AERCO

BENCHMARK

HIGH-EFFICIENCY BOILERS

eco technology

25 YEARS 1987 - 2012
Condensing Firetube Designs

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Condensing Firetube Designs

AERCO. The benchmark of high-efficiency for 25 years.

AERCO introduced condensing firetube designs to the commercial marketplace 25 years ago, raising the standard in hydronic heating. While other companies have attempted to develop similar designs, only AERCO has decades of experience, making its condensing, fully modulating boilers the standard by which all others are measured.

The Benchmark boiler family re-affirms AERCO's leadership. Having the longest, proven performance record of any condensing, modulating boiler, Benchmark delivers unparalleled cost savings, efficiency benefits, and design advantages. With the introduction of re-designed 3 million BTU/hr and revolutionary 6 million BTU/hr models, AERCO once again raises the bar.

r Wins
aler Design Award.

First boiler manufacturer to achieve
ty confirmation of performance
y (UL).

2008

Benchmark 1.5 Million BTU/hr. boiler introduced; Benchmark 1.5 Low NOx condensing boiler selected by *Buildings* as a Editors' Choice Top Product Pick; Benchmark 2.0 Low NOx boiler earns Readers' Choice Award from *ED+C* and *Sustainable Facility*.

2011

Benchmark 750 and 1000 with O_2 Monitoring introduced.

2012

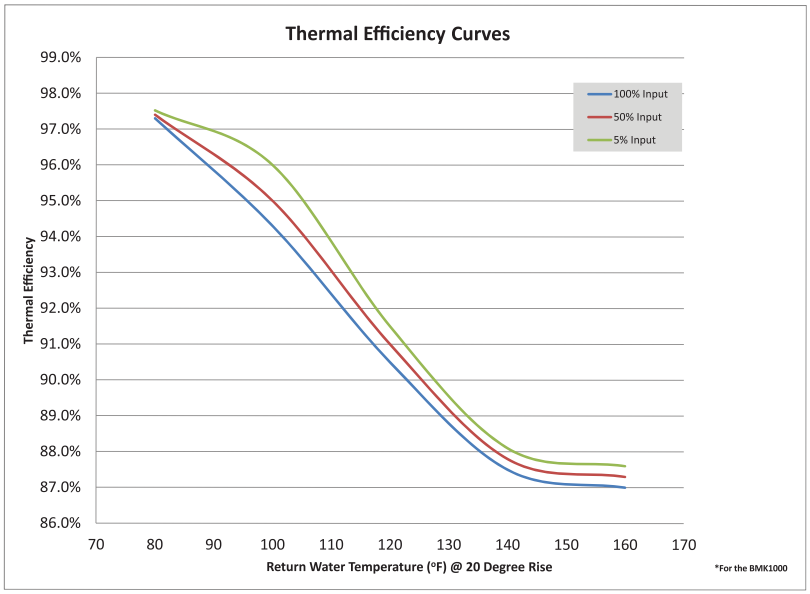
Introduction of the Benchmark 3000 and 6000 with O_2 Trim, patent pending.

- Available in six models ranging from 750,000 BTU/hr to 6 million BTU/hr
- High Efficiency – up to 99%
- Stainless Steel Firetube Heat Exchanger
- Low NOx and CO Emissions
- Small Footprint
- Installation Flexibility
- Serviceability
- Designed and Manufactured in the USA

AERCO

LEADER IN HIGH EFFICIENCY

High efficiency has become a buzz term in recent years but it is a philosophy at AERCO. Since the first Benchmark boiler was installed in 1997, it has set the gold standard for high efficiency.



Benchmark Model Numbers As Approved and Listed on the AHRI Directory	Thermal Efficiency, 100% Input • (High Fire) 100°F Temperature Differential • (80°F to 180°F)
BMK750	95.6 %
BMK1000	96.8 %
BMK1.5	95.4 %
BMK2.0	91 %
BMK3000	93.5 %
BMK6000	92.5 %

Reliability

First introduced in 1997, the Benchmark boiler is among the oldest high-efficiency products available in the U.S. The market leader for the last decade, several thousand Benchmark units have been installed throughout North America and have continued to operate flawlessly season after season.

Their performance proven reliability can be credited to:

• **Superior Construction Materials –** A new 439 stainless steel heat exchanger offers even longer life and improves longevity with a simplified design that has only two moving parts.

• **Advanced Design and Components –** AERCO's patented air/fuel delivery system and fully modulating burner reduces cycling losses, as well as wear and tear.

• **Warranty –** AERCO stands behind its products. The heat exchanger in the Benchmark boilers has a 10-year full (non-prorated) warranty.

INSTALLATION ADVANTAGES

Venting Versatility

Benchmark products provides a number of venting options. Sidewall, through-the-roof, and sealed combustion capabilities (direct-vent), approved for venting with PVC, CPVC, Polypropylene, or AL29-4C materials, are all available and provide broad installation flexibility and savings.

Space-saving Design

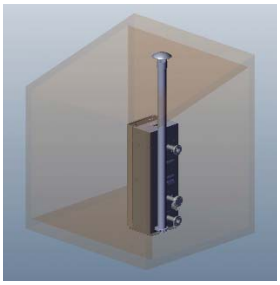
All Benchmark products are delivered as a single, fully assembled unit. Its small footprint, doorway size, and quiet operation make it ideal for both new construction and retrofit applications. Our new Benchmark 6000 model is the most compactly designed 6 million BTU/hr boiler in the market. No one is even close. A re-designed Benchmark 3000 model is 22% smaller than earlier generations.

Zero Side Clearance

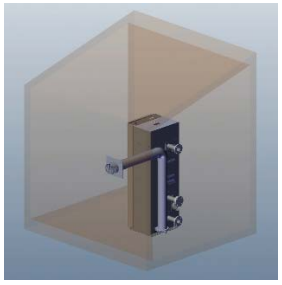
The redesigned Benchmark can be serviced via the front or top of the boiler, as well as the side. This flexibility allows units to be configured side-by-side.

BMK 3000 Shown

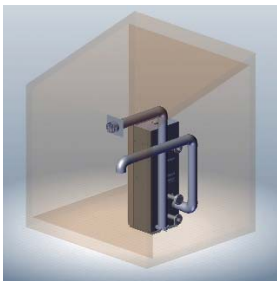
Vent Configurations



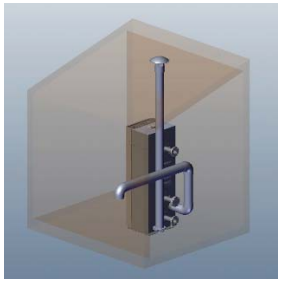
Vertical vent/room air



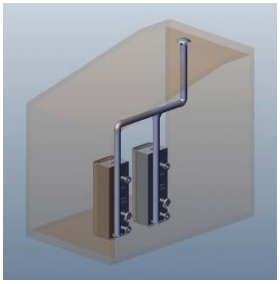
Sidewall vent/room air



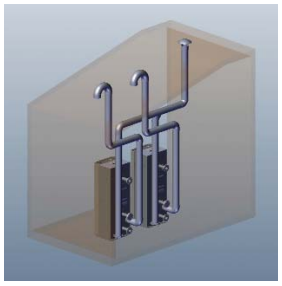
Direct-vent



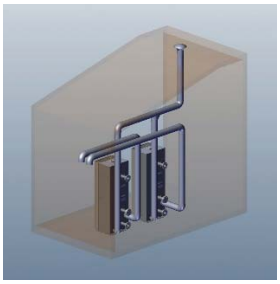
Vertical vent/sidewall air



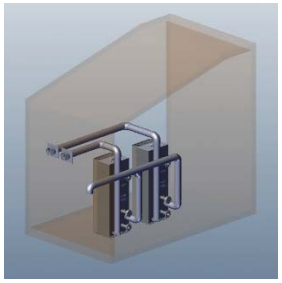
Common vertical vent/ room air



Common vertical vent/ individual vertical air



Common vertical vent/ individual sidewall air



Individual sidewall vent/ common sidewall air

ENVIRONMENTAL

The Greenspec® Listed Benchmark boilers are perfect for "green" designs. Their small footprint, flexible venting/piping options, high efficiency, and lower operating costs can help facilities earn LEED points. Benchmark has been designed with environmental advantages:

- **O_2 monitoring system* –** Benchmark units are available with AERCO's proprietary O_2 monitoring system, which displays the oxygen level directly on the C-More controller in real time. It can be monitored via Modbus, so customers can measure emission levels and fuel combustion efficiency to maximize fuel economy.

*Note- Optional on BMK750, BMK1000 and Standard on BMK3000 and BMK6000

- **Low NOx burner –** Benchmark boilers are fitted with a low NOx burner whose emissions consistently meet the highest regulatory standards. Ultra low NOx (9 ppm or less) calibrations are available.**

**See tech data sheets for model specs.

Advanced Controls

C-More

Efficiency and operation is further optimized via the C-More Touch Screen Control System. Intuitive, advanced, and simple to operate, C-More combines temperature and operating controls, combustion safeguards and fault enunciator functions – all at your fingertips! Benefits include:

- User-friendly touch screen (optional)
- Simplifies diagnostic troubleshooting
- Full integration with BAS and EMS systems
- Supports remote monitoring and control

Ensures fail-safe boiler operation (if external building controls fail).

Remote Data Collection

AERCO's remote data collection continually monitors the internal operations of your AERCO equipment, scanning performance parameters and potential fault risks. This information, transmitted via Internet, is collected and evaluated at our data center. Our data center has the capability to monitor performance trends and fault occurrences. Future capabilities include early warnings before faults occur and email alerts to the user.*

*Consult AERCO if you are interested in the benefit of remote monitoring service.

AT A GLANCE

Benchmark 750 (BMK750) and Benchmark 1000 (BMK1000)

Features:

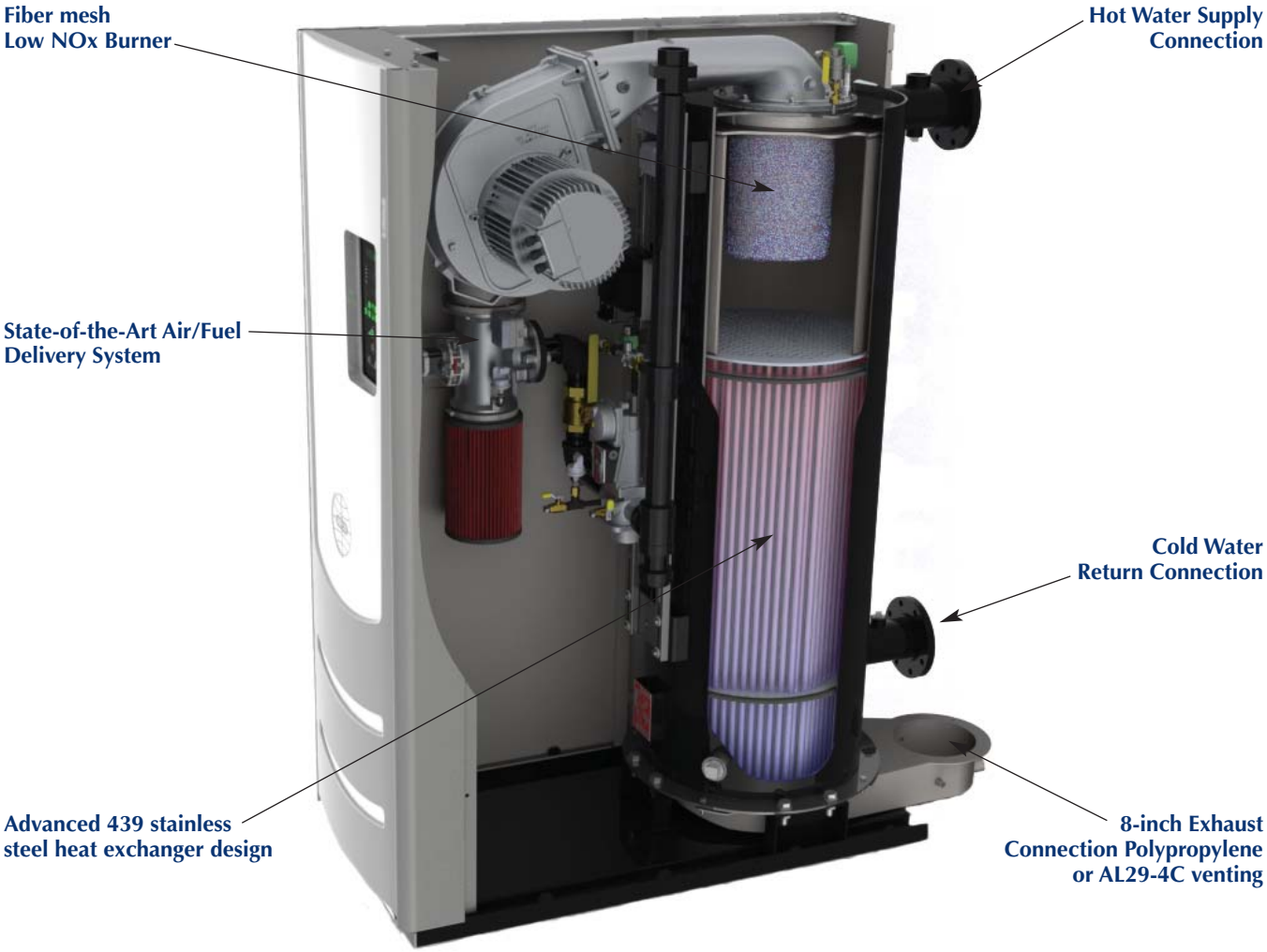
- BMK 750 – 15:1 Turndown Ratio (7%)
- BMK 1000 – 20:1 Turndown Ratio (5%)
- Oxygen Level (O_2) Monitoring (optional)
- Stainless Steel Firetube Heat Exchanger
- Capable of variable primary flow installations
- NOx Emissions 20 ppm or less at all firing rate
- 9 ppm optional calibration
- Compact Footprint (25"D x 28"W x 78"H)
- High and Low Temperature System Return Connections
- Sealed Combustion Capable
- Acceptable vent materials AL29-4C, Polypropylene, CPVC, and PVC

AT A GLANCE

Benchmark 3000 (BMK3000)

Features:

- Natural Gas
- 15:1 Turndown Ratio (7%)
- Oxygen Level (O_2) Monitoring
- Stainless Steel Firetube Heat Exchanger
- Capable of variable primary flow installations
- NOx Emissions 30 ppm or less at all firing rates
- Compact Footprint (78"H x 28"W x 56"D)
- Sealed Combustion Capable
- Acceptable vent materials AL29-4C, Polypropylene

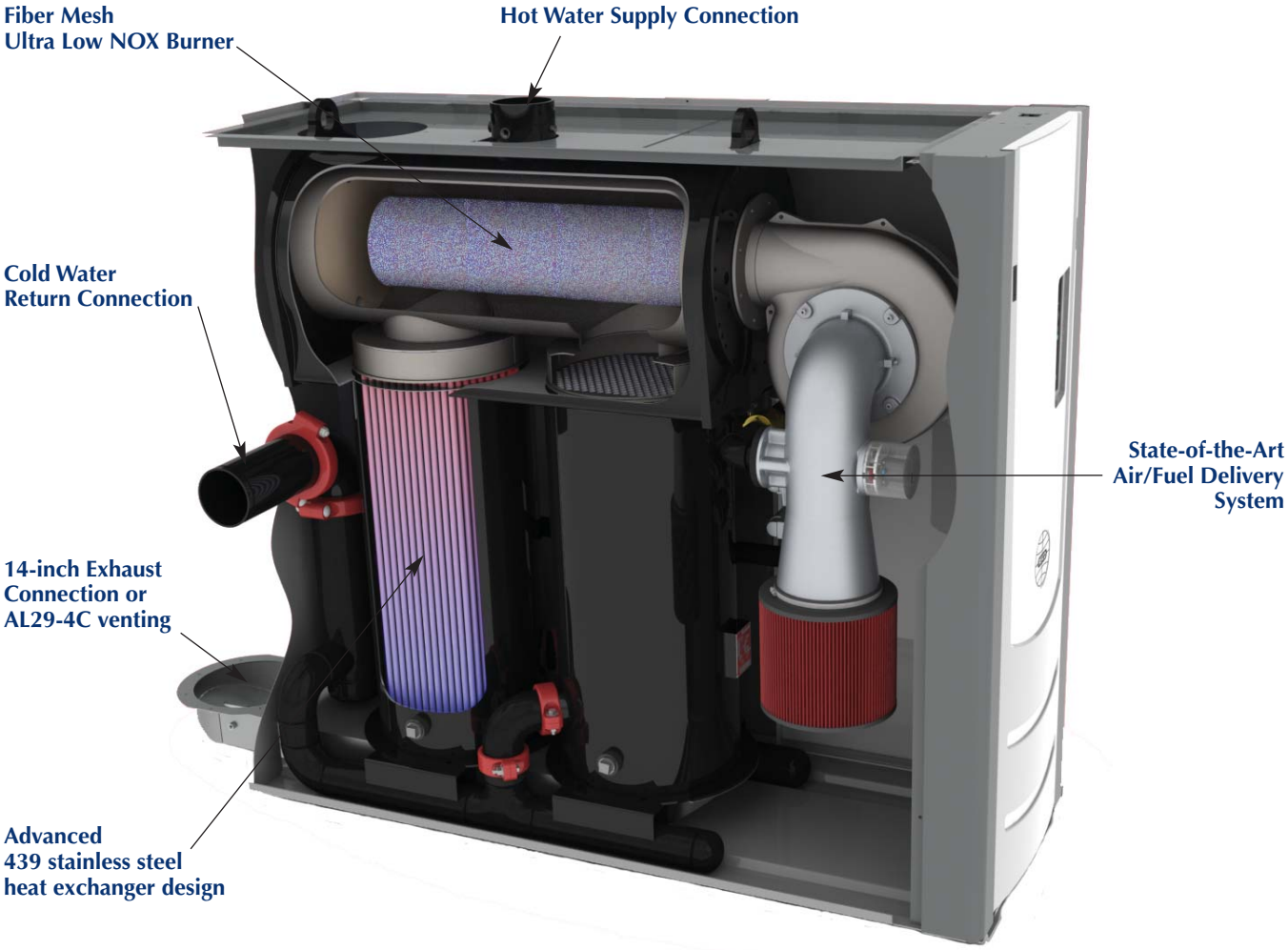


AT A GLANCE

Benchmark 6000 (BMK6000)

Features:

- Natural Gas
- 15:1 Turndown Ratio (7%)
- Oxygen Level (O_2) Monitoring
- Stainless Steel Firetube Heat Exchanger
- Capable of variable primary flow installations
- NOx Emissions 20 ppm or less at all firing rates
- Compact Footprint (78"H x 34"W x 88"D)
- Sealed Combustion Capable
- Acceptable vent materials AL29-4C



ACCESSORIES

AERCO Control System (ACS)

Strongly recommended to maximize modular heating plant efficiency, AERCO Control System (ACS) offers remote access and control of multiple boiler installations and is compatible with Building Automation Systems via Modbus open protocol or conventional analog systems.

Boiler Valve Control

Designed for variable flow heating systems, the AERCO Boiler Valve Controller automatically sequences each motor operated valve* (MOV) – reducing the system's minimum flow requirement to a single boiler's minimum flow. For example, a four BMK2.0LN installation without MOV requires 4 x 25 = 100 gpm minimum system flow, while the same installation with MOVs and the AERCO Boiler Valve Controller will only require 25 gpm minimum system flow. When system demand is satisfied, the Boiler Valve Controller opens all MOVs, preventing system pump dead head conditions.

Motorized Valves

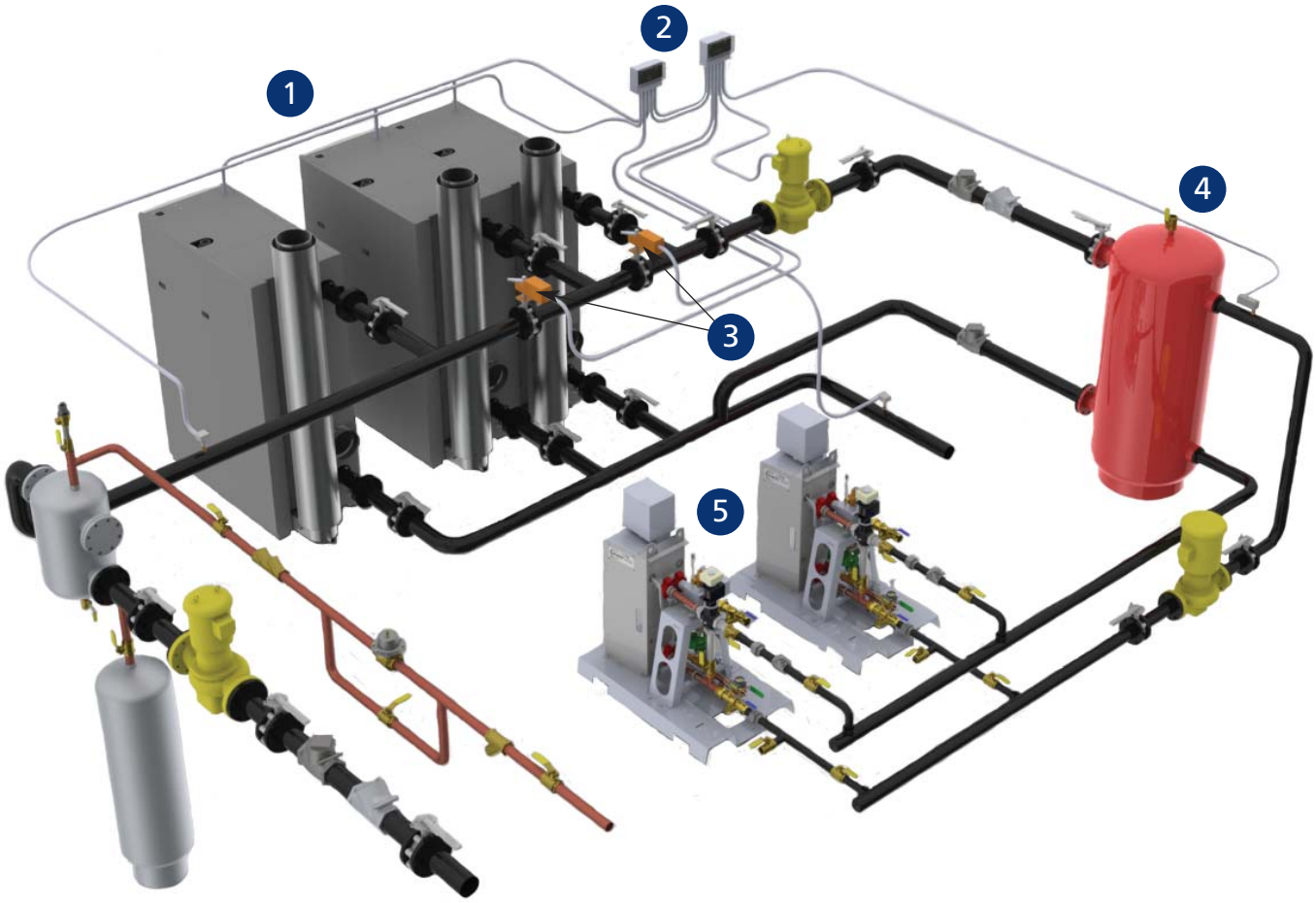
The Belimo F6...HDU Series 2-way butterfly valves are designed to meet the needs of HVAC and commercial application requiring bubble tight shut-off for liquids. Typical applications include boiler isolation, chiller isolation, cooling tower isolation, change-over systems, air handler coil control, bypass and process control applications.

AERCO Protonode/Gateways

AERCO offers a multi-protocol, communications gateway to support integration with customers' building control and energy management systems. The plug-n-play package supports integration with BACnet/IP, BACnet MS/TP, LonWorks, and Johnson Controls Metasys N2 systems. AERCO's Communications Gateway is available for all AERCO boilers, *water heaters and electronically controlled indirect systems.

Sample Installation

1. Benchmark 3000
2. AERCO Control System (ACS) and ACS Relay Panel
3. Motorized Valves
4. Buffer Tank
5. SmartPlate



BENCHMARK SPECIFICATIONS

	750	1000	1.5
Adjustable Temperature Control	50°F to 190°F	50°F to 190°F	50°F to 190°F
Ambient Temperature	0°F to 130°F	0°F to 130°F	0°F to 130°F
Accuracy	+/-4°F	+/-4°F	+/-4°F
Input	750,000 BTUH (Natural Gas)	1,000,000 BTUH (Natural Gas)	1,500,000 BTUH (Natural Gas)
Net Output	697,000 BTUH (Natural Gas)	930,000 BTUH (Natural Gas)	1,395,000 BTUH (Natural Gas)
Turndown Ratio	15:1	20:1	20:1
Flue Size	6" Diameter	6" Diameter	6" Diameter
Flue Material (per local code)	PVC, CPVC, PP or AL29-4C	PVC, CPVC, PP or AL29-4C	AL29-4C
Water Inlet and Outlet	3" 150# Flange	3" 150# Flange	3" 150# Flange
Gas Connection	1" NPT Male	1" NPT Male	1.5" NPT Male
Gas Pressure Requirements	14" WC Maximum, 4" WC Minimum at Full Load	14" WC Maximum, 4" WC Minimum at Full Load	14" WC Maximum, 4" WC Minimum at Full Load
Min/Max Water Flow	25-150 GPM	25-150 GPM	25-225 GPM
Condensate Connection	3/4" NPT Female	3/4" NPT Female	3/4" NPT Female
Maximum Condensate Flow	6 GPH	8 GPH	9 GPH
Pressure Rating	160 PSIG at 210°F	160 PSIG at 210°F	160 PSIG at 210°F
NOx Emissions Certifcations	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ
Standard Listing and Approvals	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME
Gas Train Options	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)
Electrical Requirements	120/1/60 20 AMP (9 AMP FLA)	120/1/60 20 AMP (9 AMP FLA)	120/1/60 20 AMP (13 AMP FLA)
Water Pressure Drop at 20° delta T	1.5 psi	3 psi	4 psi
Water Volume	16.25 gallons	14.25 gallons	27 gallons
Weight, Installed	669 lbs. (dry), 802 lbs. (wet)	700 lbs. (dry), 817 lbs. (wet)	1,533 lbs. (dry), 1,757 lbs. (wet)

BENCHMARK SPECIFICATIONS

	2.0	3000	6000
Adjustable Temperature Control	50°F to 190°F	50°F to 190°F	50°F to 190°F
Ambient Temperature	0°F to 130°F	0°F to 130°F	0°F to 130°F
Accuracy	+/-4°F	+/-4°F	+/-4°F
Input	2,000,000 BTUH (Natural Gas)	3,000,000 BTUH (Natural Gas)	6,000,000 BTUH (Natural Gas)
Net Output	1,820,000 BTUH (Natural Gas)	2,790,000 BTUH (Natural Gas)	5,580,000 BTUH (Natural Gas)
Turndown Ratio	20:1	15:1	15:1
Flue Size	8" Diameter	8" Diameter	14" Diameter
Flue Material (per local code)	AL29-4C	PP or AL29-4C	AL29-4C
Water Inlet and Outlet	4" 150# Flange	4" 150# Flange	6" Victaulic with 150# Flange option
Gas Connection	2" NPT Male	2" NPT Male	2" NPT Male
Gas Pressure Requirements	14" WC Maximum, 4" WC Minimum at Full Load	14" WC Maximum, 4" WC Minimum at Full Load	2 PSI Maximum, 20" WC Minimum at Full Load
Min/Max Water Flow	25-350 GPM	25-375 GPM	75-600 GPM
Condensate Connection	3/4" NPT Female	1.5" Male	1.5" Male
Maximum Condensate Flow	10 GPH	20 GPH	40 GPH
Pressure Rating	160 PSIG at 210°F	160 PSIG at 210°F	80 PSIG at 210°F
NOx Emissions Certifcations	SCAQMD, TCEQ	SCAQMD, TCEQ	SCAQMD, TCEQ
Standard Listing and Approvals	UL, CUL, ASME	UL, CUL, ASME	UL, CUL, ASME
Gas Train Options	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)	FM Compliant or Factory Installed, Double Block and Bleed (Formerly IRI)
Electrical Requirements	120/1/60 20 AMP (15 AMP FLA)	208-230/3/60 20 AMP (10 AMP FLA) 460-230/3/60 15 AMP (5 AMP FLA)	208-230V/3/60 30 AMP (16.3 AMP FLA) 460/3/60 15 AMP (7.3 AMP FLA)
Water Pressure Drop at 20° delta T	1.7 psi	3 psi	4 psi
Water Volume	24 gallons	80 gallons	110 gallons
Weight, Installed	1,450 lbs. (dry), 1,650 lbs. (wet)	1,700 lbs. (dry), 2,364 lbs. (wet)	3,000 lbs. (dry), 3,920 lbs. (wet)

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