MFC

Multi-Fuel Condensing Hydronic Boilers

AERCO.com

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AERCO's First Multi-Fuel Condensing Hydronic Boiler

The Multi-Fuel Condensing Hydronic Boiler (MFC) has the capability to be fired with multiple fuels including natural gas, propane or #2 fuel oil (as back-up). It's an ideal boiler for the healthcare market, military bases, emergency shelters, industrial operations, and any other market sector or project that typically requires a back-up fuel.

The series is available in six models from three-ten million BTU/hr capacities. It is designed for a condensing application in any closed loop hydronic system and features a proven 4-pass fire tube heat exchanger designed for maximum heat transfer and efficiency. The heat exchanger is extremely durable built with a combination of high quality carbon steel and 316Ti stainless steel. In particular, the 316Ti SS construction in its 4th pass offers superior corrosion resistance against acidic flue gas condensation.

Fitted with industry-leading power burners (Riello), the MFC's emissions are extremely low while its fully modulatingcapability delivers greatly increased energy efficiency, longevity, and reliability.

The MFC is constructed of the highest quality material optimizing its performance and minimizing maintenance. Its standard dual returns not only provide greater flexibility in each application, but also optimize your plant's efficiency with lower water return temperatures. This MFC feature coupled with its highly reliable heat exchanger and energy savings, allows you to experience a greater ROI.

Key Features and Benefits

- Natural gas, propane, or dual fuel (#2 fuel oil backup)
- Full condensing on natural gas/propane
- Condensing capability on #2 fuel oil (<15 ppm sulfur content)
- Up to 5:1 turndown ratio (20%) when firing on natural gas or propane
- High quality combined carbon steel/316Ti SS 4-pass fire tube heat exchanger
- Capable of variable primary flow installations
- NOx emissions capable of 40 PPM or less @ all firing rates when firing on natural gas
- Dual return water connections
- Precise temperature control
- Industry-leading power burner (Riello)
- Ducted combustion air capable
- Easy serviceability
- Acceptable vent materials AL29-4C
- Controls 0ptions:
  - Constant setpoint
  - Indoor/outdoor reset
  - Remote setpoint (via Modbus)
  - 4-20mA modulating control

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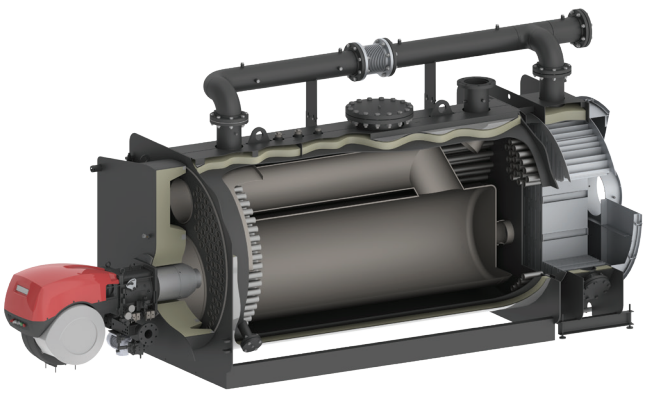


Superior Efficiency

The MFC delivers a high operating efficiency of up to 94.2%. With its proven 4-pass fire tube heat exchanger and high-quality construction, the MFC is designed to maximize heat transfer and efficiency giving your plant the best in reliability and performance.

Ultra-durable heat exchanger – the 316Ti stainless steel construction in the heat exchanger's 4th pass promotes continuous condensation while offering superior corrosion-resistance against acidic flue gases.

Dual returns – standard dual returns not only provide greater flexibility in each application, but can also optimize your plant's efficiency with lower water return temperatures for greater ROI on energy costs, including up to 10% savings on seasonal efficiency.

Operating flexibility –The heat exchanger's maximum working temperature of 240˚F allows for greater operating temperature range and meets the requirements of higher temperature applications when necessary, but also allows for the building to reset water temperature for condensing in the shoulder months.

High-performing burner – the Riello burner is a world-class burner well-known for its high quality, superior performance, low energy consumption and high-combustion efficiency.

Ratings

Model Number	Min Input MBH[a]	Max Input MBH	Max Output MBH[b]	Efficiency Range
MFC 3000	600	3000	2580-2790	85.5%-94.2%
MFC 4000	800	4000	3440-3720	85.5%-94.2%
MFC 5000	1000	5000	4300-4650	85.5%-94.2%
MFC 6000	1200	6000	5160-5580	85.5%-94.2%
MFC 8000	1600	8000	6880-7440	85.5%-94.2%
MFC 10000	2000	10000	8600-9300	85.5%-94.2%

a Values based on natural gas/propane firing b Max output dependent upon application - See efficiency curves

Environmental Stewards

From its high efficiency, condensing capabilities and its low emission burner to its soon-to-be-realized ability to use renewable fuels, the MFC reduces carbon footprint while delivering worry-free reliability and performance.

Low emissions – The MFC Series is fitted with industry-leading power burners whose emissions will meet most stringent NOx and CO requirements. The fully modulating burner also maintains AERCO standards for energy efficiency, longevity, reliability and construction quality. NOx emissions capable of 40 PPM or less on all firing rates when firing on natural gas.

High efficiency – the high efficiency of the MFC enables the system to burn less fossil fuel providing greater savings in energy and fewer emissions into the atmosphere.

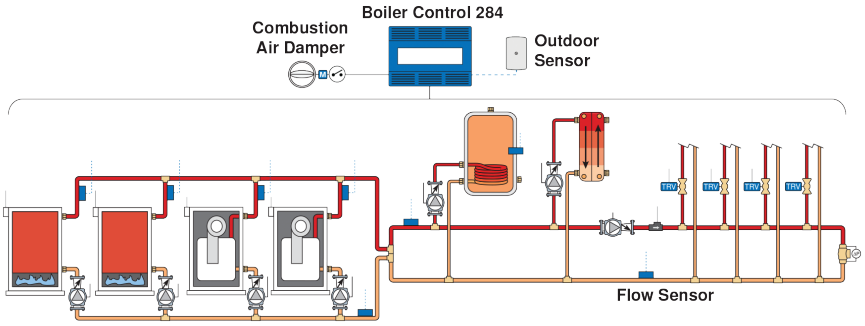
Accessories and Service Parts

AERCO 64128 Boiler Control: A Flexible Solution for Multiple Boiler Heating Plants

The Boiler Control 284 is designed to operate up to four boilers to accurately maintain a target water temperature. The 64128 operates both condensing & non-condensing boilers that are either modulating, single stage or two stage to provide a flexible, cost effective mixed boiler plant solution with better system performance. The target water temperature is based on outdoor temperature reset or a fixed setpoint for space or process heating applications. Additional loads supplied by the 64128 include domestic hot water & setpoint heating. Boiler equal run-time rotation, stand-by primary pump operation & pump exercising all increase boiler plant reliability. The 64128 communicates with a Building Automation System (BAS) using BACnet® or Modbus® for remote monitoring & adjustment capability.

Featuring the Best in Boiler Plant Control

- Control up to four boilers
- Condensing & non-condensing
- Modulating, single stage or two stage
- BACnet® or Modbus® communication
- tekmarNet® communication
- Outdoor temperature reset
- Boiler isolation valves (spring return, normally open/fail open type).
- Primary pump sequencing
- Domestic hot water priority
- Setpoint operation
- Energy, flow & pressure monitoring
- Combustion air damper control
- Programmable schedules

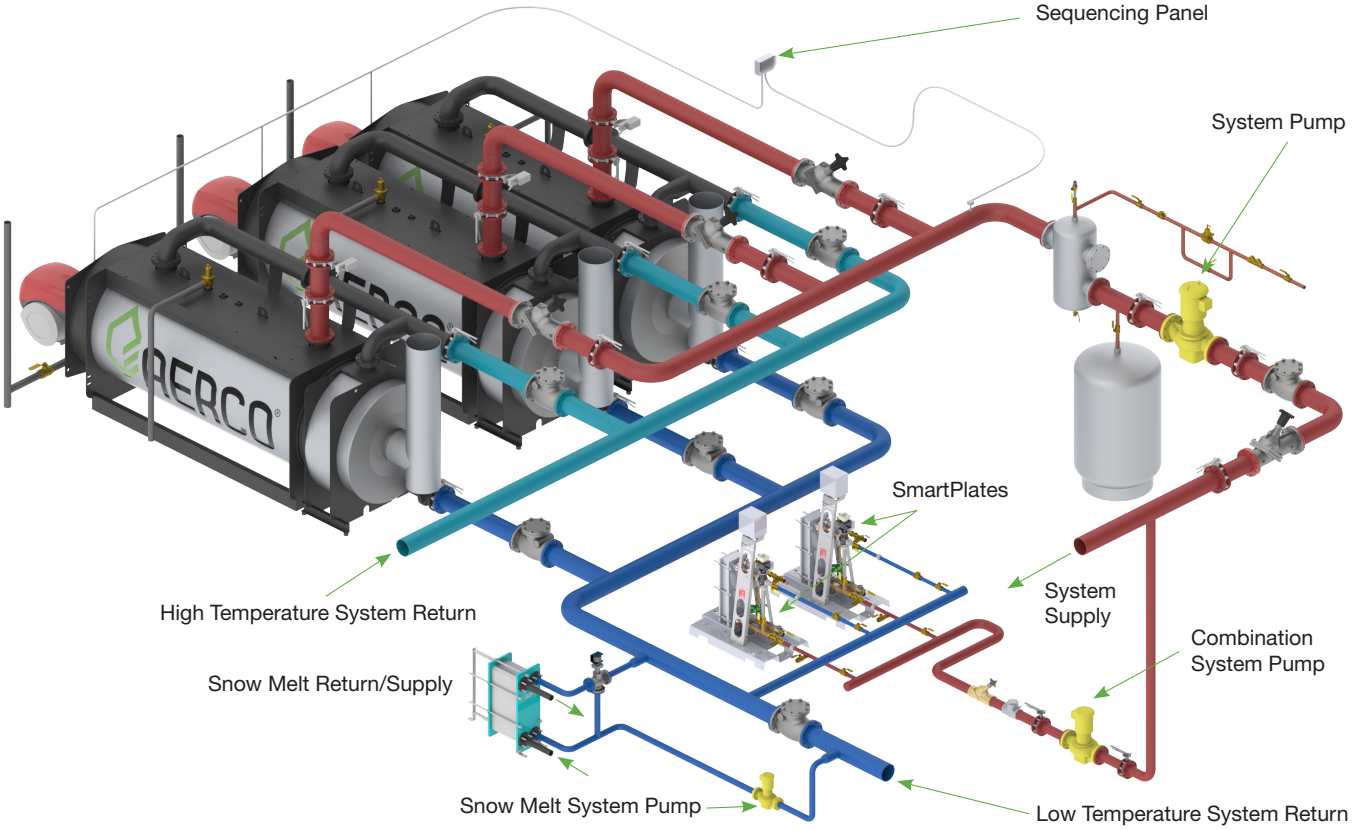


Condensate Neutralizer Kit

AERCO Condensate Neutralizers are ideal for neutralizing condensate from condensing boilers and furnaces operating on natural gas or propane.
The condensate is acidic and has the potential to harm the environment and the sewer system. The AERCO Condensate Neutralizer will raise the pH of the condensate to a more neutral level before it is discharged to drain.

Installation Solutions

Below is an example of an MFC installation at a hospital. This installation uses an MFC boiler for space heating, a SmartPlate for domestic hot water and a dual return, and a snow melt system to optimize efficiency (and safety) of patients, hospital staff and visitors.



Multiple Applications

Markets

Because the MFC offers duel fuel flexibility and has the capability to be fired with multiple fuels including natural gas, propane or #2 fuel oil as back-up, it is ideal for projects and applications that typically require a back-up fuel including:

- Healthcare
  Hospitals, Dialysis centers, Ambulatory care
- Education
- Government
  Military bases, Law enforcement facilities
- Emergency shelters
- Industrial

Single Unit or Modular Arrangements

The MFC Series is also flexible in how it's applied to a site - it can be used as an individual unit or in modular arrangements that offer selectable modes of operation. In addition to controlling the boiler according to a constant set point, indoor/outdoor reset schedule or 4-20mA modulating control, one or more units can be integrated via Modbus communications protocol.

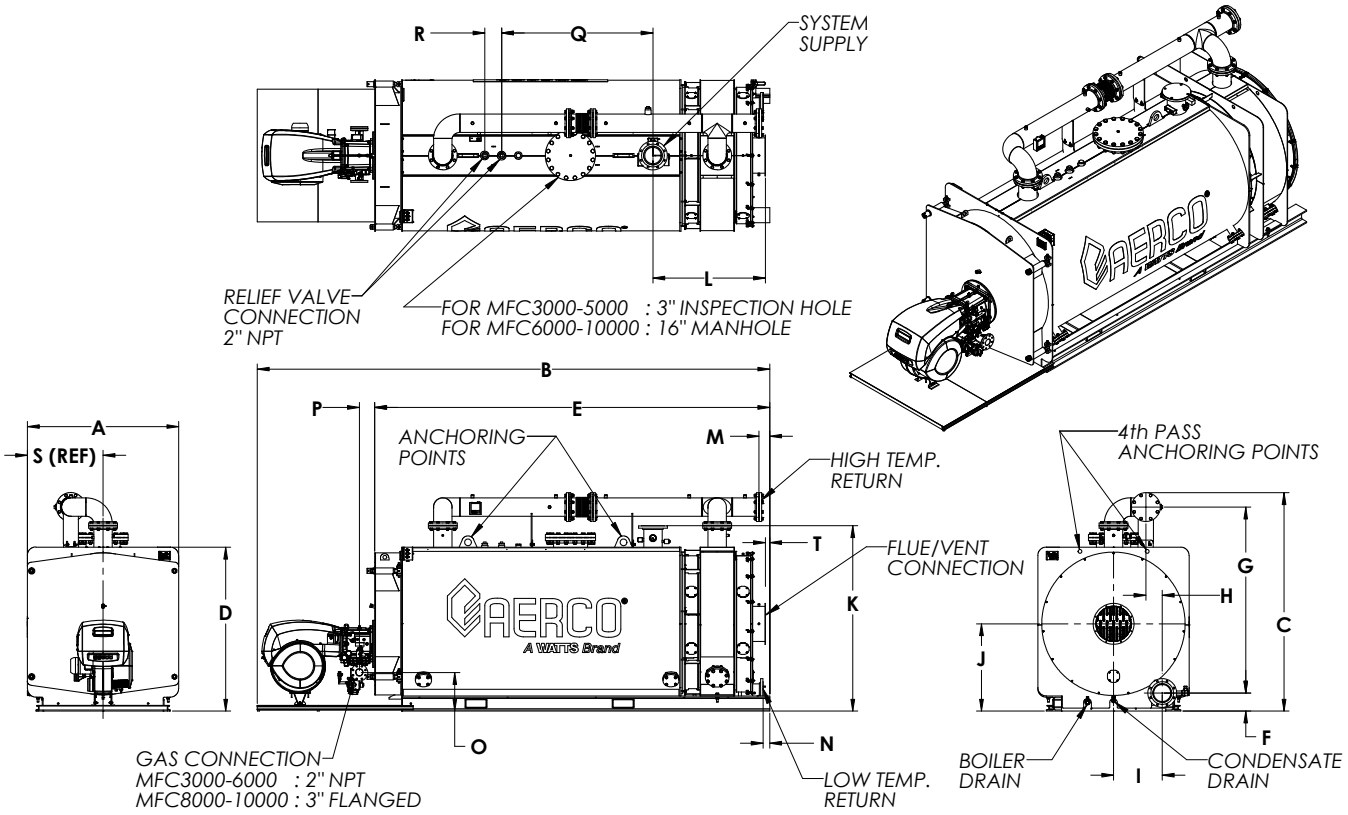
For boiler plants containing two or more boilers, AERCO offers an available sequencing controller designed to optimize plant efficiency. Alternatively, MFC systems can be easily integrated with a facility-wide Energy Management or Building Automation System.

Dimensions

Model	A (Width)	B (Length)	C (Height)	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S (REF)	T
MFC 3000	54.3”	171.5”	84.0”	63.0”	128.3”	6.6”	72.9”	0.6”	12.6”	35.2”	73.0”	48.9”	7.1”	2.6”	18.1”	6.5”	27.6”	6.9”	27.2”	2.1”
MFC 4000	58.7”	174.1”	88.3”	66.1”	130.9”	7.3”	75.4”	4.5”	16.2”	36.2”	76.2”	48.9”	5.5”	2.6”	17.3”	6.5”	27.6”	6.9”	29.3”	2.1”
MFC 5000	58.7”	186.3”	88.3”	66.1”	143.1”	7.3”	75.4”	4.5”	16.2”	36.2”	76.2”	49.3”	5.5”	2.6”	17.3”	6.5”	35.6”	6.9”	29.3”	2.1”
MFC 6000	70.9”	188.9”**	101.1”	76.8”	145.7”	8.5”	87.1”	3.1”	22.8”	40.9”	86.8”	50.3”	6.5”	**	21.1”	6.5”	53.2”	6.7”	35.4”	2.1”
MFC 8000	70.9”	220.4”	102.3”	76.8”	165.4”	8.5”	87.1”	7.8”	22.8”	40.9”	86.8”	53.8”	5.0”	3.1”	18.1”	7.2”	55.9”	7.1”	35.4”	2.1”
MFC 10000	70.9”	240.0”	102.3”	76.8”	185.0”	8.5”	87.1”	7.8”	22.8”	40.9”	86.8”	52.7”	5.0”	3.1”	18.0”	7.2”	70.9”	7.9”	35.4”	2.1”

*Dimensions and information for #2 fuel oil connections can be found in MFC Series O&M Manual GF-148.
**MFC 6000 includes an 8”x6” reducer. The reducer goes past the frame 4”.

MFC 3000-10000



Specifications

	MFC 3000	MFC 4000	MFC 5000	MFC 6000	MFC 8000	MFC 10000
Boiler Category	ASME Sect. IV					
Max. Allowed Working Pressure	80 PSIG					
Max. Working Temperature	240°F					
Gas Connections (NPT)	2”	2”	2”	2”	3” (Flange)	3” (Flange)
Oil Connections	.375”	.375”	.5”	.5”	.5”	.5”
Max. Gas Pressure	1 psi	1 psi	1 psi	2 psi	2 psi	2 psi
Min. Gas Pressure [1]	14”	14”	14”	1 psi	1 psi	1 psi
Max. #2 Fuel Oil Consumption Flow Rate (GPH)	21.4	28.6	35.7	42.9	57.1	71.4
#2 Fuel Oil Supply Flow Rate (GPH)	85	150	150	150	218	218
Electrical Req. 208V/3PH/60Hz [2, 3]	11.4 FLA	16.8 FLA	16.8 FLA	16.8 FLA	25.8 FLA	25.8 FLA
Electrical Req. 460V/3PH/60Hz [2, 3]	5.8 FLA	7.6 FLA	7.6 FLA	7.6 FLA	11.7 FLA	11.7 FLA
Electrical Req. 575V/3PH/60Hz [2, 3]	4.5 FLA	6.2 FLA	6.2 FLA	6.2 FLA	10.2 FLA	10.2 FLA
Water Connections (Flanged)	4”	6”	6”	6”	8”	8”
Dual Return Water Connections						
Min. Water Flow (GPM)	0	0	0	0	0	0
Max. Water Flow (GPM)	350	520	610	750	1000	1100
Water Volume Gallons	407	464	518	724	898	1043
Water Pressure Drop	2.4 PSIG @300GPM	1 PSIG @400GPM	1.3 PSIG @500GPM	1.9 PSIG @600GPM	1.1 PSIG @800GPM	1.7 PSIG @1000GPM
Turndown (Nat.Gas/Propane)	Up to 5:1 (20%)					
Turndown (#2 Fuel Oil)	Up to 3:1 (33%)					
Vent/Air Intake Connections [4]	12 Inch	12 Inch	12 Inch	16 Inch	16 Inch	16 Inch
Vent Materials	AL29-4C					
Type of Fuel	Natural Gas, Propane, #2 Fuel Oil (backup)	Natural Gas, Propane, #2 Fuel Oil (backup)	Natural Gas, Propane, #2 Fuel Oil (backup)	Natural Gas, Propane, #2 Fuel Oil (backup)	Natural Gas, Propane, #2 Fuel Oil (backup)	Natural Gas, Propane, #2 Fuel Oil (backup)
NOx Emissions on Nat. Gas	30 ppm	30 ppm	30 ppm	30 ppm	40 ppm	40 ppm
Temperature Control Range	125ºF to 230ºF					
Minimum Water Inlet Temperature[5]	100ºF					
Ambient Temperature Range	32ºF to 140ºF					
Standard Listings & Approvals	UL, CUL, CSD-1, ASME					
Gas Train Operations	FM Compliant or Double Block and Bleed (IRI)					
Weight (dry) / Shipping Weight lbs.	7,300	10,160	11,063	13,137	16,645	18,520
Weight (wet) lbs.	10,694	14,030	15,383	19,175	24,134	27,219

[1]Values are for Natural Gas FM Compliant 2” gas trains available with Riello Dual Fuel (light oil/gas) burners. Additional gas train sizes with added gas pressure ranges are available. Consult factory or see MFC Series Gas/Oil Components & Supply Design Guide GF-148-G for additional model gas train minimum gas pressure requirements.

[2]See MFC Electrical Power Guide GF-148-E for Service Disconnect Switch amperage requirements.

[3]Values are for Riello Dual Fuel (light oil/gas) RLS 120-300 models. Consult MFC Electrical Power Guide GF-148-E for additional model and power requirements.

[4]See Venting Guide GF-148-V for minimum exhaust vent diameters. Ducted combustion air connections available on MFC 3000 models.

[5]See MFC Applications Guide GF-148-B for corresponding turndown.

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