High Efficiency Boilers & Water Heaters

XTherm®

ULTRA HIGH EFFICIENCY

Models
1005, 1505, 2005

Up to 99% thermal efficiency!

Xtreme performance powered by

Raypak®
A Rheem® Company

Xtreme Performance

Up to 99% thermal efficiency!

Raypak's Next Generation Condensing Modulating Heater

Time-honored technologies unite with cutting-edge advancements in Raypak's new XTherm® modulating vertical heater. Never before has a vertical heater provided both the installer and building owner such installation flexibility, ease-of-commissioning, reliability and long-term performance. Small space, not a problem. The XTherm has one of the smallest installed footprints of any vertical condensing heater. Our compact design makes it the perfect choice for those hard to reach retrofit projects. Raypak's XTherm is built with commercial-grade components and materials. From our steel channel base to our stainless steel flue wrapper, and secondary heat exchanger, you can tell the XTherm is built to last. It's easy to handle and install, but still user friendly to service. Now is the perfect time to take a closer look at Raypak.

Flexibility

Industry-leading vent length allowances afford greater vent location options, thus reducing wasted space. Vent versatility is further enhanced by the self-tuning combustion system which compensates for unusual chimney and vent configurations.

Category IV -CSA-certified 96% efficiency at full fire for hydronic boilers and 97% for domestic hot water heaters *(Up to 99% at part load!)* When the job requires high efficiency, XTherm meets your needs.

At the heart of every Raypak XTherm is a unique integral evaporator system - the first defense against condensation in the primary heat exchanger. Raypak's evaporator system collects and re-evaporates condensate which may form during initial start-up.

True Modulation

Modulation is nothing new to Raypak, we have honed our gas modulation experience for over 50 years. The Raypak XTherm will precisely track the heating load with it's built-in TempTracker Mod control, eliminating costly overshooting. Utilizing the latest European technology for the combustion-components, the optimum fuel-air ratio is maintained throughout the entire range of the load-tracking operation. Our smooth 4:1 turndown ensures efficiency is maintained throughout the firing rate and actually increases during part load, right when you want it! The XTherm automatically self-tunes to accommodate the widest range of gas supply pressures. The high quality integrated blower-gas valve is self-correcting and allows smooth operation with fluctuating gas supply pressures. The Raypak XTherm is cutting edge technology with atmospheric simplicity.

Key Features

- 3 models from 1,000,000 to 2,000,000 BTUH
- 96% thermal efficiency hydronic and 97% domestic hot water
- Minimum continuos inlet water temperature (50°F)
- Modulating gas valve and burner, up to 4:1turndown
- Small footprint, less than 11 square feet
- On-board diagnostic center, real English, no codes.
- All models indoor/outdoor certified
- Complete cabinet protects all controls and wiring
- Meets all current Low NOx regulations, including the new 2010 SCAQMD revisions
- Suitable for altitudes up to 10,000 ft. (derate above 5,000 ft.)
- Water heater models are equipped with all copper and bronze waterways.
- Boiler models are equipped with cast iron headers and pumps with the option to upgrade to bronze. All other waterway plumbing is copper.
- 0-10 VDC Remote set point BMS Interface
- 0-10 VDC Direct Drive

Think Green

Think Raypak

1. Low Voltage Wiring Terminal
Up front and easy to get to. Makes sensor wiring and BMS wiring simple and clean.

2. On Board Diagnostic Center
Factory-mounted standard equipment. Gives relevant service feedback as well as possible solutions to clear the fault. All in plain english, no cryptic codes to decipher. The control also stores up to 16 fault codes in its history file for the service technician to review.

3. TempTracker Mod Controller
Standard equipment on the XTherm. This factory-mounted multi-function control delivers precise load-tracking with selectable mode displays that are easy to access and read.

4. Combustion Air Fan
Cast aluminum, non-sparking construction. The state of the art variable speed fan is controlled by the TempTracker Mod and works in smooth harmony with the main gas valve.

5. Dungs Gas Valve
The XTherm uses a state-of-the-art main gas valve manufactured in Germany. This precision gas valve works in perfect unison with the combustion air fan. The result is silky smooth light-offs and a 4:1 turn down.

6. Flow Switch
Monitors water flow and provides safe shut down if water flow drops below the minimum required.

7. Vent Pressure Switch
Monitors vent pressure and provides safe shut down if back pressure is excessive.

8. Gas Inlet
The XTherm will operate at 100% full rate with gas pressures as low as 4.0"w.c.

9. Boiler Pump
Sometimes referred to as the primary pump. This pump keeps flow through the heat exchanger.

10. Water Outlet

11. Water Inlet
The XTherm can accept 50°F continuous inlet water temperature.

12. Cold Water Run Pumps
The XTherm comes factory equipped with a built in Cold Water Run system. This advanced water control system keeps the inlet water temperature to the primary heat exchanger above 120°F, regardless of the incoming water temperature. It constantly self adjusts and regulates the incoming water flow while still maintaining a constant delta-T in the heat exchanger.

13. Flue Outlet
Stainless steel Category IV compatible.

14. Stainless Steel Secondary Heat Exchanger
Recovers waste heat to boost efficiency into 96%+ range. The XTherm utilizes a separate high-grade stainless steel heat exchanger. This allows the corrosive combustion condensate to be collected safely without damaging the heater. There is a condensate disposal connection on the rear of the heater. The XTherm is also equipped with a condensate switch that will sense a blocked condensate drain, which protects the heater.

15. Vertical Heat Exchanger
Cylindrical, multi-pass heat exchanger captures all radiant energy, eliminating the need for heavy refractory.

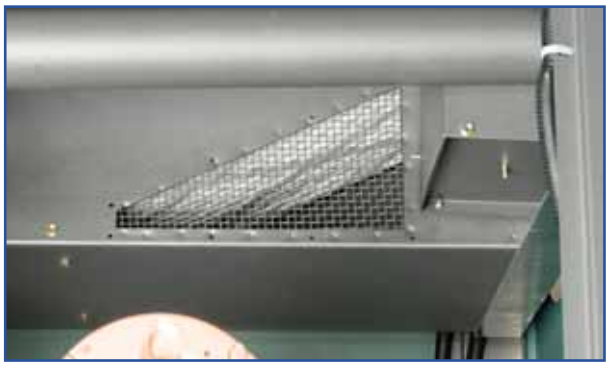
16. Drain Valve
One of two drain valves located at the bottom of the heat exchanger. A third drain valve is located on the secondary heat exchanger. This allows for complete winterizing and drainage of the heater.

17. Viewing Port
Allows for easy burner inspection.

18. Weather-Proof Jacket
Heavy gauge galvanized steel with a UV-resistant Polytuf powder coat finish is impervious to weather and corrosion.

Xtreme Versatility

Can be installed indoor or outdoors!



Internal Air Intake

1. High Voltage Wiring Box
120VAC connections.

2. Removable Air Filter
Easy access and easily removable for inspection and replacement. 12"x20"high capacity filter is rated MERV 8.

3. Direct Vent Capability
Every XTherm is direct vent capable. By installing an optional vent pipe adapter and air plenum plug, your XTherm is ready for direct vent.

3a. Outdoor Cover
If your job requires outdoor installation, an optional air vent plug easily screws on to cover the direct vent air intake. The combustion air will then be drawn from inside the heater through screened plenum openings. *See photo above right.*

4. Gas Inlet
The XTherm will operate at 100% full rate with gas pressures as low as 4.0"w.c.

5. Water Outlet

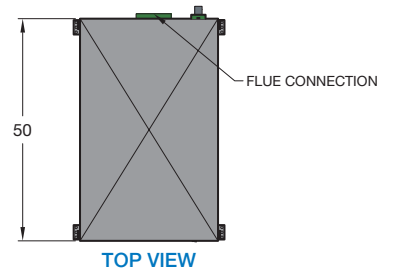
6. Water Inlet
The XTherm can accept as low as 50°F continuous inlet water temperature without damage to the primary heat exchanger.

7. Access Panel to Cold Run Pumps
Easily removable access panel even when unit is plumbed in place. Provides full access to inspect and service the Cold Run Pump system and condensate drain switch.

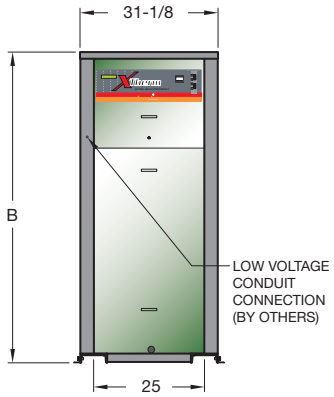
8. Flue Outlet
Stainless steel Category IV compatible.

9. Condensate Drain
3/4"-NPT PVC connection for condensate removal. Raypak offers condensate neutralizer kits that can be plumbed between the heater and the drain.

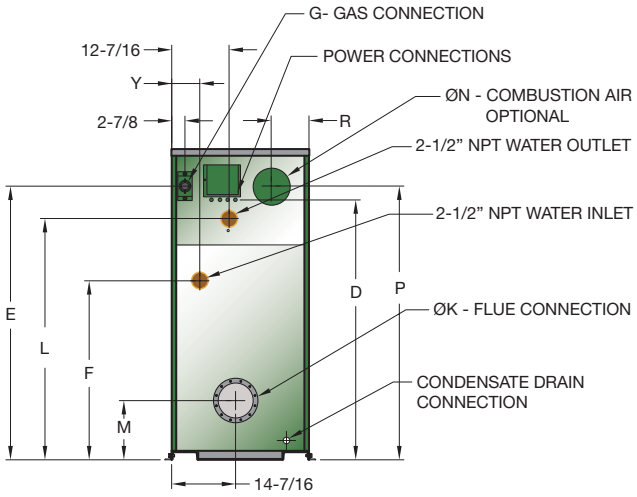
Xtremely Small Footprint



TOP VIEW



FRONT VIEW



REAR VIEW

PHYSICAL DATA

Model	Dimensions (inches)												Operating Weight (lbs.)	H Amps†	WH Amps‡
	B Ht.	D	E	F	G* NPT	K Flue Ø	L	M	N C/A Ø	P	R	Y			
1005	55-1/8	45	47-1/8	36-1/2	1-1/4	6	40-1/16	11-1/2	6	47-1/8	8-1/16	6-1/16	1065	22	15
1505	67-1/8	57	59-1/16	38-1/2	1-1/4	8	52-1/16	12-5/8	8	59-1/8	8-3/16	6-1/16	1234	26	15
2005	81-1/8	71	71-3/16	38-1/2	2	8	64-1/16	12-5/8	8	73-1/8	8-3/16	6-1/4	1461	35	21

*For propane gas, all models are 1-1/4" NPT.
†Includes boiler pump. Separate wiring connection required for boiler pump
‡Does not include water heater pump. Separate wiring connection required for water heater pump

MBTUH

Model	MBTUH Input	Boiler		MBTUH Input	Water Heaters		Minimum Input
		Output	Efficiency		Output	Efficiency	
1005	999	959	96%	999	969	97%	250
1505	1500	1440	96%	1500	1455	97%	375
2005	1999	1919	96%	1999	1939	97%	500

Heater Amps

Add heater amps to pump amps to find total amp draw.

+

Pump Amps

CLEARANCES

Heater Side		From Combustible Surfaces (min.)	For Service (recommended)
Floor*		0	N/A
Rear		12	36
Right Side		1	24
Left Side		1	1
Front		24	24
Top	Indoor	0	10
	Outdoor	Unobstructed	Unobstructed
Vent Stack	Indoor	1	N/A
Vent Cap	Outdoor	12	12

*Do not install on carpeting
Note: Local codes may require increased clearances

XTherm Model	Water Heater Pump Sizes					
	Soft		Medium		Hard	
	HP	Amps	HP	Amps	HP	Amps
1005	1/2	7	1/2	7	3/4	11
1505	1/2	7	3/4	11	1	14
2005	1	14	1	14	N/A	N/A

Note: Current draw (Amps) is for pump only

Water hardness grains per gallon
Soft = 0-4 • Medium = 5-15 • Hard = 16-25

Xtreme Pumping

Cold Water Run System

The XTherm comes standard with a state-of-the-art Cold Water Run system factory mounted and plumbed. Raypak's Cold Water Run system provides constant protection against condensation in the primary heat exchanger. The system utilizes one or two variable speed pumps, depending on model size and type, to inject just the right amount of water from the main system loop into the boiler to maintain the optimum inlet temperature. This allows the full capacity of the boiler to be utilized to meet the system load, while at the same time continuously maintaining the optimum inlet water temperature to prevent condensation in the primary heat exchanger. For models using the twin pump design, each pump acts independently giving the boiler up to a 10:1 flow turndown. All of this keeps the condensate were it belongs, in the stainless steel secondary heat exchanger.

TYPE WH

XTherm Model	Recovery Rates													
	Temperature Rise (°F)													
	20	30	40	50	60	70	80	90	100	110	120	130	140	150
1005	5,817	3,878	2,908	2,327	1,939	1,662	1,454	1,293	1,163	1,058	969	895	831	776
1505	8,733	5,822	4,367	3,493	2,911	2,495	2,183	1,941	1,747	1,588	1,456	1,344	1,248	1,164
2005	11,639	7,759	5,813	4,656	3,880	3,325	2,910	2,586	2,328	2,116	1,940	1,791	1,663	1,552

XTherm
ULTRA HIGH EFFICIENCY

Xtreme Control

Simple Serviceability

Raypak's easy-to-understand user interface, including on-board diagnostics and LED operating status lights, tells the technician all he needs to know. All service/repair components are readily accessible from the front or side for maximum installation flexibility. To enhance serviceability, the control box is completely removable allowing total access.

TempTracker Mod

Raypak's XTherm comes standard with TempTracker Mod. This control can be used for space heating and hot water supply with 8 application-specific modes to meet various applications, including outdoor reset for heating systems. The control monitors and displays inlet and outlet temperatures on all applications as well as monitor outdoor temperature when an outdoor reset mode is selected. Only Raypak's TempTracker Mod allows for a user definable outdoor reset ratio. Adjustable limits prevent over-cycling, saving energy and extending the life of the heater. Your XTherm is never down with a sensor failure thanks to Raypak's exclusive TempTracker software. It can operate with as little as one functioning sensor, keeping you up and running until service arrives.

- P or PID logic
- 0-10VDC Setpoint Input
- 0-10VDC Direct Drive Input
- 4-20ma output
- Building management direct control
- LCD Display
- Freeze Protection

On-Board Diagnostic Center

Raypak's XTherm comes equipped with a microprocessor-controlled diagnostic control center that displays its information on a 2x20 character LCD display in plain English. This control monitors system safeties, ignition faults and system status, while storing up to 16 reported faults. Raypaks diagnostic center monitors the fault outputs of the Fenwal ignition control. Converting the Fenwal's flashing lights into real English fault codes that anyone can understand. The control is also equipped with a SPDT dry contact relay output that is switched anytime a safety fault occurs. This can be used for a heater alarm or a BMS safety interface.

Example Diagnostic Fault Report

Water Flow Sw Fault
Check Boiler Pump, Purge Air, Replace Flow Switch

Diagnostic Information

Safety Faults

- Condensate Drain
- Manual High Limit
- Auto High Limit
- Low Water Cut-off
- Vent Pressure
- High Gas Pressure
- Low Gas Pressure
- Controller Alarm
- Flow Switch
- Blower Switch
- Factory Option
- External Interlock
- Cold Water Run

Ignition Control Faults

- Low Air
- Flame- No CFH
- Ignition Lockout
- Low HSI Current
- Low 24VAC
- Internal Control Fault

Raypak A Rheem Company

XTherm ULTRA HIGH EFFICIENCY

		Water Heaters (Type WH)	Boilers (Type H)
HEAT EXCHANGER			
ASME, National Board Registered, 160 PSI	• HLW Stamp	●	N/A
	• H Stamp	N/A	●
Heat Exchanger Tubes	• Copper	●	●
	• Cupro Nickel	○	○
Bronze Headers		●	○
Cast Iron Headers		N/A	●
Stainless Steel Condensing Heat Exchanger	• U Stamp	●	●
Pressure Relief Valve (mounted on outlet)	• 60 PSI	○	●
	• 125 PSI	●	○
	• 30, 45, 75, 150 PSI	○	○
Temperature & Pressure Gauge		●	●
Pump	• 120V, Single-Phase	●	●
JACKET			
Indoor/Outdoor Certified		●	●
Vent Terminal	• Outdoor	○	○
	• Through-the-Wall	○	○
Fully-Enclosed Controls		●	●
Combustible Floor Rated		●	●
OPERATING CONTROLS			
120V Power Supply with 120V/24V Transformer		●	●
On/Off Switch		●	●
Programmable Pump Time Delay, Single-Phase	• Included in TempTracker Mod Controller	●	●
Terminal Block Connections (Front mounted)	• Enable / Disable	●	●
	• External Interlocks	●	●
	• 0-10 VDC Setpoint/Direct Drive Input dry contacts	●	●
LCD diagnostic display with 16-Event History (2x20 character display, reads in plain English)		●	●
Status Display Lights (4)		●	●
Temperature Controller with 3 Water Sensors	• TempTracker Mod (up to 4:1 Turndown)	●	●
	• Outdoor Reset Sensor	N/A	○
Multiple Boiler Controller	• TempTracker Mod+, up to 16 boilers	○	○
	• Y-200, up to 40 boilers (LonWorks optional)	○	○
SAFETIES			
Hot Surface Ignition System	• 1-try	○	○
	• 3-try	●	●
High/Low Gas Pressure Switches		○	○
Blocked Vent and Air Pressure Switches		●	●
High Limit Switch	• Manual Reset, Fixed	●	●
	• Manual Reset, Adjustable	○	○
	• Automatic Reset, Adjustable	○	○
Low Water Cut-Off, 24V	• With Manual Reset and Test Buttons	○	○
Flow Switch		●	●
GAS TRAIN			
Modulating Combination Gas Valve		●	●
Combustion Air Blower		●	●
Additional Safety Valve	• Motorized (externally mounted)	○	○
	• Solenoid (externally mounted)	○	○
OTHER			
CSA-Certified Efficiency	• 96% at Full Fire	N/A	●
	• 97% at Full Fire	●	N/A
Air Filter		●	●
TruSeal Direct-Vent Ready		●	●
Alarm System		○	○
CSD-1 / GE GAP Control System		○	○
Low NOx	• Meets all current requirements	●	●
Cold Water Run	• Prevents condensation in primary heat exchanger	●	●

● ● = Standard ○ ○ = Optional

Raypak, Inc. • 2151 Eastman Avenue, Oxnard, CA 93030 • phone: (805) 278-5300 • fax: (800) 872-8725 • www.raypak.com

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