



# ARCTIC™

Stainless Steel, Condensing,  
Gas-Fired Commercial Boiler

Because Reliability and Longevity Matter

- 95% AHRI-Certified Efficiency
- Tru-O<sub>2</sub> 20:1 Turndown
- 3500, 4000, 4500, 5000, 5500, and 6000 MBH
- Lifetime Shockproof Seal
- Field-Repairable Heat Exchanger
- Variable Primary or Primary/Secondary Piping
- 100°F Delta-T with Low Minimum Flows
- Designed and Made in the U.S.A.



**THERMAL**®  
**SOLUTIONS**  
Innovative Equipment for Hot Water Systems



## Longevity & Serviceability Delivered to Condensing Space

Flexible watertubes have long been the workhorse of the boiler industry, naturally flexing and moving with expansion & contraction that occurs in heating. These tubes are unrivaled at absorbing and transferring the intense heat of today's burners into water and distributed as heat. Thermal Solutions uses no welds in mechanically sealing tubes to header and provides a lifetime warranty on this seal. With no welds, the Arctic permits field access for tube replacement making it the only field repairable heat exchanger in the condensing market. The Arctic is available fully packaged, or if required, knockdown for ease of onsite maneuvering and assembly, another industry first.



### TRU-O<sub>2</sub> High Turndown System

With constant O<sub>2</sub> at highest and lowest fire setting, Tru-O<sub>2</sub> maintains "Condensing Sweet Spot of 130°F" across the entire firing range. Other models commonly add 50% or more excess air at low fire, robbing condensing efficiency and lowering the dew point by 15 or more degrees causing return temperatures of 115°F or lower to condense flue gases. Tru-O<sub>2</sub> also features independent ignition position, a 9 point curve for tuning and adjustment. No more gimmicks, TruO<sub>2</sub> is how turndown should be done.

### High Temperature Supply Header

We use flexible watertubes for what they do best;

- Flex and move with heat
- Stress free
- Field-replaceable tubes



### Low Temperature Return Header

- Maximum heat transfer
- Minimal waterside pressure drop

### Venting Category II and IV

Common and Individual venting with engineered vent systems.

### Variable Primary or Primary/Secondary Piping

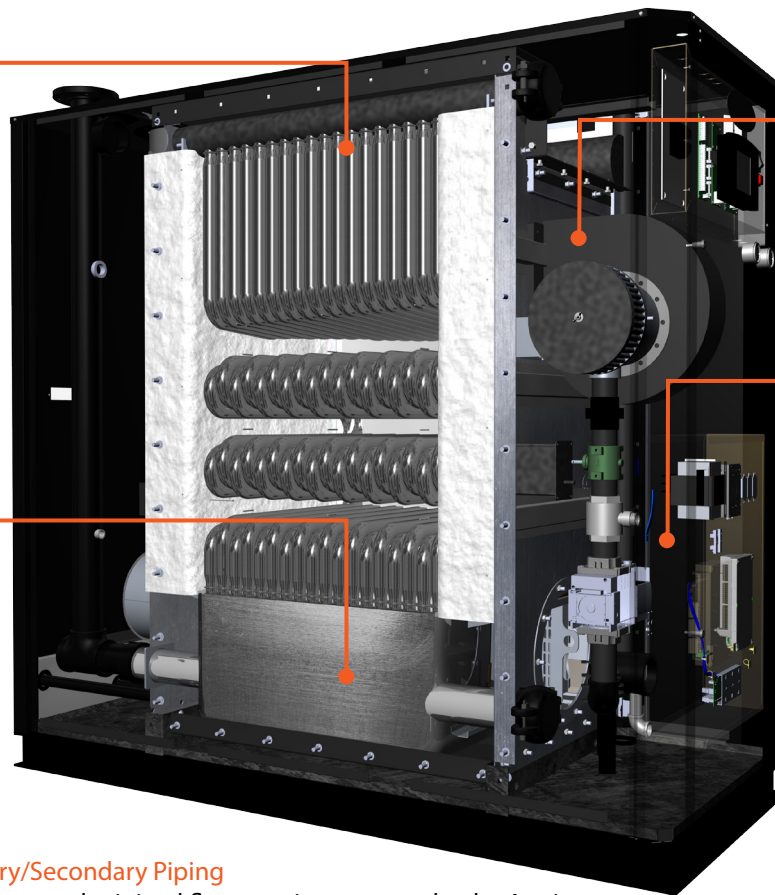
Low waterside pressure drop and minimal flow requirements make the Arctic ideal for variable primary and LEED conscious designs; also well suited for traditional primary/secondary piping.

### Knockdown Availability

The Arctic's weld-free tube design allows for multiple knockdown configurations to gain entry access into a building whereas a packaged boiler could not. To ensure reliability and performance, we build the Arctic complete as a package, perform a combustion fire test and then disassemble into the required knockdown configuration. Reassembly is fast and easy without the need of an ASME code welder.

### Weld-Free from Tube to Header!

Tapered end-forms are mechanically fitted into the upper and lower headers allowing water to pass from tube to header. This proven assembly method has stood the test of time for nearly 100 years and is backed by a Lifetime Shockproof Seal of Certainty against leakage due to thermal shock. Capable of up to 100°F delta-T, no welded boiler can provide this assurance and longevity.



### Combustion Design

- Standard Tru-O<sub>2</sub> high turndown up to 20:1
- Supervised pilot
- UV scanner
- Low NOx capable

### Service-Friendly by Design

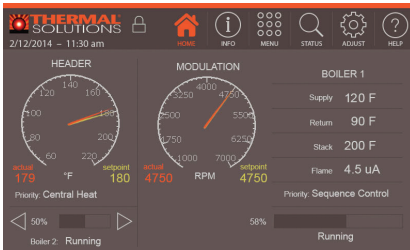
Accessibility for service and maintenance is another vital feature to the overall design:

- Electrical panel available from front door
- Burner/blower assembly easily reached through front door and/or removable side flue collector doors
- Heat exchanger tubes accessible from removable side flue collector doors on both sides

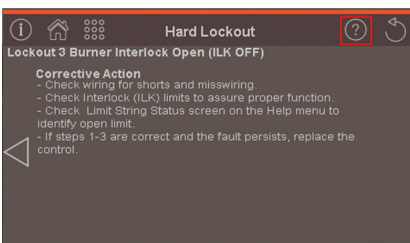


# Advanced Commercial Boiler Control...Putting your System in Tune

The Concert™ Boiler Control includes features and functions designed to save energy, optimize long-term efficiency, and integrate seamlessly with all Energy Management Systems (EMS). Built on a proven control platform, Concert is the most comprehensive commercial boiler control on the market. From Intuitive Icon Navigation, to Self Guiding Diagnostics, Unmatched Archives, USB Data Sharing, and other unique features & optional system enhancements, this control scales above all others!



Intuitive Icon Navigation – “Touch” and move through our control menus effortlessly. Whether it be commissioning the boiler with the “Quick Setup” menu, pinpointing fault codes with corrective actions in seconds or seamlessly connecting to an EMS. Extensive data archives with graphical displays are available to evaluate boiler performance and make value-added adjustments to maximize boiler & system efficiency.



Self-Guiding Diagnostics – Troubleshooting boiler issues has never been this easy! The industry-leading fault identification and correction feature allows the service technician to quickly drill down on the issue, with cause and corrective measures.



Unmatched Archives – With the largest collection of stored operational data (4 months), no stone is left unturned when it comes to evaluating a boiler's performance and pinpointing adjustments for improvement. The boiler's onboard energy management system is a true step above all others!



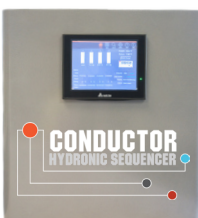
USB Data Sharing – Make room on the tool belt for a flash drive as the USB data sharing port has become another important device for commissioning (uploading/downloading settings from one boiler to the next), servicing (downloading data and emailing file(s) to factory for assistance) and analyzing boiler operation (historical info can be downloaded & saved in .CRV formatted files).

## Unique Features:

- Complete EMS Interface - Read and write firing rate demand & setpoint.
- A.I.D. (Advanced Input Determination) - Firing rate and water temperature based algorithms for multiple boilers.
- Factory Default Settings - Restore control parameters back to factory settings.
- Real Time BTU/Hr Display.
- Time/Date Stamp - On all logged events.
- Two (2) Boiler Start/Stop Triggers - Support large domestic hot water demands.
- USB Data Sharing Port - Easily transfer parameters from boiler to boiler.

## Options:

- Motorized Isolation Valves - Maintain energy efficient flow requirements for variable flow systems.
- 0-10 vdc Input - Converts 0-10vdc signal from EMS to 4-20mA dc for our control.
- Wireless Outdoor Sensor - Saves installation time.
- BACnet, Metasys N2, LonWorks and Modbus - Communication gateway translates effectively to various EMS protocols.



## Harmonizing Boilers with Systems

Optional control panel integrates all makes of boilers (water or steam) for seamless, single-point connection with EMS. Improves efficiency and operation of condensing, non-condensing, hybrid or steam systems up to 8 units. “Smart Ops” select boiler type (condensing or non-condensing) based on load requirements and inputs of boilers of any size. Selectable Unison and/or Sequential modulation with base load ensures peak efficiency and maximum run time for all types of boiler technologies.



## Arctic Standard Equipment

### PRESSURE VESSEL DESIGN

ASME certified stainless steel heat exchanger  
ASME Section IV-certified, "H" Stamp  
MAWP 160 PSIG & max temp 210°F  
Ten Year limited heat exchanger warranty  
Lifetime thermal shock warranty

### COMBUSTION DESIGN

Stainless steel mesh pre-mix burner  
Low NOx emissions  
Full modulation, up to 20:1 turndown  
Natural gas (consult factory on LP gas)  
7" wc to 14" wc inlet gas pressure  
Supervised ignition system/UV scanner  
High/Low gas pressure switches, manual reset  
Variable speed combustion blower  
Air proving switch  
High altitude available; please consult factory

### VENTING

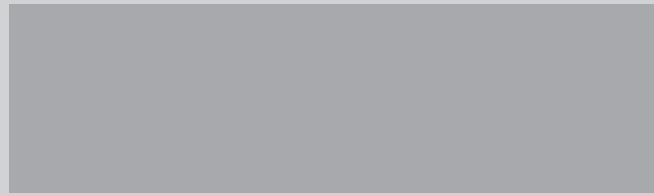
Air Intake - Ducted or Room Air  
Category IV Individual Venting  
Category II Common Venting with Engineered Vent System

### BOILER EQUIPMENT

Siemens LMV3 control system  
High limit w/ manual reset safety temperature control  
Water flow switch  
Supply & return water temperature sensors  
Flue gas temperature sensor  
Air vent valve  
Boiler drain valve  
Condensate trap  
Pressure & temperature gauge  
ASME safety relief valve  
(30, 50, 60, 75, 100, 125, or 150 psig)

### ELECTRICAL DESIGN

24 VAC low voltage control power supply  
208-240-460 VAC / 60 Hertz / 3 phase power supply (ARC3500-4000)  
460 VAC / 60 Hertz / 3 phase power supply (ARC4500+)



## Arctic Optional Equipment

Condensate neutralizer  
Header sensor, direct immersion  
Header sensor, well immersion (with well)  
Outdoor air reset sensor

Knockdown configuration  
Motorized isolation valves  
Hydronic kit - boiler pump and condensate neutralizer



## Concert Boiler Control

Dashboard - color touch screen display, 7"

- Intuitive icon navigation
- "Quick" setup menus
- "Real time" BTU/H display\*

Two (2) temperature demand inputs

- Outdoor air reset curve for each input
- Time of day setback capability (EnviraCom thermostat must be installed)

Three (3) pump control

- Boiler pump with on/off or variable speed cont.
- Domestic hot water (DHW) pump
- System pump
- Alternative control to isolation valve, combustion air damper, or standby loss damper
- Pump overrun for heat dissipation
- Pump exercise
- Pump rotor seizing protection

Peer-to-peer boiler communications

- Multiple size boiler sequencing up to 8 units
- Two (2) boiler start/stop trigger\*
- Lead boiler automatic rotation

Energy management system (EMS) interface

- Firing rate and water temperature based algorithms for multiple boilers; loss of EMS signal defaults to local boiler settings\*
- 4-20mA input/output (0-10V optional converter)
- ModBus Input/Output (BACnet or LonWorks optional gateway)
- Simultaneous interface with peer-to-peer

USB data port transfer\*

- Upload settings between boilers
- Download parameters for troubleshooting
- Import data into .CRV formatted files for performance analysis

Energy efficiency enhancer

- Anti-cycling technology
- Multiple boiler base load common rate
- Outdoor air temperature reset curve
- Warm weather shutdown
- Boost temperature & time
- Ramp delay
- Over-temperature safeguarding

Self-guiding diagnostics

- Identifies fault
- Describes possible problems
- Provides corrective actions

Time/Date stamp on alarms and lockouts\*

Unmatched archives

- Historical trends - collects up to 4 months of data
- Event History - up to 3,000 alarms, lockouts, and cycle & run times
- Alarm-limit string faults, holds, lockouts and others
- Cycle & run time - boilers & pumps
- Resettable (lockouts/alarms/cycles & run time)

Domestic hot water priority

- DHW tank piped with priority in the boiler loop
- DHW tank piped as a zone in the system with the pumps controlled by the Concert control
- DHW modulation limiting

Other features

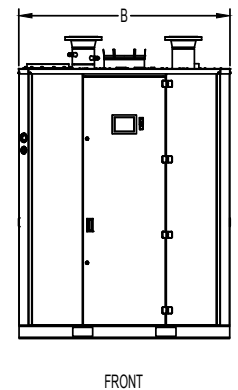
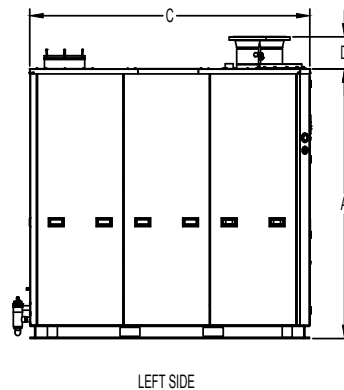
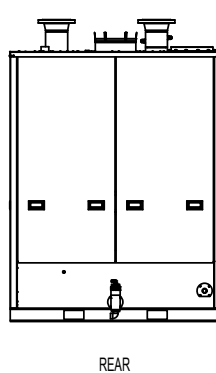
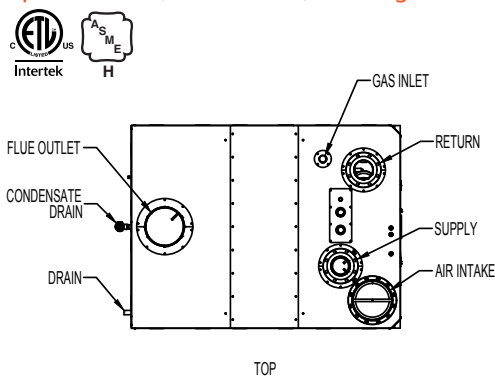
- Factory default settings\*
- Three level password security
- Frost protection
- Sensor monitoring and control
- Low water flow safety control & indication
- Proportion integral derivative (PID) parameters for central heat, DHW, sequencer and fan
- Built-in brown-out protection

\* Unique to Thermal Solutions

## Concert Boiler Control Options

- Communications gateway - BACnet, LonWorks or Modbus compatible
- Wireless outdoor air temperature kit
- 0-10v signal converter

## Specifications, Dimensions, & Ratings



MODEL	RATINGS		THERM EFF. %	"A" HEIGHT (IN.)	"B" WIDTH (IN.)	"C" LENGTH (IN.)	"D" CONN. HEIGHT (IN.)	SUPPLY/ RETURN CONN. (IN.)	AIR INTAKE/ VENT DIA. (IN.)	CONDENSATE & BOILER DRAIN CONN. (IN.)	GAS CONN. (IN.)	APPROX. SHIPPING WEIGHT (LBS)
	INPUT (MBH)	GROSS OUTPUT (MBH)										
ARC-3500	3500	3325	95.0	81	64	84	10	6 Flange	12	1	2	4500
ARC-4000	4000	3800	95.0	81	64	84	10	6 Flange	12	1	2	4500
ARC-4500	4500	4275	95.0	81	64	102	10	6 Flange	14	1	2	5400
ARC-5000	5000	4750	95.0	81	64	102	10	6 Flange	14	1	2	5400
ARC-5500	5500	5225	95.0	81	64	102	10	6 Flange	14	1	2	5400
ARC-6000	6000	5700	95.0	81	64	102	10	6 Flange	14	1	2	5400

106390-03

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