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HEATNET® 3.0

HEATNET 3.0 VIRTUOSO$_2$

ADVANCED HIGH TURNDOWN CONTROLS

FLEXCORE®

SYMMETRICAL FIRETUBE

FlexCore CK-Series Gas-Fired Direct Vent Stainless Steel Boilers

Models CK0850-CK3000

Control Manual

Virtuoso$_2$ 10:1 Supplement

This instruction manual applies only to RBI firmware version 4.x on version 3.x control boards equipped with the high turndown option.

Also read and follow:

FlexCore CK-Series Control Manual

FlexCore CK-Series Gas Boiler Installation and Operating Instructions

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WARNING This manual is intended only for use by a qualified heating installer/technician. Read and follow this manual, all supplements and related instructional information provided with the boiler. Install, start and service the boiler only in the sequence and methods given in these instructions. Failure to do so can result in severe personal injury, death or substantial property damage.

WARNING **Do not use the boiler during construction.** Construction dust and particulate, particularly drywall dust, will cause contamination of the burner, resulting in possible severe personal injury, death or substantial property damage. The boiler can only be operated with a dust-free air supply. Follow the instruction manual procedures to duct air to the boiler air intake. If the boiler has been contaminated by operation with contaminated air, follow the instruction manual guidelines to clean, repair or replace the boiler if necessary.

CAUTION Affix these instructions near to the boiler. Instruct the building owner to retain the instructions for future use by a qualified service technician, and to follow all guidelines in the User's Information Manual.

Table of Contents

Introduction

FlexCore CK-Series boilers equipped with the High Turndown feature include the Virtuoso$_2$ High Turndown Control and the air shutter module to allow up to 10:1 Turndown. The shutter provides protection from intake and flue pressure fluctuations by keeping the blower RPMs high for increased stability. The combustion is also monitored using an oxygen sensor to provide feedback on the combustion efficiency. This system provides robust operation at lower inputs, improves the air-fuel mixture to the burner and maximizes overall operational efficiency.

This manual covers the new settings, adjustments, and fault messages for the high turndown feature.

Specifications

Control	Microprocessor based stepper motor and O2 sensor control (**NOT a safety limit**)
Environment	-40 °F to 140 °F, <90% RH non-condensing
Input Power	12VDC, 60W
Relays	Alarm, 5A 250 VAC resistive
Dimensions	3.5” wide; 2” high; 3” deep
Communications	HeatNet Minibus

Components & Accessories

Part Number

40-0080-001	Virtuoso$_2$ High Turndown Control
40-0092	HeatNet V3.0, Full, SATA
16-0341	Oxygen Sensor
15-0353-001	12V DC Power Supply
48-0708-001	Minibus SATA Cable 2M
48-0708-002	Minibus SATA Cable 4M
82-0962-001	Installation & Operation Manual

Operation & Setup

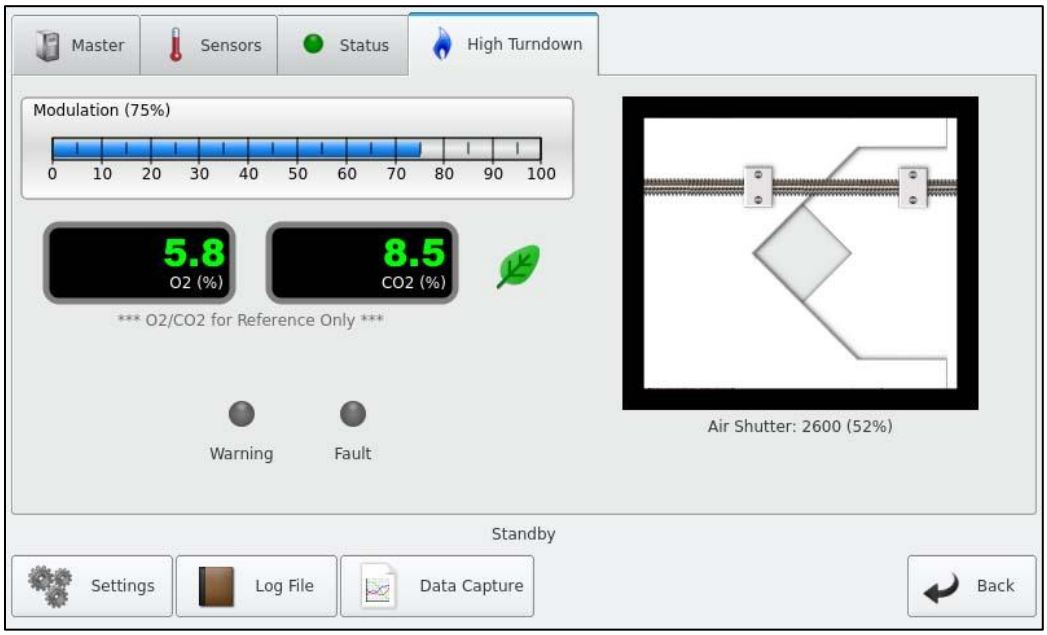
At power-up the air shutter will find its home position by hitting the end switch, and then go to the appropriate starting position for the boiler model selected. The air shutter stays in the starting position throughout the ignition cycle. Once the boiler is running it will vary its position depending on the boiler modulation. During the post purge period at the end of the boiler cycle, the air shutter will find its home position and then return to the appropriate starting position.

The blower speed is varied according to the boiler modulation the same as typical 5:1 boilers. However, when operating in 10:1 turndown, the blower speed is not reduced all the way down to the minimum input. Lower inputs are obtained by keeping the blower running at the Blower Clamp value and adjusting the air shutter position.

An oxygen sensor is used to monitor the combustion values and provide feedback on the combustion efficiency of the boiler. The accuracy of the O_2 sensor is checked during the post purge period.

High Turndown Status

A new High Turndown tab has been added to the boiler information screen.



The High Turndown screen shows the details of the high turndown features. The screen shows the modulation input of the boiler, the O2% and CO2% readings, and the position of the air shutter. The leaf icon to the right of the combustion values indicates the combustion efficiency of the boiler. A green leaf indicates good combustion, and a yellow leaf indicates that the combustion values may need to be adjusted. Please refer to the Boiler Manual, Installation and Operation Instructions for more information.

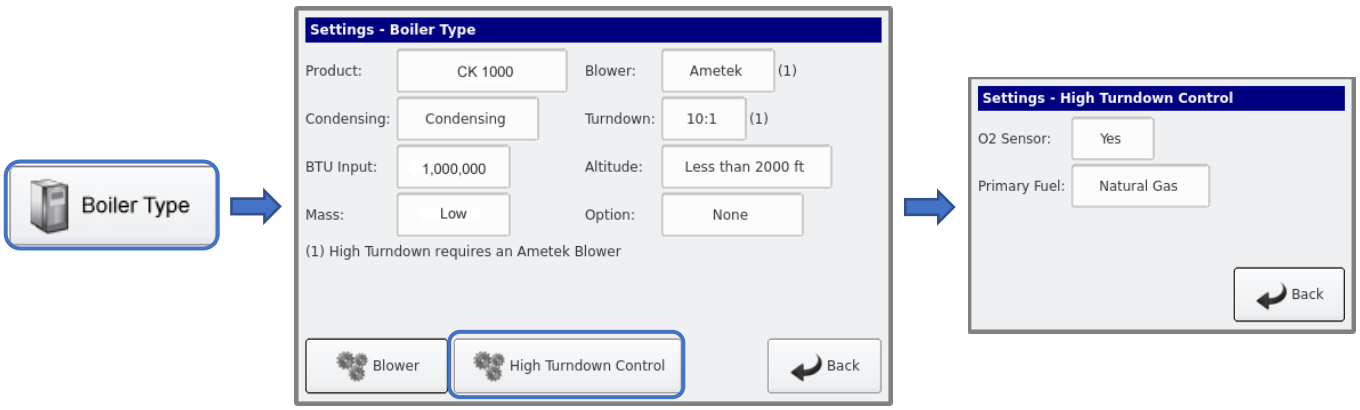
This screen will also indicate if a Warning or Fault is present and display the corresponding message.

High Turndown Messages and Log Entries

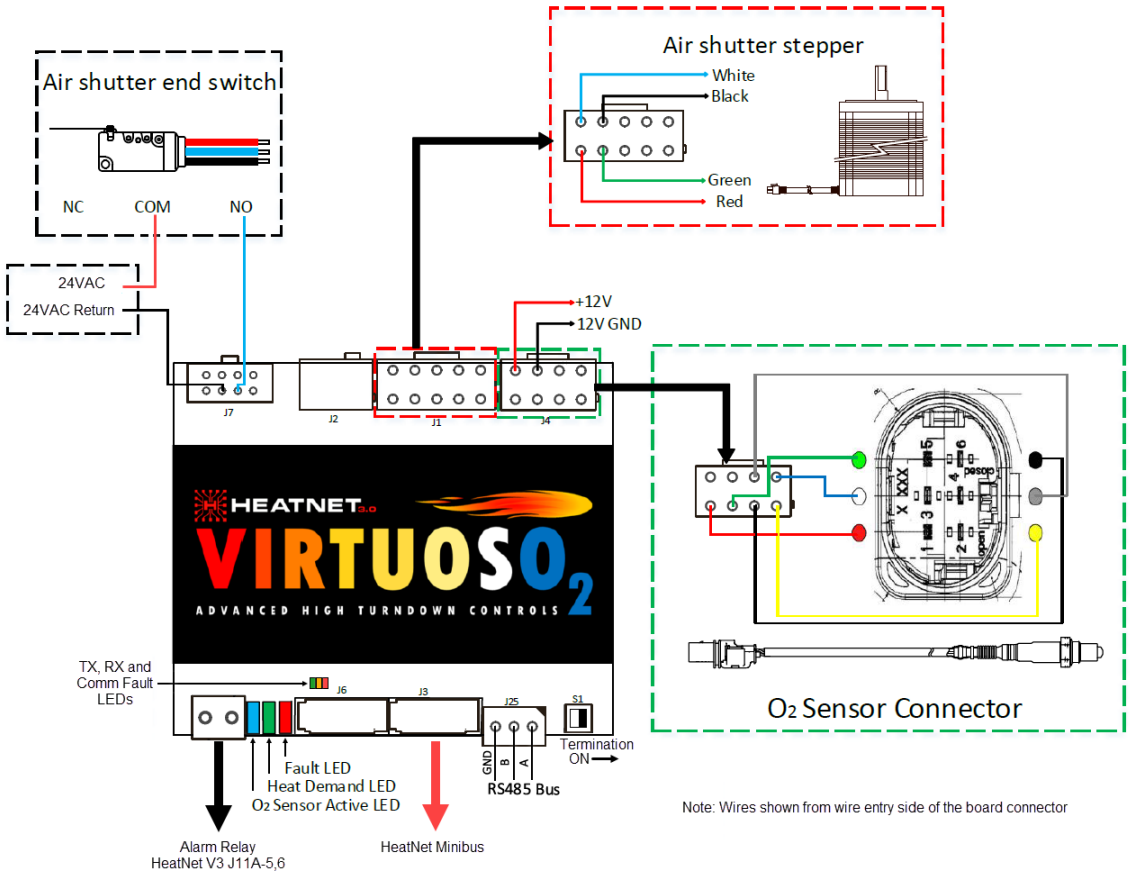
Message	Description/Resolution
Air Stepper Fault	The Air stepper a was unable to find the end switch. Verify stepper and end switch wiring, and check the air shutter is not bound. A power cycle is required to clear.
O_2 Sensor Warning	There is a problem with the O_2 sensor, or its wiring. Verify wiring or replace the O_2 sensor.
O_2 Circuit Warning	There is a problem with the O_2 sensor circuitry. If a power cycle does not clear the warning, replace the Virtuoso$_2$ High Turndown Control.
O_2 Sensor Near End of Life	The O_2 sensor is near the end of its life and should be replaced soon.
Replace O2 Sensor	The O_2 sensor has reached the end of its life and should be replaced.
Minibus Packet Error	Minibus packet errors are being generated. Verify the minibus wiring and termination.
Lost Minibus Heartbeat	The Virtuoso$_2$ High Turndown Control is not responding to minibus heartbeat requests. Verify the minibus wiring and termination.
Lost Minibus	The Virtuoso$_2$ High Turndown Control is not responding to any minibus communications. Verify the minibus wiring, termination and power to the Virtuoso$_2$ High Turndown Control.
High Turndown Control Interlock (J11A-5,6)	The High Turndown Control Interlock is open on the HeatNet V3 control. Verify wiring to J11A-5 and 6, and make sure the Virtuoso$_2$ High Turndown Control is operational and Is not faulted.
High Turndown Control is Offline	The Virtuoso$_2$ High Turndown Control is not responding to any minibus communications. Verify the minibus wiring, termination and power to the Virtuoso$_2$ High Turndown Control.

High Turndown Settings

The HeatNet V3 control board must be configured correctly for proper 10:1 operation. Only boilers equipped with an Ametek blower can be used with the Virtuoso$_2$ High Turndown Control to achieve 10:1 turndown. The O_2 Sensor and the Primary Fuel type must be set correctly to accurately display combustion values.



High Turndown System Wiring

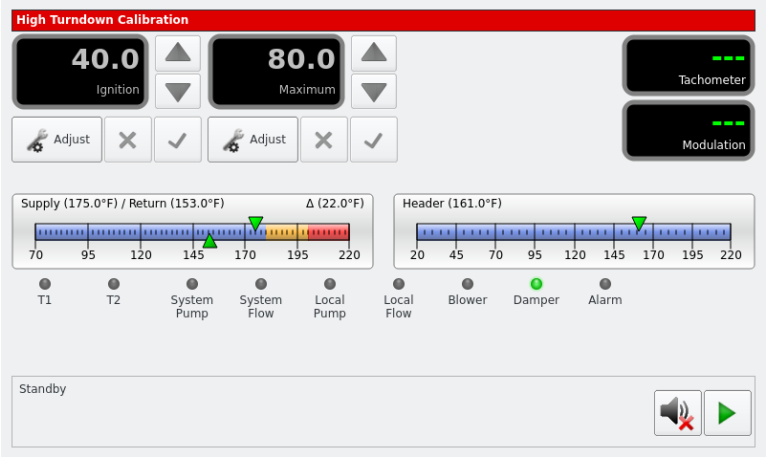


10:1 Calibration

NOTICE **The calibration of the FlexCore CK-Series boiler should only be performed by a licensed/Certified technician**.

All calibration settings should be adjusted based on the boiler's parameters. See the Boiler Installation, Operation, and Maintenance manual - (10:1) Startup Procedure.

To enter the calibration menus, place the S2 switch on the main control board to the CAL position. A reloading message will appear and then the calibrate screen will be displayed. The calibration screen allows the Ignition% and Maximum% to be adjusted.



Pressing the Start Calibrate Button  will allow the Min Air Shutter and Blower Clamp values to be set.