

# KN SERIES

# PRODUCT DATA

## Control Platform

### DESCRIPTION

The KN-Series boiler control is designed to provide the KN-series boiler with an integrated boiler management system on every boiler. A key component of the Air-Fuel coupled KN-Series boilers, the KN-series control provides for optimized heating efficiency without the need for an external "wall mount control". The control method used by the KN-series control is based on digital communications, which eliminates the need for analog control signals. The use of analog control signals is still supported, but a higher level of control precision, repeatability, and feedback is gained with digital communications control.

The KN-Series control is extremely flexible, and can be operated in multiple ways:

- A stand-alone boiler.
- A boiler in a Boiler Network using the Heat-Net™ protocol.
- A member boiler to a boiler management system
- A member of a system with up to 3 boilers using relay control.

The primary purpose of the control is to maintain the boiler water temperature setpoint at either the supply or the header sensor. The control also monitors dedicated external limits and provides an orderly shutdown and fault indication in the event of a trip.

The control method used is based on a PID loop and functions much like a thermostat with an analog output. The PID loop's input can be the supply or the header temperature depending on the setup. The output is a control signal that is derived from the difference between this supply/header temperature and the setpoint. This output control signal is a Pulse Width Modulated signal used to control the blower which is Air-Fuel coupled to the main gas valve.

When an external input is used to cycle the boiler ON and OFF or when using an external modulation signal, an adjustable internal operating limit setpoint is provided. If the control is the master, a setpoint with a control band is also employed in conjunction with the internal operating limit setpoint to limit the output of the boiler.

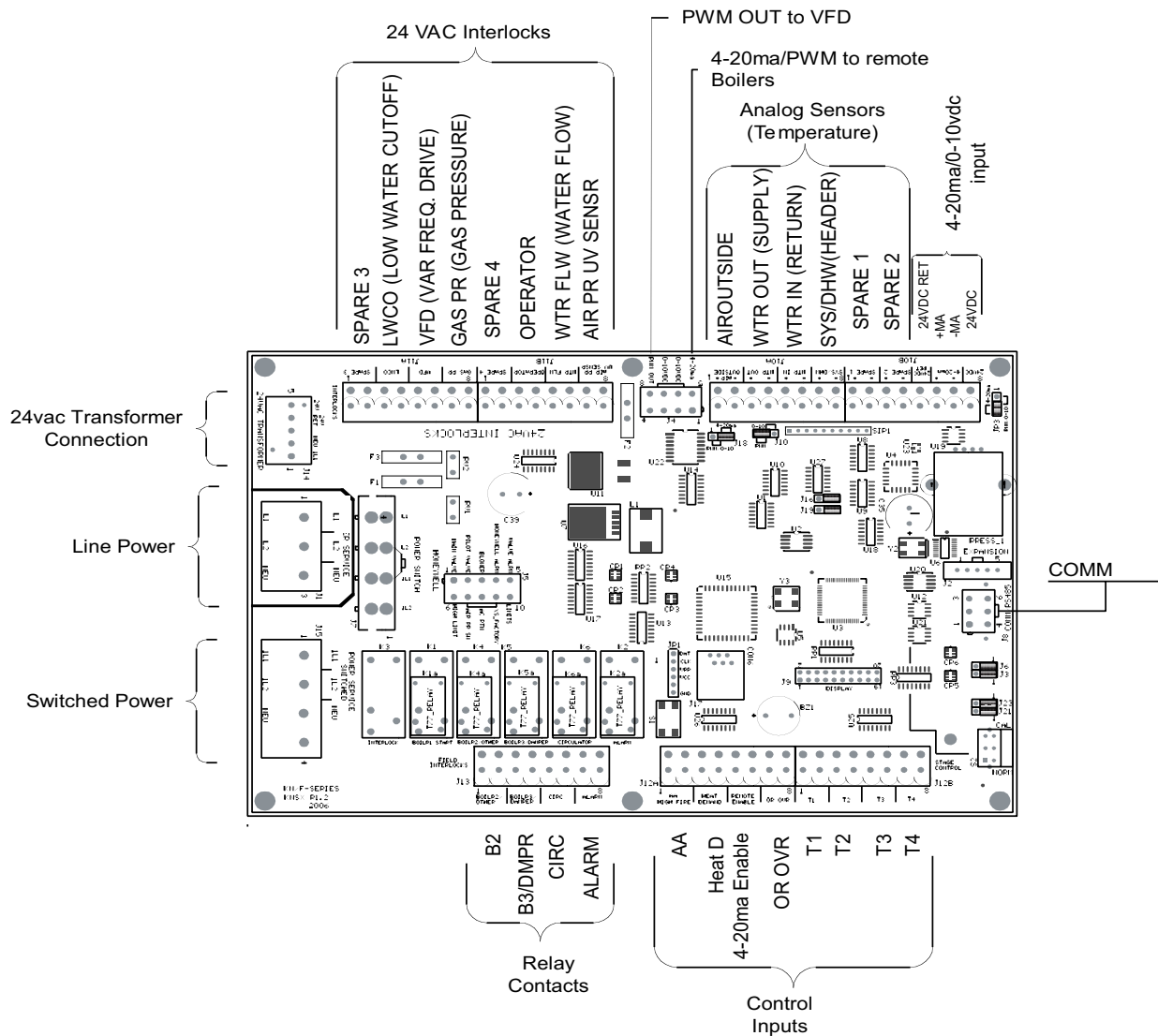
### STANDARD FEATURES

- Four levels of external control inputs, including modulation and stage.
- Digital Communications Control (analog 4-20ma, 0-10vdc control supported, but not required).
- Boiler to Boiler: Heat-Net™
- Building Management System (Modbus, Optional BACnet or LonWorks) to Boiler
- Distributed control using the Heat-Net™ protocol for up to 16 boilers, or up to 3 boilers using dedicated relays. Eliminates the need for "wall mounted" controls.
- System operating status and error logging with time stamp.
- Advanced PID algorithm optimized for the KN series boilers.
- 4 Dedicated temperature sensor inputs for: Outside Air Temperature, Supply (Outlet) Temperature, Return Temperature(Inlet), and Header Temperature.
- Automatically detects the optional temperature sensors on power up.
- Menu driven calibration and setup menus with a bright (Adj.) 4 line Vacuum Fluorescent Display.
- 8 Dedicated 24vac interlock monitors, and 8 dedicated 120vac system monitors used for diagnostics and providing feedback of faults and system status.
- Multiple circulator pump control modes.
- Combustion Air Damper control with proof time.
- USB/RS485 network support to allow firmware updates or custom configurations.
- Optional BACnet or LonWorks interface.
- Alarm contacts.
- Runtime status.
- Outdoor Air Reset with programmable ratio.
- Time of Day clock to provide up to 4 night setback temperatures.
- Failsafe mode - When a Building Management System is controlling setpoint, if communications is lost, the boiler/system will run off the Local setpoint.

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# HeatNet™ Control Platform

## Typical Wiring Diagram



### OPTIONAL EQUIPMENT

#### BM-904:

Supply, Header, Return Sensors with Hardware

#### BM-9018:

Outside Air Sensor with Housing

### SPECIFICATIONS

#### Control:

Microprocessor based PID modulating control (NOT a safety limit)

#### Environment:

-40°F to 140°F, <90% RH non-condensing

#### Input Power:

24 VAC, 250 ma

#### Switched Line:

120 VAC single phase, 240 VAC single phase

#### Relays:

Stage, Circulator, Alarm 8A 250 VAC

#### AC Interlocks:

24 VAC – 120 VAC input

#### Control Inputs:

AA, Heat Demand, 4-20ma Enable, OA override, T1-T4: 24 VAC

#### Dimensions:

9" wide: 6" high: 2" deep

#### Approvals:

CSA Approved as integral part of boiler

#### Temperature Sensors:

NTC thermistor, 10K @ 77°F, 335.67K @ -40°F, 185 @ 150°F, +/- 1°F

#### Communications Environment:

-40°F to 140°F, <90% RH non-condensing

#### USB:

1.0

#### RS485 Console:

Modbus RTU, 19200 baud, 8 bits, Even Parity, 1 Stop Bit

#### Boiler-to-Boiler:

Heat-Net™