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fireye

NXM2G-2 Installation and Operating Manual

(-2 CE version shown)

CE

This manual must be affixed on or adjacent to the boiler or kept with boiler operating manual or other information.

NXM2G DESCRIPTION

The NXM2G system is a microprocessor based boiler load optimization control system designed to provide optimum thermal efficiency of Low Temperature Hot Water (LTHW) boilers.

Control theory

The NXM2G measures the supply (flow) and return temperatures via digital sensors (supplied) and monitors the "call for heat" via the Opto-isolators from the limit string wiring connections.

• On first firing, the boiler will reach the normal cut out set point and turn off,

• On the next burner cycle, the NXM2G will check:

    i)   for the "call for heat "

    ii)   if the boiler flow and return temperatures are within the designed temperature differential settings (parameter), and

    iii)   if the boiler is required to fire, based on control algorithms.

When this occurs, the NXM2G will hold off the boiler firing (save mode) based on temperature and time, which are both adaptive. The NXM2G will also inhibit the burner from firing on stage 2, if the boiler load demand is low, thus ensuring the best efficiency for the current system demand.

⚠️ **WARNING:**
• **The installer must be suitably qualified and trained to install NXM2G.**
• **Follow the boiler manufacturer's instructions.**

NXM2G interface wiring

The NXM2G has 2 normally closed relays which are failsafe. These relays are wired in series to the 1st and 2nd stage operating control circuits. The relays operate according to whether the boiler is in save mode or low fire save mode. The NXM2G has a series of LEDs that give the following indications:

• **Power**   230 VAC applied

• **Thermostat on**   Call for heat / 1st Stage thermostat closed

                      Blinking: "Save" mode

                      Steady: Boiler allowed to fire

- **Boiler firing**   Call for heat / Boiler allowed to fire

  Blinking: Burner purging

  Steady: Boiler allowed to fire (or fuel valve open)

- **Stage 2 firing**   Call for heat / 2nd Stage thermostat closed

  Blinking: "Low Fire Save" mode

  Steady: Stage 2 firing

Failsafe operation

In all cases the safety integrity of the boiler operation is not compromised. Moreover, the boiler set point is always maintained. Should the NXM2G unit fail or lose electrical supply the boiler control system wiring remains as normal and the boiler will operate as if the NXM2G were not installed. The boiler's operating control is always in circuit and protected with the boiler high temperature limit.

NXM2G WIRING SCHEMATIC

Figure 1 shows the wiring of the NXM2G. The NXM2G has 4 separate plug connections for field wiring.

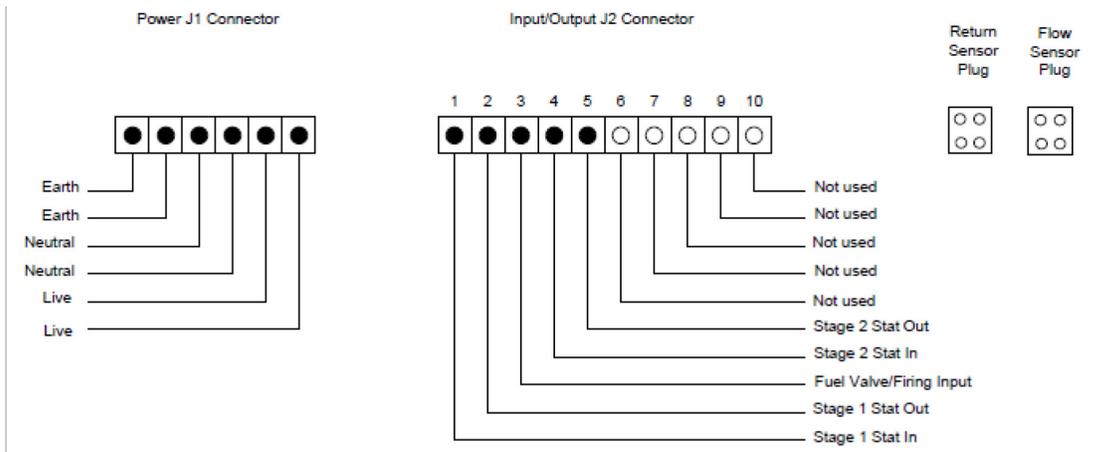**FIGURE 1.**   **NXM2G Terminal Connections**

FIGURE 2.

Power J1 Connector	
Terminal	Common Earth/Ground connection ⏚
Terminal	Common Earth/Ground connection ⏚
Terminal	Neutral
Terminal	Neutral
Terminal	Live
Terminal	Live

Input/Outputs J2 Connector	
Terminal 1	Stage 1 Thermostat Input (Call for heat)
Terminal 2	Stage 1 Thermostat Output
Terminal 3	Fuel Valve/Firing Input
Terminal 4	Stage 2 Thermostat Input (Call for heat)
Terminal 5	Stage 2 Thermostat Output
Terminal 6	Not used
Terminal 7	Not used
Terminal 8	Not used
Terminal 9	Not used
Terminal 10	Not used

Power Wiring

It is required that the NXM2G device be powered via an isolation switch. The NXM2G may be powered from the same isolated supply provided that the branch circuit protection or fuse located within the isolator (if present) is rated at 7A or less. Where the NXM2G circuit protection exceeds 7A, the supply for the NXM2G from the isolated supply shall include a supplementary fuse rated at 3A."

The wiring associated with the control circuits (J2) shall be protected by an overcurrent device rated at not more than 7A. Overcurrent protection may be incorporated into the controlled devices

NXM2G SPECIFICATIONS

NXM2G System	Model NXM2G-2
Supply Voltage:	230V AC / 60Hz
Rated Current:	50mA
Relay Switching Capacity:	2A at 230V AC (resistive)
Fuse Rating:	1.6A @ 230 V AC
Dimensions:	6.9" (175mm) W x 4.7" (119mm) H x 2.8" (71mm) D
Sensors:	Plug in Digital Thermometer (2)
Sensor Range:	55°C to 125°C
Weight:	2.2 pounds (1.0kg)
Case:	Painted Metal
Environment:	NEMA 1 / IP11 Note: Casing not intended for outdoor installation. For outdoor installations the device should be enclosed in an appropriate utility box (NEMA 3 or better).
Maximum Operating Temperature Limits:	52°C
Minimum Operating Temperature Limits:	0°C
Maximum:	Mounted surface temperature 40°C
Humidity:	85% R.H. Maximum (Non-Condensing)

The right to make changes in specification or design at any time without prior notice is hereby reserved.

SUITABLE NXM2G APPLICATIONS

The NXM2G operates on:

- Low temperature hot water (LTHW) boilers fired with:

    on/off forced draft burners

    two stage high/low burners

    modulating burners

- Atmospheric boilers fired with:

    two stage burners

    modulating burners

Wiring Diagrams

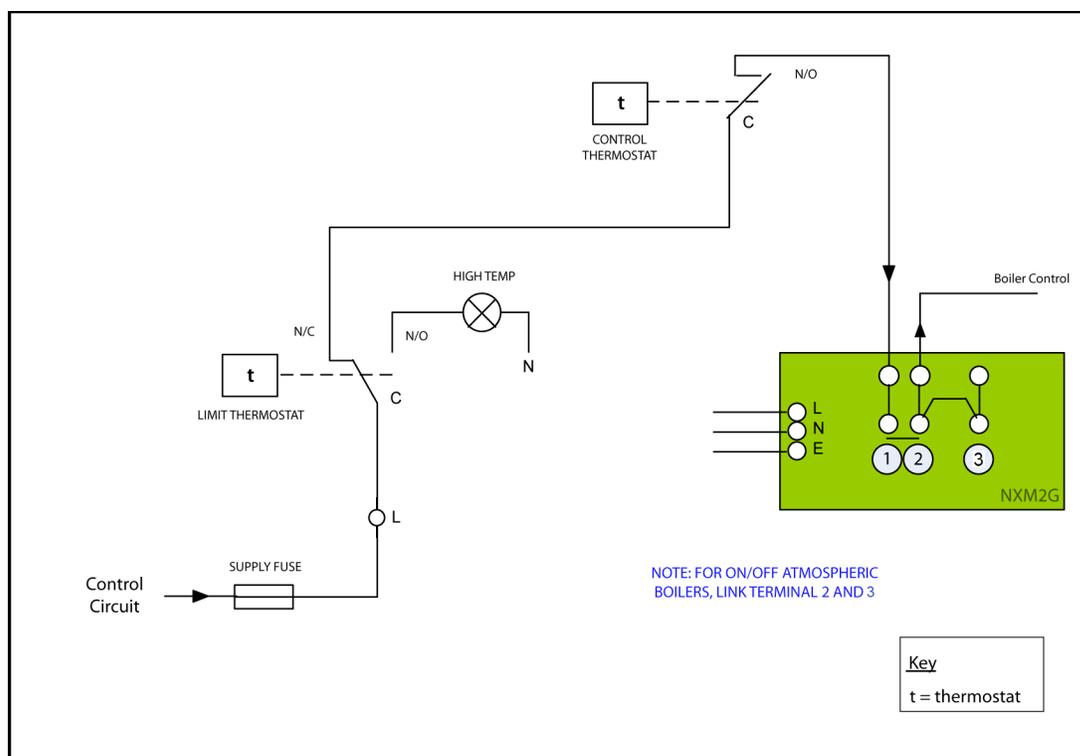**FIGURE 3.**   **Typical Wiring for single stage atmospheric boiler**

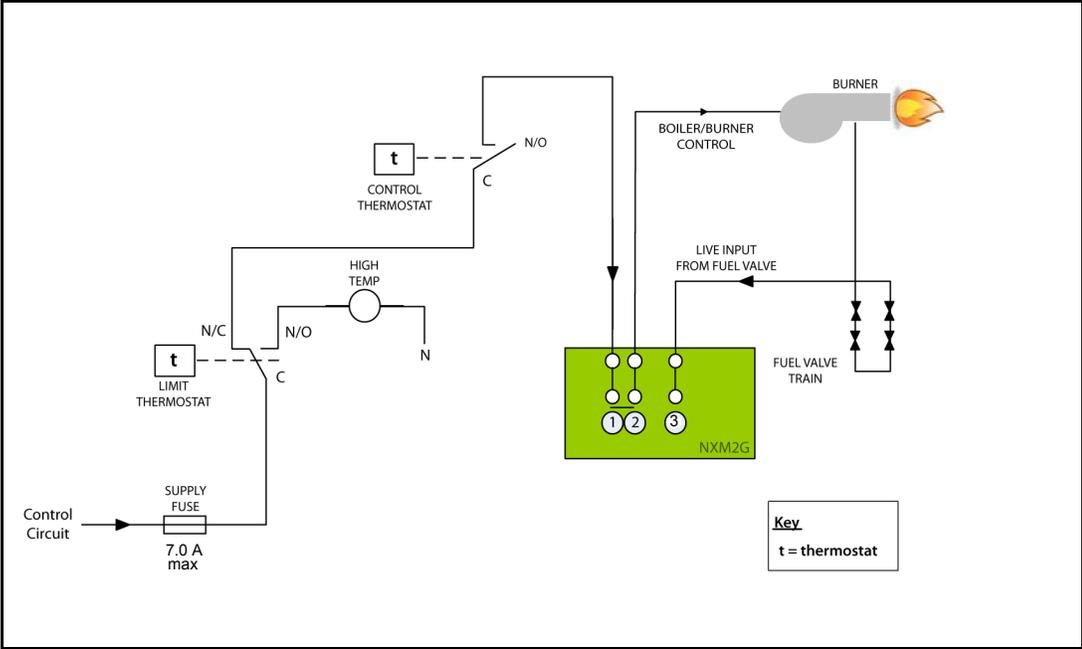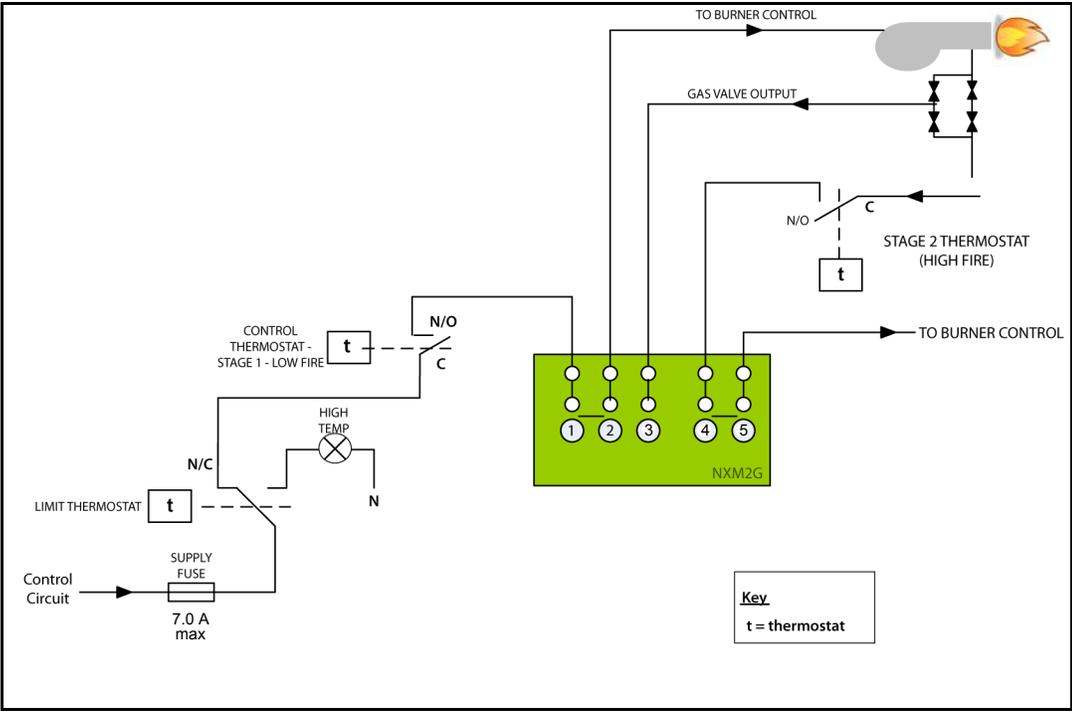**FIGURE 4.** **Typical Wiring for single stage forced draft burner**

FIGURE 5. **Typical Wiring for 2 stage High/Low force draft boiler**

INSTALLING THE NXM2G

	CAUTION: **Electrical supply to the boiler and burner must be isolated during the** **installation process.**

Before installing the NXM2G

1. Ensure that all boiler equipment is suitable for an NXM2G installation.
2. Ensure that all boiler equipment is fully functional.

Installing the NXM2G

- Mount the NXM2G wiring base on the boiler casing or on a suitable adjacent surface.
- The location should be

    free from excessive vibration

    within the specified ambient temperature rating (i.e away from hot surfaces).

- The NXM2G base can be mounted in any angular position

	CAUTION: **Ensure that the mounting area for the NXM2G is free from hidden** **electrical cables and other obstructions.**

When choosing a place to locate the NXM2G, ensure that

1. The position of the NXM2G does not obstruct the boiler access panels used for maintenance

2. The NXM2G LEDs can be viewed without restriction.

	CAUTION: **All wiring should comply with applicable electrical codes, regulations** **for local conditions.** **Use moisture / heat resistant color coded multi core cable.** **The NXM2G must be correctly grounded (earthed) to provide a minimal** **effect of AC quality problems.**

TYPICAL NXM2G INSTALLATION PROCEDURES

When installing the NXM2G, the following procedures must be followed:

- Remove the bottom wiring cover. Select the required conduit size and connections for the field wiring to the boiler controls and temperature sensors.

- Use suitable screwed fasteners such as self tapping screws. Only use the holes provided in the wiring compartment for mounting the NXM2G.

- For top mounting, use only mounting screws and brackets provided.

> **WARNING:**
> **Do not use the internal PCB area to secure the NXM2G – doing so will void the warranty**

- Use conduits to run wires to connect the boiler thermostat/s or boiler control panel to the NXM2G.

- Conduits must be used to run the flow and return sensor wires to the NXM2G.

> **TIP:**
> **Before installing the temperature sensors inside the conduits, mark either or both the flow or return sensor(s) with colored tape at both ends of the cable(s). This helps to ensure correct orientation when inserting the plugs into the NXM2G connectors. i.e. the supply (flow) sensor plugs into the supply (flow) connector on the NXM2G and the return sensor plugs into the return connector on the NXM2G.**

- Use colored multi-core cable to make the various connections between the boiler and the NXM2G.

- Remove the plug connectors from the wiring compartment. As in **Figure 1**. using the cable anchor provided, use cable ties to secure cables in the wiring compartment.

- Connect mains L, N and E (Ground) to the connector and plug into the NXM2G as in **Figure 1**. The L, N and E (Ground) must be on the same electrical phase as the boiler/burner's electrical supply.

> ⚠️ **WARNING:**
> **Ensure that the NXM2G mains electrical supply is on the same phase as the boiler / burner's electrical supply.**

- Locate the required boiler thermostat(s). Connect to the switched side of the thermostat contacts, as shown in **Figure 1.**

- Use the boiler/burner manufacturers wiring diagrams to determine the connections to the NXM2G as in **Figure 1.**

- Wire the connector as in **Figure 1.**

- Plug the connector into NXM2G as in **Figure 1.**

- The supply (flow) and supply return temperature sensors need to be fixed to the correct boiler pipe work connections; this should be as close to the boiler as possible. This may require the pipe work insulation to be removed. Using appropriate banding (clamp), secure the sensors to the pipe.

  Please note: Do not over tighten, as this may damage the sensor.

  Replace the pipe work insulation on completion. Plug the correct supply (flow) and return sensors into the NXM2G terminal as detailed in **Figure 1.**

- Ensure that all connections, including ground/earth connections, are secure. Replace covers with screws provided.

NXM2G COMMISSIONING AND FUNCTIONAL TESTS

Before commissioning the NXM2G check the following:

1. The NXM2G has been correctly positioned and is securely mounted to the mounting surface
2. The connectors in the NXM2G have been correctly wired to boiler/burner.
3. The electrical supply voltage and phase are powering the NXM2G correctly.

Commissioning the NXM2G on the boiler can now begin by following the steps below:

1. Power up the boiler and burner.
2. Observe LED status. (*Refer to Figure 6 on following page*)
3. **Note:** during "power up" all LEDs will be illuminated for a short time.
4. Confirm operation for **Thermostat on** and **Boiler firing** LEDs and check for "**Boiler firing mode**". This will allow the burner/boiler to start without interruption (i.e. not in save mode) when the NXM2G is powered for the first time. (see **Figure 6**).
5. Operate the boiler thermostat (boiler firing) to stop the boiler/burner firing. Then reset the thermostat to "call for heat" and check that the NXM2G initiates the "save mode" with the Thermostat On LED flashing.
6. Operate boiler thermostat (**stage 2 firing**) if applicable and check second stage "first firing" mode (see **Figure 6**)
7. Operate boiler thermostat (**stage 2 firing**) to reduce boiler firing to 1st **boiler firing**. Then reset the thermostat to "call for heat" and check that the NXM2G initiates the "save mode" **Stage 2 firing** LED now flashing.
8. Isolate the boiler/burner and repeat the above procedures.
9. In the event that the NXM2G does not operate as in **Figure 6**, isolate boiler/burner and check all wiring connections, and repeat steps 1 to 7.

NXM2G IN OPERATION

FIGURE 6.   NXM2G Operation Status (LED's)

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: No power or electrical supply

Key

○ = OFF

◗ = Flashing

● = ON

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Power on, not "calling for heat", boiler off

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Boiler "call for heat". Boiler held off on "Save" mode (maximum time 15 minutes)

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Burner purging, waiting for gas valve to open

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Boiler on and firing on 1st stage

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Boiler on and firing on 1st stage, 2nd stage in "Save" mode

Power
Thermostat On
Boiler Firing
Stage 2 Firing

Status: Boiler on and firing on 1st stage and 2nd stage firing

FAULT FINDING

Use the relevant flowcharts to troubleshoot non-working NXM2Gs.

Typical faults with flowchart guides to resolving the problems are:

1. Electrical Supply Fault NXM2G Power (Red) LED off – follow flowchart in Figure 7.1

2. NXM2G Power supply correct (red LED on) however, boiler is not firing during "**first firing**" – follow flowchart in Figure 7.2

3. Boiler/Burner fires during "first firing" only and will not re fire thereafter – follow flowchart in Figure 7.3

4. Boiler/Burner fires in normal way, without NXM2G operating in "Save" mode after first firing – follow flowchart in Figure 7.4

5. NXM2G Operates Boiler/Burner but **Thermostat on** and **Boiler firing** LED's remain on, when the boiler is not firing – follow flowchart in Figure 7.5

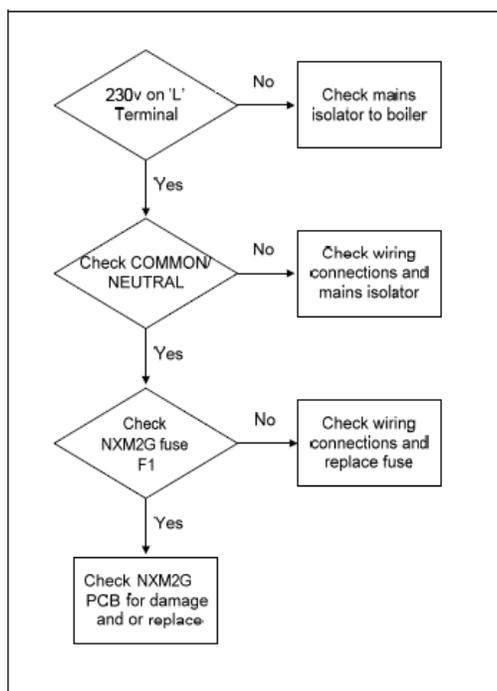**FIGURE 7.1**   **Electrical Supply Fault NXM2G Power (Red) LED off**

FIGURE 7.2 **NXM2G Power supply correct (red LED on), however boiler will not fire during "First Firing"**
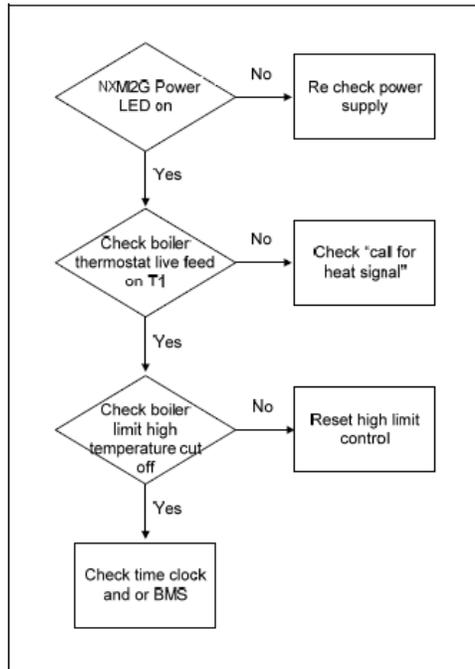

FIGURE 7.3 **Boiler/Burner fires during "First firing" only and will not re-fire thereafter**
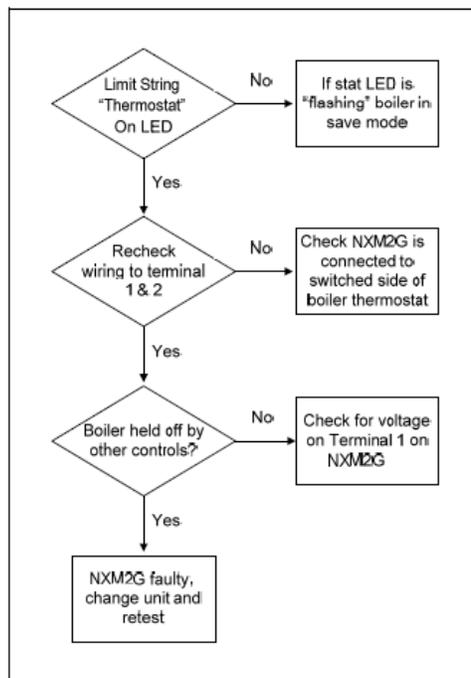
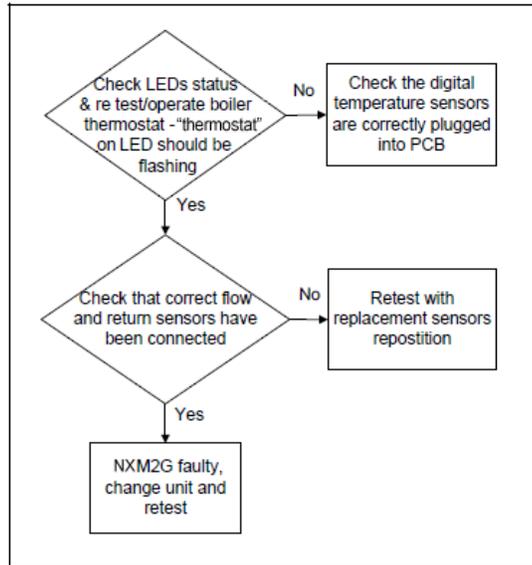**FIGURE 7.4**   **Boiler/Burner fires in normal way, without NXM2G operating in "Save" mode after first firing**

FIGURE 7.5   **NXM2G Operates Boiler/Burner but Thermostat on and Boiler firing LED's remain on, when the boiler is not firing**

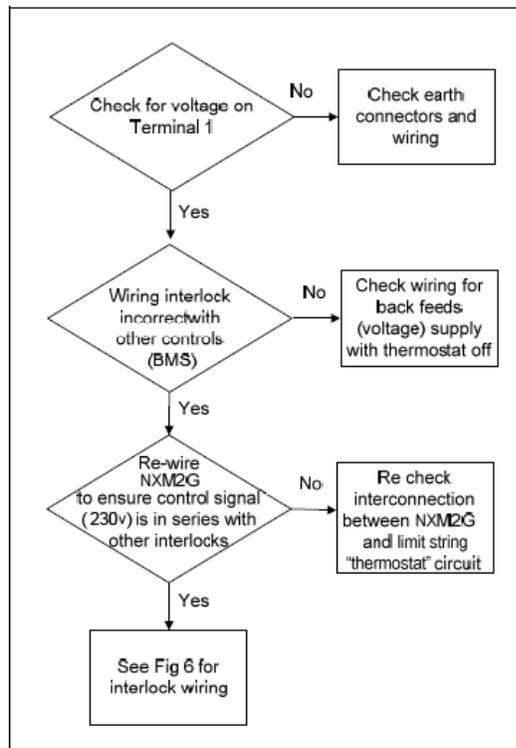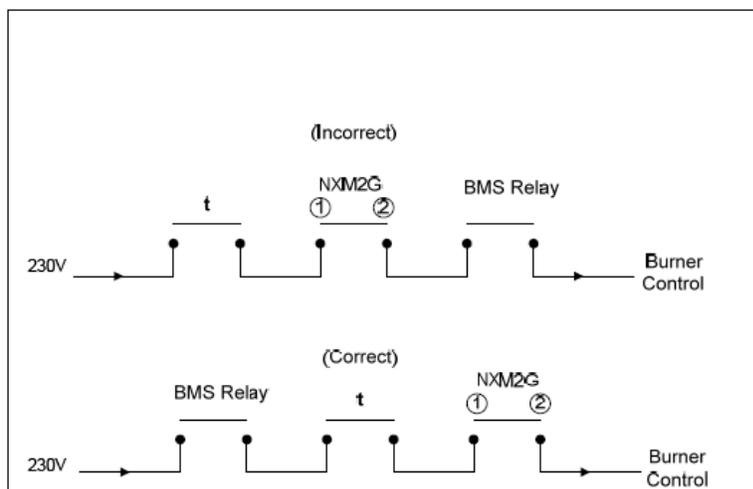**FIGURE 7.6**   **NXM2G Interlock Schematic**

NXM2G interlock schematic, showing the correct positioning of the NXM2G in the boiler control circuit.

NOTICE

When Fireye products are combined with equipment manufactured by others and/or integrated into systems designed or manufactured by others, the Fireye warranty, as stated it its General Terms and Conditions of Sale, pertains only to the Fireye products and not to any other equipment or to the combined system or its overall performance.

WARRANTIES

FIREYE guarantees for *one year from the date of installation or 18 months from date of manufacture* of its products to replace, or, at its option, to repair any product or part thereof (except lamps, electronic tubes and photocells) which is found defective in material or workmanship or which otherwise fails to conform to the description of the product on the face of its sales order. **THE FOREGOING IS IN LIEU OF ALL OTHER WARRANTIES AND FIREYE MAKES NO WARRANTY OF MERCHANTABILITY OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED.** Except as specifically stated in these general terms and conditions of sale, remedies with respect to any product or part number manufactured or sold by Fireye shall be limited exclusively to the right to replacement or repair as above provided. In no event shall Fireye be liable for consequential or special damages of any nature that may arise in connection with such product or part.