CROWN Boiler Co.

BWC Series

AM4 Module Installation Instructions

WARNING

These instructions are intended for use by a qualified heating service technician only. Do not attempt to revise the control module parameters unless you have read and fully understand these instructions. Altering the control parameter settings can result in unreliable operation, property damage, personal injury, or loss of life.

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AM4 Module Description

The AM4 module can be used with any residential BWC series boiler to serve either, or both, of two functions:

1. It allows the boiler input to be modulated solely in response to a 0-10VDC signal provided by an external control, such as a multiple-modulating boiler control. When this function is used, the boiler no longer responds to a heating thermostat or outdoor sensor connected to the boiler itself. The boiler will respond normally to a call from the domestic hot water thermostat.

2. The AM4 also provides a set of low voltage dry alarm contacts which close if the boiler MCBA goes into a hard lockout. MCBA soft lockouts will not cause the alarm contacts to close.

A. AM4 Installation Instructions For BWC070/090/120

1. Three holes to mount the AM4 mounting bracket to the BWC070/090/120 have been prepunched in on the control chassis under the pressure/temperature gauge (one of these holes is also used to hold the pink 1/4W resistor in place).

2. To remove the AM4 cover, insert a small flat blade screwdriver into the slot located on the tapered end of the control and lift the cover off. Attach the AM4 base to the AM4 mounting bracket using two #8-32 x 3/4 screws and hex nuts as shown in Figure 1.1.

3. Attach the mounting bracket to the control chassis using three #10 x 1/2 sheet metal screws as shown in Figure 1.1. Reattach the resistor using its clamp in its original mounting hole over the AM4 bracket.

4. Insert the short ribbon cable provided into the socket labeled X7 on the AM4 module and attach the other end of the ribbon cable to the socket labeled X7 or X8 on the MCBA.

5. Refer to the 0-10VDC control manufacturer's instructions for the size and type of wire to use for the 0-10VDC connections. In general, it is a good idea to route this wiring away from potential sources of electrical noise, such as transformers, power lines, and fluorescent lighting. Where such sources cannot be avoided, it may be necessary to use properly grounded shielded cable. Run the 0-10VDC wiring through one of the 7/8" openings in the control compartment under the terminal strip and connect the positive (+) wire to terminal X2-1 and the negative (-) wire to terminal X2-2 (Figure 1.4 detail).

6. Connect the alarm wiring to terminals X1-1 and X1-2 in the AM4 module (Figure 1.5) and run this wiring through one of the openings in the bottom of the control compartment.
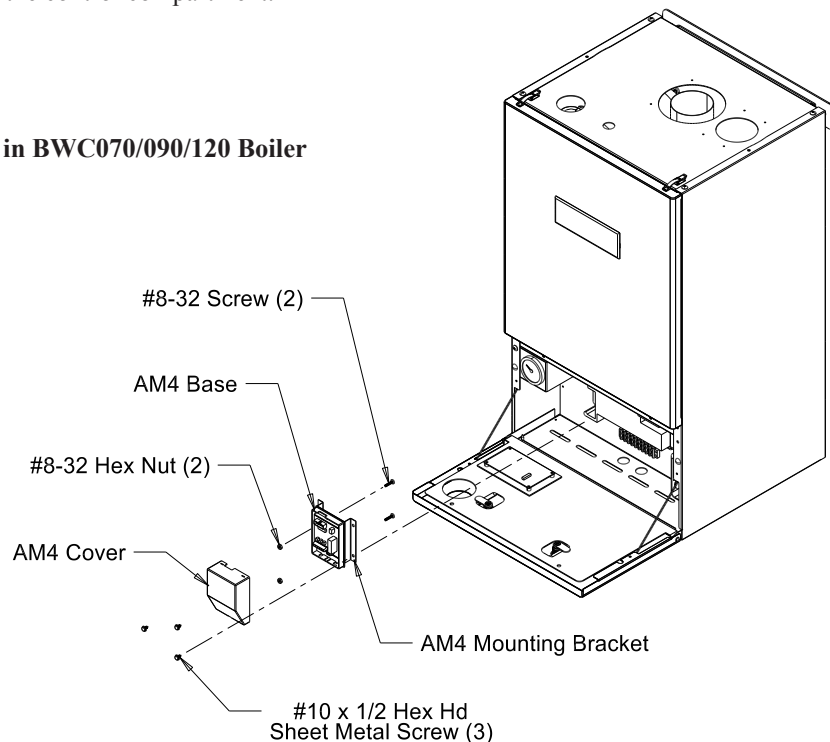
Figure 1.1: AM4 Installation in BWC070/090/120 Boiler

#8-32 Screw (2)

AM4 Base

#8-32 Hex Nut (2)

AM4 Cover

AM4 Mounting Bracket

#10 x 1/2 Hex Hd Sheet Metal Screw (3)

B. AM4 Installation Instructions For BWC150/225

1. To mount the AM4 on a BWC150/225, use the dimensions in Figure 1.2 to locate and drill two 3/16" holes as shown in Figure 1.2.
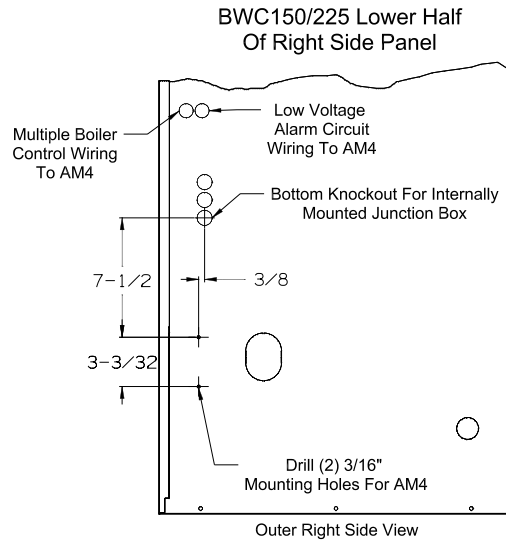

Figure 1.2: AM4 Mounting Hole Location For BWC150/225

2. To remove the AM4 cover, insert a small flat blade screwdriver into the slot located on the tapered end of the control and lift the cover off. Attach the AM4 base to the inside of the jacket panel using two #8-32 x 3/4 screws and hex nuts as shown in Figure 1.3.

3. Insert the long ribbon cable into the socket labeled X7 on the AM4 module and attach the other end of the ribbon cable to the socket labeled X7 or X8 on the MCBA. Bundle the excess ribbon cable and secure it with the clip provided on the inside of the RH jacket panel under the junction box.

4. Refer to the 0-10VDC control manufacturer's instructions for the size and type of wire to use for the 0-10VDC connections. In general, it is a good idea to route this wiring away from potential sources of electrical noise, such as transformers, power lines, and fluorescent lighting. Where such sources cannot be avoided, it may be necessary to use properly grounded shielded cable. Run the 0-10VDC wiring through one of the 7/8" openings in RH jacket panel above the junction box and connect the positive (+) wire to terminal X2-1 and the negative (-) wire to terminal X2-2 (Figure 1.4 Detail).

5. Connect the alarm wiring to terminals X1-1 and X1-2 in the AM4 module (Figure 1.5) and run this wiring through one of the openings in the RH jacket panel above the junction box.

6. Reinstall the cover on the AM4 module.

Figure 1.3: AM4 Installation in BWC150/225 Boiler

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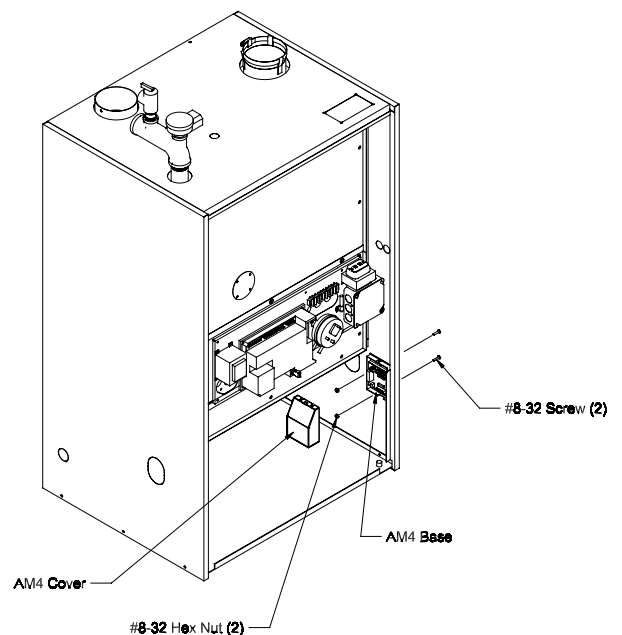
C. Reprogramming Parameter 34
(Required for 0-10VDC Input Modulation Applications Only)

The MCBA control in all BWC series boilers is factory programmed to respond to a call for heat from a room thermostat connected to the boiler. If the AM4 is used for 0-10VDC external modulation, the MCBA must be reprogrammed, before it will respond to the 0-10VDC signal. There are two ways to do this:

Using the Boiler Keypad

1. With the boiler running, toggle the Mode key until you reach the (STBY) Standby mode.

2. Depress and hold the Step key and then quickly depress and hold the Mode key for 2 – 5 seconds until the display reads (CODE). Release the Mode key, then the Step key. The display should show a 'C' followed by a random two digit number.

3. Use the + or – keys to scroll to the number 05.

4. Press the Store key momentarily and watch for the display to blink twice. CODE mode has now been activated.

5. Toggle the Mode key until you reach (PARA) Parameter mode.

6. Press the Step key to scroll to parameter 34.

7. Press the + or - key to change the parameter setting to ($--84$).

8. Press the Store key momentarily and watch for the display to blink once. Parameter 34 has now been set to its new value.

9. Press the Reset key to restart the boiler.

Using the Gascom PC Interface

To make this change using Gascom, select parameter "34 CH type (2nd digit)" and scroll to the **"0-10V analog on AM4: capacity"** setting and click OK. Then write the parameter file to the MCBA by selecting the "Write to MCBA" option.

D. Checking AM4 Operation

1. When used in 0-10VDC input modulation applications, the AM4 varies the boiler's fan speed (and therefore the firing rate) as a function of the DC voltage present across X2-1 and X2-2. The MCBA responds to the 0-10VDC input signal as follows:

    a. At a signal below 0.5 VDC the boiler will remain off.
    b. At a signal between 0.5VDC and 1.8VDC the boiler will remain in low fire.
    c. At a signal between 1.8VDC and 10VDC the boiler will operate between low fire and high fire.
    d. At a signal at, or above, 10VDC the boiler will remain in high fire.
    e. If connected, the boiler will completely ignore a heating thermostat and/or outdoor sensor connected to the boiler itself.
    f. If the boiler receives a call for domestic hot water from a thermostat connected to the boiler, it will ignore the 0-10VDC signal and respond to the call for domestic water: the central heating circulator will shut off, the indirect water heater circulator will start and the boiler input will modulate as required to maintain the target boiler supply temperature for DHW (default = 180°F).

    To verify the AM4 and modulating multiple boiler control are functioning properly, initiate a call for heat from the multiple boiler control and then vary the input voltage to insure the boiler behaves as described above. If a DHW zone is connected to the boiler, verify that a call from the DHW thermostat over-rides the AM-4.

2. When the alarm contacts on the AM4 are used (see Figure 1.5), the MCBA will close the alarm contacts and activate the alarm upon any hard lockout error code. The contacts will remain open during soft lockouts. To check the alarm function, turn off power to the boiler and unplug the connector at the low water cut-off. When the boiler is turned back on, the alarm should activate. To restore normal operation, plug the LWCO back in and push the reset button on the boiler.

3. Replace any boiler and jacket components removed during the AM4 installation process. Before leaving the jobsite, refer to the Start-up and Check-out procedure in the boiler instruction manual to verify proper operation of the boiler.

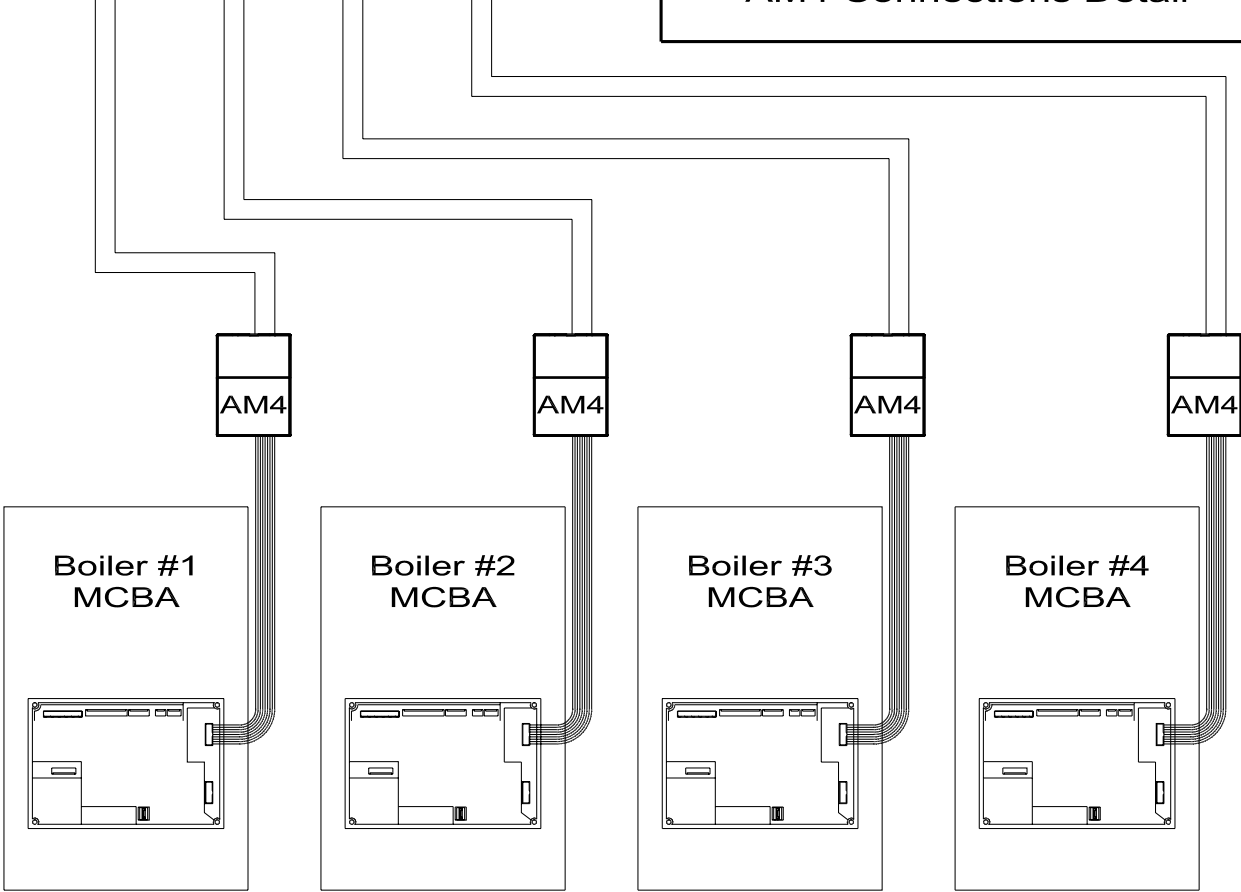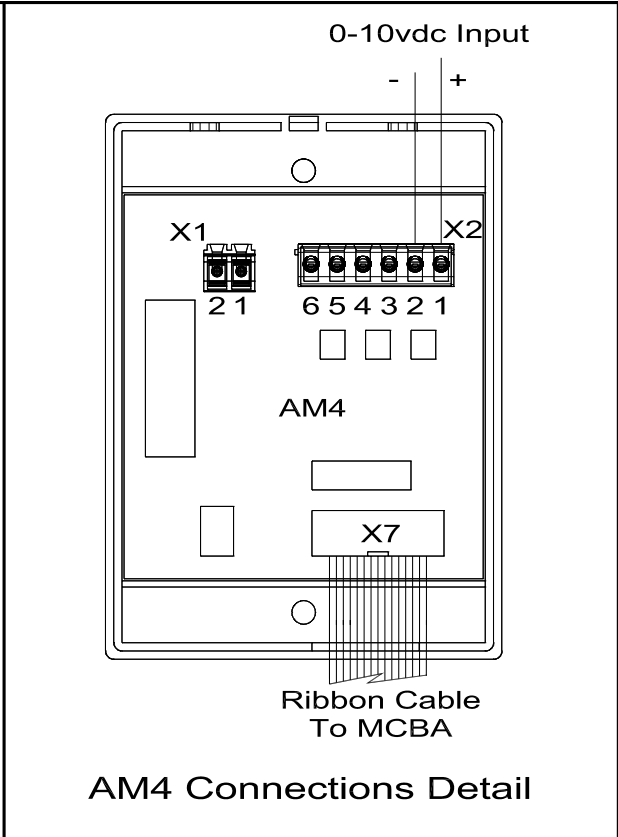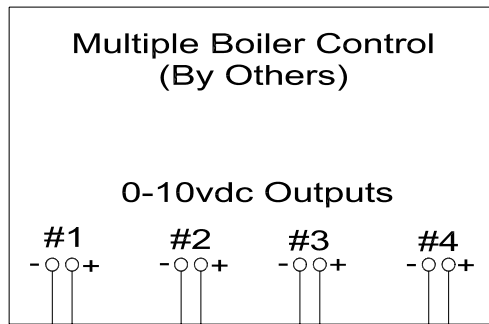# Use Of AM4 With Multiple Boiler Control

0-10vdc Input

− +

X1 X2

2 1 6 5 4 3 2 1

AM4

X7

Ribbon Cable
To MCBA

AM4 Connections Detail

Multiple Boiler Control
(By Others)

0-10vdc Outputs

#1 #2 #3 #4
− ○○ + − ○○ + − ○○ + − ○○ +

AM4 AM4 AM4 AM4

Boiler #1
MCBA

Boiler #2
MCBA

Boiler #3
MCBA

Boiler #4
MCBA
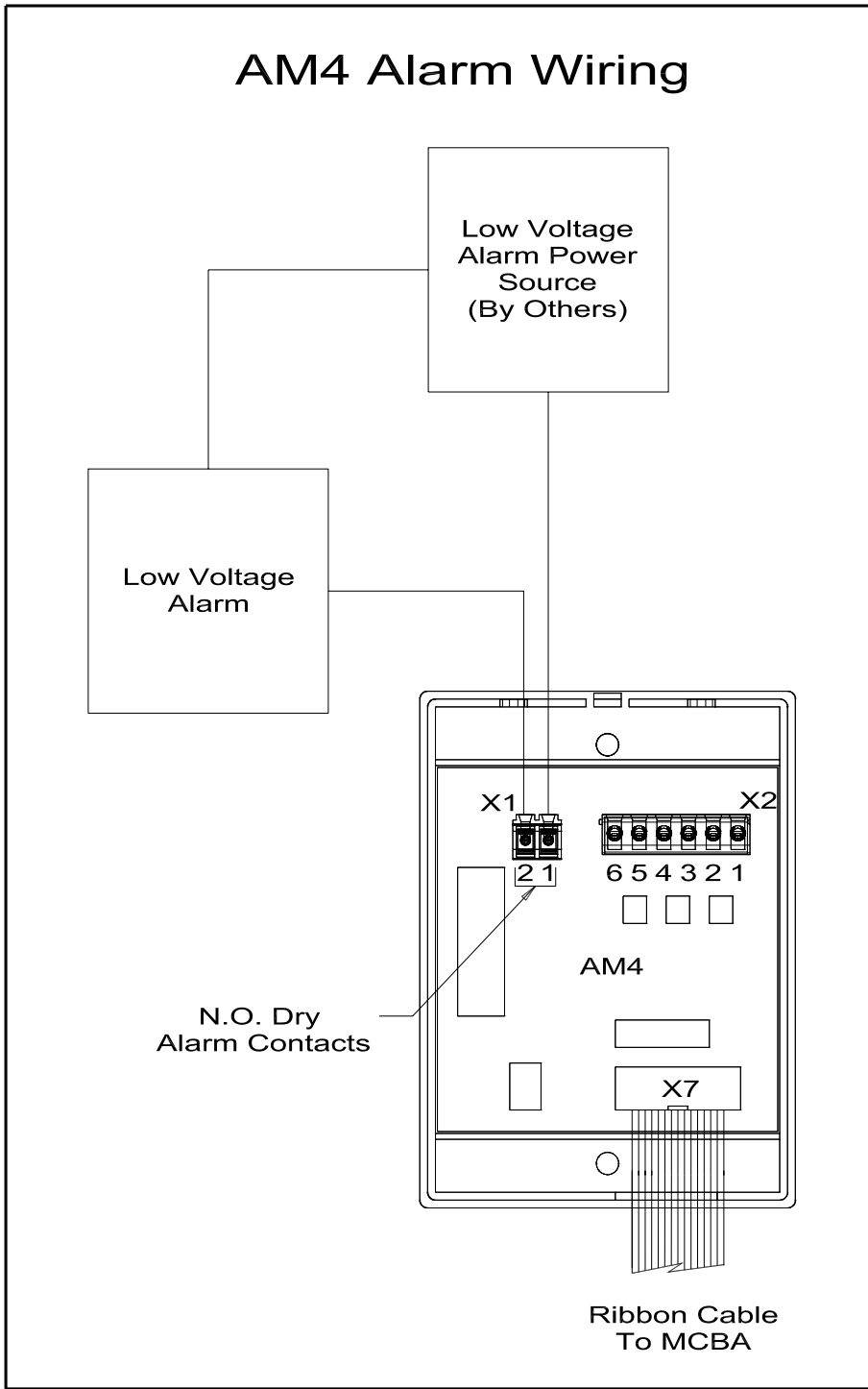
Figure 1.4: Use Of AM4 With Multiple Boiler Control

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AM4 Alarm Wiring

Low Voltage
Alarm Power
Source
(By Others)

Low Voltage
Alarm

X1

X2

2 1

6 5 4 3 2 1

AM4

N.O. Dry
Alarm Contacts

X7

Ribbon Cable
To MCBA

Figure 1.5: AM4 Alarm Wiring

AM4 Installation Kit Parts List

Decscription	PN	Qty
AM4 Module	3501080	1
Short Ribbon Cable	9602308	1
Long Ribbon Cable	9602400	1
AM4 Mounting Bracket	230430	1
#8-32 x 1/2" Machine Screw	90-052	2
#8-32 Hex Nut	90-053	2
#10 x 1/2" Sheet Metal Screw	90-212	3
Ribbon Cable Clip	900012	1

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