
Albion Electronics

DESIGN ● MANUFACTURE ● CONSULTANCY

Abbey House,
19 - 21 Fleet Street,
Pemberton,
Wigan,
WN5 0DU.
England.



Telephone:
0942 227652
Facsimile:
0942 227653
Modem:
Request Access

APPLICATION NOTE FOR MODULATING BOARD M008

Introduction.

The M008 board is a two-channel modulating control for combination boilers. It is a PI (Proportional+Integral) controller and, as such, is capable of very good temperature control.

The board can be used with either open flue or RSF appliances depending on whether it is interfaced directly to the gas valve, via an ignition board, or via a full sequence controller (terminal TB13).

Thermistors.

Due to its fine temperature control capability, special high response thermistor probes are recommended for use with the M008. Two of these thermistors are needed, one each for Domestic Hot Water (TB4) and Central Heating (TB5). It is possible to operate both channels using a single thermistor inserted at a suitable point in the primary water circuit and connected to terminal TB5. To do this R11 is left off the board, link LK1 is added and resistors R5,12 reviewed. This saves the cost of a thermistor at the price of a poorer but acceptable regulation on the HW channel.

Two potentiometers connected to TB6 and TB7 are used to set the temperatures for the domestic hot water and central heating respectively.

The M008 incorporates features which allows the optimum efficiency to be obtained from any given application whilst not compromising on comfort features.

For example, when used with the F007xxx¹ full sequence control board, it is able to modulate with a dual air rate thus allowing a higher turn down ratio than would normally be possible with only a single air rate.

¹ Refer to Application Notes for F007xxx.

Also as an efficiency feature, the M008 incorporates an electrical minimum-output limit (factory-set) on the heating side as well as an adjustable electrical maximum limit. The presence of the electrical minimum-output on heating means that a very high turndown ratio can be obtained on domestic hot water output whilst still obtaining a very good efficiency performance on the heating.

An anticycling feature on the heating side is provided in the form of a timed delay of between 2 and 5 minutes (depending on the ambient temperature of the board (issue 1 only)).

The issue 2 board has a variable anticycling time which can be adjusted from approximately 40 seconds to 3.5 minutes. The bottom limit effectively means the delay can be removed if required.

CONNECTIONS

1. TB1:- This is the Fan Speed Control interface between the M008 and the F007xxx. Through it the M008 signals to the F007xxx when the fan should be at high speed and when it should be at low speed.
2. TB2:- Output drive to the modulating gas valve.
3. TB3:- Flow Switch for domestic hot water. Pins 1 & 3 are used for this purpose. The remaining pins are reserved for future use with Albion's electronic water flow sensor.
4. TB4:- Domestic Hot Water thermistor.
5. TB5:- Central Heating thermistor.
6. TB6:- Hot Water temperature set-point potentiometer. Value is 10k linear.

Pin Assignment:-

1	---> No Connection
2	---> Maximum
3	---> Wiper
4	---> Minimum

7. TB7:- Central Heating temperature set-point potentiometer.

Pin Assignment:-

1	---> Maximum
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2 ---> Wiper
3 ---> Minimum
4 ---> No Connection

8. TB8:- Mains power supply consisting of screw terminal connections for Live, Neutral, and Earth. "Earth" refers to the same electrical potential as the appliances main frame.

9. TB9:- Not used. Reserved for future use. Refer to note 2 on page 8.

10. TB10:- Terminal block for connecting programmer and room thermostat.

Pin Assignment:- 1,2 ---> Room Thermostat
3 ---> Neutral
4 ---> Switched Live Input
5 ---> Permanent Live

Pins 1 and 2 are normally linked together and this link should be removed if an external room thermostat is required. It should be ensured that the external room thermostat is wired with a double insulated cable as these terminals are live. The same requirement applies to the external programmer if used.

11. TB11:- Shorting the two pins of this terminal together would force the burner into a medium/high fire mode which is better for initial burner lighting. When this terminal is connected to the F007xxx via a special harness (specified by Albion), the F007xxx automatically shorts the pins together during ignition and releases them at any other time.

12. TB12:- Not used. Reserved for future use.

13. TB13:- Powers the Safety Gas Valve. This terminal only powers the gas valve directly in case of a permanent pilot appliance. For an appliance with electronic ignition, it powers the ignition board which is responsible for powering the gas valve and flame supervision.

Pin Assignment:- 1 ---> Earth
2 ---> No Connection

3 ---> Neutral
4 ---> Output

14. TB14:- Pump. Maximum pump current of 1 Ampere.

Pin Assignment:- 1 ---> Earth
 2 ---> Neutral
 3 ---> No Connection
 4 ---> Output

15. TB15:- Front panel mains ON/OFF switch.

Pin Assignment:- 1 ---> Neutral
 2 ---> Switched Live
 3 ---> Live

16. TB16:- Winter/Summer switch. Switch is closed for winter.

17. RV1:- Maximum heating output preset adjustment for central heating.

SPECIFICATION.

Supply Voltage	220/240	Volts
Supply Voltage Frequency	50/60	Hz
Power Consumption	12	VA ⁽²⁾
Operating Temperature	0 - 60	°C

Nominal Temperature Range:-

Central Heating	60 - 90	°C
Domestic Hot Water	40 - 60	°C
Steady State Tolerance	< +/- 0.5	°C
Load Regulation ⁽³⁾	≤ 0.3	°C/kW

Recommended Thermistors:-

Special Thermistor Probe Reference:- THP103NDL1.

Temperature Potentiometers:-

Value	10k Linear	ohm.
Tolerance	≤ 20 %	

Mechanical Form should be decided by the user.

Board Size:- 170 x 100 mm.

Environmental:-

Ambient Temperature	60	°C
Mounting Means	4 Corner Holes	Dia. 4 mm
Mounting Orientation	Any except upside down.	
Enclosure	Minimum of IP40 recommended.	

² Electronics board only, not including other attachments.

³ Domestic Hot Water only. Figure depends on appliance design but this represents a typical figure on some practical applications.

Track Layout.



