



# **Domestic Boiler Management System**

**Energy Efficiency Improvement of >30%**

Results of Trials in Domestic Tenanted Properties  
West Country Housing Association

## Domestic Boiler Management (Domestic Gas, Oil and LPG Boiler Management)

This document explains the features and benefits of the Domestic Boiler Management system and provides the results from a number of monitored trials.

### What is Domestic Boiler Management?

The Domestic Boiler Management unit is an intelligent way of controlling the cycles of a domestic boiler, reducing unnecessary boiler firing (dry cycling) and by doing so typically reduces the annual fuel cost of running a domestic boiler by 20% (subject to boiler usage pattern).

The unit is compatible with mains gas, LPG and oil boilers, using a unique variable thermal response program and electronic sensors to intelligently manage boilers, maximising efficiency while ensuring the demand on the heating system is met in full.

### Features & benefits

- Reduces energy usage and carbon footprint
- Save money without compromising on the provision of your heating or hot water
- Compact and unobtrusive
- Easy to install by a qualified electrician
- Typical payback within 2-3years
- Typically reduces the annual cost of running a domestic boiler by 20% (subject to boiler usage pattern)
- Full digital display
- User keypad
- Software driven

### What does the Domestic Boiler Management unit do?

The Domestic Boiler Management unit is fitted to your boiler and will manage the boiler to maximise the efficiency and still deliver the heat and hot water levels you require. This will reduce the operating costs and the levels of carbon dioxide released into the atmosphere.

The unit gives far more control over your central heating system and reduces the time the boiler needs to fire in order to maintain a steady temperature. It achieves this by electronically measuring the temperature of the flow and return pipes of the central heating system. Information from the sensors is used to accurately vary the system temperature output according to the demand imposed. In essence it will only allow the boiler to fire if the water drops outside of the required temperature variance. This means you get better and more accurate control with your central heating at a significantly reduced cost.

The unit does come with a “Boost” function, so if you wish to boost the hot water for example you can do this still.

### Typical installations

The Domestic Boiler Management unit is compatible with mains gas, LPG and oil boilers so would be appropriate in the majority of domestic households.

## Technical specification

	Domestic Boiler Management	Domestic Boiler Management Plus
<b>Product code</b>	BM1001	BM1002
<b>Mains supply</b>	240Volts AC 50Hz 1Ph	240Volts AC 50Hz 1Ph
<b>Consumption</b>	3VA	3VA
<b>Switching mode</b>	Volt free	Volt free
<b>Switching current</b>	5Amp	5Amp
<b>Boiler stability</b>	Single small domestic boiler	Single small domestic boiler
<b>No of channels</b>	1 boiler	1 boiler
<b>Standard equipment</b>	1 mains controller, 1 flow sensor, 1 return sensor, 1 mains harness	1 mains controller, 1 flow sensor, 1 return sensor, 1 mains harness
<b>User adjustments</b>	Boiler temperature, active/bypass switch	Boiler temperature, active/bypass switch
<b>Viewing indicators</b>	Current mode, boost, system temperatures	Current mode, boost, system temperatures
<b>Indicator type</b>	LCD display	LCD display
<b>Dimensions</b>	177mm(w) x 120mm(h) x 37mm(d)	177mm(w) x 120mm(h) x 37mm(d)

All connections are external to the boiler

## Trial data

Trials were conducted in properties where the tenants by the nature of their age or incapacity require longer heating times. These people are more likely to be categorised as being more greatly effected by fuel poverty and would therefore benefit significantly from the reduction in energy consumption and therefore cost that the unit can deliver.

The following pages detail the results of a number of trials.

## Test methodology

The methodology uses day on / day off test procedures to monitor the fuel savings achieved by its energy management systems because of its accuracy. Day on / day off test monitoring calculates and compares boiler firing times to analyse fuel savings based on current fuel consumption. This eliminates any miscalculations due to historical variances.

In brief, one day the Domestic Boiler Management unit controls the boilers (Active Mode) and the next day the unit is in bypass and the boilers revert back to their normal mode of operation (Bypass Mode). This process is automatically repeated throughout the test period.

In cases where likelihood of seasonally warmer weather, or householder usage patterns, the test software measures boiler demand periods as well as firing. So where heating is occasionally switched off during the trial period we still able to calculate fuel saved by comparing the relative % of boiler firing as a proportion of demand during bypass days and active days.

## Mrs. A - Housing Association Tenant

### Test period

22 January – 5 February 10.00 2009 – 14 days 8 hrs

### Heating plant

1 x domestic wall mounted oil fired condensing boiler providing heating and hot water.

### Product tested

Domestic Boiler Management BM1001

### Final meter readings

Single boiler      Active firing time: 000953 units  
                          Bypass firing time: 001392 units

### Calculation

Fuel saved is expressed as the percentage reduction in boiler firing time during Active mode compared to bypass mode. In this case data was captured part way through a bypass mode day.

Accordingly the figures need to be corrected to establish the both the average hourly active and bypass modes, thus:

Average active units per hour 953 units / 176 hours = 5.41  
Average bypass units per hour 1392 units / 168 hours = 8.29

$$\frac{8.29 - 5.41 \times 100}{8.29} = 34.74\%$$

### Notes

Several calls were made during the trial and no problems were reported to us. But the trial was cut short owing to the house being vacated and power cut off. The reads shown were the last recorded prior to the house being vacated.

Please note these tests were carried out by CarbonAqua and Total Energy Controls Ltd and all results and data has been provided by them using the measurement criteria described in the "Test methodology" detailed above. Savings levels achieved will be dependant upon individual household and usage.

**Mr. Z, Newbury, Housing Association tenant**

**Test period**

19 February – 20 March 2009 - 30 days.

**Heating plant**

1 x domestic wall mounted gas fired conventional boiler providing heating and hot water.

**Product tested**

Domestic Boiler Management BM1001

**Final meter readings**

Single Boiler      Active demand: 008462 units  
                          Active firing: 001819 units  
                          Bypass demand: 008593 units  
                          Bypass firing: 002700 units

**Calculation**

Fuel saved is expressed as the proportion of actual boiler firing during available demand periods, in active mode compared with bypass mode, thus:

Active firing       $\frac{1819 \times 100}{8462} = 21.49\%$  of the time available  
Active demand      8462

Bypass firing       $\frac{2700 \times 100}{8593} = 31.42\%$  of the time available  
Bypass demand      8593

$$\frac{31.42 - 21.49 \times 100}{31.42} = 31.60\%$$

**Notes**

Several calls were made during the trial and no problems were reported to us.

Please note these tests were carried out by CarbonAqua and Total Energy Controls Ltd and all results and data has been provided by them using the measurement criteria described in the "Test methodology" detailed above. Savings levels achieved will be dependant upon individual household and usage.

**Mrs. & Mrs B, Didcot, Oxon** (disabled middle aged couple)

**Test period**

12 March – 10 April 2009 inclusive – 30 Days

**Heating plant**

1 x domestic wall mounted gas fired conventional boiler providing heating and hot water.

**Product tested**

Domestic Boiler Management BM1001

**Final meter readings**

Single Boiler      Active demand: 003242 units  
                          Active firing: 000781 units  
                          Bypass demand: 002104 units  
                          Bypass Firing: 001304 units

**Calculation**

Fuel saved is expressed as the proportion of actual boiler firing during available demand periods, in active mode compared with bypass mode, thus:

$$\begin{array}{l} \text{Active firing} \quad \frac{781 \times 100}{3242} = 24.09\% \text{ of the time available} \\ \text{Active demand} \quad 3242 \end{array}$$

$$\begin{array}{l} \text{Bypass firing} \quad \frac{1304 \times 100}{2104} = 61.98\% \text{ of the time available} \\ \text{Bypass demand} \quad 2104 \end{array}$$

$$\frac{61.98 - 24.09}{61.98} \times 100 = 61.13\%$$

**Notes**

Several calls were made during the trial and no problems were reported to us. Mrs B suffers from Rheumatoid Arthritis requiring long spells of heat from the central heating to remedy her pain. This would explain heavy demand periods of gas usage for heating. This is causing the boiler to dry cycle enabling the unit to achieve higher than usual savings. Mrs B commented on how her pre-payment usage had significantly reduced since the Domestic Boiler Management unit was installation.

Please note these tests were carried out by CarbonAqua and Total Energy Controls Ltd and all results and data has been provided by them using the measurement criteria described in the "Test methodology" detailed above. Savings levels achieved will be dependant upon individual household and usage.

**Mr. X (elderly private tenant), Paignton**

**Test period**

30/10/2006 to 28/11/2006 – 30 Days

**Test procedure**

Day on / day off monitoring recording boiler firing times.

**Product tested**

Domestic Boiler Management BM1001

**Heating plant**

1 x Wall mounted Baxi gas fired boiler providing both heating and hot water.

**Final meter readings**

Boiler 1 Active firing time: 001691 units  
Bypass firing time: 002840 units

**Calculation**

Active firing time total = 1691  
Bypass firing time total = 2840

Fuel saved is expressed as the percentage reduction in boiler firing time during Active mode compared to Bypass mode, thus:

$$\frac{2840 - 1691 \times 100}{2840} = 40.45\%$$

**Customer comments**

No problems reported.

Please note these tests were carried out by CarbonAqua and Total Energy Controls Ltd and all results and data has been provided by them using the measurement criteria described in the "Test methodology" detailed above. Savings levels achieved will be dependant upon individual household and usage.

**Mrs. Y (elderly private tenant), Plymouth**

**Test period**

25/10/2006 to 24/11/2006 – 30 Days

**Test procedure**

Day on / day off monitoring recording boiler firing times.

**Product tested**

Domestic Boiler Management BM1001

**Heating plant**

1 x Vaillant Ecomax 24 gas fired boiler.

**Final meter readings**

Boiler 1	Active firing time:	000907 units
	Bypass firing time:	001739 units

**Calculation**

Active firing time total = 907  
Bypass firing time total = 1739

Fuel saved is expressed as the percentage reduction in boiler firing time during Active mode compared to Bypass mode, thus:

$$\frac{1739 - 907 \times 100}{1739} = 47.84\%$$

**Customer comments**

No problems reported.

Please note these tests were carried out by CarbonAqua and Total Energy Controls Ltd and all results and data has been provided by them using the measurement criteria described in the "Test methodology" detailed above. Savings levels achieved will be dependant upon individual household and usage.