Domestic Central Heating
Wiring Systems and Controls
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The purpose of this unique book is to provide a comprehensive reference manual for hundreds of items of heating and control equipment and provide trained engineers with a vitally important resource so that they will be able to take advantage of the huge changes currently taking place in the heating industry. Since this book was first published in 1998 the need to be conversant with energy controls has increased considerably due to the introduction on 1st April 2002, of a revised Part L of the Building Regulations. These regulations provide for a continuing obligation to install efficient heating equipment and controls.

Part L will continue to be revised; new regulations are to come into force on 1st April 2005 and future revisions could stipulate that only high efficiency condensing boilers can be installed from around 2007/2008. Clearly the opportunities for qualified installers will exist as the replacement market expands and this book will prove invaluable in providing the information necessary as systems are changed from ‘old’ gravity systems to a more efficient fully pumped system with full controls.

These regulations demand that efficiency is taken into account when installing a new heating system or updating existing systems. This will have a major impact on the domestic heating industry and provide untold business opportunities for installers who educate the consumer on energy efficiency in their homes and the benefits to the environment due to the reduction in carbon emissions.

In new and existing properties, all new systems are required to be fully pumped whereas existing systems will require upgrading to meet the new levels of efficiency required when the boiler is replaced. This could be installing room and cylinder thermostats, timers or thermostatic radiator valves.

There will be occasions when a gravity system cannot be upgraded so when installing a new boiler it will be necessary to fit controls that ensure that the boiler does not fire when there is no demand for heat. This is referred to as a ‘boiler interlock’ in the regulations. This will most likely be a room thermostat, a cylinder thermostat and a motorized valve, e.g. Honeywell ‘C’ Plan system.

Gradually, gravity hot water systems will diminish whilst high efficiency condensing boilers will become the norm. The range of condensing boilers available to installers is increasing month by month and this is reflected in this revised edition of this book where the number included has greatly increased. How many manufacturers take on the challenge of producing a back-boiler to meet efficiency limits remains to be seen but the replacement market will be immense.

This second edition includes a huge number of additional combination boilers due to the fact that over two-thirds of boilers sold are combi’s. Also included are controls that have been developed using the latest technology. These include room thermostats that use radio frequency and so are ‘wire-free’ and also programmable room thermostats, an option when installing a combination boiler.

Also added to this edition is the SEDBUK rating where this is known. SEDBUK stands for Seasonal Efficiency of Domestic Boilers in the UK and is the standard for measuring the efficiency of boilers. For many of the older boilers no data is available. Some models vary on the SEDBUK rating depending on the output. Some efficiency values are minimal but will cause a boiler to be in a different band. The efficiency ratings are:

- 90% and above Band A
- 86–90% Band B
- 82–86% Band C
- 78–82% Band D
Preface

- 74–78% Band E
- 70–74% Band F
- Below 70% Band G

More information can be obtained from www.boilers.org.uk or www.heatingcontrols.org.uk

It is intended that those persons with the appropriate skills and knowledge to work safely on electrical systems use this book. It is not intended for the do it yourself enthusiast or unskilled homeowner. A reminder is given that only persons registered with CORGI may carry out work on certain aspects of gas appliances and equipment.
ACKNOWLEDGEMENTS

The author wishes to thank Meryl Brooks for her continued support and assistance in compiling this revised edition. Also, the manufacturers, who have continued to provide data and allow their diagrams and illustrations to be reproduced. Thanks also to Richard Hawkes for his diligence in drawing the system wiring diagrams. Finally, the editorial staff at Elsevier, in particular, Rebecca, Hayley and Matthew, for their continual guidance and expert advice, which was greatly appreciated.
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Guide to use

It is essential that this section is read and understood thoroughly prior to use of the book. All information supplied is believed to be correct, and as such no responsibility can be taken for errors or misuse of information.

General

All equipment is listed in numerical and alphabetical order within its own section, and where items are included elsewhere this is mentioned. An index at the back of the book gives additional information.

Manufacturers and trade names

Over the years manufacturers have merged or been taken over by other companies and every effort has been made to guide the reader to the correct location for information. However some items were manufactured under two names, e.g. Apollo boiler was produced by Myson and Thorn but Myson have since merged with Potterton, therefore a list is given below of where some difficulties may arise:

(a) ACL, Drayton, Grasslin, Invensys, Motortrol, Switchmaster, Tower
(b) Danfoss, Randall
(c) Baxi, Myson, Potterton, Thorn
(d) Satchwell, Sunvic, Terrier
(e) Landis & Gyr, Landis & Staefa, Siemens

Reference to the manufacturers’ and trade names directory in Chapter 14 will also help.

Programmers and time switches

These are listed in Chapter 2 in manufacturer order. The first detail is whether the item is electromechanical (driven by a motor) or electronic. Then the setting programme is indicated, i.e. 24 hour, 5/2 day (weekday/weekend), or 7 day. The terms ‘Basic’ and/or ‘Full’ are used if the item is a programmer. The term ‘Basic’ means that the programmer does not have the facility for programming ‘central heating only’ and would be used, e.g. in a gravity hot water, pumped central heating system. The term ‘Full’ means that central heating can be selected without hot water such as is required for a normal fully pumped system. Programmers described as ‘Basic/Full’ have the facility for either option and details are given on how to alter the programmer as required. The maximum number of switching options (on/off), usually per day, are given as well as the current rating of the programmer switch in amps. The rating given will be for a resistive load and a rating for inductive loads may be given in brackets. Dimensions are also given in millimetres and this information can be extremely useful when having to replace an obsolete or unavailable model.

Programmers and time switches with inbuilt or external sensors or thermostats

Wiring and specification details are broadly similar to that given for the room thermostats and programmers.

Wiring system diagrams

Diagrams of all usual systems are included plus those of systems where special requirements may need to be met. All of the full system diagrams are based on the use of a junction box or wiring centre, although it is of course possible to connect wiring into a suitable programmer by following the wiring through. A full list of wiring diagrams included is
given at the beginning of Chapter 12. **Important note:** for clarity all earth connections have been omitted but must be made where required.

**Cylinder and pipe, room and frost thermostats**

The room and frost thermostat details are listed separately to those of the cylinder and pipe thermostats, although the information given is similar. It can be assumed that all thermostats are suitable for 240V unless stated otherwise. The terminal identification is given as follows:

<table>
<thead>
<tr>
<th>Common</th>
<th>The ‘live in’ terminal. In the case of a room thermostat, e.g. this would be from the ‘heating on’ terminal of the programmer in most cases.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>This contact will be ‘made’ to the common when the thermostat is calling or demanding heat.</td>
</tr>
<tr>
<td>Satisfied</td>
<td>This terminal will be ‘made’ to the common when the thermostat has reached the required temperature or is ‘satisfied’.</td>
</tr>
<tr>
<td>Neutral</td>
<td><em>Room thermostats</em> – should be wired where shown as this enables the heat anticipator to function and therefore make the thermostat more accurate and sensitive to alteration in temperature fluctuation.</td>
</tr>
<tr>
<td></td>
<td><em>Cylinder thermostats</em> – required for Potterton PTT1 and PTT2.</td>
</tr>
</tbody>
</table>

Also included are the available scale settings, the dimensions in millimetres, and the current rating of the thermostat contacts.

**Motorized valves**

Besides providing for wiring details of motorized valves and actuators as below, information is also included regarding port layout of 3-way valves, current rating of auxiliary switch, if fitted, and pipe sizes available.

Where the motorized valve or actuator is of a common type, e.g. 2-port spring return, diverter (3-port priority) or mid-position 3-port, then wiring may be given as *standard colour flex conductors* and these are as follows:

**2-port 5-wire (or 4-wire without earth), spring return**

<table>
<thead>
<tr>
<th>Brown</th>
<th>Energize motor, usually to open valve</th>
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<tbody>
<tr>
<td>Blue</td>
<td>Neutral</td>
</tr>
<tr>
<td>Green/yellow</td>
<td>Earth (if fitted)</td>
</tr>
<tr>
<td>Orange</td>
<td>Live-in for auxiliary switch</td>
</tr>
<tr>
<td>Grey</td>
<td>Live-out from auxiliary switch when valve energized</td>
</tr>
</tbody>
</table>

**Note:** In the 2-wire auxiliary switch the orange and grey leads can be reversed. They may also have the colour coding black-black, white-white, or black-white, depending upon age and manufacturer.

**2-port 6-wire (or 5-wire without earth), spring return**, (excluding Sunvic SZ1302/2302)

As above with extra:

| White     | Live-out from auxiliary switch when valve de-energized. Orange and grey must be wired correctly as above. If this wire is spare then it must be made electrically safe. |

**3-port diverter – priority, spring return**

<table>
<thead>
<tr>
<th>Brown</th>
<th>Energize motor to open closed port (usually energized to open port to central heating)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>Neutral</td>
</tr>
<tr>
<td>Green/yellow</td>
<td>Earth (if fitted)</td>
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</table>

**3-port mid-position**

<table>
<thead>
<tr>
<th>Orange</th>
<th>From cylinder thermostat demand and to boiler and pump. Note that pump may need to be wired into boiler if boiler has pump over-run requirement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/brown</td>
<td>From programmer ‘central heating on’ via room thermostat if fitted.</td>
</tr>
</tbody>
</table>
Grey From cylinder thermostat satisfied and also from ‘hot water off’ of programmer if possible. Without this second connection then ‘central heating only’ could not be selected if programmer is of the Full control type.

Blue Neutral
Green/yellow Earth (if fitted)

Boilers

The problem with boilers and associated information is deciding which ones should be included and how old. We have attempted to include all boilers that were still in production in 1989 and to date, therefore some boilers over 15 years old may be included, although it is felt that boilers beyond this time are unlikely to be incorporated into an updated system.

Besides wiring, the following information on boilers is included:

(a) Heat exchanger material
(b) Suitability for sealed systems
(c) Whether for fully pumped systems only
(d) Wall or floor mounted, or back boiler unit
(e) SEDBUK rating.

The wiring of standard boilers is usually of two methods. Either a simple switched live, or, in the case of a boiler with pump overrun, a permanent live, switched live and pump live. Some back boiler units may require a permanent live to enable the bulbs on the fire front to work when the boiler is off. The wiring of combination boilers is usually via a voltage-free switch of a time clock.

Ancillary equipment

Brief details of domestic compensator systems, boiler energy controls and similar are given and these are listed at the beginning of the section.
Programmers and time switches

ACL FP

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L N HW HW CH CH

MAINS ON OFF ON OFF

(a) Fully pumped 2 × 2 port motor open/close valves links 4–9, 5–7
(b) Fully pumped 2 × 2 port spring return valves, 1 × 3-way mid-position valve, Satchell Duoflow Switchmaster Midi and Drayton Flowshare link 1–4–9 and 5–7
(c) Tower or ACL Biflo mid-position valve link 1–4–9
(d) Terminal 3 is a spare terminal

Electromechanical 24 hour Full programmer

Clock module available as a spare.

On/off × 4
H106 × W113 × D65
Switch rating 6A

ACL MP

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L N HW CH

MAINS ON ON

(a) Link 1–4 and 6–11 for all systems except (b)
(b) Tower or ACL Biflo mid-position valve link 1–4
(c) Terminals 3, 7 and 8 are spare terminals

Electromechanical 24 hour Basic programmer

Clock module available as a spare.

On/off × 4
H106 × W113 × D65
Switch rating 6A

ACL TC

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L N see ON

MAINS note

(a) Link L–4–6 for 240V control
(b) Link 4–6 for voltage-free switching – input to terminal 4
(c) Terminals, 2, 8, 9, 10 and 11 are spare terminals

Electromechanical 24 hour time switch

Clock module available as a spare.

On/off × 4
H160 × W113 × D65
Switch rating 10A

ACL TC/7

As TC with 7-day clock fitted
Programmers and time switches

**ACL LP 111**

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Voltage-free switching unless L–1 linked

**Electronic 24 hour time switch**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

**ACL LP 112**

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<td>MAINS</td>
<td>HW</td>
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<td>HW</td>
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<tr>
<td>HW</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
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**Electronic 24 hour Basic/Full programmer**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

Move slider at rear of programmer to G for Basic control or P for Full control

**ACL LP 241**

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<td>HW</td>
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<td>HW</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
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Facility for setting hot water and heating at different times in Full mode

**Electronic 24 hour Basic/Full programmer**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

Move slider at rear of programmer to G for Basic control or P for Full control

**ACL LP 522**

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<td>MAINS</td>
<td>HW</td>
<td>HW</td>
<td>CH</td>
<td>CH</td>
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<tr>
<td>HW</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
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</table>

Facility for setting hot water and heating at different times in Full mode

**Electronic 5/2 day Basic/Full programmer**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

Move slider at rear of programmer to G for Basic control or P for Full control

**ACL LP 711**

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<tr>
<td>MAINS</td>
<td>COM</td>
<td>OFF</td>
<td>ON</td>
<td>SPARE</td>
</tr>
</tbody>
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Voltage-free switching unless L–1 linked

**Electronic 7 day time switch**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

**ACL LP 722**

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<td>MAINS</td>
<td>HW</td>
<td>CH</td>
<td>HW</td>
<td>CH</td>
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<tr>
<td>HW</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
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</table>

Facility for setting hot water and heating at different time from each other every day in Full mode

**Electronic 7 day Basic/Full programmer**

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)

Move slider at rear of programmer to G for Basic control or P for Full control
## Domestic Central Heating Wiring Systems and Controls

### ACL LS 111

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| MAINS | COM | OFF | ON | SPARE |

Voltage-free switching unless L–1 linked

### Electronic 24 hour time switch

- On/off $\times$ 2
- H81 $\times$ W165 $\times$ D44
- Switch rating 2A (1A)

### ACL LS 112

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| MAINS | COM | OFF | HW | CH | ON |

Voltage-free switching unless L–1 linked

### Electronic 24 hour Basic programmer

- On/off $\times$ 2
- H81 $\times$ W165 $\times$ D46
- Switch rating 2A (1A)

### ACL LS 241

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</table>

| MAINS | HW | CH | HW | CH |

| OFF | OFF | ON | ON |

### Electronic 24 hour Basic/Full programmer

- On/off $\times$ 2
- H87 $\times$ W170 $\times$ D47
- Switch rating 2A (1A)
- Turn screw at rear of programmer to G for Basic control or P for Full control

### ACL LS 522

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| MAINS | HW | CH | HW | CH |

| OFF | OFF | ON | ON |

Facility for 5/2 day setting

### Electronic 24 hour Basic/Full programmer

- On/off $\times$ 2
- H87 $\times$ W170 $\times$ D47
- Switch rating 2A (1A)
- Turn screw at rear of programmer to G for Basic control or P for Full control

### ACL LS 711

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| MAINS | COM | OFF | ON | SPARE |

Voltage-free switching unless L–1 linked

### Electronic 7 day time switch

- On/off $\times$ 2
- H87 $\times$ W170 $\times$ D47
- Switch rating 2A (1A)

### ACL LS 722

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| MAINS | HW | CH | HW | CH |

| OFF | OFF | ON | ON |

Facility for setting hot water and heating at different time from each other every day in Full mode

### Electronic 7 day Basic/Full programmer

- On/off $\times$ 2
- H87 $\times$ W170 $\times$ D47
- Switch rating 2A (1A)
- Turn screw at rear of programmer to G for Basic control or P for Full control
Programmers and time switches

ACL 2000
As Tower T 2000

Barlo EPR1
As ACL LS 522

Crossling Controller
As Landis & Gyr RWB 2

Danfoss 3001
As Horstmann 425 Coronet

Danfoss 3002
As Horstmann 425 Diadem

Danfoss CP 15
Electronic 24 hour or 5/2 day Basic/Full programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Danfoss CP 75
Electronic 7 day or 5/2 day Basic/Full programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Danfoss FP 15
Electronic 24 hour or 5/2 day Basic/Full programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Danfoss FP 75
Electronic 24 hour or 5/2 day Basic/Full programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Facility for setting hot water and central heating at different times to each other
Domestic Central Heating Wiring Systems and Controls

Danfoss MP 15

E  N  L  1  2  3  4  5  6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS  HW  CH  HW  CH  SPARE

Electronic 24 hour or 5/2 day Basic programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Danfoss MP 75

E  N  L  1  2  3  4  5  6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS  HW  CH  HW  CH  SPARE

Electronic 7 day or 5/2 day Basic programmer
On/off × 3
H88 × W135 × D38
Switch rating 3A (1A)

Danfoss TS 15

N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
N  L  COM  OFF  SPARE  ON

Voltage-free switching unless L–1 linked

Danfoss TS 75

N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
N  L  COM  OFF  SPARE  ON

Voltage-free switching unless L–1 linked

Danfoss-Randall SET 1E

E  N  L  1  2  3  4  5  6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS  SPARE  OFF  COM  ON

Electronic 24 hour time switch
On/off × 2
H98 × W158 × D36
Switch rating 3A (1A)

Danfoss-Randall SET 2E

E  N  L  1  2  3  4  5  6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS  HW  COM  HW  COM  CH  CH

Electronic 24 hour Basic programmer
On/off × 2
H98 × W158 × D36
Switch rating 3A (1A)
Danfoss-Randall SET 3E

E N L 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○
MAINS HW COM HW ON OFF CH COM CH OFF

Voltage-free switching unless L–2–5 linked

Danfoss-Randall SET 3M

E N L 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○
MAINS 240V HW COM HW ON OFF CH COM CH OFF

Voltage-free switching unless L–2–5 linked

Danfoss Randall FP 975

E N L 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○
MAINS SPARE HW COM HW OFF ON CH COM CH ON

Voltage-free switching unless L–2–5 linked
With facility for 5/2 day setting

Danfoss Randall TS 975

E N L 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○
MAINS SPARE OFF COM ON

Voltage-free switching unless L–5 linked
With facility for 5/2 day setting

Drayton Tempus 1

E N L 1 2 3 4
○ ○ ○ ○ ○ ○ ○ ○
MAINS COM ON OFF SPARE

Voltage-free switching unless L–1 linked

Drayton Tempus 1 MK2

N L 1 2 3 4
○ ○ ○ ○ ○ ○ ○ ○
MAINS COM OFF ON SPARE

Note wiring is different to original Tempus 1
Voltage-free switching unless L–1 linked

Electronic 24 hour Basic/Full programmer
On/off × 2
H98 × W158 × D36
Switch rating 3A (1A)

Electronic 7 day Basic/Full programmer
On/off × 3
H99 × W150 × D42
Switch rating 3A (1A)
Move slider at rear for Basic control

Electronic 24 hour/5/2 day time switch
On/off × 3
H99 × W153 × D36
Switch rating 5A (2A)
Domestic Central Heating Wiring Systems and Controls

Drayton Tempus 2

E  N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  COM  ON  OFF  SPARE

Voltage-free switching unless L–1 linked
With facility for 5/2 day setting

Drayton Tempus 2 MK2

N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  COM  OFF  ON  SPARE

Note wiring is different to original Tempus 2
Voltage-free switching unless L–1 linked

Drayton Tempus 3

E  N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  HW  OFF  CH  HW  CH

Facility for 5/2 day setting

Drayton Tempus 4

E  N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  HW  OFF  CH  HW  CH

Facility for 5/2 day setting

Drayton Tempus 6

N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  HW  OFF  CH  HW  CH

Facility for setting hot water and central heating at
different times to each other

Drayton Tempus 7

E  N  L  1  2  3  4
○ ○ ○ ○ ○ ○ ○
MAINS  HW  OFF  CH  HW  CH

Facility for setting hot water and heating at different
times daily in Full mode

Electronic 24 hour time switch

On/off × 2
H84 × W140 × D46
Switch rating 3A (1A)

Electronic 5/2 day or 7 day time switch

On/off × 3
H99 × W153 × D36
Switch rating 5A (2A)

Electronic 24 hour Basic/Full programmer

On/off × 2
H84 × W140 × D46
Switch rating 3A (1A)
For Basic control remove plug from rear of programmer

Electronic 24 hour or 5/2 day Basic/Full programmer

On/off × 2
H84 × W140 × D46
Switch rating 3A (1A)
For Basic control remove plug from rear of programmer

Electronic 24 hour or 5/2 day Basic/Full programmer

On/off × 2
H99 × W153 × D36
Switch rating 5A (2A)
For Basic control remove plug from rear of programmer

Electronic 7 day Basic/Full programmer

On/off × 2
H84 × W140 × D46
Switch rating 3A (1A)
For Basic control remove plug from rear of programmer
**Programmers and time switches**

**Drayton Tempus 7 MK2**

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Facility for setting hot water and central heating at different times to each other

**Eberle 606**

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Terminals 2–7 are internally linked

**Eberle 607**

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Terminals 2–7 are internally linked

**Eberle 608**

For diagram see Figure 2.13, page 58

**Eberle 609**

See Eberle 633

**Eberle 610 and 610/15**

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Terminals 2–7 are internally linked

**Electronic 5/2 day or 7 day Basic/Full Programmer**

On/off × 3
H99 × W153 × D36
Switch rating 5A (2A)

**Electromechanical 24 hour Basic programmer**

On/off × 2

**Electromechanical 24 hour time switch with pump switch**

On/off × 2

**Electromechanical 24 hour priority programmer**

On/off × 2

**Electromechanical 24 hour time switch**

On/off × 2
Domestic Central Heating Wiring Systems and Controls

**Eberle 633** (supercedes 609)

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Link L–7 unless used in conjunction with Honeywell V4073 6-wire mid-position valve (with external relay)

**Flash 31031 (FP 124)**

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Electromechanical 24 hour Full programmer

On/off × 2
H193 × W105 × D72

**Flash 31032 (FP 224)**

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Electromechanical 24 hour time switch

On/off × 36
H84 × W167 × D44
Switch rating 6A

**Flash 31033 (FP 324)**

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Electromechanical 24 hour Full programmer

On/off × 36
H84 × W167 × D44
Switch rating 6A

**Flash 31731 (FP 17)**

7 day version of 31031 with up to 6 on/off's per day

**Flash 31731 (FP 27)**

7 day version of 31032 with up to 6 on/off's per day

**Flash 31733 (FP 37)**

7 day version of 31033 with up to 6 on/off's per day

**Glow-Worm M2525**

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Electromechanical 24 hour Basic programmer

On/off × 2
H118 × W209 × D55
Programmers and time switches

**Glow-Worm Mastermind**

As Landis & Gyr RWB 2

**Grasslin QE 1**

See Tower QE 1

**Grasslin QE 2**

See Tower QE 2

**Grasslin Towerchron QM 1**

Electromechanical 24 hour time switch

On/off × 48

H85 × W156 × D42

Switch rating 5A (2A)

Link L–3 for 240V switching

**Grasslin Towerchron QM 2**

Electromechanical 24 hour Basic/Full Programmer

On/off × 48

H85 × W156 × D42

Switch rating 5A(2A)

**Harp HGC1**

Electronic check cost programmer

On/off × 2

H134 × W205 × D48

Switch rating 5A (2A)

**Hawk HTC1**

See Switchmaster 980

**Honeywell ST499A**

Electronic 24 hour Full programmer

With off/timed/continuous options.

On/off × 2

H100 × W100 × D38

Switch rating 2A (2A)
### Domestic Central Heating Wiring Systems and Controls

#### Honeywell ST699B

- As ST699C, with off/once/twice/continuous options

#### Honeywell ST699C

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- COM HW HW COM CH CH N L

- Voltage-free switching unless L–5–8 linked

#### Honeywell ST799

- 7 day version of ST699B

- If weekday-weekend programming is required, cut and remove link LK1. After replacing programmer press ‘Reset’ immediately power is turned on.

#### Honeywell ST6100A

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- N L COM OFF SPARE ON

- Voltage-free switching unless L–1 linked

#### Honeywell ST6100C

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- N L COM OFF SPARE ON

- Voltage-free switching unless L–1 linked

#### Honeywell ST6200A

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- N L HW OFF CH HW CH

#### Honeywell ST6300A

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- N L HW OFF CH HW CH

#### Electronic 24 hour Full programmer

- **With off/timed/continuous options.**

- On/off × 2

- H100 × W100 × D38

- Switch rating 2A (1A)

#### Electronic 24 hour time switch

- On/off × 3

- H95 × W145 × D52

- Switch rating 3A (3A)

#### Electronic 7 day time switch

- On/off × 3

- H95 × W145 × D52

- Switch rating 3A (3A)

#### Electronic 24 hour Basic programmer

- On/off × 2

- H95 × W145 × D52

- Switch rating 3A (3A)

#### Electronic 24 hour Full programmer

- On/off × 2

- H95 × W145 × D52

- Switch rating 3A (3A)
### Programmers and time switches

#### Honeywell ST6400C

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<td>OFF</td>
<td>OFF</td>
<td>CH</td>
<td>HW</td>
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Facility for setting hot water and heating at different times from each other

#### Honeywell ST6450

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<td>OFF</td>
<td>CH</td>
<td>HW</td>
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Facility for setting hot water and heating at different times

#### Honeywell ST7000A

- CH ON: 4
- HW ON: 3
- HW OFF: 2
- LIVE: L

The unit is battery powered and so no neutral is required

#### Honeywell ST7000B

- ON: 3
- OFF: 2
- LIVE: L

The unit is battery powered and so no neutral is required

#### Honeywell ST7100

- 8
- 7
- 6
- 5
- 4
- 3

- HW ON: OFF
- HW COM: OFF
- CH ON: ON
- CH OFF: OFF
- N: L

Voltage-free switching unless L–3–6 linked Terminals are provided for earth and neutral connections

### Electronic 7 day Full programmer

- On/off × 3
- H95 × W145 × D52
- Switch rating 3A (3A)

### Electronic 5/2 day Full programmer

- On/off × 3
- H95 × W145 × D52
- Switch rating 3A (3A)

### Electronic 24 hour Basic programmer

- On/off × 2
- H95 × W122 × D27
- Switch rating 2A (2A)

### Electronic 24 hour time switch

- On/off × 2
- H95 × W122 × D27
- Switch rating 2A (2A)

### Electronic 24 hour Full programmer

- Facility for setting hot water and heating at different times to each other during 5/2 day
- On/off × 3
- H95 × W150 × D49
- Switch rating 2A (2A)
Domestic Central Heating Wiring Systems and Controls

**Horstmann 423 Amber**

![Horstmann 423 Amber Diagram](image)

**Electromechanical 24 hour Full programmer**

*Designed for use on fully pumped system using change over thermostats and motor open/close motorized valves without end switches.*

On/off × 2  
H177 × W85 × D57  
Switch rating 6A

**Horstmann 423 Amethyst 7+10**

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N  
HW  
OFF  
HW  
ON  
CH  
OFF  
CH  
ON  
SPARE

Amethyst 7 has off/constant/auto control  
Amethyst 10 has off/constant/twice/all day control

**Horstmann 423 Coral**

![Horstmann 423 Coral Diagram](image)

**Electromechanical 24 hour Basic programmer**

On/off × 2  
H177 × W85 × D57  
Switch rating 6A

If a room thermostat is to be fitted remove link 7–8
Programmers and time switches

Horstmann 423 Diamond

5  N  1  2
   ○   ○   ○   ○
SPARE  N  L  HW  ON
6  L  3  4
   ○   ○   ○   ○
SPARE  L  L  CH  ON

(a) Terminals L–1–3 have a bridging link which can be removed to provide separate switch and motor terminal connections
(b) Terminals 5 and 6 are provided for linking and have no internal connections to the time control

Horstmann 423 Emerald

N  1  2  5
   ○   ○   ○   ○
N  SPARE  SPARE  SPARE
L  3  4  6
   ○   ○   ○   ○
L  COM  ON  SPARE

Terminals L–3 are linked internally but this can be removed for voltage-free switching

Horstmann 423 Leucite 10

1  2  3  4  5  6  7  8
   ○   ○   ○   ○   ○   ○   ○   ○
L  N  HW  HW  COM  CH  COM  CH
MAINS  ON  OFF  ON  OFF

Link 5–7

Horstmann 423 Pearl 6

N  1  2  5
   ○   ○   ○   ○
N  SPARE  SPARE  SPARE
L  3  4  6
   ○   ○   ○   ○
L  COM  ON  SPARE

Terminals L–3 are linked internally but this can be removed for voltage-free switching

Horstmann 423 Pearl 16

As Pearl 6, but 16A (3A) switch rating

Horstmann 423 Pearl Auto 6 and 16

As Pearl, with off/constant/auto control
See also SMC programmers

Electromechanical 24 hour Basic programmer

On/off × 2
H105 × W83 × D57
Switch rating 6A (2A)

Electromechanical 24 hour time switch

On/off × 2
H105 × W88 × D57
Switch rating 6A (2A)

Electromechanical 24 hour Full programmer

On/off × 2
H177 × W85 × D57
Switch rating 6A (2A)
**Domestic Central Heating Wiring Systems and Controls**

**Horstmann 423 Ruby**

*Electromechanical 24 hour time switch*

*Specifically designed for warm air units.*

On/off × 2
H105 × W88 × D57
Switch rating 6A (2A)

For diagram see Figure 2.3

**Horstmann 423 Sapphire**

*Electromechanical 24 hour priority programmer*

On/off × 2
H177 × W85 × D57
Switch rating 6A

For diagram see Figure 2.14, page 59

**Horstmann 423 Topaz**

*Electromechanical 24 hour time switch*

*Specifically designed for night set-back thermostat.*

On/off × 2
H105 × W88 × D57
Switch rating 6A (2A)

**Horstmann 424 Amber**

*Electromechanical 24 hour Full programmer*

*Designed for use on fully pumped system, using change over thermostats and motorized valves without end switches.*

On/off × 2
H177 × W85 × D57
Switch rating 6A

For diagram see Figure 2.1
**Programmers and time switches**

### Horstmann 424 Amethyst 7

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Electromechanical 24 hour Full programmer

- On/off × 2
- H177 × W85 × D57
- Switch rating 6A

### Horstmann 424 Coral

For diagram see Figure 2.2

### Horstmann 424 Diamond

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Terminals L–3 are linked internally

### Horstmann 424 Emerald

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Terminals L1–3 are linked internally but this can be removed for voltage-free switching

### Horstmann 424 Gem

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Link 5–8–10

### Horstmann 424 Leucite

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Link 5–7

### Electromechanical 24 hour Full programmer

- On/off × 2
- H177 × W86 × D57
- Switch rating 6A

### Electromechanical 24 hour Basic programmer

- On/off × 2
- H177 × W85 × D57
- Switch rating 6A

### Electromechanical 24 hour Basic programmer

- On/off × 2
- H130 × W87 × D57
- Switch rating 6A (2A)

### Electromechanical 24 hour time switch

- On/off × 2
- H130 × W87 × D57
- Switch rating 16A (3A)

See also SMC programmers
Domestic Central Heating Wiring Systems and Controls

**Horstmann 424 Pearl**

<table>
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Terminals L1–3 are linked internally but this can be removed for voltage-free switching.

**Horstmann 424 Pearl Auto**

As Pearl, with off/constant/auto control

**Horstmann 424 Sapphire**

Electromechanical 24 hour priority programmer

On/off × 2
H130 × W87 × D57
Switch rating 6A (3A)

For diagram see Figure 2.14, page 59

**Horstmann 424 Topaz**

Electromechanical 24 hour time switch

Specifically designed for use with night setback thermostat.

On/off × 2
H130 × W87 × D57
Switch rating 6A (3A)

For diagram see Figure 2.4

**Horstmann 425 Coronet**

Electromechanical 24 hour time switch

On/off × 2
H107 × W152 × D39
Switch rating 16A (6A)

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Voltage-free switching unless L–5 linked

**Horstmann 425 Diadem**

Electromechanical 24 hour Basic/Full programmer

On/off × 2
H107 × W152 × D39
Switch rating 6A (2A)
See 425 TIARA

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Voltage-free switching unless L–2–5 linked
**Programmers and time switches**

**Horstmann 425 Tiara**

As 425 Diadem but without neon indicators

To set programmer for Basic/Full control, turn interlock screws as shown

**Horstmann 517**

Voltage-free switching unless L–5 linked

**Horstmann 525**

Voltage-free switching unless L–2–5 linked

**Horstmann 525 7D**

For Full mode switch on power to the programmer, remove the switch over plate and move slide switch to extreme left. Move slide switch three positions to the right and re-fit switch cover plate. For Basic mode move the slide switch to the extreme right and fit gravity cover plate and switch on power.

**Horstmann 525 Zone**

As 527 7D but outputs labelled Zone 1 and Zone 2 instead of HW and CH

**Electronic 7 day time switch**

On/off × 3

H101 × W175 × D45

Switch rating 3A (1A)

**Electronic 24 hour Basic/Full programmer**

Facility for setting hot water and heating at different times to each other daily in Full mode.

On/off × 2

H101 × W175 × D45

Switch rating 3A (1A)

**Electronic 7 day Basic/Full programmer**

Facility for setting hot water and heating at different times from each other every day in Full mode.

On/off × 2

H101 × W175 × D45

Switch rating 3A (1A)

Convert to Full/Basic mode as 525
Domestic Central Heating Wiring Systems and Controls

**Horstmann 581 Senior**

Typical wiring diagram

![Wiring Diagram](image)

- **Mains** Supply
- **Hot Water Output** [Model 582 only]
- **Heating Output**
- **Summer Switch**
- **ROOM THERMOSTAT**
- **Set-back Resistor**

Figure 2.6

**Horstmann 582 Senior**

As 581 but with additional hot water switching

See Figure 2.6

**Horstmann C 11**

<table>
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MAINS COM OFF ON

Link L–2 for 240V control

**Horstmann C 17**

**Horstmann C 21**

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MAINS HW OFF CH HW CH

Hot water and central heating can be programmed separately

**Horstmann C 27**

Hot water and central heating can be programmed separately for each day of the week.

**Electronic 24 hour time switch**

*Designed for use by the elderly on systems utilizing combination boilers. It has a night-set back facility and is supplied with a suitable room thermostat (Eberle 3545) for which wiring instructions are given. The usual on/off times are featured as high/low.*

High/low $\times 2$

H101 $\times$ W175 $\times$ D45

Switch rating 3A (1A)

**Electronic 24 hour Basic/Full programmer**

On/off $\times 2$

H101 $\times$ W175 $\times$ D45

Switch rating 3A (1A)

Convert to Full/Basic as 525

**Electronic 24 hour Basic/Full programmer**

On/off $\times 3$

H84 $\times$ W150 $\times$ D29

Switch rating 5A (1A)

**Electronic 24 hour Basic/Full programmer**

On/off $\times 3$

H84 $\times$ W150 $\times$ D29

Switch rating 5A (1A)

For basic control remove blue link on back of programmer

**Electronic 7 day Basic/Full programmer**

7 day version of C17

**Electronic 7 day Basic/Full programmer**

7 day version of C21
Programmers and time switches

**Horstmann C 121**

Electronic 24 hour Basic/Full programmer
As C21 except cannot programme hot water and central heating separately

**Horstmann C 127**

Electronic 7 day Basic/Full programmer
As C27 except cannot programme hot water and central heating separately

**Horstmann H 11**

Electronic 24 hour time switch
On/off × 3
H101 × W163 × D33
Switch rating 3A (1A)
Voltage-free switching unless L–5 linked

**Horstmann H 17**

Electronic 7 day time switch
On/off × 3
H101 × W163 × D33
Switch rating 3A (1A)
Voltage-free switching unless L–5 linked

**Horstmann H 21**

Electronic 24 hour Basic/Full programmer
On/off × 3
H101 × W163 × D33
Switch rating 3A (1A)
To change from Basic to Full move slider at rear of programmer
Voltage-free switching unless L–2–5 linked

**Horstmann H 27**

Electronic 7 day Basic/Full programmer
Facility for setting hot water and heating at different times from each other every day in Full mode.
On/off × 3
H101 × W163 × D33
Switch rating 3A (1A)
Voltage-free switching unless L–2–5 linked

**Horstmann H 27 Z**

As H27 but outputs labelled Zone 1 and Zone 2 instead of HW and CH
Domestic Central Heating Wiring Systems and Controls

**Horstmann H 37**

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MAINS 240V  
ZONE 1  ZONE 2  ZONE 3

Although the programmer commissioning switch has a gravity position it should not be selected.

**Horstmann H 121**

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MAINS  
ON  OFF  ON  OFF  ON  OFF

Voltage-free switching unless L–2–5 linked.

**Horstmann SC1 Centaur**

1  O  N  
2  O  SPARE  
3  O  ON  
4  O  LIVE

The unit is battery powered and so no neutral is required.

**Horstmann SC 7 Centaur**

5/2 day version of SC1 with same wiring and specification.

**Horstmann TC 1 Centaur**

1  O  N  
2  O  CH ON  
3  O  HW ON  
4  O  LIVE IN

The unit is battery powered and so no neutral is required.

**Horstmann TC 7 Centaur**

5/2 day version of TC 1 with same wiring and specification.

**Electronic 7 day Full programmer**

*With one hot water channel and two heating zone channels.*

On/off × 3  
H101 × W163 × D33  
Switch rating 3A (1A)

**Electronic 24 hour Basic/Full programmer**

On/off × 3  
H101 × W163 × D33  
Switch rating 3A (1A)

**Electronic 24 hour time switch**

On/off × 3  
H71 × W142 × D30  
Switch rating 5A (1A)

**Electronic 24 hour Basic programmer**

On/off × 3  
H71 × W142 × D30  
Switch rating 5A (1A)
Programmers and time switches

Ideal STD. ISC-1

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Electromechanical 24 hour Basic/Full Programmer
On/off × 2
H105 × W181 × D77
Switch rating 3A (1A)

Invensys SM 1

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Electromechanical 24 hour time switch
On/off × 2
H83 × W138 × D55
Switch rating 2A (1A)

Link L–1 for 240 V switching
Internal electronic operation

Invensys SM 2

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Electromechanical 24 hour Basic/Full programmer
On/off × 2
H83 × W138 × D55
Switch rating 2A (1A)

Internal electronic operation

Landis & Gyr RWB 1

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Electromechanical 24 hour Basic/Full programmer
On/off × 2
H80 × W135 × D38
Switch rating 10A (2A)
For Full control turn screw at rear of programmer to horizontal

Landis & Gyr RWB 2

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Electromechanical 24 hour Basic/Full programmer
On/off × 2
H80 × W135 × D38
Switch rating 10A (2A)
For Full control turn screw at rear of programmer to horizontal

Landis & Gyr RWB 2 MK2

As RWB 2 with internal electronic operation.
Switch rating 5A (2A)

Landis & Gyr RWB 2.9

As RWB 2, but without neon indicators
Domestic Central Heating Wiring Systems and Controls

**Landis & Staefa RWB 7**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L SPARE COM OFF ON

MAINS

Voltage-free switching unless L–2 linked

**Landis & Staefa RWB 9**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L HW CH HW CH

MAINS OFF OFF ON ON

**Landis & Gyr RWB 20**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L HW CH HW CH

MAINS OFF OFF ON ON

The unit is battery powered so no neutral is required. Facility for setting hot water and heating at different times daily in Full mode

**Landis & Gyr RWB 30**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L SPARE COM OFF ON

MAINS

Voltage-free switching unless L–2 linked

**Landis & Gyr RWB 40**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L HW CH HW CH

MAINS OFF OFF ON ON

**Landis & Gyr RWB 50**

N L 1 2 3 4
○ ○ ○ ○ ○ ○

N L SPARE COM OFF ON

MAINS

Voltage-free switching unless L–2 linked

**Electronic 24 hour, 5/2 day, 7 day time switch**

On/off × 2
H85 × W140 × D35
Switch rating 6A (2A)

**Electronic 24 hour, 5/2 day, 7 day Basic/Full programmer**

On/off × 2
H85 × W140 × D35
Switch rating 6A (2A)
To change from Full to Basic move dip switch on rear of programmer to ‘10’ position

**Electronic 7 day Basic/Full programmer**

On/off × 3
H87 × W135 × D40
Switch rating 6A (2A)
For Full control cut link at rear of programmer

**Electromechanical 24 hour time switch**

On/off × 2
H80 × W135 × D38
Switch rating 6A (2A)

**Electronic 24 hour Basic/Full programmer**

On/off × 3
H90 × W115 × D44
Switch rating 6A (2A)
For Full control cut link at rear of programmer

**Electronic 24 hour time switch**

On/off × 3
H90 × W115 × D44
Switch rating 6A (2A)
### Landis & Gyr RWB 100

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MAINS SPARE COM OFF ON

Voltage-free switching unless L–2 linked

#### Electronic 24 hour time switch
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)

### Landis & Gyr RWB 102

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MAINS HW CH HW CH

Note that heating only is not available and no connection need to be made to terminal 1 as, e.g., for a mid-position valve

#### Electronic 24 hour Basic programmer
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)

### Landis & Gyr RWB 152

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MAINS SPARE COM OFF ON

Voltage-free switching unless L–2 linked

#### Electronic 5/2 day time switch
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)

### Landis & Gyr RWB 170

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MAINS SPARE COM OFF ON

Voltage-free switching unless L–2 linked

#### Electronic 7 day time switch
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)

### Landis & Gyr RWB 200

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MAINS HW CH HW CH

#### Electronic 24 hour Basic/Full programmer
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)

### Landis & Gyr RWB 252

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MAINS HW CH HW CH

#### Electronic 5/2 day Basic/Full programmer
- On/off × 2
- H80 × W135 × D31
- Switch rating 6A (2A)
Domestic Central Heating Wiring Systems and Controls

Landis & Gyr RWB 270

Electronic 7 day programmer

On/off × 2
H80 × W135 × D31
Switch rating 6A (2A)

Landis & Staefa RWB 2E

As RWB 2 with internal electronic operation

Landis & Staefa RWB 30E

As RWB 30 with internal electronic operation

Myson MEP1c

Electronic 24 hour or 5/2 day or 7 day time switch

On/off × 3
H100 × W160
Switch rating 3A (3A)

Link L–3 for 240V switching

Myson MEP2c

Electronic 24 hour or 5/2 day or 7 day Basic/Full programmer

On/off × 3
H100 × W160
Switch rating 3A (3A)

Myson Microtimer 1

Electronic 24 hour Basic/Full programmer

On/off × 2
H100 × W165 × D50
Switch rating 2A (2A)

To adjust from Full to Basic system, remove programmer from backplate and move system select switch to required position

A connection block is provided for neutrals

Myson Microtimer 7

Electronic 7 day Basic/Full programmer

On/off × 2
H100 × W165 × D50
Switch rating 2A (2A)

To adjust from Full to Basic system, remove programmer from backplate and move system select switch to required position

A connection block is provided for neutrals
Potterton 423

As Horstmann 423 Diamond

Potterton 424

As Horstmann 424 Diamond

Potterton EP 2000

Electronic 24 hour Basic/Full programmer

On/off × 2
H100 × W157 × D46
Switch rating 6A (2A)
To adjust from Basic to Full move slider from 10 to 16 position and turn screw to vertical on rear of programmer

Potterton EP 2000 MK 2

Electronic 24 hour Basic/Full programmer

On/off × 2
H104 × W161 × D49
Switch rating 2A (1A)
To adjust from Basic to Full move slider on rear of programmer from 10 to 16 position

Potterton EP 2001

Electronic 24 hour Basic/Full programmer

Facility for 5/2 day setting.

On/off × 2
H104 × W160 × D41
Switch rating 6A (2A)
To adjust from Basic to Full move slider from 10 to 16 position on rear of programmer with battery removed

Potterton EP 2002

Electronic 5/2 day Basic/Full programmer

5/2 day version of EP 2000 MK2

Potterton EP 3000

As EP 2000 specification but with 7 day programming facility

Potterton EP 3001

As EP 2001 specification but with 7 day programming facility and allows for hot water and central heating to be set for different times daily
Domestic Central Heating Wiring Systems and Controls

Potterton EP 3002

Electronic 7 day Basic/Full programmer
Facility for setting hot water and heating for different times daily.
7 day version of EP 2000 MK2

Potterton EP 4000

Voltage-free switching unless L–5 linked. A connection block is provided for neutrals and earths

Potterton EP 4000 MK2

Voltage-free switching unless L–5 linked. A connection block is provided for neutrals and earths

Potterton EP 4001

Voltage-free switching unless L–5 linked. A connection block is provided for neutrals and earths

Potterton EP 4002

Electronic 5/2 day time switch
5/2 day version of EP 4000 MK2 with 3 on/off per day

Potterton EP 5001

Electronic 7 day time switch
On/off × 3
H104 × W160 × D41
Switch rating 6A (2A)
Programmers and time switches

Potterton EP 5002

Potterton EP 6000

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Link L–5. A connection block is provided for neutrals and earths

Potterton EP 6002

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Link L–5. A connection block is provided for neutrals and earths

Potterton Mini-Minder

Potterton Mini-Minder E

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Link L–5. A connection block is provided for neutrals and earths

Potterton Mini-Minder Es

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Voltage-free switching unless L–2 linked

Electronic 7 day time switch

7 day version of EP 4000 MK2 with 3 on/offs per day

Electronic 7 day Basic/Full programmer

Facility for setting either hot water or heating at different times daily and the other channel 5/2 day in Full mode.

On/off × 3
H104 × W164 × D51
Switch rating 6A (2A)
To adjust from Basic to Full move slider from 10 to 16 position on rear of programmer with battery removed

Electronic 7 day Full programmer

Facility for setting hot water and heating for different times to each other daily.

On/off × 3
H104 × W161 × D49
Switch rating 2A (1A)

As Landis & Gyr RWB 2

Electronic 24 hour Basic/Full programmer

On/off × 2
H105 × W164 × D51
Switch rating 2A (1A)
To change Basic/Full set both sliders to OFF and turn selector at rear to required position

Electronic 24 hour time switch

On/off × 2
H105 × W164 × D51
Switch rating 2A (1A)

As Flash 31031

Proheat FP 1

As Flash 31031
Domestic Central Heating Wiring Systems and Controls

Proheat FP 2
As Flash 31032

Proheat FP 3
As Flash 31033

Randall Mk. 1
Electromechanical 24 hour Basic programmer

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MAINS ROOM STAT PUMP BOILER SPARE
On/off × 2
H100 × W200 × D68

Randall Mk. 2 R6
Electromechanical 24 hour Basic programmer

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L L N HW CH SPARE DO NOT USE
On/off × 2
H216 × W102 × D57
Switch rating 5A

Link 1–2

Randall 102
Electromechanical 24 hour Basic programmer

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HW CH COM E N L
On/off × 2
H135 × W112 × D69
Switch Rating 6A

Voltage-free switching unless 3–6 linked

Randall 102 E
Electronic 24 hour Basic programmer

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HW CH COM E N L
On/off × 6
H136 × W102 × D47
Switch rating 3A

Voltage-free switching unless 3–6 linked

Randall 102 E5
Electronic 5/2 day Basic programmer

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HW CH COM E N L
On/off × 3
H136 × W102 × D47
Switch rating 3A

Voltage-free switching unless 3–6 linked
Programmers and time switches

**Randall 102 E7**

1 2 3 E 5 6
Ο Ο Ο Ο Ο Ο
HW CH COM E N L
ON ON MAINS

Voltage-free switching unless 3–6 linked

**Electronic 7 day Basic programmer**

On/off × 3
H136 × W102 × D47
Switch rating 3A

**Randall 103**

1 2 3 E 5 6
Ο Ο Ο Ο Ο Ο
ON SPARE COM E N L

Voltage-free switching unless 3–6 linked

**Electromechanical 24 hour time switch**

On/off × 2
H135 × W112 × D69
Switch rating 6A

**Randall 103 E**

1 2 3 E 5 6
Ο Ο Ο Ο Ο Ο
ON SPARE COM E N L

Voltage-free switching unless 3–6 linked

**Electronic 24 hour time switch**

On/off × 6
H136 × W102 × D47
Switch rating 3A

**Randall 103 E5**

1 2 3 E 5 6
Ο Ο Ο Ο Ο Ο
ON SPARE COM E N L

Voltage-free switching unless 3–6 linked

**Electronic 5/2 day time switch**

On/off × 3
H136 × W102 × D47
Switch rating 3A

**Randall 103 E7**

1 2 3 E 5 6
Ο Ο Ο Ο Ο Ο
ON SPARE COM E N L

Voltage-free switching unless 3–6 linked

**Electronic 7 day time switch**

On/off × 3
H136 × W102 × D47
Switch rating 3A

**Randall 105**

For use with the ACL/Tower Biflo mid-position valve.

For diagram see Figure 2.24, page 61

**Electromechanical 24 hour Basic programmer**

On/off × 2
H135 × W112 × D69
Switch rating 10A
Domestic Central Heating Wiring Systems and Controls

Randall 106

For diagram see Figure 2.15, page 59

Randall 151

1 2 3 E 5 6
○ ○ ○ ○ ○ ○
ON OFF COM E N MAINS L

Voltage-free switching unless 3–6 linked

Randall 152 E

1 2 3 E 5 6
○ ○ ○ ○ ○ ○
ON OFF COM E N MAINS L

Voltage-free switching unless 3–6 linked

Randall 152 E7

1 2 3 E 5 6
○ ○ ○ ○ ○ ○
ON OFF COM E N MAINS L

Voltage-free switching unless 3–6 linked

Randall 153 E

1 2 3 E 5 6
○ ○ ○ ○ ○ ○
ON SPARE COM E N MAINS L

Voltage-free switching unless 3–6 linked

Randall 153 E7

1 2 3 E 5 6
○ ○ ○ ○ ○ ○
ON SPARE COM E N MAINS L

Voltage-free switching unless 3–6 linked

Electromechanical 24 hour priority programmer

On/off × 2
H135 × W112 × D69
Switch rating 10A

Electromechanical 24 hour time switch

On/off × 2
H135 × W112 × D69
Switch rating 15A

Electronic 24 hour time switch

On/off × 6
H136 × W102 × D47
Switch rating 8A

Electronic 7 day time switch

On/off × 3
H136 × W102 × D47
Switch rating 8A

Electronic 24 hour time switch

On/off × 6
H136 × W102 × D47
Switch rating 15A (4A)

Electronic 7 day time switch

On/off × 3
H136 × W102 × D47
Switch rating 15A (4A)
Programmers and time switches

Randall 701

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<th>Switches</th>
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<td>CH CH HW HW L L MAINS</td>
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<tr>
<td>ON OFF ON OFF CH HW</td>
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Voltage-free switching unless 5–6–L linked

Electronic 24 hour Basic programmer

On/off × 3
H108 × W221 × D51
Switch rating 3A

Randall 702

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<td>CH CH HW HW L L MAINS</td>
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<tr>
<td>ON OFF ON OFF CH HW</td>
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Voltage-free switching unless 5–6–L linked

Electronic 24 hour Full programmer

On/off × 3
H108 × W221 × D51
Switch rating 3A

Randall 811, 841, 842, 851, 852

A range of electronic time switches and programmers intended for commercial use. However, as it is possible to use these in a domestic situation, basic wiring and description are given here.

Randall 811

<table>
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<th>Switches</th>
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<td>N L E 1 2</td>
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Voltage-free switching unless L–1 linked

Randall 841

<table>
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</thead>
<tbody>
<tr>
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<td>SPARE MAINS COM ON</td>
</tr>
</tbody>
</table>

Voltage-free switching unless L–1 linked

All models:

On/off × up to 200 on/off operations in any 7 day period
H112 × W226 × D55

Randall 842

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Voltage-free switching unless L–4–1 linked

7 day time switch

With 30A SPST switch

Single channel pulsed output time switch

For applications where a time pulsed signal is required to activate equipment. For example, for timed bell ringing to school class changes, or shift changes and breaks in factories.

2-channel pulsed output time switch

Each output channel is totally independent of the other and can be used where timed pulsed signals are required to activate equipment in two separate areas, e.g. in locations as described above.
Domestic Central Heating Wiring Systems and Controls

Randall 851

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SPARE  MAINS  SPARE  OFF  ON  COM

Voltage-free switching unless L–1 linked

Randall 852

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SPARE  MAINS  OFF  ON  COM  OFF  ON  COM

CHANNEL 2  CHANNEL 1

Voltage-free switching unless L–4–1 linked

Randall 911

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MAINS  SPARE  OFF  COM  ON

Voltage-free switching unless L–5 linked

Randall 922

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MAINS  HW  COM  HW  CH  COM  CH  OFF  ON

Voltage-free switching unless L–2–5 linked

Facility for setting hot water and heating at different times from each other daily in Full mode.

Randall 971

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MAINS  SPARE  OFF  COM  ON

Voltage-free switching unless L–5 linked

7 day time switch

With 10A SPDT switch

2 channel 7 day time switch

With independent SPDT switching to each channel

Electronic 24 hour time switch

On/off × 6
H85 × W160 × D38
Switch rating 3A

Electronic 24 hour Basic/Full programmer

On/off × 6
H85 × W160 × D38
Switch rating 3A

For basic system the recessed switch on the rear of the programmer should be moved to the up position

Electronic 7 day time switch

On/off × 3
H85 × W160 × D38
Switch rating 3A
Randall 972

Programmers and time switches

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Main switch

Voltage-free switching unless L–2–5 linked

Facility for setting hot water and heating at different times from each other daily in Full mode.

Randall 3020P

Electronic 7 day Basic/Full programmer

On/off × 3
H85 × W160 × D38
Switch rating 3A

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Main switch

For diagram see Figure 2.17, page 59

Randall 3022

Electromechanical 24 hour Basic programmer

On/off × 2
H216 × W102 × D57
Switch rating 3A

Randall 3033

Electromechanical 24 hour priority programmer

On/off × 2
H216 × W102 × D57
Switch rating 3A

Randall 3060

Electromechanical 24 hour Basic programmer

On/off × 2
H216 × W102 × D57
Switch rating 3A

Randall 4033

Electromechanical 24 hour Full programmer

On/off × 2
H216 × W102 × D57
Switch rating 3A

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Main switch

Link 1–6
Domestic Central Heating Wiring Systems and Controls

Randall Set 1

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MAINS SPARE ON COM OFF

Voltage-free switching unless L–5 linked

Electronic 24 hour time switch
On/off × 2
H101 × W148 × D36
Switch rating 5A

Randall Set 2

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MAINS HW COM HW OFF CH ON COM CH OFF

Voltage-free switching unless L–2–5 linked

Electronic 24 hour Basic programmer
On/off × 2
H101 × W148 × D36
Switch rating 3A

Randall Set 3

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MAINS HW ON COM HW OFF CH ON COM CH OFF

Voltage-free switching unless L–2–5 linked

Electronic 24 hour Full programmer
On/off × 2
H101 × W148 × D36
Switch rating 3A

Randall Set 1E, 2E, 3E, 3M

See Danfoss Randall 1E, 2E, 3E, 3M

Randall Set 4

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MAINS SPARE ON COM OFF

Voltage-free switching unless L–5 linked

Electronic 7 day time switch
On/off × 2
H101 × W148 × D36
Switch rating 5A

Randall Set 5

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MAINS HW ON COM HW OFF CH ON COM CH OFF

Voltage-free switching unless L–2–5 linked

Electronic 5/2 day Full programmer
On/off × 2
H101 × W148 × D36
Switch rating 3A

Randall TSR/2

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L L N SPARE ON SPARE

Link 1–2

Electromechanical 24 hour time switch
On/off × 2
H216 × W102 × D57
Switch rating 3A
Randall TSR 2+2

For diagram see Figure 2.16, page 59

Randall TSR 2P

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Link 1–2 and 5–6

Randall TSR 3+3

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Electromechanical 24 hour priority programmer

On/off $\times$ 2
H216 $\times$ W102 $\times$ D57
Switch rating 3A

Electromechanical 24 hour Basic programmer

On/off $\times$ 2
H216 $\times$ W102 $\times$ D57
Switch rating 3A

Electromechanical 24 hour Full programmer

On/off $\times$ 2
H216 $\times$ W102 $\times$ D57
Switch rating 3A

As Switchmaster 950

Sangamo M5

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Link 1–6

Sangamo M6

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Electromechanical 24 hour time switch

On/off $\times$ 2
H89 $\times$ W141 $\times$ D38
Switch rating 10A (2A)

Voltage-free switching unless 3–6 linked
Domestic Central Heating Wiring Systems and Controls

**Sangamo S250 series and S350 series**

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Link L–COM if required

**Electromechanical 24 hour time switch**

On/off × 4 max.
H140 × W97 × D102
Switch rating 20A
Conduit box available, FD 930

**Sangamo S408**

**Form 2**

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Voltage-free switching unless L–COM linked

**Electromechanical 24 hour time switch**

On/off × pegs
H105 × W105 × D60
Switch rating 15A

**Sangamo S408**

**Form 5**

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**Electromechanical 24 hour time switch**

On/off × pegs
H105 × W105 × D60
Switch rating 15A

**Sangamo S408**

**Form 6**

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Voltage-free switching unless L–COM linked

**Electromechanical 24 hour time switch**

On/off × pegs
H105 × W105 × D60
Switch rating 15A

**Sangamo 409 FI**

1  | N  | N  | MAINS |
2  | HW ON  | L  | MAINS |
3  | ON  | 5  | ROOM STAT OUT |
4  | CH ON  | 6  | ROOM STAT IN |

If no room stat link 5–6

**Electromechanical 24 hour Basic programmer**

On/off × 2
H106 × W160 × D67
Switch rating 10A (3A)

**Sangamo 409 F3**

1  | CH ON |
3  | N  | 2  | CH OFF |
6  | N MAINS  | 4  | HW ON |
7  | L MAINS  | 5  | HW OFF |

**Electromechanical 24 hour Full programmer**

On/off × 2
H106 × W160 × D67
Switch rating 10A (3A)
Programmers and time switches

**Sangamo 409 F4**

- 1 ○ N
- 2 ○ HW ON
- 3 ○ ON
- 4 ○ CH ON

If no room stat link 5–6

**Electromechanical 24 hour Basic programmer**

- On/off × 2
- H106 × W160 × D67
- Switch rating 10A (3A)

**Sangamo 409 F5**

Figure 2.7

**Electromechanical 24 hour Electricaire control**

- On/off × 2
- H106 × W160 × D67
- Switch rating 10A (3A)

**Sangamo 409 F6**

Figure 2.8

**Electromechanical 24 hour warm air control**

*With provision for ventilation.*

- On/off × 2
- H106 × W160 × D67
- Switch rating 10A (3A)

**Sangamo 409 F7**

For diagram see Figure 2.18, page 60

**Electromechanical 24 hour priority programmer**

- On/off × 2
- H106 × W160 × D67
- Switch rating 10A (3A)

**Sangamo 409 F8**

- 1 ○ SPARE
- 2 ○ ON
- 3 ○ N

If no room stat link 5–6

**Electromechanical 24 hour time switch**

- On/off × 2
- H106 × W160 × D67
- Switch rating 10A (3A)
### Domestic Central Heating Wiring Systems and Controls

**Sangamo 410 F1**

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**Electromechanical 24 hour Full programmer**

On/off × 2  
H85 × W138 × D46  
Switch rating 10A (2A)

Link 3–6

**Sangamo 410 F2**

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**Electromechanical 24 hour Basic programmer**

On/off × 2  
H85 × W138 × D46  
Switch rating 10A (2A)

Link 3–6

**Sangamo 410 F3**

**Electromechanical 24 hour programmer**

Specification as 410 F1 but labelled Zone 1 and Zone 2 instead to hot water and central heating

**Sangamo 410 F4 (early model)**

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**Electromechanical 24 hour Basic programmer**

On/off × 2  
H85 × W138 × D46  
Switch rating 10A (2A)

Link 1–6

**Sangamo 410 F4**

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**Electromechanical 24 hour Basic programmer**

On/off × 2  
H85 × W138 × D46  
Switch rating 10A (2A)

Link 3–6
Sangamo 410 F5

Electromechanical 24 hour Electricaire control

A single circuit programmer for controlling a two-speed fan on ‘Electricaire’ systems. It is fitted with an advance knob. The service knob allows a choice between ‘Normal’ or ‘Boost’ conditions.

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)

Figure 2.9

Sangamo 410 F6

Electromechanical 24 hour warm air control

A single circuit programmer for controlling warm air systems with a provision for VENT (ventilation). It is fitted with an advance knob, programme selector knob and a manual selector knob to provide VENT ‘ON’ or ‘OFF’.

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)

Figure 2.10

Sangamo 410 F7

For diagram see Figure 2.19, page 60

Sangamo 410 F8

Electromechanical 24 hour priority programmer

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)

Electromechanical 24 hour time switch

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)
### Sangamo 410 F9

For diagram see Figure 2.25, page 62

### Sangamo 414 twin set

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Link 3–6

### Sangamo 440

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Voltage-free switching unless 3–6 linked

### Sangamo 931091

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Voltage-free switching unless L–2 linked

### Sangamo 931092

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### Electromechanical 24 hour Full programmer

For fully pumped systems utilizing ACL/Tower Biflo mid-position valve.

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)

### Electromechanical 24 hour two-zone two-clock programmer

The programmer is fitted with two time switch dials on the left-hand side, each having two ‘on’ and two ‘off’ levers. The right-hand side is divided into two, the upper portion carrying the knobs and indicator associated with the upper time switch dial (Zone 1) and the lower portion with the lower dial (Zone 2).

On/off × 2 ea.
H85 × W138 × D61
Switch rating 10A (2A)

### Electromechanical 24 hour time switch

On/off × 2
H85 × W138 × D46
Switch rating 10A (2A)

### Electromechanical 24 hour time switch

On/off × multiple
H84 × W167 × D44
Switch rating 6A

### Electromechanical 24 hour Basic programmer

On/off × multiple
H84 × W167 × D44
Switch rating 6A
Programmers and time switches

Sangamo 931093

**Electromechanical 24 hour Full programmer**

- On/off × multiple
- H84 × W167 × D44
- Switch rating 6A

Sangamo S610

**Electromechanical 24 hour time switch**

- On/off × 4
- H139 × W82 × D70
- Switch rating 30A
- Conduit box available – FD 1510

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Link L–COM if required

Sangamo S611

As S610 with day omittance device

Sangamo Set 1

As Randall Set 1

Sangamo Set 2

As Randall Set 2

Siemens RWB 27

**Electronic 24 hour or 5/2 day or 7 day time switch**

- Wiring as Landis & Staefa RWB30
- On/off × 3
- H90 × W145 × D34
- Switch rating 6A (2A)

Siemens RWB 29

**Electronic 24 hour or 5/2 day or 7 day Basic/Full programmer**

- Wiring as Landis & Staefa RWB40
- On/off × 3
- H90 × W145 × D34
- Switch rating 6A (2A)

SMC

- For diagrams see Figures 2.16 and 2.17, page 59; also Figures 12.48 and 12.49, pages 254

The SMC programmers used in the SMC control pack (one boiler and two pumps, room and cylinder thermostats but no motorized valves) were manufactured by Horstmann. The first one was based on the 423 Pearl Auto and the next one was based on the 424 Emerald. They both contained a boiler switching relay. To replace, it is necessary to use either the new SMC wiring centre, incorporating a relay, or use a Basic or Full facility programmer and an external relay.
### Domestic Central Heating Wiring Systems and Controls

#### Smiths Controller 10

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MAINS CH HW ON ON

Terminals 1 and 4 are internally linked and have no other connection

---

#### Smiths Controller 30

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N L SPARE ON ON SPARE

Terminals 4 and 5 are internally linked

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#### Smiths Controller 30+

For diagram see Figure 2.20, page 60

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#### Smiths Controller 40

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N L SPARE HW CH ON ON

Electromechanical 24 hour Basic programmer

On/off × 2
H130 × W186 × D76
Switch rating 6A

---

#### Smiths Controller 40+

For diagram see Figure 2.21, page 61

---

#### Smiths Controller 50

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N L COM ON N

Voltage-free switching unless 2–3 linked

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#### Electromechanical 24 hour Basic programmer

On/off × 2
H130 × W186 × D76
Switch rating 6A

---

#### Electromechanical 24 hour time switch

On/off × 2
H98 × W156 × D72
Switch rating 6A

---

#### Electromechanical 24 hour priority programmer

On/off × 2
H98 × W156 × D72
Switch rating 6A

---

#### Electromechanical 24 hour Basic programmer

On/off × 2
H105 × W152 × D80
Switch rating 6A

---

#### Electromechanical 24 hour priority programmer

On/off × 2
H98 × W156 × D72
Switch rating 6A

---

#### Electromechanical 24 hour time switch

On/off × 2
H105 × W152 × D72
Switch rating 6A
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<td>Electromechanical 24 hour Full programmer</td>
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<td>Electronic 24 hour Basic programmer</td>
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<td>7 day version of CHP11</td>
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**Domestic Central Heating Wiring Systems and Controls**

**Smiths Supply Master FST11**

Incorporated in a switched fused spur

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L N N L COM ON

Voltage-free switching unless 3–2 linked

**Electronic 24 hour time switch**

On/off × 4
H85 × W85 × D37
Switch rating 13A

**Smiths Supply Master FST17**

7 day version of FST11

**Sopac 24 Hour Fuelminder**

On/off × 48
H159 × W83 × D42
Switch rating 15A (2A)

**Sopac 7D Fuelminder**

As 24 hour but with 7 day setting facility with on 6 on/offs per day

**Southern Digital**

A range of time switches and controls not specifically designed for central heating but larger loads, e.g. immersion heaters

**SUGG Supaheat**

On/off × 2

**Sunvic CB2201**

Electromechanical 24 hour Full programmer

This unit is only available as a Clockbox 2 spare

**Sunvic DHP 1201 Libra**

Electromechanical 24 hour Full programmer

On/off × 6
H125 × W190 × D64
Switch rating 3A

Voltage-free switching unless 2–4–7 linked
Programmers and time switches

**Sunvic DHP 2201**

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Voltage-free switching unless 2–4–7 linked

**Electronic 24 hour Full programmer**

On/off × 6
H125 × W190 × D64
Switch rating 3A

**Sunvic ET 1401/ET 1402**

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Voltage-free switching unless 2–3–6 linked

**Electronic 24 hour Full programmer**

On/off × 4
H110 × W180 × D65
Switch rating 5A (1A)

**Sunvic ET 1451**

As ET 1401 with battery reserve and advance features

**Sunvic MP2**

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Switch rating 5A (1A)

**Electromechanical 24 hour Full programmer**

On/off × 2
H100 × W202 × D56
Switch rating 5A (1A)

**Sunvic Select 107**

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<td>COM</td>
<td>OFF</td>
<td>ON</td>
<td>SPARE</td>
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</table>

Voltage-free switching unless L–1 linked

**Electronic 24 hour or 5/2 day or 7 day time switch**

On/off × 2
H82 × W135 × D36
Switch rating 3A (1A)

**Sunvic Select 207**

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Switch rating 3A (1A)

**Electronic 24 hour or 5/2 day or 7 day Basic/Full programmer**

On/off × 2
H82 × W135 × D36
Switch rating 3A (1A)

**Sunvic SP 20**

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Voltage-free switching unless L–3 linked

**Electronic 24 hour time switch**

On/off × 2
H91 × W161 × D42
Switch rating 5A (1A)
Domestic Central Heating Wiring Systems and Controls

Sunvic SP 25

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Electronic 24 hour Basic programmer
On/off \(\times 2\)
H91 \(\times W161 \times D42\)
Switch rating 5A (1A)

Sunvic SP 30

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<td>CH</td>
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Electronic 24 hour Basic programmer

*This unit is similar to the SP 25 with extra features which may be useful for the elderly or visually handicapped, including setting tones.*

On/off \(\times 2\)
H91 \(\times W161 \times D42\)
Switch rating 5A (1A)

Sunvic SP 35

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Voltage-free switching unless L–3 linked

Sunvic SP 50

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<td>L</td>
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<td>E</td>
<td>SPARE</td>
<td>CH</td>
<td>CH</td>
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Link L–3

Facility for setting hot water and heating at different times weekly in Full mode.

Sunvic SP 100

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<td>CH</td>
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Link L–3

Facility for setting hot water and heating at different times to each other every day in Full mode

Superswitch 1511

As Sopac Fuelminder 24H

Superswitch 1517

As Sopac Fuelminder 7D
<table>
<thead>
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<th><strong>Electronic 24 hour time switch</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>L N N L1 L2</strong></td>
<td>On/off × 6</td>
</tr>
<tr>
<td>MAINS LOAD ON SPARE</td>
<td>H90 × W162 × D75</td>
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<tr>
<td></td>
<td>Switch rating 15A (2)A</td>
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</table>

<table>
<thead>
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<td><strong>L N N L1 L2</strong></td>
<td>On/off × 6</td>
</tr>
<tr>
<td>MAINS LOAD HW CH ON</td>
<td>H90 × W162 × D75</td>
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<table>
<thead>
<tr>
<th><strong>Switchmaster 300</strong></th>
<th><strong>Electromechanical 24 hour time switch</strong></th>
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<tbody>
<tr>
<td><strong>N L 1 2 3 4</strong></td>
<td>On/off × 2</td>
</tr>
<tr>
<td>MAINS ON N SPARE COM</td>
<td>H100 × W168 × D48</td>
</tr>
<tr>
<td></td>
<td>Switch rating 5A (2A)</td>
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Links were fitted N–2 and L–4 but may have been removed depending on use. On the later ACL/Switchmaster version no links were fitted.

Voltage-free switch

<table>
<thead>
<tr>
<th><strong>Switchmaster 320</strong></th>
<th><strong>Electromechanical 24 hour Basic programmer</strong></th>
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<td>On/off × 2</td>
</tr>
<tr>
<td>MAINS ON N HW L ON</td>
<td>H100 × W168 × D48</td>
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<tr>
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<td>Switch rating 5A (2A)</td>
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</table>

Links were fitted N–2 and L–4 on backplate

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</tr>
<tr>
<td>MAINS ON N HW L ON</td>
<td>H100 × W168 × D48</td>
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<td>Switch rating 5A (2A)</td>
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</table>

Link were fitted N–2 and L–4 on backplate

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<tr>
<td>MAINS ON SPARE HW HW</td>
<td>H100 × W168 × D48</td>
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**Switchmaster 500**

For diagram see Figure 2.22, page 61

**Switchmaster 600**

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<tr>
<td>MAINS</td>
<td>CH</td>
<td>SPARE</td>
<td>HW</td>
<td>SPARE</td>
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**Electromechanical 24 hour priority programmer**

On/off × 2
H100 × W168 × D48
Switch rating 5A (2A)

**Switchmaster 800**

As 805 with neon indicators

**Switchmaster 805**

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<tr>
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<td>CH</td>
<td>CH</td>
<td>HW</td>
<td>HW</td>
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**Electromechanical 24 hour Basic programmer**

On/off × 2
H100 × W168 × D48
Switch rating 5A (2A)

**Switchmaster 900**

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<td>HW</td>
<td>HW</td>
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**Electromechanical 24 hour Basic/Full programmer**

On/off × 2
H138 × W83 × D53
Switch rating 5A (2A)

To adjust from Basic to Full mode, turn screw at rear of programmer from 10 to 16

**Switchmaster 905**

As 900 with different styling

**Switchmaster 950**

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<td>MAINS</td>
<td>ON</td>
<td>OFF</td>
<td>SPARE</td>
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**Electromechanical 24 hour time switch**

On/off × 2
H138 × W83 × D53
Switch rating 5A (2A)

**Switchmaster 980 Combi**

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Voltage-free switching unless L–4 linked

**Electromechanical 24 hour time switch**

On/off × 2
H138 × W83 × D53
Switch rating 5A (2A)
Switchmaster 3000

As 300 with Homewarm motif

Switchmaster 9000

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Electronic 24 hour Basic/Full programmer

On/off × 2
H136 × W83 × D454
Switch rating 3A (2A)
To adjust from Basic to Full mode, move the slider at the rear of the programmer to the left.

Switchmaster 9001

As 9000 with different styling

Switchmaster Sonata

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Electronic 7 day Full programmer

On/off × 3
H95 × W161 × D40
Switch rating 3A (2A)

Thorn

A version of the Randall 4033 was marketed with a Thorn cover and mounted horizontally

Thorn Microtimer

As Honeywell ST 699 B

Tower DP 72

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Electronic 7 day Basic/Full programmer

On/off × 2
H79 × W163 × D50
Switch rating 5A (2A)
For Full mode remove tab switch at rear of programmer

Facility for setting hot water and heating at different times for each other every day in Full mode

Tower DT 71

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Electronic 7 day time switch

On/off × 2
H79 × W163 × D50
Switch rating 5A (2A)
Voltage-free switching unless L–3 linked

Tower FP

As ACL FP

Tower MP

As ACL MP
### Domestic Central Heating Wiring Systems and Controls

#### Tower QE1

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MAINS SPARE OFF COM ON

Voltage-free switching unless L–3 linked

#### Tower QE2

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MAINS HW CH HW CH

OFF OFF ON ON

#### Tower TC

#### Tower T2000

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MAINS COM CH CH

ON OFF

N C ON OFF

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SPARE N COM HW HW

ON OFF

#### Tower T2001

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MAINS

N 4

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#### Tower T2002

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MAINS

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#### Electronic 7 day time switch

On/off × 2
H85 × W155 × D45
Switch rating 5A (2A)

#### Electronic 7 day Basic/Full programmer

On/off × 2
H85 × W155 × D45
Switch rating 5A (2A)
To change from Basic to Full move slider at rear of programmer

#### As ACL TC

#### Electronic 24 hour Full programmer

With facility for 5/2 day setting.

On/off × 2
H75 × W156 × D50
Switch rating 6A (2A)

#### Electromechanical 24 hour time switch

On/off × 4
H80 × W165 × D55
Switch rating 6A (2A)

#### Electromechanical 24 hour Basic programmer

On/off × 4
H80 × W165 × D55
Switch rating 6A (2A)
Programmers and time switches

Tower T2003

| N | L | c | ON | OFF |
|   |   |   |     |     |
| MAINS | COM | CH | CH |

| N | c | ON | OFF |
|   |   |     |     |
| SPARE | N | COM | HW | HW |

Voltage-free switching unless L–C–C linked

Electromechanical 24 hour Basic/Full programmer

On/off × 4
H80 × W165 × D55
Switch rating 6A (2A)
For Full mode remove plastic switch slide covers

Trac TP 10

As Flash 31031

Trac TP 20

As Flash 31032

Trac TP 20/7

As Flash 31732

Trac TP 30

As Flash 31033

Trac TP 30E

As Switchmaster 9001

Venner CHC/2

Electromechanical 24 hour warm air control

On/off × 2
H84 × W135 × D88
Switch rating 5A (2A)

Venner CHC/GW

For diagram see Figure 2.23, page 61

Electromechanical 24 hour priority programmer

On/off × 2
H84 × W135 × D88
Switch rating 5A (2A)
### Domestic Central Heating Wiring Systems and Controls

#### Venner CHC/W2

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Voltage-free switching unless L1–2 linked

#### Venner T20

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Link 5–6 if no room stat

#### Venner T30

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Link 5–6 if no room stat

#### Venner Vennerette

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Voltage-free switching unless 3–4 linked

#### Venner Venomise

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<td>N</td>
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</tr>
<tr>
<td>L</td>
<td>MAINS</td>
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</table>

The Venomise is designed for control of an immersion heater or similar.

#### Electromechanical 24 hour Basic programmer

- On/off × 2
- H84 × W135 × D88
- Switch rating 5A (2A)

#### Electromechanical 24 hour Full programmer

- On/off × 2
- H162 × W100 × D63
- Switch rating 6A

#### Electromechanical 24 hour time switch

- On/off × 2
- H102 × W87 × D76
- Switch rating 30A

- On/off × 2
- H113 × W109 × D50
- Switch rating 16A
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<th>Switch rating</th>
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<td>24 hour time switch</td>
<td>On/off</td>
<td>15A</td>
</tr>
<tr>
<td>Venner Venotime</td>
<td>24 hour time switch</td>
<td>On/off</td>
<td>16A</td>
</tr>
<tr>
<td>Venner Venotrol 80</td>
<td>24 hour Basic programmer</td>
<td>On/off</td>
<td>15A</td>
</tr>
<tr>
<td>Venner Venotrol 80M</td>
<td>24 hour Full programmer</td>
<td>On/off</td>
<td>15A</td>
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<tr>
<td>Venner Venotrol 80P</td>
<td>24 hour Full programmer</td>
<td>On/off</td>
<td>15A</td>
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</table>
Domestic Central Heating Wiring Systems and Controls

**Venner Venotrol 80PM**

- **A/S:** 5 4 3 2 1 N L
- **ROOM STAT:** CH ON OFF
- **CH:** N HW
- **N:** HW ON OFF
- **MAINS:**

Fit link if no room stat

**Venner Venotrol 90**

- **A/S:** 5 4 3 2 1 N L
- **ROOM STAT:** CH ON OFF
- **CH:** N HW
- **N:** HW ON N MAINS

Fit link if no room stat

**Electromechanical 24 hour Full programmer**

- **On/off × 2**
- **H105 × W170 × D50**

**Electromechanical 24 hour Basic programmer**

- **On/off × 2**
- **H105 × W170 × D50**

**Priority system programmers**

**Replacing a priority programmer with a double-circuit programmer**

---

**Figure 2.12** Horstmann 425/525 with Honeywell motorized valve and thermostats

**Figure 2.13** Eberle 608
Programmers and time switches

Figure 2.14  Horstmann Sapphire 423/424

Figure 2.16  Randall TSR 2+2

Figure 2.15  Randall 106

Figure 2.17  Randell 3022
Figure 2.18  Sangamo 409 F7

Figure 2.19  Sangamo 410 F7

Figure 2.20  Smiths Controller 30+
Programmers and time switches

Figure 2.21  *Smiths Controller 40+*

Figure 2.22  *Switchmaster 500*

Figure 2.23  *Venner CHC/GW*
Programmers specifically designed for used with the ACL 672 BR 340 Biflo motorized valve

Others were suitable for this and other systems. See motorized valves, Chapter 6.

**Figure 2.24** Randall 105

**Figure 2.25** Sangamo 410 F9

**SMC Control pack wiring diagrams utilizing Horstmann programmers**

**Figure 2.26** Horstmann 423 Pearl Auto

**Figure 2.27** Horstmann 424 Emerald
Programmers and time switches with inbuilt or external sensors or thermostats

**ACL CC 240**
**CC 520**

The CC 240/520 allows switching times and room temperature to be selected from a central point. A remote sensor DR 174 is used to detect and control room temperature. The hot water temperature can be controlled using a conventional cylinder thermostat. The CC 240 has 24 hour programming and the CC 520 has weekday/weekend programming.

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Terminals 4 and 5 are internally linked

**Electronic comfort controller**
(full control only)

Scale 5–30°C
H93 × W148 × D31
Switch rating 2A (1A)
On/off CC 240 × 2
CC 520 × 3

**ACL CT 171**
**CT 172**

The CT 171/172 allow switching times and room temperature to be selected from a single point. An inbuilt sensor is used to detect and control room temperature. In the OFF position central heating will remain off unless the temperature drops to the low-temperature point, in which case it will automatically switch on again.

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Voltage-free switching unless L–1 linked

**Programmable electronic thermostats with low-temperature protection**

Scale CT 171 5–30°C  
CT 172 16–28°C
Low-temperature protection  
CT 171 7°C  
CT 172 16°C  
H87 × W170 × D74
Switch rating 2A (1A)
On/off × 2
Batteries required 3 × AAA
**Domestic Central Heating Wiring Systems and Controls**

**ACL CT 174**

The CT 174 allows switching times and room temperature to be selected from a central point. A remote sensor DR 174 is used to detect and control room temperature. The CT 174 has 7 day programming.

![Diagram of CT 174](image)

Voltage-free switching unless L–1 linked

<table>
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**Electronic clock thermostat**

Scale 16–28°C (scaled 1–5)
H87 × W170 × D47
Switch rating 2A (1A)
On/off × 2
Batteries required 3 × AAA

**ACL ILP 112**

![Diagram of ILP 112](image)

Electronic 24 hour Basic/Full programmer
(with optimum start feature through inbuilt sensor)

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)
Move slider at rear of programmer to G for Basic control or P for Full control.

<table>
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<th>N</th>
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**ACL OCC 520**

5/2 day version of OCC 720

**ACL OCC 720**

![Diagram of OCC 720](image)

Electronic 7 day Full comfort controller
(with optimum start feature)

On/off × 3
H93 × W148 × D31
Switch rating 2A (1A)

<table>
<thead>
<tr>
<th>N</th>
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**ACL OLP 552**

![Diagram of OLP 552](image)

Electronic weekday/weekend Basic/Full programmer
(with optimum start feature)

On/off × 2
H93 × W148 × D31
Switch rating 2A (1A)
Move slider at rear of programmer to G for Basic control and P for Full control.

<table>
<thead>
<tr>
<th>N</th>
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**ACL OLP 722**

7 day version of OLP 522
Programmers and time switches with inbuilt or external sensors or thermostats

**ACL OPT 170**

Electronic clock thermostat  
(with optimum start feature)

The OPT 170 allows switching times and room temperatures to be selected from a central point. A remote sensor DR 174 is used to detect and control room temperature. The optimum start feature automatically reduces warm up time for the heating system as weather becomes milder.

![Diagram of ACL OPT 170](image)

Voltage-free switching unless L–4 linked

**ACL PT 110**  
**PT 170**

The PT 110/170 allows switching times and room temperature to be selected from a central point. A remote sensor DR 174 is used to detect and control room temperature. The PT 110 has a 24 hour programme and the PT 170 has a 7 day programme.

![Diagram of ACL PT 110/170](image)

Voltage-free switching unless L–4 linked

**ACL PT 271**  
**PT 371**

The PT 271/371 allows switching times and room temperatures to be selected from a central point. An inbuilt sensor is used to detect and control room temperature. PT 271 programmer options are off/timed/high/low. When set to timed the programmer will turn on or off at the pre-programmed times and temperatures. There are four temperature setting periods. The PT 371 programme options are low/timed/medium/high. There are six temperatures setting periods.

![Diagram of ACL PT 271/371](image)

Voltage-free switching unless L–1 linked

**ACL-Drayton**  
**Digistat 2**

24 hour programmable room thermostat

![Diagram of ACL-Drayton Digistat 2](image)

Scale 5–30°C  
H93 × W148 × D31  
Switch rating 2A (1A)  
On/off × 2  
Batteries required 2 × AA
**Domestic Central Heating Wiring Systems and Controls**

**ACL-Drayton**

**Digistat 3**

24 hour programmable room thermostat

7 day version of Digistat 2.

**Danfoss-Randall HC75**

**HC75A**

Electronic programmable room thermostat

Scale 5–30°C

H88 × W135 × D32

Switch rating 2A (1A)

Batteries required 2 × AA

6 setting periods in 24 hours

**Danfoss-Randall RT52**

Set-back room thermostat with built in timer

Scale 5–30°C

H88 × W110 × D28

Switch rating 6A (2A)

On/off × 2

**Danfoss-Randall RT52-RF**

Set-back thermostat with built-in timer and remote sensor

Scale 5–30°C

H88 × W138 × D32

Switch rating 3A (1A)

On/off × 2

**Danfoss-Randall TP5E**

Electronic programmable room thermostat

Scale 5–30°C

H81 × W99 × D34

Switch rating 6A (2A)

Up to 6 temperature changes per day

Batteries required 2 × AA

**Danfoss-Randall TP5E-RF**

Radio controlled programmable room thermostat

The TP5E-RF is a control for use in situations where it is not practical or acceptable to run cables between the room thermostat and the other control components in the system.

Using radio transmissions the TP5E-RF communicates instructions to a receiver unit, type RX, which can be located up to 30m away from the thermostat.

The receiver unit is available in three versions offering one, two or three zones of control, each zone requiring its own TP5E-RF thermostat. Any TP5E-RF can be tuned or re-tuned to any receiver channel.

The TP5E-RF thermostat offers identical functionality to that of the hard wired TP5E version, except that the relay function is moved from the thermostat to the RX receiver unit.
Programmers and time switches with inbuilt or external sensors or thermostats

RX1

```
N L 1 2 3 4
○ ○ ○ ○ ○ ○
MAINS SP COM ON OFF
```

Scale 5–30°C
TP5E-RF H81 × W98 × D34
RX receiver H88 × W138 × D32
Switch rating 3A (1A)
Batteries required 2 × AA

RX2

```
N L 1 2 3 4
○ ○ ○ ○ ○ ○
MAINS ZONE COM ZONE ZONE
```

RX3

```
A B C 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS COM ZONE ZONE ZONE ZONE
```

Danfoss-Randall TP75

7 day programmable room thermostat

Scale 5–30°C
H88 × W135 × D32
Switch rating 2A (1A)
Up to 6 temperature changes per day
Batteries required 2 × AA

Danfoss-Randall TP75M

7 day programmable room thermostat

7 day version of TP75

Danfoss-Randall TP75H, TP75HA

7 day programmable room thermostat

The TP75H is a 7 day, programmable room thermostat designed specifically for use in high-current applications such as direct electric heating. The TP75H is capable of switching loads of up to 16A directly without the use of an external load contactor.

```
E N L 1 2 3 4 5 6
○ ○ ○ ○ ○ ○ ○ ○ ○ ○
MAINS COM OFF SP ON Remote Sensor
```

Scale 5–30°C
H88 × W135 × D43
Switch rating 16A (4A)
Up to 6 temperature changes per day
Batteries required 2 × AA
**Domestic Central Heating Wiring Systems and Controls**

**Danfoss-Randall TP5000**

A  B  C
○  ○  ○  ○  ○  ○  ○  ○  ○  ○
Satisfied  Com  Demand

**Danfoss-Randall TP5000-RF**

A  B  C  1  2  3  4  5  6
○  ○  ○  ○  ○  ○  ○  ○  ○  ○
N  L  MAINS  COM  ZONE  ZONE  ZONE  ZONE

**Danfoss-Randall WP75H**

○  ○  ○  ○  ○  ○
E  N  N  OFF  COM  ON

**Drayton Digistat RF 2**

N  L  1  2  3
○  ○  ○  ○  ○
MAINS  COM  SAT  DEM

**Drayton Digistat RF 3**

**Eberle RTR-UTQ 9200**

**RTR-UWQ 9400E**

These are electronic programmable room thermostats.

**Electronic programmable room thermostat**

Scale 5–30°C
H88 × W110 × D28
Switch rating 6A (2A)
Up to 6 temperature changes per day

**Electronic programmable room thermostat**

Scale 5–30°C
H88 × W110 × D28
Switch rating 6A (2A)
Up to 6 temperature changes per day

**5/2 day or 7 day programmable hot water thermostat**

Scale 35–65°C
H88 × W135 × D43
Switch rating 16A (4A)
On/offs × 2
Batteries required 2 × AA

**Electronic wireless 24 hour programmable thermostat**

Scale 5–30°C
H87 × W87 × D33
Switch rating 2A (1A)
On/offs × 2
Batteries required 4 × AA

**Electronic wireless 24 hour programmable thermostat**

7 day version of Digistat RF 2

**Electromechanical clock thermostat**

This is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 2–10°C. In the moon position the time switch will override the clock to give continuous set-back. In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat.

Link 1–6 if required
**Eberle RTR-UTQ 9230**  
24V electromechanical clock thermostat

This is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 2–10°C. In the moon position, the time switch will override the clock to give continuous set-back. In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat.

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<td>COM</td>
<td>SPARE</td>
<td>ON</td>
<td>N-24V</td>
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Scale 5–30°C  
H71 \( \times \) W142 \( \times \) D32  
Switch rating 1A (1A)  
On/off \( \times \) 3

Link 1–6 if required

**Eberle RTR-UQW 9300**

Electromechanical clock thermostat

7 day version of RTR-UTQ 9200 with 9 on/off.

**Grasslin RTC 7**

Programmable room thermostat

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<tr>
<td>Com</td>
<td>Satisfied</td>
<td>Demand</td>
</tr>
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Scale 8–32°C  
H140 \( \times \) W143 \( \times \) D33  
Switch rating 8A(1A)  
Up to 25 temperature changes per day  
Batteries required 2 \( \times \) AA

**Honeywell CM 31**  
CM 37

24 hour programmable room thermostat  
7 day programmable room thermostat

<table>
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<tr>
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<tr>
<td>LIVE</td>
<td>DEMAND</td>
<td>SATISFIED</td>
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Scale 5–30°C  
H90 \( \times \) W135 \( \times \) D29  
Switch rating 8A  
On/off \( \times \) 48 per day – CM31  
On/off \( \times \) 6 per day – CM37  
Batteries required 2 \( \times \) AA

**Honeywell CM 41**

Electronic programmable thermostat

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<tr>
<td>LIVE</td>
<td>LOAD</td>
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Scale 5–30°C  
H80 \( \times \) W130 \( \times \) D37  
Switch rating 8 (3A) SPST  
4 time/temperature pairs per day  
Batteries required 2 \( \times \) AA

**Honeywell CM 51**

7 day electronic programmable thermostat

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<td>LIVE</td>
<td>LOAD</td>
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</table>

Scale 5–30°C  
H80 \( \times \) W130 \( \times \) D37  
Switch rating 8 (3A) SPST  
6 time/temperature pairs per day  
Batteries required 2 \( \times \) AA
Domestic Central Heating Wiring Systems and Controls

Honeywell CM 61
CM 67

24 hour programmable room thermostat
7 day programmable room thermostat

Scale 5–30°C
H86 × W130 × D30
Switch rating 8A
On/off × 3 to 12 cycles per hour
Batteries required 2 × AA

Honeywell CM 61 RF
CM 67 RF

Wire free version of CM 61, CM 67

Honeywell CM 4000
CM 5000

Electronic programmable thermostat

The CM 4000/5000 allows switching times and room temperature to be selected from a central point. An inbuilt sensor is used to detect and control room temperature. The CM 4000 has a 24 hour programming and the CM 5000 has 7 day programming.

Horstmann
Centaurstat 1
Centaurstat 7

Electronic programmable thermostat

The Centaurstat allows switching times and room temperatures to be selected from a central point. An inbuilt sensor is used to select and control room temperature. The Centaurstat 1 has 24 hour setting and the Centaurstat 7 has weekday/weekend setting.

Landis & Gyr RAV 1 Chronogyr

Electromechanical clock thermostat

The RAV 1 is a room temperature controller with adjustable automatic night set-back. Two knobs are provided for setting the day and night room temperatures and a synchronous time switch for adjustment of the changeover from day/night temperature times.
Landis & Gyr RAV 10U

Chronogyr RAV 10Ure 24V

Electromechanical clock thermostat

The RAV 10 is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the ‘clock’ position, the time switch will automatically switch from set temperature to reduced temperature by 2–12°C. In the ‘moon’ position, the time switch will override the clock to give continuous set-back. In the ‘sun’ position, the time switch will override the clock to give continuous temperature as set on the thermostat.

Landis & Gyr RAV 91 Chronogyr

Electromechanical clock thermostat

The RAV 91 is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the ‘clock’ position, the time switch will automatically switch from set temperature to reduced temperature by 2–12°C. In the ‘moon’ position, the time switch will override the clock to give continuous set-back. In the ‘sun’ position, the time switch will override the clock to give continuous temperature as set on the thermostat. The unit has a quartz clock and is powered by batteries.

Landis & Gyr REV 10 Chronogyr

Electronic programmable room thermostat

The REV 10 is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a five-position switch – A, B, sun, moon and off. With the switch at A or B the function will be auto operation to heating programme A (two set-back cycles per 24 hours) or B (one set-back cycle per 24 hours). In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat, and the moon position will give continuous temperature at the pre-set reduced temperature. In the off position the heating will be off unless the frost protection facility, set at 5°C, takes over. The REV 10 has 24 hour setting facility.
Domestic Central Heating Wiring Systems and Controls

**Landis & Gyr REV 20 Chronogyr**

Electronic programmable room thermostat

The REV 20 is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a five-position switch – A, B, sun, moon and off. With the switch at A or B the function will be auto operation to heating programme A (two set-back cycles per 24 hours) or B (one set-back cycle per 24 hours). In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat, and the moon position will give continuous temperature at the pre-set reduced temperature. In the off position the heating will be off unless the frost protection facility, set at 5°C, takes over. The REV 20 has 7 day setting facility.

<table>
<thead>
<tr>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>24–250V ac</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Scale 3–29°C
H90 × W115 × D32
Switch rating 5A (2A)
On/off × 3 per day
Batteries required 3 × AA

**Landis and Staefa REV 11 Chronogyr**

As REV 15 with daily operation

**Landis & Staefa REV 15/15T Chronogyr**

Electronic programmable room thermostat

The REV 15 incorporates a self-learning control algorithm that enables the thermostat to adjust to local climate, building and heating installation environments to provide optimum comfort benefits. The REV 15T has a remote operation facility. Both units have 5/2 day operating modes and are battery powered.

<table>
<thead>
<tr>
<th>L</th>
<th>L1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td>DEM</td>
</tr>
</tbody>
</table>

Scale 0–40°C
H104 × W128 × D37
Switch rating 8A (3.5A)
Batteries required 2 × AA

**Landis & Staefa REV 22/22T Chronogyr**

Electronic programmable room thermostat

The REV 22 incorporates a self-learning control algorithm that enables the thermostat to adjust to local climate, building and heating installation environments to provide optimum comfort benefits. The REV 22T has a remote operation facility. Both units have 7 day programming and holiday programming with three comfort settings per day. Also incorporates night set-back and frost protection. The units are battery powered.

<table>
<thead>
<tr>
<th>L</th>
<th>L1</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>COM</td>
<td>N.O.</td>
<td>N.C.</td>
</tr>
</tbody>
</table>

Scale 0–40°C
H104 × W128 × D37
Switch rating 6A (2.5A)
Batteries required 2 × AA
**Potterton PET 1**

The PET 1 allows switching times and room temperatures to be selected from a central point. An inbuilt sensor is used to detect and control room temperature. The PET 1 has weekday/weekend programming facility and low-limit frost protection override.

```
2 L 1 N E
O O O O O
OFF L(COM) ON N E
```

Scale 6–29°C
H88 × W142 × D46
Switch rating 6A (1A)
Setting periods × 4 in 24 hours
Batteries required 4 × AA

**Randall TP 1**

As Potterton Pet 1

**Randall TP 2, TP 3, TP 4, TP 5**

The TP 2-5 allows switching times and room temperatures to be selected from a central point. An inbuilt sensor is used to detect and control room temperatures. The TP 2 and TP 4 have 24 hour programming and the TP 3 and TP 5 have weekday/weekend programming.

```
3 2 1
O O O
ON OFF COM
```

As the unit is battery powered no neutral is required

Scale TP 2 and TP 3 16–30°C
Scale TP 4 and TP 5 5–30°C
H81 × W98 × D34
Switch rating 6A
Setting periods × 6 in 24 hours
Batteries required 2 × AA

**Randall TP 6, TP 7**

The PT 6 and TP 7 allow switching times and room temperatures to be controlled from a central point. An inbuilt sensor is used to detect and control room temperatures. The hot water temperature can be controlled using a conventional cylinder thermostat. For Basic control, remove white socket from back of unit.

```
E N L 1 2 3 4 5 6
O O O O O O O O
E N L HW HW HW CH CH CH
MAINS ON COM OFF ON COM OFF
```

Scale TP 6 16–30°C
Scale TP 7 5–30°C
H105 × W150 × D38
Switch rating 3A
CH setting periods × 6 in 24 hours
HW on/offs × 2
Domestic Central Heating Wiring Systems and Controls

Randall TP 8, TP 9

Electronic programmable thermostat with timed hot water Basic/Full control

The TP 8 and TP 9 allow switching times and room temperatures to be controlled from a central point. A remote sensor is used to detect and control room temperature. The hot water can be controlled using a conventional cylinder thermostat. For Basic control, remove white socket from back of unit.

Switch rating 3A
CH setting periods × 6 in 24 hours
HW on/off × 2

Scale TP 8 16–30°C
Scale TP 9 5–30°C
H105 × W150 × D38

Smiths Centroller 2000

Electronic 24 hour Basic/Full programmer

This programmer was supplied with room and cylinder sensors. The on/off times are divided up into day/nightime periods and room and water temperature are set on the programmer itself.

Switch rating 5A (2A)

Two diagrams are shown; note that boiler and pump switching were done by the programmer and not the auxiliary switches of motorized valves.

Figure 3.1  Centroller 2000/3000. Basic system pumped heating gravity hot water. Do NOT use on low water content boilers.
Programmers and time switches with inbuilt or external sensors or thermostats

Smith Controller 3000

Electronic 24 hour Basic/Full programmer

As Controller 2000 with boost facility for hot water.

Smiths ERS 1

Electronic programmable thermostat

The ERS 1 allows switching times and room temperatures to be selected from a central point. An inbuilt sensor is used to detect and control room temperature. The ERS 1 has weekday/weekend programming facility and low-limit frost protection override.

2  |  L  |  1  |  N  |  E
OFF | L(COM) | ON  | N   | E

Scale 6–29°C
H88 × W142 × D46
Switch rating 6A (1A)
Setting periods × 4 in 24 hours
Batteries required 4 × AA

Sunvic EC 1401/1451

Electronic clock thermostat

The Sunvic EC electronic clock thermostat is designed to control room temperature at two pre-selected levels – day and night. During the On periods the temperature is controlled by the selected day temperature and at other times controlled to the night temperature setting.

1  |  2  |  3  |  4  |  5  |  6  |  7  |  8
L  |  N  |  OFF | ON | COM | COM | ON  | OFF
MAINS | CIRCUIT A | CIRCUIT A

Scale 10–40°C
H110 × W180 × D65
Switch rating 5A (1A)

Voltage-free switching unless L–5–6 linked

Figure 3.2  Controller 2000/3000. Fully pumped 2 valve zone control. For spring return motorized valves ignore terminals 1 and 3.
**Domestic Central Heating Wiring Systems and Controls**

**Sunvic TLC 2358**

The TLC is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 6°C. In the moon position, the time switch will override the clock to give continuous set-back. In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>L(COM)</td>
<td>N</td>
</tr>
</tbody>
</table>

Scale 3–27°C

H87 × W157 × D47

Switch rating 2A (1A)

**Sunvic TLX 6501**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM</td>
<td>DEMAND</td>
<td>SATISFIED</td>
</tr>
</tbody>
</table>

Scale 5–40°C

H82 × W120 × D31

Switch rating 6A (2A)

Up to 6 temperature changes per day

Batteries required 2 × AA

**Switchmaster Serenade**

The Serenade allows switching times and room temperature to be selected from a central point. An inbuilt sensor is used to detect and control room temperature. The Serenade has 7 day programming and a frost protection facility.

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>COM</td>
<td>OFF</td>
</tr>
</tbody>
</table>

As the unit is battery operated no neutral is required

Scale 5–29.5°C

H95 × W161 × D40

Switch rating 3A (2A)

Setting periods × 3

Batteries required 3 × AA

**Switchmaster Symphony**

The Symphony is supplied with room and cylinder sensors.

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>1</th>
<th>3</th>
<th>4</th>
<th>6</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAINS</td>
<td>HW</td>
<td>HW</td>
<td>CH</td>
<td>CH</td>
<td>On/off</td>
<td>See Note</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A–C Room sensor. B–C Cylinder sensor

Scale 5–29.5°C

H95 × W161 × D40

Switch rating 3A

**Electromechanical clock thermostat**

Scale 3–27°C

H87 × W157 × D47

Switch rating 2A (1A)

**Programmable room thermostat**

Scale 5–40°C

H82 × W120 × D31

Switch rating 6A (2A)

Up to 6 temperature changes per day

Batteries required 2 × AA

**Electronic programmable room thermostat**

Scale 5–29.5°C

H95 × W161 × D40

Switch rating 3A (2A)

Setting periods × 3

Batteries required 3 × AA

**Electronic 7 day Full programmer**

On/off × 3

H95 × W161 × D40

Switch rating 3A
**Vaillant CRT 394 Calotrol**

The VRT 394 is a room thermostat with a built-in time switch which reduces temperature at selected times. It incorporates a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 5°C. In the moon position, the timeswitch will override the clock to give continuous set-back. In the sun position, the timeswitch will override the clock to give continuous temperature as set on the thermostat. When tappets are pushed in, the clock functions at full set temperature, and when tappets remain out, the clock functions at reduced set temperature.

```
7   2   1   4   3
○   ○   ○   ○   ○
L   N   ON  COM
MAINS
```

Scale 5–30°C  
H75 × W146 × D28  
Switch rating 10A

Voltage free switching unless 2–3 linked

The VRT 394 can also function in an on/off mode when it will turn off a boiler, e.g. during the nighttime period. For this facility wire as below:

```
7   2   1   4   3
○   ○   ○   ○   ○
COM  L   N   ON
MAINS
```

Voltage-free switching unless 2–7 linked

---

**Vaillant VRT QT4 Calotrol**  
**VRT QW4 Calotrol**

The QT has a 24 hour clock and the QW has a 7 day clock. They incorporate a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 6°C. In the moon position, the time switch will override the clock to give continuous set-back. In the sun position, the time switch will override the clock to give continuous temperature as set on the thermostat. The set-back of 5°C can be altered up to 10°C by first isolating the power supply and removing the casing by releasing bottom screws and tilting case upwards. Adjust the potentiometer to required level and re-assemble case. When tappets are pushed in, the clock functions at full set temperature, and when tappets remain out, the clock functions at reduced set temperature.

```
4   1   2   3
○   ○   ○   ○
ON  N   L   COM
MAINS
```

Scale 5–30°C  
H75 × W142 × D35  
Switch rating 2A

Voltage-free switching unless 2–3 linked
Domestic Central Heating Wiring Systems and Controls

**Vaillant VRT-UT2-394 240V Calotrol**

**VRT-UT2-396 24V Calotrol**

Electromechanical clock thermostat

The VRT-UT2-394/396 are room thermostats with a built-in time switch which reduces temperature at selected times. They incorporate a three-position switch – clock, moon and sun. With the switch in the clock position, the time switch will automatically switch from set temperature to reduced temperature by 5°C. In the moon position, the timeswitch will override the clock to give continuous set-back. In the sun position, the timeswitch will override the clock to give continuous temperature as set on the thermostat. When tappets are pushed in the clock functions at full set temperature and when tappets remain out the clock functions at reduced set temperature.

<table>
<thead>
<tr>
<th>7</th>
<th>2</th>
<th>1</th>
<th>4</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>L</td>
<td>N</td>
<td>ON</td>
<td>COM</td>
<td></td>
</tr>
</tbody>
</table>

Voltage-free switching unless 2–3 linked

The VRT-UT2-394/396 can also function in an on/off mode when it will turn off a boiler, e.g. during the nighttime period. For this facility wire as below:

<table>
<thead>
<tr>
<th>7</th>
<th>2</th>
<th>1</th>
<th>4</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>COM</td>
<td>L</td>
<td>N</td>
<td>ON</td>
<td></td>
</tr>
</tbody>
</table>

Voltage-free switching unless 2–7 linked
The cylinder thermostat is a device for detecting and setting the temperature of water in the domestic hot water cylinder. It should be in a position so that the householder can easily make any adjustments that may be required. If possible, it is best to site it away from the flow/return pipes to avoiding detecting conducted heat. The thermostat is usually located a third of the way up the cylinder and virtually all are clamped to the cylinder with a metal band or spring wire. The exceptions to this rule are the Potterton PTT1 and PTT2. On these, the actual thermostat is fixed on a convenient wall and a pre-wired probe is attached to the cylinder. The probes are available with 2m or 10m leads. These thermostats are ideal where a cylinder is located in a loft, eaves cupboard or similar difficult-to-get-at location.

Virtually all cylinder and pipe thermostats have SPDT switching and are suitable for all voltages up to 240V. Some are pre-wired and when using one of these for a SPST application the wire not used must be safely terminated as it will be live when the thermostat is in a satisfied state.

There are two instances where fixing the cylinder thermostat can be problem. These are the horizontally mounted cylinder and the square or oblong copper tank. To deal with the horizontal cylinder first. It is probably going to be a trial and error exercise as to location but a third of the way up as normal would be the best place to start. As for the square or oblong copper tank, one method is to solder two copper tags onto the tank about 12–18 inches apart and a third of the way up. Two pieces of flattened 15mm tube will do the job. Then the thermostat can be fixed using the spring wire method. Alternatively, the Potterton cylinder thermostat with sensor could be used with the sensor being held in position with suitable tape.

Pipe thermostats are usually cylinder thermostats with a modified base. They function just the same and are used for various reasons, including pump overrun thermostats.

### Cylinder and pipe thermostats

<table>
<thead>
<tr>
<th>ACL HTS</th>
<th>Common</th>
<th>Scale 50–80°C</th>
<th>Demand</th>
<th>H114 × W58 × D67</th>
<th>Satisfied</th>
<th>15A res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>3</td>
<td></td>
<td>Demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACL HTS 2</th>
<th>Common</th>
<th>Scale 50–80°C</th>
<th>Demand</th>
<th>H110 × W34 × D40</th>
<th>Satisfied</th>
<th>3A res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>Red</td>
<td></td>
<td>Demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.5m pre-wired.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACL HTS 2/S</th>
<th>Common</th>
<th>Scale 50–80°C</th>
<th>Demand</th>
<th>H100 × W40 × D45</th>
<th>Satisfied</th>
<th>3A res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>C</td>
<td></td>
<td>Demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Barlo CT 1</th>
<th>Common</th>
<th>Scale 50–80°C</th>
<th>Demand</th>
<th>H100 × W34 × D40</th>
<th>Satisfied</th>
<th>3A res.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>Red</td>
<td></td>
<td>Demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>Yellow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Common</th>
<th>Scale 15–90°C</th>
<th>Demand</th>
<th>H116 × W50 × D54</th>
<th>Satisfied</th>
<th>15A res. (2.5A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common</td>
<td>1</td>
<td></td>
<td>Demand</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Domestic Central Heating Wiring Systems and Controls

### Danfoss ATC
- **Common**: C
- **Scale**: 20–90°C
- **Demand**: NC
- **Satisfied**: NO
- **Resistors**: H100 × W60 × D57
- **Satisfied**: 15A res. (2.5A ind.)

### Honeywell L641B
- **Pipe frost thermostat**
- **Common**: C
- **Scale**: 10–40°C
- **Demand**: 1
- **Satisfied**: 2
- **Resistors**: H79 × W44 × D56
- **Satisfied**: 4A (2A)

### Danfoss ATF
- **Pipe frost thermostat**
- **Common**: C
- **Scale**: 5–90°C
- **Demand**: NC
- **Satisfied**: NO
- **Resistors**: H100 × W60 × D57
- **Satisfied**: 6A

### Honeywell L697A
- **Common**: 1
- **Scale**: 100–180°F
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H120 × W94 × D50
- **Satisfied**: 20A res.

### Danfoss ATP
- **Pipe thermostat**
- **Common**: C
- **Scale**: 30–90°C
- **Demand**: NC
- **Satisfied**: NO
- **Resistors**: H100 × W60 × D57
- **Satisfied**: 6A

### Honeywell L6090A
- **Common**: C
- **Scale**: 30–90°C
- **Demand**: 1
- **Satisfied**: 2
- **Resistors**: H95 × W50 × D85
- **Satisfied**: 6A res. (4A ind.)

### Drayton CS 1
- **Common**: 1
- **Scale**: 20–90°C
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H92 × W60 × D59
- **Satisfied**: 6A res. (2A ind.)

### Honeywell L6190B
- **Common**: C
- **Scale**: 25–95°C
- **Demand**: 1
- **Satisfied**: 2
- **Resistors**: H92 × W48 × D77
- **Satisfied**: 10A res. (2.5A)

### Drayton CS 2
- **Common**: 1
- **Scale**: 20–90°C
- **Demand**: 2
- **Satisfied**: 4
- **Resistors**: H90 × W40 × D45
- **Satisfied**: 15A res. (2.5A)

### Horstmann HCT – 1
- **Common**: 1
- **Scale**: 15–90°C
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H116 × W50 × D54
- **Satisfied**: 15A res. (2.5A)

### Eberle rar
- **Common**: 1
- **Scale**: 15–90°C
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H116 × W50 × D54
- **Satisfied**: 15A res. (2.5A)

### Landis & Gyr RAM 1
- **Common**: 1
- **Scale**: 15–90°C
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H116 × W50 × D54
- **Satisfied**: 15A res. (2.5A)

### Honeywell L641A
- **Common**: C
- **Scale**: 50–80°C
- **Demand**: 1
- **Satisfied**: 2
- **Resistors**: H79 × W44 × D44/54
- **Satisfied**: 4A res. (2A ind.)

### Landis & Gyr RAM 21
- **Common**: 1
- **Scale**: 50–80°C
- **Demand**: 2
- **Satisfied**: 3
- **Resistors**: H141 × W50 × D42
- **Satisfied**: 6A res. (3.5A)
### Cylinder and pipe thermostats

<table>
<thead>
<tr>
<th>Model</th>
<th>Common</th>
<th>Scale</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Potterton PTT 1</strong></td>
<td>L</td>
<td>45–75°C</td>
<td>H78 × W70 × D40</td>
<td>5A res. (2.5A)</td>
<td>N</td>
<td>This thermostat is fitted remote from the cylinder using a probe supplied with a 2m lead. A 10m lead is available. The thermostat is also supplied with indicator neons to show whether temperature is reached. The wiring of a neutral is essential.</td>
</tr>
<tr>
<td><strong>Smiths C</strong></td>
<td>C</td>
<td>120–180°F</td>
<td>H118 × W53 × D40</td>
<td>3A res.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Potterton PTT 2</strong></td>
<td>L</td>
<td>45–75°C</td>
<td>H78 × W70 × D40</td>
<td>5A res. (2.5A)</td>
<td>N</td>
<td>This thermostat has a boost facility and a permanent live is required. It is fitted remote from the cylinder using a probe supplied with a 2m lead. A 10m lead is available. The thermostat is also supplied with indicator neons to show whether temperature is reached. The wiring of a neutral is essential.</td>
</tr>
<tr>
<td><strong>Sopac SA 0570</strong></td>
<td>C</td>
<td>5–70°C</td>
<td>H100 × W50 × D40</td>
<td>16A res. (2.5A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sopac SA 0701</strong></td>
<td>C</td>
<td>25–90°C</td>
<td>H101 × W38 × D38</td>
<td>16A res. (2.5A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Potterton PTT 100</strong></td>
<td>TL</td>
<td>30–90°C</td>
<td>H110 × W52 × D70</td>
<td>16A (2A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sunvic PA 2252</strong></td>
<td>C</td>
<td>40–90°C</td>
<td>H127 × W53 × D62</td>
<td>15A res.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Procon SOA</strong></td>
<td>3</td>
<td>33–83°C</td>
<td>H92 × W57 × D32</td>
<td>3A res. (2A ind.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sunvic SA 36</strong></td>
<td>3</td>
<td>130–180°F</td>
<td>H105 × W55 × D63</td>
<td>15A res.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Randall CN4</strong></td>
<td>1</td>
<td>15–90°C</td>
<td>H116 × W50 × D54</td>
<td>15A res. (2.5A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sunvic SA 1452</strong></td>
<td>3</td>
<td>46–90°C</td>
<td>H100 × W50 × D50</td>
<td>6A res. (2.5A)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Domestic Central Heating Wiring Systems and Controls**

**Sunvic SA 1453**
As SA 1452 but pre-wired.
- **Common**: Brown
- **Demand**: Black
- **Satisfied**: Blue
- Scale 46–90°C
- H100 × W50 × D50
- 6A res. (2.5A)

**Sunvic SA 1502**
As SA 1452, pre-wired with 4-way plug for duoplug or clock box systems. The colour coding of the flex is:
- **Common**: Blue
- **Demand**: Yellow
- **Satisfied**: White

**Sunvic SA 1503**
As SA 1502.

**Sunvic SA 2401**
- **Common**: 3
- **Demand**: 1
- **Satisfied**: 2
- Scale 40–90°C
- H109 × W53 × D59
- 15A res.

**Sunvic SA 2451**
- **Common**: 3
- **Demand**: 1
- **Satisfied**: 2
- Scale 40–90°C
- H109 × W53 × D59
- 15A res.

**Sunvic SA 2452**
- **Common**: 3
- **Demand**: 1
- **Satisfied**: 2
- Scale 40–90°C
- H95 × W33 × D42
- 5A (1A)

**Sunvic SA 2453**
As SA 2452 but pre-wired.
- **Common**: Blue
- **Demand**: Yellow
- **Satisfied**: White
- Scale 40–90°C
- H95 × W33 × D42
- 5A (1A)

**Sunvic SA 2501**
As 2451, but pre-wired with 4-way plug fitted for duoplug system. Colour coding as SA 1502.

**Sunvic SA 2502**
As SA 2453 with plug for duoflow system.

**Sunvic SA 2601**
- **Common**: 3
- **Demand**: 1
- **Satisfied**: 2
- Scale 45–85°C
- H95 × W33 × D42
- 5A (1A)

**Switchmaster SCT 1**
- **Common**: 1
- **Demand**: 2
- **Satisfied**: 3
- Scale 40–80°C
- H114 × W45 × D50
- 6A res. (1A)

**Teddington FEA**
- **Common**: 1
- **Demand**: 2
- **Satisfied**: 3
- Scale 40–80°C
- H114 × W45 × D50
- 6A res. (1A)

**Tower CS**
- **Common**: Red
- **Demand**: Black
- **Satisfied**: Yellow
- Scale 50–80°C
- H100 × W34 × D40
- 3A res.
- 1.5m pre-wired.

**Trac TS 30**
- **Common**: 1
- **Demand**: 2
- **Satisfied**: 3
- Scale 15–90°C
- H116 × W50 × D54
- 15A res. (2.5A)

**Wickes CS**
- **Common**: 1
- **Demand**: 2
- **Satisfied**: 3
- Scale 50–80°C
- H141 × W50 × D42
- 6A res. (3.5A)
Room thermostats come in many shapes and sizes with different switching arrangements, current ratings and facilities such as neon indicators, off position, locking device, thermometer, night setback, etc. However, its function, when used with domestic central heating, is to act as a temperature-operated switch to turn off the pump, close a motorized valve, etc.

As the thermostat is designed to operate on fluctuations in air temperature, it must be sited in a position where there is good air movement and circulation. This would normally be the hall or largest living room, about 5 feet (1.5m) from the floor. It is also necessary to ensure that it is influenced by a radiator not fitted with a thermostatic radiator valve, but it must not be sited immediately adjacent to it.

Some examples of where **not to** site a room thermostat are:

(a) within 6 inches of an internal corner as air circulates – a corner of a room is regarded as dead air space
(b) over or near an artificial heat source, e.g. table lamp, television
(c) in a kitchen or cupboard
(d) in a room containing an open fire, gas fire, electric fire, or similar heating appliance not influenced by the thermostat
(e) on an outside wall
(f) on an airing cupboard wall
(g) on a chimney breast that may be used
(h) in direct sunlight
(i) in a draught
(j) behind curtains.

Having selected the correct position, which is often a matter of compromise, ensure that the thermostat is wired up correctly. This is straightforward but it is essential for greater accuracy to wire the live into the correct terminal so that the heat anticipator, if fitted, functions correctly.

One other thing to remember is that on 24V room thermostats there is usually an adjustment to be made inside the thermostat so that the anticipator scale coincides with the current rating of the gas valve of the boiler or warm air heater. A 24V thermostat must not be used on a 240V supply, but a 240V room thermostat can be used on a 24V system, although it may perform poorly and such practice is not to be encouraged.

If part of the system is likely to suffer damage from freezing in cold weather, it is necessary to fit a frost or low-limit thermostat. Likewise, protection of the property itself is sometimes the requirement, e.g. timber framed houses may require a low-limit thermostat set at about 11°C to avoid condensation forming. Usually, the frost or low-limit thermostats are wired to override any time clock and room thermostat. Many electricians think that room, frost and low-limit are wired differently because one acts at high temperature and the others at low temperature. However, all three thermostats break on temperature rise and so are wired the same. When wiring a frost thermostat on a gravity hot-water/pumped central heating system, it is necessary to override both hot water and heating channels of a programmer, and so a double-pole thermostat, such as a Sopac TA 147, has to be used. An alternative is the conventional SPST thermostat, with a double-pole relay. Both methods are shown on page 257. Some manufacturers include a frost position on their normal room thermostats or have boxes for fitting the frost thermostat outside on a wall, such as the Sunvic BX3.
## Domestic Central Heating Wiring Systems and Controls

### ACL DT
- **Common**: 3
- **Scale**: 5–25°C
- **Demand**: 1
  - H66 × W100 × D39
- **Satisfied**: 2
  - 6A res. (2A)
- **Neutral**: N

### ACL ST
- **Common**: 3
- **Scale**: 5–25°C
- **Demand**: 1
  - H66 × W100 × D39
- **Satisfied**: None
  - 6A res. (2A)
- **Neutral**: N

### ACL TA350
- **Common**: 1
- **Scale**: 6–30°C
- **Demand**: 3
  - H72 × W72 × D44
- **Satisfied**: 2
  - 16A res. (2.5A)
- **Neutral**: None

### ACL TS142
- **Common**: 1
- **Scale**: 3–30°C
- **Demand**: 2
  - H71 × W71 × D35
- **Satisfied**: None
  - 16A res. (4A)
- **Neutral**: 4

### ACL-Drayton RTS 1 and 2
**Electronic thermostat, 240V only**
- **Common**: L
- **Scale**: 10–30°C
- **Demand**: 3
  - H86 × W86 × D37
- **Satisfied**: None
  - 2A (1A)
- **Neutral**: N
  - RTS2 has LED ‘ON’ indicator

### ACL-Drayton RTS 3
**Frost thermostat, 240V only**
- **Common**: L
- **Scale**: 3–10°C
- **Demand**: 3
  - H86 × W86 × D37
- **Satisfied**: None
  - 2A (1A)
- **Neutral**: N

### ACL-Drayton RTS 4
**Electronic thermostat**
- **Perm live**: L
  - Scale 10–30°C
- **Common**: 1
  - H86 × W86 × D37
- **Demand**: 3
  - 2A (1A)
- **Satisfied**: 2
- **Neutral**: N

It is essential that a 240V supply is wired to L and N. Link L–1 if voltage-free contacts are not required.

### ACL-Drayton RTS 5
**Optimum start and save facility**
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
  - H66 × W100 × D39
- **Satisfied**: None
  - 2A (1A)
- **Neutral**: N

### Barlo RT 1
- **Common**: 1
- **Scale**: 3–30°C
- **Demand**: 2
  - H71 × W71 × D35
- **Satisfied**: None
  - 16A res. (4A)
- **Neutral**: 4

### Benefit BRFT 10
- **Common**: 1
- **Scale**: 5–30°C
- **Demand**: 2
  - H68 × W90 × D40
- **Satisfied**: 3
  - 16A res. (2.5A)
- **Neutral**: None

### Brassware Ferroli
- **Common**: 2
- **Scale**: 5–30°C
- **Demand**: 1
  - H78 × W78 × D36
- **Satisfied**: 3
  - 16A res. (2.5A)
- **Neutral**: None

### Danfoss HCT
- **Common**: 3
- **Scale**: 5–30°C
- **Demand**: 5
  - H88 × W135 × D32
- **Satisfied**: 6
  - 2A (1A)
- **Remote sensor**: A–B
- **Batteries**: 2 × AA

### Danfoss-Randall HT
**Incorporates day/night switch**
- **Common**: 3
- **Scale**: 5–30°C
- **Demand**: 5
  - H88 × W135 × D32
- **Satisfied**: 6
  - 2A (1A)
- **Neutral**: None
### Danfoss-Randall RET 230 C, L, NA

**Electronic thermostat**
- **Common**: L
- **Scale**: 5–30°C
- **Demand**: 3
- **H86 × W85 × D42
- **Satisfied**: 4
- **3A (1A)
- **Neutral**: N

### Danfoss-Randall RET-B Battery powered

- **Common**: 3
- **Scale**: 5–30°C
- **Demand**: 2
- **H86 × W110 × D28
- **Satisfied**: 1
- **6A (2A)
- **Neutral**: None

### Danfoss RMT 24 – 24V

- **Common**: 1
- **Scale**: 8–30°C
- **Demand**: 2
- **H80 × W80 × D40
- **Satisfied**: 3
- **10A (4)
- **Neutral**: 4
- **Neutral is – of circuit

### Danfoss RMT 24T

*With night set-back facility/thermometer*
- **Common**: 1
- **Scale**: 8–30°C
- **Demand**: 2
- **H80 × W80 × D40
- **Satisfied**: 3
- **10A (4A)
- **Neutral**: 4 + 5
- **Neutral is – of circuit
- **NSB**: 6

### Danfoss RMT 230

- **Common**: 1
- **Scale**: 8–30°C
- **Demand**: 2
- **H80 × W80 × D40
- **Satisfied**: 3
- **10A (4A)
- **Neutral**: 4

### Danfoss RMT 230T

*With night set-back facility/thermometer*
- **Common**: 1
- **Scale**: 8–30°C
- **Demand**: 2
- **H80 × W80 × D40
- **Satisfied**: 3
- **10A (4A)
- **Neutral**: 4
- **NSB**: switch 5 and 6

### Danfoss RTF

**Frost thermostat**
- **Common**: 1
- **Scale**: – 5°C fixed
- **Demand**: 2
- **H80 × W80 × D40
- **Satisfied**: None
- **16A (2.5A)
- **Neutral**: None

### Danfoss RT1

**Digital electronic thermostat**
- **Common**: 1
- **Scale**: 5–30°C
- **Demand**: 3
- **H81 × W98 × D34
- **Satisfied**: 2
- **6A SPDT
- **Neutral**: None

### Danfoss-Randall RT 1 – RF

As RT 1 with remote sensor.

### Danfoss-Randall RT 2

As RT 1 with integral timer.

### Danfoss-Randall RT 2 – RF

As RT 2 with remote sensor.

### Danfoss-Randall RT 51

**Manual day/night feature**
- **Common**: B
- **Scale**: 5–30°C
- **Demand**: C
- **H88 × W110 × D28
- **Satisfied**: A
- **6A (2A)
- **Neutral**: Batteries 2 × AA

### Danfoss-Randall RT 51 – RF

As RT 51 with remote sensor, RX1, RX2 or RX3, see TP5E-RF.
### Domestic Central Heating Wiring Systems and Controls

#### Danfoss ST

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>1</td>
<td>None</td>
<td>40–80°F</td>
</tr>
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</table>

#### Danfoss TWE

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>None</td>
<td>4</td>
<td>0–30°C</td>
</tr>
</tbody>
</table>

#### Danfoss TWK

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>0–30°C</td>
</tr>
</tbody>
</table>

#### Danfoss TWL – 24V

<table>
<thead>
<tr>
<th>Common</th>
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<th>Neutral</th>
<th>Scale</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>None</td>
<td>None</td>
<td>5–30°C</td>
</tr>
</tbody>
</table>

#### Danfoss TWLT – 24V

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
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</thead>
<tbody>
<tr>
<td>C</td>
<td>4</td>
<td>None</td>
<td>None</td>
<td>5–30°C</td>
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</table>

#### Danfoss TWPT

**Night set-back facility**

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5–30°C</td>
</tr>
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</table>

#### Danfoss TWR

<table>
<thead>
<tr>
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<th>Scale</th>
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</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
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<td>4</td>
<td>0–30°C</td>
</tr>
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</table>

#### Danfoss TWR 24 – 24V

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>None</td>
<td>4</td>
<td>5–30°C</td>
</tr>
</tbody>
</table>

#### Drayton Digistat 1

**Electronic thermostat**

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>2</td>
<td>None</td>
<td>5–30°C</td>
</tr>
</tbody>
</table>

**Electronic wireless digital thermostat**

*Used in conjunction with SCR receiver*

<table>
<thead>
<tr>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
<th>Neutral</th>
<th>Scale</th>
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<tbody>
<tr>
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<td>3</td>
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<td>N</td>
<td>5–30°C</td>
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**Batteries required**

<table>
<thead>
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<td>2</td>
<td>2</td>
<td>2</td>
<td>N</td>
<td>2 AA</td>
</tr>
<tr>
<td>Drayton Roomstat</td>
<td>Eberle RTR6121</td>
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<tr>
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</tr>
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</tr>
<tr>
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<td>Common 1 Scale 5–30°C</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Demand 2 H81 × W81 × D31</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Satisfied 3 10A res.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Neutral 4</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Common 1 Scale 5–30°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Demand 2 H79 × W79 × D27</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Satisfied None 10A res. (4A)</td>
<td></td>
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<tr>
<td></td>
<td>Neutral 4</td>
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<table>
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<tr>
<th>Drayton RT°C</th>
<th>Eberle RTR6121</th>
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<tbody>
<tr>
<td>Common</td>
<td>Common</td>
</tr>
<tr>
<td>3</td>
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</tr>
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<td>Neutral</td>
<td>Neutral</td>
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<td>N</td>
</tr>
<tr>
<td></td>
<td>Common 3 Scale 2–27°C</td>
</tr>
<tr>
<td></td>
<td>Demand 1 H66 × W100 × D39</td>
</tr>
<tr>
<td></td>
<td>Satisfied 2 6A res. (2A)</td>
</tr>
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</tr>
<tr>
<td></td>
<td>Demand 1 H78 × W133 × D41</td>
</tr>
<tr>
<td></td>
<td>Satisfied C 20A res.</td>
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<tr>
<td></td>
<td>Neutral N</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Drayton RTE</th>
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</tr>
</thead>
<tbody>
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<tr>
<td>4</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Common 1 Scale 5–30°C</td>
</tr>
<tr>
<td></td>
<td>Demand 2 H79 × W79 × D27</td>
</tr>
<tr>
<td></td>
<td>Satisfied 3 10A res. (4A)</td>
</tr>
<tr>
<td></td>
<td>Neutral 4</td>
</tr>
<tr>
<td></td>
<td>Common 1 Scale 5–30°C</td>
</tr>
<tr>
<td></td>
<td>Demand 2 H79 × W79 × D27</td>
</tr>
<tr>
<td></td>
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<table>
<thead>
<tr>
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<th>Eberle RTR6121</th>
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</tr>
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<td>3</td>
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<td>H</td>
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<td>2</td>
<td>C</td>
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<td>None</td>
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<tr>
<td></td>
<td>Common 3 Scale 13–24°C</td>
</tr>
<tr>
<td></td>
<td>Demand 1 H66 × W100 × D39</td>
</tr>
<tr>
<td></td>
<td>Satisfied 2 6A res. (2A)</td>
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<td>Demand 1 H90 × W86 × D46</td>
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<td>Demand 1 H66 × W100 × D39</td>
</tr>
<tr>
<td></td>
<td>Satisfied 2 6A res. (2A)</td>
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<td>Common 3 Scale 13–24°C</td>
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<td>Demand 1 H66 × W100 × D39</td>
</tr>
<tr>
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<tr>
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<td>Common 4</td>
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<tr>
<td></td>
<td>Demand 3 H132 × W75 × D65</td>
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<tr>
<td></td>
<td>Demand B H84 × W84 × D34</td>
</tr>
<tr>
<td></td>
<td>Satisfied C 8 (3A)</td>
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<td>Batteries required 2 × AA</td>
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<thead>
<tr>
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<th>Honeywell CT200</th>
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<tr>
<td>Common</td>
<td>Electronic thermostat</td>
</tr>
<tr>
<td>1</td>
<td>With night set-back facility</td>
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<tr>
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<tr>
<td>2</td>
<td>Demand B H84 × W84 × D34</td>
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<tr>
<td>Satisfied</td>
<td>Satisfied C 8 (3A)</td>
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<tr>
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<tr>
<td>Neutral</td>
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</table>
### Honeywell T87F 24V
- 2 wire control
- Scale 5–30°C
- Circular 93mm
- 1.5A

### Honeywell T403A 1018
- Common: 3
- Demand: 1
- Satisfied: None
- Neutral: 2
- Scale: 40–80°F
- Dimensions: H98 × W83 × D40
- Neutral: None
- 2A res.

### Honeywell T403A 1125
- Common: 3
- Demand: 1
- Satisfied: None
- Neutral: None
- Scale: 30–70°F
- Dimensions: H98 × W83 × D40
- Neutral: None
- 1A res.

### Honeywell T403A 1141
- Common: 3
- Demand: 1
- Satisfied: None
- Neutral: None
- Scale: 40–80°F
- Dimensions: H98 × W83 × D40
- Neutral: None
- 2A res.

### Honeywell T406
- Common: 1
- Demand: 3
- Satisfied: None
- Neutral
- Scale: 0–20°C
- Dimensions: H87 × W114 × D42
- Neutral
- 20A res. (4A)

### Honeywell T473X
- Common: 3
- Demand: 2
- Satisfied: None
- Neutral: None
- Scale: 48–72°F
- Dimensions: H85 × W132 × D65
- Neutral
- 17.5A res. (6.5A)

### Honeywell T498
- Common: 3
- Demand: 1
- Satisfied: None
- Neutral: 2
- Scale: H115 × W73 × D65
- Neutral
- 22A res.

### Honeywell T603
- Common: 1
- Demand: 3
- Satisfied: 4
- Neutral: None

### Honeywell T803 – 24V
- Common: 3
- Demand: 1
- Satisfied: None
- Neutral: None
- Scale: 42–80°F
- Dimensions: H95 × W78 × D35
- Neutral
- 0.18–0.8A res.

### Honeywell T822 – 24V
- 2 wire control
- Scale: 13–35°C
- Dimensions: H125 × W79 × D31
- Neutral
- 0.18–0.8A res.

### Honeywell T832 1083 – 24V
- Incorporates two temperature setting levers and a hand wound clock, which enables user to select day and night running temperatures.
- Circular in shape 93mm.

### Honeywell T4160A
- Common: 1
- Demand: 3
- Satisfied: None
- Neutral: None
- Scale: 0–20°C
- Dimensions: H79 × W83 × D49
- Neutral
- 2A res. (2A)
### Honeywell T4160C
*With night set-back facility*
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H79 × W83 × D49**
- **Satisfied**: None
- **Neutral**: None
- **NSB**: 5

### Honeywell T4360A
*Frost thermostat*
- **Common**: 1
- **Scale**: 3–22°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: None

### Honeywell T4360B 1015
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: None

### Honeywell T4360E
*With night set-back facility*
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: 2 and 5
- **NSB**: 6

### Honeywell T6160B
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H79 × W83 × D49**
- **Satisfied**: None
- **Neutral**: 2

### Honeywell T6360B 1028
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: 2

### Honeywell T6360B 1036
*With indictor lamp illuminated when calling for heat*
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: 2

### Honeywell T6360B 1069
*With tamper-proof cover*
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: 2

### Honeywell T6360B 1085
- **Common**: 1
- **Scale**: 1–5°C
- **Demand**: 3
- **H84 × W84 × D42**
- **Satisfied**: None
- **Neutral**: 2

### Honeywell T6060 A/B/C
*T6060A – no anticipator*
*T6060B – with anticipator and optional thermometer*
*T6060C – with anticipator, night set-back and optional thermometer*
- **Common**: 1
- **Scale**: 10–30°C
- **Demand**: 3
- **H87 × W114 × D42**
- **Satisfied**: None
- **Neutral**: 2

**Horstmann HRT 1**
- **Common**: 1
- **Scale**: 3–30°C
- **Demand**: 2
- **H71 × W71 × D35**
- **Satisfied**: None
- **Neutral**: 4
### KDG Range

As Sopac/Smiths Industries.
For model see inside cover.

### Landis & Gyr RAD 1A

<table>
<thead>
<tr>
<th>Type</th>
<th>Common</th>
<th>Demand</th>
<th>Satisfied</th>
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<tr>
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<td>3</td>
<td>4</td>
</tr>
<tr>
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<td>Scale 5–30°C</td>
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<td>16A res. (2.5A)</td>
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### Landis & Gyr RAD 1F

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<td>16A res. (2.5A)</td>
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### Landis & Gyr RAD 1N

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<td>H78 × W78 × D43</td>
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### Landis & Gyr RAD 5

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<td>H80 × W80 × D27</td>
<td>6A res. (2.5A)</td>
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### Landis & Gyr RAD 7

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<thead>
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<td>Scale</td>
<td>Scale 5–30°C</td>
<td>H82 × W82 × D30</td>
<td>15A res. (4A)</td>
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### Nettle

The Nettle range of thermostats is similar to the Honeywell T6060 range.

### Pegler SR 2

<table>
<thead>
<tr>
<th>Type</th>
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<tbody>
<tr>
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<td>H</td>
<td>C</td>
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</tr>
<tr>
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<td>Scale 0–30°C</td>
<td>H78 × W133 × D41</td>
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### Potterton PRT 1

<table>
<thead>
<tr>
<th>Type</th>
<th>Common</th>
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<th>Satisfied</th>
<th>Neutral</th>
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<tbody>
<tr>
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<td>H</td>
<td>C</td>
<td>N</td>
</tr>
<tr>
<td>Scale</td>
<td>Scale 5–30°C</td>
<td>H78 × W70 × D38</td>
<td>5A res. (2.5A)</td>
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</tr>
</tbody>
</table>

This thermostat has indicators to show whether the set temperature has been reached. The wiring of a neutral is essential.

### Potterton PRT 2

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<tr>
<th>Type</th>
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<td>H84 × W110 × D38</td>
<td>5A res. (2.5A)</td>
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</tbody>
</table>

If the thermostat is to be used for 240V, link TL to COM. If the thermostat is to be used for switching a different voltage, e.g. 24V, the switch contacts are Terminal COM and H and the above link should not be fitted. However, a 240V supply to Terminal TL must be fitted and a neutral is required in all applications. This thermostat is fitted with indicators to show whether the set temperature has been reached.

### Potterton PRT 100 DT

<table>
<thead>
<tr>
<th>Type</th>
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<tr>
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<td>TL</td>
<td>H</td>
<td>C</td>
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<tr>
<td>Scale</td>
<td>Scale 5–30°C</td>
<td>H70 × W70 × D31</td>
<td>10A (3A)</td>
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### Potterton PRT 100 FR

#### Frost thermostat

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<tr>
<td>Scale</td>
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<td>H70 × W70 × D31</td>
<td>10A (3A)</td>
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<tr>
<td>Proscen LC</td>
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<tr>
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<td>H11003</td>
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<td>1</td>
<td>6A res. (2A)</td>
<td>N</td>
</tr>
<tr>
<td>Demand</td>
<td>H66 × W100 × D39</td>
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<tr>
<td>Satisfied</td>
<td>20A res.</td>
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<tr>
<td>Neutral</td>
<td>None</td>
<td>H11003</td>
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<td>Randall RSR/M</td>
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<tr>
<td>Sangamo 925890</td>
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<td>H11003</td>
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### Domestic Central Heating Wiring Systems and Controls

#### Sangamo 925895

*With on/off switch*

<table>
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#### Sauter TSH 3

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#### Sauter TSH 57 (F004)

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#### Smiths RS

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#### Smiths ZV2521

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#### Smiths ZV2522

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#### Sopac TA 50 range

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<td>(if fitted)</td>
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#### Sopac TA 80

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#### Sopac TA 80Y

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<td>10A res.</td>
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#### Sopac TA 84

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#### Sopac TA 84Y

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<td>H58 × W80 × D45</td>
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<td>10A res.</td>
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#### Sopac TA 340

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<td>None</td>
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<tr>
<td>Neutral</td>
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### Room, frost and low-limit thermostats

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<th>Sunvic TL 11 – 24V</th>
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<td><strong>Scale 3–27°C</strong></td>
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<tr>
<td>H72 × W72 × D44</td>
<td>H67 × W103 × D65</td>
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<tr>
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<td><strong>Scale 3–27°C</strong></td>
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<td><strong>Demand</strong> 1</td>
</tr>
<tr>
<td>H79 × W75 × D46</td>
<td>H67 × W103 × D65</td>
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<td><strong>Satisfied</strong> 2</td>
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<td>1A res. (1A)</td>
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<td><strong>Scale 6–30°C</strong></td>
<td><strong>Scale 38–82°F</strong></td>
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<tr>
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<td><strong>Demand</strong> 1</td>
</tr>
<tr>
<td>H79 × W75 × D46</td>
<td>H67 × W103 × D65</td>
</tr>
<tr>
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<td><strong>Satisfied</strong> 2</td>
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<tr>
<td>16A res. (2.5A)</td>
<td>1A res. (1A)</td>
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<td><strong>Scale 38–82°F</strong></td>
</tr>
<tr>
<td><strong>Demand</strong> 3</td>
<td><strong>Demand</strong> 1</td>
</tr>
<tr>
<td>H79 × W75 × D46</td>
<td>H67 × W103 × D65</td>
</tr>
<tr>
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<td><strong>Satisfied</strong> None</td>
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<tr>
<td>16A res. (2.5A)</td>
<td>1A res. (1A)</td>
</tr>
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<table>
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</tr>
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<td><strong>Scale 2–27°C</strong></td>
<td><strong>Scale 3–27°C</strong></td>
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<td><strong>Demand</strong> 1</td>
</tr>
<tr>
<td>H66 × W100 × D39</td>
<td>H67 × W103 × D65</td>
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<tr>
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</tr>
<tr>
<td>6A res. (2A)</td>
<td>1A res. (1A)</td>
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<th>Sunvic TLM 2253</th>
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<td><strong>T denotes with thermometer.</strong></td>
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<td><strong>Scale 38–82°F</strong></td>
<td><strong>Scale 3–27°C</strong></td>
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<td><strong>Demand</strong> 1</td>
</tr>
<tr>
<td>H67 × W103 × D65</td>
<td>H90 × W86 × D46</td>
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<tr>
<td><strong>Satisfied</strong> None</td>
<td><strong>Satisfied</strong> None</td>
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<td>1A res. (1A)</td>
<td>16A res.</td>
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<tr>
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Domestic Central Heating Wiring Systems and Controls

**Sunvic TLM 2257**

**Frost thermostat**

<table>
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**Sunvic TLX 2222**

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**Sunvic TLX 2251 – 24V**

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**Sunvic TLX 2259**

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**Sunvic TLX 2358**

**With tamper-proof cover**

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**Sunvic TLX 2359**

<table>
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<tr>
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<td>16A res.</td>
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**Sunvic TLX 2360**

**Frost thermostat**

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<tr>
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<td>6A res. (2.5A)</td>
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**Sunvic TLX 3101 Electronic**

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**Sunvic TLX 5101 Electronic**

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<td>H86 × W86 × D37</td>
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<td>10A (4A)</td>
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**Sunvic TLX 5201 Electronic**

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<tbody>
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**Sunvic TLX 5701 24V Electronic**

<table>
<thead>
<tr>
<th>Common</th>
<th>1</th>
<th>Scale</th>
<th>5–30°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand</td>
<td>8</td>
<td>H86 × W86 × D37</td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>None</td>
<td>10A (4A)</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Sunvic TLX 7501
Common 3 Scale 5–35°C
Demand 2 H86 × W86 × D31
Satisfied 1 A 2(1)A
Neutral None Batteries 2 × AA

Sunvic TM 12
Frost thermostat
Common 3 Scale 8–52°F
Demand 1 H67 × W103 × D65
Satisfied None 1A res.
Neutral 4

Sunvic TM 16
Common 3 Scale 38–82°F
Demand 1 H67 × W103 × D65
Satisfied None 1A res.
Neutral 4

Sunvic TM 56
Common 3 Scale 3–27°C
Demand 1 H67 × W103 × D65
Satisfied None 1A res.
Neutral 4

Switchmaster plug-in
Common 3 Scale 5–30°C
Demand 2 H85 × W85 × D45
Satisfied 1 4A res. (1A)
Neutral 5

Switchmaster SRT 1/2
Common 1 Scale 6–30°C
Demand 3 H72 × W72 × D44
Satisfied 2 16A res. (2.5A)
Neutral None

Switchmaster SRT 3
Specification as SRT 4, but with Homewarm cover with heating/hot water scale. Can be replaced with conventional thermostat if necessary.

Switchmaster SRT 4
Common 1 Scale 6–30°C
Demand 3 H79 × W75 × D46
Satisfied 2 16A res. (2.5A)
Neutral None

Teddington FEB
Common 3 Scale 5–30°C
Demand 2 H85 × W85 × D45
Satisfied 1 4A res. (1A)
Neutral 5

Thorn security optima
Optimum start temperature control
Switch live S/L Scale 5–30°C
Permanent live P/L H84 × W84 × D30
Demand On 6A res. (3A)
Satisfied Off
Neutral N

Permanent live is optional and provides a 1 hour heating boost facility.

Tower DT
Common 3 Scale 5–25°C
Demand 1 H66 × W100 × D39
Satisfied 2 6A res. (2A)
Neutral N

Tower RS
Common 1 Scale 5–35°C
Demand 3 H76 × W76 × D30
Satisfied None 6A (2A)
Neutral 4
### Domestic Central Heating Wiring Systems and Controls

#### Tower SS
- **Common**: 1
- **Scale**: 0–30°C
- **Demand**: 2
- **H70 × W70 × D35**: H70 × W70 × D35
- **Satisfied**: None
- **Neutral**: 4
- **16A res. (4A)**

#### Vaillant VRT 9090
- **Common**: 3
- **Scale**: 5–30°C
- **Demand**: 4
- **H60 × W112 × D35**: H60 × W112 × D35
- **Satisfied**: None
- **Neutral**: 5
- **10A res.**

#### Tower ST
- **Common**: 3
- **Scale**: 5–25°C
- **Demand**: 1
- **H66 × W100 × D39**: H66 × W100 × D39
- **Satisfied**: None
- **Neutral**: N
- **6A res. (2A)**

#### Vokera
- **Common**: 2
- **Scale**: 5–30°C
- **Demand**: 5
- **H80 × W80 × D35**: H80 × W80 × D35
- **Satisfied**: None
- **Neutral**: 6
- **10A res. (2.5A)**
- **Link**: 1–4
- **NOTE: Terminals run 1 3 2 4 5 6**

#### Trac RS10
- **Common**: 1
- **Scale**: 5–30°C
- **Demand**: 2
- **H78 × W78 × D43**: H78 × W78 × D43
- **Satisfied**: 3
- **16A res. (2.5A)**
- **Neutral**: None

#### Wickes RS
- **Common**: 6
- **Scale**: 5–30°C
- **Demand**: 2
- **H80 × W80 × D27**: H80 × W80 × D27
- **Satisfied**: None
- **Neutral**: 4
- **6A res. (2.5A)**

#### Tristat
- Produced mainly for the commercial market, it is used in conjunction with a passive infra-red sensor and enables temperature to be reduced automatically, when a room is unoccupied.

#### Unity
- **Common**: L
- **Scale**: 35–80°F
- **Demand**: H
- **H137 × W70 × D48**: H137 × W70 × D48
- **Satisfied**: None
- **Neutral**: N
- **15A**

#### Worcester Digistat CD
- See ACL-Drayton Digistat RF1.

#### Vaillant VRT 378
- **Common**: 3
- **Scale**: 5–30°C
- **Demand**: 4
- **H64 × W110 × D24**: H64 × W110 × D24
- **Satisfied**: None
- **Neutral**: 5
- **10A res.**
Motorized valves and actuators

<table>
<thead>
<tr>
<th>ACL Biflo</th>
<th>Mid-position</th>
</tr>
</thead>
<tbody>
<tr>
<td>672 BRO 340</td>
<td>⅛” BSP</td>
</tr>
<tr>
<td>679 BRO 340</td>
<td>22mm</td>
</tr>
<tr>
<td>773 BRO 337</td>
<td>1” BSP</td>
</tr>
<tr>
<td></td>
<td>Heating port B, hot water port A</td>
</tr>
</tbody>
</table>

This valve requires SPDT room and cylinder thermostats. It can only utilize a simple time switch or a small group of electromechanical programmers, e.g. Sangamo F410, F9, Randall 105, Tower/ACL MP, Tower/ACL FP and Horstmann Gem (see Chapter 2). These can now be replaced with electronic programmers of the type where links usually need to be fitted live and switch commons but these links are not required for this system (see pages 62 and 248).

<table>
<thead>
<tr>
<th>ACL Lifestyle</th>
<th>2-port zone</th>
<th>Spring return</th>
</tr>
</thead>
<tbody>
<tr>
<td>679H 308</td>
<td>22mm</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
<tr>
<td>779H 335</td>
<td>28mm</td>
<td>Auxiliary switch SPDT 5A</td>
</tr>
</tbody>
</table>

Standard colour flex conductors.

<table>
<thead>
<tr>
<th>ACL Lifestyle</th>
<th>Diverter</th>
</tr>
</thead>
<tbody>
<tr>
<td>679H 314</td>
<td>22mm</td>
</tr>
<tr>
<td>779H 336</td>
<td>28mm</td>
</tr>
</tbody>
</table>

Available with auxiliary switch if required. Standard colour flex conductors.

<table>
<thead>
<tr>
<th>ACL Lifestyle</th>
<th>Mid-position</th>
</tr>
</thead>
<tbody>
<tr>
<td>679H 340</td>
<td>22mm</td>
</tr>
<tr>
<td>779H 340</td>
<td>28mm</td>
</tr>
</tbody>
</table>

Auxiliary switch rating 5A. Standard colour flex conductors.

<table>
<thead>
<tr>
<th>ACL Motortrol</th>
<th>2-port zone</th>
<th>BSP</th>
<th>Spring return</th>
</tr>
</thead>
<tbody>
<tr>
<td>631 B308</td>
<td>⅛” BSP</td>
<td>Old</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
<tr>
<td>691 B308</td>
<td>¼” BSP</td>
<td>New</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
</tbody>
</table>
Domestic Central Heating Wiring Systems and Controls

<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
<th>Old/SPST</th>
<th>New/SPDT</th>
</tr>
</thead>
<tbody>
<tr>
<td>672 B308</td>
<td>⅜&quot; BSP</td>
<td>Old</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
<tr>
<td>679 B308</td>
<td>⅜&quot; BSP</td>
<td>New</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
<tr>
<td>773 B335</td>
<td>1&quot; BSP</td>
<td>Old</td>
<td>Auxiliary switch SPST 5A</td>
</tr>
<tr>
<td>779 B335</td>
<td>1&quot; BSP</td>
<td>New</td>
<td>Auxiliary switch SPDT 5A</td>
</tr>
</tbody>
</table>

24V, 110V and energize to close – available as special. Standard colour flex conductors.

**ACL Motortrol**

<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>691 B314</td>
<td>⅛&quot; BSP</td>
<td>Inlet port C, port B open when energized</td>
</tr>
<tr>
<td>672 B314</td>
<td>⅜&quot; BSP</td>
<td>(usually central heating)</td>
</tr>
<tr>
<td>679 B314</td>
<td>⅜&quot; BSP</td>
<td>Standard colour flex conductors.</td>
</tr>
<tr>
<td>773 B336</td>
<td>1&quot; BSP</td>
<td></td>
</tr>
</tbody>
</table>

**Barlo 2PV 1**

2-port zone Spring return

As ACL 670 H308

**Barlo 3PV 1**

Mid-position

As ACL 679 H340

**Danfoss ABV-VMT**

2-port zone Thermohydraulic

<table>
<thead>
<tr>
<th>Code</th>
<th>Size (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABV-VMT 15/8</td>
<td>15</td>
<td>15mm pumped only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
<tr>
<td>ABV-VMT 22/8</td>
<td>22</td>
<td>22mm pumped only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
<tr>
<td>AVB-VMT 28/8</td>
<td>28</td>
<td>28mm pumped only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
<tr>
<td>AVB-VMT 15/2</td>
<td>15</td>
<td>15mm gravity only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
<tr>
<td>AVB-VMT 22/2</td>
<td>22</td>
<td>22mm gravity only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
<tr>
<td>AVB-VMT 28/2</td>
<td>28</td>
<td>28mm gravity only systems ABV is the actuator part of the valve and is available in both 24V and 40V. They do not have auxilliary switch.</td>
</tr>
</tbody>
</table>

**Danfoss ABV-VMV**

<table>
<thead>
<tr>
<th>Code</th>
<th>Size (mm)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABV-VMV-15</td>
<td>⅛&quot;</td>
<td>ABV is the actuator part of the valve and is available in both 24V and 240V. They do not have auxilliary switch. The VMV must always be installed as a mixing valve (two inlet ports) according to the flow direction arrows cast into the valve body. The VMV closes across main ports A–AB on rising spindle travel.</td>
</tr>
<tr>
<td>ABV-VMV-20</td>
<td>⅛&quot;</td>
<td>ABV is the actuator part of the valve and is available in both 24V and 240V. They do not have auxilliary switch. The VMV must always be installed as a mixing valve (two inlet ports) according to the flow direction arrows cast into the valve body. The VMV closes across main ports A–AB on rising spindle travel.</td>
</tr>
<tr>
<td>ABV-VMV-25</td>
<td>1&quot;</td>
<td>VMV must always be installed as a mixing valve (two inlet ports) according to the flow direction arrows cast into the valve body. The VMV closes across main ports A–AB on rising spindle travel.</td>
</tr>
<tr>
<td>ABV-VMV-32</td>
<td>1 ⅜&quot;</td>
<td>VMV must always be installed as a mixing valve (two inlet ports) according to the flow direction arrows cast into the valve body. The VMV closes across main ports A–AB on rising spindle travel.</td>
</tr>
<tr>
<td>ABV-VMV-40</td>
<td>1 ½&quot;</td>
<td>VMV must always be installed as a mixing valve (two inlet ports) according to the flow direction arrows cast into the valve body. The VMV closes across main ports A–AB on rising spindle travel.</td>
</tr>
</tbody>
</table>

**Danfoss DMV-2C**

2-port zone Spring return

22mm Auxiliary switch SPST 3A (2A)
28mm Auxiliary switch SPDT 3A (2A)

Danfoss DMV-21
2-port zone  Spring return
1” BSP
Auxiliary switch SPDT 3A (2A)
Wiring as DMV-2C 28mm. Standard colour flex conductors.

Danfoss DMV-3D
Diverter
22mm
Inlet port AB
Port A open when energized (usually central heating)
Standard colour flex conductors

Danfoss DMV-3M
Mid-position
22mm
Inlet port AB. Heating port A. Hot water port B
Auxiliary switch rating 3A (2A). Standard colour flex conductors.

Danfoss HP 2
2-port zone
As Randall HP 2

Danfoss HS 3
Mid-position
As Randall HS 3

Drayton TA/M2
2-port zone actuator – motor open/close
Fits to TA/VA range of valve bodies – see after TA/M5
Energize WHITE for clockwise rotation of actuator (Port 2 shut)
Energize BLUE for anti-clockwise rotation of actuator (Port 3 shut)
Neutral BLACK
No auxiliary switch
See also page 249

Figure 6.1  Drayton TA/M2

Drayton TA/M2A
2-port zone actuator – motor open/close
Fits to TA/VA range of valve bodies – see after TA/M5
Energize WHITE for clockwise rotation of actuator (Port 2 shut)
Energize BLUE for anti-clockwise rotation of actuator (Port 3 shut)
Neutral BLACK
Auxiliary switch SPDT 3A
Valve clockwise RED + YELLOW made
Valve anti-clockwise RED + GREY made
See also page 251

Figure 6.2  Drayton TA/M2A
**Drayton TA/M4**

![Diagram of Drayton TA/M4](image)

**Mid-position actuator**

Fits to TA/VA range of valve bodies – see after TA/M5.

Usually used in conjunction with an RB1 or RB2 relay box for boiler switching – see pages 101

Energize WHITE for clockwise rotation of valve (Port 2 shut)

Energize BLUE for anti-clockwise rotation of valve (Port 3 shut)

Energize YELLOW for mid-position

Neutral BLACK

See also page 250

**Drayton TA/M5**

![Diagram of Drayton TA/M5](image)

**Diverter actuator**

Fits to TA/VA range of valve bodies – see over

Energize WHITE for clockwise rotation of valve (Port 2 shut)

Energize BLUE for anti-clockwise rotation of valve (Port 3 shut)

Auxiliary switch SPDT 3A

Valve clockwise YELLOW + WHITE made

Valve anti-clockwise YELLOW + BLUE made

**Drayton TA/VA**

**Valve bodies**

<table>
<thead>
<tr>
<th>Valve</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA/V1</td>
<td>½” 15 mm 2-port</td>
</tr>
<tr>
<td>TA/V2</td>
<td>½” 15 mm 3 port inlet port 1</td>
</tr>
<tr>
<td>TA/V4*</td>
<td>¾” BSP 3 port, ports 2 and 3 reversible</td>
</tr>
<tr>
<td>TA/V6*</td>
<td>1” BSP 3 port</td>
</tr>
</tbody>
</table>

*Can be converted to 2-port by plugging third port.

![Diagram of Drayton TA/VA](image)

Figure 6.5  *Drayton TA/VA*
**Drayton RB1 and RB2 relay boxes** (usually used with TA/M4 actuator)

*RB1 CONFIGURATION*

Double pole, double throw relay with no internal links. H95 × W111 × D71
Contact rating 6A (1.5A)
See also page 250

*Figure 6.6  Drayton RB1*

*RB2 CONFIGURATION*

Double pole, double throw relay with printed circuit internal links. H95 × W111 × D71
Contact rating 6A (2A)
See also page 250

*Figure 6.7  Drayton RB2*

**Drayton ZVA 22**

2-port zone  Spring return

22mm  
Auxiliary switch SPST 3A
Standard colour flex conductors.

**Drayton ZVA 28**

2-port zone  Spring return

28mm  
Auxiliary switch SPDT 3A
Standard colour flex conductors.

**Honeywell V 2057A**

24V version of V 6057A

**Honeywell V 4043**

2-port zone  Spring return

<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Status</th>
<th>Switch Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1257</td>
<td>22mm</td>
<td>De-energized OPEN</td>
<td>Auxiliary switch none – see page 243</td>
</tr>
<tr>
<td>B1265</td>
<td>28mm</td>
<td>De-energized OPEN</td>
<td>Auxiliary switch none – see page 243</td>
</tr>
<tr>
<td>C1156</td>
<td>½” BSP</td>
<td>De-energized SHUT</td>
<td>Auxiliary switch none</td>
</tr>
<tr>
<td>H1056</td>
<td>22mm</td>
<td>De-energized SHUT</td>
<td>Auxiliary switch SPST 2.2A</td>
</tr>
<tr>
<td>H1106</td>
<td>28mm</td>
<td>De-energized SHUT</td>
<td>Auxiliary switch SPDT 2.2A</td>
</tr>
<tr>
<td>H1007</td>
<td>½” BSP</td>
<td>De-energized SHUT</td>
<td>Auxiliary switch SPST 2.2A</td>
</tr>
<tr>
<td>H1080</td>
<td>1” BSP</td>
<td>De-energized SHUT</td>
<td>Auxiliary switch SPDT 2.2A</td>
</tr>
</tbody>
</table>

Standard colour flex conductors.
### Domestic Central Heating Wiring Systems and Controls

<table>
<thead>
<tr>
<th><strong>Honeywell</strong></th>
<th><strong>V 4044C</strong></th>
<th><strong>Diverter</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1288</td>
<td>22mm</td>
<td>Inlet Port AB</td>
</tr>
<tr>
<td>1569</td>
<td>28mm</td>
<td></td>
</tr>
<tr>
<td>1098</td>
<td>¾” BSP</td>
<td>Port A open when energized (usually central heating)</td>
</tr>
<tr>
<td>1494</td>
<td>1” BSP</td>
<td></td>
</tr>
</tbody>
</table>

**Standard colour flex conductors.**

<table>
<thead>
<tr>
<th><strong>Honeywell V 4073A</strong></th>
<th><strong>Mid-position 5 wire</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1039</td>
<td>22mm</td>
</tr>
<tr>
<td>1088</td>
<td>28mm</td>
</tr>
<tr>
<td>1054</td>
<td>¾” BSP</td>
</tr>
<tr>
<td>1062</td>
<td>1” BSP</td>
</tr>
</tbody>
</table>

**Standard colour flex conductors.**

<table>
<thead>
<tr>
<th><strong>Honeywell V 4073</strong></th>
<th><strong>Mid-position 6 wire</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet port AB</td>
<td>Identifiable by the external relay fitted to the valve motor cover.</td>
</tr>
<tr>
<td>Heating port A</td>
<td>If replacing with V 3073 5-wire connect colour for colour (disregard brown wire connection) and change over wires on cylinder thermostat common and demand. See also pages ?</td>
</tr>
<tr>
<td>Hot water port B</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Honeywell V 6057A</strong></th>
<th><strong>2-port zone</strong></th>
<th><strong>Motor open/close</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitted to a V 5057A valve body, ¾” or 1”</td>
<td></td>
<td>Auxiliary switch contacts if fitted:</td>
</tr>
<tr>
<td>Fitted with or without SPDT</td>
<td>Terminal 4 Common</td>
<td></td>
</tr>
<tr>
<td>Auxiliary switch 5A (2A)</td>
<td>Terminal 5 Made when valve shut</td>
<td></td>
</tr>
<tr>
<td>Terminal 1 Neutral</td>
<td>Terminal 6 Made when valve open</td>
<td></td>
</tr>
<tr>
<td>Terminal 2 Close valve</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal 3 Open valve</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Honeywell V 8043</strong></th>
<th><strong>2-port zone</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>V 8044</strong></td>
<td><strong>Diverter</strong></td>
</tr>
<tr>
<td><strong>V 8073</strong></td>
<td><strong>Mid-position</strong></td>
</tr>
</tbody>
</table>

The above valves were 24V versions of the 240V range. Should any of the above need replacing, then it can be done so with the 240V equivalent and a 24V motor which is available as a spare.

<table>
<thead>
<tr>
<th><strong>Hortsmann</strong></th>
<th><strong>2-port zone</strong></th>
<th><strong>Spring return</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H-2-22-Z</strong></td>
<td>22mm</td>
<td>Auxiliary switch SPST</td>
</tr>
<tr>
<td><strong>H-2-28-Z</strong></td>
<td>28mm</td>
<td>Auxiliary switch SPDT</td>
</tr>
</tbody>
</table>

**Standard colour flex conductors.**

<table>
<thead>
<tr>
<th><strong>Hortsmann</strong></th>
<th><strong>Mid-position</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H-3-22-M</strong></td>
<td>22mm</td>
</tr>
</tbody>
</table>

**Standard colour flex conductors.**
Motorized valves and actuators

Horstmann 2-port zone  Spring return
Z222XL  22mm  Auxiliary switch SPST 3A
Standard colour flex conductors.

Horstmann 2-port zone  Spring return
Z228XL  28mm  Auxiliary switch SPDT 3A
Standard colour flex conductors.

Horstmann  Mid-position 4 wire
Z322XL  22mm  Inlet port AB, heating port A, hot water port B
Auxiliary switch rating 3A
Standard colour flex conductors.

Landis & Gyr Da-V322 Diverter
22mm  Inlet port AB. Port A open when energized (usually central heating)
Standard colour flex conductors.

Landis & Gyr MA-V3 Mid-position
MA-V322  22mm  Inlet port AB, heating port A, hot water port B
Auxiliary switch rating 3A
Standard colour flex conductors.
MA-V328  28mm

Landis & Gyr SK2/LL 2-port zone  Spring return
LL4402  15mm valve body
LL4453  22mm valve body
LL4501  28mm valve body
SK2  Actuator
Auxiliary switch SPST 5A (5). Standard colour flex conductors.

Landis & Gyr SK3/2701  Mid-position
LT2701  22mm valve body  Inlet port AB, heating port A
SK3  Actuator  Hot water port B
Auxiliary switch rating 5A (5).  Standard colour flex conductors.
Domestic Central Heating Wiring Systems and Controls

Landis & Gyr STC 4 × 7½” Mid-position

This valve was used only in conjunction with a relay box. See page 253

Landis & Gyr ZA V2 2-port zone Spring return

ZA-V215 15mm Auxiliary switch SPST 3A
ZA-V222 22mm Auxiliary switch SPST 3A
ZA-V228 28mm Auxiliary switch SPST 3A

Standard colour flex conductors.

Myson MSV222 2-port zone Spring return

22mm Auxiliary switch rating 3A
Standard colour flex conductors.

Myson MSV228 2-port zone Spring return

28mm Auxiliary switch rating 3A
Standard colour flex conductors.

Myson MSV322 Mid-position

22mm Auxiliary switch rating 3A
Inlet port AB, heating port A, hot water port B
Standard colour flex conductors.

Potterton MSV322 Mid-position

28mm Auxiliary switch rating 3A
Inlet port AB, heating port A, hot water port B
Standard colour flex conductors.

Potterton PMV2 2-port zone Spring return

22mm As Landis & Gyr SK2

Potterton PMV3 Mid-position

22mm As Landis & Gyr SK3
Randall HP 2
2-port zone  Spring return
As Switchmaster VM4 auto zone valve

Randall HP 2
2-port zone  Spring return
HPA 2  Actuator  Auxiliary switch SPST
HPA 2C  Actuator  Auxiliary switch SPDT
Standard colour flex conductors.

HS 3  Diverter  Standard colour flex conductors.
HSA 3D  Actuator

Randall HS
Mid-position
As Switchmaster VM1 Midi

Randall HS 3
Mid-position
HSA 3  Actuator
Standard colour flex conductors.

Siemens
See Landis & Gyr

Smiths Controller
OS-C/DV 1-1/4”
Diverter  Thermohydraulic
This diverter valve is made up of two separate
Actuators, one code O (energized to open) and
one code C (energized to close). Actuator O should
be in the central heating branch of the valve body.

Figure 6.8

Smiths Controller
OS/V22
2-port zone  Thermohydraulic
Consisting of a V22 or V¾” valve body and an
OS energized to open actuator with SPST
auxiliary switch. If no auxiliary switch required,
then a Code O actuator can be used.

Figure 6.9
## Smiths Controller

<table>
<thead>
<tr>
<th>Mid-position</th>
<th>Thermohydraulic</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS/DV 1-(\frac{3}{4})&quot;</td>
<td>Consisting of a DV 1-(\frac{3}{4})&quot; valve body and two OS energized to open actuators</td>
</tr>
</tbody>
</table>

Figure 6.10

## Smiths Controller

<table>
<thead>
<tr>
<th>Actuators</th>
<th>Thermohydraulic</th>
</tr>
</thead>
</table>
| O-C-OS | Code O energize to open  
Code C energize to close  
Code OS energize to open with auxiliary switch |

These actuators work by a heated wax cylinder, operating a plunger to open or close the appropriate port and operate an end switch if fitted. They are, therefore, wired as a spring return type actuator, but take considerably longer to operate. They were not pre-wired.

## Sopac ZV

<table>
<thead>
<tr>
<th>2-port zone</th>
<th>Spring return</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZV-15-2 (\frac{1}{2})&quot; BSP</td>
<td>Auxiliary switch to all models</td>
</tr>
<tr>
<td>ZV-20-2 (\frac{3}{4})&quot; BSP</td>
<td>SPST switch rating 3A</td>
</tr>
<tr>
<td>ZV-20-2-B 22mm</td>
<td>Energize to close available with or without auxiliary switches</td>
</tr>
<tr>
<td>ZV-25-2-B 28mm</td>
<td></td>
</tr>
</tbody>
</table>

## Sopac ZV

<table>
<thead>
<tr>
<th>Diverter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZV-20 (\frac{3}{4})&quot; BSP</td>
</tr>
<tr>
<td>ZV-25 1&quot; BSP</td>
</tr>
<tr>
<td>ZV-20-EB 22mm</td>
</tr>
<tr>
<td>ZV-25-B 28mm</td>
</tr>
</tbody>
</table>

## Sopac ZV

<table>
<thead>
<tr>
<th>Mid-position</th>
</tr>
</thead>
</table>
| ZV-20-EB-MID 22mm | Inlet port AB, heating port A, hot water port B  
Auxiliary switch rating 3A  
Standard colour flex conductors. |
Sunvic DM 3601  
**Mid-position**  
DM 3551  
For use only with the Duoval RJ relay box.  
DM3651 has a 5-way plug for connection into the Duo-plug RJ relay box.

Sunvic DM 4601  
**Mid-position**  
DM 4651  
For use only with the Duoval RJ relay box.  
DM4651 has a 5-way plug for connection into the Duo-plug RJ relay box.  
The DM 36 and 46 Duoval and Duo-plug models are interchangeable and differ only in styling. They can also be connected into any of the three relay boxes, RJ 1801, RJ 2801 and RJ 2802 or the Duo-plug relay box RJ 2852 using the appropriate wiring diagram. See pages 255 and 256

Sunvic DT and EDT  
Valve bodies for use with SD actuators  
DT 1601  
¾” BSP  
DT 1701  
22mm  
DT 1801  
Has a 28mm connection to inlet and port A and a 22mm connection to port B  
DT 2601  
¾” BSP  
EDT 1702  
22mm  
EDT 2702  
22mm

Sunvic Duoflow – RJ 1801 relay box  

- **Diagram:**  
  -ROLS  
  -LE  
  -EN  
  -BOILER  
  -PUMP  
  -YEL  
  -ORA  
  -WHI  
  -BLU  
  -N  
  -E  
  -DEM  
  -COM  
  -ROOM  
  -STAT  
  -DEMO  
  -CYLINDER  
  -STAT  

If boiler has pump overrun, pump should be wired as boiler instructions. See also page 255

Sunvic Duoflow – RJ 2801 relay box  

- **Diagram:**  
  -COM  
  -N  
  -DEMO  
  -ROOM  
  -STAT  
  -BOILER  
  -PUMP  
  -SPARE  
  -PROG  
  -CH  
  -ON  
  -DEMO  
  -SAT  
  -COM  
  -WHI  
  -OR  
  -YEL  
  -BLU

If programmer has HW OFF connection wire to terminal 11.  
*If boiler has pump overrun, pump should be wired as boiler instructions.  
See also page 255
Sunvic Duoflow RJ 2802
Relay box (plug-in)

If programmer has HW OFF connection wire to terminal 18.
*If boiler has pump overrun, pump should be wired as boiler instructions.
See also page 256
Motorized valves and actuators

Sunvic SD 1601 Diverter
SD 1626
Combines with the DT or EDT valve body to make a priority valve in the Uniflow system. The SD 1626 differs in that it has a manual lever.

Sunvic SD 1701 Mid-position
SD 1726
Combines with the DT or EDT valve body to make a mid-position valve in the Unishare system. The SD 1726 differs in that it has a manual lever.
Standard flex covers.

Complete Valve SDV 1211 22mm

Sunvic SD 1752 Mid-position
Combines with the EDT 1702 valve body to make a mid-position valve in the Clockbox II Unishare system. The actuator is fitted with a 4-way plug.

Sunvic 2601 Replacement actuator for SD 1601.

Sunvic SD 2701 Replacement actuator for SD 1701.
Complete valve SDV 2211 22mm

Sunvic SM2, SM2201 2-port actuator now SM 4201

Sunvic SM5, SM 2203 2-port actuator now SM 4203

Sunvic SML 2-port zone Motor open/close
A range of 2-port motorized valves comprising of a valve body type ML and an actuator type SM to make the Minival series. The actuator range was initially SM 3201–5 and then restyled to become SM 4201/3/5 and later just SM 5201/3. The wiring principle has remained the same, although the colours were altered slightly when blue instead of black became neutral. All models fit the ML valve body.

ML 3401 \(\frac{1}{4}''\) BSP Valve body
ML 3402 15mm Valve body
ML 3451 \(\frac{3}{4}''\) BSP Valve body
ML 3453 22mm Valve body
ML 3501 1'' BSP Valve body
EML 3501 28mm Valve body
SM 3201/4201/5201  Auxiliary switch None  18” lead
SM 3202  Auxiliary switch None  72” lead
SM 3203/4203  Auxiliary switch Yes  36” lead
SM 3204/5203  Auxiliary switch Yes  17” lead
SM 3205/4205  Auxiliary switch Yes  18” lead

Auxiliary switch rating 3A (1.3A)

On the SM 3203/4203 and 3204 the auxiliary switch provides a live supply on the orange wire when the valve is open.

On the SM 3205/4205 the auxiliary switch provides a live supply on the orange wire when the valve is open and a live supply on the pink wire when the valve is closed.

The EML valve body differs from the ML range in having external compression fittings.

<table>
<thead>
<tr>
<th>Colour code</th>
<th>Old</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral</td>
<td>Black</td>
<td>Blue</td>
</tr>
<tr>
<td>Motor open</td>
<td>Yellow</td>
<td>Yellow</td>
</tr>
<tr>
<td>Motor close</td>
<td>Blue</td>
<td>White</td>
</tr>
<tr>
<td>Aux. sw. (if fitted) open</td>
<td>Orange</td>
<td>Orange</td>
</tr>
<tr>
<td></td>
<td>Pink</td>
<td>Pink</td>
</tr>
</tbody>
</table>

**Sunvic SZ**  2-port zone  Spring return

A range of spring return actuators that fit to the ML and EML range of valve bodies, as above, to make the Unival series.

**MK1 MK2**

<table>
<thead>
<tr>
<th></th>
<th>Auxiliary switch None</th>
<th>De-energized SHUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SZ 1201/2201</td>
<td>As SZ 1201, with manual lever</td>
<td>De-energized OPEN</td>
</tr>
<tr>
<td>SZ 1226/2226</td>
<td>Auxiliary switch None</td>
<td>De-energized OPEN</td>
</tr>
<tr>
<td>SZ 151/2251</td>
<td>Auxiliary switch SPST</td>
<td>De-energized SHUT</td>
</tr>
<tr>
<td>SZ 1301/2301</td>
<td>Auxiliary switch Yes</td>
<td>De-energized SHUT</td>
</tr>
<tr>
<td>SZ 1302/2302</td>
<td>Designed for use on gravity hot water systems. See also page 237</td>
<td></td>
</tr>
<tr>
<td>SZ 1326/2326</td>
<td>As SZ 1301, with manual lever</td>
<td></td>
</tr>
<tr>
<td>SZ 1327/2327</td>
<td>As SZ 1302, with manual lever</td>
<td></td>
</tr>
<tr>
<td>SZ 1351/2351</td>
<td>Auxiliary switch SPST</td>
<td>De-energized OPEN</td>
</tr>
<tr>
<td>SZ 2301 F</td>
<td>Functionally the same as the SZ 2301 but has a superior quality motor for use in high ambient temperature locations such as within boiler casings.</td>
<td></td>
</tr>
<tr>
<td>SZV 2212</td>
<td>Complete unit</td>
<td></td>
</tr>
<tr>
<td>SZV 2218</td>
<td>Complete unit</td>
<td></td>
</tr>
<tr>
<td>SZV 2228</td>
<td>Complete unit</td>
<td></td>
</tr>
</tbody>
</table>

**Switchmaster VM1**  Mid-position

Consisting of type VB1 valve body (22mm) and a type VA1 actuator. Known as a MIDI valve, it is blue in colour. Actuator can be turned with a screwdriver for manual operation if necessary. See also page 257

Inter – centre T
Central heating port – right hand with T at bottom
Hot water port – left hand with T at bottom
Auxiliary switch rating 3A
Switchmaster VM2 2-port zone Motor open/close

Consisting of type VB2 valve body (22mm) and a type VA2 actuator, which is blue in colour. Actuator can be turned with a screwdriver for manual operation if necessary.

Auxiliary switch rating 3A

Switchmaster VM3 Mid-position

This is a manual version of the VM1 on the VB1 valve body.

Switchmaster VM4 2-port zone See description

Consisting of type VB4 valve body (22mm) and a type VA4 actuator, which is brown in colour and labelled AUTOZONE. Actuator can be turned with a screwdriver for manual operation of necessary. Although the actuator is of the motor open/close type, it is wired as and has the same colour coding as a spring return actuator, although it is necessary to ensure that the grey of the auxiliary switch is connected to live, and the orange is connected to boiler and pump.

Switchmaster VM5 Diverter

Consisting of type VB5 valve body (22mm) and a type VS5 actuator, which is brown in colour. The valve is designed specifically for the HOMEWARM system and is wired internally to give hot water priority when the room thermostat is satisfied. When the room thermostat is calling for heat, then 90% of boiler output goes to the heating circuit and the remaining 10% to the hot water circuit. A 1m lead is supplied, exposing four colours. However, if the cable is shortened, an orange wire will be exposed and can be disregarded. Same port format as VM1. See also page 252
Domestic Central Heating Wiring Systems and Controls

Tower MP 3

<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP 332C</td>
<td>22mm</td>
<td></td>
</tr>
<tr>
<td>MP 3-1”B</td>
<td>1” BSP</td>
<td>available special order only</td>
</tr>
<tr>
<td>MP 3-28C</td>
<td>28mm</td>
<td>available special order only</td>
</tr>
</tbody>
</table>

Auxiliary switch rating 3A. Standard colour flex conductors. Inlet port AB, heating port A, hot water port B

Tower MV 2

<table>
<thead>
<tr>
<th>Model</th>
<th>Size</th>
<th>Switch Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>MV2-22C</td>
<td>22mm</td>
<td>SPST 3A</td>
<td></td>
</tr>
<tr>
<td>MV2-1”B</td>
<td>1”</td>
<td>SPDT 3A</td>
<td></td>
</tr>
<tr>
<td>MV2-28C</td>
<td>28mm</td>
<td>SPST 3A</td>
<td></td>
</tr>
</tbody>
</table>

Standard colour flex conductors.

Tower MV3-22C

22mm

Inlet port AB, heating port A, hot water port B

Standard colour flex conductors.

Tower/ACL

Many of the earlier Motortrol range of motorized valves were under the TOWER and ACL name. Refer to ACL.

Wickes

2-port zone

As Landis & Gyr SK 2

Wickes

Mid-position

As Landis & Gyr SK 3
Boilers – general

Electricity

The use of electricity as a fuel for wet system central heating systems is limited to only a few manufacturers even though electricity as a fuel gives the advantage of being able to site the boiler virtually anywhere as no flue or storage of fuel is required. Also some are able to utilize off-peak electricity. They do however require a substantial electrical supply, e.g. 50A in the case of 12kW versions, and this may be a governing factor when considering options.

Gas

Gas boilers come in all shapes, sizes and formats, and as such have the advantage of being able to be utilized for virtually any application. They can be floor, wall or hearth mounted and heat exchanger material could be cast iron, copper, aluminium, stainless steel, or even a mixture of metals. Even where there is no mains gas supply, there is usually an LPG model that could be used, although the sitting of the LPG storage vessel could be problematical.

Gas boilers can be used in any wet heating system and, of course, gas fuels many warm air systems that may incorporate domestic hot water circulators. In addition to a basic boiler, other models available include: boilers with integral sealed system equipment such as pressure vessel, gauge, etc.; combination boilers which offer instant hot water and remove the need for a hot water storage cylinder; condensing boilers which recycle the hot flue gases to produced over 90 per cent efficiency; and system boilers which include pump, motorized valve and possibly programmer within its casing, thereby usually making installation easier.

As regards electrical control wiring, basic boilers comes in two types – those requiring just a switched live, neutral and earth connections often via an integral 3-pin plug, or the type of boiler which has a pump over-run facility. This device is a pre-set thermostat that measures the temperature of the heat exchanger. When in operation the overrun facility enables the system pump to continue running for a short period, possibly up to 20 minutes after the boiler itself has shut down thus dissipating the residual heat from the heat exchanger. This method is generally employed on wall-hung, low water content boilers that use non-cast iron heat exchangers, although some manufacturers of boilers using cast iron heat exchangers also include this over-run facility.

In addition to the above, some boilers may require additional wiring if they incorporate a programmer or timer, or in the case of back boiler units, a permanent live supply may be needed so that the live fuel effect light bulbs can be utilized when the boiler is off. It is essential that this live supply be taken from the same source as that for the boiler itself.

One type of gas boiler not mentioned in this book is those that use a pressure jet gas burner. This is because it is used on boilers intended for commercial and industrial premises. However, they can be linked into the external controls described here, in the same way as those boilers included.

Oil

Like gas, oil boilers come in a wide range of types suitable for floor, wall and hearth mounting. Oil also offers the basic boiler, combination and systems boilers. There are two type of oil boiler – wall flame and pressure jet. Wall flame boilers are the less popular and operate by oil being pumped into a large drum where it is electrically ignited, thereby heating the heat exchanger. The pressure jet fires oil into the burner under pressure and is also ignited electrically. These are the most popular type of oil boiler. Both types employ safety lock-out features to prevent oil being discharged without
firing. Oil boilers need to be finely tuned in much the same way as a car engine so that it operates reliably and with maximum efficiency. It is essential that the correct grade of oil is used for each type of burner.

The method of wiring to oil boilers varies in that the supply wiring could go into the wall flame control box, the pressure jet control box or into a boiler terminal strip probably located at the top of the casing near the boiler thermostat. Wiring details are given for popular models but don’t be surprised if some look as if they are not included. This may be because they employ a control box as listed and wiring details are given for those instead. Manufacturers and models where this may be the case include: Delheat, Heatrae Aggressor, McFarlane, Perrymatic and Potterton.

**Solid fuel**

By their very nature solid-fuel boilers only come as floor standing models, although electrical controls can be incorporated into boilers fitted into fireplaces as room heaters. These latter models can have a heat exchanger for supplying hot water to the domestic cylinder or heating circuit using gravity pumped or circulation. The Honeywell Y605B Link Fuel Plan described in the ancillary equipment section (Chapter 11) may be of use to anyone wishing to install or adapt such a system. Features of a conventional solid-fuel boiler may include a fan to aid combustion, or a safety switch which will shut down the boiler in the event of chimney blockage.

Because the temperature of the fuel cannot be instantly reduced or shut down as with gas or oil, solid-fuel boilers cannot be employed in conventional fully pumped heating systems. However, by using a combination of normally-open and normally-closed spring return motorized valves it is possible to utilize a solid-fuel boiler in such a system. The Honeywell Y605A Panel Solid Fuel Timed Sundial Plan is a fully assembled, pre-plumbed and pre-wired control set and is designed specifically for use with a solid-fuel boiler on a fully pumped system.

A feature of the Trianco TRG range of boilers is the use of an Economy Thermostat which is preset at a low temperature (57°C) for night operation and any day period when central heating is not required. A double circuit programmer is used to control the boiler. When hot water is programmed, the boiler operates on the Economy Thermostat. When central heating is selected, the boiler is controlled by the higher thermostat setting and the pump also starts (see Figure 7.1).
Boilers – general

MAINS SUPPLY 200/250/1/50

- E
- N
- L

5 AMP FUSE

D/P SWITCH TO
SUIT LOCAL AUTHORITIES

RED
BROWN
BLUE

YELLOW/GREEN

3-PIN PLUG & SOCKET

BOILER CONTROL
THERMOSTAT

ECONOMY THERMOSTAT
SET AT 57°C (136°F)

DOUBLE CIRCUIT TIME CONTROL
e.g. HORSTMANN 426 DIadem OR
SIMILAR

- M
- HW
- CH

IDENTIFIERS

1 2 3 4 5 6

EXTERNAL WIRING

ROOM
STAT

PUMP

Figure 7.1
Electroheat Amptec

The boiler requires two supplies; a 6A supply for the control circuit and an additional supply for the heating elements depending on model selected. In all cases an RCD rated at 30mA must be fitted.

<table>
<thead>
<tr>
<th>Control Circuit</th>
<th>Supply</th>
<th>Fully pumped systems only</th>
</tr>
</thead>
<tbody>
<tr>
<td>T N R E N L</td>
<td>N E L</td>
<td>Suitable for use on sealed systems (with 2-port safety motorized valve)</td>
</tr>
<tr>
<td>N Live</td>
<td>Pump</td>
<td>Efficiency 99.8%</td>
</tr>
</tbody>
</table>

It may be necessary to fit a capacitor between N and R to prevent the boiler continuing to run due to leakage current from some motorized valves.

Gledhill Electromate 2000

The boiler provides mains pressure hot water and conventional central heating by radiators by using off-peak electricity to heat the thermal store. When the store is depleted the controller starts the recharge cycle giving priority to times when off-peak electricity is available. It therefore requires standard tariff and off-peak supplies.

A programmable room thermostat, supplied with the unit, best serves control of heating.

<table>
<thead>
<tr>
<th>Room Stat Common</th>
<th>Room Stat Demand</th>
<th>Fully pumped systems only</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 25 27 P28</td>
<td>E</td>
<td>Suitable for use on sealed systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heat exchanger material</td>
</tr>
</tbody>
</table>

Myson Maxton

This boiler dates back to the 1980s but as they could still form part of a system upgrade, it is included. An off-peak supply is desirable but not essential.

<table>
<thead>
<tr>
<th>N Control Live</th>
<th>6 Mains Live</th>
<th>Fully pumped systems only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>O</td>
<td>Heat exchanger material, copper</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
<td>Efficiency 99%</td>
</tr>
</tbody>
</table>
Trianco Aztec

The boiler requires two supplies; a 6A supply for the control circuit and an additional supply for the heating elements depending on model selected. In all cases an RCD rated at 30mA must be fitted.

L N E
Supply

L Call
Control
Live in
Remove Link

PCB Control
L
L
N L Pump

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper
Efficiency 99.8%
Boilers – gas

Alpha CB24/28 combination

A room thermostat suitable for mains voltage should be connected to terminals 1–2 after removing link.

Wall mounted
Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Alpha SY9–24 System

F2A L N E 1 2
Fuse L N E Switch Live
Live Out

Remove link 1–2 if fitting external controls

Wall mounted
Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Alpha SY 24 System

A room thermostat suitable for mains voltage should be connected to terminals 1–2 after removing link.

Wall mounted
Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection
SEDBUK Rating D

Ariston 20 MFS combination

Boiler is supplied with a 3-core mains lead.
External controls such as a time clock with voltage free contacts, or room thermostat suitable for use on 240V, should be connected as follows to the 12-way terminal strip:

<table>
<thead>
<tr>
<th>TT</th>
<th>TR</th>
<th>TC</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Suitable for sealed systems
Heat exchanger material, copper

Wall mounted

Ariston DIA 20 MFFICE combination

Boiler is supplied with a 3-core mains lead.
A room thermostat suitable for use on low voltage and/or can be connected into terminals after removing either of the two brown links from the green connector on the PCB board (an external timer with voltage free terminals).

Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating D
<table>
<thead>
<tr>
<th>Boilers – gas</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ariston Eco Genus 24 condensing</strong></td>
</tr>
<tr>
<td>Connect a room thermostat to TA on terminal strip after removing link.</td>
</tr>
<tr>
<td><strong>Wall mounted</strong></td>
</tr>
<tr>
<td>Fully pumped systems only</td>
</tr>
<tr>
<td>Suitable for sealed systems only</td>
</tr>
<tr>
<td>Heat exchanger material, aluminium</td>
</tr>
<tr>
<td>Integral frost protection</td>
</tr>
<tr>
<td>SEDBUK rating B</td>
</tr>
</tbody>
</table>

| **Ariston Eco Genus 24 system condensing** |
| Connect a room thermostat to TA on terminal strip after removing link. |
| **Wall mounted** |
| Fully pumped systems only |
| Suitable for sealed systems only |
| Heat exchanger material, aluminium |
| Integral frost protection |
| SEDBUK rating A |

| **Ariston Eurocombi combination** |
| Connect a room thermostat to control strip after removing link. |
| **Wall mounted** |
| Fully pumped systems only |
| Suitable for sealed systems only |
| Heat exchanger material, copper |
| Integral frost protection |
| SEDBUK rating C |

| **Ariston Genus 23, 27, 30 combination** |
| Connect a room thermostat to control strip after removing link. |
| **Wall mounted** |
| Fully pumped systems only |
| Suitable for sealed systems |
| Heat exchanger material, copper |
| Integral frost protection |
| SEDBUK rating D |

| **Ariston Genus 27 system** |
| Connect a room thermostat to control strip after removing link. |
| **Wall mounted** |
| Fully pumped systems only |
| Suitable for sealed systems |
| Heat exchanger material, copper |
| Integral frost protection |
| SEDBUK rating D |
Domestic Central Heating Wiring Systems and Controls

Ariston Micro system

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>1</th>
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<th>4</th>
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</tbody>
</table>

Remove links 3–4 and 5–6 as appropriate. Terminals 4–5 are linked internally. If connecting to a system incorporating 2 × 2-port motorized valves or a mid-position valve, terminal 1 is Live Out and terminal 2 switch Live In, after removing link.

Ariston Micro Genus combination

Connect a voltage free room thermostat to the 2-way terminal block on the back of the control panel after removing link.

Atmos Coopra compact

N30 condensing

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
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</table>

External sensor and template sensor for cylinder may be fitted.

Atmos Multi 24/80, 32/80 plus condensing combination

Mains lead supplied. Connect 24 V room stat to terminals ZW on terminal block K1.

Barlo Balmoral

See Halstead Balmoral

Barlo Blenheim

15/30, 30/40, 40/50, 50/60, 60/75

See Halstead Blenheim
Boilers – gas

**Barlo Blenheim 42, 53**
See Halstead 40H, 50H

**Barlo Duo combination**

<table>
<thead>
<tr>
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<th>N</th>
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<th>3</th>
<th>4</th>
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</tbody>
</table>

Mains Timer Motor Out In Timer Contacts Out In Room Stat Contacts

**Wall mounted**

Suitable for sealed systems
Heat exchanger material, copper

If no timer or room thermostat link 3–4 and/or 5–6 as appropriate.

**Baxi 100 HE condensing**

<table>
<thead>
<tr>
<th>SL</th>
<th>E</th>
<th>N</th>
<th>PF</th>
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<tbody>
<tr>
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</tr>
</tbody>
</table>

Switch Live E N Pump Live (optional)

**Wall mounted**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, aluminum
SEDBUK rating A

**Baxi 401, 552**

<table>
<thead>
<tr>
<th>L</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>

Switch Live N Perm* Live

**Back boiler unit**

Suitable for use on sealed systems using optional kit
Heat exchanger material, cast iron

*Permanent live only required if fire front has light bulbs, e.g. B, GF Super, LFE3 Super, VP and SP fire fronts.

**Baxi Bahama 100 combination**

<table>
<thead>
<tr>
<th>E</th>
<th>N</th>
<th>L</th>
<th>NT</th>
<th>LT</th>
<th>1</th>
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</table>

Mains Timer Motor Voltage Free Switch Contacts R/S R/S R/S N

**Wall mounted**

Fully pumped system only
For sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Connect frost stat between 1 and 4.
Connect external time switch voltage free terminals across 1–2.
Domestic Central Heating Wiring Systems and Controls

Baxi Barcelona condensing

<table>
<thead>
<tr>
<th></th>
<th>S/L</th>
<th>E</th>
<th>N</th>
<th>P/F</th>
<th>Switch</th>
<th>Live</th>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>Live</td>
<td></td>
</tr>
</tbody>
</table>

Wall mounted
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, aluminium
- SEDBUK rating A

The pump can be wired directly to the system or to terminal P/F. The P/F connection should only be used on a full TRV System without a by-pass.

Baxi Barcelona condensing system

<table>
<thead>
<tr>
<th></th>
<th>S/L</th>
<th>E</th>
<th>N</th>
<th>P/F</th>
<th>Switch</th>
<th>Live</th>
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<tbody>
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<td>○</td>
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<td>○</td>
<td>Live</td>
<td></td>
</tr>
</tbody>
</table>

Wall mounted
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, aluminium
- SEDBUK rating A

Terminal P/F is an optional pump feed which only needs to be used when fitting an additional external pump on a full TRV system.

Baxi Boston

With/without integral programmer

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>L1</th>
<th>N1</th>
<th>Switch</th>
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<td>○</td>
<td>○</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

Mains
- Not suitable for use on sealed systems
- Heat exchanger material, cast iron
- Programmer if fitted
- Landis & Gyr RWB2

Baxi Boston 2, OF, RS

<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>N</th>
<th>L</th>
<th>Switch</th>
<th>Live</th>
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<tbody>
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<td>○</td>
<td>○</td>
<td>○</td>
<td></td>
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</tr>
</tbody>
</table>

Floor standing
- Not suitable for sealed systems
- Heat exchanger material, cast iron

The pump can be wired directly to the system or to terminal P/F. The P/F connection should only be used on a full TRV System without a by-pass.

Baxi Combi 80e, 105e combination

<table>
<thead>
<tr>
<th></th>
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<th>bl</th>
<th>g/y</th>
<th>bk</th>
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</tbody>
</table>

Mains
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.
Baxi Combi 80 Eco combination

<table>
<thead>
<tr>
<th>br</th>
<th>bl</th>
<th>g/y</th>
<th>bk</th>
<th>bk</th>
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<tr>
<td>Mains</td>
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</table>

Wall mounted
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, copper
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

Baxi Combi 80 Maxflue combination

<table>
<thead>
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<tr>
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</tbody>
</table>

Wall mounted
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

Baxi Combi 130 HE combination

<table>
<thead>
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</table>

Wall mounted
- Fully pumped system only
- For sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating A

Connect external time switch voltage free terminals across 1–2 after removing link.
Connect room stat across terminals 3–4 after removing link.
Terminal 5 can be used as a live feed for an external pump.

Baxi FS range

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>L1</th>
<th>N1</th>
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<table>
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<th>HW</th>
<th>CH</th>
<th>Switch</th>
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<td>Off</td>
<td>On</td>
<td>On</td>
<td>Live</td>
<td></td>
</tr>
</tbody>
</table>

Floor standing
- Not suitable for use on sealed systems
- Heat exchanger material, cast iron
- Programmer if fitted
- Landis & Gyr RWB2

Baxi Genesis combination

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>Multi-pin Plug</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Wall mounted
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls, such as time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals 5 and 7 after removing link.
**Domestic Central Heating Wiring Systems and Controls**

**Baxi Maxflow Combi FS combination**

- Floor standing
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

**Baxi Maxflow Combi WM combination**

- Wall mounted
- Fully pumped systems only
- For sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

**Baxi Solo PF**

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, cast iron

**Baxi Solo RS**

- Wall mounted
- Not suitable for use on sealed systems
  (see Solo RS/SS)
- Heat exchanger material, cast iron

**Baxi Solo RS/SS**

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, cast iron
**Baxi Solo 2 PF**

Pump - E N PL SWL

- O O O O O O O O
- L N E E N Perm Live Switch Live

**Wall mounted**

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, cast iron
- Integral frost protection

**Baxi Solo 2 RS**

**Fully pumped systems**

- a) SL N E PL L N E
- O O O O O O O
- Switch Live N E Perm Live Pump N E Live Live

**Wall mounted**

- Suitable for use on sealed systems
- Heat exchanger material, cast iron

**Gravity hot water, pumped central heating systems**

- b) SL N E PL L N E
- O O O O O O O
- Switch Live N E Not Used

When used on system b) the overheat thermostat should be by-passed by referring to installation instructions.

**Baxi Solo 3 PFL**

Pump - E N PL SW

- O O O O O O O
- L N E E N Perm Live Switch Live

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, cast iron
- Integral frost protection
- SEDBUK rating D/E

**Biasi Parva M90 combination**

- L E N 3 2 1
- O O O O O O
- Mains

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper/steel
- Integral frost protection
- SEDBUK rating D

Connect room stat between 3 and 1 after removing link.
Connect frost stat between 2 and 1.
Domestic Central Heating Wiring Systems and Controls

**Biasi Riva 24S, 28S, 24SR combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper/steel
- SEDBUK rating D

Remove link if fitting room stat. Room stat anticipator if fitted should be connected to N. Connect frost stat between SWL and Frost.

**Bosch Greenstar condensing**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- SEDBUK rating A

**Bosch RX2 condensing combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating C

To external controls – 230V

**Boulter Buderus 600R condensing**

A room thermostat of either mains voltage or with voltage free connections can be wired to the boiler but not to the same terminals. A mains voltage room thermostat should be connected to terminals 1–2 of the 230V connection box. A voltage free room thermostat should be connected to terminals 1–2 of the volt free connection box. Boulter Buderus supply a range of temperature controls for the latter.

**Boulter Buderus 800 condensing**

When these boilers are installed with external controls, e.g. zone valves, mid-position valves, programmers and time clocks, the switched live should be connected to L on the relay pcb. No mains wiring should be connected to terminals 1–12.
Broag-Remeha Selecta combination condensing

A 24V room thermostat should be connected to terminals 2–3 on X4. A range of manufacturers control equipment is available.

Broag-Remeha Selecta system condensing

A 24V room thermostat should be connected to terminals 2–3 on X4. A range of manufacturers control equipment is available.

Broag-Remeha Quinta condensing

A range of manufacturers control equipment is available. All connections are made to 24-way terminal strip X11, Live to terminal 16 and Neutral to terminal 18.

Chaffoteaux Britony combination

Multi-pin Plug

<table>
<thead>
<tr>
<th>N</th>
<th>Ph</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
<th>O</th>
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<tbody>
<tr>
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<td>L</td>
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</tbody>
</table>

Connect room thermostat suitable for 24V into multi-pin plug removing link.

Chaffoteaux Britony SE combination

A mains lead is supplied. A24V room thermostat should be connected to multi-pin plug on terminal board after removing link.
Domestic Central Heating Wiring Systems and Controls

Chaffoteaux Britony system II
The System II Plus has separate water storage unit.

Wall mounted
Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, copper
SEDBUK rating D

Chaffoteaux Calydra Comfort combination
A mains lead is supplied. A 24V room thermostat should be connected to multi-pin plug on terminal board after removing link.

Wall mounted
Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Chaffoteaux Calydra Green condensing combination

Wall mounted
Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, aluminium
Integral frost protection
SEDBUK rating D

Chaffoteaux Calydra Green system condensing

Wall mounted
Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, aluminium
Integral frost protection
SEDBUK rating A

Chaffoteaux Celtic combination

Wall mounted
Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
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<th>5</th>
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<tbody>
<tr>
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</tr>
</tbody>
</table>
L N Timer or Room Stat Contacts

If no timer or room thermostat fit link 4–5
Chaffoteaux Celtic Plus FF combination

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

If no timer or room thermostat fit link 4–5

Chaffoteaux Centora Green combination condensing

Wall mounted

Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

Connect mains to multi-pin plug J1.
A24V room thermostat and/or timer with voltage free terminals can be connected to the multi-pin plug after removing link.

Chaffoteaux Challenger

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

Chaffoteaux Flexiflame 140

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper
The integral pump is not the system pump

If no timer or room thermostat fit link 6–7

Chaffoteaux Minima MX2 combination

Wall mounted

Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, copper
SEDBUK rating D

A mains lead is supplied.
A 24V room thermostat can be connected to the control board after removing link.
Domestic Central Heating Wiring Systems and Controls

**Chaffoteaux Sterling OF and FF combination**

Wall mounted

<table>
<thead>
<tr>
<th>L1</th>
<th>N2</th>
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<th>5</th>
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</tr>
</tbody>
</table>

Mains

Suitable for use on sealed systems
Heat exchanger material, copper

External controls such as time clock with voltage free contacts, or room thermostat, should be connected between terminals 4 and 5. Terminal 3 can be used to connect room thermostat neutral.

**Chaffoteaux Sterling SB system boiler**

Wall mounted

Available with or without 3-port mid-position valve

Without valve – heating only:

<table>
<thead>
<tr>
<th>Room Stat</th>
<th>N</th>
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</tr>
<tr>
<td>N</td>
<td>COM</td>
<td>DEM</td>
<td>Mains</td>
</tr>
</tbody>
</table>

Suitable for use on sealed systems
Heat exchanger material, copper

Link N–N, COM–L only

With 3-port mid-position valve:

Connect valve as per colours indicated on terminal strip. Room thermostat and mains as above.

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>5</th>
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<th>3</th>
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<td>SAT</td>
<td>COM</td>
<td>DEM</td>
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</tr>
</tbody>
</table>

Suitable for use on sealed systems
Heat exchanger material, copper


**Combi Company GEM combination**

Wall mounted

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>L2</th>
<th>L1</th>
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<tr>
<td>Mains</td>
<td>12V DC</td>
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</tbody>
</table>

Suitable for use on sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts or room thermostat should be connected between terminals L2 and L1. A frost thermostat should be wired across L2 and red wire connected to DHW flow switch.
Eco-hometec EC Compact condensing

A main lead is supplied.
A range of manufacturers control equipment is available.

Eco-hometec EC 16, 23, 31, 38 Condensing

Mains connection via 3-pin plug.
A range of manufacturers control equipment is available.

Eco-hometec Solar Combi condensing combination

Mains connection via 3-pin plug.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
<th>R2</th>
<th>R3</th>
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</thead>
<tbody>
<tr>
<td>Cyl stat or sensor</td>
<td>Outside sensor</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td>Modulating room sensor</td>
<td>Do not use</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

L1 N L1 N L2 L1 N L N

External Heating Pump
Room stat or motorized valve end Switch
Hot Water pump or spring return diverter value

ELM Leblanc GLM 5.20, 5.32 combination

N L 240V Mains

Timer
Room Stat

ELM Leblanc GVM 4.20 combination

N L 240V Mains

Timer
Room Stat
Domestic Central Heating Wiring Systems and Controls

**ELM Leblanc GVM 7.23 combination GVM 7.28**

- Wall mounted
- Suitable for sealed systems
- Heat exchanger material, copper
- Timer and/or room thermostat should be connected into their appropriate terminals and be suitable for 24V.

**ELM Leblanc GVM 14/20 combination**

- Wall mounted
- Suitable for sealed systems
- Heat exchanger material, copper

**ELM Leblanc GVM C.21, C.23 condensing combination**

- Wall mounted
- Suitable for sealed systems
- Heat exchanger material, copper

Timer should have voltage free contacts. Room thermostat should be suitable for low voltage 32V.

**Eurocombi Styx combination**

- Wall mounted
- Boiler is supplied with a 3-core mains lead
- External controls such as time clock with voltage free contacts or room thermostat should be connected into connector C after removing either brown link.

- Suitable or sealed systems
- Heat exchanger material, copper

**Fagor Eco Compact combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper/stainless steel
- Integral frost protection

- Mains lead supplied. External controls such as room stat on time switch should have voltage free terminals and be suitable for 24V. Connect to block CM2.

**Fagor FE-20E combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material
- SEDBUK rating D

- Mains lead supplied. A 24V room thermostat and/or time clock with voltage free contacts should be connected to 2-way connector block.
Ferroli 76 FF combination

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper
Room thermostat should be suitable for 24V.

If no timer or room thermostat fit link. Do not wire room thermostat neutral.

Ferroli 77 CF, FF and FF Popular combination

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper
77 FF Popular does not include integral clock.

Ferroli 100 FF, 120 CF combination

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals 4 and 5 after removing link.

Ferroli Arena 30A system condensing

A voltage free room thermostat can be connected to terminals 1–2 on the 12-way connection block. Other controls including Eco/Comfort selection switch (3–4), external temperature sensor (7–8), remote control (9–10) and DHW storage sensor (11–12) can also be connected to this connection block.

Ferroli Arena 30c combination condensing

A voltage free room thermostat can be connected to terminals 1–2 on the 12-way connection block. Other controls including remote control (9–10), external temperature sensor (7–8), Eco/Comfort selection switch (3–4) and domestic hot water exclusion switch (5–6) can also be connected to this connection block.
**Domestic Central Heating Wiring Systems and Controls**

**Ferroli Domina 80E combination**

A mains supply should be connected to the 3-way terminal board XI. Voltage free external controls and/or a 24V room thermostat should be connected to the 2-way terminal board (terminals 3 & 4).

**Ferroli F24, F30 combination**

A mains supply should be connected to the 3-way terminal board XI. Voltage free external controls and/or a 24V room thermostat should be connected to the 2-way terminal board (terminals 3 & 4).

**Ferroli Logica condensing combination**

<table>
<thead>
<tr>
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</table>

Mains 24V

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals 4 and 5 after removing link.

**Ferroli Modena 80E combination**

A mains supply should be connected to the 3-way terminal board XI. Voltage free external controls and/or a 24V room thermostat should be connected to the 2-way terminal board (terminals 3 & 4).

**Ferroli Nouvelle Elite 127/92 combination**

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<tr>
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</table>

Mains 240V

External controls such as time clock, or room thermostat suitable for use at 24V, should be connected between terminals 4 and 5 after removing link. Do not wire room thermostat neutral.
**Ferroli Optima combination**

<table>
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<tr>
<th>L</th>
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</table>

**Wall mounted**

- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals 4 and 5 after removing link.

**Ferroli Optima 201–1001**

Mains supply to X7, 1–2. A 24V thermostat can be connected to the 2-way terminal board (4 & 5) after removing link.

**Ferroli Optima 2001 condensing**

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</table>

**Wall mounted**

- Fully pumped systems only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating E

Mains supply to X7, 1–2. A 24V thermostat can be connected to the 4-way terminal board as below after removing link.

**Ferroli Roma**

<table>
<thead>
<tr>
<th>1</th>
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</table>

**Wall mounted**

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- Integral frost protection

**Ferroli Sigma**

<table>
<thead>
<tr>
<th>SWL</th>
<th>L</th>
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</tbody>
</table>

**Wall mounted**

- Suitable for sealed systems
- Heat exchanger material, cast iron
- SEDBUK rating D/E

For pumped CH and gravity HW, move link on X8 from CP (fully pumped) to GC.
Domestic Central Heating Wiring Systems and Controls

**Ferroli Sys 10–23 system**

<table>
<thead>
<tr>
<th>7</th>
<th>6</th>
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</table>

Switch Live

Room thermostat should be suitable for mains voltage

**Ferroli Tempra 24 combination**

A mains supply should be connected to the 3-way terminal board XI. Voltage free external controls and/or a 24V room thermostat should be connected to the 2-way terminal board (terminals 3 & 4).

**Ferroli Xignal combination**

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L E N Room External Sensor

**Gemini 960E combination**

<table>
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<th>T1</th>
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</table>

240V Room Stat 240V Mains

Electrical connection via 7-pin plug as shown. Connect frost thermostat across B4-T1 in plug.

**Geminox MZ condensing**

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<tr>
<th>P</th>
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<th>TH</th>
<th>N</th>
<th>N</th>
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</table>

Link Timer or Room stat contacts

Link P–P to be removed if fitting digi control

**Glotec GT80 condensing**

<table>
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<tr>
<th>10</th>
<th>9</th>
<th>8</th>
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<th>6</th>
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</tbody>
</table>

Switch Live Pump (optional connection)

Wall mounted

**Ferroli Tempra 24 combination**

Wall mounted

**Ferroli Xignal combination**

Wall mounted

**Gemini 960E combination**

Wall mounted

**Geminox MZ condensing**

Wall mounted

**Glotec GT80 condensing**

Wall mounted
Glow-Worm 18 si, 30 si system

Wall mounted

Connection of external controls will be different depending on whether they are voltage free or mains voltage. Voltage free – remove wire link from two-way connection on control box cover. Mains voltage – refer to diagram below which shows the controls interface PCB.

- 230V switched live from optional frost stat
- 230V switched live from heating controls
- Do not connect

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

If mains voltage external controls are used, the mains voltage heating controls plug should be installed on the controls interface PCB.

Glow-Worm 18 sxi, 30 sxi condensing system

Wall mounted

- 230V switched live from optional frost stat
- 230V switched live from heating controls
- Do not connect

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

Remove link if fitting voltage-free or mains external controls. If the link is not removed, the boiler will run continuously.

Glow-Worm 24 cxi, 30 cxi, 38 cxi condensing combination

Connection of external controls will be different depending on whether they are voltage free or mains voltage. Voltage free – remove wire link from two-way connection on control box cover. Mains voltage – refer to diagram below which shows the controls interface PCB.

- 230V switched live from optional frost stat
- 230V switched live from heating controls
- Do not connect

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

If mains voltage external controls are used, the mains voltage heating controls plug should be installed on the controls interface PCB.
Domestic Central Heating Wiring Systems and Controls

Glow-Worm 30 Ci, 35 Ci combination

Connection of external controls will be different depending on whether they are voltage free or mains voltage. Voltage free – remove wire link from-way connection on control box cover.
Mains voltage – refer to diagram below which shows the controls interface PCB.

- 230V switched live from optional frost stat
- 230V switched live from heating controls
- Do not connect

If mains voltage external controls are used, the mains voltage heating controls plug should be installed on the controls interface PCB.

Glow-Worm 45 and 56B

Back boiler unit

Not suitable for use on sealed systems
Heat exchanger material, cast iron
SEDBUK rating D

*Permanent live only required if fire front has light bulbs, e.g. Homeglow and LFC.

Glow-Worm Compact 70e, 80e combination

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
SEDBUK rating D

Connect external controls suitable for mains voltage to R1–R2 after removing link.

Glow-Worm Compact 60, 100 system

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D
Glow-Worm Economy

Remove link 7–12

Glow-Worm Energysaver condensing

Remove link 7–12

Glow-Worm Energysaver 30e, 40e, 80e condensing

Remove link 7–12

Glow-Worm Energysaver Combi 2 80, 100 condensing combination

Black control Plug

Red Link Blue Link

Mains voltage must not be connected to the black control plug.
Connect room stat after removing red link.
Connect timer after removing blue link.
Connect frost stat across two outer terminals if either red or blue link removed.

Glow-Worm Express combination

5-pin internal plug

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper
SEDBUK rating B

Wall mounted

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating B

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, aluminum
Integral frost protection
SEDBUK rating A

Suitable for sealed systems
Heat exchanger material, copper
Domestic Central Heating Wiring Systems and Controls

**Glow-Worm Fuelsaver ‘B’ MK2**

<table>
<thead>
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<th>10</th>
<th>11</th>
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<tbody>
<tr>
<td>L</td>
<td>N</td>
<td>L</td>
<td>N</td>
<td>L</td>
<td>Switch</td>
</tr>
<tr>
<td>Pump</td>
<td>Mains</td>
<td>Live</td>
<td></td>
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</tbody>
</table>

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper

Remove link 7–12

**Glow-Worm Fuelsaver ‘BR’ MK2**

<table>
<thead>
<tr>
<th>E</th>
<th>N</th>
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<th>SL</th>
<th>9</th>
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<th>7</th>
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<tbody>
<tr>
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<td>L</td>
<td>N</td>
<td>L</td>
<td>Pump</td>
<td></td>
</tr>
</tbody>
</table>

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper

Remove link SL–9

**Glow-Worm Fuelsaver Complheat condensing**

Electrical connection of switch live (L), neutral (N), and earth (E), via 3-pin internal plug

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- SEDBUK rating E

**Glow-Worm Fuelsaver ‘F’**

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<td>N</td>
<td>L</td>
<td>Switch</td>
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<tr>
<td>Pump</td>
<td>Mains</td>
<td>Live</td>
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</tbody>
</table>

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems except 100F
- Heat exchanger material, copper

Remove link 7–12

**Glow-Worm Fuelsaver ‘R’ MK2**

<table>
<thead>
<tr>
<th>E</th>
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<th>L</th>
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<td>L</td>
<td>N</td>
<td>L</td>
<td>Pump</td>
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</tbody>
</table>

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems except 75R MK2
- Heat exchanger material, copper

Remove link SL–9

**Glow-Worm Fuelsaver UFB**

<table>
<thead>
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<td>L</td>
<td>N</td>
<td>L</td>
<td>Pump</td>
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</tbody>
</table>

- Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems except 100F
- Heat exchanger material, copper

Remove link SL–9
Glow-Worm Hideaway

Electrical connection via 3-pin internal plug

Glow-Worm Micron 30FF

- LS
- N
- E
- ○
- ○
- ○
- Switch
- Live
- N
- E

Glow-Worm Micron 60FF

- LP
- LS
- N
- E
- E
- E
- PL
- PN
- ○
- ○
- ○
- ○
- Perm Switch
- Live
- N
- E
- E
- L
- N
- Pump

Glow-Worm Micron 100FF, 120FF

- E
- N
- L
- SL
- 9
- PN
- PL
- E
- K1
- K2
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- Mains Switch
- Live
- Pump

- Remove link SL–9 when fitting external controls. Fit link K1–K2 on open vented systems only.

Glow-Worm Spacesaver 75 CF

- Control Box M5222
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- ○
- Mains Switch
- Live
- Pump

- Remove link 7–8

Glow-Worm Spacesaver ‘BR’ MK2

- E
- N
- L
- ○
- ○
- ○
- Switch
- Live

Floor standing

- Not suitable for use on sealed systems
- Heat exchanger material, cast iron
- SEDBUK rating D/E

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

Wall mounted

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

Wall mounted

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, stainless steel
- SEDBUK rating D

Wall mounted

- Fully pumped systems only
- Not suitable for use on sealed systems
- Heat Exchange materials, cast iron

Wall mounted

- 80BR MK2 – Fully pumped systems only
- Not suitable for use on sealed systems
- Heat exchanger material, cast iron
Domestic Central Heating Wiring Systems and Controls

Glow-Worm Spacesaver ‘F’

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Switch Live

Wall mounted
Not suitable for use on sealed systems
Heat exchanger material, cast iron

Glow-Worm Spacesaver ‘KFB’

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Remove link 7–12

Fully pumped systems only
Not suitable for use on sealed systems
Heat exchanger material, cast iron

Glow-Worm Spacesaver ‘R’ MK2

<table>
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Switch Live

Not suitable for use on sealed systems
Heat exchanger material, cast iron

Glow-Worm Spacesaver ‘RF’

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Switch Live

Not suitable for use on sealed systems
Heat exchanger material, cast iron

Glow-Worm Swiftflow combination

Electrical connections are via a 5-pin plug

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Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating E/F

External controls can be connected between terminal 2 and 1 or directly into terminal 1 after removing link.

Glow-Worm Ultimate BF and CF

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Switch Live

80 BF – Fully pumped systems only
Not suitable for use on sealed systems
Heat exchanger material, cast iron
SEDBUK rating E/F
Boilers – gas

Glow-Worm Ultimate BFSS

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<thead>
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<th>P</th>
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</table>

Pump Switch Perm N E Internal

Remove link 4–SL if wiring external controls

Glow-Worm Ultimate FF (excl. 80FF – see below)

Gravity hot water, pumped central heating

<table>
<thead>
<tr>
<th>E</th>
<th>N</th>
<th>L</th>
<th>SL</th>
<th>9</th>
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<th>PL</th>
<th>E</th>
<th>K1</th>
<th>K2</th>
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Switch Live

Fully pumped systems

<table>
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<th>SL</th>
<th>9</th>
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Mains Switch Pump No Link

Glow-Worm Ultimate 80FF

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</table>

Pump Switch Perm N E

Remove link 9–SL when wiring external controls

Glow-Worm Xtrafast 96, 120 combination

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</table>

Remove link to connect external voltage free control

Glow-Worm Xtramax combination

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</thead>
</table>

Remove link to connect external voltage free control

Wall mounted

Fully pumped systems only

Suitable for use on sealed systems

Heat exchanger material, cast iron

SEDBUK rating E/F

Wall mounted

Fully pumped systems only

Not suitable for use on sealed systems

Heat exchanger material, cast iron

SEDBUK rating E

Wall mounted

Fully pumped system only

Suitable for sealed systems only

Heat exchanger material, copper

Integral frost protection

SEDBUK rating D

Wall mounted

Fully pumped system only

Suitable for sealed systems only

Heat exchanger material, copper

Integral frost protection

SEDBUK rating D
Domestic Central Heating Wiring Systems and Controls

Halstead 40H–50H

<table>
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<tr>
<th>E</th>
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<th>N</th>
<th>NP</th>
<th>LP</th>
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<th>N</th>
<th>Pump</th>
<th>L</th>
<th>Switch</th>
<th>Internal</th>
</tr>
</thead>
</table>

Mains | Live | Wiring

Full pumped systems only
Not suitable for use on sealed systems
Heat exchanger material, copper

Halstead 45F, 65F

As Halstead Balmoral

Halstead ACE & ACE High combination

<table>
<thead>
<tr>
<th>L3</th>
<th>N</th>
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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Live</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Remove link between L1 and L3 if fitting external controls, which must be suitable for 240V and voltage free.

Halstead Balmoral

<table>
<thead>
<tr>
<th>12</th>
<th>11</th>
<th>10</th>
<th>9</th>
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<tbody>
<tr>
<td>Pump</td>
<td>Live</td>
<td>Wiring</td>
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Terminals 7 and 12 are linked

Halstead Bentley

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<table>
<thead>
<tr>
<th>E</th>
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<th>Switch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live</td>
<td></td>
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</tbody>
</table>

Suitable for use on sealed systems
using optional kit
Heat exchanger material, cast iron

Halstead Best

See Halstead Boss – renamed

Halstead Blenheim

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
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</tbody>
</table>

| Internal | Switch | Live | L | E | L | N | N | L | Mains |

Fully pumped systems only
Suitable for use on sealed systems
(15/30 using optional kit)
Heat exchanger material, copper
**Halstead Boss**

<table>
<thead>
<tr>
<th>L</th>
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</table>

- Mains Switch Live
- Pump Live

**Wall mounted**

- Suitable for use on sealed systems
- Heat exchanger material, cast iron
- SEDBUK rating D

A permanent live and pump live must be wired into the boiler for all systems including gravity hot water. The plug at the front of the control box should be positioned as necessary.

**Halstead Buckingham and Buckingham 2**

<table>
<thead>
<tr>
<th>E</th>
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<th>L1</th>
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</table>

- E | N | Switch Live

**Floor standing**

- Not suitable for use on sealed systems
- Heat exchanger material, cast iron

**Halstead Buckingham 3**

Connect switched live, neutral and earth to 3-way connector (LS, N, E)

**Floor standing**

- Not suitable for sealed systems
- Heat exchanger material – cast iron
- SEDBUK rating D

**Halstead Buckingham 4**

Connect switched live, neutral and earth to 3-way connector (LS, N, E)

**Floor standing**

- Not suitable for sealed systems
- Heat exchanger material, cast iron
- SEDBUK rating D

**Halstead Eden Cb condensing combination**

Connection of external controls will be different depending on whether they are voltage free or mains voltage.

- Voltage free – remove wire link from 2-way connection on control box cover
- Mains voltage – refer to diagram below which shows the controls interface PCB

- 230V switched live from optional frost stat
- 230V switched live from heating controls
- Do not connect

- Fully pumped system only
- Suitable for sealed systems only
- Heat Exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A

If mains voltage external controls are used, the mains voltage heating controls plug should be installed on the controls interface PCB.
Domestic Central Heating Wiring Systems and Controls

**Halstead Eden Sb condensing system**

A mains lead is supplied. When connecting external mains voltage controls, remove red link from connection plug and connect as below.

- ☐ – 230V switched live from optional frost stat
- ☐ – 230V switched live from heating controls
- ☐ – Do not connect

**Halstead Eden Vb condensing**

Wall mounted

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</tbody>
</table>

- Mains Switch Live
- Frost stat Live
- E
- N
- Pump Live

Link 1–2 if no external controls

**Halstead Finest, & Finest Gold combination**

Wall mounted

- E
- N
- L

- Mains
- Control Link

Remove link if fitting external controls, which must be suitable for 240V and voltage free.

**Halstead Hero**

Wall mounted

- L2
- L3
- E
- N
- L1

- Pump Live
- Switch E
- N
- Mains Live

**Halstead Quattro combination**

Wall mounted

- Mains
- Room Stat

Suitable for sealed systems

Heat exchanger material, copper

Integral frost protection

Room thermostat should be suitable for 240V.
Halstead Quattro Gold combination

Wall mounted
Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection

Room thermostat should be suitable for 240V.

Halstead Trio combination

Connection via internal plug

Wall mounted
Suitable for sealed systems
Heat exchanger material, copper

If no room thermostat link 40–41. Time clock integral to boiler.

Heatline Compact combination

A mains lead is supplied

Wall mounted
Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection

Heatline Compact system

A mains lead is supplied

Wall mounted
Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection

Heatline Solaris condensing

Wall mounted
Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection

Ideal C80FF, C95FF combination

Wall mounted
Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper/stainless steel
SEDBUK rating D

Remove link in main terminal box when wiring external controls.
Remove link in secondary terminal box when wiring optional or external timer.
**Domestic Central Heating Wiring Systems and Controls**

**Ideal Classic BF**

Wall mounted

- Suitable for use on sealed systems using optional kit
- Heat exchanger material, cast iron
- SEDBUK rating D/E

**Ideal Classic FF**

Electrical connection via 3-pin plug

Wall mounted

- Not suitable for use on sealed systems using optional kit
- Heat exchanger material, cast iron
- SEDBUK rating D/E

**Ideal Classic LX**

As Classic with glass front panel and enhanced casing trim.

**Ideal Classic system boiler**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, cast iron

**Ideal Classic Combi NF80 combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, cast iron

Fit link L1–HW. Connect room thermostat between terminals RS1 (out) and RS2 (in) after removing link. Connect external timer between terminals CL (live) and CH (control). Terminal CN is for room thermostat and timer neutral. A programmer can be installed as above with hot water channel connected to HW after removing link L1–HW.

**Ideal Compact Extra system boiler**

Wall mounted

- Suitable for use on sealed systems using optional kit
- Heat exchanger material, copper

Boiler incorporates a priority valve and a link to alter from HW to CH priority if required. Sensors could be wired in bell wire.
Boilers – gas

**Ideal Elan 2CF, F, RS**

- Gas Valve
- Optional pump connection
- Switch
- Live

**Wall mounted**

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper

**Ideal Elan 2CF, NF, RS**

- Link for Optional Overheat Thermostat
- Switch
- Live

**Wall mounted**

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- See also Elan 2CF, F, RS

**Ideal Icos condensing**

- Perm Switch
- Live

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminum
- SEDBUK rating A

Connection via 5-way plug. A permanent live is essential. Remove link L1 and L2 if connecting external controls. A control circuit can be between L1 and L2 instead of a switched live into L2.

**Ideal Icos system condensing**

- Mains Switch
- Live
- External
- Controls

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminum
- SEDBUK rating A

Connect frost stat across L3–L2

**Ideal Imax condensing**

- Mains Supply
- Room Stat
- Cyl Stat
- CH Pump
- HW Pump

**Wall mounted**

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating A

A permanent live is required. A diverter valve can be connected to 11–12 instead of a HW pump. Other controls including a cylinder sensor kit, outside temperature sensor and modulating sequencer kits can be incorporated into the controls.

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Domestic Central Heating Wiring Systems and Controls

**Ideal Isar condensing combination**

<table>
<thead>
<tr>
<th>L3</th>
<th>N</th>
<th>E</th>
<th>L2</th>
<th>L1</th>
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</table>

Perm Live N E Switch Live

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- SEDBUK rating A

Connection via 5-way plug. A permanent live is essential. Remove link L1–L2 if connecting external controls. A control circuit can be between L1 and L2 instead of a switched live into L2.

**Ideal Mexico Slimline 2**

Electrical connection via 3-pin internal plug

Not suitable for use on sealed systems

- Heat exchanger material, cast iron
- SEDBUK rating F

**Ideal Mexico Super 2**

N E LP LP LB E N LG E N

| ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

N E * * Switch E N Internal Wiring to Gas Valve

Floor standing

Not suitable for use on sealed systems

- Heat exchanger material, cast iron
- SEDBUK rating D/E

*Terminals LP are provided for connecting pump if convenient to do so.

**Ideal Mexico Super FF**

LH LG E N L E

| ○ | ○ | ○ | ○ | ○ | ○ |

E N Switch Live E

Floor standing

Suitable for sealed systems with kit

- Heat exchanger material, cast iron
- SEDBUK rating D/E

**Ideal Minimiser condensing**

Requires a switched live and neutral connection.

Wall mounted

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminum
- SEDBUK rating B

**Ideal Minimiser FF condensing**

A switched live and a neutral are connected into the 2-terminal connector block.

Wall mounted

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, aluminium
Ideal Response 80, 100, 120 combination

Wall mounted

- Fully pumped system only
- For sealed systems only
- Heat exchanger material, copper/cast iron
- SEDBUK rating D

Connect external controls, suitable for 240V, across terminals R1–R2 after removing link.

Ideal Response FF combination

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper and cast iron
- SEDBUK rating D

External controls such as time clock with voltage free contacts, or room thermostat, should be connected between terminals R1 and R2 after removing link. Room thermostat neutral can be connected to N.

Ideal Response SE condensing combination

Wall mounted

- Fully pumped system only
- For sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating B

Connect external controls across 1–2 after removing link.

Ideal Sprint 80F combination

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as time clock with voltage free contacts, or room thermostat, should be connected between terminals L1 and L2. Connect frost thermostat across L0–L2. Thermostats should be suitable for 240V.

Ideal Sprint RS75 combination

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper
**Domestic Central Heating Wiring Systems and Controls**

**Ideal Sprint Rapide RS 75N combination**

L N E N CK3 SCK4 RS1 RS2

240V Mains Switch Live
Remove Link

Connect frost thermostat across FRS1–FRS2

**Ideal Sprint Rapide 90NF combination**

(a) Permanent Mains connection required
(b) Connect room thermostat between RS1-RS2
(c) Connect timer switch live to SCK4 (remove link CK3–SCK4)
(d) Connect frost thermostat between FRS1 and FRS2

**Ideal Systemiser SE condensing system**

1 2 E N 3

Switch Mains

Connect room stat between 1–2 after removing link

**Ideal Turbo 2 condensing**

LP NP LB N L NT CH HW CH HW

Optional Switch N L N Programmer Terminals* Pump Live Mains* If fitted

*Permanent live is only required if internal programmer fitted.

**Ideal W2000**

Electrical connection via 3-pin internal plug

*Wall mounted*

Suitable for sealed systems
Heat exchanger material, copper

*Wall mounted*

Suitable for sealed systems
Heat exchanger material, copper

*Wall mounted*

Fully pumped system only
For sealed systems only
Heat exchanger material, aluminium
Integral frost protection
SEDBUK rating B

*Wall mounted*

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, aluminium
SEDBUK rating B

*Permanent live is only required if internal programmer fitted.

Suitable for use on sealed systems using optional kit
Heat exchanger material, cast iron
**Jaguar combination**

Mains lead supplied. A voltage free room thermostat should be connected to the integral external controls connection after removing the link.

**Johnson & Starley Reno HE 30C condensing combination**

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper/stainless steel
- Integral frost protection
- SEDBUK rating D

**Johnson & Starley Reno HE 25S condensing system**

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A

**Johnson & Starley Reno HE 25H condensing**

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A

**Keston 50, 60, 80 condensing**

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<thead>
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</tbody>
</table>

Remove link SL–SL if wiring external voltage free controls.

- LO – lock out indicator – optional.

**Keston Celsius 25 condensing**

<table>
<thead>
<tr>
<th>PL</th>
<th>N</th>
<th>E</th>
<th>SL</th>
<th>SL</th>
<th>LO</th>
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<tbody>
<tr>
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<td>Live</td>
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<td></td>
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</tr>
</tbody>
</table>

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A
Domestic Central Heating Wiring Systems and Controls

**Malvern 30–70 condensing**

Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper, aluminium
- SEDBUK rating C

**Maxol EM25**

Wall mounted
- Fully pumped systems only
- Not suitable for use on sealed systems
- Heat exchanger material, copper

**Maxol EM40, EM50**

Wall mounted
- Fully pumped systems only
- Not suitable for use on sealed systems
- Heat exchanger material, copper

**Maxol Homewarm 600**

Wall mounted
- Fully pumped systems only
- Not suitable for use on sealed systems
- Heat exchanger material, copper

Terminals L–2–L are linked. Terminals N–4–N are linked

**Maxol Microturbo 40**

Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- SEDBUK rating D

Terminals 2–L Mains are linked

**Maxol Morocco**

Wall mounted
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- SEDBUK rating F

Terminals L–2–L are linked. Terminals N–4–N are linked
Maxol Mystique

Terminals 2–L are linked

MHS Strata 1 condensing

Connections of manufacturers control equipment and mains supply are via a plug-in system.

MHS Strata 2 condensing

Connections of manufacturers control equipment and mains supply are via a plug-in system.

MHS Strata 3 condensing

Connections of manufacturers control equipment and mains supply are via a plug-in system.

MHS Strata 38 condensing

Wiring details are subject to the system into which the boiler is fitted. Brief details are given purely as a guide.

Wall mounted

Fully pumped systems only
Not suitable for use on sealed systems
Heat exchanger material, copper

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

Wiring details are subject to the system into which the boiler is fitted. Brief details are given purely as a guide.
### MHS Strata 38/46 condensing combination

<table>
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<th>N</th>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Room Stat

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A

Wiring details are subject to the system into which the boiler is fitted. Brief details are given purely as a guide.

### Myson Apollo

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>HW</th>
<th>ON</th>
<th>CH</th>
<th>ON</th>
<th>CH</th>
<th>CH</th>
<th>ON</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N L Mains

Programmer Terminals if fitted

Switch Live Pump

Wall mounted

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper

### Myson Housewarmer 2

<table>
<thead>
<tr>
<th>L1</th>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Perm Switch N E

Mains Terminals Live Pump

Wall mounted

- Not suitable for use on sealed systems
- Heat exchanger material, cast iron

*Permanent live only required for fire front bulbs if fitted.

### Myson Housewarmer electronic

<table>
<thead>
<tr>
<th>L1</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>Int</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Perm Switch N E

Mains Terminals Live Pump

Back boiler unit

- Not suitable for use on sealed systems
- Heat exchanger material, cast iron

*Permanent live only required for fire front bulbs if fitted.

### Myson Marathon 1500C

<table>
<thead>
<tr>
<th>E</th>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mains Switch Live

Floor standing

- Not suitable for use on sealed systems
- Heat exchanger material, cast iron
- Fit blue plug for gravity hot water
- Fit red plug for fully pumped

Remove link L–1 and 2–Pump L
Myson Midas B combination

Myson Midas Si combination

Myson Orion

Ocean Alpha 240/280

Ocean 80, OF, FF, FF style combination

Boilers – gas

Remove Link R1–R0 if wiring room thermostat

Connect room thermostat across terminals R1 and R0 after removing link. Do not connect room thermostat neutral. If wiring a frost thermostat, connect across terminals N and R1.

Remove links L–2, 1–4, 4–5 and 2–4 if programmer fitted.

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected between terminals 1 and 2 after removing link.

External controls such as time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected between terminals 1 and 2 after removing link. Room thermostat neutral can be connected to terminal N.

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

Wall mounted

Suitable for use on sealed systems
Heat exchanger material, copper

Wall mounted

75 Si only suitable for use on sealed systems.
Others: suitable for use on sealed systems using optional kit.
Heat exchanger material, cast iron

Wall mounted

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, copper/stainless steel

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper
Domestic Central Heating Wiring Systems and Controls

Potterton Envoy

L N SWL E PL 1 2 3
O O O O O O O O
L N Switch E Pump CH HW HW
Mains Live Live ON ON OFF

Terminals 1, 2, 3, only used if optional timer used

Wall mounted

Potterton Fireside

L N E
O O O
Switch Live

Back boiler unit

Potterton Flamingo 2

T E E N N L 1 2 3
O O O O O O O O
Int. E N Switch Spare Spare
Live

Terminals L–2 are linked

Wall mounted

Potterton Flamingo 3

Gravity hot water, pumped central heating

L N E SWL L N E
O O O O O O O O
Switch Live

Fully pumped systems

L N E SWL L N E
O O O O O O O O
Pump Switch Perm N E
Live

Wall mounted

Potterton Housewarmer 45, 55

Gravity hot water, pumped central heating

N L* SWL E N L
O O O O O O O
Mains Switch Live E

*Permanent live only required if fire front has bulbs.

Fully pumped systems

N L SWL E N L
O O O O O O O
Mains Switch Live E Pump

Back boiler unit

Suitable for use on sealed systems

Heat exchanger material, cast iron

Suitable for use on fully pumped systems when used on sealed systems

Heat exchanger material, cast iron
**Potterton Kingfisher 2**

- **Floor standing**
  - Suitable for use on sealed systems using optional kit
  - Heat exchanger material, cast iron

**Potterton Kingfisher Mf**

- **Gravity hot water, pumped central heating**
  - Suitable for sealed systems only
  - Heat exchanger material, cast iron
  - SEDBUK rating D/E

- **Fully pumped**
  - Suitable for sealed systems
  - Heat exchanger material, copper

Note: On open vented, fully pumped systems, if no permanent live is available the boiler can be wired as follows providing that the system has a separate cold feed and vent pipe.

The overheat thermostat should be removed from the flow pipe and repositioned on the gravity return pipe using the bracket supplied.

**Potterton Lynx combination**

- **Wall mounted**
  - Suitable for sealed systems
  - Heat exchanger material, copper
Domestic Central Heating Wiring Systems and Controls

Potterton Myson Ultra System Boiler

Wall mounted

Suitable for sealed systems
Heat exchanger material, cast iron

The boiler has the facility to wire external room thermostat, cylinder thermostat and mid-position valve into the control box as follows:

<table>
<thead>
<tr>
<th>Room stat Common</th>
<th>Cylinder stat Common</th>
<th>Mid-position valve:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>4</td>
<td>Green–yellow</td>
</tr>
<tr>
<td>Room stat Demand</td>
<td>Cylinder stat Demand</td>
<td>ON</td>
</tr>
<tr>
<td>7</td>
<td>ON</td>
<td>Blue</td>
</tr>
<tr>
<td>Room stat Neutral</td>
<td>Cylinder stat Satisfied</td>
<td>Grey</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>Brown or white</td>
</tr>
</tbody>
</table>

External controls such as time clock with voltage free contacts or room thermostat suitable for use at 240V should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

Potterton Osprey 2

Floor standing

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, cast iron
SEDBUK rating D

L & L are linked

Potterton Performa 24, 28, 28i combination

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection, not model 24
SEDBUK rating B

External controls such as time clock with voltage free contacts or room thermostat suitable for use at 240V should be connected to terminal block after removing link. Connect room stat anticipator, if fitted, to N.

Potterton Powermax HE condensing

Floor Standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

An integral programmer is supplied but if an external programmer is required the internal programmer must be switched off by moving the disable switch to the left.
**Potterton Profile (also Netaheat Profile)**

Gravity hot water, pumped central heating

- Suitable for use on sealed systems
- Heat exchanger material, cast iron
- SEDBUK rating D/E/F

*From room thermostat demand or central heating ‘on’ if no room thermostat fitted.

Fully pumped

- Fanned flue models: fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, cast iron

**Potterton Profile prima**

Gravity hot water, pumped central heating (not fanned flue model)

Full pumped

**Potterton Promax 15HE, 24HE condensing**

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminium
- SEDBUK rating A

The boiler does not require a permanent live. The pump should be connected to P/F if the system has TRV’s throughout and no by-pass.
Domestic Central Heating Wiring Systems and Controls

Potterton Promax System HE condensing

<table>
<thead>
<tr>
<th>S/L</th>
<th>E</th>
<th>N</th>
<th>P/F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Switch Live E N

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, aluminium
SEDBUK rating A

Connection PF is an optional pump feed for use when fitting an additional external pump on a full TRV system with no by-pass fitted.

Potterton Puma combination

<table>
<thead>
<tr>
<th>External Timer</th>
<th>Room Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 9 8 7 6 5 4 3 2 1</td>
<td>E N L SWL E N L SWL N L</td>
</tr>
<tr>
<td>o o o o o o o o o o</td>
<td>o o o o o o o o o o</td>
</tr>
</tbody>
</table>

240V supply Switch Live E N Room Stat Mains 240V

Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

Potterton Suprima

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>SWL</th>
<th>N</th>
<th>L</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Pump Switch Live Mains

Fully pumped systems only
Suitable for use on sealed systems using optional kit
Heat exchanger material, cast iron
SEDBUK rating D/E

Potterton Suprima DV System

This is a Suprima boiler with sealed system components and diverter valve added. It comes complete with a wiring centre to connect external controls.

Potterton Suprima System & System POD

This is a Suprima boiler with sealed system components and diverter valve added. Wiring as per Suprima. The ‘Pod’ version allows the sealed system components to be concealed behind a casing above the boiler.

Wall mounted

Wall mounted

Wall mounted

Wall mounted

Wall mounted

Wall mounted
Potterton Tattler

Floor standing

Not suitable for use on sealed systems
Heat exchanger material, cast iron

Powermax 195 combination

Floor standing

The bulk of the water in the boiler’s thermal store is used for central heating and also for heating the integral heat exchanger coil to supply domestic hot water. Model 185P has integral pump and 185CP has integral pump and programmer. Diagram shows basic model.

An internal programmer should have voltage free contacts. Link programmer live to hot water common. Connect the HW demand to terminal 14. Wire the central heating channel by removing link across 9–10 and wiring CH common and CH demand into 9–10. The programmer live should not be linked to the central heating switch.

Protherm 80E, 80EC, 100EC combination

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating D

Radiant RCM, Comfort, RSF combination

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating D

Radiant R and RS Comfort heating only

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating D/E
**Domestic Central Heating Wiring Systems and Controls**

**Radiant RMA, RMAS combination**  
Incorporates 45 litre domestic hot water cylinder  
A 3-core lead is supplied for connection to an adjacent point. External controls such as time clock with voltage free contacts, or room thermostat, should be connected between terminals TA and OR after removing link. Room thermostat neutral should not be connected.

**Radiant Rain combination**

**Range Powermax combination**

**External Controls**

<table>
<thead>
<tr>
<th></th>
<th>24</th>
<th>L1</th>
<th>N1</th>
<th>E</th>
<th>25</th>
<th>N2</th>
<th>E</th>
<th>L2</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>N3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

HW N E N E Prog CH Prog Live On N

**Internal Programmer**

<table>
<thead>
<tr>
<th></th>
<th>24</th>
<th>L1</th>
<th>N1</th>
<th>E</th>
<th>25</th>
<th>N2</th>
<th>E</th>
<th>L2</th>
<th>26</th>
<th>27</th>
<th>28</th>
<th>N3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

N E L N E Live Live Pump Out In Room Stat

Connect mains supply to 3-way terminal block. Connect room stat between 27–28 after removing link.

**Ravenheat 30B, 40B, 50B, 50S**

**Internal Programmer**

<table>
<thead>
<tr>
<th></th>
<th>E</th>
<th>N</th>
<th>L</th>
<th>D</th>
<th>C</th>
<th>N</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

E N Perm Switch Live Live N L Pump

When wiring external controls remove link D–C

**Ravenheat CF10/20, CF10/25 combination**

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>N</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Mains 240V 24V

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected between terminals C and D after removing link.
**Ravenheat Combiplus combination**

- L N C D
- ○ ○ ○ ○
- Mains 240V External controls

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected between terminals C and D after removing link.

**Ravenheat CSI 85, CSI 85T condensing combination**

- | | ○ Room Stat
- Timer L ○ ○
- Mains N ○ ○ Frost Stat

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper/aluminum
Integral frost protection
SEDBUK rating A

External controls must be voltage free

**Ravenheat CS1 Primary condensing**

- E N L C D L N E
- ○ ○ ○ ○ ○ ○ ○
- Mains Link Pump

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, copper/aluminium
SEDBUK rating A

Remove link C–D if fitting external controls. Terminal C is live out if required and terminal D is the control live in. The pump must be connected to the boiler terminal block.

**Ravenheat CSI System condensing**

- | | ○ Room Stat
- Timer L ○ ○
- Mains N ○ ○ Frost Stat

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper/aluminum
Integral frost protection
SEDBUK rating A

External controls must be voltage free
Domestic Central Heating Wiring Systems and Controls

Mid-position valve (Y plan)

<table>
<thead>
<tr>
<th>E</th>
<th>E</th>
<th>VN</th>
<th>VL</th>
<th>V2</th>
<th>V3</th>
<th>CS1</th>
<th>CS2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>blue</td>
<td>white</td>
<td>or</td>
<td>grey</td>
<td>cyl stat</td>
<td></td>
</tr>
</tbody>
</table>

2 × 2-port motorized valves (S plan)

<table>
<thead>
<tr>
<th>E</th>
<th>E</th>
<th>VN</th>
<th>VL</th>
<th>V2</th>
<th>V3</th>
<th>CS1</th>
<th>CS2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>blue</td>
<td>brown</td>
<td>brown</td>
<td>CH</td>
<td>HW</td>
<td>cyl stat</td>
</tr>
</tbody>
</table>

Ravenheat Little Star LS80, LS80T combination

Wall mounted

Ravenheat Merit

Wall mounted

Ravenheat RSF 82E, RSF 82ET, RSF 84E, RSF 100E, combination

Wall mounted

A mains lead is supplied. A room thermostat should be connected as shown to PCB connection strip CN4 after removing link. External controls must be voltage free.

External controls must be voltage free
Ravenheat RSF 820/20 combination

Wall mounted

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Mains 240V 24V

Suitable for sealed systems
Heat exchanger material, copper
SEDBUK rating E

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals C and D after removing link.

Rayburn GD 80 cooking appliance/boiler

Floor standing

<table>
<thead>
<tr>
<th>PL</th>
<th>PN</th>
<th>E</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>L1</th>
<th>N</th>
<th>CSL</th>
<th>BSL</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Pump Mains Switch Live

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

If wiring external controls remove link L1–BSL. Pump Live must be wired into terminal PL.

Saunier Duval Ecosy 24E, 28E condensing combination

Wall mounted

Connect voltage free external controls via 3-way external controls plug after removing link. Do not connect room thermostat neutral.

Saunier Duval Ecosy SB24E, SB28E condensing system

Wall mounted

Connect voltage free external controls via 5-way external controls plug after removing link. Do not connect room thermostat neutral.
Domestic Central Heating Wiring Systems and Controls

Saunier Duval SD30e combination

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>R1</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Mains</td>
<td></td>
<td></td>
<td>Out</td>
<td>In</td>
</tr>
</tbody>
</table>

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

Voltage free room thermostat and/or external timer should be connected between R1–R2 after removing link.

Saunier Duval SD 123C, 123F

SD 223C, 223F

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Mains 240V</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 1 and 2 after removing link. Room thermostat neutral can be connected to terminal 5.

Saunier Duval SD 135C, 135F

SD 235C, 235F

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Mains 240V</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 1 and 2 after removing link. Room thermostat neutral can be connected to terminal 5.

Saunier Duval SD 620F combination

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Mains 240V</td>
<td>6</td>
<td>5</td>
</tr>
</tbody>
</table>

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 2 and 3 after removing link. Room thermostat neutral can be connected to terminal 5.
Boilers – gas

**Saunier Duval SD 623 combination**

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 1 and 2 after removing link. Room thermostat neutral can be connected to terminal 5.

**Saunier Duval SD 625M combination**

Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 24V, should be connected between terminals 2 and 3 after removing link. Room thermostat neutral can be connected to terminal 1.

**Saunier Duval Isofast F combination**

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating C

A mains lead is supplied. A voltage free room thermostat can be connected to terminal block E after removing link.

**Saunier Duval Isomax combination**

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

A mains lead is supplied. A voltage free room thermostat can be connected to terminal block E after removing link.

**Saunier Duval Master Twin combination**

Floor standing

Suitable for sealed systems
Heat exchanger material, copper
Integral frost protection

Supplied with mains lead.

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected into 3-pin connector after removing link between terminals 2 and 3 in plug. Room thermostat neutral should not be connected.
Domestic Central Heating Wiring Systems and Controls

**Saunier Duval Master Twin L85E combination**
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- Wall mounted

A 24V room thermostat can be connected to terminals 2 and 3 of the 3-way plug after removing the link. For frost protection to function, boiler must be set to frost or sun.

**Saunier Duval Sylva FF 24E combination**
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- wall mounted
- SEDBUK rating D

A 24V room thermostat or voltage free external controls should be connected between terminals 2 and 3; otherwise a link should be fitted.

**Saunier Duval System 400**
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- Wall mounted

Electrical connection is via a 3-pin plug

**Saunier Duval SB 23 Thelia**
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper
- Wall mounted

Supplied with mains lead.

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected into 5-pin connector between top two terminals after removing link. Room thermostat neutral should not be connected. A cylinder thermostat can be connected across the bottom two terminals.

**Saunier Duval 23, 23E Thelia combination**
- Suitable for sealed systems
- Heat exchanger material, copper
- Wall mounted

Supplied with mains lead.

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected into 3-pin connector after removing link between 2 and 3 in plug. Room thermostat neutral should not be connected.

**Saunier Duval 30E Thelia combination**
- Suitable for sealed systems
- Heat exchanger material, copper
- Wall mounted

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>N</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>E</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Mains 240V</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 2 and 3 after removing link. Room thermostat neutral can be connected to terminal 5.
Boilers – gas

**Saunier Duval Thelia Twin combination**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Mains 240V

- 1
- 2
- 3
- 4
- 5
- 6

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper
- Integral frost protection

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 2 and 3 after removing link. Room thermostat neutral must not be connected.

**Saunier Duval Thelia Twin 28E combination**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Mains 240V

- 1
- 2
- 3
- 4
- 5
- 6

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- SEDBUK rating D

A 24V room thermostat or voltage free external controls should be connected between terminals 2 and 3; otherwise a link should be fitted.

**Saunier Duval Thema F-23E combination**

Connect external controls with voltage free contacts to 2-way connector after removing link. Mains lead supplied.

**Saunier Duval Thema F SB 18E, SB 23E**

- Cyl Stat
- Room Stat

**Saunier Duval 223 Themis combination**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Mains 240V

- 1
- 2
- 3
- 4
- 5
- 6

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems only
- Heat exchanger material, copper

For use without time switch or room thermostat, link together terminals 1, 2 and 3. With this wiring the control thermostat controls the operation of the burner – the pump runs continuously. To stop the pump working this way, disconnect the wiring loom connectors and insulate them from the earth of the boiler. With this layout the control thermostat controls the burner. The pump will stop when the burner goes out. For use with time switch and room thermostat, connect time switch voltage free contacts and room thermostat in series between terminals 1 and 2 and link together terminals 2 and 3. The neutral of the room thermostat must be connected to terminal 5.
Domestic Central Heating Wiring Systems and Controls

**Saunier Duval Thermaclasic F24E, F30E, Plus Condensing Combination**

Connection of external controls will be different depending on whether they are voltage free or mains voltage.
Voltage free – remove wire link from two-way connection on control box cover.
Mains voltage – refer to diagram below which shows the controls interface PCB.

- 230v switched live from optional frost stat
- 230v switched live from heating controls
- Do not connect

If mains voltage external controls are used, the mains voltage heating controls plug should be installed on the controls interface PCB.

**Saunier Duval Xeon FF**

Full Pumped

- Mains Live
- Switch
- N Pump
- E

Gravity Hot Water Pumped Central Heating

- E
- N
- Link

Link SL–9 on GHW/PCH Systems

**Sime Format 80C, 100C, 110C combination**

A room thermostat suitable for mains voltage should be connected to TA connector (10–11) after removing link.

**Sime Friendly, Friendly E combination**

A room thermostat should be connected to terminals 40–41 in the control box. In the Friendly model this should be suitable for mains voltage and in the Friendly E model this should be suitable for 24V.
Sime Friendly Format combination

A room thermostat suitable for mains voltage should be connected to connector block TA, (22–23) after removing link.

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating D

Sime Planet Dewy combination

Condensing

Mains lead supplied. A room thermostat should be connected to connector block J2, terminals 4–5.

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating B

Sime Planet Super 4WM combination

Mains lead supplied. A voltage free room thermostat should be connected across TA–TA (5–6) after removing link. Comes with ‘Logica’ optimizer control.

Wall mounted

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminium
- Integral frost protection

Sime Super 4 combination

A voltage free room thermostat should be connected to terminals 40–41 after removing link.

Floor standing (FS) and Wall mounted (WM)

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, aluminium
- Integral frost protection

Sime Super 90 combination

Connection via internal 5-pin plug

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>41</th>
<th>40</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Mains 240V
Room Stat 24V

Suitable for sealed systems
Heat exchanger material, copper
Frost thermostat and time clock integral to boiler.

Wall mounted

Sime Super 90 & 105 MK11 combination

A room thermostat suitable for mains voltage should be connected to connector block TA, (22–23) after removing link.

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating D
Domestic Central Heating Wiring Systems and Controls

**Sime Superior MK 11**

<table>
<thead>
<tr>
<th>2</th>
<th>1</th>
<th>E</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Pump Switch E N Perm
Live Live Live

Suitable for sealed systems only
Heat exchanger material, cast iron

For gravity HW. Pumped CH, the switch at the rear of the control box should be set to gravity.

**Sinclair 40, 50**

See Halstead 40H, 50H

**Strebel SC 30 Condensing**

| SC 30C – Boiler |
| SC 30B – System |
| SC 30K – Combination |

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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</thead>
<tbody>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Room Stat

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating A

External sensor and temperature sensor for cylinder may be fitted.

**Strebel Super HR condensing**

Installation will normally include Brain room thermostat and controls. If these are to be replaced by other products they should be potential free.

<table>
<thead>
<tr>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>E</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Mains

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating A

**Thermomatic RSM 15, 20, 25 combination**

<table>
<thead>
<tr>
<th>14</th>
<th>13</th>
<th>12</th>
<th>11</th>
<th>E</th>
<th>N</th>
<th>L</th>
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</thead>
<tbody>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Mains

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 11–12 after removing link. Terminals 13–14 should remain linked.
Trianco Homeflame

L N E
○ ○ ○
Switch Live

Back boiler unit

Not suitable for use on sealed systems
Heat exchanger material, cast iron

Trianco Triancogas F

3 2 1 L N E
○ ○ ○ ○ ○ ○
L Switch Live L Mains 240V

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

Trianco Triancogas RS

E N L1
○ ○ ○ ○
E N Switch Live

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

Trianco Tristar

E N L EP NP LP 1 2
○ ○ ○ ○ ○ ○ ○ ○
E N L E N L Switch Live

Wall mounted

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, copper

Terminal 1 can be used as live to external controls

Trianco Tristar Optima condensing combination

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, aluminium
Integral frost protection
SEDBUK rating A

Trianco Tristar Optima condensing system

Wall mounted

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, aluminium
Integral frost protection
SEDBUK rating A
Domestic Central Heating Wiring Systems and Controls

**Trisave FS 60, 80, 80C condensing**

A 4-core lead is supplied which should be connected as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grn ylw</td>
<td>Earth</td>
</tr>
<tr>
<td>Blue</td>
<td>Neutral</td>
</tr>
<tr>
<td>Black</td>
<td>Perm live</td>
</tr>
<tr>
<td>Brown</td>
<td>Switch live</td>
</tr>
</tbody>
</table>

**Trisave Turbo 22, 30, 45, 60 condensing**

A 4-core lead is supplied which should be connected as follows:

<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grn ylw</td>
<td>Earth</td>
</tr>
<tr>
<td>Blue</td>
<td>Neutral</td>
</tr>
<tr>
<td>Black</td>
<td>Perm live</td>
</tr>
<tr>
<td>Brown</td>
<td>Switch live</td>
</tr>
</tbody>
</table>

**Floor standing**

- Fully pumped systems only
- Suitable for use on sealed systems using optional kit
- Heat exchanger material, aluminium
- The pump is connected into the boiler via 3-pin plug supplied.

**Wall mounted**

- Fully pumped systems only
- Suitable for use on sealed systems using optional kit
- Heat exchanger material, aluminium
- The pump is connected into the boiler via 3-pin plug supplied.

**Vaillant, general information**

Model codes:

- VC = Vaillant Central (heating)
- VCW = Vaillant Central (heating) Water, e.g. Combi
- GB = Great Britain – following models may include GB but wiring is the same.
- First two numbers denote kilowatt output and third number denotes flue type, i.e.
  
  - 0 = Conventional, 1 = Balanced, 2 = Fanned
- Following letters denote thus: E = Electronic, H = Natural gas, B = bottled gas.
- Therefore a VCW 242E is a 24kW fanned flue electronic combination boiler.

**Vaillant Ecomax 600 System condensing**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7, 8, 9</td>
<td>L, N, E</td>
</tr>
<tr>
<td>3, 4, 5</td>
<td>L, N, E</td>
</tr>
</tbody>
</table>

- Underfloor Overheat Thermostat
- Do not Connect Mains Supply
- External Controls
- External Pump
- if req.

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating A

A room thermostat suitable for 230V and/or timer with voltage free controls should be connected across 3 and 4 after removing link. Terminal 5 can be used as a neutral connection.
**Vaillant Ecomax 800 System combination condensing**

- Underfloor Overheat Thermostat
- Do not Connect Mains Supply
- 7, 8, 9, L, N, E, 3, 4, 5, L, N, E
- External Controls
- External Pump if req.

A room thermostat suitable for 230V and/or timer with voltage free controls should be connected across 3–4 after removing link. Terminal 5 can be used as a neutral connection.

**Vaillant Ecomax pro condensing**

- Perm Switch Frost
- Live Stat Live
- 1, 2, 3, 4, 5, 6, 7, 8
- 0, 0, 0, 0, 0, 0, 0, 0

Connect link 1–2 if no external controls

**Vaillant Thermocompact system**

- Do Not Use Mains
- 7, 8, 9, L, N, E, 3, 4, 5
- 0, 0, 0, 0, 0, 0, 0, 0

A room thermostat suitable for 230V and/or timer with voltage free controls should be connected across 3–4 after removing link. Terminal 5 can be used as a neutral connection.

**Vaillant Turbomax plus combination**

- Do Not Use Mains
- 7, 8, 9, L, N, E, 3, 4, 5
- 0, 0, 0, 0, 0, 0, 0, 0

A room thermostat suitable for 230V and/or timer with voltage free controls should be connected across 3–4 after removing link. Terminal 5 can be used as a neutral connection.
Domestic Central Heating Wiring Systems and Controls

### Vaillant Turbomax Pro combination

<table>
<thead>
<tr>
<th>7</th>
<th>8</th>
<th>9</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>Do not Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Wall mounted*
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating D

A room thermostat suitable for 230v and/or timer with voltage free controls should be connected across 3–4 after removing link. Terminal 5 can be used as a neutral connection.

### Vaillant Turbomax Pro condensing

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perm Switch Frost Live Stat Live</td>
<td>N</td>
<td>E</td>
<td>E</td>
<td>N</td>
<td>Pump Live</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Wall mounted*
- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, stainless steel
- Integral frost protection
- SEDBUK rating D/E

Connect link 1–2 if no external controls

### Vaillant VC 10, 15 TW3, 20 TW3

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2R</th>
<th>1MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Switches</td>
<td>L</td>
<td>Mains</td>
<td>240V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Wall mounted*
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link.

### Vaillant VC 10-W, 15-W, 20-W

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2R</th>
<th>1MP</th>
</tr>
</thead>
<tbody>
<tr>
<td>External Switches</td>
<td>L</td>
<td>N</td>
<td>Mains</td>
<td>240V</td>
<td></td>
</tr>
</tbody>
</table>

*Wall mounted*
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link.

### Vaillant VC 110, 180, 240 combination

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Mains</td>
<td>240V</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Wall mounted*
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.
**Vaillant VC 110 H, 180 H, 240 H**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

---

**Vaillant VC 112 EH, 142 EH**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

---

**Vaillant VC 112 E – RSF VC 142 E, 182 E, 242 E, 282 E**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

---

**Vaillant VC 221 H**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

---

**Vaillant VC Sine 18 W**

Wall mounted

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link.
Domestic Central Heating Wiring Systems and Controls

**Vaillant VCW 182 E, 242 E combination**

- **Wall mounted**
- Suitable for sealed systems
- Heat exchanger material, copper

![Diagram of VCW 182 E, 242 E combination]

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

**Vaillant VC 221 combination**

- **Wall mounted**
- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, copper

![Diagram of VC 221 combination]

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

**Vaillant VCW 240 H, 280 H combination**

- **Wall mounted**
- Suitable for sealed systems
- Heat exchanger material, copper

![Diagram of VCW 240 H, 280 H combination]

External controls such as a time clock, or room thermostat, should be connected between terminal 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.

**Vaillant VCW 242 EH, 282 EH combination**

- **Wall mounted**
- Suitable for sealed systems
- Heat exchanger material, copper

![Diagram of VCW 242 EH, 282 EH combination]

External controls such as a time clock, or room thermostat, should be connected between terminals 3 and 4. Connect room thermostat neutral to terminal 5. Do not use terminals 7–12.
**Vaillant VK-E, VKS-E**

- **Floor standing**
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, cast iron

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link.

**Vaillant VU 186 EH**

- **Wall mounted**
- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, copper
- SEDBUK rating B

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link. When used in conjunction with a 3-port or 2 x 2-port motorized valve, the switched live can be connected into terminal 4.

**Vaillant VUW 236 EH**

- **Wall mounted**
- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals 3 and 4 after removing link.

**Vokera 12–48 RS Mynute**

- **Wall mounted**
- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat between terminals 2 and 3 after removing link. If wiring into a conventional fully pumped system, e.g. Y Plan, the switch live should be connected to terminal 3 after removing link.
Domestic Central Heating Wiring Systems and Controls

**Vokera 18–72 DMCF**
**21–84 DMCF combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat, between terminals 3 and 4 after removing link. Connect room thermostat neutral into terminal 5.

**Vokera 20–80 flowmatic combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat, between terminals 1 and 3.

**Vokera 20–80 RS turbo combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat, between terminals 3 and 4 after removing link. Connect room thermostat neutral into terminal 5.

**Vokera 21–84 Turbo combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock with voltage free contacts, or room thermostat, between terminals 4 and 5 after removing link.

**Vokera 21–84 DC turbo combination**

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat, between terminals 3–4 after removing link. Connect room thermostat neutral into terminal 5.
**Vokera 20–80 Flowmatic combination**

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains</td>
<td>240V</td>
<td>External Controls</td>
<td>N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, copper

Connect external controls such as a time clock, or room thermostat, between terminals 1 and 3.

**Vokera Compact 24, 28 combinations**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains</td>
<td>240V</td>
<td></td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

A 3-core mains lead is supplied. Connector strip is numbered 1–6 for clarity; it is not numbered in the boiler. L-4 is linked, N-6 is linked. Terminals 2 and 5 are spare for making connections. The timer clock motor should be wired from 4(L) and (6N). The control circuit for timer contacts and/or room thermostat are terminals 1 and 3.

**Vokera Eclipse ESC condensing combination**

Integral timer. If connecting a room thermostat it must be suitable for 24V. The timer wire into terminal 2 of M4 should be connected to terminal 1 and room thermostat connected to 2 and 1.

External timer and/or room thermostat. Voltage free controls suitable for 24V should be connected between 2 and 3 on terminal block M4 after removing link.

**Vokera Eclipse ESS condensing system**

<table>
<thead>
<tr>
<th>9</th>
<th>8</th>
<th>7</th>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mains</td>
<td>240V</td>
<td>External Controls</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wall mounted

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating A

External voltage-free controls suitable for 24V should be connected between terminals 6 and 4 after removing link.
Domestic Central Heating Wiring Systems and Controls

**Vokera Excell 80SP, 80E, 96E combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Timer
Motor
Supply

Connect voltage free controls to terminals 1–3 after removing link. Terminal 2 is spare and can be utilised.

**Vokera Hydra condensing combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating A

A mains supply should be connected to L + N on terminal block M2. A 24V room thermostat or voltage free control should be connected to terminal 2 and 3 on terminal block M7.

**Vokera Linea 7 combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

<table>
<thead>
<tr>
<th>N</th>
<th>N</th>
<th>L</th>
<th>L</th>
<th>TA</th>
<th>TA</th>
<th>=</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mains
External Controls
Spare

It can be wired in conjunction with a cylinder and external controls, e.g. Honeywell ‘S’ Plan. Connect external controls across TA–TA after removing link. Connect room thermostat neutral to N. Terminal = is a spare terminal used to connect controls. This boiler can be used with 2 × 2-port motorised valves but not 1 × 3-way mid-position motorised valve.

**Vokera Linea 24, 28 Plus combination**

- Wall mounted
- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

<table>
<thead>
<tr>
<th>N</th>
<th>N</th>
<th>L</th>
<th>L</th>
<th>TA</th>
<th>TA</th>
<th>=</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mains
External Controls
Spare

It can be wired in conjunction with a cylinder and external controls, e.g. Honeywell ‘S’ or ‘Y’ Plan. Connect external controls across TA–TA after removing link. Connect room thermostat neutral to N. Terminal = is a spare terminal used to connect controls.
**Vokera Linea Max combination**

 Voltage free external controls and/or room thermostat should be connected to terminals 2–3 after removing link. Room thermostat neutral should be connected to 5 or N.

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
Integral frost protection
SEDBUK rating D

**Vokera Meteor S90 system**

Connect external controls between 1 and 2 after removing link.

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, cast iron

**Vokera Meteor V90**

Connect external controls between 1 and 2 after removing link. Terminal 1 is switch live from external controls.

**Floor standing**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, cast iron

**Vokera Mynute 10e, 14e, 20e system**

Terminals 3–6 only apply if Vokera integral programmer fitted.

**Wall mounted**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, copper
SEDBUK rating D

**Vokera Mynute 10se, 14se, 28se system**

A mains supply should be connected into the 3-way mains connector block. External controls suitable for mains voltage should be across terminals 1–3 after removing link.
Domestic Central Heating Wiring Systems and Controls

**Vokera Option combination**

- E
- N
- L

The boiler has an integral time clock. An external timer and/or time clock should be wired into terminals as shown after removing link. The integral timer should be disconnected by removing black wire from terminal 5 of M3 and connecting to terminal 6.

**Vokera Pinnacle 16, 26 condensing system**

A mains supply should be connected to L + N on terminal block M2. A 240V room thermostat or voltage free external controls such as motorized valve and switches, should be connected to terminals 2 and 3 on terminal block M7.

**Vokera Synergy 29 condensing system**

**Vokera Syntesi 25, 29, 35 condensing combinations**

**Warmworld FFC 30/60, FFC 65/80 condensing**

**Warmworld HE condensing combination**

External controls must have voltage free contacts

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating A

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium
- Integral frost protection
- SEDBUK rating B

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating A

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium/copper
- Integral frost protection
- SEDBUK rating B

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminum/copper/stainless steel
- Integral frost protection
- SEDBUK rating A

**Wall mounted**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, aluminium/copper/stainless steel
- Integral frost protection
- SEDBUK rating A

---

186
**Warm World HE30–HE70 condensing**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>N</th>
<th>N</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Live</td>
<td>Switch HW</td>
<td>HW</td>
<td>CH</td>
<td>Off</td>
<td>On</td>
<td>On</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Fully pumped systems only
- Suitable for use on sealed systems
- Heat exchanger material, aluminium and copper
- SEDBUK rating C
- Integral programmer if fitted

**Wickes 40, 50 MK2**

- See Halstead Blenheim

**Wickes 42, 53**

- See Halstead 40H, 50H

**Wickes 45F, 65F**

- See Halstead Balmoral

**Wickes Combi**

- Wall mounted

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

- Suitable for sealed systems
- Heat exchanger material, copper
- SEDBUK rating D

If no timer or room stat Link 3–4 or 5–6 as appropriate.

**Wickes Combi 30/90 combination.**

- Wall mounted

Connection via internal plug

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

- Suitable for sealed systems
- Heat exchanger material, copper

If no room thermostat link 40–41. Time clock integral to boiler.

**Worcester 9/14, 14/19, 19/24 CBi**

- Wall mounted

<table>
<thead>
<tr>
<th>Pump Live</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump Neutral</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Permanent Live</td>
</tr>
<tr>
<td>Switch Live</td>
</tr>
</tbody>
</table>

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, cast iron
- Integral frost protection
- SEDBUK rating D
**Domestic Central Heating Wiring Systems and Controls**

**Worcester 9.24 BF, OF electronic, combination**

- Suitable for sealed systems
- Heat exchanger material, copper

**Worcester 9.24 BF, OF, MK 1.5 combination**

- Suitable for sealed systems
- Heat exchanger material, copper

**Worcester 9.24 RSF ‘E’ combination**

- Suitable for sealed systems
- Heat exchanger material, copper

**Worcester 15Cbi, 24Cbi**

- Control Board X1
- Pump Live
- N
- Pump N
- Perm Live
- Switch Live

**Worcester 15Sbi, 24Sbi**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, copper
- Integral frost protection
- SEDBUK rating D

Remove link LS–LR if wiring external controls

**Worcester 24CDi combination**

- Suitable for sealed systems
- Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat, should be connected between terminals LS and LR after removing link. Room thermostat neutral can be connected to NS. If system uses wire free remote Digistat room thermostat – see ACL-Drayton Digistat RF1. If external frost protection is required also connect across LS–LR in addition to other wiring.
Worcester 24CDi, 28CDi, 35CDi, RSF combination

<table>
<thead>
<tr>
<th>NS</th>
<th>LS</th>
<th>ST8</th>
<th>LR</th>
<th>Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>o</td>
</tr>
</tbody>
</table>

N L Switch
Live

To external controls – 230V

Worcester 24i, 28i RSF combination

<table>
<thead>
<tr>
<th>CN</th>
<th>C1</th>
<th>CL</th>
<th>X2</th>
<th>RN</th>
<th>R1</th>
<th>RL</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>X2</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

N Switch
Live
Timer

N Switch
Live
Room
Thermostat

Remove links as required

External controls – 230V

Worcester 25Si, 28Si, combination

<table>
<thead>
<tr>
<th>NS</th>
<th>ST8</th>
<th>LS</th>
<th>LR</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>o</td>
</tr>
</tbody>
</table>

N L Switch
Live

Worcester 26CDi XTRA condensing combination

<table>
<thead>
<tr>
<th>NS</th>
<th>LS</th>
<th>ST8</th>
<th>LR</th>
<th>Spare</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>o</td>
</tr>
</tbody>
</table>

N L Switch
Live

To external controls – 230V

Worcester 240, BF, OF

<table>
<thead>
<tr>
<th>X4</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>o</td>
<td>o</td>
<td>0</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

Room Stat
or Timer

N Frost
Stat

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected as shown.
Domestic Central Heating Wiring Systems and Controls

Worcester 240, BF, OF RSF  
Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat suitable or use at 240V, should be connected as shown.

Worcester 280, RSF  
Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free contacts, or room thermostat suitable for use at 240V, should be connected as shown.

Worcester 350 combination  
Wall mounted

Suitable for sealed systems
Heat exchanger material, copper

Worcester Delglo 2 combination  
Floor standing

Suitable for use on sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. A frost thermostat should be of the double pole type wired common to terminal 6 and 2-pole connections to 1 and 2.

Worcester Delglo 3 combination  
Floor standing

Suitable for use on sealed systems
Heat exchanger material, copper

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. A frost thermostat should be of the double pole type wired common to terminal 6 and 2-pole connections to 1 and 2.
<table>
<thead>
<tr>
<th>Boiler Model</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Worcester Greenstar HE combination condensing</strong></td>
<td>Wall mounted</td>
</tr>
</tbody>
</table>
| The boiler incorporates a plug-in facility for controls | Fully pumped system only  
Suitable for sealed systems only  
Heat exchanger material, aluminium  
Integral frost protection  
SEDBUK rating A |
| **Worcester Greenstar HE system condensing** | Wall mounted |
| The boiler incorporates a plug-in facility for controls | Fully pumped system only  
Suitable for sealed systems only  
Heat exchanger material, aluminium  
Integral frost protection  
SEDBUK rating A |
| **Worcester Heatslave 9.24 BF, OF, MK 1 combination** | Floor standing |
| | Suitable for use on sealed systems  
Heat exchanger material, copper |

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. Wire frost thermostat across terminals 4–5.

| **Worcester Heatslave 9.24 RSF combination** | Wall mounted |
| | Suitable for use on sealed systems  
Heat exchanger material, copper |

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. Wire frost thermostat across main live and terminal 3.

| **Worcester Heatslave High Flow combination** | Floor standing |
| | Suitable for use on sealed systems  
Heat exchanger material, copper |

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. A frost thermostat should be of the double pole type and connected common to terminal L and 2-pole connections to 1 and 3.
### Worcester Heatslave Senior 6 combination

**Floor standing**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>N</th>
<th>N</th>
<th>E</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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</thead>
<tbody>
<tr>
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<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

**Mains 240V**

Suitable for use on sealed systems

Heat exchanger material, copper

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 4 after removing link. A frost thermostat should be of the double pole type and wired common to terminal 3 and 2-pole connections to 1 and 2.

### Worcester High Flow 3.5 BF, OF, 4.5 BF, OF, 5.3 BF, OF combination

**Floor standing**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
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</tr>
</tbody>
</table>

**Mains 240V**

SS versions only, suitable for use on sealed systems

Heat exchanger material, copper

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals 2 and 3 after removing link. A frost thermostat should be of the double pole type and connected common to terminal L and 2-pole connections to 1 and 3.

### Worcester Highflow 400, OF, BF, RSF combination

**Wall mounted**

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>X13</th>
<th>X12</th>
<th>X12</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>X13</td>
<td>X12</td>
<td>X12</td>
</tr>
<tr>
<td>Frost Stat</td>
<td>Room Stat</td>
<td>N</td>
<td>CH</td>
<td>HW</td>
<td>L</td>
<td>N</td>
<td>External Programmer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Fully pumped system only

Suitable for sealed systems only

Heat exchanger material, copper

SEDBUK rating D/E

The above connections apply to a fully pumped system such as a Y plan. However, if only a room thermostat and/or time clock is to be used, then a permanent live should be wired to L and N, and the control wiring connected across TH–TH after removing link.

### Yorkpark Microstar 20 condensing

**Wall mounted**

<table>
<thead>
<tr>
<th>TH</th>
<th>TH</th>
<th>N</th>
<th>N</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Switch Live

Fully pumped systems only

Suitable for sealed systems

Heat exchanger material, aluminium
Yorkpark Microstar 20 condensing, combination

The above connections apply to a fully pumped system such as a Y plan. However, if only a room thermostat and/or time clock is to be used, then a permanent live should be wired to L and N and the control wiring connected across TH–TH after removing link.

Yorkpark Microstar MC24G condensing

Terminals 1, 2, 6, 7, 8, 9, 13, 14, 15, 16 are low voltage. A 240V mains should be connected into the separate terminal block.

Yorkpark Microstar MZ22C condensing

The above connections apply to a fully pumped system such as a Y plan. However, if only a room thermostat and/or time clock is to be used, then a permanent live should be wired to L and N, and the control wiring connected across TH–TH after removing link.

Yorkpark Microstar MZ22S condensing, combination

External controls such as a time clock with voltage free terminals, or room thermostat, should be connected between terminals TH–TH after removing link.
Boiler wiring – oil

Aquaflame Evolution

Floor standing

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating C

Aquaflame Eco-Avance 11 condensing

Floor standing

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, stainless steel
SEDBUK rating A

B. H. Associates Merlin 45/65, 65/95, 100/150, 150/185

Floor standing

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating C

B. H. Associates Merlin 2000 40/60, 60/80, 80/100

Floor standing

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, stainless steel
SEDBUK rating C

Boulter Bonus

Floor standing

Suitable for sealed systems
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating C

Boulter Camray 2.3

Floor mounted

Suitable for use on sealed systems using optional kit
Heat exchanger material, mild steel

Camray 2 de-luxe has integral programmer
Boulter Camray 5 50/70 External

Connection via 3-way terminal block

Boulter Camray 5 50/70 Internal

Connection via 3-way terminal block

Boulter Camray 5 Combi

Connection is to L, N and E on terminal block

Boulter Camray 5 Combi External

Room and frost thermostats and external programmer should be connected into the boiler as shown. When fitting an external programmer the Summer/Winter switch will be inoperative as all wires should be cut from switch and connected as shown. Terminal 3 of JP12 is neutral for external programmer and/or room/frost thermostats. Mains connection is via a 3-pin plug.

PCB JP9

CH Live HW
On Out On

PCB JP12

Frost Stat N Room Stat

Wall mounted

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
Integral frost protection
SEDBUK rating C

Wall mounted

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

Floor standing

Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

Floor standing

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

Floor standing

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C
Domestic Central Heating Wiring Systems and Controls

**Boulter Camray 5 Kitchen & Utility Models**

Connection via 3-pin plug.

**Boulter Camray 15/21**

<table>
<thead>
<tr>
<th>3</th>
<th>2</th>
<th>1</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perm</td>
<td>N</td>
<td>Switch</td>
<td>Live</td>
</tr>
</tbody>
</table>

Can be mounted externally with GRP case.

**Boulter Camray Combi combination**

Mains via 3-pin plug. External controls, such as a time clock with voltage free contacts or room thermostat should be connected across terminals 3–5.

**Boulter Camray Compact**

Connect to external controls via 3-pin plug supplied.

**Boulter Camray L60**

<table>
<thead>
<tr>
<th>Perm</th>
<th>Switch</th>
<th>Live</th>
<th>Live</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Live</td>
<td>L</td>
<td>N</td>
<td>E</td>
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</tr>
</tbody>
</table>

**Boulter Camray Pathfinder C, PJ**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
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</thead>
<tbody>
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</tbody>
</table>

Camray 2 de-luxe has integral programmer.

**Floor standing**

Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

**Wall mounted**

Suitable for use on sealed systems
Heat exchanger material, mild steel
Integral frost protection

**Floor mounted**

Suitable for use on sealed systems using optional kit
Heat exchanger material, mild steel

**Wall mounted**

Fully pumped systems only
Suitable for use on sealed systems
Heat exchanger material, mild steel

Not suitable for use on sealed systems
Heat exchanger material, mild steel

**Floor mounted**

Fully pumped system only
Suitable for use on sealed systems
Heat exchanger material, cast iron
**Boulter Classic**

Connection via 3-way terminal block.

**Boulter Eco-System**

Connection via 3-way terminal block.

**Eco hometec EC condensing**

The integral pump is not the system pump. Unit supplied with Landis & Staefa Comfort Controller. A mains supply should be connected to the left-hand side of the integral wiring center. A voltage free control circuit, e.g. motorized valve and switches should be connected across terminals 13–14 after removing link.

**Eurocal Ambassador**

Switch live should be connected to C of the high-limit stat and the neutral to the terminal connector.

**Eurocal Consul**

Switch live should be connected to C of the high-limit stat and the neutral to the terminal connector.

**Eurocal Countryman**

Switch live should be connected to C of the high-limit stat and the neutral to the terminal connector.

**Floor standing**

Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, stainless steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems only
Heat exchanger material, mild steel
SEDBUK rating C
Domestic Central Heating Wiring Systems and Controls

**Eurocal Countryman Combi**

A room thermostat should be connected to terminals 3–4 on the 8-way connector strip after removing the link. A frost thermostat should be connected to terminals 5–3 on the 8-way connector strip. A thermostat neutral should be connected to terminal 6 on the 8-way connector strip.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
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<th>4</th>
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<th>6</th>
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<tbody>
<tr>
<td>E</td>
<td>N</td>
<td>L</td>
<td>Live</td>
<td>Live</td>
<td>Out</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In</td>
<td>To Timer or Programmable</td>
<td>Room Stat</td>
</tr>
</tbody>
</table>

**Eurocal President**

Connection is via a 3-pin plug.

**Eurocal Senator Combi**

A room thermostat and/or timer should be connected to terminals 3–4 on the 8-way connector strip after removing the link. A frost thermostat should be connected to terminals 5–3 on the 8-way connector strip. A thermostat neutral should be connected to terminal 6 on the 8-way connector strip.

**Floor standing**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, mild steel
- SEDBUK rating C

**Firebird Combi 90 combination**

A room thermostat can be connected to terminal strip after removing link

**Floor standing**

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, mild steel
- SEDBUK rating C

Floor standing

- Fully pumped system only
- Suitable for sealed systems only
- Heat exchanger material, mild steel
- SEDBUK rating C
Firebird Olylympic ‘BH’ Boilerhouse Model

Connect switched live to limit stat ‘C’.
Connect Neutral to terminal block.

Firebird Olylympic De Luxe

5-Way Plug
1 2 3 4 5
○ ○ ○ ○ ○
Room Stat
Remove
Link
L N E
Pump

Connect mains to terminal strip

Firebird Olylympic ‘S’ Standard

Connect switched live to limit stat ‘C’.
Connect Neutral to terminal block.

Firebird Olylympic system

Floor standing
Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, mild steel
Integral frost protection
SEDBUK rating C

Gemini Triple Pass

L1  N2  E3  E4  N5  L6
○ ○ ○ ○ ○ ○
Switch
Live
N   E   E   N   L
Burner supply

Floor mounted
Suitable for use on sealed systems
Heat exchanger material, steel
Domestic Central Heating Wiring Systems and Controls

Grant Combi 70 and 90 combination

External controls such as time clock with voltage free contacts or room thermostat should be connected into time clock socket after removing red link.

**BOILER TERMINAL BLOCK**

L1 N2 3 4E 12

L N E
Mains

**PLUG-IN TIMER SOCKET**

Link

L N E

Suitable for use on sealed systems
Heat exchanger material, steel

Grant Combi MKII

Connect mains supply to L1, N2, E3. A room thermostat should be connected between terminals 7 and 12 after removing link. If fitting a timer remove link 13–14.

**Grant Combi 90 Outdoor**

Suitable for use on sealed systems
Heat exchanger material, stainless steel
SEDBUK rating C

Floor standing

Fully pumped systems only
Suitable for sealed systems only
Heat exchanger material, stainless steel
Integral frost protection
SEDBUK rating C

Floor standing

If a time – switch is used 2–3.
A room thermostat should be wired in series between the timer and boiler terminal SL1.

Grant Euroflame Boiler House

Connect switched live to C on the overheat thermostat.
Connect the neutral to burner neutral.

Floor standing

Suitable for sealed systems
Heat exchanger material, stainless steel
SEDBUK rating C

Grant Euroflame Kitchen/Utility

Floor standing

Suitable for sealed systems
Heat exchanger material, stainless steel
SEDBUK rating C
### Grant Euroflame Sealed system

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>E</th>
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<td>7</td>
<td>8</td>
<td>9</td>
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</tbody>
</table>

SW: Switched Live  
L: Live  
N: Neutral  
E: Earth

#### Floor standing
- Fully pumped systems only  
- Suitable for sealed systems  
- Heat exchanger material, stainless steel  
- SEDBUK rating C

### Grant Euroflame Utility

<table>
<thead>
<tr>
<th>L1</th>
<th>N2</th>
<th>N3</th>
<th>E4</th>
<th>N5</th>
<th>L6</th>
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</tr>
<tr>
<td>Switch:</td>
<td>N</td>
<td>E</td>
<td>E</td>
<td>N</td>
<td>L</td>
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</tbody>
</table>

#### Floor mounted
- Suitable for use on sealed systems  
- Heat exchanger material, steel

### Grant Multi Pass

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<tr>
<td>L</td>
<td>N</td>
<td>E</td>
<td>HW</td>
<td>NW</td>
<td>HTG</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mains:  
L: Live  
N: Neutral  
E: Earth

#### Floor mounted
- Suitable for use on sealed systems  
- Heat exchanger material, steel

### Grant Multi Pass Boiler House

Connect switched live to C on the overheat thermostat.  
Connect the neutral to burner neutral.

### Grant Multi Pass Kitchen 50/70, 70/90, 90/140

If fitting an integral programmer connect as follows:  
Live–1, Neutral–2, Earth–3, switched live–9 and remove link 1–9 (L–BLR).  
If fitting an external programme connect as follows:  
Switched Live–1, Neutral–2, Earth–3.

### Grant Multi Pass system

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<th>12</th>
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</tr>
<tr>
<td>L</td>
<td>N</td>
<td>E</td>
<td>Pump</td>
<td>HW</td>
<td>HW</td>
<td>CH</td>
<td>BLR</td>
<td>E</td>
<td>N</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

Mains:  
L: Live  
N: Neutral  
E: Earth

External controls with no internal programmer – connect switched live to 1 or 9.  
Internal programmer with no external controls – remove link 1–9.  
Internal programmer with external controls – remove link 1–9, 6–8–9, connect switched live to 9.
Grant Outdoor

Remove link 10–12 and connect room stat ‘satisfied’ on fully pumped systems.
The internal frost protection will not function unless a permanent live is connected to terminal L2.

Grant Vortex Kitchen condensing

If fitting an integral programmer, remove link 1–8 (L–boiler feed), Connect as follows:
Live–1, Neutral–2, Earth–3, Switched Live–8
If fitting an external programmer connect as follows:
Switched Live–1, Neutral–2, Earth–3

Grant Vortex Kitchen system condensing

Connect Mains to 1L, 2N, 3E
Connect Pump to 4L, 5N, 6E

Grant Vortex Utility condensing

Grant Vortex Utility system condensing

Heating World Grandee Combi

If fitting a room stat, connect between CH-On and CH after removing existing connection.
Boiler wiring – oil

**Heating World Grandee External**

- Fully pumped systems only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- Integral frost protection
- SEDBUK rating C

**Heating World Grandee Combi**

- Wall mounted

As Grandee Combi Floor.

**Heating World Grandee Combi Compact**

- Wall mounted

As Grandee Combi Floor.

**Heating World Sorrento**

- Back boiler unit

Connection is via a 3-pin plug.

**HRM Starflow**

- Floor standing

<table>
<thead>
<tr>
<th>N</th>
<th>E</th>
<th>L</th>
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<tbody>
<tr>
<td>○</td>
<td>○</td>
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</tr>
</tbody>
</table>

Suitable for sealed systems
Heat exchanger material, stainless steel
SEDBUK rating C

**HRM Wallstar**

- Wall mounted

<table>
<thead>
<tr>
<th>Switch</th>
<th>N</th>
<th>P-L</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Integral frost thermostat
Suitable for use on sealed systems
Heat exchanger material, mild steel

**HRM Wallstar combination**

- Wall mounted

Integral timer and mains lead fitted.
A room thermostat should be wired between 5A–6A after removing link.

**HRM Starflow**

- Floor mounted

<table>
<thead>
<tr>
<th>SW-L</th>
<th>N</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Suitable for use on sealed systems
Heat exchanger material, mild steel
Domestic Central Heating Wiring Systems and Controls

Perrymatic Jetstreme MK3

CONTROL BOX TERMINAL BLOCK
1 2 3 4 5 6 7 8 9
○ ○ ○ ○ ○ ○ ○ ○ ○
N Switch
Live*

*via separate terminal block under burner cover

Floor mounted
Suitable for use on sealed systems
Heat exchanger material, steel

Potterton Statesman

Connection via 3-pin plug.

Floor standing
Fully pumped system only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating C

Potterton Statesman system

Mains connection via 3-pin plug. A room thermostat can be connected across L-S/L of the 6-way boiler terminal plug after removing link.

Floor standing
Fully pumped system only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating D

Potterton Statesman Flowsure combination

Mains connection via 3-pin plug. A room thermostat can be connected across the two middle terminals of the 6-way timer plug after removing link.

Floor standing
Fully pumped system only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating D

Potterton Statesman Flowsure & Storage combination

Mains connection via 3-pin plug. A room thermostat can be connected across the two middle terminals of the 6-way timer plug after removing link.

Floor standing
Fully pumped system only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating D

Thermecon Option

Connection via 3-way plug.

Floor standing
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating C
Thermeccon Option system

Connection via 3-way plug.

Floor standing

Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating C

Thermeccon Select External

Connection via 4-way plug.

Floor standing or Wall mounted

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, steel
Integral frost protection
SEDBUK rating C

Thermeccon Select Floor

Connection via 3-way plug.

Floor standing

Fully pumped systems only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating C

Thermeccon Select Wall

Connection via 3-way plug.

Wall mounted

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, steel
SEDBUK rating C

Thorn Panda

Floor mounted

Not suitable for use on sealed systems
Heat exchanger material, steel

*TIf integral programmer fitted.
If used on fully pumped system remove links L–1–3, L–2. Link 3–pump live.

Trianco Centrajet 13/17

Wall mounted

Not suitable for use on sealed systems
Heat exchanger material, mild steel
Domestic Central Heating Wiring Systems and Controls

**Trianco Centramatic 13/17**

Without integral programmer

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<tr>
<th>1</th>
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</thead>
<tbody>
<tr>
<td>Switch</td>
<td>Perm</td>
<td>N</td>
<td></td>
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</tbody>
</table>

Live

Remove Link 1–2

Floor mounted

Not suitable for use on sealed systems

Heat exchanger material, mild steel

**Trianco Centramatic 40, 55, 80**

2 way connector on 40 and 55

<table>
<thead>
<tr>
<th>1</th>
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<tbody>
<tr>
<td>Switch</td>
<td>N</td>
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</tbody>
</table>

Live

Remove Link 1–2

A 240V connection should be made to L and N on the Red Fyre control box.

**Trianco TRO MK1**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>Switch</td>
<td>N</td>
<td></td>
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</tr>
</tbody>
</table>

Live

Floor mounted

Not suitable for use on sealed systems

Heat exchanger material, mild steel

**Trianco TRO MK2 and 3**

<table>
<thead>
<tr>
<th>1</th>
<th>12</th>
<th>L</th>
<th>N</th>
<th>E</th>
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<tbody>
<tr>
<td>Switch</td>
<td>L</td>
<td>N</td>
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</table>

Mains 24V

Remove Link 2–12

Floor mounted

Not suitable for use on sealed systems

Heat exchanger material, mild steel

**Trianco TRO 80 combination**

<table>
<thead>
<tr>
<th>E</th>
<th>N</th>
<th>L</th>
<th>Switch</th>
</tr>
</thead>
</table>

Live

Mains

Wall mounted

Suitable for use on sealed systems

Heat exchanger material, mild steel

**Trianco TRO 110 combination**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
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</thead>
</table>

Remove Link

Mains 240V

Switch Live (CH)

Floor mounted

Suitable for use on sealed systems

Heat exchanger material, mild steel
Triano TRO BF range

Floor mounted

- Not suitable for use on sealed systems
- Heat exchanger material, mild steel

Triano TSB system boiler

Wall mounted

- Suitable for sealed systems
- Heat exchanger material, mild steel

Triano Eurostar 2000

Floor standing

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- SEDBUK rating C

Triano Eurostar Combi combination

Floor mounted

- Suitable for use on sealed systems
- Heat exchanger material, mild steel

External controls such as time clock with voltage free contacts or room thermostat should be connected between 3 and 6 after removing link.

Triano Eurostar Combi

Floor standing

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- SEDBUK rating C

When fitting a room thermostat connect across T & H after removing link.
Domestic Central Heating Wiring Systems and Controls

**Trianco Eurostar Eco Combi**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
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<th>3</th>
<th>4</th>
<th>N</th>
<th>E</th>
<th>N</th>
<th>L</th>
<th>W</th>
<th>T</th>
<th>H</th>
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<tr>
<td></td>
<td></td>
<td>Mains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Room</td>
<td>Stat</td>
<td></td>
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</table>

Remove link T–H when wiring room stat.

**Trianco Eurostar FS 50/90, 95/115 external**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>SL</th>
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<tbody>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Switch</td>
<td>Live</td>
</tr>
</tbody>
</table>

Remove link L–SL if fitting external controls. A permanent live is required for frost protection.

**Trianco Eurostar Standard**

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
<th>3</th>
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<td></td>
<td>Switch</td>
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**Trianco Eurostar system**

<table>
<thead>
<tr>
<th>N</th>
<th>L</th>
<th>1</th>
<th>2</th>
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<td></td>
<td>Switch</td>
<td>Live</td>
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</table>

**Trianco Eurostar Utility**

<table>
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<td></td>
<td>Switch</td>
<td>Live</td>
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<td>E</td>
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</tbody>
</table>

**Floor standing**

- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- SEDBUK rating C

**Floor mounted**

- Suitable for use on sealed systems
- Heat exchanger material, mild steel

- Suitable for use on sealed systems
- Heat exchanger material, mild steel

- Suitable for use on sealed systems
- Heat exchanger material, mild steel
Boiler wiring – oil

**Trianco Eurostar WM 50/65 external**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>E</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>SL</th>
<th>3</th>
<th>4</th>
<th>E</th>
<th>E</th>
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</tbody>
</table>

To RCD Mains SW Live From RCD Sleeved White Sleeved Black

**Trianco Eurostar WM 50/7**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
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</thead>
</table>

The switched live or the live if no external controls are fitted should be connected to L.

**Trianco Eurostar WM system boiler**

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>○</th>
<th>○</th>
<th>○</th>
<th>○</th>
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</thead>
</table>

Switch N E Internal Connection

**Trianco Eurotrader**

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<thead>
<tr>
<th>L</th>
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<th>E</th>
<th>○</th>
<th>○</th>
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</table>

Switch N E Live Connection

**Trianco Utility**

<table>
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<tr>
<th>N</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>SL</th>
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<tbody>
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</table>

Switch N E Live

**Trianco Utility Sealed system**

<table>
<thead>
<tr>
<th>N</th>
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<th>1</th>
<th>2</th>
<th>E</th>
<th>3</th>
<th>4</th>
<th>L</th>
<th>N</th>
<th>E</th>
<th>SL</th>
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<tbody>
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<td>○</td>
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<td></td>
</tr>
</tbody>
</table>

Mains

**Warmflow Bluebird**

Main connection via 3-way plug. Switched live to terminal 6. Terminals 7–8 remain linked.

**Wall Mounted**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
Integral frost thermostat fitted
SEDBUK rating C

**Wall mounted**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Suitable for sealed systems (with kit)
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Fully pumped system only
Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C

**Floor standing**

Suitable for sealed systems
Heat exchanger material, mild steel
SEDBUK rating C
Domestic Central Heating Wiring Systems and Controls

**Warmflow Kabin Pak External**

As Warmflow Bluebird

**Warmflow Whitebird**

As Warmflow Bluebird

**Worcester Danesmoor 12/14, 15/19, 20/25, 26/32, 35/50, 50/70**

Floor standing

Connect a mains supply to terminals L, N, E.

If fitting an external programmer and/or external controls refer to installation manual.

**Worcester Danesmoor DF**

Floor mounted

Suitable for sealed systems

Heat exchanger material, mild steel

SEDBUK rating C

```
1  L  N  E  N  L1  L2  L3  L4
  ○  ○  ○  ○  ○  ○  ○  ○
  N  E  SW  Live*
```

Remove links L–L2 and L3–L4

**Worcester Danesmoor PJ MK1 combination**

Floor mounted

Suitable for use on sealed systems using optional kit

Heat exchanger material, mild steel

```
L  N  E  1  2  3
  ○  ○  ○  ○  ○  ○
Mains 240V  Switch Live
```

Remove link L–3

**Worcester Danesmoor PJ MK2**

Floor mounted

Suitable for use on sealed systems using optional kit

Heat exchanger material, mild steel

```
L  N  E  N  1  2  3  4  5  6
  ○  ○  ○  ○  ○  ○  ○  ○  ○  ○
240V Mains  Switch Live
```

Remove link plug from programmer terminal strip
**Worcester Danesmoor SLPJ**

With external controls

<table>
<thead>
<tr>
<th>L</th>
<th>N</th>
<th>E</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
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<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Mains lead supplied  Switch  Live

Remove link plug from programmer terminal strip

**Worcester Danesmoor system**

Connect a mains supply to terminals L, N, E.
If fitting an external programmer and/or external controls refer to installation manual.

**Worcester Danesmoor Utility**

<table>
<thead>
<tr>
<th>○</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>2</td>
</tr>
<tr>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Switch Live</td>
<td>○</td>
</tr>
<tr>
<td>E</td>
<td>○</td>
</tr>
<tr>
<td>○</td>
<td>3</td>
</tr>
</tbody>
</table>

**Worcester Danesmoor WM12/19**

Connect a mains supply to terminals L, N, E.
If fitting an external programmer and/or controls refer to installation manual.

**Worcester Greenstar HE 12/22 condensing**

<table>
<thead>
<tr>
<th>L</th>
<th>E</th>
<th>N</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Mains  Switch  Room Stat or Timer

External controls such as a time clock with voltage-free contacts or room thermostat should be connected across terminals 1–2 after removing link.

**Worcester Heatslave 012–14 combination 015–19 020–25**

Mains lead supplied. External controls, such as a time clock with voltage free contacts or room thermostat should be connected across terminals 2–4 after removing link. Room thermostat neutral can be connected to terminal N2.
Domestic Central Heating Wiring Systems and Controls

Worcester Heatslave 2+ combination G40, G50

- Floor mounted
- Not suitable for use on sealed systems
- Heat exchanger material, mild steel
Mains lead supplied. External controls, such as a time clock with voltage free contacts or room thermostat should be connected across terminals 2–4 after removing link. Room thermostat neutral can be connected to terminal N2.

Worcester Heatslave 12/14, 15/19, 20/25

- Floor standing
- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- SEDBUK rating 12/14-D, others C
Terminal block X2

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
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<tr>
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<td>☐</td>
<td>☐</td>
<td>☐</td>
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<td>☐</td>
</tr>
</tbody>
</table>

Connect room thermostat between terminals 2 and 3 after removing link. Room thermostat neutral should be connected to terminal 6.

Worcester Heatslave 26/32 Combination

- Floor standing
- Fully pumped system only
- Suitable for sealed systems
- Heat exchanger material, mild steel
- SEDBUK rating C
Terminal block X2

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
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<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Connect room thermostat between terminals 2 and 3 after removing link. Room thermostat neutral should be connected to terminal 6.

Yorkpark Oilstar combination

- Wall mounted
- Fully pumped systems only
- Suitable for sealed systems only
- Heat exchanger material, stainless steel

Yorkpark Yorkstar condensing

- Floor standing
- Fully pumped systems only
- Suitable for sealed systems with optional kit
- Heat exchanger material, NK
- Integral frost protection
- SEDBUK rating A

212
Control wiring connections for when connected directly into burner control box

<table>
<thead>
<tr>
<th>Control box</th>
<th>Perm live</th>
<th>Control live</th>
<th>N</th>
<th>E</th>
<th>Link information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Danesmoore TSV</td>
<td>L</td>
<td>HW ON-4</td>
<td>N</td>
<td>E</td>
<td>Remove Links A–1 and A–2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CH ON-6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danfoss BHO 1</td>
<td></td>
<td></td>
<td>6*</td>
<td>N</td>
<td>E</td>
</tr>
<tr>
<td>Danfoss BHO 15</td>
<td></td>
<td></td>
<td>9+</td>
<td>7</td>
<td>E</td>
</tr>
<tr>
<td>Danfoss 57 F</td>
<td></td>
<td></td>
<td>1</td>
<td>3</td>
<td>E</td>
</tr>
<tr>
<td>Danfoss 57 H</td>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td>E</td>
</tr>
<tr>
<td>Danfoss 57L</td>
<td></td>
<td></td>
<td>5</td>
<td>3</td>
<td>E</td>
</tr>
<tr>
<td>DS 220</td>
<td></td>
<td></td>
<td>2</td>
<td>N</td>
<td>E</td>
</tr>
<tr>
<td>Elestra</td>
<td></td>
<td></td>
<td>2</td>
<td>1</td>
<td>E</td>
</tr>
<tr>
<td>Honeywell Protectorelay</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>E</td>
</tr>
<tr>
<td>Landis &amp; Gyr LAB 1</td>
<td>1+</td>
<td></td>
<td>2</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Landis &amp; Gyr LOA 21</td>
<td>1+</td>
<td></td>
<td>2</td>
<td>E</td>
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</tr>
<tr>
<td>Nu-way ZLO</td>
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<td></td>
<td>6</td>
<td>1</td>
<td>E</td>
</tr>
<tr>
<td>Nu-way ZL2D</td>
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<td></td>
<td>1</td>
<td>4</td>
<td>E</td>
</tr>
<tr>
<td>Petercem MA28</td>
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<td></td>
<td>10</td>
<td>4</td>
<td>E</td>
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<tr>
<td>Satchwell DG</td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
<td>E</td>
</tr>
<tr>
<td>Satronic TF 701 B</td>
<td></td>
<td></td>
<td>9+</td>
<td>8</td>
<td>E</td>
</tr>
<tr>
<td>Satronic TF 830 N</td>
<td></td>
<td></td>
<td>9+</td>
<td>8</td>
<td>E</td>
</tr>
<tr>
<td>Selectos D42</td>
<td></td>
<td></td>
<td>6</td>
<td>1</td>
<td>E</td>
</tr>
<tr>
<td>Selectos JSS 1</td>
<td>6+</td>
<td></td>
<td>1</td>
<td>E</td>
<td></td>
</tr>
<tr>
<td>Selectos JSS 2#</td>
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<td></td>
<td>8</td>
<td>2</td>
<td>E</td>
</tr>
<tr>
<td>Stewart TSV</td>
<td>as Danesmoor TSV</td>
<td></td>
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<td></td>
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<tr>
<td>Teddington DAS</td>
<td>L</td>
<td></td>
<td>11</td>
<td>N</td>
<td>E Remove Link L–11</td>
</tr>
<tr>
<td>Thermoflex MC50</td>
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<td></td>
<td>4</td>
<td>2</td>
<td>E</td>
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<td>Trianco TSV</td>
<td>as Danesmoor TSV</td>
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<td></td>
</tr>
</tbody>
</table>

* via limit thermostat
+ via control and limit thermostats
# connections into motor burner starter

**Note:** the earth connection may be a nut and bolt stud or screw into casing
Ancillary controls

Contents

Danfoss BEM 4000 Boiler Energy Manager
Danfoss BEM 5000 Boiler Energy Manager

Dataterm Optimiser

Honeywell AQ6000 Compensator System
Honeywell Y604A Sundial Plans
Honeywell Y605B Sundial Plans

Randall EBM 2.1 Boiler Efficiency Control

Sunvic Clockbox and Clockbox 2
Danfoss BEM 4000
Boiler Energy Manager

The Boiler Energy Manager (BEM) is an electronic controller which can be added to almost any central heating system to eliminate unnecessary boiler cycling and improve boiler seasonal efficiency.

The BEM 4000 consists of an electronic controller, an outdoor temperature sensor and a strap-on flow temperature sensor. It can be used in conjunction with a room thermostat (utilized as a frost stat) and TRVs. Boiler performance is improved when the flow temperature is varied according to the outside temperature. The outside temperature sensor should be mounted on the coldest elevation of the building away from opening windows and the boiler flue. The flow sensor should be fitted within 6 inches of the boiler outlet on the flow pipe, or on low-water content boilers it can additionally be fitted between the boiler and the bypass. A cylinder thermostat should be fitted as normal. All diagrams show Danfoss programmer and thermostats, but others can be used. In all cases, if a room thermostat is to be utilized as a frost or low-limit thermostat, connect to terminals 3 and 11.

In Figures 11.2 and 11.3 two boilers are shown – one with pump overrun and one without. Select diagram as appropriate, remembering to insert Link 2–4 when using boiler without pump overrun.

Figure 11.1  Gravity hot water, pumped central heating

Figure 11.2  Fully pumped system with two motorized zone valves
Commissioning the BEM 4000

Hot water service

Set the programmer to hot water constant, central heating off, and cylinder thermostat to maximum. Set boiler to the design flow temperature of 82°C.

Lamps 1 and 2 will illuminate and boiler and pump will start, except in gravity hot water systems, in which the pump will not start. The hot water valve will open.

Central heating service

Set programmer to hot water off, central heating constant and boiler as above. Where a heating motorized valve is fitted, it will open. Illumination of lamp 3 signifies that the boiler has stopped and after a time lamp 1 will go off, indicating pump stopped.

After testing, set the programmer and cylinder thermostat to the required settings.

Fault finding

When the ‘on’ lamp on the front of the BEM 4000 does not illuminate, check the power supply. There should be 240V across terminals 12 and 13. If this is OK, check the built-in fuse on the rear of the BEM 4000, and if blown, there is a spare attached to the rear of the unit. If this fuse is OK the fault is probably within the electronics, and the BEM 4000 plug-in front plate should be replaced.

Where a zone valve will not open, check that 240V exists at the valve leads. If OK change valve, if not check programmer and other wiring.

In the event of difficulties, the BEM 4000 can be overridden by inserting a link between terminals 14 and 15, ensuring that the power is turned off first.

Danfoss Randall BEM 5000

Boiler Energy Manager

The BEM 5000 is an electronic control, which, when added to almost any central heating system, reduces unnecessary boiler cycling and improves boiler seasonal efficiency. It is compatible with most popular control systems including radiator thermostats, programmers, motorized valves and even room thermostats, although in systems having radiator thermostats it is recommended that the room thermostat be turned up to maximum or rewired as frost thermostats. Radiator thermostats are recommended, but are not mandatory. If they are fitted, then a by-pass valve should be fitted. If it is impractical to fit a by-pass valve, then one radiator should be left uncontrolled.

The BEM 5000 measures outdoor temperature and varies the temperature of water flowing to the radiators accordingly. This significantly improves boiler performance. A water temperature sensor is
used to monitor temperature of water returning to the boiler. Any change in load on the system is measured and the boiler is controlled accordingly. To minimize energy loss from the boiler case and flue, the pump runs on after the boiler has stopped, circulating all useful heat to the system. When no more heat can be extracted, the pump is stopped. The BEM 5000 integrates the operation of heating and hot water. During periods of hot water demand, water temperature flowing to both water and heating circuits is boosted to boiler thermostat settings to ensure rapid recovery. Figures 11.4 and 11.5 show the BEM 5000 wired into a fully pumped system, one with two 2-port motorized valves and one with a 3-port, mid-position valve. It can also be utilized on a combination boiler.

**Dataterm optimiser**

Dataterm is a microprocessor-based energy management system and can be used as part of a new system or to replace traditional room thermostats and programmer. The fully automatic optimum start function takes into consideration the current weather and calculates the boiler start time eliminating fuel waste through fixed boiler start times. Dataterm is suitable for any conventional oil or gas wet central heating system complete with hot water control, as well as other applications.

The control pack consists of two units, a low-voltage programmable room thermostat and a controlling power pack located in a convenient position, e.g. adjacent to the boiler or motorized valves.
Domestic Central Heating Wiring Systems and Controls

Honeywell AQ 6000

The AQ 6000 is an outside temperature compensator system for use in domestic properties and can be used on new installations or to upgrade existing systems, making use of existing valves that may be installed. The AQ 6000 is available in three packs – an Upgrade pack, a Standard pack or a Modulating pack. The Modulating pack is for use on boilers of 90000–150000BTU and provides control of the heating circuit by modulating a mixing valve. There are five systems – A, B, C, D and E. Systems D and E use the modulating mixing valve and are not shown.

The AQ 6000 consists of a control unit, a room unit and outside, water supply and domestic hot water sensors. All wiring is terminated in the control unit along with boiler, pump and any valve wiring.

A built-in start-up operating sequence allows the system wiring to be tested. Before turning on power to the system, remove the room unit from its mounting bracket. Turn on the power and the control unit will power the valve, pump and boiler.

When the system is operational actual temperatures can be displayed on the room unit. When the green enquiry button is pressed, ‘T1’ will be displayed at the left side of the display and the temperature in °C on the right. Repeated use of this button will display other system temperatures. The codes are listed in Table 11.1. To restore the display to its normal operation press the enquiry button repeatedly until the ‘T’ is no longer displayed and in its place is the current weekday number.
When the room unit is connected and the supply switched on, an indication of any faults within the system can be displayed by pressing any four buttons on the unit. A fault code is displayed as an ‘F’ followed by a number. The different numbers correspond to the faults listed in Table 11.2. No ‘F’ on the display means that no fault has been observed by the controller. To clear the fault code, press any button.

Table 11.1

<table>
<thead>
<tr>
<th>Code</th>
<th>Temperature measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>Room temperature</td>
</tr>
<tr>
<td>T2</td>
<td>Boiler/mixed water temperature</td>
</tr>
<tr>
<td>T3</td>
<td>Outside temperature</td>
</tr>
<tr>
<td>T4</td>
<td>System C – not used (will display 0°C)</td>
</tr>
<tr>
<td></td>
<td>Systems A and B – domestic hot water temperature</td>
</tr>
</tbody>
</table>

Table 11.2

<table>
<thead>
<tr>
<th>Code</th>
<th>Indicates</th>
<th>Possible causes</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Hot water has not reached 30°C within 40 minutes of start-up</td>
<td>Boiler not firing</td>
<td>Check wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pump not running</td>
<td>Check appliance function</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valve being driven closed</td>
<td>Check wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Valve in closed position</td>
<td>Reverse leads 1 and 2 on the actuator or on the boiler unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Check wiring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Check actuator</td>
</tr>
<tr>
<td>F2</td>
<td>Boiler/mixed water temperature sensor fault</td>
<td>Faulty sensor wiring</td>
<td>Check wiring for open or short circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change sensor</td>
</tr>
<tr>
<td>F3</td>
<td>Outside temperature sensor fault</td>
<td>Faulty sensor wiring</td>
<td>Check wiring for open or short circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change sensor</td>
</tr>
<tr>
<td>F4</td>
<td>Failure of the communications link between the room and the boiler room</td>
<td>Room unit not securely seated in the mounting bracket</td>
<td>Check seating of room unit in its bracket</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Faulty wiring</td>
<td>Check for open or short circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wire connected the wrong way round</td>
<td>Reverse wiring connection at the boiler unit or room unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No power at boiler unit</td>
<td>Check boiler supply and 50mA fuse on boiler unit board</td>
</tr>
<tr>
<td>F5</td>
<td>Limit or domestic hot water temperature sensor fault</td>
<td>Faulty wiring</td>
<td>Check wiring for open or short circuits</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On systems C and D, check that the resistor is still in place between terminals 3 and 4 of the boiler unit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>On other systems, check that the resistor has been removed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Change sensor</td>
</tr>
</tbody>
</table>
**System A: Boiler control with domestic hot water control using two motorized zone valves**

The following adjustments must be made before power is applied to the system:

1. System selection switches.
2. Burner cycles per hour (3 to 9), typical setting: 6.
3. Domestic hot water (35 up to 100°C), typical setting: 55°C.

**Note:** The switch A–B should be in position A for the domestic hot water to be off when the system is controlling at the Economy level. The switch should be in position B for the domestic hot water to be continuously serviced.

**System B: Boiler control with domestic hot water control using a 3-port motorized valve**

The following adjustments must be made before power is applied to the system:

1. System selection switches.
2. Burner cycles per hour (3 to 9), typical setting: 6.3.
3. Domestic hot water (35 to 100°C), typical setting: 55°C.

**Note:** The switch A–B should be in position A for the domestic hot water to be off when the system is controlling at the Economy level. The switch should be in position B for the domestic hot water to be continuously serviced. Wiring shows a priority valve. Where a mid-position valve is used the White (or Brown) and Grey go to terminal C.
**System C: Boiler control without domestic hot water control**

The following adjustments must be made **before** power is applied to the system:

1. System selection switches.
2. Burner cycles per hour (3 to 9), typical setting: 6.

**Note:** Only recommended for systems up to 70000BTU. Domestic hot water sensor, T4, is not used.

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**Honeywell Y604A Panel and Timed Sundial Plans**

The Y604A Panel and Panel Timed Sundial Plans are fully assembled, pre-plumbed and pre-wired control sets and comprise of either a Honeywell S or Y Plan, or Timed S or Y Plan, plus pump and isolating valves in a multipoise carrier bracket.

**Table 11.3  External wiring connections – panel plans**

<table>
<thead>
<tr>
<th>Room thermostat</th>
<th>Common</th>
<th>4</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demand</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Basic boiler</td>
<td>Live</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Earth</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td>Boiler with pump overrun</td>
<td>Remove link 7–9 in junction box</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Live</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Earth</td>
<td>E</td>
<td>E</td>
</tr>
<tr>
<td></td>
<td>Boiler on</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Pump live</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Programmer</td>
<td>Live</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Neutral</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td>Heating on</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Hot water on</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Hot water off</td>
<td>–</td>
<td>7</td>
</tr>
<tr>
<td>Frost thermostat</td>
<td>Common</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Demand</td>
<td>5</td>
<td>8</td>
</tr>
</tbody>
</table>
Honeywell Y605B Panel
Link-Fuel Timed Sundial Plan

The Y605B Panel Link-Fuel Timed Sundial Plan is an assembled, pre-plumbed and pre-wired control set. Designed for use with fully pumped wet central heating systems linking together a solid-fuel boiler with either a gas, oil or electric boiler. Full time and temperature control of the system is achieved by use of the programmer, room and cylinder thermostats.

The system selector box offers the choice of heating by means of solid-fuel only, where the link-fuel boiler will not be used, or as a link-up system where both the solid-fuel and link-fuel boilers will be used.

A second selection allows choice between dissipating excess heat either into the heating or the domestic hot water circuits. It is recommended that heating be selected during the winter and hot water in spring or autumn, whenever the solid-fuel appliance is in use.

When commissioning, set the required on/off times of the system on the programmer, set required temperature for domestic hot water, and the room thermostat to the required room temperature. The triple aquastat limit thermostat is factory set but may need to be adjusted.

Control operation

A. When solid fuel only has been selected. The link-fuel valve will be closed and the solid-fuel valve will be open and the system will operate as follows:

1. No demand within the system slumber valve open to allow full bore gravity circulation to the slumber circuit. Safe operation of solid-fuel appliance without overheating of space or domestic hot water. Heating valve and domestic hot water valve closed, pump off.

2. Heating only: pump on, slumber and hot water valves closed, heating valve open to allow heating to be provided. Water pumped around the slumber circuit through adjustable gate valve.

3. Hot water only: pump on, slumber and heating valves closed, hot water valve open to allow circulation to the domestic hot water. Water pumped around the slumber circuit through adjustable gate valve.

4. Both heating and hot water: pump on, slumber valve closed, heating and hot water valves open to allow circulation throughout the whole of the system. Water pumped around the slumber circuit through the adjustable gate valve.

Table 11.4 External wiring connections – panel timed plans

<table>
<thead>
<tr>
<th></th>
<th>S Plan terminals</th>
<th>Y Plan terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room thermostat</td>
<td>Common 4</td>
<td>Demand 4</td>
</tr>
<tr>
<td></td>
<td>Demand 5</td>
<td>Neutral N</td>
</tr>
<tr>
<td></td>
<td>Neutral N</td>
<td>Earth N</td>
</tr>
<tr>
<td>Basic boiler</td>
<td>Live 7</td>
<td>Neutral N</td>
</tr>
<tr>
<td></td>
<td>Neutral N</td>
<td>Earth E</td>
</tr>
<tr>
<td></td>
<td>Boiler on 7</td>
<td>Pump live 9</td>
</tr>
<tr>
<td>Boiler with pump overrun</td>
<td>Remove link 7–9 in junction box</td>
<td>Live L</td>
</tr>
<tr>
<td></td>
<td>Neutral N</td>
<td>Earth E</td>
</tr>
<tr>
<td></td>
<td>Boiler on 7</td>
<td>Pump live 9</td>
</tr>
<tr>
<td>Frost thermostat</td>
<td>Common 1</td>
<td>Demand 8</td>
</tr>
</tbody>
</table>
5. If the temperature of the water exceeds the high-limit setting at any time the safety controls will take effect. Then pump on, slumber valve closed whilst either heating or hot water valve will open to allow for excess heat to be dissipated into either the hot water or heating and slumber circuits, as selected. The high-limit thermostat will automatically reset when the temperature of the water has reduced and the system will return to normal operation.

B. When the link-fuel has been selected the system operates in conjunction with the limit thermostats:

1. When flow temperature from solid-fuel appliance is below the mid-limit, the link-fuel boiler is brought into use. The slumber valve is closed, link-fuel and solid-fuel valves open and either heating, or hot water, or both, valves open to satisfy demand of the system. Water is supplied to the slumber circuit through the adjustable gate valve and both the pump and link-fuel boiler are on. Operation of the system is switched between the solid-fuel and link-fuel by the mid-limit thermostat.

2. When flow temperature from solid-fuel appliance is between the mid- and high-limit temperatures then the link-fuel boiler is switched off. Full use is made of the output from the solid-fuel appliance only, hence achieving maximum use of the solid-fuel appliance and economizing on other fuels. Link-fuel valve closed.

3. If the flow temperature from the solid-fuel appliance exceeds the high-limit setting then the link-fuel boiler is switched off. Slumber and link-fuel valves close, solid-fuel valve opens as well as either heating or hot water valve, depending upon selection of either heating or hot water for dissipation for excess heat. Pump is on to remove excess heat through the chosen circuit and also through the slumber circuit via the adjustable gate valve.

4. The low-limit thermostat provides control of the solid-fuel appliance at low temperature.
   (a) Temperatures below the low-limit setting, solid-fuel valve will be closed.
   (b) Temperatures above the low-limit setting, solid-fuel valve will be open.
   (c) Any requirement for heating or hot water will be met by the link-fuel boiler exactly as Item 1 above.

Note: When pump is off, slumber valve is open. When pump is on, slumber valve is closed.

Figure 11.9

When using pump overrun boiler do not fit link S/L to P/L but connect L to L and P/L to P/L.
**Randall EBM 2.1**  
**Boiler Efficiency Control**

The EBM 2.1 Boiler Efficiency Control is designed, with one simple user adjustment, to maximize the efficiency of gas fired wet domestic central heating systems. This is for systems which incorporate time and temperature controls (TRV or room thermostat and cylinder thermostat) and motorized valves. Suitable for both new and existing installations incorporating conventional or condensing boilers in either gravity or fully pumped systems.

The following pages show various systems and their wiring diagrams, however, before turning to these it is important to note the following:

1. The EBM 2.1 should be mounted where it is clearly accessible.
2. The OTS outside sensor should be mounted on an outside wall on the coldest side of the house (usually north facing) about 18 inches below eaves height and away from chimneys, flues or windows, etc. Connection must be made with cable suitable for 240V as follows:
   - Terminal 1 on the OTS to terminal 11 on the EBM wallplate.
   - Terminal 2 on the OTS to terminal 10 on the EBM wallplate.
3. The BRS boiler return sensor should be mounted on the common return to the boiler between the boiler and by-pass. In gravity hot water systems it should be mounted on the heating return. Connect to EBM as follows:
   - Brown lead to terminal 12 on the EBM wallplate.
   - Blue lead to terminal 10 on the EBM wallplate.
4. The cylinder thermostat and any motorized valves shown are not included in the kit.
5. The pump should be connected to terminal 5 of the EBM in all cases, even if the boiler has its own pump connection or pump overrun facility.
6. In gravity hot water systems, it is necessary to cut an internal link in the EBM by prizing off the back cover and cutting the grey link wire located inside the housing on the left.
7. The boiler thermostat should be set to maximum.

**Commissioning the EBM 2.1**

1. Set the response rate setting on the EBM 2.1 to 10, except for condensing boilers, where the response rate should be set at 5.
2. Set the boiler thermostat to maximum.
3. Set the cylinder thermostat to maximum.
4. Set the room thermostat (if fitted) to maximum.
5. Turn on the power to the system. The ‘Saving’ light will illuminate.
6. Set the programmer on HW ‘ON’. The ‘HW’ and ‘Pump’ lights will illuminate. The boiler will fire and the pump will run. The ‘Saving’ light will switch off.
7. Allow the system to warm for about 15 minutes and turn the cylinder thermostat to minimum. The ‘HW’ light will switch off and the boiler will stop. The pump (and ‘Pump’ light) may continue to run depending on the return temperature (see note above for gravity primary systems). The ‘Saving’ light will switch on.
8. Set the programmer to CH ‘ON’. The ‘CH’ light will illuminate. The ‘Saving’ light will switch off and the boiler and pump will run.

   **Note:** If the outside temperature is greater than approximately 17°C, it will not be possible to run the CH service as outlined above as it will not switch on. If this is the case, disconnect the sensor lead from terminal 11 on the wallplate which will force the CH service on. After checking, the sensor lead should be reconnected to terminal 11.
9. When the system is up to temperature, the boiler will stop and the ‘Saving’ light will illuminate. The pump will continue to run. When the system temperature drops sufficiently the boiler will fire again and the ‘Saving’ light will switch off.
Ancillary controls

Figure 11.10  *Fully pumped system with two motor open, motor closed motorized valves*

Figure 11.11  *Fully pumped system with two spring-return motorized valves*
Figure 11.12  Fully pumped system with mid-position motorized valve

Figure 11.13  Fully pumped system with Switchmaster ‘Midi’ or Randall HS mid-position valve
Sunvic Clockbox and Clockbox 2

The Clockbox is a complete plug-in central heating control pack with programming facility into which the motorized valve and cylinder stat are plugged in to. The boiler, pump, room stat and mains are wired in to their respective terminals.

Figure 11.14  Clockbox – basic programmer

Figure 11.15  Clockbox 2 – full programmer
12

Wiring system diagrams

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Figure 12.26 With a 2-port spring return motorized valve to both central heating and hot water circuit when no permanent live is available for valve auxiliary switches. Provides full temperature control.

Figure 12.27 With a 2-port spring return *normally open* motorized valve to both central heating and hot water circuits.

Figure 12.28 Showing the addition of a 2-port spring return motorized valve to an existing system for zone control.

Figure 12.29 Showing multiples of 2-port spring return motorized valves wired to one programmer, as may be used in a large property for zone control.

Figure 12.30 Showing multiples of 2-port motor open, motor close motorized valves wired to one programmer, as may be used in a large property for zone control.

Figure 12.31 With one boiler and zone control using one pump for each zone. No motorized valves.

Figure 12.32 With two or more pump overrun boilers and one pump using relays as required.

Figure 12.33 With pump to each circuit and no motorized valves.

Figure 12.34 With pump overrun boiler, pump to each circuit, room and cylinder thermostats, programmer and relay. No motorized valves.

Figure 12.35 With pump overrun boiler, pump and 2-port spring return motorized valves to each circuit, room and cylinder thermostats, programmer and relay.

Figure 12.36 ACL Bifo System MK1 with time clock.

Figure 12.37 ACL Bifo System MK1 using a programmer with voltage free contacts. Provides full temperature and programming control.

Figure 12.38 Danfoss 2.2 and 2C System.

Figure 12.39 Drayton Plan 1 with Drayton TA/M2 actuator.

Figure 12.40 Drayton Flowshare 5 System with TA/M4 actuator, RB1 relay box and programmer.

Figure 12.41 Drayton Flowshare 5 System with Drayton TA/M4 actuator, RB2 relay box and programmer.

Figure 12.42 Drayton Plan 7 System with two TA/M2A actuators providing full temperature and programming control.

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Figure 12.45 Honeywell ‘Y’ Plan System using the V4073 6-wire, 3-port motorized valve with integral relay giving full temperature control.

Figure 12.46 Honeywell ‘Y’ Plan System using the V4073 6-wire, 3-port motorized valve with integral relay giving full temperature and programming control.

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Figure 12.49 SMC Control Pack 2 System with pump overrun boiler and a pump to both central heating and hot water circuits. No motorized valves. Provides full temperature and programming control.

Figure 12.50 Sunvic Duoflow System with RJ 1801 relay box and programmer.

Figure 12.51 Sunvic Duoflow System with RJ 2801 relay box and programmer.

Figure 12.52 Sunvic Duoflow System with RJ 2802 or RJ 2852 relay box and time clock.

Figure 12.53 Sunvic Duoflow System with RJ 2802 or RJ 2852 relay box and programmer.

Figure 12.54 Switchmaster Midi System.
Various frost protection thermostat wiring

Figure 12.55  Wiring of a double-pole frost thermostat to a gravity hot water, pumped central heating system
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Figure 12.60  Addition of a changeover switch to a priority system incorporating a 3-port valve, e.g. Honeywell V4044, to enable changing from hot water or heating priority as required. A simple 2-way light switch is ideal for this purpose.
Figure 12.61  Simple pump overrun thermostat wiring
Figure 12.62  Wiring of relays, including examples
Figure 12.63  Wiring of a relay to allow a 2-wire (SPST) cylinder or room thermostat to function as a 3-wire (SPDT)
Figure 12.64  Simplified warm air unit wiring

Gravity hot water, pumped central heating

Notes
a) Known as Drayton Plan 2.
b) Suitable only for Basic programming.
c) Connect frost thermostat across junction box terminals L–1 for hot water or double-pole frost thermostat L–1 and L–3.

Figure 12.1  Usual arrangement with room thermostat controlling pump
Notes
a) Known as Honeywell ‘A’ Plan.
b) Suitable only for Basic programming.
c) Cylinder thermostat will only control hot water temperature when ‘Hot Water Only’ is selected on programmer.
d) Connect frost thermostat across junction box terminals L–4 for hot water or use double-pole frost thermostat L–4 and L–3.

Figure 12.2 With a cylinder thermostat to control hot water temperature

Notes
a) Suitable for Basic or Full control programming but no temperature control of hot water when heating is on.
b) Heating will not work until cylinder thermostat is satisfied.
c) Connect frost thermostat across junction box terminals L–1.

Figure 12.3 With room and cylinder thermostats controlling boiler and pump giving hot water priority
Notes

a) This method provides for the heating of the hot water to the cylinder thermostat temperature before the heating pump can function. This is ideal for systems where the heating pump will ‘starve’ the cylinder.

b) No hot water temperature control. Cylinder thermostat serves only to delay heating until cylinder is hot.

c) Suitable for Basic programmers only.

d) Connect frost thermostat L–1 for hot water or double-pole frost thermostat L–1 and L–4.

Figure 12.4  With room and cylinder thermostats both controlling pump, giving hot water priority

Notes

a) Suitable only for Basic programming.

b) Hot water temperature control only possible when ‘Hot Water Only’ selected.

c) Connect frost thermostat across junction box terminals L–3 for hot water only or double-pole frost thermostat L–3 and L–4.

Figure 12.5  With pump on each circuit, giving limited hot water temperature control
Figure 12.6  With one 2-port spring return motorized valve in central heating circuit, giving limited temperature control of hot water

Notes
a) Known as Honeywell System L.
b) Suitable only for Basic programming.
c) Hot water temperature control only possible when ‘Hot Water Only’ selected.
d) Connect frost thermostat across junction box terminals L–3.

Figure 12.7  With a 28mm 2-port spring return motorized valve to hot water circuit, giving full temperature and programming control

Notes
a) Known as Honeywell ‘C’ Plan.
b) Suitable for Basic or Full programming.
c) Connection of grey can be made to junction box terminal 1 (Hot Water On) if no live at junction box.
d) Motorized valve must have changeover auxiliary switch.
Notes
a) Suitable only for Basic programming.
b) Connect frost thermostat across junction box terminals L–1 for hot water only or double-pole frost thermostat L–1 and L–4.

Figure 12.8 With a 2-port spring return motorized valve to both central heating and hot water circuits, giving full temperature control

Notes
a) Suitable for Basic or Full programming.
b) Requires a DPDT relay.
c) Connect frost thermostat across junction box terminals L–6.

Figure 12.9 With a 2-port spring return motorized valve to hot water circuit and relay, giving full temperature and programming control
**Notes**

a) Motorized valve on heating to stop gravity circulation.

b) System requires changeover room and cylinder thermostats.

c) Suitable for Basic control only but programmer must have ‘Offs’ to heating and hot water.

d) For frost protection see special diagram, page 258

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**Figure 12.10**  *With a 2-port motor open, motor close motorized valve to both central heating and hot water circuits, giving full temperature control*

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**Notes**

a) Suitable for Basic or Full programming but ‘Hot Water Off’ signal required regardless of whichever is used.

b) Requires an SPDT relay.

c) Connect frost stat across junction box terminals L–4.

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**Figure 12.11**  *With a 2-port motor open, motor close motorized valve to hot water circuit and relay, giving full temperature and programming control*
Notes
a) Suitable only for Basic programming.
b) Connect frost thermostat across junction box terminals L–3 for hot water or double-pole frost thermostat L–3 and L–2.

Figure 12.12  Danfoss Plan 1.1 and Plan 2A

Notes
a) Could be used with time clock.
b) Connect frost thermostat across junction box terminals L–3 for hot water or double-pole frost thermostat L–3 and L–1.

Figure 12.13  Utilizing Drayton SU 1 switch unit
Wiring system diagrams

Notes
a) Could be used with time clock.
b) Connect frost thermostat across junction box terminals L–2 for hot water or double-pole frost thermostat L–2 and L–3.

Figure 12.14  Utilizing Drayton SU 2 switch unit

Notes
a) Suitable for Basic or Full programming.
b) Connect frost thermostat across junction box terminals L–4.

Figure 12.15  With Sunvic SZ 1302 actuator to hot water circuit, giving full temperature and programming control
Fully pumped systems

Notes

a) Where no room/cylinder thermostat exists, link 1–2 in junction box.
b) When using a pump overrun boiler then wire pump as indicated in Chapter 9.
c) Connect frost thermostat across junction box terminals L–1.

Figure 12.16  For use on one circuit only, i.e. central heating or hot water, with or without temperature control

Notes

a) Suitable for Basic programmer only.
b) For specially manufactured priority programmers refer to page 58.
c) Connect frost thermostat across junction box terminals L–3.

Figure 12.17  Priority system with diverter valve showing hot water priority
Notes
a) Suitable only for Basic programming.
b) For specially manufactured priority programmers refer to programmer section, page 58
c) Connect frost thermostat across junction box terminals L–3.

Figure 12.18  Priority system with diverter valve showing central heating priority

Notes
a) Suitable for Basic programming only.
b) Connect frost thermostat across junction box terminals L–3.

Figure 12.19  Priority system with diverter valve and simple changeover switch to provide for optional priority
Domestic Central Heating Wiring Systems and Controls

Notes
a) Hot water temperature control only when programmer is in ‘Hot Water Only’ position.
b) Programmer should have ‘Heating Off’ signal, otherwise room thermostat will need to be turned down whilst clock is in ‘Heating On’ mode.
c) System requires changeover room thermostat.
d) Suitable for Basic control only.
e) Connect frost thermostat across junction box terminals L–5.

Figure 12.20  With one 2-port motor open, motor close motorized valve in central heating circuit

Notes
a) Suitable for Basic programming only.
b) Hot water temperature control only when programmer set to ‘Hot Water’ only.
c) Connect frost thermostat across junction box terminals L–4.

Figure 12.21  With one 2-port spring return motorized valve in central heating circuit, providing limited hot water temperature control
Notes
a) Known as Honeywell ‘S’ Plan and Sunvic System 4.
b) Suitable for Basic or Full programming.
c) Connect frost thermostat across junction box terminals L–4.

Figure 12.22 With a 2-port spring return motorized valve to both central heating and hot water circuits, providing full temperature and programming control

Notes
a) Full programming only available if programmer has ‘Hot Water Off’ terminal and dotted connection is made.
b) Known as Honeywell ‘Y’ Plan and Sunvic Unishare System.
c) Connect frost thermostat across junction box terminals L–5.

Figure 12.23 With a mid-position 3-port valve with standard colour flex conductors. Provides full temperature and programming control
Notes
a) Programmer must have ‘Offs’ for both heating and hot water.
b) For frost protection refer to special diagrams.

Figure 12.24  With a 2-port motor open, motor close motorized valve to both central heating and hot water circuits. Provides full temperature and programming control.

Notes
a) Suitable for Basic or Full control but programmer must have ‘Off’ signal for circuit with motor open, motor close valve (shown on hot water in this diagram).
b) Connect frost thermostat across junction box terminals L–5.

Figure 12.25  With a 2-port motor open, motor close motorized valve and a 2-port spring return motorized valve to control central heating and hot water circuits.
Notes
a) Suitable for Basic programming only.
b) Connect frost thermostat across junction box terminals L–3.

Figure 12.26 With a 2-port spring return motorized valve to both central heating and hot water circuit when no permanent live is available for valve auxiliary switches. Provides full temperature control.

Notes
a) Known as Honeywell System G.
b) Not commonly used but type of valve V4043B used in solid-fuel systems.
c) Essential that programmer has ‘Off’ signals to both heating and hot water.
d) System requires changeover room and cylinder thermostat.
e) Connect frost thermostat across junction box terminals L–5.

Figure 12.27 With a 2-port spring return normally open motorized valve to both central heating and hot water circuits.
**Note**

Shown on central heating but could apply to the hot water circuit if required.

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**Figure 12.28**  
Showing the addition of a 2-port spring return motorized valve to an existing system for zone control.

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**Note**

Up to three valves are shown on heating, although in theory there is no limit and they could also be used in the hot water circuit, where several cylinders are utilized.

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**Figure 12.29**  
Showing multiples of 2-port spring return motorized valves wired to one programmer, as may be used in a large property for zone control.
### Notes

a) Diagram shows two valves on the heating, although in theory any number can be used, providing a relay is used for each. Note that the ‘Heating Off’ signal from the programmer is not required. The same principle applies if used on the hot water circuit.

b) In a system utilizing, e.g. one motor open, motor close valve on the hot water and two motor open, motor close valves on the heating, the hot water valve would be wired as normal using the ‘Hot Water Off’ from programmer and cylinder thermostat, and the heating valves should be wired as shown. However, if there were two motor open, motor close valves to both hot water and heating circuits then all four would need to be wired as shown, and four relays would be required. As this would normally occur in a large property, it would be easier and more cost effective, and provide greater benefits in programming to fit two programmers or change actuators to spring return type. Remember that where a valve is controlled by a relay, a changeover thermostat or ‘Off’ signal from the programmer is not required.

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**Figure 12.30** Showing multiples of 2-port motor open, motor close motorized valves wired to one programmer, as may be used in a large property for zone control

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**Figure 12.31** With one boiler and zone control using one pump for each zone. No motorized valves

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Notes

a) Requires a DPDT relay for each pump.
b) More appropriate to a commercial or large domestic situation.
c) Connect frost thermostat across junction box terminals L–1. It is assumed that at least one room thermostat is calling for heat.
Notes
a) Requires a single-pole changeover relay for each boiler after the first one, e.g. two boilers, one relay, three boilers, two relays, etc.
b) Boiler PL refers to pump live. Boiler SL refers to switched live from system control.
c) Connect frost thermostat across junction box terminals L–2.

Figure 12.32 With two or more pump overrun boilers and one pump using relays as required

Notes
a) Requires a single-pole changeover relay (SPDT).
b) System similar to SMC control pack MK1 and can be utilized to convert from original Horstmann programmer.
c) Basic or Full control, dependent on programmer used.
d) Connect frost thermostat across junction box terminals L–3.

Figure 12.33 With pump to each circuit and no motorized valves
**Wiring system diagrams**

**Notes**

a) Requires a double-pole changeover relay (DPDT).

b) System similar to SMC control pack MK1 and can be utilized to convert from original Horstmann programmer.

c) Basic or Full control dependent on programmer used.

d) Connect frost thermostat across junction box terminals L–3.

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Figure 12.34  With pump overrun boiler, pump to each circuit, room and cylinder thermostats, programmer and relay. No motorized valves.

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Figure 12.35  With pump overrun boiler, pump and 2-port spring return motorized valve to each circuit, room and cylinder thermostats, programmer and relay.

**Notes**

a) Requires a double-pole changeover relay (DPDT).

b) Pump overrun functions on hot water pump.

c) Connect frost thermostat across junction box terminals L–4.
Notes

a) System requires changeover room and cylinder thermostats.
b) See motorized valve section (Chapter 6, ACL 672 BRO 340).
c) Connect frost thermostat across junction box terminals L–1.

Figure 12.36  *ACL Biflo System MK1 with time clock*

Notes

a) Programmer must have voltage free contacts – link as shown.
b) Brown wire of valve may be red.
c) System requires changeover room and cylinder thermostats.
d) Connect frost thermostat across junction box terminals L–2.

Figure 12.37  *ACL Biflo System MK1 using a programmer with voltage free contacts. Provides full temperature and programming control*
Notes
a) Suitable for Basic programming only.
b) Connect frost thermostat across junction box terminals L–1.

Figure 12.38  *Danfoss 2.2 and 2C system*

Notes
a) No temperature control of hot water unless non-electric device is used.
b) Suitable for Basic programmer only, although programmer must have hot water and heating ‘Offs’ and voltage free switching.
c) Note that valve black is neutral.
d) Connect frost thermostat across junction box terminals L–3.

Figure 12.39  *Drayton Plan 1 with Drayton TA/M2 actuator*
Notes

a) Suitable for Basic programmers only unless programmer has ‘Heating Off’ facility and dotted line is connected.
b) If a time switch is used link ‘Heating On’ and ‘Hot Water On’.
c) As this actuator is reversible, it is possible to find different site wiring to that shown.
d) Relay diagram is inside cover. Relay can be replaced by double-pole changeover relay (DPDT).
e) Note that neutral on the actuator is black.
f) Connect frost thermostat across junction box terminals L–6.

Figure 12.40 Drayton Flowshare 5 System with Drayton TA/M4 actuator, RB1 relay box and programmer

Figure 12.41 Drayton Flowshare 5 system with TA/M4 actuator, RB2 relay box and programmer
Notes
a) Essential that programmer has ‘Off’ signals to both heating and hot water.
b) System requires changeover room and cylinder thermostats.
c) Note that black is neutral and green is a live conductor.
d) Connect frost thermostat across junction box terminals L–6.

Figure 12.42 Drayton Plan 7 System with two TA/M2A actuators providing full temperature and programming control

Notes
a) A manually operated 3-port valve is used to divert flow to heating or hot water circuits as required.
b) If no comfort controller, link 1–2 in junction box.
c) Connect frost thermostat across junction box terminals L–2.

Figure 12.43 Homewarm Manual System
Domestic Central Heating Wiring Systems and Controls

Notes
a) Designed as a low-cost installation. Refer to motorized valve section (Chapter 6, Switchmaster VM5).
b) If an orange wire is exposed in valve flex, this can be cut off and disregarded.
c) Connect frost thermostat across junction box terminals L–1.

Figure 12.44 Homewarm Auto System with Switchmaster VM5 actuator

Notes
a) Suitable in this diagram for a Basic programmer only.
b) Connect frost thermostat across junction box terminals L–3.

Figure 12.45 Honeywell ‘Y’ Plan System using the V4073 6-wire, 3-port motorized valve with integral relay giving full temperature control
Notes

a) Suitable in this diagram for Full control using programmers shown.

b) For more information on the V4073 6-wire motorized valve refer to Chapter 6.

c) Connect frost thermostat across junction box terminals L–3.

Figure 12.46  Honeywell ‘Y’ Plan System using the V4073 6-wire, 3-port motorized valve with integral relay giving full temperature and programming control

Notes

a) Suitable for Basic or Full control, depending on programmer used.

b) Connect frost thermostat across junction box terminals L–7.

Figure 12.47  Landis & Gyr LGM System
Domestic Central Heating Wiring Systems and Controls

**Notes**

a) All controls wired into SMC wiring centre incorporating relay.
b) Internal wiring of SMC wiring centre not shown.
c) Suitable for Basic or Full programming.
d) Terminals 2–3 are linked internally for neutral connection.
e) Connect frost thermostat across junction box terminals L–6.

**Figure 12.48** SMC Control Pack 2 System with one boiler and a pump to both central heating and hot water circuits. No motorized valves. Provides full temperature and programming control.

**Figure 12.49** SMC Control Pack 2 System with pump overrun boiler and pump to both central heating and hot water circuits. No motorized valves. Provides full temperature and programming control.
Notes
a) Suitable for Basic programming only.
b) Yellow CH/HW, orange HW, white CH, blue N.
c) Can be used with any DM actuator.
d) Where a programmer is used, remove links 1–13 and 13–16.
e) Where a time switch is used, remove links 13–16.
f) Where there is no time control leave links in place.
g) Connect frost thermostat across junction box terminals 1–12.

Figure 12.50  Sunvic Duoflow System with RJ 1801 relay box and programmer

Notes
a) Suitable for Basic programmer only unless programmer has ‘Central Heating Only’ and ‘Heating Off’ signal, in which case dotted line must be connected.
b) Can be used with any DM actuator.
c) Connect frost thermostat across junction box terminals 3–8.

Figure 12.51  Sunvic Duoflow System with RJ 2801 relay box and programmer
Domestic Central Heating Wiring Systems and Controls

Notes
a) Remove link A.
b) Can be used with any of the DM actuators.
c) RJ 2852 is the plug-in version of the RJ 2802.
d) Connect frost thermostat across junction box terminals 1–19.

Figure 12.52  Sunvic Duoflow System with RJ 2802 or RJ 2852 relay box and time clock

Notes
a) Remove links A and B.
b) Suitable for Basic programming only unless programmer has ‘Central Heating Only’ and ‘Heating Off’ signal, in which case dotted line must be connected.
c) Can be used with any of the DM actuators.
d) RJ 2852 is the plug-in version of the RJ 2802.
e) Connect frost thermostat across junction box terminals 1–19.

Figure 12.53  Sunvic Duoflow System with RJ 2802 or RJ 2852 relay box and programmer
Notes
a) Suitable for Basic control only unless programmer has ‘Hot Water Off’ signal, in which case full control is possible by connecting dotted line.
b) Connect frost thermostat across junction box terminals L–4.

Various frost protection thermostat wiring

Figure 12.55  Wiring of a double-pole frost thermostat to a gravity hot water, pumped central heating system

Figure 12.56  Wiring of a single-pole frost thermostat to a gravity hot water, pumped central heating system using a DPDT relay
Domestic Central Heating Wiring Systems and Controls

Notes
a) Will only function if room thermostat is also calling for heat.
b) To connect into existing, remove wire from programmer ‘Heating Off’ to room thermostat ‘Satisfied’. Wire from programmer ‘Heating Off’ to frost thermostat ‘Common’. Wire frost thermostat ‘Satisfied’ to room thermostat ‘Demand’ to room thermostat ‘Common’.
c) Requires SPDT room and frost thermostats.

Figure 12.57  Wiring a frost thermostat to a motor open, motor close motorized valve

Notes
a) Frost thermostat shown on heating circuit but can be used on hot water if required.
b) Requires an SPDT relay.
c) Requires an SPST frost thermostat.
d) Frost thermostat common can go to terminal L if required instead of ‘Heating Off’.

Figure 12.58  Wiring a frost thermostat to a fully pumped system using two motor open, motor close motorized valves
Supplementary wiring diagrams

Note
Programmer must have voltage free terminals.

![Diagram of wiring system](image1)

Figure 12.59 Utilizing a full control programmer for basic control

**Note**
HOT WATER PRIORITY
CYL STAT COMMON, BOILER & PUMP
VALVE BROWN & CYL STAT SATISFIED
HEATING PRIORITY
ROOM STAT DEMAND
2-WAY SWITCH

**Figure 12.60** Addition of a changeover switch to a priority system incorporating a 3-port valve, e.g. Honeywell V4044, to enable changing from hot water or heating priority as required. A simple 2-way light switch is ideal for this purpose.

![Diagram of wiring system](image2)

Figure 12.61 Simple pump overrun thermostat wiring

**Note**
Could be used as an additional control, e.g. on cast iron boilers, by employing a pipe thermostat located on the flow or return pipework as required.

Relays

Relays are often viewed with suspicion and a lot of electricians will hold their hands up in horror at the sight of a relay, especially when included into what already looks a complicated heating system. Relays deployed in this way are usually for switching 240V to get over problems of 'back-feed', which may cause the system to do strange things. They can also be used for switching different voltages, e.g. a 240V coil could switch 24V and vice versa.

There are a number of diagrams in the book which require the use of a relay and it may well be that the fault the engineer has been sent to find exists because a relay has never been fitted.

All relays are shown relaxed or de-energized.

**ABBREVIATIONS:**
- **SPDT** Single-pole double-throw – top
- **DPDT** Double-pole double-throw – middle
- **COM** Common
- **NO** Normally open – de-energized
- **NC** Normally closed – de-energized

![Diagram of wiring system](image3)

Figure 12.62 Wiring of relays, including examples

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Figure 12.63  
Wiring of a relay to allow a 2-wire (SPST) cylinder or room thermostat to function as a 3-wire (SPDT)

Notes
a) Ideal for when two wires have been run to a room or cylinder thermostat and system alterations require three wires.
b) Shown on a 3-way valve with standard flex conductors.

Figure 12.64  
Simplified warm air unit wiring

Notes
a) When the clock and room thermostat contacts are made, the main gas burner will light, warming the heat exchanger. The heat will be detected by the fan thermostat which will turn the fan on.
b) When the clock or room thermostat contacts break, the main gas valve will go off and the fan will continue to run for a while to clear the residual heat from the heat exchanger, until it falls below the setting of the fan thermostat.
c) It is usually essential that the time clock has voltage free terminals and in some clocks it is necessary to remove a link to achieve this.
Interchangeability guide for programmers and time switches

This guide is to assist the replacement of faulty or obsolete programmers and time switches but it must be remembered that each group relates only to backplate and wiring, or product, and not to the facilities provided by the programmer or time switch itself, although a brief indication of setting options is given. Full details of the various differences, including dimensions, can be found earlier in this book.

This guide will also help in providing the householder with a prompt replacement, and in some cases offer the opportunity for replacing an electromechanical programmer with an electronic equivalent providing more programming options with minimum inconvenience. Obvious groupings are not included. For example there are four different models of Randall 103 time clock but are all wired the same and are interchangeable. Any differences are indicated earlier in this book.

The following groups of programmers and time switches can usually be directly interchanged without changing the backplate. However, backplate design may vary making a straight exchange impossible, e.g. a Landis & Gyr RWB2 will not fit an ACL 722 backplate but the reverse is possible. This is due to the provision of an earth terminal on the ACL backplate. Note also that it would be good working practice to change the backplate, as occasionally the contacts become worn and give rise to a fault situation that could mislead the engineer into suspecting that the programmer or time switch is faulty. In some cases it may be necessary to make a minor wiring alteration, and this is included in this chapter.

Programmers

Please note that all programmers listed below are suitable for use on Basic or Full systems unless stated otherwise. Therefore when changing ensure that the new programmer is set for the same system as the old one.

**GROUP A**

*Electronic*

- **ACL-Drayton Tempus 6** – 24 hour or 5/2 day programming
- **ACL-Drayton Tempus 7 (new)** – 5/2 day or 7 day programming
- **ACL LP 112** – 24 hour programming
- **ACL LP 241** – 24 hour programming
- **ACL LP 522** – 5/2 day programming
- **ACL LP 722** – 7 day programming
- **ACL LS 112*** – Basic systems only, 24 hour programming
- **ACL LS 241** – 24 hour programming
- **ACL LS 522** – 5/2 day programming
- **ACL LS 722** – 7 day programming
- **Barlo EPR 1** – 5/2 day programming
- **British Gas EMP 2**
- **British Gas UP1**
Domestic Central Heating Wiring Systems and Controls

Danfoss Randall CP15 – 24 hour or 5/2 day programming
Danfoss Randall CP75 – 5/2 day or 7 day programming
Danfoss Randall FP15 – 24 hour or 5/2 day programming
Danfoss Randall FP75 – 5/2 day or 7 day programming
Danfoss Randall MP15 – Basic systems only, 24 hour or 5/2 day programming
Danfoss Randall MP75 – Basic systems only, 5/2 day or 7 day programming
Drayton Tempus 3 – 24 hour programming
Drayton Tempus 4 – 5/2 day programming
Drayton Tempus 7 – 7 day programming
Honeywell ST 6200 – Basic systems only, 24 hour programming
Honeywell ST 6300 – Full systems only, 24 hour programming
Honeywell ST 6400 – Full systems only, 7 day programming
Honeywell ST 6450 – Full systems only, 5/2 day programming
Horstmann Centaurplus C21 – 24 hour programming
Horstmann Centaurplus C27 – 7 day programming
Horstmann Centaurplus C121 – 24 hour programming
Horstmann Centaurplus C127 – 24 hour programming
Landis & Gyr RW 200 – 24 hour programming
Landis & Gyr RWB 20 – 7 day programming
Landis & Gyr RWB 40 – 24 hour programming
Landis & Gyr RWB 102 – Basic systems only, 24 hour programming
Landis & Gyr RWB 252 – 5/2 day programming
Landis & Steafa RWB 9 – 24 hour, 5/2 day, 7 day programming
Landis & Steafa RWB2E – 24 hour programming
Myson MEP 2C – 24 hour, 5/2 day, 7 day programming
Potterton Mini-minder E – 24 hour programming
Siemens RWB 29 – 24 hour, 5/2 day, 7 day programming
Siemens RWB 270 – 7 day programming
Smiths Centroller 1000 – 24 hour programming
Sunvic 207 – 24 hour, 5/2 day, 7 day programming
Tower DP 72 – 7 day programming
Tower QE2 – 7 day programming
* A wiring alteration will be necessary

Electromechanical

Crossling Controller
Glow-Worm Mastermind
Invensys SM 2 – 24 hour programming
Landis & Gyr RWB 1
Landis & Gyr RWB 2 MK 1
Landis & Gyr RWB 2 MK 2
Landis & Gyr RWB 2.9 – no neon indicators
Potterton Mini-minder
Tower SM 2 – 24 hour programming

GROUP B

Electronic

Danfoss Randall FP 965 – 5/2 day or 7 day programming
Horstmann 525 – 24 hour programming
Horstmann 527 – 7 day programming
Interchangeability guide for programmers and time switches

Horstmann H21 – 24 hour programming
Horstmann H121 – 24 hour programming
Horstmann H27 – 7 day programming
Randall 922 – 24 hour programming
Randall 972 – 7 day programming
Randall Set 2** – Basic systems only, 24 hour programming
Randall Set 2E** – Basic systems only, 24 hour programming
Randall Set 3 – Full systems only, 24 hour programming
Randall Set 3E – 24 hour programming
Randall Set 5 – 5/2 day programming
**Link 1–5 on backplate.

Electromechanical

Danfoss 3002
Horstmann 425 Diadem
Horstmann 425 Tiara – no neon
Randall set 3M

Note: Only the Danfos Randall FP 965 will fit the Randall 922 and 972 backplate.

GROUP C

Electronic

Honeywell ST 499A – Full systems only, 24 hour programming
Honeywell ST 699B – Full systems only, 24 hour programming
Honeywell ST 699C – Full systems only, 24 hour programming
Thorn Microtimer – Full systems only, 24 hour programming

GROUP D

Electronic

Potterton EP 2000 – 24 hour programming
Potterton EP 2001 – 5/2 day programming
Potterton EP 2002 – 5/2 day programming
Potterton EP 3000 – 7 day programming
Potterton EP 3001 – 7 day programming
Potterton EP 3002 – 7 day programming
Potterton EP 6000 – 7 day and 5/2 day programming (optional each channel)
Potterton EP 6002 – Full systems only, 7 day programming

GROUP E

Electronic

Switchmaster 9000 – 24 hour programming
Switchmaster 9001 – 24 hour programming

Electromechanical

Switchmaster 900
Switchmaster 905
Time switches

GROUP A

Electronic
Horstmann H11 – 24 hour programming
Horstmann H17 – 7 day programming

Electromechanical
Danfoss 3001
Horstmann 425 Coronet

GROUP B

Electronic
Danfoss Randall TS975 – 5/2 day or 7 day programming
Randall 911 – 24 hour programming
Randall 971 – 7 day programming
Randall Set 1 – 1E – 24 hour programming
Randall Set 4 – 5/2 day programming
Sangamo Set 1 – 24 hour programming

GROUP C

See note after Group G.

Electronic
Horstmann Centaurplus C11 – 24 hour programming
Horstmann Centaurplus C17 – 7 day programming
Landis & Gyr RWB 50 – 24 hour programming
Landis & Gyr RWB 100 – 24 hour programming
Landis & Gyr RWB 152 – 5/2 day programming
Landis & Staefa RWB 7 – 24 hour, 5/2 day, 7 day programming
Landis & Staefa RWB 30E – 24 hour programming
Potterton Mini-minder ES – 24 hour programming
Siemens RWB 27 – 24 hour, 5/2 day, 7 day programming
Siemens RWB 170 – 7 day programming

Electromechanical
Landis & Gyr RWB 30

GROUP D

See note after Group G.

Electronic
ACL-Drayton Tempus 1 (new) – 24 hour or 5/2 day programming
ACL-Drayton Tempus 2 (new) – 5/2 day or 7 day programming
ACL LP 111 – 24 hour programming
Interchangeability guide for programmers and time switches

ACL LP 711 – 7 day programming
ACL LS 111 – 24 hour programming
ACL LS 711 – 7 day programming
British Gas EMT 2
British Gas UT 1
Sunvic 107 – 24 hour, 5/2 day, 7 day programming

**Electromechanical**

Invensys SM1 – 24 hour programming

**GROUP E**

See note after Group G.

**Electronic**

Drayton Tempus 1 – 24 hour programming
Drayton Tempus 2 – 5/2 day programming

**GROUP F**

See note after Group G.

**Electronic**

Myson MEP 1c – 24 hour, 5/2 day, 7 day programming
Tower DT 71 – 7 day programming
Tower QE 1 – 7 day programming

**Electromechanical**

Tower QM1 – 24 hour programming

**GROUP G**

**Electronic**

Danfoss Randall TS 15 – 24 hour, 5/2 day programming
Danfoss Randall TS 75 – 5/2 day, 7 day programming
Honeywell ST 6100A – 24 hour programming
Honeywell ST 6100C – 7 day programming

**Note:** All time switches in Groups C, D, E, F and G have similar backplates but a wiring alteration will also be required.

**GROUP H**

**Electronic**

Potterton EP 4000 – 7 day programming
Potterton EP 4001 – 5/2 day programming
Potterton EP 4002 – 5/2 day programming
Potterton EP 5001 – 7 day programming
Potterton EP 5002 – 7 day programming
### Manufacturers’ trade names and directory

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
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Tel: 01379 640406; Fax: 01379 650640
Bha.merlin@fsbdial.co.uk www.merlinboilers.co.uk

Boulter Boilers Ltd
Magnet House, White House Road, Ipswich, IP1 5JA
Tel: 01473 241555; Fax: 01473 241321
sales@boulter-boilers.com www.boulter-boilers.com

Brassware Ferroli
See Ferroli

Broag Limited
Remeha House, Molly Millars Lane, Wokingham, Berkshire, RG41 2QP
Tel: 0118 978 3434; Fax: 0118 978 6977
boilers@broag-remeha.com www.broag-remeha.com

Burco Dean
Rose Grove, Burnley, Lancs, BB12 6AL
Burco-Maxol
Tel: 01282 427241; Fax: 01282 831206
sales@burcodean.co.uk www.burcodean.com

Caradon-Ideal Heating Ltd
PO Box 103, National Avenue, Hull, HU5 4JN
Tel: 01482 492251; Fax: 01482 448858
enquiries@idealboilers.com www.idealboilers.com

R&S Cartwright
Floats Road, Roundthorn Industrial Estate, Manchester, M23 9NE
See Turkington Engineering

Calfire Boilers Ltd
See Turkington Engineering

Chaffoteaux et Maury
See MTS (GB) Ltd www.chaffoteaux.co.uk

Chalmor Ltd
Unit 1, Albert Road Industrial Estate, Luton Beds, LU1 3QF
Tel: 01582 748700; Fax: 01582 748748
info@chalmor.co.uk www.chalmor.co.uk

Church Hill Systems
4A Hinckley Business Centre, Burbage Road, Hinckley, Leics, LE10 2TP
Tel: 01455 890685; Fax: 01455 891341
sales@churchhillsystems.co.uk www.churchhillsystems.co.uk

Clyde Combustions
Cox Lane, Chessington, Surrey, KT9 1SL
Tel: 020 8391 2020; Fax: 020 8397 4598
info@clyde4heat.co.uk www.clyde4heat.co.uk

Clyde Valley Control Systems Ltd
33 Glenburn Road, College Milton North, East Kilbride, G74 3BA
Tel: 01355 247921; Fax: 01355 249197
sales@cvcs.co.co.uk www.storm-products.co.uk

Combat Engineering
Oxford Street, Bilston, West Midlands, WV14 7EG
Tel: 01902 494425; Fax: 01902 403200
uksales@rg-inc.com www.rg-inc.com

Compact Electric Boilers
All enquiries to Quick Spares Ltd

Crosslee PLC
Lightcliffe Factory, Hipperholme, Halifax, West Yorks, HX3 8DE
Tel: 01422 203555; Fax: 01422 206304
lv@crosslee.co.uk www.crosslee.co.uk
Domestic Central Heating Wiring Systems and Controls

Danfoss-Randall
Ampthill Road, Bedford, Beds, MK42 9ER
Tel: 01234 364621; Fax: 01234 219705
danfossrandall@danfoss.com  www.danfoss-randall.co.uk

Dimplex
Millbrook House, Grange Drive, Hedge End, Southampton, SO30 2DF
Tel: 0870 077 7117; Fax: 0870 727 0109
www.dimplex.co.uk

Drayton Controls
All enquiries to Invensys

Dunphy Oil & Gas Burners Ltd
Queensway, Rochdale, Lancs, OL11 2SL
Tel: 01706 649217; Fax: 01706 55512
sales@dunphy.co.uk  www.dunphy.co.uk

Eastham Maxol
All enquiries to Burco Dean

Eberle Controls
8 Shannon Place, Potton, Sandy, Beds, SG19 2PZ
Tel: 01895 444012; Fax: 01895 421901

Eco hometec (UK) Ltd
Unit 11E, Carcroft Enterprise Park, Carcroft, Doncaster, DN6 8DD
Tel: 01302 722266; Fax: 01302 728634
sales@eco-hometec.co.uk  www.eco-hometec.co.uk

Electroheat
3 Century House, Vickers Business Centre, Priestly Road, Basingstoke, Hants, RG24 9RA
Tel: 01256 363417; Fax: 01256 841843
sales@electroheatplc.co.uk  www.electroheatplc.co.uk

Elsy & Gibbons Ltd
Simonside, South Shields, Tyne & Wear, NE34 9PE
Tel: 0191 427 0777; Fax: 0191 427 0888
sales@elsonhotwater.co.uk  www.elsonhotwater.co.uk

Euramo
See Wilo Salmsn Pumps Ltd

Eurocombi
See MTS (GB) Ltd

Euro Controls
Unit 54, Monument Industrial Park, Chalgrove, Oxon, OX44 7RW
Tel: 01865 400526; Fax: 01865 400524
sales@eurocontrols.com  www.eurocontrols.com

Eurocal Boilers
See Turkington Engineering

Eurotronics
See Euro Controls

Fagor Comfort UK Ltd
Morco House, 59 Beverley Road, Hull, HU3 1XW
Tel: 01482 325456; Fax: 01482 212869
sales@morcoproducts.co.uk

Ferroli
Lichfield Road, Branston Industrial Estate, Burton upon Trent
Staffs, DE14 3HD
Tel: 08707 282885; Fax: 08707 282886
sales@ferroli.co.uk  www.ferroli.co.uk

Firebird Boilers
Unit 6, Westover Industrial Estate, Ivybridge, Devon, PL21 9ES
Tel: 01752 691177; Fax: 01752 691131
info@firebirdboilers.co.uk  www.firebirdboilers.co.uk

Firefly (UK) Ltd
Unit 4, Stag Business Park, Christchurch Road, Ringwood,
Hants, BH24 3SB
Tel: 01425 480210; Fax: 01425 479089

Flash
All enquiries to Euro Controls

GAH (Heating Products)
Melton Road, Melton, Woodbridge, Suffolk, IP12 1NH
Tel: 01394 386699; Fax: 01394 386609
mail@gah.co.uk  www.gahheatingproducts.co.uk
GEC Nightstor
All enquiries to Quick Spares Ltd
Gledhill Water Storage
Sycamore Estate, Squires Gate, Blackpool, Lancs, FY4 3RL
Tel: 01253 474444; Fax: 01253 474445
Sales@gledhill.net www.gledhill.net
Glow-Worm
See Hepworth Heating Ltd
GP Burners Ltd
2D Hargreaves Road, Groundwell Industrial Estate, Swindon, Wilts, SN2 5AZ
Tel: 01793 709050; Fax: 01793 709060
info@gpburners.co.uk www.gpburners.co.uk
Grant Engineering
Hopton House, Hopton Industrial Estate, Devizes, Wilts, SP2 7PU
Tel: 01380 736920; Fax: 0870 777 5553
info@grantuk.com www.grantuk.com
Grasslin (UK) Ltd
Vale Rise, Tonbridge, Kent, TN9 1TB
Tel: 01732 359888; Fax: 01732 354445
www.tfc-group.co.uk
Grundfos Pumps Ltd
Grovebury Road, Leighton Buzzard, Beds, LU7 4TL
Tel: 01525 850000; Fax: 01525 850011
www.grundfoss.com
Halstead Boilers
20/22 First Avenue, Bluebridge Industrial Estate, Halstead, Essex, CO9 2EX
Tel: 01787 475557; Fax: 01787 474588
sales@halsteadboilers.co.uk www.halsteadboilers.co.uk
Hamworthy Heating Ltd
Fleets Corner, Poole, Dorset, BH17 7LA
Tel: 01202 662500; Fax: 01202 665111
company.info@hamworthy-heating.com
www.hamworthy-heating.com
Heat Line
16–19 The Manton Centre, Manton Lane, Bedford, MK41 7PX
Tel: 0870 787 3363; Fax: 0870 777 8322
info@heatline.co.uk www.heatline.co.uk
Heating Control Services
Tel: 01922 634503; Fax: 01922 723777
Heating World Group
Excelsior Works, Eyre Street, Birmingham, B18 7AD
Tel: 0121 454 2244; Fax: 0121 454 4488
info@heatingworld.com www.heatingworld.com
Heatmiser UK Ltd
Primrose House, Primrose Street, Darwen, BB3 2DE
Tel: 01254 776343; Fax: 01254 704143
service@heatmiser.co.uk
Heatrae-Sadia
Hurricane Way, Norwich, Norfolk, NR6 6EA
Tel: 01603 420100; Fax: 01603 409409
sales@heatraesadia.com www.heatraesadia.com
Heb Boilers
All enquiries to GAH Heating Products
Hepworth Heating
Nottingham Road, Belper, Derbyshire, DE56 1JT
Tel: 01773 824141; Fax: 01773 828123
info@glow-worm.co.uk www.glow-worm.co.uk
Hermann
Broughton & Crangrove
Tel: 0870 6060601
hermann.uk@tiscali.co.uk www.hermann.it
Honeywell Control Systems
Honeywell House, Arlington Business Park, Bracknell, Berkshire, RG12 1EB
Tel: 01344 656000; Fax: 01344 656204
uk.infocentre@honeywell.com www.honeywell.com
Domestic Central Heating Wiring Systems and Controls

Horstmann Controls
South Bristol Business Park, Roman Farm Road, Bristol, BS4 1UP
Tel: 01179 788700; Fax: 01179 788701
sales@horstmann.co.uk www.horstmann.co.uk

Hoval Ltd
Northgate, Newark, Notts, NG24 1JN
Tel: 01636 672711; Fax: 01636 673532
hoval@hoval.co.uk www.hoval@hoval.co.uk

HRM Boiler Co
Haverscroft Industrial Estate, Attleborough, Norfolk, NR17 1YE
Tel: 01953 455400; Fax: 01953 454483
info@hrmboilers.co.uk www.hrmboilers.co.uk

Ideal
See Caradon-Ideal

IMI Pactrol
See Pactrol Controls

Imstor
See Church Hill Systems Ltd

Invensys
PO Box 57, Farnham Road, Slough, Berks, SL1 4UH
Tel: 01753 550550; Fax: 01753 824078
Customer.care@invensys.com www.invensys.com

Jaguar
All enquiries to Hepworth Heating

JLB Group
All enquiries to Crosslee PLC

Johnson & Starley
Rhosili Road, Brackmills, Northampton, NN4 0LZ
Tel: 01604 762881; Fax: 01604 767408
sales@johnsonandstarley.co.uk www.johnsonandstarley.co.uk

Keston Boilers
34 West Common Road, Hayes, Bromley, Kent, BR2 7BX
Tel: 020 8462 0262; Fax: 020 8462 4459
info@keston.co.uk www.keston.co.uk

Landis & Gyr
All enquiries to Siemens

Landis & Staefa
All enquiries to Siemens

Lennox Industries
Cornwell Business Park, Slat House Road, Brackmills, Northampton, NN4 7EX
Tel: 01604 669100; Fax: 01604 669150
www.lennoxuk.com

Lochnivar Ltd
7 Lombard Way, The MXL Centre, Banbury, Oxon, OX16 4TJ
Tel: 01295 269981; Fax: 01295 271640
sales@lochnivar.lyd.uk www.lochnivar.lyd.uk

Malvern Boilers
Spring Lane North, Malvern, Worcs, WR14 1BW
Tel: 01684 893777; Fax: 01684 893776
sales@malvernboilers.co.uk www.malvernboilers.co.uk

Maxol
All enquiries to Burco Dean

Merlin
See B.H. Associates

Meta
See Modular Heating Sales

Modular Heating Sales
35 Nobel Square, Burnt Mills Industrial Estate, Basildon, Essex, SS13 1LT
Tel: 01268 591010; Fax: 01268 728202
sales@modular-heating-group.co.uk www.mhsboilers.com

MTS (GB) Ltd
MTS Building, Hughenden Avenue, High Wycombe, Bucks, HP13 5FT
Tel: 01494 755600; Fax: 01494 459775
info@mtsgb.ltd.uk www.mtsgb.ltd.uk
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<tr>
<th>Company</th>
<th>Address</th>
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<tr>
<td>Myson Controls</td>
<td>Eastern Valley, Team Valley, Gateshead, Tyne &amp; Wear, NE11 0PG</td>
<td>Tel: 0191 491 7530; Fax: 0191 491 7568</td>
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<td></td>
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<td><a href="mailto:sales@myson.co.uk">sales@myson.co.uk</a> <a href="http://www.mysoncontrols.co.uk">www.mysoncontrols.co.uk</a></td>
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<td>Myson Heating</td>
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<td>Nailmere Ltd</td>
<td>All enquiries to Time &amp; Temperature for AWB and Pyrocraft boilers</td>
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<td>Nu-Heat Ltd</td>
<td>Heathpark House, Devonshire Road, Heathpark Industrial Estate, Honiton, Devon, EX14 1SD</td>
<td>Tel: 01404 549770; Fax: 01404 549771</td>
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<td></td>
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<td><a href="mailto:ufh@nu-heat.co.uk">ufh@nu-heat.co.uk</a> <a href="http://www.nu-heat.co.uk">www.nu-heat.co.uk</a></td>
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<tr>
<td>Nu-Way Ltd</td>
<td>PO Box 1, Vines Lane, Droitwich, Worcs, WR9 8NA</td>
<td>Tel: 01905 794331; Fax: 01905 794017</td>
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<td><a href="mailto:info@nu-way.co.uk">info@nu-way.co.uk</a> <a href="http://www.nu-way.co.uk">www.nu-way.co.uk</a></td>
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<td>Ocean Boilers</td>
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<td>Offergram</td>
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<tr>
<td>Ouzledale Foundry Co</td>
<td>Long Ing, Barnoldswick, Colne, Lancs, BB18 6BN</td>
<td>Tel: 01282 813235; Fax: 01282 816876</td>
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<td></td>
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<td><a href="mailto:esse@ouzledale.co.uk">esse@ouzledale.co.uk</a> <a href="http://www.ouzledale.co.uk">www.ouzledale.co.uk</a></td>
</tr>
<tr>
<td>Pactrol Controls</td>
<td>10 Pithey Place, West Pimbo, Skelmersdale, Lancs, WN8 9PS</td>
<td>Tel: 01695 725152; Fax: 01695 724400</td>
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<td><a href="mailto:post@pactrol.com">post@pactrol.com</a> <a href="http://www.pactrol.com">www.pactrol.com</a></td>
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<td>Parkray</td>
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<tr>
<td>Pegler Ltd</td>
<td>St Catherine Avenue, Doncaster, DN4 8DF</td>
<td>Tel: 0870 120 0284; Fax: 01302 560109</td>
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<td><a href="mailto:uk.sales@pegler.co.uk">uk.sales@pegler.co.uk</a> <a href="http://www.pegler.com">www.pegler.com</a></td>
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<td>Potterton</td>
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<td><a href="mailto:enquiries@potterton.co.uk">enquiries@potterton.co.uk</a> <a href="http://www.potterton.co.uk">www.potterton.co.uk</a></td>
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<td>Potterton Myson</td>
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<tr>
<td>Powermatic</td>
<td>Winterhay Lane, Ilminster, Somerset, TA19 9PQ</td>
<td>Tel: 01460 53535; Fax: 01460 52341</td>
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<td><a href="mailto:info@powrmatic.co.uk">info@powrmatic.co.uk</a> <a href="http://www.powrmatic.co.uk">www.powrmatic.co.uk</a></td>
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<td>Proscon</td>
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<td>Pyrocraft</td>
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<tr>
<td>Quick Spares Ltd</td>
<td>Storey Lane Industrial Estate, Rain Hill, Merseyside, L35 9LZ</td>
<td>Tel: 0151 426 1393; Fax: 0151 426 1384</td>
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<tr>
<td>Radiant Boilers (Agent)</td>
<td>Unit 16, Spurlings Yard, Wallington, Gareham, Hampshire, PO17 6AB</td>
<td>Tel: 01329 828555; Fax: 01329 823208</td>
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<tr>
<td>Radiation</td>
<td>All enquiries to Hepworth Heating Ltd</td>
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<td>Randall Electronics</td>
<td>All enquiries to Danfoss Randall</td>
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<tr>
<td>Ravenheat</td>
<td>Chartists Way, Morley, Leeds, LS27 9ET</td>
<td>Tel: 0113 252 7007; Fax: 0113 238 0229</td>
</tr>
<tr>
<td></td>
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<td><a href="mailto:enquiries@ravenheat.co.uk">enquiries@ravenheat.co.uk</a> <a href="http://www.ravenheat.co.uk">www.ravenheat.co.uk</a></td>
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<tr>
<td>Rayburn</td>
<td>All enquiries to Aga-Rayburn</td>
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Redring Electric Ltd
See Applied Energy
Riello Ltd
The Ermine Centre, Ermine Business Park, Huntingdon, Cambs, PE18 6XX
Tel: 01480 432144; Fax: 01480 432191
info@rielloburners.co.uk www.rielloburners.co.uk
Ringdale UK Ltd
56 Victoria Road, Burgess Hill, West Sussex, RH15 9LR
01444 871349; Fax: 01444 870228
sales@ringdale.com www.ringdale.com
Saacke Ltd
Marshlands Spur, Farlington, Portsmouth, Hants, PO6 1RX
Tel: 02392 383111; Fax: 02392 327120
admin@saacke.co.uk www.saacke.co.uk
Sangamo
Industrial Estate, Port Glasgow, Renfrewshire, PA14 5XG
Tel: 01475 745131; Fax: 01475 744567
enquiries@sangamo.co.uk www.sangamo.co.uk
Satchwell Control Systems
All enquiries to Invensys
Satchwell Sunvic
All enquiries to Pegler or Sunvic
Saunier Duval
All enquiries to Hepworth Heating
Sauter Automation
Inova House, Hampshire International Business Park, Crockford Lane, Chineham, Basingstoke, RG24 8WH
Tel: 01256 374400; Fax: 01256 374455
info@uk.sauter-bc.com www.sauter-controls.com
Servowarm
9 The Gateway Centre, Coronation Road, Cressex Business Park, High Wycombe, Bucks, HP12 3SU
Tel: 0845 600 2266; Fax: 01494 492321
sales@servowarm.co.uk www.servowarm.co.uk
Siebe
All enquiries to Invensys
Siemens HVAC Products
Hawthorne Road, Staines, Middlesex, TW18 2AY
Tel: 01527 406224; Fax: 01527 406207
www.landisstaefa.co.uk
Sime Ltd
Unit 2, Enterprise Way, Bradford Road, Idle, Bradford, BD10 8EW
Tel: 0870 9911114; Fax: 0870 9911115
enquiries@sime.ltd.uk www.sime.ltd.uk
Sinclair
All enquiries to Halstead Heating
Smith Meters
All enquiries to Invensys
Smiths Industries
All enquiries to Timeguard
Sopac-Jaeger Controls
17 Invincible Road, Farnborough, Hants, GU14 7QN
Tel: 01252 511981; Fax: 01252 524018
jaegercontrols@btconnect.com
Southern Digital
No longer trading
Stelrad-Ideal
All enquiries to Caradon-Ideal
Strebel Ltd
1F Albany Park Industrial Estate, Frimley Road, Camberley, Surrey, GU16 7PB
Tel: 01276 685422; Fax: 01276 685405
info@strebel.co.uk www.strebel.co.uk
Sunvic Controls
Bellshill Road, Uddington, Glasgow, G71 6NP
Tel: 01698 812944; Fax: 01698 813637
sales@sunvic.co.uk www.sunvic.co.uk
Superswitch Electric
Novar ED&S, The Arnold Centre, Paycocke Road, Basildon, Essex, SS14 3EA.
Tel: 01268 563000
www.ade.co.uk
Switchmaster Controls
All enquiries to Invensys
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<th>Company</th>
<th>Address</th>
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<tr>
<td>Teddington Controls</td>
<td>Holmbush, St Austell, Cornwall, PL25 3HG</td>
<td>Tel: 01726 222522; Fax: 01726 222504</td>
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<td><a href="mailto:gas@tedcon.com">gas@tedcon.com</a>; <a href="http://www.tedcon.com">www.tedcon.com</a></td>
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<td>Thermecan Boilers</td>
<td>All enquiries to GAH Heating Products</td>
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<td>Thorn Heating</td>
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<td>TI Radiation</td>
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<tr>
<td>Time &amp; Temperature</td>
<td>Unit 56, Plume Street Industrial Estate, Plume Street, Aston, Birmingham, B6 7RT</td>
<td>Tel: 0121 327 2717; Fax: 0121 327 2395</td>
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<td><a href="http://www.plumbbase.com">www.plumbbase.com</a></td>
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<tr>
<td>Timeguard</td>
<td>Waterloo Road, London, NW2 7UR</td>
<td>Tel: 020 8450 8944; Fax: 020 8452 5143</td>
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<td><a href="mailto:csc@timeguard.com">csc@timeguard.com</a>; <a href="http://www.timeguard.com">www.timeguard.com</a></td>
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<tr>
<td>Tower</td>
<td>See Grasslin (UK) Ltd</td>
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<tr>
<td>Trac Time Controls</td>
<td>Thirsk Industrial Estate, Thirsk, North Yorks, YO7 3BX</td>
<td>Tel: 01845 526006; Fax: 01845 526010</td>
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<td><a href="mailto:sales@trac.co.uk">sales@trac.co.uk</a>; <a href="http://www.trac.co.uk">www.trac.co.uk</a></td>
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<tr>
<td>Trianco Redfyre Ltd</td>
<td>Thorncliffe, Chapeltown, Sheffield, S35 2PZ</td>
<td>Tel: 0114 257 2300; Fax: 0114 245 3021</td>
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<td>Tricom Group Ltd</td>
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<td>Trisave</td>
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<tr>
<td>Turkington Engineering</td>
<td>Unit 12, Whitegate Industrial Estate, Wrexham, LL13 8UG</td>
<td>Tel: 01978 363048; Fax: 01978 363046</td>
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<td><a href="mailto:Eurocal@wrexham.plus.com">Eurocal@wrexham.plus.com</a>; <a href="http://www.eurocalboilers.com">www.eurocalboilers.com</a></td>
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<tr>
<td>Unidare</td>
<td>See Dimplex</td>
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<td>Wickes (Controls)</td>
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Centrum 100, Second Avenue, Burton on Trent, DE14 2WJ
Tel: 01283 523000; Fax: 01283 523099
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**Worcester Heat Systems**
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**Yorkpark Ltd**
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