Technical and Specification Information

GB162 50kW – 100kW
GB162 cascades up to 800kW

# GB162 wall mounted gas-fired condensing boiler series

**NEW 50kW model**

WORCESTER
Bosch Group


# Worcester and you, making a difference

As part of the Bosch Group, Worcester products are designed and manufactured to provide its customers with the high levels of quality and reliability which are synonymous with the Bosch name throughout the world.

As part of Europe's largest supplier of heating products, Worcester, Bosch Group has the UK-based resources and support capability to offer you the value-added solutions you deserve. Worcester employs more than 2,000 people, including a nationwide network of Service Engineers and technically trained Field Sales Managers.

These are supported by an experienced technical services team which is able to provide comprehensive support and advice from system layout through to installation.

Worcester is dedicated to providing high performance, energy efficient heating and hot water systems for a wide range of installations, including large domestic properties and commercial applications such as offices, schools, sports centres and hotels.

BOSCH
Invented for life

The reception and main entrance at our Worcester headquarters

*"At Worcester, we remain keen to embrace new market opportunities and with an increasing number of you now looking to develop your business by branching into the light commercial sector, we are pleased to announce the addition of the GB162 model to our gas-fired boiler range. In doing so, we will continue to deliver on our core values of reliability, quality, efficiency."*

Carl Arntzen,
Managing Director,
Bosch Thermotechnology Ltd.

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# GB162 condensing boiler series

The GB162 is part of a market leading range of energy-saving condensing wall mounted gas-fired boilers.

The GB162 is an extremely versatile and compact wall hung condensing boiler that can be installed on its own or as part of a multi-boiler 'cascade' system. The boiler is available with individual outputs of 50, 65, 80 and 100kW; outputs of up to 800kW can be achieved when multiple units are connected as part of a cascade installation.

### Precise energy management

Each boiler in the GB162 series can automatically modulate its output down to 30% or less in order to precisely match the demand for heat. This considerably reduces fuel consumption and improves overall seasonal efficiency.

The GB162 is fully compatible with the Energy Management System (EMS) modular controls platform. This optimises performance by keeping the boiler in condensing mode for as long as possible. EMS also provides comprehensive heating system functionality and ensures minimal energy usage at all times.

### High efficiency, low emissions

The GB162 provides net efficiencies of up to 110% (NCV) with ultra low class 5 levels of $CO_2$ and NOx emissions. Its compact dimensions make it especially suitable for installations where space is restricted, but demand for a modern high output heating solution is high.

### Tax relief with the Carbon Trust

GB162 80kW and 100kW models are registered on the Carbon Trust's ECA scheme (Enhanced Capital Allowance). This will enable businesses to claim 100% of the first year capital allowance on investments in energy saving technology. For more details on how to register a claim please visit **www.etl.decc.gov.uk** or follow the links on **www.worcester-bosch.co.uk/commercial**.

## The GB162 series at a glance

| Boiler | | GB162 50kW | GB162 65kW | GB162 80kW | GB162 100kW |
|---|---|---|---|---|---|
| Part No. | NG | 7 736 700 642 | 7 746 900 822 | 8 747 024 8 | 8 747 025 0 |
| Heat output at 50/30°C | Min. | 15.6kW | 15.6kW | 20.8kW | 20.5kW |
| | Max. | 49.9kW | 65.0kW | 84.5kW | 99.5kW |
| Heat output at 80/60°C | Min. | 14.2kW | 14.2kW | 18.9kW | 19.0kW |
| | Max. | 46.6kW | 60.5kW | 80.0kW | 94.5kW |
| Net efficiency | | 110% | 108.0% | 110.0% | 110.0% |
| Seasonal efficiency | | 95.9% | 95.5% | 95.7% | 96.1% |
| Natural gas | | ✓ | ✓ | ✓ | ✓ |
| LPG conversion kit | | ✓ | ✓ | ✓ | ✓ |
| Single boiler installation | | ✓ | ✓ | ✓ | ✓ |
| Cascade installation | | ✓ | ✓ | ✓ | ✓ |

# Features of the GB162 condensing boiler series

### Patented, award-winning ALU-Plus heat exchanger

The precision engineered heat exchanger in the GB162 is constructed from a cast aluminium silicate compound which is lightweight, robust and allows for a rapid transfer of heat. The heat exchanger also uses the very latest ALU-Plus technology that has been developed by Bosch Thermotechnology Ltd. to increase durability and optimise heating efficiency.

Fins on the outside of the aluminium tubes increase the exterior surface area so that more hot flue gas comes into contact with the heat exchanger.

A spiral channel on the inside of the tube increases the internal surface area, bringing more water in contact with the heating surface and ensuring an optimum heat transfer.

The wide channels on the heat exchanger ensure that the flow resistance is minimised and this, combined with its fully insulated case, makes the GB162 incredibly quiet in operation.

### Plasma-polymerised heat exchanger

The surfaces of the heat exchanger's tubes are treated using a patented plasma-polymerisation process which leaves the surfaces so smooth that the heat exchanger effectively stays clean as no deposits can adhere to them. Its extremely high efficiency is maintained and there is no need for mechanical cleaning; the heat exchanger can be simply flushed through during servicing.

### 5 year guarantee heat exchanger

The ALU-Plus heat exchanger in the GB162 is eligible for a 5 year guarantee*.

### Multi-boiler cascade systems

For larger heat demands, the GB162 can be easily combined as part of a multi-boiler cascade system. Any combination of 1 to 8 boilers can be connected either in-line (TL) or back-to-back (TR). This provides a condensing boiler output of up to 800kW with the ability to modulate down to as low as 2.5% of the total output. This ensures that high levels of efficiency can be achieved all year round, even when demand for heat is low. Boilers can be sequenced to come into and out of operation when required.


The lower output 50kW and 65kW models enable suitably qualified heating engineers to undertake larger domestic and some light Commercial applications without the need for Commercial ACS qualifications.

**Terms and conditions apply.*

## Heating redundancy

A two 50kW GB162 cascade is an ideal solution for applications with heating demands of up to 50kW, such as nursing, care and residential homes, where there are vulnerable residents and back-up heating and hot water from a second boiler is an essential requirement.

When total net input is above 70kW, such as the cascade example above, Commercial ACS qualifications are required for installers.

## Cascade controls

Worcester offers a range of advanced modular controls designed specifically for the GB162 cascade system. The MCM10 or 4121/4122 controls can be easily wired to the boiler and fixed to a cascade frame kit, or can be fitted onto a wall of the boiler room. For further details on these control configurations please see page 31.

The modular control system provides a comprehensive solution for any heating system and is a cost-effective alternative to installing a Building Management System.

For ease and speed of installation, and in situations where a Hot Work Permit would normally be required to weld the low loss header and the flow and return connections, threaded flange connection sets are available in 2½", 3" and 4" diameter sizes.

## The GB162 cascade kit includes:

- Mounting frames
- Support legs
- Main gas pipe
- Flow and return headers (reversible for either left or right orientation)
- Low loss header (optional – variants available with and without Low loss header)
- Boiler connecting pipe work
- Full insulation.

The picture below shows each boiler fitted with a pump group which is available separately. For full technical details on each individual back-to-back (TR) or in-line (TL) GB162 cascade kit please see pages 34-39 at the back of this brochure.

## No minimum flow rate required

GB162 boilers do not require a minimum flow rate, which makes the design and specification of a heating system much simpler, removing the need for additional components and reducing installation time.

Modulating fans and pump groups mean that output is precisely matched to the user's actual requirements at all times and, as such, electricity consumption can fall by up to 40% in some cases.

Using Worcester accessories in the system will help to ensure that the best solution is provided for optimum energy savings and reduced installation costs.

| Features | Benefits |
|---|---|
| Condensing technology with up to 110% net efficiency† | Saves fuel compared to standard efficiency boiler |
| Modulation to just 20% of total output† | Year round efficiency according to seasonal demand |
| Cascade outputs up to 800kW per frame kit | Modular package providing energy saving flexibility and maintenance backup |
| Ultra low emission levels | Cleaner combustion and increased carbon savings |
| Quick and easy installation | Time saving |
| Integrates with solar thermal installations | Maximise savings from solar hot water |
| Individual lift weight only 70kg | Easy manoeuvrability |
| Whisper quiet | Can be sited near occupied rooms |
| Intuitive user controls | Increased system functionality and reduced running costs |
| LPG conversion available | Ideal for off mains locations |

*†Depending on model.*

# GB commercial plate heat exchangers

The new GB commercial plate heat exchangers are a ready-made solution for separating the boiler from heating systems with old, dirty and poor quality system water and allows our range of GB162 boilers to be fitted on an open-vented system.

### Enhanced reliability and efficiency

The GB plate heat exchanger ensures boiler water and system water never meet. The heat exchanger protects the boiler and therefore minimises potential downtime, as well as improving long-term efficiency.

### Open-vented system

The GB plate heat exchanger allows GB162 boilers to be installed on an open vented system. The plate heat exchanger separates the primary (boiler) and secondary (heating system), therefore protecting the boiler's heat exchanger from system water by effectively creating its own sealed system. The plate heat exchanger can also be used to provide boiler protection when installing within an old, sealed secondary system.


**Please note that system flushing and treating must still be carried out as best practice. The plate heat exchanger is sized on the basis of a boiler ΔT of 20°C and a system ΔT of 11°C.**

### Sized to match all boiler outputs

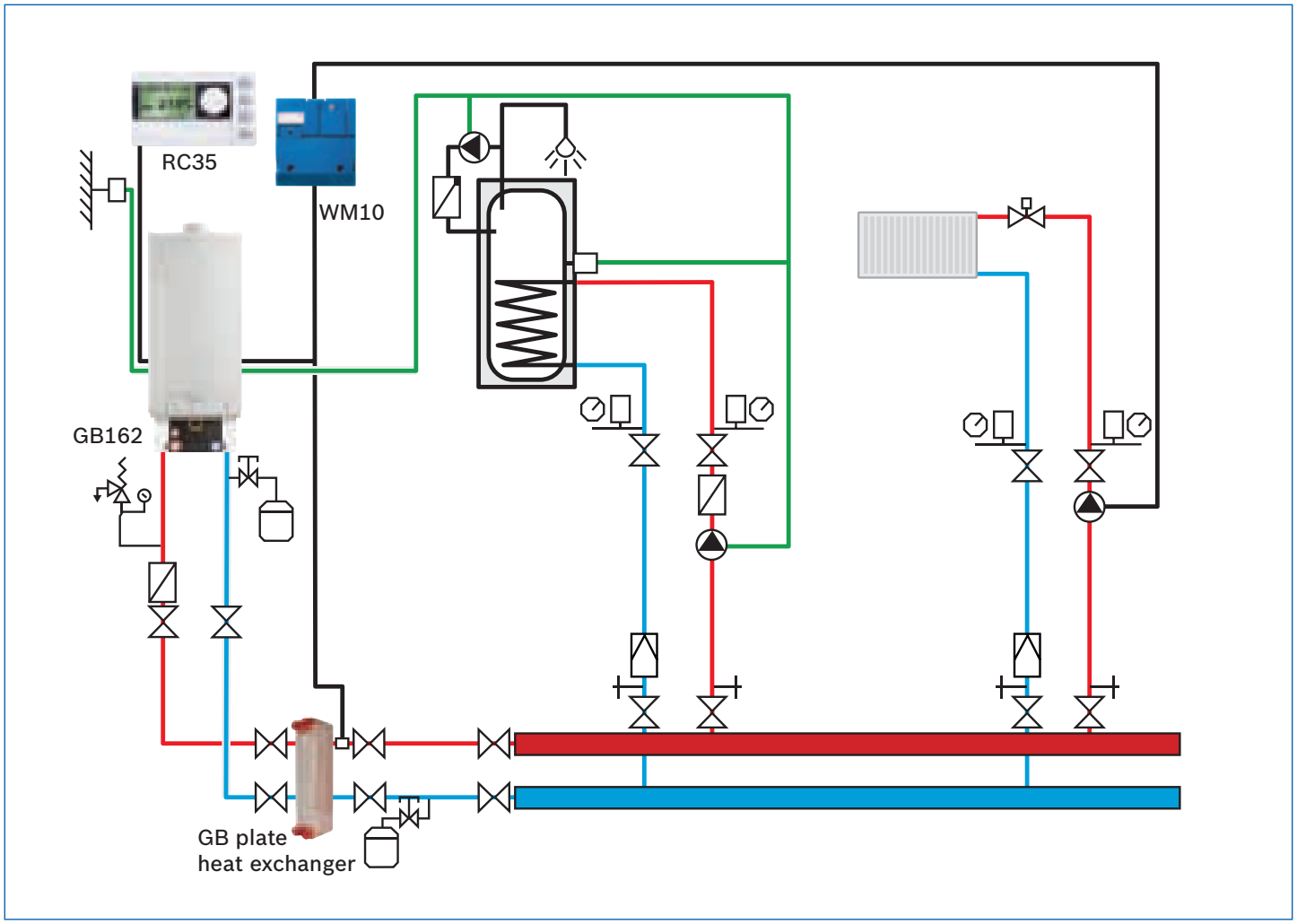
Each GB plate heat exchanger has been sized to match all possible combinations of GB162 boiler single and cascade installations as indicated by the product name. This means that the pump flow rates are suitable and allow heat to efficiently transfer in the plate heat exchanger, while also ensuring that existing pumps can be used in cases of retrofit.

### Features and benefits of GB commercial plate heat exchanger at a glance:

- Enhanced reliability and efficiency
- Maximises running hours, overall efficiency and availability of heating and hot water
- Allows GB162 boilers to be installed on an open vented system
- Improved installation flexibility
- Sized and matched for all boiler outputs
- Time saving when designing the heating system and easy to specify and order
- Compatible with our range of GB162 boiler controls
- Precise energy management.

### GB commercial plate heat exchangers

| GB162 | | | | | |
|---|---|---|---|---|---|
| 50kW | 65kW | 80-100kW | 101-140kW | 141-180kW | 181-230kW |
| 7 733 600 013 | 7 733 600 014 | 7 733 600 016 | 7 733 600 017 | 7 733 600 018 | 7 733 600 020 |
| 231-280kW | 281-400kW | 401-520kW | 521-640kW | 641-800kW | |
| 7 733 600 021 | 7 733 600 023 | 7 733 600 024 | 7 733 600 026 | 7 733 600 027 | |




**Compatible with existing GB162 boiler controls**

As the GB plate heat exchanger can simply be treated as a Low Loss Header our RC35, MCM10 and 4000 controls can still be used to ensure the boiler is operating at the right level of modulation, via flow temperature sensors.

**Note when specifying a plate heat exchanger:**

Opt for Cascade Kit without Low Loss Header option; e.g. TL2 Boiler Cascade Kit without LLH (7747201426) instead of TL2 Boiler Cascade Kit with LLH (7114064).

The plate heat exchanger is also supplied with tailor-made insulation in order to ensure minimal heat losses. Standard factory fittings are pre-fitted external (male) threads on all 4 connections (1¼", 2" or 2½" depending on the model). Stud bolts are supplied for when mounting on a skid.

Flow Temperature Sensor must be installed.

- With RC35 controls, a WM10 must be installed (provides FK terminal for wiring of sensor) – sensor included
- For cascades controlled with the MCM10 sequencer, use the sensor supplied (connection point E in Installation Manual) – FV/FZ sensors required (5991376)
- With 4000 controls – FK connection to be used – additional sensor not required (4000 controls supplied with sensor)
- Flow sensor to be strapped on secondary flow pipe.

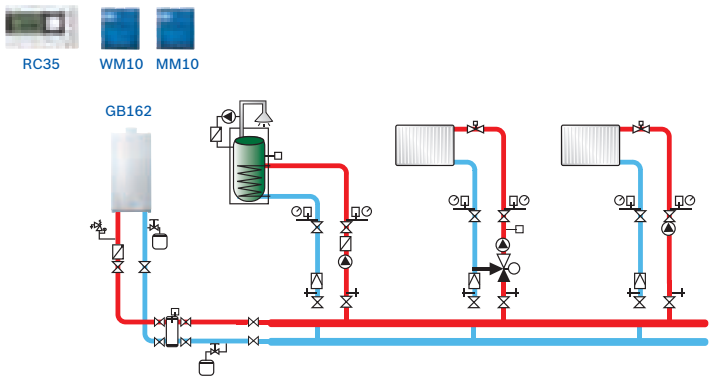
# Flexible system solutions

GB162 boilers have been developed to allow specifiers and heating engineers greater flexibility to design heating systems, providing reliability and efficient performance for any project.

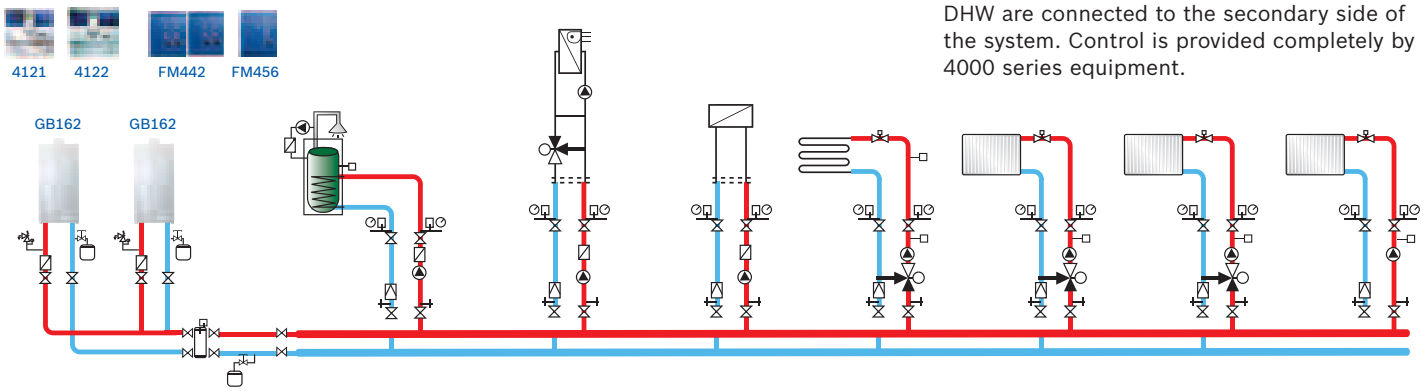
In addition, Worcester also offers a comprehensive on-site technical service where system specialists can visit and discuss the best heating solutions for your needs.

The following hydraulic schematics show just some of the many options that are available for individual and cascade installations. For support on hydraulics and controls please contact the Worcester technical support team on **0330 123 0165**.

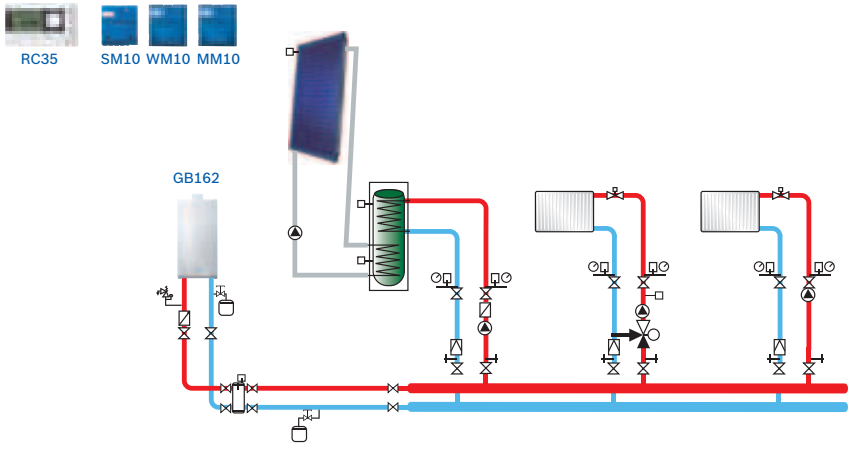
In all instances the pump group is not shown.




1. Single GB162 installed with a low loss header. Two heating circuits and DHW are connected to the secondary side of the system. Control is provided completely by RC series equipment.




2. Example shows two GB162 boilers installed with a low loss header. Six heating circuits and DHW are connected to the secondary side of the system. Control is provided completely by 4000 series equipment.




3. Single GB162 installed with a low loss header. Two heating circuits and DHW with solar are connected to the secondary side of the system. Control, including the solar system, is provided completely by RC series equipment.

# GB162 technical data

| Boiler | GB162 50kW | GB162 65kW | GB162 80kW | GB162 100kW |
|---|---|---|---|---|
| Height without pump group | 980mm | 980mm | 980mm | 980mm |
| H x W x D (with pump group) | 1414x520x465mm | 1414x520x465mm | 1414x520x465mm | 1414x520x465mm |
| Dry weight (without a pump group) | 70kg | 70kg | 70kg | 70kg |
| Boiler flow and return connections | G1½" union nut free female thread enclosed | G1½" union nut free female thread enclosed | G1½" union nut free female thread enclosed | G1½" union nut free female thread enclosed |
| Concentric room sealed flue | 80/125mm dia. or 100mm/150mm dia.* | 80/125mm dia. or 100mm/150mm dia.* | 100mm/150mm dia. | 100mm/150mm dia. |
| Gas connection | R1" | R1" | R1" | R1" |
| Condensate drain | Ø 24mm | Ø 24mm | Ø 24mm | Ø 24mm |
| Nominal heat output at 80/60°C | 14.2 - 46.6kW | 14.2 - 60.5kW | 18.9 - 80.0kW | 19.0 - 94.5kW |
| Nominal heat output at 50/30°C | 15.6 - 49.9kW | 15.6 - 65.0kW | 20.8 - 84.5kW | 20.5 - 99.5kW |
| Safety valve connection | R1" | R1" | R1" | R1" |
| Rated heat input | 14.6 - 47.5kW | 14.6 - 62.0kW | 19.3 - 82.0kW | 19.3 - 96.5kW |
| Net efficiency (NCV) | 110% | 108% | 110% | 110% |
| Seasonal efficiency (as L2B) | 95.9% | 95.5% | 95.7% | 96.1% |
| ErP efficiency class | A | A | N/A | N/A |
| ErP seasonal efficiency | 93% | 92% | N/A | N/A |
| 2009 SEDBUK value – natural gas | 88.7% | 88.9% | N/A | N/A |
| Standby heat loss | 0.05% | 0.05% | 0.05% | 0.06% |
| Maximum working pressure | 4bar | 4bar | 4bar | 4bar |
| Flow temperature | 30 - 90°C | 30 - 90°C | 30 - 90°C | 30 - 90°C |
| Water content | 5l | 5l | 5l | 5l |
| Pressure drop rate at ΔT 20K | 90mbar | 170mbar | 225mbar | 320mbar |
| Noise level at 1m, full load | 45dB(A) | 46dB(A) | 47dB(A) | 52dB(A) |
| NOx rating at 0% oxygen, dry mg/kWh | 27 | 28 | 37 | 39 |
| Maximum flue length 80/125mm | 7.7m | 7.7m | N/A | N/A |
| Maximum flue length 100/150mm | 20m* | 20m* | 18m | 18m |
| Flue gas mass flow rate, full load | 21.6g/s | 27.2g/s | 35.3g/s | 44.9g/s |
| Flue gas temperature 80/60°C, full load | 60°C | 64°C | 67°C | 76°C |
| Flue gas temperature 80/60°C, part load | 57°C | 57°C | 61°C | 57°C |
| Flue gas temperature 50/30°C, full load | 43°C | 43°C | 48°C | 51°C |
| Flue gas temperature 50/30°C, part load | 33°C | 33°C | 34°C | 34°C |
| Free feed pressure of fan | 85Pa | 120Pa | 139Pa | 220Pa |
| $CO_2$ content at full load, natural gas G20 | 9.3% | 9.4% | 9.3% | 9.4% |
| Condensate water rate natural gas G20, 40/30°C | 5.2l/h | 6.9l/h | 9.0l/h | 10.8l/h |
| pH value of condensate water | approx. 4.1 | approx. 4.1 | approx. 4.1 | approx. 4.1 |
| Gas pressure (natural gas) | 17 - 25mbar | 17 - 25mbar | 17 - 25mbar | 17 - 25mbar |
| Gas rating at 15°C 1013mbar (natural gas) | 5.03$m^3$/h | 6.56$m^3$/h | 8.68$m^3$/h | 10.21$m^3$/h |
| Current rating | 230 VAC, 50 Hz, 10A | 230 VAC, 50 Hz, 10A | 230 VAC, 50 Hz, 10A | 230 VAC, 50 Hz, 10A |
| Electrical supply, number of phases | 1 | 1 | 1 | 1 |
| Maximum fuse rating | 10 | 10 | 10 | 10 |
| Electrical power consumption, full load | 45W† | 99W† | 97W† | 147W† |
| Electrical power consumption, part load | 20W† | 21W† | 30W† | 28W† |
| Electrical ingress protection | IPX4D | IPX4D | IPX4D | IPX4D |

**100/150 adaptor required. †Electrical consumption does not include pump group.*

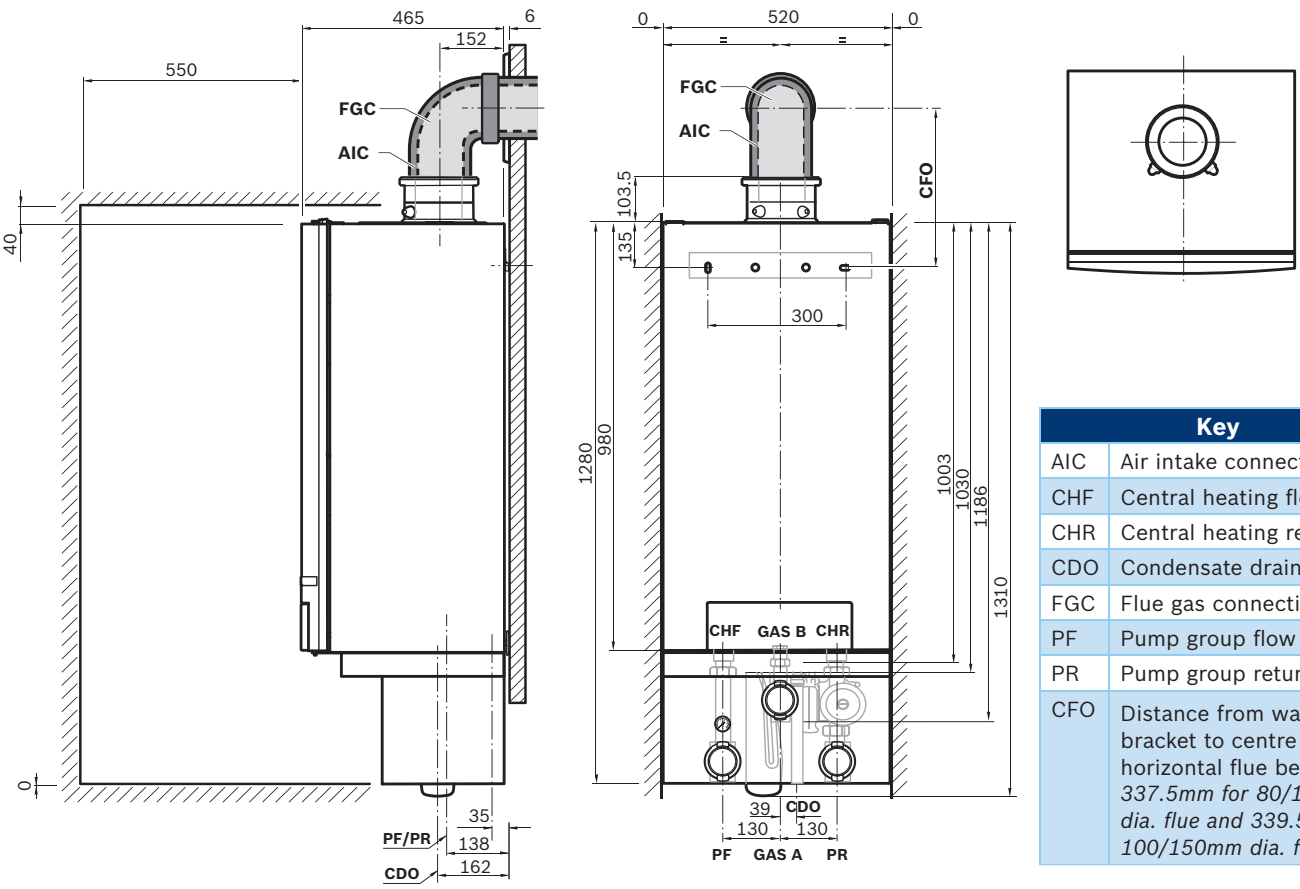
# Inside story

# Installing the GB162 series

The GB162 series is the perfect replacement boiler for many installations where old and inefficient heating systems have come to the end of their life. By investing in condensing technology with a fully compatible controls system, fuel savings can be achieved from day one, and the higher fuel prices go, the bigger your saving will be.

With its compact dimensions, relative light weight and modular design, the GB162 is an excellent choice where access to the boiler or plant room is restricted, or where floor space is limited. A smaller physical footprint for the heating system will increase installation flexibility, speed up the installation process, improve access for maintenance, and reduce the need for large boiler rooms.

## Dimensions




| Key | |
|---|---|
| AIC | Air intake connection |
| CHF | Central heating flow |
| CHR | Central heating return |
| CDO | Condensate drain outlet |
| FGC | Flue gas connection |
| PF | Pump group flow |
| PR | Pump group return |
| CFO | Distance from wall bracket to centre of horizontal flue bend; *337.5mm for 80/125mm dia. flue and 339.5mm for 100/150mm dia. flue* |

## Clearances

The minimum clearances shown below should be allowed for installation and servicing.

| Permanent clearances | | | | |
|---|---|---|---|---|
| | GB162 50kW | GB162 65kW | GB162 80kW | GB162 100kW |
| In front | 50mm | 50mm | 50mm | 50mm |
| Below | 0mm* | 0mm* | 0mm* | 0mm* |
| Right side | 0mm | 0mm | 0mm | 0mm |
| Left side | 0mm | 0mm | 0mm | 0mm |
| Above | 30mm | 30mm | 30mm | 30mm |

**250mm with pump group.*

| Service clearances | | | | |
|---|---|---|---|---|
| | GB162 50kW | GB162 65kW | GB162 80kW | GB162 100kW |
| In front | 550mm | 550mm | 550mm | 550mm |
| Below | 350mm | 350mm | 350mm | 350mm |
| Right side | 0mm | 0mm | 0mm | 0mm |
| Left side | 0mm | 0mm | 0mm | 0mm |
| Above | 40mm | 40mm | 40mm | 40mm |

# Installation requirements

These pages provide an overview of the main installation and system requirements for the GB162. The full installation instructions supplied with the boiler must be adhered to before any work on the heating system takes place.

Where there is a secondary pump in the heating system, a low loss header should be installed to separate the boilers from the rest of the heating system. Fitting together with the modulating pump group accessory ensures that flow volumes are balanced, efficiency is high and hydraulic performance is optimised.

Regardless of whether a secondary pump is installed or not, 80kW and 100kW models should always be hydraulically separated.

Hydraulic separation can also be achieved with a plate heat exchanger – see pages 8-9.

Worcester's technical support team is available to offer system design advice or if necessary make site visits. For more details call **0330 123 0165**.

### Frost protection

The boiler has integrated frost protection which switches the boiler on at a central heating flow temperature of 7°C and switches it off at a central heating flow temperature of 15°C.

### Designated use

The boilers may only be used to heat water for sealed heating systems of up to 4 bar. For greater system pressures or open vented systems the boiler must be separated from the heating system with a plate heat exchanger (see page 9).

### Quality of the heating system water

We strongly recommend thoroughly flushing the system before filling it and using only untreated tap water when filling the system. The use of dirty water will lead to build-ups of sediment and corrosion, which can result in the boiler malfunctioning and cause damage to the heat exchanger.

DO NOT treat the water with products such as pH-adjusting substances (chemical additives), antifreeze or water softeners. Sentinel X100 or Fernox MB-1 can be used to achieve the desired water quality. The concentration of Sentinel or Fernox should be at least 1% of the volume of the water in the system.

The pH of the heating system water MUST be between 7 and 8.5. If this is not the case, please contact Worcester's technical support team before proceeding.

Artificially softened water should not be used with the GB162.

### Wiring diagram

A detailed wiring diagram showing how to wire the boiler and controls can be found on pages 19-20. We recommend using either dedicated controls to maximise efficiency or control the GB162 with an existing 0 to 10V BMS signal.

The 50kW and 65kW boilers incorporate an RTH converter allowing existing 230V controls to be connected (for single boiler installations only).

### Quality of the pipe work

When using plastic pipe work in the heating system, e.g. for underfloor heating, it has to be oxygen-tight according to relevant UK Standards. If the plastic pipes do not comply with these standards, the system parts must be separated using a plate heat exchanger.

### Maintenance schedule

The activities to be included in an annual inspection and maintenance contract can be found in the service section of the installation manual. If an inspection reveals that maintenance activities are necessary, these activities must be carried out.

### Connection of gas and water

The boilers do not contain a factory installed circulation pump. The boiler should be installed together with a GB162 accessory pump group to ensure that the pump is appropriately sized for the boiler. The pump group also allows for an easier and quicker installation.

If the boiler is being wall mounted rather than frame mounted, a connection set is required in order to connect the flow and return.

| Pump group part numbers | |
|---|---|
| Modulating pump group | **7 746 901 863** |
| Modulating pump group – low energy* | **7 746 901 876** |
| Connection set (for using pump group without cascade set) | **558 4552** |

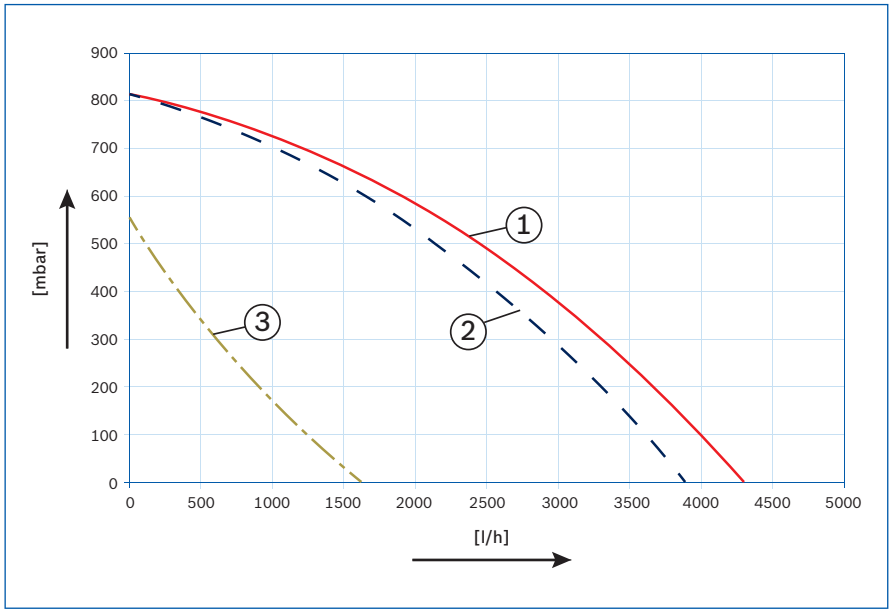
**Replacing 7 746 901 863 from July 2015 onwards.*

## LPG conversion

The boiler can be converted to LPG use with the appropriate kit.

| LPG conversion kit part numbers | |
|---|---|
| 50/65kW | **7 746 900 509** |
| 80/100kW | **8 718 601 980** |

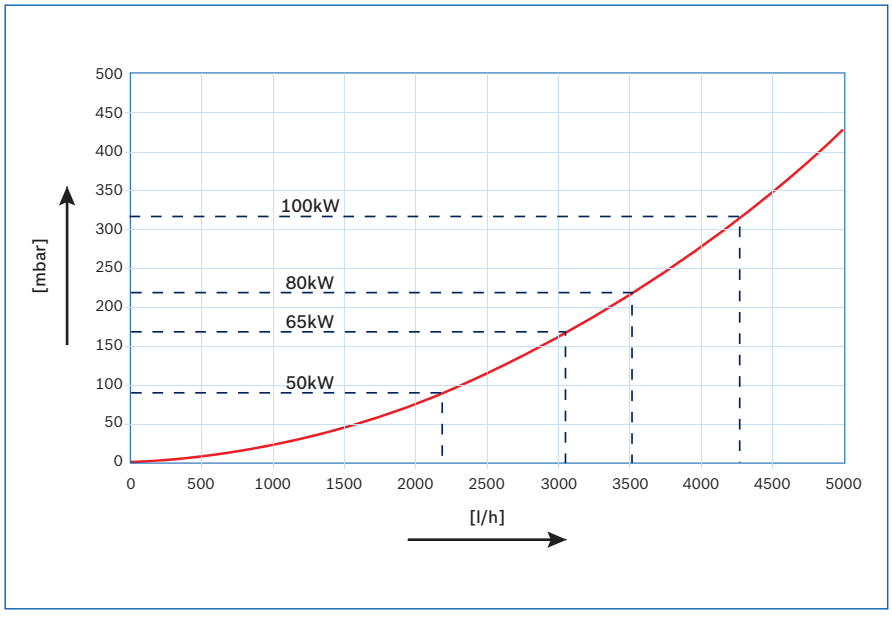
## Modulating and low energy modulating pump group – 50/65/80/100kW




*Residual head downstream of the pump group – with and without a non-return valve*

**l/h** Volume flow
**mbar** Residual head
**1** Residual head downstream of the pump group without a non-return valve (UPER 25-80) – full load
**2** Residual head downstream of the pump group with a non-return valve (UPER 25-80) – full load
**3** Residual head downstream of the pump group with a non-return valve (UPER 25-80) – partial load

## Hydraulic resistance




*Boiler resistance curve*

**l/h** Volume flow
**mbar** Residual head

# Single boiler installation

The GB162 50kW and 65kW boilers, when installed on their own, must use a pump group and connection set. For control of the boiler it can be connected to 230V AC on/off controls via the supplied RTH convertor. Alternatively, an RC35 control can be used to control the system circuits. Please note this will also require at least a low loss header and a WM10 module.

The GB162 80kW and 100kW boilers also require a pump group and connection set, and must be installed with a low loss header. Third party circulation pumps will also be required for the DHW and heating circuits. To monitor the temperature at the low loss header, a WM10 module is required with an RC35 controller. A DHW circuit will also require the additional DHW cylinder sensor. The 80kW and 100kW boilers cannot be connected to 230V AC controls.

| | | Part no. | GB162 50kW (7 736 700 642) | GB162 65kW (7 746 900 822) | GB162 80kW (8 747 024 8) | GB162 100kW (8 747 025 0) |
|---|---|---|---|---|---|---|
|  | Modulating pump group – low energy†<br><br>Modulating pump group | 7 746 901 876<br><br>7 746 901 863 | ✓ | ✓ | ✓ | ✓ |
|  | Connection set | 5 584 552 | ✓ | ✓ | ✓ | ✓ |
|  | Low loss header c/w insulation | 89 200 972 | * | * | ✓ | ✓ |
|  | RC35 digital boiler control | 7 747 312 318 | * | * | ✓ | ✓ |
|  | WM10 low loss header module | 30 008 458 | * | * | ✓ | ✓ |
|  | DHW cylinder sensor (if DHW cylinder is present) | 5 991 387 | * | * | ✓ | ✓ |

†*Replacing 7 746 901 863 from July 2015 onwards.*

✓ *Required accessory.*

* *Optional accessory may be required in some installations.*

# Modulating pump group

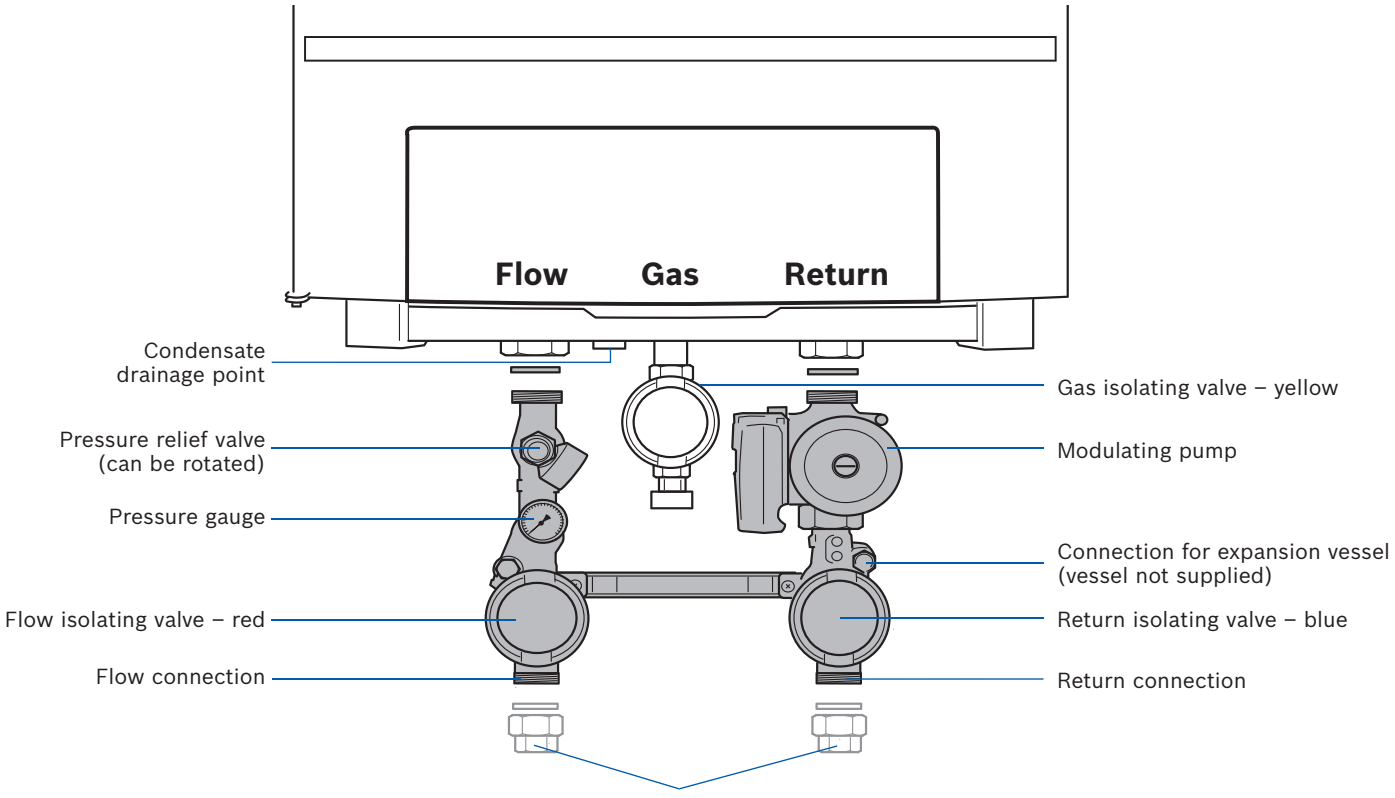
The GB162 can be installed with a modulating pump group accessory. The high quality pump group ensures quick, easy and reliable connection of the boiler to the main flow, return and gas headers. The Worcester pump groups are correctly sized to ensure that the flow rate through the GB162 heat cell never exceeds the limit of 5000l/h @ ΔT 20K. The pump group options will also help to prolong the life of the boiler by minimising wear and tear on its components. As a result, system efficiency is improved and installation time and running costs are reduced. When using a Worcester pump group, a low loss header should also be used to simplify hydraulic design of the heating circuit.

The pump groups are directly mounted under the boiler to feed a low loss header or plate heat exchanger or in the case of a single 50kW and 65kW boiler supply the system directly. As the heating circuits reach their required temperature and the flow is reduced by the thermostatic radiator valves, the modulating pump will respond to the reduced demand. This helps keep a system in balance as well as reducing noise and electrical energy use.

| | Modulating pump group (7 746 901 863) | Modulating pump group – low energy† (7 746 901 876) |
|---|---|---|
| Modulating 25/80 pump | ✓ | ✓ |
| Gas isolation valve | ✓ | ✓ |
| Flow & return isolation valves | ✓ | ✓ |
| Pressure gauge | ✓ | ✓ |
| Pressure relief valve | ✓ | ✓ |
| Drain valve | ✓ | ✓ |
| Expansion vessel connection point* | ✓ | ✓ |
| Insulated cover | ✓ | ✓ |
| Flow & return thermometers | ✓ | ✓ |

*Expansion vessel not supplied.*
*†Replacing 7 746 901 863 from July 2015 onwards.*

# Modulating pump group at a glance




Screw fitting 1¼" connection set (accessory 5 584 552) when using boiler without cascade frame

### Positioning and termination of the condensate drain pipe

The condensate pipe should be routed internally to prevent freezing. If an internal routing of the condensate pipe work is not possible, it is advisable to use a trace heating device or an auxiliary syphon to reduce the potential for freezing.

The condensate pipe should run and connect to the internal sewage pipe in the building or waste pipe. Alternatively, the condensate can be discharged into the rainwater system if connected to a foul water draining system.

All connecting drainage pipe work should generally have a fall of at least 2.5º to the horizontal, or approximately 50mm per metre of pipe run. If this cannot be achieved, you should consider the use of a condensate pump. It should be noted that the connection of a condensate pipe to a drain may be subject to local Building Control. See installation manual for more information and guidance.

# Wiring diagrams

The schematic below shows a standard GB162 hydraulic, complete with low loss header. Connecting the sophisticated energy saving controls to the GB162 is simplified by the use of colour coded plugs.

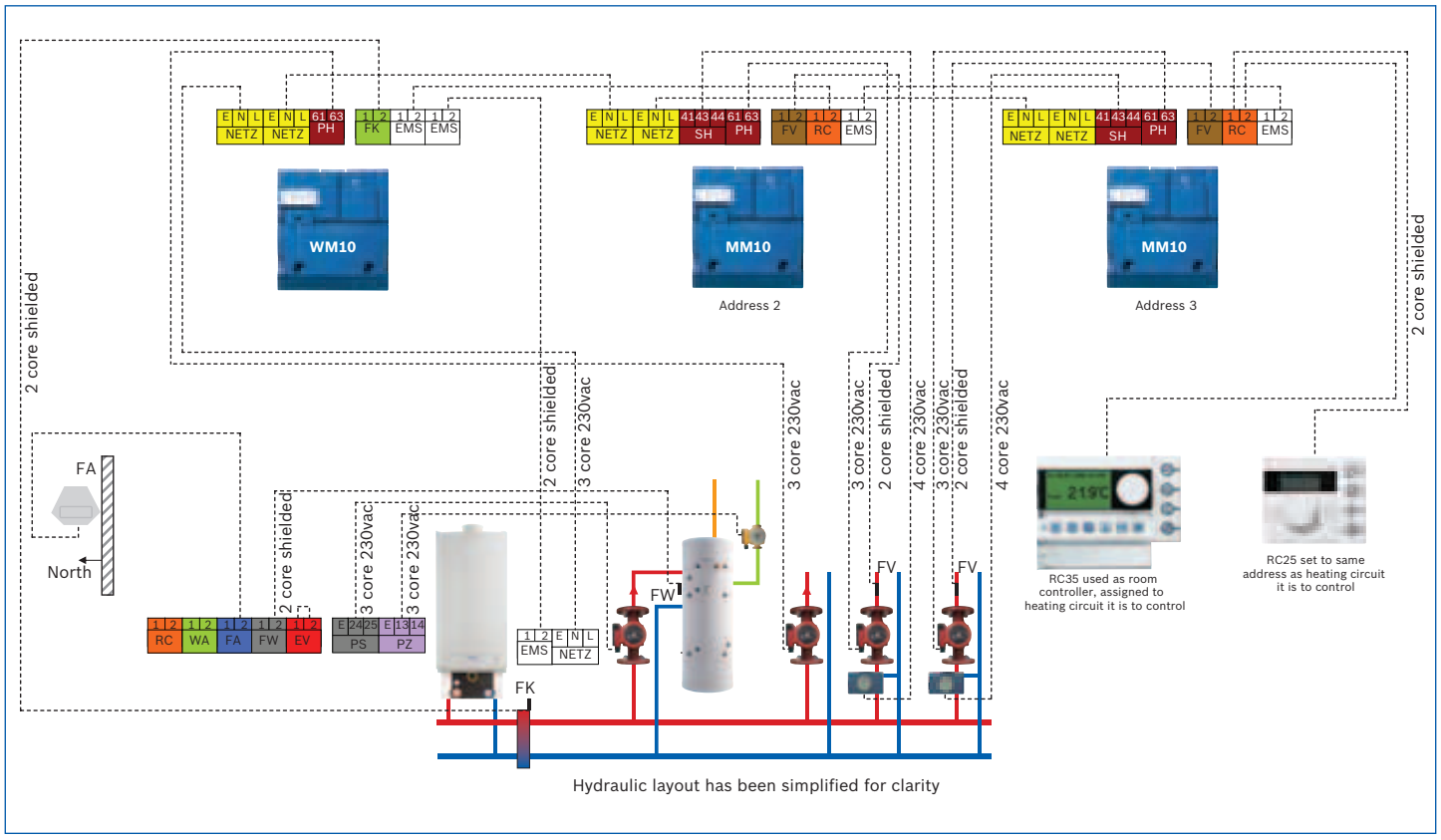
The RC35 programmer, outdoor weather sensor and domestic hot water tank sensor are all wired back to their respective plugs which are then simply clicked into the coded connections on the GB162. For systems with an additional unmixed or mixed heating circuit, the MM10 with a flow temperature sensor can be used to control a pump and mixing valve.

As shown in the schematic, it is possible to connect an RC25 to this module which provides room temperature influence to the weather compensating heating curve. The WM10 module for the low loss header and unmixed heating circuit pump is connected in the boiler tray via the EMS bus.

| Key | |
|---|---|
| EMS | Energy Management System |
| EV | External safety contact, e.g. external safety chain |
| FA | Outdoor temperature sensor |
| FK | Low loss header temperature sensor |
| FV | Flow temperature sensor |
| FW | DHW sensor |
| NETZ | Mains connection 230 VAC 50Hz, max. permissible: 10A |
| PH | Heating pump 230 VAC max. 250W |
| PS | DHW pump 230VAC max. 250W |
| PZ | DHW circulation pump 230 VAC max. 250W |
| RC | Room controller RC and EMS bus |
| SH | Mixing valve |
| WA | On/off temperature controller, potential free |

## RC35 and RC25 wiring diagram

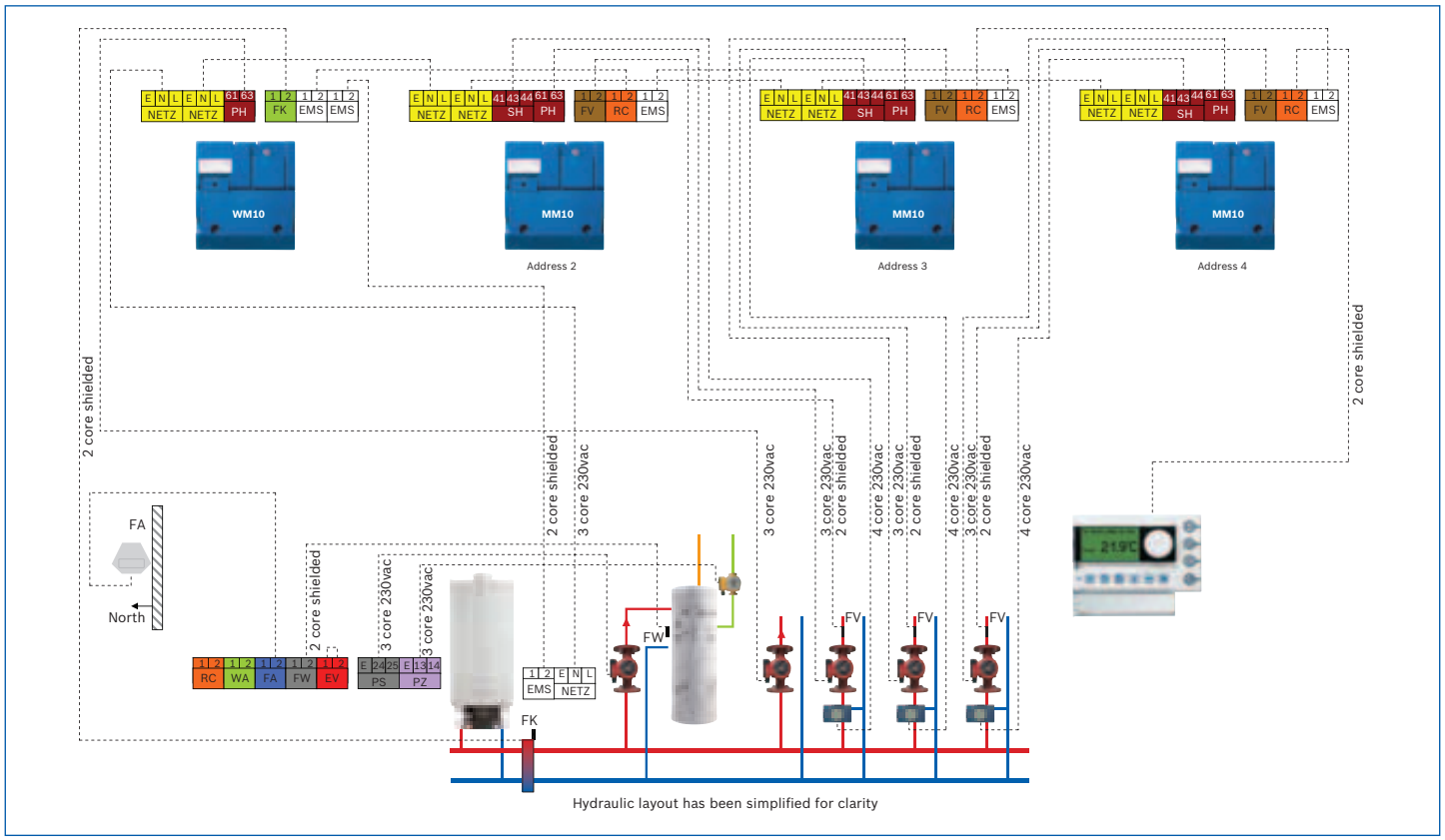
For DHW, 1 x unmixed heating and 2 x mixed heating circuits




**Please note: The addition of controls and/or a cylinder with or without solar thermal in conjunction with a single 50kW or 65kW boiler constitutes an ErP system – please see www.worcester-bosch.co.uk to access the easy to use ErP system tool.**

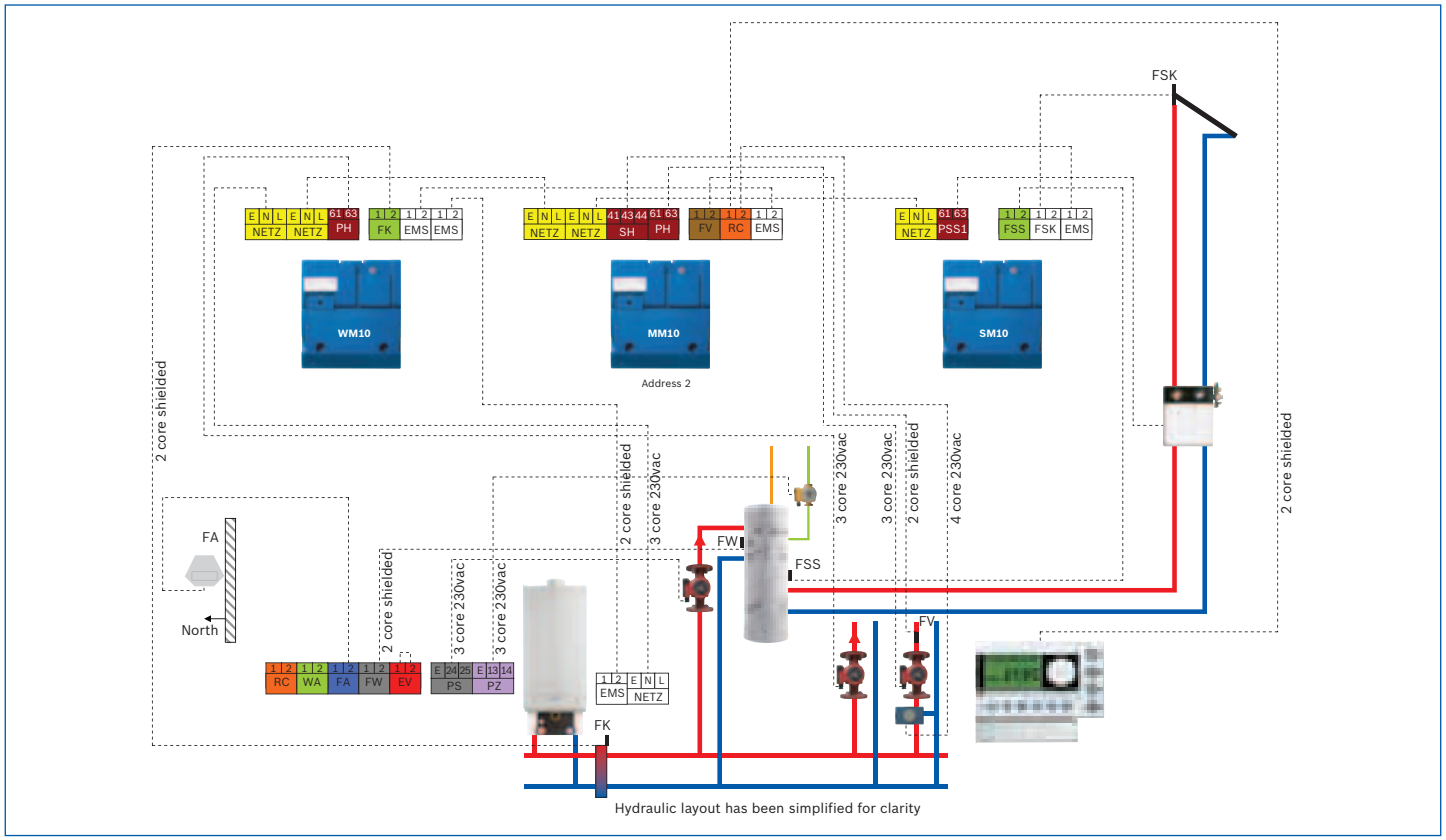
## RC35 wiring diagram

For DHW, 1 x unmixed heating and 3 x mixed heating circuits




## RC35 and solar wiring diagram

For DHW, solar, 1 x unmixed heating and 1 x mixed heating circuits

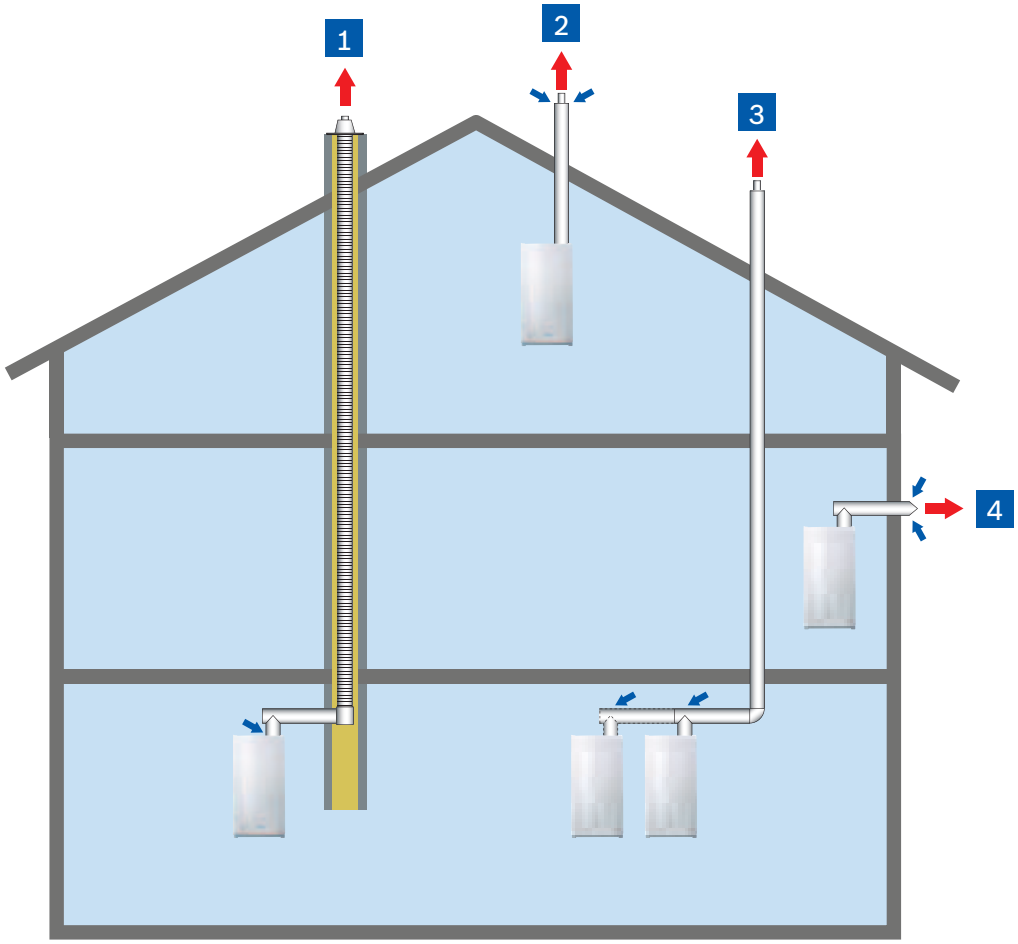



**Please note: The addition of controls and/or a cylinder with or without solar thermal in conjunction with a single 50kW or 65kW boiler constitutes an ErP system – please see www.worcester-bosch.co.uk to access the easy to use ErP system tool.**

# GB162 boiler series fluing options

The flexibility of the GB162 series also extends to the fluing options, as shown in the diagram below, allowing the specifier to site the boiler in a number of different positions. The GB162 is suitable for either room sealed or open flues. To ensure maximum reliability, quality and safety all Worcester flue gas systems are rigorously tested to the latest industry standards.

The diagram below shows typical standard flue systems that can be used for a GB162 installation. Full installation instructions and relevant building regulations must be adhered to prior to installation of any flue system. Additional fluing solutions are possible and should be discussed with your fluing specialist.

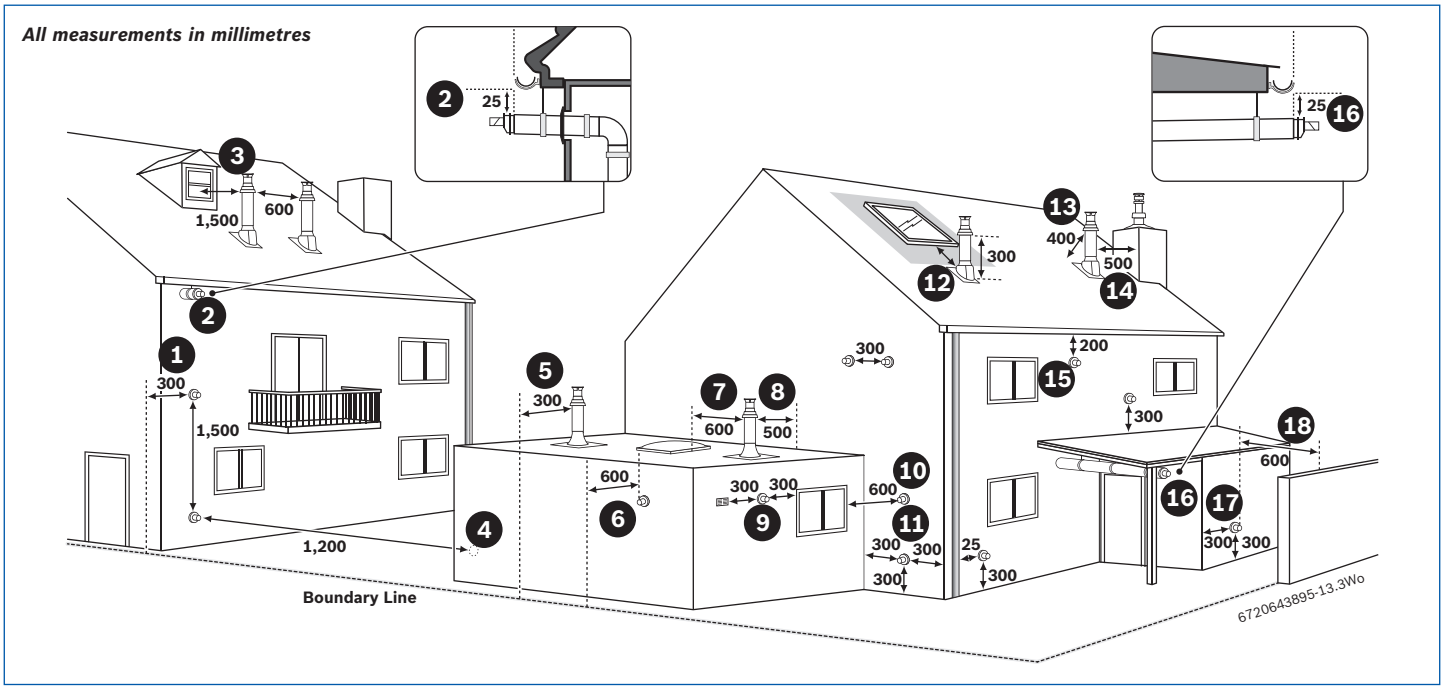



| Key | |
|---|---|
| **Open flue** | |
| 1 | Open flue, B23 |
| 3 | Cascade, B23 |
| **Room sealed** | |
| 2 | Vertical, C33 |
| 4 | Horizontal ,C33 |

**Please note: Worcester does not currently offer a 'flexible flue' or 'flue liner' for the GB162.**

# Horizontal and vertical flue terminal positioning

## Flue terminal positions for boilers up to 70kW in accordance with BS 5440




### Note

- **Installations in car ports are not recommended.**
- **The flue cannot be lower than 1,000mm from the top of a light well due to the build up of combustion products.**
- **Dimensions from a flue terminal to a fanned air inlet to be determined by the ventilation equipment manufacturer.**

### boilers less than 70kW

- **Pluming will occur at the terminal so terminal positions where this could cause a nuisance should be avoided.**
- **The air supply and the flue gas exhaust must meet the applicable general regulations. Please consult the instructions provided with the flue terminal kits prior to installation.**
- **The boiler MUST be installed so that the terminal is exposed to the external air.**
- **It is important that the position of the terminal allows the free passage of air at all times.**
- **Minimum acceptable spacing from the terminal to obstructions and ventilation openings are specified above, for domestic situations in accordance with BS 5440.**

### Boilers greater than 70kW

- **The flue must be installed in accordance with the recommendations of IGE UP10.**

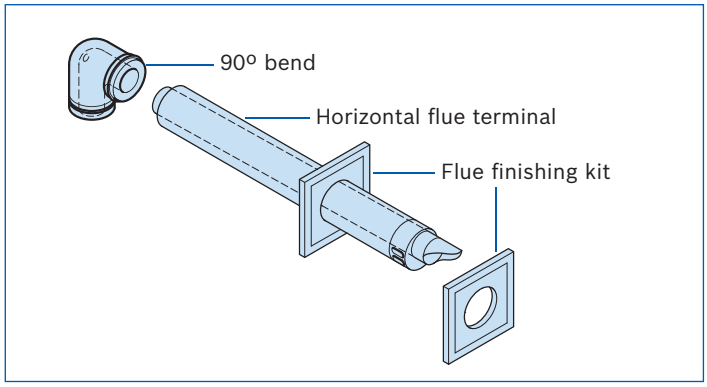
### Key to illustration

1. 300mm adjacent to a boundary line.
2. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
3. 1,500mm between a vertical flue terminal and a window or dormer window.
4. 1,200mm between terminals facing each other.
5. Vertical flue clearance, 300mm adjacent to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
6. 600mm distance to a boundary line, unless it will cause a nuisance. BS 5440:Part 1 recommends that care is taken when siting terminal in relation to boundary lines.
7. 600mm minimum clearance from a skylight to a vertical flue.
8. Vertical flue clearance, 500mm to non-combustible building material, and 1,500mm clearance to combustible building material.
9. 300mm above, below and either side of an opening door, air vent or opening window.
10. 600mm diagonally to an opening door, air vent or opening window.
11. 300mm to an internal or external corner.
12. 2,000mm below a Velux window, 600mm above or to either side of the Velux window.
13. 400mm from a pitched roof or in regions with heavy snow fall 500mm.
14. 500mm clearance to any vertical structure on a roof, 600mm to room sealed flue or 1,500 to an open flue.
15. 200mm below eaves and 75mm below gutters, pipe and drains.
16. The dimension below eaves, balconies and car ports can be reduced to 25mm, as long as the flue terminal is extended to clear any overhang. Any external flue joints must be sealed with suitable silicon sealant.
17. Flue clearance must be at least 300mm from the ground. Terminal guards must be fitted if the flue is less than 2 metres from the ground or if a person could come into contact with the flue terminal.
18. 600mm distance to a surface facing a terminal, unless it will cause a nuisance. BS 5440: Part 1 recommends that care is taken when siting terminals in relation to surfaces facing a terminal.

# GB162 boiler series horizontal room sealed fluing options

### Horizontal room sealed flue

| Flue diameter | 80/125mm | 100/150mm |
|---|---|---|
| GB162 50kW | | |
| Maximum flue length | 7,700mm | 20,000mm |
| GB162 65kW | | |
| Maximum flue length | 7,700mm | 20,000mm |
| GB162 80kW | | |
| Maximum flue length | N/A | 18,000mm |
| GB162 100kW | | |
| Maximum flue length | N/A | 18,000mm |




Standard horizontal flue kit

***80/125mm dia. horizontal flue kit***

1 x 90º bend

1 x horizontal flue terminal

1 x flue finishing kit

**Part No. 7 716 191 116**

***100/150mm dia. horizontal flue kit***

1 x 90º bend

1 x horizontal flue terminal

1 x flue finishing kit

**Part No. 7 716 191 094**

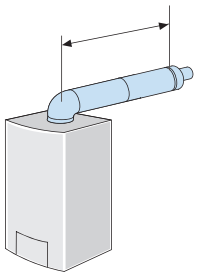
### 80/125mm horizontal room sealed flue accessories

| Components | Part No. | Description |
|---|---|---|
|  | 7 716 191 116 | 80/125mm dia. horizontal flue kit |
|  | 7 716 191 118 | 80/125mm dia. 1m flue extension (cutable) |
|  | 7 716 191 117 | 80/125mm dia. 0.5m flue extension (cutable) |
|  | 7 716 191 119 | 80/125mm dia. 90º bend |
|  | 7 716 191 120 | 80/125mm dia. 45º bends (pair) |
|  | T 000 082 131 | 80/125mm dia. flue support bracket (3 pack) |

### 100/150mm horizontal room sealed flue accessories

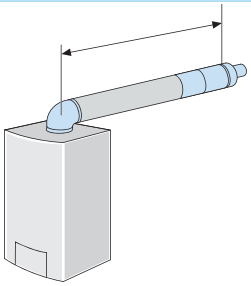
| Components | Part No. | Description |
|---|---|---|
|  | 7 716 191 094 | 100/150mm dia. horizontal flue kit |
|  | 7 716 191 096 | 100/150mm dia. 1m flue extension (cutable) |
|  | 7 716 191 097 | 100/150mm dia. 1m flue extension (non-cutable) |
|  | 7 716 191 095 | 100/150mm dia. 0.5m flue extension (cutable) |
|  | 7 716 191 098 | 100/150mm dia. 90º bend |
|  | 7 716 191 099 | 100/150mm dia. 45º bends (pair) |
|  | 7 746 901 750 | 100/150mm dia. adaptor **(GB162 50kW and 65kW only)** |
|  | 7 716 191 102 | 100/150mm dia. flue support bracket (3 pack) |
|  | 7 716 191 103 | 100/150mm dia. clamp with EPDM seal |

## Standard horizontal flue assembly



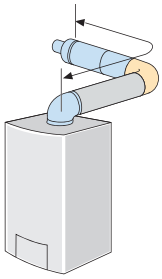
| Components | | | |
|---|---|---|---|
| Part No. 125mm | | 7 716 191 116 | N/A |
| Part No. 150mm | | 7 716 191 094 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | |
| GB162 50kW | | | |
| 125mm | 540 | 1 | N/A |
| 150mm | 550 | 1 | 1 |
| GB162 65kW | | | |
| 125mm | 540 | 1 | N/A |
| 150mm | 550 | 1 | 1 |
| GB162 80kW | | | |
| 150mm | 550 | 1 | N/A |
| GB162 100kW | | | |
| 150mm | 550 | 1 | N/A |

## Extension flue horizontal



| Components | | | | |
|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 116 | 7 716 191 116 | N/A |
| Part No. 150mm | | 7 716 191 094 | 7 716 191 094 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | |
| GB162 50kW | | | | |
| 125mm | 7,700 | 1 | up to 8 | N/A |
| 150mm | 20,000 | 1 | up to 20 | 1 |
| GB162 65kW | | | | |
| 125mm | 7,700 | 1 | up to 8 | N/A |
| 150mm | 20,000 | 1 | up to 20 | 1 |
| GB162 80kW | | | | |
| 150mm | 18,000 | 1 | up to 18 | N/A |
| GB162 100kW | | | | |
| 150mm | 18,000 | 1 | up to 18 | N/A |

## Extension flue horizontal using a second 90º bend



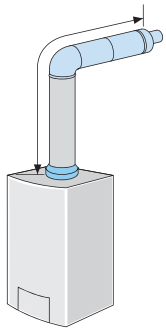
| Components | | | | | |
|---|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 116 | 7 716 191 118 | 7 716 191 119 | N/A |
| Part No. 150mm | | 7 716 191 094 | 7 716 191 096 | 7 716 191 098 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | | |
| GB162 50kW | | | | | |
| 125mm | 5,800 | 1 | up to 6 | 1 | N/A |
| 150mm | 17,900 | 1 | up to 18 | 1 | 1 |
| GB162 65kW | | | | | |
| 125mm | 5,800 | 1 | up to 6 | 1 | N/A |
| 150mm | 17,900 | 1 | up to 18 | 1 | 1 |
| GB162 80kW | | | | | |
| 150mm | 15,900 | 1 | up to 16 | 1 | N/A |
| GB162 100kW | | | | | |
| 150mm | 15,900 | 1 | up to 16 | 1 | N/A |

**Note:** The short 0.5m flue extension may be used as an alternative to the standard extension.

**Note:** The maximum flue length must be reduced by the following amounts for each bend used.

| | GB162 50, 65kW 80/125mm flues | GB162 50, 65, 80, 100kW 100/150mm flues |
|---|---|---|
| 45º bend | 0.9m | 1.2m |
| 90º bend | 1.9m | 2.1m |

## Extension flue horizontal and upwards

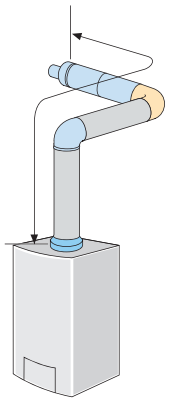


| Components | | | | | |
|---|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 116 | 7 716 191 118 | 7 716 191 119 | N/A |
| Part No. 150mm | | 7 716 191 094 | 7 716 191 096 | 7 716 191 098 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | | |
| GB162 50kW | | | | | |
| 125mm | 7,700 | 1 | up to 8 | 0* | N/A |
| 150mm | 20,000 | 1 | up to 20 | 0* | 1 |
| GB162 65kW | | | | | |
| 125mm | 7,700 | 1 | up to 8 | 0* | N/A |
| 150mm | 20,000 | 1 | up to 20 | 0* | 1 |
| GB162 80kW | | | | | |
| 150mm | 18,000 | 1 | up to 18 | 0* | N/A |
| GB162 100kW | | | | | |
| 150mm | 18,000 | 1 | up to 18 | 0* | N/A |

**Horizontal flue kit includes a 90º bend.*

**Note:** The short 0.5m flue extension may be used as an alternative to the standard extension.

## Extension flue upwards and horizontal using a second 90º bend



| Components | | | | | |
|---|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 116 | 7 716 191 118 | 7 716 191 119 | N/A |
| Part No. 150mm | | 7 716 191 094 | 7 716 191 096 | 7 716 191 098 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | | |
| GB162 50kW | | | | | |
| 125mm | 5,800 | 1 | up to 6 | 1* | N/A |
| 150mm | 17,900 | 1 | up to 18 | 1* | 1 |
| GB162 65kW | | | | | |
| 125mm | 5,800 | 1 | up to 6 | 1* | N/A |
| 150mm | 17,900 | 1 | up to 18 | 1* | 1 |
| GB162 80kW | | | | | |
| 150mm | 15,900 | 1 | up to 16 | 1* | N/A |
| GB162 100kW | | | | | |
| 150mm | 15,900 | 1 | up to 16 | 1* | N/A |

**Horizontal flue kit includes a 90º bend, therefore only 1 additional bend needs to be ordered.*

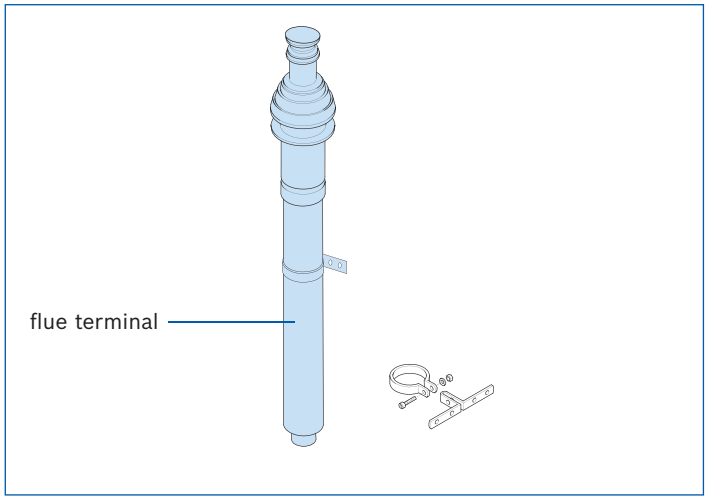
**Note:** The maximum flue length must be reduced by the following amounts for each bend used.

| | GB162 50, 65kW 80/125mm flues | GB162 50, 65, 80, 100kW 100/150mm flues |
|---|---|---|
| 45º bend | 0.9m | 1.2m |
| 90º bend | 1.9m | 2.1m |

# GB162 boiler series vertical room sealed fluing options

### Vertical room sealed flue

| Flue diameter | 80/125mm | 100/150mm |
|---|---|---|
| GB162 50kW | | |
| Maximum flue length | 7,700mm | 20,000mm |
| GB162 65kW | | |
| Maximum flue length | 7,700mm | 20,000mm |
| GB162 80kW | | |
| Maximum flue length | N/A | 18,000mm |
| GB162 100kW | | |
| Maximum flue length | N/A | 18,000mm |




Standard vertical flue kit

***80/125mm dia. vertical flue kit***

1 x flue terminal
1 x support bracket
1 x sealing clamp

**Part No. 7 716 191 115**

***100/150mm dia. vertical flue kit***

1 x flue terminal
1 x support bracket
1 x sealing clamp

**Part No. 7 716 191 093**

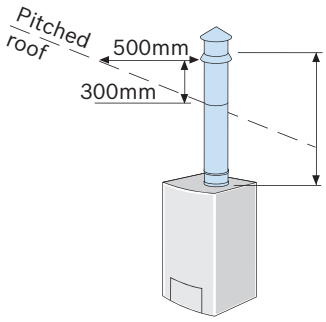
### 80/125mm vertical room sealed flue accessories

| Components | Part No. | Description |
|---|---|---|
| | 7 716 191 115 | 80/125mm dia. vertical flue kit |
| | 7 716 191 118 | 80/125mm dia. 1m flue extension (cutable) |
| | 7 716 191 117 | 80/125mm dia. 0.5m flue extension (cutable) |
| | 7 716 191 119 | 80/125mm dia. 90º bend |
| | 7 716 191 120 | 80/125mm dia. 45º bends (pair) |
| | T 000 082 131 | 80/125mm dia. flue support bracket (3 pack) |
| | 7 716 191 090 | 80/125mm dia. flat roof flashing |
| | 7 716 191 091 | 80/125mm dia. pitched roof flashing |

### 100/150mm vertical room sealed flue accessories

| Components | Part No. | Description |
|---|---|---|
| | 7 716 191 093 | 100/150mm dia. vertical flue kit |
| | 7 716 191 096 | 100/150mm dia. 1m flue extension (cutable) |
| | 7 716 191 097 | 100/150mm dia. 1m flue extension (non-cutable) |
| | 7 716 191 095 | 100/150mm dia. 0.5m flue extension (cutable) |
| | 7 716 191 098 | 100/150mm dia. 90º bend |
| | 7 716 191 099 | 100/150mm dia. 45º bends (pair) |
| | 7 746 901 750 | 100/150mm dia. adaptor **(GB162 50kW and 65kW only)** |
| | 7 716 191 102 | 100/150mm dia. flue support bracket (3 pack) |
| | 7 716 191 103 | 100/150mm dia. clamp with EPDM seal |
| | 7 716 191 101 | 100/150mm dia. flat roof flashing |
| | 7 716 191 100 | 100/150mm dia. pitched roof flashing |

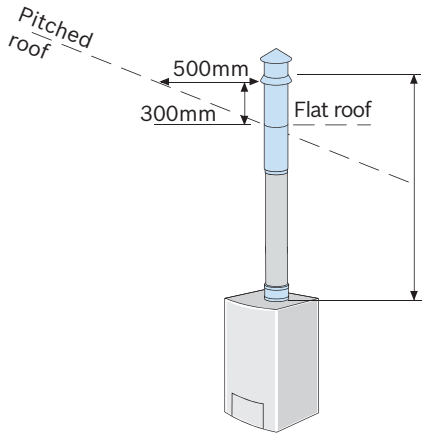
## Standard vertical flue assembly




| Components | | | |
|---|---|---|---|
| Part No. 125mm | | 7 716 191 115 | N/A |
| Part No. 150mm | | 7 716 191 093 | 7 746 901 750 |
| **Minimum lengths (mm) & no. of components required** | | | |
| GB162 50kW | | | |
| 125mm | 1,352 | 1 | N/A |
| 150mm | 1,545 | 1 | 1 |
| GB162 65kW | | | |
| 125mm | 1,352 | 1 | N/A |
| 150mm | 1,545 | 1 | 1 |
| GB162 80kW | | | |
| 150mm | 1,545 | 1 | N/A |
| GB162 100kW | | | |
| 150mm | 1,545 | 1 | N/A |

**Note:** The short 0.5m flue extension may be used as an alternative to the standard extension.

## Vertical balanced flue system maximum height

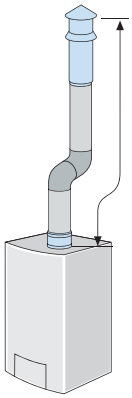



| Components | | | | |
|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 115 | 7 716 191 118 | N/A |
| Part No. 150mm | | 7 716 191 093 | 7 716 191 096 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | |
| GB162 50kW | | | | |
| 125mm | 7,700 | 1 | up to 7 | N/A |
| 150mm | 20,000 | 1 | up to 20 | 1 |
| GB162 65kW | | | | |
| 125mm | 7,700 | 1 | up to 7 | N/A |
| 150mm | 20,000 | 1 | up to 20 | 1 |
| GB162 80kW | | | | |
| 150mm | 18,000 | 1 | up to 18 | N/A |
| GB162 100kW | | | | |
| 150mm | 18,000 | 1 | up to 18 | N/A |

**Note:** The maximum flue length must be reduced by the following amounts for each bend used.

| | GB162 50, 65kW 80/125mm flues | GB162 50, 65, 80, 100kW 100/150mm flues |
|---|---|---|
| 45º bend | 0.9m | 1.2m |
| 90º bend | 1.9m | 2.1m |

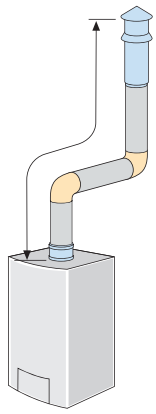
## Vertical balanced flue system with two 45º bends



| Components | | | | | |
|---|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 115 | 7 716 191 118 | 7 716 191 120 | N/A |
| Part No. 150mm | | 7 716 191 093 | 7 716 191 096 | 7 716 191 099 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | | |
| GB162 50kW | | | | | |
| 125mm | 5,900 | 1 | up to 6 | 2 | N/A |
| 150mm | 17,600 | 1 | up to 17 | 2 | 1 |
| GB162 65kW | | | | | |
| 125mm | 5,900 | 1 | up to 6 | 2 | N/A |
| 150mm | 17,600 | 1 | up to 17 | 2 | 1 |
| GB162 80kW | | | | | |
| 150mm | 15,600 | 1 | up to 15 | 2 | N/A |
| GB162 100kW | | | | | |
| 150mm | 15,600 | 1 | up to 15 | 2 | N/A |

**Note:** The short 0.5m flue extension may be used as an alternative to the standard extension.

## Vertical balanced flue system with two 90º bends



| Components | | | | | |
|---|---|---|---|---|---|
| Part No. 125mm | | 7 716 191 115 | 7 716 191 118 | 7 716 191 119 | N/A |
| Part No. 150mm | | 7 716 191 093 | 7 716 191 096 | 7 716 191 098 | 7 746 901 750 |
| **Maximum lengths (mm) & no. of components required** | | | | | |
| GB162 50kW | | | | | |
| 125mm | 3,900 | 1 | up to 4 | 2 | N/A |
| 150mm | 15,800 | 1 | up to 16 | 2 | 1 |
| GB162 65kW | | | | | |
| 125mm | 3,900 | 1 | up to 4 | 2 | N/A |
| 150mm | 15,800 | 1 | up to 16 | 2 | 1 |
| GB162 80kW | | | | | |
| 150mm | 13,800 | 1 | up to 14 | 2 | N/A |
| GB162 100kW | | | | | |
| 150mm | 13,800 | 1 | up to 14 | 2 | N/A |

**Note:** The maximum flue length must be reduced by the following amounts for each bend used.

| | GB162 50, 65kW 80/125mm flues | GB162 50, 65, 80, 100kW 100/150mm flues |
|---|---|---|
| 45º bend | 0.9m | 1.2m |
| 90º bend | 1.9m | 2.1m |

# Energy management controls

It is vital when fitting any energy efficient heating equipment that controls are not overlooked. The controls are designed to maximise system efficiency and allow the heating engineer quick and easy access to all functions of the boiler and heating system. For the end user, selection of the most appropriate controls for the installation will result in greater functionality of the system and more efficient operation.

### EMS (Energy Management System)

EMS is a state-of-the-art intelligent control system that uses a standard operating structure to ensure smooth and continuous communication between the automatic firing of the boiler and the heating system controls. This improves overall efficiency and gives the heating engineer a large degree of flexibility and control over the heating system, allowing individual circuits and zones to be effectively managed. EMS is equipped as standard in the GB162 and is fully compatible with the high performance range of the 4121/4122 modular controls as well as the RC35 digital programmer.

***BC10***

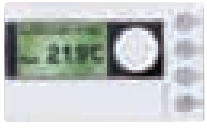
Built into the GB162, it is a controls platform that has a simple, easy to navigate menu structure that allows quick access to all of the major boiler functions, including boiler testing, DHW, heating temperature and status display (for one boiler only).

***UBA3***

The boiler is also equipped with a UBA3 digital, automatic burner control which monitors and controls all the electronic components of the appliance to ensure the most efficient combustion.

***RC25***

The RC25 can be used in conjunction with the RC35 as a remote room or zone control. It allows precise setting and programming of room temperature as well as acting as a thermostat. The unit is very simple to use and removes the need to visit the boiler to change the temperature. Where two RC25 controls are used in conjunction with an RC35 control installed as a room temperature sensor then ErP controls classification VIII is achieved and a subsequent 5% can be added to the space heating efficiency (see Worcester website tool).



***RC35***

The RC35 is the latest generation of digital controls for single boilers. It offers comprehensive functionality for single boiler systems operating with EMS, and takes full advantage of the control modules that can be added to the GB162. The RC35 can be integrated into the boiler next to the BC10 and has a detailed text display that uses a intuitive push-and-turn system to navigate users through the various functions and menus. The RC35 is also compatible with the RC25 room controllers* and enables separate heating circuits to be fine tuned to ensure optimum fuel efficiency, straightforward servicing and rapid fault diagnosis.

## RC controls series

| GB162 50kW and 65kW | RC25 | RC25 + RC35 (weather compensation with room influence from RC25) | 2 x RC25 + RC35 (weather compensation with 3 room sensors for multi-zones) | RC35 (weather compensation with room influence when used as a room controller) | RC35 (weather compensation only – when installed in the fascia of the GB162) | RC35 (when used as a room controller) |
|---|---|---|---|---|---|---|
| **ErP efficiency class** | - | VI | VIII[1] | VI[2] | II[3] | V[4] |
| **Efficiency benefit** | - | +4% | +5% | +4% | +2% | +3% |

*[1]Class VIII can only be achieved when the RC35 is used as a room thermostat. [2]Class VI can only be achieved when the RC35 is used as a room thermostat. [3]Class II when RC35 is mounted within the GB162 fascia. [4]Class V is only be achieved when the RC35 is used as a room thermostat and the weather sensor is not connected.*

**Contact technical support for details.*

# Control modules for use with RC35 and Building Management Systems (BMS)

## RC35 control modules

The RC35 is compatible with several individual control modules that are easily wired into the connections in the tray located underneath the GB162. These modules extend the functionality of the RC35 and GB162 considerably, providing control for low loss headers, solar and additional mixed heating circuits. All wiring has colour coded plugs for quick installation into the main control unit.

### *WM10 low loss header module*

For use with GB162 boilers and heating systems with a low loss header, the WM10 can control one unmixed heating circuit and is always necessary when adding modules.

The flow temperature can be determined by a weather compensation heating control in conjunction with the RC35, which is either mounted in the boiler or as a room controller. The WM10 comes supplied with a low loss header temperature sensor and a wall mounted bracket. It is only possible to use one WM10 module per control system.

### *MM10 mixed heating circuit module*

For heating systems with additional mixed or unmixed heating circuits, this module can control a 230V AC 3 port valve and has a sensor to control flow temperature when used in conjunction with an RC35 controller. It is also possible to connect to an RC25 remote control for room temperature compensation, please contact technical support for further information. Up to 3 modules can be used per heating system.

### *SM10 solar circuit module*

The SM10 fully controls a solar thermal system for DHW purposes. This module is linked into the boiler control and automatically monitors the available solar energy. When there is heat available from the solar collectors, the controller will prevent the boiler from firing in order to optimise the use of the free solar energy.

## Single boiler or cascade installations with BMS

### *EM10 BMS interface module*

The EM10 module interfaces with an existing BMS. It can create a fault report, 230V signal or a volt free fault signal, and has a 0-10V contact for signals from the BMS to control the boiler flow temperature. Fig. 1 shows control options compatible with BMS.

### *MCM10 cascade sequencer*

The MCM10 simplifies the optimum running of a cascade system when interfacing with an existing BMS. By sequencing the lead boiler it eliminates excessive wear in any one unit and also interprets the 0-10V input signal from the BMS to modulate the heat output of the cascade. This is all achieved without the need for programming or complex set up and is a true ‘Plug & Play’ control. An individual MCM10 can control up to 4 boilers and up to 16 boilers can be achieved when 4 MCM10 units are linked together. Fig. 1 shows control options compatible with BMS.

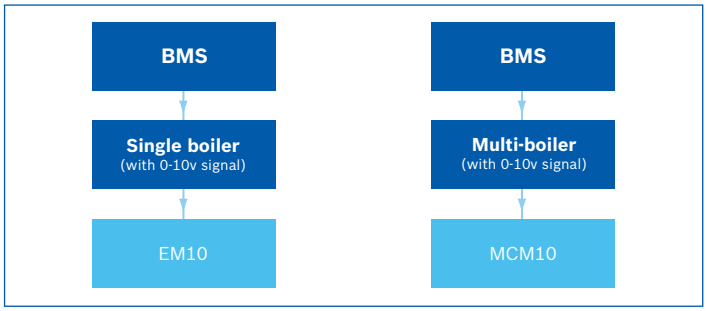
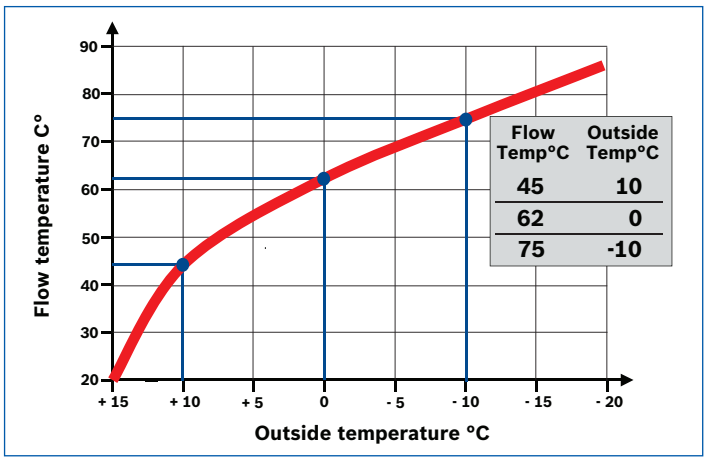



Fig. 1. Compatible BMS controls

## The benefits of weather compensation

The RC35 controller can change the required temperature for different heating circuits according to the outside temperature and is measured using a small external sensor. With mixed heating circuits this means that each individual circuit has its own characteristics and the boiler will supply only the heat needed for certain parts of the system. This is particularly effective in Spring and Autumn as temperatures for the heating circuits can be reduced significantly, saving fuel and allowing the highest efficiency from the condensing process.




The graph above shows how the heating curve can be modified at any time using the RC35 controller, providing maximum comfort for the user.

# 4000 series boiler management
## Cascade/multi-boiler control options

The 4000 series modular digital boiler control units secure the safe function of the boilers and allow for the optimum control of the heating system. The 4121 comes supplied with a MEC2 digital programmer with clear text display which provides external weather compensated heating control, perfect for maximising the condensing efficiency of the boilers. The 4122 control unit can house any of the additional control modules listed, dependent on system requirements.

4121 Control Unit

4122 Control Unit (with/without MEC2)

The 4121 can control two (one mixed/one unmixed) heating circuits and DHW, while also having the space to allow the connection of an additional module.

The 4122 can be used as an extension to the 4121 or as a stand alone controller and has space to allow for the connection of two additional modules.

***MEC2***

The MEC2 digital programmer is supplied with the 4121 control. Its simple ‘press and turn’ operation makes setting and changing heating options easy. A plain text display allows input of system operations and communicates boiler diagnostics. They can be fitted directly to the main control unit or wired to the boiler from the living or working space (as a room thermostat).

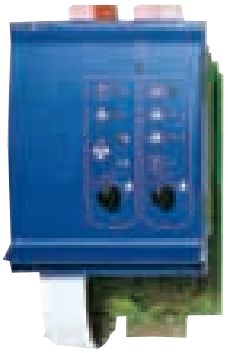
***BFU Room Thermostat***

The BFU is a remote control which allows the temperature to be adjusted from the end user's living or working space. This includes a room temperature sensor, and works in conjunction with the 4121/FM442.

## 4000 controls series

| | **4121**<br>(weather compensation of up to 2 mixed HCs) | **4121 + BFU Room Thermostat**<br>(weather compensation with room influence) | **4121 + MEC2**<br>**(MEC2 installed remotely)**<br>(weather compensation with room influence) |
|---|---|---|---|
| **ErP efficiency class** | II* | VI | VI |
| **Efficiency benefit** | +2% | +4% | +4% |

**No room influence as standard.*



***FM441 Heating and DHW Control Module***

For use in 4000 series controls, this module controls one mixed heating circuit (with circulation pump and mixing valve) or an unmixed heating circuit and one DHW circuit (with cylinder load and circulation pump). It includes manual controls to switch circuits between on/off/automatic and comes supplied with a 9mm DHW temperature sensor. All wiring has colour coded plugs for quick installation into the main control unit (BFU as accessory). For a mixed heating circuit an FV/FZ sensor will be required. **Please note that the FM441 cannot be used with 4121.**

***FM442 Heating Circuit Control Module***

For use in 4000 series controls, this module controls up to two mixed heating circuits (with circulation pump and mixing valve) or two unmixed circuits. It includes manual controls to switch circuits between on/off/automatic and comes supplied with one FV/FZ temperature sensor.

All wiring has colour coded plugs for a quick installation into the main control unit (BFU up to 2x as accessory). An additional FV/FZ sensor is required if using with two mixed circuits.

***FM443 Solar Module***

The intelligent FM443 solar module allows optimum solar and heating functionality. With this fully integrated Energy Management System the boiler recognises the solar output and delays firing the boiler for as long as possible by continuously monitoring the changes in the heat demand. This not only reduces the wear and tear on the heating system by reducing burner start ups by up to 24%, but can also provide an additional 10% of energy savings.

***FM456 and FM457 Cascade Control Module***

The FM456 and FM457 can control the modulation and sequencing strategy from 2 to 4 boilers, and can also control one additional unmixed heating circuit. A 0-10V input with provision for a common alarm signal, for use with the BMS control.

# Cascade – quick and simple to install

The innovative, low weight cascade design used with the GB162 series means it is installer-friendly, reducing fitting time and costs. The cascade boiler connection kit is supplied with all the necessary fittings and accessories, all of which can easily be transported to the boiler room. The installer builds the framework and constructs the pipe system in a few simple steps as shown below. After the installation everything fits together perfectly, the pipe work is tidy, and the boilers are connected to the main heating system without the need to install additional hydraulic equipment.

**Step 1:**
The sturdy floor standing cascade framework is bolted together.

**Step 2:**
Low loss header, flow, return and gas pipes are fitted.

**Step 3:**
Individual GB162 boilers are mounted securely on the framework.

**Step 4:**
Pump groups (additional accessory) and valves are connected to boilers and flow and return pipe work attached to the headers.

**Step 5:**
Custom-fit insulation is added to pipe work and fitted around each pump group to minimise heat loss.

For assistance in specification of GB162 cascade systems please contact your local commercial sales manager.

**Note:** ErP system labels and fiches do not need to be provided to the end user if any combination of GB162s are cascaded.

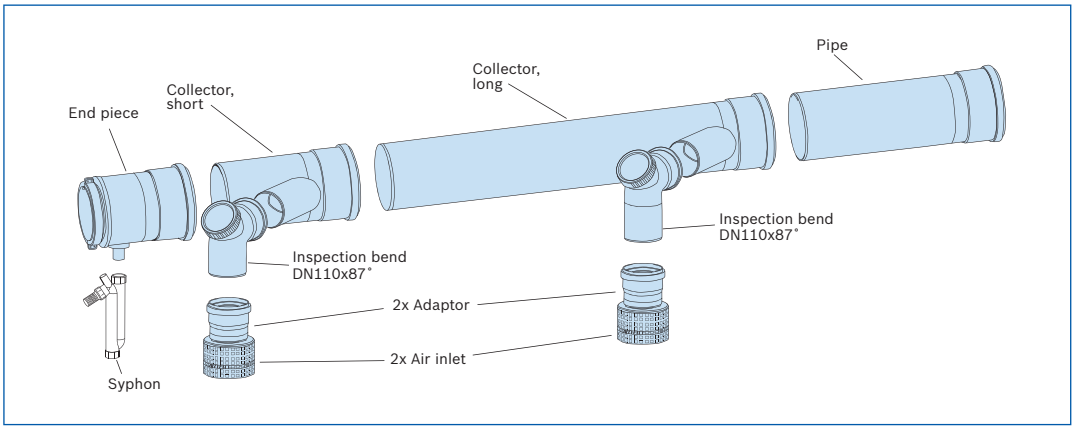
**Cascade features at a glance:**

- Fixed to the floor freestanding assembly
- Boilers hung directly on the frame
- Uses the GB162 pump group
- Complete unit with high quality, custom fit robust insulation
- Integrated gas pipe, flow and return with low loss header
- Up to 8 boilers with one control
- The cascade will modulate from the lowest output of the smallest boiler within the cascade, up to the total load of all boilers
- Suitably designed and sized low loss header
- Best use of condensing technology due to low return temperature.

# Cascade technical information

## Cascade flue systems

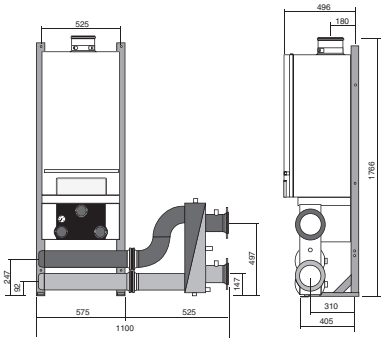
Worcester supplies a range of cascade flue kits for GB162 systems of up to 800kW. For further details on bespoke flue systems for the GB162 please visit the website or contact your local commercial sales manager.




This example shows a typical Worcester flue header kit for a 2 boiler in-line cascade system.

# GB162 Cascade in-line (TL) systems

## TL1 configuration




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 50 to 100kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 1,100mm |
| Depth | 496mm |

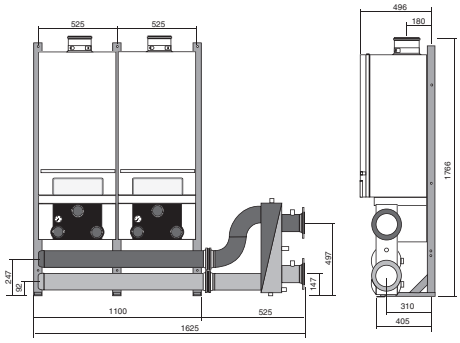
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL1 NW65 | 1 |
| Main gas pipe | 1 |
| Boiler piping set TL configuration | 1 |
| 2½" Low loss header | 1 |
| TL configuration supports | 2 |
| Connecting frame | 1 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 1 |

*Controls and fluing as required.*

## TL2 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 100 to 200kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 1,625mm |
| Depth | 496mm |

| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL2 NW65 | 1 |
| Main gas pipe TL2 – 2" | 1 |
| Boiler piping set TL configuration | 2 |
| 2½" Low loss header | 1 |
| TL configuration supports | 3 |
| Connecting frame | 2 |

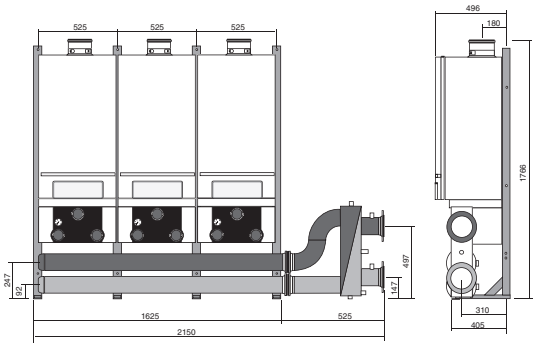
### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 2 |

*Controls and fluing as required.*

# GB162 Cascade in-line (TL) systems – continued

## TL3 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 150 to 300kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,150mm |
| Depth | 496mm |

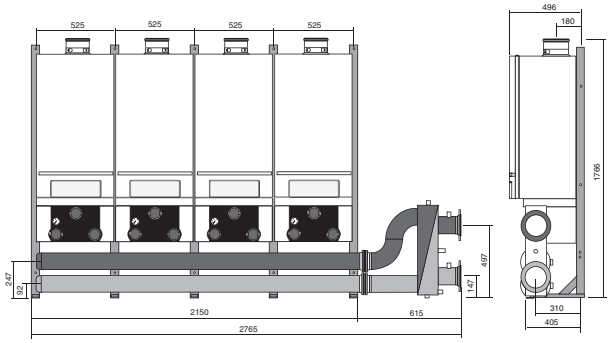
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL3 NW65 | 1 |
| Main gas pipe TL3 – 2" | 1 |
| Boiler piping set TL configuration | 3 |
| 2½" Low loss header | 1 |
| TL configuration supports | 4 |
| Connecting frame | 3 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 3 |

*Controls and fluing as required.*

## TL4 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 200 to 400kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,765mm |
| Depth | 496mm |

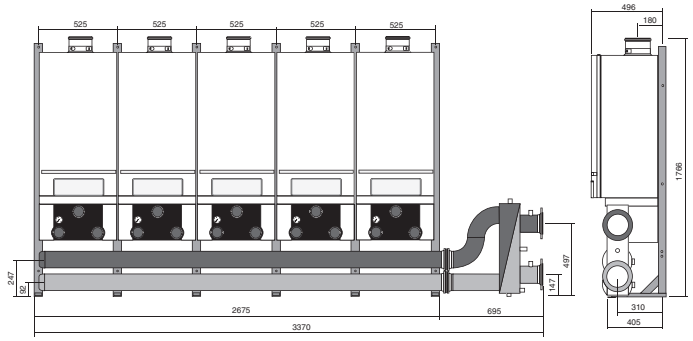
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL4 NW80 | 1 |
| Main gas pipe TL4 – 2" | 1 |
| Boiler piping set TL configuration | 4 |
| 3" Low loss header | 1 |
| TL configuration supports | 5 |
| Connecting frame | 4 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 4 |

*Controls and fluing as required.*

## TL5 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 250 to 500kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 3,370mm |
| Depth | 496mm |

| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL5 NW100 | 1 |
| Main gas pipe TL5 – 2" | 1 |
| Boiler piping set TL configuration | 5 |
| 4" Low loss header | 1 |
| TL configuration supports | 6 |
| Connecting frame | 5 |

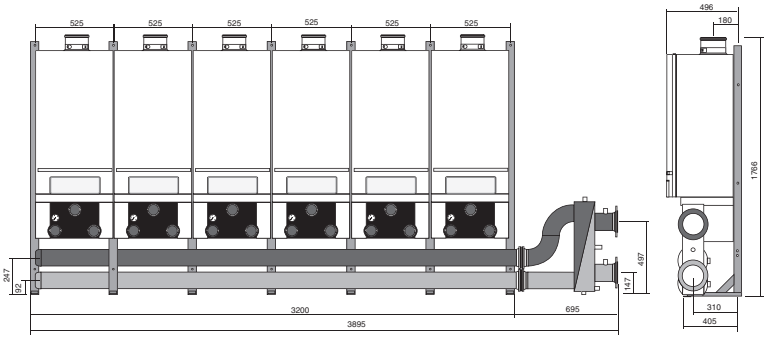
### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 5 |

*Controls and fluing as required.*

# GB162 Cascade in-line (TL) systems – continued

## TL6 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 300 to 600kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 3,895mm |
| Depth | 496mm |

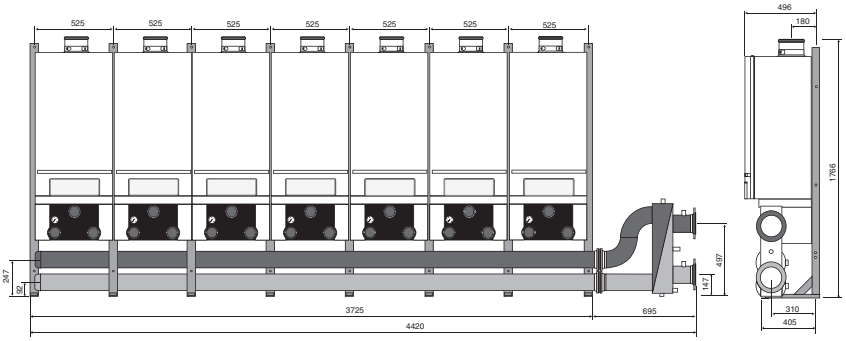
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL6 NW100 | 1 |
| Main gas pipe TL6 – 3" | 1 |
| Boiler piping set TL configuration | 6 |
| 4" Low loss header | 1 |
| TL configuration supports | 7 |
| Connecting frame | 6 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 6 |

*Controls and fluing as required.*

## TL7 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 350 to 700kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 4,420mm |
| Depth | 496mm |

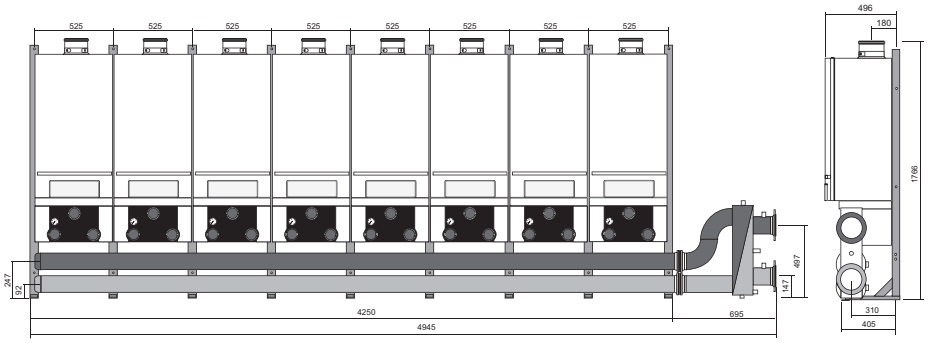
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL7 NW100 | 1 |
| Main gas pipe TL7 – 3" | 1 |
| Boiler piping set TL configuration | 7 |
| 4" Low loss header | 1 |
| TL configuration supports | 8 |
| Connecting frame | 7 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 7 |

*Controls and fluing as required.*

## TL8 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 400 to 800kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 4,945mm |
| Depth | 496mm |

| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL8 NW100 | 1 |
| Main gas pipe TL8 – 3" | 1 |
| Boiler piping set TL configuration | 8 |
| 4" Low loss header | 1 |
| TL configuration supports | 9 |
| Connecting frame | 8 |

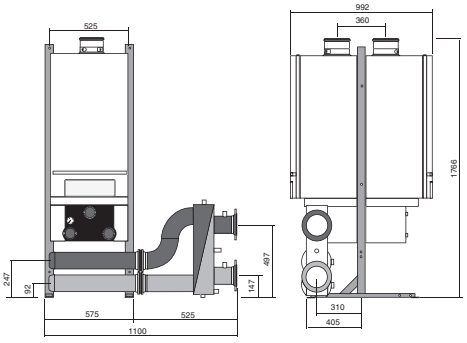
### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 8 |

*Controls and fluing as required.*

# GB162 Cascade back-to-back (TR) systems

## TR2 configuration




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 100 to 200kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 1,100mm |
| Depth | 992mm |

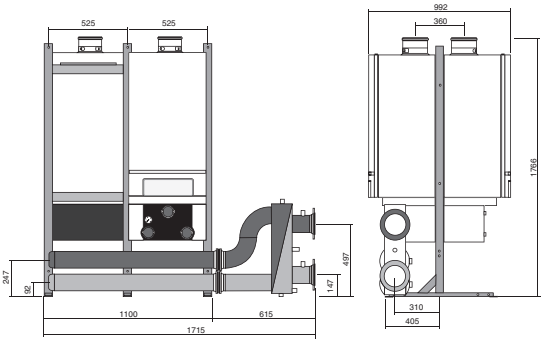
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TR2 NW65 | 1 |
| Main gas pipe TR2 – 2" | 1 |
| Boiler piping set TL configuration | 1 |
| Boiler piping set TR configuration | 1 |
| 2½" Low loss header | 1 |
| TR configuration supports | 2 |
| Connecting frame | 1 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 2 |

*Controls and fluing as required.*

## TR3 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 150 to 300kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 1,715mm |
| Depth | 992mm |

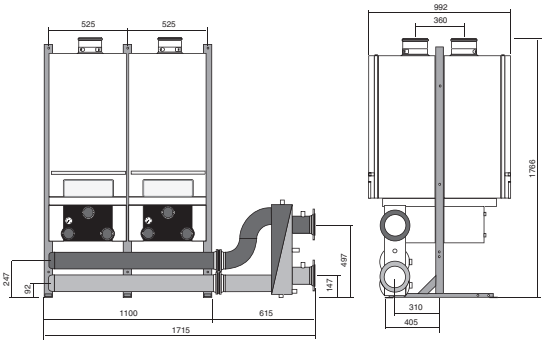
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL4 NW80 | 1 |
| Main gas pipe TR4 – 2" | 1 |
| Boiler piping set TL configuration | 1 |
| Boiler piping set TR configuration | 2 |
| 3" Low loss header | 1 |
| TR configuration supports | 3 |
| Connecting frame | 2 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 3 |

*Controls and fluing as required.*

## TR4 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 200 to 400kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 1,715mm |
| Depth | 992mm |

| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL4 NW80 | 1 |
| Main gas pipe TR4 – 2" | 1 |
| Boiler piping set TL configuration | 2 |
| Boiler piping set TR configuration | 2 |
| 3" Low loss header | 1 |
| TR configuration supports | 3 |
| Connecting frame | 2 |

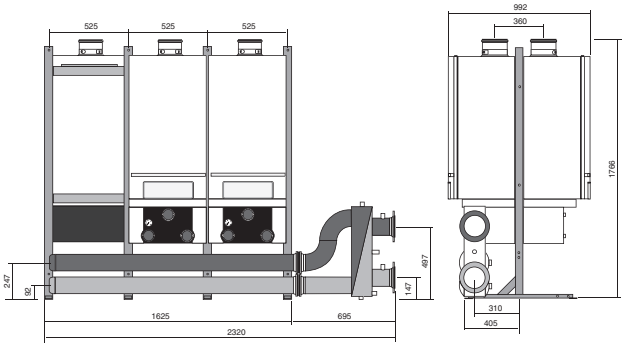
### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 4 |

*Controls and fluing as required.*

# GB162 Cascade back-to-back (TR) systems – continued

## TR5 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 250 to 500kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,320mm |
| Depth | 992mm |

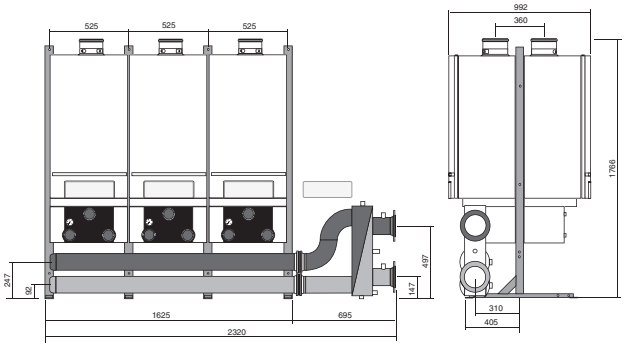
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL5 NW100 | 1 |
| Main gas pipe TR6 – 3" | 1 |
| Boiler piping set TL configuration | 2 |
| Boiler piping set TR configuration | 3 |
| 4" Low loss header | 1 |
| TR configuration supports | 4 |
| Connecting frame | 3 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 5 |

*Controls and fluing as required.*

## TR6 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 300 to 600kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,320mm |
| Depth | 992mm |

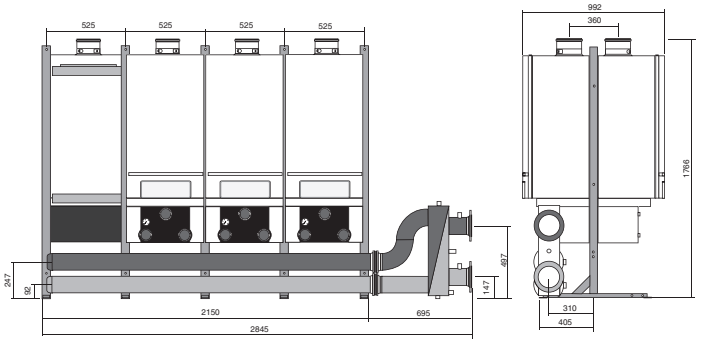
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TL6 NW100 | 1 |
| Main gas pipe TR6 – 3" | 1 |
| Boiler piping set TL configuration | 3 |
| Boiler piping set TR configuration | 3 |
| 4" Low loss header | 1 |
| TR configuration supports | 4 |
| Connecting frame | 3 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 6 |

*Controls and fluing as required.*

## TR7 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 350 to 700kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,845mm |
| Depth | 992mm |

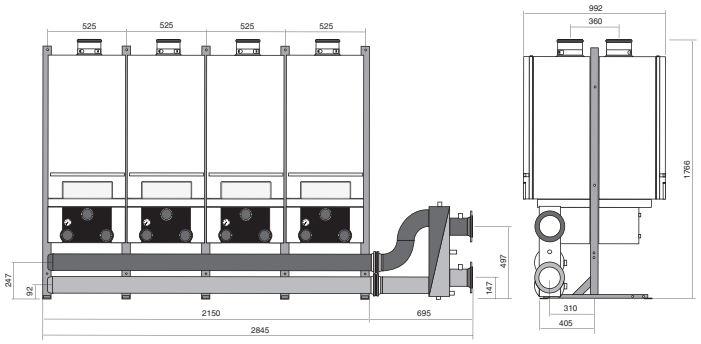
| Parts list | Quantity |
|---|---|
| Main flow and return pipe TR8 NW100 | 1 |
| Main gas pipe TR8 – 3" | 1 |
| Boiler piping set TL configuration | 3 |
| Boiler piping set TR configuration | 4 |
| 4" Low loss header | 1 |
| TR configuration supports | 5 |
| Connecting frame | 4 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 7 |

*Controls and fluing as required.*

## TR8 configuration with pump groups




| Specification | Value |
|---|---|
| Cascadable outputs (max.) | 400 to 800kW |
| Height (excluding flue adaptor) | 1,710mm |
| Length (inc. straight low loss header) | 2,845mm |
| Depth | 992mm |

| Parts list | Quantity |
|---|---|
| Main flow and return pipe TR8 NW100 | 1 |
| Main gas pipe TR8 – 3" | 1 |
| Boiler piping set TL configuration | 4 |
| Boiler piping set TR configuration | 4 |
| 4" Low loss header | 1 |
| TR configuration supports | 5 |
| Connecting frame | 4 |

### Required accessories

| | |
|---|---|
| Sensor pocket | 1 |
| Pump group (50/65/80/100kW) | 8 |

*Controls and fluing as required.*

# GB162 boiler series and accessories

## GB162 boilers

**GB162 50kW**

Worcester Part No.
7 736 700 642

**GB162 65kW**

Worcester Part No.
7 746 900 822

**GB162 80kW**

Worcester Part No.
8 747 024 8

**GB162 100kW**

Worcester Part No.
8 747 025 0

## RC series boiler & system controls

**RC35 digital boiler control**


Worcester Part No.
7 747 312 318

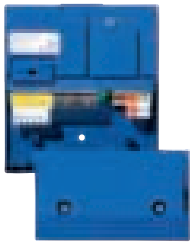
**RC25 room thermostat (max 2 per system)**

Worcester Part No.
7 747 312 367

**WM10 low loss header module**

Worcester Part No.
30 008 458

**MM10 mixed heating circuit module**

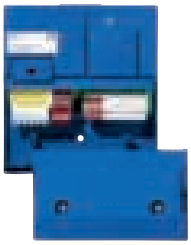


Worcester Part No.
30 008 453

**SM10 solar module**

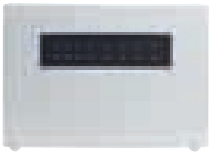
Worcester Part No.
30 008 448

**EM10 BMS interface for single boilers**



Worcester Part No.
5 016 995

**MCM10 cascade sequencing control for up to 4 boilers**



Worcester Part No.
7 746 900 847

# 4000 series boiler & system controls

### 4121 control unit

**Worcester Part No.**
**30 008 919**

### 4122 control unit without MEC2

**Worcester Part No.**
**30 009 078**

### 4122 control unit with MEC2

**Worcester Part No.**
**30 008 934**

### FM441 heating & DHW control module

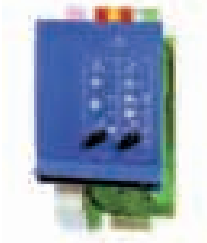
**Worcester Part No.**
**30 004 850**

*Only for use with 4122*

### FM442 heating circuit control module

**Worcester Part No.**
**30 004 867**

### FM443 solar module



**Worcester Part No.**
**7 747 300 910**

### FM456 two boiler cascade sequence module

**Worcester Part No.**
**30 009 043**

### FM457 four boiler cascade sequence module

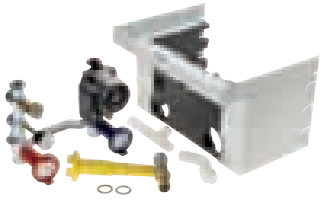
**Worcester Part No.**
**30 009 057**

### BFU remote control & room thermostat

**Worcester Part No.**
**30 002 243**

# Hydraulic accessories

### Modulating pump group & connection set for 50, 65, 80 & 100kW models



**Worcester Part No.**
**7 746 901 863**

### Modulating pump group – low energy† 50, 65, 80 & 100kW models

**Worcester Part No.**
**7 746 901 876**

### Connection set when using pump group without cascade frame

**Worcester Part No.**
**5 584 552**

### Low loss header for single boiler installations (50, 65, 80 & 100kW)

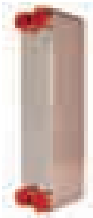
**Worcester Part No.**
**89 200 972**

†*Replacing 7 746 901 863 from July 2015 onwards.*

# GB162 boiler series and accessories

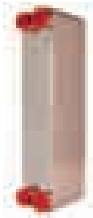
## Hydraulic accessories

**GB plate heat exchanger 50kW**



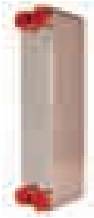
Worcester Part No.
7 733 600 013

**GB plate heat exchanger 65kW**



Worcester Part No.
7 733 600 014

**GB plate heat exchanger 80/100kW**



Worcester Part No.
7 733 600 016

**Threaded flange set**

Worcester Part No.
2½" – 7 736 700 487
3" – 7 736 700 963
4" – 7 736 700 964

## 80/125mm room sealed concentric flue – 50kW and 65kW models

**Vertical flue kit (80/125mm dia.)**

Worcester Part No.
7 716 191 115

**Horizontal flue kit (80/125mm dia.)**

Worcester Part No.
7 716 191 116

**0.5m flue extension – cutable (80/125mm dia.)**

Worcester Part No.
7 716 191 117

**1m flue extension – cutable (80/125mm dia.)**

Worcester Part No.
7 716 191 118

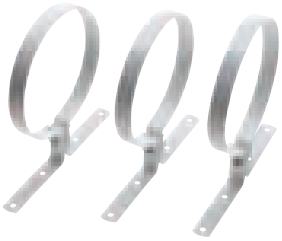
**90º bend (80/125mm dia.)**

Worcester Part No.
7 716 191 119

**45º bends – pair (80/125mm dia.)**

Worcester Part No.
7 716 191 120

**Flue support bracket – 3 pack (80/125mm dia.)**

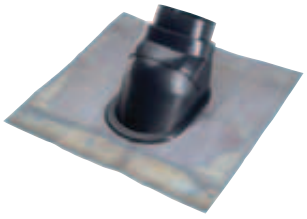


Worcester Part No.
T 000 082 131

**Flat roof flashing for vertical flue kit (80/125mm dia.)**

Worcester Part No.
7 716 191 090

**Pitched roof flashing for vertical flue kit (80/125mm dia.)**



Worcester Part No.
7 716 191 091

# 100/150mm room sealed concentric flue – 50, 65, 80 & 100kW models

**Vertical flue kit (100/150mm dia.)**

Worcester Part No.
7 716 191 093

**Horizontal flue kit (100/150mm dia.)**

Worcester Part No.
7 716 191 094

**Adaptor for GB162 50kW and 65kW only (100/150mm dia.)**

Worcester Part No.
7 746 901 750

**0.5m flue extension – cutable (100/150mm dia.)**

Worcester Part No.
7 716 191 095

**1m flue extension – cutable (100/150mm dia.)**

Worcester Part No.
7 716 191 096

**1m flue extension – non-cutable (100/150mm dia.)**

Worcester Part No.
7 716 191 097

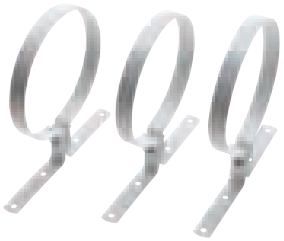
**90º bend (100/150mm dia.)**

Worcester Part No.
7 716 191 098

**45º bends – pair (100/150mm dia.)**

Worcester Part No.
7 716 191 099

**Flue support bracket – 3 pack (100/150mm dia.)**

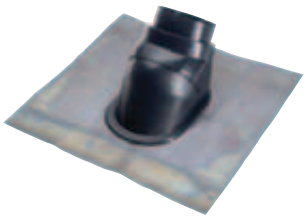


Worcester Part No.
7 716 191 102

**Clamp with EPDM seal (100/150mm dia.)**

Worcester Part No.
7 716 191 103

**Pitched roof flashing (100/150mm dia.)**



Worcester Part No.
7 716 191 100

**Flat roof flashing (100/150mm dia.)**

Worcester Part No.
7 716 191 101

# Total training experience
# from Land's End to John O'Groats

Worcester has always been committed to setting the industry standard for expert professional training and this is reflected in the scope and content of the courses, venues and options available.

We offer training on our entire range of domestic and commercial heating technologies as well as industry-led courses. All tuition is handled by expert heating specialists, combining classroom theory with, practical hands-on experience. Keep up-to-date with legislation and experience hands-on-training with our new technologies.

To increase your skills, expertise and value in the market place, trust Worcester's unique and proven total training concept.

## Training centres throughout the UK

***Worcester***

Worcester's award-winning, state-of-the-art Training Academy is an innovative and spacious high tech training arena at our headquarters in Worcester. Facilities include open-plan domestic training areas with life-size single-storey brick buildings. Here installers can get to grips with Greenskies solar thermal systems working with Greenstar gas appliances, clearly demonstrating the importance of system design and operation.

***Wakefield***

Opened in Summer 2013, the Wakefield Training and Assessment Academy boasts a large gas laboratory which features our entire range of Greenstar gas-fired appliances, a flushing area, wet and dry boilers and a light commercial area with a cascade of Worcester GB162 boilers. There is a solar room with fully working components from our entire Greenskies solar range and a pitched roof for practical training, as well as a large commercial training room.

***West Thurrock and Clay Cross***

Further academies are located at West Thurrock in Essex and Clay Cross in Derbyshire, both of which offer a comprehensive choice of courses.

## College-linked Learning

As well as offering training at our own centres, Worcester has established close partnerships with many colleges around the UK, equipping them with our latest products.

Worcester has worked closely with leading colleges and independent training centres for more than 20 years – a successful enterprise which in 2007 was enhanced further with the launch of the College Links Learning Scheme.

## Mobile training

We can also bring training to you. We have mobile vehicles fully equipped with operational Greenstar gas-fired boilers, dry strip-down models and even a Greensource air to air heat pump. Our 7.5 tonne mobile oil vehicle is also available for hands-on oil product training and OFTEC assessments.

**Call now for more information 0330 123 0166.**

# Commercial product courses

Along with Worcester's expanding range of commercial products, Bosch Commercial and Industrial Heating also offers training on a range of commercial technologies. Our commercial technical training officers have many years' experience as heating technicians and can deliver first-class training from renewables to Combined Heat and Power (CHP), as well as industrial boilers that reach up to 19.2MW.

Worcester also runs certified Commercial ACS training and assessment, equipping installers with the relevant qualifications for the changeover from domestic to commercial gas work.

As well as the extensive commercial appliance training we can offer at our centres, we offer CIBSE certified CPD seminars as well as on site training when you need it. For further information, contact our Training Helpline on **0330 123 0166** or email us at **training@uk.bosch.com**

### Worcester commercial training courses

**Greenspring CWi47 gas-fired condensing instantaneous water heater.**
**GB162 product overview.**
**GB162 domestic.**
**GB162 commercial.**
**Greenstar Heat Distribution Unit.**
**Commercial ACS training and assessment – CODNCO1** (includes CIGA1 - Indirect fired heating appliance and equipment, ICPN1 - Pipework in excess of 35mm and TPCP1A - Testing and purging) Certified by Logic Certification.

### Bosch commercial training courses

**GB312 & GB402 overview.**
**Solar thermal product overview.**
**GWPL Gas Absorption Heat Pumps overview.**
**CHP overview.**
**Commercial controls overview.**

| Worcester courses | GB162 Overview | GB162 Domestic | GB162 Commercial | Heat Distribution Unit | CWi47 Water Heater | CODNCO1 |
|---|---|---|---|---|---|---|
| Duration | 1 Day | 1 Day | 1 Day | 1 Day | 1 Day | 5 Days |
| Cost | Free* | Free* | Free* | Free* | Free* | £780 |
| **Training course covers** | | | | | | |
| Specification | ✓ | ✓ | ✓ | ✓ | ✓ | Changeover qualification from domestic to commercial, including CIGA1, ICPN1, TPCP1A |
| Installation | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Commissioning | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Servicing | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Maintenance | ✓ | ✓ | ✓ | ✓ | ✓ | |
| **Course locations** | | | | | | |
| Worcester | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Clay Cross | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |
| Wakefield | ✓ | ✓ | ✓ | ✓ | ✓ | Coming soon 2015 |
| West Thurrock | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| College Links† | ✓ | ✓ | ✓ | ✗ | ✗ | ✗ |
| Mobile | ✗ | ✗ | ✗ | ✗ | ✗ | ✗ |

*A holding fee of £65 applies to free courses and is refunded on attendance of the course. If a booking is cancelled more than 10 working days before the course date, the fee will be fully refunded. The fee is non-refundable if a cancellation is made less than 10 working days before the course date.
†Please contact Worcester Training for specific colleges.

# Additional product and industry training courses

The diversity of products in today's heating industry gives you the opportunity to expand your expertise, whilst offering more choice to your customers. Worcester provides comprehensive training from all its academies on its entire range of technologies. Call us on **0330 123 0166** to order a full course training brochure or to book yourself onto a training course, alternatively, you can visit **www.worcester-bosch.co.uk/training**

### Gas-fired condensing boiler courses

- **Greenstar CDi Classic gas-fired condensing combi boilers.**
- **Greenstar CDi Compact and Greenstar Si Compact gas-fired condensing combi boilers.**
- **Greenstar i gas-fired condensing combi boilers.**
- **Greenstar system & regular gas-fired condensing boilers.**
- **Greenstar Highflow CDi & FS CDi Regular floor standing gas-fired condensing combi and regular boilers.**
- **Greenstar Controls** (covers MT10, MT10RF, NEW Greenstar Comfort range, NEW Wave internet connected room thermostat, FR10, FR110, FW100, and solar controls).

### Oil-fired product courses

- **Greenstar Danesmoor & Heatslave II high efficiency condensing oil-fired boilers.**
- **Oil advanced fault finding.**
- **OFTEC 50.**
- **OFTEC 101/105e, OFTEC 600a and OFTEC 101/105e/600a.**

### Renewable product courses

- **Renewables overview.**
- **Greenskies solar.**
- **Greenskies advanced solar.**
- **Introduction to heat pumps.**
- **Greenstore LECP ground source heat pumps.**
- **Greensource air to air heat pumps.**

### Industry focused courses

- **Hot water systems & safety.**
- **Chemical water treatment.**
- **Construction skills F-Gas training/assessment certification.**
- **IDHEE domestic heating design.**
- **Domestic ACS training and assessment – reassessment. CCN1 + 3 appliances.**
- **QCF Level 3 Award**
  - **Air source and ground source heat pumps.**
  - **Air to water and split air to water heat pumps.**
  - **Solar thermal.**
- **MCS Made Easy.**
- **Green Deal.**
- **LPG Changeover.**
- **WRAS Water Regulations.**

# A complete after-sales service

As part of the worldwide Bosch Group, Worcester strives to maintain the highest possible standards of after-sales care.

### Worcester Contact Centre

Should you require support, our award winning Contact Centre team, based at our head office in Worcester, are ready to take your calls. Whatever your query our contact centre operators along with our nationwide team of engineers are ready to help you.

**Tel: 0330 123 9559**

### Opening times

Monday – Friday: 7.00am – 8.00pm
Saturday: 8.00am – 5.00pm
Sunday: 9.00am – 12 noon
Bank Holidays: 8.00am – 4.30pm

2014 OFTEC Awards for Excellence

### Spares

Genuine replacement parts for all supported Worcester products are readily available from stock, or on a next day delivery basis. Visit **www.worcester-bosch.co.uk/spares** to find your local stockist.

### Customer Technical Support

The Worcester Technical Helpline is a dedicated phone line – committed to providing a comprehensive service to complement the brand name and quality of our products. Our experienced team of technical experts provides answers to queries of a technical nature across the entire Worcester range.

### Technical Support

**Tel: 0330 123 3366**
**Fax: 01905 752 741**
**Email: technical-advice@uk.bosch.com**

### Opening times

Monday – Friday: 7.00am – 8.00pm
Saturday: 8.30am – 4.00pm
Bank Holidays: 8.00am – 4.30pm

### ErP Technical Helpline

**Tel: 0330 123 3641**
**Email: ErP-advice@uk.bosch.com**

# Useful numbers

### Sales
Tel: 0330 123 9669
sales.mailbox@uk.bosch.com

### Spare Parts
Tel: 0330 123 9779
spares.mailbox@uk.bosch.com

### Technical Helpline (Pre & Post Sales)
Tel: 0330 123 3366
technical-advice@uk.bosch.com

### Renewables Technical Helpline
Email: renewable-advice@uk.bosch.com
or telephone 0330 123 9229

### ErP Technical Helpline
Tel: 0330 123 3641
ErP-advice@uk.bosch.com

### Training
Tel: 0330 123 0166
training@uk.bosch.com

### Literature
Email: brochure-request@uk.bosch.com
or download instantly from our website
or telephone 0330 123 9119

# Customer Service

### Engineer Appointments
Email: service-appointment@uk.bosch.com
or telephone 0330 123 9339

### Service Enquiries
Email: service-enquiries@uk.bosch.com
or telephone 0330 123 9559

### Guarantee Registration
To register your Worcester guarantee, please visit our website www.worcester-bosch.co.uk/registration, download our guarantee registration app or telephone 0330 123 2552

Guarantee app

Calls to 03 numbers cost no more than a national rate call to an 01 or 02 number and must count towards any inclusive minutes in the same way as 01 and 02 calls. These rules apply to calls from any type of line, including mobile, BT, other fixed phone line or payphone. Calls from mobiles and some other networks may vary. Calls to and from Bosch Thermotechnology Ltd may be recorded for training and quality assurance purposes.

## worcester-bosch.co.uk

In partnership with energy saving trust™



Part No. 8 716 111 872 D 05/15

Sustainable Forests

Totally Chlorine Free

BBT3588

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