

TECHNICAL BULLETIN

PRODUCT: GREENSTAR GAS FIRED BOILERS

AIR/GAS RATIO CONTROL VALVES:

Gas Safe has issued an important technical bulletin **TB126** dated 6th November 2009. This relates to undertaking work on condensing boilers, which incorporate an air/gas ratio control valve.

COMMISSIONING DURING INSTALLATION:

The combustion settings on all Greenstar gas fired boilers have been checked, adjusted and preset at the factory for operation on the gas type defined on the boiler data plate. No measurement of the combustion values are necessary provided there is a meter installed allowing the gas rate to be checked. Do not adjust the air/gas ratio valve.

Having checked:

- ▶ That the boiler has been installed in accordance with the installation instructions,
- ▶ The integrity of the flue system and flue seals, as described in GasSafe Technical Bulletin **TB008**
- ▶ The integrity of the boiler combustion circuit and relevant seals.

Check the operational (working) gas inlet pressure:

To check the operational pressure, set the boiler to run at maximum rate condition (see installation and service instructions) and check the operational (working) gas pressure at the inlet gas pressure test point shown in the Figs 1 and 2.

The table below shows the minimum mbar requirement at the meter or regulator, the inlet of the boiler and the minimum mbar at the gas valve inlet test point for both Natural gas and L.P.G. boilers to obtain optimum performance of the boiler. For further guidance see technical training bulletin no: 8716 115 666a.

Gas type	Mbar at meter/regulator	Mbar at boiler inlet	Mbar at the gas valve
Nat' gas	19 mbar	18 mbar	16.5 mbar
LPG	32 mbar	29.5 mbar	28.0 mbar

Table 1: minimum mbar requirement as per Gas Safe TB 115

Abbreviations:

Nat' gas = natural gas

L.P.G. = liquid petroleum gas

Notice: Ensure that this inlet pressure can be obtained with all other gas appliances in the property working.

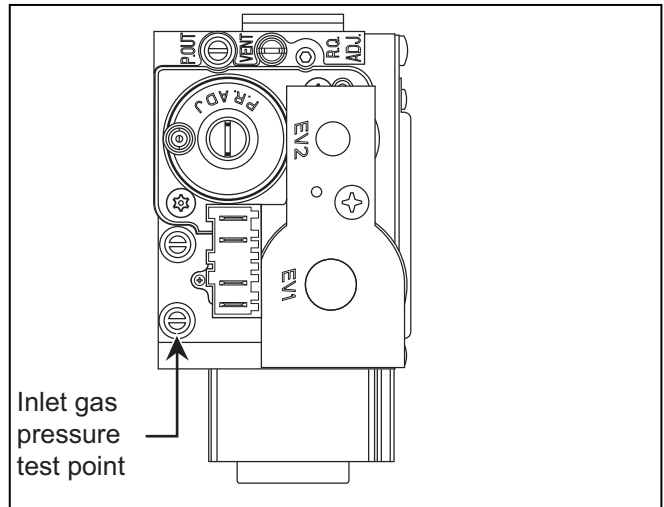


Fig 1: Boilers fitted with a SIT gas valve

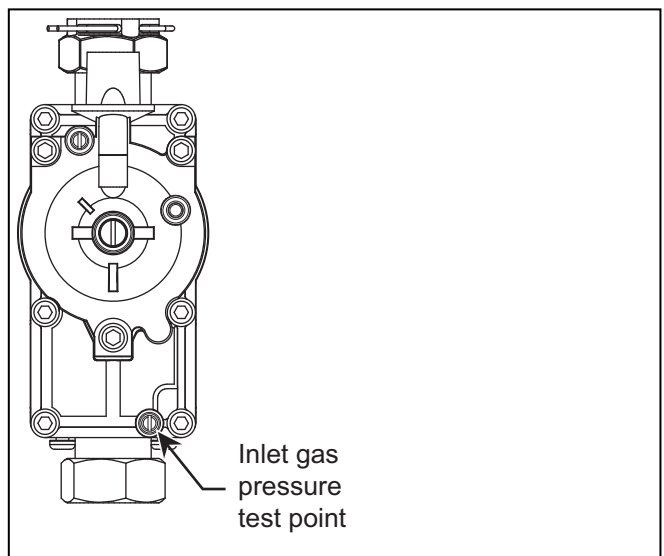


Fig 2: Boilers fitted with a PRETTLE gas valve

Measure the gas rate:

Metered:

The gas rate should be measured at the gas meter after 10 minutes operation at maximum rate condition. See technical data section of the installation manual.

Non-metered:

Where a gas meter is not available the CO and CO₂ must be checked and compared to the units shown in the combustion check of the routine servicing maintenance and repair section of this Technical Bulletin.

Whilst it is always our intention to fully assist, it is essential to recognise that all information given by the company in response to an enquiry of any nature is provided in good faith and based upon the information provided with the enquiry. We recommend that advice should always be checked with your installer or contract partner. Consequently, the company cannot be held responsible for any liability relating to the use or repetition of such information or part thereof. In addition, whilst making every reasonable effort to monitor the performance and quality of our supply, installation and service network, we do not accept responsibility for the workmanship or operation of any third party company that the company may have promoted either in conversation, e-mail or other communication.

Similarly, the views and opinions expressed in communication with individuals within the company may not reflect that of the business as a whole.

TECHNICAL BULLETIN

PRODUCT: GREENSTAR GAS FIRED BOILERS

ROUTINE SERVICING MAINTENANCE AND REPAIR:

Warning: During routine servicing, and after any maintenance or change of part of the combustion circuit, the following must be checked:

- ▶ The integrity of the flue system and the flue seals, as described in GasSafe Technical Bulletin **TB008**.
- ▶ The integrity of the boiler combustion circuit and the relevant seals.
- ▶ The operational (working) gas inlet pressure at maximum rate condition, as described in the commissioning section of this Technical Bulletin.
- ▶ The gas rate, as described in the commissioning section of this Technical Bulletin.
- ▶ The combustion performance, as described in the combustion check section of this Technical bulletin.

Examples of parts that would be affected:

Any part of the ignition system, air inlet, gas train PCB, fan, flap valve, gas valve, electrode, burner (and seals) primary heat exchanger and flue components.

Competence to carry out the check of combustion performance:

BS 6798: 2009 Specification for installation and maintenance of gas-fired boilers of rated output not exceeding 70 kW net advises that:

- ▶ The person carrying out a combustion measurement should have been assessed as competent in the use of a flue gas analyser and interpretation of the results;
- ▶ The flue gas analyser used should meet the requirements of BS 7927 or BS-EN50379-3 and be calibrated in accordance with the manufacturers requirements.
- ▶ Competence can be demonstrated by satisfactory completion of the CPA1 ACS assessment, which covers the use of electronic portable combustion gas analysers in accordance with BS 7967, parts 1 to 4.

Combustion check:

Connect the flue gas analyser to the flue gas sampling point as shown in Fig 3 and check against the boiler model shown in the following tables.

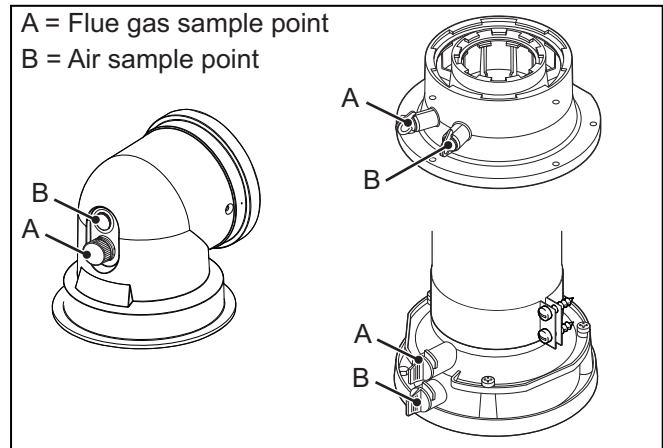


Fig 3: Vertical and horizontal flue sampling points

Notice: If the reading is within the tolerances shown no adjustment is required.

Warning: If the combustion reading is greater than the acceptable value and the integrity of the complete flue system and combustion circuit seals have been verified along with the inlet gas pressure, proceed to the section “setting the air/gas ratio valve” of this Technical Bulletin.

Safe combustion will be verified on CO/CO₂ ratio only. The CO/CO₂ ratio must be less than 0.002.

TECHNICAL BULLETIN

PRODUCT: GREENSTAR GAS FIRED BOILERS

Boiler model Greenstar ...	Gas type	CO ₂ setting maximum	CO ₂ setting minimum
24 & 28 i Junior Combi	Nat' gas	9.8% +/- 0.5	9.2% +/- 0.5
	L.P.G.	11.0% +/- 0.5	10.5% +/- 0.5
25 & 30 Si Combi	Nat' gas	9.8% +/- 0.5	9.2% +/- 0.5
	L.P.G.	11.0% +/- 0.5	10.5% +/- 0.5
27 & 30 CDi Combi	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
37 & 42 CDi Combi	Nat' gas	9.7% +/- 0.4	9.1% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
Highflow 440 & 550 CDi	Nat' gas	9.4% +/- 0.5	8.6% +/- 0.5
	L.P.G.	10.8% +/- 0.5	10.4% +/- 0.5
12, 15, 18 & 24 i System	Nat' gas	9.8% +/- 0.5	9.2% +/- 0.5
	L.P.G.	11.0% +/- 0.5	10.5% +/- 0.5
30 CDi System	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
12, 15, 18 & 24 Ri Regular	Nat' gas	9.8% +/- 0.5	9.2% +/- 0.5
	L.P.G.	11.0% +/- 0.5	10.5% +/- 0.5
30 & 40 CDi Regular	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
30 & 42 CDi FS Regular	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
CO – Less than 200ppm (0.002 ratio)			

Table 2: Current Worcester gas fired boiler range

Boiler model	Gas type	CO ₂ setting maximum	CO ₂ setting minimum
Bosch Greenstar MKI	Nat' gas	9.7% +/- 0.3	9.3% +/- 0.3
	L.P.G.		
25 & 30 HE Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
30 HE Plus Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
35 HE Plus Combi	Nat' gas	9.2% +/- 0.4	9.2% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.8% +/- 0.4
R25 & R30 HE Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
R30 HE Plus Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
R35 HE Plus Combi	Nat' gas	9.0% +/- 0.4	10.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.8% +/- 0.4
R40 HE Plus Combi	Nat' gas	9.2% +/- 0.4	9.2% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.8% +/- 0.4
29 HE Conv. & 27 HE System	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
R29 HE Conventional	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
R40 HE Conventional	Nat' gas	9.2% +/- 0.4	9.2% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.8% +/- 0.4
Greenstar 25 CDi Combi	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
Greenstar 35 CDi Combi	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
Greenstar 40 CDi Combi	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
Highflow 440	Nat' gas	9.6% +/- 0.4	9.0% +/- 0.4
	L.P.G.	11.5% +/- 0.4	10.5% +/- 0.4
CO – Less than 200ppm (0.002 ratio)			

Table 3: Non production Worcester gas fired boilers

Note: When checking an existing appliance the tolerances are as above. If checking after cleaning or component replacement or for adjustment when the reading obtained is outside the above allowances, then the tolerance is ± 0.2%

Boiler model	Gas type	CO ₂ setting maximum	CO ₂ setting minimum
430/i 30kW CDi System	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
532/i 32kW CDi Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	11.0% +/- 0.4	10.5% +/- 0.4
537/i 37kW CDi Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
542/i 42kW CDi Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
CO – Less than 200ppm (0.002 ratio)			

Table 4: Current BG boilers:

Boiler model	Gas type	CO ₂ setting maximum	CO ₂ setting minimum
CC1 29kW HE Combi	Nat' gas	9.2% +/- 0.4	8.8 +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
CS1 28kW HE System	Nat' gas	9.2% +/- 0.4	8.8 +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
ICC2 30kW HE Combi Plus	Nat' gas	9.4% +/- 0.4	9.2 +/- 0.4
	L.P.G.	11.0% +/- 0.4	11.0% +/- 0.4
ICC2 37kW HE Combi Plus	Nat' gas	9.4% +/- 0.4	9.2 +/- 0.4
	L.P.G.	11.0% +/- 0.4	11.0% +/- 0.4
ICS1 28kW HE System	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD528 29kW HE Regular	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD428 28kW HE System	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD 529 29kW Combi	Nat' gas	9.5% +/- 0.4	9.2% +/- 0.4
	L.P.G.	11.3% +/- 0.4	11.0% +/- 0.4
RD532 32kW HE Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD532i 32kW HE Combi	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD537i 37kW HE Combi Plus	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
RD542i 42kW HE Combi Plus	Nat' gas	9.2% +/- 0.4	8.8% +/- 0.4
	L.P.G.	10.8% +/- 0.4	10.5% +/- 0.4
CO – Less than 200ppm (0.002 ratio)			

Table 5: Non production BG boilers

Notice: If the reading is within the tolerances shown no adjustment is required. However if an adjustment is made to the maximum or minimum setting then both maximum and minimum CO₂ levels must be checked.

Whilst it is always our intention to fully assist, it is essential to recognise that all information given by the company in response to an enquiry of any nature is provided in good faith and based upon the information provided with the enquiry. We recommend that advice should always be checked with your installer or contract partner. Consequently, the company cannot be held responsible for any liability relating to the use or repetition of such information or part thereof. In addition, whilst making every reasonable effort to monitor the performance and quality of our supply, installation and service network, we do not accept responsibility for the workmanship or operation of any third party company that the company may have promoted either in conversation, e-mail or other communication.

Similarly, the views and opinions expressed in communication with individuals within the company may not reflect that of the business as a whole.

TECHNICAL BULLETIN

PRODUCT: GREENSTAR GAS FIRED BOILERS

SETTING THE AIR/GAS RATIO VALVE:

The following diagrams show the different air/gas ratio valves on all condensing gas boilers and how to adjust them:

SIT valve on i Junior, Si and Ri;

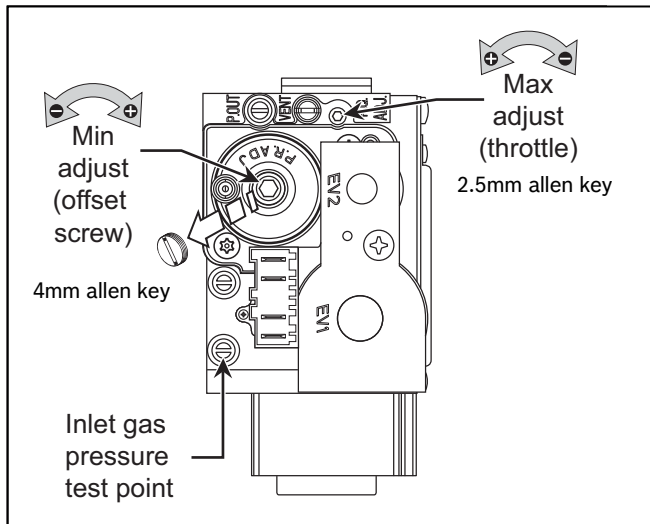


Fig 4: Adjusting the SIT gas valve on i Junior, Si and Ri

To adjust the CO₂ setting, first remove the brass cap to access the minimum adjustment as shown in Fig 4. When setting the gas valve use the values shown in the table that refers to the boiler being worked on.

Notice: In all cases adjust in steps of no more than 1/8 of a turn and wait 1 minute after each adjustment to allow the setting to stabilise.

If re-setting the CO₂ it should be set to nominal figure +/- 0.2 on page 4.

Warning: In the event an acceptable setting level cannot be obtained: Do not continue to adjust the air/gas ratio valve, shut off the gas supply to the boiler and contact Technical Support on: 0844 892 3366.

PRETTLE gas valve:

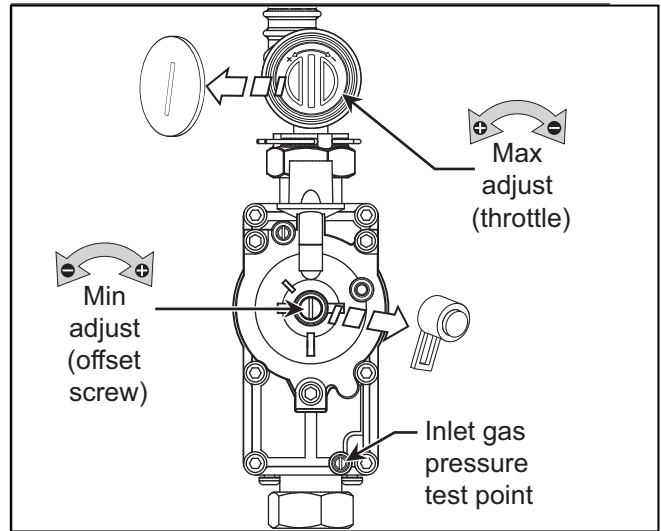


Fig 5: Adjusting the PRETTLE gas valve

To adjust the CO₂ setting, remove the plastic cap on the minimum adjustment. Remove the larger plastic cap to access the maximum adjustment as shown in Fig 5.

Notice: the maximum adjustment is inside the combustion chamber.

SIT gas valve on CDi range;

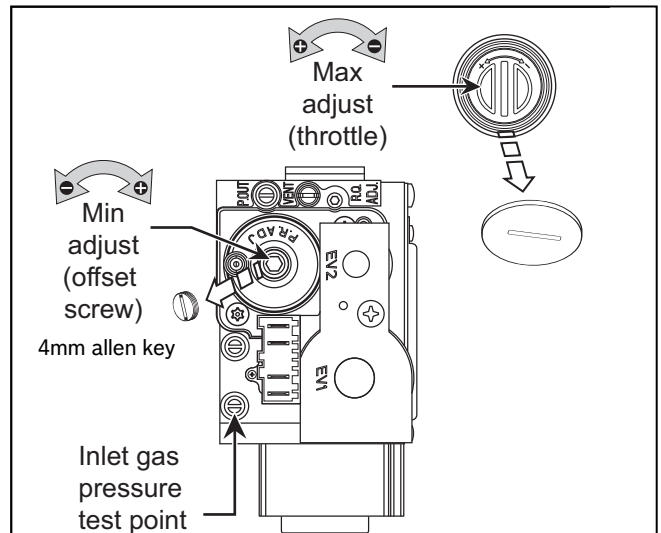


Fig 6: Adjusting the SIT gas valve on the CDi range:

To adjust the CO₂ setting, remove the brass cap to access the minimum adjustment. Remove the larger plastic cap to access the maximum adjustment as shown in Fig 6.