

Specification guide





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GAS 120 ACE

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Remeha, the expert choice.

Complete commercial solutions from the experts in sustainable heating and hot water.

Choose Remeha's advanced commercial boilers for your next commercial project. We invest heavily in research and development which enables our specialist teams to design high performance products at every level. From using the latest materials and manufacturing techniques to meticulously designing and engineering each boiler, we ensure they're efficient to specify, install, run and maintain. All our boilers share the same simple design – so they're expandable, adaptable and future-proofed.

We're the experts in heating and hot water solutions, built with sustainable technology. Our teams will guide you through the right choices for your commercial heating and hot water project. So from specification to design, through to supply and installation, our customer service and product support is second to none.

Introducing the Remeha Gas 120 Ace Range.

The Gas 120 Ace range features advanced floor-standing, modular gas-fired condensing boilers, available in 65, 90 and 115 models.

These boilers have been specifically developed to fit directly into the same floor area as a traditional boiler of equal output, promoting higher energy-efficiency and lower carbon emissions. They're designed for sealed heating systems, with a maximum operating temperature of 90°C.

Features and benefits

High efficiency condensing boilers (up to 97.6% gross seasonal efficiency) for use with natural gas or LPG	Higher than average energy savings
Low Class 6 NO ₂ emission levels from 29mg/kWh (0% 0_2 , dry)	Low pollutant emissions meeting all environmental legislation
0-10 volt and volt free contacts as standard R-Bus	Allows basic connection to a BMS system
Remeha Connect	Predictive and scheduled maintenance, full/advanced connection to a BMS system
e-Smart ready (upgraded controls)	Remote boiler connection over Wi-Fi, buffer management, DHW, new cascade manager
Open Therm connectivity (iSense, iSense Pro, eTwist)	For quick and easy connection between boiler and thermostatic controller
Cascade packages for up to 4 boilers	Space saving solution for greater design flexibility
Quiet operation <45dBA	Improved comfort levels – suitable for schools and hotels
Extremely compact – boilers are only 600mm wide	The Gas 120 Ace range will fit into even the smallest of plant rooms (offering a genuine alternative to using wall-hung boilers which are more labour intensive to install)

Gas 120 Ace boiler construction.

Main boiler component



Fig. 1 Key

1	Control unit
2	Flow sensor
3	Light
4	Ignition/ionization electrode
5	Non-return valve
6	Gas valve
7	Heat exchanger (heating circuit)
8	Return sensor
9	Pressure gauge sensor
10	CU-GH-08 PCB housing
11	Siphon
12	Flue gas circuit
13	Intake silencer
14	Venturi
15	Flue gas sensor
16	Fan
17	Automatic air vent
18	Flue gas measuring point
19	Combustion air measuring point
20	Flue gas outlet/air supply

Operating principle.

The products of combustion, in the form of hot flue gases, are forced through the heat exchanger, transferring their heat to the system water. The flue gas temperature is reduced to approximately 5°C above the temperature of the system return water then discharged vertically via the condensate collector, through the flue connection to atmosphere.

The low flue gas exit temperature means there will be a vapour cloud formed at the flue gas terminal – this is water vapour formed during the combustion process. If the controls allow the flow, and therefore return temperature, to fall below dew point (55°C), this water vapour will begin to condense in the boiler, transferring its latent heat into the system water and increasing the output of the boiler, without increasing gas consumption. Condensation formed within the boiler and flue system is discharged from the boiler to an external drain via the drain pan/siphon supplied.

Combustion air is drawn into the closed air box by a variable speed fan, through the air inlet connection from the plant room (open flued) or from outside via the concentric flue system (room-sealed). On the inlet side of the fan is a specially designed venturi which is connected to the outlet side of the gas valve. Depending on the demand (under the dictates of flow/ return sensor and other external/internal control inputs) the electronic control unit directly monitors the volume of gas and air being delivered to the premix burner. This mixture is initially ignited by the combined ignition/ionisation probe which then monitors the state of the flame. If the flame doesn't ignite or is unstable, within the pre-set safety time cycle, the controls will shut the boiler down (after five attempts) requiring manual intervention to reset the boiler. The digital display will also indicate a flashing fault code confirming the reason for the failure.









Gas 120 Ace technical information.

	Gas 120 Ace 65	Gas 120 Ace 90	Gas 120 Ace 115	
Performance				
Nominal heat output central heating operation @ 80/60°C kW (min-max)	12.0-61.5 61.5	14.1-84.2 84.2	18.9-103.9 103.9	
Nominal heat output central heating operation @ 50/30°C kW (max)	13.5-65.0 65.0	15.8-89.5 89.5	21.2-109.7 109.7	
Nominal input (kW) central heating operation (Hi) min-max kW	12.2-62.0 62.0	14.6-86.0 86.0	19.6-107.0 107.0	
Efficiency				
SEBM seasonal efficiency GCV	97.6	95.7	95.4	
Efficiency – full load 100% NCV	99.2	97.9	97.1	
Efficiency – part load 30% NCV	110.4	108.1	108	
ECO design useful efficiency @ 80/60% (100% full load) GCV	89.4	88.2	87.5	
ECO design useful efficiency @ 50/30% (30% part load) GCV	99.5	97.4	97.3	
Energy labelling seasonal space efficiency GCV	94	94 N/A		
ErP efficiency rating	A	N/A		
Gas				
Standard fuel		NG		
Optional fuel adjustment – see installation manual		LPG		
Max gas consumption NG m ³ /h	6.6	9.1	11.7	
Max gas consumption LPG kg/h	2.5	1.5	2.0	
Min-max gas inlet pressure NG mbar		17-25		
Min-max gas pressure LPG mbar		37-50		
Gas connection size BSP inches		3⁄4"		
Flue (concentric connection supplied as standard)				
Flue diameter mm I/D		100		
Air inlet diameter mm I/D		150		
Min-max flue gas flow rate kg/h	21-104	28-138	36-178	
Average flue gas temperature (75/60°C)		30-120		
Residual fan duty PA	100	160	220	

Gas 120 Ace technical information.

	Gas 120 Ace 65	Gas 120 Ace 90	Gas 120 Ace 115	
Hydraulics				
Water content litres	7.1	10.1	10.1	
Hydraulic resistance @ 20°C ΔT mbar	170	160	260	
Resistance @ 11°C ΔT mbar	562	529	860	
Normal flow rate at 20°C Δ T l/s	0.74	1.01	1.24	
Normal flow rate at 11°C ΔT I/s	1.34	1.83	2.26	
Minimum flow rate I/hr	290	340	455	
Condensate connection		25mm OD		
Connection size BSP		1¼" (m)		
Standard operating temperature °C		20-90		
Max operating temperature °C		90		
Max water operating pressure bar	4			
Min water operating pressure bar	0.8			
Min water operating pressure bar open vented* (OV)	0.3 0.5			
General				
Dry weight (kg)	98 109			
Dimensions (WxHxD) (includes flow/return and gas pipework)	600 x 1360 x 605 600 x 1582 x 605			
NO _x (dry, 0% 0) mg/kWh EN483/15420EN483/15420	29	4	1	
Noise levels dB (A) at 1 metre	40	4	5	
Eco design sound power levels LWA indoors dB	55	61	60	
Standby heat loss kWh/24hr	0.114	0.1	19	
Electrical				
Nominal power supply		230v-1ph		
Power consumption (W)	25-92 24-124 34.4-18			
Modulating input (V DC)	0-10			
Fuse rating amps	6.3			
Controls voltage		24 (4va)		
Insulation class IP	IPX1B			

*Open vented option maximum operating temperature 75°C.

Note: These figures are correct at time of print. Please refer to the manual for the latest information.

Suggested engineering specification Gas 120 Ace.

Construction

The boiler shall be a floor-standing type condensing boiler. The single piece cast aluminium heat exchanger and other major components are contained within a sealed air box. The boiler casing is complete with a removable front section for maintenance purposes. Electrical and electronic controls are contained within the instrument panel mounted in the hinged top panel and also the electrical housing mounted on the inside of the boiler panel.

Hydraulic, Gas and Flue Connections

The combined flue gas outlet and combustion air inlet shall be mounted at the top of the boiler, with the flow, return, gas and condensate connections located at the rear. The boiler is suitable for room-sealed or open flue applications. The boiler is designed for central heating and indirect hot water production up to four bar working pressure. The boiler is suitable for use on sealed systems and open vented installations.

Operation

The boiler is complete with a modulating control system that limits the maximum difference in temperature between the heating flow and return, and the maximum speed at which the flow temperature increases. The boiler is complete with a pre-mix burner (NG or LPG) with the gas/air ratio control system controlled internally. An intelligent, advanced boiler control continuously monitors the boiler conditions, varying the heat output to suit the system load. The control is able to react to external negative influences in the rest of the system (flow rates and air/gas supply problems) maintaining boiler output for as long as possible without resorting to a lock out condition.

Should a negative effect happen in the system the boiler reduces its output and/or shuts down (shut-off mode), awaiting the negative conditions to return to normal before restarting. The control cannot override the standard flame safety controls. Standard frost protection shall activate below 7°C with stage one activating the system/shunt pump. Stage two shall activate below 3°C with boiler switching on to 10°C flow.

Controls

The boiler includes a controls package that allows the actual and set values to be read and adjusted on the built-in digital display, which also provides normal operating and fault code indication. The controls come as standard with the following inputs/outputs:

- > 0-10V input (flow temperature or load control)
- > DHW temperature input
- > High limit lock out
- > Safety/shutdown/release input
- Low water protection
- > Outside sensor (optional)
- > External shunt pump control
- > Service report output
- > External system pump control
- > Run and fault indication output
- > Open therm interface
- > R-Bus

Features

- > Ultra-low Class 6 NO_x <29mg/kWh
- Fully modulating
- > Quiet operation <45 dB(A)
- > Data file for storing fault/run info
- > ErP compliant
- > Full colour text display
- > Premix burner

The boiler meets the requirements of the following EC regulations and directives:

- > Gas Appliances Regulation (EU) (2016/426)
- > Pressure Equipment Directive 2014/68/EU
- > Electromagnetic Compatibility Directive (2014/30/EU)
- > Low Voltage Directive (2014/35/EU)
- > Efficiency Directive (92/42/EEC)
- European Ecodesign Directive (2009/125/EC) EU Regulation (813/2013)
- European Labelling Framework Regulation (EU) (2017/1369)
 EU Regulation (811/2013)

Engineering specification and dimensions and connections.

Gas 120 Ace Dimensions and Connections



Dimensions

1	Heating circuit flow (R11/4")	2	Gas inlet (G¾")		Heating circuit return (R11/4")
4	Condensate discharge (DN22)	5	Flue gas pipe Gas 120 Ace 65: Diameter 100/150mm Gas 120 Ace 90: Diameter 100/150mm Gas 120 Ace 115: Diameter 100/150mm	A	Gas 120 Ace 65: 1340mm Gas 120 Ace 90: 1562mm Gas 120 Ace 115: 1562mm
В	Gas 120 Ace 65: 1164mm Gas 120 Ace 90: 1386mm Gas 120 Ace 115: 1386mms	С	Gas 120 Ace 65: 1082mm Gas 120 Ace 90: 1304mm Gas 120 Ace 115: 1304mm	D	Gas 120 Ace 65: 971mm Gas 120 Ace 90: 1193mm Gas 120 Ace 115: 1193mm
E	Gas 120 Ace 65: 410mm Gas 120 Ace 90: 632mm Gas 120 Ace 115: 632mm	F	Gas 120 Ace 65: 87mm Gas 120 Ace 90: 303mm Gas 120 Ace 115: 303mm	G	Gas 120 Ace 65: 128mm Gas 120 Ace 90: 350mm Gas 120 Ace 115: 350mm

Maintenance and service clearances.

Clear space should be left around the boiler:

- > 500mm in front of the boiler
- > 500mm above the boiler
- > 500mm each side of the boiler
- > 100mm each side of the boiler (in cascade)

(Facilitates removal of the casing.)

The boiler can be located along a partition on one of its sides, provided there is a 500mm space on the opposite side.

Allow enough space around the boiler to facilitate accessibility and maintenance. The minimum recommended dimensions are shown in the illustration.





Maintenance and service clearances and typical installations.

Single boiler



Single boiler, direct hot water priority with low loss header



Modular cascade boiler configuration



Note: These layouts do not constitute a design. Calculations must be carried out to ensure pipework and pumps are sized to match boiler nominal flows against system design flow requirements. All connections are to the back of the boiler.

Electrical installation

General

The Gas 120 Ace is supplied as standard with electronic control and flame ionisation safety controls, with a specially designed microprocessor at the heart of the control system.

Specifications

Electrical supply

The Gas 120 Ace must have a permanent 230V – 50Hz single phase supply rated at 6.3 amps.

Boiler temperature control

The Gas 120 Ace has electronic temperature control with flow and return temperature sensors. The flow temperature can be adjusted between 20 and 90°C.

High limit temperature control

The high limit temperature protection device switches off and locks out the boiler when the flow temperature exceeds the high limit set point (adjustable). When the fault is corrected the boiler can be restarted by using the reset key on the control panel.

Low water protection (flow and content)

The Gas 120 Ace is supplied with low water protection via pressure sensor. By modulating back at the moment the water flow threatens to fall too low, the boiler is kept operating for as long as possible. In the event of low flow (F/R $\Delta T > 45^{\circ}$ C) the boiler will shut off and not lockout. If the boiler is fired dry it will go to lockout.

Electrical installation and electrical connections.

The Gas 120 Ace 65/90/115 must have a fixed 230v - 50Hz single phase mains supply. It must be powered by a circuit containing a double pole switch with an opening distance of 3mm.

CB-09 PCB



SCB-02



1 Input	2 Inputs	3 Bus
 > Flow sensor > DHW sensor > Outside sensor > Safety contact 	 > Three way valve > Heating zone pump > DHW pumpr > Status contact (2x) > 0-10 V 	 > OpenTherm slave and Room unit Bus > L-Bus (local bus) > S-Bus (service bus)

IF-01



Connector	Description
0-10 (input)	Not used
0-10 (input)	The 0-10V signal corresponds to a temperature or power set point, depending on the position of the jumpers
0-10 (input)	Output signal indicating the boiler's operating mode
Status	Boiler fault reporting contact output
OTm	Communication link with the CU-GH-08- PCB

Flue options.

The Gas 120 Ace boilers have fan assisted flues supplied as standard, with a concentric flue outlet/air inlet connection used for room sealed operation, or for open flue (room ventilated) applications. An optional twin pipe fitting is available for the room sealed CLV system.

The concentric system can be supplied for individual boilers for horizontal or vertical installation. Because of the excess fan capacity of the boiler, most flue lengths can be accommodated (depending on the boiler model and actual route taken), which enables installers to position the boiler almost anywhere in the building.

Open flue or room ventilated systems can be installed as individual or combined flues and should discharge vertically, with the flue terminating in an optional tapered cone, complete with bird guard.

Care needs to be taken when siting the actual discharge point. Please refer to local regulations.

Flue options.

Typical flue options



Note: The diagram above showing flue configurations is for classification purposes only.

Ke	y		
1	Flue type C13 Air/flue gas connection by means of concentric pipes to a horizontal terminal (so-called forced flue)	5	Flue type C53 Air and flue gas connection separated by means of a bi-flow adapter and single pipes (combustive air taken from outside)
2 OR	Flue type C33 Air/flue gas connection by means of concentric pipes to a vertical terminal (roof outlet)	6	Flue type B23P Chimney connection (combustive air taken from the boiler room)
3	Flue type C33 Air/flue gas connection by concentric pipes in the boiler room and single pipes in the chimney (combustive air in counter current in the chimney)	7	Flue type B23P
4	Flue type C33 Air/flue gas connection by concentric pipes in the boiler room and single 'flex' in the chimney (combustive air in counter current in the chimney)	7	Flue damper

 $\label{eq:Note:If further classification is required please refer to a specialist flue contractor.$



Concentric room sealed applications (C13/C33)



- > 90° Elbow an equivalent length of 1.9m
- > 45° Elbow an equivalent length of 1.2m
- > Inspection Tee an equivalent length of 3.3m

Note: Flue lengths can be extended by using larger diameter flue pipe. For further clarification please consult a flue specialist and the Remeha technical department on 0118 978 3434.

Calculation Data – Room Sealed Applications	Flue Option	Gas 120 Ace 65	Gas 120 Ace 90	Gas 120 Ace 115
Maximum length O/L using 100/150mm concentric flue	C13	9m	8m	5.9m
Maximum length O/L using 100/150mm concentric flue	C33	11.5m	10m	9.4m

Note: Minimum fall back is 2° or 50mm per metre.

Conventional flue (B23P)



Calculation Data Conventional Flue	Flue Option	Gas 120 Ace 65, 90 & 115
Maximum length O/L using 100mm single wall flue	B23P	40m

Flue options.

CLV system (C53)



Calculation Data – CLV system (Twin pipe – two zone) Applications	Flue	Gas 120	Gas 120	Gas 120
	Option	Ace 65	Ace 90	Ace 115
Maximum length O/L using 2 x 100mm single wall flue	C53	23m	17.5m	16m (11m air/ 5m gas)

Modular flue systems.

The integral flue non-return valve allows for multiple Gas 120 Ace boilers when used on a common flue system. The following table offers flue system sizing guidance, based upon the total heat output and the available chimney height. Please consult a flue specialist or our technical department for any further assistance. Typical cascade flue arrangement, please refer to O&M Manuals and flue specialist for further assistance.

Multi-boiler installation on a combined header



Note: Connect the boilers to the horizontal header using swept connections.

Flue options.

Flue dilution systems



Note: Please contact a flue specialist for assistance with flue dilution system design.

*Typical modular flue dilution system showing the flue break necessary for use on all pre-mix boilers. The flue break prevents the dilution fan affecting the gas/air ratio control system within the boiler.

Flue Guidelines

Refer to the latest relevant British Standards.

Ref BS 5440-2: Specification for installation and maintenance of ventilation for gas appliances not exceeding 70kW (1st, 2nd and 3rd family gases).

Ref BS 5440-1: Specification for installation of gas appliances to chimneys and for maintenance of chimneys not exceeding 70kW (1st, 2nd and 3rd family gases).

Ref BS 6644: Specification for installation of gas red hot water boilers of rated inputs between 70kW to 1.8MW (net) (2nd and 3rd family gases).

Ref IGE/UP/10: Installation of flued gas appliances in industrial and commercial premises.

It's the responsibility of the installer to install the flues and fluecades to comply with the current regulations and standards.

Important note

All flue terminals and CLV kits are supplied with a condense drain/siphon – this must be connected within one metre of the boiler flue connection. Any condensate which is able to flow back into the boiler from flue lengths greater than one metre must be discharged via a condense collector and drain system fitted within one metre of the boiler flue connection. Make sure that any flue gas outlet pipe to the boiler has a sufficient gradient (at least 50mm per metre) and there's a sufficient condensate collector. Where boilers have been installed on a common open flue system, condensate collectors and drain systems must be fitted on each individual boiler directly above the boiler flue connection. Condense siphons must be deep-seal water type with the discharge taken to a suitable drain point.

Further information regarding flue with dissimilar metals can be found in BS6644 – 2011 Section 6.10.4.

Concentric room-sealed flue components should not be mixed with single wall flue components.

Flue components are constructed from a white painted metal outer and plastic inner.

Flue terminals are painted as detailed in the terminal diagrams.

Plume kit external components are aluminium or plastic and are painted black. All flue components are CE approved.

Single boiler hydraulic accessories.

Remeha offers a low loss header solution for single boiler applications for use with the Gas 120 Ace Boilers. Fitting a low loss header allows the boiler to maintain the correct flow of water constantly, ensuring maximum reliability and efficiency. These accessories are easily integrated into the boiler. They are supplied with boiler case extension panels which conceal the low loss header arrangement.



Single boiler hydraulic accessories.

Remeha offers a Plate to Plate Heat Exchanger Kit for single boiler applications for use with the Gas 120 Ace Boilers. Fitting this accessory allows the boiler to maintain the correct flow of water constantly, ensuring maximum reliability and efficiency. These accessories are easily integrated into the boiler. They are supplied with boiler case extension panels which conceal the low loss header arrangement.



Dimensions

- 1 Gas 120 Ace 65
- 4 1082mm

Gas 120 Ace 90 and 115

1304mm

Modular cascade option.

Spreading the total required heat output over several boilers in cascade configuration improves reliability and efficiency of the heat provision.

Modular cascade options



Dimensions

	Gas 120 Ace 65	Gas 120 Ace 90 and 115
в	1082mm	1304mm

Smart connection technology

Remeha's 'Smart Connection Technology' modular pipework kit has been designed to reduce installation time and simplify the planning of the primary circuit layout, for up to four boilers.

The pipework kit comprises a flow and return assembly to each boiler which incorporates a suitably sized circulation pump, safety relief valve set at three bar and isolation valves. Each manifold (one per boiler) simply bolts together at 700mm centres, with a low loss header and connecting/blanking flanges completing the installation. The standard manifold provides connections for both in-line and back-to-back boilers. Simply blank off the connections not used with the caps contained within the kit. The pipework kits have been designed to operate at a minimum $15^{\circ}C \Delta T$.



Technical support and declaration of compliance.

Technical support

From brochures to CAD drawings and BIM files, you can access all the information you need at **remeha.co.uk**

Or call our sales or technical departments on 0345 070 1055.

We're always happy to help.

We can provide you with:

- > Brochures
- > Technical specification sheets
- > Case studies
- > Installation manuals
- > BIM files
- CAD files
- > Energy-related products directive data
- Commissioning
- > Technical information
- > Spare parts (part of our aftersales service)

Declaration of compliance

We hereby certify that the series of appliances specified herein is in compliance with the standard model described in the EC declaration of compliance, and that it is manufactured and marketed in compliance with the requirements and standards of the following European Directives:

- > Gas Appliances Regulation (EU) (2016/426)
- > Pressure Equipment Directive 2014/68/EU
- > Electromagnetic Compatibility Directive (2014/30/EU)
- > Low Voltage Directive (2014/35/EU)
- > Efficiency Directive (92/42/EEC)
- European Ecodesign Directive (2009/125/EC) EU Regulation (813/2013)
- Energy Labelling Framework Regulation (EU) (2017/1369) EU Regulation (811/2013)



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