



Ethos Condensing Boilers

Wall mounted: 65kW-120kW Condensing Boilers



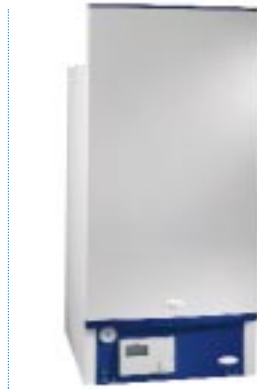
Ethos 65-120

Wall Mounted Condensing Boilers

The Ethos 65-120 Condensing Boilers

The Ethos range of wall mounted gas fired *ultra low NOx condensing boilers set new bench marks in power for appliances of their type: with four models available at 65, 85, 100 and 120kW. With such outputs available for wall mounting, valuable floor space can be utilized for other purposes keeping plant room space requirement within a building to a minimum. Arranged within a compact and uncluttered frame, the boiler utilizes the well proven helical stainless steel tube type heat exchanger and this with its matched modulating premix burner can return efficiency in excess of 109.5% net with a turndown range of 5:1. All models may be room sealed if required and can be flued over considerable distances using either 2 x DN100 tubes or 100/150 concentric flue components. Environmental impact is kept to a minimum through very high efficiency and very low emission from the clean burning premix combustion system.

* < 34 mg/kWh NOx



Standard Features

Compact dimensions

All models are housed in a stylish casing measuring just 896mm high x 465mm wide x either 405, 510, 560 or 670mm deep respectively for the models 65, 85, 100 & 120.

Concealed control centre

The front casing panel slides upwards to reveal the controls and self supports whilst access is made to the comprehensive but user friendly control module. For ease of operation a short instruction guide is permanently affixed to a slide-out panel at the base of the controls housing.

Controls options

To meet the needs of modern heating systems and with close control to ensure comfort and economy, a range of matched control options is offered covering direct-on-boiler weather compensation and domestic hot water control plus the possibility to control up to 16 zones and up to 8 boilers in cascade.

Extreme efficiency

The coiled-tube all stainless steel heat exchanger, coupled with a modulating premix burner with turndown to 20% output can return efficiency in excess of 109.5% net. Operating at this extremely high efficiency, the boiler has almost no losses to the chimney giving maximum fuel savings.

Inherent reliability

With all solid state controls, and moving parts confined to the gas valve and fan (pump also in model 65 & 85) there is little to wear through usage, plus all components are sensibly laid out within the uncluttered frame making maintenance a simple task.

Very low operating noise

At just 48dba, the Ethos wall mounted boilers are extremely quiet making them an ideal appliance to choose in noise sensitive applications such as residential blocks, schools and libraries etc

Varied fluing possibilities

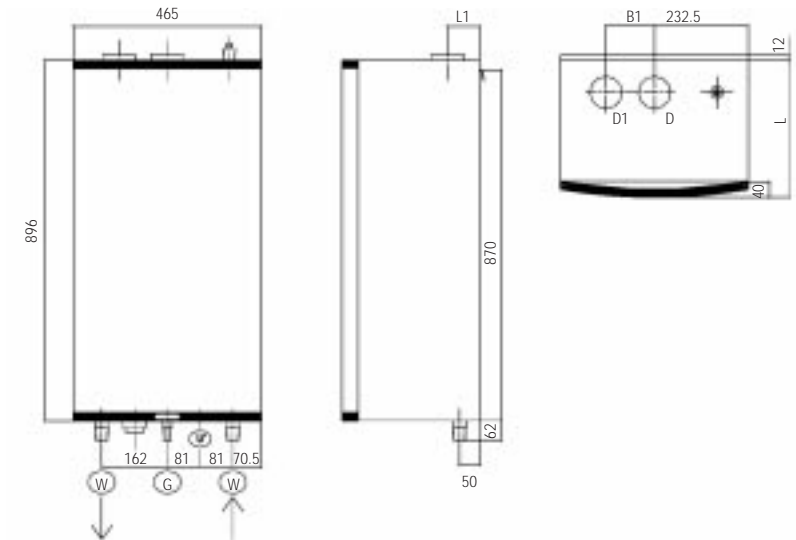
The appliance may take air for combustion from the room or it may be room sealed using either a two tube or a concentric tube arrangement. As the flue gas temperature does not exceed 70°C, the use of PP plastic material is permissible and flue lengths of up to 35m are possible using DN100 tube.

Warranty

The heat exchanger carries a 5 year guarantee, all other components carry a 12 month guarantee.

All guarantees are against manufacturing or material defects only.

Dimensions & Clearances



Type	Ethos 65	Ethos 85	Ethos 100	Ethos 120
B1 mm	120	140	140	140
D mm	80	100	100	100
D1 mm	80	100	100	100
G	3/4"	3/4"	3/4"	3/4"
L	405	510	560	670
L1	90	90	90	90
W	1 1/4" / 1"	1 1/4" / 1"	1 1/4" / 1"	1 1/4" / 1"

Note:

Flow and Return Connections W have both internal 1" and external 1 1/4" threaded connections. To ensure lowest hydraulic resistance of the attached pipework and fittings it is recommended to use the larger external connections.

D = Flue Connection
D1 = Combustion Air Connection
G = Gas Connection

Technical Data - Ethos 65 - 120

BOILER MODEL		ETHOS 65	ETHOS 85	ETHOS 100	ETHOS 120
Nominal heat output 80/60°C	kW	8.3 - 59.2	15.6 - 77.8	17.6 - 88.2	21.9 - 109.8
Nominal heat output 40/30°C	kW	9.2 - 65	17 - 85	19.2 - 96.3	24 - 120
Nominal heat input	Gross kW	9.5 - 67.4	17.7 - 88.8	19.9 - 99.9	25 - 124.8
	Net kW	8.6 - 60.7	16 - 80	18 - 90	22.5 - 112.4
Max flow temperature	°C	90	90	90	90
Water content	ltrs	6.6	8.4	10.3	12
Design temperature rise (ΔT)	°C	20	20	20	20
Residual head of pump	kPa	29	15	*	*
Min/Max operating pressure	bar	1.5 / 6	1.5 / 6	1.5 / 6	1.5 / 6
Gas consumption Nat Gas (G20)	m3/hr	6.29	8.28	9.32	11.65
Gas consumption LPG (G31)	m3/hr	2.5	3.2	3.6	4.6
Gas inlet press nom. Nat Gas (G20)	mbar	17 / 20	17 / 20	17 / 20	17 / 20
Gas inlet press min/max LPG (G31)	mbar	30 / 50	30 / 50	30 / 50	30 / 50
Approx flue gas volume max	m3/hr	113	149	168	209
Approx flue gas temperature max	°C	70	70	70	70
Gas connection	BSP M	3/4"	3/4"	3/4"	3/4"
Flow/return connections**	BSP	1 1/4" / 1"	1 1/4" / 1"	1 1/4" / 1"	1 1/4" / 1"
Air supply connection	mm	80	100	100	100
Flue connection	mm	80	100	100	100
Condensate waste connection (flexible hose)	mm	25 OD x 300L	25 OD x 300L	25 OD x 300L	25 OD x 300L
Nominal weight (dry)	kg	55	65	80	65
Electrical supply (230V 50Hz)	Amps	6	6	6	6

Note:

* Pump not included

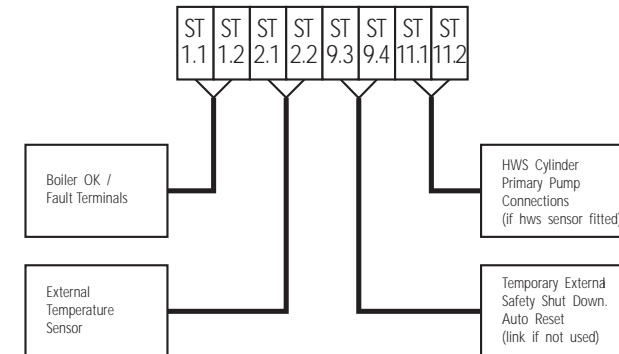
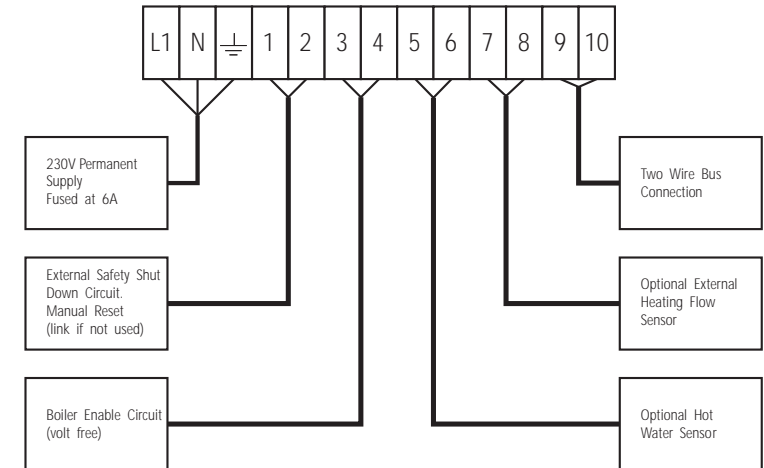
** Flow and return connections have both internal 1" and external 1 1/4" threaded connections. To ensure lowest hydraulic resistance of the attached pipework and fittings it is recommended to use the larger external connections.

Gas Category II 2H3P

Appliance Category B23, C13, C33, C43, C53, C63, C83

CE Product Identification Number 0063B03192

Electrical Connections



Controls and Options

The Ethos series boilers are equipped with a modulating control system. As standard (without additional control options) the boiler operates to provide a constant flow temperature, however, if required, the flow temperature can be controlled via a 0-5 VDC signal for example in response to external temperatures. An indirect hot water storage cylinder may also be controlled (with priority) and is part of the standard capability of the boiler controls, an additional sensor or thermostat is required to utilize these options.

The control capability of the boiler can be extended by including items from the following options:

BME

A weather-dependent temperature controller with the following features:

- Direct-on-boiler weather compensated flow temperature
- Programming of 3 heating periods with different room temperatures
- Adjustable night set-back temperature
- Hot water priority circuit with 2 on/off's per day
- Override for single hot water period during night time reduced flow temperature operation
- Optimum start time calculation
- Room temperature control with or without external temperature influence
- Option of internal (standard) or external room sensor (option)
- Adjustable response of the flow temperature to sensed room temperature
- Calibration of the room sensor
- Delay to flow temperature compensation due to external temperature change up to a maximum of 3 hours
- Holiday Programme
- Frost protection system based on external temperature or room temperature
- Remote activation via telephone if no external room sensor fitted (external relay required)
- Optimisation of compensation slope based on room temperature and external temperature with optimum start time adjustment
- Hot water Anti-legionella bacteria function (65°C)
- Option of switching off internal room sensor
- 2-wire bus connection to boiler
- Repeat of boiler controller functions with display of status, operating hours, number of starts, degree of modulation and temperatures

E6.1111

This is a control system for the weather dependent control of two heating circuits. It may be used in conjunction with a single boiler or as an extension add-on to a KKM unit. In addition, one hot water circuit can also be controlled. Each circuit may operate

independently, with independent time and temperature scheduling. The E6.1111 controller can be further extended with an optimizing room unit for each heating zone (BM Room Unit). The weather dependent control of the boiler is done indirectly by the E6.1111.

Up to 8 Nr E6.1111 controllers may be connected together extending the capability up to 16 heating zones. Each heating zone may have a BM Room Unit providing room influence and allowing the user to make adjustments to the set programmes if required. Note; only one hot water circuit may be controlled regardless of how many E6 controllers are installed.

The E6.1111 has similar functions to the BME unit with additional facilities of:

- The maximum flow temperature can be set for each heating circuit
- The compensation slope can be manipulated with a parallel displacement to the desired flow temperature of the boiler
- Additional time channel for control of an HWS secondary circulation pump
- Pump exercising function

KKM

This is a boiler cascade manager with which up to 8 boilers can be connected in cascade (and an extra on/off boiler can be operated). The KKM also has the same functional features as the E6.1111. UP 7Nr E6.1111 controllers may be connected to a KKM extending the control capability up to 16 heating zones. Each heating zone may have a BM Room Unit providing room influence and allowing the user to make adjustments to the set programmes if required.

Each of the control options listed above is supplied incorporated into a wall mounting box. Appropriate sensor sets are included.

The KKM option includes boiler to boiler bus connection cables.

System Water

Ethos boilers must only be installed onto sealed and pressurised systems with a minimum static head of 10m or 15m dependant upon operational temperature.

All systems must be thoroughly cleansed prior to the connection of the boiler and the system water must be dosed with a good quality treatment to prevent corrosion within the system and the formation of scale within the boiler waterways. The chloride content of the fill water must not exceed 200mg/litre. Particular care must be taken when installing the boiler onto an old system, with consideration given to the installation of an air and dirt separator.

For specialist advice and water treatment products, contact: Fernox, Tandem House, Marlowe Way, Beddington Farm Road, Croydon CR0 4XS Tel: 0208 665 6666 or Betz Dearborn Ltd, Widnes, Cheshire WA8 8UD Tel: 0151 495 1861

Installation requirements

Ethos series boilers should be installed in accordance with the relevant requirements of the Building Regulations, Health and Safety Executive Regulation PM5, IEE Regulations, Gas Safety (Installation and use) Regulations, National and Water Bylaws and any Insurance Company requirements.

Codes of practice

The following list of codes of practice give guidance on the requirements for installation.

BS 6880	Code of Practice for low temperature hot water heating systems for output greater than 45kW.
BS 6644	Installation of gas fired hot water boilers of rated inputs above 60kW, but not greater than 2MW.
BS 6798	Specification for installation of gas fired hot water boilers of rated input not exceeding 60kW.
IGE/UP/2	Gas installation pipework and compressors on industrial and commercial premises.
IGE/UP/10	Installation of gas appliances in industrial and commercial premises, Part 1: Flued appliances.
CISBE Guide	Reference sections B7, B11 and B13.

Hydraulic system design

Ethos boilers are designed to operate with a nominal Δt 20°C and a flow temperature up to 90°C. The heating system shall be sealed and pressurized, and shall be treated in accordance with BS7593-1992, code of practice for treatment of hot water central heating systems.

Boiler pumps 65 & 85

Ethos models 65 & 85 are equipped with a factory fitted pump mounted inside the casing.

Ethos models 100 and 120 are supplied without pumps and it is the responsibility of the installer to provide and install an appropriately sized pump. The pump must be mounted in the pipe work outside of the boiler casing. The power supply for the pump is provided from the boiler, and the boiler incorporates a 1m x 3 core flex cable for this purpose. Max pump motor load 1Amp.

Care must be taken with the minimum static head, and systems operating up to 80°C must have a cold fill pressure of not less than 1.0bar and systems operating up to 90°C must have a cold fill pressure of not less than 1.5bar.

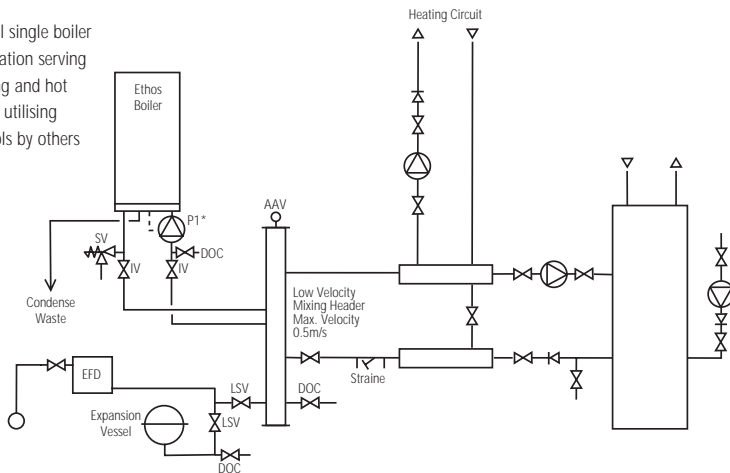
Type	Ethos 65	Ethos 85	Ethos 100	Ethos 120
Nominal flow rate @ 20°C ΔT l/s	0.71	0.93	1.05	1.3
Available residual head pressure @ nominal flow rate kPa	49	15	*	*

Suitable pumps may be:

Type	Ethos 100	Ethos 120
Wilo model	TOP-S 30/7	TOP-S 30/7
Residual head kPa	24	12
Grundfos model	UPS 25-80	UPS 25-80
Residual head kPa	22	12

System schematics

Typical single boiler installation serving heating and hot water, utilising controls by others

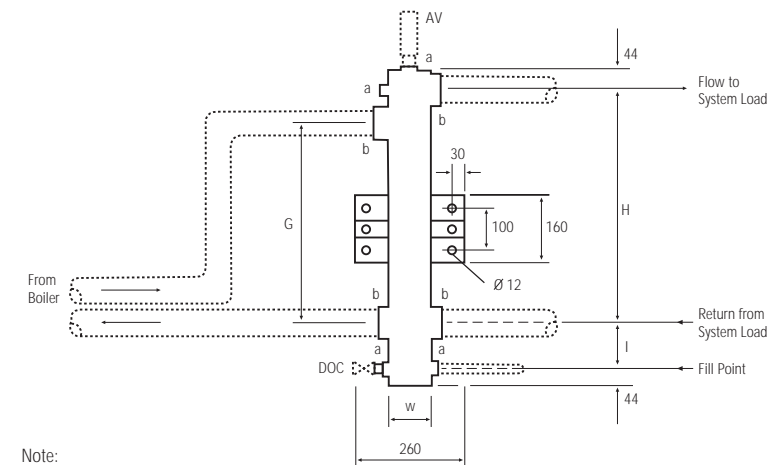


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Vertical low velocity header

As an aid to installation, a small range of prefabricated vertical low velocity headers are available. Prefabricated insulating jackets for the headers are also available.

Date	Type A	Type B	Type C
Connections Tappings	a	1/2" BSP-F	1/2" BSP-F
Connections Tappings	b	1 1/4" BSP-F	2" BSP-F
W	mm	50	60
Depth	mm	50	60
Distances from Wall To ϵ			
Connections Tappings	mm	260	260
G	mm	285	280
H	mm	345	350
I	mm	95	120
Duty @ 20°C Δt	kW	up to 90	91 to 155
			156 to 300



Note:
Vertical low velocity headers are reversible to allow connection from boiler from either direction

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Flue system design and data

A direct connection to a brick chimney is not permissible, since the chimney losses must be less than 17%.

The following table gives the flue gas data for all the types.

		Ethos 65	Ethos 85	Ethos 100	Ethos 120
Maximum flue gas temperature at full load (°C)		70	70	70	70
Quantity of flue gas at full load	m ³ /h	113	149	168	209
	kg/s	0.031	0.041	0.046	0.058
Maximum permissible flue resistance (mbar)		2.4	2.4	2.4	2.0

Flue length

Since the boiler is equipped with a "premix burner" with a fan, an overpressure is created in the boiler. This overpressure is sufficient to overcome the resistance of the burner, the heat exchanger and the chimney.

The back pressure outside the boiler depends on:

- the resistance of the flue pipe
- the degree of cooling of the combustion gas
- the resistance of the discharge outlet

The degree of cooling of the combustion gases depends on:

- the insulation value of the flue
- the ambient temperature
- the flue system and outlet

There is a maximum overpressure of around 1.4mbar (140pa) for the types 65, 85, 100 and 2.0mbar (200pa) for the type 120 in the boiler for the flue gas discharge system.

Calculation of diameter and length

For the calculation and control of the inner diameter of a discharge system with mechanical discharge, please refer to the applicable national and local standards and regulations.

Length of flue

	Ethos 65	Ethos 85	Ethos 100	Ethos 120
Diameter 70mm (m)	n/a	n/a	n/a	n/a
Diameter 80mm (m)	12*	n/a	n/a	n/a
Diameter 90mm (m)	39	18	n/a	n/a
Diameter 100mm (m)	67	32*	22*	35*
Diameter 110mm (m)	n/a	70	40	38
Diameter 130mm (m)	n/a	n/a	80	72

* flue diameter on the boiler

These lengths apply to open type applications.

For room sealed appliances, these lengths apply to inlets and outlets combined.

Flue losses of various flue components expressed in metre of straight pipe. The total loss should be subtracted from the maximum permissible flue length from the previous table.

		Ethos 65	Ethos 85	Ethos 100	Ethos 120
Pipe bend 90° R/D = 0.5	80mm flue diameter	4.0*	4.5	4.9	4.9
	90mm flue diameter	4.5	4.9	5.4	5.4
	100mm flue diameter	4.9	5.4*	6.2*	6.2*
Pipe bend 90° R/D = 1	80mm flue diameter	1.5*	1.7	1.8	1.8
	90mm flue diameter	1.7	1.8	2.0	2.0
	100mm flue diameter	1.8	2.0*	2.2*	2.2*
Pipe bend 45° R/D = 0.5	80mm flue diameter	1.2*	1.3	1.4	1.4
	90mm flue diameter	1.3	1.4	1.5	1.5
	100mm flue diameter	1.4	1.5	1.6	1.6
T- piece	80mm flue diameter	4.0	4.5	4.9	4.9
	90mm flue diameter	4.5	4.9	5.4	5.7
	100mm flue diameter	5.4	5.4	6.0	6.0

*flue diameter of the boiler

If concentric discharge from the appliance is used, the following maximum lengths in metres (excluding roof clearance) are permissible:

Number of 90° pipe bends	Ethos 65 (80mm flue diameter)	Ethos 85 (100mm flue diameter)	Ethos 100 (100mm flue diameter)	Ethos 120 (100mm flue diameter)
2	4	16	9	10
4	3	14	7	8
6	1	13	5	6

NOTE: For details of concentric flue systems, contact our technical department.

NOTE: Plumbing (water vapour) is a characteristic of all condensing boilers and care should be taken when siting the flue terminal to avoid nuisance to neighbouring properties.