

Clyde

Clyde CK5

Carnot Consult

Natural gas

Class D oil

Class C oil

40 kW

to

70 kW

Cast Iron Boiler



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- **Seasonal efficiency of over 84% gives compliance with ADL2B 2013 gas fired boilers without the need for additional heating credits**
- **Compact heat exchanger gives small footprint relative to output**
- **Delivered as a ready-assembled block**
- **Range of 1-stage gas and oil burners available**

General information



Description

CK5 cast iron sectional boilers are designed for use in either open vented or pressurised heating systems up to 6 bar working pressure with gas or oil burners. There are four models in the range 40 kW to 70 kW. The boiler has a pressurised combustion chamber and burners offered are all capable of overcoming the boiler resistance without the assistance of the chimney.

These are 3-pass boilers, ensuring that they comply with the efficiency requirements of ADL2B of Part L 2013 of The Building Regulations.

Application

CK5 boilers are made from Grade GG20 cast iron and conform with the requirements of EN 303-1. The boilers are suitable for use in LTHW or MTHW heating systems with a maximum operating pressure of 6 bar. Maximum system operating temperature is 90°C for LTHW and 105°C for MTHW systems.

CK5 boilers may be fired by Natural gas or Class C or D oil burners with single-stage control.

The boiler is suitable for use in either open vented or pressurised heating systems. It is not suitable for use as a direct water heater. Where potable water is required, a matching calorifier or plate heat exchanger must be provided in the system.

Statutory requirements

CK5 boilers are CE marked and must be fired by a compatible burner certified to EN267 (oil firing) or EN676 (gas firing) to comply with the Boiler (Efficiency) Directive 1993.

The installation, assembling and commissioning of the boiler must be carried out by a qualified engineer in accordance with the instructions provided.

Gas supplies and gas burners must be installed and commissioned by a qualified person, eg. a Gas Safe registered engineer.

Materials & boiler assembling

The boiler is supplied as standard with the cast iron sectional block fully assembled. The boiler blocks can be broken down and reassembled on site to special order. Each section is tested hydraulically for soundness in accordance with EN 303-1. Conical nipples are used to join the sections. The insulation around the assembled boiler block is 50mm thick and the steel jacket is finished in two-tone enamel. The jacket, insulation, boiler control panel and burner are packed separately for fitting on site.

Site assembling should only be undertaken by Carnot or their authorised engineer. All insulating and refractory materials are included, with ceramic sealing ropes for all access doors.

Handling

Offloading, dry storing and placing of equipment in the boiler room is the responsibility of the installer.

Equipment must be dry stored and protected from frost. Cartons must not be crushed or otherwise damaged.

Commissioning

Carnot undertake commissioning of boilers. Commissioning charges do not include servicing during the guarantee period. This may be carried out under service contract or to specific order.

Boiler log book

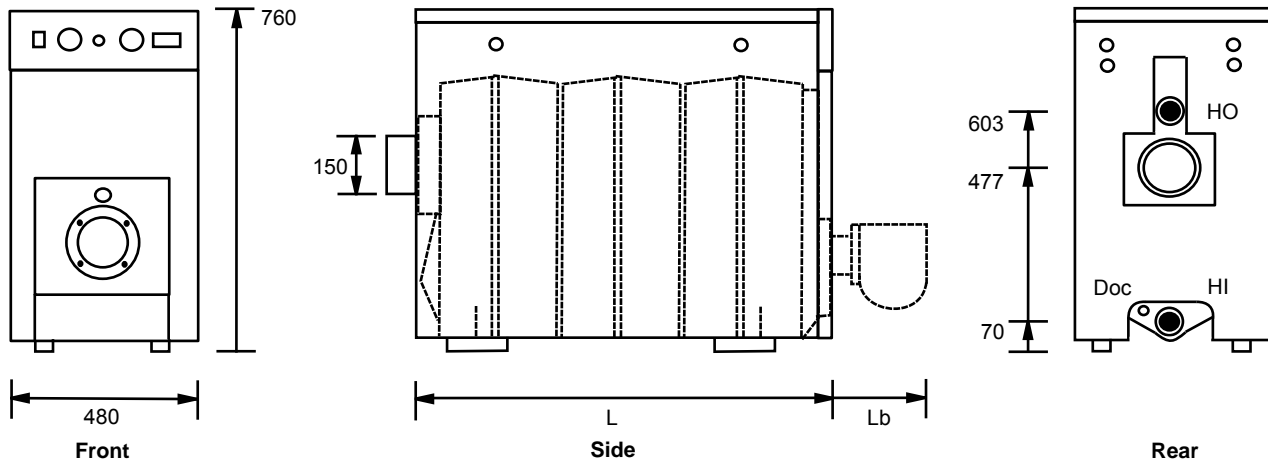
A permanent record of commissioning and servicing data and measurements should be kept in the building log book. It should be kept safe and updated whenever routine or emergency work is performed on the boiler.

Guarantee

Subject to correct handling, installation and operation, all equipment is guaranteed for twelve months from the date of despatch. Boiler sections are guaranteed for a period of five years from the date of despatch.

The guarantee is not valid if the boiler is subjected to thermal stress, becomes blocked with debris and/or carbonate deposits from the system water and/or there is no documented evidence of commissioning by a competent engineer.

Dimensions and Technical data



Dimensions

Boiler model		40	50	60	70	
Output	kW	42	52	62	70	
No. sections		4	5	6	7	
Overall length	L	mm	580	680	780	880
Combustion chamber length	mm	447	548	649	750	
Combustion chamber diameter	mm	280 W x 284 H				
Boiler door thickness	mm	38				
Boiler flow connection	HO	R1½				
Boiler return connection	HI	R1½				
Boiler drain connection	Doc	R½				
Flue spigot diameter	mm	150				

Technical data

Nominal heat output (full load) ncv	kW	42	52	62	70	
Nominal heat input (full load) ncv	kW	46	57	68	77	
Efficiency at 100% load (ncv)	%	91.1	91	90.9	90.9	
Efficiency at 30% load (ncv)	%	94.1	94	93.9	93.9	
Boiler seasonal efficiency (1)	%	84.3	84.3	84.2	84.2	
Natural gas consumption (gcv)	m³/h	4.74	5.87	7	7.94	
Oil consumption (ncv)	kg/h	4.28	5.42	6.34	7.35	
Dry weight (excludes burner)	kg	145	173	200	227	
Water volume	litres	16	19.5	23	25.5	
Flue gas mass flow @3% oxygen	m³/h	72.1	88	104.1	118.9	
Chimney draught	Pa	0				
Gas side resistance	mbar	0.39	0.54	0.74	0.78	
Flue gas temperature rise @3% oxygen	Nat gas (2)	°C	187	180	179	178
	Class D oil	°C	207	208	212	215
Maximum working temperature	°C	90 LTHW				
Maximum hydraulic working pressure	bar	6				

Water flow rates and hydraulic resistances

Water flow rate at 11°C temp. rise	l/s	0.9	1.13	1.34	1.52
Hydraulic resistance at 11°C temp. rise	kPa	3.2	4.9	8.4	11.8
Water flow rate at 20°C temp. rise	l/s	0.5	0.62	0.74	0.83
Hydraulic resistance at 20°C temp. rise	kPa	1	1.5	2.5	3.6
Water flow rate at 30°C temp. rise	l/s	0.33	0.41	0.49	0.56
Hydraulic resistance at 30°C temp. rise	kPa	0.4	0.7	1.1	1.6

Notes: (1) Calculated from the non-domestic heating and cooling compliance guide for conformance with ADL2A and

ADL2B 2013 using the formula $n_{\text{seasonal}} = 0.81n_{30\%} + 0.19n_{100\%}$

(2) BS 7190:1989

Installation requirements

Boiler location (Refer Figs 1 & 2)

The location chosen for the boiler(s) must be frost free, provide for a satisfactory flue system and an adequate air supply for combustion and ventilation. Adequate access is necessary for boiler servicing.

Boilers must not be installed in areas where inflammable vapours are likely to be present. To avoid damage to the boilers, contamination of the combustion air by high levels of dust or halogenated hydrocarbons (eg. Solvents, spray can propellants, cleaning agents, adhesives, etc) must be avoided.

Boilers should be installed on a plinth which is at least 50mm high and is smooth and level. Mild steel inserts to support the boiler should be positioned in the partially set concrete, made level and the concrete allowed to set. (NB : For some burners with acoustic shrouds the plinth may need to be higher - refer Sales Office).

An uneven plinth will prevent correct assembling of the boiler sections, cause damage to sections and assembling tools and may give rise to leaks. It can also inhibit freedom for expansion and contraction of the boiler during operation.

Burners

Boilers are supplied with single stage Natural gas or Class D or C oil burners. A choice of burner makes is available.

Fuel specification

Natural gas (GCV 38.76 MJ/m³) with a minimum gas inlet pressure according to the burner model specified.

BS2869 Class D oil (35 sec). Advice should be sought from the oil supplier regarding the storage of oil.

Fuel supply pipework

Install gas or oil supply pipe(s) and service valve(s) so as to allow free access to the boiler and full opening of the furnace door without removing the burner from the boiler door (see below).

Commissioning of the gas supply pipework and components must be carried out by a qualified person, eg, a Gas Safe registered engineer. The gas meter and supply must be sited in accordance with the requirements of BS6400.

Plant room layout (Refer Fig 1)

When planning the layout of the boiler room, allowance must be made for removing the boiler door and burner, boiler assembling, boiler cleaning and maintenance. A ceiling height of at least 2.3m is recommended. Wall clearances:

- W1 Minimum 100mm
- W2 Minimum 400mm (W1 and W2 are interchangeable)
- W3 Jacket length + 200mm in front of boiler for cleaning
- W4 Min 700mm behind boiler to allow 500mm of horizontal flue before any bends or tees

Plinth dimensions (Refer Fig 2)

Plinth height - at least 50mm, smooth and level.

Steel inserts - 50mm x 6mm steel strips.

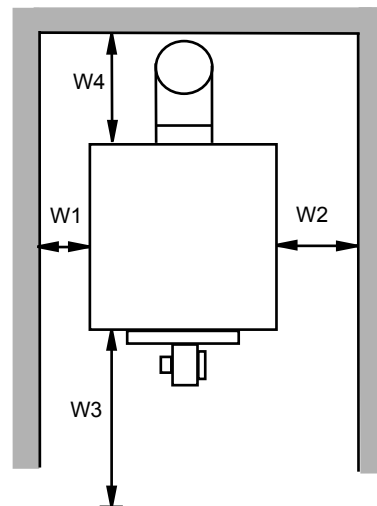


Fig 1 Wall clearances

Boiler	L1 mm	L2 mm
CK5-40	580	355
CK5-50	680	455
CK5-60	780	555
CK5-70	880	655

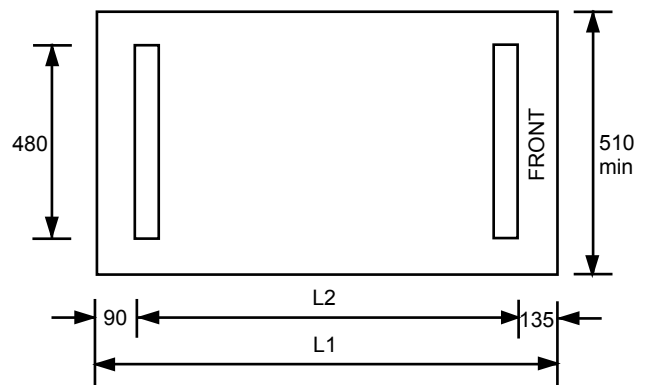


Fig 2 Plinth dimensions

Installation requirements

Air supply

Air for ventilation and combustion must be provided for gas fired boilers in accordance with either BS 6644:2011, BS 5440-2:2009 or IGE/UP/10. Air supply for oil fired boilers must conform to BS 5410 : Part 2.

Chimney design

The CK5 boiler is designed to operate with a pressurised combustion chamber and the chimney is not required to assist the burner in overcoming the boiler resistance. The chimney must cater for the total internal resistance of the flue system from each boiler outlet and not impose an additional load on the burner.

Water circulation (Refer Fig 3)

The flow water temperature from the boiler must reach 60°C (gas firing) or 50°C (oil firing) within 10 minutes of the boiler being brought into operation. Thereafter, water circulation should be maintained through the boiler such that the boiler flow water temperature is always above 60°C (gas firing) or 50°C (oil firing). A pump overrun facility is necessary to ensure that water circulation is maintained for at least three minutes after the boiler is switched off.

There are several ways of providing boiler protection, eg shunt pumps, primary loops, etc. A typical boiler pump and 3-port valve arrangement is shown in Fig 3.

For multi-boiler systems a 'reverse return' pipework configuration is required to ensure equal distribution of water flow through the boilers.

Water treatment

Whenever a new boiler is connected to an existing system, the pipework must be thoroughly cleaned and flushed. Cannot recommend that a permanent means of filtration be fitted into the return pipework, such as a sludge trap, hydrocyclone or full flow duplex filters. The boiler guarantee will be invalid if waterways are blocked by debris or carbonate deposits. Long term water treatment is essential to the economic operation and life of both new and refurbished heating systems.

For full information on cleaning, flushing and protecting hot water systems, refer to BSRIA Application Guide AG 1/2001.

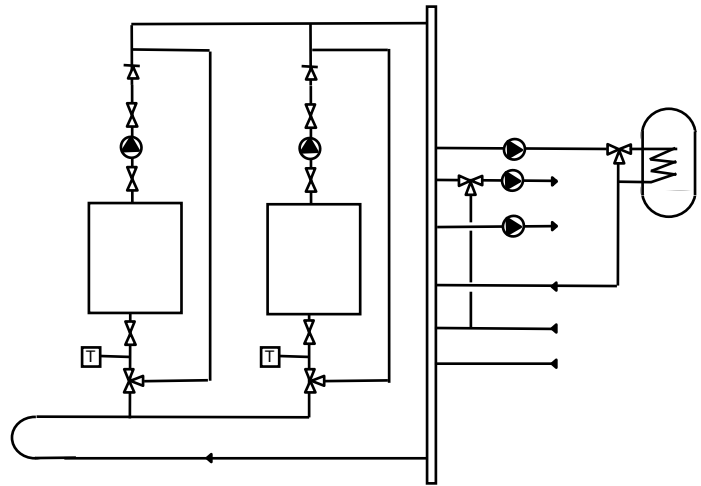


Fig 3 Multiple boilers with individual pumps

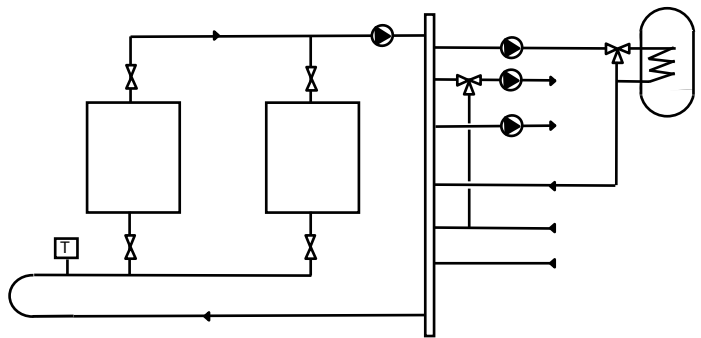


Fig 3a Alternative arrangement for boiler protection with a primary loop

Electrical supply (Refer Fig 4)

A 230Vac 1PH supply is required for all the standard burners offered, and should be taken to the control panel on the boiler. The harness and connector supplied will feed the burner.

The electricity supplies to the burner and boiler control panel must be wired in accordance with IEE Regulations. A separate supply and isolating switch is required for each boiler in the plant room.

All isolating switches and fuses must be provided by the installer. Burner start/run currents for fuse specification are available on request. Burner wiring diagrams and technical data are also available on request.

All connections between the boiler control panel and the burner are made through harnesses with matching plugs and sockets, supplied as standard.

Note: Fig 4 is only diagrammatic. Double pole switches with a minimum separation of 3 mm must always be used.

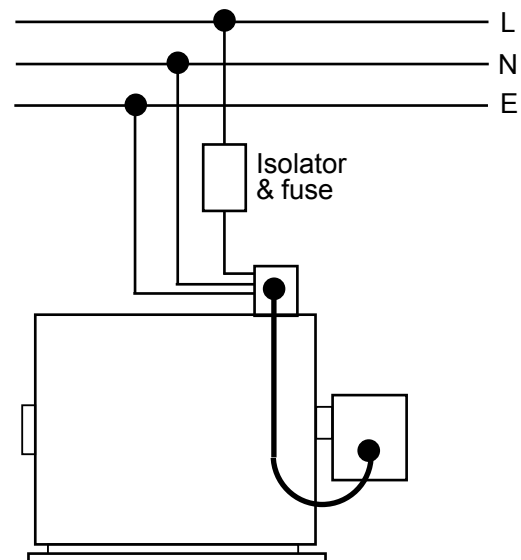


Fig 4 - Electricity supply

Boiler control panel and wiring diagram

A control panel is provided that gives 1-stage burner control for on/off gas or oil burners. There is also a facility for temperature control of a circulating pump, such as a shunt pump - see Fig 5 below.

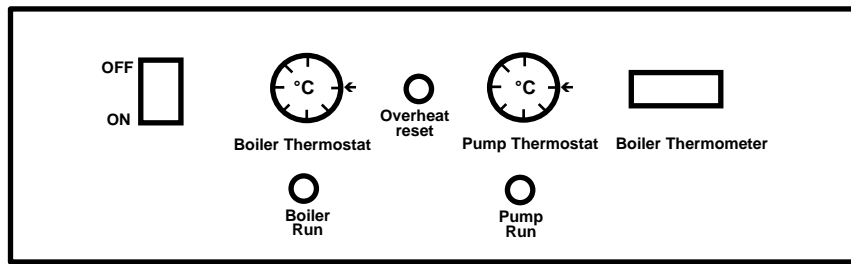


Fig 5 Boiler control panel

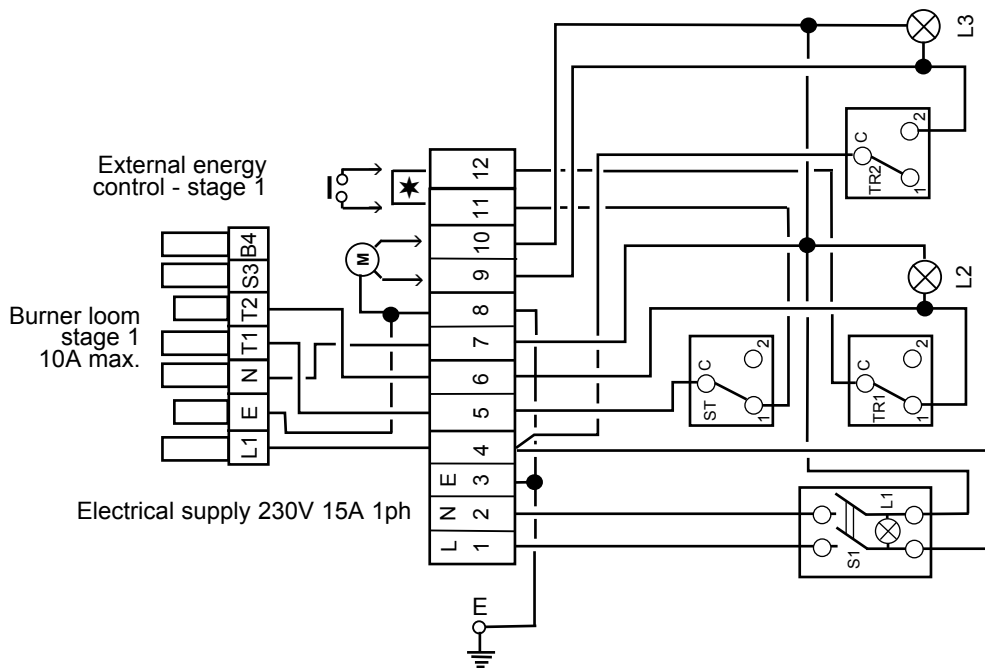


Fig 6 Wiring diagram

All external wiring by installer

★ Remove bridging link if device is fitted

Key to Fig 6

- L1 Power on lamp
- L2 Boiler run lamp
- L3 Pump run lamp
- S1 On / off switch
- ST Overheat thermostat
- T1 Control circuit out
- T2 Control circuit return
- TR1 Boiler control thermostat
- TR2 Pump control thermostat

Note when using Hansa pre-mixed gas burners

The Hansa burner has a low voltage control circuit (T1 / T2). A 230 Vac supply must not be introduced into the control circuit. When connecting a time clock or other control device to External energy control - stage 1 (terminals 11 and 12), this **must** be volt-free.

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Carnot Consult Ltd

5 Burgesshall Drive
Maidstone
Kent ME17 1SH
t : 01622 862746
e : info@carnotconsult.com
w : carnotconsult.com

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