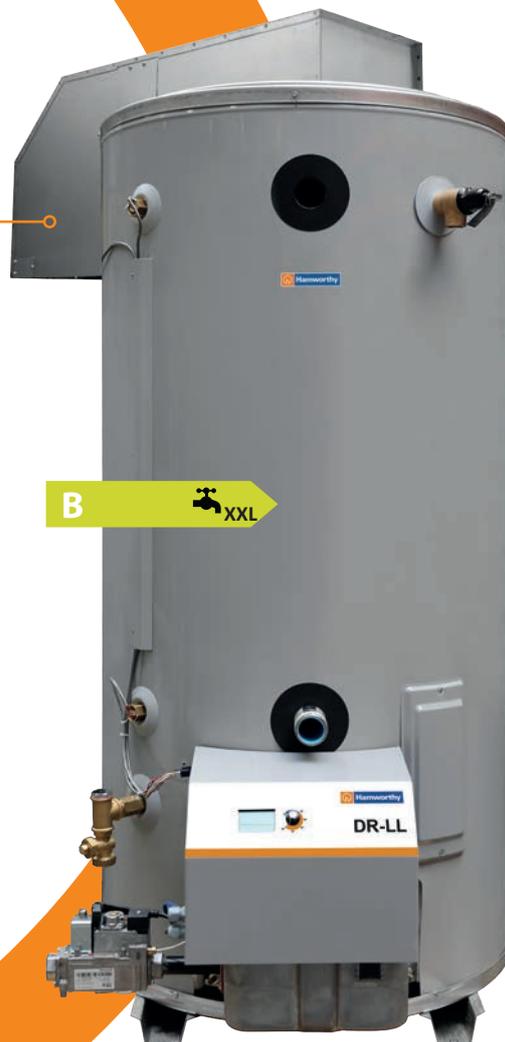


# Dorchester DR-LL

- Atmospheric direct fired low NO<sub>x</sub> water heater
- Automatic spark ignition
- Simple to use LCD controls

Easy fit  
**REPLACEMENT**



3 MODELS,  
CONTINUOUS OUTPUTS 970-1,800L/H



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## Low NO<sub>x</sub>

The Dorchester DR-LL has been developed for replacement projects to minimise flue changes\*.

The burner design achieves low NO<sub>x</sub> levels that are compliant with the stricter criteria of the Energy related Products directive (ErP).



## Simple to operate and flexible installation options

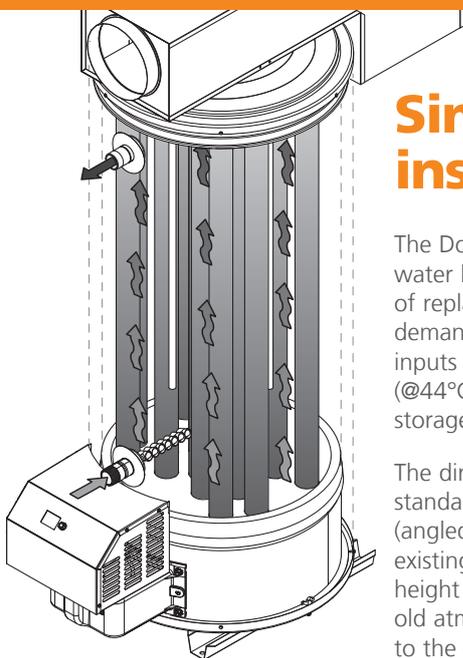
The Dorchester DR-LL range of atmospheric water heaters are designed to meet the needs of replacements projects with high hot water demands. Choose from 3 models with gas inputs from 60-103kW, continuous outputs (@44°C ΔT) from 970l/h to 1,800l/h and storage capacities from 291 to 347 litres.

The direct fired water heaters come with a standard draught diverter plus 2 additional options (angled or round), allowing you to match most existing flue installations and fit into restricted height plant rooms. And when you are replacing old atmospheric water heaters a simple adaptation to the existing flue may be all that is required.\*

Featuring automatic spark ignition and an easy to use LCD screen for simple operation, control and fault diagnostics. Plus, components are easily accessed for maintenance and servicing.

With load profiles of XXL/3XL and NO<sub>x</sub> levels between 31-45mg/kWh these products are fully compliant with current ErP regulations and provide an easy replacement option for urgent projects.

*\*Subject to survey. New draught diverter must be fitted.*



## Key benefits



Fits through a standard doorway



Low NO<sub>x</sub>



Meets high demand



Easy access for service and maintenance



Flexible flue installation

## Key features:

- ⊗ Atmospheric, direct fired gas water heater
- ⊗ 3 models: 49, 66 & 84kW output
- ⊗ 3 storage capacity options: 291, 325 & 347 litres
- ⊗ Continuous outputs (@44°C): 970, 1,300 & 1,800 l/h
- ⊗ Natural gas
- ⊗ Fan assisted combustion
- ⊗ Automatic spark ignition via intermittent pilot

### Optional kit (Page 8)

- ⊗ Unvented supply kit
- ⊗ Draught diverter  
- angled or round vertical

### Flues (Page 6)

- ⊗ B13bs Open flue systems

### Service & Warranty (Page 15)

- ⊗ 2-year warranty
- ⊗ Range of service options
- ⊗ Commissioning

### Controls (Page 10)

- ⊗ LCD screen
- ⊗ Temperature control and protection
- ⊗ Setpoint indication during operation
- ⊗ Frost protection
- ⊗ Error indication
- ⊗ Hysteresis control
- ⊗ On/off control

## Anatomy of the Dorchester DR-LL

- |                       |  |
|-----------------------|--|
| ① Water inlet         | ⑨ Tank   |
| ② Water outlet        | ⑩ Drain valve  |
| ③ User interface      | ⑪ Clean out/<br>inspection access                        |
| ④ Control switch      | ⑫ Draught diverter<br>(Type 1 shown -<br>optional extra) |
| ⑤ Gas control valve   |  |
| ⑥ Temperature sensors |  |
| ⑦ T & P valve         |  |
| ⑧ Combustion chamber  |  |



# Technical data & dimensions

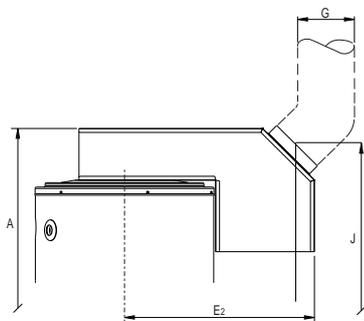
All Models

	Dorchester DR-LL model	Units	DR-LL 50 -288	DR-LL 70 - 344	DR-LL 90 - 322
Water	Continuous output with 44°C ΔT	l/h	970	1300	1800
	1st hour output with 44°C ΔT	l	1400	1800	2200
	Continuous output with 50°C ΔT	l/h	850	1200	1600
	1st hour output with 50°C ΔT	l	1200	1600	1900
	Continuous output with 55°C ΔT	l/h	770	1100	1400
	1st hour output with 55°C ΔT	l	1100	1400	1700
	Storage capacity	l	291	347	325
	Maximum working pressure	bar	8	8	8
	Load profile	-	XXL	XXL	3XL
Energy	Water Heating energy efficiency	%	66	66	71
	Net combustion efficiency (gross)	%	91 (82)	90 (81)	91 (82)
	ErP efficiency rating	-	B	B	N/A
	Heating-up time, ΔT = 44°C	min.	18	16	11
	Heating-up time, ΔT = 50°C	min.	21	19	13
Heating-up time, ΔT = 55°C	min.	23	20	14	
Nat Gas	Input, gross	kW	60.0	81.1	103.3
	Input, net	kW	54.0	73.0	93.0
	Output – maximum	kW	49.1	66.4	84.4
	Gas inlet pressure – nominal	mbar	20	20	20
	Gas flow rate – maximum @1013.25 mbar and 15°C	m³/h	5.7	7.7	9.8
Flue	Mass flow rate flue gases (round draught diverter)*	kg/h	161	234	271
	Mass flow rate flue gases (draught diverter type 1)*	kg/h	126	196	310
	Mass flow rate flue gases (draught diverter type 2 - standard)*	kg/h	118	184	258
	Flue gas temperature (round draught diverter)*	°C	161	172	125
	Flue gas temperature (draught diverter type 1)*	°C	126	97	107
	Flue gas temperature (draught diverter type 2 - standard)*	°C	133	129	121
	NOx emission, dry air free, European Class 6. Maximum (at part load)	mg/kWh	45	35	31
Electrical	Power consumption (nominal)	W	65	75	100
	Electrical supply	Vac	230V 1PH 50Hz	230V 1PH 50Hz	230V/50Hz
	Voltage tolerance	% of Vac	(-15+10%)	(-15+10%)	(-15+10%)
Misc.	Sound level	dB	64	68	70
	Number of magnesium anodes	-	4	4	4
	Weight when empty	kg	252	276	310
	Approximate shipping weight	kg	282	311	347
Maximum floor load/ weight filled with water	kg	540	620	632	

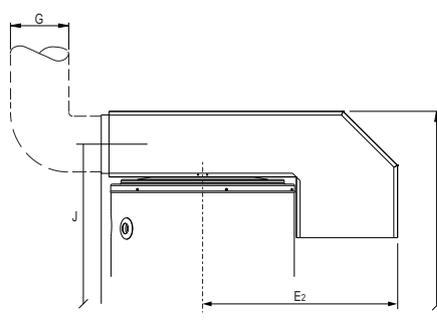
\*Based on 1013.25 mbar and 15°C.

	Dimensions	Unit	DR-LL 50 -288	DR-LL 70 - 344	DR-LL 90 - 322
A	Device height (incl. round draught diverter)	mm	1760	1955	1965
	Device height (incl. box draught diverter type I)	mm	1695	1880	1950
	Device height (incl. standard box draught diverter type II)	mm	1770	2000	2000
B	Device height	mm	1560	1740	1740
D	Device diameter	mm	705	705	705
E1	Depth (incl. round draught diverter)	mm	605	605	605
	Depth (incl. box draught diverter type I)	mm	605	605	605
	Device Depth (incl. standard box draught diverter type II)	mm	605	605	605
E2	Depth (incl. round draught diverter)	mm	355	355	355
	Depth (incl. box draught diverter type I)	mm	695	695	750
	Depth (incl. standard box draught diverter type II)	mm	610	750	650
	Total depth (incl. round draught diverter)	mm	960	960	960
	Total depth (incl. box draught diverter type I)	mm	1300	1300	1355
	Total depth (incl. standard box draught diverter type II)	mm	1215	1355	1355
G	Flue gas outlet Ø (incl. round draught diverter)	mm	150	180	200*
	Flue gas outlet Ø (incl. box draught diverter type I)	mm	150	180	225*
	Flue gas outlet Ø (incl. standard box draught diverter type II)	mm	150	180	250
J	Height flue gas outlet connection (incl. round draught diverter)	mm	1760	1955	1965
	Height flue gas outlet connection (incl. box draught diverter type I)	mm	1625	1830	1880
	Height flue gas outlet connection (incl. standard box draught diverter type II)	mm	1645	1870	1870
K	Height gas valve connection	mm	155	155	155
M	Height cold water supply connection	mm	525	520	520
N	Height hot water outlet connection	mm	1345	1550	1550
P	Height clean out	mm	455	455	455
R	Height drain valve connection	mm	370	370	370
S	T&P-valve connection	mm	1340	1545	1545
1	Cold water supply connection (male)	-	R 1½	R 1½	R 1½
2	Hot water outlet connection (female)	-	R 1½	R 1½	R 1½
3	Gas control valve connection (female)	-	Rp ¾	Rp ¾	Rp ¾
4	Drain valve connection (female)	-	1" NPT	1" NPT	1" NPT
5	T&P-valve connection (female)	-	¾" NPT	1" NPT	1" NPT
6	Inspection opening	mm	95x70	95x70	95x70

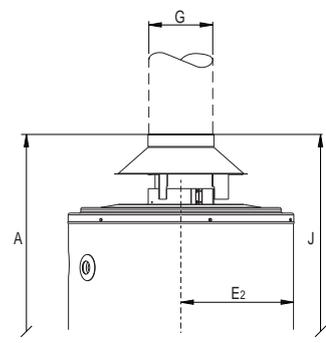
\*Optional flue pipe adaptors are available for DR-LL 90 to increase flue connection to 250mm (round draught diverter and box type 1 draught diverter)



Optional box draught diverter type I



Standard box draught diverter type II

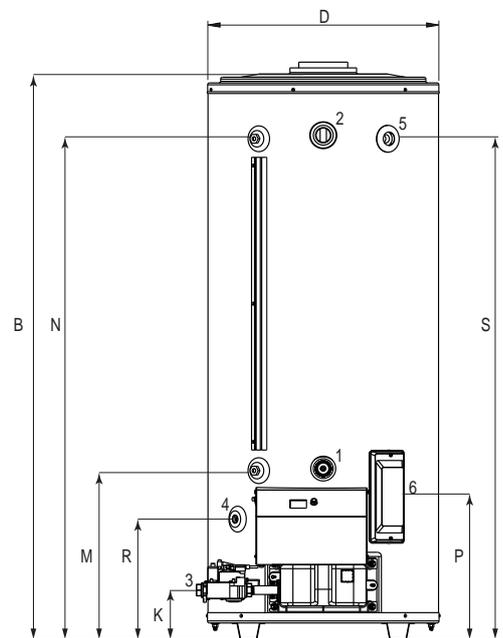
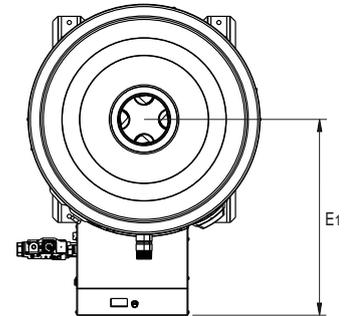


Optional round draught diverter

## Clearances

Ensure there is sufficient clearance to access the water heater:

- 1000mm in front
- 500mm at the left and right side
- 1000mm at the top



Note: All dimensions in mm unless otherwise stated.

# Specification

## Construction

The Dorchester DR-LL is made from enamelled steel, with the vessel being fully insulated to minimise standing losses. The water heater can operate up to 8bar pressure. A clean out door to aid the ease of service and maintenance is located at the front of the unit.

## Burner <sup>(1)</sup>

The burner is at the bottom of the unit. The burner design enables this range to achieve low NO<sub>x</sub> emissions, ranging from 35-45mg/kWh.

## Heat exchanger

The DR-LL features a non-condensing multi-flue type heat exchanger. The flue ways run vertically through the tank and are baffled to increase the heat transfer to the water for faster recovery rates.

## Anode protection

All models are fitted with sacrificial magnesium anode corrosion protection as standard.

## ErP compliance

With NO<sub>x</sub> emissions of 45mg/kWh or less across the range and load profiles of XXL /3XL the Dorchester DR-LL is compliant with the ErP regulations for water heaters. The 2013 published Ecodesign and Energy Labelling regulations (ErP) were introduced as a step towards achieving more energy savings. Since 2015, increasingly stricter



sets of minimum efficiency requirements for water heaters (excluding hot water storage tanks and solar water heaters) have been enforced. The minimum energy efficiency level that applies is dependent on the "load profile". NO<sub>x</sub> emission levels were enforced for water heaters from 26 September 2018. For conventional water heaters, the limits are 56 mg/kWh (gaseous fuels).

## Clean out door

The Dorchester DR-LL has an easily accessible clean out door that allows for the inspection and cleaning of the tank's interior, as required by the recommendations of the Health and Safety Commission (HSC) for the control of Legionellosis.

## Flue connection

The flues gases exit the cylinder at the top of the water heater into the draught diverter which contains the temperature sensors to safeguard against down draught.

## Flue system

The Dorchester DR-LL can be installed on conventional open flue systems only. Classification Type B13bs; Atmospheric device with draught diverter and back draught protection system; the combustion train incorporates a blower/fan to feed air for combustion only to the burner.

The flue system works on thermal draught created by the flue, and must be designed to have a negative pressure. The blower motor only compensates for the resistance of the burner. Only the draught diverters supplied by Hamworthy with the down draught sensor safeguard can be fitted with these appliances.

The products must be installed in accordance with local regulations, with adequate ventilation in the plant room and a suitable flue gas discharge.

## Guidance on replacements

If replacing a single model in an existing cascade the installer is responsible for confirming that the existing flue will meet CE Certification – IGE UP10 states: "Where a common flue is installed, all appliances connected to it should be of the same burner type,

for example natural or forced induced draught. Where dissimilar types of burner are used, it shall be verified, at the design and commissioning stages, that unsafe conditions cannot occur, please contact your flue specialist to confirm that the existing flue system meets the requirements". The guidance provided in the standards are written to prevent positive flue pressure appliances being mixed with atmospheric. For example, the DR-LL cannot be mixed with the DR-XP, DR-CC or DR-FC Evo water heaters in a cascade.

## Draught diverter

The Dorchester DR-LL comes with a standard draught diverter. To enable minimal changes to the flue connection into the existing flue system and fit into restricted height plant rooms an angled horizontal and round vertical draught diverter is also available as a chargeable extra. Please ask us when placing your order.

## Safety

The HSC approved code of practice and guidance document L8, makes it clear that if the risk of Legionella is to be minimised, then the recommendations must be observed in so far as they relate to hot & cold-water systems.

Dorchester water heaters conform to these requirements as follows:

- ⊕ Good access for cleaning
- ⊕ Generous flow and return connections
- ⊕ Adequately sized drain
- ⊕ Base designed to avoid sludge traps
- ⊕ Anodes to reduce metal corrosion
- ⊕ Number of tappings correctly positioned to facilitate recirculation, destratification and to avoid stagnation
- ⊕ Designed to meet unvented supply requirements

## Vented or unvented systems

The water heaters are suitable for vented water systems i.e. those fed typically via a header tank and float valve arrangement. They may also be used in unvented water systems fed directly from the mains cold water supply if an optional unvented water supply kit is used. See page 8 for details of Hamworthy's unvented supply kit.

# How it works

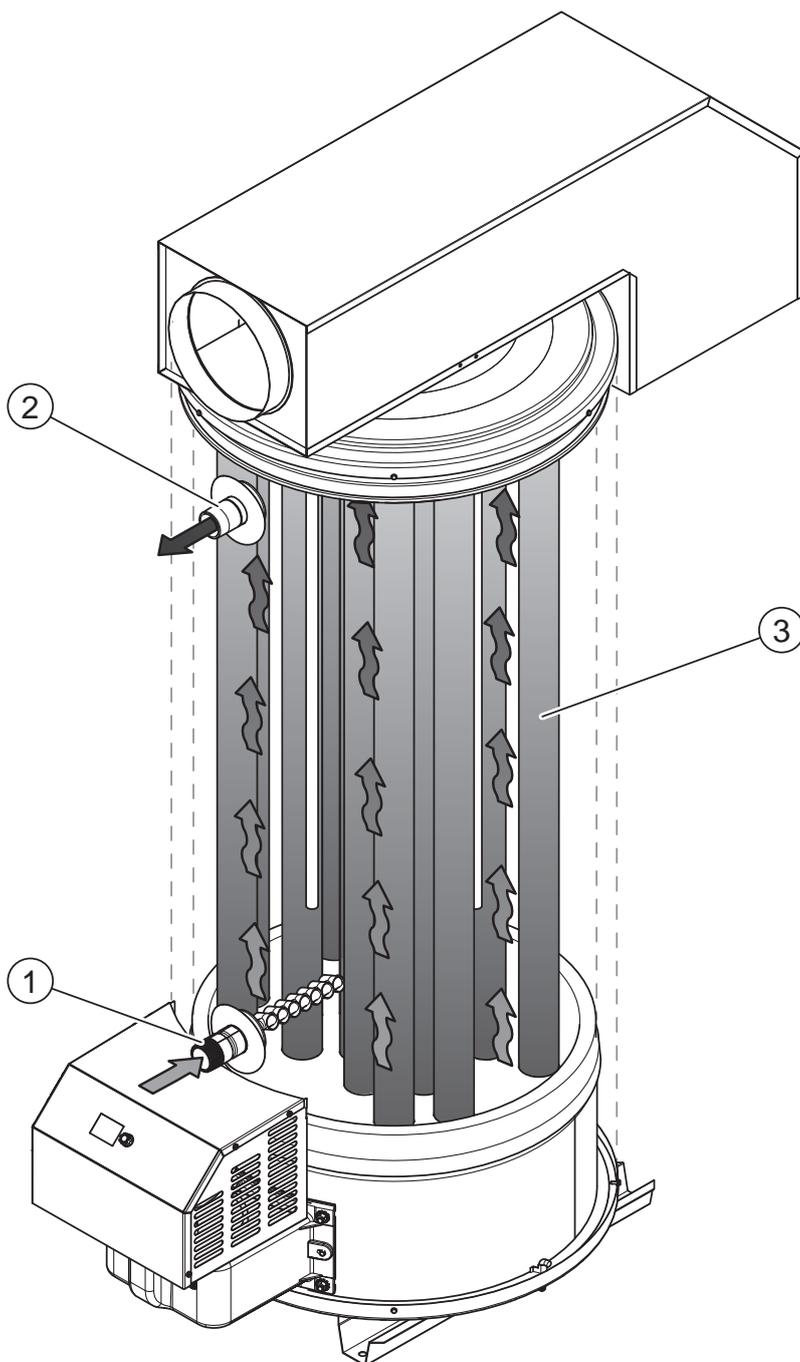
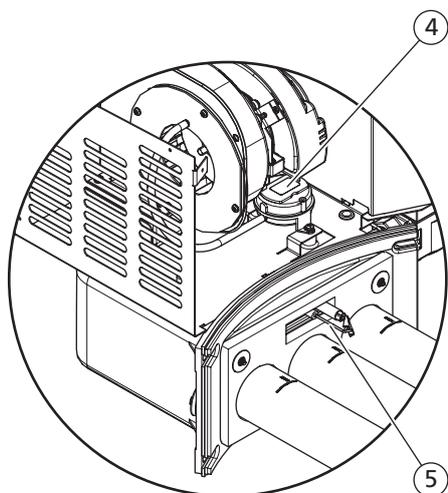
Combustion air is pushed into the air box by the blower. From the air box the air is pushed into the burner where it's mixed with the gas coming out of the orifice. The gas/air mixture is ignited by the pilot flame.

The flue gases are fed through the heat exchanger consisting of several flue pipes. The transport of flue gases through the heat exchanger is based on thermal draught (the blower only compensates for the restriction of the burner).

The flue gases are collected through the top opening where the draught diverter is installed. The draught diverter "disconnects" the flue system from the appliance to prevent influence on the draught of the product itself.

## Key

- |                  |                       |
|------------------|-----------------------|
| 1 Water inlet    | 4 Air proving switch  |
| 2 Water outlet   | 5 Igniter/Flame probe |
| 3 Heat exchanger |                       |



## Replacement

Designed as a non-condensing alternative for unplanned replacements and breakdowns of older atmospheric water heaters. Use the table to find the equivalent old replacements from the Hamworthy range.

Old Hamworthy model	Old Hamworthy model	New equivalent model
DR30L	DR-LA(P) 30	DR-LL 50-288
DR50L	DR-LA(P) 40	DR-LL 50-288
DR50L	DR-LA(P) 45	DR-LL 50-288
DR70L	DR-LA(P) 60	DR-LL 70-344
DR90L	DR-LA(P) 75	DR-LL 90-322
DR90L	DR-LA(P) 95	DR-LL 90-322
DR90L	DR-LA 110	DR-LL 90-322

# Unvented kits

The optional unvented supply kit is essential for any unvented application and includes an expansion vessel sized for the water heater and local pipework only.

Each unvented supply kit is sized 1" and comprises the following items:

- ⊗ Strainer
- ⊗ Non adjustable pressure reducing valve factory set at 3.5bar
- ⊗ Non return valve
- ⊗ ¾" Expansion relief valve, 6 bar
- ⊗ Temperature and pressure relief valve, 7 bar, 95°C
- ⊗ 24 litre expansion vessel, 3.5 bar cushion pressure.
- ⊗ ¾ x 1" adaptor

For large hot water systems or systems with additional storage tanks, additional expansion vessel capacity may be required.

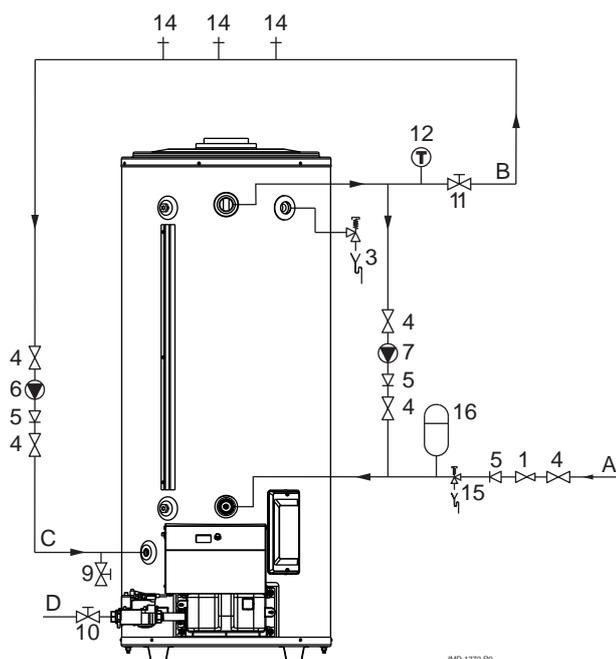
The unvented supply kit allows the water heater to be fed directly from the mains water supply or boosted cold water supply, without the need for header tanks.

Each unvented supply kit is designed to be used with an individual water heater. Multiple water heater installations should be provided with one unvented supply kit per water heater.

The kit contains all the essential components to comply with the Water Supply (water fittings) Regulations 1999 (WRAS), including a suitably sized pressure and temperature relief valve, which locates directly into the water heater.

## Installation diagram

Fig. Installation diagram



## Expansion vessel sizing calculation

Required expansion vessel volume ( $V_2$ ) can be calculated using the following formula:

$$\frac{V_2 = \Sigma \times V_1}{1 - P_c / P_w}$$

- Where
- $V_2$  = Required expansion vessel
  - $V_1$  = Total system volume (cylinder plus pipework)
  - $\Sigma$  = Water expansion factor
  - $P_c$  = Expansion vessel cushion pressure (absolute)
  - $P_w$  = Working pressure (absolute) = Expansion valve setting + 1 bar

## Basic pipework volume calculation

To calculate pipe volume for use in expansion vessel sizing calculation, use the formula:

$$\text{Volume (litres) per metre} = 0.0031428 \times r^2$$

Where  $r$  = Internal radius = (( $\frac{1}{2}$  x Outside Diameter) - wall thickness), in mm and  $L$  = length of pipe, in metres

### Example

For a 10m length of EN 1057 copper pipe, 22mm outside diameter, with wall thickness 0.9mm, the internal radius  $r$  = ((22/2) - 0.9) = 10.1 mm.

$$\begin{aligned} \text{Volume of water per metre} &= 0.0031428 \times r^2 \\ &= 0.0031428 \times 10.1 \times 10.1 \\ &= 0.3206 \text{ litres/metre} \end{aligned}$$

Therefore total volume of water in 10m of pipe is  $10 \times 0.3206 = 3.206$  litres.

## Expansion factor for different water temperatures

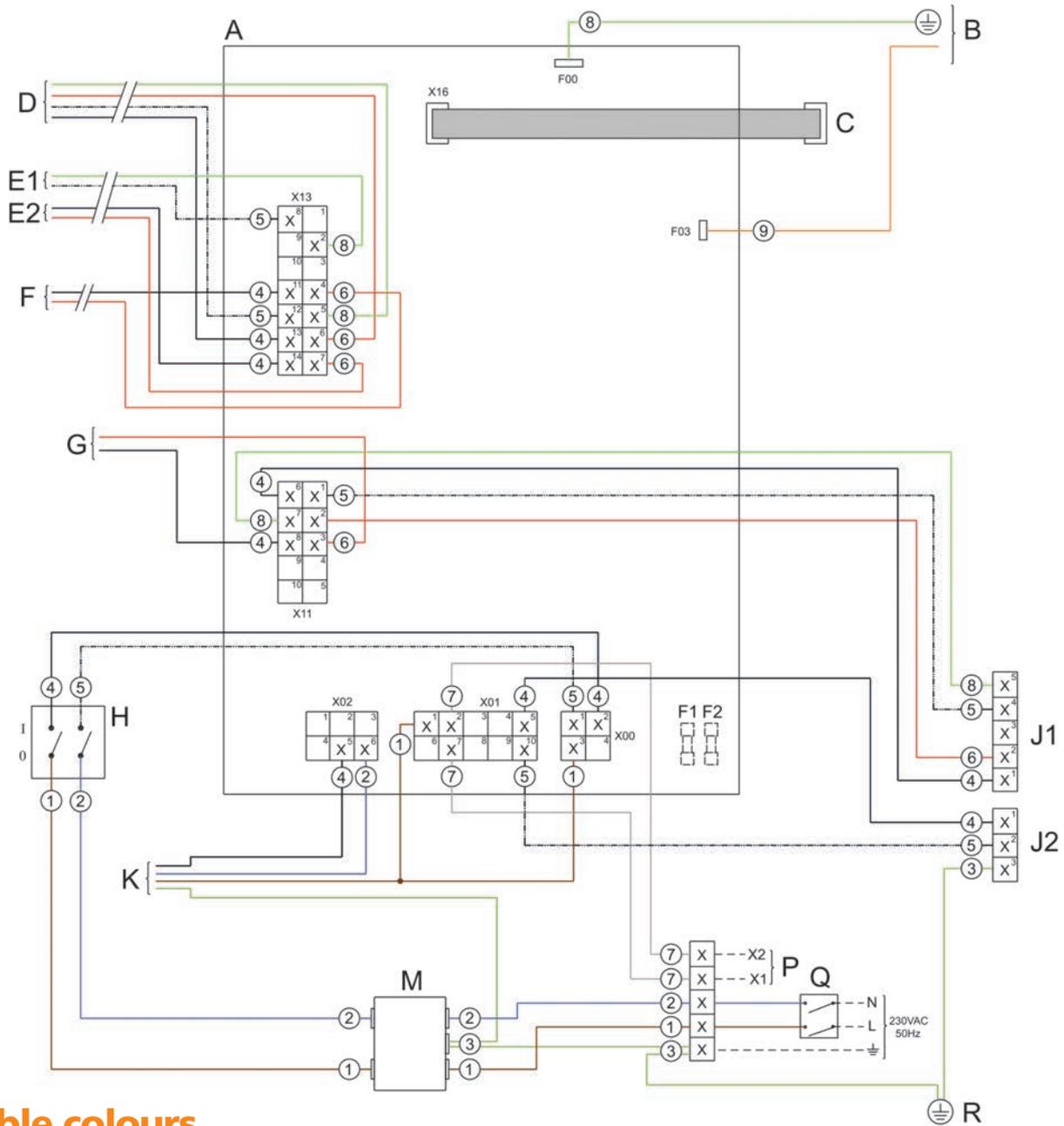
Temperature °C	50	55	60	65	70
Expansion Factor $\Sigma$	0.0118	0.0142	0.0168	0.0196	0.0225

- 1. Pressure reducing valve (mandatory if the mains water pressure is too high)
- 2. Pressure reducing valve (mandatory if the mains water pressure is too high)
- 3. T&P valve (optional)
- 4. Stop valve (recommended)
- 5. Non-return valve
- 6. Circulation pump (optional)
- 7. Shunt pump
- 9. Drain valve
- 10. Manual gas valve
- 11. Service stop valve
- 12. Temperature gauge (optional)
- 14. Draw-off point
- 15. Expansion valve
- 16. Expansion vessel
- A. Cold water supply
- B. Hot water outlet
- C. Circulation pipe (optional)
- D. Gas supply

# Electrical connections

## 11.5 Electrical wiring diagram

Fig. Electrical wiring diagram



### Cable colours

1. Brown 2. Blue 3. Green/Yellow 4. Black 5. White 6. Red 7. Grey 8. Green 9. Orange

### Terminal block connections

A. Earth N. Neutral L. Phase input X1. Additional error signal (optional) X2. Additional error signal (optional)

### Components

A. Control B. Pilot burner C. Display D. Temperature sensor (flue gas) E1. Temperature sensor (T1 - top of tank) E2. Safety thermostat F. Temperature sensor (T2 - bottom of tank) G. Pressure switch H. Control switch J1. Fan (PWM control) J2. Fan (power supply) K. Gas valve M. Line filter P. Additional error signal (0.8A) Q. Main switch R. Earth connection housing F1. Fuse (T3, 15AL-250V) F2. Fuse (T3, 15AL-250V)

# Controls

The Dorchester DR-LL range features integrated controls operated through an LCD display. Settings can be programmed via the easy to use control panel.

When in the 'on' mode and heating the water, the display will switch between showing the actual temperature and the set point temperature. When not heating, the display will only show the actual temperature. When the water heater is switched off it will display 'off', unless the frost protection is activated where it will show the actual water temperature.

It can also display error conditions, service conditions, and anode warnings.

## User interface

The interface consists of:

- ⊙ a control switch on the left side of the water heater
- ⊙ a temperature control knob on the front of the water heater
- ⊙ a LCD display to view the status of the water heater and to view errors

## ON/OFF operation

The DR-LL operates in an ON or OFF mode. The thermostat must be set between 40°C and 80°C for operation (Standard setting from factory 65C).

In the **OFF mode** the water heater is de-activated. The temperature control knob is set at the frost symbol between **reset** and **40 °C**. The control display will permanently show OFF unless the temperature drops below 5°C.

In the **ON mode** the water heater continuously responds to the heat demand. The temperature control knob is set between 40 and 80 °C. The pilot flame is activated and ignites the main burners when there is a heat demand.

When the water heater is heating the water, the control display on the user interface alternately switches between set point and actual temperature. The actual temperature is indicated by a dash in the second segment of the control display at the bottom, the setpoint temperature is indicated by a dash in the second segment of the display at the top.

When the water heater is not heating the water (setpoint reached and in standby mode), only the actual temperature is shown. The symbols **Heat demand** and **In operation** will not be shown.

## Error codes

If there is an error, the display shows an error code. Error codes always have one letter and two digits. There is a list of error codes and their meanings in the installation manual.

## Frost protection

Dorchester DR-LL water heaters are supplied as standard with a frost protection sensor. When the ON/OFF switch on the control panel is in the OFF position, the frost protection system will initiate firing of the burner when the stored water temperature falls below 5°C to provide protection against freezing in the cylinder. The display shows the characters Fr followed by the actual temperature. The water heater will heat the water to 20°C and then turns back to **OFF mode**.

## Anti-legionella

All Dorchester models are designed to meet the Health & Safety Commission (HSC) requirements for safe production of hot water, and in particular the control of Legionellosis.

Legionella bacteria are common in natural water sources and low concentrations may be present in many water systems. It is important that hot water services are designed and operated in such a way that these organisms are prevented from multiplying.

Water temperature is a significant factor in controlling the risk, with optimum conditions for bacterial growth occurring between 20°C and 45°C.

Regular cleaning of the system will help to avoid the build-up of sediments, which may harbour or provide nutrients for the bacteria.

Water stagnation may encourage the growth of biofilm, which can provide local conditions for the production of Legionella bacteria.

Fig. Actual water temperature



Fig. Setpoint



Fig. Standby



# Application and water system

## Location

The location chosen for the water heater must permit the provision of a satisfactory flue system and an adequate air supply. The location must also provide adequate space for servicing and air circulation around each unit. This includes any electrical trunking laid along the floor and to the appliance.

The water heater mounting surface should be a non-combustible flat and level surface capable of supporting the weight of the water heater when full of water and any additional ancillary equipment.

Any combustible material adjacent to the water heater and the flue system must be so placed or shielded to ensure that its temperature does not exceed 65°C.

Adequate space to enable installation and servicing should be provided, with due consideration to ensuring access to the clean out door and removal of the burner assembly.

## Layout

Dorchester DR-LL water heaters are suitable for installation in either single or multiple configurations. If additional storage is required to meet peak demands the water heater can be connected to one or more storage tanks. If a storage tank is used an additional loading pump and thermostats are required to ensure proper control over the stored water temperature.

## Water quality

Due to the variable chemical composition of distributed water supplies it is necessary to identify the properties of the cold water feed to the water heater. In common with all types of water heating equipment, scale will develop during normal use and it is therefore essential that appropriate steps are taken to ensure reliable and continuous operation of the plant.

Contact should be made with the local water provider to determine the quality of the feed water and reference should be made to water treatment specialists for appropriate advice.

The water heater warranty requires that the conductivity of the water in the heater must be no less than 125 microsiemens/cm. This is necessary to ensure effective operation of the anodic protection system.

There is no upper limit to water hardness, however where domestic feed water hardness is very high, water treatment should be considered to reduce the hardness. As hardness and conductivity are related, care should be taken not to soften the water to a point where the conductivity falls below 125 microsiemens/cm otherwise the anodic protection will be ineffective. Harder water produces more scale and results in more frequent maintenance upstream of the water heater. PH Values should be in the region of 7.0 to 9.5.

## Vented systems

For Hamworthy Dorchester DR-LL vented systems, the feed cistern and water supply from the feed system must be so sized as to ensure that the make-up water is equivalent to or exceeds the maximum draw off rate of the heater systems and any other system requirements. The hot water flow pipe from each heater must be fitted with a  $\frac{3}{4}$ " (20 mm) relief valve and an open vent 1 $\frac{1}{4}$ " (32 mm) and a cold feed 1" (28 mm) minimum.

No isolating valves should be fitted between the water heater and the draw off point for relief valve and open vent.

The maximum working head of the heater is 74 m (242 feet). Dead legs to water draw off points should be as short as possible and must not exceed the lengths laid down in the water supply (water fittings) regulations. These regulations state that the maximum lengths of pipe supplying a hot water draw off tap measured along the axis of the pipe from the heater, cylinder or tank from a secondary circuit are as listed below:

Pipes not greater than 19 mm I/D—maximum dead leg is 12 m.

Pipes in range 19–24 mm I/D—maximum dead leg is 7.6 m.

Pipes greater than 25 mm I/D—maximum dead leg is 3 m.

## Unvented systems

Hamworthy can offer a pre-assembled, WRAS approved unvented kit to ensure safe and compliant connection to mains cold water supplies.

The kit comes complete with water 'train', non-return valve, pressure reducing valve, strainer, expansion vessel & connection, and 6 bar expansion relief valve. This simplifies site installation, allowing the water main to be connected to the supplied water train which is then connected to the heater.

Each unvented system kit is supplied with a 25 litre expansion vessel to accommodate the stored hot water expansion from the water heater. Due to the variable nature of hot water circuits an additional expansion vessel may be required to accommodate expansion from the hot water store within the distribution pipework or additional storage tanks where used. Hamworthy can supply a range of expansion vessels up to 1000 litre capacity suitable for potable hot water systems to suit most requirements.

A dedicated socket is provided on all Dorchester DR-LL water heaters exclusively for the fitment of the temperature and pressure relief valve, the discharge of which should be via an air break to a tundish.

For comprehensive recommendations on the design, installation and testing of services supplying water within buildings, attention is drawn to the appropriate sections of BSEN806 Parts 1 to 5 and BS8558: 2011.

# Ventilation

## General ventilation requirements

An adequate supply of fresh air for combustion and ventilation must be provided in accordance with BS 5440 for installations less than 70kW net rated input, and with BS 6644 for installations greater than 70kW net rated input.

## Boiler house temperatures

Additional requirements of BS 6644 for multiple boiler installations requires that the air supplied for boiler house ventilation shall be such that the maximum temperatures within the boiler house do not exceed:

- ⤵ At floor level, 25°C (or 100mm above floor level)
- ⤵ At mid-level, 32°C (1.5m above floor level)
- ⤵ At ceiling height, 40°C (or 100mm below ceiling height)

## Ventilation grille openings

High and low level ventilation grilles shall be positioned as high and as low as practicably possible. Low level grilles will be located within 1metre of floor level for Natural Gas. High level grilles are recommended to be positioned within 15% of the plant room height from the ceiling. High and low ventilation grilles shall communicate with the same room or internal space where compartment ventilation is used. Where ventilation grilles communicate directly with outside air they shall be positioned on the same wall.

## Air supply

The air supply should be free from contamination such as building dust and insulation fibres from lagging. To avoid unnecessary cleaning and servicing, the appliances should not be fired whilst building work is being undertaken. Where a boiler installation is to operate throughout the summer months, e.g. for domestic hot water production for more than 50% of the time, then additional ventilation allowances are required. Refer to BS 6644 for more information.



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CHIMNEY SYSTEMS

**Need help with your flue design?  
Talk to Jeremias, our flue partner.**

The Jeremias Group is one of the leading manufacturers of flue systems and chimney systems in domestic and industrial applications worldwide. Their history dates back to the early 70's with the discovery of a niche sector in relining chimney systems due to the use of new technologies in the heating sector.

The UK division was created in 2010 with a focus on providing the most reliable turn key service in the UK, combining the complete Know-How of the Jeremias group. Jeremias UK can offer special component design, manufacture, install, technical support, commissioning, or supply only.

**For any enquiries, technical support or project requirements please talk to Jeremias UK:**  
[www.jeremias.uk](http://www.jeremias.uk)    01623 889219    [info@jeremias.uk](mailto:info@jeremias.uk)

# Hydraulic schemes

## Unvented systems

Following the publication of Part G3 of the Building Regulations, provisions were issued for the essential safety requirements necessary on unvented hot water storage systems.

These requirements are now covered in law by The Water Supply (Water Fittings) Regulations 1999.

The safety system comprises of a number of essential controls pre-set to specific and very important pressure and temperature levels.

To ensure that the controls are correctly sized for application, set to appropriate levels and assembled in the correct order, Hamworthy Heating offer the unvented kit as a single WRAS approved "water train" with a separate temperature/pressure relief valve sized to suit the energy input of the heater. This considerably simplifies site installation, leaving the installer to connect from the water main to the water train and from the train to the heater.

A connection is provided on all DR-LL water heaters for the fitting of the temperature and pressure (T&P) relief valve, the discharge of which should be via an air break to a tundish. For comprehensive recommendations on the design, installation and testing of services supplying water within buildings, attention is drawn to the appropriate sections of BS 6700.

## Unvented supply kit (optional)

Each unvented supply kit is designed to be used with an individual water heater. Multiple water heater installations should be specified with one unvented supply kit per water heater.

Each unvented supply kit comprises 1" nominal components as follows:

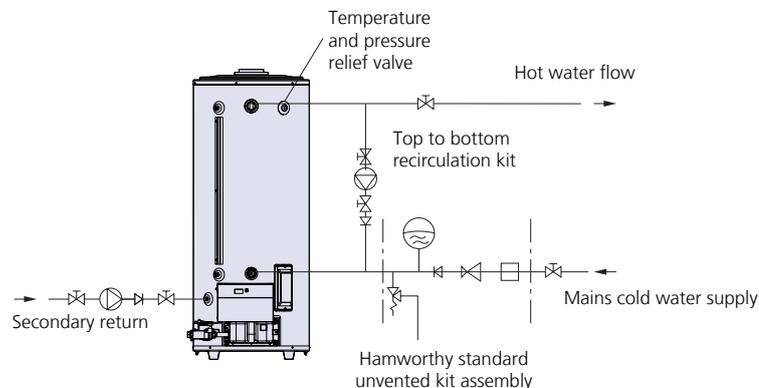
- Strainer
- Pressure reducing valve
- Non return valve
- ¾" Expansion relief valve, 6 bar
- Temperature and pressure relief valve, 7 bar, 95°C
- 25 Litre expansion vessel, 3.5 bar cushion pressure
- The DR LL 50-288 has a 3/4" PTRV connection and a 3/4" male to 1" female brass reducing socket will be supplied

For large hot water systems or systems with additional storage tanks, alternative expansion vessel capacity may be required.

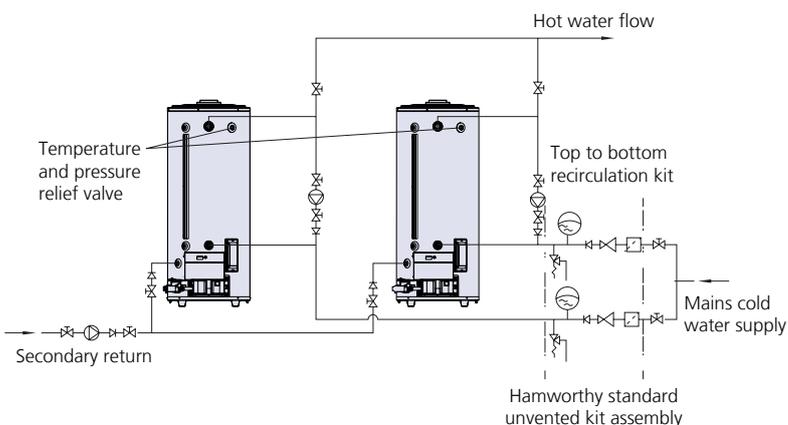
*Consult with Technical team for full range of Hamworthy expansion vessels.*

Tel: 01202 662500.

Direct unvented supply: single DR-LL water heater



Direct unvented supply: two DR-LL water heaters



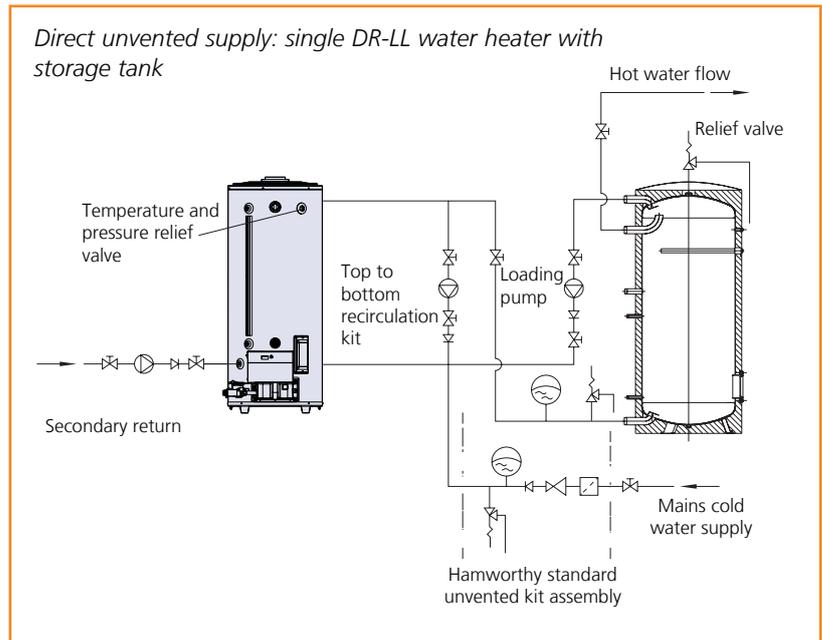
# Hydraulic schemes

## Unvented systems

For systems requiring peak load high volumes of hot water, Dorchester DR-LL water heaters can be installed with additional storage tanks. Using a loading pump, water is transferred between the water heater and the storage tank creating a large volume hot water store. The loading pump can be thermostatically controlled to turn off once the storage tank reaches set point temperature, saving electrical energy.

Cooler secondary return water is re-circulated to the water heater for re-heating.

With unvented systems, additional expansion vessel capacity is required to cater for the storage tank volume.

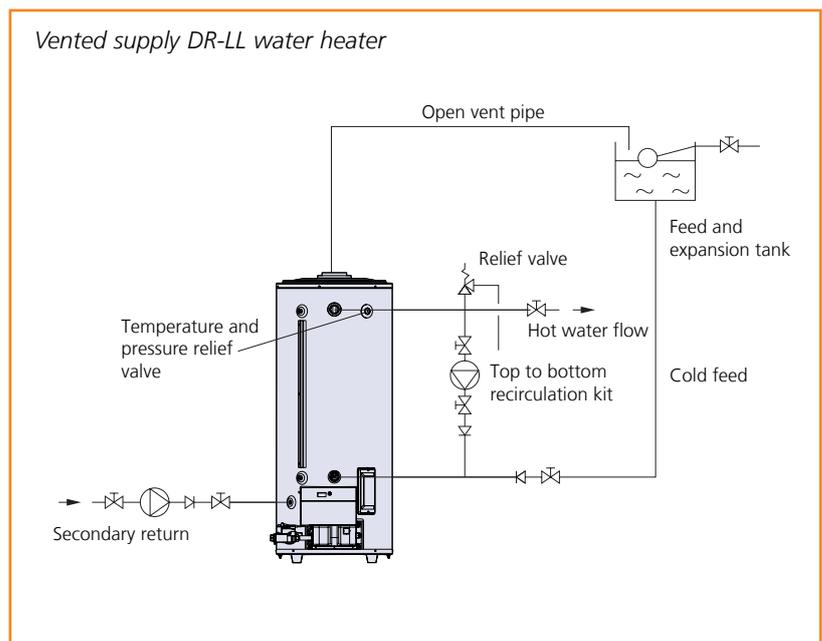


## Vented systems

With vented systems the feed and expansion tank must be sized to provide sufficient cold water storage and accommodate expanded system water without the risk of overflowing.

System operating pressure is a direct result of the height of the feed and expansion tank. The feed and expansion tank must therefore be carefully located to ensure sufficient head pressure and flow is maintained at all outlets likely to be operating concurrently.

The minimum recommended height for the bottom of the feed and expansion tank above the hot water heater is 2 metres



# Services and warranty



## Commissioning

We strongly recommend that all water heaters are commissioned by our service department. As well as ensuring your product is set up correctly for maximum efficiencies you will receive extra benefits on warranty (see below). On completion, you will get a report with details of the initial operating settings.

## Service

Installed water heaters will experience a wide variation in operating conditions that can occur due to differing patterns of usage and the variable chemical nature of distributed water supplies. It is therefore strongly recommended that water heaters be drained and inspected within 3 months of the initial commissioning. Once the levels of calcium deposition are established a suitable maintenance schedule can be implemented, however as a minimum all water heaters should be serviced annually. To maintain your water heaters, we have a range of servicing options that can be tailored to your requirements. For more information on commissioning and service please contact Hamworthy Heating Service Department.



## Warranty

The Dorchester DR-LL comes with a 2-year warranty (except for consumables in line with our Terms and Conditions). Where the product is commissioned by Hamworthy service engineers within 6 months of delivery date, then the two-year warranty covers parts and labour from date of commissioning. We offer tailored packages to suit individual customer requirements, many of which include extended warranty benefits. Full details of warranty terms and conditions are available on request.



## Spares

Essential to any maintenance and service regime is the availability of quality spare parts.

By coming to us you can be assured of genuine spare parts and may also benefit from technological improvements. We have a long-term commitment to spare parts for our products.

## Delivery

Dorchester water heaters are delivered factory assembled and mounted within frames, shrink-wrapped. Standard delivery for all Hamworthy products is free of charge.

Deliveries are closely co-ordinated with the customer, to suit the site construction programme. Products are delivered to ground level and it is the responsibility of the customer to arrange movement of products from here to the required location on site.

To enquire about special delivery services including FORS and time critical deliveries (additional charges apply) please contact our customer services team.

## Service

Tel: **01202 662555**

Email: **service@hamworthy-heating.com**

## Spares

Tel: **01202 662525** Fax: **01202 662551**

Email: **spares@hamworthy-heating.com**

# Complete your system

As well as energy efficient water heaters, we supply commercial boilers and hot water storage tanks to help complete your system.

## System equipment

### Powerstock storage tanks

Powerstock hot water storage tanks are the perfect partner for Dorchester water heaters where large volumes of hot water are required with intermittent use.

Available in 300, 500, 750 and 1000 litre capacities, these high quality glass lined storage tanks can be installed in single or multiple configurations to match the hot water demand and increase system security.

Powerstock are suitable for both unvented and vented applications.



Burstock expansion vessel



Trigon solar thermal system

### Trigon solar thermal system

A complete solar hot water system including solar collectors, transfer stations, and controllers that can be combined with a solar water heater.

### Burstock expansion vessel

Floor standing expansions vessels for use with sealed heating and hot water systems. Available in 10 models from 25 to 1000 litres.

## Boilers

### Floor standing condensing boilers

We have an extensive range of floor standing modular boilers with outputs from 70kW up to 1050kW. With natural gas and LPG options available they can be used across the UK.

The Upton and Wessex ModuMax mk3 boilers are designed as vertically stacking modular boilers to fit in the smallest of plant rooms – offering over 1MW output from 1 metre squared footprint.

Purewell Variheat mk2 boilers are built around a cast iron heat exchanger for tolerance to older heating circuits, making them a perfect choice for refurbishment and replacing old atmospheric boilers.

For larger heat loads or simplified design, the Varmax boilers do not need to be installed with a primary circuit and have split temperature return connections for improved efficiency.



Upton



Purewell Variheat mk2



Stratton mk2



Wessex Modumax mk3



Ensbury LT

### Wall hung condensing boilers

The Stratton mk2 wall hung boiler offers the benefits of a long life and corrosion resistance with a stainless steel heat exchanger. It can also fit into low height plant rooms thanks to a built in flue gas non return valve and low height pipework kits.

### Pressure jet boilers

For higher heating demands and a greater choice of fuel options including oil and biofuel, Hamworthy can provide pressure jet/power flame boilers. With outputs from 440kW right up to 10MW, and a choice of matched burners.

# Want to improve your industry knowledge?

## We're accredited with CIBSE to deliver approved Continuing Professional Development (CPD) courses.

It's our opportunity to share our knowledge with you. More than 3,000 people have attended our CPD seminars and 95% rated them as good or excellent.

Hamworthy CPD seminars are free to attend and our flexible approach means that we are able to tailor our training to suit your business. Lots of our customers choose to run these online at lunchtime or at their own premises so that there is minimal disruption to the working day.

*“Very good session with lots of very detailed and relevant information. Would highly recommend!”*



Book a free CIBSE-accredited CPD seminar for you and your colleagues today:  
[hamworthy-heating.com/cpd](http://hamworthy-heating.com/cpd)

### CPD courses available:

- ⊙ **New Boilers on Old Heating Systems: Hydraulic Design - A Story of Separation**
- ⊙ **Best Practice Heating & Hot Water Plant Refurbishment**
- ⊙ **Energy Saving in Commercial Heating and Hot Water - Could you save a £million?**
- ⊙ **Best Practice in Domestic Hot Water (DHW) - 3 modules**



## Product Training

### Get hands-on training with Hamworthy's commercial boilers.

We can provide training onsite, online, or you can attend a course at one of our training centres. Delivered by Groupe Atlantic engineers with years of product knowledge and industry experience. By attending our training you'll be more confident in running our equipment.

The course will guide you through the servicing and fault finding of Hamworthy products to ensure they are operating at their maximum efficiencies.

Hamworthy's training centres are conveniently located across the UK.

Each training centre has live firing boilers as well as a display of boilers, water heaters and additional system equipment.

See the latest training dates and book your place online:  
[hamworthy-heating.com/training](http://hamworthy-heating.com/training)

### Training courses available:

- ⊙ **Purewell Variheat mk2 boiler**
- ⊙ **Stratton mk2 wall hung boiler**
- ⊙ **Wessex ModuMax mk3 boiler**
- ⊙ **Upton boiler**



# About Hamworthy

Hamworthy Heating is a leading British commercial boiler manufacturer. Our energy efficient heating, hot water and renewable solutions are used in buildings across the UK.

## The Hamworthy difference

### British engineering excellence

Here in the UK, we design, test, manufacture and source market-leading products. We know our products inside out, back to front and from start to finish. You can trust that we know what we're talking about.

### Lifetime support

From design and specification, through to commissioning, training and maintenance, as well as commitment to spares availability. We provide long term support for businesses with their commercial heating and hot water needs.

### People first

It's not just our products that set us apart, it's our people. Truly excellent customer service, great technical knowledge and being easy to deal with. That's the Hamworthy difference.



## Everyone's got history, we've got heritage

Our roots date back to 1914 when two brothers in Poole set up Hamworthy Engineering. Decades of experience go in to every nut, screw and bolt. Every phone call, text and email. Since 2008, we've been part of Groupe Atlantic, a company with a similar ethos to us. Groupe Atlantic was founded in 1968 by two engineers and is now one of the market leaders in the European heating and hot water industry. We're now part of their growing UK, ROI and North America Divisions.



### Our associations

We are an active member of trade associations and professional bodies supporting the industries we work in.

### Our accreditations

International Organisation for Standardisation (ISO) is the world's largest developer of voluntary International Standards. We are proud to have been awarded the following ISO accreditations:

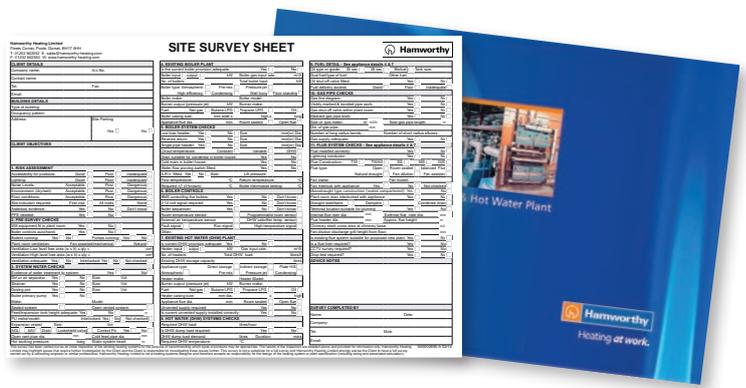
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System
- ISO 45001 Health and Safety Management System

When you deal with Hamworthy, have confidence that we're working within a defined set of standards that is internationally recognised.



## Book a free site survey

[hamworthy-heating.com/site-survey](http://hamworthy-heating.com/site-survey)



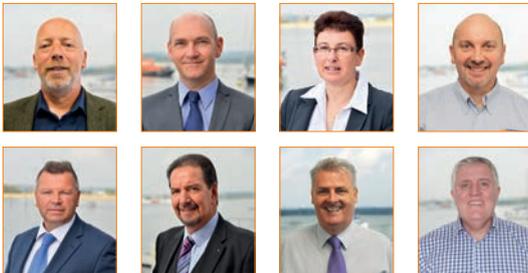
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## Download product literature and drawings

[hamworthy-heating.com/technical-library](http://hamworthy-heating.com/technical-library)



## Find out who your local contact is

[hamworthy-heating.com/find-your-local-sales-manager](http://hamworthy-heating.com/find-your-local-sales-manager)

## Get information for discontinued products

[hamworthy-heating.com/discontinued-products](http://hamworthy-heating.com/discontinued-products)



## Contact our in-house technical support team on

**01202 662505**

Your local contact is:

Placeholder for local contact information, indicated by four corner brackets.

**British engineering excellence from Hamworthy Heating;  
the commercial heating and hot water specialists.**



Hamworthy Heating Limited  
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Poole, Dorset BH17 0NF

**01202 662500**

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[hamworthy-heating.com](http://hamworthy-heating.com)



**Hamworthy Heating Accreditations**

ISO 9001 Quality Management System  
ISO 14001 Environmental Management System  
ISO 45001 Health & Safety Management System



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Hamworthy Heating reserves the right to make changes and improvements which may necessitate alteration to product specification without prior notice.