LBT THERMAL STORE

Installation, Commissioning, Maintenance and User Instructions

Models:

LBT300	LBT3000
LBT500	LBT4000
LBT800	LBT5000
LBT1000	LBT6000
LBT1500	LBT8000
LBT2000	LBT10000
LBT2500	



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1.0 INTRODUCTION

- The LBT is a thermal store for use with Renewable energy to provide a store of energy.
- All installations must conform to the relevant Building Regulations. Health & Safety requirements must also be taken into account when installing any equipment. Failure to comply with the above may lead to prosecution.
- If the equipment is to be connected to a pressurised system, care must be taken to ensure all extra safety requirements are satisfied should a high or low-pressure condition occur in the system.

2.0 SAFETY GUIDELINES

Carefully read all the instructions before commencing installation.

Keep these instructions near the water heater for quick reference.

A competent person must install this equipment. All installations must conform to the relevant Building Regulations. Health & Safety requirements must also be taken into account when installing any equipment. Failure to comply with the above may lead to prosecution.

Commissioning, maintenance and repair must be done by a skilled installer/engineer, according to all applicable standards and regulations.

2.1 General description of safety symbols used



BANNED

A black symbol inside a red circle with a red diagonal indicates an action that should not be performed



WARNING

A black symbol added to a yellow triangle with black edges indicates danger



ACTION REQUIRED

A white symbol inserted in a blue circle indicates an action that must be taken to avoid risk



This symbol shows essential information which is not safety related

2.2 General



Lochinvar Limited is not liable for any damage caused by inaccurately following these mounting instructions. Only original parts may be used when carrying out any repair or service work.



This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.



READ AND UNDERSTAND THE INSTRUCTIONS

Read and fully understand all instructions before attempting to operate maintain or install the unit.

3.0 TECHNICAL DATA MODELS LBT300 TO LBT5000



Note:

Models LBT300 to LBT5000 are Suitable for both heating and cooling projects

Description	Unit	LBT300	LBT500	LBT800	LBT1000	LBT1500
Storage Capacity	litres	300	500	750	1000	1500
Empty Weight	kg	48	80	106	130	218
Floor Load (weight unit + storage capacity)	kg	348	580	856	1130	1718
Maximum Working Pressure Tank	bar	6	6	6	6	6
Minimum Vessel Temperature	°C	-10	-10	-10	-10	-10
Maximum Vessel Temperature	°C	90	90	90	90	90
Stand-by Loss	W	65.5	114	133	125	149.5
Stand-by Loss	kWh/ltr/day	1.60	2.74	3.18	3.01	3.6
Insulation Thickness	mm	55	55	60	80	100
Insulation Material	-		Polyurethane			Polyethylene
Fire Class	-	HBF	HBF	HBF	HBF	B-s2d0

Description	Unit	LBT2000	LBT2500	LBT3000	LBT4000	LBT5000
Storage Capacity	litres	2000	2500	3000	4000	5000
Empty Weight	kg	260	293	340	490	580
Floor Load (weight unit + storage capacity)	kg	2260	2793	3340	4490	5580
Maximum Working Pressure Tank	bar	6	6	6	6	6
Minimum Vessel Temperature	°C	-10	-10	-10	-10	-10
Maximum Vessel Temperature	°C	90	90	90	90	90
Stand-by Loss	W	190.7	n/a	n/a	n/a	n/a
Stand-by Loss	kWh/ltr/day	4.6	n/a	n/a	n/a	n/a
Insulation Thickness	mm	100	100	100	100	100
Insulation Material	-	Polyethylene				
Fire Class	-	B-s2d0	B-s2d0	B-s2d0	B-s2d0	B-s2d0

3.1 COOLING SYSTEMS LBT300-LBT5000

When used with cooling systems the ASHP flow connection becomes the Chilled water return and the ASHP return becomes the Chilled water flow connection.

3.2 DIMENSIONS AND CONNECTION SIZES LBT300 – LBT5000



3.2.1 DIMENSIONAL DRAWING

3.2.2 DIMENSIONS

No	Description	Unit	LBT300	LBT500	LBT800	LBT1000	LBT1500
А	Total Height (with insulation)	mm	1680	1735	1765	2075	2245
В	Diameter of Water Heater (with insulation)	mm	610	760	910	1010	1220
С	Height of Heating system flow connection	mm	1405	1450	1445	1715	1800
D	Height of Auxiliary connection	mm	1255	1300	1295	1565	1650
Е	Height of Sensor connection	mm	895	885	885	1095	1180
F	Height of Auxiliary connection	mm	645	690	685	955	1040
G	Height of Heating system return connection	mm	355	380	395	415	500
Н	Height ASHP Return connection	mm	355	380	395	415	500
Ι	Height of Auxiliary connection	mm	780	785	820	955	1020
J	Height of Auxiliary connection	mm	980	985	1020	1155	1220
К	Height of ASHP flow connection	mm	1405	1450	1445	1715	1800
А	Height of AAV Connection	mm	1680	1735	1765	2075	2245

No	Description	Unit	LBT2000	LBT2500	LBT3000	LBT4000	LBT5000
А	Total Height (with insulation)	mm	2565	2360	2860	2930	2970
В	Diameter of Water Heater (with insulation)	mm	1320	1470	1470	1620	1820
С	Height of Heating system flow connection	mm	2105	1865	2365	2390	2400
D	Height of Auxiliary connection		1955	1615	2115	2140	2150
E	Height of Sensor connection	mm	1450	1255	1755	1780	1790
F	Height of Auxiliary connection	mm	1345	1005	1505	1530	1540
G	Height of Heating system return connection	mm	505	565	565	590	600
Н	Height ASHP Return connection	mm	505	565	565	590	600
I	Height of Auxiliary connection	mm	1180	1150	1365	1390	1400
J	Height of Auxiliary connection	mm	1380	1315	1565	1590	1600
К	Height of ASHP flow connection	mm	2105	1865	2365	2390	2400
А	Height of AAV Connection	mm	2565	2360	2860	2930	2970

3.2.3 CONNECTION SIZES

No	Description	Unit	LBT300	LBT500	LBT800	LBT1000	LBT1500
1	Connection Heating System Flow	BSP	2"	3"	3"	3"	3"
2	Connection Tank body	BSP	1½"	2"	2"	2"	2"
3	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
4	Connection Tank body	BSP	1½"	2"	2"	2"	2"
5	Connection Heating System Return	BSP	2"	3"	3"	3"	3"
6	Connection Drain	BSP	1¼"	1¼"	1½"	1½"	2"
7	Connection ASHP Return	BSP	2"	3"	3"	3"	3"
8	Connection Tank Body	BSP	1½"	2"	2"	2"	2"
9	Connection Tank Body	BSP	1½"	2"	2"	2"	2"
10	Connection ASHP Flow	BSP	2"	3"	3"	3"	3"
11	Connection Immersion heater	BSP	2"	2"	2"	2"	2"
12	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
13	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
14	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
15	Connection Air Vent	BSP	1¼"	1¼"	1½"	1½"	2"

No	Description	Unit	LBT2000	LBT2500	LBT3000	LBT4000	LBT5000
1	Connection Heating System Flow	BSP	3"	4"	4"	4"	4"
2	Connection Tank body	BSP	2"	2"	2"	2"	2"
3	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
4	Connection Tank body	BSP	2"	2"	2"	2"	2"
5	Connection Heating System Return	BSP	3"	4"	4"	4"	4"
6	Connection Drain	BSP	2"	2"	2"	2"	2"
7	Connection ASHP Return	BSP	3"	4"	4"	4"	4"
8	Connection Tank Body	BSP	2"	2"	2"	2"	2"
9	Connection Tank Body	BSP	2"	2"	2"	2"	2"
10	Connection ASHP Flow	BSP	3"	4"	4"	4"	4"
11	Connection Immersion heater	BSP	2"	2"	2"	2"	2"
12	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
13	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
14	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"	1⁄2"	1⁄2"
15	Connection Air Vent	BSP	2"	2"	2"	2"	2"

4.0 TECHNICAL DATA MODELS LBT6000 – LBT10000



Note: Models LBT6000 to LBT10000 are only Suitable for heating projects

Description	Unit	LBT6000	LBT8000	LBT10000
Storage Capacity	litres	6000	8000	10000
Empty Weight	kg	684	823	973
Floor Load (weight unit + storage capacity)	kg	6684	8823	10973
Maximum Working Pressure Tank	bar	5	5	5
Minimum Vessel Temperature	°C	n/a	n/a	n/a
Maximum Vessel Temperature	°C	95	95	95
Stand-by Loss	W	n/a	n/a	n/a
Stand-by Loss	kWh/ltr/day	n/a	n/a	n/a
Insulation Thickness	mm	100	100	100
Insulation Material	-	Ecozero	Ecozero	Ecozero
Fire Class	-	b1	b1	b1

4.1 DIMENSIONS AND CONNECTION SIZES LBT600 – LBT10000



4.1.1 DIMENSIONAL DRAWING

4.1.2 DIMENSIONS

No	Description	Unit	LBT6000	LBT8000	LBT10000
А	Total Height (with insulation)	mm	2790	3490	4240
В	Diameter of Water Heater (with insulation)	mm	2000	2000	2000
С	Height of Immersion heater connection	mm	1415	1615	2365
D	Connection ASHP return	mm	635	625	625
Е	Height of Tank body connection	mm	1155	1385	1635
F	Height of Tank body connection	mm	1675	2145	2645
G	Connection ASHP flow	mm	2195	2905	3655
Н	Height of Tank body connection	mm	N/A	N/A	N/A
I	Height of Tank body connection	mm	N/A	N/A	N/A
J	Height of Tank body connection	mm	N/A	N/A	N/A
А	Height of AAV Connection	mm	2790	3490	4240

4.1.3 CONNECTION SIZES

No	Description	Unit	LBT6000	LBT8000	LBT10000
1	Connection Heating System Flow	BSP	3"	3"	3"
2	Connection Tank body	BSP	3"	3"	3"
3	Connection Tank body	BSP	3"	3"	3"
4	Connection Heating System Return	BSP	3"	3"	3"
5	Connection ASHP Flow	BSP	3"	3"	3"
6	Connection Tank body	BSP	3"	3"	3"
7	Connection Tank body	BSP	3"	3"	3"
8	Connection ASHP Return	BSP	3"	3"	3"
9	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"
10	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"
11	Connection Immersion heater	BSP	1½"	1½"	1½"
12	Connection Sensor Point	BSP	1⁄2"	1⁄2"	1⁄2"
13	Connection Sensor Point	BSP	1/2"	1⁄2"	1⁄2"
14	Connection Air Vent	BSP	2"	2"	2"

5.0 GENERAL REQUIREMENTS

The Lochinvar LBT thermal store has been designed to operate trouble free for many years. These instructions should be followed closely to obtain the maximum usage and efficiency of the equipment. **PLEASE** read the instructions fully before installing or using the appliance. These instructions should be read in conjunction with the appropriate Heat pump installation manual.

5.1 Related Documents

The installation should follow the relevant guidance offered in the following documents. It is not practical to list all relevant information, but emphasis is placed on the following documents, as failure to comply with the guidance given will almost certainly result in an unsatisfactory installation:

BS 6700: 1997	Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages
BS 7074: 1989 Parts 1 and 2	Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems. Code of practice for domestic heating and hot water supply
BS 7671: 2008	Requirements for electrical installations, I.E.E. wiring regulations seventeenth edition
CP 342: Part 2 1974	Code of practice for centralised hot water supply-buildings other than dwellings

6.0 WATER QUALITY

6.1 Vessel

On systems where the LBT is working with Heat Pumps, CHP, Gas condensing boilers or any other direct heat source then the LBT should be treated as per the rest of the system. See main heat source ICM for further guidance.

7.0 WATER CONNECTIONS

7.1 General

- 1. Circulating pipework should be insulated; cisterns, expansion vessels and pipework situated in areas exposed to freezing conditions should also be insulated.
- 2. Drain valves must be located in accessible positions that will permit draining of the entire system.
- 3. Individual valves should be fitted to each unit to enable isolation from the system.

7.2 Storage Vessel



The safety valve must be rated no higher than 5 bar. There must be no isolating valves between the LBT and this safety valve.

The connections used will depend upon the system the LBT is fitted to; you must consult the relevant drawing and /or ICM instructions for the Solar thermal or Heat pump also being installed.

7.2.1 RELIEF VALVE DISCHARGE PIPEWORK

It is important that any discharge water does not collect in the discharge pipe-work and can run freely to the tundish. The tundish should be mounted in a vertical and visible position located in the same space as the unvented hot water storage system and be fitted as close as possible and within 600mm of the safety device e.g. the temperature relief valve.

The discharge pipe from the tundish should terminate in a safe place where there is no risk to persons in the vicinity of the discharge, be of metal or other material that has been demonstrated to be capable of safely withstanding temperatures of the water discharged and is clearly and permanently marked to identify the product and performance standard, and:

a) Be at least one pipe size larger than the nominal outlet size of the safety device unless its total equivalent hydraulic resistance exceeds that of a straight pipe 9m long i.e. discharge pipes between 9m and 18m equivalent resistance length should be at least two sizes larger than the nominal outlet size of the safety device, between 18 and 27m at least 3 sizes larger, and so on. Bends must be taken into account in calculating the flow resistance.

An alternative approach for sizing discharge pipes would be to follow BS6700 Specification for design installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages.

- b) Have a vertical section of pipe at least 300mm long, below the tundish before any elbows or bends in the pipework.
- c) Be installed with a continuous fall of at least 1 in 200.
- d) Have discharges visible at both the tundish and the final point of discharge but where this is not possible or is practically difficult there should be clear visibility at one or other of these locations.

Examples of acceptable discharge arrangements are:

- I. Ideally below the fixed grating and above the water seal in a trapped gulley.
- II. Downward discharges at a low level; i.e. up to 100mm above external surfaces such as car parks, hard standings, grassed areas etc. are acceptable providing that where children play or otherwise come into contact with discharges, a wire cage or similar guard is positioned to prevent contact whilst maintaining visibility.
- III. Discharges at a high level; e.g. into a metal hopper and metal down pipe with the end of the discharge pipe clearly visible (tundish visible or not) or onto a roof capable of withstanding high temperature discharges of water and 3m from any plastic guttering systems that would collect such discharges (tundish visible).
- IV. Where a single pipe serves a number of discharges, such as in blocks of flats, the number served should be limited to not more than 6 systems so that any installation can be traced reasonably easily. The single common discharge pipe should be at least one pipe size larger than the largest individual discharge pipe to be connected. If unvented hot water storage systems are installed where discharges from safety devices may not be apparent i.e. in dwellings occupied by blind, infirm or disabled people, consideration should be given to the installation of an electronically operated device to warn when discharge takes place.



7.2.2 RELIEF VALVE DISCHARGE PIPEWORK

8.0 COMMISSIONING AND TESTING

8.1 Electrical Installation

Any ancillary item that requires an electrical supply should be installed and commissioned as per instructions.

8.2 Water Connection

For design, see Section 5: Water connections



The system should be thoroughly flushed out with cold water without any circulating pumps in position. Ensure all the valves are open.

8.3 Primary Heat Source

The primary heat source operating in conjunction with the LBT Thermal store should be installed and commissioned in accordance with the relevant ICM Instructions provided.



Commissioning Check List

Failure to follow and complete the commissioning procedure and checklist will invalidate all warranties. See page <u>15</u> for checklist

9.0 USER INSTRUCTIONS

Your LBT Thermal store has been designed to give many years of trouble free service.



Warning: If cold/warm water exits from the temperature and pressure relief valve (TPV) or from the pressure relief valve (PRV) call your installer. If very hot water exits from either valve, switch off the heat source immediately and isolate the electricity supply to the cylinder and separate heat source.

10.0 MAINTENANCE

10.1 General

Regular servicing is required, to ensure trouble free operation. Even if a maintenance schedule is determined to be less than annually, it is important that all controls and safety features be checked for correct operation on an annual basis.



Failure to follow and complete the maintenance procedure and checklist will invalidate all warranties. See page <u>16</u>

10.2 1.1 Maintenance Schedule

It is good practice to service the LBT every 12 months. Lochinvar Limited recommend that this is the maximum service interval, however in hard water areas; it may be necessary to reduce this time period to ensure correct operation of the storage vessel and associated equipment.



10.3 Other Checks

10.3.1 RELIEF VALVE

At least once a year, the temperature and pressure relief valve and safety valve should be checked to ensure that they are in operating condition. To check each valve, lift the lever or turn the screw cap at the end of the valve several times. The valve should operate freely and seat properly.

If water does not flow, remove and inspect for obstructions or corrosion. Replace with a new valve of the recommended size as necessary.

10.4 Maintenance Record

The maintenance record found on page $\underline{16}$

10.5 Draining the LBT

The following procedure must be observed to prevent damage to the LBT and ancillary items connected to it.

- 1. Ensure any heat source connected to the LBT is either turned off or disconnected from the LBT if safe to do so. (check the ICM of the heat source before any further action is taken)
- 2. Turn off the water if applicable.
- 3. Connect a hose to the system drain valve.
- 4. Locate hose's discharge in an area where hot water will not cause any damage or injury.
- 5. Open the drain valve.
- 6. If the vessel is being drained for an extended shutdown, it is suggested the drain valve be left open during this period.

10.6 Re-Filling the System

- 1. Close the drain valve.
- 2. Open the cold water supply to water heater and allow the vessel to fill.
- 3. Check automatic air valve on top of the LBT is operating correctly

Check for water leakage.

11.0 APPENDIX

11.1 WARRANTY

Models	Warranty P	eriod	Maximum working temperature/pressure
	Vessel	2 years	Maximum working temperature/Pressure within the Vessel:
All models	Other Components	1 year	95°C/5Bar

General Warranty

Our warranty is to provide a replacement component in exchange for the return of the defective component and is subject to an audit upon receipt of the faulty component. Replacement components must be paid for in full prior to dispatch unless we agree otherwise. The warranty does not include any labour costs or carriage of the returned component. If (after verification and at the sole discretion of Lochinvar Limited) a component or part of the LBT Thermal store supplied by Lochinvar Limited proves, within 24 months from the date of delivery of the original appliance to be defective or fails to function correctly due to manufacturing and/or material defects, then Lochinvar Limited shall repair or replace this component or part.

Conditions for installation and use

The warranty set out above will apply solely under the following conditions:

- a) The warranty is subject to the LBT Thermal store being installed, and maintained in accordance with the relevant Installation Commissioning and Maintenance Instructions and does not cover failures due to deliberate misuse, malicious damage, neglect, unauthorised alterations or repairs, accidental damage or third party damage.
- b) The LBT Thermal store remains installed at the original site of installation.
- c) Working temperature must be no greater than 95°C, and MWP pressures must not exceed the figures given in the table above.

Exclusions

The warranty set out above will not apply in the event of damage to the LBT Thermal store caused by an external factor such as:

- a) Damage occurring during transport, lifting or installation.
- b) Misuse, neglect (including frost damage), modification, incorrect and/or unauthorised use of the LBT Thermal store and any attempt to repair leaks;
- c) Contaminants or other substances having been allowed to enter the LBT Thermal store
- d) Unfiltered, recirculated water flowing through the LBT Thermal store
- e) Any fault arising due to inadequate water quality or insufficient cleansing of the heating system is not covered by the warranty.

Scope of the warranty

The obligations of Lochinvar Limited by virtue of the warranty provided do not extend beyond delivery free of charge from the warehouse of the parts or components of the LBT Thermal store to be replaced; transport (including crane hire), labour, installation and other costs associated with the replacement shall not be borne by Lochinvar Limited.

11.2 DECLARATION OF PERFORMANCE UKCA-EEC-Declaration of Conformity

Supplier: Lochinvar Limited 7 Lombard Way The MXL Centre Banbury, United Kingdom

Hereby declares that the following products:

Product Description: Storage Vessel Product Models: LBT Range

Have been manufactured, inspected and pressure tested in accordance with the requirement of the: European Pressure Equipment Directive (PED) 97/23/EC, Article 3, Paragraph 3 of DL 25, Feb.2000, n 93

Conditions of use:

1. The installation instructions have been followed

2. Fluids being passed through the heat exchanger are non-hazardous in the group 2 category

3. The maximum working pressures and temperatures as noted on the equipment data plate are not exceeded.

11.3 ERP DATA TABLE

Information	Symbol	Unit	Value					
Trade mark	-	-		Lochinvar Limited				
Model Identifier	-	-	LBT300	LBT500	LBT800	LBT1000	LBT1500	LBT2000
Energy efficiency class	-	-	В	С	С	С	С	С
Standing loss	-	W	67.7	114.1	132.7	125.4	146.5	189.5
Storage volume	-	litres	300	500	800	1000	1500	2000

11.4 COMMISSIONING CHECKLIST

WHAT PRIMARY HEAT SOURCE IS CONNECTED TO THE LBT

SOLAR THERMAL	
AIR SOURCE HEAT PUMP	
GAS CONDENSING BOILERS	
OTHER-PLEASE SPECIFY	

-	UNINECTED	10	I

WHAT IS THE MAXIMUM FLOW/RETURN TEMPERATURE OF THE PRIMARY HEAT SOURCE(s)

FLOW RETURN

WHAT IS THE MAXIMUM WORKING PRESSURE OF THE PRIMARY HEAT SOURCE(s)

HAS A T&P VALVE BEEN FITTED TO THE BODY OF THE LBT

12.0 MAINTENANCE CHECKLIST

SERVICE 1 Date
Engineer name
Company name
Comments
Signature

SERVICE 3	Date
Engineer na	ne
Company na	me
Comments	
Signature	

SERVICE 2 Date
Engineer name
Company name
Comments
Signature

SERVICE 4 Date
Engineer name
Company name
Comments
Signature





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