

Outline Heat Pump Specifications

Manufactured by Kensa Heat Pumps

Overall Specification

The heat pump shall be designed and built to meet or exceed the requirements of BS EN14511 Parts 1,2 or 4 (as applicable). It shall be supplied factory built, internally wired and tested. Multiple plant room models may require each individual heat pump to be site mounted onto the base frame, and individual power, enable signal and water pipes connected.

Application

The application shall be as a water to water heat pump configured for either heating only, cooling only, reverse cycle heating optimised or reverse cycle cooling optimised.

Testing

Minimum testing shall be to BS EN 14511 which for heating optimised heat pumps is 1/2 hour at 0 deg C source (ground) temperature at 35 deg C load (underfloor) temperature.

Cases

Where cases are supplied they shall be fabricated from sheet steel with tig-welded joints to provide overall Ingress Protection (IP) rating of 23. Alternatively, they may be from GRP (Glass Reinforced Plastic) with gelcoat finish. All internal surfaces shall be lined with a closed cell thermal and acoustic barrier foam 12 mm thick which will be flameproof. Locks shall be fitted which require a tool to open access doors.

Chassis & Base Frame

The chassis (and base frame where supplied) shall be fabricated from steel in either RHS or fabricated sheet metal and finished with either electrostatic powder coating or galvanising. The chassis may be isolated from the base frame by flexible rubber mounts to prevent the transmission of noise and vibration.

Electrical Connections

Both power supply and control signals shall enter the junction box from below the heat pump and connect to terminals provided within the heat pump control box. A separate power supply shall be required for each heat pump.

Ambient Operating Range

The ambient operating range shall be +2 to 40 deg C, non-condensing.

Refrigerant

A non-ozone depleting refrigerant shall be used.

Pumps

On Compact models, both load side (output) and ground side water pumps will be provided as an integral part of the heat pump. On Plant Room models, no water pumps will be supplied. Any

pump connections will be of the gasketed type. No pump isolation valves will be provided by the heat pump. Pumps shall be vapour-barrier insulated with joints in insulation sealed with silicone sealant to prevent condensation forming during operation at standard room temperature and pressure.

External connections will be by either flanges or "o" seals.

Power Supplies

A suitable power supply shall be either 230 VAC single phase or 415 VAC three phase depending upon the model, and 50 Hz. Allowable voltage tolerance will be +10% or -6% in the UK, and +6% and -10% in all other EU countries. A neutral and earth connection shall be required.

Compressors

Compressors shall be of the scroll type, mounted flexibly by four separate mounts to the chassis. Compressors shall contain integral current and temperature limitation by "Klixon" type bimetallic strip method, with automatic reset. An integral high pressure bypass valve shall provide compliance with the EU Pressure Equipment Directive. Compact heat pumps for heating only and heating optimised reverse cycle heat pumps shall be supplied with jacketed compressors to provide thermal and acoustic insulation.

Refrigerant Circuits

Refrigerant circuits shall be one per compressor, and consist of an expansion valve with thermal and pressure compensation and a solid core filter drier. A four-port reversing valve shall be fitted if reverse cycle operation is required.

Refrigerant Circuit Access

Access to the refrigerant circuit will be provided by high and low side industry standard Schrader valves ports. They are "fitted for life", and require no routine maintenance.

Heat Exchangers

For closed loop systems heat exchangers shall generally be of the brazed plate type, although the co-axial type may also be used. Open loop may use shell and tube type heat exchangers. One heat exchanger shall be fitted for each refrigerant to water circuit.

Refrigeration Pipes

All pipes shall be to BS EN 12735-1 annealed and joined by copper brazing or silver soldering whilst being purged with oxygen-free dry nitrogen. Insulation shall be to vapour barrier Class "O" such that no condensation shall be visible during system operation at standard room temperature and humidity.

Water Pipes

All water pipes shall be from copper, and joined by either brazing, silver soldering, "O" seal, olive compression or gasket compression. Insulation shall be to vapour barrier Class "O" such that no condensation shall be visible during system operation at standard room temperature and humidity.

External Water Pipe Connections

All connections shall be in a recognised plastic piping system from underneath the heat pump.

Water Bleed Points

One manual schrader type bleed valve will be provided on each internal water circuit.

Gauges

Load (underfloor) water pressure and source (ground) water pressure gauges shall be mounted on a bezel on the heat pump chassis.

Electrical System

The electrical shall be split into "control" and "compressor" circuits, the wiring of each shall be protected by a suitably rated miniature circuit breaker. All wiring shall be colour coded for identification and sized to carry the currents flowing in that circuit. The control box shall have a removable lid. The compressor shall be supplied with power via a suitably rated contactor. All components shall be electrically bonded to provide protective earthing.

Control System Type

The control system shall be based on a fully programmable menu-driven software controller. Access to the control box shall be by opening the front door of the case. All sensors shall be thermistor beads. The weather compensation thermistor bead shall be provided as free issue for site installation by others.

Control System Voltages

All control devices shall operate at 24 VAC via a transformer mounted within the heat pump control system or 230 VAC.

Control System External Inputs

An enable signal shall be provided by others to instruct the heat pump to "run". Reverse cycle heat pumps shall be provided with an enable signal, by others, to change from the default heating or cooling mode into the new heating or cooling mode. All signals shall come via volt-free contacts provided by others. A volt-free fault signal may be provided for connection to remote monitoring device.

Control System External Outputs

Where no source (ground) pump is provided within the heat pump then a volt-free enable signal shall be provided by the heat pump to provide a signal for an external source pump to operate. Where no load (underfloor) pump is provided within the heat pump then no control signal shall be supplied by the heat pump for any external load pump.

Control System Faults Monitored At Which Heat Pump Will Fail Safe : -

Low source (ground) water pressure
Low load (underfloor) water pressure
Low source (ground) water temperature in heating mode
Low load (underfloor) water temperature in cooling mode
Low refrigerant charge
Low refrigerant temperature
High refrigerant temperature
Low power input voltage
High power input voltage
Sensor fault

Temperatures Monitored By The Control System: -

Load (underfloor) return temperature
Source (ground) return temperature
Source (ground) output temperature
External ambient temperature (via probe installed by other)

Control System Information That Can Be Displayed: -

Display lit indicates power to control circuit
All fault codes
Compressor running
Compressor time delay counting down
Heating or cooling mode operation
Load (underfloor) return temperature
Source (ground) return temperature
Source (ground) output temperature
Evaporating temperature of refrigeration circuit
External ambient temperature (via probe installed by other)
Setpoint heating temperature
Setpoint cooling temperature

Control System Parameters That Can Be Programmed : -

Heating or cooling mode operation
Load (underfloor) return water temperature setpoint in heating mode
Adjustable differential temperature applied to heating mode setpoint
Load (underfloor) return water temperature setpoint in cooling mode
Adjustable differential temperature applied to heating mode setpoint
Short cycle time delay for compressor
Short cycle time delay defeated on first compressor start
Low refrigerant pressure fault defeated on first compressor start
Low source (ground) flow temperature fault alarm in heating mode
Automatic or manual reset after fault alarm condition is removed
Weather compensation temperatures in heating mode
Weather compensation temperatures in cooling mode
Calibration of heat pump thermistor beads
Calibration of evaporation temperature pressure sensor
Minimum and maximum compressor run times
Toggle default heating or cooling mode
Remote control over choice of heating or cooling mode