RISE | Retrofit information, support & expertise

# Air source heat pumps: installation considerations

## Supply chain advice pack

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www.riseretrofit.org.uk

# Introduction

## Which buildings are suitable for heat pumps?

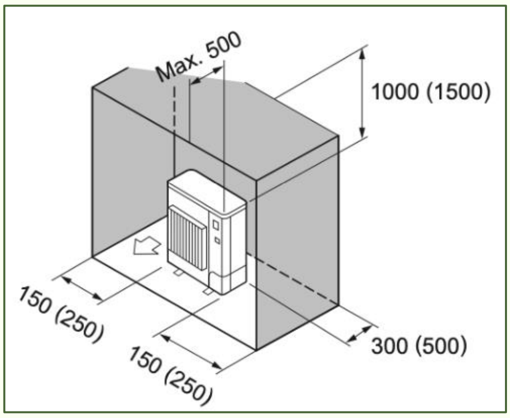
Any conventional house and most maisonettes are likely to be suitable for a conventional Air Source Heat Pump (ASHP) installation. Flats higher than two stories are unlikely to be suitable. However, there will be some buildings which may present one or more issues that are more difficult to resolve.

## What physical constraints might present problems?

| Space | Noise | Hot water storage | Combi boilers | Storage heaters | Electrical connection |
|---|---|---|---|---|---|

### Space outside the property

- ASHPs installed in domestic properties in the UK are usually a variant referred to as 'monoblocs'. This means that all the main components are in a single unit – the monobloc. This unit can vary in size based on the heating capacity but is typically around (W)1000mm x (H)800mm and 40mm deep. However, it will also require free movement of air around the unit: it is important to follow the manufacturer's recommendations on the clearances. Failure to follow the manufacturer guidance is likely to lead to poor performance and higher bills for the occupant. Below is an example clearance diagram from a manufacturer's installation instructions.



Source: Mitsubishi


Source: sfearnplumbing

- In some circumstances, the most suitable location for the heat pump might be within the building curtilage, but when this is not possible a shared area could be used. However, this brings a risk of nuisance damage. It is possible to install a purpose-built cage that can protect the heat pump without impeding air flow. For examples see the security cage for heat pump, designed for free air flow figure below.

**Source:** BES

### Hot water storage

- In nearly all cases, hot water storage will be required with a heat pump installation. Cylinders that were previously used with a boiler will need to be replaced, as the heating coil inside the cylinder will not be of adequate size to allow suitable heat transfer. Failure to replace the cylinder for a "heat pump ready" type is likely to lead to poor performance ('cycling') and increased maintenance requirements.

### Buildings being heated with combi boilers

- Will need a location for the new hot water cylinder, and this may be problematic for the occupants. New unvented cylinders will require a space around 600mm x 800mm for an 'airing cupboard'. Alternatively, under-counter hot water storage can be specified in the form of a 'heat battery'. These are more expensive than a conventional hot water cylinder, but may provide a useful solution in tricky situations, and the additional cost may be justified. It is possible to get the equivalent of a 210-litre cylinder in a unit approximately the size of an under-counter fridge.

### Properties heated by storage heaters

- These may not already have a hot water cylinder, but if they do it may need to be replaced if it is not "heat pump ready".

### Noise nuisance

- Noise nuisance is a potential risk, if there are other properties nearby which might be able to hear the heat pump at night – or the monobloc is placed too near to bedroom windows. This is covered in more detail below. The permitted development regulations require this assessment to be done in all cases.

### Electrical connection

- The existing **electrical connection** is likely to be adequate in most situations. However, there is a small possibility that 'looped' supplies could present a problem, especially if there are plans to install EV charging as well. A looped supply is when a single supply cable is shared by more than one property. Unlooping a supply will require provision for a new supply cable to each additional property fed by the looped supply cable.
- In some cases, a load limiting device can be installed as a temporary measure.

# The Microgeneration Certification Scheme (MCS)

**For Warm Homes projects:**

All projects must be compliant with PAS 2035:2023. PAS 2035 also requires low carbon heat measures to be installed by MCS certified installers, with the exception of high heat retention storage heaters that are covered by PAS 2030.

**MCS Transition period**

Please note MCS are currently going through a transition period: please refer to the website for the latest updates.

## The MCS design and installation process

- The MCS scheme is a comprehensive certification scheme which covers the entire installation process from sales through to commissioning and operation of the heat pump. MCS is a membership organisation, and all heat pumps installers pay to be able to **self-certify their installations** under the building regulations. There are some 'umbrella' schemes[1] which allow non-registered installers to complete installations using the umbrella scheme provider to deal with many of the compliance and governance processes.

[1] Umbrella Schemes - MCS Certified

- All of the scheme guidance covering the survey, design, installation and commissioning can be found on the MCS website[2]. This process includes a permitted development compliant noise impact assessment calculation.

## MCS key points

- **Designer and Installer:** Certification of compliant installations is divided into two duties – designer and installer. An installer can be certified for both duties, or just installation. You can employ a separate designer and installer if you wish.
- **Heat loss calculations:** Each building must have a detailed heat loss calculation carried out. The heat loss calculation is automated using the 'MCS heat pump calculator' tool, which is available for registered installers on the MCS website. There are other compliant online services available that use the same calculation methodology.
- **Sizing:** The heat pump calculator also ensures the correct sized radiators are specified for each room and advises where fabric / insulation improvements may be required.
- **Running costs:** The heat pump calculator carries out running cost calculations which can be used for demonstrating compliance with the Warm Homes guidance. The heat pump calculator can also help size compliant **'retrofit hybrid'** installations (see the 'Pre-Installation' guide for a definition).

## Installation key points

- **MCS guidance:** Always follow the recommendations in the MCS heat pump calculator with respect to radiator upgrades and fabric improvements (if necessary).
- **Check DNO requirements:** In most cases installing a heat pump is a "fit and inform" process with respect to **notifying the DNO**. However, if you are fitting several heat pumps in a close geographical area fed from the same sub-station you should contact the DNO before progressing to installation using the forms provided on the DNO's website, or the **Energy Networks Association** website.
- **Manufacturer instructions:** Always follow manufacturer specific instructions relating to materials used, placement of specific components and commissioning.
- **Site clearance:** The monobloc unit must be sited in a secure location and protected from damage and other negative influences which may impede performance, such as a risk of items being stacked against it, spray and dirt from nearby roads, risk of vandalism etc.
- **Resident engagement:** Consult with residents to ensure the placement of equipment inside and outside the house will not be a surprise on the day of installation.

[2] https://mcscertified.com/

- **In-use considerations:** The condensate run-off from the monobloc which is created in winter months during de-icing cycles should be managed so that water will not drip onto footpaths and freeze, causing a slip hazard.
- **Climate context:** To ensure running costs are as low as possible, it's important that the installation is set up with the correct weather compensation (referred to as the 'heating curve') in the heat pump control settings. This may require installers to go back to the property after the first heating season to adjust the settings. This will be covered in more detail in the next information sheet – 'Post Installation'.
- **Audit trail:** Collecting commissioning paperwork is vital for helping track issues later.

# Resources

**Advice packs:** Heat pumps: pre-installation steps available here.

**Podcast** "Heat Pump Lessons from Retrofit with Kensa" here.

**Masterclass** "Heat pumps in retrofit projects with Sureserve" available here.

**Podcasts** listen to the RISE podcasts here available here.

**Guidance MCS** available here.

**Guidance:** air source heat pump noise emissions planning guidance here

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