

### Power Disruption and Kensa Heat Pumps V1

Every time an inductive load such as a heat pump, fridge, television or computer starts, there is a surge on the local electricity supply network. This surge can cause disruption, particularly where only a single-phase power supply is available, which is generally the case in the United Kingdom. This disruption generally takes the form of flicker on tungsten filament light bulbs – although it is likely to be less evident on more modern forms of lighting such as fluorescents, low-energy light bulbs or LEDs.

Where heat pumps are connected to a *wet* style of underfloor heating system, they are normally connected to a banded off-peak electricity tariff such as Economy 10. This means that the time clock (or programmable room thermostats) on the underfloor heating system should be programmed to start only three times a day at the start of each off-peak period. The heat pump will start once, and run continuously until all the rooms are up to temperature. The heat pump will then be switched off by the thermostats, and/or the time-clock.

The situation with radiators or fan coils is entirely different, as they generally operate on-demand. This means that the heat pump can *cycle* on and off several times an hour, just like a conventional boiler. Each time the heat pump starts it may cause lights to flicker.

Kensa single phase domestic heat pumps all come with ‘Smart’ starts fitted as standard. A ‘Smart’ start is a device that limits the starting current of the heat pump and hence minimises any power disruption on the electrical supply. The ‘Smart’ starts limit the starting current to around 30-40amps (depending on the size) which is similar to an electric cooker. The ‘Smart’ starts used by Kensa are specifically designed for use with high efficiency scroll compressors as used in Kensa heat pumps.

If a building has a three-phase power supply this flicker is very much reduced, because the starting surge is spread across all three phases, and is further helped by the heat pump having a lower starting surge when connected to a three-phase power supply.

Isolated buildings usually have their own transformer and any disruption should be limited to just that building. This is because transformers generally take the 11-kilovolt mains grid voltage down to 230 volts, and any disruption generally does not go back up through the transformer, and into the 11-kilovolt network that serves other transformers and buildings.

Where a building shares a single-phase transformer with a variety of other buildings, it is advisable to talk to the network operator about fitting a heat pump. Smaller heat pumps are generally not a problem and with a Kensa domestic heat pump and ‘Smart’ start, no special measures need to be taken.

#### Facts at a glance:

**Starting Currents**—Everytime the compressor switched on inside a heat pump a surge on the local supply network can occur.

**Off-peak Tariffs and Underfloor**—By using off-peak and underfloor systems the number of starts for the compressor can be reduced and hence the disruption.