

Installation Instructions for the KEC Residential Unit

Enclosed in the box you will find:

- (1) KVAR unit
- (1) Panel box coupling device
- (1) Panel box coupling device nut
- (1) Tubing (10")



Authorized KVAR dealers and distributors and sales agents shall not be responsible for any damages, personal or property, resulting from the installation of this product in a manner which deviates from the instructions specified herein.

KVAR recommends that this unit be installed by a licensed electrician.

To reduce the risk of electric shock, it is recommended to shut down the main panel breaker to remove electrical power to the panel box prior to installation.

KEC 100 Amp & 200 Amp - Installation Instructions

1. Make visual check on breaker sizes & location

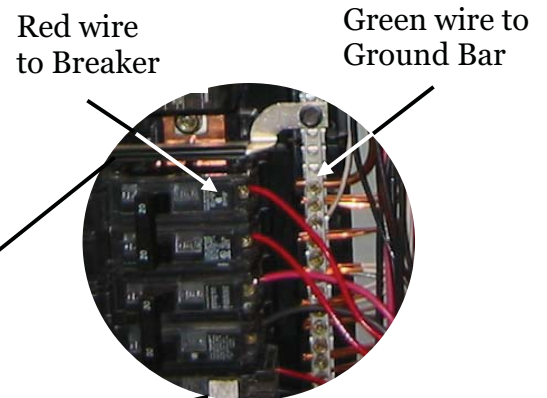
- Locate an existing or purchase a new full size double pole 240 volt 20 amp or 30 amp breaker designed for your panel. NOTE: these take up 2" of space.
- Position that breaker directly below main breaker using the first two bus line slots on either side of breaker panel. It should be installed in the top slot on the left or right side of the panel. NOTE: If the main power comes into the panel from the bottom, then the "top" of the panel is actually the bottom and the 20/30amp breaker would be the 1st breaker on the bottom.
- If there is no double pole 20 amp or 30 amp breaker available in the panel, then one will have to be added (not included.)



2. Remove electricity panel cover

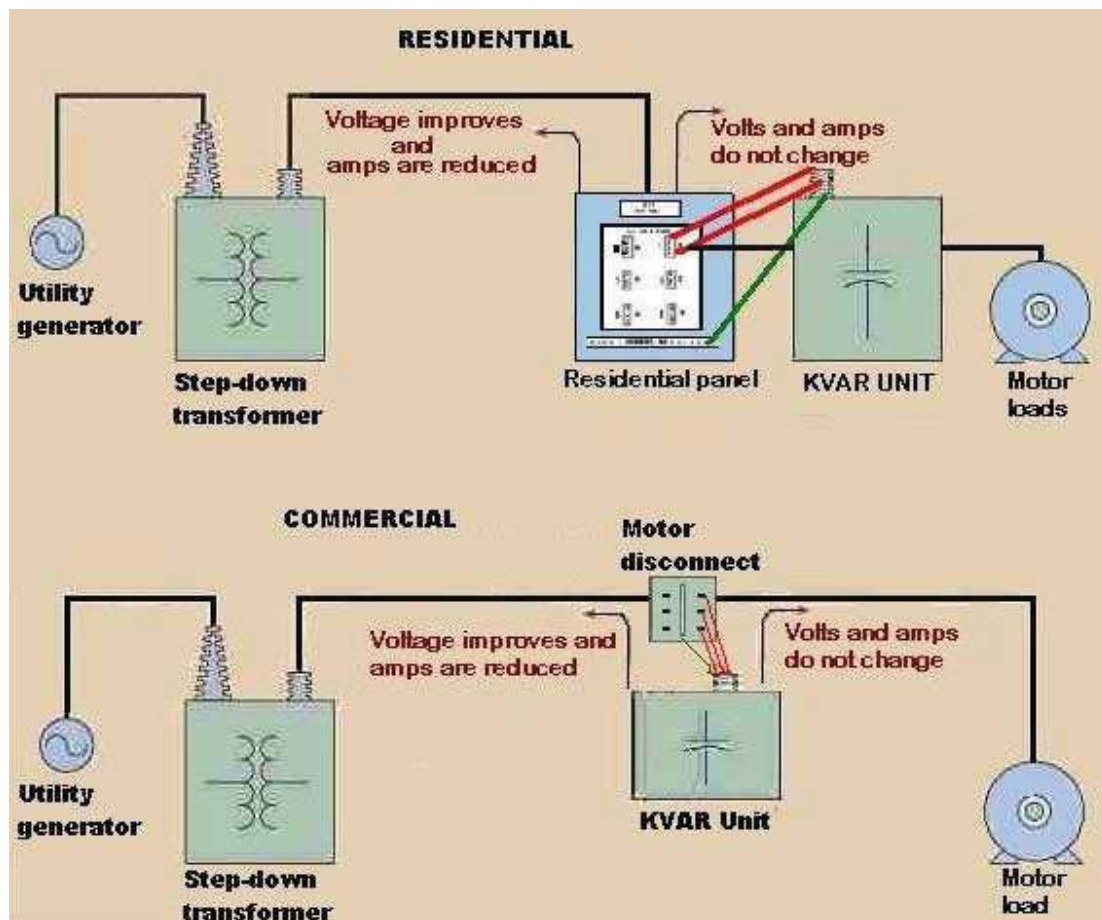
- **CAUTION! EVEN IF THE MAIN PANEL BREAKER IS SHUT OFF, THE WIRE ABOVE THE MAIN BREAKER IS STILL LIVE! EXERCISE EXTREME CAUTION TO PREVENT INJURY OR DEATH FROM ELECTRIC SHOCK.**
- Exercise extreme care when entering the cables into the panel from the KEC unit.
- Locate 7/8" knock out in panel - It is usually the smaller one in the cluster of knock outs. If a 7/8" knock out is not available at the desired location, one will have to be added.

3. Locate desired location & mount unit (left, right, top or bottom side of panel, nearest the knock out and breaker you will be using)
 - Mount the KEC unit using 2 wall material appropriate screws (not included.)
 - Loosen plastic lock rings on 90 degree elbows.
 - Pass all wires from 90 degree on unit through flex tubing through second 90 degree elbow.
 - Tighten plastic lock rings.
4. Connecting knockout fitting to panel
 - Remove metal lock ring on 90 degree rain tight fitting.
 - Pass all wires through knockout opening in panel. (Be sure not to touch any live circuits!)
 - Pass lock ring over wires all the way to the 90 degree fitting and screw on to threads and secure well.
 - Leave wires hanging out of panel at this point making sure wires do not touch any live circuits in panel.
5. Connecting the KEC unit to panel electrical system
 - Turn off the 20 or 30 amp double breaker that the KEC will be connected to.
 - Cut to length, strip the ends and then connect each of the 2 red wires to each screw terminal on the 20 or 30 amp double breaker.
 - Cut to length, strip the end and then connect the green wire to the ground bar.
 - The Ground bar can usually be identified by locating the green wire coming from outside (from the meter) or the wire coming from outside that has black insulation with a strip of green tape on it.



6. Setting KVAR unit into operation
 - If Main Panel breaker was turned off then turn back on.
 - Turn the KEC 20 or 30 amp breaker on.
 - Check to ensure red indicator light on KEC unit is lit. If it is lit, then the unit is activated and working – a slight hum is normal.
 - Replace all panel covers. - Installation Complete.

PRINCIPLES OF KVAR INSTALLATION



WHERE TO INSTALL THE KVAR UNIT IN RESIDENTIAL HOME APPLICATIONS AND SETTINGS:

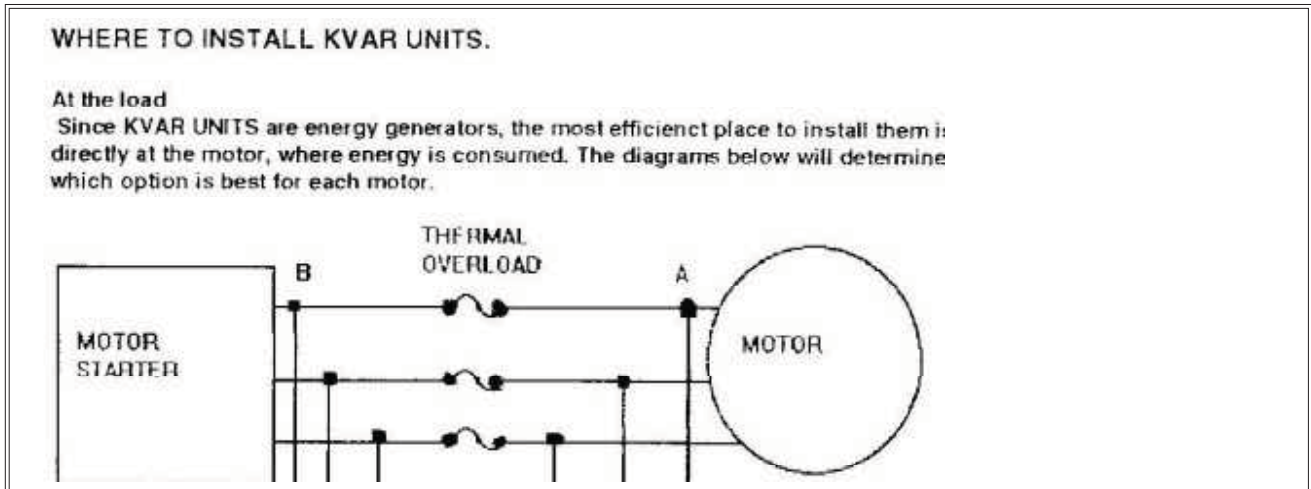
Installation in a residential home is simple as compared to installations made in industrial and commercial situations. To maximize results, the KVAR is connected to the upper most switch in the residential panel box.

WHERE TO INSTALL THE KVAR UNITS IN COMMERCIAL & INDUSTRIAL APPLICATIONS AND SETTINGS:

Theoretically and technically speaking, when capacitors are installed between the transformer and the load and not only at whatever other points (e.g. A, B or C), unity power factor is achieved. The utility company will perceive the power system as having a unity power factor no matter where the power factor correction capacitors are located on the distribution line as long as they are sized correctly. This is **Power Factor Correction**.

Since KVAR Units are energy generators, the most efficient place to install them is directly at the motor where energy is consumed where the units will supply the kVAR reactive current component to the load because the KVAR unit is able to store reactive energy in its magnetic field when it charges up, and releases it when it discharges. The generator (or transformer) must still supply the load's KW

requirements, but the reactive current component is now supplied by the KVAR unit and not the generator of the utility company.¹



As uniquely distinct from all the other electrical capacitors, the KVAR does not only do power factor correction and create a system-wide surge protection facility. The KVAR primarily functions as a **Power Optimization Technology**. Optimum efficiency and economics is achieved when the KVAR unit is installed as close to the load as possible because by doing this, the total line current to the load is reduced and therefore the total losses in the line conductor in the forms of heat or noise is reduced and the voltage drop in the line is decreased. The other electrical capacitors do not provide this optimization value which the KVAR does.

¹ The energy “contained” in the KVAR current component is transferred back and forth between the KVAR unit and the motor two times for every voltage (i.e. at 120 times a second). This FREE reactive energy (kVAR) produced by the KVAR is never consumed by either the KVAR unit or the motor (in contrast to the KW energy which performs real work and is totally consumed) is only “borrowed” half of the time by the KVAR unit and half of the time by the motor. The energy is used to charge the AC electric field of the KVAR unit and to energize and create the AC magnetic fields contained in the motor windings. In short, the capacitance in the KVAR unit and the inductance in the motor’s windings “slinky” this reactive energy back and forth 120 times a second, each supplying the needs of the others.