Converting Our Generators From Three-Phase Power To Single Phase

Phase Conversion in Generators:

(1) Reconfiguring Coil Connection

- A three-phase generator can be converted to a single-phase one by altering the connection between its stator windings inside or outside the generator head. For instance, in the case of a 3-phase generator, you would have 6 leads. Larger generators commonly have 12 leads from six coils and all the wires come out of the generator making it easier to configure the generator in a variety of ways as follows –
  - Connecting the coils in series will convert the generator to a single-phase one.
  - By connecting opposite coils in series, you can double the output voltage.
  - A parallel connection will double the flow of current.

- The tricky part of reconfiguring a generator lies in mapping the wires emerging from the generator to the coils they are connected to. It is necessary to have the manufacturer's documents. Else, you would need to study how your generator is currently wired and work backwards from there.

(2) Centre-Tapping Single-Phase Loads To Three-Phase Generators

- A three-phase generator can be viewed as a combination of three single-phase units. Single-phase loads can be connected to a three-phase generator in one of the following ways –
  - Connect the load between a phase conductor and the system neutral. This is usually done for low-power loads.
  - Connect the load across two live conductors in a phase-to-phase connection. This is usually done for high-power loads such as air conditioners or heaters and provides 208 V. However, this may lead to poor performance since appliances require 240 V for operation would run at 75% of their rated capacity at 208 V.

(3) Phase Convertors:

- A rotary phase convertor (RPC) can be directly connected to a single-phase generator to produce three-phase power supply. It requires a simple configuration comprising two input connections, known as idler inputs from a single-phase generator. A voltage is produced on the third terminal that is not connected to the single-phase power. The induced voltage differs in phase from that on the other two terminals by 120°.

(4) Variable speed drives (VSDs) / variable frequency drives (VFDs) / Inverters

- These are similar to rotary phase convertors. The VFD-single-phase generator combination is most effective in the case of applications that require less than 20 horsepower.