SELECTING THE RIGHT TYPE OF STABLIZER

Introduction

The world over, generation of A.C. electricity follows a rule. It is a three-phase 3 -wire system. Even though the voltage levels may be different in different countries, but generation and transmission of electrical energy is effected through a 3 - wire system. In common parlance this is termed as a Balanced supply system.

To facilitate the working of single-phase loads the help of a Delta/Star transformer is taken at the last point of distribution. This converts the system into a three-phase 4-wire system. Importance has to be given to the fact that in such a distribution system, the neutral point of the star side (secondary) of the transformer must be solidly grounded so as to avoid Oscillation or floating of the neutral. This oscillation of the neutral gives rise to the unbalanced nature of single-phase Voltage so commonly seen in our country in the distribution.

Even through the single-phase voltage may very from each other drastically, the point to note is that the line voltage (RY, YB, BR) remain balanced for all practical purposes. As a consequence of this, this distribution system supports the safe running of three phase loads through there may be difficulties in running single-phase loads.

In the event to a floating or oscillating neutral, two options emerge before us to effectively run single-phase loads.

1. To equalize the unbalanced phase voltages (RN, YN, BN) using unbalanced load type stabilizer. This has following repercussions:

    a) The phase voltage (RN, YN, BN) may be distressed third harmonic e.m.f.s. these arise because their phase magnetic circuits are not interlinked and out of balance (Zero phase

sequence) currents have an iron path for the production of Z.p.s. flux.

b) The output load (say IR) concerns one phase only, whereas the corresponding input load current has, in the absence of a primary neutral to be conducted though both of the other phase (Y, B), which act as reactors. The voltage of the loaded phase is reduced, while that of other being raised. Simply speaking, the use of such a voltage correction systems creates an unbalance in the supply side leading to overall system instability.

2. To ground the neutral solidly.

Guiding Principle

An important fact emerge out of the above:

In any A.C. Electrical supply distribution systems, the three phase line voltage, (RY, YB, BR) always remain balanced whereas the single-phase voltage (RY, YN, BN) may be balanced or unbalanced, depending on the condition of neutral grounding. In case the three line voltages (RY, YB, BR) are unbalanced, it can only be due to a faulty supply system like a damaged transformer, sparking cable joints etc. which no stabilizer (balanced or unbalanced load type) can correct the situation. Therefore, never chose a three-phase stabilizer seeing the level/ condition of single-phase voltages.

How to choose

There can be three types of loading conditions in an electrical system

a. All the loads are of three-phase nature.
b. There is a mixture of three-phase and single-phase loads.
c. All the loads are of single-phase nature.

In view of the above facts and the guiding principle, the choice of a three phase stabilizer for condition (a) and (b) falls on balanced load type stabilizer.

An unbalanced load type stabilizer should be used only for option (c).

In spite of the selection of the type of 3 - phase stabilizer, it is imperative to point out that the neutral needs to be solidly grounded for proper functioning of the electrical system.

Choosing the right KVA

Some thumb rule conversions factors for choosing the right KVA of the Servo Stabilizer.

a.	KVA of Stabilizer	=	H.P. of lift * 3
b.	KVA of Stabilizer	=	Tonnage of A.C. plant * 2
c.	KVA of Stabilizer	=	H.P. for Resistive loads
d.	KVA of Stabilizer	=	H.P. or K.W./ Power factor for Reactive loads.

The stabilizer KVA needs to ascertained and designed using the pack conditions.