3-PHASE MOTORS RUNNING ON 1-PHASE 208-220VAC SUPPLY

To energize pumps, compressors, motor-tools or any equipment based on 3-phase motors on electric facilities with only 1-phase 208-220VAC mains supply available, has been the main goal of different techniques and connections that were developed for this kind of operation.

Most of these techniques are based on Rotary–Phase-Converters or Static-Converters using solid state devices. Due to its high cost and low availability, a simple and low cost solution is described based on the DMS module typically used as a universal replacement of the centrifugal switch of any 1-phase motor.

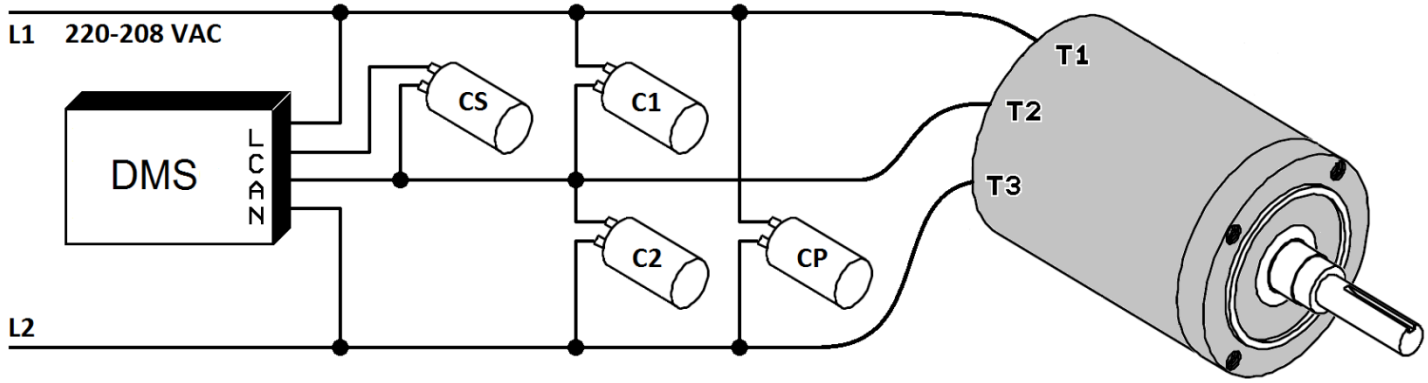
The proposed connection can deliver up to 80% of the 3-phase motor nominal power and shows small unbalance on the generated 3-phase line voltage and current.

The above limitations are lowered to an acceptable level by the proper value calculation of the capacitor used on this connection. Furthermore, it is always possible to increase the motor performance by minor adjustment of the final capacitors value on behalf of the equalization of the measured voltages and currents on the running motor.
Delta wired motors are recommended, although wye-wired can be used too. Use oil-filled capacitors 350VAC rated.

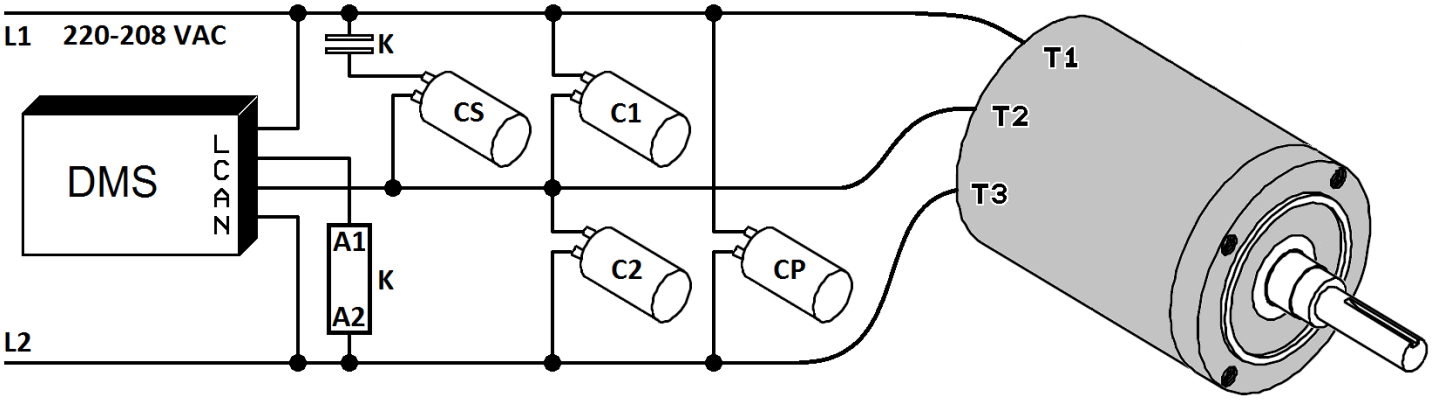
Equations:	C1 = 15 x (Motor nominal power in HP)	Value in micro Farads (approx.)
	C2 = C1 / 1.5	
	CP = C2 / 2	Compensates motors power factor
	CS = 70 x (Motor nominal power in HP)	

Once the main motor is running, the 3-phase lines T1-T2-T3 can be used to feed other 3-phase motors (lower power than the main). Proper protection (breakers and fuses) should be installed.

3-Phase motors up to 5HP.



3-Phase motors over 5HP. (K: contactor sized to the motor current)



Depending of the motor type used, connecting the DMS's terminal (N) to the single phase neutral line, the main motors startup and running performance could be increased.