



MOTOR PROTECTOR DETERMINATION FOR SINGLE PHASE ELECTRIC MOTORS

General characteristics

Manufacturer:		Motor code:	
Voltage:	Frequency:	Nominal power:	
Nominal current:	Full load current:	Number of poles:	
Fan: (no , 1 , 2)			
Other data:			

Overload running tests:

overload must not trip and maximum allowed winding temperature is °C

Test	voltage [V]	mech load torque []	main winding temp. [°C]	aux winding temp. [°C]	ambient temp. [°C]	shell temp. [°C]	location temp. [°C]	total current [A]
1	V(min)							
2	V(nom)							
3	V(max)							

- Ambient temperature is usually 43°C.
- Take measures after thermal stabilisation.
- The worst condition is usually at minimum voltage.
- Location temperature is defined as the one that is affecting the bimetal disk of the overload: to measure this an overload protector plastic case (no disk, no heating resistance) provided with a thermocouple must be placed on the usual location and the compressor is run under the loading conditions.

Ultimate trip tests:

overload must trip and maximum winding temperature allowed is : ° C

Test	voltage [V]	mech load torque []	main winding temp. [°C]	aux winding temp. [°C]	ambient temp. [°C]	shell temp. [°C]	location temp. [°C]	total current [A]
1	V(min)							
2	V(nom)							
3	V(max)							

- Tripping must occur before reaching dangerous temperature of the windings, depending on their insulation.

Locked rotor tests

Test	circuit	voltage [V]	cycling time [s]	main winding temp. [°C]	aux winding temp [°C]	ambient temp [°C]	shell temp. [°C]	location temp [°C]	total current [A]
1	Main winding	V (min)							
2	Main winding	V (max)							
3	Both windings	V (min)							
4	Both windings	V (max)							

- Ambient temperature is usually 20°C.
- Stop test when maximum winding (main or aux) temperature is reached under steady state conditions: record last values.
- Select voltage (min , max) according to worst case.
- It is recommended to test either with both windings or with only the main winding energised, to check the most severe condition.
- If capacitors are provided, it is recommended to test with and without capacitors in the circuit.
- Shell maximum temperature must not be higher than 150°C.
- Winding temperatures must not be higher than the maximum expected one for the life and integrity of the motor itself: it could be as high as 200°C depending on the grade of the wire and insulation class of the motor.
- For automatic reset protectors cycling time must not be so long that, once extended over a period of 15 days, could lead to more than 10.000 cycles, thus affecting the reliability of the overload protector.
- The above tests have the purpose of the determination of the overload protector: once this has been done, the 15 days locked rotor test must be suitably performed: after the 15 days locked rotor test the insulation integrity of the motor is checked through high potential test and the protector integrity must be proved by the constancy of the cycling time.