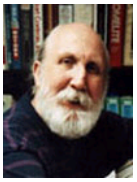
Shop "Tech Talk" March 2008



Q.	I am a newcomer to the factory maintenance department of my company. Can you give me some basic information on troubleshooting electric motors of all kinds?

Basic Electric Motor Troubleshooting-Part 1

The most important advice, above all else, has to be on SAFETY and by this I mean your own individual safety. Working around electric motors be they 3 phase, dc or single phase means that you will be around dangerous voltages that can hurt or in the worst case kill you. You must never forget, that everyday when you work around machines, you must be vigilant. The company you work for has SAFETY REGULATIONS , please follow them.
After all, if you won't look after yourself who else in the world will ?

If you don't remember anything else I have to say on the subject of troubleshooting,
REMEMBER THIS!

The voltage necessary for ELECTROCUTION depends on the current flowing through the body and the duration of the current flow. Using Ohm's law, Voltage = Current × Resistance, we see that the current drawn depends on the resistance of the body. The resistance of our skin varies from person to person and fluctuates between different times of day. In general, dry skin isn't a very good conductor having a resistance of around 10,000 Ω, while skin dampened by tap water or sweat has a resistance of around 1,000 Ω. The capability of a conducting material to carry a current depends on its cross section, which is why males typically have a higher lethal current than females (10 amperes vs 9 amperes) due to a larger amount of tissue. However, death can occur from currents as low as 0.1 to 0.3 amps.

From Ohms Law we can deduce the following:

Electric Current (Amperes)	Voltage @ 10,000 ohms	Voltage @ 1,000 ohms	Maximum Power (Watts)	Physiological Effect
0.001A	10V	1V	0.01W	Threshold of feeling an electric shock
0.005A	50V	5V	0.25W	Maximum current which would be harmless
0.01 to 0.02A	100 to 200V	10 to 20V	1 to 4W	Sustained muscular contraction "Cannot let go" current
0.05A	500V	50V	25W	Ventricular interference, respiratory difficulty
0.1 to 0.3A	1,000 to 3,000V	100 to 300V	100 to 900W	Ventricular fibrillation. Can be fatal
6A	60,000V	6,000V	360,000W	Sustained ventricular contraction followed by normal heart rhythm. These are the operation parameters for a defibrillator. Temporary respiratory paralysis and possibly burns

Next week we will continue this series of articles in Part-2 by talking about the selection of the basic tools that can be used when troubleshooting an electric motor.

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