THE FUNCTION OF AN ELECTRIC MOTOR

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COMMUNIST CHINA

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FOREWORD

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[FOLLOWING IS A TRANSLATION OF AN ARTICLE WRITTEN BY CHING CHIANG IN TA KUNG PAO, PEIPING, 9 NOVEMBER 1960, PAGE 3.]

There are many types and specifications of electric motors (generally known as motors or electric rotors). If one does not know the function and characteristics of a motor, many difficulties will be encountered in selecting, using, and repairing a motor.

On the top of each electric motor, there is attached a small piece of metal, with symbols and numbers to indicate the function and characteristics of the particular motor. If one knows the meaning of these items, he will understand the basic functions.

On this small piece of metal attached to the motor, the following several principal items are generally inserted:

Three Phase Induction Electric Motor

Voltage: 220/330 volts
Current: 3.1/1.79 amperes
Power: 0.65 Kw.
Rev. min.: 1430
Frequency: 50

Let's First Discuss "Three Phase"

The electricity generated by a power plant is "three phase". The reason that it is called "three phase" is that three transmission lines carry the electricity. If the electric motor is similarly composed of three separately wound coils, which are connected with three out-going wires and which are in turn connected to three power lines, thus a circuit is completed and the motor turns. So, such a motor is called "three phase". In using a "three phase" motor, the burden of carrying the current is divided onto three wires so
that the wires can be of smaller size and the structure of
the motor can also be smaller. Most of the large- and medium-
size electric motors are made under the three phases princi-
bles. There are some motors composed of a single coil and
only two out-going wires, connecting one power line and the
other the neutral line; such a motor is called the single
phase electric motor. The smaller power electric motor does
not need the complicated three phases but just the single
phase.

Voltage Rating

Voltage rating indicates the suitable applied voltage
to the motor. In the above example, "Voltage: 24 220/380 volts"
indicates that this electric motor, if it uses different wire
connections, may be used separately for 220 or 380 voltage
source (volt is an electric unit, generally represented by V).
If the motor is connected to an electric source greater than
the specified source, it will burn out; if it is connected to
a smaller source, it will not operate.

What "Current" Indicates

On the small plate, the insertion "Current: 3.1/1.79
amperes" indicates that in using the motor, if the 220 volt
source is applied, the maximum current should not surpass
3.1 amperes, and if the 380 volt source is applied, the elec-
critic current should not surpass 1.79 amperes (this can be
measured by an ammeter). If the specified amperage is
exceeded, i.e., exceeding the current rating, and this situ-
a tion is prolonged, the motor will burn out.

What Is Power

The power of an electric motor is indicated by "horse
power". At present, most electric motors use kilowatt (or
kW) to indicate power (one kilowatt equals 1.36 horsepower.
In the above example, the motor 0.65kW is equivalent to 0.88
horsepower. As to the "revolution/minute", this means the
motor makes so many revolutions per minute. The "rev./min.: 
1430" means that this motor makes 1,430 revolutions in a minute.
The revolution speed is sometimes represented by "R.P.M.", e.g.,
"R.P.M. 1430".

What is Frequency

Frequency refers to the number of positive and negative
peaks reached by the alternating current in each second. The
current generated by the power plant has a fixed frequency. In the above example, "Frequency: 50" indicates that this motor is suitable for an alternating current that has 50 positive and negative peaks.