

TABLE 7. TYPICAL SPECIFICATIONS FOR SYNCHRONOUS MOTORS

.....Hp,RPM,Per Cent P.F.,Volts, $\left\{ \begin{smallmatrix} 2 \\ 3 \end{smallmatrix} \right\}$ Phase, $\left\{ \begin{smallmatrix} 25 \\ 60 \end{smallmatrix} \right\}$ Cycles,	
Synchronous Motors of the $\left\{ \begin{smallmatrix} Belted \\ Coupled \\ Engine \end{smallmatrix} \right\}$ Type for Driving.....	(Application)
Motor Shall be Arranged for $\left\{ \begin{smallmatrix} Horizontal \\ Vertical \end{smallmatrix} \right\}$ Operation and Shall Be Provided With	
A Type of Enclosure. Motor Shall be Capable	(Open, Splashproof, etc.)
of Developing A Starting Torque of Per Cent Full Load Torque, A Pull-In Torque of Per Cent Full Load Torque, And A Pull-Out Torque of Per Cent Full Load Torque. The Motor Field Shall Be Excited From A	
$\left\{ \begin{smallmatrix} Direct Connected Exciter \\ Belted Exciter \\ M-G Set Exciter \\ d-c Bus \end{smallmatrix} \right\}$ Which $\left\{ \begin{smallmatrix} Shall \\ Shall Not \end{smallmatrix} \right\}$ Be Included With The Motor.	

TABLE 8. TYPICAL SPECIFICATIONS FOR SINGLE PHASE MOTORS

.....Hp,RPM, $\left\{ \begin{smallmatrix} 25 \\ 60 \end{smallmatrix} \right\}$ Cycles, $\left\{ \begin{smallmatrix} 115 \\ 230 \end{smallmatrix} \right\}$ Volts, Single Phase Motor of	
the Type for Driving Motor Shall	(Capacitor, Split Phase, etc.) (Application)
Be Arranged for $\left\{ \begin{smallmatrix} Horizontal \\ Vertical \end{smallmatrix} \right\}$ Mounting And Shall Be Provided With	
a Type of Enclosure, NEMA $\left\{ \begin{smallmatrix} Class A \\ Class B \end{smallmatrix} \right\}$ Insulation, And	(Open, Splashproof, etc.)
$\left\{ \begin{smallmatrix} Ball \\ Sleeve \end{smallmatrix} \right\}$ Bearings.	

TABLE 9. TYPICAL SPECIFICATIONS FOR SQUIRREL-CAGE MOTOR CONTROL

Control for Squirrel-Cage Motors Shall Consist of An Enclosed	(Fan, Pump, etc.)
$\left\{ \begin{smallmatrix} Manual \\ Magnetic \end{smallmatrix} \right\}$ Type $\left\{ \begin{smallmatrix} Across The Line \\ Reduced Voltage \end{smallmatrix} \right\}$ Starter Providing Overload Protection And	
Low Voltage $\left\{ \begin{smallmatrix} Protection \\ Release \end{smallmatrix} \right\}$ Control Shall Include A Safety Disconnect Switch	
$\left\{ \begin{smallmatrix} Separately Mounted \\ In a Common Enclosure \end{smallmatrix} \right\}$ With the Starting Controller.	

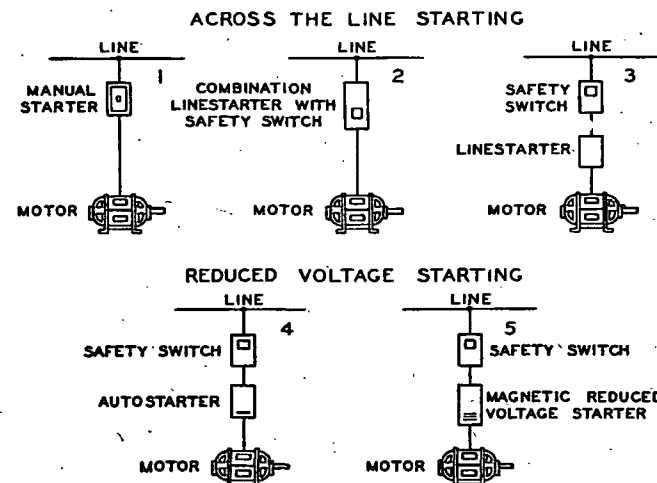
Multi-Speed control may be either manual or magnetic, and at full or reduced voltage. When using automatic magnetic control with two-, three-, and four-speed separate winding or consequent pole motors, control may be obtained from a remote point by means of a push button master switch. The various speeds of the motor are obtained from the master switch by simply depressing the correct push button. This is

known as selective speed control. It is commonly used in the smaller theater installations where the fan and motor are located backstage and the speed control is located in the lobby.

Multi-speed motor controllers may be provided with compelling relays which make it necessary for the operator to press the first speed button before regulating the motor to the desired speed. This insures that the motor is always started at low speed before adjusting to a higher speed.

Timing relays which provide for automatic acceleration may be used for control. With this feature the motor will always start at low speed and automatically accelerate to the desired speed. Decelerating relays may be used to reduce the shock effect of the braking action to the motor and drive when the speed is reduced from a higher to a lower speed.

Single Phase motor control usually consists only of a linestarter, either



Arrangements 2, 3, 4 and 5 provide automatic push-button starting.

FIG. 11. RECOMMENDED CONTROLS FOR SQUIRREL-CAGE MOTORS

manual or magnetic. In some cases it is desirable also to provide a disconnect switch. Fig. 13 illustrates the recommended controls.

Typical specifications for single phase motor control are shown in Table 12.

GEAR MOTORS

A gear motor is a self-contained combination of any type of a-c or d-c motor and an enclosed speed-reducing gear, providing a more compact and readily adaptable unit than is obtained by using a motor coupled to a gear reducer. Gear motors are available in sizes up to 75 hp with output shaft speeds from about 4 to 1430 rpm, making it possible to couple or to connect by gear or chain to nearly any machine. High speed motors are used, generally 1800 rpm on 60 cycles, thus obtaining the advantages of