MOTOR CONTROL PERFORMANCE STANDARDS

COILS

1. INRUSH VOLT AMPERES:

A magnet coil has a small impedance when initially energized and before the magnet starts to move. In order for the magnet to close, the coil must be energized with a certain number of ampere turns regardless of voltage. In other words, if a starter needs 198 Volt Amperes to close, the current would be 1.64 Amps at 120 Volts and 0.82 Amps at 240 Volts. The inrush volt amperes usually determines the required size of the control transformer.

2. HOLDING VOLT AMPERES:

The holding volt amperes at full voltage are shown in the chart. The fact that some devices require low values of inrush and holding volt amperes is not necessarily an advantage. These characteristics usually indicate small magnet forces.

3. PICK-UP VOLTAGE:

Pick-up voltage is the minimum voltage at which a starter will start closing. Since the resistance of a coil increases with temperature, the pick-up voltage should be measured when the coil is warm. This voltage should be below the UL and NEMA Standards. The NEMA Standards require that the starter can be operated at 90% of the full voltage with a control transformer, and at 85% of the full voltage without a control transformer. A "kiss" position between the full open and full close position of a magnet should be avoided or at least held to a minimum. Our starters have no damaging "kiss" position. A "kiss" is especially damaging if the pick-up voltage is close to the NEMA Standards.

4. COIL TEMPERATURE:

NEMA Standards require that coils operate satisfactorily under over-voltage conditions. An over-voltage of 10% means 10% higher inrush and holding current and, at least a 21% increase in temperature rise. All of this means increased impact during make and therefore, a shorter life of the starter. It is desirable to know the actual voltage under which the starter will operate if high life is required

MAGNETIC STARTER COIL CHARACTERISTICS

Characteristic	Size 1	Size 2	Size 3	Size 4	Size 5	U.L. Std.	NEMA Std.
3 POLES							
Inrush V.A.	198	360	790	1,400	900	—	—
Hold V.A.	24	41	57	70	10	—	—
Sealed Watts	6	10	16	20	8	—	—
Drop-out Voltage %	37%	37%	46%	55%	42%	—	—
Pick-up Voltage, warm	70%	70%	69%	69%	68%	85%	85%
Control Transf., V.A.	50	75	150	250	350	—	—
Pick-up Voltage with CPT	78%	78%	78%	78%	70%	—	—
Coil Temperature Rise (Resistance Method)	50°C	72°C	69°C	69°C	—	85°C(A) 105°C(B)	85°C(A) 105°C(B)
Insulation Class	B	B	B	B	B		
5 POLES							
Inrush V.A.	198	370	840	1,780	—	—	—
Hold V.A.	24	47	74	89	—	—	—
Sealed Watts	6	13	21	24	—	—	—
Drop-out Voltage %	37%	37%	50%	55%	—	—	—
Pick-up Voltage, warm	73%	73%	73%	75%	—	85%	85%
Control Transf., V.A.	50	100	200	300	—	—	—
Pick-up Voltage with CPT	78%	78%	78%	78%	—	—	—
Coil Temperature Rise (Resistance Method)	50°C	84°C	83°C	85°C	—	85°C(A) 105°C(B)	85°C(A) 105°C(B)
Insulation Class	B	B	B	B	—		

COIL CHARACTERISTICS FOR OTHER DEVICES

Characteristic	Class J10**	Class J11**	Class J13**	Class A12 & A14
Inrush V.A.	130	—	160	—
Hold V.A.	15	—	5	—
Sealed Watts	5	—	5	—
Drop-out Voltage %	50—65%	—	20—40%	—
Pick-up Voltage, warm	70—75%	—	60—75%	—
Latching V.A.	—	210	—	*
Unlatching V.A.	—	200	—	200
Coil Temperature Rise (Resistance Method)	52°C	—	45°C	—
Insulation Class	B	B	B	B

* Same as in table for Magnetic Starter—5 poles, Inrush V.A.
** These values are the same, irrespective of the number of poles.