

**APPENDIX 5A. CONSTRUCTION AND PERFORMANCE SPECIFICATIONS OF  
SMALL ELECTRIC MOTORS DESIGNED FOR THE ENGINEERING ANALYSIS**

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Foreword: This appendix provides design information on one electric motor design from each of the four representative equipment classes analyzed in the engineering analysis. Information on the engineering analysis and inputs used to prepare these designs can be found in preliminary TSD chapter 5.

## 5A.1 POLYPHASE, 1 HP, 4 POLE, 56 FRAME MOTOR

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### 5A.1.1 Stator Dimensions

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Lamination Steel Type	Armco-M19
Length of the Stator Stack	3.0000 inches
Stacking Factor of the Stator	0.9800
Stator Slot Insulation Thickness	0.0100 inch
Number of Stator Poles	4 Poles
Outside Diameter of the Stator	6.1500 inches
Number of Stator Slots	24
Inside Diameter of the Stator	2.8710 inches
Thickness of mid slot separator	0.0000 inch
Stator Slot Width Next to Gap	0.1500 inch
Stator Slot Width at Bottom of Slot	0.3350 inch
Depth of Main Trapezoidal Part;	1.0000 inch
Depth of Slot Mouth	0.0230 inch
Stator Slot Opening	0.1000 inch
Depth of Tooth Tip	0.0300 inch
Total Depth of Stator Slot	1.0500 inches

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### 5A.1.2 Rotor Dimensions

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Shaft Material	Magnetic
Outside Diameter of the Rotor	2.8400 inches
Inside Diameter of the Rotor	0.5000 inch
Length of the Rotor Stack	3.0000 inches
Stacking Factor of the Rotor	0.9800

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### 5A.1.3 Rotor Slot Dimensions

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Slot Shape	Closed Bridge, Trap w/ Round Bottom
Depth of Rotor Slot Opening	0.0000 inch
Width at Top of Rotor Slot	0.0500 inch
Width at Bottom of Rotor Slot	0.0500 inch
Depth of Main Trapezoidal Part	0.4750 inch
Depth of Slot Mouth	0.0200 inch
Depth of Bridge	0.0200 inch
Total Depth of Rotor Slot	0.5700 inch
Number of Rotor Slots	36 slots

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5A.1.4 *Ring and Coil Data*

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Inside Diameter of Ring 1	1.5000 inches
Outside Diameter of Ring 1	2.8000 inches
Axial Thickness at Outside of Ring 1	1.1000 inches
Axial Thickness at Inside of Ring 1	1.1000 inches
Inside Diameter of Ring 2	1.7000 inches
Outside Diameter of Ring 2	2.8000 inches
Axial Thickness at Outside of Ring 2	1.1000 inches
Axial Thickness at Inside of Ring 2	1.1000 inches
Conductivity of the Rotor Bar Material	0.5700
Conductivity of the End Ring Material	0.5700

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5A.1.5 *Electrical Data*

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Wire Insulation Type Heavy	
Terminal Voltage	230.00 Volts
Turns per Coil in Slot 1	30 Turns
Turns per Coil in Slot 2	25 Turns
Winding Wire Size	19.0 AWG
Freq Line Frequency	60.0 Hz
Rotor Skew	1.50 bars
Winding Operating Temperature	100.00 deg C
Friction & Windage Loss at Idle Speed	10.0000 Watts
Stray Load Loss	1.0 %
Wire Stretch Factor	1.040

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5A.1.6 *Load Speed and Slip Information*

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Load Speed Specified Load Speed	1766.0 RPM
Minimum Load Speed	0.0 RPM
Speed Increment	5.0 RPM

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5A.1.7 *No Load Performance*

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Synchronous Speed	1800.0 RPM
Actual No Load Speed	1798.9 RPM
Actual No Load Phase Current	3.13 Amps
No Load Phase Winding Current Density	1543.69 Amps/sq. in

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5A.1.8 *Locked Rotor Data*

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Locked Rotor Torque	125.20 oz-ft
Locked Rotor Phase Current	17.499 Amps
Locked Rotor Phase Current Density	8643.95 A/sq. in.

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5A.1.9 *Breakdown Load Parameters*

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Break Down Speed	1099.4 RPM
Break Down Torque	177.19 oz-ft
Break Down Current	13.16 Amps
Break Down Output Power	1729.1 Watts
Break Down Output Power	2.3179 Hp
Break Down Efficiency	49.4 %
Break Down Power Factor	66.823
Break Down Input Power	3502.7 Watts
Phase Current Density at Break Down	6499.50 A/sq. in.

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5A.1.10 *Reactance Values*

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Primary Slot Leakage	1.7643 Ohms
Secondary Slot Leakage	2.1573 Ohms
End Leakage	0.4189 Ohm
Skew Leakage	0.4032 Ohm
Zig Zag Leakage	0.7289 Ohm
Belt Leakage	0.1392 Ohm
Primary Leakage Reactance	3.4544 Ohms
Rotor Leakage	3.4781 Ohms
Magnetizing Reactance	39.0054 Ohms

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5A.1.11 *Winding Information*

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Hot Rotor Resistance	2.6236 Ohms
Rotor Resistance Ratio	0.3784
Cold Winding Resistance	0.9368
Hot Winding Resistance	1.2071 Ohms
Winding Distribution Factor	0.848
Total Winding Conductors per Phase	440.00 Conductors
Effective Winding Conductors per Phase	373.2 Conductors
Slot 1 % Fill	34.21 %
Slot 2 % Fill	28.51 %
Slot 3 % Fill	0.00 %
Slot 4 % Fill	0.00 %
Slot 5 % Fill	0.00 %
Slot 6 % Fill	0.00 %
Slot 7 % Fill	0.00 %
Slot 8 % Fill	0.00 %
Total Weight of the Copper	5.4817 lbs
Electrical Area of One Rotor Bar	0.0247 sq. in.
Electrical Area of All Rotor Bars	0.8903 sq. in.
Weight of Stator Steel	0.0000 lbs
Weight of Rotor Steel	0.0000 lbs
Weight of Stator and Rotor Steel	0.0000 lbs
Weight of Rotor Aluminum	1.1742 lbs

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5A.1.12 *Magnetic Circuit Data*

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Magnetic Length of Air Gap	0.0190 inch
Total Air Gap Flux per Pole	239.4 kilolines
Flux Density in Air Gap	51.5 Klines/in <sup>2</sup>
Flux Density in Stator Yoke	65.4 Klines/in <sup>2</sup>
Flux Density in Stator Teeth	80.4 Klines/in <sup>2</sup>
Flux Density in Rotor Yoke	60.8 Klines/in <sup>2</sup>
Flux Density in Rotor Teeth	95.2 Klines/in <sup>2</sup>
MMF Drop in Air Gap	306.8 A-T
MMF Drop in Stator Yoke	3.8 A-T
MMF Drop in Rotor Yoke	0.7 A-T
MMF Drop in Stator Teeth	6.7 A-T
MMF Drop in Rotor Teeth	25.1 A-T
Total MMF Drop	343.1 A-T

## 5A.2 CAPACITOR-START INDUCTION-RUN ½ HP, 4 POLE, 56 FRAME MOTOR

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### 5A.2.1 Stator Dimensions

---

Lamination Steel Type	Armco-M19
Length of the Stator Stack	2.6000 inches
Stacking Factor of the Stator	0.9800
Stator Slot Insulation Thickness	0.0100 inch
Number of Stator Poles	4 Poles
Outside Diameter of the Stator	6.1500 inches
Number of Stator Slots	24
Inside Diameter of the Stator	2.8710 inches
Thickness of mid slot separator	0.0000 inch
Stator Slot Width Next to Gap	0.1500 inch
Stator Slot Width at Bottom of Slot	0.3350 inch
Depth of Main Trapezoidal Part;	1.0000 inch
Depth of Slot Mouth	0.0230 inch
Stator Slot Opening	0.1000 inch
Depth of Tooth Tip	0.0300 inch
Total Depth of Stator Slot	1.0500 inches

---

### 5A.2.2 Rotor Dimensions

---

Shaft Material	Magnetic
Outside Diameter of the Rotor	2.8400 inches
Inside Diameter of the Rotor	0.5000 inch
Length of the Rotor Stack	2.6000 inches
Stacking Factor of the Rotor	0.9800

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### 5A.2.3 Rotor Slot Dimensions

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Slot Shape	Closed Bridge, Trap w/ Round Bottom
Depth of Rotor Slot Opening	0.0000 inch
Width at Top of Rotor Slot	0.1000 inch
Width at Bottom of Rotor Slot	0.0500 inch
Depth of Main Trapezoidal Part	0.2750 inch
Depth of Slot Mouth	0.0500 inch
Depth of Bridge	0.0200 inch
Total Depth of Rotor Slot	0.3700 inch
Number of Rotor Slots	36 slots

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#### 5A.2.4 *Ring and Coil Data*

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Inside Diameter of Ring 1	1.7000 inches
Outside Diameter of Ring 1	2.8000 inches
Axial Thickness at Outside of Ring 1	1.1000 inches
Axial Thickness at Inside of Ring 1	1.1000 inches
Inside Diameter of Ring 2	1.7000 inches
Outside Diameter of Ring 2	2.8000 inches
Axial Thickness at Outside of Ring 2	1.1000 inches
Axial Thickness at Inside of Ring 2	1.1000 inches
Conductivity of the Rotor Bar Material	0.5700
Conductivity of the End Ring Material	0.5700

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#### 5A.2.5 *Electrical Data*

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Wire Insulation Type	Heavy
Terminal Voltage	115.00 Volts
Turns per Coil in Main Slot	1 65 Turns
Turns per Coil in Main Slot	2 49 Turns
Main Winding Wire Size	19.0 AWG
Turns per Coil in Aux. Slot 1	52 Turns
Turns per Coil in Aux. Slot 2	37 Turns
Auxiliary Wire Size	19.5 AWG
Running Capacitance	0.0000 mfd
Starting Capacitance	300.0000 mfd
Line Frequency	60.0 Hz
Rotor Skew	1.50 bar
Winding Operating Temperature	90.00 deg C
Friction & Windage Loss at Idle Speed	10.0000 Watts
Stray Load Loss	1.0 %
Wire Stretch Factor	1.040

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#### 5A.2.6 *Load Speed and Slip Information*

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Specified Load Speed	1727.0 RPM
Minimum Load Speed	0.0 RPM
Speed Increment	5.0 RPM

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5A.2.7 *No Load Performance*

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Synchronous Speed	1800.0 RPM
Actual No Load Speed	1796.4 RPM
Actual No Load Line Current	6.83 Amps
No Load Main Winding Current Density	1686.68 Amps/sq. in
No Load Aux. Winding Current Density	0.00 Amps/sq. in

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5A.2.8 *Locked Rotor Data*

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Locked Rotor Torque	87.08 oz-ft
Locked Rotor Line Current	37.500 Amps
Locked Rotor Main Current Density	6579.06 A/sq. in.
Locked Rotor Aux. Current Density	17444.66 A/sq. in.

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5A.2.9 *Breakdown Parameters*

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Break Down Speed	1479.6 RPM
Break Down Torque	59.27 oz-ft
Break Down Current	18.16 Amps
Break Down Output Power	778.4 Watts
Break Down Output Power	1.0434 Hp
Break Down Efficiency	55.7 %
Break Down Power Factor	0.666
Break Down Input Power	1397.3 Watts
Main Current Density at Break Down	4484.81 A/sq. in.
Aux. Current Density at Break Down	0.00 A/sq. in.

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5A.2.10 *Reactance Values*

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Primary Slot Leakage	1.1444 Ohms
Secondary Slot Leakage	0.7143 Ohm
End Leakage	0.3083 Ohm
Skew Leakage	0.6312 Ohm
Zig Zag Leakage	0.9370 Ohm
Belt Leakage	0.1956 Ohm
Main Winding Leakage Reactance	2.3346 Ohms
Rotor Leakage Referred to Main	1.5962 Ohms
Auxiliary Winding Leakage Reactance	5.7896 Ohms
Magnetizing Reactance of Main Winding	27.4071 Ohms

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5A.2.11 *Winding Information*

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Hot Rotor Resistance	1.3986 Ohms
Rotor Resistance Ratio	0.3558
Cold Auxiliary Resistance	3.3111 inches
Cold Main Winding Resistance	0.4737
Hot Main Winding Resistance	0.5922 Ohm
Hot Aux. Winding Resistance	4.1392 Ohms
Main Winding Distribution Factor	0.855
Aux. Winding Distribution Factor	0.858
Total Main Winding Conductors	456.00 Conductors
Total Aux. Winding Conductors	712.00 Conductors
Effective Main Winding Conductors	389.7 Conductors
Effective Aux. Winding Conductors	611.1 Conductors
Turns Ratio	1.57
Slot 1 % Fill	74.12 %
Slot 2 % Fill	74.95 %
Slot 3 % Fill	26.80 %
Slot 4 % Fill	0.00 %
Slot 5 % Fill	0.00 %
Slot 6 % Fill	0.00 %
Slot 7 % Fill	0.00 %
Slot 8 % Fill	0.00 %
Total Weight of the Main Winding	3.7776 lbs
Total Weight of the Aux. Winding	1.3276 lbs
Electrical Area of One Rotor Bar	0.0256 sq. in.
Electrical Area of All Rotor Bars	0.9225 sq. in.
Weight of Stator Steel	11.9719 lbs
Weight of Rotor Steel	3.8538 lbs
Weight of Stator and Rotor Steel	15.8257 lbs
Weight of Rotor Aluminum	1.0910 lbs

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5A.2.12 *Magnetic Circuit Data*

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Magnetic Length of Air Gap	0.0182 inch
Total Air Gap Flux per Pole	214.7 kilolines
Flux Density in Air Gap	47.856 KLines/in <sup>2</sup>
Flux Density in Stator Yoke	67.615 KLines/in <sup>2</sup>
Flux Density in Stator Teeth	83.141 KLines/in <sup>2</sup>
Flux Density in Rotor Yoke	43.304 KLines/in <sup>2</sup>
Flux Density in Rotor Teeth	89.285 KLines/in <sup>2</sup>
MMF Drop in Air Gap	273.1 A-T
MMF Drop in Stator Yoke	4.2 A-T
MMF Drop in Rotor Yoke	0.6 A-T
MMF Drop in Statot Teeth	9.0 A-T
MMF Drop in Rotor Teeth	4.8 A-T
Total MMF Drop	291.7 A-T

### 5A.3 CAPACITOR-START INDUCTION-RUN ½ HP, 4 POLE, 48 FRAME MOTOR

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#### 5A.3.1 Stator Dimensions

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Lamination Steel Type	M 19
Length of the Stator Stack	3.0000 inches
Stacking Factor of the Stator	0.9800
Stator Slot Insulation Thickness	0.0100 inches
Number of Stator Poles	4 Poles
Outside Diameter of the Stator	5.2390 inches
Number of Stator Slots	24
Inside Diameter of the Stator	2.7450 inches
Thickness of mid slot separator	0.0000 inch
Stator Slot Width Next to Gap	0.1500 inch
Stator Slot Width at Bottom of Slot	0.3300 inch
Depth of Main Trapezoidal Part;	0.7150 inch
Depth of Slot Mouth	0.0200 inch
Stator Slot Opening	0.1000 inch
Depth of Tooth Tip	0.0300 inch
Total Depth of Stator Slot	0.7750 inch

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#### 5A.3.2 Rotor Dimensions

---

Shaft Material	Magnetic
Outside Diameter of the Rotor	2.7150 inches
Inside Diameter of the Rotor	0.7350 inch
Length of the Rotor Stack	3.0000 inches
Stacking Factor of the Rotor	0.9800

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#### 5A.3.3 Rotor Slot Dimensions

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Slot Shape	Closed Bridge, Trap w/ Round Bottom
Depth of Rotor Slot Opening	0.0000 inch
Width at Top of Rotor Slot	0.1060 inch
Width at Bottom of Rotor Slot	0.0580 inch
Depth of Main Trapezoidal Part	0.3400 inch
Depth of Slot Mouth	0.0500 inch
Depth of Bridge	0.0300 inch
Total Depth of Rotor Slot	0.3950 inch
Number of Rotor Slots	36 slots

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#### 5A.3.4 *Ring and Coil Data*

---

Inside Diameter of Ring 1	1.6150 inches
Outside Diameter of Ring 1	2.5500 inches
Axial Thickness at Outside of Ring 1	0.7500 inch
Axial Thickness at Inside of Ring 1	0.7500 inch
Inside Diameter of Ring 2	1.6150 inches
Outside Diameter of Ring 2	2.5600 inches
Axial Thickness at Outside of Ring 2	0.3150 inch
Axial Thickness at Inside of Ring 2	0.3150 inch
Conductivity of the Rotor Bar Material	0.5700
Conductivity of the End Ring Material	0.5700

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#### 5A.3.5 *Electrical Data*

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Wire Insulation Type	Heavy
Terminal Voltage	115.00 Volts
Turns per Coil in Main Slot 1	65 Turns
Turns per Coil in Main Slot 2	46 Turns
Main Winding Wire Size	20.5 AWG
Turns per Coil in Aux. Slot	1 45 Turns
Turns per Coil in Aux. Slot	2 28 Turns
Auxiliary Wire Size	20.0 AWG
Running Capacitance	0.0000 mfd
Starting Capacitance	300.0000 mfd
Line Frequency	60.0 Hz
Rotor Skew	1.50 bar
Winding Operating Temperature	100.00 deg C
Friction & Windage Loss at Idle Speed	6.0000 Watts
Stray Load Loss	1.0 %
Wire Stretch Factor	1.030

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#### 5A.3.6 *Load Speed and Slip Information*

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Specified Load Speed	1738.0 RPM
Minimum Load Speed	0.0 RPM
Speed Increment	5.0 RPM

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5A.3.7 *No Load Performance*

---

Synchronous Speed	1800.0 RPM
Actual No Load Speed	1796.4 RPM
Actual No Load Line Current	6.78 Amps
No Load Main Winding Current Density	2351.14 Amps/sq. in
No Load Aux. Winding Current Density	0.00 Amps/sq. in

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5A.3.8 *Locked Rotor Data*

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Locked Rotor Torque	90.12 oz-ft
Locked Rotor Line Current	34.358 Amps
Locked Rotor Main Current Density	9113.71 A/sq. in.
Locked Rotor Aux. Current Density	22469.09 A/sq. in.

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5A.3.9 *Breakdown Parameters*

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Break Down Speed	1501.2 RPM
Break Down Torque	57.45 oz-ft
Break Down Current	17.71 Amps
Break Down Output Power	765.5 Watts
Break Down Output Power	1.0261 Hp
Break Down Efficiency	54.4 %
Break Down Power Factor	0.687
Break Down Input Power	1405.9 Watts
Main Current Density at Break Down	6141.36 A/sq. in.
Aux. Current Density at Break Down	0.00 A/sq. in.

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5A.3.10 *Reactance Values*

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Primary Slot Leakage	0.9866 Ohm
Secondary Slot Leakage	0.8400 Ohm
End Leakage	0.2670 Ohm
Skew Leakage	0.6397 Ohm
Zig Zag Leakage	1.0043 Ohms
Belt Leakage	0.1982 Ohm
Main Winding Leakage Reactance	2.1747 Ohms
Rotor Leakage Referred to Main	1.7610 Ohms
Auxiliary Winding Leakage Reactance	3.9043 Ohms
Magnetizing Reactance of Main Winding	27.7764 Ohms

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5A.3.11 *Winding Information*

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Hot Rotor Resistance	1.3256 Ohms
Rotor Resistance Ratio	0.3368
Cold Auxiliary Resistance	3.0958 inches
Cold Main Winding Resistance	0.6515
Hot Main Winding Resistance	0.8396 Ohm
Hot Aux. Winding Resistance	3.9892 Ohms
Main Winding Distribution Factor	0.859
Aux. Winding Distribution Factor	0.867
Total Main Winding Conductors	444.00 Conductors
Aux. Winding Conductors	584.00 Conductors
Effective Main Winding Conductors	381.2 Conductors
Effective Aux. Winding Conductors	506.1 Conductors
Turns Ratio	1.33
Slot 1 % Fill	72.20 %
Slot 2 % Fill	68.30 %
Slot 3 % Fill	27.64 %
Slot 4 % Fill	0.00 %
Slot 5 % Fill	0.00 %
Slot 6 % Fill	0.00 %
Slot 7 % Fill	0.00 %
Slot 8 % Fill	0.00 %
Total Weight of the Main Winding	2.6364 lbs
Total Weight of the Aux. Winding	0.9740 lb
Electrical Area of One Rotor Bar	0.0332 sq. in.
Electrical Area of All Rotor Bars	1.1945 sq. in.
Weight of Stator Steel	8.8286 lbs
Weight of Rotor Steel	3.5400 lbs
Weight of Stator and Rotor Steel	12.3686 lbs
Weight of Rotor Aluminum	0.6880 lb

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5A.3.12 *Magnetic Circuit Data*

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Magnetic Length of Air Gap	0.0178 inch
Total Air Gap Flux per Pole	219.4 kilolines
Flux Density in Air Gap	44.5 Klines/in <sup>2</sup>
Flux Density in Stator Yoke	73.9 Klines/in <sup>2</sup>
Flux Density in Stator Teeth	86.9 Klines/in <sup>2</sup>
Flux Density in Rotor Yoke	51.6 Klines/in <sup>2</sup>
Flux Density in Rotor Teeth	98.9 Klines/in <sup>2</sup>
MMF Drop in Air Gap	248.6 A-T
MMF Drop in Stator Yoke	7.2 A-T
MMF Drop in Rotor Yoke	0.6 A-T
MMF Drop in Statot Teeth	6.9 A-T
MMF Drop in Rotor Teeth	19.4 A-T
Total MMF Drop	282.7 A-T

## 5A.4 CAPACITOR-START CAPACITOR-RUN ¾ HP, 4 POLE, 56 FRAME MOTOR

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### 5A.4.1 Stator Dimensions

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Lamination Steel Type	M 19
Length of the Stator Stack	3.1000 inches
Stacking Factor of the Stator	0.9800
Stator Slot Insulation Thickness	0.0100 inch
Number of Stator Poles	4 Poles
Outside Diameter of the Stator	6.1500 inches
Number of Stator Slots	24
Inside Diameter of the Stator	2.8710 inches
Thickness of mid slot separator	0.0000 inch
Stator Slot Width Next to Gap	0.1500 inch
Stator Slot Width at Bottom of Slot	0.3350 inch
Depth of Main Trapezoidal Part;	1.0000 inch
Depth of Slot Mouth	0.0230 inch
Stator Slot Opening	0.1000 inch
Depth of Tooth Tip	0.0300 inch
Total Depth of Stator Slot	1.0500 inches

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### 5A.4.2 Rotor Dimensions

---

Shaft Material	Magnetic
Outside Diameter of the Rotor	2.8400 inches
Inside Diameter of the Rotor	0.5000 inch
Length of the Rotor Stack	3.1000 inches
Stacking Factor of the Rotor	0.9800

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### 5A.4.3 Rotors Slot Dimensions

---

Slot Shape	Closed Bridge, Trap w/ Round Bottom
Depth of Rotor Slot Opening	0.0000 inch
Width at Top of Rotor Slot	0.1000 inch
Width at Bottom of Rotor Slot	0.0500 inch
Depth of Main Trapezoidal Part	0.2750 inch
Depth of Slot Mouth	0.0500 inch
Depth of Bridge	0.0200 inch
Total Depth of Rotor Slot	0.3700 inch
Number of Rotor Slots	36 slots

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#### 5A.4.4 *Ring and Coil Data*

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Inside Diameter of Ring 1	1.7000 inches
Outside Diameter of Ring 1	2.8000 inches
Axial Thickness at Outside of Ring 1	1.1000 inches
Axial Thickness at Inside of Ring 1	1.1000 inches
Inside Diameter of Ring 2	1.7000 inches
Outside Diameter of Ring 2	2.8000 inches
Axial Thickness at Outside of Ring 2	1.1000 inches
Axial Thickness at Inside of Ring 2	1.1000 inches
Conductivity of the Rotor Bar Material	0.5700
Conductivity of the End Ring Material	0.5700

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#### 5A.4.5 *Electrical Data*

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Wire Insulation Type	Heavy
Terminal Voltage	115.00 Volts
Turns per Coil in Main Slot 1	54 Turns
Turns per Coil in Main Slot 2	39 Turns
Main Winding Wire Size	19.0 AWG
Turns per Coil in Aux. Slot 1	30 Turns
Turns per Coil in Aux. Slot 2	25 Turns
Auxiliary Wire Size	21.5 AWG
Running Capacitance	50.0000 mfd
Starting Capacitance	400.0000 mfd
Line Frequency	60.0 Hz
Rotor Skew	1.50 bar
Winding Operating Temperature	100.00 deg C
Friction & Windage Loss at Idle Speed	10.0000 Watts
Stray Load Loss	1.0 %
Wire Stretch Factor	1.040

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#### 5A.4.6 *Load Speed and Slip Information*

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Specified Load Speed	1735.0 RPM
Minimum Load Speed	0.0 RPM
Speed Increment	10.0 RPM

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5A.4.7 *No Load Performance*

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Synchronous Speed	1800.0 RPM
Actual No Load Speed	1796.4 RPM
Actual No Load Line Current	4.28 Amps
No Load Main Winding Current Density	1682.56 A/sq. in.
No Load Aux. Winding Current Density	3028.11 A/sq. in.

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5A.4.8 *Locked Rotor Data*

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Locked Rotor Torque	126.70 oz-ft
Locked Rotor Line Current	39.677 Amps
Locked Rotor Main Current Density	8255.61 A/sq. in.
Locked Rotor Aux. Current Density	22881.65 A/sq. in.

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5A.4.9 *Breakdown Load Parameters*

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Break Down Speed	1486.8 RPM
Break Down Torque	85.83 oz-ft
Break Down Current	21.08 Amps
Break Down Output Power	1132.7 Watts
Break Down Output Power	1.5183 Hp
Break Down Efficiency	61.2 %
Break Down Power Factor	0.763
Break Down Input Power	1849.7 Watts
Main Current Density at Break Down	5216.63 A/sq. in.
Aux. Current Density at Break Down	1809.46 A/sq. in.

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5A.4.10 *Reactance Values*

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Primary Slot Leakage	0.9137 Ohm
Secondary Slot Leakage	0.5704 Ohm
End Leakage	0.2075 Ohm
Skew Leakage	0.4944 Ohm
Zig Zag Leakage	0.7483 Ohm
Belt Leakage	0.1532 Ohm
Main Winding Leakage Reactance	1.8192 Ohms
Rotor Leakage Referred to Main	1.2683 Ohms
Auxiliary Winding Leakage Reactance	2.4386 Ohms
Magnetizing Reactance of Main Winding	21.4686 Ohms

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5A.4.11 *Winding Information*

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Hot Rotor Resistance	1.1392 Ohms
Rotor Resistance Ratio	0.3690
Cold Auxiliary Resistance	1.7571 inches
Cold Main Winding Resistance	0.4207
Hot Main Winding Resistance	0.5421 Ohm
Hot Aux. Winding Resistance	2.2642 Ohms
Main Winding Distribution Factor	0.857
Aux. Winding Distribution Factor	0.848
Total Main Winding Conductors	372.00 Conductors
Total Aux. Winding Conductors	440.00 Conductors
Effective Main Winding Conductors	318.9 Conductors
Effective Aux. Winding Conductors	373.2 Conductors
Turns Ratio	1.17
Slot 1 % Fill	61.58 %
Slot 2 % Fill	61.01 %
Slot 3 % Fill	19.85 %
Slot 4 % Fill	0.00 %
Slot 5 % Fill	0.00 %
Slot 6 % Fill	0.00 %
Slot 7 % Fill	0.00 %
Slot 8 % Fill	0.00 %
Total Weight of the Main Winding	3.3546 lbs
Total Weight of the Aux. Winding	1.1042 lbs
Electrical Area of One Rotor Bar	0.0256 sq. in.
Electrical Area of All Rotor Bars	0.9225 sq. in.
Weight of Stator Steel	14.2742 lbs
Weight of Rotor Steel	4.5949 lbs
Weight of Stator and Rotor Steel	18.8691 lbs
Weight of Rotor Aluminum	1.1368 lbs

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5A.4.12 *Magnetic Circuit Data*

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Magnetic Length of Air Gap	0.0182 inch
Total Air Gap Flux per Pole	262.3 kilolines
Flux Density in Air Gap	50.6 Klines/in <sup>2</sup>
Flux Density in Stator Yoke	69.3 Klines/in <sup>2</sup>
Flux Density in Stator Teeth	85.2 Klines/in <sup>2</sup>
Flux Density in Rotor Yoke	45.7 Klines/in <sup>2</sup>
Flux Density in Rotor Teeth	94.3 Klines/in <sup>2</sup>
MMF Drop in Air Gap	288.5 A-T
MMF Drop in Stator Yoke	6.6 A-T
MMF Drop in Rotor Yoke	0.5 A-T
MMF Drop in Statot Teeth	9.1 A-T
MMF Drop in Rotor Teeth	9.4 A-T
Total MMF Drop	314.1 A-T