

**DATA SHEET****Three Phase Induction Motor - Squirrel Cage**

Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15832534

Frame	: 160L	Cooling method	: IC411 - TEFC
Insulation class	: F	Mounting	: B3T
Duty cycle	: S1	Rotation <sup>1</sup>	: Both
Ambient temperature	: -20 °C to +40 °C	Starting method	: Direct On Line
Altitude	: 1000 m.a.s.l	Approx. weight <sup>2</sup>	: 135 kg
Protection degree	: IP55	Moment of inertia (J)	: 0.0663 kgm <sup>2</sup>
Design	: N		

Output	18.5 kW	18.5 kW	18.5 kW
Poles	2	2	2
Frequency	50 Hz	50 Hz	50 Hz
Rated voltage	380/660 V	400/690 V	415 V
Rated current	34.6/19.9 A	34.0/19.7 A	33.6 A
L. R. Amperes	277/159 A	289/168 A	302 A
LRC	8.0	8.5	9.0
No load current	12.0/6.91 A	13.5/7.83 A	14.0 A
Rated speed	2950 rpm	2955 rpm	2960 rpm
Slip	1.67 %	1.50 %	1.33 %
Rated torque	59.9 Nm	59.8 Nm	59.7 Nm
Locked rotor torque	280 %	310 %	340 %
Pull up torque	235 %	260 %	285 %
Breakdown torque	330 %	370 %	410 %
Service factor	1.00	1.00	1.00
Noise level <sup>2</sup>	67.0 dB(A)	67.0 dB(A)	67.0 dB(A)
Locked rotor time (hot)	7 s	7 s	6 s
Locked rotor time (cold)	13 s	13 s	11 s
Efficiency (%)	50%	92.0	91.0
	75%	92.3	92.2
	100%	92.4	92.4
Power Factor	50%	0.74	0.64
	75%	0.83	0.77
	100%	0.88	0.83

Bearing type	Drive end	Non drive end	Foundation loads
	6309-C3	6209-C3	
Lubrication interval	20000 h	20000 h	Max. compression : 4518 N
Lubricant amount	13 g	9 g	Load type :-
Lubricant type	MOBIL POLYREX EM		Load torque :-
			Load inertia (J=GD <sup>2</sup> /4) :-

Notes  
See notes on page 2.

This revision replaces and cancel the previous one, which must be eliminated.

- (1) Looking the motor from the shaft end.
- (2) Measured at 1m and with tolerance of +3dB(A).
- (3) Approximate weight, subject to be changed after manufacturing process.
- (4) At 100% of full load.

These are average values based on tests with sinusoidal power supply, subject to the tolerances stipulated in IEC 60034-1.

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### Thermal protection

ID	Application	Type	Quantity	Sensing Temperature
1	Winding	Thermistor - 2 wires	1 x Phase	155°C

Space heater information  
Voltage: 110-127/200-240 V  
Output: 25-33/25-35 W

### Notes

Standards	Specification : IEC 60034-1	Vibration : IEC 60034-14
	Test : IEC 60034-2	Tolerance : IEC 60034-1
	Noise : IEC 60034-9	

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(3) Approximate weight, subject to be changed after manufacturing process.  
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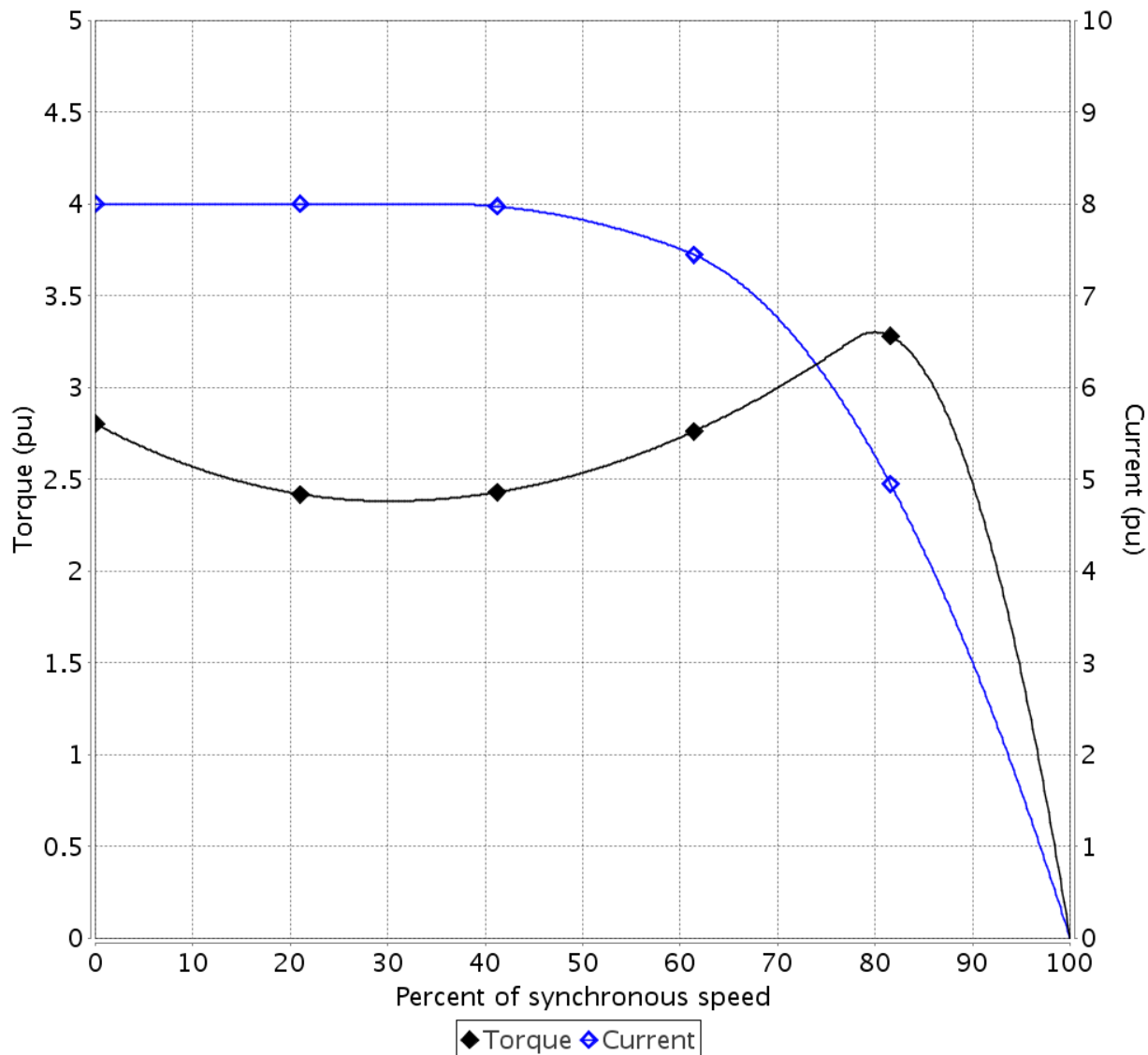
# TORQUE AND CURRENT VS SPEED CURVE

## Three Phase Induction Motor - Squirrel Cage



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Performance : 18.5 kW 380/660 V 50 Hz 2P 160L

Rated current	: 34.6/19.9 A	Moment of inertia (J)	: 0.0663 kgm <sup>2</sup>
LRC	: 8.0	Duty cycle	: S1
Rated torque	: 59.9 Nm	Insulation class	: F
Locked rotor torque	: 280 %	Service factor	: 1.00
Breakdown torque	: 330 %	Temperature rise	: 80 K
Rated speed	: 2950 rpm	Design	: N

Locked rotor time 100% : 7 s (hot) 13 s (cold)

Load inertia (J=GD<sup>2</sup>/4) : 0.0663 kgm<sup>2</sup>

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# THERMAL LIMIT CURVE

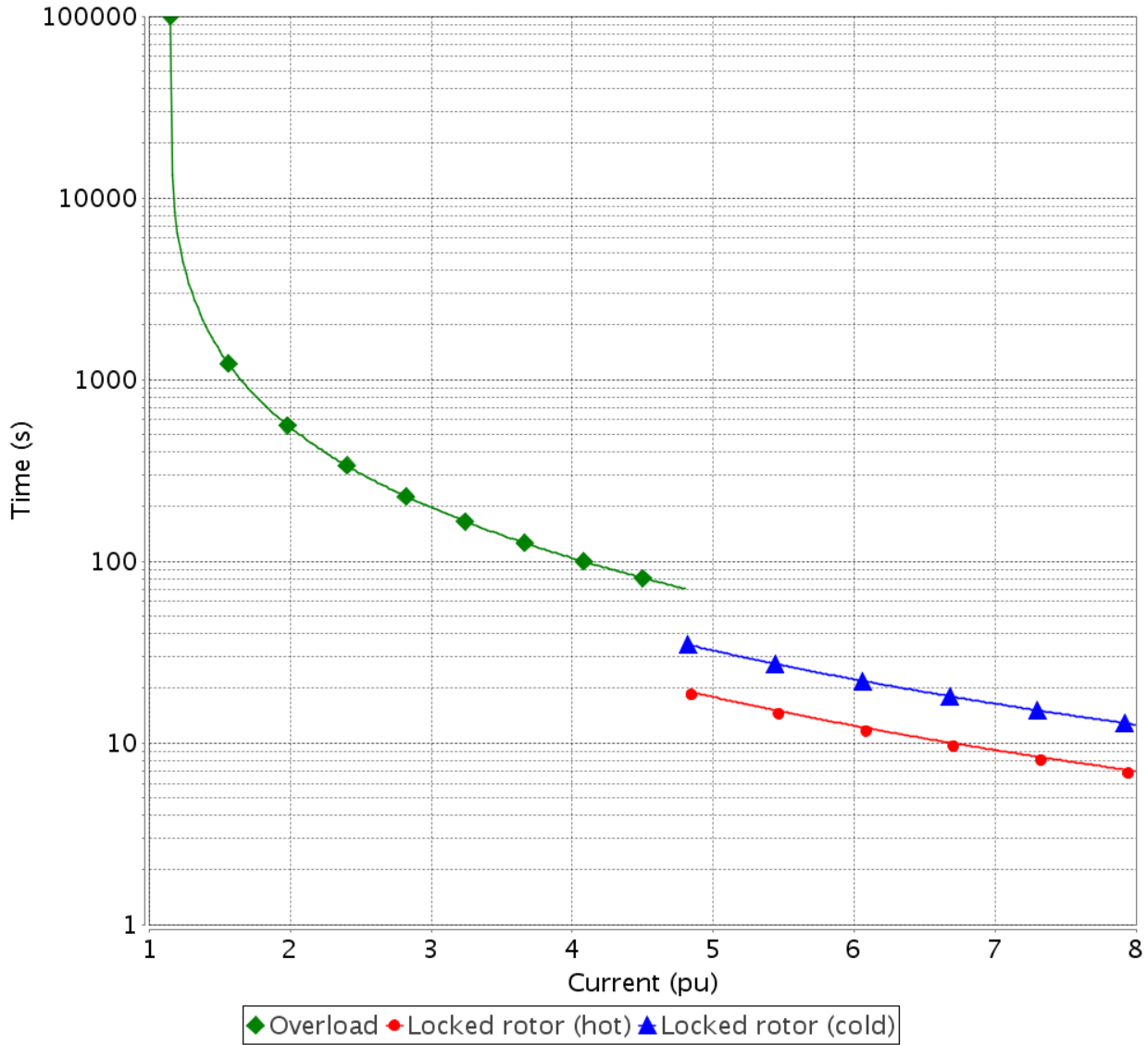
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Product code : 15832534



Performance : 18.5 kW 380/660 V 50 Hz 2P 160L

Rated current : 34.6/19.9 A

Moment of inertia (J) : 0.0663 kgm<sup>2</sup>

LRC : 8.0

Duty cycle : S1

Rated torque : 59.9 Nm

Insulation class : F

Locked rotor torque : 280 %

Service factor : 1.00

Breakdown torque : 330 %

Temperature rise : 80 K

Rated speed : 2950 rpm

Design : N

Heating constant : 26.4 min

Cooling constant : 79.2 min

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# LOAD PERFORMANCE CURVE

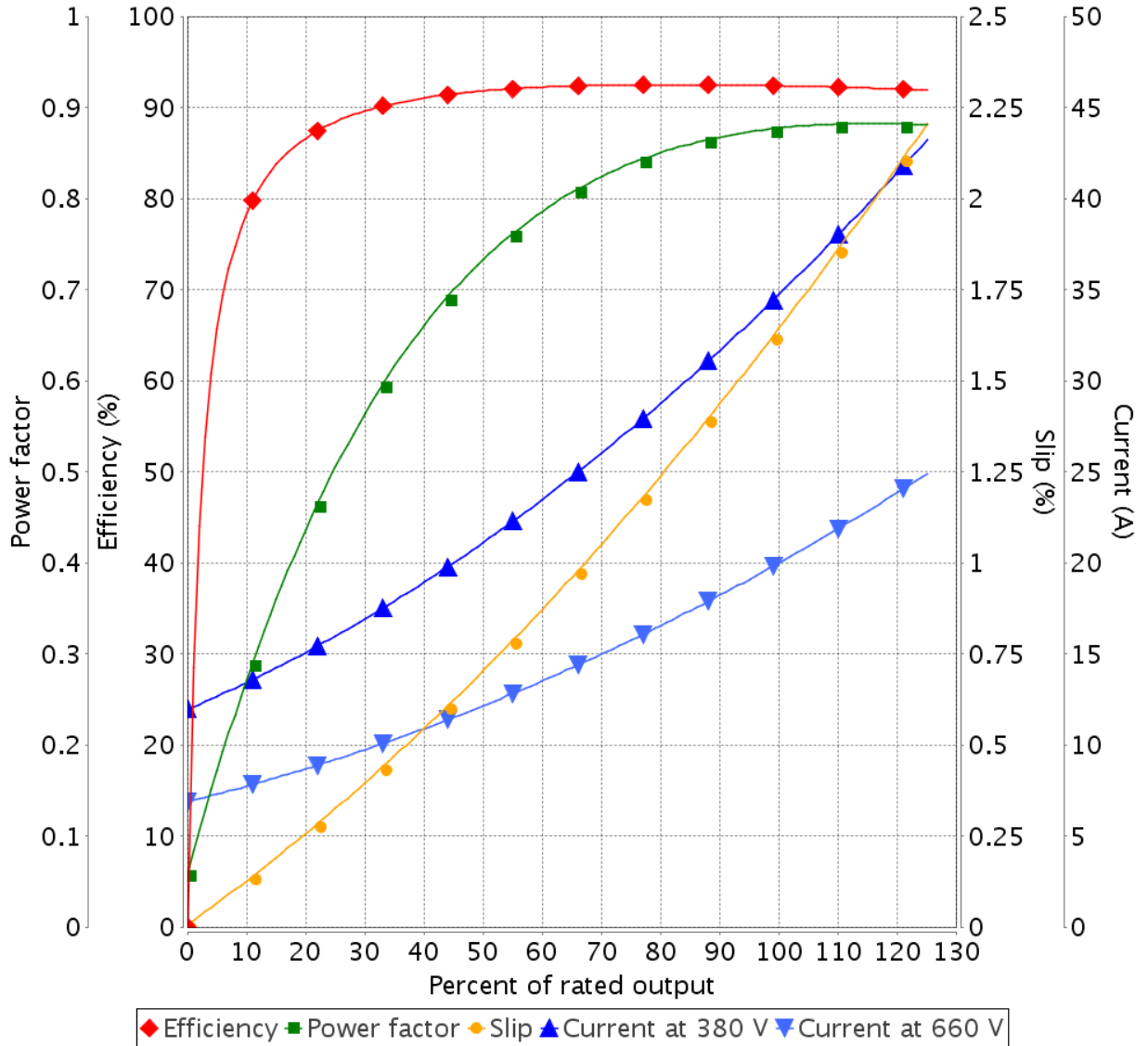
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Rated current : 34.6/19.9 A  
 LRC : 8.0  
 Rated torque : 59.9 Nm  
 Locked rotor torque : 280 %  
 Breakdown torque : 330 %  
 Rated speed : 2950 rpm

Moment of inertia (J) : 0.0663 kgm<sup>2</sup>  
 Duty cycle : S1  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : N

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# VFD OPERATION CURVE

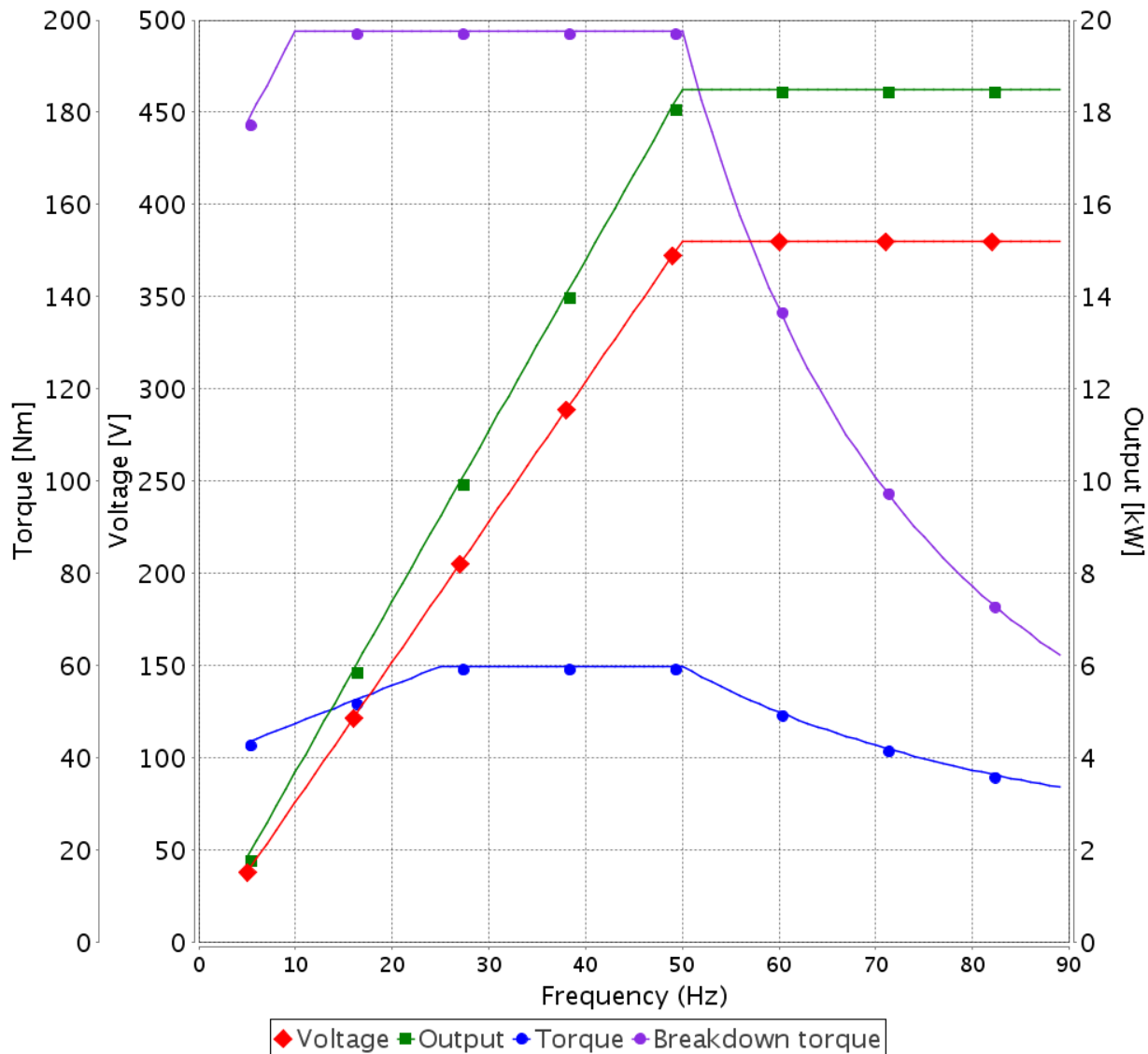
## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

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Performance : 18.5 kW 380/660 V 50 Hz 2P 160L

Rated current : 34.6/19.9 A  
 LRC : 8.0  
 Rated torque : 59.9 Nm  
 Locked rotor torque : 280 %  
 Breakdown torque : 330 %  
 Rated speed : 2950 rpm

Moment of inertia (J) : 0.0663 kgm<sup>2</sup>  
 Duty cycle : S1  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : N

Voltage Peak Phase-Phase = 1600.0  
 dV/dt = 5200.0  
 Rise time = 0.1

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# EQUIVALENT CIRCUIT

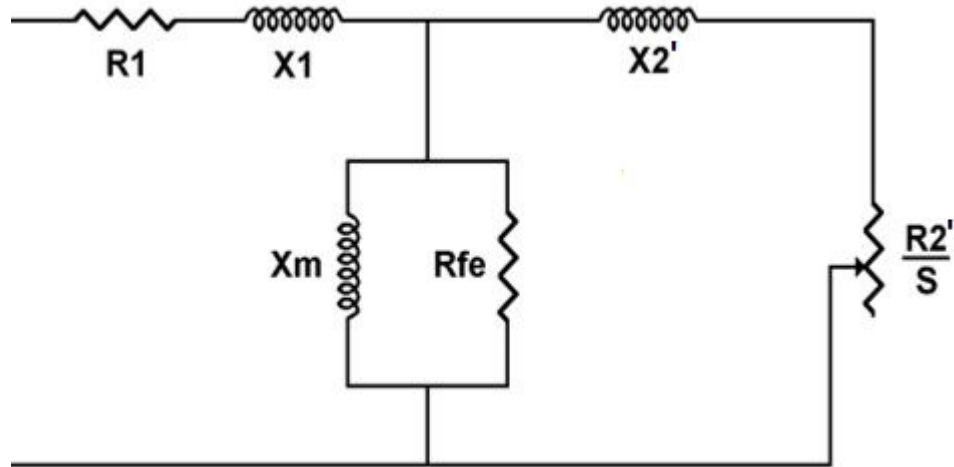
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Rated			
<b>R1</b>	0.4994 omhs / 0.0640 p.u.	<b>X1</b>	0.9384 omhs / 0.1202 p.u.
<b>R2'</b>	0.2286 omhs / 0.0293 p.u.	<b>X2'</b>	1.5381 omhs / 0.1971 p.u.
<b>Rfe</b>	1413.8650 omhs / 181.1393 p.u.	<b>Xm</b>	42.9963 omhs / 5.5085 p.u.

Locked rotor			
<b>R1</b>	0.6694 omhs / 0.0858 p.u.	<b>X1</b>	0.8225 omhs / 0.1054 p.u.
<b>R2'</b>	0.5724 omhs / 0.0733 p.u.	<b>X2'</b>	0.9136 omhs / 0.1170 p.u.
<b>Rfe</b>	1209.9940 omhs / 155.0201 p.u.	<b>Xm</b>	51.2977 omhs / 6.5721 p.u.

<b>T"do</b>	0.4870 s	<b>X/R</b>	2.3980 p.u.
<b>T"d</b>	0.0192 s	<b>RS</b>	0.1050 omhs / 0.0135 p.u.
<b>Ta</b>	0.0080 s	<b>X"d = Xs</b>	1.7361 omhs / 0.2224 p.u.
<b>Zbase</b>	7.8054 omhs	<b>X2(-)</b>	1.2866 omhs / 0.1648 p.u.

All parameters reflected to stator side.  
 Per phase values, for T connection.  
 Resistances at 20.0 °C, reactances at rated voltage and frequency.

R1	: Stator resistance	T"do	: Open circuit AC time constant
R2'	: Rotor resistance	T'd	: Short circuit AC time constant
Rfe	: Core loss resistance	Ta	: Short circuit DC time constant
X1	: Stator leakage reactance	X/R	: X/R ratio
X2'	: Rotor leakage reactance	RS	: Supplementary losses resistance
Xm	: Magnetizing reactance	X"d = Xs	: Subtransient reactance
Zbase	: Base impedance	X2(-)	: Negative sequence reactance

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