

# DATA SHEET

## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15832530

Frame	: 160M	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>3</sup>	: 120 kg
Protection degree	: IP55	Moment of inertia (J)	: 0.0551 kgm <sup>2</sup>
Design	: N		

Output	15 kW	15 kW	15 kW
Poles	2	2	2
Frequency	50 Hz	50 Hz	50 Hz
Rated voltage	380/660 V	400/690 V	415 V
Rated current	28.5/16.4 A	27.7/16.1 A	27.7 A
L. R. Amperes	222/128 A	230/133 A	244 A
LRC	7.8	8.3	8.8
No load current	10.0/5.76 A	11.0/6.38 A	12.0 A
Rated speed	2945 rpm	2950 rpm	2955 rpm
Slip	1.83 %	1.67 %	1.50 %
Rated torque	48.7 Nm	48.6 Nm	48.5 Nm
Locked rotor torque	250 %	280 %	300 %
Pull up torque	210 %	235 %	255 %
Breakdown torque	320 %	360 %	390 %
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)	8 s	8 s	8 s
Locked rotor time (cold)	14 s	14 s	14 s
Efficiency (%)	50%	91.0	90.3
	75%	91.6	91.6
	100%	91.9	91.9
Power Factor	50%	0.72	0.63
	75%	0.82	0.76
	100%	0.87	0.82

Bearing type	Drive end	Non drive end	Foundation loads
	6309-C3	6209-C3	
Lubrication interval	20000 h	20000 h	Max. compression : 3567 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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(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.  
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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 LIMIT CURVE

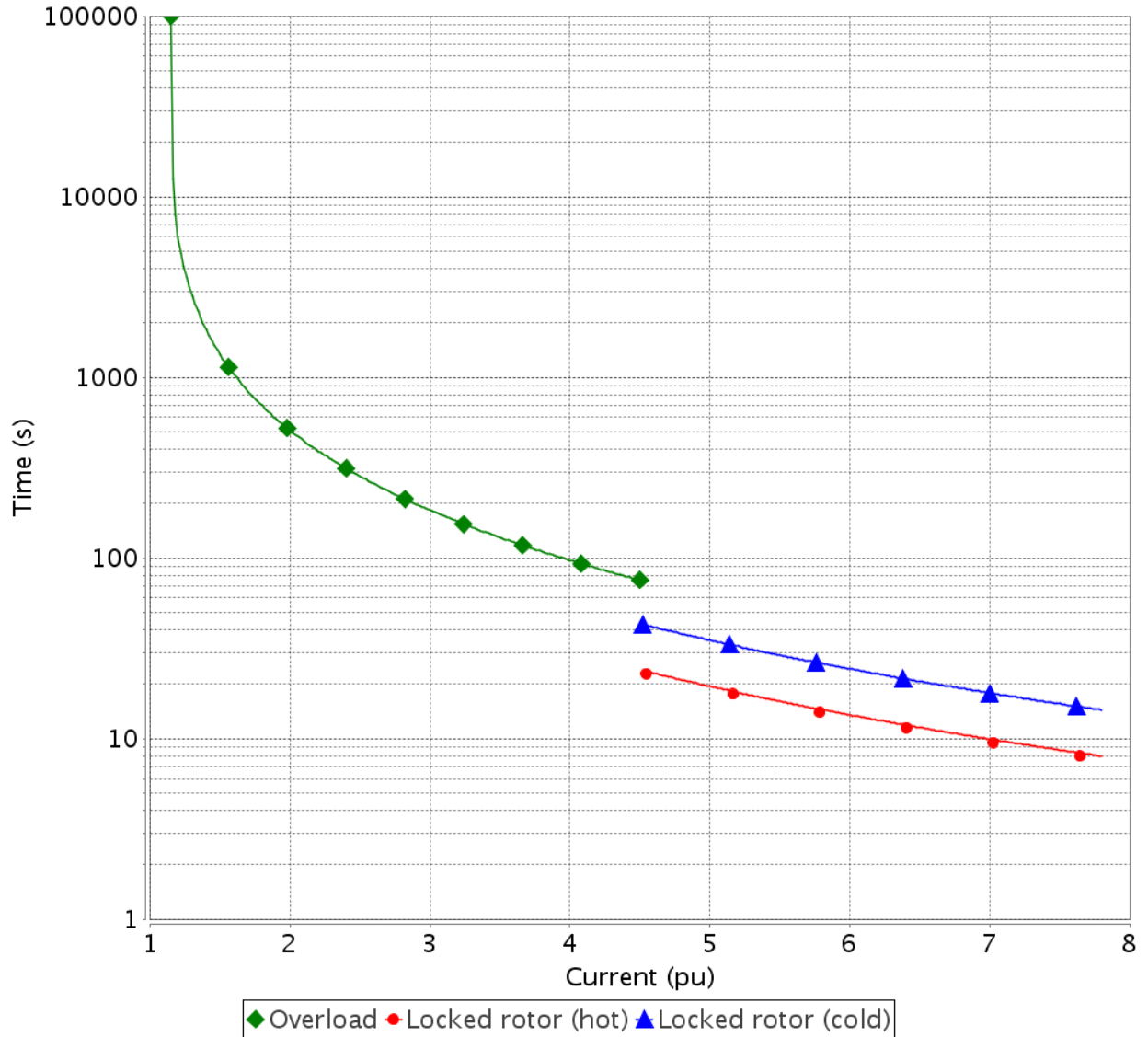
## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage

Product code : 15832530



Performance : 15 kW 380/660 V 50 Hz 2P 160M

Rated current	: 28.5/16.4 A	Moment of inertia (J)	: 0.0551 kgm <sup>2</sup>
LRC	: 7.8	Duty cycle	: S1
Rated torque	: 48.7 Nm	Insulation class	: F
Locked rotor torque	: 250 %	Service factor	: 1.00
Breakdown torque	: 320 %	Temperature rise	: 80 K
Rated speed	: 2945 rpm	Design	: N
Heating constant	: 24.6 min		
Cooling constant	: 73.8 min		

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# LOAD PERFORMANCE CURVE

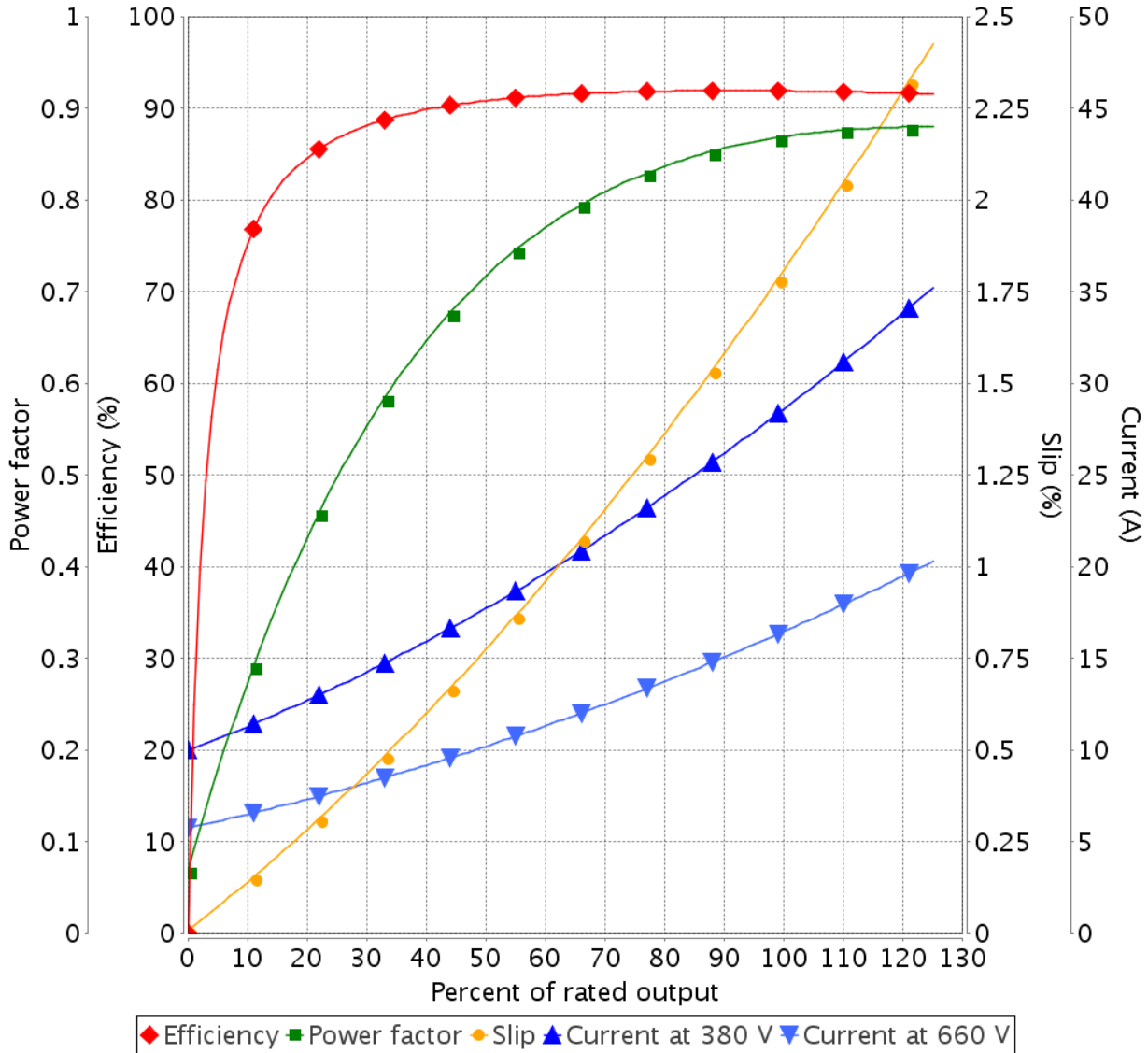
## Three Phase Induction Motor - Squirrel Cage



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Product code : 15832530



Performance : 15 kW 380/660 V 50 Hz 2P 160M

Rated current : 28.5/16.4 A  
 LRC : 7.8  
 Rated torque : 48.7 Nm  
 Locked rotor torque : 250 %  
 Breakdown torque : 320 %  
 Rated speed : 2945 rpm

Moment of inertia (J) : 0.0551 kgm<sup>2</sup>  
 Duty cycle : S1  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : N

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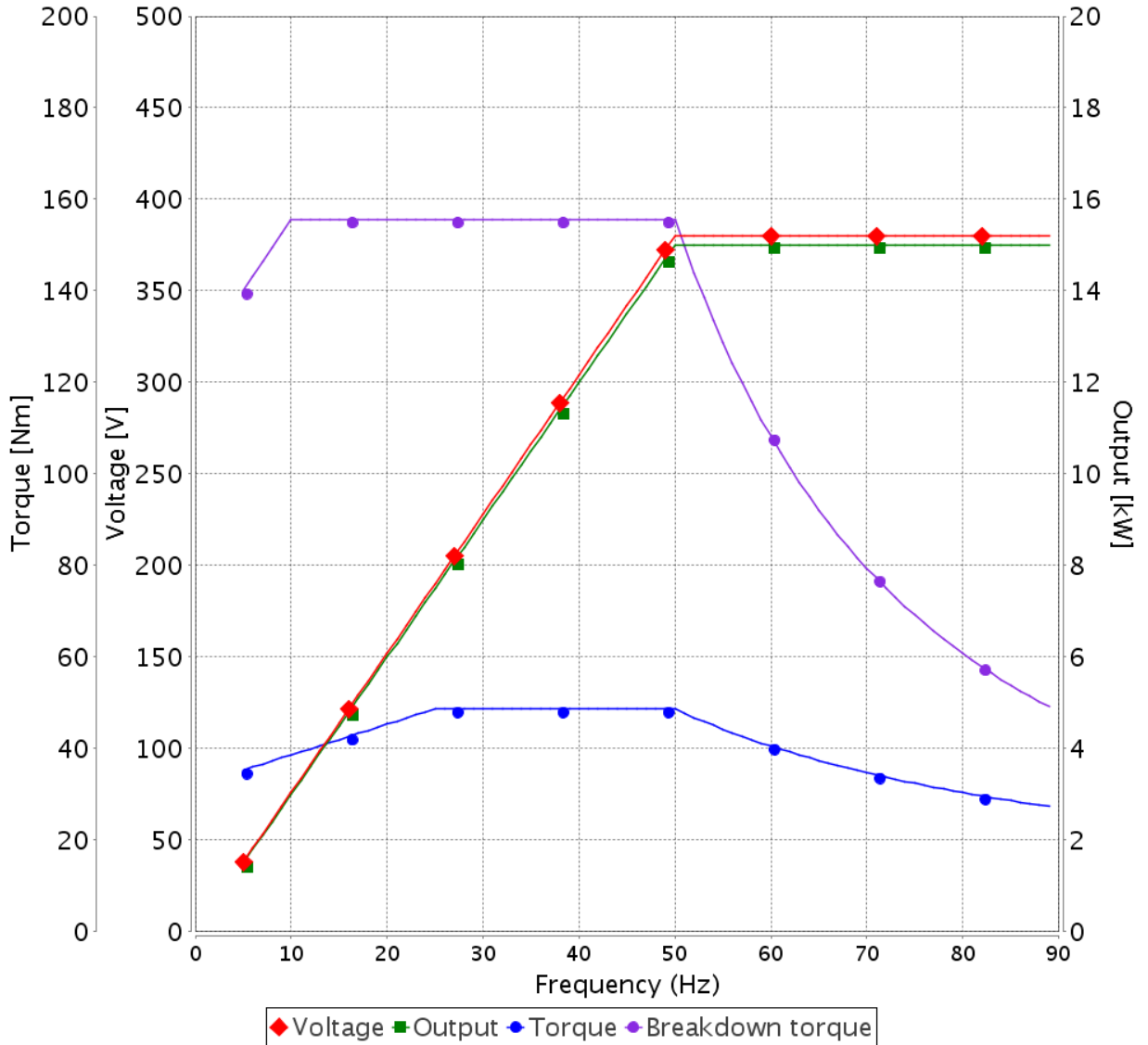
# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage



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Performance : 15 kW 380/660 V 50 Hz 2P 160M

Rated current	: 28.5/16.4 A	Moment of inertia (J)	: 0.0551 kgm <sup>2</sup>
LRC	: 7.8	Duty cycle	: S1
Rated torque	: 48.7 Nm	Insulation class	: F
Locked rotor torque	: 250 %	Service factor	: 1.00
Breakdown torque	: 320 %	Temperature rise	: 80 K
Rated speed	: 2945 rpm	Design	: N

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

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# TORQUE AND CURRENT VS SPEED CURVE

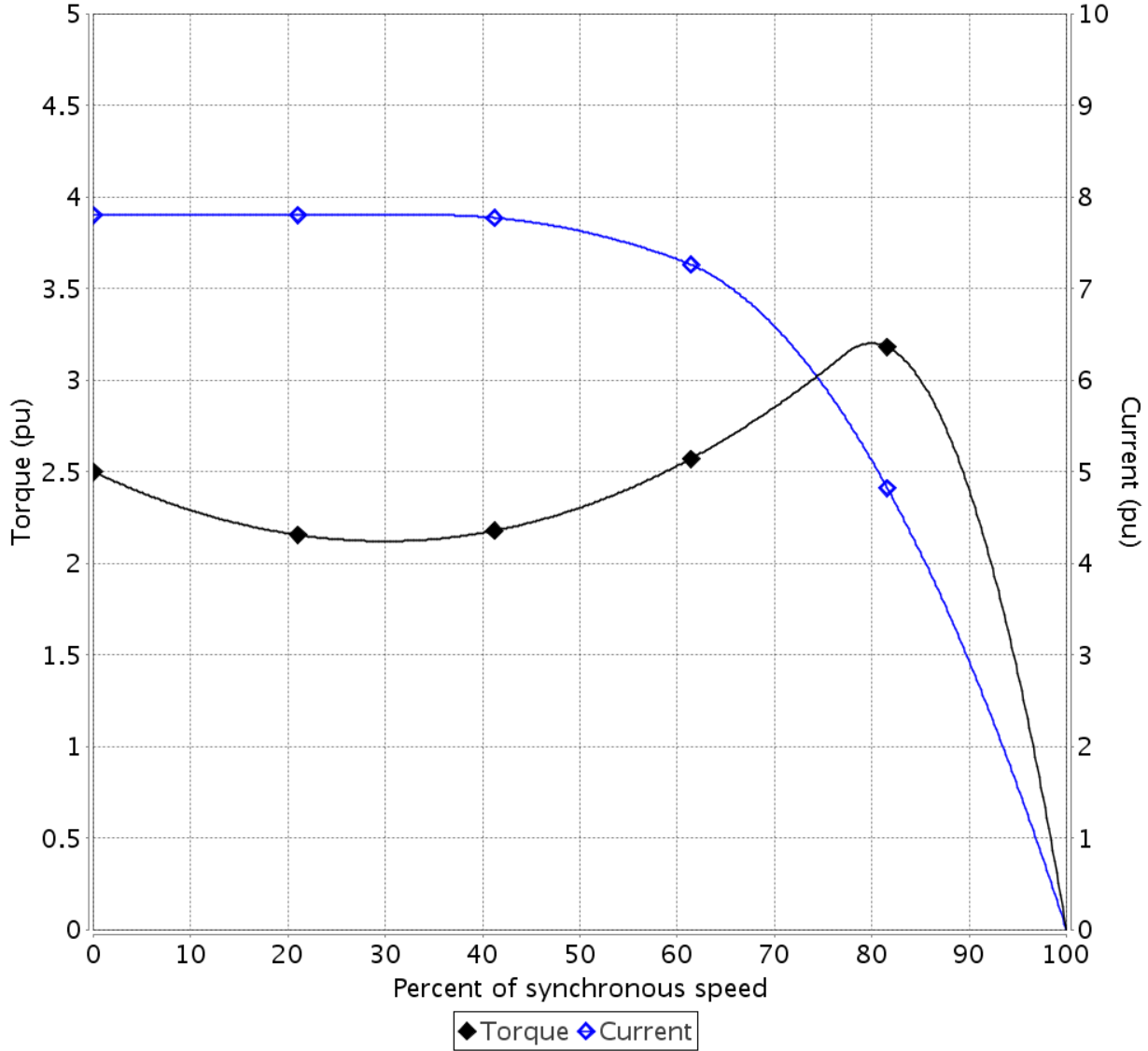
## Three Phase Induction Motor - Squirrel Cage



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Product code : 15832530



Performance : 15 kW 380/660 V 50 Hz 2P 160M

Rated current : 28.5/16.4 A  
 LRC : 7.8  
 Rated torque : 48.7 Nm  
 Locked rotor torque : 250 %  
 Breakdown torque : 320 %  
 Rated speed : 2945 rpm

Moment of inertia (J) : 0.0551 kgm<sup>2</sup>  
 Duty cycle : S1  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : N

Locked rotor time 100% : 8 s (hot) 14 s (cold)  
 Load inertia (J=GD<sup>2</sup>/4) : 0.0551 kgm<sup>2</sup>

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# EQUIVALENT CIRCUIT

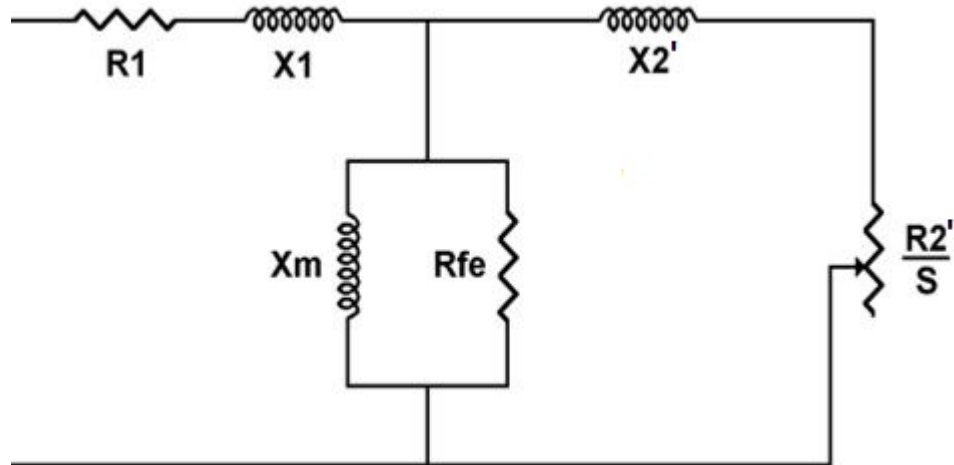
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Rated			
<b>R1</b>	0.6338 omhs / 0.0658 p.u.	<b>X1</b>	1.2671 omhs / 0.1316 p.u.
<b>R2'</b>	0.2906 omhs / 0.0302 p.u.	<b>X2'</b>	1.8587 omhs / 0.1931 p.u.
<b>Rfe</b>	1704.5910 omhs / 177.0691 p.u.	<b>Xm</b>	51.8237 omhs / 5.3833 p.u.

Locked rotor			
<b>R1</b>	0.7984 omhs / 0.0829 p.u.	<b>X1</b>	1.1352 omhs / 0.1179 p.u.
<b>R2'</b>	0.7193 omhs / 0.0747 p.u.	<b>X2'</b>	1.1249 omhs / 0.1169 p.u.
<b>Rfe</b>	1459.4590 omhs / 151.6053 p.u.	<b>Xm</b>	62.1533 omhs / 6.4563 p.u.

<b>T"do</b>	0.4690 s	<b>X/R</b>	2.6250 p.u.
<b>T"d</b>	0.0200 s	<b>RS</b>	0.1093 omhs / 0.0114 p.u.
<b>Ta</b>	0.0080 s	<b>X"d = Xs</b>	2.2600 omhs / 0.2348 p.u.
<b>Zbase</b>	9.6267 omhs	<b>X2(-)</b>	1.5835 omhs / 0.1645 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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