

# DATA SHEET

## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15824773

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>	: 115 kg
Protection degree	: IP55	Moment of inertia (J)	: 0.0482 kgm <sup>2</sup>
Design	: N		

Output	11 kW	11 kW	11 kW
Poles	2	2	2
Frequency	50 Hz	50 Hz	50 Hz
Rated voltage	380/660 V	400/690 V	415 V
Rated current	21.1/12.1 A	20.4/11.8 A	20.2 A
L. R. Amperes	158/91.1 A	163/94.6 A	172 A
LRC	7.5	8.0	8.5
No load current	7.60/4.38 A	8.60/4.99 A	9.00 A
Rated speed	2950 rpm	2955 rpm	2955 rpm
Slip	1.67 %	1.50 %	1.50 %
Rated torque	35.6 Nm	35.6 Nm	35.6 Nm
Locked rotor torque	240 %	270 %	300 %
Pull up torque	200 %	230 %	255 %
Breakdown torque	310 %	340 %	370 %
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)	12 s	12 s	12 s
Locked rotor time (cold)	22 s	22 s	22 s
Efficiency (%)	50%	90.7	89.9
	75%	91.2	91.3
	100%	91.2	91.4
Power Factor	50%	0.74	0.65
	75%	0.83	0.77
	100%	0.87	0.83

Bearing type	Drive end	Non drive end	Foundation loads	Max. traction	: 1508 N
	6309-C3	6209-C3		Max. compression	: 2636 N
Lubrication interval	20000 h	20000 h	Load type	: -	
Lubricant amount	13 g	9 g		Load torque	: -
Lubricant type	MOBIL POLYREX EM			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.

Rev.	Changes Summary	Rev.	Checked	Date
Performed by	dang	1230994031		
Checked by	AUTOMATICO	Page	Rev.	
Date	11/11/2021	1 / 7	0	

# DATA SHEET

## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15824773

### 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		

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.

Rev.	Changes Summary	Rev.	Checked	Date
Performed by	dang		1230994031	
Checked by	AUTOMATICO		Page	Rev.
Date	11/11/2021		2 / 7	0

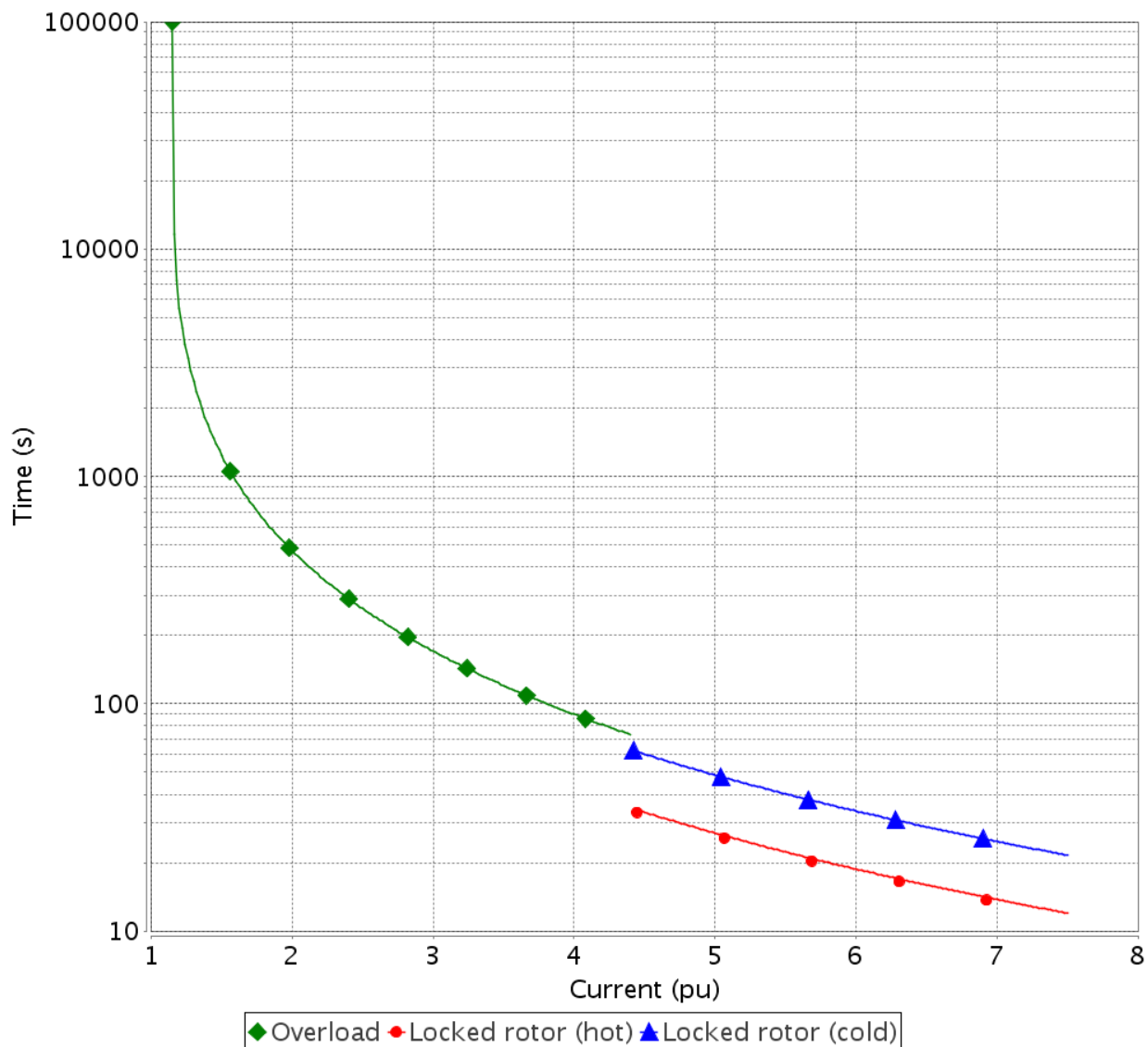
# THERMAL LIMIT CURVE

## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15824773



Performance : 11 kW 380/660 V 50 Hz 2P 160M

Rated current	: 21.1/12.1 A	Moment of inertia (J)	: 0.0482 kgm <sup>2</sup>
LRC	: 7.5	Duty cycle	: S1
Rated torque	: 35.6 Nm	Insulation class	: F
Locked rotor torque	: 240 %	Service factor	: 1.00
Breakdown torque	: 310 %	Temperature rise	: 80 K
Rated speed	: 2950 rpm	Design	: N
Heating constant	: 22.8 min		
Cooling constant	: 68.4 min		

Rev.	Changes Summary		Rev.	Checked	Date
Performed by	dang				
Checked by				Page	Rev.
Date	11/11/2021			3 / 7	0

# LOAD PERFORMANCE CURVE

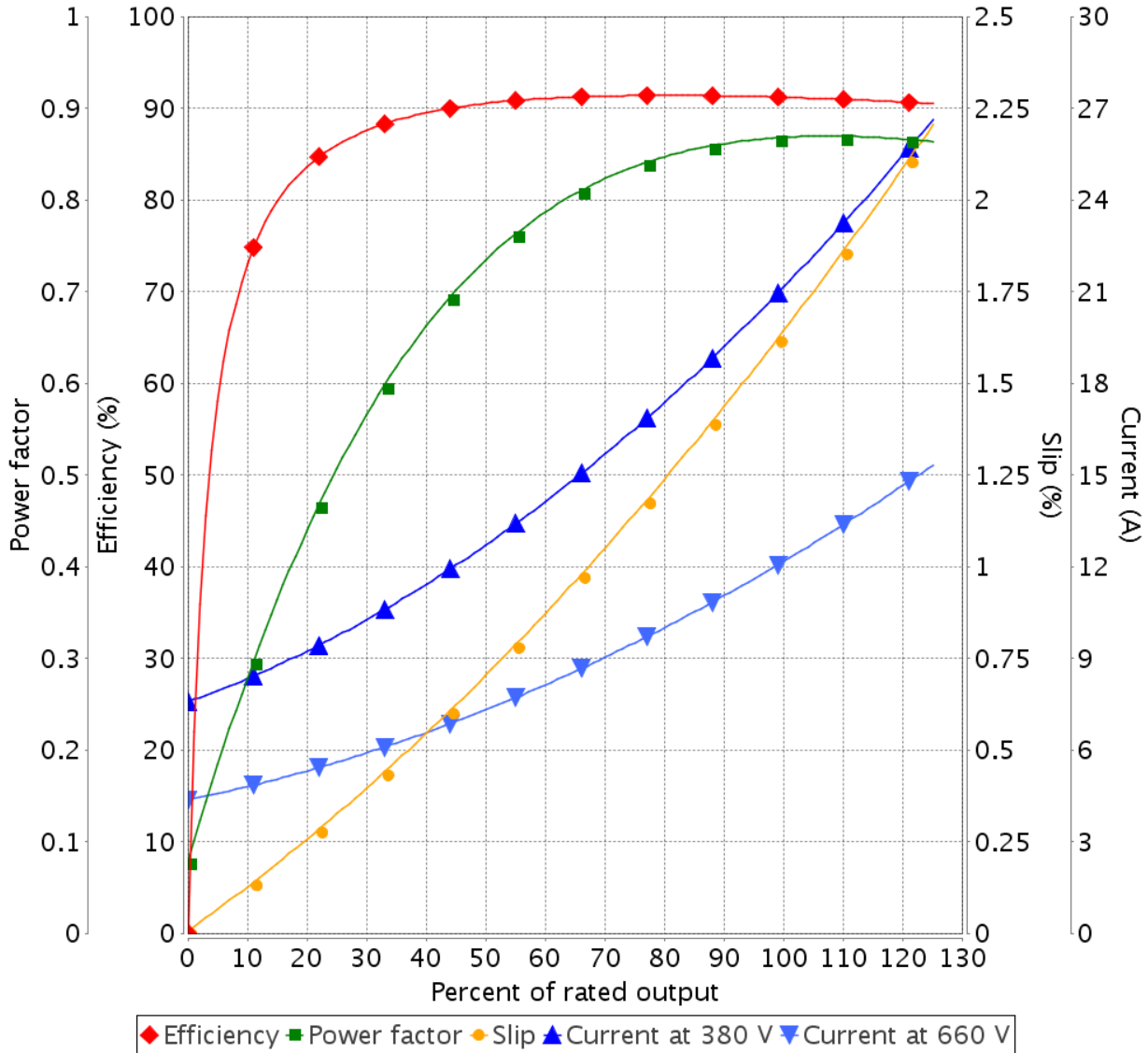
## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage

Product code : 15824773



Performance : 11 kW 380/660 V 50 Hz 2P 160M

Rated current	: 21.1/12.1 A	Moment of inertia (J)	: 0.0482 kgm <sup>2</sup>
LRC	: 7.5	Duty cycle	: S1
Rated torque	: 35.6 Nm	Insulation class	: F
Locked rotor torque	: 240 %	Service factor	: 1.00
Breakdown torque	: 310 %	Temperature rise	: 80 K
Rated speed	: 2950 rpm	Design	: N

Rev.	Changes Summary		Rev.	Checked	Date
Performed by	dang				
Checked by				Page	Rev.
Date	11/11/2021			4 / 7	0

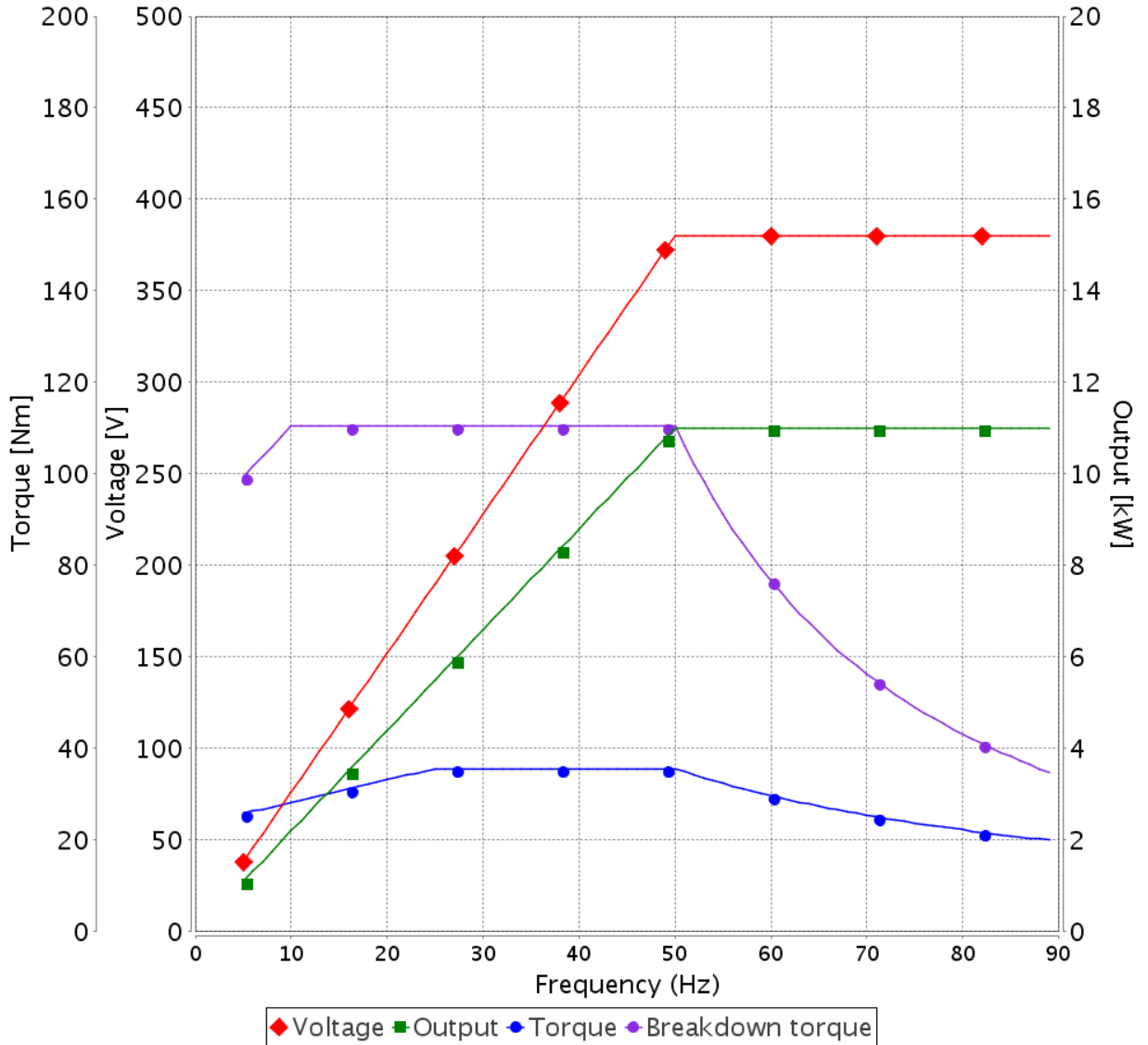
# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 15824773



Performance : 11 kW 380/660 V 50 Hz 2P 160M

Rated current : 21.1/12.1 A  
 LRC : 7.5  
 Rated torque : 35.6 Nm  
 Locked rotor torque : 240 %  
 Breakdown torque : 310 %  
 Rated speed : 2950 rpm

Moment of inertia (J) : 0.0482 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

Rev.	Changes Summary		Rev.	Checked	Date
Performed by	dang			Page	Rev.
Checked by				5 / 7	0
Date	11/11/2021				

# TORQUE AND CURRENT VS SPEED CURVE

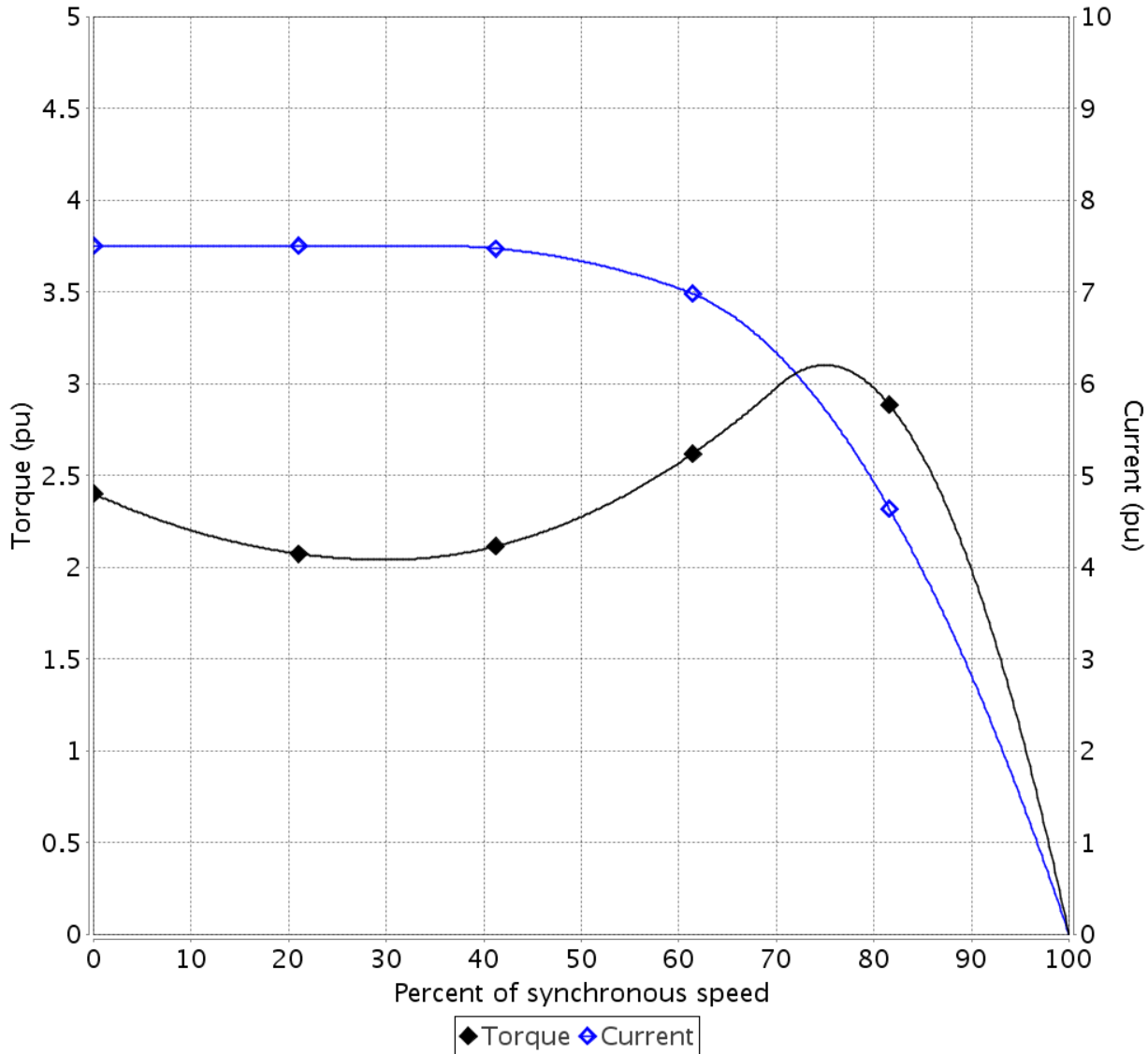
## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage

Product code : 15824773



Performance : 11 kW 380/660 V 50 Hz 2P 160M

Rated current : 21.1/12.1 A

LRC : 7.5

Rated torque : 35.6 Nm

Locked rotor torque : 240 %

Breakdown torque : 310 %

Rated speed : 2950 rpm

Moment of inertia (J) : 0.0482 kgm<sup>2</sup>

Duty cycle : S1

Insulation class : F

Service factor : 1.00

Temperature rise : 80 K

Design : N

Locked rotor time 100% : 12 s (hot) 22 s (cold)

Load inertia (J=GD<sup>2</sup>/4) : 0.0482 kgm<sup>2</sup>

Rev.	Changes Summary		Rev.	Checked	Date
Performed by	dang		1230994031		
Checked by	AUTOMATICO		Page	Rev.	
Date	11/11/2021		6 / 7	0	

# EQUIVALENT CIRCUIT

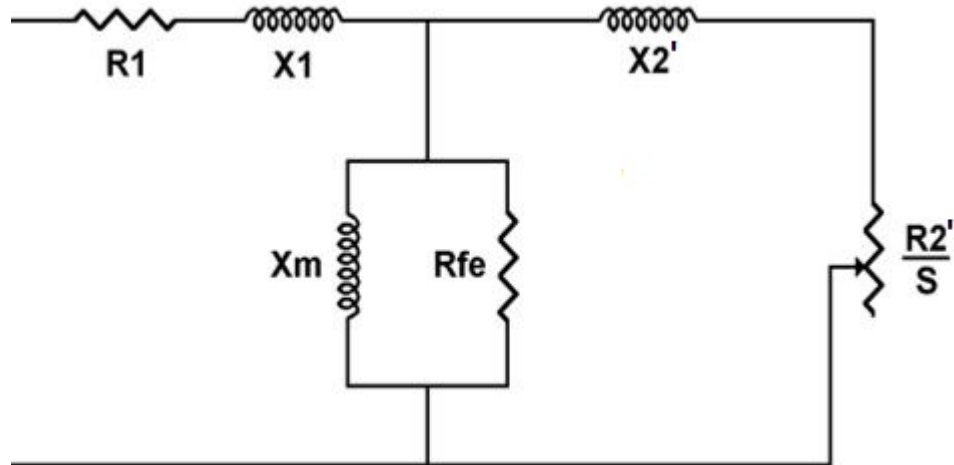
## Three Phase Induction Motor - Squirrel Cage



Customer : QUANTUM CONTROLS

Product line : W22 - IE3 Premium Efficiency Multivoltage

Product code : 15824773



Rated			
<b>R1</b>	0.9333 omhs / 0.0711 p.u.	<b>X1</b>	1.8031 omhs / 0.1374 p.u.
<b>R2'</b>	0.3930 omhs / 0.0299 p.u.	<b>X2'</b>	2.4278 omhs / 0.1849 p.u.
<b>Rfe</b>	2252.8770 omhs / 171.6177 p.u.	<b>Xm</b>	68.0720 omhs / 5.1855 p.u.

Locked rotor			
<b>R1</b>	1.1336 omhs / 0.0864 p.u.	<b>X1</b>	1.6576 omhs / 0.1263 p.u.
<b>R2'</b>	0.9540 omhs / 0.0727 p.u.	<b>X2'</b>	1.4805 omhs / 0.1128 p.u.
<b>Rfe</b>	1854.5470 omhs / 141.2741 p.u.	<b>Xm</b>	80.0455 omhs / 6.0976 p.u.

<b>T"do</b>	0.4700 s	<b>X/R</b>	2.5880 p.u.
<b>T"d</b>	0.0211 s	<b>RS</b>	0.1122 omhs / 0.0085 p.u.
<b>Ta</b>	0.0080 s	<b>X"d = Xs</b>	3.1381 omhs / 0.2391 p.u.
<b>Zbase</b>	13.1273 omhs	<b>X2(-)</b>	2.0849 omhs / 0.1588 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

Rev.	Changes Summary		Rev.	Checked	Date
Performed by	dang		Page	Rev.	
Checked by			7 / 7	0	
Date	11/11/2021				