

# DATA SHEET



## Three Phase Induction Motor - Squirrel Cage

Customer								
Product line	: NEMA Premium Efficiency Three-Phase	Product code	: 14325516					
		Catalog #	: 02009ST3QIE324TC-W22					
Frame	: 324/6TC	Cooling method	: IC411 - TEFC					
Insulation class	: F	Mounting	: F-1					
Duty cycle	: Cont.(S1)	Rotation <sup>1</sup>	: Both (CW and CCW)					
Ambient temperature	: -20°C to +40°C	Starting method	: Direct On Line					
Altitude	: 1000 m.a.s.l.	Approx. weight <sup>2</sup>	: 452 lb					
Protection degree	: IP55	Moment of inertia (J)	: 9.37 sq.ft.lb					
Design	: B							
Output [HP]	20	15	15	15	20	20	20	
Poles	8	8	8	8	8	8	8	
Frequency [Hz]	60	50	50	50	50	50	50	
Rated voltage [V]	460	380	400	415	380	400	415	
Rated current [A]	28.3	26.5	26.4	27.1	33.4	32.6	32.7	
L. R. Amperes [A]	142	133	142	152	134	143	150	
LRC [A]	5.0x(Code G)	5.0x(Code G)	5.4x(Code H)	5.6x(Code J)	4.0x(Code D)	4.4x(Code E)	4.6x(Code F)	
No load current [A]	16.0	15.7	17.6	19.3	15.7	17.6	19.3	
Rated speed [RPM]	880	730	730	735	725	725	730	
Slip [%]	2.22	2.67	2.67	2.00	3.33	3.33	2.67	
Rated torque [ft.lb]	119	108	108	107	145	145	144	
Locked rotor torque [%]	190	190	210	240	140	160	180	
Breakdown torque [%]	220	229	260	280	170	190	210	
Service factor	1.25	1.00	1.15	1.15	1.00	1.15	1.15	
Temperature rise	80 K	80 K	80 K	80 K	105 K	105 K	80 K	
Locked rotor time	48s (cold) 27s (hot)	36s (cold) 20s (hot)	36s (cold) 20s (hot)	36s (cold) 20s (hot)	36s (cold) 20s (hot)	36s (cold) 20s (hot)	36s (cold) 20s (hot)	
Noise level <sup>2</sup>	56.0 dB(A)	56.0 dB(A)	56.0 dB(A)	56.0 dB(A)	56.0 dB(A)	56.0 dB(A)	56.0 dB(A)	
Efficiency (%)	25%	89.2	88.3	86.8	85.6	90.2	89.1	88.0
	50%	89.5	88.5	87.4	86.3	89.5	88.5	87.5
	75%	91.0	89.6	89.0	88.5	89.5	89.5	89.5
	100%	91.0	89.5	89.3	89.0	88.5	88.5	88.5
Power Factor	25%	0.31	0.29	0.25	0.23	0.36	0.32	0.29
	50%	0.54	0.51	0.46	0.42	0.61	0.56	0.52
	75%	0.66	0.64	0.60	0.56	0.72	0.68	0.65
	100%	0.73	0.72	0.69	0.65	0.77	0.75	0.72
Bearing type	: 6312 C3	6212 C3	Foundation loads					
Sealing	: Inpro/Seal	Inpro/Seal	Max. traction	: 933 lb				
Lubrication interval	: 20000 h	20000 h	Max. compression	: 1385 lb				
Lubricant amount	: 21 g	13 g						
Lubricant type	: Mobil Polyrex EM							
Notes								
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 changes 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 NEMA MG-1.				
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# TORQUE AND CURRENT VS SPEED CURVE

## Three Phase Induction Motor - Squirrel Cage



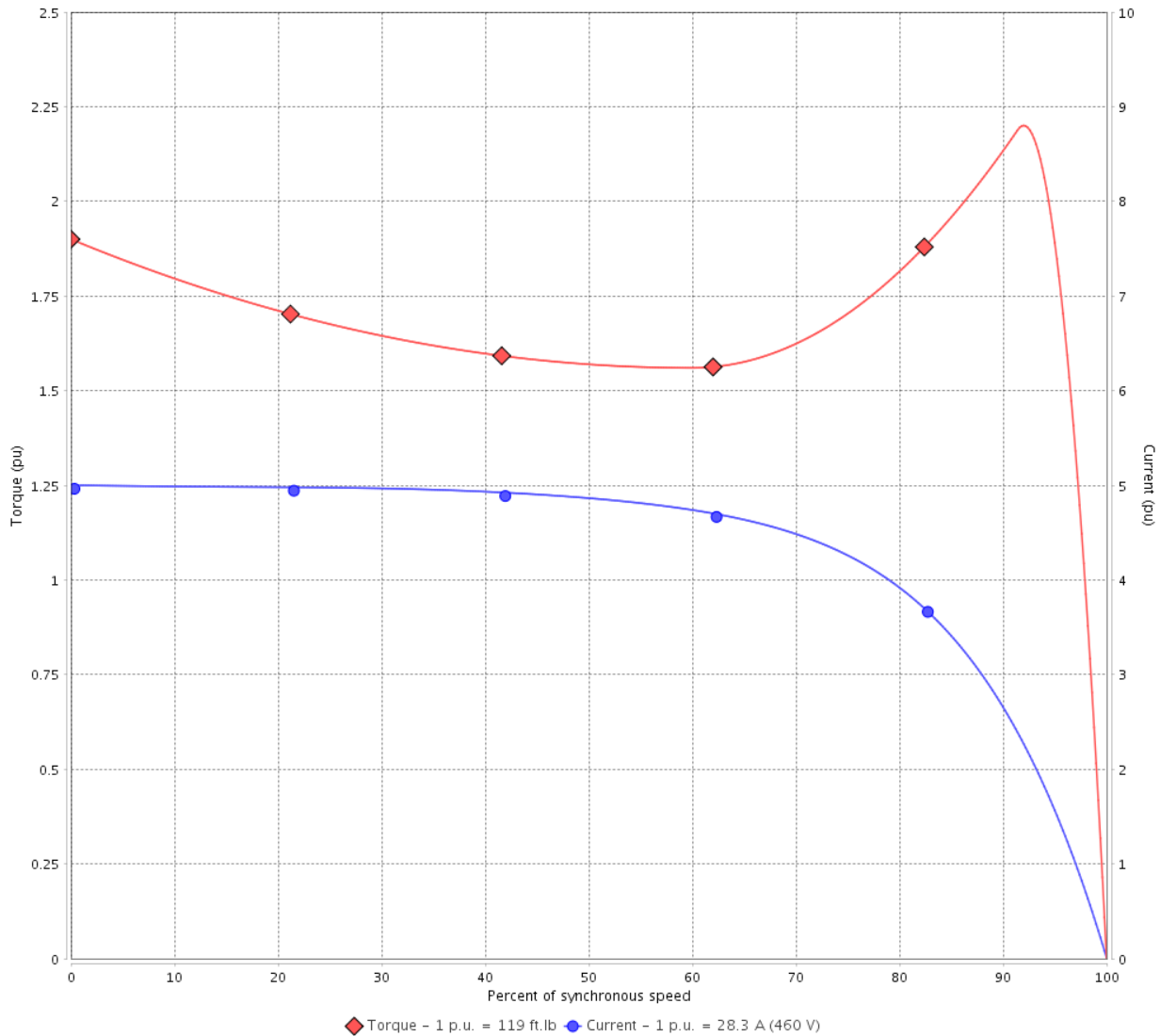
Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22

TORQUE AND CURRENT VS SPEED CURVE



Performance : 460 V 60 Hz 8P

Rated current	: 28.3 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.0	Duty cycle	: Cont.(S1)
Rated torque	: 119 ft.lb	Insulation class	: F
Locked rotor torque	: 190 %	Service factor	: 1.25
Breakdown torque	: 220 %	Temperature rise	: 80 K
Rated speed	: 880 rpm	Design	: B

Locked rotor time : 48s (cold) 27s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE



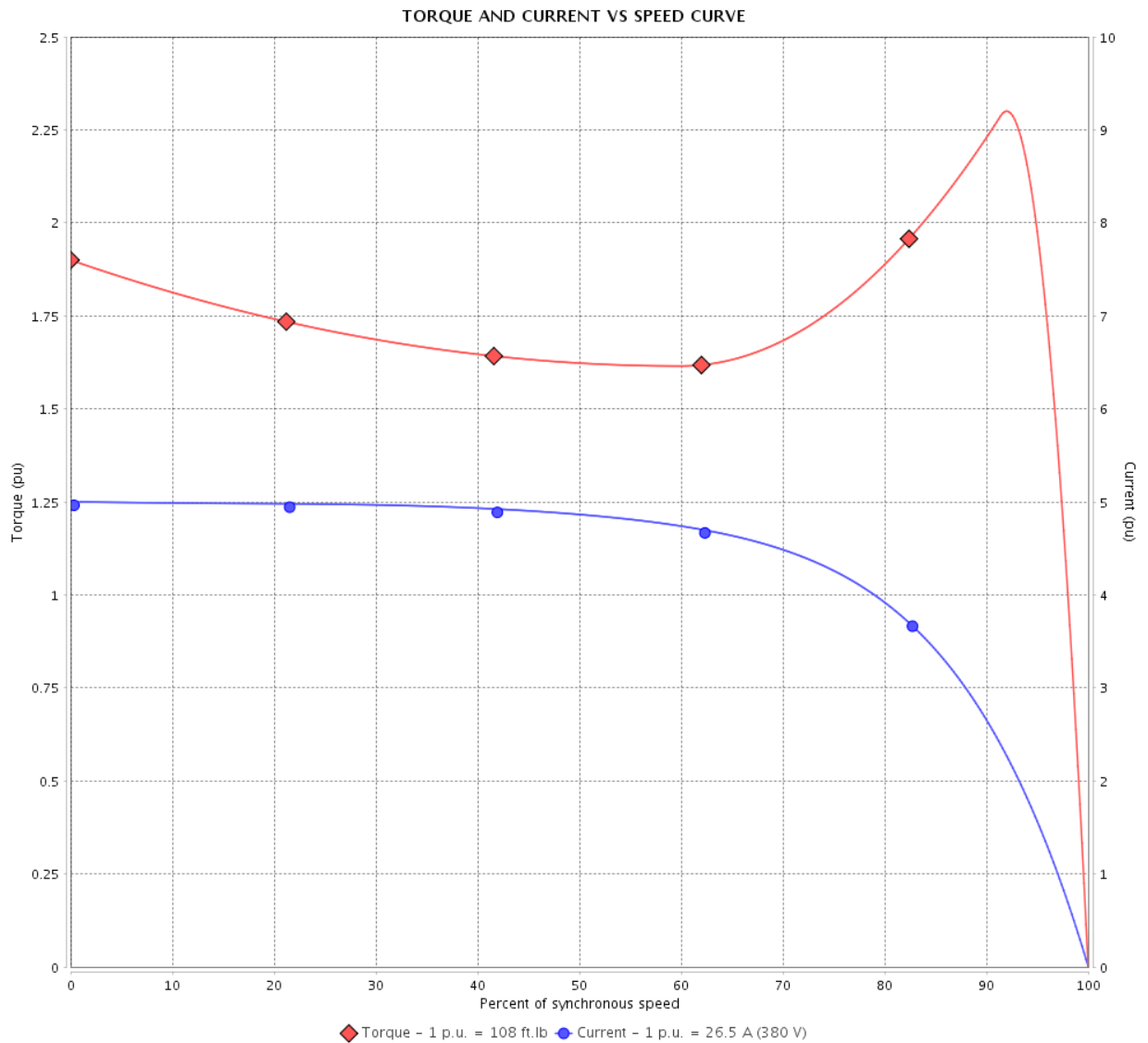
## Three Phase Induction Motor - Squirrel Cage

Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 380 V 50 Hz 8P IE3

Rated current	: 26.5 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.0	Duty cycle	: Cont.(S1)
Rated torque	: 108 ft.lb	Insulation class	: F
Locked rotor torque	: 190 %	Service factor	: 1.00
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE

## Three Phase Induction Motor - Squirrel Cage



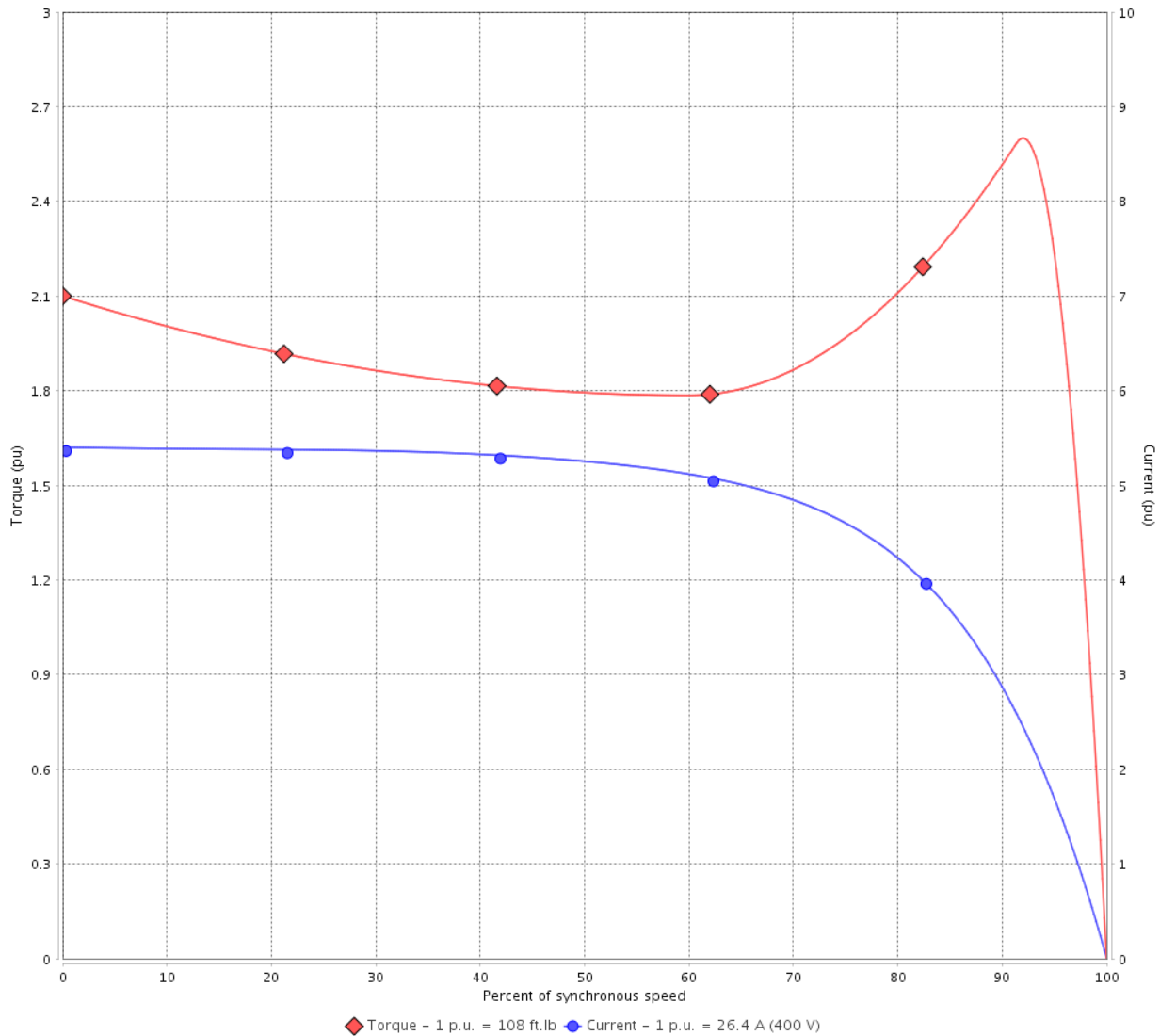
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Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22

TORQUE AND CURRENT VS SPEED CURVE



Performance : 400 V 50 Hz 8P IE3

Rated current	: 26.4 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.4	Duty cycle	: Cont.(S1)
Rated torque	: 108 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 260 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE



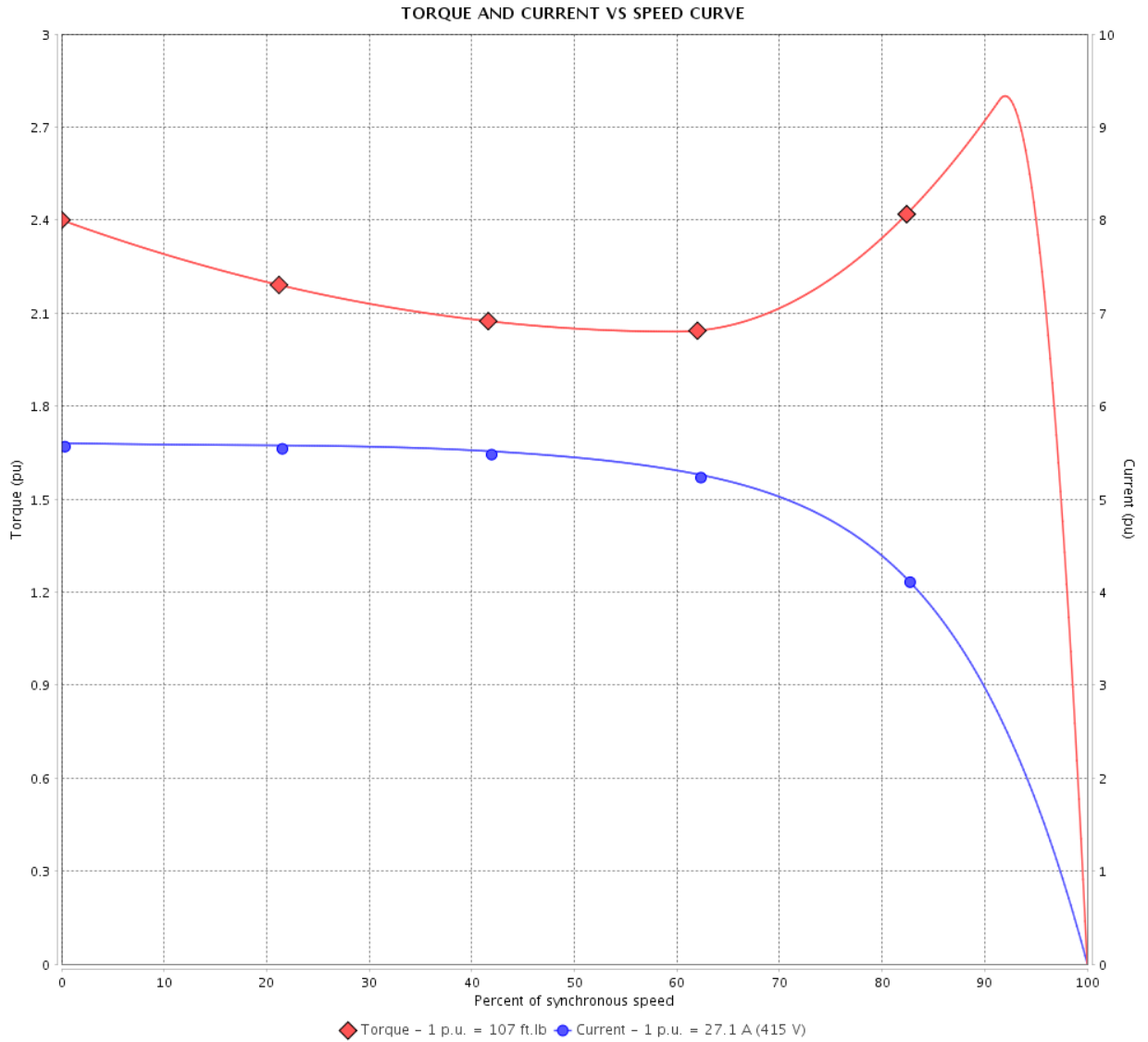
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Customer :

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Performance : 415 V 50 Hz 8P IE3

Rated current	: 27.1 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.6	Duty cycle	: Cont.(S1)
Rated torque	: 107 ft.lb	Insulation class	: F
Locked rotor torque	: 240 %	Service factor	: 1.15
Breakdown torque	: 280 %	Temperature rise	: 80 K
Rated speed	: 735 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE

Three Phase Induction Motor - Squirrel Cage



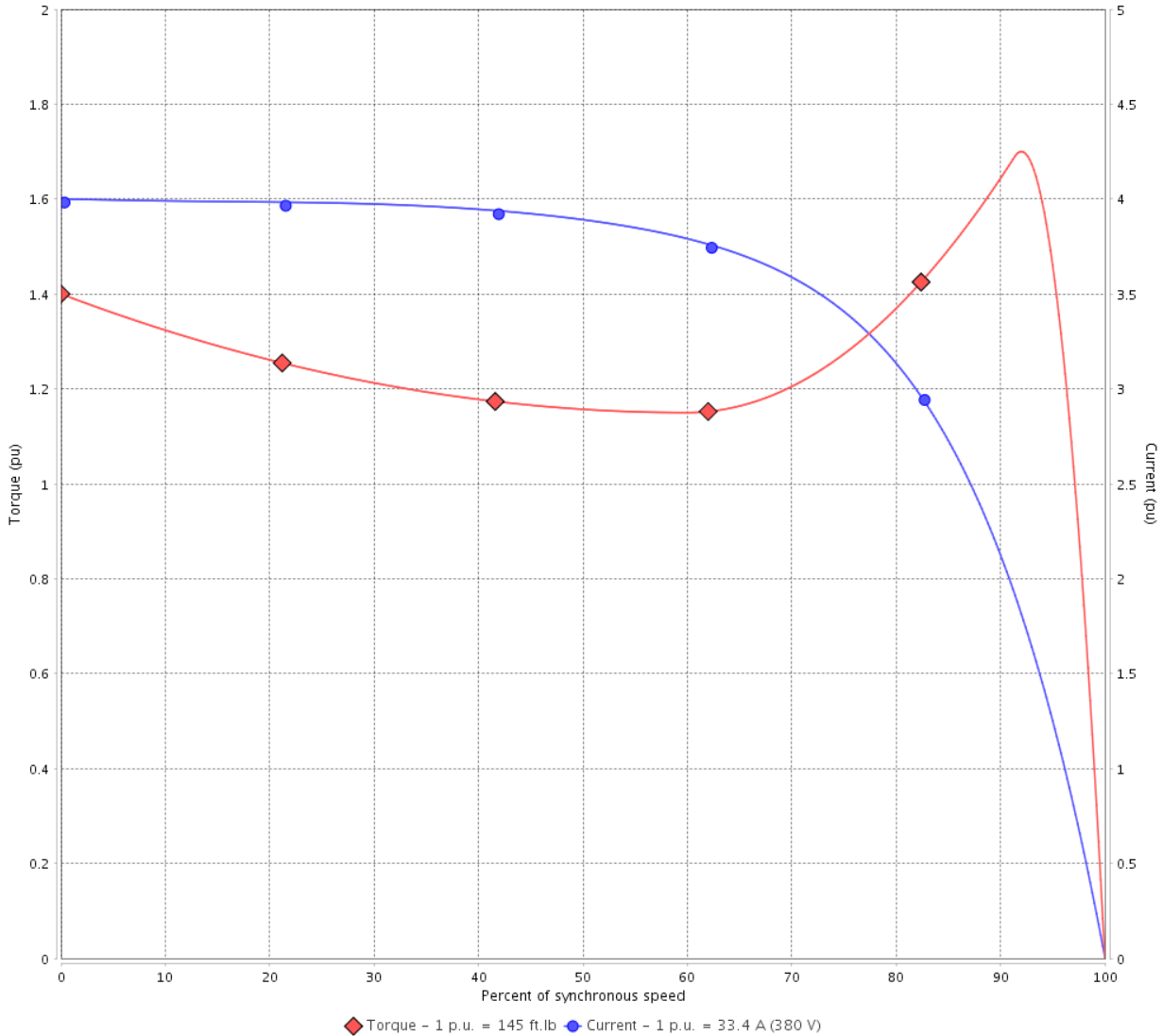
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TORQUE AND CURRENT VS SPEED CURVE



Performance : 380 V 50 Hz 8P IE2

Rated current	: 33.4 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.0	Duty cycle	: Cont.(S1)
Rated torque	: 145 ft.lb	Insulation class	: F
Locked rotor torque	: 140 %	Service factor	: 1.00
Breakdown torque	: 170 %	Temperature rise	: 105 K
Rated speed	: 725 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE



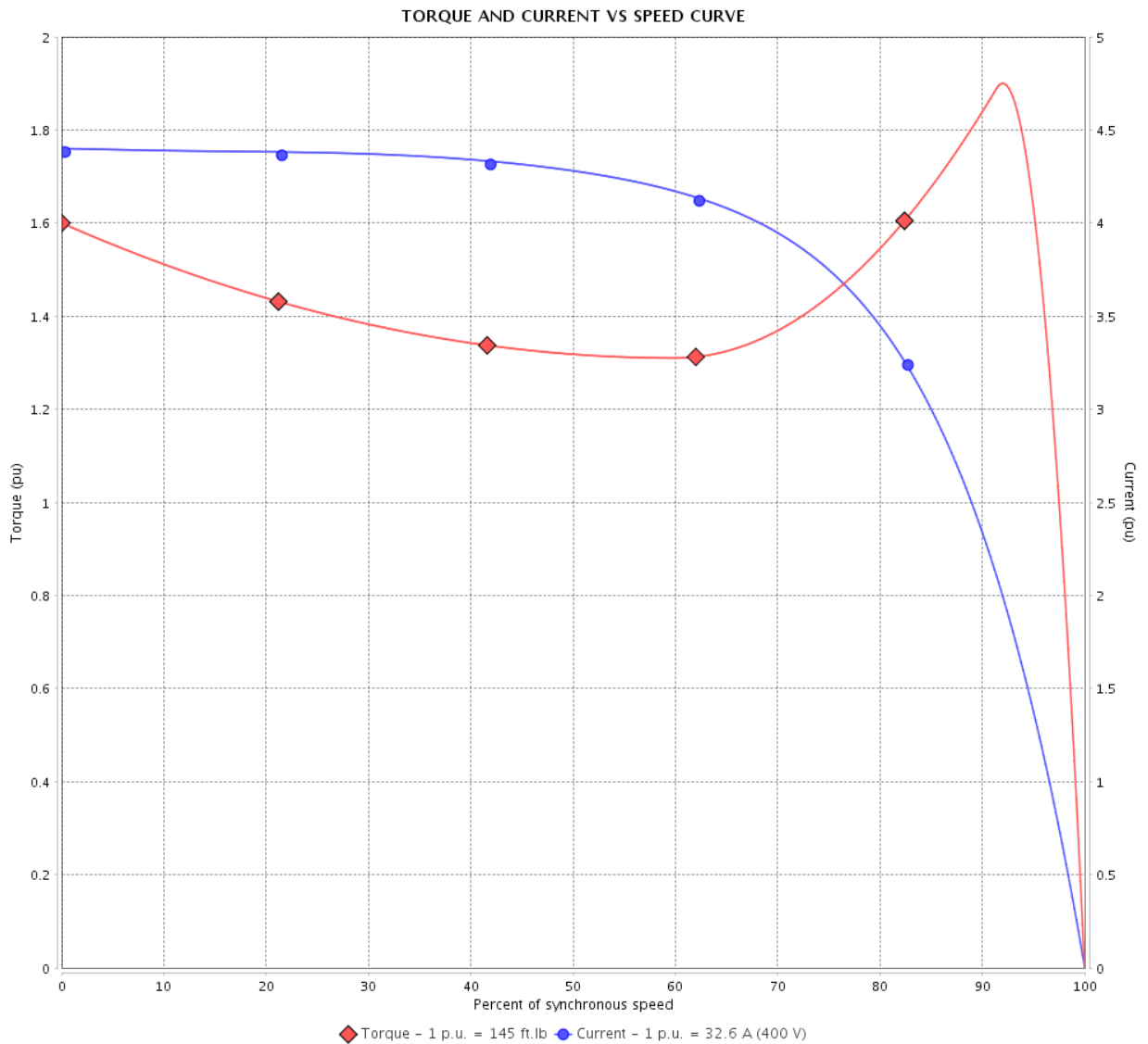
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Product code : 14325516

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Performance : 400 V 50 Hz 8P IE2

Rated current	: 32.6 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.4	Duty cycle	: Cont.(S1)
Rated torque	: 145 ft.lb	Insulation class	: F
Locked rotor torque	: 160 %	Service factor	: 1.15
Breakdown torque	: 190 %	Temperature rise	: 105 K
Rated speed	: 725 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# TORQUE AND CURRENT VS SPEED CURVE

Three Phase Induction Motor - Squirrel Cage



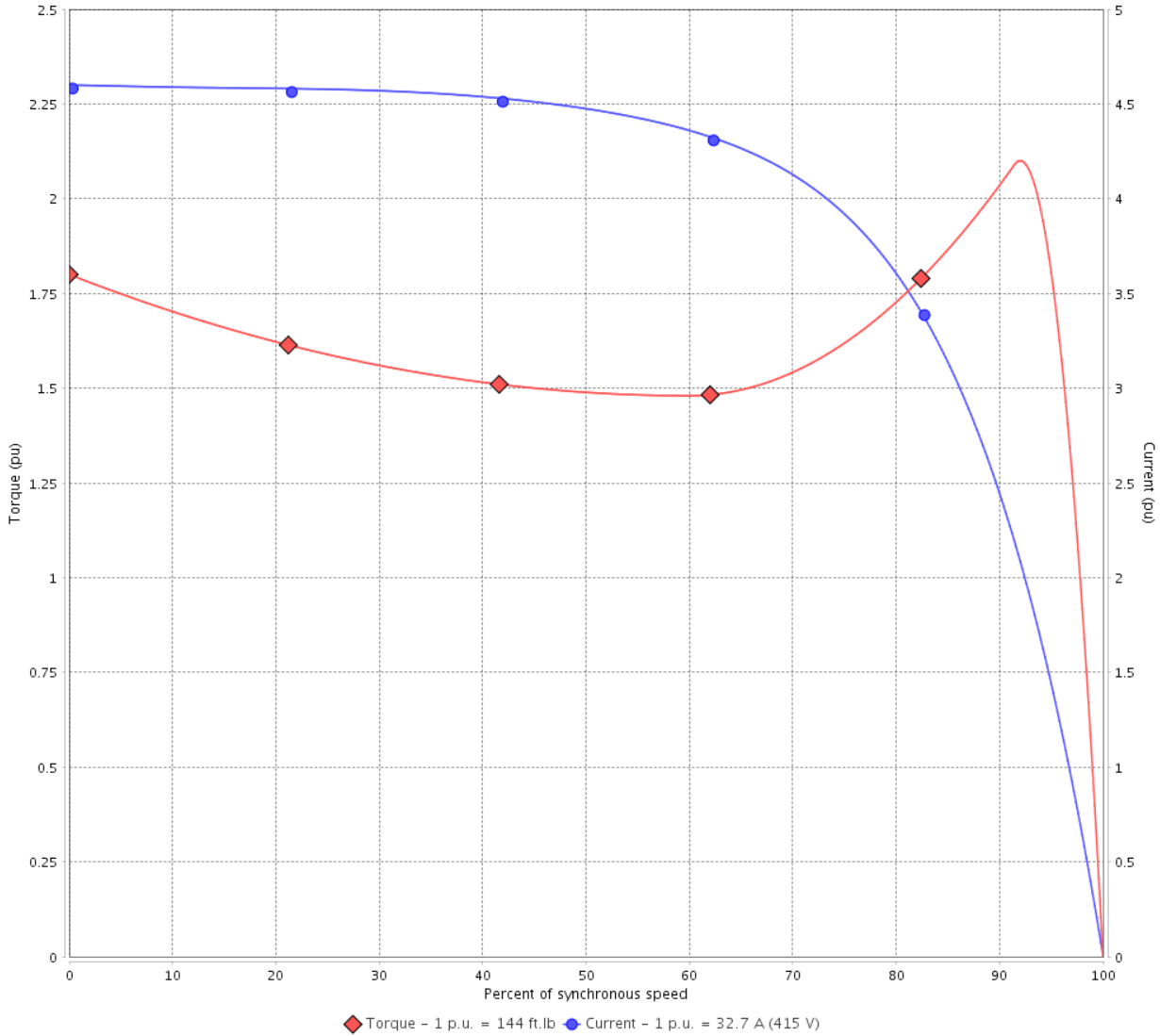
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TORQUE AND CURRENT VS SPEED CURVE



Performance : 415 V 50 Hz 8P IE2

Rated current	: 32.7 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.6	Duty cycle	: Cont.(S1)
Rated torque	: 144 ft.lb	Insulation class	: F
Locked rotor torque	: 180 %	Service factor	: 1.15
Breakdown torque	: 210 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Locked rotor time : 36s (cold) 20s (hot)

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# LOAD PERFORMANCE CURVE

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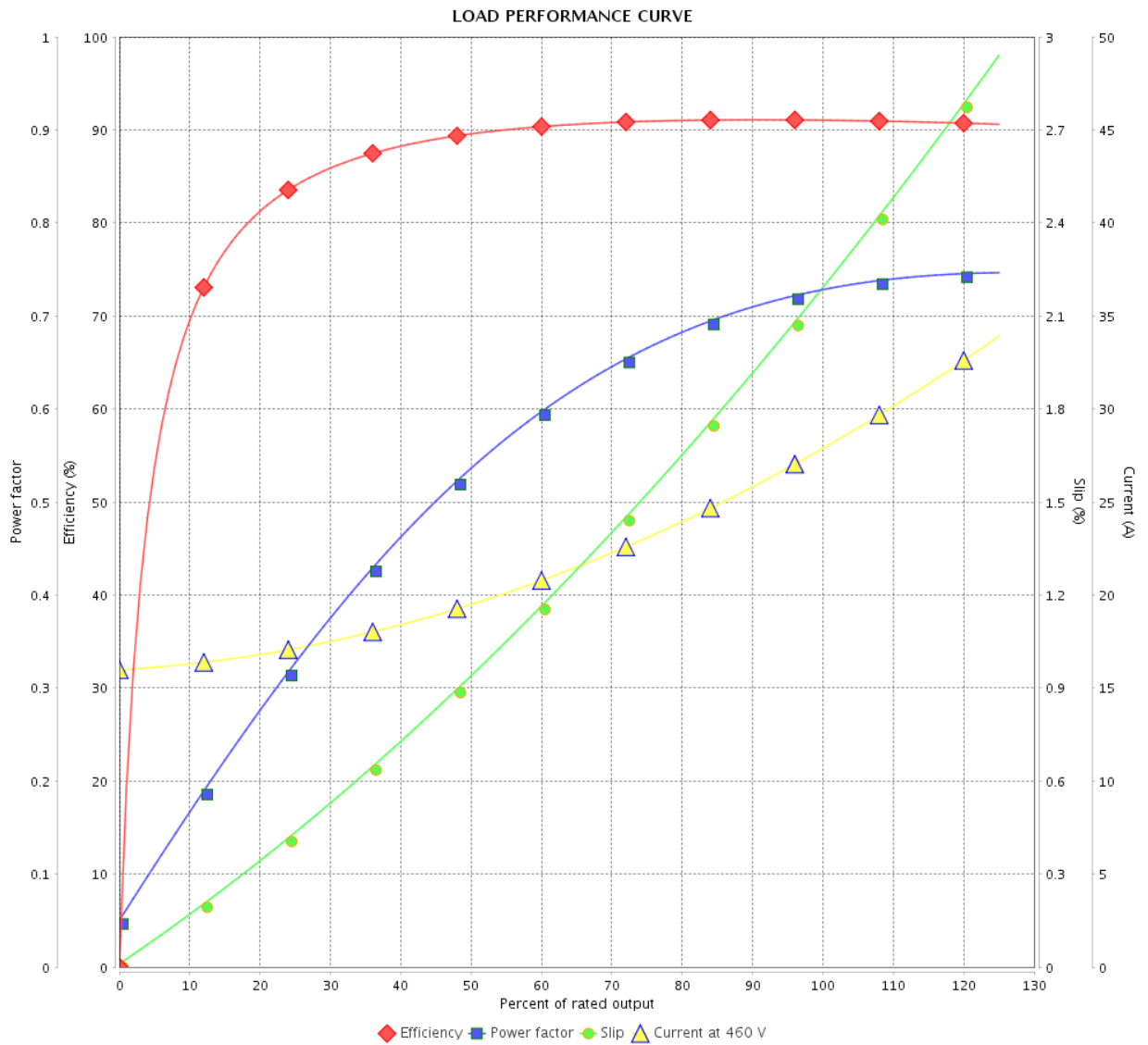


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Performance : 460 V 60 Hz 8P

Rated current : 28.3 A  
 LRC : 5.0  
 Rated torque : 119 ft.lb  
 Locked rotor torque : 190 %  
 Breakdown torque : 220 %  
 Rated speed : 880 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.25  
 Temperature rise : 80 K  
 Design : B

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# LOAD PERFORMANCE CURVE

Three Phase Induction Motor - Squirrel Cage



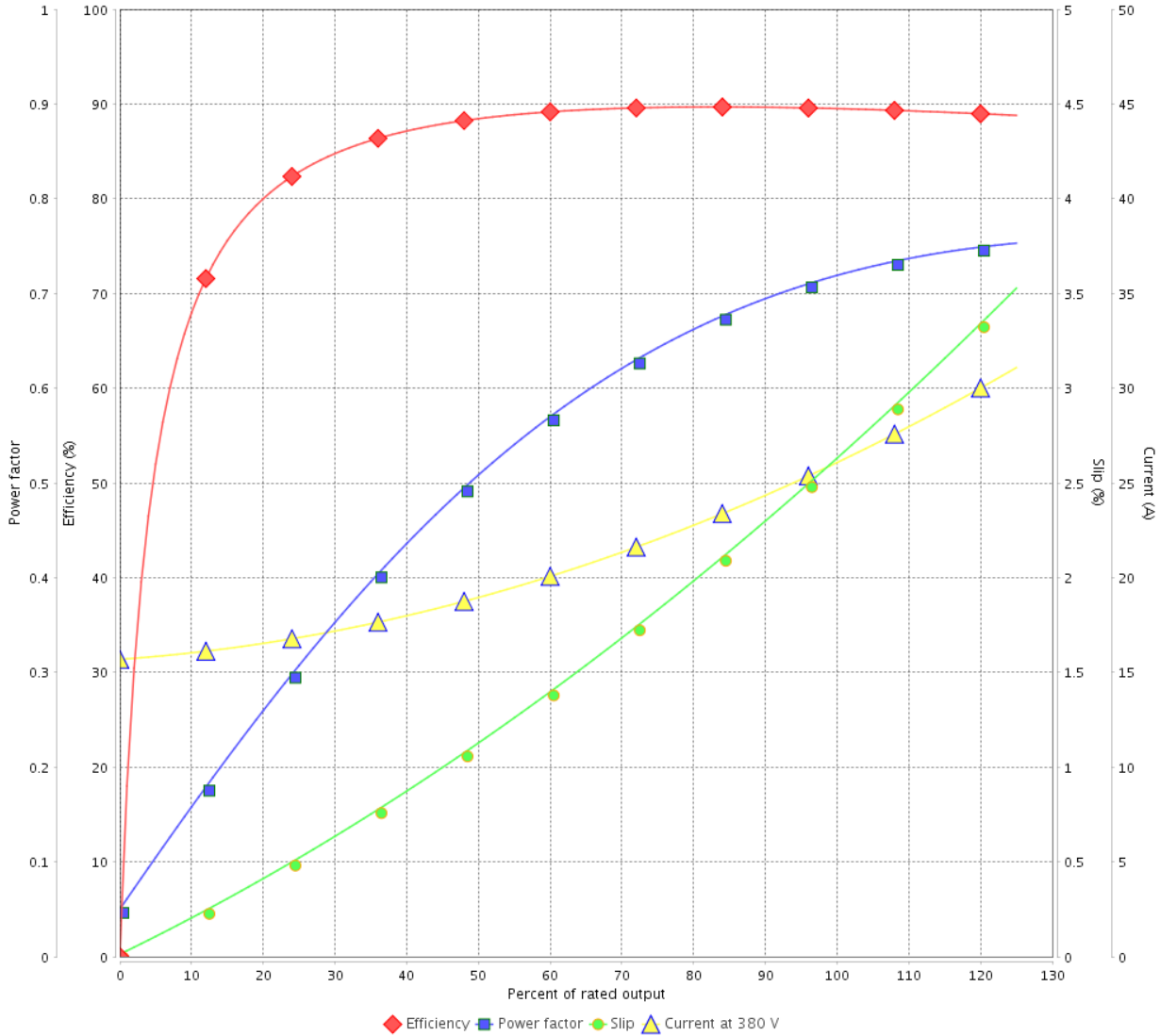
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LOAD PERFORMANCE CURVE



Performance : 380 V 50 Hz 8P IE3

Rated current : 26.5 A  
 LRC : 5.0  
 Rated torque : 108 ft.lb  
 Locked rotor torque : 190 %  
 Breakdown torque : 229 %  
 Rated speed : 730 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : B

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# LOAD PERFORMANCE CURVE

## Three Phase Induction Motor - Squirrel Cage

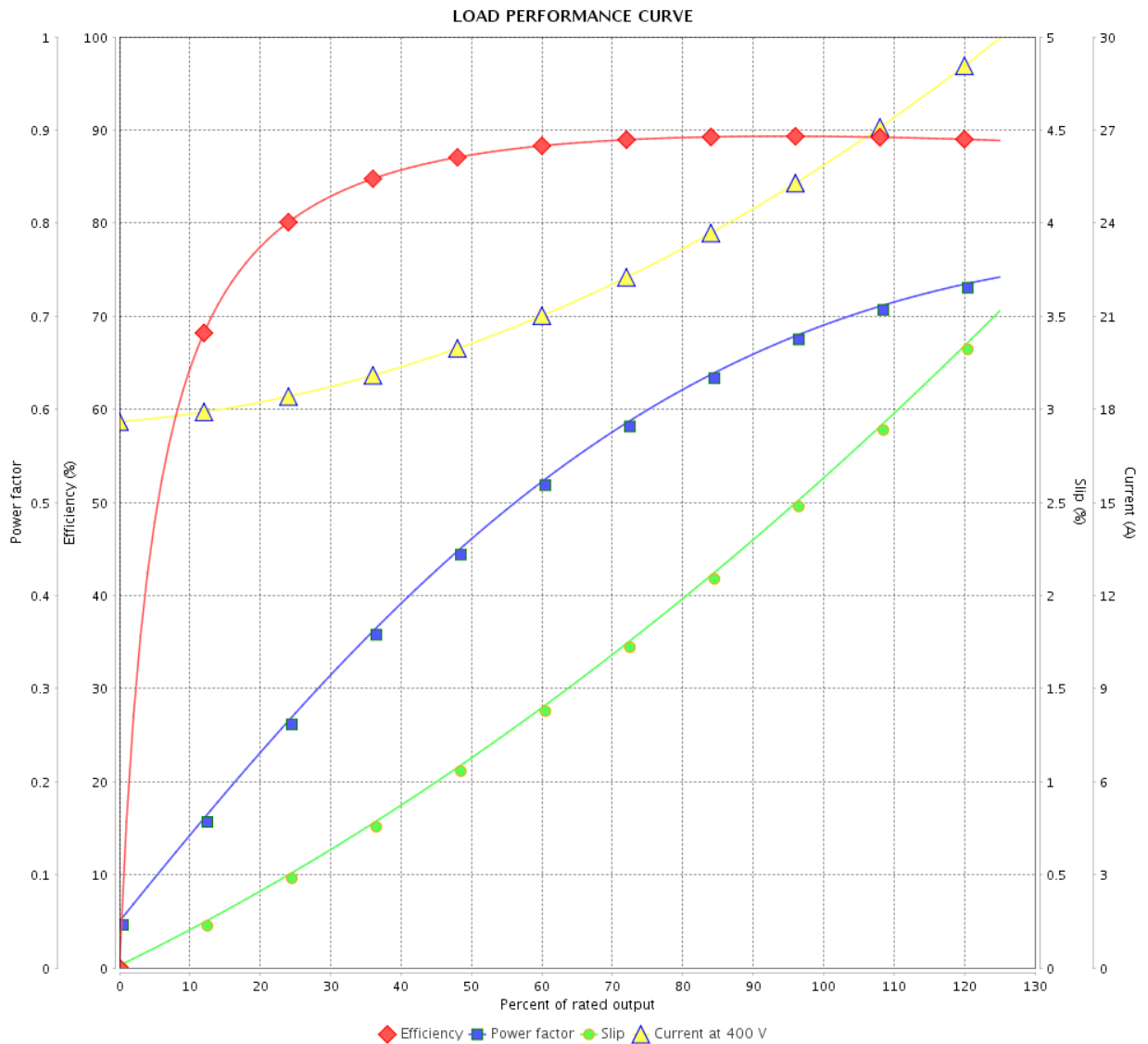


Customer : \_\_\_\_\_

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

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Performance : 400 V 50 Hz 8P IE3

Rated current : 26.4 A  
 LRC : 5.4  
 Rated torque : 108 ft.lb  
 Locked rotor torque : 210 %  
 Breakdown torque : 260 %  
 Rated speed : 730 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 80 K  
 Design : B

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Three Phase Induction Motor - Squirrel Cage



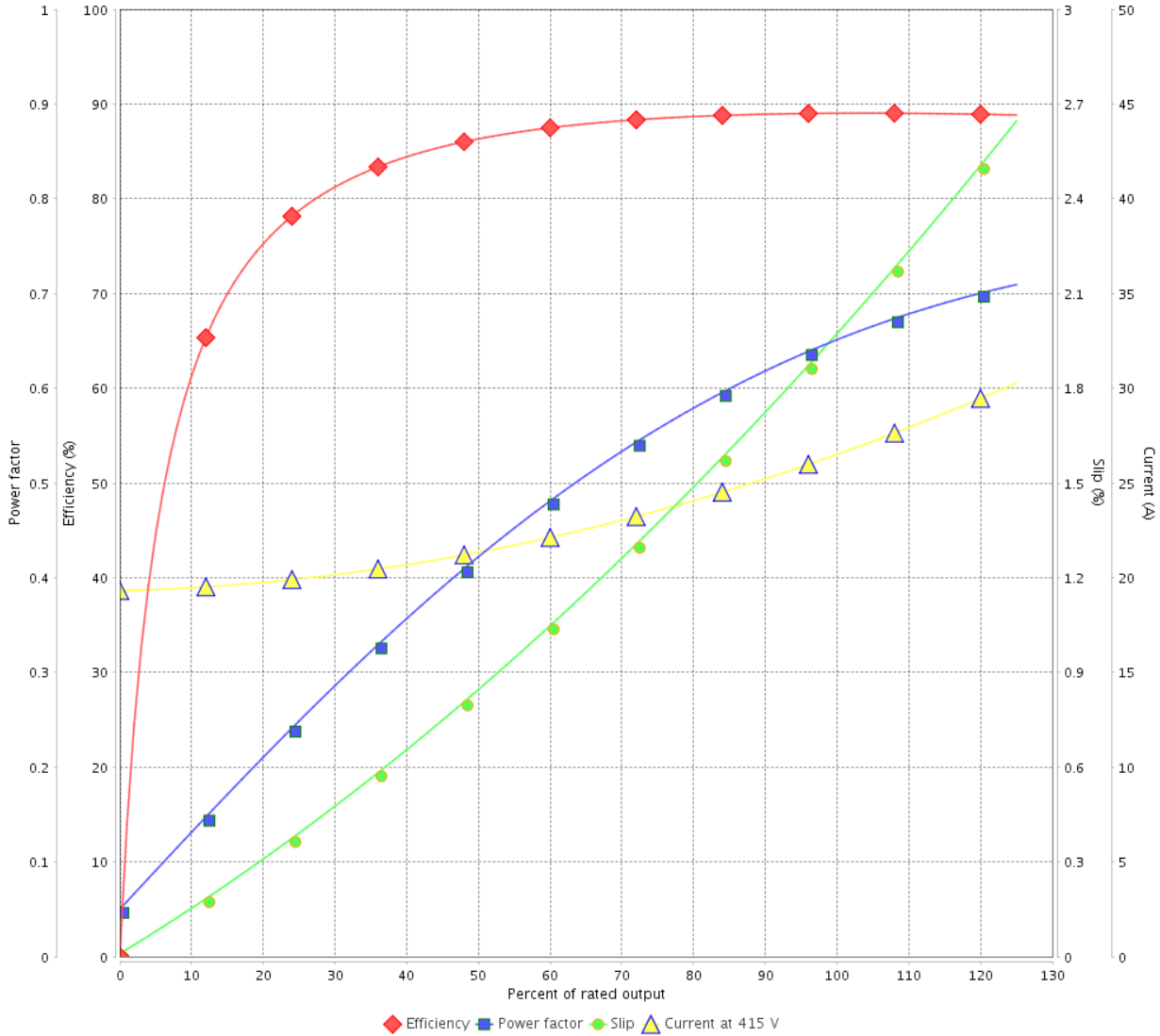
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LOAD PERFORMANCE CURVE



Performance : 415 V 50 Hz 8P IE3

Rated current : 27.1 A  
 LRC : 5.6  
 Rated torque : 107 ft.lb  
 Locked rotor torque : 240 %  
 Breakdown torque : 280 %  
 Rated speed : 735 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 80 K  
 Design : B

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# LOAD PERFORMANCE CURVE

## Three Phase Induction Motor - Squirrel Cage

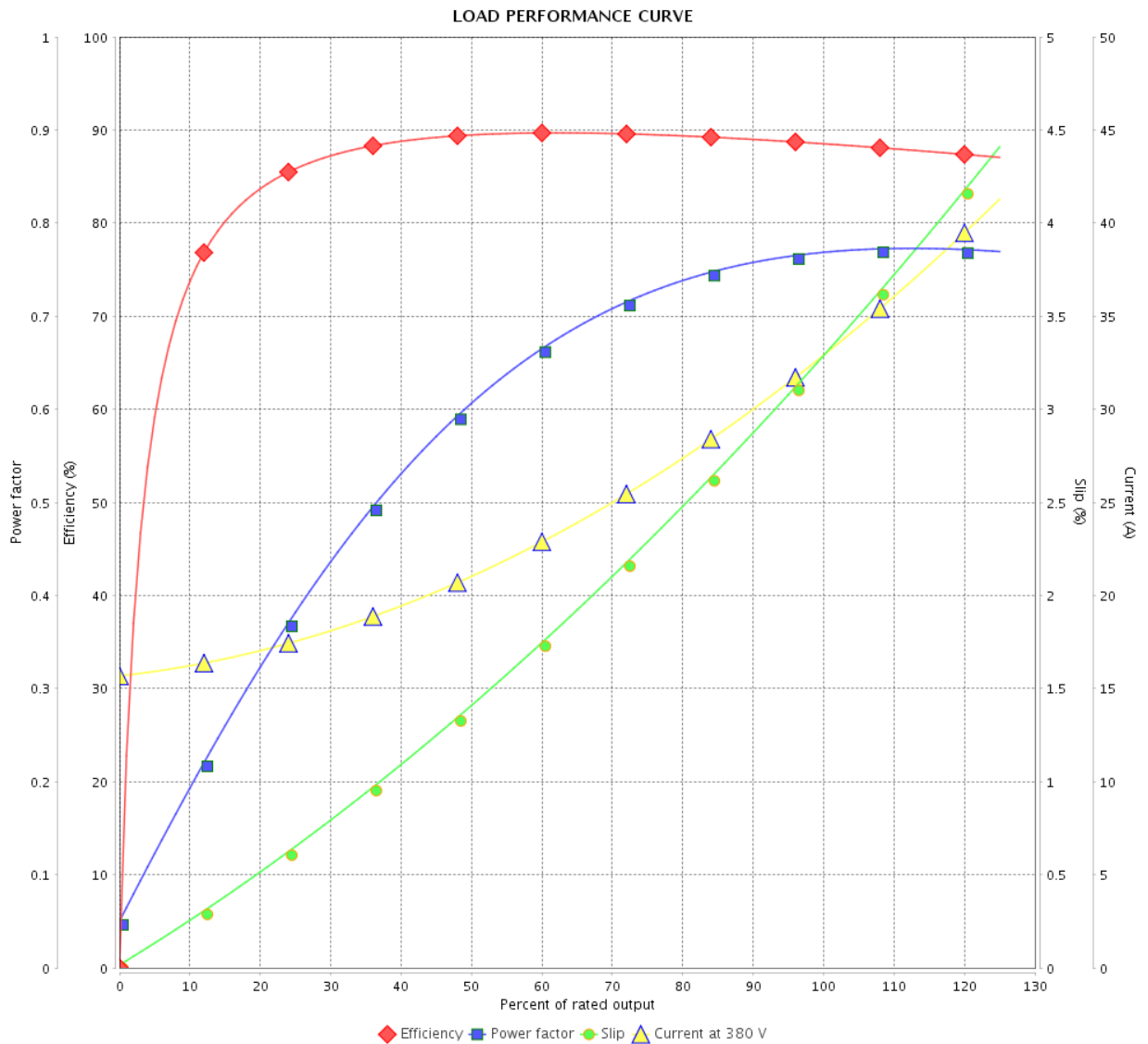


Customer :

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Catalog # : 02009ST3QIE324TC-W22



Performance : 380 V 50 Hz 8P IE2

Rated current : 33.4 A  
 LRC : 4.0  
 Rated torque : 145 ft.lb  
 Locked rotor torque : 140 %  
 Breakdown torque : 170 %  
 Rated speed : 725 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 105 K  
 Design : B

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Three Phase Induction Motor - Squirrel Cage



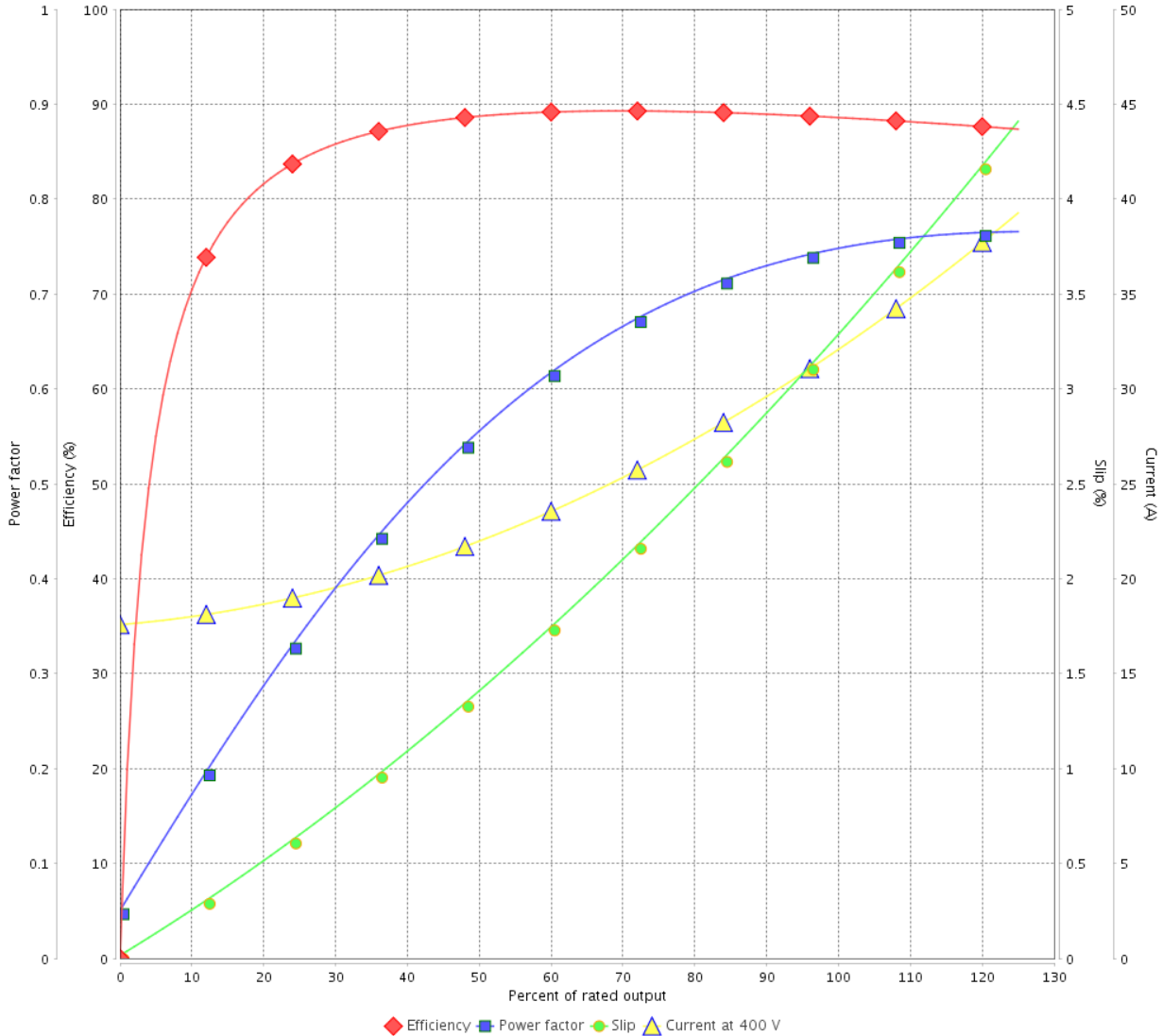
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Performance : 400 V 50 Hz 8P IE2

Rated current : 32.6 A  
 LRC : 4.4  
 Rated torque : 145 ft.lb  
 Locked rotor torque : 160 %  
 Breakdown torque : 190 %  
 Rated speed : 725 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 105 K  
 Design : B

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# LOAD PERFORMANCE CURVE

## Three Phase Induction Motor - Squirrel Cage

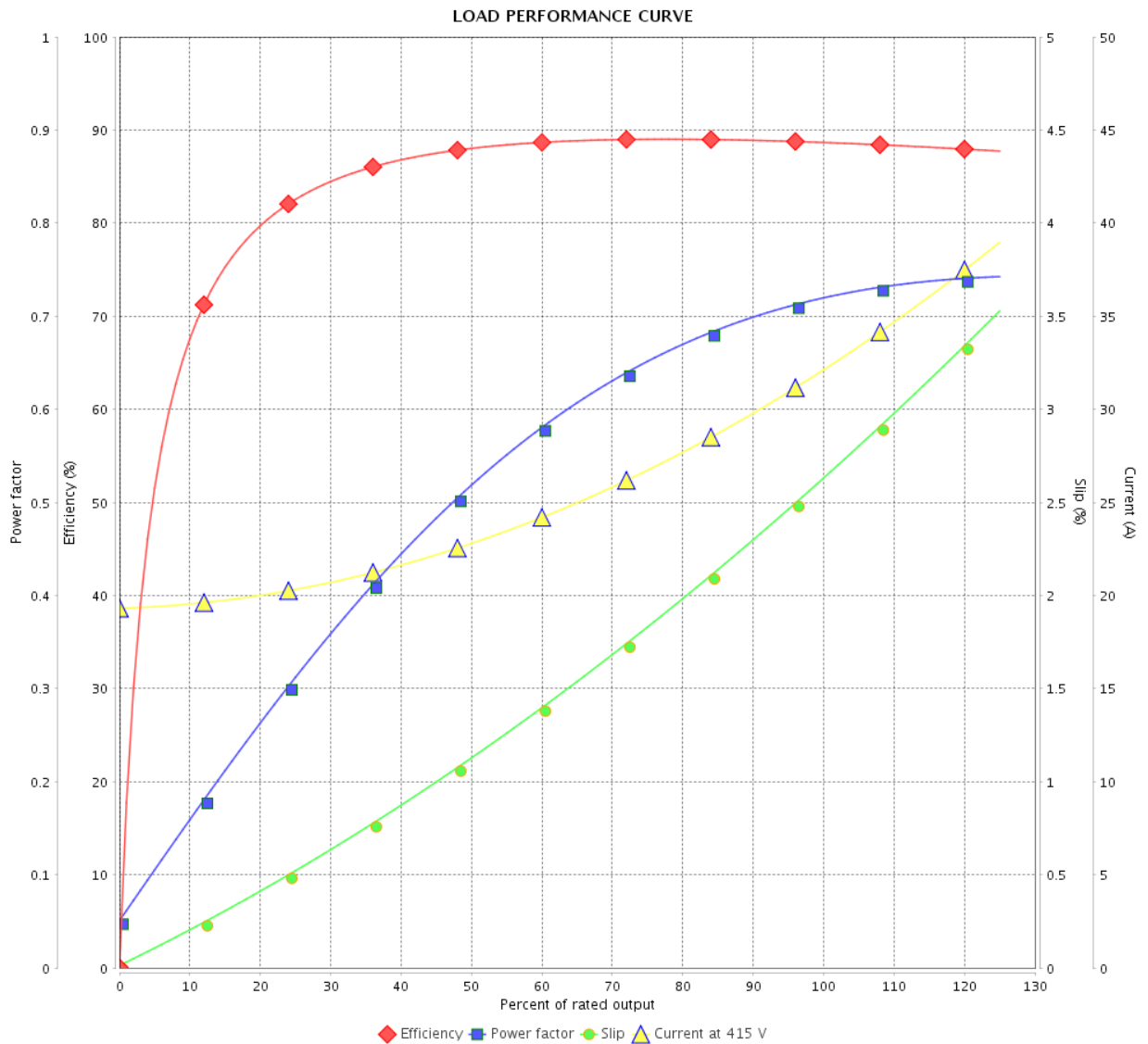


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Catalog # : 02009ST3QIE324TC-W22



Performance : 415 V 50 Hz 8P IE2

Rated current : 32.7 A  
 LRC : 4.6  
 Rated torque : 144 ft.lb  
 Locked rotor torque : 180 %  
 Breakdown torque : 210 %  
 Rated speed : 730 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 80 K  
 Design : B

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# THERMAL LIMIT CURVE

## Three Phase Induction Motor - Squirrel Cage



Customer :

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Performance : 460 V 60 Hz 8P

Rated current	: 28.3 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.0	Duty cycle	: Cont.(S1)
Rated torque	: 119 ft.lb	Insulation class	: F
Locked rotor torque	: 190 %	Service factor	: 1.25
Breakdown torque	: 220 %	Temperature rise	: 80 K
Rated speed	: 880 rpm	Design	: B

Heating constant

Cooling constant

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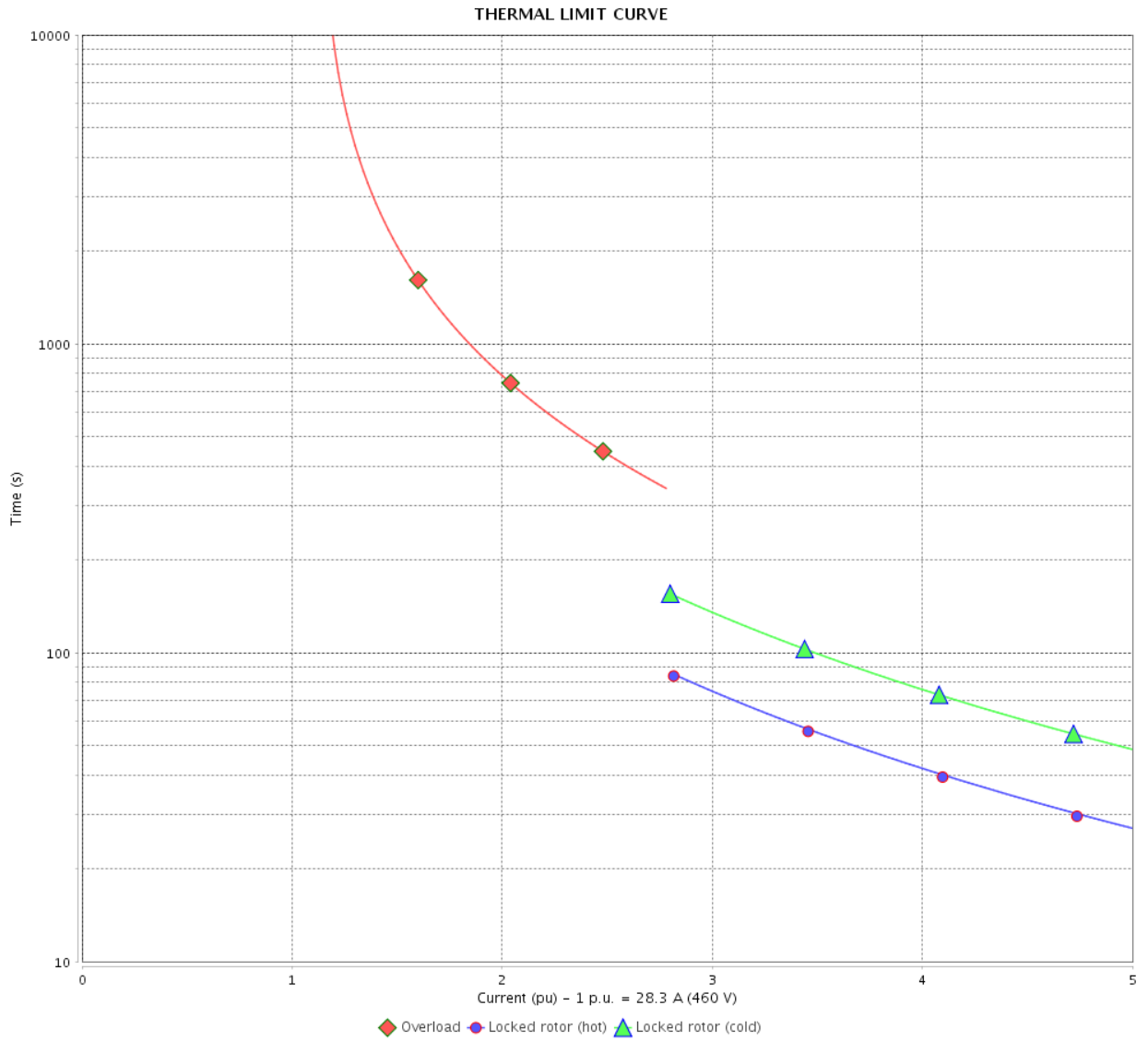


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Three Phase Induction Motor - Squirrel Cage



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# THERMAL LIMIT CURVE



## Three Phase Induction Motor - Squirrel Cage

Customer :

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Product code : 14325516  
Catalog # : 02009ST3QIE324TC-W22

Performance : 380 V 50 Hz 8P IE3

Rated current	: 26.5 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.0	Duty cycle	: Cont.(S1)
Rated torque	: 108 ft.lb	Insulation class	: F
Locked rotor torque	: 190 %	Service factor	: 1.00
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Heating constant

Cooling constant

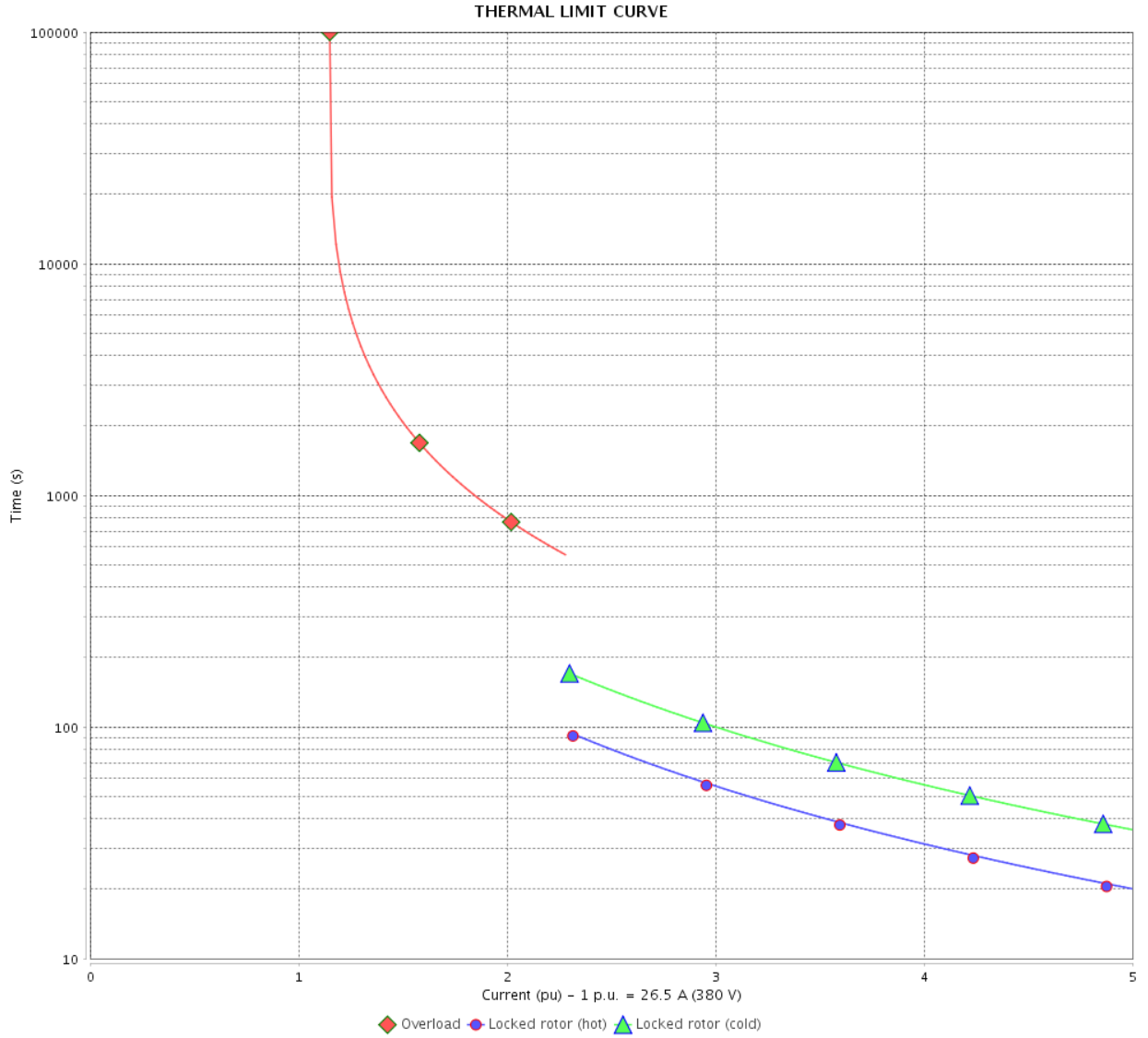
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# THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage



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Performance : 400 V 50 Hz 8P IE3

Rated current	: 26.4 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 5.4	Duty cycle	: Cont.(S1)
Rated torque	: 108 ft.lb	Insulation class	: F
Locked rotor torque	: 210 %	Service factor	: 1.15
Breakdown torque	: 260 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Heating constant

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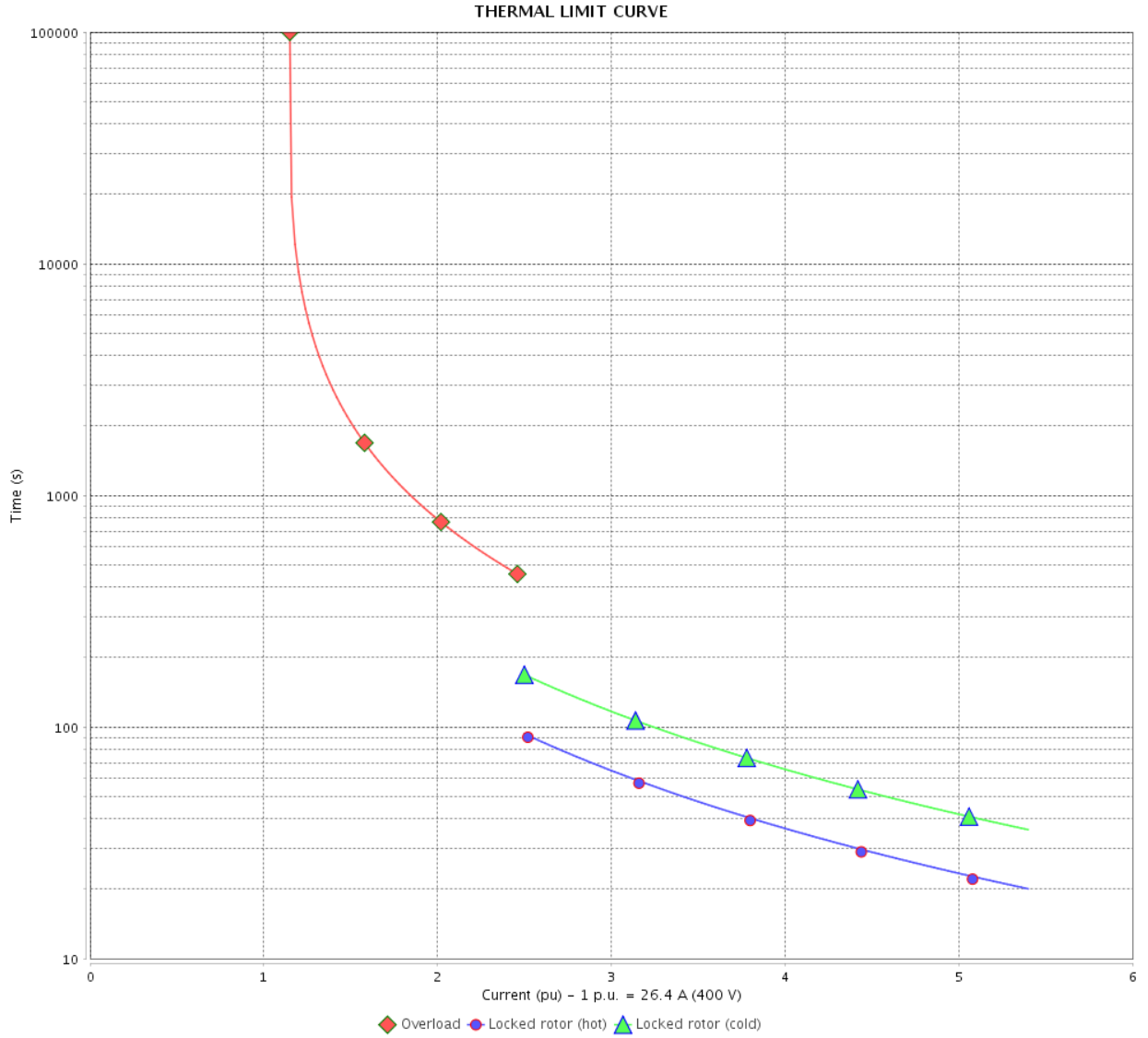
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Three Phase Induction Motor - Squirrel Cage



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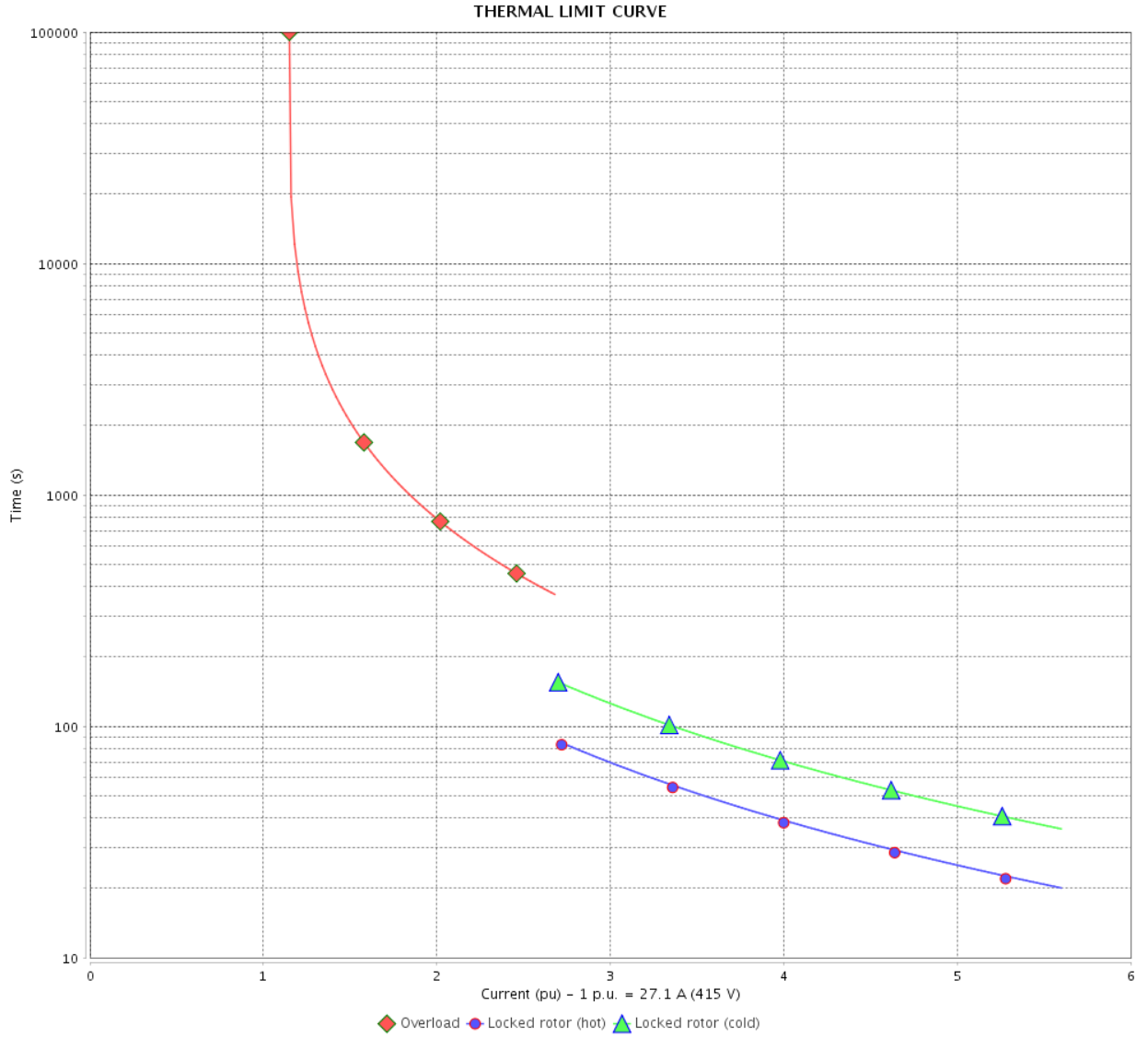
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LRC : 4.0	Duty cycle : Cont.(S1)
Rated torque : 145 ft.lb	Insulation class : F
Locked rotor torque : 140 %	Service factor : 1.00
Breakdown torque : 170 %	Temperature rise : 105 K
Rated speed : 725 rpm	Design : B

Heating constant

Cooling constant

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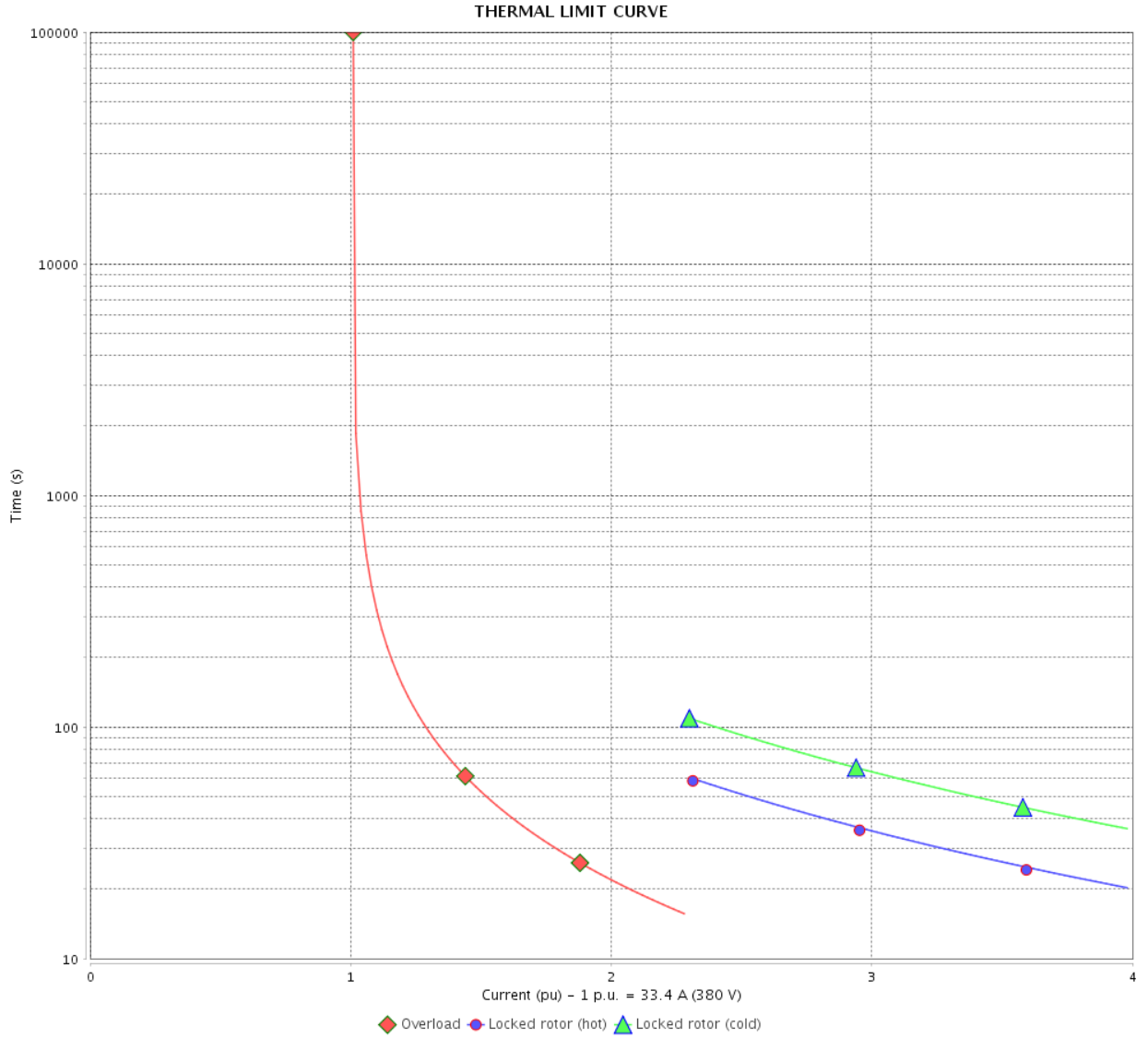


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Date		14/04/2022		

# THERMAL LIMIT CURVE

## Three Phase Induction Motor - Squirrel Cage



Customer :

Product line : NEMA Premium Efficiency Three-Phase  
Product code : 14325516  
Catalog # : 02009ST3QIE324TC-W22

Performance : 400 V 50 Hz 8P IE2

Rated current	: 32.6 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.4	Duty cycle	: Cont.(S1)
Rated torque	: 145 ft.lb	Insulation class	: F
Locked rotor torque	: 160 %	Service factor	: 1.15
Breakdown torque	: 190 %	Temperature rise	: 105 K
Rated speed	: 725 rpm	Design	: B

Heating constant

Cooling constant

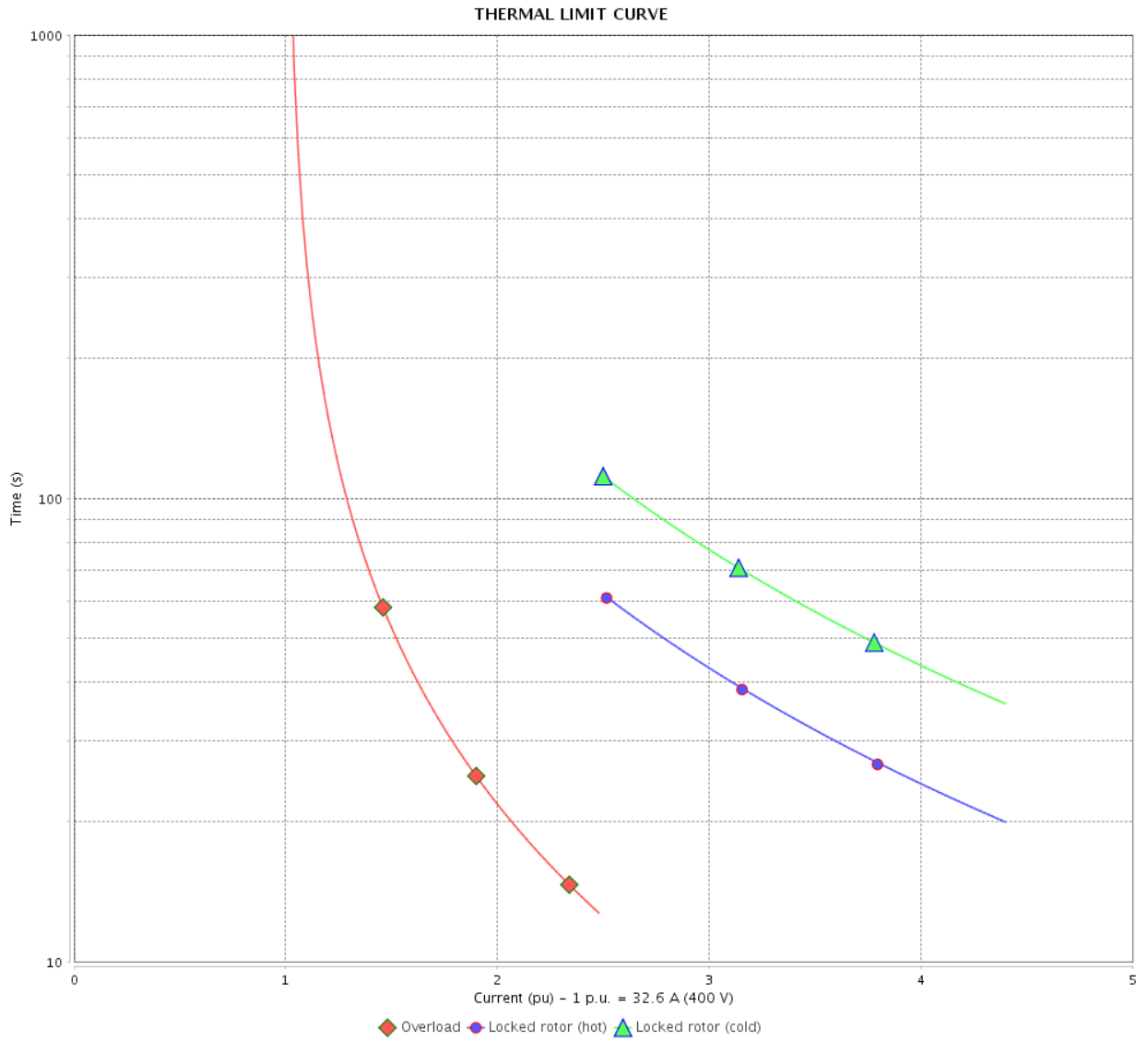
Rev.	Changes Summary	Performed	Checked	Date
Performed by				
Checked by			Page	Revision
Date	14/04/2022		26 / 36	

# THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage



Customer : \_\_\_\_\_



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Performed by		Page 27 / 36		Revision
Checked by				
Date				

# THERMAL LIMIT CURVE

## Three Phase Induction Motor - Squirrel Cage



Customer :

Product line : NEMA Premium Efficiency Three-Phase  
Product code : 14325516  
Catalog # : 02009ST3QIE324TC-W22

Performance : 415 V 50 Hz 8P IE2

Rated current	: 32.7 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.6	Duty cycle	: Cont.(S1)
Rated torque	: 144 ft.lb	Insulation class	: F
Locked rotor torque	: 180 %	Service factor	: 1.15
Breakdown torque	: 210 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

Heating constant

Cooling constant

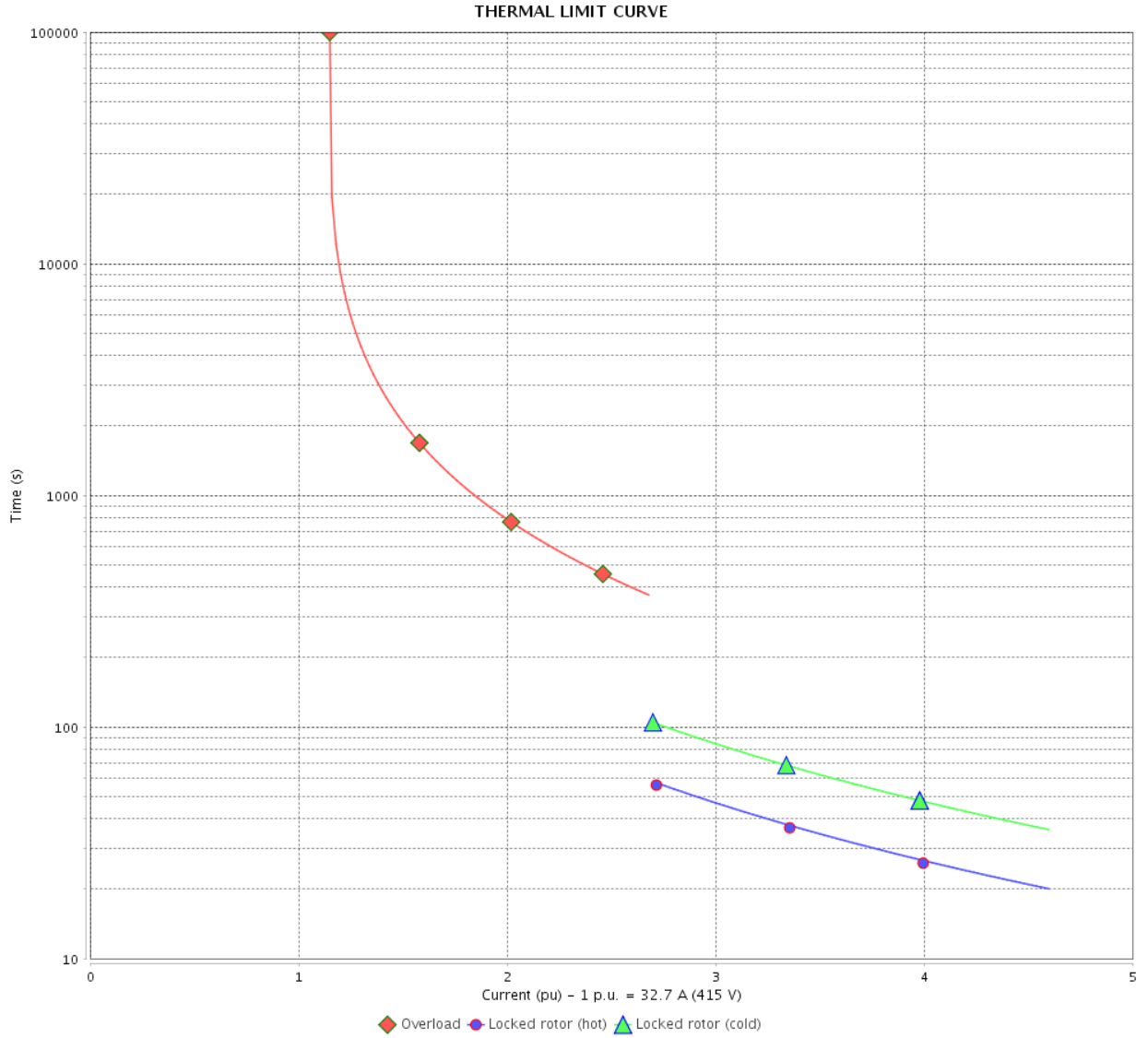
Rev.	Changes Summary	Performed	Checked	Date
Performed by				
Checked by			Page	Revision
Date	14/04/2022		28 / 36	

# THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage



Customer : \_\_\_\_\_



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Performed by		Page		Revision
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Date		14/04/2022		

# VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

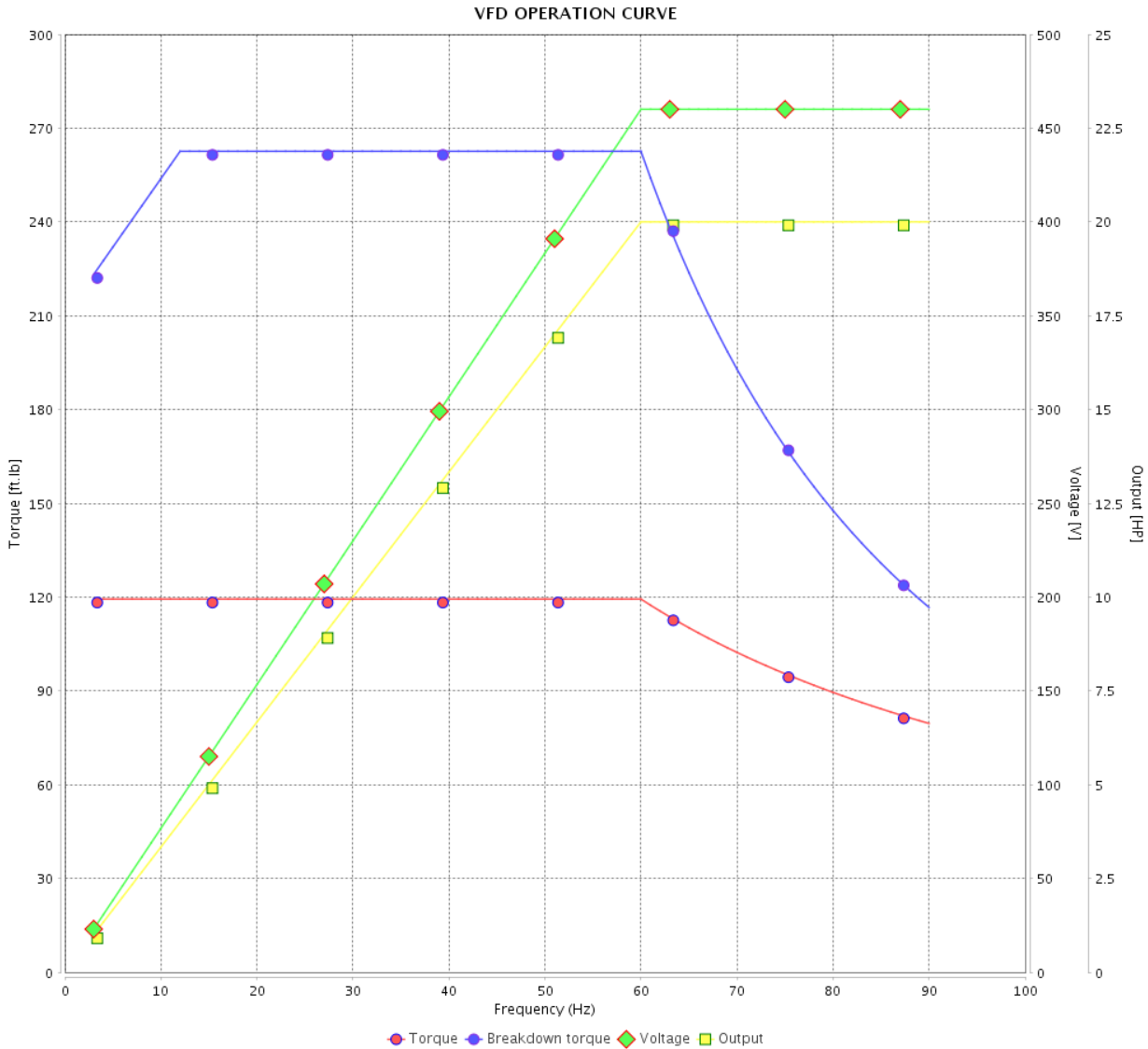


Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 460 V 60 Hz 8P

Rated current : 28.3 A  
 LRC : 5.0  
 Rated torque : 119 ft.lb  
 Locked rotor torque : 190 %  
 Breakdown torque : 220 %  
 Rated speed : 880 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.25  
 Temperature rise : 80 K  
 Design : B

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Performed by			Page	Revision
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Date				
		30 / 36		

# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage

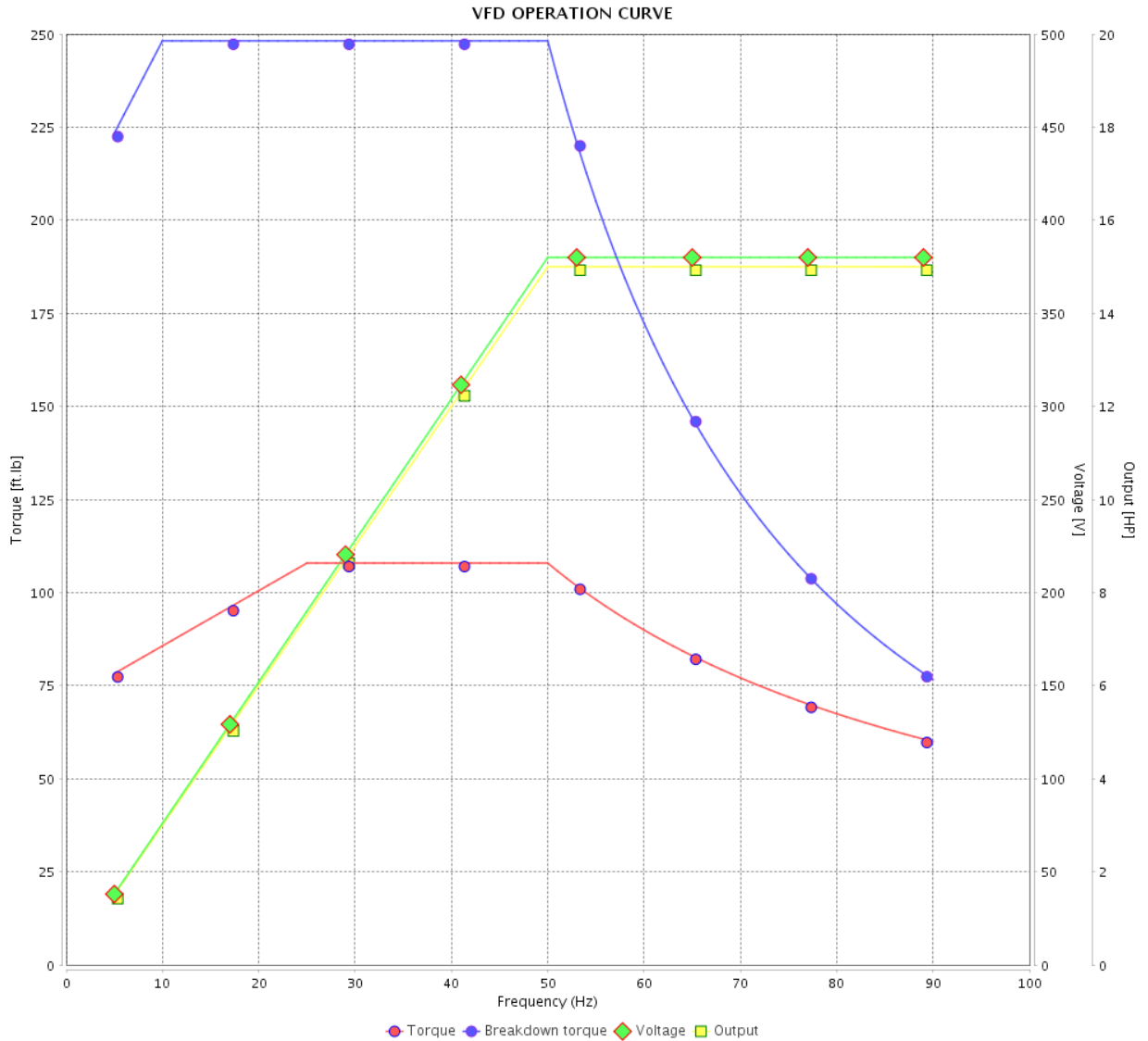


Customer : \_\_\_\_\_

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 380 V 50 Hz 8P IE3

Rated current : 26.5 A  
 LRC : 5.0  
 Rated torque : 108 ft.lb  
 Locked rotor torque : 190 %  
 Breakdown torque : 229 %  
 Rated speed : 730 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 80 K  
 Design : B

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Performed by		Page		Revision
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Date		14/04/2022		

# VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage



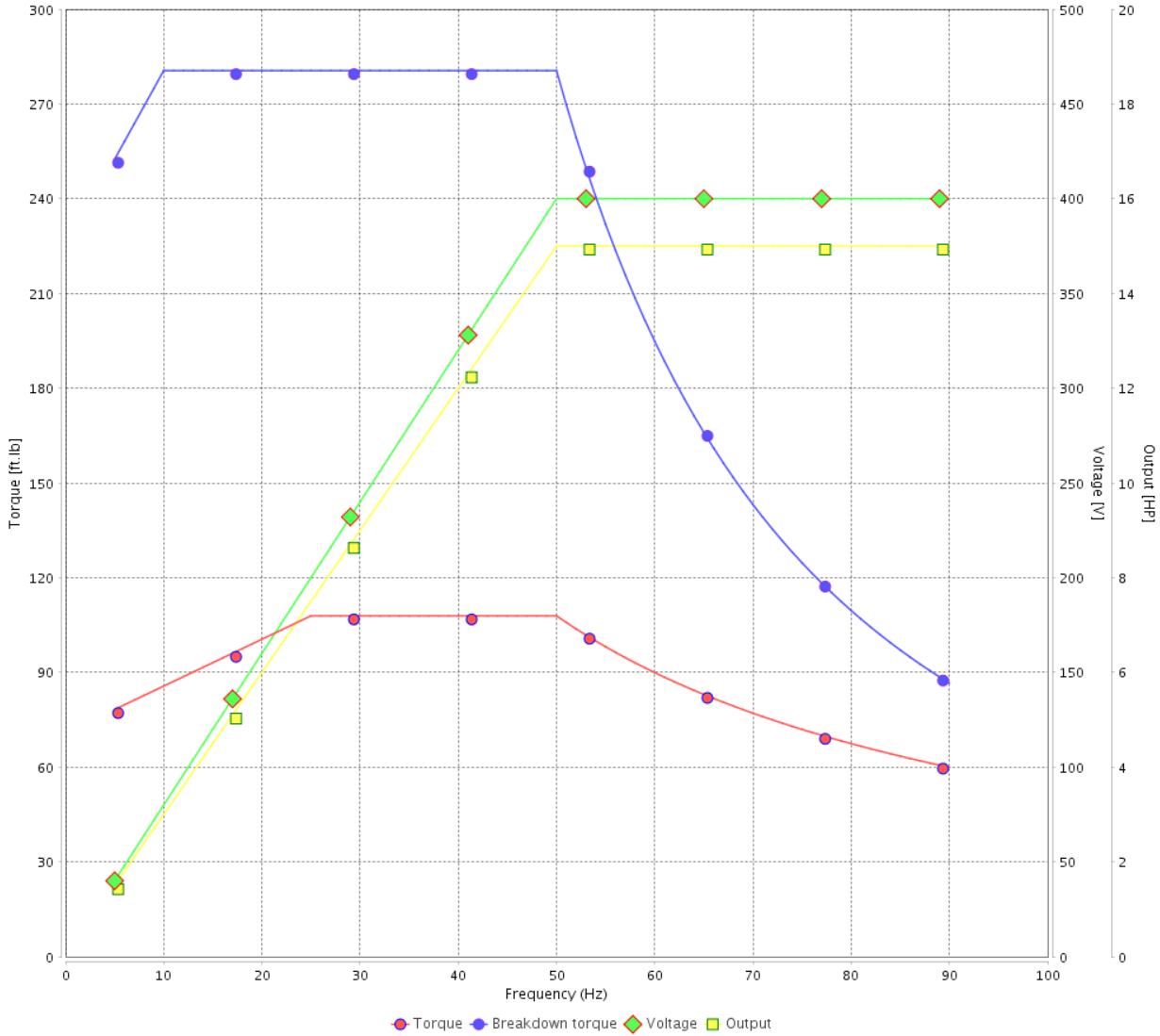
Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22

VFD OPERATION CURVE



Performance : 400 V 50 Hz 8P IE3

Rated current : 26.4 A  
 LRC : 5.4  
 Rated torque : 108 ft.lb  
 Locked rotor torque : 210 %  
 Breakdown torque : 260 %  
 Rated speed : 730 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 80 K  
 Design : B

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Date	14/04/2022			



# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage

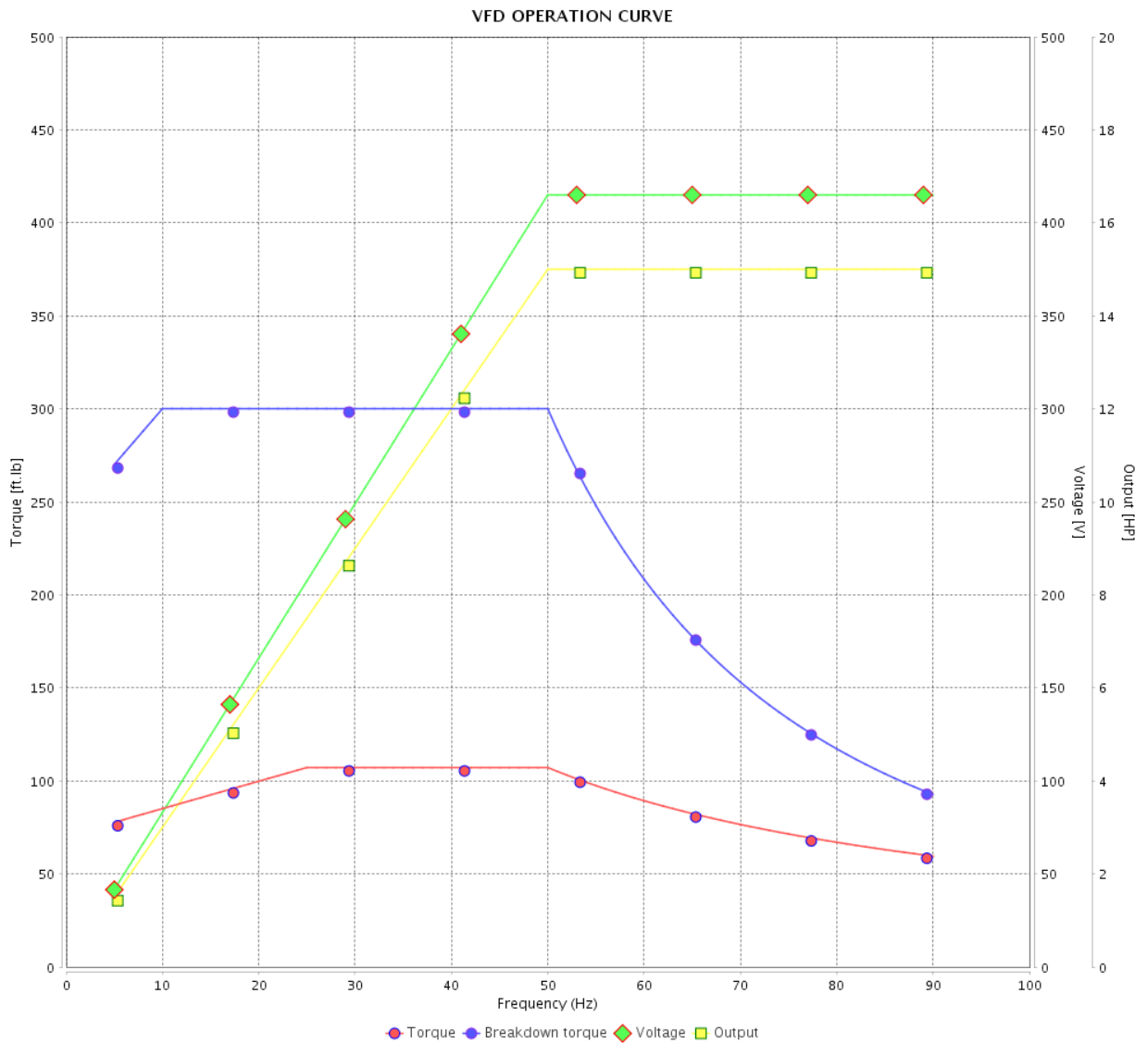


Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 415 V 50 Hz 8P IE3

Rated current : 27.1 A  
 LRC : 5.6  
 Rated torque : 107 ft.lb  
 Locked rotor torque : 240 %  
 Breakdown torque : 280 %  
 Rated speed : 735 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 80 K  
 Design : B

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# VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

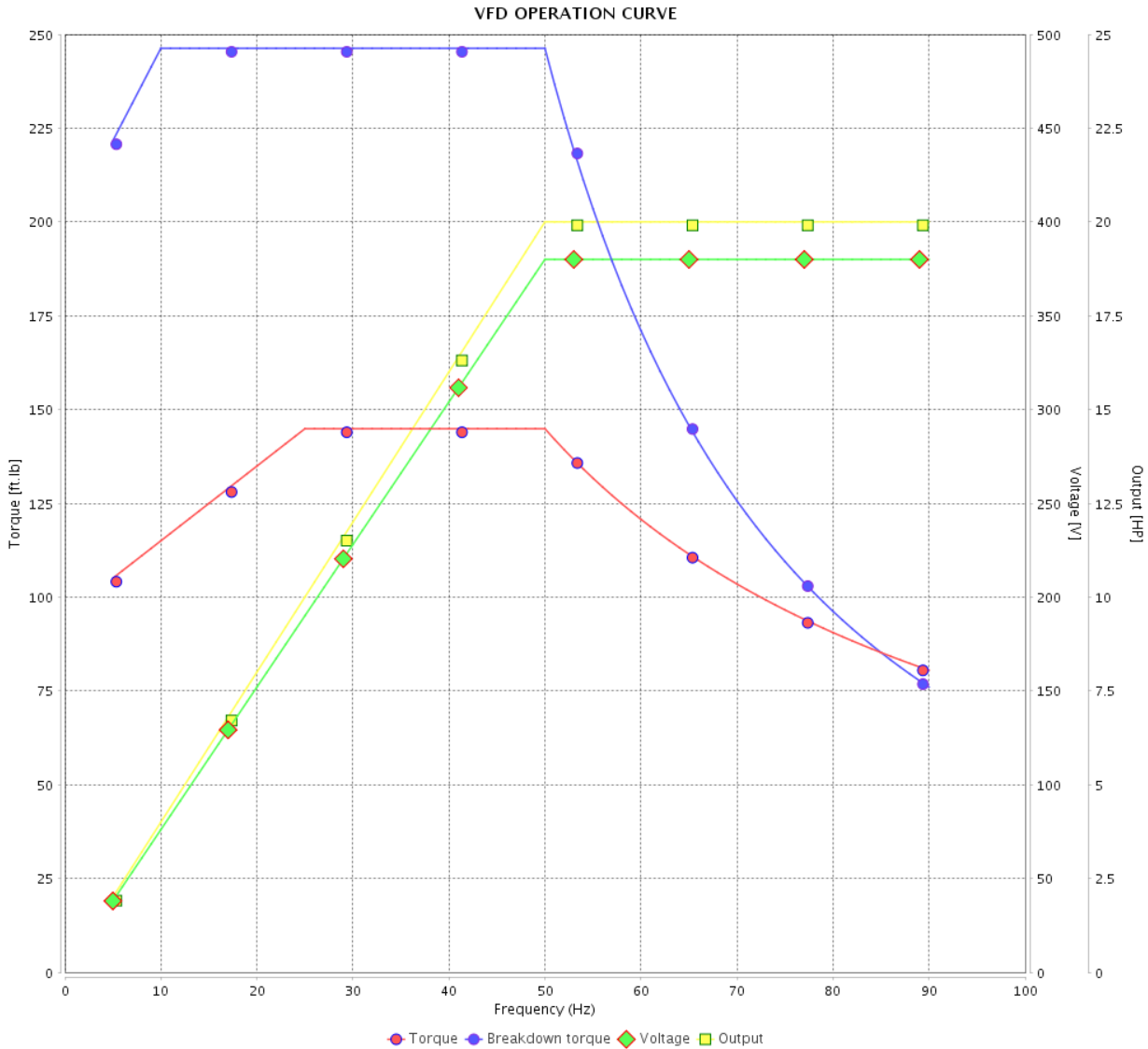


Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 380 V 50 Hz 8P IE2

Rated current : 33.4 A  
 LRC : 4.0  
 Rated torque : 145 ft.lb  
 Locked rotor torque : 140 %  
 Breakdown torque : 170 %  
 Rated speed : 725 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.00  
 Temperature rise : 105 K  
 Design : B

Rev.	Changes Summary	Performed	Checked	Date
Performed by			Page 34 / 36	Revision
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Date	14/04/2022			

# VFD OPERATION CURVE

## Three Phase Induction Motor - Squirrel Cage

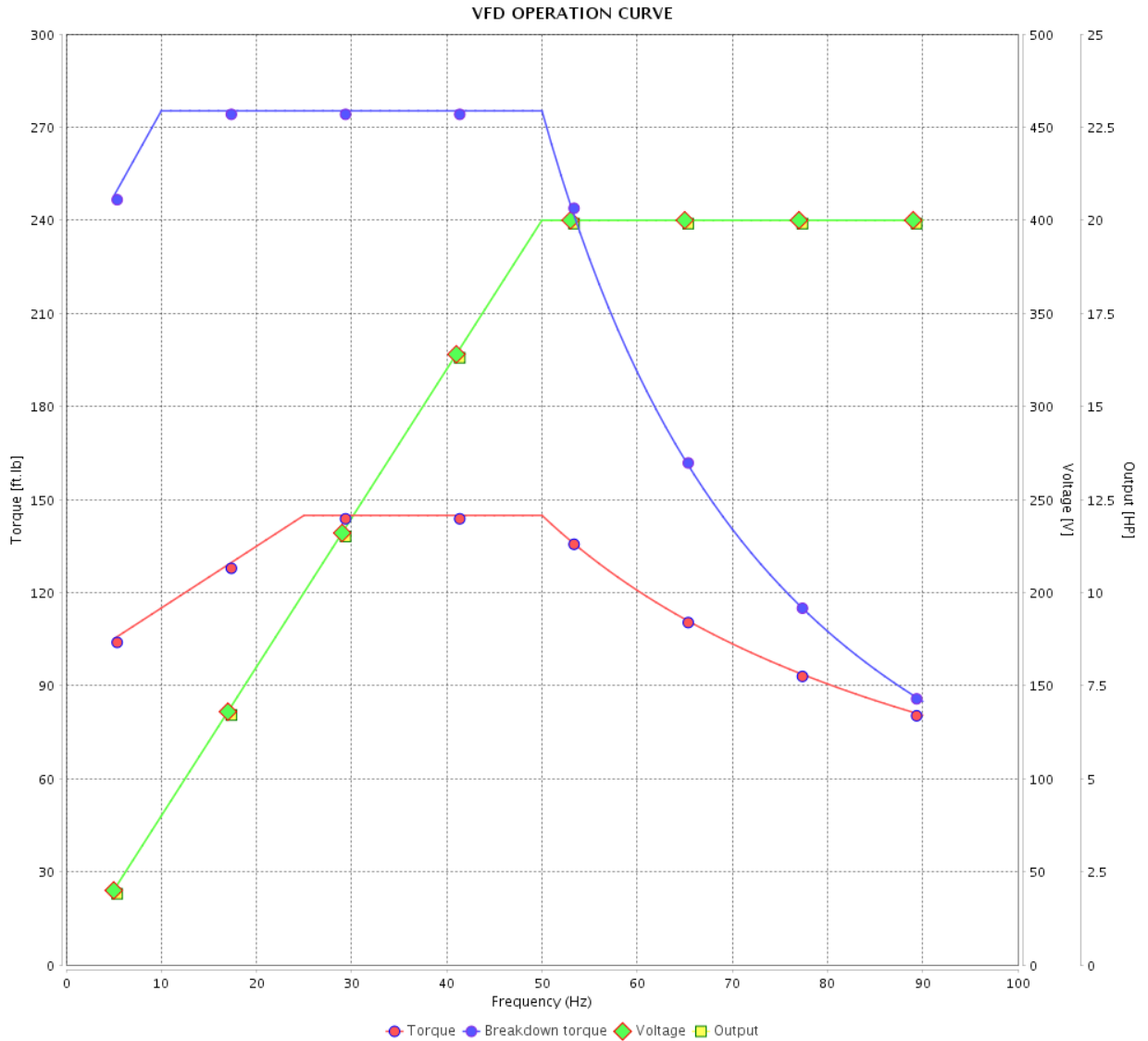


Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22



Performance : 400 V 50 Hz 8P IE2

Rated current : 32.6 A  
 LRC : 4.4  
 Rated torque : 145 ft.lb  
 Locked rotor torque : 160 %  
 Breakdown torque : 190 %  
 Rated speed : 725 rpm

Moment of inertia (J) : 9.37 sq.ft.lb  
 Duty cycle : Cont.(S1)  
 Insulation class : F  
 Service factor : 1.15  
 Temperature rise : 105 K  
 Design : B

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# VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage



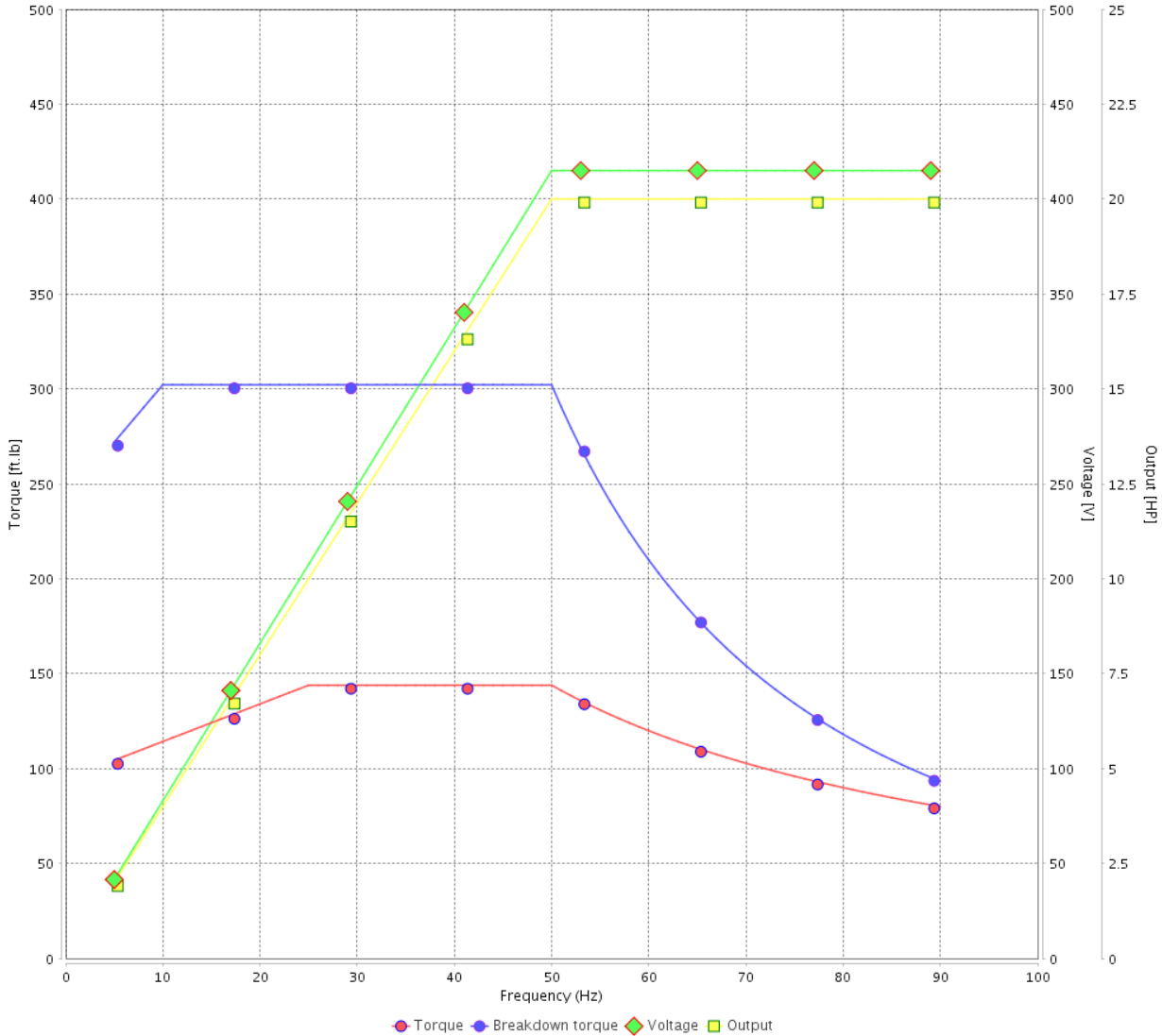
Customer :

Product line : NEMA Premium Efficiency Three-Phase

Product code : 14325516

Catalog # : 02009ST3QIE324TC-W22

VFD OPERATION CURVE



Performance : 415 V 50 Hz 8P IE2

Rated current	: 32.7 A	Moment of inertia (J)	: 9.37 sq.ft.lb
LRC	: 4.6	Duty cycle	: Cont.(S1)
Rated torque	: 144 ft.lb	Insulation class	: F
Locked rotor torque	: 180 %	Service factor	: 1.15
Breakdown torque	: 210 %	Temperature rise	: 80 K
Rated speed	: 730 rpm	Design	: B

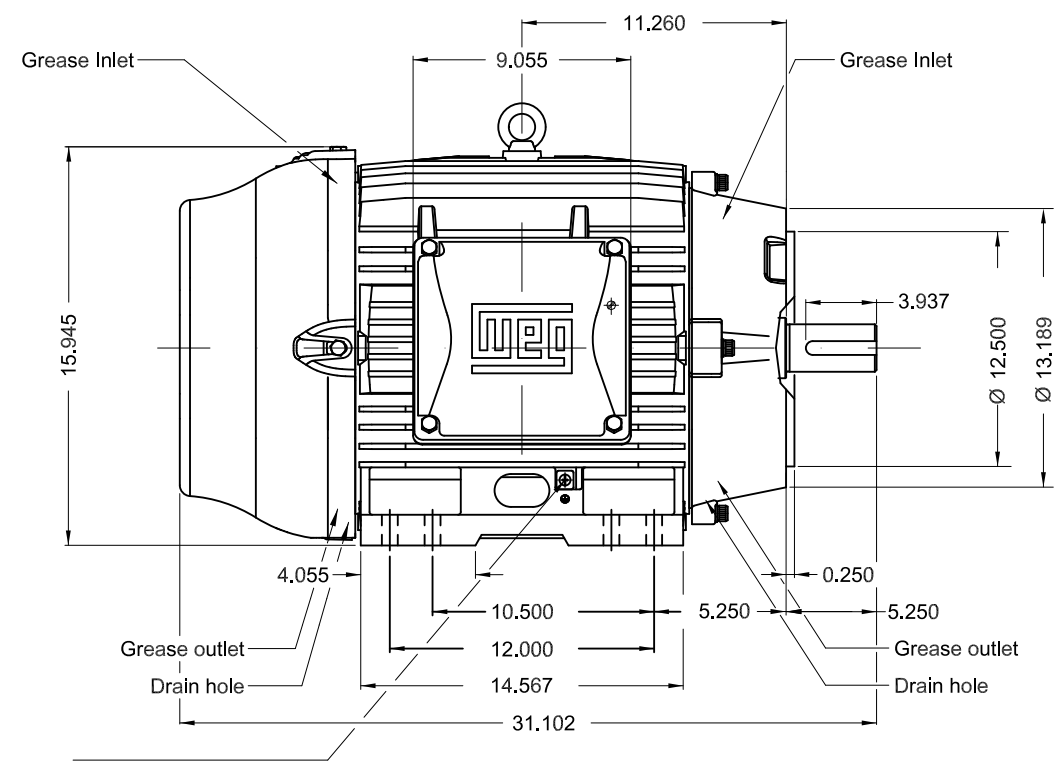
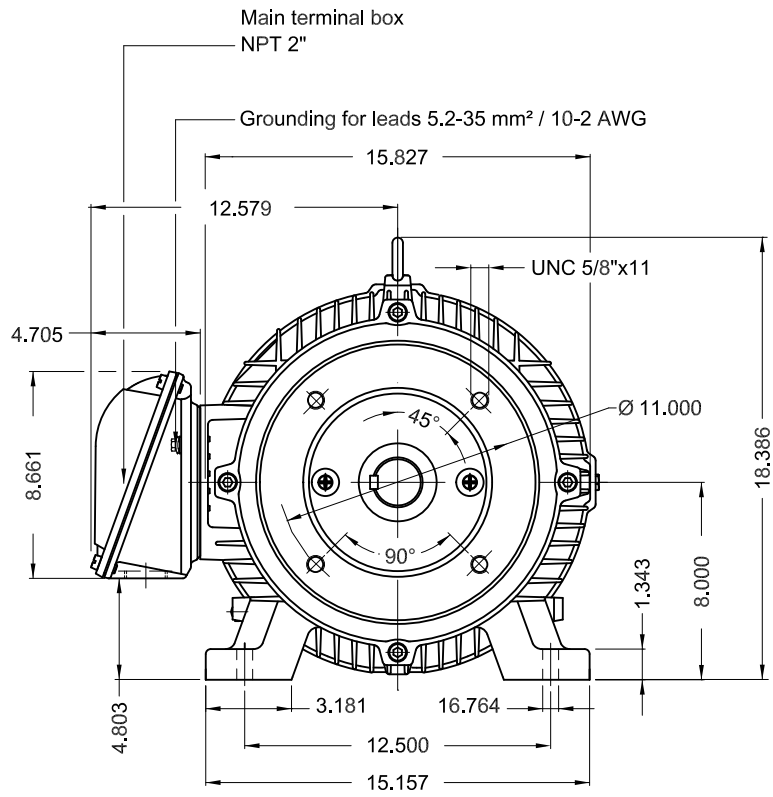
Rev.	Changes Summary	Performed	Checked	Date
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Date	14/04/2022			

1 2 3 4 5 6

A

B

C

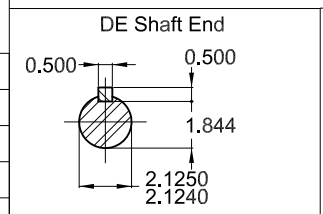


Grounding for leads 5.2-35 mm² / 10-2 AWG

D

E

Without vertical jackscrews  
 Color RAL 5009  
 Painting plan 202E  
 Mounting NEMA F-1  
 Mounting B34R(D)



20 HP 08 Poles 60 Hz A

ECM	LOC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE	VER
EXECUTED	PIRWBUSER	THREE PH. MOTOR IEEE 841 W22 PREM. EFF.					
CHECKED		FRAME 324/6TC IP55 TEFC					
RELEASED							
REL DT.	WMO	Jaragua do Sul	Product Engineering	SHEET	1 / 1		

PREVIEW  
 WDD

