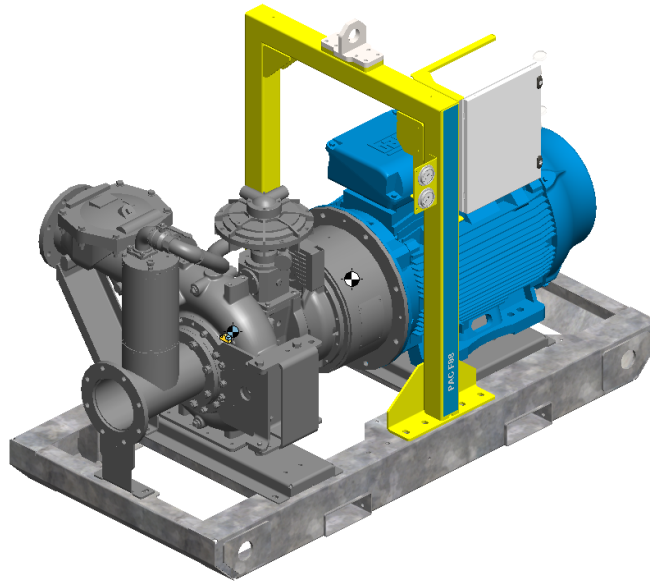


Product reference - 8381064431

# PAC F88 E 150HP

Diesel - Qmax 3,950 USgpm - Hmax 200 ft



Indicative picture of the product

## PAC Flow series

The pump system consists of a centrifugal pump and a separator, which enables air to be separated from the liquid and be sucked by a vacuum pump - making automatic priming possible. Even with suction heights of several feet the machine rapidly evacuates the air from the suction pipe and starts to pump. The PAC range is also suitable for pumping liquids with solids in suspension with best possible efficiency.

## Applications

The PAC F88 Atlas Copco pump is designed to withstand toughest applications and delivers best in class pumping efficiency. One of the most common area of utilization is the mining and Oil & Gas segment where reliability, efficiency and versatility is the key to provide a customized solution. Other suitable applications within Construction and General dewatering, Municipal as well as General Industry are ideal for the PAC F88 pump. Atlas Copco pumps are packed with features that not only meet, but exceed the needs of our customers.

## Benefits

### Efficiency

The 12" impeller with 82% efficiency at B.E.P. provides best pumping result with minimal efforts

### Solids handling

Closed impeller type with solids handling capability of 3" for trouble free operation

### Easy maintenance

Hinged cover for direct access to the impeller and pump volute

# PAC F88 E 150HP

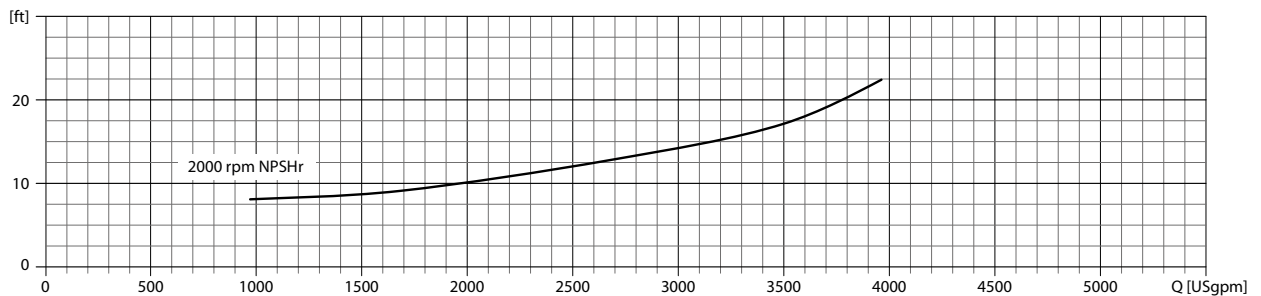
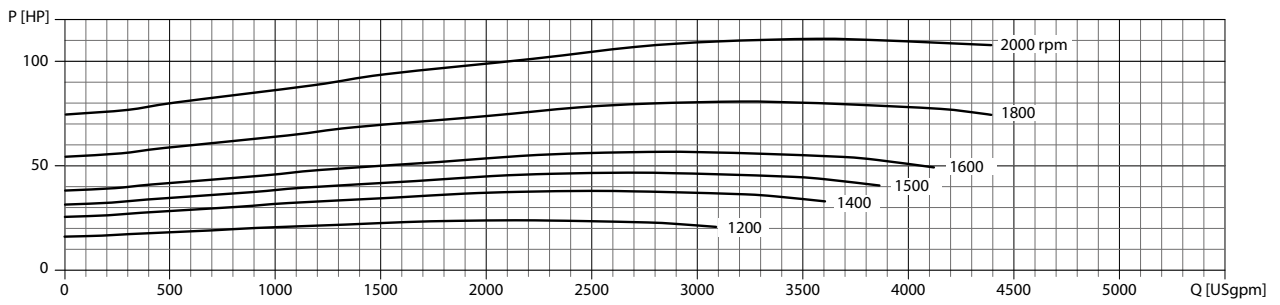
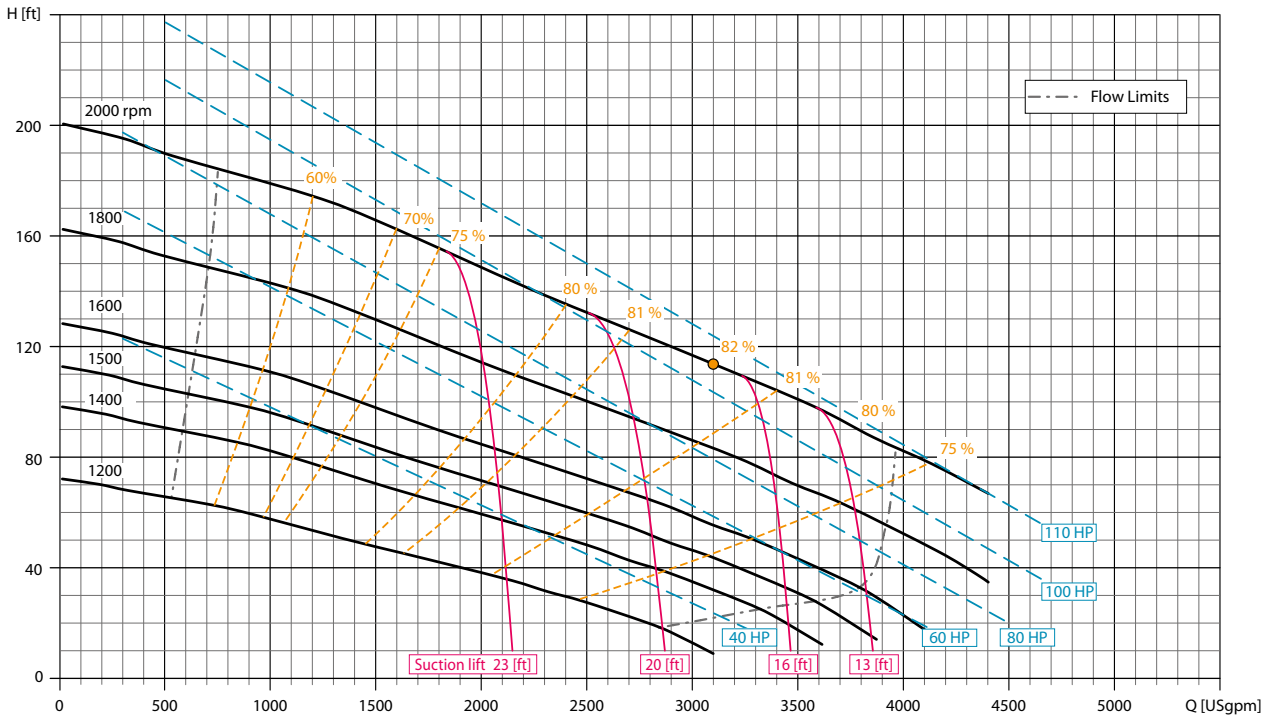
## Performance curves

Test according to UNI EN ISO 9906 standard - level 2B

Test liquid: clean water, density 62.43 lb/ft<sup>3</sup> (8.345 lb/gal)

Losses from priming system and check valve not included

Speed	Impeller Dia.	Style	Solids Dia.	Ns	Suction	Discharge	No. Vanes
Various	12" / 315 mm	Closed	3" / 76 mm	2000 rpm	8" / 200 mm	8" / 200 mm	2



# PAC F88 E 150HP

## Technical data

### Pump

Model	PAC F88
Qmax	3,950 USgpm
Hmax	200 ft
Q max eff.	3,100 USgpm
Eff. max	82 %
Suction port	8" Flange - ANSI class 150
Delivery port	8" Flange - ANSI class 150
Impeller type	Closed, 2 vane
Impeller diameter	12"
Solids handling	3"
Material	
Casing	ASTM A536 ductile iron
Impeller	ASTM A536 ductile iron
Wear ring	ASTM A48 Class 20 grey iron
Wear plate	ASTM A48 Class 20 grey iron
Shaft	AISI 630 stainless steel
Mechanical Seal faces	Silicon carbide / Silicon carbide / VITON
Elastomers	NBR + VITON
Lubrication	Grease (bearings)
Check Valve	ASTM A536 ductile iron + NBR rubber flap
Separator	Aluminium alloy

### Priming system

Vacuum pump	
Vacuum pump type	Diaphragm
Nominal air capacity	50 cfm
Max vacuum	- 26.6 inHg
Drives	Link belt

### Motor

Make	Weg
Type	Three Phase Induction Motor
Cooling method	IC411 - TEFC
No. poles	4
Tension supply	460 V
Frequency	60 Hz
Rated power	150 HP
Rated speed	1,784 rpm
Rated current	116 A
Efficiency class	W22 NEMA premium efficiency
Max efficiency	95.4 %
Protection rating	IP55
Insulation class	F
Thermal protection	Thermistors 2 Wires - 311 degF
Duty cycle	Continuous - S1

### Arrangement

Technical data	
Material	ASTM A36 steel
Coatings	Epoxy powder, average thickness of 3 MIL
Features	Lifting beam. Fork lift pockets. Pump access through hinged door.
Dry weight	- lbs

## Dimensional drawing

[in]

# DATA SHEET



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580

Frame : 315S/M	Cooling method : IC411 - TEFC
Insulation class : F	Mounting : B35T
Duty cycle : S1	Direct of 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> : 982 kg
Degree of protection : IP55	Moment of inertia (J) : 2.89 kgm <sup>2</sup>
Design : N	

Output	110 kW (150 HP)	110 kW (150 HP)	110 kW (150 HP)	110 kW (150 HP)
Poles	4	4	4	4
Frequency	50 Hz	50 Hz	50 Hz	60 Hz
Rated voltage	380/660 V	400/690 V	415 V	460 V
Rated current	201/116 A	195/113 A	193 A	170 A
L. R. Amperes	1286/741 A	1365/791 A	1428 A	1326 A
LRC (p.u.)	6.4	7.0	7.4	7.8 x Code H
No load current	62.0/35.7 A	69.4/40.2 A	76.2 A	63.4 A
Rated speed	1488 rpm	1489 rpm	1490 rpm	1791 rpm
Slip	0.80 %	0.73 %	0.67 %	0.50 %
Rated torque	706 Nm	706 Nm	705 Nm	587 Nm
Locked rotor torque	210 %	230 %	250 %	260 %
Breakdown torque	230 %	260 %	280 %	290 %
Service factor	1.00	1.00	1.00	1.25
Noise level <sup>2</sup>	71.0 dB(A)	71.0 dB(A)	71.0 dB(A)	75.0 dB(A)
Locked rotor time	38 s (hot)	35 s (hot)	33 s (hot)	42 s (hot)
	68 s (cold)	63 s (cold)	59 s (cold)	76 s (cold)
Efficiency (%)	50%	95.0	94.7	94.4
	75%	95.5	95.5	95.4
	100%	95.5	95.6	95.5
Power factor	Start	0.38	0.38	0.39
	50%	0.76	0.72	0.71
	75%	0.83	0.81	0.79
	100%	0.87	0.85	0.83

Bearing type Lubrication interval Lubricant amount Lubricant type	<u>Drive end</u>	<u>Non drive end</u>	Foundation loads Maximum traction : 10735 N Maximum compression : 20369 N
	6319-C3	6316-C3	
	11000 h	13000 h	
	45 g	34 g	
	MOBIL POLYREX EM		

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

- (1) When viewed from the drive end.
- (2) Measured at 1m and with tolerance of +3dB(A).
- (3) Approximate weight subject to changes after manufacturing process.
- (4) At the rated point.

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

Rev.	Summary of changes	Performed	Checked	Date
Performed by	cheikh			205556/2021
Checked by	AUTOMATICO			Page Revision
Date	27/07/2021			1/19 0

# DATA SHEET



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580

### Thermal protection

ID	Application	Type	Quantity	Switching temperature
01	Winding	Thermistor - 2 Wires	1 x Phase	155 °C

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

Rev.	Summary of changes	Performed	Checked	Date
Performed by	cheikh			205556/2021
Checked by	AUTOMATICO			Page Revision
Date	27/07/2021			2/19 0

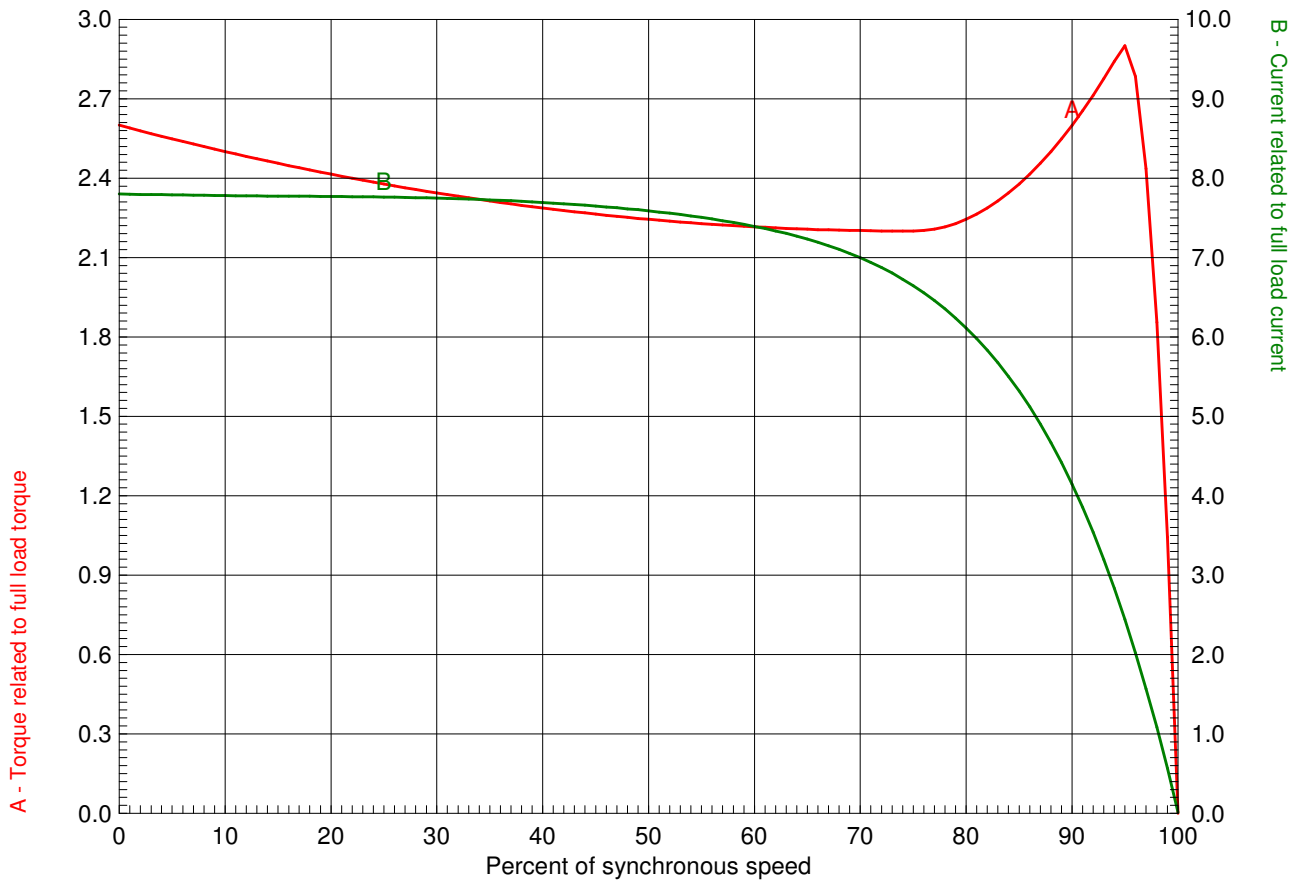
# TORQUE AND CURRENT X SPEED CURVE



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580



Performance : 110 kW (150 HP) 460 V 60 Hz 4P 315S/M

Rated current : 170 A	Moment of inertia (J) : 2.89 kgm <sup>2</sup>
LRC (p.u.) : 7.8 Code H	Duty cycle : S1
Rated torque : 587 Nm	Insulation class : F
Locked rotor torque : 260 %	Service factor : 1.25
Breakdown torque : 290 %	Temperature rise : 80 K
Rated speed : 1791 rpm	Design : N

Locked rotor time 100% : 42 s (hot) 76 s (cold)  
 Load inertia (J=GD<sup>2</sup>/4) : 2.89325 kgm<sup>2</sup>

Rev.	Summary of changes	Performed	Checked	Date
Performed by	cheikh	205556/2021-T6		
Checked by	AUTOMATICO	Page	Revision	
Date	27/07/2021	6/19	0	

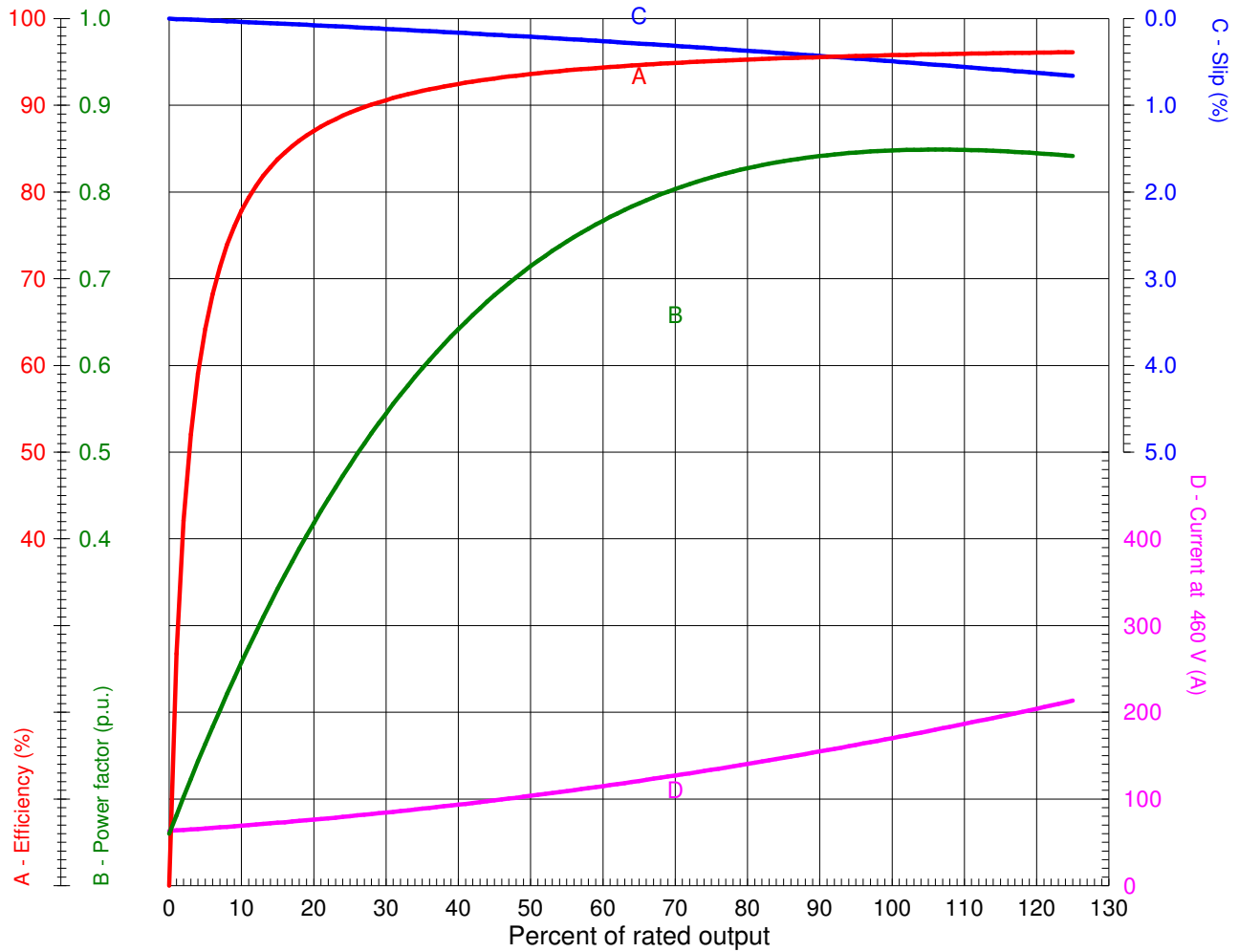
# LOAD PERFORMANCE CURVE



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580



Performance : 110 kW (150 HP) 460 V 60 Hz 4P 315S/M

Rated current	: 170 A	Moment of inertia (J)	: 2.89 kgm <sup>2</sup>
LRC (p.u.)	: 7.8 Code H	Duty cycle	: S1
Rated torque	: 587 Nm	Insulation class	: F
Locked rotor torque	: 260 %	Service factor	: 1.25
Breakdown torque	: 290 %	Temperature rise	: 80 K
Rated speed	: 1791 rpm	Design	: N

Rev.	Summary of changes	Performed	Checked	Date
Performed by	cheikh			205556/2021-T6
Checked by	AUTOMATICO			Page Revision
Date	27/07/2021			10/19 0

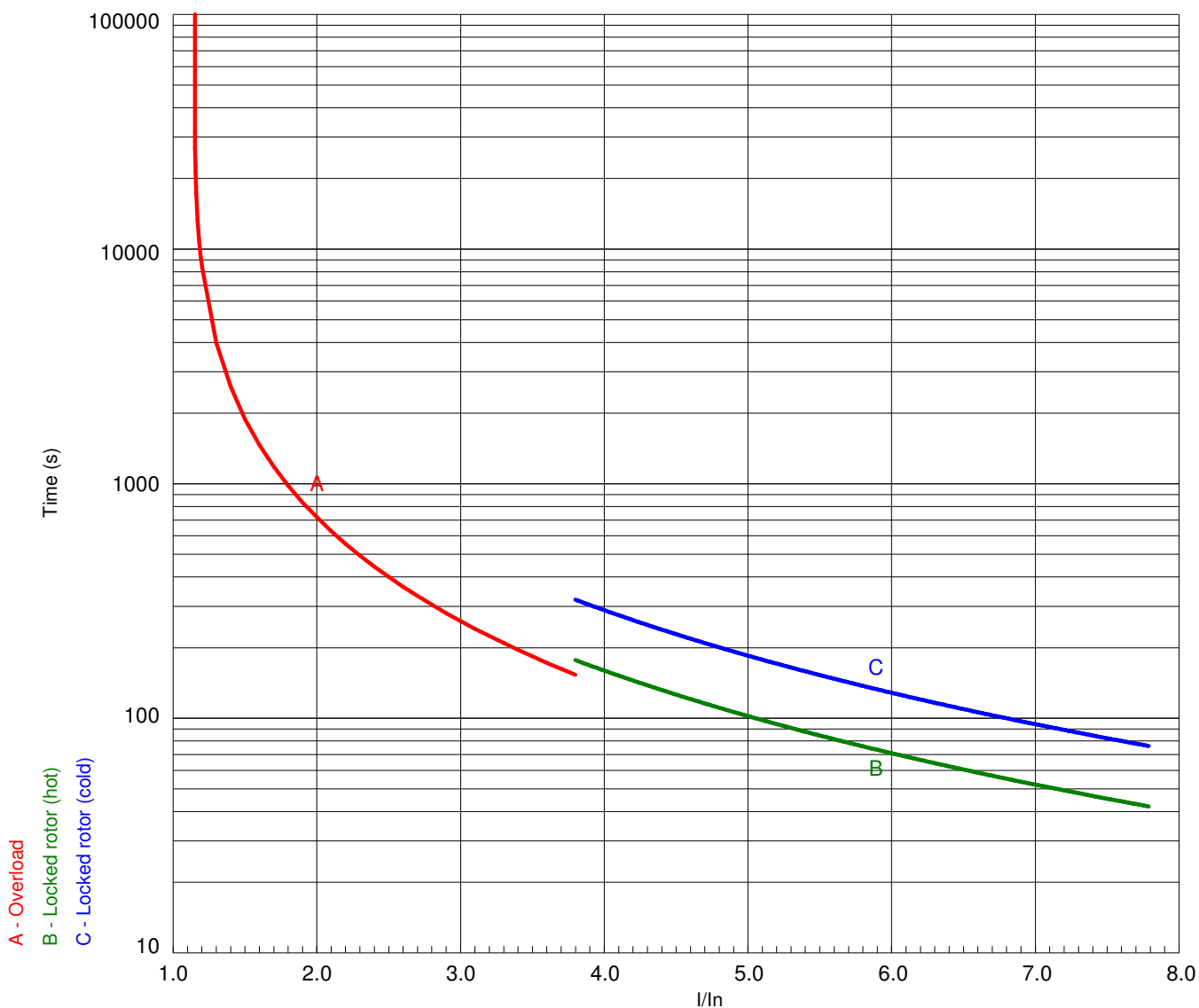
# THERMAL LIMIT CURVE



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580



Performance : 110 kW (150 HP) 460 V 60 Hz 4P 315S/M

Rated current : 170 A	Moment of inertia (J) : 2.89 kgm <sup>2</sup>
LRC (p.u.) : 7.8 Code H	Duty cycle : S1
Rated torque : 587 Nm	Insulation class : F
Locked rotor torque : 260 %	Service factor : 1.25
Breakdown torque : 290 %	Temperature rise : 80 K
Rated speed : 1791 rpm	Design : N

Heating constant : 34.8 min  
Cooling constant : 104.4 min

Rev.	Summary of changes	Performed	Checked	Date
Performed by	cheikh	205556/2021-T6		Page Revision
Checked by	AUTOMATICO			
Date	27/07/2021			
		14/19	0	



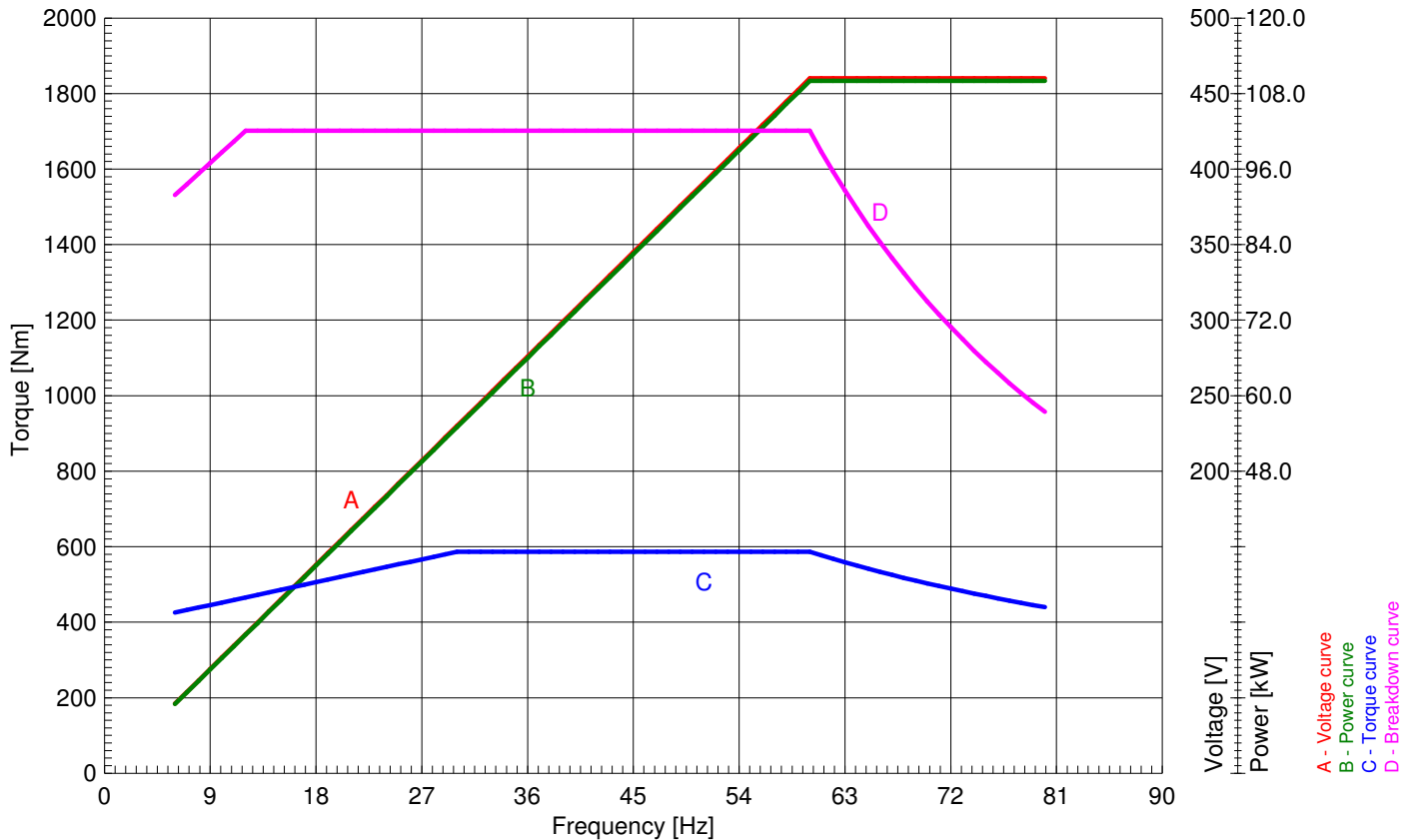
# VFD OPERATION CURVE



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580



Performance : 110 kW (150 HP) 460 V 60 Hz 4P 315S/M

Rated current : 170 A	Moment of inertia (J) : 2.89 kgm <sup>2</sup>
LRC (p.u.) : 7.8 Code H	Duty cycle : S1
Rated torque : 587 Nm	Insulation class : F
Locked rotor torque : 260 %	Service factor : 1.25
Breakdown torque : 290 %	Temperature rise : 80 K
Rated speed : 1791 rpm	Design : N

Maximum peak voltage phase-to-phase <= 1600 V  
 dV/dt <= 5200 V/μs  
 Rise time >= 0,1 μs

Rev.	Summary of changes		Performed	Checked	Date
Performed by	cheikh			205556/2021-T6	
Checked by	AUTOMATICO			Page	Revision
Date	27/07/2021			18/19	0

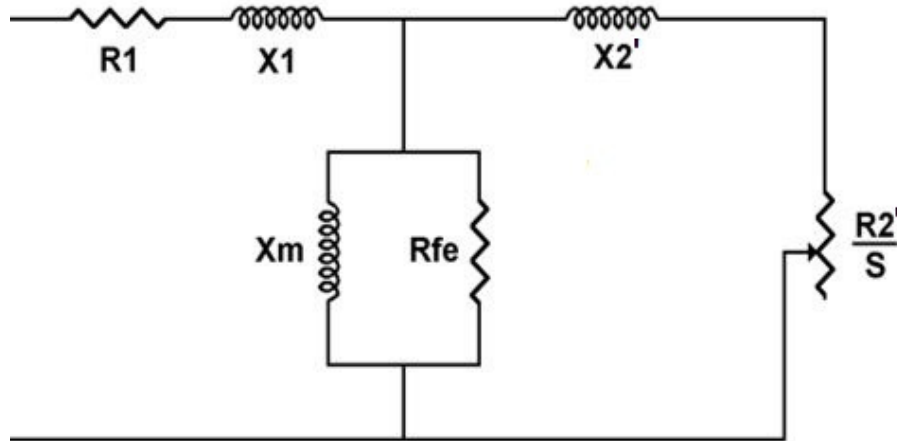
# EQUIVALENT CIRCUIT



## Three Phase Induction Motor - Squirrel Cage

Customer : VARISCO S.P.A. ( ATLAS COPCO GROUP

Product line : W22 - IE3 Premium Efficiency Multivoltage Product code : 12881580



Rated			
<b>R1</b>	0.0357 ohms / 0.0272 p.u.	<b>X1</b>	0.3005 ohms / 0.2289 p.u.
<b>R2'</b>	0.0175 ohms / 0.0133 p.u.	<b>X2'</b>	0.4268 ohms / 0.3251 p.u.
<b>Rfe</b>	271.4585 ohms / 206.7940 p.u.	<b>Xm</b>	8.3905 ohms / 6.3918 p.u.

Locked rotor			
<b>R1</b>	0.0380 ohms / 0.0289 p.u.	<b>X1</b>	0.2707 ohms / 0.2062 p.u.
<b>R2'</b>	0.1246 ohms / 0.0949 p.u.	<b>X2'</b>	0.1805 ohms / 0.1375 p.u.
<b>Rfe</b>	255.4111 ohms / 194.5693 p.u.	<b>Xm</b>	10.6134 ohms / 8.0852 p.u.

<b>T"do</b>	1.2122 s	<b>X/R</b>	7.9629 p.u.
<b>T"d</b>	0.0629 s	<b>RS</b>	0.0150 ohms / 0.0114 p.u.
<b>Ta</b>	0.0253 s	<b>X"d = Xs</b>	0.4513 ohms / 0.3438 p.u.
<b>Zbase</b>	1.3127 ohms	<b>X2(-)</b>	0.2548 ohms / 0.1941 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.

Performance : 110 kW (150 HP) 380 V 50 Hz 4P 315S/M

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.	Summary of changes		Performed	Checked	Date
Performed by	cheikh			205556/2021	
Checked by	AUTOMATICO			Page	Revision
Date	27/07/2021			19/19	0

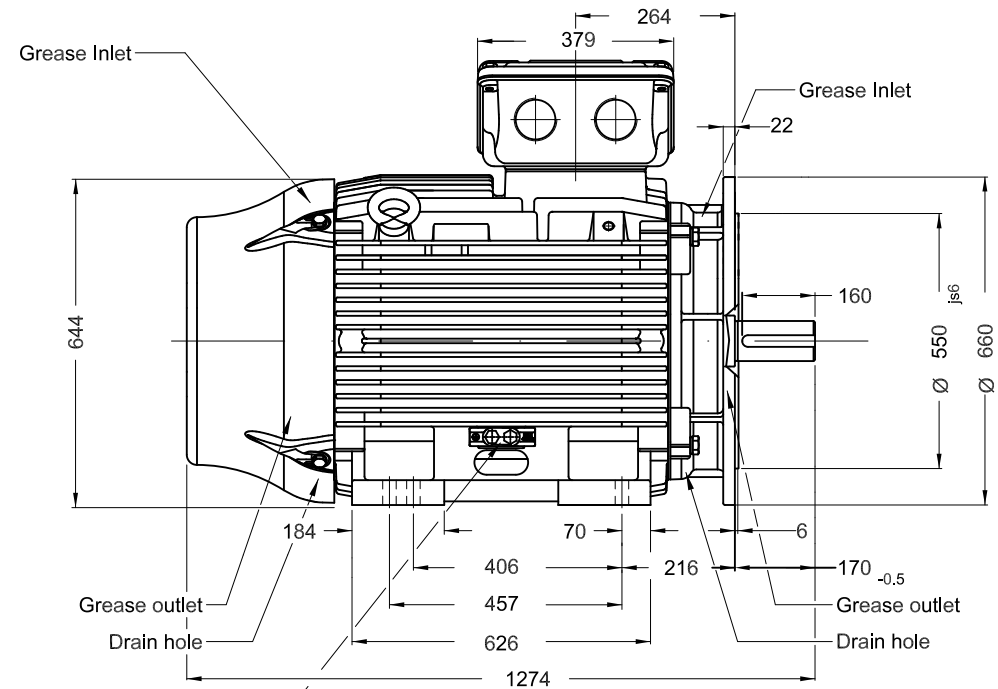
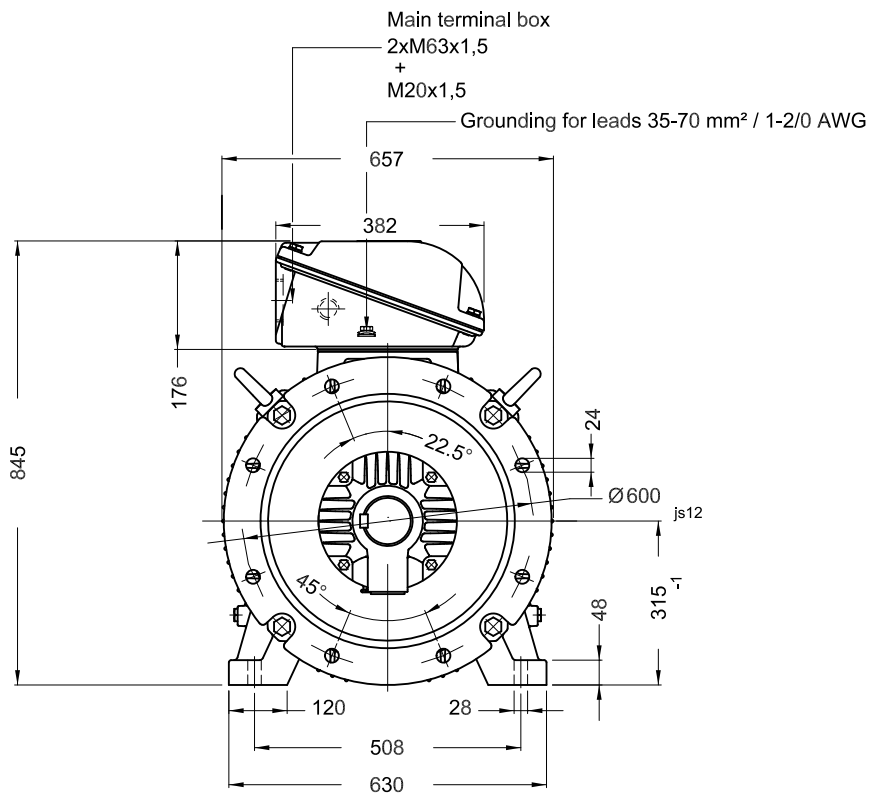
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1 2 3 4 5 6

A

B

C

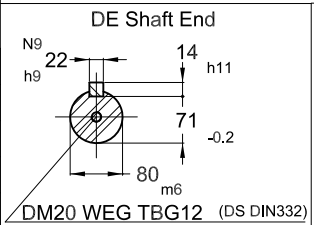


Grounding for leads 25-185 mm² / 3AWG-350MCM

D

E

Without vertical jackscrews  
 NDE endshield with electrically insulated bearing hub  
 Color RAL 5009  
 Painting plan 203A  
 Mounting B35T



110 kW 04 Poles 50 Hz A

ECM	LOC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE	VER
EXECUTED	PIRWBUSER	THREE PHASE W22 MOTOR - PREMIUM EFF					
CHECKED		FRAME 315S/M IP55 TEFC					
RELEASED							
REL DT.	WMO	Jaragua do Sul	Product Engineering	SHEET	1 / 1		

PREVIEW  
 WDD

