2034001501-(XG-PKG01)-E105718824-01
AERZEN BLOWERS MOTOR DATA BOOK

Submittal (Section 5: Motor)

Evoqua Water

Tag:19-C-051A/B/C

Positive Displacement Blowers

Manufacturer/Service/ Parts

Aerzen USA Corp.
108 Independence Way
Coatesville, PA 19320
800-444-1692 (tel)
610-380-0278 (fax)
www.aerzenusa.com

Severe Duty is **Standard** with **WEG W22** motors.

You do not need a special motor for severe duty. Severe Duty is standard with WEG W22 motors.

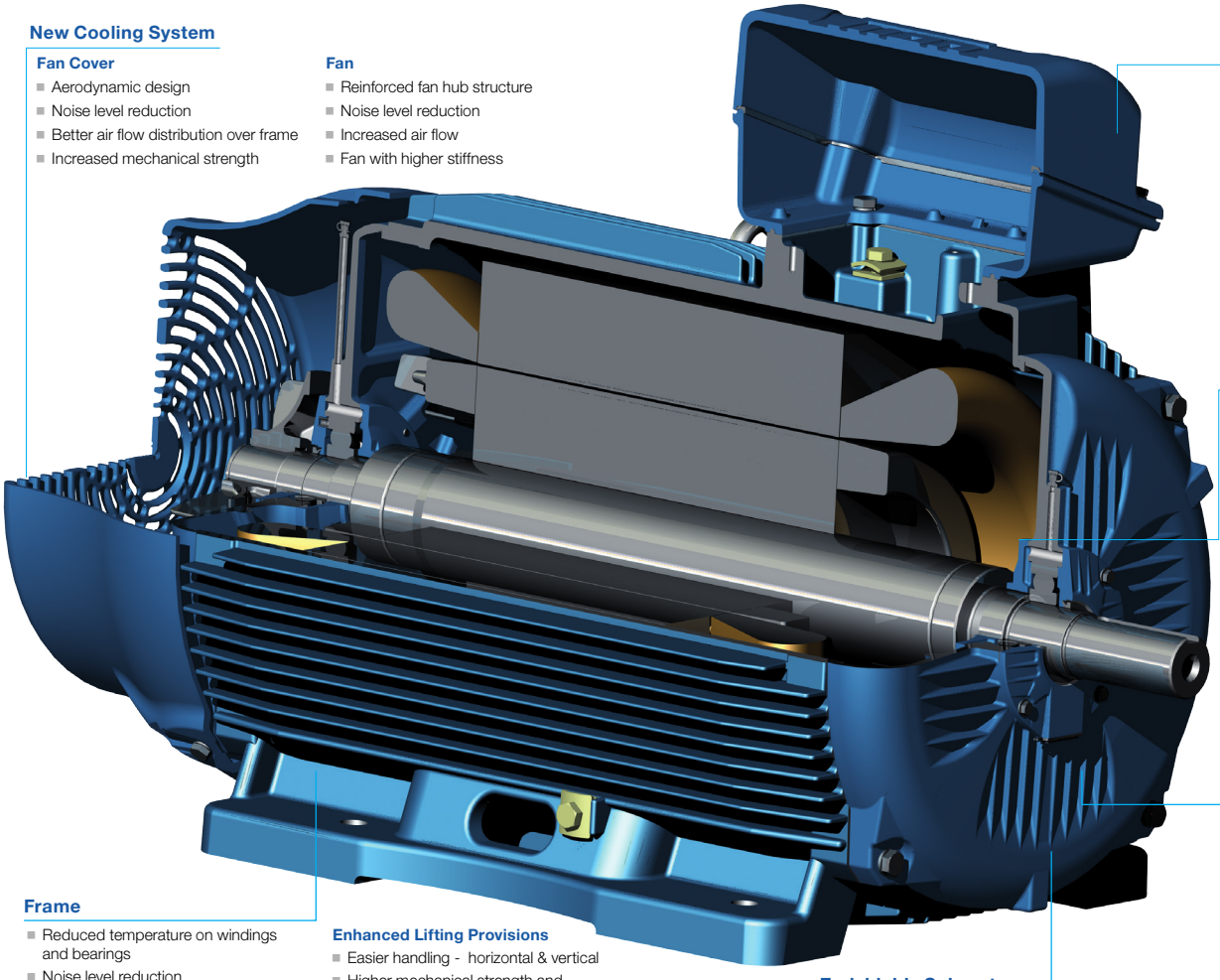


You do not need a special motor for severe duty. Severe Duty is standard with WEG.

Features that make a difference:

- All NEMA Premium ratings have a 1.25 service factor (up to 100 HP) resulting in cooler operation and extended life of the motor
- All Cast Iron Construction, including Terminal Box and Fan Cover (*)
- Solid feet for reduced vibration levels and impact absorption
- Optimized ventilation system for cooler operation and extended life
- High Grade FC200 cast iron provides superior mechanical strength and heat dissipation
- All WEG W22 motors are Totally Enclosed Fan Cooled with a true IP55 rating against dust and moisture. (IPW56, IPW65 and IPW66 available as optional)
- Exclusive W-Seal 364T and larger provides superior bearing protection
- Taconite Labyrinth seal 586 Frame and larger
- Exclusive WEG painting system exceed 200hrs ASTM 117 corrosion test (Exceeds IEEE841 standard)
- Balanced to 0.08 inches per second vibration limits (Meets IEEE841 standard)
- Four Bolt Conduit Cover with glued Neoprene Gasket
- Impregnation Resin and magnet wire are insulation class H
- Stainless Steel Nameplate - Laser edged with high contrast background
- Corrosion Proof Drains
- Inverter Duty per NEMA MG1, Part 31
- Certified Class I Div 2, Groups A, B, C & D; Class II, Div 2, Groups F & G

**cast iron fan cover available as an option on 143-215T frames*



New Cooling System

Fan Cover
- Aerodynamic design
- Noise level reduction
- Better air flow distribution over frame
- Increased mechanical strength

Fan
- Reinforced fan hub structure
- Noise level reduction
- Increased air flow
- Fan with higher stiffness

Terminal Box
- Better connection quality
- Easier cable handling during installation
- More space available for accessory installation
- Easier Maintenance
- Mounting F1/F2/F3
- Rotation on 90° stages

Bearing Caps

External
- Finned surface for improved bearing heat dissipation

Internal
- Change of grease path for positive lubrication
- Bearing lubrication quality improvement
- Reduced bearing temperature

Seal Subsystem
- Increased dust and moisture protection
- Increased protection to high-pressure cleaning

Frame
- Reduced temperature on windings and bearings
- Noise level reduction
- Terminal box position outlet on top

Pad for vibration sensor
- Displaced 90° from each other

Enhanced Lifting Provisions
- Easier handling - horizontal & vertical
- Higher mechanical strength and handling safety

Solid feet
- More impact resistance
- Ideal for high vibration level applications

Endshields Subsystem

DE (Drive Endshield)
- New fin design
- Bearing moved outwards for better load support
- Improved bearing heat dissipation for reduced bearing temperature
- Reinforced endshield structure

NDE (Non-Drive Endshield)
- New design with smooth exterior surface
- Improved air flow
- Noise level reduction
- Improved structural rigidity for low vibration

DATA SHEET

Three Phase Induction Motor - Squirrel Cage

Customer	:

Product line	: W22 NEMA Premium Efficiency Three-Phase	Product code :	11570960
		Catalog # :	12518ST3QIERB444T-W2

Frame	: 444/5T	Locked rotor time	: 48s (cold) 27s (hot)
Output	: 125 HP	Temperature rise	: 80 K
Poles	: 4	Duty cycle	: Cont.(S1)
Frequency	: 60 Hz	Ambient temperature	: -20°C to +40°C
Rated voltage	: 460 V	Altitude	: 1000 m.a.s.l.
Rated current	: 139 A	Protection degree	: IP55
L. R. Amperes	: 904 A	Cooling method	: IC411 -
LRC	: 6.5x(Code G)	Mounting	: F-1
No load current	: 40.0 A	Rotation¹	: Both (CW and CCW)
Rated speed	: 1780 rpm	Noise level²	: 73.0 dB(A)
Slip	: 1.11 %	Starting method	
Rated torque	: 369 ft.lb	Approx. weight³	: 1668 lb
Locked rotor torque	: 200 %		
Breakdown torque	: 229 %		
Insulation class	: F		
Service factor	: 1.15		
Moment of inertia (J)	: 57.2 sq.ft.lb		
Design	: B		

Output	25%	50%	75%	100%
Efficiency (%)	94.9	95.0	95.4	95.4
Power Factor	0.52	0.74	0.82	0.85

Foundation loads

Max. traction	: 1767 lb
Max. compression	: 3435 lb

		Drive end	Non drive end
Bearing type	:	NU-319 C3	6316 C3
Sealing	:	Inpro/Seal	Inpro/Seal
Lubrication interval	:	5000 h	10000 h
Lubricant amount	:	45 g	34 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.

Rev.	Changes Summary	Performed	Checked	Date

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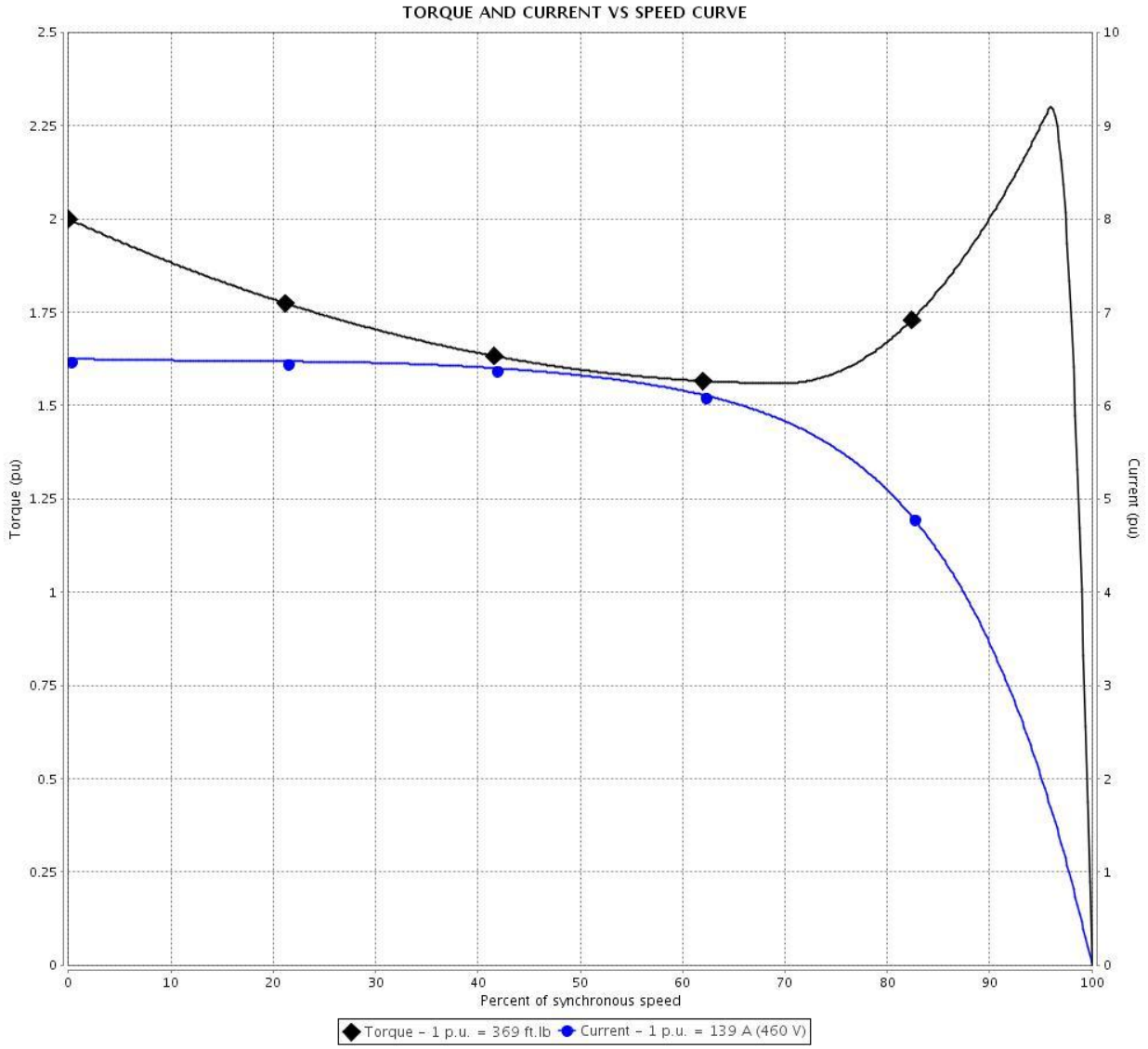
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TORQUE AND CURRENT VS SPEED CURVE

Three Phase Induction Motor - Squirrel Cage

Customer	:

Product line	: W22 IEEE 841 NEMA Premium Efficiency Three-Phase	Product code :	11570960
		Catalog # :	12518ST3QIERB444T-W2



Performance	: 460 V 60 Hz 4P

Rated current	: 139 A	Moment of inertia (J)	: 57.2 sq.ft.lb
LRC	: 6.5	Duty cycle	: Cont.(S1)
Rated torque	: 369 ft.lb	Insulation class	: F
Locked rotor torque	: 200 %	Service factor	: 1.15
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 1780 rpm	Design	: B

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

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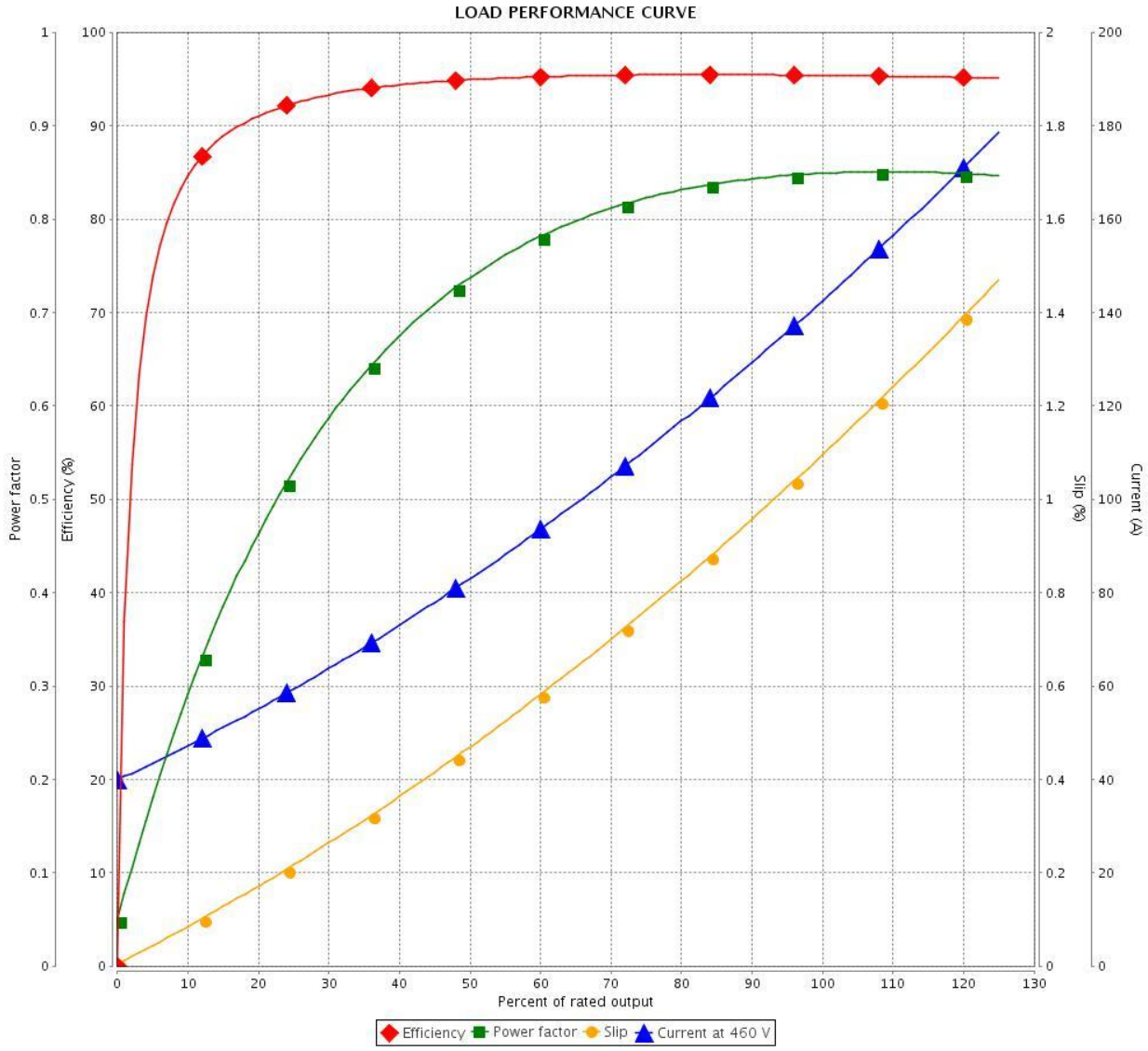
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LOAD PERFORMANCE CURVE

Three Phase Induction Motor - Squirrel Cage

Customer	:

Product line	: W22 IEEE 841 NEMA Premium Efficiency Three-Phase	Product code :	11570960
		Catalog # :	12518ST3QIERB444T-W2



Performance	: 460 V 60 Hz 4P		
Rated current	: 139 A	Moment of inertia (J)	: 57.2 sq.ft.lb
LRC	: 6.5	Duty cycle	: Cont.(S1)
Rated torque	: 369 ft.lb	Insulation class	: F
Locked rotor torque	: 200 %	Service factor	: 1.15
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 1780 rpm	Design	: B

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THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer	:

Product line	: W22 IEEE 841 NEMA Premium Efficiency Three-Phase	Product code :	11570960
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Rated torque	: 369 ft.lb	Insulation class	: F
Locked rotor torque	: 200 %	Service factor	: 1.15
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 1780 rpm	Design	: B
Heating constant			
Cooling constant			

Rev.	Changes Summary	Performed	Checked	Date

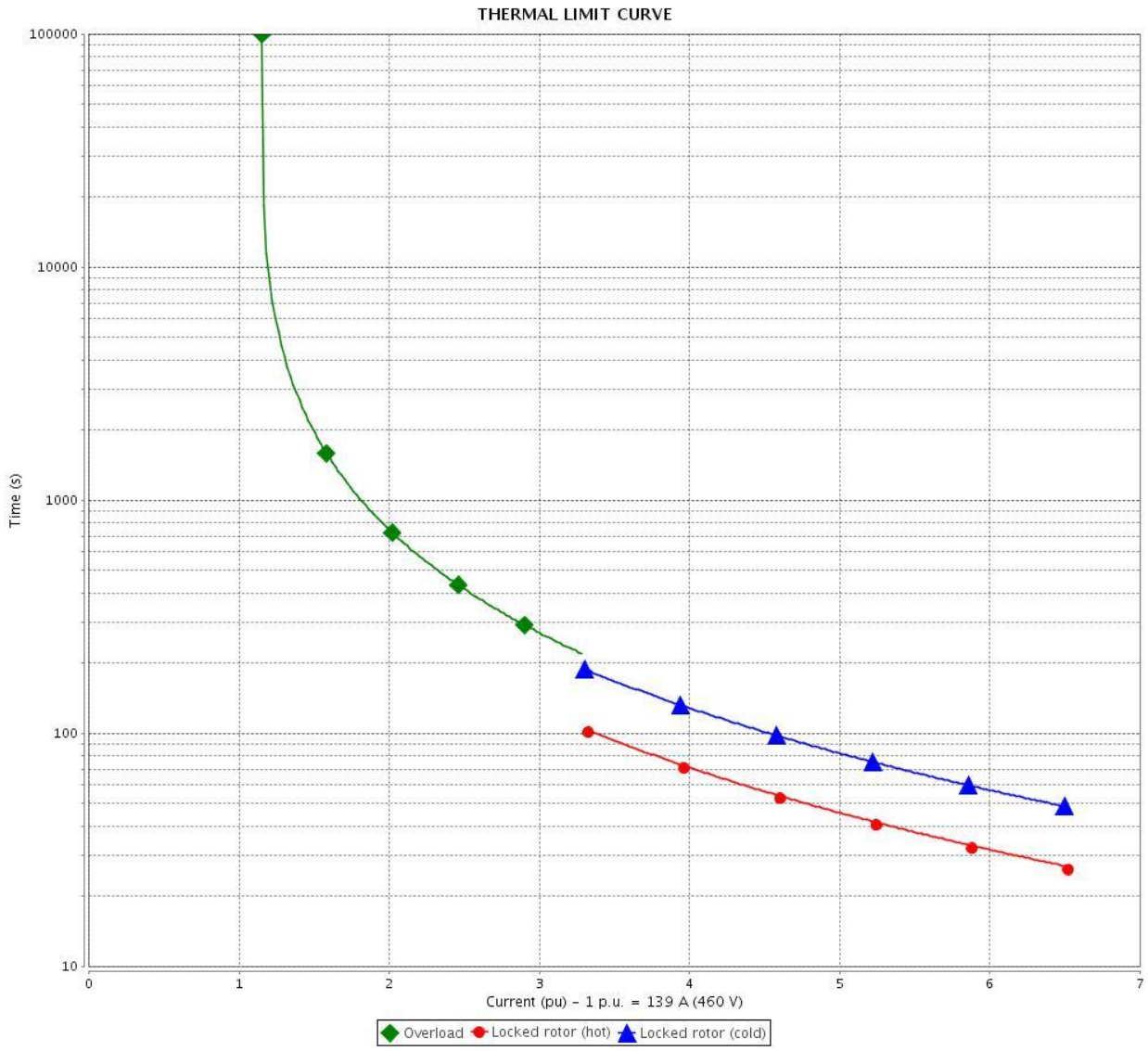
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THERMAL LIMIT CURVE

Three Phase Induction Motor - Squirrel Cage

Customer :



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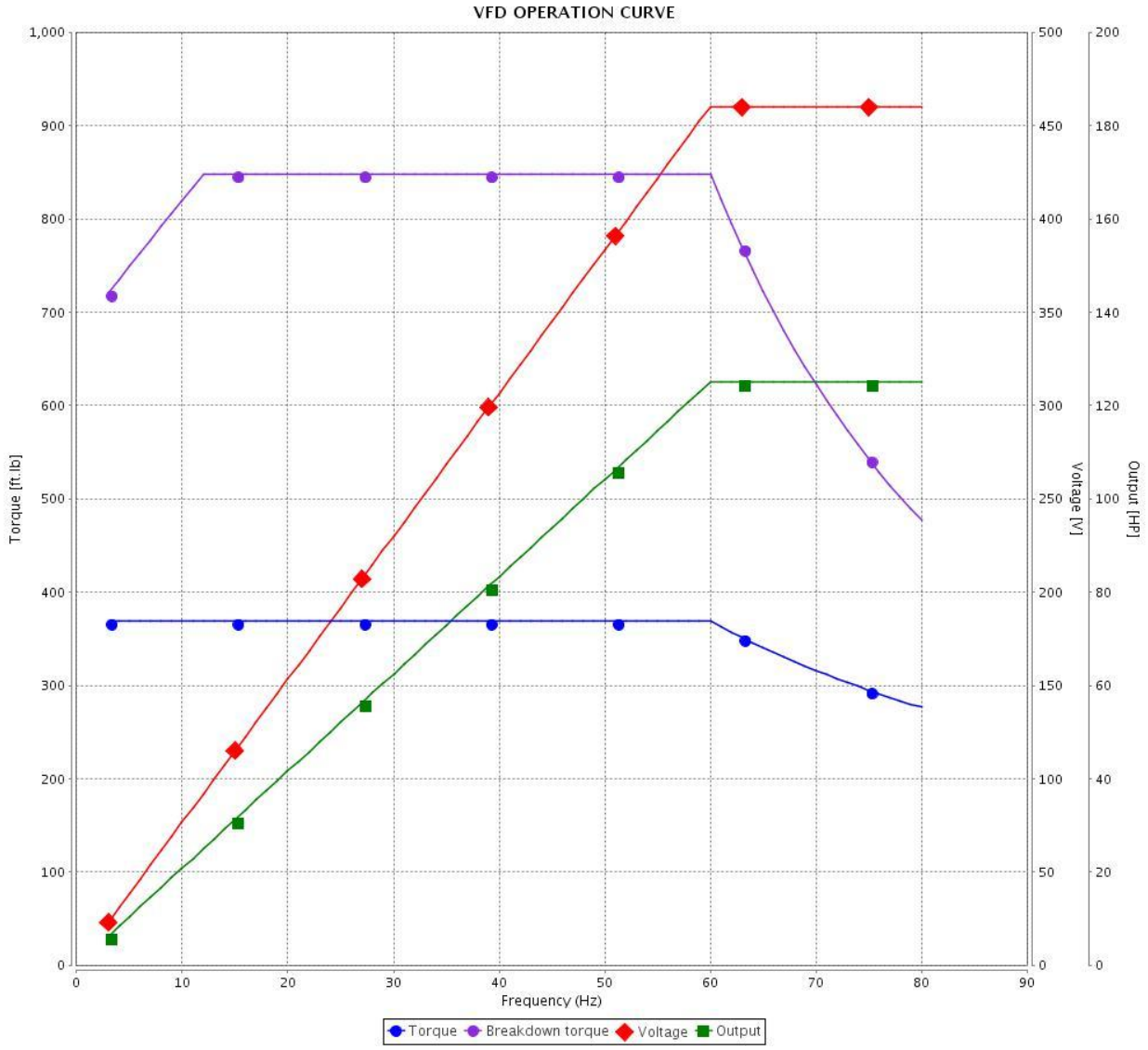
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VFD OPERATION CURVE

Three Phase Induction Motor - Squirrel Cage

Customer	:		
Product line	: W22 IEEE 841 NEMA Premium Efficiency Three-Phase	Product code :	11570960
		Catalog # :	12518ST3QIERB444T-W2

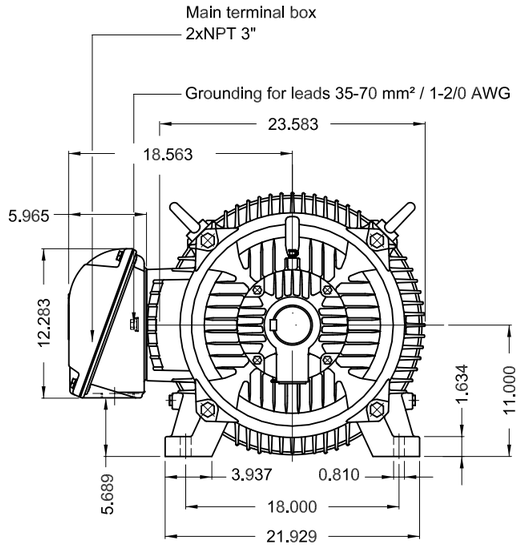


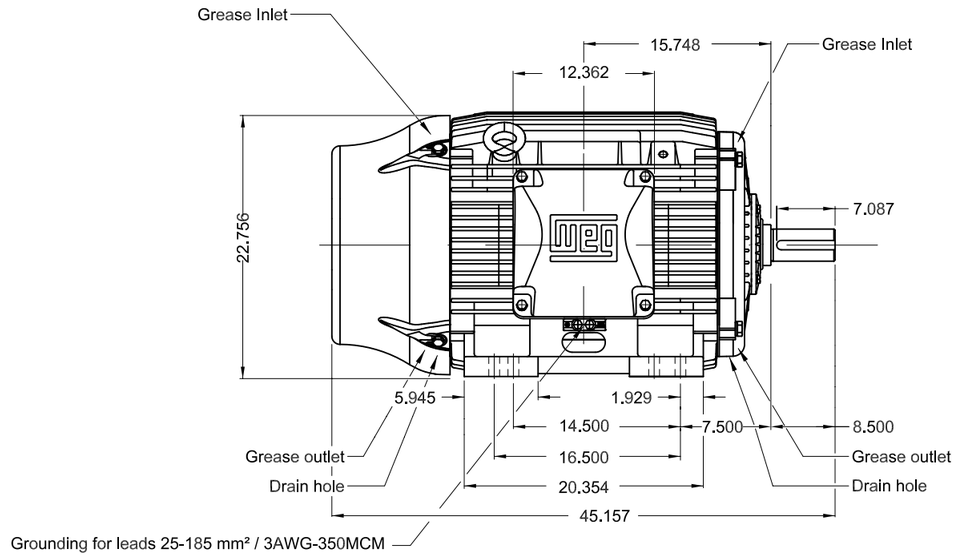
Performance	: 460 V 60 Hz 4P		
Rated current	: 139 A	Moment of inertia (J)	: 57.2 sq.ft.lb
LRC	: 6.5	Duty cycle	: Cont.(S1)
Rated torque	: 369 ft.lb	Insulation class	: F
Locked rotor torque	: 200 %	Service factor	: 1.15
Breakdown torque	: 229 %	Temperature rise	: 80 K
Rated speed	: 1780 rpm	Design	: B

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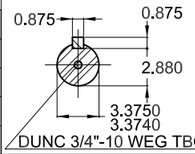
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DE roller bearing
Shaft locking device
Color RAL 5009
Painting plan 202E
Mounting B3R(D)

DE Shaft End



125 HP 04 Poles 60 Hz | A

ECM	LOC	SUMMARY OF MODIFICATIONS	EXECUTED	CHECKED	RELEASED	DATE	VER

EXECUTED	PIRWBUSER	THREE PH. W22 NEMA P.EFF MOTOR IEEE841	PREVIEW
CHECKED		FRAME 444/5T IP55 TEFC	WDD
RELEASED			
REL DT.		WMO Jaragua do Sul Product Engineering	SHEET 1 / 1

Dimensions in inches

XME A3

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WEG NEMA Premium® W22

3PT9 LISTED
C UL US

FOR SAFE AREA
Mod.TE1BFOXON
CC029A

CSA US Energy Verified

Class I, Div 2, Gr A, B, C and D ~~– T3~~ T3C
~~Class I, Zone 2, IIC – T3~~
Class II, Div 2, Gr F and G – T3C
For use on PWM: Gr. A, B, C, D and F,
VT 1000:1, CT 20:1, 1.00SF – T3A

MODEL 12518ST3QIERB444T-W2

Inverter Duty Motor
Severe Duty

IEEE 841-2009

MADE IN BRAZIL
11570960

PH3 60Hz Fr. 444/5T 1000m.a.s.l. IP55 TEFC 1668lb

V 460	A 139		
HP 125	kW 90		
SF 1.15	SFA 160		
RPM 1780	PF 0.85		
AMB 40°C	INS cl. F DT80K	NEMA NOM EFF	95.4%
DUTY CONT.	DES B Code G	GUARANT. EFF	94.5%

T1 T2 T3
L1 L2 L3

460V

NU-319-C3 (45g) 95RU03X30

6316-C3 (34g) 80BC03X30

MOBIL POLYREX EM (5000h)

BEST PRACTICES FOR VARIABLE FREQUENCY DRIVE (VFD) APPLICATIONS

VFD-induced shaft voltage can exist in every VFD driven motor application. It is not specific to the air movement industry, nor is it specific to any particular manufacturer's motors, drives or equipment. However, shaft voltage only becomes a problem when it leads to bearing current and consequential damage to the motor bearings.

NOTICE!

Risk of serious machine damage!
Appropriate measures must be implemented by the installation contractor to limit the shaft induced voltage to 1V – 2V as per IEEE 112.

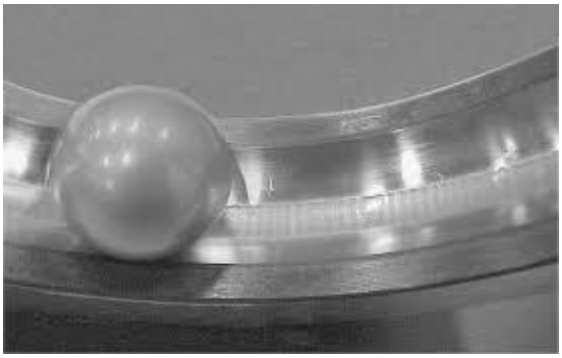


Figure 1 Bearing damage caused by EDM

Frequency converters (also known as variable frequency drives or VFD's) can induce a voltage on the shafts of drive motors and stages due to the high switching frequencies used in these drives. Shaft voltage can become a problem when it reaches a high enough level to discharge across the bearings, causing electrical discharge machining (EDM) and creating small grooves called fluting which can lead to premature bearing failure. The potential for this induced shaft voltage exists in every VFD driven motor application and must be addressed on an installation specific basis.

VFD induced voltage is a phenomenon that is somewhat rare and unpredictable. As additional protection, Aerzen USA offers options for mitigating induced shaft currents such as grounding rings and isolated motor non drive end bearings. Even with these options installed, there is no guarantee that this phenomenon will be entirely eliminated. Damage to the motor bearings from shaft / bearing currents is not covered by warranty from Aerzen, the motor manufacturer or VFD manufacturer.

GENERAL RECOMMENDATIONS:

Motors up to and including 100HP (75kW) – Low Voltage

For induction motors either foot mounted, c-face or d-flange mounted motors with single row radial ball bearings on both ends of the motors

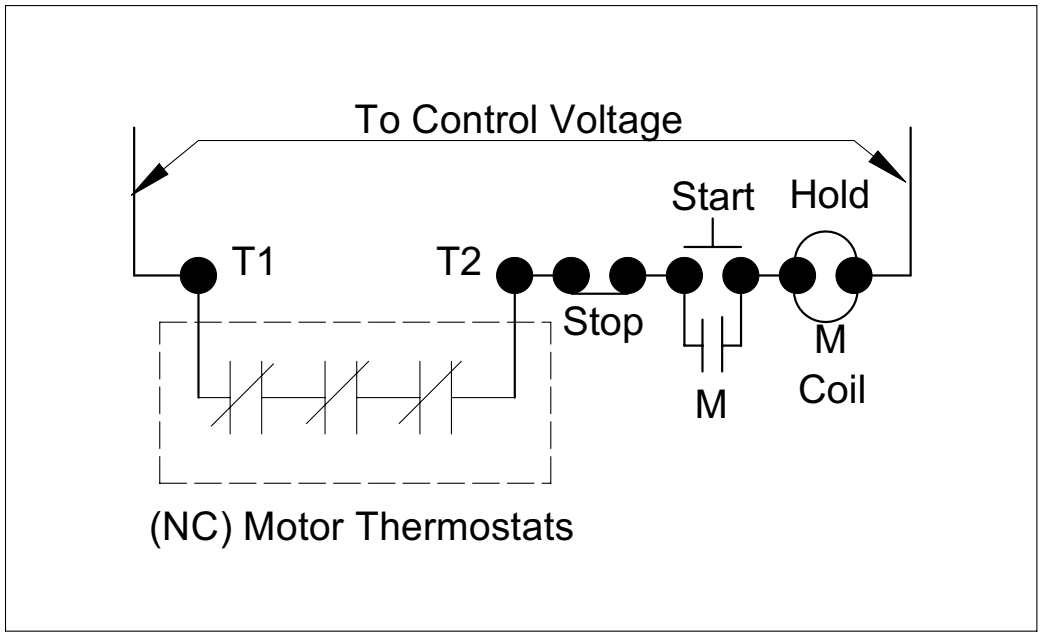
- Install one AEGIS SGR Bearing Protection Ring on either the drive end or the non-drive end of the motor to discharge capacitive induced shaft voltage.

Motors Greater than 100HP (75kW)

For horizontally mounted motors with single row radial ball bearings on both ends of the motor:

- Non-Drive End (Opposite Drive End): Bearing housing must be isolated with insulated sleeve or coating or use insulated ceramic or hybrid bearing to disrupt circulating currents.
- Drive End: Install one AEGIS Bearing Protection Ring.

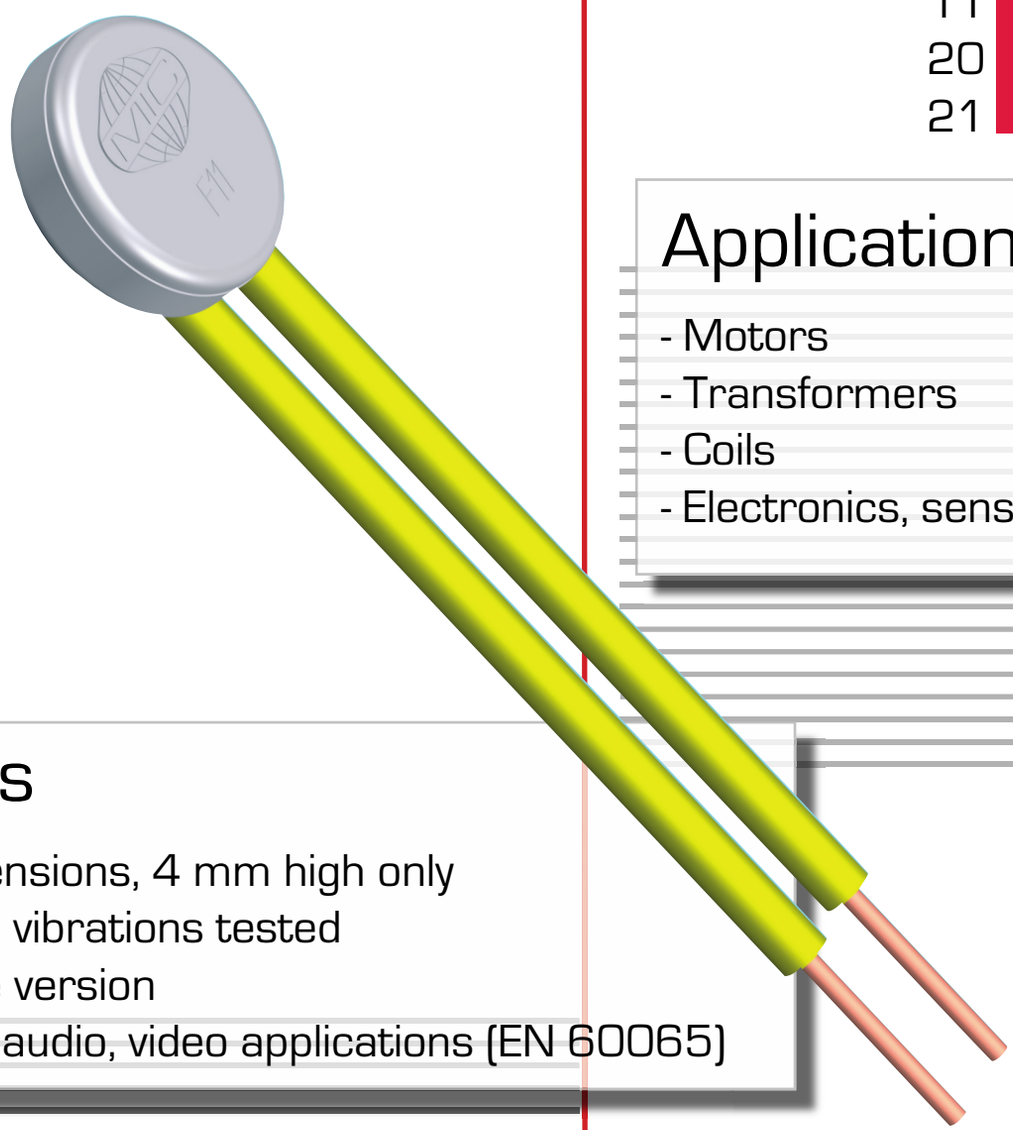
Typical Thermostat Control Schematic



Thermal motor protector
Temperature limiter
Thermal cut-out

F

11
20
21

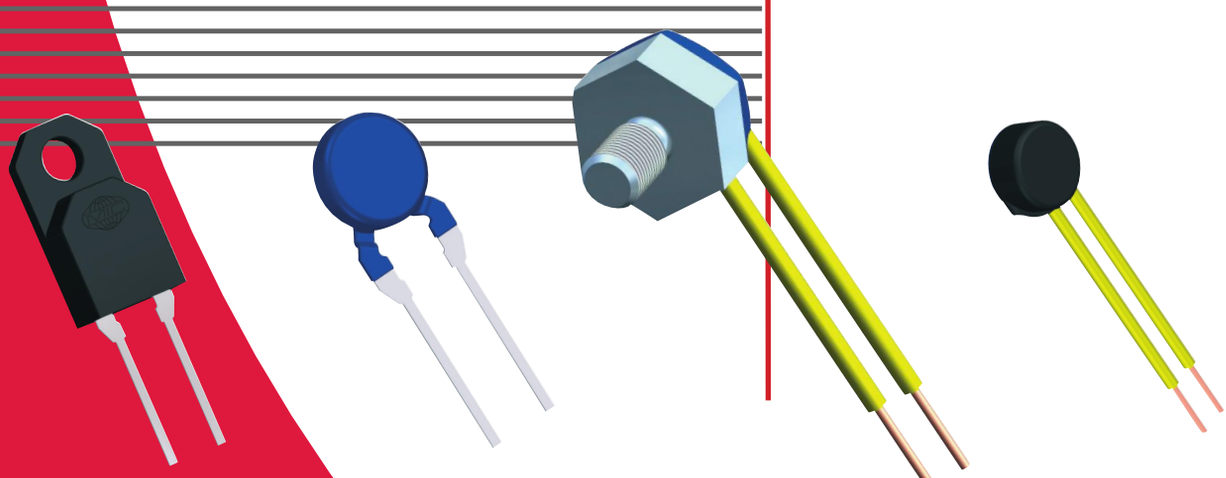


Applications

- Motors
- Transformers
- Coils
- Electronics, sensors

Benefits

- Small dimensions, 4 mm high only
- Shock- and vibrations tested
- Leadframe version
- Tested for audio, video applications (EN 60065)



MICROTHERM

MIC
Microtherm International Cooperation

Technical data

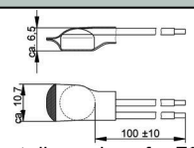
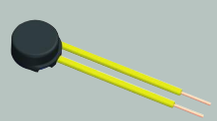
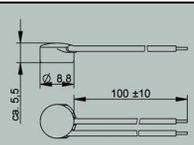
ratings \ control type		F20A / E	F20B / G	F21A / E	
version		normally closed	normally open	normally closed	
rated current at 250 V 50/60 Hz (power factor 0.95 / 0.6)		2.0 A / 1.6 A	2.0 A / 1.6 A	3.0 A / 3.0 A	6.3 A / 1.0 A
switching cycles		10,000		10,000	700
max. current at 250 V 50/60 Hz (power factor 0.95)		6.3 A		8.0 A	
switching cycles under max. current		100			
temperature rating Ta (steps in 5 K)		70 °C ... 160 °C	70 °C ... 155 °C	70 °C ... 160 °C	
tolerances		Standard: ± 5 K			
feature of automatic action		1.B, 2.B.M, 1.C, 3.C		2.B, 1.C	
contact resistance (incl. wire of 100 mm)		< 50 mΩ			
hysteresis		30 K ± 15 K			
dielectric strength (standard insulation)		2 kV			
shock- / vibration testing (similar to EN 50155)		400 m/s² sine half wave / 100 m/s² 5 Hz ... 2,000 Hz sine			
resistances to impregnation		tight against ordinary resins and lacquers			
degrees of protection provided by enclosures (EN 60529)		IP00			
suitable for use in protection category		I, II			
approvals	**VDE / ENEC**	EN 60730-1 / -2-2 / -2-3 [1] /-2-9			
	UL	UL 2111 / UL 873			
	CSA	C22.2 No. 77 / C22.2 No. 24 [2]			

[1] different power rating
[2] on demand

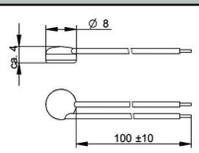
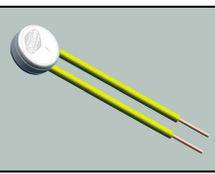
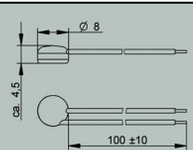
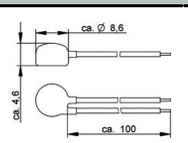
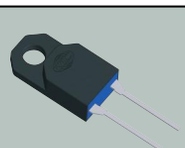
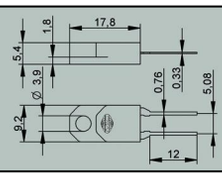
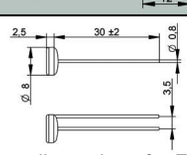
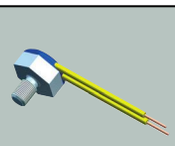
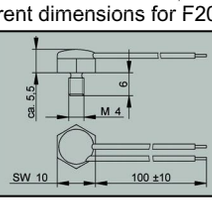
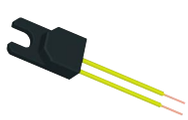
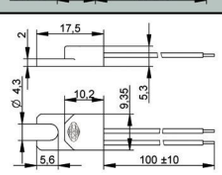
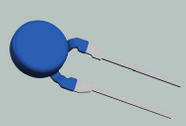
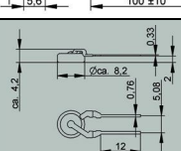
Standard wire (length 100 ± 10 mm, stripped 6 ± 1 mm)

lead	code	temperature max.	operating voltage max.	diameter insulation	cross section diameter	UL style
stranded white	L300	150 °C	300 V	1.57 mm	AWG24 / 0.21 mm²	3398
	L310			1.80 mm	AWG20 / 0.48 mm²	
	L330	200 °C	600 V	0.90 mm	AWG24 / 0.24 mm²	3557
solid yellow	L400	150 °C	300 V	1.40 mm	AWG24 / 0.51 mm	3398
	L410			1.65 mm	AWG20 / 0.81 mm	
	L430	200 °C	300 V	1.21 mm	AWG24 / 0.51 mm	1332
	L440			1.71 mm	AWG20 / 0.81 mm	

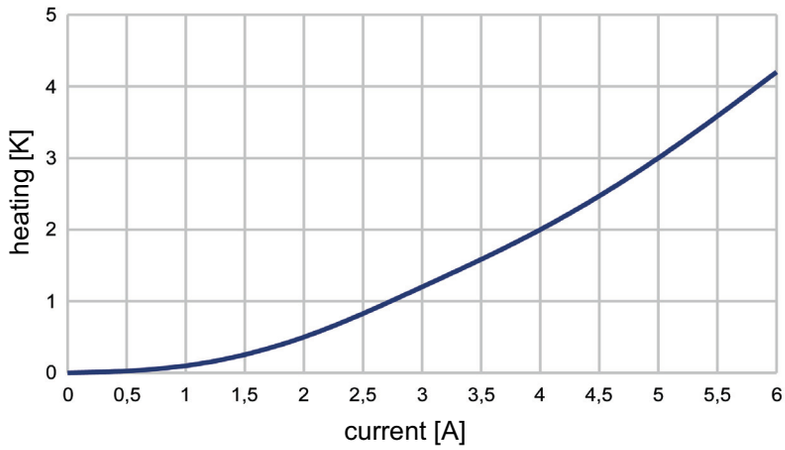
Standard insulation

control type	nc	no	code	illustration	drawing dimensions (mm)	technical specification	approvals
F11, F21 F20	A A	B	U254		 different dimensions for F20, F21	shrink cap potted Ta max. 155°C	VDE, UL
F11	A		U198		 different dimensions for F20, F21	cap of PPS potted	VDE, UL
F20 F21	A A	B	U185				

Specific variations

control type	nc	no	code	illustration	drawing dimensions (mm)	technical specification	approvals
F11	A					not insulated potted	VDE, UL, CSA
F20 F21	A A	B				not insulated potted	VDE, UL, CSA
F11, F21 F20	A A	B	U112		 different dimensions for F20, F21	coated	VDE, UL
F20 F21	A A	B	A150 U280			housing of PPS leadframe leads grid dimension 5.08 potted	VDE, UL
F11, F21 F20	A A	B	A800		 different dimensions for F20, F21	not insulated potted	VDE, UL
F20 F21	E E	G	G700			aluminium housing thread M4x6 potted Attention: Ta max. 150 °C	VDE, UL
F11	A		U281			housing of PPS potted	VDE, UL
F11, F21 F20	A A	B	A150 U112		 different dimensions for F20, F21	leadframe leads grid dimension 5.08 coated	VDE, UL

Heating by current

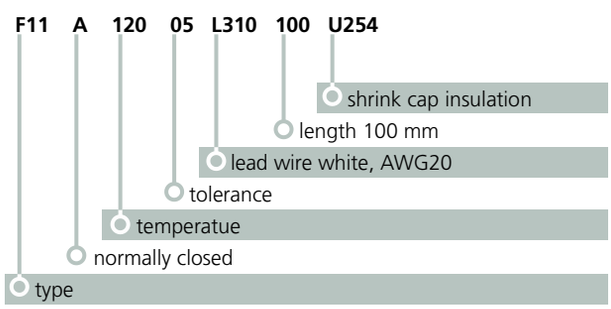


The diagram is measured with a thermal control without any insulation in an oil bath.

Attention:
The heating depends on the thermal conduction of the control to the equipment or part which should be protected.

Ordering and marking example

Ordering example



Deviations from standard controls on request.

Marking

F11A	type (F11 nc)
12005	response temperature (120°C), tolerance (± 5K)
026D	date of manufacture (Feb.2006), country (D=Germany)

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1. OBJECTIVE:

This standard aims at providing specification and installation procedures for "space-heater" installed in WEG motors.

2. WATTAGE AND CONNECTIONS:

FRAMES		TOTAL WATTS (W ± 10%) [3]	SPACE HEATER VOLTAGE					
			110 ± 22V		220 ± 44V		440 ± 88V	
NEMA	IEC		TYPE	CONNECTION/Req.	TYPE	CONNECTION/Req.	TYPE	CONNECTION/Req.
	63	8 [1]	20W/m-110V	Req. = 1,512 Ω	20W/m-220V	Req. = 6,050Ω	20W/m-440V	Req.=12,100Ω
	71							
	80							
143 145	90							
100		16 [2]	20W/m-110V	Req. = 756Ω	20W/m-220V	Req. = 3,025Ω	20W/m-440V	Req. = 6,050Ω
182 184	112							
213 215	132	24	30W/m-110V	Req.= 504Ω	30W/m-220V	Req. = 2,017Ω	30W/m-440V	Req. = 8,067Ω
254 256	160	48	30W/m-110V	Req. = 252Ω	30W/m-220V	Req. = 1,008.5Ω	30W/m-440V	Req = 40,033.5 Ω
284 286	180							
324 326	200							
364 365	225	79	35W/m-110V	Req.= 153Ω	35W/m-220V	Req. = 612Ω	35W/m-440V	Req.=2,450Ω
404 405	250							
444 445	280	158	35W/m-110V	Req. = 76.5Ω	35W/m-220V	Req. = 306Ω	35W/m-440V	Req. = 1,225Ω
447 449								
504/5	315							
5008	315B							
586/7	355							

Note: 1) For voltage of 440V, the total power is = 16W.
2) For voltage of 440V, the total power is = 32W.

3) The total Space Heather Watts is calculated according to: $P = \frac{V^2}{\mathrm{Re}\, q}(W)$

3. SPACE HEATER INSTALLATION

3.1. Space Heater is installed on the stator-winding head (at the opposite side of the leads) before the stator is pressed into the frame. On frame 364 and above, the space heater is installed into the stator-winding head (same side of the leads) after the winding head has been pressed.
3.2. Space Heather is fasten at, minimum, 4 points by nylon cord. For frames 364 and above it is fastened with a polyester jacket.

Notes:

1) Space heater installation does not require varnish impregnation.
2) Space heater leads are identified by:
   - R1 for the first space heater and
   - R2 for the second space heater (when installed).

