TEST REPORT
EN 60034-1:2010
Rotating electrical machines - Part 1: Rating and performance
EN IEC 60034-5:2020
Rotating electrical machines - Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) - Classification

Report Number.....:	**B2204TR90147S**
Test by (+signature).....:	Kyle Wang
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Date of issue.....:	May 10, 2022
Total number of pages	**25 pages**
Testing laboratory.....:	Shenzhen Bory Technology Service Co., Ltd.
Address .....:	501, Building 10, Xinlitang Building, Gangbei Industrial Park, Huangtian Community, Hangcheng Street, Baoan District, Shenzhen, Guangdong, China
Testing location .....:	As above
Applicant's name .....:	Shenzhen Vector Technology Co., Ltd
Address.....:	Room 502, Building 13, Maker Town, University Town, Taoyuan Street, Nanshan District, Shenzhen, Guangdong Province
Test specification:	
Standard .....:	EN 60034-1:2010 EN IEC 60034-5:2020
Test procedure.....:	LVD Scheme
Non-standard test method .....:	N/A
Test Report Form No. .....:	EN 60034-1, EN IEC 60034-5
Test Report Form(s) Originator.....:	N/A
Master TRF .....:	N/A
Test item description.....:	Servo Motor
Trade Mark.....:	VECTOR 威科达科技
Manufacturer.....:	Vector (Dongguan) Intelligent Control Co.,Ltd Building 12, CIMC Park, No.1 Nanshan Road, Songshan Lake High-Tech Industrial Development Zone, Dongguan, Guangdong Province
Model/Type reference.....:	aaaMC-bbbxzzye-jdm*, aaabcc-dxxxyyezzjh- ifk*
Ratings.....:	380V~, 20-200Hz,

Summary of testing:	
Tests performed (name of test and test clause): EN 60034-1:2010 EN IEC 60034-5:2020 The submitted samples were found to comply with the requirements of above specification.	**Testing location:** 501, Building 10, Xinlitang Building, Gangbei Industrial Park, Huangtian Community, Hangcheng Street, Baoan District, Shenzhen, Guangdong, China
Summary of compliance with National Differences: **List of countries addressed** ☐ **The product fulfils the requirements of _____ (insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)**	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Servo Motor
Model: 130MB-1R515A33F-MF2M
Rated: 380V 3P 3.5A
Rated power: 1.5kW
Rated speed: 3000r/min
Insulation: F
Torque: 10N.m
Duty: S1

IMPORTER: XXXX
IMPORTER ADDRESS: XXX
Manufacture: Vector (Dongguan) Intelligent Control Co.,Ltd
Address: Building 12, CIMC Park, No.1 Nanshan Road, Songshan Lake High-Tech Industrial Development Zone, Dongguan, Guangdong Province
Made in China

Test item particulars..... :	
Type of motor ..... :	Induction motor
Rating by duty type ..... :	S1
Degree of protection ..... :	IP65
Rated ambient temperature(℃) ..... :	40
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A (Not Applicable)
- test object does meet the requirement ..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing.....:	
Date of receipt of test item..... :	Apr. 25, 2022
Date (s) of performance of tests..... :	Apr. 26, 2022 ~May 06, 2022

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

The test results presented in this report relate only to the object tested.

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Throughout this report a ☐ comma / ☐ point is used as the decimal separator.

General product information:

1. The product is build-in appliance.
2. Model List:

Model	Specification
aaaMC-bbbxzzye-jdm*,	aaa: 10-999, bbb:1 R5/2R2/3R7/5R5/7R5/1R1/001-150, x: A-Z, zz: 23/33/43, y: A/D/E, e: F/B/A/C/T1-T9/W/D/b/c/Blank, j: MN/X/B/C1A/C2A/SIC/D1-D10, d: F/ Blank, m; 1-10/ Blank, A-Z/a-z/Blank
aaabcc-dxxxyyezzjh- ifk*	aaa: 10-999,b: F/ Blank, CC: ME/MB/ME1/MD/MH, d: L/M/H/ Blank, XXX: R10/R20/R40/R75/R85/1R3/1R2/1R1/1R5/1R8/2R5/2R6/2R3/2R2/2R8/3R5/3R6/3R8/2R7/4R2/4R5/2R9/4R3/4R4/4R6/4R7/3R7/5R2/5R5/5R6/7R3/7R5/5R7/8R2/5R9/6R3/6R7/6R8/7R4/9R3/9R6//11R6/8R8/15R6/17R3/17R6/25R6/6R6/8R6/001-150; yy: 01-999, e: A/D/E, zz: 23/33/43, j: F/D/Y/N/B/A/C /T /T1-T9/W/r /e/Blank, h: 1-10/ Blank, i: MN/X/B/C1A/C2A/S/C/ D1-D10, f: F/ Blank, K: 1-10/ Blank, *: A-Z/a-z/LA/IA

3. The test data is gathered from a production sample, provided by the manufacturer. The Sales area of others models listed in the report is different from main-test model 130MB-1R515A33F-MF2M, but the circuit、the electronic construction and specification is identical, declared by the manufacturer.

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
1	**Scope**		**P**
	Applicable to all rotating electrical machines		P
2	**Normative references**		**P**
4	**Duty**		**P**
4.1	Declaration of duty		P
	It is the responsibility of the purchaser to declare the duty. The purchaser may describe the duty by one of the following:		P
	a) numerically, where the load does not vary or where it varies in a known manner;		N
	b) as a time sequence graph of the variable quantities;		N
	c) by selecting one of the duty types S1 to S10 that is no less onerous than the expected duty.	The duty types S1	P
4.2	Duty types		P
4.2.1	Duty type S1 – Continuous running duty		P
	Operation at a constant load maintained for sufficient time to allow the machine to reach thermal equilibrium.		P
4.2.2	Duty type S2 – Short-time duty		N
	Operation at constant load for a given time, less than that required to reach thermal equilibrium, followed by a time de-energized and at rest of sufficient duration to re-establish machine temperatures within 2 K of the coolant temperature		N
4.2.3	Duty type S3 – Intermittent periodic duty		N
	A sequence of identical duty cycles, each including a time of operation at constant load and a ime de-energized and at rest, see Figure 3. In this duty, the cycle is such that the starting current does not significantly affect the temperature rise.		N
4.2.4	Duty type S4 – Intermittent periodic duty with starting		N
	A sequence of identical duty cycles, each cycle including a significant starting time, a time of operation at constant load and a time de-energized and at rest.		N
4.2.5	Duty type S5 – Intermittent periodic duty with electric braking		N
	A sequence of identical duty cycles, each cycle consisting of a starting time, a time of operation at constant load, a time of electric braking and a time de-energized and at rest, see Figure 5.		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
4.2.6	Duty type S6 – Continuous-operation periodic duty		N
	A sequence of identical duty cycles, each cycle consisting of a time of operation at constant load and a time of operation at no-load. There is no time de-energized and at rest, see Figure 6.		N
4.2.7	Duty type S7 – Continuous-operation periodic duty with electric braking		N
	A sequence of identical duty cycles, each cycle consisting of a starting time, a time of operation at constant load and a time of electric braking. There is no time de-energized and at rest, see Figure 7.		N
4.2.8	Duty type S8 – Continuous-operation periodic duty with related load/speed changes		N
	A sequence of identical duty cycles, each cycle consisting of a time of operation at constant load corresponding to a predetermined speed of rotation, followed by one or more times of operation at other constant loads corresponding to different speeds of rotation (carried out, for example, by means of a change in the number of poles in the case of induction motors). There is no time de-energized and at rest (see Figure 8).		N
4.2.9	Duty type S9 – Duty with non-periodic load and speed variations		N
	A duty in which generally load and speed vary non-periodically within the permissible operating range. This duty includes frequently applied overloads that may greatly exceed the reference load (see Figure 9).		N
4.2.10	Duty type S10 – Duty with discrete constant loads and speeds		N
	A duty consisting of a specific number of discrete values of load (or equivalent loading) and if applicable, speed, each load/speed combination being maintained for sufficient time to allow the machine to reach thermal equilibrium, see Figure 10. The minimum load within a duty cycle may have the value zero (no-load or de-energized and at rest).		N
5	**Rating**		P
5.1	Assignment of rating		P
	The rating, as defined in 3.2, shall be assigned by the manufacturer. In assigning the rating the manufacturer shall select one of the classes of rating defined in 5.2.1 to 5.2.6.		P
5.2	Classes of rating		P
5.2.1	Rating for continuous running duty		P

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
	A rating at which the machine may be operated for an unlimited period, while complying with the requirements of this standard.		P
5.2.2	Rating for short-time duty	S1	N
	A rating at which the machine may be operated for a limited period, starting at ambient temperature, while complying with the requirements of this standard.		N
5.2.3	Rating for periodic duty		N
	A rating at which the machine may be operated on duty cycles, while complying with the requirements of this standard.		N
5.2.4	Rating for non-periodic duty		N
	A rating at which the machine may be operated non-periodically while complying with the requirements of this standard.		N
5.2.5	Rating for duty with discrete constant loads and speeds		N
	A rating at which the machine may be operated with the associated loads and speeds of duty type S10 for an unlimited period of time while complying with the requirements of this standard.		N
5.2.6	Rating for equivalent loading		N
	A rating, for test purposes, at which the machine may be operated at constant load until thermal equilibrium is reached and which results in the same stator winding temperature rise as the average temperature rise during one load cycle of the specified duty type.		N
5.3	Selection of a class of rating		P
	A machine manufactured for general purpose shall have a rating for continuous running duty and be capable of performing duty type S1.	Duty type S1	P
	When a machine is intended to have a rating for short-time duty, the rating shall be based on duty type S2, see 4.2.2.		N
	When a machine is intended to supply varying loads or loads including a time of no-load or times where the machine will be in a state of de-energized and at rest, the rating shall be a rating for periodic duty based on a duty type selected from duty types S3 to S8, see 4.2.3 to 4.2.8.		N
	When a machine is intended non-periodically to supply variable loads at variable speeds, including overloads, the rating shall be a rating for non-periodic duty based on duty type S9, see 4.2.9.		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
	When a machine is intended to supply discrete constant loads including times of overload or times of no-load (or de-energized and at rest) the rating shall be a rating with discrete constant loads based on duty type S10, see 4.2.10.		N
5.4	Allocation of outputs to class of rating		P
	For duty types S1 to S8, the specified value(s) of the constant load(s) shall be the rated output(s), see 4.2.1 to 4.2.8.	S1;	P
	For duty types S9 and S10, the reference value of the load based on duty type S1 shall be taken as the rated output, see 4.2.9 and 4.2.10.		N
5.5	Rated output		P
5.5.1	DC generators		N
	The rated output is the output at the terminals and shall be expressed in watts (W).		N
5.5.2	AC generators		N
	The rated output is the apparent power at the terminals and shall be expressed in voltamperes (VA) together with the power factor.		N
	The rated power factor for synchronous generators shall be 0,8 lagging (over-excited), unless otherwise specified by the purchaser.		N
5.5.3	Motors		P
	The rated output is the mechanical power available at the shaft and shall be expressed in watts (W).		P
5.5.4	Synchronous condensers		N
	The rated output is the reactive power at the terminals and shall be expressed in volt-amperes reactive (var) in leading (under-excited) and lagging (over-excited) conditions.		N
5.6	Rated voltage		N
5.6.1	DC generators		N
	For d.c. generators intended to operate over a relatively small range of voltage, the rated output and current shall apply at the highest voltage of the range, unless otherwise specified, see also 7.3.		N
5.6.2	AC generators		N
	For a.c. generators intended to operate over a relatively small range of voltage, the rated output and power factor shall apply at any voltage within the range, unless otherwise specified, see also 7.3.		N
5.7	Co-ordination of voltages and outputs		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
	It is not practical to build machines of all ratings for all rated voltages. In general, for a.c. machines, based on design and manufacturing considerations, preferred voltage ratings above 1 kV in terms of rated output are as shown in Table 1.		N
5.8	**Machines with more than one rating**		P
	For machines with more than one rating, the machine shall comply with this standard in all respects at each rating.		P

6	**Site operating conditions**		**P**
6.1	General		P
	Unless otherwise specified, machines shall be suitable for the following site operation conditions.		P
6.2	Altitude		P
	The altitude shall not exceed 1 000 m above sea-level.		P
6.3	Maximum ambient air temperature	Max.40℃	P
	The ambient air temperature shall not exceed 40 °C.		P
6.4	Minimum ambient air temperature		P
	The ambient air temperature shall not be less than −15 °C for any machine.		N
	The ambient air temperature shall be not less than 0 °C for a machine with any of the following:		P
	a) rated output greater than 3 300 kW (or kVA) per 1 000 min-1;		N
	b) rated output less than 600 W (or VA);		P
	c) a commutator;		N
	d) a sleeve bearing;		N
	e) water as a primary or secondary coolant.		N
6.5	Water coolant temperature		N
	The water coolant temperature at the inlet to a machine or heat exchanger, or the ambient water (in the case of submersible machines with surface cooling or machines with water jacket cooling) shall not exceed +25 °C nor be less than +5 °C.		N
6.6	Storage and transport		P
	When temperatures lower than specified in 6.4 are expected during transportation, storage, or after installation, the purchaser shall inform the manufacturer and specify the expected minimum temperature.		P

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
6.7	Purity of hydrogen coolant		N
	Hydrogen cooled machines shall be capable of operating at rated output under rated conditions with a coolant containing not less than 95 % hydrogen by volume.		N
7	**Electrical operating conditions**		**P**
	For three-phase a.c. machines, 50 Hz or 60 Hz, intended to be directly connected to distribution or utilisation systems, the rated voltages shall be derived from the nominal voltages given in IEC 60038.		N
7.2	Form and symmetry of voltages and currents		P
7.2.1	AC motors		P
7.2.1.1	AC motors rated for use on a power supply of fixed frequency, supplied from an a.c. generator (whether local or via a supply network) shall be suitable for operation on a supply voltage having a harmonic voltage factor (HVF) not exceeding:		P
	0,02 for single-phase motors and three-phase motors, including synchronous motors but excluding motors of design N (see EN 60034-12), unless the manufacturer declares otherwise.		P
	0,03 for design N motors.		N
7.2.1.2	AC motors supplied from static converters have to tolerate higher harmonic contents of the supply voltage, see EN 60034-17 for the case of cage motors within the scope of EN 60034-12.		N
7.2.2	AC generators		P
	Three-phase a.c. generators shall be suitable for supplying circuits which, when supplied by a system of balanced and sinusoidal voltages:		N
	a) result in currents not exceeding a harmonic current factor (HCF) of 0,05, and		N
	b) result in a system of currents where neither the negative-sequence component nor the zero-sequence component exceed 5 % of the positive-sequence component.		N
7.2.3	Synchronous machines		N
	Unless otherwise specified, three-phase synchronous machines shall be capable of operating continuously on an unbalanced system in such a way that, with none of the phase currents exceeding the rated current, the ratio of the negative-sequence component of current (I2) to the rated current (IN) does not exceed the values in Table 2 and under fault conditions shall be capable of operation with the product of (I2/IN)2 and time (t) not exceeding the values in Table 2.		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.4	DC motors supplied from static power converters		N
	In the case of a d.c. motor supplied from a static power converter, the pulsating voltage and current affect the performance of the machine.		N
7.3	Voltage and frequency variations during operation		P
	For a.c. machines rated for use on a power supply of fixed frequency supplied from an a.c. generator (whether local or via a supply network), combinations of voltage variation and frequency variation are classified as being either zone A or zone B, in accordance with Figure 11 for generators and synchronous condensers, and Figure 12 for motors.		P
7.4	Three-phase a.c. machines operating on unearthed systems		N
	Three-phase a.c. machines shall be suitable for continuous operation with the neutral at or near earth potential.		N
7.5	Voltage (peak and gradient) withstand levels		P
	For a.c. motors the manufacturer shall declare a limiting value for the peak voltage and for the voltage gradient in continuous operation.		P
8	**Thermal performance and tests**		**P**
8.1	Thermal class		P
	A thermal class in accordance with IEC 62114 shall be assigned to the insulation systems used in machines.	Class F	P
8.2	Reference coolant		P
	The reference coolant for a given method of cooling the machine is specified in Table 4.		N
8.3	Conditions for thermal tests		P
8.3.1	Electrical supply		P
	During thermal testing of an a.c. motor the HVF of the supply shall not exceed 0,015 and the negative-sequence component of the system of voltages shall be less than 0,5 % of the positive-sequence component, the influence of the zero-sequence component being eliminated.		P
8.3.2	Temperature of machine before test		P
	If the temperature of a winding is to be determined from the increase of resistance, the initial winding temperature shall not differ from the coolant by more than 2 K.		P
8.3.3	Temperature of coolant		P
	A machine may be tested at any convenient value of coolant temperature.		P

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.3.4	Measurement of coolant temperature during test		P
8.5	Methods of measurement of temperature		P
	Three methods of measuring the temperature of windings and other parts are recognized:		P
	- resistance method;		P
	- embedded temperature detector (ETD) method;		N
	– thermometer method.		N
8.5.2	Resistance method		P
8.5.3	Embedded temperature detector (ETD) method		N
8.5.4	Thermometer method		P
8.6	Determination of winding temperature		P
8.6.1	Choice of method		P
	In general, for measuring the temperature of the windings of a machine, the resistance method in accordance with 8.5.1 shall be applied (but see also 8.6.2.3.3).		P
8.6.2	Determination by resistance method		P
8.6.2.1	Measurement		P
	One of the following methods shall be used:		P
	direct measurement at the beginning and the end of the test, using an instrument having a suitable range;		P
	measurement by d.c. current/voltage in d.c. windings, by measuring the current in and the voltage across the winding, using instruments having suitable ranges;		N
	measurement by d.c. current/voltage in a.c. windings by injecting direct current into the winding when de-energized;		N
	superposition method without interruption of the a.c. load current by superimposing on the load current a small d.c. measuring current, in accordance with IEC 60279.		N
8.6.2.2	Calculation		P
8.6.2.3	Correction for stopping time		N
8.6.3	Determination by ETD method		N
8.6.3.1	General		N
8.6.3.2	Two or more coil-sides per slot		N
8.6.3.3	One coil-side per slot		N
8.6.3.4	End windings		N
8.6.4	Determination by thermometer method		P
8.7	Duration of thermal tests		P

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.7.1	Rating for continuous running duty		P
8.7.2	Rating for short-time duty		N
8.7.3	Rating for periodic duty		N
8.7.4	Ratings for non-periodic duty and for duty with discrete constant loads		N
8.8	Determination of the thermal equivalent time constant for machines of duty type S9		N
8.9	Measurement of bearing temperature		P
8.10	Limits of temperature and of temperature rise		P
8.10.1	Indirect cooled windings		P
8.10.2	Direct cooled windings		N
8.10.3	Adjustments to take account of hydrogen purity on test		N
8.10.4	Permanently short-circuited windings, magnetic cores and all structural components (other than bearings) whether or not in contact with insulation		N
8.10.5	Commutators and sliprings, open or enclosed and their brushes and brushgear		N
9	**Other performance and tests**		**P**
9.1	Routine tests		P
9.2	Withstand voltage test		P
9.3	Occasional excess current		N
9.3.1	General		N
9.3.2	Generators		N
9.3.3	Motors		N
9.3.4	Commutator machines		N
9.4	Momentary excess torque for motors		P
9.4.1	Polyphase induction motors and d.c. motors		N
9.4.2	Polyphase synchronous motors		N
9.4.3	Other motors		P
9.5	Pull-up torque		P
9.6	Safe operating speed of cage induction motors		P
9.7	Overspeed		N
9.8	Short-circuit current for synchronous machines		N
9.9	Short-circuit withstand test for synchronous machines		N
9.10	Commutation test for commutator machines		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.11	Total Harmonic Distortion (THD) for synchronous machines		N
9.11.1	General		N
9.11.2	Limits		N
10	**Rating plates**		**P**
10.1	General		P
10.2	Marking		P
	1) The manufacturer's name or mark.	See the label	P
	2) The manufacturer's serial number, or identification mark.		P
	3) Information to identify the year of manufacture.		N
	4) The manufacturer's machine code.		N
	5) For a.c. machines, the number of phases.	Three-phase	P
	6) The number(s) of the rating and performance standard(s) which are applicable (IEC 60034-X and/or equivalent national standard(s)). If IEC 60034 is marked, this implies compliance with all the other relevant standards of the IEC 60034 series.		N
	7) The degree of protection provided by the integral design of the rotating electrical machine enclosures (IP code) in accordance with IEC 60034-5.		N
	8) The thermal class and the limit of temperature or of temperature rise (when lower than that of the thermal class) and, if necessary,		P
	9) The class(es) of rating of the machine if designed for other than rating for continuous running duty S1, see 5.2.		P
	10)The rated output(s) or range of rated output.		N
	11) The rated voltage(s) or range of rated voltage.	380V	P
	12) For a.c. machines the rated frequency or range of rated frequency.	20-200Hz	P
	13) The rated current(s) or range of rated current.		P
	14) The rated speed(s) or range of rated speed.		P
	15) The permissible overspeed if other than specified in 9.7. Or the maximum safe operating speed if less than in 9.6.		P
	16) For d.c. machines with separate excitation or with shunt excitation and for synchronous machines, the rated field voltage and the rated field current.		N
	17) For a.c. machines, the rated power factor(s).		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
	18) For wound-rotor induction machines, the rated open-circuit voltage between slip-rings and the rated slip-ring current.		N
	19) For d.c. motors with armatures intended to be supplied by static power converters, the identification code of the static power converter in accordance with IEC 60971. Alternatively, for motors not exceeding 5 kW, the rated form factor and the rated alternating voltage at the input terminals of the static power converter, when this exceeds the rated direct voltage of the motor armature circuit.		N
	20) The maximum ambient air temperature, if other than 40 °C. The maximum water coolant temperature, if other than 25 °C.		N
	21) The minimum ambient air temperature if other than specified in 6.4.		N
	22) The altitude for which the machine is designed (if exceeding 1 000 m above sea-level).		N
	23) For hydrogen-cooled machines, the hydrogen pressure at rated output.		N
	24)When specified, the approximate total mass of the machine, if exceeding 30kg		N
	25) for machine suitable for operation in only one of direction of rotation, the direction of rotation, indicated by an arrow. This arrow need not be on the rating plate, but it shall be easily visible		N
	26) the connecting instructions in accordance with IEC 60034-8 by means of a diagram or text located near the terminals		N
11	**Miscellaneous requirements**		**N**
11.1	Protective earthing of machines		N
11.2	Shaft-end key(s)		N
12	**Tolerances**		**N**
12.1	General		N
14	**Safety**		**P**
Annex A	**Guidance for the application of duty type S10 and for establishing the value of relative thermal life expectancy TL**		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict
A.1	The load of the machine at any moment is equivalent to duty type S1 corresponding to 4.2.1. However, the load cycle may comprise loads other than the rated load based on duty type S1.		N
A.2	Depending on the value and duration of the different loads within one cycle, the relative life expectancy of the machine based on the thermal ageing of the insulation system can be calculated by the following equation		N
A.3	The quantity TL is an integral part of the unambiguous identification of the class of rating.		N
A.4	The value of the quantity TL can be determined only when, in addition to information concerning the load cycle according to Figure 10, the value k for the insulation system is known.		N
A.5	TL can be stated sensibly as a relative value only.		N
A.6	The manufacturer of the machine is responsible for the correct compilation of the various parameters for determining the value of TL.		N
Annex B	**Electromagnetic compatibility (EMC) limits**		N

EN 60034-1			
Clause	Requirement + Test	Result - Remark	Verdict

Attachment 1 Product Specification

	TABLE: List of critical components				
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity[1])
Magnet wire	CNI	PEW	MW30, 180℃	EN 60034-1	Test in equipment
[1]) An asterisk indicates a mark which assures the agreed level of surveillance					
Supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict
4	Degrees of protection – First characteristic numeral		
4.1	Indication of degree of protection		
	The first characteristic numeral indicates the degree of protection provided by the enclosure to persons and to the parts of the machine inside the enclosure. Table 2 gives, in the third column, brief details of objects which will be 'excluded' from the enclosure for each of the degrees of protection represented by the first characteristic numeral. The term 'excluded' implies that a part of the body, a tool or a wire held by a person, either will not enter the machine or, if it enters, that adequate clearance will be maintained between it and the live parts or dangerous moving parts (smooth rotating shafts and the like are not considered dangerous). The third column of table 2 also indicates the minimum size of solid foreign objects which will be excluded.		P
4.2	Compliance to indicated degree of protection		P
	Compliance of an enclosure with an indicated degree of protection implies that the enclosure will also comply with all lower degrees of protection in table 2. In consequence, the tests establishing these lower degrees of protection are not required, except in case of doubt.		P
4.3	External fans		P
	The blades and spokes of fans external to the enclosure shall be protected against contact by means of guards complying with table 1.		P
	Table 1 – Test requirements for guards Protection of machine For the test, the rotor shall be slowly rotated, for example by hand when possible. Smooth rotating shafts and similar parts are not considered dangerous.	Finger test	P
4.4	Drain holes		N/A
	If the machine is provided with drain holes, the following shall apply: – drain holes intended normally to be open on site shall be kept open during testing; – drain holes intended normally to be closed on site shall be kept closed during testing; – if machines with protection IP3X or IP4X are intended to be run with open drain holes, the drain holes may comply with protection IP2X;	No drain holes	N/A

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	– if machines with protection IP5X are intended to be run with open drain holes, the drain holes shall comply with protection IP4X.		
	Table 2 – Degrees of protection indicated by the first characteristic numeral First Degree of protection characteristic numeral Brief description	IP5X	P
5	Degrees of protection – Second characteristic numeral		P
5.1	The second characteristic numeral indicates the degree of protection provided by the enclosure with respect to harmful effects due to ingress of water.		P
	Table 3 gives, in the third column, details of the type of protection provided by the enclosure for each of the degrees of protection represented by the second characteristic numeral.	IPX6	P
	An air-cooled open machine is weather-protected when its design reduces the ingress of rain, snow and airborne particles, under specified conditions, to an amount consistent with correct operation.		N/A
	This degree of protection is designated by the letter W placed after the second characteristic numeral.		N/A
5.2	For second characteristic numerals up to and including 6, compliance of an enclosure with an indicated degree of protection implies that the enclosure will also comply with all lower degrees of protection in table 3.		P
	In consequence, the tests establishing these lower degrees of protection are not required, except in case of doubt. For IPX7 and IPX8, it shall not be assumed that compliance of the enclosure implies that the enclosure will also comply with all lower degrees of protection in table 3		P
	Table 3 – Degrees of protection indicated by the second characteristic numeral Second Degree of protection characteristic numeral. Brief description		P
6	Marking		P
	It is recommended that the characteristic letters and numerals be marked on the machine preferably on the rating plate or, if this is not practicable, on the enclosure.	In the rating metal plate is stamp IP 56	P
	When all parts of a machine do not have the same degree of protection, at least the designation of the lowest degree shall be shown, followed, if		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	necessary, by the higher designation with clear reference to the part to which it applies.		
	NOTE Space limitations on the rating plate usually only allow the lowest IP code to be marked. Parts or components having a higher degree of protection should then be specified in the documentation and/or in the operating instructions. The lower degree of protection of: – guards for external fans (as allowed in 4.3); – drain holes (as allowed in 4.4); need not be specified on the rating plate or in the documentation. Where the mounting of the machine has an influence on the degree of protection, the intended mounting arrangements shall be indicated by the manufacturer on the rating plate or in the instructions for mounting.		N/A
7	General requirements for tests		P
	The tests specified in this standard are type tests. They shall be carried out on standard products or models of them. Where this is not feasible, verification either by an alternative test or by examination of drawings shall be the subject of an agreement between manufacturer and user.	Test made on the complete product.	P
	Unless otherwise specified, the machine for each test shall be clean with all the parts in place and mounted in the manner stated by the manufacturer.		N/A
	In the case of both first and second characteristic numerals 1, 2, 3 and 4, a visual inspection may, in certain obvious cases, show that the intended degree of protection is obtained. In such cases, no test need be made. However, in case of doubt, tests shall be made as prescribed in clauses 8 and 9.		N/A
7.1	Adequate clearance		P
	For the purpose of the following test clauses in this standard, the term ‘adequate clearance has the meaning given in 7.1.1 or 7.1.2.		P
7.1.1	Low-voltage machines (rated voltages not exceeding 1 000 V a.c. and 1 500 V d.c.) The test device (sphere, finger, wire, etc.) does not touch the live parts or moving parts other than non-dangerous parts such as smooth rotating shafts.		P
7.1.2	High-voltage machines (rated voltages exceeding 1 000 V a.c. and 1 500 V d.c.) When the test device is placed in the most unfavorable position, the machine shall be capable of withstanding the dielectric test applicable to the		N/A

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	machine. This dielectric test requirement may be replaced by a specified clearance dimension in air which would ensure that this test would be satisfactory under the most unfavorable electrical field configuration.		
8	Tests for first characteristic numeral		P
	Test and acceptance conditions for the first characteristic numeral are given in table 4.		P
	The dust test for numerals 5 and 6 shall be performed with the shaft stationary, provided that the difference in pressure between running and stationary (caused by fan effects) is lower than 2 kPa. If the pressure difference is greater than 2 kPa, the internal machine pressure during the dust test shall be depressed accordingly.	The test IP 5X was made with air depression internal to the motor (see annex photos).	P
	Alternatively, the machine may be tested with the shaft rotating at rated speed.		N/A
	Table 4 – Test and acceptance conditions for first characteristic numeral First characteristic numeral Test and acceptance conditions	No dust is present in the internal side of machine.	P
9	Tests for second characteristic numeral		P
9.1	Test conditions		P
	Test conditions for the second characteristic numeral are given in table 5.		P
	The test shall be conducted with fresh water. During the test, the moisture contained inside the enclosure may be partly condensed. The dew which may thus be deposited should not be mistaken for an ingress of water. For the purpose of the tests, the surface area of the machine shall be calculated with an accuracy of 10 %.		P
	When possible, the machine shall be run at rated speed. This can be achieved by mechanical means or by energization. If the machine is energized, adequate safety precautions shall be taken.		N/A
	Table 5 – Test conditions for second characteristic numeral Second characteristic numeral Test conditions		P
9.2	Acceptance conditions		P
	After the test in accordance with table 5 has been		P

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	carried out, the machine shall be inspected for ingress of water and subjected to the following verification and tests:		
9.2.1	The amount of water which has entered the machine shall not be capable of interfering with its satisfactory operation. The windings and live parts not designed to operate when wet shall not be wet and no accumulation of water which could reach them shall occur inside the machine. It is, however, permissible for the blades of fans inside rotating machines to be wet and leakage along the shaft is allowable if provision is made for drainage of this water.	No water has entered in the machine.	P
9.2.2	In the case of a test on a machine not running: a) the machine shall be operated under no-load conditions at rated voltage for 15 min, b) then be submitted to a withstand voltage test, the test voltage being 50 % of the test voltage for a new machine (but not less than 125 % of the rated voltage). In the case of a test on a running machine, only the withstand voltage test is made, in accordance with item b) above. The test is deemed satisfactory if these checks show no failure.		N/A
10	Requirements and tests for open weather-protected machines		N/A
	The degree of protection W is intended for air-cooled open machines with open circuit cooling, that is, machines with cooling systems designated by IC0X to IC3X according to IEC 60034-6. Weather-protected machines shall be so designed that the ingress of rain, snow and airborne particles into the electrical parts is reduced. Other measures providing weather protection (such as encapsulated windings or total enclosure) are not designated by W.		N/A
	Machines with degree of protection W shall have ventilation passages constructed such that:		N/A
	a) at both intake and discharge, high-velocity air and airborne particles are prevented from entering the internal passages leading directly to the electrical parts of the machine;		N/A
	b) the air intake path, by baffling or use of separate housings, provides at least three abrupt changes in the direction of the air intake, each of which is at least 90°;		N/A

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	c) the air intake path provides an area of average velocity not exceeding 3 m/s, enabling any particles to settle. Removable or otherwise easy to clean filters or any other arrangement for the separation of particles may be provided instead of a settling chamber.		N/A
	The protection of the machine against contact, foreign objects and water shall comply with the conditions and tests specified for the stated degree of protection. The design of the terminal box shall ensure a degree of protection of at least IP54. If necessary, arrangements to provide protection against icing, moisture, corrosion or other abnormal conditions shall be made by agreement (e.g. by using anti-condensation heating). For the verification of weather protection W, a study of drawings is generally sufficient.		N/A

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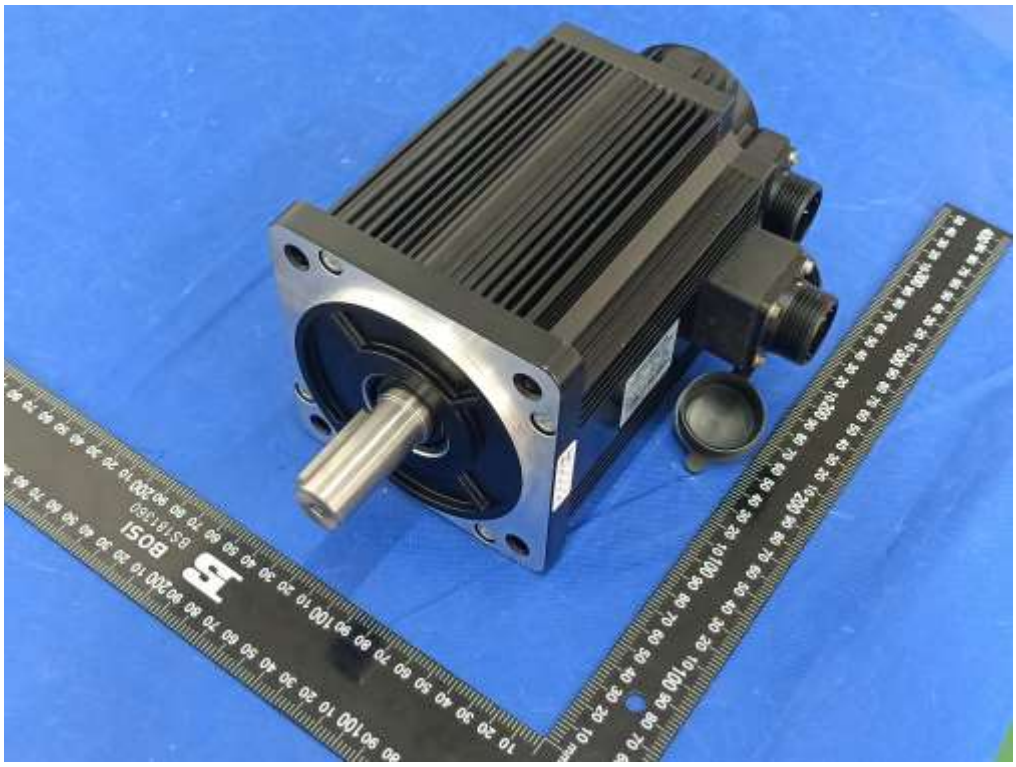
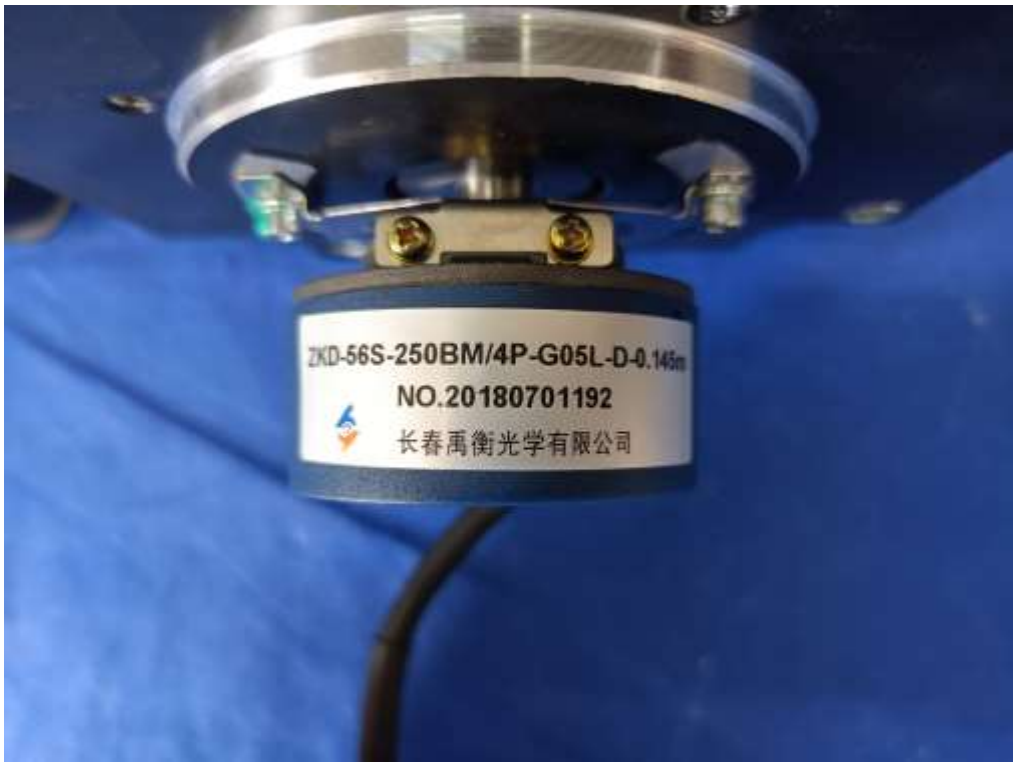
Model: 130MB-1R515A33F-MF2M





END OF REPORT