



LVD TEST REPORT

EN 60034-1: 2010/AC: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

For

Shenzhen Rtelligent Technology Co.,Ltd

2F-6F, A Building, Ruitech Industrial Park, Xingyu Road No.23, Xixiang Street, Bao an District,
Shenzhen,Guangdong Province China,518102

Model:

See the attachment

2024-07-15

This Report Concerns:

☒ Original Report

Equipment Type:

Stepper Motor(Open Loop)

Test Engineer:

Eric Tao/

Eric Tao

Report Number:

TH2407145-C01-R01

Test Date:

2024-07-08 to 2024-07-15

Reviewed By:

Prince Huang /

Prince Huang

Approved By:

Prince Huang /

Prince Huang

Prepared By:

Shenzhen Tian Hai Test Technology Co.,Ltd.

4F, A3 BLDG, The Silicon Valley Power intelligent terminal
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen Tian Hai Test Technology Co.,Ltd.



TEST REPORT

EN 60034-1: 2010/AC: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 reference No. TH2407145-C01-R01

Tested by (+signature) Eric Tao

Reviewed by (+ signature) Prince Huang

Approved by (+signature) Prince Huang

Date of issue 2024-07-15

Testing laboratory

Name **Shenzhen Tian Hai Test Technology Co., Ltd.**

Address 4F, A3 BLDG, The Silicon Valley Power intelligent terminal industrial park,
Guanlan street, Longhua district, Shenzhen

Test location Same as above

Client

Applicant **Shenzhen Rtelligent Technology Co.,Ltd**

Address 2F-6F, A Building, Ruitech Industrial Park, Xingyu Road No.23, Xixiang
Street, Bao an District, Shenzhen,Guangdong Province China,518102

Manufacturer **Shenzhen Rtelligent Technology Co.,Ltd**

Address 2F-6F, A Building, Ruitech Industrial Park, Xingyu Road No.23, Xixiang
Street, Bao an District, Shenzhen,Guangdong Province China,518102

Test specification

Standard EN 60034-1: 2010/AC:2010,EN IEC 60034-5:2020

Non-standard test method N.A.

Test item

Description **Stepper Motor(Open Loop)**

Trademark --

Model no. See the attachment

Rating(s) See the attachment

Note: All tests performed on model:57AM23-30.



Test item particulars :	
Classification of installation and use	Motor
Supply Connection	Permanent connect
Test case verdicts	
Test case does not apply to the test object :	N(not apply)
Test item does meet the requirement:	P(Pass)
Test item does not meet the requirement :	F(Fail)
Testing	
Date of receipt of test item	2024-07-08
Date (s) of performance of tests	2024-07-08 to 2024-07-15

“(see remark #)” refers to a remark appended to the report.

“(see appended table)” refers to a table appended to the report.

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

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

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Note:

Attached with:
APPENDIX A - EUT PHOTOGRAPHS

General product information:

Marking

Stepper Motor(Open Loop)

Model: 57AM23-30

Input: DC48V,1.5A,150W



Shenzhen Rtelligent Technology Co.,Ltd

2F-6F, A Building, Ruitech Industrial Park, Xingyu Road No.23, Xixiang Street, Bao an District, Shenzhen,Guangdong Province China,518102

Remark:

The height dimension of CE symbol should not less than 5mm, the heighet dimension of WEEE symbol should not less than 7mm.



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
4	Duty		P
4.1	Declaration of duty		P
	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.	S9	P
	Where the purchaser does not declare a duty, the manufacturer shall assume that duty type S1 (continuous running duty) applies.		N
4.2	Duty types		P
4.2.1	Duty type S1 – Continuous running duty		P
4.2.2	Duty type S2 – Short-time duty		N
4.2.3	Duty type S3 – Intermittent periodic duty		N
4.2.4	Duty type S4 – Intermittent periodic duty with starting		N
4.2.5	Duty type S5 – Intermittent periodic duty with electric braking		N
4.2.6	Duty type S6 – Continuous operation periodic duty		N
4.2.7	Duty type S7 – Continuous operation periodic duty with electric braking		N
4.2.8	Duty type S8 – Continuous operation periodic duty with related load/speed changes		N
4.2.9	Duty type S9 – Duty with non-periodic load and speed variations		N
4.2.10	Duty type S10 – Duty with discrete constant loads and speeds		N
5	Rating		P
5.1	Assignment of rating		P
	In assigning the rating the manufacturer shall select one of the classes of rating defined in 5.2.1 to 5.2.6. The designation of the class of rating shall be written after the rated output. If no designation is stated, rating for continuous running duty applies.		P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
	Special considerations are required when assigning ratings to machines fed from or supplying static converters.		N
5.2	Classes of rating		P
5.2.1	Rating for continuous running duty		N
5.2.2	Rating for short-time duty		N
5.2.3	Rating for periodic duty		N
5.2.4	Rating for non-periodic duty		P
5.2.5	Rating for duty with discrete constant loads and speeds		N
5.2.6	Rating for equivalent loading		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.		N
	The duty has not been specified by the purchaser, duty type S1 applies and the rating assigned shall be a rating for continuous running duty.		N
	When a machine is intended to have a rating for short-time duty, the rating shall be based on duty type S2,		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		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		P
	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		N
5.4	Allocation of outputs to class of rating		P
	In the determination of the rating:		P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
	For duty types S1 to S8, the specified value(s) of the constant load(s) shall be the rated output(s)		N
	For duty types S9 and S10, the reference value of the load based on duty type S1 shall be taken as the rated output	S9	N
5.5	Rated output	150W	P
5.5.1	DC generators		P
5.5.2	AC generators		N
5.5.3	Motors	150W	P
5.5.4	Synchronous condensers		P
5.6	Rated voltage	48V	P
5.6.1	DC generators		P
5.6.2	AC generators		N
5.7	Co-ordination of voltages and outputs		P
5.8	Machines with more than one rating	one rating	N
6	Site operating conditions		P
6.1	General		P
	machines shall be suitable for the following site operating conditions		P
6.2	Altitude	The altitude not exceed 1 000 m above sea-level.	P
6.3	Maximum ambient air temperature	Maximum Ambient air temperature is 40°C	P
6.4	Minimum ambient air temperature	Minimum ambient air temperature is -15°C	P
	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);	150W	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



EN 60034-1: 2010/AC:2010			
Clause	Requirement - Test	Result -Remark	Verdict
6.6	Storage and transport	Temperatures not lower than specified in 6.4	P
6.7	Purity of hydrogen coolant	No Hydrogen cooled machines	N
7	Electrical operating conditions		P
7.1	Electrical supply	48V	P
7.2	Form and symmetry of voltages and currents		P
7.2.1	AC motors		N
7.2.1.1	AC motors rated for use on a power supply of fixed frequency, supply voltage having a harmonic voltage factor (HVF) not exceeding:		N
	– 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.		N
	– 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		N
7.2.2	AC generators		N
	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		P
7.2.4	DC motors supplied from static power converters		P
7.3	Voltage and frequency variations during operation		N
7.4	Three-phase a.c. machines operating on unearthed systems		N
7.5	Voltage (peak and gradient) withstand levels		P
8.	Thermal performance and tests		P
8.1	Thermal class	Class B	P
8.2	Reference coolant	Primary coolant: Air Method of cooling: Indirect Secondary coolant: None	P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
8.3	Conditions for thermal tests		P
8.3.1	Electrical supply	48V	P
8.3.2	Temperature of machine before test		P
8.3.3	Temperature of coolant	Air	P
8.3.4	Measurement of coolant temperature during test	23.5°C	P
8.3.4.1	Open machines or closed machines without heat exchangers (cooled by surrounding ambient air or gas)		P
8.3.4.2	Machines cooled by air or gas from a remote source through ventilation ducts and machines with separately mounted heat exchangers		N
8.3.4.3	Closed machines with machine-mounted or internal heat exchangers		N
8.4	Temperature rise of a part of a machine		P
8.5	Methods of measurement of temperature		P
8.5.1	General		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		N
8.6	Determination of winding temperature		P
8.6.1	Choice of method		P
	For a.c. machines having a rated output less than or equal to 200 kW (or kVA) the manufacturer shall choose the direct measurement version or the superposition version of the resistance method (see 8.6.2.1), unless otherwise agreed		N
	The thermometer method is recognized in the following cases:		N
	a) when it is not practicable to determine the temperature rise by the resistance method as,		N
	b) single layer windings, rotating or stationary;		N
	c) during routine tests on machines manufactured in large numbers.		N
8.6.2	Determination by resistance method		P



EN 60034-1: 2010/AC:2010			
Clause	Requirement - Test	Result -Remark	Verdict
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;		P
	Measurement by d.c. current/voltage in a.c. windings, by injecting direct current into the winding when de-energized.		N
8.6.2.2	Calculation		P
	The temperature rise, may be obtained from the equation: $\frac{\theta_2 + k}{\theta_1 + k} = \frac{R_2}{R_1}$		P
8.6.2.3	Correction for stopping time		P
8.6.2.3.1	General	The measurement of temperatures at the end of the thermal test by the direct measurement resistance method requires a quick shutdown. A carefully planned procedure and an adequate number of people are required.	P
8.6.2.3.2	Short stopping time		N
8.6.2.3.3	Extended stopping time		P
8.6.2.3.4	Windings with one coil-side per slot		P
8.6.3	Determination by ETD method		P
8.6.3.1	General		P
	The detectors shall be suitably distributed throughout the winding and the number of detectors installed shall be not less than six.		P
8.6.3.2	Two or more coil-sides per slot		N
8.6.3.3	One coil-side per slot		P
8.6.3.4	End windings		P
8.6.4	Determination by thermometer method		N
8.7	Duration of thermal tests		P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
8.7.1	Rating for continuous running duty		N
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		P
8.9	Measurement of bearing temperature		N
	Either the thermometer method or the ETD method may be used.		--
8.10	Limits of temperature and of temperature rise	Limits are given for operation under site operating conditions specified in Clause 6 and at rating for continuous running duty (reference conditions)	P
8.10.1	Indirect cooled windings		N
8.10.2	Direct cooled windings		P
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		P
8.10.5	Commutators and sliprings, open or enclosed and their brushes and brushgear		P
9	Other performance and tests		P
9.1	Routine tests		P
9.2	Withstand voltage test	3000V AC 1min	P
9.3	Occasional excess current		P
9.3.1	General		P
9.3.2	Generators		P
9.3.3	Motors (except commutator motors and permanent magnet motors)		P
9.3.4	Commutator machines		N
9.4	Momentary excess torque for motors	75N	P
9.4.1	Polyphase induction motors and d.c. motors	Can capable of withstanding an excess torque of at least 60 % of their rated torque for 15 s without either stalling or exhibiting an abrupt change of speed	P
9.4.2	Polyphase synchronous motors		N
9.4.3	Other motors		N



EN 60034-1: 2010/AC:2010			
Clause	Requirement - Test	Result -Remark	Verdict
9.5	Pull-up torque	6N.m	P
9.6	Safe operating speed of cage induction motors		N
9.7	Overspeed		P
9.8	Short-circuit current for synchronous machines		P
9.9	Short-circuit withstand test for synchronous machines		P
9.10	Momentary excess torque for motors		P
9.10.1	Total harmonic distortion (THD) for synchronous machines		P
9.10.2	General		P
9.10.3	Limits		P
9.10.4	Tests		P
10	Rating plates		P
10.1	General		P
10.2	Marking		P
	a) The manufacturer's name or mark.	Shenzhen Rtelligent Technology Co.,Ltd	P
	b) The manufacturer's serial number, or identification mark.		P
	c) Information to identify the year of manufacture. This shall be marked on the rating plate or be given on a separate data sheet to be provided with the machine.		P
	d) The manufacturer's machine code.		P
	e) For a.c. machines, the number of phases.		N
	The degree of protection provided by the integral design of the rotating electrical machine (IP code) in accordance with IEC 60034-5.		P
	g) The degree of protection provided by the integral design of the rotating electrical machine (IP code) in accordance with IEC 60034-5.		P
	h) For motors within the scope of IEC 60034-30, the efficiency class (IE code) and the rated efficiency as specified in IEC 60034-30.		N




EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
	i) The thermal class and the limit of temperature or of temperature rise (when lower than that of the thermal class) and, if necessary, the method of measurement, followed in the case of a machine with a water-cooled heat exchanger by 'P' or 'S', depending on whether the temperature rise is measured above the primary or secondary coolant respectively (see 8.2). This information shall be given for both stator and rotor (separated by a slash) when their thermal class differ.	Class B	P
	j) The class(es) of rating of the machine if designed for other than rating for continuous running duty S1, see 5.2.	S9	N
	k) The rated output(s) or range of rated output.	150W	P
	l) The rated voltage(s) or range of rated voltage.	48V	P
	m) For a.c. machines the rated frequency or range of rated frequency.		N
	n) For synchronous machines excited by permanent magnets the open circuit voltage at rated speed.		P
	o) The rated current(s) or range of rated current.	1.5A	P
	p) The rated speed(s) or range of rated speed.		P
	q) The permissible overspeed if other than specified in 9.7.		P
	the maximum safe operating speed if less than in 9.6 or if the machine is designed especially for variable speed operation.		N
	r) For d.c. machines with separate excitation or with shunt excitation and for synchronous machines, the rated field voltage and the rated field current.		P
	s) For a.c. machines, the rated power factor(s).		N
	t) For wound-rotor induction machines, the rated open-circuit voltage between slip-rings and the rated slip-ring current.		N
	u) 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.		P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
	v) The maximum ambient air temperature, if other than 40 °C. The maximum water coolant temperature, if other than 25 °C.	40°C	P
	w) The minimum ambient air temperature if other than specified in 6.4.	-15°C	P
	x) The altitude for which the machine is designed (if exceeding 1 000 m above sea-level).		N
	y) For hydrogen-cooled machines, the hydrogen pressure at rated output.		N
	z) When specified, the approximate total mass of the machine, if exceeding 30 kg.		N
	aa) For machines suitable for operation in only one 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.		P
	bb) The connecting instructions in accordance with IEC 60034-8 by means of a diagram or text located near the terminals.		P
11	Miscellaneous requirements		P
11.1	Protective earthing of machines		N
	Machines shall be provided with an earthing terminal or another device to permit the connection of a protective conductor or an earthing conductor. The symbol  or legend shall identify this device		N
	The earthing terminal shall be designed to ensure a good connection with the earthing conductor without any damage to the conductor or terminal.		N
11.2	Shaft-end key(s)		N
12	Tolerances		P
12.1	General		P
12.2	Tolerances on values of quantities		P
13	Electromagnetic compatibility (EMC)		P
13.1	General		P
13.2	Immunity		P



EN 60034-1: 2010/AC:2010

Clause	Requirement - Test	Result -Remark	Verdict
13.2.1	Machines not incorporating electronic circuits Machines without electronic circuits are not sensitive to electromagnetic		P
13.2.2	Machines incorporating electronic circuits		P
13.3	Emission		P
13.3.1	Machines without brushes		N
13.3.2	Machines with brushes		P
13.4	Immunity tests		P
13.5	Emission tests		P
13.5.1	Machines without brushes		N
13.5.2	Machines with brushes		P
14	Safety		P
	Rotating machines in accordance with this standard shall comply with the requirements of IEC 60204-1 or IEC 60204-11 or, in the case of rotating machines incorporated in household and similar electrical appliances, IEC 60335-1, as appropriate unless otherwise specified in this standard, and be designed and constructed as far as possible in accordance with internationally accepted best design practice, appropriate to the application.	IEC 60204-1	P



EN IEC 60034-5:2020

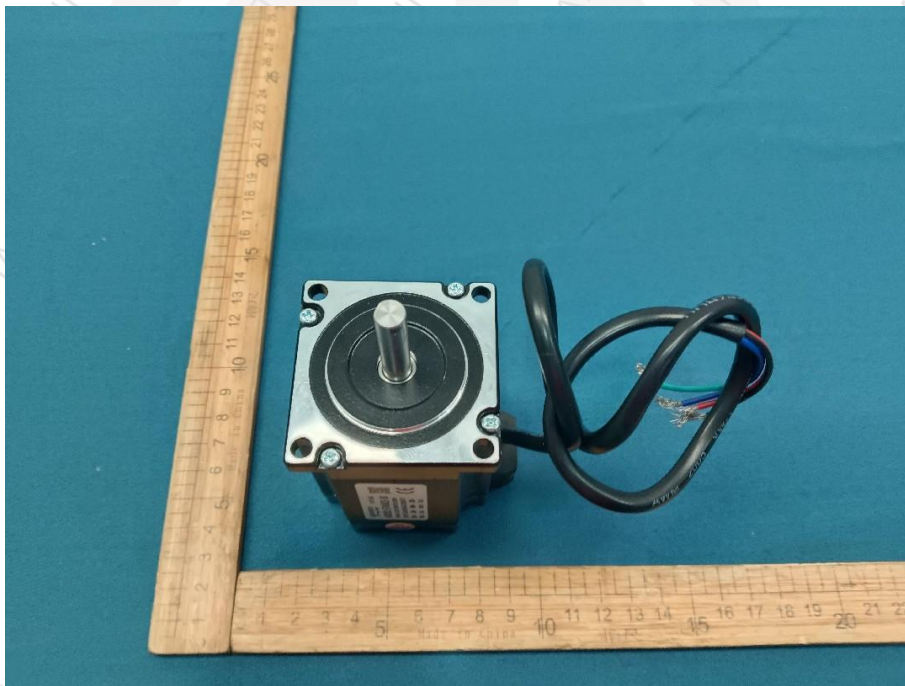
Clause	Requirement - Test	Result -Remark	Verdict
5	Degrees of protection -First characteristic numeral		P
	IP5X--Dust-protected machine		P
	Contact with or approach to live or moving parts inside the enclosure. Ingress of dust is not totally prevented but dust does not enter in sufficient quantity to interfere with satisfactory operation of the machine.	No effect to the operation of the machine	P
6	Degrees of protection -Second characteristic numeral		P
	IPX5--Machine protected against water jets		P
	Water projected by a nozzle against the machine from any direction shall have no harmful effect	No harmful effect	P

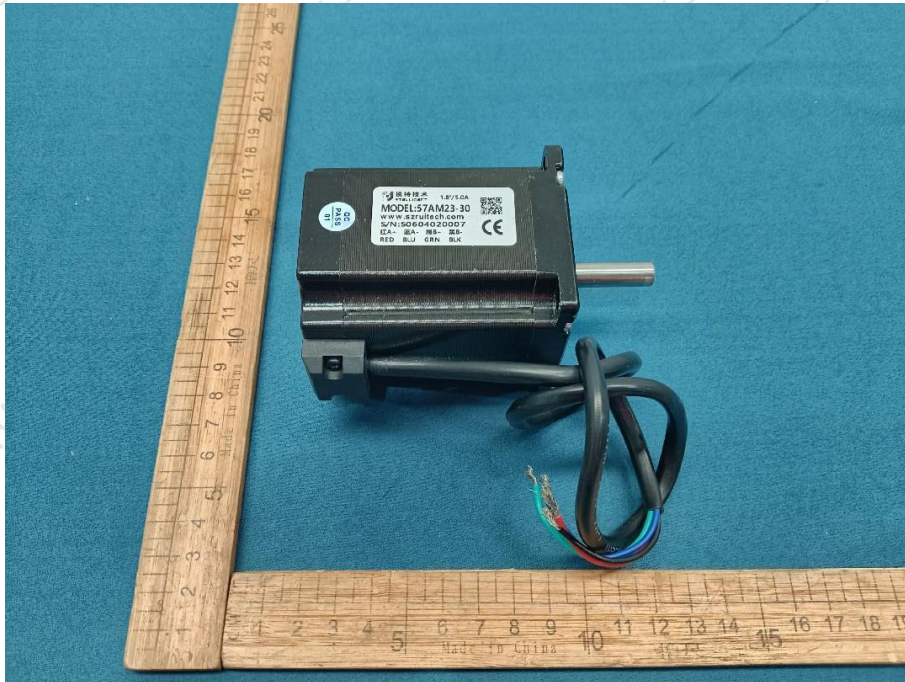
Test equipment:

Instr. Code	Instrument Type	Range Used Or ***	Make and Model **	Calibration Date	
				Last	Due
TH-SE-064	Dust test chamber	IP5X, IP6X,	XIANGRUI/ XR-SC225	2024-03-15	2025-03-14
TH-SE-065	Strong flush and rain test device	IPX5,IPX6	GONGWEN/ IP5-IP6	2024-03-15	2025-03-14



EUT PHOTOGRAPHS









The Attachment For TH2407145-C01-R01

57AM23-30	57AM13-30	57AM23-Z2	86AM85-Z2	86AM85ED-Z2	110AM20
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Model: XXXXX-X

Remark:

1: First "X" means frame size, can be

"20" indicates 20mm;

"28" indicates 28mm;

"35" indicates 35mm;

"39" indicates 39mm;

"42" indicates 42mm;

"57" indicates 57mm;

"60" indicates 60mm;

"86" indicates 86mm;

"110" indicates 110mm;

"130" indicates 130mm.

2: Second "X" means step angle type, can be

"A" indicates 1.8°;

"B" indicates 1.2° ;

"C" indicates 0.72° .

3: Third "X" means motor cable type, can be

"Null" indicates that the motor cable has no plastic case protective cover;

"M" indicates that the motor cable has a plastic case protective cover.

4: Forth "X" means motor torque, can be

"003" indicates 0.03Nm;

"005" indicates 0.05Nm;

"006" indicates 0.06Nm;

"01" indicates 0.1Nm;

"013" indicates 0.13Nm;

"02" indicates 0.2Nm;

"04" indicates 0.4Nm;

"06" indicates 0.6Nm;

"08" indicates 0.8Nm;

"09" indicates 0.9Nm;

"13" indicates 1.3Nm;

"15" indicates 1.5Nm;

"21" indicates 2.1Nm;

"1" indicates 1.3Nm;

"2" indicates 2.2Nm;

"3" indicates 3.0Nm;

"23" indicates 2.3Nm or 23Nm;



“24” indicates 2.4Nm;
“26” indicates 2.6Nm;
“30” indicates 3.0Nm;
“35” indicates 3.5Nm;
“40” indicates 4.0Nm or 4.3Nm;
“45” indicates 4.5Nm or 45Nm;
“65” indicates 6.5Nm;
“85” indicates 8.5Nm;
“12” indicates 12Nm;
“20” indicates 2.3Nm or 20Nm;
“27” indicates 27Nm;
“28” indicates 28Nm;
“36” indicates 36Nm;
“50” indicates 50Nm;
“70” indicates 7Nm;
“90” indicates 9Nm;
“80” indicates 8Nm。
“100” indicates 10Nm;
“120” indicates 12Nm;
“160” indicates 16Nm;
“200” indicates 20Nm.

5: Fifth “X” means encoder type, can be
“Null” indicates no encoder;
“EC” indicates 1000 line photoelectric encoder, encoder cable AMP6 connector;
“ED” indicates 1000 line photoelectric encoder, encoder cable DB9 connector;
“EX” indicates 1000 line photoelectric encoder, encoder cable DB9 connector, motor cable AMP4 connector;
“ET” indicates 1000 line photoelectric encoder, encoder cable AMP6 connector, motor cable AMP4 connector;
“EH” indicates 1000 line photoelectric encoder, encoder cable AMP9 connector, motor cable AMP4 connector.

6: Sixth “X” means non-standard code, can be
“Z2” indicates with brake;
“6.35” indicates that the shaft diameter of the motor is 6.35mm;
“8” indicates that the motor shaft diameter is 8mm;
“14” indicates that the motor shaft diameter is 14mm;
“10” indicates that the motor shaft length is 10mm;
“25” indicates that the motor shaft length is 25mm;
“30” indicates that the motor shaft length is 30mm;
“JSJ” indicates a short-shaft motor.

***** END OF THE REPORT *****