

Prüfbericht-Nr.: Test Report No.:	11034792 001	Auftrags-Nr.: Order No.:	114015023	Seite 1 von 29 Page 1 of 29
Kunden-Referenz-Nr.: Client Reference No.:	12067680	Auftragsdatum: Order date:	14.10.2013	
Auftraggeber: Client:	Delta Electronics, Inc. 31-1, Shien Pan Road Kuei Shan Ind. Zone TW-333 Taoyuan Taiwan, R.O.C.			
Prüfgegenstand: Test item:	Linear Motor			
Bezeichnung / Typ-Nr.: Identification / Type No.:	ECML-S2508A2DNS			
Auftrags-Inhalt: Order content:	COC of LVD			
Prüfgrundlage: Test specification:	EN60034-1:2010 Rotating electrical machines - Part 1: Rating and performance			
Wareneingangsdatum: Date of receipt:	N/A			
Prüfmuster-Nr.: Test sample No.:	ECML-S2508A2DNS			
Prüfzeitraum: Testing period:	27.01.2014 – 24.02.2014			
Ort der Prüfung: Place of testing:	Delta Electronics, Inc			
Prüflaboratorium: Testing laboratory:	TUV Rheinland Taiwan Ltd., Taichung Laboratory.			
Prüfergebnis*: Test result*:	Pass			

geprüft von / tested by:	kontrolliert von / reviewed by:
21.07.2014 Ray Liao / Project Engineer	21.07.2014 Andy Wer / Section Manager
Datum Name / Stellung Unterschrift	Datum Name / Stellung Unterschrift
Date Name / Position Signature	Date Name / Position Signature

Sonstiges / Other: The motor can only function properly with specified motor drive "ASDA-A2R-0721 series" from the client (DELTA). The products are linear motor. The incoming power supply and control of the motor is through its integrated motor driver (incoming power supply of 1~, 220V, 50/60 Hz). During the inspection and examination, ECML-S2508A2DNS was selected as the test sample. Controller (motor drive) is not within the scope of this evaluation.

Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Details im vorherigen Abschnitt Test item complete and undamaged
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet	
Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specification(s) F(ail) = failed a.m. test specification(s) N/A = not applicable N/T = not tested	

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

TEST REPORT**EN 60034-1****Rotating electrical machines - Part 1: Rating and performance**

Report Reference No......: 11034792 001
Compiled by (+ signature): Ray Liao Sign see cover sheet.....
Approved by (+ signature): Andy Wen Sign see cover sheet.....
Date of issue: See cover sheet Contents.....29 pages


Testing laboratory.....: TÜV Rheinland Taiwan, Taichung Laboratory
Address: No. 9, Lane 36, Sec. 3, Minsheng Rd., Daya District, Taichung City
428, Taiwan, R.O.C.
Testing location: Delta Electronics, Inc.
39, Section 2, Huandong Rd. Shanhua Township, Tainan County
74144, Taiwan, R.O.C.

Client.....: Delta Electronics, Inc.
Address: 31-1, Shien Pan Road Kuei Shan Ind. Zone TW-333 Taoyuan
Taiwan, R.O.C.

Standard.....: EN 60034-1:2010
Test procedure: N/A
Procedure deviation.....: N/A
Non-standard test method.....: N/A

Test Report Form No.: EN 60034-1/2010

Test item

Kind of machine: Linear Motor
Trademark: 
Model and/or type reference.....: ECML-S2508A2DNS
Manufacturer: Same as client
Production facilities: Delta Electronics, Inc.
39, Section 2, Huandong Rd. Shanhua Township, Tainan County
74144, Taiwan, R.O.C.
Rated voltage(s) (V).....: 200V (from motor drive)
The incoming power supply and control of the motor is through its
integrated motor driver (incoming power supply of single~, 200-
230V, 50/60 Hz or 3 phase , 200-230V, 50/60 Hz)
Rated frequency (Hz).....: None
Rated output (W)(A).....: 2.5A 152.5W

Particulars: test item vs. test requirements

Duty class.....: S1
Cycling duration factor.....: Not applicable
Class of equipment.....: Class I
Locked-rotor torque.....: N/A
Locked-rotor current.....: N/A

Pull-up torque	: N/A
Breakdown torque	: N/A
Pull-out torque	: N/A
Rated speed(min ⁻¹)	: Max speed:4m/s
Thermal classification according to IEC 62114.....	: Class 180 (H)
Type of cooling	: Air
Primary coolant	: IC4A8
Secondary coolant	: None
Maximum ambient air temperature (°C).....	: 40
Altitude above sea level (m)	: 1000
IP degree of machine.....	: IP42
IP degree of fan.....	: None
Mass of equipment (kg)	:

Test case verdicts

Test case does not apply to the test object.....	: N/A
Test item does meet the requirement	: P
Test item does not meet the requirement	: F

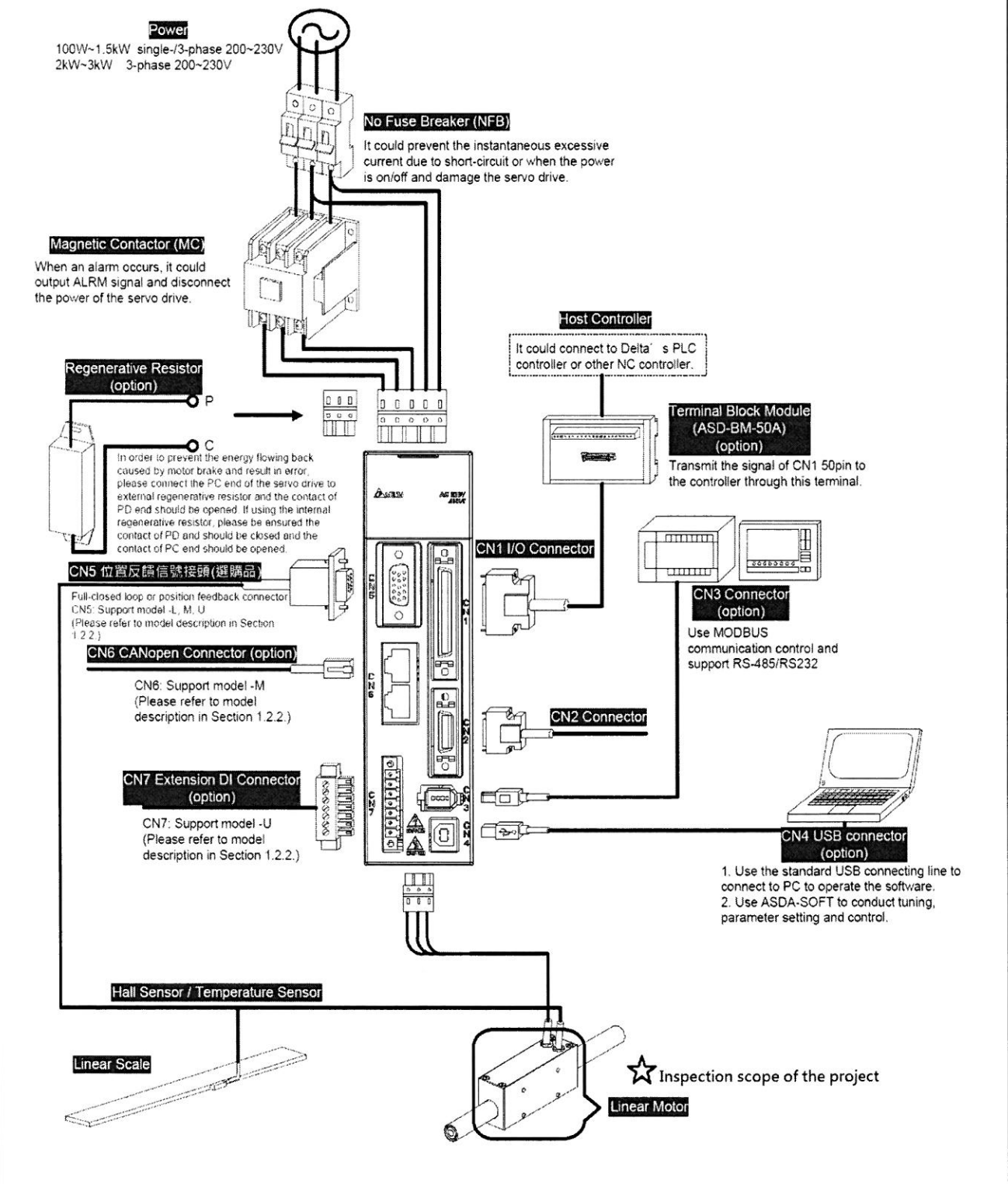
General remarks:

This test report shall not be reproduced except in full without the written approval of the testing laboratory.
 The test results presented in this report relate only to the item tested.
 "(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 period is used as the decimal separator.

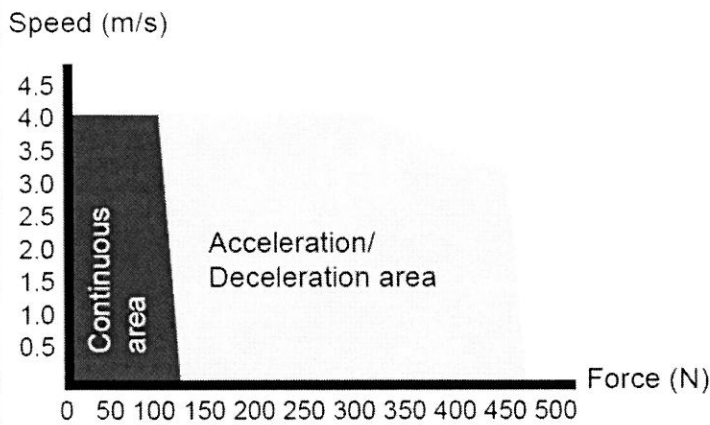
Brief description of the test sample:

A linear motor is an electric motor that has had its stator and rotor "unrolled" so that instead of producing a torque (rotation) it produces a linear force along its length.

The incoming power supply and control of the motor is through its integrated motor driver.



ECML	S25
	08
Rated force (N)	130.0
Max. force (N)	520.0
Rated current (Arms)	2.5
Max. instantaneous current (Arms)	10.0
Force constant-FC (N/Arms)	52.5
Voltage constant –KE (Vrms/(m/s))	17.5
Armature resistance (Ohm)	12.6
Armature inductance (mH)	23
Rated power (W)	152.5
Max. instantaneous power (W)	2439.6
Motor constant (N/√W)	10.5
Electric constant (ms)	1.83
Thermal resistance (°C /W)	0.49
Weight of coil assembly (kg)	2.1
Length of coil assembly (mm)	258
Vertical Magnetic Adsorption Force (N)	0
Air gap (mm)	0.75
Insulation resistance	> 10MΩ, DC 500V
Insulation strength	1.8k Vac,1 sec
Operating temperature (°C)	0 °C~ 40°C
Storage temperature (°C)	-10°C ~ 80°C
Operating humidity	20 ~ 80%RH (non-condensing)
Storage humidity	20 ~ 80%RH (non-condensing)

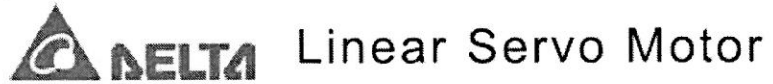


Name Plate :

The marking be laser engraving on the linear motor

ECML Series Servo Motor

■ Coil Assembly_Nameplate Information



Model Name → MODEL: ECML-S2508A2DNS

Power Input Specification → INPUT: 200V 2.5A

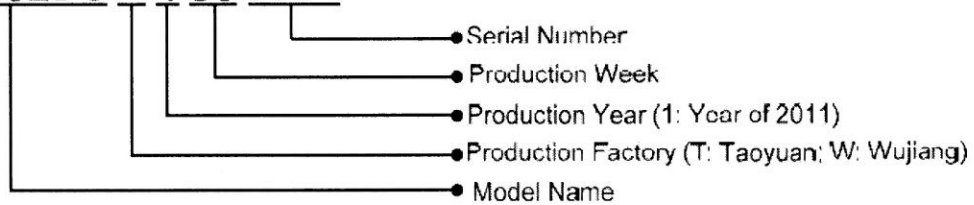
Delta Electronics, Inc.
Made in Taiwan

S25082DST1500001



■ Coil assembly_Serial Number

S25082DS T 1 50 0001



EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
4	SECTION 4: DUTY		-
4.1	Declaration of duty		-
	Purchasers declaration of duty	See below	P
	If duty not declared, S1	S1, continuous running duty	P
4.2	Duty types		-
4.2.1	Duty type S1 – Continuous running duty	S1, continuous running duty	P
4.2.2	Duty type S2 – Short-time duty		N/A
4.2.3	Duty type S3 – Intermittent periodic duty		N/A
4.2.4	Duty type S4 – Intermittent periodic duty with starting		N/A
4.2.5	Duty type S5 – Intermittent periodic duty with electric braking		N/A
4.2.6	Duty type S6 – Continuous-operation periodic duty		N/A
4.2.7	Duty type S7 – Continuous-operation periodic duty with electric breaking		N/A
4.2.8	Duty type S8 – Continuous-operation periodic duty with related load/speed changes		N/A
4.2.9	Duty type S9 – Duty with non-periodic load and speed variations		N/A
4.2.10	Duty type S10 – Duty with discrete constant loads		N/A
5	SECTION 5: RATING		-
5.1	Assignment of rating		-
	Rating assigned by manufacturer	Rating is assigned by the manufacturer	P
5.2	Classes of rating		-
5.2.1	Rating for continuous running duty	Rating is assigned by the manufacturer Applied (S1)	P
5.2.2	Rating for short-time duty	Not applicable	N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
5.2.3	Rating for periodic duty	Not applicable	N/A
5.2.4	Rating for non-periodic duty	Not applicable	N/A
5.2.5	Rating for duty with discrete constant loads	Not applicable	N/A
5.2.6	Rating for equivalent loading	Not applicable	N/A
5.3	Selection of a class of rating		-
	General purpose machine has rating for continuous running duty	Rating is assigned by the manufacturer	P
	If duty not specified by purchaser S1 applies	Not applicable	N/A
	Short-time duty, S2 applies	Not applicable	N/A
	Varying loads and no-load, S3 to S8 applies	Not applicable	N/A
	Non-periodical variable loads at variable speeds, S9 applies	Not applicable	N/A
	Discrete constant loads, S10 applies	Not applicable	N/A
5.4	Allocation of outputs to class of rating		-
	For duty S1 to S8, specified value(s) of constant load(s) is rated output(s)	Constant load applied	P
	For duty S9 and S10, reference value of load based on S1 taken as rated output	Not applicable	N/A
5.5	Rated output		-
5.5.1	DC generators		N/A
	Output at terminals (W).....:	Not applicable	N/A
5.5.2	AC generators		N/A
	Apparent power at terminals (VA).....:	Not applicable	N/A
	Power factor.....:	Not applicable	N/A
	Rated power factor for synchronous generators 0.8 lagging (over-excited)	Not applicable	N/A
5.5.3	Motors		P
	Mechanical power at shaft (W).....:	152.5W 2.5A	P
5.5.4	Synchronous condensers		-

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Reactive power at terminals (var).....:	Not applicable	N/A
5.6	Rated voltage		-
5.6.1	DC generators		N/A
	For small range of voltage, rated output and output factor applies at any voltage within range	Not applicable	N/A
5.6.2	AC generators		N/A
	Small range of voltage, rated output and output factor applying at any voltage within range	Not applicable	N/A
5.7	Coordination of voltages and outputs		-
	For machines with rated voltages above 1 kV, preferred rated voltages are selected according to rated output as stated in table	Not applicable No voltage above 1kV.	N/A
5.8	Machines with more than one rating		N/A
	Complying with standard for each rating	Not applicable	N/A
	Multi-speed motors rating assigned for each speed	This linear motor is designed for motor controller only setting in the speed 4m/s. Max speed:4m/s	N/A
	For varying rated quantities ratings stated at limits	This linear motor is designed for motor controller only Frequency variations limits marking on the user manual.	N/A
6	SECTION 6: SITE OPERATING CONDITIONS		-
6.1	General		-
	Machine suitable for operating conditions as stated in section 5	As required	P
6.2	Altitude		-
	Not exceeding 1 000 m	Less than 1000m	P
6.3	Maximum ambient air temperature		-

EN 60034-1:2010																														
Clause	Requirement - Test	Result - Remark	Verdict																											
	Not exceeding +40 °C	Not more than 40 °C	P																											
6.4	Minimum ambient air temperature		-																											
	Not less than -15 °C	Minimum temperature stated with -10 °C for storage and 0°C for operation.	P																											
	Not less than 0 °C if one or more exceptions apply	Not applicable	N/A																											
6.5	Water coolant temperature		N/A																											
	Not exceeding +25 °C and not less than +5 °C	No water-cooling	N/A																											
6.6	Storage and transport		-																											
	Minimum specified temperature if different from that in 5.4 (°C).....:	Not applicable. -10°C	N/A																											
6.7	Purity of hydrogen coolant		-																											
	Operation at hydrogen content of ≥ 95 %	No hydrogen cooling.	N/A																											
7	SECTION 7: ELECTRICAL OPERATING CONDITIONS		-																											
7.1	Electrical supply		-																											
	<p>Rated voltage of three-phase machines derived from IEC 60038</p> <table border="1"> <thead> <tr> <th colspan="2">Three-phase four-wire or three-wire systems</th> <th>Single-phase three-wire systems</th> </tr> <tr> <th colspan="2">Nominal voltage V</th> <th>Nominal voltage V</th> </tr> <tr> <th>50 Hz</th> <th>50 Hz</th> <th>60 Hz</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>120/208</td> <td>120/240</td> </tr> <tr> <td>-</td> <td>240</td> <td>-</td> </tr> <tr> <td>230/400¹⁾</td> <td>277/480</td> <td>-</td> </tr> <tr> <td>400/690¹⁾</td> <td>480</td> <td>-</td> </tr> <tr> <td>-</td> <td>347/600</td> <td>-</td> </tr> <tr> <td>1 000</td> <td>600</td> <td>-</td> </tr> </tbody> </table> <p>¹⁾ The nominal voltage of existing 220/380 V and 240/415 V systems shall evolve toward the recommended value of 230/400 V. The transition period should be as short as possible and should not exceed the year 2003. During this period, as a first step, the electricity supply authorities of countries having 220/380 V systems should bring the voltage within the range 230/400 V +0 % -10 % and those of countries having 240/415 V systems should bring the voltage within the range 230/400 V +10 % -0 %. At the end of this transition period, the tolerance of 230/400 V ± 10 % should have been achieved, after this the reduction of this range will be considered. All the above considerations apply also to the present 330/660 V value with respect to the recommended value 400/690 V.</p>	Three-phase four-wire or three-wire systems		Single-phase three-wire systems	Nominal voltage V		Nominal voltage V	50 Hz	50 Hz	60 Hz	-	120/208	120/240	-	240	-	230/400 ¹⁾	277/480	-	400/690 ¹⁾	480	-	-	347/600	-	1 000	600	-	<p>The motor is not intended to be directly connected to distribution or utilisation systems.</p> <p>The motor driver rated voltages is conform with nominal voltages given in IEC 60038.</p>	N/A
Three-phase four-wire or three-wire systems		Single-phase three-wire systems																												
Nominal voltage V		Nominal voltage V																												
50 Hz	50 Hz	60 Hz																												
-	120/208	120/240																												
-	240	-																												
230/400 ¹⁾	277/480	-																												
400/690 ¹⁾	480	-																												
-	347/600	-																												
1 000	600	-																												
7.2	Form and symmetry of voltages and currents		-																											
7.2.1	AC motors		-																											

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
7.2.1.1	AC motors supplied from power supply (AC generator) of fixed frequency suitable for operation on supply voltage having harmonic voltage factor not exceeding:	Supplied from a motor drive.	P
	0.02 for single and three phase motors	Manufacturer declares motor is capable to run at HVF of 0.02	N/A
	0.03 for design N motors		N/A
7.2.1.2	AC motors supplied from static converters		N/A
7.2.2	AC generators		N/A
	Complying with requirements		N/A
7.2.3	Synchronous machines		N/A
	Maximum I_2/I_N value for continuous operation		N/A
	Maximum $(I_2/I_N)^2 \times t$ in seconds at single fault condition		N/A
7.2.4	DC motors supplied from static power converters		P
	Complying with requirements		P
7.3	Voltage and frequency variations during operation		-
	Figure 11 used for generators and synchronous condensers	Not applicable	N/A
	Figure 12 used for motors	The motor is not intended for fixed frequency	N/A
	Machine capable of performing its primary function within Zone A	Supplied via motor driver.	N/A
	Machine capable of performing its primary function within Zone B with deviations	Supplied via motor driver.	N/A
7.4	Three-phase AC machines operating on unearthed systems		-
	Machine able to operate at earthed neutral	Grounding is provided	N/A
	Machine able to operate at unearthed systems with one line at earth potential for short duration	Grounding is provided	N/A
7.5	Voltage (peak and gradient) withstand levels		-

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Limiting value for peak voltage (V)	Motor Driver and overvoltage category specified, no further declaration regarded necessary.	N/A
	Limiting value for voltage gradient	Recurring peak voltages originating in the driver regarded not critical for the motor due to the relatively low voltage	N/A
	For cage induction motors within the scope of IEC 60034-12	Not specified	N/A
	For high-voltage a.c. motor	Not applicable	N/A
	For creepage and clearance distances of bare live copper, see IEC 60664-1.		P
8	SECTION 8: THERMAL PERFORMANCE AND TESTS		-
8.1	Thermal class		-
	A thermal class in accordance with IEC 60085 shall be assigned to the insulation systems used in machines:	Class B	P
8.2	Reference coolant		-
	Primary coolant	Indirect air cooling by motor enclosure and support table. (Air Direct cooling)	P
	Method of cooling	indirect	P
	Secondary coolant	None	N/A
	Table number	Table number 7 EN 60034-6 IC4A8	P
8.3	Conditions for thermal tests		-
8.3.1	Electrical supply		-
	Complying with requirements	Supplied from the specified motor drive(DELTA ASDA-A2R)	P
8.3.2	Temperature of machine before test		-

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Temperature of winding measured before the test shall not differ from the coolant temperature by more than 2K	Cool condition	P
	For short-time rating (S2) temperature of winding measured before the test within 5 K of coolant temperature	S1 duty	N/A
8.3.3	Temperature of coolant		-
	Temperature of primary coolant ((C)..... :	Same as the ambient temperature	P
	Temperature of secondary coolant ((C)..... :	None	N/A
8.3.4	Measurement of coolant temperature during test		P
	Mean value of readings during last quarter taken as value; variations of temperature of coolant minimized		P
8.3.4.1	Open machines or closed machines without heat exchangers (cooled by surrounding ambient air or gas)		P
	Several detectors placed around the machine at halfway at distance of 1 m to 2 m; detectors protected from radiant heat and draught	1 thermocouple at 1 m distance placed beside sample. Because the small size of the motor, more than 1 thermocouple is considered as not required	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/A
	Temperature of the primary coolant measured where it enters the machine		N/A
8.3.4.3	Closed machines with machine-mounted or internal-heat exchangers		N/A
	Temperature of primary coolant measured where it enters the machine; for machines having water-cooled or air-cooled heat exchangers, temperature of secondary coolant measured where it enters the heat exchanger		N/A
8.4	Temperature rise of a part of a machine		P
	Temperature measured at the end of the test	As required	P
8.5	Methods of measurement of temperature		P
	Recognized method used	Resistance method for winding temperature. Thermo coupler method for surface	P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
		temperature after motor stop running.	

8.6	Determination of winding temperature		P
8.6.1	Choice of method		P
	Rated output (W or VA)	< 200kW	P
	Method for measuring winding temperature	Resistance method	P
	Thermometer method only used in following cases:	Not used for winding.	N/A
	a) When not practicable to determine temperature rise by resistance method		N/A
	b) Single layer windings, rotating or stationary.		N/A
	c) During routine tests on machines manufactured in large numbers		N/A
	d) If purchaser wishes to have thermometer reading in addition to values determined by resistance or ETD method		N/A

8.6.2	Determination by resistance method		P
8.6.2.1	Measurement		P
	One of following methods used:		P
	Direct measurement	Applied.	P
	Measurement by DC current/voltage	Not applicable	N/A
	Superstition method	Not applicable	N/A
8.6.2.2	Calculation		P
	Temperature (1) of winding (cold) at moment of initial resistance measurement (C).....	Refer to attached measurement table	P
	Temperature (a) of coolant at end of test (C).....	Refer to attached measurement table	P
	Resistance (R1) of winding (cold) at temperature (1)	Refer to attached measurement table	P
	Resistance (R2) of winding (hot) at end of test / at temperature (2).....	Refer to attached measurement table	P
	Reciprocal of temperature coefficient (k)	235	P
	Temperature rise ((2 - (a) (K)	Refer to attached measurement table	P
8.6.2.3	Correction for stopping time		P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
8.6.2.3.1	General		P
8.6.2.3.2	Short stopping time		P
	Initial reading obtained within time interval specified in table 5	Initial measurement made within 30 s according to table 5	P
8.6.2.3.3	Extended stopping time		N/A
	Initial reading obtained within twice the time interval specified in table 5		N/A
	Value at time of shutdown determined through extrapolation		N/A
8.6.2.3.4	Windings with one coil-side per slot		P
	Direct measurement only used if machine comes to stop within time interval specified in table 5	Motor with load stops within 30 s.	P
8.6.3	Determination by ETD method		N/A
8.6.3.1	General		N/A
8.6.3.2	Two or more coil-sides per slot		N/A
	Detectors located between insulated coil-sides within slot in positions which highest temperature are likely to occur	ETD method only for refer.	N/A
8.6.3.3	One coil-side per slot		N/A
	Detectors located between wedge and outside of winding insulation in positions which highest temperature are likely to occur		N/A
8.6.3.4	End windings		N/A
	Detectors located between two adjacent coil-sides within end windings in positions where highest temperature are likely to occur; sensing point in close contact with surface of coil-side and adequately protected against influence of coolant		N/A
8.6.4	Determination by thermometer method		N/A
	Thermometer placed at hottest accessible spot	Not used for winding temperature determination.	N/A
8.7	Duration of thermal tests		P
8.7.1	Rating for continuous running duty		P
	Test continued until thermal equilibrium has been reached	Test continued until outer enclosure temperature did not vary by more than 2 K per hour.	P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
8.7.2	Rating for short-time duty		N/A
	Test duration as specified in rating	S1, continuous type	N/A
8.7.3	Rating for periodic duty		N/A
	Rated for equivalent loading applied until thermal equilibrium has been reached		N/A
	Test on actual duty load cycle and continued until practically identical temperature cycles are obtained		N/A
8.7.4	Rating for non-periodic duty and for duty with discrete constant loads		N/A
	Rated for equivalent loading applied until thermal equilibrium has been reached		N/A
8.8	Determination of the thermal equivalent time constant for machines of duty type S9		N/A
	Thermal equivalent time constant determined from plotted cooling curve		N/A
8.9	Measurement of bearing temperature		N/A
	Thermometer method or ETD method used	Not applicable Tested only linear motor	N/A
	Measuring point for as near as possible to one of the two locations specified in table 6		N/A
	Thermal resistance between temperature detector and object minimized		N/A
8.10	Limits of temperature and temperature rise		P
8.10.1	Indirect cooled windings		P
	Temperature rises not exceeding limits of table 7 or 8	Limit of table 7 is not exceeded	P
	Temperature rise limit according to table 7 or 8 (K).....:	180 (H)	P
	Measured / calculated temperature rise according to 8.6 (K).....:	Applied and see the attached measurement table	P
	For other operating site conditions, ratings other than continuous running duty, rated voltages greater than 12 000 V, limits adjusted according to table 9 and 10	Ordinary operating conditions	N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	For test site conditions differing from operating site conditions, limits adjusted according to table 11	Not differing extensively.	P
8.10.2	Direct cooled windings		N/A
	Temperatures not exceeding limits of table 12		N/A
	For other operating site conditions limits adjusted according to table 13		N/A
	For test site conditions differing from operating site conditions, limits adjusted according to table 14		N/A
8.10.3	Adjustment to take account of hydrogen purity on test		N/A
	Hydrogen content between 95 – 100 %		N/A
8.10.4	Permanently short-circuited windings, magnetic cores and all structural components (other than bearings) whether or not in contact with insulation		P
	Temperature rise / Temperature not detrimental to insulation	No excessive temperature rises / temperatures determined and/or to be expected.	P
8.10.5	Commutators and sliprings, open or enclosed and their brushes and brushgear		N/A
	Temperature rise / Temperature not detrimental to insulation	No such components employed.	N/A
	Temperature rise / Temperature not exceeding that at which combination of brush grade and commutator or slipring material can handle current over full operating range	No commutators, sliprings or brushes.	N/A

9	SECTION 9: OTHER PERFORMANCE AND TESTS		-
---	--	--	---

9.1	Routine tests		P
9.2	Dielectric tests		P
9.2.1	High-voltage test applied between windings under test and frame of machine	Performed with 1500V.	P
	Dielectric test carried out immediately after the thermal test	Applied	P
	Polyphase machines with rated voltages above 1 kV having both ends of each phase individually accessible, test carried out for each phase	Not exceed 1kV.	P
	Test voltage applied for 1 min	1 min.	P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Test voltage (V).....:	1500V is applied	P
9.2.2	Bars and coils of high voltage machines tested according to EN 50209 and EN 60034-15	Non-high voltage motor	N/A
9.3	Occasional excess current		P
9.3.1	General		P
9.3.2	Generators		N/A
	AC generators with output not exceeding 1 200 MVA capable of withstanding current of 1.5 times rated current for 30 s	The product is not a generator	N/A
	AC generators with output exceeding 1 200 MVA capable of withstanding current of 1.5 times rated current for at least 15 s	The product is not a generator	N/A
9.3.3	AC motors (except commutator motors and Permanent magnet motor)		P
	Three-phase AC motors having rated outputs not exceeding 315 kW and rated voltages not exceeding 1 kV capable of withstanding current equal to 1.5 times rated current for not less than 2 min	Linear motor here.	N/A
9.3.4	Commutator machines		N/A
	Capable of withstanding 1.5 times rated current for 60 s for specified conditions	Not commutator motor	N/A
9.4	Momentary excess torque for motors		P
9.4.1	Polyphase induction motors and DC motors (excluding motors for specific applications)		P
	Capable of withstanding for 15 s excess torque of 60 % of rated torque; motor for duty type S9 capable of withstanding momentarily excess torque determined according to duty specified	The motor is capable of withstanding for 15 s excess torque of 60 % of rated torque	P
	Rated torque (Nm) :	130N	P
	Excess torque (Nm)	208N	P
	Induction motors for specific applications		N/A
	Motor intended for specified applications that require a high torque subject of agreement between manufacturer and purchaser	Not for specified applications	N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	For cage-type induction motors specially designed to ensure starting current less than 4.5 times the rated current, excess torque not less than 50 %	See above	N/A
	Special type induction motor with special inherent starting properties, value of excess torque subject of agreement between manufacturer and purchaser	See above	N/A
	Rated torque (Nm)	See above	N/A
	Excess torque (Nm)	See above	N/A
9.4.2	Polyphase synchronous motors		N/A
	Capable of withstanding excess torque as specified for 15 s without failing out of synchronism	Not synchronous motors	N/A
	Rated torque (Nm)		N/A
	Excess torque (Nm)		N/A
9.4.3	Other motors		N/A
	Momentary excess torque subject of agreement		N/A
	Rated torque (Nm)		N/A
	Excess torque (Nm)		N/A
9.5	Pull-up torque		N/A
	Unless otherwise specified, the pull-up torque of cage induction motors under full voltage shall be not less than 0.3 times the rated torque.		N/A
	Rated torque (Nm)	Not applicable	N/A
	Locked-rotor torque (Nm)		N/A
	Pull-up torque (Nm).....		N/A
9.6	Safe operating speed of cage induction motor		N/A
	All three-phase single cage induction motors of frame number up to and including 315, shall be capable of safe continuous operation at speed up to the appropriate speed given in table 17, unless otherwise stated on rating plate.	Not cage induction motor.	N/A
9.7	Overspeed		P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Withstanding speed specified in table 18	The speed is limited and controlled with the motor Drive. Nevertheless tested with 1,2 times the rated speed. No abnormal situation occurred. (4 x 1.2=4.8m/s)	P
9.8	Short-circuit current for synchronous machines		N/A
	Peak value of short-circuit current of synchronous machines not exceeding 15 times peak value or 21 times the r.m.s. value of rated current	Linear motor is not applicable	N/A
	Rated current (peak / r.m.s.) (A).....:		N/A
	Measured / calculated short-circuit current (A).....:		N/A
9.9	Short-circuit withstand test for synchronous machines		N/A
	Requested by purchaser		N/A
	Machine running on no-load with excitation corresponding to rated voltage, short circuit maintained for 3 s		N/A
	No harmful deformation, dielectric strength test not resulting in breakdown		N/A
9.10	Commutation test for commutator machines		N/A
	Capable of operating from no-load to operation with excess current or excess torque specified in 8.2 and 8.3 without permanent damage to surface of commutator and brushes, no injurious sparking, brushes remaining in same set position		N/A
9.11	Total Harmonic Distortion (THD) for synchronous machines		N/A
9.11.1	General		N/A
9.11.2	Limits		N/A
	Not exceeding limit		N/A
9.11.3	Tests		N/A
	THD limit (%).....:		N/A
	THD measured (%).....:		N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
10	SECTION 10: RATING PLATES		-
10.1	General		P
	Machine provided with rating plate, durable and securely mounted	As required	P
	Rating plate mounted on frame, easily legible	Laser engraving on the enclosure	P
	Second rating label requested by purchaser		N/A
10.2	Marking		P
	Machines with rated output not exceeding 750 W (VA) and special-purpose built-in machines with rated output not exceeding 3 kW (kVA) marked with items a, b, k, l, z as minimum		P
	Other machines marked with the following as far as applicable:		P
	a) Manufacturer's name or mark	DELTA	P
	b) Manufacturer's serial number, or identification mark.....	Stated	P
	c) Year of manufacture (or as code as part of item 2).....	Assembly serial number	P
	d) Manufacturer's machine code	Model indicated	P
	e) For AC machines, number of phases		N/A
	f) Number(s) of rating and performance standard(s) which are applicable (IEC 60034-X and/or equivalent national standard(s))		N/A
	g) Degree of protection provided by enclosures (IP code) in accordance with IEC 60034-5.....		N/A
	h) For motors within the scope of IEC 60034-30, the efficiency class (IE code) and rated efficiency as specified in IEC 60034-30	Not stated	N/A
	i) Thermal classification or permissible temperature rise. If necessary, method of measurement, followed in case of machine with water-cooled heat exchanger by "P" or "S"		N/A
	j) Class(es) of rating of machine if designed for other than rating for continuous running duty type S1	S1	P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	k) Rated output(s) (W or VA)	Stated 2.5A (152.5W)	P
	l) Rated voltage(s) or range of rated voltage (V)....	Stated	P
	m) For AC machines rated frequency or range of rated frequencies (Hz). For universal motors, rated frequency (Hz) followed by appropriate symbol		N/A
	n) For synchronous machines excited by permanent magnets the open circuit voltage at the rated speed		N/A
	o) Rated current(s) (A)	Stated 2.5A	P
	p) Rated speed(s) or range of rated speeds	Uermanual 4m/s	P
	q) Permissible overspeed, if other than specified in 9.7	Not stated The over speed test is not in the test scope.	N/A
	r) For DC machines with separate excitation or with shunt excitation and for synchronous machines, rated field voltage (V) and rated field current (A)	Motor drive is used	N/A
	s) For AC machines, rated power factor(s)		N/A
	t) For wound-motor induction machines rated open-circuit voltage (V) between slip-rings and rated slip-ring current (A)	Not stated	N/A
	u) For DC motors with armatures intended to be supplied by static power converters, identification code of static power converter in accordance with IEC 60971 (alternatively for motors not exceeding 5 kW, rated form factor and rated alternating voltage at input terminals of static power converter, when this exceeds rated direct voltage of motor armature circuit)		N/A
	v) Maximum permissible ambient temperature, if other than 40 °C; maximum permissible water temperature, if other than 25 °C (°C)	Not more than 40 °C	N/A
	w) Minimum permissible ambient temperature if other than specified in 6.4 (°C)	Not applicable	N/A
	x) Altitude for which machine is designed (if exceeding 1 000 m above sea level)	No exceeding 1 000 m above sea level	N/A
	y) For hydrogen-cooled machines, hydrogen pressure at rated output (Pa or bar)		N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	z) When specified, approximate total mass of machine, if exceeding 30 kg		N/A
	aa) For machines suitable for operation in only one direction of rotation, direction of rotation, indicated by arrow; arrow easily visible	Not applicable Linear motor used for running both side.	N/A
	bb) The connecting instructions in accordance with IEC 60034-8 by means of a diagram or text located near the terminals.	Not applicable	N/A
	Two different rated values shall be indicated by	Not applicable	N/A
	If winding of machine is partially or totally repaired or changed by other than manufacturer, additional plate provided indicating repair contractor's name, year of repair and changes made.	Not applicable	N/A

11	SECTION 11: MISCELLANEOUS REQUIREMENTS	-
----	--	---

11.1	Protective earthing of machines		P
	Machines shall be provided with an earthing terminal or another device to permit the connection of a protective conductor or an earthing conductor	Terminal for earth connection is provided	P
	Appropriate symbol or legend used	Grounding green wire fixation and sealing by epoxy in the linear motor.	P
	However , machines shall neither be earthed nor be provide with an earthing terminal when:	See above	N/A
	a) they are fitted with supplementary insulation, or	See above	N/A
	b) they are intended for assembly in apparatus having supplementary insulation, or	See above	N/A
	c) they have rated voltages up to 50V a.c. or 120V d.c. and are intended for use on SELV circuits.	See above	N/A
	Machines with rated voltages greater than AC 50 V or DC 120 V, but not exceeding AC 1 000 V or DC 1 500 V terminal for earth conductor situated in vicinity of terminals for line conductors, inside terminal box (if provided); machines having rated outputs exceeding 100 kW provided with in addition, with earth terminal fitted on frame		N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
	Machines with rated voltages greater than AC 1 000 V or DC 1 500 V provided with earth terminal on frame and in addition, means inside terminal box for connecting conducting cable sheath (if any)	Rated voltage not exceeding 1000 V	N/A
	Accessible conducting parts have good electrically conducting connection with earth terminal; if all bearings and rotor winding of machine are insulated, shaft electrically connected to earth terminal (unless manufacturer and purchaser agree to alternative means of protection)	Accessible conducting parts have good electrically conducting connection with earth terminal.	P
	If earth terminal provided in terminal box, earth conductor made of same metal as live conductors		N/A
	If earth terminal provided on frame, earth conductor made of another metal, proper consideration given to conductivity of conductor		N/A
	Earth terminal designed to accommodate earth conductor of cross-sectional area in accordance with table 19	Live and earth conductors are of same type	P
	The earth terminals shall be identified in accordance with IEC60445		N/A
11.2	Shaft-end key(s)		N/A
	If machine shaft end provided with one or more keyways, keyway provided with full key of normal shape and length		N/A
12	SECTION 12: TOLERANCES		-
	Tolerances as specified in table 20	Not evaluated	N/A
13	SECTION 13: Electromagnetic compatibility (EMC)		-
13.1	General		N/A
	Rotating machine with rated voltage not exceeding AC 1 000 V or DC 1 500 V	Electronic components applied on motor drive	N/A
	Electronic components mounted inside rotating electrical machine and essential for its operation		N/A

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
13.2	Immunity		N/A
13.2.1	Machines not incorporating electronic circuits		N/A
	Machines without electronic circuits are not sensitive to electromagnetic emissions, no immunity tests are required.	Not required	N/A
13.2.2	Machines incorporating electronic circuits		N/A
	As electronic circuits which are incorporated in machines generally utilize components that are passive, immunity tests are not required.	Passive components	P
	Warning class A equipment is intended for use in an industrial environment. In the documentation for the user, a statement shall be included drawing attention to the fact that there may be potential difficulties in ensuring electromagnetic compatibility in other environments, due to conducted as well as radiated disturbances.	The motor is intended for incorporation in an apparatus. EMC emission shall be tested at final product.	N/A
13.3	Emission		N/A
13.3.1	Machines without brushes		P
	Radiated and conducted emissions shall comply with the requirements of CISPR 11, Class B, Group 1, see Table B.1	Emission test shall be performed at the final product.	N/A
13.3.2	Machines with brushes		N/A
	Radiated and conducted (if applicable) emissions shall comply with the requirements of CISPR 11, Class A, Group 1, see Table B.2	No brushes applied in the machine.	N/A
13.4	Immunity tests		N/A
	Immunity tests are not required.	Not applicable	N/A
13.5	Emission tests		N/A
	Type tests shall be carried out in accordance with CISPR 11, CISPR 14 and CISPR 16 as applicable		N/A
13.5.1	Machines without brushes		N/A
	Machines without brushes shall comply with the emission limits of 13.3.1.	See the comments in sub-clause 13.1.	P
13.5.2	Machines with brushes		N/A
	Machines with brushes, when tested at no-load, shall comply with the emission limits of 13.3.2		N/A
14	SECTION 14: SAFETY		-

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict
14.1	Safety		P
	Machine complying with EN/IEC 60204-1	Considered	P
	Insulation (PVC, 2000V test voltage, 500V for PELV, see IEC 60364-4-41, class III equipment...)	Insulation test is carried out and passed.	P
	Insulation resistance tests (500Vdc, > 1 MΩ...)	Insulation resistance tests is carried out and passed.	P
	Voltage tests (1000Vac, 10 sec, 500VA...)	1500Vac, No breakdowns were recorded.	P
	Protection against residual voltages (60V/5sec or 60μC/1sec or IP2X)	Residual voltage test is carried out and passed.	P
	Bonding continuity bonding test	Measured with 10A between PE and stator core of disassembled sample	P
	Wire sizes according to table 5 of EN/IEC 60204-1	Power cable size 18AWG (0.823 mm ²) for rated current	N/A
	Surface temperatures not exceeding 70 °C or enclosure provided with warning symbol 60417-IEC-5041 or installation instructions provided with note about excessive surface temperature and requirements for supply cable		N/A
	IP degree in compliance with EN/IEC 60034-5		N/A
	IP degree.....:		-
	Cable gland or cord anchorage provided for power cable/cord	Not used.	N/A
	or complying with EN/IEC 60204-11		N/A
	or incorporated in household appliance , EN 60335-1 as appropriate Note: it is the responsibility of the manufacturer or assembler of equipment incorporating electric machines as components to ensure the overall equipment is safe.	It is the responsibility of manufacturer of final equipment to ensure it.	N/A
	Motors is designed and constructed as far as possible in accordance with internationally accepted best design practice, appropriate to the application	Considered	P
	Clearances and creepage distances complying with IEC 60664-1.	See below.	P

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict

TABLE IEC 60664-1:2004: clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of:	U r.m.s. (V)	Required cl (mm)	cl (mm)	required dcr (mm)	Dcr (mm)
Winding – cover	225	1.5	-	2.5	>3
Winding – frame	225	1.5	-	2.5	>3
Line conductor – frame	225	1.5	-	2.5	>3
Line to Line (terminal)	225	1.5	>1.5	2.5	>3
Printed wiring live part-frame	225	1.5	-	1.0	>3
Line to Line (PCB)	225	1.0	-	1.0	>2

Remark: * Requirement for clearance exceeds requirement for creepage distance.

The incoming power supply and control of the motor is through its integrated motor driver (incoming power supply of 1~ 220-230V, 50/60 Hz).

The motor is filled with epoxy

Clearances:

Overvoltage category III 2500V

Case A Inhomogeneous field

Pollution degree 3

Creepage:

Pollution degree 3

Material group III

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict

TABLE: List of critical components					
Object/part no.	Manufacturer/ Trademark	Type/Model	Technical Data	Standard	Mark(s) of Conformity
Power cable	Pacific electric wire & cable co., Ltd.	XL-PE Jacket Shield Cable	18AWG *3C 125°C , 300V	UL758	Test with motor UL E41396
Encoder cable	Variable	UL2589#26AWG x4P	105 deg C, 30 Vac	UL758	UL E117926
Tubing	Shenzhen woer heat-shrinkable material co ltd	Variable	600V	UL224	UL E203950
Copper magnet wire	Variable	Variable	180 (H)	UL 1446	UL TUV National Compulsory Certification mark
Copper magnet wire	JUNG SHING WIRE CO., LTD.	Variable	Class 180 (H)	UL 1446	UL E174837
Bobbin	Polyplastics Co.,	A130(a)	V0 130°C	UL 94 UL 746	UL E106764
Printed Circuit Board	First Hi-Tec Enterprise Co Ltd	HL1-V0A	rated 130°C 94V-0	UL 796	UL E119921
Epoxy	Fong Yong Chemical Co. LTD	E536/H536	UL 94-V0 RTI130	UL 94 UL 746	UL E120665

¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance

EN 60034-1:2010			
Clause	Requirement - Test	Result - Remark	Verdict

TABLE: temperature rise measurements					P
t1 (°C)	23.5				
t2 (°C)	24				—
Test voltage (V)	See remark				—
temperature rise dT of part/at:	dT (K)		required dT (K)		
Power cable	7+16		50		
Motor Enclosure (Aluminium)	36.2+16		60		
Motor Enclosure (Aluminium)	34.2+16		60		
Magnetic rail tube	29.2+16		60		
winding temperature rise measurements:					
insulation class	See below				—
temperature rise dT of winding:	R ₁ (Ω)	R ₂ (Ω)	dT (K)	required dT (K)	Insulation class
Main winding	12.696	17.23	91.64+16	130	Class 180 (H)
<p>Remark:</p> <p>Model: ECML-S2508A2DNS</p> <p>Motor rated voltage: 200V</p> <p>The products are linear motor. The incoming power supply and control of the motor is through its integrated motor driver (incoming power supply of 1~, 220V, 50/60 Hz).</p> <p>Temperature allow limit refer to EN 60335-1</p> <p>Intended used Ambient temperature 0 - 40°C</p>					