

TEST REPORT EN 61800-5-1 Adjustable speed electrical power drive systems – Part 5-1: Safety requirements – Electrical, Thermal and Energy	
Report Number :	INVT.2019.09.25.0001
Date of issue	2019-09-25
Total number of pages :	33
Name of Testing Laboratory preparing the Report :	Shenzhen INVT Electric Co., Ltd INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China, 518106
Applicant's name	INVT Industrial Technology (Shanghai) Co., Ltd.
Address	Building No.1 188 Xinjun Ring Rd, Minhang District, Shanghai, P. R. China,
Test specification:	
Standard :	EN 61800-5-1:2007+A1:2017
Test procedure :	CE—LVD
Non-standard test method :	N/A
Test item description	AC Servo Motor Driver
Trade Mark	
Manufacturer :	INVT Industrial Technology (Shanghai) Co., Ltd. Building No.1 188 Xinjun Ring Rd, Minhang District, Shanghai, P. R. China,
Model/Type reference	SV-DA300-0R1-2-E0, SV-DA300-0R1-2-N0, SV-DA300-0R1-2-S0, SV-DA300-0R1-2-C0, SV-DA300-0R1-2-P0, SV-DA300-0R1-2-S7, SV-DA300-0R1-2-E7, SV-DA300-0R2-2-E0, SV-DA300-0R2-2-N0, SV-DA300-0R2-2-S0, SV-DA300-0R2-2-C0, SV-DA300-0R2-2-P0, SV-DA300-0R2-2-S7, SV-DA300-0R2-2-E7, SV-DA300-0R4-2-E0, SV-DA300-0R4-2-N0, SV-DA300-0R4-2-S0, SV-DA300-0R4-2-C0, SV-DA300-0R4-2-P0, SV-DA300-0R4-2-S7, SV-DA300-0R4-2-E7, SV-DA300-0R7-2-E0, SV-DA300-0R7-2-N0, SV-DA300-0R7-2-S0, SV-DA300-0R7-2-C0, SV-DA300-0R7-2-P0, SV-DA300-0R7-2-S7, SV-DA300-0R7-2-E7, SV-DA300-1R0-2-E0, SV-DA300-1R0-2-N0, SV-DA300-1R0-2-S0, SV-DA300-1R0-2-C0, SV-DA300-1R0-2-P0, SV-DA300-1R0-2-S7, SV-DA300-1R0-2-E7, SV-DA300-1R5-2-E0, SV-DA300-1R5-2-N0, SV-DA300-1R5-2-S0, SV-DA300-1R5-2-C0, SV-DA300-1R5-2-P0, SV-DA300-1R5-2-S7, SV-DA300-1R5-2-E7, SV-DA300-2R0-2-E0, SV-DA300-2R0-2-N0, SV-DA300-2R0-2-S0, SV-DA300-2R0-2-C0, SV-DA300-2R0-2-P0, SV-DA300-2R0-2-S7, SV-DA300-2R0-2-E7
Ratings	See below table
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):	
<input type="checkbox"/> Testing Laboratory:	Shenzhen INVT Electric Co., Ltd.
Testing location/ address	INVT Guangming Technology Building, Songbai

	Road,Matian,Guangming District,Shenzhen,China,518106	
Tested by (name, function, signature) :	Li Zhan	<i>Li Zhan</i>
Approved by (name, function, signature) .. :	Fangyuan Zhang	<i>Fangyuan Zhang</i>

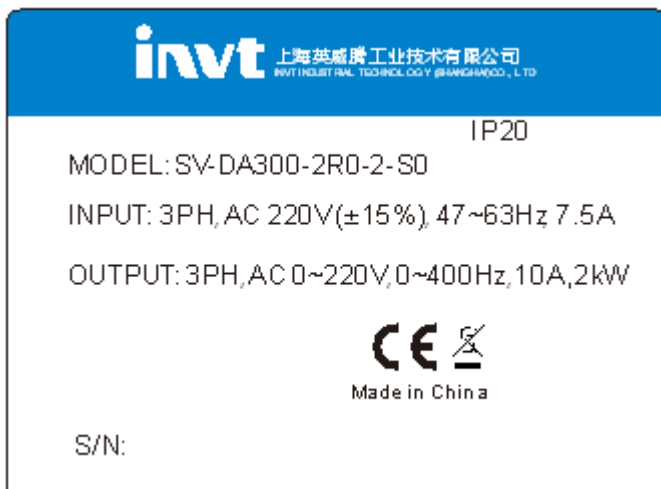
List of Attachments (including a total number of pages in each attachment):
Attachment No. 1: 7 pages of photo documentation

Summary of testing:
Tests performed (name of test and test clause):

The submitted sample was found to comply with the requirements of:
EN 61800-5-1:2007+A1:2017

Testing location:

INVT Guangming Technology Building, Songbai Road, Matian, Guangming District, Shenzhen, China, 518106

Copy of marking plate:

Alternative warning:


Test item particulars :															
Equipment under test	<input type="checkbox"/> PDS <input type="checkbox"/> CDM <input checked="" type="checkbox"/> BDM <input type="checkbox"/> Other:														
Equipment location	<input checked="" type="checkbox"/> stand alone <input type="checkbox"/> for building-in (open type)														
Mains supply overvoltage category (OVC)	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input checked="" type="checkbox"/> OVC III <input type="checkbox"/> OVC IV														
Reduction of OVC for basic insulation used	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes, by:														
Supply earthing systems and system voltage (V) :	<table border="0"> <tr> <td>Supply Earthing system</td> <td>System voltage</td> </tr> <tr> <td><input checked="" type="checkbox"/> TN-S, TN-C, TN-CS, TT (not corner earthed)</td> <td>253V</td> </tr> <tr> <td><input type="checkbox"/> TN-S, TT (corner earthed)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> TN-C (middle point earthed)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> IT (not corner referenced)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> IT (corner referenced)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> other:</td> <td></td> </tr> </table>	Supply Earthing system	System voltage	<input checked="" type="checkbox"/> TN-S, TN-C, TN-CS, TT (not corner earthed)	253V	<input type="checkbox"/> TN-S, TT (corner earthed)		<input type="checkbox"/> TN-C (middle point earthed)		<input type="checkbox"/> IT (not corner referenced)		<input type="checkbox"/> IT (corner referenced)		<input type="checkbox"/> other:	
Supply Earthing system	System voltage														
<input checked="" type="checkbox"/> TN-S, TN-C, TN-CS, TT (not corner earthed)	253V														
<input type="checkbox"/> TN-S, TT (corner earthed)															
<input type="checkbox"/> TN-C (middle point earthed)															
<input type="checkbox"/> IT (not corner referenced)															
<input type="checkbox"/> IT (corner referenced)															
<input type="checkbox"/> other:															
DVC D circuits/terminals (other than mains)	N/A														
DVC C circuits/terminals (other than mains)	Others in the EUT are DVC C expect DVC A circuits.														
DVC B circuits/terminals	N/A														
DVC A circuits/terminals	All the circuits on Control board are DVC A circuits.														
Potential free circuits/terminals (voltage, OVC)... :	N/A														
Class of equipment	<input checked="" type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class 0 <input type="checkbox"/> Class III														
Pollution degree	<input type="checkbox"/> PD 1: <input checked="" type="checkbox"/> PD 2: <input type="checkbox"/> PD 3: <input type="checkbox"/> PD 4:														
IP protection classes	IP20														
Ambient temperature during operation (°C) with/without derating	40°C														
Liquid cooling temperature during operation (°C) with/without derating	N/A														
Maximum operation altitude (m)	2000														
Altitude of test laboratory (m)	<500														
Other particulars	N/A														
Motor overload and over temperature protection :	<input checked="" type="checkbox"/> Thermal or electronic overload relay <input type="checkbox"/> Electronic motor overload protection with thermal memory retention <input type="checkbox"/> Electronic motor overload protection with speed sensitivity <input type="checkbox"/> Monitoring and automatic reduction of motor current based on thermal sensor in or on motor <input type="checkbox"/> Embedded motor thermal protection disconnecting the motor <input type="checkbox"/> None														



Possible test case verdicts:

- test case does not apply to the test object: N/A
- test object does meet the requirement: P (Pass)
- test object does not meet the requirement: F (Fail)

Testing.....:

Date of receipt of test item: 2019-09-01
Date (s) of performance of tests.....: 2019-09-01 to 2019-09-25

General remarks:

The test results presented in this report relate only to the object tested.
 This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

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

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

Name and address of factory (ies).....: INVT POWER ELECTRONICS (SUZHOU) CO., LTD
 No.1,KunLunShan Road, Suzhou Science & Technology Tower, Hi-Tech Area, Suzhou City, Jiangsu Province, P. R. China

General product information and other remarks:

Model name designation key:

SV- DA300 -0R1- 2 – E 0
 ① ② ③ ④ ⑤ ⑥

No.	Instruction	Content
①	Product category	SV: Servo inverter
②	Product series	DA300:DA300 series
③	Power degree	0R1:100W 0R2:200W 0R4:400W 0R7:750W 1R0:1kW 1R5:1.5kW 2R0:2kW
④	Input voltage degree	2:220Vac
⑤	Servo type	E:Pulse type S:standard type N:Ethercat bus type C:Canopen type P:Profibus-DP bus type
⑥	Encoder type	0: Photoelectric encoder 7: Rotary transformer

Rated Value:

Model	Input	Output	Volume (H*W*D)
SV-DA300-0R1-2-E0 SV-DA300-0R1-2-N0 SV-DA300-0R1-2-S0 SV-DA300-0R1-2-C0 SV-DA300-0R1-2-P0 SV-DA300-0R1-2-S7 SV-DA300-0R1-2-C7	1PH/3PH,AC 220V(\pm 15%),47~63Hz,0.9A/0.4A	3PH,AC 0~220V,0~ 400Hz,1.3A,100W	Frame A- 220*110*200
SV-DA300-0R2-2-E0 SV-DA300-0R2-2-N0 SV-DA300-0R2-2-S0 SV-DA300-0R2-2-C0 SV-DA300-0R2-2-P0 SV-DA300-0R2-2-S7 SV-DA300-0R2-2-C7	1PH/3PH,AC 220V(\pm 15%),47~63Hz,1.8A/0.8A	3PH,AC 0~220V,0~ 400Hz,1.8A,200W	
SV-DA300-0R4-2-E0 SV-DA300-0R4-2-N0 SV-DA300-0R4-2-S0 SV-DA300-0R4-2-C0 SV-DA300-0R4-2-P0 SV-DA300-0R4-2-S7 SV-DA300-0R4-2-C7	1PH/3PH,AC 220V(\pm 15%),47~63Hz,3.6A/1.5A	3PH,AC 0~220V,0~ 400Hz,2.8A,400W	
SV-DA300-0R7-2-E0 SV-DA300-0R7-2-N0 SV-DA300-0R7-2-S0 SV-DA300-0R7-2-C0 SV-DA300-0R7-2-P0 SV-DA300-0R7-2-S7 SV-DA300-0R7-2-C7	1PH/3PH,AC 220V(\pm 15%),47~63Hz,6.8A/2.8A	3PH,AC 0~220V,0~ 400Hz,5.2A,750W	Frame B- 220*110*200
SV-DA300-1R0-2-E0 SV-DA300-1R0-2-N0 SV-DA300-1R0-2-S0 SV-DA300-1R0-2-C0 SV-DA300-1R0-2-P0 SV-DA300-1R0-2-S7 SV-DA300-1R0-2-C7	1PH/3PH,AC 220V(\pm 15%),47~63Hz,9.1A/3.7A	3PH,AC 0~220V,0~ 400Hz,6A,1kW	
SV-DA300-1R5-2-E0 SV-DA300-1R5-2-N0 SV-DA300-1R5-2-S0 SV-DA300-1R5-2-C0 SV-DA300-1R5-2-P0 SV-DA300-1R5-2-S7 SV-DA300-1R5-2-C7	3PH,AC 220V(\pm 15%),47~ 63Hz,5.6A	3PH,AC 0~220V,0~ 400Hz,7.6A,1.5kW	Frame C- 245*145*250
SV-DA300-2R0-2-E0 SV-DA300-2R0-2-N0 SV-DA300-2R0-2-S0 SV-DA300-2R0-2-C0 SV-DA300-2R0-2-P0 SV-DA300-2R0-2-S7 SV-DA300-2R0-2-C7	3PH,AC 220V(\pm 15%),47~ 63Hz,7.5A	3PH,AC 0~220V,0~ 400Hz,10A,2kW	

Model difference:

Models in same frame size are identical to each other except for electrical rating and software.

Model names of frame A are similar with model names of frame B except for some power components (IGBT, rectifier bridge, fan, transformer).

These products are stand-alone type Servo Power Conversion Equipment with three or single phase input and three phase output. They are used to provide both an adjustable voltage and adjustable frequency to the ac motor.

Unless otherwise specified, the models SV-DA300-2R0-2-S0, SV-DA300-1R0-2-S0 were chosen as representative models to perform all the tests.

- When installing the equipment, all requirements of the mentioned standard must be fulfilled and it should be suitably installed in closed electrical operation area.
- Maximum operating temperature is 40°C.
- The input and output circuits were considered as DVC C circuits and signal circuit was considered as DVC A circuit.
- TN-S, TN-C, TN-C-S and TT (not corner earthed) power systems were evaluated.
- The frequency inverter has no over current protective device. For safety operation, a suitable external circuit breaker must be employed before installation.

Clause	Requirement + Test	Result - Remark	Verdict
4	PROTECTION AGAINST ELECTRIC SHOCK, THERMAL, AND ENERGY HAZARDS		P
4.1	General		P
4.2	Fault conditions		P
4.3	Protection against electric shock		P
4.3.1	Decisive voltage classification		P
4.3.1.1	Use of decisive voltage class (DVC)	DVC A and DVC C were used in the product	P
4.3.1.2	Limits of DVC		P
4.3.1.3	Requirements for protection	Protective separation provided between the DVC A and DVC C circuit. And basic insulation between DVC C circuit and the Protection Earthing.	P
4.3.1.4	Circuit evaluation		P
4.3.1.4.1	General		P
4.3.1.4.2	A.C. working voltage	R.M.S value and recurring peak voltage were measured	P
4.3.1.4.3	D.C. working voltage		P
4.3.1.4.4	Pulsating working voltage		P
4.3.2	Protective separation	By double or reinforced insulation or by protective bonding, protective impedance	P
4.3.3	Protection against direct contact		P
4.3.3.1	General		P
4.3.3.2	Protection by means of insulation of live parts		P
4.3.3.3	Protection by means of enclosures and barriers		P
4.3.4	Protection in case of direct contact		P
4.3.4.1	General		P
4.3.4.2	Protection using DVC A	See below	P
4.3.4.3	Protection by means of protective impedance	By protective resistors	P
4.3.4.4	Protection by means of using limited voltages		N/A
4.3.5	Protection against indirect contact		P
4.3.5.1	General	Comply with the requirements for protective class I	P
4.3.5.2	Insulation between live parts and accessible conductive parts		P
4.3.5.3	Protective bonding circuit		P
4.3.5.3.1	General		P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.5.3.2	Rating of protective bonding	Comply with 5.2.3.9	P
4.3.5.3.3	Protective bonding impedance		N/A
4.3.5.4	Protective earthing conductor	Through a dedicated protective bonding conductor	P
4.3.5.5	Means of connection for the protective earthing conductor		P
4.3.5.5.1	General		P
4.3.5.5.2	Touch current in case of failure of protective earthing conductor	Marking was added on the enclosure	P
4.3.5.6	Special features in equipment for protective class II	Class I equipment	N/A
4.3.6	Insulation		P
4.3.6.1	General		P
4.3.6.1.1	Influencing factors		P
4.3.6.1.2	Pollution degree	Pollution degree 2	P
4.3.6.1.3	Overtoltage category	OVC III	
4.3.6.1.4	Supply earthing systems	TN-S, TN-C, TN-C-S and TT (not corner earthed)	P
4.3.6.1.5	Insulation voltages	For model SV-DA300-0R4-2-S0, SV-DA300-1R0-2-S0: System voltage: 253V Impulse Voltage: 4000V Temporary overvoltage: 2120V(crest value) For model SV-DA300-2R0-2-S0: System voltage: 147V Impulse Voltage: 2500V Temporary overvoltage: 1910V(crest value)	P
4.3.6.2	Insulation to the surroundings		P
4.3.6.2.1	General		P
4.3.6.2.2	Circuits connected directly to the supply mains ... :	Over voltage category III was used	P
4.3.6.2.3	Circuits not connected directly to the supply mains		N/A

Clause	Requirement + Test	Result - Remark	Verdict
4.3.6.2.4	Insulation between circuits	The input and output circuits were considered as DVC C circuits and signal circuit was considered as DVC A circuit. Protective separation was provided between DVC C to DVC A circuit and basic insulation between DVC C circuit to the protection earthing	P
4.3.6.3	Functional insulation		P
4.3.6.4	Clearance distances	See appended table 4.3.6.4.	P
4.3.6.4.1	Determination		P
4.3.6.4.2	Electric field homogeneity		P
4.3.6.4.3	Clearance to conductive enclosures	See 4.3.6.4.1 & 5.2.2.5	P
4.3.6.5	Creepage distances	See appended table 4.3.6.5.	P
4.3.6.5.1	General		P
4.3.6.5.2	Materials	IIIa	P
4.3.6.6	Coating		P
4.3.6.7	PWB spacings for functional insulation		N/A
4.3.6.8	Solid insulation	See appended table 4.3.6.8.	P
4.3.6.8.1	General		P
4.3.6.8.2	Requirements for electrical withstand capability		P
4.3.6.8.2.1	Basic or supplementary insulation	(See appended table 4.3.6.8)	P
4.3.6.8.2.2	Double and reinforced insulation	(See appended table 4.3.6.8)	P
4.3.6.8.2.3	Functional insulation		P
4.3.6.8.3	Thin sheet or tape material	(See appended table 4.3.6.8)	P
4.3.6.8.3.1	General		P
4.3.6.8.3.2	Material thickness not less than 0,2 mm		P
4.3.6.8.3.3	Material thickness less than 0,2 mm		P
4.3.6.8.3.4	Compliance		P
4.3.6.8.4	Printed wiring boards (PWBs)		P
4.3.6.8.4.1	General		P
4.3.6.8.4.2	Use of coating materials		N/A
4.3.6.8.5	Wound components		P
4.3.6.8.6	Potting materials		N/A
4.3.6.9	Insulation requirements above 30 kHz		N/A
4.3.7	Enclosures		P
4.3.7.1	General	See cl. 4.4.3, 5.2.2.5.2, & 5.2.2.5.3.	P

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Clause	Requirement + Test	Result - Remark	Verdict
4.3.7.2	Cast metal		N/A
4.3.7.3	Sheet metal		N/A
4.3.8	Wiring and connections		P
4.3.8.1	General		P
4.3.8.2	Routing		P
4.3.8.3	Colour coding	The wires in the colour green with or without one or more yellow stripes were not used other than for protective bonding.	P
4.3.8.4	Splices and connections		P
4.3.8.5	Accessible connections		P
4.3.8.6	Interconnections between parts of the PDS		P
4.3.8.7	Supply connections		P
4.3.8.8	Terminals		P
4.3.8.8.1	Construction requirements		P
4.3.8.8.2	Connecting capacity		P
4.3.8.8.3	Connection		N/A
4.3.8.8.4	Wire bending space for wires 10 mm ² and greater	No such wire used	N/A
4.3.9	Output short circuit requirements	(See appended table 5.2.3.6)	P
4.3.10	Residual current-operated protective (RCD) or monitoring (RCM) device compatibility	No RCD or RCM provided	N/A
4.3.11	Capacitor discharge	Discharge to 60V within 236s; Warning symbol according IEC 60417-5036 was provided and discharge time was also added.	P
4.3.12	Access conditions for high-voltage PDS	Not high-voltage PDS	N/A
4.4	Protection against thermal hazards		P
4.4.1	Minimizing the risk of ignition	See appended table 1.	P
4.4.2	Insulating materials		P
4.4.2.1	General	See appended table 5.2.3.8.	P
4.4.2.2	Material requirements	See cl. 5.2.5.1, 5.2.5.2 and appended table 1.	P
4.4.3	Flammability of enclosure materials	See appended table 1.	P
4.4.4	Temperature limits		P
4.4.4.1	Internal parts	(See appended table 5.2.3.8)	P
4.4.4.2	External parts of CDM	(See appended table 5.2.3.8)	P
4.4.5	Specific requirements for liquid cooled PDS		N/A
4.4.5.1	Coolant		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
4.4.5.2	Design requirements		N/A
4.4.5.2.1	Corrosion resistance		N/A
4.4.5.2.2	Tubing, joints and seals		N/A
4.4.5.2.3	Provision for condensation		N/A
4.4.5.2.4	Leakage of coolant		N/A
4.4.5.2.5	Loss of coolant		N/A
4.4.5.2.6	Conductivity of coolant		N/A
4.4.5.2.7	Insulation requirements for coolant hoses		N/A
4.4.6	Motor overload and over temperature protection		P
4.4.6.1	Means of protection		P
4.4.6.2	CDM/BDM with electronic motor overload protection	Motor overload protection alarm "Er17-0". See appended Table 5.2.8.	P
4.4.6.3	CDM/BDM with electronic motor overload protection with thermal memory retention		N/A
4.4.6.4	CDM/BDM with electronic motor overload protection which is speed sensitive		N/A
4.4.6.5	CDM/BDM providing monitoring and automatic reduction of motor current by means of thermal sensors		N/A
4.5	Protection against energy hazards		P
4.5.1	Electrical energy hazards	Check in PDS	P
4.5.2	Mechanical energy hazards		N/A
4.5.2.1	General		N/A
4.5.2.2	Critical torsional speed		N/A
4.5.2.3	Transient torque analysis		N/A
4.5.3	Acoustic noise emission		N/A
4.6	Protection against environmental stresses	See 5.2.6	P
5	TEST REQUIREMENTS		P
5.1	General		P
5.1.1	Test objectives and classification		P
5.1.2	Selection of test samples		P
5.1.3	Sequence of tests		P
5.1.4	Earthing conditions	Neutral to earth	P
5.1.5	Compliance		P
5.1.6	Test Overview		P
5.2	Test specifications		P
5.2.1	Visual inspections (type test, sample test and routine test)		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.2.2	Mechanical tests		P
5.2.2.1	Clearance and Creepage distances (type test)	See appended table 5.2.2.1.	P
5.2.2.2	PWB short-circuit test (type test)	See appended table 5.2.2.2.	P
5.2.2.3	Non-accessibility test (type test)		P
5.2.2.4	Enclosure integrity test (type test)	IP20	P
5.2.2.5	Deformation tests		P
5.2.2.5.1	General	See below	P
5.2.2.5.2	Deflection test (type test)	250 N, 5s tested for metal enclosure	P
5.2.2.5.3	Impact test (type test), temperature (°C)	No damage for display panel	P
5.2.3	Electrical tests		P
5.2.3.1	Impulse voltage test (type test and sample test)	See appended table 5.2.3.1.	P
5.2.3.2	A.C. or d.c. voltage test (type and routine test)	See appended table 5.2.3.2.	P
5.2.3.2.1	Purpose of test	The test is used to verify that the clearance and solid insulation of components and of assemble BDM has adequate dielectric strength to resist overvoltage conditions	P
5.2.3.2.2	Value and type of test voltage	For models SV-DA300-0R4-2-S0 , SV-DA300-1R0-2-S0 : 2120Vdc for basic insulation, 4240Vdc for reinforced insulation For models SV-DA300-2R0-2-S0: 1910Vdc for basic insulation, 3820Vdc for reinforced insulation	P
5.2.3.2.3	Performing the voltage test		P
5.2.3.2.4	Duration of the a.c. or d.c. voltage test	60 s	P
5.2.3.2.5	Verification of the a.c. or d.c. voltage test	No electrical breakdown occurs	P
5.2.3.3	Partial discharge test (type test, sample test)	See appended table 5.2.3.3.	N/A
5.2.3.4	Protective impedance (type test and routine test) :	Resistor connection between the accessible live parts and circuits of DVC C. The test result using the circuit of IEC 60990, Figure 4: Max. 2.4mA	P
5.2.3.5	Touch current measurement (type test)	Marking added on the enclosure	P
5.2.3.6	Short-circuit test and Breakdown of components test (type tests)	(See appended table 5.2.3.6)	P
5.2.3.6.1	General		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.2.3.6.2	Test configuration		P
5.2.3.6.2.1	Supply voltage and current	Rated supply voltage used.	P
5.2.3.6.3	Short-circuit test	See appended table 5.2.3.6.3.	P
5.2.3.6.3.1	Load conditions		
5.2.3.6.3.2	Short-circuit between phase terminals of power outputs		P
5.2.3.6.3.3	Short-circuit between phase terminals of power output and protective earth		P
5.2.3.6.4	Breakdown of components test	Normal load conditions	P
5.2.3.6.4.1	Load conditions		P
5.2.3.6.4.2	Application of short-circuit or open-circuit		P
5.2.3.6.5	Test sequence		P
5.2.3.6.6	Pass criteria		P
5.2.3.7	Capacitor discharge (type test)	Discharge to 60V within 236s; Warning symbol according IEC 60417-5036 was provided and discharge time was also added.	P
5.2.3.8	Temperature rise test (type test)	See appended table 5.2.3.8.	P
5.2.3.9	Protective bonding (type test and routine test)	See appended table 5.2.3.9.	P
5.2.4	Abnormal operation tests	See appended table 5.2.4.	P
5.2.4.1	General		P
5.2.4.2	Test duration		P
5.2.4.3	Pass criteria		P
5.2.4.4	Loss of phase (type test)	See appended table 5.2.4.4.	P
5.2.4.5	Cooling failure tests (type tests)	See appended table 5.2.4.5.	P
5.2.4.5.1	General		P
5.2.4.5.2	Inoperative blower motor		P
5.2.4.5.3	Clogged filter		P
5.2.4.5.4	Loss of coolant	Air cooled equipment.	N/A
5.2.5	Material tests	See appended table 5.2.5.	P
5.2.5.1	High current arcing ignition test (type test)		N/A
5.2.5.2	Glow-wire test (type test)		N/A
5.2.5.3	Hot wire ignition test (type test – alternative to Glow-wire test)		N/A
5.2.5.4	Flammability test (type test)	UL recognized material used.	N/A
5.2.6	Environmental tests (type tests)		P
5.2.6.1	General		P
5.2.6.2	Acceptance criteria		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.2.6.3	Climatic tests		P
5.2.6.3.1	Dry heat test (steady state)		P
5.2.6.3.2	Damp heat test (steady state)		P
5.2.6.4	Vibration test (type test)		P
5.2.7	Hydrostatic pressure test (type test and routine test)	Not a liquid cooled equipment	N/A
5.2.8	Electronic motor overload protection test (type test)	Motor overload protection alarm "Er17-0". See appended Table 5.2.8.	P
5.2.8.1	General requirements		P
5.2.8.2	Test set-up		P
5.2.8.3	Pass criteria		P
5.2.8.4	CDM/BDM electronic motor overload protection test (type test)	Provided in the user manual	P
5.2.8.5	CDM/BDM electronic motor thermal memory retention shutdown test (type test)		N/A
5.2.8.6	CDM/BDM electronic motor thermal memory retention loss of power test (type test)		N/A
5.2.8.7	CDM/BDM electronic motor thermal speed sensitivity test (type test)		N/A
5.2.9	Circuit functionality evaluation (routine and/or sample test)		N/A
6	INFORMATION AND MARKING REQUIREMENTS		P
6.1	General		P
6.2	Information for selection	See appended table 6, part 6.2.	P
6.3	Information for installing and commissioning	See appended table 6, part 6.3.	P
6.3.1	General		P
6.3.2	Mechanical considerations		P
6.3.3	Environment		P
6.3.4	Handling and mounting		P
6.3.5	Motor and driven equipment		P
6.3.5.1	Motor selection		P
6.3.5.2	Motor integrated sensors		P
6.3.5.3	Critical torsional speeds	Check in PDS	N/A
6.3.5.4	Transient torque analysis	Check in PDS	N/A
6.3.6	Connections		P
6.3.6.1	General		P
6.3.6.2	Interconnection and wiring diagrams	Provided in the user manual	P

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Clause	Requirement + Test	Result - Remark	Verdict
6.3.6.3	Conductor (cable) selection	Provided in the user manual	P
6.3.6.4	Terminal capacity and identification	Provided in the user manual	P
6.3.6.5	Protection requirements	No such accessible part	N/A
6.3.6.6	Earthing	Provided in the user manual	P
6.3.6.7	Protective Earthing conductor current		P
6.3.6.8	Special requirements		P
6.3.7	Overcurrent and short-circuit protection		P
6.3.8	Motor overload protection and over temperature protection	Provided in the user manual	P
6.3.8.1	CDM/BDM not incorporating internal electronic motor overload and over temperature protection		N/A
6.3.8.2	CDM/BDM incorporating internal electronic motor overload and over temperature protection		P
6.3.9	Commissioning		N/A
6.4	Information for use	See appended table 6, part 6.4.	P
6.4.1	General		P
6.4.2	Adjustment		P
6.4.3	Labels, signs and signals	Warning for high voltage	P
6.4.3.1	General		P
6.4.3.2	Isolators	No isolator	N/A
6.4.3.3	Visual and audible signals	For function purpose	N/A
6.4.3.4	Hot surfaces		P
6.4.3.5	Equipment marking		P
6.5	Information for maintenance	See appended table 6, part 6.5.	P
6.5.1	General		P
6.5.2	Capacitor discharge	Cl. 4.3.11 was complied, Warning symbol according IEC 60417-5036 was provided and discharge time was also added.	P
6.5.3	Auto restart/bypass connection	No auto restart/bypass connection provided	N/A
6.5.4	PT/CT connection		N/A
6.5.5	Other hazards		P
Annex A	Examples of protection in case of direct contact		P
Annex B	Examples of overvoltage category reduction		P
Annex C	Measurement of clearance and creepage distances		P
Annex D	Altitude correction for clearances		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
Annex E	Clearance and Creepage distance determination for frequencies greater than 30 kHz		P
Annex F	Cross-sections of round conductors		P
Annex G	Guidelines for RCD compatibility		N/A
Annex H	Symbols referred to in this part of IEC 61800		P

1	TABLE: List of materials and components separately evaluated					P
Object/Part No.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity	
Plastic Enclosure	CHI MEI CORPORATION	PA-765A(+)	5VA, 85 °C	UL94 UL746	UL	
Fan	SHENZHEN HUAXIA HENGTAI ELECTRONIC CO LTD	DA06020B24 UR	24V,0.1A	UL507	UL	
Terminal block	NINGBO DEGSON ELECTRICAL CO LTD	2EDGRM-7.62	400V,20A	UL1059	UL	
Photo-coupler 1	AVAGO TECHNOLOGIES PTE LTD	ACPL-W314	110° C, 5000 V	EN60747-5	VDE	
Alt.	TOSHIBA CORP, SEMICONDUCTOR CO DISCRETE SEMICONDUCTOR DIV	TLP701HF	100° C, 5000 V	EN60747-5	VDE	
Alt.	TOSHIBA CORP, SEMICONDUCTOR CO DISCRETE SEMICONDUCTOR DIV	FOD8314T	100° C, 5000 V	EN60747-5	VDE	
Alt.	LITE-ON TECHNOLOGY CORP	LTV-314W	105° C, 5000 V	EN60747-5	VDE	
Alt.	TOSHIBA CORP, SEMICONDUCTOR CO DISCRETE SEMICONDUCTOR DIV	TLP5701	110° C, 5000 V	EN60747-5	VDE	
Alt.	RENESAS ELECTRONICS CORPORATION	PS9031	125° C, 5000 V	EN60747-5	VDE	
Alt.	VISHAY SEMICONDUCTOR GMBH	VOL3120T	110° C, 5000 V	EN60747-5	VDE	
Photo-coupler 2	SHARP CORP ELECTRONIC COMPONENTS AND DEVICES DIV	PC123	110° C, 5000 V	EN60747-5	VDE	
Alt.	LITE-ON TECHNOLOGY CORP	LTV-816	115° C, 5000 V	EN60747-5	VDE	
Alt.	AVAGO TECHNOLOGIES PTE LTD	HCPL-817	115° C, 5000 V	EN60747-5	VDE	
Alt.	FAIRCHILD SEMICONDUCTOR CORP	FOD817CSD	110° C, 5000 V	EN60747-5	VDE	
Alt.	VISHAY INFRARED COMPONENTS INC	VO617A	115° C, 5000 V	EN60747-5	VDE	
Alt.	CT MICROELECTRONICS FAR EAST LTD	CT817C	110° C, 5000 V	EN60747-5	VDE	
Alt.	EVERLIGHT	EL816	125° C, 5000 V	EN60747-5	VDE	
Transformer TR1 for frame C	SHENZHEN BOULDER ELECTRONIC CO.,LTD	BCK.34C9813 W	130° C	EN61800-5-1	Tested with appliance	
Transformer TR1 for frame	SHENZHEN BOULDER ELECTRONIC CO.,LTD	EFD25-20W	130° C	EN61800-5-1	Tested with appliance	

1	TABLE: List of materials and components separately evaluated					P
Object/Part No.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity	
A,B						
Alt.	YD	DA100	130° C	EN61800-5-1	VDE	
Relay K1	TYCO ELECTRONICS (SHENZHEN) CO LTD	OZ-SS-1-24LM1	16.7A, 240V, 105° C	EN61810-1	VDE	
Alt.	OMRON CORP	G2RL-1A-E DC24	20A, 240 V, 85° C	EN61810-1	VDE	
Alt.	DONGGUAN CHUROD ELECTRONICS CO LTD	CHZ03-V-124LA2	15A, 277 V, 85° C	EN61810-1	VDE	
Alt.	Sanyou Corporation Limited	SZ-Serie(s)	250Vac, 16A	EN61810-1	VDE	
Alt.	Clion Electrical Co., Ltd.	NNC69B-1H16ADC12V	10A, 240 V ac	EN61810-1	VDE	
Alt.	Wangrong Electronics (Shenzhen) Co., Ltd	RMIH-SS	250Vac, 16A	EN61810-1	VDE	
Alt.	Xiamen Hongfa Electroacoustic Co., Ltd.	HF14FW Serie(s)	250Vac, 16A	EN61810-1	VDE	
Relay K2	TYCO	OZ-SS-124L	16A, 240Vac	EN61810-1	VDE	
Y2 cap. C43-C47	FENGHUA (HOLDING) CO LTD	CT7-Y2	250 Vac, 125° C 4.7 nF	IEC 60384-14	VDE	
Alt.	MURATA MFG CO LTD	KH	250 Vac, 125° C 4.7 nF	IEC 60384-14	VDE	
Alt.	TDK CORPORATION	CS	400 Vac, 125° C 4.7 nF	IEC 60384-14	VDE	
Alt.	SHAANXI HUAXING ELECTRONIC DEVELOPMENT CO LTD	CT7Y2	250 Vac, 125° C, 4.7 Nf	IEC 60384-14	VDE	
Alt.	VISHAY ELECTRONIC GMBH	VY2	300 Vac, 125° C 4.7 nF	IEC 60384-14	VDE	
Rectifier bridge for frame C	LESHAN RADIO CO LTD	D25SB100	25 A, 1000 V, 125° C	UL 1557	UL	
Alt.	HY ELECTRONIC (CAYMAN) LTD TAIWAN BRANCH	GBJ2510	25 A, 1000 V, 150° C	UL 1557	UL	
Alt.	LESHAN SHARE ELECTRONIC CO LTD	D25SB100	25 A, 1000 V, 125° C	UL 1557	UL	
Alt.	LESHAN RADIO CO LTD	D25SB100	25 A, 1000 V, 125° C	UL 1557	UL	
Rectifier bridge	IXYS	GUO40-	1000V, 25A	UL 1557	UL	

1	TABLE: List of materials and components separately evaluated					P
Object/Part No.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity	
for frame A,B		12NO1				
Alt.	HY ELECTRONIC (CAYMAN) LTD TAIWAN BRANCH	SGBJ2510	1000V,25A	UL 1557	UL	
Alt.	LESHAN RADIO CO LTD	D25SB100	25 A, 1000 V,125° C	UL 1557	UL	
Alt.	HY ELECTRONIC (CAYMAN) LTD TAIWAN BRANCH	GBJ2510	25 A, 1000 V,150° C	UL 1557	UL	
Alt.	LESHAN SHARE ELECTRONIC CO LTD	D25SB100	25 A, 1000 V,125° C	UL 1557	UL	
IGBT for frame C	INFINEON TECHNOLOGIES AG	GD30PJT60L 2S	600V,30A	UL 1557	UL	
Alt.	STARPOWER SEMICONDUCTOR LTD	FP30R06W1E 3	600V,30A	UL 1557	UL	
IGBT for frame A,B	ST	STGF15M65D F2	600V,15A	UL 1557	UL	
Alt.	INFINEON	IKA15N60T	600V,15A	UL 1557	UL	
IGBT for frame A	MITSUBISHI electirc	PSS30S92F6-AG-UL	600V,30A	UL 1557	UL	
IGBT for frame B	MITSUBISHI electirc	PSS20S92F6-AG	600V,20A	UL 1557	UL	
Alt.	FUJI	6MBP20VSC0 60-50-	600V,20A	UL 1557	UL	
Fuse F7,F8,F9	shanghai wayon	LP-NSM075	6V,0.75A	EN 60127	TUV	
Fuse F1-F6,F11	shanghai wayon	LP-NSM016	30V,0.16A	EN 60127	TUV	
Fan for frame C	SHENZHEN HUAXIA HENGTAI ELECTRONIC CO LTD	DA06020B24 UR	24V,0.1A	UL 507	UL	
Fan for frame B	SHENZHEN BAIKE MOTOR ELECTRONICS CO LTD	DBA04015B1 2MRGC270	12V,0.08A	UL 507	UL	
Realy for frame A,B	OMRON	G6C-2114P-FD-US-DV12	8A,12VDC	EN61810-1	VDE	
Alt.	Panasonic	DK1A1B-12V	8A,12VDC	EN61810-1	VDE	
PCB of drive board	SHENZHEN HANGSHENG PCB TECHNOLOGY CO LTD	M	130°C,V-0	UL 94	UL	

1	TABLE: List of materials and components separately evaluated					P
Object/Part No.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity	
PCB of control board	HUIZHOU GLORYSKY ELECTRONICS CO LTD	GS-M	130°C,V-0	UL 94	UL	
Supplemental information:						

5.2.2.1	TABLE: General selection and information of supply earthing systems for clearance distances										-
Power systems	TN-S, TN-C, TN-CS, TT (not corner earthed)		TN-S, TT (corner earthed)		TN-C (middle point earthed)		IT (not corner earthed)		IT (corner earthed)		
For model SV-DA300-2R0-2-S0											
Rated voltage (V)	187-253		Not evaluated		Not evaluated		Not evaluated		Not evaluated		
Max. altitude (m)	2000		-		-		-		-		
System voltage	253		-		-		-		-		
	BI/SI	RI	BI/SI	RI	BI/SI	RI	BI/SI	RI	BI/SI	RI	
Rated Impulse voltage (kV)	2.5	4.0	-	-	-	-	-	-	-	-	
Temporary overvoltage (V)	1910Vdc	3820Vdc	-	-	-	-	-	-	-	-	
Clearance (mm)	1.5	3.0	-	-	-	-	-	-	-	-	
Test impulse voltage for clearance (kV)	2.5	4.0	-	-	-	-	-	-	-	-	
IT corner earthed, simulated impedance (MΩ)..... :					Not evaluated						
Supplementary information: B/S=Basic or supplemental; D/R=double or reinforced											

5.2.2.1	TABLE: General selection and information of supply earthing systems for clearance distances										-
Power systems	TN-S, TN-C, TN-CS, TT (not corner earthed)		TN-S, TT (corner earthed)		TN-C (middle point earthed)		IT (not corner earthed)		IT (corner earthed)		
For model SV-DA300-1R0-2-S0, SV-DA300-0R4-2-S0											
Rated voltage (V)	187-253		Not evaluated		Not evaluated		Not evaluated		Not evaluated		
Max. altitude (m)	2000		-		-		-		-		
System voltage	253		-		-		-		-		
	BI/SI	RI	BI/SI	RI	BI/SI	RI	BI/SI	RI	BI/SI	RI	
Rated Impulse voltage (kV)	4.0	6.0	-	-	-	-	-	-	-	-	

Temporary overvoltage (V)	2120Vdc	4240Vdc	-	-	-	-	-	-	-	-
Clearance (mm)	3.0	5.5	-	-	-	-	-	-	-	-
Test impulse voltage for clearance (kV)	4.0	6.0	-	-	-	-	-	-	-	-
IT corner earthed, simulated impedance (MΩ)..... :						Not evaluated				
Supplementary information: B/S=Basic or supplemental; D/R=double or reinforced										

5.2.2.1		TABLE: Working voltage measurements for clearance and creepage distances										-
Condition	Between	TN-S, TN-C, TN-CS, TT (not corner earthed)		TN-S, TT (corner earthed)		TN-C (middle point earthed)		IT (not corner earthed)		IT (corner earthed)		
		peak	rms	peak	rms	peak	rms	peak	rms	peak	rms	
Transformer on the auxiliary driver PCB												
	Transformer Pri. and Sec.	250	220	Not apply	Not apply	Not apply	Not apply	Not evaluated	Not evaluated	Not evaluated	Not evaluated	

5.2.2.1		TABLE: Clearance and creepage distance measurements					P
Clearance (Cl) and Creepage distance (Cr) at/of/between:		PWB layer	CTI (V)	Req. cl. (mm)	Meas. cl. (mm)	Req. cr. (mm)	Meas. cr. (mm)
SV-DA300-2R0-2-S0							
Functional insulation:							
Different poles of inputs or outputs terminals on PCB		Top layer	IIIa	1.5	3.2	1.5	3.2
DC+ and N		Top layer	IIIa	1.5	3.2	1.5	3.2
Basic/supplementary insulation:							
DC+ to PE		Bottom layer	IIIa	1.5	3.8	1.5	3.8
L1 to PE		Bottom layer	IIIa	1.5	4.0	1.5	4.0
Reinforced insulation:							
Pri. to sec. of TR1		Bottom layer	IIIa	3.0	7.5	3.0	7.5
Across opto-coupler on control board		Top layer	IIIa	3.0	7.5	3.0	7.5

SV-DA300-1R0-2-S0						
Functional insulation:						
DC+ and DC-	Top layer	IIIa	3.0	3.5	3.0	3.5
Basic/supplementary insulation:						
Primary to PE	Top layer	IIIa	3.0	3.2	3.0	3.2
Bus cap to PE	/	/	3.0	3.4	3.0	3.4
Reinforced insulation:						
Pri. to Sec. of transformer	Top layer	IIIa	5.5	8.0	5.5	8.0
Across opto-coupler on control board	Top layer	IIIa	3.0	7.5	3.0	7.5
Supplementary information:						

4.3.6.8 5.2.3.1 5.2.3.2 5.2.3.3	TABLE: Solid insulation, Impulse voltage test, A.C. or d.c. voltage test, Partial discharge test					P
Test voltage applied between/at:	DTI (mm)	Impulse test (kV, circuit)	Electric strength test (V a.c., V d.c.)	Partial discharge test (V)	Result	
For model SV-DA300-2R0-2-S0						
Functional:						
-	-	N/A	N/A	N/A	N/A	
Basic/supplementary:						
Input /output terminals to Earthing terminal	-	2.5	1910Vdc	N/A	P	
Insulation sheet	-	2.5	1910Vdc	N/A	P	
Internal wire	-	2.5	1910Vdc	N/A	P	
Reinforced:						
Transformer primary and secondary on power PCB	-	4.0	3820Vdc	N/A	P	
Input /output terminal to signal connector	-	4.0	3820Vdc	N/A	P	
Insulated sheet	-	4.0	3820Vdc	N/A	P	
After deflection and impact test:						
Input /output terminals to earthing terminal	-	2.5	1910Vdc	N/A	P	
Input /output terminal to signal connector	-	4.0	3820Vdc	N/A	P	

After dry heat test:					
Input /output terminals to earthing terminal	-	2.5	1910Vdc	N/A	P
Input /output terminal to signal connector	-	4.0	3820Vdc	N/A	P
After damp heat test:					
Input /output terminals to earthing terminal	-	2.5	1910Vdc	N/A	P
Input /output terminal to signal connector	-	4.0	3820Vdc	N/A	P
After vibration test:					
Input /output terminals to earthing terminal	-	2.5	1910Vdc	N/A	P
Input /output terminal to signal connector	-	4.0	3820Vdc	N/A	P
After hydrostatic pressure test:					
Input /output terminals to earthing terminal	-	-	-	-	-
For model SV-DA300-1R0-2-S0, SV-DA300-0R7-2-S0					
Functional:					
-	-	N/A	N/A	N/A	N/A
Basic/supplementary:					
Input /output terminals to Earthing terminal	-	4.0	2120Vdc	N/A	P
Insulation sheet	-	4.0	2120Vdc	N/A	P
Internal wire	-	4.0	2120Vdc	N/A	P
Reinforced:					
Transformer primary and secondary on power PCB	-	6.0	4240Vdc	N/A	P
Input /output terminal to signal connector	-	6.0	4240Vdc	N/A	P
Insulated sheet	-	6.0	4240Vdc	N/A	P
After deflection and impact test:					
Input /output terminals to earthing terminal	-	4.0	2120Vdc	N/A	P
Input /output terminal to signal connector	-	6.0	4240Vdc	N/A	P
After dry heat test:					
Input /output terminals to earthing terminal	-	4.0	2120Vdc	N/A	P
Input /output terminal to signal connector	-	6.0	4240Vdc	N/A	P
After damp heat test:					
Input /output terminals to earthing terminal	-	4.0	2120Vdc	N/A	P
Input /output terminal to signal connector	-	6.0	4240Vdc	N/A	P
After vibration test:					
Input /output terminals to earthing terminal	-	4.0	2120Vdc	N/A	P
Input /output terminal to signal connector	-	6.0	4240Vdc	N/A	P
After hydrostatic pressure test:					
Input /output terminals to earthing terminal	-	-	-	-	-
Supplementary information:					

5.2.3.5		TABLE: Touch current measurement						P	
Single phase equipment									
L - N TN-S, TN-C, TN-CS, TT (not corner earthed) Figure 6	L - L TN-C, TT (middle point earthed) Figure 7	L - L TN, TT (not corner earthed) Figure 8	L - N IT (not corner refer- enced) Figure 9	L - N IT (corner refer- enced) Figure 9	L - L IT (not corner refer- enced) Figure 10	L - L IT (corner refer- enced) Figure 10	Limit for 50 Hz (mA)	Limit for 60 Hz (mA)	
-	-	-	-	-	-	-	3.5	3.5	
Three-phase equipment									
TN-S, TN-C, TN- CS, TT (not corner earthed) Figure 11	IT (star point referenced) Figure 12	IT (corner referenced) Figure 12	TN, TT (corner earthed) Figure 13	TN, TT (middle point earthed) Figure 14	Limit for 50 Hz (mA)	Limit for 60 Hz (mA)			
-	-	-	-	-	3.5	3.5			
Supplementary information: Marking added on the enclosure, Measurements have been carried out according to figures of IEC 60990.									

5.2.3.6.3 5.2.3.6.4 5.2.4.4 5.2.4.5 5.2.8		TABLE: Short-circuit test Breakdown of components test Loss of phase test Cooling failure tests Electronic motor overload protection test				P	
Tested item	Fault (SC, OC, OL)	Supply Voltage (V)	Test time	Test environment (ambient, fuse etc.) and observation	Result		
Rectifier (L1-B1+)	Short circuit	220	1S	After short, rectifier bridge damaged, unit shut down immediately. No hazard.			
IGBT (PB+ - U phase)	Short circuit	220	1S	After short, Unit alarm 'Er01-0', no output. Recoverable after remove fault condition. No damage, no hazard.			
IGBT (GU- - U phase)	Short circuit	220	1S	After short, Unit alarm 'Er01-2', no output. Recoverable after remove fault condition. No damage, no hazard.			
Bus Capacitor	Short circuit	220	1S	After short, Rectifier damaged, unit shut down immediately. No hazard.			
Half filter	clogged	220	2hours	Unit operated as normal until temperature is stable. No damage, no hazard			
All filter	clogged	220	60min	Unit alarm 'Er20-0' (Over temperature). No damage, no hazard.			
Output U-V	Short circuit	220	10min	Unit shut down at once show"Er01-0". No damage, no hazard.			
Output U-W	Short circuit	220	10min	Unit shut down at once show"Er01-0". No damage, no hazard.			

Output V-W	Short circuit	220	10min	Unit shut down at once show“Er01-0”. No damage, no hazard.	
Loss phase	Loss L1	220	10min	Unit shut down at once show“Er10-6”. No damage, no hazard	
Loss phase	Loss L2	220	10min	Unit shut down at once show“Er10-6”. No damage, no hazard	
Loss phase	Loss L3	220	10min	Unit shut down at once show“Er10-6”. No damage, no hazard	
One blower motor	Inoperative	220	2hours	Unit operated as normal until temperature is stable. No damage, no hazard	
All blower motors	Inoperative	220	45min	Unit alarm ‘Er23-0’ (Over temperature). No damage, no hazard.	
Motor Overload	Overload	220	1S	Unit shut down at once show“Er17-0” with 200% load of motor. No damage, no hazard	
Supplementary information:					

5.2.3.8	TABLE: Temperature rise test			P
	Supply voltage (V)	187	253	—
	Derating (%)	--	--	—
	Rated maximum ambient temperature (°C)	40.0	40.0	—
	Ambient T _{min} (°C)	26	27	—
	Ambient T _{max} (°C)	28.5	29.0	—
Maximum measured temperature T of part/at:		T (°C)		Allowed T _{max} (°C)
Model:SV-DA300-2R0-2-E0				
Heat sink		86.2	87.9	130
IGBT		89.0	84.2	130
Rectifier Bridge		91.0	89.2	125
Fan		53.0	53.7	70
Input Terminal Block		54.2	52.9	90
Optical Isolator PC2 Body		70.8	72.5	100
Optical Isolator PC10 Body		64.2	65.2	110
Transformer coil		71.3	70.2	130
Transformer wire		68.5	67.4	130
PCB		80.5	82.4	130
Y2 cap. C43		51.2	53.1	85
RV4		55.4	53.2	85

Panel Key	51.6	51.9	65
Input terminal block	59.5	61.5	90
Output terminal block	55.6	57.2	90
Ambient Temperature	40.0	40.0	--
Model:SV-DA300-0R7-2-E0			
Heat sink	90.2	85.9	130
IGBT	70.2	68.5	130
Rectifier Bridge	85.6	84.1	125
Fan	49.0	48.1	70
Input Terminal Block	50.4	49.9	90
Optical Isolator PC4 Body	65.2	66.4	100
Optical Isolator PC7 Body	63.5	60.2	110
Transformer coil	81.3	80.2	130
Transformer wire	78.5	77.4	130
PCB	72.5	70.4	130
Y2 cap. C121	46.3	46.8	85
RV4	56.4	59.2	85
Panel Key	46.6	46.9	65
Input terminal block	49.5	48.2	90
Output terminal block	47.9	46.2	90
Ambient Temperature	40.0	40.0	--
Model:SV-DA300-0R4-2-E0			
Heat sink	85.0	87.0	130
IGBT	94.0	92.4	130
Rectifier Bridge	78.2	80.1	125
Input Terminal Block	51.3	50.6	90
Optical Isolator PC5 Body	55.9	62.5	100
Optical Isolator PC10 Body	65.3	63.4	110
Transformer coil	90.1	89.2	130
Transformer wire	86.7	85.9	130
PCB	81.2	80.9	130
Y2 cap. C32	50.6	51.3	85

RV4		55.3	56.8	85			
Panel Key		50.2	51.3	65			
Input terminal block		53.6	54.8	90			
Output terminal block		54.1	53.9	90			
Ambient Temperature		40.0	40.0	--			
Temperature T of winding:	t ₁ (°C)	R ₁ (Ω)	t ₂ (°C)	R ₂ (Ω)	T (°C)	Allowed T _{max} (°C)	Insulation class
—	—	—	—	—	—	—	—
Supplementary information: The measured value has been adjusted to rated maximum ambient.							

5.2.3.9	TABLE: Protective bonding					P
Points of application	Current (A)	Voltage (V)	Resistance (mΩ)	Test time (min)	Result	
Metal enclosure	Max.20	-	8	60	Pass	
After dry heat test:						
Metal enclosure	Max.20	-	9	60	Pass	
After damp heat test:						
Metal enclosure	Max.20	-	9	60	Pass	
After vibration test:						
Metal enclosure	Max.20	-	8	60	Pass	
Supplementary information: limit is 20 mΩ						

5.2.5	TABLE: Material test			N/A
Object / Part No. / Material	Manufacturer / trademark / type designation	Test procedure		Result
-	-	-		-
Supplementary information: UL Recognized materials and Parts were used				

6	TABLE: Information and marking requirements					P
	Product	Package	Installation	User	Maintenance	
6.2	Information for selection					
- Name or trademark of the manufacturer, supplier or importer	OK	OK	OK	OK	OK	
- Catalogue number or equivalent	OK	OK	OK	OK	OK	
- Input voltage rating	OK	-	OK	-	OK	
- Input current rating	OK	-	OK	-	OK	
- Input power rating	OK	-	OK	-	OK	
- Input frequency	OK	-	OK	-	OK	
- Input number of phases	OK	-	OK	-	OK	

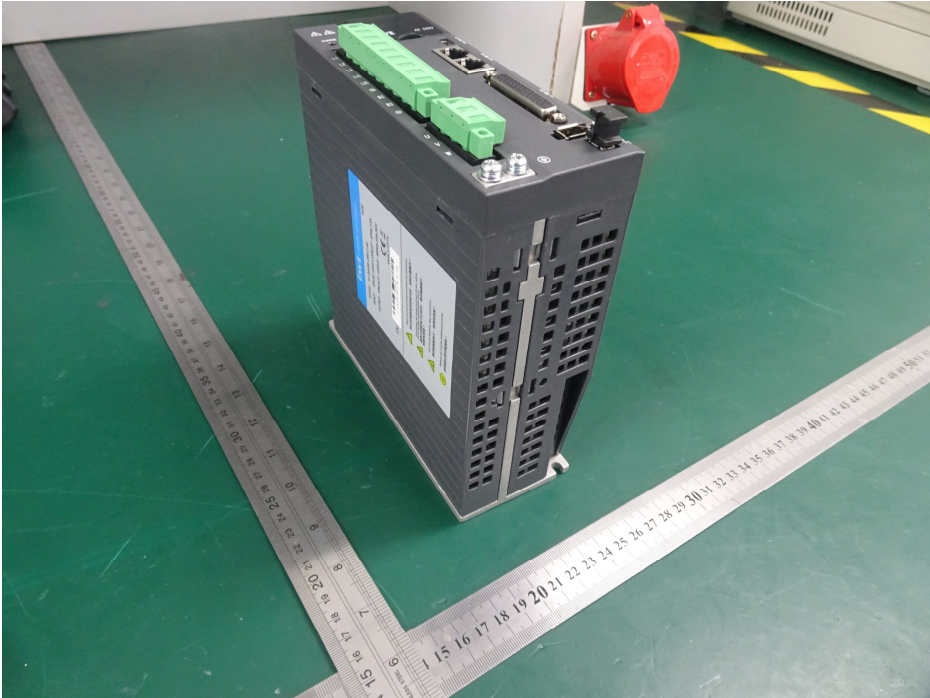
- Output voltage rating	OK	-	OK	-	OK
- Output current rating	OK	-	OK	-	OK
- Output power rating	OK	-	OK	-	OK
- Output frequency	OK	-	OK	-	OK
- Output number of phases	OK	-	OK	-	OK
- Protective class	See 6.3.6.6.				
- Type of electrical supply system	See 6.3.3.				
- Prospective short-circuit current and protective device characteristics	See 6.3.7.				
- Field supply requirements (if any)	See 6.3.3.				
- Coolant type and design pressure	-	-	-	-	-
- IP rating	OK	-	OK	-	OK
- Operating and storage environment	See 6.3.3.				
- Reference to relevant standards	-	-	OK	-	-
- Date code or serial number	OK	-	-	-	-
- Reference to instructions	-	-	OK	OK	OK
6.3	Information for installation and comissioning				
6.3.2: Mechanical considerations	-	OK	OK	-	OK
- Dimensional drawing (SI units)	-	-	OK	-	OK
- Mass (SI units)	-	OK	OK	-	OK
- Mounting drawing (SI units)	-	-	OK	-	OK
6.3.3: Environment (operation, transport, storage)	-	-	OK	-	OK
- Temperature	-	-	OK	-	OK
- Humidity	-	-	OK	-	OK
- Altitude	-	-	OK	-	OK
- Pollution	-	-	OK	-	OK
- Ultra violet light	-	-	OK	-	OK
- Type of electrical supply system	-	-	OK	-	-
- Field supply requirements (if any)	-	-	OK	-	-
- Other	OK	-	OK	-	OK
6.3.4: Handling and mounting	-	OK	OK	-	OK
- Packing and unpacking	-	OK	OK	-	OK
- Moving	-	OK	OK	-	OK
- Lifting	-	OK	OK	-	OK
- Strength and rigidity of mounting surface	-	OK	OK	-	OK
- Fastening	-	OK	OK	-	OK
- Provision of adequate access for operation, adjustment and maintenance	-	OK	OK	-	OK
- Warning regarding combustibility if mounting surface exceeds 90 °C	-	-	N/A	-	-
6.3.5: Motor and driven equipment	-	-	N/A	N/A	N/A

6.3.5.1: Motor selection	-	-	N/A	N/A	N/A
6.3.5.2: Motor integrated sensors	-	-	N/A	N/A	N/A
6.3.5.3: Critical torsional speeds	-	-	N/A	N/A	N/A
6.3.5.4: Transient torque analysis	-	-	N/A	N/A	N/A
6.3.6: Connections	-	-	OK	-	OK
6.3.6.1: General	-	-	OK	-	OK
6.3.6.2: Interconnection and wiring diagrams ..	-	-	OK	-	OK
6.3.6.3: Conductor (cable) selection	-	-	OK	-	OK
6.3.6.4: Terminal capacity and identification ...	OK	-	OK	-	OK
6.3.6.5: Protection requirements	-	-	OK	OK	OK
- Protective class 0	OK	-	OK	OK	OK
- Interface details	-	-	OK	-	OK
- Terminals with protective separation	-	-	OK	OK	OK
6.3.6.6: Earthing	-	-	OK	-	OK
- High-voltage PDS: Earthing switch	N/A	N/A -	N/A -	N/A -	N/A -
- Symbol IEC 60417-5019, PE or green-yellow :	OK	-	-	-	-
- Symbol IEC 6417-5172 for Class II	N/A	-	-	-	-
6.3.6.7: Protective earthing conductor current :	-	-	OK	-	OK
- Symbol ISO 7000-0434 and instruction	OK	-	OK	-	OK
- RCD compability	-	-	N/A	-	N/A
- RCD/RCM caution notice and marking ISO 7000-0434	-	-	N/A	-	N/A
6.3.6.8: Special requirements	-	-	OK	-	OK
6.3.7: Overcurrent or short-circuit protection ...	-	-	OK	-	OK
- Electronic power output short-circuit protection circuitry conditions	-	-	OK	-	OK
6.3.8: Motor overload protection and over temperature protection	-	-	OK	-	OK
6.3.8.1: CDM/BDM not incorporating internal electronic motor overload and overtemperature protection	-	-	OK	-	OK
6.3.8.2: CDM/BDM incorporating internal electronic motor overload and overtemperature protection.....	-	-	OK	-	OK
6.3.9: Commissioning	-	-	OK	-	-
6.4	Information for use				
6.4.1: General	-	-	OK	OK	OK
6.4.2: Adjustment	OK	-	OK	OK	OK
6.4.3: Labels, signs, and signals	OK	-	OK	OK	OK
6.4.3.1: General	OK	-	OK	OK	OK
6.4.3.2: Isolators	OK	-	-	-	-
6.4.3.3: Visual and audible signals	OK	-	-	OK	-
6.4.3.4: Hot surfaces, symbol IEC 60417-5041 :	OK	-	-	OK	-

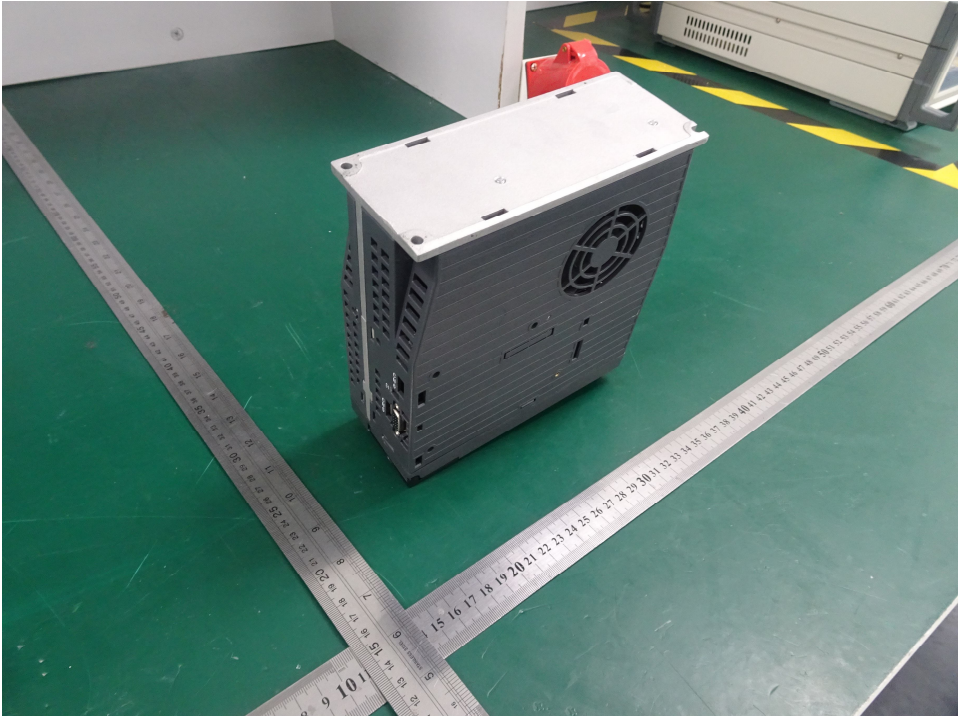
6.4.3.5: Equipment marking	OK	-	OK	OK	OK
- Control devices	OK	-	OK	-	OK
- Indicating devices	OK	-	OK	-	OK
- Replaceable fuses	N/A	-	-	N/A	-
- Movable connectors	N/A	-	-	N/A	-
- Test points	OK	-	OK	-	OK
- Polarized devices	OK	-	OK	-	OK
- Pre-set controls	OK	-	OK	-	OK
6.5	Information for maintenance				
6.5.1: General	-	-	-	OK	OK
- Maintenance procedures.....	-	-	-	-	OK
- Maintenance schedules	-	-	-	OK	OK
- Safety precautions	-	-	-	-	OK
- Location of live parts accessible during maintenance	-	-	-	-	OK
- Adjustment procedures	-	-	OK	OK	OK
- Repair and replacement procedures	-	-	-	-	OK
- Other relevant information (e.g. special tools list)	-	-	-	OK	OK
6.5.2: Capacitor discharge	OK	-	OK	-	OK
6.5.3: Auto restart/bypass connection	-	-	OK	OK	OK
6.5.4: Potential Transformer (PT) / Current Transformer (CT) connection	OK	-	OK	-	OK
6.5.5: Other hazards	OK	-	-	-	OK
Supplementary information:					

Attachment No. 1: Product Photos

SV-DA300-2R0-2-S0



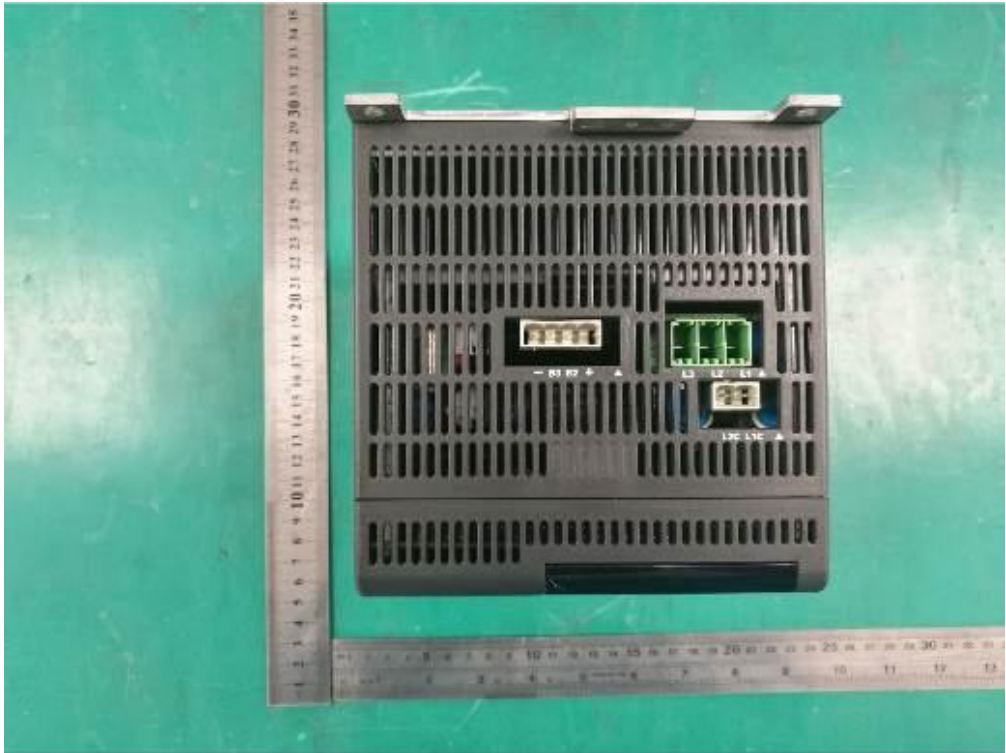
General View



General View



Left Side View



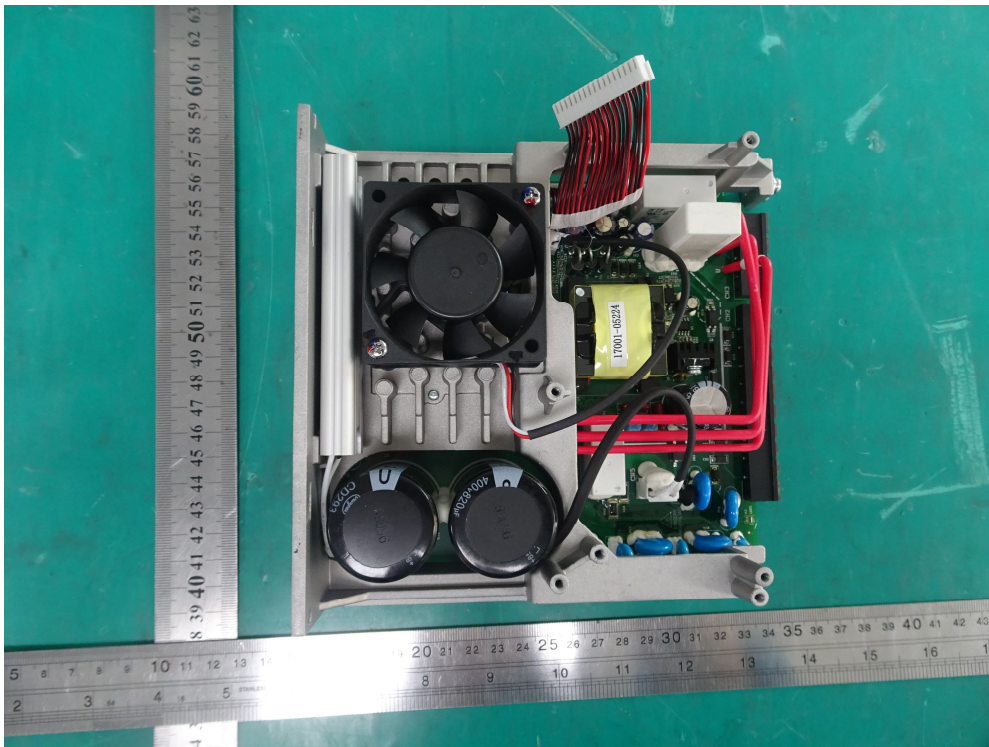
Top Side View



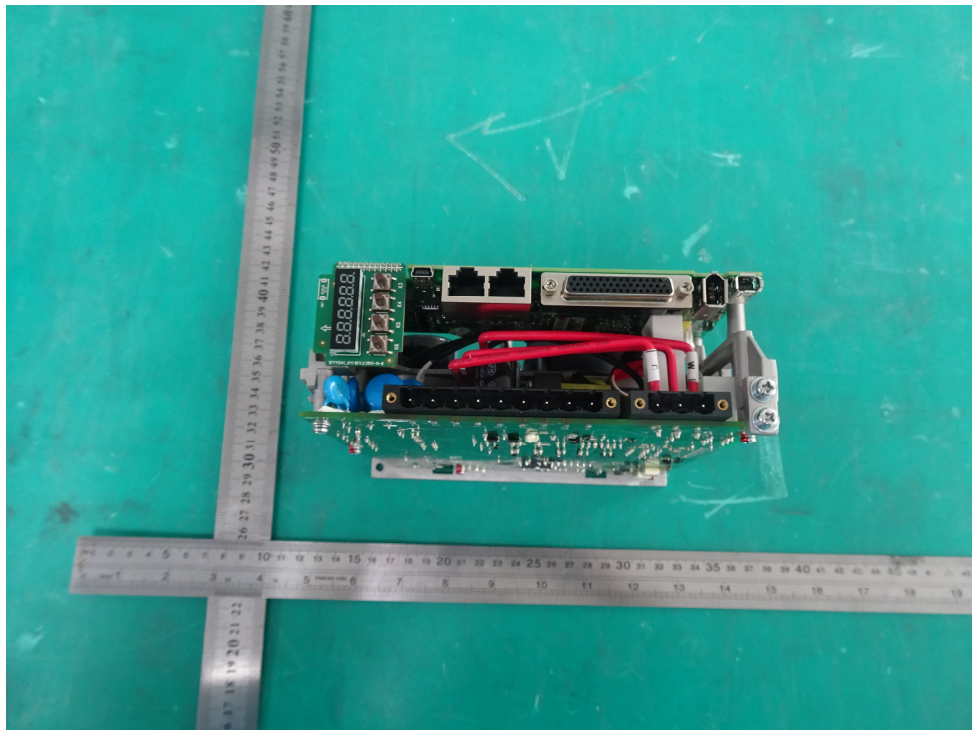
Internal view



Internal view



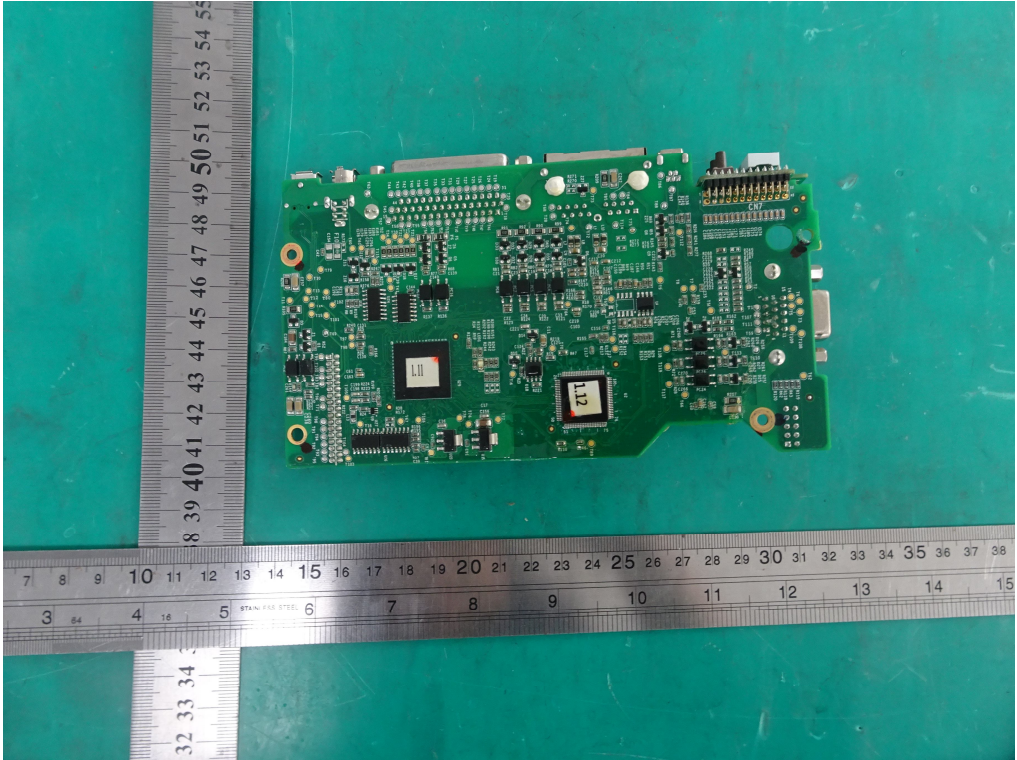
Internal View



Internal View



Control board View



Control board View

SV-DA300-1R0-2-S0:



Left side view



Right side view



Internal view



Internal view