Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT

IEC 60950-1

Information technology equipment – Safety – Part 1: General requirements

Report Number. ..... :	50077297 001
Date of issue ..... :	2017-08-09
Total number of pages ..... :	99 (excluding attachments, see page 3)
Applicant's name ..... :	TDK-Lambda Corp. Nagaoka Technical Center
Address ..... :	2704-1 Settaya-machi, Nagaoka-shi, Niigata, 940-1195, JAPAN
Test specification:	
Standard ..... :	IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC60950_1F
Test Report Form(s) Originator .... :	SGS Fimko Ltd
Master TRF ..... :	Dated 2014-02

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

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 CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :	Switching Power Supply
Trade Mark ..... :	TDK·Lambda
Manufacturer ..... :	Same as applicant
Model/Type reference ..... :	CUS60M-zzxxxxxxx; CME60A-zzxxxxxxx (zz = 5,12,15,18,24,36 or 48; xxxxxxx = A, U, ADJ, M, CO, SF, other alphanumeric character) Refer to page 11 for definition of variables
Ratings ..... :	AC input: See the model list on page 9 and 10 for details
	DC output: See the model list on page 9 and 10 for details

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	TÜV Rheinland Shanghai Co., Ltd.	
Testing location/ address ..... :		No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :		Sunny Sun	
Approved by (name + signature) ..... :		Roy Chen	
☐	**Testing procedure: TMP/CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Approved by (name + signature) ..... :			
☐	**Testing procedure: WMT/CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name + signature) ..... :			
Approved by (name + signature) ..... :			
☐	**Testing procedure: SMT/CTF Stage 3 or 4:**		
Testing location/ address ..... :			
Tested by (name + signature) ..... :			
Witnessed by (name + signature) ..... :			
Approved by (name + signature) ..... :			
Supervised by (name + signature) ..... :			

List of Attachments (including a total number of pages in each attachment):

- ATTACHMENT 1 - National Differences (74 pages)
- ATTACHMENT 2 - Photo documentation (6 pages)
- ATTACHMENT 3 - Technical documentation (17 pages)

Note: Total number of pages in each attachment is indicated in individual attachment.

Summary of testing:

All applicable tests as described in Test Case and Measurement Sections were performed.

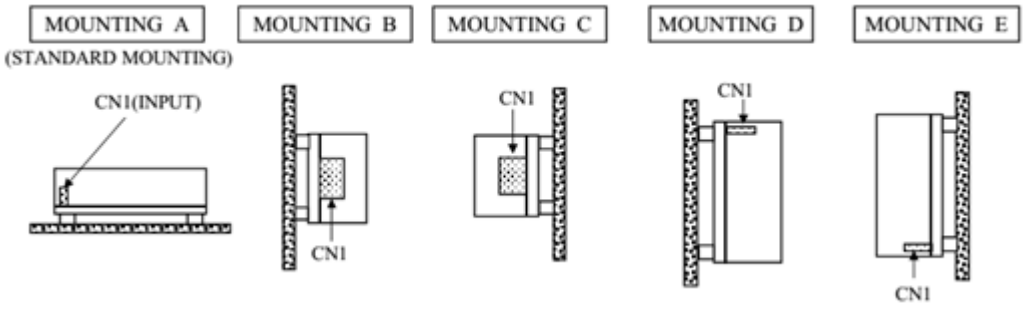
The maximum specified operation ambient temperature is 70°C.

Specified ambient temperature for operation is according to manufacturer's specification.(see chart of convection cooling on below on below)

Unless otherwise specified, throughout this report, all tests were performed on models CUS60M-5/ADJ, CUS60M-12/ADJ, CUS60M-36/ADJ, CUS60M-48/ADJ and perform construction check on models CUS60M-48 to represent other similar models.

The load conditions used during testing: Maximum normal load according to sub-clause 1.2.2.1 for this equipment is the operation with the maximum specified DC-load with maximum power condition according to the manufacturer specified.

Mounting position:



Derating Curve:

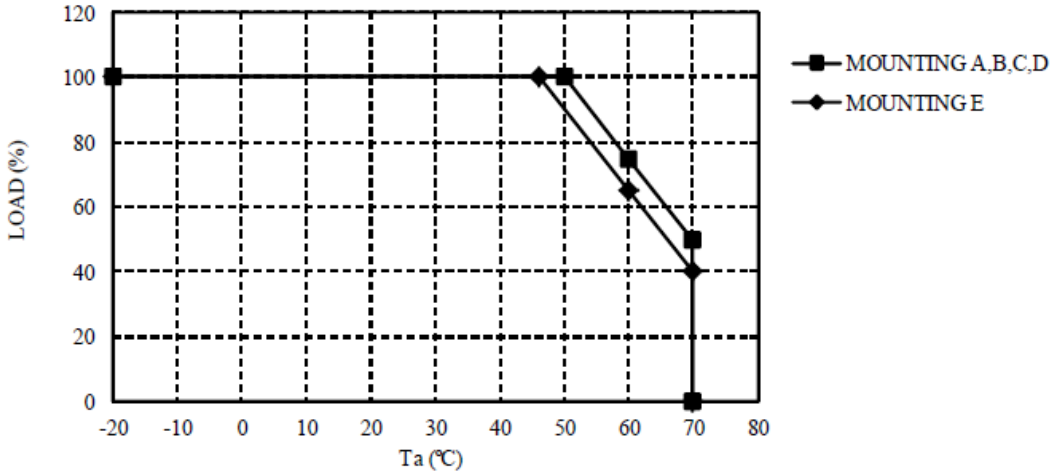
For CUS60M (excluding CUS60M-/A) series

Convection Cooling: Mounting A,B,C,D

Ta (°C)	Load (%)
-20 - +50	100
60	75
70	50

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +46	100
60	65
70	40



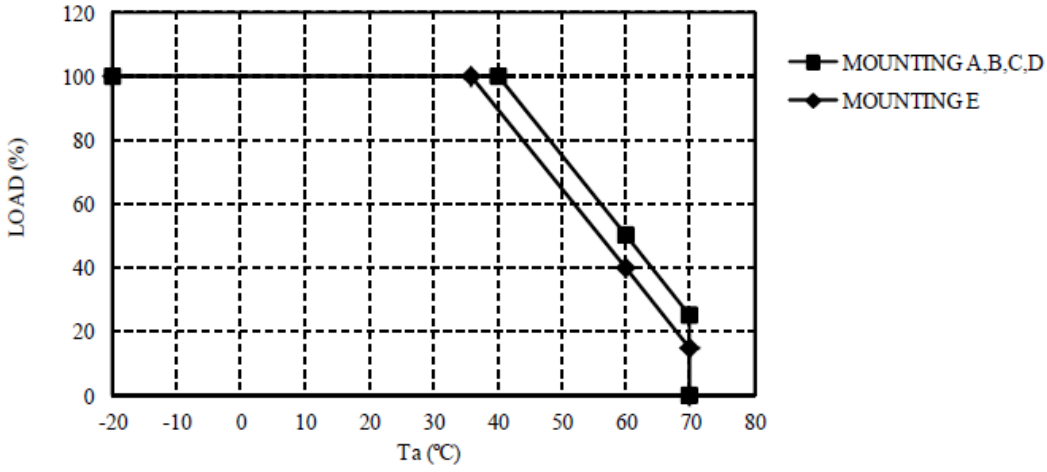
For CUS60M-/A series

Convection Cooling: Mounting A,B,C,D

Ta (°C)	Load (%)
-20 - +40	100
60	50
70	25

Convection Cooling: Mounting E

Ta (°C)	Load (%)
-20 - +36	100
60	40
70	15



The equipment is operated up to 5000m above sea level as declared by manufacturer. Clearances have been evaluated according to IEC 60664-1 table A.2 with a multiplication factor of 1.48 throughout this report.

Tests performed (name of test and test clause):

Clause	Test description
1.6.2	Input Current
1.7.11	Durability
2.1.1.5	Energy Hazards
2.1.1.7	Discharge of Capacitors in equipment
2.2.2	Voltages under normal conditions
2.2.3	Voltages under fault conditions
2.4.2	Limit values - Limited current circuits
2.5	Limited power sources
2.6.3.4	Resistance of earthing conductors and their terminations
2.9.2	Humidity Conditioning - Electrical insulation
2.10.2	Determination of working voltage
4.2.2	Steady Force Test, 10N
4.5.2	Temperature tests
4.5.5	Resistance to abnormal heat
5.1.6	Test measurements - Touch current and protective conductor current
5.2	Electric strength
5.3	Abnormal operating and fault conditions
Annex C	Transformers

Testing location:

TÜV Rheinland Shanghai Co., Ltd.
No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

Summary of compliance with National Differences

List of countries addressed:

EU Group Differences, EU Special National Conditions, AR, AU, AT, BH, BY, BE, BR, BG, CA, CN, CO, HR, CZ, DK, FI, FR, DE, GR, HU, IN, ID, IE, IL, IT, JP, KE, KR, LR, MY, MX, AN, NZ, NG, NO, PK, PL, PT, RU, SA, RS, SG, SK, SI, ZA, ES, SE, CH, TH, TR, UA, AE, GB, US, VN

Explanation of used codes:

AR = Argentina**; AU = Australia; AT = Austria*; BH = Bahrain**; BY = Belarus**;
BE = Belgium*/**; BR = Brazil**; BG = Bulgaria*/**; CA = Canada; CN = China**;
CO = Colombia**; HR = Croatia**; CZ = Czech** Republic*; DK = Denmark*; FI = Finland*/**;
FR = France*/**; DE = Germany*/**; GR = Greece*/**; HU = Hungary*/**; IN = India**;
ID = Indonesia**; IE = Ireland*/**; IL = Israel**; IT = Italy*; JP = Japan**; KE = Kenya**;
KR = Korea, Republic of**; LR = Libya**; MY = Malaysia**; MX = Mexico**; AN = Netherlands Antilles*/**;
NZ = New Zealand; NG = Nigeria**; NO = Norway*/**; PK = Pakistan**; PL = Poland*/**;
PT = Portugal*/**; RU = Russian Federation**; RO = Romania*/**; SA = Saudi Arabia**; RS = Serbia Republic of**; SG = Singapore**; SK = Slovakia*/**; SI = Slovenia*/**; ZA = South Africa**; ES = Spain*/**;
SE = Sweden*; CH = Switzerland*/**; TH = Thailand**; TR = Turkey*/**; UA = Ukraine**;
AE = United Arab Emirates**; GB = United Kingdom*; US = United States of America; VN = Vietnam**

Note(s):
Countries outside the CB Scheme membership may also accept this report.
* Only applicable for Group Differences (if any). See attachment 1 for details.
** No National Differences Declared in CB Scheme

Germany, Denmark, Finland, United Kingdom, Israel, Republic of Korea, Sweden, Slovenia and Japan National differences to IEC 60950-1:2005 (Second Edition) + Am 1:2009 evaluated.

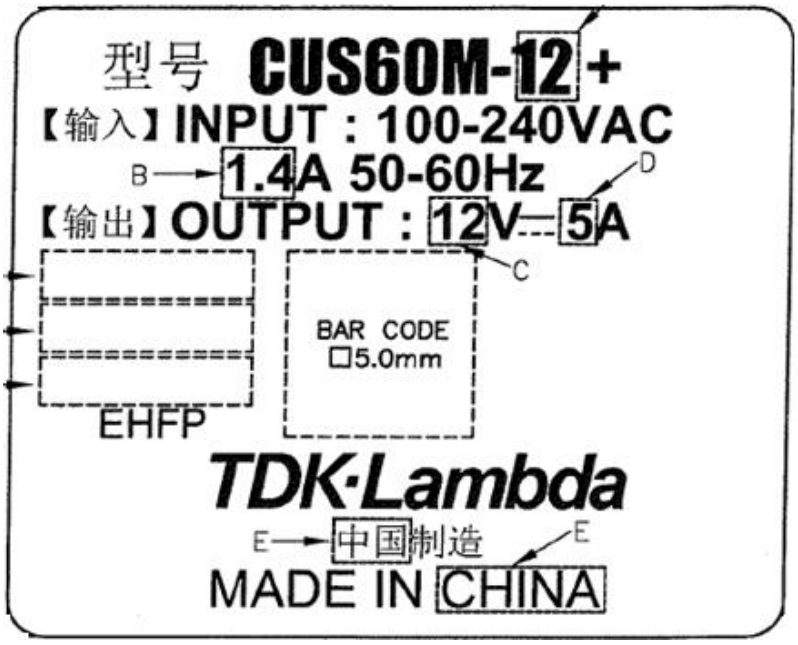
China, Switzerland, Spain, Ireland and Norway National differences to IEC 60950-1:2005 evaluated. National differences to J 60950-1(H27) evaluated.

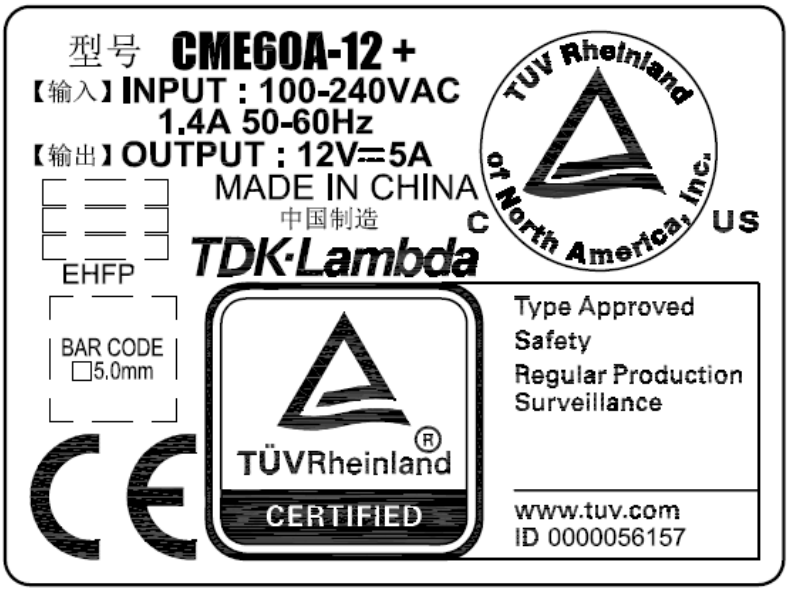
The product fulfils the requirements of
EN 60950-1:2006+A11+A1+A12+A2,
UL 60950-1:2007 R10.14 and
CAN/CSA C22.2 No. 60950-1-07+A1:2011+A2:2014.

Copy of marking plate

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

<Representative>





Remark: The rating labels of all models have the same design except for the model designation and input or output ratings.

Test item particulars..... :	See below
Equipment mobility.....:	[] movable [] hand-held [] transportable [] stationary [x] for building-in [] direct plug-in
Connection to the mains.....:	[x] pluggable equipment [x] type A [] type B [x] permanent connection [x] detachable power supply cord [] non-detachable power supply cord [] not directly connected to the mains
Operating condition.....:	[x] continuous [] rated operating / resting time:
Access location .....:	[] operator accessible [x] restricted access location
Over voltage category (OVC) .....:	[] OVC I [x] OVC II [] OVC III [] OVC IV [] other:
Mains supply tolerance (%) or absolute mains supply values .....:	±10%
Tested for IT power systems .....:	[x] Yes [] No
IT testing, phase-phase voltage (V) .....:	
Class of equipment .....:	[] Class I [] Class II [] Class III [x] Not classified
Considered current rating of protective device as part of the building installation (A) .....:	16 (20 for US/CSA)
Pollution degree (PD) .....:	[] PD 1 [x] PD 2 [] PD 3
IP protection class .....:	IPX0
Altitude during operation (m) .....:	Up to 5000
Altitude of test laboratory (m) .....:	Approx 50
Mass of equipment (kg) .....:	≅0.23kg (with chassis and cover) ≅0.14kg (without chassis and cover)
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.....:	2017-05-22
Date(s) of performance of tests .....:	2017-05-27 to 2017-06-30
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See ATTACHMENT #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :

☒ **Yes**

☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :

1. Wuxi TDK-Lambda Electronics Co., Ltd.
   No. 6 Xing Chuang Er Lu, Wuxi, Jiangsu 214028, P. R. China
2. Zhangjiagang Hua Yang Electronics Co., Ltd.
   Zhao Feng Industrial Zone, Leyu Town, Zhangjiagang, Jiangsu 215622, P. R. China
3. Sendan Electronics Mfg. Co., Ltd.
   1010 Habushin Nanto-shi, Toyama 939-1756 JAPAN
4. ALPS Logistics Facilities Co., Ltd.
   593-1 Nishi-Ohashi, Tsukuba-shi, Ibaraki, 305-0831, JAPAN
5. TDK-Lambda Corp. Nagaoka Technical Center
   2704-1 Settaya-machi, Nagaoka-shi, Niigata 940-1195, JAPAN

General product information:

The EUT is a component type switching mode power supplies intended for the earthed construction or non-earthed construction of information technology equipment.

- For earthed construction (Class I), the SMPS need to be reliably earthed and professionally installed and fixed with metal screws.
- For non-earthed construction (Class II), no earthing connection is required. The SMPS need to be fixed so, that it is insulated from any unearthed accessible conductive part by reinforced insulation.

Model CME60A-zzxxxxxxx is identical to model CUS60M-zzxxxxxxx except for model name.

All models are identical, except of the optional chassis, cover, turns of Transformer and the rating of some components which results in different output ratings. See Model List below for details.

For rating differences between the models see below tables:

Series Model	I/p voltage (Vac)	Freq (Hz)	I/p current (A)	Minimal output	Rated output (typical)	Maximum output
CUS60M-5 xxxxxxx CME60A-5 xxxxxxx	100-240	50-60	1.0	4.85Vdc	5Vdc	5.15Vdc
				6A	6A	5.83A
CUS60M-12 xxxxxxx CME60A-12 xxxxxxx	100-240	50-60	1.4	11.7Vdc	12Vdc	12.3Vdc
				5A	5A	4.88A
CUS60M-15 xxxxxxx CME60A-15 xxxxxxx	100-240	50-60	1.4	14.625Vdc	15Vdc	15.375Vdc
				4A	4A	3.9A
CUS60M-18 xxxxxxx CME60A-18 xxxxxxx	100-240	50-60	1.4	17.55Vdc	18Vdc	18.45Vdc
				3.35A	3.35A	3.27A

CUS60M-24 xxxxxxx CME60A-24 xxxxxxx	100-240	50-60	1.4	23.4Vdc	24Vdc	24.6Vdc
				2.5A	2.5A	2.44A
CUS60M-36 xxxxxxx CME60A-36 xxxxxxx	100-240	50-60	1.4	35.1Vdc	36Vdc	36.9Vdc
				1.68A	1.68A	1.64A
CUS60M-48 xxxxxxx CME60A-48 xxxxxxx	100-240	50-60	1.4	46.8Vdc	48Vdc	49.2Vdc
				1.25A	1.25A	1.22A
CUS60M-5/ADJ CME60A-5/ADJ	100-240	50-60	1.4	4.5Vdc	5Vdc	5.5Vdc
				6A	6A	5.45A
CUS60M-12/ADJ CME60A-12/ADJ	100-240	50-60	1.4	10.8Vdc	12Vdc	13.2Vdc
				5A	5A	4.55A
CUS60M-15/ADJ CME60A-15/ADJ	100-240	50-60	1.4	13.5Vdc	15Vdc	16.5Vdc
				4A	4A	3.64A
CUS60M-18/ADJ CME60A-18ADJ	100-240	50-60	1.4	16.2Vdc	18Vdc	19.8Vdc
				3.35A	3.35A	3.05A
CUS60M-24/ADJ CME60A-24/ADJ	100-240	50-60	1.4	21.6Vdc	24Vdc	26.4Vdc
				2.5A	2.5A	2.27A
CUS60M-36/ADJ CME60A-36/ADJ	100-240	50-60	1.4	32.4Vdc	36Vdc	39.6Vdc
				1.68A	1.68A	1.53A
CUS60M-48/ADJ CME60A-48/ADJ	100-240	50-60	1.4	43.2Vdc	48Vdc	52.8Vdc
				1.25A	1.25A	1.14A
Remark: Operating temp.: up to +70ºC (operating temperature depending on equipment's load, mounting position, for details refer to instruction manual).						

Additional Information

- The product is component type S.M.P.S., the overall compliance shall be investigated in the complete information technology equipment, in particular as:

  -Fire enclosure

  -Mechanical enclosure

  -Electrical enclosure

- Some components are **pre-certified**, which have been evaluated according to the relevant requirements of IEC 60950-1, are employed in this product. Their suitability of use has been checked according to subclauses 1.5.1 and 1.5.2.
- The product is a **component** intended for incorporation in information technology equipment, the overall compliance shall be investigated in the complete information technology equipment
- Tests were repeated with each alternative source of components with identical results unless otherwise specified.

Markings and Instructions

- The installation instruction contains instructions for connection to an IT power distribution system. (See subclause 1.7.2.4):
- Fuse Identification (See subclause 1.7.6): F1A/F1B : T2.0A 250Vac

The product also marked with:

CAUTION: FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

Definition of variable(s):

CUS60M-zzxxxxxxx; CME60A-zzxxxxxxx (zz = 5,12,15,18,24,36 or 48; xxxxxxx = A, U, ADJ, M, CO, SF, other alphanumeric character)

Note: Suffix options would be used shown below or used together.

Variable:	Range of variable:	Content:
zz	5, 12, 15, 18, 24, 36 or 48	Denotes for output voltage
xxxxxxx	A	Denotes for chassis & cover
	U	Denotes for U shape chassis
	ADJ	Denotes for output adjust
	M	Denotes for Molex connector
	CO	Denotes for PWB coating
	SF	Denotes for single fuse
	other alphanumeric character	For market purposes, no construction differences and no safety impact.

Abbreviations used in the report:

-Normal conditions	N.C.	-Single fault conditions	S.F.C
-Functional insulation	OP	-Basic insulation	BI
-Double insulation	DI	-Supplementary insulation	SI
-Between parts of opposite polarity	BOP	-Reinforced insulation	RI
-Short-circuited	s-c	-No component damage	NCD
-Open-circuited	o-c	-Component damage	CD
-Overloaded	o-l	-Test repeated, similar result	RT
-Internal protection operated	IP	-No indication of dielectric breakdown	NB
-Input	i/p	-Cheesecloth remained intact	NC
-Output	o/p	-Tissue paper remained intact	NT
-Constant temperatures were obtained	CT	-The unit can recover auto when removing the abnormal condition	RA

Indicate used abbreviations (if any)