



EMC TEST REPORT

EU EMC-DIRECTIVE 2014/30/EU

PROJECT NO.: 96161074

Registration NO.: SP1001GZ1612092

EN 60269-1:2007+A2:2014,

EN 61000-3-2:2014, EN 61000-3-3:2013

FUSE-LINK

ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.

Date of Report: December 12, 2016

Sapo Certification & Testing Laboratory Limited

Web: www.sapo.org.uk

E-mail: sapo@sapo.org.uk



SAPO CERTIFICATION & TESTING LABORATORY

Testing laboratory

Location

SAPO CERTIFICATION & TESTING LABORATORY LIMITED

CHANCERY HOUSE, CHANCERY LANE, LONDON, UNITED KINGDOM, WC2A 1QU
Web: www.sapo.org.uk E-mail: sapo@sapo.org.uk

Details of applicant

Name : ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.
ADD : NO.41-43, CHANGCHENG ROAD, LIUSHI, YUEQING, ZHEJIANG, CHINA

Details of manufacturer

Name : ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.
ADD : NO.41-43, CHANGCHENG ROAD, LIUSHI, YUEQING, ZHEJIANG, CHINA

Test item

Description of test item : FUSE-LINK
Type identification : NT00
Specification : 160A ,

Test Standards

EN 60269-1:2007+A2:2014, EN 61000-3-2:2014
EN 61000-3-3:2013

AUDIT INFORMATION:		
Description of Test	Standard No.	EN 60269-1:2007+A2:2014, EN 61000-3-2:2014 EN 61000-3-3:2013
Test Engineer by	Michael	Signature <i>Michael</i>
Reviewer by	Jack .H	Signature <i>Jack</i>
SAPO CERTIFICATION & TESTING LABORATORY LIMITED		

EN 60269-1:2007+A2:2014,
EN 61000-3-2:2014, EN 61000-3-3:2013



SAPO CERTIFICATION & TESTING LABORATORY

Test item particulars -- FUSE-LINK

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 : 2016-12-05
Date(s) of performance of tests : 2016-12-05~2016-12-12

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.

Test product information:

Type identification : NT00
Specification : 160A

Test Result:

Pass

FOR FURTHER DETAILS, PLEASE REFER TO THE FOLLOWING PAGES



SAPO CERTIFICATION & TESTING LABORATORY

Electro - Magnetic Compatibility

Test - Result

☒ 1st test

☐ test after modification

☐ production test

Test Emission / Immunity			Done	Test passed	Test failed
Emission	Emission requirements	EN 60269-1:2007	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Emission	Conducted Emission	EN 60269-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Emission	Radiated Emission	EN 60269-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Harmonics	Current Harmonics	EN61000-3-2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Flicker	Voltage Fluctuations	EN61000-3-3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Immunity	Immunity requirements	EN 60269-1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ESD	Radiated Immunity	EN61000-4-2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF-Field	Radiated Immunity	EN61000-4-3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Burst	Electrical Fast Transients	EN61000-4-4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Surge	Transients comm.&diff.mode	EN61000-4-5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
RF-com.mode	RF continues conducted	EN61000-4-6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Magn.-Field	Magn.-Field Immunity	EN61000-4-8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V-dips	Voltage dips and Interruption	EN61000-4-11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comment : The equipment under test was a sample device without active electronic elements (IC's)

Remarks : **Please take running production control**

Sapo can carry out running production test for you.

EN 60269-1:2007+A2:2014,
EN 61000-3-2:2014, EN 61000-3-3:2013



SAPO CERTIFICATION & TESTING LABORATORY

Test equipment utilized

Electro - Magnetic Compatibility

Radiated Emission Test Site: 966

966 Chamber Test Site G

No.	EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
01	EMI Test Receiver	R&S	ESCI	100005	18/07/2016	17/07/2017
02	Amplifier	HP	HP8447E	2945A02715	18/07/2016	17/07/2017
03	Antenna	Sunol Sciences Corporation	JB3	A021907	18/07/2016	17/07/2017
04	Cable	TIME MICROWAVE	LMR-400	N-TYPE04	18/07/2016	17/07/2017
05	System-Controller	CC-C-1F	MF7802080	N/A	N/A	N/A
06	Turn Table	EMCO	2081-1.21	N/A	N/A	N/A
07	Antenna Tower	CT	N/A	N/A	N/A	N/A
08	DECOUPLING NETWORK	FISCHER CUSTOM	F-201-DCN-5-6MM	12	18/07/2016	17/07/2017

Conducted Emission Test Site: 843

Conducted Emission Test Site G

No.	EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
09	EMI Test Receiver	R&S	ESCI	100005	18/07/2016	17/07/2017
10	LISN	AFJ	LS16	16010222119	18/07/2016	17/07/2017
11	LISN	messtec	AN3016	04/10040	18/07/2016	17/07/2017

Power Disturbance Test Site: 843 Chamber

No.	EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
12	EMI Test Receiver	R&S	ESCS30	100343	18/07/2016	17/07/2017
13	ABSORBING CLAMP	FCC	F-201-23mm	160	18/07/2016	17/07/2017
14	CABLE	TIME MICROWAVE	LMR-400	N-TYPE04	18/07/2016	17/07/2017

Power Harmonic & Voltage Fluctuation/Flicker Measurement (61000-3-2&3-3)

No.	EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
15	Harmonic & Flicker Tester	SCHAFFNER	NSG 1007-5-400	54789	18/07/2016	17/07/2017

EN 60269-1:2007+A2:2014,
EN 61000-3-2:2014, EN 61000-3-3:2013



SAPO CERTIFICATION & TESTING LABORATORY

EN 61000-3-2 & EN 61000-3-3
(POWER HARMONICS & VOLTAGE FLUCTUATION / FLICKER)

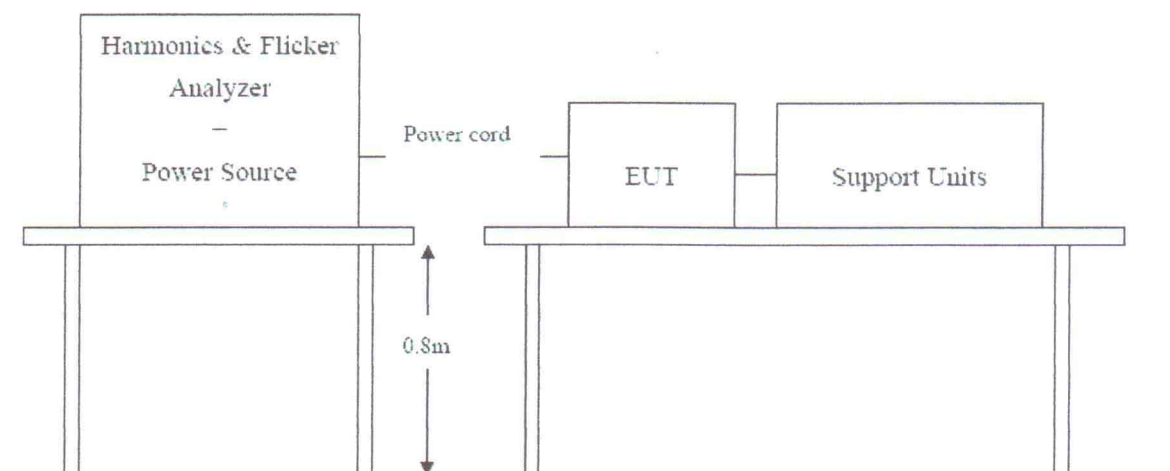
POWER HARMONICS MEASUREMENT

Port : NT00
Basic Standard : EN 61000-3-2:2014
Limits : CLASS B
Temperature : 24°C
Humidity : 55%

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : NT00
Basic Standard : EN 61000-3-3:2013
Limits : § 5 of EN 61000-3-3:2013
Temperature : 24°C
Humidity : 55%

Block Diagram of Test Setup:





SAPO CERTIFICATION & TESTING LABORATORY

Result:

Harmonics - Class-B per Ed. 2.2 (2016-12) (Run time)

EUT: NT00

Test category: Class-B per Ed. 2.2 (2016-12) (European limits) Test Margin: 100

Test date: 2016-12-09

Start time: 15:13:21 End time: 15:15:42

Test duration (min): 2.5

Comment: NT00

Customer: ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO., LTD.

Test Result: **Pass**

Source qualification: Normal

Current & voltage waveforms

Harmonics and Class B limit line European Limits

Test result: Pass Worst harmonic was #15 with 4.84% of the limit.



SAPO CERTIFICATION & TESTING LABORATORY

CURRENT TEST RESULT SUMMARY (RUN TIME)

EUT: NT00

Test category: Class-A per Ed. 2.2 (2016-12) (European limits)

Test date: 2016-12-09 Start time: 15:13:21 End time: 15:15:42

Test duration (min): 2.5 Data file name: H-1612092.vovgz_data

Comment: NT00

Customer: ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.

Test Result: **Pass** Source qualification: Normal

THC(A): 0.06 I-THD(%): 200.01 POHC(A): 0.008 POHC Limit(A): 0.251

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	1.080	0.1	0.001	1.620	0.08	Pass

VOLTAGE SOURCE VERIFICATION DATA (RUN TIME)

EUT: NT00

Test category: Class-A per Ed. 2.2 (2016-12) (European limits)

Test date: **2016-12-09** Start time: 15:13:21 End time: 15:15:42

Test duration (min): 2.5 Data file name: H-1612092.vovgz_data

Comment: NT00

Customer: ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.

Test Result: **Pass** Source qualification: Normal

Highest parameter values during test:

Voltage (Vrms): 380.19 Frequency(Hz): 50.00

I_Peak (Amps): 158.071 I_RMS (Amps): 158.204

I_Fund (Amps): 158.10 Crest Factor: 0.032

Power (Watts): 60.1911kW Power Factor: 0.99

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.240	0.312	50.59	OK



SAPO CERTIFICATION & TESTING LABORATORY

FLICKER TEST SUMMARY PER EN61000-3-3 (RUN TIME)

EUT: NT00

Test category: All parameters (European limits)

Test date: 2016-12-09 Start time: 3:41:12 PM End time: 3:54:17 PM

Test duration (min): 10

Comment: NT00

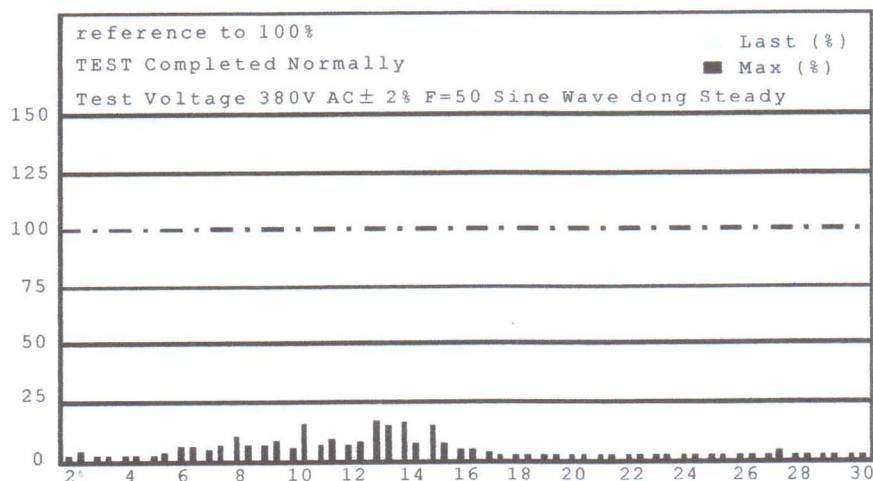
Customer: ZHEJIANG LIAOYUAN ELECTRIC APPARATUS CO.,LTD.

Test Result: Pass

Status: Test Completed

PSTI AND LIMIT LINE

EUROPEAN LIMITS



Time is too short for Plt plot

Parameter values recorded during the test:

Vrms at the end of test (Volt): 380.84

Highest dt (%): 0.00

Test limit (%): 3.30 Pass

Time(mS) > dt: 0.0

Test limit (mS): 500.0 Pass

Highest dc (%): 0.00

Test limit (%): 3.30 Pass

Highest dmax (%): 0.00

Test limit (%): 4.00 Pass

Highest Pst (10 min. period): 0.001

Test limit: 1.000 Pass

Highest Plt (2 hr. period): 0.001

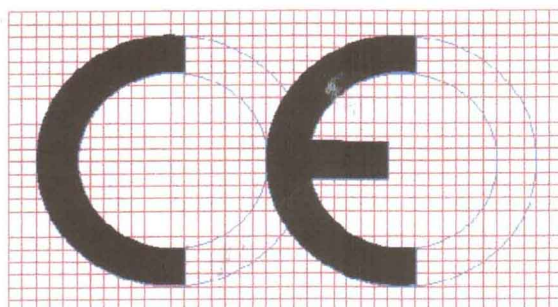
Test limit: 0.650 Pass



SAPO CERTIFICATION & TESTING LABORATORY

PRODUCT LABELING

CE Mark Label Specification



Min 5mm

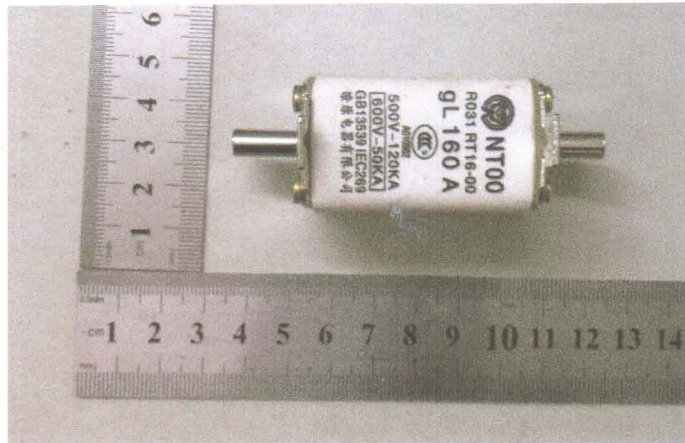
Specifications: Text is Black or white in color and is left justified. Labels are printed in indelible ink on permanent adhesive backing or silk-screened onto the EUT or shall be affixed at a conspicuous location on the EUT.





SAPO CERTIFICATION & TESTING LABORATORY

EUT PHOTOGRAPHS
NT00 160A



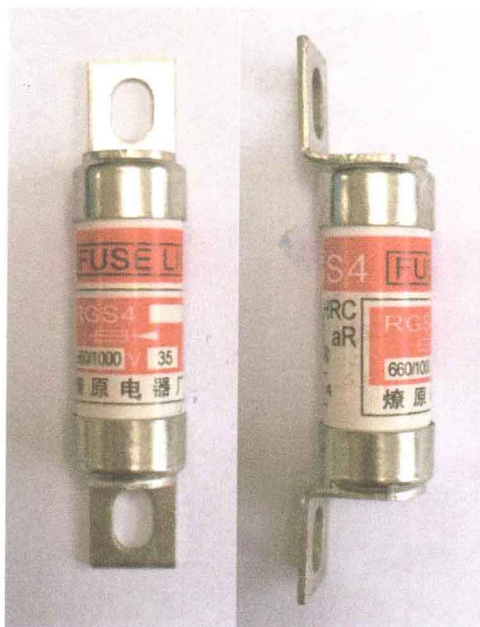
RGS11



RGS12



RGS4



R015
10*38;2-32A



R016
14*51;2-63A



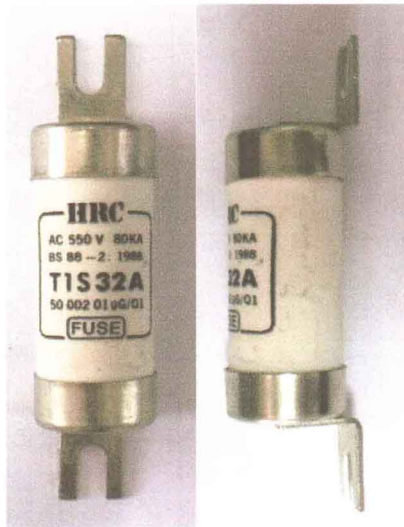


SAPO CERTIFICATION & TESTING LABORATORY

R016
22*58;30-100A



HRC-32



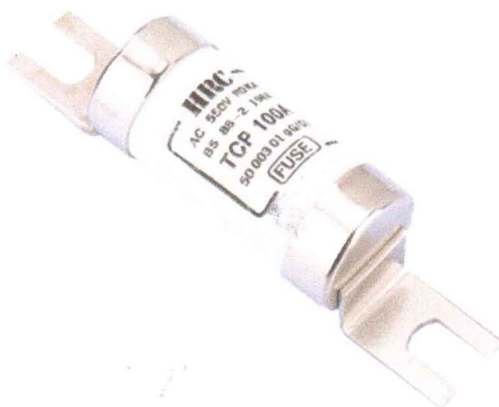
HRC-63



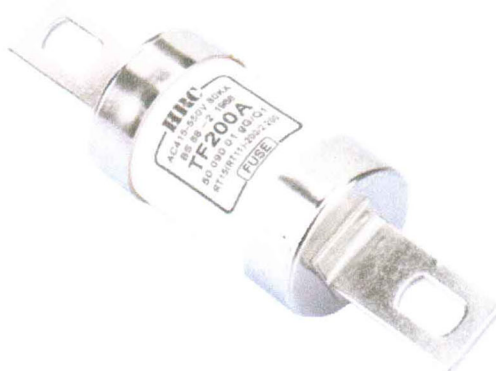


SAPO CERTIFICATION & TESTING LABORATORY

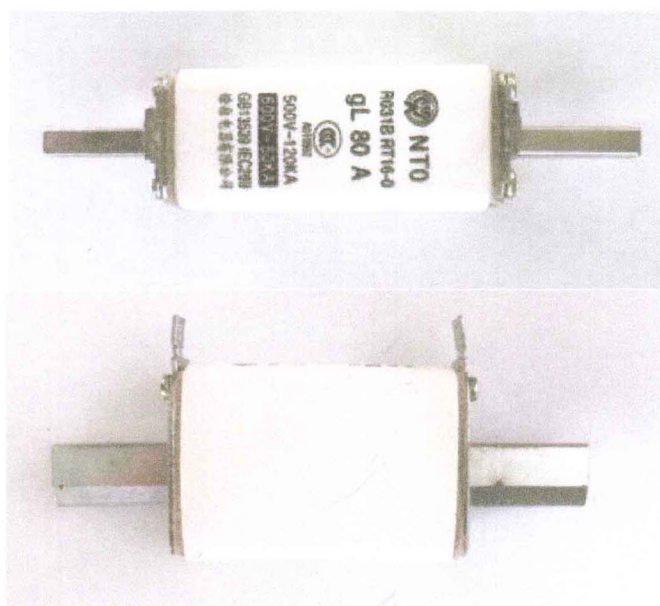
HRC-100



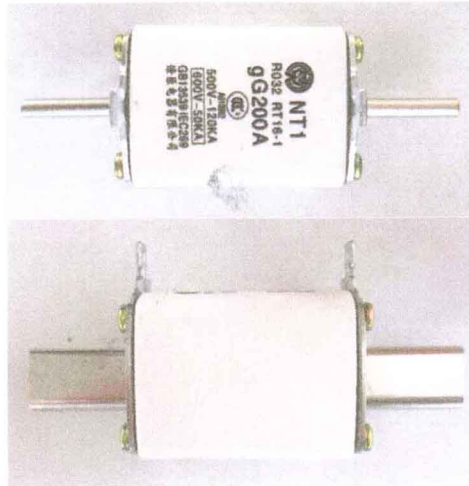
HRC-200



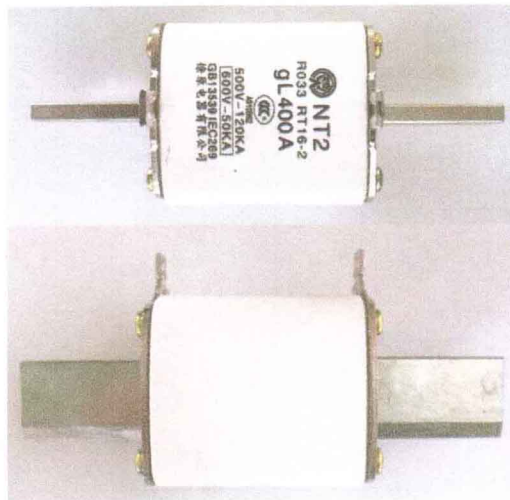
NT0 (NH0)
60-160A



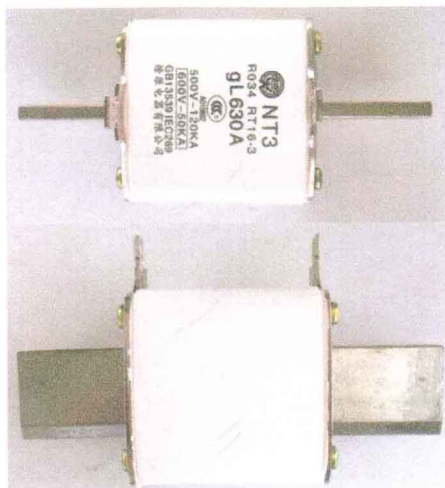
NT1 (NH1)
63-250A



NT2 (NH2)
200-400A



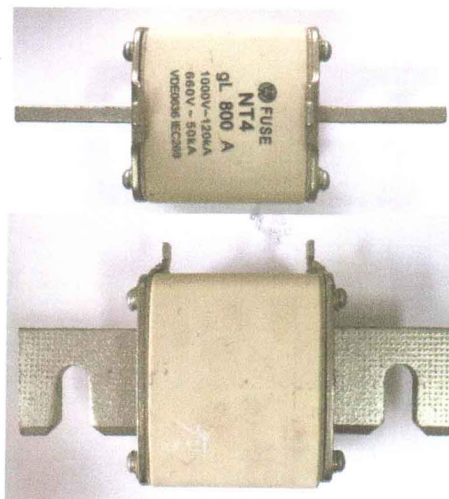
NT3 (NH3)
400-630A





SAPO CERTIFICATION & TESTING LABORATORY

NT4 (NH4)
630-1000A



EN 60269-1:2007+A2:2014,
EN 61000-3-2:2014, EN 61000-3-3:2013



SAPO CERTIFICATION & TESTING LABORATORY

Manufacturer/Approval holder Declaration

The following identical model(s):

R015, R016, HRC-32, HRC-63, HRC-100, HRC-200, NT00 (NH00) ,
NT0 (NH0) , NT1 (NH1) , NT2 (NH2) , NT3 (NH3) , NT4 (NH4) , RGS4 ,
RGS12, RGS11, RGS18, RGS19

Belong to the tested device:

Product description: **FUSE-LINK**

Model name: **NT00**

No additional models were tested.



DECLARATION

1. The test is sub-contracted to a laboratory which complies with the requirement of IOS/IEC 17025:2005.
2. The results only related to the items tested.
3. This report shall not be published as advertisement without the approval of SAPO.
4. This report shall not be copied partly without the written approval of SAPO.

** End of Report **