CENTRE OF TESTING SERVICE INTERNATIONAL

OPERATE ACCORDING TO ISO/IEC 17025

EMC TEST REPORT

TEST REPORT NUMBER : CNB3091224-05060-E

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao,
Guangzhou, China.

TEST REPORT

EN 61643-11:2002

Low-voltage surge protective devices -- Part 11: Surge protective devices connected to low-voltage power systems - Requirements and tests—Only EMC

Report Reference No.	CNB3091224-05060-E
Date of issue	30 December 2009
Testing Laboratory Name	**CENTRE OF TESTING SERVICE CO., LTD**
Address	Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China.
Testing location/ procedure	Full application of Harmonised standards ■
	Partial application of Harmonised standards □
	Other standard testing method □
Applicant's name.....	wenzhou tuoer electrical CO.,LTD
Address	qiligang industry,yueqing city,zhejiang
Test specification:	
Standard.....	**EN 61643-11:2002**
Test Report Form No.....	CTSEMC-1.0
TRF Originator.....	CENTRE OF TESTING SERVICE CO., LTD
Master TRF	Dated 2009-01
CENTRE OF TESTING SERVICE CO., LTD. All rights reserved.	
This publication may be reproduced in whole or in part for non-commercial purposes as long as the CENTRE OF TESTING SERVICE CO., LTD is acknowledged as copyright owner and source of the material. CENTRE OF TESTING SERVICE CO., LTD takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
Test item description.	surge protective device
Trade Mark.....	thor
Manufacturer	wenzhou tuoer electrical CO.,LTD
Model/Type reference.....	TRS1
Ratings	N/A
Result	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Quty Liu / File administrators	Jackson Zhang / Technique principal	Kevin Liang / Manager

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

EMC -- T E S T R E P O R T

Test Report No. : CNB3091224-05060-E	30 December 2009 Date of issue

Type / Model.....	TRS1
EUT.....	surge protective device
Applicant……	wenzhou tuoer electrical CO.,LTD
Address.....	qiligang industry,yueqing city,zhejiang
Telephone.....	+86-577-62677703
Fax.....	+86-577-62677709
Contact.....	Zheng xiaopeng
Manufacturer……	wenzhou tuoer electrical CO.,LTD
Address.....	qiligang industry,yueqing city,zhejiang
Telephone.....	+86-577-62677703
Fax.....	+86-577-62677709
Contact.....	Zheng xiaopeng
Test report holder……	wenzhou tuoer electrical CO.,LTD
Address.....	qiligang industry,yueqing city,zhejiang
Telephone.....	+86-577-62677703
Fax.....	+86-577-62677709
Contact.....	Zheng xiaopeng

Test Result according to the standards on page 3: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

TABLE OF CONTENTS

Description **Page**

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

1 TEST STANDARDS

The tests were performed according to following standards:

EN 61643-11: 2002 Low-voltage surge protective devices -- Part 11: Surge protective devices connected to low-voltage power systems - Requirements and tests—Only EMC

2 SUMMARY

2.1 GENERAL REMARKS

Date of receipt of test sample	25 December 2009
Testing commenced on	29 December 2009
Testing concluded on	29 December 2009

2.2 FINAL ASSESSMENT

The EMC requirements pertaining to the technical standards and tested operation modes are

■ - fulfilled.

□ - **not** fulfilled.

The equipment under test

■ - fulfils the EMC requirements cited on page 3.

□ - **does not** fulfil the EMC requirements cited on page 3.

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

3 EQUIPMENT UNDER TEST

3.1 Power supply system utilised

Power supply voltage	:	☐ AC 230V/50 Hz	☐ 115V/60Hz
		☐ 12 V DC	☐ 24 V DC
		☐ Other (Specified blank below)	■ N/A

3.2 Short description of the Equipment under Test (EUT)

Number of tested samples: **1**
Serial number: Prototype

3.3 EUT operation mode

The equipment under test was operated during the measurement under the following conditions:

☐ - Standby
☐ - Test programme (H - Pattern)
☐ - Test programme (colour bar)
☐ - Operating mode 2500 U/min. (1 cylinder)
☐ - Operating mode 1500 U/min. (> 1 cylinder)
☐ - Ignition on , Motor off
☐ - Speed 50 km/h
■ - Test program (customer specific)

Operation mode 1:On

The equipment under test was operated during the measurement under the following conditions: Test program (customer specific)

Emissions tests……: According to EN 61643-11, searching for the highest disturbance.

Immunity tests ……: According to EN 61643-11, searching for the highest susceptivity.

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

3.4 EUT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurement :

Name	:	/
M/N	:	/
S/N	:	/
Manufacturer	:	/
Power Cord	:	/
Certificate	:	/

☐ - unscreened power cables

☐ - customer specific cables

3.5 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

3.6 Definition related to the performance level

■ based on the used product standard
☐ based on the declaration of the manufacturer, requestor or purchaser

Criterion A:
Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

Criterion B:
Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

Criterion C:
Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Criterion D:
Definition: loss of function or degradation of performance, which is not recoverable, owing to damage to hardware or software, or loss of data:

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China

Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406

4.2 Test facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L3394

CENTRE OF TESTING SERVICE CO., LTD has been assessed and proved to be in compliance with CNAS-CL01: 2006 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories.

IC-Registration No.: 8374

The 3m Alternate Test Site of CENTRE OF TESTING SERVICE CO., LTD has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 8374 on June 24, 2009 .

FCC-Registration No.: 971995

CENTRE OF TESTING SERVICE CO., LTD, EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration No.971995, July 21, 2009.

4.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 °C
Humidity:	25~75 %
Atmospheric pressure:	86~106 kPa

4.4 Definitions of symbols used in this test report

■ - The black square indicates that the listed condition, standard or equipment is applicable for this report.

□ - The empty square indicates that the listed condition, standard or equipment is **not** applicable for this report.

4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the CTS quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.6 Measurement Uncertainty

Test Item	Frequency Range	Uncertainty	Note
Conduction disturbance	150kHz~30MHz	±1.22dB	(1)
Power disturbance	30MHz~300MHz	±1.38dB	(1)
Radiation emission (3m)	30MHz~300MHz	±3.14dB	(1)
	300MHz~1000MHz	±3.18dB	(1)

(1).This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

4.7 Test Description

4.7.1 Description of Standards and Results

EMISSION(EN 61643-11:2002)			
Description of Test Item	**Standard**	**Limits**	**Results**
Conducted disturbance at mains terminals	EN 55014-1:2006	--------	N/A
Conducted disturbance at load port	EN 55014-1:2006	--------	N/A
Power disturbance	EN 55014-1:2006	--------	N/A
Harmonic current emissions	EN 61000-3-2:2006	Class A	N/A
Voltage fluctuations & flicker	EN 61000-3-3:1995 +A1:2001+A2:2005	--------	N/A
IMMUNITY (EN 61643-11:2002)			
Description of Test Item	**Basic Standard**	**Performance Criteria**	**Results**
Electrostatic discharge (ESD)	IEC 61000-4-2:1995 +A1:1998+A2:2000	B	N/A
Radio-frequency, Continuous radiated disturbance	IEC 61000-4-3:2008	A	N/A
Electrical fast transient (EFT)	IEC 61000-4-4:2007	B	N/A
Surge (Input a.c. power ports)	IEC 61000-4-5:2005	B	PASS
Radio-frequency, Continuous conducted disturbance	IEC 61000-4-6:2008	A	N/A
Voltage dips, Interruptions	IEC 61000-4-11:2004	C	N/A
N/A is an abbreviation for Not Applicable.			

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

5 TEST CONDITIONS AND RESULTS

5.1 Surge

For test instruments and accessories used see section 6 part **6.9**.

5.1.1 Description of the test location

Test location :	Test location no. 2
Power supply:	N/A
Test condition:	Ambient Temperature: 20℃, Humidity:50%
Date of test :	29 December 2009
Operator :	**Raymond**

5.1.2 Severity levels of surge

5.1.2.1 Severity level: Line to line: ±2KV

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
X	Special

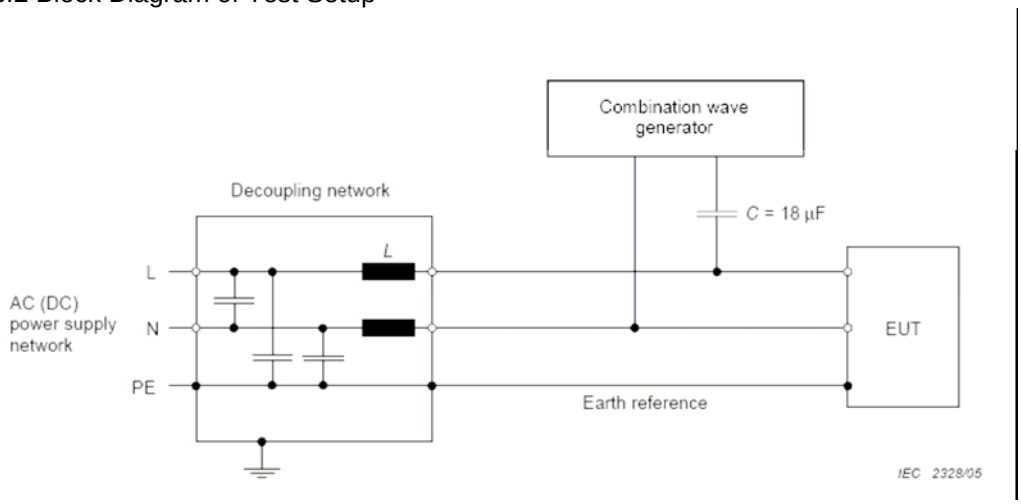
5.1.2.2 Performance Criterion: **B**

5.1.3 Description of the test set-up

5.1.3.1 Operating Condition

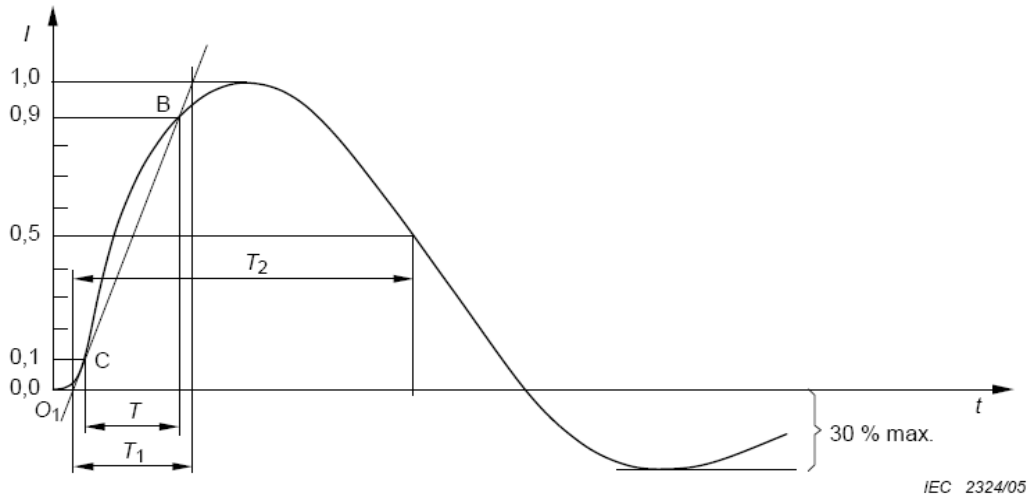
The EUT is engraving during the test, and the results of the maximum emanation are recorded

5.1.3.2 Block Diagram of Test Setup



5.1.4 Test specification:

Pulse amplitude-Power line sym.: Source impedance: 2 Ω + 18µF	■ 0.5 kV ■ 1 kV ■ 2 kV ☐ 4 kV
Pulse amplitude-Power line unsym: Source impedance: 12 Ω + 9µF	☐ 0.5 kV ☐1 kV ☐ 2 kV ☐ 5 kV
Number of surges:	■ 5 Surges/Phase angle
Phase angle:	■ 0 ° ■ 90 ° ■ 180 ° ■ 270 °
Repetition rate:	■ 60 s
Polarity:	■ positive ■ negative



Front time: $T_1 = 1{,}25 \times T = 8\ \mu s \pm 20\ \%$
Time to half-value: $T_2 = 20\ \mu s \pm 20\ \%$

5.1.5 Coupling points

Cable description:	AC power line: L+N
Screening:	☐ screened ■ unscreened
Status:	☐ passive ■ active
Signal transmission:	■ analogue ☐ digital
Length:	■ 1.5 m

5.1.6 Test result

The requirements are **Fulfilled** Performance Criterion : **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn See Reverse For Terms And Conditions of Service

6 USED TEST EQUIPMENT

6.1

Radiated Emission (Electrical field)					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100868	2008/12
2	Biconical Antenna	ROHDE & SCHWARZ	HK116	100221	2008/12
3	Log per Antenna	ROHDE & SCHWARZ	HL223	100226	2008/12
4	Log per Antenna	ROHDE & SCHWARZ	HL050	100186	2008/12
5	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

6.2

Power Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESVS10	842885/001	2008/12
2	Absorbing clamp	ROHDE & SCHWARZ	MDS 21	03466	2008/12
3	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

6.3

Conducted Disturbance					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI Test Receiver	ROHDE & SCHWARZ	ESHS10	842884/012	2008/12
2	Artificial Mains	ROHDE & SCHWARZ	ESH3-Z5	832479/025	2008/12
3	Pulse Limiter	ROHDE & SCHWARZ	ESHSZ2	100301	2008/12
4	EMI Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

6.4

Harmonic Current					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	HAR1H01B	HAR1000-48	2008/12

6.5

Voltage fluctuation and Flicker					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Harmonic And Flicker Analyzer	EMC Partner	HAR1H01B	HAR1000-48	2008/12

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

6.6

Electrostatic Discharge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	ESD Simulator	Schlöder	SESD 200	0302016	2008/12

6.7

RF Field Strength Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMY 01	843215/014	2008/12
2	AMPLIFIER	KALMUS	713FC	7385-1	2008/12
3	EMS Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

6.8

Electrical Fast Transient/Burst					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12
2	Coupling Clamp	EMC Partner	SFT 410	0302015	2008/12

6.9

Surge					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

6.10

Conducted Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	RF generator / amplifier	Schlöder	CDG 6000	HU906007	2008/12
2	CDN	Schlöder	CDN M3	A3003008	2008/12
3	CDN	Schlöde	CDN T2	A3010005	2008/12
4	EM injection clamp	Liithi	EM101	35670	2008/12
5	EMS Test Software	ROHDE & SCHWARZ	ESK1	N/A	2008/12

6.11

Power Frequency Magnetic Field Susceptibility					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	Power frequency mag-field generator System	EM TEST	EMS61000-8K	409001	2008/12

6.12

Voltage Dips					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

6.13

Voltage Short Interruptions					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMC test system Transient-1000	EMC Partner	TRA1H01B	HAR1000-78	2008/12

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn

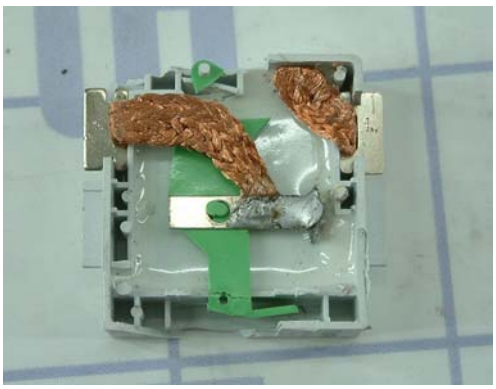
7 External and Internal Photos of the EUT

External view-front

External view-top

External view-side

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn See Reverse For Terms And Conditions of Service



Internal view

CENTRE OF TESTING SERVICE CO., LTD.
Building F, Dachuang industrial park, No.379, Zhongshan Dadao, Guangzhou, China
Tel：+86-20-85543113 (32 lines) Fax：+86-20-38780406
Complaint line：+86-20-85533471 E-mail：cts@cts-lab.com.cn