TEST REPORT
IEC 61010-2-032 / EN 61010-2-032
Safety requirements for electrical equipment for measurement, control, and laboratory use
Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement

Report Reference No. ..... :	GZ09010112-2	
Compiled by (+ signature) ..... :	Spark He	Spark
Approved by (+ signature) ..... :	Justin He	
Date of issue ..... :	2 Jun 2009	

CB Testing Laboratory ..... :	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
Address ..... :	Block E, No.7-2 Guang Dong Software Science Park, Caipin Road, Guangzhou Science City, GETDD, Guangzhou, China
Testing location/procedure ..... :	CBTL ☒ SMT ☐ TMP ☐
Address ..... :	Same as above
Applicant's name ..... :	Precision Mastech Enterprises Co.
Address ..... :	Room 1708-1709, Hewlett Centre, 54 Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong
Test specification:	
Standard ..... :	IEC 61010-2-032: 2002 (Second Edition), EN 61010-2-032: 2002
Test procedure ..... :	LVD
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61010_2_032B
TRF Originator ..... :	Intertek Semko AB
Master TRF ..... :	2004-12

Test item description ..... :	MS2203: Three Phase Digital Power Clamp Meter MS2205: Harmonic Power Clamp Meter
Trade Mark ..... :	MASTECH
Manufacturer ..... :	Dongguan Huayi Mastech Co., Ltd.
Model/Type reference ..... :	MS2203, MS2205
Ratings ..... :	4×1,5V AA, 600 V, CAT III

Copy of marking plate and summary of test results (information/comments):

Refer to report: GZ09010112-1

Summary of testing:

The apparatus comply with IEC 61010-2-032: 2002, the report should be read in conjunction with report No.: GZ09010112-1 dated 2 Jun 2009.

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Test item particulars		
Type of item tested	:	Measurement
Description of equipment function	:	MS2203: measure for AC voltage, AC current, power of 3-phase 3-wire circuit, power of 3-phase 4-wire circuit, single-phase circuit; MS2205: measure for power, voltage, current, peak value, phase, frequency, power factor, phase angle and reaction factor of single-/three-phase circuit.
Type of CURRENT SENSOR	:	Type A
Protection class	:	II
Measurement category	:	CAT III 600 V
Environmental rating	:	extended (specify): 0 - 40℃
Operating conditions	:	continuous
Marked degree of protection to IEC 60529	:	N/A
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	:	7 Jan 2009
Date (s) of performance of tests	:	7 Jan 2009 – 30 Apr 2009
General remarks:		

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The test results presented in this report relate only to the object tested.
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"(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 comma is used as the decimal separator.
List of test equipment must be kept on file and available for review.
When determining for test conclusion, measurement uncertainty of tests has been considered.
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The test report only allows to be revised only within the report defined retention period unless standard or regulation was withdrawn or invalid.

This test report is intended for the investigation of HAND-HELD and hand-manipulated CURRENT SENSORS for electrical test and measurement to be used in conjunction with the test report for IEC 61010-1: 2001 (Part 1, General Requirements), where test results are documented in test data sheets Form A.xx.

General product information:

The current sensors are integral part of MS2203 and MS2205.

	TABLE: 1 - Documents attached to this report	
Document No.	Document description	Page Numbers
None		

Intertek Testing Services Shenzhen Ltd. Guangzhou Branch
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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict
5	Marking and documentation		P
5.1.2	Identification		P
5.1.2 aa)	1) If designed for specific equipment it is clearly indicated or	For general use	N/A
	If information only in documentation, marked with symbol 14		N/A
	2) Type A CURRENT SENSOR marked with symbol 102		P
	3) Type B and C CURRENT SENSORS marked with symbol 101		N/A
	The marking above is adjacent to any CAT marking		P
5.1.5.101	Voltage and current RATINGS of jaws		P
	RATED circuit to earth voltage for uninsulated conductor		P
	Nature is marked unless valid for both AC and DC		N/A
	Marking of CAT adjacent voltage		P
	Value and nature of maximum rated current	1000 A	P
5.4.4	Equipment operation		P
5.4.4 a)	Identification of operating controls and their use		P
5.4.4 b)	Instructions for connecting to accessories and other equipment		P
	indication of suitable accessories and detachable parts		P
5.4.4 c)	Limits of intermittent operation	Continuous	N/A
5.4.4 d)	Explanation of safety related symbols used		P
5.4.4 e)	Instructions for replacement of replaceable parts		P
5.4.4 f)	Instructions for cleaning and decontamination		P
5.4.4 g)	Instructions for the application and removal of the CURRENT SENSOR		P
5.4.4 h)	Instructions to de-energize or adopt safe procedures when working on hazardous live installations with type B and C CURRENT SENSORS	Type A current sensor	N/A
5.4.4 i)	Warning to use individual protective equipment if working in installations with ACCESSIBLE HAZARDOUS LIVE parts	No such equipment	N/A
5.4.4 j)	Instructions about the tactile indication		P

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict
5.4.4 k)	A warning not to use FLEXIBLE CURRENT SENSOR if the contrasting inner colour is visible		N/A
5.4.4 l)	A warning not to use the sensor if the wear indicator in the jaw is visible		N/A
	A statement that if used in a manner not specified by the manufacturer, safety may be impaired		P
6	Protection against electric shock		P
6.1.2	Exceptions		N/A
6.1.2 aa)	Conductive parts within a jaw opening, provided that they meet 6.9.101		P
6.7	CLEARANCES and CREEPAGE DISTANCES		P
6.7.3	Circuits other than MAINS CIRCUITS		P
6.7.3.1	General		P
6.7.3.1 c)	Reduction of CLEARANCES by homogenous construction not permitted		N/A
6.9	Constructional requirements for protection against electric shock and prevention of short-circuits		P
6.9.101	Insulation requirements for jaws and jaw openings		P
6.9.101.1	General		P
	Tests performed after pre-treatment		P
6.9.101.2	Pre-treatment of the JAW OPENING		P
	Procedure used		P
6.9.101.3	Protection against touching the HAZARDOUS LIVE conductor		P
	Type A CURRENT SENSORS have barrier or tactile indicator		P
	Cover at least 50% of the perimeter		P
	Extend along two opposite sides		P
	CLEARANCE and CREEPAGE meet the requirements for DOUBLE or REINFORCED INSULATION	s. Form A.5 and A.13	P
6.9.101.4	HAND-HELD or hand-manipulated parts		P
	Separated by DOUBLE or REINFORCED INSULATION from:		P
	- ACCESSIBLE magnetic circuit		N/A
	- HAZARDOUS LIVE conductor		P
	- output and input circuit and their leads		N/A

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict
6.9.101.5	Insulation of a flexible CURRENT SENSOR		N/A
	Provided with wear indicator		N/A
	DOUBLE or REINFORCED INSULATION when new		N/A
	At least BASIC INSULATION when reached the wear indicator		N/A
	If not provided with wear indicator, DOUBLE or REINFORCED INSULATION provided after typical lifetime wear		N/A
	Treatment used.....:		N/A
6.9.101.6	Pull test for endcaps of flexible CURRENT SENSORS		N/A
	Force used .....:		N/A
	Displacement measured.....:		N/A
	Repeated test, if applicable .....:		N/A
	No damage		N/A
	CLEARANCE and CREEPAGE not have been reduced below the limits of 6.7.4		N/A
	Dielectric strength test acc. to 6.8		N/A
6.9.101.7	Protection against short-circuits caused by JAWS and JAW OPENINGS		P
	Enclosure provides at least BASIC INSULATION in closed position	s. Form A.5 and Form A. 13	P
	Dielectric strength test acc. to 6.8	s. Form A.14	P
	Type A and B CURRENT SENSORS have additional protection providing BASIC INSULATION during insertion and removal	s. Form A.13	P
	Dielectric strength test acc. to 6.8	s. Form A.14	P
8	Mechanical resistance to shock and impact		P
8.1.2	Dynamic test		P
	Test on 3 samples		P
	If RATED below 2°C, cooled before test	0℃	P
	Dielectric strength test acc. to 6.8 without humidity preconditioning	s. Form A.14	P
14	Components		N/A
14.101	Signal and measuring leads meet 61010-031		N/A

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict
16	Test and measurement equipment		N/A
16.101	CURRENT SENSORS with internal current transformers		N/A
	Protection against hazard caused by high voltage generated during interruption		N/A

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict

6	**TABLE: Protection against electric shock - Block diagram of system Form A.5**	P

Refer to report: GZ09020692-1

Pollution degree ..... : 2 | Measurement category (overvoltage category) . : III | P

Location or description	Insulation type (NOTE 1)	Maximum working voltage (NOTE 2)	CREEPAGE DISTANCE (NOTE 3) PWB mm	CTI	Other mm	CTI	CLEARANCE (NOTE 3) mm	Test voltage (NOTE 2) V	Comments

NOTE 1 – Type of insulation:
BI = BASIC INSULATION
DI = DOUBLE INSULATION
PI = PROTECTIVE IMPEDANCE
RI = Reinforced INSULATION
SI = Supplementary INSULATION

NOTE 2 - Types of voltage
Peak impulse test voltage (pulse)
r.m.s.
d.c.
peak

NOTE 3 - INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) or POLLUTION DEGREES which differ from these should be shown under "Comments".

Supplementary Information:

Refer to report GZ09010112-1

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IEC 61010-031			
Clause	Requirement + Test	Result – Remark	Verdict

6.7	**TABLE: CLEARANCES and CREEPAGE DISTANCES** **Form A.13**	P
6.9.101	Insulation for JAWS and JAW OPENING	P
8	Mechanical resistance to shock and impact	P

Location (see Form A.5)	Measured (initial – 6.7)		Verdict	Mechanical tests (note)					Test at max. RATED ambient (10.5.1)	Measured after test (if required)		Verdict	Comments
	CREEPAGE DISTANCE mm	CLEARANCE mm		Applied force (6.7) N	Rigidity (8.1) Static	Rigidity (8.1) Dynamic	Drop (8.2) Normal	Drop (8.2) Hand-held/ Plug-in		CREEPAGE DISTANCE mm	CLEARANCE mm		

NOTE – Refer to Form A.14 for dielectric strength tests following the above tests.

Remark: refer to report GZ09010112-1

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict

6.8	**TABLE: Dielectric strength tests**	**Form A.14**	P
4.4.4.1 b)	Conformity after application of fault conditions[1]		P
6.9.101.3	Protection against touching the HAZARDOUS LIVE conductor		P
6.9.101.4	HAND-HELD or hand-manipulated parts		P
6.9.101.5	Insulation of a flexible CURRENT SENSOR		N/A
6.9.101.6	Pull test for endcaps of flexible CURRENT SENSORS		N/A
6.9.101.7	Protection against short-circuits caused by the JAWS and JAW OPENING		P
8.1.2	Dynamic test		P
[1] Record the fault, test or treatment applied before the dielectric strength test			
	Test site altitude .....:	Up to 2000 m	—
	Test voltage correction factor (see Table 10)....:	--	—

Location or references from Form A.5	Clause or sub-clause	Humidity Yes/No	Working voltage V	Test voltage r.m.s./peak/d.c V	Comments	Verdict

Supplementary information:

Refer to report GZ09010112-1

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IEC 61010-2-032			
Clause	Requirement + Test	Result - Remark	Verdict

16.1	**TABLE: Current measuring circuits** **Form A.31**	N/A
16.101	Current sensors with internal current transformers	N/A
These tests are performed with all types and models of current transformers without internal protection, and which are specified by the manufacturer for use with the equipment		
a) Current transformers		

Type/Model	RATED current A	Test current A	Interrupt Yes / No	Verdict	Comments

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