

PRODUCT SAFETY REVIEW

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Issue A
25 February 2013

MICOM TEST BLOCK P991

SHORT PRODUCT SAFETY REVIEW LVDR130225

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SUMMARY/REVIEW FINDINGS:

- Product compliant with the essential requirements of Low Voltage directive 2006/95/EC.

CONFIRMATION OF PROTECTION REQUIREMENTS:


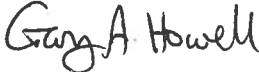
- European Low Voltage Directive 2006/95/EC, demonstrated by reference to EN 60255-27:2005 (incorporating corrigendum March 2007), down to zero volts.
- EC Directive 99/5/EC on R&TTE via compliance with Low Voltage Directive 2006/95/EC down to zero volts and assuming compliance with EMC Directive 2004/108/EC.
- EC Directive 94/9/EC on ATEX for equipment and protective systems intended for use in potentially explosive atmospheres, compliance via EC Type Examination of equipment and Quality Assurance of Manufacturing via Notified Body to:
EN 60079-7:2007, EN 60079-14:2003 and EN 80079-34:2011.

▼ ***If the product is a module or board that can be inserted into an ATEX listed product, then ATEX compliance shall be re-assessed for each ATEX listed product that can accommodate this module or board.***

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Title	Signature*	Name	Date
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Certification Manager		Gary Howell	26/02/13

**Signature indicates agreement with this report*

*Note: The content of this report is dependent upon the information and models supplied to IEDC-L.
IEDC-L are not responsible for ensuring that the information and models supplied are the latest versions.*

VERSION CONTROL

Issue	Author(s)	Reason for change	Date
A	Alan Trow	Initial Issue	26/02/13

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1 INTRODUCTION, MODELS AND TERMS OF REFERENCE

Operation of the P991 test block with the P992 multi-finger test plug ensures automatic shorting of all the current transformer circuits connected to the P991 before allowing access to the relays.

This prevents open circuiting of current transformers and the consequential unwanted generation of dangerously high voltages.

This report examines contact bounce in the test block during rapid extraction of the test plug and any subsequent effects in terms of voltage developed across the test block contacts due to voltages generated by open circuit current transformers.

Model No.	Part Number	Description
P991	-	MiCOM Test Block
P992	-	MiCOM Test Plugs

2 PRODUCT SAFETY REVIEW HISTORY

Review No.	Date	Major/Minor	Items or Model(s) Covered	All Actions complete.
LVDR0036A	16/01/01	Major	P990	Yes

A Minor review should reference a major review where applicable.

3 STANDARDS REFERENCED

Document No.	Issue	Document Name
EN 60255-27	2005 + 2007 Corrigendum	Measuring relays and protection equipment – Part 27: Product safety requirements
EN 60664-1	2007	Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests.

4 ITEM(S) ASSESSED IN THIS REVIEW

4.1 PCB / MODULE SUB ASSEMBLIES

*Module or PCB Ref. No.	PCB Part No	Reviewed PCB Design Suffix	Latest PCB Design Suffix	Brief functional description
MiCOM Multi finger Test Plug	P991	-	G	Test Block

*Module or PCB Ref. No.	PCB Part No	Reviewed PCB Design Suffix	Latest PCB Design Suffix	Brief functional description
MiCOM Test Block	P992	-	H	Multi Finger test Plug

4.2 ASSEMBLY / MECHANICAL DRAWINGS REFERENCED

Module/ PCB Ref. No.	Drawing type/reference number	Issue/date
P991	Assembly Drawing: GN0079-1.pdf	G 20/02/13
P992	Assembly Drawing: GN0080-1.pdf	H 03/03/05

4.3 PRODUCT CLAIMS

- Class I protection from electric shock (Basic Insulation and earthed accessible metal parts)
- Overvoltage Category III (2kV dielectric withstand, 5kV peak impulse)
- Pollution Degree 2

5 CASE(S) USED IN REVIEW

IEDC-L Store Number	Model No.	Case Size	Description
0068	P992	10TE	MiCOM Test Block
0069	P991	10TE	MiCOM Multi finger Test Plug

6 CONCLUSION

It was observed that during rapid extraction of the test plug the contacts in the test block experienced contact bounce for about 4ms. The concern is what voltage could develop across the test block contacts due to an open circuit current transformer condition during this contact bounce period. A 200Vdc and 400Vdc test was performed on the test block whilst the test plug was rapidly extracted to monitor (with an oscilloscope) the effect on the contacts in the test block.

The highest voltage measured during the 250 shots at each voltage of 200Vdc and 400Vdc was 132.8Vdc. (see Appendix B for Test Results). This implies that during the period of contact bounce the conductive arc across the contact air-gap is suppressing the voltage and ensuring that dangerous voltages are not developed across the bouncing contacts.

There is an improbable risk of voltages developing that are high enough to break down insulation on equipment wiring during contact bounce and there is no danger to operators since they have no access to the test block contacts (as these are back of panel) and the operator hand contact is on the extracted test plug which is withdrawn from the test block and so is at zero voltage.

APPENDIX A - PRODUCT SAFETY REVIEW ACTIONS

Action No.	Section No. Review	Actions identified/relevant information	Person Actioned	Agreed action ¹ Required (R) Future (F)	Progress	Progress Review Date	Action Status (O) Outstanding (O) Complete (C)
1.		No product safety actions found					
2.							
3.							
4.							
5.							
6.							
7.							

Note: Product release will not be sanctioned until all required (R) actions have been completed.

APPENDIX B – EXTRACTION TEST

The sample P991 (Certification Lab reference IEDC-L0068) was mounted in the portable 19" rack and connected to an Elektro-Automatik EA-PS 8400-70 (TOGA number Cert-910-021) in series with a 1.8kΩ resistor to ensure a current of 0.167A flowed at 300Vdc (maximum rated load of P991 is 50W). The voltage across the pair of contacts being tested (terminals 5 and 6) was monitored using a Tektronix TDS 744A oscilloscope (TOGA number Cert-131-002). The corresponding terminals of the P992 (Certification Lab reference IEDC-L0069) were shorted together to ensure a current flowed through the P991 with the P992 inserted and removed. The peak voltage created when the P992 was extracted from the P991 was recorded.

¹ R = Required action, F = Future action which may be implemented at the same time as other minor actions not significantly affecting product safety

P991/2 Extraction Tests

Shot	200V	400V	Shot 25	Shot 50	Shot 75	Shot 100			
1	48.8	48.0	26	64.8	52.0	31.2	52.8	42.4	50.4
2	53.6	57.6	27	44.0	49.6	33.6	74.4	35.2	49.6
3	65.6	60.0	28	54.4	73.6	54.4	52.0	33.6	52.0
4	53.6	57.6	29	46.4	67.2	38.4	125.6	32.8	51.2
5	46.4	47.2	30	40.8	69.6	40.0	56.8	35.2	60.8
6	33.6	90.4	31	29.6	64.8	38.4	80.0	41.6	40.0
7	52.0	71.2	32	47.2	55.2	40.0	53.6	30.4	61.6
8	41.6	76.8	33	60.0	76.8	56.8	58.4	33.6	55.2
9	31.2	75.2	34	66.4	68.8	47.2	70.4	40.8	44.8
10	32.0	54.4	35	72.0	45.6	36.8	53.6	35.2	69.6
11	38.4	60.8	36	60.8	78.4	43.2	64.8	29.6	54.4
12	33.6	73.6	37	64.0	71.2	28.0	52.8	56.0	63.2
13	44.0	60.8	38	58.4	54.4	30.4	72.8	38.4	66.4
14	40.8	80.8	39	64.0	49.6	38.4	48.0	40.0	58.4
15	44.0	67.2	40	76.0	67.2	38.4	68.0	32.8	47.2
16	50.4	59.2	41	132.8	46.4	54.4	56.8	44.0	62.4
17	46.4	65.6	42	88.8	58.4	43.2	64.8	40.0	46.4
18	35.2	76.8	43	66.4	51.2	30.4	54.4	16.8	64.0
19	29.6	64.8	44	68.0	54.4	34.4	70.4	52.0	53.8
20	34.4	60.0	45	64.8	45.6	38.4	49.6	44.8	54.4
21	35.2	88.8	46	92.0	55.2	44.8	61.6	34.4	57.6
22	56.0	51.2	47	82.4	57.6	30.4	71.2	40.8	68.8
23	39.2	56.8	48	83.2	44.8	34.4	40.0	42.4	46.4
24	30.4	68.8	49	52.8	44.0	40.0	43.2	36.8	48.8
					65.6	35.2	45.6	46.4	63.2

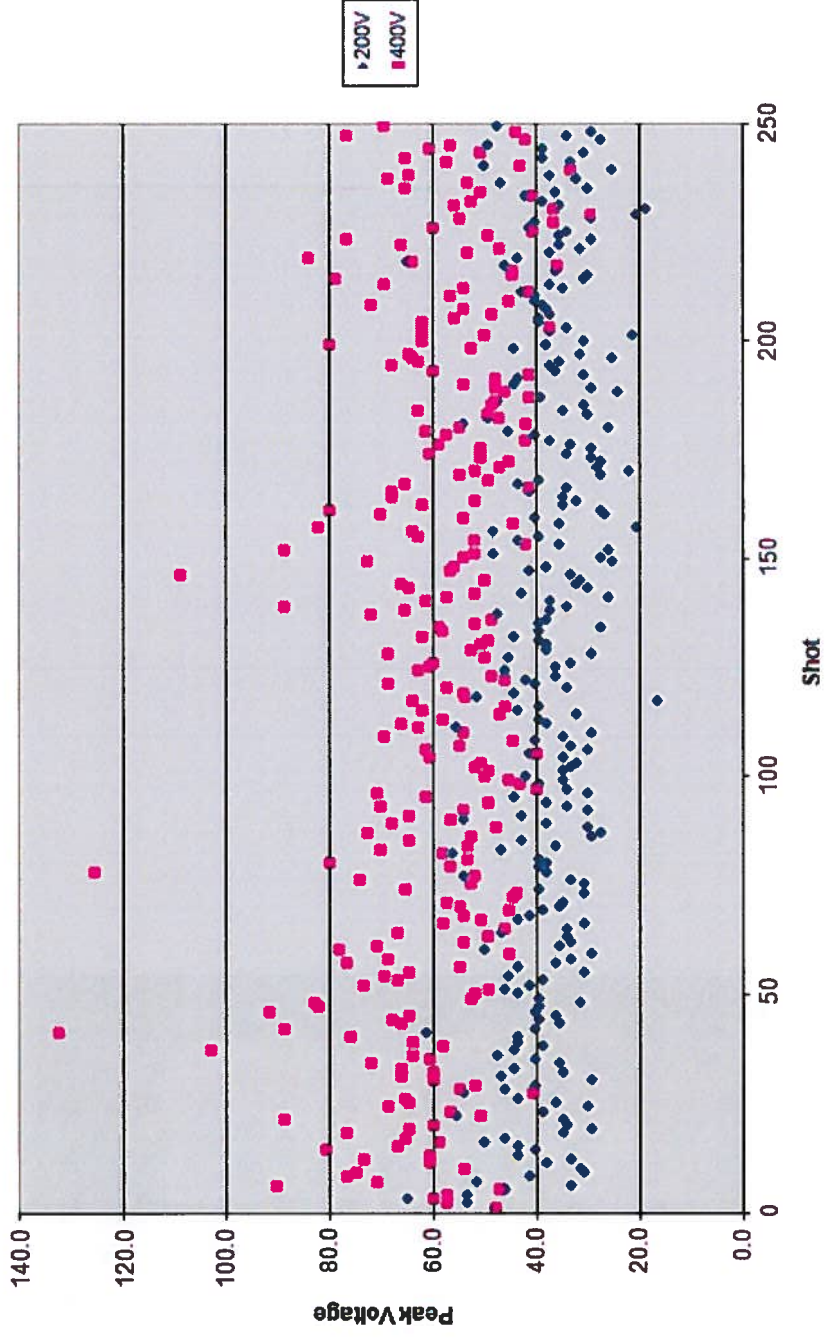
Shot 125	Shot 150	Shot 175	Shot 200	Shot 225
126	151	176	201	226
127	152	177	202	227
128	153	178	203	228
129	154	179	204	229
130	155	180	205	230
131	156	181	206	231
132	157	182	207	232
133	158	183	208	233
134	159	184	209	234
135	160	185	210	235
136	161	186	211	236
137	162	187	212	237
138	163	188	213	238
139	164	189	214	239
140	165	190	215	240
141	166	191	216	241
142	167	192	217	242
143	168	193	218	243
144	169	194	219	244
145	170	195	220	245
146	171	196	221	246
147	172	197	222	247
148	173	198	223	248
149	174	199	224	249
				250
				52

Shot 175	Shot 200	Shot 225
54.4	51.2	62.4
28.0	29.6	50.4
48.8	33.6	62.4
26.4	37.6	37.6
36.0	42.4	34.4
44.0	57.6	40.0
40.0	61.6	40.0
48.8	55.2	56.0
20.8	42.4	48.8
36.0	47.2	54.4
40.8	49.6	72.0
27.2	30.4	45.6
28.0	35.2	56.8
35.2	31.2	41.6
32.8	48.0	54.4
35.2	41.6	69.6
41.6	46.4	79.2
68.0	48.0	31.2
68.0	54.4	30.4
41.6	44.0	44.8
65.6	48.0	36.8
49.6	41.6	46.4
55.2	60.0	65.6
52.0	63.2	44.0
47.2	64.0	84.0
45.6	25.6	53.6
51.2	64.8	47.2
60.8	32.0	66.4
72.8	29.6	76.8
	34.4	44.0
	38.4	48.0
	80.0	49.6
		36

200V	400V
Max	65.6
Min	132.8
Average	29.6
	59.6

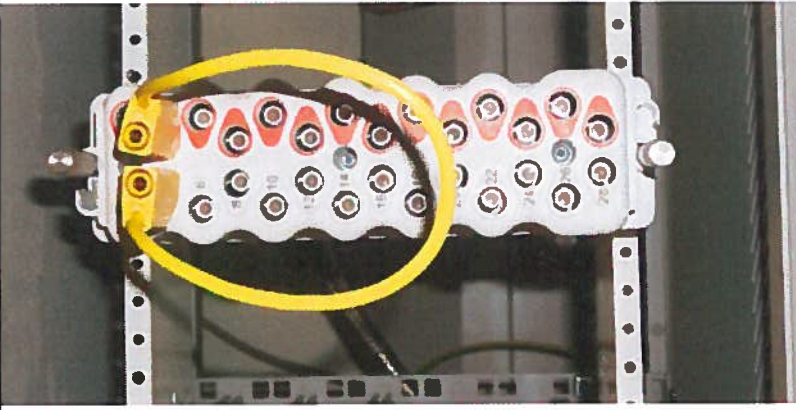
Scatter graph representation of results

Voltage Across P991 Contacts During P992 Extraction



APPENDIX C - DIAGRAMS AND PHOTOGRAPHIC EVIDENCE

1. P991 & P992 unit during Contact test



2.

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