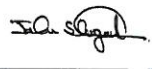


Test Report No.: 19300582 006		Page 1 of 11	
<i>Prüfbericht - Nr.:</i>		<i>Seite 1 von 11</i>	
Client: <i>Auftraggeber:</i>	PACE Electrotech Pty Ltd Level 2, 28 Fortescue Street, Spring Hill, Queensland, 4000, Australia		
Test item: <i>Gegenstand der Prüfung:</i>	"SafeARC Interrupter Module"		
Identification: <i>Bezeichnung:</i>	None	Serial No.: <i>Serien-Nr.:</i>	None
Receipt No.: <i>Wareneingangs-Nr.:</i>	1113005036	Date of receipt: <i>Eingangsdatum:</i>	25-9-2012
Testing location: <i>Prüfart:</i>	TUV Rheinland Australia Pty. Ltd. 27 Sheehan Road, Heidelberg West, Vic 3081, Australia		
Test specification: <i>Prüfgrundlage:</i>	Clause 8.2.1 of AS/NZS 3439.1:2002		
Test Result: <i>Prüfergebnis:</i>	The test item passed the above mentioned test specification(s) <i>Der Prüfgegenstand entspricht oben genannter Prüfgrundlage(n).</i>		
Testing Laboratory/ Prüflaboratorium: compiled by/ zusammengestellt:		checked by/ kontrolliert:	
7-2-2013	John Strugarek		7-2-2013
			Antony K. Milovac
Date <i>Datum</i>	Name <i>Name</i>	Signature <i>Unterschrift</i>	Date <i>Datum</i>
			Name <i>Name</i>
			Signature <i>Unterschrift</i>
Other Aspects/ Sonstiges:			
Module fitted with Bussman 170M6208, 500 A fuse-links, (eight per phase) and two heat exchange assemblies six fans per assembly fans in use. With simulated sun radiation onto the front face of the assembly.			
$I_n = 3200 \text{ A}$			
This document is issued in accordance with NATA's accreditation requirements.			
Abbreviations: ok / P = passed fail / F = failed n.a. / N = not applicable		Abkürzungen: ok / P = entspricht Prüfgrundlage fail / F = entspricht nicht Prüfgrundlage n.a. / N = nicht anwendbar	
This test report relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any safety mark on this or similar products. <i>Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.</i>			

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Technical Competence



GENERAL

- a This report shall not be reproduced, except in full. Other details are in the testing record file No. 1113005036.
- b As detailed in this test report, one sample of “SafeARC Interrupter Module” labelled PT1113005036-1-1 was tested.
- c The results detailed in this report were based on the sample submitted by the client. TUV disclaims any and all responsibility or obligation for any other item.
- d The test sample was subjected to the relevant clauses as stated herein.
- e Reporting of results herein is in accordance with NATA recommendations taking into account Uncertainty of Measurement. Where measurement is on the limit or below the limit it is deemed to comply. Where measurement is above the limit it is deemed not to comply.
- f Power supplies used were mains derived a.c. voltage sources of substantially sinusoidal waveform with a nominal frequency of 50 Hz unless otherwise noted.
- g Note: N/R means Not Relevant, N/T means Not Tested, DNC means Did Not Comply, T.O. means Test Object.

WITNESSES:

Bob Fuller
Brad Gradwell

PACE Electrotech
PACE Electrotech

TEST SPECIFICATION

AS/NZS 3439.1: 2002

Low-voltage switchgear and controlgear assemblies
Part 1: Type-tested and partially type-tested assemblies

DATE OF TEST

The testing was performed on the 27th September 2012.

SPECIFICATION**“SafeARC Interrupter Module”**

Rated Current	3200 A
Rated Voltage	415 V
Rated Frequency	50 Hz
Main busbars	1 x 200 mm x 25 mm copper

Fuse-link specification	Bussmann 170M6208 500 A 690 V~ IEC 700 V~ ЯU IR700-200kA 3TN/110
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Eight fuse-links in parallel per phase.

Heat exchange specification	Thermacore HXi 1500 air to air, (six fans per assembly - 3 inside 3 outside).
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List of documents supplied by the manufacturer are included in test report No 19300582 005.

RESULTS

If not indicated, the following Clauses refer to AS 3439.1:2002

Clause 8.2.1 Verification of temperature-rise limits

Clause 8.2.1.1 General

The temperature-rise test was made with three phase 50 Hz a.c. current. The test voltages used were such that a current equal to the rated current flows through the circuits.

Clause 8.2.1.2 Arrangement of the assembly

The assembly was arranged as in normal use with all covers in place and fans operating. Four, 2.5 kW heating devices arranged in pairs located approximately 500 mm from the assembly were used to simulate the suns radiation onto the front face of the assembly.

For the test the current source was connected to the provided incoming terminals located at the back of the assembly and connected to the main busbars within the assembly. Shorting links comprising of 22 laminations of 100 mm by 1.0 mm copper were fitted to the bottom outgoing cable connections located within the assembly. The assembly was not fitted with external vents.

Clause 8.2.1.3 Temperature-rise test using current on all apparatus.

The test covered the incoming and outgoing busbars and fuse-links fitted.

The test current was supplied by a three phase step-down transformer with adjustment provided by three single phase variable transformers. All three phases of the incoming and outgoing tested circuits were monitored using current transformers connected to an ammeter.

The temperature rise reported in this test report was recorded after the temperature had reached steady state (temperature rise variation did not exceed 1 K/h).

Clause 8.2.1.3.1 For values of test current up to and including 400 A N/R

Clause 8.2.1.3.2 For values of test current higher than 400 A but not exceeding 800 A N/R

Clause 8.2.1.3.3 For values of test current higher than 800 A but not exceeding 3150 A. N/R

Clause 8.2.1.3.4 For values of test current higher than 3150 A

The manufacturer chose the following setup:

Location	Phase	Test Conductors (per phase)		
		Quantity	Size [mm]	Length [m]
3200 A Incoming	R,W,B	4	125 x 6.3	2.0

The copper bars were spaced at approximately the distance between terminals. Multiple copper bars per terminal were spaced at a distance approximately equal to the bar thickness. The copper bars were finished in matt black.

Clause 8.2.1.4 Temperature rise test using heating resistors with an equivalent power loss
N/R

Clause 8.2.1.5 Measurement of temperatures

Type K thermocouples were used for temperature measurement.

Clause 8.2.1.6 Ambient air temperature

The ambient temperature was measured during the test using two thermocouples immersed in two separate oil baths. The oil baths were located around the assembly at about half its height and at a distance of about 1 m from the assembly.

Clause 8.2.1.7 Results to be obtained

Thermocouple Location	Phase	Temperature		
		[°C]	Rise [K]	Rise Limit [K]
Average ambient	-	33.9	-	-
Top Internal Ambient	-	70.5	36.6	-
Centre Internal Ambient	-	73.0	39.1	-
Bottom Internal Ambient	-	65.4	31.5	-
Top Fuse-Link End Plate	R	92.3	58.4	110*
	W	101.3	67.4	
	B	100.5	66.5	

Results continued.

Thermocouple Location	Phase	Temperature		
		[°C]	Rise [K]	Rise Limit [K]
4 th Fuse-Link End Plate	R	97.8	63.9	110*
	W	96.0	62.1	
	B	101.2	67.3	
Bottom Fuse-Link End Plate	R	112.8	78.9	110*
	W	103.0	69.0	
	B	106.0	72.0	
Incoming Vertical Busbars above Horizontal Connection	R	81.5	47.5	70
	W	88.4	54.5	70
	B	83.7	49.8	70
Back Main Vertical Busbars Between 1 st & 2 nd Fuse-Links	R	84.2	50.3	70
	W	91.4	57.4	70
	B	87.1	53.2	70
Front Main Vertical Busbars Between 1 st & 2 nd Fuse-Links	R	84.8	50.9	70
	W	86.0	52.1	70
	B	85.9	52.0	70
Front Main Vertical Busbars Between 5 th & 6 th Fuse-Links	R	88.2	54.3	70
	W	86.7	52.7	70
	B	78.0	44.1	70
External Enclosure L/H/S. Top Heat Exchange Cover	-	60.1	26.2	30
External Enclosure L/H/S. Top Front Cover L/H/S	-	58.8	24.9	30
Bottom Front Cover L/H/S	-	70.9	37.0	N/R**
Top Front Cover R/H/S	-	67.9	34.0	N/R**
Top Front Cover R/H/S	-	73.1	39.2	N/R**
Bottom Front Cover R/H/S	-	72.2	38.3	N/R**
Top Heat Exchange Cover Front Face	-	58.4	24.5	30
External Supply Terminals	R	83.8	49.9	70
	W	84.4	50.5	70
	B	79.0	45.1	70

* Limited by the permissible temperature declared by the Client (refer Appendix).

** External enclosure was influenced by external heating devices (refer photos).

Average currents during the last sixty minutes of the test:

Location	Average Test Current [A]		
	R	W	B
Incoming Supply	3239	3240	3239



Photo 12616: Assembly L/H/S View with Heaters in Place

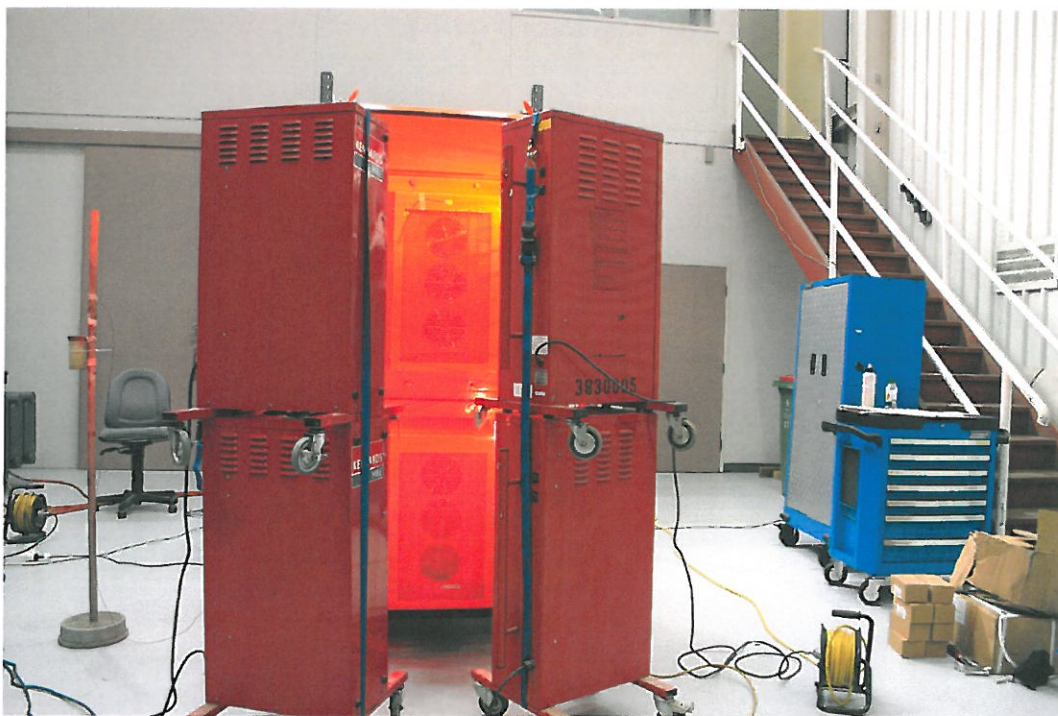


Photo 12617: Front of Assembly with Heaters in Place



Photo 12618: Assembly R/H/S View with Heaters in Place



Photo 12619: Back of Assembly with Heaters in Place