

**DESIGN OBJECTIVES**

The product described in this document has not been fully tested to insure conformance to the requirements outlined below. Therefore AMP Incorporated makes no representation or warranty, expressed or implied, that the product will comply with these requirements.

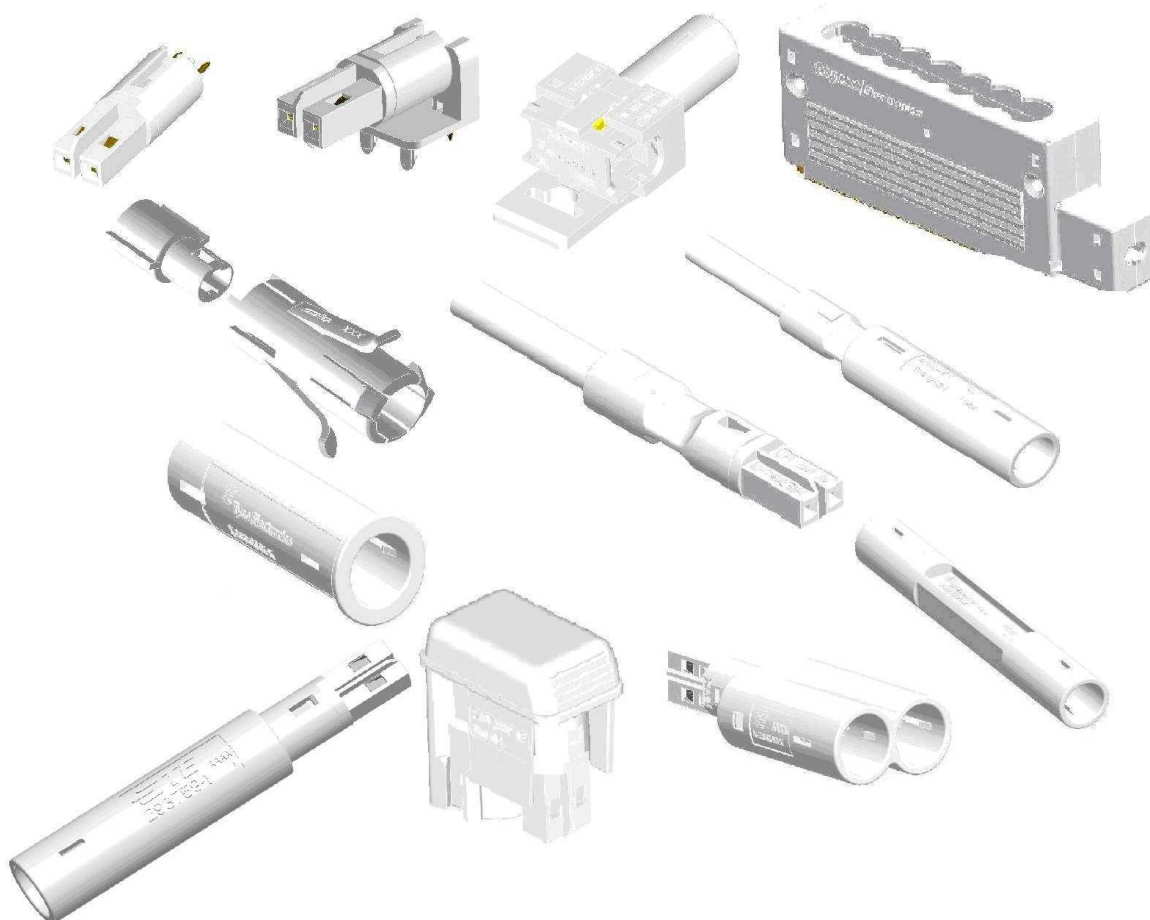
Further, AMP Incorporated may change these requirements based on the results of additional testing and evaluation.

Contact AMP Engineering for further details.

Il prodotto descritto in questa specifica non è stato ancora completamente provato per garantirne la conformità ai requisiti indicati nel documento. Perciò l'AMP non può al momento fornire assicurazione sulla conformità del prodotto a questi requisiti.

L'AMP si riserva inoltre la facoltà di modificare i requisiti della specifica sulla base dei risultati di addizionali prove e valutazioni.

Per ulteriori informazioni si prega di contattare l'Ufficio Tecnico.



<b>A4</b>	Removed PCB Outlet and added Bridge Plug/Outlet. Spec. for PCB Outlet is 108-20295	A. Vecchia	02/08/2011	G. Turco	02/08/2011
<b>A3</b>	Added flexing test	A. Vecchia	12/03/2009	G. Turco	12/03/2009
<b>A2</b>	Revised	A. Vecchia	20/06/2009	G. Turco	19/06/2009
rev letter	rev. record	DR	Date	CHK	Date
DR.		DATE	APVD		DATE

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**1.0 SCOPE:**

This specification refers to the requirements and tests of the 7.5 mm Mini HVL connector system mentioned in the table :

Full test list for each connector

	Test Number	4.01	4.02	4.03	4.04	4.05	4.06	4.07	4.08	4.09	4.10	4.11	4.12	4.13	4.14	4.15	4.16	4.17	4.18	4.19	4.20	4.21	4.22	4.23	4.24	4.25	4.26	
7.5 mm Outlet (HV)	1740262-..	X	X	X	X	X	X	X	X	X	X					X	X		X	X	X	X	X	X				
*with tube and ring clip	1740826-..	X	X	X	X	X	X	X	X	X	X					X	X		X	X	X	X	X	X				
7.5 mm Plug (HV)	1740259-..	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X				
*with tube and ring clip	1740825-..	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X				
7.5 mm Outlet (LV)	1740451-..	X	X	X	X	X	X	X	X	X	X					X	X		X	X	X	X	X	X				
7.5 mm Plug (LV)	1740449-..	X	X	X	X	X	X	X	X	X	X								X	X	X	X	X	X				
7.5 mm Pin contact	1740335-7 Rev.B	X	X	X	X	X	X	X	X			X	X						X	X	X	X	X	X				
7.5 mm Socket	1740336-7 Rev.C	X	X	X	X	X	X	X	X			X	X						X	X	X	X	X	X				
T-Splitter	293234-..	X	X	X	X	X		X	X	X	X	X							X	X	X	X	X	X				
	293235-..	X	X	X	X	X		X	X	X	X	X							X	X		X	X	X				
Panel mount outlet	293224-..	X							X	X				X	X	X							X	X				
Outlet bridge	293225-..	X	X	X	X	X		X	X	X	X	X							X	X		X	X	X				
Plug/Outlet bridge	293759-..	X	X	X	X	X		X	X	X	X	X							X	X		X	X	X				
Bus Bar general	293300-..	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X	X	X	X	X		X	X	
Bus Bar sealed	293270-..	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X	X	X	X	X		X	X	
6 way and 7 Way	1740317-..	X	X	X	X	X		X	X	X	X	X							X	X		X	X	X				
	1740315-..	X	X	X	X	X		X	X	X	X	X							X	X		X	X	X				
PCB plug straight	293308-..	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X		X	X	X		X		
PCB plug 90°	293311-..	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X		X	X	X		X		
Chassis mount	293302-..	X							X	X				X	X								X	X				
Chassis mount	293303-..	X							X	X				X	X								X	X				
T5 Bridge	1740907-..	X	X	X	X	X	X	X	X	X	X	X			X	X			X	X	X	X	X	X				

\* tube P/N 1740260-... and ring clip 1740261-...

**1.1 QUALIFICATION :**

Qualification tests are listed in par. 4.1 to 4.16 . Dimensional check must be made in accordance with drawings and relevant control plans.

Tests condition and sample preparation are specified in Par. 3.3.

**2.0 APPLICABLE DOCUMENTS:**

In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

**2.1 TYCO SPECIFICATIONS:**

Tyco Norm	Description
109.1	General Requirements for Test Specification
108-18030	Micro Quadlok System
114-18751	General 7.5miniHVL Application spec.
114-18821-2	Hera connector application spec.

**2.2 INTERNATIONAL SPECIFICATIONS (for ref. only):**

IEC 60512	Electromechanical components for electronic equipment , basic testing procedures and measuring methods
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IEC 60320-1	Appliance couplers for household and similar general purposes
IEC 60335-1	Safety of household and similar electrical appliances
IEC 60695-2-11	Fire hazard testing –Glowing/hot wire based test methods- Glow wire flammability test methods for end-products.

**3.0 DESIGN AND CONSTRUCTION:**

Product shall comply with the design, construction and physical dimensions specified in the applicable product .

**3.1 MATERIALS:**

Components	Material	Finish
Housings	PA66	-
Female contacts	Body:CuNiSi ; Spring: Stainless Steel	Blank
Pin contacts	Body:CuNiSi ; Spring: Stainless Steel	Blank
Male contacts of outlet bridge & splitter conn.s ; T5 Bridge	Phosphor bronze	Tin plated

**3.2 CONNECTOR RATING:**

Characteristic		Notes
Continuous Current and Voltage	7A 42V dc & 7A 42V ac 2.5A 250V ac (**)	CABLE H03 VVH2-F 0,75 mm <sup>2</sup>
Working temperature	-40°C to +120°C	Including the temperature increasing due to current flow.
Degree of protection for general products	IP 2.0	EN 60529

(\*\*)For application at different voltage , contact Tyco Electronics

**3.3 QUALITY ASSURANCE PROVISION:**

**A. Sample preparation:**

The samples to be used for the tests shall be prepared by randomly selecting them from the current production .The contacts shall be crimped in accordance with the relevant Application Specification .

No sample shall be reused, unless otherwise specified.

**B. Test Conditions:**

All the tests shall be performed under the combination of the following test conditions, unless otherwise specified:

- Room temperature: 23 ± 5°C
- Relative Humidity: 45 - 70%
- Atmospheric Pressure: 860÷1060 mbar

**4.0 TEST REQUIREMENTS AND PROCEDURES SUMMARY:**

Par.	Test Items	Requirements	Test method
4.1	Visual and dimensional examination	At new and after each test sequence	According to drawings:

**ELECTRICAL & THERMAL REQUIREMENTS**

Par.	Test Items	Requirements	Test method
4.2	Contact resistance (Dry circuit)	Maximum termination resistance : At new < 5 mOhm After test < 10 mOhm (unless otherwise specified)	Measure millivolt drop between connectors as indicated in Fig. 1. No load voltage <20 mV Current <100 mA
4.3	Dielectric withstanding voltage	No flashes or breakdown allowed	Between one contact and the others : 2000 V rsm – 1 minute and between contacts connected together and the body :4000V rsm – 1 minute
4.4	Insulation resistance	>5 MOhm - 500 V dc for 60 sec.	Between one contact and the others and between contacts connected together and the body
4.5	Temperature Rise	Temperature rise <45°C Connector mating & unmating force within the limits indicated in par. 4.9 & 4.10	T-rise (measured as shown in fig. 2) at a current of 1,25 times of rated current for 1 hour
4.5 bis	Temperature Rise ONLY for bus bar connector 293300 and 293270	Temperature rise <55°C Connector mating & unmating force within the limits indicated in par. 4.9 & 4.10	T-rise (measured as shown in fig. 2) at a current of 7A

4.6	Breaking capacity (Mate/unmate with current load)	No permanent open circuit after test Contact resistance <10 mOhm No physical damages allowed	Connectors loaded with a current of 1.25 times of rating current (3.2 A) Test voltage 275 V ac ; power factor 0,6 +/-0,05. 50 cycles of mating and unmating (100 strokes) at a rate of 30 strokes per minute , as per IEC 60320-1 par 19 Test made in ambient temperature
4.7	Normal operation	No permanent open circuit after test Contact resistance <10 mOhm No physical damages allowed.	1000 current cycles (2000 strokes) at rating current (2.5 A) plus 3000 cycles of mating/unmating without current .. Test made in ambient temperature
4.8	Bending operation	No short circuit between conductors or interruption of current	The cord is loaded with 10N and it is supplied with 2.5A 250V AC. 20000 flexing at a rate of 60 per minute. A flexing is one movement, either backwards or forwards.
<b>MECHANICAL REQUIREMENTS</b>			
Par.	Test Items	Requirements	Test method
4.9	Vibration	No discontinuance greater than 1 microseconds. Contact resistance ( dry circuit ), measured as indicated in Fig.1, according to limits.	Subject mated connectors to sinusoidal vibration: frequency 15-1000-15 Hz ; sweep rate 1 octave/minute ; acceleration : 5g ; 2 hours each of the 3 mutually perpendicular directions . Test set-up as indicated in Fig. 3
4.10	Connector mating force	38 N maximum(first cycle)	Mating speed = 25.4 mm per minute.
4.11	Connector unmating force	10 N minimum (first cycle)	Unmating speed = 25.4 mm per minute.
4.12	Single Contact Engaging force	18 N Max	Engaging speed = 25.4 mm per minute.
4.13	Single Contact Separating force	1.5 N minimum after Normal operation test (Par.4.7)	Separating speed = 25.4 mm per minute.
4.14	Insertion Force on Panel Mount	30N Max	Pushing speed =25.4mm per minute
4.15	Retention Force from Panel Mount	60N min	Traction speed =25.4mm per minute

4.16	Impact test	No physical damages allowed.	Impact energy 0,5 J ± 0,05 J. according to IEC 60320 par 23.5
4.17	Pin movement	Connector in oven at 70°C for 1 minute. In the oven each pin is loaded with 60N for 1 minute. No squeezing or distortion of the body or pin movement exceeding 2.5mm	According to IEC 60320 par 13.4
4.18	Retention force between cover and body	Cable traction according to test retention force between cover and body	The cable have to be tractioned together as shown in picture 5. Minimum force 100N

### CONNECTOR ENVIRONMENT REQUIREMENTS

Par.	Test Items	Requirements	Test method
4.19	Thermal shock	Contact resistance(dry circuit) measured as indicated in Fig.1, according to limits No physical damages allowed.	Subject mated connectors to 10 cycles of 30 minutes each , between -40° and 120 °C ; Temperature changes in 1 minute max.
4.20	Temperature ageing	Contact resistance(dry circuit) measured as indicated in Fig.1, according to limits No physical damages allowed	Subjected mated connectors to exposure in ventilated oven at 80°C for 168 hours.
4.21	Flexing test of cord	20'000 flexing movements with mechanical load and rated current.no interruption or short circuit allowed	According to IEC 60320 par. 22.4. Rayed current of 5 A – Mechanical lod of 20 N .Set-up as indicated in fig. 4). Cable as indicated in par. 1.0
4.22	Humidity (Moisture resistance)	Contact resistance ( dry circuit) , measured as indicated in Fig.1, according to limits	Subject mated connectors to exposure for 48 hours in ambient at 30°C and humidity between 91% and 95% .
4.23	Glow wire test	Temperature :750°C No flame	According to IEC 60695-2 -11 according to IEC 60335-1
4.24	Xenon test	No relevant changes in color according to grey scale as per DIN EN 20-105-A02	20 minutes on 60W/m2 10 minutes off

4.25	Solderability test	Appearance of the specimen shall be inspected after the test with the assistance of a magnifier capable of giving a magnification of 10X for any damage such as pinholes, void or rough surface. Solderable area shall have a solder coverage of 95% minimum.	Subject contacts to melted 60% tin/40% lead solder tub at 230±5° for 3±0.5 seconds, after immersing into flux.(Alpha-100, non-active rosin base)
4.26	Corrosion salt spray	Termination resistance (dry circuit), measured as indicated in Fig. 1 according to limits	Subject mated connectors to exposure for 48 hours to salt spray at 40°C, 5% salt concentration. At the end rinse in fresh water for 5 minutes and then in distilled water
4.27	Water protection degree	IP 6.7 according to EN 60529	Immersion of samples at 1m below the water surface; duration of test 30 min.

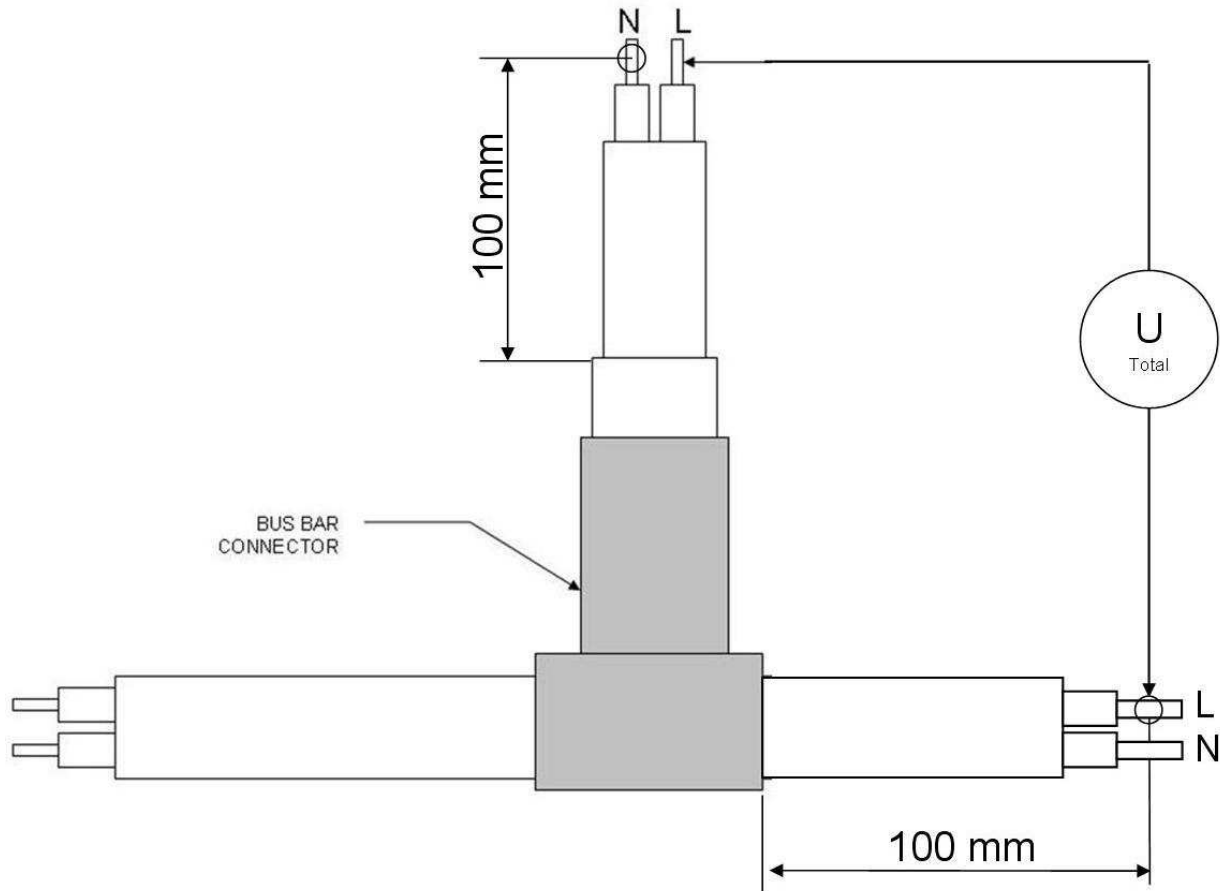
**Note:** After test described in par. 4 , samples have to be conditioned for 2 hours at ambient humidity and temperature before any measurement

## 5.0 PRODUCT QUALIFICATION TEST SEQUENCE

Test Items		Test groups							
Par.		A	B	C	D	E	F	G	H
4.1	Confirmation of Product	1,9	1,11	1,11	1,3	1,5	1,3	1, 5	1,4
4.2	Contact resistance, dry circuit	2,8	2,6,8	2,6,10		2,4			2
4.3	Dielectric withstanding voltage		4,10	4,9				2, 4	
4.4	Insulation resistance		3,9	3,8					
4.5	Temperature rise				2				
4.6	Breaking capacity					3			
4.7	Normal operation	5							
4.8	Bending operation								3
4.9	Vibration			5					
4.10	Mating force	3,7							
4.11	Unmating force	4,6							
4.12	Thermal Shock		5						
4.13	Thermal ageing		7						
4.14	Flexing test of cord							3	
4.15	Humidity			7					
4.16	Glow wire test						2		

Fig. 1

Picture of millivolt drop measurement points  
Busbar connector



Free hanging version



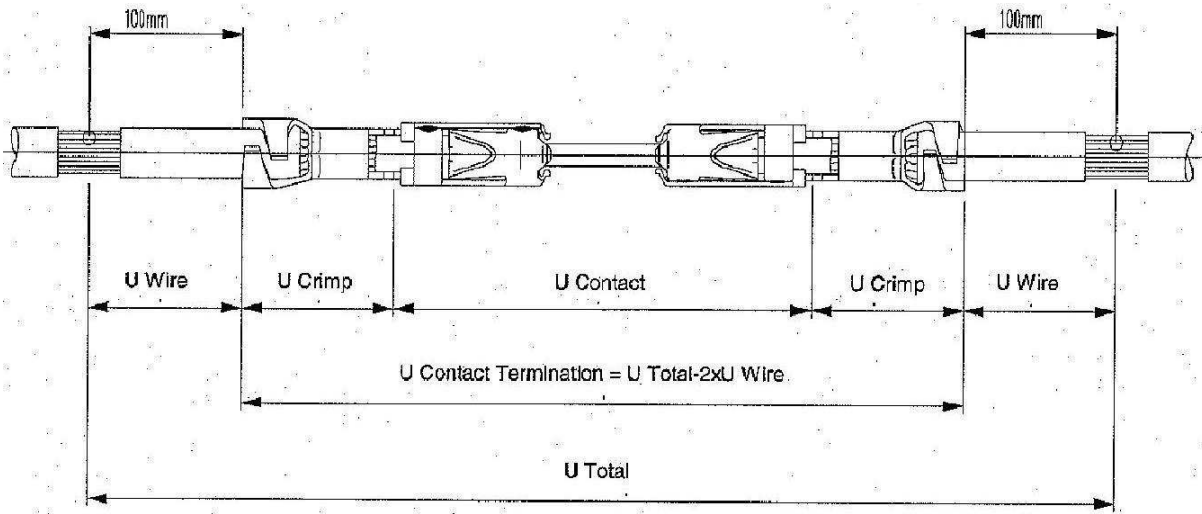
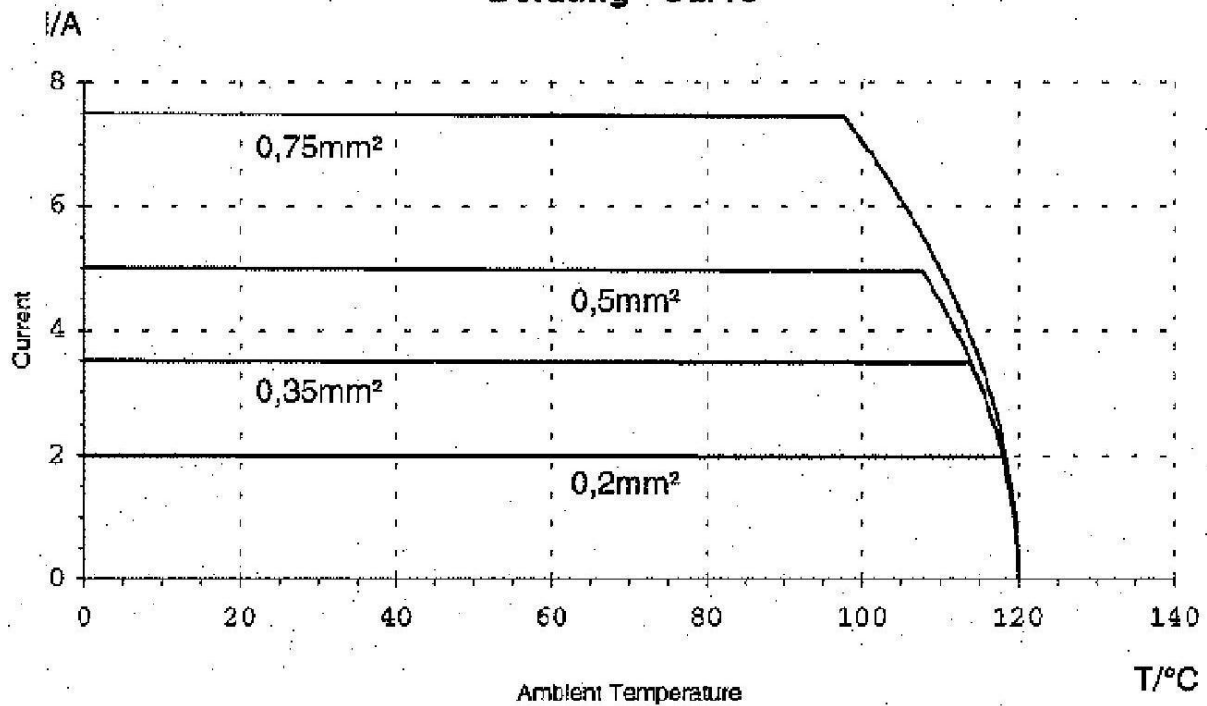


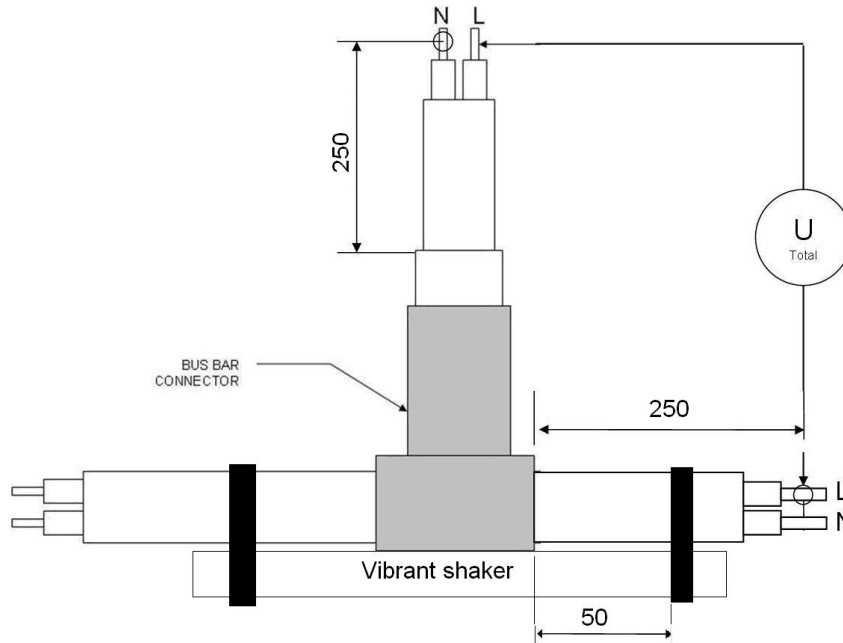
Fig.2

Picture of Derating curve

**Derating - Curve**



**Fig.3**  
Picture of Vibration test set-up



**Fig.4**  
Picture of flexing test set-up

