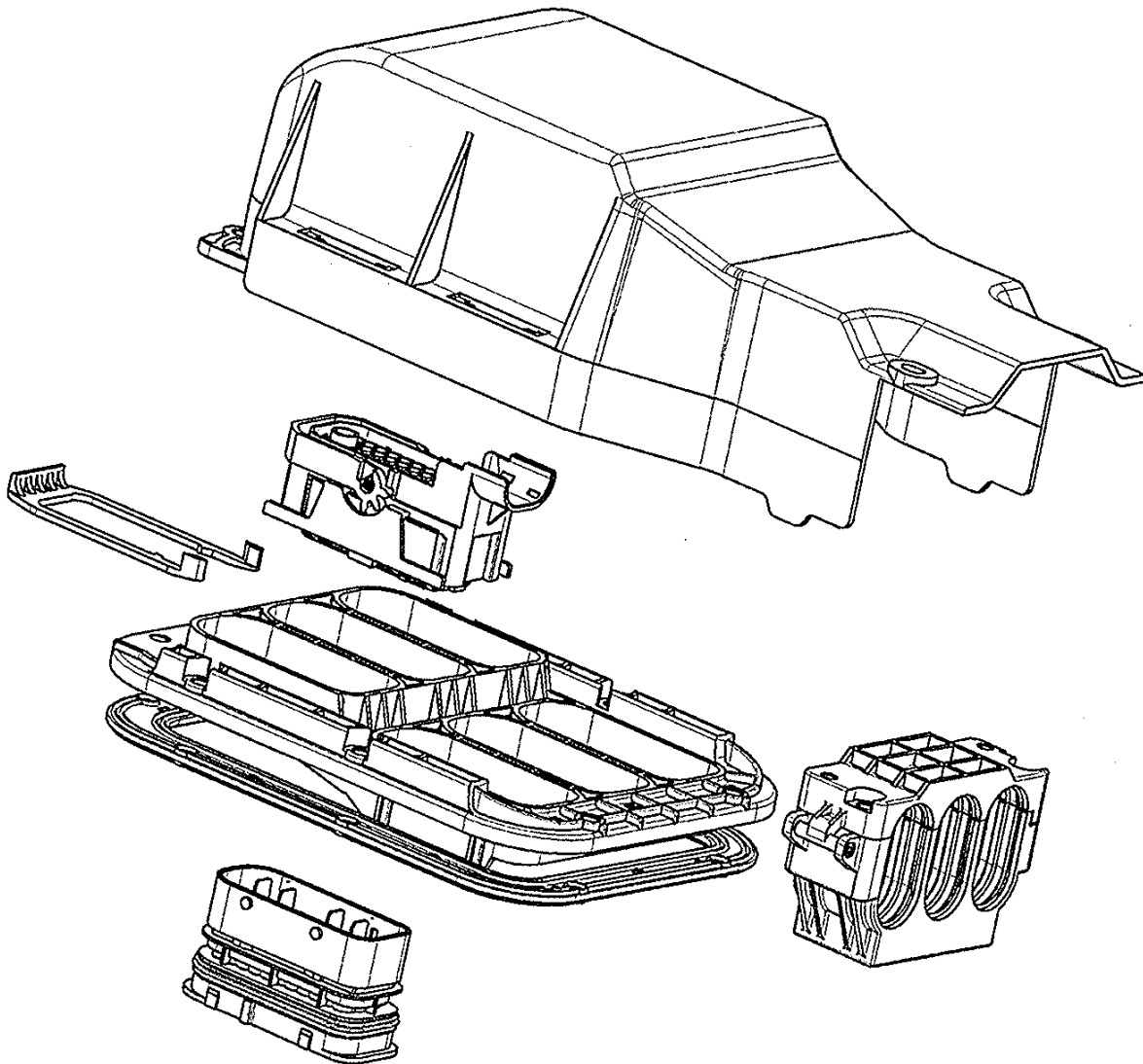


**NEW BULKHEAD CONN. FOR TRUCKS  
( MEDIUM CLASS )**



Rev. A3	Updated P/N's table	<i>M. Polizzi</i> M. POLIZZI	<i>O. Canuto</i> O. CANUTO	6APR2005
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**0.1 CONTENTS**

This specification covers the requirements for product performance, test methods and quality assurance provision for the New Bulk-head connectors for Medium Class Truck version, composed by the parts listed in the following table :

<b>PN's</b>	<b>DESCRIPTION</b>
284258-1 to -6	40 Pos. male connector assembly
284259-1	Blanking device for empty Plate cavities
284257-1 to -6	40 Pos. female connect. assembly
1745047-1	Blanking device for male connector
284351-1	Support Plate
284260-1	Cover for support Plate
284266-1	Gasket for support Plate
284261-1	Bulk-head conn. support kit
284352-1	Retainer
284262-1	Mini Mic Tab contact, unsealed, 0.3-0.5 mm <sup>2</sup>
284263-1	Mini Mic Tab contact, unsealed, 1.0-1.5 mm <sup>2</sup>
282403-1	Mini Mic Rec Contact (wire seal) 0.3-0.5 mm <sup>2</sup>
282110-1	Mini Mic Rec Contact (wire seal) 1.0-1.5 mm <sup>2</sup>
281934-2-4	Individual wire seal)
927835-2	Std Pwr Timer Rec cont (wire seal) 1.5-2.5 mm <sup>2</sup>
963709-2	Std PwrTimer Rec cont (wire seal) 4-6 mm <sup>2</sup>
282362-1	Individual wire seal
963244-1	Individual wire seal
1-962846-1	Std Pwr Timer Tab cont, unsealed, >2.5-4 mm <sup>2</sup>

## 0.2 APPLICABLE DOCUMENTS

Product drawings have to be considered part of this specification. In case of conflicts between specification and referenced documents, this specification shall take precedence.

## 0.3 AMP SPECIFICATIONS

A. 109-5000 Test Specification, General Requirements for Test Methods

## 0.4 COMMERCIAL STANDARD SPECIFICATIONS

A. Low Voltage Stranded Cables for Automobiles acc. to FIAT Normation Table N°91107/03

B. FIAT General Specification for Connectors 9.91320/02

## 0.5 DESIGN AND CONSTRUCTION

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

## 0.6 RATINGS

### A. CURRENT RATING:

MINIMIC CONTACT :      14 A max with 1.5 mm<sup>2</sup> wire  
                                     11 A max. with 1.0 mm<sup>2</sup> wire  
                                     6 A max. with 0.75 mm<sup>2</sup> wire  
                                     5 A max. with 0.5 mm<sup>2</sup> wire

STANDARD POWER TIMER CONTACT:

28 A max with 4.0 mm<sup>2</sup> wire

Current rating per wire section a.m. are according to Fiat spec. 91107/03

B. TEMPERATURE RATING: -40°C TO +125 °C ( including the temperature increasing due to working current flow )

C: MAXIMUM OPERATING VOLTAGE: 24 V d.c.; for application at higher voltage please contact AMP

**0.7. QUALITY ASSURANCE PROVISION****A. Sample preparation**

The test samples to be used for the test shall be prepared by random selection from the current production and the contact shall be crimped in accordance with the applic. spec. 114-20045 and 114-20062.

No sample shall be reused, unless otherwise specified.

**B. Test condition:**

All the test shall be performed under any combination of the following test condition, unless otherwise specified:

Room temperature:  $23 \pm 5^{\circ}\text{C}$

Relative humidity:  $45 \div 70\%$

Atmospheric pressure:  $860 \div 1060$  mbar

## 0.8 TEST REQUIREMENTS AND PROCEDURES

Test Description	Requirements	Procedure
<b>1. PRODUCT EXAMINATION</b>		
1.1 Confirmation of product	-Product shall confirm the requirements of applicable product drawing and Application specification	Visually, dimensionally and functionally inspection per applicable quality inspection plan
1.2 Visual examination	-Any visible damage, cracking or defect when the product is new and even after environmental, mechanical and electrical test.	Visual inspection
<b>2. MECHANICAL REQUIREMENTS</b>		
2.1 Connector mating force	40 ways: $\leq 120$ N	With corresponding counterpart (assembled), moving the lever with an operation speed of 50 mm/min.
2.2. Connector unmating force	40 ways: $\leq 80$ N	With corresponding counterpart, all assembled moving the lever with an operation speed of 50 mm/min..
2.3 Contact insertion force in housing ( crimp contacts )	15 N max	Insert contact into the cavity with operating speed 25 mm/min.. The housing has to be mounted on a self aligning platform.
2.4 Contact extraction force from housing ( crimp contacts )	-With primary locking : 50 N min. -With secondary locking included : 70 N min.	Pulling wires axially with an operating speed of 50 mm/min. max
2.5 Kojiri test.	-Housing completely loaded - No electrical interruption	Apply a load to the cable bundle of 100 N in every direction of a 90° cone. Clamp on the counterpart. Operation speed: 25-50 mm/min.
2.6 Polarization effectiveness	200 N min. per 60 sec.	Assembled connectors must withstand the specified axial load without mating the counterpart with the incorrect polarization.
2.7 A Operating force of secondary lock ( all contacts properly inserted ) 2.7 B Operating force of secondary lock ( one or more contacts not properly inserted )	- Operating force $\leq 60$ N  - Operating force $\geq 120$ N	Apply increasing load parallel to the operating direction and measure force to actuate
2.8 Durability	- As requested by the Table 1	10 mating /unmating operations
Test Description	Requirements	Procedure

<p>2.9 Random vibration test</p>	<p>-No electrical discontinuity greater than 1 micro sec. shall occur</p> <p>-Voltage drop within limits indicated for new contacts</p>	<p>Duration: 30 hrs on the direction of mating axis. Wires bundle fixet at 20 cm Test current: 1 mA Acceleration: 2g x , y axis 3g z axis Frequency: 10-80-10 Hz Displacement: 3 mm On mated connector with the counterpart</p>
<p><b>3. ELECTRICAL REQUIREMENTS</b></p>		
<p>3.1 Voltage drop</p>	<p>Minimic contact -≤4 mVA</p> <p>Standard Power Timer contact -≤ 3 mVA - new contacts - after ten insertion/extraction</p>	<p>Between a point of the wire at 1 cm from the conn. Edge, both sides ( see Fig.2 ), at the nominal current for each wire size. (Termination resistance is obtained after subtraction of the resistance of wire used for termination ). Wire current rating : see Para. 0.6</p>
<p>3.2 Dielectric strength</p>	<p>Neither creeping discharge nor flashover shall occur</p>	<p>≥ 1000Vac for 1 minute. Test between adjacent circuits of mated connectors</p>
<p>3.3 Insulation resistance</p>	<p>10 MΩ min.</p>	<p>Applied voltage: 500 V dc between one contact and the others short circuited.</p>
<p>3.4 High temperature resistance with current load</p>	<p>-Temperature increase :≤ 45°C after first cycle -Temperature increase :≤ 50°C after 8 cycles ( Thermocouple placed on transition between contact body and wire barrel ) -Voltage drop within limits indicated for new contacts -No damaging</p>	<p>Test performed on n.2 pairs of mated connectors inserted in position A and C of Support Plate.</p> <p>Connectors Wire loading and test current shown in Table 2.</p> <p>Duration: 8 cycles as shown in Figure 1.</p>
<p>3.5 Current overload</p>	<p>Temperature rise increase: ≤ 70°C ( thermocouple placed on transition between contact body and wire barrel ) -Voltage drop within 50% increase of limits indicated for new contacts -No damaging</p>	<p>On one pair of mated contacts without housing: Test current 1.5 time nominal current ( see par. 0.6 ) -Duration 500 cycles composed of: 45 min current ON 15 min current OFF</p>



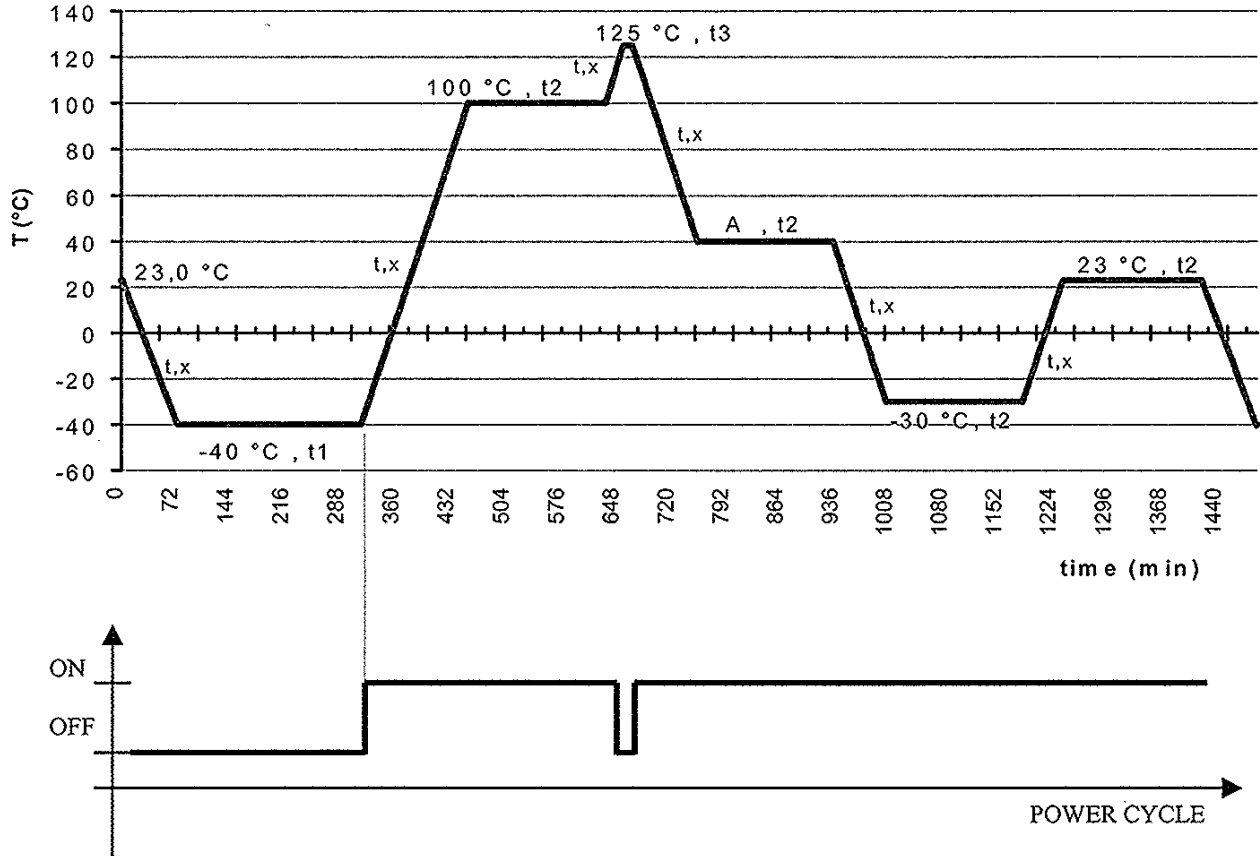
Test Description	Requirements	Procedure
<b>4.0 ENVIRONMENTAL REQUIREMENTS</b>		
4.1 Accelerated ageing	<ul style="list-style-type: none"> <li>-No deformation or cracking of the plastic parts ( color change allowed )</li> <li>-Voltage drop: :≤specified limits for new contacts increased of 50%</li> <li>-Insulation resistance and dielectric strength within indicated limits</li> <li>-Perform additional cumulative tests as specified in Table 1</li> <li>-Mechanical performances within limits specified for new parts with 50% max acceptable variation</li> </ul>	<p>On mated connectors submitted to the following cumulative tests:</p> <p>A- 5 cycles composed of:            -2 hrs at 125°C ± 2°C            -2 hrs -40°C ± 2°C</p> <p>B- 5 cycles composed of:            -2 hrs at 125°C ± 2°C            -2 hrs at +40°C ± 2°C and 90-95% r.h.            -2 hrs -40°C ± 2°C</p> <p>C- 200 hrs at 125 °C</p>
4.2 Resistance to rain test	<ul style="list-style-type: none"> <li>- Insulation resistance and Dielectric strength must be according to the specified limits.</li> <li>- No presence of water must be detected inside the connectors, after unmating.</li> </ul>	<p>According to IEC 529 (IP X4) , test condition 8.4.            Test performed on support plate fully loaded with mated connectors and without support plate cover.            Test duration : 20 min.</p>
4.3 Resistance to water spray	<ul style="list-style-type: none"> <li>- Insulation resistance and Dielectric strength must be according to the specified limits.</li> <li>- No presence of water must be detected inside the connectors, after unmating.</li> </ul>	<p>According to IEC 529 (IP X5) , test condition 8.5.            Test performed on support plate fully loaded with mated connectors. The cover for support plate shall be mounted.            Test characteristics:            -Nozzle internal diameter 6.3 mm            -Capacity 12.5 dm<sup>3</sup>/min +/-5%            -Water pressure on the nozzle 30x10<sup>3</sup> Pa            -Test duration 30 min            -Nozzle to sample distance 3m</p>
4.4 Resistance to dynamic immersion	<ul style="list-style-type: none"> <li>- Insulation resistance and Dielectric strength must be according to the specified limits.</li> <li>- No presence of water must be detected inside the connectors, after unmating.</li> </ul>	<p>Test according to IEC 529            Samples (mated connectors) must be immersed and maintained under 10 cm of water.            During immersion pull cables with 1.5-2.5 N load for 100,000 lateral movements at max frequency of 50 cycles /min, as shown in Fig.3</p>
4.5 Resistance to low temperature	<ul style="list-style-type: none"> <li>- No breakage os parts detected</li> </ul>	<p>Keep mated sample to -40° C for 2 hours, move to 0° C in a time of 3 min max and let stabilize, then unmate and remate the connectors 1 time.</p>
4.6 Salt spray corrosion test	<ul style="list-style-type: none"> <li>-Voltage drop: :≤specified limits for new contacts increased of 100%</li> </ul>	<p>-150 hours of salt mist at 35°C± 2°C, 5% of NaCl , pH 6.5-7.2 class 2  ( mated connector )</p>
<b>Test Description</b>	<b>Requirements</b>	<b>Procedure</b>

<p>4.7 Kesternich corrosion</p>	<p>-Voltage drop: : ≤specified limits for new contacts increased of 100%</p>	<p>4 cycles composed of:                  -8 hrs of exposure to an atmosphere with 0.66% of SO<sub>2</sub> at +40°C ± 2°C ( method acc. to DIN 50118 )                   -16 hours in free air                   ( mated connector )</p>
<p>4.8 Resistance to fluids</p>	<p>- No damages, deformations , cracks , breakages found on the parts.                  - Contact retention in housing, connector mating / unmating forces according to the specified limits.</p>	<p>Test complete, mated connectors with 3 min. of immersion in the following fluids (not cumulative test, use different samples for each fluid) :</p> <ul style="list-style-type: none"> <li>- Gasoline at 23° +/- 5°C</li> <li>- Cleaning agent at 23° +/- 5° C</li> <li>- Break fluid at 50° +/- 5° C</li> <li>- Anti-freeze mixture at 23° +/- 5°C</li> <li>- ASTM1 oil/engine oil at 100° +/- 3° C</li> <li>- Leadless engine fuel at 23° +/- 5°C</li> <li>- Transmission fluid at 100° +/- 3° C</li> </ul>
<p>4.9 Resistance to dust (according to IEC 529, level 5)</p>	<p>- Voltage drop and insulation resistance according to the specified limits.                  - Minor traces of dust allowed inside the connectors after unmating.</p>	<p>Test the mated connectors.                  Test characteristics :</p> <ul style="list-style-type: none"> <li>- Duration 30 min.</li> <li>- Ambient temperature from 15 to 35° C</li> <li>- Density of dust 2 Kg / m3                      ( 4,5 Kg of Portland cement )</li> </ul>

**TABLE I**  
**PRODUCT QUALIFICATION TEST SEQUENCE**  
**TEST GROUPS**

ITEM	DESCRIPTION	A	B	C	D	E	F	G	H	I	L	M	N	O
1	Visual examination	1,7	1,7	1,5	1,5	1,5	1,6, 17	1,3	1, 11	1,5	1,5	1,9	1,7	1,7
2.1	Connector mating force		2				11					2,6		
2.2	Connector unmating force		3				12					3,7		
2.3	Contact ins. force (in hsg)	2	4				13							
2.4	Cont. ext. force (from hsg)	6	5				14					4,8		
2.5	Kojiri test	4												
2.6	Polarization effectiveness						15							
2.7	Oper. force of sec lock		6				16							
2.8	Durability						10							
2.9	Random vibration test			3										
3.1	Voltage drop	3,5		2,4	2,4	2,4	2,7			2,4	2,4		2,5	
3.2	Dielectric strength						3,8		2,6, 9					2,5
3.3	Insulation resistance						4,9		3,7, 10				3,6	3,6
3.4	High temp. resist.(in oven)				3									
3.5	Current over-load					3								
4.1	Accelerated ageing						5		4					
4.2	Resistance to rain test								5					
4.3	Resistance to water spray								8					
4.4	Dynamic immersion													4
4.5	Resist. to low temperature							2						
4.6	Salt spray corrosion									3				
4.7	Kesternick corrosion										3			
4.8	Resistance to fluids											5		
4.9	Resistance to dust												4	

**FIGURE 1  
1 CYCLE**



**Parameters:**

A= 40°C with 90-95% of Relative Humidity.

t1 = 3 h

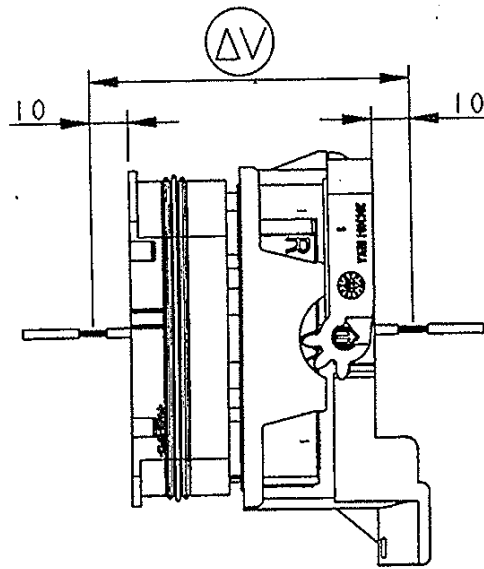
t2 = 3 h

t3 = 10 min

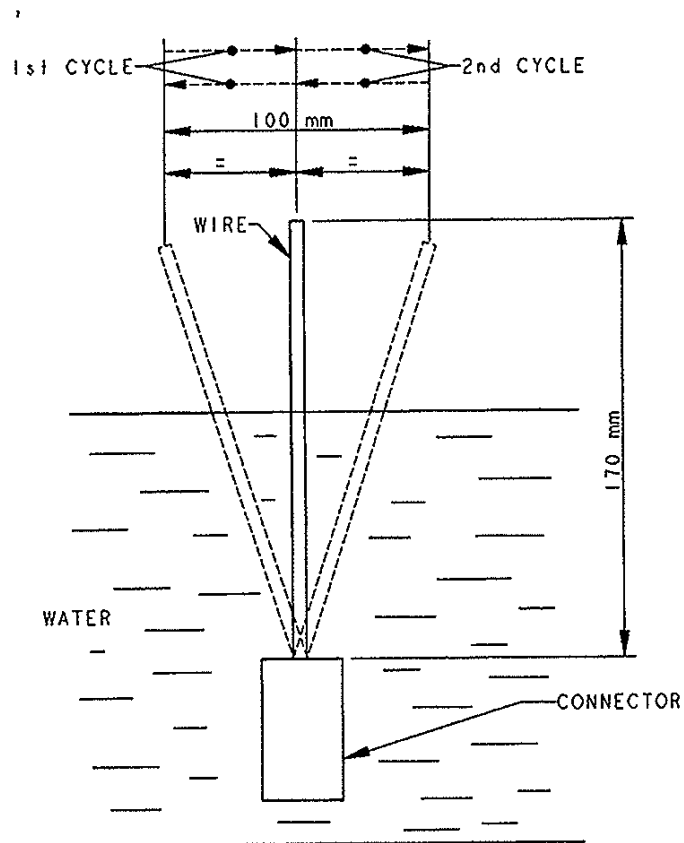
t,x = 1°C/min of temperature increment

Test current:

Table 1	
Test current (A)	Connector ways no.
16	39 - 40
6	12 - 28 - 29 - 30 - 31 - 32 - 33
1	ALL OTHER WAYS



**Fig. 2 -Voltage drop measuring points**



**Fig. 3- Dinamic immersion test**