

PRODUCT ENGINEERING

LABORATORY

RL.

130471

Rev. 1

Material / Parts description:

PN:

Drawing Issue

Amplivar Splice

280004-1

R1

Requester:

Dept:

Natanael M. Santos

EPA

Customer:

Supplier:

Denso

TE - Brazil

Confidentiality:

- () 1- CONFIDENTIAL
 () 2- TYCO RESTRICTED
 (X) 3- ADDRESSED CUSTOMER
 ()

- (X) REQUESTER
 (X) DM-TEC
 ()

Purpose:

1 - Validation

General information:

Validation of Amplivar Splice PN TE 280004-1 in "A" and "B" Splices (specified below), according with Denso solicitation.

"A" Splice - Thermo fuse 23 AWG + MAG Copper 23AWG.

Total CAM = 1104

11 samples

"B" Splice - MAG Copper 23 AWG + 0,75mm² wire.

Total CAM = 2070

12 samples

Test(s):

Please, view page 2.

Specification (s):

Has no specification. Procedure in accordance to requester definition.

Conclusion:

Informative test report.

March 4th, 2013

Date

SIGNATURE ON FILE

Executed by

JÉSUS V. DE OLIVEIRA PRETO
 LABORATORY ENGINEER

SIGNATURE ON FILE

Responsible

PAULO SÉRGIO DE ALMEIDA
 LABORATORY COORDINATOR

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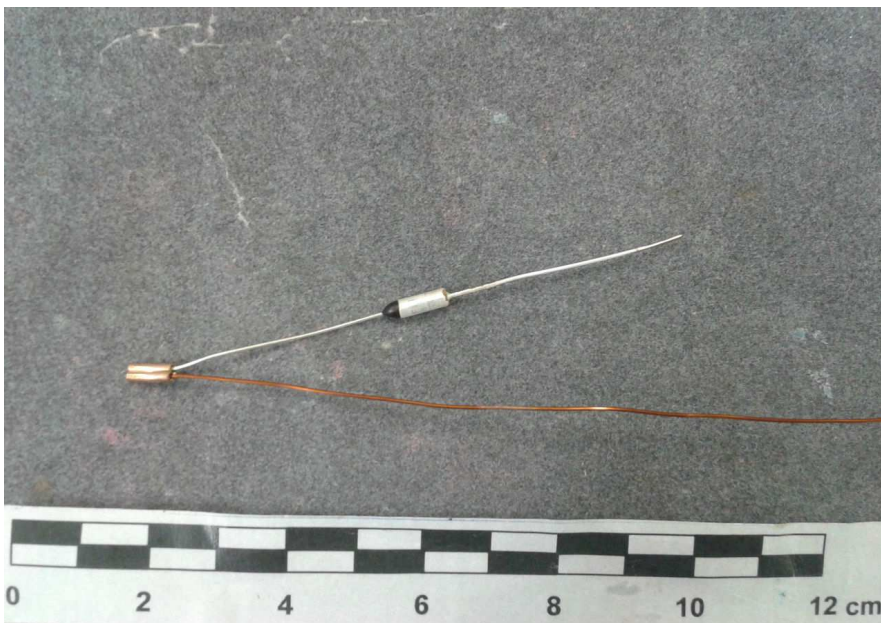
4 - Group III (Crimping Picture) pg. 11

1 General

Tests performed at Bragança Paulista electrical components test laboratory. Period: February to March 2013.

1.1 Samples Identification

Sample Group	Samples	Part Number	Description
I	1~10	280004-1	1~5: thermo fuse 23 AWG + MAG Copper 23 AWG 6~10: MAG copper 23 AWG + 0,75mm ² wire gauge
II	11~20	280004-1	11~15: thermo fuse 23AWG + MAG Copper 23AWG 16~20: MAG copper 23 AWG + 0,75mm ² wire gauge
III	21~23	280004-1	21: thermo fuse 23 AWG + MAG Copper 23 AWG 22~23: MAG copper 23 AWG + 0,75mm ² wire gauge



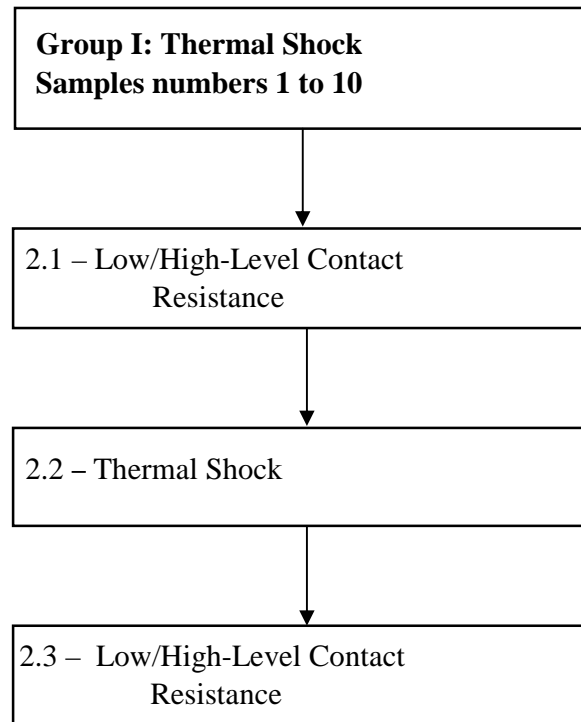
"A" Splice - Thermo fuse 23 AWG + MAG Copper 23AWG.



"B" Splice - MAG Copper 23 AWG + 0,75mm² wire.

2 - Group I: Thermal Shock

Sequence:



2.1 – Low/High - Level Contact Resistance

Samples

10 parts, numbers 1 to 10.

Equipments

HP Digital Multimeter Model 34401A, TE reference Nr. 93-339033-031.
Agilent Power Supply, Model E3641A, TE reference Nr. 93-339036-019.
HP Power Supply, Model 6571A, TE reference Nr. 93-339036-021.

Specification

No specification.

Requirements

Just informative.

Procedures

Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage to low-level contact resistance test and 1 ampere to high-level contact resistance test.

Results

Low-Level Contact Resistance (100mA)

"A" Splice

Initial Measurement:

Voltage Drop (mV) - "A" Splice		
Sample	MAG 23AWG	Thermo fuse 23AWG
1	0,023	0,016
2	0,001	0,034
3	0,025	0,019
4	0,004	0,021
5	0,012	0,026

"B" Splice

Initial Measurement:

Voltage Drop (mV) - "B" Splice		
Sample	MAG 23AWG	0,75mm ² Wire
6	0,000	0,000
7	0,005	0,000
8	0,016	0,005
9	0,000	0,005
10	0,003	0,002

High-Level Contact Resistance (1A)

"A" Splice

Initial Measurement:

Voltage Drop (mV) - "A" Splice		
Sample	MAG 23AWG	Thermo fuse 23AWG
1	0,515	0,245
2	0,080	0,310
3	0,480	0,372
4	0,100	0,375
5	0,237	0,330

"B" Splice

Initial Measurement:

Voltage Drop (mV) - "B" Splice		
Sample	MAG 23AWG	0,75mm ² Wire
6	0,150	0,015
7	0,115	0,000
8	0,175	0,064
9	0,080	0,045
10	0,085	0,018

2.2 – Thermal Shock

Samples

10 parts, numbers 1 to 10.

Equipments

Fanem Ovem Incubator, Model 320E, TE reference Nr. 92-339031-1065.

Indrel Industrial Freezer, Model IULT 364 D, TE reference 93-339032-008

Specification

No specification.

Requirements

Just informative.

Procedures

Subject specimens to 25 cycles between -65 and 150°C with 30 minutes of dwells at extreme temperatures

Transition time: $\leq 1m$

Results

Results will be shown at item 2.3

2.3 – Low/High - Level Contact Resistance

Samples

10 parts, numbers 1 to 10.

Equipments

HP Digital Multimeter Model 34401A, TE reference Nr. 93-339033-031.

Agilent Power Supply, Model E3641A, TE reference Nr. 93-339036-019.

HP Power Supply, Model 6571A, TE reference Nr. 93-339036-021.

Specification

No specification.

Requirements

Just informative.

Procedures

Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage to low-level contact resistance test and 1 ampere to high-level contact resistance test.

Results

Low-Level Contact Resistance (100mA)

"A" Splice

Final Measurement:

Voltage Drop (mV) - "A" Splice		
Sample	MAG 23AWG	Thermo fuse 23AWG
1	0,074	0,033
2	0,015	0,037
3	0,072	0,026
4	0,019	0,050
5	0,014	0,027

Maximum Variation	Average Variation
0,051	0,019

"B" Splice

Final Measurement:

Voltage Drop (mV) - "B" Splice		
Sample	MAG 23AWG	0,75mm ² Wire
6	0,028	0,009
7	0,015	0,003
8	0,032	0,007
9	0,012	0,009
10	0,018	0,005

Maximum Variation	Average Variation
0,028	0,010

High-Level Contact Resistance (1A)

"A" Splice

Final Measurement:

Voltage Drop (mV) - "A" Splice		
Sample	MAG 23AWG	Thermo fuse 23AWG
1	1,110	0,448
2	0,538	0,580
3	1,080	0,615
4	0,595	0,637
5	0,722	0,592

Maximum Variation	Average Variation
0,6	0,387

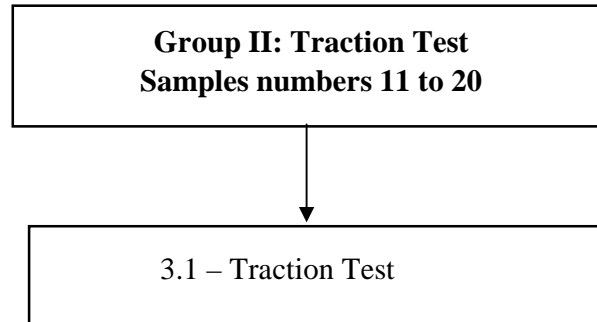
Final Measurement:

Voltage Drop (mV) - "B" Splice		
Sample	MAG 23AWG	0,75mm ² Wire
6	0,565	0,390
7	0,505	0,340
8	0,610	0,435
9	0,495	0,370
10	0,510	0,407

Maximum Variation	Average Variation
0,435	0,388

3 - Group II: Traction Test

Sequence:



3.1 - Traction Test

Samples

10 parts, numbers 11 to 20.

Equipments

Instron Traction Machine, TE reference NR. 92.339017-085

Specification

No specification.

Requirements

Crimping traction resistance shall be greater than 70% of wire traction resistance.

Procedures

Submit specimens to traction until reaches the breaking point and record the peak force.

Results

"A" Splice

Thermo fuse 23AWG + MAG Copper Wire 23AWG			
Breaking Force [N]			
Sample	Wire + Connector	Only Wire	Percent
11	66,46	66,68	99,67%
12	66,68	66,68	100,00%
13	66,51	66,68	99,75%
14	65,65	66,68	98,46%
15	65,54	66,68	98,29%

"B" Splice

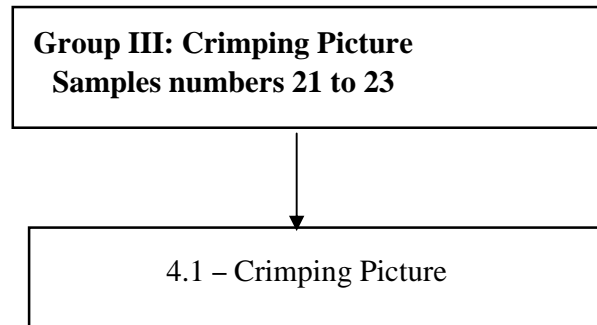
Wire 0,75mm ² = MAG Copper Wire 23AWG			
Breaking Force [N]			
Sample	Wire + Connector	Only Wire	Percent
16	66,68	66,68	100,00%
17	66,68	66,68	100,00%
18	66,68	66,68	100,00%
19	66,68	66,68	100,00%
20	66,60	66,68	99,88%

Conclusion

Samples meet the requirements.

4 - Group III: Crimping Picture

Sequence:



4.1 – Crimping Picture

Samples

3 parts, numbers 21 to 23.

Equipments

Zeiss Microscope, Model Stemi 2000-C

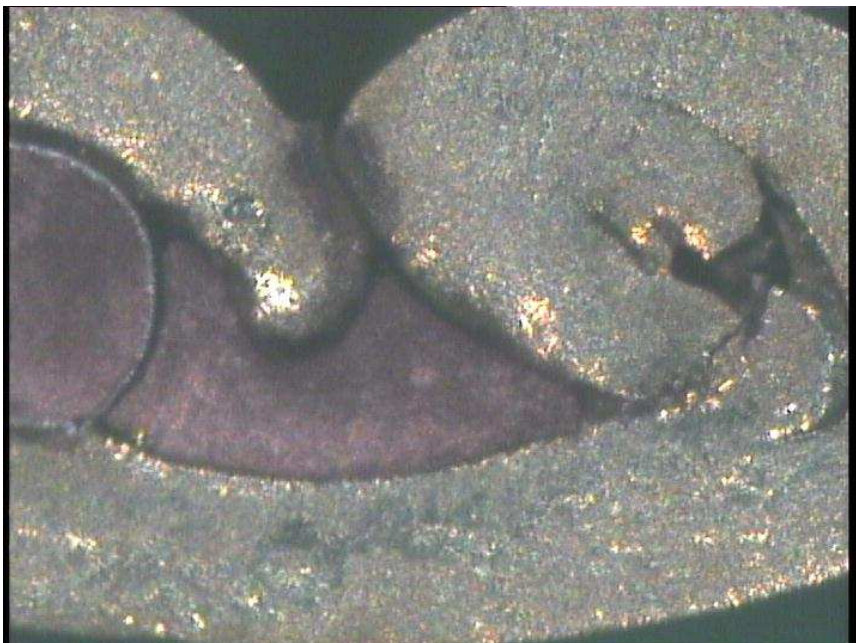
Specification

No specification

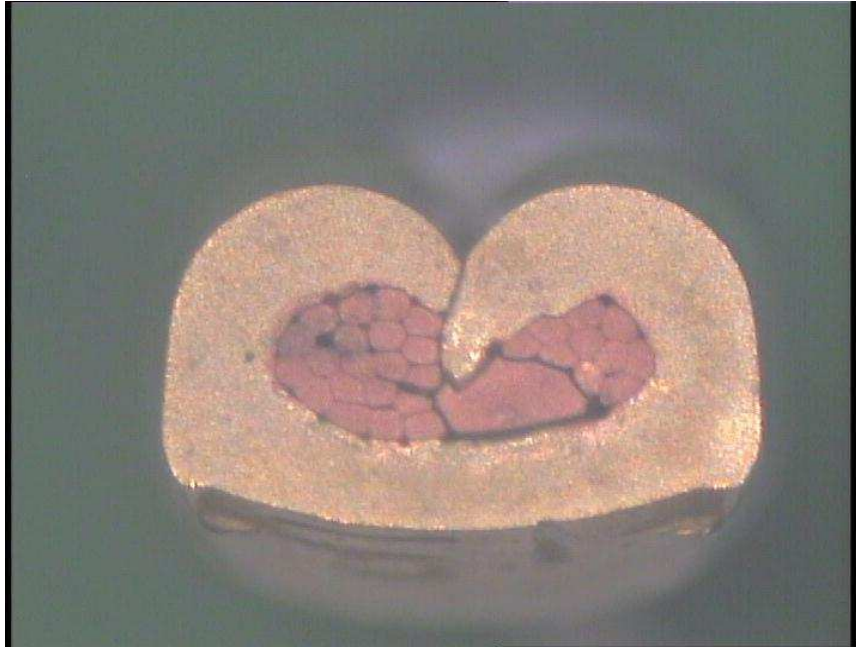
Requirements

Informative test.

Nr. 1: "A" Splice. Thermo fuse 23 AWG + MAG Copper 23AWG.



Nr. 2: "B" Splice. MAG copper 23 AWG + 0,75mm² wire



Nr. 3: "B" Splice. MAG copper 23 AWG + 0,75mm² wire

