

MITSUBISHI
4/6/2005
LETTER TO ODI
ATTACHMENT
DOCUMENT NO. 26 - 34
PART 4 OF 4

Document No.26

Yasuhiro
Sakamoto/MOPDEOK
2001/08/08 18:48

宛先: Sukiyoshi Nakashima/MOPDEOK, Shiro Harada/MOPDEOK, Yuuji
Tozuka/MOPDEOK, Minoru Tabemoto/MOPDEOK, Yuuji
Kamiyama/MOPDEOK, Toohyuki Takahashi/MOPDEOK

Title: Result of OVERVOLT HEAD LI HI & LO Simultaneous ON TEST
at Vehicle

To: Int design Mr. Nakashima, MGR
Electrical System Design Mr. Harada, MGR
Electronics Testing Mr. Tabemoto, MGR
Mr. Kamiyama, MGR

This is Sakamoto from Etc testing.

Let me inform the test result of the test above.
As for detail, please see attached.

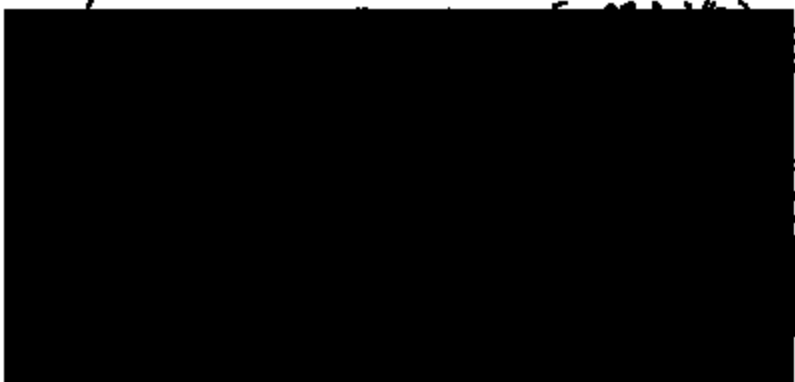
Abstract Terminal Terminal
Lo端子 GND端子

Terminal Temperature	Terminal Lo端子	Terminal GND端子
Eng Off	139.8°C	184.5°C
アイドル Idle	116.1°C	130.5°C

(参考)(Reference) only

Eng Off, Lot-上のみ	98.7°C	83.8°C
アイドル, Lot-上のみ	83.8°C	78.4°C

所見 Opinion:



High temperature is smaller at Idle, but
this can be guessed as radiator fan
activation which flows the atmosphere
and lamp surface temperature radiation is
expedited.
At HI & LO simultaneous on, the terminal temp.
reach to 159.5°C. There is 10.8A current on
terminal at on board test.

Actual simultaneous HI/LO on has been
done for 2 hours with no shape change
However, when touches there, there is
high temperature and it may be deformed
by heat if continued.

However on actual running condition,
there will be no problem.

DLT
- hlp h1.xls 08.01 15:38

"OVERSPEC HEAD LAMP Hi/Lo Simultaneous ON" vehicle test

Hi/Lo Simultaneous ON Test

(Reference Data)
(参考データ)

After run
Lo only

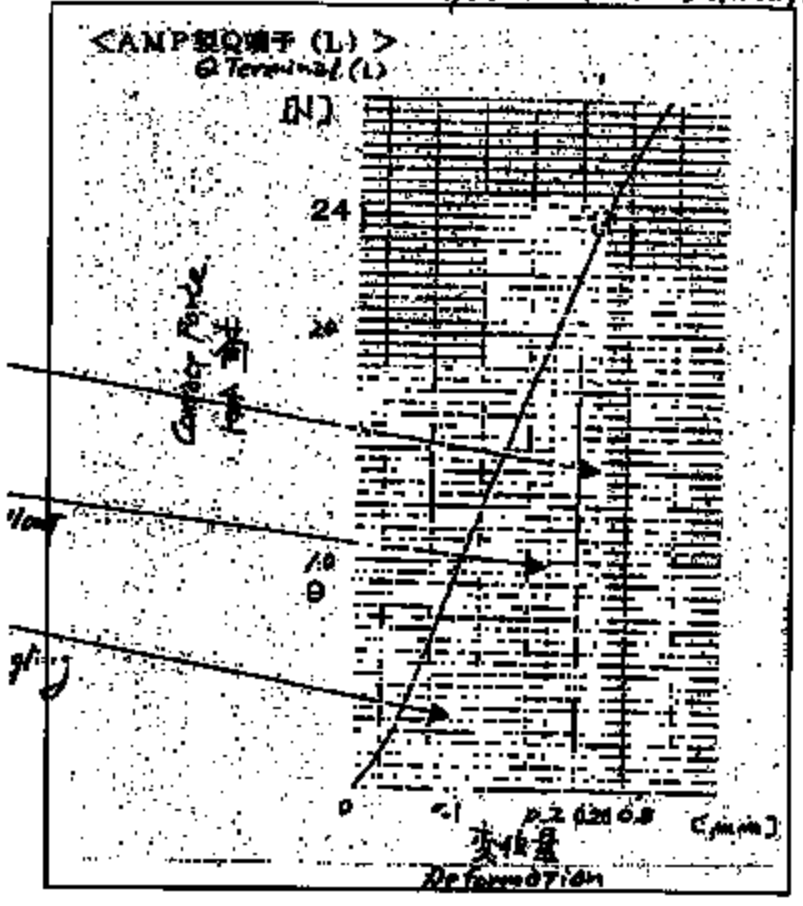
Measurement Point	TEST CONDITION 試験状態	VEHICLE 車両 02MY ST28 4GB4 M/T H/LAMPヘッドランプ Vehicle Right Side 車体右側 Eng OFF	Hi/Lo Simultaneous 25.1	Hi/Lo Simultaneous 26.2
Atmosphere	Lamp terminal (Lo)		139.8	115.1
	(Sw)		154.5	130.6
	(Hi)		130.4	125.3
	Full body connector side body portion		216.0	204.3
	Full body insulation Hook		201.4	193.3
	Lamp Harness		48.8	51.4
	Atmosphere of behind lamps		31.4	42.9
Test Condition	<ul style="list-style-type: none"> ランプ: GE H82 アンペア: AMP 型 (0.5sec-4A) 端子電圧: 18.5V印可 Eng OFFはフード開、アイドルはフード閉で測定実施 Eng OFF: Hood Open Idle: Hood Close 			

Vehicle Right Side 車体右側	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	02MY ST28 4GB4 M/T	
Eng OFF	Lo	Lo	Lo	Lo	Lo	Lo	Lo	Lo	
22.0	22.0	-	24.2	23.4	96.7	65.5	83.5	93.6	57.4
93.8	76.5	78.4	108.8	57.0	98.8	76.5	78.4	108.8	57.0
80.8	53.0	82.0	98.2	49.4	129.5	103.0	119.4	166.0	91.4
121.7	102.0	118.0	92.5	56.5	42.9	29.0	35.0	-	-
23.8	23.0	47.0	-	-	-	-	-	-	-
◆以前配布のデータ引用 Previous Data						◆ランプ: GE H82 アンペア: AMP 型 (0.5sec-4A) 端子電圧: 18.5V印可 Terminal Voltage 18.5V			

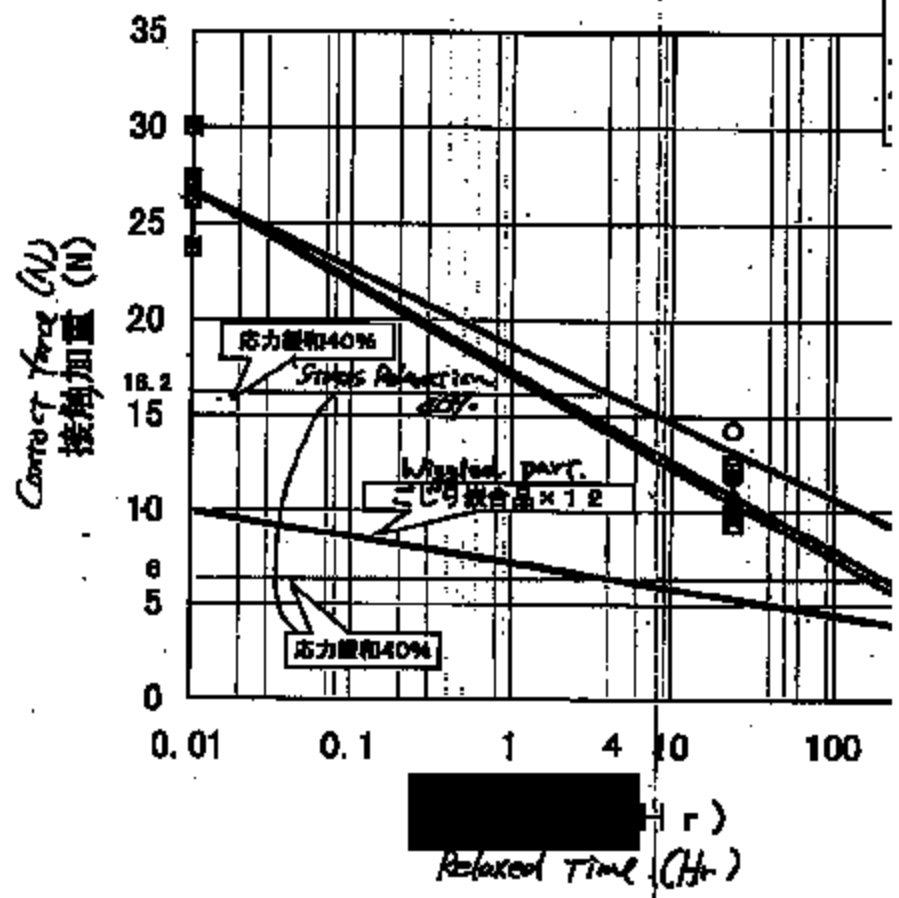
Document No.27

18.00	Max	0.51	0.58	0.56
17.83	Ave	0.51	0.56	0.56
17.50	Min	0.51	0.58	0.56

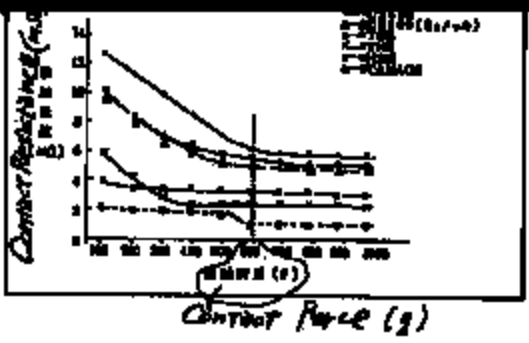
Initial Over time insertion & pullout 3 times insertion & pullout



Terminal stress relaxation



Unit	計算値 (Calculation)
	106.95
	0.25T
	0.2 ± 0.06
	21.4



まとめ Summary

The lowest recommended contact force is 6.0N for its stability



Under ca

Document No.28

No. _____ DATE: 7 July 2001

to: Mr. Tatum, MMMA-PC to: Mr. Perkins, MMMA-MFG cc: Mr. Nono, MMMA-QC cc: Mr. Lawrence, MMMA-P&S cc: Mr. Funakoshi, MMC-Quality promotion cc: Mr. Hargane, M Project, MMC	to: Mr. Mixer, MMMA-PE cc: Mr. Tanaka, MMA-PSC cc: Mr. Yamane / Mr. Mae, MRDA-BN cc: Mr. Kubo Yazaki NAB cc: Mr. Nakashima, MMC-Interior designing cc: Mr. Kamiya, MMC-Ele testing
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From: Wada, MMC- ELE DESIGN
(Written by Y.Tozuka)

Sender No: _____ Ref.No: _____ Subject: _____
M.I.D.1 - 0010 Request to Process Pre-Production EO for ST41/24/28 Head Light connector change

Dear Sir:

Thank you very much for your dally cooperation.

Please process the pre-production EO, to validate new ST41/24/28 head light connector insertion workability / quality.
 The production change will be done by EO BP1812 for 02MY in order to avoid terminal twisting insertion, informed by LSS1- 0078.
 This is the pre-production trial to pre confirm the change.

Abstract of trial:
 To change head light connector type from AMP to Yazaki made (LH & RH).

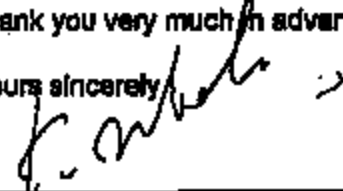
Object cars: 50 cars for 02 ST41, 50 cars for 02 ST24S

For harnesses preparation, please discuss with supplier Yazaki asking their cooperation.
 (Please order exactly which car to be evaluated)

Part Name & No.	EO No.	REASON	CONTENTS
Pre-Production EO	BM4769	To avoid terminal twisting insertion	To change head light connector type (IS)Yazaki NQ type ↑ (WAS)AMP Q type

To PE/MFG-MMMA:
 Please issue a trial report to all related parties with summarizing all MMMA-parties result, if we have a fatal problem or not against the proposed connector.
 We are pleased if you can apply to this by end of July '01.

Thank you very much in advance.

Yours sincerely

 Kenichiro Wada

ENGINEERING ORDER (P)

PRODUCTION ORDER

RELEASE OF LIST	RE-RELEASE OF DWG	RE-RELEASE OF CPT	RE-RELEASE OF SPEC	ORDER FOR PRODUCTION	GENERAL REQUIREMENT
CHANGE OF LIST	CHANGE OF DWG	CHANGE OF CPT	CHANGE OF SPEC	ORDER FOR TEST	SUPERSEDES OF ED
ABOLITION OF LIST	ABOLITION OF DWG	ABOLITION OF CPT	ABOLITION OF SPEC	LABOR PRODUCTION	CANCELLATION OF ED
RE-REVISION OF LIST	RE-REVISION OF DWG	RE-REVISION OF CPT	RE-REVISION OF SPEC	PRE-PRODUCTION	
TEMPORARY CHANGE OF LIST	TEMPORARY CHANGE OF DWG	TEMPORARY CHANGE OF CPT	TEMPORARY CHANGE OF SPEC		

RELEASE	CHANGE OF PPS
CHANGE	
ABOLITION	
REVISION	

*2. REASON (PROTOTYPE OR PRODUCTION STATUS)

1. SUBJECT	2. PART NO.	3. PART NAME	4. DESCRIPTION	5. DESCRIPTION
PP			This is an EO for PPS - Production of ST4/245/28 Head lamp connector type change, workability & quality confirmation.	AA
			1. Contents of change: Change type of Head lamp connector (U&RH). Details are on (2) (3).	BB
			* The parts are to be prepared by supplier (Yatoki).	CC
			2. Object cars, series, qty: 02 ST4 / X50 cars, 02 ST245 (or 28 or combined) 50 cars (represent ST245 & 28).	DD
			3. Trial report of result: Result should be summarized and reported by HAMA-PE to all the related party (P.C., P.S., EC, MFG, MRMA-MAC) in terms of (a) Workability evaluation (PE, MFG) (b) Quality concerns (QC).	EE
			by 31 July '01.	FF
				GG

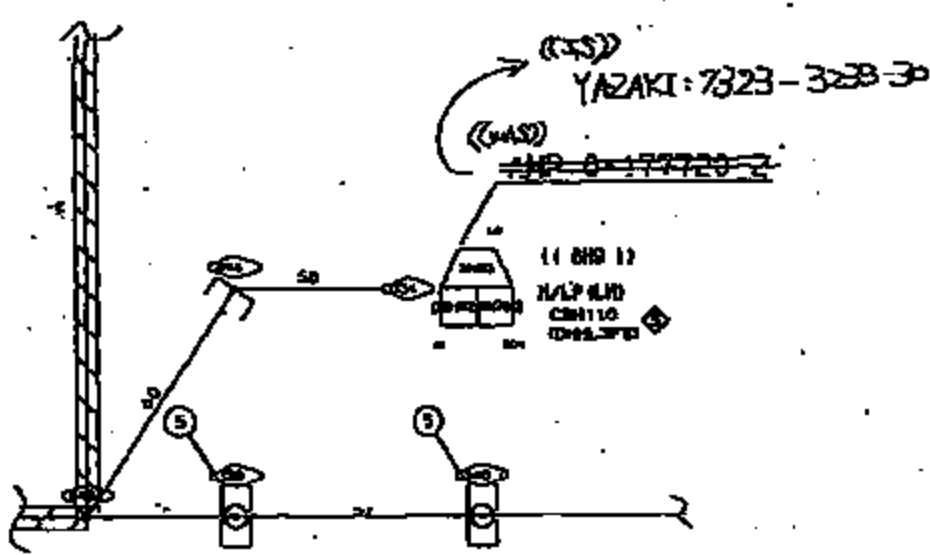
REASON FOR RELEASE (R.L.) To make trial to avoid twisted insertion of head light connector.	REQUESTED BY LETTER: MDT-00/0	EFFECTIVE TO BP18/2	EFFECTIVITY * Above	
	SERVICE BULLETIN <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	TITLE PRE PRODUCTION OF HEAD LIGHT CONNECTOR CHANGE		
	GOVERNMENT APPROVAL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	OWNER'S MANUAL <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	NEW MATL. <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	AIR CHKD <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO
	APPROVED [Signature]	DATE 7/20/01	SECTION TEL: 7-1000A (537)	SECTION TEL: 1-101 (537)
ED NO. ACH REVISION	FULL DATE 01/01/01	MITSUBISHI MOTORS CORPORATION		
		MODEL P3A R200	ED NO. BM.4.7.59 (1/3)	

ST41

ENGINEERING ORDER (A)-

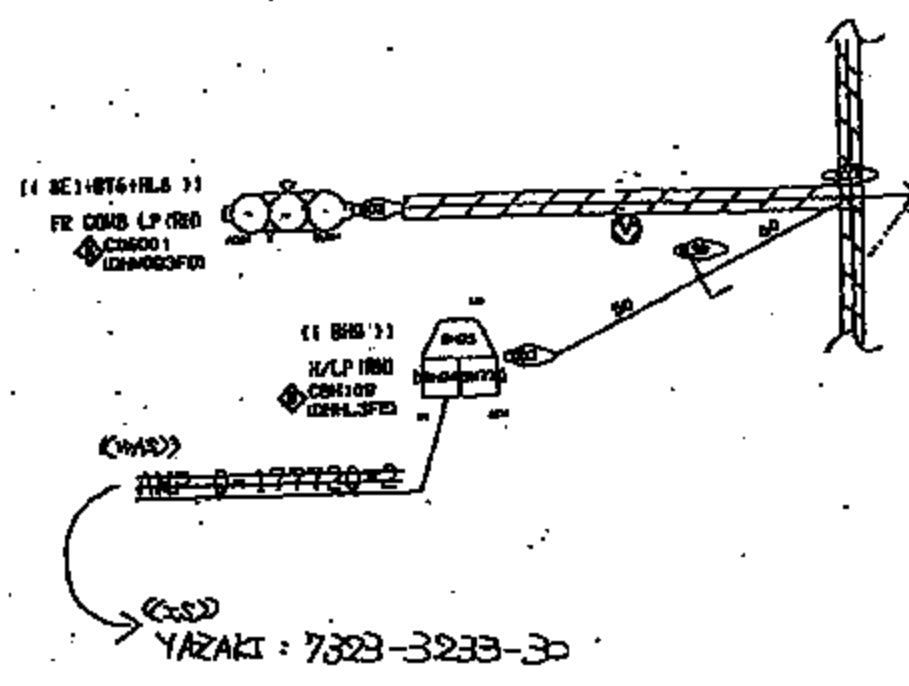
① CHANGE AS FOLLOWS

(LH)



② CHANGE AS FOLLOWS

(RH)



MITSUBISHI MOTORS CORPORATION

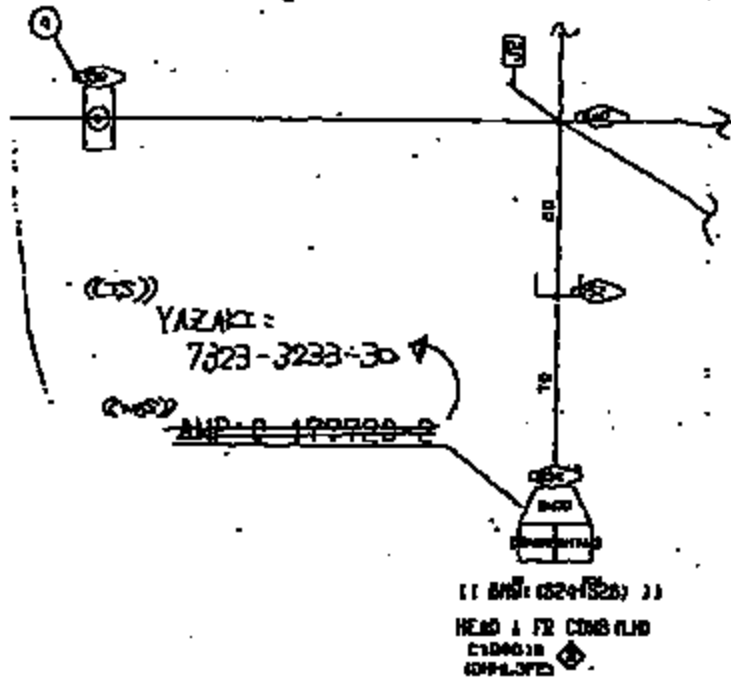
BH4759 (1/2)

ST24/28

ENGINEERING ORDER (A)-1

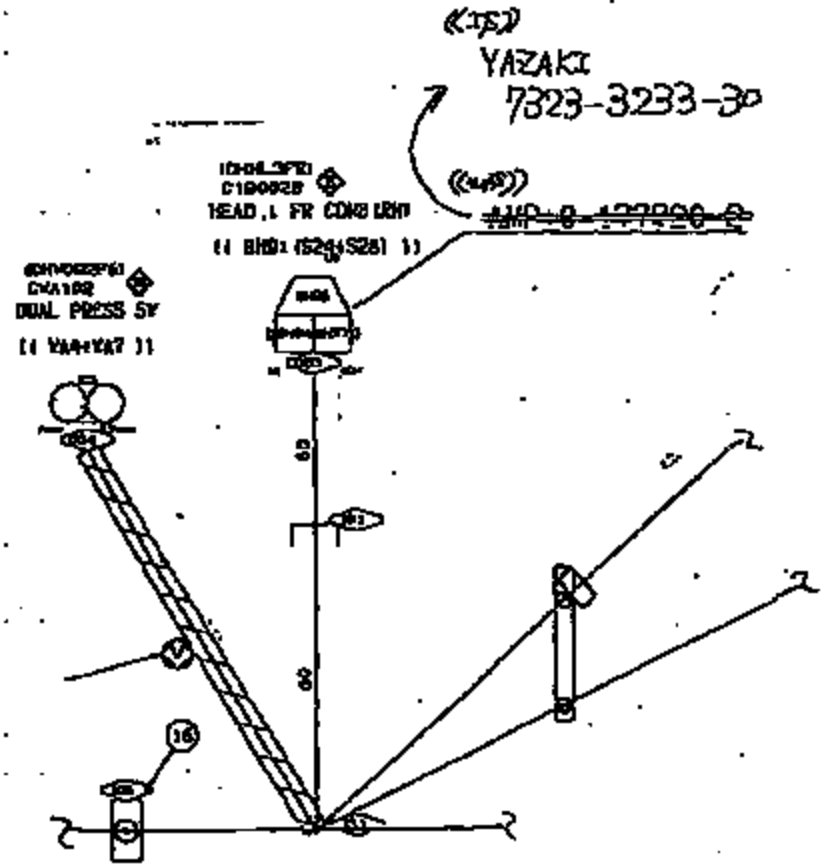
CHANGE AS FOLLOWS

(LH)



CHANGE AS FOLLOWS

(RH)



MITSUBISHI MOTORS CORPORATION

BH4759 (3/)

No. _____

to: Mr. Tatsumi, PC, MMMA
 to: Mr. Nono / Mr. Seki, QC, MMMA
 cc: Mr. Funakoshi, Quality promotion, MMC
 cc: Mr. Nakashima, Int. design, MMC
 cc: Mr. Yamane / Mr. Mae, MRDA-BN

to: Mr. Lawrence, P&S, MMMA
 to: Mr. Rinsheimer, PE, MMMA
 cc: Mr. Hargane, MMMA 系, MMC
 cc: Mr. Teraoka, Body ext. design, MMC
 cc: Mr. Kubo, Yazaki NAB

From: Shiro Harada, ELE-DESIGN, MMC-OKZ
 (Written by Tozuka)

Sender No: LSS1-0078 Ref. No: Subject: Request of changes of Head lamp connector for ST41/24S/28

Dear sir,

Please proceed with the following front harness changing EO, to change the type of Head lamp connector to avoid the connector terminal from being twisted insertion, which might cause the melt of the connector housing.

The new connector has better performance on twisted insertion protection without increasing the insertion force up. The connector manufacturer is to be changed from AMP to Yazaki.

The connector is used for ST41/24/28 model, not to ST22.

We have informed this change preliminary to the harness supplier Yazaki. Please confirm to the supplier for the change.

Part Number&Name	EO No.	Reason of change	Contents of change
MR583221: MR583231 MR588191 MR588281 (02Front harness)	BP1812	To avoid connector terminal from being twisted insertion	To change H/LP connector type
MR588286 MR588281 (03Front harness)	BP1816		To change H/LP connector type

Implementation timing:
 02MY:G
 03MY:D50A P1

If you have any questions, please let me know.
 Thank you very much in advance.

Sincerely yours

S. Harada
 Shiro Harada

ENGINEERING ORDER (P)

PRODUCTION ORDER

*1. 01:RELEASE OF LIST 02:RELEASE OF DWG 03:RELEASE OF CPT 04:RELEASE OF SPEC 05:ORDER FOR PRODUCTION 06:GENERAL REQUIREMENT
 01:CHANGE OF LIST 02:CHANGE OF DWG 03:CHANGE OF CPT 04:CHANGE OF SPEC 05:ORDER FOR TEST 06:SUPERSEDED OF EO
 01:OBSELETION OF LIST 02:OBSELETION OF DWG 03:OBSELETION OF CPT 04:OBSELETION OF SPEC 05:LESS PRODUCTION 06:AMMUCIATION OF EO
 01:REVIVAL OF LIST 02:REVIVAL OF DWG 03:REVIVAL OF CPT 04:REVIVAL OF SPEC 05:PP-PPC PRODUCTION
 01:TEMPORARY CHANGE OF LIST 02:TEMPORARY CHANGE OF DWG 03:TEMPORARY CHANGE OF CPT 04:TEMPORARY CHANGE OF SPEC

*3. 01:RELEASE 02:CHANGE OF PPS
 01:CHANGE 02:OBSELETION
 01:REVIVAL

*2. : 01:PROTOTYPE OR PRODUCTION STATUS

*4. P:PARTS DATA

SUBJECT	DWG-LIST NO.	PART NO.	P P S	PART NAME	DESCRIPTION	E * DESCRIPTION	E * DESCRIPTION	
							ORDERING PART NO.	ORDERING PART NAME
CD	MR583221 (1/)-(2/)	R MR583221-25	M C	WIRING HARNESS,FRONT		<1>'02 ST41 TO CHANGE H/LP CONN TYPE		
CD	MR583231 (1/)-(2/)	K MR583231-33	M C	WIRING HARNESS,FRONT		<2>'02 ST41 TO CHANGE H/LP CONN TYPE		
CD	MR588191 (1/)-(2/)	M MR588191	M C	WIRING HARNESS,FRONT		<3>'02 ST24S/28 TO CHANGE H/LP CONN TYPE		
"	"	" MR588193-97	" C	"				
CD	MR588261 (1/)-(2/)	F MR588261-63	M C	WIRING HARNESS,FRONT		<4>'02 ST24S/28 TO CHANGE H/LP CONN TYPE		

REASON FOR RELEASE (02)
 理由
 (MMA)
 TO AVOID CONNECTOR TERMINAL FROM
 BEING TWISTED INSERTION
 (MMA)

EFFECTIVITY : 0
 EFFECTIVITY
 REASON :
 SIMULTANEOUS EFFECTIVE EO
 REASON REFERENCE EO

REQUESTED BY:
 PEC NO. :
 SERVICE BULLETIN : Y
 GOVERNMENT APPROVALS : N
 OWNER'S MANUAL : N

担当者 : 電装設計
 SECTION : Electrical System Design
 DWN : K. OOHARA TELNO : 3944 DATE : 2001.04.13
 CHKD : Y. TODUKA
 APVD : S. HARADA
 MATL : / HOWOL :

フォーニング(実施予定)
 (1) : 年 月 日
 (2) : 年 月 日
 (3) : 年 月 日
 年 式 ~
 指 定 : 年 月 日
 D/B反映 : 年 月 日
 切替条件

納入予定 : 年 月 日
 ワイン区分 :
 先行実施 : 可・否
 管理区分 : A・B・C・Z
 図 書 者 : 有・無
 生産管理システム
 備考 :

品名 :
 TITLE: WIRING HARNESS FRONT

ED NO.	REVISION	DATE	CHKD

MITSUBISHI MOTORS CORPORATION

車 種 MODEL : EA3A 050A ED NO. : BP1812 PAGE : 1/3

E
 N
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 CL

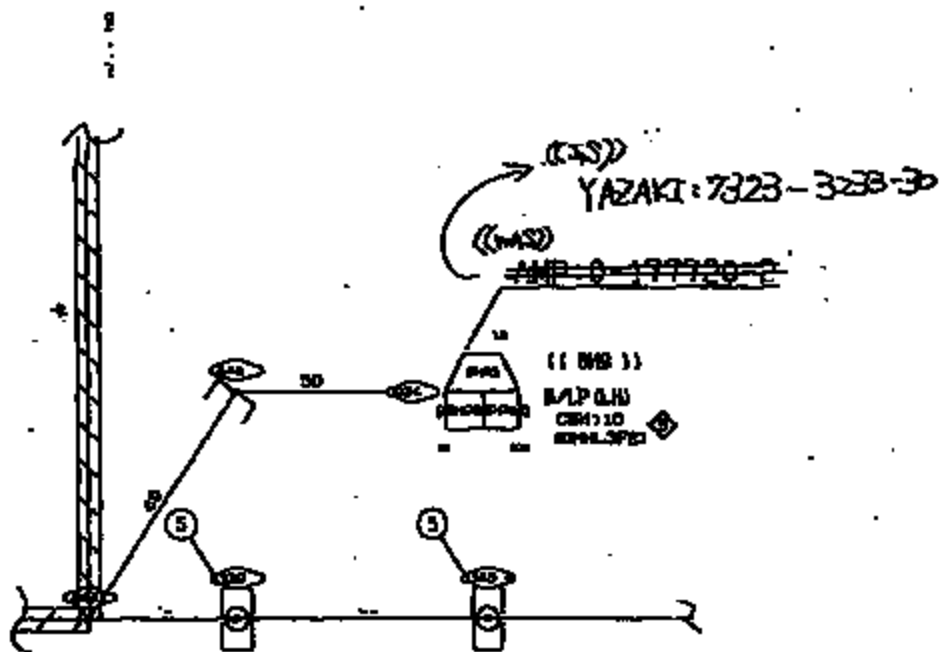
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ENGINEERING ORDER (A)-1

ST41

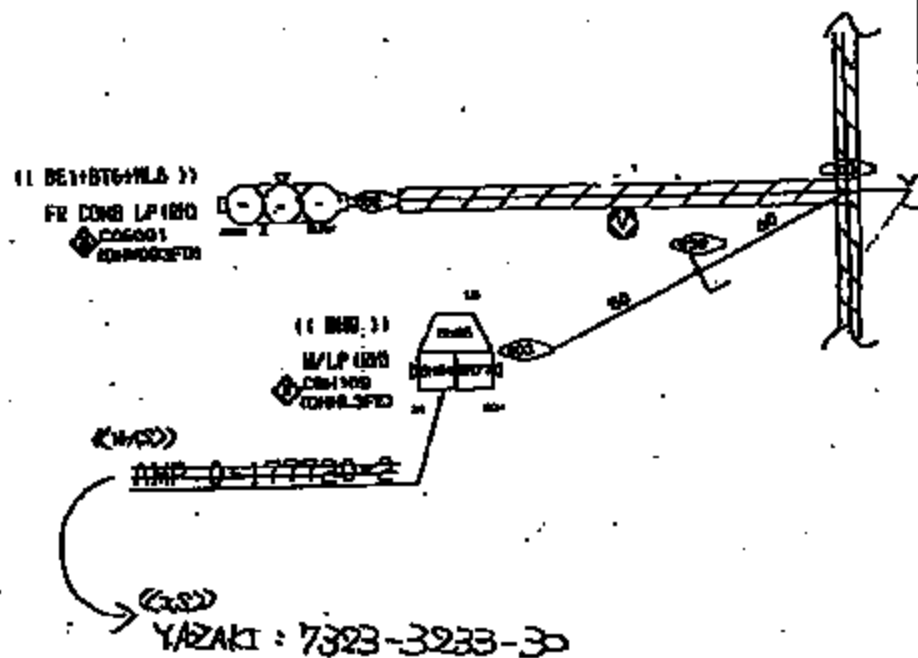
CHANGE AS FOLLOWS

(LH)



CHANGE AS FOLLOWS

(RH)



mitsubishi motors corporation

2000-11-14 08-11-14

BP.18.12(1/2)

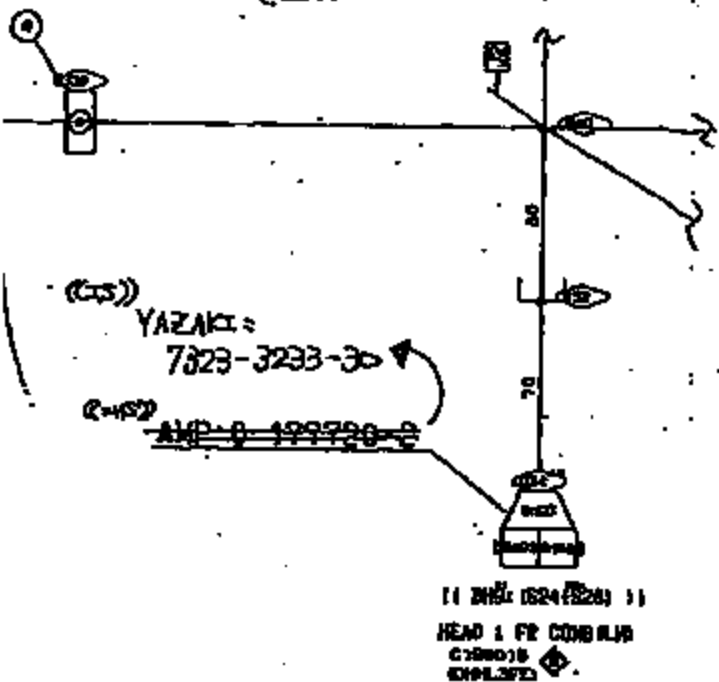
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ENGINEERING ORDER (A)-1

ST24/28

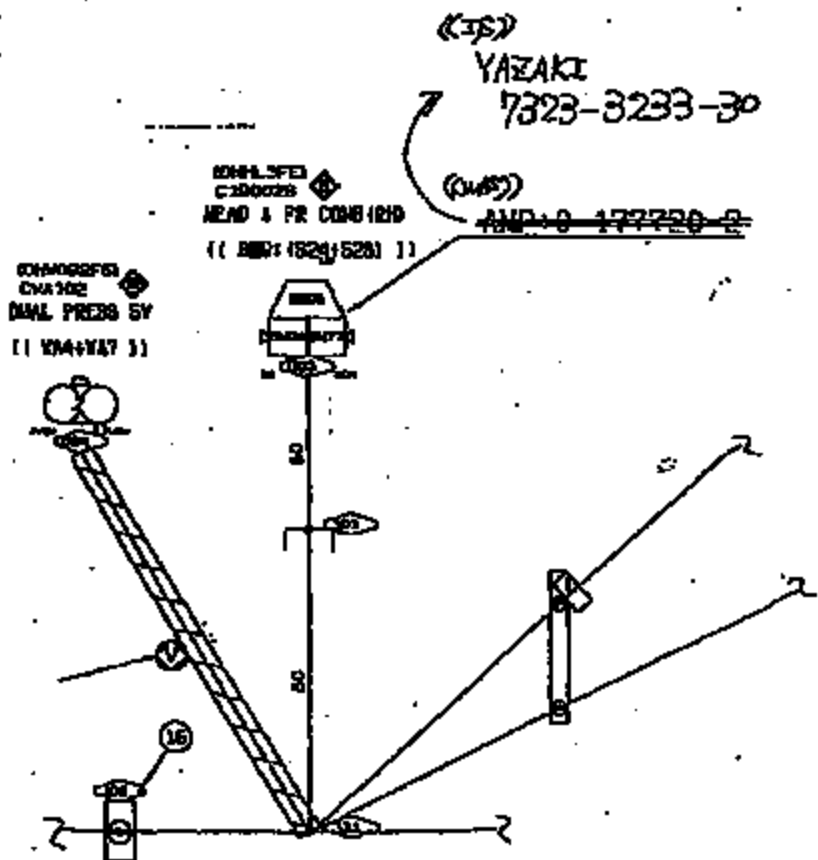
CHANGE AS FOLLOWS

(LH)



CHANGE AS FOLLOWS

(RH)



MITSUBISHI MOTORS CORPORATION

EO INT EO NO.
BP1812 (3/)

R/E

Document No.29

causes the wireharness to melt on MMMA vehicles.

investigate the Headlight wireharness deformation. The
available for an investigation, but following information was

enger side Headlight Wire harness, bulb was operable. The
not an OEM part (custom made by the dealer). The driver
also replaced due to the vehicle's involvement in an
re harness is not an OEM part.

enger side Headlight bulb due to defective

DA - AA S. Mac - MRDA - BN P. Reynolds - MMSA
5 Essington Ave. Philadelphia, PA

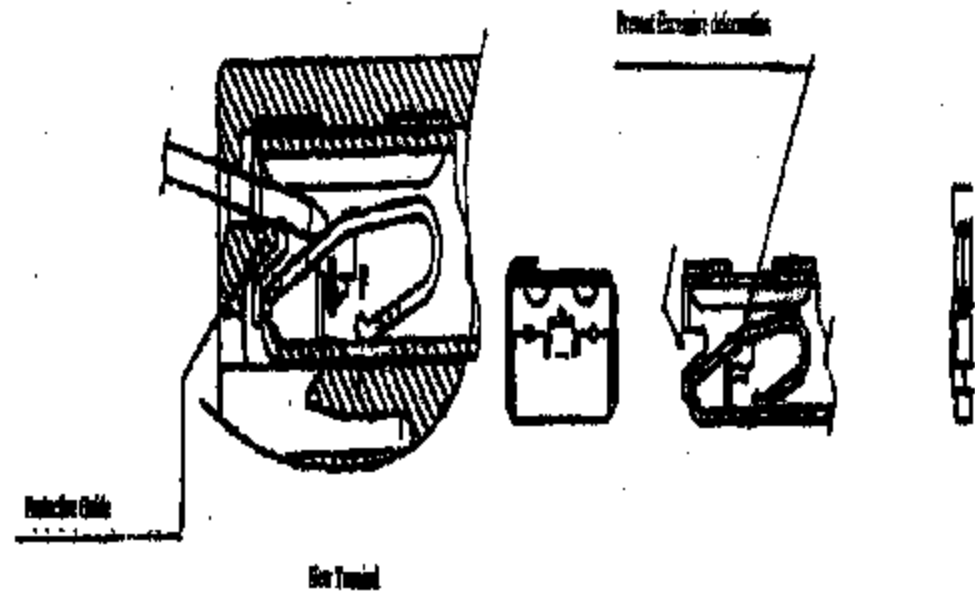
de:
female connector was found to be acceptable (btw 0.660mm - 0.711mm).
s found on the connector, the material helps prevent corrosion.
e inside the headlight.

are required when replacing a defective light bulb.
res high force, wiggling) following can occur:
terminal -> Terminal Deformation -> Low Contacts Pressure ->
contacts -> Rising of Contacts Temperature -> Melt Connector
terminal -> Terminal Deformation -> Low Contacts Pressure -> Loose
ion -> Sparking/Discharging -> Increase of Resistance at Contacts ->
ature -> Melt Connector

7.1 Future Action

7.1 The wire harness design will be changed in Aug. 01 (running change)!

- * Adoption of Anti-wiggling terminal:
- * Built-in protective guide at every cavity
- * Spring type contact for prevention of terminal deformation
- * Terminal Material Change: From Brass (threshold: 120 D.C.) to a



7.2 MMC to change the design for the bulb bracket(holder). Current design c
(lot of play).



Document No. 3 0

Meeting Minutes - '01 June Monthly Quality Meeting

MMMA ST24/28/41 Melt Headlamp Connector

1. Returned Parts:

(1) MMC received 11 warranty parts and investigated them (Refer to appendix 1).

- Loose terminal contacts and melt connector housing at ground/common terminal.
- Spark mark can be observed on bulb terminal
- Qualitative analysis shows little salt damage/brine damage.
- No specific regional difference.

(2) Occurrence of the problem (Weibull distribution analysis; Refer to XDR1-160047):

Wear-out failure outbreaks in MMMA ST series.

Destination	Vehicle	M	F(36)	F(60)	Frequency	Production Volume
MMSA	ST41	2.1	0.37	2.1	365	233540
	ST24/28	2.2	1.29	3.95	134	129164
	MG	0.9	0.01	0.01	7	196493
	P45	1.4	0.01	0.03	11	233290
JAPAN	DZL	0.9	0.05	0.12	27	167998
EU	ST41	1.5	0.02	0.04	12	86999

(Production period: 05/1995-04/2001);

($M < 0.8$: initial failure; $0.8 \leq M < 1.2$: random failure; $1.2 \leq M$: wear-out failure)

($F(n)$: rate of occurrence within 'n' months after sale date.)

2. FTA (Refer to appendix 2-1, 2-2):

- (1) Wiggling of connector/terminal → Terminal Deformation → Low Contacts Pressure → Increase of Resistance at Contacts → Rising of Contacts Temperature → Melt Connector
- (2) Wiggling of connector/terminal → Terminal Deformation → Low Contacts Pressure → Loose Contacts Caused by Vibration → Sparking/Discharging → Increase of Resistance at Contacts → Rising of Contacts Temperature → Melt Connector

3. Vehicle Investigation Result:

(1) Headlamp Terminal Temperature (Refer to Appendix 3-1, 3-2)

- Driving Condition: ST41/24(V6)'s headlamp terminal (low beam) temperature was 121.6 D.C. which was higher than P45 by approx. 20 D.C. and higher than Camry by approx. 30 D.C.
- Lab Condition: ST41 showed 111 D.C. which was higher than CK by approx. 25 D.C. and higher than Camry by approx. 20 D.C.

(2) Wiggling Test (Simulation of Bad Installation): Appendix 4

- 2 times of Wiggling test with 13 specimen of ST41 and ST24 showed deterioration:

Gap between Contacts: 0.54 mm → 0.70 mm;

Displacement: 0.22 mm → 0.06 mm (displaced by male terminal (t=0.76) insertion)

Wiggling reduces contacts nominal pressure from 1400 g to 400 g.

- ST24 has inferior workability to ST41 due to work space behind the headlamp.

ST24 has higher potential wiggling insertion than ST41.

(3) Duplication of the Problem:

- By applying doubled vibration (compared to the Cross-Country test road) to enlarged gap terminal (0.74 mm), the problem could be duplicated at 10 hours driving.

- The problem could be duplicated with smaller gap terminals, such as 0.72 mm, 0.70 mm, 0.68 mm.

- Temperature at terminal reached up to 180 D.C. after 14 days of continuous lighting test.

(During the test, water was applied once a day.)

4. Supposition of Mechanism/Factor:

According to the result of FTA and duplication test, MMC suppose following mechanism and factor:

(a) Wiggling while installation → Low Contacts Pressure → Increase of Resistance at Contacts →

Rising of Contacts Temperature → Overcoming of Applicable Temperature to the Brass Terminal

(120 D.C.) → Decrease of Contacts Pressure → Increase of Terminal Gap → Sparking/Discharging

between Terminals → Formation of Oxide Layer → Increase of Resistance at Contacts → Rising

of Contacts Temperature → Melt Connector (Wiggling + High Temperature + Vibration)

(b) Design Overlooking:

Since the terminal and its connector has been used for long time, MMC overlooked its

disadvantage: Vulnerable to wiggling insertion.

5. Countermeasures:

(1) Production Vehicle: EO BP1812 was issued on June 12th, 2001 to adopt new connector and terminal to ST41,24, and 28.

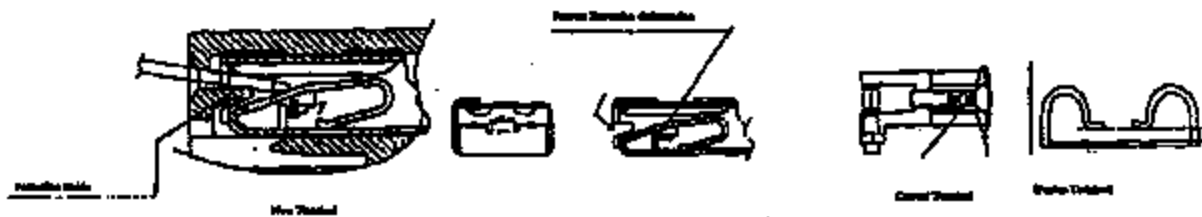
- Adoption of Anti-wiggling terminal:

Built-in protective guide at every cavity

Spring type contact for prevention of terminal deformation

- Terminal Material Change:

From brass (threshold: 120 D.C.) to a Copper alloy (threshold :140 D.C.)



(2) Built Vehicle (Vehicle in field):

Replace service parts MB943536 with MU800585.

6. Action Plan for Another Application:

(1) Adopt same terminal/connector to DZ/DZL, JT41, JT44X, JT44XL, CB, CBZ, RG, RGW, KS, P, P45, KR, CK, MGX, DX: by July 10th 2001.

(2) Analyze any factor of why MMMA STs have so high occurrence (Refer to appendix 5-1, 5-2).

(3) Propose MMMA to standardize its installation method: Connect before headlamp installation.

7. Prevention of Re-occurrence of Similar Problem:

(1) High current connector and terminals on components shall adopt anti-deformation structure.

(2) Collect temperature data from components those produce heat, put them into specifications.

This document was translated by Y. Mox of MRDA.

Headlamp connector

MMMA生産車へ

不具合内容

Date of problem

Date of production

Mileage

Position

Repair

Returned parts condition

Appendix 1

原付
01.6.8
内装部

Remarks

車種	VIN	ENG	Dealer	Date of production	Mileage	Position	Repair	Returned parts condition	Remarks
1	0001ent 4A3AA48G4Y	4084/A/T	IL, CHICAGO	89.7.14	01,52	2888	RH		01.10.27:3527交換 Column SW ve
2	0001ent 4A3AA48G3Y	4084/A/T	CA, CORONA	89.10.14	01,62	28621			1-1-AIMP low beam ll
3	0001ent 4A3AA48G0Y	4084/A/T	TX, HOUSTON	00.1.20	01,81	28761	LH, RH		Crack on cc
4	0001ent 4A3AC84L8Y	8072/A/T	NY, ELMHURST	89.7.18	01,62	14420	RH		01.52:3527交換 Column SW ve
5	0001ent 4A3AC54L8Y	8072/M/T	DE, WILMINGTON	89.10.21	01,418	24000	LH, RH		外527交換.1977 H/L, Batter replaced
6	0001ent 4A3AC54L8Y	8072/A/T	PA, PHILA	89.11.22	01,110	18885			7交換01.4.18
					01,412	18683			2nd time
7	0101ent 4A3AC84H11	8072/A/T	NY, GRENDALE	01.1.8	01,82	2402	RH		
8	9901ent 4A3AA48L20	8072/A/T	VA, HAMPTON	89.8.18	08,103	23421	RH		01.12.20:LH&R交換 LH bulb ve
					01,424	34281			01.10.31:276SW交換 Column SW 1
9	0001ent 4A3AC34G0Y	4084/A/T	IN, LEBANON	00.2.7	01,411	18843	RH		
10	0001ent 4A3AC54L8Y	8072/M/T	IN, RUSHVILLE	00.2.26	01,418	21638	RH		
11	0001ent 4A3AC44G0Y				01,421	18774	RH		

bulb replacement
connector replacement

connector, bulb, fuse replacement

arc mark on bulb
con terminal (ground) melt

connector melted

con terminal (ground)
gap enlarged.

Appendix 1-1/1

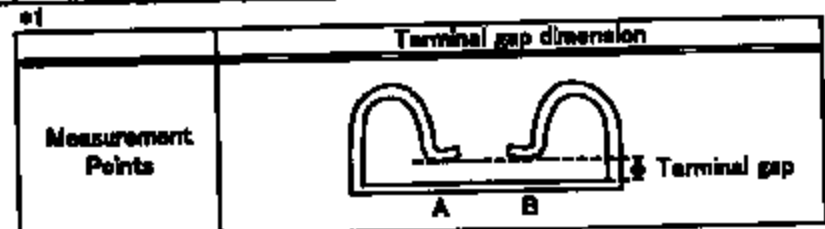
Return parts investigation

No	Model	VIN	Date of prod.	Date of problem	Mileage	Position	Remarks
1	Galant	4A3AA4604Y	99.07.14	01.05.02	29885	RH	Bulb & connector (in ASSY condition) returned
2	Galant	4A3AA4605Y	99.10.14	01.05.02	29621	—	Bulb & connector (in disassembled condition) returned
3	Galant	4A3AA4600Y	00.01.20	01.05.01	28751	LH&RH	LH&RH connector returned (One COM terminal missing)
4	Eclipse	4A3AC84L8Y	99.07.13	01.05.02	14420	RH	Only connector returned
5	Eclipse	4A3AC54L0Y	99.10.21	01.04.18	24000	LH&RH	Bulb & connector (disassembled) returned (COM term. mis)
6	Eclipse	4A3AC54L5Y	99.11.22	01.01.10	16896	—	Only connector returned
7	Eclipse	4A3AC84H11	01.01.09	01.05.02	3402	RH	Only connector returned

		Measurement result								
		Sample 1	Sample 2	Sample 3-1	Sample 3-2	Sample 4	Sample 5	Sample 6	Sample 7	
Contact resist. (press contact portion) (m ohm)	COM							N/A (0.52)	N/A (0.72)	
	Lo	5.01 (0.33)	8.29 (0.27)	4.18 (0.16)		8.08 (0.08)	7.45 (0.53)	4.81 (0.01)	7.05 (0.09)	
	Hi	4.38 (0.87)	8.97 (0.34)	5.07 (0.07)	8.18 (0.14)	8.88 (0.18)	4.18 (0.31)	5.28 (0.02)	6.89 (0.28)	
Terminal gap (mm) Initial: 0.54±0.05mm	COM	A								
		B								
	Lo	A	0.88	0.85	0.87		0.65		0.88	0.88
		B	0.87	0.84	0.67		0.64		0.67	0.67
	Hi	A	0.85	0.88	0.87	0.85	0.82	0.88	0.87	0.85
		B	0.85	0.88	0.88	0.86	0.83	0.88	0.88	0.85
Term. appearance	COM #2	—	Arc mark on terminal contact surface	—	Arc mark on terminal contact surface	←	←	←	←	

N/A : Measurement is not possible

Qualitative analysis	Terminal corroded		Discolored thinning	
	much	Cu, Cu	much	Cu, Sn
	not much	C, O, Zn, Cl	not much	C, S, Zn, Cl
	a little		a little	O

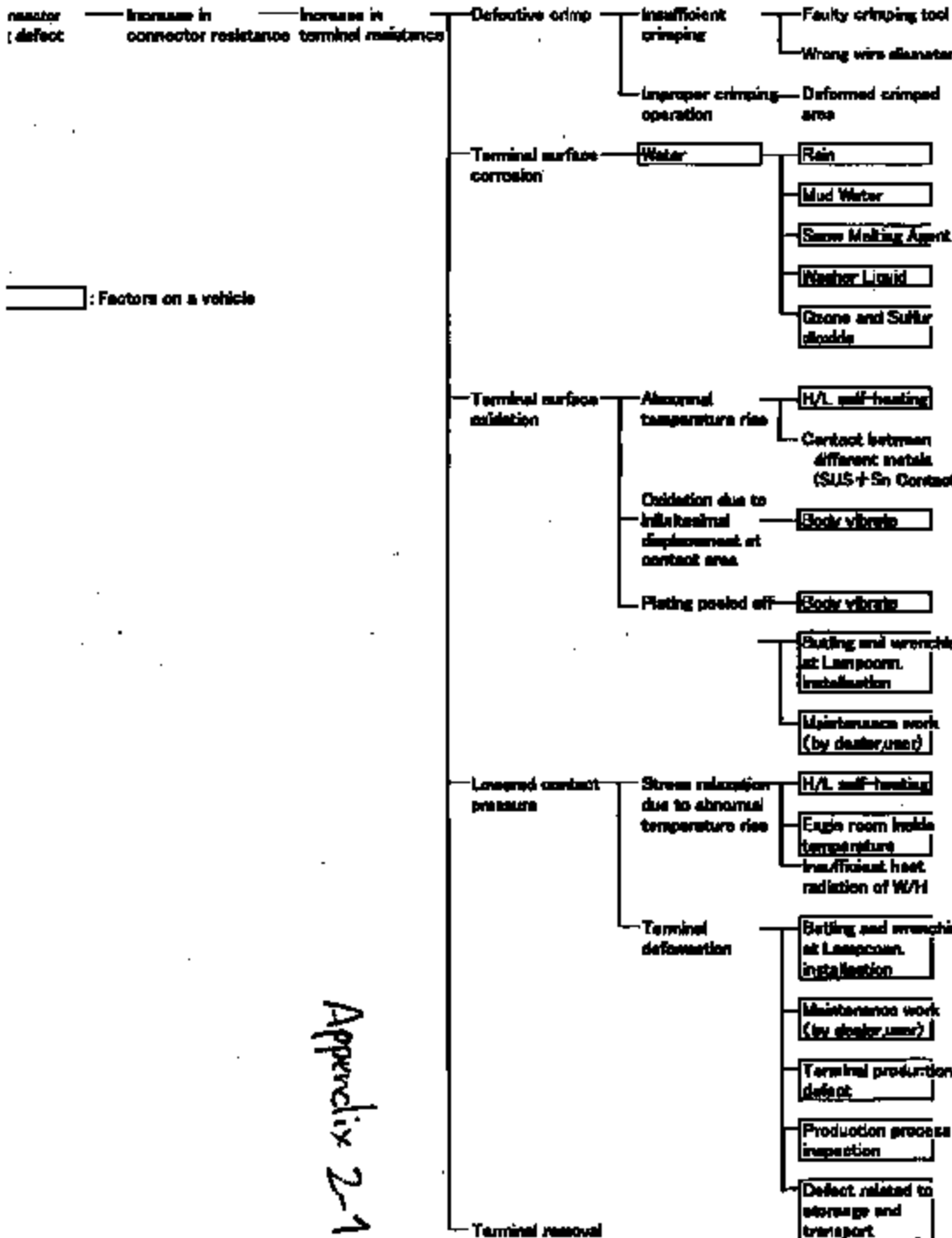


*2 : Lo terminal checked only on sample 5

■ Malted portions

Summary

- Contact resistance of the terminals melted are very high although press contact resistance are low.
- Gaps of the terminal melted are wider than the other terminals and the gaps are the same as male terminal thickness or wider than male terminal.
- Appearances of arc marks on the terminal contact surface are similar with the arc mark caused on simulation test.
- From qualitative analysis, Cl which is found on the both of terminal corroded and discolored thinning portions caused by melted wire cover.



Check result

Bench test	
Checked the products crimped at Yazaki factories.(EMI, YTM, DIT, NIM)	No problem with compression rate and crimped area resistance.
Checked the products crimped at Yazaki factories.(EMI, YTM, DIT, NIM)	No deformation caused by inspection etc.

Investigation on the reclaimed parts.

Checked the appearance for water disposition.(sig,rain,etc.)
No corrosive constituent detected from the reclaimed sample qualitative analysis.
No constituent which might cause salt damage detected from the reclaimed sample qualitative analysis.
No harmful constituent detected from the reclaimed sample qualitative analysis.
No harmful constituent detected from the reclaimed sample qualitative analysis.

Test

	AMP Q	Judgment	Y2K MQ	Judgment
Contact force	18.8N→13.0N	-	38.2N→29.2N	-
Wrenching vibration	8.21~72.25mΩ 107.8~144.3°C	x	4.51~8.23mΩ 184.9~114.3°C	○
Wrenching	Initial:20.8N→1st:7.4N →2nd:3.3N→3rd:1.5N	-		
Wrenching during mating	Gap Initial 0.85mm→0.71mm	x	FIRST : 0.37mm→0.42mm	○
Gap 0.8mm→Vibration	116.7~171.4°C (Melting)	x		-
Resistance	3.05~8.10~11.2mΩ	x	3.38~5.22~8.83mΩ	○
Temperature rise deg	38.8~43.8~60.4	-	48.7~51.5~54.3	-
Resistance	After 120°CX120hr Sn-SUS Resistance stabilized at 8N Cu-SUS Increased to Ω order even at 50N			
Salt water examination	2.41~2.90~4.21mΩ	○	2.33~3.05~4.26mΩ	○
Humidity examination				
Sulfurous acid	1.41~3.80~4.98mΩ	○	1.73~3.55~4.85mΩ	○
Multi factor environment	5.98~14.2~20.9mΩ	x	3.08~5.30~8.41mΩ	○
Resistance	After 120°CX120hr Sn-SUS Resistance stabilized at 8N Cu-SUS Increased to Ω order even at 50N			
Inertion/Extraction	1.12~2.07~3.94mΩ	○	1.07~1.78~3.32mΩ	○

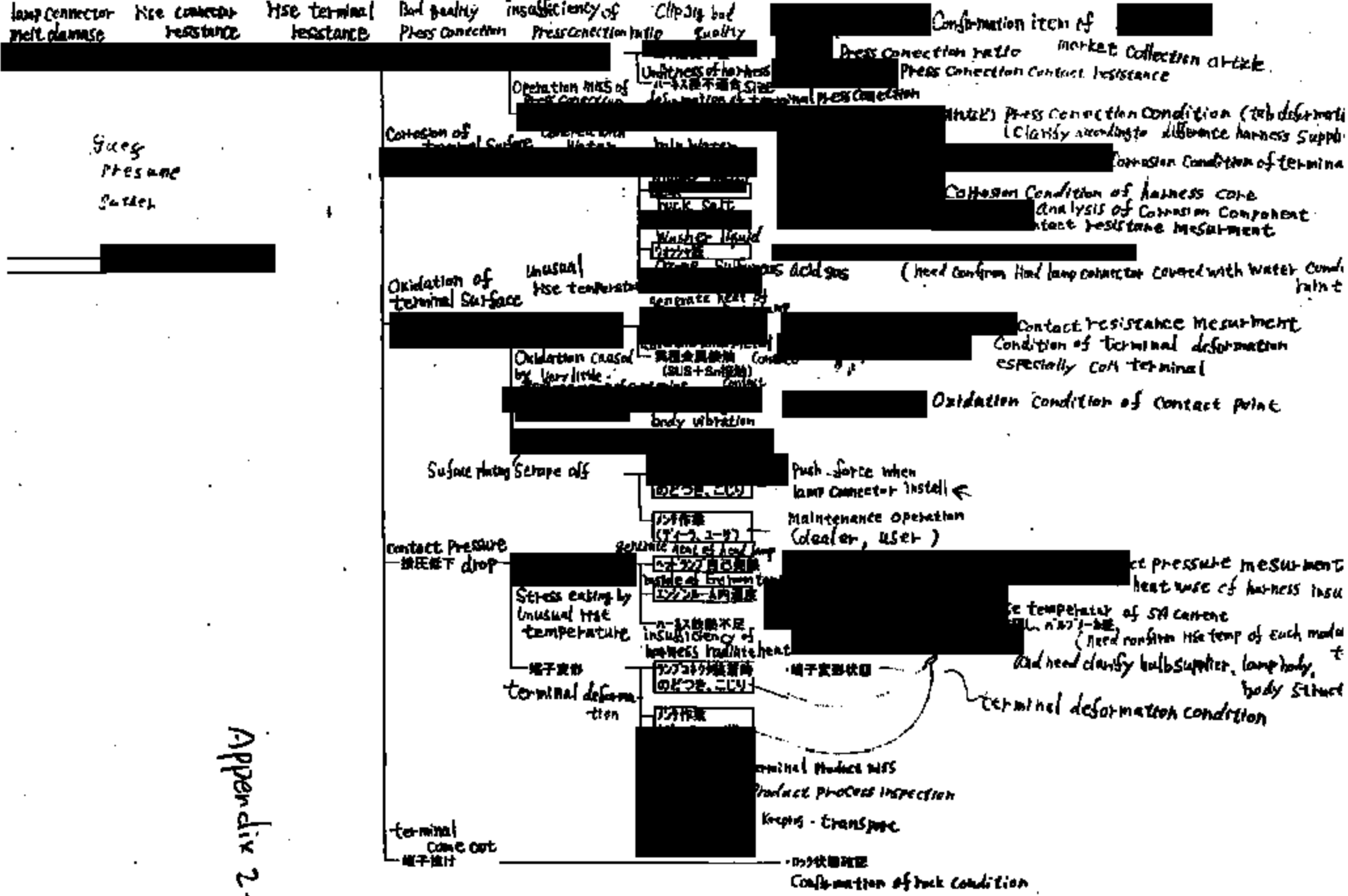
Evaluation under harsh conditions.

Shock and vibrat	Temperature rise 180°C	-	
Wrenching+Vibration (1G)	Temperature rise 158.2°C Resistance 72.25mΩ	-	
Random vibration test (ST41) + Evaluation to see water influence. Measured the temperature that the terminal was subjected to.			

Appendix 2-1

FTA analysis result of MMA ST head lamp connector melt damage Cause

MMA STヘッドランプコネクタ溶損原因のFTA解析結果(MMC実施結果)



Guess
Pressure
Surface

Appendix 2-2

100km/hで30分走行後

Test condition : 100km/h traveling at 30min then 30min idling
Head lamp on

high speed
Test course

Car model 車種	02MY ST41 8G72 A/T		00MY ST24S 8G72 4A/T		97トヨタ カムリ V6 A/T		88MY P45 DOM 6G74 A/T	
Head lamp ヘッドランプ	2灯 2 light		2灯 2 light		2灯 2 light		2灯 2 light	
Bulb バルブ	GE HB2		GE HB2		HB2		HB2	
Connector terminal コネクタ端子	[Redacted]		[Redacted]		[Redacted]		[Redacted]	
測定部位 Measurement portion	走行中 during travel		走行中	7分後	走行中	7分後	走行中	7分後
a) Lamp terminal (Lo)	65.0°C	121.6°C	73.8°C	117.2°C	58.0°C	89.0°C	57.0°C	101.3°C
b) Lamp terminal (GND)	57.5°C	114.6°C	63.9°C	112.5°C	53.5°C	89.0°C	49.7°C	93.8°C
c) Lamp terminal (Hi)	38.0°C	96.0°C	-	-	59.0°C	92.5°C	49.7°C	93.4°C
connector Side body portion of bulb body	102.0°C	146.7°C	-	-	82.0°C	112.9°C	73.0°C	115.5°C
Bulb body installation portion	110.5°C	147.6°C	-	-	86.0°C	117.5°C	74.3°C	113.3°C
ハーネス Lamp harness	31.5°C	75.0°C	-	-	32.0°C	69.5°C	29.0°C	73.8°C
rear phase of lamp behind	29.0°C	70.0°C	37.6°C	67.6°C	29.0°C	68.0°C	26.7°C	71.1°C

1312回

Appendix 3-1/1
4

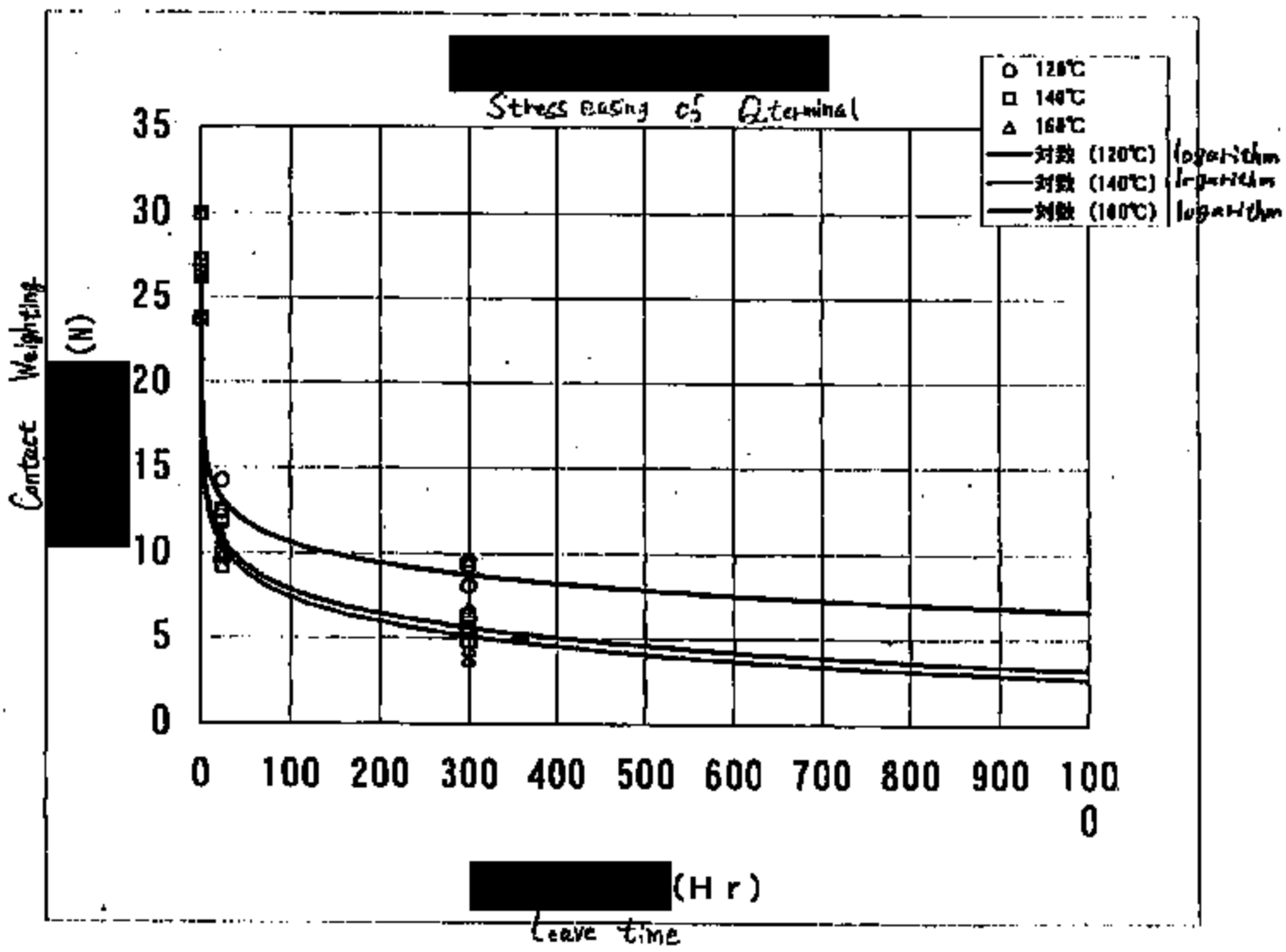
Condition: Temp. max till become disconnected. H/L by lamp on (lamp control SA).

Measurement Result

- Need measurement terminal temperature mentioned below
- H/L connector (harness L terminal) • H/L bulb body
 - H/L connector (harness Hi terminal) • H/L bulb installation screw

供試車 Test Vehicle			
02ST41 P0試	02ST28 F試	02CK NAS P2試	トヨタカミ TOYOTA Camry
111°C	97°C	85°C	89°C
93°C	94°C	83°C	81°C
134°C	130°C	113°C	113°C
—	122°C	92°C	115°C
055# →	←	←	←

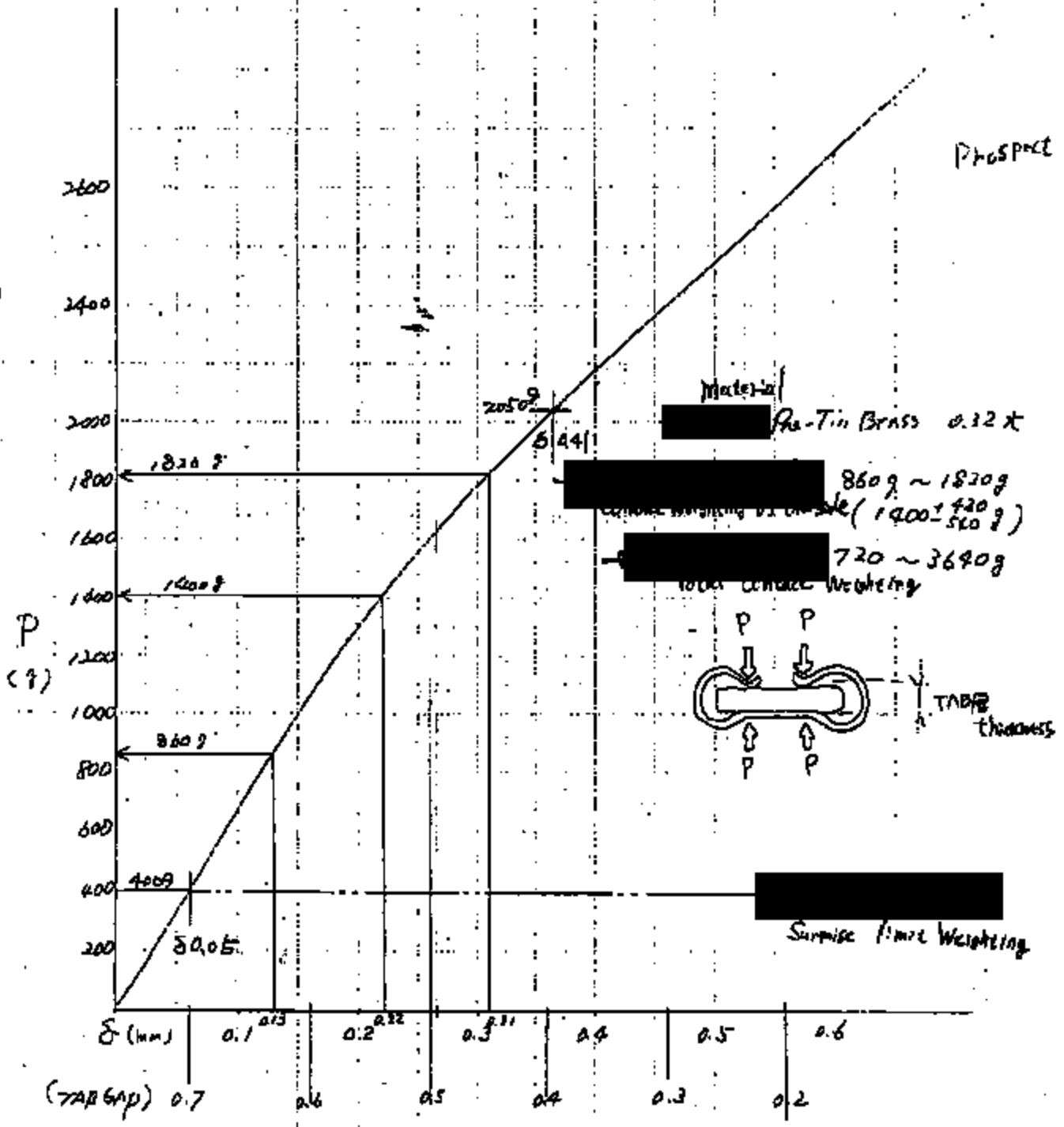
"+" terminal and
"-" terminal



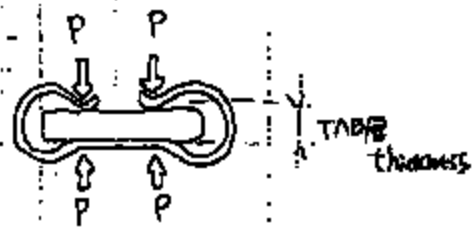
Appendix
4-2-1

GAP 0.54 ± 0.05 (0.49 ~ 0.59)
 TAB 0.76 ± 0.04 (0.72 ~ 0.80)
 δ $0.13 \sim 0.31$ (nom. 0.22) 0.22 ± 0.07

312 positive Rec. p- δ (H18!!) (one side)
 (172795-1)
 (172796-1)



Material
 Re-Tin Brass 0.32 x
 860g ~ 1820g
 Contact Weighting of one side (1400 ~ 420g)
 720 ~ 3640g
 Total Contact Weighting



Surprise limit Weighting

Study of various factors between USA and Japan, as problem occurs only in USA although lamp structure is the same between ST41 produced in Japan and USA.

Potential	NAS	DOM	Comment	
Production Line	Operation posture	from vehicle front		
	Connector installation direction	Small space behind lamp for operator hand possibly causing inclined insert	Japanese operator hand is smaller and can insert properly.	
	Connector installation force	Insert in one stroke, as operator physical force is strong.	Insert step by step as operator physical force is weak.	
Road circumstances	Traffic condition	Traffic jam appears in commutation time 3 to 5 PM.	Traffic jam appears in many place in commutation time.	Heat damage in engine room by driving condition does not differ.
	Vehicle speed	legal allowable speed : 80MPH	legal allowable speed : 80km/h	
	Anti-freeze agent	Salt	Salty Oil	No salt found on the returned parts
	Road surface	Rough surface frequently found on main road	Rough surface frequently found on main road	High speed drive is more frequent in USA, disadvantage for vibration
Usage	Lighting in daytime	H/L ON during driving increasing	H/L OFF	Headlamp terminal temp. increases by H/L ON on commutation in USA
	Driving time	Company closes 3 PM	Company closes 3 PM	
	Commuting distance	Long	Short	
Ambient climate		North: Snow South: High temp. and High Humid Desert: Big temp difference	Summer: High temp. and High Humid Winter: Dry	No specific regional characteristic On terminal of returned parts, corrosion found by rain water entry.
Lamp	Number of lamp	1 lamp	2 Lamps	
	Connector fitting structure	Directly connected to terminal on	Connected via sub-harness	
	Ground terminal temp.(engine OFF)	111D.C., High temp.(Lo lamp ON)	Not measured	
	Ground terminal temp.(engine idle)	114.8D.C.		
	Ground terminal temp.(100km/h)	57.5 D.C.		
Lamp vibration	Big horizontal movement as only spring fix upper and lower of lamp			On ground terminal of returned part, arc mark found
Head lamp connector	Make	Q terminal by AMP		

1-11

Study of various factors, as problem occurs only on ST24S and ST41 although lamp connector is the same between ST and P45

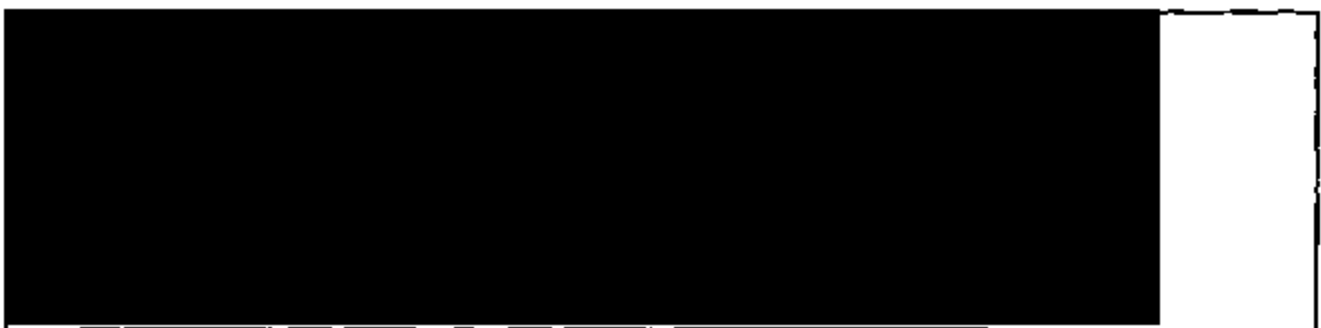
Potential	ST41	P45	Comment	
Production Line	Production place	MMMA	Mitsubishi Plant(MMC)	Returned part from ST41, gaps of Lo and Hi terminals were enlarged. Insert force of terminals were small.
	Operation posture			
	Connector installation direction	Small space behind lamp for operator hand possibly causing inclined insert	Enough space for operator hand, connector can be inserted properly.	
	Connector installation force	Insert in one stroke, as operator physical force is strong.	Insert step by step as operator physical force is weak.	
Road circumstance	Traffic condition	Traffic jam appears in commutation time 3 to 5 PM.	← Same	
	Vehicle speed	legal allowable speed : 80MPH	← Same	
	Anti-freeze agent	Salt	← Same	No salt found on the returned parts
	Road surface	Rough surface frequently found on main road	← Same	High speed drive is more frequent in USA, disadvantage for vibration
Usage	Lighting in daytime	H/L ON during driving increasing	← Same	Headlamp terminal temp. increases by H/L ON on commutation in USA
	Driving time	Company closes 3 PM	← Same	
Ambient climate	North: Snow South: High temp. and High Humid Desert: Big temp difference	← Same		No specific regional characteristic On terminal of returned parts, corrosion found by rain water entry.
Lamp	Number of lamp	1 lamp	2 Lamps	- Connector melted on sub-harness in Japan
	Connector fitting structure	Directly connected to terminal on Lamp	← Same	- Temp increase on P45 is about 20 D.C. less.
	Ground terminal temp.(engine OFF)	111D.C., High temp.(Lo lamp ON)	R 84.2 D.C./L 89.7 D.C.	- ST41 temp is low as 57.5 D.C. during drive.
	Ground terminal temp.(engine idle)	114.6D.C.	R 88.4 D.C./L 100.9 D.C.	
	Ground terminal temp.(100km/h)	57.5 D.C.	R 49.7 D.C./L 51.2 D.C.	
	Lamp vibration	Big horizontal movement as only spring fix upper and lower of lamp	← Same	On ground terminal of returned part, arc mark found
Head lamp connector	Make	Q terminal by AMP	← Same	

Appendix 5-2

					A	B	C	分類No.	重要度
D	010601	010629	543542		27	52		STJ-54	S2

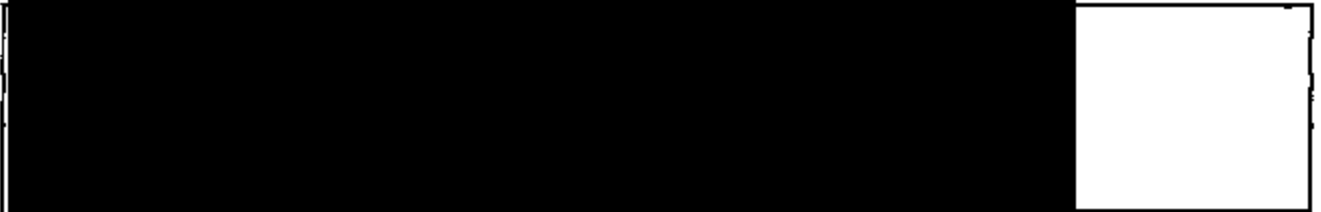
No	E/GorT/M型式		E/GorT/M型式					
1	MMSA	4A3AA36G4X E			990312	990323	010308	29,664
2								
3								
4								
5								

[B]		対策完了日程 01/08
-----	--	-----------------



仕向地	車種	M	F(36)	F(60)	クレーム件数	対象台数
MMMA	ST41	2.1	0.73	2.1	365	233540
	ST245・28	2.2	1.29	3.95	134	129164
MMSA	MG	0.9	0.01	0.01	7	198493
	P46	1.4	0.01	0.03	11	233290
DOM	DZL	0.9	0.05	0.12	27	167998
EU	ST41	1.5	0.02	0.04	12	68999

*MMMA S



T MMMA生産車ヘッドランプコネクタの整備の件

添付1
01.6.6
内設部

不具合内容

O	車種	VIN	ENG							
1	00salant	4A3AA46G5Y	4G84/A/T	IL,CHICAGO	99.7.14	01.5.2	29865	RH		備考 00.10.27:コイルスワッチ交換
2	00salant	4A3AA46G5Y	4G84/A/T	CA,CORONA	99.10.14	01.5.2	29821			0-ビ-ランプ
3	00salant	4A3AA46G0Y	4G84/A/T	TX,HOUSTON	00.1.20	01.5.1	28761	LH,RH		コイルスワッチ
4	00eclipse	4A3AC84LTY	6G72/A/T	NY,ELMHURST	99.7.13	01.5.2	14420	RH		01.5.2:コイルスワッチ交換
5	00eclipse	4A3AC54LDY	6G72/M/T	DE,WILMINGTON	99.10.21	01.4.18	24000	LH,RH		ヘッドランプ交換、バッテリー
6	00eclipse	4A3AC54L5Y	6G72/A/T	PA,PHILA	99.11.22	01.1.10	18895			ケーブル交換01.4.18
						01.4.13	19583			二日目
7	01eclipse	4A3AC84H11	6G72/A/T	NY,BLENDALE	01.1.9	01.5.2	2402	RH		
8	99salant	4A3AA46 ZXB	6G72/A/T	VA,HAMPTON	99.8.19	00.10.3	22421	RH		00.12.20:LH/RHランプ交換
						01.4.24	24281	LH		00.10.31:コイルスワッチ交換
9	00eclipse	4A3AC34GXY	4G84/A/T	IN,LEBANON	00.3.7	01.4.11	18943	RH		
10	00eclipse	4A3AC54LDY	6G72/M/T	IN,RUSHVILLE	00.2.25	01.4.12	21609	RH		
11	00eclipse	4A3AC44G5Y				01.4.21	18774	RH		

10/12

		VINNo.					備考
1	キヤブ	4A3AA46G4V	99.07.14	01.05.02	29885	RH	
2	↑	4A3AA46G5V	99.10.14	01.05.02	29821	—	
3	↑	4A3AA46G0Y	00.01.20	01.05.01	26751	LH, RH	
4	イカブス	4A3AC84L8Y	99.07.13	01.05.02	14420	RH	
5	↑	4A3AC54L0Y	99.10.21	01.04.16	24000	LR, RH	
6	↑	4A3AC54L5Y	99.11.22	01.01.10	16885	—	
7	↑	4A3AC84H11	01.01.09	01.05.02	3402	RH	

測定部位 ^(注1)		12/81	12/82	9/83	12/84	12/85	9/86	9/87
COM		0.48	0.41	—	0.17	0.16	—	0.52
Lo		5.01(0.33)	8.29(0.27)	4.18(0.16)	0.71	8.06(0.08)	74.83(0.83)	4.81(0.01)
Hi		4.38(0.67)	8.97(0.34)	5.07(0.07)	8.18(0.14)	8.98(0.18)	4.18(0.31)	5.26(0.02)
COM	A部	1.84(入), 1.04(出)	1.79	—	—	0.87	—	0.77
	B部	1.47	0.82	—	0.88	0.88	—	0.77
Lo	A部	0.68	0.65	0.67	1.41	0.85	0.77	0.66
	B部	0.67	0.64	0.67	0.84	0.84	0.78	0.67
Hi	A部	0.65	0.68	0.67	0.65	0.62	0.66	0.67
	B部	0.65	0.68	0.66	0.66	0.63	0.68	0.66
COM ^(注2)					←	←	←	←

Ca, Cu	Cu, Sn
C, O, Zn, Cl	C, S, Zn, Cl

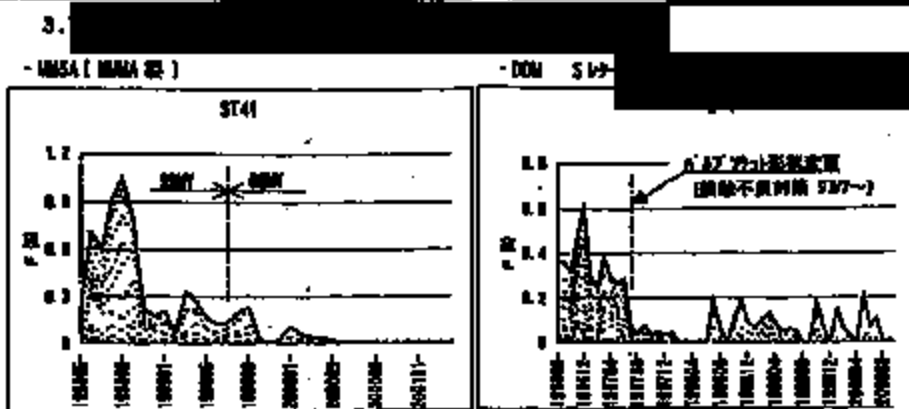


(9/10) 2/1

種別 [Redacted]

品名 金子 (M&E統計△C)
 数量 A4X18 A2X9
 作成 2001年10月18日 販売 - 枚
 備考 XDR1-160047

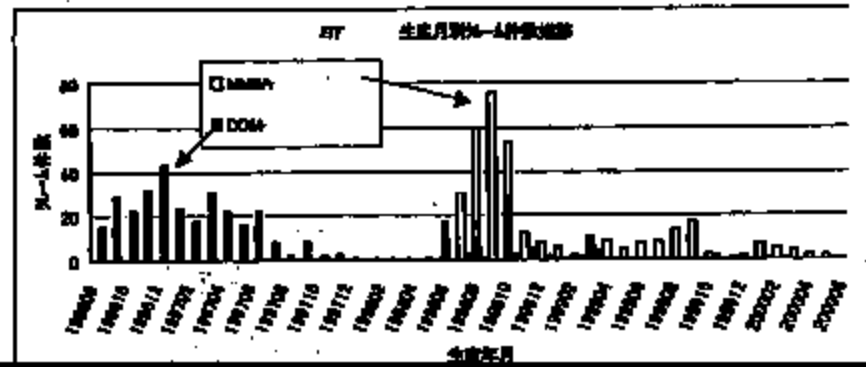
[Redacted]



仕向	票種	M	F(30)	F(60)	FPL(S20)	外-△件数	封筒合計
MMSA (MMSA票)	ST41	2.1	0.72	2.10	46.8	395	238,540
	GT245/28	2.2	1.29	3.99	106.3	124	128,184
MMSA	MQ	0.8	0.01	0.01	0.4	7	106,463
	P45	1.4	0.01	0.02	0.8	11	239,290
DOM	ST	2.2	0.63	0.07	2.8	79	209,284
	DZL	0.8/1.8	0.05	0.13	2.1	27	147,898
	JT44X	-	-	-	-	1	53,405
	MQ	1.8	0.02	0.04	0.8	19	223,212
EU	YR	2.3	0.02	0.02	1.8	31	79,384
	MQ	-	-	-	-	2	86,899
※ DOM	ST 封筒前	1.1/2.0	0.15	0.02	5.4	211	11,228
	ST 封筒後	1.2	0.08	0.11	2.4	64	118,899

※ S14-指定コードおよび交換部品で解析 封筒内容は、カッパ形状変更後7/77全票→ M が 2 箇所ある項目は、票合タイプAの特性あり

3. 3 クレーム内容統計……… 付表7-13 p.15-24



①は紙類の名称

- 1 内装
- ① 写紙
- ① 紙類
- 水筒口蓋
- ① 紙類
- 川崎川蓋
- 紙口蓋
- 紙口蓋
- 1 封筒



72組分品

車種	02MY ST41 6G72 A/T		00MY ST24S 6G72 AA/T		07トヨタ カムリ V8 A/T		08MY P45 DOM 6G74 A/T	
	2灯		2灯		2灯		2灯	
	GE HB2		GE HB2		HB2		H4	
	試験機 : 室温120°C		試験機 : 室温120°C		試験機 : 室温120°C		試験機 : 室温120°C	
上部位	走行中	7-1/A後	走行中	7-1/A後	走行中	7-1/A後	走行中	7-1/A後
	65.0°C	121.6°C	73.8°C	117.2°C	58.0°C	89.0°C	57.0°C	101.3°C
	57.5°C	114.6°C	63.9°C	112.5°C	53.5°C	89.0°C	49.7°C	93.8°C
	38.0°C	96.0°C	-	-	59.0°C	92.5°C	49.7°C	93.4°C
	102.0°C	146.7°C	-	-	82.0°C	112.9°C	73.0°C	115.5°C
	110.5°C	147.6°C	-	-	86.0°C	117.5°C	74.3°C	113.3°C
	31.5°C	75.0°C	-	-	32.0°C	69.5°C	29.0°C	73.8°C
	29.0°C	70.0°C	37.6°C	67.6°C	29.0°C	68.0°C	26.7°C	71.1°C

測定結果

	供試車			
	02ST41 P0機	02ST28 F機	02CK NAS P2機	トヨタ カムリ
	111°C	97°C	85°C	89°C
	93°C	94°C	83°C	81°C
	134°C	130°C	113°C	113°C
	—	122°C	92°C	115°C

7/25

01

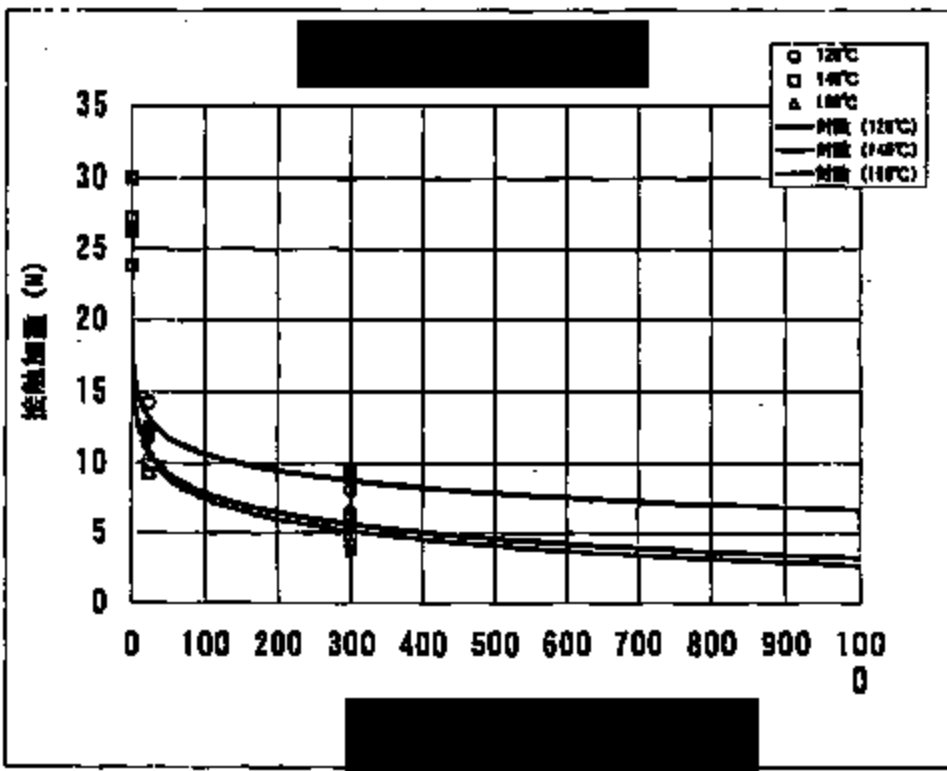
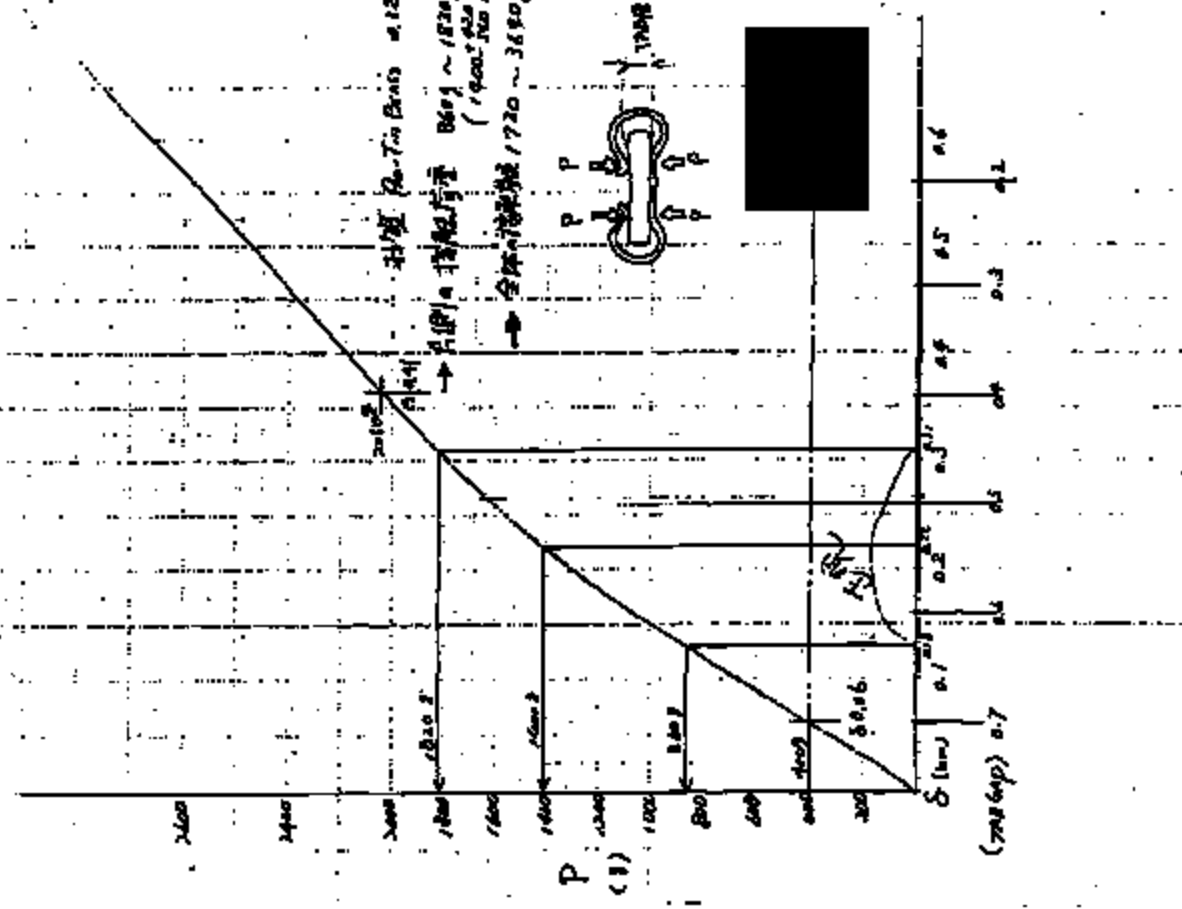
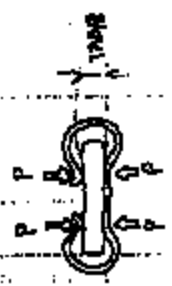
添 4-2 1/2 1/4

QAP 0.34 ~ 0.05 (0.99 ~ 0.97)
 MOE 0.26 ~ 0.08 (0.98 ~ 0.80)
 S 0.13 ~ 0.31 (nom. 0.22) 0.22 ± 0.07

312 position Sec. P-8 (AWI)

(172795-1)
 (172795-1)

312 位 Pa-Tin Brads 0.12 x
 312 位 172795-1
 (1900 172795-1)
 全数 172795-1 720 ~ 36909



Document No. 3 1

'01 July Monthly Quality Meeting

MMMA ST Headlamp harness connector melted

[Service(MMMA) replay]

Countermeasure Implementation :

To be switched to new connector in the middle of August in relation with stock parts

[R&D replay]

1. Follow up of pending items from June meeting

1) Follow up of countermeasure extension to the other models

Drawings already issued for all the other models

2) Potential factor of occurrence only in north America

- (1) Investigation result of the vehicle in Pennsylvania which experienced problem two times (ST24S)

- No specific problem occurred such as terminal deformation, etc.

- Cause of recurrence is considered that bulb possibly damaged was not replaced at the 1st repair.

- No high electric load equipment installed such as DRL kit, etc. and usage was also normal.

(2) Headlamp temperature measurement on vehicle

In comparison with ST41 DOM, NAS models have more than 20 D.D. higher temp than DOM.

- Lo terminal : ST41 NAS : 122 D.C. ST24 : 117 D.C. ST41 DOM : 87 D.C.

- HI terminal : ST41 NAS : 115 D.C. ST24 : 113 D.C. ST41 DOM : 90 D.C.

3) ST22 Headlamp

Headlamp temperature are shown below in the condition 100km/h Driving and Idling

-> Same level as the other ST series, but, different terminal structure does not cause the problem

- Lo terminal : 109 D.C. COM terminal : 115 D.C.

4) Recurrence prevention implemented in the tests in HOT room

Refer to the attached letter.

2. Conclusion

Workability of the connector (Wiggling Insert) and/or terminal temperature is considered the problem.

3. Consideration of field treatment

Since it takes 1000 hour after headlamp becomes dark till connector melting, the problem is considered foreseeable and repair can be at claim basis.

[R&D reply on meeting table]

Check of service manual :

No caution for wiggling connector, but, no description will be changed because the connector will be switched to anti-wiggling type.

[Overall discussion result]

The problem is considered foreseeable as headlamp become gradually dark, so, repair can be at claim basis.

=====Official Letter=====

Sender : GM, Electric equipment development
Person in charge : Kamiya, Electrical testing
Type : Confidential
Subject : Request for temperature rising test in electrically power-on condition
Sender No. : HATSUHONDENKAI-2GOU
Date : July 16, '01
Attention : GM, Performance Testing
Copy : Mr.Fukui, PL / GM, Interior design / GM, Quality promotion
 GM, Vehicle testing / Mr.Kojima, CQE, Engineering verification office
 Mr.Hoshiko, MRDA-AA / Mr.Torii, VE / Mr.Fukuda-MRDA-BN
 Managers, Electric testing

Content

In north American market, head lamp connector on ST41&ST24S melts frequently.
 One of supposed factor is that lamp connector terminal exceeds its permissible temperature
 by influence of higher engine room temperature on ST series.
 Therefore, we would like you to implement temperature rising test in electrically power-on
 condition as recurrence prevention.

1. Request

Temperature rising test in electrically power-on to be carried out together with the tests in
 HOT room.

2. Test procedure

(1) Measurement points

- To be requested by us or Interior design.
- Only large current circuits to be measured.
- Radiator relay terminal
- Lo and COM terminal in headlamp connector
- Fuel pump relay terminal
- Headlamp Lo terminal in front ECU
- Fog lamp relay terminal
- +B 60A F/L terminal

(2) Driving pattern

More than 30min. each of Flat road, uphill slope, idling

(3) Electrical equipment operation

- To be requested point by point
- (ex. Lo ON in case of headlamp circuit)

3. Implementation

From the next HOT room test

For PSU, the above tests are being implemented in advance.

Head Lamp Vibration Test

YAZAKI Parts

2001.07.24



01.07.24 01.07.24

Test Method

Lamp Assembly : ST41
 Voltage : 13.8V (Hi : Turn on continuously)
 Room Temperature : 70°C
 Vibration : Random Vibration
 15Hz 0.0516G²/Hz
 44 0.0176
 116 3.48 × 10⁻⁴

Lamp : GE

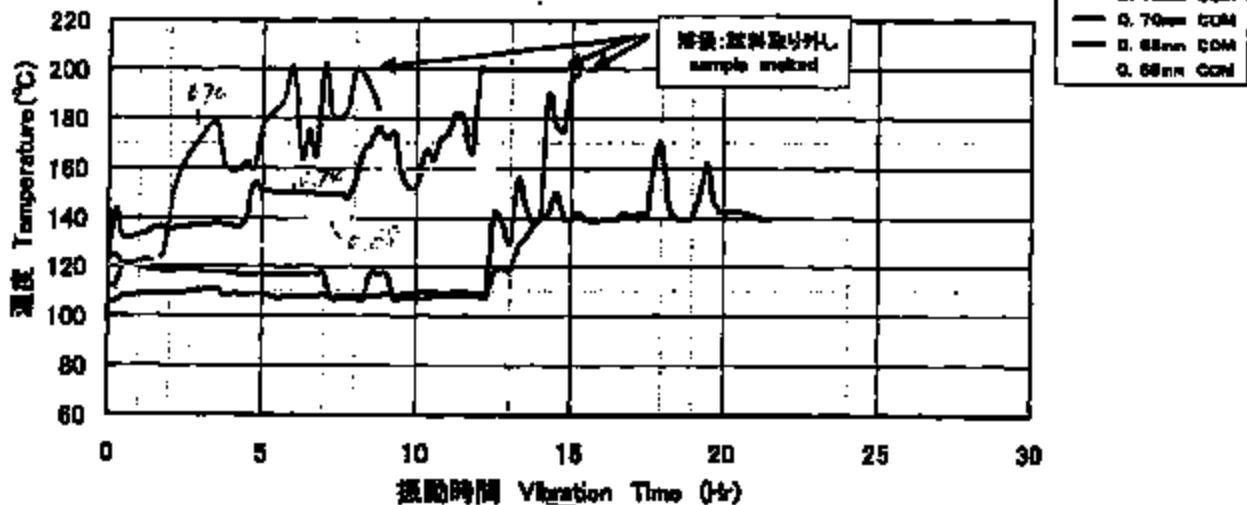
Sample :

Terminal	supplier	Contact gap mm
Q	AMP	0.74, 0.72, 0.70, 0.68
NQ	yazaki	0.42



Photo-1 test condition

端子温度 Terminal Temperature (Room Temperature 70°C)



Terminal with more than 0.70mm contact gap had melted. Terminal with 0.68mm gap is still on going. Same test with NQ terminal will start.

				A	B	C	分類No.	重要度	
D	010801	010727	543542	27	52		STJ-54	S2	

No		E/Doc								
情 報 源	1	MISA	4A3AA36G4X	E			990312	990323	010308	29,664
	2									
	3									
	4									
	5									

								対策完了日付
								01/09

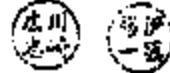
[Redacted Content]

[Redacted Content]

Head Lamp Vibration Test

YAZAKI Parts

2001.07.24



010724 010724

Test Method

Lamp Assembly : ST41
 Voltage : 13.3V (Hi : Turn on continuously)
 Room Temperature : 70°C
 Vibration : Random Vibration
 15Hz 0.0516G²/Hz
 44 0.0176
 115 3.48 × 10⁻³

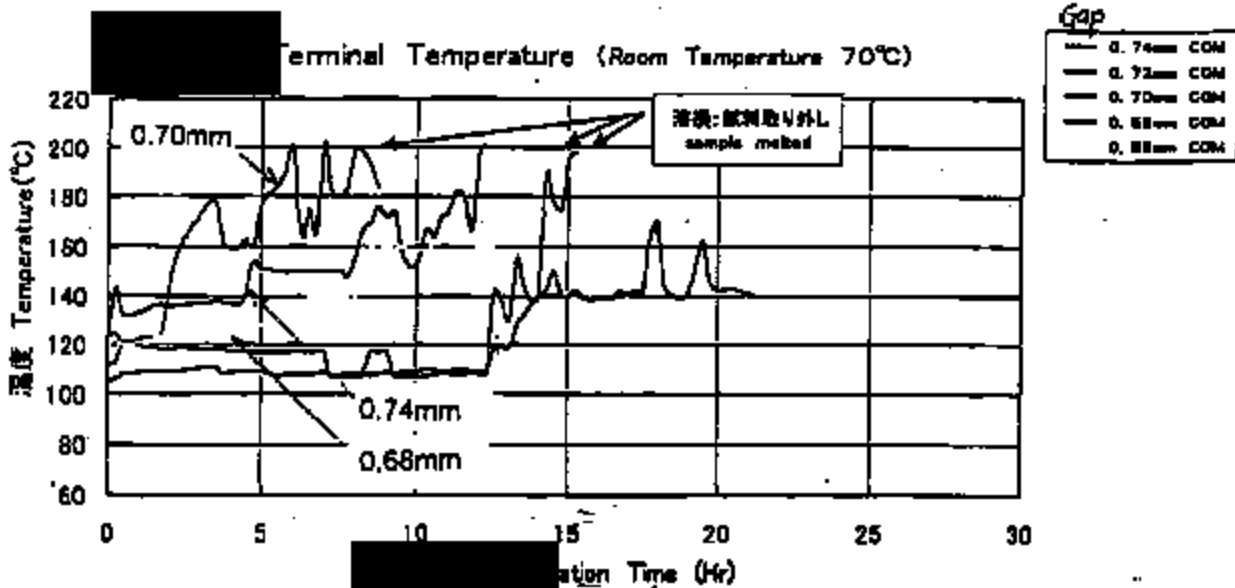
Lamp : GE

Sample :

Terminal	supplier	Contact gap mm
Q	AMP	0.74, 0.72, 0.70, 0.68
NQ	yazaki	0.42



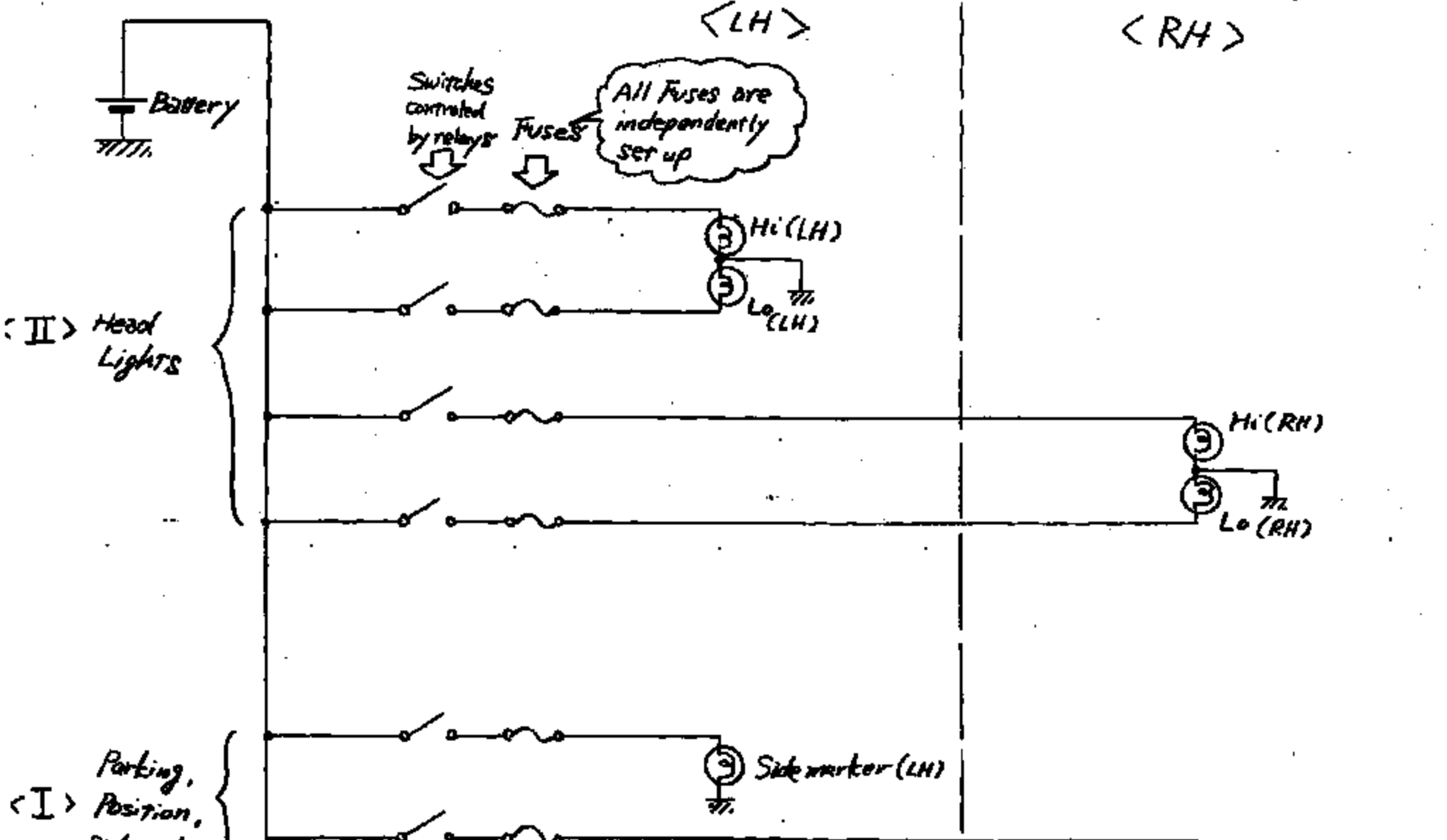
Photo-1 test condition



Terminal with more than 0.70mm contact gap had melted. Terminal with 0.68mm gap is still on going. Same test with NQ terminal will start.

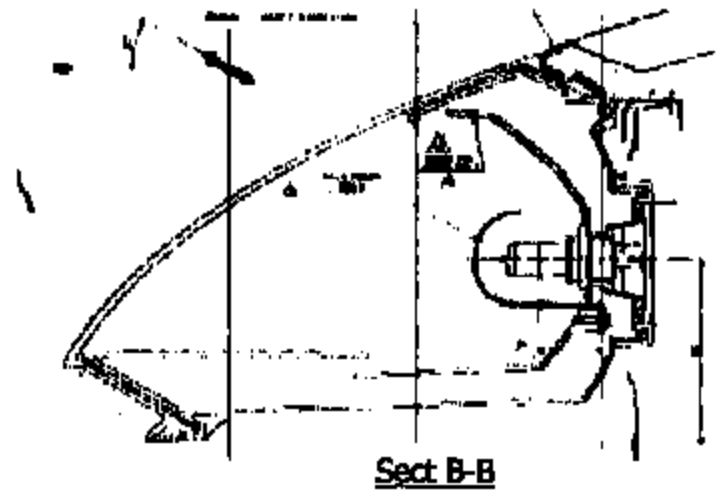
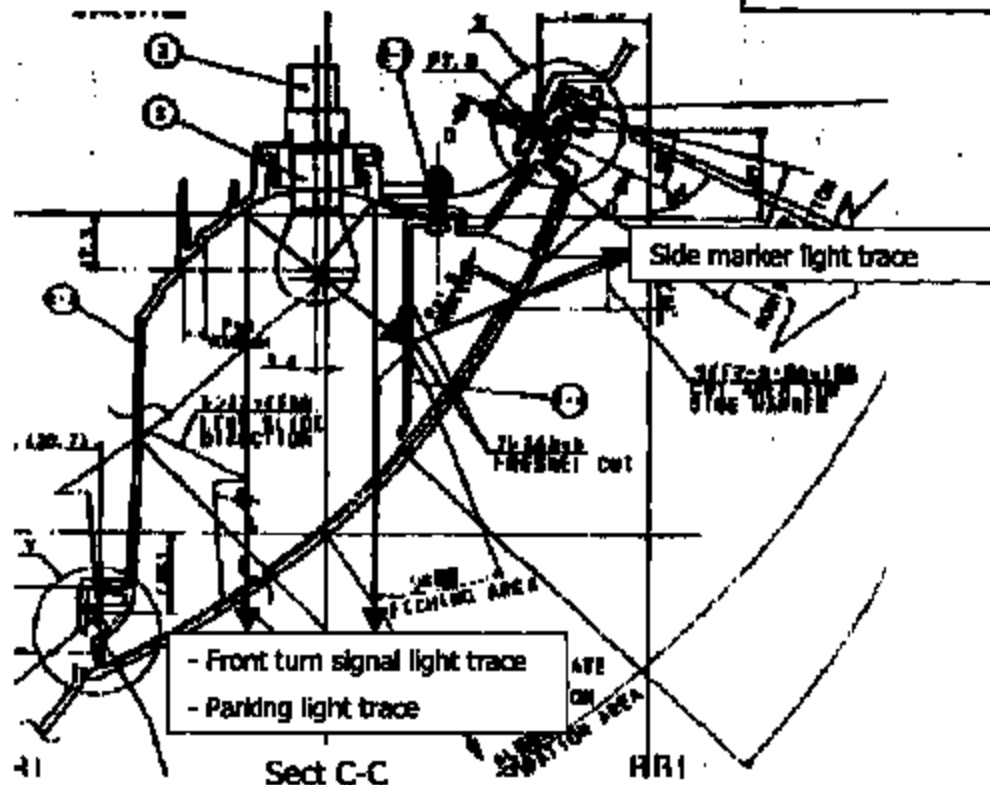
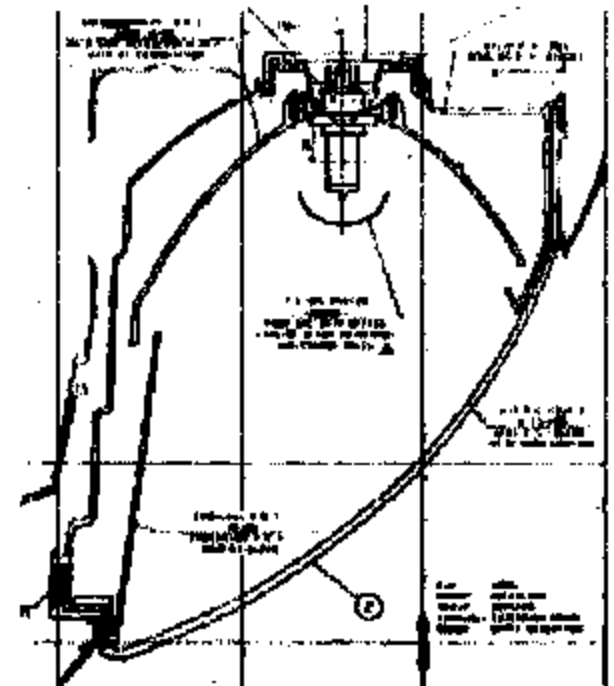
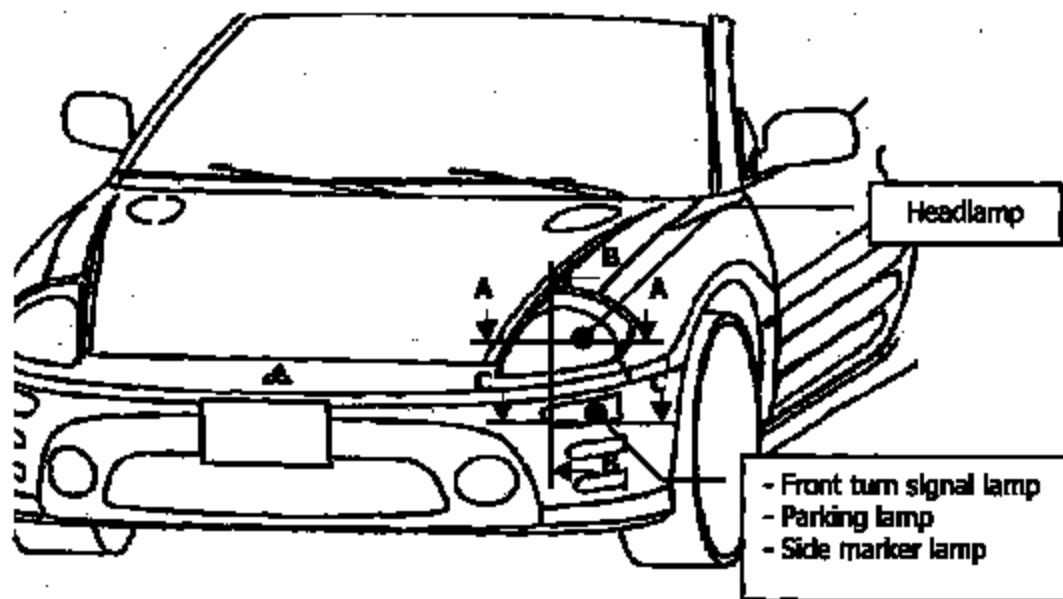
Document No.32

< ST24S/28, ST41 FRONT LIGHT RELATED WIRING DIAGRAM >

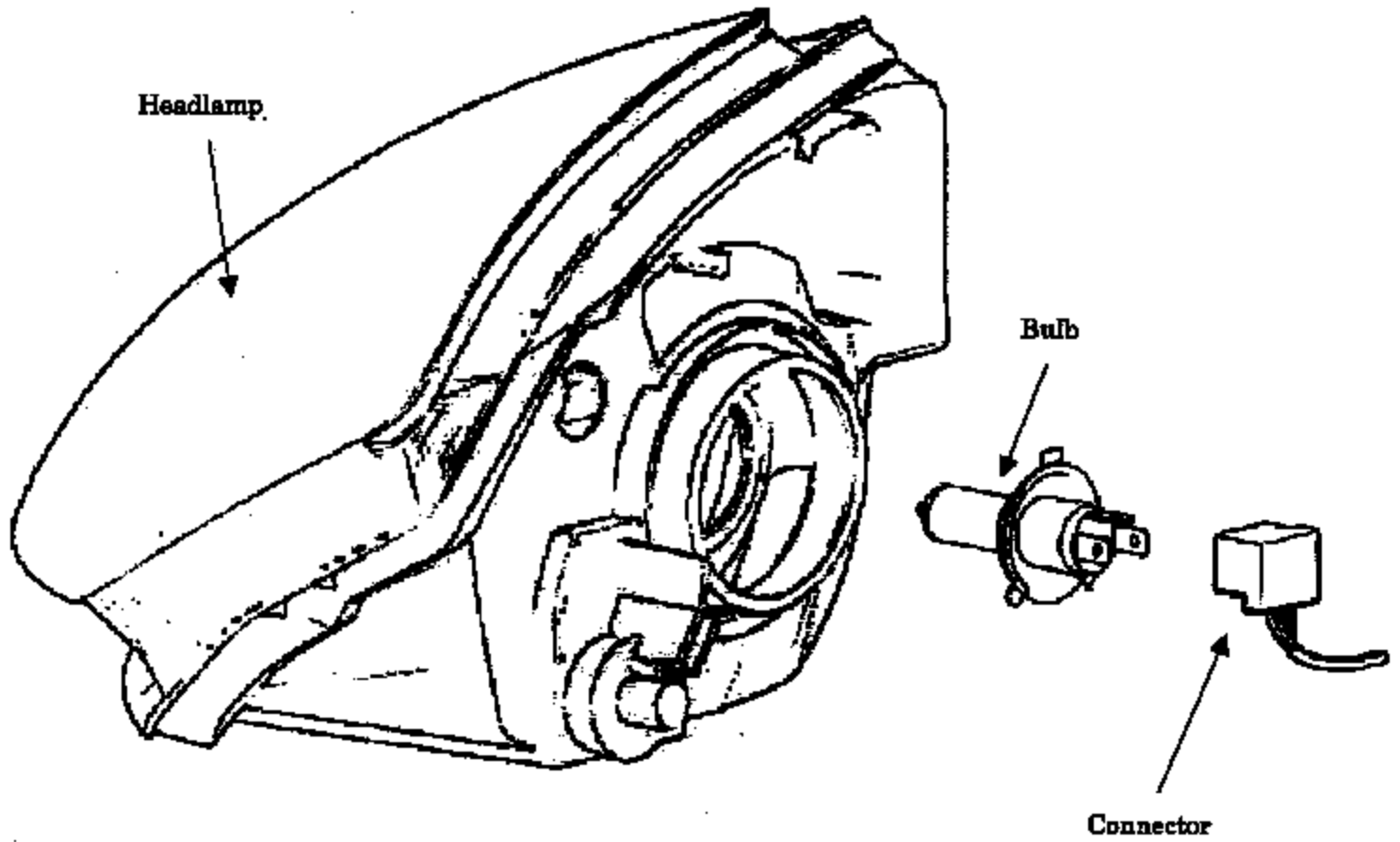


* Light SW mode

Light SW Mode	Light Activation	
	< I >	< II >
OFF	OFF	OFF
↓ POSITION	ON	OFF
↓ ON	ON	ON

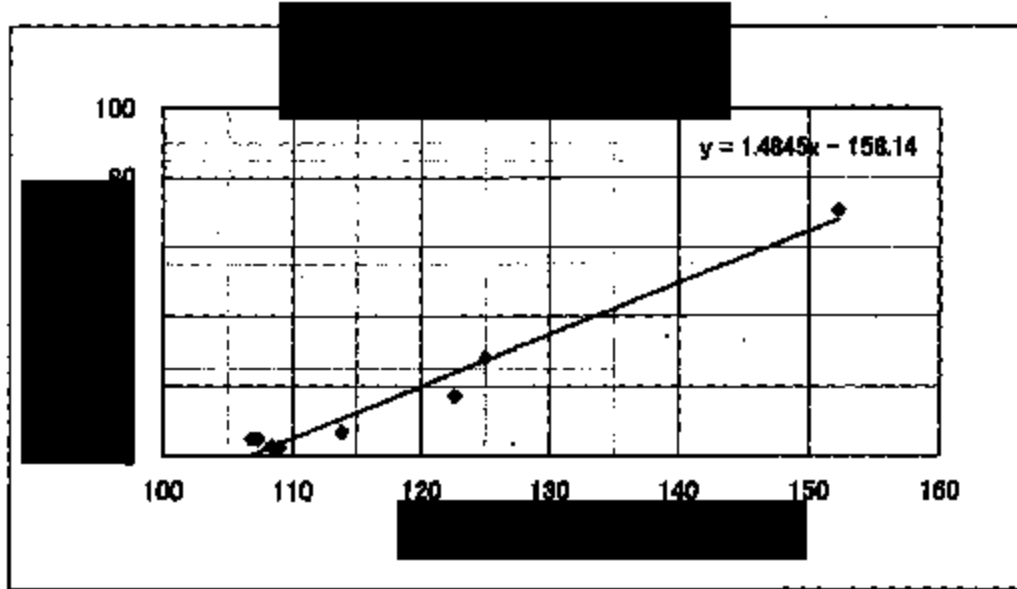


Headlamp schematics for the subject vehicle

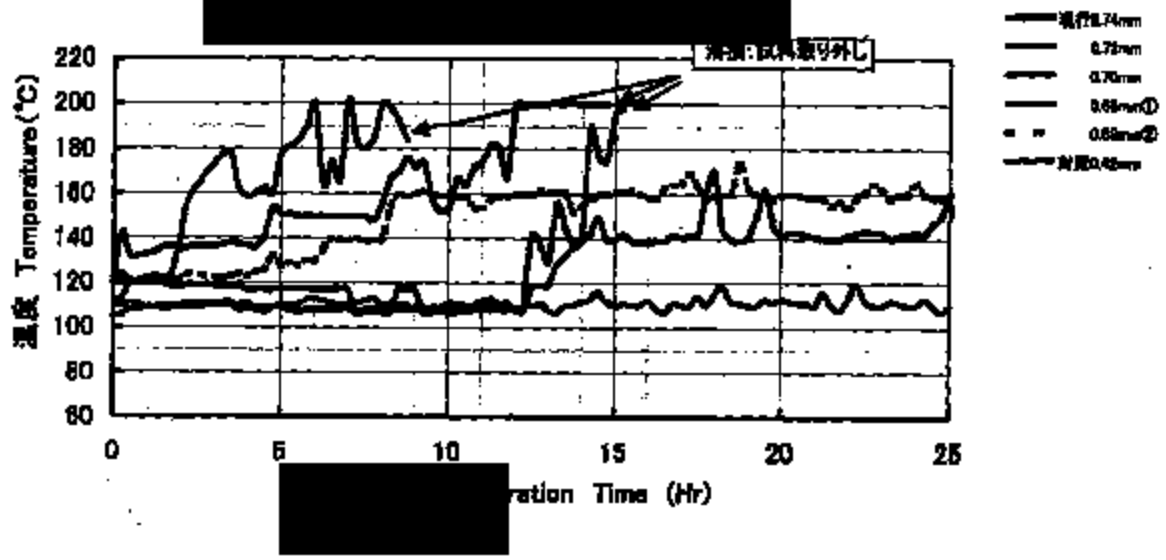


Document No.33

	1	2	3	4	5	6	7	8
	109	109.4	113.8	107.3	122.6	109.8	125	152.3
	2.43	2.86	6.81	4.98	17.80	4.87	28.03	70.83
	12.27	12.22	12.28	12.22	12.22	12.18	12.22	12.17
	5.10	5.06	5.10	5.08	5.07	5.07	5.08	6.00



COM端子抵抗



Document No.34

ST24S Headlamp connector failure mode confirmation

approve Y. Kariya April 4, '95	check	prepared Y. Kariya April 4, '95	REV A 3 of 1	No. XLJ2-200443 Electronics Testing Group
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1. Purpose

Verify failure mode after headlamp wiring

2. Test method Refer to FIG. 3 for bench test setup

Lamp Assembly Used : Eclipse

Rated Voltage : 13.2V

Atmospheric Temp : 70°C

Vibration Direction : up-down

Vibration Requirements: Random vibration (2 times actual vehicle vibration, 100 times accelerating test equivalent)

Rz	#2/Hz
15	0.0616
44	0.0178
115	3.49E-05

Terminal Used : terminal whereby the spring gap has been abnormally widened (more than 1mm) until the terminal contacts the connector box wall

3. Test result

Maximum temperature is saturated approximately 350°C at GND terminal.

4. Remarks

As indicated in TABLE 1, the self-ignition temperatures for the connector directly contacting the terminal and the wire are above 424°C.

The self-ignition temperature of the headlamp cover directly contacting the connector is above 400°C. Thus, there is no possibility of self-ignition.

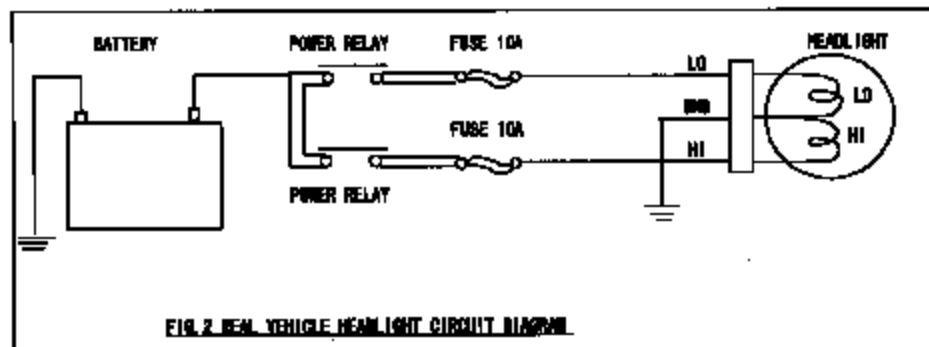


FIG. 2 REAL VEHICLE HEADLIGHT CIRCUIT DIAGRAM

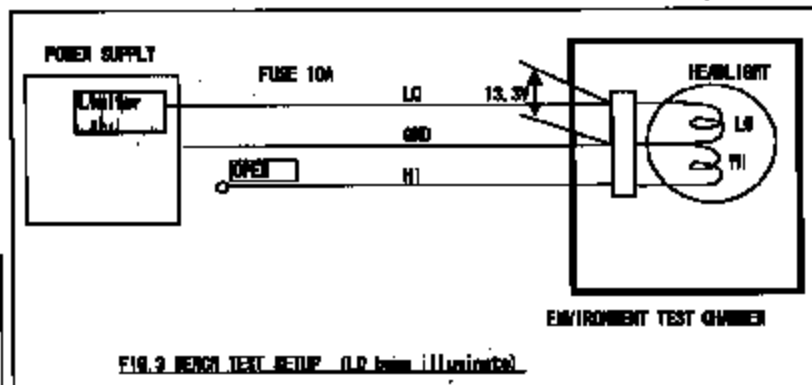


FIG. 3 BENCH TEST SETUP (LO beam illuminated)

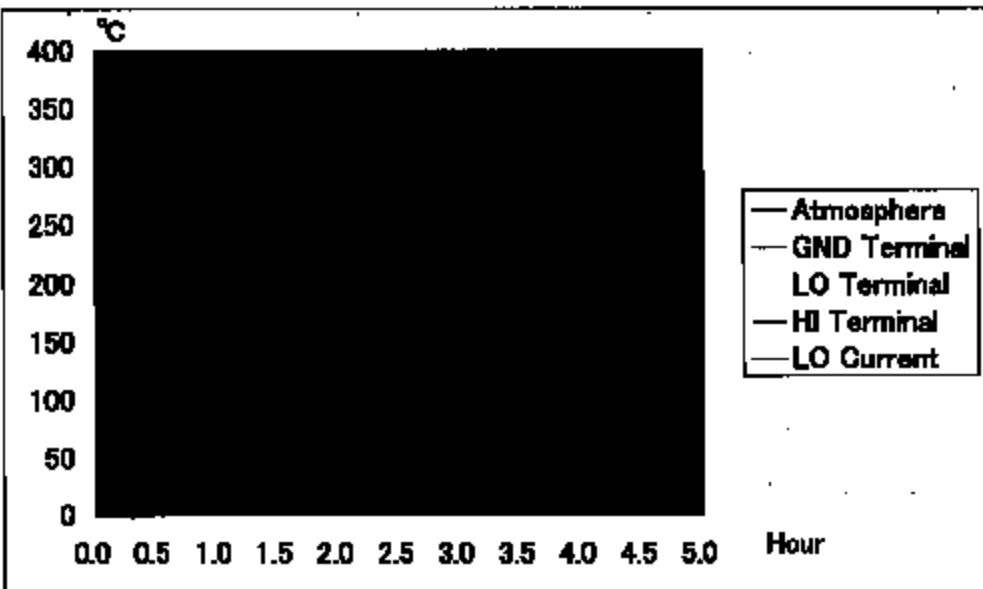


FIG. 1 TEMPERATURE TRANSITION OF HEAD LAMP TERMINALS ON BENCH TEST

Part	Material	Self-Ignition Points
Parts contacting the terminal	Connector housing: PA66 Wire: PVC	424 483
Parts contacting the connector	Headlamp cover: EPDM	more than 460
Peripheral Parts	Headlamp inner shield: B&C Headlamp case: PP-T30 Relaybox cover: PP-T10 Relaybox body: PA+PPE Power steering Tank & Cap: PA66-GP35 Power steering Return hose: CR	708 448 370 more than 430 466 499

Table 1. Self-ignition characteristics of headlamp peripheral parts (Self-ignition temperature)

