



**ANALYSIS/DEVELOPMENT/VALIDATION PLAN & REPORT
(ADVP&R) FOR SUPPLIERS**

SECTION II – PLAN AND REPORT DATA

PLAN # Delta Z Ignition Switch	PLAN DATE 9-5-2000
AUTHOR'S NAME Thomas Svoboda	AUTHOR'S PHONE # [REDACTED]
SUPPLIER APPROVAL	GM APPROVAL
REPORTING ENGR NAME Erik Mattson	PHONE # [REDACTED]
	REPORT DATE 5-21-2002

SECTION I -- DESIGN EVALUATED

PART NAME Delta Z Ignition Switch	PART # 12450250	UPC # 12	REVISION DATE / LEVEL Various
MODEL YEAR 2003	PLATFORM GMX357	MODEL # Delta Z	SUPPLIER NAME Delphi VS / ED

SECTION VI - D F M E A APPROVAL

APPROVED: _____ NOT APPROVED: _____
GM VALIDATION ENGINEER SIGNATURE: _____ DATE: _____

SECTION V - VALIDATION RESULTS APPROVAL

APPROVED: _____ NOT APPROVED: _____
VALIDATION PHASE: _____
GM VALIDATION ENGINEER SIGNATURE _____ DATE: _____

SECTION III -- VALIDATION PLAN

SEC IV -- VALIDATION REPORT

NOTES

ITEM #	PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQMT VALUE	RESPON SIBILITY	EVALU ATION PHASE	SAMPLE		TIMING		SAMPLES TESTED			RESULTS	NOTES
							QTY	TYPE	START	COMPL	QTY	TYPE	STAGE		
1	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	Delphi Lab Number 01-382 [CTS Rev 3-22-2001] Test Leg #1/#2 Initial Perf Tests
2	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
3	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
4	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
5	GM 9110P Sect. 5.6	GM9110P Function Check at Temp Extr. -40C	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK OK OK OK OK OK	

PROCEDURE # Enter the 4 digit standard procedure number. If not standard, enter 0000.	PROCEDURE TITLE Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	REQUIREMENT # & TITLE Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	REQUIREMENT VALUE Enter cycles, miles, volts, minimum value, no loss of function.	EVALUATION PHASE D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	SAMPLE TYPE A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	HARDWARE STAGE M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	SAMPLES TESTED Enter quantity tested, sample type and hardware stage.	RESULTS Enter actual results.	NOTES Describe unique criteria or results. Use to describe interim status of evaluations.
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			Diff KRC-RC ACC Break KRC Resist Diff ACC- KRC KRC NonResist Diff ACC- KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27										OK Not OK Not OK Not OK Not OK OK Not OK Not OK OK Not OK Not OK OK Not OK OK	9/6 Deg 102/99 Deg 102/95 Deg 7/0 Deg 96/94 Deg 7/3 Deg 101/98 Deg 104/62 Deg, #2 Cont Bnc 57/55 Deg 47/6 Deg, #2 Cont Bounce 41/39 Deg 31/29 Deg
8	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
9	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
10	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make- Break	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
11	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	18	D	12-6-01	12-11-01	18	D	Pil	OK	
12	3.1.3.2	Humidity	No Damage or Performance	N/A	Delphi	PV	18	D	12-12-01	12-14-01	18	D	Pil	OK	

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			Degradation												
13	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	18	D	12-14-01	12-14-01	18	D	Pil	OK	
14	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	18	D	12-14-01	12-14-01	18	D	Pil	OK	
15	3.1.3.1.1	Storage Temperature	No Damage or Performance Degradation	N/A	Delphi	PV	6	D	12-15-01	12-19-01	6	D	Pil	OK	Leg #2 Samples ONLY
16	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	D	12-19-01	12-19-01	6	D	Pil	OK	Leg #2 Samples ONLY
17	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	12-19-01	12-19-01	6	D	Pil	OK	Leg #2 Samples ONLY
18	3.1.3.4	Thermal Shock	No Changes In Product Integrity	N/A	Delphi	PV	18	D	12-19-01	12-20-01	18	D	Pil	OK	
19	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	18	D	12-20-01	12-20-01	18	D	Pil	OK	
20	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	18	D	12-20-01	12-20-01	18	D	Pil	OK	
21	3.1.3.3	Vibration	No Damage or Loss of Function	N/A	Delphi	PV	18	D	12-21-01	1-2-02	18	D	Pil	OK	
22	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
23	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
24	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
25	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	

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26	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
27	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
28	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	18	D	1-2-02	1-2-02	18	D	Pil	OK	
29	3.2.2.13	Mechanical Overload	KEY-IN Push Theft Det Push Torsional Key Rotation	110N Min 220N Min 4 N-m Min	Delphi	PV	6	D	1-7-02	1-7-02	6	D	Pil	OK OK Not OK	Rotor breakage between 3.1N-m and 3.8 N-m. Sample #2 Damaged by Torque-Angle Probe Removal. No further testing of sample #2.
30	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	18	D	1-11-02	1-11-02	5	D	Pil	OK	
31	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	1-11-02	1-11-02	6	D	Pil	Not OK	#6 PASS, All others cracked rotors.
32	3.2.2.12	Switch Insertion & Retention	Force to Remove Switch from Steering Col.	220N Min	Delphi	PV	6	D	1-16-02	1-16-02	5	D	Pil	OK	
33	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	
34	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	
35	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	

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38	GM 9110P Sect. 5.6	GM9110P Function Check at Temp Extr. +85C	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement Deg ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC- KRC KRC NonResist Diff ACC- KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27	Delph i	PV	6	D	1-16- 02	1-22- 02	5	D	Pil	<p>all switches are OK.</p> <p>See PPAP for Measured values.</p> <p>Torques-</p> <p>OK 2/2 N-cm OK 5/5 N-cm OK 30/27 N-cm OK 14/12 N-cm OK 5/5 N-cm OK 6/5 N-cm</p> <p>Displacements-</p> <p>OK 33/32 Deg OK 44/42 Deg OK 68/66 Deg OK 60/59 Deg OK 9/6 Deg OK 105/102 Deg OK 100/97 Deg</p> <p>OK 6/3 Deg OK 99/96 Deg OK 6/4 Deg OK 104/101 Deg OK 65/64 Deg OK 57/56 Deg OK 9/7 Deg OK 40/40 Deg OK 31/30 Deg</p> <p>Per GM9110P, Section 5.6, Performance Limits Differ From Limits at Room Temp. Therefore, all parameters of all switches are OK.</p>
39	3.2.2.3	Torque- Angle	Actuation Torque	All In N-cm	Delph i	PV	18	D	1-16- 02	1-22- 02	5	D	Pil	<p>See PPAP for Measured values.</p> <p>Torques-</p>

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			Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF	25/15 25/15 65/55 15 Min 25/15 25/15									Not OK Not OK Not OK Not OK Not OK Not OK	4/2 N-cm 6/4 N-cm 30/27 N-cm 13/12 N-cm 6/5 N-cm 7/5 N-cm	
			Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC- KRC KRC NonResist Diff ACC- KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min KRC 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27									OK Not OK OK OK OK Not OK Not OK OK Not OK OK Not OK OK OK OK OK OK OK	Displacements- 31/31 Deg 42/41 Deg 65/65 Deg 59/58 Deg 8/6 Deg 101/100 Deg 98/95 Deg 6/3 Deg 97/94 Deg 6/4 Deg 101/100 Deg 65/63 Deg 57/55 Deg 9/6 Deg 40/39 Deg 30/29 Deg	
40	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	
41	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	
42	3.2.1.8	Contact Bounce	Measure Number of	5 Max 1.0	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	

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			Bounces and Duration	mSec Max None 10mSec Post Make-Break											
43	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	1-16-02	1-22-02	5	D	Pil	OK	
44	3.1.3.6	Fluid Compatibility	No Degradation of Performance or Appearance	N/A	Delphi	PV	6	D	1-24-02	1-26-02	6	D	Pil	Not OK	ALL FLUIDS Poured ONTO EACH OF THE SIX SAMPLES. Tested with power and loads connected, switches in OFF position, KEY-IN was actuated, monitored for nuisance electrical circuit state change. KRC circuits of each sample exhibited some temporary current leakage during the fluid spills. Salt water solution produced the highest level of leakage current. No permanent electrical state changes were detected during fluid spill.
45	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	D	1-25-02	1-26-02	6	D	Pil	OK	
46	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	1-25-02	1-26-02	6	D	Pil	OK	
47	3.1.5.1	Durability to 50% Life	Proper Function	25000 Cycles	Delphi	PV	6	D	1-2-02	1-7-02	6	D	Pil		All samples tested with the following current loads. ACC (2-4) = 3 Relays and Resistance totaling 0.99A to 1.03A RUN-CRANK (2-3) = 4 Relays

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															of less than 350mV, except a voltage drop of 530mV was measured on cycle 24598 at 23C.
48	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	OK	
49	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	OK	
50	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	OK	
51	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	OK	
52	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	OK	
53	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min	Delphi	PV	6	D	1-7-02	1-8-02	6	D	Pil	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK OK OK Not OK Not OK OK	See PPAP for Measured values. Torques- 5/3 N-cm 7/4 N-cm 38/31 N-cm 15/12 N-cm 5/4 N-cm 6/5 N-cm Displacements- 33/31 Deg 43/41 Deg 67/65 Deg 60/58 Deg 9/7 Deg 102/100 Deg 98/96 Deg 6/3 Deg

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			NonResist Diff ACC- KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27										Not OK OK Not OK OK OK OK Not OK OK	97/95Deg 6/4 Deg 101/99 Deg 65/63 Deg 58/56 Deg 9/6 Deg 41/40 Deg 31/30 Deg
54	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delph i	PV	6	D	1-7- 02	1-8- 02	6	D	Pil	OK	
55	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delph i	PV	6	D	1-7- 02	1-8- 02	6	D	Pil	OK	
56	3.1.3.7	Dust	Meet Performance Test Req's	N/A	Delph i	PV	6	D	1-11- 02	1-11- 02	6	D	Pil	OK	
57	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delph i	PV	6	D	1-12- 02	1-14- 02	6	D	Pil	OK	
58	3.2.2.3	Torque- Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82	Delph i	PV	6	D	1-12- 02	1-14- 02	6	D	Pil	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK OK OK Not OK Not OK	See PPAP for Measured values. Torques- 5/4 N-cm 6/6 N-cm 36/30 N-cm 13/10 N-cm 6/5 N-cm 7/5 N-cm Displacements- 32/31 Deg 42/12 Deg; #16 Premature Brk 67/65 Deg 59/58 Deg 9/6 Deg 101/100 Deg Bounce 97/96 Deg

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			Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27										OK Not OK OK Not OK OK OK OK OK Not OK OK	6/3 Deg 96/95 Deg 6/3 Deg 101/99 Deg 65/64 Deg 57/56 Deg 9/6 Deg 41/40 Deg 31/30 Deg
59	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	1-12-02	1-12-02	6	D	Pil	OK	
60	3.1.5.1	Durability to 100% Life	Proper Function	25000 Cycles	Delphi	PV	6	D	1-12-02	1-16-02	6	D	Pil	OK	<p>All samples tested with the following current loads. ACC (2-4) = 3 Relays and Resistance totaling 0.99A to 1.03A RUN-CRANK (2-3) = 4 Relays and Resistance totaling 747mA-755mA KEY-RUN-CRANK (6-5) = Resistive Load of 807uA. KEY-IN (2-5) = Resistive Load of 2.3mA</p> <p>All circuits of all samples functioned properly in the KEY-IN and OFF switch positions, with no closed circuits in OFF, and no open circuit conditions detected and maximum voltage drop values of less than 350mV in KEY-IN.</p> <p>Sample #13 RUN switch position: The KEY-RUN-CRANK circuit</p>

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														Not OK	25000 cycles, with a maximum measured voltage drop of 1220 mV at 23C, 27782 cycles. The KEY-RUN-CRANK circuit exhibited 10 randomly occurring open conditions between cycles 27714 and 27912 while at 23C.
														OK	START switch position: The ACC circuit functioned properly throughout the 25000 cycles.
														Not OK	The RUN-CRANK circuit was functional throughout the 25000 cycles, with a maximum measured voltage drop of 436 mV at -40C, 30150 cycles.
														Not OK	The KEY-RUN-CRANK circuit exhibited 120 open conditions between cycles 27710 and 44202, at 23C, -40C, and while ramping from -40C to -23C.
														OK	ACC switch position: The RUN-CRANK and KEY-RUN-CRANK circuits functioned properly throughout the 25000 cycles.
														Not OK	The ACC circuit was functional throughout the 25000 cycles, with a maximum measured voltage drop of 430 mV at -40C, 30227 cycles.
61	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	Not OK	Max Measured Values ACC 2-4: 113mOhms RUN 2-4: 76mOhms RUN 2-3: 106mOhms RUN 6-5: 108mOhms START 2-3: 69mOhms START 6-5: 768Ohms KEY-IN 2-5: 98mOhms

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62	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
63	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
64	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
65	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
66	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK OK OK Not OK Not OK OK Not OK OK Not OK OK OK OK OK	See PPAP for Measured values. Torques- 5/3 N-cm 7/5 N-cm 35/29 N-cm 12/11 N-cm 7/5 N-cm 8/6 N-cm Displacements- 32/30 Deg 42/41 Deg 66/65 Deg 59/57 Deg 9/7 Deg 102/100 Deg 97/95 Deg 7/3 Deg 96/94 Deg 7/4 Deg 102/99 Deg 65/64 Deg 57/56 Deg 10/7 Deg

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PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
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			Key-In Make ACC Break	40/34 33/27									Not OK OK	41/40 Deg 31/29 Deg	
67	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make-Break	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
68	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
69	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	6	D	1-16-02	1-18-02	6	D	Pil	OK	
70	3.1.3.5	Salt Fog	Meet Performance Test Req's	N/A	Delphi	PV	6	D	1-18-02	1-22-02	6	D	Pil	Not OK	Samples were exposed to an 96 hour period of salt fog environment per GM9110P. Each switch detented position was maintained for approximately 1/3 of the total exposure period while monitoring for proper electrical state conditions. Leakage Current of N.O.circuits, circuits which should be closed were open. #13 OFF: KRC current leakage. #13 ACC: KRC current leakage. #13 RUN: All circuits functioned properly. #14 OFF: KRC current leakage. #14 ACC: KRC/RC current leakage, ACC open. #14 RUN: KRC Intermittent, ACC open.

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															#15 OFF: KRC current leakage. #15 ACC: KRC current leakage. #15 RUN: All circuits functioned properly. #16 OFF: KRC current leakage. #16 ACC: KRC/RC current leakage. #16 RUN: All circuits functioned properly. #17 OFF: KRC current leakage. #17 ACC: KRC current leakage, ACC open. #17 RUN: ACC Intermittent. #18 OFF: KRC current leakage. #18 ACC: KRC current leakage, ACC Intermittent. #18 RUN: RC/ACC open circuits.
71	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	6	D			0	D	Pil		NOT TESTED DUE TO SAMPLE FUNCTIONAL STATUS
72	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	D	1-25-02	1-25-02	6	D	Pil	Not OK	Multiple circuits of each sample failed to close.
73	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	6	D			0	D	Pil		NOT TESTED DUE TO SAMPLE FUNCTIONAL STATUS
74	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D			0	D	Pil		NOT TESTED DUE TO SAMPLE FUNCTIONAL STATUS
75	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	6	D			0	D	Pil		NOT TESTED DUE TO SAMPLE FUNCTIONAL STATUS
76	3.2.2.13	Mechanical Overload	Torsional Key Rotation	4 N-m Min	Delphi	PV	12	D	2-26-02	2-26-02	12	D	Prod	OK	Three samples achieved 4N-m in the CW direction with no damage sustained. Four samples achieved 4N-m in the CCW direction with no damage sustained.
														Not OK	Three samples achieved 4N-mm

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															in the CW direction, but sustained stress cracks part of the way up the drive slot between 3.80 and 3.99 N-m, originating at the floor of the drive slot. Two samples achieved 4N-mm in the CCW direction, but sustained stress cracks part of the way up the drive slot at 3.12 and 3.87 N-m, originating at the floor of the drive slot. In all instances stress cracks originated at the floor of the drive slot and extended upward, but never reaching the top of the drive slot. NOTE: All samples were production built switches, retrofitted at Downers Grove with new detent plunger part number 741-75316.
77	3.2.2.15	Theft Deterrence	Integral Theft Resistor Shall Be Destroyed	40N to 300N 5mm Max	Delphi	DV	10	E	5-10-02	5-10-02	10	E	Prod	OK	Delphi Lab Number 02-160 [CTS Rev 3-22-2001] 154N to 185N, 3.07mm to 3.92mm.
78	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	E	3-22-02	3-22-02	6	E	Prod	OK	Delphi Lab Number 02-109 [CTS Rev 3-22-2001] Test Leg #1 Initial Perf Tests
79	3.2.1.11	24 Volt Jump Start	Shall Operate Without Damage or Functional Degradation	24V Applied in START, RUN, and ACC Switch Positions	Delphi	PV	6	E	5-9-02	5-9-02	6	E	Prod	OK	

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80	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	E	5-9-02	5-9-02	6	E	Prod	OK	
81	3.2.1.7	Continuous Current Overload	Shall Conform to Maximum Current Requirements	Twice Rated Load Per Circuit	Delphi	PV	6	E	5-9-02	5-9-02	6	E	Prod	OK	
82	3.1.2.2	Simple Function	Circuit Make Circuit Break	N/A	Delphi	PV	6	E	5-9-02	5-9-02	6	E	Prod	OK	
83	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	36	E	3-25-02	5-1-02	36	E	Prod	OK	Delphi Lab Number 02-109 [CTS Rev 3-22-2001] Test Leg #3 Initial Perf Tests
84	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	36	E	3-25-02	5-3-02	36	E	Prod	OK	
85	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	36	E	3-25-02	5-2-02	36	E	Prod	OK	
86	3.2.1.6	Isolation Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	36	E	3-25-02	5-2-02	36	E	Prod	OK	
87	GM 9110P Sect. 5.6	GM9110P Function Check at Temp Extr. -40C	Actuation Torque Off-ACC 25/15 ACC-RUN 25/15 Max Travel 65/55 Return Torque 15 Min RUN-ACC 25/15 ACC-OFF 25/15 Displacement All In Deg ACC Make 33/27 Key-In Break 40/34 RC Make 67/61 KRC Make 61/55 Diff KRC-RC 10/2 ACC Break 99/93 KRC Resist 95/82	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15	Delphi	PV	36	E	3-26-02	5-3-02	36	E	Prod	OK OK OK OK OK OK OK OK OK OK OK	See PPAP for Measured values. Torques- 10/4 N-cm 13/9 N-cm 33/29 N-cm 15/13 N-cm 11/7 N-cm 13/9 N-cm Displacements- 32/30 Deg 43/32 Deg; #33 Contact Bnc 66/63 Deg 61/58 Deg 7/4 Deg 101/67 Deg; #32,#34 Cont Bnc 98/95 Deg

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			Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27										OK OK OK OK OK OK OK OK OK OK	5/-29 Deg; #32,#34 Cont Bnc 98/95Deg 5/1 Deg 101/98 Deg 91/62 Deg; #32,#38 Cont Bnc 58/57 Deg 34/4 Deg; #32,#38 Cont Bnc 40/38 Deg 30/29 Deg Per GM9110P, Section 5.6, Performance Limits Differ From Limits at Room Temp. Therefore, all parameters of all switches are OK.
88	GM 9110P Sect. 5.6	GM9110P Function Check at Temp Extr. +85C	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min	Delphi	PV	36	E	3-27-02	5-2-02	36	E	Prod	OK OK OK OK OK OK OK OK OK OK OK OK OK OK	See PPAP for Measured values. Torques- 5/2 N-cm 9/6 N-cm 30/27 N-cm 16/13 N-cm 9/6 N-cm 10/7 N-cm Displacements- 33/31 Deg 43/41 Deg 67/64 Deg 61/59 Deg 7/4 Deg 103/99 Deg 100/97 Deg 5/1 Deg

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			NonResist Diff ACC- KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27										OK OK OK OK OK OK OK OK	99/96 Deg 5/1 Deg 102/98 Deg 98/62 Deg; #21 Contact Bounce 59/56 Deg 40/4 Deg; #21 Contact Bounce 40/38 Deg 30/28 Deg
															Per GM9110P, Section 5.6, Performance Limits Differ From Limits at Room Temp. Therefore, all parameters of all switches are OK.
89	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC- KRC KRC NonResist Diff ACC- KRC	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min	Delphi	PV	36	E	3-26-02	5-1-02	36	E	Prod	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK OK OK Not OK Not OK Not OK Not OK Not OK	See PPAP for Measured values. Torques- 9/3 N-cm 10/8 N-cm 31/28 N-cm 15/13 N-cm 10/7 N-cm 11/7 N-cm Displacements- 32/30 Deg 42/40 Deg 66/64 Deg 61/58 Deg 6/4 Deg 101/47 Deg; #8 Contact Bnc 98/96 Deg 5/-49 Deg; #8 Contact Bnc 98/95 Deg 5/1 Deg

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			ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	99/93 67/61 61/55 10/2 40/34 33/27										Not OK Not OK OK Not OK OK OK	101/98 Deg 96/62 Deg; #3 Contact Bnc 58/57 Deg 38/4 Deg; #3 Contact Bnc 40/38 Deg 30/28 Deg
90	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	36	E	3-22-02	5-2-02	36	E	Prod	OK	
91	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	36	E	3-27-02	3-27-02	12	E	Prod	OK	Only switches 1-12 were tested. Sound measurement equipment was out for calibration check at the time of the measurement of the next 24 switches. 50dB Max Measured Value
92	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make-Break	Delphi	PV	36	E	3-25-02	5-2-02	36	E	Prod	OK	No Bounces Detected
93	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	36	E	3-22-02	5-2-02	36	E	Prod	OK	
94	3.2.3.2	Reliability Requirements	R98 at One Design Life with C50: Test 34 Switches Min to One Design Life Without Failure	50000 Cycles	Delphi	PV	12	E			12	E	Prod		All samples tested with the following current loads. ACC (2-4) = 3 Relays and Resistance totaling 0.99A to 1.03A RUN-CRANK (2-3) = 4 Relays and Resistance totaling 747mA-755mA KEY-RUN-CRANK (6-5) = Resistive Load of 807uA. KEY-IN (2-5) = Resistive Load

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															350mV, 355mV, 47950 cycles, 17C, and 369mV, 47953 cycles, 19C. One hundred ten measurements of the contact voltage drop values of the B+ to RC circuit in the RUN position were greater than 350mV, 352mV to 768mV, between 22869 cycles and 47953 cycles, between -40C and 51C. Seventy-seven measurements of the contact voltage drop values of the B+ to RC circuit in the START position were greater than 350mV, 352mV to 837mV, between 17553 cycles and 49944 cycles, between 85C and -41C.
95	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	12	E	4-16-02	4-16-02	12	E	Prod	Not OK Not OK Not OK Not OK OK Not OK Not OK	ACC (Terms 2-4): 3767 mOhm / 65 mOhm RUN (Terms 2-4): 647 mOhm / 55 mOhm RUN (Terms 2-3): 107 mOhm / 65 mOhm RUN (Terms 6-5): 45310 mOhm / 46 mOhm START (Terms 2-3): 68 mOhm / 48 mOhm START (Terms 6-5): 769 Ohm / 372 Ohm KEY-IN (Terms 2-5): 438 mOhm / 73 mOhm
96	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	12	E	4-16-02	4-16-02	12	E	Prod	OK OK OK Not OK	ACC (Terms 2-4): 179 mV / 57 mV RUN (Terms 2-4): 161 mV / 51 mV RUN (Terms 2-3): 139 mV / 77 mV RUN (Terms 6-5): 545 mV / 36 mV

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			Key-In Make ACC Break	40/34 33/27									OK OK	40/39 Deg 31/29 Deg Per GM9110P, Section 5.6, Performance Limits Differ From Limits at Room Temp. Therefore, all parameters of all switches are OK.	
101	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34	Delphi	PV	12	E	4-16-02	4-16-02	12	E	Prod	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK Not OK OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK	See PPAP for Measured values. Torques- 7/3 N-cm 26/10 N-cm 33/30 N-cm 15/13 N-cm 15/10 N-cm 16/10 N-cm Displacements- 33/31 Deg 43/18 Deg; #3, #5, #7 Cont Bnc 67/65 Deg 62/59 Deg 7/5 Deg 101/99 Deg 99/97 Deg 4/1 Deg 98/96 Deg 4/1 Deg 101/98 Deg 109/62 Deg; #9,#12 Cont Bnc #7 Multiple Contact Breaks 60/57 Deg 52/3 Deg; #9,#12 Cont Bnc #7 Multiple Contact Breaks 40/39 Deg

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PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

			ACC Break	33/27										OK	31/29 Deg
102	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	12	E	4-16-02	4-16-02	12	E	Prod	OK	
103	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	12	E	4-17-02	4-17-02	0	E	Prod		NOT tested. Sound measurement equipment was out for calibration check at the time of the measurement.
104	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make-Break	Delphi	PV	12	E	4-17-02	4-17-02	12	E	Prod	OK	5 Bounces Max, 0.47mSec Max
105	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	12	E	4-16-02	4-16-02	12	E	Prod	OK	
106	3.2.3.2	Reliability Requirements	R98 at One Design Life with C50: Test 34 Switches Min to One Design Life Without Failure	50000 Cycles	Delphi	PV	12	E	4-25-02	5-5-02	12	E	Prod	OK	All samples tested with the following current loads. ACC (2-4) = 3 Relays and Resistance totaling 0.99A to 1.03A RUN-CRANK (2-3) = 4 Relays and Resistance totaling 747mA-755mA KEY-RUN-CRANK (6-5) = Resistive Load of 807uA. KEY-IN (2-5) = Resistive Load of 2.3mA GROUP #2: 12 SWITCHES Samples #19, #25, #26, and #28 All circuits functioned properly

PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

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															352mV to 837mV. Fifty-six between 3753 cycles and 4260 cycles, all at -40C. One at 10696 cycles, -12C. Three between 27302 cycles and 27401 cycles, all at -40C. Thirty-eight between 33336 cycles and 33495 cycles, during -40C temp period and the transition up to 22C. Twenty-seven between 38438 cycles and 39011 cycles, during -40C temp period and the transitions from -33C and to -38C. One at 10923 cycles, 23C. One at 44238 cycles, -37C. Three between 49942 cycles and 49964 cycles, -21C to -32C.
107	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	12	E	5-9-02	5-9-02	12	E	Prod	Not OK Not OK OK OK OK Not OK OK	ACC (Terms 2-4): 119 mOhm / 52 mOhm RUN (Terms 2-4): 154 mOhm / 50 mOhm RUN (Terms 2-3): 99 mOhm / 59 mOhm RUN (Terms 6-5): 89 mOhm / 40 mOhm START (Terms 2-3): 71 mOhm / 45 mOhm START (Terms 6-5): 1780 Ohm / 372 Ohm KEY-IN (Terms 2-5): 85 mOhm / 64 mOhm
108	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	12	E	5-13-02	5-13-02	12	E	Prod	OK OK OK OK	ACC (Terms 2-4): 115 mV / 43 mV RUN (Terms 2-4): 94 mV / 43 mV RUN (Terms 2-3): 148 mV / 76 mV RUN (Terms 6-5): 139 mV / 33 mV

PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

															Per GM9110P, Section 5.6, Performance Limits Differ From Limits at Room Temp. Therefore, all parameters of all switches are OK.
113	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27	Delphi	PV	12	E	5-10-02	5-10-02	12	E	Prod	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK Not OK OK OK Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK Not OK OK	See PPAP for Measured values. Torques- 5/3 N-cm 18/10 N-cm 31/28 N-cm 14/13 N-cm 15/10 N-cm 15/9 N-cm Displacements- 33/32 Deg 44/42 Deg 68/66 Deg 61/59 Deg 7/5 Deg 103/100 Deg 99/97 Deg 4/1 Deg 98/97 Deg 4/1 Deg 102/99 Deg 107/62 Deg; #20,#22,#30 Lengthy Circuit Breaks 59/58 Deg 49/4 Deg; #20,#22,#30 Lengthy Circuit Breaks 41/39 Deg 31/30 Deg
114	3.2.2.5	Rattle	No Rattle,	N/A	Delphi	PV	12	E	5-13-	5-13-	12	E	Prod	OK	

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PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

		Evaluation	Squeak, or Undesirable Noise		i				02	02					
115	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	12	E	5-14-02	5-14-02	12	E	Prod	OK	49 dB Max Measured Value
116	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make-Break	Delphi	PV	12	E	5-14-02	5-14-02	12	E	Prod	OK	No Bounces Detected
117	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	12	E	5-13-02	5-13-02	12	E	Prod	OK	
118	3.2.3.2	Reliability Requirements	R98 at One Design Life with C50: Test 34 Switches Min to One Design Life Without Failure	50000 Cycles	Delphi	PV	12	E	5-5-02	5-16-02	12	E	Prod	OK	All samples tested with the following current loads. ACC (2-4) = 3 Relays and Resistance totaling 0.99A to 1.03A RUN-CRANK (2-3) = 4 Relays and Resistance totaling 747mA-755mA KEY-RUN-CRANK (6-5) = Resistive Load of 807uA. KEY-IN (2-5) = Resistive Load of 2.3mA GROUP #3: 12 SWITCHES Samples #32, #33, and #34 All circuits functioned properly in the KEY-IN, ACC, RUN, and START switch positions throughout the 50,000 cycles of

PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

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															45139 cycles to 45477 cycles, -40C to -32C. One hundred forty-five measurements of the contact voltage drop values of the B+ to RC circuit in the START position were greater than 350mV, 351mV to 777mV, 10289 cycles to 45410 cycles, all at -40C or the transition to -40C.
119	3.2.1.4	Contact Resistance	Measured Resistance	100 mOhms Max	Delphi	PV	12	E	5-16-02	5-16-02	12	E	Prod	Not OK Not OK Not OK OK OK Not OK Not OK	ACC (Terms 2-4): 230 mOhm / 53 mOhm RUN (Terms 2-4): 101 mOhm / 50 mOhm RUN (Terms 2-3): 129 mOhm / 60 mOhm RUN (Terms 6-5): 63 mOhm / 43 mOhm START (Terms 2-3): 87 mOhm / 45 mOhm START (Terms 6-5): 1781 Ohm / 372 Ohm KEY-IN (Terms 2-5): 110 mOhm / 64 mOhm
120	3.1.2.3	Voltage Drop	Measured Voltage Drop	350 mV Max	Delphi	PV	12	E	5-17-02	5-17-02	12	E	Prod	OK OK OK OK OK	ACC (Terms 2-4): 151 mV / 48 mV RUN (Terms 2-4): 107 mV / 40 mV RUN (Terms 2-3): 178 mV / 71 mV RUN (Terms 6-5): 60 mV / 31 mV START (Terms 2-3): 129 mV / 46 mV
121	3.2.1.5	Open Circuit Resistance	Measured Resistance	20 Mohm Min	Delphi	PV	12	E	5-17-02	5-17-02	12	E	Prod	OK	
122	3.2.1.6	Isolation	Measured	20	Delphi	PV	12	E	5-17-	5-17-	12	E	Prod	OK	

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PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.

															From Limits at Room Temp. Therefore, all parameters of all switches are OK.
125	3.2.2.3	Torque-Angle	Actuation Torque Off-ACC ACC-RUN Max Travel Return Torque RUN-ACC ACC-OFF Displacement ACC Make Key-In Break RC Make KRC Make Diff KRC-RC ACC Break KRC Resist Diff ACC-KRC KRC NonResist Diff ACC-KRC ACC Make RC Break KRC Break Diff KRC-RC Key-In Make ACC Break	All In N-cm 25/15 25/15 65/55 15 Min 25/15 25/15 All In Deg 33/27 40/34 67/61 61/55 10/2 99/93 95/82 2 Min 95/82 2 Min 99/93 67/61 61/55 10/2 40/34 33/27	Delphi	PV	12	E	5-16-02	5-16-02	12	E	Prod	Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK OK OK OK Not OK Not OK Not OK Not OK Not OK Not OK OK Not OK Not OK Not OK Not OK OK Not OK Not OK OK	See PPAP for Measured values. Torques- 5/4 N-cm 30/10 N-cm 32/29 N-cm 14/12 N-cm 19/11 N-cm 16/10 N-cm Displacements- 33/32 Deg 43/42 Deg 67/66 Deg 61/59 Deg 7/6 Deg 102/100 Deg 99/97 Deg 4/1 Deg 98/96 Deg 4/1 Deg 101/99 Deg 107/62 Deg; #35,#40,#41 Lengthy Circuit Breaks 60/57 Deg 49/4 Deg; #35,#40,#41 Lengthy Circuit Breaks 41/39 Deg 31/30 Deg
126	3.2.2.5	Rattle Evaluation	No Rattle, Squeak, or Undesirable Noise	N/A	Delphi	PV	12	E	5-17-02	5-17-02	12	E	Prod	OK	

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PROCEDURE # Enter the 4 digit standard procedure number. If not standard, enter 0000.	PROCEDURE TITLE Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	REQUIREMENT # & TITLE Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	REQUIREMENT VALUE Enter cycles, miles, volts, minimum value, no loss of function.	EVALUATION PHASE D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	SAMPLE TYPE A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	HARDWARE STAGE M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	SAMPLES TESTED Enter quantity tested, sample type and hardware stage.	RESULTS Enter actual results.	NOTES Describe unique criteria or results. Use to describe interim status of evaluations.
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127	3.2.2.4	Audible Sound	Measure Sound Due to Actuation Into and Out Of Each Position	50 dB Avg Max	Delphi	PV	12	E	5-20-02	5-20-02	12	E	Prod	OK	50 dB Max Measured Value
128	3.2.1.8	Contact Bounce	Measure Number of Bounces and Duration	5 Max 1.0 mSec Max None 10mSec Post Make-Break	Delphi	PV	12	E	5-17-02	5-17-02	12	E	Prod	OK	No Bounces Detected
129	3.1.1	Visual Appearance	No Objectionable Appearance	N/A	Delphi	PV	12	E	5-17-02	5-17-02	12	E	Prod	OK	

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PROCEDURE #	PROCEDURE TITLE	REQUIREMENT # & TITLE	REQUIREMENT VALUE	EVALUATION PHASE	SAMPLE TYPE	HARDWARE STAGE	SAMPLES TESTED	RESULTS	NOTES
Enter the 4 digit standard procedure number. If not standard, enter 0000.	Enter the full name of the standard evaluation procedure. If not standard, create a brief, descriptive title.	Enter number and title of corresponding VTS, SSTS and/or CTS requirements being evaluated.	Enter cycles, miles, volts, minimum value, no loss of function.	D = Development DV = Design Validation PV = Product Validation PVA = Post Validation Audit	A = Analysis B = Hand made C = Soft tooled D = Hard tooled E = PPAP (Initial Production) F = Full volume production	M = Mule α = Alpha β = Beta Prot = Prototype Pil = Pilot Prod = Production	Enter quantity tested, sample type and hardware stage.	Enter actual results.	Describe unique criteria or results. Use to describe interim status of evaluations.