Potential
Failure Mode and Effects Analysis
(Design FMEA)

___System
___Subsystem
_X_Component: Connector System
Model Year/Vehicle(s): / 42 VOLT SYS
Core Team: Refer to workgroup list

Design Responsibility: Workgroup
Key Date: October 2000

FMEA Number: MIT 1

Prepared by: M.Andrew
FMEA Date (Orig.): 2000.02.16 (Rev.): 2010.02.16

Item / Function	Potential Failure Mode	Potential Effect(s) of Failure	Sev	Class	Potential Cause(s)/ Mechanism(s) Failure	Occur	Current Design Controls	Detec	R.P.N.	Recommended Action(s)	Responsibility & Target Completion Date	Action Results: Actions Taken	Sev	Occ	Det	R.P.N.
- handles rated electrical current with maximum voltage drop of (50mV), for up to xxx sec. over and ambient temperature range of -40C to 80C. Voltage drop spec. referenced to end-of-conditioning status, including Meet stds.for underhood environment (corrosion resistance) Must withstand SAEJ537 spec.for vibration Must satisfy thermal cycling spec.	Excessive voltage drop	Overheating Reduced voltage to loads	8		decreased normal force		end-of-line check test									
					partially backed-out connector											
					partially backed-out terminal											
					loss of asparities(terminal interface)											
					Environmental conditions											
					material properties											
	system not electrically connected	open circuit	7		excessive mating force											
					broken connector latch											
					inadequate connector latch											
	terminal not connected	open circuit	7		terminal partially seated											
					damaged terminal											
					improper terminal orientation											
					excessive mating force											
maintains mechanical integrity	doesn't support cable load	open, short, or intermittent circuit, or overheating			inadequate material selection(housing or terminal)											
					inadequate strain relief											
	unmated connectors	Open circuit overheating Reduced voltage to loads			partially backed-out connector											
					partially backed-out terminal											

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					loss of asparities(terminal interface)											
Prevents accidental shorting of positive terminal to ground	Short from positive to negative or to ground	Excessive current draw Overheating			Design Dependent - to be identified for each design.											
mate/unmate connections - under load (less than 10 amps for a minimum of 50 cycles)	Increased voltage drop	Overheating Excessive voltage drop to load			loss of asparities(terminal interface)											
					decreased normal forc											
	reduced mechanical retention force	open, short or intermittent circuit			broken connector latch											
					inadequate connector latch											
	unmate force is excessive	Can't disconnect battery Permanent damage to the system			Cold welds at the interface											
					Corrosion											
					Mechanical latch failure											
					Mechanical distortion of separable interface											
Prevent reverse connections	Reverse connections are made	Damage to vehicle electrical system. Damage to connection			Inadequate polarization or indexing											
Prevent 12 volt to 36 volt connections	Wrong connections are made	Damage to vehicle electrical system. Damage to connection Battery damage			Inadequate indexing											
					Allows for alligator style jumper cable attachment											
Prevent connection to different battery chemistry technology(indexing required at positive only)	Wrong connections are made	Damage to battery			Inadequate indexing											

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Prevent customers access with standard jumper cables on the connection system	Alligator style jumper cables can be attached	Damage to the vehicle electrical system Damage to battery Damage to connector			Allows for alligator style jumper cable attachmen											
Disconnect under XX electical load	Damage to connection system	Oveheating warping excessive spark permanent damage to the connection system			excessive arcing - impact will be design dependent											
75 N maximum mating force requirement	requires more than 75 N to mate	Cannot mate connection open circuit Partially mated Ergonomic concerns			Out of spec on mating alignment assurance											
					damaged terminals											
					improper terminal orientation											
					damaged housing											
					Contamination											
75 N maximum unmating force(minimum locking strength of 110 N) USCAR 5.4.2.4	requires more than 75 N unmating force	excessive unmating force			damaged terminals											
					improper terminal orientation											
					damaged housing											
					Contamination/corrosion											
	Less than 110 N locking strength	Terminal latch disengages before the connector unmates			Inadequate terminal retention feature											
					Improper material											
maintain stable cable routing orientation	cable out of desired position	damaged battery cable			Inadequate mechanical positioning feature											