Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value		1	Required	Illumin.
Solenoid S1	P0973	Circuit continuity check	Short-cut ground		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Detect signal of the S1 monitor	"OFF"	Time after solenoid output changed	>10 msec	Continuous	
					S1 driver outputs signal	"ON"		
	P0974	-	Not connected or short-cut Ubatt		DS Active V <sup>1</sup>	TRUE	1	
	1 0374		Detect signal of the S1 monitor	"ON"	Time after solenoid output changed	>10 msec		
			Solost olginal of the C i mornio.		Time dite. colonida culpat changed			
					S1 driver outputs signal	"OFF"		
Timing solenoid SLC1	P0966	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
1			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
1					No DTC set	P0657		
1						P0967 for 1 sec and		
						over		
	P0967		Short-cut Ubatt (B+)		20 4 11 111	TRUE	500 msec	2nd
	P0967		, ,	>= 1358 mA	DS Active V <sup>1</sup>			ZIIU
			Feedback current	>= 1308 IIIA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657	1	
						P0966 for 1 sec and		
						over		
	P0778		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
	1. 00		Toda Basir Garretti Glasti(Elostribal)		Battery remage	continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA	Commudad	
				50 4		FALSE		
			ie	> 50 mA	Emergency mode			
					DS Active V <sup>1</sup>	TRUE		
					No DTC set	P0966		
						P0967		
						P0657		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec	sum ie>	
					Battery remage	continuously	60000mA	
			sum_ie	>20000 mA	Feedback current	< 1358 mA		
			"ie" is added to "sum_ie" every 10 msec.	>20000 IIIA		FALSE		
					Emergency mode			
			"ie": Difference of "ir" and "ifb".		DS Active V <sup>1</sup>	TRUE		
			"ir" : Target current		No DTC set	P0966		
			"ifb": Feedback current			P0967	1	
			"sum_ie" is cleared as follows:			P0657	1	
			(1) or (2) or (3)					
			(1): Detection window = FALSE				1	
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
Timing solenoid SLC2	P0970	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	1
					No DTC set	P0657	1	1
						P0971 for 1 sec and	1	1
						over		
	P0971		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
	1 03/1		Feedback current	>= 1358 mA	Emergency mode	FALSE	Continuous	2110
			Feedback current	>= 1336 IIIA			Continuous	
					No DTC set	P0657	1	
						P0970 for 1 sec and	1	
						over	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
	P0798		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
						continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA		
			lie l	> 50 mA	Emergency mode	FALSE		
			i ·		DS_Active_V1	TRUE		
					No DTC set	P0970		
						P0971		
						P0657		
						1 0007		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec	cum io >	1
			Ontonaz.		Dattery voltage	continuously	60000mA	
			aum ia	>20000 mA	Feedback current	< 1358 mA	OOOOOIIIA	
			sum_ie "ie" is added to "sum_ie" every 10 msec.	>20000 IIIA		FALSE		
					Emergency mode			
			"ie" : Difference of "ir" and "ifb".		DS_Active_V1	TRUE		
			"ir" : Target current		No DTC set	P0970		
			"ifb": Feedback current			P0971		
			"sum_ie" is cleared as follows:			P0657		
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
ming solenoid SLC3	P2720	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2721 for 1 sec and		
						over		
	P2721		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	>= 1358 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2720 for 1 sec and		
						over		
						0.0.		
	P2716		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
	1				,	continuously	Continuous	1
			Criteria1:		Feedback current	< 1358 mA		
			ie	> 50 mA	Emergency mode	FALSE		
			10	2 00 HIA		TRUE		1
					DS Active V <sup>1</sup> No DTC set	P2720		
					INO DTC Set			1
						P2721		
						P0657		
			Criteria2:		Pottony voltage	10 E V for E00 man	oum io s	4
			Gitteriaz.		Battery voltage	> 10.5 V for 500 msec		
					For the street summer.	continuously	60000mA	
			sum_ie	>20000 mA	Feedback current	< 1358 mA		
			"ie" is added to "sum_ie" every 10 msec.		Emergency mode	FALSE		
			"ie" : Difference of "ir" and "ifb".		DS Active V <sup>1</sup>	TRUE		
			"ir" : Target current		No DTC set	P2720		1
			"ifb": Feedback current			P2721		
	1		"sum_ie" is cleared as follows:	1		P0657		1
			(1) or (2) or (3)					

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions	Boendar 1	MIL
System	Code	Description	Criteria	Value			Required	Illumin.
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").					
iming solenoid SLB1	P2729	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2730 for 1 sec and		
						over		
	P2730		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	>= 1358 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2729 for 1 sec and		
						over		
	P2727		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
			,		, , , , , , , ,	continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA		
			ie	> 50 mA	Emergency mode	FALSE		
					DS Active V <sup>1</sup>	TRUE		
					No DTC set	P2729		
						P2730		
						P0657		
							<b>_</b>	
			Criteria2:		Battery voltage	> 10.5 V for 500 msec	sum_ie >	
						continuously	60000mA	
			sum_ie	>20000 mA	Feedback current	< 1358 mA		
			"ie" is added to "sum_ie" every 10 msec.		Emergency mode	FALSE		
			"ie": Difference of "ir" and "ifb".		DS Active V <sup>1</sup>	TRUE		
			"ir" : Target current		No DTC set	P2729		
			"ifb": Feedback current			P2730		
			"sum_ie" is cleared as follows:			P0657		
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").					
essure solenoid SLT	P0962	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
Social Solonold GE1	1 0002	Circuit continuity criccit	Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	Ziio
			i obabasi sairon	1 20 1111	No DTC set	P0657		
						P0963 for 1 sec and		
						over		
	Docco		Chart sut I hatt (D.)			TDUE	E00	0-4
	P0963		Short-cut Ubatt (B+) Feedback current	>= 1358 mA	DS Active V <sup>1</sup>	TRUE FALSE	500 msec Continuous	2nd
			Feedback current	>= 1330 IIIA	Emergency mode		Continuous	
					No DTC set	P0657 P0962 for 1 sec and		
						over		
						Over		
	P0748		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
						continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA		
			ie	> 50 mA	Emergency mode	FALSE		
					DS Active V <sup>1</sup>	TRUE		
					No DTC set	P0962		
			1	1		P0963	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions	D	MIL
System	Code	Description	Criteria	Value			Required	Illumi
						P0657		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec	sum_ie >	4
			Criteriaz.		Battery Voltage	continuously	60000mA	
			sum_ie	>20000 mA	Feedback current	< 1358 mA	0000011111	
			"ie" is added to "sum_ie" every 10 msec.	>20000 IIIA	Emergency mode	FALSE		
			"ie" : Difference of "ir" and "ifb".			TRUE		
			"ir" : Target current		DS Active V <sup>1</sup>	P0962		
					No DTC set	P0962 P0963		
			"ifb": Feedback current					
			"sum_ie" is cleared as follows:			P0657		
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").					
sure solenoid SLU	P2764	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2763 for 1 sec and		
						over		
	P2763		Short-cut Ubatt (B+)			TRUE	500 msec	2nd
	F2/03			>= 1358 mA	DS Active V <sup>1</sup>	FALSE	Continuous	ZHU
			Feedback current	>= 1336 IIIA	Emergency mode	P0657	Continuous	
					No DTC set			
						P2764 for 1 sec and over		
						Over		
	P2761		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
						continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA		
			ie	> 50 mA	Emergency mode	FALSE		
					DS Active V <sup>1</sup>	TRUE		
					No DTC set	P2764		
						P2763		
						P0657		
			Criteria2:	<del> </del>	Battery voltage	> 10.5 V for 500 msec	sum_ie >	-
	1				3.	continuously	60000mA	
			sum ie	>20000 mA	Feedback current	< 1358 mA		
			"ie" is added to "sum_ie" every 10 msec.		Emergency mode	FALSE		
	1		"ie" : Difference of "ir" and "ifb".		DS Active V <sup>1</sup>	TRUE	1	
	1		"ir" : Target current		No DTC set	P2764	1	1
			"ifb": Feedback current			P2763		
			"sum ie" is cleared as follows:			P0657		
	1		(1) or (2) or (3)			1 0001	1	1
	1		(1): Detection window = FALSE				1	
	1		(2): -50 mA <= ie <= 50 mA				1	
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
Linear solenoid driver	P0657		Malfunction		DS_Active_V <sup>1</sup>	TRUE	400 msec	2nd
			Linear solenoid driver status	= abnormal			Cntinuous	
aminaian Outaut arras d	D0700		No rules			TDUE	Danandaci	الم ما
smission Output speed or	P0722		No pulse		DS Active EG V <sup>16</sup>	TRUE FALSE	Dependent of Speed	2nd
OI .	1	1		I	Emergency mode	II ALSE	or oheen	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
			Number of pulses from Transmission Output Speed		Shift position	RANGE_D(defined)		
			Sensor	0				
			Number of pulses from Transmission Input Speed Sensor	16	Not during Neutral control			
					T_NConFin <sup>14</sup> msec after Neutral			
					control			
					Not during shifting			
					T ShiftFin <sup>14</sup> msec after shifting			
					Not during garage control			
					T_GarageFin <sup>14</sup> msec after garage			
					control			
					Not during C1 OFF control			
					T_C1ctrlFin <sup>15</sup> msec after C1 OFF			
					control			
					Not during C2 OFF control			
					T_C3ctrlFin <sup>15</sup> msec after C2 OFF			
					control			
					Notice Express stell another a section			
					Not in Engine stall avoidance control	000		
					outRpmNC	>= 300 rpm P0705		
					No DTC set	P0705 P0707		
						P0707 P0708		
						P0708 P0717		
						P0715		
						P0748		
						P0778		
						P0798		
						P0962		
						P0963		
						P0966		
						P0967		
						P0970		
						P0971		
						P0973		
						P0974		
						P2716		
						P2720		
						P2721		
						P2727		
						P0657		
						P0720		
						P2729		
						P2730		
	P0720	Circuit continuity check	Electrical Failure (B+ short / GND short / Open)		DS Active V <sup>1</sup>	TRUE		2nd
			NINM-voltage	< 0.206V or > 2.727V			Consecutive	
			(AD value)	(< 45 or > 545 )				
minnion inner and a	D0747		No pulso		DS_Active_EG_V <sup>16</sup>	TRUE	Donordent	2nd
smission input speed or	P0717		No pulse			FALSE	Dependent of Speed	2nd
JI					Emergency mode	FALSE	or Speed	
			No of pulsos from Transmission Innut Cased Cases		Shift position	DANCE D/defined)		
			No of pulses from Transmission Input Speed Sensor	0	Shift position	RANGE_D(defined)		
			No of pulses from Transmission Output Speed Sensor	24	CurrentGear	>= 2nd gear		
	1				Not during Neutral control		1	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
					T_NConFin <sup>14</sup> msec after Neutral			
					control			
					Not during shifting			
					T ShiftFin <sup>14</sup> msec after shifting			
					Not during garage control			
					T_GarageFin <sup>14</sup> msec after garage			
					control			
					Not during C1 OFF control			
					T_C1ctrlFin <sup>15</sup> msec after C1 OFF			
					control			
					T_C3ctrlFin <sup>15</sup> msec after C2 OFF			
					control			
					Not in Engine stall avoidance control			
					Transmission Output Speed	>= 300 rpm		
					No DTC set	P0705		
						P0707		
						P0708		
						P0722		
						P0720		
						P0748		
						P0778		
						P0798		
						P0962		
						P0963		
						P0966		
						P0967		
						P0970		
						P0971		
						P0973		
						P0974		
						P2716		
						P2720		
						P2721		
						P2727		
						P0657		
						P0715		
						P2729		
						P2730		
	P0715	Circuit continuity check	Electrical Failure (B+ short / GND short / Open)		DS Active V <sup>1</sup>	TRUE	1000 msec	2nd
			NOUTM-voltage	< 0.206V or > 2.727V			Consecutive	
			(AD value)	(< 45 or > 545 )				
	P0707	Voltage low	Input POS1 Voltage or Input POS2 Voltage	< 0.127V	Diagnosis Service mode	FALSE	200msec	2nd
cuit					Battery voltage	9V < Battery Voltage	Continuous	
						<= 32 V		
	P0708	Voltage high	Input POS1 Voltage or Input POS2 Voltage	> 4.84V	Diagnosis Service mode	FALSE	200 msec	2nd
					Battery voltage	9V < Battery Voltage	Continuous	
						<= 32 V		
	P0705	Signal out of range	Input POS1 Voltage + Input POS2 Voltage	< 5V -0.29V or > 5V +0.29V	Diagnosis Service mode	FALSE	200 msec	2nd
					Battery voltage	9 V <= Battery Voltage	Continuous	
						< 32 V		
					No DTC set	P0707		

Component/	Fault	Monitor Strategy	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Boquire d	MIL Illumin.
System	Code	Description	Criteria	value		+	Required	mumin.
	D0744	D. C. Fr	0.11.1		071	201 0	10 1	0 1
Transmission oil temperature sensor	P0711	Rationality	Criteria1: Oil temperature change less than	10 (AD value)	Oil temperature DS Active EG V <sup>16</sup> AD value of oil temperature AD value of oil temperature Emergency mode Shift position	<= 20deg.C TRUE >= 10 <= 1010 FALSE ≠ (P, R or N)	10 min	2nd
					Vehicle Speed No DTC set	>= 40km/h once P0705 P0707 P0708 P0711 P0712 P0713		
			Criteria2: Oil temperature	< 20deg.C	DS Active EG V <sup>16</sup> AD value of oil temperature AD value of oil temperature Emergency mode Estimated heating value Engine speed No DTC set	TRUE >= 10 <= 1010 FALSE >= MAP Q NORMAL <sup>16</sup> P0717 P0715 P0711 P0712 P0713	1 time	
	P0712	Circuit continuity check	Short-cut ground AD value of Oil temperature	< 10 (More than 200deg.C).	DS Active V <sup>1</sup>	TRUE	60 sec	2nd
	P0713	Circuit continuity check	Short-cut Ubat or open circuit AD value of Oil temperature	> 1010 ( less than -55deg.C)	DS Active EG V <sup>16</sup> DriveTime	TRUE > 1 min	12 sec	2nd
Ignition Switch Run/Start Position	P2534	Circuit Low	Ignition voltage	< 9V	DS Active ACC <sup>4</sup> Emergency mode Engine speed No DTC set	TRUE FALSE > 400rpm U0001 U0100	20 sec	2nd
Internal Control Module Memory	P0601	Check Sum Error	Detectin of differences between the result of the checksum calculation executed after IG ON and the correct checksum. If there are differences from the correct checksum value stored in the FLASH ROM, a second calculation is made.		Ignition	OFF->ON	1 time	2nd
Control Module Programming	P0602	Control Module Programming	Calibration data is not downlord properly.		None		1 time	1st
Non volatile memory	P0603	Read / Write error	To detect calculated checksum in RAM is different from checksum value in EEPROM.  TCM has two areas (main and sub) for EEPROM. This failure is detected when both areas are wrong.		Ignition	OFF->ON (only at T/M computer initialization function)	1 time	1st
Random access memory	P0604	Read / Write error	To detect different value between write and read (Step1 and Step2, Step3 and Step4) while TCM checks all RAM from step 1 to step 4 in initialize routine.		Ignition	OFF->ON (only at T/M computer initialization function)	1 time	1st

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
			Step 1. TCU writes 55(hex) data in the ram.					
			Step 1. TCU writes 55(nex) data in the ram.  Step 2. TCU reads 55(hex) data in the ram.					
			Step 3. TCU writes AA(hex) data in the ram.					
			Step 4. TCU reads AA(hex) data in the ram.					
AN Bus Off Counter	110004	CAN acceptable acceptable about				TRUE	0 6	On al
Verrun	U0001	CAN controller continuity check	Receiving "BUS OFF" state from CAN controller		DS Active ACC <sup>4</sup>	IRUE	8 times	2nd
ost communication with	U0100	Frame missing from ECM	No CAN status frame from ECM detected		Diagnostic Service "Disable Normal C	ommunication" not	4 sec	2nd
CM (Engine)					detected		Continuous	
					Ignition	ON >5 sec		
					DS Active CAN <sup>2</sup>	TRUE		
					No DTC set	U0001		
ear error, hydraulic fault	P0731	Rationality	Calculation of actual gear ratio for 1st gear is not correct.		Current Gear	1st	2.5sec	2nd
ear error, riyaraano raan	1 0/31	Rationality	Calculation of actual year ratio for 13t year is not correct.		Transmission Output Speed	> 60rpm	Continuous	ZIIG
			abs( 1 - GRCurrent/ 2nd GearRatio)	< 4%	EngineTorque_noACC	>= 60Nm	Sommous	
			abo( 1 Ortourient Zha Obartano)	770	Engine Forque_nonce	(GEAR_1ST)		
			or		Transmission Input Speed	<=6000rpm		
			oi e		Transmission input opeed	(gasoline engine)		
			abs(1 - GRCurrent/ 3rd GearRatio)	< 4%	Transmission Input Speed	<=4000rpm		
			abs(1 - Greenit sid Gearrand)	470	Transmission input opeed	( diesel engine)		
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1 - GRCurrent/ 4th GearRatio)	< 4%	ConditionA	IIIOE		
			abs(1 - Ortourent 4th Ceantaile)	7.0				
	P0732	Rationality	Calculation of actual gear ratio for 2nd gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)				Continuous	
			Criteria1:		Current gear	2nd		
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
					ConditionA <sup>13</sup>	TRUE		
					No DTC set	P0732		
						(Criteria2)		
			Criteria2:				2.5 sec	1
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	Current gear	2nd	Accumulate	
			or		Transmission Output Speed	>= 60rpm		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	ConditionA <sup>13</sup>	TRUE		
			or		InTorque	>=30Nm or <=-20Nm		
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%				
	P0733	Rationality	Calculation of actual gear ratio for 3rd gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)	<b></b>		2-4	Continuous	
			Criteria1:	. 200/	Current gear	3rd		
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
					ConditionA <sup>13</sup>	TRUE		
					No DTC set	P0733		
						(Criteria2)		
			Criteria2:	<del></del>	Current gear	3rd	2.5 sec	1
			abs(1-Gear Ratio Current/ 2nd Gear Ratio)	<4%	Transmission Output Speed	>= 60rpm	Accumulate	
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or		1.00			
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%				
	1	i	′	1	i	I	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		M
System	Code	Description	Criteria	Value			Required	Illur
	P0734	Rationality	Calculation of actual gear ratio for 4th gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)				Continuous	
			Criteria1:		Current gear	4th		
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
			abo(1 ortouriont ortexpositoa)	2070	ConditionA <sup>13</sup>	TRUE		
					No DTC set	P0734		
					No DTC Set			
						(Criteria2)		
						<b></b>		4
			Criteria2:		Current gear	4th	2.5 sec	
			abs(1-Gear Ratio Current/ 2nd Gear Ratio)	<4%	Transmission Output Speed	>= 60rpm	Accumulate	
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or					
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%				
				C470				
			or				1	
	1		abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%			1	1
							1	
	P0735	Rationality	Calculation of actual gear ratio for 5th gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)				Continuous	
			Criteria1:		Current gear	5th	7	
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm	1	
	1				ConditionA <sup>13</sup>	TRUE	1	1
					ConditionA	P0735		
					No DTO and	(Criteria2)		
					No DTC set	(Criteriaz)		
						<b> </b>		4
			Criteria2:		Current gear	5th	2.5 sec	
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	Transmission Output Speed	>= 60rpm	Accumulate	
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or `		,			
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%				
			ass(1 seal reals surrous our seal reals)	1170				
	P0729	Rationality	Calculation of actual gear ratio for 6th gear is not correct.				12 sec	2nd
	1 0723	Rationality	(Criteria1 or Criteria2)				Continuous	ZIIG
			Criteria1:		Current and	C4F	Continuous	
					Current gear	6th	1	
			abs(1-GRCurrent/GRExpected)	> 20%	Transmission Output Speed	>= 60rpm		
	1				ConditionA <sup>13</sup>	TRUE	1	1
	1					P0729	1	1
					No DTC set	(Criteria2)	1	
			L	L		J	1	_
			Criteria2:		Current gear	6th	2.5 sec	
	1		abs(1-Gear Ratio Current/ 2nd Gear Ratio)	<4%	Transmission Output Speed	>= 60rpm	Accumulate	1
			or		ConditionA <sup>13</sup>	TRUE		
	1		abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm	1	1
			or			55.1 5. 3- 2011111	1	1
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%			1	
			aus(1-Gear Katio Current/5th Gear Katio)	<470			1	1
	D0744	Comparison of angine anged and	Convertor is aligning with active look up or		50 A # 50 V/16	TRUE	12 sec	2nd
Convertor Clutal	P0741	Comparison of engine speed and	Converter is slipping with active lock-up on.		DS Active EG V <sup>16</sup>			∠na
Converter Clutch	1	transmission input speed	(Engine Speed - Transmission Input Speed)	> 300rpm	Fdetect inh <sup>5</sup>	FALSE	Continuous	1
Converter Clutch		transmission input speed (E			Shift position	RANGE_D(defined)	1	1
Converter Clutch						1	1	1
Converter Clutch					Time after N-D shifting control 10 ends	8 sec		
Converter Clutch					Time after N-D shifting control <sup>10</sup> ends	8 sec		
Converter Clutch					Time after N-D shifting control <sup>10</sup> ends  Engine Torque	8 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
					Time after SLU target current (_ir) >= 1000 mA Oil temperature Lock-up Not during garage control T_GarageFin <sup>14</sup> msec after garage control Not during shifting T_ShiftFin <sup>14</sup> msec after shifting No DTC set	Time_SLU_Full <sup>18</sup> sec >= -7deg.C FALSE  P2763 P2764 P2761 P0715 P0717 P0720 P0722		
Un-usual shifting P0869	SLC1 MAX	count fail SLC1MAX usft 17	>= 5times	DS_Active_EG_V16 Fdetect inh <sup>5</sup> Time after N-D Shifting Control <sup>10</sup> ends Not during garage control	TRUE FALSE This timer is based on oil temperature.	1 time	2nd	
		SLC2 MAX	count_fail_SLC2MAX_usft <sup>17</sup>	>= 5times	T_GarageFin <sup>14</sup> msec after garage control Shift position	RANGE_D(defined)		
		SLC3 MAX	count_fail_SLC3MAX_usft <sup>17</sup>	>= 5times	Not during Neutral control  T_NConFin <sup>14</sup> msec after Neutral control  Time after neutral control ends	This timer is based on		
		SLB1 MAX	count fail SLB1MAX usft <sup>17</sup>	>= 5times	wheel spin condition Transmission Output Speed Oil temperature Tmr_inh_GE <sup>14</sup> sec after shift to safe gear No DTC set	oil temperature. FALSE >300rpm >= -20 °C  P0715 P0717 P0720 P0722		
leutral condition P0965	P0965		Step 1: abs(Engine Speed - Transmission Input Speed) Transmission Input Speed (at D range)	<300rpm > Transmission Output Speed x (1st gear ratio at RANGE_D) + revNfaildet <sup>19</sup> rpm	DS Active EG V <sup>16</sup> Fdetect_Inh <sup>5</sup> Oil temperature Shift position Not during shifting T ShiftFin <sup>14</sup> msec after shifting Not during garage control(N-D) T_GarageFin <sup>14</sup> msec after garage control	TRUE FALSE >= -7deg.C RANGE_D(defined)	Step 1: at D range: 3.3 sec if (0 <= X <= 1500) 1.3 sec if (1501 <= X <= 3000)	2nd
			Step 2: Transmission Input Speed Engine Speed Shift position	<200rpm >600rpm RANGE_D(defined)	Not during Neutral control T_NConFin <sup>14</sup> msec after Neutral control Transmission Output Speed Lockup Current gear	<=500rpm FALSE 1 or 2 or 3 or 4	0.8 sec if (3001 <= X)	

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
					OS AirSuction <sup>6</sup> Prohibit Neutral Judgment flag No DTC set	FALSE	Step 2: 0.3sec	

#### 1)DS\_Active\_V

DS\_Active\_V = TRUE when start condition for failure detection is fulfilled for 2.0 sec continuously.

DS\_Active\_V = FALSE when permission condition for failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode

#### 2) DS\_Active\_CAN

DS\_Active\_CAN = TRUE when the start condition for CAN failure detection is fulfilled for 5.0 sec continously.

DS\_Active\_CAN = FALSE when the permission condition for CAN failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode

#### 3)DS\_Active\_EG\_V

DS\_Active\_EG\_V = TRUE when start condition for failure detection is fulfilled for 2.0 sec continuously.

DS\_Active\_EG\_V = FALSE when permission condition for failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish and

Egrpm > 400rpm and Egrpm = Q\_NORMAL<sup>16</sup>

Bus off, ECU no communication = Q\_NORMAL<sup>16</sup>

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode and

Egrpm > 400rpm and Egrpm = Q\_NORMAL<sup>16</sup>

Bus off, ECU no communication = Q\_NORMAL<sup>16</sup>

#### 4) DS\_Active\_ACC

DS\_Active\_ACC = TRUE when the start condition for failure detection is fulfilled for 2.0 sec continously.

DS\_Active\_ACC = FALSE when the permission condition for failure detection is not fulfilled.

Start Condition for failure detection:

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.

Accessory ON or Ignition ON and

10.2V < Battery Voltage <= 32V and Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Accessory ON **or** Ignition ON and 9.0V < Battery Voltage <= 32V and Not in service mode

5) Fdetech\_Inh = TRUE if:

In Emergency mode **or** Spinning<sup>7</sup> = TRUE **or** 

within 10.0 sec after spinning<sup>7</sup> detection end **or** 

DTC set: P0973, P0974, P0966, P0967, P0970, P0971, P2720, P2721, P2729, P2730, P0962, P0963, P2763, P0717, P0722, P0705, P0707, P0708, U0001, U0100, P0601, P0711, P0712, P0713, P2534, P0604, P0778, P0798, P2716, P0748, P2761, P2727, P0657, P0720, P0715,

Not in Neutral avoidance control

Not in Engine stall avoidance control

Egrpm = Q NORMAL16

Egtrg = Q NORMAL16

Accel = Q NORMAL16

<sup>6)</sup>QS\_AirSuction: Quick stop detection flag for the prevention of failure misdetection for Air suction, is set if the vehicle brakes hard.

<sup>7)</sup> Spinning: If "LateralACC > 7.00m/s^2", Spinning is TRUE.

LateralACC[m/s^2] = ( WheelDiff[m/s] \* WheelSpeedABS[m/s] ) / WheelWidth[m] )

WheelDiff ... "WheelSpeed RR" - "WheelSpeed RL"

WheelWidth... The width of the Wheel.

#### 8) Wheel spin condition

- (1) 300 rpm < outRpm < 3000rpm
- (2) Egtorque\_noACC > -500Nm
- (3) ABS (vehicle front wheels average speed vehicle rear wheels average speed) > 5.0 km/h
- (4) Throttle > 70 %
- (5) outRpmSpeed < -50rpm/sec
- {(1)and(2)and(3)}or{ (1)and(4)and(5)}continuously detected for 300 msec

After that, Wheel spin condition = TRUE continuously 10000 msec

#### 9) EngineTorque\_noACC

Engine output torque, acceleration inertia torque not included.

#### Shifting Contro

"Shifting Control" is activated when the transmission is in between two gears (undefined gear ratio), until applied pressure has reached to full

#### "Neutral Control

Neutral Control is activated if the vehicle is at stand still and in range D with the brake pressed for 2 seconds until the brake is released.

#### 12) "Garage Shifting

"Garage Shifting Control" is activated when the range selector changes from N to D or R until appropriate Gear Ratio is detected.

#### <sup>13)</sup> ConditionA = TRUE if:

DS Active EG V<sup>3</sup> = TRUE and Fdetect Inh<sup>5</sup> = FALSE and

Garage shifting control<sup>12</sup>(N-D or N-R) = FALSE and

T\_GarageFin sec 14 after garage shift control 12 end and

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.

Neutral control<sup>11</sup> = FALSE and

T\_NConFin<sup>14</sup> after neutral control<sup>11</sup> end **and** 

Shifting control<sup>10</sup> = FALSE and

T\_ShiftFin<sup>14</sup> after shifting control<sup>10</sup> end **and** RANGE\_D (defined signal) **and** 

Oil temperature >= -20 deq.C and

QS\_AirSuction<sup>6</sup> = FALSE **and** 

No DTC set: P0717, P0715, P0722, P0720

14)

Const Data	< -20 deg.C	>= -20 deg.C< -10 deg.C	>= -10 deg.C< 20 deg.C	>= 20 deg.C
T. Oans as Fire Issues at			, ,	Ü
T_GarageFin [msec]	50000	8000	2000	1000
T_NConFin [msec]	50000	8000	2000	1000
T_ShiftFin [msec]	50000	2000	1000	500
Tmr_inh_GE [msec]	50000	2000	1000	500

15)

Const Data	< GE_OT	>= GE_OT1	>=
oiltemp	1	< GE_OT2	GE_OT2
T_C1ctrlFin [msec]	50000	20000	8000
T_C3ctrlFin [msec]	50000	20000	8000

<sup>16)</sup> Q\_NORMAL

<sup>17)</sup> count\_fail\_SLC1MAX\_usft, count\_fail\_SLC2MAX\_usft, count\_fail\_SLC3MAX\_usft, count\_fail\_SLB1MAX\_usft
When the following shift conditions are satisfied, increments the counter of count\_fail\_SLXXMAX\_usft.

Condit	ition					
ount	A-1*	A-2*	B-1*	B-2*	D*	E*
	4-5, 4-6,					
SLC1MAX_usft	2-6, 3-5	-	-	-	6-2, 5-3	5-6, 6-5, 6-4, 5-4
		4-3, 4-2,				1-2, 1-3, 2-3, 2-4,
SLC2MAX_usft	-	5-3, 6-2	-	-	2-6, 3-5, 2-1, 1-1EB	3-4, 3-2, 3-1, 2-1
						1-2, 1-3, 2-3, 2-4, 4-3,
						4-2, 2-1, 2-1EB, 1EB-1,
SLC3MAX_usft	3-4, 5-6	5-4, 3-2	-	-	2-6, 4-5, 4-6, 4-2 4-3, 6-2	1-1EB, 4-5, 4-6, 6-5, 6-4
				_		1-2, 1-3, 3-4, 3-2,
						3-1, 1EB-1,1-1EB,
SLB1MAX_usft	2-3, 2-4	6-5, 6-4, 2-1EB	3-4	4-3	3-5, 4-5, 4-6, 5-6, 3-1, 3-2, 4-2, 5-3, 5-4	4-5, 4-6, 5-6, 5-4, 4-2

<sup>\*</sup>Refer to Un-usual shifting Condition for the detail of "A-1, A-2, B-1, B-2, D, E"

18)

	OT < 20	
OilTemp [deg.C]	deg.C	OT >= 20 deg.C
Time_SLU_Full [msec]	3000	3000

19)

OilTemp [deg.C]		OT < 0 deg.C	OT >= 0 deg.C
revNfaildet [rnm]	R range	1200	1000

Q\_NORMAL menas that no failure is detected

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions	Domin 1	MIL
System S4	Code	Description Circuit and advisor in the selection	Criteria	Value		TDUE	Required	Illumin.
Solenoid S1	P0973	Circuit continuity check	Short-cut ground		DS_Active_V <sup>1</sup>	TRUE	500 msec	2nd
			Detect signal of the S1 monitor	"OFF"	Time after solenoid output changed	>10 msec	Continuous	
			Detect signar of the of monitor	011	Time after soleriola output changed	> 10 1113CC	Continuous	
						C		
	P0974	4	Not connected or short-cut Ubatt		S1 driver outputs signal	"ON" TRUE	4	
	P0974		Not connected or short-cut obatt		DS_Active_V <sup>1</sup>	TRUE		
			Detect signal of the S1 monitor	"ON"	Time after solenoid output changed	>10 msec		
1								
1								
					S1 driver outputs signal	"OFF"		
Timing solenoid SLC1	P0966	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P0967 for 1 sec and over		
						0.00		
	P0967		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current		Emergency mode	FALSE	Continuous	
				>= 1358 mA	No DTC and	P0657		
					No DTC set	P0057		
						P0966 for 1 sec and		
						over		
	P0778		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec		2nd
			Outrouted			continuously	Continuous	
			Criteria1:		Feedback current	< 1358 mA		
					Emergency mode	FALSE		
			ie	> 50 mA				
					DS_Active_V <sup>1</sup>	TRUE		
					No DTC set	P0966		
						P0967		
						P0657		
						170057		

	Criteria2:  sum_ie  "ie" is added to "sum_ie" every 10 msec.	>20000 mA	Feedback current		Required sum_ie > 60000mA	
						l
	"ie" is added to "sum_ie" every 10 msec.					ı
i			DS_Active_V <sup>1</sup>	TRUE		l
	"ie" : Difference of "ir" and "ifb".  "ir" : Target current		No DTC set	P0966		I
	"ifb": Feedback current			P0967		İ
	"sum_ie" is cleared as follows:					ı
	(1) or (2) or (3)					ı
	(1): Detection window = FALSE					I
	(2): -50 mA <= ie <= 50 mA					ı
						I
	(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").					ı
Circuit continuity check	Short-cut ground or open Feedback current	< 20 mA	DS Active V <sup>1</sup> Emergency mode			2nd
				P0657 P0971 for 1 sec and over		İ
	Circuit continuity check	(2): -50 mA <= ie <= 50 mA  (3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").  Circuit continuity check  Short-cut ground or open	(1): Detection window = FALSE  (2): -50 mA <= ie <= 50 mA  (3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").  Circuit continuity check  Short-cut ground or open Feedback current < 20 mA	(1): Detection window = FALSE  (2): -50 mA <= ie <= 50 mA  (3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").  Circuit continuity check  Short-cut ground or open  DS Active V¹	(1): Detection window = FALSE  (2): -50 mA <= ie <= 50 mA  (3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").  Circuit continuity check  Short-cut ground or open Feedback current  Short-cut ground or open Feedback current  Short-cut ground or open Feedback current  No DTC set  P0657 P0971 for 1 sec and	(1): Detection window = FALSE  (2): -50 mA <= ie <= 50 mA  (3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").  Circuit continuity check  Short-cut ground or open Feedback current  Short-cut ground or open Feedback current  Short-cut ground or open Feedback current  No DTC set  P0657 P0971 for 1 sec and

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
System	P0971	Description	Short-cut Ubatt (B+) Feedback current	Value	DS Active V <sup>1</sup> Emergency mode	TRUE FALSE	500 msec Continuous	2nd
			r ceasage carrein	>= 1358 mA	No DTC set	P0657	Continuous	
					No DTC set	P0970 for 1 sec and over		
	P0798		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec continuously	2000 msec Continuous	2nd
			Criteria1:		Feedback current	< 1358 mA	Continuous	
			ie	> 50 mA	Emergency mode DS_Active_V1	FALSE TRUE		
					No DTC set	P0970		
						P0971 P0657		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec continuously	sum_ie > 60000mA	
			sum_ie	>20000 mA	Feedback current	< 1358 mA		
			"ie" is added to "sum_ie" every 10 msec.		Emergency mode DS_Active_V1	FALSE TRUE		
			"ie": Difference of "ir" and "ifb".					
			"ir" : Target current		No DTC set	P0970 P0971		
			"ifb": Feedback current			P0657		
			"sum_ie" is cleared as follows:					
			(1) or (2) or (3)					
			(1): Detection window = FALSE					

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
			(0), 50 m A 50 m A					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
Fiming solenoid SLC3	P2720	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					No DTC and	P0657		
					No DTC set	P0657 P2721 for 1 sec and		
						over		
						0.00		
	P2721		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current		Emergency mode	FALSE	Continuous	
				>= 1358 mA				
					No DTC set	P0657		
						P2720 for 1 sec and		
						over		
	P2716		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
	1 27 10		Toda Baok Garront Glack(Elocitical)		Battory voltage	continuously	Continuous	Ziid
			Criteria1:			·		
					Feedback current	< 1358 mA		
			ie	> 50 mA	Emergency mode	FALSE		
			lie	> 30 IIIA				
					DS_Active_V <sup>1</sup>	TRUE		
					No DTC set	P2720		
					INO DTC Set	P2720 P2721		
						P0657		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec	sum_ie >	1
						continuously	60000mA	
			sum_ie	>20000 mA	Foodback current	. 1250 m A		
					Feedback current	< 1358 mA FALSE		
					Emergency mode	FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
					DS_Active_V <sup>1</sup>	TRUE		
			"ie" : Difference of "ir" and "ifb".		No DTC out	D0700		
			"ir" : Target current		No DTC set	P2720		
						P2721		
			"ifb": Feedback current					
						P0657		
			"sum_ie" is cleared as follows:					
			(1) or (2) or (3)					
			(1) 3. (2) 6. (6)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
ming solenoid SLB1	P2729	Circuit continuity check	Short-cut ground or open Feedback current	< 20 mA	DS Active V <sup>1</sup> Emergency mode	TRUE FALSE	500 msec Continuous	2nd
			reeuback current	201117			Continuous	
					No DTC set	P0657 P2730 for 1 sec and		
						over		
	P2730		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	>= 1358 mA	Emergency mode	FALSE	Continuous	
					No DTC set	P0657		
						P2729 for 1 sec and over		
	P2727		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec	2000 msec	2nd
	F2121				battery voltage	> 10.5 V for 500 msec	Continuous	ZIIU
			Criteria1:		Feedback current	- 1358 m∆		
	1	1	Ţ		Feedback current	< 1358 mA	1	1

System   Code   Description   Criteria   Value   Emergency mode   FALSE	MIL
Battery voltage	ed Illumin.
No DTC set	
P2730   P0657	
P2730   P0657	
Criteria2:  Battery voltage  >10.5 V for 500 msec sum_ie continuously  sum_ie  >20000 mA  Feedback current	
sum_ie >20000 mA  Feedback current	
sum_ie >20000 mA  Feedback current	
Feedback current Emergency mode FALSE  "ie" is added to "sum_ie" every 10 msec.  DS_Active_V¹  TRUE  "ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "is cleared as follows:	
Feedback current Emergency mode FALSE  "ie" is added to "sum_ie" every 10 msec.  DS_Active_V¹  TRUE  "ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "is cleared as follows:	
Feedback current Emergency mode FALSE  "ie" is added to "sum_ie" every 10 msec.  DS_Active_V¹  TRUE  "ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "is cleared as follows:	
Emergency mode  FALSE  "ie" is added to "sum_ie" every 10 msec.  DS_Active_V¹  TRUE  "ie": Difference of "ir" and "ifb".  "ir": Target current  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ie" is added to "sum_ie" every 10 msec.  DS_Active_V¹  TRUE  "ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ie" : Difference of "ir" and "ifb".  "ir" : Target current  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ir" : Target current  No DTC set  P2729  P2730  "ifb": Feedback current  P0657  "sum_ie" is cleared as follows:	
"ir" : Target current  No DTC set  P2729  P2730  "ifb": Feedback current  "sum_ie" is cleared as follows:	
"ir" : Target current  P2730  "ifb": Feedback current  P0657  "sum_ie" is cleared as follows:	
"ifb": Feedback current  "ifb": Feedback current  P0657  "sum_ie" is cleared as follows:	
"ifb": Feedback current P0657  "sum_ie" is cleared as follows:	
"sum_ie" is cleared as follows:	
"sum_ie" is cleared as follows:	
(1) or (2) or (3)	
(1) (1 (2) (1 (3)	
(1): Detection window = FALSE	
(1) 2000001 111100	
(O) - FO = A - in - FO = A	
(2): -50 mA <= ie <= 50 mA	
(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
Pressure solenoid SLT	P0962	Circuit continuity check	Short-cut ground or open Feedback current	< 20 mA	DS Active V <sup>1</sup> Emergency mode	TRUE FALSE	500 msec Continuous	2nd
					No DTC set	P0657 P0963 for 1 sec and over		
	P0963		Short-cut Ubatt (B+) Feedback current	>= 1358 mA	DS Active V <sup>1</sup> Emergency mode	TRUE FALSE	500 msec Continuous	2nd
					No DTC set	P0657 P0962 for 1 sec and over		
	P0748		Feed Back Current Stuck(Electrical)  Criteria1:		Battery voltage	> 10.5 V for 500 msec continuously	2000 msec Continuous	2nd
			ie	> 50 mA	Feedback current Emergency mode	< 1358 mA FALSE		
					DS_Active_V <sup>1</sup>	TRUE		
					No DTC set	P0962 P0963 P0657		
			Criteria2:		Battery voltage	> 10.5 V for 500 msec continuously	sum_ie > 60000mA	
		sui	sum_ie	>20000 mA	Feedback current Emergency mode	< 1358 mA FALSE		
			"ie" is added to "sum_ie" every 10 msec.		DS_Active_V <sup>1</sup>	TRUE		
		"ie" : Difference of "ir" and "ifb".  "ir" : Target current		No DTC set	P0962			
		"ifb": Feedback current			P0963			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions	Domini 1	MIL
System	Code	Description	Criteria	Value		P0657	Required	Illumin.
						P0057		
			"sum_ie" is cleared as follows:					
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie >0mA" ("ie < 0mA").					
ressure solenoid SLU	P2764	Circuit continuity check	Short-cut ground or open		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
			Feedback current	< 20 mA	Emergency mode	FALSE	Continuous	
					N. 570	D0057		
					No DTC set	P0657 P2763 for 1 sec and		
						over		
	P2763		Short-cut Ubatt (B+)		DS Active V <sup>1</sup>	TRUE	500 msec	2nd
	1 2703		Feedback current		Emergency mode	FALSE	Continuous	ZIIU
				>= 1358 mA				
					No DTC set	P0657		
						P2764 for 1 sec and over		
	P2761		Feed Back Current Stuck(Electrical)		Battery voltage	> 10.5 V for 500 msec continuously	2000 msec Continuous	2nd
			Criteria1:				20	
					Feedback current	< 1358 mA		
			lie l	> 50 mA	Emergency mode	FALSE		
					DS_Active_V <sup>1</sup>	TRUE		
					No DTC set	P2764		
						P2763 P0657		
						1000/		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumii
			Criteria2:		Battery voltage	> 10.5 V for 500 msec continuously	sum_ie > 60000mA	
						Continuously	booodina	
			sum_ie	>20000 mA				
					Feedback current	< 1358 mA		
					Emergency mode	FALSE		
			"ie" is added to "sum_ie" every 10 msec.					
					DS_Active_V <sup>1</sup>	TRUE		
			"ie" : Difference of "ir" and "ifb".					
					No DTC set	P2764		
			"ir": Target current					
						P2763		
			"ifb": Feedback current					
			lib . Feedback current			P0657		
						1 0007		
			"sum_ie" is cleared as follows:					
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2), 50 4					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < 0mA" ("ie >0mA") to "ie					
			>0mA" ("ie < 0mA").					
Linear solenoid driver	P0657		Malfunction		DS_Active_V <sup>1</sup>	TRUE	400 msec	2nd
				= abnormal			Cntinuous	
			Linear solenoid driver status					
smission Output speed	P0722		No pulse		DS Active EG V <sup>16</sup>	TRUE	Dependent	2nd

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
sensor					Emergency mode Shift position	FALSE RANGE_D(defined)	of Speed	
			Number of pulses from Transmission Output Speed Sensor Number of pulses from Transmission Input Speed Sensor	0 16	Not during Neutral control			
					T_NConFin <sup>14</sup> msec after Neutral control Not during shifting			
					T_ShiftFin <sup>14</sup> msec after shifting  Not during garage control			
					T_GarageFin <sup>14</sup> msec after garage control  Not during C1 OFF control  T_C1ctrlFin <sup>15</sup> msec after C1 OFF control			
					Not during C2 OFF control  T_C3ctrlFin <sup>15</sup> msec after C2 OFF control			
					Not in Engine stall avoidance control outRpmNC No DTC set	>= 300 rpm P0705		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
Component/ System	Fault	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	P0707 P0708 P0717 P0718 P0717 P0715 P0748 P0798 P0962 P0963 P0966 P0967 P0970 P0971 P0973 P0974 P2716 P2720 P2721 P2727 P0657 P0720 P2729 P2730	Required	MIL Illumin.
	P0720	Circuit continuity check	Electrical Failure (B+ short / GND short / Open) NINM-voltage	< 0.206V or > 2.727V	DS Active V <sup>1</sup>	TRUE	1000 msec Consecutive	2nd
Transmission input speed sensor	P0717		(AD value)  No pulse	(< 45 or > 545 )	DS_Active_EG_V <sup>16</sup> Emergency mode	TRUE FALSE	Dependent of Speed	2nd
			No of pulses from Transmission Input Speed Sensor No of pulses from Transmission Output Speed Sensor	0 24	Shift position  CurrentGear  Not during Neutral control	RANGE_D(defined) >= 2nd gear		
					T_NConFin <sup>14</sup> msec after Neutral control			

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
					Not during shifting			
					T_ShiftFin <sup>14</sup> msec after shifting			
					Not during garage control			
					T_GarageFin <sup>14</sup> msec after garage			
					control			
					Not during C1 OFF control			
					15			
					T_C1ctrlFin <sup>15</sup> msec after C1 OFF			
					control			
					T_C3ctrlFin <sup>15</sup> msec after C2 OFF			
					control			
					Control			
					Not in Engine stall avoidance control			
					3			
					Transmission Output Speed	>= 300 rpm		
					No DTC set	P0705		
						P0707		
						P0708		
						P0722		
						P0720		
						P0748		
						P0778		
						P0798		
	1					P0962	1	
						P0963		
	1					P0966	1	
						P0967	1	
						P0970	1	
						P0971	1	
						P0973		
						P0974		
						P2716		
	1 1			1		P2720	1	1

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value		Dozos	Required	Illumin.
						P2721 P2727		
						P2727 P0657		
						P0715		
						P2729		
						P2730		
	P0715	Circuit continuity check	Electrical Failure (B+ short / GND short / Open)		DS Active V <sup>1</sup>	TRUE	1000 msec	2nd
			NOUTM-voltage	< 0.206V or > 2.727V	20 7.00 1		Consecutive	
			(AD value)	(< 45 or > 545 )				
Fransmission Range Sensor	P0707	Voltage low	Input POS1 Voltage or Input POS2 Voltage	< 0.127V	Diagnosis Service mode	FALSE	200msec	2nd
Circuit								
					Battery voltage	9V < Battery Voltage	Continuous	
					Battery voltage	<= 32 V	Continuous	
						1 02 V		
	P0708	Voltage high	Input POS1 Voltage or Input POS2 Voltage	> 4.84V	Diagnosis Service mode	FALSE	200 msec	2nd
					Battery voltage	9V < Battery Voltage	Continuous	
						<= 32 V		
	P0705	Signal out of range	Input POS1 Voltage + Input POS2 Voltage	< 5V -0.29V or > 5V	Diagnosis Service mode	FALSE	200 msec	2nd
				+0.29V	Battery voltage	9 V <= Battery Voltage	Continuous	
						< 32 V		
					No DTC set	P0707		
						P0708		
ransmission oil	P0711	Rationality	Criteria1:		Oil temperature	<= 20deg.C	10 min	2nd
emperature sensor	0711	Rationality	Oil temperature change less than	10 (AD value)	DS_Active_EG_V <sup>16</sup>	TRUE	10111111	ZIIU
			On temperature change less than	TO (AB value)	DS_ACTIVE_EG_V	INOL		
					AD value of oil temperature	>= 10		
					7 to value of oil temperature			
					AD value of oil temperature	<= 1010		
					AD value of oil temperature	- 1010		
					Emergency mode	FALSE		
					Shift position	≠ (P, R or N)		
	l	Ĭ		1		(, , , , , , , , , , , , , , , , , , ,	1	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
					Vehicle Speed	>= 40km/h once		
					No DTC set	P0705 P0707 P0708 P0711		
						P0712 P0713		
			Criteria2:		DS_Active_EG_V <sup>16</sup>	TRUE	1 time	
			Oil temperature	< 20deg.C	AD value of oil temperature	>= 10		
					AD value of oil temperature	<= 1010		
					Emergency mode Estimated heating value	FALSE >= MAP		
					Engine speed	Q_NORMAL <sup>16</sup>		
					No DTC set	P0717 P0715 P0711 P0712 P0713		
	P0712	Circuit continuity check	Short-cut ground AD value of Oil temperature	< 10 (More than 200deg.C).	DS Active V <sup>1</sup>	TRUE	60 sec	2nd
	P0713	Circuit continuity check	Short-cut Ubat or open circuit AD value of Oil temperature	> 1010 ( less than - 55deg.C)	DS Active EG V <sup>16</sup> DriveTime	TRUE > 1 min	12 sec	2nd
gnition Switch Run/Start osition	P2534	Circuit Low	Ignition voltage	< 9V	DS Active ACC <sup>4</sup> Emergency mode	TRUE FALSE	20 sec	2nd
					Engine speed	> 400rpm		
					No DTC set	U0001 U0100		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
Internal Control Module Memory	P0601	Check Sum Error	Detectin of differences between the result of the checksum calculation executed after IG ON and the correct checksum. If there are differences from the correct checksum value stored in the FLASH ROM, a second calculation is made.		Ignition	OFF->ON	1 time	2nd
Control Module Programming	P0602	Control Module Programming	Calibration data is not downlord properly.		None		1 time	1st
Non volatile memory	P0603	Read / Write error	To detect calculated checksum in RAM is different from checksum value in EEPROM.  TCM has two areas (main and sub) for EEPROM. This failure is detected when both areas are wrong.		Ignition	OFF->ON (only at T/M computer initialization function)	1 time	1st
Random access memory	P0604	Read / Write error	To detect different value between write and read (Step1 and Step2, Step3 and Step4) while TCM checks all RAM from step 1 to step 4 in initialize routine.  Step 1. TCU writes 55(hex) data in the ram. Step 2. TCU reads 55(hex) data in the ram. Step 3. TCU writes AA(hex) data in the ram. Step 4. TCU reads AA(hex) data in the ram.		Ignition	OFF->ON (only at T/M computer initialization function)	1 time	1st
CAN Bus Off Counter Overrun	U0001	CAN controller continuity check	Receiving "BUS OFF" state from CAN controller		DS Active ACC <sup>4</sup>	TRUE	8 times	2nd
Lost communication with ECM (Engine)	U0100	Frame missing from ECM	No CAN status frame from ECM detected		Diagnostic Service "Disable Normal of detected Ignition DS_Active_CAN2 No DTC set	ON >5 sec TRUE	4 sec Continuous	2nd
Gear error, hydraulic fault	P0731	Rationality	Calculation of actual gear ratio for 1st gear is not correct.		Current Gear Transmission Output Speed	1st > 60rpm	2.5sec Continuous	2nd
			abs(1 - GRCurrent/2nd GearRatio)	< 4%	EngineTorque_noACC	>= 60Nm (GEAR_1ST)		
			or		Transmission Input Speed	<=6000rpm (gasoline engine)		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL IIIum
,		·	abs(1 - GRCurrent/ 3rd GearRatio)	< 4%	Transmission Input Speed	<=4000rpm		
			,			( diesel engine)		
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1 - GRCurrent/ 4th GearRatio)	< 4%				
			abs(1 - Greathern 4th Gearratio)	4 /0				
	P0732	Rationality	Calculation of actual gear ratio for 2nd gear is not				12 sec	2nd
			correct. (Criteria1 or Criteria2)		Current goor	2nd	Continuous	
			Criteria1:		Current gear	2nd		
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
			( )					
					12	TOUE		
					ConditionA <sup>13</sup>	TRUE		
					No DTC set	P0732		
					140 2 10 000	(Criteria2)		
			Criteria2:				2.5 sec	
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	Current gear	2nd	Accumulate	
			or		Transmission Output Speed			
			aha (4. O a an Batia O annant/ 4th O a an Batia)	40/	12	>= 60rpm		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	ConditionA <sup>13</sup>	TRUE		
					InTorque	>=30Nm or <=-20Nm		
			or					
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%				
	P0733	Rationality	Calculation of actual gear ratio for 3rd gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)				Continuous	
					Current gear	3rd		
	- 1		Criteria1:					1

System Code	Description	abs(1-GRCurrent/GRExpected)  Criteria2: abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or abs(1-Gear Ratio Current/ 4th Gear Ratio)	Value >20% <4%	Transmission Output Speed  ConditionA <sup>13</sup> No DTC set  Current gear  Transmission Output Speed  ConditionA <sup>13</sup> InTorque	>= 60rpm  TRUE  P0733 (Criteria2)  3rd  >= 60rpm  TRUE  >= 30Nm or <=-20Nm	2.5 sec Accumulate	Illumin.
		Criteria2: abs(1-Gear Ratio Current/ 2nd Gear Ratio) or	<4%	ConditionA <sup>13</sup> No DTC set  Current gear  Transmission Output Speed  ConditionA <sup>13</sup>	TRUE P0733 (Criteria2) 3rd >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		No DTC set  Current gear  Transmission Output Speed  ConditionA <sup>13</sup>	P0733 (Criteria2) 3rd >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		No DTC set  Current gear  Transmission Output Speed  ConditionA <sup>13</sup>	P0733 (Criteria2) 3rd >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		No DTC set  Current gear  Transmission Output Speed  ConditionA <sup>13</sup>	P0733 (Criteria2) 3rd >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		Current gear  Transmission Output Speed  ConditionA <sup>13</sup>	(Criteria2)  3rd  >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		Transmission Output Speed  ConditionA <sup>13</sup>	3rd >= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		Transmission Output Speed  ConditionA <sup>13</sup>	>= 60rpm TRUE		
		abs(1-Gear Ratio Current/ 2nd Gear Ratio)  or		Transmission Output Speed  ConditionA <sup>13</sup>	>= 60rpm TRUE		
		or		ConditionA <sup>13</sup>	TRUE	Accumulate	
			<4%		TRUE		
			<4%		TRUE		
			<4%		TRUE		
			<4%				
		abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
							1
		or					
		abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%				
P0734	Rationality	Calculation of actual gear ratio for 4th gear is not correct.					2nd
		(Criteria1 or Criteria2)		Current gear	4th	Continuous	
		Criteria1:		Current gear	401		
		abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
				ConditionA <sup>13</sup>	TRUE		
				No DTC and	P0734		
				No DTC set	(Criteria2)		
				<u> </u>	, , ,		
		Criteria 2		Current gear	4th	2.5 sec	
		Criteria2: abs(1-Gear Ratio Current/ 2nd Gear Ratio)	<4%	Transmission Output Speed		Accumulate	
		The state of the s					
	1				>= 60rpm		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions	Daniel I	MIL
System	Code	Description	Criteria or	Value	ConditionA <sup>13</sup>	TRUE	Required	Illumin.
					ConditionA	INGE		
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%				
			abs(1-Geal Ratio Culterity Still Geal Ratio)	<4 <i>7</i> 0				
			or					
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%				
	P0735	Rationality	Calculation of actual gear ratio for 5th gear is not correct.				12 sec	2nd
			(Criteria1 or Criteria2)		Current gear	5th	Continuous	
			Criteria1:					
			abs(1-GRCurrent/GRExpected)	>20%	Transmission Output Speed	>= 60rpm		
					ConditionA <sup>13</sup>	TRUE		
						P0735		
					No DTC set	(Criteria2)		
					Current geor	Eth.	2.5.000	
			Criteria2:		Current gear	5th	2.5 sec	
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	Transmission Output Speed		Accumulate	
						>= 60rpm		
			or		ConditionA <sup>13</sup>	TRUE		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or					
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
-								
	P0729	Rationality	Calculation of actual gear ratio for 6th gear is not correct. (Criteria1 or Criteria2)				12 sec Continuous	2nd
			Criteria1: abs(1-GRCurrent/GRExpected)	> 20%	Current gear Transmission Output Speed	6th >= 60rpm		
					ConditionA <sup>13</sup>	TRUE		
					No DTC set	P0729 (Criteria2)		
			Criteria2:		Current gear	6th	2.5 sec	
			abs(1-Gear Ratio Current/ 2nd Gear Ratio)	<4%	Transmission Output Speed		Accumulate	
			or		ConditionA <sup>13</sup>	>= 60rpm TRUE		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	InTorque	>=30Nm or <=-20Nm		
			or abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%				
Torque Converter Clutch	P0741	Comparison of engine speed and	Converter is slipping with active lock-up on.		DS Active EG V <sup>16</sup>	TRUE	12 sec	2nd
rorque Converter Clutch	P0741	transmission input speed	(Engine Speed - Transmission Input Speed)	> 300rpm	Fdetect_inh <sup>5</sup>	FALSE	Continuous	2110
					Shift position	RANGE_D(defined)		
					Time after N-D shifting control <sup>10</sup> ends	8 sec		
					Engine Torque	>= 0 Nm		
					Engine Speed	< 4000 rpm		

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.
					Time after SLU target current (_ir) >= 1000 mA	Time_SLU_Full <sup>18</sup> sec		
					1000 mA			
					Oil temperature	>= -7deg.C		
						, and the second		
					Lock-up	FALSE		
					Not during garage central			
					Not during garage control			
					T_GarageFin <sup>14</sup> msec after garage			
					control			
					Not during shifting			
					T_ShiftFin <sup>14</sup> msec after shifting			
					No DTC set	P2763		
					No B To set	P2764		
						P2761		
						P0715		
						P0717		
						P0720		
						P0722		
n-usual shifting	P0869	SLC1 MAX	count fail SLC1MAX usft 17	>= 5times	DS_Active_EG_V16	TRUE	1 time	2nd
ili-usuai siliitiilig	F 0809	SECTIVIAX	count fall SECTIMAX usft	>= Stillies	Fdetect inh <sup>5</sup>	FALSE	i time	ZIIU
					Time after N-D Shifting Control <sup>10</sup> ends			
					Time diter it 2 criming certain crids	oil temperature.		
					Not during garage control			
		SLC2 MAX	count_fail_SLC2MAX_usft 17	>= 5times	T_GarageFin <sup>14</sup> msec after garage			
					control			
					Shift position	RANGE_D(defined)		
		SLC3 MAX		>= 5times	Not during Neutral control T_NConFin <sup>14</sup> msec after Neutral			
		SLG3 IVIAA	count_fail_SLC3MAX_usft 17	>= Julines	control			
					Time after neutral control ends	This timer is based on		
						oil temperature.		
					wheel spin condition	FALSE		
		SLB1 MAX	count fail SLB1MAX usft 17	>= 5times	Transmission Output Speed	>300rpm		
					Oil temperature	>= -20 °C		
					Tmr_inh_GE <sup>14</sup> sec after shift to safe			
					gear	D0745		
	1			1	No DTC set	P0715	1	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
						P0717 P0720 P0722		
Neutral condition	P0965		Step 1:	<300rpm	DS_Active_EG_V <sup>16</sup>	TRUE	Step 1:	2nd
			abs(Engine Speed - Transmission Input Speed) Transmission Input Speed (at D range)	> Transmission Output Speed x (1st gear ratio at RANGE_D) + revNfaildet <sup>19</sup> rpm	Fdetect_Inh <sup>5</sup> Oil temperature  Shift position Not during shifting	>= -7deg.C  RANGE_D(defined)	at D range: 3.3 sec if (0 <= X <= 1500)	
					T_ShiftFin <sup>14</sup> msec after shifting  Not during garage control(N-D)		1.3 sec if (1501 <= X <= 3000)	
					T_GarageFin <sup>14</sup> msec after garage control Not during Neutral control			
			Step 2: Transmission Input Speed	<200rpm				
			Engine Speed	>600rpm	T_NConFin <sup>14</sup> msec after Neutral control		0.8 sec if (3001 <= X)	
			Shift position	RANGE_D(defined)	Transmission Output Speed Lockup	<=500rpm	(3001 <= 1)	
					Current gear QS_AirSuction <sup>6</sup>	1 or 2 or 3 or 4 FALSE		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Required	MIL Illumin.
System	Code	Description	Cinteria	value			Step 2:	illullilli.
					Prohibit Neutral Judgment flag No DTC set	FALSE P0717 P0722 P0715 P0720	0.3sec	

#### 1)DS\_Active\_V

DS\_Active\_V = TRUE when start condition for failure detection is fulfilled for 2.0 sec continuously.

DS\_Active\_V = FALSE when permission condition for failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode

#### 2) DS\_Active\_CAN

DS\_Active\_CAN = TRUE when the start condition for CAN failure detection is fulfilled for 5.0 sec continously.

DS\_Active\_CAN = FALSE when the permission condition for CAN failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode

#### 3)DS\_Active\_EG\_V

DS\_Active\_EG\_V = TRUE when start condition for failure detection is fulfilled for 2.0 sec continuously.

DS\_Active\_EG\_V = FALSE when permission condition for failure detection is not fulfilled.

#### Start Condition for failure detection:

Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish and

Egrpm > 400rpm and Egrpm = Q\_NORMAL<sup>16</sup>

Bus off, ECU no communication = Q\_NORMAL<sup>16</sup>

#### Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage <= 32V and

Γ	Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
L	System	Code	Description	Criteria	Value			Required	Illumin.

Not in service mode and

Egrpm > 400rpm and Egrpm =  $Q_NORMAL^{16}$ 

Bus off, ECU no communication = Q\_NORMAL<sup>16</sup>

#### 4) DS\_Active\_ACC

DS\_Active\_ACC = TRUE when the start condition for failure detection is fulfilled for 2.0 sec continously.

DS\_Active\_ACC = FALSE when the permission condition for failure detection is not fulfilled.

#### Start Condition for failure detection:

Accessory ON or Ignition ON and

10.2V < Battery Voltage <= 32V and

Not in service mode and

Reading EEPROM finish

#### Permission condition for failure detection:

Accessory ON or Ignition ON and

9.0V < Battery Voltage <= 32V and

Not in service mode

#### <sup>5)</sup> Fdetech\_Inh = TRUE if:

In Emergency mode or

Spinning $^7$  = TRUE **or** 

within 10.0 sec after spinning<sup>7</sup> detection end or

DTC set: P0973, P0974, P0966, P0967, P0970, P0971, P2720, P2721, P2729, P2730, P0962, P0963, P2763, P0717, P0722, P0705, P0707, P0708, U0001, U0100, P0601, P0711, P0712, P0713, P2534, P0604, P0778, P0798, P2716, P0748, P2761, P2727, P0657, P0720, P0715.

Not in Neutral avoidance control

Not in Engine stall avoidance control

Egrpm = Q NORMAL<sup>16</sup>

Egtrq = Q  $NORMAL^{16}$ 

 $Accel = Q NORMAL^{16}$ 

<sup>6)</sup>QS\_AirSuction: Quick stop detection flag for the prevention of failure misdetection for Air suction, is set if the vehicle brakes hard.

(1) Spinning: If "LateralACC > 7.00m/s^2", Spinning is TRUE.

 $LateralACC[m/s^2] = (WheelDiff[m/s] * WheelSpeedABS[m/s]) / WheelWidth[m])$ 

WheelDiff ... "WheelSpeed RR" - "WheelSpeed RL"

WheelWidth... The width of the Wheel.

- 8) Wheel spin condition
  - (1) 300 rpm < outRpm < 3000rpm
  - (2) Egtorque\_noACC > -500Nm
  - (3) ABS (vehicle front wheels average speed vehicle rear wheels average speed) > 5.0 km/h
  - (4) Throttle > 70 %
  - (5) outRpmSpeed < -50rpm/sec
  - {(1)and(2)and(3)}or{ (1)and(4)and(5)}continuously detected for 300 msec

After that, Wheel spin condition = TRUE continuously 10000 msec

Engine output torque, acceleration inertia torque not included.

<sup>9)</sup> EngineTorque\_noACC

Component/	Fault	Monitor Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Description	Criteria	Value			Required	Illumin.

<sup>10)</sup> Shifting Control

#### 11) "Neutral Control"

Neutral Control is activated if the vehicle is at stand still and in range D with the brake pressed for 2 seconds until the brake is released.

#### 12) "Garage Shifting"

"Garage Shifting Control" is activated when the range selector changes from N to D or R until appropriate Gear Ratio is detected.

<sup>13)</sup> ConditionA = TRUE if:

DS Active EG V<sup>3</sup> = TRUE and Fdetect\_Inh<sup>5</sup> = FALSE and Garage shifting control<sup>12</sup>(N-D or N-R) = FALSE and T\_GarageFin sec <sup>14</sup> after garage shift control<sup>12</sup> end and Neutral control<sup>11</sup> = FALSE and

T\_NConFin<sup>14</sup> after neutral control<sup>11</sup> end **and** 

Shifting control<sup>10</sup> = FALSE **and** 

T\_ShiftFin<sup>14</sup> after shifting control<sup>10</sup> end and

RANGE\_D (defined signal) and

Oil temperature >= -20 deg.C **and** 

QS\_AirSuction<sup>6</sup> = FALSE and

No DTC set: P0717, P0715, P0722, P0720

14)

Const Data	< -20	>= -20 deg.C< -10	>= -10 deg.C< 20	
	deg.C	deg.C	deg.C	>= 20 deg.C
T_GarageFin [msec]	50000	8000	2000	1000
T_NConFin [msec]	50000	8000	2000	1000
T_ShiftFin [msec]	50000	2000	1000	500
Tmr_inh_GE [msec]	50000	2000	1000	500

15)

Const Data	< GE_OT	>= GE_OT1	>=
oiltemp	1	< GE_OT2	GE_OT2
T_C1ctrlFin [msec]	50000	20000	8000
T_C3ctrlFin [msec]	50000	20000	8000

<sup>16)</sup> Q\_NORMAL

When the following shift conditions are satisfied, increments the counter of count\_fail\_SLXXMAX\_usft.

Condition	1					
count	A-1*	A-2*	B-1*	B-2*	D*	E*
	4-5, 4-6,					
SLC1MAX_usft	2-6, 3-5	-	-	-	6-2, 5-3	5-6, 6-5, 6-4, 5-4
		4-3, 4-2,				1-2, 1-3, 2-3, 2-4,
SLC2MAX_usft	-	5-3, 6-2	-	-	2-6, 3-5, 2-1, 1-1EB	3-4, 3-2, 3-1, 2-1

<sup>&</sup>quot;Shifting Control" is activated when the transmission is in between two gears (undefined gear ratio), until applied pressure has reached to full

Q\_NORMAL menas that no failure is detected

 $<sup>^{1/)}</sup> count\_fail\_SLC1MAX\_usft, count\_fail\_SLC2MAX\_usft, count\_fail\_SLC3MAX\_usft, count\_fail\_SLB1MAX\_usft, count\_fail\_SLC3MAX\_usft, count\_fail\_S$ 

Component/	Fault	Monitor	Strategy	Malfunction	Threshold	Secondary Parameters	Enable Conditions		MIL
System	Code	Desci	ription	Criteria	Value			Required	Illumin.
						1-2, 1-3, 2-3, 2-4, 4-3,			-
					2-6, 4-5, 4-6, 4-2 4-3, 6-	4-2, 2-1, 2-1EB, 1EB-1,			
SLC3MAX_usft	3-4, 5-6	5-4, 3-2	-	-	2	1-1EB, 4-5, 4-6, 6-5, 6-4			
						1-2, 1-3, 3-4, 3-2,			
					3-5, 4-5, 4-6, 5-6, 3-1, 3-	3-1, 1EB-1,1-1EB,			
SLB1MAX_usft	2-3, 2-4	6-5, 6-4, 2-1EB	3-4	4-3	2, 4-2, 5-3, 5-4	4-5, 4-6, 5-6, 5-4, 4-2			

<sup>\*</sup>Refer to Un-usual shifting Condition for the detail of "A-1, A-2, B-1, B-2, D, E"

18)

	OT < 20	
OilTemp [deg.C]	deg.C	OT >= 20 deg.C
Time SLU Full [msec]	3000	3000

19)

OilTemp [deg.C]		OT < 0 deg.C	OT >= 0 deg.C
revNfaildet [rpm]	R range	1200	1000
revivialidet [rpm]	D range	400	400