Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
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 (only at Transmission computer initialization function)	2 times	2nd
Lost communication with ECM (Engine)		Frame missing from ECM	No CAN status frame from ECM detected		Diagnostic Service "Disable Not Communication" not detected Engine speed Ignition DS Active CAN <sup>2</sup>	rmal > 400 rpm once within the driving cycle ON >3 sec TRUE	4 sec Continuous	2nd
CAN Bus Off Counter Overrun	U0001	CAN controller continuity check	Receiving "BUS OFF" state from CAN controller		Ignition DS_Active_CAN <sup>2</sup>	ON >3 sec TRUE	8 times	2nd
Invalid data from ECM	P1895	Engine Torque signal is indicated invalid	TCM receives Engine Torque Actual Validity	"Invalid"	Ignition DS_Active_CAN <sup>2</sup>	FALSE ON >3 sec TRUE	4 sec Continuous	2nd
Solenoid S1	P0985 P0986	Circuit continuity check	Short-cut ground Detected signal of the S1 monitor when S1 driver outputs the "ON"signal (12V) Not connected or short-cut Ubatt Detected signal of the S1 monitor when S1 driver outputs the "OFF"signal (0V)	"OFF" signal (0V) "ON" signal (12V)	No DTC set DS_Active <sup>3</sup> Time after solenoid output changed Emergency mode	U0100 TRUE >10 ms FALSE	500 msec Continuous	2nd
Solenoid S2	P0973 P0974	Circuit continuity check	Short-cut ground Detected signal of the S2 monitor when S2 driver outputs the "ON"signal (12V) Not connected or short-cut Ubatt	"OFF" signal (0V)	DS_Active <sup>3</sup> Time after solenoid output changed Emergency mode	TRUE >10 ms FALSE	500 msec Continuous	2nd

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			Detected signal of the S2 monitor when S2 driver outputs the "OFF"signal (0V)	"ON" signal (12V)				
Torque Converter Clutch	P0741	Comparison of engine speed and transmission input	Converter is slipping with active lock-up on. (Engine Speed - Transmission	> 100rpm	DS_Active <sup>3</sup>	TRUE FALSE	12 sec Continuous	2nd
		speed	Input Speed)		Fdetect_inh <sup>4</sup> Shift position	RANGE_D(defined)		
					Time after N-D shifting control <sup>9</sup> ends	8 sec		
					Engine Torque	>= 0 Nm		
					Engine Speed	< 4000 rpm		
					Time after SLU target current (_ir) >= 1000 mA	3sec		
					abs( 1- SpeedABS / Transmission Output Speed calculated from Transmission Input Speed)	< 10 %		
						0.5 sec		
					Oil temperature Lock-up	>= 20°C FALSE		
					No DTC set	P2759		
						P0716 P0717		
						P0717 P0721		
						P0722		
	P0742		Abs(EngineSpeed - Transmission	< 30 rpm for 2.0 sec	DS_Active <sup>3</sup>	TRUE	4sec	2nd
			Input Speed)	continuously	_ Fdetect_inh⁴	FALSE		
					Shift position	RANGE_D		
						(defined)		
					Time after N-D shifting control <sup>9</sup> end	1.0 sec		
				Time after changing to Shift position = RANGE_D(defined)	8.0 sec			
					Time after shifting control <sup>9</sup> ends	0.5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EngineTorque_noACC <sup>8</sup> Engine Speed abs( 1- SpeedABS / Transmission Output Speed calculated from Transmission Input Speed)	>= 60Nm >1000 rpm < 3000 rpm <10 %		
					Oil temperature Time after SLU pressure = 0 kPa	>= 20 °C 3sec		
					No DTC set	P2759 P0716 P0717 P0721 P0722		
Pressure solenoid SLU	P2764	Circuit continuity check	Short-cut ground or open Current (AD	<23 mA <15)	DS_Active <sup>3</sup> Emergency mode	TRUE FALSE	500 ms Continuous	2nd
					No DTC set	P2763 for 1 sec and over		
	P2762		Terminal short Error current	> 80 mA	No Shifting Control <sup>9</sup> Emergency mode Oil temperature System voltage change System voltage SLU Output current target DS_Active <sup>3</sup>	FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE	2,75 sec Continuous	2nd
					No DTC set	P0711 P0712 P0713		
	P2763		Short-cut Ubatt (+B) Measured Current (AD	> 1,333 mA > 1000)	DS_Active <sup>3</sup> Emergency mode No DTC set	TRUE FALSE P2764 for 1 sec	500 ms Continuous	2nd
	P2759		Feed Back Current Stuck(Electrical)		IG voltage	and over > 10.5 V	1 sec	2nd

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
		1	sum_ie	>20000	Input AD value	< 1000(1333mA)		
			"ie" is added to "sum_ie" every	1	Emergency mode	FALSE		
			"ie" : Difference of "ir" and "ifb".		DS Active <sup>3</sup>	TRUE		
			"ir" : Target current					
			"ifb": Feedback current		No DTC set	P2763		
			"sum_ie" is cleared as follows:			P2764		
			(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 >0m				
Pressure solenoid	P0962		Short-cut ground or open		DS_Active <sup>3</sup>	TRUE	500 ms	2nd
SLT		check	Current	<23 mA	Emergency mode	FALSE	Continuous	
			(AD	<15)				
					No DTC set	P0963 for 1 sec		
	P0961		Torrecipel chart			and over	2.75 sec	Qrad
	P0961		Terminal short		No Shifting Control <sup>9</sup>			2nd
			Error current	> 80 mA	Emergency mode	FALSE > 20°C	Continuous	
					Oil temperature System voltage change	< 0,2V		
					System voltage	11 -18 V		
					SLT Output current target	> 835mA and		
						constant.		
					DS_Active <sup>3</sup>	TRUE		
					No DTC set	P0711		
						P0712		
						P0713		
	P0963		Short-cut Ubatt (+B)		DS_Active <sup>3</sup>	TRUE	500 ms	2nd
			Measured Current	> 1,333 mA	Emergency mode	FALSE	Continuous	
			(AD	> 1000)				
					No DTC set	P0962 for 1 sec		
						and over		
	P0748		Feed Back Current		IG voltage	> 10.5 V	1 sec	2nd
			Stuck(Electrical)			4000(4000		
				>20000	Input AD value	< 1000(1333mA) FALSE		
			"ie" is added to "sum_ie" every	TU MSEC.	Emergency mode	TRUE		
			"ie" : Difference of "ir" and "ifb".		DS_Active <sup>3</sup>			
			"ir" : Target current "ifb": Feedback current		No DTC set	P0962		
			"sum_ie" is cleared as follows:			P0963		
			(1) or (2) or (3)					
1	I	I		· · · · ·	I	I	I	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL
e jetem		200011011			1 -		itequirea	
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie < (	0mA" ("ie >0mA") to "ie >0m	nA" ("ie < 0mA").			
Timing solenoid	P0966	Circuit continuity	Short-cut ground or open		DS Active <sup>3</sup>	TRUE	500 msec	2nd
SLC1		check	Current	<23 mA	Emergency mode	FALSE	Continuous	
			(AD	<15)				
					No DTC set	P0967 for 1 sec		
						and over		
	P0965		Terminal short		No Shifting Control <sup>9</sup>		2.75 sec	2nd
			Error current	> 80 mA	Emergency mode	FALSE	Continuous	
					Oil temperature	> 20°C		
					System voltage change	< 0,2V		
					System voltage	11 -18 V		
					SLC1 Output current target	> 835mA and		
						constant.		
					DS_Active <sup>3</sup>	TRUE		
					No DTC set	P0711		
						P0712		
						P0713		
	P0967		Short-cut Ubatt (+B)		DS_Active <sup>3</sup>	TRUE	500 msec	2nd
			Measured Current	> 1,333 mA	Emergency mode	FALSE	Continuous	
			(AD	> 1000)	No DTC set	P0966 for 1 sec		
					NO DTC Set	and over		
	P0778		Feed Back Current		IG voltage	> 10.5 V	1 sec	2nd
	F0//0		Stuck(Electrical)		16 voltage	> 10.5 V	1 500	Znu
				>20000	input AD value	< 1000(1333mA)		
			"ie" is added to "sum_ie" every		Emergency mode	FALSE		
			"ie" : Difference of "ir" and "ifb".	To msec.		TRUE		
			"ir" : Target current		DS_Active <sup>3</sup>			
			<b>u</b>			DOOCC		
			"ifb": Feedback current		No DTC set	P0966		
			"sum_ie" is cleared as follows:			P0967		
			(1) or (2) or (3)					
			(1): Detection window = FALSE					
			(2): -50 mA <= ie <= 50 mA	)	A" ("in < 0m A")			
Timing solenoid	D0070	Circuit continuity	(3): ie value cahnges from "ie < (	JIIA (IE ≥UIIA) TO IE ≥UM I		TRUE	500 msec	2nd
SLC2	P09/0		Short-cut ground or open		DS_Active <sup>3</sup>			2110
3102		check	Current	<23 mA	Emergency mode	FALSE	Continuous	
			(AD	<15)	1			

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					No DTC set	P0971 for 1 sec and over		
	P0969		Terminal short Error current	> 80 mA	No Shifting Control <sup>9</sup> Emergency mode Oil temperature System voltage change System voltage SLC2 Output current target DS_Active <sup>3</sup>	FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE	2.75 sec Continuous	2nd
					No DTC set	P0711 P0712 P0713		
	P0971		Short-cut Ubatt (+B) Measured Current (AD	> 1,333 mA > 1000)	DS_Active <sup>3</sup> Emergency mode No DTC set	TRUE FALSE P0970 for 1 sec	500 msec Continuous	2nd
	P0798		Feed Back Current Stuck(Electrical) sum_ie <b>"ie" is added to "sum_ie" every</b> "ie" : Difference of "ir" and "ifb".	>20000 10 msec.	IG voltage Input AD value Emergency mode DS Active <sup>3</sup>	and over > 10.5 V < 1000(1333mA) FALSE TRUE	1 sec	2nd
			<pre>"ir" : Target current "ifb": Feedback current "sum_ie" is cleared as follows:   (1) or (2) or (3)   (1): Detection window = FALSE   (2): -50 mA &lt;= ie &lt;= 50 mA</pre>		No DTC set	P0970 P0971		
Timing solenoid SLC3	P2720	Circuit continuity check	(3): ie value cahnges from "ie < ( Short-cut ground or open Current (AD	0mA" ("ie >0mA") to "ie >0m <23 mA <15)	DS_Active <sup>3</sup> Emergency mode	TRUE FALSE	500 msec Continuous	2nd
	P2719		Terminal short		No DTC set No Shifting Control <sup>9</sup>	P2721 for 1 sec and over	2.75 sec	2nd
			Error current	> 80 mA	Emergency mode Oil temperature System voltage change System voltage	FALSE > 20°C < 0,2V 11 -18 V	Continuous	

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					SLC3 Output current target	> 835mA and constant.		
					DS_Active <sup>3</sup>	TRUE		
					No DTC set	P0711 P0712 P0713		
	P2721		Short-cut Ubatt (+B)		DS_Active <sup>3</sup>		500 msec	2nd
			Measured Current	> 1,333 mA > 1000)	Emergency mode		Continuous	
			,	,	No DTC set	P2720 for 1 sec and over		
	P2716		Feed Back Current Stuck(Electrical)		IG voltage	> 10.5 V	1 sec	2nd
			sum ie	>20000	Input AD value	< 1000(1333mA)		
			"ie" is added to "sum_ie" every	10 msec.	Emergency mode	FALSE		
			"ie" : Difference of "ir" and "ifb". "ir" : Target current		DS_Active <sup>3</sup>	TRUE		
			"ifb": Feedback current		No DTC set	P2720		
			<ul> <li>"sum_ie" is cleared as follows:</li> <li>(1) or (2) or (3)</li> <li>(1): Detection window = FALSE</li> <li>(2): -50 mA &lt;= ie &lt;= 50 mA</li> <li>(3): ie value cannges from "ie &lt; 0</li> </ul>	) DmA" ("ie >0mA") to "ie >0m	  A" ("ie < 0mA").	P2721		
Timing solenoid	P2729	Circuit continuity	Short-cut ground or open		DS_Active <sup>3</sup>	TRUE	500 msec	2nd
SLB1		check	Current (AD	<23 mA <15)	Emergency mode	FALSE	Continuous	
					No DTC set	P2730 for 1 sec and over		
	P2728		Terminal short		No Shifting Control <sup>9</sup>		2.75 sec	2nd
			Error current	> 80 mA	Emergency mode	FALSE	Continuous	
					Oil temperature	> 20°C		
					System voltage change	< 0,2V		
					System voltage	11 -18 V		
					SLB1 Output current target	> 835mA and constant.		
					DS_Active <sup>3</sup>	TRUE		
					No DTC set	P0711 P0712		
				Dage 7 of 24		P0713		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P2730		Short-cut Ubatt (+B)		DS_Active <sup>3</sup>	TRUE	500 msec	2nd
			Measured Current (AD	> 1,333 mA > 1000)	Emergency mode	FALSE	Continuous	
				2 1000)	No DTC set	P2729 for 1 sec and over		
	P2725		Feed Back Current Stuck(Electrical)		IG voltage	> 10.5 V	1 sec	2nd
			sum_ie	>20000	Input AD value	< 1000(1333mA)		
			"ie" is added to "sum_ie" every "ie" : Difference of "ir" and "ifb".	10 msec.	Emergency mode DS_Active <sup>3</sup>	FALSE TRUE		
			<ul><li>"ir" : Target current</li><li>"ifb": Feedback current</li><li>"sum_ie" is cleared as follows:</li></ul>		No DTC set	P2729 P2730		
			(1) or (2) or (3) (1): Detection window = FALSE (2): -50 mA <= ie <= 50 mA					
			(3): ie value cahnges from "ie <	n 0mA" ("ie >0mA") to "ie >0m	A" ("ie < 0mA").			
Gear error, hydraulic fault	P0729	Rationality	Calculation of actual gear ratio for 6th gear is not correct. (Condition A or Condition B)		No Shifting Control <sup>9</sup> Not in neutral control <sup>10</sup>		12 sec Continuous	2nd
			Condition A	I	Not garage shifting control <sup>11</sup> (N-	D or N-R)		
				> 20%	Throttle (A only)	>= 10%		
			Condition B		Transmission Output Speed (A)	>= 500rpm		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	Transmission Output Speed (B)	>=250rpm		
			<b>or</b> abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%	Current gear Engine Torque_noACC <sup>8</sup> (B only)	6 >=80Nm		
					DS_Active <sup>3</sup> Fdetect Inh <sup>4</sup>	TRUE FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control <sup>11</sup> end	1.0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after neutral control <sup>10</sup> end	1.0 sec		<u> </u>
					Time after shifting control <sup>9</sup> end	0.5 sec		
					Brake abs(1-SpeedABS/Trans. Output Speed)	>= 20°C OFF < 10% FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0731	Rationality	Calculation of actual gear ratio for 1st gear is not correct.		Not garage shifting control <sup>11</sup> (N-	D or N-R)	12 sec	2nd
					Not in neutral control <sup>10</sup>		Continuous	
			abs( 1 - GRCurrent/ 2nd GearRatio) <b>or</b>	< 4%		GEAR_1ST or GEAR_1STEB 1350 rpm >=		
						outRpm >= 250 rpm		
			abs(1 - GRCurrent/ 3rd GearRatio)	< 4%		>=100Nm (GEAR_1ST)		
			or		EngineTorque_noACC <sup>8</sup>	>= 80 Nm (GEAR_1STEB)		
			abs(1 - GRCurrent/ 4th GearRatio)	< 4%	DS_Active <sup>3</sup>	TRUE		
						FALSE RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control <sup>11</sup> end	1.0 sec		
					Time after neutral control <sup>10</sup> end	1.0 sec		

P0732       Rationality       Calculation of actual gear ratio for 2nd gear is not correct. (Condition A abs(1-SpectABS/Trans.Output)       P0733       P0734       P0735       P0735       P0736       P0737       P0737       P0737       P0738       P0738       P0738       P0737       P0738       P0738       P0738       P0738       P0738       P0738       P0738       P0737	Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum
P0732     Rationality     Calculation of actual gear ratio for Condition A abs(1-Gear Ratio 0     Calculation of actual gear ratio por abs(1-Gear Ratio 0     No     No     Shifting Control <sup>3</sup> Not in neutral control <sup>11</sup> (N-D or N-R)     12 sec Continuous     2nd       V0732     Rationality     Calculation of actual gear ratio for Condition A abs(1-GRCurrent/GRExpected)     No     No     Shifting Control <sup>3</sup> Not in neutral control <sup>10</sup> 12 sec Continuous     2nd       V0732     Condition A abs(1-GRCurrent/GRExpected)     >20%     Transmission Output Speed (A)     >= 10%     Continuous       V074     Condition B abs(1-Gear Ratio Current/1st Gear Ratio)     <4%						Time after shifting control <sup>9</sup> end	0.5 sec		
P0732     Rationality     Calculation of actual gear ratio for 2nd gear is not correct. (Condition A or Condition B)     No Shifting Control <sup>9</sup> Not in neutral control <sup>11</sup> (N-D or N-R)     12 sec Continuous     2nd Continuous     2nd Continuous       Condition A abs(1-GRCurrent/GRExpected)     >20%     Not garage shifting control <sup>11</sup> (N-D or N-R)     12 sec Continuous     2nd Continuous       Condition B abs(1-Gear Ratio Current/ 1st Gear Ratio)     >20%     Transmission Output Speed (A)     >= 10%       Condition B abs(1-Gear Ratio Current/ 3rd Gear Ratio)     <4%						Brake abs(1-SpeedABS/Trans.Output	OFF		
P0732       Rationality       Calculation of actual gear ratio for 2nd gear is not correct. (Condition A or Condition B)       No Shifting Control <sup>9</sup> Not in neutral control <sup>10</sup> 12 sec P0722       2nd Continuous         Condition A abs(1-GRCurrent/GRExpected)       >20%       Not garage shifting control <sup>11</sup> (N-D r N-R) Throttle (A only)       >= 10%       Continuous       12 sec Continuous       2nd Continuous         Description Condition B       Condition B       >20%       Transmission Output Speed (A)       >= 500rpm (A)       >= 500rpm (B)       >= 500rpm (B)       >= 250rpm (B)       >= 4%       Engline Torque_noACC <sup>6</sup> (B)       >=80Nm (B)       >= 250rpm (B)       >= 4%       DS_Active <sup>3</sup> TRUE (B)       >=80Nm       Shift position       RAUSE       Shift position       RAUSE       Shift position       Shift position       RAUSE_D(defined)       Ima after changing to Shift position = RANGE_D(defined)       Shift position       RANGE_D(defined)       Ima after changing to Shift position = RANGE_D(defined)       Ima after changing to						QS_AirSuction <sup>5</sup>	FALSE		
2nd gear is not correct. (Condition A or Condition B)       Not sintenutral control <sup>10</sup> Continuous.         Not in neutral control <sup>10</sup> Not garage shifting control <sup>11</sup> (N-D or N-R)       Not garage shifting control <sup>11</sup> (N-D or N-R)         abs(1-GRCurrent/GRExpected)       >20%       Throttle (A only)       >= 10%         Condition B       Transmission Output Speed (A)       >= 500rpm       >= 250rpm         abs(1-Gear Ratio Current/1st Gear Ratio)       <4%						No DTC set	P0716 P0717 P0721		
Image: Condition A or Condition B)       Not in neutral control <sup>10</sup> Continuous         Condition A or Condition B       Not garage shifting control <sup>11</sup> (N-D or N-R)       Not garage shifting control <sup>11</sup> (N-D or N-R)         Condition B       Transmission Output Speed       >= 500rpm         Gear Ratio       4%       Transmission Output Speed       >= 250rpm         or       abs(1-Gear Ratio Current/ 1st       <4%		P0732	Rationality			No Shifting Control <sup>9</sup>	•	12 sec	2nd
Image: Contained A abs(1-GRCurrent/GRExpected)       >20%       Throttle (A only)       >= 10%         Image: Condition B       Transmission Output Speed (A)       >= 500rpm         abs(1-Gear Ratio Current/ 1st Gear Ratio Current/ 1st Gear Ratio)       <4%						-		Continuous	
abs(1-GRCurrent/GRExpected)       >20%       Throttle (A only)       >= 10%         Condition B       Transmission Output Speed (A)       >= 500rpm         abs(1-Gear Ratio Current/1st Gear Ratio)       <4%				Condition A		Not garage shifting control <sup>11</sup> (N-	D or N-R)		
(A)       Transmission Output Speed       >=250rpm         (B)       Current gear       2         (C)       Current gear       Current gear         (C)       Current gear       Current gear <t< td=""><td></td><td></td><td></td><td></td><td>&gt;20%</td><td>Throttle (A only)</td><td>&gt;= 10%</td><td></td><td></td></t<>					>20%	Throttle (A only)	>= 10%		
abs(1-Gear Ratio Current/ 1st Gear Ratio)       <4%				Condition B			>= 500rpm		
Gear Ratio)       or         abs(1-Gear Ratio Current/ 4th Gear Ratio)       <4%				Gear Ratio)	<4%	Transmission Output Speed (B)	>=250rpm 2		
or       abs(1-Gear Ratio Current/ 4th Gear Ratio)       <4%					<4%	Engine Torque_noACC <sup>8</sup> (B	>=80Nm		
or       abs(1-Gear Ratio Current/ 6th Gear Ratio)       <4%				abs(1-Gear Ratio Current/ 4th	<4%	DS_Active <sup>3</sup>			
abs(1-Gear Ratio Current/ 6th Gear Ratio)       <4%						Shift position	RANGE_D(defined)		
control <sup>11</sup> end				abs(1-Gear Ratio Current/ 6th	<4%		8.0 sec		
Time after neutral control <sup>10</sup> end 1.0 sec							1.0 sec		
						Time after neutral control <sup>10</sup> end	1.0 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			1			0.5.000		ļ
					Time after shifting control <sup>9</sup> end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans.	< 10%		
					Output Speed)	FALSE		
					QS_AirSuction <sup>5</sup>	FALSE		
					No DTC set	P0703		
						P0716		
						P0717		
						P0721		
	P0733	Rationality	Calculation of actual gear ratio for			P0722	12 sec	2nd
	1 07 00	rationality	3rd gear is not correct.		No Shifting Control <sup>9</sup>		12 300	2110
			(Condition A or Condition B)		Not in neutral control <sup>10</sup>		Continuous	
			Condition A		Not garage shifting control <sup>11</sup> (N-	, ,		
			abs(1-GRCurrent/GRExpected)	>20%	Throttle (A only)	>= 10%		
			Condition B		Transmission Output Speed (A)	>= 500rpm		
			abs(1-Gear Ratio Current/ 1st	<4%	Transmission Output Speed			
			Gear Ratio)		(B)	>=250rpm		
			or	- 40/	Current gear	3		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	Engine Torque_noACC <sup>8</sup> (B only)	>=80Nm		
			or		DS_Active <sup>3</sup>	TRUE		
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%	Fdetect_Inh <sup>4</sup>	FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift	1.0 sec		
					control <sup>11</sup> end			
					Time after neutral control <sup>10</sup> end	1.0 sec		
I				l		l		

System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after shifting control <sup>9</sup> end	0.5 sec		
					Oil temperature Brake	>= 20°C OFF		
					abs(1-SpeedABS/Trans.	< 10%		
					Output Speed)	1070		
					QS_AirSuction <sup>5</sup>	FALSE		
					_			
					No DTC set	P0703		
						P0716		
						P0717 P0721		
						P0721 P0722		
	P0734	Rationality	Calculation of actual gear ratio for		No Shifting Control <sup>9</sup>		12 sec	2nd
		-	4th gear is not correct.		Not in neutral control <sup>10</sup>		Continuous	
			(Condition A or Condition B)				Continuouo	
			Condition A		Not garage shifting control <sup>11</sup> (N-			
			abs(1-GRCurrent/GRExpected)	>20%	Throttle (A only)	>= 10%		
			Condition B		Transmission Output Speed (A)	>= 500rpm		
			abs(1-Gear Ratio Current/ 1st	<4%	Transmission Output Speed			
			Gear Ratio)		(B)	>=250rpm		
			or		Current gear	4		
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%	Engine Torque_noACC <sup>8</sup> (B only)	>=80Nm		
			or		DS_Active <sup>3</sup>	TRUE		
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%	Fdetect_Inh⁴	FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control <sup>11</sup> end	1.0 sec		
					Time after neutral control <sup>10</sup> end	1.0 sec		
						1.0 000		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after shifting control <sup>9</sup> end	0.5 sec		
					Oil temperature Brake abs(1-SpeedABS/Trans. Output Speed) QS_AirSuction <sup>5</sup>	>= 20°C OFF < 10% FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0735	Rationality	Calculation of actual gear ratio for		No Shifting Control <sup>9</sup>		12 sec	2nd
			5th gear is not correct. (Condition A or Condition B)		Not in neutral control <sup>10</sup>		Continuous	
			Condition A		Not garage shifting control <sup>11</sup> (N-	D or N-R)		
			abs(1-GRCurrent/GRExpected)	>20%	Throttle (A only)	>= 10%		
			Condition B		Transmission Output Speed (A)	>= 500rpm		
			abs(1-Gear Ratio Current/ 4th Gear Ratio) <b>or</b>	<4%	(A) Transmission Output Speed (B) Current gear	>=250rpm 5		
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%	Engine Torque_noACC <sup>8</sup> (B only)	>=80Nm		
					DS_Active <sup>3</sup> Fdetect_Inh <sup>4</sup>	TRUE FALSE RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control <sup>11</sup> end	1.0 sec		
					Time after neutral control <sup>10</sup> end	1.0 sec		
					Time after shifting control <sup>9</sup> end	0.5 sec		

Component/	Fault	Monitor Strategy				Enable Conditions	Time	MIL
System	Code	Description	Malfunction Criteria	Threshold Value	Secondary Parameters		Required	Illum.
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans.	< 10%		
					Output Speed)			
					QS_AirSuction <sup>5</sup>	FALSE		
					No DTC set	P0703		
						P0716		
						P0717		
						P0721		
						P0722		
Engine speed	P0725	Signal from ECM	Engine Speed Validity	"Invalid"	Diagnostic Service "Disable No	rmal	4 sec	2nd
signal		stated as unreliable			Communication" not detected	Level i		
					Ignition	ON >3 sec	Continuous	
					DS_Active_CAN <sup>2</sup>	TRUE		
					Emergency mode	FALSE		
					No DTC set	U0100		
Transmission	P0707	Voltage low	POS1 Voltage or POS2 Voltage	< 0.127 (AD value=26) V	Battery voltage		200ms	2nd
Range Sensor						Voltage < 18 V		
Circuit					Diagnosis Service mode	FALSE		
	P0708	Voltage high	Input POS1 Voltage or Input	> 4.87 (AD value=997)V	Diagnosis Service mode	FALSE	200 ms	2nd
			POS2 Voltage		Battery voltage	6.0 V < Battery	Continuous	
						Voltage < 18 V		
	P0706	Signal out of range	Input POS1 Voltage + Input	<= 5V -0.29V or >= 5V	Diagnosis Service mode		200 ms	2nd
			POS2 Voltage	+0.29V	Battery voltage	6.0 V < Battery	Continuous	
Output speed	P0722		No pulse		Net in a suited souther 10	Voltage < 18 V	Dependent of	2nd
sensor circuit	1 0722				Not in neutral control <sup>10</sup>		Speed	2110
					No Shifting Control <sup>9</sup>		opoou	
					Not garage shifting control <sup>11</sup> (N			
			Number of pulses from			-0)		
			Transmission Output Speed					
			Sensor	0		T		
			Number of pulses from	16	DS_Active <sup>3</sup>	TRUE		
			Transmission Input Speed		Emergency mode	FALSE		
			Sensor		Shift position	RANGE_D(defined)		
1	I	I	1	1	I	1	l	1

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illun
					Time since change from P,R or			
					N range to others if vehicle			
					speed >= 66km/h and oil			
					temperature >20°C	2.5sec		
					Time since change from P,R or			
					N range to others if vehicle			
					speed < 66km/h and oil			
					temperature <= 20°C			
						10sec		
					SpeedABS	> 300 rpm		
					No DTC set	P0501		
						P0706		
						P0707		
						P0708		
						P0716		
						P0717		
						P0748		
						P0778		
						P0798		
						P0961		
						P0962		
						P0963		
						P0965		
						P0966		
						P0967		
						P0969		
						P0970		
						P0971		
						P0973		
						P0974		
						P0985		
						P0986		
						P1895		
						P2159		
						P2716 P2719		
						P2719 P2720		
						P2720 P2721		
						P2721 P2725		
						P2725 P2728		
						P2728 P2729		1
		I		Page 15 of 24	I	FZ129		I

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						D2720		
						P2730 U0001		
						U0121		
	P0721				Not garage shifting control <sup>11</sup> (N-		10 sec	2nd
	1 07 2 1		Range/Performance, wrong pulse		Inot garage sinting control (IN-	0)	10 000	2110
			1-SpeedABS/Transmission Output Speed	> 15 %	No Shifting Control <sup>9</sup>	I		
						>= 2ND		
					1-SpeedABS/ Trans. Output			
					Speed	< 5%		
					Time after shifting control	8 sec		
					Time after changing to Position	8 sec		
					Shift position	RANGE_D(defined)		
						> 400rpm		
						>= 30 km/h		
					Spinning <sup>6</sup>	FALSE		
					DS_Active <sup>3</sup>	TRUE		
						FALSE		
					No DTC set	P0501		
						P0706		
						P0707		
						P0708		
						P0711		
						P0712		
						P0713		
						P0725		
						P0741		
						P0742		
						P0748		
						P0778		
						P0798		
						P0961		
						P0962		
						P0963 P0965		
						P0965 P0966		
						P0966 P0967		
						P0967 P0969		
						P0969 P0970		
I	1 1		I	Page 16 of 24	I		l	I

Component/	Fault	Monitor Strategy	Malfunation Onitaria	Thursday July Volum	October Demonstere	Enable Conditions		MIL
System	Code	Description	Malfunction Criteria	Threshold Value	Secondary Parameters		Required	Illum.
						P0971 P0973 P0974 P0985 P0986 P1820 P1895 P2159 P2716 P2719 P2720 P2721 P2720 P2721 P2725 P2728 P2728 P2729 P2730 P2759 P2762 P2762 P2763 P2764 U0001 U0121		
Transmission input speed sensor	P0717		No pulse No of pulses from Transmission Input Speed Sensor No of pulses from Transmission Output Speed Sensor	0 24	No Shifting Control <sup>9</sup> Not garage shifting control <sup>11</sup> (N- DS_Active <sup>3</sup> Emergency mode Trans. Output Speed * CurrentGearRatio Shift position CurrentGear Time since change from P,R or N range to others if vehicle speed >= 66km/h and oil temperature >20°C	D) TRUE FALSE > 600 rpm RANGE_D(defined) >= 2nd gear	Dependent of Speed	2nd

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time since change from P,R or			T
					N range to others if vehicle			
					speed < 66km/h and oil			
					temperature <= 20°C			
						10sec		
						P0501		
						P0706		
						P0707		
						P0708		
						P0721		
						P0722		
						P0748		
						P0778		
						P0798		
						P0961		
						P0962		
						P0963		
						P0965		
						P0966		
						P0967		
						P0969		
						P0970		
						P0971		
						P0973		
						P0974		
						P0985 P0986		
						P0986 P1895		
						P2159		
						P2716		
						P2719		
						P2720		
						P2721		
						P2725		
						P2728		
						P2729		
						P2730		
						U0001		
						U0121		
		-		Page 18 of 24				

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0716						10 sec	2nd
	P0710		Wrong Pulse		No Shifting Control <sup>9</sup>		TO SEC	2110
			1-speedABS/Transmission Input Speed	> 15 %	Not garage shifting control <sup>11</sup> (N-	D)		
					1-SpeedABS/Trans. Output Speed	< 5 %		
					1-SpeedABS/Engine Speed   Time after shifting control Time after changing to Position switch = RANGE_D	< 5 % 8 sec 8 sec		
					Gear	>= 2ND		
					Range Engine speed Spinning <sup>6</sup> DS_Active <sup>3</sup> LockUpActive Emergency mode Speed ABS No DTC set	other than P and N and R > 400rpm FALSE TRUE TRUE FALSE > 30 km/h U0001 P0501 P0706 P0707 P0708 P0711 P0712		
						P0712 P0713 P0721 P0722 P0725 P0741 P0742 P0748 P0748 P0778 P0798 P0961 P0962 P0963		
						P0963 P0965		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0966 P0967 P0969 P0970 P0971 P0973 P0974 P0985 P0986 P1820 P1820 P1895 P2159 P2716 P2719 P2720 P2721 P2720 P2721 P2725 P2728 P2729 P2729 P2730 P2759 P2762 P2762 P2763 P2764 U0121		
Transmission oil temperature sensor	P0711	Rationality	Oil temperature change less than	10 (AD value)	Oil temp DS_Active <sup>3</sup> AD value of oil temperature AD value of oil temperature Emergency mode Range Vehicle Speed No DTC set	< 20°C TRUE > 10 < 1000 FALSE ≠ (P, R or N) > 40km/h once P0706 P0707	10 min	2nd
	P0712	Circuit continuity check	Short-cut ground AD value of Oil Temp	< 10 (More than 200 °C).	DS_Active <sup>3</sup>	P0708 TRUE	300sec	2nd

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
	P0713	Circuit continuity	Short-cut Ubat or open circuit		DS_Active <sup>3</sup>	TRUE	12 sec	2nd
		check	AD value of Oil temperature	> 1000 ( -43 °C)	_ DriveTime	> 10 min		
Invalid signal from ECM	P1820	position signal is	Accelerator Position Validity	"Invalid"	Diagnostic Service "Disable No Communication" not detected		4 sec	2nd
invalid	invalid			Ignition DS_Active_CAN <sup>2</sup> Emergency mode	ON > 3sec TRUE FALSE			
					No DTC set	U0100		
Neutral condition	P1701		Step 1:		Not garage shifting control <sup>11</sup> (N-	D or N-R)	Step1:	2nd
	Step 1: abs(Engine Speed - Transmission Input Spee Transmission Input Spee range) Transmission Input Spee range)	abs(Engine Speed - Transmission Input Speed) Transmission Input Speed (at D range) Transmission Input Speed (at R range) <b>Step 2:</b>	RANGE_D) +400rpm > Transmission Output Speed x (reverse gear ratio at RANGE_R) +1000rpm	Not in neutral control <sup>10</sup> No Shifting Control <sup>9</sup> DS_Active <sup>3</sup> Fdetect_Inh <sup>4</sup> Oil temperature	TRUE FALSE (except P0966) >0°C	at D range: 3.3 sec if (0 <= X <= 1500) 1.3 sec if (1501 <= X <= 3000)		
			Transmission Input Speed Engine Speed	<200rpm >600rpm	Shift position Time after changing to shift position = RANGE_D or R(defined)	RANGE_D or RANGE_R (defined) 1.0sec	0.8 sec if (3001 <= X)	
					Time after garage shifting end	1.0sec 1.0sec	at R range: 1.8 sec if (0 <= Y <= 1500)	
					Time after shifting control end Transmission Output Speed SpeedABS Lockup Current gear QS_AirSuction <sup>5</sup>	0.5sec <=500rpm <=500rpm FALSE 1 or 2 or 3 or 4 FALSE	1.3 sec if (1501 <= Y <= 3000) 0.8 sec if (3001 <= Y)	
		l		Page 21 of 24	No DTC set	P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0722	X = inRpm - outRpm X (1st gear ratio at RANGE_D)	
							Y = inRpm - outRpm X (reverse gear ratio at RANGE_R)	
							<b>Step 2:</b> 0.1sec	
Neutral control	P1704			>= (Transmission Input	DS_Active <sup>3</sup> Shift position	TRUE RANGE_D(defined)	0.3sec	2nd
			C1 pressure	>=3.0kg/cm <sup>2</sup>	Fdetect_Inh <sup>4</sup> Oil temperature QS_AirSuction <sup>5</sup>	FALSE >=10°C FALSE		
					No DTC set	P0716 P0717 P0721 P0722		

<sup>1)</sup> Q\_NORMAL

Q\_NORMAL menas that no failure is detected

<sup>2)</sup> DS\_Active\_CAN

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

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

Start Condition for CAN failure detection:

Ignition ON and 10.2V < Battery Voltage < 18V and Not in service mode and

Reading EEPROM finish **Permission condition for CAN failure detection:** Ignition ON and 9.0V < Battery Voltage < 18V and Not in service mode

### <sup>3)</sup> DS\_Active

DS Active = TRUE when the start condition for failure detection is fulfilled for 2.0 sec continously. DS Active = FALSE when the permission condition for failure detection is not fulfilled. Start Condition for failure detection: Ignition ON and 10.2V < Battery Voltage < 18V and Not in service mode and Reading EEPROM finish and Egrpm > 400rpm and Egrpm = Q NORMAL<sup>1</sup> Permission condition for failure detection: Ignition ON and 9.0V < Battery Voltage < 18V and Not in service mode and Eqrpm > 400rpm and Eqrpm = Q NORMAL<sup>1</sup> <sup>4)</sup> Fdetech Inh = TRUE if: In Emergency mode or spinning<sup>6</sup> = TRUE **or** 

within 10.0 sec after spinning detection end **or** DTC set: P0973, P0974, P0985, P0986, P0966, P0967, P0970, P0971, P2720, P2721, 2729, 2730, P0962, P0963, P2763, P0716, P0717, P0721, P0722, P0706, P0707, P0708, P0562, P0563, U0001, U0100, P1820,

<sup>5)</sup>QS\_AirSuction : Quick stop detection flag for the prevention of failure misdetection for Air suction, is set if the vehicle brakes hard.

### <sup>6)</sup> Spinning

Spinning = 1 if Transversal acceleration > 0.7G (input from ABS signal) Spinning = 0 if Transversal acceleration parameter < 0.7G for 2sec. Continously. (input from ABS signal)

#### <sup>7)</sup> Wheel spin condition

- (1) 300 rpm < outRpm < 3000rpm
- (2) Egtorque\_noACC > 0Nm

(3) ABS (vehicle front wheels average speed - vehicle rear wheels average speed) > 5.0 km/h

(4) Throttle > 70 %

(5) outRpmSpeed < -20 rpm/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

### <sup>8)</sup> EngineTorque\_noACC

Engine output torque, acceleration inertia torque not included.

### 9) Shifting Control

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

### <sup>10)</sup> "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.

### <sup>11)</sup> "Garage Shifting"

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