12 OBDGS1 Transmission Diagnostics

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)	U0100	Frame missing from ECM	No CAN status frame from ECM detected		Diagnostic Service "Disable Normal Communication" not detected Engine speed Ignition DS_Active_CAN[2]	 > 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[2]	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”	Diagnostic Service "Disable Normal Communication" not detected Emergency mode Ignition DS_Active_CAN[2] No DTC set	 FALSE ON >3 sec TRUE U0100	4 sec Continuous	2nd
Solenoid S1	P0985	Circuit continuity check	Short-cut ground Detected signal of the S1 monitor when S1 driver outputs the “ON”signal (12V)	“OFF” signal (0V)	DS_Active[3] Time after solenoid output changed Emergency mode	TRUE >10 ms FALSE	500 msec Continuous	2nd
	P0986		Not connected or short-cut Ubatt Detected signal of the S1 monitor when S1 driver outputs the “OFF”signal (0V)	“ON” signal (12V)				
Solenoid S2	P0973	Circuit continuity check	Short-cut ground Detected signal of the S2 monitor when S2 driver outputs the “ON”signal (12V)	“OFF” signal (0V)	DS_Active[3] Time after solenoid output changed Emergency mode	TRUE >10 ms FALSE	500 msec Continuous	2nd
	P0974		Not connected or short-cut Ubatt					

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 speed	Converter is slipping with active lock-up on. (Engine Speed - Transmission Input Speed)	> 100rpm	DS_Active[3] Fdetect_inh[4] Shift position Time after N-D shifting control[9] ends Engine Torque Engine Speed Time after SLU target current (_ir) >= 1000 mA abs(1- SpeedABS / Transmission Output Speed calculated from Transmission Input Speed) Time after shifting control[9] ends Oil temperature Lock-up No DTC set	TRUE FALSE RANGE_D(defined) 8 sec >= 0 Nm < 4000 rpm 3sec < 10 % 0.5 sec >= 20°C FALSE P2759 P0716 P0717 P0721 P0722	12 sec Continuous	2nd
	P0742		Abs(EngineSpeed - Transmission Input Speed)	< 30 rpm for 2.0 sec continuously	DS_Active[3] Fdetect_inh[4] Shift position Time after N-D shifting control[9] end Time after changing to Shift position = RANGE_D(defined) Time after shifting control[9] ends	TRUE FALSE RANGE_D (defined) 1.0 sec 8.0 sec 0.5 sec	4sec	2nd

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					EngineTorque_noACC[8] Engine Speed abs(1- SpeedABS / Transmission Output Speed calculated from Transmission Input Speed) Oil temperature Time after SLU pressure = 0 kPa No DTC set	>= 60Nm >1000 rpm < 3000 rpm <10 % >= 20 °C 3sec P2759 P0716 P0717 P0721 P0722		
Pressure solenoid SLU	P2764	Circuit continuity check	Short-cut ground or open Current (AD	 <23 mA <15)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P2763 for 1 sec and over	500 ms Continuous	2nd
	P2762		Terminal short Error current	 > 80 mA	No Shifting Control[9] Emergency mode Oil temperature System voltage change System voltage SLU Output current target DS_Active[3] No DTC set	 FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE P0711 P0712 P0713	2,75 sec Continuous	2nd
	P2763		Short-cut Ubatt (+B) Measured Current (AD	 > 1,333 mA > 1000)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P2764 for 1 sec and over	500 ms Continuous	2nd
	P2759		Feed Back Current Stuck(Electrical)		IG voltage	> 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.
			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".		DS_Active[3]	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 >0mA" ("ie < 0mA").					
Pressure solenoid SLT	P0962	Circuit continuity check	Short-cut ground or open		DS_Active[3]	TRUE	500 ms	2nd
			Current	<23 mA	Emergency mode	FALSE	Continuous	
			(AD	<15)				
					No DTC set	P0963 for 1 sec and over		
	P0961		Terminal short		No Shifting Control[9]		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		
					SLT Output current target	> 835mA and constant.		
					DS_Active[3]	TRUE		
					No DTC set	P0711		
						P0712		
						P0713		
	P0963		Short-cut Ubatt (+B)		DS_Active[3]	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 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".		DS_Active[3]	TRUE		
			"ir" : Target current					
			"ifb": Feedback current		No DTC set	P0962		
			"sum_ie" is cleared as follows:			P0963		
			(1) or (2) or (3)					

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
			(1): Detection window = FALSE (2): -50 mA <= ie <= 50 mA (3): ie value cahnges from “ie < 0mA“ (“ie >0mA“) to “ie >0mA“ (“ie < 0mA“).					
Timing solenoid SLC1	P0966	Circuit continuity check	Short-cut ground or open Current (AD	 <23 mA <15)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P0967 for 1 sec and over	500 msec Continuous	2nd
	P0965		Terminal short Error current	 > 80 mA	No Shifting Control[9] Emergency mode Oil temperature System voltage change System voltage SLC1 Output current target DS_Active[3] No DTC set	 FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE P0711 P0712 P0713	2.75 sec Continuous	2nd
	P0967		Short-cut Ubatt (+B) Measured Current (AD	 > 1,333 mA > 1000)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P0966 for 1 sec and over	500 msec Continuous	2nd
	P0778		Feed Back Current Stuck(Electrical) sum_ie **"ie" is added to “sum_ie” every 10 msec.** “ie” : Difference of “ir” and “ifb”. “ir” : Target current “ifb”: Feedback current “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“).	 >20000	IG voltage input AD value Emergency mode DS_Active[3] No DTC set	> 10.5 V < 1000(1333mA) FALSE TRUE P0966 P0967	1 sec	2nd
Timing solenoid SLC2	P0970	Circuit continuity check	Short-cut ground or open Current (AD	 <23 mA <15)	DS_Active[3] Emergency mode	TRUE FALSE	500 msec Continuous	2nd

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[9] Emergency mode Oil temperature System voltage change System voltage SLC2 Output current target DS_Active[3] No DTC set	 FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE P0711 P0712 P0713	2.75 sec Continuous	2nd
	P0971		Short-cut Ubatt (+B) Measured Current (AD	 > 1,333 mA > 1000)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P0970 for 1 sec and over	500 msec Continuous	2nd
	P0798		Feed Back Current Stuck(Electrical) sum_ie **"ie" is added to "sum_ie" every 10 msec.** "ie" : Difference of "ir" and "ifb". "ir" : Target current "ifb": Feedback current "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").	 >20000	IG voltage Input AD value Emergency mode DS_Active[3] No DTC set	> 10.5 V < 1000(1333mA) FALSE TRUE P0970 P0971	1 sec	2nd
Timing solenoid SLC3	P2720	Circuit continuity check	Short-cut ground or open Current (AD	 <23 mA <15)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P2721 for 1 sec and over	500 msec Continuous	2nd
	P2719		Terminal short Error current	 > 80 mA	No Shifting Control[9] Emergency mode Oil temperature System voltage change System voltage	 FALSE > 20°C < 0,2V 11 -18 V	2.75 sec Continuous	2nd

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[3]	TRUE		
					No DTC set	P0711 P0712 P0713		
	P2721		Short-cut Ubatt (+B) Measured Current (AD	 > 1,333 mA > 1000)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P2720 for 1 sec and over	500 msec Continuous	2nd
	P2716		Feed Back Current Stuck(Electrical) sum_ie **"ie" is added to "sum_ie" every 10 msec.** "ie" : Difference of "ir" and "ifb". "ir" : Target current "ifb": Feedback current "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").	 >20000	IG voltage Input AD value Emergency mode DS_Active[3] No DTC set	> 10.5 V < 1000(1333mA) FALSE TRUE P2720 P2721	1 sec	2nd
Timing solenoid SLB1	P2729	Circuit continuity check	Short-cut ground or open Current (AD	 <23 mA <15)	DS_Active[3] Emergency mode No DTC set	TRUE FALSE P2730 for 1 sec and over	500 msec Continuous	2nd
	P2728		Terminal short Error current	 > 80 mA	No Shifting Control[9] Emergency mode Oil temperature System voltage change System voltage SLB1 Output current target DS_Active[3] No DTC set	 FALSE > 20°C < 0,2V 11 -18 V > 835mA and constant. TRUE P0711 P0712 P0713	2.75 sec Continuous	2nd

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Time after neutral control[10] end	1.0 sec		
					Time after shifting control[9] end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans. Output Speed)	< 10%		
					QS_AirSuction[5]	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[11](N-D or N-R) Not in neutral control[10] No Shifting Control[9]		12 sec Continuous	2nd
			abs(1 - GRCurrent/ 2nd GearRatio)	< 4%	Current Gear	GEAR_1ST or GEAR_1STEB		
			or		Transmission Output Speed	1350 rpm >= outRpm >= 250 rpm		
			abs(1 - GRCurrent/ 3rd GearRatio)	< 4%	EngineTorque_noACC[8]	>=100Nm (GEAR_1ST)		
			or		EngineTorque_noACC[8]	>= 80 Nm (GEAR_1STEB)		
			abs(1 - GRCurrent/ 4th GearRatio)	< 4%	DS_Active[3]	TRUE		
					Fdetect_Inh[4]	FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control[11] end	1.0 sec		
					Time after neutral control[10] 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 shifting control[9] end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans.Output Speed)	< 10%		
					QS_AirSuction[5]	FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0732	Rationality	Calculation of actual gear ratio for 2nd gear is not correct. (Condition A or Condition B)		No Shifting Control[9] Not in neutral control[10] Not garage shifting control[11](N-D or N-R)		12 sec Continuous	2nd
			Condition A					
			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%	Transmission Output Speed (B)	>=250rpm		
			or		Current gear	2		
			abs(1-Gear Ratio Current/ 3rd Gear Ratio)	<4%	Engine Torque_noACC[8] (B only)	>=80Nm		
			or		DS_Active[3]	TRUE		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	Fdetect_Inh[4]	FALSE		
					Shift position	RANGE_D(defined)		
			or					
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%	Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control[11] end	1.0 sec		
					Time after neutral control[10] 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 shifting control[9] end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans. Output Speed)	< 10%		
					QS_AirSuction[5]	FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0733	Rationality	Calculation of actual gear ratio for 3rd gear is not correct. (Condition A or Condition B)		No Shifting Control[9] Not in neutral control[10]		12 sec Continuous	2nd
			Condition A		Not garage shifting control[11](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/ 1st Gear Ratio)	<4%	Transmission Output Speed (B)	>=250rpm		
			or		Current gear	3		
			abs(1-Gear Ratio Current/ 4th Gear Ratio)	<4%	Engine Torque_noACC[8] (B only)	>=80Nm		
			or		DS_Active[3]	TRUE		
			abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%	Fdetect_Inh[4]	FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control[11] end	1.0 sec		
					Time after neutral control[10] 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 shifting control[9] end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans. Output Speed)	< 10%		
					QS_AirSuction[5]	FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0734	Rationality	Calculation of actual gear ratio for 4th gear is not correct. (Condition A or Condition B)		No Shifting Control[9] Not in neutral control[10] Not garage shifting control[11](N-D or N-R)		12 sec Continuous	2nd
			Condition A abs(1-GRCurrent/GRExpected)	>20%	Throttle (A only)	>= 10%		
			Condition B abs(1-Gear Ratio Current/ 1st Gear Ratio)	<4%	Transmission Output Speed (A)	>= 500rpm		
			or abs(1-Gear Ratio Current/ 5th Gear Ratio)	<4%	Transmission Output Speed (B) Current gear Engine Torque_noACC[8] (B only)	>=250rpm 4 >=80Nm		
			or abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%	DS_Active[3] Fdetect_Inh[4]	TRUE FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control[11] end	1.0 sec		
					Time after neutral control[10] 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 shifting control[9] end	0.5 sec		
					Oil temperature	>= 20°C		
					Brake	OFF		
					abs(1-SpeedABS/Trans. Output Speed)	< 10%		
					QS_AirSuction[5]	FALSE		
					No DTC set	P0703 P0716 P0717 P0721 P0722		
	P0735	Rationality	Calculation of actual gear ratio for 5th gear is not correct. (Condition A or Condition B)		No Shifting Control[9] Not in neutral control[10] Not garage shifting control[11](N-D or N-R)		12 sec Continuous	2nd
			Condition A					
			abs(1-GRCurrent/GRExpected)	>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		
			or		Current gear	5		
			abs(1-Gear Ratio Current/ 6th Gear Ratio)	<4%	Engine Torque_noACC[8] (B only)	>=80Nm		
					DS_Active[3]	TRUE		
					Fdetect_Inh[4]	FALSE		
					Shift position	RANGE_D(defined)		
					Time after changing to Shift position = RANGE_D(defined)	8.0 sec		
					Time after garage shift control[11] end	1.0 sec		
					Time after neutral control[10] end	1.0 sec		
					Time after shifting control[9] end	0.5 sec		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
					Oil temperature Brake abs(1-SpeedABS/Trans. Output Speed) QS_AirSuction[5] No DTC set	>= 20°C OFF < 10% FALSE P0703 P0716 P0717 P0721 P0722		
Engine speed signal	P0725	Signal from ECM stated as unreliable	Engine Speed Validity	"Invalid"	Diagnostic Service "Disable Normal Communication" not detected Ignition DS_Active_CAN[2] Emergency mode No DTC set	 ON >3 sec TRUE FALSE U0100	4 sec Continuous	2nd
Transmission Range Sensor Circuit	P0707	Voltage low	POS1 Voltage or POS2 Voltage	< 0.127 (AD value=26) V	Battery voltage Diagnosis Service mode	6.0 V < Battery Voltage < 18 V FALSE	200ms	2nd
	P0708	Voltage high	Input POS1 Voltage or Input POS2 Voltage	> 4.87 (AD value=997)V	Diagnosis Service mode Battery voltage	FALSE 6.0 V < Battery Voltage < 18 V	200 ms Continuous	2nd
	P0706	Signal out of range	Input POS1 Voltage + Input POS2 Voltage	<= 5V -0.29V or >= 5V +0.29V	Diagnosis Service mode Battery voltage	FALSE 6.0 V < Battery Voltage < 18 V	200 ms Continuous	2nd
Output speed sensor circuit	P0722		No pulse Number of pulses from Transmission Output Speed Sensor Number of pulses from Transmission Input Speed Sensor	 0 16	Not in neutral control[10] No Shifting Control[9] Not garage shifting control[11](N-D) DS_Active[3] Emergency mode Shift position	 TRUE FALSE RANGE_D(defined)	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 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 P2720 P2721 P2725 P2728 P2729		

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

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0971 P0973 P0974 P0985 P0986 P1820 P1895 P2159 P2716 P2719 P2720 P2721 P2725 P2728 P2729 P2730 P2759 P2762 P2763 P2764 U0001 U0121		
Transmission input speed sensor	P0717		No pulse		No Shifting Control[9] Not garage shifting control[11](N-D)		Dependent of Speed	2nd
			No of pulses from Transmission Input Speed Sensor	0	DS_Active[3]	TRUE		
			No of pulses from Transmission Output Speed Sensor	24	Emergency mode	FALSE		
					Trans. Output Speed * CurrentGearRatio	> 600 rpm		
					Shift position	RANGE_D(defined)		
					CurrentGear	>= 2nd gear		
					Time since change from P,R or N range to others if vehicle speed >= 66km/h and oil temperature >20°C	2.5sec		

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 N range to others if vehicle speed < 66km/h and oil temperature <= 20°C No DTC set	10sec P0501 P0706 P0707 P0708 P0721 P0722 P0748 P0778 P0798 P0961 P0962 P0963 P0965 P0966 P0967 P0969 P0970 P0971 P0973 P0974 P0985 P0986 P1895 P2159 P2716 P2719 P2720 P2721 P2725 P2728 P2729 P2730 U0001 U0121		

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

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 P1895 P2159 P2716 P2719 P2720 P2721 P2725 P2728 P2729 P2730 P2759 P2762 P2763 P2764 U0121		
Transmission oil temperature sensor	P0711	Rationality	Oil temperature change less than	10 (AD value)	Oil temp DS_Active[3] 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 P0708	10 min	2nd
	P0712	Circuit continuity check	Short-cut ground AD value of Oil Temp	< 10 (More than 200 °C).	DS_Active[3]	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 check	Short-cut Ubat or open circuit		DS_Active[3]	TRUE	12 sec	2nd
			AD value of Oil temperature	> 1000 (-43 °C)	DriveTime	> 10 min		
Invalid signal from ECM	P1820	Accelerator pedal position signal is invalid	Accelerator Position Validity	“Invalid”	Diagnostic Service "Disable Normal Communication" not detected		4 sec	2nd
					Ignition	ON > 3sec		
					DS_Active_CAN[2]	TRUE		
					Emergency mode	FALSE		
					No DTC set	U0100		
Neutral condition	P1701		**Step 1:**		Not garage shifting control[11](N-D or N-R)		**Step1:**	2nd
			abs(Engine Speed - Transmission Input Speed)	<150rpm	Not in neutral control[10]		at D range: 3.3 sec if (0 <= X <= 1500)	
			Transmission Input Speed (at D range)	> Transmission Output Speed x (1st gear ratio at RANGE_D) +400rpm	No Shifting Control[9]			
					DS_Active[3]	TRUE		
			Transmission Input Speed (at R range)	> Transmission Output Speed x (reverse gear ratio at RANGE_R) +1000rpm	Fdetect_Inh[4]	FALSE (except P0966)	1.3 sec if (1501 <= X <= 3000)	
			Step 2:		Oil temperature	>0°C		
			Transmission Input Speed	<200rpm	Shift position	RANGE_D or RANGE_R (defined)	0.8 sec if (3001 <= X)	
			Engine Speed	>600rpm	Time after changing to shift position = RANGE_D or R(defined)	1.0sec		
					Time after garage shifting end	1.0sec	at R range: 1.8 sec if (0 <= Y <= 1500)	
					Time after neutral control end	1.0sec		
					Time after shifting control end	0.5sec		
					Transmission Output Speed	<=500rpm		
					SpeedABS	<=500rpm	1.3 sec if (1501 <= Y <= 3000)	
					Lockup	FALSE		
					Current gear	1 or 2 or 3 or 4		
					QS_AirSuction[5]	FALSE	0.8 sec if (3001 <= Y)	
					No DTC set	P0716		

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illum.
						P0717 P0721 P0722	X = inRpm - outRpm X (1st gear ratio at RANGE_D) Y = inRpm - outRpm X (reverse gear ratio at RANGE_R) **Step 2:** 0.1sec	
Neutral control	P1704		C1 apply control Transmission Input Speed C1 pressure	>= (Transmission Input Speed at apply start + 400rpm + Transmission Output Speed x gear ratio) >=3.0kg/cm^2	DS_Active[3] Shift position Fdetect_Inh[4] Oil temperature QS_AirSuction[5] No DTC set	TRUE RANGE_D(defined) FALSE >=10°C FALSE P0716 P0717 P0721 P0722	0.3sec	2nd

[1)] Q_NORMAL

Q_NORMAL menas that no failure is detected

[2)] 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

[3] 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[1]

Permission condition for failure detection:

Ignition ON and

9.0V < Battery Voltage < 18V and

Not in service mode and

Egrpm > 400rpm and Egrpm = Q_NORMAL[1]

[4] Fdetech_Inh = TRUE if:

In Emergency mode **or**

spinning[6] = 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,

[5]QS_AirSuction : Quick stop detection flag for the prevention of failure misdetection for Air suction, is set if the vehicle brakes hard.

[6] 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)

[7] 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

[8)] 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

[10)] "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.

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