

090BDG12 TRANS Diagnostics

COMPONENT/ SYSTEM	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA	THRESHOLD VALUE	SECONDARY PARAMETERS	ENABLE CONDITIONS	TIME REQUIRED	MIL ILLUM.
Shift solenoid 1 (GND short)	P0973	circuit continuity	Comparison of TCM output signal and monitoring level	(GND short)	DS_Active_EG_V	TRUE	0.3sec	1D.C.
Shift solenoid 1 (+B short, Open)	P0974	circuit continuity		Monitoring signal is Low at output ON	Emergency mode	No	0.5sec	1D.C.
Shift solenoid 2 (GND short)	P0976	circuit continuity		(+B short / Open)			03sec	1D.C.
Shift solenoid 2 (+B short, Open)	P0977	circuit continuity		Monitoring signal is High at output OFF			0.5sec	1D.C.
Shift solenoid 3 (GND short)	P0979	circuit continuity					0.3sec	1D.C.
Shift solenoid 3 (+B short, Open)	P0980	circuit continuity					0.5sec	1D.C.
Linear solenoid SLT (GND short, Open)	P0962	circuit continuity		Check the feedback current value	(GND short, Open) ≤68	DS_Active_EG_V	TRUE	12.5sec
Linear solenoid SLT (+B Short)	P0963	circuit continuity	(+B Short) ≥1000		Emergency mode	No		
Linear solenoid SLU (GND Short/Open)	P0966	circuit continuity			DS_Active_EG_V	TRUE	12.5sec	1D.C.
Linear solenoid SLU (+B Short)	P0967	circuit continuity			Emergency mode	No	0.5sec	1D.C.
					DS_Active_EG_V	TRUE		
				Emergency mode	No			
				Pass time from no failure detection at another side	≥ 1sec			
Linear solenoid SLU (Terminal Short)	P0965	circuit continuity	[Criterion1]	[Criterion1]	DS_Active_EG_V	TRUE	[Criterion1]	1D.C.
			Check the error current value (error current value : target current value - feed back current value)	>80mA	Emergency mode	No	2.75sec	
					During shift	No		
					Battery voltage	>11V, <18V and variation<0.2V		
					[Criterion2]	[Criterion2]	Oil temperature	
			Thermal Shut Down of Linear Solenoid Driver	Occurrence	Oil temperature sensor (P0711, P0712, P0713)	Not fail	6times	
					SLU current	≥ 853mA		
					SLU target current value	No change		
Linear solenoid SLU (OFF Stuck)	P0741	functional check	Failure is detected if the following condition is satisfied.	≥2sec	DS_Active_EG_V	TRUE	6times	1D.C.
				Emergency mode	No			
			• Engine revolution - Input revolution	≥100rpm	Selector position switch	D, 3 range defined		
					Time after gear selector change	>8sec		
					During shift	No		
					Time after shift change	>3sec		
					Time after lock up ON output	>2sec		
					Oil temperature	≥20°C		
					Current Gear	≥2ND		
					Throttle	≥15%		
			Input revolution	≥150rpm, ≤6000rpm				

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					Engine torque Engine revolution Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980) Linear solenoid (SLT: P0962,P0963 SLU: P0965,P0966,P0967) Output revolution sensor(P0722) Input revolution sensor(P0717) Selector position switch(P0705) Oil temperature sensor (P0711, P0712, P0713) Engine torque signal(P2637) Throttle signal(P1125)	>=engine torque in MAP_A(*3) Nm >2000rpm Not fail		
Output revolution sensor	P0722	circuit continuity	Check the output revolution pulse while detecting input revolution sensor signal 10 pulse.	No pulse	DS_Active_EG_V Time after gear selector change from P, R or N range to others (at oil temp >=20deg.C and oil sensor is no failure(P0711,P0712,P0713) or Vehicle Speed calculated by output revolution sensor >= 66 km/h) Selector position switch Neutral control Vehicle speed Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980) Selector position switch(P0705)	TRUE >=10sec (>=2.5sec) Defined No > 7 km/h (1st Gear) > 13 km/h (2nd Gear) > 18 km/h (3rd Gear) > 26 km/h (4th Gear) Not fail	500times	1D.C.
Input revolution sensor	P0717	circuit continuity	Check the input revolution pulse while detecting output revolution sensor signal 6 pulse.	No pulse	DS_Active_EG_V Time after gear selector change from P, R or N range to others (at oil temp >=20deg.C and oil sensor is no failure(P0711,P0712,P0713) or Vehicle Speed calculated by output revolution sensor >= 66 km/h) Selector position switch Neutral control Vehicle speed	TRUE >=10sec (>=2.5sec) Defined No > 7 km/h	500times	1D.C.

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					Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980) Selector position switch(P0705)	Not fail		
Selector position switch	P0705	circuit continuity	Pattern of the switches	illegal pattern	DS_Active_EG_V Emergency mode	TRUE No	0.5sec	1D.C.
Transmission oil temperature sensor (GND short)	P0712	circuit continuity	Input A/D value	<10	DS_ACTIVE_EG_V Emergency mode	TRUE No	5min	1D.C.
Transmission oil temperature sensor (Open, +B Short)	P0713	circuit continuity	Input A/D value	>=1000	DS_ACTIVE_EG_V Emergency mode Selector position switch Output revolution Output revolution sensor(P0722) Selector position switch(P0705)	TRUE No D, 3, 2, 1 range defined > 600rpm for 10min. Not fail	12sec	1D.C.
Transmission oil temperature sensor (Stuck)	P0711	functional check	Criteria flag 1. INITIAL status Criteria flag = FALSE OT base = Init Oil temperature OT base AD = Init Oil A/D value Goto "WAITING" status 2. WAITING status Criteria flag = FALSE OT = Oil temperature OT AD = Oil A/D value OT base = Init Oil temperature OT base AD = Init Oil A/D value If cond1 is satisfied, goto "CRITERIA" status 3. CRITERIA status Criteria flag = TRUE If cond5 is satisfied, goto "WAITING" status If cond2 is satisfied, goto "NORMAL" status If cond3 is satisfied, goto "HOLD" status 4. NORMAL status Criteria flag = FALSE OT = Oil Temperature OT AD = Oil A/D value OT base = Init Oil Temperature	TRUE (Criteria timer shall keep at HOLD status)	DS_Active_EG_V Emergency mode Oil temperature sensor AD	TRUE No >=10,<1000	10min	1D.C.

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			<p>OT_base_AD = Init Oil A/D value If cond5 is satisfied, goto "WAITING" status If cond1 is satisfied, goto "CRITERIA" status</p> <p>5. HOLD status Criteria flag = FALSE</p> <p>If cond5 is satisfied, goto "WAITING" status If cond4 is satisfied, goto "CRITERIA" status</p> <p>Cond1: (OT < 20deg.C or OT_base < 20deg.C) AND Range!=(P,R or N) AND Vehicle speed >= 40km/h at once (if state Vehicle speed parameter is reseted)</p> <p>Cond2: OT_AD - input A/D value > 10* OR OT_base_AD - input A/D value > 10*</p> <p>Cond3: Range = (P,R or N)</p> <p>Cond4: Range !=(P,R or N) Vehicle speed >= 40km/h at once</p> <p>Cond5: Window condition is not satisfied</p>					
Shift solenoid 1 (ON stuck)	P0752	functional check	GRCurrent(*4) is 2nd at GRExpected(*5) is 3rd	>=5.0sec	DS_ACTIVE_EG_V	TRUE	1times	1D.C.
					Emergency mode	No		
					During shift	No		
					Throttle	>=8%		
					Output revolution	>=500rpm		
					Selector position switch	D, 3, 2 range defined		
					Time after gear selector change	>8sec		
					Time after shift change	>=3sec		
					Oil temperature	>=20°C		
					Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980)	Not fail		
Linear solenoid (SLT: P0962,P0963)								

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					Output speed sensor(P0722) Input revolution(P0717) Selector position switch(P0705) Throttle signal(P1125) Oil temperature sensor (P0711, P0712, P0713)			
Shift solenoid 1 (OFF stuck)	P0751	functional check	GRCurrent(*4) is 3rd at GRExpected(*5) is 2nd	>=3.0sec	DS_ACTIVE_EG_V Emergency mode During shift Throttle Output revolution Selector position switch Time after gear selector change Time after shift change Oil temperature Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980) Linear solenoid (SLT: P0962,P0963) Output speed sensor(P0722) Input revolution(P0717) Selector position switch(P0705) Throttle signal(P1125) Oil temperature sensor (P0711, P0712, P0713)	TRUE No No >=14% >=500rpm D, 3, 2 range defined >8sec >=3sec >=20°C Not fail	1times	1D.C.
Shift solenoid 2 (ON stuck)	P0757	functional check	GRCurrent(*4) is 3rd at GRExpected(*5) is 4th	>=5.0sec	DS_ACTIVE_EG_V Emergency mode During shift Throttle Output revolution Selector position switch Time after gear selector change Time after shift change Oil temperature Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980) Linear solenoid (SLT: P0962,P0963) Output speed sensor(P0722) Input revolution(P0717) Selector position switch(P0705) Throttle signal(P1125) Oil temperature sensor (P0711, P0712, P0713)	TRUE No No >=25% >=500rpm D, 3, 2 range defined >8sec >=3sec >=20°C Not fail	1times	1D.C.

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Shift solenoid 2 (OFF stuck)	P0756	functional check	GRCurrent(*4) is 4th at GRExpected(*5) is 3rd	>=5.0sec	DS_ACTIVE_EG_V	TRUE	1times	1D.C.
					Emergency mode	No		
					During shift	No		
					Throttle	>=8%		
					Output revolution	>=500rpm		
					Selector position switch	D, 3, 2 range defined		
					Time after gear selector change	>8sec		
					Time after shift change	>=3sec		
					Oil temperature	>=20°C		
					Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980)	Not fail		
					Linear solenoid (SLT: P0962,P0963)			
					Output speed sensor(P0722)			
					Input revolution(P0717)			
					Selector position switch(P0705)			
Throttle signal(P1125)								
Oil temperature sensor (P0711, P0712, P0713)								
Shift Mechanism	P0780	functional check	Unexpected downshift	Occurrence	DS_ACTIVE_V	TRUE	1280msec	1D.C.
					Emergency mode	No		
					Selector position switch	D, 3, 2, 1 range defined		
					During shift	No		
					Neutral control	No		
					Time after gear selector change	>=3sec		
					Shift solenoid (S1: P0973,P0974 S2: P0976,P0977 S3: P0979,P0980)	Not fail		
					Selector position switch(P0705)			
					Time after gear selector change from P, R or N range to others (at oil temp >=20deg.C and oil sensor is no failure(P0711,P0712,P0713) or Vehicle Speed calculated by output revolution sensor >= 66 km/h)	>=10sec (>=2.5sec)		
Neutral Control (Engine flare at C1 apply)	P079A	functional check	TCM detects A/T input rev. is more than (A/T input rev. apply start + A/T output rev. * gear ratio + 400rpm)	>=0.3 sec	DS_ACTIVE_EG_V	TRUE	1time	1D.C.
					Emergency mode	No		
					During apply control	Yes		
					Oil temperature sensor	>=10°C		
					Selector position switch	D, 3, 2, 1 range defined		
					Pressure control solenoid value	>=3.0Kg/cm ²		

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Neutral Control (Engine flare at neutral control OFF)	P0762	functional check	A/T Input revolution is more than (A/T output * gear ratio + 500	>=10sec	DS_ACTIVE_EG_V	TRUE	3times	1D.C.
					Emergency mode	No		
					Neutral control	No		
					All of the following conditions are satisfied after output revolution >= 250 rpm	No		
					During shift	D, 3, 2, 1 range		
					Selector position switch	>=10°C		
					Oil temperature	<250rpm		
					Output revolution	>0rpm		
Bus Off counter over run	U2104	Check the bus condition	If MPU receive "BUS OFF" state from CAN controller	-	DS_ACTIVE_V	TRUE	1time	1D.C.
					Time after IG ON	>=3sec		
Lost communication with ECM	U0100	Check the CAN signal from ECM	If TCM cannot detect frame of GENERAL STATUS ECM (Node ID: \$300)	>=4sec	DS_ACTIVE_V	TRUE	1time	1D.C.
					Time after IG ON	>=3sec		
					InRpm or EgRpm	>=400rpm		
Flash ROM	P0601	Check sum (Only 1time at IG ON)	To detect that the value of checksum calculations executed after IG ON. If there are a differences from the correct checksum value stored in FLASH ROM, the second calculation is made.	Difference at stored value	-	-	2times	1D.C.
Non volatile memory (EEPROM)	P0603	Check sum (Only 1time at IG ON)	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.	Difference at stored value	-	-	1time	1D.C.
Random access memory (RAM)	P0604	Check the write data (Only 1time at IG ON)	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.	-	-	-	1time	1D.C.

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			Step 4. TCU reads AA(hex) data in the RAM.					
Notes								
1. Failure detection starts when start condition for failure detection (condition 1) is fulfilled for 2.0 sec continuously. (DS_Active_EG_V = TRUE)								
2. All failure detection quits when permission condition for failure detection (condition 2) is not fulfilled. (DS_Active_EG_V = FALSE)								
3. Failure detection for CAN signal starts when start condition for failure detection (condition 1 without engine revolution condition) is fulfilled for 2.0 sec continuously. (DS_Active_V = TRUE)								
4. Failure detection for CAN signal quits when permission condition for failure detection (condition 2 without engine revolution condition) is not fulfilled. (DS_Active_V = FALSE)								
5. However, failure detection for IG voltage operates regardless the following conditions:								
Start condition for failure detection (condition 1):								
Ignition ON and								
10.2 V < Battery voltage and								
Not in service mode (*1) and								
Reading non volatile memory and								
Engine revolution >= 400rpm and								
no failure detection (*2)								
Permission condition for failure detection (condition 2):								
Ignition ON and								
9.0 V < Battery voltage and								
Not in service mode (*1) and								
Engine revolution >= 400rpm and								
no failure detection (*2)								
*1: Service mode: Diagnostic service mode (ClearDiagnosticInformation, InputOutputControl, DisableNormalMessageTransmission). TCU will prevent the failure detection when TCU will prevent the miss detection during InputOutputControl function. Because the CAN signal is not transmitted, the failure detection cannot be done.								
*2: Not in "Engine speed signal" failure(P0727)								
Not in "Bus off" failure(U2104)								
Not in "Lost Communicationwith ECM" failure(U0100)								

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*3: MAP_A												
		turbine rev[rpm]	1000	2000	3000	4000	5000	6000				
		engine	47	47	50	65	65	65				
*4: GRCurrent : T/M input revolution / T/M output revolution												
*5: GRExpected : Defined gear ratio												