2003 CVT *when used with 2.2L L61 engine in the Saturn ION*
TRANSMISSION DIAGNOSTIC PARAMETERS

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SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
TCM Memory ROM	P0601	The code is designed to verify ROM checksum at key up.	Calculated two's complement ROM checksum is not the same as the stored checksum in KKSUM ID cal.	None	Runs @ start-up	Type A
TCM Not Programmed	P0602	The code is designed to verify that the TCM has been programmed.	TCM is not programmed (Variable KFP0602_CNT_NoStartCal is NOT equal to 137)	No P0601	Runs @ start-up	Type A
TCM Long Term Memory Reset	P0603	This code is designed to verify the usability of ALL four blocks of EEPROM.	All four blocks of EEPROM are not usable (Checksum of Static did not match OR Checksum of Block Data did not match OR Checksum of cumulative data did not match.)	No P0604	Runs @ start-up	Type A
TCM Memory RAM	P0604	This code is designed to verify RAM.	Read Data is not equal to written data (A single byte of RAM is written to with 55H and then it is read back. Another byte is written to with AAH and then read back. If wither one of these actions returns with bad data the code is set.)	None	Runs @ start-up	Type A
TCM Internal Performance	P0606	This code is designed to detect continuous running resets with the internal performance of the TCM.	Running reset has occurred 7 times out of 10 loops	No P0601 nor P0604	0.7 seconds Continuous	Type A
Transmission Range Switch – Illegal Range	P0705	This code checks for an illegal combination with the NSBU.	Illegal Range	System Voltage between 8 & 18 volts	5 seconds Continuous	Type B
Trans Fluid Temp Sensor Circuit - Range/ Perf	P0711	0.24V to 5.0V This DTC detects an unrealistically large change in transmission temperature or a value which remains constant for a period of time in which a measurable amount of change is expected.	Fail Case 1 Change in Transmission Temperature < 2 C since start-up for 80 seconds Fail Case 2 Change in Transmission Temperature < 2 C since start-up. Fail Case 3 Fail counter = 10 within 2 seconds.	*Fail Case 1* System Voltage between 8 & 18 volts Engine running > 500 rpm Coolant Temperature is Valid P0711 has not already passed Start-up trans temp between –40 & -20 C. Coolant temp change > 20 C. Coolant Temp ≥ 0 C. No P0716, P0717, P0722, P0723 *Fail Case 2* System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Coolant Temperature is Valid P0711 has not already passed Start-up trans temp between –20 and 140 C. Coolant temp change > 50 C. Coolant Temp ≥ 70 C. TCC slip ≥ 50 rpm for 300 sec. Output Pulley Speed ≥ 400 rpm 300 sec.	Fail Case 1 & 2 180 seconds Fail Case 3 Fail counter ≥ 10 in 2 sec. Continuous	Type C

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				Fail Case 3 System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Trans Temp change ≥ 15 deg, software loop to software loop, increments the fail counter.		
Trans Fluid Temp Sensor Circuit - Low Input	P0712	0.24V to 5.0V The DTC detects a continuous short to ground in the TTS signal circuit or the TTS sensor	Trans Temp ≥ 151 C	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec	2 seconds Continuous	Type C
Trans Fluid Temp. Sensor Circuit - High Input	P0713	0.24V to 5.0V The DTC detects a continuous open or short to high in the TTS signal circuit or the TTS sensor	Trans Temp ≤ - 40 C	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec TCC Slip Speed ≥ 20 rpm No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723)	200 seconds Continuous	Type C
Input Speed Sensor Circuit- Range/Perf	P0716	0 RPM TO 6000 RPM The DTC detects an unrealistically large change in Input Speed in a very short period of time	Input Speed Drop ≥ 1000 rpm and then remain for 0.8 sec	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Range = Drive Throttle ≥ 15 % Output Pulley Speed ≥ 1350 rpm Input Speed has been > 1000 rpm for 5 seconds Delta Positive Turbine Speed ≤ 200 rpm for 3 seconds.	0.8 seconds Continuous	Type A
Input Speed Sensor Circuit No Activity	P0717	0 RPM TO 6000 RPM The DTC detects a Low Input Speed when the vehicle has large vehicle speed.	Input Speed Sensor ≤ 100 rpm	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Range ≠ Park or Neutral Engine Torque between 30 N-m and 300 N-m Engine Torque is Valid Output Pulley Speed ≥ 400 rpm No Output Speed Sensor Codes (P0722, P0723) No Range Codes (P0705, P1756,P1758) No Engine Torque Code (P1779)	5 seconds Continuous	Type A
Output Speed Sensor - Low Input	P0722	0 RPM to 8000 RPM This DTC detects a low output speed when the vehicle has a large engine speed in a drive range.	Output Pulley Speed ≤ 200 rpm	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Throttle > 15 % Throttle is valid Range ≠ Park or Neutral Input Speed > 750 rpm Engine Torque Between 30 and 300 N-m Engine Torque is Valid Input Clutch Capacity = Maximum No Range Codes (P0705, P1756,P1758) No Engine Torque Code (P1779) No Input Speed Sensor Codes (P0716 P0717) No Engine Speed Sensor Code (P0727) No Output Speed Sensor Intermittent (P0723)	5 seconds Continuous	Type A
Output Speed Sensor	P0723	0 RPM to 8000 RPM	Output Pulley Speed drop ≥ 500 rpm and	System Voltage between 8 & 18 volts	0.8 second	Type A

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Circuit Performance (Intermittent)		This DTC detects a loss of output speed when vehicle is in motion.	then remains for 0.8 sec.	Engine running > 500 rpm for 5 sec Time since range change > 6 sec Range ≠ Park or Neutral Input Speed > 200 rpm Output Pulley Speed has been ≥ 600 rpm for 5 seconds. Positive Delta Output Speed Loop to Loop ≤ 200 rpm for 3 seconds (Stable output speed) Change in Input Speed loop to loop ≤ 100 for 3 sec. (Stable input speed) No Range Codes (P0705, P1756,P1758) No Input Speed Sensor Codes (P0716 P0717)	Continuous	
Engine Speed Sensor Circuit	P0727	0V to 12V This DTC detects a loss of engine speed across the CAN Bus.	Engine Speed Validity bit is not set.	System Voltage between 8 & 18 volts No U2103 or U2105 codes	2 seconds Continuous	Type B
TCC System Stuck OFF	P0741	This DTC detects high TCC Slip Speed when TCC is commanded on.	TCC Slip ≥ 220 rpm for 3 seconds increments fail counter Fail counter = 3	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Time since range change > 6 sec Range ≠ Park or Neutral or Reverse Throttle > 5% Trans temp between 21 and 130 C Speed Ratio > 0.38 Engine Torque between 30 N-m and 300 N-m *TCC is Commanded ON*. Commanded TCC Pressure ≥ 100 kpa for 5 seconds Engine Torque is valid Actual Throttle Angle is Valid No Range Codes (P0705, P1756,P1758) No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723) No TCC System Stuck ON Code (P0742) No TCC/NI Multiplex Solenoid Circuit Codes (P1888, P1889) No Engine Torque Code (P1779)	3 seconds Continuous	Type B
TCC System Stuck ON	P0742	This DTC detects Low TCC Slip Speed when TCC is commanded OFF.	TCC Slip Speed < 5 rpm increments a fail and a total counter. For the test to be valid, the total counter must have incremented to a value between 60 and 150 counts. Code sets when fail counter reaches a	Note: This test runs at engine start-up System Voltage between 8 & 18 volts Engine running between 500 rpm and 2000 rpm Throttle < 3% Change in throttle ≤ 2% since start-up When the above conditions are true, then the TCC override pressure is commanded to 150 kpa. This increments the sample counter. No Range Codes (P0705, P1756,P1758)	5 seconds Runs @ Start-up and when vehicle enters Park/Neutral	Type A

SENSED PARAMETER	FAULT CODE	MONITOR STRATEGY DESCRIPTION	MALFUNCTION CRITERIA AND THRESHOLD VALUE(S)	SECONDARY PARAMETERS AND ENABLE CONDITIONS	TIME LENGTH AND FREQUENCY	MIL ILLUMINATION TYPE
			minimum of 25 % of the total counter.	No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723) No TCC System Stuck ON Code (P0742) No TCC/NI Multiplex Solenoid Circuit Codes (P1888, P1889) No Engine Torque Code (P1779)		
Pressure Sensor Rationality	P0841	0V to 12 V This DTC monitors the functionality of the pressure sensor.	Fail Case 1 Absolute Value in the change in Desired line pressure ≤ 600 kpa while the Absolute Value in the change of Actual Line Pressure ≥ 1000 kpa. Increments Fail counter. Code sets when counter = 10 counts in 2 sec. Fail Case 2 Absolute Line Pressure has **not** changed more than 100 kpa since start-up	*Common Enablers for Both fail cases:* System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Line_Press_Solenoid_Off_Default is not set Trans Temp ≥ 21 No Engine Speed Sensor code (P0727) No Line Pressure Sensor codes (P0842, P0843) No Line Pressure Codes (P0960, P0961,P0962) No CAN BUS Error ECM (U2105) *Additional Enablers* *Fail Case 1* Engine Speed ≥ 1500 rpm Output Speed ≥ 300 rpm No Output Speed Sensor codes (P0722, P0723) No Throttle Position Codes (P1791, P1795) *Fail Case 2* Code has not passed since this key on. Desired line pressure has changed ≥ 200 kpa since key on.	*Fail Case 1* 10 fail counts in 2 seconds *Fail Case 2* 2 seconds Continuous	Type B
Transmission Fluid Pressure Sensor Circuit Low Voltage	P0842	0V to 12V This DTC sets when the pressure sensor reads low as the commanded pressure is very high.	Actual Line Pressure ≤ 50 Kpa	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Commanded VBS Line Pressure ≥ 2200 kpa No VBS Line Pressure Codes (P0960, P0961,P0962)	20 seconds Continuous	Type A
Transmission Fluid Pressure Sensor Circuit High Voltage	P0843	0V to 12V This DTC sets when the pressure sensor reads high as the commanded pressure is low.	Actual Line Pressure ≥ 4500 kpa	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Commanded VBS Line Pressure ≤ 4000 kpa No VBS Line Pressure Codes (P0960, P0961,P0962)	20 seconds Continuous	Type A
Pressure Control Solenoid A Control Circuit Open	P0960	0V to 12V This DTC detects a continuous open in the PCS Circuit.	Line Pressure Circuit Open Flag is set For 13 out of 20 counts	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Line pressure Control Circuit Voltage out of range bit is not set No Pressure Control System or Performance codes set (P0961, P0962)	1.3 seconds Continuous	Type B
Pressure Control	P0961	0V to 12V	Line Pressure Circuit = Locked Off until	System Voltage between 8 & 18 volts	2 seconds	Type B

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Solenoid A System Performance		This DTC detects a continuous difference in the commanded current and actual current.	retest.	Engine running > 500 rpm for 5 sec Line Pressure Control Circuit Voltage out of range bit is not set No Pressure Control System or Performance codes set (P0960, P0961)	Continuous	
Pressure Control Solenoid A Control Circuit Low Voltage	P0962	0V to 12V This DTC detects a continuous short to ground in the PCS Circuit.	Line Pressure Circuit Short to Ground Flag is set for 13 out of 20 seconds	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Line Pressure Control Circuit Voltage out of range bit is not set No Pressure Control System or Performance codes set (P0960, P0961)	1.3 seconds Continuous	Type B
Pressure Control Solenoid B Control Circuit Open	P0964	0V to 12V This DTC detects a continuous open in the Multiplex Solenoid Circuit.	Multiplex Circuit Open Flag is set For 13 out of 20 counts	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Multiplex Circuit Voltage Out of Range = False. Multiplex Circuit Halt Testing = False Multiplex Circuit Test Suspension Time = zero. No Pressure Control Solenoid B Performance code (P0965)	1.3 seconds Continuous	Type B
Pressure Control Solenoid B System Performance	P0965	0V to 12V This DTC detects performance concerns with the TCC/NI solenoid.	Multiplex State Circuit = Locked Off until retest.	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Multiplex Control Circuit Voltage out of range bit is not set No Multiplex Control System or Performance codes set (P0964, P0966)	2 seconds Continuous	Type B
Pressure Control Solenoid B Control Circuit Low Voltage	P0966	0V to 12V This DTC detects a continuous short to ground in the Multiplex PCS Circuit.	Multiplex Circuit Short to Ground Flag is set for 13 out of 20 counts	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Multiplex Circuit Voltage Out of Range = False. Multiplex Circuit Halt Testing = False Multiplex Circuit Test Suspension Time = zero. No Pressure Control Solenoid B Performance code (P0965)	1.3 seconds Continuous	Type B
Range Switch Indicates Drive when in Park/ Neutral	P1756	0V to 12V This DTC detects an incorrect state of the Trans range switch.	CVT ≠ Park/ Neutral when Turbine Speed ≥ 550 rpm	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Output Pulley Speed ≤ 100 rpm Throttle < 1% Speed Ratio between 0.38 & 0.42 Input Clutch at Max Capacity No Range Codes (P0705, P1758) No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723) No TCC System Stuck ON Code (P0742) No TCC/NI Multiplex Solenoid Circuit Codes (P1888, P1889) No Engine Torque Code (P1779)	20 seconds Continuous	Type B
Range Switch Indicates Park/Neutral when in Drive	P1758	0V to 12V This DTC detects an incorrect state of the Trans	Range = Park/Neutral	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Throttle ≥ 5 %	5 seconds Continuous	Type B

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		range switch.		Output Pulley Speed ≥ 400 rpm Engine Torque > 2 Nm Speed Ratio > 0.38 No Range Codes (P0705, P1756) No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723) No TCC System Stuck ON Code (P0742) No TCC/NI Multiplex Solenoid Circuit Codes (P1888, P1889) No Engine Torque Code (P1779)		
Engine Torque Signal	P1779	This DTC monitors the validity of the engine torque that is sent to the TCM via the CAN Bus.	Engine torque valid bit is not set	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec No CAN communication Codes(U2103, U2105)	2 seconds Continuous	Type B
Ratio Control Performance	P1882	This DTC monitors the error between actual ratio and the commanded ratio.	Absolute Value of Commanded Speed Ratio – Actual Speed Ratio > 0.1	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec Throttle > 5% Output Pulley Speed > 400 rpm CVT Range = Drive Time since range change > 6 seconds Speed Ratio > 0.38 Turbine Speed > 700 rpm Trans temp > 21C Stepper Motor is not in Default No Range Codes (P0705, P1756) No Input Speed Sensor Codes (P0716 P0717) No Output Speed Sensor Codes (P0722, P0723) No TCC/NI Multiplex Solenoid Circuit Codes (P1888, P1889) No Engine Torque Code (P1779) No Stepper motor electrical codes (P1883, P1884, P1885, P1886) No CAN Communication Codes (U2103, U2104, U2105)	7 seconds Continuous	Type A
Stepper Motor Electrical Circuit A1Fault	P1883	This DTC detects open, short to ground or short to voltage the stepper motor circuit.	Open/Short to ground, or short to voltage flag detected	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec	0.56 seconds Continuous	Type A
Stepper Motor Electrical Circuit A2 Fault	P1884	This DTC detects open, short to ground or short to voltage the stepper motor circuit.	Open/Short to ground, or short to voltage flag detected	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec	0.56 seconds Continuous	Type A
Stepper Motor Electrical Circuit B1 Fault	P1885	This DTC detects open, short to ground or short to voltage the stepper motor circuit.	Open/Short to ground, or short to voltage flag detected	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec	0.56 seconds Continuous	Type A
Stepper Motor	P1886	This DTC detects open,	Open/Short to ground, or short to voltage	System Voltage between 8 & 18 volts	0.56 seconds	Type A

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Electrical Circuit B2 Fault		short to ground or short to voltage the stepper motor circuit.	flag detected	Engine running > 500 rpm for 5 sec	Continuous	
TCC/NI Multiplex Solenoid Circuit Low Voltage	P1888	This DTC detects open or short to ground in the TCC NI Solenoid.	Open/Short to ground flag detected	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec TCC/NI Multiplex Solenoid HSD is enabled TCC/NI Multiplex Solenoid is commanded OFF	0.36 seconds Continuous	Type A
TCC/NI Multiplex Solenoid Circuit High Voltage	P1889	This DTC detects short to voltage in the TCC NI Solenoid.	Short to voltage flag detected	System Voltage between 8 & 18 volts Engine running > 500 rpm for 5 sec TCC/NI Multiplex Solenoid HSD is enabled TCC/NI Multiplex Solenoid is commanded ON	0.36 seconds Continuous	Type A
CAN Node Communication Error	U2103	This DTC sets when the TCM has seen the CAN Bus reset one time.	CAN Communication flag is not set	System Voltage between 8 & 18 volts	1 seconds Continuous	Type A
CAN Bus reset counter Overrun	U2104	This DTC sets when the CAN bus has continuous running reset.	CAN Bus reset Counter ≥ 64 counts	System Voltage between 8 & 18 volts	Continuous	Type A
CAN Bus Error ECM	U2105	This DTC sets when the TCM no longer communicates with the ECM.	ECM No Communication flag is set	System Voltage between 8 & 18 volts ECM is not reprogramming ECM is present in vehicle configuration Ignition is ON No reset for 3 seconds No U2103	2 seconds Continuous	Type A