SERVICE BULLETIN

MITSUBISHI MOTORS

GLOBAL AFTER SALES OFFICE, MITSUBISHI MOTORS CORPORATION

PURPOSE : CORRECTION	ISSUE NO. : MSB-13EXL23-501	DATE : 2013-02-21
SUBJECT : CVT TROUBLE SHOOTING		<Destination/Model> (AS PER ATTACHED) <M/Y> 13
GROUP : CVT		MIRAGE/SPACE STAR(A03A)

1. Description:

See the attached document for the correction of the error existing in the applicable service manual.

2. Applicable Manual :

See the attached document

3. Details:

See the attached document

For overseas market

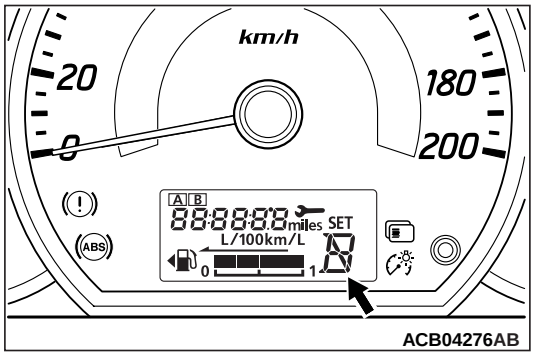
Destination	Applicable manual	Pub. No.	Applicable title (INFO ID)	Content
THAI/EXP	2013 MIRAGE Workshop Manual <THAI>	PWFE1201R(Eng) THAI:DRAFT	DIAGNOSTIC FUNCTION, WARNING INDICATOR (M231-21-900-32700-01)	Attached sheet 3
			RATIO PATTERN (M231-20-260-63900-01)	Attached sheet 4
			DAMPER CLUTCH OPERATION (M231-20-410-50000-01)	Attached sheet 5
			TROUBLE SYMPTOM DIAGNOSIS CHART (M231-22-050-01400-01)	Attached sheet 6
			CVT-ECU TERMINAL VOLTAGE TABLE (M231-22-910-64800-01)	Attached sheet 7
			OSILLOSCOPE INSPECTION PROCEDURES (M231-20-850-39500-01)	Attached sheet 8
	2013 MIRAGE Workshop Manual <EXCEPT THAI>		DIAGNOSTIC FUNCTION, WARNING INDICATOR (M231-21-900-32700-01)	Attached sheet 9
			RATIO PATTERN (M231-20-260-63900-01)	Attached sheet 10
			DAMPER CLUTCH OPERATION (M231-20-410-50000-01)	Attached sheet 11
			TROUBLE SYMPTOM DIAGNOSIS CHART (M231-22-050-01400-01)	Attached sheet 12
			CVT-ECU TERMINAL VOLTAGE TABLE (M231-22-910-64800-01)	Attached sheet 13
			OSILLOSCOPE INSPECTION PROCEDURES (M231-20-850-39500-01)	Attached sheet 14
EU	2013 SPACE STAR Workshop Manual	CA0E13E1-CD(ENG) CA0F13E1-CD(FRE) CA0G13E1-CD(GER) CA0I13E1-CD(ITA) CA0S13E1-CD(SPA)	TROUBLE SYMPTOM DIAGNOSIS CHART (M231-22-050-02500-01)	Attached sheet 15
			OSILLOSCOPE INSPECTION PROCEDURES (M231-20-850-41400-01)	Attached sheet 16
MMAL	2013 MIRAGE Workshop Manual	DRAFT	TROUBLE SYMPTOM DIAGNOSIS CHART (M231-22-050-03600-01)	Attached sheet 17
			OSILLOSCOPE INSPECTION PROCEDURES (M231-20-850-42500-01)	Attached sheet 18

Attached sheet 3

3. Depress the accelerator pedal while depressing the brake pedal. (Engine stops.) Use the M.U.T.-III special function to execute "reset" while holding them in applied position.
4. Set the selector lever to the P range.
5. Turn the ignition switch to the LOCK (OFF) position, and then wait for ten seconds.

⚠ CAUTION
Do not start the engine.

6. Turn the ignition switch to the ON position, and then wait for ten seconds.



7. Check that "P" is displayed on the selector lever position indicator on the multi-information display.
   NOTE: While reading the data, the "P" range lamp remains extinguished. When the data reading is complete, the "P" range lamp will come on.
8. Turn the ignition switch to the LOCK (OFF) position and then to the ON position. Then use the M.U.T.-III to erase the CVT fluid deterioration level.

G-SENSOR CALIBRATION

M1231217200013

AIM

If the G-sensor is not calibrated, the idle neutral control does not operate normally.
If any of the operations below is performed, calibrate the G-sensor.

- The G-sensor is removed and installed/replaced
- The CVT-ECU is replaced.

CALIBRATION PROCEDURES

⚠ CAUTION

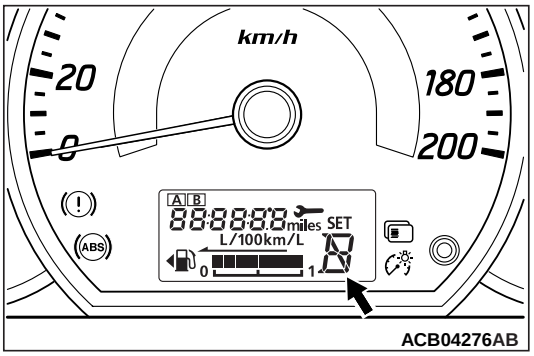
- **Before performing calibration, check that any of the G-sensor-related diagnosis code (P1708, P1709, P170A) is not stored.**
- **Do not start the engine.**
- **While the G-sensor calibration is in progress, do not jounce the vehicle.**

1. Park the vehicle on a level surface.
2. Adjust the pressures of all tyres to the specifications.
3. Connect the M.U.T.-III, and then turn the ignition switch to the ON position. (Engine: Stopped)
4. Select the M.U.T.-III screen menu as follows.
   (1) Select "CVT" on the "System selection" screen.
   (2) Select "Special function."
   (3) Select "Sensor calibration learning" and then execute it.
5. Confirm "Execute command: Executed" and then complete the G-sensor calibration by pressing the OK button.
6. Turn the ignition switch to the LOCK (OFF) position, and then wait for ten seconds.
7. Turn the ignition switch to the ON position.
8. Use the M.U.T.-III to check that diagnosis code P170B is not set.
9. Operation complete.

DIAGNOSTIC FUNCTION

M1231219000327

WARNING INDICATOR



If a malfunction occurs in the CVT system, any of "R", "N", "D", "S" or "A" on the selector lever position indicator in the multi-information display will be flashed (one flash per two seconds).

NOTE:

- *The selector lever position indicator "P" does not flash when a malfunction occurs in the CVT system.*
- *When the system is normal, the selector lever position indicator "A" is not displayed. Only when a malfunction occurs in the inhibitor switch, the indicator will flash.*

If the selector lever position indicator flashes rapidly (one flash per one second), the CVT fluid temperature is too <Incorrect> ates when the fluid temperature is approximately 135°C or higher, and goes out automatically when the fluid temperature drops below approximately 132°C.)

137°C <Correct>

Attached sheet 4 (1/3)

NOTE: These CVT fluid temperatures, at which the indicator flashes or goes out, are indication values on the M.U.T.-III.

HOW TO READ DIAGNOSIS CODE

Use M.U.T.-III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points).

HOW TO ERASE DIAGNOSIS CODE

Use M.U.T.-III to erase the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points).

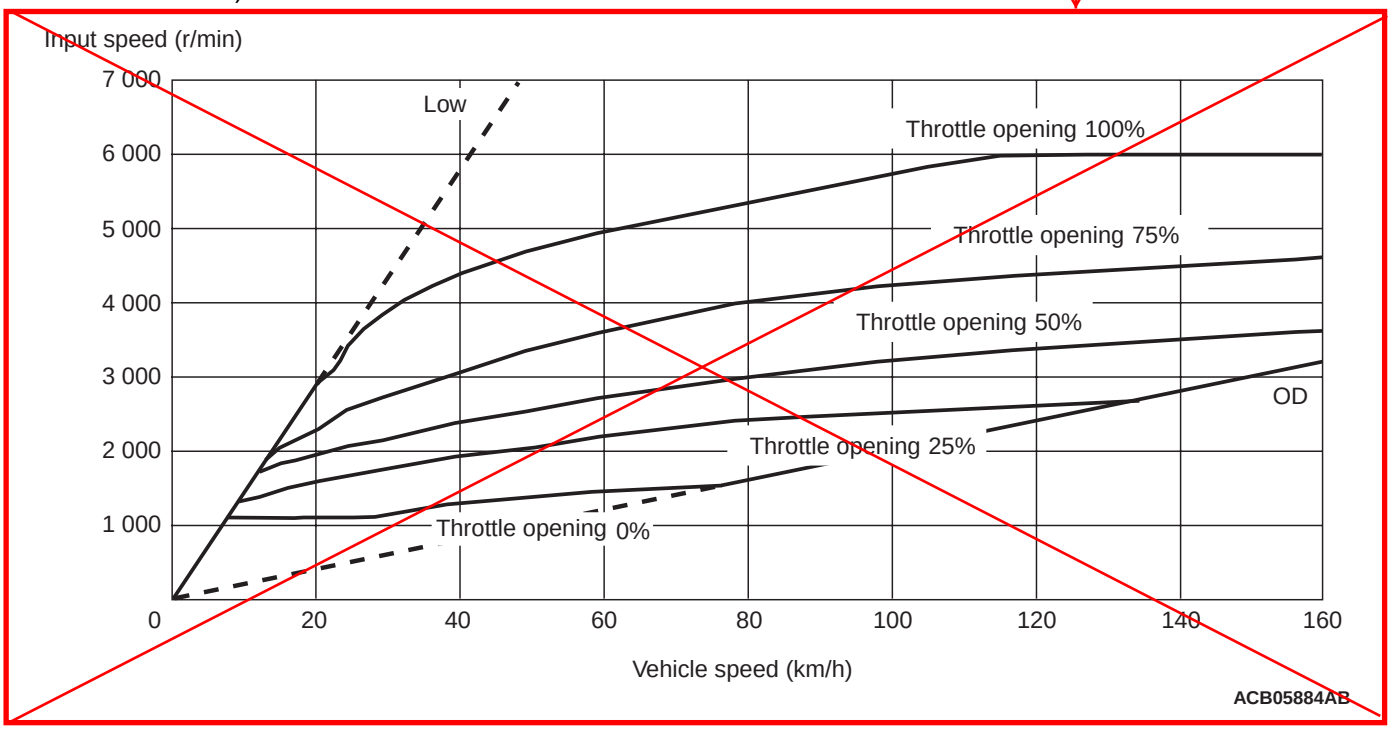
RATIO PATTERN

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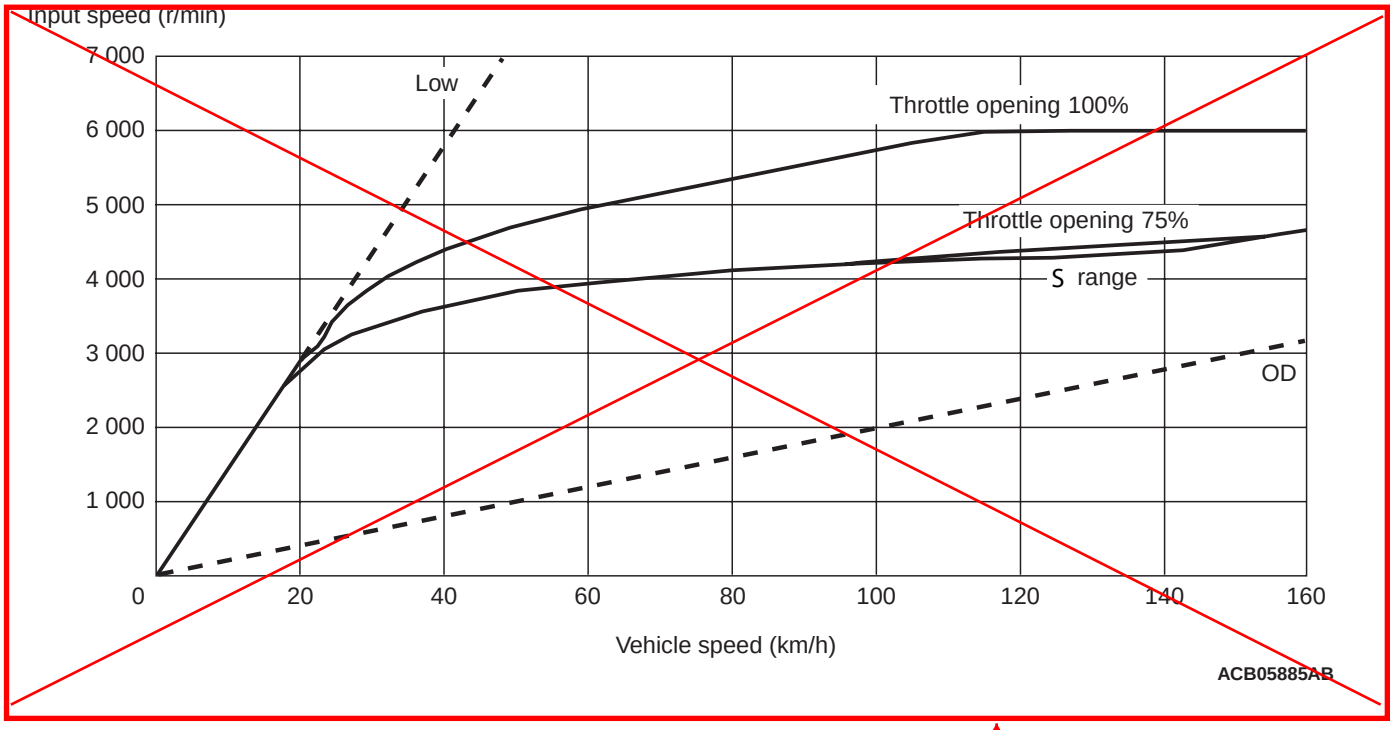
From attached sheet 4 (2/3)

<D RANGE>

<Incorrect>



<S RANGE>



<Incorrect>

<correct>

From attached sheet 4 (3/3)

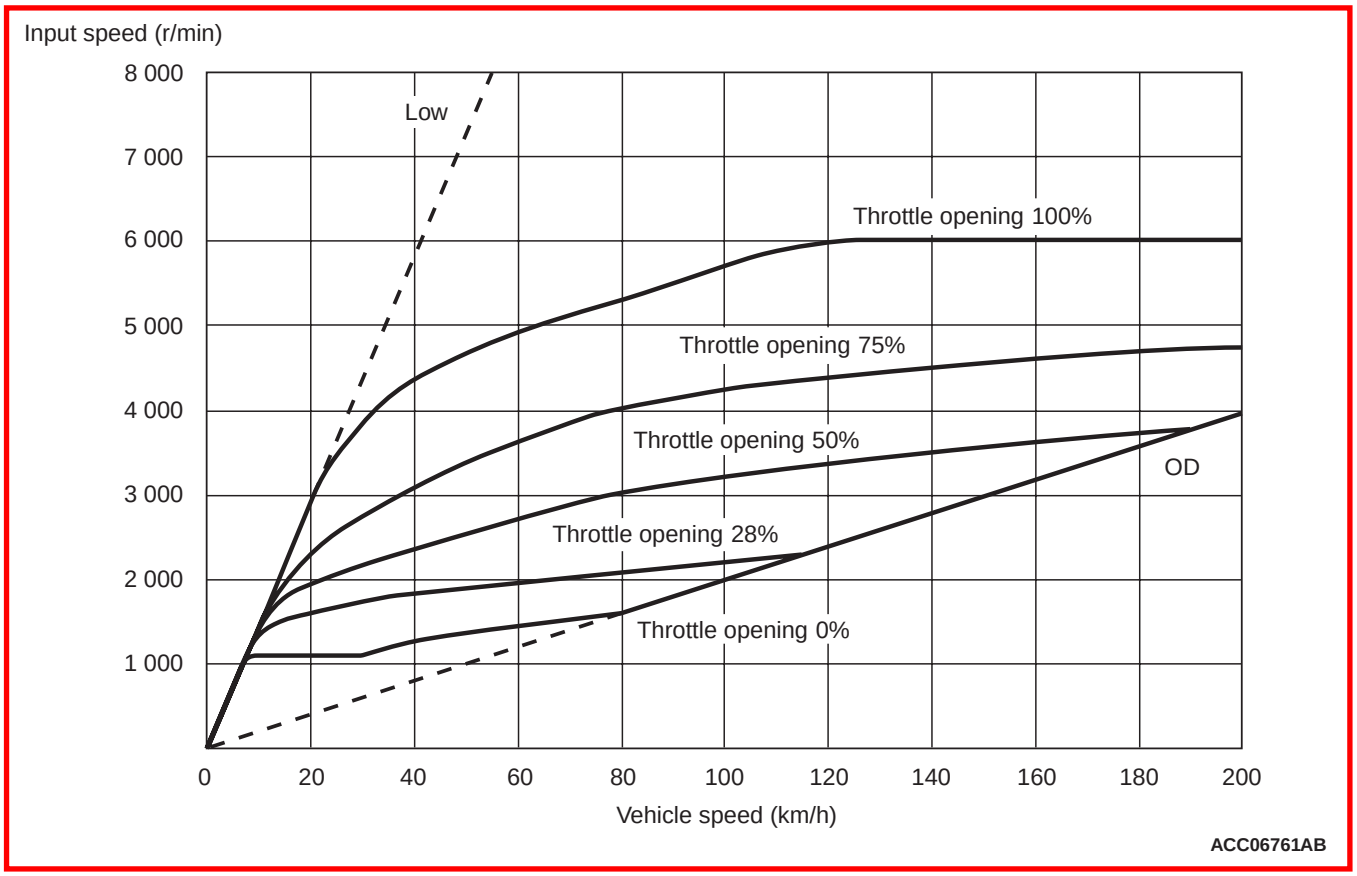
Attached sheet 4 (2/3)

RATIO PATTERN

M1231202600714

<D RANGE>

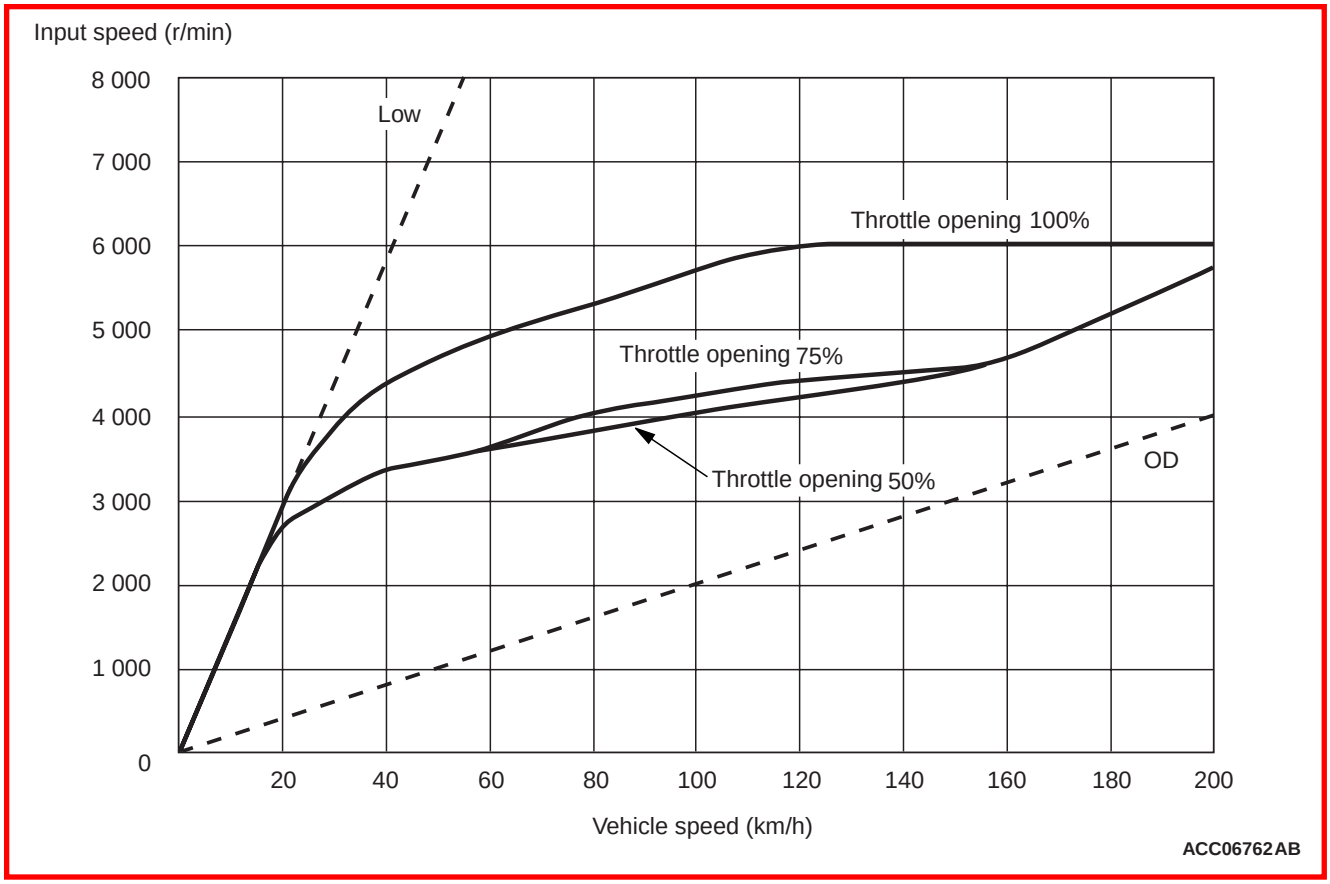
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Attached sheet 4 (3/3)

<S RANGE>

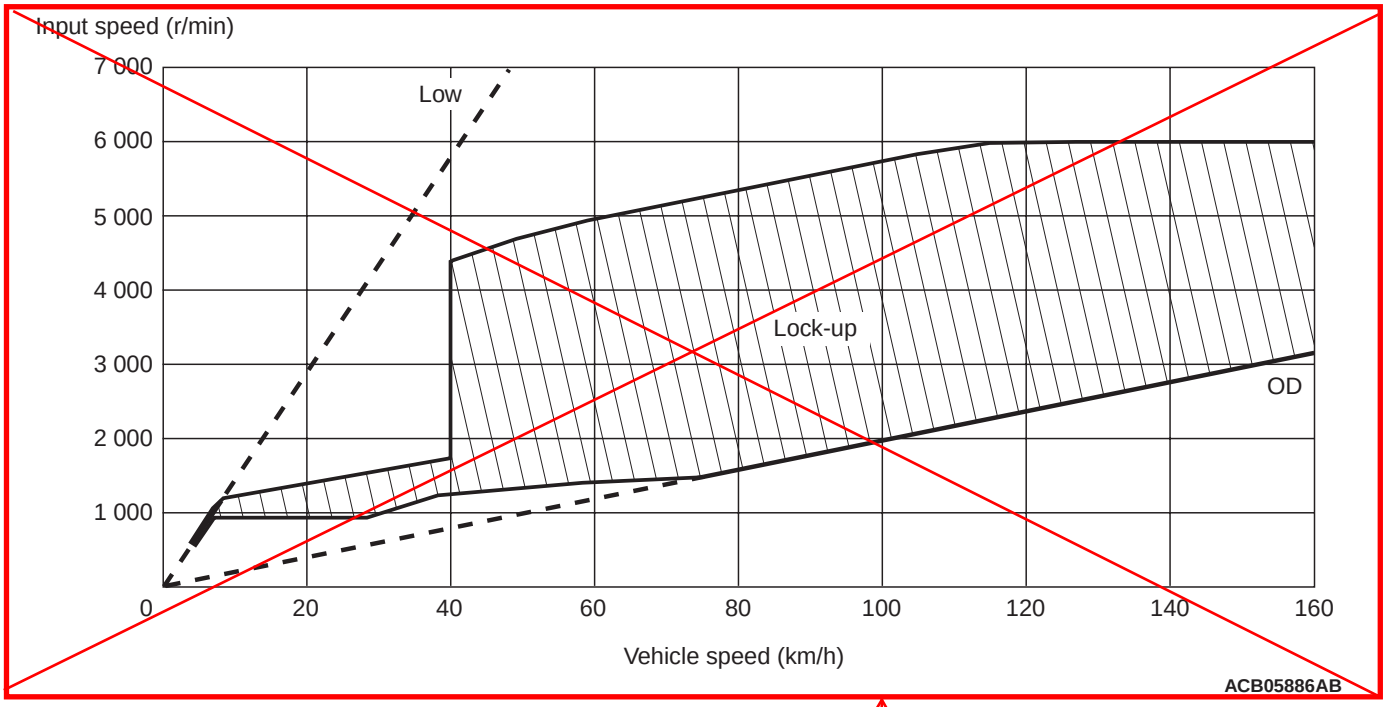
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Attached sheet 5 (1/2)

DAMPER CLUTCH OPERATION ZONE

M1231204100500



<Incorrect>

DIAGNOSIS CODE CHART

M1231207900851

<Correct> From attached sheet 5 (2/2)

⚠ CAUTION
During diagnosis, a diagnosis code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

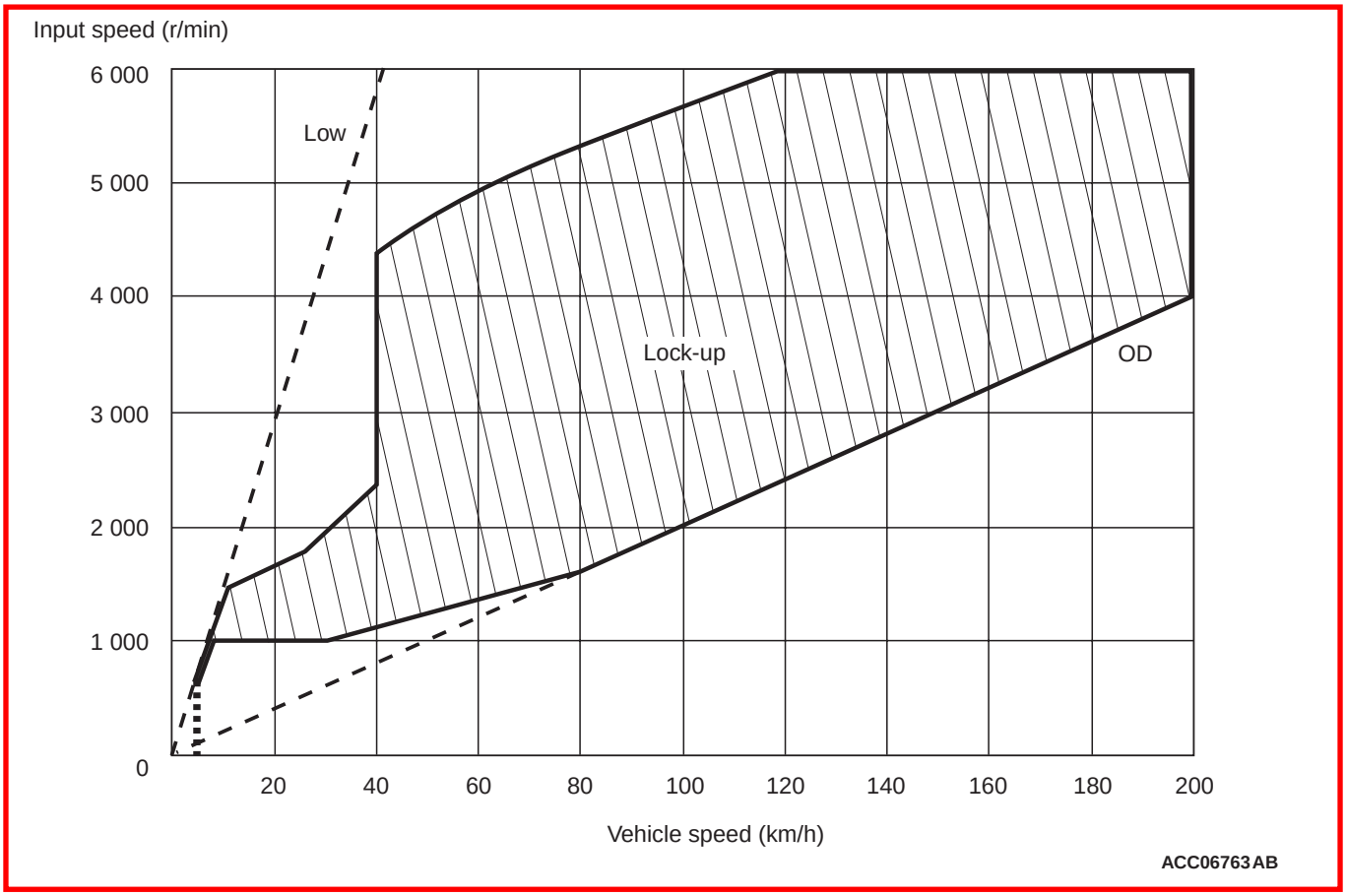
Diagnosis code No.	Diagnostic item	Reference page
P0705	Malfunction of inhibitor switch	
P0712	Malfunction of the CVT fluid temperature sensor (low input)	
P0713	Malfunction of the CVT fluid temperature sensor (high input)	
P0715	Malfunction of primary pulley speed sensor	
P0720	Malfunction of output speed sensor	
P0741	Abnormality in lockup function	
P0746	Abnormality in hydraulic control system function	
P0791	Malfunction of secondary pulley speed sensor	
P0796	Abnormality in primary pressure solenoid valve function	
P0841	Abnormality in secondary pressure sensor function	
P0842	Malfunction of the secondary pressure sensor (low voltage)	
P0843	Malfunction of the secondary pressure sensor (high voltage)	
P0962	Malfunction of the line pressure solenoid valve (low input)	

Attached sheet 5 (2/2)

DAMPER CLUTCH OPERATION ZONE

M1231204100588

<Correct>



Attached sheet 6 (1/2)

Trouble symptom		Possible cause No.	
		(A)	(B)
Poor driveability	Driving off is impossible due to too high engine speed at the R, D or S range.	1, 2, 3, 4, 5, 6, 7, 8, 12, 14, 15, 17, 18, 20, 21 (at D or S range), 23 (at R range), 25, 26, 27, 28	10, 16
	Driving off is impossible as then engine stalls at the R, D or S range.	4, 5, 6, 7, 8, 10, 11, 12, 17, 24, 25, 26, 27, 28, 29	16
	Poor acceleration at the R, D or S range.	1, 5, 7, 8, 9, 11, 12, 14, 15, 16, 17, 19, 21 (at D or S range), 23 (at R range)	3, 6, 10, 13
	The engine speed rises suddenly while the vehicle is being driven at the R, D or S range.	2, 3, 11, 12, 14, 15, 17, 18, 20, 21 (at D or S range), ~~23~~ (at D or S range), 23 (at R range)	10
	Engine braking becomes effective suddenly while the vehicle is being driven at the R or D range.	1, 3, 11, 12, 14, 15, 17, 21 (at D or S range), ~~23~~ (at D or S range), 23 (at R range)	–
Shifting fault	~~Secondary shift mechanism~~ slips when the transmission is shifted from 1st to 2nd gear range (engine revving).	3, 12, 14, 17, 18, 21, 22	1
	Engine braking does not become effective at the S range.	3, 4, 5, 6, 7, 8, 12, 13, 15, 17, 19, 21, 22	11, 18, 20
	The engine stalls immediately before the vehicle decelerates and then stops completely at the D or S range.	9, 13, 17, 19	–
	The torque converter is not locked-up due to slips while the vehicle is being driven at the D range.	5, 6, 7, 8, 9, 11, 12, 13, 16, 17, 19	10, ~~18, 20~~

<Incorrect>
<Correct> 22 → ~~23~~ (at D or S range), 23 (at R range)

<Incorrect>
<Correct> 22 → ~~23~~ (at D or S range), 23 (at R range)

<Incorrect>
~~Secondary shift mechanism~~

<Deleted>
~~18, 20~~

Auxiliary gearbox <Correct>

Attached sheet 6 (2/2)

Trouble symptom		Possible cause No.	
		(A)	(B)
Shift shock/ vibration/ abnormal noise	Harsh shock occurs during driving off at R, D or S range.	3, 12, 13, 17, 20, 21 (at D or S range), 23 (at R range)	10, 25, 26, 27, 28
	Harsh shift change occurs when the transmission is shifted from 1st to 2nd gear.	3, 14, 15, 17, 21, 22	1, 5
	Harsh shift shock during locking up while the vehicle is being driven at the D or S range.	5, 13, 17, 19	–
	Harsh shift shock during shifting from N to D, N to R range.	1, 3, 6, 7, 8, 12, 13, 14, 15, 16, 17, 21 (at N → D), 23 (at N → R)	5
	Harsh shift shock during shifting from D to B range while the vehicle is being driven.	15, 17, 21, 22	–
	Vibration occurs while the vehicle is being driven at the R, D or S range.	1, 2, 3, 5, 9, 13, 14, 15, 17, 18, 19, 20, 21 (at D or S range), 23 (at D or S range), 23 (at R range), 24, 25, 26, 27, 28	10
	Abnormal noise occurs while the vehicle is being driven.	2, 17, 18, 20, 24, 25, 26, 27, 28	–
	Abnormal noise occurs while the engine is idling.	1, 2, 17, 18, 20, 24, 25, 26	–
Others	The starter operates at the R, D or S range.	4, 5, 6	–
	The engine stalls while the vehicle is driven at the R, D or S range.	1, 5, 9, 13, 17, 19	–
	The starter does not operate at the R or N range.	4, 5, 6	–
	The parking mechanism does not operate at the P range.	4, 6, 29	–
	The parking mechanism cannot be released when shifting from the P range to another range.	4, 6, 29	–
	The engine stalls while the vehicle is stationary at the P or R range.	1, 5, 9, 10, 13	–

<Incorrect> <Correct> 22
<Deleted>
<Incorrect> stopped <Correct>
<Incorrect> <Deleted>
P <Correct>
<Incorrect>
<Correct> N

Attached sheet 7 (1/2)

Terminal No.	Terminal code	Check item	Check conditions	Standard value
19	ROM3	ROM assembly (DATA I/O)	–	–
20	INHL	Inhibitor switch B	• Ignition switch: ON • Selector lever position: S	System voltage
			• Ignition switch: ON • Selector lever position: Other than S	1 V or less
25	IGSW	Power supply	Ignition switch: ON	System voltage
			Ignition switch: OFF	1 V or less
26	GND2	Earth	Always	1 V or less
31	BATT	Power supply <Incorrect>	~~Ignition switch: ON~~	~~System voltage~~
			~~Ignition switch: OFF~~	~~1 V or less~~ <Deleted>
32	OUTS	Output speed sensor Always <Correct>	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h • Use an oscilloscope to measure the voltage between the terminals No. 32 and No. 43.	Approx. 230 Hz Oscilloscope inspection procedure (Refer to .)
33	PRMS	Primary pulley speed sensor	• Selector lever position: S • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear) • Use an oscilloscope to measure the voltage between the terminals No. 33 and No. 43.	Approx. 1 100 Hz Oscilloscope inspection procedure (Refer to .)
			• Selector lever position: S • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear) • Use an oscilloscope to measure the voltage between the terminals No. 33 and No. 43.	Approx. 900 Hz Oscilloscope inspection procedure (Refer to .)
34	SECS	Secondary pulley speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear) • Use an oscilloscope to measure the voltage between the terminals No. 34 and No. 43.	Approx. 730 Hz Oscilloscope inspection procedure (Refer to .)
			• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear) • Use an oscilloscope to measure the voltage between the terminals No. 34 and No. 43.	Approx. 400 Hz Oscilloscope inspection procedure (Refer to .)
37	LPRS	Secondary pressure sensor	• Engine: Idling (after warming up) • Selector lever position: N	0.88 – 0.92 V

Attached sheet 7 (2/2)

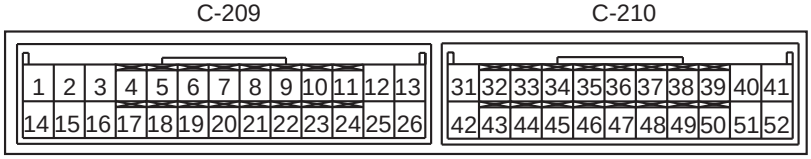
Terminal No.	Terminal code	Check item	Check conditions		Standard value
38	SPWR	CVT fluid temperature sensor	Ignition switch: ON	CVT fluid temperature: 20°C	2.01 – 2.05 V
				CVT fluid temperature: 50°C	1.45 – 1.50 V
				CVT fluid temperature: 80°C	0.90 – 0.94 V
39	GSNR	G-sensor	• Ignition switch: ON • When the vehicle is parked on a level surface.		Approx. 2.5 V
40	SPW2	Power supply (G-sensor)	Ignition switch: ON		Approx. 5 V
			Ignition switch: OFF		1 V or less
41	HRLS	High clutch and reverse brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear)		Oscilloscope inspection procedure (Refer to .)
42	BAT2	Power supply	Ignition switch: ON		System voltage
			Ignition switch: OFF		1 V or less
43	SGN2	Sensor earth	Always		1 V or less
49	SGND	Sensor earth	Always		1 V or less
50	SGN3	Sensor earth (G-sensor)	Always		1 V or less
51	SSPW	Power supply (sensor)	Ignition switch: ON		Approx. 5 V
			Ignition switch: OFF		1 V or less
52	LULS	Lockup solenoid valve	Driving conditions	Lockup engaged	Oscilloscope inspection procedure (Refer to .)

<Incorrect>
<Correct> 60km/h
<Incorrect>
<Correct> Always
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OSCILLOSCOPE INSPECTION PROCEDURES

M1231208500395

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ACB05799AB

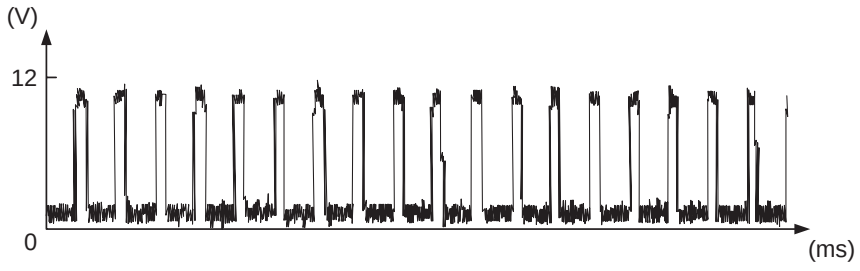
Attached sheet 8

Terminal No.	Terminal code	Check item	Check conditions	Wave patterns
1	PLLS	Line pressure solenoid valve	• Engine: Idling • Selector lever position: P	Waveform A
2	PRLS	Primary pressure solenoid valve		
3	LBLS	Low brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear)	
41	HRLS	High clutch and reverse brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear)	
52	LULS	Lockup solenoid valve	• Driving conditions • Lockup engaged	
32	OUTS	Output speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h	Waveform B
33	PRMS	Primary pulley speed sensor	• Selector lever position: S • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	
			• Selector lever position: S • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	
34	SECS	Secondary pulley speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	
			• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	

<Incorrect>
<Correct>
60km/h
<Incorrect>
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auxiliary gearbox
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auxiliary gearbox
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auxiliary gearbox

WAVEFORM SAMPLE

Waveform A



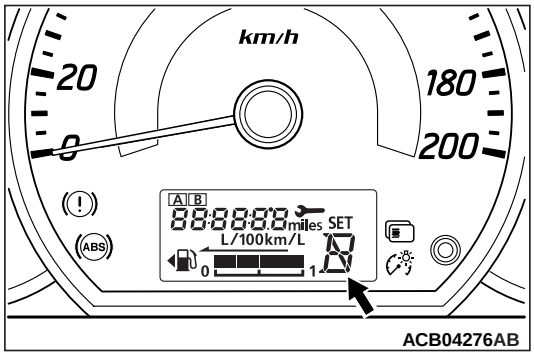
ACB04315AB

Attached sheet 9

3. Depress the accelerator pedal while depressing the brake pedal. (Engine stops.) Use the M.U.T.-III special function to execute "reset" while holding them in applied position.
4. Set the selector lever to the P range.
5. Turn the ignition switch to the LOCK (OFF) position, and then wait for ten seconds.

⚠ CAUTION
Do not start the engine.

6. Turn the ignition switch to the ON position, and then wait for ten seconds.



7. Check that "P" is displayed on the selector lever position indicator on the multi-information display.
   NOTE: While reading the data, the "P" range lamp remains extinguished. When the data reading is complete, the "P" range lamp will come on.
8. Turn the ignition switch to the LOCK (OFF) position and then to the ON position. Then use the M.U.T.-III to erase the CVT fluid deterioration level.

G-SENSOR CALIBRATION

M1231217200013

AIM

If the G-sensor is not calibrated, the idle neutral control does not operate normally.
If any of the operations below is performed, calibrate the G-sensor.

- The G-sensor is removed and installed/replaced
- The CVT-ECU is replaced.

CALIBRATION PROCEDURES

⚠ CAUTION

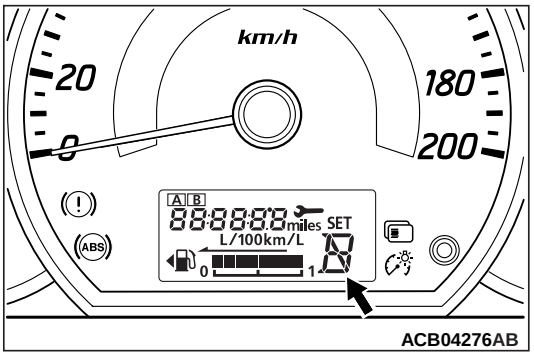
- **Before performing calibration, check that any of the G-sensor-related diagnosis code (P1708, P1709, P170A) is not stored.**
- **Do not start the engine.**
- **While the G-sensor calibration is in progress, do not jounce the vehicle.**

1. Park the vehicle on a level surface.
2. Adjust the pressures of all tyres to the specifications.
3. Connect the M.U.T.-III, and then turn the ignition switch to the ON position. (Engine: Stopped)
4. Select the M.U.T.-III screen menu as follows.
   (1) Select "CVT" on the "System selection" screen.
   (2) Select "Special function."
   (3) Select "Sensor calibration learning" and then execute it.
5. Confirm "Execute command: Executed" and then complete the G-sensor calibration by pressing the OK button.
6. Turn the ignition switch to the LOCK (OFF) position, and then wait for ten seconds.
7. Turn the ignition switch to the ON position.
8. Use the M.U.T.-III to check that diagnosis code P170B is not set.
9. Operation complete.

DIAGNOSTIC FUNCTION

M1231219000327

WARNING INDICATOR



If a malfunction occurs in the CVT system, any of "R", "N", "D", "B" or "A" on the selector lever position indicator in the multi-information display will be flashed (one flash per two seconds).

NOTE:

- *The selector lever position indicator "P" does not flash when a malfunction occurs in the CVT system.*
- *When the system is normal, the selector lever position indicator "A" is not displayed. Only when a malfunction occurs in the inhibitor switch, the indicator will flash.*

If the selector lever position indicator flashes rapidly (one flash per one second), the CVT fluid temperature is too hi[illegible] es when the fluid temperature is approximately 135°C or higher, and goes out automatically when the fluid temperature drops below approximately 132°C.)

<Incorrect>
<Correct> 137°C

Attached sheet 10 (1/3)

NOTE: These CVT fluid temperatures, at which the indicator flashes or goes out, are indication values on the M.U.T.-III.

HOW TO READ DIAGNOSIS CODE

Use M.U.T.-III to read the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points).

HOW TO ERASE DIAGNOSIS CODE

Use M.U.T.-III to erase the diagnosis code (Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points).

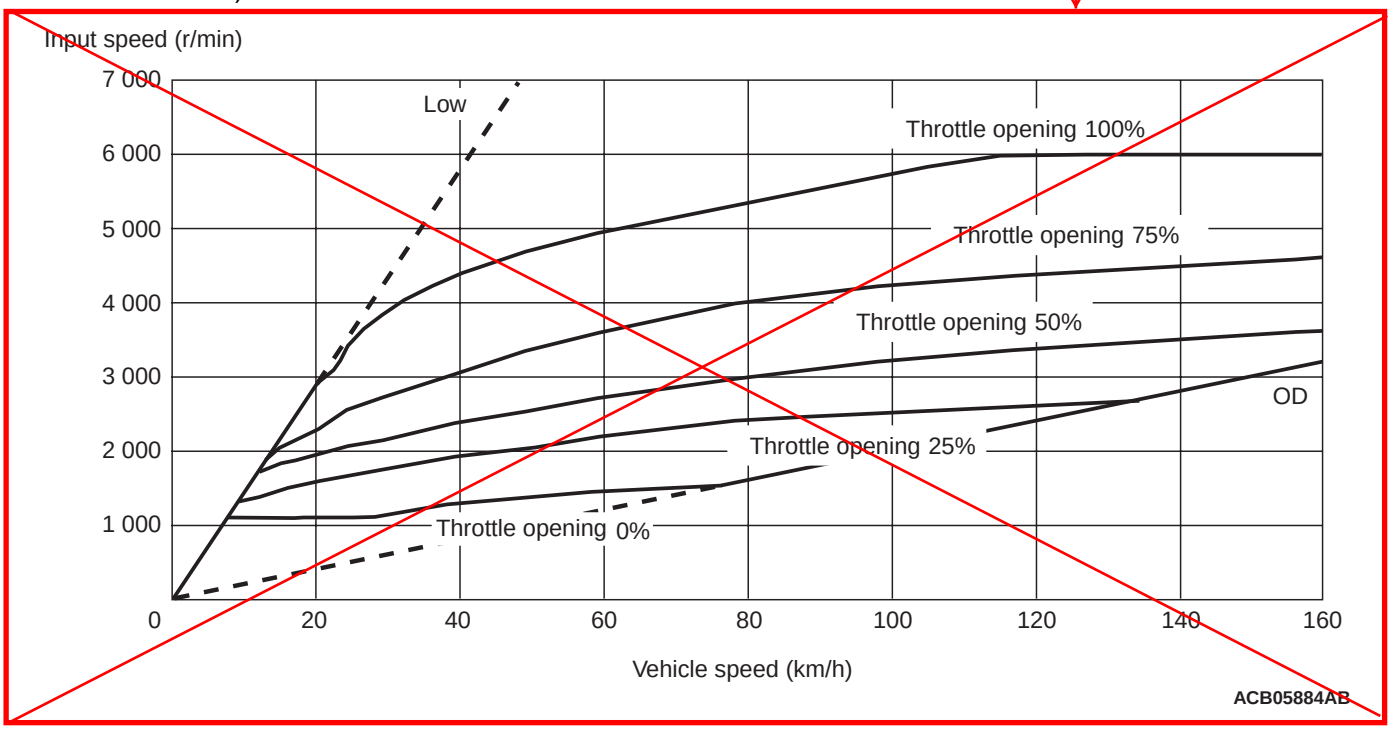
RATIO PATTERN

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From attached sheet 10 (2/3)

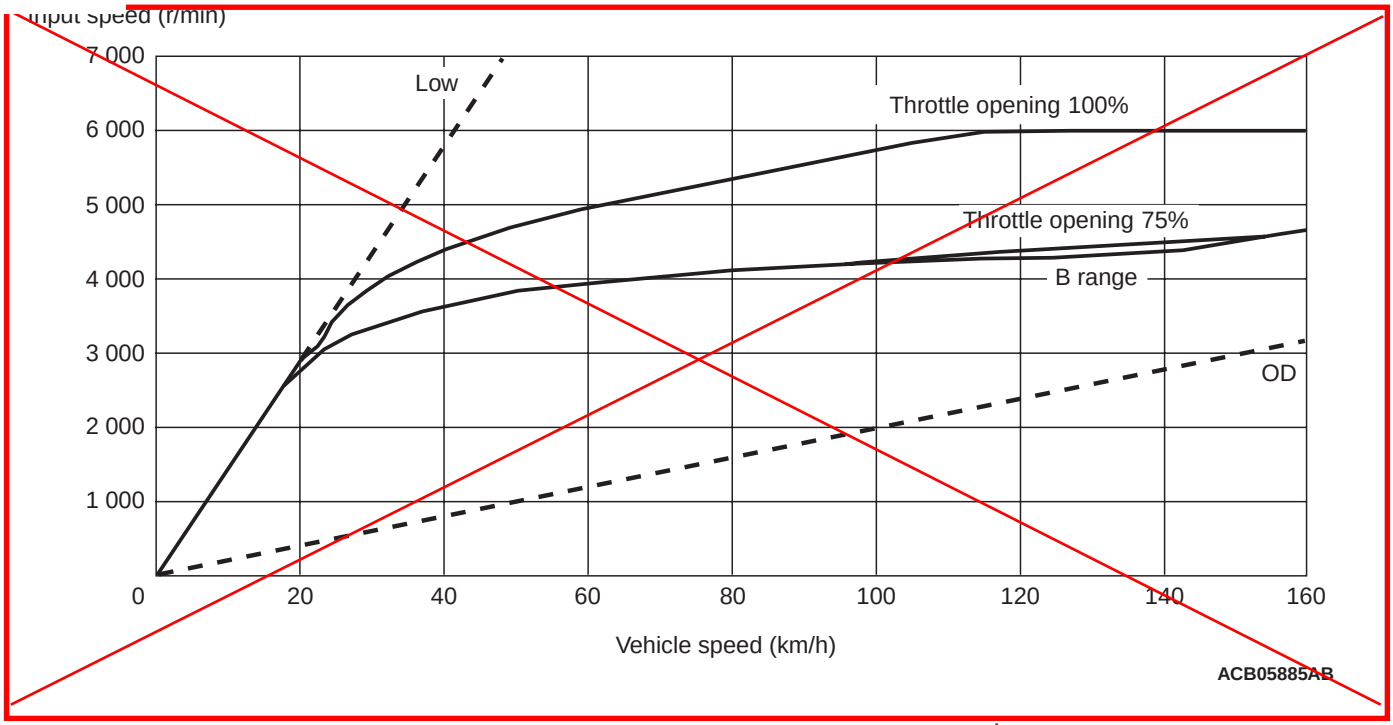
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<D RANGE>



<B RANGE>

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From attached sheet 10 (3/3)

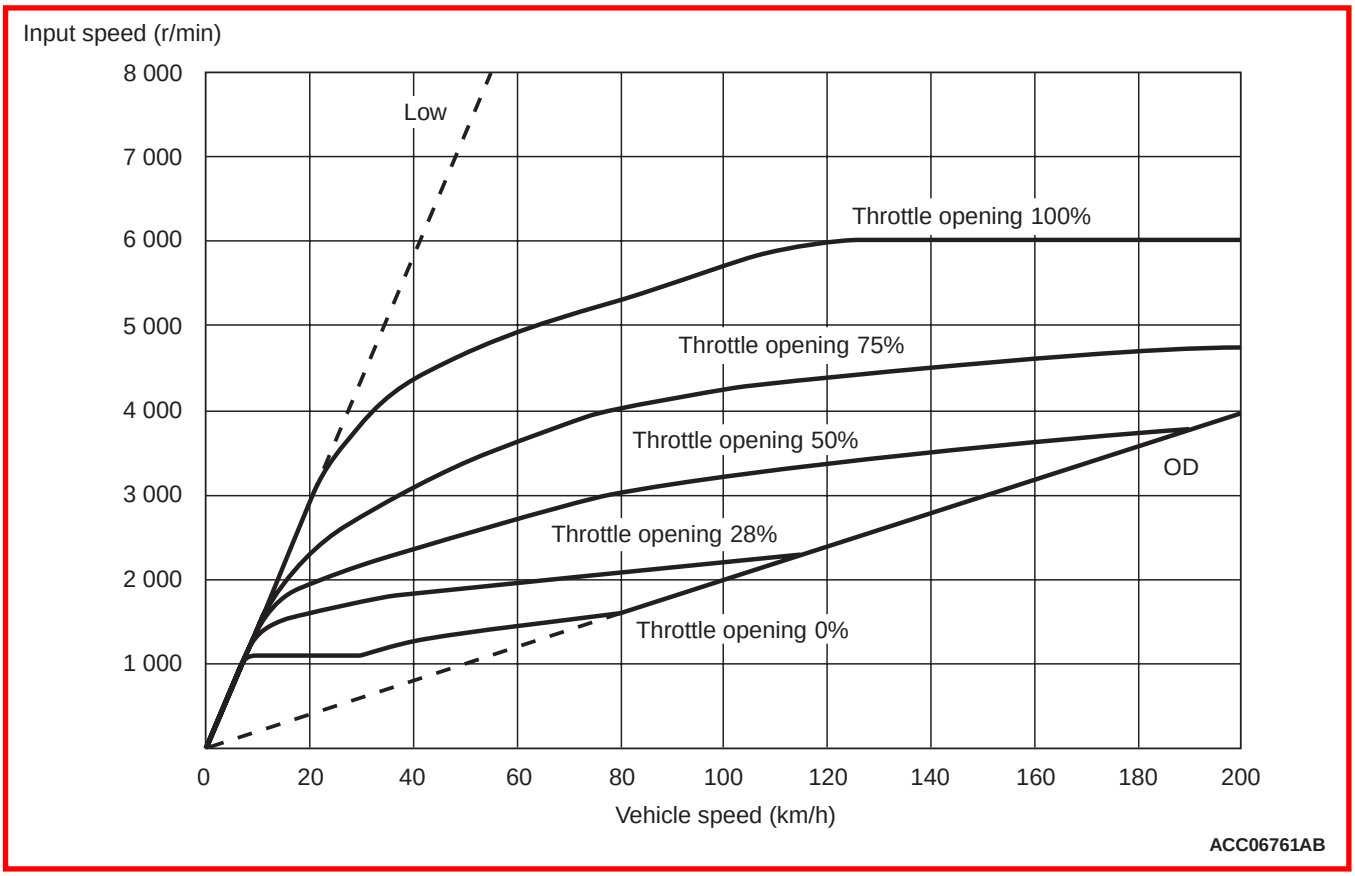
Attached sheet 10 (2/3)

RATIO PATTERN

M1231202600714

<D RANGE>

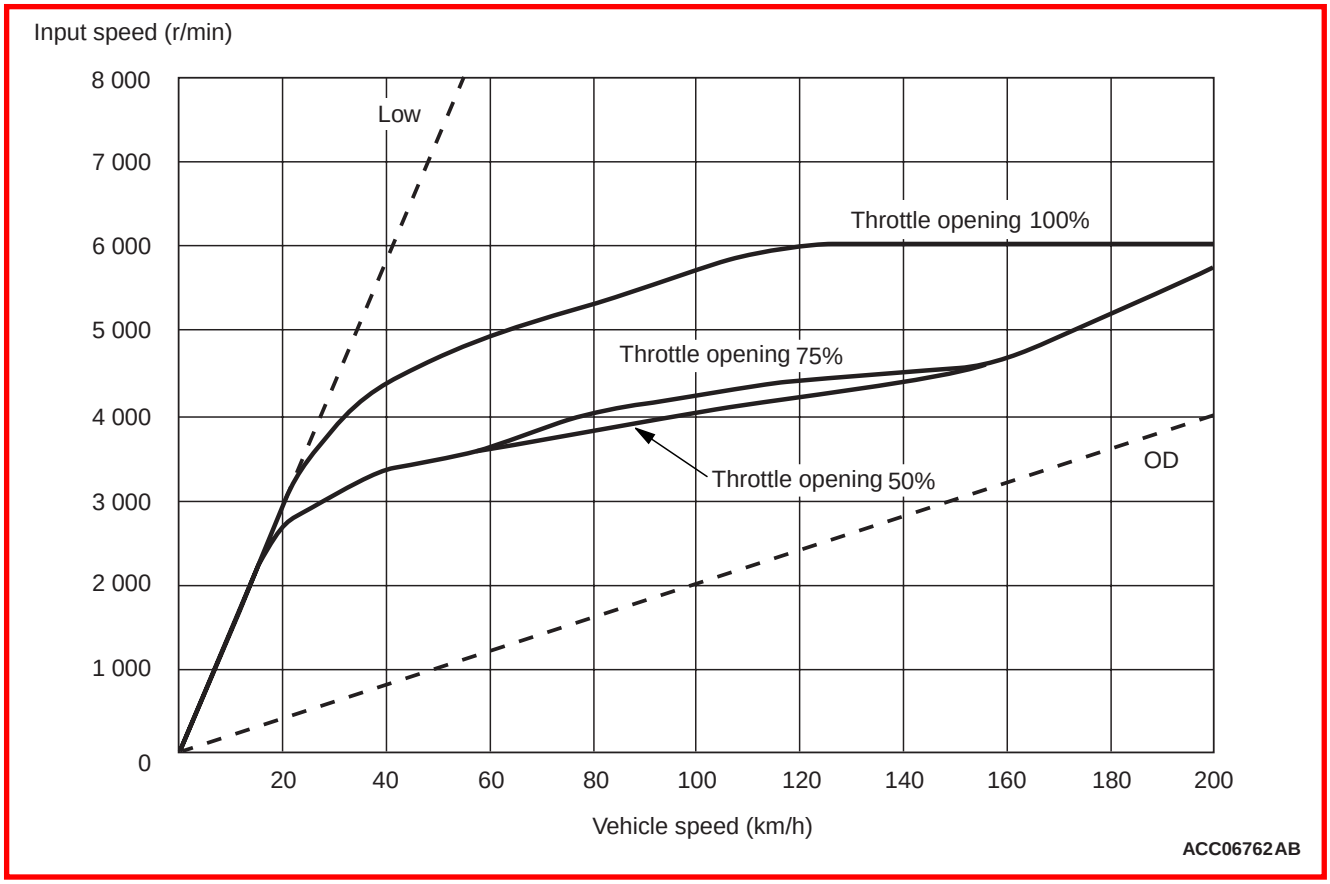
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Attached sheet 10 (3/3)

<B RANGE>

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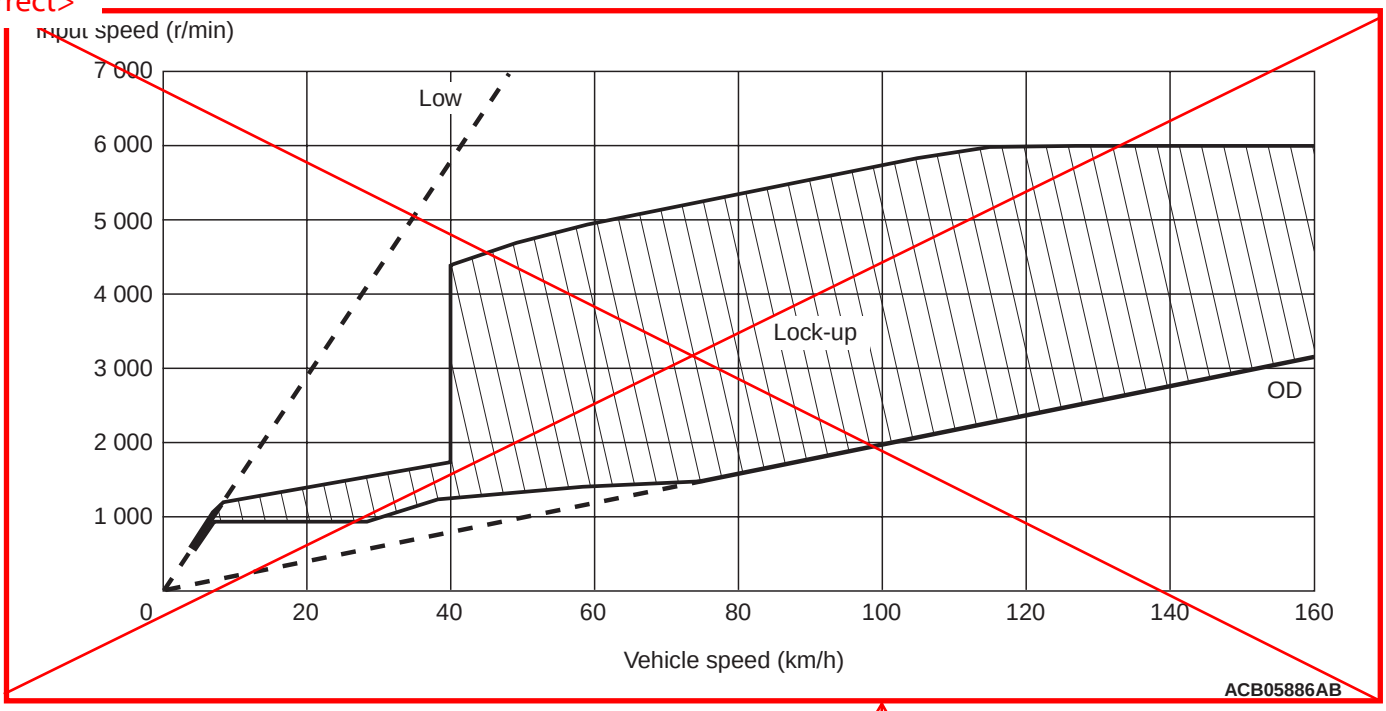


Attached sheet 11 (1/2)

DAMPER CLUTCH OPERATION ZONE

M1231204100500

<Incorrect>



DIAGNOSIS CODE CHART

M1231207900851

<Correct> From attached sheet 11 (2/2)

⚠ CAUTION

During diagnosis, a diagnosis code associated with other system may be set when the ignition switch is turned on with connector(s) disconnected. On completion, confirm all systems for diagnosis code(s). If diagnosis code(s) are set, erase them all.

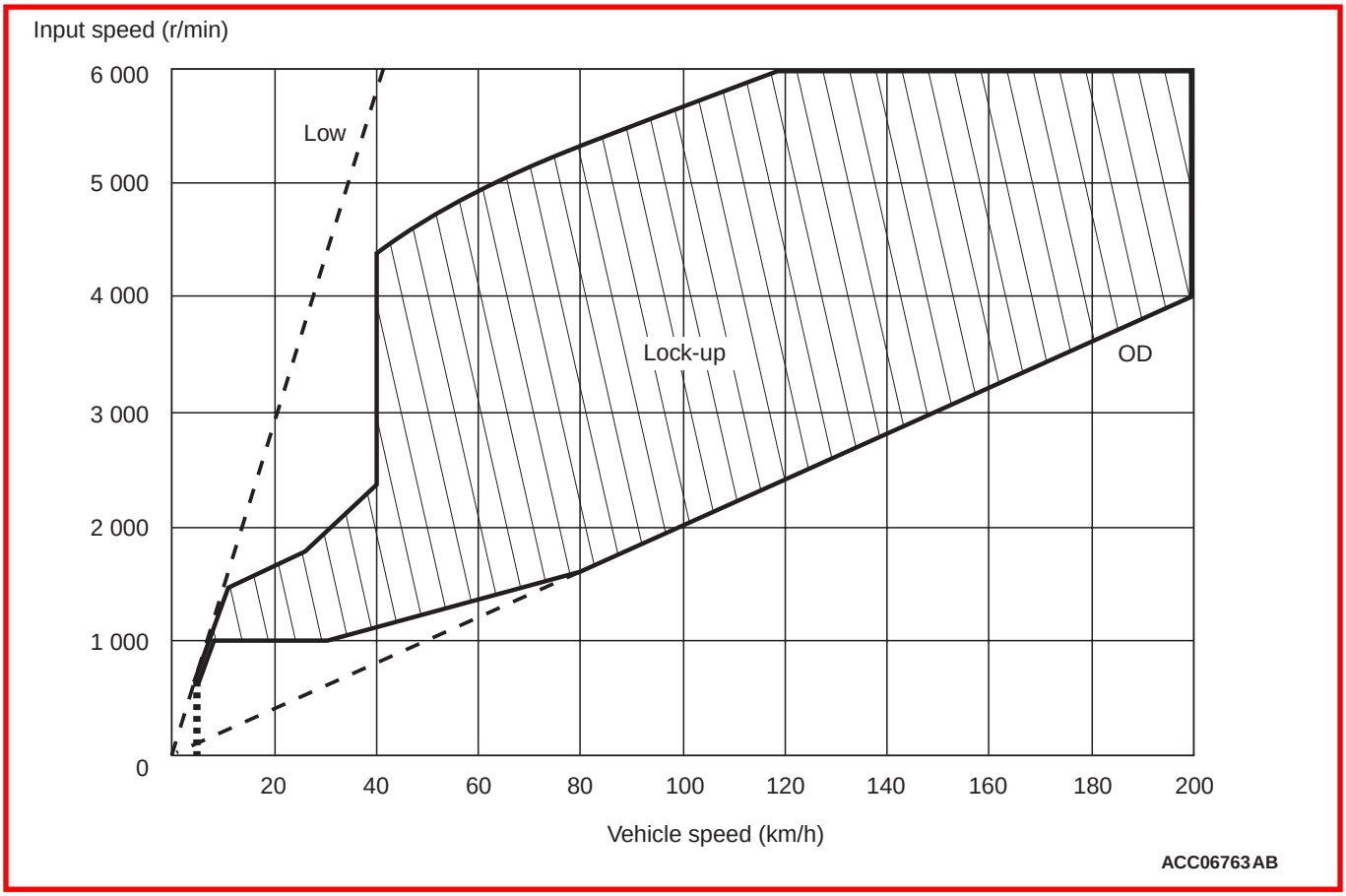
Diagnosis code No.	Diagnostic item	Reference page
P0705	Malfunction of inhibitor switch	
P0712	Malfunction of the CVT fluid temperature sensor (low input)	
P0713	Malfunction of the CVT fluid temperature sensor (high input)	
P0715	Malfunction of primary pulley speed sensor	
P0720	Malfunction of output speed sensor	
P0741	Abnormality in lockup function	
P0746	Abnormality in hydraulic control system function	
P0791	Malfunction of secondary pulley speed sensor	
P0796	Abnormality in primary pressure solenoid valve function	
P0841	Abnormality in secondary pressure sensor function	
P0842	Malfunction of the secondary pressure sensor (low voltage)	
P0843	Malfunction of the secondary pressure sensor (high voltage)	
P0962	Malfunction of the line pressure solenoid valve (low input)	

Attached sheet 11 (2/2)

DAMPER CLUTCH OPERATION ZONE

M1231204100588

<Correct>



Attached sheet 12 (1/2)

Trouble symptom		Possible cause No.	
		(A)	(B)
Poor driveability	Driving off is impossible due to too high engine speed at the R, D or B range.	1, 2, 3, 4, 5, 6, 7, 8, 12, 14, 15, 17, 18, 20, 21 (at D or B range), 23 (at R range), 25, 26, 27, 28	10, 16
	Driving off is impossible as then engine stalls at the R, D or B range.	4, 5, 6, 7, 8, 10, 11, 12, 17, 24, 25, 26, 27, 28, 29	16
	Poor acceleration at the R, D or B range.	1, 5, 7, 8, 9, 11, 12, 14, 15, 16, 17, 19, 21 (at D or B range), 23 (at R range)	3, 6, 10, 13
	The engine speed rises suddenly while the vehicle is being driven at the R, D or B range.	2, 3, 11, 12, 14, 15, 17, [illegible] D or B range), 23 (at D or B range), 23 (at R range)	10
	Engine braking becomes effective suddenly while the vehicle is being driven at the R or D range.	[illegible], 11, 12, 14, 15, 17, [illegible] D or B range), 23 (at D or B range), 23 (at R range)	–
Shifting fault	~~Secondary shift mechanism~~ slips when the transmission is shifted from 1st to 2nd gear range (engine revving).	3, 12, 14, 17, 18, 21, 22	1
	Engine braking does not become effective at the B range.	3, 4, 5, 6, 7, 8, 12, 13, 15, 17, 19, 21, 22	11, 18, 20
	The engine stalls immediately before the vehicle decelerates and then stops completely at the D or B range.	9, 13, 17, 19	–
	The torque converter is not locked-up due to slips while the vehicle is being driven at the D range.	5, 6, 7, 8, 9, 11, 12, 13, 16, 17, 19	10, ~~18, 20~~

<Incorrect>
<Correct> 22 → ~~23~~
<Incorrect>
<Correct> 22 → ~~23~~
<Incorrect>
Auxiliary gearbox <Correct>
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Attached sheet 12 (2/2)

Trouble symptom		Possible cause No.	
		(A)	(B)
Shift shock/ vibration/ abnormal noise	Harsh shock occurs during driving off at R, D or B range.	3, 12, 13, 17, 20, 21 (at D or B range), 23 (at R range)	10, 25, 26, 27, 28
	Harsh shift change occurs when the transmission is shifted from 1st to 2nd gear.	3, 14, 15, 17, 21, 22	1, 5
	Harsh shift shock during locking up while the vehicle is being driven at the D or B range.	5, 13, 17, 19	–
	Harsh shift shock during shifting from N to D, N to R range.	1, 3, 6, 7, 8, 12, 13, 14, 15, 16, 17, 21 (at N → D), 23 (at N → R)	5
	Harsh shift shock during shifting from D to B range while the vehicle is being driven.	15, 17, 21, 22	–
	Vibration occurs while the vehicle is being driven at the R, D or B range.	1, 2, 3, 5, 9, 13, 14, 15, 17, 18, 19, 20, D or B range), 23 (at D or B range), 23 (at R range), 24, 25, 26, 27, 28	10
	Abnormal noise occurs while the vehicle is being driven.	2, 17, 18, 20, 24, 25, 26, 27, 28	–
	Abnormal noise occurs while the engine is idling.	1, 2, 17, 18, 20, 24, 25, 26	–
Others	The starter operates at the R, D or B range.	4, 5, 6	–
	The engine stalls while the vehicle is driven at the R, D or B range.	1, 5, 9, 13, 17, 19	–
	The starter does not operate at the R or N range.	4, 5, 6	–
	The parking mechanism does not operate at the P range.	4, 6, 29	–
	The parking mechanism cannot be released when shifting from the P range to another range.	4, 6, 29	–
	The engine can be started while the vehicle is stationary at the P or R range.	1, 5, 9, 10, 13	–

<Incorrect> <Correct> 22 <Deleted> <Incorrect> stopped <Correct> <Incorrect> <Deleted> P <Correct> <Incorrect> <Correct> N

Attached sheet 13 (1/2)

Terminal No.	Terminal code	Check item	Check conditions	Standard value
19	ROM3	ROM assembly (DATA I/O)	–	–
20	INHL	Inhibitor switch B	• Ignition switch: ON • Selector lever position: B	System voltage
			• Ignition switch: ON • Selector lever position: Other than B	1 V or less
25	IGSW	Power supply	Ignition switch: ON	System voltage
			Ignition switch: OFF	1 V or less
26	GND2	Earth	Always	1 V or less
31	BATT	Power supply	Ignition switch: ON	System voltage
			Ignition switch: OFF	1 V or less
32	OUTS	Output speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h • Use an oscilloscope to measure the voltage between the terminals No. 32 and No. 43.	Approx. 230 Hz Oscilloscope inspection procedure (Refer to .)
33	PRMS	Primary pulley speed sensor	• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear) • Use an oscilloscope to measure the voltage between the terminals No. 33 and No. 43.	Approx. 1 100 Hz Oscilloscope inspection procedure (Refer to .)
			• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear) • Use an oscilloscope to measure the voltage between the terminals No. 33 and No. 43.	Approx. 900 Hz Oscilloscope inspection procedure (Refer to .)
34	SECS	Secondary pulley speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear) • Use an oscilloscope to measure the voltage between the terminals No. 34 and No. 43.	Approx. 730 Hz Oscilloscope inspection procedure (Refer to .)
			• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear) • Use an oscilloscope to measure the voltage between the terminals No. 34 and No. 43.	Approx. 400 Hz Oscilloscope inspection procedure (Refer to .)
37	LPRS	Secondary pressure sensor	• Engine: Idling (after warming up) • Selector lever position: N	0.88 – 0.92 V

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Always
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Attached sheet 13 (2/2)

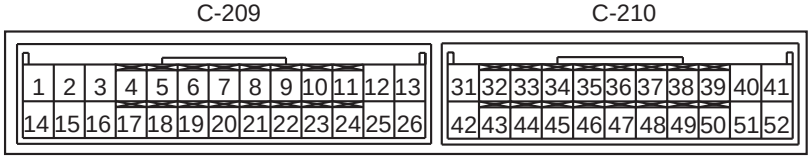
Terminal No.	Terminal code	Check item	Check conditions		Standard value
38	SPWR	CVT fluid temperature sensor	Ignition switch: ON	CVT fluid temperature: 20°C	2.01 – 2.05 V
				CVT fluid temperature: 50°C	1.45 – 1.50 V
				CVT fluid temperature: 80°C	0.90 – 0.94 V
39	GSNR	G-sensor	• Ignition switch: ON • When the vehicle is parked on a level surface.		Approx. 2.5 V
40	SPW2	Power supply (G-sensor)	Ignition switch: ON		Approx. 5 V
			Ignition switch: OFF		1 V or less
41	HRLS	High clutch and reverse brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear)		Oscilloscope inspection procedure (Refer to .)
42	BAT2	Power supply	Ignition switch: ON		System voltage
			Ignition switch: OFF		1 V or less
43	SGN2	Sensor earth	Always		1 V or less
49	SGND	Sensor earth	Always		1 V or less
50	SGN3	Sensor earth (G-sensor)	Always		1 V or less
51	SSPW	Power supply (sensor)	Ignition switch: ON		Approx. 5 V
			Ignition switch: OFF		1 V or less
52	LULS	Lockup solenoid valve	Driving conditions	Lockup engaged	Oscilloscope inspection procedure (Refer to .)

<Incorrect>
<Correct> 60km/h
<Incorrect>
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OSCILLOSCOPE INSPECTION PROCEDURES

M1231208500395

-



ACB05799AB

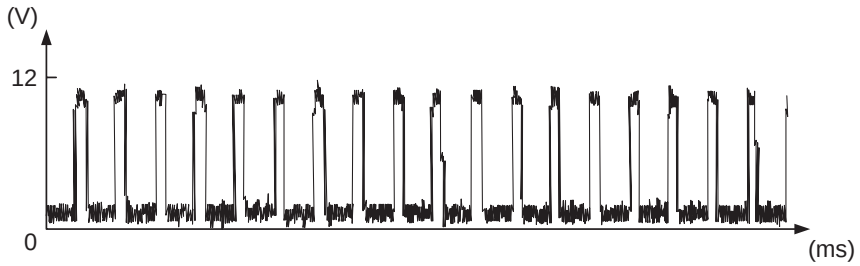
Attached sheet 14

Terminal No.	Terminal code	Check item	Check conditions	Wave patterns
1	PLLS	Line pressure solenoid valve	• Engine: Idling • Selector lever position: P	Waveform A
2	PRLS	Primary pressure solenoid valve		
3	LBLS	Low brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear)	
41	HRLS	High clutch and reverse brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 2nd gear)	
52	LULS	Lockup solenoid valve	• Driving conditions • Lockup engaged	
32	OUTS	Output speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h	Waveform B
33	PRMS	Primary pulley speed sensor	• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	
			• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	
34	SECS	Secondary pulley speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	
			• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	

<Incorrect>
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60km/h
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auxiliary gearbox
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auxiliary gearbox
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auxiliary gearbox
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auxiliary gearbox

WAVEFORM SAMPLE

Waveform A



ACB04315AB

Attached sheet 15

Trouble symptom		Possible cause No.	
		(A)	(B)
Others	The starter can operate at the R, D, Ds or L range.	4, 6	–
	The engine stalls while the vehicle is stopped at the R, D, D<Incorrect>	1, 5, 10, 14, 18, 20	–
	The starter cannot operate at the R or N range.	4, 6 P <Correct>	22, 23
	The parking mechanism does not operate at the P range.	4, 6, 30	–
	The parking mechanism cannot be released when shifting from the P range to another range.	4, 6, 30	–
	The engir <Incorrect> the vehicle is stationary at the P or R range. N <Correct>	1, 5, 10, 11, 14	22, 23

Possible cause chart

Possible cause No.	Probable cause	Remedy
1	Malfunction of the engine system	Check the engine system, and repair or replace if necessary.
2	Improper CVT fluid level	Check the CVT fluid, and repair or replace if necessary.
3	Not within the standard value of the line pressure	Check the hydraulic system, and repair or replace if necessary.
4	Malfunction of transmission control cable	Check the transmission control cable, and repair or replace if necessary.

Attached sheet 16

Terminal No.	Terminal code	Check item	Check conditions	Wave patterns
1	PLLS	Line pressure solenoid valve	• Engine: Idling • Selector lever position: P	Waveform A
2	PRLS	Primary pressure solenoid valve		
3	LBLS	Low brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (auxiliary gearbox: at 1st gear)	
41	HRLS	High clutch and reverse brake solenoid valve	• Selector lever position: D • Drive at a constant speed of approx. 60 km/h (auxiliary gearbox: at 2nd gear)	
52	LULS	Lockup solenoid valve	• Driving conditions • Lockup engaged	
32	OUTS	Output speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h	Waveform B
33	PRMS	Primary pulley speed sensor	• Selector lever position: L • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	<Incorrect> <Correct> auxiliary gearbox
			• Selector lever position: L • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	<Incorrect> <Correct> auxiliary gearbox
34	SECS	Secondary pulley speed sensor	• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	<Incorrect> <Correct> auxiliary gearbox
			• Selector lever position: D • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	<Incorrect> <Correct> auxiliary gearbox
44	EOPI	Electric oil pump input <Vehicles with AS&G system>	While electric oil pump relay ON	
45	EOPO	Electric oil pump output <Vehicles with AS&G system>	Ignition switch: ON	

Attached sheet 17

Trouble symptom		Possible cause No.	
		(A)	(B)
Shift shock/ vibration/ abnormal noise	Harsh shock occurs during driving off at R, D or B range.	3, 12, 13, 17, 20, 21 (at D or B range), 23 (at R range)	10, 25, 26, 27, 28
	The shift shock is large when auxiliary gearbox shifting from 1st to 2nd.	3, 14, 15, 17, 21, 22	1, 5
	The torque converter lock-up shock is large while the vehicle is being driven at the D or B range.	5, 13, 17, 19	–
	The select shock is large when the selector lever position is shifted from "N" to "D", and "N" to "R".	1, 3, 6, 7, 8, 12, 13, 14, 15, 16, 17, 21 (at N → D), 23 (at N → R)	5
	Harsh shift shock during shifting from D to B range while the vehicle is being driven.	15, 17, 21, 22	–
	Vibration occurs while the vehicle is being driven at the R, D or B range.	1, 2, 3, 5, 9, 13, 14, 15, 17, 18, 19, 20, 21 (at D or B range), 22 (at D or B range), 23 (at R range), 24, 25, 26, 27, 28	10
	Abnormal noise occurs while the vehicle is being driven.	2, 17, 18, 20, 24, 25, 26, 27, 28	–
	Abnormal noise occurs while the engine is idling.	1, 2, 17, 18, 20, 24, 25, 26	–
Others	The starter can operate at the R, D or B range.	4, 6	–
	The engine stalls while the vehicle is stopped at the R, D or P range.	1, 5, 9, 13, 17, 19	–
	The starter cannot operate at the P or N range.	4, 6	21, 22
	The parking mechanism does not operate at the P range.	4, 6, 29	–
	The parking mechanism cannot be released when shifting from the P range to another range.	4, 6, 29	–
	The engine can be started while the vehicle is stationary at the P or R range.	1, 5, 9, 10, 13	21, 22

<Incorrect> R <Correct> P

<Incorrect> <Correct> N

Attached sheet 18

OSCILLOSCOPE INSPECTION PROCEDURES

M1231208500425

Terminal No.	Terminal code	Check item	Check conditions	Wave patterns
33	PRMS	Primary pulley speed sensor	• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 1st gear)	Waveform B
			• Selector lever position: B • Drive at a constant speed of approx. 20 km/h (secondary shift mechanism: at 2nd gear)	

<Incorrect> <Correct> auxiliary gearbox

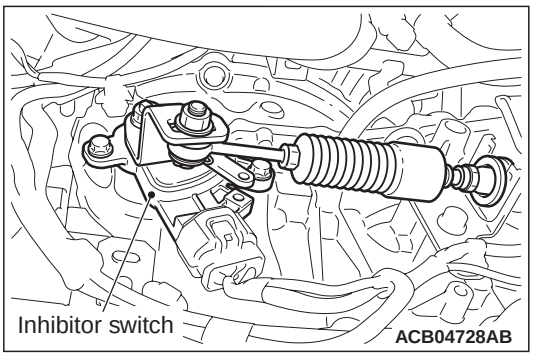
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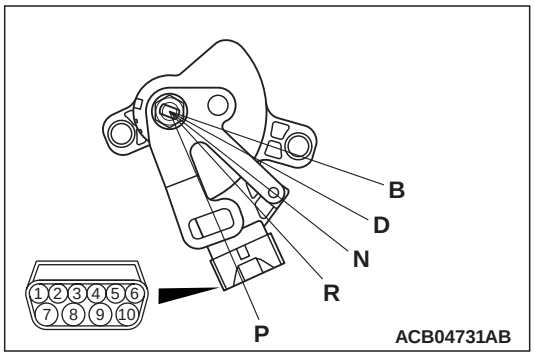
ON-VEHICLE SERVICE

ESSENTIAL SERVICE

INHIBITOR SWITCH CONTINUITY CHECK

M1231201400535





Item	Terminal number	Resistance value
P	3 – 2, 7 – 10	Continuity exists (2 Ω or less).
	Other than above	No continuity

Item	Terminal number	Resistance value
R	3 – 9	Continuity exists (2 Ω or less).
	Other than above	No continuity
N	3 – 8, 7 – 10	Continuity exists (2 Ω or less).
	Other than above	No continuity
D	3 – 5	Continuity exists (2 Ω or less).
	Other than above	No continuity
B	3 – 1	Continuity exists (2 Ω or less).
	Other than above	No continuity

HYDRAULIC PRESSURE TEST

M1231205500608

⚠ CAUTION

This test must be performed with the CVT fluid temperature within the range of 70 to 80°C.

1. Check the engine oil level, and add if necessary.
2. Warm up the engine, and then perform test drive for approx. ten minutes.
3. Check the CVT fluid for leaks, level and contamination. Then top up or change if necessary.
4. Operate the parking brake securely, and then chock the wheels.
5. Connect the M.U.T.-III, and then start the engine.