ELECTRICAL SYSTEM TROUBLESHOOTING

8FG(D)U15-32, 8FGCU20-32

Service Manual Change History

	Description	Page #	Date
1	Revised error code for change in terminal esignation on seat switch from X1-1, X1-2 to 05-	19-111	12/15/09
2	Page not required foerror code A5-1 and turned into memo page	19-112	12/15/09
3	Added bookmarks	all	3/31/13
4	Added SIB CE07-008	197	3/31/13
5	Added SIB CE08-005	195, 196	3/31/13
6	Added SIB CE09-004	199	3/31/13
7	Added SIB CE10-005	198	3/31/13

Service Information Buletin

1	SIB CC08-005	4Y ECS Controller Programming Change	Chapter 19
2	SIB CE07-008	Error Code AD-1 and AD-7	Chapter 19
3	SIB CE09-004	A5, A5-1 or 1-1 Error Codes For OPSS	Chapter 19
4	SIB CE10-003	Horn Relocation	Chapter E2
5	SIB CE10-005	Main Wiring Harness Change (Error Code 73-1)	Chapter 19
6	SIB CE11-001R	Clamp Release Interlock (Mini Lever Units)	Chapter 19, 14, E3
7	SIB CE11-003	Clamp Release Interlock (Standard Lever Units)	Chapter 14, E3
8	SIB EN07-001	4Y Engine Ignition Timing Procedure	Chapter 1.3-10
9	SIB EN08-001	Repair Manual (00700-X8880-71) Revision	Embedded
10	SIB EN08-002	Repair Manual (00700-X8880-71) Revision	Embedded
11	SIB EN09-001	Repair Manual (00700-X8880-71) Revision	Embedded
12	SIB EN09-002	Repair Manual (00700-X8880-71) Revision	Embedded
13	SIB EN10-001	Engine Block Heaters	Chapter 1.2-4
14	SIB FS08-001	LPG Regulator	Chapter 1.3-2
15	SIB HS07-003	Flow Regulator Replacement Parts	Chapter 14
16	SIB MA07-001	Hourmeter Fuse Installation	Chapter 0
17	SIB MA07-003	Transmission Oil Level Inspection	Chapter 2 & 2.1
18	SIB MA07-004R	Grease Specifications	Chapter 0
19	SIB MA10-001	Overhead Guard Mounting Bolt Torque	Chapter 9
20	SIB MA10-007	Oil Pressure Switch	Chpater 0 & E3
21	SIB MA11-001	Service Hint For Greasing Rear Axle Beam Pivot Pin	Chapter 0
22	SIB MA13-001	Exhaust Mounting Clamp with Rubber Bushing Inspection	Chapter 0
23	SIB RA08-001	Updated Horn Pad	Chapter 7
24	SIB ST07-001	Special Service Tools	Chapter 17
25	SIB TR07-001	Transmission Control Valve Identification	Chapter 2 & 2.1
26	SIB TR07-002	Propeller Shaft Cover	Chapter 2 & 2.1

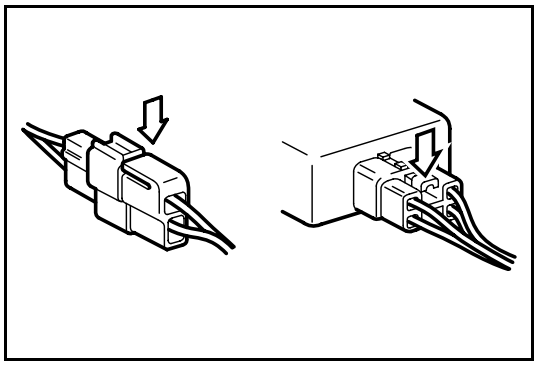
Technical News Brief

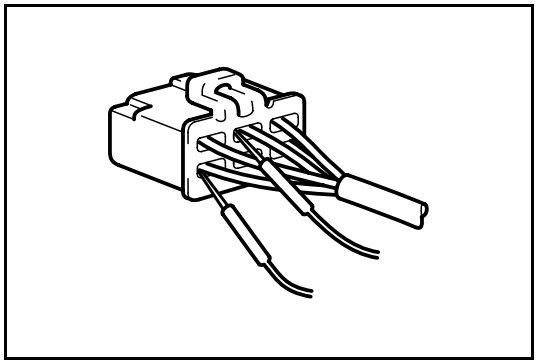
1	TNB 2007-03R1	Hydraulic Oil Change
2	TNB 2007-05	Transmission Knocking Noise At Idle
3	TNB 2007-06	LPG Regualtor Slow Path Tamper Resistant Cap
4	TNB 2007-11	Torque Specificaion Of Outer Mast Support Bolts
5	TNB 2008-07	Fuel Mixture Adjustment Procedure For The 4Y ECS Engine
6	TNB 2008-20	Gasoline Fuel System
7	TNB 2008-12	Installation of Fuel Line Fittings
8	TNB 2009-03	Suppliment to TNB 2008-07 For Adjusting VF (Voltage Fuel)

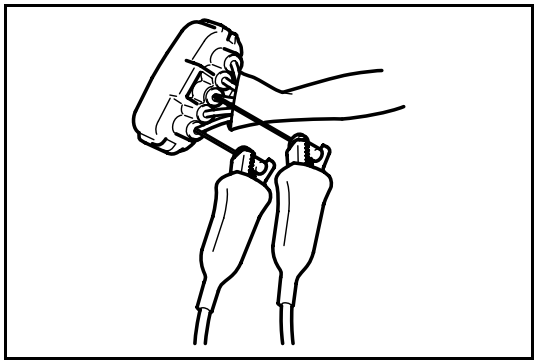
Hotline Tech Tips

1	HTT 2007-02	Transmission Control Valve Identification; Proper Chasis Lubrication
2	HTT 2007-03	Idle Surge/Hunt; Quick Facts; Rotten Egg/Ammonia Smell
3	HTT 2007-04	Limiting Travel Speed; A5-1 Code
4	HTT 2007-05	LPG Regulator Adjustment; Engine/Transmission "Knocking" Complaint
5	HTT 2007-06	Troubleshooting Diesel Smoke; Multifunction Display
6	HTT 2007-07	LPG Regulator Maintenance
7	HTT 2007-08	Engine Surge
8	HTT 2007-09	Propshaft Cover
9	HTT 2007-10	Error Code 68-3; Flow Regulator Valve Parts Replacement
10	HTT 2007-11	Wet Brake Option Hydraulic Oil; Error Code AD-1 And AD-7

11	HTT 2007-12	Horn Pad Improvements; Correct Timing Mark On Crank Pulley
12	HTT 2008-01	"L-OFF" Complaint
13	HTT 2008-02	Error Code List; Rear Pillar Assist Relay Location; New Cab
14	HTT 2008-03	Carriage Roller Replacement
15	HTT 2008-04	Fuel Shut Off Valve Orientation On Gasoline And Dual Fuel Trucks
16	HTT 2008-05	Driveability Issues Due To Dirty Throttle Body
17	HTT 2008-06	Shift Interlock (Intelli-Shift) Adjustments; Overheat Trouble Shooting
18	HTT 2008-07	LPG Tamper Resistant Cap
19	HTT 2008-08	Cam Positions Sensor
20	HTT 2008-09	SAS Matching; Transmission Repair
21	HTT 2008-10	Seatbelt Interlock; Function Menu w/ Travel & Load Handling Option; Gas Tank Pressure
22	HTT 2008-11	Accelerator Sensor Codes; LPG Filter Kit Service Parts
23	HTT 2008-12	CNG Trucks Using The Analyzer; Extra Long Feeler Gauges for Mast Shimming Checks
24	HTT 2009-01	Error Code 73-1, Or Missing Plug On New Harness
25	HTT 2009-03	Load Sensor Wire Breakage; Dual Brake Pedal "Low Pedal" Complaint
26	HTT 2009-06	Error Code OB-1
27	HTT 2009-07	Horn Pad Improvements; Flow Regulator Update; Overheat Diagnostics
28	HTT 2009-08	Engine Controller Version Identification
29	HTT 2009-09	Identifying LPG Regulator 1st Valve Material; High Engine Idle Issues
30	HTT 2009-10	Using the Engine Analyzer To Check The Engine Function
31	HTT 2009-11	Error Codes Without An Hour Meter Reading; LPG Filter Kit PN
32	HTT 2010-01	Reverse Polarity Damage Issues
33	HTT 2010-02	Ignition Timing Value (IGT) Shown On Analyzer
34	HTT 2010-03	Error Code 06-3; Error Code 01-5
35	HTT 2010-04	To Throttle Valve Actuation And Error Code 06-3 E-THRO Fuse Location
36	HTT 2010-05	Error Code AD-7 After Replacing The Main Harness
37	HTT 2010-06	SAS Manual Lowering Valve Location; Flow Regulator W/ Part Numbers
38	HTT 2010-07	SAS Code History Check Without The Analyzer
39	HTT 2010-08	Clearing 01-1, 01-2, 01-3, 01-4, 01-5, 01-6 Codes After Making The Repair
40	HTT 2010-09	Error Code 73-1 After Replacing The Main Harness
41	HTT 2010-10	Hour Meter Diagnostics & Memory
42	HTT 2010-11	Diagnosing Diesel Smoke
43	HTT 2010-12	LPG Regulator Adjustment & Tar Draining: Idle Speed Adjustment
44	HTT 2011-01	How To Read An O2 Sensor
45	HTT 2011-02	Required Adjustments For New LP Regulator, And Installation Of Anti-Tamper Caps
46	HTT 2011-03	Engine Analyzer Screen 1/10; Throttle Body Cleaning
47	HTT 2011-04	Engine Analyzer Screen 2/10; Analyzer Speed Versus Displayed Speed
48	HTT 2011-05	Engine Analyzer Screen 3/10
49	HTT 2011-06	Engine Analyzer Screen 4/10
50	HTT 2011-07	Engine Analyzer Screen 5/10
51	HTT 2011-08	Engine Analyzer Screen 6/10
52	HTT 2011-09	Engine Analyzer Screen 7/10
53	HTT 2011-10	Engine Analyzer Screen 8/10
54	HTT 2011-11	Engine Analyzer Screen 9/10
55	HTT 2011-12	Engine Analyzer Screen 10/10
56	HTT 2012-01	Error Code 09-1; LPG Filter Kit; Cold Soak Lack Of Travel







BEFORE TROUBLESHOOTING

CONNECTOR HANDLING

1. Disconnect the battery plug before connecting or disconnecting each connector or terminal.
2. When disconnecting a connector, do not pull the wire harness but hold the connector itself and pull it after unlocking it.
   To connect, push the connector fully until it is locked in position.
3. Bring a tester probe into contact with a connector terminal from the rear side of the connector (harness side).
4. If insertion from the rear side is impossible, as in the case of a waterproof connector, bring the tester probe carefully into contact with the terminal so as not to cause deformation of the connector terminal.
5. Do not touch connector terminals directly with your hand.
6. When bringing tester probes into contact with terminals that voltage is applied to prevent two tester probes from coming into contact with each other.

WIRE HARNESS AND CONNECTOR INSPECTION PROCEDURE

When any trouble occurs, first inspect the connectors and wire harness of the related circuit according to the following procedure:

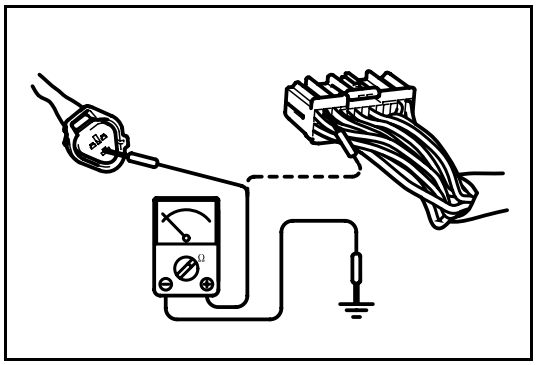
Continuity Inspection

1. Disconnect the connectors at both ends of the corresponding harness.
2. Measure the resistance between corresponding terminals of the connectors at both ends.

   Standard: 10 Ω or less

Note:

- **Measure while jiggling the wire harness up and down and sideways.**
- **Open circuit at the wire harness occurs rarely partway through a vehicle wiring but mostly at connectors. Inspect especially the sensor connectors with sufficient care.**

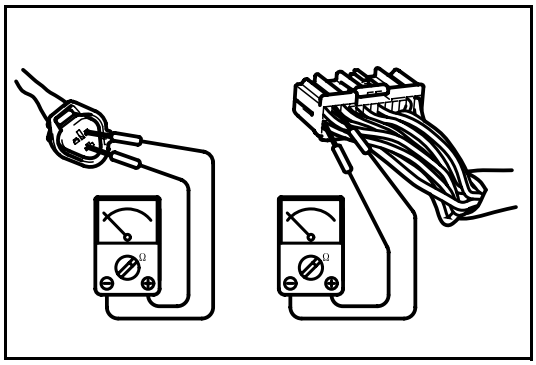


Short Circuit Check

1. Disconnect the connectors at both ends of the corresponding harness.
2. Measure the resistance between the corresponding connector terminal and frame. Be sure to inspect the connectors at both ends.

   Standard: 1 MΩ or above

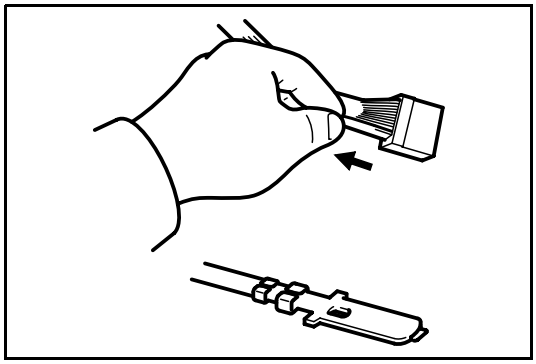
Note:
Measure while jiggling the wire harness up and down and sideways.



3. Measure the resistance between terminals of the corresponding connector. Be sure to inspect the connectors at both ends.

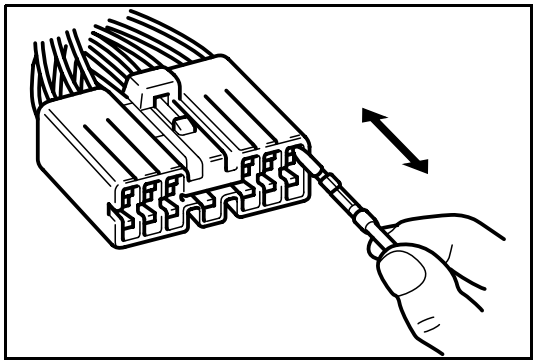
   Standard: 1 MΩ or above

Note:
The wiring may short-circuit due to pinching by the body or defective clamping.



Visual and Contact Pressure Checks

1. Disconnect the connectors at both ends of the corresponding harness.
2. Visually inspect that there is neither rust nor foreign matter trapped at connector terminals.
3. Inspect that there is no looseness or damage at the crimped portion. Also, lightly pull the wire harness from the connector to check that it does not come off.



4. Insert a male terminal same as that of the connector terminal to a female connector and check the drawing force.
   Defective contact may exist at a terminal where the drawing force is less than that of other terminals.

Note:
Even if there is rust or foreign matter trapped at the terminal, or the contact pressure between male and female terminals is low, abnormal contact condition may be changed to normal by disconnecting and reconnecting the connector. In this case, disconnect and reconnect the connector several times, and if a fault occurs even once, then consider the terminal may have a defective contact.

TROUBLESHOOTING

BEFORE BEGINNING TROUBLESHOOTING FOR THE 4Y-E ENGINE

It is extremely risky to begin troubleshooting for the 4Y engine on the basis of results only. It can lead to mistaken corrective action, wasted time, and sometimes to an increase in abnormalities. Therefore, ask the customer about detailed information on conditions around the time a problem occurred, based on the following.

Diagnostic Procedure

First, it is necessary to be informed of the "fault history and service history" for the vehicle, and then to gather definite information about the fault occurence such as "when", "at what times", "in what places", "during what operations or actions", "what happened afterwards", and “frequency of occurrence”.

Also, try to recreate the conditions for the fault occurence. (a. Recreation impossible b. Recreation possible: in what condition?)

- **General items**

Customer name	Date of delivery	Date fault occurred / hour meter reading
Vehicle model	Frame No.	Engine No. (punched)
Fuel type		
☐ Gasoline ☐ LPG ☐ Gasoline - LPG combination (Note LPG fuel company name:)		

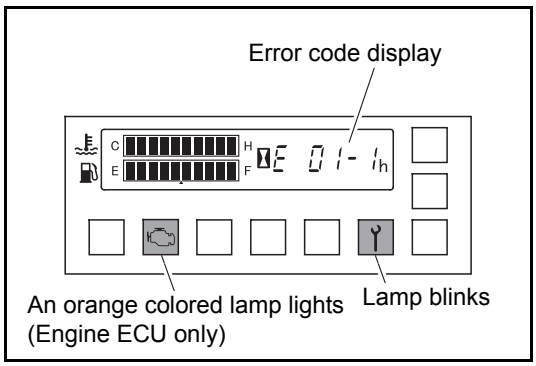
- **Condition of the defect (Tick the items that apply)**

Defect phenomena					
1. Cannot start	a. Does not crank b. Combustion does not start c. Incomplete combustion				
2. Does not start well	Poor cranking (when cold - when warm - at all times)				
3. Poor idle	a. Poor idle speed b. Unstable idle speed c. Hunting (regular fluctuation in speed)				
4. Engine stalling	a. Immediately after start-up (when cold - when warm) b. During deceleration c. After deceleration d. Without sign e. After the engine has been running rough f. When steering g. When handling materials h. Can be re-started immediately				
5. Defect operational status	a. Insufficient power output b. Hesitation c. Surging (swaying forward and backward during acceleration) d. Knocking e. Backfiring f. After firing				
6. Other	a. Excessive fuel consumption b. Excessive oil consumption c. Overheating d. Water or oil leaks e. Abnormal noise f. Other ( )				
Environment at the time of the defect's occurrence					
The time when the fault began to occur	a. Since the vehicle was new b. Recently (from around the following date (month and year):) c. After being serviced				
Frequency of occurence	a. Always b. Under certain conditions c. Sometimes				
Weather	Sunny - cloudy - rain - snow - thunderstorm	Temperature	Approximately °C	Humidity	Approximately %
Temperature conditions	Coolant: a. When cool b. When warm Temperature inside engine room: °C				
Operation conditions	a. No relation b. When idling c. When revving d. When accelerating e. When traveling at constant speed f. When decelerating g. When climbing a slope h. During material handling operations When not loaded (when steering - when lifting - when tilting) When loaded (load: appox. kg) (when steering - when lifting - when tilting) i. Other (when using the inching brake - when steering - other)				
Lamps	a. Lights constantly b. Lights occaisonally c. Does not light				

DIAGNOSIS (SELF DIAGNOSIS FUNCTION)

General

When the computer detects a problem in the system, the fault is indicated by lighting a warning lamp on the combination meter and displaying an error code. And fail-safe functions are started automatically to stop the engine or control the engine to a low speed.



DIAGNOSIS DISPLAY METHOD

1. Diagnosis display method
   The diagnosis is displayed by means of an error code as shown in the illustration to the left, and by the lights turning on. When the ignition key switch is turned ON, the lamp lights once to allow checking for the bulb, and then turns off again if the status is normal.
   With the ignition key switch ON, if an abnormality is detected when the vehicle is stopped, travelling or performing meterials handling operations, an error code is displayed and the lamps turn on as a warning.
   When this happens, stop the vehicle immediately and check the error code.

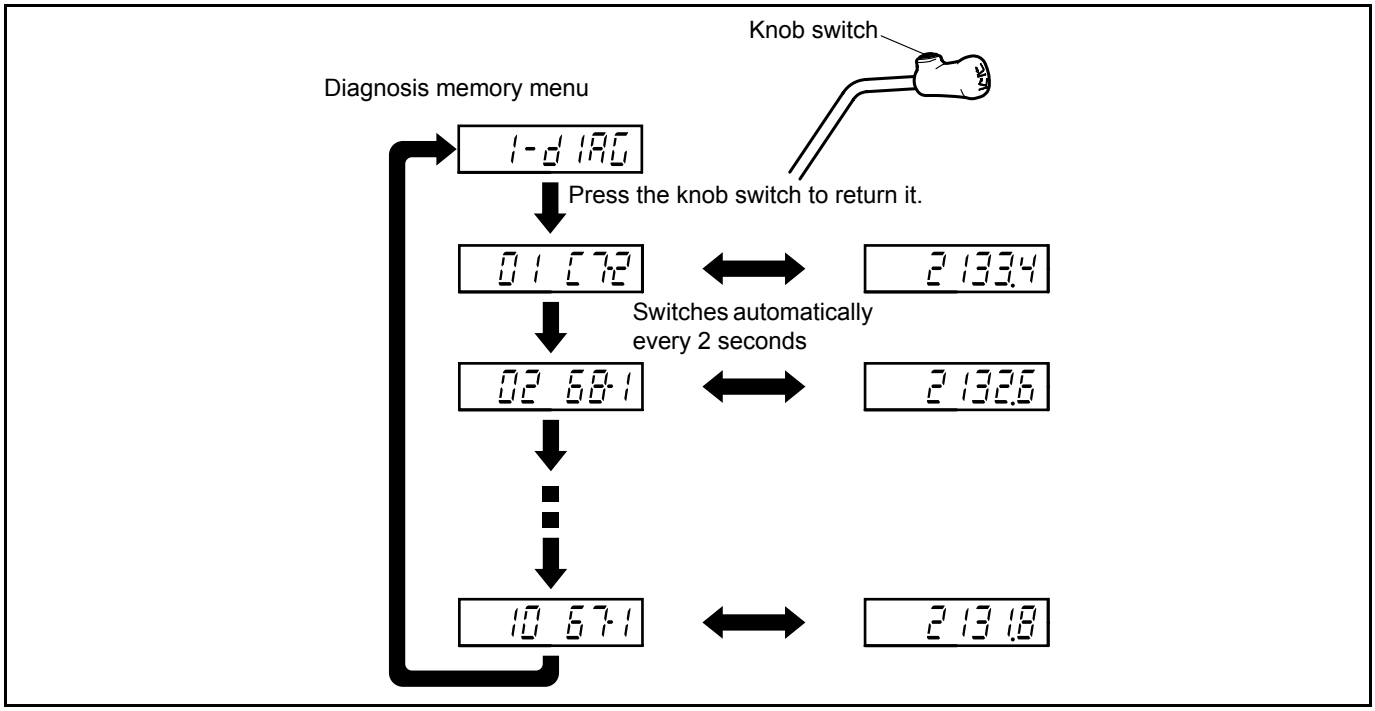
2. Diagnosis memory display method
   To display the diagnosis memory display, there are a method using the hour meter and tilt lever, a method using the optional display, and a method using a plug-in analyzer.
   Here the display method using the hour meter and tilt lever is described.

   (1) From the main menu, display the diagnosis memory menu. For how to display the main menu, refer to page 18-30.

   (2) A diagnosis No. and error code are displayed each time the knob switch is pressed and released. Each error code and the time at which it occurred are displayed alternately at 2 second intervals.

Note:
- **The maximum number of error codes that can be stored is 10. The smaller the diagnosis No., the more recent the error is.**
- **The stored time of an error code appearing just when the ignition key switch is turned ON may be stored as 0.0.**

   (3) Connect the matching connector and turn the ignition key switch OFF.



LIST OF DIAGNOSIS CODES

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
01-1	01-1	Blinking	4Y-ECS	Fuel feedback control error (gasoline) rich	The engine speed is unstable and it may stop.	19-14
01-2	01-2	Blinking	4Y-ECS	Fuel feedback control error (gasoline) lean		
01-3	01-3	Blinking	4Y-ECS	Fuel feedback control error (LPG/CNG) rich		19-18
01-4	01-4	Blinking	4Y-ECS	Fuel feedback control error (LPG/CNG) lean		
01-5	01-5	Blinking	4Y-ECS	O2 sensor open abnormality	The engine speed is unstable and it may stop.	19-23
01-6	01-6	Blinking	4Y-ECS	O2 sensor heater open abnormality	Display only	19-25
02-1	02-1	Blinking	4Y-ECS	Intake temperature sensor open abnormality	The engine may have a problem at low temperatures.	19-27
02-2	02-2	Blinking	4Y-ECS	Intake temperature sensor short abnormality		
03-1	03-1	Blinking	4Y-ECS	Intake pipe pressure sensor open abnormality	The engine may have a problem	19-29
03-2	03-2	Blinking	4Y-ECS	Intake pipe pressure sensor short abnormality		
04-1	04-1	Blinking	4Y-ECS	Coolant temperature sensor open abnormality	The engine may have a problem at low temperatures.	19-31
04-2	04-2	Blinking	4Y-ECS	Coolant temperature sensor short abnormality		
05-1	05-1	Blinking	4Y-ECS	Throttle position sensor 1 open abnormality	Limting speed of traveling and materials handling due to limited engine power output	19-33
05-2	05-2	Blinking	4Y-ECS	Throttle position sensor 1 short abnormality		
05-3	05-3	Blinking	4Y-ECS	Throttle position sensor 2 open abnormality		
05-4	05-4	Blinking	4Y-ECS	Throttle position sensor 2 short abnormality		
05-5	05-5	Blinking	4Y-ECS	Throttle position sensor offset abnormality		
05-6	05-6	Blinking	4Y-ECS	Throttle position sensor out of range error		
06-1	06-1	Blinking	4Y-ECS	Throttle motor drive circuit open abnormality	Limting speed of traveling and materials handling due to limited engine power output	19-35
06-2	06-2	Blinking	4Y-ECS	Throttle motor drive circuit short abnormality		
06-3	06-3	Blinking	4Y-ECS	Throttle motor power supply circuit open abnormality		19-37
06-4	06-4	Blinking	4Y-ECS	Throttle motor power supply circuit short abnormality		
06-5	06-5	Blinking	4Y-ECS	Throttle motor seizing abnormality		19-38
06-6	06-6	Blinking	4Y-ECS	Electronic throttle system error		19-40
07-1	07-1	Blinking	4Y-ECS	Air-fuel ratio motor open abnormality	The engine speed is unstable and it may stop.	19-41
08-1	08-1	Blinking	4Y-ECS	Low voltage (battery line open) error	Display only	19-43
09-1	09-1	Blinking	4Y-ECS	Ignition signal error	The engine speed is unstable and it may stop.	19-44
0A-1	0A-1	Blinking	4Y-ECS	Fuel specification determination signal error	Display only	19-47
0A-2	0A-2	Blinking	4Y-ECS	Fuel specification changeover switch error	Display only	
0A-3	0A-3	Blinking	4Y-ECS	Fuel specification type unmatch	Engine may stop	

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
0A-4	0A-4	Blinking	4Y-ECS	Engine specification determination error	Limting speed of traveling and materials handling due to limited engine power output	19-49
13-1	13-1	Blinking	ASC	Motor relay contact point open abnormality	Continuation of engine idling status	19-50
13-2	13-2	Blinking	ASC	Motor relay contact point short abnormality	Display only	
13-3	13-3	Blinking	ASC	Motor relay open circuit or load short abnormality	Continuation of engine idling status	
15-1	15-1	Blinking	ASC	NMR switch open abnormality	The engine may idle during full acceleration.	19-52
15-2	15-2	Blinking	ASC	NMR switch short abnormality	Continuation of engine idling status	
15-3	15-3	Blinking	ASC	Idle / NMR switch simultaneously ON error	Continuation of engine idling status after acceleration off.	19-55
16-1	16-1	Blinking	ASC	Idle switch open abnormality	Continuation of engine idling status	19-58
16-2	16-2	Blinking	ASC	Idle switch short abnormality		
18-1	18-1	Blinking	4Y-ECS	Cam angle sensor open abnormality	Engine stop	19-61
			ASC	Engine speed sensor open abnormality	Partial limitation of the drive control function.	19-65
18-2	18-2	Blinking	4Y-ECS	Cam angle sensor open abnormality (on start up)	Engine will not start	19-61
			ASC	Engine speed sensor GND short abnormality	Partial limitation of the drive control function.	19-65
18-3	18-3	Blinking	4Y-ECS	Crank angle sensor open abnormality	Display only	19-63
1F-1 ~ 8	1F-1 ~ 8	Blinking	ASC	CPU error	Continuation of engine idling status Maximum speed may be limited Function of automatic idle speed increse during lifting limited	19-67
41-1	41-1	Blinking	SAS/OPS	Matching connector open abnormality	Display only	19-68
51-1	51-1	Blinking	SAS/OPS	Speed sensor open abnormality	The vehicle speed indicator shows 0 km/h Partial limitation of the rear wheel swing control function. Knob offest compensation stops Partial limitation of the drive control function.	19-69
51-2	51-2	Blinking	SAS/OPS	Speed sensor GND short abnormality		
52-1	52-1	Blinking	SAS/OPS	Yaw rate sensor open abnormality	Partial limitation of the rear wheel swing control function	19-71
52-2	52-2	Blinking	SAS/OPS	Yaw rate sensor VCC short abnormality		
52-3	52-3	Blinking	SAS/OPS	Yaw rate sensor neutral voltage error		
54-1	54-1	Blinking	SAS/OPS	Swing lock solenoid open circuit or load short abnormality	Partial limitation of the rear wheel swing control function	19-73
61-1	61-1	Blinking	SAS/OPS	Load sensor open abnormality	Partial limitation of the rear wheel swing control function Partial limitation of mast control function Limitation of the drive control function Load indicator cannot display	19-75
61-2	61-2	Blinking	SAS/OPS	Load sensor VCC short abnormality		

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
62-1	62-1	Blinking	SAS/OPS	Tilt angle sensor open abnormality	Partial limitation of mast control function	19-78
62-2	62-2	Blinking	SAS/OPS	Tilt angle sensor VCC short abnormality		
63-1	63-1	Blinking	SAS/OPS	Tilt switches simultaneously ON	Partial limitation of mast control function	19-81
63-2	63-2	Blinking	SAS/OPS	Tilt switch forward tilt SW short		
63-3	63-3	Blinking	SAS/OPS	Tilt switch backward tilt SW short		
64-1	64-1	Blinking	SAS/OPS	Lift lower lock solenoid open circuit or load short abnormality	Lift lower may stop	19-84
65-1	65-1	Blinking	SAS/OPS	Tilt control solenoid open circuit or load short abnormality	Forward tilt may stop, backward tilt may go fully back	19-86
66-1	66-1	Blinking	SAS/OPS	Outside matching value range for tilt angle error	Partial limitation of mast control function	19-88
67-1	67-1	Blinking	SAS/OPS	Lifting height switch open abnormality	Partial limitation of the rear wheel swing control function Partial limitation of mast control function Limitation of the drive control function Load indicator display is unsteady	19-89
68-1	68-1	Blinking	SAS/OPS	Lift switch raise and lower simultaneously ON error	Lowering may stop Function of automatic idle speed increse during lifting limited	19-92
68-2	68-2	Blinking	SAS/OPS	Lift switch raise SW short abnormality	Function of automatic idle speed increse during lifting limited	
68-3	68-3	Blinking	SAS/OPS	Lift switch lower SW short abnormality	Lowering may stop	
69-1	69-1	Blinking	SAS/OPS	Backward tilt lock solenoid open circuit or load short abnormality	Backward tilt may stop	19-95
71-1	71-1	Blinking	SAS/OPS	Tire angle sensor open abnormality	Knob offest compensation stops	19-97
71-2	71-2	Blinking	SAS/OPS	Tire angle sensor VCC short abnormality		
72-1	72-1	Blinking	SAS/OPS	Steering-wheel angle sensor SS1 open abnormality	Knob offest compensation stops	19-100
72-2	72-2	Blinking	SAS/OPS	Steering-wheel angle sensor SS2 open abnormality		
72-3	72-3	Blinking	SAS/OPS	Steering-wheel angle sensor SSC open abnormality		
72-4	72-4	Blinking	SAS/OPS	Steering-wheel angle sensors SS1 and SS2 open abnormality		

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
73-1	73-1	Blinking	SAS/OPS	Knob position compensation solenoid open circuit or load short abnormality	Knob offest compensation stops	19-108
74-1	74-1	Blinking	SAS/OPS	Outside matching value range for tire angle error	Knob offest compensation stops	19-110
A5-1	A5-1	Blinking	SAS/OPS	Seat switch GND short abnormality	Traveling and material handling possible even after leaving the seat. Parking brake reminder and release reminder alarm partially disabled.	19-111
A7-1	A7-1	Blinking	SAS/OPS	Brake switch GND short abnormality	Partial limitation of the drive control function	19-113
AD-1	AD-1	Blinking	SAS/OPS	CAN communication 4Y-ECS or ASC data reception error	Partial limitation of the drive control function	19-115
AD-2	AD-2	Blinking	4Y-ECS	CAN communication SAS/OPS data reception error	Partial limitation of the drive control function	
AD-7	AD-7	Blinking	SAS/OPS	CAN communication display data reception error	Limitation of the drive control function Function of automatic idle speed increse during lifting limited Display warning function operation failure	
AD-8	AD-8	–	Display	CAN communication SAS/OPS data reception error	Display not stable	
AF-1 ~ 3	AF-1 ~ 3	On	SAS/OPS	CPU error	Various control operations not stable	19-119
AF-4 ~ 8	AF-4 ~ 8	Blinking	SAS/OPS			
C4-1	C4-1	Blinking	4Y-ECS ASC	Accelerator sensor 1 open	Limting speed of traveling and materials handling due to limited engine power output	19-123
C4-2	C4-2	Blinking	4Y-ECS ASC	Accelerator sensor 1 short		
C4-3	C4-3	Blinking	4Y-ECS ASC	Accelerator sensor 2 open		
C4-4	C4-4	Blinking	4Y-ECS ASC	Accelerator sensor 2 short		
C4-5	C4-5	Blinking	4Y-ECS ASC	Accelerator sensor offset abnormality		
C4-6	C4-6	Blinking	4Y-ECS	Accelerator sensor out of range error		
C7-1	C7-1	Blinking	SAS/OPS	Shift lever forward and reverse travel switch open abnormality	Travel return to neutral operation disabled Partial limitation of the drive control function.	19-126
C7-2	C7-2	Blinking	SAS/OPS	Shift lever forward and reverse travel switches simultaneously ON error	Travelling may stop Partial limitation of the drive control function.	
CA-1	CA-1	Blinking	SAS/OPS	Forward and reverse travel T/C relay open circuit or load short abnormality	Travelling and material handling enabled even after leaving the seat.	19-129

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
EC-1	EC-1	Blinking	SAS/OPS	Unload solenoid open circuit or load short abnormality	Travelling and material handling enabled even after leaving the seat.	19-131
F1-1	–	Blinking	Meter	SAS/OPS data reception error	Display only	19-133
F2-1	–	Blinking				
F4-1 ~ 8	F4-1 ~ 8	Blinking	Display	CPU error	Display not stable	19-134
H1-1	H1-1	Blinking	SAS/OPS	Lift lever potentiometer open abnormality	Lift stop	19-135
H1-2	H1-2	Blinking	SAS/OPS	Lift lever potentiometer VCC short abnormality		
H1-3	H1-3	Blinking	SAS/OPS	Lift lever potentiometer assembly error		
H1-4	H1-4	Blinking	SAS/OPS	Lift lever potentiometer neutral abnormality	Material handling disabled	
H1-5	H1-5	Blinking	SAS/OPS	Lift lever potentiometer matching value abnormality	Lift stop	
H2-1	H2-1	Blinking	SAS/OPS	Tilt lever potentiometer open abnormality	Tilt stop	19-138
H2-2	H2-2	Blinking	SAS/OPS	Tilt lever potentiometer VCC short abnormality		
H2-3	H2-3	Blinking	SAS/OPS	Tilt lever potentiometer assembly error		
H2-4	H2-4	Blinking	SAS/OPS	Tilt lever potentiometer neutral error abnormality	Material handling disabled	
H2-5	H2-5	Blinking	SAS/OPS	Tilt lever potentiometer matching error	Tilt stop	
H3-1	H3-1	Blinking	SAS/OPS	Attachment 1 lever potentiometer open abnormality	Attachment 1 stop	19-141
H3-2	H3-2	Blinking	SAS/OPS	Attachment 1 lever potentiometer VCC short abnormality		
H3-3	H3-3	Blinking	SAS/OPS	Attachment 1 lever potentiometer combination error		
H3-4	H3-4	Blinking	SAS/OPS	Attachment 1 lever potentiometer neutral abnormality	Material handling disabled	
H3-5	H3-5	Blinking	SAS/OPS	Attachment 1 lever potentiometer matching value abnormality	Attachment 1 stop	
H4-1	H4-1	Blinking	SAS/OPS	Attachment 2 lever potentiometer open abnormality	Lever 2 stop	19-144
H4-2	H4-2	Blinking	SAS/OPS	Attachment 2 lever potentiometer VCC short abnormality		
H4-3	H4-3	Blinking	SAS/OPS	Attachment 2 lever potentiometer combination error		
H4-4	H4-4	Blinking	SAS/OPS	Attachment 2 lever potentiometer neutral abnormality	Material handling disabled	
H4-5	H4-5	Blinking	SAS/OPS	Attachment 2 lever potentiometer matching value abnormality	Lever 2 stop	
H5-1	H5-1	Blinking	SAS/OPS	Lift PUSH solenoid open abnormality	Lift may stop	19-147
H5-2	H5-2	Blinking	SAS/OPS	Lift PULL solenoid open abnormality		
H6-1	H6-1	Blinking	SAS/OPS	Tilt PUSH solenoid open abnormality	Tilt may stop	19-149
H6-2	H6-2	Blinking	SAS/OPS	Tilt PULL solenoid open abnormality		
H7-1	H7-1	Blinking	SAS/OPS	Attachment 1 PUSH solenoid open abnormality	Attachment 1 may stop	19-151
H7-2	H7-2	Blinking	SAS/OPS	Attachment 1 PULL solenoid open abnormality		

Indication	Wrench lamp	Spanner	Detection ECU	Error mode	Phenomenon on vehicle	Described on page
H8-1	H8-1	Blinking	SAS/OPS	Attachment 2 PUSH solenoid open abnormality	Attachment 2 may stop	19-153
H8-2	H8-2	Blinking	SAS/OPS	Attachment 2 PULL solenoid open abnormality		
HA-1	HA-1	Blinking	SAS/OPS	3/4 way change relay GND short abnormality	Attachment switching disabled	19-155

WARNING LIST

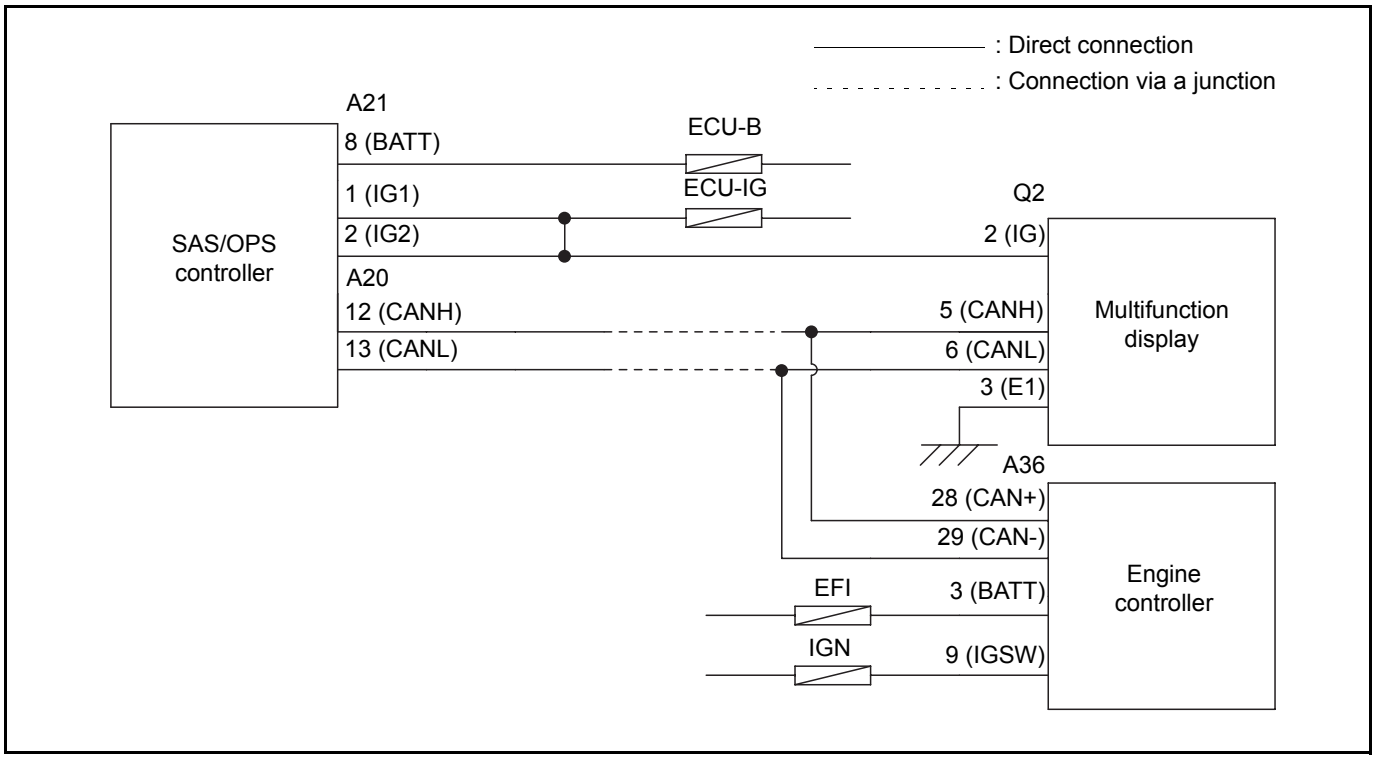
Caution:
If the wrench lamp illuminates and the following phenomena occur on the vehicle without an error being displayed, it is not a fault. Take the appropriate corrective action.

Indication	Memory	Wrench lamp	Detection ECU	Phenomenon on vehicle	Content of warning	Appropriate corrective action
Water temperature gauge flashing	OB-1	–	4Y-ECS	Top speed and load lifting speed are limited. (Only when OPT equipped)	Overheat	Leave the vehicle at idle for a while
–	–	On	SAS/OPS	Swing lock control is always locked Knob offset occurrence Material handling disabled (mini lever) Material handling except lifting disabled	High battery voltage	Use a battery of the specified voltage
–	–	On	SAS/OPS	Swing lock control is always locked	Low battery voltage	Charge or replace the battery
–	–	On	SAS/OPS	Tilt operates to forward most tilt position	Forward tilt restriction angle not matching	Carry out matching for each item
–	–	On	SAS/OPS	Tilt disabled with the knob switch in the ON position	Auto leveling angle not matching	
–	–	On	SAS/OPS	Tilt operates to forward most tilt position Tilt disabled with the knob switch in the ON position	SAS/OPS NL load not matching (NL: No-load)	
–	–	On	SAS/OPS	Knob offset occurrence	Tire angle not matching	
–	–	On	SAS/OPS	Swing lock control disabled	Swing leveling not matching	
–	–	On	SAS/OPS	Lift stop	Lift lever not matching	
–	–	On	SAS/OPS	Tilt stop	Tilt lever not matching	
–	–	On	SAS/OPS	Attachment 1 stop	Attachment 1 not matching	
–	–	On	SAS/OPS	Attachment 2 stop	Attachment 2 not matching	

VIEWING RELATED PORTIONS

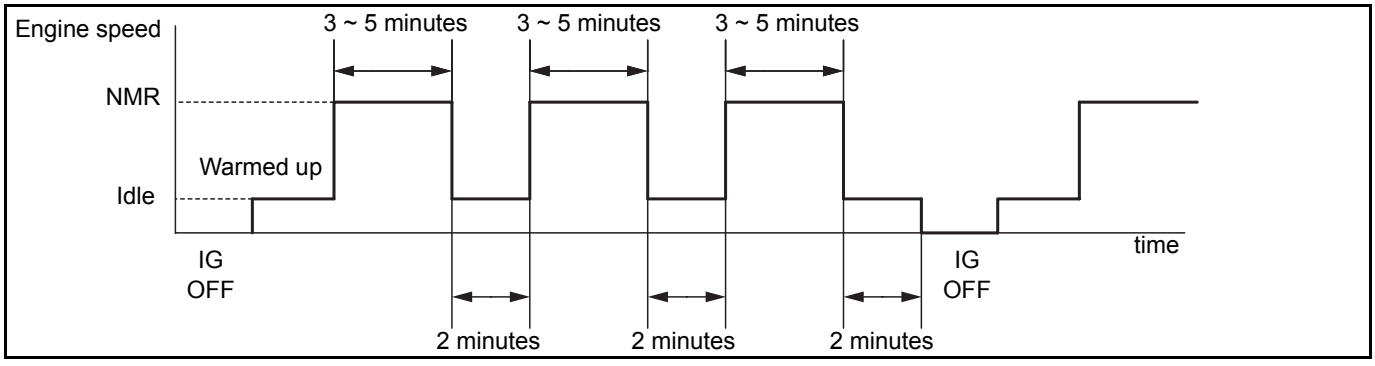
In the wiring diagrams for related portions, there are cases in which the parts are connected directly, and cases where they are connected via a junction block or similar.
Refer below for how to identify wiring configuartions.

Example of a Related Portion



ERROR CONFIRMATION DRIVE MODE

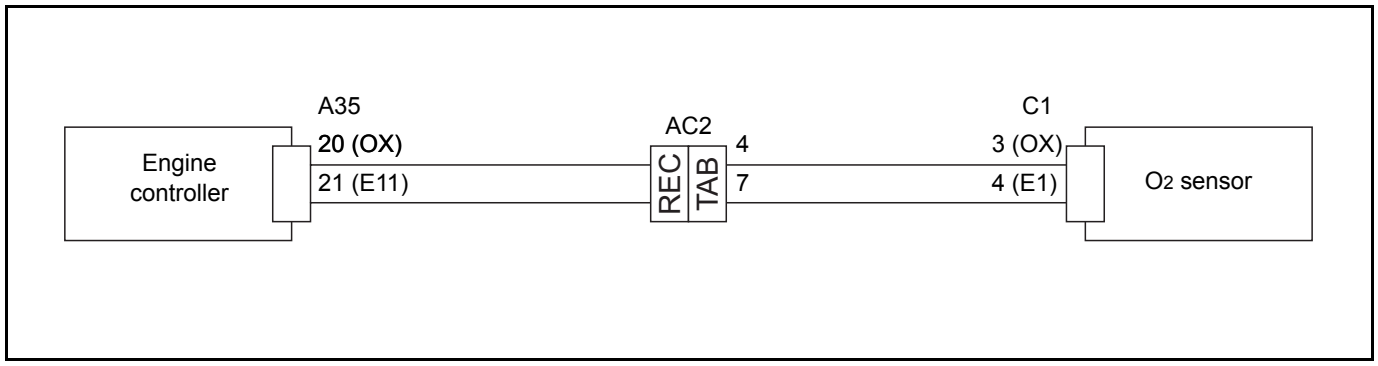
① Turn the ignition key switch ON, start and completely warm up the engine.
② Fully depress the accelerator pedal for 3 to 5 minutes with the direction neutral.
③ Release and leave the accelerator pedal (run the engine at idle) for 2 minutes.
④ Repeat steps ② and ③ 3 times.
⑤ Turn the ignition key switch OFF (for 1 minute).
⑥ Repeat steps ① to ⑤ 3 times.



TROUBLESHOOTING BY ERROR CODE

● **Error codes 01-1, 01-2 (Fuel feedback control abnormality) (Gasoline)**

Related portion



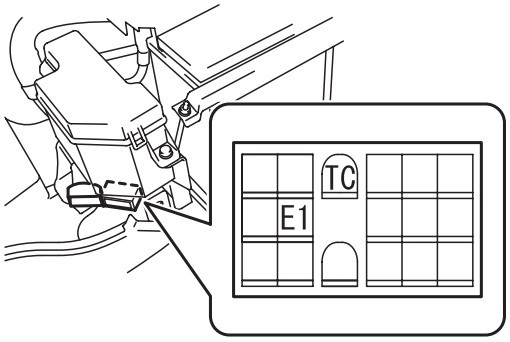
Probable cause

① Intake system defect
② Exhaust system defect
③ Sensor defect
④ Ignition defect
⑤ Fuel system defect
⑥ Harness defect
⑦ Engine controller defect

Caution:
When another error code is present repair the related parts first before carrying out the following.

Error codes 01-1 and 01-2

Disconnect the battery negative terminal (for more than 10 seconds). Check the connection status of C1, disconnect C1 and perform a visual and contact pressure inspection of the connector. Short circuit the service connector TC terminal with the E1 terminal, and after connecting C1 and the battery negative terminal (on a combination vehicle, switch the fuel changeover switch to gasoline), turn the ignition key switch ON (engine stopped), depress the accelerator pedal 5 times within 30 seconds (fully open to fully closed), then start the engine and check that the error has been cleared.



Service connector

↓

Disconnect the battery negative terminal, disconnect TC terminal - E1 terminal, connect the battery negative terminal, start the engine, and check whether the error occurs after performing error confirmation drive mode (see 19-13).

No error → Connector contact defect

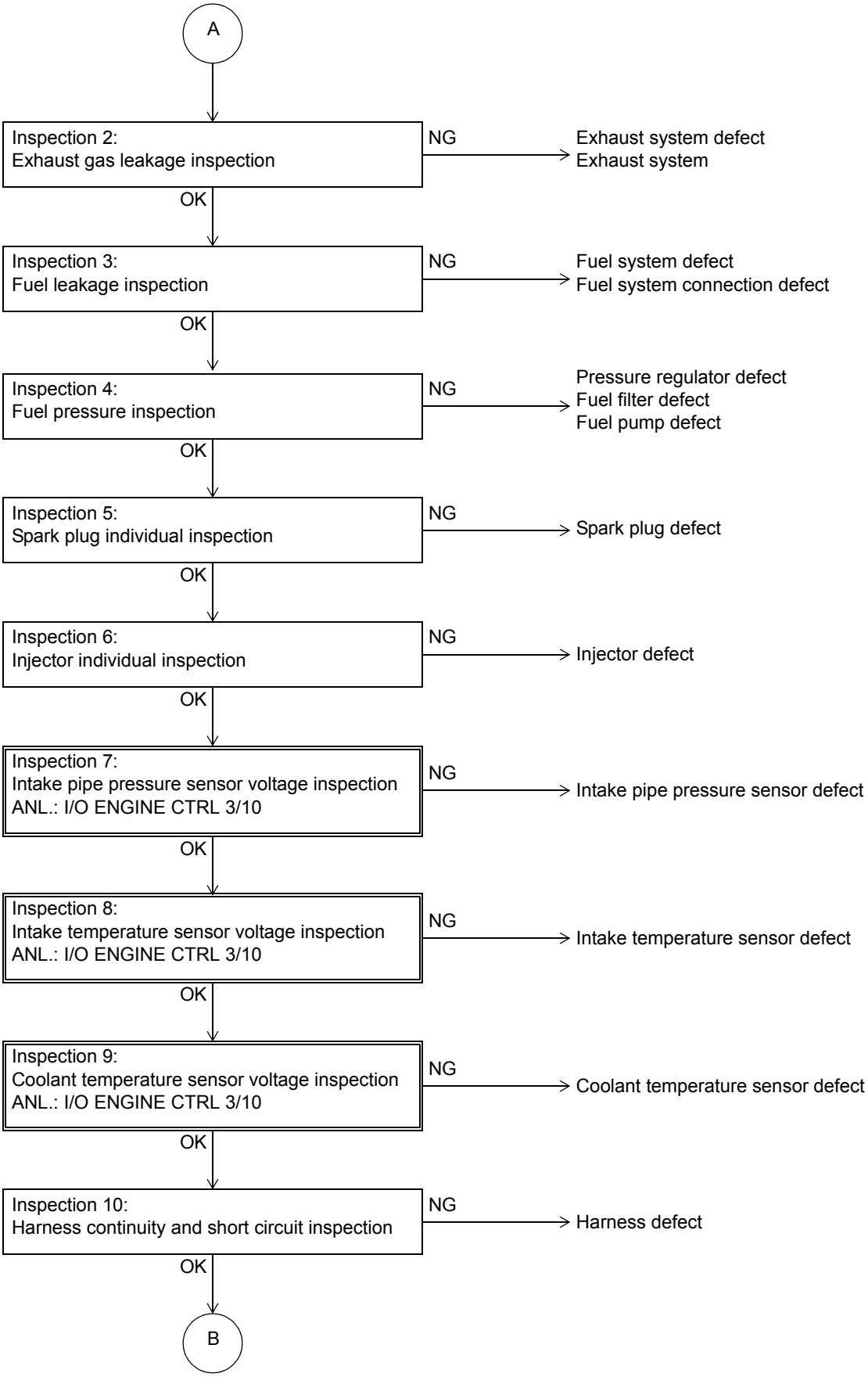
Error ↓

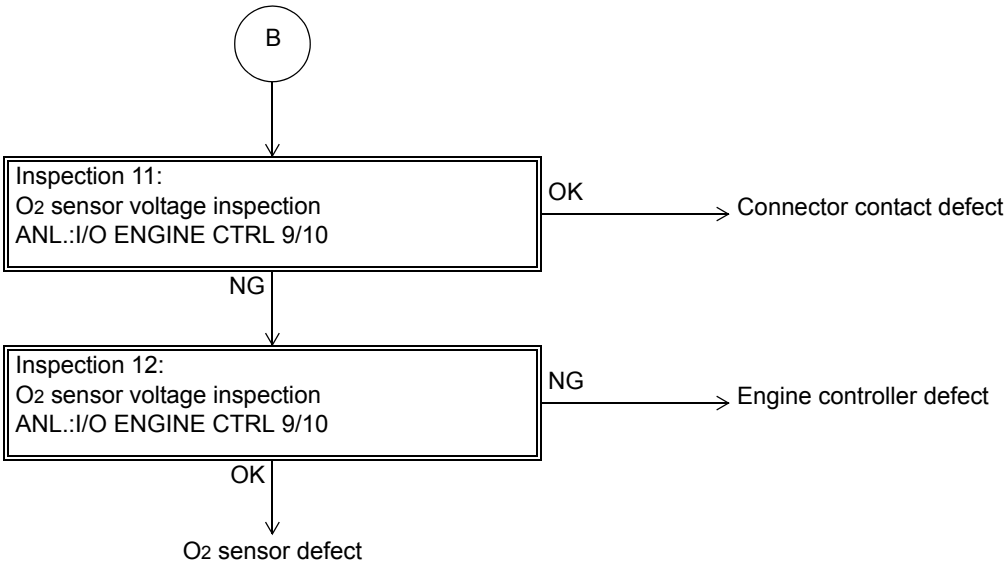
Inspection 1:
Inspect the air intake

NG → Intake system defect
Intake system connection defect

OK ↓

A


A
Inspection 2:
Exhaust gas leakage inspection
NG
Exhaust system defect
Exhaust system
OK
Inspection 3:
Fuel leakage inspection
NG
Fuel system defect
Fuel system connection defect
OK
Inspection 4:
Fuel pressure inspection
NG
Pressure regulator defect
Fuel filter defect
Fuel pump defect
OK
Inspection 5:
Spark plug individual inspection
NG
Spark plug defect
OK
Inspection 6:
Injector individual inspection
NG
Injector defect
OK
Inspection 7:
Intake pipe pressure sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Intake pipe pressure sensor defect
OK
Inspection 8:
Intake temperature sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Intake temperature sensor defect
OK
Inspection 9:
Coolant temperature sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Coolant temperature sensor defect
OK
Inspection 10:
Harness continuity and short circuit inspection
NG
Harness defect
OK
B



Inspection 1:

Inspect for air suction.

Start the engine and check whether air is being sucked in from the engine oil level gauge, oil filler cap, or PCV hose etc.

Standard: There is no air being sucked in.

Check if there is air being sucked in from the intake system parts and connections between the air cleaner and the cylinder head.

Standard: There is no air being sucked in.

Inspection 2:

Inspect for exhaust gas leakage.

Start the engine and check if there is any exhaust gas leakage from the exhaust system parts and connections between the cylinder head and the catalytic muffler.

Standard: There is no exhaust gas leakage.

Inspection 3:

Inspect for fuel leakage.

Start the engine and check if there is any fuel leakage from the fuel system parts and connections between the fuel pump and the injectors.

Standard: There is no fuel leakage.

Inspection 4:

Inspect the fuel pressure.

For the fuel pressure inspection, refer to the repair manual for the 4Y engine.

Inspection 5:

Carry out a spark plug individual inspection.

For the spark plug individual inspection, refer to the repair manual for the 4Y engine.

Inspection 6:

Carry out an injector individual inspection.

For the individual injector inspection, refer to the repair manual for the 4Y engine.

Inspection 7:

Inspect the intake pipe pressure sensor voltage.

Ignition key switch ON, engine stopped
Intake pipe pressure sensor voltage (I/O monitor: PIM)

Standard:

PIM	3.6 ± 0.3 V (100 ± 10 kPa (1 ± 0.1 kgf/cm^2) [14 ± 1.4 psi])

Inspection 8:

Inspect the intake temperature sensor voltage.
Ignition key switch ON, engine stopped

Intake temperature sensor voltage (I/O monitor: THA)

Standard:

THA	2.4 ± 0.6 V (20 ± 10°C)
	0.55 ± 0.15 V (80 ± 10°C) (reference value)

Inspection 9:

Inspect the coolant temperature sensor voltage.
Start the engine, warm up completely (coolant temperature gauge: at 5-6 bars)

Coolant temperature sensor voltage (I/O monitor: THW)

Standard:

THW	0.55 ± 0.15 V (80 ± 10°C)
	2.4 ± 0.6 V (20 ± 10°C) (reference value)

Inspection 10:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect battery negative terminal, disconnect A35 and C1.

Standard:

A35-20 ~ C1-3	Continuity
A35-21 ~ C1-4	Continuity
A35-20 ~ Frame	No continuity

Inspection 11:

Inspect the O_2 sensor output.

Connect A35 and C1, start the engine, warm up completely, set direction in neutral, fully open the accelerator pedal
O_2 sensor voltage (I/O monitor: OX)

Standard:

OX	0.4 V or less and 0.5 V or more alternately output

Inspection 12:

Inspect the O_2 sensor output.

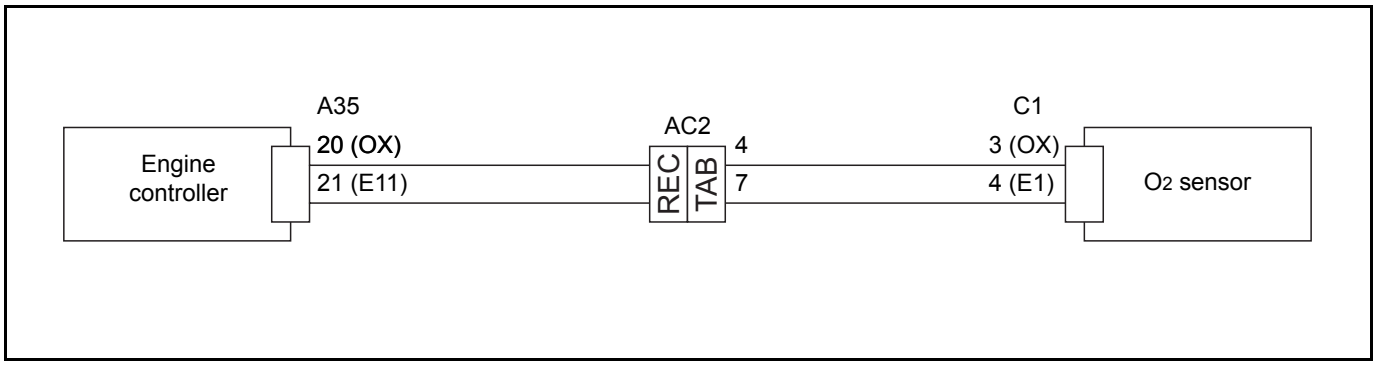
Disconnect C1, connect A35, start the engine, warm up completely, set direction in neutral, fully open the accelerator pedal
O_2 sensor voltage (I/O monitor: OX)

Standard:

OX	0.2 V or less

● **Error codes 01-3, 01-4 (Fuel feedback control abnormality) (LPG/CNG)**

Related portion



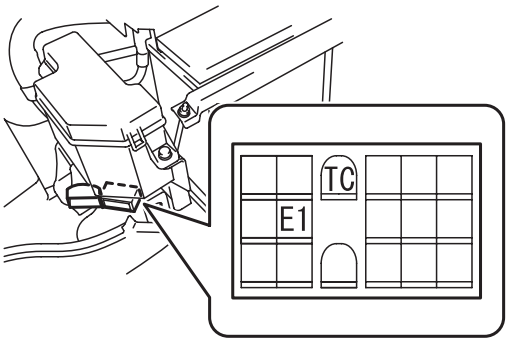
Probable cause

① Intake system defect
② Exhaust system defect
③ Sensor defect
④ Ignition defect
⑤ Fuel system defect
⑥ Harness defect
⑦ Engine controller defect

Caution:
When another error code is occuring, repair the related parts first before carrying out the following.

Error codes 01-3 and 01-4

Disconnect the battery negative terminal (for more than 10 seconds). Check the connection status of C1, disconnect C1 and perform a visual and contact pressure inspection of the connector. Short circuit the service connector TC terminal with the E1 terminal, and after connecting C1 and the battery negative terminal (on a combination vehicle, switch the fuel changeover switch to gasoline), turn the ignition key switch ON (engine stopped), depress the accelerator pedal 5 times within 30 seconds (fully open to fully closed), then start the engine and check that the error has been cleared.



Service connector

↓

Disconnect the battery negative terminal, disconnect TC terminal - E1 terminal, connect the battery negative terminal, start the engine, and check whether the error occurs after performing error confirmation drive mode (see 19-13).

No error → Connector contact defect

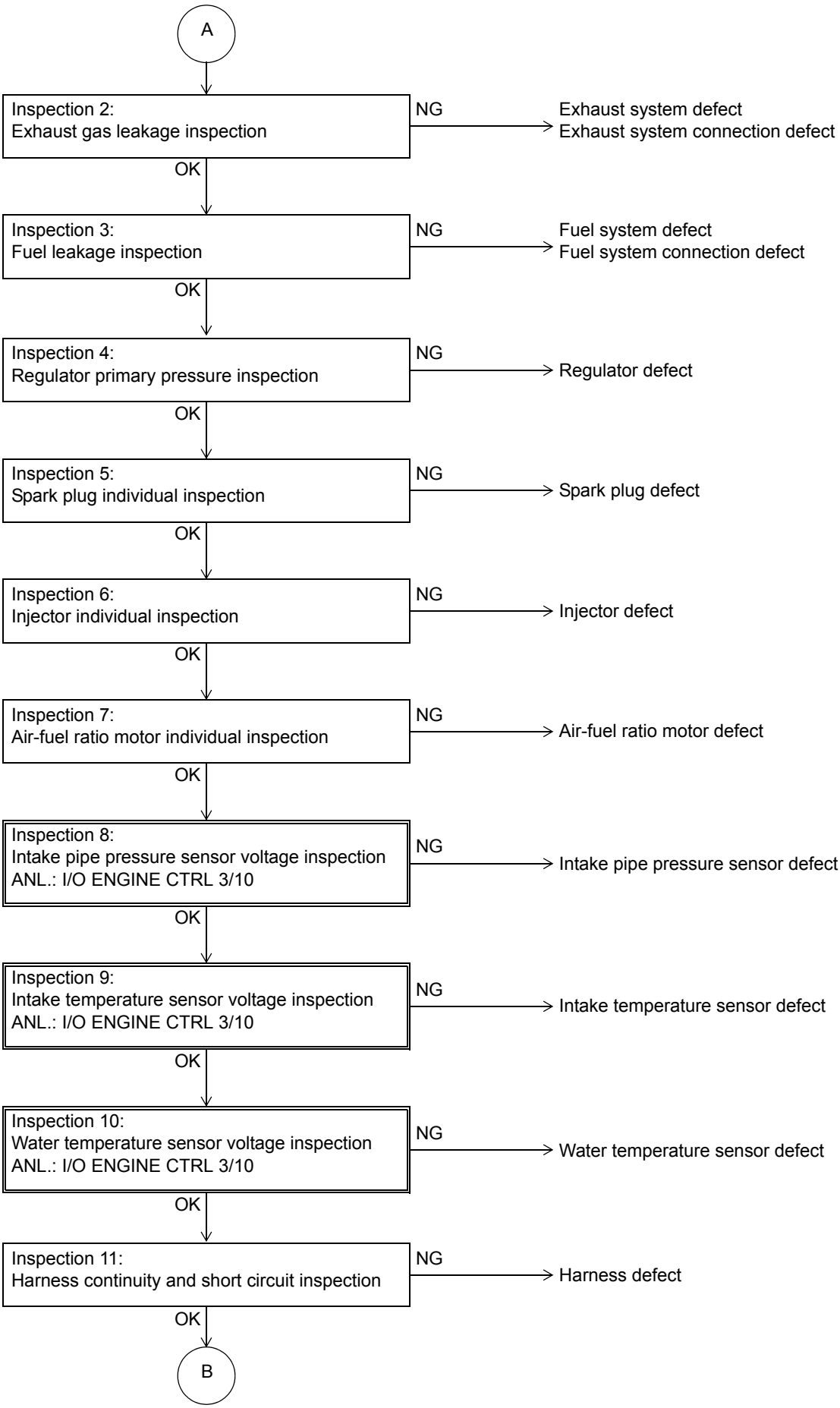
Error ↓

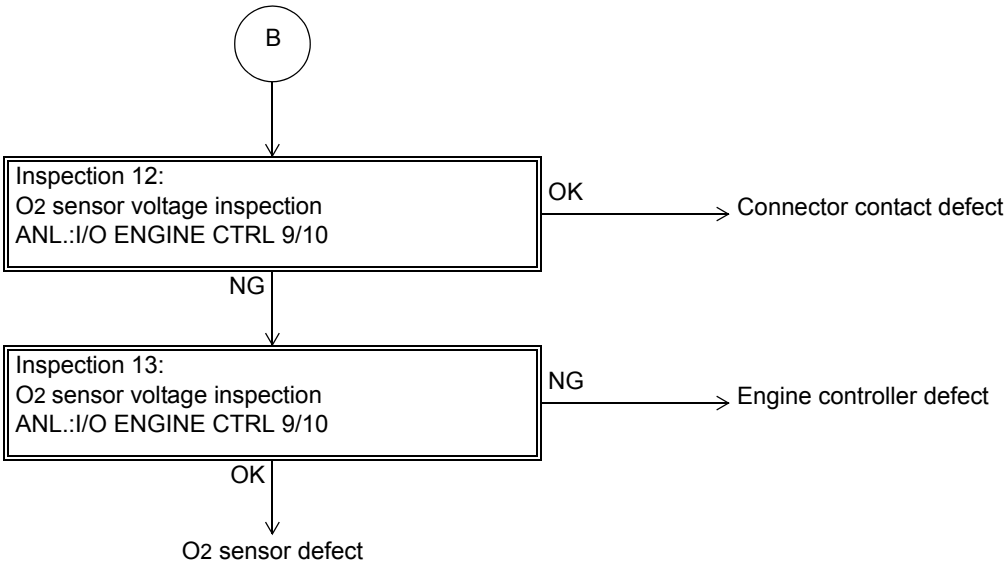
Inspection 1:
Inspect the air intake

NG → Intake system defect
Intake system connection defect

OK ↓

A


A
Inspection 2:
Exhaust gas leakage inspection
NG
Exhaust system defect
Exhaust system connection defect
OK
Inspection 3:
Fuel leakage inspection
NG
Fuel system defect
Fuel system connection defect
OK
Inspection 4:
Regulator primary pressure inspection
NG
Regulator defect
OK
Inspection 5:
Spark plug individual inspection
NG
Spark plug defect
OK
Inspection 6:
Injector individual inspection
NG
Injector defect
OK
Inspection 7:
Air-fuel ratio motor individual inspection
NG
Air-fuel ratio motor defect
OK
Inspection 8:
Intake pipe pressure sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Intake pipe pressure sensor defect
OK
Inspection 9:
Intake temperature sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Intake temperature sensor defect
OK
Inspection 10:
Water temperature sensor voltage inspection
ANL.: I/O ENGINE CTRL 3/10
NG
Water temperature sensor defect
OK
Inspection 11:
Harness continuity and short circuit inspection
NG
Harness defect
OK
B



Inspection 1:

Inspect for air suction.

Start the engine and check whether air is being sucked in from the engine oil level gauge, oil filler cap, or PCV hose etc.

Standard: There is no air being sucked in.
Check if there is air being sucked in from the intake system parts and connections between the air cleaner and the regulator.

Standard: There is no air being sucked in.
Check if there is air being sucked in from the intake system parts and connections among the air cleaner hose, the resonator, and the regulator.

Standard: There is no air being sucked in.

Inspection 2:

Inspect for exhaust gas leakage.

Start the engine and check if there is any exhaust gas leakage from the exhaust system parts and connections between the cylinder head and the catalytic muffler.

Standard: There is no exhaust gas leakage.

Inspection 3:

Inspect for fuel leakage.

Start the engine and check if there is any fuel leakage from the fuel system parts and connections between the fuel tank and the regulator.

Standard: There is no fuel leakage.
Check if there is fuel leakage from the fuel system parts and connections between the regulator and the LPG adapter.

Standard: There is no fuel leakage.
Check if there is fuel leakage from the fuel system parts and connections between the regulator and the injector.

Standard: There is no fuel leakage.

Inspection 4:

Inspect the regulator primary pressure.

For the regulator primary pressure inspection, refer to the LPG repair manual.

Inspection 5:

Carry out a spark plug individual inspection.

For the spark plug individual inspection, refer to the repair manual for the 4Y engine.

Inspection 6:

Carry out an injector individual inspection.

For the individual injector inspection, refer to the repair manual for the 4Y engine.

Inspection 7:

Carry out an individual inspection of the air-fuel ratio motor.

For the individual air-fuel ratio motor inspection, refer to the LPG repair manual.

Inspection 8:

Inspect the intake pipe pressure sensor voltage.

Ignition key switch ON, engine stopped
Intake pipe pressure sensor voltage (I/O monitor: PIM)

Standard:

PIM	3.6 ± 0.3 V (100 ± 10 kPa (1 ± 0.1 kgf/cm^2) [14 ± 1.4 psi])

Inspection 9:

Inspect the intake temperature sensor voltage.

Ignition key switch ON, engine stopped
Intake temperature sensor voltage (I/O monitor: THA)

Standard:

THA	2.4 ± 0.6 V (20 ± 10°C)
	0.55 ± 0.15 V (80 ± 10°C) (reference value)

Inspection 10:

Inspect the coolant temperature sensor voltage.

Start the engine, warm up completely (coolant temperature gauge: 5-6 bars)
Coolant temperature sensor voltage (I/O monitor: THW)

Standard:

THW	0.55 ± 0.15 V (80 ± 10°C)
	2.4 ± 0.6 V (20 ± 10°C) (reference value)

Inspection 11:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A35 and C1

Standard:

A35-20 ~ C1-3	Continuity
A35-21 ~ C1-4	Continuity
A35-20 ~ Frame	No continuity

Inspection 12:

Inspect the O_2 sensor output.

Start the engine, warm up completely, put the direction in neutral, fully open the accelerator pedal O_2 sensor voltage (I/O monitor: OX)

Standard:

OX	0.4 V or less and 0.5 V or more alternately output

Inspection 13:

Inspect the O_2 sensor output.

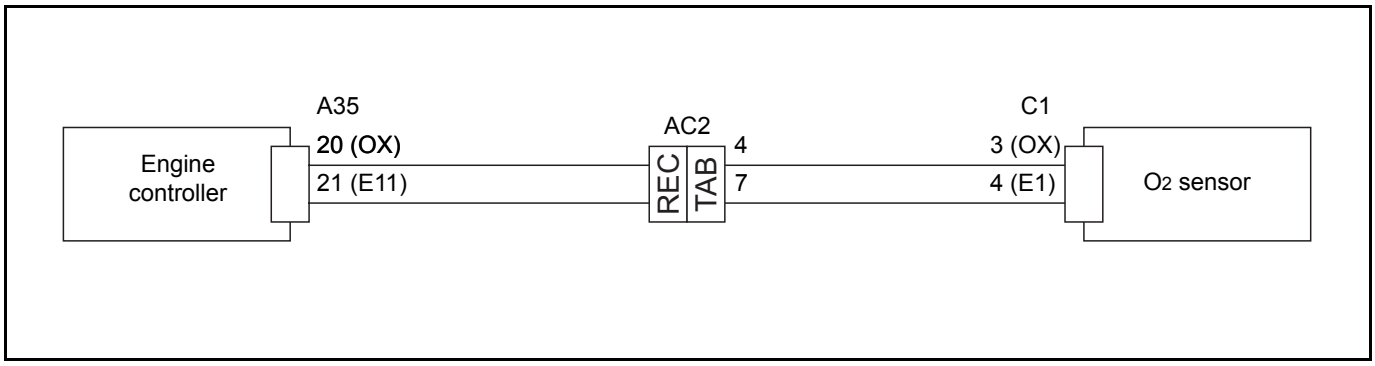
Start the engine, warm up completely, put the direction in neutral, fully open the accelerator pedal O_2 sensor voltage (I/O monitor: OX)

Standard:

OX	0.2 V or less

● **Error code 01-5 (O_2 sensor open abnormality)**

Related portion



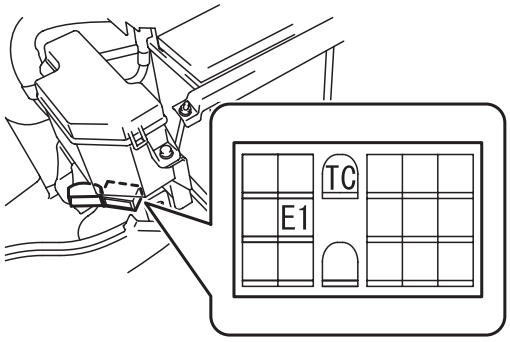
Probable cause

① O_2 Sensor defect
② Harness defect
③ Engine controller defect

Caution:
When another error code is present, repair the related parts first before carrying out the following.

Error code 01-5

Disconnect the battery negative terminal (for more than 10 seconds). Check the connection status of C1, disconnect C1 and perform a visual and contact pressure inspection of the connector. Short circuit the service connector TC terminal with the E1 terminal, and after connecting C1 and the battery negative terminal (on a combination vehicle, switch the fuel changeover switch to gasoline), turn the ignition key switch ON (engine stopped), depress the accelerator pedal 5 times within 30 seconds (fully open to fully closed), then start the engine and check that the error has been cleared.



Service connector

↓

Disconnect the battery negative terminal, disconnect TC terminal - E1 terminal, connect the battery negative terminal, start the engine, and check whether the error occurs after performing error confirmation drive mode (see 19-13).

No error → Connector contact defect

Error ↓

Inspection 1:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

O_2 sensor defect

If the error occurs even after replacing the O_2 sensor ↓

Engine controller defect

Inspection 1:

Inspect for continuity and short circuiting of the harness.

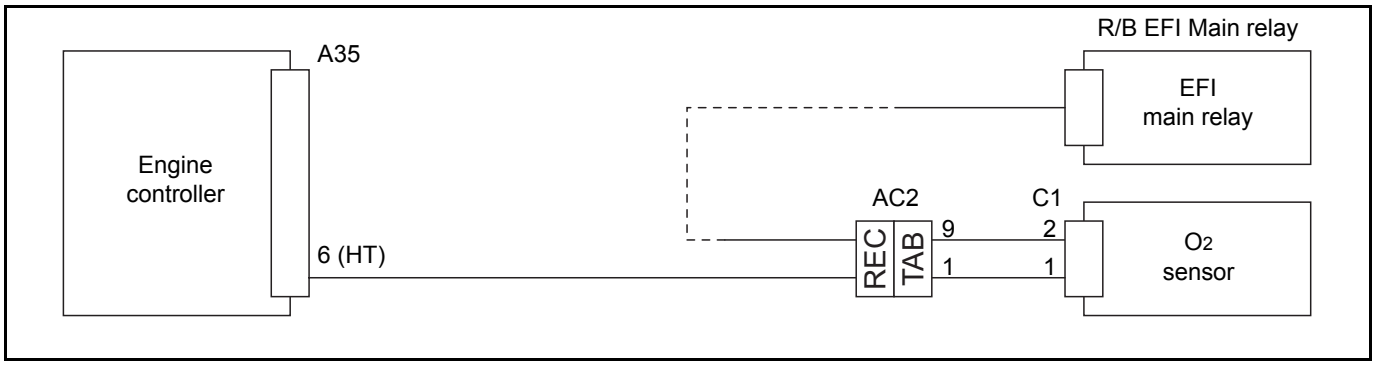
Ignition key switch OFF, disconnect A35 and C1

Standard:

A35-20 ~ C1-3	Continuity
A35-21 ~ C1-4	Continuity
A35-20 ~ Frame	No continuity

● **Error code 01-6 (O_2 sensor heater open abnormality)**

Related portion



Probable cause

① O_2 Sensor defect
② Harness defect
③ Engine controller defect

Error code 01-6

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of C1, AC2, reconnect all connectors and battery negative terminal, turn the ignition key switch ON (start the engine), and check whether or not there is an error.
① Turn the ignition key switch ON. (Start and run the engine for more than 10 seconds.)
② Turn the ignition key switch OFF for more than10 seconds.
③ Turn the ignition key switch ON. (Start and run the engine for more than 10 seconds.)
④ Check for errors.

No error → Connector contact defect

Error ↓

Inspection 1: O_2 sensor individual inspection

NG → O_2 sensor defect

OK ↓

Inspection 2: O_2 sensor heater power voltage inspection

NG → Harness defect

OK ↓

Inspection 3: Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Engine controller defect

Inspection 1:

Carry out O_2 sensor individual inspection.

Ignition key switch OFF, disconnect C1, connect A35

C1

Standard: (Sensor side)

C1-2 ~ C1-1	13 ~ 16 Ω (20°C)

Inspection 2:

Carry out O_2 sensor heater power voltage inspection.

Ignition key switch OFF, diconnect C1, connect A35, start engine

Standard:

C1-2 ~ Frame	8 ~ 16 V

Inspection 3:

Inspect for continuity and short circuiting of the harness.

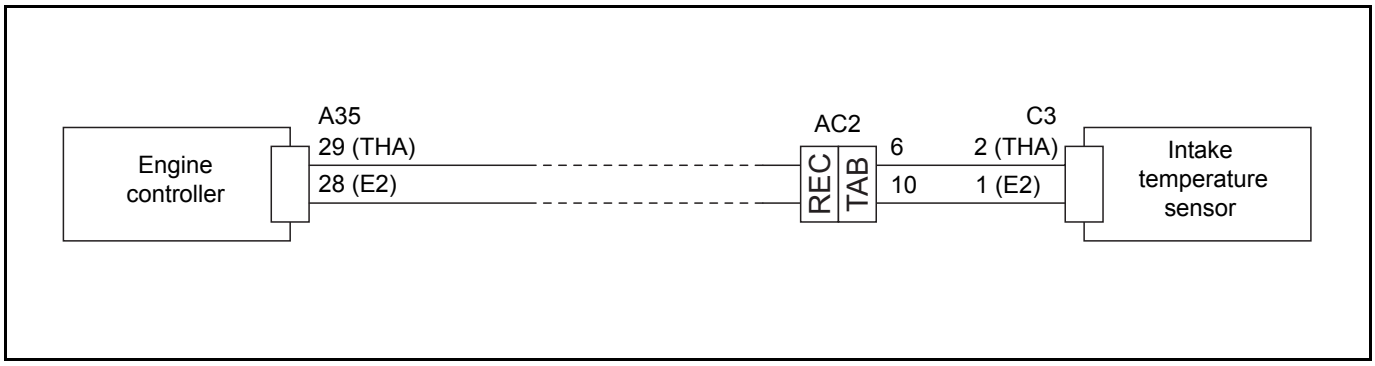
Ignition key switch OFF, disconnect A35 and C1

Standard:

A35-6 ~ C1-1	Continuity
A35-6 ~ Frame	No continuity

● **Error codes 02-1, 02-2 (Intake temperature sensor abnormality)**

Related portion



Probable cause

① Intake temperature sensor defect
② Harness defect
③ Engine controller defect

Error codes 02-1 and 02-2

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of C3, AC2, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Intake temperature sensor individual inspection

NG → Intake temperature sensor defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

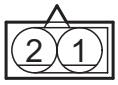
OK ↓

Engine controller defect

Inspection 1:

Carry out intake temperature sensor individual inspection..

Ignition key switch OFF, disconnect C3, connect A35



C3

Standard: (Sensor side)

C3-1 ~ C3-2	2.45 ± 0.24 kΩ (20°C)
	0.32 ± 0.03 kΩ (80°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

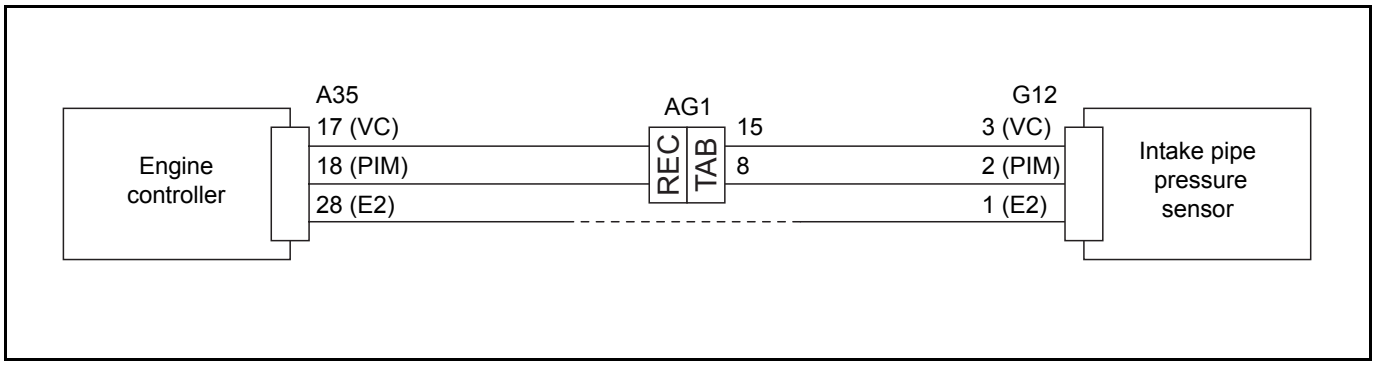
Ignition key switch OFF, disconnect A35 and C3

Standard:

A35-29 ~ C3-2	Continuity
A35-28 ~ C3-1	Continuity
A35-29 ~ Frame	No continuity

● **Error codes 03-1, 03-2 (Intake pipe negative pressure sensor abnormality)**

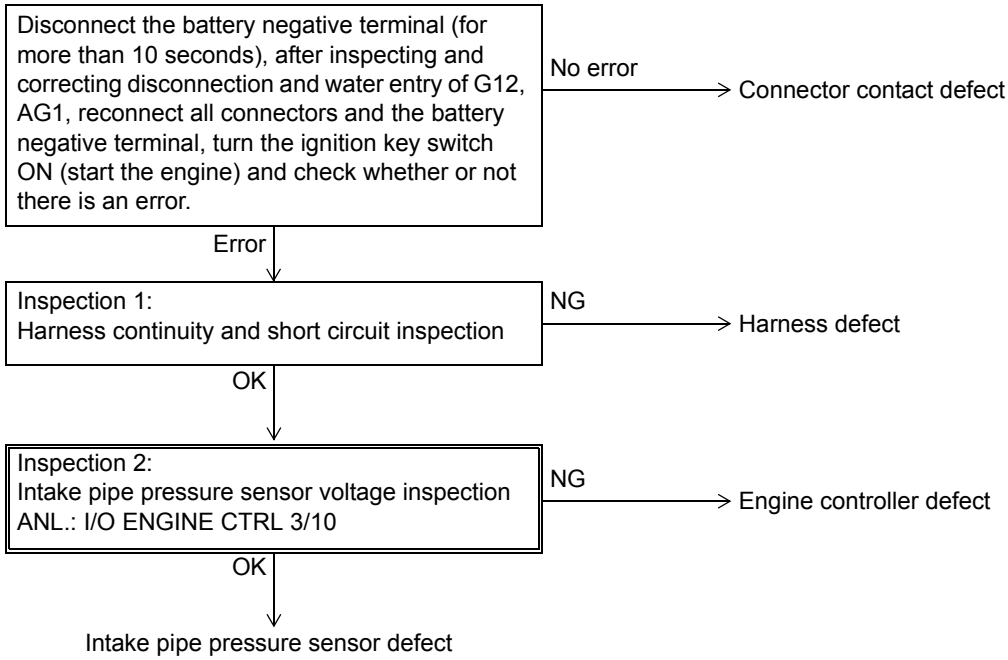
Related portion



Probable cause

① Intake pipe negative pressure sensor defect
② Harness defect
③ Engine controller defect

Error codes 03-1 and 03-2



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A35 and G12

Standard:

A35-18 ~ G12-2	Continuity
A35-28 ~ G12-1	Continuity
A35-18 ~ A35-17	No continuity
A35-17 ~ G12-3	Continuity
A35-18 ~ Frame	No continuity
A35-17 ~ Frame	No continuity

Inspection 2:

Inspect the intake pipe pressure sensor voltage.

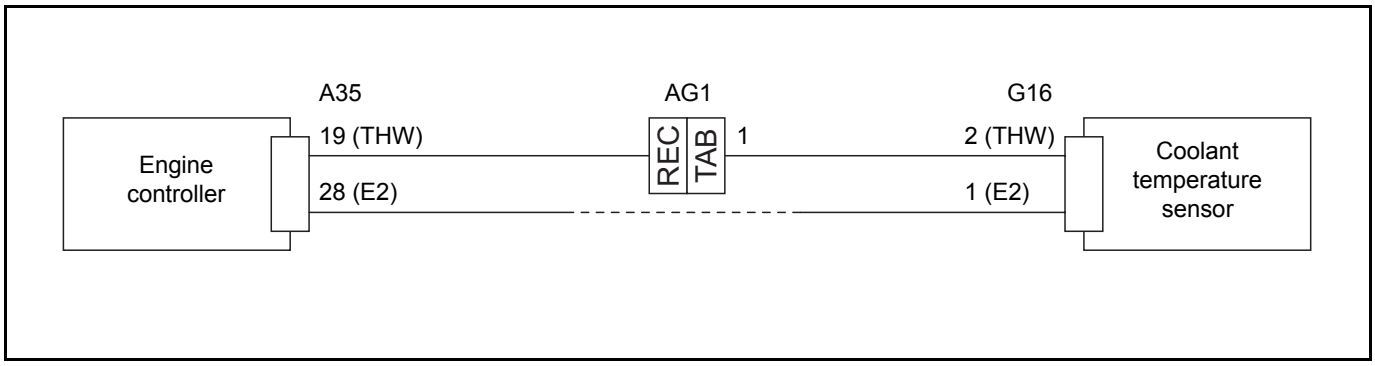
Ignition key switch OFF, disconnect G12, connect A35, ignition key switch ON, engine stopped
Intake pipe pressure sensor voltage (I/O monitor: PIM)

Standard:

PIM	4.80 V or more

● **Error codes 04-1, 04-2 (Coolant temperature sensor abnormality)**

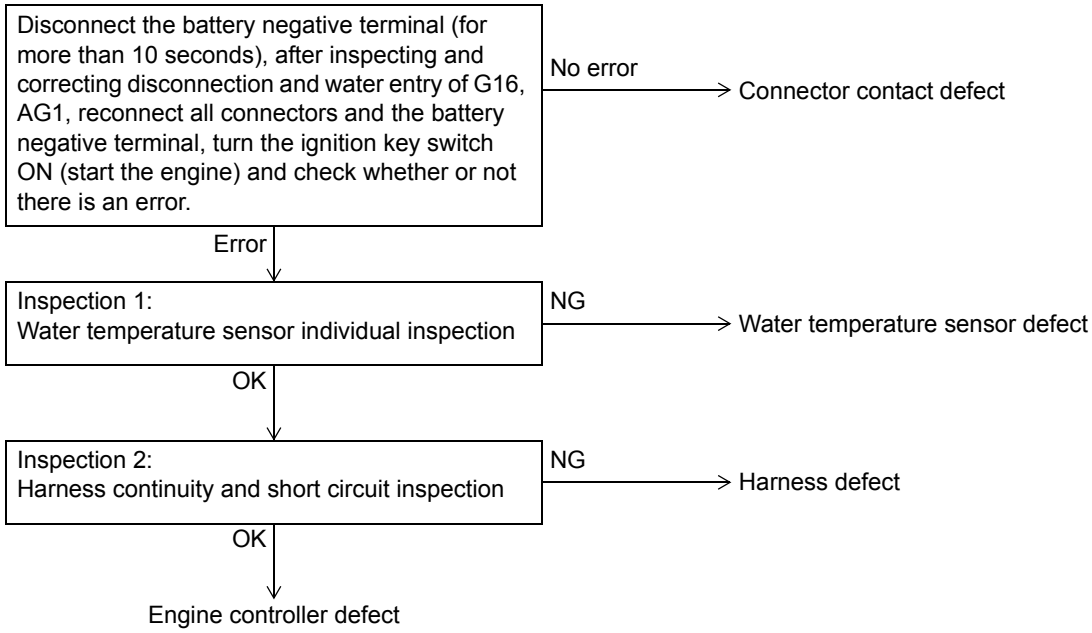
Related portion



Probable cause

① Coolant temperature sensor defect
② Harness defect
③ Engine controller defect

Error codes 04-1 and 04-2



Inspection 1:

Carry out coolant temperature sensor individual inspection.

Ignition key switch OFF, disconnect A35 and G16

Standard: (Sensor side)

G16-1 ~ G16-2	2.45 ± 0.24 kΩ (20°C)
	0.32 ± 0.03 kΩ (80°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

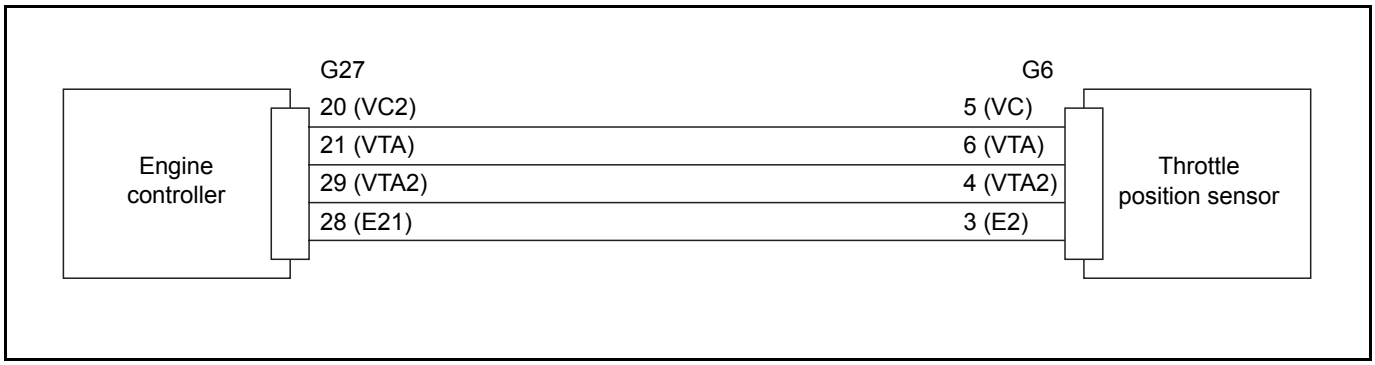
Ignition key switch OFF, disconnect A35 and G16

Standard:

A35-19 ~ G16-2	Continuity
A35-28 ~ G16-1	Continuity
A35-19 ~ Frame	No continuity

● **Error codes 05-1, 05-2, 05-3, 05-4, 05-5, 05-6 (Throttle position sensor abnormality)**

Related portion



Probable cause

① Throttle position sensor defect
② Harness defect
③ Engine controller defect

Error codes 05-1, 05-2, 05-3, 05-4, 05-5, 05-6

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G6, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 2:
Throttle position sensor voltage inspection
ANL.: I/O ENGINE CTRL 5/10

NG → Engine controller defect

OK ↓

Throttle position sensor defect

Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G27 and G6

Standard:

G27-21 ~ G6-6	Continuity
G27-28 ~ G6-3	Continuity
G27-21 ~ G27-20	No continuity
G27-20 ~ G6-5	Continuity
G27-21 ~ Frame	No continuity
G27-29 ~ G6-4	Continuity
G27-29 ~ G27-20	No continuity
G27-29 ~ Frame	No continuity
G27-21 ~ G27-29	No continuity
G27-21 ~ G27-28	No continuity
G27-29 ~ G27-28	No continuity
G27-20 ~ Frame	No continuity

Inspection 2:

Inspect the throttle position sensor voltage.

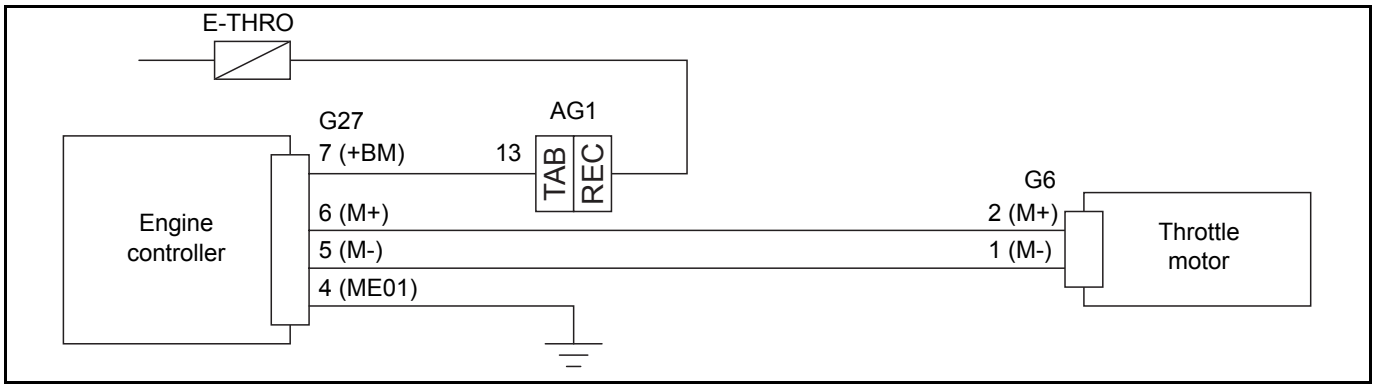
Ignition key switch OFF, disconnect G6, connect G27, ignition key switch ON
Throttle position sensor voltage (I/O monitor: VTA1, VTA2)

Standard:

VTA1, VTA2	4.80 V or more

● **Error codes 06-1, 06-2 (Throttle motor drive circuit open/short abnormality)**

Related portion



Probable cause

① Throttle motor defect
② Harness defect
③ Engine controller defect

Error codes 06-1 and 06-2

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G6, AG1, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Throttle motor individual inspection

NG → Throttle motor defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

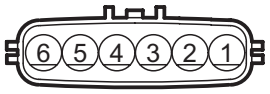
NG → Harness defect

OK ↓

Engine controller defect

Inspection 1:

Carry out throttle motor individual inspection.



G6

Ignition key switch OFF, disconnect G6, connect G27

(1) Throttle motor resistance inspection

Standard: (Motor side)

G6-2 ~ G6-1	0.3 ~ 100 Ω (20°C)

(2) Throttle valve drive condition

Standard:
Throttle valve operates smoothly when fully opened.
Throttle valve operates smoothly when fully closed.
When you remove your hand from the throttle valve, it returns to the opener angle.

Inspection 2:

Inspect for continuity and short circuiting of the harness.

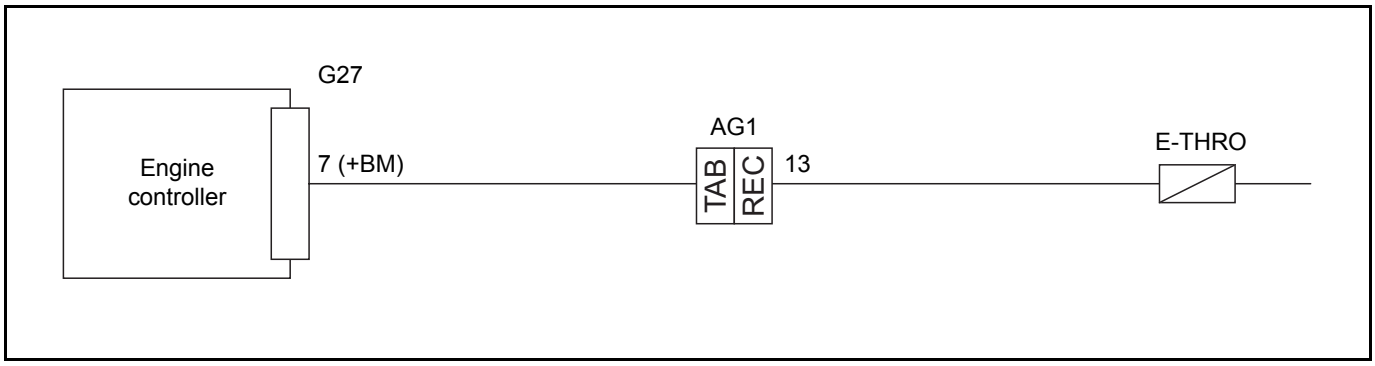
Ignition key switch OFF, disconnect G27 and G6

Standard:

G27-6 ~ G6-2	Continuity
G27-5 ~ G6-1	Continuity
G27-6 ~ Frame	No continuity
G27-5 ~ Frame	No continuity
G27-6 ~ G27-5	No continuity
G27-6 ~ G27-7	No continuity
G27-5 ~ G27-7	No continuity

● **Error codes 06-3, 06-4 (Throttle motor power circuit open/short abnormality)**

Related portion

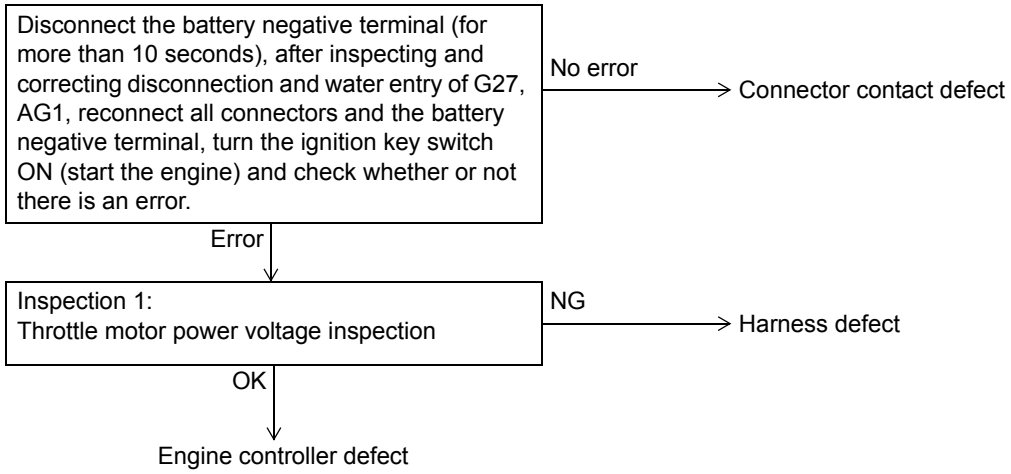


Probable cause

① Harness defect

② Engine controller defect

Error codes 06-3 and 06-4



Inspection 1:

Inspect the throttle motor power voltage.

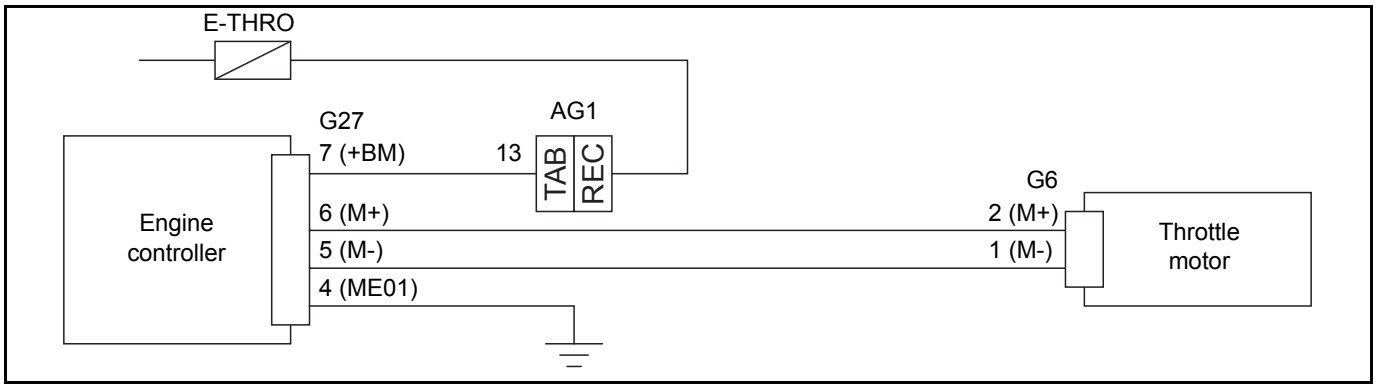
Ignition key switch OFF, disconnect G27

Standard:

G27-7 ~ Frame	8 ~ 16 V

● **Error code 06-5 (Throttle motor seized abnormality)**

Related portion



Probable cause

① Throttle motor defect
② Harness defect
③ Engine controller defect

Error code 06-5

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G6, AG1, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Throttle motor individual inspection

NG → Throttle motor defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

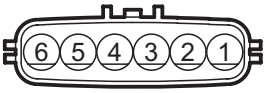
OK ↓

Engine controller defect

Inspection 1:

Carry out throttle motor individual inspection.

Ignition key switch OFF, disconnect G6, connect G27



G6

(1) Throttle motor resistance inspection

Standard: (Motor side)

G6-2 ~ G6-1	0.3 ~ 100 Ω (20°C)

(2) Throttle valve drive condition

Standard:
Throttle valve operates smoothly when fully opened.
Throttle valve operates smoothly when fully closed.
When you remove your hand from the throttle valve, it returns to the opener angle

Inspection 2:

Inspect for continuity and short circuiting of the harness.

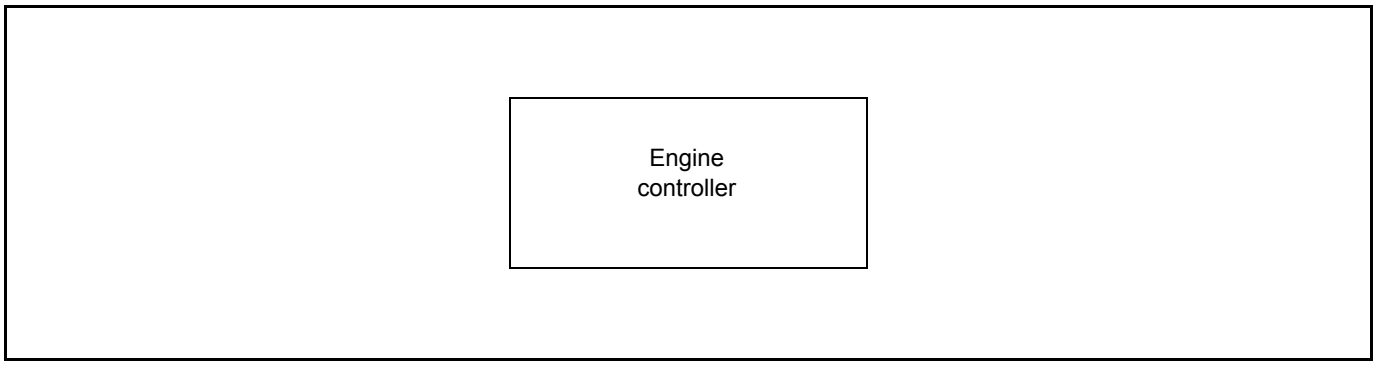
Ignition key switch OFF, disconnect G6 and G27

Standard:

G27-6 ~ G27-5	No continuity
G27-6 ~ G27-7	No continuity
G27-5 ~ G27-7	No continuity

● **Error code 06-6 (Electronic throttle abnormality)**

Related portion



Probable cause

① Engine controller defect

Error code 06-6

Disconnect the negative terminal of the battery for 10 seconds or more. Reconnect the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

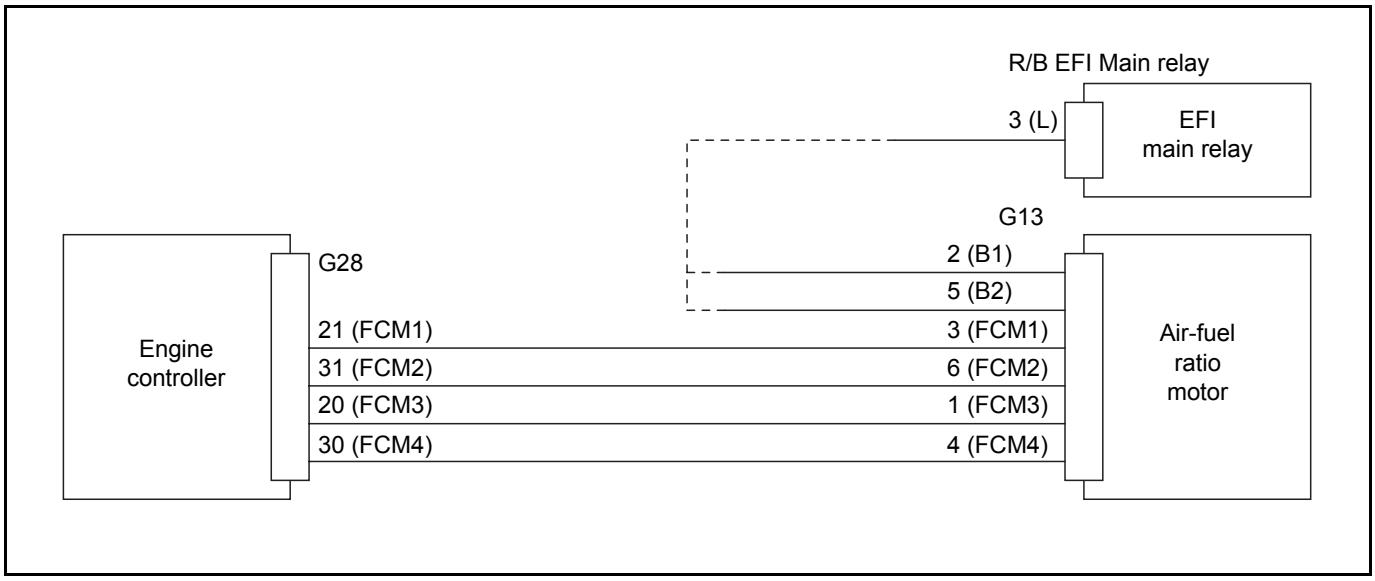
No error → Connector contact defect

Error ↓

Engine controller defect

● **Error code 07-1 (Air-fuel ratio motor open abnormality)**

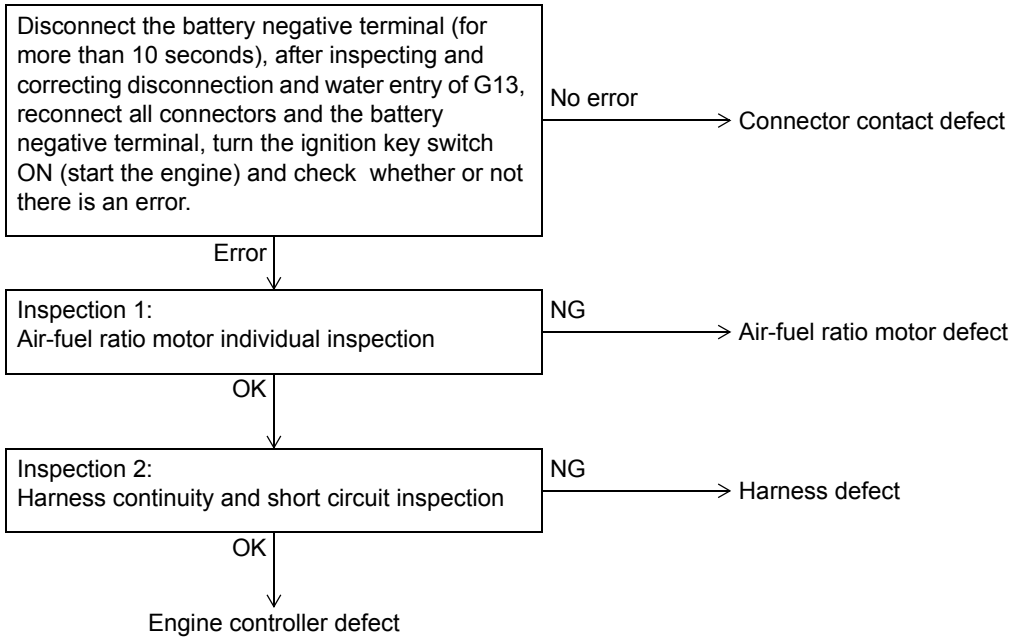
Related portion



Probable cause

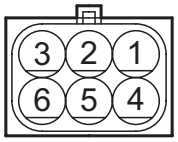
① Air-fuel ratio motor defect
② Harness defect
③ Engine controller defect

Error code 07-1



Inspection 1:

Carry out an individual inspection of the air-fuel ratio motor.



G13

(1) Air-fuel ratio motor resistance inspection
Ignition key switch OFF, disconnect G13, connect G28

Standard: (Air-fuel ratio motor side)

G13-2 ~ G13-1	20 ± 5 Ω (-10 ~ 50°C) 25 ± 5 Ω (50 ~ 100°C)
G13-2 ~ G13-3	
G13-5 ~ G13-4	
G13-5 ~ G13-6	

(2) Valve operation check
Connect the battery positive terminal to G13-2 and G13-5 and ground in the following terminal order.

Standard: (Air-fuel ratio motor side)
G13-3→G13-6→G13-1→G13-4: Moves to the close side
G13-4→G13-1→G13-6→G13-3: Moves to the open side

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G28, G13 and R/B main relay

Standard:

G28-21 ~ G13-3	Continuity
G28-31 ~ G13-6	Continuity
G28-20 ~ G13-1	Continuity
G28-30 ~ G13-4	Continuity
G13-2 ~ R/B main relay terminal 3	Continuity
G13-5 ~ R/B main relay terminal 3	Continuity
G28-21 ~ Frame	No continuity
G28-31 ~ Frame	No continuity
G28-20 ~ Frame	No continuity
G28-30 ~ Frame	No continuity

● **Error code 08-1 (Low voltage abnormality)**

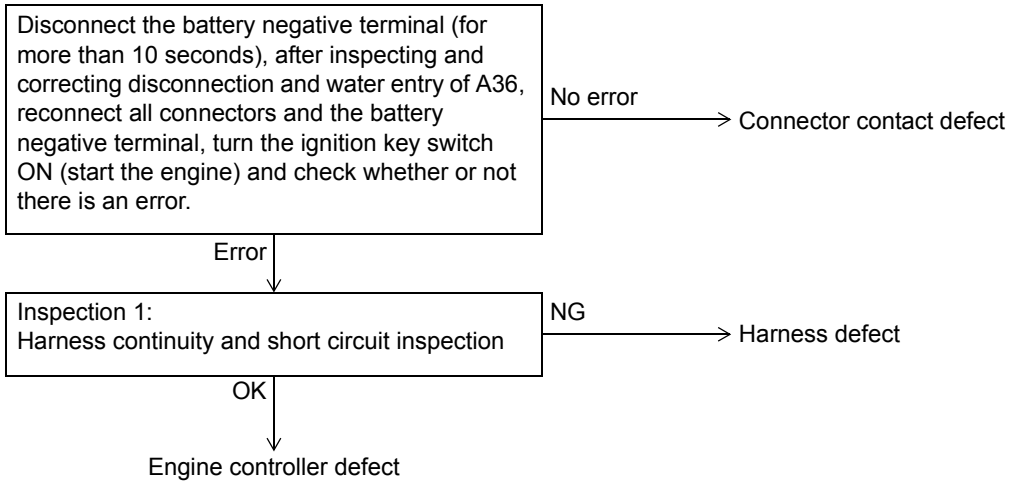
Related portion

Probable cause

① Harness defect

② Engine controller defect

Error code 08-1



Inspection 1:

Inspect for continuity and short circuiting of the harness.

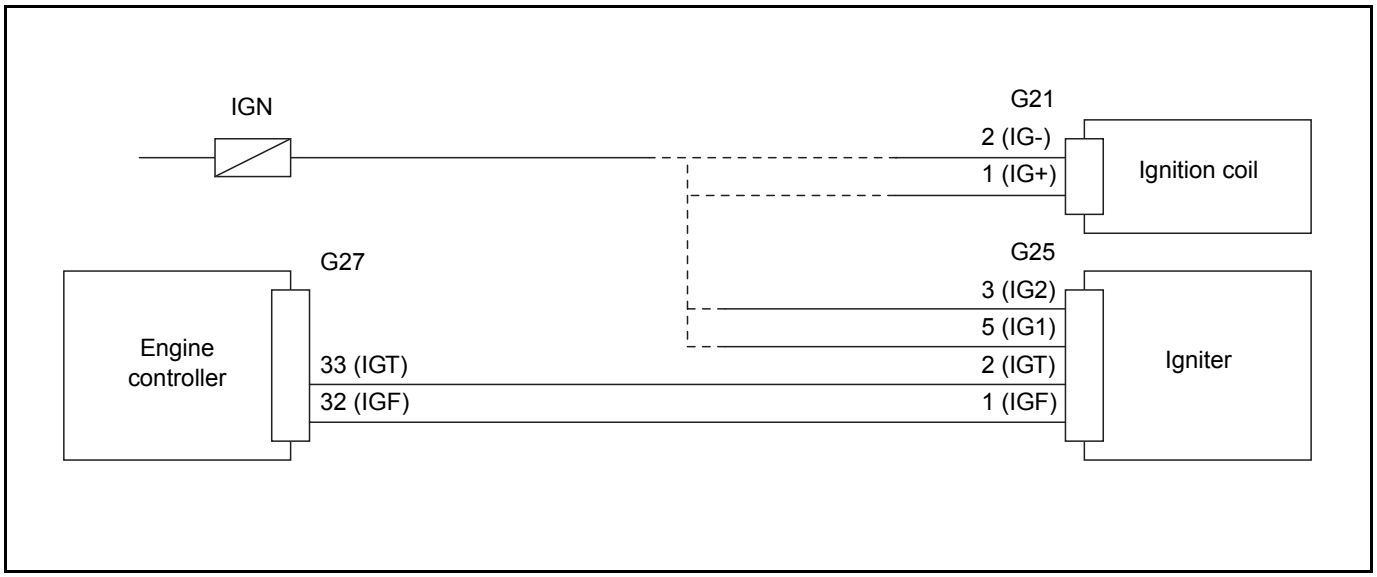
Ignition key switch OFF, disconnect A36

Standard:

A36-3 ~ EFI	Continuity
A36-3 ~ Frame	No continuity

●Error code 09-1 (Ignition signal abnormality)

Related portion



Probable cause

① Ignition coil
② Igniter defect
③ Harness defect
④ Engine controller defect

Error code 09-1

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection of G21 and G25 and internal leakage, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON to start the engine.

Engine will not start

Engine starts

Operate the accelerator pedal and check whether there is an error.

No error → Connector contact defect

Error

Inspection 1:
Ignition abnormality signal (IGF) inspection

NG → Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

OK → Engine controller defect

OK → Igniter defect

Inspection 3:
Ignition coil individual inspection

NG → Ignition coil defect

OK

Inspection 4:
Harness continuity and short circuit inspection

NG → Harness defect

OK

Inspection 5:
Igniter IGT signal inspection

NG → Engine controller defect

OK → Igniter defect

Inspection 1:

Carry out an ignition signal (IGF) inspection.

G25

Ignition key switch OFF, disconnect G25, connect G27, ignition key switch ON, engine stopped

Standard:

G25-1 ~ Frame	4.0 ~ 5.5 V

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G27 and G25

Standard:

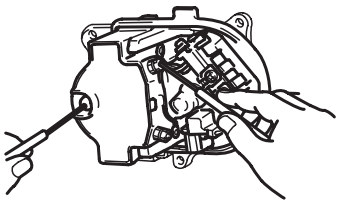
G27-32 ~ G25-1	Continuity
G27-32 ~ Frame	No continuity

Inspection 3:

Carry out distributor individual inspection.

Ignition key switch OFF, disconnect G21 and G25, connect G27

G21



Standard:

Primary side (G21-1 ~ G21-2)	1.2 ~ 1.5 Ω
Secondary side (IIA inner terminal)	7.7 ~ 10.4 Ω

Inspection 4:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G27, G21 and G25

Standard:

G27-33 ~ G25-2	Continuity
G27-32 ~ G25-1	Continuity
G27-33 ~ G27-32	No continuity
G27-33 ~ Frame	No continuity
G27-32 ~ Frame	No continuity
G25-5 ~ G21-2	Continuity
G25-3 ~ G21-1	Continuity
G25-5 ~ G25-3	No continuity
G25-5 ~ frame	No continuity
G25-3 ~ frame	No continuity

Inspection 5:

Carry out an igniter (IGT) signal inspection.

G25

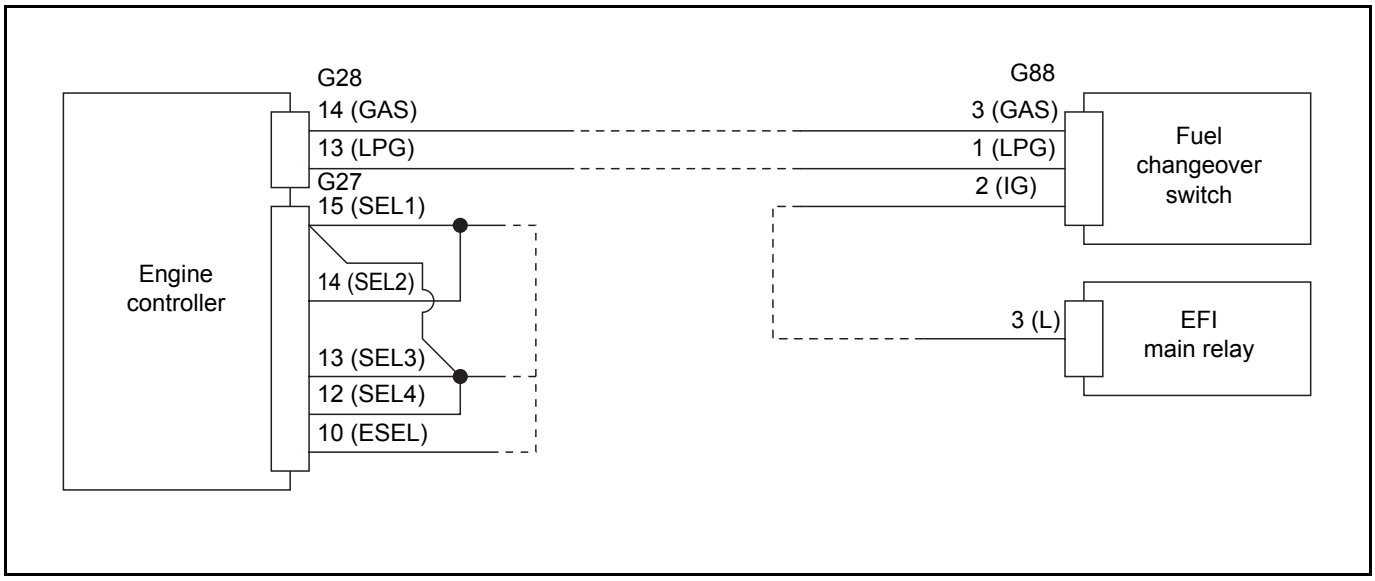
Ignition key switch OFF, disconnect G21 and G25, connect G27, ignition key switch ON, (cranking)

Standard:

G25-2 ~ Frame	Not 0 V

● **Error code 0A-1, 0A-2, 0A-3 (Fuel specification determination abnormality)**

Related portion



Probable cause

① Fuel changeover switch defect
② Harness defect
③ Engine controller defect

Error codes 0A-1, 0A-2, 0A-3

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G88, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Switch input signal inspection
ANL.: I/O ENGINE CTRL 1/10

OK ↓

Inspection 2:
Fuel changeover switch individual inspection

NG → Fuel changeover switch defect

OK ↓

Inspection 3:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Engine controller defect

Inspection 1:

Carry out switch input signal inspection.

Ignition key switch ON
Switch input signal (I/O monitor: G/LP, SEL1-4)

Standard:

Vehicle specification	Fuel changeover switch	G/LP	SEL
Gasoline specification	–	10	1100
LPG exclusive	–	01	0101
LPG/Gasoline convertible	Gasoline selection	10	0110
	LPG selection	01	
	Neutral	00	
Gasoline/CNG convertible	Gasoline selection	10	0101
	CNG selection	01	
	Neutral	00	

Inspection 2:

Carry out fuel changeover switch individual inspection.
(Carry out only for convertible vehicles, and only when the G/LP input in inspection 1 is outside the standard value)

G88

Ignition key switch OFF, disconnect G88, connect G28 and G27

Standard: (Switch side)

	Fuel changeover switch		
	Gasoline	LPG/CNG	Neutral
G88-2 ~ G88-3	Continuity	No continuity	No continuity
G88-2 ~ G88-1	No continuity	Continuity	No continuity

Inspection 3:

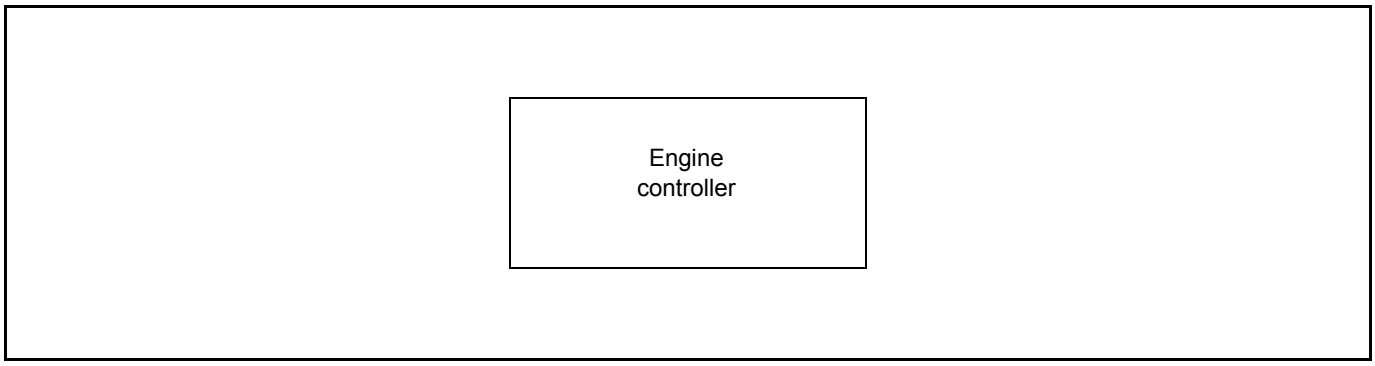
Inspect for continuity and short circuiting of the harness. (Begin with the place that was outside the standard value in inspection 1)

Ignition key switch OFF, disconnect G28, G27 and G88

Vehicle specification	Harness			
	SEL1	SEL2	SEL3	SEL4
Gasoline specification	Short circuit to ESEL	Short circuit to ESEL	–	–
LPG exclusive	Short circuit to ESEL	Short circuit to ESEL	Short circuit to ESEL	–
LPG/Gasoline convertible	–	Short circuit to ESEL	Short circuit to ESEL	–
Gasoline/CNG convertible	–	Short circuit to ESEL	–	Short circuit to ESEL

● **Error code 0A-4 (Engine specification determination abnormality)**

Related portion



Probable cause

① Engine controller defect

Error code 0A-4

Disconnect the battery negative terminal (for 10 seconds or more), reconnect the battery negative terminal, then turn the ignition key switch ON (start the engine) and check whether or not there is an error.

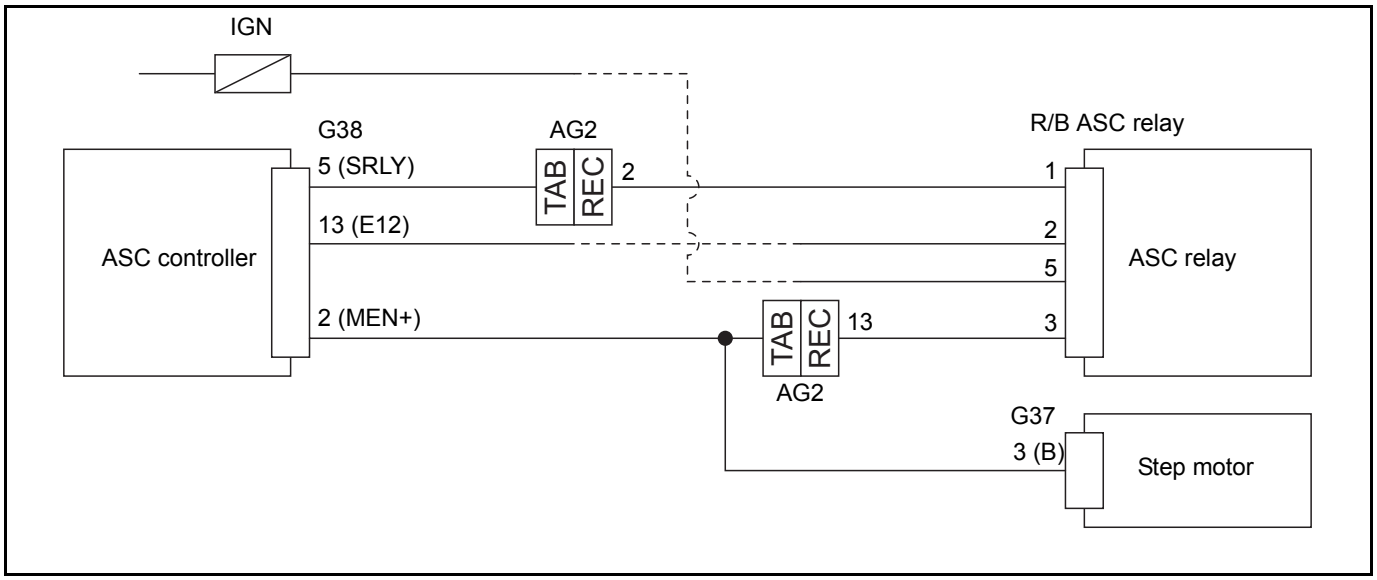
No error → Normal

Error ↓

Engine controller defect

● **Error codes 13-1, 13-2, 13-3 (Relay abnormality)**

Related portion



Probable cause

① Connector contact defect
② ASC relay defect
③ Harness defect
④ ASC controller defect

Error codes 13-1, 13-2, 13-3

Disconnect the battery negative terminal, after inspecting and correcting disconnection and water entry of G38, AG2 and the ASC relay, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON and check whether or not there is an error.

No error → Connector contact defect
ASC relay not plugged in properly

Error ↓

Inspection 1:
ASC relay individual inspection

NG → ASC relay defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

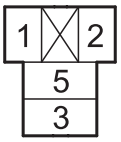
OK ↓

ASC controller defect

Inspection 1:

Carry out ASC relay individual inspection.

Ignition key switch OFF, remove ASC relay



ASC relay

Standard: (Relay side)

At all times	1 ~ 2 terminals	Continuity (approx. 90 Ω)
	3 ~ 5 terminals	No continuity
When battery voltage is applied between terminals 1 ~ 2	3 ~ 5 terminals	Continuity

Inspection 2:

Inspect for continuity and short circuiting of the harness.

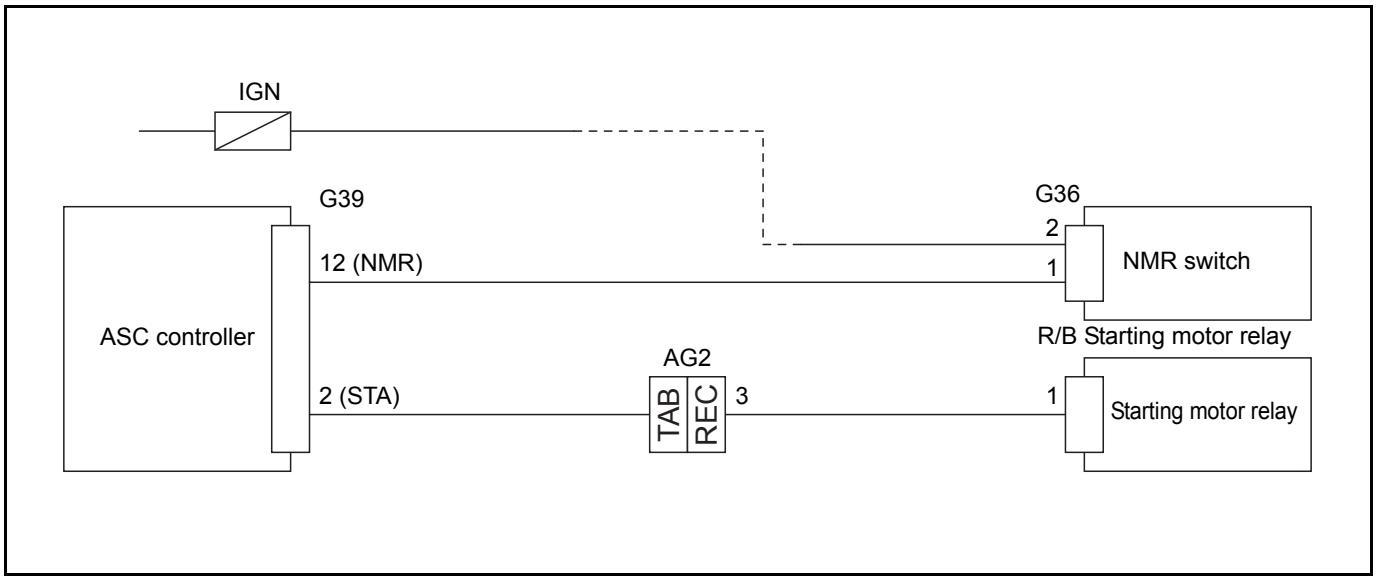
Ignition key switch OFF, disconnect G38, remove ASC relay

Standard:

G38-2 ~ ASC relay terminal 5	Continuity
ASC relay terminal 3 ~ IGN	Continuity
G38-2 ~ BATT	No continuity
G38-5 ~ ASC relay terminal 1	Continuity
G38-5 ~ G38-13	No continuity
G38-5 ~ Frame	No continuity
G38-5 ~ BATT	No continuity
ASC relay terminal 2 ~ Frame	Continuity

● **Error codes 15-1 and 15-2 (NMR switch abnormality)**

Related portion



Probable cause

① Connector contact defect
② NMR switch defect
③ Harness defect
④ ASC controller defect
⑤ Mechanical system defect (link catching, switch position adjustment, step motor defect etc.)

Error codes 15-1, 15-2

Disconnect the battery negative terminal, then inspect and repair disconnection of G36, G39, AG2 and starting motor relay and any water entry.

↓

Reconnect the connectors and the battery negative terminal, then repeat the operations ① to ④ below several times and check whether an error occurs.
① Turn the ignition key switch ON (engine stopped)
② Operate the accelerator pedal ON/OFF (several times)
③ Start the engine with the accelerator fully depressed
④ Release the accelerator pedal and turn the ignition key switch OFF

No error → Connector contact defect

Error ↓

Inspection 1:
NMR switch individual inspection

NG → NMR switch defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 3:
Inspection of the status of the NMR switch which is detected by ASC controller
ANL.: I/O ENGINE CTRL 1/3

NG → ASC controller defect

OK ↓

Refer to and carry out mechanical system inspection items such as link catching or switch position adjustment.

Inspection 1:

Carry out an NMR switch individual inspection.

Ignition key switch OFF, disconnect G36, connect G39

G36

Standard: (Switch side)

	Switch OFF	Switch ON
G36-1 ~ G36-2	No continuity	Continuity

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G36, G39 and starting motor relay

Standard:

G39-12 ~ G36-1	Continuity
IGN ~ G36-2	Continuity
G39-2 ~ Starting motor relay terminal 1	Continuity
G39-12 ~ IGN	No continuity

Inspection 3:

Carry out inspection of the status of the NMR switch in the controller.

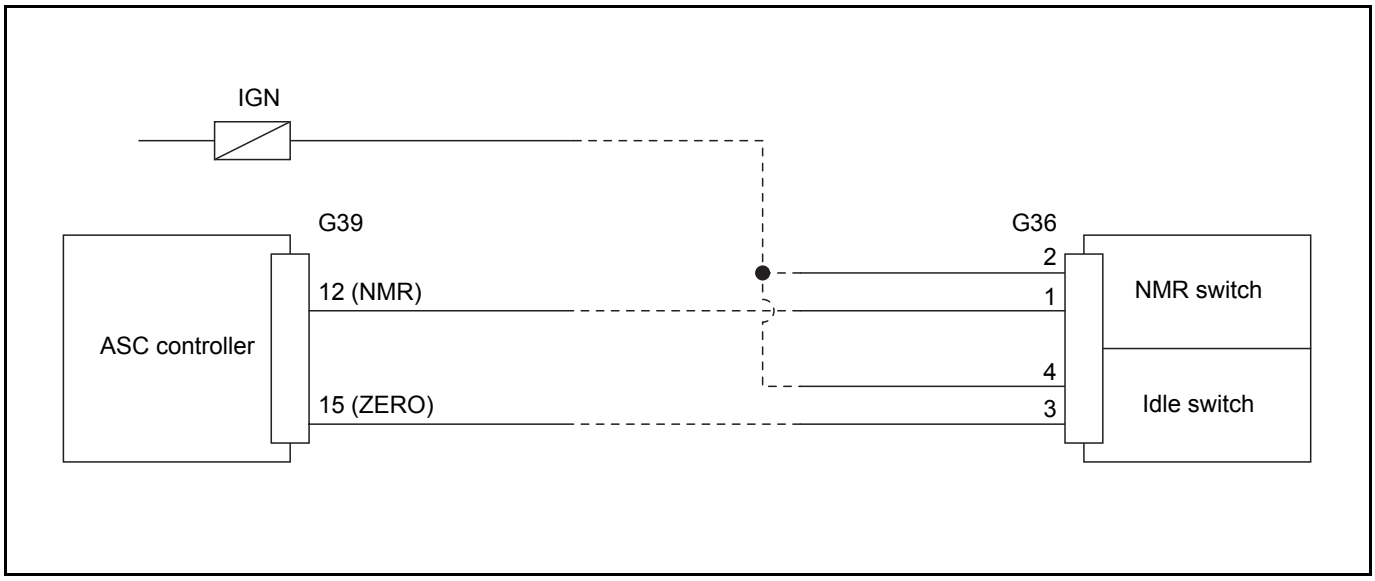
Ignition key switch OFF, remove NMR switch so that it can be turned ON and OFF manually, connect G39 and G36, ignition key switch ON
NMR switch (I/O monitor: NMR)

Standard:

Analyzer display	Switch OFF	Switch ON
NMR	0	1

● **Error code 15-3 (NMR switch abnormality)**

Related portion



Probable cause

① Connector contact defect
② NMR switch defect
③ Idle switch defect
④ Harness defect
⑤ ASC controller defect
⑥ Mechanical system defect (link catching, switch position adjustment, step motor defect etc.)

Error code 15-3

Disconnect the battery negative terminal, then inspect and repair disconnection of G39 and G36 and any water entry.

↓

Reconnect the connectors and the battery negative terminal, then repeat the operations ① to ③ below several times and check whether an error occurs.
① Turn the ignition key switch ON (engine stopped)
② Operate the accelerator pedal ON/OFF (several times)
③ Turn the ignition key switch OFF

No error → Connector contact defect

Error ↓

Inspection 1:
NMR and idle switch individual inspection

NG → NMR switch defect
Idle switch defect

OK ↓

Inspection 2:
Carry out harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 3:
Inspection of the status of the NMR and idle switches in the controller
ANL.: I/O ENGINE CTRL 1/3

NG → ASC controller defect

OK ↓

Refer to and carry out mechanical system inspection items such as link catching or switch position adjustment.

Inspection 1:

Carry out an NMR and idle switch individual inspection.

Ignition key switch OFF, disconnect G36, connect G39

G36

Standard: (Switch side)

	Switch OFF	Switch ON
G36-1 ~ G36-2	No continuity	Continuity
G36-3 ~ G36-4	No continuity	Continuity

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G36 and G39

Standard:

G39-12 ~ IG	No continuity
G39-15 ~ IG	No continuity

Inspection 3:

Carry out inspection of the status of the NMR and idle switches which is detected by controller.

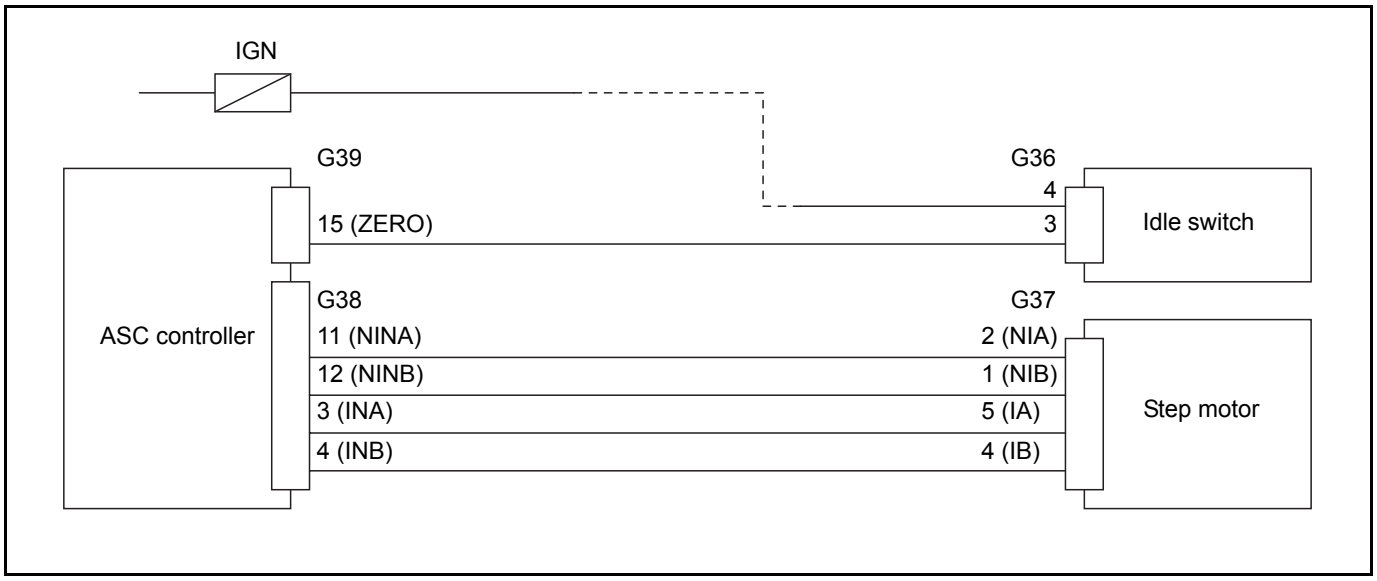
Ignition key switch OFF, remove NMR and idle switches so that they can be turned ON and OFF manually, connect G36 and G39, ignition key switch ON
NMR and idle switches (I/O monitor: NMR, IDLE)

Standard:

Analyzer display	Switch OFF	Switch ON
NMR	0	1
IDLE	0	1

● **Error codes 16-1 and 16-2 (Idle switch abnormality)**

Related portion



Probable cause

① Connector contact defect
② Idle switch defect
③ Harness defect
④ ASC controller defect
⑤ Mechanical system defect (link catching, switch position adjustment, step motor defect etc.)

Note:
In the case where a 13-1 error is present, service that error first before dealing with this one.

Error codes 16-1, 16-2

Disconnect the battery negative terminal, then inspect and repair disconnection and water entry of G39, G36 and G37.

↓

Reconnect the connectors and the battery negative terminal, then repeat the operations ① to ③ below several times and check whether an error occurs.
① Turn the ignition key switch ON (engine stopped)
② Operate the accelerator pedal ON/OFF (several times)
③ Turn the ignition key switch OFF

No error → Connector contact defect

Error ↓

Inspection 1:
Idle switch individual inspection

NG → Idle switch defect

OK ↓

Inspection 2:
Carry out harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 3:
Inspection of the status of the idle switch which is detected by controller
ANL.: I/O ENGINE CTRL 1/3

NG → ASC controller defect

OK ↓

Refer to and carry out mechanical system inspection items such as link catching or switch position adjustment.

Inspection 1:

Carry out idle switch individual inspection.

Ignition key switch OFF, disconnect G36, connect G39

G36

Standard: (Switch side)

	Switch OFF	Switch ON
G36-3 ~ G36-4	No continuity	Continuity

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G36, G37, G38 and G39

Standard:

G39-15 ~ G36-3	Continuity
IGN ~ G36-4	Continuity
G39-15 ~ IGN	No continuity
G38-11 ~ G37-2	Continuity
G38-12 ~ G37-1	Continuity
G38-3 ~ G37-5	Continuity
G38-4 ~ G37-4	Continuity
G38-11 ~G38-12	No continuity
G38-11 ~ G38-3	No continuity
G38-11 ~ G38-4	No continuity
G38-12 ~ G38-3	No continuity
G38-12 ~ G38-4	No continuity
G38-3 ~ G38-4	No continuity
G38-11 ~ IGN	No continuity
G38-12 ~ IGN	No continuity
G38-3 ~ IGN	No continuity
G38-4 ~ IGN	No continuity
G38-11 ~ Frame	No continuity
G38-12 ~ Frame	No continuity
G38-3 ~ Frame	No continuity
G38-4 ~ Frame	No continuity

Inspection 3:

Carry out inspection of the status of the idle switch which is detected by controller.

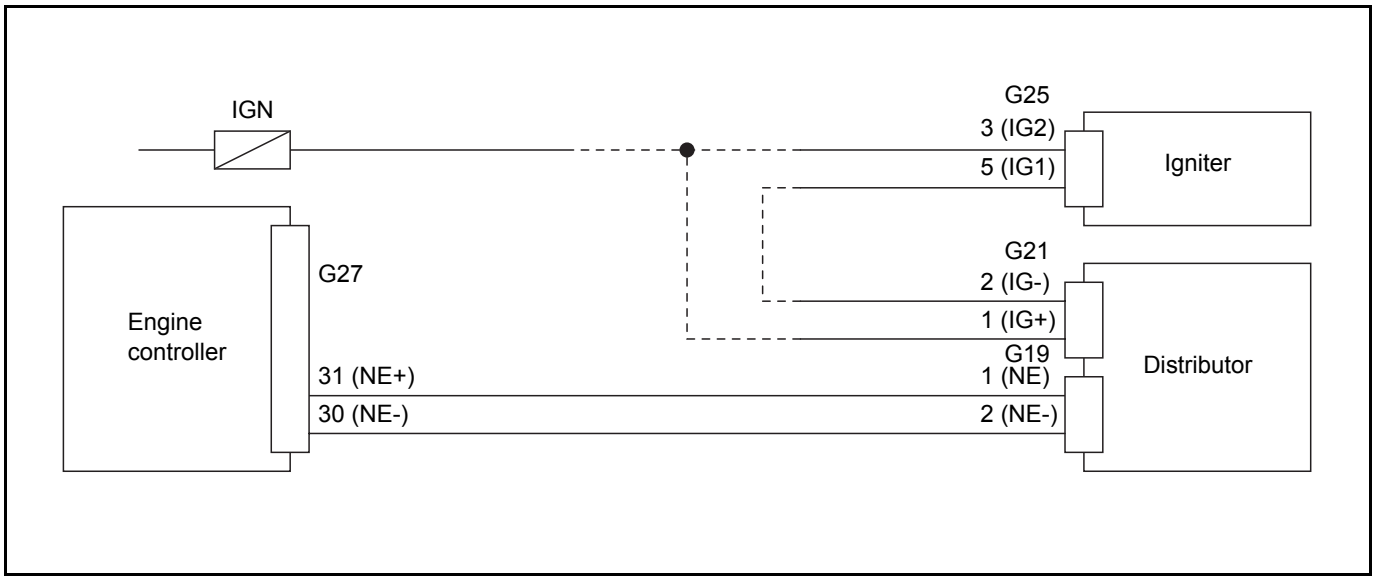
Ignition key switch OFF, remove idle switch so that it can be turned ON and OFF manually, connect G36 and G39, ignition key switch ON
Idle switch (I/O monitor: IDLE)

Standard:

Analyzer display	Switch OFF	Switch ON
IDLE	0	1

● **Error codes 18-1, 18-2 (4Y engine: Cam angle sensor abnormality)**

Related portion



Probable cause

① Distributor (cam angle sensor) defect
② Starter defect
③ Defect in the part connecting the starter and engine
④ Harness defect
⑤ Engine controller defect

Caution:

If the engine does not crank, troubleshoot "Does not crank (see 19-156)" first.

Error codes 18-1, 18-2

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G19, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Distributor individual inspection

NG → Distributor (cam angle sensor) defect

OK ↓

Inspection 2:
Timing rotor operation inspection

NG → Starter defect
Defect in the part connecting the starter and engine

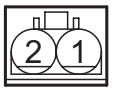
OK ↓

Inspection 3:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Engine controller defect



G19

Inspection 1:

Carry out distributor individual inspection.

Ignition key switch OFF, disconnect G19 and G21, connect G27

(1) Pickup coil (2 in series) resistance measurement

Standard: (Distributor side)

G19-1 ~ G19-2	460 ± 50 Ω

(2) Inspection of the air gap between the pickup coils and the timing rotor

Standard: 0.2 ~ 0.4 mm (0.008 ~ 0.016 in)

Inspection 2:

Inspect the timing rotor operation.

Disconnect G19 and G21, connect G27, ignition key switch ON

Standard: Timing rotor rotates during cranking

Inspection 3:

Inspect for continuity and short circuiting of the harness.

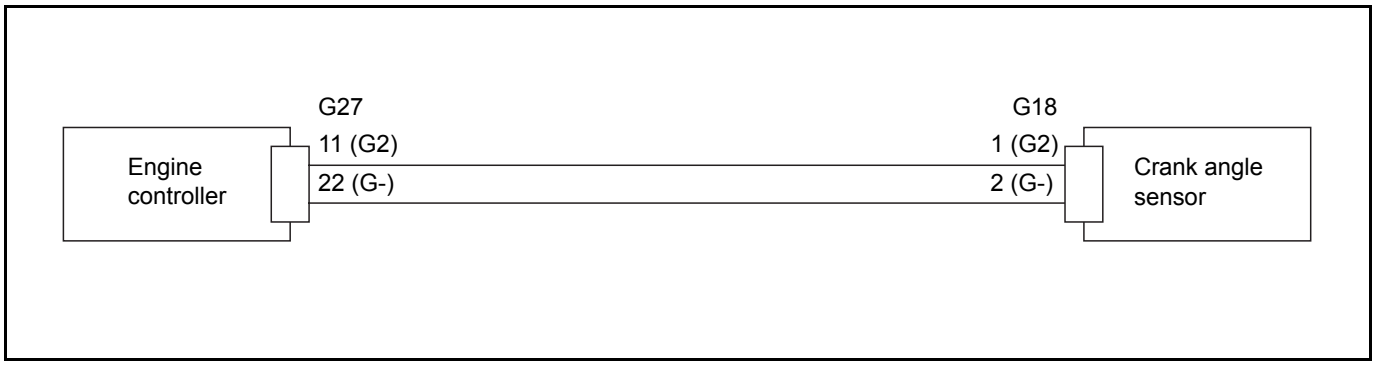
Ignition key switch OFF, disconnect G19, G21 and G27

Standard:

G27-31 ~ G19-1	Continuity
G27-30 ~ G19-2	Continuity
G27-31 ~ G27-30	No continuity

● **Error code 18-3 (4Y engine: Crank angle sensor abnormality)**

Related portion



Probable cause

① Crank angle sensor defect
② Harness defect
③ Engine controller defect

Error code 18-3

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of G18, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.

No error → Connector contact defect

Error ↓

Inspection 1:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 2:
Crank angle sensor individual inspection

NG → Crank angle sensor defect

OK ↓

Inspection 3:
Crank angle sensor installation inspection

↓

Install the crank angle sensor, connect G27, G18 and battery negative terminal, start the engine. Check whether an error occurs.

No error → Normal
(Entry of foreign matter etc.)

Error ↓

Engine controller defect

Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G27 and G18

Standard:

G27-11 ~ G18-1	Continuity
G27-22 ~ G18-2	Continuity
G27-11 ~ G27-22	No continuity

Inspection 2:

Carry out crank angle sensor individual inspection.

Ignition key switch OFF, disconnect G27 and G18

Standard: (Sensor side)

G18-1 ~ G18-2	1100 ± 150 Ω

G18

Inspection 3:

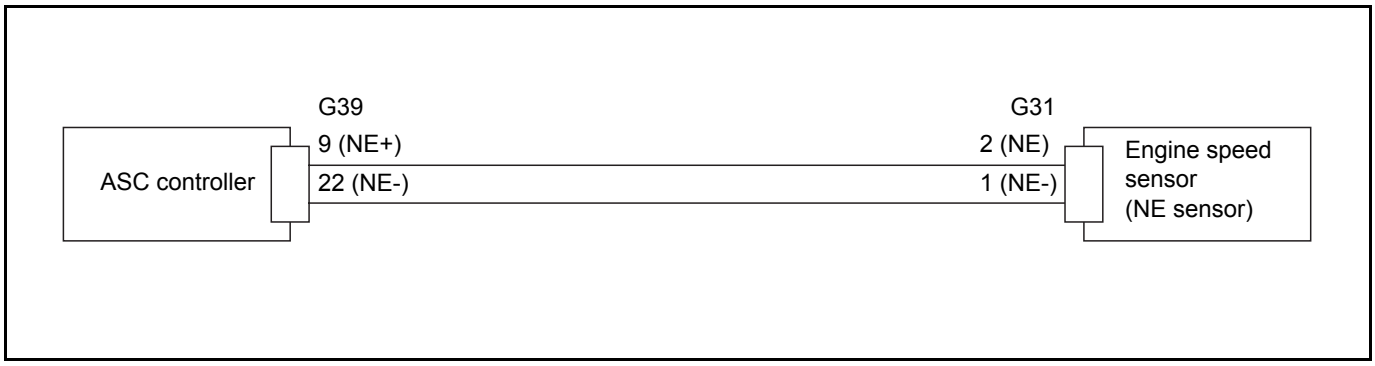
Carry out crank angle sensor installation inspection.

Ignition key switch OFF, disconnect G27 and G18

Standard:
Remove the crank angle sensor, ensure that there is no foreign matter etc. adhereing to the sensor part. If there is remove it.

● **Error codes 18-1, 18-2 (1DZ-II, 2Z engines: NE sensor abnormality)**

Related portion

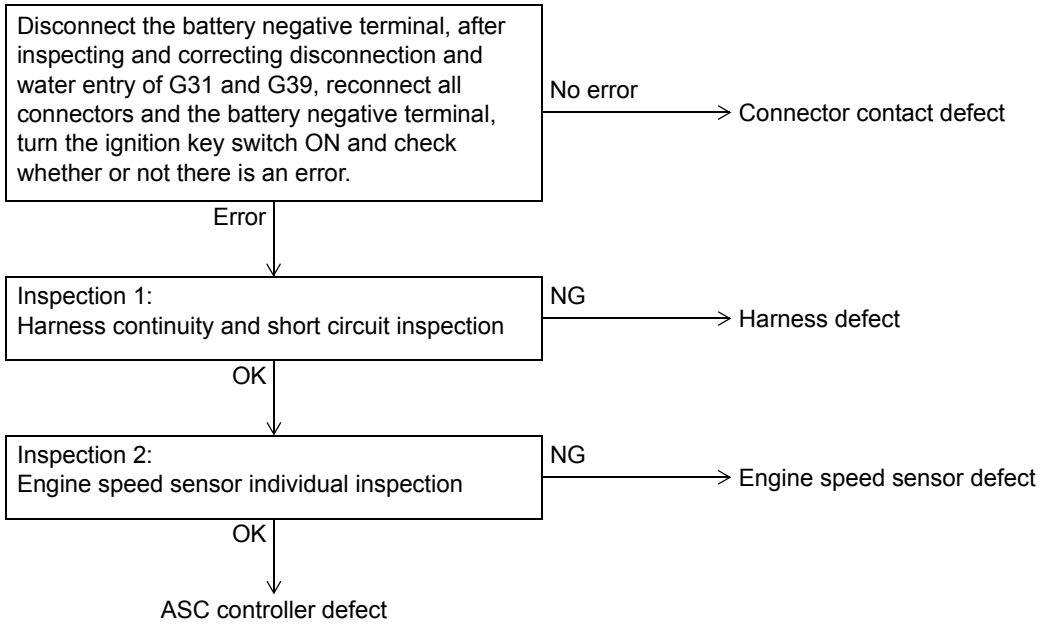


Probable cause

① Connector contact defect
② Engine speed sensor defect
③ Harness defect
④ ASC controller defect

Caution:
In the event that the engine stops while traveling, when the ignition key switch is turned from OFF to ON, an 18-2 error may be detected, however this is not a fault.
Stop the vehicle, turn the ignition key switch OFF and restart the engine.

Error codes 18-1, 18-2



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G31 and G39

Standard:

G39-9 ~ G31-2	Continuity
G39-22 ~ G31-1	Continuity
G39-9 ~ G39-22	No continuity

Inspection 2:

Carry out engine speed sensor individual inspection.

Ignition key switch OFF, disconnect G31 and G39

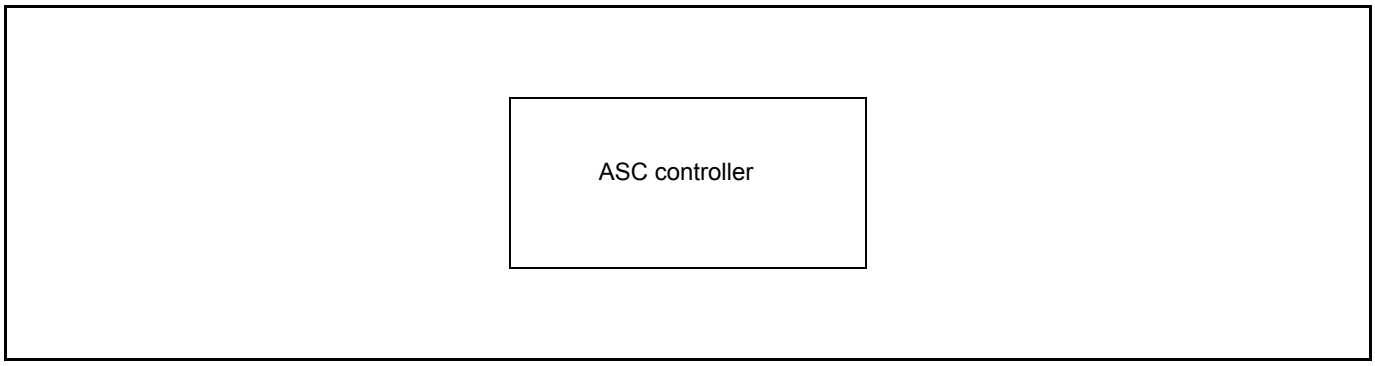
G31

Standard: (Sensor side)

G31-1 ~ G31-2	Approx. 1 kΩ

● **Error codes 1F-1, 1F-2, 1F-3, 1F-4, 1F-5, 1F-6, 1F-7, 1F-8 (CPU abnormality)**

Related portion

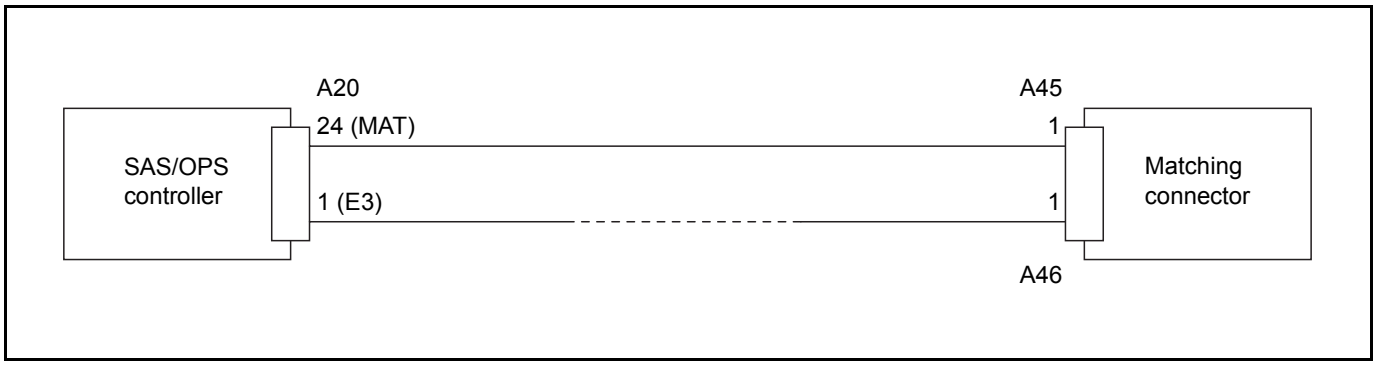


Probable cause

① ASC controller defect

● **Error code 41-1 (Matching connector abnormality)**

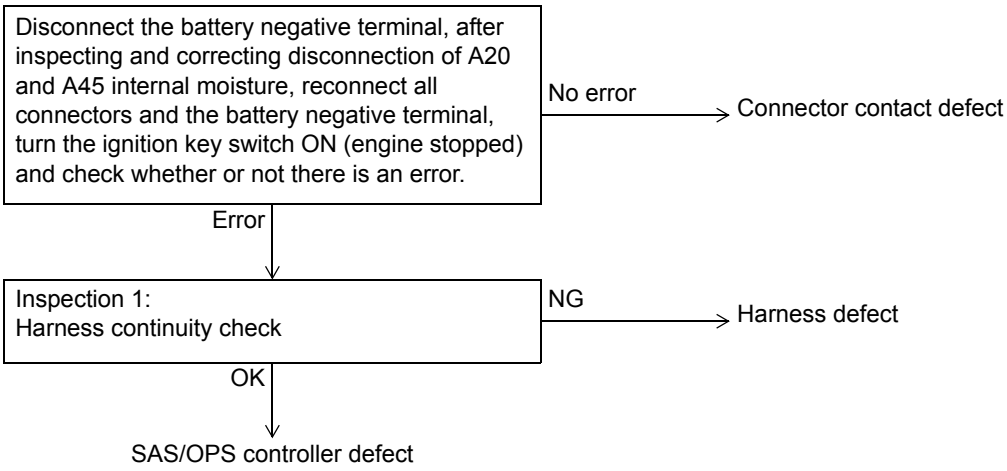
Related portion



Probable cause

① Connector contact defect
② Matching connector harness defect
③ SAS/OPS controller defect

Error code 41-1



Inspection 1:

Inspect for continuity of the harness.

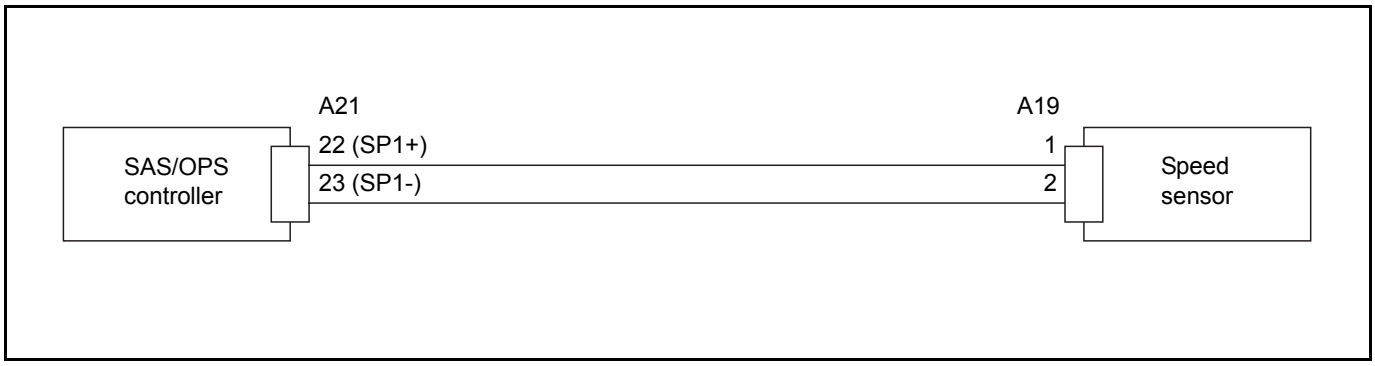
Ignition key switch OFF, disconnect A20, A45 and A46

Standard:

A20-24 ~ A45-1	Continuity
A20-1 ~ A46-1	Continuity

● **Error codes 51-1, 51-2 (Speed sensor abnormality)**

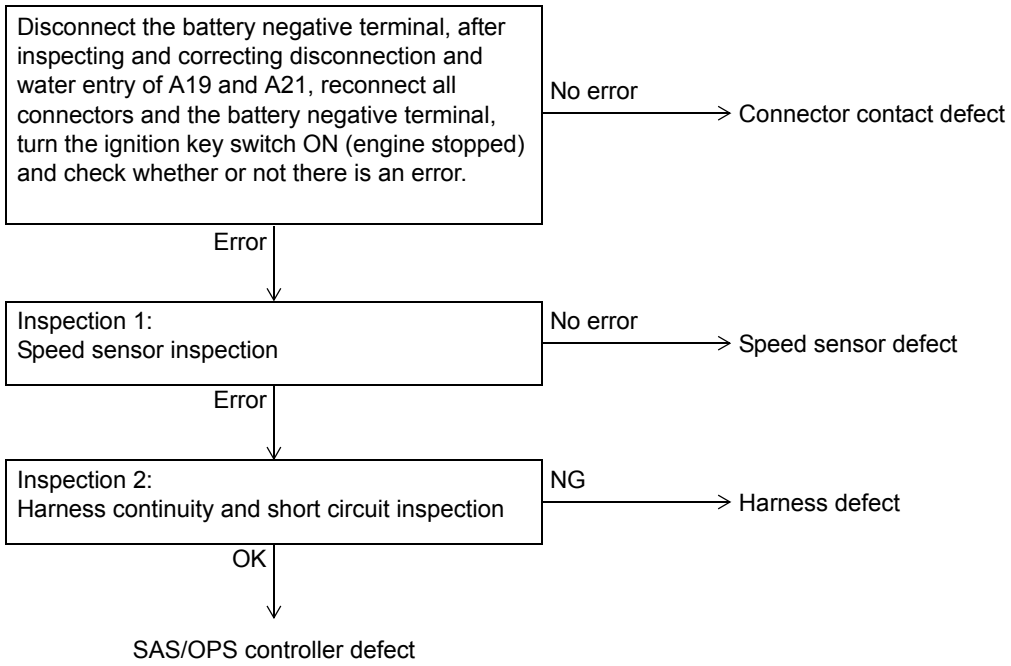
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Speed sensor defect
④ SAS/OPS controller defect

Error code 51-1



Inspection 1:

Ignition key switch OFF, disconnect A19, use SST 09236-13900-71 to short circuit A19, ignition key switch ON, engine stopped

51-1 displayed → to inspection 2
No error displayed → Speed sensor error

Inspection 2:

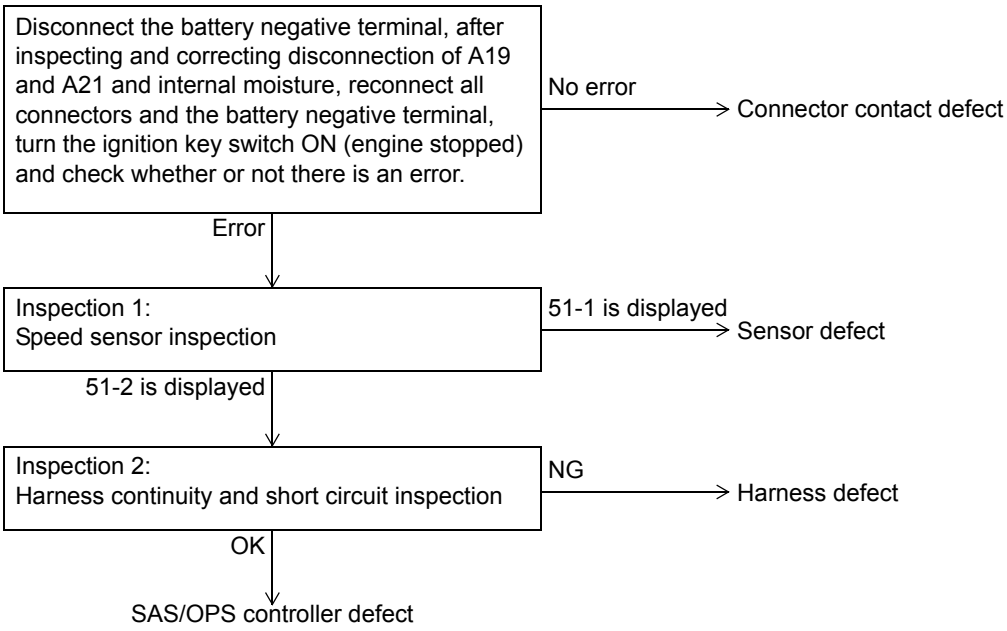
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A19 and A21

Standard:

A21-22 ~ A19-1	Continuity
A21-23 ~ A19-2	Continuity
A21-22 ~ Frame	No continuity
A21-23 ~ Frame	No continuity

Error code 51-2



Inspection 1:

Ignition key switch OFF, disconnect A19, ignition key switch ON, engine stopped

51-2 displayed → to next inspection
51-1 displayed → Speed sensor defect

Inspection 2:

Inspect for continuity and short circuiting of the harness.

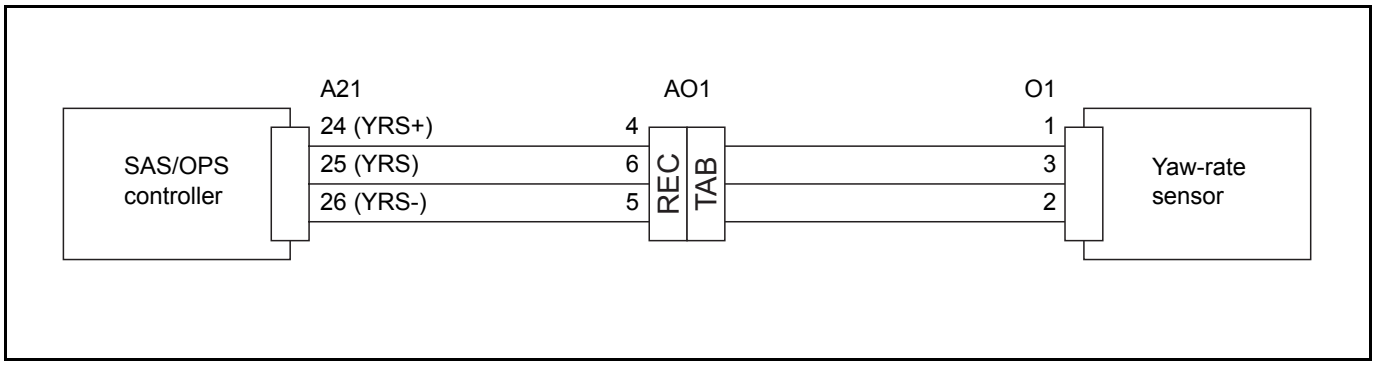
Ignition key switch OFF, disconnect A19 and A21

Standard:

A21-22 ~ A19-1	Continuity
A21-23 ~ A19-2	Continuity
A21-22 ~ Frame	No continuity
A21-23 ~ Frame	No continuity

● **Error codes 52-1, 52-2, 52-3 (Yaw rate sensor abnormality)**

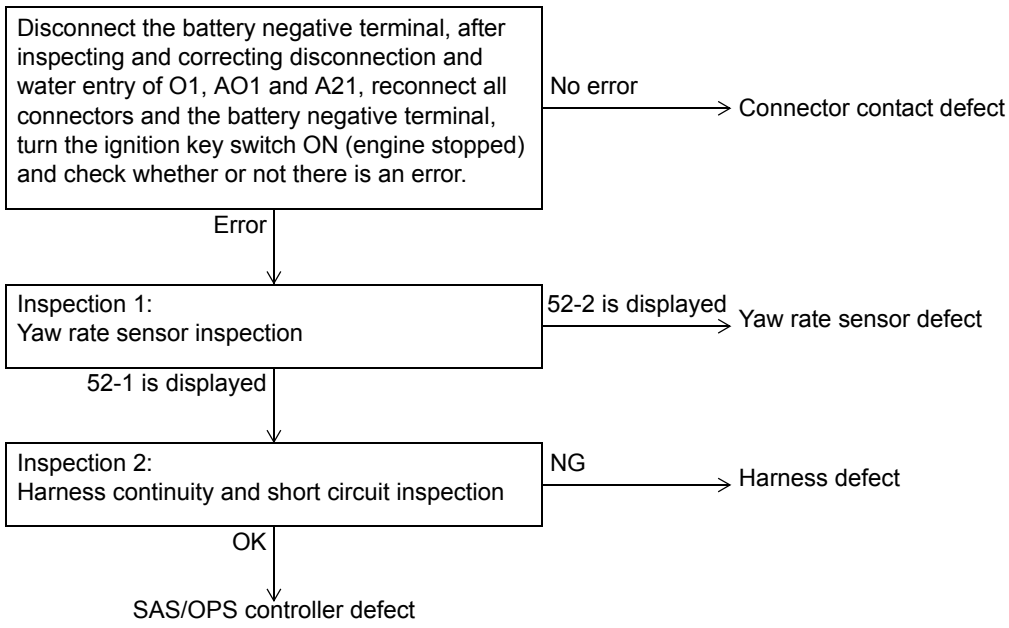
Related portion



Probable cause

① Connector contact defect
② Yaw rate sensor harness defect
③ Yaw rate sensor defect
④ SAS/OPS controller defect

Error code 52-1



Inspection 1:

Ignition key switch OFF, disconnect O1, use SST 09232-13130-71 to short circuit O1-1 and O1-3, ignition key switch ON, engine stopped

52-1 displayed → to inspection 2
52-2 displayed → Yaw rate sensor defect

Inspection 2:

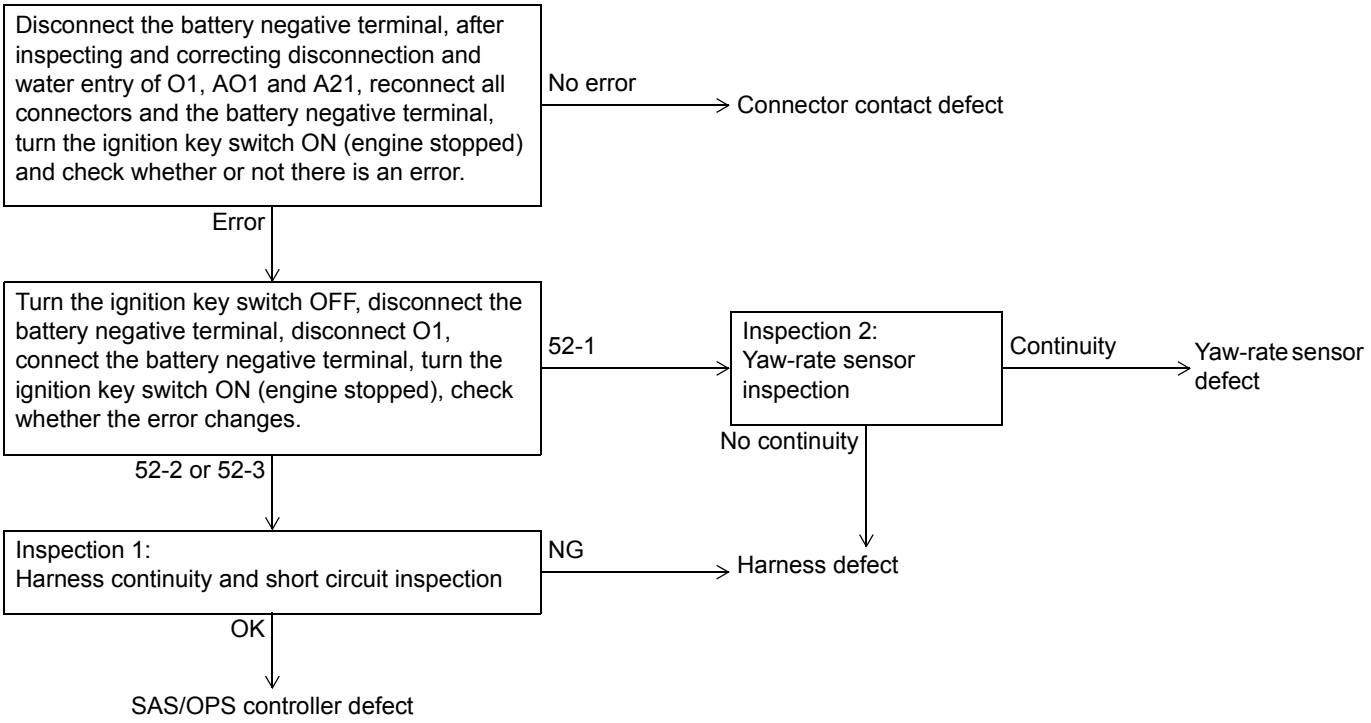
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect O1 and A21

Standard:

A21-25 ~ O1-3	Continuity
A21-26 ~ O1-2	Continuity
A21-24 ~ O1-1	Continuity
A21-24 ~ Frame	No continuity
A21-25 ~ Frame	No continuity
A21-26 ~ Frame	No continuity

Error codes 52-2, 52-3



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect O1 and A21

Standard:

A21-25 ~ O1-3	Continuity
A21-26 ~ O1-2	Continuity
A21-24 ~ O1-1	Continuity
A21-24 ~ Frame	No continuity
A21-25 ~ Frame	No continuity
A21-26 ~ Frame	No continuity

Inspection 2:

Yaw-rate sensor inspection

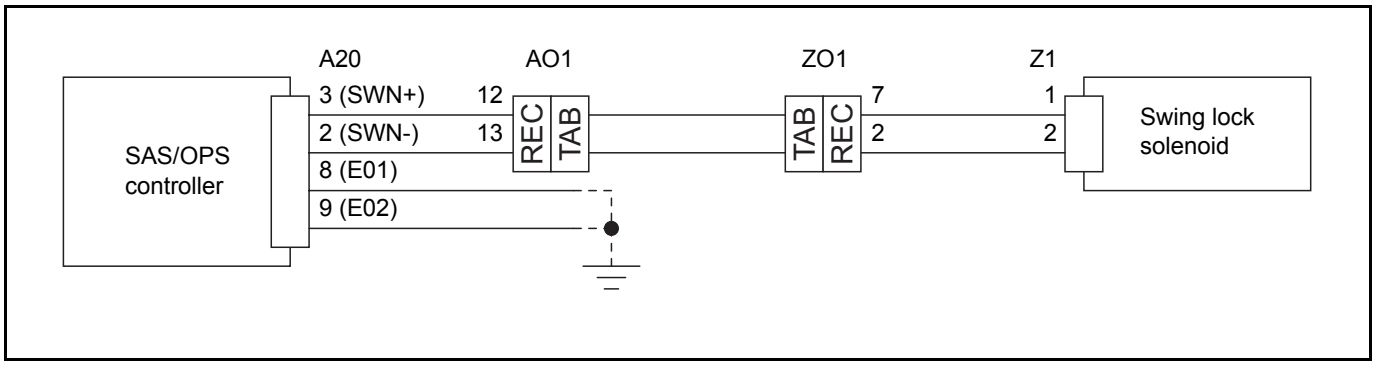
Ignition key switch OFF, disconnect A21 and O1, use SST 09232-13130-71 to short circuit O1-2 to O1-3 (main harness side)

Standard:

A21-25 ~ A21-26	Continuity
A21-25 ~ Frame	No continuity
A21-26 ~ Frame	No continuity

● **Error code 54-1 (Swing lock solenoid abnormality)**

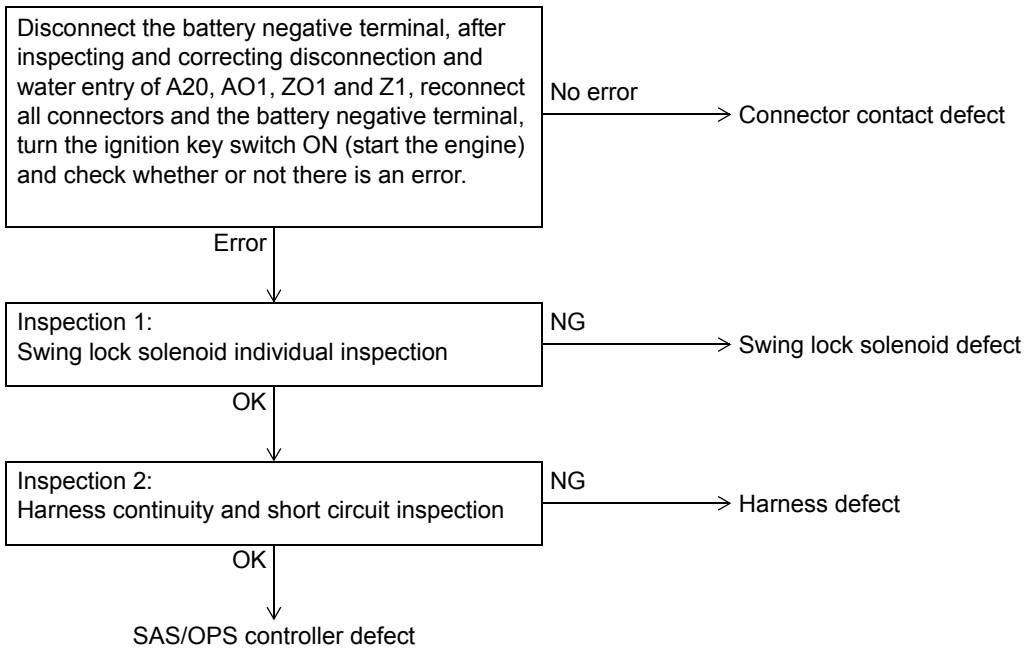
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Swing lock solenoid defect
④ SAS/OPS controller defect

Error code 54-1

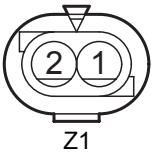


*: Make sure that no error is displayed when driving in a circle or during repeated left and right turns.

Inspection 1:

Carry out swing lock solenoid individual inspection.

Ignition key switch OFF, disconnect Z1



Z1

Standard: (Solenoid side)

Z1-1 ~ Z1-2	Approx. 6 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

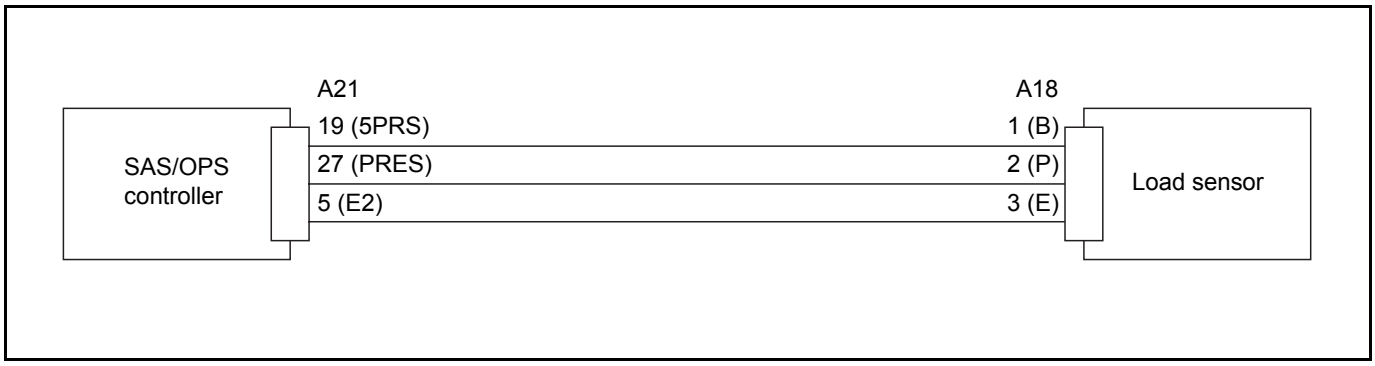
Ignition key switch OFF, disconnect Z1 and A20

Standard:

A20-3 ~ Z1-1	Continuity
A20-2 ~ Z1-2	Continuity
A20-3 ~ Frame	No continuity
A20-2 ~ Frame	No continuity

● **Error codes 61-1, 61-2 (Load sensor abnormality)**

Related portion



Probable cause

① Connector contact defect
② Load sensor defect
③ Harness defect
④ SAS/OPS controller defect

Error code 61-1

Disconnect the battery negative terminal, after inspecting and correcting disconnection and water entry of A18 and A21, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (engine stopped) and check whether or not there is an error.
→ No error → Connector contact defect
↓ Error

Inspection 1:
Load sensor individual inspection
→ 61-2 is displayed → Load sensor defect
↓ 61-1 is displayed

Inspection 2:
Harness continuity and short circuit inspection
→ No continuity → Main harness defect
↓ Continuity

Inspection 3:
Harness continuity and short circuit inspection
→ No continuity → SAS/OPS controller defect
↓ Continuity

Main harness defect

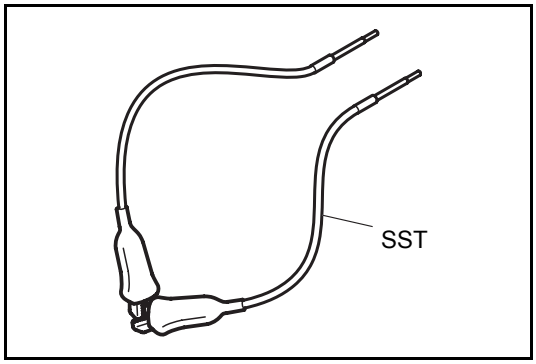
Inspection 1:

Carry out load sensor individual inspection.

Ignition key switch OFF, disconnect A18, use SST 09230-13700-71 to short circuit A18-1 and A18-2 (main harness side), ignition key switch ON, engine stopped

61-1 displayed → to inspection 2

61-2 displayed → load sensor defect



Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21 (with the SST used in inspection 1 still connected)

Standard:

A21-19 ~ A21-27	Continuity

Inspection 3:

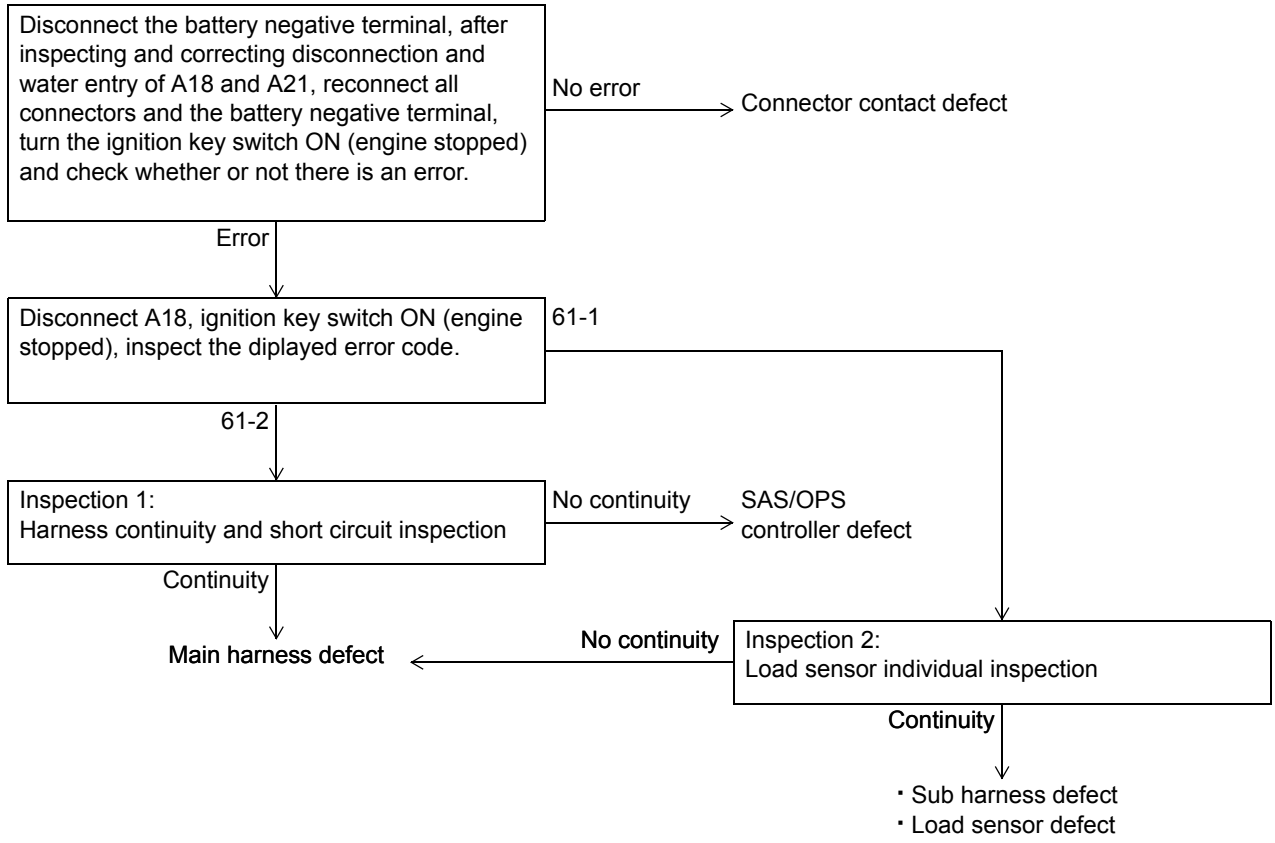
Inspect for continuity and short circuiting of the harness.

In the same state as for inspection 2

Standard:

A21-27 ~ A21-5	No continuity
A21-19 ~ Frame	No continuity
A21-27 ~ Frame	No continuity

Error code 61-2



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-19 ~ A21-27	No continuity
A21-19 ~ Frame	No continuity
A21-27 ~ Frame	No continuity

Inspection 2:

Carry out load sensor individual inspection.

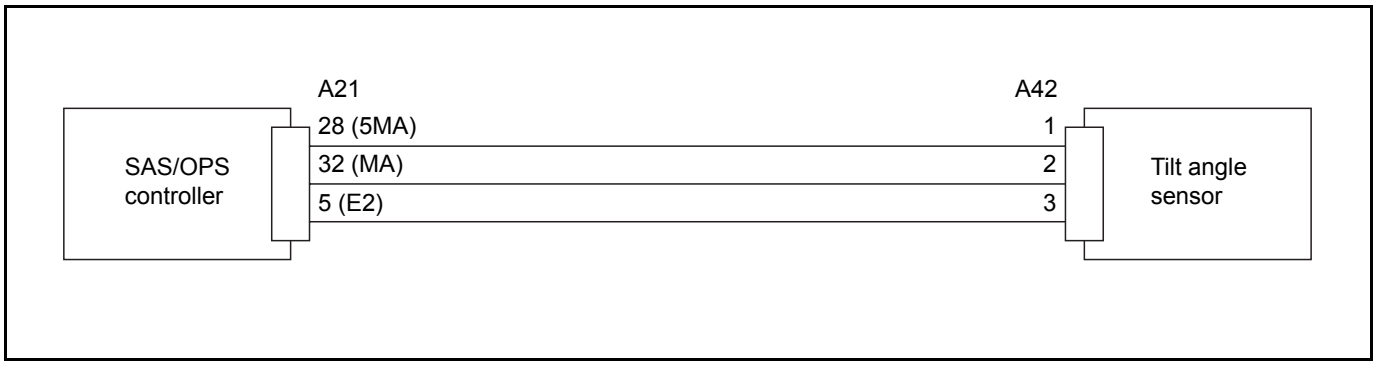
Ignition key switch OFF, disconnect the battery negative terminal, disconnect A18 and A21, use SST 09230-13700-71 to short circuit A18-2 to A18-3 (main harness side)

Standard:

A21-27 ~ A21-5	Continuity

● **Error codes 62-1, 62-2 (Tilt angle sensor abnormality)**

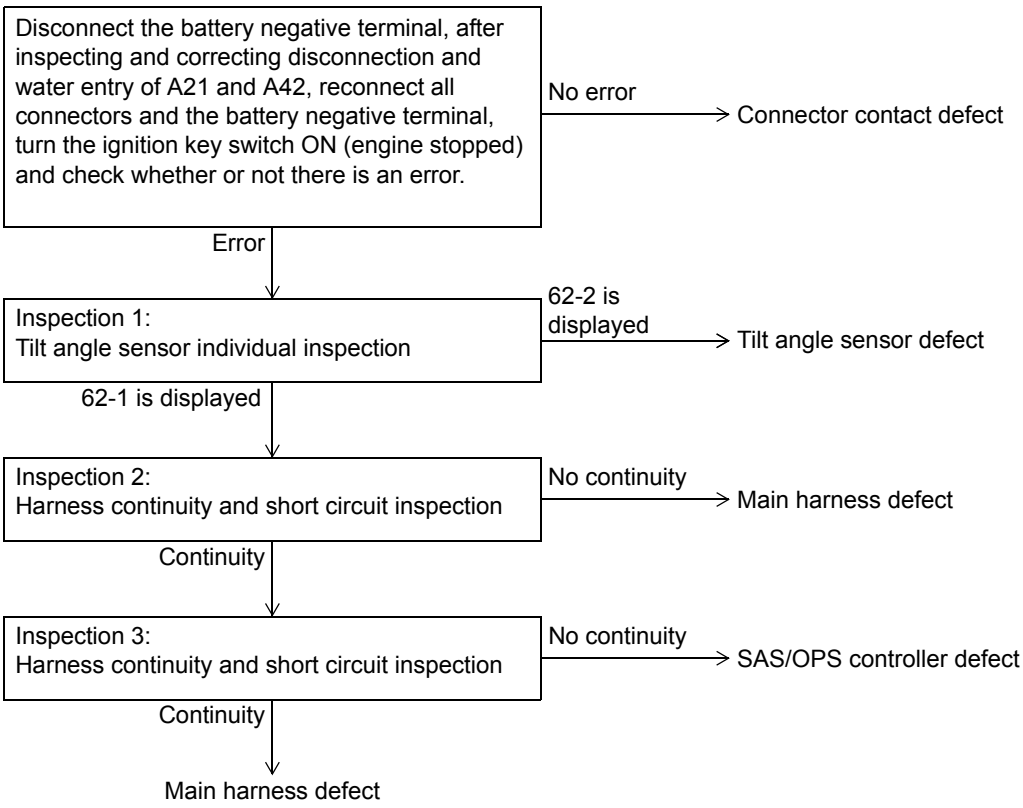
Related portion



Probable cause

① Connector contact defect
② Tilt angle sensor harness defect
③ Tilt angle sensor defect
④ SAS/OPS controller defect

Error code 62-1



Inspection 1:

Carry out tilt angle sensor individual inspection.

Ignition key switch OFF, disconnect A42, use SST 09232-13130-71 to short circuit A42-1 and A42-2 (main harness side), ignition key switch ON (engine stopped)

62-1 displayed → to inspection 2

62-2 displayed → tilt angle sensor defect

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21 (with the SST used in inspection 1 still connected)

Standard:

A21-28 ~ A21-32	Continuity

Inspection 3:

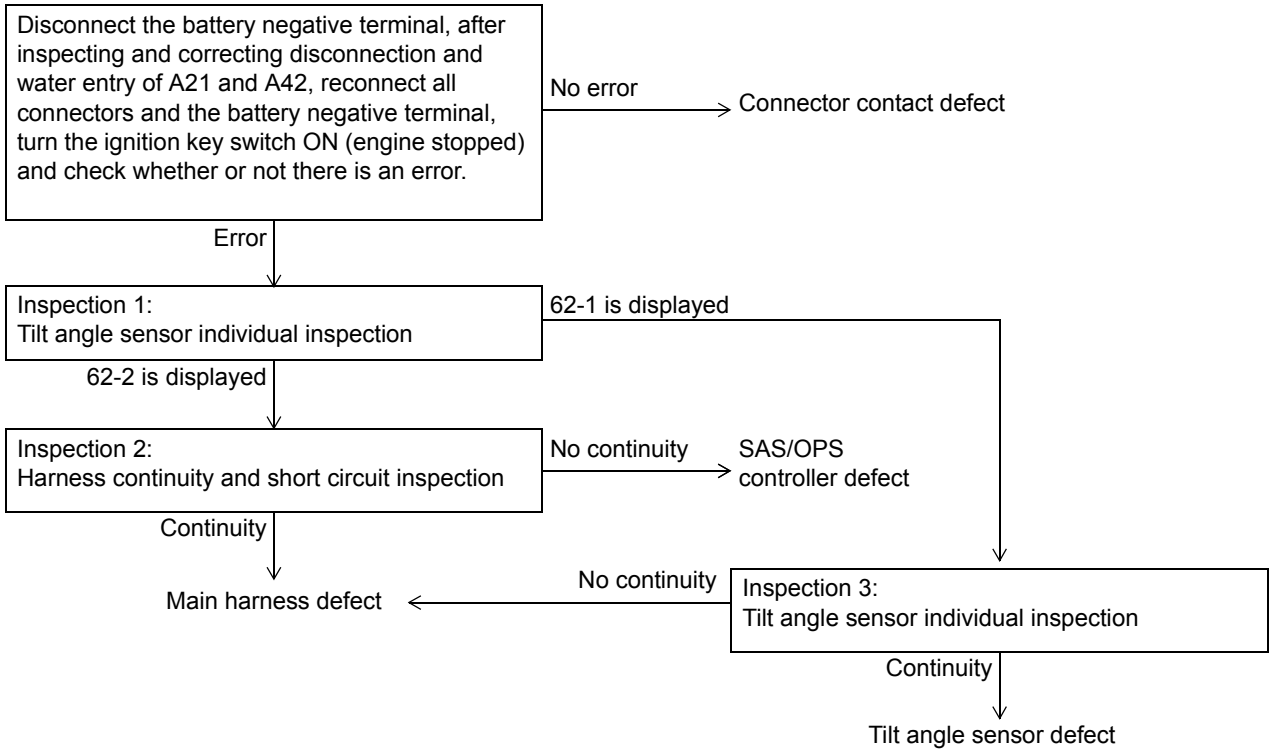
Inspect for continuity and short circuiting of the harness.

In the same state as for inspection 2

Standard:

A21-32 ~ A21-5	No continuity
A21-28 ~ Frame	No continuity
A21-32 ~ Frame	No continuity

Error code 62-2



Inspection 1:

Carry out tilt angle sensor individual inspection.

Ignition key switch OFF, disconnect A42, ignition key switch ON, engine stopped
62-1 displayed → to inspection 3
62-2 displayed → to inspection 2

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-28 ~ A21-32	No continuity

Inspection 3:

Carry out tilt angle sensor individual inspection.

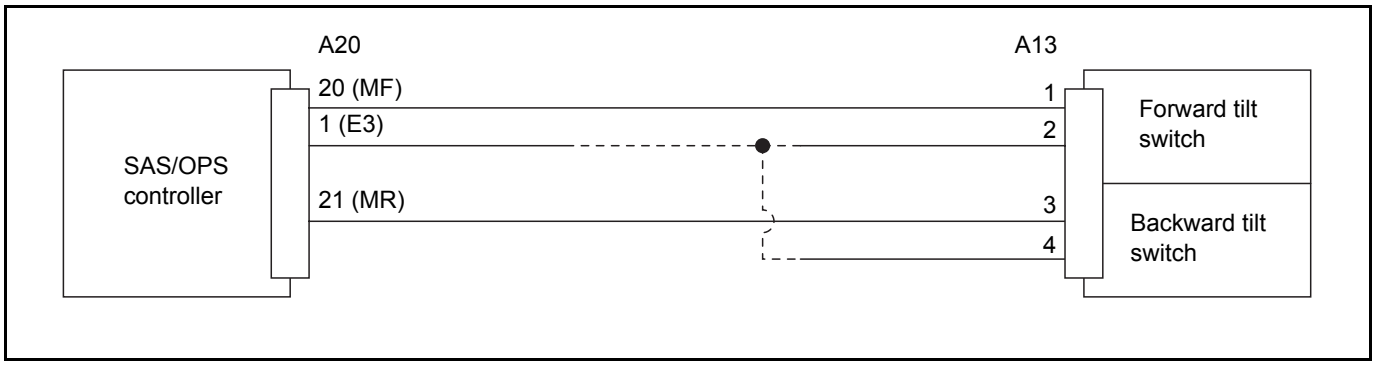
Ignition key switch OFF, disconnect A21 and A42, use SST 09232-13130-71 to short circuit A21-2 and A42-3 (main harness side)

Standard:

A42-32 ~ A21-5	Continuity

● **Error codes 63-1, 63-2, 63-3 (Tilt lever switch abnormality)**

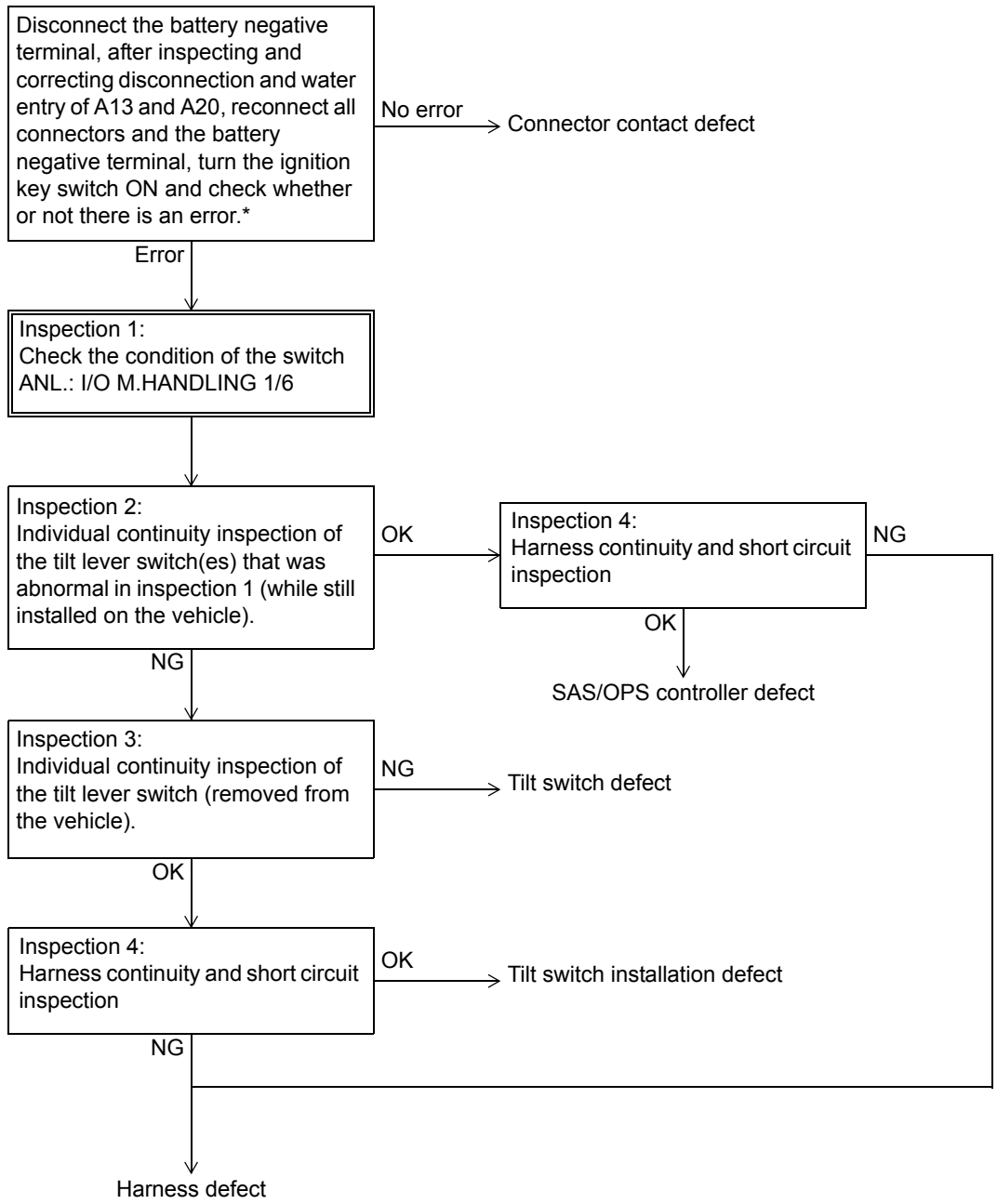
Related portion



Probable cause

① Connector contact defect
② Forward tilt switch defect
③ Backward tilt switch defect
④ Harness defect
⑤ Tilt switch installation defect
⑥ SAS/OPS controller defect

Error codes 63-1, 63-2, 63-3



*: Make sure there is no error displayed after turning the ignition key switch ON, and moving the tilt lever forward and backward. Also, make sure that no error is displayed when the tilt lever is left standing in neutral position for 2 minutes.

Inspection 1:

Check the condition of the switch.

Ignition key switch ON, engine stopped
Tilt switch (I/O monitor: MF·MR)

Standard:

	Lever in neutral position	Lever in forward tilt position	Lever in backward tilt position
MF (Forward tilt switch)	0	1	0
MR (Backward tilt switch)	0	0	1

Inspection 2:

Individual continuity inspection of the tilt lever switch (still installed on the vehicle).

Ignition key switch OFF, disconnect A13

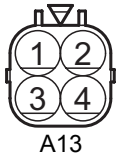
Standard: (Switch side)

	Lever in neutral position	Lever in forward tilt position	Lever in backward tilt position
A13-1 ~ A13-2	No continuity	Continuity	No continuity
A13-3 ~ A13-4	No continuity	No continuity	Continuity

Inspection 3:

Carry out individual continuity inspection of the tilt lever switch (removed from the vehicle).

Ignition key switch OFF, disconnect A13



A13

Standard: (Switch side)

	Switch OFF	Switch ON
A13-1 ~ A13-2	No continuity	Continuity
A13-3 ~ A13-4	No continuity	No continuity

Inspection 4:

Inspect for continuity and short circuiting of the harness.

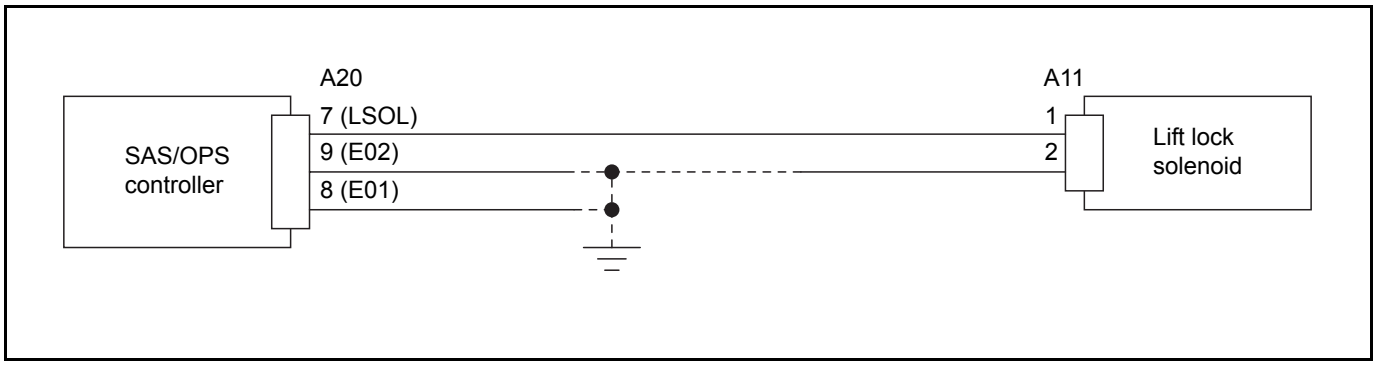
Ignition key switch OFF, disconnect A13 and A20

Standard:

A20-20 ~ A20-1	No continuity
A20-21 ~ A20-1	No continuity
A20-20 ~ A20-21	No continuity
A20-20 ~ Frame	No continuity
A20-21 ~ Frame	No continuity

● **Error code 64-1 (Lift lock solenoid abnormality)**

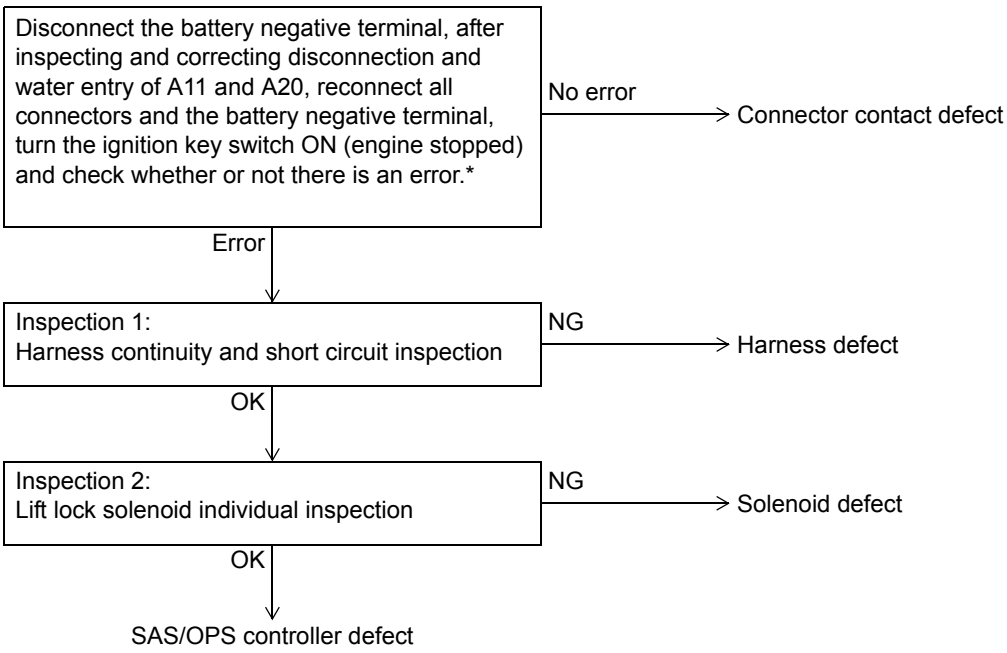
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Lift lock solenoid defect
④ SAS/OPS controller defect

Error code 64-1



*: Make sure that no error is displayed when the material handling lever is lowered.

Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A11 and A20

Standard:

A20-7 ~ A11-1	Continuity
A11-2 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A20-7 ~ Frame	No continuity

Inspection 2:

Carry out lift lock solenoid individual inspection.

Ignition key switch OFF, disconnect A11

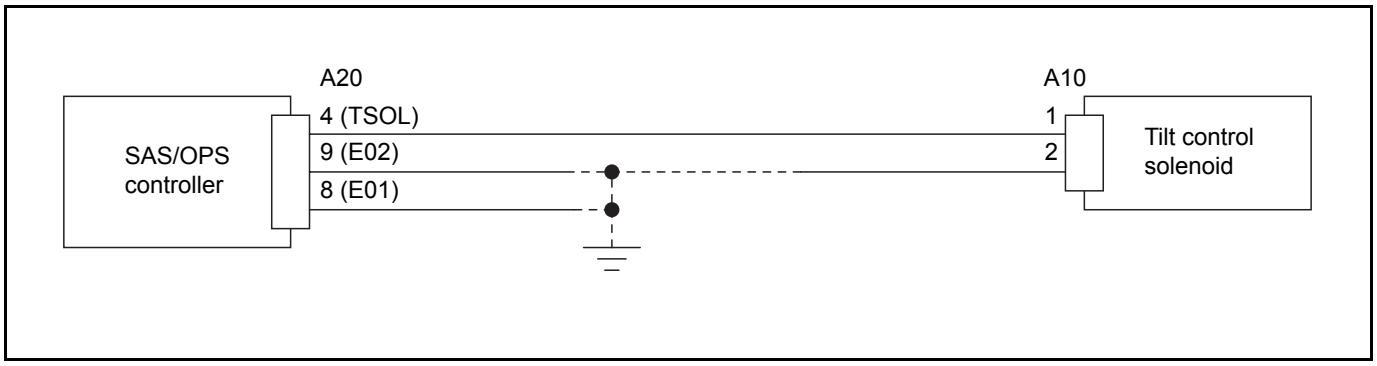
A11

Standard: (Solenoid side)

A11-1 ~ A11-2	9.9 ± 0.5 Ω (20°C)

● **Error code 65-1 (Tilt control solenoid abnormality)**

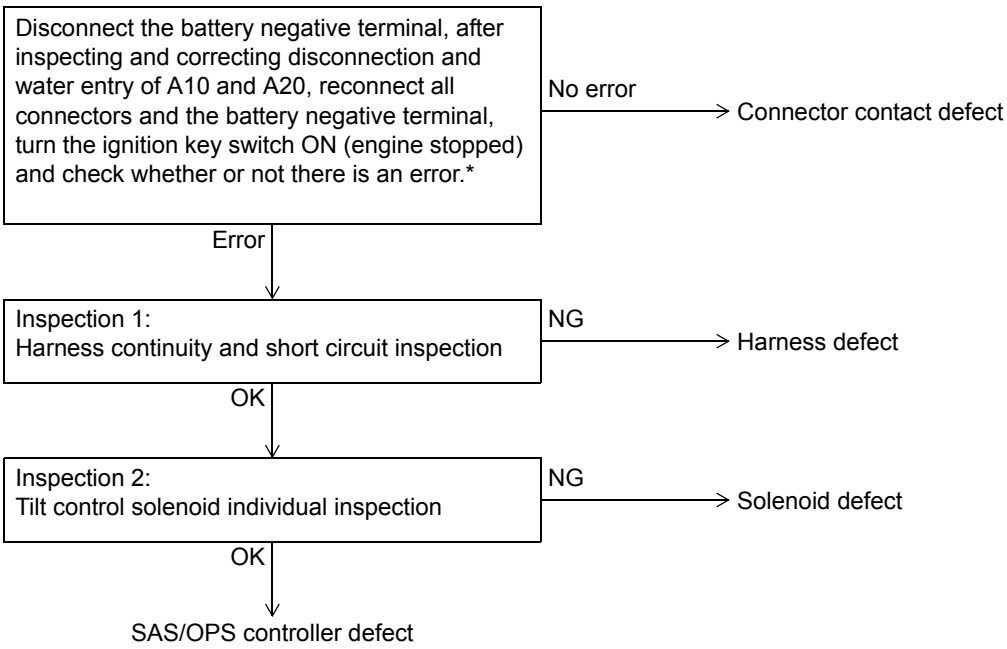
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Tilt control solenoid defect
④ SAS/OPS controller defect

Error code 65-1



*: Make sure that no error is displayed when the material handling lever is operated to tilt forward.

Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A10 and A20

Standard:

A20-4 ~ A10-1	Continuity
A10-2 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A20-4 ~ Frame	No continuity

Inspection 2:

Carry out tilt control solenoid individual inspection.

Ignition key switch OFF, disconnect A10

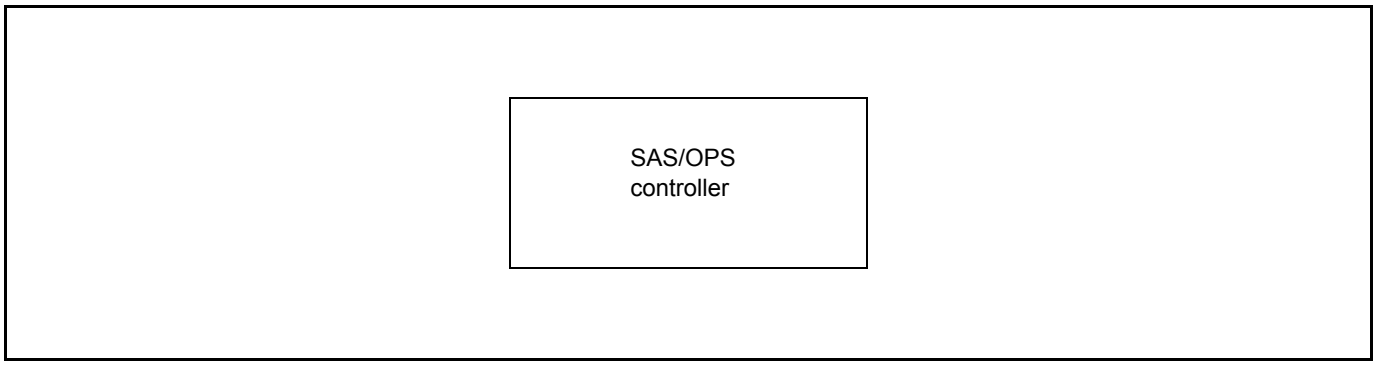
A10

Standard: (Solenoid side)

A10-1 ~ A10-2	9.9 ± 0.5 Ω (20°C)

● **Error code 66-1 (Outside matching value range abnormality)**

Related portion



Probable cause

① Tilt horizontal angle matching value is outside the specified range for matching.
② Tilt forward tilt angle matching value is outside the specified range for matching.
③ Load sensor matching value is outside the specified range for matching.

Error code 66-1

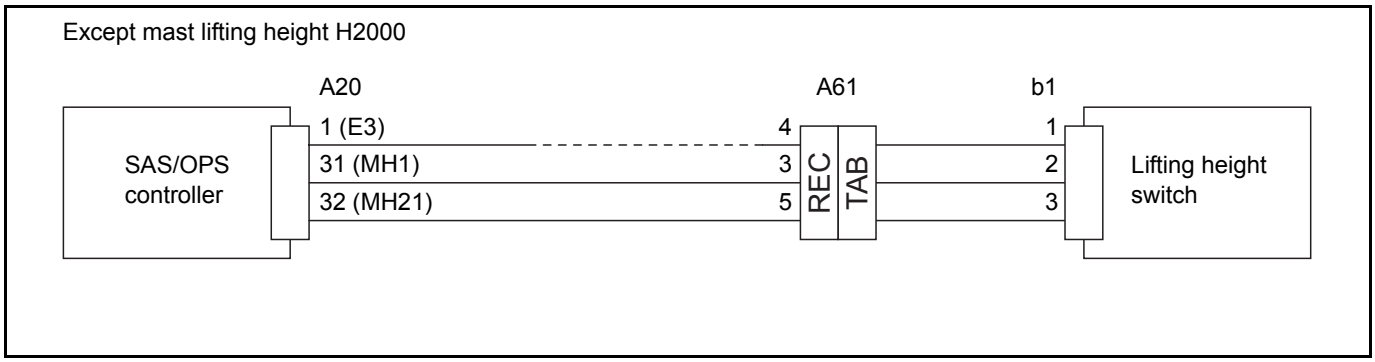
Carry out tilt horizontal angle matching, tilt forward tilt angle matching, and load sensor matching. (Refer to section 18)

Error

Controller defect

● **Error code 67-1 (Lifting height switch abnormality)**

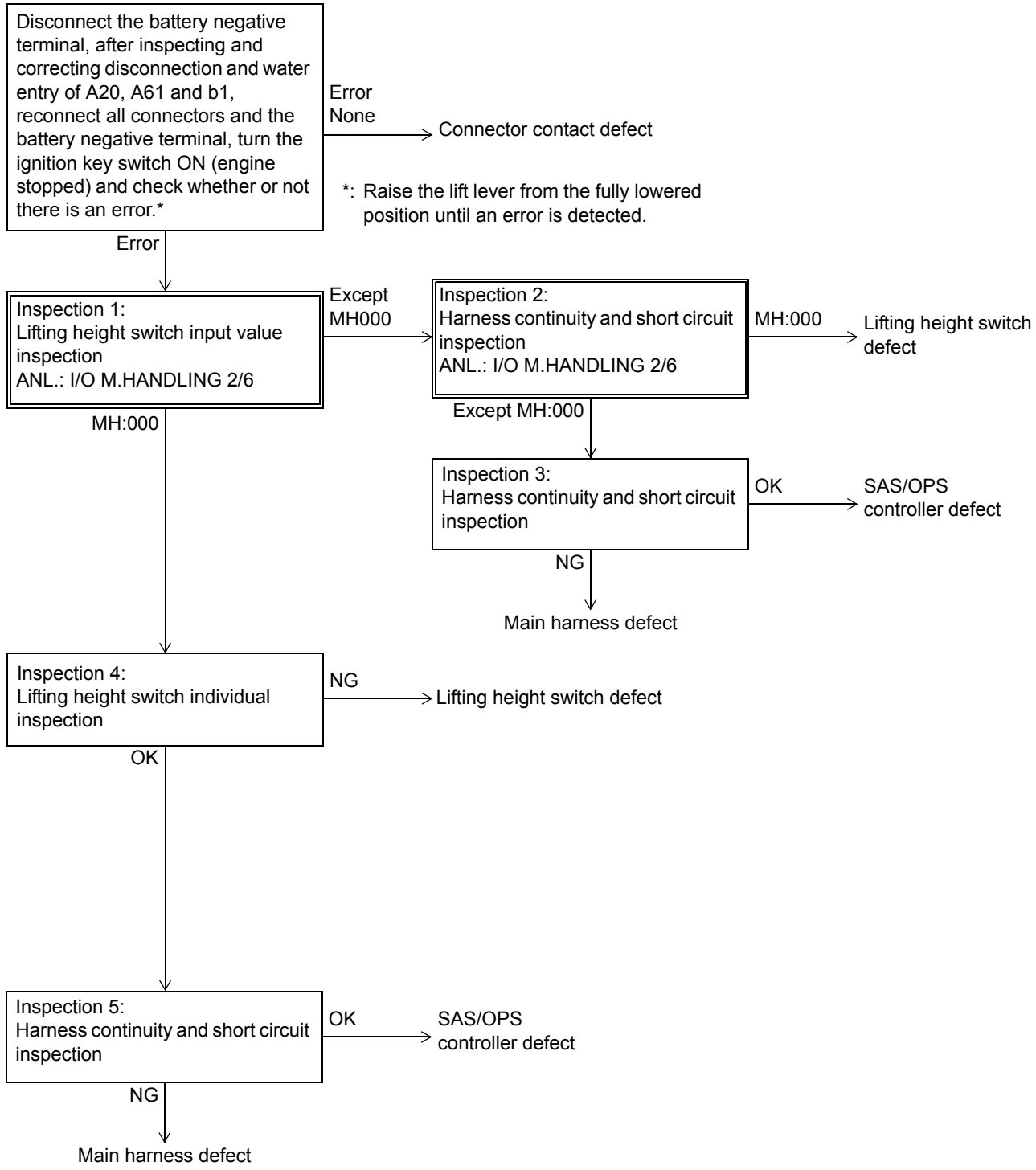
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Lifting height switch defect
④ SAS/OPS controller defect
⑤ IG fuse defect

Error code 67-1



Inspection 1:

Check the condition of the switch.

Maintain the error status and check the display.
Lifting height switch (I/O monitor: MH)
MH: 000 displayed → to checking the mast height at the time of error detection
MH: Except 000 → to inspection 2

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Put the lift in fully lowered state, ignition key switch OFF, disconnect A20 and b1, ignition key switch ON, stop the engine, check the display
MH: 000 displayed → sub harness defect or lifting height switch defect
MH: Except 000 → to inspection 3

Inspection 3:

Inspect for continuity and short circuiting of the harness.

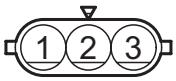
Put the lift in fully lowered state, ignition key switch OFF, disconnect A20 and b1

Standard:

A20-1 ~ A20-31	No continuity
A20-1 ~ A20-32	No continuity
A20-1 ~ A20-33	No continuity
A20-31 ~ A20-32	No continuity
A20-32 ~ A20-33	No continuity
A20-33 ~ A20-31	No continuity
A20-31 ~ Frame	No continuity
A20-32 ~ Frame	No continuity
A20-33 ~ Frame	No continuity

Inspection 4:

Carry out lifting height switch individual inspection.



b1

Maintain the error status, ignition key switch OFF, disconnect b1

Standard: (Switch side)

b1-1 ~ b1-2	No continuity
b1-1 ~ b1-3	Continuity

Inspection 5:

Inspect for continuity and short circuiting of the harness.

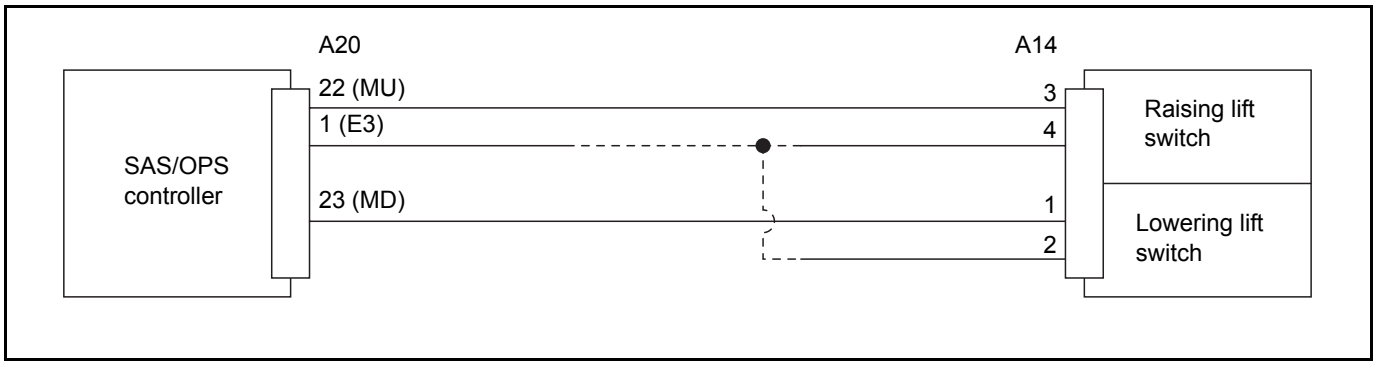
Put the lift in fully lowered state, ignition key switch OFF, disconnect A20 adn b1, use SST 09236-13900-71 to short circuit the terminals

Standard:

Inspection terminal	Short circuit terminals	Continuity
A20-1 ~ A20-31	b1-1 ~ b1-2	Continuity
A20-1 ~ A20-32	b1-1 ~ b1-3	Continuity

● **Error codes 68-1, 68-2, 68-3 (Lift switch abnormality)**

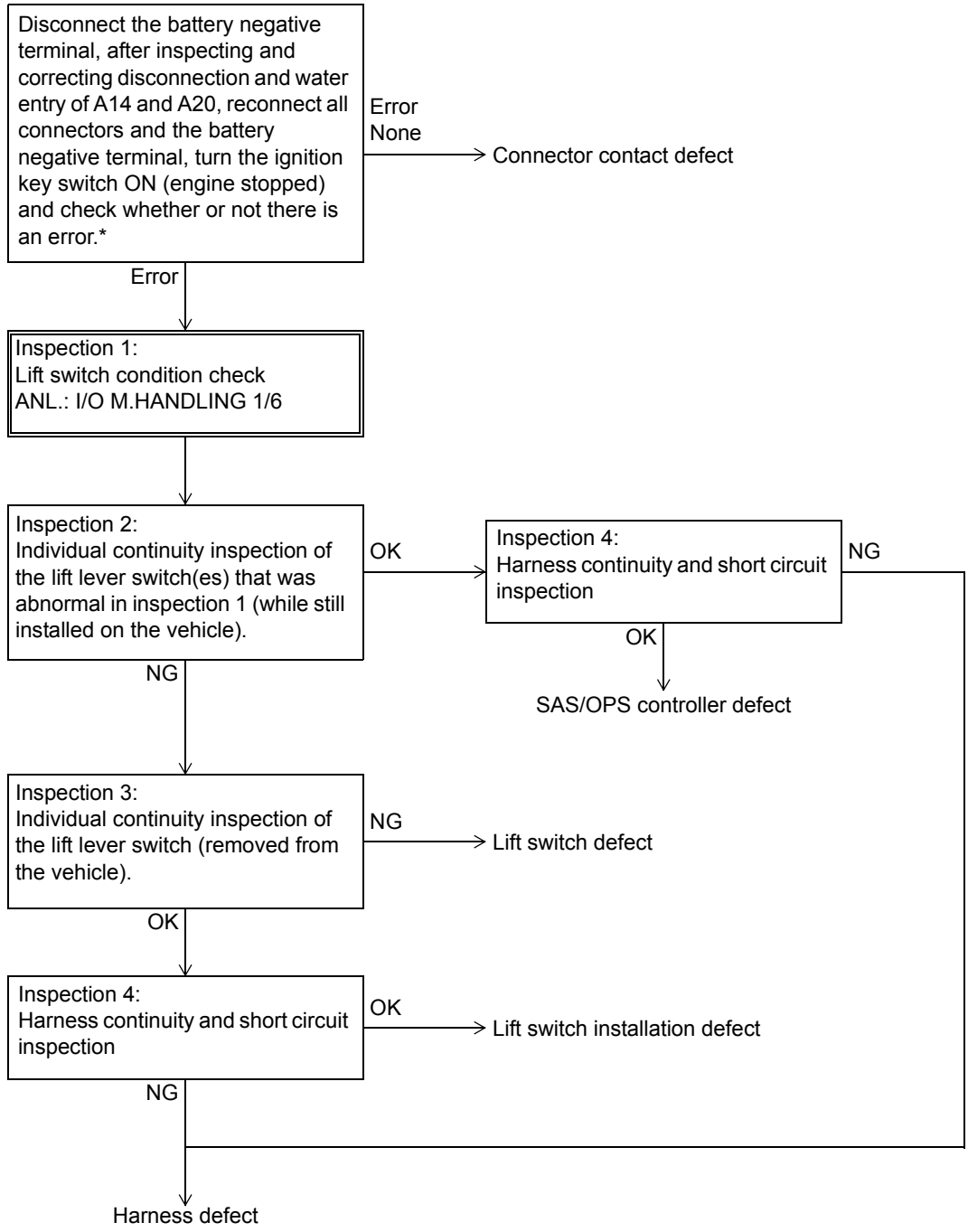
Related portion



Probable cause

① Connector contact defect
② Raising lift switch defect
③ Lowering lift switch defect
④ Harness defect
⑤ Lift switch installation defect
⑥ SAS/OPS controller defect

Error codes 68-1, 68-2, 68-3



*: Make sure there is no error displayed after turning the ignition key switch ON, and moving the lift lever upward and downward. Also, make sure that no error is displayed when the lift lever is left standing in neutral position for 2 minutes.

Inspection 1:

Check the condition of the switch.

Ignition key switch ON (engine stopped)
Lift switch (I/O monitor: MU·MD)

Standard:

	Lever in neutral position	Lever in raised position	Lever in lowered position
MU (Raising switch)	0	1	0
MD (Lowering switch)	0	0	1

Inspection 2:

Carry out individual continuity inspection of the lift lever switch (still installed on the vehicle).

Ignition key switch OFF, disconnect A14

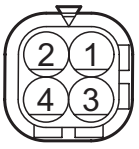
Standard: (Switch side)

	Lever in neutral position	Lever in raised position	Lever in lowered position
A14-3 ~ A14-4	No continuity	No continuity	Continuity
A14-1 ~ A14-2	No continuity	Continuity	No continuity

Inspection 3:

Carry out individual continuity inspection of the lift lever switch (removed from the vehicle).

Ignition key switch OFF, disconnect A14



A14

Standard: (Switch side)

	Switch ON	Switch OFF
A14-3 ~ A14-4	Continuity	No continuity
A14-1 ~ A14-2	Continuity	No continuity

Inspection 4:

Harness continuity and short circuit inspection

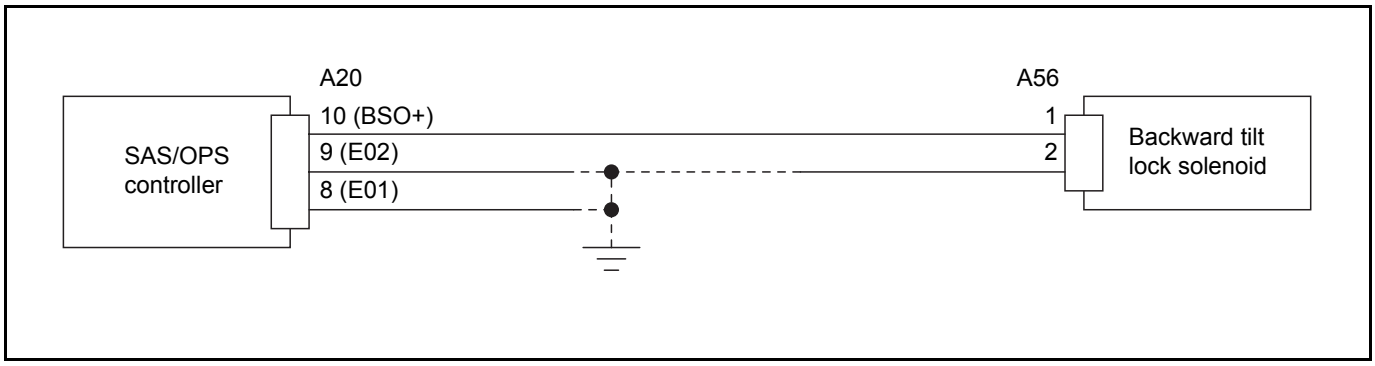
Ignition key switch OFF, disconnect A14 and A20

Standard:

A20-22 ~ Frame	No continuity
A20-23 ~ Frame	No continuity
A20-22 ~ A20-1	No continuity
A20-23 ~ A20-1	No continuity
A20-22 ~ A20-33	No continuity

● **Error code 69-1 (Backward tilt lock solenoid abnormality)**

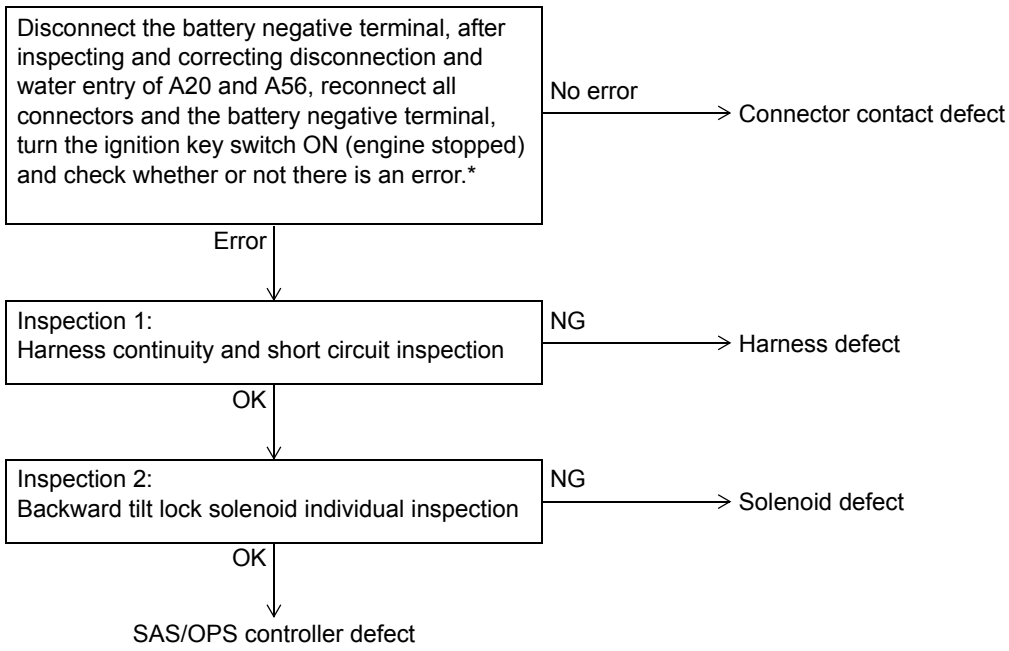
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Backward tilt lock solenoid defect
④ SAS/OPS controller defect

Error code 69-1



*: Make sure that no error is displayed when the material handling lever is operated to tilt backward.

Inspection 1:

Carry out harness continuity and short circuit inspection.

Ignition key switch OFF, disconnect A20 and A56

Standard:

A20-10 ~ A56-1	Continuity
A56-2 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A20-10 ~ Frame	No continuity

Inspection 2:

Carry out tilt backward tilt lock solenoid individual inspection.

A56

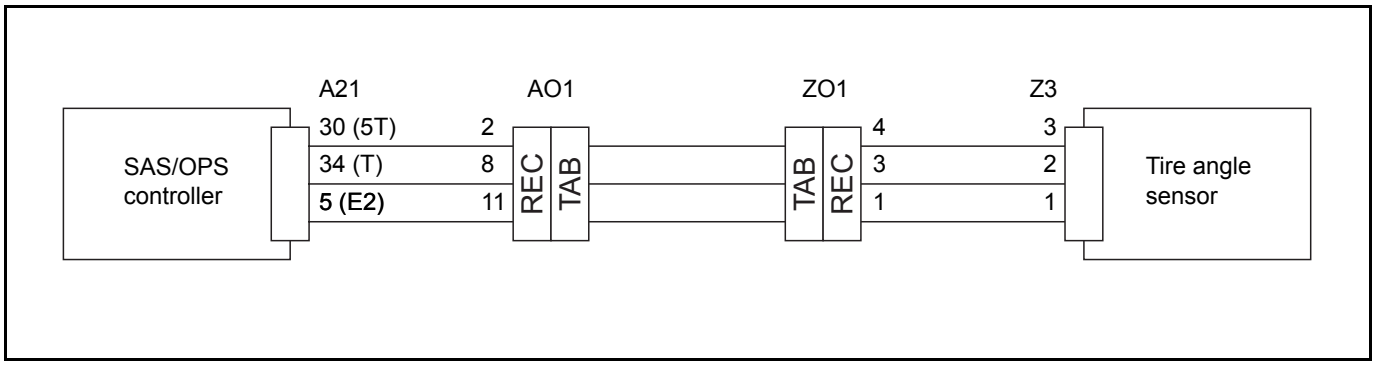
Ignition key switch OFF, disconnect A56

Standard: (Solenoid side)

A56-1 ~ A56-2	9.9 ± 0.5 Ω (20°C)

● **Error codes 71-1 and 71-2 (Tire angle sensor abnormality)**

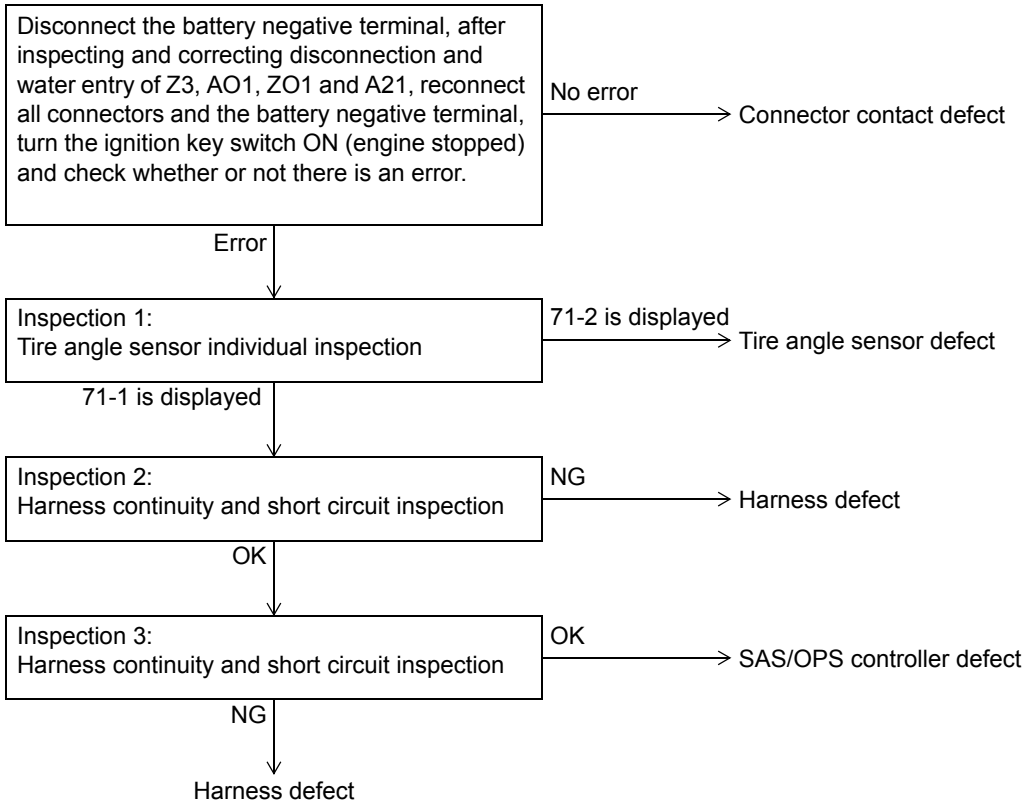
Related portion



Probable cause

① Connector contact defect
② Tire angle sensor harness defect
③ Tire angle sensor defect
④ Tire angle sensor joint, rear axle link system defect
⑤ SAS/OPS controller defect

Error code 71-1



Inspection 1:

Carry out tire angle sensor individual inspection.

Ignition key switch OFF, disconnect Z3, use SST 09232-13130-71 to short circuit Z3-2 and Z3-3, ignition key switch ON, engine stopped

71-1 displayed → to inspection 2

71-2 displayed → Tire angle sensor defect

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21
(With the SST used in inspection 1 still connected)

Standard:

A21-30 ~ A21-34	Continuity

Inspection 3:

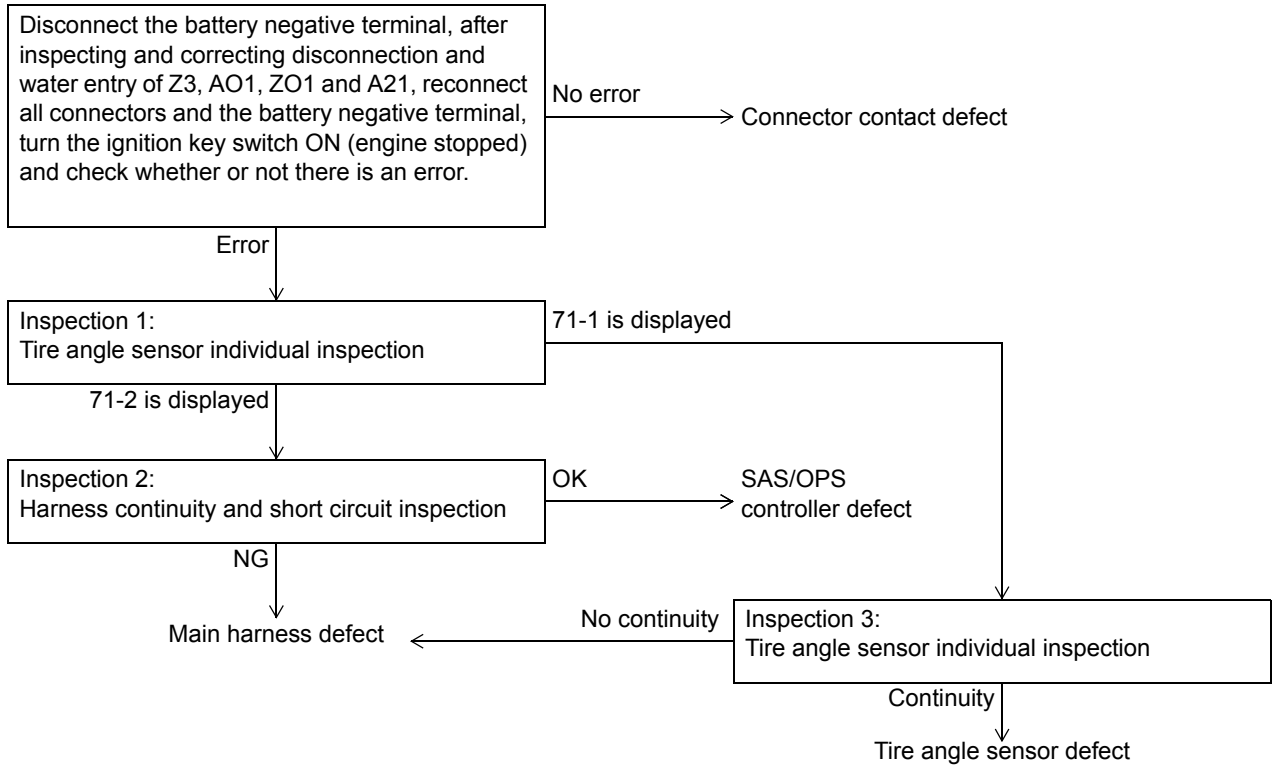
Inspect for continuity and short circuiting of the harness.

In the same state as for inspection 2

Standard:

A21-34 ~ A21-5	No continuity
A21-30 ~ Frame	No continuity
A21-34 ~ Frame	No continuity

Error code 71-2



Inspection 1:

Carry out tire angle sensor individual inspection.
Ignition key switch OFF, disconnect Z3, ignition key switch ON, engine stopped
71-1 displayed → to inspection 3
71-2 displayed → to inspection 2

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-30 ~ A21-34	No continuity

Inspection 3:

Carry out tire angle sensor individual inspection.

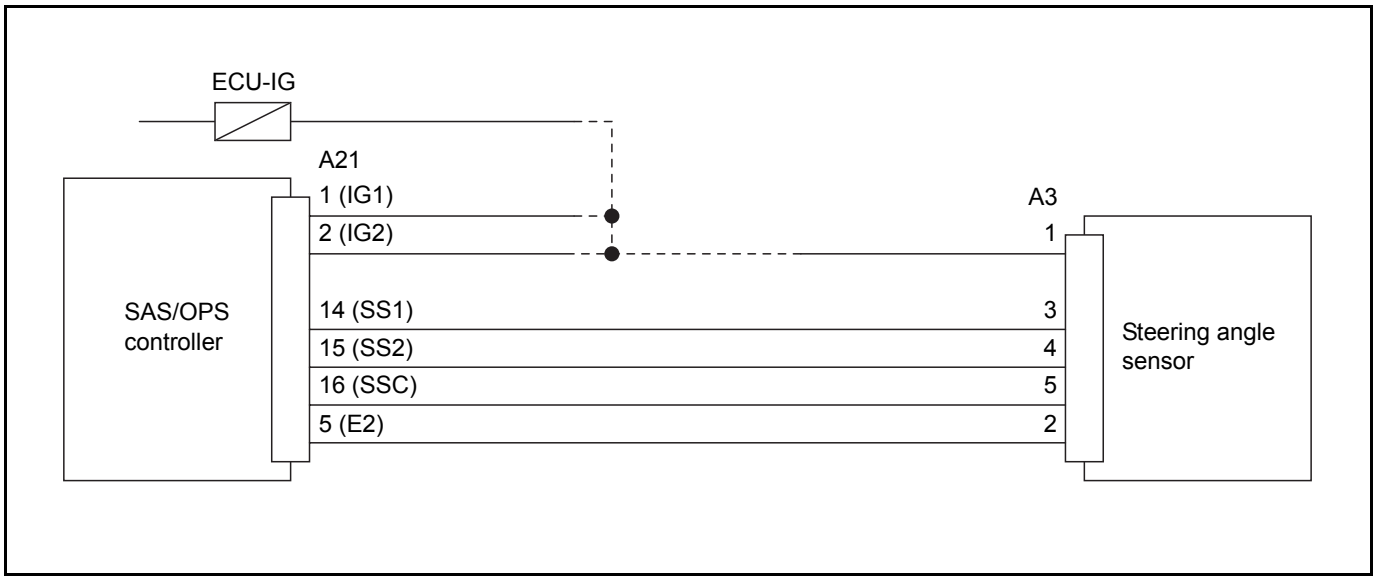
Ignition key switch OFF, disconnect Z3 and A21, use SST 09232-13130-71 to short circuit Z3-1 to Z3-2 (main harness side)

Standard:

A21-34~ A21-5	Continuity

● **Error codes 72-1, 72-2, 72-3, 72-4 (Steering angle sensor abnormality)**

Related portion



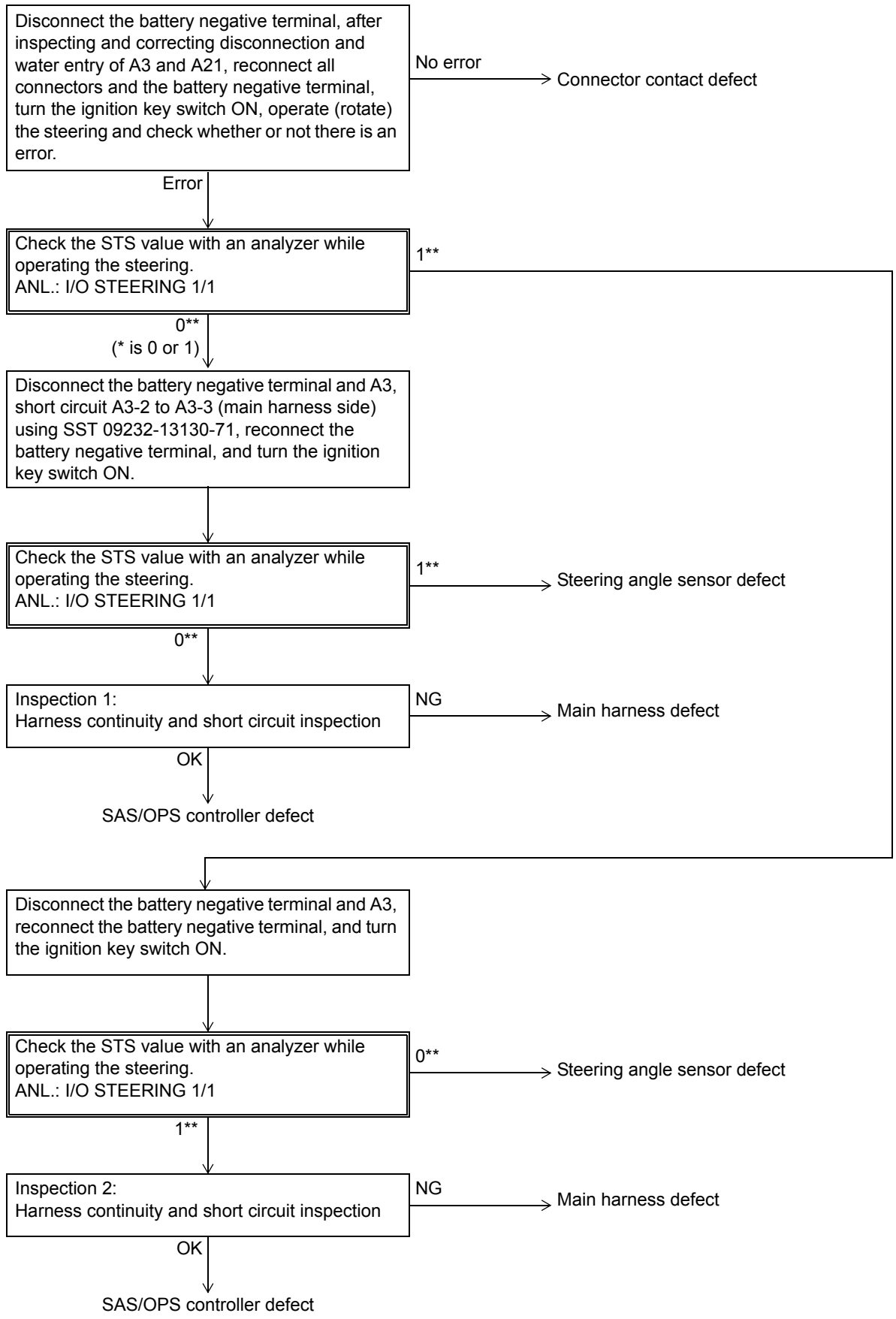
Probable cause

① Connector contact defect
② Steering angle sensor harness defect
③ Steering angle sensor defect
④ SAS/OPS controller defect

Note:

If only the steering angle sensor is turned, not with the steering wheel, error code 72-4 may be output.

Error code 72-1



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-14 ~ A21-5	Continuity

Inspection 2:

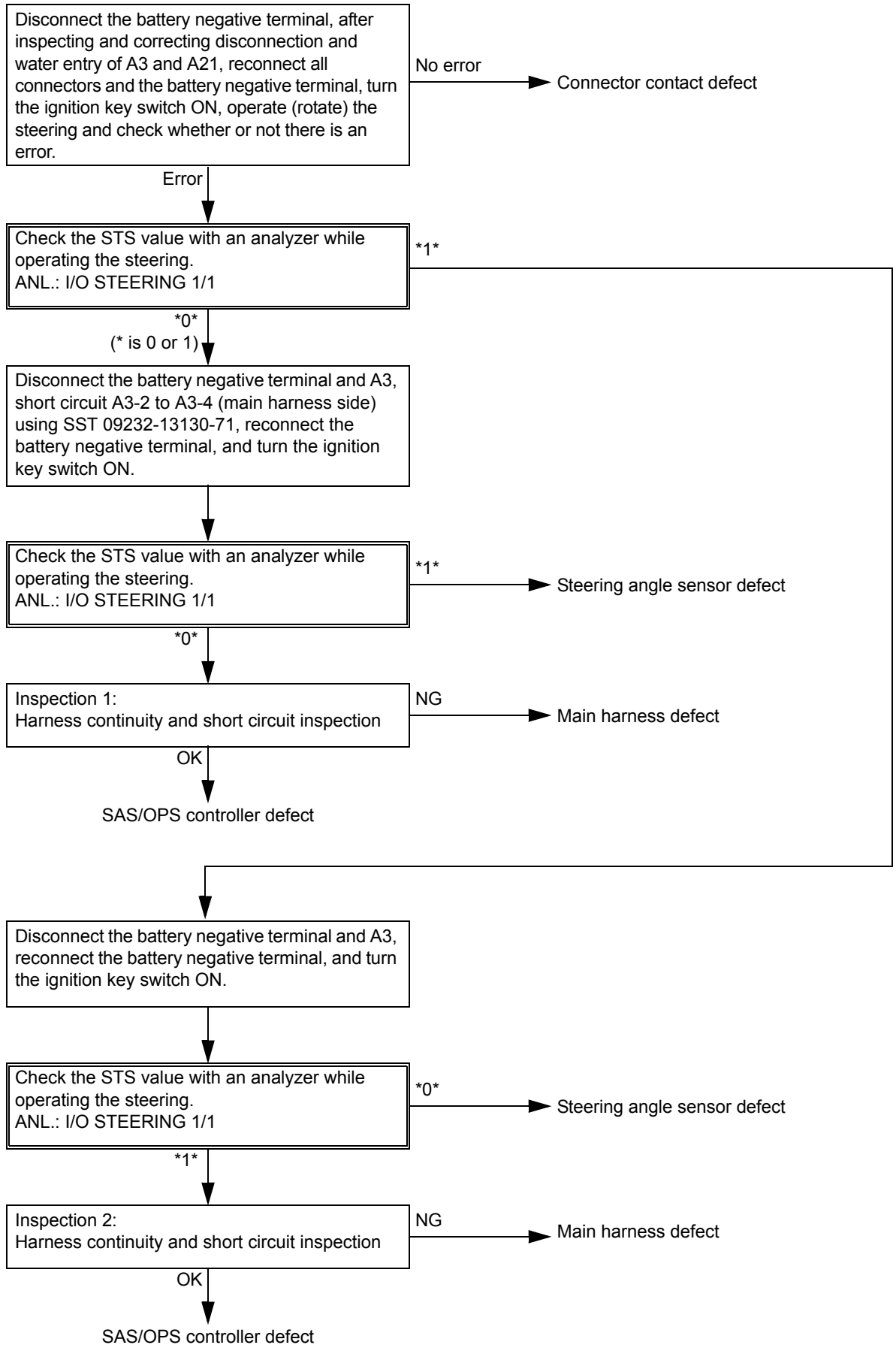
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-14 ~ A21-5	No continuity
A21-14 ~ Frame	No continuity

Error code 72-2



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-15 ~ A21-5	Continuity

Inspection 2:

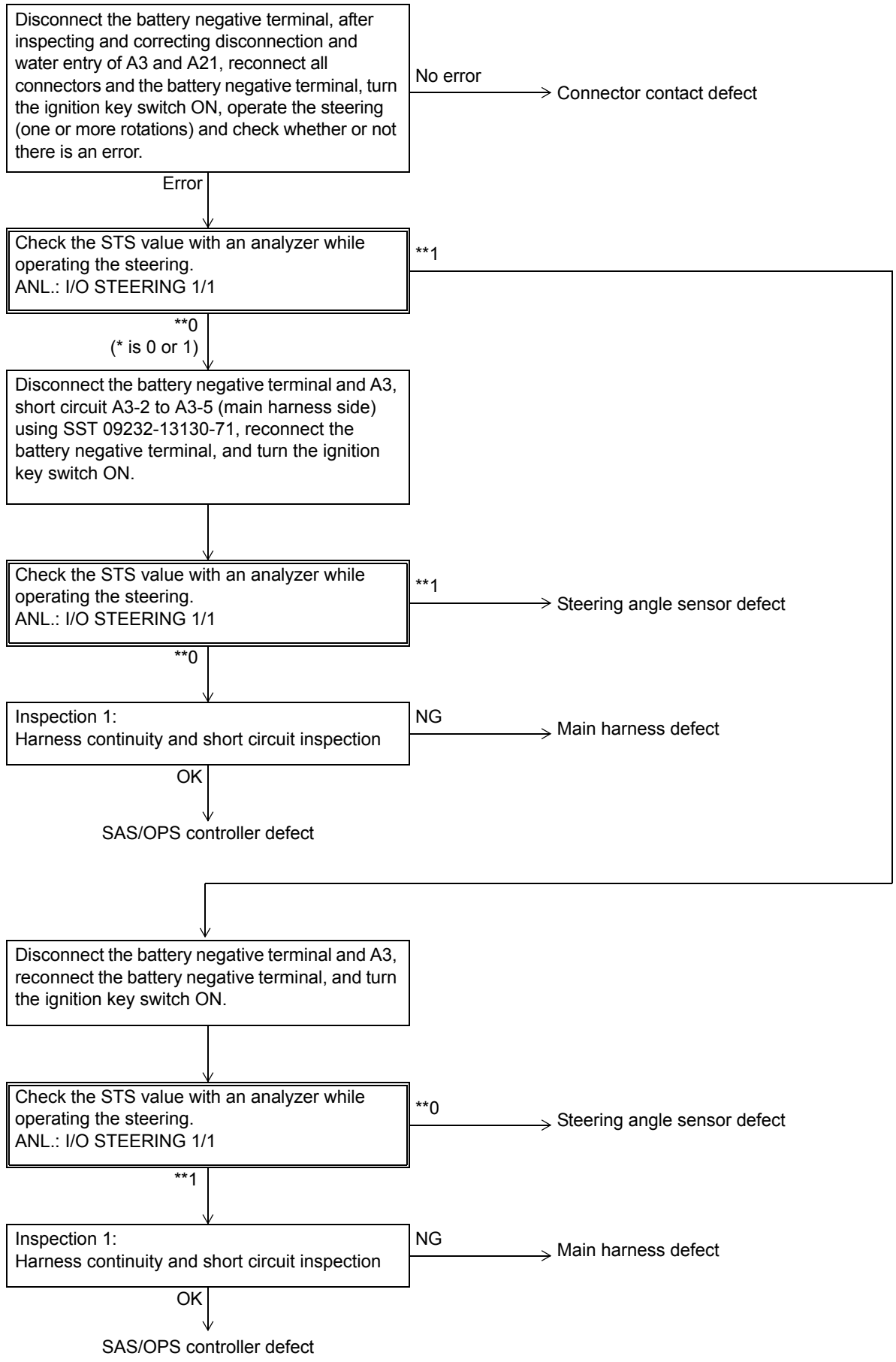
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-15 ~ A21-5	No continuity
A21-15 ~ Frame	No continuity

Error code 72-3



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-16 ~ A21-5	Continuity

Inspection 2:

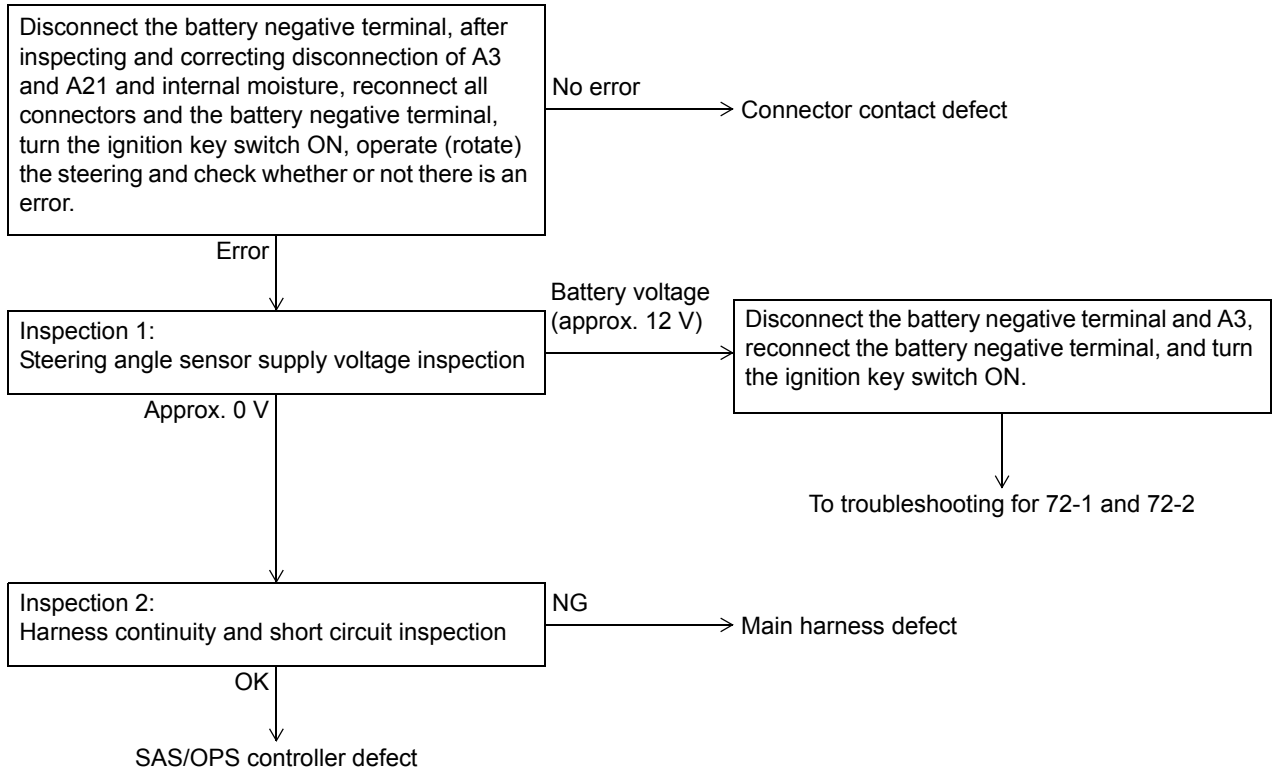
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21

Standard:

A21-16 ~ A21-5	No continuity
A21-16 ~ Frame	No continuity

Error code 72-4



Inspection 1:

Carry out steering angle sensor supply voltage inspection.

Standard:

A3-1 ~ A3-2	Battery voltage (approx. 12 V)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A3 and A21

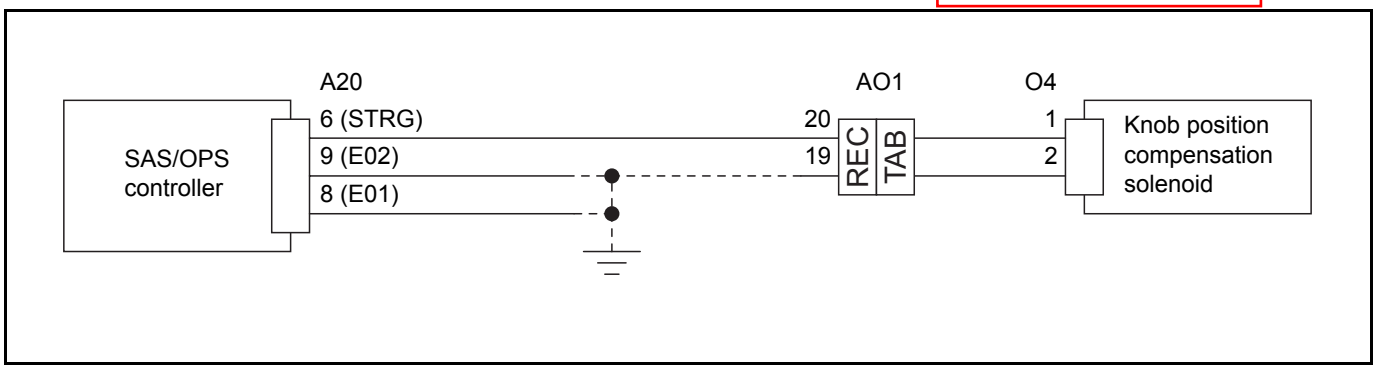
Standard:

A21-1 ~ A3-1	Continuity
A21-2 ~ A3-1	Continuity
A21-5 ~ A3-2	Continuity

● **Error code 73-1 (Knob position compensation solenoid abnormality)**

Click here for more info on 73-1 code

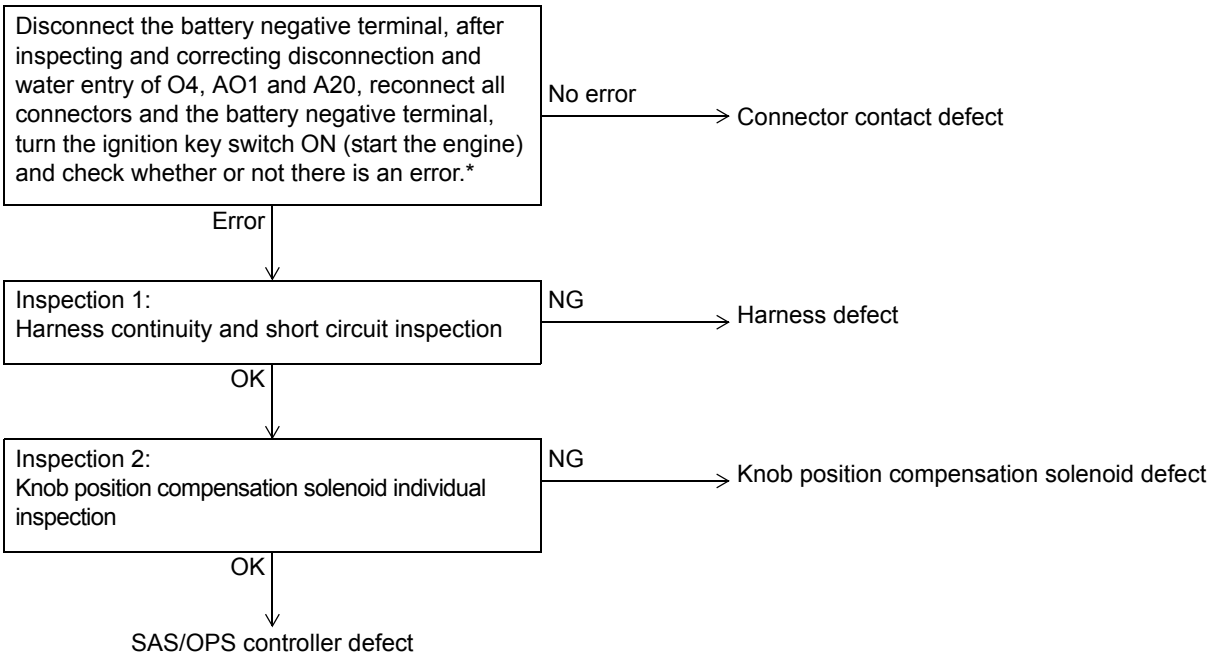
Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Knob position compensation solenoid defect
④ SAS/OPS controller defect

Error code 73-1



*: Make sure that no error is displayed when turning the knob position compensation solenoid ON/OFF using the active test function.

Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect O4 and A20

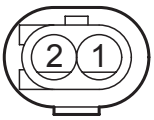
Standard:

A20-6 ~ O4-1	Continuity
O4-2 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-6 ~ Frame	No continuity

Inspection 2:

Carry out knob position compensation solenoid individual inspection.

Ignition key switch OFF, disconnect O4



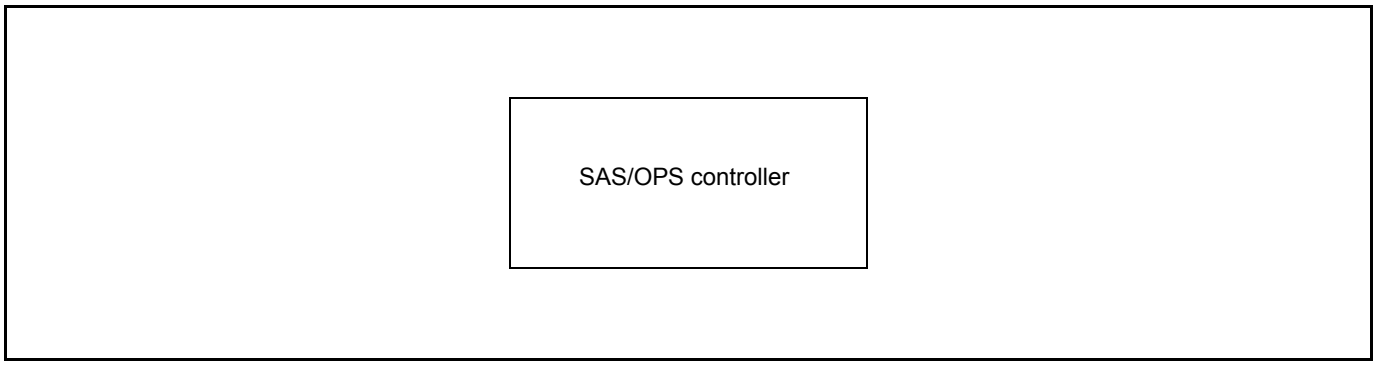
O4

Standard: (Solenoid side)

O4-1 ~ O4-2	Approx.10 Ω (20°C)

● **Error code 74-1 (Outside matching value range abnormality)**

Related portion



Probable cause

① Tire alignment value is outside the specified range for matching.

Error code 74-1

Perform tire alignment.
(Refer to section 18)

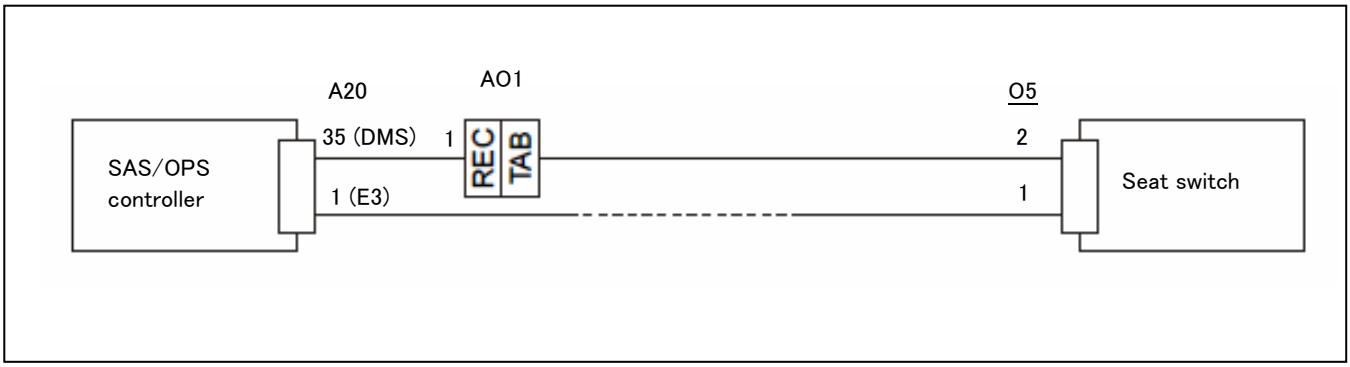
Error

Controller defect

● **Error code A5-1 (Seat switch abnormality)**

Click here for info on A5-1 code

Related Portion



Error code A5-1

Disconnect the battery negative terminal, then inspect and repair disconnection of A20, AO1 and O5 and any internal moisture.

No error →

Error ↓

Inspection 1:

Check the condition of the switch.

Disconnect O5, ignition key switch ON, engine stopped

Seat switch (I/O monitor: SEAT)

Standard:

SEAT	0

Inspection 2:

Inspect for continuity and short circuiting of the harness.

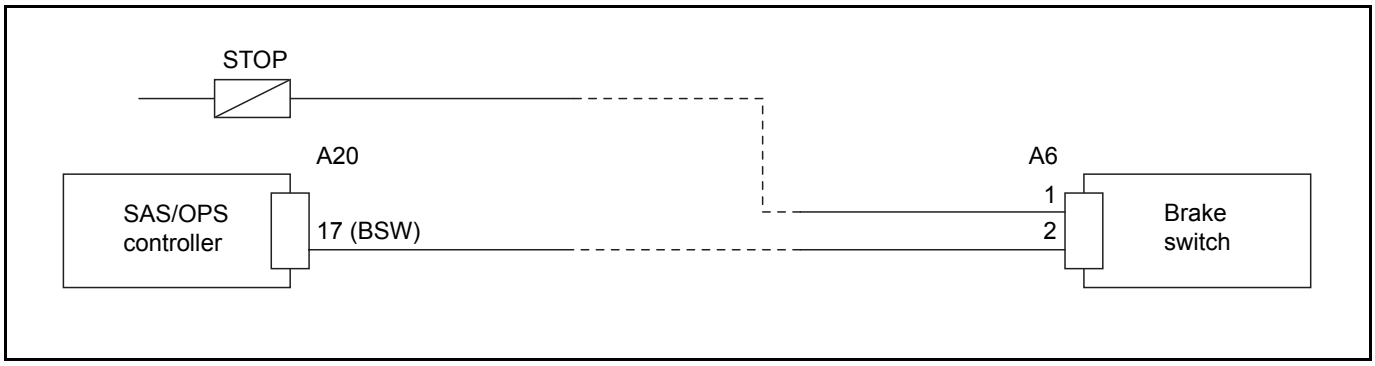
Ignition key switch OFF, disconnect A20 and O5

Standard:

A20-35～A20-1	No continuity
A20-35～Frame	No continuity

● **Error code A7-1 (Brake switch abnormality)**

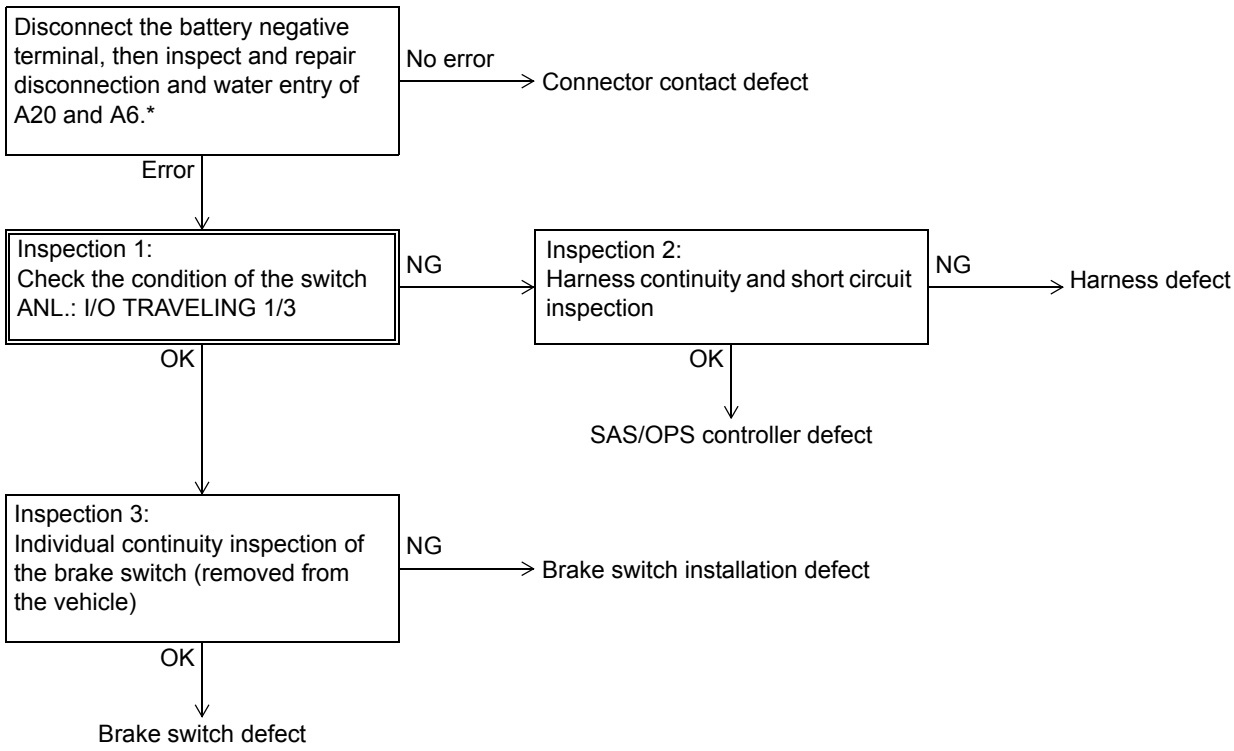
Related portion



Probable cause

① Connector contact defect
② Brake switch defect
③ Harness defect
④ SAS/OPS controller defect

Error code A7-1



*: After correcting, connect the connector and turn the ignition key switch OFF → ON (at least 2 seconds) → OFF. Make sure that no error is displayed when the ignition key is turned ON after leaving the vehicle with the seat empty for 15 minutes.

Inspection 1:

Check the condition of the switch.

Disconnect A6, ignition key switch ON, engine stopped
Brake switch (I/O monitor: BRKSW)

Standard:

BRKSW	0

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A6 and A20

Standard:

A20-17 ~ BATT	No continuity

Inspection 3:

Carry out individual continuity inspection of the brake switch (removed from the vehicle).

Ignition key switch OFF, disconnect A6

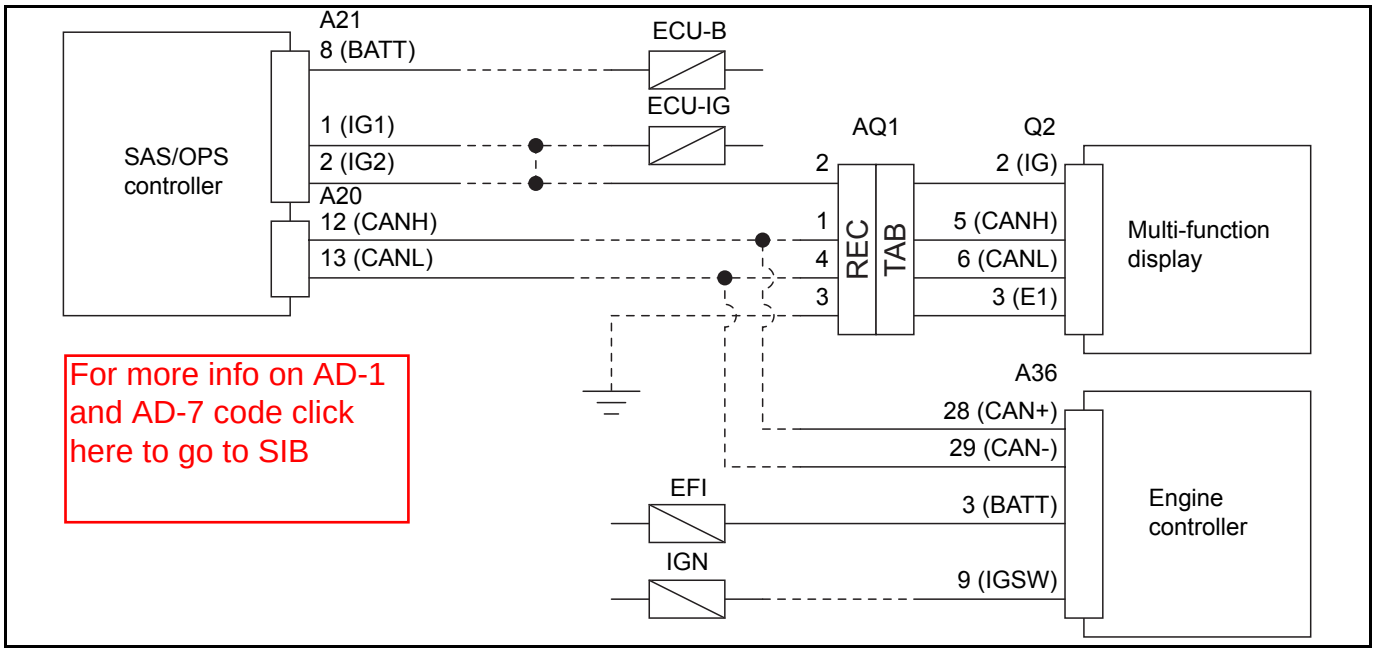
A6

Standard: (Switch side)

	Switch OFF	Switch ON
A6-1 ~ A6-2	No continuity	Continuity

● **Error codes AD-1, AD-2, AD-7, AD-8 (4Y-E spec.) (CAN communication abnormality)**

Related portion



Probable cause

① Connector contact defect
② Engine controller harness defect
③ Multifunction display harness defect
④ Fuse defect
⑤ Engine controller defect
⑥ Multifunction display defect
⑦ SAS/OPS controller defect

Caution:

When the controller or optional display is replaced into another vehicle with different specifications, AD-1 and AD-7 may occur. In such cases, perform "Engine and display ECU information clear".

Error codes AD-1, AD-2, AD-7, AD-8

Disconnect the negative terminal of the battery and inspect the fuses.
NG → Fuse defect
OK ↓

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of A20, A21, A36, AQ1 and Q2, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON and check whether or not there is an error.*
No error → Connector contact defect
Error ↓

Inspection 1:
Harness continuity and short circuit inspection
NG → Harness defect
OK ↓

Engine controller defect (AD-1)
Multifunction display defect (AD-7)
SAS/OPS controller defect (AD-8)
SAS/OPS controller or
engine controller defect (AD-2)

*: It is not necessary to inspect A36 when AD-1 and AD-2 have not occurred, and Q2 when AD-7 and AD-8 have not occurred.

Inspection 1:

Inspect for continuity and short circuiting of the harness.

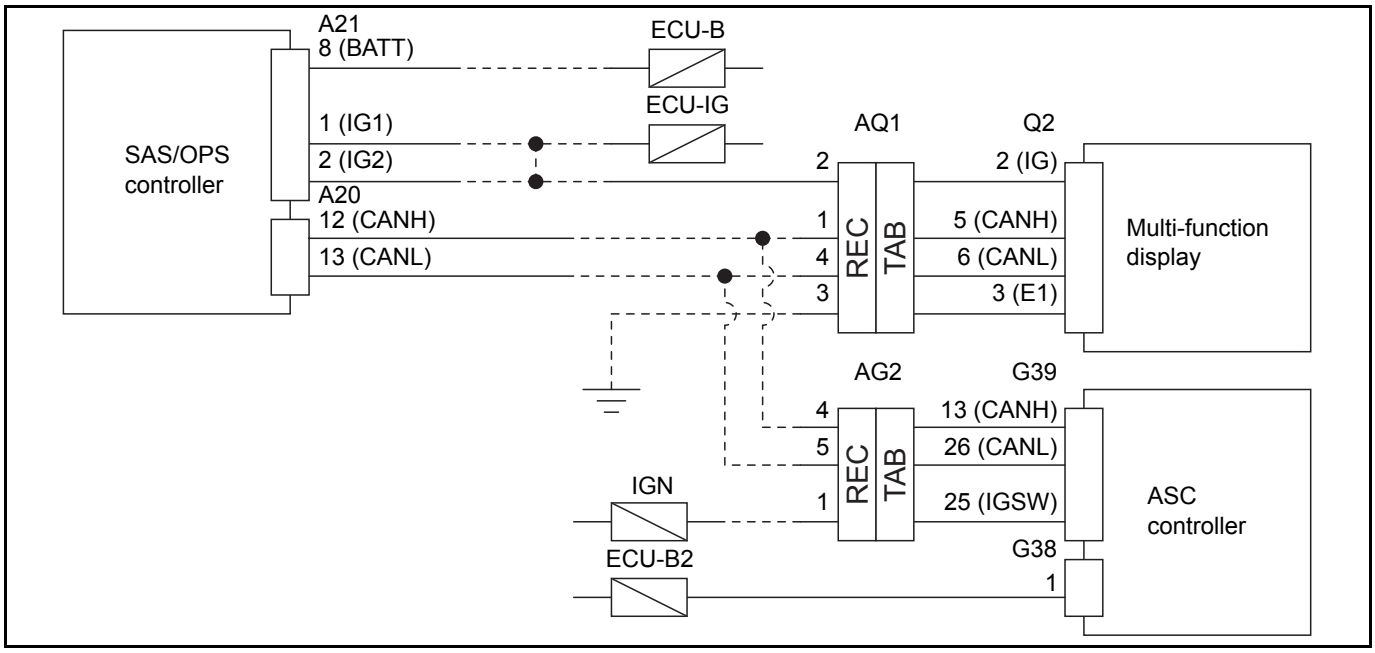
Ignition key switch OFF, disconnect Q2 (unnecessary if AD-7 and AD-8 have not occurred), A20, A21 and A36 (unnecessary if AD-1 and AD-2 have not occured)

Standard:

A21-8 ~ ECU-B	Continuity
A21-1 ~ ECU-IG	Continuity
A21-2 ~ ECU-IG	Continuity
Q2-2 ~ ECU-IG	Continuity
A20-12 ~ Q2-5	Continuity
A20-13 ~ Q2-6	Continuity
A20-12 ~ A36-28	Continuity
A20-13 ~ A36-29	Continuity
A20-12 ~ Frame	No continuity
A20-13 ~ Frame	No continuity
A36-3 ~ EFI	Continuity
A36-9 ~ IGN	Continuity

● **Error codes AD-1, AD-2, AD-7, AD-8 (ASC spec.) (CAN communication abnormality)**

Related portion



Probable cause

① Connector contact defect
② Engine controller harness defect
③ Multifunction display harness defect
④ Fuse defect
⑤ Engine controller defect
⑥ Multifunction display defect
⑦ SAS/OPS controller defect

Caution:

When the controller or optional display is replaced into another vehicle with different specifications, AD-1 and AD-7 may occur. In such cases, perform "Engine and display ECU information clear".

Error codes AD-1, AD-2, AD-7, AD-8

Disconnect the negative terminal of the battery and inspect the fuses.
NG → Fuse defect
OK ↓

Disconnect the battery negative terminal (for more than 10 seconds), after inspecting and correcting disconnection and water entry of A20, A21, G38, G39, AQ1, AG2 and Q2, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON and check whether or not there is an error.*
No error → Connector contact defect
Error ↓

Inspection 1:
Harness continuity and short circuit inspection
NG → Harness defect
OK ↓

Engine controller defect (AD-1)
Multifunction display defect (AD-7)
SAS/OPS controller defect (AD-8)
SAS/OPS controller or
engine controller defect (AD-2)

*: It is not necessary to inspect G38 when AD-1 and AD-2 have not occurred, and Q2 when AD-7 and AD-8 have not occurred.

Inspection 1:

Inspect for continuity and short circuiting of the harness.

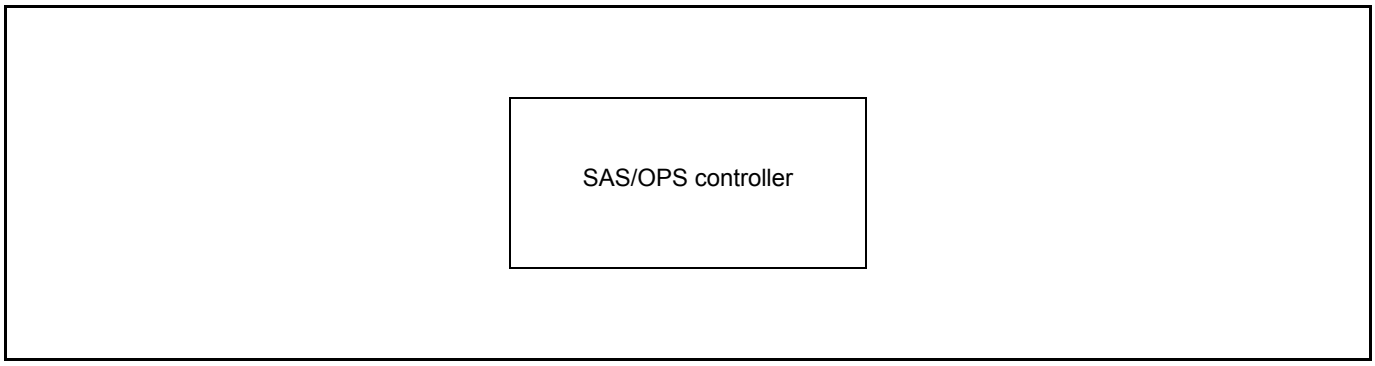
Ignition key switch OFF, disconnect Q2 (unnecessary if AD-7 and AD-8 have not occurred), A20, A21, G38 and G39 (unnecessary if AD-1 and AD-2 have not occured)

Standard:

A20-12 ~ Q2-5	Continuity
A20-13 ~ Q2-6	Continuity
A20-12 ~ G39-13	Continuity
A20-13 ~ G39-26	Continuity
A20-12 ~ Frame	No continuity
A20-13 ~ Frame	No continuity
A21-8 ~ ECU-B	Continuity
A21-1 ~ ECU-IG	Continuity
A21-2 ~ ECU-IG	Continuity
Q2-2 ~ ECU-IG	Continuity
G38-1 ~ ECU-B2	Continuity
G39-25 ~ IGN	Continuity

● **Error codes AF-1, AF-2, AF-3, AF-4, AF-5, AF-6, AF-7, AF-8 (CPU abnormality)**

Related portion



Probable cause

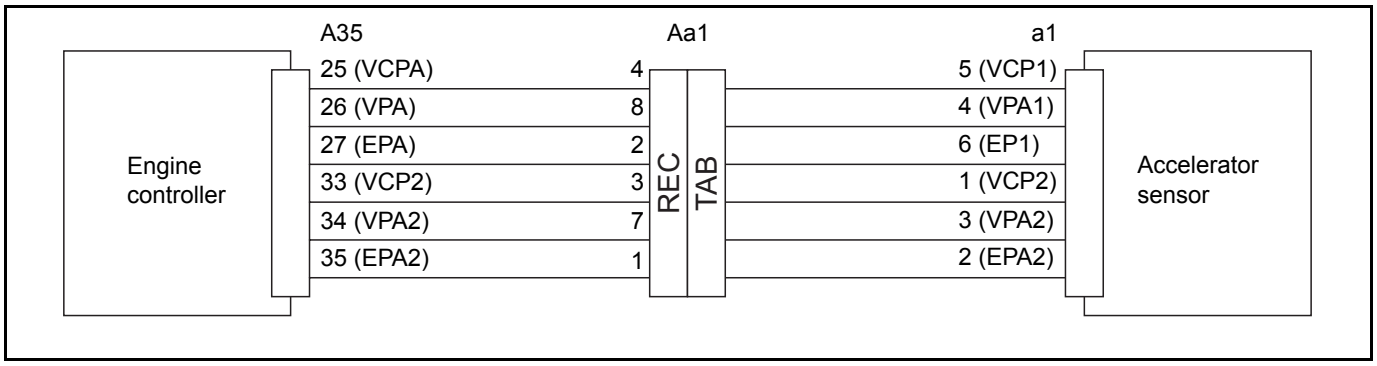
① SAS/OPS controller defect

Note:

When AF is displayed, the SAS/OPS controller is defective and must be replaced.

● **Error codes C4-1, C4-2, C4-3, C4-4, C4-5, C4-6 (4Y-E spec.) (Accelerator sensor abnormality)**

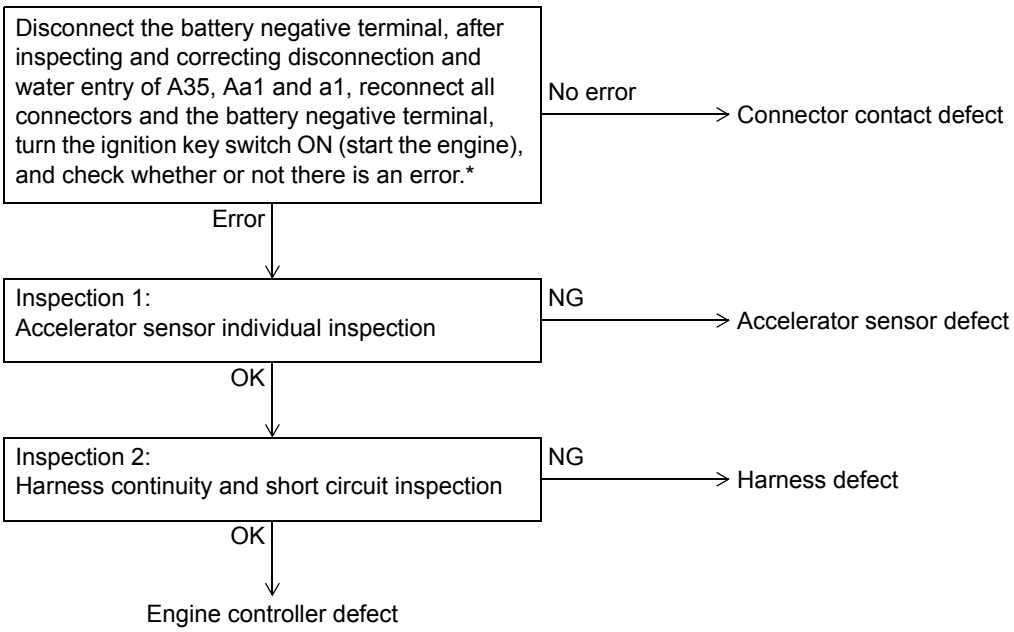
Related portion



Probable cause

① Connector contact defect
② Accelerator sensor defect
③ Harness defect
④ Engine controller defect

Error codes C4-1, C4-2, C4-3, C4-4, C4-5



*: Make sure that no error code is displayed when the accelerator pedal is operated.

Error code C4-5

Disconnect the battery negative terminal, after inspecting and correcting disconnection and water entry of A35, Aa1 and a1, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.*

No error → Connector contact defect

Error ↓

Inspection 1:
Accelerator sensor individual inspection

NG → Accelerator sensor defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 3:
Accelerator sensor voltage inspection
ANL.: I/O ENGINE CTRL 4/10

NG → Accelerator sensor defect

OK ↓

Engine controller defect

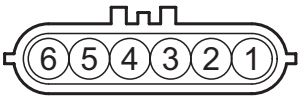
*: Make sure that no error code is displayed when the accelerator pedal is operated.

Inspection 1:

Carry out accelerator sensor individual inspection.

Ignition key switch OFF, disconnect a1, conenct A35

(1) Accelerator sensor resistance measurement



a1

Standard: (Sensor side)

a1-5 ~ a1-6	Approx. 1.8 ~ 3.5 kΩ (released)
a1-1 ~ a1-2	

(2) Accelerator sensor output circuit resistance measurement

Standard: (Sensor side)

a1-4 ~ a1-6	Make sure that the resistance value increases proportionally to the rotation of the potentiometer when the potentiometer section is rotated.
a1-3 ~ a1-2	

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A35 and a1

Standard:

A35-26 ~ a1-4	Continuity
A35-25 ~ a1-5	Continuity
A35-26 ~ Frame	No continuity
A35-27 ~ a1-6	Continuity
A35-25 ~ A35-26	No continuity
A35-26 ~ A35-33	No continuity
A35-34 ~ a1-3	Continuity
A35-33 ~ a1-1	Continuity
A35-34 ~ Frame	No continuity
A35-34 ~ A35-25	No continuity
A35-34 ~ A35-33	No continuity
A35-26 ~ A35-34	No continuity

Inspection 3:

Inspect the accelerator sensor voltage.

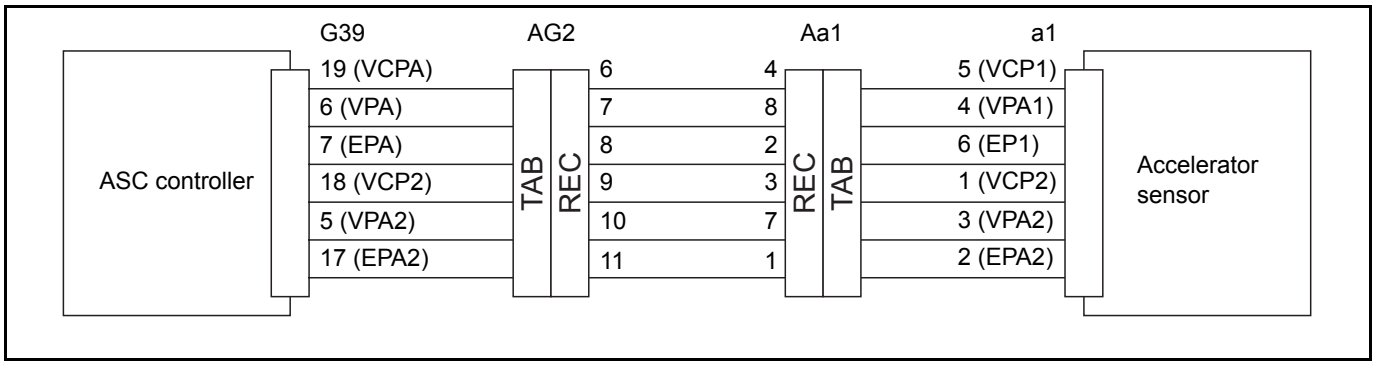
Ignition key switch OFF, disconnect a1, connect A35, ignition key switch ON
Accelerator sensor (I/O monitor: VPA1, VPA2)

Standard:

VPA1	0.20 V or less
VPA2	0.20 V or less

● **Error codes C4-1, C4-2, C4-3, C4-4, C4-5 (ASC spec.) (Accelerator sensor abnormality)**

Related portion



Probable cause

① Connector contact defect
② Accelerator sensor defect
③ Harness defect
④ ASC controller defect

Error codes C4-1, C4-2, C4-3, C4-4, C4-5

Disconnect the battery negative terminal, after inspecting and correcting disconnection and water entry of G39, AG2, Aa1 and a1, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine), and check whether or not there is an error.*

No error → Connector contact defect

Error ↓

Inspection 1:
Accelerator sensor individual inspection

NG → Accelerator sensor defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

Inspection 3:
Accelerator sensor voltage inspection
ANL: I/O ENGINE CTRL 1/3

NG → Accelerator sensor defect

OK ↓

ASC controller defect

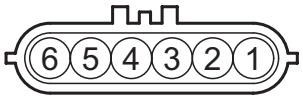
*: Make sure that no error code is displayed when the accelerator pedal is operated.

Inspection 1:

Carry out accelerator sensor individual inspection.

Ignition key switch OFF, disconnect a1, conenct G39

(1) Accelerator sensor resistance measurement



a1

Standard: (Sensor side)

a1-5 ~ a1-6	Approx. 1.8 ~ 3.5 kΩ (released)
a1-1 ~ a1-2	

(2) Accelerator sensor output circuit resistance measurement

Standard: (Sensor side)

a1-4 ~ a1-6	Make sure that the resistance value increases proportionally to the rotation of the potentiometer when the potentiometer section is rotated.
a1-3 ~ a1-2	

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect G39 and a1

Standard:

G39-6 ~ a1-4	Continuity
G39-19 ~ a1-5	Continuity
G39-6 ~ Frame	No continuity
G39-7 ~ a1-6	Continuity
G39-19 ~ G39-6	No continuity
G39-6 ~ G39-18	No continuity
G39-5 ~ a1-3	Continuity
G39-18 ~ a1-1	Continuity
G39-5 ~ Frame	No continuity
G39-5 ~ G39-19	No continuity
G39-5 ~ G39-18	No continuity
G39-6 ~ G39-5	No continuity

Inspection 3:

Inspect the accelerator sensor voltage.

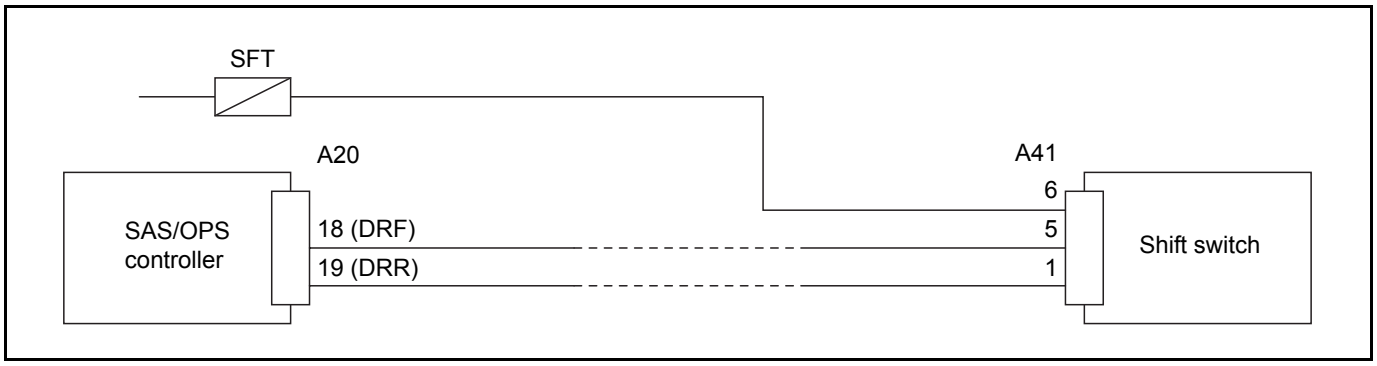
Ignition key switch OFF, disconnect a1, connect G39, ignition key switch ON
Accelerator sensor (I/O monitor: VPA1, VPA2)

Standard:

VPA1	0.20 V or less
VPA2	0.20 V or less

● **Error codes C7-1 and C7-2 (Shift lever switch abnormality)**

Related portion



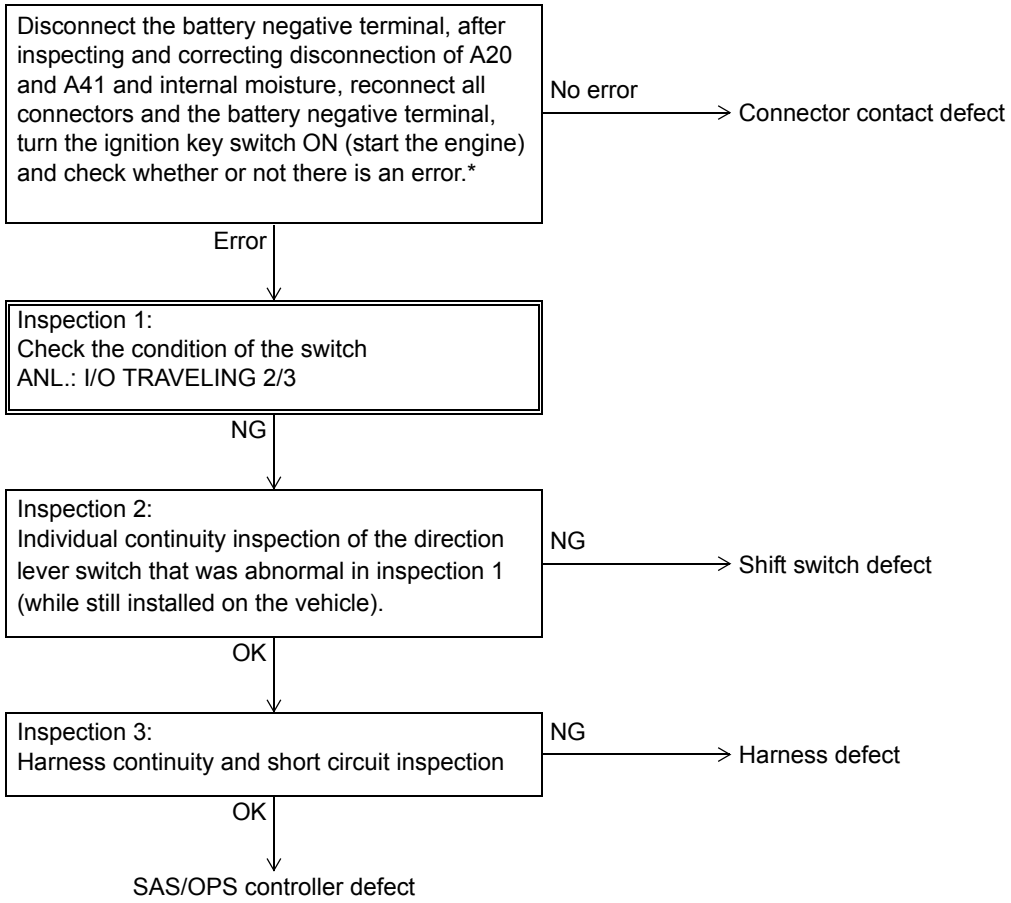
The above chart is for vehicles of the left shift lever column specification.
For vehicles of the right shift lever column specification, A43-4, A43-5 and A43-9 should be used.
For vehicles of the armrest specification, Y4-7, Y4-6 and Y4-1 should be used.

Probable cause

① Connector contact defect
② Forward travel shift switch defect
③ Reverse travel shift switch defect
④ Harness defect
⑤ Shift switch installation defect
⑥ SAS/OPS controller defect

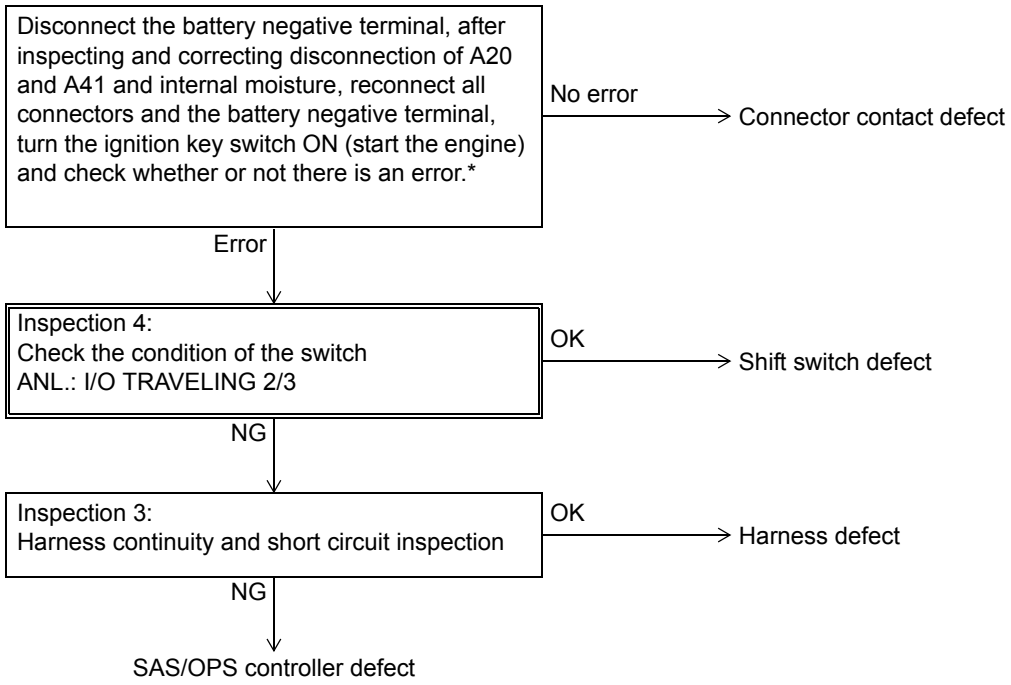
Note:
In the event that the engine stops while travelling, when the ignition key switch is turned from OFF to ON, an C7-1 error may be detected, however this is not a fault.
Stop the vehicle, turn the ignition key switch OFF and restart the engine.

Error code C7-1



*: Check if an error occurs after turning the ignition key switch ON, moving the shift lever and traveling from stopped state to more than 10 km/h (6.2 mph) within 3 seconds.

Error code C7-2



*: Make sure there is no error after turning the ignition key switch ON, and move the shift lever to forward and reverse travel.

Inspection 1:

Check the condition of the switch.

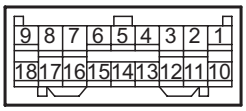
Ignition key switch ON
Direction switch (I/O monitor: DRF - DRR)

Standard:

	Lever in neutral position	Lever in forward travel position	Lever in reverse travel position
DRF (for forward travel)	0	1	0
DRR (for reverse travel)	0	0	1

Inspection 2:

Individual continuity inspection of the direction lever switch(es) (still installed on the vehicle).



A41

Ignition key switch OFF, disconnect A41

Standard: (Switch side)

	Lever in neutral position	Lever in forward travel position	Lever in reverse travel position
A41-6 ~ A41-5	No continuity	Continuity	No continuity
A41-6 ~ A41-1	No continuity	No continuity	Continuity

Inspection 3:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A20 and A41

Standard:

A20-18 ~ A41-5	Continuity
A20-18 ~ Frame	No continuity
A20-19 ~ A41-1	Continuity
A20-19 ~ Frame	No continuity
A20-18 ~ A41-6	No continuity
A20-19 ~ A41-6	No continuity
A20-18 ~ A20-19	No continuity

Inspection 4:

Check the condition of the switch.

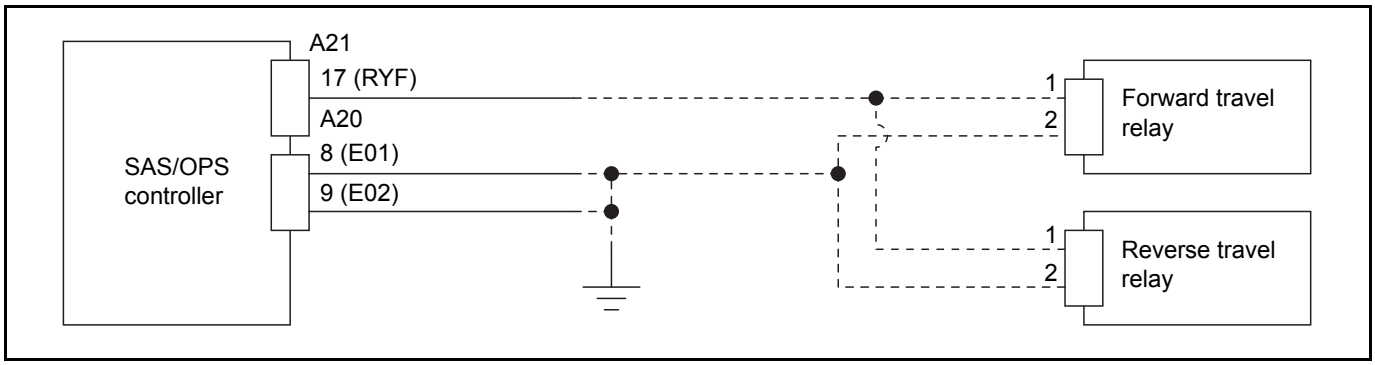
Disconnect A41, ignition key switch ON (engine stopped), direction switch (I/O monitor: DRF·DRR)

Standard:

	Analyzer display
DRF (for forward travel)	0
DRR (for reverse travel)	0

● **Error code CA-1 (Forward-reverse travel lever abnormality)**

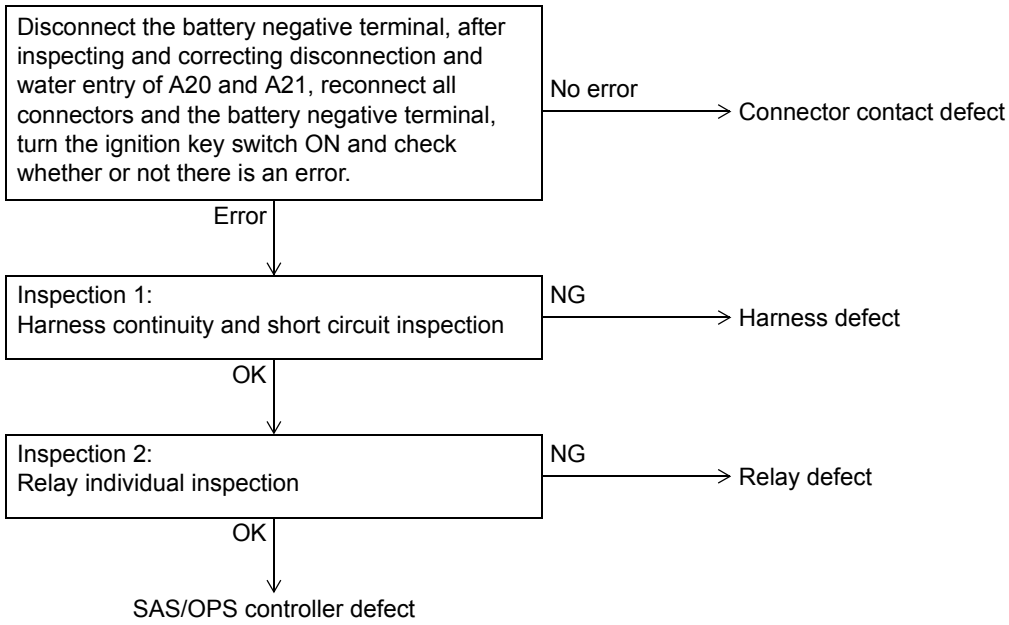
Related portion



Probable cause

① Connector contact defect
② Forward travel relay harness defect
③ Forward travel relay defect
④ Reverse travel relay harness defect
⑤ Reverse travel relay defect
⑥ SAS/OPS controller defect

Error code CA-1



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A20, A21 and forward/reverse relay

Standard:

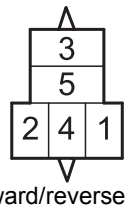
A21-17 ~ R/B forward relay terminal 1	Continuity
R/B reverse relay terminal 2 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A21-17 ~ Frame	No continuity

Inspection 2:

Carry out relay individual inspection.

Standard: (Relay side)

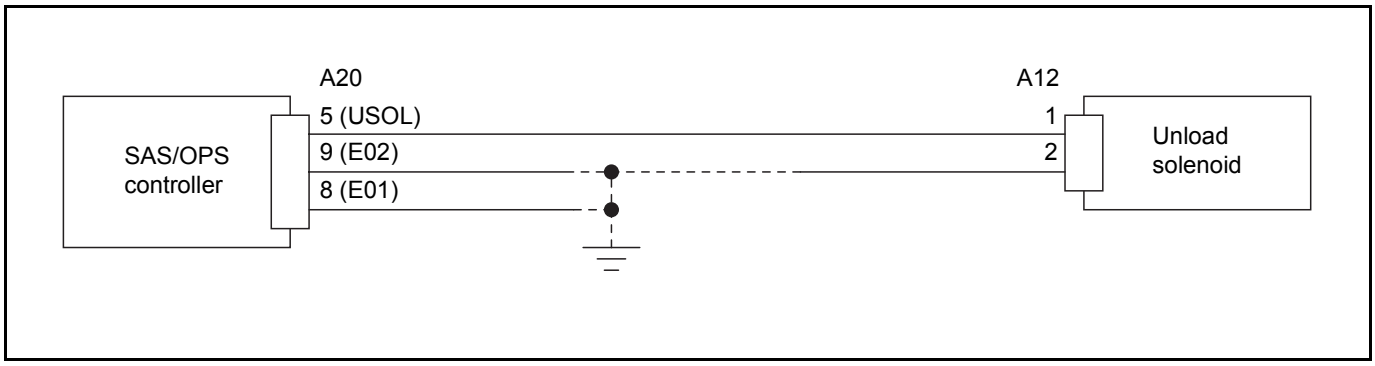
Forward relay terminal 1 ~ Forward relay terminal 2	Approx. 90 Ω (20°C)
Reverse relay terminal 1 ~ Reverse relay terminal 2	



Forward/reverse relay

● **Error code EC-1 (Unload solenoid abnormality)**

Related portion



Probable cause

① Connector contact defect
② Harness defect
③ Unload solenoid defect
④ SAS/OPS controller defect

Error code EC-1

Disconnect the battery negative terminal, after inspecting and correcting disconnection and water entry of A12 and A20, reconnect all connectors and the battery negative terminal, turn the ignition key switch ON (start the engine) and check whether or not there is an error.*

No error → Connector contact defect

Error ↓

Inspection 1:
Unload solenoid individual inspection

NG → Unload solenoid defect

OK ↓

Inspection 2:
Harness continuity and short circuit inspection

NG → Harness defect

OK ↓

SAS/OPS controller defect

*: Check whether an error occurs after turning the ignition key switch ON and leaving the seat (for at least 2 seconds).

Inspection 1:

Carry out unload solenoid individual inspection.

Ignition key switch OFF, disconnect A12

Standard: (Solenoid side)

A12-1 ~ A12-2	Approx. 10 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

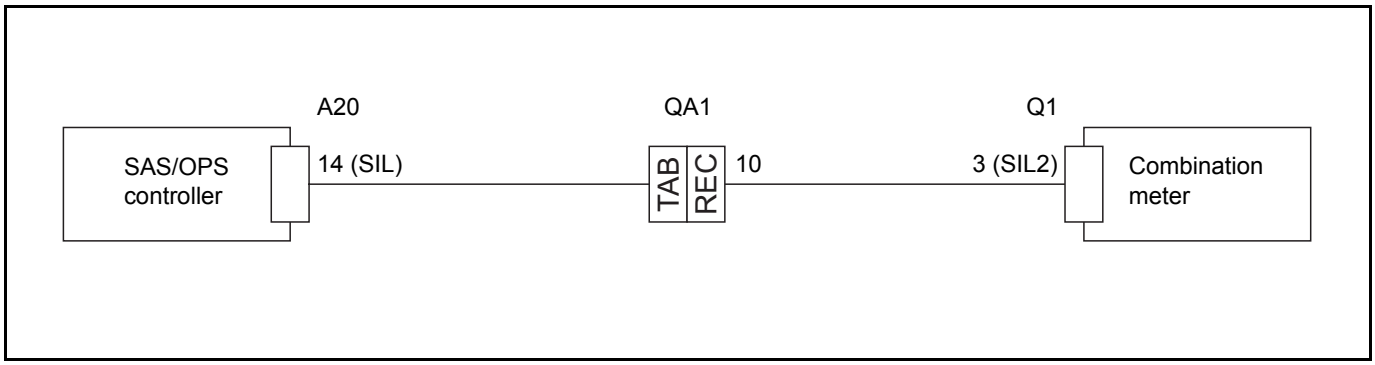
Ignition key switch OFF, disconnect A20 and A12

Standard:

A20-5 ~ A12-1	Continuity
A12-2 ~ Frame	Continuity
A20-8 ~ Frame	Continuity
A20-9 ~ Frame	Continuity
A20-5 ~ Frame	No continuity

● **Error codes F1-1, F2-1 (Controller to combination meter communication abnormality)**

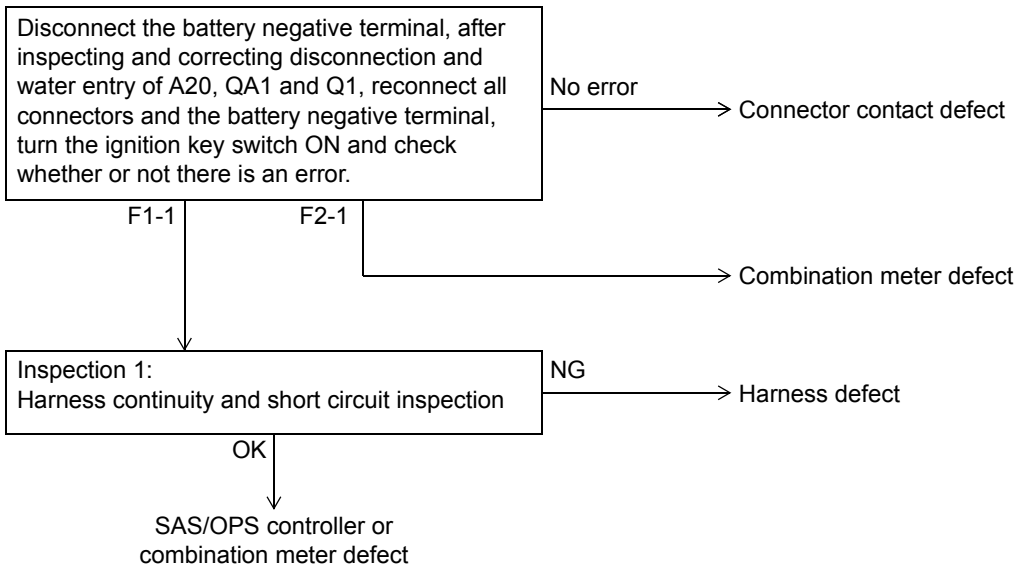
Related portion



Probable cause

① Connector contact defect
② Hour meter harness defect
③ Hour meter defect
④ SAS/OPS controller defect

Error codes F1-1, F2-1



Inspection 1:

Inspect for continuity and short circuiting of the harness.

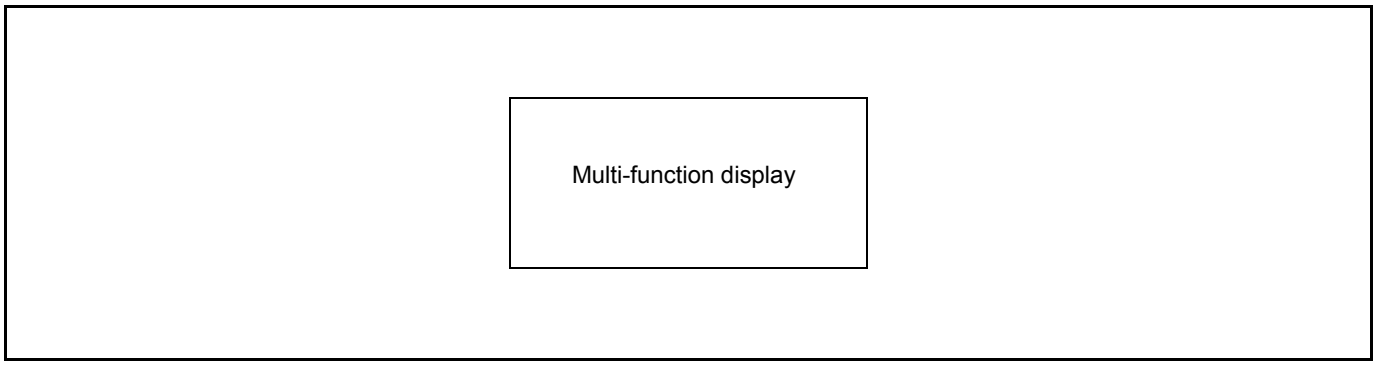
Ignition key switch OFF, disconnect A20 and Q1

Standard:

Q1-3 ~ Frame	No continuity
A20-14 ~ Q1-3	Continuity

● **Error codes F4-1, F4-2, F4-3, F4-4, F4-5, F4-7, F4-8 (CPU abnormality)**

Related portion

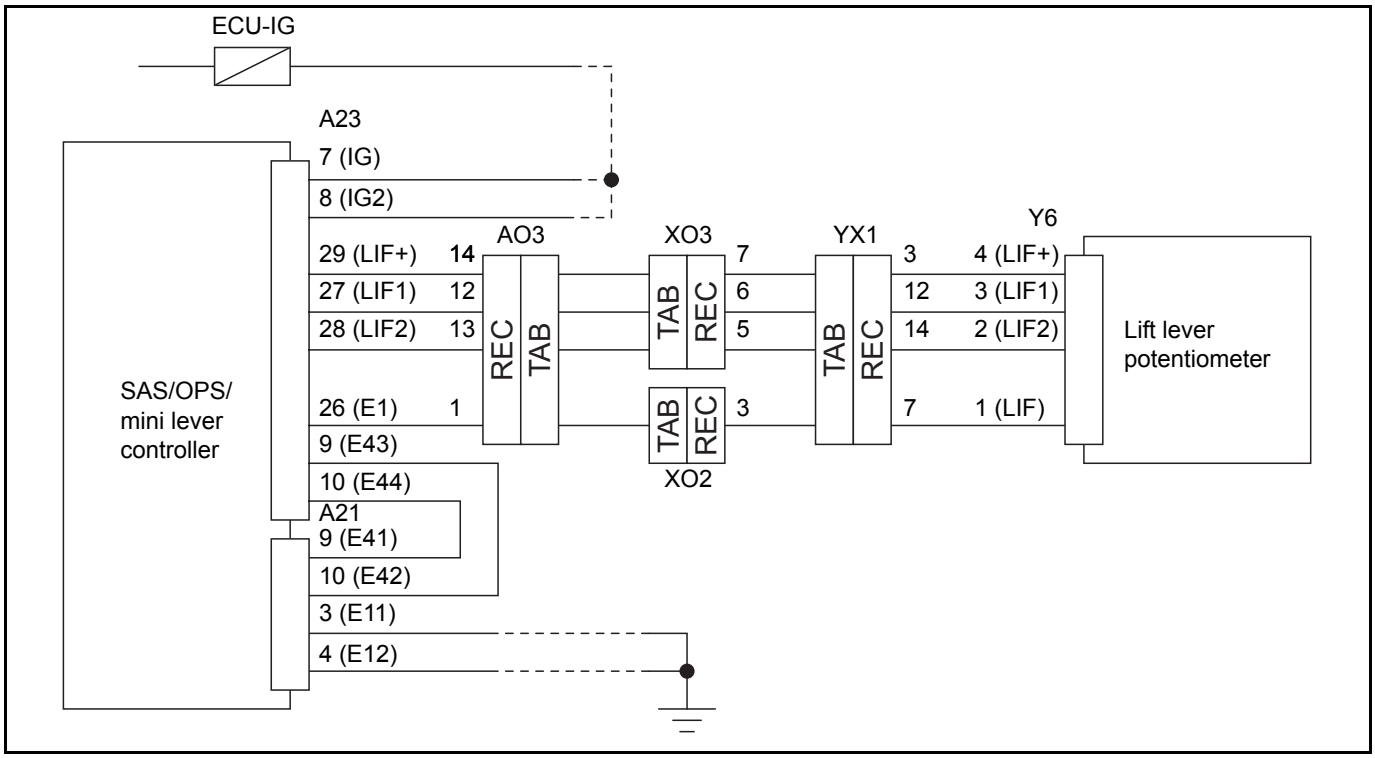


Probable cause

① Multi-function display board defect

● **Error codes H1-1, H1-2, H1-3, H1-4, H1-5 (Lift lever potentiometer abnormality)**

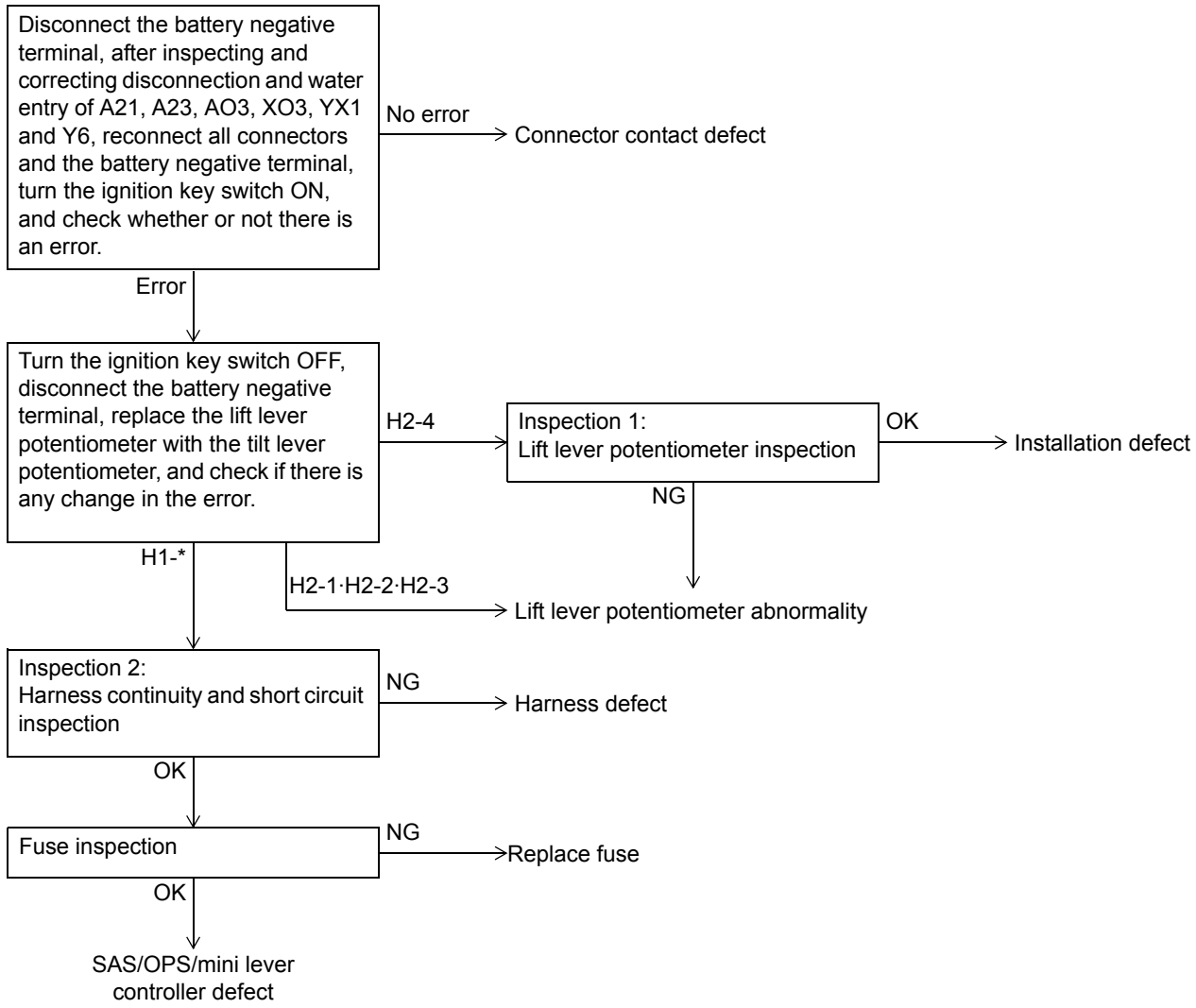
Related portion



Probable cause

① Connector contact defect
② Lift lever potentiometer harness defect
③ Lift lever potentiometer defect
④ SAS/OPS controller defect
⑤ Fuse defect

Error codes H1-1, H1-2, H1-3, H1-4



Note:
If the lever has been removed, be sure to perform matching after the lever is reinstalled.

Inspection 1:

Carry out lift lever potentiometer inspection.

Ignition key switch OFF, return the lift lever potentiometer and tilt lever potentiometer to their original positions, check lift lever potentiometer installation (refer to section 18), ignition key switch ON, match lift lever potentiometer

Inspection 2:

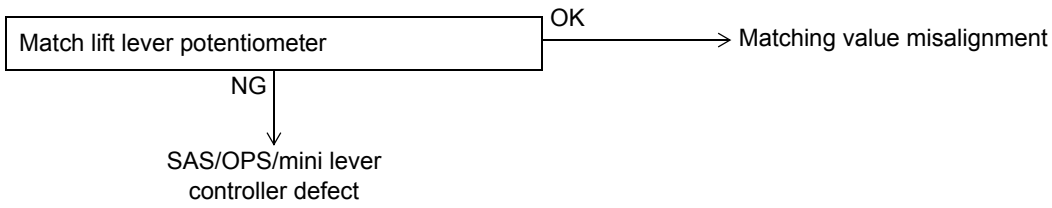
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21, A23 and Y6

Standard:

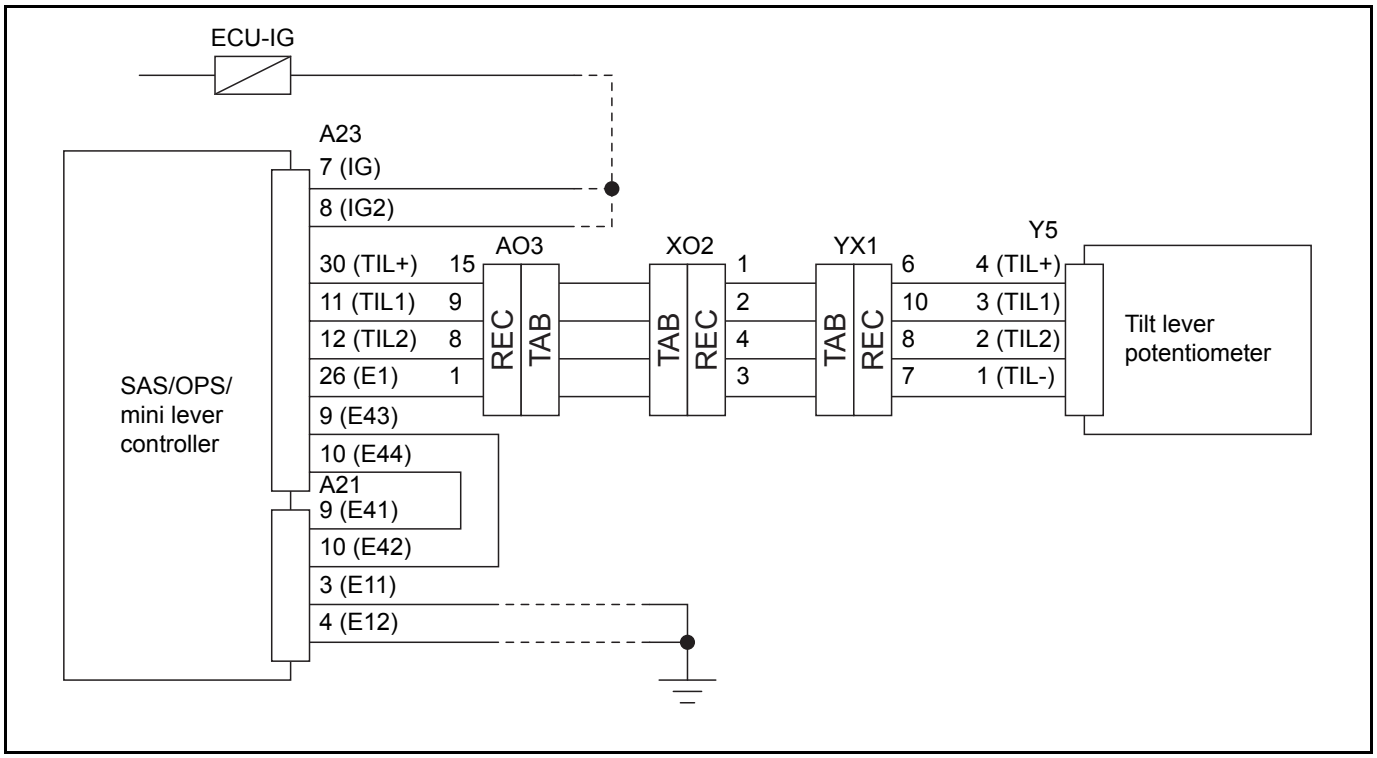
A23-29 ~ Y6-4	Continuity
A23-27 ~ Y6-3	Continuity
A23-28 ~ Y6-2	Continuity
A23-26 ~ Y6-1	Continuity
A23-29 ~ Frame	No continuity
A23-27 ~ Frame	No continuity
A23-28 ~ Frame	No continuity

Error code H1-5



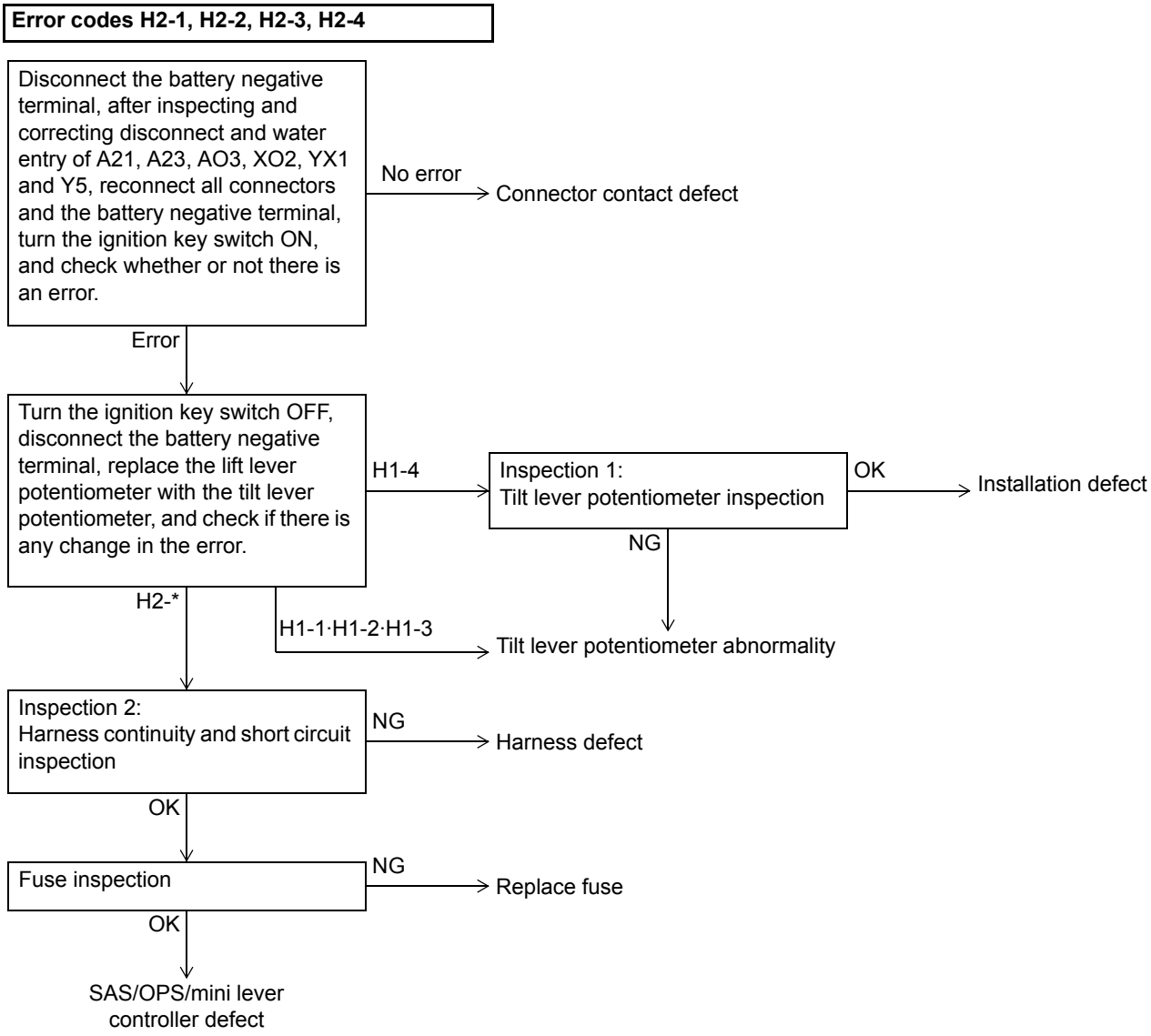
● **Error codes H2-1, H2-2, H2-3, H2-4, H2-5 (Tilt lever potentiometer abnormality)**

Related portion



Probable cause

① Connector contact defect
② Tilt lever potentiometer harness defect
③ Tilt lever potentiometer defect
④ SAS/OPS controller defect
⑤ Fuse defect



Note:
If the lever has been removed, be sure to perform matching after the lever is reinstalled.

Inspection 1:

Carry out tilt lever potentiometer inspection.

Ignition key switch OFF, return the tilt lever potentiometer and lift lever potentiometer to their original positions, check tilt lever potentiometer installation (refer to section 18), ignition key switch ON, match tilt lever potentiometer

Inspection 2:

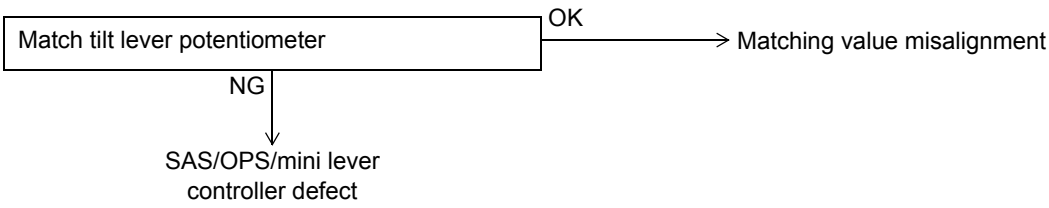
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21, A23 and Y5

Standard:

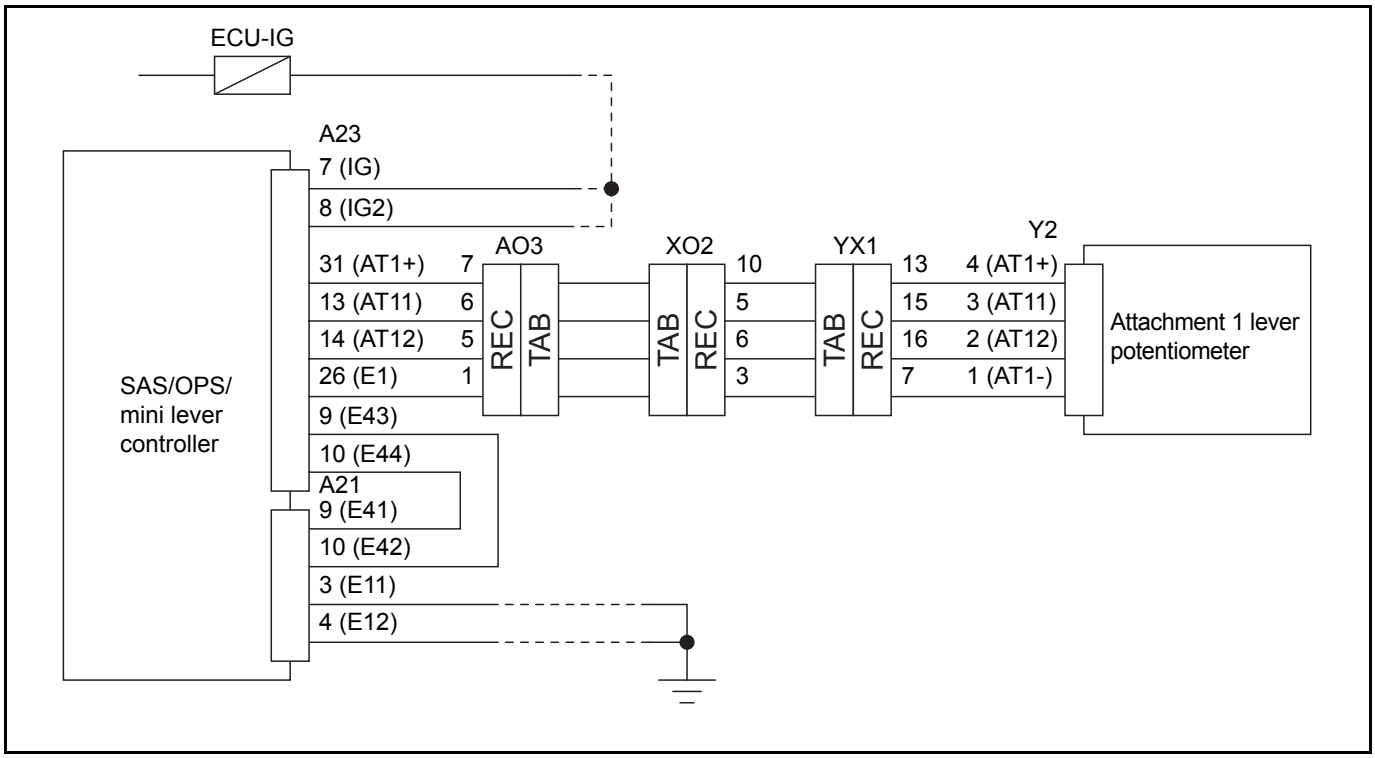
A23-30 ~ Y5-4	Continuity
A23-11 ~ Y5-3	Continuity
A23-12 ~ Y5-2	Continuity
A23-26 ~ Y5-1	Continuity
A23-30 ~ Frame	No continuity
A23-11 ~ Frame	No continuity
A23-12 ~ Frame	No continuity

Error code H2-5



● **Error codes H3-1, H3-2, H3-3, H3-4, H3-5 (Attachment 1 lever potentiometer abnormality)**

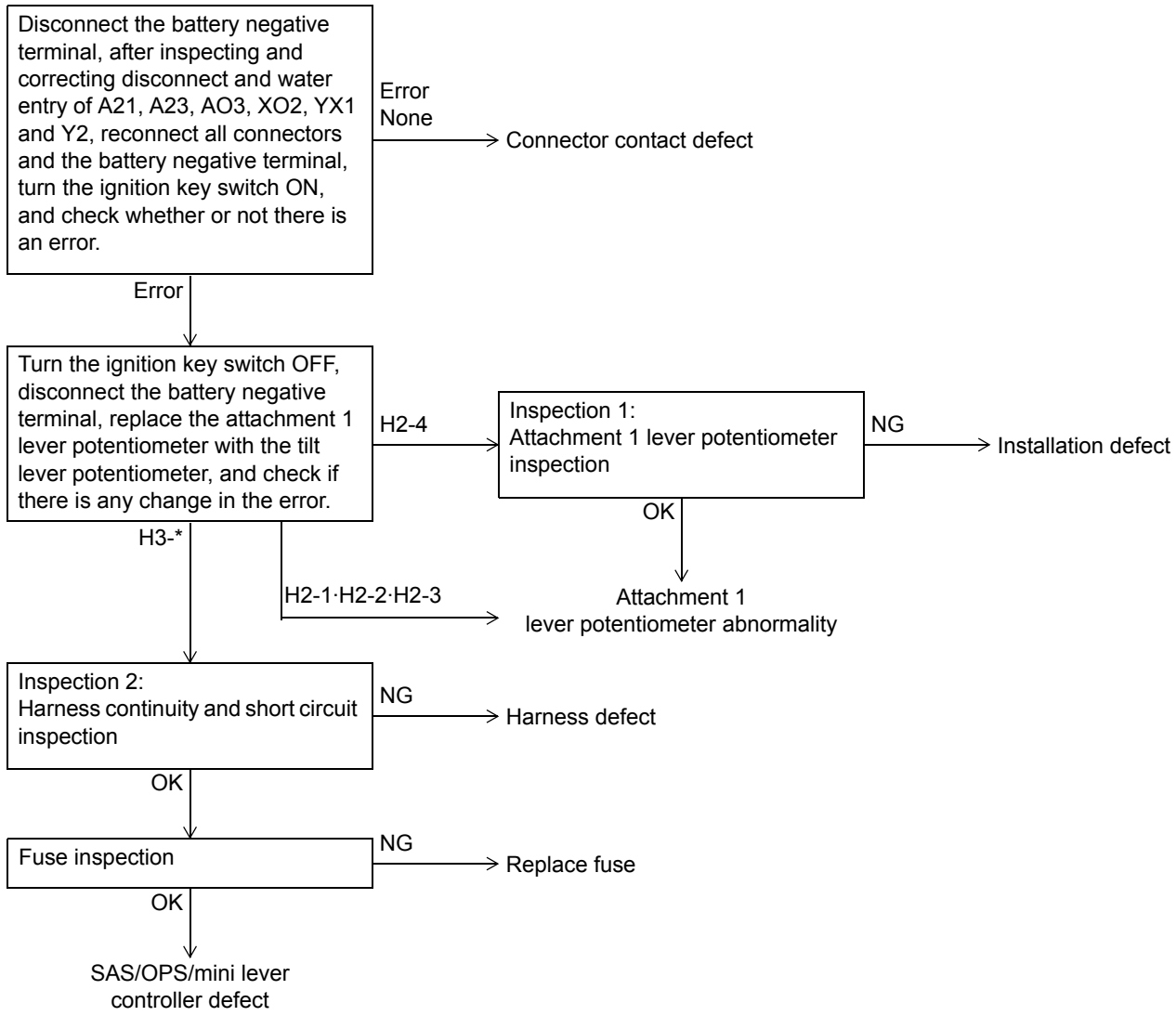
Related portion



Probable cause

① Connector contact defect
② Attachment 1 lever potentiometer harness defect
③ Attachment 1 lever potentiometer defect
④ SAS/OPS controller defect
⑤ Fuse defect

Error codes H3-1, H3-2, H3-3, H3-4



Note:
If the lever has been removed, be sure to perform matching after the lever is reinstalled.

Inspection 1:

Carry out attachment 1 lever potentiometer inspection.

Ignition key switch OFF, return the attachment 1 lever potentiometer and tilt lever potentiometer to their original positions

Check attachment 1 lever potentiometer installation (refer to section 18), ignition key switch ON, match attachment 1 lever potentiometer

Inspection 2:

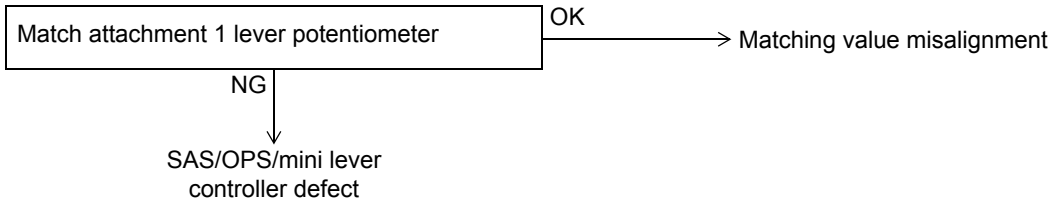
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21, A23 and Y2

Standard:

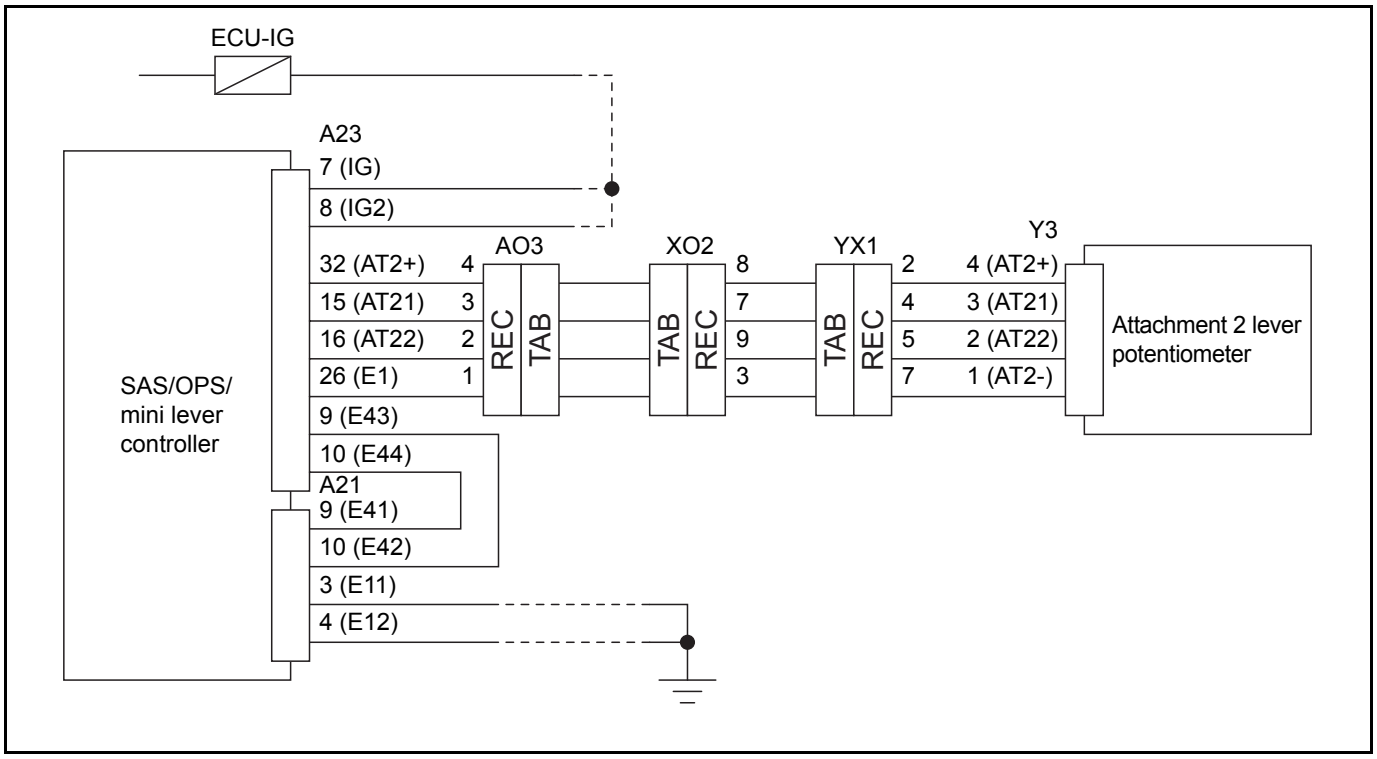
A23-31 ~ Y2-4	Continuity
A23-13 ~ Y2-3	Continuity
A23-14 ~ Y2-2	Continuity
A23-26 ~ Y2-1	Continuity
A23-31 ~ Frame	No continuity
A23-13 ~ Frame	No continuity
A23-14 ~ Frame	No continuity

Error code H3-5



● **Error codes H4-1, H4-2, H4-3, H4-4, H4-5 (Attachment 2 lever potentiometer abnormality)**

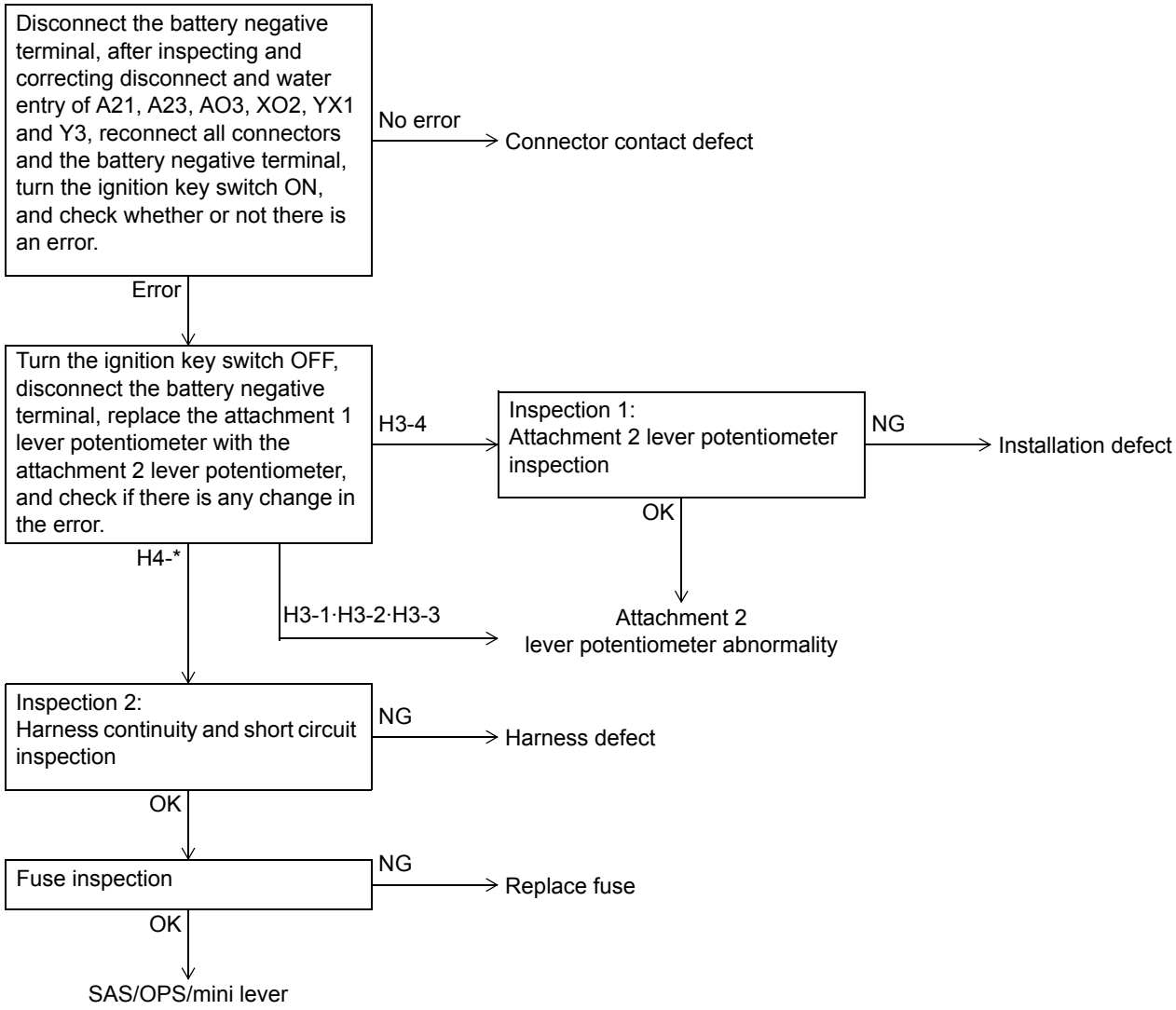
Related portion



Probable cause

① Connector contact defect
② Attachment 2 lever potentiometer harness defect
③ Attachment 2 lever potentiometer defect
④ SAS/OPS controller defect
⑤ Fuse defect

Error codes H4-1, H4-2, H4-3, H4-4



Note:
If the lever has been removed, be sure to perform matching after the lever is reinstalled.

Inspection 1:

Carry out attachment 2 lever potentiometer inspection.

Ignition key switch OFF, return the attachment 2 lever potentiometer and tilt lever potentiometer to their original positions

Check attachment 2 lever potentiometer installation (refer to section 18), ignition key switch ON, match attachment 2 lever potentiometer

Inspection 2:

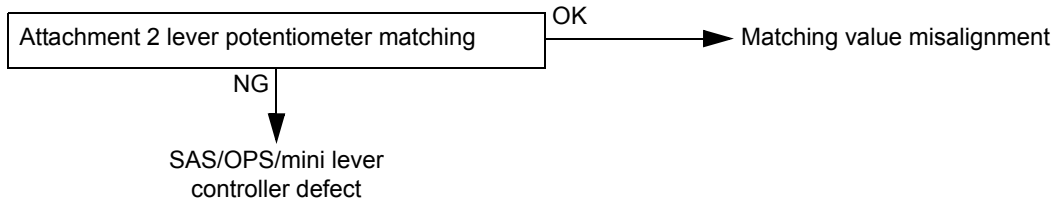
Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21, A23 and Y3

Standard:

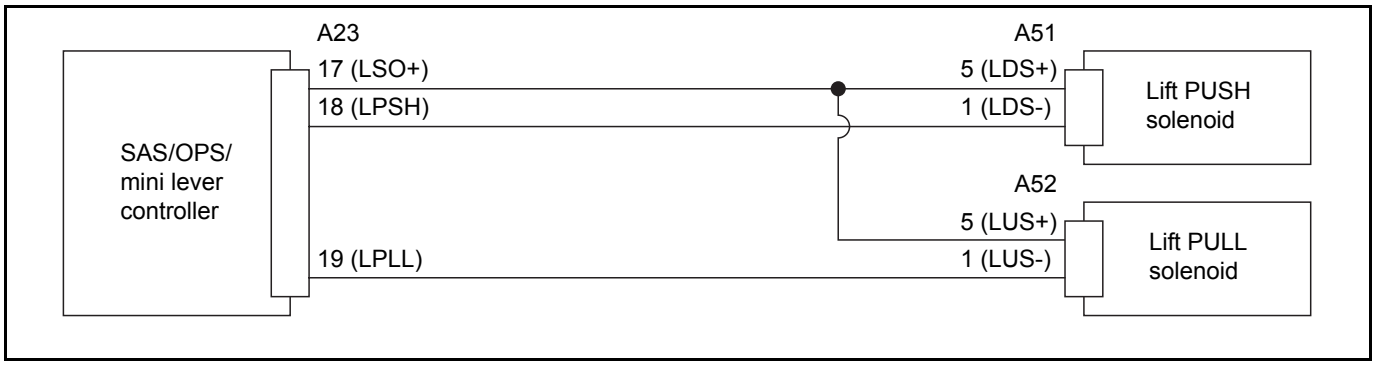
A23-32 ~ Y3-4	Continuity
A23-15 ~ Y3-3	Continuity
A23-16 ~ Y3-2	Continuity
A23-26 ~ Y3-1	Continuity
A23-32 ~ Frame	No continuity
A23-15 ~ Frame	No continuity
A23-16 ~ Frame	No continuity

Error code H4-5



● **Error codes H5-1 and H5-2 (Lift solenoid abnormality)**

Related portion

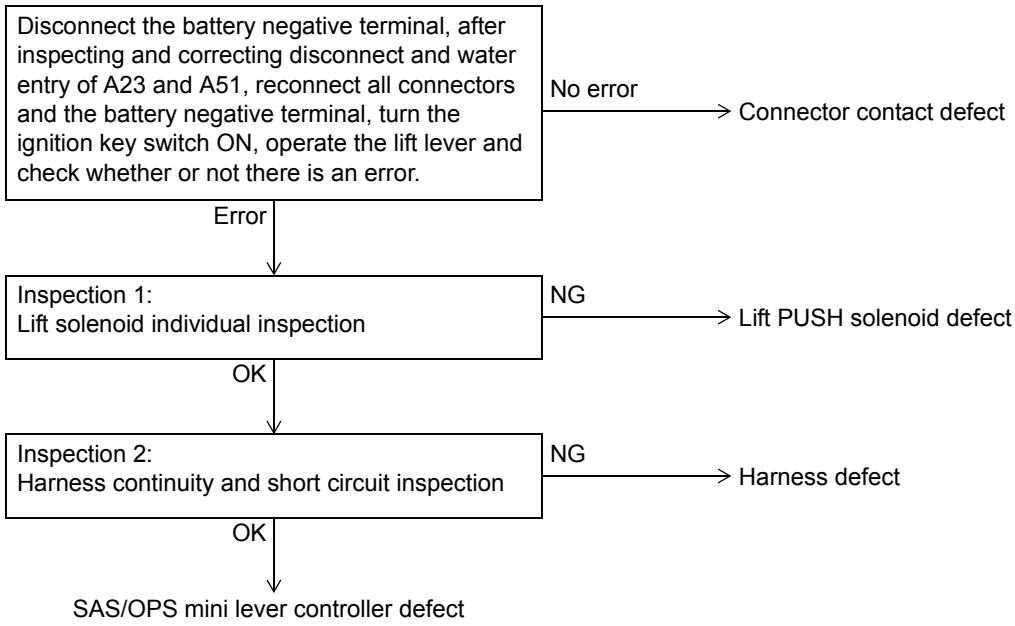


Probable cause

① Connector contact defect
② Lift PUSH solenoid harness defect
③ Lift PUSH solenoid defect
④ Lift PULL solenoid harness defect
⑤ Lift PULL solenoid defect
⑥ SAS/OPS/mini lever controller defect

Error codes H5-1, H5-2

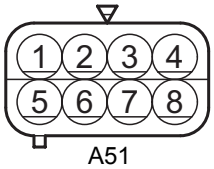
H5-1 is now described. For H5-2, substitute A52 for A51 and PULL for PUSH in the following.



Inspection 1:

Carry out lift solenoid individual inspection.

Ignition key switch OFF, disconnect battery negative terminal, disconnect A51



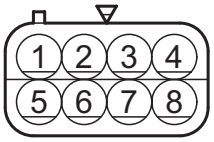
Standard: (Solenoid side)

A51-5 ~ A51-1	Approx. 7 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect battery negative terminal, disconnect A23 and A51



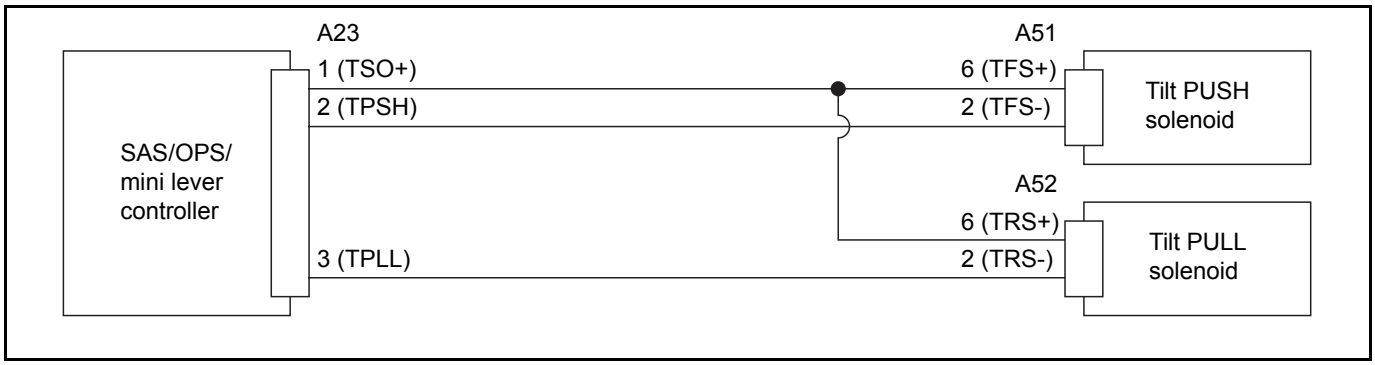
A52

Standard:

A23-17 ~ A51-5	Continuity
A23-18 ~ A51-1	Continuity
A23-17 ~ A23-18	No continuity
A23-17 ~ A23-19	No continuity
A23-17 ~ Frame	No continuity
A23-18 ~ Frame	No continuity
A23-19 ~ Frame	No continuity

● **Error codes H6-1 and H6-2 (Tilt solenoid abnormality)**

Related portion

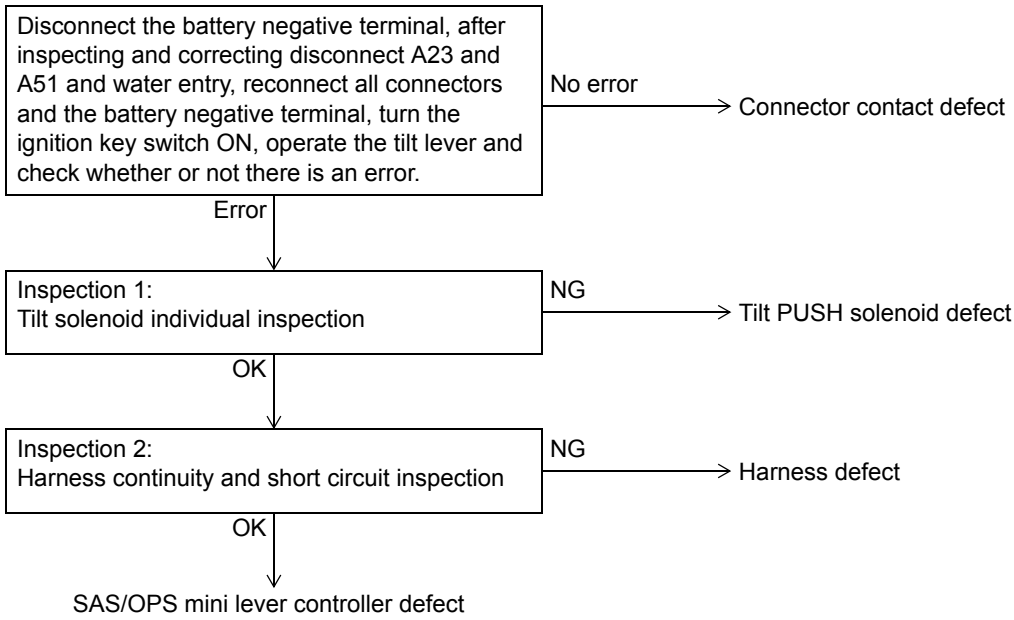


Probable cause

① Connector contact defect
② Tilt PUSH solenoid harness defect
③ Tilt PUSH solenoid defect
④ Tilt PULL solenoid harness defect
⑤ Tilt PULL solenoid defect
⑥ SAS/OPS/mini lever controller defect

Error codes H6-1 and H6-2

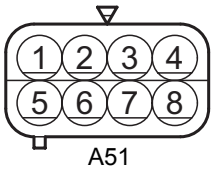
H6-1 is now described. For H6-2, substitute A52 for A51 and PULL for PUSH in the following



Inspection 1:

Carry out tilt solenoid individual inspection.

Ignition key switch OFF, disconnect A51



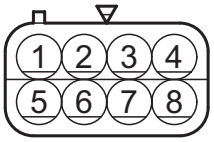
Standard: (Solenoid side)

A51-6 ~ A51-2	Approx. 7 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A23 and A51



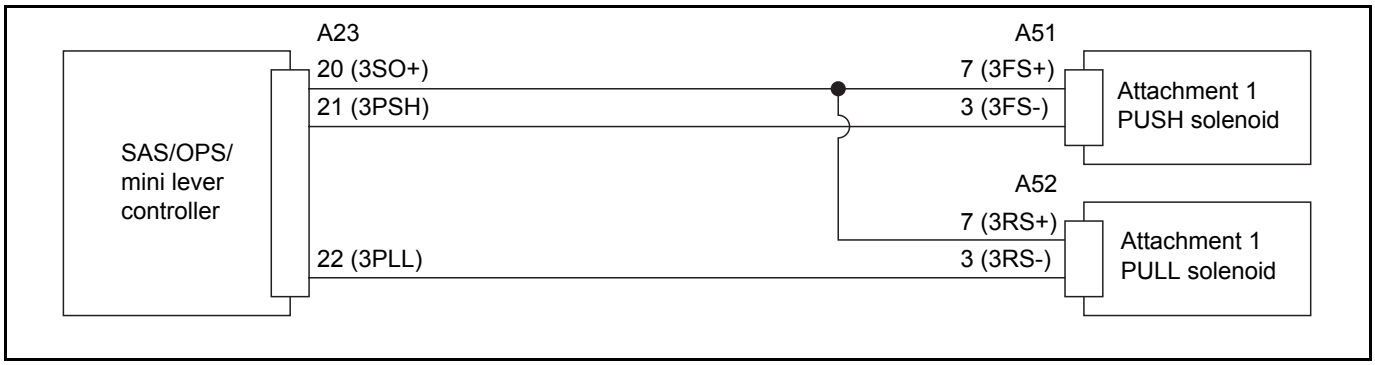
A52

Standard:

A23-1 ~ A51-6	Continuity
A23-2 ~ A51-2	Continuity
A23-1 ~ A23-2	No continuity
A23-1 ~ A23-3	No continuity
A23-1 ~ Frame	No continuity
A23-2 ~ Frame	No continuity
A23-3 ~ Frame	No continuity

● **Error codes H7-1, H7-2 (Attachment 1 solenoid abnormality)**

Related portion

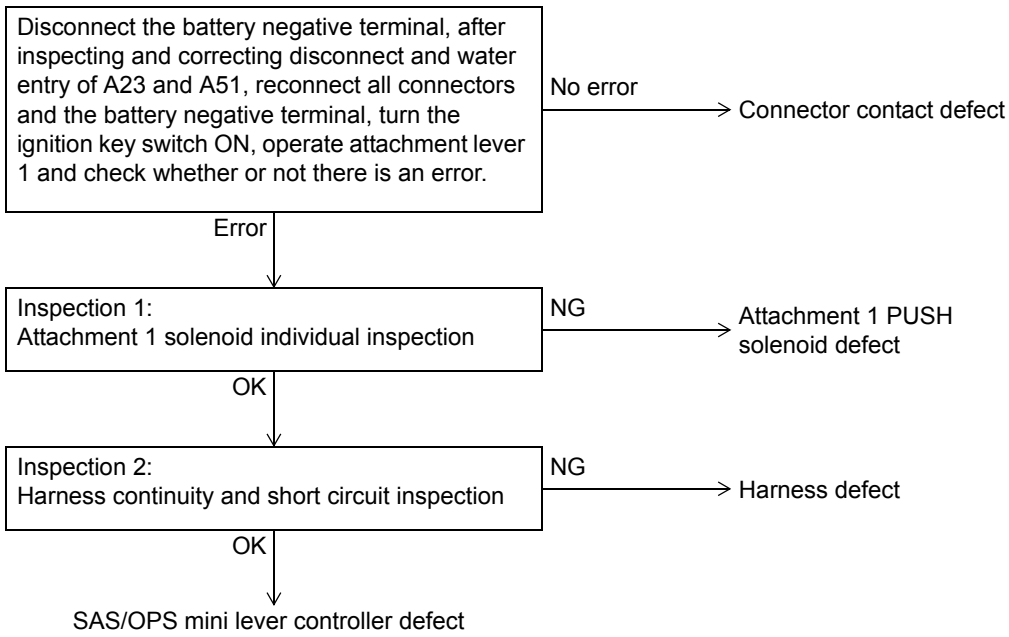


Probable cause

① Connector contact defect
② Attachment 1 PUSH solenoid harness defect
③ Attachment 1 PUSH solenoid defect
④ Attachment 1 PULL solenoid harness defect
⑤ Attachment 1 PULL solenoid defect
⑥ SAS/OPS/ mini lever controller defect

Error codes H7-1, H7-2

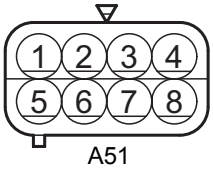
H7-1 is now described. For H7-2, substitute A52 for A51 and PULL for PUSH in the following



Inspection 1:

Carry out attachment 1 solenoid individual inspection.

Ignition key switch OFF, disconnect A51



A51

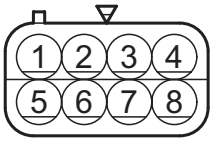
Standard: (Solenoid side)

A51-7 ~ A51-3	Approx. 7 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A23 and A51



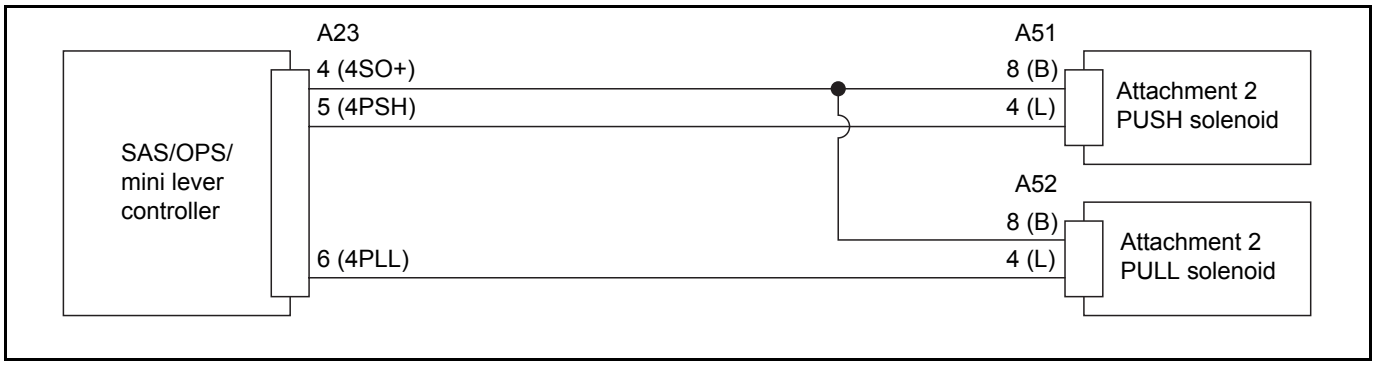
A52

Standard:

A23-20 ~ A51-7	Continuity
A23-21 ~ A51-3	Continuity
A23-20~ A23-21	No continuity
A23-20 ~ A23-22	No continuity
A23-20 ~ Frame	No continuity
A23-21 ~ Frame	No continuity
A23-22 ~ Frame	No continuity

● **Error codes H8-1, H8-2 (Attachment 2 solenoid abnormality)**

Related portion

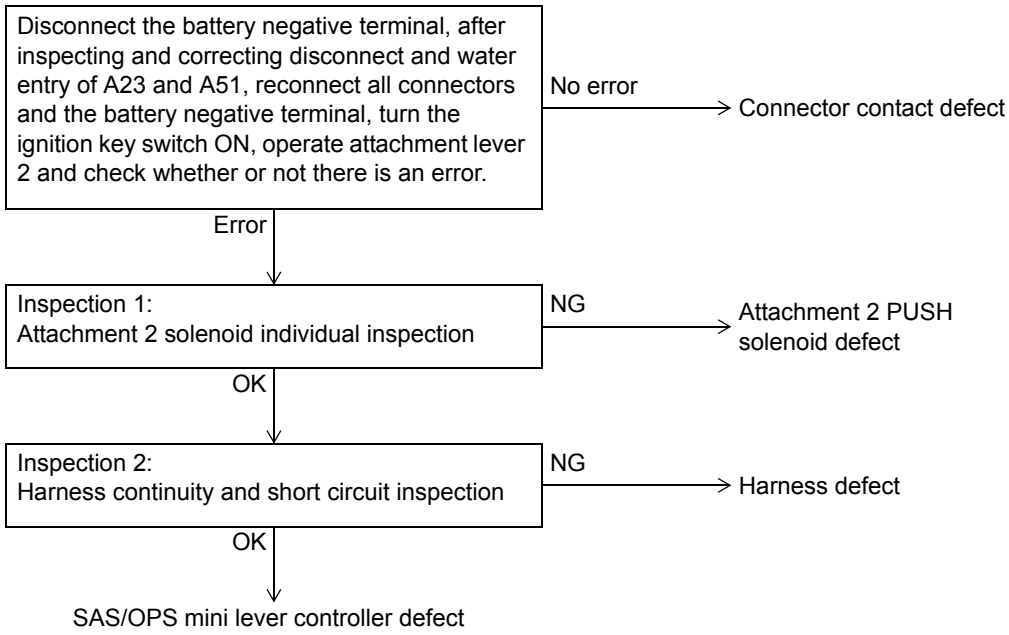


Probable cause

① Connector contact defect
② Attachment 2 PUSH solenoid harness defect
③ Attachment 2 PUSH solenoid defect
④ Attachment 2 PULL solenoid harness defect
⑤ Attachment 2 PULL solenoid defect
⑥ SAS/OPS/ mini lever controller defect

Error codes H8-1, H8-2

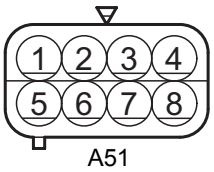
H8-1 is now described. For H8-2, substitute A52 for A51 and PULL for PUSH in the following.



Inspection 1:

Carry out attachment 2 solenoid individual inspection.

Ignition key switch OFF, disconnect battery negative terminal and A51



A51

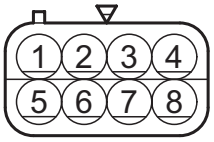
Standard: (Solenoid side)

A51-8 ~ A51-4	Approx. 7 Ω (20°C)

Inspection 2:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A23 and A51



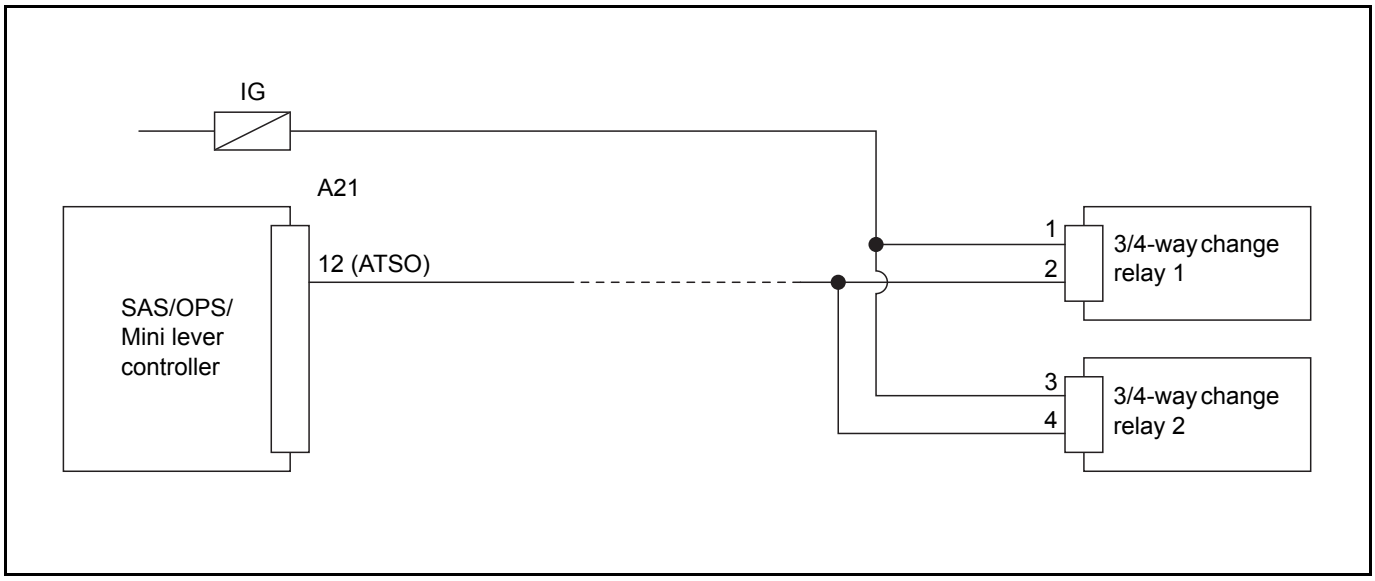
A52

Standard:

A23-4 ~ A51-8	Continuity
A23-5 ~ A51-4	Continuity
A23-4 ~ A23-5	No continuity
A23-4 ~ A23-6	No continuity
A23-4 ~ Frame	No continuity
A23-5 ~ Frame	No continuity
A23-6 ~ Frame	No continuity

● **Error code HA-1 (3/4-way change relay abnormality)**

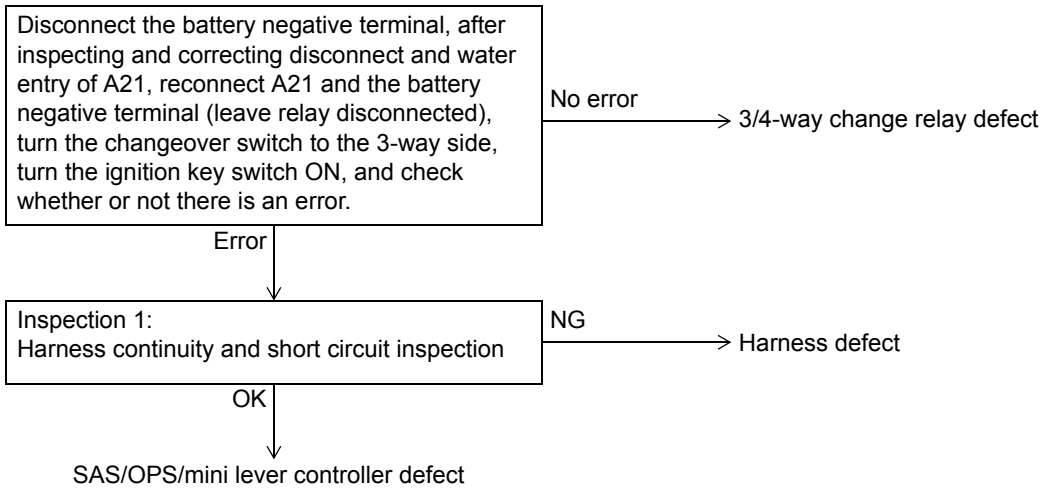
Related portion



Probable cause

① Connector contact defect
② 3/4-way change relay 1 harness defect
③ 3/4-way change relay 1 defect
④ 3/4-way change relay 2 harness defect
⑤ 3/4-way change relay 2 defect
⑥ SAS/OPS controller defect

Error code HA-1



Inspection 1:

Inspect for continuity and short circuiting of the harness.

Ignition key switch OFF, disconnect A21 and each relay

Standard:

A21-12 ~ Relay terminal 2	Continuity
A21-12 ~ Relay terminal 4	Continuity
A21-12 ~ Frame	No continuity

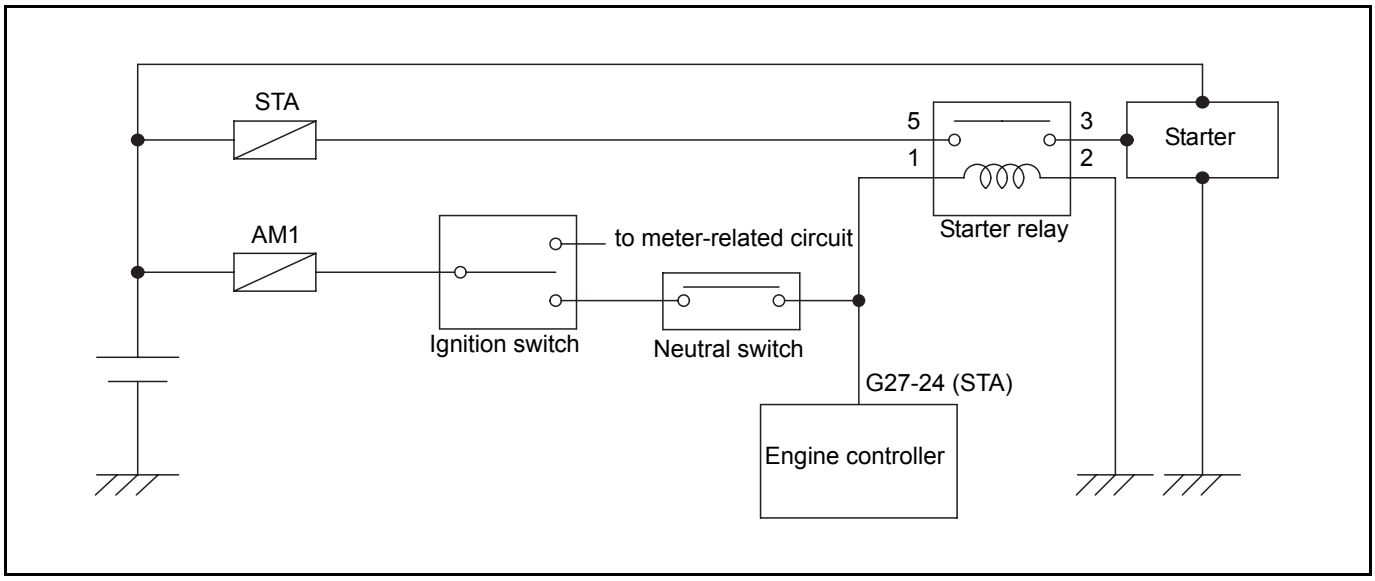
TROUBLESHOOTING WHEN THERE IS NO ERROR CODE

4Y-E Engine List by Symptom

Symptom	Portion to be inspected	Page for reference
Does not crank	1. Starter relay and starter	19-157
	2. Neutral start switch	–
Cannot start (no starting combustion)	1. ECU power supply system	19-159
	2. Igniter system	19-44
	3. Fuel pump circuit	19-161
	4. Fuel injector	Refer to engine repair manual
Cannot start (no complete combustion)	1. Fuel pump circuit	19-161
	2. Igniter system	19-44
	3. Fuel injector	Refer to engine repair manual
Does not start well	1. Electronic throttle	Refer to engine repair manual
	2. Fuel pump circuit	19-161
	3. Igniter system	19-44
	4. Spark plugs	Refer to engine repair manual
	5. Fuel injector	Refer to engine repair manual
	6. Compression	Refer to engine repair manual
Fast idling rough	1. Electronic throttle	Refer to engine repair manual
Idle speed high	1. Electronic throttle	Refer to engine repair manual
	2. ECU power supply system	19-159
	3. Neutral start switch	–
Idle speed low	1. Electronic throttle	Refer to engine repair manual
	2. Fuel injector	Refer to engine repair manual
	3. Igniter system	19-44
	4. Compression	Refer to engine repair manual
	5. Fuel pump circuit	19-161
Idle unstable	1. Electronic throttle	Refer to engine repair manual
	2. ECU power supply system	19-159
	3. Fuel pump circuit	19-161
Hunting	1. Fuel injector	Refer to engine repair manual
	2. Fuel pump circuit	19-161
	3. Igniter system	19-44
Hesitation, poor acceleration	1. Igniter system	19-44
	2. Spark plugs	Refer to engine repair manual
	3. Fuel injector	Refer to engine repair manual
After fire	1. Fuel pump circuit	19-161
	2. Spark plugs	Refer to engine repair manual
	3. Fuel injector	Refer to engine repair manual
Engine stalling (immediately after start up)	1. Fuel pump circuit	19-161
Engine stalling (immediately after deceleration)	1. Fuel injector	Refer to engine repair manual
	2. Engine control computer	–

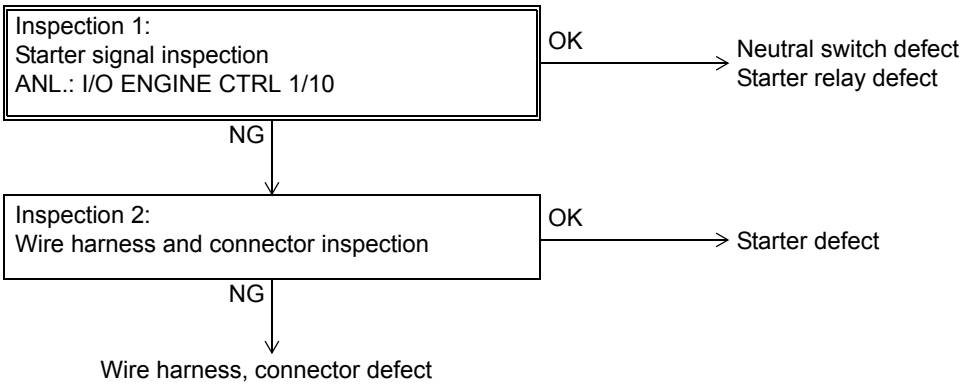
● **Starter relay and starter**

Related portion



Probable cause

① Neutral switch defect
② Starter relay defect
③ Starter defect
④ Wire harness, connector defect



Inspection 1:

Carry out starter signal inspection.

Ignition key switch ON
Starter signal (I/O motor: STA)

Standard:

	Starter stopped	Starter in operation
STA	0	1

Inspection 2:

Carry out wire harness inspection.

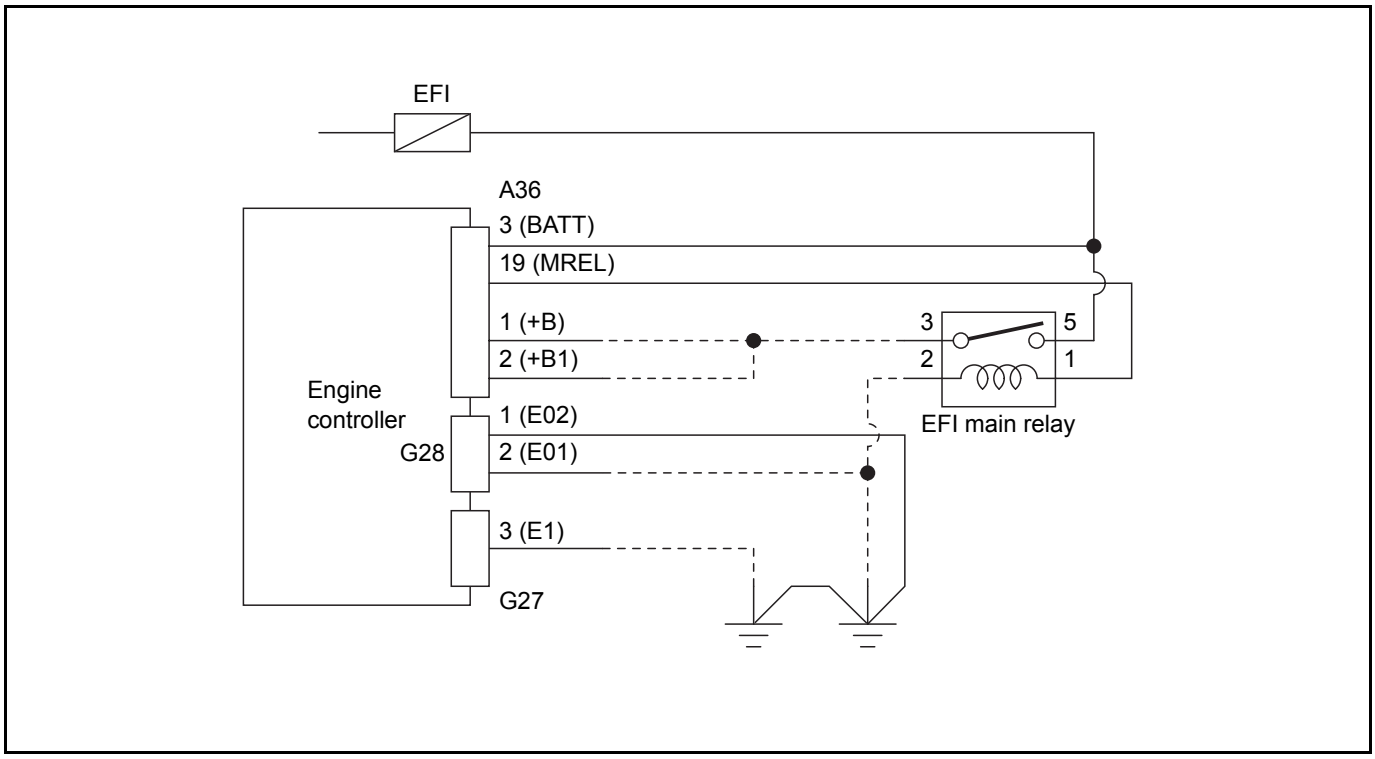
Ignition key switch OFF, remove the starter relay, crank the engine and check voltage

Standard:

Relay terminal 1 ~ frame	9 ~ 14 V
Relay terminal 2 ~ frame	0 V
Relay terminal 3 ~ frame	0 V
Relay terminal 5 ~ frame	9 ~ 14 V

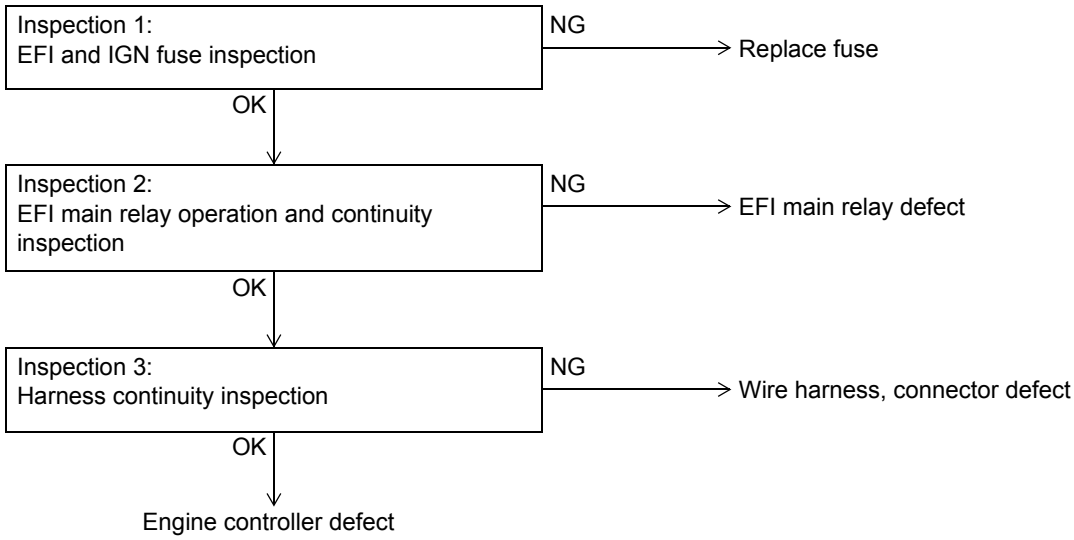
● **ECU power supply system**

Related portion



Probable cause

① Blown fuse
② EFI main relay defect
③ Wire harness, connector defect



Inspection 1:

Carry out a fuse continuity inspection.

Remove the EFI fuse and IGN fuse.

Standard: Continuity exists.

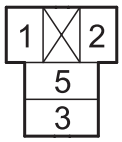
Inspection 2:

Inspect the EFI main relay.

(1) Inspect the EFI main relay operation.
Ignition key switch ON, operate the EFI main relay

Standard:
The EFI main relay makes an operating sound in coordination with the ignition key switch.

(2) Inspect for continuity between each of the terminals of the relay.



EFI relay

Ignition key switch OFF, remove the EFI main relay

Standard:

Relay terminals 1 ~ 2	Continuity
Relay terminals 3 ~ 5	No continuity

(3) Inspect for continuity between relay terminals 3 and 5 when the battery voltage is applied accross terminals 1 to 2.

Standard: Continuity exists.

Inspection 3:

Inspect for continuity of the wire harness.

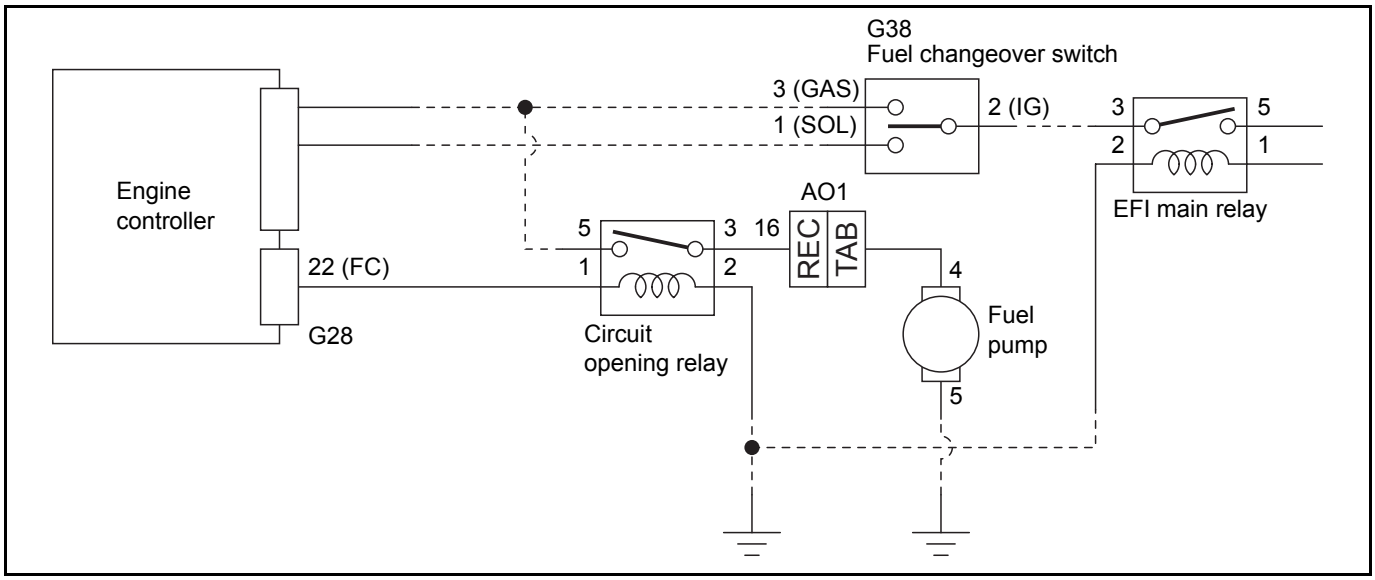
Ignition key switch OFF

Standard:

IGN ~ IG switch	Continuity
MREL ~ EFI main relay (N18)	Continuity
EFI main relay (Z23) ~ frame	Continuity
EFI ~ +B	Continuity
EFI ~ +B1	Continuity
EFI ~ BATT	Continuity
E01 ~ frame	Continuity
E02 ~ frame	Continuity
E1 ~ frame	Continuity

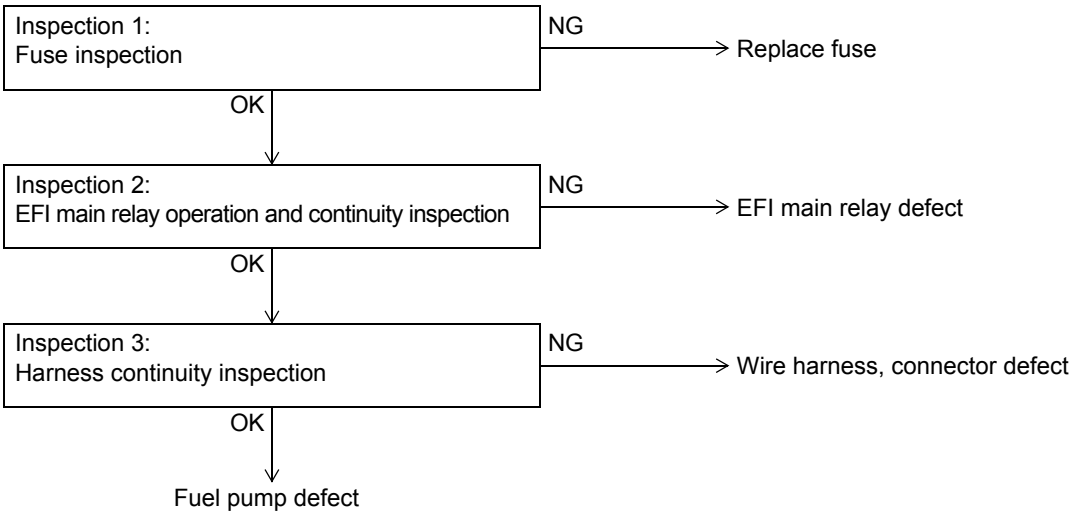
● **Fuel pump control system**

Related portion



Probable cause

① Blown fuse
② EFI main relay defect
③ Wire harness, connector defect
④ Fuel pump defect



Inspection 1:

Carry out a fuse continuity inspection.

Remove the EFI fuse and IGN fuse.

Standard: Continuity exists.

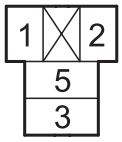
Inspection 2:

Inspect the EFI main relay.

(1) Inspect the EFI main relay operation.
Ignition key switch ON, inspect the operation of the EFI main relay

Standard: The EFI main relay makes an operating sound in coordination with the ignition key switch

(2) Inspect for continuity between each of the terminals of the relay



EFI relay

Ignition key switch OFF, remove EFI main relay

Standard:

Relay terminals 1 ~ 2	Continuity
Relay terminals 3 ~ 5	No continuity

(3) Inspect for continuity between relay terminals 3 and 5 when the battery voltage is applied accross terminals 1 to 2.

Standard: Continuity exists

Inspection 3:

Inspect for continuity of the wire harness.

Ignition key switch OFF

Standard:

Main relay ~ fuel changeover switch	Continuity
Fuel changeover switch ~ GAS	Continuity
FC ~ Circuit opening relay	Continuity
Circuit opening relay ~ GND	Continuity
Fuel changeover switch ~ Circuit opening relay	Continuity
Circuit opening relay ~ Fuel pump	Continuity
Fuel pump ~ GND	Continuity

Defect Causes When There is No SAS/OPS Error Display

Note:
If an error code or wrench lamp is flashing, repair it first.

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Travel and load handling control	For vehicles with travel and load handling control: Engine is always slow to rev up. (Even with the direction lever left in F or R position and the brake applied, the engine is still slow to rev up)	Brake switch unit: Open fault (Stuck in depressed state, or internal damage) Brake switch line: Disconnection fault (Harness, connector, fuse)	ON/OFF check with analyzer	Harness check or replace switch
		Accelerator sensor unit: Internal damage Accelerator sensor installation: Link, installation part destroyed, damaged	Accelerator pedal position check: Check the opening degree of the accelerator pedal when not operated.	If not close to 0%, installation check or replace sensor.
		SAS/OPS controller: Controller defect	–	Replace
	For vehicles with travel and load handling control: Even if the lift is raised, the idle speed does not rise.	Lift raise switch unit: Open fault (Switch mounted incorrectly, internal damage, stuck) Lift raise switch line: Disconnection fault (Harness, connector) Switch ground line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		Display setting: Lift idle up disabled, Idle up speed tuning value low	Check settings with option set and tuning	Change
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Travel and load handling control	For vehicles with travel and load handling control: Speed limit applies at high lifting height despite not being loaded	Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or link fault (Harness, connector)	Load sensor voltage check: Mount a load, ground the forks and check the change in voltage.	If there is no change, perform a harness check or replace the sensor.
		Display setting: Maximum speed limiter, Speed limit setting enabled	Check the setting content of the maximum speed limiter, check the setting content of the speed limit setting.	Change
		SAS/OPS controller: Controller defect	–	Replace
	For vehicles with travel and load handling control: Despite being loaded at high lifting height the speed limit does not operate.	Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or link fault (Harness, connector)	Load sensor voltage check: Mount a load, ground the forks and check the change in voltage.	If there is no change, perform a harness check or replace the sensor.
		Lifting height switch unit: Disconnection fault (internal damage, stuck)	ON/OFF check with analyzer	Harness check or replace sensor
		Display setting: Traveling limit setting disabled Load sensing speed limit disabled	Check setting values with option set	Change
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Travel and load handling control	For vehicles with travel and load handling control: Speed limit applies when loaded despite being at a low lifting height	Lifting height switch unit: Disconnection fault (Internal damage, stuck)	ON/OFF check with analyzer	Harness check or replace switch
		Display setting: Maximum speed limiter, speed limiter setting enabled	Check the setting content of the maximum speed limiter, check the setting content of the speed limit setting.	Change
		SAS/OPS/mini lever controller: Controller defect	–	Replace
	For vehicles with travel and load handling control: Speed limit applies at all times regardless of lifting height or load	Display setting: Maximum speed limiter, speed limiter setting enabled	Check the setting content of the maximum speed limiter, check the setting content of the speed limit setting.	Change
		SAS/OPS controller: Controller defect	–	Replace
Buzzer related (*)	Buzzer sounds constantly	Buzzer unit: Buzzer defect Buzzer harness line (Lead-in side): Ground short or link fault (Harness, connector)	–	Harness check or replace buzzer
		SAS/OPS controller: Controller defect	–	Replace
	OPS leaving seat warning does not sound.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Disconnection fault (Harness, connector)	–	Harness check or replace buzzer
		Display setting: OPS leaving seat notification buzzer setting disabled	Check setting values with option set	Change
		SAS/OPS controller, OPS controller: Controller defect	–	Replace

*: Only export model except “WITHOUT OPS BUZZER” specification

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Buzzer related	Traveling OPS return to neutral alarm does not sound.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Disconnection fault (Harness, connector)	–	Harness check or replace buzzer
		Direction lever unit: Lever defect Direction lever signal: Disconnection fault (Harness, connector)	Refer to "Traveling OPS does not operate, cannot travel".	Refer to "Traveling OPS does not operate, cannot travel".
		Display setting: USA specification enabled	Check setting values with option set.	Change
		SAS/OPS controller: Controller defect	–	Replace
	For cowl lever vehicles: Material handling OPS return to neutral alarm does not sound.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Disconnection fault (Harness, connector)	–	Harness check or replace buzzer
		Lowering lever switch: Lever defect Lowering lever signal: Disconnection fault (Harness, connector)	Refer to “Cowl lever vehicles: cannot lower lift”. *: The material handling OPS return to neutral is only a function for the lowering lever on cowl lever vehicles.	Refer to “Cowl lever vehicles: cannot lower lift”.
		Display setting: USA specification enabled	Check setting values with option set.	Change
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Buzzer related	For mini lever vehicles: Material handling OPS return to neutral alarm does not sound.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Disconnection fault (Harness, connector)	–	Harness check or replace buzzer
		Material handling lever potentiometer unit: Lever defect Material handling lever line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or link fault (Harness, connector)	Material handling lever potentiometer voltage check: Move the lever into forward and reverse tilt positions and check the voltage change.	If there is no change, perform a harness check or replace the potentiometer If none of the material handling levers move, refer to “Cowl lever vehicles, mini lever vehicles: cannot perform any material handling”.
		Display setting: USA specification enabled	Check setting values with option set	Change
		SAS/OPS controller: Controller defect	–	Replace
	Vehicles with multifunction display DX: Parking brake reminder alarm does not sound.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Fault (Harness, connector)	–	Harness check or replace buzzer
		Parking brake switch unit: Open fault (stuck in released state, internal damage) Parking brake detection mechanism: Always released Parking brake line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer.	If there is no change, perform an installation check, harness check, or replace the switch.
		Display setting: Parking brake reminder alarm setting disabled. USA specification enabled	Check setting values with option set	Change
		SAS/OPS controller setting: Not matched	–	Follow matching procedure to match.
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Buzzer related	Vehicles with multifunction display DX: Parking brake reminder alarm continues to sound even after the parking brake has been depressed (or pulled).	Parking brake switch unit: Ground short fault (Stuck in released state, internal damage) Parking brake detection mechanism: Always released Parking brake line: Ground short fault (Harness, connector)	ON/OFF check with analyzer	If there is no change, perform an installation check, harness check, or replace the switch.
		SAS/OPS controller: Controller defect	–	Replace
	Vehicles with multifunction display DX: Parking brake return reminder alarm does not sound. * First perform a “Parking brake reminder alarm does not sound” check.	Buzzer unit: Buzzer defect Buzzer harness line (Power supply side, lead-in side): Fault (Harness, connector)	–	Harness check or replace buzzer
		Vehicle speed sensor unit: Cannot detect low speed (Internal damage) Vehicle speed sensor line (SPD+ side, SPD- side): Link fault (Harness, connector)	Check sensor voltage and vehicle speed with the analyzer * With the parking brake not returned, even when the accelerator pedal is depressed, the alarm only sounds at speeds above 2 km/h.	If there is no change, perform an installation check or replace the sensor.
		SAS/OPS controller: Controller defect	–	Replace
	Vehicles with multifunction display DX: Parking brake return reminder alarm sounds on traveling. * First perform a “Parking brake reminder alarm does not sound” check.	Meter unit (with OK monitor): Meter defect	–	Replace
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Display function	Vehicles with multifunction display DX: When the load indicator switch is pressed, the load is not displayed.	Load indicator switch unit: Open fault (Internal damage) Load indicator switch detection mechanism (Mini lever, joystick): Detection part gap adjustment defect Load indicator switch line (Power supply, signal, ground): Open fault (Power supply, harness, connector)	ON/OFF check with analyzer	If there is no change, perform an installation check, harness check, or replace the switch (lever).
	Vehicles with multifunction display DX: When the vehicle is stopped, the display continually shows load indicator.	Load indicator switch unit: Short fault (Internal damage) Load indicator switch detection mechanism (Mini lever, joystick): Detection part gap adjustment defect Load indicator switch line (Signal): Short fault (Harness, connector)	ON/OFF check with analyzer	If there is no change, perform an installation check, harness check, or replace the switch (lever).
	Vehicles with multifunction display DX: The correct load is not displayed.	Display setting: Cylinder bore, number of cylinders, 0 point correction, calibration	Carry out rematching and check operation Load sensor voltage check: Mount a load, ground the forks and check the change in voltage * At high lifting height, correct load cannot be calculated and the display flashes.	Follow the procedure for matching, and rematch (cylinder bore, number of cylinders, 0 point correction) In cases where precision is required, adjust on the load indicator matching LOAD CALIBRATION screen. If there is no change during the voltage check, perform a harness check or replace the sensor.

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Display function	Vehicles with multifunction display DX: Torque converter oil temperature indicator stays at level 1.	Torque converter oil temperature sensor unit: Open fault (Internal damage) Torque converter oil temperature sensor line (Signal, ground): Disconnection fault (Harness, connector) +B short fault (Harness, connector) SAS/OPS controller: Controller defect	Start the engine and after leaving the vehicle running for a while, check the indicator.	Harness check or replace sensor, or replace SAS/OPS controller
	Vehicles with multifunction display DX: Torque converter oil temperature indicator continually displays overheat warning indication.	Torque converter oil temperature sensor unit: Short fault (Internal damage) Torque converter oil temperature sensor line (Signal): Ground short fault (Harness, connector) SAS/OPS controller: Controller defect	Stop the engine and after leaving the vehicle stopped for a while, check the indicatior.	Harness check or replace sensor, or replace SAS/OPS controller
	Vehicles with multifunction display DX: Torque converter oil temperature indicator does not display.	There is no display on MT vehicles. Display setting: Torque converter oil temperature emergency setting enabled SAS/OPS controller: Controller defect (MTC line short)	Check that the TEMPGAUGE on the option set screen is set to YES, and that the MTC on the analyzer I/O OTHERS screen is set to 0.	If the TEMPGAUGE is set to NO on the option set screen, change it to YES, and if MTC on the analyzer I/O OTHERS screen is set to 1, perform a harness check or replace the SAS/OPS controller.

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Swing lock	Feels unstable when traveling. (Traveling lock has become difficult or no longer possible)	Tire unit: Burst, tire pressure adjustment defect	–	Adjust or replace
		Lock cylinder unit: Leak, cannot lock (Internal damage) Lock cylinder locked status: Installation part damaged or destroyed	Check the locked status with an active test.	Replace
		Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or leak fault (Harness, connector)	Load sensor voltage check: Peform lift relief and check the change in voltage.	If there is no change, perform an installation check or replace the sensor.
		Lifting height switch unit: Disconnection fault (Internal damage, stuck)	ON/OFF check with analyzer	Harness check or replace switch
		Yaw rate sensor unit: Reduced sensitivity, voltage stuck (Internal damage) Yaw rate sensor line (Signal): Leak (Harness, connector)	Yaw rate sensor voltage check: Check that the voltage is approximately 2.5 V when the vehicle is stopped.	Installation check or replace sensor
		Vehicle speed sensor unit: Cannot detect low speeds (Internal damage) Vehicle speed sensor line (SPD+ side, SPD- side): Leak fault (Harness, connector)	Check sensor voltage and vehicle speed with the analyzer	If there is no change, perform an installation check or replace the sensor.
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Swing lock	Swing lock continually activates while traveling and material handling operations, or swing lock activates frequently.	Lock cylinder unit: Lock stuck (internal damage)	Check the locked status with an active test.	Replace
		Swing lock solenoid line (SWN+, SWN-): Disconnection fault (Harness, connector) Solenoid ground line (E01, E02): Disconnection fault (Harness, connector)	Check the locked status with an active test.	Harness check or replace solenoid
		Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or leak fault (Harness, connector)	Load sensor voltage check: Peform lift relief and check that the voltage rises.	If there is no change, perform an installation check or replace the sensor.
		Lifting height switch unit (2200H): Disconnection fault (internal damage, stuck) Lifting height switch unit (4000H): Disconnection fault (internal damage, stuck)	ON/OFF check with analyzer	Harness check or replace switch
		Yaw rate sensor unit: Reduced sensitivity, voltage stuck (Internal damage)	Yaw rate sensor voltage check: Check that the voltage is approximately 2.5 V when the vehicle is stopped.	Installation check or replace sensor
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Tilt control	Forward tilt automatic fork leveling does not stop. (Continues to tilt to the forward most tilt position without stopping at the level position)	Tilt angle sensor unit: Sensor defect Tilt angle sensor installation: Link, installation part destroyed, damaged	Tilt angle sensor voltage check: Tilt to forward and backward tilt positions and check the voltage change.	If there is no change, perform an installation check or replace the sensor.
		Horizontal matching value for tilt angle sensor: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Automatic fork leveling switch unit: Open fault (internal damage) Automatic fork leveling switch detection mechanism (mini lever, joystick): Detection part gap adjustment defect Automatic fork leveling switch line (Power supply, signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer.	Harness check or replace switch
		C/V tilt control valve: Stuck (internal damage)	Turn the tilt solenoid OFF and operate to forward tilt using an active test.	If forward tilt can be performed, replace the C/V tilt control valve.
		Display setting (mini lever, joy stick): 3/4 way change over specification is set to 2/3 way change over setting	Check the option set content.	Change
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Tilt control	Forward tilt automatic fork leveling does not stop. (Stops at a position slightly off the level position)	Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or leak fault (Harness, connector)	Load sensor voltage check: Peform lift relief and check that the voltage rises.	If there is no change, perform an installation check or replace the sensor.
		Load sensor no-load matching value: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Tilt angle sensor unit: Sensor defect Tilt angle sensor installation: Link, installation part destroyed, damaged	Tilt angle sensor voltage check: Tilt to forward and backward tilt positions and check the voltage change.	If there is no change, perform an installation check or replace the sensor.
		Horizontal matching value for tilt angle sensor: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Tilt control	Forward tilt automatic fork leveling does not stop. (Stops at the position where the automatic fork leveling switch is pressed)	Load sensor unit: Sensor defect Load sensor line (Power supply, signal, ground): Disconnection fault (Harness, connector) Short or leak fault (Harness, connector)	Load sensor voltage check: Check that the voltage rises on lift relief.	If there is no change, perform an installation check or replace the sensor.
		Load sensor no-load matching value: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Tilt angle sensor unit: Sensor defect Tilt angle sensor installation: Link, installation part destroyed, damaged	Tilt angle sensor voltage check: Tilt to forward and backward tilt positions and check the voltage change.	If there is no change, perform an installation check or replace the sensor.
		Horizontal matching value for tilt angle sensor: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Lifting height switch unit (2200H): Disconnection fault (internal damage, stuck)	ON/OFF check with analyzer.	Harness check or replace switch
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Tilt control	Mast backward tilting speed is not limited. Or, backward tilting speed is always slow.	Automatic fork leveling switch unit: Open fault (internal damage) Automatic fork leveling switch detection mechanism (mini lever, joystick): Detection part gap adjustment defect Automatic fork leveling switch line (Power supply, signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		C/V tilt control valve: Stuck (internal damage)	Turn the tilt solenoid ON/OFF and operate to backward tilt using an active test.	If there is no change in the backward tilting speed when ON/OFF operated, replace the C/V tilt control valve.
		Lifting height switch unit (2200H): Disconnection fault (internal damage, stuck)	ON/OFF check with analyzer	Harness check or replace switch
		Display setting (mini lever, joystick): 3/4-way change over specification is set to 2/3-way change over setting	Check the option set content.	Change
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Mini lever function	Mini lever, joystick vehicles: Backward tilt automatic fork leveling does not stop. (Continues to tilt to backward most tilt position without stopping at the level position)	Tilt angle sensor unit: Sensor defect Tilt angle sensor installation: Link, installation part destroyed, damaged	Tilt angle sensor voltage check: Tilt to forward and backward tilt positions and check the voltage change.	If there is no change, perform an installation check or replace the sensor.
		Horizontal matching value for tilt angle sensor: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Automatic fork leveling switch unit: Open fault (internal damage) Automatic fork leveling switch detection mechanism (mini lever, joystick): Detection part gap adjustment defect Automatic fork leveling switch line (Power supply, signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		Display setting (mini lever, joy stick): • 3/4-way change over specification set to 2/3-way change over setting • Backward tilt automatic fork leveling is deactivated	Check the option set content	Change
		SAS/OPS controller: Controller defect	–	Replace
	Mini lever, joystick vehicles: Backward tilt automatic fork leveling does not stop. (Stops at a position slightly off the level position)	Refer to forward tilt automatic fork leveling does not stop (stops at the position where the automatic leveling switch is pressed).	–	–

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Mini lever function	Mini lever, joystick vehicles: Backward tilt automatic fork leveling does not stop. (Stops at the position where the automatic fork leveling switch is pressed)	Tilt angle sensor unit: Sensor defect Tilt angle sensor installation: Link, installation part destroyed, damaged	Tilt angle sensor voltage check: Tilt to forward and backward tilt positions and check the voltage change.	If there is no change, perform an installation check or replace the sensor.
		Horizontal matching value for tilt angle sensor: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		SAS/OPS controller: Controller defect	–	Replace
	Mini lever 3/4-way (2/3-way) change over specification: 3-way (2-way) operation even when the lever change over switch is pressed. (Does not change over)	Lever change over switch unit: Open fault (internal damage) Lever change over switch detection mechanism (mini lever): Detection part gap adjustment defect Lever change over switch line (Power supply, signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		Lever change over relay 1 or 2 unit: Stuck, welding fault (internal damage) Lever change over relay 1 or 2 primary side line: Disconnection fault (wire, connector)	Check the changeover status with an active test.	Harness check or replace relay
		SAS/OPS/mini lever controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Mini lever function	Mini lever 3/4-way (2/3-way) change over specification: 4-way (3-way) continues to operate even though the lever change over switch has been operated. (Stays changed over)	Lever change over switch unit: Ground short fault (Internal damage) Lever change over switch detection mechanism (mini lever): Detection part gap adjustment defect Lever change over switch line (signal): Ground short fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		Lever change over relay 1 or 2 unit: Stuck, welding fault (internal damage) Lever change over relay 1 or 2 primary side lower line: Ground short fault (wire, connector)	Check the changeover status with an active test.	Harness check or replace relay
		Display setting: Number of attachment levers is not set to 5 way	Check the option set content.	Change
		SAS/OPS controller: Controller defect	–	Replace
	Mini lever 2/3-way change over specification: During ATT1 operation and high lifting height, and when loaded, ATT1 stops and pull-side operation is slow.	Display setting: Number of attachment levers is not set to 2/3-way	Check the option set content.	Change
	3-way (4-way) specifcation: Although ATT1 (ATT2) is operated, it does not work.	Display setting: Number of attachment levers is not set to 3-way (4-way)	Check the option set content.	Change

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Knob compensaiton control	Knob moves out of alignment into a certain position. (More than 10° off the straight ahead position)	Tire angle sensor unit: Sensor defect Tire angle sensor installation: Looseness of the attachment part, damage, bearing housing damage	Tire angle sensor voltage check: Operate the steering and check the change in voltage.	If there is no change, perform an installation check or replace the sensor.
		Tire angle sensor matching value: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Steering angle sensor unit: Sensor defect Steering angle sensor installation: Cam or steering wheel defect	ON/OFF check with analyzer	Harness check or replace sensor
		Knob compensation valve unit: Leak, stuck, (internal damage)	Using an active test, turn the knob compensation SOL ON and OFF and operate the steering at the tire end. SOL ON: check that the steering wheel can be turned freely. SOL OFF: Check that the steering wheel cannot be turned freely (steering is heavy).	Replace
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Knob compensation control	Knob position is out of alignment. (Knob position is not constant when traveling straight ahead)	Tire angle sensor unit: Sensor defect Tire angle sensor installation: Looseness of the attachment part, damage, bearing housing damage	Tire angle sensor voltage check: Operate the steering and check the change in voltage.	If there is no change, perform an installation check or replace the sensor.
		Tire angle sensor matching value: Does not match actual status (rematch)	–	Follow matching procedure to rematch.
		Steering angle sensor unit: Sensor defect Steering angle sensor installation: Cam or steering wheel defect	Check sensor voltage with the analyzer.	Harness check or replace sensor
		Knob compensation valve unit: Leak, stuck, (internal damage)	Using an active test, turn the knob compensation SOL ON and OFF and operate the steering at the tire end. SOL ON: Check that the steering wheel can be turned freely. SOL OFF: Check that the steering wheel cannot be turned freely (steering is heavy).	Replace
		PS cylinder system link defect: Eccentric pin, kingpin defect	–	Replace
		Vehicle speed sensor unit: Cannot detect low speed (internal damage) Vehicle speed sensor installation: High speed not detected correctly (sensor tip has metallic particle adhered) Vehicle speed sensor line (SPD+ side, SPD- side): Leak fault (Harness, connector)	Check sensor voltage and vehicle speed with the analyzer.	If there is no change, perform an installation check or replace the sensor.
		SAS/OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Meter	Wrench lamp is lit continually.	Fuse: ECU+B fuse blown ECU-IG fuse blown	–	Check for blown fuse
		Meter communication line: Ground short (Harness, connector) Disconnection fault (Harness, connector) SAS/OPS IG line, +B line, ground system: Disconnection fault (Harness, connector)	–	Harness check
		Battery unit: Low voltage, intake heater, large current auxiliary equipment operation	Check battery voltage with the analyzer.	Keep the engine at high speed for a while.
		SAS/OPS controller setting: Not matched	–	Follow matching procedure to rematch.
		Meter unit: Meter defect	–	Replace
		SAS/OPS controller: Controller defect	–	Replace
	The wrench lamp does not light even when the ignition key switch is turned ON.	Meter power supply line: Disconnection fault (Harness, connector)	–	Harness check
		Meter unit: Meter defect	–	Replace
	Hour meter is not displayed.	Hour meter start fuse: Not connected Hour meter start signal line: Disconnection fault (Harness, connector)	–	Harness check or replace connector
		Meter unit: Meter defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
OPS	For cowl lever vehicles: Cannot lower the lift.	Lift lower switch unit: Open fault (Switch mounted incorrectly, internal damage, stuck) Lift lower switch line: Disconnection fault (Harness, connector) Switch ground line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		C/V lift lower lock valve Stuck (internal damage)	Using an active test, turn the lift lower lock solenoid ON and perform lower operation.	If the lift cannot lower by lower operation, replace the C/V.
		Seat switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
	For cowl lever vehicles: Cannot perform forward tilt.	Forward tilt switch unit: Open fault (Switch mounted incorrectly, internal damage, stuck) Forward tilt switch line: Disconnection fault (Harness, connector) Switch ground line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		C/V tilt control valve Stuck (internal damage)	Turn the tilt solenoid ON and operate to forward tilt using an active test.	If forward tilt cannot be performed, replace the C/V tilt control valve.
		Seat switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
OPS	For cowl lever vehicles: Cannot perform backward tilt.	Backward tilt switch unit: Open fault (Switch mounted incorrectly, internal damage, stuck) Backward tilt switch line: Disconnection fault (Harness, connector) Switch ground line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		C/V backward tilt lock valve Stuck (internal damage)	Turn the backward tilt lock solenoid ON and operate to backward tilt using an active test.	If backward tilt cannot be performed, replace the C/V backward tilt lock valve.
		Seat switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
	Cannot perform material handling except for lift lower.	C/V unload valve: Stuck (internal damage)	For cowl lever vehicles: Turn the unload valve solenoid OFF and perform raising operation using an active test. For mini lever vehicles: Turn the unload valve solenoid ON and perform raising operation using an active test.	If raising cannot be performed, replace the C/V unload valve.

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
OPS	Material handling OPS does not operate.	C/V tilt control valve: Stuck (internal damage)	Turn the tilt solenoid OFF and operate to forward tilt using an active test.	If forward tilt can be performed, replace the C/V tilt control valve.
		C/V backward tilt lock valve: Stuck (internal damage)	Turn the backward tilt lock solenoid OFF and operate to backward tilt using an active test.	If backward tilt can be performed, replace the C/V tilt control valve.
		C/V lift lower lock valve: Stuck (internal damage)	Using an active test, turn the lift lower lock solenoid OFF and perform lower operation.	If lowering can be performed, replace the C/V lift lower lock valve.
		C/V unload valve: Stuck (internal damage)	For cowl lever vehicles: Turn the unload valve solenoid ON and perform lift raising operation using an active test. For mini lever vehicles: Turn the unload valve solenoid OFF and perform lift raising operation using an active test.	If raising can be performed, replace the C/V unload valve.
		Seat switch unit: Short fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		SAS/OPS controller, OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
OPS	Cowl lever, mini lever vehicles: No material handling can be performed.	Seat switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		C/V unload valve: Stuck (internal damage)	For cowl lever vehicles: Turn the unload valve solenoid OFF and perform lift raising operation using an active test. For mini lever vehicles: Turn the unload valve solenoid ON and perform lift raising operation using an active test.	If raising cannot be performed, replace the C/V unload valve.
		SAS/OPS controller, OPS controller: Controller defect	–	Replace
	Traveling OPS does not operate.	Forward travel interrupt relay unit: Stuck (internal damage, welded) Reverse travel interrupt relay unit: Stuck (internal damage, welded) Relay secondary side line: Short fault (Harness, connector)	Turn the forward and reverse travel interrupt relays ON and operate forward and reverse travel using an active test.	If forward travel can be performed, replace the forward travel interrupt relay. If reverse travel can be performed, replace the reverse travel interrupt relay. Or perform a harness check.
		Short switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		SAS/OPS controller, OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
OPS	Cannot travel.	Fuse: Shift fuse blown	–	Check for blown fuse
		Forward travel interrupt relay unit: Open fault (internal damage, welded) Reverse travel interrupt relay unit: Open fault (internal damage, welded) Relay secondary side line: Open fault (Harness, connector)	Turn the forward and reverse travel interrupt relays OFF and operate forward and reverse travel using an active test.	If forward travel cannot be performed, replace the forward travel interrupt relay. If reverse travel cannot be performed, replace the reverse travel interrupt relay. Or perform a harness check.
		Seat switch unit: Open fault (internal damage) Seat switch line (Signal, ground): Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		Direction lever unit: Open system fault (internal damage) Direction lever signal line: Disconnection fault (Harness, connector)	ON/OFF check with analyzer	Harness check or replace switch
		SAS/OPS controller, OPS controller: Controller defect	–	Replace

Control type	Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Torque converter interlock	The vehicle cannot travel.	Torque converter interlock relay main unit for forward movement: An open circuit (internal damage) Torque converter interlock relay main unit for backward movement: An open circuit (internal damage) Relay secondary line: An open circuit (harnesses, connectors)	–	Check the harnesses. If the vehicle cannot travel forward, replace the torque converter interlock relay for forward movement. If the vehicle cannot travel backward, replace the torque converter interlock relay for backward movement.
		SAS/OPS controller: Internal damage	–	Replace the controller.
	The torque converter interlock does not operate.	SAS/OPS controller is set: Option set is not set	–	Set the controller again according to the option set procedure.
		Torque converter interlock relay main unit for forward movement: An open circuit (internal damage) Torque converter interlock relay main unit for backward movement: An open circuit (internal damage) Relay secondary line: Frame short (harnesses)	–	Check the harnesses. If the vehicle cannot travel forward, replace the torque converter interlock relay for forward movement. If the vehicle cannot travel backward, replace the torque converter interlock relay for backward movement.
		SAS/OPS controller: Internal damage	–	Replace the controller.

Defect Causes When There is No ASC Error Display

Note:
If an error code or wrench lamp is flashing, repair it first.

Phenomenon on vehicle	Malfunction area · mode	Checking method	Corrective action
Occaisonally full speed is not reached even with the accelerator pedal fully depressed. (NMR speed not acheived)	NMR switch unit: Switch defect NMR switch line: Disconnection fault (Harness, connector) NMR switch adjustment: Adjustment defect, seal bolt position defect or some other mechanical defect	ON/OFF check with analyzer	Harness check or replace switch, or adjust switch, adjust and repair mechanical parts.
	ASC controller: Controller defect	–	Replace
Idle speed is higher than specified speed even when the accelerator pedal is not depressed.	Idle switch adjustment: Adjustment defect or mechanical defect	–	Switch adjustment
	Accelerator sensor: Sensor catching, mistake in procedure during sensor replacement (when the sensor is beng replaced, if a C4 series error is not created by turning the ignition key ON while the sensor connector is disconnected, the fully closed position learning value is not reset)	Check accelerator sensor voltage with the analyzer.	Accelerator sensor adjustment, or, if a fault occurs after sensor replacement, turn the ignition key ON with the accelerator sensor connectors removed, in order to create an error once. Then turn the ignition key OFF, connect connectors and turn the ignition key ON
	ASC controller: Controller defect	–	Replace
Engine rev up is poor or slow.	Drop in battery voltage: Battery life, intake heater, afterheat	Check battery voltage with the analyzer.	Battery replacement
	ASC controller: Controller defect	–	Replace
Does not rev up from idling	IGN, +B line: Disconnection fault (Harness, connector, fuse) GND line complete loss: Disconnection fault (Harness, connector)	Check battery voltage with the analyzer.	Harness check or replace fuse
	ASC controller: Controller defect	–	Replace

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TOYOTA
MATERIAL HANDLING U.S.A.

SERVICE INFORMATION BULLETIN

Control Circuit
CC08-005
April 15, 2008
Programming Change
8FGU15-32, 8FGCU15-32

Subject: 4Y-ECS Controller Programming Change

Return To CC Index
Return To Main Index

MODEL APPLICATION:
8FGU15-32 and 8FGCU15-32

GENERAL INFORMATION:
The 8-Series 4Y-ECS controller programming has been changed to correct the ammonia type odor from the exhaust stream. The controller change has been implemented in production and the controller is now available through Service Parts for repairing forklifts in the field. The part number for the new controller has not changed. The controller with the new programming can be identified by the color of the label. The label on the controller will have a white and orange label.
The part number of the ECS controller has stayed the same in past programming versions which can be identified by the black-white, green-white and blue-white labels. Even though the controller may have a different color label, it does not need to be changed if an ammonia odor is not present.

Example of an ECS controller with the white and orange label

The ECS controller does not need to be changed if an ammonia odor is not present.

REPAIR INFORMATION:

To change out the ECS controller:

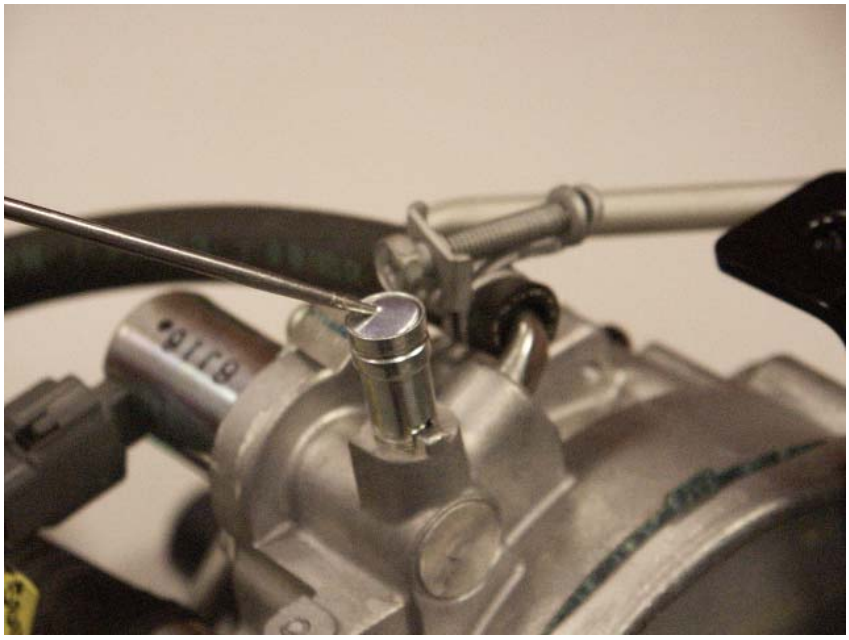
1. Disconnect the battery.
2. Replace the ECS controller.
3. Reconnect the battery.
4. Once the controller is replaced. Verify that the ignition timing and fuel system are adjusted correctly.

Ignition Timing and Fuel System Adjustments:

To check and adjust the ignition timing, reference page 2-18 of the 8-Series repair manual, 00700-X8880-71.

TNB-2008-07 can be used as a reference and guide line for checking and making the adjustments to the fuel system.

The idle mixture adjustment screw can be accessed by piercing the cap and prying it out of the sleeve.



Use a pick to pierce and pry out the cap for the idle
Mixture adjustment screw

Be sure the replace the tamper resistant cap, p/n 21673-13370-71, after making the any adjustments to the regulator. This is an EPA requirement.

Frame Number Effective Range:

8FGU15-18	8FGU18-11533 and Higher
8FGU20-25	8FGU25-15748 and Higher
8FGU30-32	8FGU32-12676 and Higher
8FGCU15-S20	8FGCSU20-12589 and Higher
8FGCU20-25	8FGCU25-19092 and Higher
8FGCU30-32	8FGCU32-11833 and Higher

TOYOTA
MATERIAL HANDLING U.S.A.

Chassis Electrical
CE07-008
November 30, 2007
Error Codes AD-1 and AD-7
8FG(C)U15-32

SERVICE INFORMATION BULLETIN

Subject: Error Codes AD-1 and AD-7

Return To CE Index
Return To Main Index

MODEL APPLICATION:
8FGCU15-32 and 8FGU15-32

GENERAL INFORMATION:
Error codes AD-1 and AD-7 are CAN Communication Abnormality error codes and can be set by installing a controller or optional display from one unit to another unit with different specifications, or when testing individual components and circuits. In either case, perform the “Engine and Display ECU information clear” procedure to clear the error codes.

REPAIR INFORMATION:
To perform the “Engine and Display ECU information clear” procedure, follow the instructions for SET 5 in the matching menu on page 16-29 of repair manual 00700-X8880-71.

TOYOTA
MATERIAL HANDLING U.S.A.

SERVICE INFORMATION BULLETIN

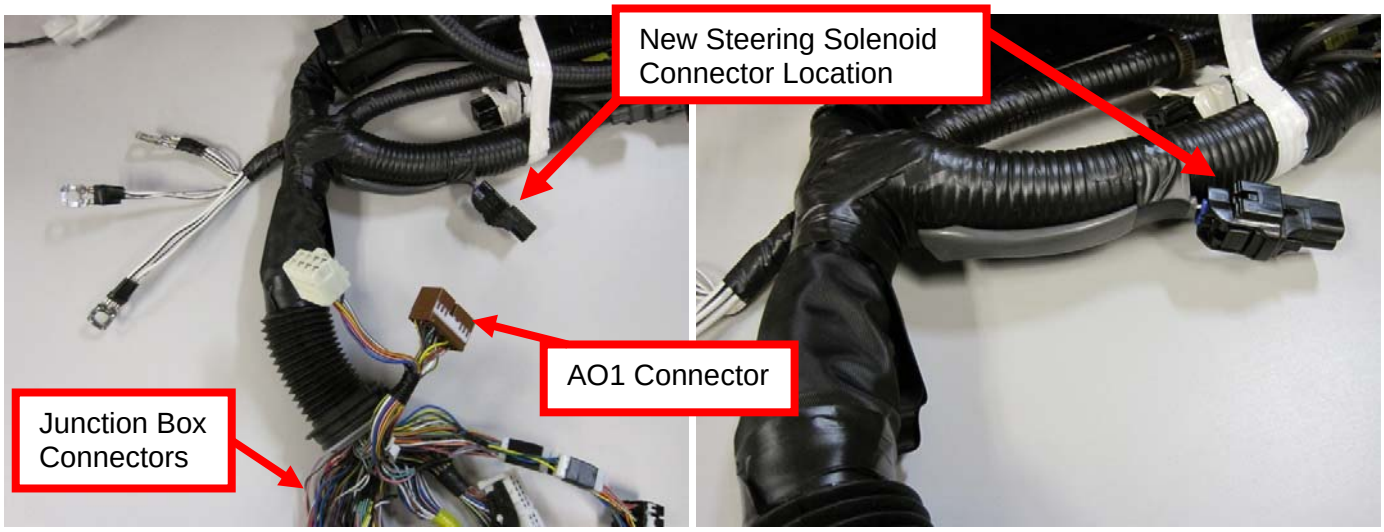
Chassis Electrical
CE10-005
August 31, 2010
Main Wiring Harness Change
(Error Code 73-1)
8FG(D)U15-32, 8FGCU20-32

Subject: Main Wiring Harness Change (Error Code 73-1)

MODEL APPLICATION:
8FG(D)U15-32, 8FGCU20-32

GENERAL INFORMATION:
There has been a main wiring harness change (part # 56011-U2241-71) on the 8-Series I.C trucks with the synchronized steering option (E72A). The connector (O4) for the synchronized steering solenoid has been moved from the left hand side harness to the main wiring harness. If the harness is not installed correctly, then error code 73-1 will become active.

REPAIR INFORMATION:
The Green and White-Black wires that connect the SAS/OPSS controller to the steering solenoid no longer go through pins 19 and 20 at the brown AO1 connector. The Green and White-Black wires now stop short of the AO1 connector and have their own connector that comes out of the harness just before the junction block connectors. This connector is a black 2-pin connector with a black terminating plug on the end.



When installing the new main harness, the original connector (O4) used on the steer solenoid from the Left Hand wiring harness needs to be disconnected and taped up in the harness. This connector is now inactive, so there is no need to seal the connector. The connector shown above will need to be connected to the steer solenoid in place of the original (O4) connector.

TOYOTA
MATERIAL HANDLING U.S.A.

Chassis Electrical
CE09-004
October 30, 2009
A5, A5-1, or 1-1 Error Codes for OPSS

SERVICE INFORMATION BULLETIN

MODEL APPLICATION:
7FBCU15, 7FBCU18, 7FBCU20, 7FBCU25, 7FBCU30, 7FBCU32
7FBCU35, 7FBCU45, 7FBCU55, 7FBCHU18, 7FBCHU25
7FBEU15, 7FBEU18, 7FBEU20, 7FBEHU18, 7FGU15, 7FGU18
7FGU20, 7FGU25, 7FGU30, 7FGU32, 7FDU15, 7FDU18, 7FDU20
7FDU25, 7FDU30, 7FDU32, 8FGU15, 8FGU18, 8FGU20, 8FGU25
8FGU30, 8FGU32, 8FDU15, 8FDU18, 8FDU20, 8FDU25, 8FDU30
8FDU32, 7FGCU15, 7FGCU18, 7FGCU20, 7FGCSU20, 7FGCU25
7FGCU30, 7FGCU32, 8FGCU18, 8FGCU20, 8FGCSU20, 8FGCU25
8FGCU30, 8FGCU32, 7FGU35, 7FDU35, 7FGKU40, 7FDKU40
7FGU45, 7FDU45, 7FGAU50, 7FDAU50, 7FGU60, 7FDU60, 7FGU70
7FDU70, 7FGU80, 7FDU80, 7FGCU35, 7FGCU45, 7FGCU55
7FGCU60, 7FGCU70

GENERAL INFORMATION:
All three error codes are for the same condition.

- A5 is for sit-down electric trucks (Class I)
- A5-1 is for 8-Series internal combustion trucks (Class IV & V)
- 1-1 is for 7-Series internal combustion trucks (Class IV & V) with OPSS (Operator Presence Sensing System)

This system was implemented in 2005. The OPSS is required to check for a malfunctioning or bypassed seat switch circuit. To do this, the system stays active even when the key is off and monitors the seat switch. If the seat switch stays closed for more than 15 minutes with the key off, the system assumes that the switch has malfunctioned or been bypassed. The code will stay active until the system sees the seat switch circuit cycle open/closed, then will automatically clear.

REPAIR INFORMATION:
The most common cause for these seat switch codes is an operator staying in the seat. If an operator stays sitting in the seat with the truck turned off for 15 minutes, they will trip the seat code. Examples have been operators taking a break, lunch period, or filling out paperwork while sitting on the truck with the key off. The dealer has been called for a seat switch code and when the technician arrives, the code has cleared, but is stored in memory. This is because the operator left the truck while waiting for the technician; this cycled the seat switch and cleared the code. In many cases, the seat switch has been replaced unnecessarily due to this occurrence. Further information concerning these codes can be found in the following manuals:
7FBCU15-55 ►OPSS Manual CU335 page 3-9
7FBEU15-20 ►OPSS Manual CU341 page 1-10
7FGCU15, 18, S20 ►OPSS Manual CU042 page 1-19
7FGU15-32, 7FDU15-32, 7FGCU20-32 ►OPSS Manual CU040 page 1-18
7FGU35-80, 7FDU35-80, 7FGCU35-70 ►OPSS Manual CU041 page 1-17
8FGCU15, 18, S20 ►Service manual 00700-X8880-71 page 19.1-82
8FGU15-32, 8FDU15-32, 8FGCU20-32 ►Service manual 00700-X8880-71 page 19-111