

ES START (EASY & SMOOTH START SYSTEM)

BR04-001

ES START BR04-2

DESCRIPTION BR04-2

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INITIAL SETTING OF ES START BR04-6

ES START CONTROL VALVE BR04-12

COMPONENT LOCATOR BR04-12

OVERHAUL BR04-13

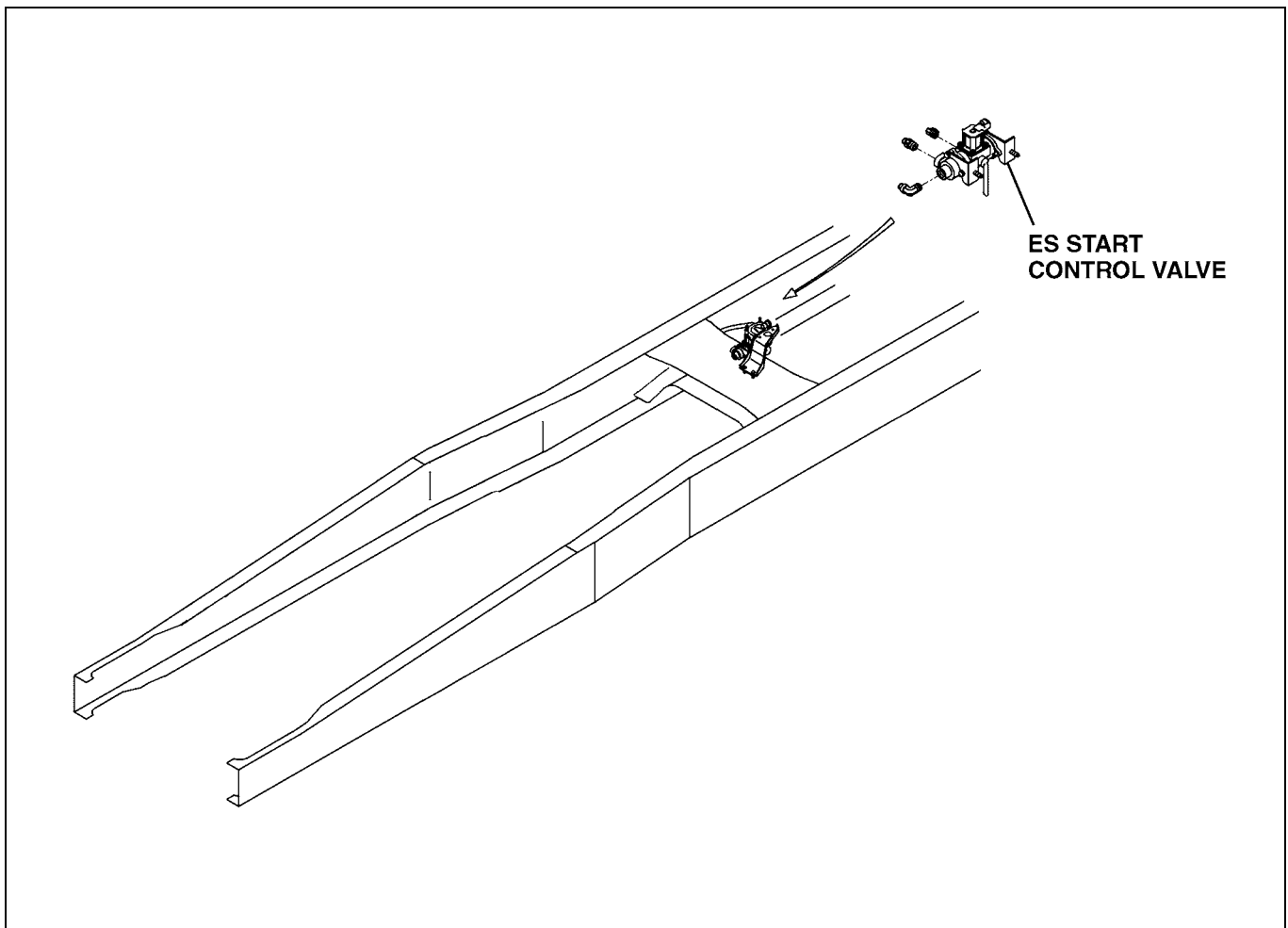
INSPECTION AND REPAIR..... BR04-15

ES START

DESCRIPTION

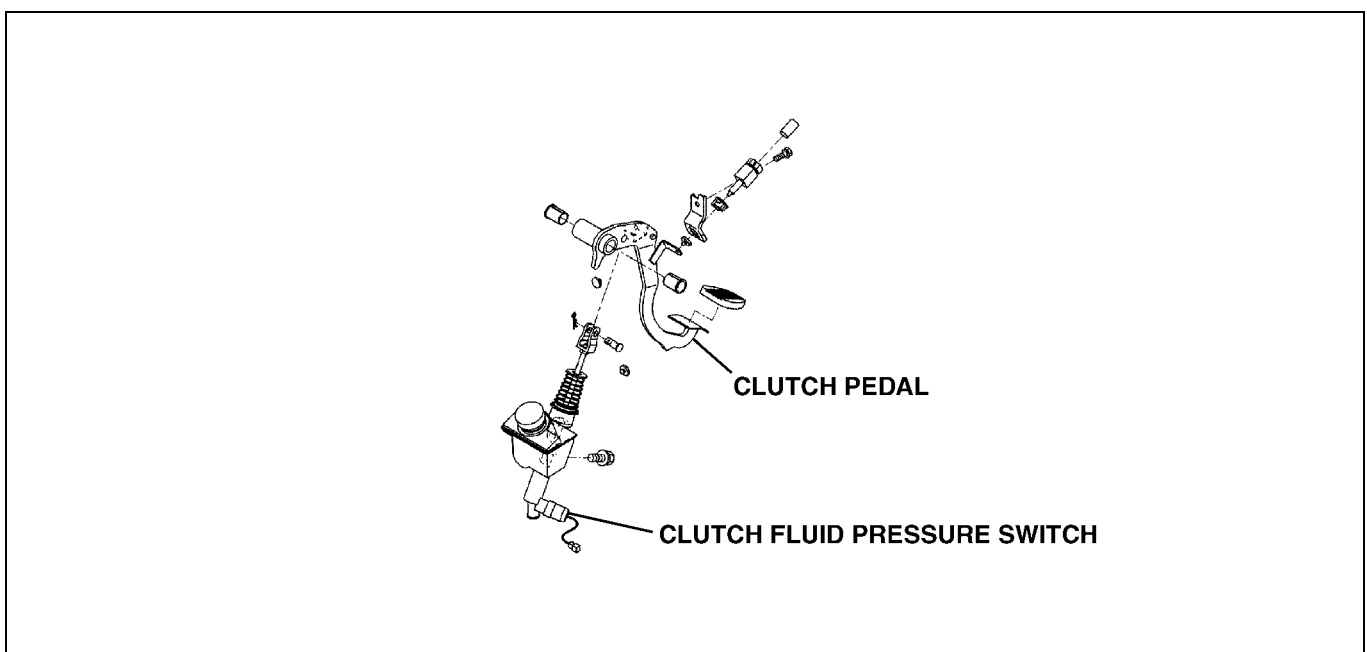
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ES START CONTROL VALVE

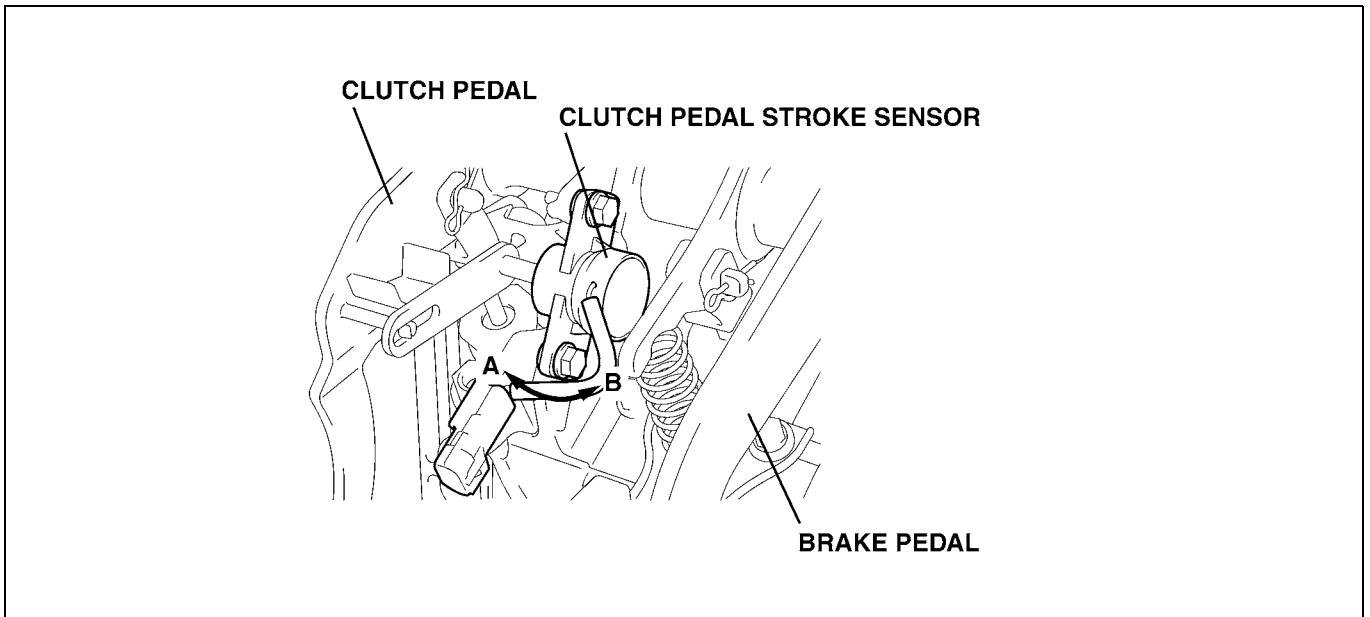


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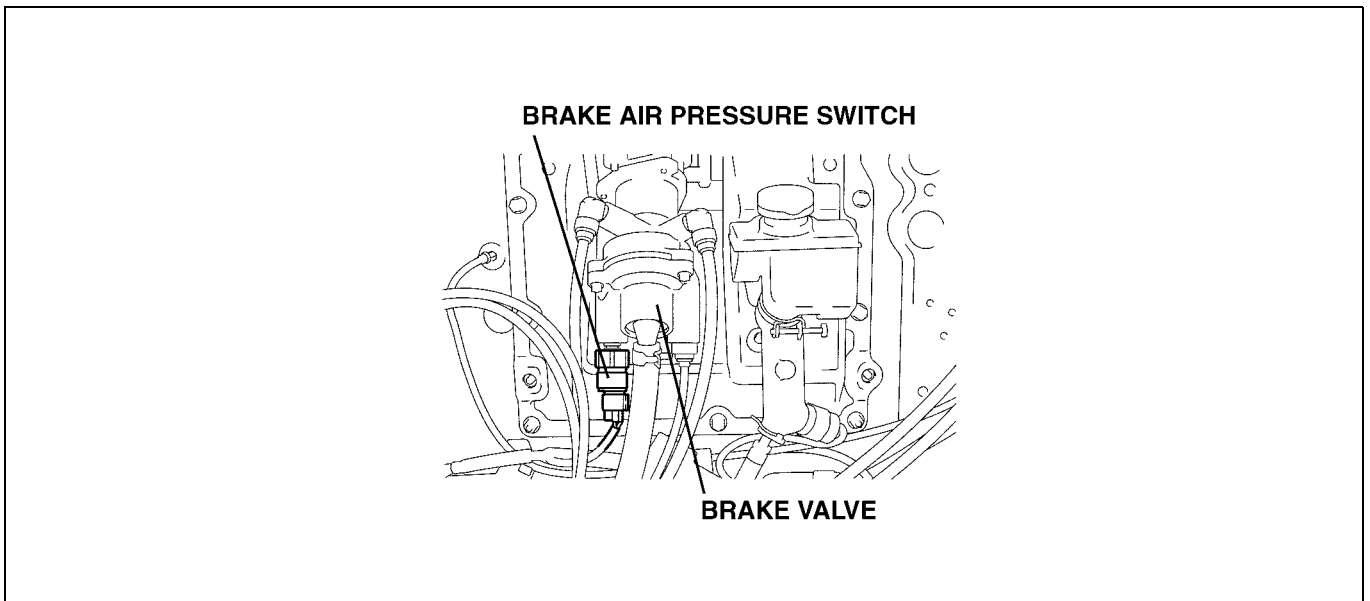
CLUTCH FLUID PRESSURE SWITCH



SHTS06Z080400002

CLUTCH PEDAL STROKE SENSOR

SHTS06Z080400003

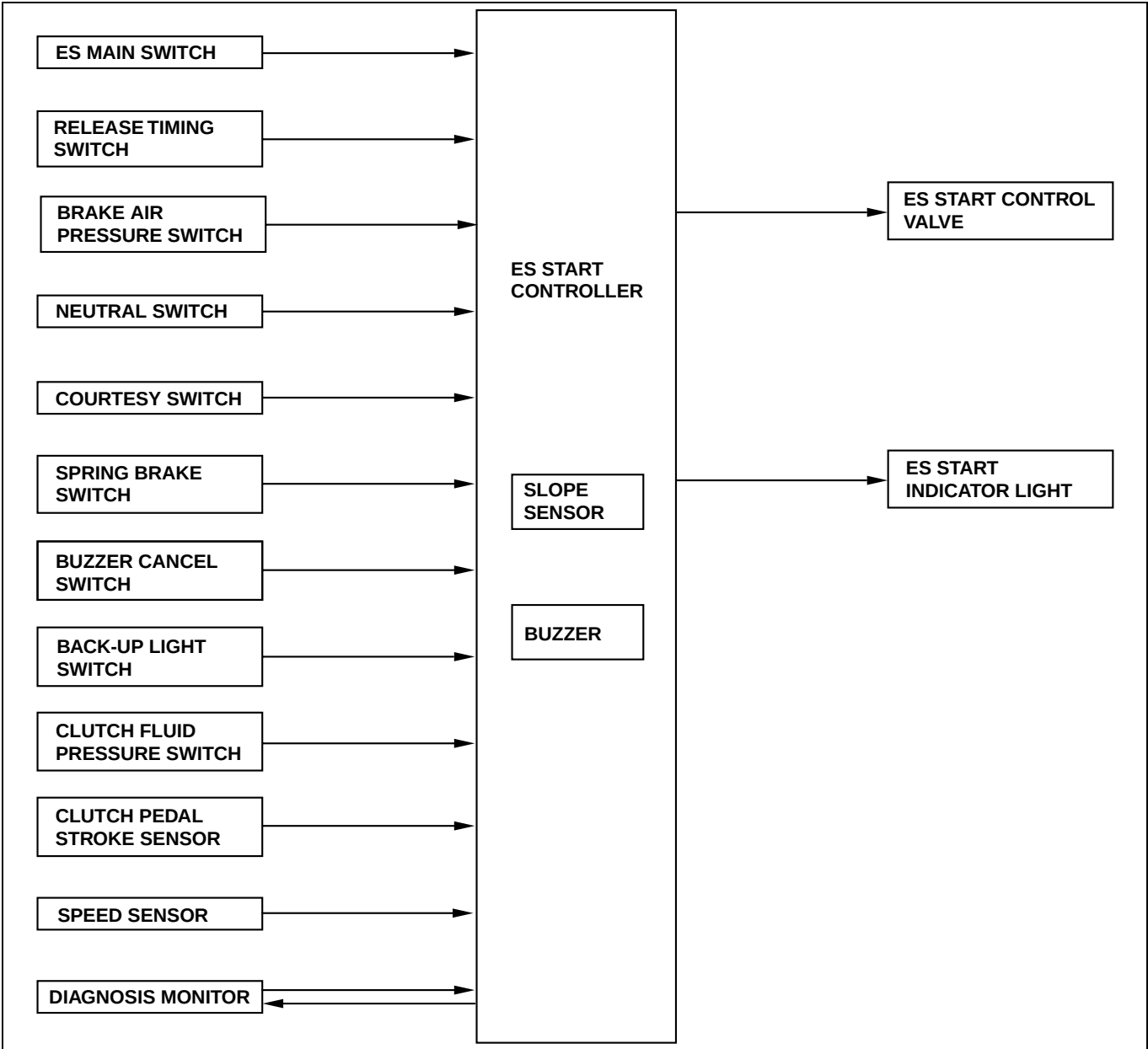
STOP LIGHT SWITCH

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DIAGRAM

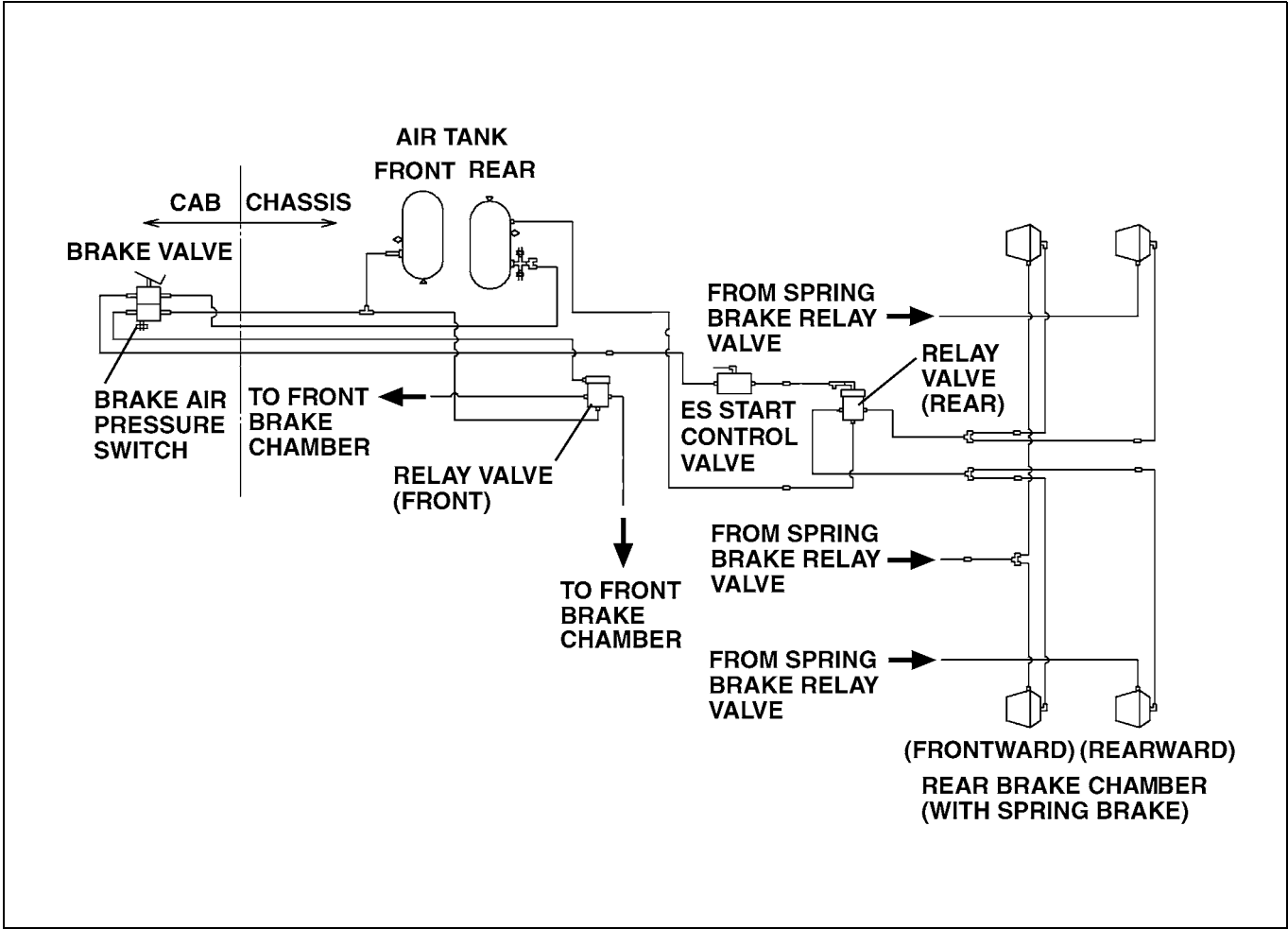
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SYSTEM DIAGRAM



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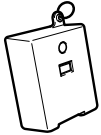
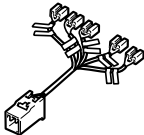
PIPING DIAGRAM



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SPECIAL TOOL

EN06Z0804K100001

Illustration	Part number	Tool name	Remarks
	09630-1370	DIAGNOSIS MONITOR	FOR DIAGNOSING AND SETUP OF ES START
	09630-2300	SPECIAL WIRING HARNESS FOR INTENSIVE DIAGNOSIS CONNECTOR	FOR CONNECTING DIAGNOSIS MONITOR

INITIAL SETTING OF ES START

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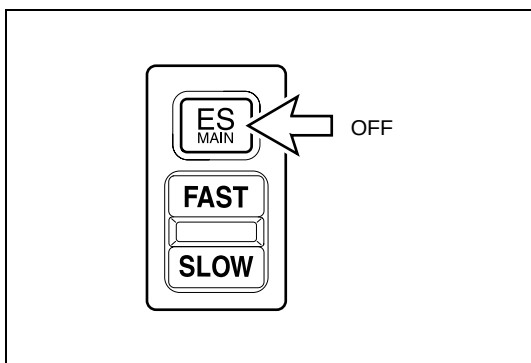
INITIAL SETTING

NOTICE

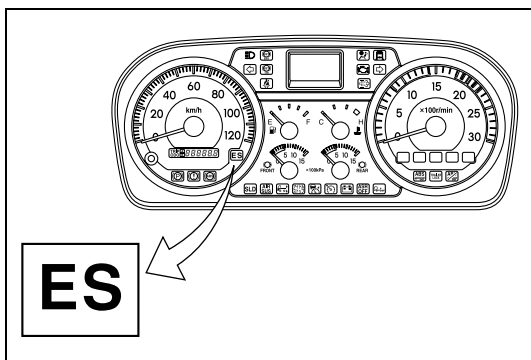
When replacing a controller of "ES Start", be sure to execute this initial setting.

1. CHECK "ON" OF POWER SUPPLY WHEN SWITCHING THE STARTER KEY "ON".

- (1) Turn "OFF" ES main switch while turning "ON" the starter key.



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SHTS06Z080400010

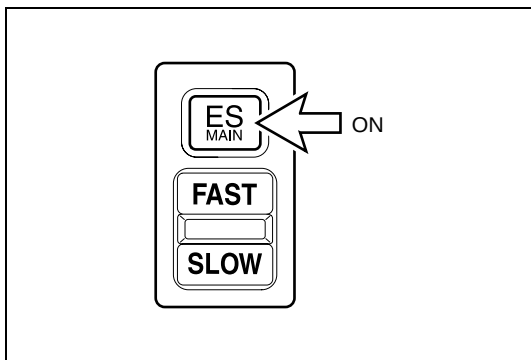
- (2) Check the operation of "ES start" indicator in the meter and also the buzzer.

Standard:

After the indicator light is lit for a second, the buzzer to switch off the light beeps one time.

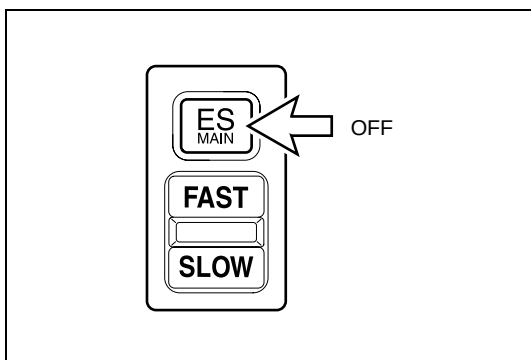
NOTICE

Unless the buzzer beeps, the indicator is not lit. When it does not turn off even after one second, inspect the electrical circuit.



SHTS06Z080400011

- (3) Turn "ON" the ES main switch.



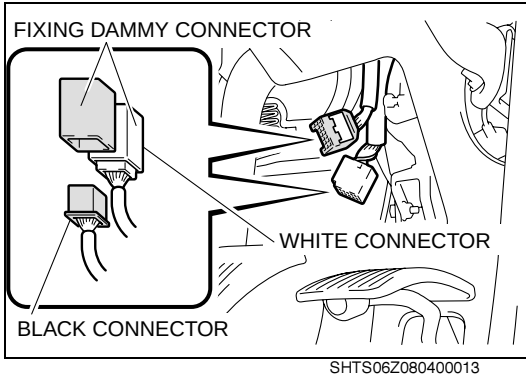
SHTS06Z080400012

2. CHECK OF INSTALLING CONDITION OF CLUTCH STROKE SENSOR.

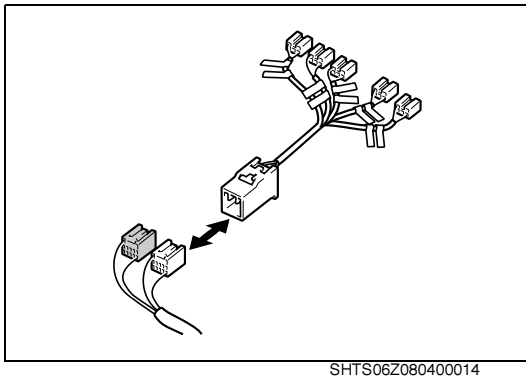
NOTICE

- When replacing clutch stroke sensor, execute this inspection without fail.
- Execute this under the condition that clutch adjustment (for normal clearance of clutch pedal) completed.

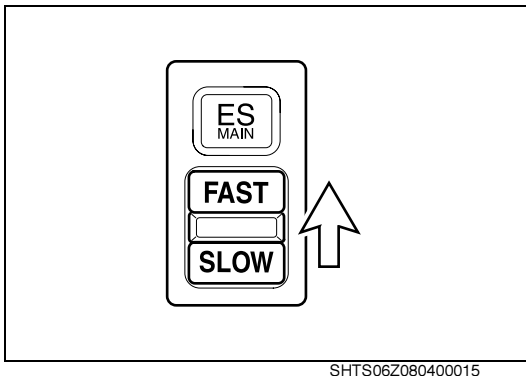
- (1) Turn "ON" starter key and turn "OFF" the ES main switch.



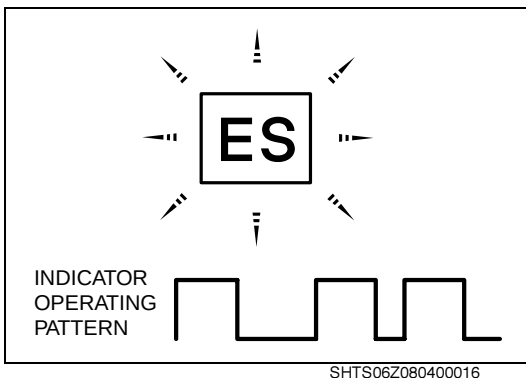
- (2) White color connector, one of two intensive diagnosis connectors, located at lower part of right side of the instrument panel, should be connected to the specific harness and the diagnosis monitor be connected to the connector with a tag of "ES start".

SST:**Dedicated Harness (09630-2300)****Diagnosis Monitor (09630-1370)****NOTICE**

As intensive diagnosis connector is normally connected to the fixed dummy connector, pull it out from the dummy connector to use. Also, couple it with the fixed dummy connector while not using it.



- (3) Turn on "FAST" release timing switch three times within 5 seconds.



- (4) Checking function of sensor installation condition starts and check that indicator is flashing as shown in the figure.

NOTICE

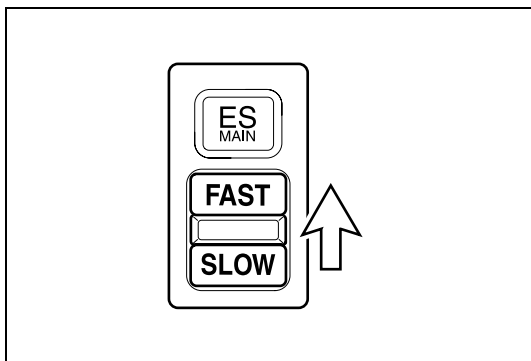
When indicator not flashing, inspect the electrical circuit.

- (5) Check sensor installation condition with the buzzer beeping when clutch pedal is free.

Standard: The buzzer beeps continuously.

NOTICE

When not beeping the buzzer, inspect clutch stroke sensor and its relating circuit.



SHTS06Z080400017

- (6) After turning again release timing switch on "FAST", remove diagnosis monitor.

3. INITIAL SETTING FOR RELEASING POSITION

NOTICE

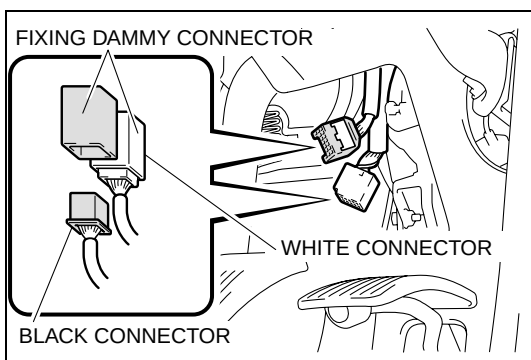
Execute initial setting of releasing position without fail when replacing clutch.

- (1) Confirm the following condition of the vehicle.
 - Starter key: ON
 - ES main switch: OFF
 - Clutch pedal: Free position
 - Parking brake: Operating
- (2) Starting engine, check that idling revolution is normal.
- (3) White color connector, one of two centralized diagnosis connectors located at lower part of right side of the instrument panel, should be connected to the dedicated harness and diagnosis monitor be connected to the connector with a tag of "ES start".

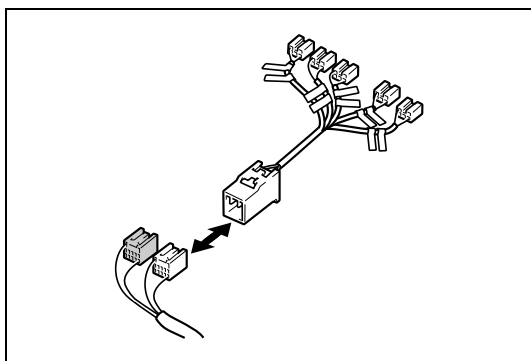
SST:

Dedicated Harness (09630-2300)

Diagnosis Monitor (09630-1370)



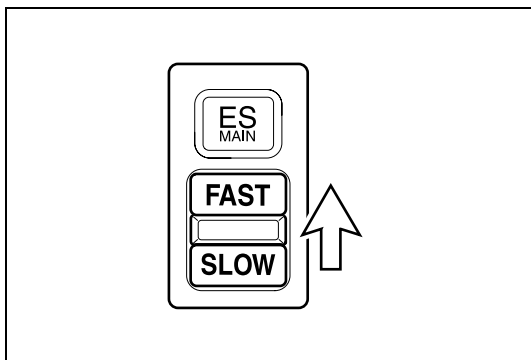
SHTS06Z080400018



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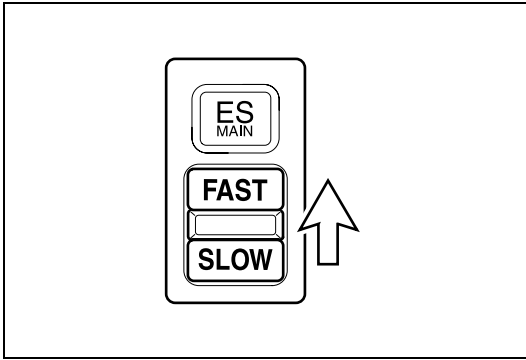
NOTICE

As centralized diagnosis connector is normally connected to the fixed dummy connector, pull it out from the dummy connector to use. Also, couple it with the fixed dummy connector while not using it.



SHTS06Z080400020

- (4) Put release timing switch on "FAST" for more than 3 seconds.
- (5) Initial setting function of release position starts. Check that buzzer and indicator are working as it follows.
 - Buzzer: 1 long beeping continuously.
 - Indicator: Flashes in synchronization with the buzzer beeping.
- (6) When buzzer does not beep, check the following points:
 - Relating circuit with parking brake (buzzer cancel switch)
 - Relating circuit with "ES start" switch.
 - Controller
- (7) Depress the clutch pedal and shift the gear to 3rd speed.
- (8) Release slowly the pedal for clutch engagement.



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- (9) When tachometer needle descends and then comes back again, put again release timing switch on "FAST". At this moment, controller memorizes signal of clutch stroke sensor.
- (10) Once controller memory completed, buzzer stops after it beeps one time. Indicator light goes off.
- (11) Remove diagnosis monitor from the coupler.

4. INITIAL SETTING OF SLOPE SENSOR AT "0" POINT.

NOTICE

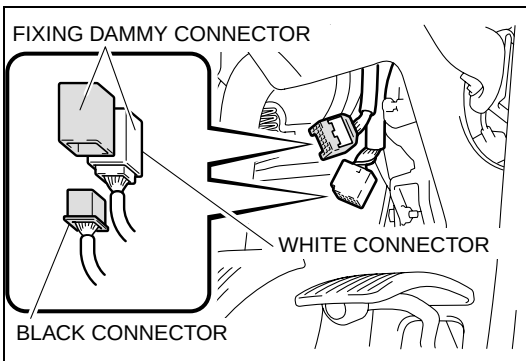
When any style of body mounted on the chassis of vehicle and the vehicle level changed, implement this initial setting without fail.

- (1) Confirm that the following condition of the vehicle.
 - ES main switch: OFF
 - Road surface condition: Flat (± 1 deg)
 - Parking brake: Operating
- (2) White color connector, one of two intensive diagnosis connectors, located at lower part of right side of the instrument panel, should be connected to the dedicated harness and the diagnosis monitor be connected to the connector with a tag of "ES Start".

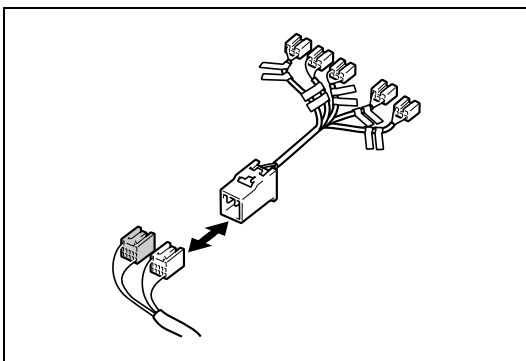
SST:

Dedicated Harness (09630-2300)

Diagnosis Monitor (09630-1370)



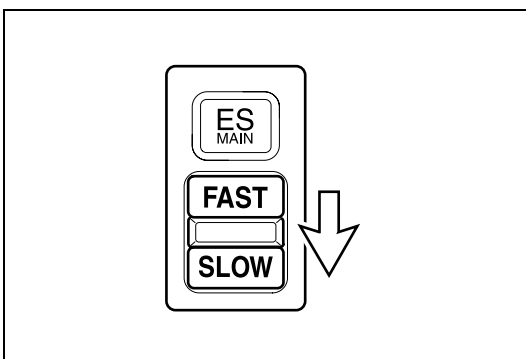
SHTS06Z080400013



SHTS06Z080400014

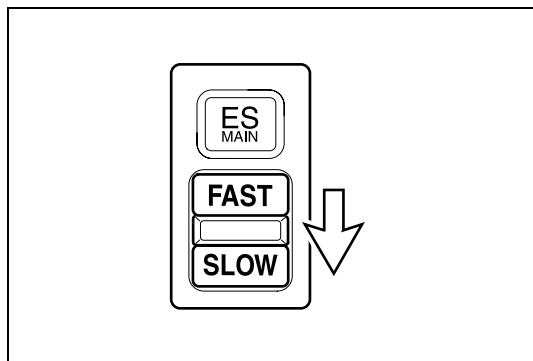
NOTICE

As intensive diagnosis connector is normally connected to the fixed dummy connector, pull it out from the dummy connector to use. Also, couple it with the fixed dummy connector while not using it.



SHTS06Z080400022

- (3) Put release timing switch on "SLOW" for more than 3 seconds.
- (4) Initial setting function of slope sensor starts. Check that buzzer and indicator are working as it follows:
 - Buzzer: 2 short beeping continuously.
 - Indicator: Flashes in synchronization with the buzzer beeping.
- (5) When not beeping nor flashing as mentioned above, check the following points:
 - Relating circuit with parking brake (buzzer cancel switch)
 - Relating circuit with "ES start" switch
 - Controller



SHTS06Z080400023

- (6) Put again release timing switch on "SLOW". At this moment, controller memorizes signal of slope sensor.
- (7) Once controller memory completed, buzzer stops after it beeps one time.
- (8) Indicator light goes off.

CHECKING PROCEDURE OF OPERATION

1. PREPARATION

- (1) Confirm that the vehicle is under the following condition:
 - The road surface is not at down hill.
 - Starter key: ON
 - Parking brake released
 - The both doors of the cab at driver's and the other side are closed.

NOTICE

- **Operation check can be done, even though the engine is not in motion.**
- **In case of operation checking while the engine is in motion, you will need to perform a starting operation by paying much attention not to start out the vehicle suddenly.**

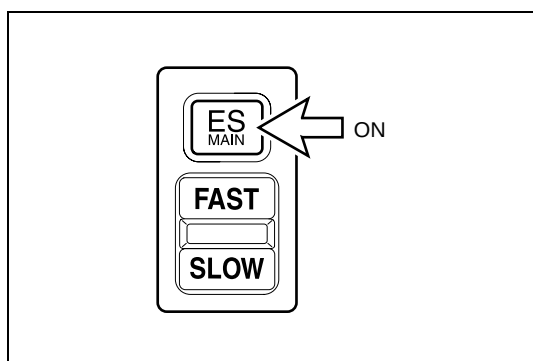
2. OPERATION OF "ES START"

- (1) Free clutch pedal by shifting the gear to the neutral position.
- (2) Turn "ON" ES main switch.
- (3) Once continuing to depress the brake pedal, "ES start" will start to work within about one second.
- (4) Confirm the operation of "ES start" with the following points.
 - Buzzer beeps one time.
 - Indicator light is lit.
 - The braking force will be retained, even though setting your leg free from the brake pedal.

Braking axle when operating "ES Start"

Model	Axle position			
	Front-front	Front-rear	Rear-front	Rear-rear
FS	X	—	○	○
FY	X	X	○	○

○: Operating, X: Not operating, —: Not available



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- (5) When "ES start" does not work, check the following points:
- a. Indicator light is not lit.
 - Inclination of road (when at down hill, shift the gear to "R", it does not work unless the clutch pedal is depressed.)
 - Neutral switch and its relating circuit
 - Stop light switch and its relating circuit
 - b. Indicator flashes and the buzzer beeps.
 - Check it through diagnosis function.
 - c. Indicator light is lit. But the buzzer beeps.
 - Courtesy switch and its relating circuit.
 - d. Braking force is not retained.
 - ES start valve and brake air circuit
 - Controller

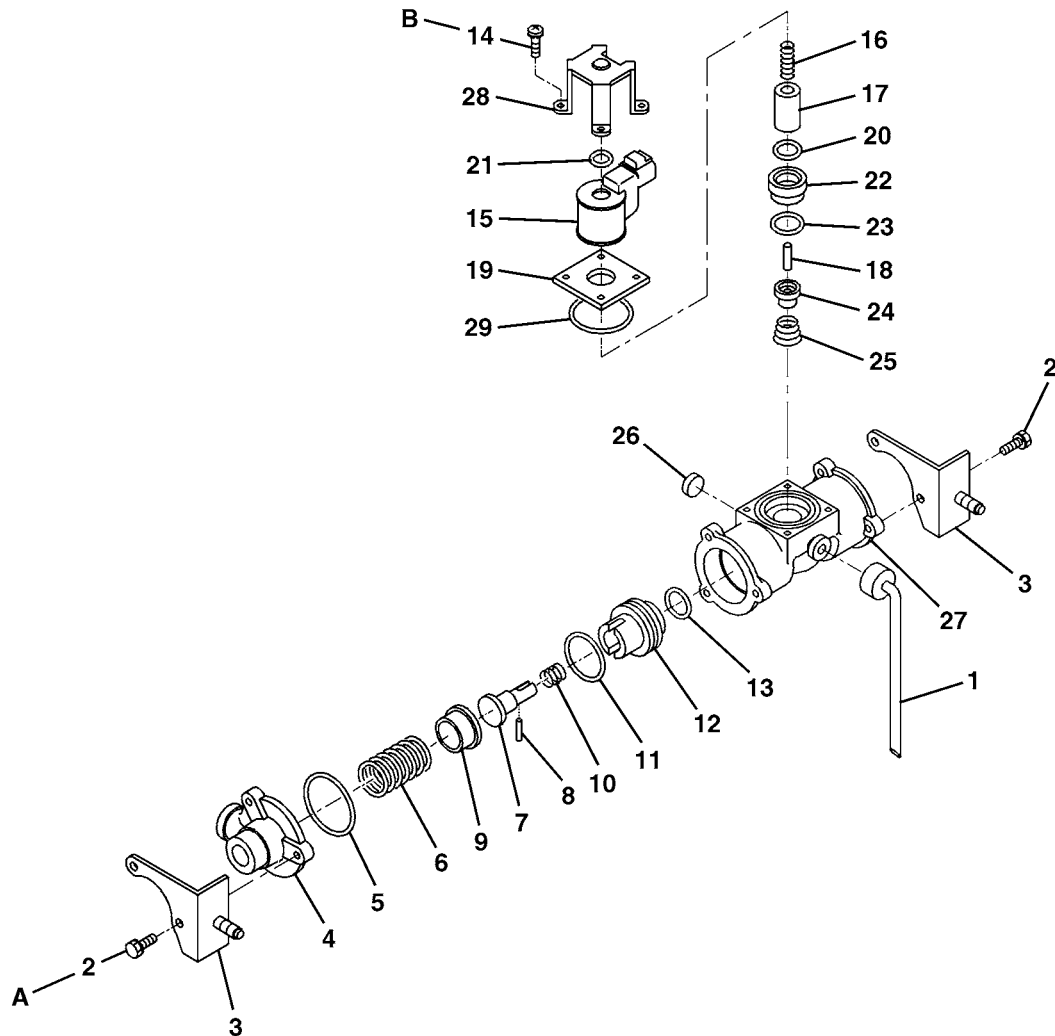
3. RELEASE OF "ES START"

- (1) Depressing deep and surely the clutch pedal, shift the gear for moving forward.
- (2) Release the pedal for clutch engagement.
- (3) "ES start" will be released at the partial clutch engagement. Check the following conditions:
 - Indicator light is not lit.
 - Release of braking force.
- (4) When "ES start" not released, check the following points:
 - a. Indicator light does not turn out.
 - It will not be released by mis-handling (when the clutch pedal is not deeply depressed at shifting the gear)
 - Neutral switch and its relating circuit
 - Clutch pedal stroke sensor and its relating circuit.
 - b. Braking force is not retained.
 - "ES start" valve and the brake air circuit.
 - Controller

ES START CONTROL VALVE

COMPONENT LOCATOR

EN06Z0804D100001



SHTS06Z080400025

1	Hose	11	O-ring	21	O-ring
2	Bolt	12	Piston	22	Valve seat
3	Bracket	13	O-ring	23	O-ring
4	Cover	14	Screw	24	Valve
5	O-ring	15	Solenoid assembly	25	Spring
6	Spring	16	Spring	26	Filter
7	Inlet valve	17	Plunger	27	Body
8	Straight pin	18	Rod	28	Cover
9	Spring seat	19	Coil cover	29	O-ring
10	Spring	20	O-ring		

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A	4.0-6.0 {40-60, 2.9-4.3}	B	1.3-1.7 {13-17, 0.49-1.22}
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OVERHAUL

EN06Z0804H200001

IMPORTANT POINT - DISMOUNTING

NOTICE

- When dismantling and storing parts, place a cap on all ports so not dirt or dust enters.
- Be careful so water, dirt, or dust does not enter inside the harness connector to prevent solenoid short circuits or faulty connections.

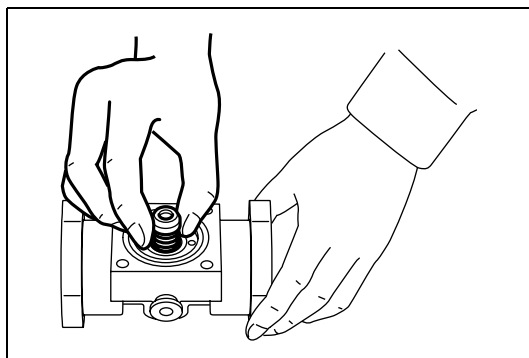
IMPORTANT POINT - ASSEMBLY

NOTICE

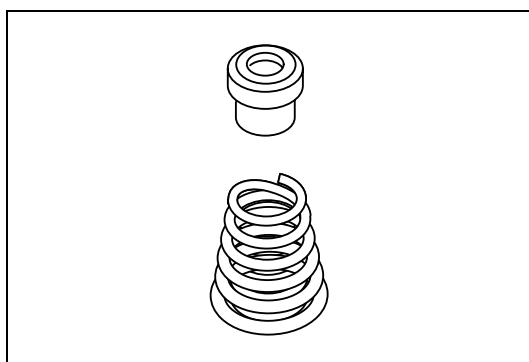
Apply an adequate amount of grease to each O-ring before assembly.

1. ASSEMBLING ES START CONTROL VALVE

- (1) Insert the spring in the valve and assemble it in the body.



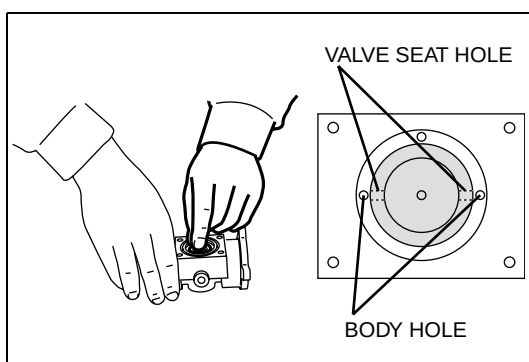
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NOTICE

Assemble the valve and the spring as shown in the figure.

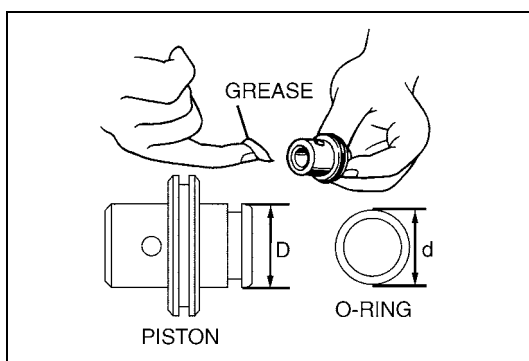


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- (2) Align and attach the O-ring to the groove of the inside valve seat correctly and install it in the body.

NOTICE

Align the valve seat holes and body holes to perform the assembly.



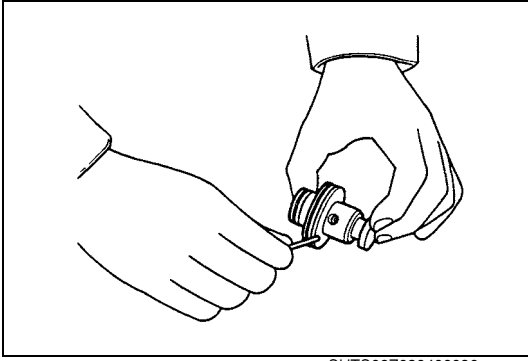
SHTS06Z080400029

- (3) Assemble the O-rings (2 units) in the piston and lubricate the inside diameter of the piston with grease.

NOTICE

Verify the diameter of the O-ring (small one) because there are multiple settings and then assemble the unit.

Dimension "D" and "d" = 22 mm {0.87 in.}

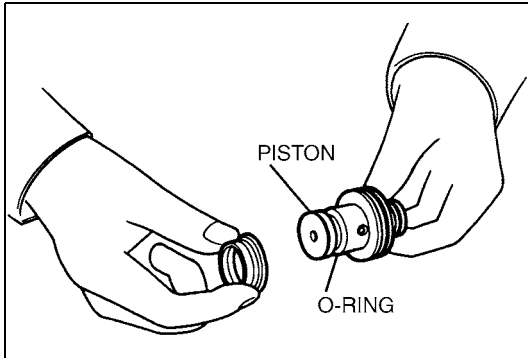


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- (4) Assemble the spring, piston and inlet valve. Press in the inlet valve and install the straight pin.

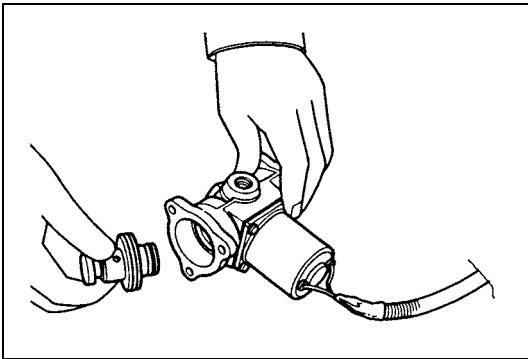
NOTICE

Align the inlet valve pin hole and piston pin hole and assemble the parts. After the assembly is completed, do not rotate the inlet valve to align the pin holes.



SHTS06Z080400031

- (5) Position the spring seat collar so it faces the rear side and install the unit.
 (6) Apply grease to the outer surface of the O-ring installed in the piston.



SHTS06Z080400032

- (7) Apply grease to the inner surface of the body.
 (8) Insert the piston inlet valve assembly in the body.

NOTICE

Do not turn the piston when inserting it.

INSPECTION AND REPAIR

EN06Z0804H300002

NOTICE

Isopropyl alcohol should only be used to wash the ES start control valve components.

Inspection item	Standard	Limit	Remedy	Inspection procedure
Valve body inside, piston, valve, valve seat, spring and inlet valve: Wear and damage	—	—	Replace, if necessary.	Visual check 
O-ring: Crack and damage	—	—	Replace, if necessary.	Visual check 