

SERVICE BRAKE

BR02-001

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AIR DRYER

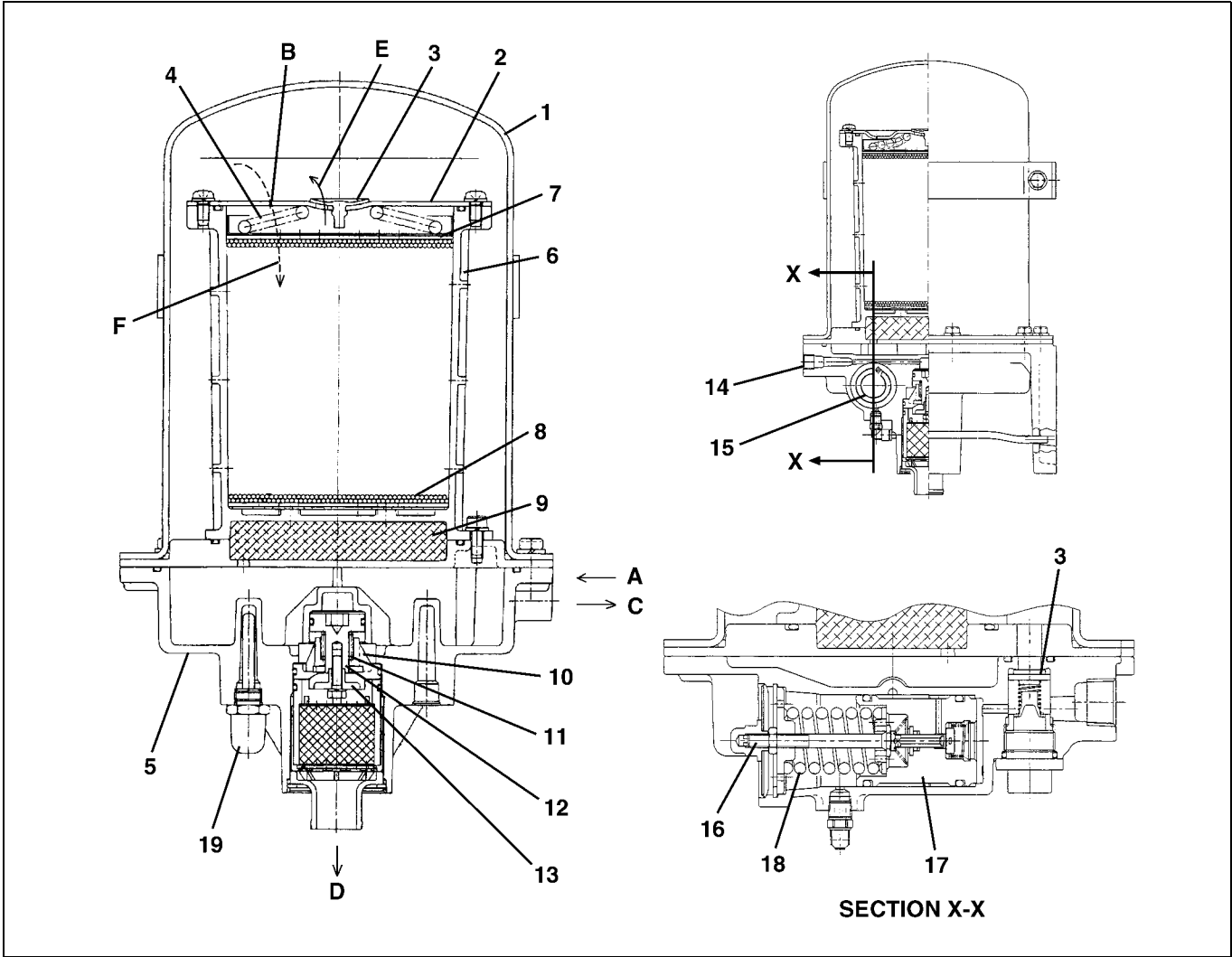
DATA AND SPECIFICATIONS

EN0680202I200001

Type	Purge tank, desiccant, auto-purge valve.
Air and Water discharging time (Reclamation cycle)	Approx. 50 sec.

DESCRIPTION

EN0680202C100001

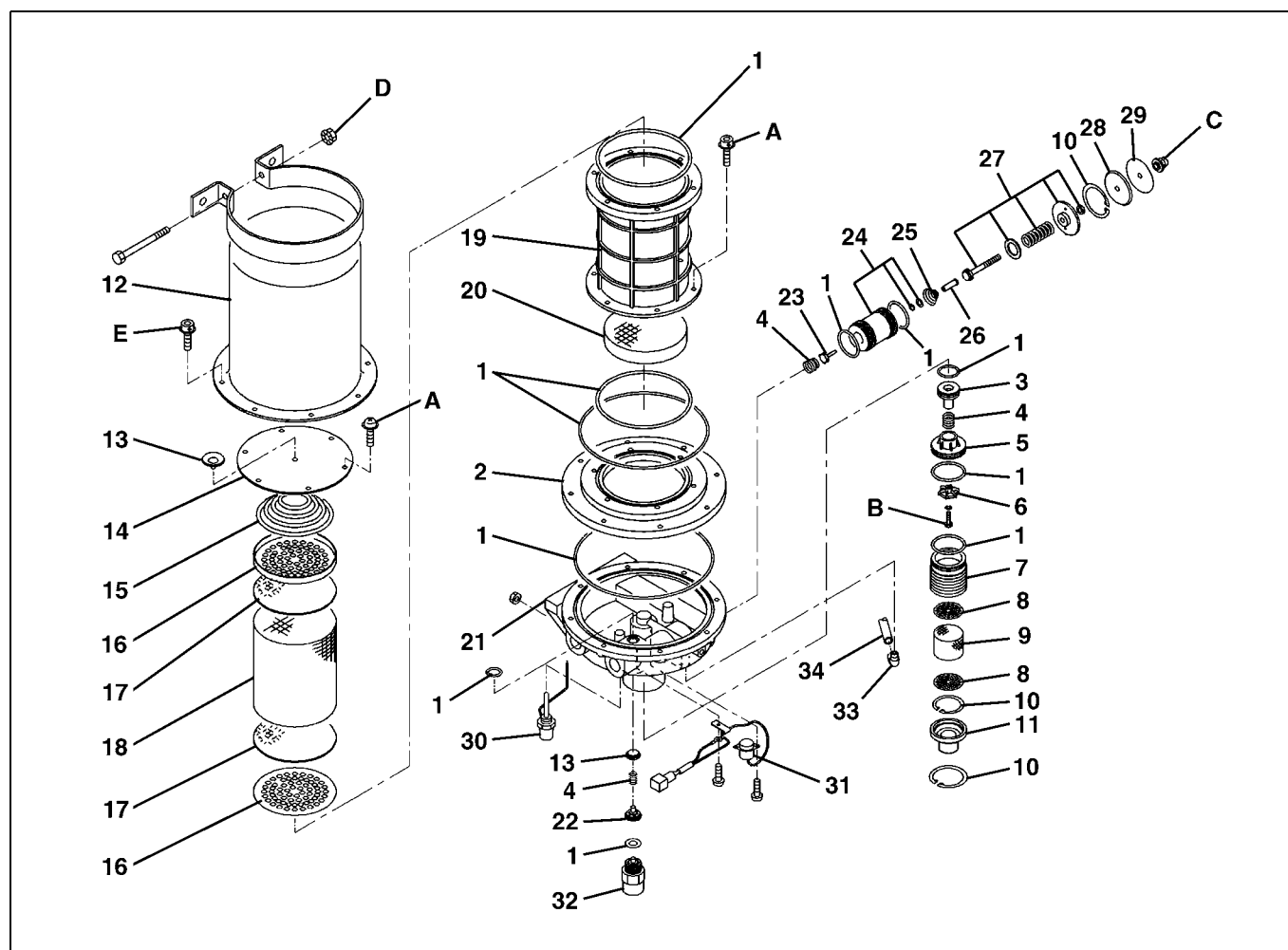


SHTS068020200001

1 Chamber (Purge tank)	14 Plug
2 Case cover	15 Pressure regulator
3 Check valve	16 Adjusting screw
4 Spring	17 Piston
5 Body	18 Piston spring
6 Desiccant case	19 Heater (If so equipped)
7 Filter	A Inlet (From air compressor)
8 Desiccant	B Orifice
9 Oil separator filter	C Outlet (Dried air to air tank)
10 Valve body	D Purged air
11 Valve spring	E Dehumidification
12 Piston	F Reclamation
13 Purge valve	

COMPONENT LOCATOR

EN0680202D100001



SHTS068020200002

1 O-ring	18 Desiccant
2 Cover	19 Desiccant case
3 Piston	20 Oil separator filter
4 Valve spring	21 Body
5 Valve body	22 Valve stopper
6 Purge valve	23 Governor valve
7 Silencer case	24 Piston assembly
8 Silencer plate	25 Exhaust stem spring
9 Silencer	26 Exhaust stem
10 Retainer ring	27 Pressure regulator assembly
11 Exhaust cover	28 Valve seat
12 Chamber	29 Plate
13 Check valve	30 Heater
14 Case cover	31 Thermostat
15 Set spring	32 Plug
16 Filter plate	33 Elbow connector
17 Filter	34 Tube

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 3.9-6.9 {40-70, 2.9-5.0}	D 6.9-7.8 {71-79, 5.1-5.7}
B 3.9-6.9 {40-70, 2.9-5.0}	E 17.7-27.5 {181-280, 14-20}
C 4.9-5.9 {50-60, 3.7-4.3}	

OVERHAUL

EN0680202H200001

IMPORTANT POINTS - ASSEMBLY

1. LUBRICATION

- (1) When assembling the air dryer, use new O-ring, gasket and seal.
- (2) Apply grease (lithium base) to each sliding surface of the component parts and O-ring groove.

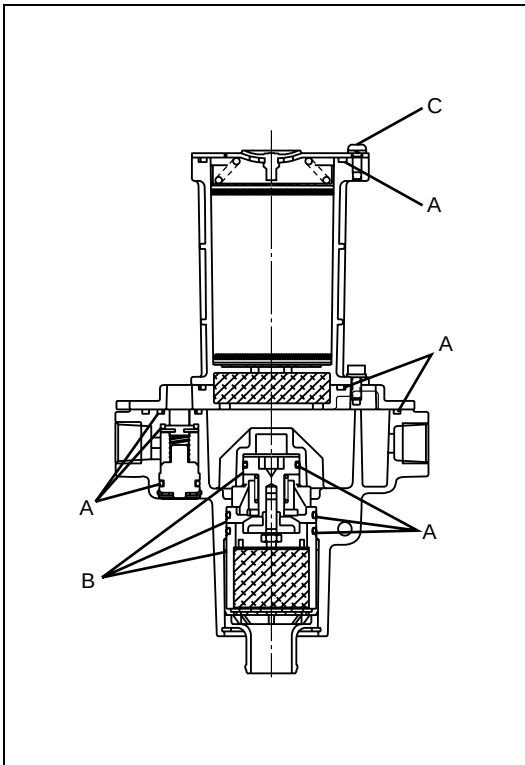
- **A: O-ring**
- **B: Sliding surface**

2. ASSEMBLY

NOTICE

Before tighten the bolt with specified tightening torque, tap all over the outer surface of the desiccant case with a plastic hammer.

- **C: Bolt**

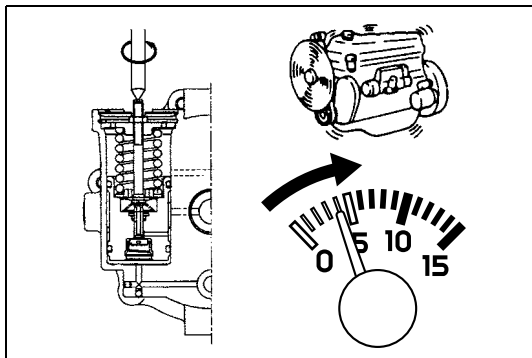


SHTS068020200003

IMPORTANT POINTS - MOUNTING

1. INSPECTION

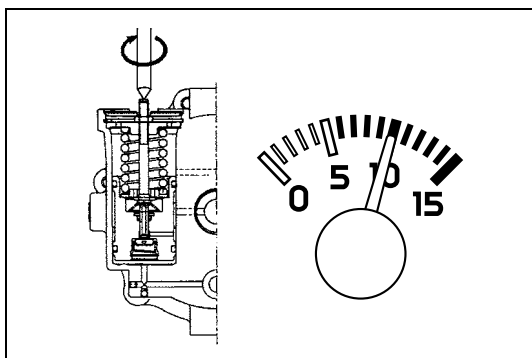
- (1) Operate the engine and raise the air pressure until the air discharge from the purge valve, then stop the engine.
(The pressure reaches the valve opening pressure of the air pressure regulator).
- a. Check to see that there is no air leakage from the purge valve.



SHTS068020200004

2. ADJUSTMENT

- (1) Loosen the adjusting screw until the rod spring tension is released, and start and idle the engine to charge the air for the air tank.



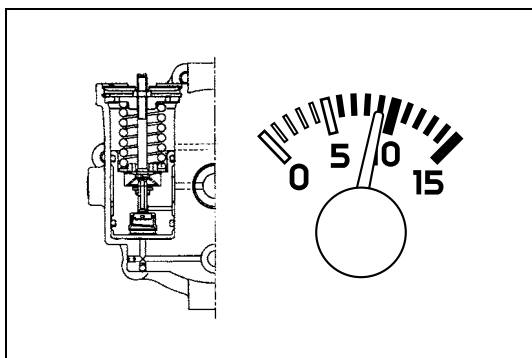
SHTS068020200005

- (2) Tighten the adjusting screw gradually till the air pressure gauge indicate valve opening pressure shown below and the air starts to discharge from purge valve.

Governor valve opening pressure:

960-1,000 kPa {9.8-10.2 kgf/cm², 139.2-145.0 lbf/in.²}

- (3) Tighten the adjusting screw lock nut.



SHTS068020200006

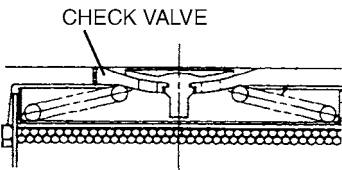
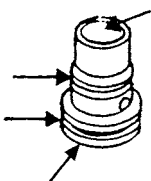
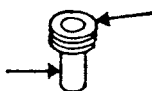
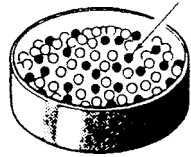
- (4) Watch the air pressure gauge needle and see that it stops at the valve closing pressure shown below.

Governor valve closing pressure:

860-900 kPa {8.8-9.2 kgf/cm², 124.7-130.5 lbf/in.²}

INSPECTION AND REPAIR

EN0680202H300001

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Check valve and valve seat surface: Wear and damage	—	—	Replace, if necessary.	Visual check 
Valve body sliding surface and purge valve seat surface: Wear and damage	—	—	Replace, if necessary.	Visual check 
Piston sliding surface: Wear and damage	—	—	Replace, if necessary.	Visual check 
Purge valve seat surface: Wear and damage	—	—	Replace, if necessary.	Visual check 
Desiccant: Contamination and deterioration	—	Discolored, more than 1/5 of the quantity.	Replace.	Visual check 

CHECK VALVE

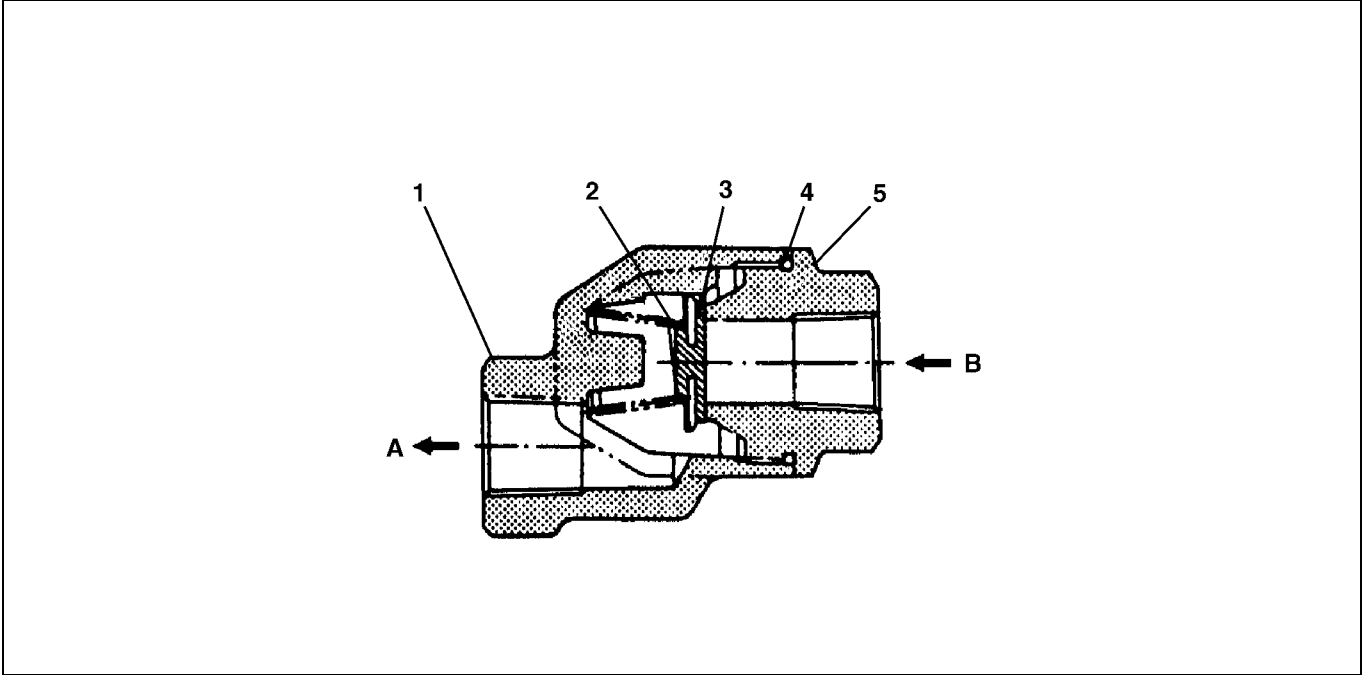
DATA AND SPECIFICATIONS

EN0680202I200002

Type	Spring type
Valve opening pressure	Outlet side pressure 14.7 kPa {0.15 kgf/cm ² , 2.13 lbf/in. ² }

DESCRIPTION

EN0680202C100002

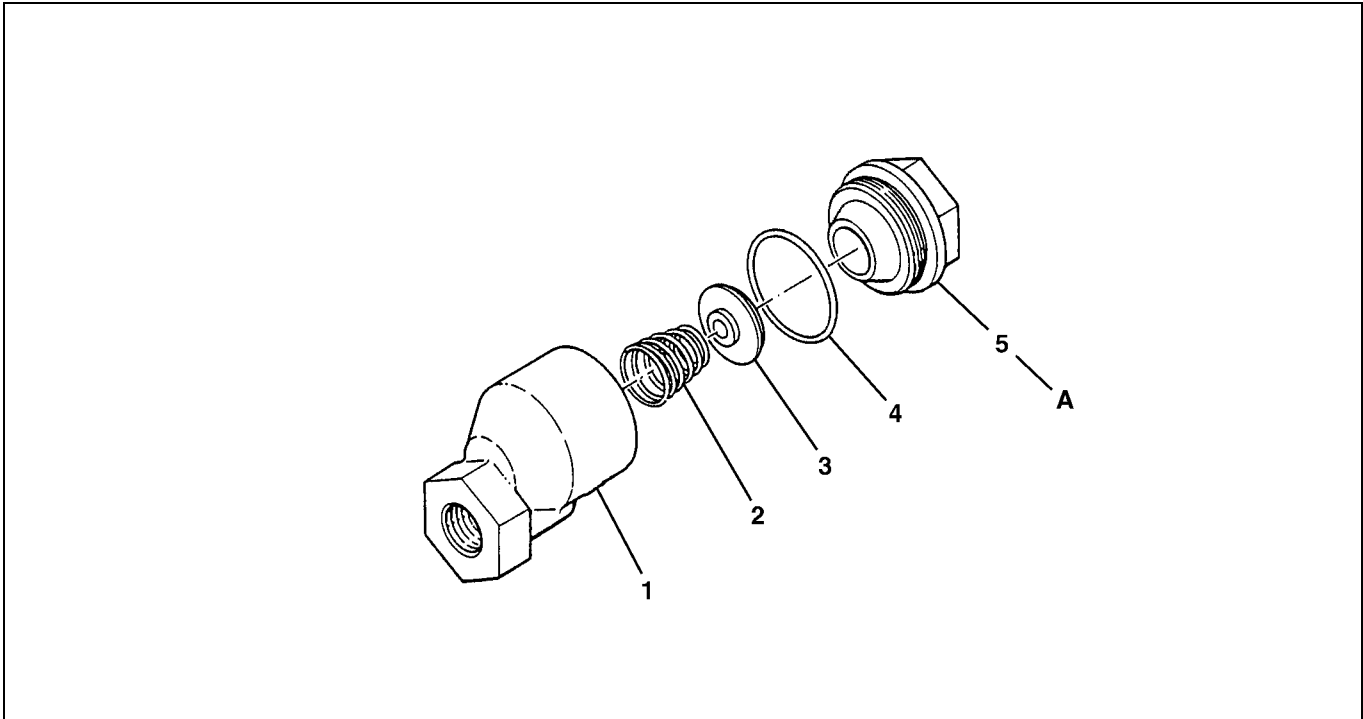


SHTS068020200012

1 Valve body	5 Body cap
2 Conical spring	A OUT
3 Valve seat	B IN
4 O-ring	

COMPONENT LOCATOR

EN0680202D100002



SHTS068020200013

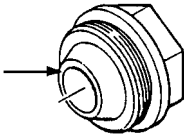
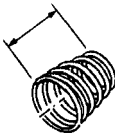
1	Valve body	4	O-ring
2	Conical spring	5	Body cap
3	Valve seat		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	44.1-53.9 {450-550, 33-39}	

INSPECTION AND REPAIR

EN0680202H300002

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Body cap: Wear and any other damage	—	—	Replace, if necessary.	Visual check 
Conical spring: Rust, damage and free length	17.5 {0.69}	16.5 {0.65}	Replace.	Measure and Visual check 

DOUBLE CHECK VALVE

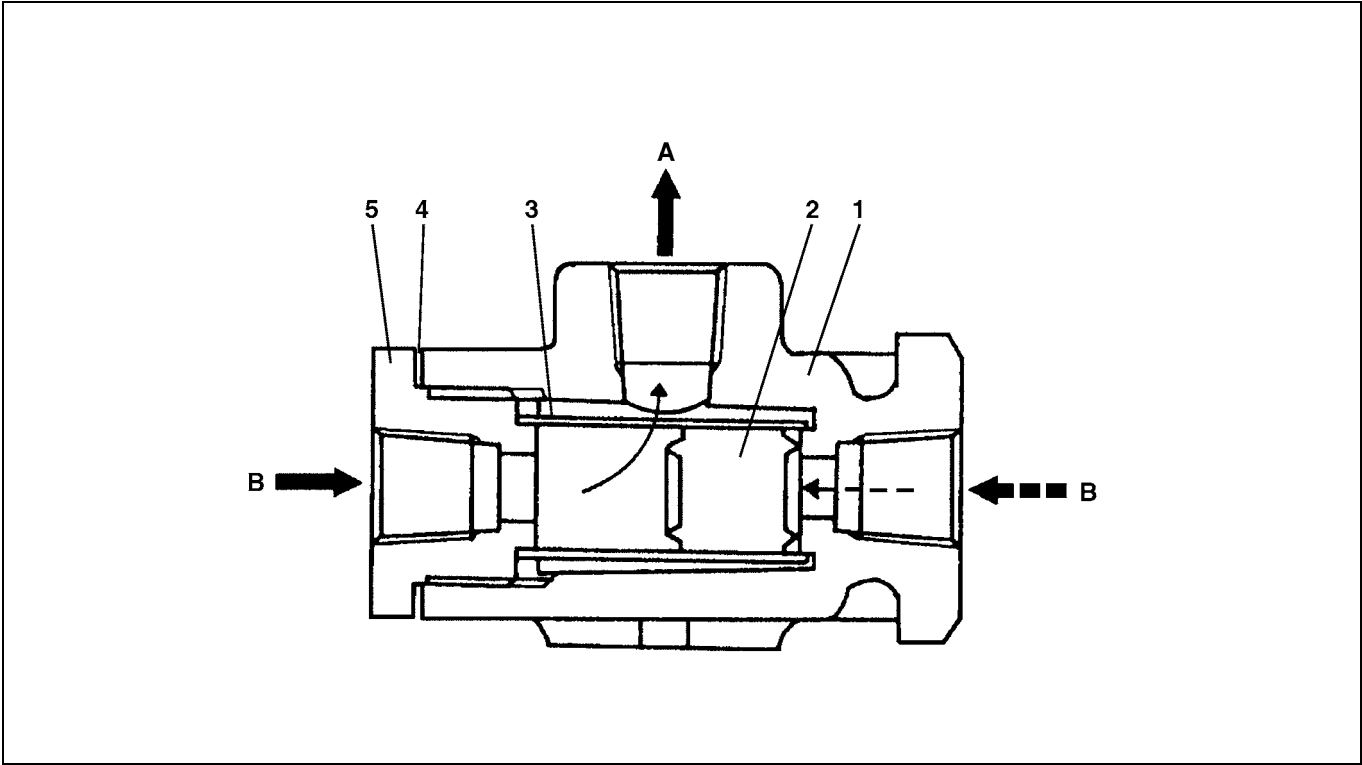
DATA AND SPECIFICATION

EN0680202I200003

Type	Piston type
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DESCRIPTION

EN0680202C100003

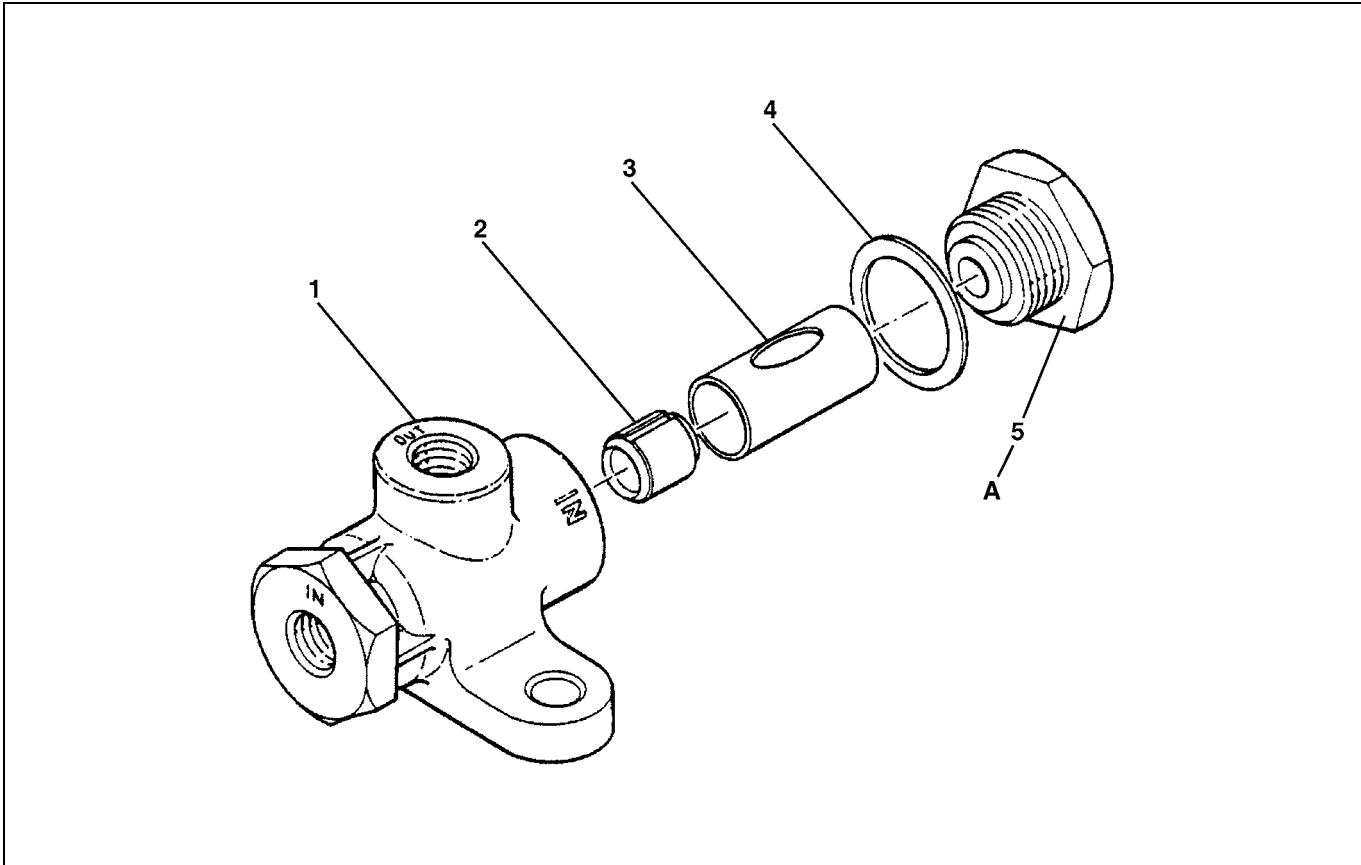


SHTS068020200016

1 Valve body	5 Plug
2 Valve	A Outlet
3 Guide	B Inlet
4 Gasket	

COMPONENT LOCATOR

EN0680202D100003



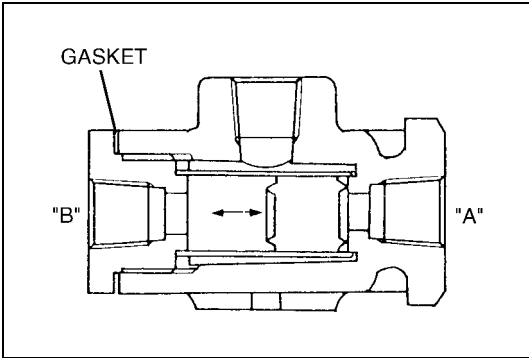
SHTS068020200017

1	Valve body	4	Gasket
2	Valve	5	Plug
3	Guide		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	34.3-44.1 {350-450, 25.3-32.5}	

OVERHAUL

EN0680202H200002



IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1) When assembling the double check valve, apply the ThreeBond: TB-1101 or equivalent to the gasket.

NOTICE

Check to see that there is no air leakage from "A", when air is charged from "B", and no air leakage from "B", when air is charged from "A".

INSPECTION AND REPAIR

EN0680202H300003

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve and guide: Rust, wear and damage	—	—	Clean or replace, if necessary.	Visual check
Valve body and plug: Rust, wear and damage	—	—	Clean or replace, if necessary.	Visual check

SAFETY VALVE

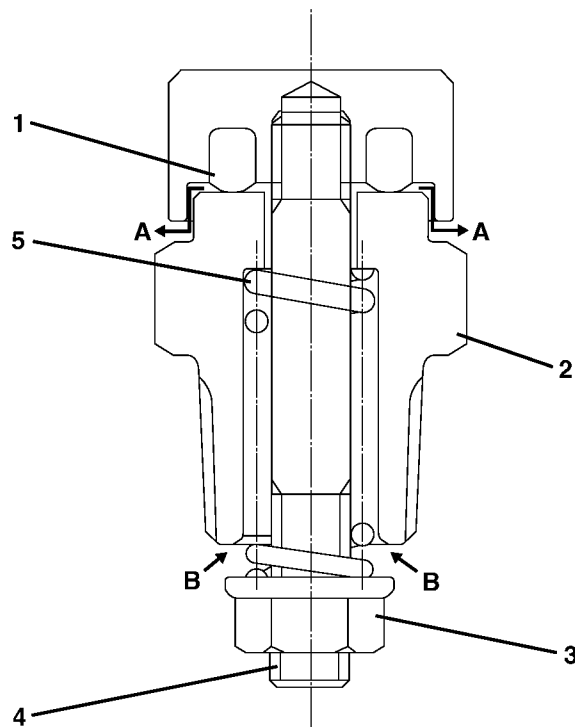
DATA AND SPECIFICATIONS

EN06802022600001

Type	Spring type
Valve opening pressure	1,029-1,068 kPa {10.5-10.9 kgf/cm ² , 149.2-154.9 lbf/in. ² }

DESCRIPTION

EN0680202C100004



SHTS068020200021

1 Valve	5 Compression spring
2 Body	A Exhaust
3 Nut	B From air tank (Pressure air)
4 Bolt	

INSPECTION AND REPAIR

EN0680202H300004

Unit: kPa {kgf/cm², lbf/in.²}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve opening pressure	1,029-1,068 {10.5-10.9, 149.2-154.9}	—	Replace.	Measure

BRAKE VALVE

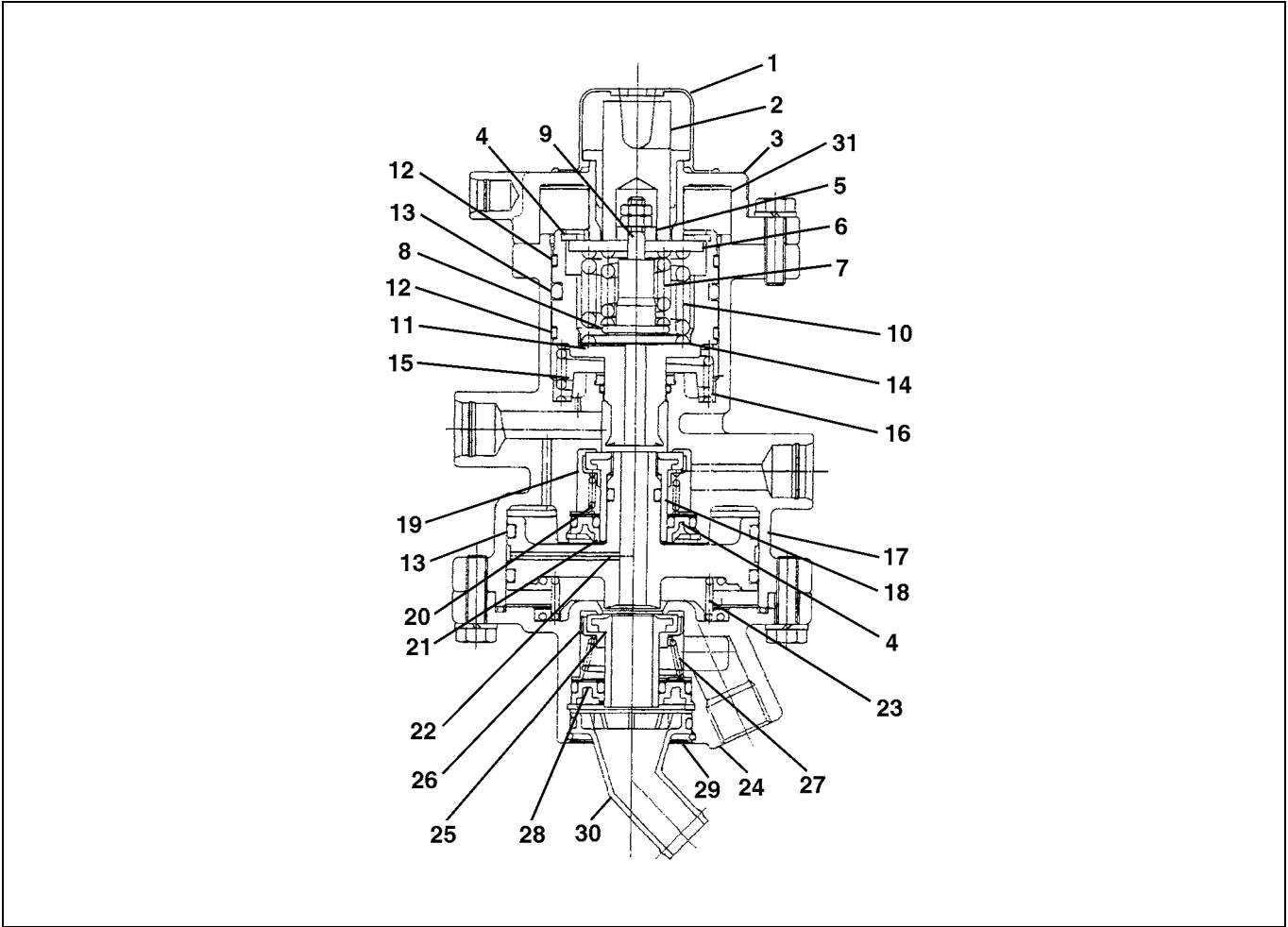
DATA AND SPECIFICATION

EN0680202I200004

Type	Dual pistons and valves with a plunger type pedal
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DESCRIPTION

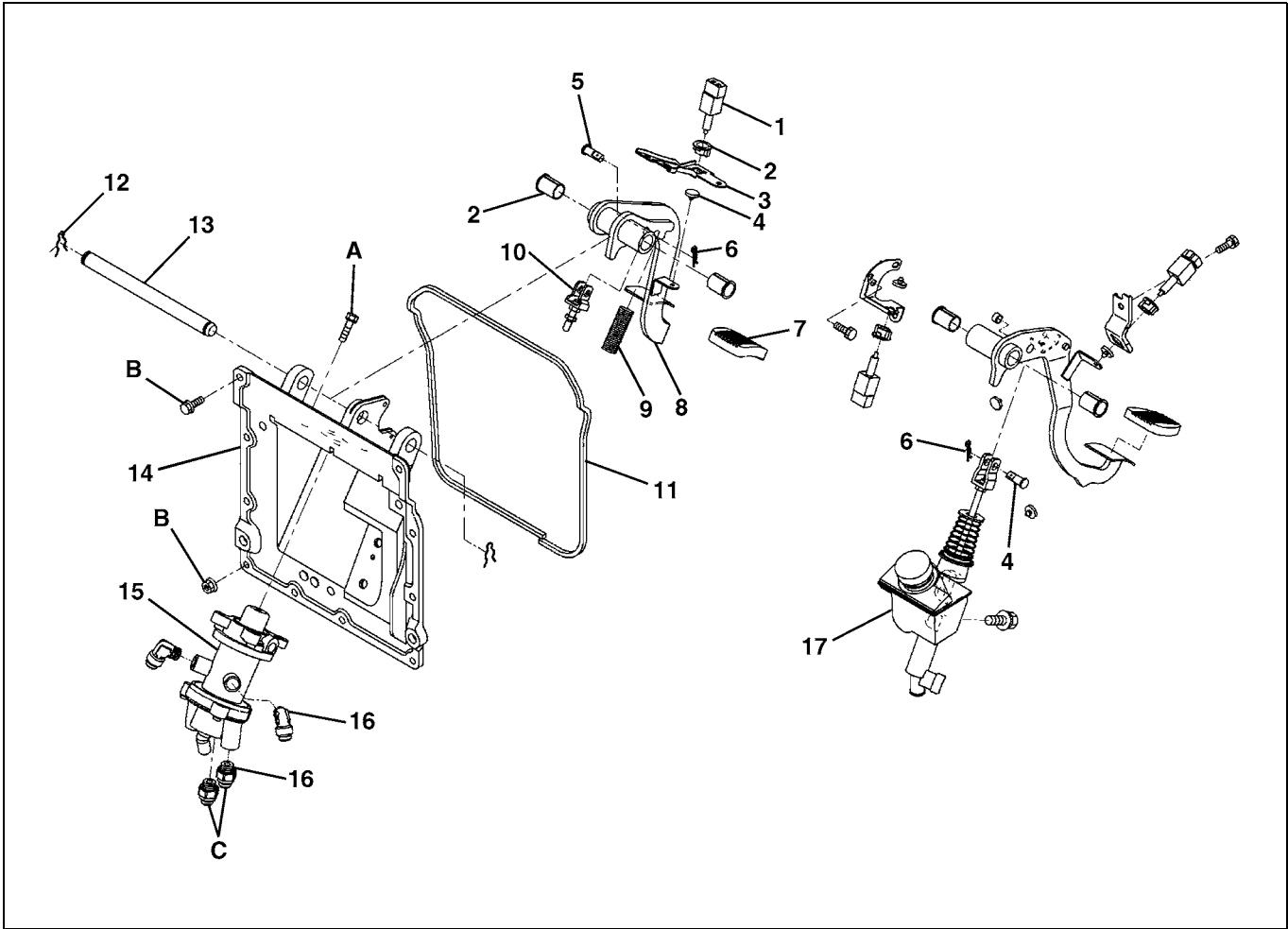
EN0680202C100005



1	Boot	16	Primary piston return spring
2	Plunger	17	Primary valve body
3	Brake valve cover	18	Primary feed valve
4	Retainer ring	19	Retainer
5	Guide ring	20	Primary feed valve return spring
6	Spring seat	21	Primary feed valve retainer
7	Sub spring	22	Secondary piston
8	Shim	23	Secondary piston return spring
9	Stem	24	Secondary valve body
10	Main spring	25	Secondary feed valve
11	Shim	26	Retainer
12	Guide ring	27	Secondary feed valve return spring
13	O-ring	28	Secondary feed valve retainer
14	Primary piston	29	C-ring
15	Guide	30	Exhaust port

COMPONENT LOCATOR

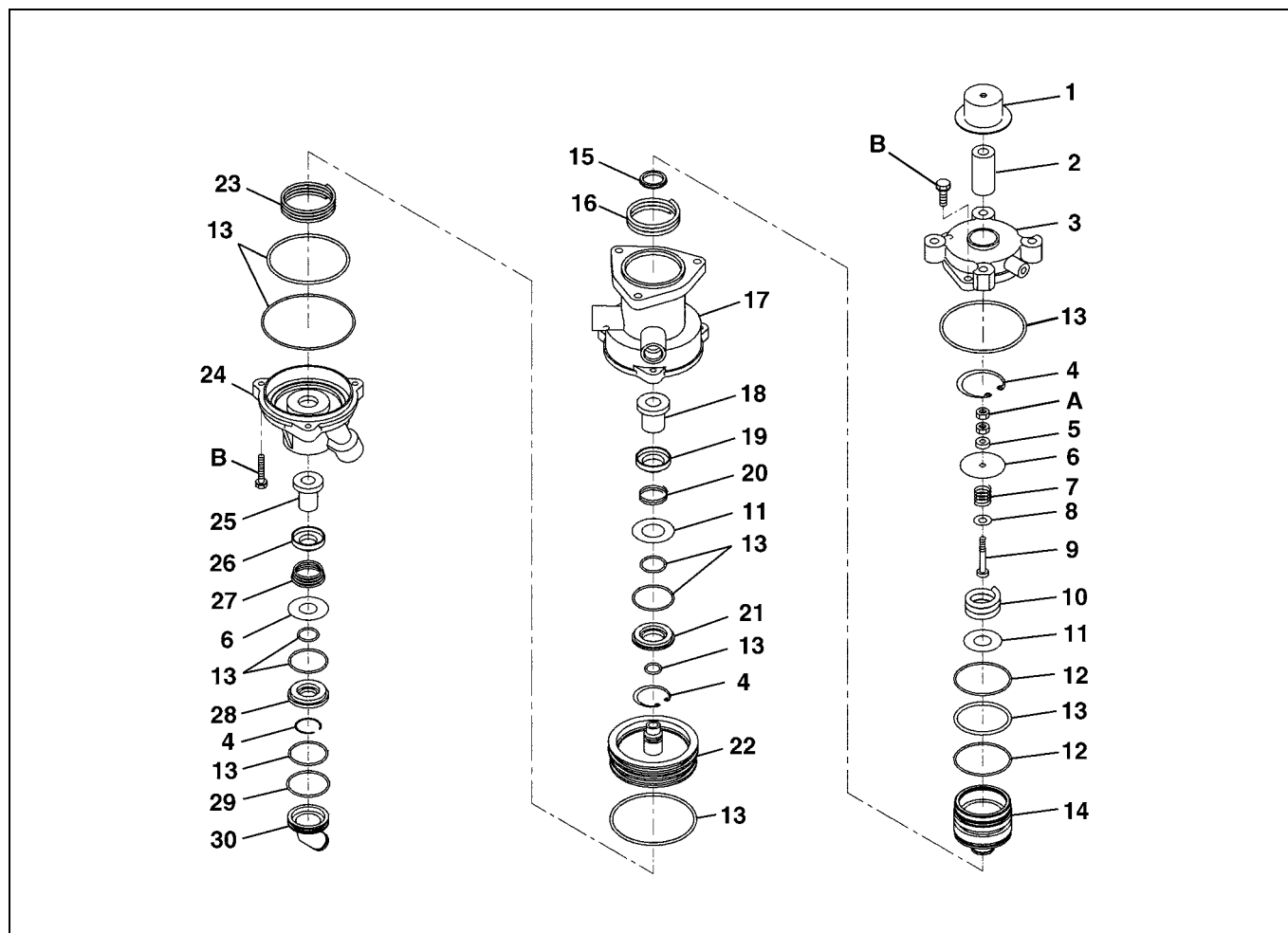
EN0680202D100004



SHTS068020200023

1	Stop lamp switch	10	Push rod
2	Bushing	11	Seal
3	Bracket	12	Clip
4	Buffer	13	Shaft
5	Pin	14	Pedal bracket
6	R-pin	15	Brake valve
7	Pedal pad	16	Connector
8	Brake pedal	17	Clutch master cylinder
9	Return spring		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	9.5-18.5 {97-188, 7.1-13.6}	C	24.4-34.5 {249-351, 18-25}
B	18-31 {184-316, 14-22}		



SHTS068020200024

1	Boot	16	Primary piston return spring
2	Plunger	17	Primary valve body
3	Brake valve cover	18	Primary feed valve
4	Retainer ring	19	Retainer
5	Guide ring	20	Primary feed valve return spring
6	Spring seat	21	Primary feed valve retainer
7	Sub spring	22	Secondary piston
8	Shim	23	Secondary piston return spring
9	Stem	24	Secondary valve body
10	Main spring	25	Secondary feed valve
11	Shim	26	Retainer
12	Guide ring	27	Secondary feed valve return spring
13	O-ring	28	Secondary feed valve retainer
14	Primary piston	29	C-ring
15	Guide	30	Exhaust port

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A	2.9-4.9 {30-50, 2.2-3.6}	B	5.9-7.4 {60-75, 4.3-5.4}
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NOTICE

The parts in 4 and 13 are not the ones to be reusable.

OVERHAUL

EN0680202H200003

IMPORTANT POINTS - DISMOUNTING

1. REMOVE THE CLUTCH MASTER CYLINDER.

HINT

Even if without removing the clutch master cylinder, pedal bracket can be removed only to the length of the clutch hose.

2. DISCONNECT THE NYLON TUBE.

NOTICE

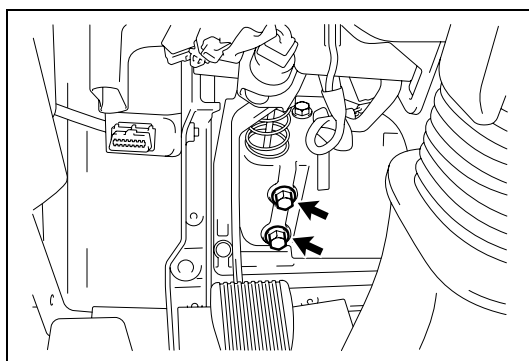
Before disconnecting, apply aligning marks on the brake valve assembly and nylon tube.

3. REMOVE THE PEDAL BRACKET ASSEMBLY.

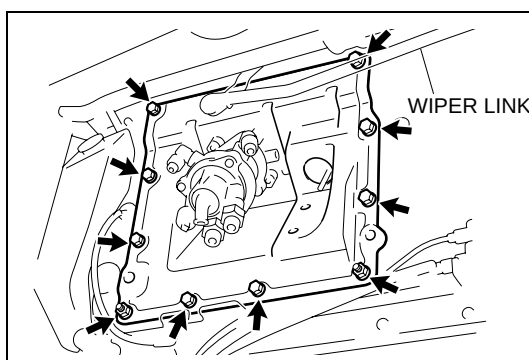
- (1) Loosen the bolt and nut to remove the pedal bracket assembly.

NOTICE

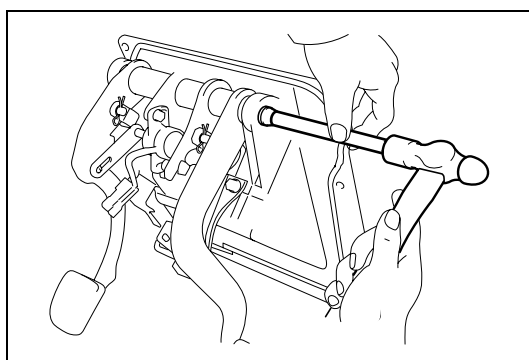
Before removing the pedal bracket, put the wiper link upward.



SHTS068020200025



SHTS068020200026



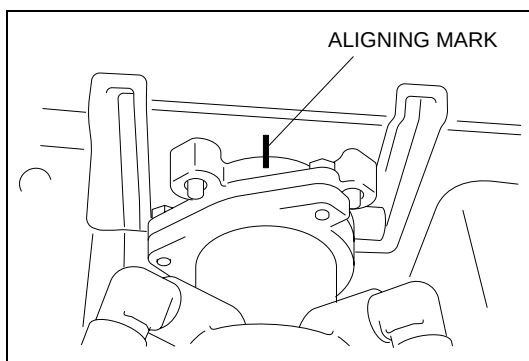
SHTS068020200027

4. REMOVE THE BRAKE PEDAL.

- (1) Tap the shaft lightly using a brass rod and a hammer, remove the brake pedal from the pedal bracket assembly.

NOTICE

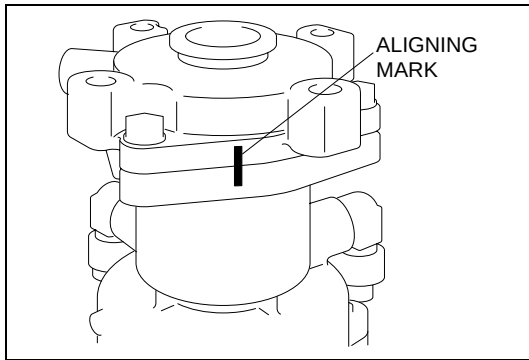
Do not pull out the shaft because the brake pedal and the clutch pedal are installed by one shaft.



SHTS068020200028

5. REMOVE THE BRAKE VALVE ASSEMBLY.

- (1) Apply aligning marks on the brake valve assembly and pedal bracket assembly.

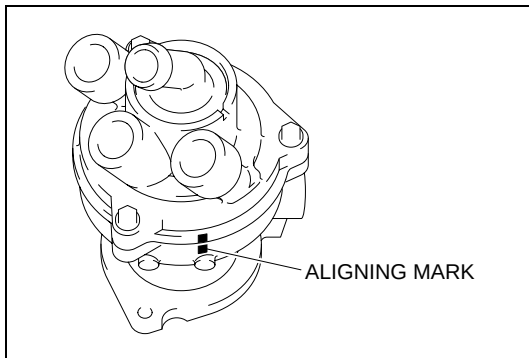


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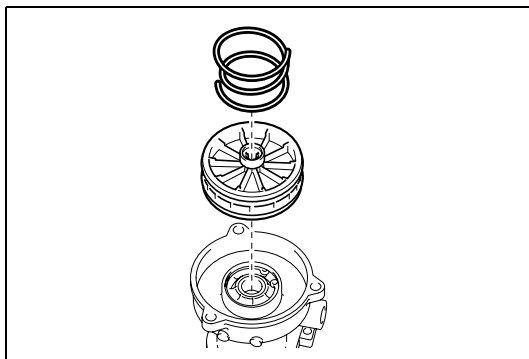
IMPORTANT POINTS - DISASSEMBLY

NOTICE

Before disassembling the brake valve, apply aligning marks on the brake valve cover, primary valve body and secondary valve body.



SHTS068020200030



SHTS068020200031

1. REMOVE THE PRIMARY PISTON ASSEMBLY.
2. REMOVE THE SECONDARY VALVE BODY.
3. REMOVE THE SECONDARY PISTON.

NOTICE

Pull out with hands to prevent the seat part of the secondary piston from being damaged by using a pryer etc. If not with hands, secondary piston should not be reused.

4. REMOVE THE PRIMARY FEED VALVE.
5. REMOVE THE EXHAUST PORT.
6. REMOVE THE SECONDARY FEED VALVE.

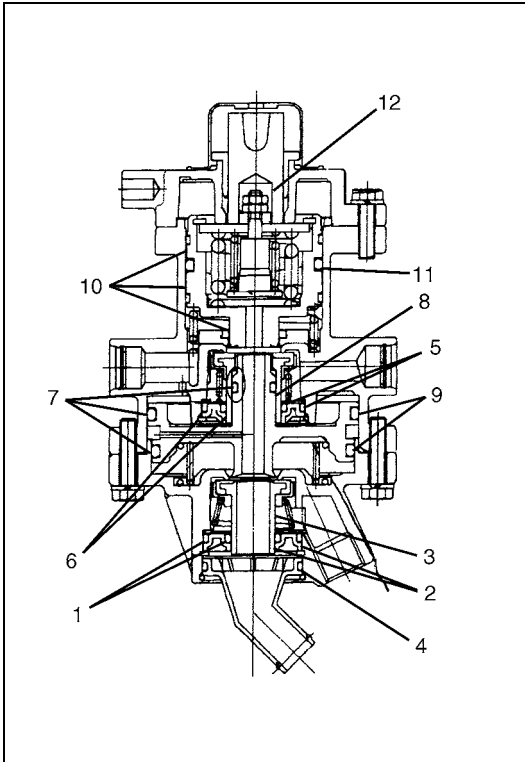
NOTICE

In order to prevent from incorrect assembling, keep in stock respectively primary feed valve assembly and secondary feed valve assembly.

IMPORTANT POINTS - ASSEMBLY**1. LUBRICATION**

- (1) When reassembling the brake valve, replace the O-rings and retainer rings with new ones.
- (2) Apply adequate amount of silicone grease on the grooves for the O-ring and to the sliding surfaces of the component parts.

1. Secondary feed valve retainer O-ring
2. Secondary feed valve retainer
3. Secondary feed valve
4. Exhaust port O-ring
5. Primary feed valve retainer O-ring
6. Primary feed valve retainer
7. Secondary piston O-ring
8. Secondary piston
9. Primary valve body
10. Primary piston
11. Primary piston O-ring
12. Plunger



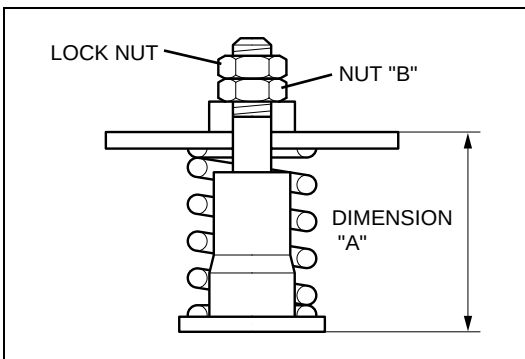
SHTS068020200032

2. ASSEMBLE THE STEM, SPRING, SPRING SEAT AND SHIM.

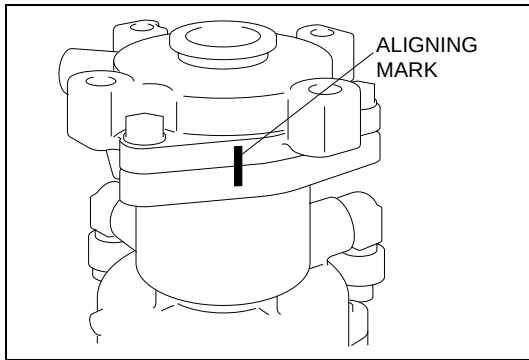
- (1) Assemble the sub spring. At this time, adjust dimension "A" and the spring compression "P" by means of the nut "B" and the shim.

Tightening Torque (Lock nut):**2.9-4.9 N·m {30-50 kgf·cm, 2.2-3.6 lbf·ft}****Dimension "A": 27.55-27.95 mm {1.0847-1.1003 in.}****Setting load "P": 0-9.8 N {0-1 kgf, 0-2.2 lbf}****NOTICE**

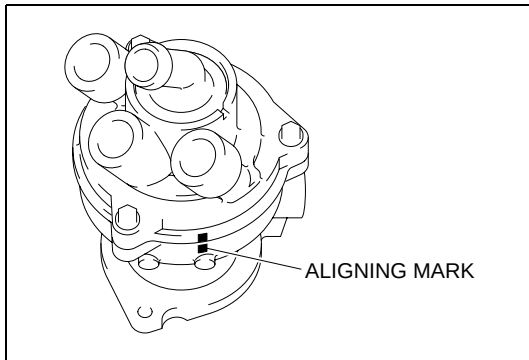
In adjusting the spring compression, the axial play of the spring must be removed.



SHTS068020200033



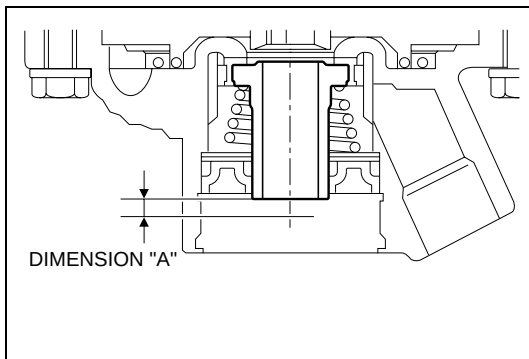
SHTS068020200029



SHTS068020200030

3. ALIGN THE VALVE COVER AND VALVE BODIES.

- (1) When assemble the brake valve cover, primary body and secondary body, align the marks which were applied at disassembly.



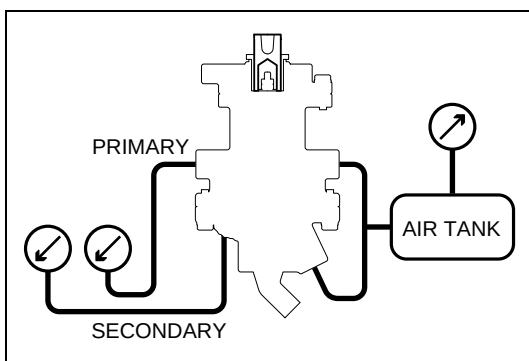
SHTS068020200034

4. INSPECTION AND ADJUSTMENT

- (1) Brake valve

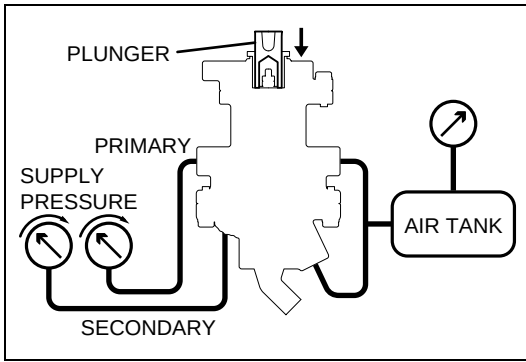
- a. Measure the secondary feed valve stroke (Dimension "A" from starting to release the plunger to completing to fully release the plunger).

A dimension: 0.6 mm {0.0236 in.} or above



SHTS068020200035

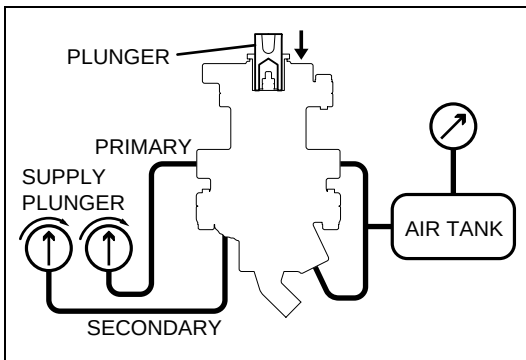
- b. Connect the brake valve, nylon tube, air pressure gauge, and air tank as shown in the figure.
- c. Set the air tank pressure at 830 kPa {8.5 kgf/cm², 120.87 lbf/in.²}.
- d. Apply soap water to the exhaust port and check to see there is no air leakage.



SHTS068020200036

- e. Drive in slowly the plunger. Measure the plunger stroke and supply pressure at the point where the primary and secondary air pressure gauges start to rise. If the measurements do not match with the standard values, adjust by the shim of the main spring.

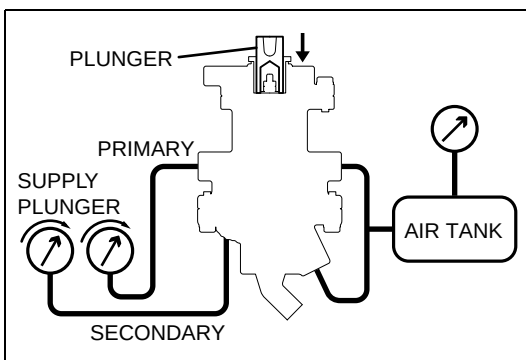
Measurement item	Standard value
Plunger stroke	0.8-1.6 mm {0.0315-0.0630 in.}
Supply pressure	19-41 kPa {0.20-0.41 kgf/cm ² , 2.76-5.94 lbf/in. ² }



SHTS068020200037

- f. Drive in further the plunger. Measure the plunger stroke and supply pressure at the point immediately before that the primary and secondary pressure increases rapidly (bending point). If the measurements do not match with the standard values, replace each spring.

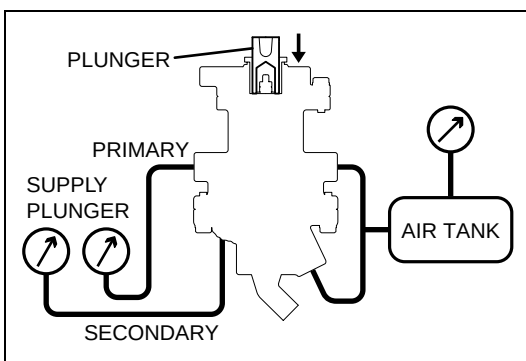
Measurement item	Standard value
Plunger stroke	3.6-4.7 mm {0.1418-0.1850 in.}
Supply pressure	196 kPa {2.00 kgf/cm ² , 28.42 lbf/in. ² }



SHTS068020200038

- g. Drive in further the plunger. Measure the plunger stroke and supply pressure at the point where the primary and secondary pressures increase rapidly. If the measurements do not match with the standard values, replace each spring.

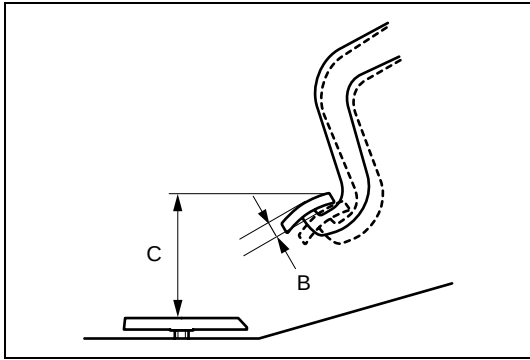
Measurement item	Standard value
Plunger stroke	5.94-7.26 mm {0.2339-0.2858 in.}
Supply pressure	624 kPa {6.36 kgf/cm ² , 90.50 lbf/in. ² }



SHTS068020200039

- h. Drive in further the plunger. Measure the pedal stepping down angle and supply pressure at the point where the primary and secondary pressure are maximum. If the measurements do not match with the standard values, replace each spring.

Measurement item	Standard value
Plunger stroke	8.34-9.76 mm {0.3284-0.3842 in.}
Supply pressure	980 kPa {9.99 kgf/cm ² , 142.14 lbf/in. ² }



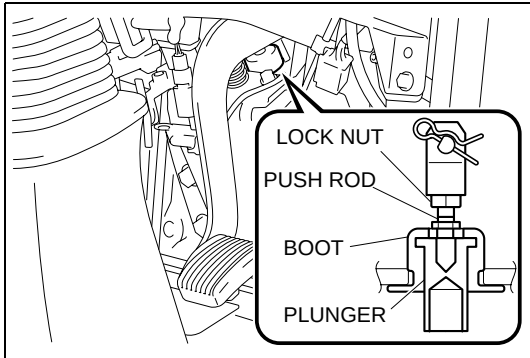
SHTS068020200040

(2) Brake pedal

- a. Make sure that the installing height of the brake pedal "C" and the pedal play "B".

"B": 2-5 mm {0.0788-0.1968 in.}

"C": 147.7-157.7 mm {5.815-6.208 in.}

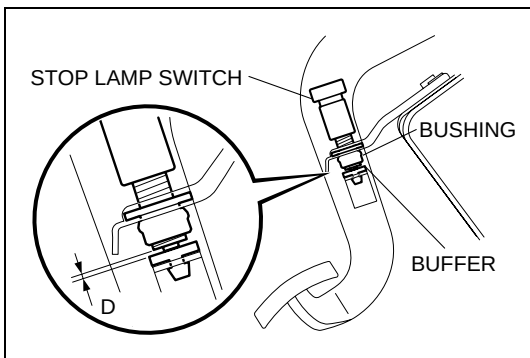


SHTS068020200041

- b. If the pedal play is out of the standard value, loosen the lock nut and turn the push rod to adjust the pedal play to the standard value.

Tightening Torque (Lock nut):

14-26 N·m {143-265 kgf·cm, 11-19 lbf·ft}



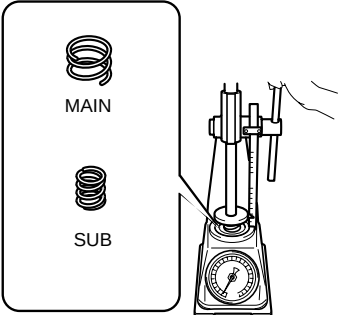
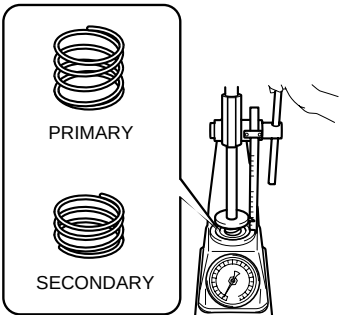
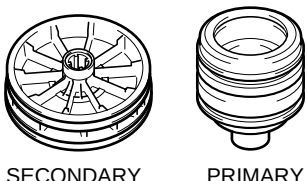
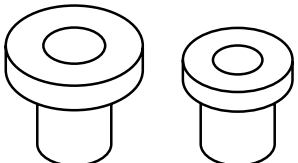
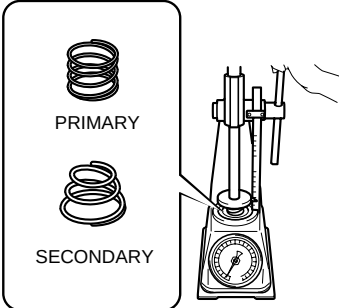
SHTS068020200042

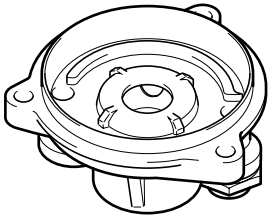
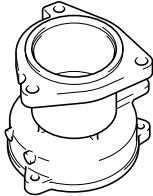
(3) Check the clearance between stop lamp switch and buffer.

"D": 0.5-1.5 mm {0.0197-0.0590 in.}

INSPECTION AND REPAIR

EN0680202H300005

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Main and sub spring: Free length/ setting length/ setting load Crack, rust and damage	Main: 29.3 mm {1.15 in.}/ 27.5 mm {1.08 in.}/ 176.5 N {18 kgf, 39.68 lbf}	28.5 mm {1.12 in.} (Free length)	Replace, if necessary.	Measure and visual check 
	Sub: 21.6 mm {0.85 in.}/ 21.6 mm {0.85 in.}/ 9.8 N {1.0 kgf, 2.20 lbf} or more	20.5 mm {0.81 in.} (Free length)		
Primary and secondary piston return spring: Free length/ setting length/ setting load Crack, rust and damage	Primary: 43.2 mm {1.70 in.}/ 16.5 mm {0.65 in.}/ 95.1 N {9.7 kgf, 21.38 lbf}	40.5 mm {1.59 in.} (Free length)	Replace, if necessary.	measure and visual check 
	Secondary: 45.8 mm {1.80 in.}/ 16.0 mm {0.63 in.}/ 49.0 N {5.0 kgf, 11.02 lbf}	43.2 mm {1.70 in.} (Free length)		
Primary and secondary piston: Wear and damage	—	—	Replace, if necessary.	Visual check 
Primary and secondary feed valve: Wear and damage	—	—	Replace, if necessary.	Visual check 
Primary and secondary feed valve return spring: Free length/ setting length/ setting load Crack, rust and damage	Primary: 21.4 mm {0.84 in.}/ 12.5 mm {0.49 in.}/ 52.0 N {5.3 kgf, 11.68 lbf}	20.4 mm {0.80 in.} (Free length)	Replace, if necessary.	Measure and visual check 
	Secondary: 22.8 mm {0.90 in.}/ 13.0 mm {0.51 in.}/ 49.0 N {5.0 kgf, 11.02 lbf}	21.8 mm {1.13 in.} (Free length)		

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Secondary valve body: Wear and damage	—	—	Replace, if necessary.	Visual check 
Primary valve body: Wear and damage	—	—	Replace, if necessary.	Visual check 

PROTECTION VALVE (TYPE-A)

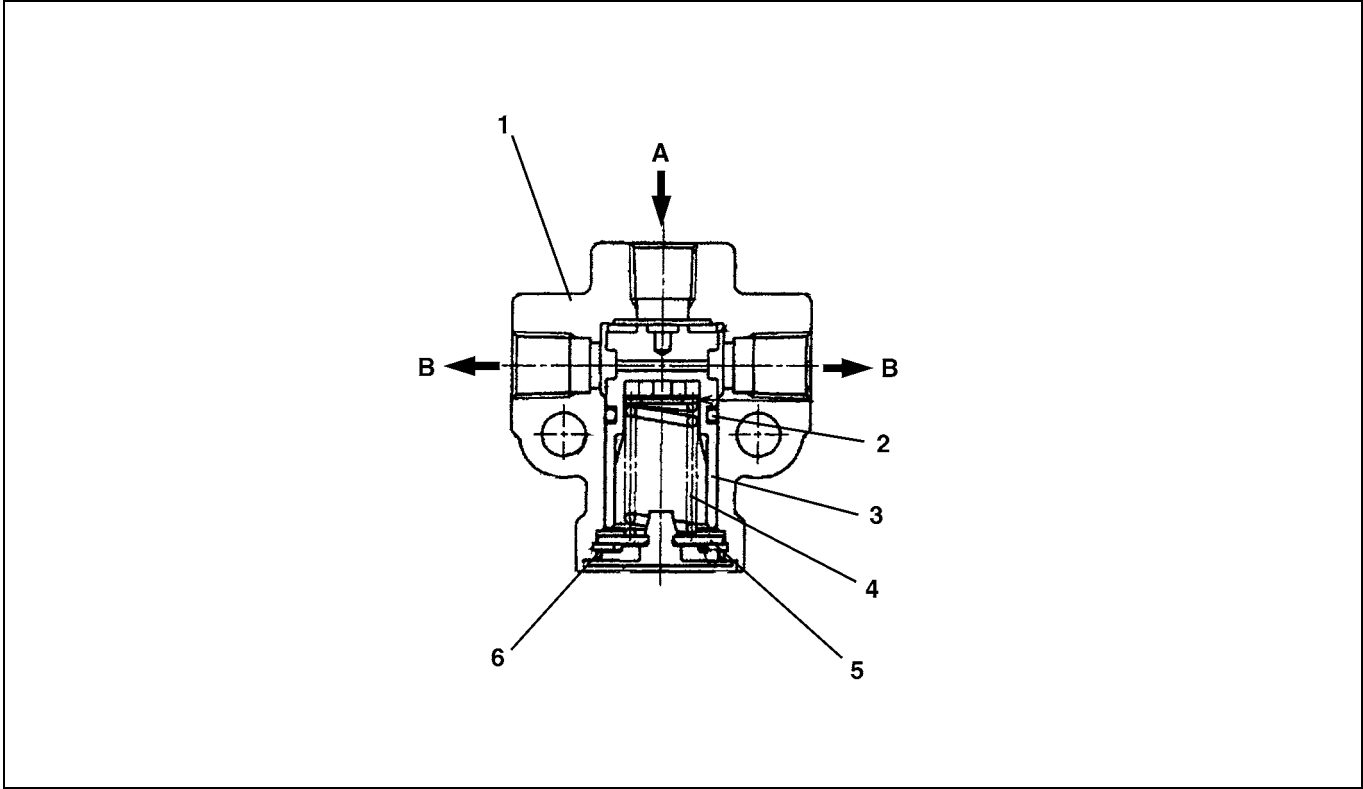
DATA AND SPECIFICATIONS

EN0680202I200005

Type		Spring type
Operating pressure	Open	637 kPa {6.5 kgf/cm ² , 92.4 lbf/in. ² }
	Close	510 kPa {5.2 kgf/cm ² , 74.0 lbf/in. ² }

DESCRIPTION

EN0680202C100006

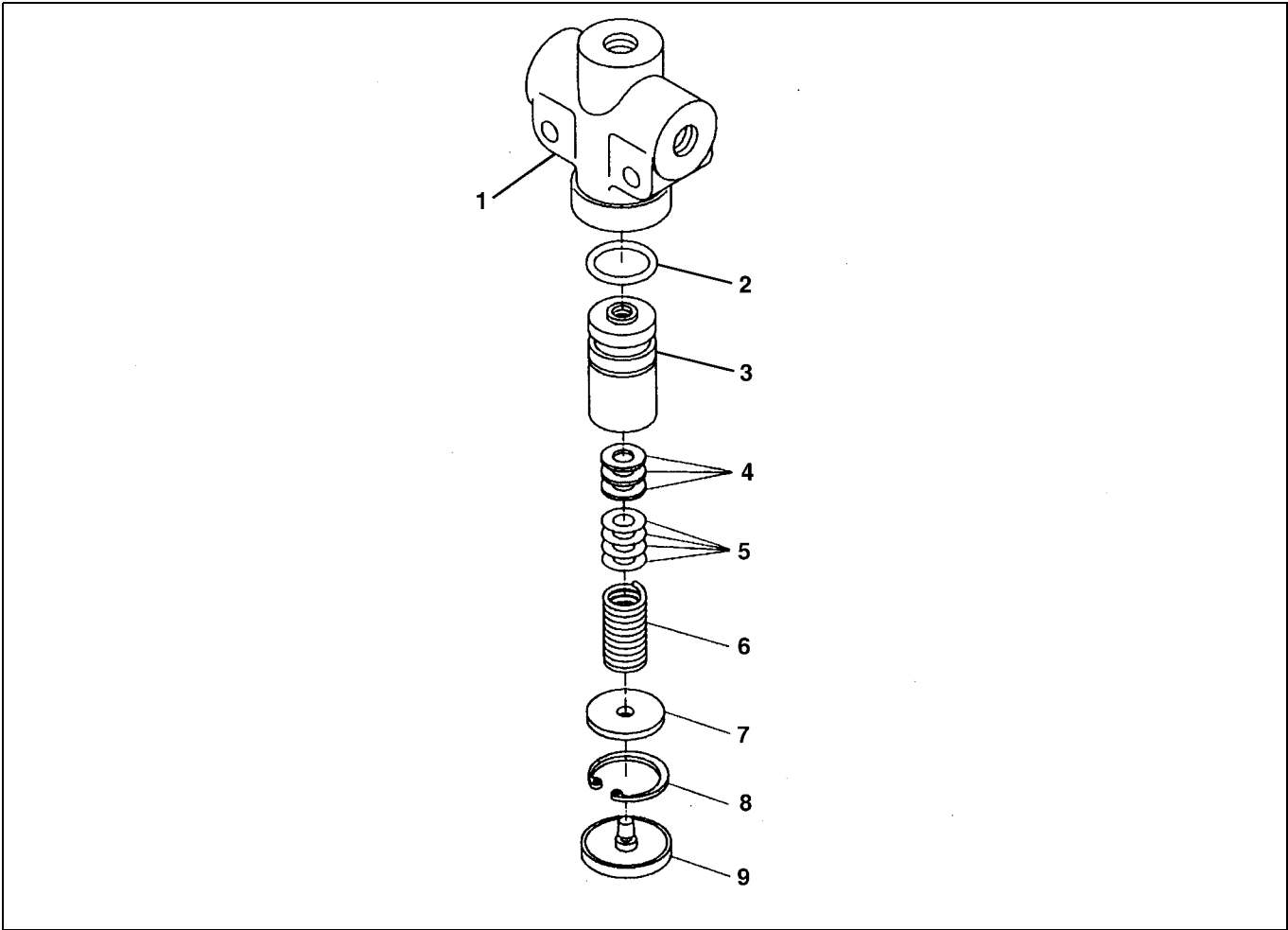


SHTS068020200050

1	Valve body	5	Dust seal plate
2	O-ring	6	Retainer ring
3	Valve	A	Inlet
4	Compression spring	B	Outlet

COMPONENT LOCATOR

EN0680202D100005



SHTS068020200051

1	Body	4	Spacer	7	Dust seal plate
2	O-ring	5	Shim	8	Retainer ring
3	Piston	6	Spring	9	Dust seal

OVERHAUL

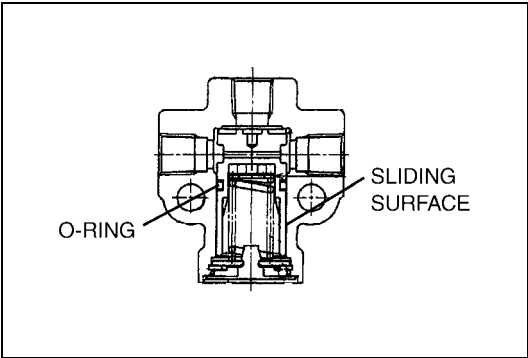
EN0680202H200004

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1)

When reassembling the protection valve, replace the O-rings and valve with new ones.
- (2)

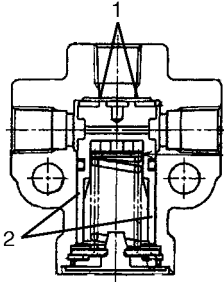
Apply adequate amount of silicone grease to the sliding surface of the component parts.



INSPECTION AND REPAIR

EN0680202H300006

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve contact surface of body cap 1: Rust, wear and damage	—	—	Clean or replace, if necessary.	Visual check 
Sliding surface of valve body 2: Rust, wear and damage	—	—	Clean or replace, if necessary.	
Valve spring: Free length	60.0 {2.36}	—	Replace, if necessary.	Measure 

PROTECTION VALVE (TYPE-B)

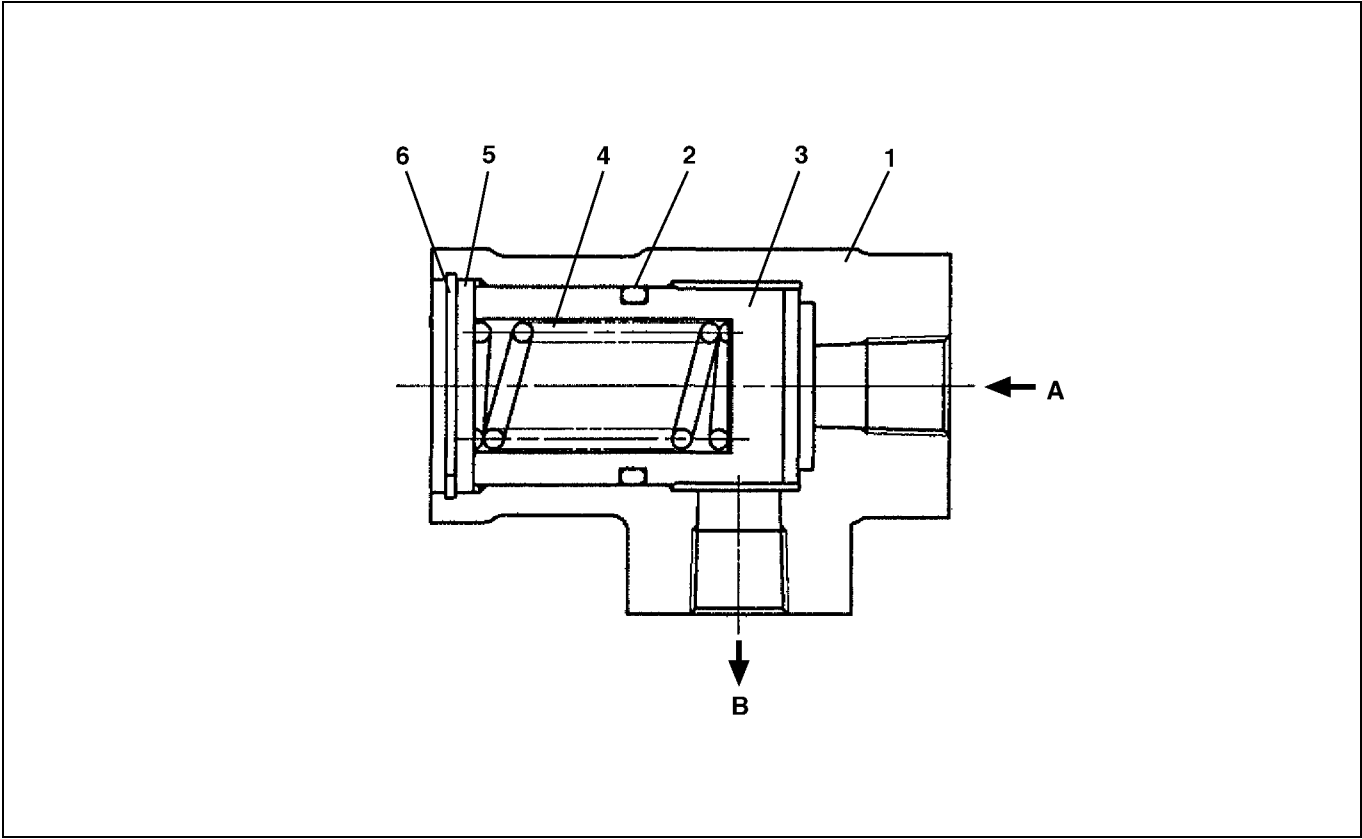
DATA AND SPECIFICATIONS

EN0680202I200006

Type		Spring type
Operating pressure	Open	540 kPa {5.5 kgf/cm ² , 78.3 lbf/in. ² }
	Close	390 kPa {4.0 kgf/cm ² , 56.6 lbf/in. ² }

DESCRIPTION

EN0680202C100007

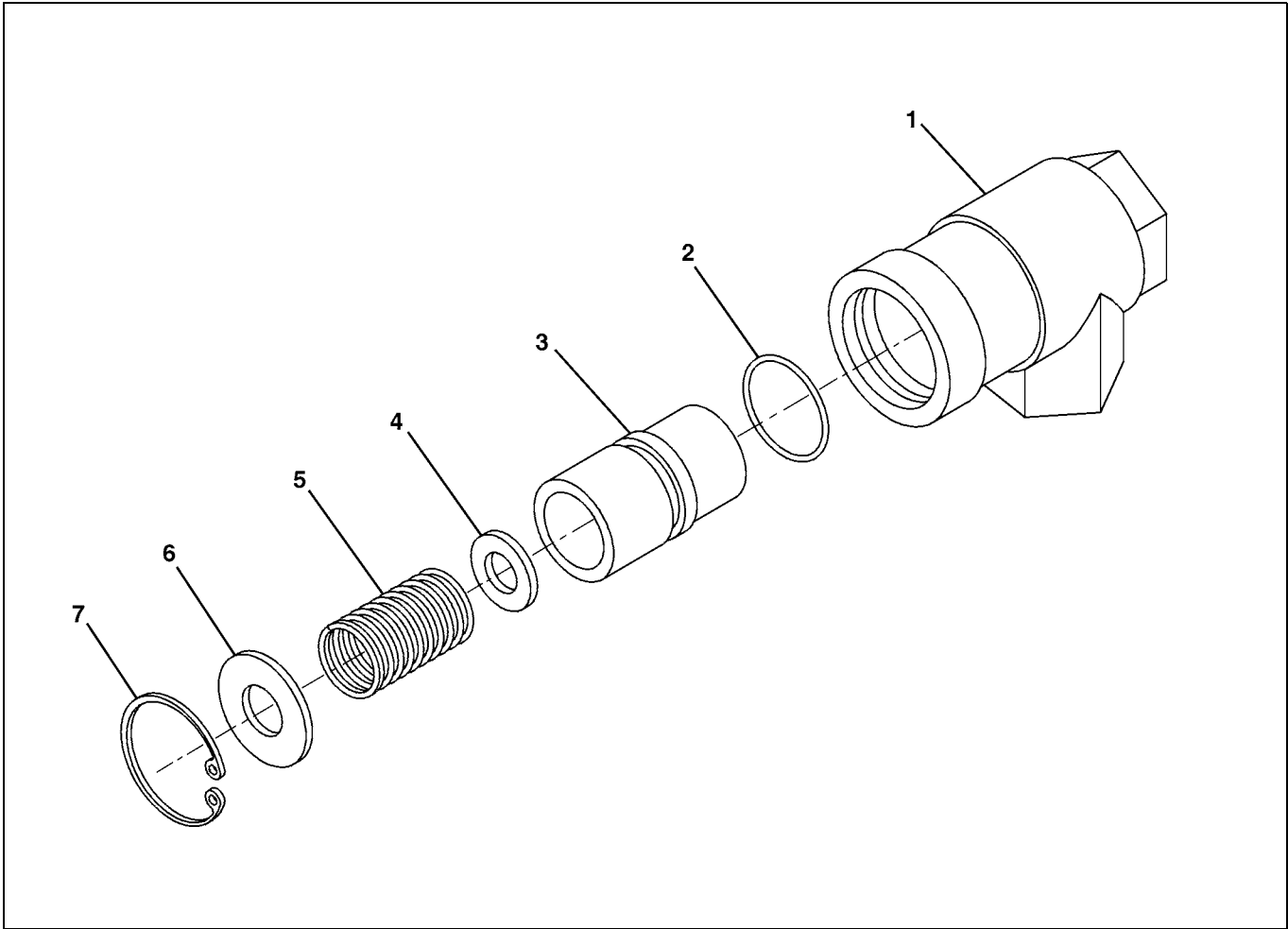


SHTS0680202000055

1	Valve body	5	Dust seal plate
2	O-ring	6	Retainer ring
3	Valve	A	Inlet
4	Compression spring	B	Outlet

COMPONENT LOCATOR

EN0680202D100006

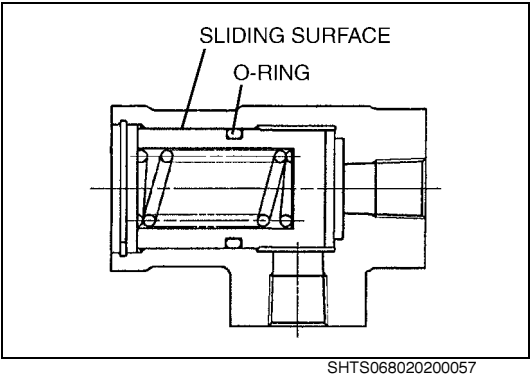


SHTS068020200056

1	Body	5	Spring
2	O-ring	6	Dust seal plate
3	Piston	7	Retainer ring
4	Shim		

OVERHAUL

EN0680202H200005



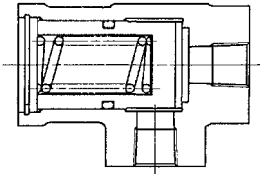
IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1) When reassembling the protection valve, replace the O-rings and valve with new ones.
 - (2) Apply adequate amount of silicone grease to the sliding surface of the component parts.

INSPECTION AND REPAIR

EN0680202H300007

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Sliding surface of valve: Rust, wear and damage	—	—	Clean or replace, if necessary.	Visual check 
Valve spring: Free length	47.5 {1.87}	—	Replace, if necessary.	Measure 

PROTECTION VALVE (WITH 4-WAY PROTECTION VALVE)

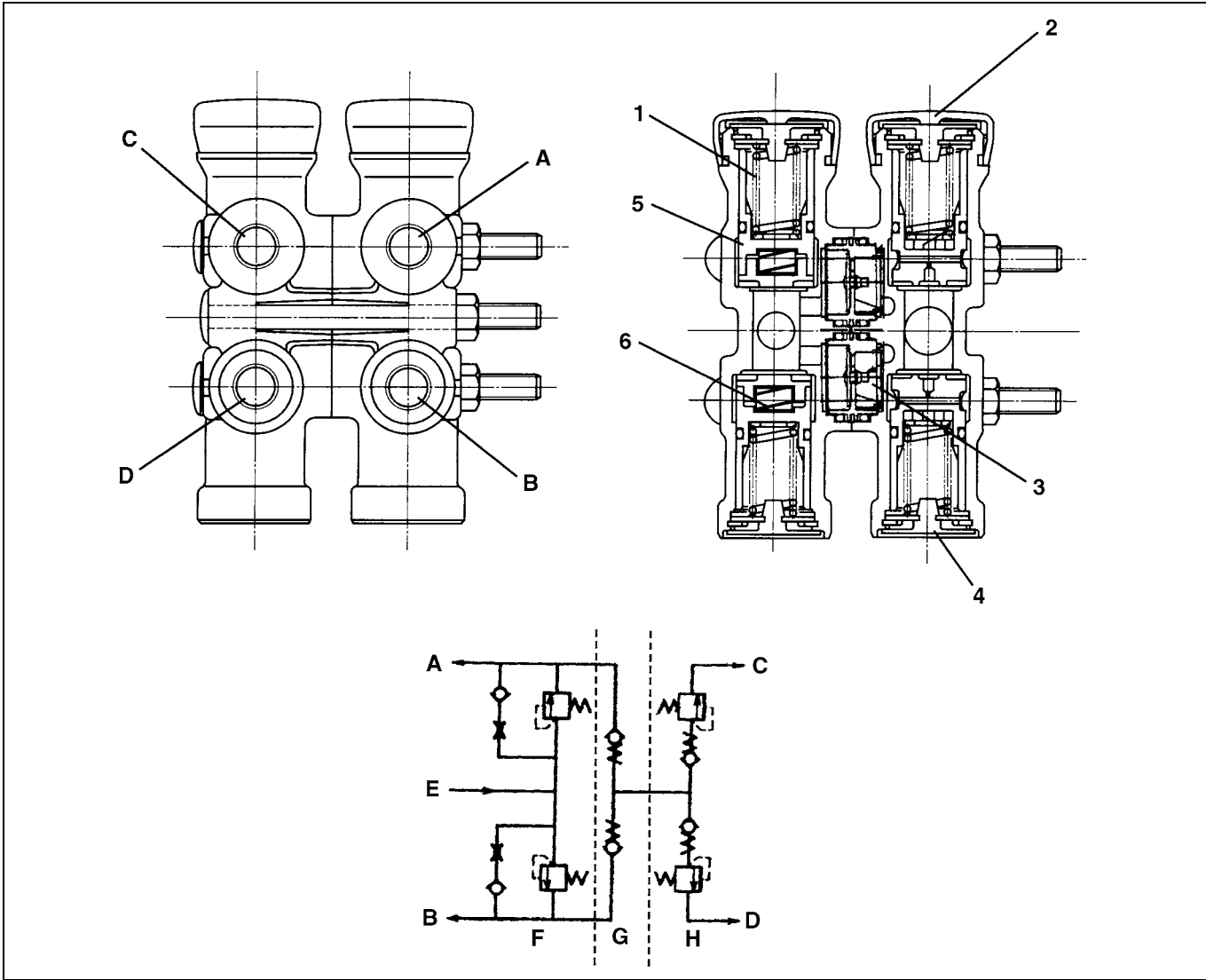
DATA AND SPECIFICATIONS

EN0680202I200007

Type			Spring type (4-way protection)
Opening pressure	Open:	Port 21, 22, 23	620-660 kPa {6.4-6.7 kgf/cm ² , 89.93-95.72 lbf/in. ² }
		Port 24	570-610 kPa {5.9-6.2 kgf/cm ² , 82.67-88.47 lbf/in. ² }
	Close:	Port 21, 22, 24	440-480 kPa {4.5-4.8 kgf/cm ² , 63.82-69.61 lbf/in. ² }
		Port 23	490-530 kPa {5.0-5.4 kgf/cm ² , 71.07-76.87 lbf/in. ² }

DESCRIPTION

EN0680202C100008

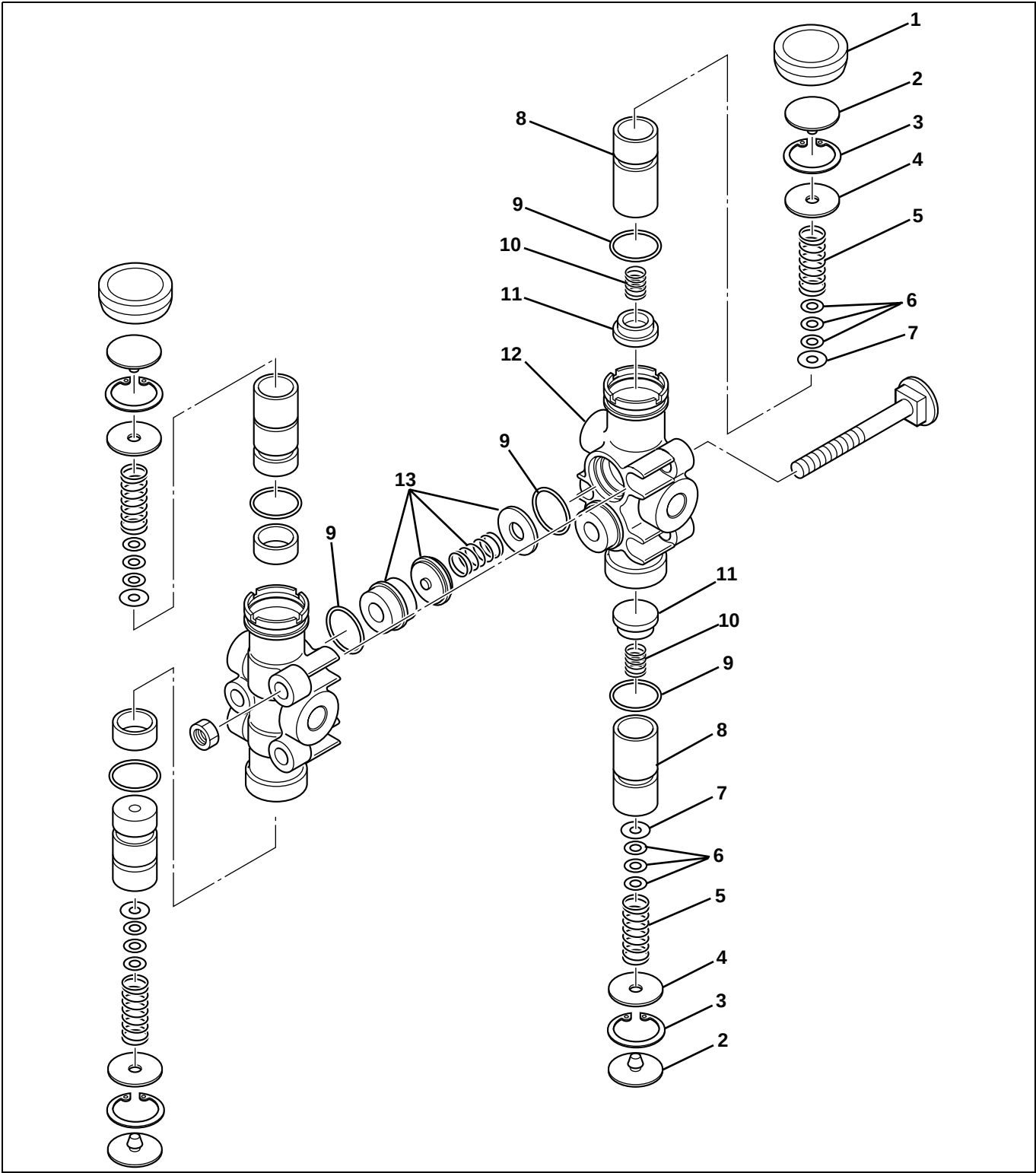


SHTS068020200059

1	Main spring	A	Port 21 (Outlet)
2	Dust cover	B	Port 22 (Outlet)
3	Check valve	C	Port 23 (Outlet)
4	Dust seal rubber	D	Port 24 (Outlet)
5	Piston	E	Inlet port
6	Valve spring	F	No.1 side
		G	Center check valve
		H	No.2 side

COMPONENT LOCATOR

EN0680202D100007



SHTS068020200060

1	Dust cover	6	Shim	11	Valve
2	Dust seal rubber	7	Spacer	12	Body
3	Retainer ring	8	Piston	13	Check valve
4	Dust seal plate	9	O-ring		
5	Main spring	10	Valve spring		

NOTICE

The parts in 3, 9 and 11 are not the ones to be reusable.

OVERHAUL

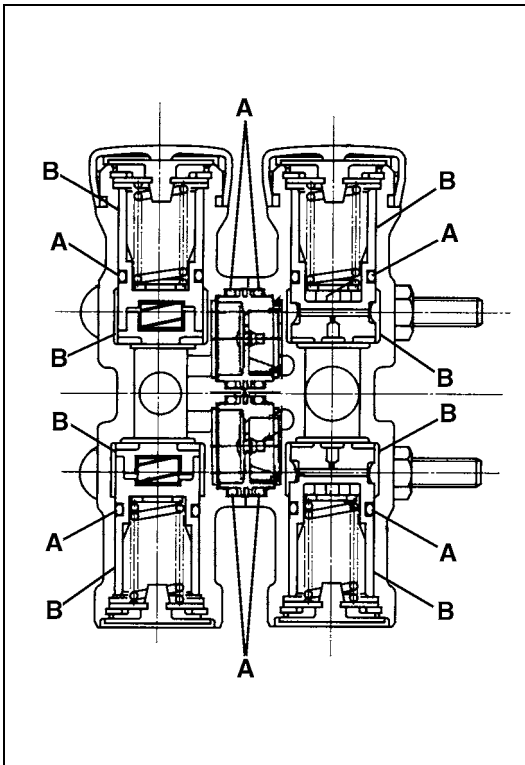
EN0680202H200006

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION

- (1) When assembling the protection valve use the new O-rings and valves.
- (2) Apply the silicone grease on the each sliding surface of the component parts and O-ring groove.

- **A: O-ring**
- **B: Sliding surface**



SHTS068020200061

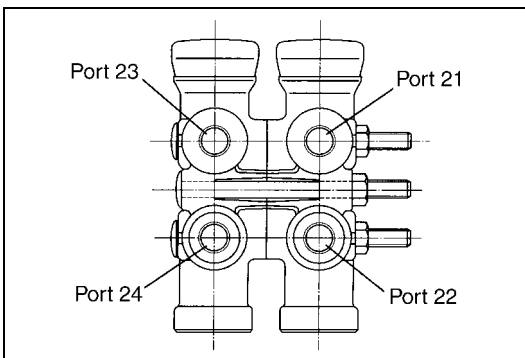
ADJUSTMENT

EN0680202H300008

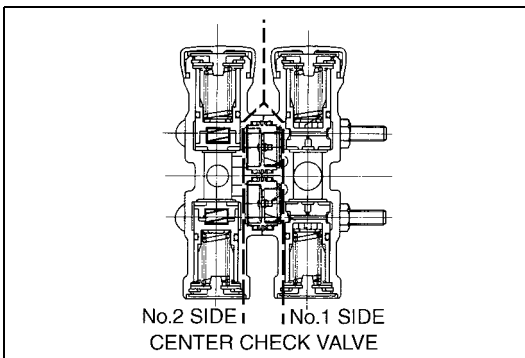
AIR LEAKAGE

1. CHECK VALVE

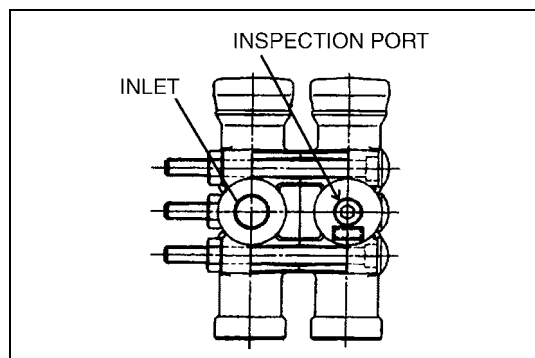
- (1) By-pass check valve at No.1 side.
 - a. Confirm no leakage of air at inlet port, when applying air pressure 49 kPa {0.5 kgf/cm², 7.11 lbf/in.²} and 392 kPa {4 kgf/cm², 56.89 lbf/in.²} from outlet port No.21 and No.22.
- (2) Center check valve
 - a. Confirm no leakage of air at the outlet port No.21 and No.22, when applying air pressure 49 kPa {0.5 kgf/cm², 7.11 lbf/in.²} and 980 kPa {10 kgf/cm², 142 lbf/in.²} from the inspection port.



SHTS068020200062



SHTS068020200063



SHTS068020200064

- (3) Check valve at No.2 side
- a. Confirm no leakage of air at the inspection port, when applying air pressure 49 kPa {0.5 kgf/cm², 7.11 lbf/in.²} and 980 kPa {10 kgf/cm², 142 lbf/in.²} from the outlet port No.23 and No.24.

2. OTHER AIR TIGHTNESS

- (1) When applying air pressure 0-980 kPa {0-10 kgf/cm², 0-142 lbf/in.²}, confirm that any leakage of air should be 0 cm³/min.

PERFORMANCE CHARACTERISTIC

1. OPENING VALVE PRESSURE

- (1) No.1 side
- a. Releasing the compressed air at the outlet port No.21 and No.22 to air, when applying the compressed air at the speed specified below, confirm that air pressure of the compressed air, saturated at the inlet should be of opening valve pressure, which should be 620-660 kPa {6.3-6.7 kgf/cm², 89.61-95.29 lbf/in.²}.
Charging speed: From 295 kPa {3.0 kgf/cm², 42.66 lbf/in.²} to 490 kPa {5.0 kgf/cm², 71.10 lbf/in.²} within 3-7 seconds.
- (2) No.2 side
- a. When applying air at charging speed specified below from the inlet side under air pressure "0" at the outlet port No.23 and No.24, confirm that a pressure at the inspection port when it starting to go up at the outlet should be of opening valve pressure, which should be 570-610 kPa {5.8-6.2 kgf/cm², 82.49-88.18 lbf/in.²}.

	Opening valve pressure
Port No.23	620-660 kPa {6.3-6.7 kgf/cm ² , 89.61-95.29 lbf/in. ² }
Port No.24	570-610 kPa {5.8-6.2 kgf/cm ² , 82.67-88.47 lbf/in. ² }

Charging speed: From 295 kPa {3.0 kgf/cm², 42.66 lbf/in.²} to 490 kPa {5.0 kgf/cm², 71.10 lbf/in.²} within 8-22 seconds.

2. CLOSING VALVE PRESSURE

- (1) When discharging air through respective No.1 side and No.2 side inlet under a pressure of 980kPa {10 kgf/cm², 142 lbf/in.²} at the inlet and the outlet, at discharging speed specified below, confirm that a pressure when the pressures saturated should be of closing valve pressure, which should be 440-480 kPa {4.5-4.8 kgf/cm², 64.01-68.27 lbf/in.²} (Port No.21, 22 and 24), and 490-530 kPa {5.0-5.4 kgf/cm², 71.07-76.87 lbf/in.²} (Port No.23).
Discharging speed: From 590 kPa {6.0 kgf/cm², 85.32 lbf/in.²} to 295 kPa {3.0 kgf/cm², 42.66 lbf/in.²} within less than 3 seconds.

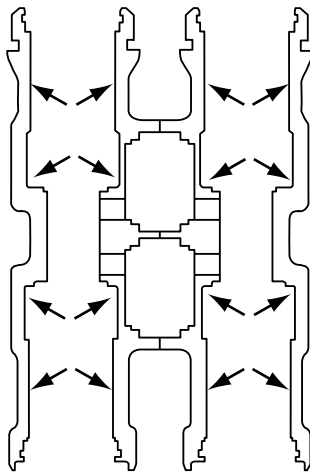
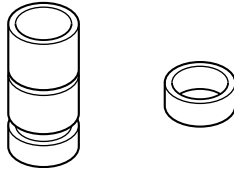
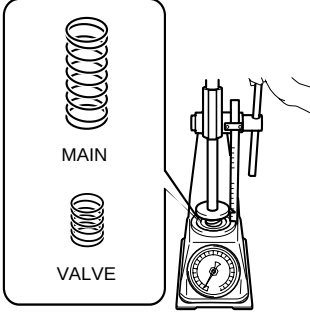
NOTICE

- Perform test again by increasing sims, when the respective pressures is low and by decreasing it when high in the above inspection.
- After inspecting, make sure to tighten the inspection port securely.

INSPECTION AND REPAIR

EN0680202H300009

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Sliding surface and contact surface of body: Wear and damage	—	—	Replace, if necessary.	Visual check 
Sliding surface and contact surface of valve seat and piston: Wear and damage	—	—	Replace, if necessary.	Visual check 
Main spring and valve spring: Free length/ Setting length/ Setting load Crack, rust and damage	Main spring (Port 21, 22, 24): 42.4 {1.67}/ 27.5 {1.08}/ 158.9 N {16.2 kgf, 35.72 lbf}	137.3 N {14.0 kgf, 30.87 lbf} (Setting load)	Replace, if necessary.	Measure and Visual check 
	Main spring (Port 23): 35.3 {1.39}/ 27.5 {1.08}/ 169.7 N {17.3 kgf, 38.15 lbf}			
	Valve spring: 20.0 {0.79}/ 9.0 {0.35}/ 0.78 N {0.08 kgf, 0.175 lbf}	0.69 N {0.07 kgf, 0.155 lbf} (Setting load)		

QUICK RELEASE VALVE

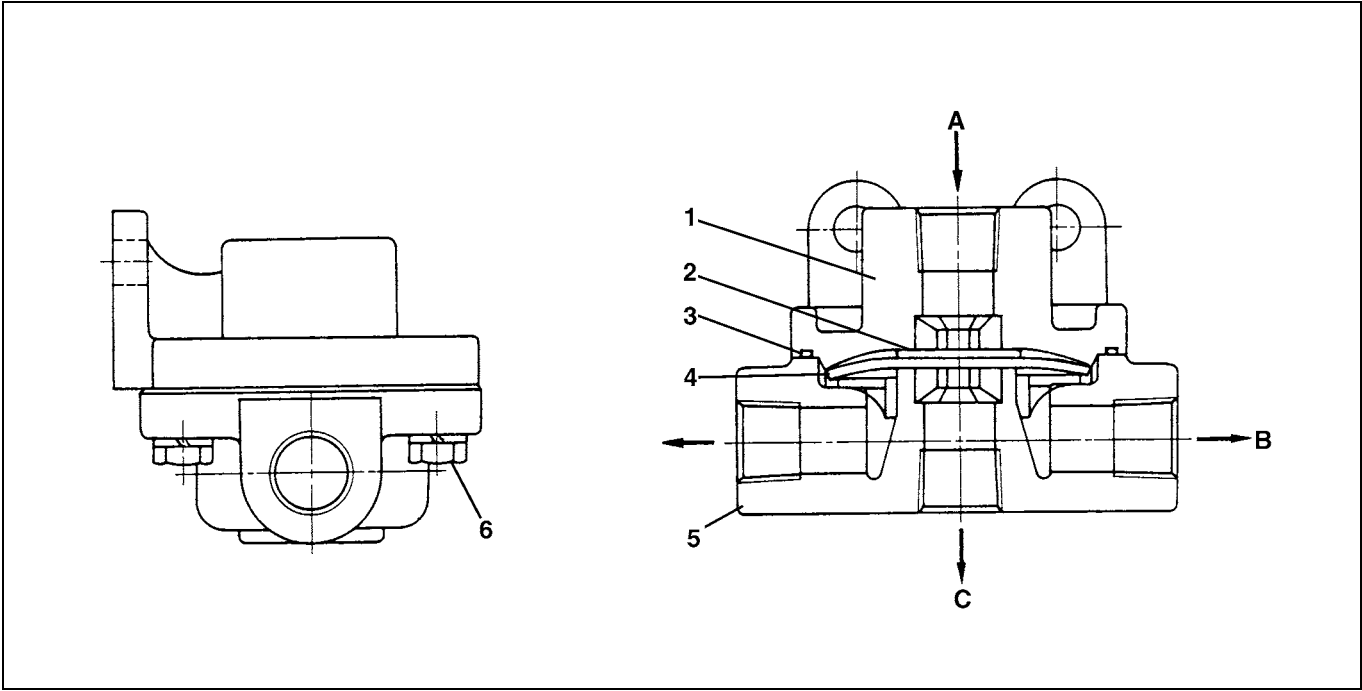
DATA AND SPECIFICATION

EN0680202I200008

Type	Diaphragm type
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DESCRIPTION

EN0680202C100009

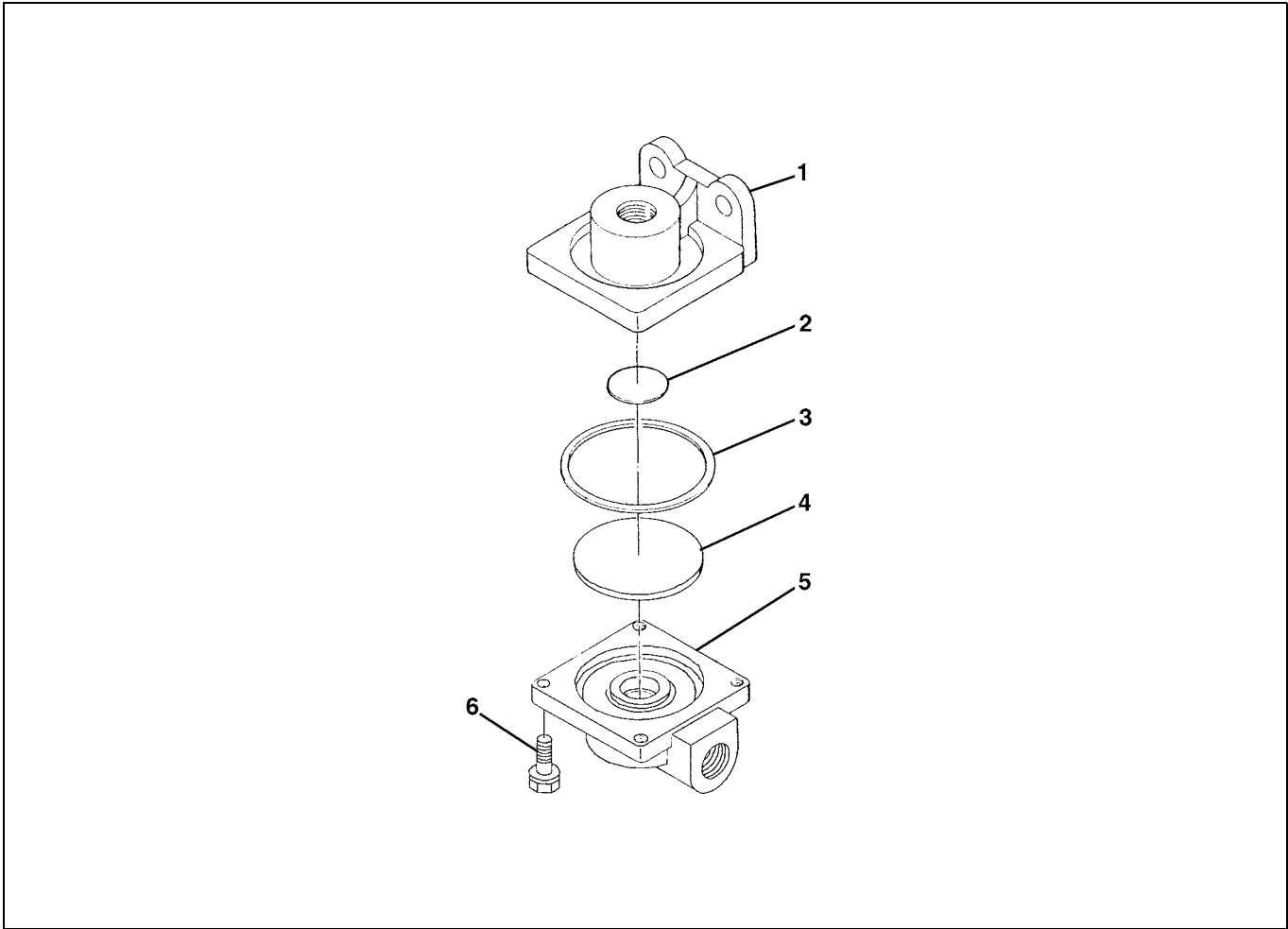


SHTS068020200068

1	Cover	6	Bolt
2	Filter	A	Inlet
3	Gasket	B	Outlet
4	Diaphragm	C	Exhaust
5	Valve body		

COMPONENT LOCATOR

EN0680202D100008

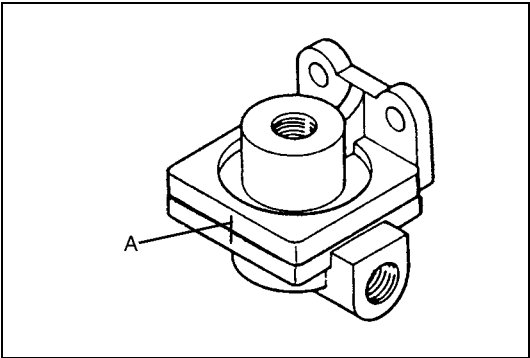


SHTS068020200069

1	Cover	4	Diaphragm
2	Filter	5	Valve body
3	Gasket	6	Bolt

OVERHAUL

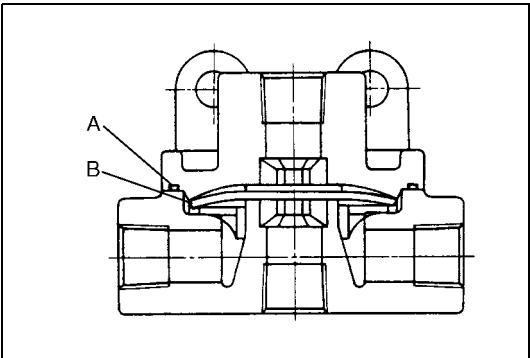
EN0680202H200007



SHTS068020200070

IMPORTANT POINT - DISASSEMBLY

NOTICE
Before disassemble the relay valve apply the aligning mark "A" for the cover and valve body.



SHTS068020200071

IMPORTANT POINT - ASSEMBLY

1. **ASSEMBLE THE RELAY VALVE.**
- (1) When assembly the relay valve, use the new diaphragm and gas-ket.
 - **A: Gasket**
 - **B: Diaphragm**
 - (2) Coincide the aligning mark "A" which were applied at disassem-bly.

INSPECTION AND REPAIR

EN0680202H300010

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve body and cover surface: Rust and damage	—	—	Replace, if necessary.	Visual check

LOAD SENSING VALVE

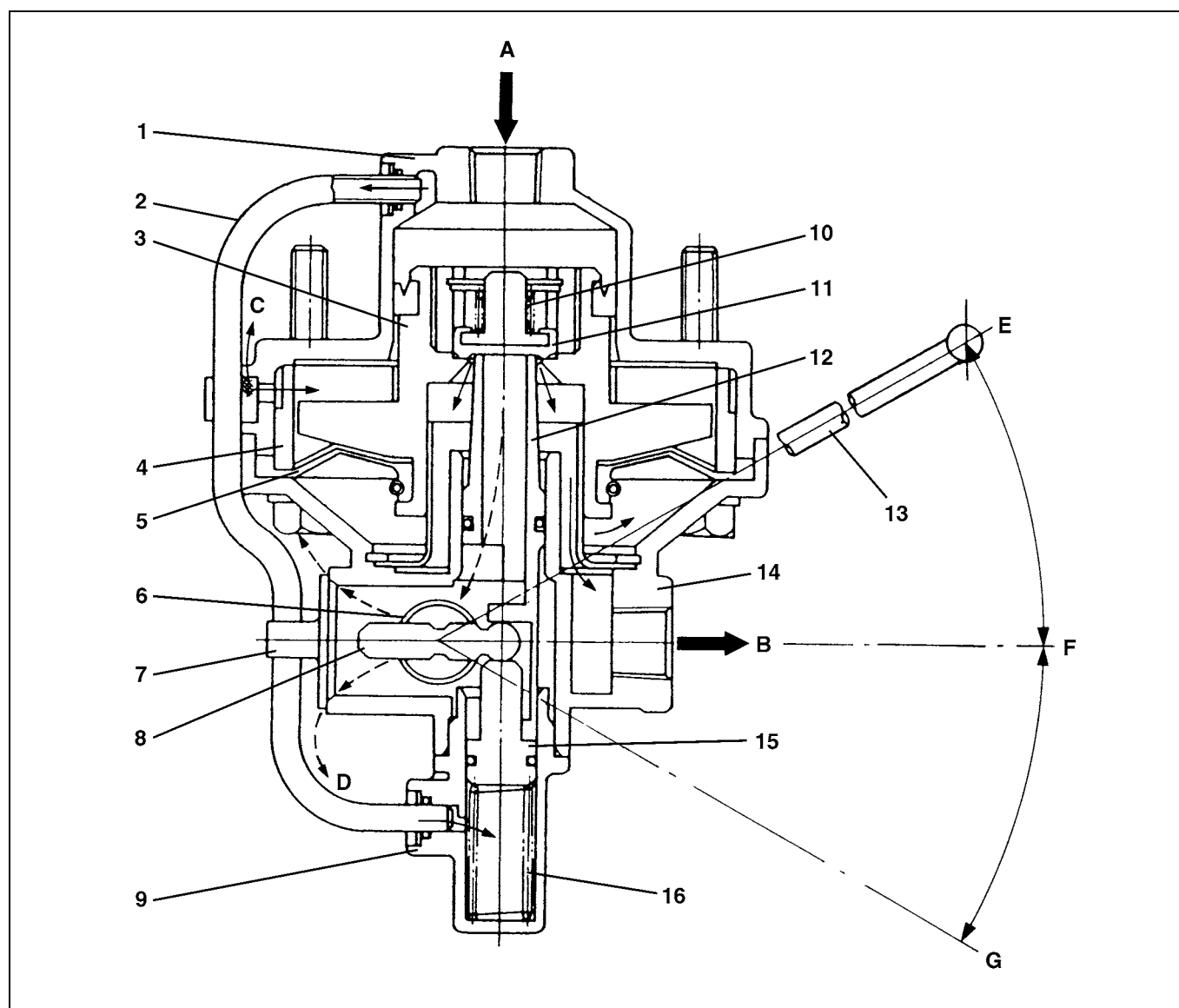
DATA AND SPECIFICATION

EN0680202I200009

Type	Piston with diaphragm type
------	----------------------------

DESCRIPTION

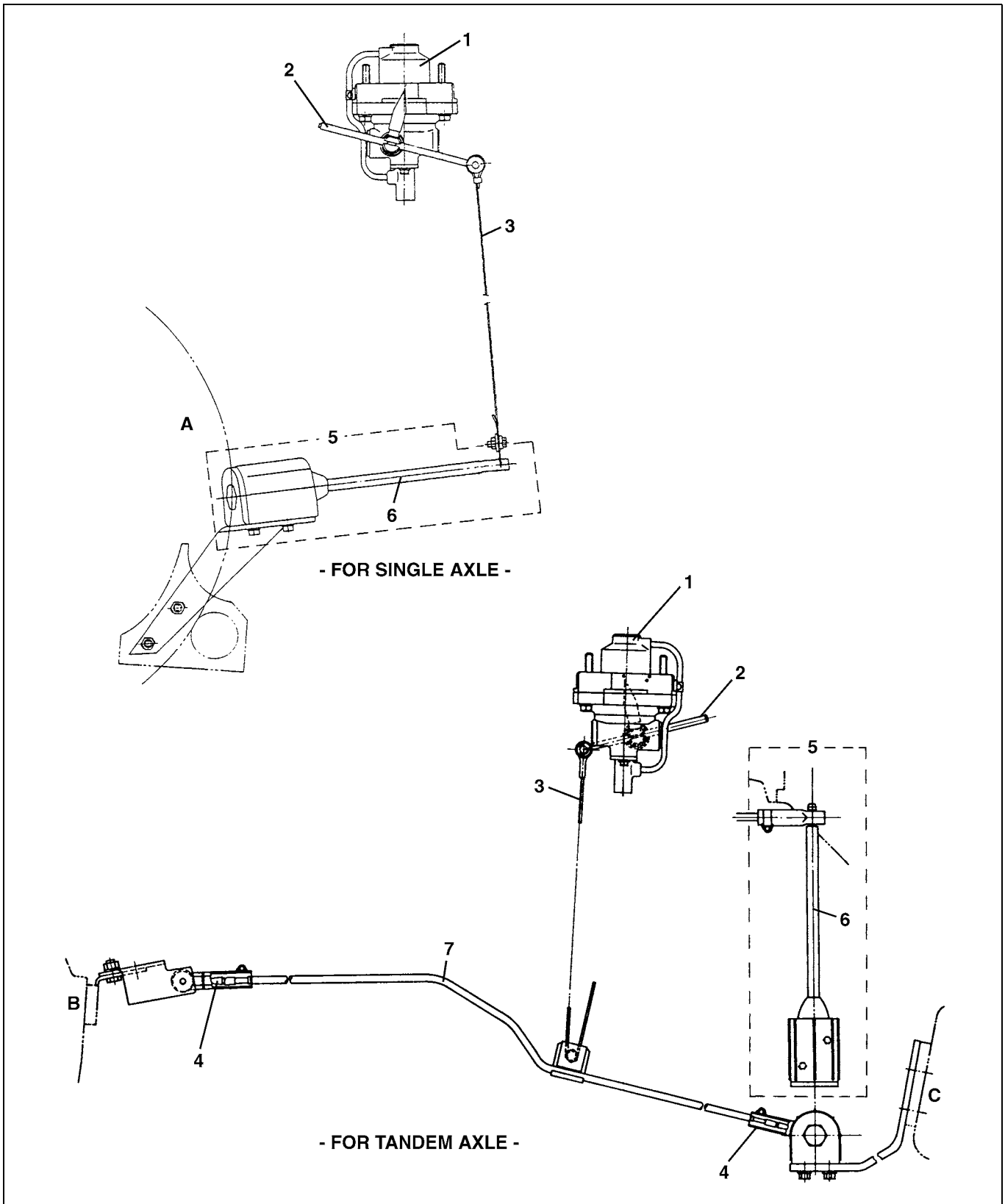
EN0680202C100010

LOAD SENSING VALVE

SHTS068020200073

1	Cover	13	Operating arm
2	Air pipe	14	Body
3	Piston	15	Plunger return piston
4	Diaphragm guide	16	Plunger spring
5	Diaphragm	A	Inlet (From Brake valve)
6	Connecting rod	B	Outlet (To Relay valve)
7	Check valve (Exhaust)	C	Breathing
8	Cam	D	Exhaust
9	Cap	E	MAX.
10	Valve spring	F	Half
11	Valve	G	MIN.
12	Plunger		

LINKAGE



SHTS068020200074

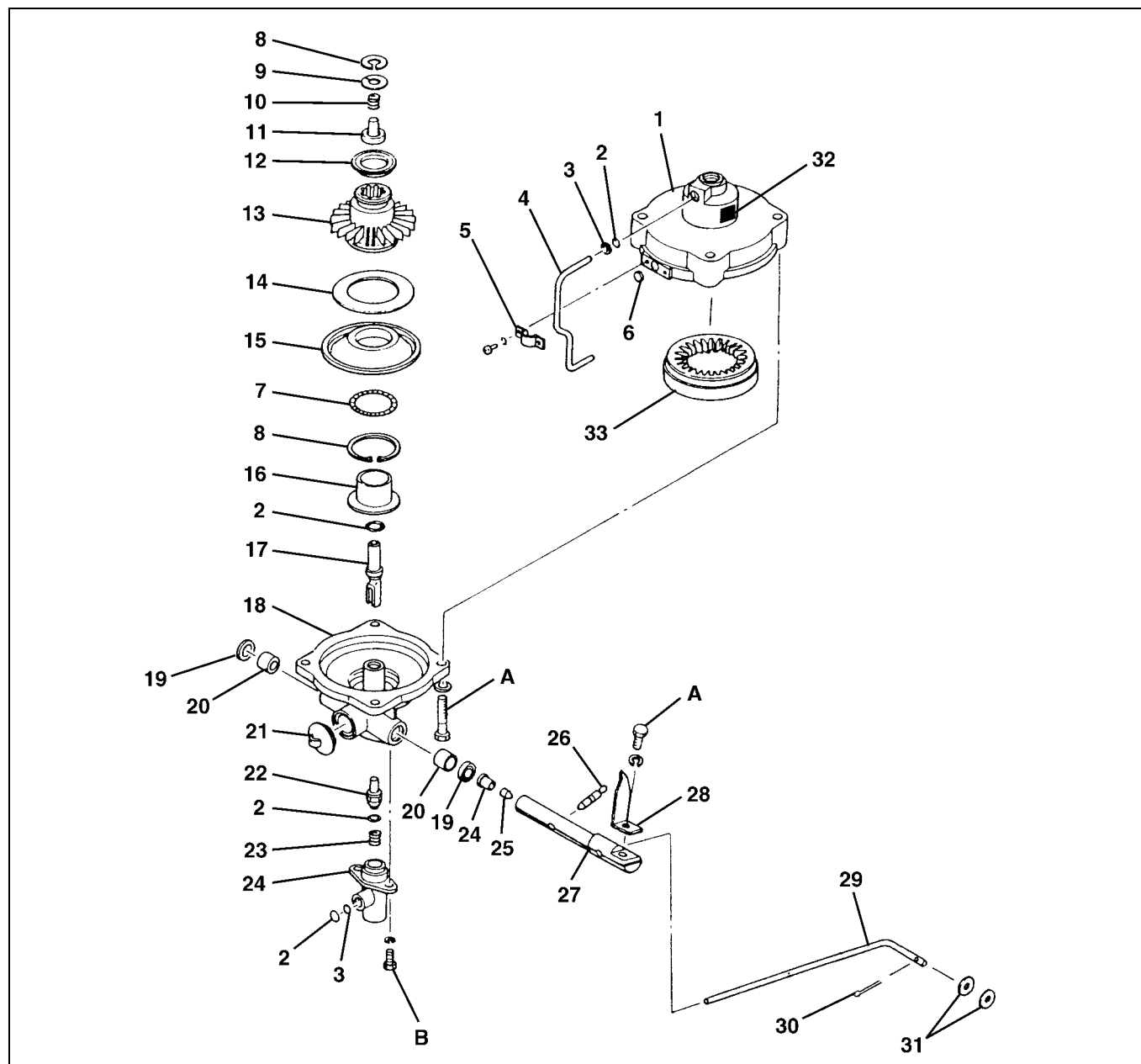
- 1 Load sensing valve
- 2 Operating arm
- 3 Adjuster
- 4 Holder
- 5 Damper assembly

- 6 Connecting rod
- 7 Push rod
- A Rear axle
- B Rear-front axle
- C Rear-rear axle

COMPONENT LOCATOR

EN0680202D100009

LOAD SENSING VALVE



SHTS068020200075

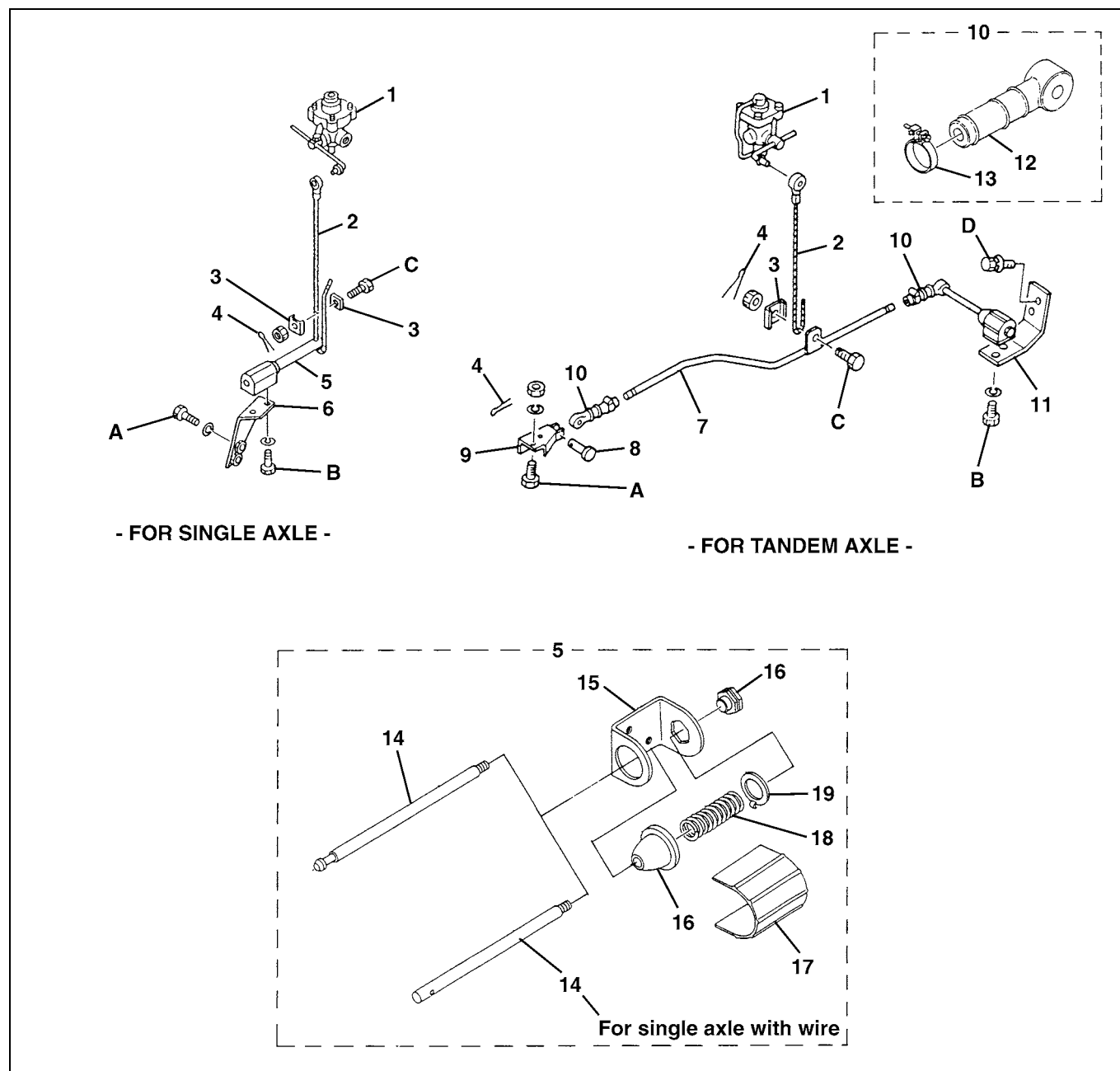
1 Cover	12 Piston seal	23 Plunger spring
2 O-ring	13 Piston	24 Cap
3 O-ring retainer	14 Diaphragm protector	25 Hexagonal socket screw
4 Air pipe	15 Diaphragm	26 Cam
5 Pipe retainer	16 Piston guide	27 Connecting rod
6 Filter	17 Plunger	28 Indicator
7 Diaphragm retainer	18 Body	29 Operating arm
8 Retainer ring	19 Oil seal	30 Cotter pin
9 Spring seat	20 Bushing	31 Washer
10 Valve spring	21 Check valve (Exhaust)	32 Valve No. plate
11 Valve	22 Plunger return piston	33 Diaphragm guide

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A	7.8-9.8 {80-100, 5.76-7.22}	B	3.4-4.9 {35-50, 2.51-3.61}
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LINKAGE



SHTS068020200076

1 Load sensing valve	8 Pin	15 Supporter
2 Adjuster (Wire type)	9 Bracket (To Rear-front axle)	16 Spring seat
3 Lock plate	10 Holder assembly	17 Cover
4 Cotter pin	11 Bracket (To Rear-rear axle)	18 Spring
5 Damper assembly	12 Connector	19 Retainer
6 Bracket (To Rear axle)	13 Clamp band	
7 Push rod	14 Connecting rod	

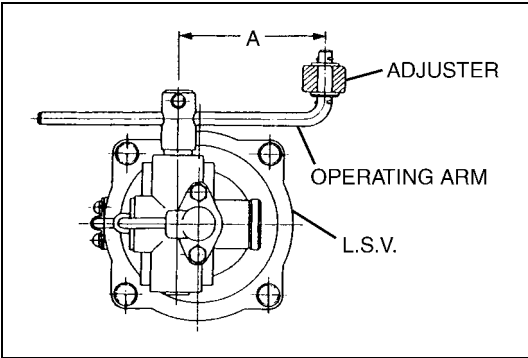
Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 35.3-52.0 {360-530, 27-38}	C 19.6-39.2 {200-400, 15-28}
B 17.7-26.5 {180-270, 14-19}	D 62.8-91.2 {640-930, 47-67}

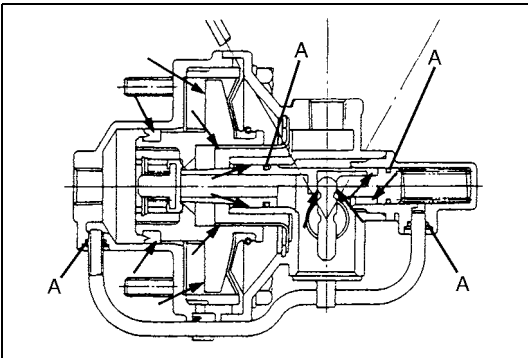
OVERHAUL

EN0680202H200008



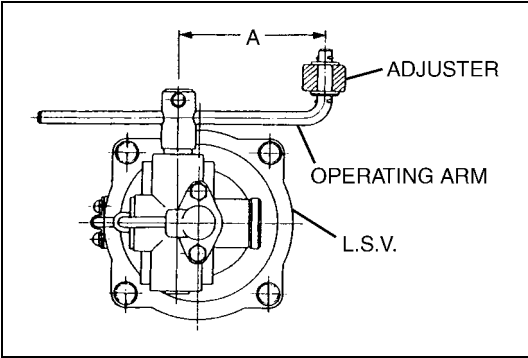
IMPORTANT POINT - DISASSEMBLY

1. REMOVE THE OPERATING ARM.
- (1) Measure and record the fixing length A of the operating arm before removing.



IMPORTANT POINTS - ASSEMBLY

1. LUBRICATION
- (1) When reassembling the L.S.V. replace all rubber parts (Piston seal, Valves, Diaphragm, Dust seals and O-rings) with new ones.
- (2) Apply lithium grease to each sliding surface of the components parts and the O-ring groove.
- A: O-ring
- *L.S.V.: Load sensing valve



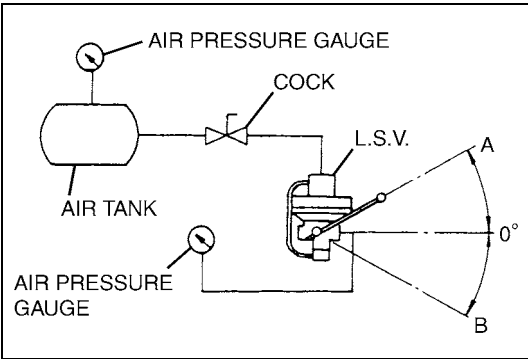
2. ASSEMBLE THE OPERATING ARM.
- (1) Set the dimension "A" of operating arm to the original length or according to table below.

Unit: mm {in.}

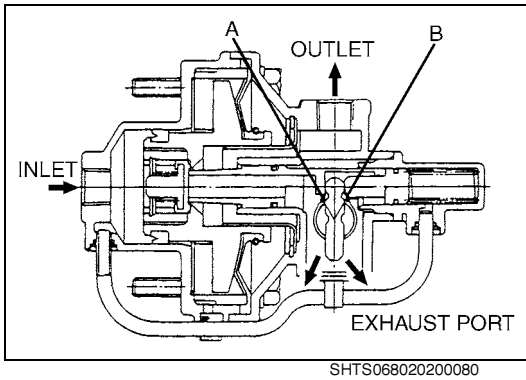
Valve No.	47640-1280	47640-1080
A	84-86 {3.307-3.385}	59-61 {2.323-2.401}

NOTICE

Valve No. is indicated on the cover.



3. INSPECTION OF THE LOAD SENSING VALVE
- (1) Connect the L.S.V., nylon tube, air pressure gauge and air tank as shown in the figure.



- (2) Set operating arm to the "A" position and close the outlet port; then hold a charge with air at a pressure of 686 kPa {7.0 kgf/cm², 99.541 lbf/in.²} into the inlet port.
Let the operating arm swing over the entire range.
At this time, check for air leak by applying soapy water around the body and pipe joint.

Valve No.	47640-1280	47640-1080
A	+30°	+15°
B	-30°	-15°

NOTICE

Valve No. is indicated on the cover.

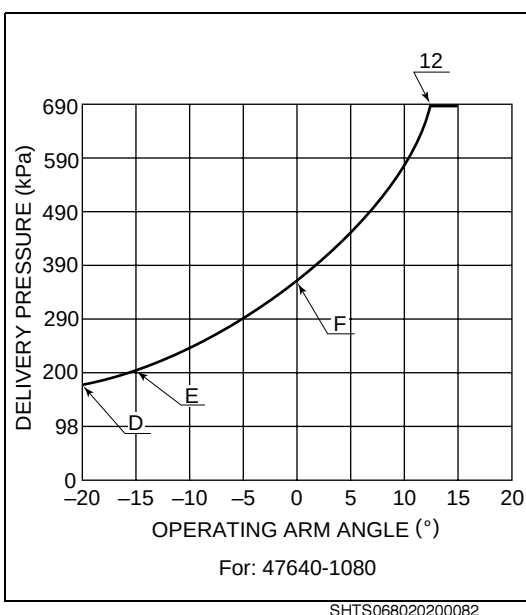
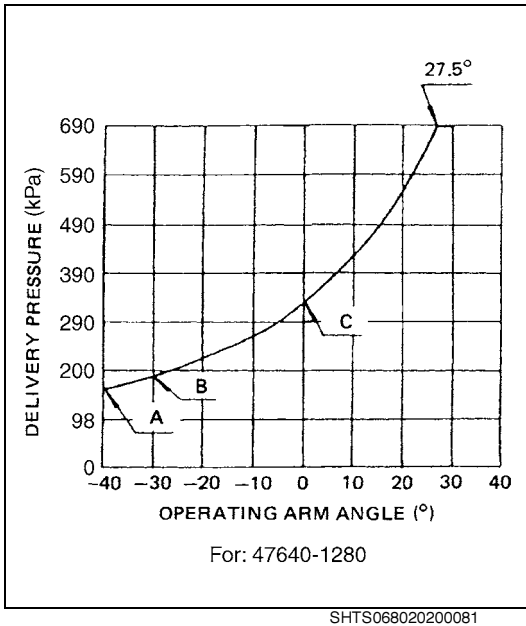
- (3) Set the air tank pressure at 686 kPa {7.0 kgf/cm², 99.54 lbf/in.²}, fix the angle of the operating arm as specified below, and measure the pressure on the outlet port when compressed air is supplied to the inlet port by using of the cock.
(4) For your information, the relation between angle of the operating arm and pressure on the outlet port is shown in the adjacent diagrams.

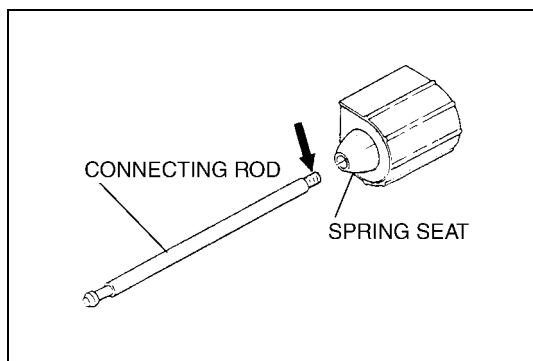
Unit: kPa {kgf/cm², lbf/in.²}

Valve No.	Operating arm angle	Rated pressure on outlet port
47640-1020 47640-1280	+30°	686 {7.0, 99.50}
	0°	C: 301-359 {3.1-3.6, 43.66-52.06}
	-30°	B: 170-210 {1.8-2.1, 24.66-30.45}
	-40°	A: 150-190 {1.6-1.9, 21.76-27.55}
47640-1080	+15°	686 {7.0, 99.50}
	0°	F: 321-379 {3.3-3.8, 46.56-54.96}
	-15°	E: 190-230 {2.0-2.3, 27.56-33.35}
	-20°	D: 160-200 {1.7-2.0, 23.21-29.00}

NOTICE

Valve No. is indicated on the cover.

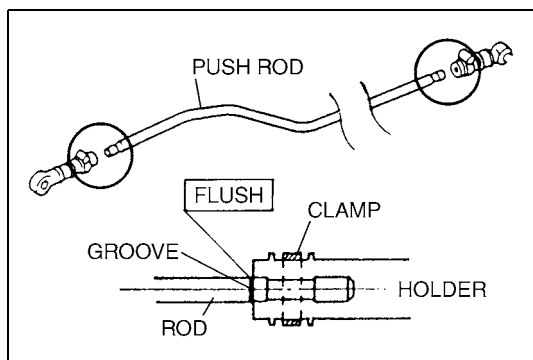




SHTS068020200083

4. DAMPER ASSEMBLY

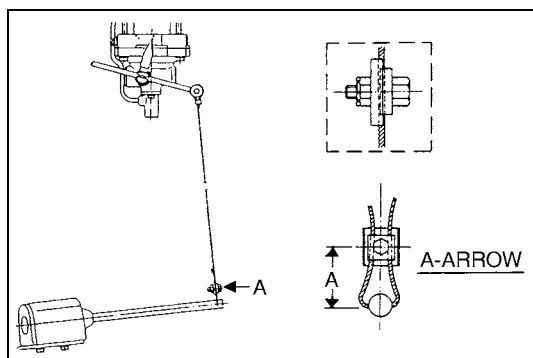
- (1) Before installing the connecting rod to the spring seat, apply the lock agent to the threads of the rod.



SHTS068020200084

5. PUSH ROD AND HOLDER ASSEMBLY (For tandem axle)

- (1) When assembling the push rod and holder assembly, insert the push rod ends to the connectors so that the groove on the push rod and connector end will be flush as shown in the figure.
- (2) Clamp band should be placed as shown in the figure.

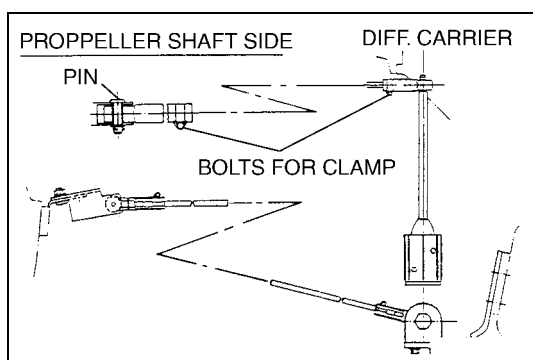


SHTS068020200085

IMPORTANT POINTS - MOUNTING

1. ADJUSTER (For single axle)

- (1) Position of the lock plate:
After connection the operating arm of the L.S.V., adjust the adjuster (wire) on the connecting rod then lock the wire as shown in the figure.
A = 60 mm {2.36 in.}



SHTS068020200086

2. PUSH ROD WITH HOLDER ASSEMBLY (For tandem axle)

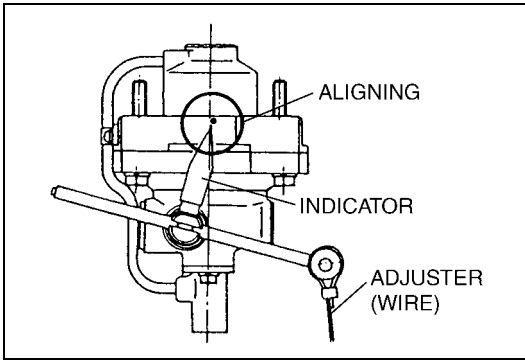
- (1) Position of bolt for clamp band:
Set the clamp bands so that the bolts for clamp bands will be on opposite sides of the propeller shaft and differential carrier.
- (2) Inserting direction of the pin:
Connect the pin to the push rod as shown in the figure.

ADJUSTMENT

EN0680202H300011

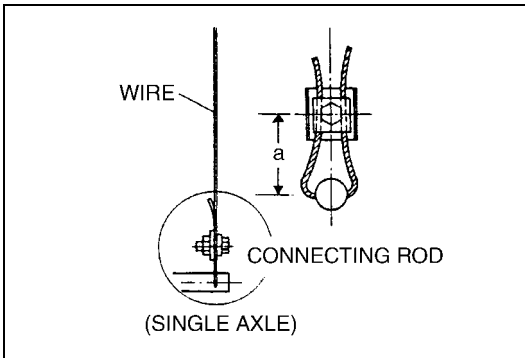
1. ADJUSTER

- (1) With the vehicle unloaded, adjust the length of the wire to align the indicator of the L.S.V. with the mark "•".

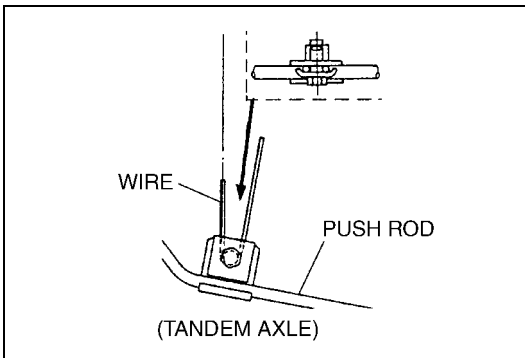


SHTS068020200087

- (2) Lock the wire as shown in the figure.
a = 60 mm {2.36 in.}



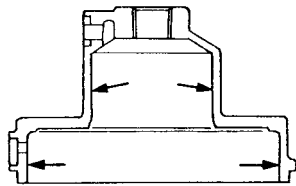
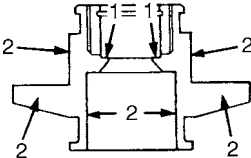
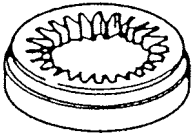
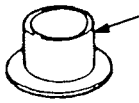
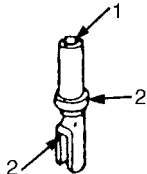
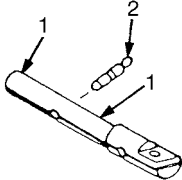
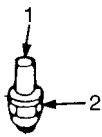
SHTS068020200088

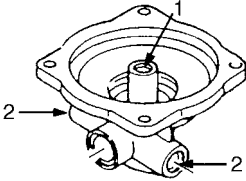
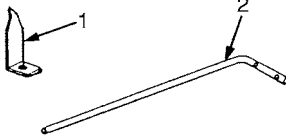
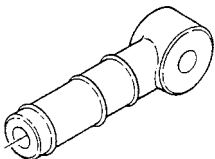
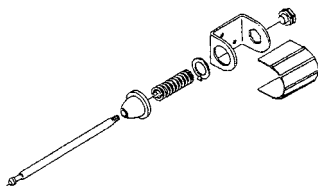
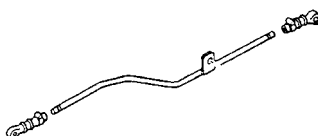


SHTS068020200089

INSPECTION AND REPAIR

EN0680202H300012

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Inner surface of cover: Wear, damage and rust	—	—	Replace, if necessary.	Visual check 
Valve contact surface 1 and friction surface 2 of piston: Wear and damage	—	—	Replace, if necessary.	Visual check 
Friction surface of dia- phragm guide: Wear and damage	—	—	Replace, if necessary.	Visual check 
Friction surface of piston guide: Wear, damage and rust	—	—	Clean or replace.	Visual check 
Valve contact surface 1 and friction surface 2 of plunger: Wear, damage and rust	—	—	Clean or replace, if necessary.	Visual check 
Friction surface of rod 1 and cam 2: Wear, damage and rust	—	—	Clean or replace, if necessary.	Visual check 
Valve contact surface 1 and friction surface 2 of plunger return piston: Wear, damage and rust	—	—	Clean or replace, if necessary.	Visual check 
Valve spring and plunger spring: Elastic distortion and damage	—	—	Replace, if necessary.	Visual check 

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Friction surface of body 1 and bushing: Wear, damage and rust	—	—	Clean or replace, if necessary.	Visual check 
Friction surface of cap: Wear, damage and rust	—	—	Clean or replace, if necessary.	Visual check 
Indicator 1, Operating arm 2: Deformation	—	—	Repair or replace.	Visual check 
Connector: Deterioration and damage	—	—	Replace, if necessary.	Visual check 
Components of damper: Deformation and damage	—	—	Replace, if necessary.	Visual check 
Push rod assembly (Tandem axle): Deformation	—	—	Replace, if necessary.	Visual check 

SPRING BRAKE CONTROL VALVE (TYPE-A)

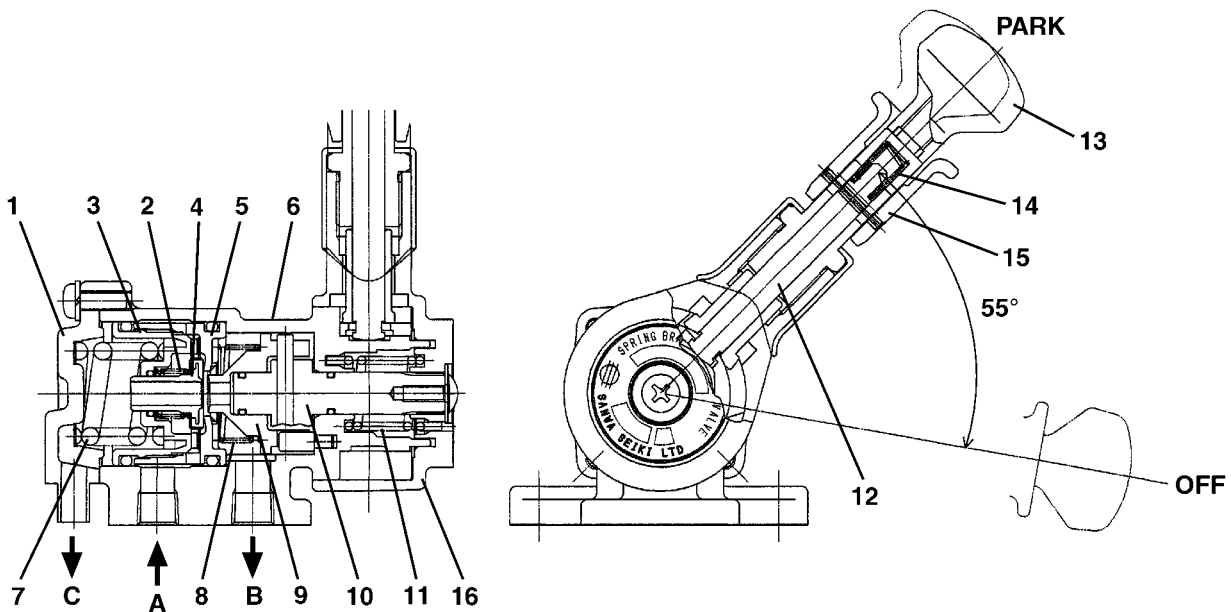
DATA AND SPECIFICATIONS

EN0680202I200010

Type	Variable pressure control type
Outlet pressure difference between parking and releasing stroke at a specified lever angle	Within 147 kPa {1.5 kgf/cm ² , 21.32 lbf/in. ² }

DESCRIPTION

EN0680202C100011

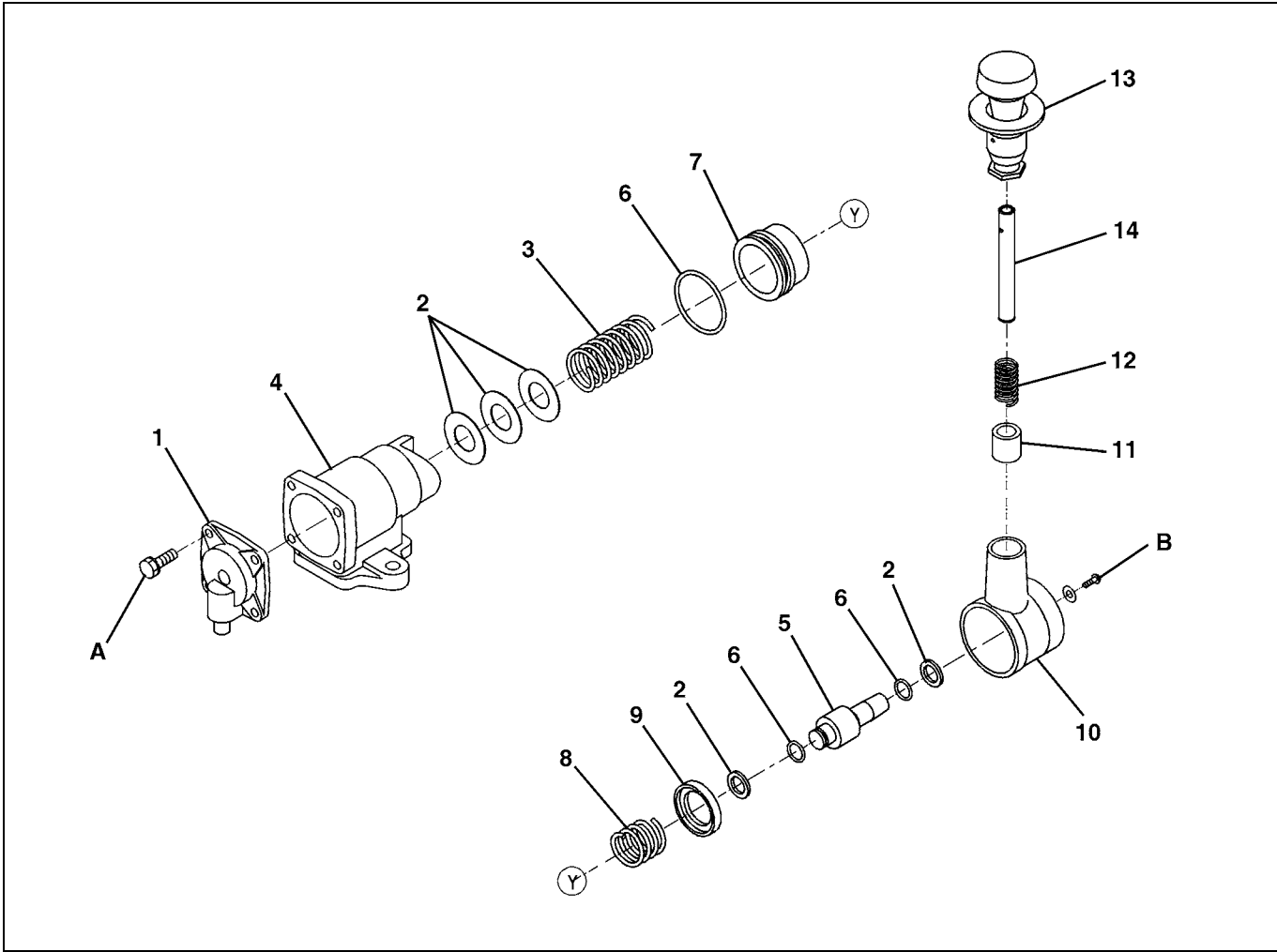


SHTS068020200104

1	Body cover	11	Handle return spring
2	Feed valve spring	12	Pull rod
3	Piston	13	Knob
4	Feed valve	14	Compression spring
5	Valve seat	15	Release knob
6	Valve body	16	Handle body
7	Piston spring	A	Inlet
8	Valve spring	B	Outlet
9	Cam	C	Exhaust (PARK)
10	Cam holder		

COMPONENT LOCATOR

EN0680202D100010



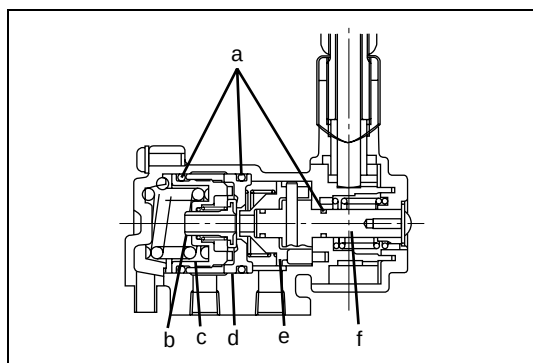
SHTS068020200105

1	Body cover	8	Valve spring
2	Shim	9	Valve seat
3	Piston spring	10	Handle body
4	Valve body	11	Stopper
5	Cam holder	12	Compression spring
6	O-ring	13	Knob sub assembly
7	Piston sub assembly	14	Pull rod

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	5.4-7.4 {55-75, 4.0-5.4}	B	3.4-4.9 {35-50, 2.6-3.6}

OVERHAUL

EN0680202H200009



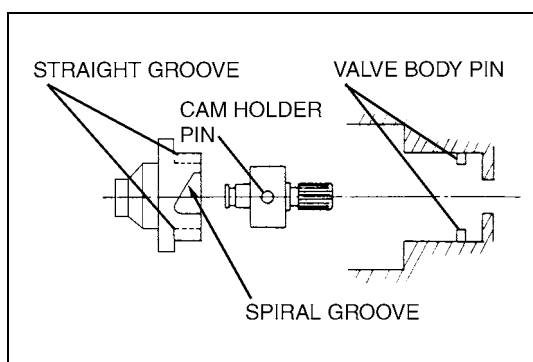
SHTS068020200106

IMPORTANT POINTS - ASSEMBLY

1. LUBRICATION

- (1) When assembling the spring brake control valve, replace the feed valve, valve seats and O-rings.
- (2) Apply silicone grease to each sliding surface of the assembly parts, O-rings and O-ring grooves.

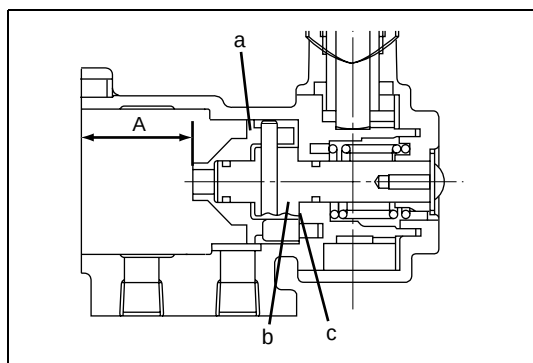
- a. O-ring
- b. Feed valve
- c. Piston
- d. Valve seat
- e. Cam
- f. Cam holder



SHTS068020200107

2. ASSEMBLE THE CAM ASSEMBLY.

- (1) When assembling the cam and cam holder, make sure that the cam holder pin and spiral groove of the cam are aligned.
- (2) When installing the cam assembly to the valve body, the valve body pin and straight groove of the cam must be aligned.

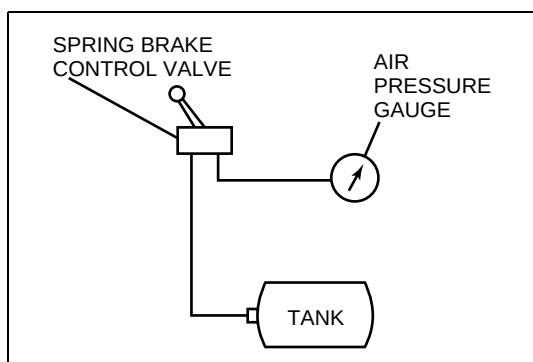


SHTS068020200108

- (3) Adjust dimension "A" with the shim.

Assembly standard: 33.8-34.2 mm {1.331-1.346 in.}

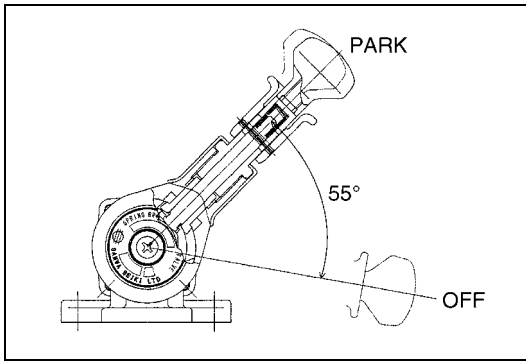
- a. Cam
- b. Cam holder
- c. Shim



SHTS068020200109

3. SPRING BRAKE CONTROL VALVE PERFORMANCE TEST

- (1) First, connect the pressure gauge to the outlet line and apply an air pressure of 980 kPa {10.0 kgf/cm², 142 lbf/in.²} to the inlet line.



SHTS068020200110

- (2) Move the spring brake control lever towards the OFF position, gradually and confirm that the air pressure in the outlet line meets the characteristic shown in figure.

Standard:

Handle angle: Outlet pressure: kPa {kgf/cm², lbf/in.²}

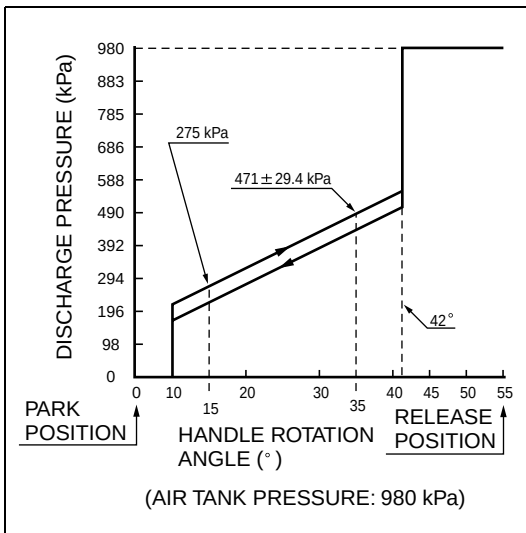
15° 275 {2.8, 39.9}

35° 441.6-500.4 {4.5-5.1, 64.0-72.6}

Over 42° 980 {10.0, 142}

NOTICE

The characteristic shown is under the inlet pressure of 480 kPa {10.0 kgf/cm², 142 lbf/in.²}.



SHTS068020200111

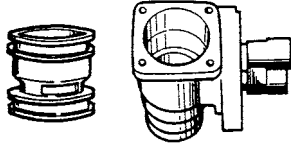
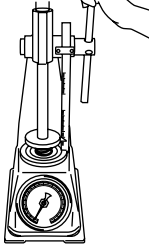
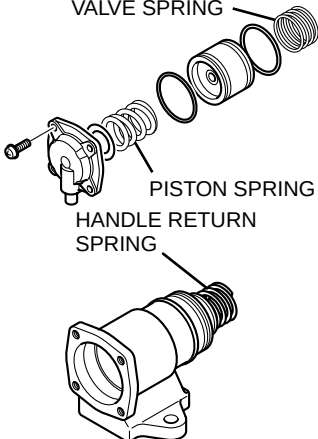
- (3) Confirm the following functions.

- The control handle is locked at PARK position.
- The control handle automatically turn to OFF position when the lever is released at PARK position.

INSPECTION AND REPAIR

EN0680202H300013

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Piston and valve body: Wear and damage	—	—	Replace, if necessary.	Visual check 
Cam, pin and cam holder: Wear and damage	—	—	Replace, if necessary.	Visual check 
Piston spring, valve spring and handle return spring: Free length/ Setting length/ Setting load Crack, rust and damage	Piston spring 27.9 {1.10}/ 25.0 {0.98}/ 553.1 N {56.4 kgf, 124.34 lbf}	500.1 N {51.0 kgf, 112.43 lbf} (Setting load)	Replace, if necessary.	Measure and visual check  VALVE SPRING  PISTON SPRING HANDLE RETURN SPRING
	Valve spring 19.6 {0.77}/ 10.5 {0.41}/ 19.6 N {2.0 kgf, 4.41 lbf}	17.6 N {1.8 kgf, 3.96 lbf} (Setting load)		
	Handle return spring 19.3 {0.76}/ 13.5 {0.53}/ 7.8 N {0.8 kgf, 1.76 lbf}	6.9 N {0.7 kgf, 1.55 lbf} (Setting load)		
Feed valve spring: Rust and damage	—	—	Replace, if necessary.	Visual check 

SPRING BRAKE CONTROL VALVE (TYPE-B)

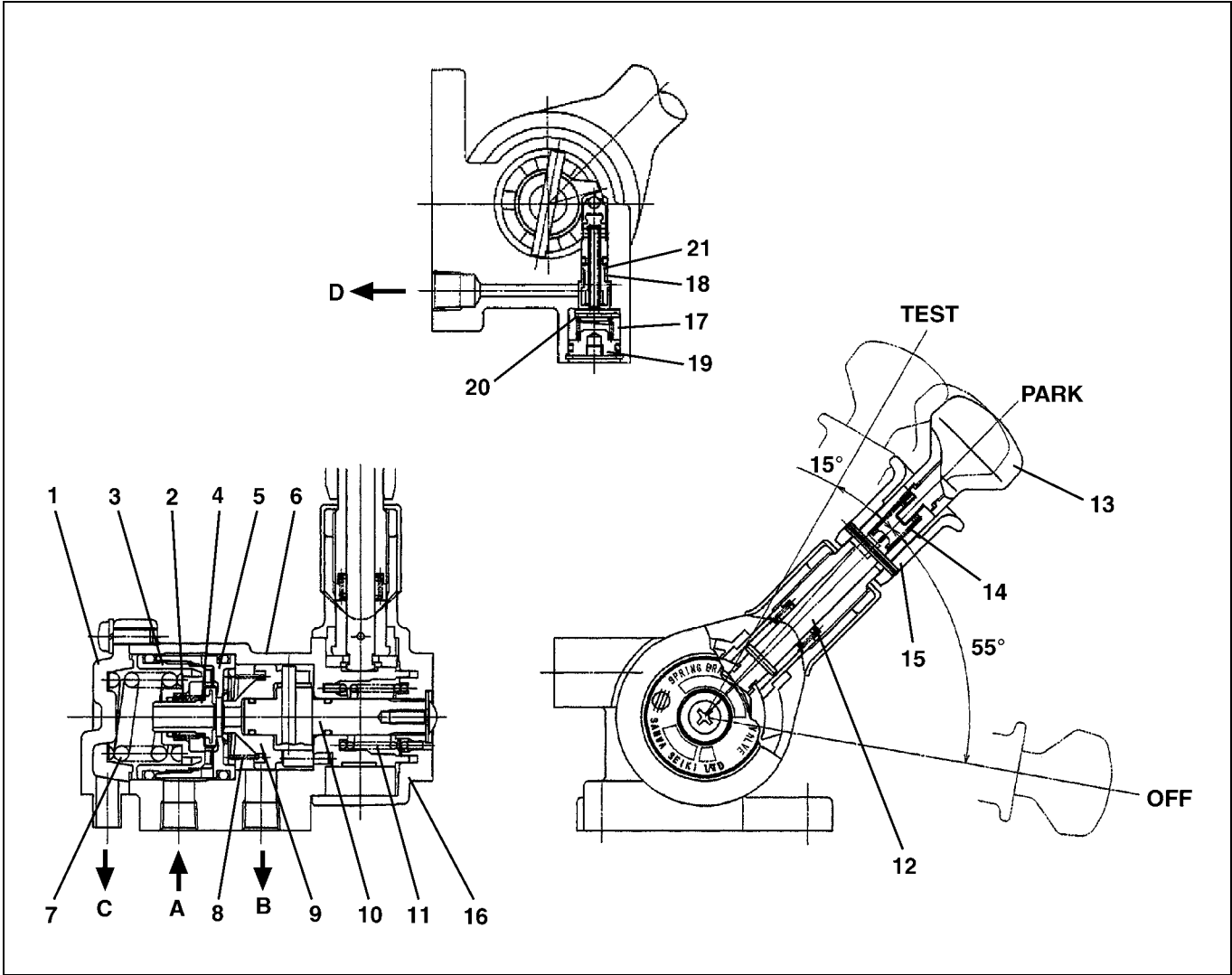
DATA AND SPECIFICATIONS

EN0680202I200011

Type	Variable pressure control type
Outlet pressure difference between parking and releasing stroke at a specified lever angle	Within 196 kPa {2.0 kgf/cm ² , 28.43 lbf/in. ² }

DESCRIPTION

EN0680202C100012

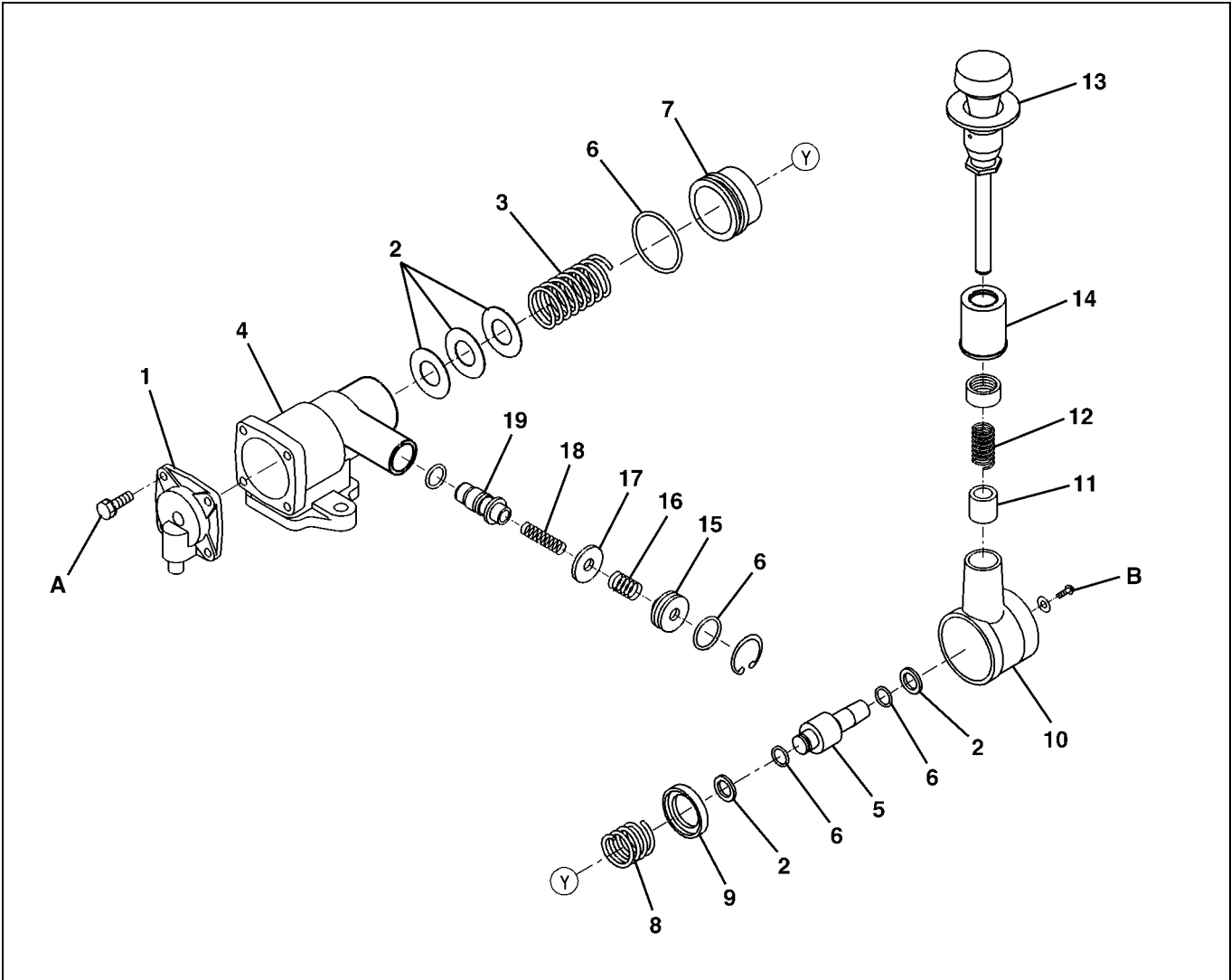


SHTS068020200116

1 Body cover	10 Cam holder	19 Retainer
2 Feed valve spring	11 Handle return spring	20 Feed valve
3 Piston	12 Pull rod	21 Plunger
4 Feed valve	13 Knob	A Inlet
5 Valve seat	14 Compression spring	B Outlet (To spring brake line)
6 Valve body	15 Release knob	C Exhaust (PARK)
7 Piston spring	16 Handle body	D Outlet (To multiple relay valve)
8 Valve spring A	17 Valve spring B	
9 Cam	18 Return spring	

COMPONENT LOCATOR

EN0680202D100011



SHTS068020200117

1	Body cover	11	Stopper
2	Shim	12	Compression spring
3	Piston spring	13	Knob sub-assembly
4	Valve body	14	Pull rod
5	Cam holder	15	Retainer
6	O-ring	16	Valve spring B
7	Piston sub-assembly	17	Feed valve
8	Valve spring A	18	Return spring
9	Valve seat	19	Plunger
10	Handle body		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	5.4-7.4 {55-75, 4.0-5.4}	B	3.4-4.9 {35-50, 2.6-3.6}

OVERHAUL

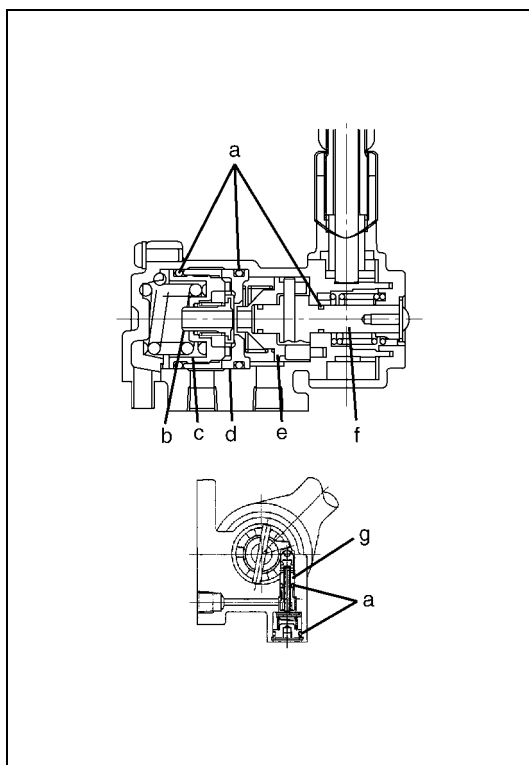
EN0680202H200010

IMPORTANT POINTS - ASSEMBLY

1. LUBRICATION

- (1) When assembling the spring brake control valve, replace the feed valve, valve seats and O-rings.
- (2) Apply silicone grease to each sliding surface of the assembly parts, O-rings and O-ring grooves.

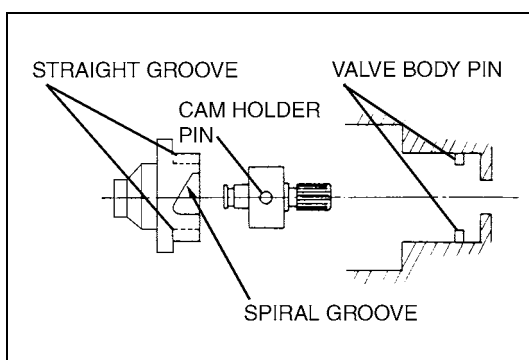
- a. O-ring
- b. Feed valve
- c. Piston
- d. Valve seat
- e. Cam
- f. Cam holder
- g. Plunger



SHTS068020200118

2. ASSEMBLE THE CAM ASSEMBLY.

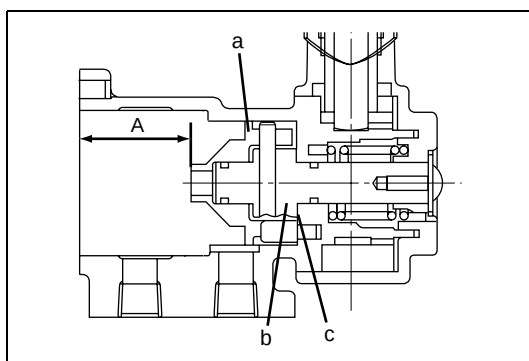
- (1) When assembling the cam and cam holder, make sure that the cam holder pin and spiral groove of the cam are aligned.
- (2) When installing the cam assembly to the valve body, the valve body pin and straight groove of the cam must be aligned.



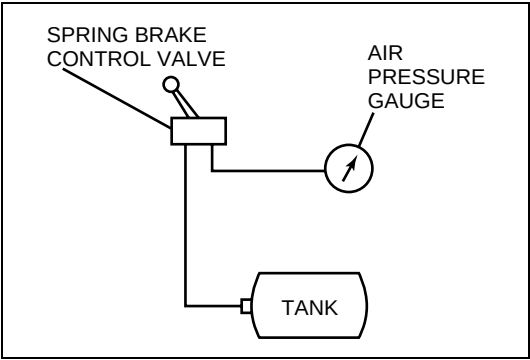
SHTS068020200119

- (3) Adjust dimension "A" with the shim.
Assembly standard: 33.8-34.2 mm {1.331-1.346 in.}

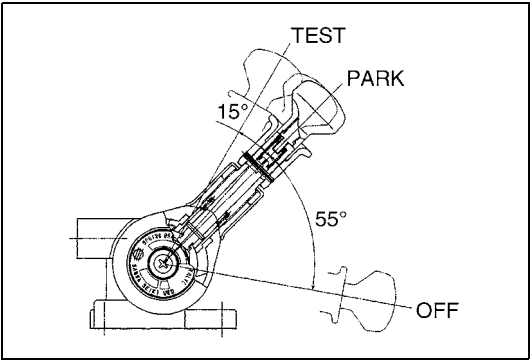
- a. Cam
- b. Cam holder
- c. Shim



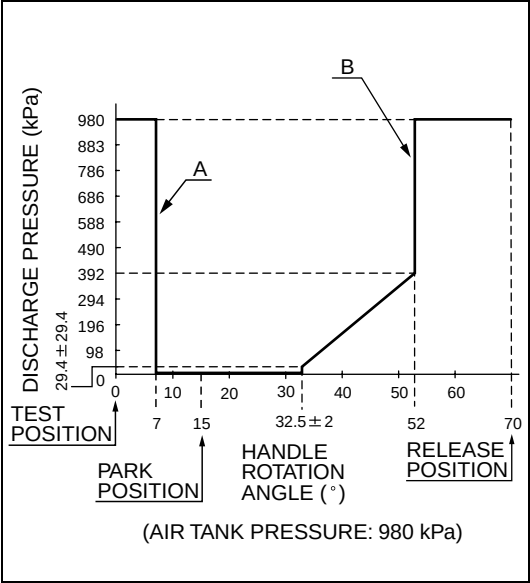
SHTS068020200108



SHTS068020200109



SHTS068020200120



SHTS068020200121

3. SPRING BRAKE CONTROL VALVE PERFORMANCE TEST

- (1) First, connect the pressure gauge to the outlet line and apply an air pressure of 980 kPa {10.0 kgf/cm², 142 lbf/in.²} to the inlet line.
- (2) Move the spring brake control handle towards the OFF position, gradually and confirm that the air pressure in the outlet line meets the characteristic shown in figure below.

NOTICE

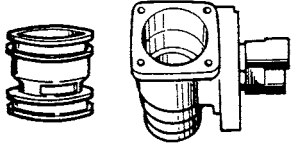
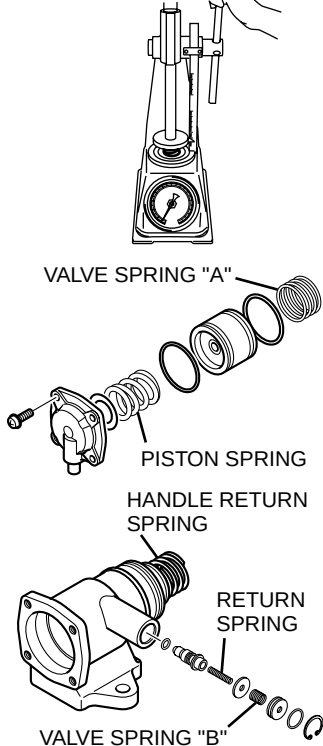
The characteristic shown is under the inlet pressure of 980 kPa {10.0 kgf/cm², 142 lbf/in.²}

- A- Outlet pressure (To multiple relay valve)
 - B- Outlet pressure (To spring brake line and multiple relay valve)
- (3) Confirm the following functions.
 - a. The control handle is locked at PARK position.
 - b. The control handle automatically turn to OFF position when the handle is released PARK position.

INSPECTION AND REPAIR

EN0680202H300014

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Piston and valve body: Wear and damage	—	—	Replace, if necessary.	Visual check 
Cam, pin and cam holder: Wear and damage	—	—	Replace, if necessary.	Visual check 
Piston spring, valve spring, handle return spring: Free length/ Setting length/ Setting load Crack, rust and damage	Piston spring 26.8 {1.06}/ 24.8 {0.98}/ 651.7 N {66.5 kgf, 146.50 lbf} Valve spring A 19.6 {0.77}/ 10.5 {0.41}/ 19.6 N {2.0 kgf, 4.41 lbf} Handle return spring 19.3 {0.76}/ 13.5 {0.53}/ 7.8 N {0.8 kgf, 1.76 lbf} Valve spring B 11.2 {0.44}/ 7.8 {0.31}/ 19.6 N {2.0 kgf, 4.41 lbf} Return spring 32.0 {1.26}/ 29.0 {1.14}/ 9.8 N {1.0 kgf, 2.20 lbf}	588.0 N {60.0 kgf, 132.19 lbf} (Setting load) 17.6 N {1.8 kgf, 3.96 lbf} (Setting load) 6.9 N {0.7 kgf, 1.54 lbf} (Setting load) 18.0 N {1.8 kgf, 4.05 lbf} (Setting load) 8.8 N {0.9 kgf, 1.98 lbf} (Setting load)	Replace, if necessary.	Measure and visual check 
Feed valve spring and valve seat spring: Rust and damage	—	—	Replace, if necessary.	Visual check 

RELAY VALVE (TYPE-A)

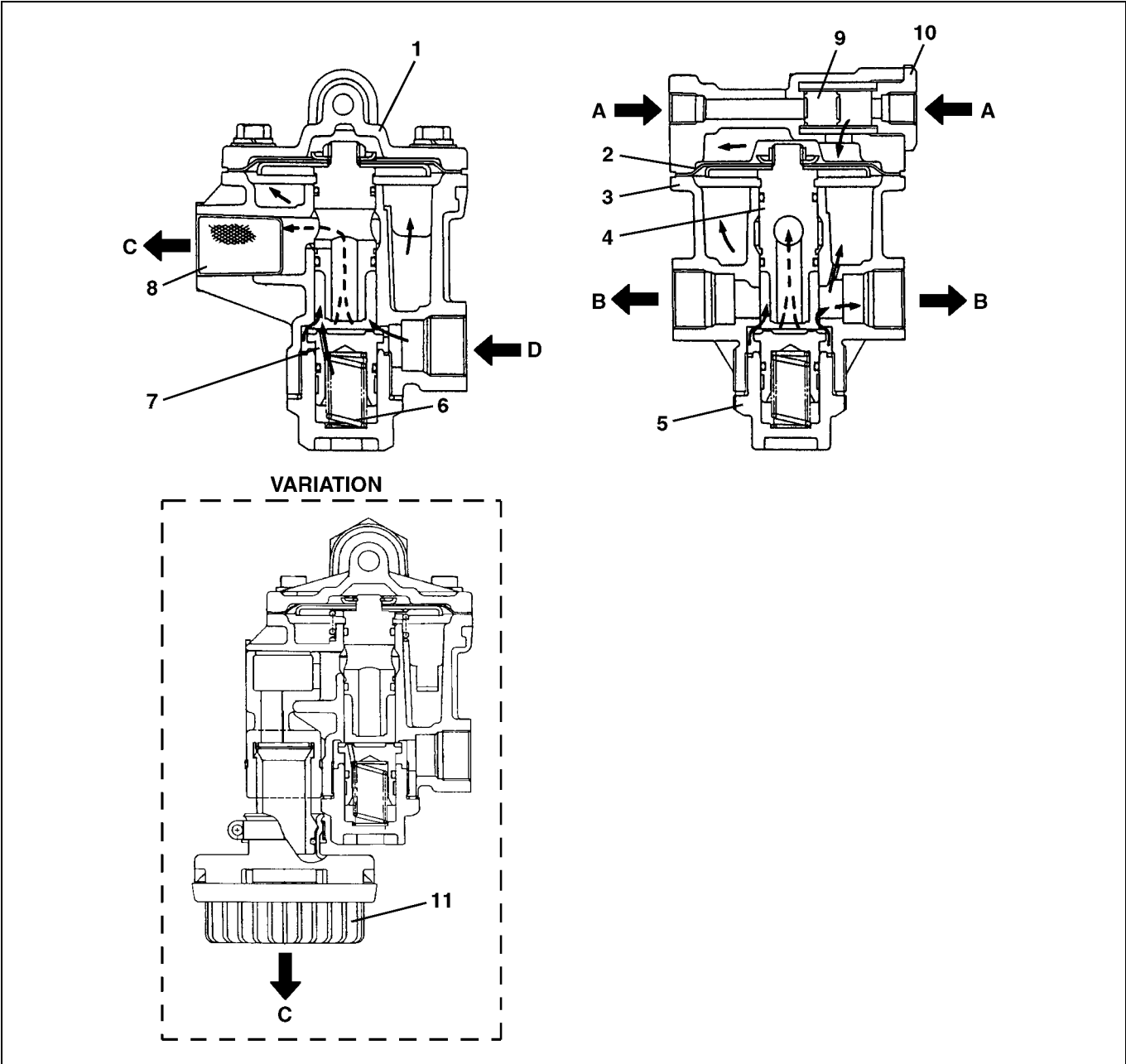
DATA AND SPECIFICATIONS

EN0680202I200012

Type	Diaphragm type with double check valve combined
Pressure difference between signal and outlet pressure	29.4 kPa {0.29 kgf/cm ² , 4.26 lbf/in. ² } or less

DESCRIPTION

EN0680202C100013

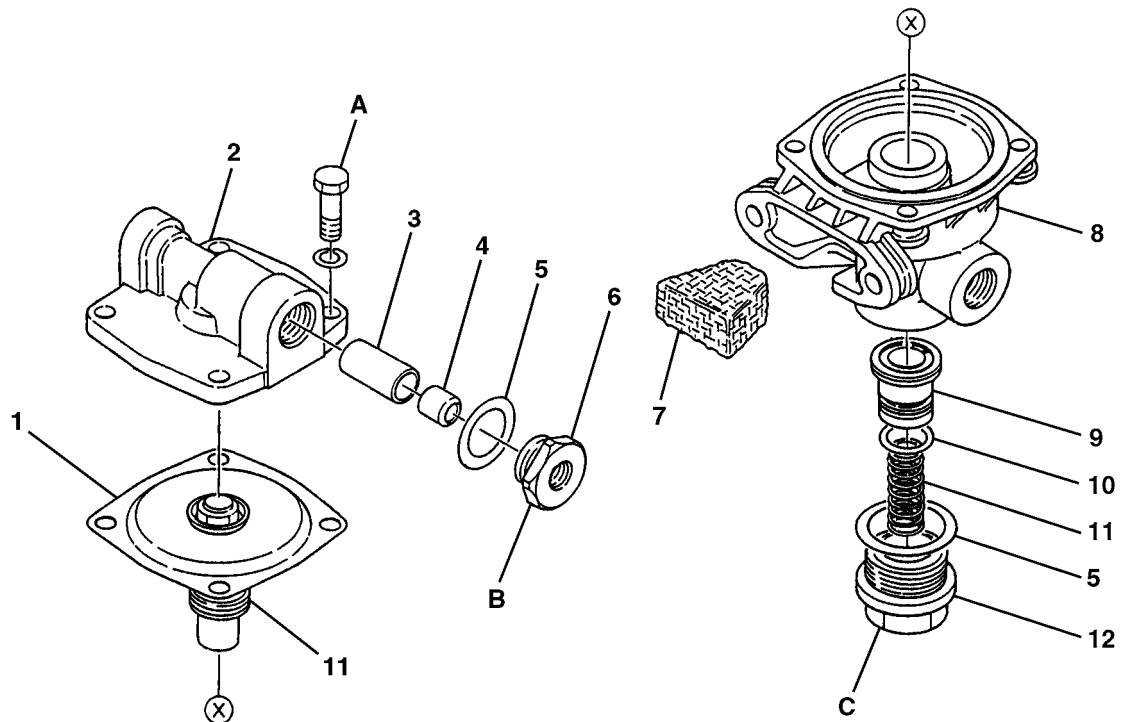


SHTS068020200123

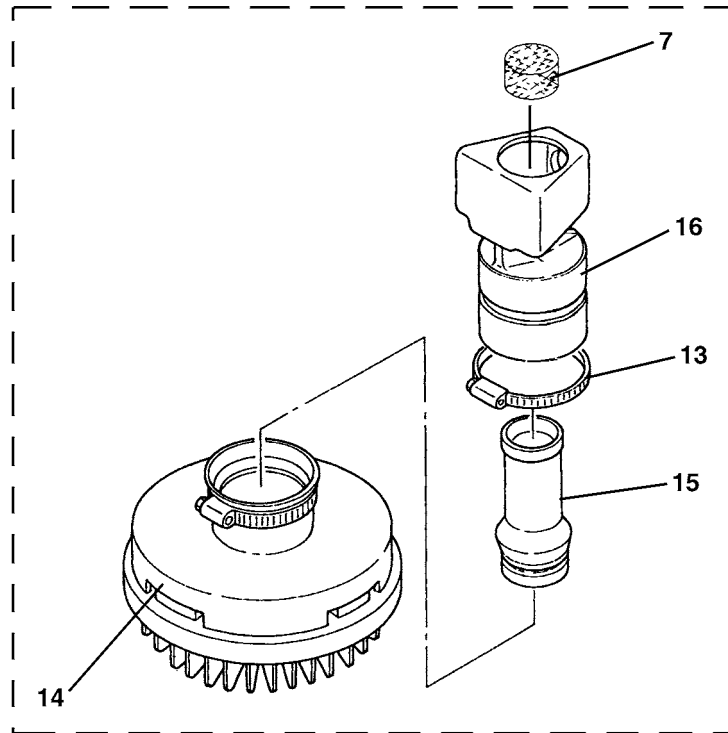
1	Cover	9	Valve
2	Diaphragm	10	Plug
3	Valve body	11	Silencer
4	Valve sub assembly	A	Signal
5	Valve cap	B	Outlet
6	Spring	C	Exhaust
7	Valve	D	Inlet
8	Filter		

COMPONENT LOCATOR

EN0680202D100012



VARIATION



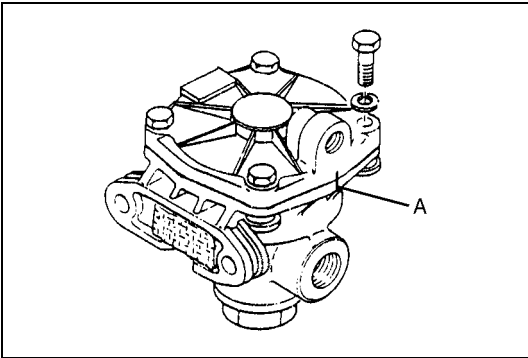
SHTS068020200124

1	Valve sub assembly	9	Valve
2	Cover	10	O-ring
3	Guide	11	Spring
4	Valve	12	Valve cap
5	Gasket	13	Clip
6	Plug	14	Silencer
7	Filter	15	Pipe
8	Valve body	16	Dust cover

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	11.8-14.7 {120-150, 9-10}	C	58.8-78.4 {600-800, 44-57}
B	34.3-44.1 {350-450, 26-32}		

OVERHAUL

EN0680202H200011

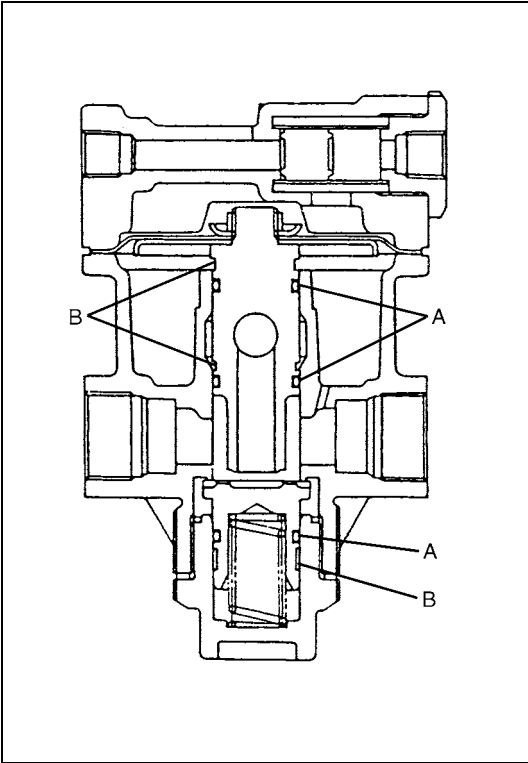


SHTS068020200125

IMPORTANT POINT - DISASSEMBLY

NOTICE

Before disassembling the relay valve, mark the aligning marks "A" on the cover and valve body.



SHTS068020200126

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION

- (1) When assembling the relay valve, use new O-rings and valves.
- (2) Apply the silicone grease to each sliding surface of the component parts and O-ring groove.

A: O-ring

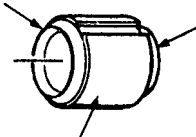
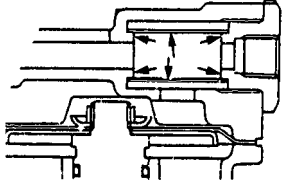
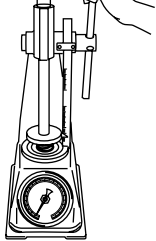
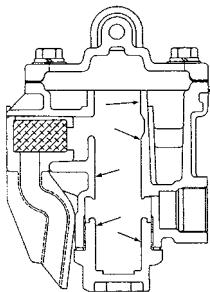
B: Apply the silicone grease

- (3) When installing the cover to the body, align the aligning marks which were applied at disassembly.

INSPECTION AND REPAIR

EN0680202H300015

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Check valve: Wear and damage	—	—	Replace, if necessary.	Visual check 
Cover, guide and plug: Damage, wear and rust	—	—	Clean or replace, if necessary.	Visual check 
Spring: Free length/ Setting length/ Setting load Crack, rust and damage	46 {1.81}/ 30 {1.18}/ 59.3 N {6.05 kgf, 13.33 lbf}	52.0 N {5.30 kgf, 11.69 lbf} (Setting load)	Replace, if necessary.	Measure and Visual check 
Relay valve body and cap sliding surface: Damage, wear and rust	—	—	Clean or replace, if necessary.	Visual check 

RELAY VALVE (TYPE-B)

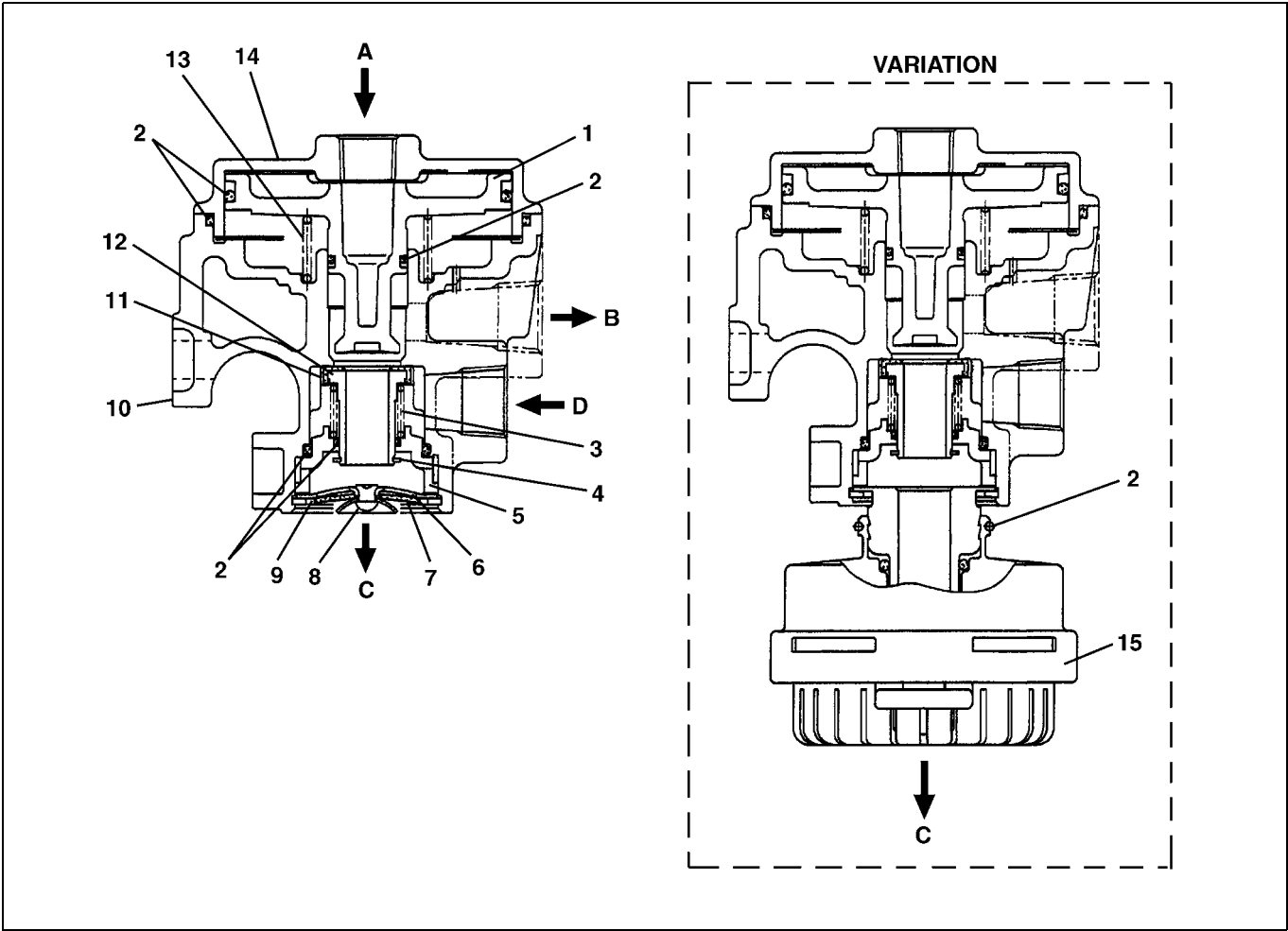
DATA AND SPECIFICATIONS

EN0680202I200013

Type	Diaphragm type with double check valve combined
Pressure difference between signal and outlet pressure	34 kPa {0.34 kgf/cm ² , 4.93 lbf/in. ² } or less (At output pressure is 50 kPa {0.51 kgf/cm ² , 7.25 lbf/in. ² } or more)

DESCRIPTION

EN0680202C100014

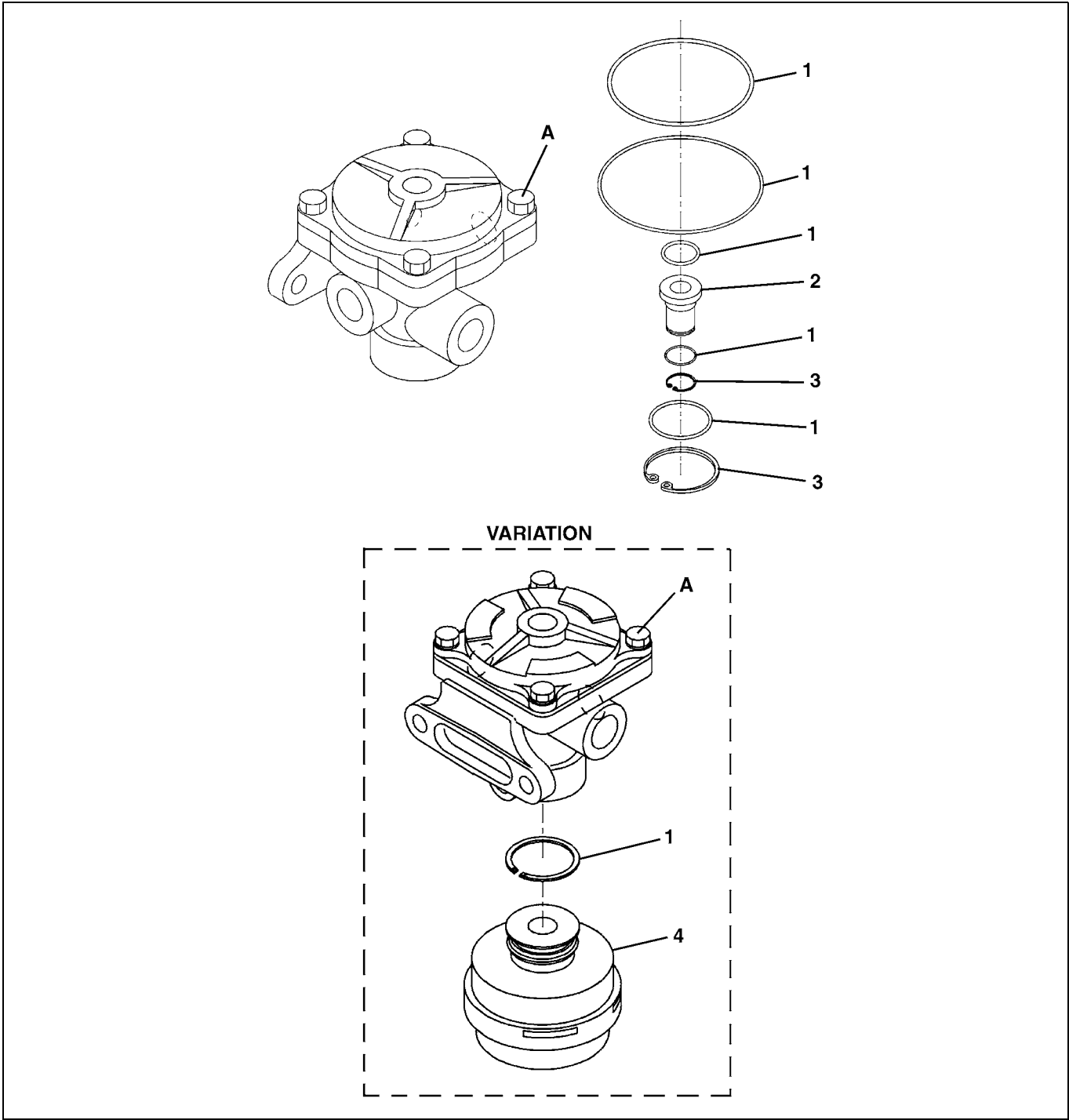


SHTS068020200131

1 Piston	10 Body
2 O-ring	11 Retainer
3 Valve spring	12 Inlet valve
4 Valve retainer	13 Piston spring
5 Valve guide	14 Cover
6 Valve seat	A Signal
7 Exhaust valve	B Outlet
8 Rivet	C Exhaust
9 Retainer ring	D Inlet

COMPONENT LOCATOR

EN0680202D100013



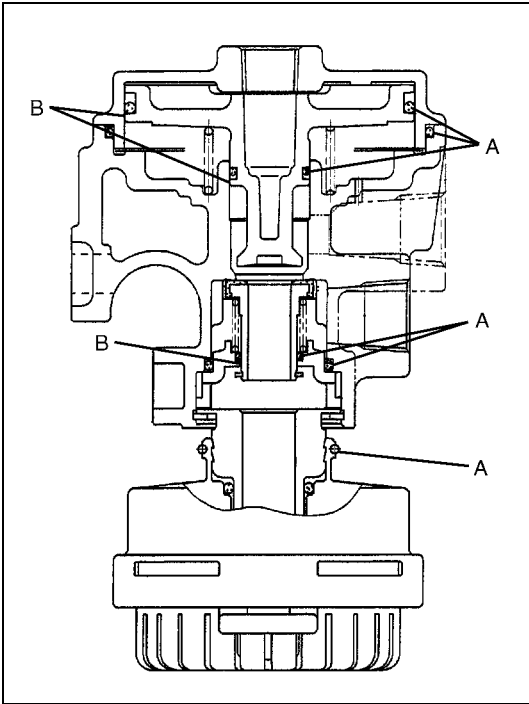
SHTS068020200132

1	O-ring	3	Retainer ring
2	Inlet valve	4	Silencer

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	12-19 {123-193, 8.9-14}	

OVERHAUL

EN0680202H200012



SHTS068020200133

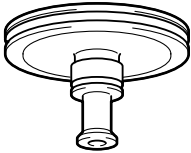
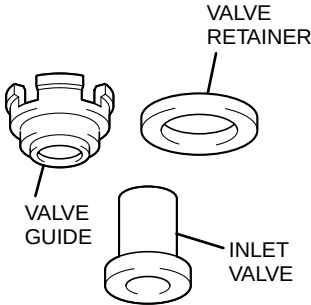
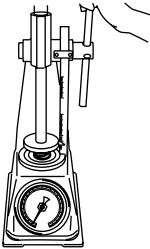
IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1) When assembling the relay valve, use new O-rings and valves.
 - (2) Apply the silicone grease to each sliding surface of the component parts and O-ring groove.
- A: O-ring
B: Apply the silicone grease

INSPECTION AND REPAIR

EN0680202H300016

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Piston and sliding surface of cover and valve body: Wear and damage	—	—	Replace, if necessary.	Visual check 
Inlet valve, valve guide, valve retainer and valve body sliding surface: Wear and damage	—	—	Clean or replace, if necessary.	Visual check 
Valve spring and piston spring: Free length/ Setting length/ Setting load Crack, rust and damage	Valve spring 23.5 {0.93}/ 15.7 {0.62}/ 29.0 N {2.96 kgf, 6.52 lbf}	21.8 N {2.22 kgf, 4.90 lbf} (Setting load)	Replace, if necessary.	Measure and visual check 
	Piston spring 34.5 {1.36}/ 18.8 {0.74}/ 54.6 N {5.57 kgf, 12.27 lbf}	41.0 N {4.18 kgf, 9.22 lbf} (Setting load)		

CUT VALVE

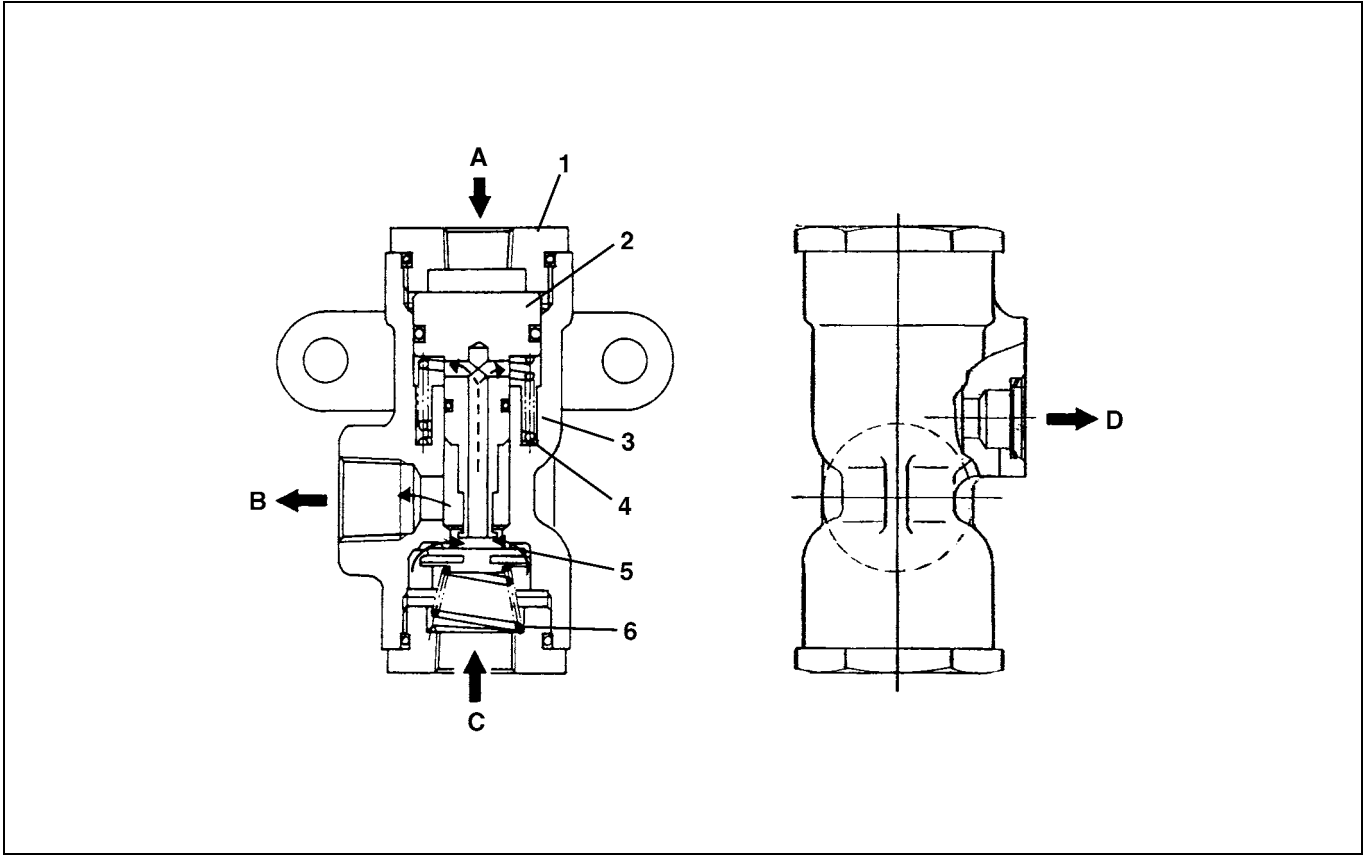
DATA AND SPECIFICATION

EN0680202I200014

Type	Spring type
------	-------------

DESCRIPTION

EN0680202C100015

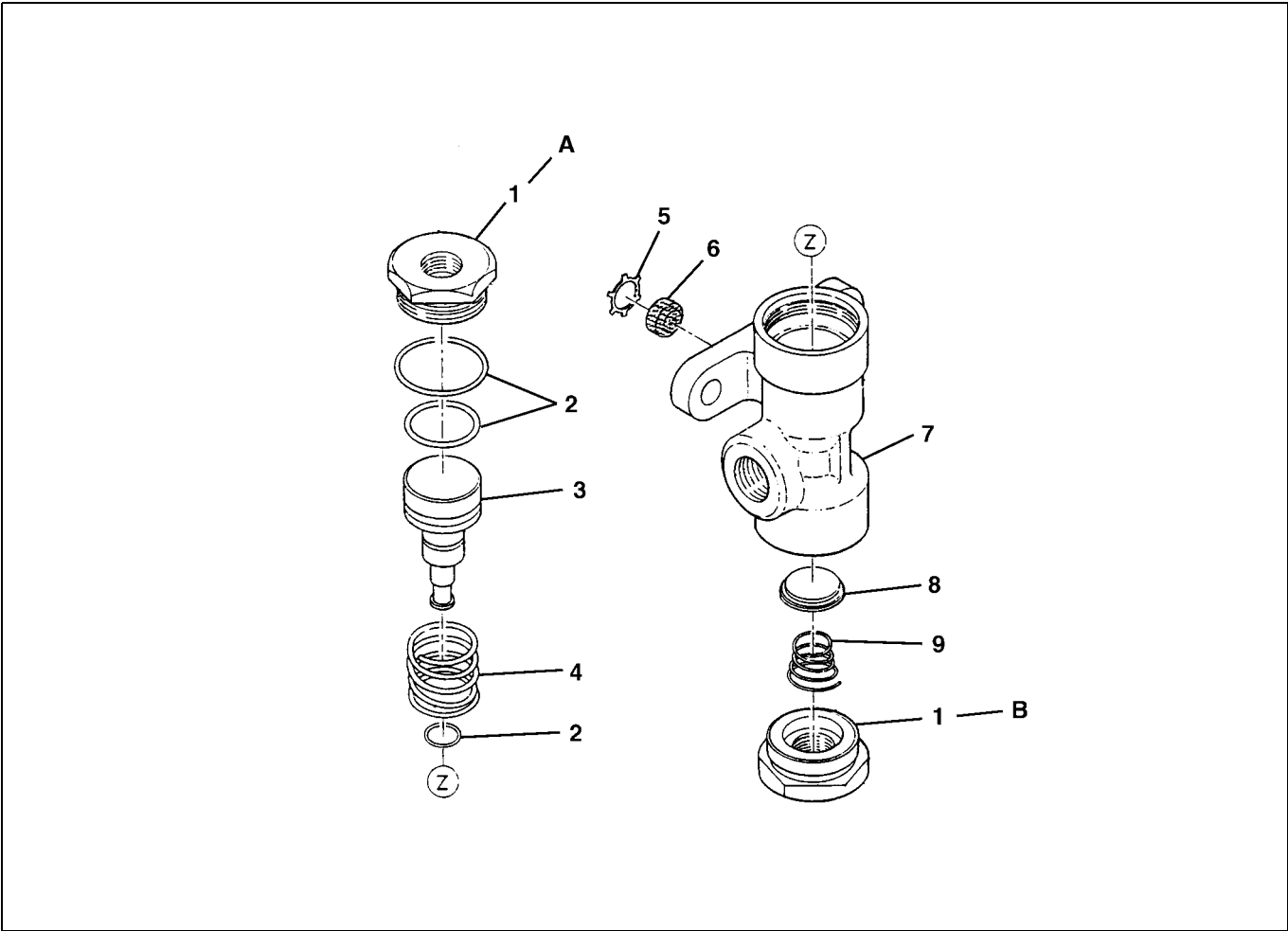


SHTS068020200137

1	Valve cap	6	Conical spring
2	Piston	A	Signal
3	Valve body	B	Outlet
4	Compression spring	C	Inlet
5	Valve sub assembly	D	Exhaust

COMPONENT LOCATOR

EN0680202D100014



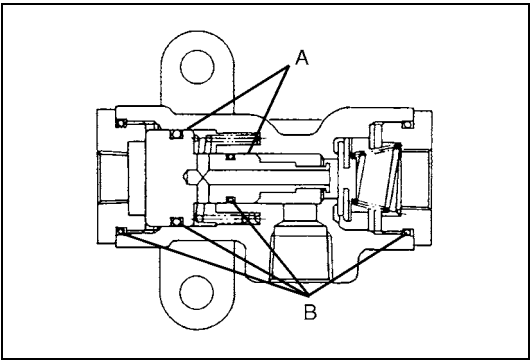
SHTS068020200138

1	Valve cap	4	Compression spring	7	Valve body
2	O-ring	5	Ring retainer	8	Valve sub assembly
3	Piston	6	Filter	9	Conical spring

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	49.04-58.83 {500-600, 36.2-43.3}	B	49.04-58.83 {500-600, 36.2-43.3}

OVERHAUL

EN0680202H200013



SHTS068020200139

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1) When assembling the cut valve, use the new O-ring and retainer ring.
 - (2) Apply the silicone grease to the each sliding surface of the component parts and O-ring groove.

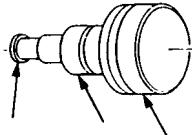
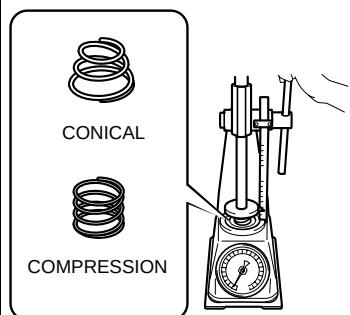
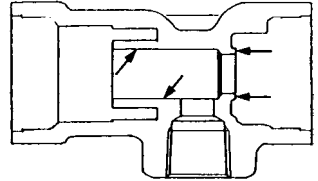
NOTICE
Check the air leakage from exhaust port, with the piston at the released position.
A: Sliding surface
B: O-ring

PERFORMANCE CHARACTERISTIC

1. When the inlet pressure is 686 kPa {7.0 kgf/cm², 99.54 lbf/in.²}, the valve should be opened with the signal pressure of below 343 kPa {3.5 kgf/cm², 49.77 lbf/in.²} and the valve should be closed with the signal pressure of 147-245 kPa {1.5-2.4 kgf/cm², 21.32-35.53 lbf/in.²}.
2. When the inlet and signal pressure are decreasing at same time, the valve should be closed at pressure of 99-196 kPa {1.0-2.0 kgf/cm², 14.22-28.44 lbf/in.²}.
3. When the inlet and signal pressure are increasing at same time, the valve should be opened with the pressure of 148-245 kPa {1.5-2.5 kgf/cm², 21.33-35.55 lbf/in.²}.

INSPECTION AND REPAIR

EN0680202H300017

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Sliding surface and valve contact surface of piston: Wear and damage	—	—	Replace, if necessary.	Visual check 
Conical spring and compression spring: Free length/ setting length/ setting load Crack, rust and damage	Conical spring: 17.6 mm {0.69 in.}/ 15.4 mm {0.61 in.}/ 0.08 N {0.008 kgf, 0.0180 lbf}	16.6 mm {0.66 in.} (Free length)	Replace, if necessary.	Visual check 
	Compression spring: 22.5 mm{0.90 in.}/ 15.5 mm {0.51 in.}/ 7.0 N {0.714 kgf, 1.5737 lbf}	20.5 mm {0.81 in.} (Free length) 6.7 N {0.684 kgf, 1.5063 lbf} (Setting load)		
Valve body: Sliding surface and contact surface: Wear and damage	—	—	Replace, if necessary.	Visual check 

REDUCING VALVE (TYPE-A)

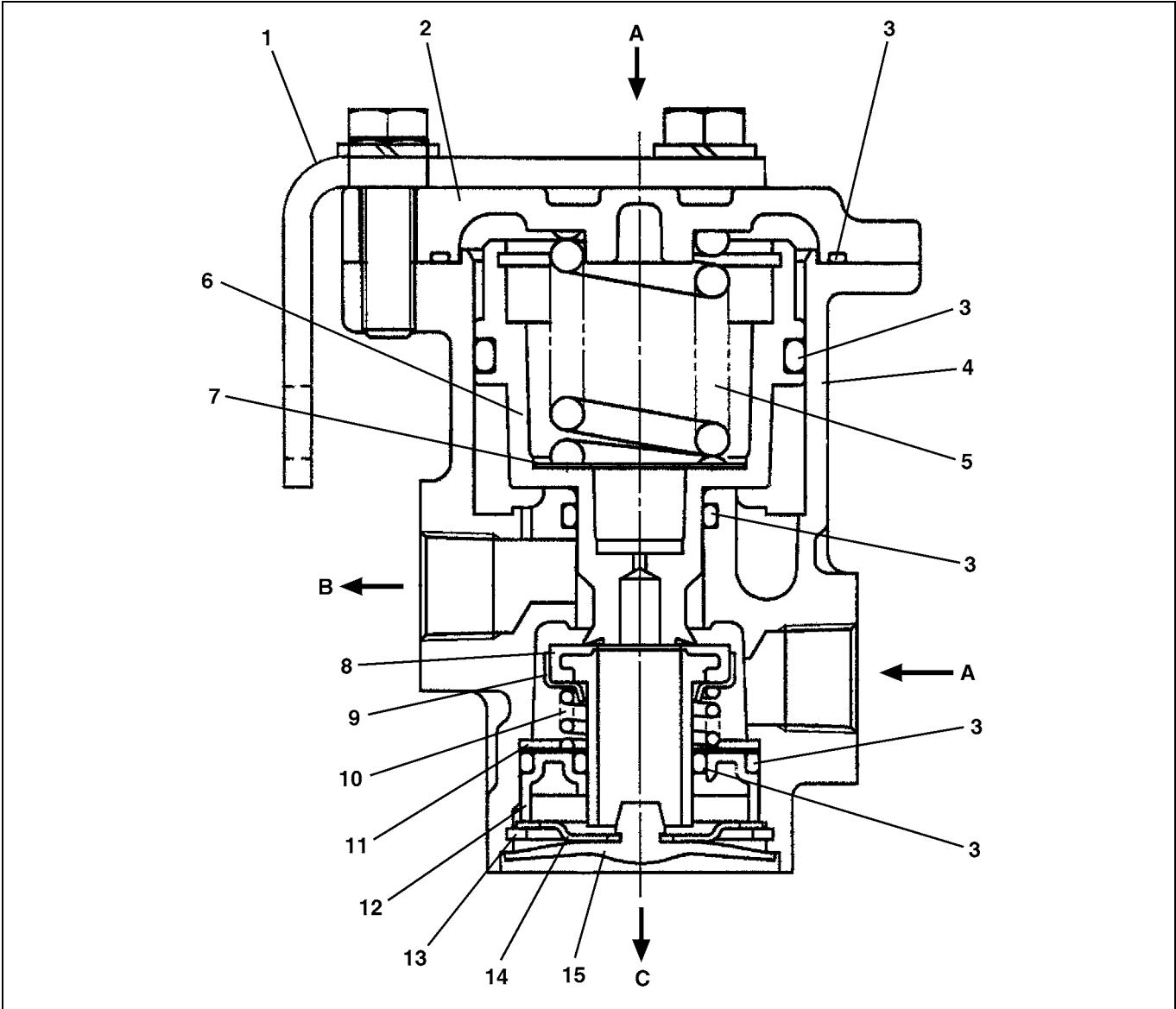
DATA AND SPECIFICATIONS

EN0680202I200015

Type	Piston
Outlet pressure	520.4-559.6 kPa {5.4-5.7 kgf/cm ² , 75.5-81.1 lbf/in. ² } at inlet pressure 690 kPa {7.0 kgf/cm ² , 100.0 lbf/in. ² }

DESCRIPTION

EN0680202C100016

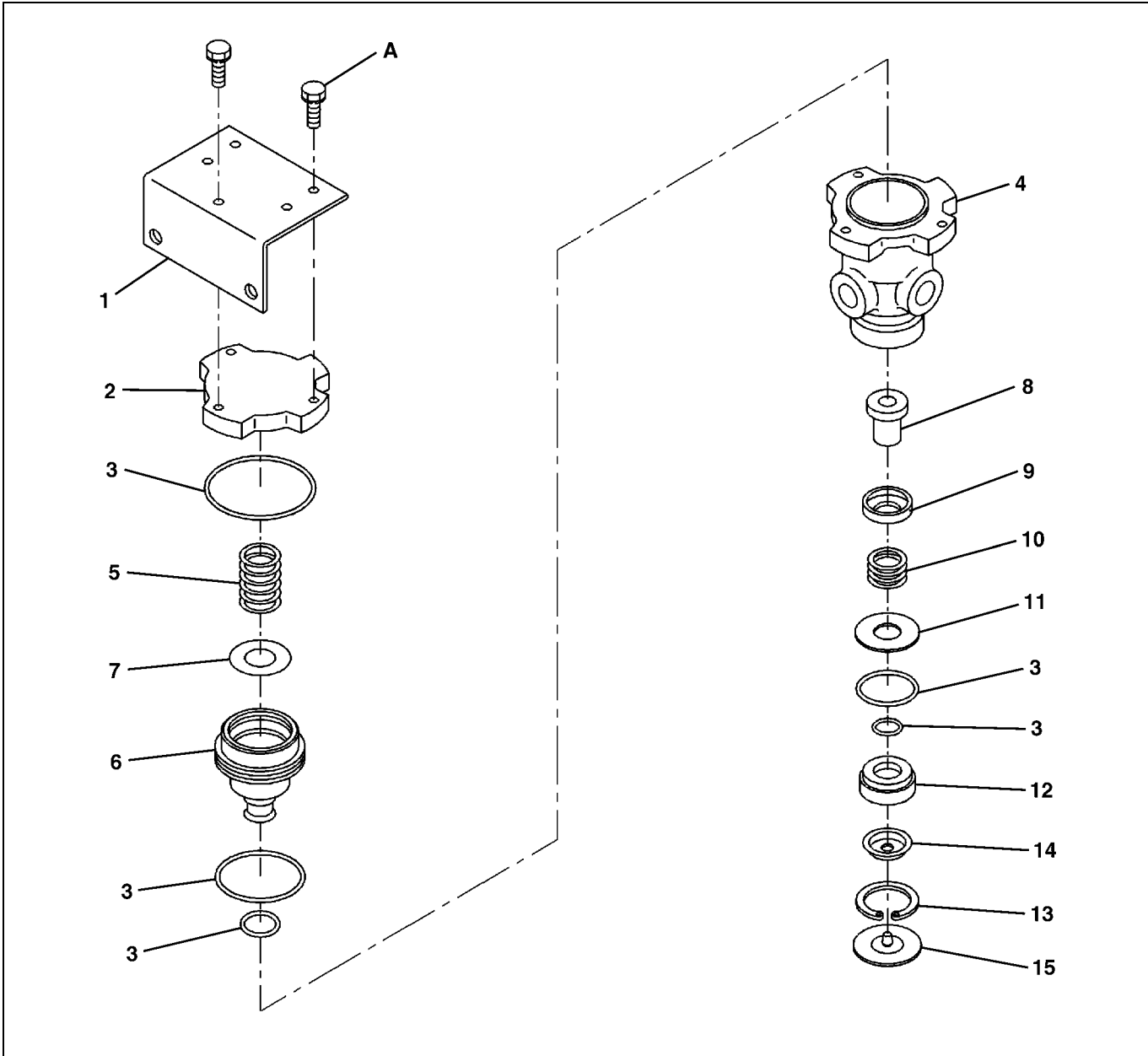


SHTS068020200143

1 Bracket	10 Spring
2 Cover	11 Spring seat
3 O-ring	12 Retainer
4 Valve body	13 Ring retainer
5 Spring	14 Valve seat
6 Piston	15 Check valve
7 Shim	A Inlet
8 Valve	B Outlet
9 Retainer	C Exhaust

COMPONENT LOCATOR

EN0680202D100015



SHTS068020200144

1 Bracket	9 Retainer
2 Cover	10 Spring
3 O-ring	11 Spring seat
4 Valve body	12 Retainer
5 Spring	13 Ring retainer
6 Piston	14 Valve seat
7 Shim	15 Check valve
8 Valve	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 9.8-19.6 {100-200, 7.3-14.4}	
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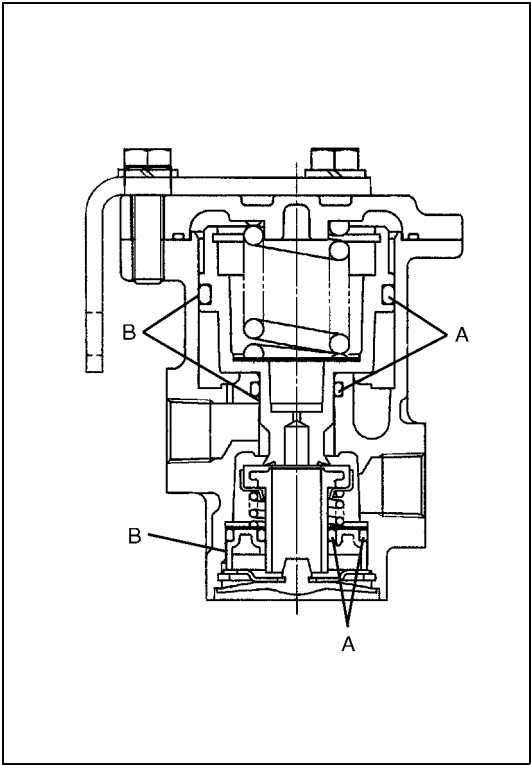
OVERHAUL

EN0680202H200014

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1) When assembling the relay valve, use new O-rings and valves.

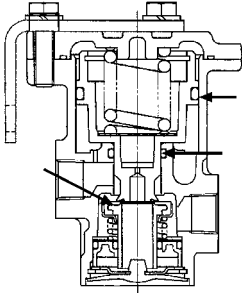
(2) Apply the silicone grease to each sliding surface of the component parts and O-ring groove.
- A: O-ring
- B: Apply the silicone grease



SHTS068020200145

INSPECTION AND REPAIR

EN0680202H300018

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Spring: Rust and damage	—	—	Replace, if necessary.	Visual check 
Valve body and piston sliding surface: Damage, wear and rust	—	—	Clean or replace, if necessary.	Visual check 
Valve contact surface: Damage, wear and rust	—	—		

REDUCING VALVE (TYPE-B)

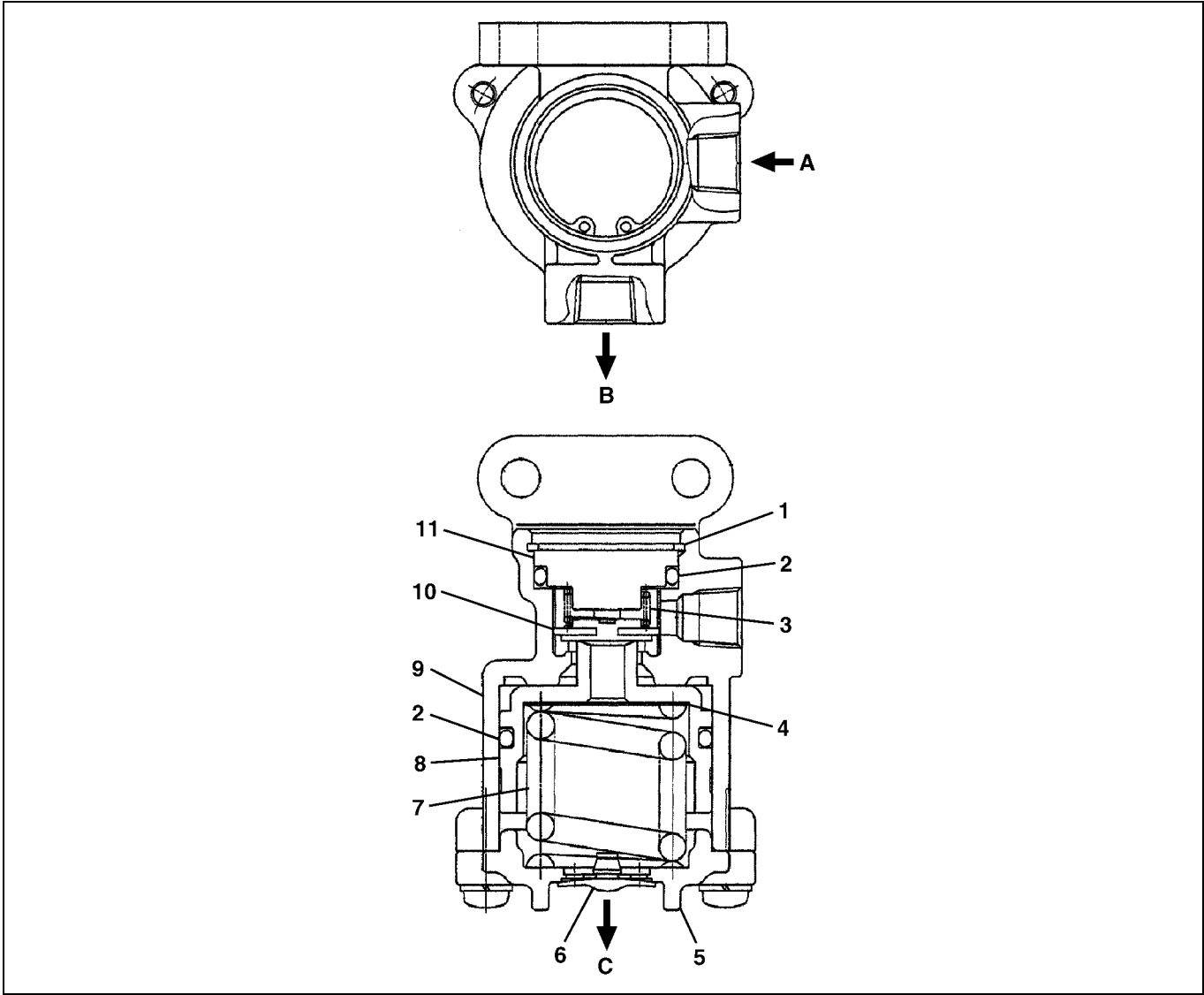
DATA AND SPECIFICATIONS

EN0680202I200016

Type	Piston
Outlet pressure	784-824 kPa {8.0-8.4 kgf/cm ² , 113.8-119.5 lbf/in. ² } at inlet pressure 980 kPa {10.0 kgf/cm ² , 142.1 lbf/in. ² }

DESCRIPTION

EN0680202C100017

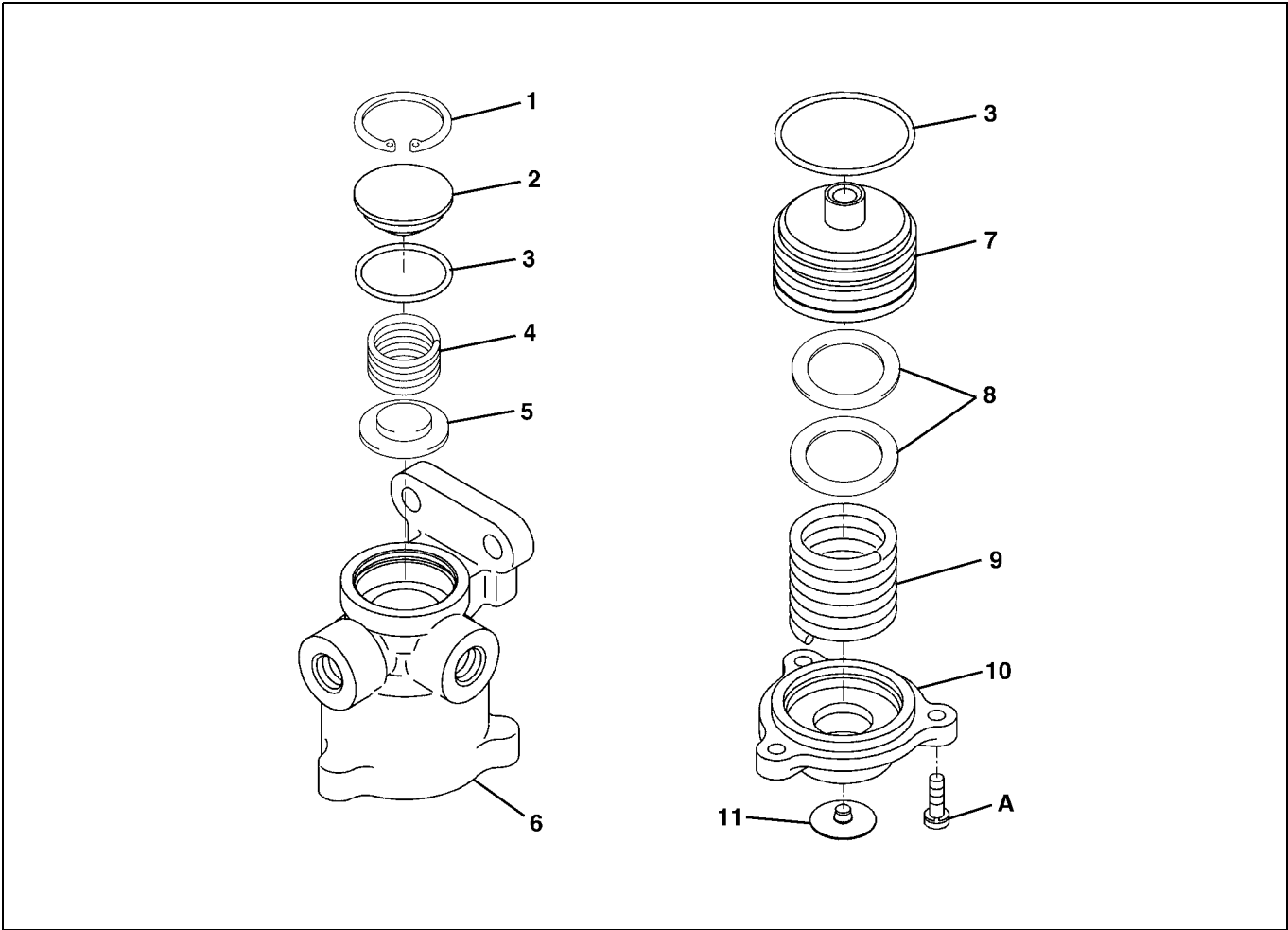


SHTS068020200148

1 Retainer ring	8 Piston
2 O-ring	9 Body
3 Valve spring	10 Valve
4 Shim	11 Valve cover
5 Lower cover	A Inlet
6 Check valve	B Outlet
7 Main spring	C Exhaust

COMPONENT LOCATOR

EN0680202D100016



SHTS068020200149

1	Retainer ring	7	Piston
2	Cover	8	Shim
3	O-ring	9	Main spring
4	Valve spring	10	Lower cover
5	Valve	11	Check valve
6	Body		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	6.2-7.8 {64-79, 4.6-5.7}		

OVERHAUL

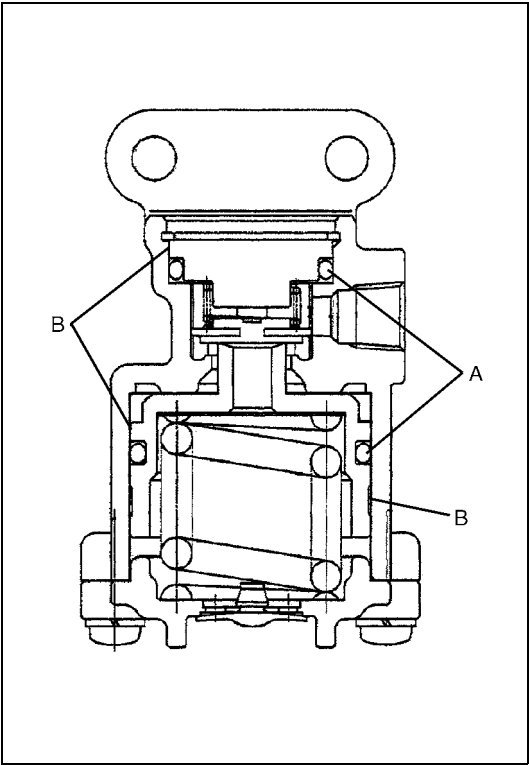
EN0680202H200015

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION
- (1)

When assembling the relay valve, use new O-rings and valves.
- (2)

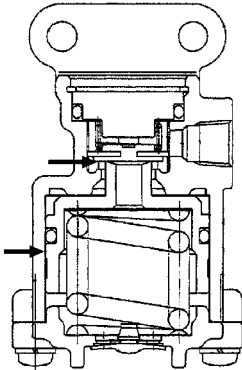
Apply the silicone grease to each sliding surface of the component parts and O-ring groove.
- A: O-ring
- B: Apply the silicone grease



SHTS068020200150

INSPECTION AND REPAIR

EN0680202H300019

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Spring: Rust and damage	—	—	Replace, if necessary.	Visual check 
Valve body and piston sliding surface: Damage, wear and rust	—	—	Clean or replace, if necessary.	Visual check 
Valve contact surface: Damage, wear and rust	—	—		

BRAKE CHAMBER

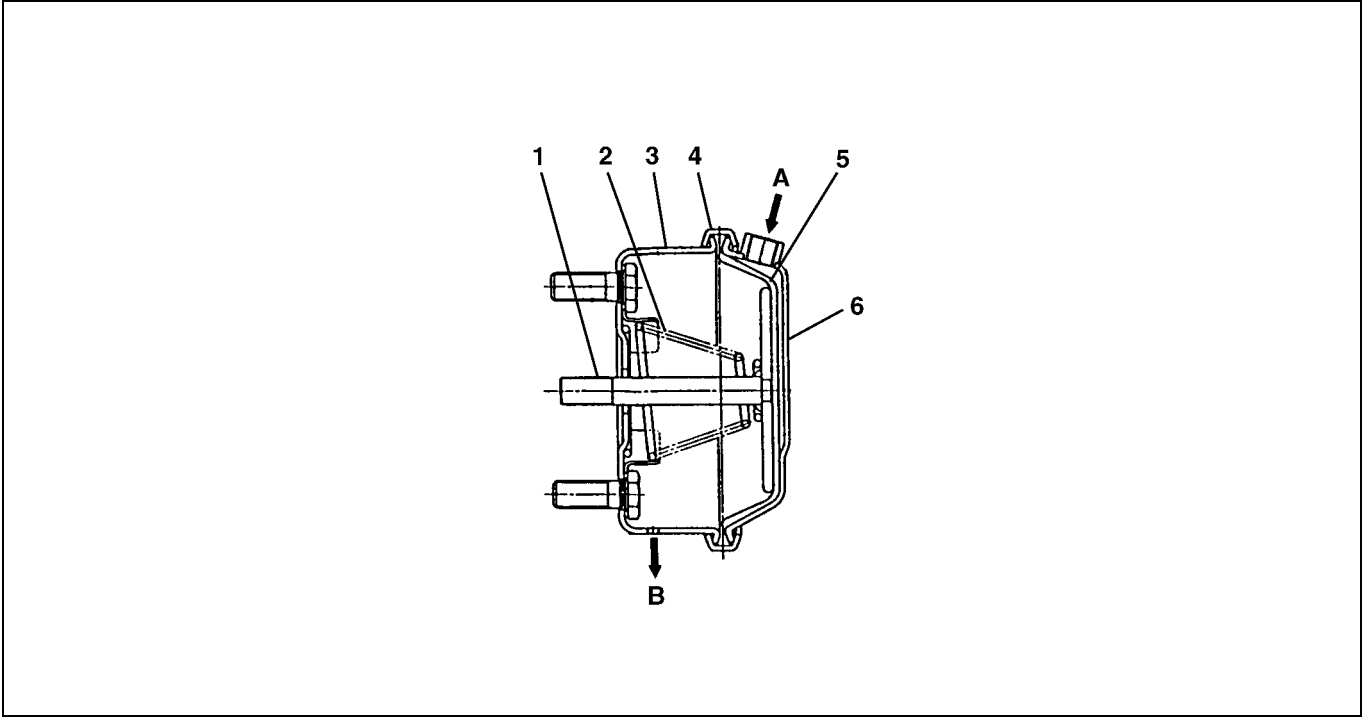
DATA AND SPECIFICATION

EN0680202I200017

Type	Diaphragm type
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DESCRIPTION

EN0680202C100018

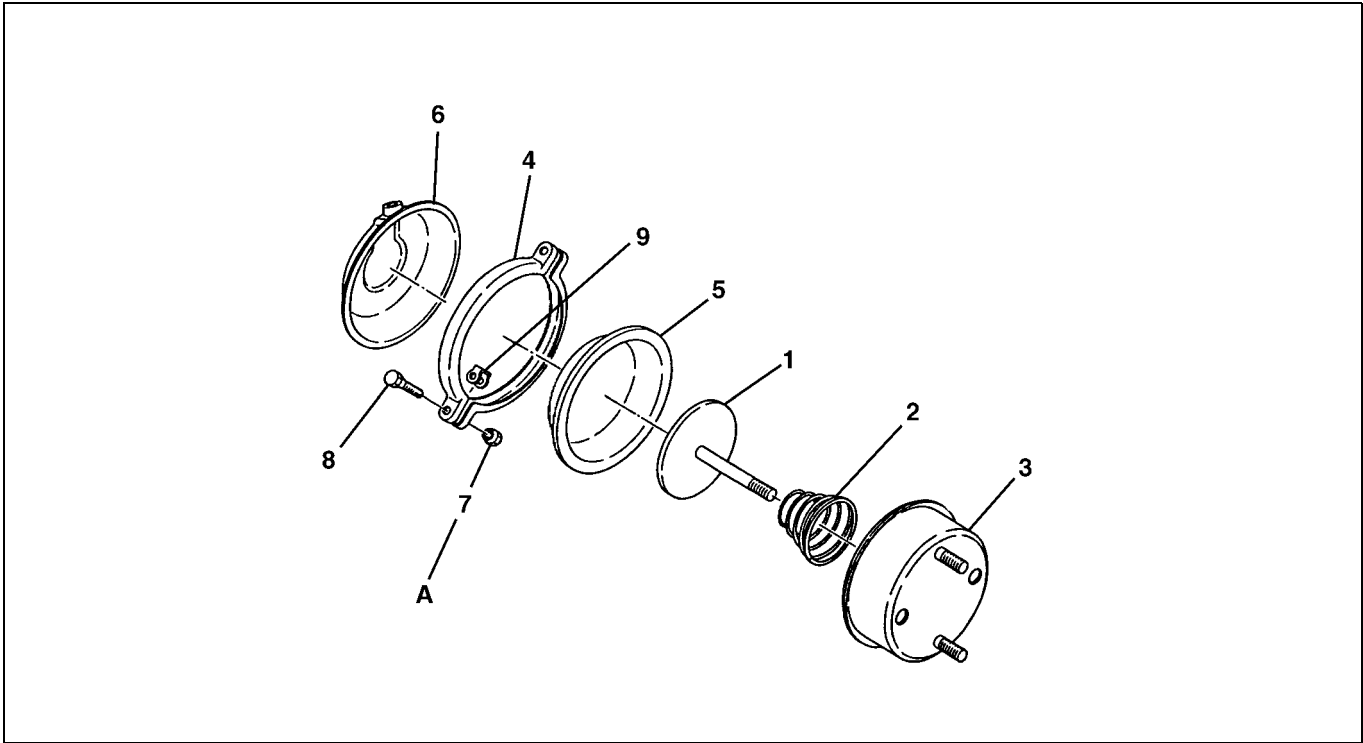


SHTS068020200152

1 Push rod	5 Diaphragm
2 Return spring	6 Chamber cover
3 Chamber	A Inlet
4 Clamp	B Drain hole

COMPONENT LOCATOR

EN0680202D100017



SHTS068020200153

1	Push rod	6	Chamber cover
2	Return spring	7	Clamp nut
3	Chamber	8	Clamp bolt
4	Clamp	9	Spacer
5	Diaphragm		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	26.5-32.3 {270-330, 19.9-24.1}	

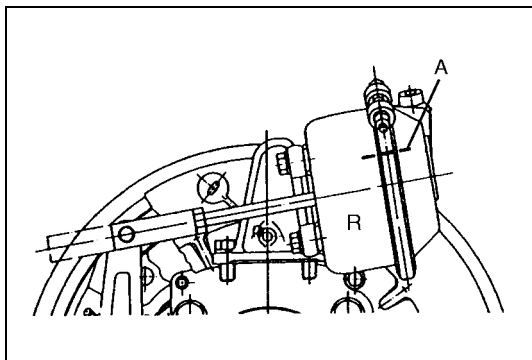
OVERHAUL

EN0680202H200016

IMPORTANT POINT - DISMOUNTING

1. DISMOUNTING OF THE BRAKE CHAMBER

- (1) Before dismounting, apply aligning mark A to the chamber, clamp and chamber cover.
- (2) Apply a position mark R or L to identify the side where the chamber was installed.

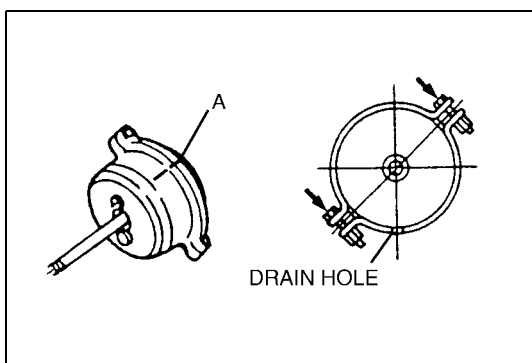


SHTS068020200154

IMPORTANT POINTS - ASSEMBLY

1. ASSEMBLING THE BRAKE CHAMBER

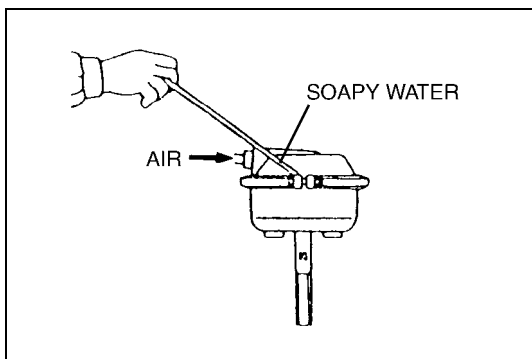
- (1) Replace the diaphragm with new one.
- (2) Align the aligning mark A of the chamber, clamp and chamber cover.
- (3) Insert the bolt from opposite side of drain hole and tighten the bolts evenly with nut within the specified torque.



SHTS068020200155

2. CHECKING FOR AIR LEAKAGE

- (1) Apply soapy water to the chamber as shown and charge with compressed air of 830 kPa {8.5 kgf/cm², 121 lbf/in.²} from the inlet port A then check for leakage.

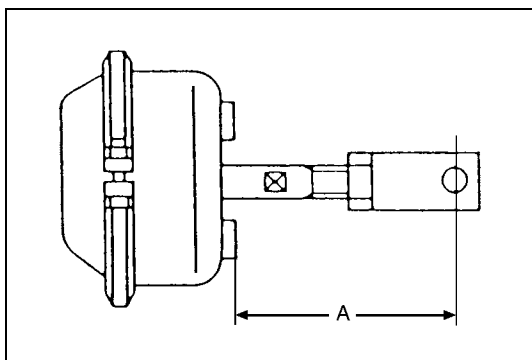


SHTS068020200156

3. INSTALLING CLEVIS

- (1) Install the clevis to the push rod and adjust dimension A to the specified value.

Assembly Standard: 84-86 mm {3.31-3.38 in.}



SHTS068020200157

IMPORTANT POINT - MOUNTING**1. INSTALLING THE BRAKE CHAMBER**

- (1) The chamber must be mounted on the side as marked when dismounting.

NOTICE

- See the position mark (R or L) which was applied when dismounting.
- When connecting the clevis with the slack adjuster, lubricate the clevis pin hole and clevis pin with sufficient chassis grease.

INSPECTION AND REPAIR

EN0680202H300020

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Cover, clamp, push rod, return spring and chamber: Wear and damage	—	—	Replace, if necessary.	Visual check 

BRAKE CHAMBER (MAKER: WABCO)

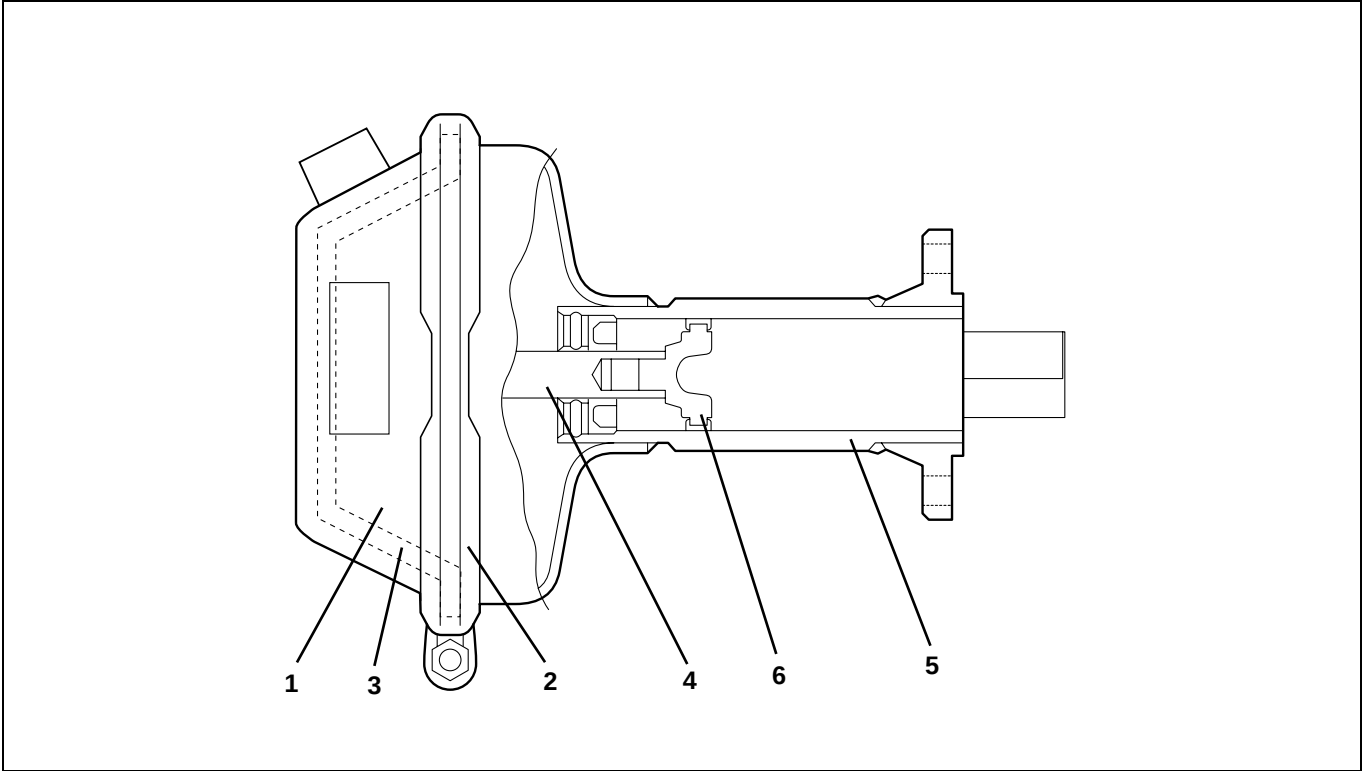
DATA AND SPECIFICATION

EN0680202I200018

Type	Diaphragm type
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DESCRIPTION

EN0680202C100019

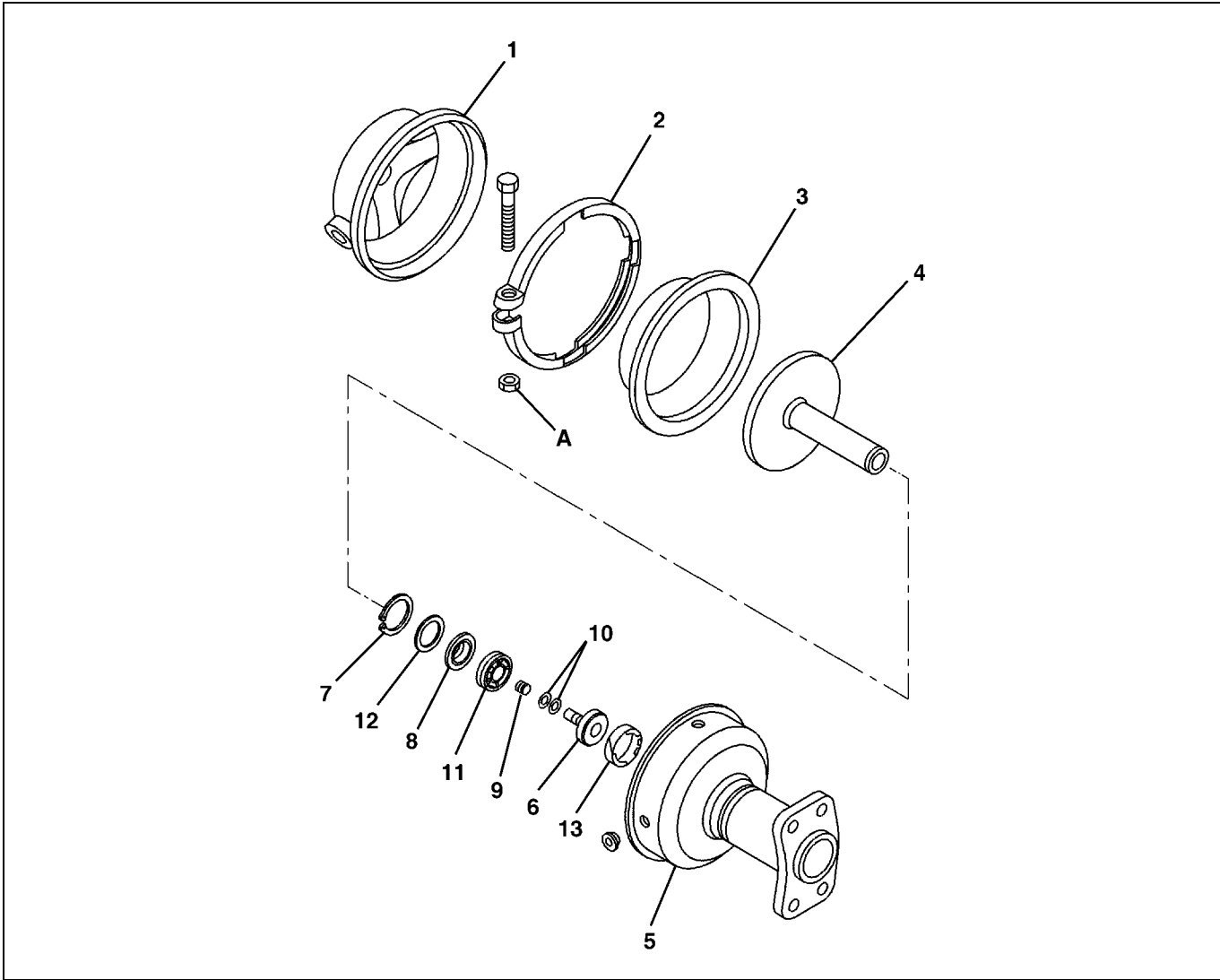


SHTS068020200159

1	Pressure plate	4	Push rod
2	Clamp ring	5	Base
3	Diaphragm	6	Push rod guide

COMPONENT LOCATOR

EN0680202D100018



SHTS068020200160

1	Pressure plate	8	Oil seal
2	Clamp ring	9	Tolerance ring
3	Diaphragm	10	Washer
4	Push rod	11	Guide
5	Base	12	Plate
6	Push rod guide	13	Bushing
7	Snap ring		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	25-30 {260-310, 18.8-22.4}	

SPECIAL TOOL

EN0680202K100001

Prior to starting a brake chamber overhaul, it is necessary to have this special tool.

Illustration	Part number	Tool name	Remarks
	09714-1030	WEDGE CHAMBER STROKE TOOL	

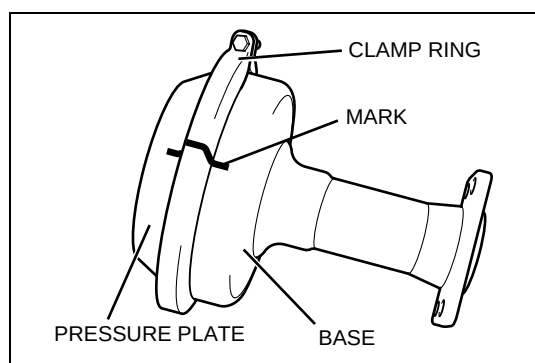
OVERHAUL

EN0680202H200017

IMPORTANT POINTS - DISASSEMBLY

1. REMOVAL OF PRESSURE PLATE

- (1) Make a matching mark to base, clamp ring and pressure plate.

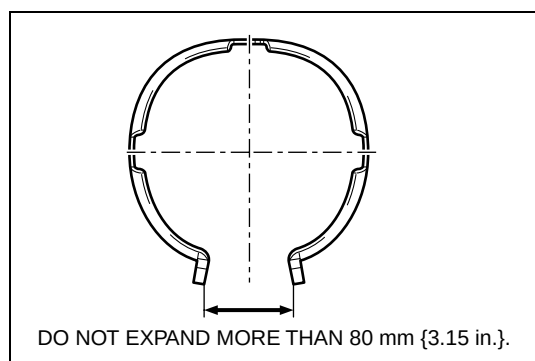


SHTS068020200162

- (2) Mark clamp ring not to forget the inserting direction of clamp ring bolt and remove clamp ring.

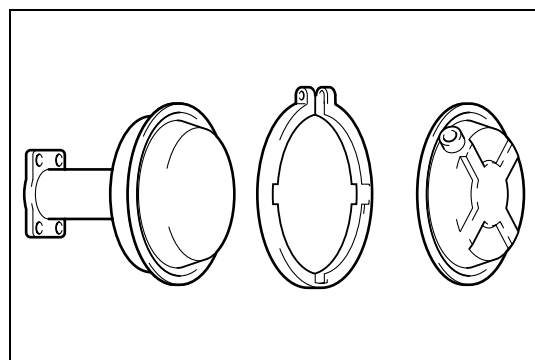
NOTICE

When removing clamp ring, do not expand the inserting portion of clamp ring bolt by more than 80 mm {3.15 in.}.



SHTS068020200163

- (3) Remove pressure plate from base.



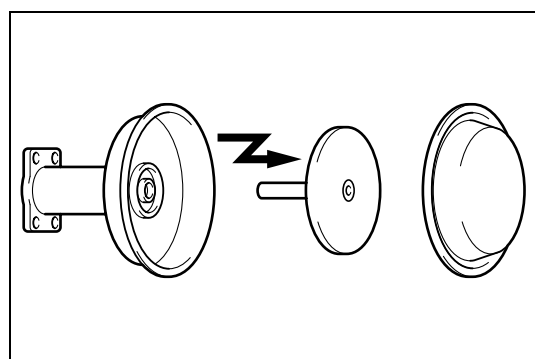
SHTS068020200164

2. REMOVAL OF DIAPHRAGM AND PUSH ROD

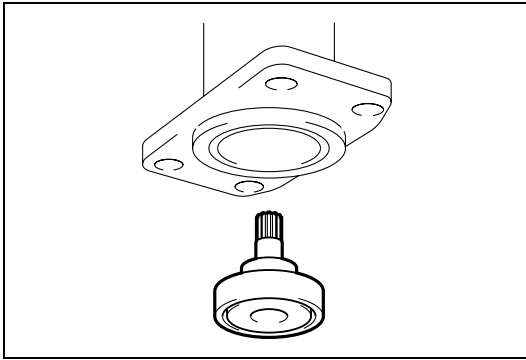
- (1) Remove diaphragm and push rod from base.

NOTICE

- Push rod should be removed out, holding plate and repeating to push and pull it straightly for a few times.
- When removing, push rod should not be pulled out up or downward, toward right or left, not hammering from the square flange side.



SHTS068020200165



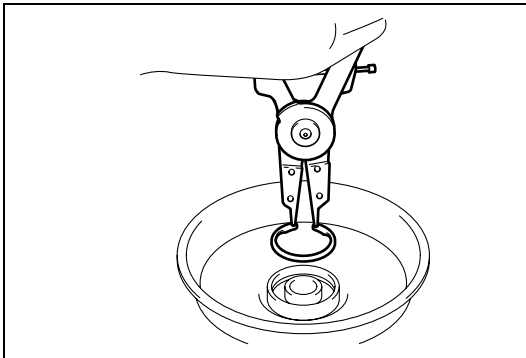
SHTS068020200166

3. REMOVAL OF PUSH ROD GUIDE

- (1) Take out push rod guide out of the square flange.

NOTICE

When removing push rod guide, do not drop off a washer in it.



SHTS068020200167

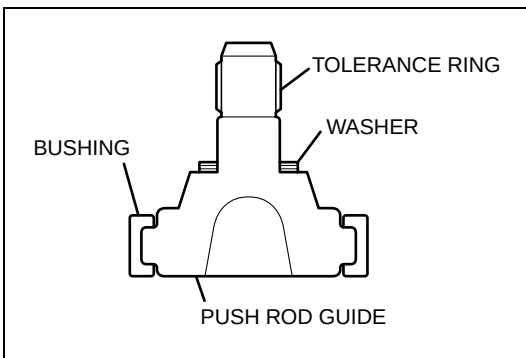
4. REMOVAL OF GUIDE

- (1) Remove snap ring, plate and oil seal with snap ring pliers.

NOTICE

Make sure not to jump out a snap ring.

- (2) Remove guide, using a pipe having outer diameter of about $\phi 37$ mm {1.46 in.} and tapping with plastic hammer by making the square flange of base upside.



SHTS068020200168

5. DISASSEMBLY OF PUSH ROD GUIDE ASSEMBLY

- (1) Remove bushing and tolerance ring from push rod guide.

NOTICE

- Keep it surely as washer in the push rod guide may be reused when assembling it.
- There is a case that tolerance ring may be in the fitting hole at the tip of push rod, in case of which, pick it up with screw-driver, etc.

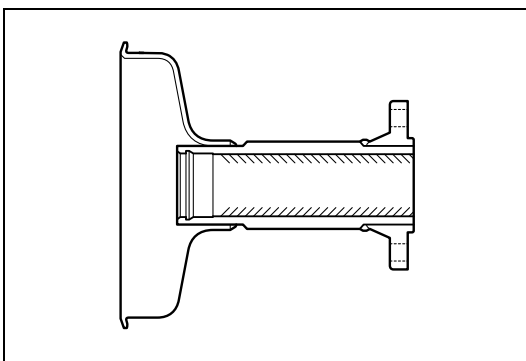
IMPORTANT POINTS - ASSEMBLY

1. INSTALLATION OF GUIDE, OIL SEAL AND PLATE

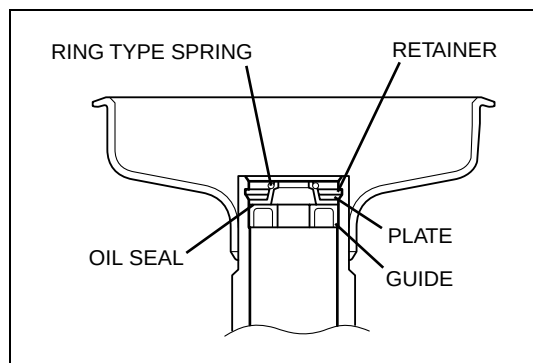
- (1) Apply lightly grease (stored in the repair kit) at moving portion of push rod guide on base.

NOTICE

Never fail to use the grease, stored in the "REPAIR KIT".



SHTS068020200169

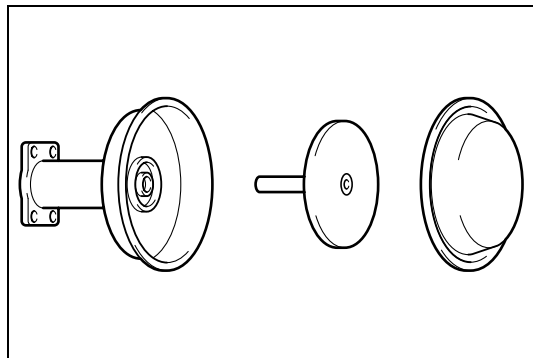


SHTS068020200170

- (2) Facing the flat side of new guide to diaphragm side, insert it until it touches down to base by tapping lightly with stick having an outer diameter of about $\phi 37$ mm {1.46 in.} or box-socket.

NOTICE

- Confirm that ring type spring is installed on oil seal.
- Confirm that retainer is in its groove.



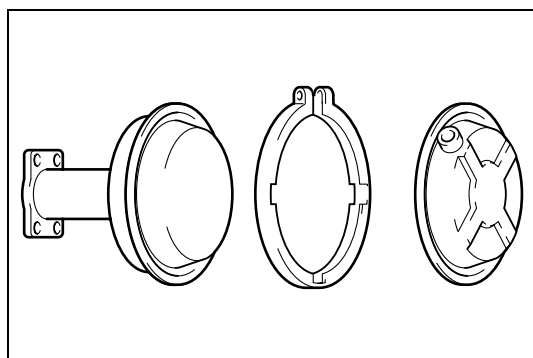
SHTS068020200171

2. INSTALLATION OF PUSH ROD AND DIAPHRAGM

- (1) Insert it to base by applying grease (stored in the "REPAIR KIT") at the rod portion of push rod.

NOTICE

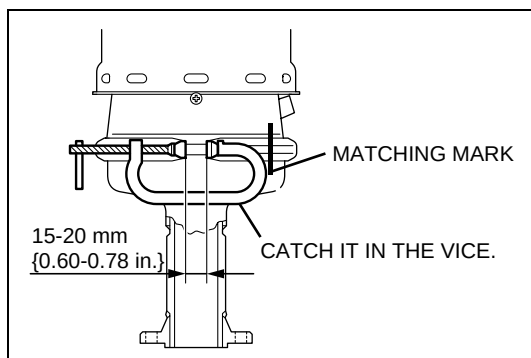
- Never fail to use grease, stored in the "REPAIR KIT".
- When installing push rod, make sure not to damage oil seal.



SHTS068020200172

3. INSTALLATION OF PRESSURE PLATE

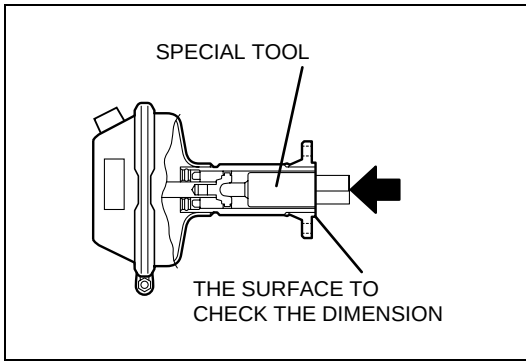
- (1) Putting pressure plate on base, align those matching marks.



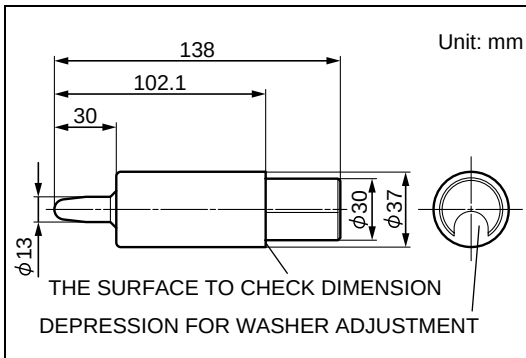
SHTS068020200173

4. INSTALLATION OF CLAMP RING

- (1) Matching clamp ring with the fitting mark, catch the both end at bolt inserting portion of clamp ring with the vice gradually and make its both end of ring come closer to approx. 15-20 mm {0.60-0.78 in.} in the distance. After that, removing the vice, tighten temporarily them toward inserting direction with the bolt and nut.
- (2) Tap all periphery of clamp ring with plastic hammer and tighten securely the nut. Repeat this 2-3 times for gradual tightening.



SHTS068020200174



SHTS068020200175

5. INSTALLATION OF PUSH ROD GUIDE

- (1) Putting new bush into pushing rod guide, insert it deeply to base until push rod guide contacts with the internal hole of push rod guide by special tool.

SST: **Wedge Chamber Stroke Tool (09714-1030)**

NOTICE

In this case, do not install tolerance ring and washer.

- (2) Under the status that the special tool remains pushed against push rod guide, piling washers on the depression for adjustment at the end-face of special tool and picking out one top washer piled up, determine Max. quantity of washers, installable in the internal diameter of base.

NOTICE

The washer quantity at this time is adjusted one for setting dimension of push rod guide. Accordingly, keep them securely.

HINT

- Do not mind to use the washers picked out in dismounting.
 - Target for washer quantity: 0-4 pcs.
 - Washer thickness (1 pierce): 0.5 mm {0.02 in.}
- (3) Picking out special tool and push rod guide for a while and installing the washer of quantities determined in the above (3) and new tolerance ring on push rod guide, insert it deeply with special tool again until push rod guide contacts with the bottom.

NOTICE

- Be careful not to drop off the washers.
- After installing, confirm that, under the status that the special tool remains pushed against push rod guide, the end-face of base side is almost identical with the surface to check setting dimension of special tool.

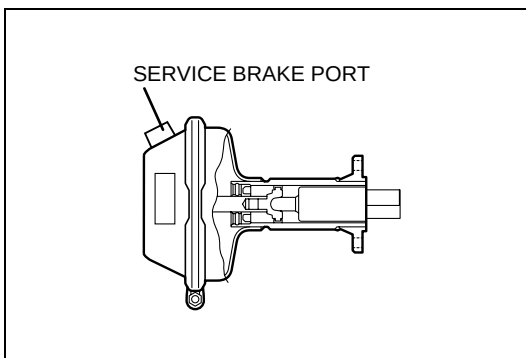
- (4) Apply grease at the depression portion of push rod guide.

Using grease:

COSMO Heat-resistant grease B No. 2 or equivalent.

6. INSPECTION AFTER INSTALLATION

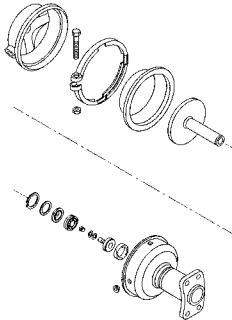
- (1) When adding air of 700-800 kPa {7.2-8.2 kgf/cm², 102-116 lbf/in².} to service brake port, check that push rod moves smoothly.
- (2) Make sure not to leak air from diaphragm.



SHTS068020200176

INSPECTION AND REPAIR

EN0680202H300021

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Pressure plate, clamp, push rod, diaphragm and base: Wear and damage	—	—	Replace, if necessary	Visual check 

SPRING BRAKE CHAMBER

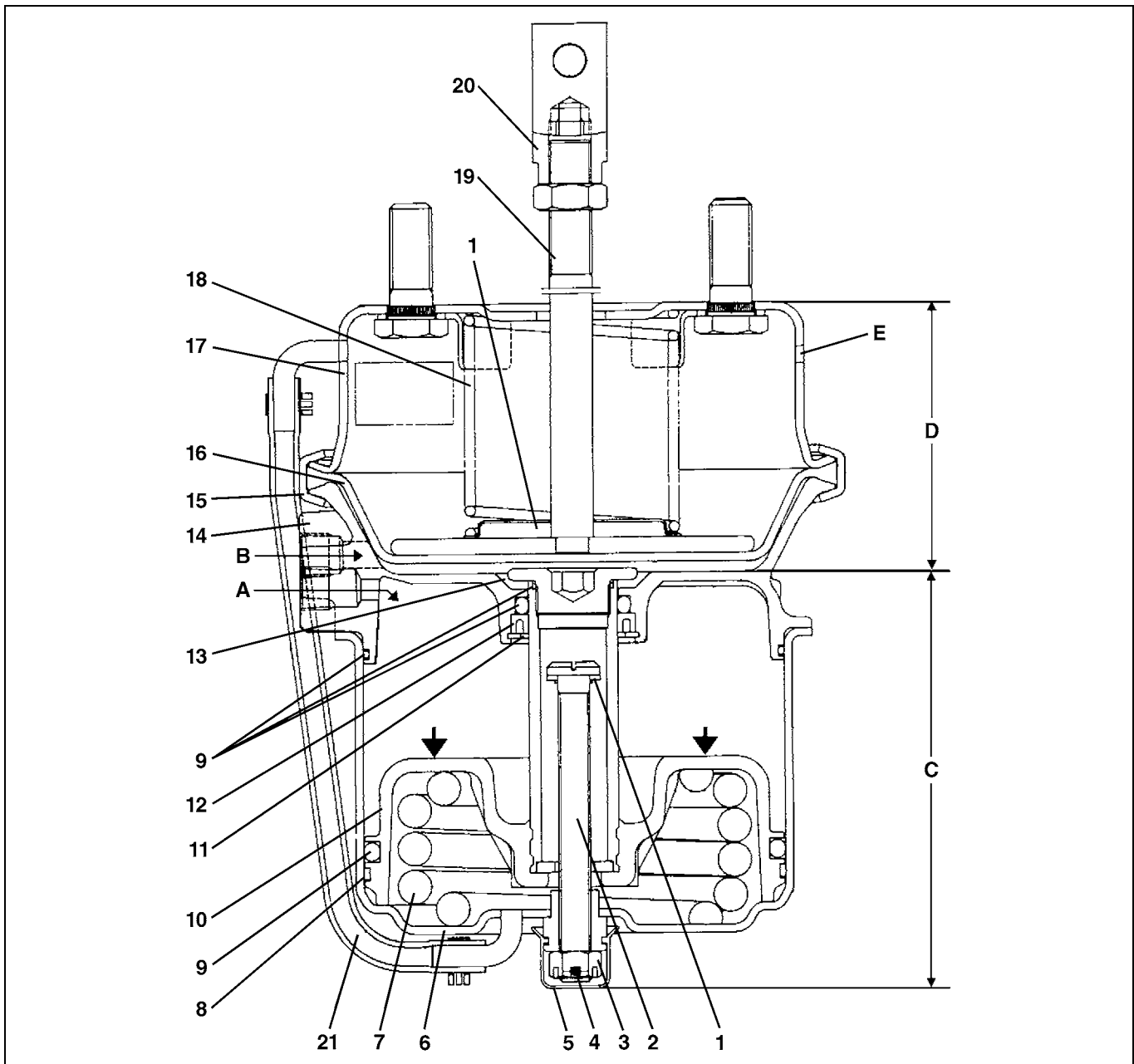
DATA AND SPECIFICATION

EN0680202I200019

Type	Spring and piston type brake chamber combined with diaphragm type chamber with breather tube
------	--

DESCRIPTION

EN0680202C100020



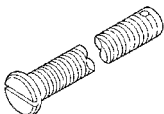
SHTS068020200178

1 Retainer	15 Clamp band
2 Release bolt	16 Diaphragm
3 Slotted nut	17 Service brake chamber
4 Spring pin	18 Compression spring
5 Dust cover	19 Push rod
6 Spring brake chamber	20 Clevis
7 Spring	21 Breather tube
8 Piston ring	A Spring brake air port (Emergency and parking) - for releasing air
9 O-ring	B Service brake air port (Service) - for braking air
10 Piston	C Spring brake portion
11 Retainer ring	D Service brake portion
12 Bushing	E Drain hole
13 Piston follower	
14 Bulkhead	

SPECIAL TOOL

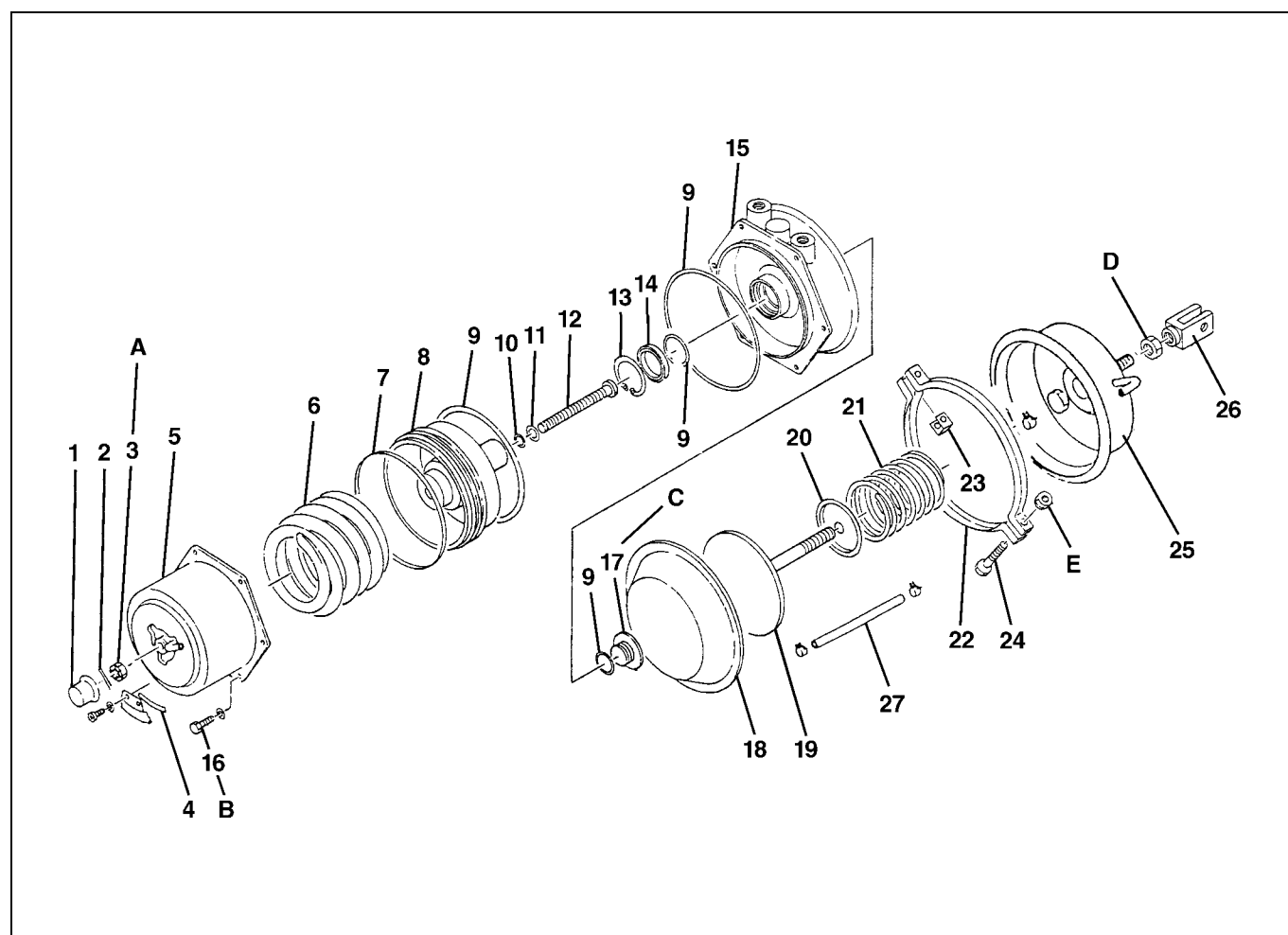
EN0680202K100002

Prior to starting a spring brake chamber overhaul, it is necessary to have this special tool.

Illustration	Part number	Tool name	Remarks
	09683-1051	SPRING BRAKE PISTON RELEASE BOLT	

COMPONENT LOCATOR

EN0680202D100019



SHTS068020200180

1 Dust cover	10 Retainer	19 Push rod
2 Spring pin	11 Plain washer	20 Spring retainer
3 Slotted nut	12 Release bolt	21 Compression spring
4 Caution plate	13 Retainer ring	22 Clamp band
5 Spring brake chamber	14 Bushing	23 Spacer
6 Spring	15 Bulkhead	24 Clamp band bolt
7 Piston ring	16 Chamber cover bolt	25 Service brake chamber
8 Piston	17 Piston follower	26 Clevis
9 O-ring	18 Diaphragm	27 Breather tube

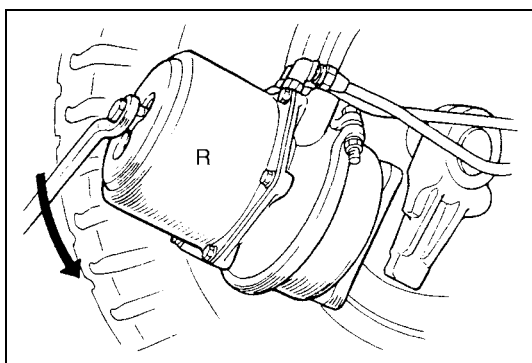
Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 39.0-44.0 {400-450, 29-32}	D 39.0-49.0 {400-500, 29-36}
B 9.8-17.6 {100-180, 7.3-13.0}	E 26.5-32.3 {270-330, 20-23}
C 39.0-49.0 {400-500, 29-36}	

OVERHAUL

EN0680202H200018

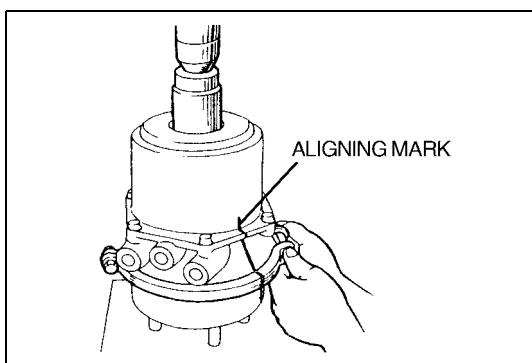


SHTS068020200181

IMPORTANT POINT - DISMOUNTING

1. DISMOUNTING THE CHAMBER ASSEMBLY

- (1) Before dismounting the chamber, turn the release bolt counter-clockwise to release the spring brake.
- (2) Apply a position mark R or L to make clear the side where the chamber was installed.

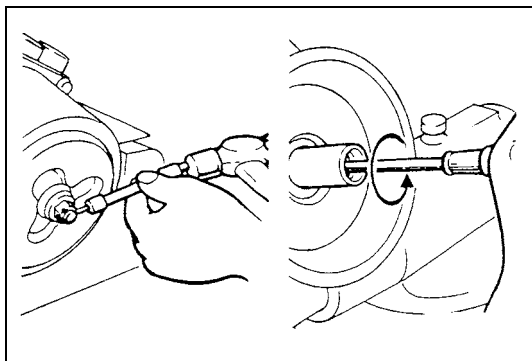


SHTS068020200182

IMPORTANT POINT - DISASSEMBLY

NOTICE

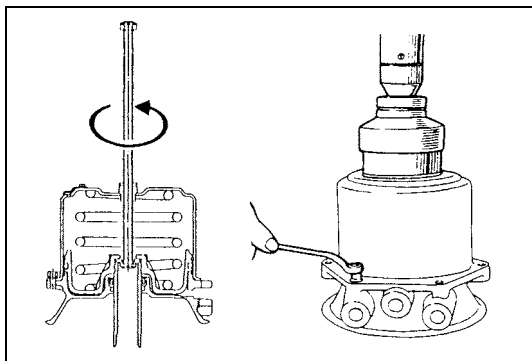
Before disassembling, put aligning marks to the clamp band, service brake chamber, bulkhead and spring brake chamber.



SHTS068020200183

1. DISASSEMBLING THE SPRING BRAKE CHAMBER

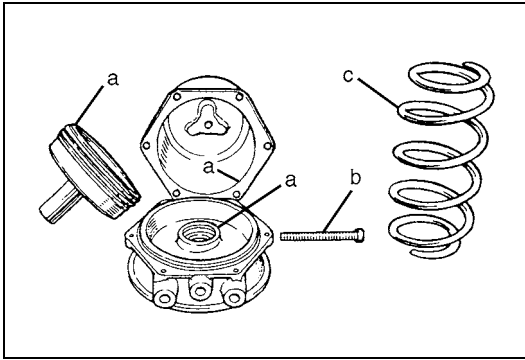
- (1) Remove the piston follower and then remove the dust cover, spring pin and release bolt.



SHTS068020200184

- (2) Use a press or special tool to hold the spring in compression then remove the chamber cover bolt.

SST: Spring Brake Piston Release Bolt (09683-1051)



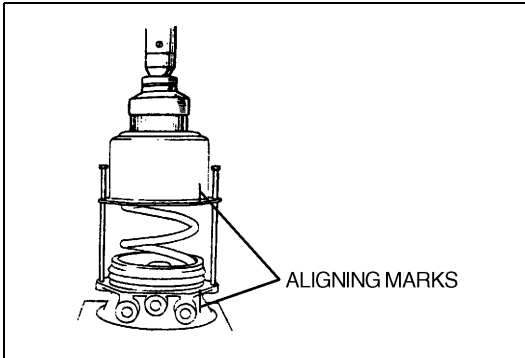
SHTS068020200185

IMPORTANT POINTS - ASSEMBLY

1. LUBRICATION

- (1) When assembling the spring brake chamber, replace the piston ring, bushing and O-ring with new ones.
- (2) Apply grease or oil to each point.

- a Silicone grease: O-ring, Bushing, Piston ring and Spring brake chamber inner side.
- b Bearing grease: Release bolt
- c Rust preventive oil: Spring



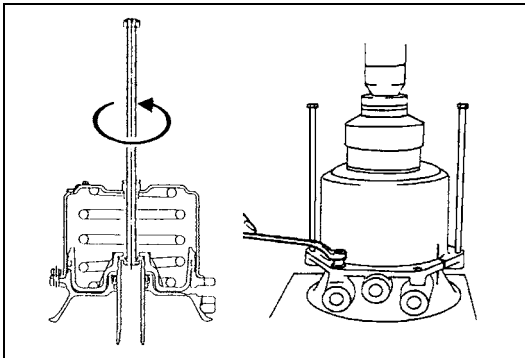
SHTS068020200186

2. ASSEMBLING THE SPRING BRAKE CHAMBER

- (1) Attach guide bolts to align the holes.

NOTICE

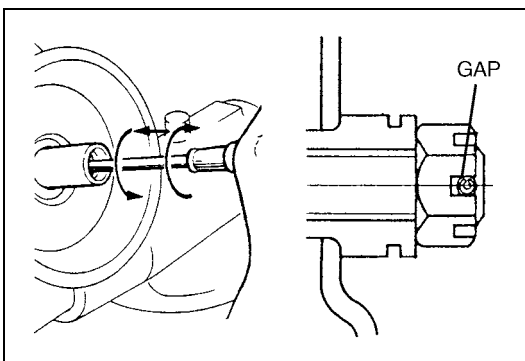
Align the aligning marks of the spring brake chamber and bulk-head.



SHTS068020200187

- (2) Use a press or special tool to compress the spring then tighten the chamber cover with the bolts.

SST: Spring Brake Piston Release Bolt (09683-1051)

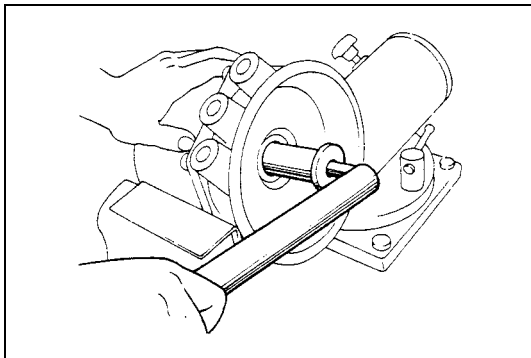


SHTS068020200188

- (3) Screw in the release bolt until its head contacts the piston flange, then return the release bolt one or two turns, then install the slot-nut and spring pin.

NOTICE

The spring pin should be installed as shown in the figure.

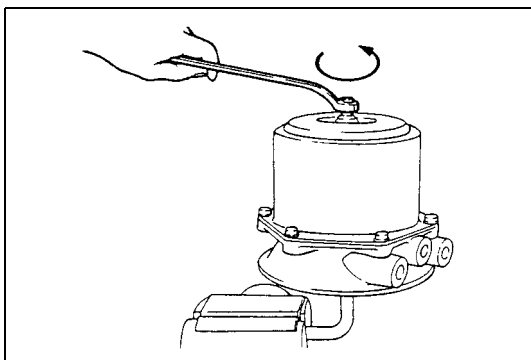


SHTS068020200189

- (4) Install the piston follower on the piston.

NOTICE

Apply locking adhesive (LOCTITE 242 or equivalent) to the thread of the piston follower.



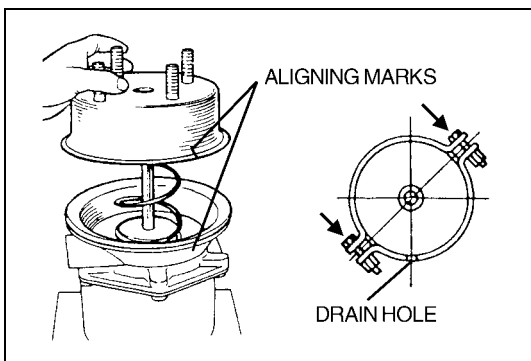
SHTS068020200190

3. ASSEMBLING THE SERVICE BRAKE CHAMBER

- (1) Turn the release bolt counterclockwise to compress the spring of the spring brake chamber.

NOTICE

To make turning easy, apply compressed air to the spring brake chamber.



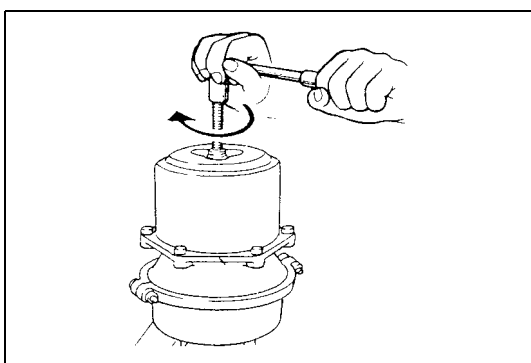
SHTS068020200191

- (2) When reassembling the chamber, replace the diaphragm with new one.

NOTICE

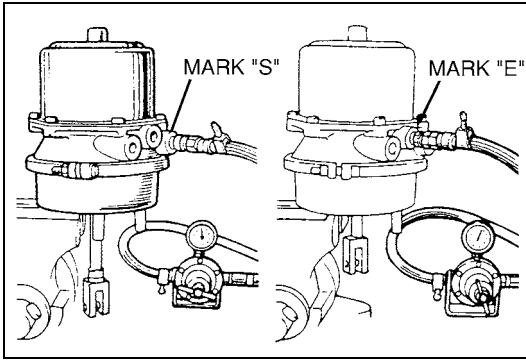
Align the aligning marks of the chamber, clamp band and bulk-head.

- (3) Insert the clamp band bolts from opposite side of drain hole and tighten the bolts evenly with nuts within specified torque.



SHTS068020200192

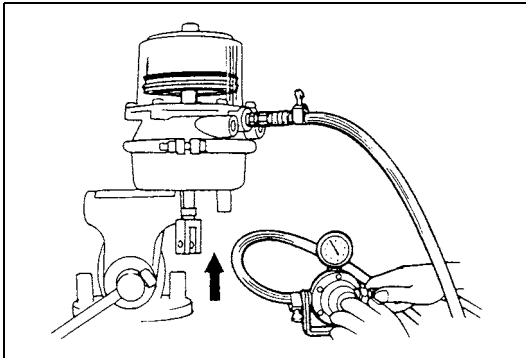
- (4) Turn the release bolt clockwise to release the spring of the spring brake chamber.



SHTS068020200193

4. INSPECTION FOR AIR LEAKAGE

- (1) Apply compressed air of 834 kPa {8.5 kgf/cm², 121 lbf/in.²} to both inlet ports marked "E" and "S", and make sure that there is no air leakage from the joints of the assembly.



SHTS068020200194

5. INSPECTION FOR PISTON MOVEMENT

- (1) Apply compressed air of 640-830 kPa {6.5-8.5 kgf/cm², 93-120 lbf/in.²} to the inlet port with mark E gradually and make sure that the push rod is completely returned.

Piston stroke: 64 mm {2.52 in.}

for spring brake chamber parts No.

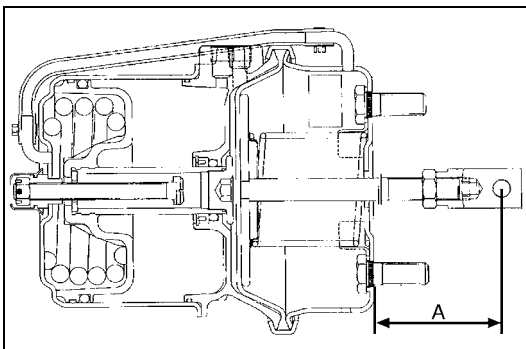
47850 -4290/ -4300/ -4310/ -4320/ -4330/

-4340/ -4350/ -4360

: 56 mm {2.20 in.}

for spring brake chamber parts No.

47850 -4370/ -4380/ -4390/ 4400



SHTS068020200360

6. INSTALLING THE CLEVIS

- (1) Install the clevis to the push rod and adjust dimension "A" to the specified value.

A: 261-263 mm {10.28-10.35 in.}

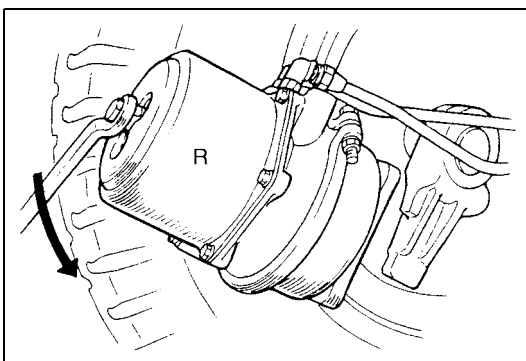
for spring brake chamber parts No.

47850-4290/ -4300/ -4330/ -4340

A: 84-86 mm {3.31-3.38 in.}

for spring brake chamber parts No.

47850-4310/ -4320/ -4350/ -4360/ -4370/ -4380/ -4390/ -4400



SHTS068020200181

IMPORTANT POINT - MOUNTING

1. INSTALLING THE CHAMBER ASSEMBLY

- (1) Before mounting, turn the release bolt counterclockwise to release the spring brake.

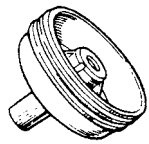
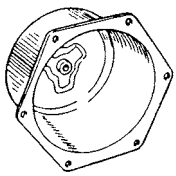
NOTICE

- Note the position mark R or L on the chamber which mark was applied when dismounting and install it to its former side.
- When connecting the clevis with slack adjuster, lubricate clevis pin-hole and clevis pin with sufficient chassis grease.

- (2) After mounting, the release bolt must be set at the specified torque.

INSPECTION AND REPAIR

EN0680202H300022

Inspection item	Standard	Limit	Remedy	Inspection procedure
Piston: Wear and damage	—	—	Replace, if necessary.	Visual check 
Chamber: Wear and damage	—	—	Replace, if necessary.	Visual check 
Spring and compression spring: Rust and damage	—	—	Replace, if necessary.	Visual check 

SPRING BRAKE CHAMBER (MAKER: NABCO)

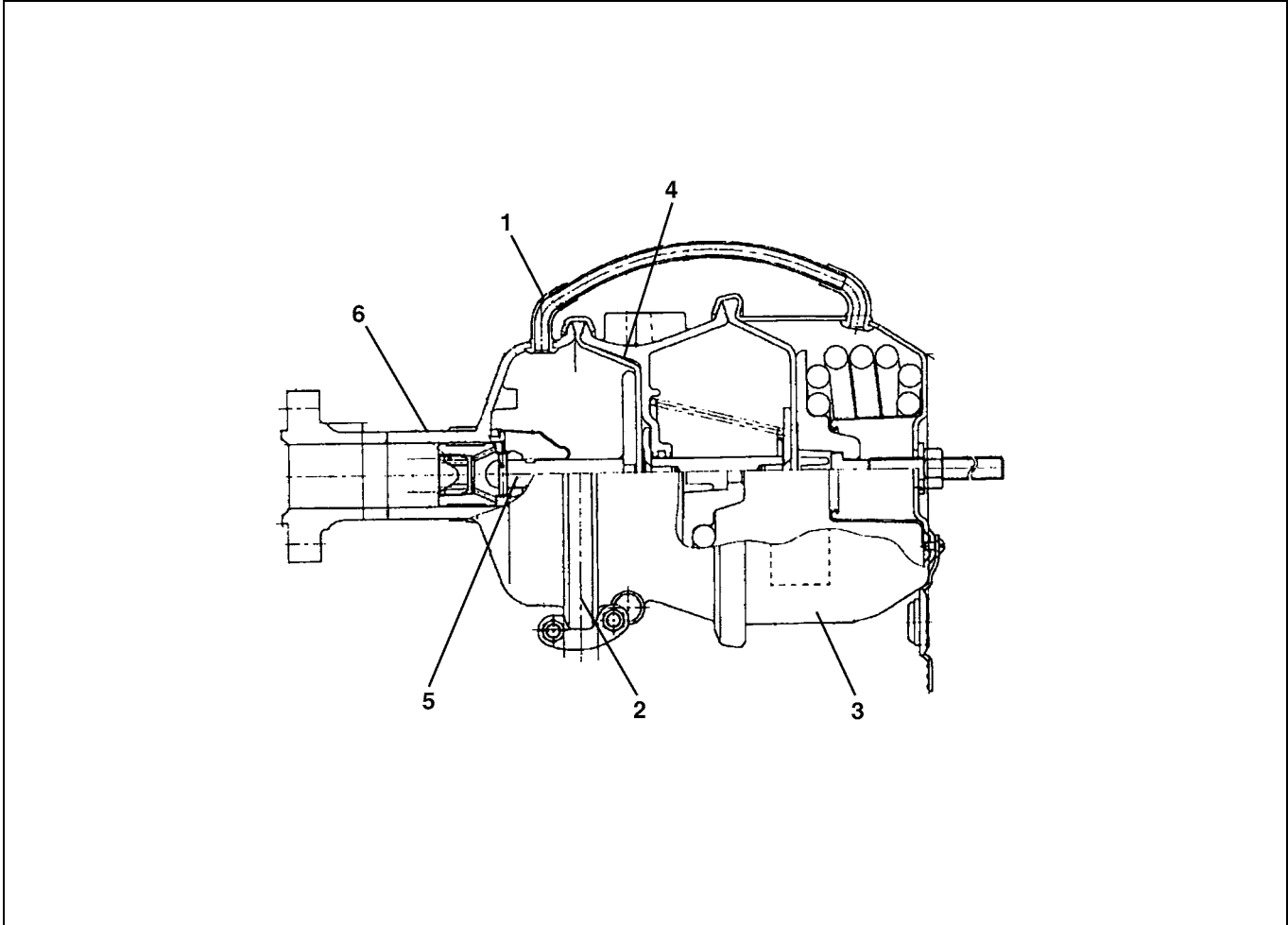
DATA AND SPECIFICATION

EN0680202I200020

Type	Spring and piston type brake chamber combined with diaphragm type chamber
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DESCRIPTION

EN0680202C100021

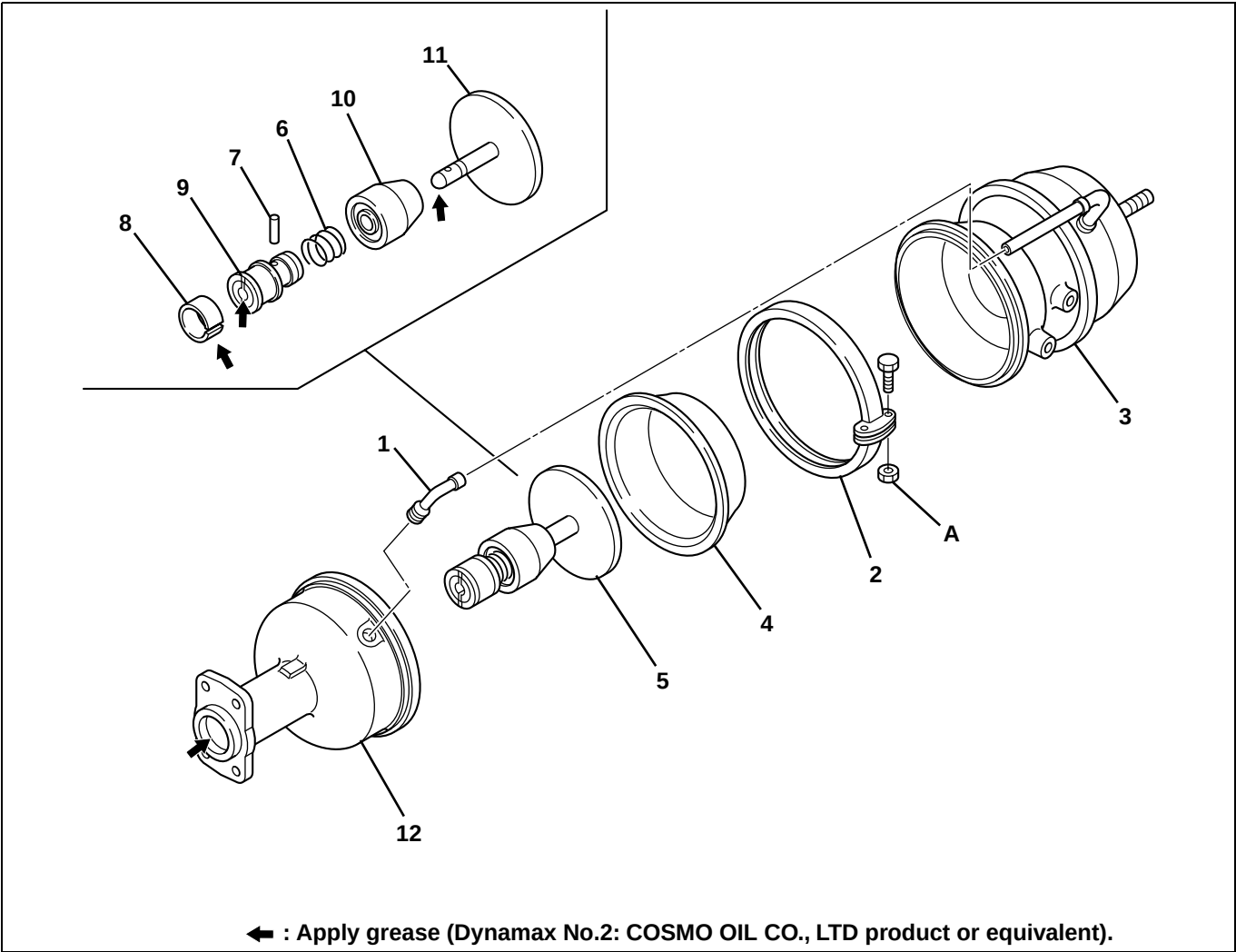


SHTS068020200199

1 Elbow	4 Diaphragm
2 Clamp	5 Push rod assembly
3 Piggyback	6 Base

COMPONENT LOCATOR

EN0680202D100020



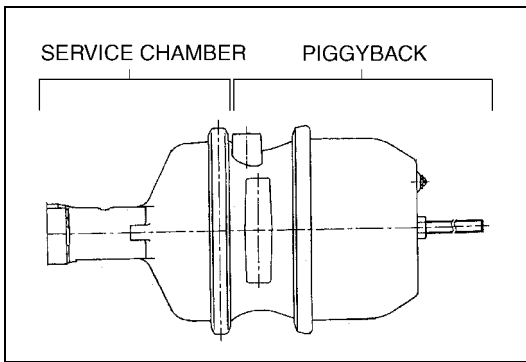
SHTS068020200200

1	Elbow	7	Pin
2	Clamp	8	Bushing
3	Piggyback	9	Push rod guide
4	Diaphragm	10	Push rod boot
5	Push rod assembly	11	Push rod
6	Spring	12	Base

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	14.7-20.0 {150-204, 11.0-14.8}	

OVERHAUL

EN0680202H200019

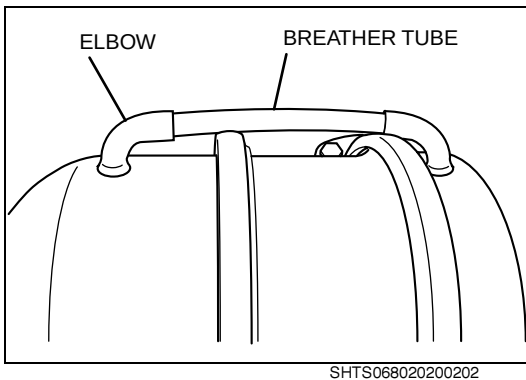


IMPORTANT POINT - DISASSEMBLY

1. DISASSEMBLY OF THE SPRING BRAKE CHAMBER

⚠ WARNING

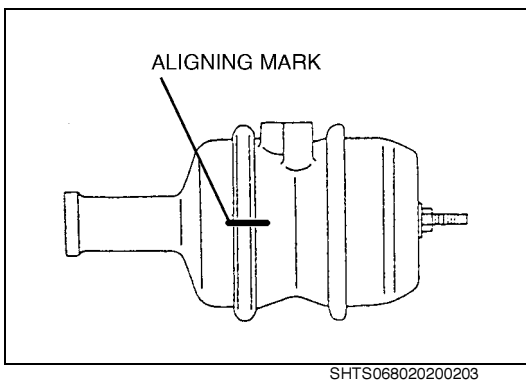
Piggyback is very dangerous because there is very strong spring inside it. Never disassemble the piggyback.



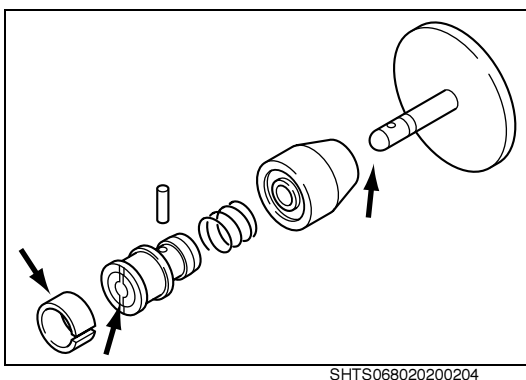
- (1) Disconnect the breather tube from the service chamber side elbow.

NOTICE

- Do not disconnect the breather tube from the piggyback side.
- Pulling the center of the elbow obliquely can easily disconnect the breather tube from the elbow.



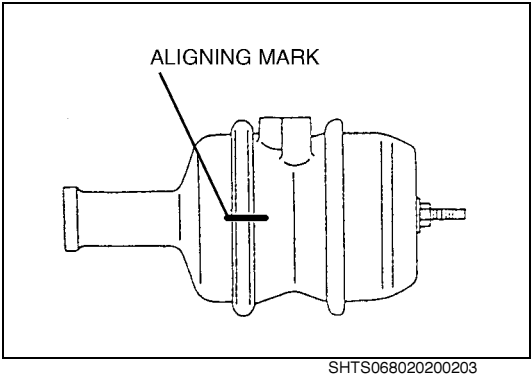
- (2) Apply the aligning mark on the clamp, piggyback and base.
- (3) Remove the clamp, the piggyback and diaphragm from the bracket.
- (4) Remove the ring and pin, then disassemble the push rod assembly.



IMPORTANT POINTS - ASSEMBLY

1. ASSEMBLY OF THE PUSH ROD ASSEMBLY

- (1) Before assembling, apply grease (Dynamax No.2: COSMO OIL., LTD. product or equivalent) to each component parts.

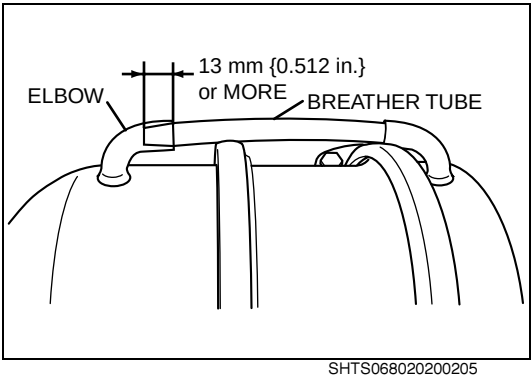


2. ASSEMBLY OF THE SPRING BRAKE CHAMBER

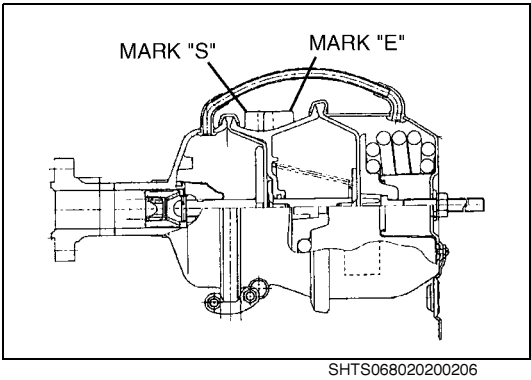
- (1) Apply grease to inside of the bracket, and install the push rod assembly, new diaphragm, piggyback and clamp.

NOTICE

- Do not adhere grease to the diaphragm.
- Before assembling, align the aligning marks on the clamp, piggyback and bracket.
- Spring cylinder (piggyback) portion should be changed every 3 years, even though it does not fail.
- Diaphragm, dust cover and bushing, etc. are the parts to be changed periodically.



- (2) After wiping the breather tube, apply lock agent (LOCTITE 414 or equivalent) on the tube open end.
- (3) Insert the breather tube in the elbow as shown in the figure.



3. INSPECTION FOR AIR LEAKAGE

- (1) Apply compressed air of 690-880 kPa {7.0-9.0 kgf/cm², 100-128 lbf/in.²} to both inlet ports marked "E" and "S", and make sure that there is no air leakage from the joints of the assembly.

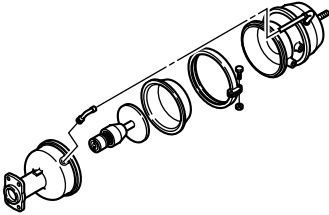
4. INSPECTION FOR PISTON MOVEMENT

- (1) Apply compressed air of 690-880 kPa {7.0-9.0 kgf/cm², 100-128 lbf/in.²} to the inlet port marked "E" gradually and measure the service chamber stroke.

Piston stroke: 58-61 mm {2.28-2.40 in.}

INSPECTION AND REPAIR

EN0680202H300023

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Bracket, push rod, diaphragm and piggyback: Wear and damage	—	—	Replace, if necessary	Visual check 

SPRING BRAKE CHAMBER (MAKER: WABCO)

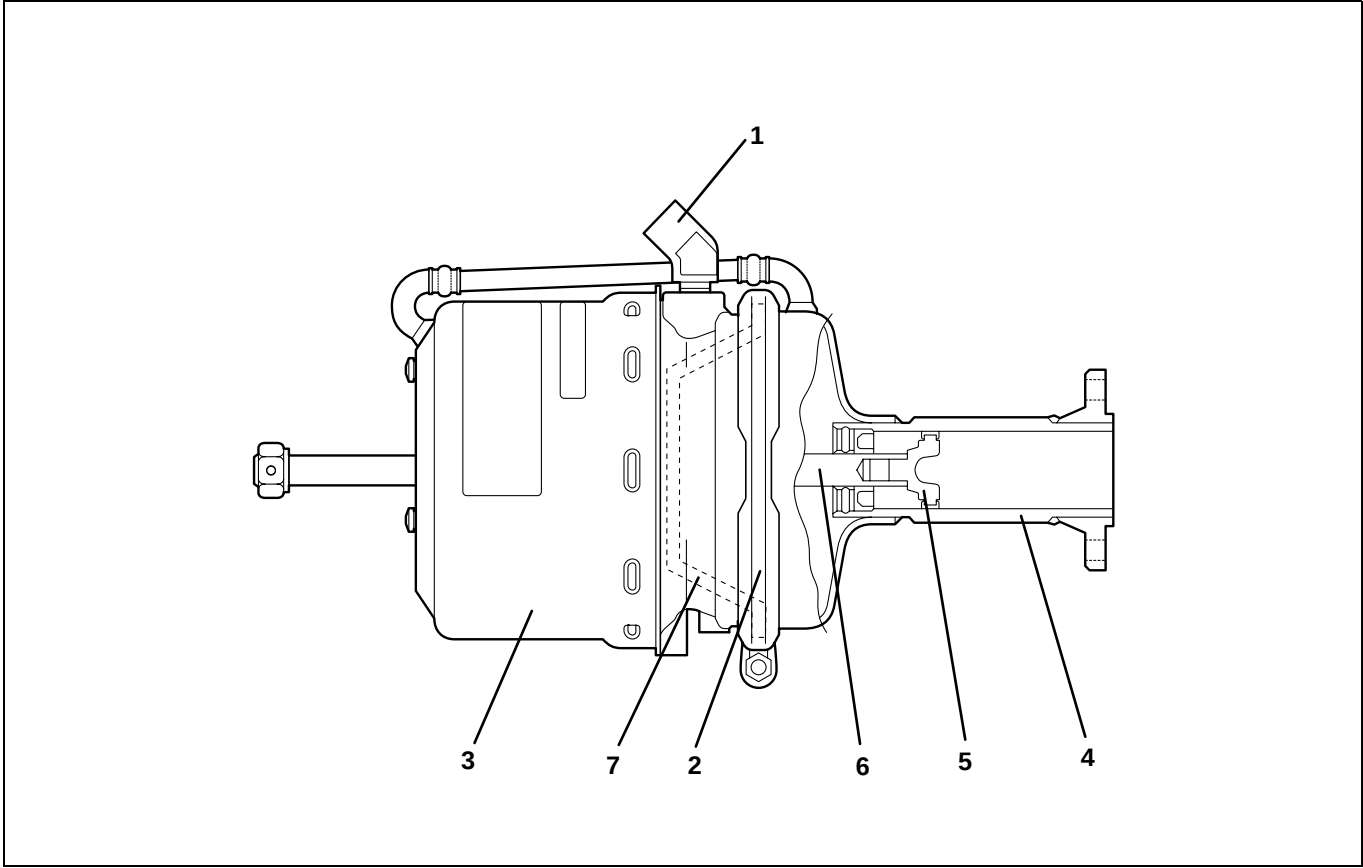
DATA AND SPECIFICATION

EN0680202I200021

Type	Spring and piston type brake chamber combined with diaphragm type chamber
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DESCRIPTION

EN0680202C100022

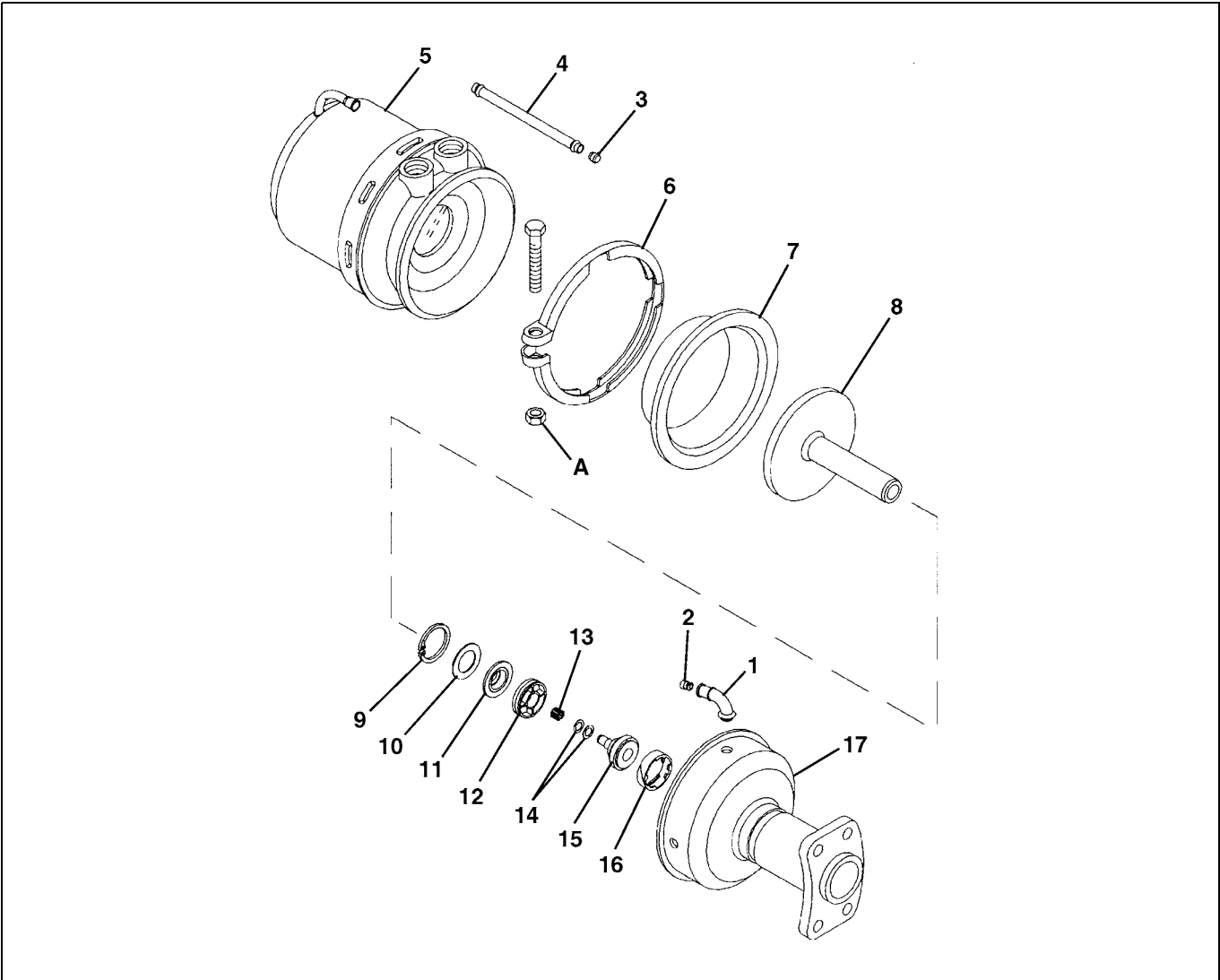


SHTS068020200208

1 Elbow	5 Push rod guide
2 Clamp	6 Push rod
3 Spring brake cylinder	7 Diaphragm
4 Base	

COMPONENT LOCATOR

EN0680202D100021



SHTS068020200209

1	Elbow	10	Plate
2	Plug	11	Oil seal
3	Filter	12	Guide
4	Tube	13	Tolerance ring
5	Spring brake cylinder	14	Washer
6	Clamp ring	15	Push rod guide
7	Diaphragm	16	Bushing
8	Push rod	17	Base
9	Snap ring		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}
A	25-30 {260-310, 18.8-22.4}	

SPECIAL TOOL

EN0680202K100003

Prior to starting a spring brake chamber overhaul, it is necessary to have this special tool.

Illustration	Part number	Tool name	Remarks
	09714-1030	WEDGE CHAMBER STROKE TOOL	

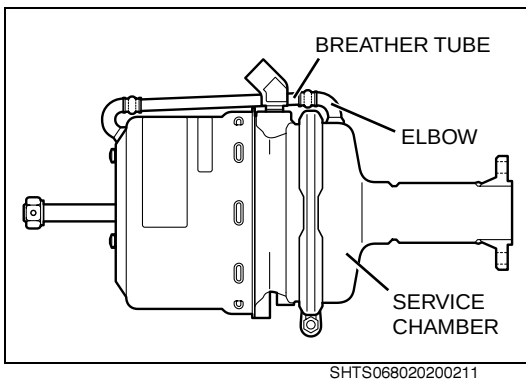
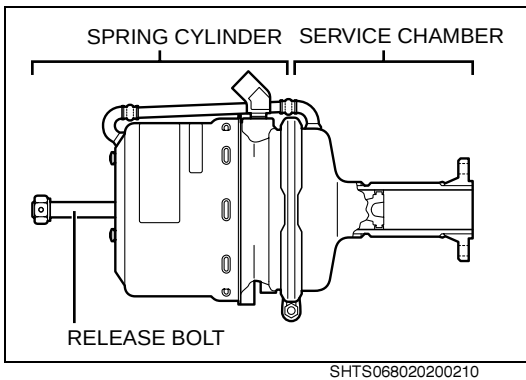
OVERHAUL

EN0680202H200020

IMPORTANT POINTS - DISASSEMBLY

⚠ WARNING

- Before disassembling it, check and verify that the release bolt is extruded.
- Spring cylinder is very dangerous because there is very strong spring inside it. Never disassembly the spring cylinder.



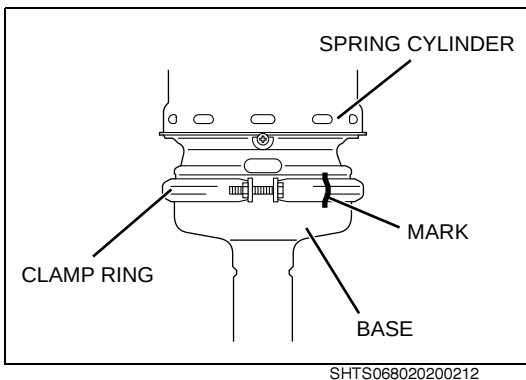
1. REMOVAL OF BREATHER TUBE

- (1) Remove off breather tube from service chamber side.

NOTICE

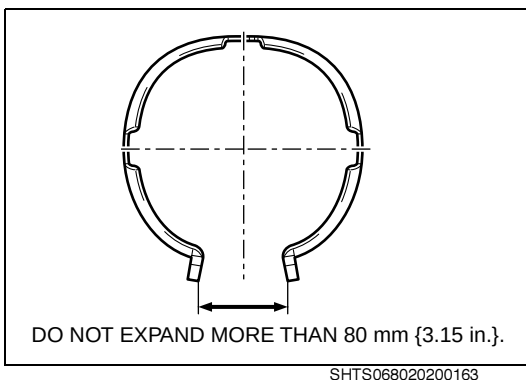
When carrying or moving to other place it, don't hold breather tube.

- (2) Remove the filter in the elbow.



2. REMOVAL OF SPRING CYLINDER

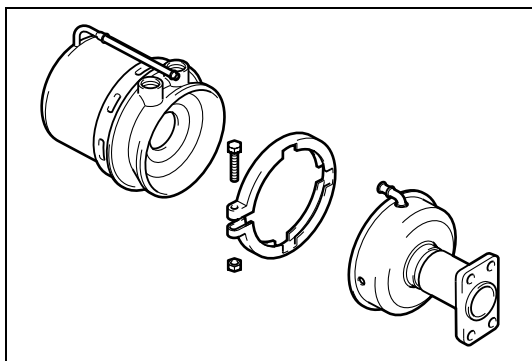
- (1) Make a matching mark to base, clamp ring and spring cylinder.



- (2) Mark clamp ring not to forget the inserting direction of clamp ring bolt and remove clamp ring.

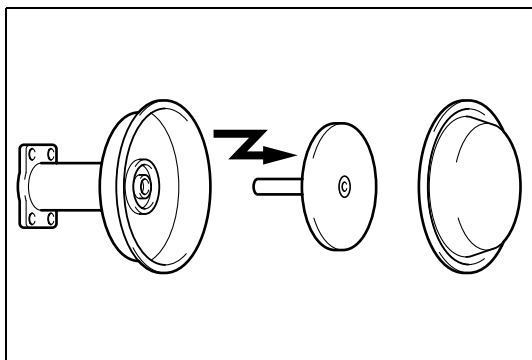
NOTICE

When removing clamp ring, do not expand the inserting portion of clamp ring bolt by more than 80 mm {3.15 in.}.



SHTS068020200213

- (3) Remove spring cylinder from base.



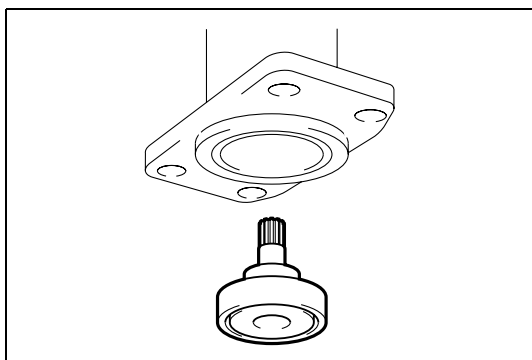
SHTS068020200165

3. REMOVAL OF DIAPHRAGM AND PUSH ROD

- (1) Remove diaphragm and push rod from base.

NOTICE

- Push rod should be removed out, holding plate and repeating to push and pull it straightly for a few times.
- When removing, push rod should not be pulled out up or downward, toward right or left, not hammering from the square flange side.



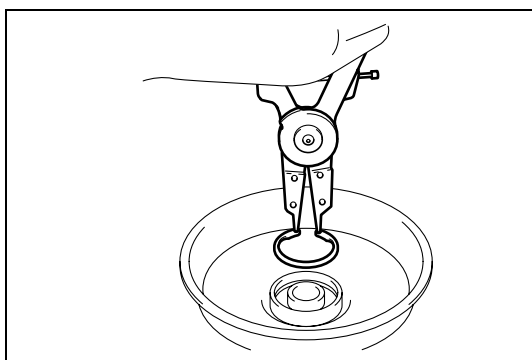
SHTS068020200166

4. REMOVAL OF PUSH ROD GUIDE

- (1) Take out push rod guide out of the square flange.

NOTICE

When removing push rod guide, do not drop off a washer in it.



SHTS068020200167

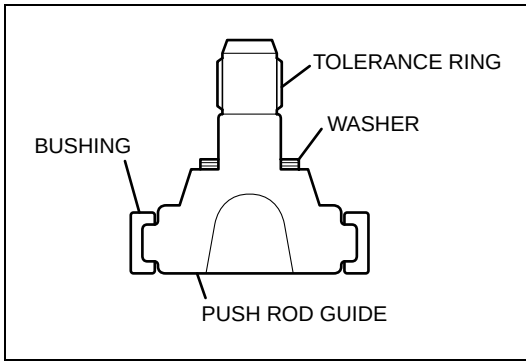
5. REMOVAL OF GUIDE

- (1) Remove snap ring, plate and oil seal with snap ring pliers.

⚠ WARNING

Make sure not to jump out a snap ring.

- (2) Remove guide, using a pipe having outer diameter of about $\phi 37$ mm {1.46 in.} and tapping with plastic hammer by making the square flange of base upside.



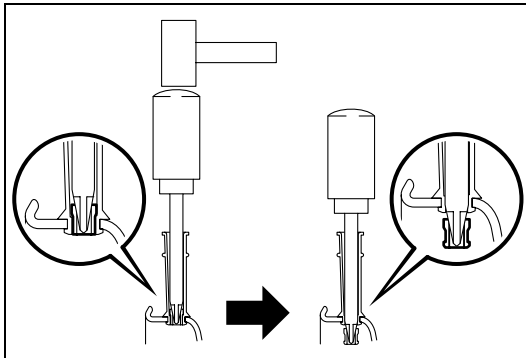
SHTS068020200168

6. DISASSEMBLY OF PUSH ROD GUIDE ASSEMBLY

- (1) Remove bushing and tolerance ring from push rod guide.

NOTICE

- Keep it surely as washer in the push rod guide may be reused when assembling it.
- There is a case that tolerance ring may be in the fitting hole at the tip of push rod, in case of which, pick it up with screw-driver, etc.



SHTS068020200214

7. REMOVAL OF ELBOW

- (1) By inserting a stick of $\phi 6 - \phi 8$ mm {0.24-0.31 in.} or screw-driver from inserting side of elbow hose, remove the plug from base, tapping with plastic hammer.

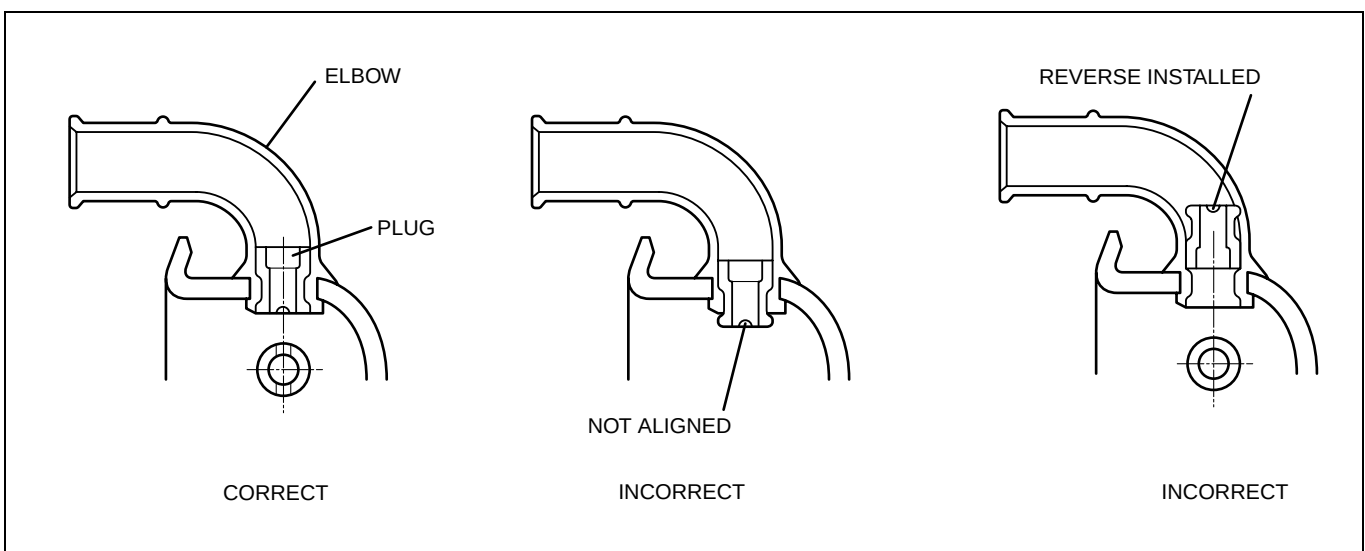
IMPORTANT POINTS - ASSEMBLY

1. MOUNTING OF ELBOW

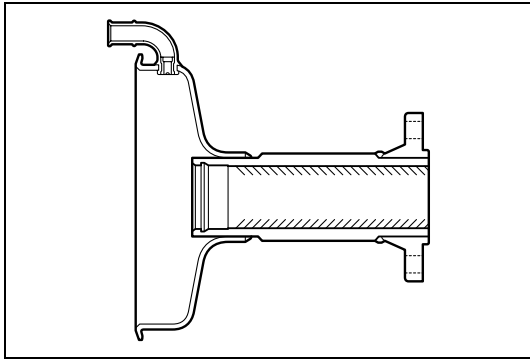
- (1) Install new elbow on base. In that case, set the direction of elbow tip to be faced toward diaphragm side and put plug in from the tip of elbow. Inserting the stick used in dismounting it or screw-driver, insert it so that both tips of plug and elbow may be aligned by tapping lightly with plastic hammer.

NOTICE

- Check and verify if the direction of plug and its installing condition are shown in the figure.
- When inserting the stick or the screw-driver, make sure not to damage elbow with their tips.
- After installing plug, make sure that elbow is not taken out by a force of 60 N {6.1 kgf, 27 lbf}.



SHTS068020200215



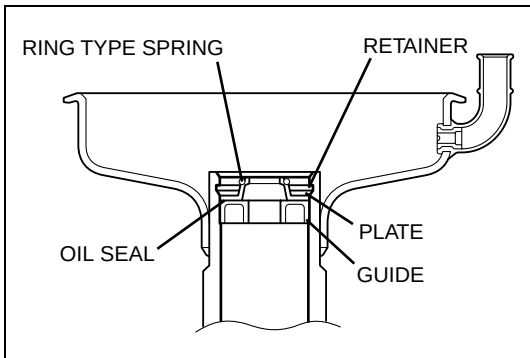
SHTS068020200216

2. INSTALLATION OF GUIDE, OIL SEAL AND PLATE

- (1) Apply lightly grease (stored in the repair kit) at moving portion of push rod guide on base.

NOTICE

Never fail to use the grease, stored in the "REPAIR KIT".

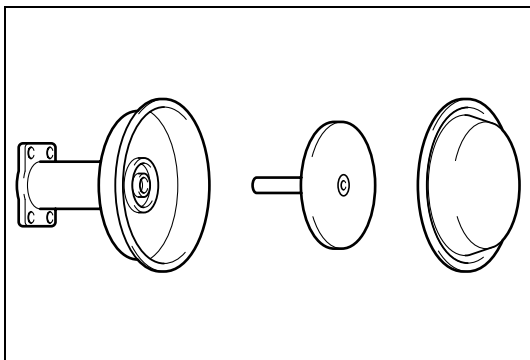


SHTS068020200217

- (2) Facing the flat side of new guide to diaphragm side, insert it until it touches down to base by tapping lightly with stick having an outer diameter of about $\phi 37$ mm {1.46 in.} or box-socket.

NOTICE

- Confirm that ring type spring is installed on oil seal.
- Confirm that retainer is in its groove.



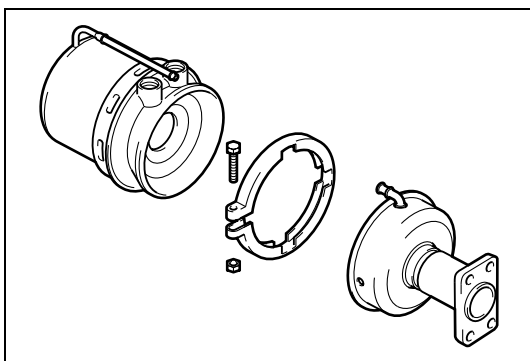
SHTS068020200171

3. INSTALLATION OF PUSH ROD AND DIAPHRAGM

- (1) Insert it to base by applying grease (stored in the "REPAIR KIT") at the rod portion of push rod.

NOTICE

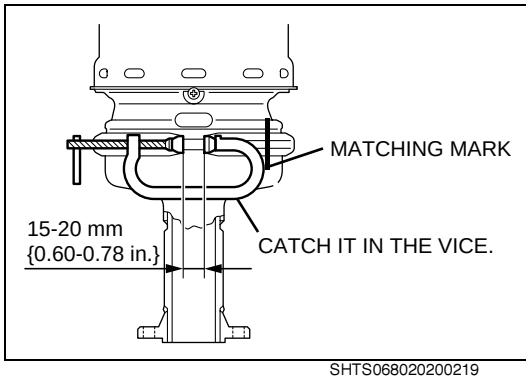
- Never fail to use grease, stored in the "REPAIR KIT".
- When installing push rod, make sure not to damage oil seal.



SHTS068020200218

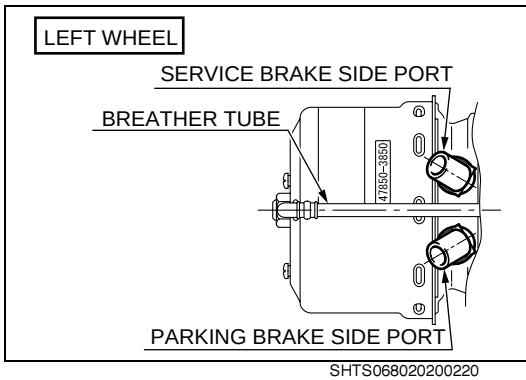
4. INSTALLATION OF SPRING CYLINDER

- (1) Putting spring cylinder on base, align those matching marks.



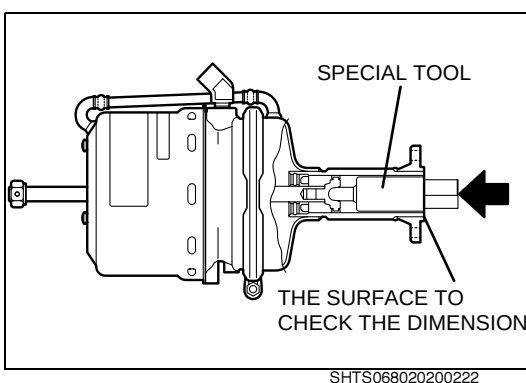
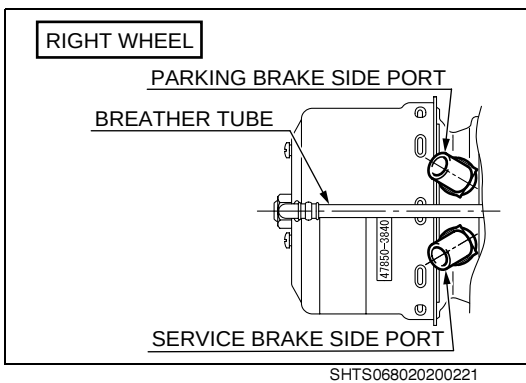
5. INSTALLATION OF CLAMP RING

- (1) Matching clamp ring with the fitting mark, catch the both end at bolt inserting portion of clamp ring with the vice gradually and make its both end of ring come closer to approx. 15-20 mm {0.60-0.78 in.} in the distance. After that, removing the vice, tighten temporarily them toward inserting direction with the bolt and nut.
- (2) Tap all periphery of clamp ring with plastic hammer and tighten securely the nut. Repeat this 2-3 times for gradual tightening.



6. INSTALLATION OF PUSH ROD GUIDE

- (1) Add into the parking brake side port a compressed air of 700-800 kPa {7.2-8.2 kgf/cm², 102-116 lbf/in.²}

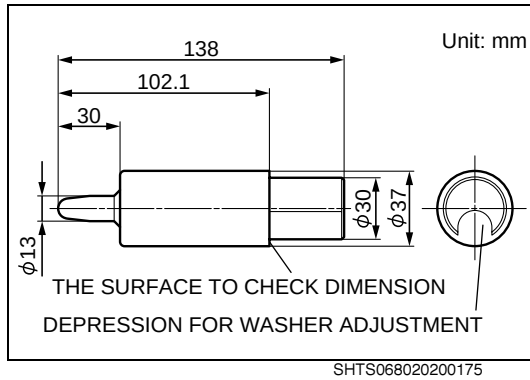


- (2) Putting new bushing into push rod guide, insert it deeply to base until push rod guide contacts with the internal hole of push rod guide by special tool.

SST: Wedge Chamber Stroke Tool (09714-1030)

NOTICE

In this case, do not install tolerance ring and washer.



- (3) Under the status that the special tool remains pushed against push rod guide, piling washers on the depression for adjustment at the end-face of special tool and picking out one top washer piled up, determine Max. quantity of washers, installable in the internal diameter of base.

NOTICE

The washer quantity at this time is adjusted one for setting dimension of push rod guide. Accordingly, keep them securely.

HINT

- Do not mind to use the washers picked out in dismounting.
 - Target for washer quantity: 0-4 pcs.
 - Washer thickness (1 pierce): 0.5 mm {0.02 in.}
- (4) Picking out special tool and push rod guide for a while and installing the washer of quantities determined in the above (3) and new tolerance ring on push rod guide, insert it deeply with special tool again until push rod guide contacts with the bottom.

NOTICE

- Be careful not to drop off the washers.
 - After installing, confirm that, under the status that the special tool remains pushed against push rod guide, the end-face of base side is almost identical with the surface to check setting dimension of special tool.
- (5) Exhaust the air of parking brake side port.
 (6) Apply grease at the depression portion of push rod guide.

Using grease:

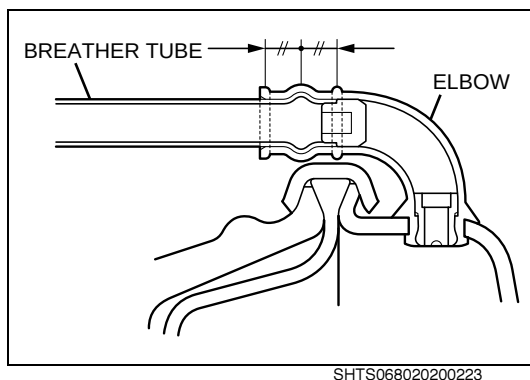
COSMO Heat-resistant grease B No. 2 or equivalent.

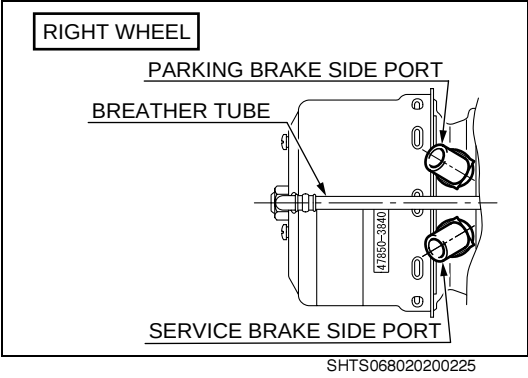
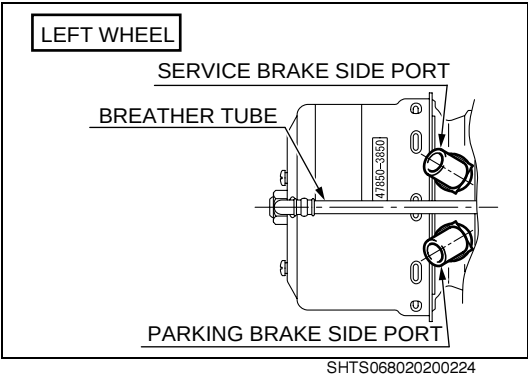
7. INSTALLATION OF BREATHER TUBE

- (1) Insert new filter into the tip of breather tube, after which it should be inserted into elbow. In this case, make sure that the hose bulge should come to the center between two protuberant portions, located at the end of elbow.

NOTICE

- Pay attention to the direction of filter. (Its small path side should be tube side)
- When inserting breather tube into elbow, do not apply any grease or the like.





8. INSPECTION AFTER INSTALLATION

- (1) When adding air of 700-800 kPa {7.2-8.2 kgf/cm², 102-116 lbf/in.²} to service brake side port or parking brake side port, check that push rod moves smoothly.
- (2) Make sure not to leak air from diaphragm.

INSPECTION AND REPAIR

EN0680202H300024

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Base, push rod, dia- phragm and spring brake cylinder: Wear and damage	—	—	Replace, if necessary	Visual check

TRAILER HAND BRAKE CONTROL VALVE

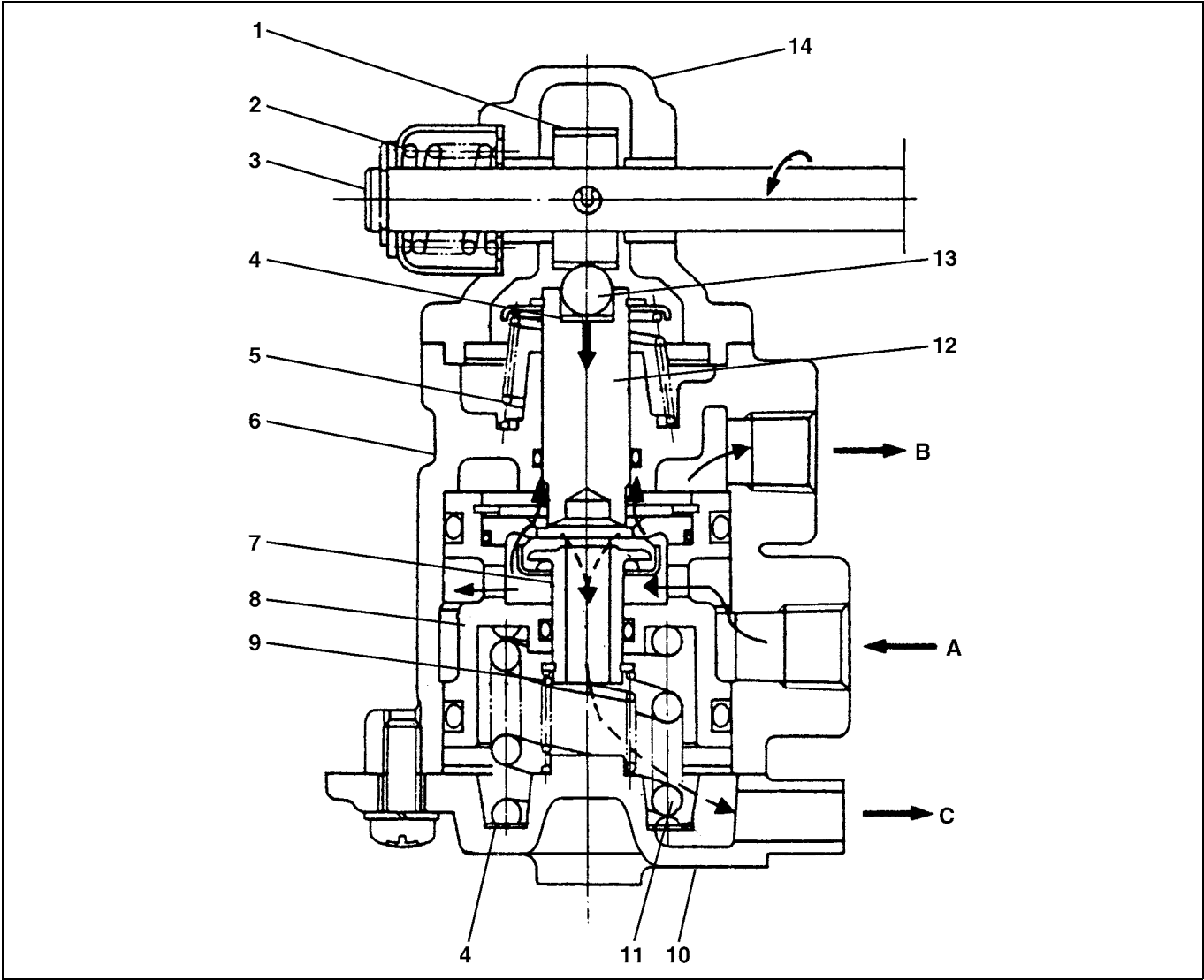
DATA AND SPECIFICATION

EN0680202I200022

Type	Variable pressure control type
------	--------------------------------

DESCRIPTION

EN0680202C100023

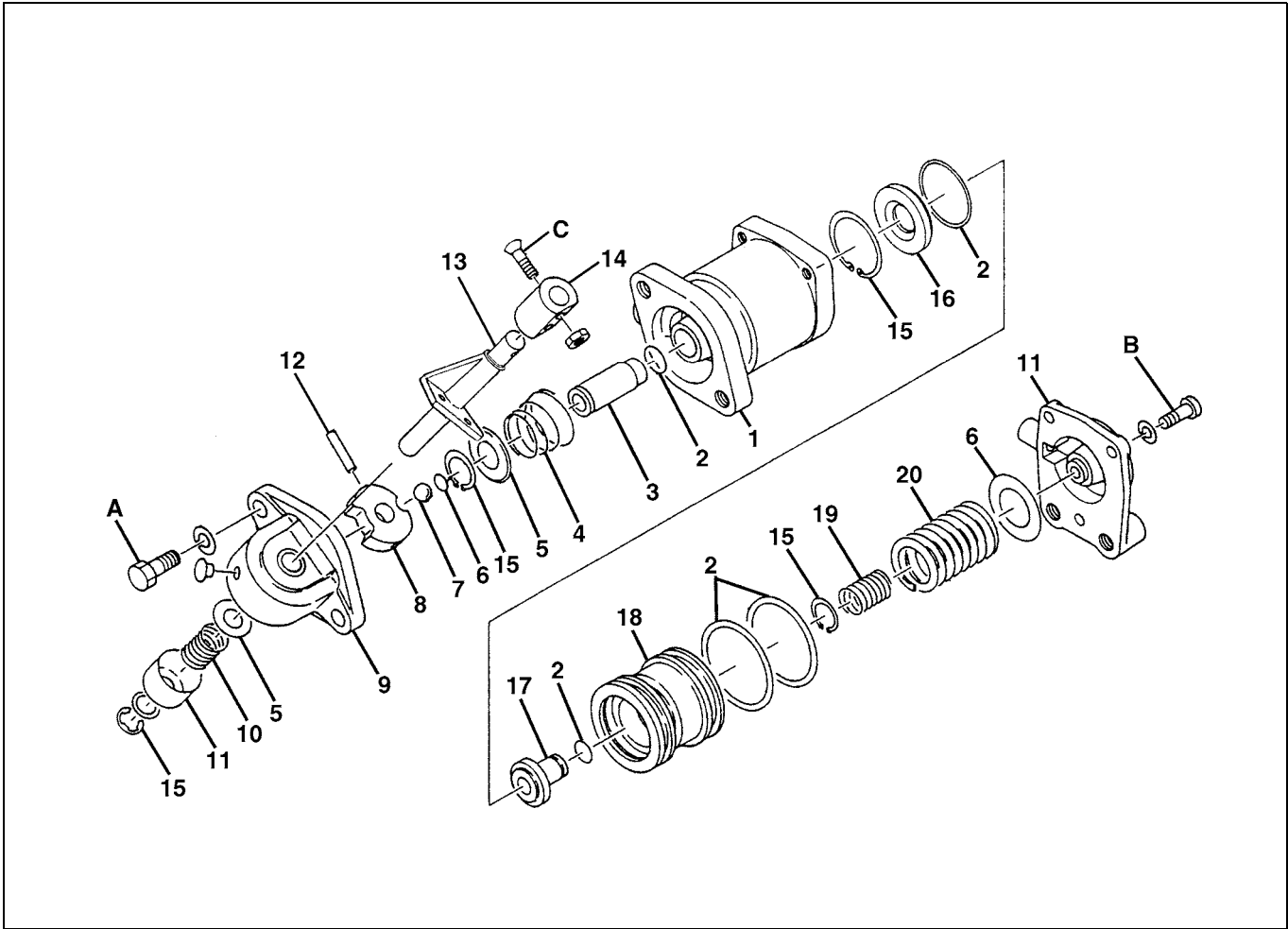


SHTS068020200227

1	Cam	7	Feed valve	13	Steel ball
2	Spring	8	Piston	14	Holder
3	Handle	9	Inner spring	A	Inlet
4	Shim	10	Cover	B	Outlet
5	Conical spring	11	Outer spring	C	Exhaust
6	Valve body	12	Exhaust valve		

COMPONENT LOCATOR

EN0680202D100022



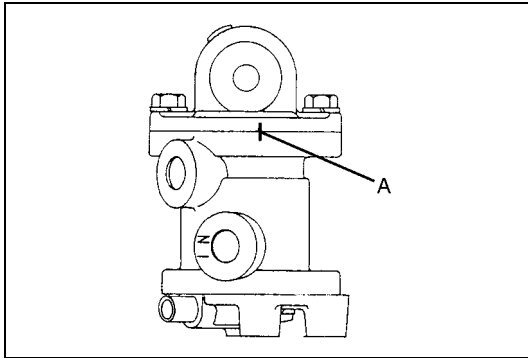
SHTS068020200228

1	Valve body	8	Cam	15	Retainer ring
2	O-ring	9	Holder	16	Valve seat
3	Exhaust valve	10	Spring	17	Feed valve
4	Conical spring	11	Cover	18	Piston
5	Spring seat	12	Pin	19	Inner spring
6	Shim	13	Handle	20	Outer spring
7	Steel ball	14	Connector		

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	9.8-19.6 {100-200, 8-14}	C	2.5-3.9 {25-40, 1.9-2.8}
B	5.4-7.4 {55-75, 4.0-5.4}		

OVERHAUL

EN0680202H200021

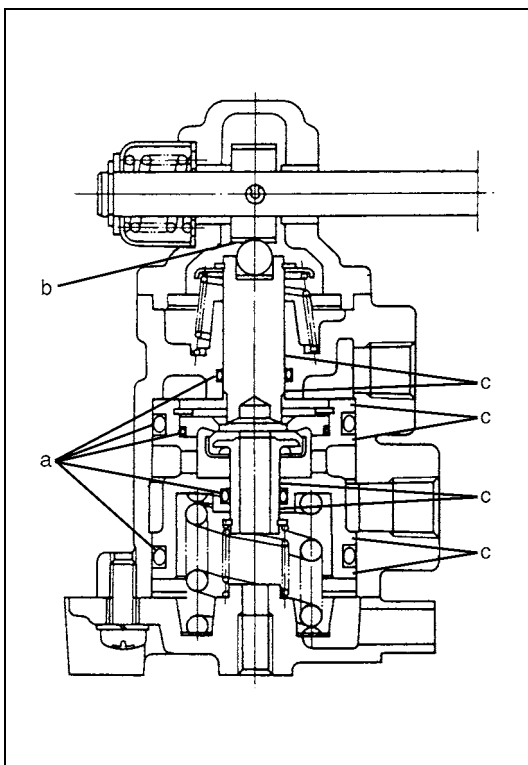


SHTS068020200229

IMPORTANT POINT - DISASSEMBLY

NOTICE

Before disassembling the hand brake valve, mark the aligning mark "A" on the holder and valve body.

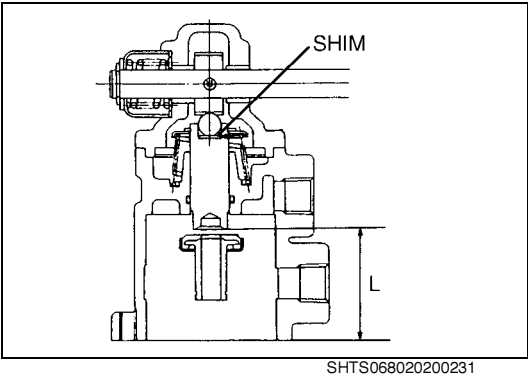


SHTS068020200230

IMPORTANT POINT - ASSEMBLY

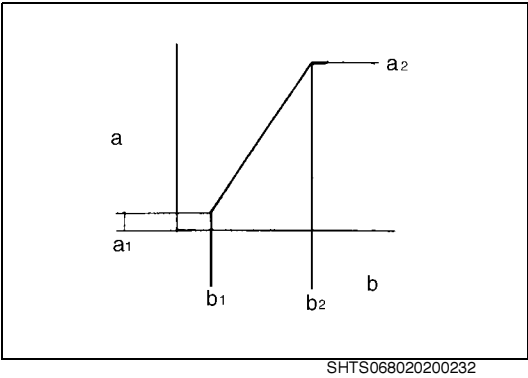
1. LUBRICATION

- (1) When assembling the hand brake valve, use new O-ring and feed valve.
- (2) Apply silicone grease to each sliding surface of the component parts and O-ring groove.
 - a. **O-ring**
 - b. **Contact of steel ball**
 - c. **Sliding surface**
- (3) Align the aligning mark of the holder and valve body.



IMPORTANT POINTS - ADJUSTMENT

1. EXHAUST VALVE FITTING HEIGHT
- (1) Measure the exhaust valve fitting height "L" and adjust it.
- NOTICE
- Adjust this dimension with shims.
- L: 38.3-38.7 mm {1.508-1.523 in.}



2. HAND BRAKE VALVE PERFORMANCE CHARACTERISTIC
- a. Air pressure at outlet port (kPa {kgf/cm², lbf/in.²})
- b. Handle turning angle (°)
- Part No. -1341

a	(a ₁) 19.6-68.6 {0.2-0.7, 2.8-9.9}	(a ₂) 313.6-411.8 {3.2-4.2, 45.5-59.7}
b	(b ₁) 7-13	(b ₂) 37-43

Part No. -1350/ -1360

a	(a ₁) 19.6-68.6 {0.2-0.7, 2.8-9.9}	(a ₂) 421-559 {4.3-5.7, 61.1-81.0}
b	(b ₁) 7-13	(b ₂) 42-48

NOTICE

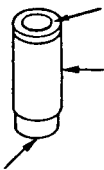
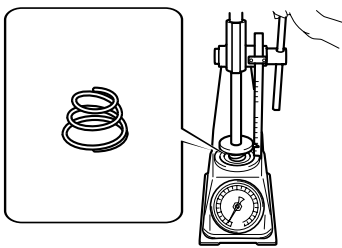
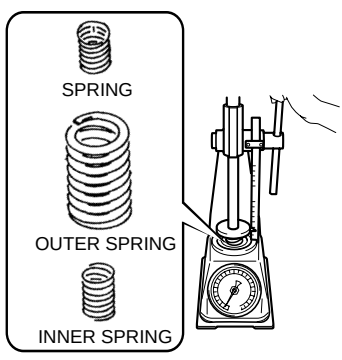
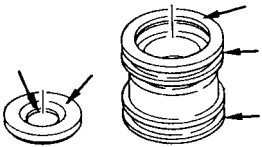
The characteristic shown in both diagrams are for inlet air pressure of 690 kPa {7.0 kgf/cm², 99.54 lbf/in.²}.

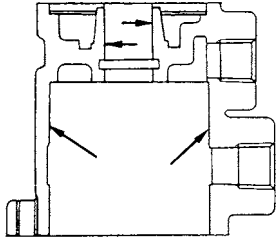
The characteristic can be adjusted by changing the shim thickness of the steel ball and of the outer spring.

INSPECTION AND REPAIR

EN0680202H300025

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Sliding surface of exhaust valve: Wear and damage	—	—	Replace, if necessary.	Visual check 
Conical spring: Free length/ Setting length/ Crack, rust and damage	28.5 {1.12}/ 18 {0.71}/ 31.4 N {3.2 kgf, 7.06 lbf}	29.4 N {3.0 kgf, 6.61 lbf} (Setting load)	Replace, if necessary.	Measure and visual check 
Spring, outer spring and inner spring: Free length/ Setting length/ Setting load Crack, rust and damage	Spring 25 {0.98}/ 15 {0.59}/ 50.0 N {5.1 kgf, 11.24 lbf}	44.1 N {4.5 kgf, 9.92 lbf} (Setting load)	Replace, if necessary.	Measure and Visual check 
	Outer spring 31.3 {1.23}/ 30.5 {1.20}/ 152.0 N {15.5 kgf, 34.17 lbf}	29.5 {1.16} (Free length) 122.6 N {12.5 kgf, 27.56 lbf} (Setting load)		
	Inner spring 28.5 {1.12}/ 18 {0.71}/ 31.4 N {3.2 kgf, 7.06 lbf}	27.5 {1.08} (Free length) 28.4 N {2.9 kgf, 6.39 lbf} (Setting length)		
Piston and valve seat: Wear and damage	—	—	Replace, if necessary.	Visual check 
Cam and steel ball: Wear and damage	—	—	Replace, if necessary.	Visual check 

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve body: Rust, wear and damage	—	—	Replace, if necessary.	Visual check 

WHEEL BRAKE (TYPE: S-CAM BRAKE)

DATA AND SPECIFICATIONS

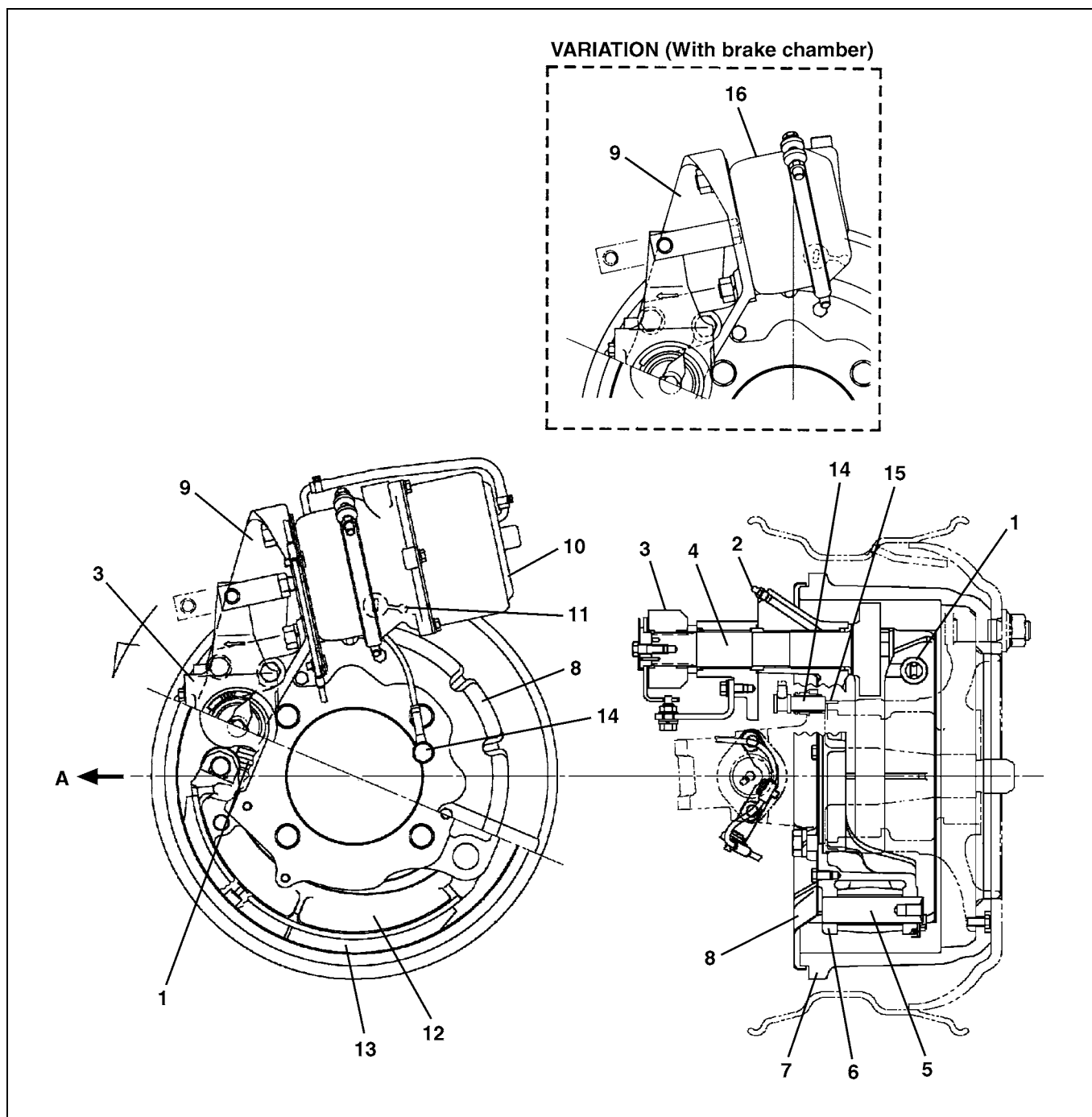
EN06802021200023

Type		Drum brake with internally expanding, leading-trailing shoes operating by cam shaft and slack adjuster in all wheels.	
Brake drum inside diameter	With ISO type wheel	406.4 mm {16.0 in.} for both front and rear	
	With spoke type wheel	440.0 mm {17.3 in.} for both front and rear	
Brake lining Width x Thickness	With ISO type wheel	Front	152 x 15.5 mm {6.0 x 0.61 in.}
		Rear	216 x 15.5 mm {8.5 x 0.61 in.}
	With spoke type wheel	Front	127 x 15.5 mm {5.0 x 0.61 in.}
		Rear	203 x 15.5 mm {8.0 x 0.61 in.}

DESCRIPTION

EN0680202C100024

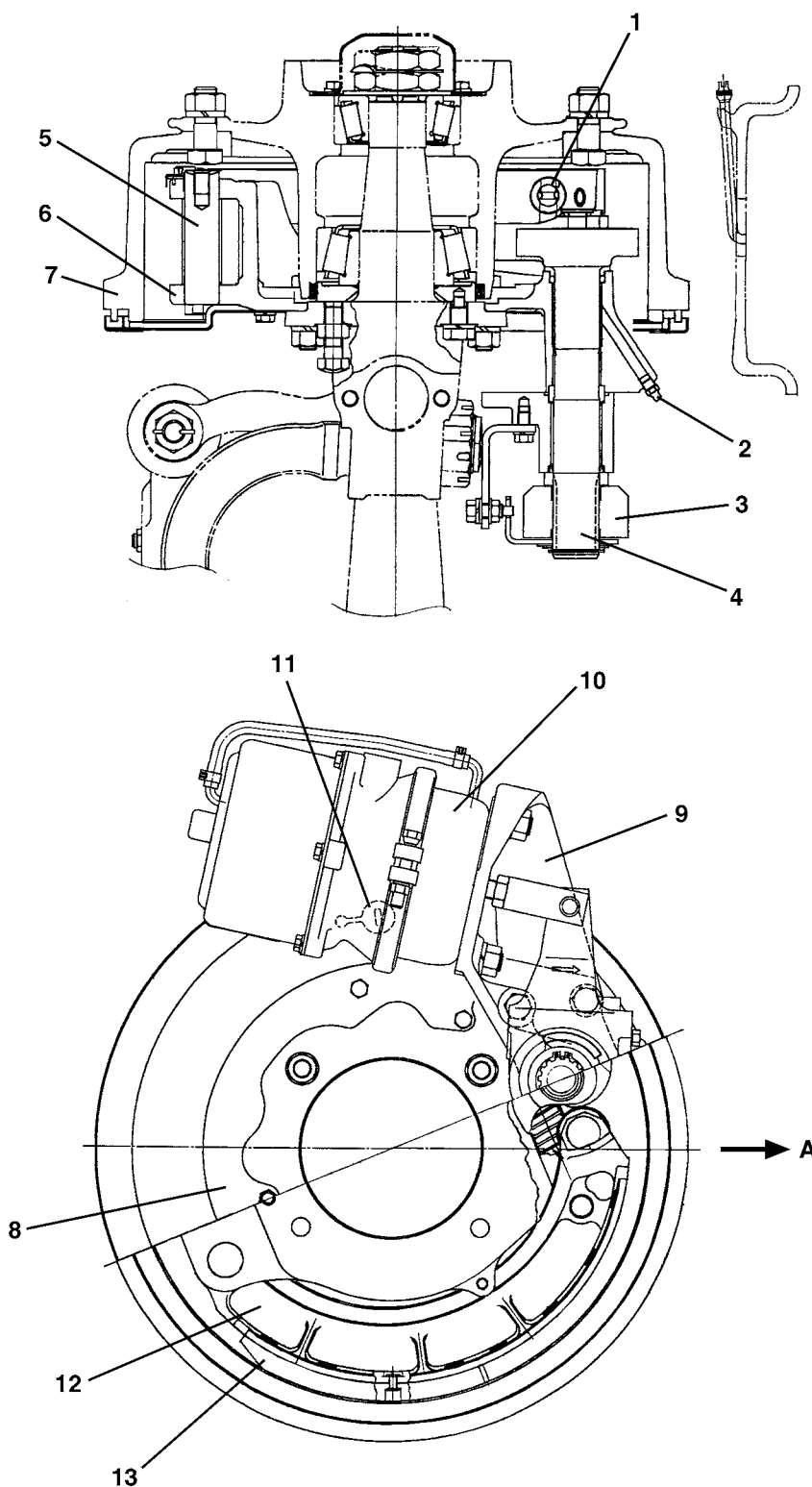
FRONT (With ISO type wheel)



SHTS068020200239

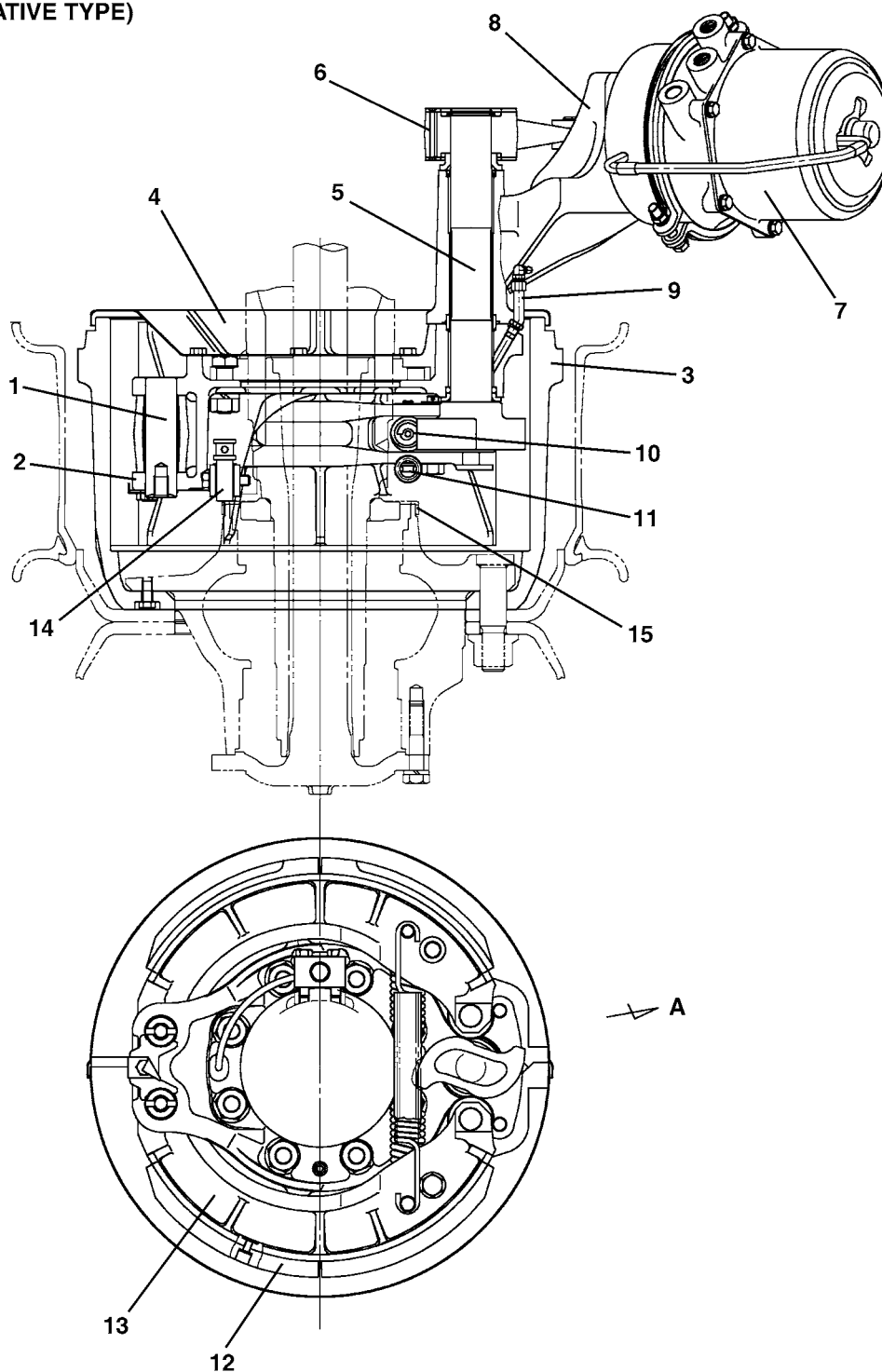
- 1 Brake shoe return spring
- 2 Lubrication fitting
- 3 Slack adjuster
- 4 Cam shaft
- 5 Anchor pin
- 6 Brake spider
- 7 Brake drum
- 8 Brake drum cover
- 9 Brake chamber bracket

- 10 Spring brake chamber
- 11 Hole plug
- 12 Brake shoe
- 13 Brake lining
- 14 Wheel sensor (If so equipped)
- 15 Sensor ring (If so equipped)
- 16 Brake chamber
- A Front

FRONT (With spoke type wheel)

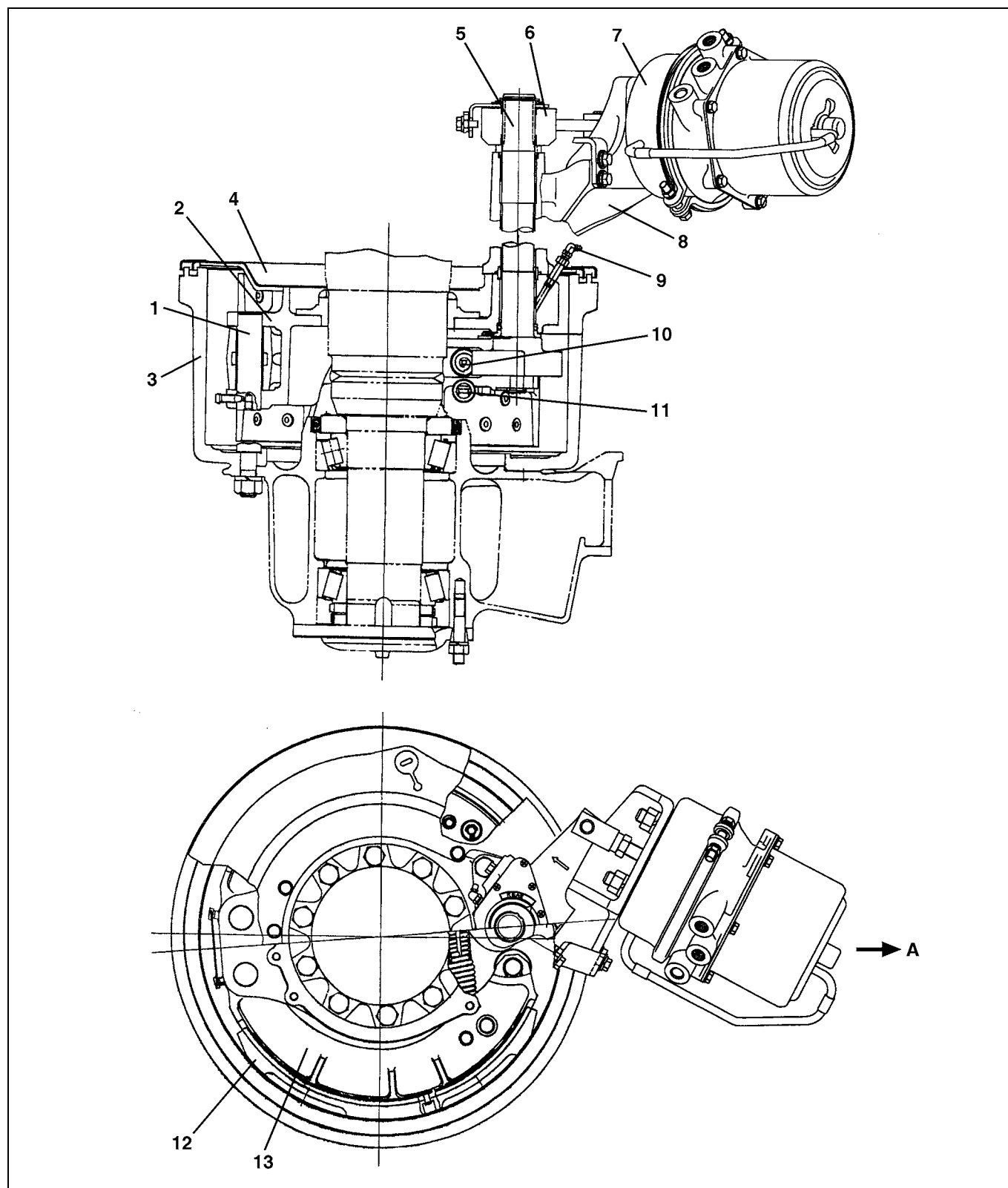
SHTS068020200240

1	Brake shoe return spring	8	Brake drum cover
2	Lubrication fitting	9	Brake chamber bracket
3	Slack adjuster	10	Spring brake chamber
4	Cam shaft	11	Hole plug
5	Anchor pin	12	Brake shoe
6	Brake spider	13	Brake lining
7	Brake drum	A	Front

REAR-FRONT (With ISO type wheel)**(REPRESENTATIVE TYPE)**

SHTS068020200241

1	Anchor pin	9	Lubrication fitting
2	Brake spider	10	Brake shoe return spring (Inner)
3	Brake drum	11	Brake shoe return spring (Outer)
4	Brake drum cover	12	Brake lining
5	Cam shaft	13	Brake shoe
6	Slack adjuster	14	Wheel sensor (If so equipped)
7	Spring brake chamber	15	Sensor ring (If so equipped)
8	Brake chamber bracket	A	Front

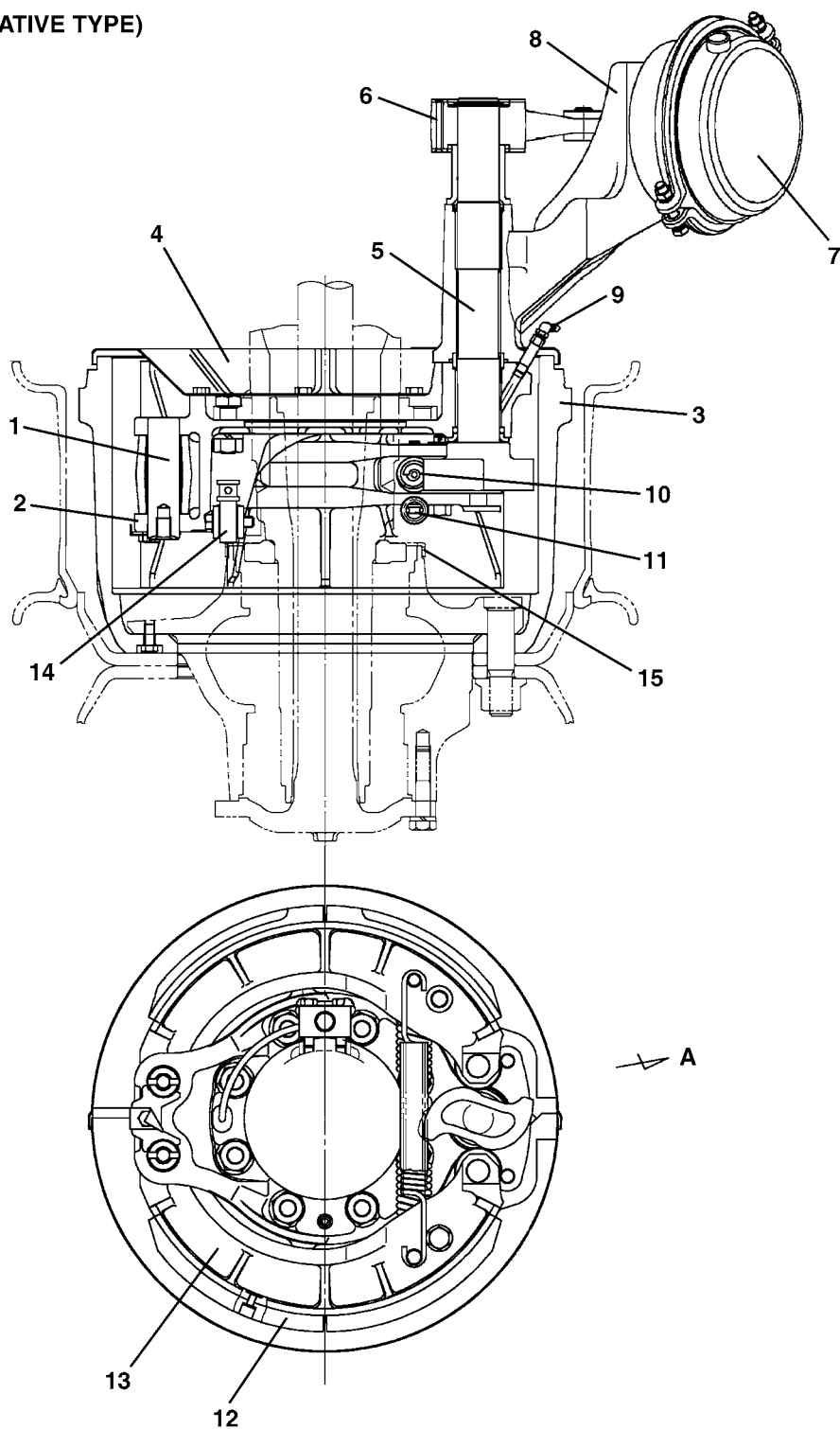
REAR-FRONT (With spoke type wheel)

SHTS068020200242

1	Anchor pin	8	Brake chamber bracket
2	Brake spider	9	Lubrication fitting
3	Brake drum	10	Brake shoe return spring (Inner)
4	Brake drum cover	11	Brake shoe return spring (Outer)
5	Cam shaft	12	Brake lining
6	Slack adjuster	13	Brake shoe
7	Spring brake chamber	A	Front

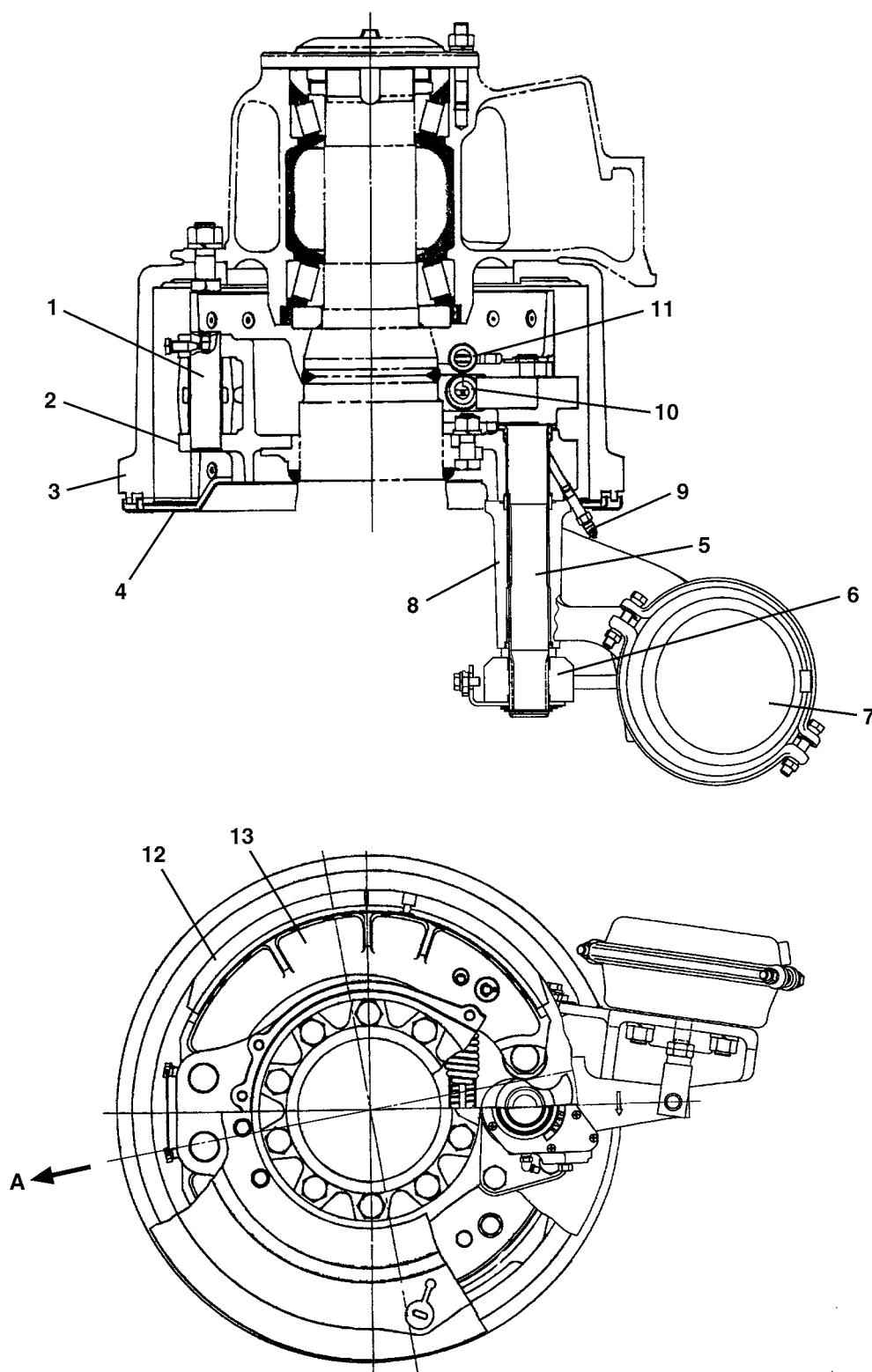
REAR-REAR (With ISO type wheel)

(REPRESENTATIVE TYPE)



SHTS068020200243

1	Anchor pin	9	Lubrication fitting
2	Brake spider	10	Brake shoe return spring (Inner)
3	Brake drum	11	Brake shoe return spring (Outer)
4	Brake drum cover	12	Brake lining
5	Cam shaft	13	Brake shoe
6	Slack adjuster	14	Wheel sensor (If so equipped)
7	Brake chamber	15	Sensor ring (If so equipped)
8	Brake chamber bracket	A	Front

REAR-REAR (With spoke type wheel)

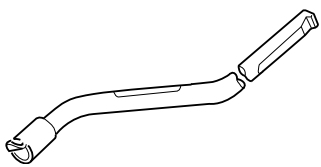
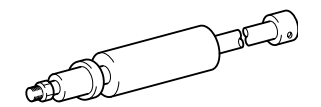
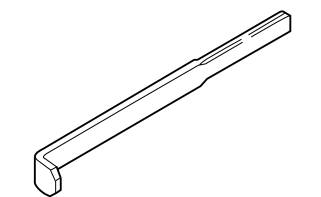
SHTS068020200244

1	Anchor pin	8	Brake chamber bracket
2	Brake spider	9	Lubrication fitting
3	Brake drum	10	Brake shoe return spring (Inner)
4	Brake drum cover	11	Brake shoe return spring (Outer)
5	Cam shaft	12	Brake lining
6	Slack adjuster	13	Brake shoe
7	Brake chamber	A	Front

SPECIAL TOOL

EN0680202K100004

Prior to starting a wheel brake overhaul, it is necessary to have these special tools.

Illustration	Part number	Tool name	Remarks
	09683-1070	SPRING PULL BACK TOOL	
	09420-1510	ANCHOR PIN PULLER	
	09684-1010	ANCHOR PIN TOOL	

COMPONENT LOCATOR

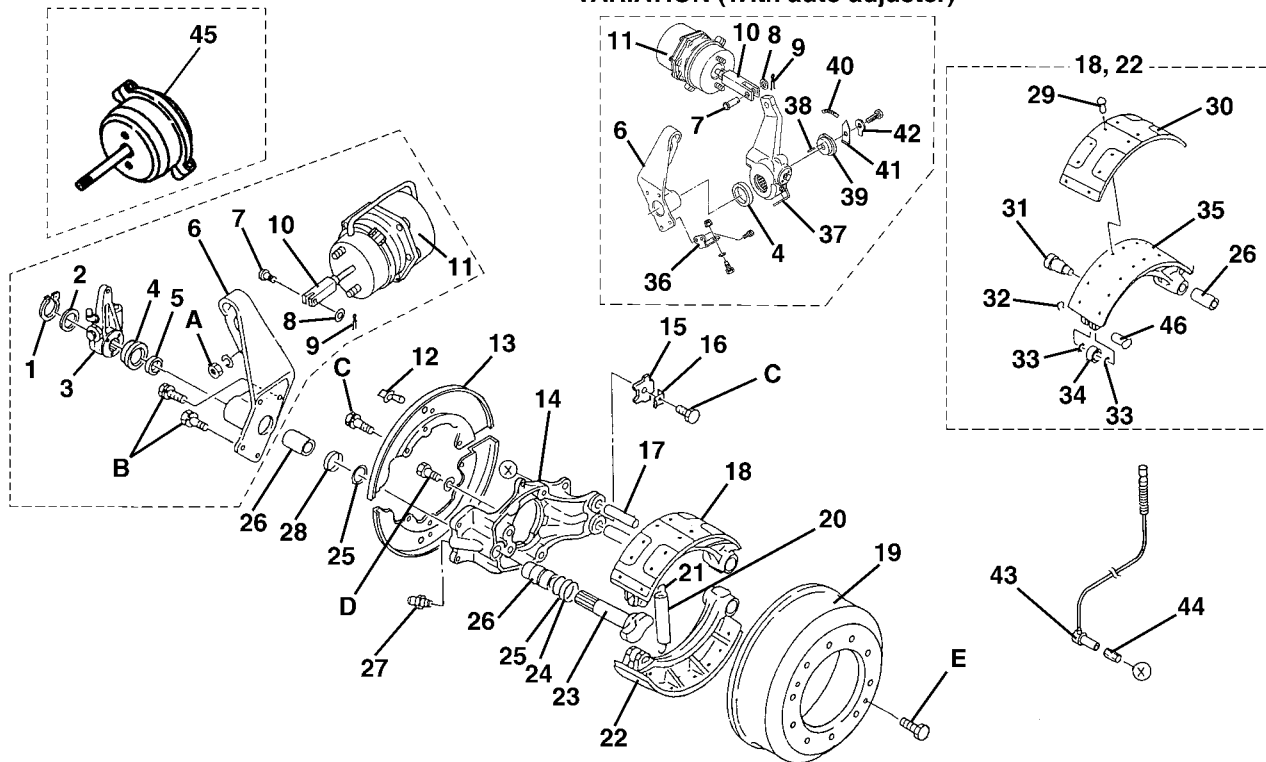
EN0680202D100023

FRONT (With ISO type wheel)

REPRESENTATIVE TYPE

VARIATION (With brake chamber)

VARIATION (With auto adjuster)



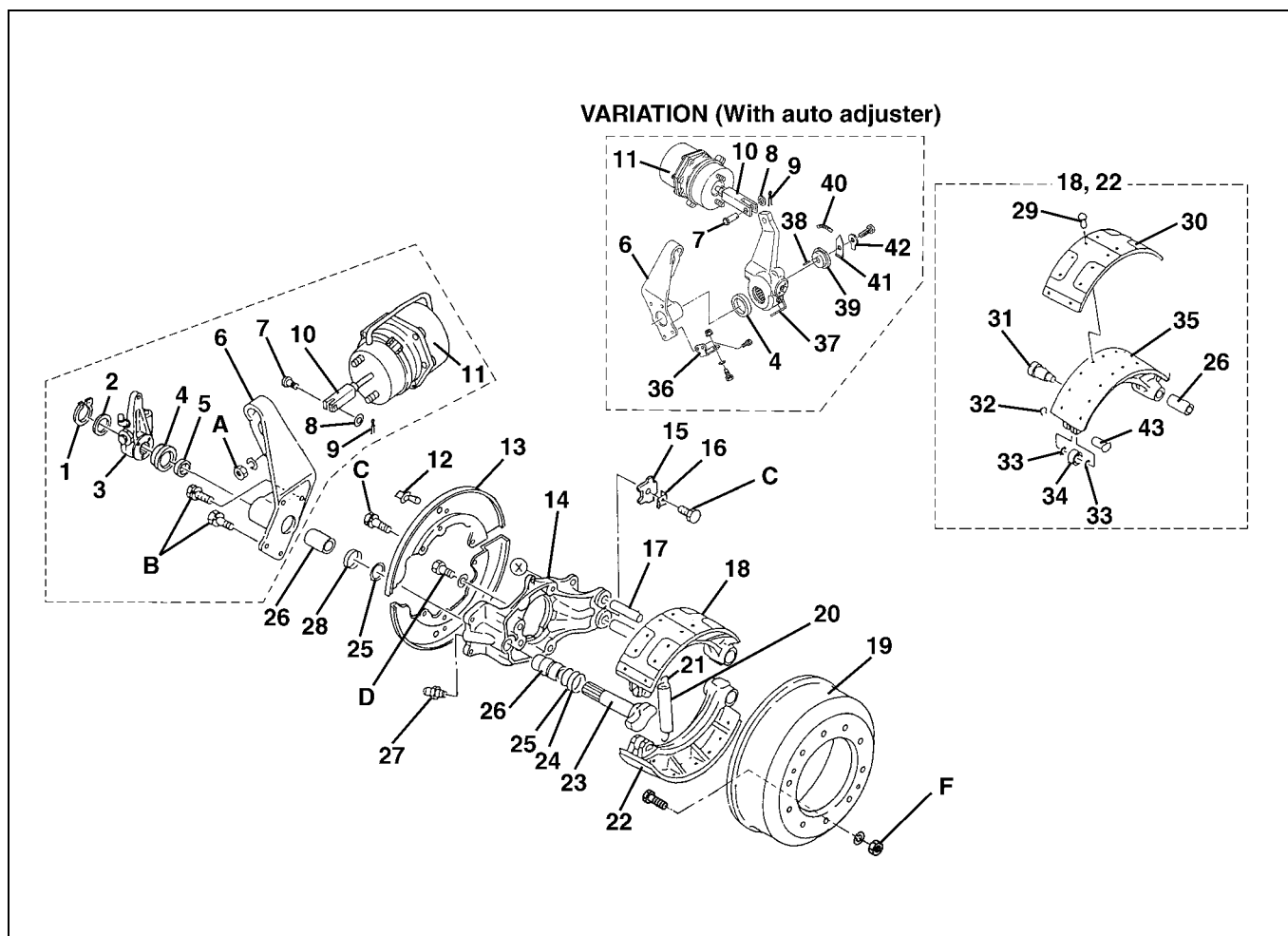
SHTS068020200248

1 Retainer ring	17 Anchor pin	33 Seal
2 Thrust washer	18 Brake shoe assembly (Trailing)	34 Roller
3 Slack adjuster	19 Brake drum	35 Brake shoe
4 Collar	20 Spring cover	36 Bracket (If so equipped)
5 Oil seal	21 Brake shoe return spring	37 Auto slack adjuster (If so equipped)
6 Brake chamber bracket	22 Brake shoe assembly (Leading)	38 Pin (If so equipped)
7 Pin	23 Cam shaft	39 Spacer (If so equipped)
8 Washer	24 Collar	40 Plate (If so equipped)
9 Cotter pin	25 O-ring	41 Indicator (If so equipped)
10 Clevis	26 Bushing	42 Lock washer (If so equipped)
11 Spring brake chamber	27 Lubrication fitting	43 Wheel sensor (If so equipped)
12 Hole plug	28 Spacer	44 Sleeve (If so equipped)
13 Brake drum cover	29 Rivet	45 Brake chamber
14 Brake spider	30 Brake lining	46 Roller pin
15 Retainer	31 Spring pin	
16 Lock plate	32 Retainer ring	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 119-225 {1,214-2,294, 88-165}	D 246-324 {2,509-3,303, 182-238}
B 109-147 {1,112-1,498, 81-108}	E 20.5-39.5 {210-402, 16-29}
C 34.5-51.5 {352-525, 26-37}	

FRONT (With spoke type wheel)

SHTS068020200249

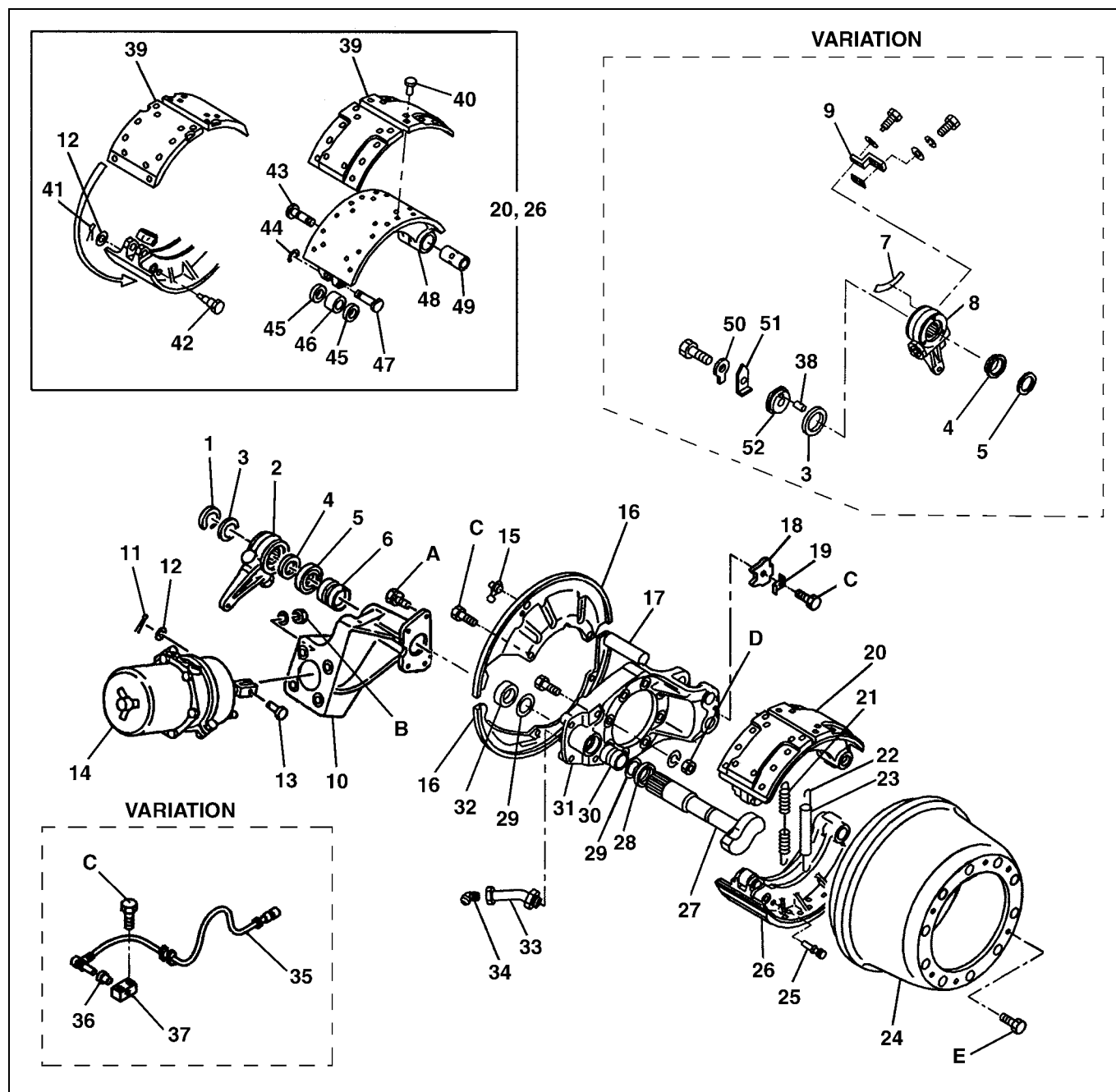
1 Retainer ring	16 Lock plate	31 Spring pin
2 Thrust washer	17 Anchor pin	32 Retainer ring
3 Slack adjuster	18 Brake shoe assembly (Trailing)	33 Seal
4 Collar	19 Brake drum	34 Roller
5 Oil seal	20 Spring cover	35 Brake shoe
6 Brake chamber bracket	21 Brake shoe return spring	36 Bracket (If so equipped)
7 Pin	22 Brake shoe assembly (Leading)	37 Auto slack adjuster (If so equipped)
8 Washer	23 Cam shaft	38 Pin (If so equipped)
9 Cotter pin	24 Collar	39 Spacer (If so equipped)
10 Clevis	25 O-ring	40 Plate (If so equipped)
11 Spring brake chamber	26 Bushing	41 Indicator (If so equipped)
12 Hole plug	27 Lubrication fitting	42 Lock washer (If so equipped)
13 Brake drum cover	28 Spacer	43 Roller pin
14 Brake spider	29 Rivet	
15 Retainer	30 Brake lining	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 119-225 {1,214-2,294, 88-165}	D 246-324 {2,509-3,303, 182-238}
B 109-147 {1,112-1,498, 81-108}	E 393-471 {4,008-4,802, 290-347}
C 34.5-51.5 {352-525, 26-37}	

REAR-FRONT (With ISO type wheel)



SHTS068020200250

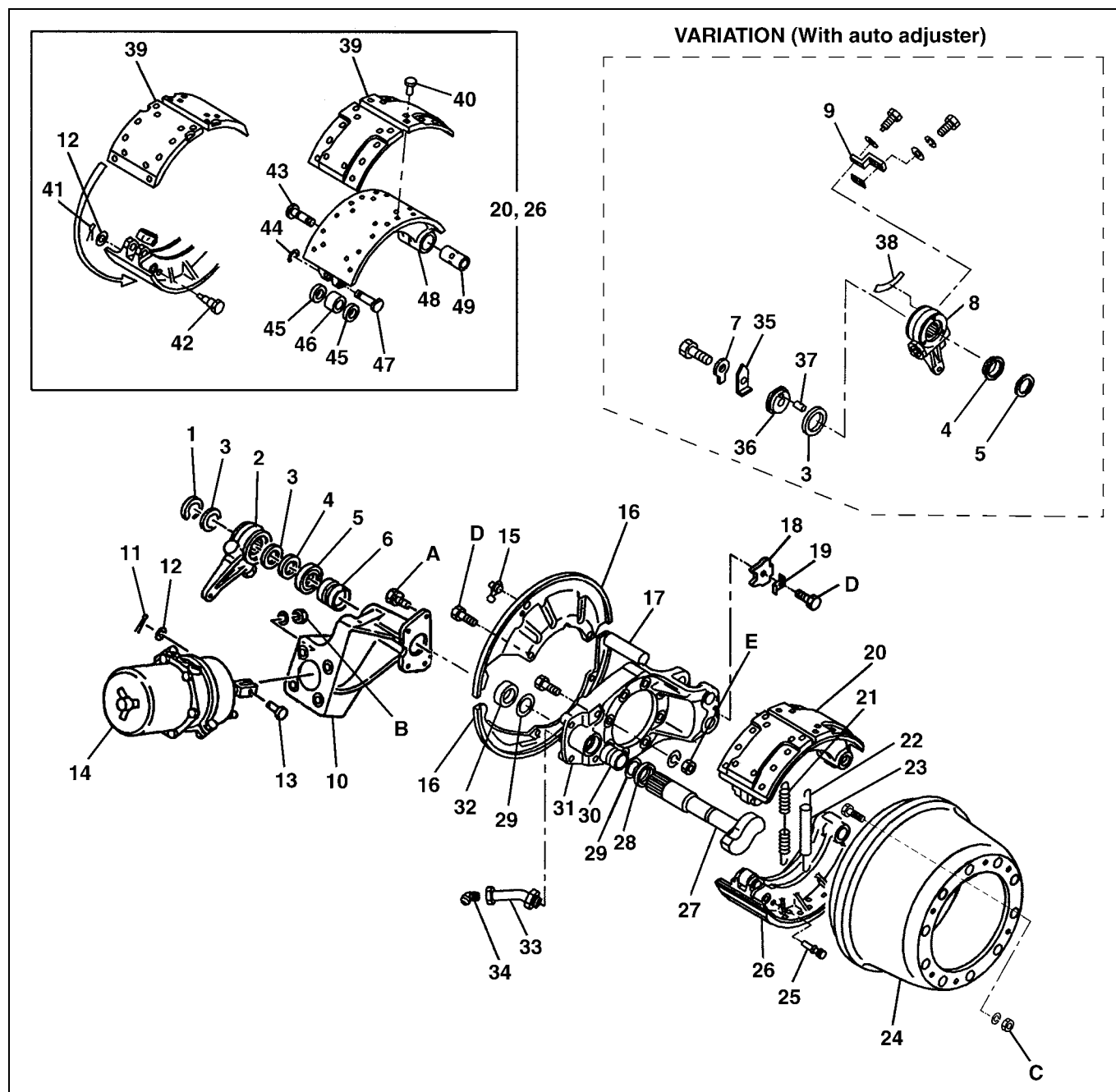
1 Retainer ring	19 Lock plate	37 Holder (If so equipped)
2 Slack adjuster	20 Brake shoe assembly (Trailing)	38 Pin (If so equipped)
3 Thrust washer	21 Brake shoe return spring (Inner)	39 Brake lining
4 Collar	22 Brake shoe return spring (Outer)	40 Rivet
5 Oil seal	23 Spring cover	41 Cotter pin
6 Bushing	24 Brake drum	42 Pivot pin
7 Plate (If so equipped)	25 Spring pin	43 Spring pin
8 Auto slack adjuster (If so equipped)	26 Brake shoe assembly (Leading)	44 Retainer ring
9 Bracket (If so equipped)	27 Cam shaft	45 Seal
10 Brake chamber bracket	28 Collar	46 Roller
11 Cotter pin	29 O-ring	47 Roller pin
12 Washer	30 Bushing	48 Brake shoe
13 Pin	31 Brake spider	49 Bushing
14 Spring brake chamber	32 Spacer	50 Lock washer (If so equipped)
15 Hole plug	33 Connector	51 Indicator (If so equipped)
16 Brake drum cover	34 Lubrication fitting	52 Spacer (If so equipped)
17 Anchor pin	35 Wheel sensor (If so equipped)	
18 Retainer	36 Sleeve (If so equipped)	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 109-147 {1,112-1,498, 81-108}	D 168-226 {1,714-2,304, 124-166}
B 119-225 {1,214-2,294, 88-165}	E 20.5-39.5 {210-402, 16-29}
C 34.5-51.5 {352-525, 26-37}	

REAR-FRONT (With spoke type wheel)



SHTS068020200251

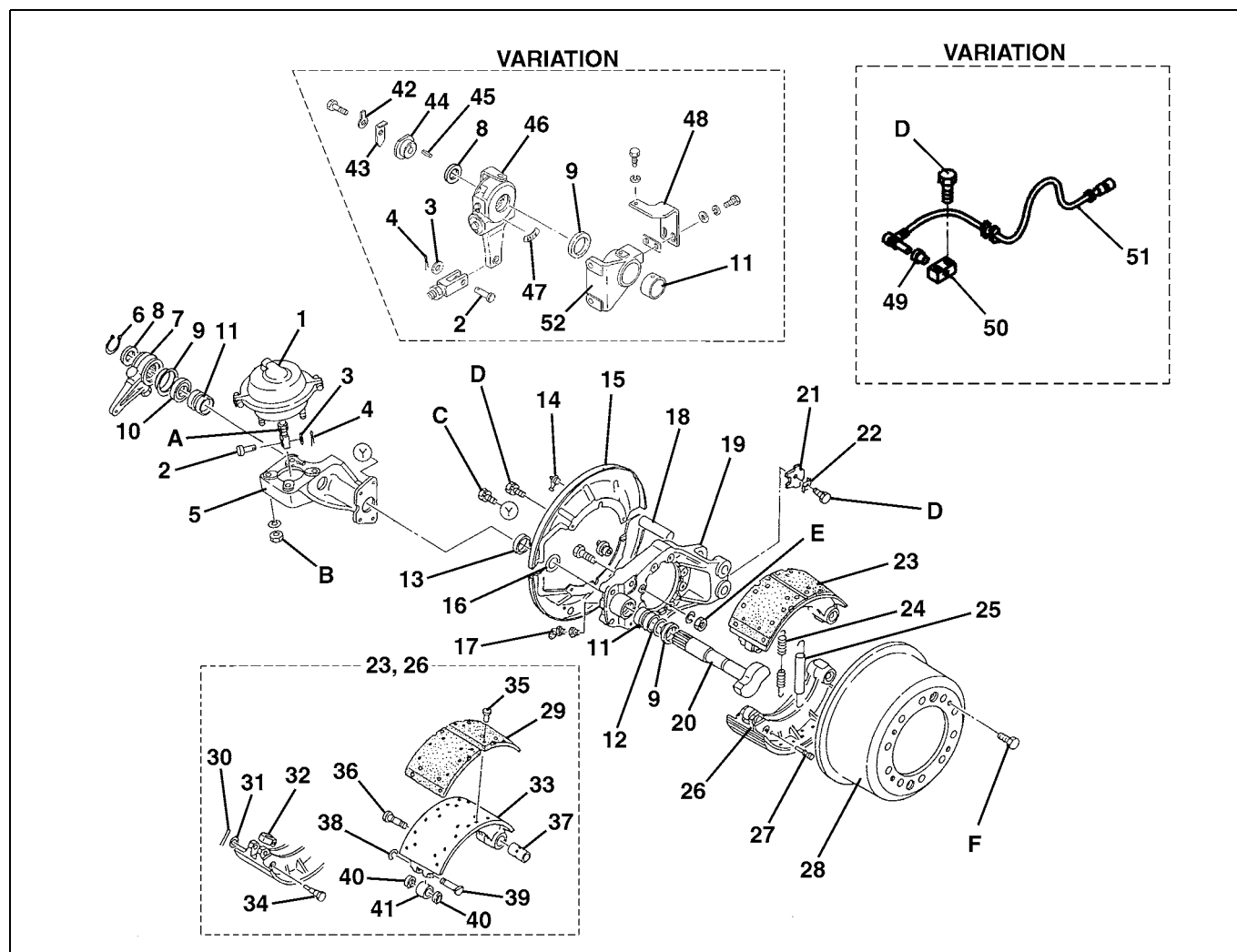
1 Retainer ring	18 Retainer	35 Indicator (If so equipped)
2 Slack adjuster	19 Lock plate	36 Spacer (If so equipped)
3 Thrust washer	20 Brake shoe assembly (Trailing)	37 Pin (If so equipped)
4 Collar	21 Brake shoe return spring (Inner)	38 Plate (If so equipped)
5 Oil seal	22 Brake shoe return spring (Outer)	39 Brake lining
6 Bushing	23 Spring cover	40 Rivet
7 Lock washer (If so equipped)	24 Brake drum	41 Cotter pin
8 Auto slack adjuster (If so equipped)	25 Spring pin	42 Pivot pin
9 Bracket (If so equipped)	26 Brake shoe assembly (Leading)	43 Spring pin
10 Brake chamber bracket	27 Cam shaft	44 Retainer ring
11 Cotter pin	28 Collar	45 Seal
12 Washer	29 O-ring	46 Roller
13 Pin	30 Bushing	47 Roller pin
14 Spring brake chamber	31 Brake spider	48 Brake shoe
15 Hole plug	32 Spacer	49 Bushing
16 Brake drum cover	33 Connector	
17 Anchor pin	34 Lubrication fitting	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 109-147 {1,112-1,498, 81-108}	D 34.5-51.5 {352-525, 26-37}
B 119-225 {1,241-2,294, 88-165}	E 168-226 {1,714-2,304, 124-166}
C 393-471 {4,008-4,802, 290-347}	

REAR-REAR (With ISO type wheel)



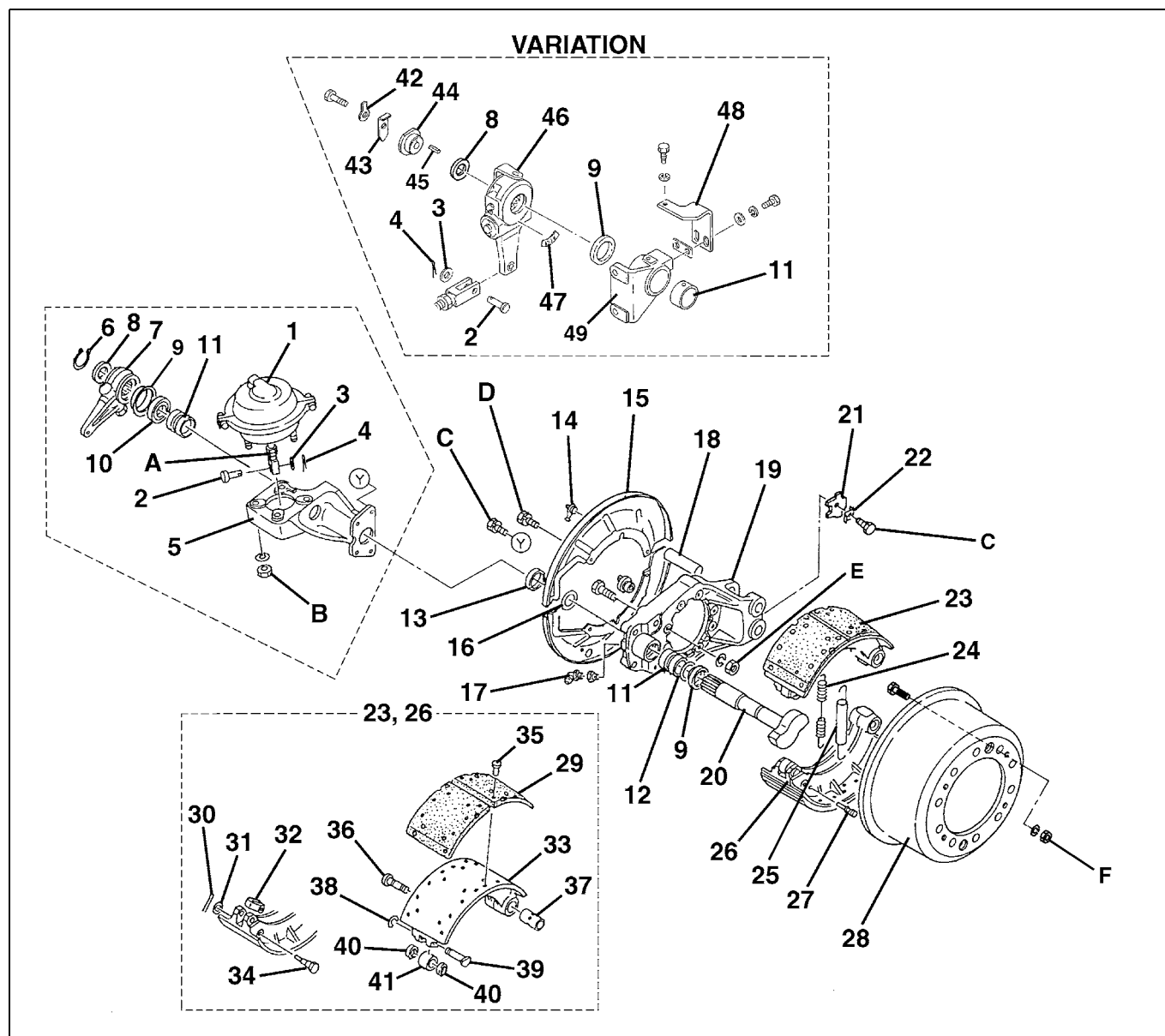
1 Brake chamber	19 Brake spider	37 Bushing
2 Pin	20 Cam shaft	38 Retainer ring
3 Washer	21 Retainer	39 Roller pin
4 Cotter pin	22 Lock plate	40 Seal
5 Brake chamber bracket	23 Brake shoe assembly (Leading)	41 Roller
6 Retainer ring	24 Brake shoe return spring (Inner)	42 Lock washer (If so equipped)
7 Slack adjuster	25 Brake shoe return spring (Outer)	43 Indicator (If so equipped)
8 Thrust washer	26 Brake shoe assembly (Trailing)	44 Spacer (If so equipped)
9 Collar	27 Spring pin	45 Pin (If so equipped)
10 Oil seal	28 Brake drum	46 Auto slack adjuster (If so equipped)
11 Bushing	29 Brake lining	47 Plate (If so equipped)
12 O-ring	30 Cotter pin	48 Bracket (If so equipped)
13 Spacer	31 Washer	49 Sleeve (If so equipped)
14 Hole plug	32 Clamp	50 Holder (If so equipped)
15 Brake drum cover	33 Brake shoe	51 Wheel sensor (If so equipped)
16 O-ring	34 Pivot pin	52 Cam shaft bracket
17 Lubrication fitting	35 Rivet	
18 Anchor pin	36 Spring pin	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 50-68 {510-693, 37-50}	D 34.5-51.5 {352-525, 26-37}
B 119-225 {1,214-2,294, 88-165}	E 168-226 {1,714-2,304, 124-166}
C 109-147 {1,112-1,498, 81-108}	F 20.5-39.5 {210-402, 16-29}

REAR-REAR (With spoke type wheel)



SHTS068020200253

1 Brake chamber	18 Anchor pin	35 Rivet
2 Pin	19 Brake spider	36 Spring pin
3 Washer	20 Cam shaft	37 Bushing
4 Cotter pin	21 Retainer	38 Retainer ring
5 Brake chamber bracket	22 Lock plate	39 Roller pin
6 Retainer ring	23 Brake shoe assembly (Leading)	40 Seal
7 Slack adjuster	24 Brake shoe return spring (Inner)	41 Roller
8 Thrust washer	25 Brake shoe return spring (Outer)	42 Lock washer (If so equipped)
9 Collar	26 Brake shoe assembly (Trailing)	43 Indicator (If so equipped)
10 Oil seal	27 Spring pin	44 Spacer (If so equipped)
11 Bushing	28 Brake drum	45 Pin (If so equipped)
12 O-ring	29 Brake lining	46 Auto slack adjuster (If so equipped)
13 Spacer	30 Cotter pin	47 Plate (If so equipped)
14 Hole plug	31 Washer	48 Bracket (If so equipped)
15 Brake drum cover	32 Clamp	49 Cam shaft bracket
16 O-ring	33 Brake shoe	
17 Lubrication fitting	34 Pivot pin	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 50-68 {510-693, 37-50}	D 34.5-51.5 {352-525, 26-37}
B 119-225 {1,214-2,294, 88-165}	E 168-226 {1,714-2,304, 124-166}
C 109-147 {1,112-1,498, 81-108}	F 393-471 {4,008-4,802, 290-347}

OVERHAUL

EN0680202H200022

IMPORTANT POINTS - DISASSEMBLY

1. REMOVAL OF TIRE

- (1) Refer to chapter for WHEEL & TIRE.

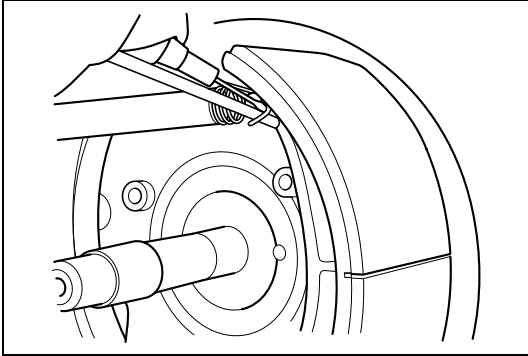
2. REMOVAL OF BRAKE DRUM WITH WHEEL HUB AND WHEEL HUB BEARINGS.

- (1) Refer to chapter FRONT AXLE and REAR AXLE.

3. REMOVAL OF BRAKE SHOE RETURN SPRING

- (1) Using the special tool, remove the return spring. (FRONT WHEEL)

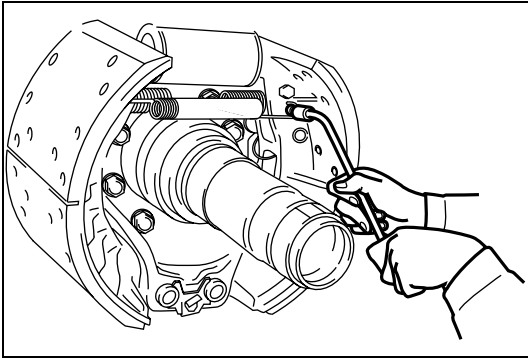
SST: Spring Pull Back Tool (09683-1070)



SHTS068020200254

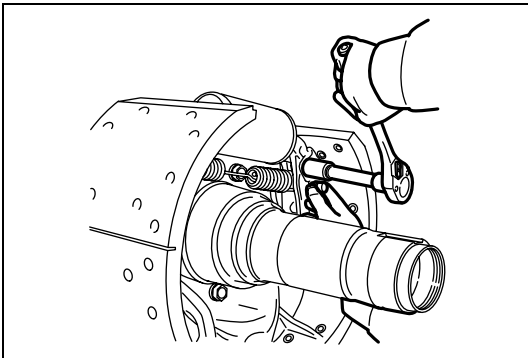
- (2) Using the special tool, remove the outer return spring. (REAR WHEEL)

SST: Spring Pull Back Tool (09683-1070)



SHTS068020200255

- (3) Turn the pivot pin and pull out the spring pin then remove the return spring, inner. (REAR WHEEL)

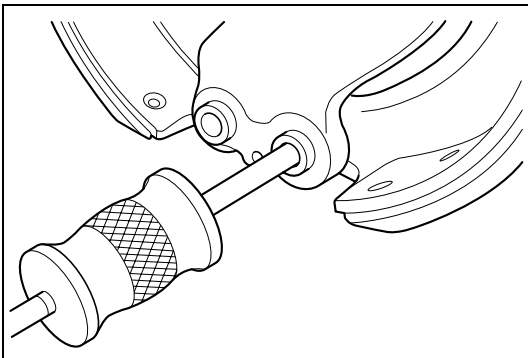


SHTS068020200256

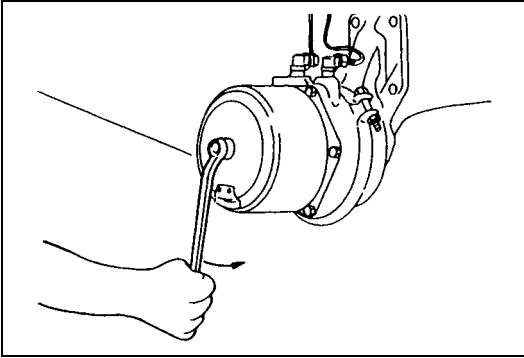
4. REMOVAL OF ANCHOR PIN

- (1) Remove the lock plate and anchor pin retainer.
- (2) Using the special tool, remove the pin and the brake shoe assembly.

SST: Anchor pin puller (09420-1510)



SHTS068020200257



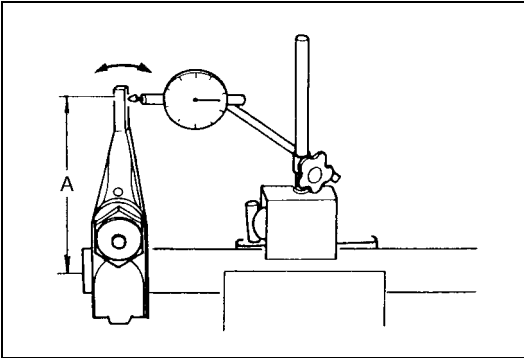
SHTS068020200258

5. REMOVAL OF CAM SHAFT AND SLACK ADJUSTER

- (1) If the vehicle is equipped with spring brake chamber, before removing the cam shaft and slack adjuster, release the spring brake.

NOTICE

Before removing the slack adjuster and cam shaft, apply a mark to them to make clear the side (Left or Right) where they were installed.



SHTS068020200259

IMPORTANT POINTS - ASSEMBLY

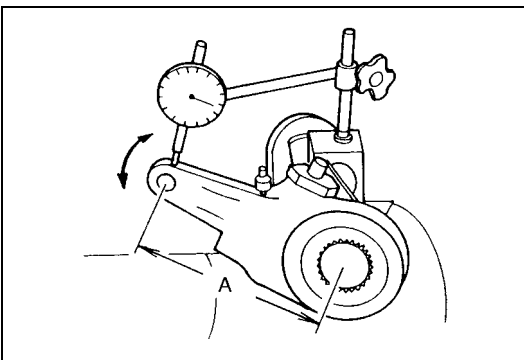
1. INSPECTION OF SLACK ADJUSTER

- (1) Measure the axial play and if the play exceed the limit, inspect the spline of cam shaft and disassemble the adjuster.

Dimension "A": 150 mm {5.9 in.}

Assembly Standard: 1.5 mm {0.06 in.}

Service Limit: 3.0 mm {0.12 in.}



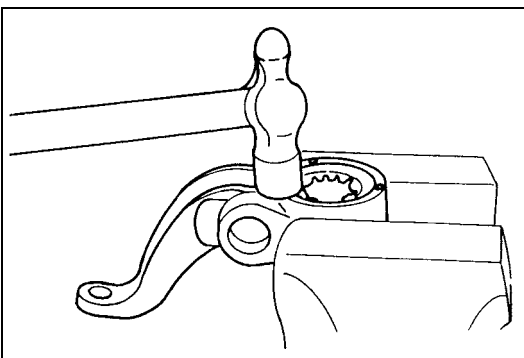
SHTS068020200260

- (2) Measure the circumference play and if the play exceed the limit, inspect the spline of cam shaft and disassemble the adjuster.

Dimension "A": 150 mm {5.9 in.}

Assembly Standard: 3.0 mm {0.12 in.}

Service Limit: 10.0 mm {0.39 in.}



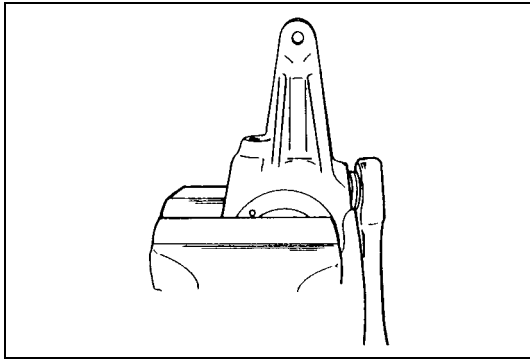
SHTS068020200261

2. ASSEMBLY OF SLACK ADJUSTER

- (1) Install the body cover.
- (2) Use new rivets and caulk the rivet ends.

NOTICE

Apply enough chassis grease on the worm gear shaft before installing the cover.

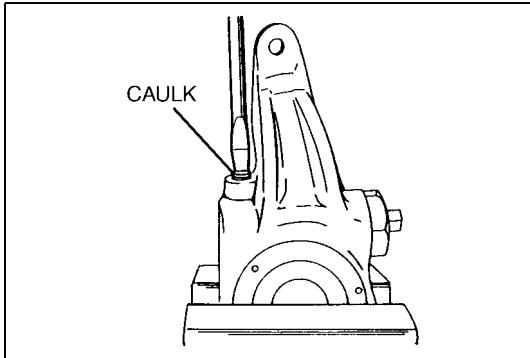


SHTS068020200262

- (3) Tighten the worm gear shaft stopper fully then loose it by 1/12-1/6 turn.

NOTICE

- Replace the O-ring with new one.
- Apply enough chassis grease on the worm gear shaft before installing the worm gear shaft.

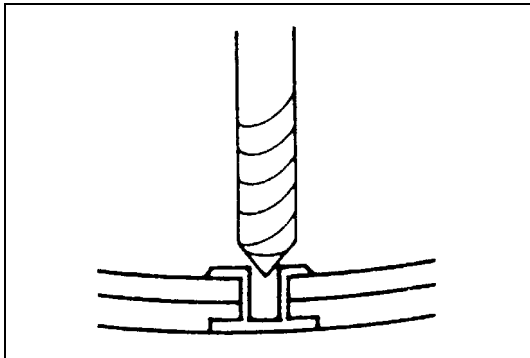


SHTS068020200263

- (4) Install the lock ball, spring and plug.
 (5) After tighten the plug, caulk it to the body by a punch.

NOTICE

Apply enough chassis grease on the lock ball and spring.



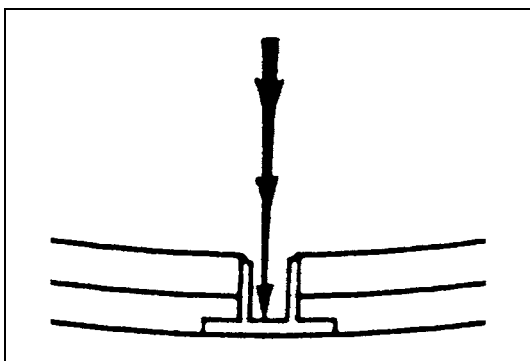
SHTS068020200264

3. REPLACEMENT OF BRAKE LINING

- (1) Remove the brake lining from the brake shoe.
 a. Drill the rivet caulking section with a drill smaller than the rivet diameter.

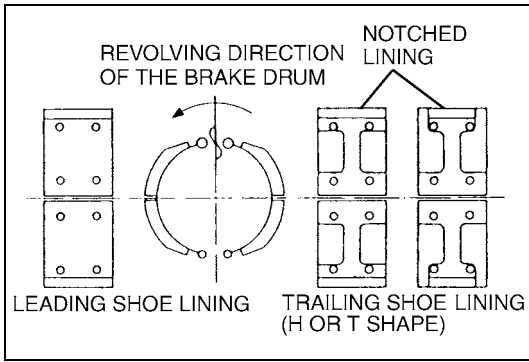
NOTICE

At this time, be careful not to scratch the brake shoe.



SHTS068020200265

- b. After drilling, remove the remaining portion of the rivet with a fine chisel or a riveting machine.

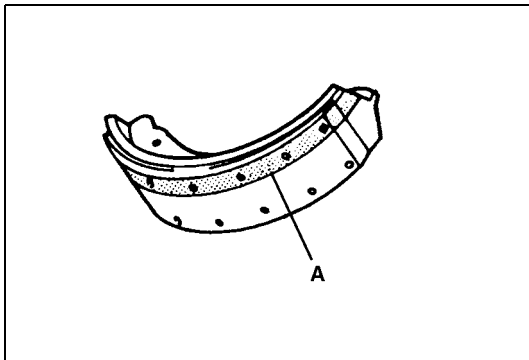


SHTS068020200266

(2) Install the brake lining to the brake shoe.

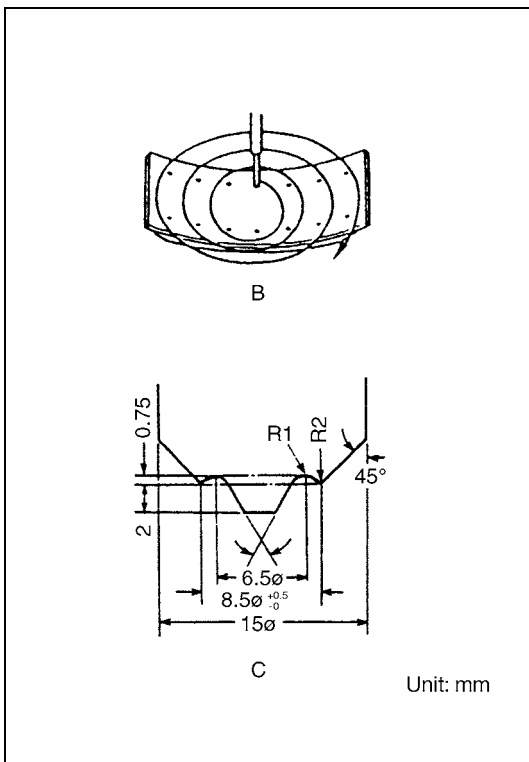
NOTICE

If a notched lining is used, the brake shoe and brake lining should be installed as shown in figure.



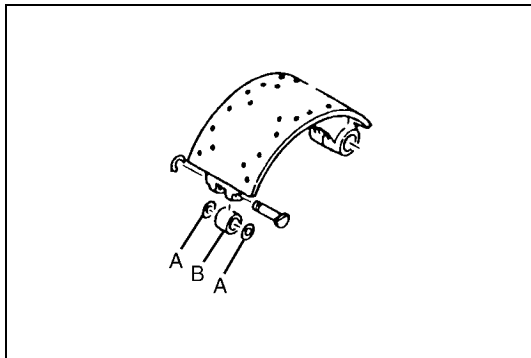
SHTS068020200267

- a. Set the lining on the shoe and insert the rivets into all holes, then hold them in place with adhesive tape "A".



SHTS068020200268

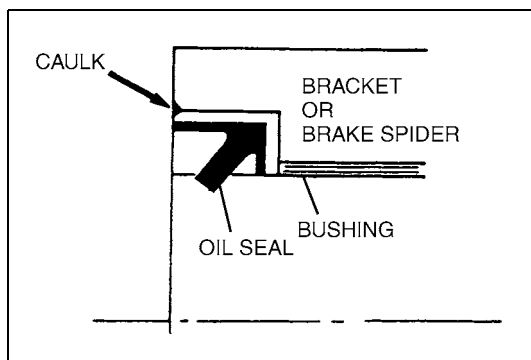
- b. Caulk the rivets lightly in a circular pattern as shown in figure "B", repeat several times assure proper seating of the lining.
Recommended configuration of punch: shown in "C".
Recommended force of staking the rivet: 2.4 tons.
- c. Remove adhesive tape.



SHTS068020200269

4. ASSEMBLY OF BRAKE SHOE

- (1) Seals "A" for roller "B" should be replaced with new ones.
- (2) Apply adequate amount of heat resistance grease on the roller and seals.



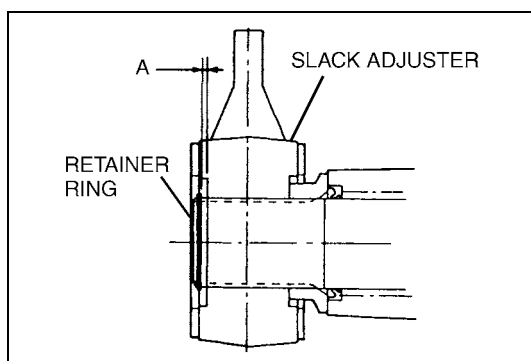
SHTS068020200270

5. INSTALLATION OF O-RING AND OIL SEAL

- (1) When assembling the wheel brake, replace the O-rings and oil seals with new ones.

NOTICE

- The lip parts of the seal should always be facing outside.
- The seal should be caulked to the bracket (or bracket spider) with a punch.



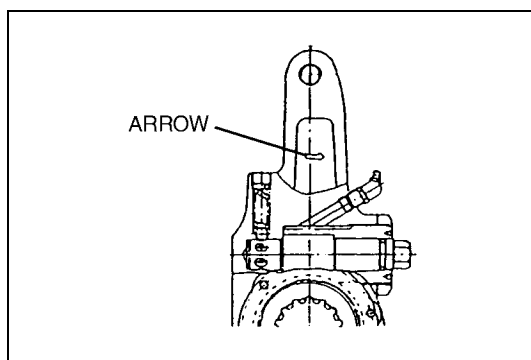
SHTS068020200271

6. INSTALLATION OF CAM SHAFT AND SLACK ADJUSTER

- (1) Apply adequate amount of chassis grease on the O-ring, oil seal and bushing before installing the cam shaft.
- (2) If the clearance "A" between the retainer ring and slack adjuster exceed 2.0 mm {0.078 in.}, install the washer between them.

NOTICE

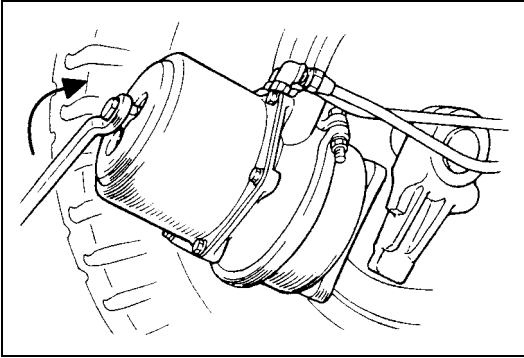
Install the cam shaft and slack adjuster on the correct side (Left or Right) according to the mark on them which were applied when disassembling.



SHTS068020200272

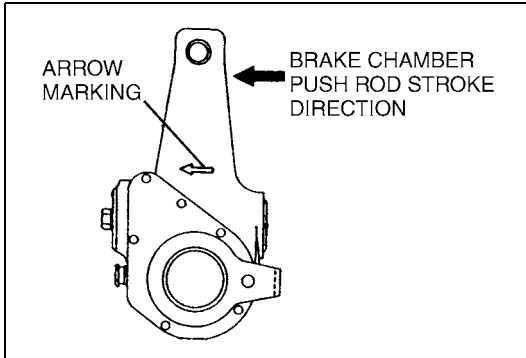
NOTICE

- Make sure that the slack adjuster is installed, so that the arrow on the adjuster points to the direction of the brake chamber rod stroke as shown in figure.
- When connecting the slack adjuster with the brake chamber and/or spring brake chamber, lubricate the clevis pin-hole and the pin with sufficient chassis grease.



SHTS068020200273

- (3) If the vehicle is equipped with a spring brake chamber, after connecting the slack adjuster with the brake chamber push rod, turn the spring brake release bolt clockwise and securely tighten (with mechanical released device).



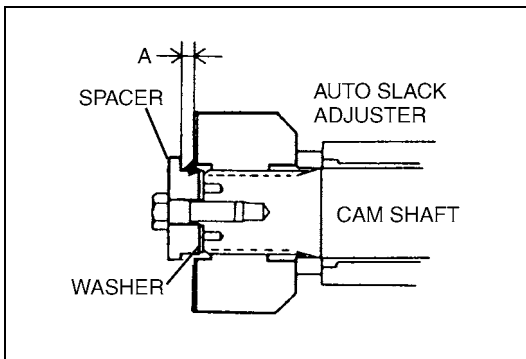
SHTS068020200274

7. INSTALLATION OF CAM SHAFT AND AUTO SLACK ADJUSTER (IF SO EQUIPPED)

- (1) Apply adequate amount of chassis grease on the O-ring, oil seal and bushing before installing the cam shaft.
- (2) Make sure that the auto slack adjuster is installed so that the arrow on the adjuster points in the direction of the brake chamber rod stroke, as shown in figure.

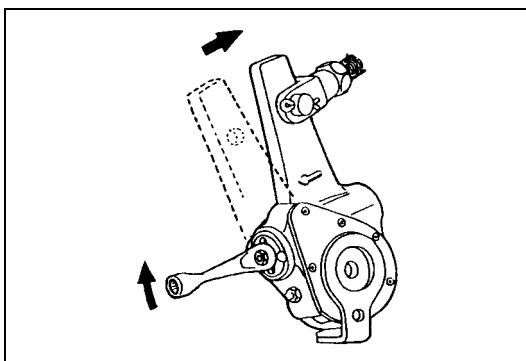
NOTICE

Install the cam shaft and auto slack adjuster on the correct side (Left or Right) according to the mark which was applied when dis-assembly.



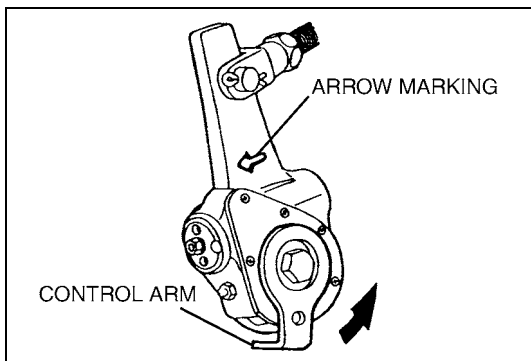
SHTS068020200275

- (3) Make sure that clearance "A" between the spacer and auto slack adjuster is 0.5-2.0 mm {0.020-0.078 in.}. Install or remove the washer to maintain the required clearance.



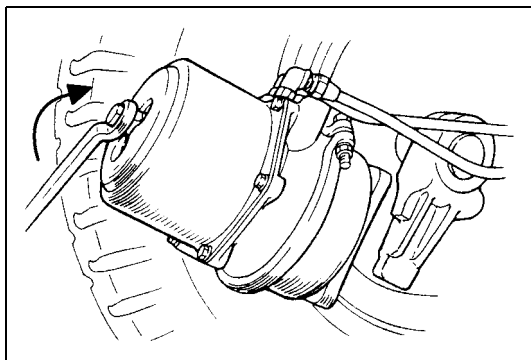
SHTS068020200276

- (4) When connection the auto slack adjuster with the brake chamber and/or spring brake chamber, lubricate the clevis pin-hole and pin with sufficient chassis grease.
- (5) If the clevis pin-hole and auto slack adjuster pin-hole are mis-aligned, turn the set screw of auto slack adjuster for clockwise.



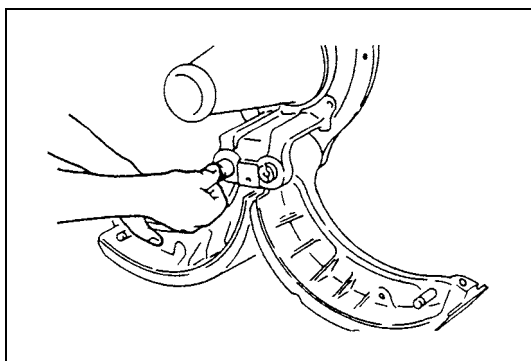
SHTS068020200277

- (6) Rotate by hand, the control arm as far as possible in the direction of the arrow on the adjuster point.
- (7) Make sure that clearance between set bolt and control arm is correct, and tighten the nut.



SHTS068020200273

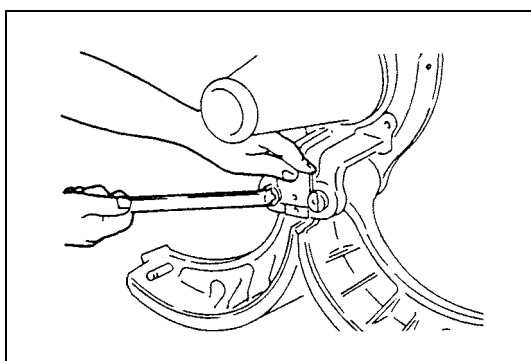
- (8) If the spring brake chamber is equipped, after connecting the auto slack adjuster with the brake chamber push rod, turn the spring brake release bolt for clockwise fully (with mechanical released device).



SHTS068020200278

8. INSTALLATION OF BRAKE SHOE ASSEMBLY

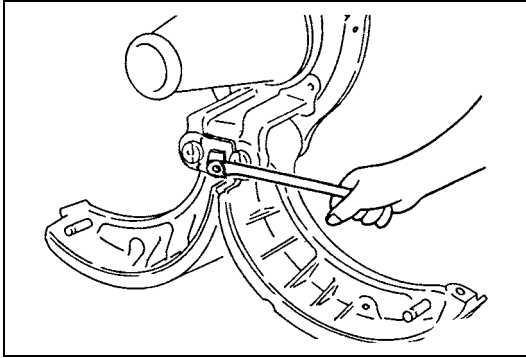
- (1) Apply adequate amount of heat resistance grease on the bushing of the brake shoe.
- (2) Set the brake shoe assembly in place, then insert the anchor pins.



SHTS068020200279

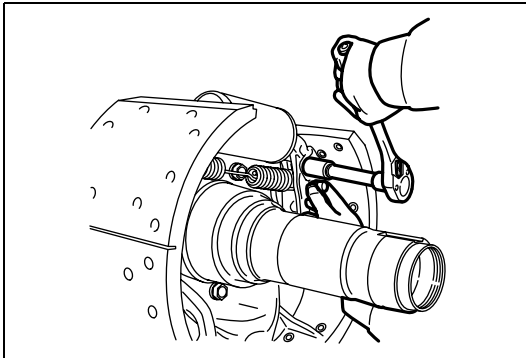
- (3) Using the special tool, set the grooves of the two anchor pin parallel and then insert the retainer in the grooves so that the retainer hole and brake spider hole are aligned.

SST: Anchor Pin Tool (09684-1010)



SHTS068020200280

- (4) Place the lock plate on the retainer so that its hole is aligned with the lock plate hole, then insert the bolt and tighten it.



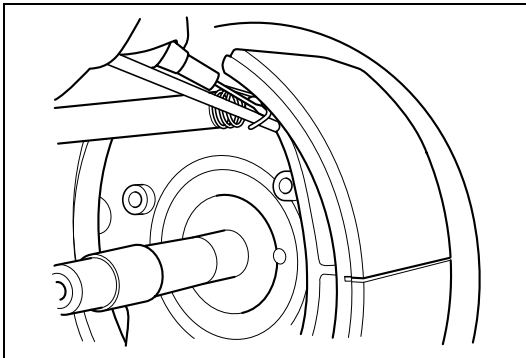
SHTS068020200281

9. INSTALLATION OF BRAKE SHOE RETURN SPRING

- (1) Hook the inner spring to the clamp and turn the pivot pin to align the holes, then insert the spring pin. (REAR WHEEL)

NOTICE

Painted part of the spring must be placed in the upper side.



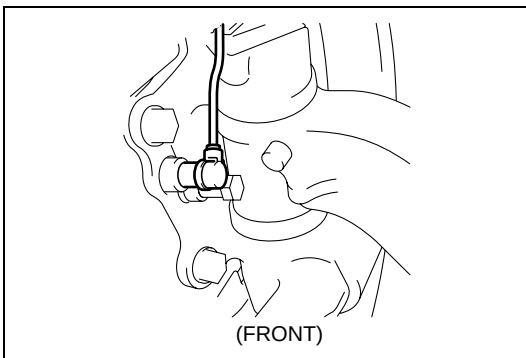
SHTS068020200282

- (2) Use the special tool to install the return spring. (FRONT WHEEL, REAR WHEEL - OUTER SPRING).

NOTICE

The folded part of the spring cover must be placed in the upper side.

SST: Spring Pull Back Tool (09683-1070)



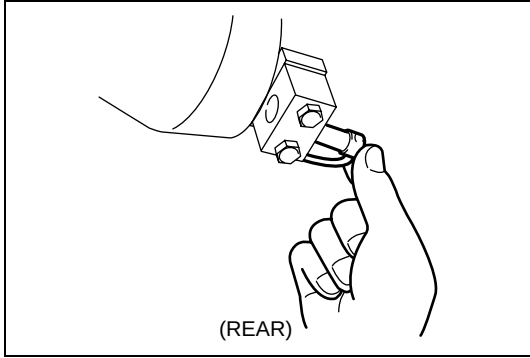
SHTS068020200283

10. INSTALL THE WHEEL SENSOR. (IF SO EQUIPPED)

- (1) Push in the clamping bushing until the stopper makes contact with the wheel sensor holder.
- (2) Push the wheel sensor forcefully into the clamping bushing until you feel that the wheel sensor has contact with the sensor ring.

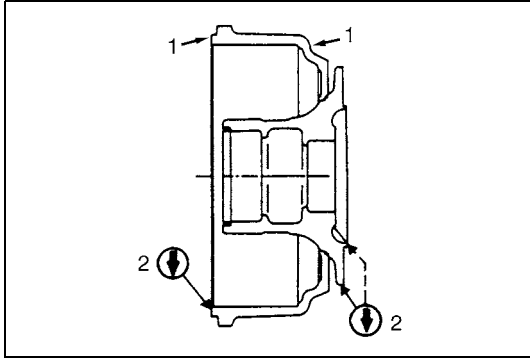
NOTICE

When inserting the wheel sensor, do not tap on it with a hammer or attempt to pry it into place using a screwdriver, or the like. Doing so could damage the wheel sensor.



SHTS068020200284

- (3) Arrange the wire harness.



SHTS068020200285

11. ASSEMBLE THE BRAKE DRUM AND WHEEL HUB. (FRONT WHEEL)

- (1) See the mark located at 1 or 1' on the brake drum as shown in figure. Install the drum according to NOTICE.

NOTICE

- The drums, number with R or L.
With R: Install in right side.
With L: Install in left side.
- The drums, with no R or L.
New drums: Install in any side.
Reused drums: Install in the side originally installed.

- (2) When assembling the brake drum and wheel hub, make sure that their aligning marks are aligned as close to each other as possible.

NOTICE

Position of marks are located at 2 as shown in the figure. (Broken line shows alternative position).

12. MOUNTING OF WHEEL HUB WITH BRAKE DRUM

- (1) Refer to chapter FRONT AXLE and REAR AXLE.

NOTICE

1. Be careful not to push back the wheel sensor too far when mounting the wheel hub and brake drum. Also, make sure they are straight so that you do not bump the tip of the wheel sensor.
 2. When inserting the outer hub bearing, avoid tapping on it with a hammer as this will expose the wheel sensor to bumps. Insert the outer hub bearing carefully using a lock nut.
- (2) Slowly turn the wheel hub and brake drum and confirm that they move smoothly.

13. MOUNTING OF TIRE

- (1) Refer to chapter WHEEL & TIRE.

14. GREASING

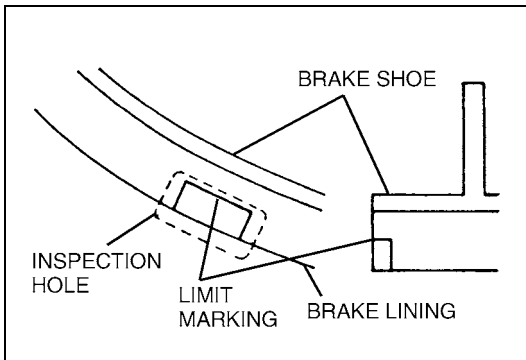
- (1) After completion of assembly, lubricate the bushings of the brake spider, cam shaft bracket (REAR WHEEL) and slack adjuster wire with chassis grease from the lubrication fittings.

15. ADJUSTMENT

- (1) Finally, adjust the brake chamber rod stroke as explained in Section "ADJUSTMENT".

ADJUSTMENT

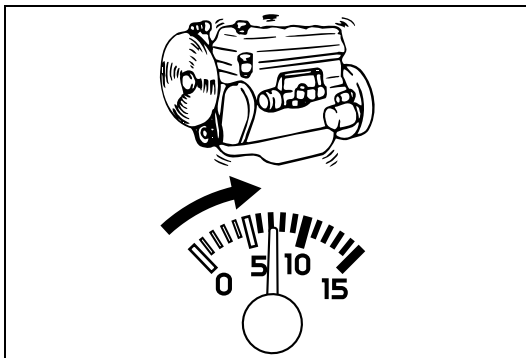
EN0680202H300026



SHTS068020200286

1. REMAINING THICKNESS OF THE BRAKE LINING

- (1) Check remaining thickness of lining through the inspection hole of the brake drum cover. If the lining has been worn to the limit marking or if it is foreseen that the lining will be worn to the limit by the time the next inspection is made, replace the lining.



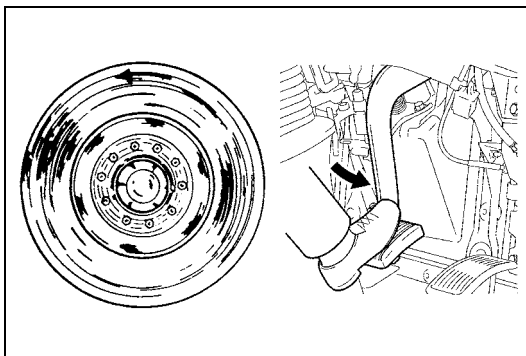
SHTS068020200287

2. AIR PRESSURE IN THE AIR TANK

- (1) Operate the engine and obtain an air pressure of the 690 kPa {7.0 kgf/cm², 99.54 lbf/in.²}

NOTICE

The specified air pressure in the air tank should be maintained when making the adjustment.



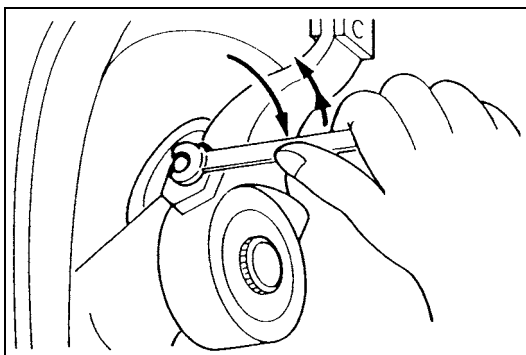
SHTS068020200288

3. ADJUST THE BRAKE CHAMBER STROKE

- (1) Lift the wheel to be adjusted off the ground.
- (2) Step on the brake pedal several times while turning the wheel in the forward direction to make sure that the brake shoes are correctly positioned.

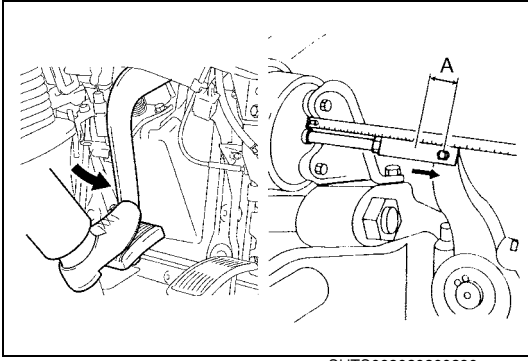
NOTICE

In the case of spring brake chamber, set the spring brake control valve to the "OFF" position.



SHTS068020200289

- (3) Turn the worm gear shaft of the slack adjuster clockwise fully and then turn it back at least two notches.



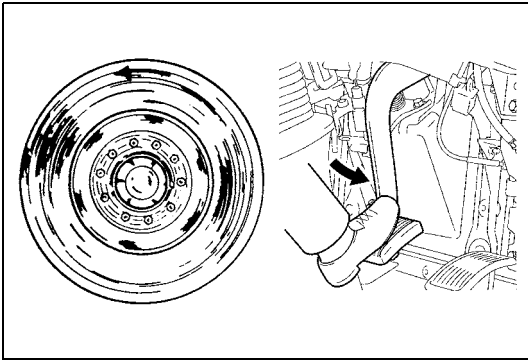
SHTS068020200290

- (4) Depress the brake pedal fully and measure the brake chamber push rod stroke "A".

Assembly standard: 22-30 mm {0.87-1.18 in.}

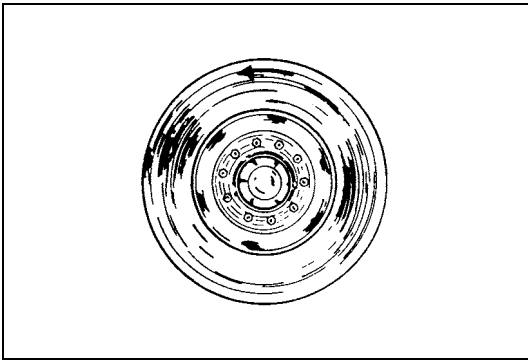
Repair limit: Brake chamber: 40 mm {1.57 in.}

Spring brake chamber: 45 mm {1.77 in.}



SHTS068020200288

- (5) While turning the wheel by hand in the forward direction, step on the brake pedal several times to make sure that the brake shoes are correctly positioned.



SHTS068020200291

- (6) Make sure that there is no dragging, when turning the wheel by hand. If there is any dragging, repeat the operation over again from (2).

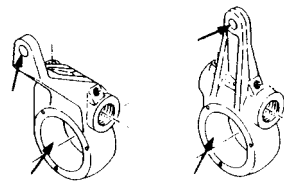
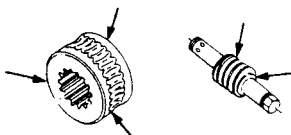
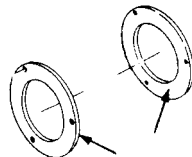
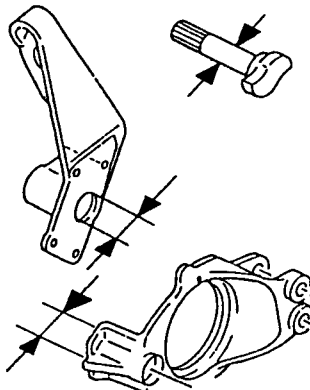
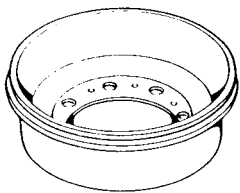
NOTICE

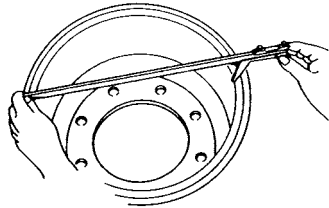
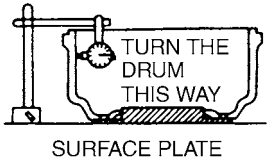
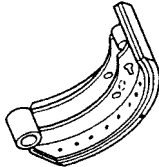
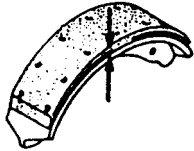
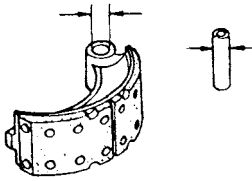
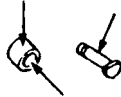
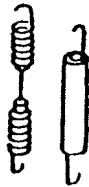
In accordance with the same procedure as above, adjust the stroke for all wheels.

INSPECTION AND REPAIR

EN0680202H300027

Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Slack adjuster body: Wear and damage.	—	—	Replace, if necessary.	Visual check 
Slack adjuster, worm gears: Wear and damage.	—	—	Replace, if necessary.	Visual check 
Slack adjuster, body cover: Wear and damage.	—	—	Replace, if necessary.	Visual check 
Cam shaft: Diameter.	39.8 {1.57}	39.5 {1.56}	Replace.	Measure 
Clearance between cam shaft and bushing of brake spider, chamber bracket, cam shaft bracket.	0.23-0.30 {0.0091-0.0110}	0.6 {0.024}	Replace bushing and/ or cam shaft.	
Cam shaft collar and spacer: Wear and damage.	—	—	Replace, if necessary.	Visual check 
Brake drum: Cracks and damage.	—	—	Regrind or replace, if necessary.	Visual check 

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Brake drum: Inside diameter.	406.4 {16.0}	Regrind 409.4 {16.12} Service 410.4 {16.16}	Regrind or replace.	Visual check 
	440.0 {17.3}	Regrind 443.0 {17.44} Service 444.0 {17.48}		
Brake drum: Run out.	0-0.1 {0-0.0039}	0.2 {0.0079}	Regrind or replace.	Measure 
Brake shoe assembly: Cracks and damage.	—	—	Replace, if necessary.	Visual check 
Brake lining: Thickness.	15.5 {0.61}	5.5 {0.217}	Replace.	Visual check 
Clearance between brake shoe bushing and anchor pin.	0.02-0.07 {0.0008-0.0027}	0.25 {0.0098}	Replace the brake shoe bushing and/ or anchor pin.	Visual check 
Brake shoe roller and pin: Wear and damage.	—	—	Replace, if necessary.	Visual check 
Brake shoe return spring and spring cover: Damage, Lacking elastic strength distortion.	—	—	Replace, if necessary.	Visual check 

WHEEL BRAKE (TYPE: WEDGE BRAKE)

DATA AND SPECIFICATIONS

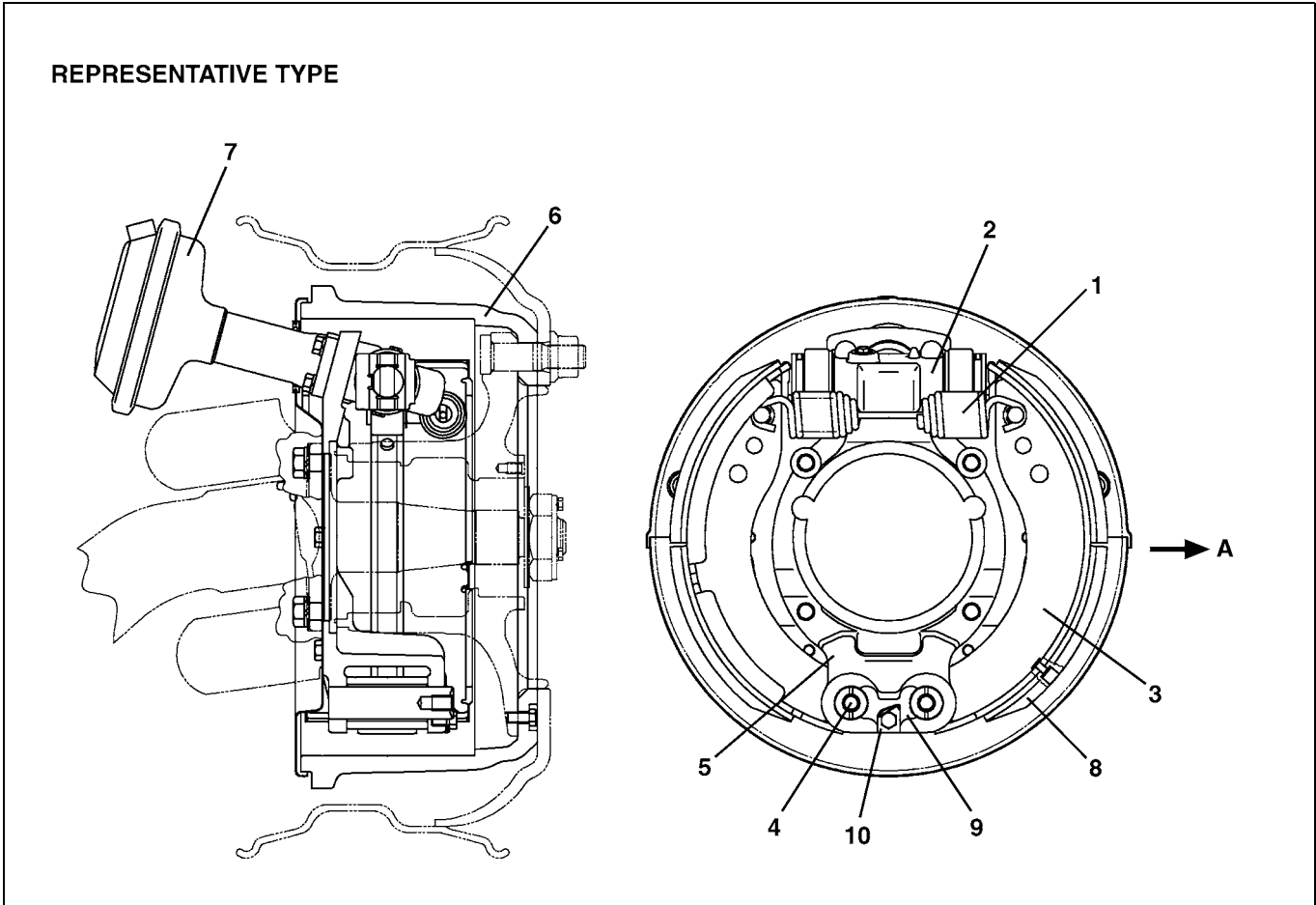
EN0680202I200024

Type	Drum brake with internally expanding, leading-trailing shoes operating by expander in all wheels.		
Brake drum inside diameter		406.4 mm {16.0 in.} for both front and rear.	
Brake lining Width x Thickness	Front		152 x 15.5 mm {6.0 x 0.61 in.}
	Rear	Frontward	216 x 15.5 mm {8.5 x 0.61 in.} (Models: FR, FS, FY, ZS)
			203 x 15.5 mm {8.0 x 0.61 in.} (Models: SH, SS)
		Rearward	152 x 15.5 mm {6.0 x 0.61 in.} (Model: FR)
			216 x 15.5 mm {8.5 x 0.61 in.} (Models: FS, FY)
			203 x 15.5 mm {8.0 x 0.61 in.} (Model: SS)

DESCRIPTION

EN0680202C100025

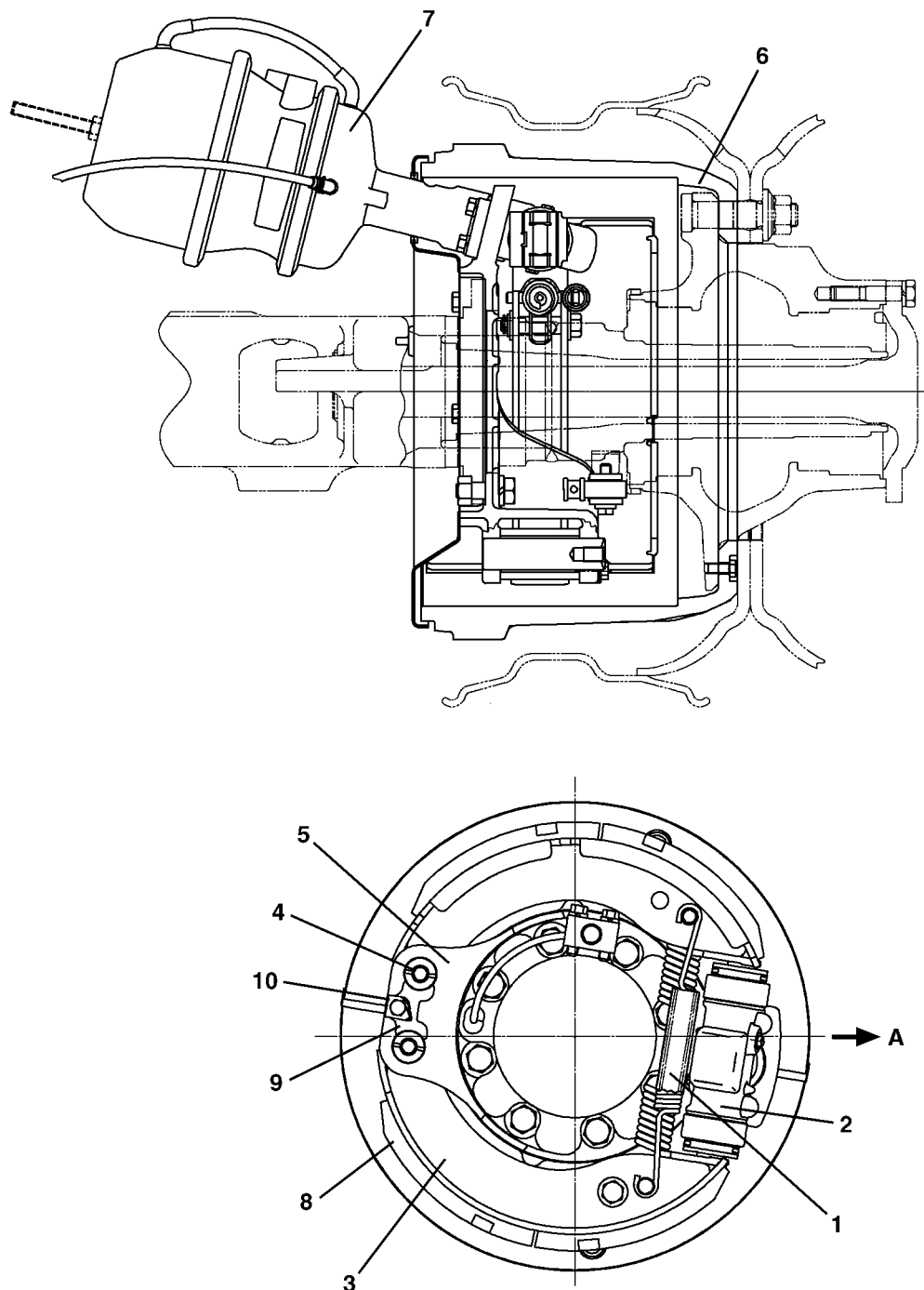
FRONT



SHTS068020200305

1	Brake shoe return spring	7	Brake chamber
2	Expander	8	Brake lining
3	Brake shoe	9	Anchor pin retainer
4	Anchor pin	10	Lock plate
5	Brake spider	A	Front
6	Brake drum		

REAR



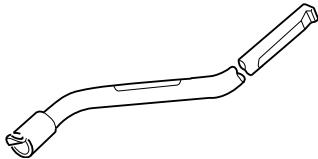
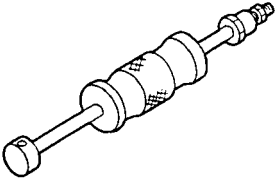
SHTS068020200306

1	Brake shoe return spring	7	Spring brake chamber
2	Expander	8	Brake lining
3	Brake shoe	9	Anchor pin retainer
4	Anchor pin	10	Lock plate
5	Brake spider	A	Front
6	Brake drum		

SPECIAL TOOL

EN0680202K100005

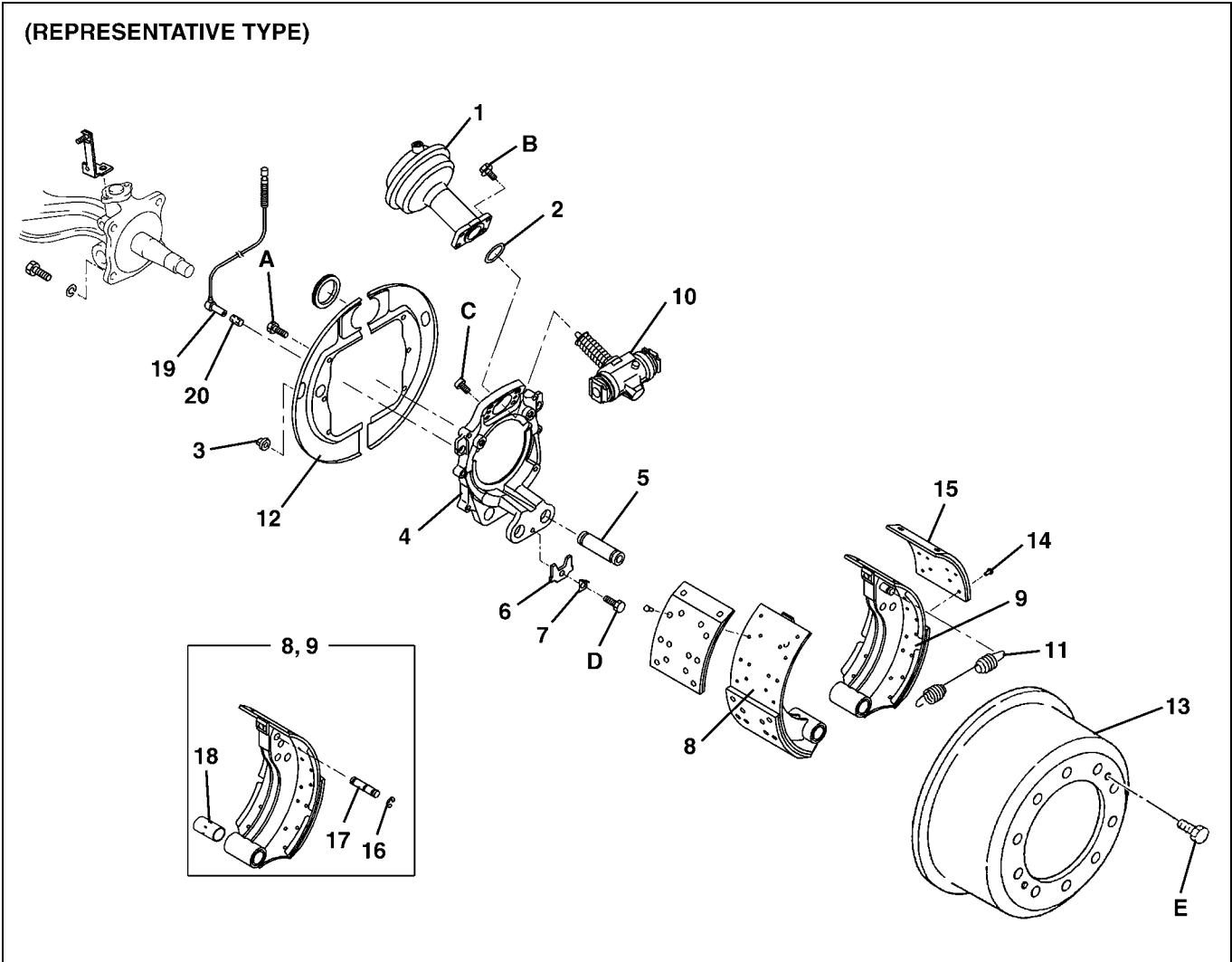
Prior to starting a wheel brake overhaul, it is necessary to have these special tools.

Illustration	Part number	Tool name	Remarks
	09683-1070	SPRING PULL BACK TOOL	
	09420-1510	ANCHOR PIN PULLER	

COMPONENT LOCATOR

EN0680202D100024

FRONT



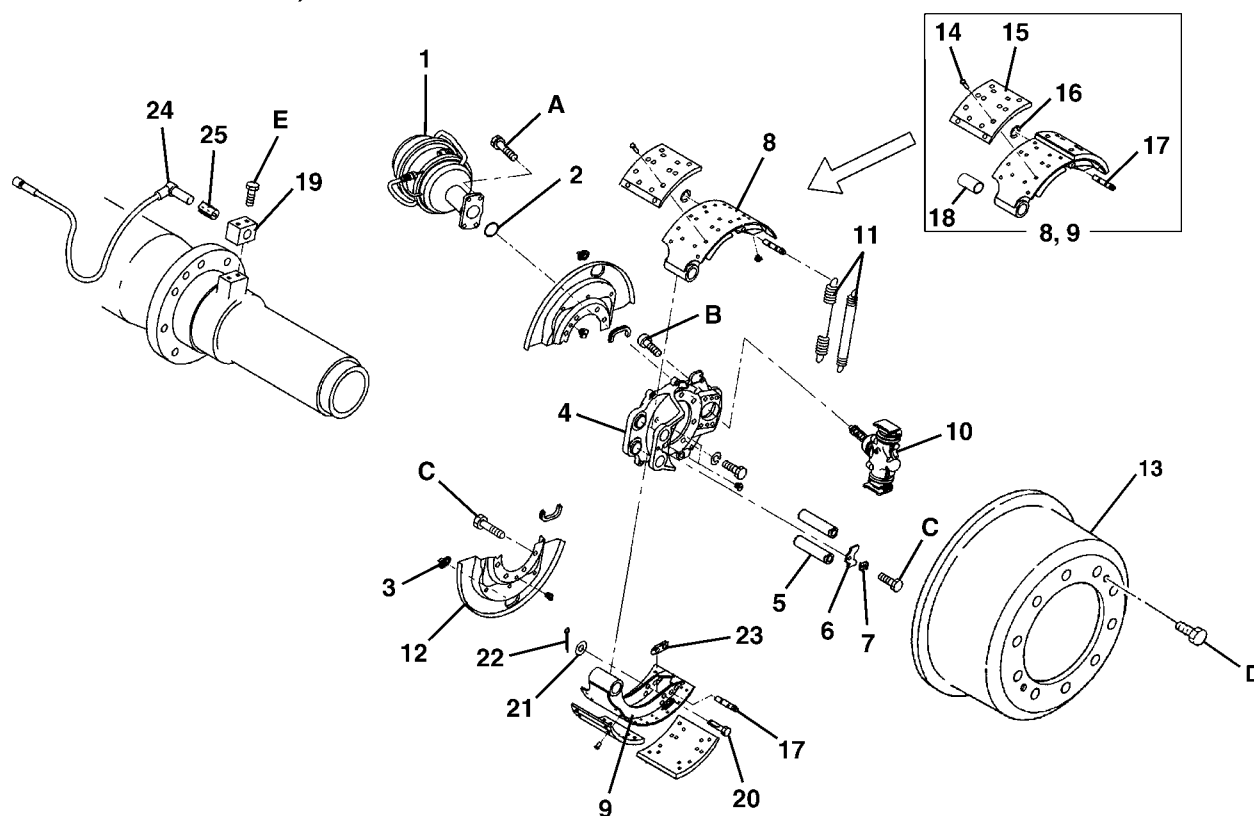
SHTS068020200308

1	Brake chamber	11	Brake shoe return spring
2	O-ring	12	Brake drum cover
3	Hole plug	13	Brake drum
4	Brake spider	14	Rivet
5	Anchor pin	15	Brake lining
6	Anchor pin retainer	16	Retainer spring
7	Lock plate	17	Return spring pin
8	Brake shoe assembly (Leading)	18	Bushing
9	Brake shoe assembly (Trailing)	19	Wheel sensor (If so equipped)
10	Expander	20	Sleeve (If so equipped)

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	35.8-51.4 {366-524, 26.4-37.9}	D	20.1-33.9 {205-345, 14.9-24.9}
B	36.2-51.8 {370-528, 26.7-38.1}	E	20.5-39.5 {210-402, 15.2-29.1}
C	14.1-23.9 {144-243, 10.4-17.6}		

REAR

(REPRESENTATIVE TYPE)



SHTS068020200309

1 Brake chamber	10 Expander	19 Sensor holder (If so equipped)
2 O-ring	11 Brake shoe return spring	20 Pivot pin
3 Hole plug	12 Brake drum cover	21 Washer
4 Brake spider	13 Brake drum	22 Cotter pin
5 Anchor pin	14 Rivet	23 Return spring hanger
6 Anchor pin retainer	15 Brake lining	24 Wheel sensor (If so equipped)
7 Lock plate	16 Retainer spring	25 Sleeve (If so equipped)
8 Brake shoe assembly (Trailing)	17 Return spring pin	
9 Brake shoe assembly (Leading)	18 Bushing	

Tightening torque

Unit: N·m {kgf·cm, lbf·ft}

A 35.8-51.4 {366-524, 26.4-37.9}	D 20.5-39.5 {210-402, 15.2-29.1}
B 14.1-23.9 {144-243, 10.4-17.6}	E 34.5-51.5 {352-525, 25.5-37.9}
C 20.1-33.9 {205-345, 14.9-24.9}	

OVERHAUL

EN0680202H200023

IMPORTANT POINTS - DISASSEMBLY

1. REMOVAL OF TIRE

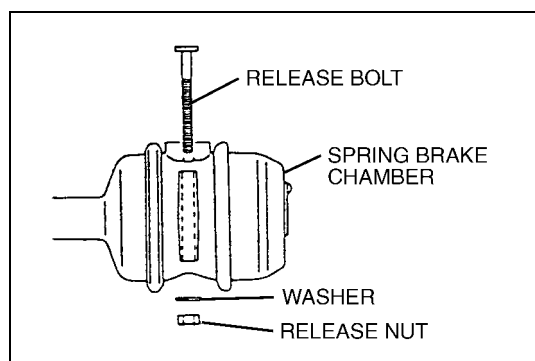
- (1) Refer to chapter for WHEEL AND TIRE.

2. REMOVAL OF BRAKE DRUM, WHEEL HUB AND WHEEL HUB BEARINGS

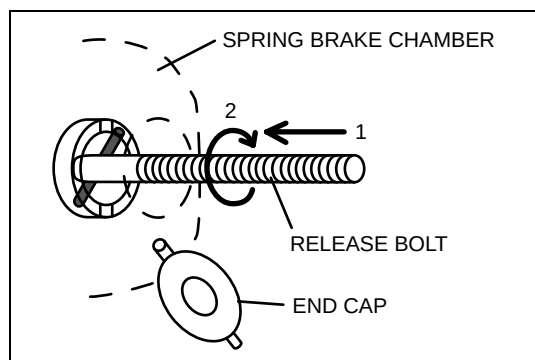
- (1) Refer to chapter for FRONT AXLE and for REAR AXLE.

3. COMPRESSION OF SPRING IN SPRING BRAKE CHAMBER BY RELEASE BOLT

- (1) Remove the release bolt, washer and release nut from the chamber.



SHTS068020200310

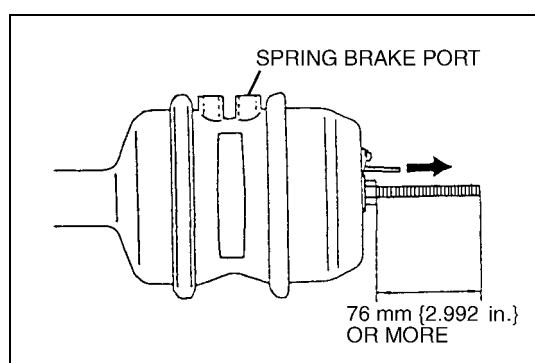


SHTS068020200311

- (2) Remove the end cap. Insert the release bolt to the brake chamber, then turn the release bolt by 1/4.

NOTICE

- Make sure that the release bolt can not be pulled out.
- When the release bolt is pulled out, insert the release bolt again and turn it by 1/4 similarly.



SHTS068020200312

- (3) Apply compressed air of 640 kPa {6.5 kgf/cm², 92.5 lbf-in.²} to the spring brake port.

NOTICE

When compressed air cannot be applying, coat grease to the release bolt.

- (4) Install the washer and release nut to the release bolt and pull out the release bolt by 85 mm {3.34 in.}.

NOTICE

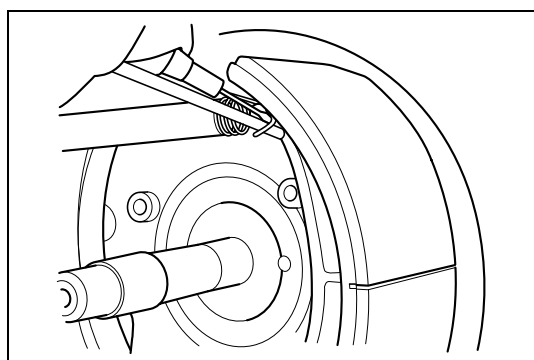
Do not turn the release nut at the strong torque (68.6 N·m {700 kgf·cm, 50.6 lbf·ft} or more).

4. REMOVAL OF BRAKE SHOE RETURN SPRING

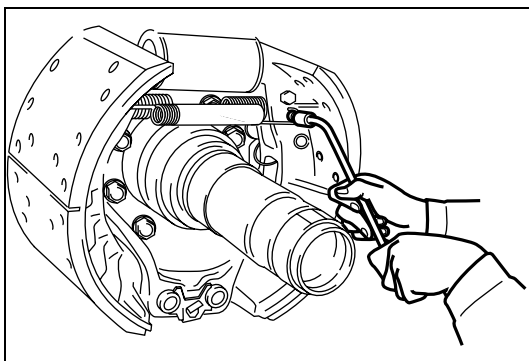
- (1) Using the special tool, remove the return spring.

(FRONT WHEEL)

SST: Spring Pull Back Tool (09683-1070)



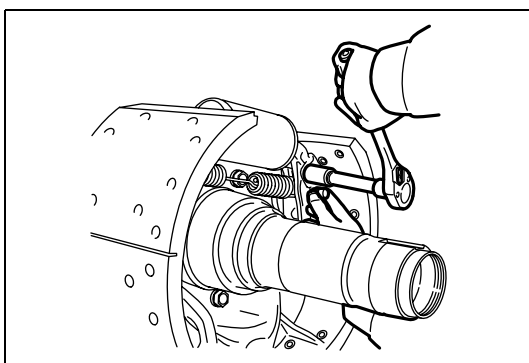
SHTS068020200313



SHTS068020200314

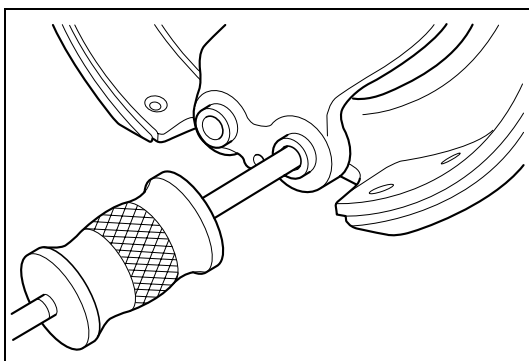
- (2) Using the special tool, remove the outer return spring.
(REAR WHEEL)

SST: Spring Pull Back Tool (09683-1070)



SHTS068020200315

- (3) Turn the pivot pin and pull out the return spring pin then remove the inner return spring (REAR WHEEL).

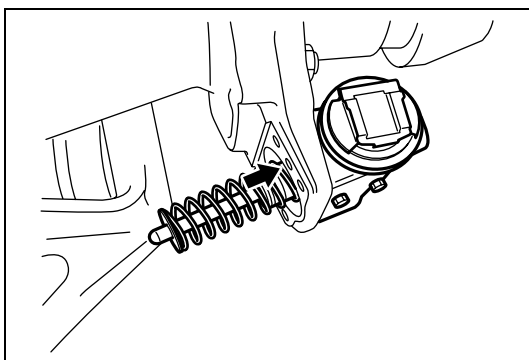


SHTS068020200316

5. REMOVAL OF ANCHOR PIN

- (1) Remove the lock plate and anchor pin retainer.
(2) Using the special tool, remove the pin and brake shoe assembly.

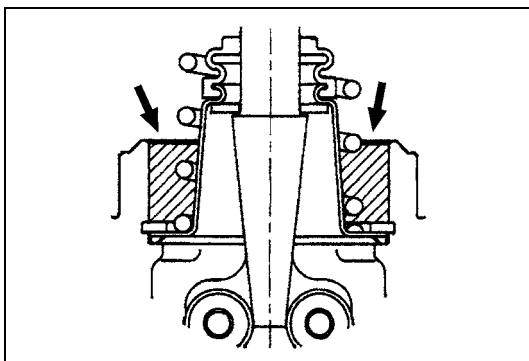
SST: Anchor Pin Puller (09420-1510)



SHTS068020200317

6. REMOVAL OF BRAKE CHAMBER AND EXPANDER

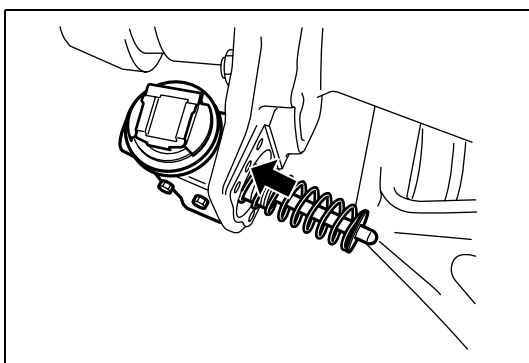
- (1) Remove the air hose.
(2) Remove the brake chamber and O-ring from the brake spider.
(3) Using a hexagon wrench, remove the expander from the brake spider.



SHTS068020200318

2. INSTALLATION OF EXPANDER AND BRAKE CHAMBER

- (1) Apply grease (Darina Grease: Showa Shell Sekiyu K.K. product or equivalent) to the expander as shown in the figure.



SHTS068020200319

- (2) Using a hexagon wrench, install the expander to the brake spider.

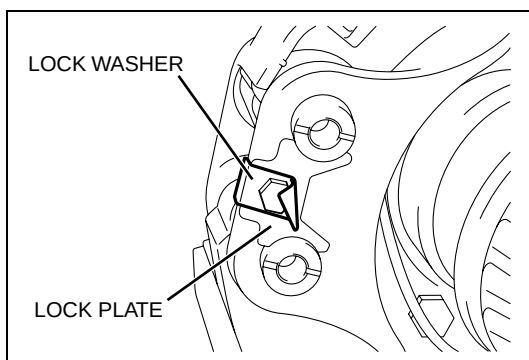
Tightening Torque:

14.1-23.9 N·m {144-243 kgf·cm, 10.4-17.6 lbf·ft}

NOTICE

Pay attention to assembling way.

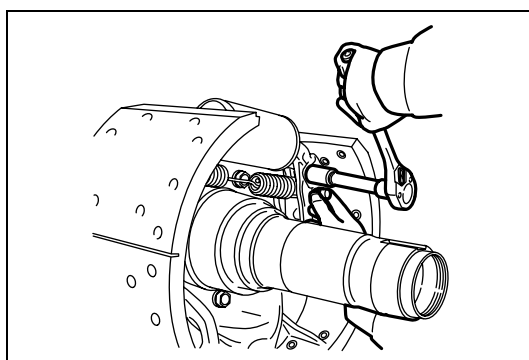
- (3) Install the new O-ring and brake chamber to the brake spider.



SHTS068020200320

3. INSTALLATION OF BRAKE SHOE ASSEMBLY

- (1) Apply adequate amount of heat resistance grease on the brake shoe bushing and anchor pin.
- (2) Set the brake shoe assembly in place, then insert the anchor pins.
- (3) Insert the anchor pin retainer in the grooves of the two anchor pins.
- (4) Place the lock plate on the anchor pin retainer so that its hole is aligned with the lock plate hole, then insert the bolt and tighten it.



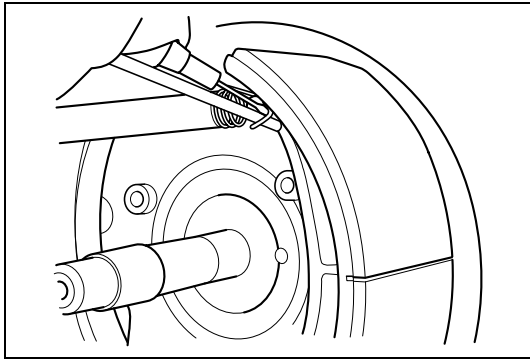
SHTS068020200315

4. INSTALLATION OF BRAKE SHOE RETURN SPRING

- (1) Hook the inner spring to the clamp and turn the pivot pin to align the holes, then insert the spring hanger.
(REAR WHEEL)

NOTICE

Painted part of the spring must be placed in the upper side.



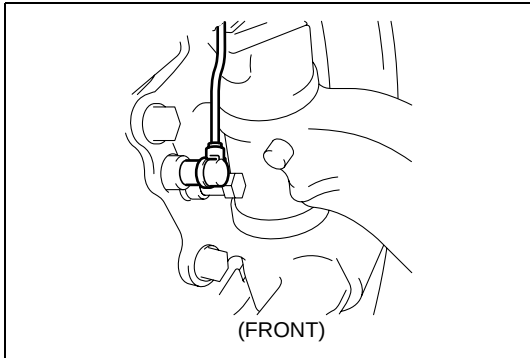
SHTS068020200313

- (2) Use the special tool to install the return spring.
(FRONT WHEEL, REAR WHEEL OUTER SPRING)

NOTICE

The folded part of the spring cover must be placed in the upper side.

SST: Spring Pull Back Tool (09683-1070)



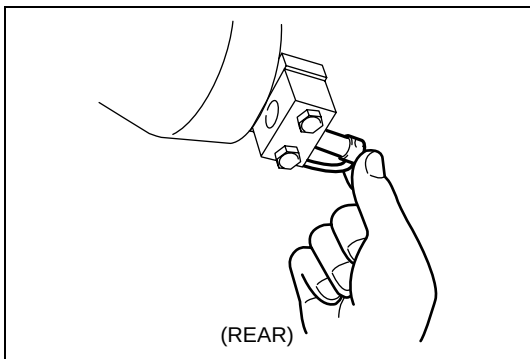
SHTS068020200321

5. INSTALL THE WHEEL SENSOR. (IF SO EQUIPPED)

- (1) Push in the clamping bushing until the stopper makes contact with the wheel sensor holder.
(2) Push the wheel sensor forcefully into the clamping bushing until you feel that the wheel sensor has contact with the sensor ring.

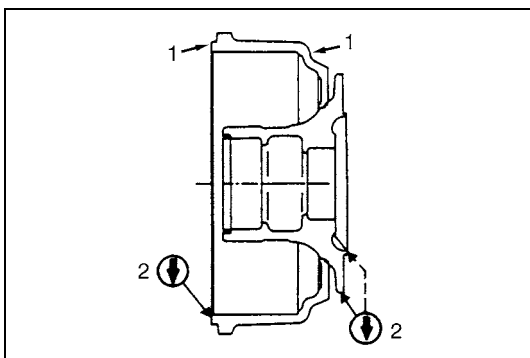
NOTICE

When inserting the wheel sensor, do not tap on it with a hammer or attempt to pry it into place using a screwdriver, or the like. Doing so could damage the wheel sensor.



SHTS068020200322

- (3) Arrange the wire harness.



SHTS068020200285

6. ASSEMBLE THE BRAKE DRUM AND WHEEL HUB. (FRONT WHEEL)

- (1) See the mark located at 1 or 1' on the brake drum as shown in figure. Install the drum according to NOTICE.

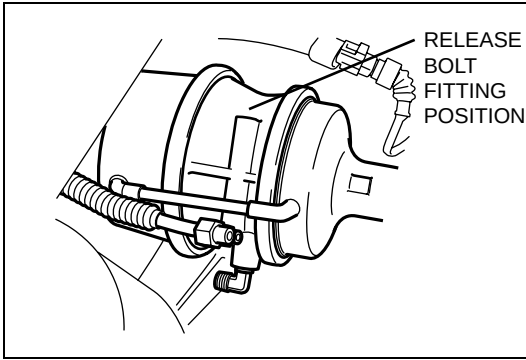
NOTICE

- The drums, number with R or L.
With R: Install in right side.
With L: Install in left side.
- The drums, with no R or L.
New drums: Install in any side.
Reused drums: Install in the side originally installed.

- (2) When assembling the brake drum and wheel hub, make sure that their aligning marks are aligned as close to each other as possible.

NOTICE

Position of marks are located at 2 as shown in the figure. (Broken line shows alternative position).



SHTS068020200323

IMPORTANT POINTS - MOUNTING

1. REMOVAL OF THE RELEASE BOLT

- (1) After mounting, turn the release bolt counterclockwise to release the spring brake.

NOTICE

Note the position mark R or L on the chamber which mark was applied when dismounting and install it to its former side.

- (2) After mounting, the release bolt must be set at the specified torque.

Tightening Torque:

13.7-15.7 N·m {140-160 kgf·cm, 10.2-11.5 lbf·in.}

2. MOUNTING OF WHEEL HUB AND BRAKE DRUM

- (1) Refer to chapter for FRONT AXLE and for REAR AXLE.

NOTICE

1. Be careful not to push back the wheel sensor too far when mounting the wheel hub and brake drum. Also, make sure they are straight so that you do not bump the tip of the wheel sensor.
2. When inserting the outer hub bearing, avoid tapping on it with a hammer as this will expose the wheel sensor to bumps. Insert the outer hub bearing carefully using a lock nut.
- (2) Slowly turn the wheel hub and brake drum and confirm that they move smoothly.

3. MOUNTING OF TIRE

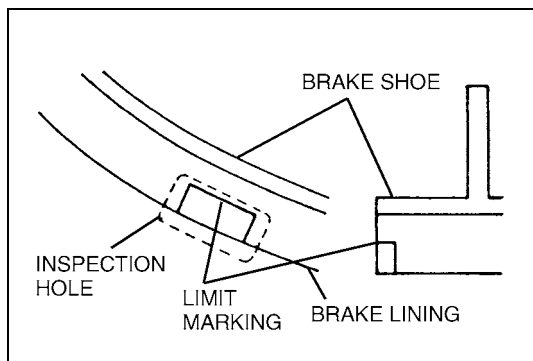
- (1) Refer to chapter for WHEEL AND TIRE.

4. ADJUSTMENT

- (1) Finally, adjust the brake shoe clearance as explained in Section WHEEL BRAKE.

ADJUSTMENT

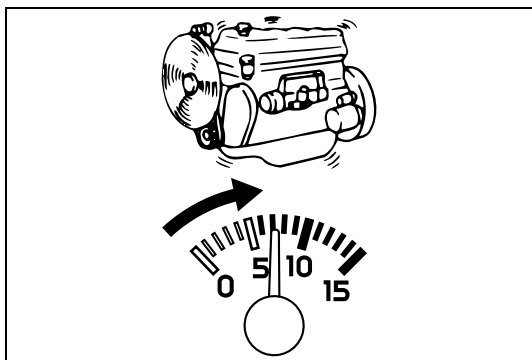
EN0680202H300028



SHTS068020200286

1. REMAINING THICKNESS OF THE BRAKE LINING

- (1) Check remaining thickness of lining through the inspection hole of the brake drum cover. If the lining has been worn to the limit marking or if it is foreseen that the lining will be worn to the limit by the time the next inspection is made replace the lining.



SHTS068020200287

2. AIR PRESSURE IN THE AIR TANK

- (1) Operate the engine and obtain an air pressure of the 740-840 kPa {7.5-8.5 kgf/cm², 107-121 lbf/in.²}

NOTICE

The specified air pressure in the air tank should be maintained while making the adjustment.

3. INSPECTION OF THE CLEARANCE BETWEEN BRAKE LINING AND BRAKE DRUM

- (1) Step on the brake pedal several times to make sure that the brake shoes are correctly positioned.
- (2) Insert a thickness gauge from the inspection hole to inspect the clearance between brake lining and brake drum. If the clearance exceeds standard value, disassemble auto adjuster and perform maintenance service because auto adjuster possibly may be out of order.

	STANDARD (mm {in.})
FRONT	0.2-1.0 {0.0079-0.0393}
REAR	0.2-1.0 {0.0079-0.0393}

4. ADJUSTMENT OF THE CLEARANCE BETWEEN BRAKE LINING AND BRAKE DRUM

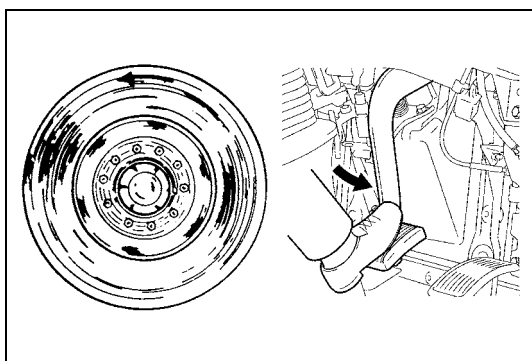
NOTICE

As this brake has auto adjuster function, it is not necessary to adjust the clearance between brake lining and brake drum. Adjust the clearance in accordance with the following method, if the brake lining is replaced and maintenance service is performed.

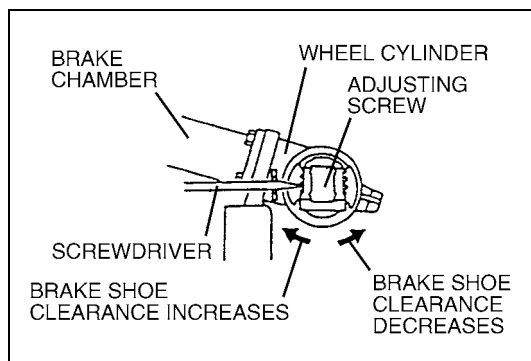
- (1) Lift the wheel to be adjusted off the ground.
- (2) While turning the wheel in the forward direction and step on the brake pedal several times to make sure that the brake shoes are correctly positioned.

NOTICE

When adjusting the clearance between brake lining and brake drum, set spring brake control valve to the OFF position.

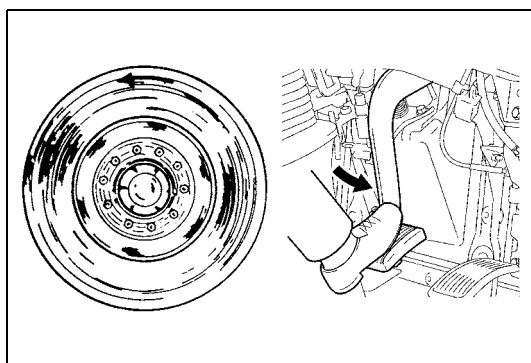


SHTS068020200288



SHTS068020200324

- (3) Remove the brake drum cover.
- (4) Insert the thickness gauge and turn the adjusting screw with screwdriver so that brake shoe clearance come to the standard value.



SHTS068020200288

- (5) While turning the wheel by hand in the forward direction, step on the brake pedal several times to make sure that the brake shoes are correctly positioned.
- (6) See to it that there is no dragging, when turning the wheel by hand. If there is any dragging, repeat the operation over again from 2.

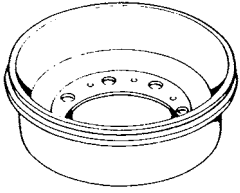
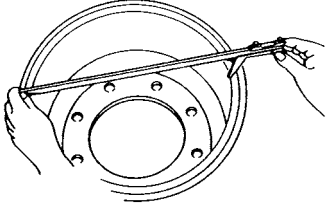
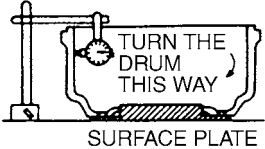
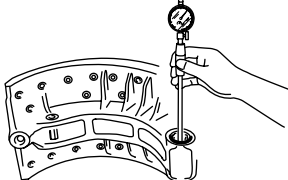
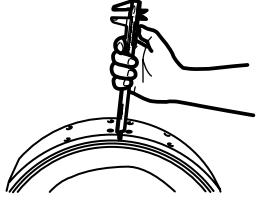
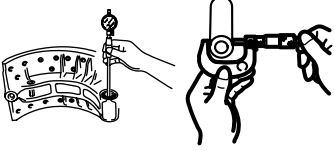
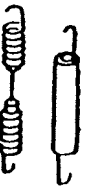
NOTICE

Using the same procedure as above, adjust the clearance for all wheels.

INSPECTION AND REPAIR

EN0680202H300029

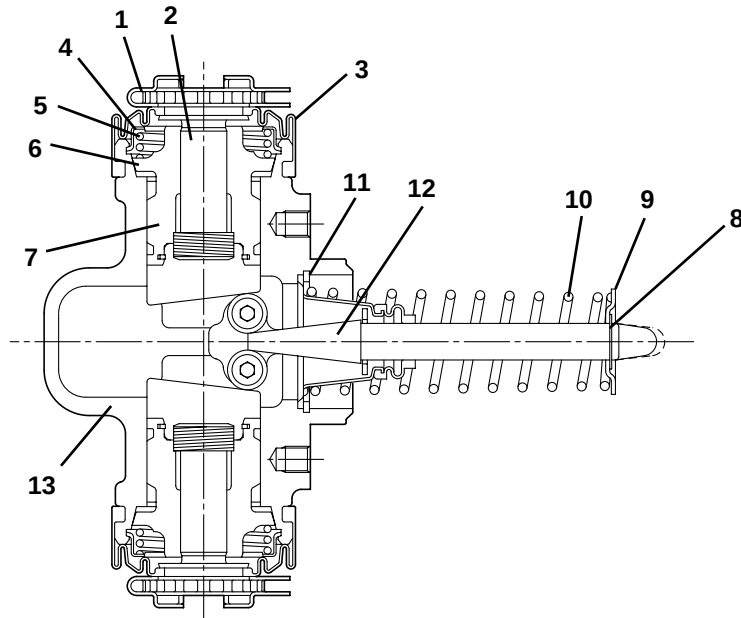
Unit: mm {in.}

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Brake drum: Cracks and damage	—	—	Regrind or replace, if necessary.	Visual check 
Brake drum: Inside diameter	406.4 {16.0}	Regrind 409.4 {16.12} Service 410.4 {16.16}	Regrind or replace.	Measure 
Brake drum: Runout	0-0.1 {0-0.0039}	0.2 {0.0079}	Regrind or replace.	Measure 
Brake shoe assembly: Cracks and damage	—	—	Replace, if necessary.	Visual check 
Brake lining: Thickness	15.5 {0.610}	5.5 {0.217}	Replace.	Measure 
Clearance between brake shoe bushing and anchor pin	0.02-0.07 {0.0008-0.0027}	0.25 {0.0098}	Replace the brake shoe bushing and/or anchor pin.	Measure 
Brake shoe return spring and spring cover: Damage, lacking elastic strength distortion	—	—	Replace, if necessary.	Visual check 

EXPANDER

DESCRIPTION

EN0680202C100026



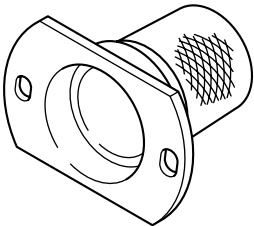
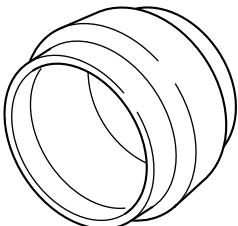
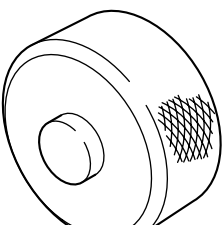
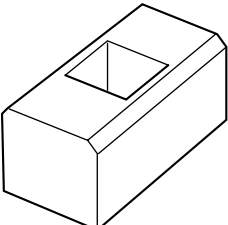
SHTS068020200331

1	Clip	8	E-retainer
2	Adjusting screw	9	Spring retainer
3	Boot	10	Wedge spring
4	Case	11	Retainer ring
5	Adjusting spring	12	Wedge
6	Drive ring	13	Body
7	Sleeve assembly		

SPECIAL TOOL

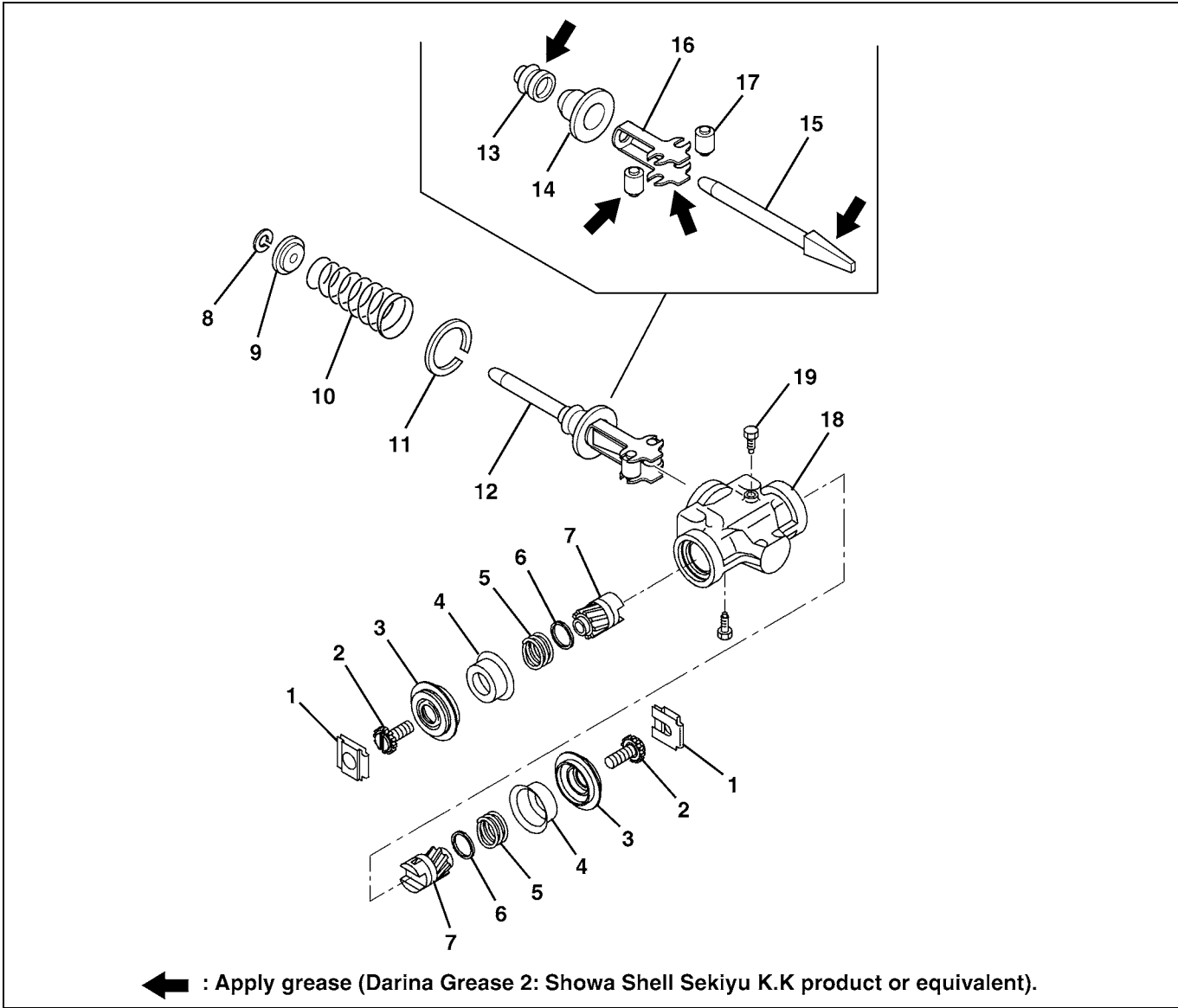
EN0680202K100006

Prior to starting an expander overhaul, it is necessary to have these special tools.

Illustration	Part number	Tool name	Remarks
	09683-1080	SPRING PULL BACK TOOL	
	09657-2330	GUIDE	
	09685-1020	BOOT SETTING TOOL	
	09659-1610	ADAPTER	

COMPONENT LOCATOR

EN0680202D100025



SHTS068020200336

1	Clip	11	Retainer ring
2	Adjusting screw	12	Wedge assembly
3	Boot	13	Wedge boot
4	Case	14	Wedge cap
5	Adjusting spring	15	Wedge
6	Drive ring	16	Cage
7	Sleeve assembly	17	Roller
8	E-retainer	18	Expander body
9	Spring retainer	19	Locating screw
10	Wedge spring		

Tightening torque

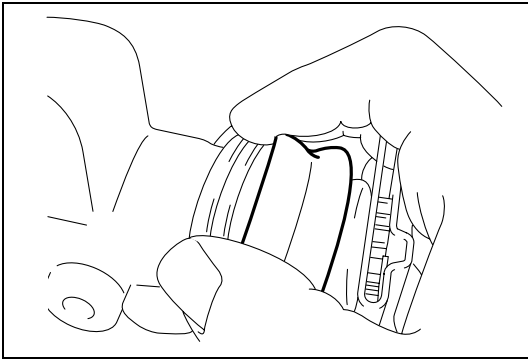
Unit: N·m {kgf·cm, lbf·ft}

A	12-18 {120-180, 9-13}	
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OVERHAUL

EN0680202H200024

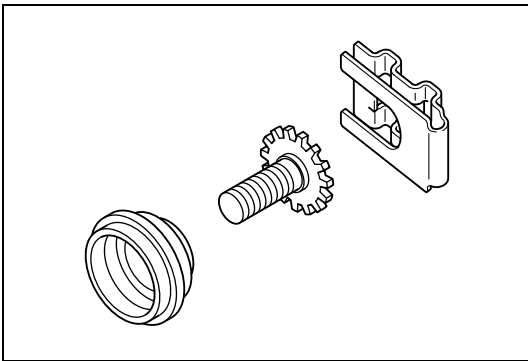
IMPORTANT POINTS - DISASSEMBLY



SHTS068020200337

1. DISASSEMBLY OF THE EXPANDER

- (1) Remove the boot from the body.
- (2) Turn the adjusting bolt counterclockwise and remove the boot with adjusting bolt.



SHTS068020200338

- (3) Remove the boot and retainer from the adjusting bolt.

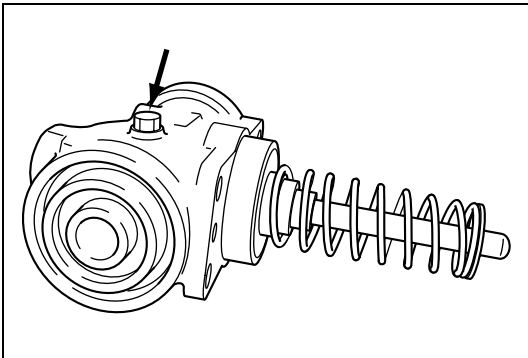
NOTICE

When removing the retainer, take care not to damage it.

- (4) Using the screwdriver, remove the cover and then remove the adjust lock spring and adjust ring.

⚠ WARNING

Pay attention to adjusting lock spring jump-out.

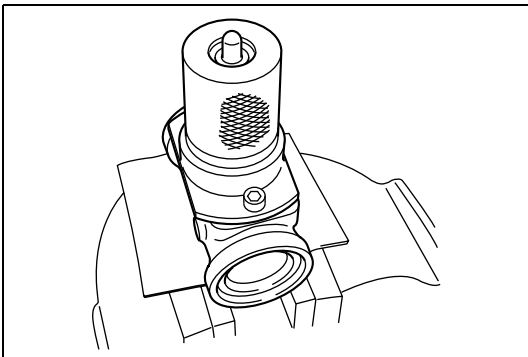


SHTS068020200339

- (5) Remove the screw and then remove the sleeve assembly.

NOTICE

Sleeve assembly can not be disassembly.



SHTS068020200340

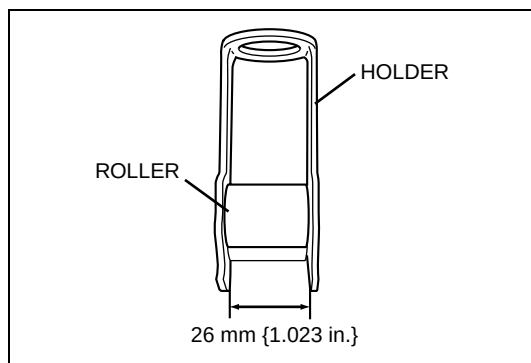
- (6) Install the special tool to the body and tighten the bolt.

SST: Spring Pull Back Tool (09683-1080)

- (7) Remove the E-ring.
- (8) Remove the special tool and then remove the retainer, return spring and wedge assembly.

⚠ WARNING

Pay attention to return spring jump-out when removing the special tool.



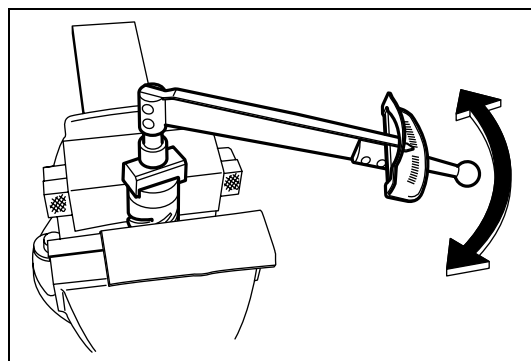
SHTS068020200341

2. DISASSEMBLY OF THE WEDGE ASSEMBLY

- (1) Remove the retainer ring and then remove the boot, retainer and wedge assembly.
- (2) Remove the holder and the roller from the wedge.

NOTICE

Do not expand open end of holder 26 mm {1.023 in.} or more.



SHTS068020200342

IMPORTANT POINTS - INSPECTION

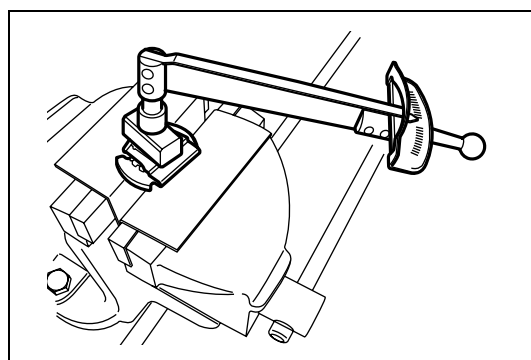
1. INSPECTION FOR SLEEVE ASSEMBLY

- (1) Fix the sleeve assembly in a vise and install the special tool to the tappet part.

SST: Adapter (09659-1610)

- (2) Install the torque wrench to the special tool to measure the starting torque of the tappet part. Replace the sleeve assembly if the torque exceeds the standard value.

	Standard (N·m {kgf·cm, lbf·ft})
Clockwise (Right turn)	0.6 {6.0, 0.433} or less
Counterclockwise (Left turn)	2.0 {20.0, 1.447} or more



SHTS068020200343

2. INSPECTION FOR RETAINER KEEP TORQUE OF ADJUSTING BOLT ASSEMBLY

- (1) Fix the adjusting bolt fitted retainer in a vise and install the special tool to clip.

NOTICE

Take care not to damage thread of the adjusting bolt when fixing adjusting bolt in a vise.

SST: Adapter (09659-1610)

- (2) Install the torque wrench to the special tool to measure the starting torque of the retainer. Replace the adjusting bolt if the torque exceeds the standard value.

Standard: 2.0-5.5 N·m {20-55 kgf·cm, 1.45-3.97 lbf·ft}

IMPORTANT POINTS - ASSEMBLY

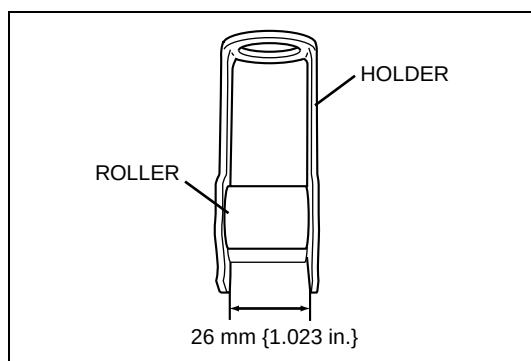
1. ASSEMBLY OF THE WEDGE ASSEMBLY

- (1) Assemble the roller to the holder and assemble them to the wedge.

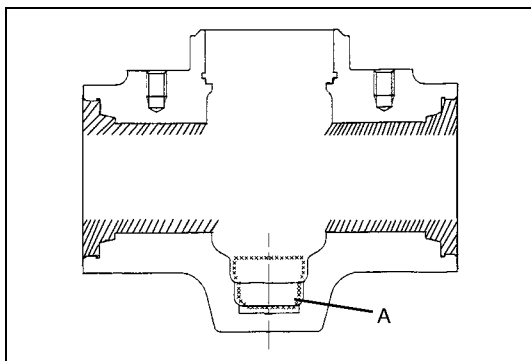
NOTICE

Do not expand open end of holder 26 mm {1.023 in.} or more.

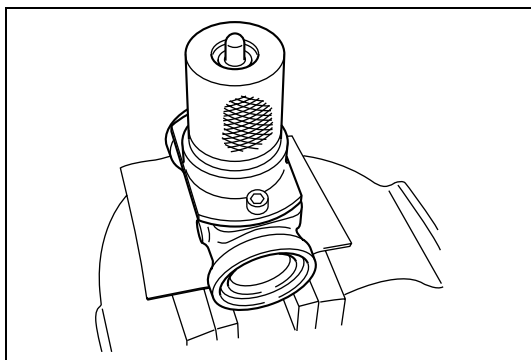
- (2) Apply grease (Darina Grease 2: Showa Shell Sekiyu K.K. product or equivalent) to engaged part and contact part of the roller, holder and wedge.
- (3) Assemble the boot and retainer to the wedge, applying grease to wedge axle part and boot contact surface.



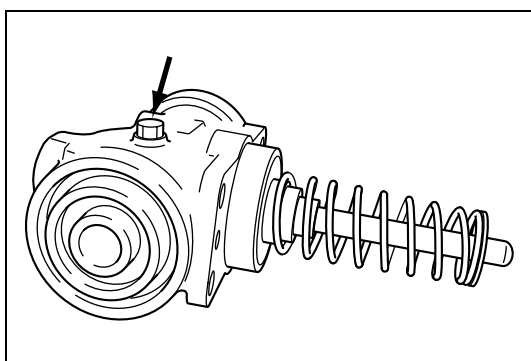
SHTS068020200341



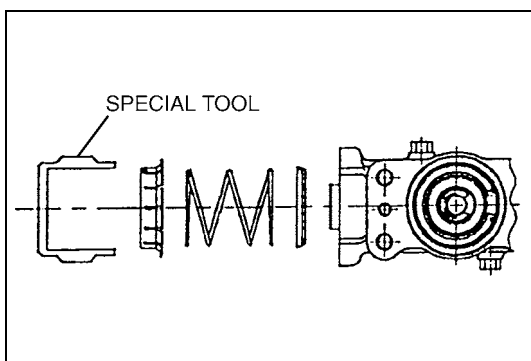
SHTS068020200344



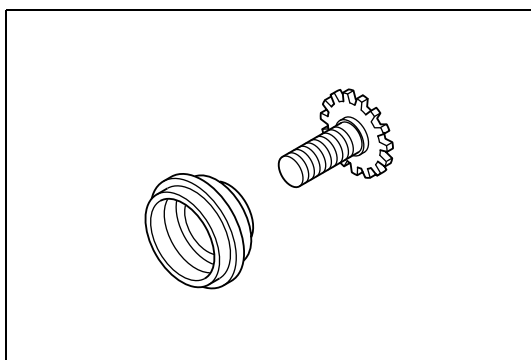
SHTS068020200340



SHTS068020200339



SHTS068020200345



SHTS068020200346

2. ASSEMBLY OF THE EXPANDER

- (1) Fill up grease (Darina Grease 2: Showa Shell Sekiyu K.K. product or equivalent) to the "A" part of body.
- (2) Apply grease (Darina Grease 2: Showa Shell Sekiyu K.K. product or equivalent) to the following part.
 1. Adjust ring seat surface of body
 2. Sleeve sliding part of body and tappet part stabbing part
 3. Roller contact surface of tappet part and outer periphery
 4. Sleeve assembly outer periphery and gear part
 5. Sleeve assembly thread part.
- (3) Assemble wedge assembly to body, and install the new retainer ring using the snap ring pliers.
- (4) Install the return spring and then install the special tool.
SST: Spring Pull Back Tool (09683-1080)
- (5) Install the new E-ring and remove the special tool.

- (6) After assembling the sleeve assembly to the body, tighten the screw applied the LOCTITE 202 or ThreeBond 2415 or equivalent.

NOTICE

Align the screw setting hole of body with the groove of tappet part.

- (7) Install the adjust ring and adjust lock spring.
- (8) Using the special tool, Install the cover.

NOTICE

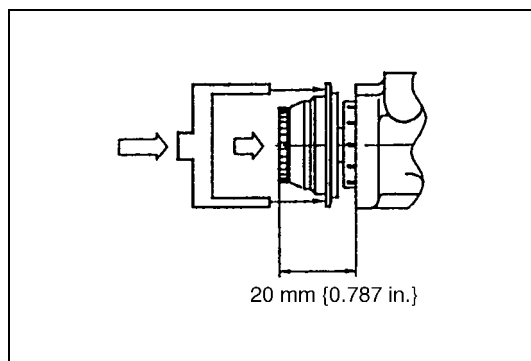
- Be sure to install by hand using such as hammer.
- Before driving cover into sleeve assembly, assemble the cover to the body groove.
- After assembling the cover, turn the cover while pushing it and make sure that the cover turns smoothly in order to confirm the cover fits securely to the groove of the body.

SST: Guide (09657-2330)

- (9) Assemble the new boot to the adjusting bolt. Apply grease (Darina Grease 2: Showa Shell Sekiyu K.K. product or equivalent) to contact part of boot and adjusting bolt, and thread part of adjusting bolt.

NOTICE

Be sure to assemble the boot to the groove of the adjusting bolt securely.



SHTS068020200347

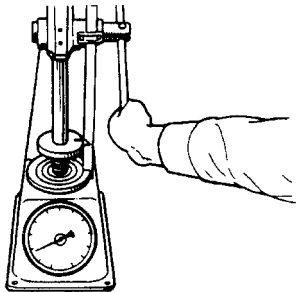
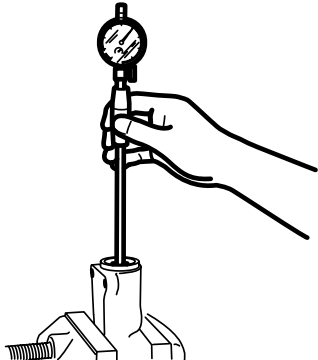
- (10) Screw adjusting bolt into the sleeve assembly until the dimension of end surfaces from adjusting bolt to body is about 20 mm {0.787 in.}.
- (11) Pull the adjusting bolt lightly to confirm the sleeve slides.
- (12) Using the plastic hammer and special tool, press a new boot in.
SST: Boot setting tool (09685-1020)
- (13) Install the retainer to the adjusting bolt.

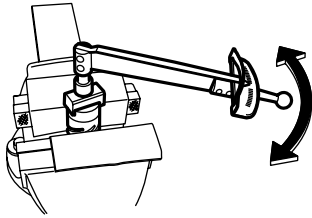
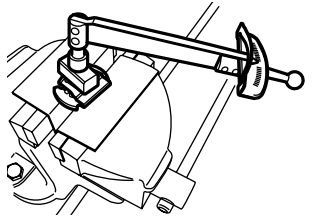
NOTICE

- Do not cut the boot.
- Pay attention to installing direction of the retainer.

INSPECTION AND REPAIR

EN0680202H300030

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Adjust lock spring: Setting load at the specified setting length	78.3 N {8.0 kgf, 17.6 lbf} at 11.3 {0.45}	73.6 N {7.5 kgf, 16.5 lbf}	Replace.	Measure 
Return spring: Setting load at the specified setting length	147 N {15 kgf, 33.1 lbf} at 105.8 {4.17}	132 N {13.5 kgf, 29.8 lbf}		
Sliding parts of sleeve assembly and roller: Wear and damage	—	—	Replace, if necessary.	Visual check
Axle dent of sleeve assembly and roller: Wear and damage	—	0.010 mm {0.0004 in.} or less	Replace, sleeve assembly or roller.	Visual check
Sliding parts of wedge and roller: Wear and damage	—	—	Replace, if necessary.	Visual check
Body inside diameter	38.05 mm {1.498 in.}	38.10 mm {1.5 in.} or less	Replace.	Measure 

Inspection Item		Standard	Limit	Remedy	Inspection Procedure
Sleeve assembly turning torque	Clockwise	0.6 N·m {6.0 kgf·cm, 0.433 lbf·ft} or less	—	Replace.	Measure 
	Counter-clockwise	2.0 N·m {20.0 kgf·cm, 1.447 lbf·ft} or more			
Retainer keep torque of adjusting bolt assembly		2.0-5.5 N·m {20-55 kgf·cm, 1.45-3.97 lbf·ft}	—	Replace.	Measure 

PRESSURE REGULATOR

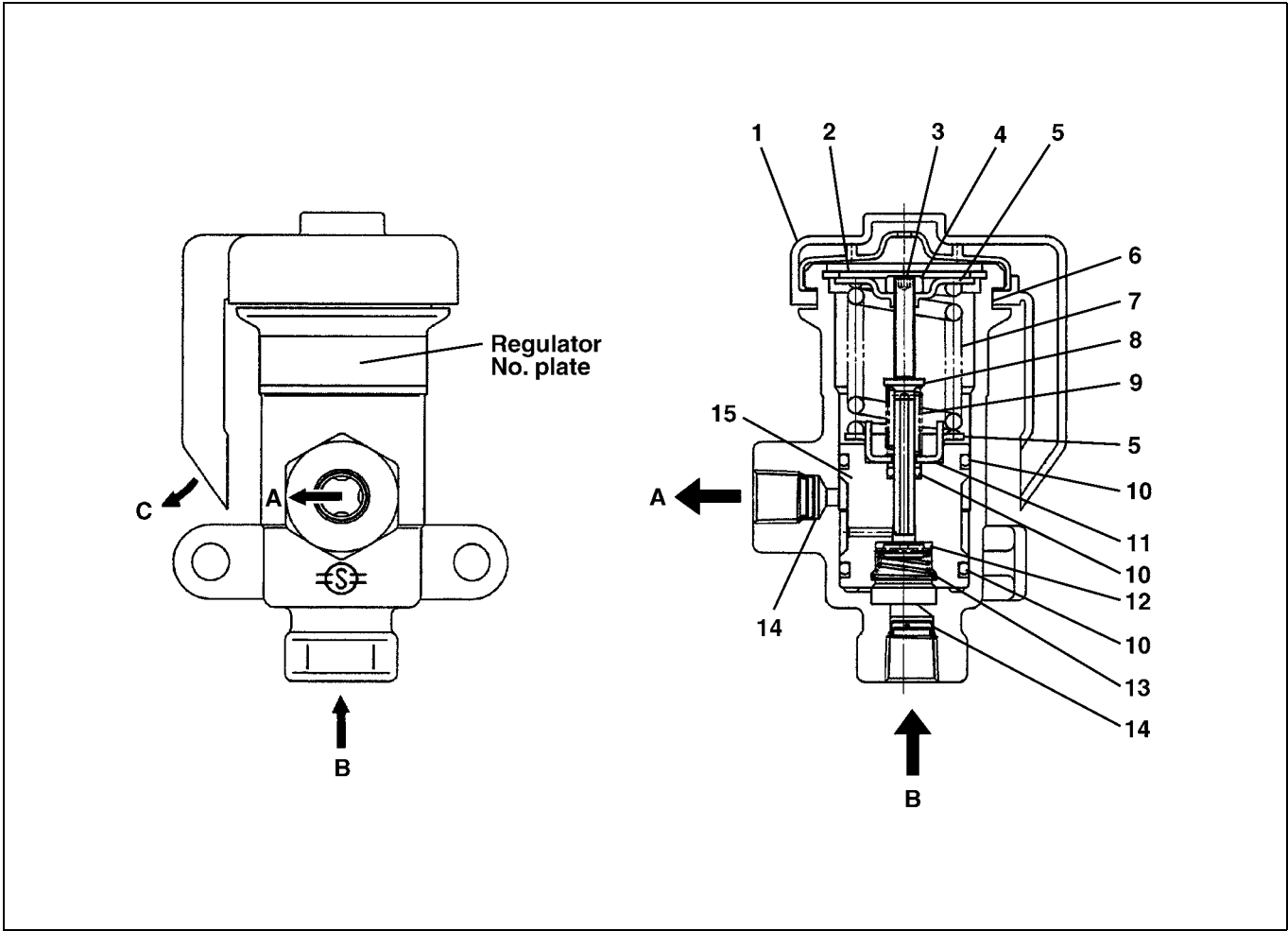
DATA AND SPECIFICATIONS

EN0680202I200025

Type	Spring type, regulates air pressure together with unloader valve on compressor
Regulating pressure: Regulator No. 44530-1420	860-980 kPa {8.8-10.0 kgf/cm ² , 125-142 lbf/in. ² }

DESCRIPTION

EN0680202C100027

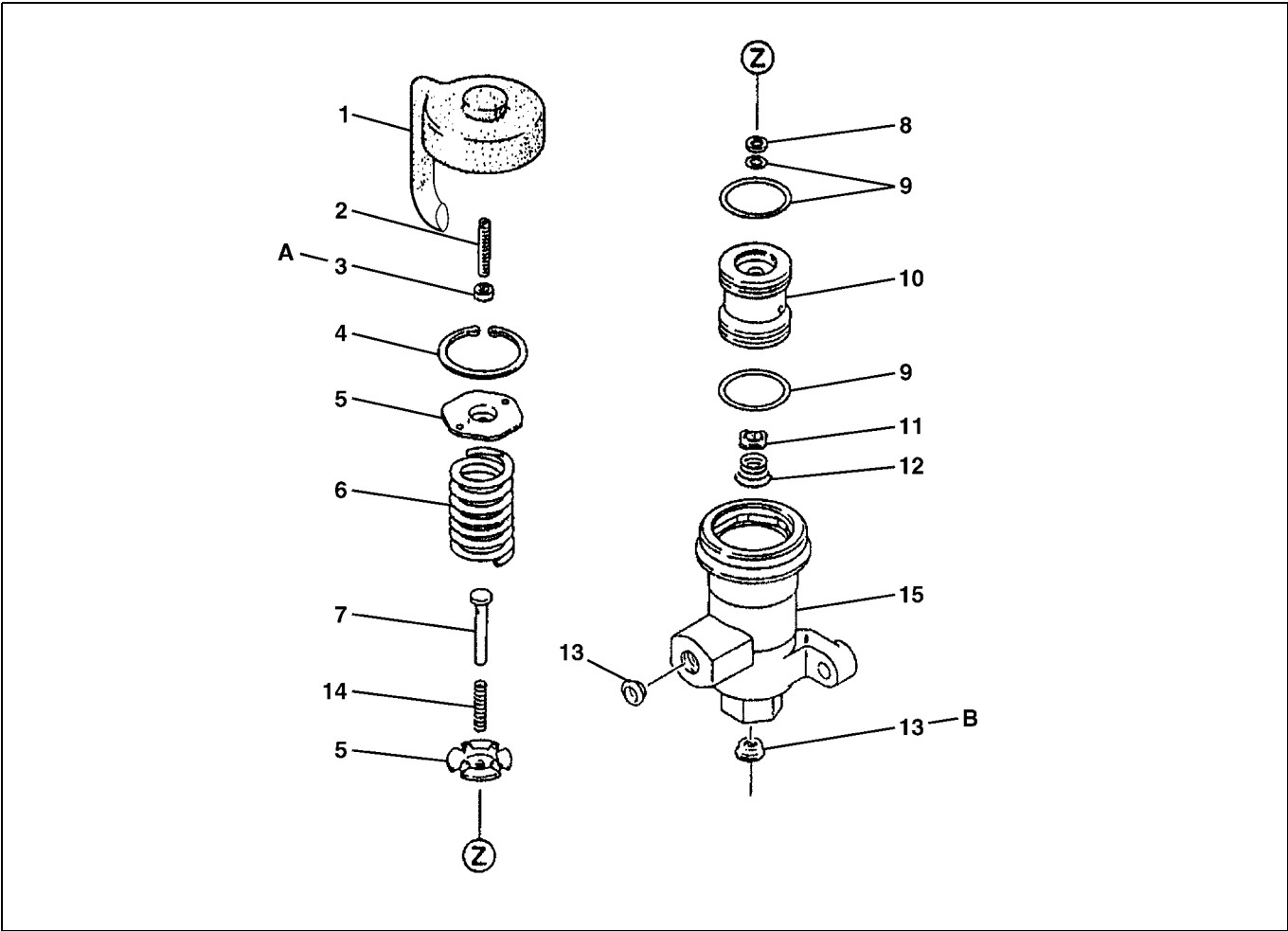


SHTS068020200352

1 Dust cover	7 Main spring	13 Valve spring
2 Retainer ring	8 Valve rod	14 Filter
3 Adjusting screw	9 Rod spring	15 Piston
4 Lock nut	10 O-ring	A To Unloader valve
5 Spring seat	11 Washer	B From Air tank
6 Valve body	12 Valve seat	C Exhaust

COMPONENT LOCATOR

EN0680202D100026



SHTS068020200353

1	Dust cover	6	Main spring	11	Valve seat
2	Adjusting screw	7	Valve rod	12	Valve spring
3	Lock nut	8	Washer	13	Filter
4	Retainer ring	9	O-ring	14	Rod spring
5	Spring seat	10	Piston	15	Valve body

Tightening torque		Unit: N·m {kgf·cm, lbf·ft}	
A	2.4-3.5 {24-36, 1.8-2.6}	B	0.29-0.49 {3-5, 0.22-0.36}

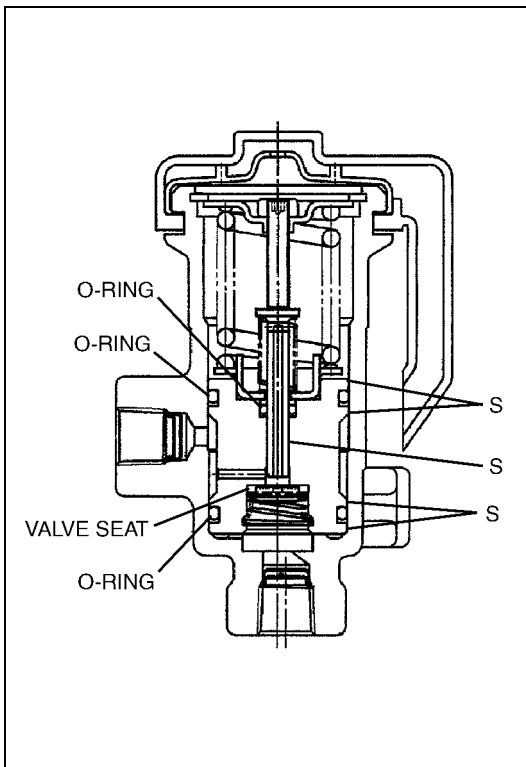
OVERHAUL

EN0680202H200025

IMPORTANT POINT - ASSEMBLY

1. LUBRICATION

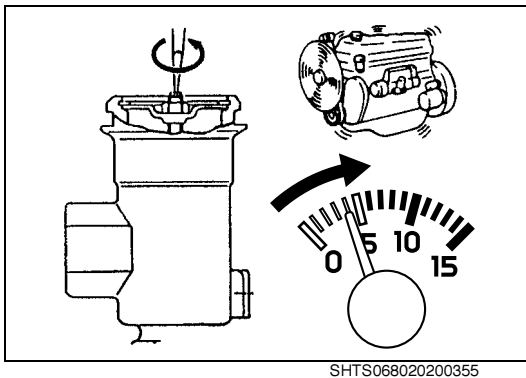
- (1) When reassembling the pressure regulator, replace all rubber parts with new ones.
- (2) Apply adequate amount of silicone grease to the O-rings, and sliding surface S of the piston and valve rod.



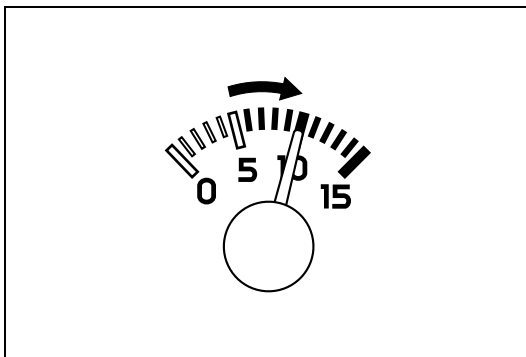
IMPORTANT POINT - MOUNTING

1. ADJUSTMENT

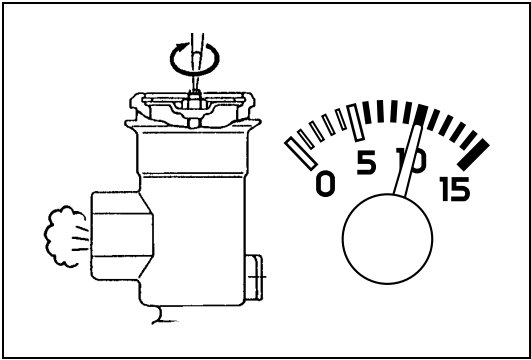
- (1) Loosen the adjusting screw until the rod spring tension is released, and start and idle the engine to charge the air for the air tank.



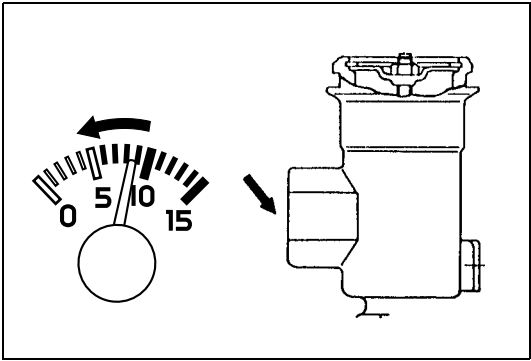
- (2) Stop the engine when the gauge indicates valve opening pressure shown below.



Valve opening pressure	Pressure kPa {kgf/cm ² , lbf/in. ² }
44530-1420	940-980 {9.6-10.0, 136.3-142.1}



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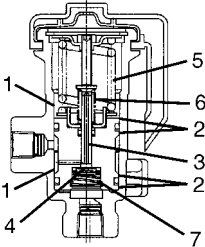
SHTS068020200358

- (3) Tighten the adjusting screw gradually till the air starts to leak from the port to the unloader valve side.
- (4) Tighten the adjusting screw lock nut.
- (5) Watch the pressure gauge needle and see that it stops at the valve closing pressure shown below.
- (6) Connect the pipe and pressure regulator.

Valve closing pressure	Pressure kPa {kgf/cm ² , lbf/in. ² }
44530-1420	820-860 {8.4-8.8, 118.9-124.7}

INSPECTION AND REPAIR

EN0680202H300031

Inspection Item	Standard	Limit	Remedy	Inspection Procedure
Valve body 1, piston 2 and valve rod 3. Sliding surface: Valve rod 4. Valve contact surface: Wear and any other dam- ages	—	—	Replace, if necessary.	Visual check 
Main spring 5. rod spring 6. and valve spring 7: Rust and damage	—	—	Replace, if necessary.	