

4. AXLE (machine serial No. : #0179~)

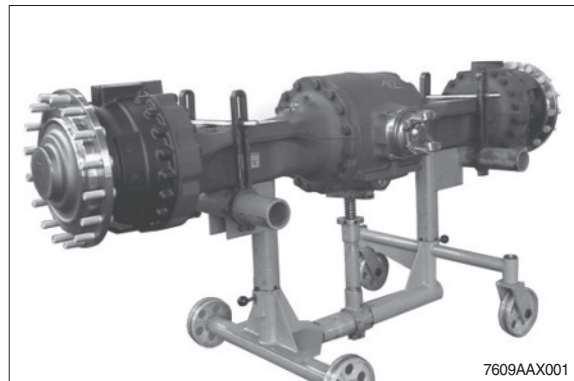
1) DISASSEMBLY

(1) Disassembly output and brake

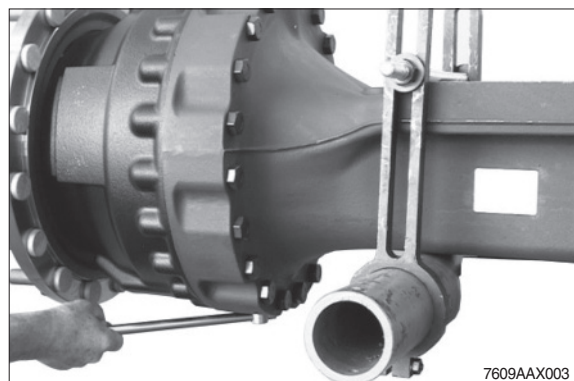
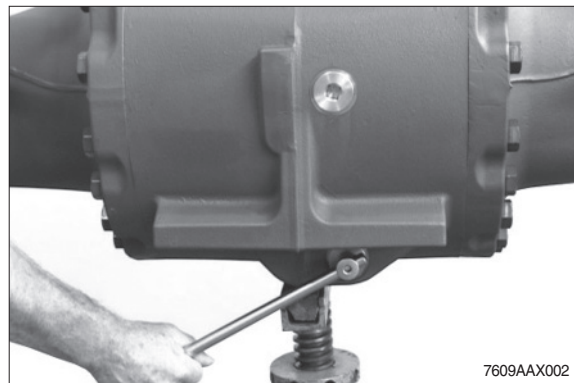
- ① Fix axle to assembly truck.

Assembly truck	5870 350 000
Fixtures	5870 350 077
Clamping brackets	5870 350 075
Support	5870 350 125

- ※ Before clamping the axle fully turn in the support. Position axle first onto the two fixtures, secure with clamping brackets and then unbolt the support until contact with the axle is obtained.

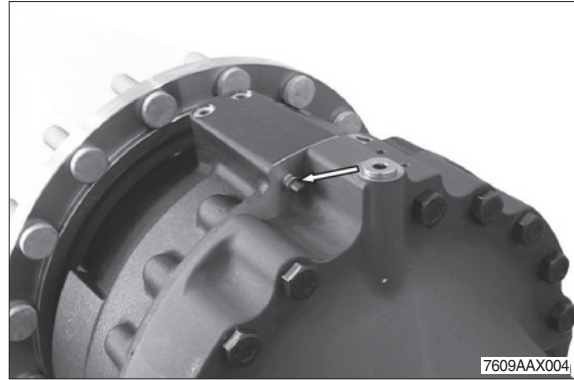


- ② Loosen screw plugs (3EA, see AX002 and AX003) and drain oil from the axle.



③ Remove the breather valve (see arrow).

- ※ To avoid any damage, the breather valve must be removed when separating the output.

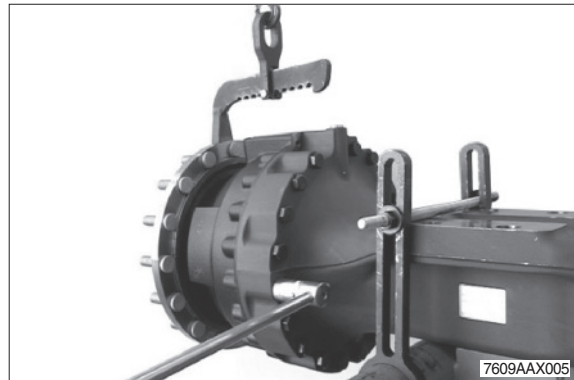


④ Secure the output with the lifting device and loosen hexagon screws.

Then separate the output assy from the axle housing.

Load carrying device 5870 281 043

- ※ Fix the load carrying device with a wheel nut.



⑤ Pull stub shaft and sun gear shaft.

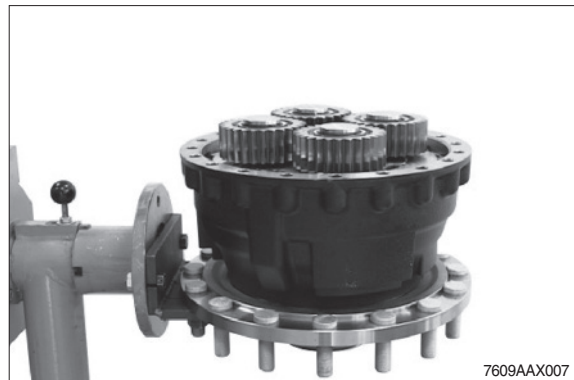
- ※ Pay attention to potentially releasing shim.



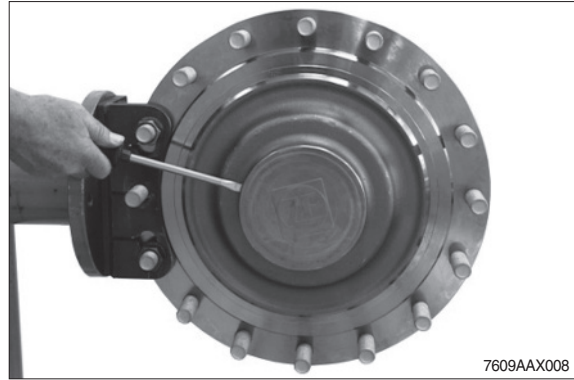
⑥ Fix output to assembly truck.

Assembly truck 5870 350 000

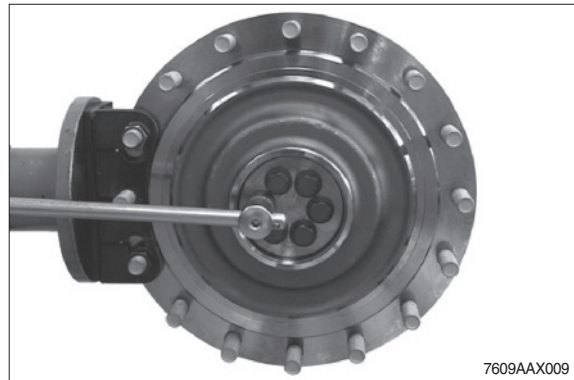
Fixture 5870 350 113



- ⑦ Use a lever to remove the cover from the output shaft.



- ⑧ Loosen locking screws and remove the releasing cover.

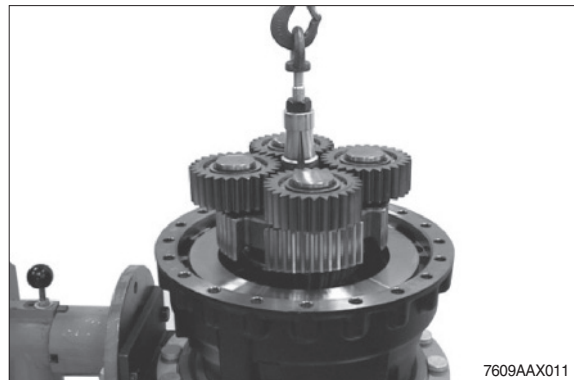


- ⑨ Press planetary carrier with a two-armed puller out of the profile of the output shaft.



- ⑩ Lift the planetary carrier out of the brake housing by means of the lifting device.

Inner extractor 5870 300 017
Eye nut 5870 204 076



- ⑪ Pull the tapered roller bearing from the planetary carrier.

Rapid grip

5873 014 016

Basic tool

5873 004 001



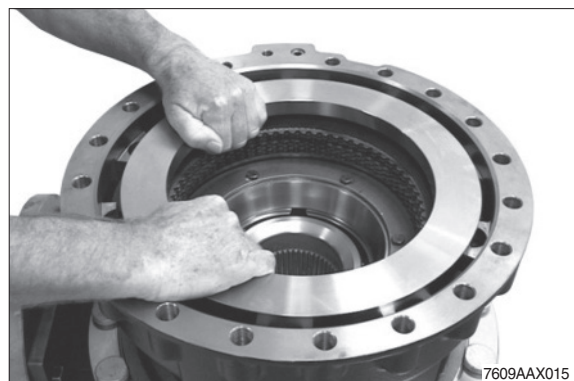
- ⑫ Disengage retaining ring.



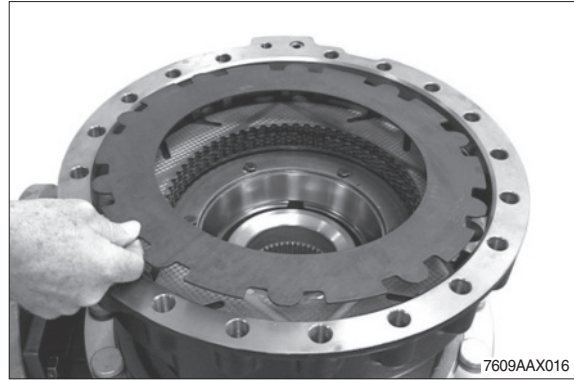
- ⑬ Pull off planetary gear.



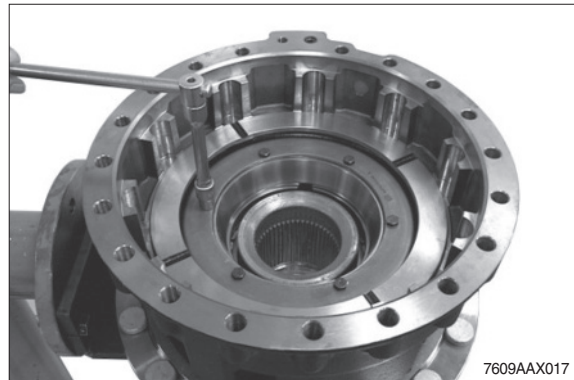
- ⑭ Lift the end plate out of the brake housing.



- ⑮ Lift the disk package out of the brake housing.



- ⑯ Loosen hexagon screws, remove releasing cover and cup spring.

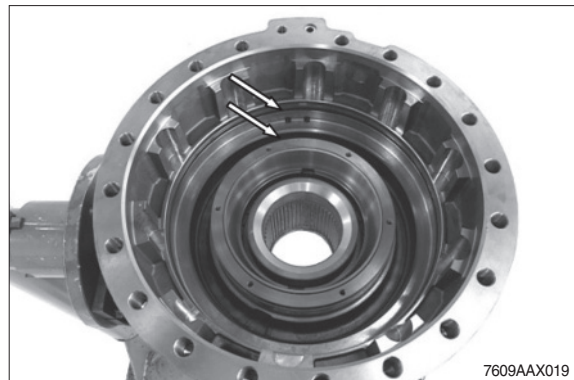


- ⑰ Mount breather valve and press piston out of the brake housing by means of compressed air.

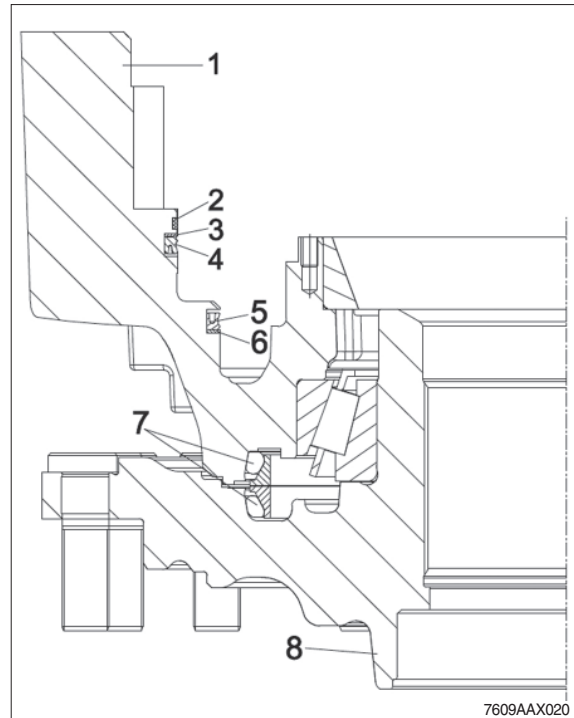


- ⑱ If necessary, remove guide ring, back-up rings and grooved rings out of the annular grooves of the brake housing (see arrows).

- ※ For the installation position of the single parts please also refer to the following sketch.



- 1 Brake housing
- 2 Guide ring
- 3 Back-up ring
- 4 Grooved ring
- 5 Grooved ring
- 6 Back-up ring
- 7 Slide ring seal
- 8 Output shaft



7609AAX020

- ①⑨ Lift the brake housing from the output shaft by means of the lifting device.



7609AAX021

- ②⑩ Use a lever to remove the slide ring seal from the brake housing.

If necessary, force out both bearing outer rings.

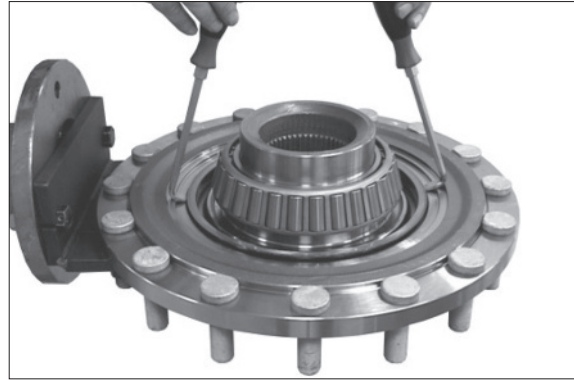
Resetting device 5870 400 001



7609AAX022

- ② Use a lever to remove the slide ring seal from the output shaft.

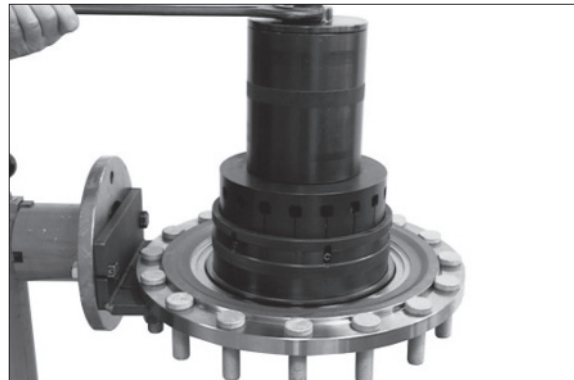
Resetting device 5870 400 001



7609AAX023

- ② Pull the tapered roller bearing from the output shaft.

Rapid grip
 Front axle AA00 693 459
 Rear axle 5873 014 013
Basic tool 5873 004 001
Pressure piece AA00 334 968



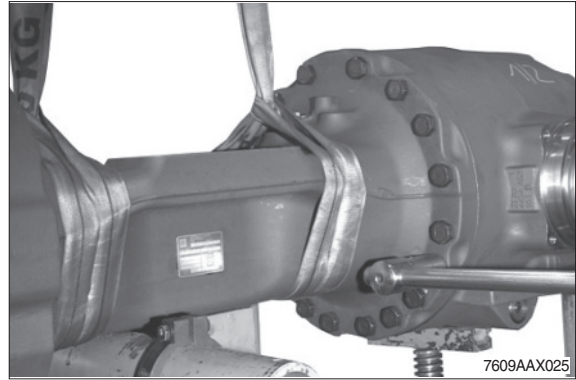
7609AAX024

(2) Disassembly axle housing

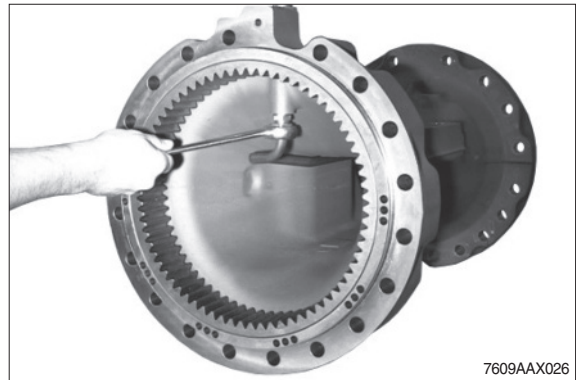
- ① Secure axle housing with the lifting device and loosen the hexagon screws.

Then separate the axle housing from the axle drive housing.

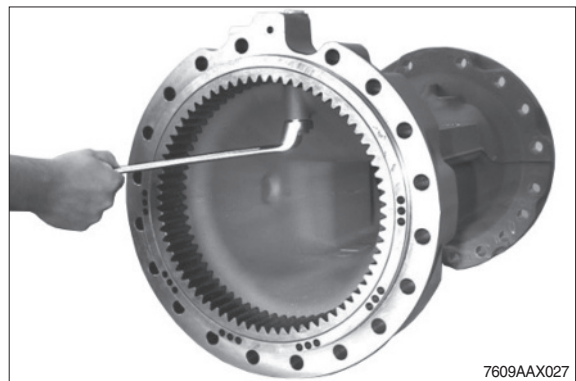
※ Pay attention to releasing differential.



- ② Loosen the threaded connections and remove the releasing brake tube.

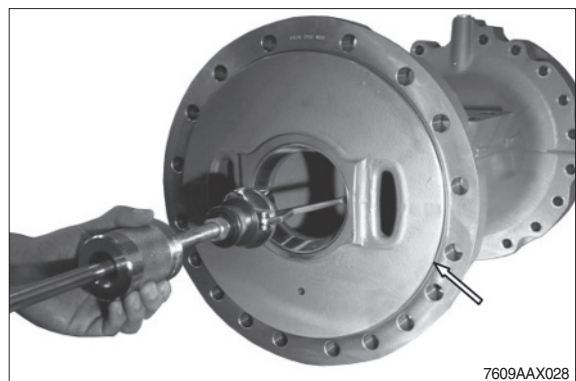


- ③ Loosen screw neck.



- ④ Pull the bearing outer ring out of the bearing hole and remove the shim behind.

Then remove the O-ring (see arrow).

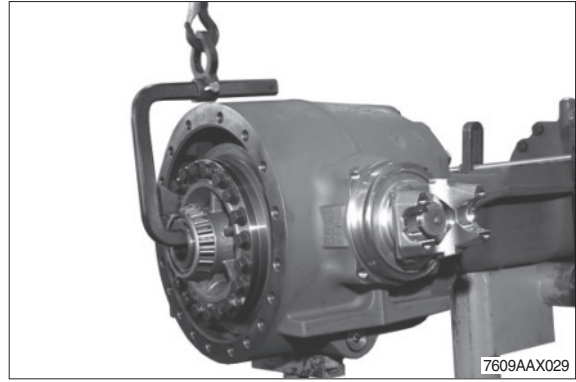


(3) Disassembly input

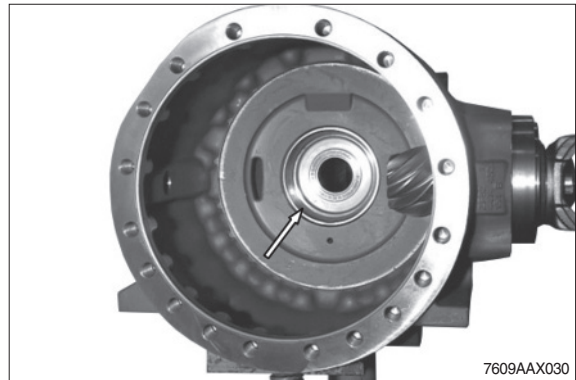
- ① Use the lifting device to lift the differential out of the axle drive housing.

Load carrying fixture 5870 281 083

- ※ Disassembly of the differential is described as of page 3-286.

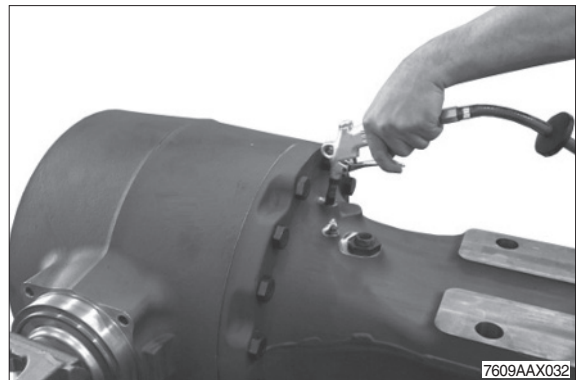
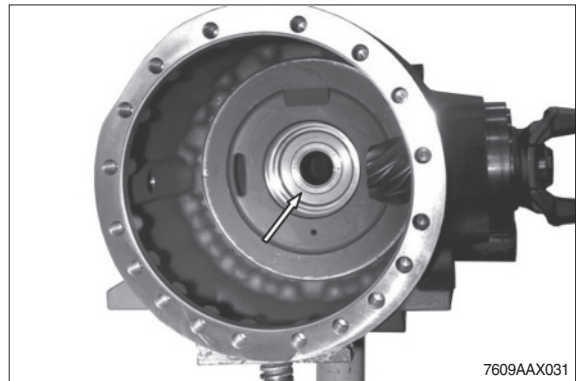


- ② Pull the bearing outer ring (see arrow) out of the housing hole and remove the shim behind.



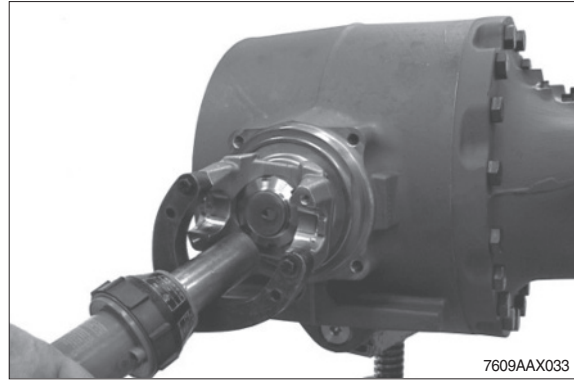
- ③ Press piston (see arrow) out of the axle housing (see subsequent figure) by means of compressed air.

- ※ This operation is only necessary for the hydraulic lock differential (option).



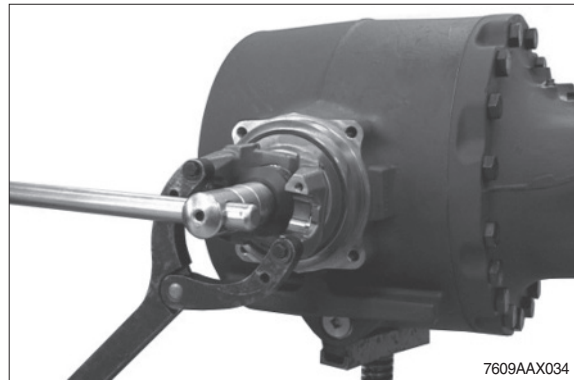
④ Heat slotted nut by means of hot air blower.

※ Slotted nut is secured with loctite (type No. : 262).

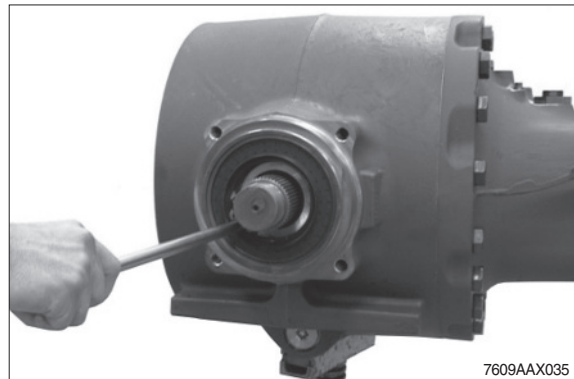


⑤ Loosen slotted nut and remove the shim behind.

Slotted nut wrench	5870 401 139
Clamping device	5870 240 002



⑥ Pull the input flange from the input pinion and use a lever to remove the shaft seal behind from the axle drive housing.



⑦ Press input pinion from the axle drive housing and remove the releasing tapered roller bearing.

Front axle	
Clamp (2EA)	AA00 338 279
Rear axle	
Extractor	5870 000 065
Hexagon screw (2EA)	AA00 331 360



- ⑧ Remove spacer ring and pull the tapered roller bearing from the input pinion.

Gripping device

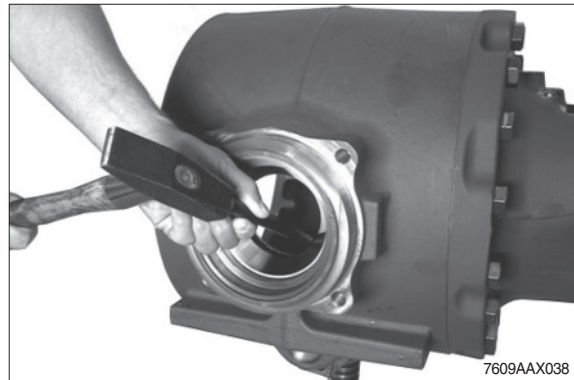
Front axle 5873 002 030

Rear axle AA00 684 425

Basic tool 5873 002 000



- ⑨ If necessary, force both bearing outer rings out of the axle drive housing.



(4) Disassembly differentials

Disassembly hydraulic lock differential (option)

- ① Remove axial roller cage (arrow).



- ② Pull both tapered roller bearings from the differential.

Crown wheel side

Grab sleeve 5873 012 016

Basic tool 5873 002 001

Opposite side

Grab sleeve 5873 003 029

Basic tool 5873 002 001

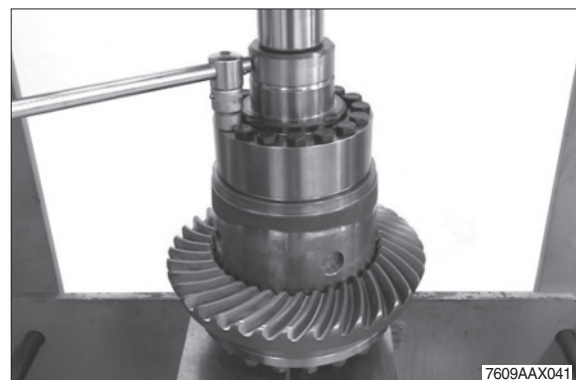
Reduction 5873 003 011

Pressure piece 5870 100 075



- ③ Preload the differential by means of the press, loosen the hexagon screws and remove the releasing housing cover.

Pressure piece 5870 100 075



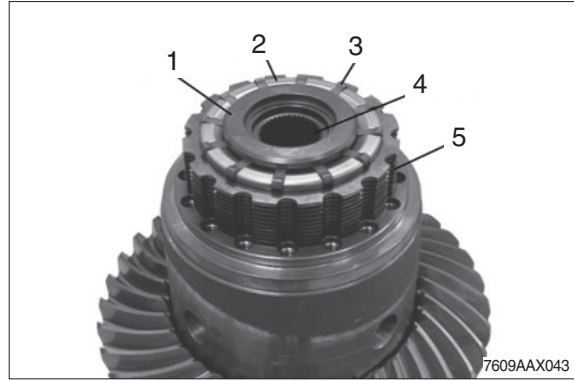
- ④ Preload the housing cover/compression spring by means of the press and disengage the retaining ring.

Then remove sliding sleeve and compression spring from the housing cover.

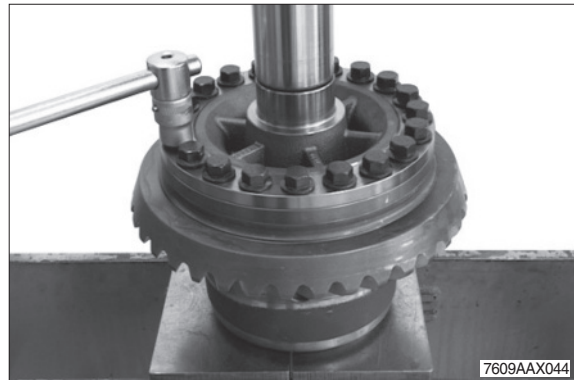


⑤ Remove single parts.

- 1 Pressure piece
- 2 Cage
- 3 Lever (12EA)
- 4 Disk carrier
- 5 Disk package



⑥ Preload differential by means of the press, loosen locking screws and housing cover.



⑦ Remove axle bevel gear with thrust washers from the differential housing.



⑧ Force out both slotted pins.



- ⑨ Force out both differential axles (short) and remove the releasing spider gears with thrust washers from the differential housing.



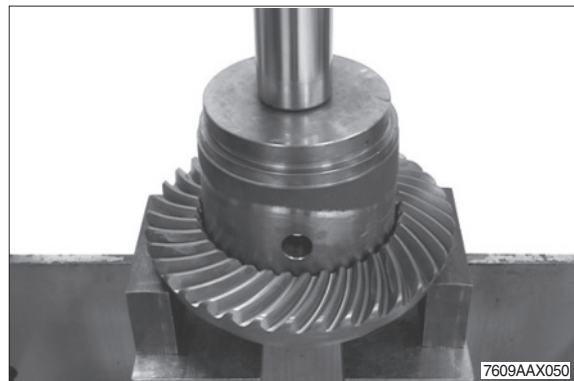
- ⑩ Pull the differential axle (long) and remove the releasing spider gears with thrust washers from the differential housing.



- ⑪ Remove the axle bevel gear and the shim behind.



- ⑫ Press crown wheel from the differential carrier.



Disassembly conventional differential (standard)

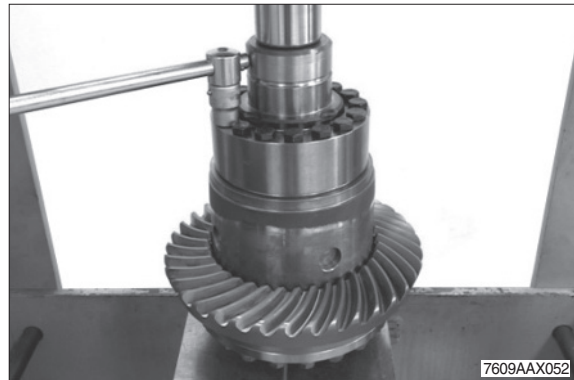
- ① Pull both tapered roller bearings from the differential.

Grab sleeve 5873 012 016

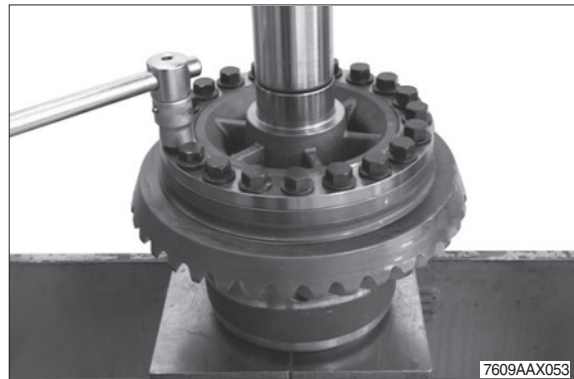
Basic tool 5873 002 001



- ② Preload the differential by means of the press, loosen the hexagon screws and remove the releasing housing cover.



- ③ Preload the differential by means of the press, loosen locking screws and housing cover.



- ④ Remove axle bevel gear with thrust washers from the differential housing.



- ⑤ Force out both slotted pins.



- ⑥ Force out both differential axles (short) and remove the releasing spider gears with thrust washers from the differential housing.



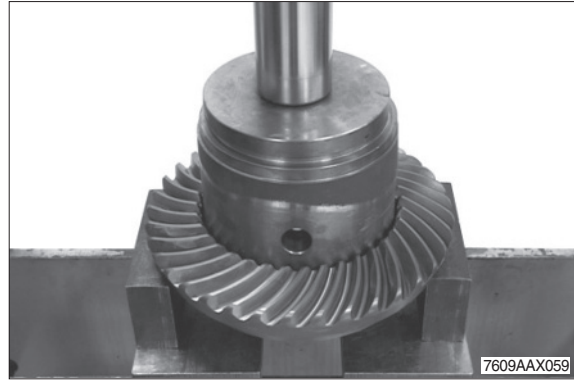
- ⑦ Pull the differential axle (long) and remove the releasing spider gears with thrust washers from the differential housing.



- ⑧ Remove the axle bevel gear and the shim behind.



- ⑨ Press crown wheel from the differential carrier.



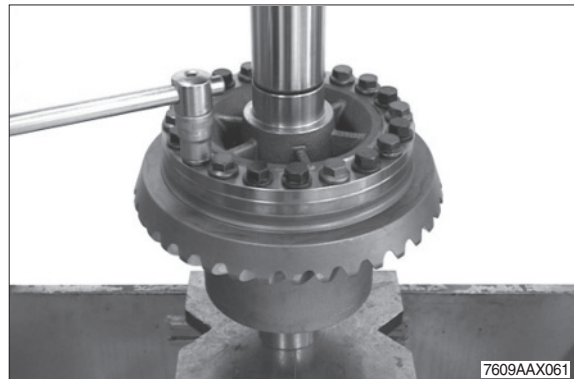
Disassembly limited slip differential (option)

- ① Pull both tapered roller bearings from the differential.

Grab sleeve	5873 012 016
Basic tool	5873 002 001



- ② Preload the differential by means of the press, loosen locking screws and housing cover.



- ③ Lift the axle bevel gear with pressure ring, disk package and thrust washers out of the differential housing.



- ④ Remove spider shafts and axle bevel gears (see figure) out of the differential housing.



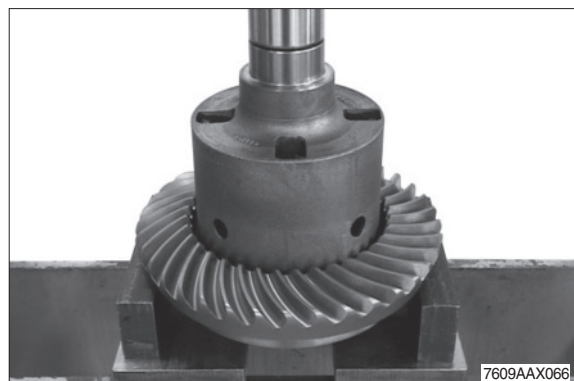
- ⑤ Remove the second axle bevel gear.



- ⑥ Lift the pressure ring out of the differential housing and remove the disk package and thrust washers behind.



- ⑦ Press crown wheel from the differential carrier.

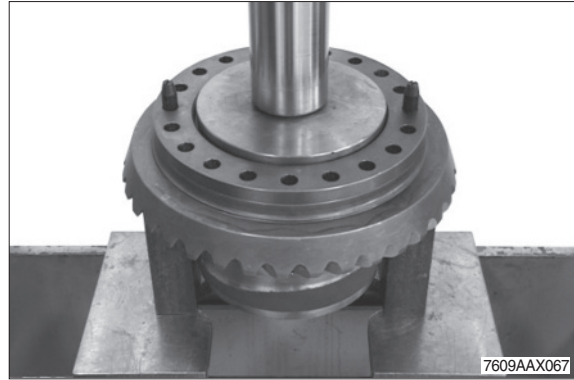


(5) Reassembly differentials

Reassembly hydraulic lock differential (option)

- ① Mount two locating pins and press the heated crown wheel onto the differential housing until contact is obtained.

Locating pins 5870 204 040



- ② Insert thrust washer into the differential housing.



- ③ Insert axle bevel gear.



- ④ Insert spider gears with thrust washers into the differential housing and fix them with the spider shaft (long).

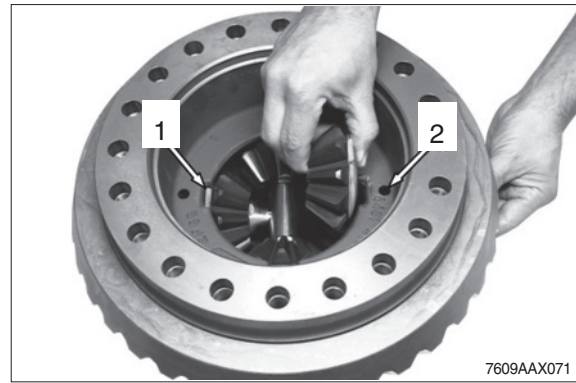
※ Thrust washers must be positioned with the tabs (see arrow) being located in the recesses of the differential housing.



⑤ Insert spider gears with thrust washers into the differential housing and fix them with the two spider shafts (short).

※ Thrust washers must be positioned with the tabs (see arrow 1) being located in the recesses of the differential housing.

※ Pay attention to radial installation position of the spider shafts (fixing holes, arrow 2).

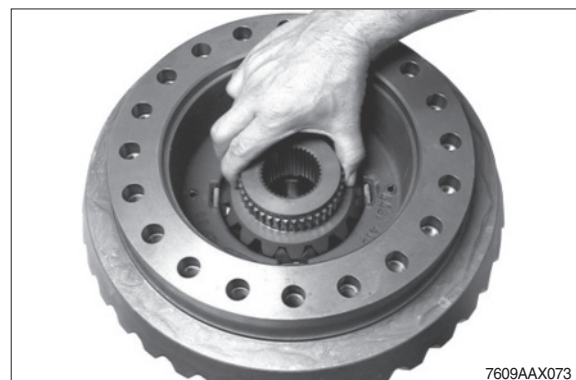


⑥ Fix spider shafts (short) with slotted pins.

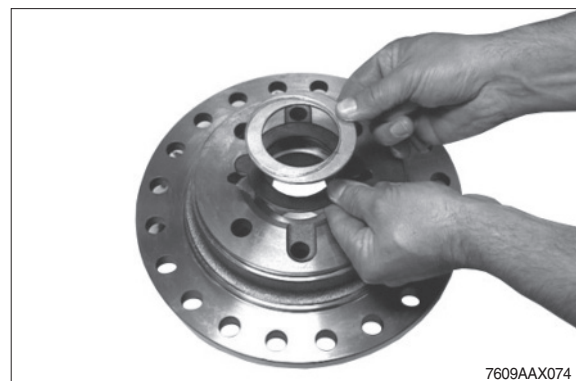
※ Flush mount slotted pins.



⑦ Mount second axle bevel gear.



⑧ Fix the thrust washers into the housing cover by means of grease.

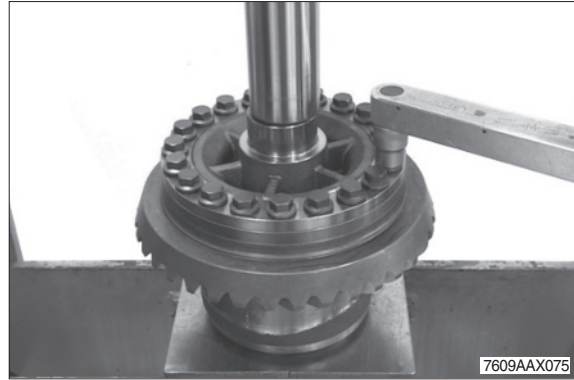


- ⑨ Mount two adjusting screws and insert the housing cover until contact with the differential housing is obtained.

Locating pins 5870 204 040

Preload the differential by means of the press and bolt with new locking screws.

- Tightening torque (M16/12.9) :
40.8 kgf · m (295 lbf · ft)



7609AAX075

- ⑩ Install compression spring onto the sliding sleeve.



7609AAX076

- ⑪ Insert the premounted sliding sleeve into the housing cover.

Preload the compression spring by means of the press and engage the retaining ring into the annular groove of the sliding sleeve.

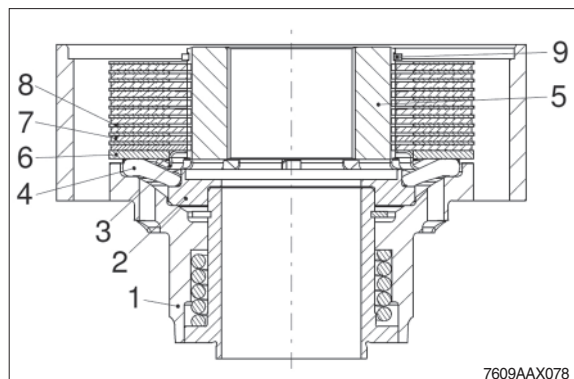


7609AAX077

Setting of disk package

- ⑫ Premount single parts according to the adjacent sketch.

- 1 Housing cover
- 2 Pressure piece
- 3 Cage
- 4 Lever (12EA)
- 5 Disk carrier
- 6 Pressure ring
- 7 Inner disks
- 8 Outer disks (optional)
- 9 Snap ring



7609AAX078

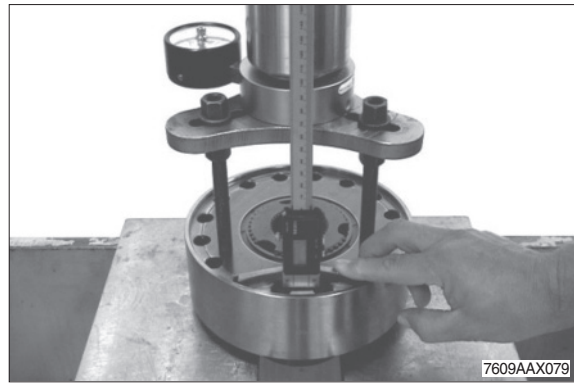
- ※ For the number of disks and the disk arrangement please refer to the relating parts manual.

- ⑬ Preload disk package with an axial force of $F = 50^{+30}$ kN.

Then check the setting dimension "A" = 1.05 ± 0.1 mm from the collar of the differential cover to the plane face of the outer disk (see also below sketch).

Pressure piece 5870 100 069
Load cell 5870 700 004

- ※ Any deviation from the specified setting dimension must be corrected with a corresponding outer disk.

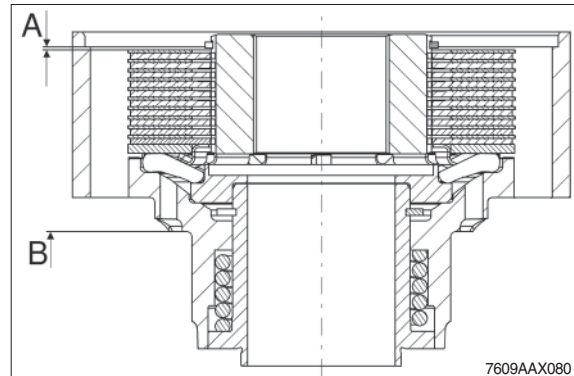


7609AAX079

A = Setting dimension = 1.05 ± 0.1 mm

B = Contact face

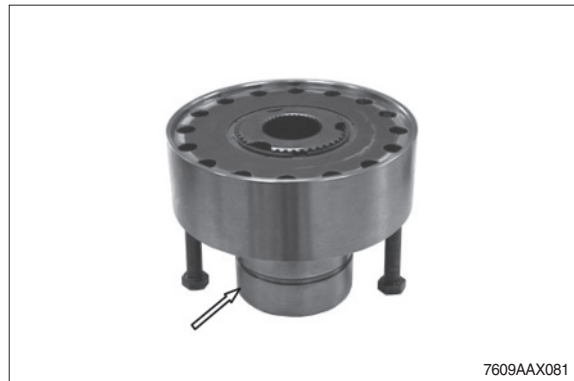
- ⑭ To obtain a correct measuring result :
The housing cover may only be supported on the contact face (B).
Ensure that the assembly fixture is only supported on the disk package and not on the disk carrier (5).



7609AAX080

- ⑮ Position housing cover onto pressure piece (see arrow).
Insert two hexagon screws into the housing cover to radially fix the disk package.

Pressure piece 5870 100 075



7609AAX081

- ⑯ Position the premounted differential with the lifting device onto the housing cover and preliminarily fix with hexagon screws.

Lifting device AA00 331 446



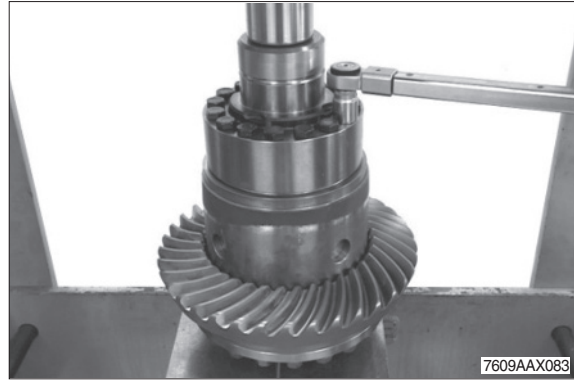
7609AAX082

- ⑰ Preload the differential by means of the press and the pressure piece.

Then finally tighten the housing cover with hexagon screws.

· Tightening torque (M14/10.9) :
18.9 kgf · m (136 lbf · ft)

Pressure piece 5870 100 075



- ⑱ Heat both tapered roller bearings and insert until contact is obtained.

※ Adjust tapered roller bearing after cooling down.



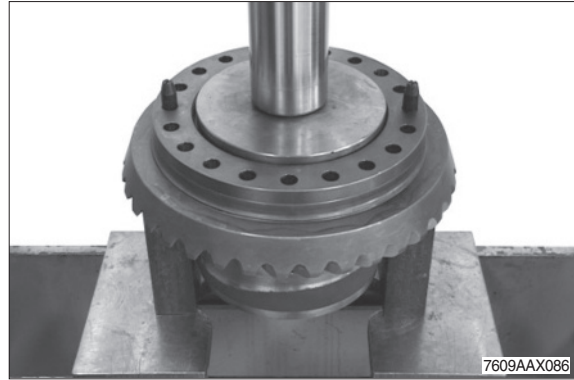
- ⑲ Fix axial roller cage (see arrow) to the sliding sleeve by means of grease.



Reassembly conventional differential (standard)

- ① Mount two locating pins and press the heated crown wheel onto the differential housing until contact is obtained.

Locating pins 5870 204 040



- ② Insert thrust washer into the differential housing.



- ③ Insert axle bevel gear.



- ④ Insert spider gears with thrust washers into the differential housing and fix them with the spider shaft (long).

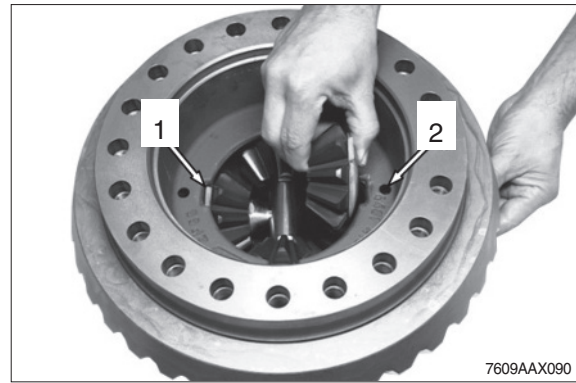
※ Thrust washers must be positioned with the tabs (see arrow) being located in the recesses of the differential housing.



⑤ Insert spider gears with thrust washers into the differential housing and fix them with the two spider shafts (short).

※ Thrust washers must be positioned with the tabs (see arrow 1) being located in the recesses of the differential housing.

※ Pay attention to radial installation position of the spider shafts (fixing holes, arrow 2).

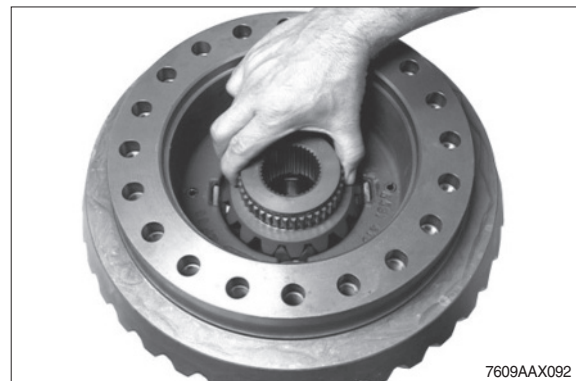


⑥ Fix spider shafts (short) with slotted pins.

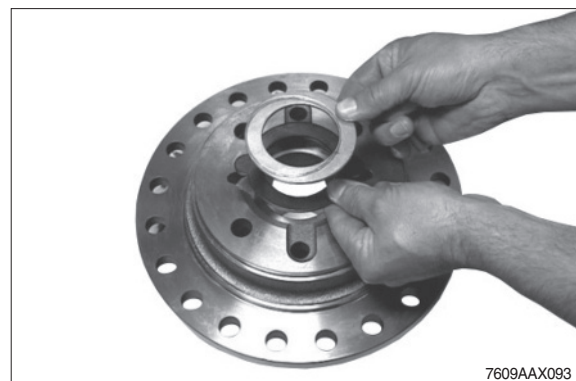
※ Flush mount slotted pins.



⑦ Mount second axle bevel gear.



⑧ Fix the thrust washers into the housing cover by means of grease.

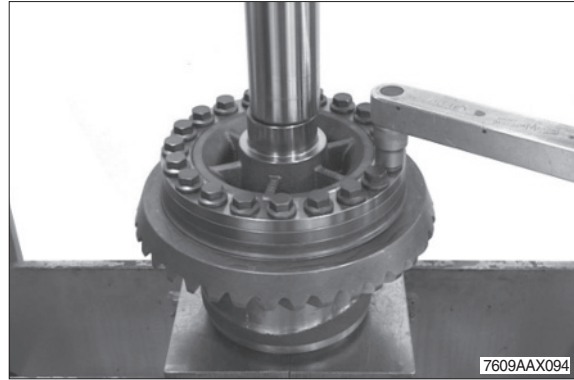


- ⑨ Mount two adjusting screws and insert the housing cover until contact with the differential housing is obtained.

Locating pins 5870 204 040

Preload the differential by means of the press and bolt with new locking screws.

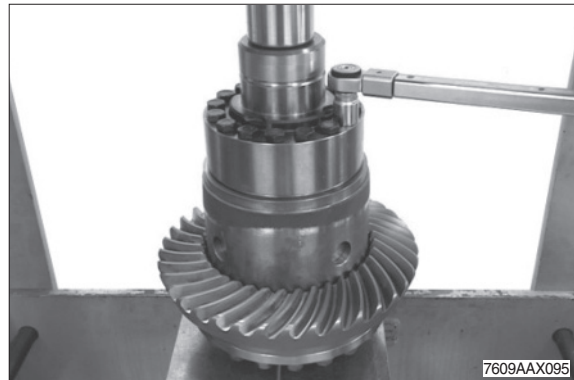
- Tightening torque (M16/12.9) :
40.8 kgf · m (295 lbf · ft)



- ⑩ Attach the housing cover and preload the differential with the press.

Then fix the housing cover with hexagon screws.

- Tightening torque (M14/10.9) :
18.9 kgf · m (136 lbf · ft)



- ⑪ Heat both tapered roller bearings and insert until contact is obtained.

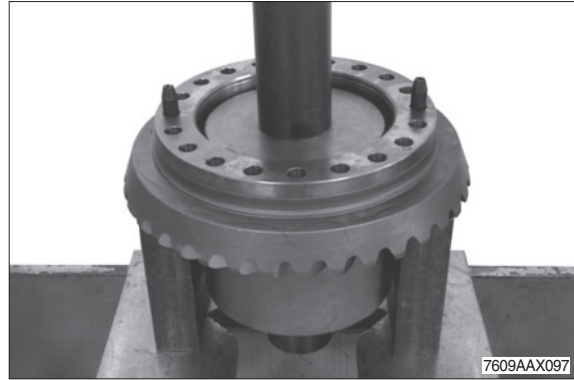
- ※ Adjust tapered roller bearing after cooling down.



Reassembly limited slip differential (option)

- ① Mount two locating pins and press the heated crown wheel onto the differential housing until contact is obtained.

Locating pins 5870 204 040



- ② Insert thrust washer into the differential housing.



- ③ Mount outer and inner disks in alternating order, starting with an outer disk.

※ The installation clearance of the internal parts is corrected by mounting outer disks with different thicknesses.

▲ The difference in thickness between the left and the right disk package must only be 0.1 mm at maximum.



- ④ Place the pressure ring.



- ⑤ Insert the axle bevel gear until contact is obtained and install the inner disks with the teeth.



- ⑥ Preassemble the differential spider and insert it into the differential housing/into the pressure ring.



- ⑦ Mount second axle bevel gear.



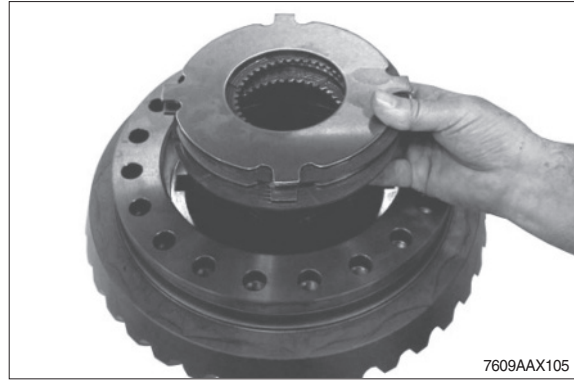
- ⑧ Insert the second pressure ring into the differential housing.



- ⑨ Mount outer and inner disks in alternating order, starting with an inner disk.

The installation clearance of the internal parts is corrected by mounting outer disks with different thicknesses.

- ▲ The difference in thickness between the left and the right disk package must only be 0.1 mm at maximum.



Determine the installation clearance 0.2~0.7 mm

- ⑩ Measure dimension I, from the mounting face of the differential housing to the plane face of the outer disk.

Dimension I e.g. 44.30 mm



- ⑪ Measure dimension II, from the contact face of the outer disk to the mounting face on the housing cover.

Dimension II e.g. 43.95 mm

CALCULATION EXAMPLE :

Dimension I 44.30 mm

Dimension II - 43.95 mm

Difference = disk clearance = 0.35 mm



- ※ Any deviation from the required installation clearance is to be corrected with corresponding outer disks (s = 2.7, s = 2.9, s = 3.0, s = 3.1, s = 3.2, s = 3.3 or s = 3.5 mm), taking care that the difference in thickness between the left and the right disk package must only be 0.1 mm at maximum.

- ⑫ Fix the thrust washers into the housing cover by means of grease.

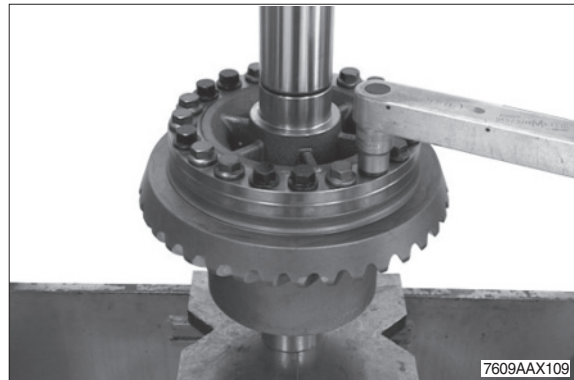


- ⑬ Mount two adjusting screws and insert the housing cover until contact with the differential housing is obtained.

Locating pins 5870 204 040

Preload the differential by means of the press and bolt with new locking screws.

- Tightening torque (M16/12.9) :
40.8 kgf · m (295 lbf · ft)



- ⑭ Heat both tapered roller bearings and insert until contact is obtained.

- ※ Adjust tapered roller bearing after cooling down.



(6) Reassembly input

※ If crown wheel or input pinion are damaged, both parts must be jointly replaced.

In case of a new installation of a complete bevel gear set pay attention to an identical mating number of input pinion and crown wheel.

Determination of shim thickness to obtain a correct contact pattern

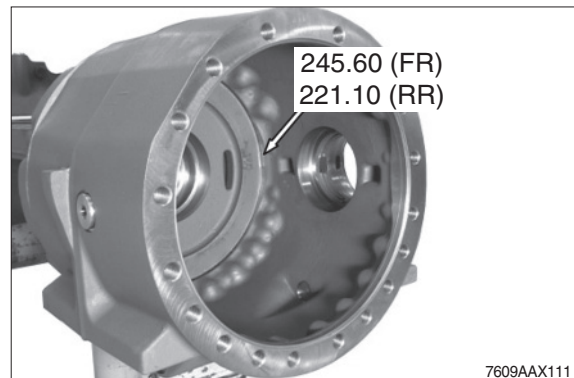
※ The following measuring procedures must be carried out with utmost accuracy.

Inaccurate measurements lead to an incorrect contact pattern requiring an additional disassembly and reassembly of input pinion and differential.

① Read dimension I from the axle drive housing.

Dimension I e.g.

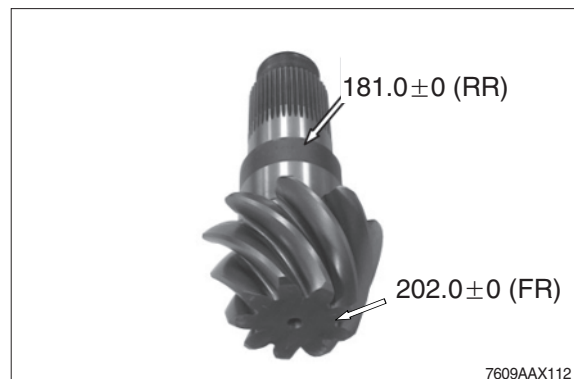
Front axle	245.60 mm
Rear axle	221.10 mm



② Read dimension II (pinion dimension).

Dimension II e.g.

Front axle	202.00 mm
Rear axle	181.00 mm



- ③ Determine dimension III (bearing width).

Dimension III e.g.

Front axle 42.50 mm

Rear axle 39.10 mm

CALCULATION EXAMPLE "A₁₁":

Front axle

Dimension I 245.60 mm

Dimension II - 202.00 mm

Dimension III - 42.60 mm

Difference = shim s = 1.00 mm

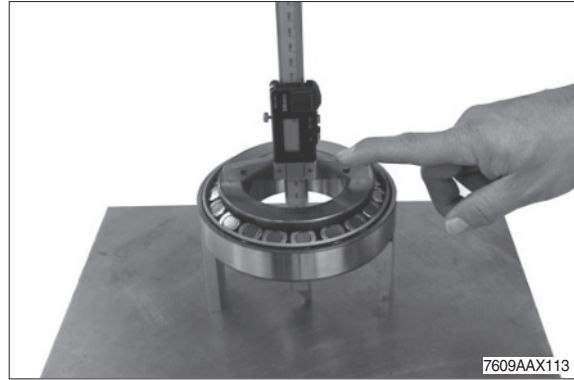
Rear axle

Dimension I 221.10 mm

Dimension II - 181.00 mm

Dimension III - 39.10 mm

Difference = shim s = 1.00 mm

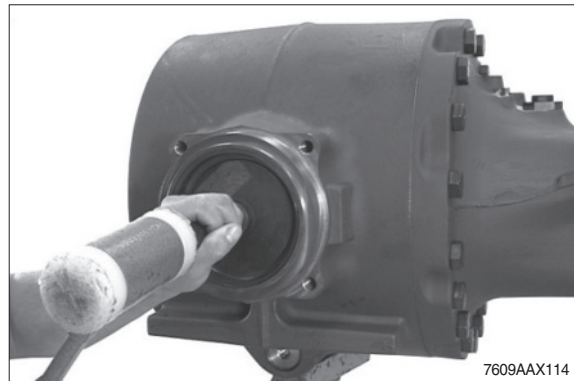


Reassembly of input pinion

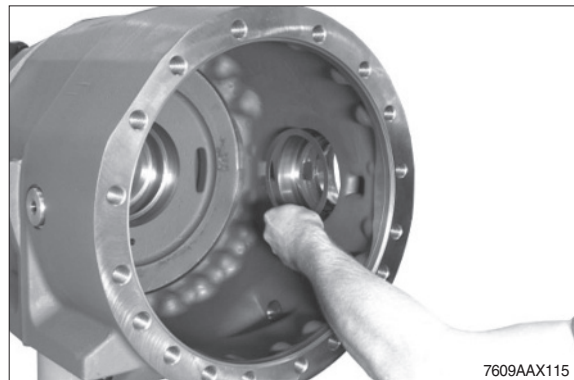
- ④ Undercool the external bearing outer ring and insert it into the axle drive housing until contact is obtained.

Driver tool 5870 058 079

Handle 5870 260 004



- ⑤ Insert the determined shim e.g. s = 1.00 mm into the housing hole.



- ⑥ Undercool the internal bearing outer ring and bring it into contact position in the housing hole by using the assembly fixture.

Assembly fixture

Front axle AA00 338 352

Rear axle 5870 345 080



- ⑦ Heat the tapered roller bearing and insert it into the input pinion until contact is obtained.

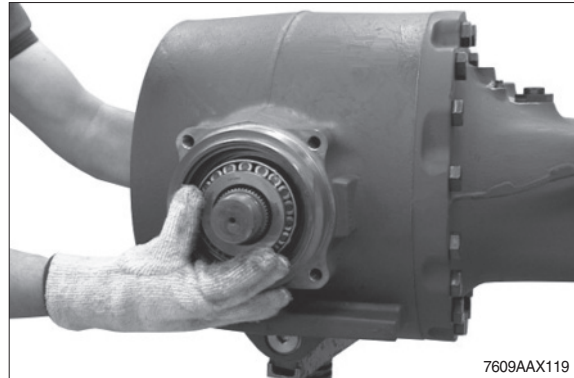


Setting of rolling torque of input pinion bearing 0.15~0.41 kgf · m (1.11~2.95 lbf · ft) (without shaft seal)

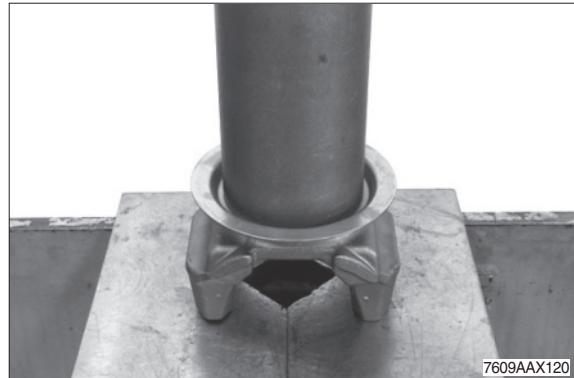
- ⑧ Insert spacer (e.g. $s = 8.18$ mm).
- ※ According to our experience the necessary rolling torque is obtained when reusing the spacer which has been removed during disassembly (e.g. $s = 8.18$ mm).
A later check of the rolling torque, however, is absolutely necessary.



- ⑨ Insert the preassembled input pinion into the axle drive housing and insert the heated tapered roller bearing until contact is obtained.



- ⑩ Press the protection plate onto the input flange (see arrow) until contact is obtained.
- ※ Do not fit the shaft seal until the contact pattern has been checked (page 3-226).



- ⑪ Insert input flange and fix it by means of disk and slotted nut.

· Tightening torque :

122 kgf · m (885 lbf · ft)

Slotted nut wrench 5870 401 139

Clamping device 5870 240 002

- ※ Preliminarily mount slotted nut without loctite.

▲ While tightening rotate the input pinion several times in both directions.

- ⑫ Check rolling torque (0.15~0.41 kgf · m without shaft seal).

- ※ When installing new bearings try to achieve the upper value of the rolling torque.

▲ In case of deviations from the necessary rolling torque correct with a corresponding spacer (AX118, page 3-222) as specified below.

Insufficient rolling torque

install thinner spacer ring

Excessive rolling torque

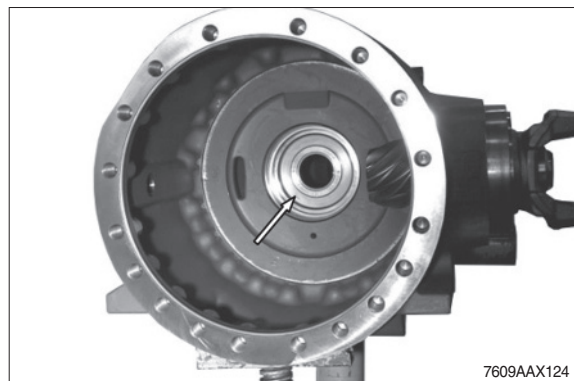
install thicker spacer ring

- ⑬ Grease O-rings (2EA, see arrows) and insert them into the annular grooves of the piston.

- ※ Operation figure AX123 and AX124 is only necessary for hydraulic lock differential (option).



- ⑭ Insert piston (see arrow) into the bearing housing until contact is obtained.



Determination of shims for setting of bearing rolling torque (differential housing) and backlash (bevel gear set)

※ Determine the required shims on the basis of the read value (deviation/test dimension) and the corresponding specifications of the table below :

(KRS – SET – RIGHT)

(KRS = bevel gear set)



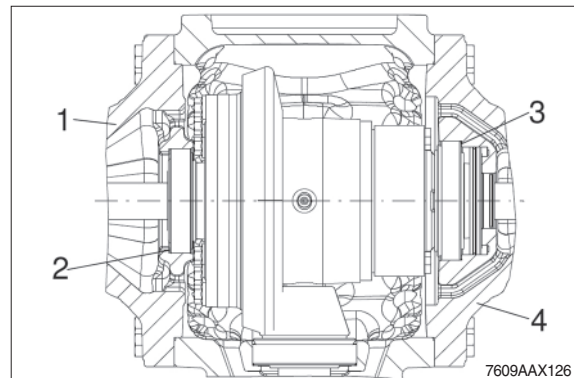
⑮ Deviation see crown wheel rear side.

※ The test dimension “101,, is stamped into the crown wheel rear side. If no + or – deviation is indicated, this value corresponds to the actual value “0” in the table below.

According to this value, the required shims are allocated in the table below.

Any + or – deviation of the test dimension caused by production is also marked on the crown wheel rear side (e.g. - 20 or - 10 or 10 or 20).

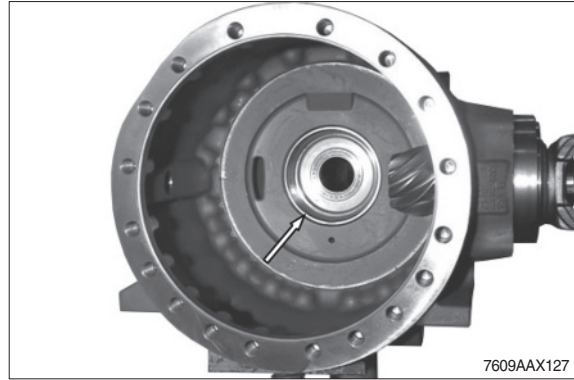
In accordance with this deviation, the required shims are allocated in the table below.



- 1 Axle housing
- 2 Shim (crown wheel side)
- 3 Shim (differential carrier side)
- 4 Axle housing

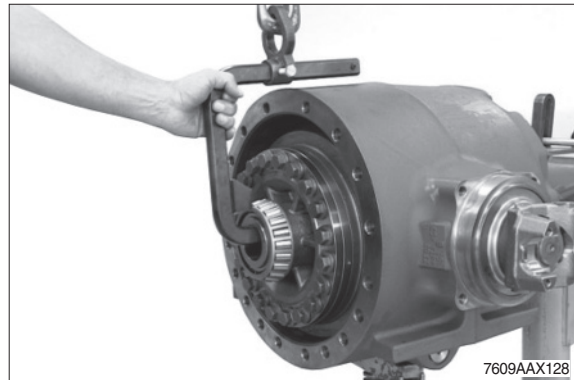
Shims for differential					
Crown wheel marking		- 20	- 10	-	10
Deviation		- 0.2	- 0.1	0	0.1
Shim Differential cage side Shim thickness	Front axle	0.8	0.9	1.0	1.1
	Rear axle	0.7	0.8	0.9	1.0
Shim	Front axle	ZGAQ-04167	ZGAQ-04168	ZGAQ-04169	ZGAQ-04170
Shim Hydraulic lock differential	Rear axle	ZGAQ-04367	ZGAQ-04167	ZGAQ-04168	ZGAQ-04169
Shim Conventional, L/slip differential	Rear axle	ZGAQ-04368	ZGAQ-03896	ZGAQ-03897	ZGAQ-03898
Shim Crown wheel side Shim thickness	Front axle	1.2	1.1	1.0	0.9
	Rear axle	1.3	1.2	1.1	1.0
Shim	Front axle	ZGAQ-04171	ZGAQ-04170	ZGAQ-04169	ZGAQ-04168
	Rear axle	ZGAQ-04368	ZGAQ-03900	ZGAQ-03899	ZGAQ-03898

- ⑩ Insert the determined shim (e.g. $s = 0.9 \text{ mm}$) into the hole of the axle housing and adjust the bearing outer ring (see arrow) until contact is obtained.

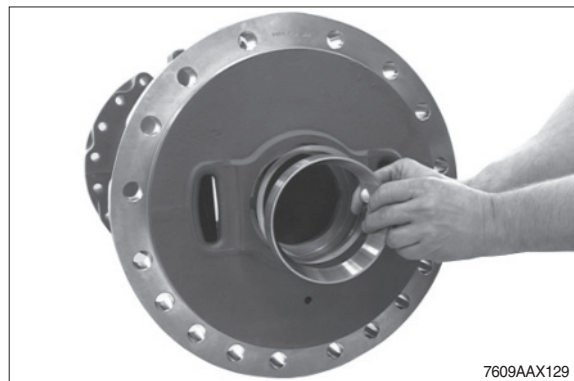


- ⑪ Cover some drive and coast flanks of the crown wheel with marking ink.
Then insert the premounted differential into the axle drive housing.

Load carrying device 5870 281 083



- ⑫ Insert the determined shim (e.g. $s = 1.1 \text{ mm}$) into the hole of the axle housing and adjust the bearing outer ring (see arrow) until contact is obtained.



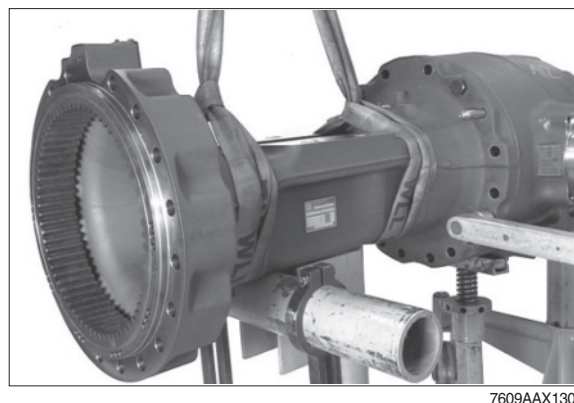
- ⑬ Mount two locating pins and bring the axle housing into contact position with the axle drive housing by means of the lifting device.

Locating pins 5870 204 024

Then preliminarily fix the axle housing with 4 hexagon screws.

- Tightening torque (M20/10.9) :
 $57.1 \text{ kgf} \cdot \text{m}$ (413 lbf · ft)

- ※ Preliminarily mount the axle housing without O-ring.

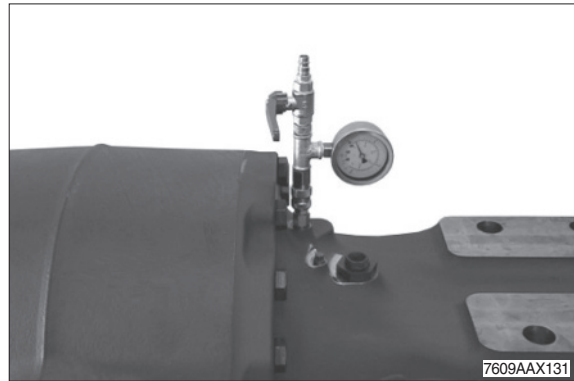


Leakage test of lock

- ⑳ Pressurize the lock ($p = 1 \text{ bar}$), close shut-off valve and remove air line.

▲ No noticeable pressure loss is allowed to occur within 10 sec.

- ※ This operation is only necessary for hydraulic lock differential (option).

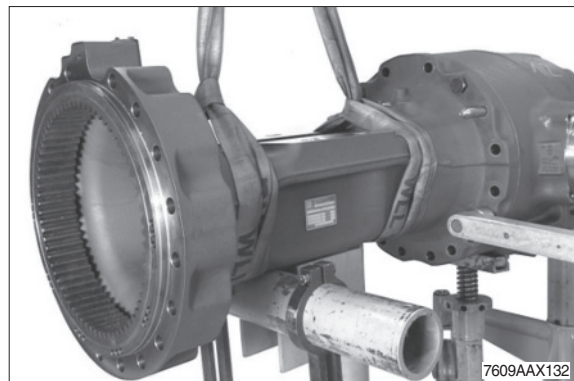


- ㉑ By rotating the input flange, roll crown wheel over the input pinion in both directions several times.

Then remove the axle housing again and lift the differential out of the axle drive housing.

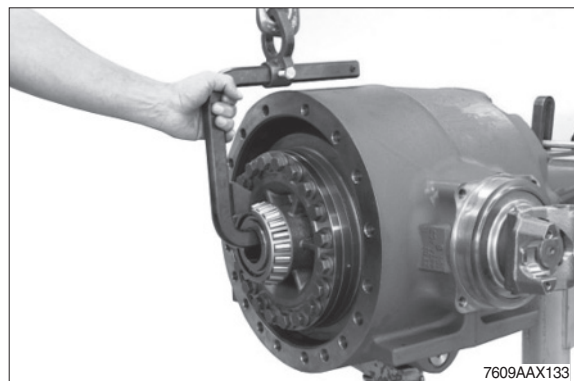
Compare the obtained contact pattern.

▲ In case of any contact pattern deviation, a measuring error was made when determining the shim (AX115, page 3-221), which must be corrected by all means.



- ㉒ After the contact pattern check insert the differential again into the axle drive housing.

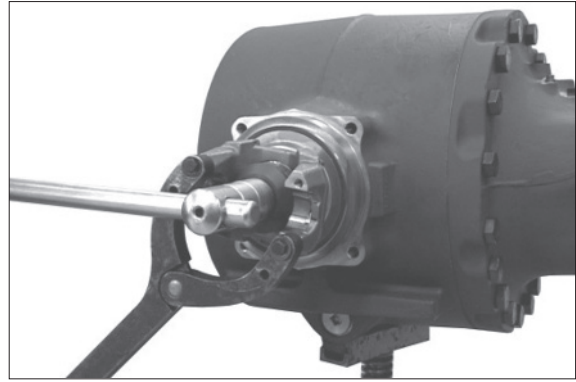
Load carrying device 5870 281 083



Reassembly of shaft seal (figure AX134~136)

- ⑳ Loosen the slotted nut and pull the input flange from the input pinion.

Slotted nut wrench 5870 401 139
Clamping device 5870 240 002

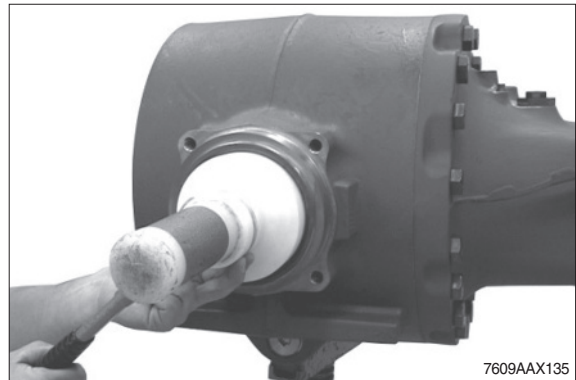


7609AAX134

- ㉑ Mount the shaft seal with the seal lip showing to the oil chamber.

Driver tool 5870 048 233

- ※ The exact installation position of the shaft seal is obtained when using the specified driver tool.
- ※ Wet the outer diameter of the shaft seal with spirit directly before installation and fill the space between seal and dust lip with grease.



7609AAX135

- ㉒ Insert input flange and finally tighten by means of disk and slotted nut.

· Tightening torque :
122 kgf · m (885 lbf · ft)

Slotted nut wrench 5870 401 139
Clamping device 5870 240 002

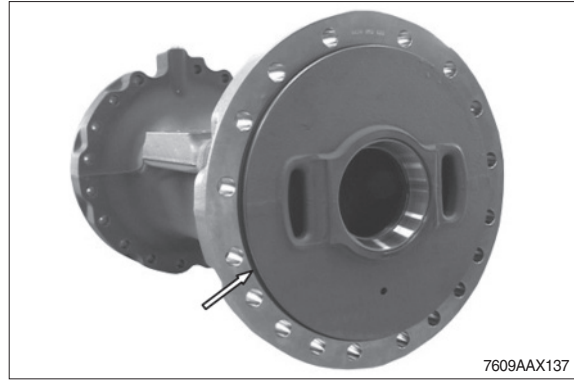
- ※ Cover the thread of the slotted nut with loctite (type no. : 262).



7609AAX136

(7) Reassembly axle housing

- ① Grease O-ring (see arrow) and insert it into the axle housing.

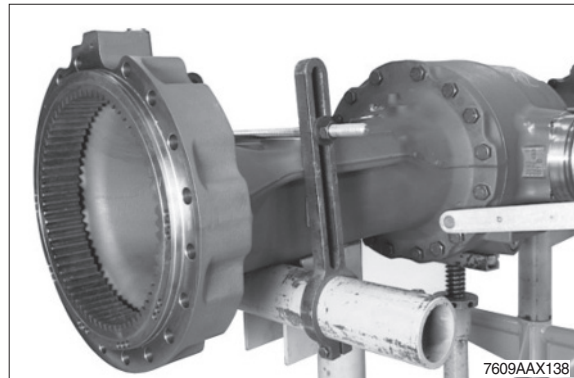


- ② Mount two locating pins and bring the axle housing into contact position with the axle drive housing by using the lifting device.

Then fix the axle housing by means of hexagon screws.

- Tightening torque (M20/10.9) :
57.1 kgf · m (413 lbf · ft)

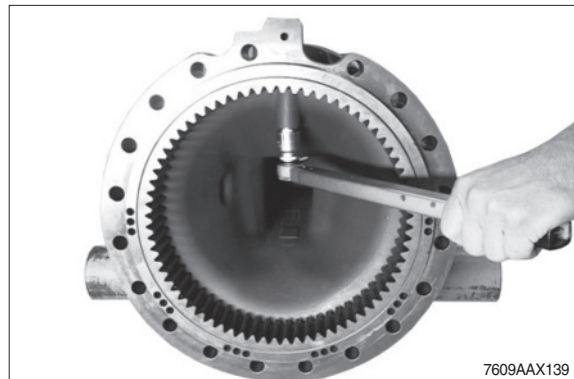
Locating pins 5870 204 024



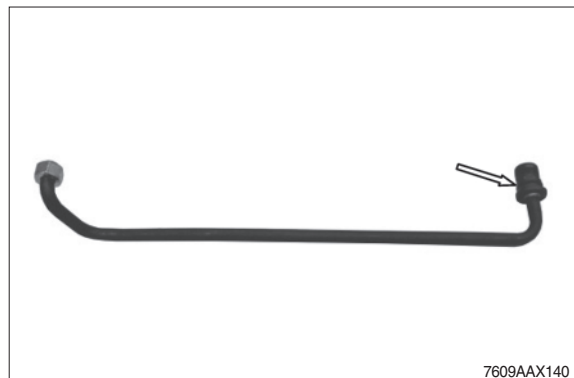
- ※ After assembling the axle housing secure the axle with clamping brackets.

- ③ Mount fitting.

- Tightening torque :
3.67 kgf · m (26.6 lbf · ft)

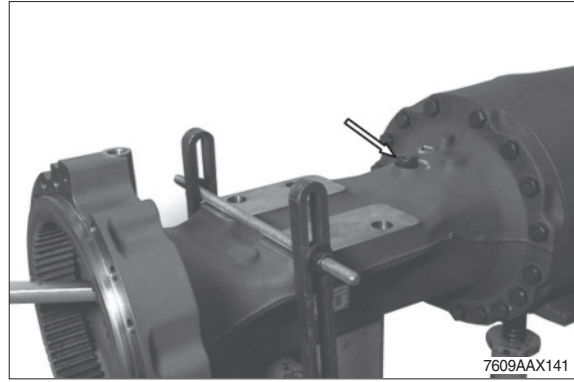


- ④ Grease O-ring and insert it into the annular groove of the brake tube (see arrow).



- ⑤ Mount brake tube with threaded connection and hexagon nut (see arrow).

· Tightening torque :
10.2 kgf · m (73.8 lbf · ft)



- ⑥ Provide screw plug with a new O-ring and fit it.

Flush mount slotted pins.

· Tightening torque :
5.1 kgf · m (36.9 lbf · ft)



(8) Reassembly output and brake

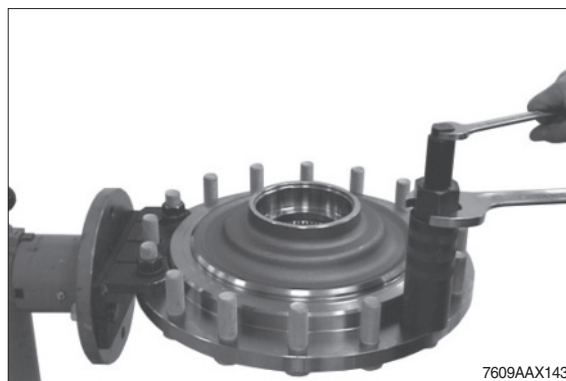
- ① Pull in wheel stud into the output shaft until contact is obtained.

Wheel stud puller-basic tool

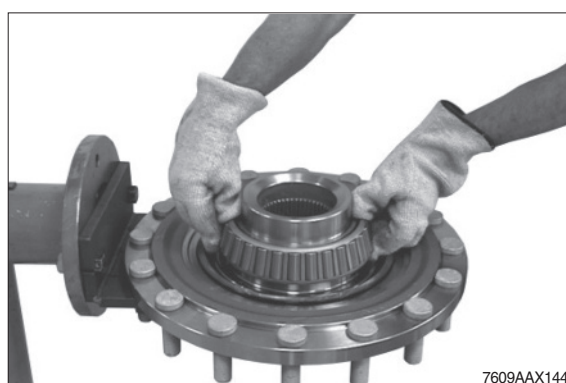
5870 610 001

Insert (M22×1.5) 5870 610 002

Special tool may only be used for repair solution when exchanging individual wheel studs with mounted output shaft. When using a new output shaft, mount the wheel studs with the press.



- ② Heat tapered roller bearing and insert it into the output shaft until contact is obtained.

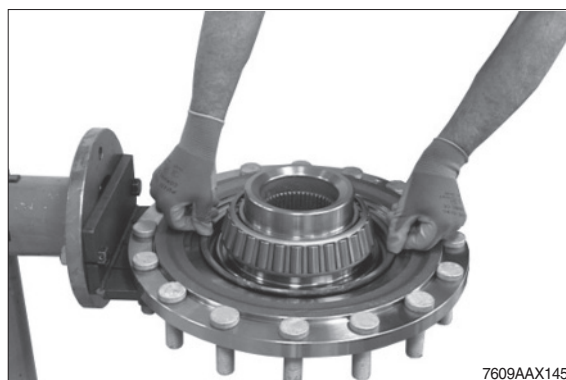


- ③ Wet O-ring of slide ring seal and locating hole with spirit.

Snap **new** slide ring seal (part 1) into the output shaft.

Then mount **new** slide ring seal (part 2) accordingly into the brake housing.

- ※ For the installation position of the seal please also refer to sketch, page 3-316.



- ※ The surface of the slide ring seal may not have any grooves, scratches or other types of damage.

Take care that the sealing surface is parallel to the housing face.

The O-rings must be mounted evenly into the locating hole and must not bulge out of the hole.

- ▲ **Risk of injury-Metal rings have extremely sharp edges. Wear protective gloves.**



- ④ Insert both bearing outer rings (see arrows) into the brake housing until contact is obtained.



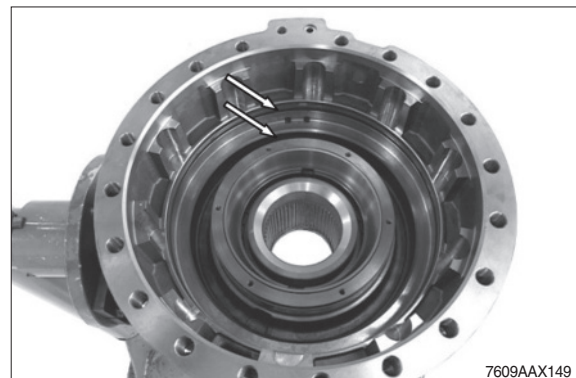
- ⑤ Insert the premounted brake housing by means of the lifting device over the output shaft until contact is obtained.

- ※ Before clamping the seal rings (slide ring seal) to installation dimension, clean the sliding surfaces and apply an oil film. We recommend to use a leather cloth soaked with oil.



- ⑥ Insert back-up rings and grooved rings into the annular grooves of the brake housing (see arrows).

- ※ Pay attention to the installation position; please also refer to sketch, page 3-316.



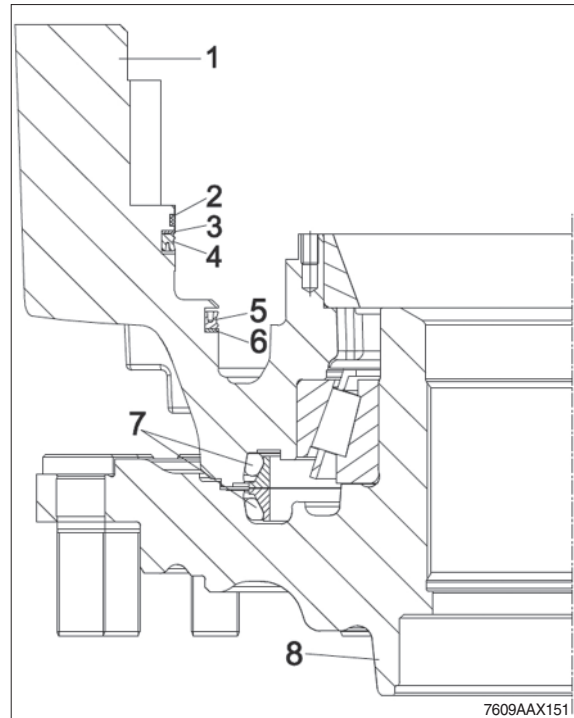
- ⑦ Clean the annular groove of the brake housing with spirit.

Then insert the guide ring into the annular groove (see also the following sketch) and fix it with loctite (type No. : 415) at its extremities (see arrows).

- ※ The full circumference of the guide ring must be in an exact contact position.
- ※ Upon installation the orifice of the guide ring must show upwards (12 o'clock).



- 1 Brake housing
- 2 Guide ring
- 3 Back-up ring
- 4 Grooved ring
- 5 Grooved ring
- 6 Back-up ring
- 7 Slide ring seal
- 8 Output shaft



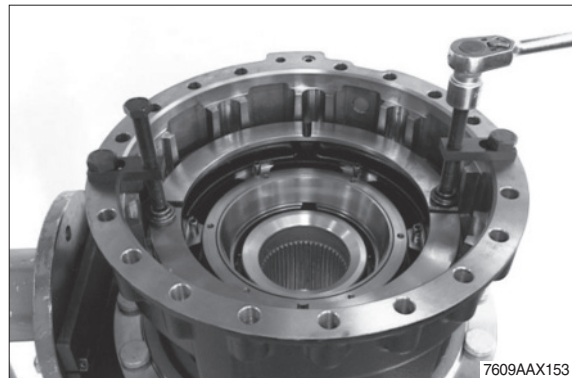
- ⑧ Flush-mount the slotted pins (6EA) into the holes of the piston.



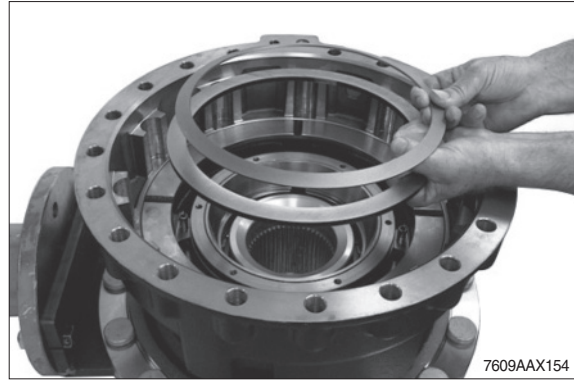
- ⑨ Insert the piston into the brake housing and carefully install with the fixing device until contact is obtained.

Fixing device AA00 680 530

- ※ Sufficiently oil seal surface of piston/
back-up rings, grooved rings and guide ring.

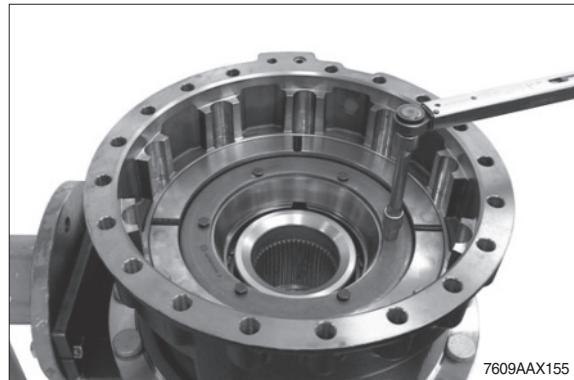


- ⑩ Insert disk and cup spring with the convex side showing upwards into the piston.



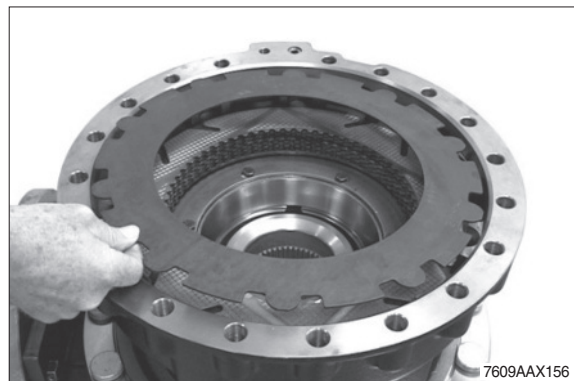
- ⑪ Insert cover and fix it by means of hexagon screws.

- Tightening torque (M8/10.9) :
3.47 kgf · m (25.1 lbf · ft)

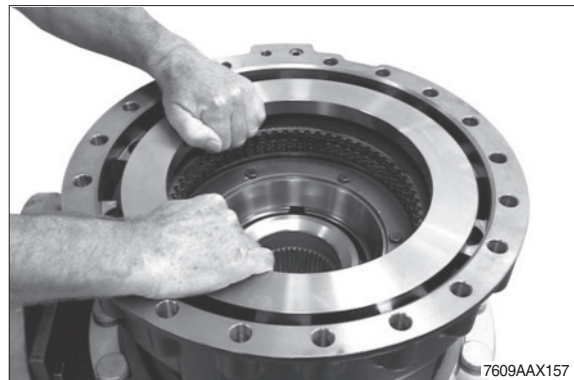


- ⑫ Mount outer and inner disks.

- ※ For the number of disks and the disk arrangement please refer to the relating parts manual.

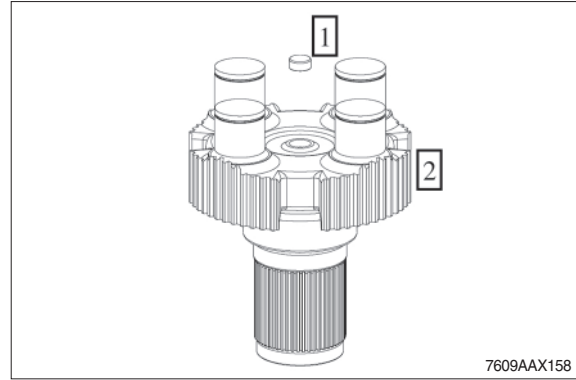


- ⑬ Insert end plate.



- ⑭ Press stop bolt into the planetary carrier until contact is obtained.

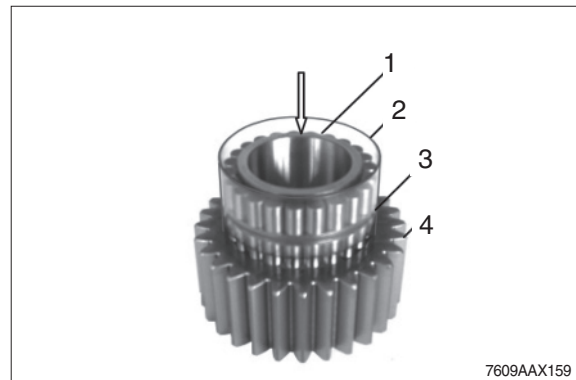
- 1 Stop bolt
- 2 Planetary carrier



- ⑮ Insert the cylindrical roller bearing into the planetary gear – for this purpose press the cylindrical roller bearing through the packaging sleeve until the snap ring engages into the annular groove of the planetary gear.

※ Use packaging sleeve to facilitate assembly.

- 1 Cylindrical roller bearing
- 2 Packaging sleeve
- 3 Snap ring
- 4 Planetary gear



- ⑯ Heat bearing inner rings and insert the premounted planetary gears with large radius facing the planetary carrier (downwards) until contact is obtained.

※ Adjust bearing inner rings after cooling down.

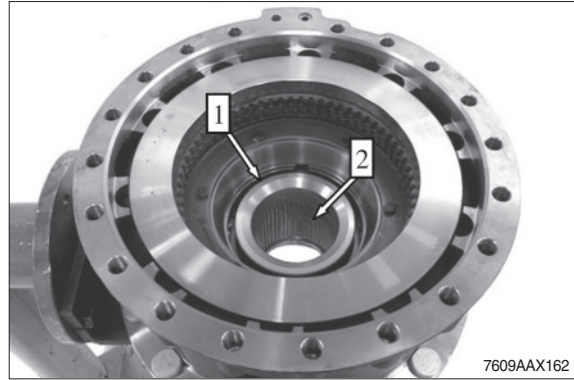
Then fix planetary gears by means of retaining rings.



- ⑰ Heat tapered roller bearing and install it to the planetary carrier until contact is obtained.



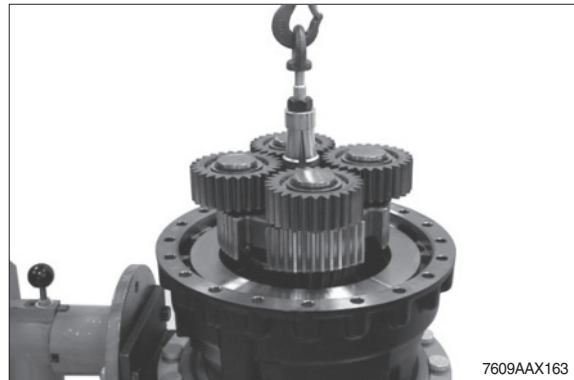
- ⑱ Wet front face (contact face bearing inner ring, arrow 1) and profile (teeth, arrow 2) in the output shaft with anti-corrosive agent.



7609AAX162

- ⑲ Align disk package centrally and radially.
Then insert the planetary carrier by means of the lifting device into the teeth of the output shaft.

Inner extractor 5870 300 017
Eye nut 5870 204 076



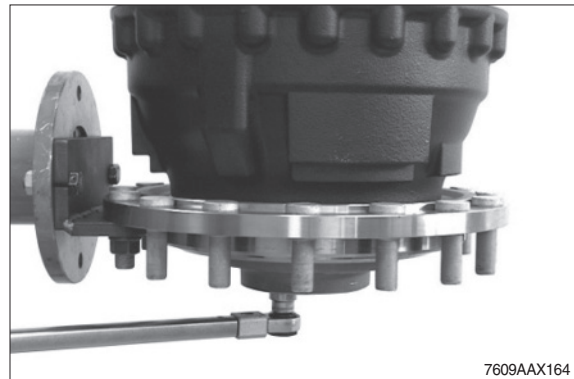
7609AAX163

Setting of gap width output shaft / planetary carrier

- ⑳ Bring planetary carrier with measuring disk and three old locking screws, which were removed during disassembly, into contact position.

· Tightening torque :
20.4 kgf · m (148 lbf · ft)

Measuring disk AA00 360 730

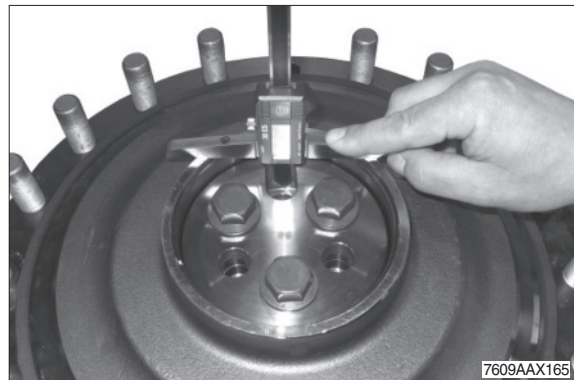


7609AAX164

- ㉑ Pivot output 180° and measure gap width from the output shaft to the planetary carrier (see also subsequent sketch).

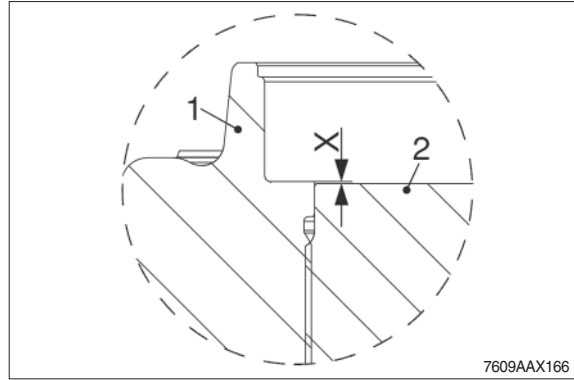
Gap width e.g. 0.21 mm

Then remove the locking screws and the measuring disk again.



7609AAX165

- 1 Planetary carrier
- 2 Output shaft
- X Gap width



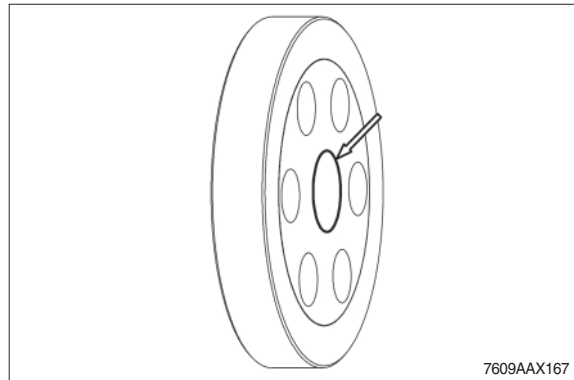
7609AAX166

② Select the cover (optional) on the basis of the following table.

Determined gap width (Delta)	Offset to be used on the cover	P/No.
0.30~0.24 mm	0.13 ± 0.01 mm	ZGAQ-04137
0.239~0.18 mm	0.07 ± 0.01 mm	ZGAQ-04370
0.179~0.10 mm	0.0 mm	ZGAQ-03909

※ Cover (ZGAQ-04370) has an offset of 0.07 mm on one side and an offset of 0.13 mm on the other side.

※ Offset 0.13 mm is visually marked with an annular groove (see arrow).



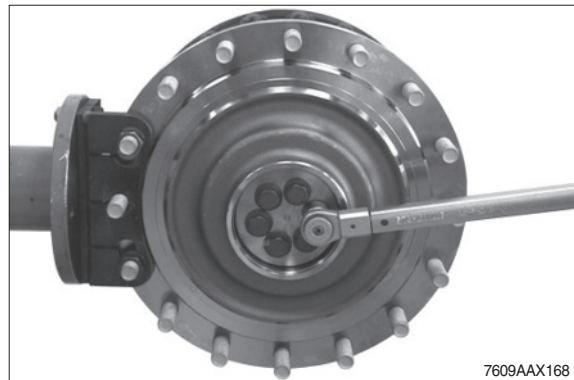
7609AAX167

③ Insert the cover with the offset e.g. 0.07 mm showing to the planetary carrier and tighten with **new** locking screws.

※ When using the cover with offset 0.07 mm, the groove (figure AX167) must be visible when the cover is installed.

※ Tighten locking screws successively with a tightening torque of 20.4 kgf · m (148 lbf · ft).

Then retighten the locking screws successively with a tightening torque of 51 kgf · m (369 lbf · ft).



7609AAX168

④ Install O-ring (see arrow 1) to the cover.

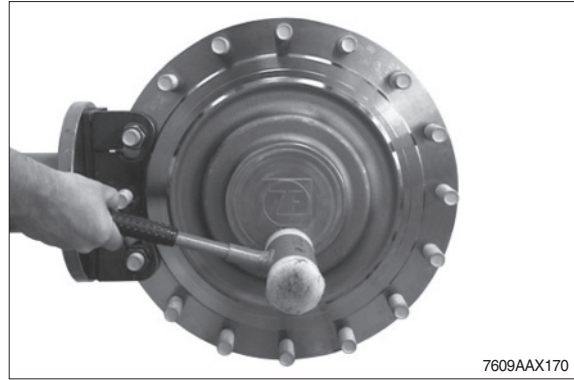
Then wet contact face (arrow 2).

※ Use new cover and O-ring.



7609AAX169

- ②⑤ Insert the cover into the output shaft until contact is obtained.



Set the axial play of the sun gear shaft 0.5~2.0 mm

- ②⑥ Determine dimension I, from the mounting face of the brake housing to the front face of the stop bolt.

Dimension I e.g.

Front axle 40.80 mm

Rear axle 19.75 mm

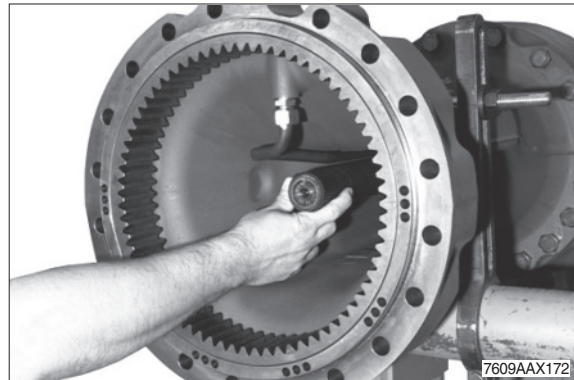
Gauge blocks 5870 200 066

Straightedge 5870 200 022

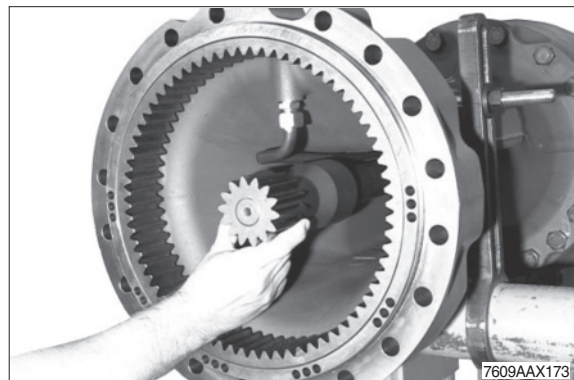


- ②⑦ Insert stub shaft into the teeth of the axle bevel gear until contact is obtained.

※ Pay attention to the installation position ; mount the stub shaft with the long teeth showing to the differential.



- ②⑧ Insert the sun gear shaft until contact is obtained.



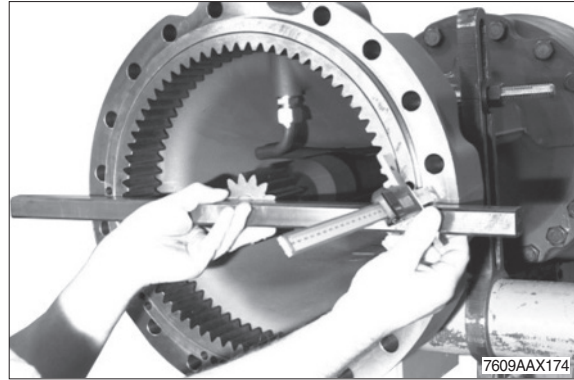
- ⑳ Measure dimension II, from the front face of the sun gear shaft to the mounting surface of the axle housing.

Dimension II e.g.

Front axle 38.20 mm

Rear axle 17.15 mm

Straightedge 5870 200 022



CALCULATION EXAMPLE :

Front axle

Dimension I 40.80 mm

Dimension II - 38.20 mm

Difference 2.60 mm

Required axial play e.g. ... - 1.00 mm

Difference = shim e.g. s = 1.60 mm

Rear axle

Dimension I 19.75 mm

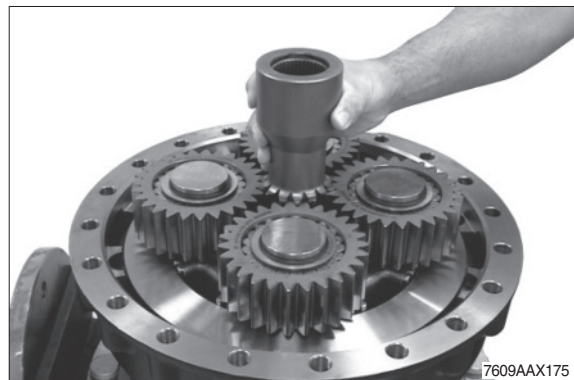
Dimension II - 17.15 mm

Difference 2.60 mm

Required axial play e.g. ... - 1.00 mm

Difference = shim e.g. s = 1.60 mm

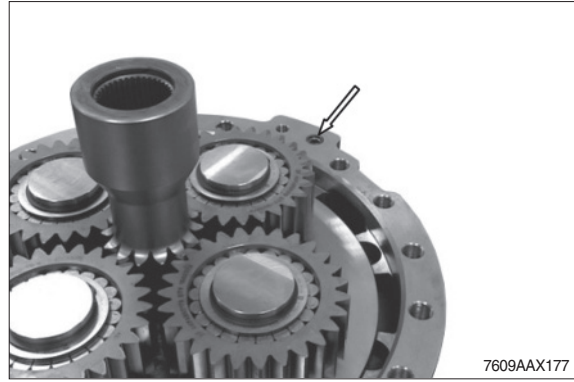
- ㉑ Insert sun gear shaft into the planetary carrier.



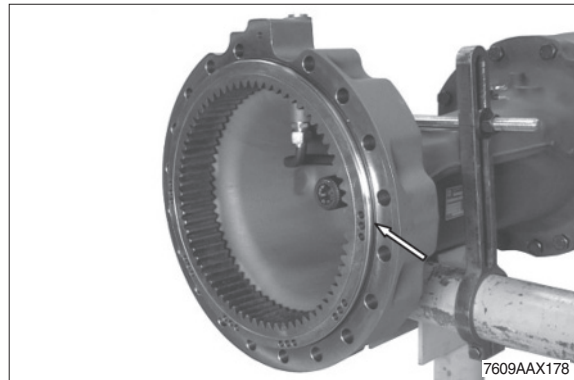
- ㉒ Fix determined shim (s) e.g. s = 1.60 mm with grease into the sun gear shaft.



- ③② Fix O-ring (see arrow) with grease into the countersink of the brake housing.



- ③③ Grease O-ring (see arrow) and install it to the axle housing.



- ③④ Mount two adjusting screws and use the lifting device to bring the output into contact position with the axle housing.

Then fix the output by means of hexagon screws.

· Tightening torque :

Front axle (M20/10.9)

57.1 kgf · m (413 lbf · ft)

Rear axle (M18/10.9)

39.8 kgf · m (288 lbf · ft)

Adjusting screws

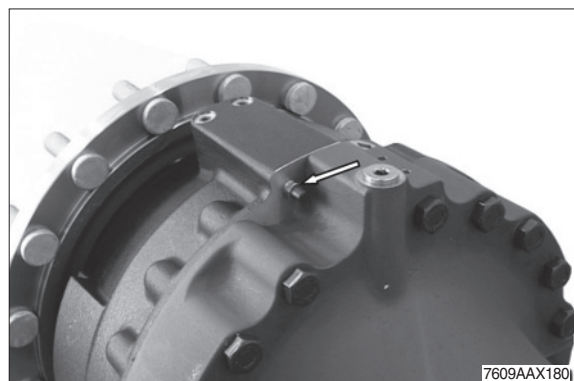
Front axle (M20) 5870 204 024

Rear axle (M18 × 15) 5870 204 029

Load carrying device 5870 281 043

※ Fix load carrying device with wheel stud.

- ③⑤ Mount breather (see arrow).



Check brake hydraulics for leakages

- ※ Before starting the test, completely breathe the brake hydraulics.

Then pressurize the brake temporarily (5EA) with $p = 100$ bar max.

High-pressure test :

Build up test pressure $p = 100-10$ bar max and close connection to HP pump via shut-off valve.

A pressure drop of max 2 % (2 bar) is permissible during a 5-minute testing time.

Low-pressure test :

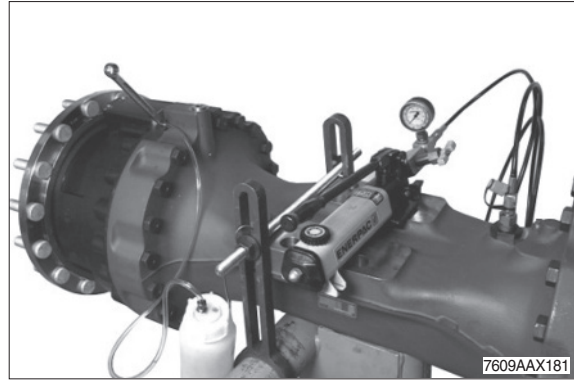
Reduce test pressure $p = 5$ bar and close shut-off valve.

No pressure drop is allowed during a 5-minute testing time.

Test media :

Engine oil SAE 10W

HP pump	5870 287 007
Clutch	0501 207 939
Reduction (M18 × 1.5)	5870 950 161
Oil collector bottle	5870 286 072



Check operability of hydraulic lock differential (opt)

Build up pressure $p = 20$ bar max and close connection to HP pump via shut-off valve.

Lock on :

When rotating the input flange, both outputs must have the same direction of rotation.

Lock off :

When rotating the input flange, one side has no movement or has the opposite direction of rotation.

Prior to putting the axle into operation, fill it with oil according to the related lubrication and maintenance instructions.

