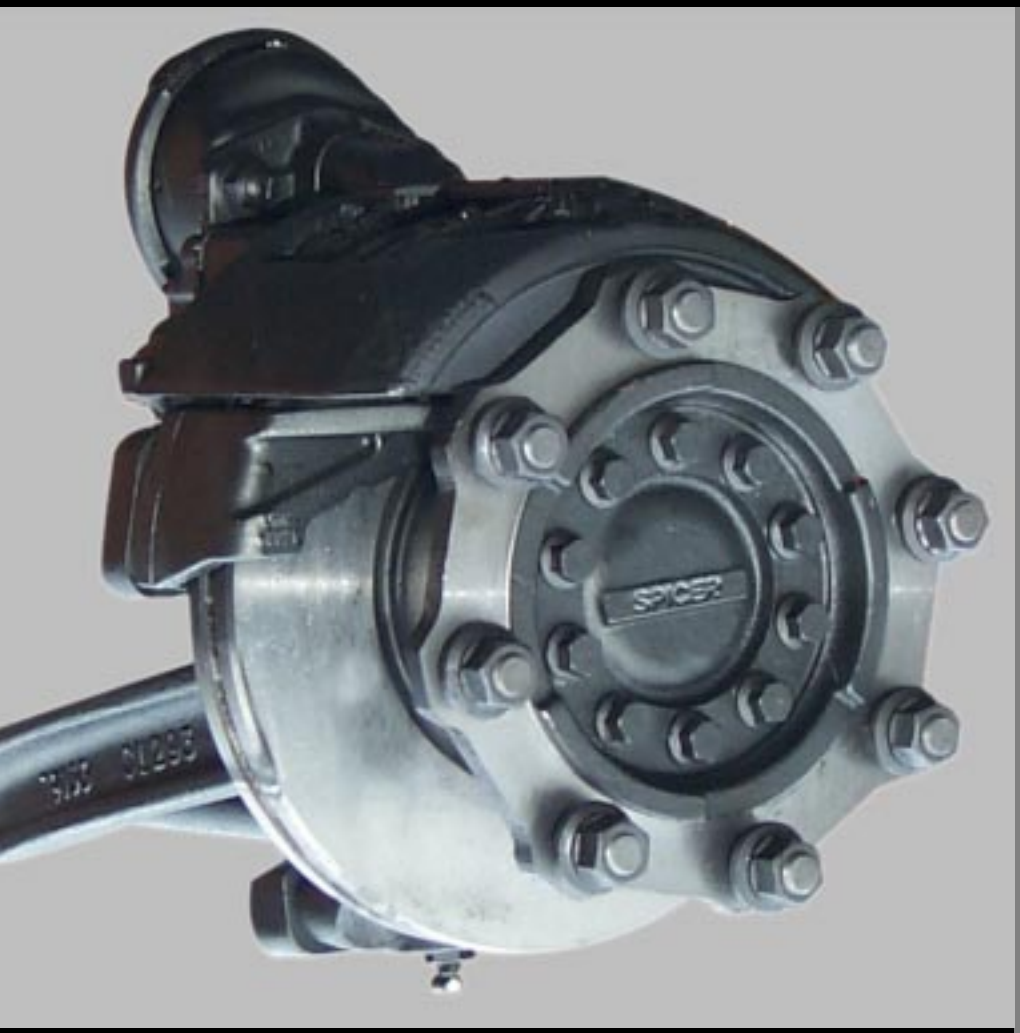
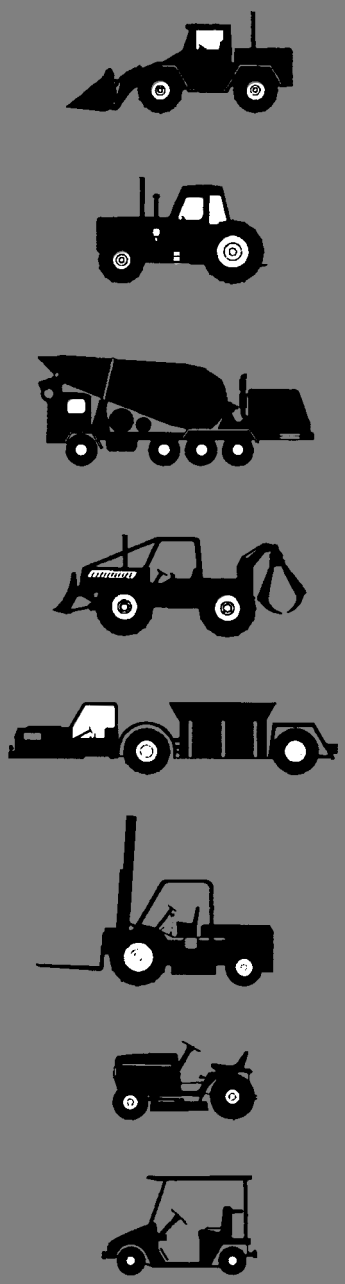
BACK / RETOUR

Maintenance manual
Model NDS
Hub and brake assembly
With Knorr Bremse
Disc brake
Fitted to offset barrel swivel





SPICER SPECIALITY AXLE DIVISION

MANUAL ISSUE SHEET

Page No.	Issue	Description / Alteration	Reason	Date
All	A	New Manual		Mar.2000
11	B	Page added all subsequent pages re numbered	Brake disc checking added	Oct.2000
7	C	Optimol Paste Added	To prevent fretting ECN 8695	Aug.2002

OVERHAUL PROCEDURES

PREPARATION

Prepare for axle overhaul as follows:

1 Set parking brake and block drive wheels to prevent vehicle movement.

2. Raise vehicle until tyres are off the ground. support raised vehicle with safety stands.

WARNING!

NEVER WORK UNDER A VEHICLE SUPPORTED ONLY BY A JACK. ALWAYS USE SAFETY STANDS.

HUB END DISASSEMBLY

1. Disconnect brake connections and ABS sensor from vehicle.
Fit plugs to connections to prevent dirt ingress.

2. Loosen but do not remove, brake caliper retaining bolts

3. Using suitable lifting equipment, support the brake caliper.

4. Remove brake caliper retaining bolts and remove brake caliper from axle.

WARNING!
BRAKE CALIPER IS HEAVY
ENSURE WEIGHT IS FULLY SUPPORTED BEFORE REMOVING RETAINING BOLTS.
TAKE CARE TO AVOID CALIPER SWINGING AND TRAPPING FINGERS.

NOTE:-
BRAKE CALIPERS ARE HANDED!
SPICER SPECIALITY AXLE DIVISION RECOMMENDS MARKING CALIPERS WITH PAINT OR MARKER PEN TO FACILITATE CORRECT REFITTING

BRAKE AIR CYLINDERS SHOULD ONLY BE REMOVED IF REPLACEMENT OR REPAIR IS REQUIRED.

REFER TO THE BRAKE MANUFACTURERS MANUAL FOR DETAILS OF CALIPER OR AIR CYLINDER SERVICE.

OVERHAUL PROCEDURES

HUB END DISASSEMBLY

5. Loosen but do not remove hub flange bolts.

6. Remove 2 diametrically opposed hub flange bolts.

7. Replace 2 diametrically opposed hub flange bolts with 2 studs (loosely fitted).

NOTE!
REPLACEMENT STUDS SHOULD PROTRUDE BEYOND FRONT FACE OF HUB FLANGE TO AID REMOVAL

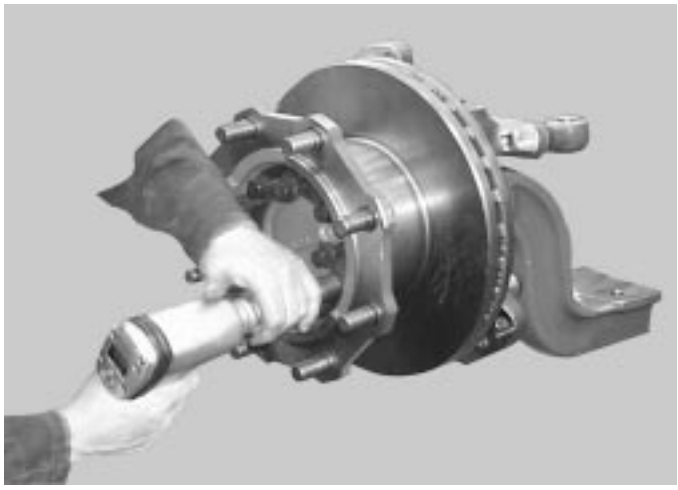
8. Gently tap hub flange outwards using a hide faced hammer.

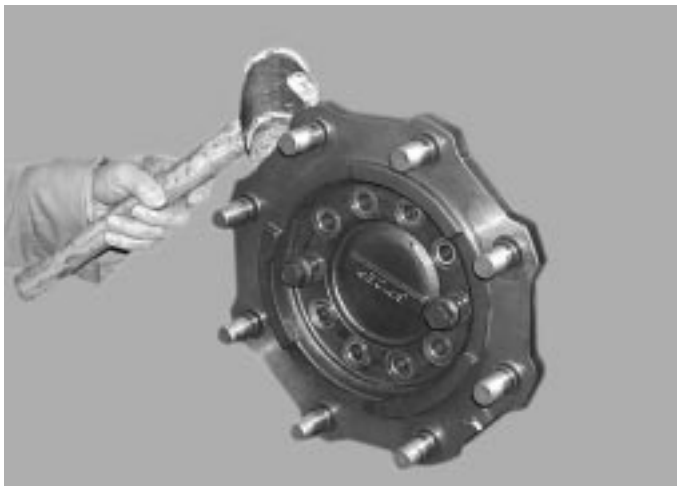
9. Support weight of hub flange and remove hub flange retaining bolts.

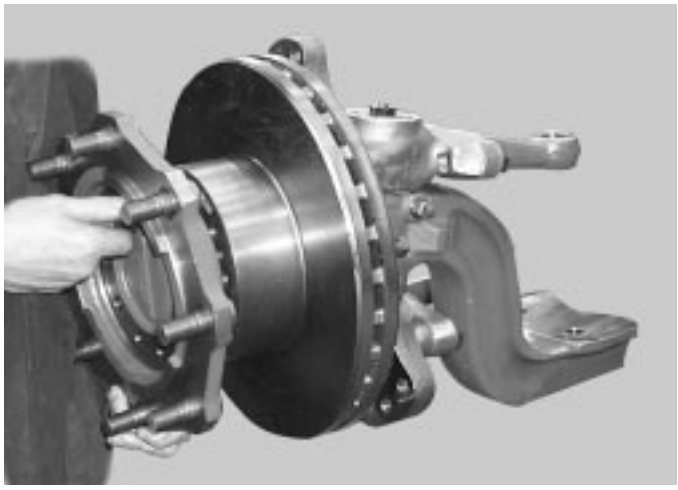
10. Remove hub flange and place on a suitable workbench.

WARNING!
COMPONENT IS HEAVY
ENSURE WEIGHT IS FULLY SUPPORTED BEFORE REMOVING RETAINING BOLTS.

11. Inspect wheel studs and remove for replacement, any that are found to be defective.







OVERHAUL PROCEDURES

HUB END DISASSEMBLY

12. Once hub flange has been removed, insert two bolts into brake disc extraction holes

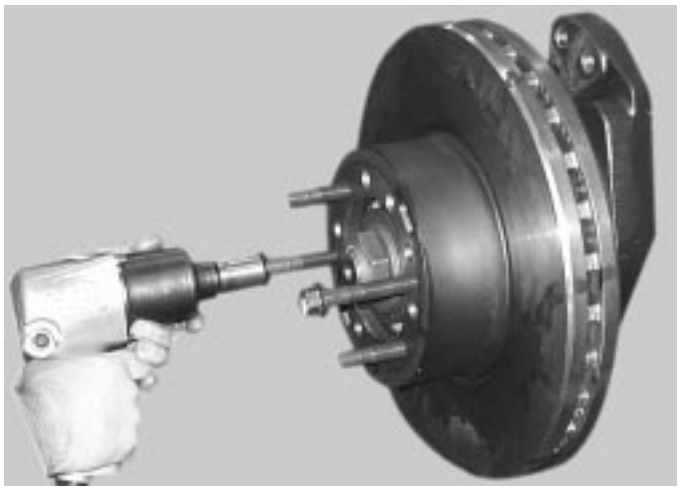
13. Tighten to free brake disc from hub bearing.

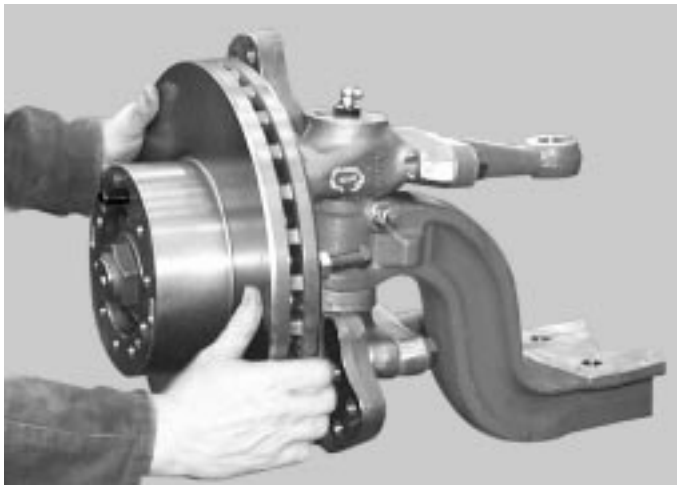
14. Support weight of brake disc and carefully slide along dummy studs to remove.

WARNING!
COMPONENT IS HEAVY
ENSURE WEIGHT IS FULLY SUPPORTED BEFORE REMOVING .

15. Place brake disc on a suitable work bench and inspect for cracks and defects, Replace if necessary.
(See Lubrication and maintenance section for details of typical defects and acceptability)
Check brake disc thickness is within manufacturers specifications.
Refer to table below for Acceptable dimensions:

WARNING!
DO NOT ALLOW BRAKE DISC TO WEAR BELOW MINIMUM THICKNESS!





Brake disc type	Original thickness	Minimum thickness
SB5000	34MM	28MM
SB6000	45MM	37MM
SB7000	45MM	37MM

OVERHAUL PROCEDURES

HUB END DISASSEMBLY

16. Using a small ended chisel, pry off the "staking" on the hub nut.

17. Remove hub nut and discard.

18. Remove bearing thrust washer.

19. Fit bearing guide sleeve onto swivel thread. (See chart at front of swivel assembly)

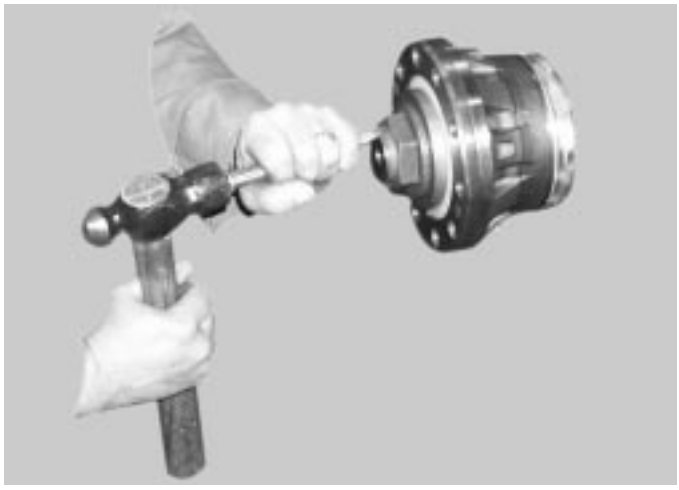
20. Carefully pull unitised hub bearing assembly towards end of swivel stub and remove.

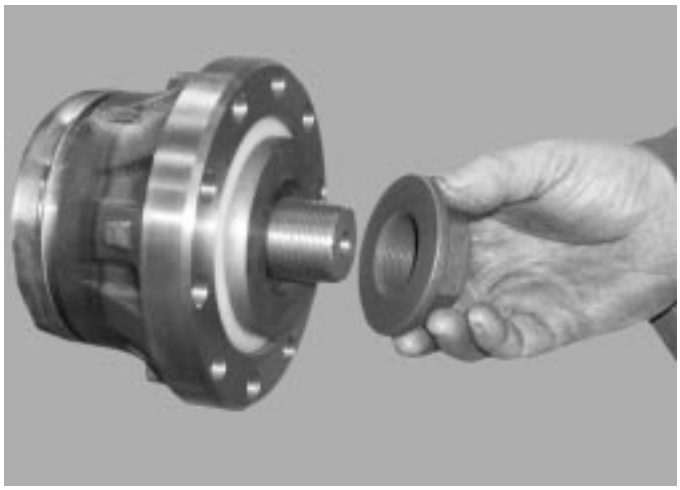
21. Place on a suitable workbench and inspect for wear / damage, taking care not to damage the ABS exciter ring in the process.

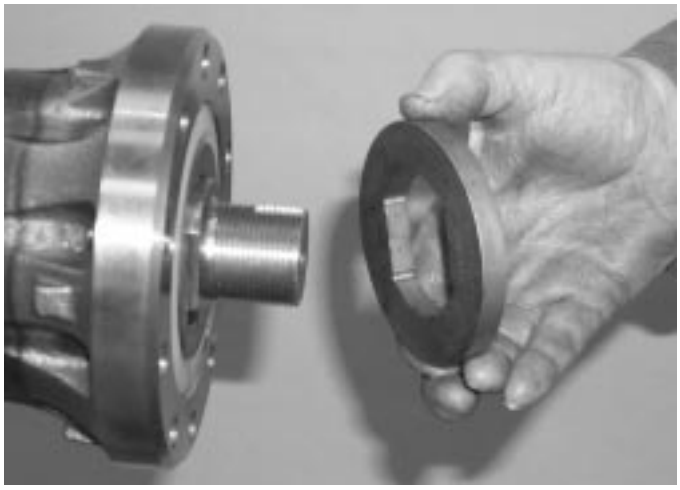
NOTE:-
THE UNITISED BEARINGS USED ON THE NDS RANGE OF AXLES, ARE NON SERVICABLE ITEMS.
BEARINGS ARE PRE ADJUSTED, LUBRICATED AND HAVE SEALS FITTED AS PART OF THE MANUFACTURING PROCESS.
THE BEARINGS ARE GREASED FOR LIFE AND THERE IS NO NEED OR FACILITY FOR RE-LUBRICATION.

22. Remove ABS sensor and sensor bush inspect for wear / damage and replace if necessary.

Stripdown remainder of axle as described in swivel assembly removal and refitting instructions.







Place bearing this way up on bench to avoid damaging pole wheel.

OVERHAUL PROCEDURES

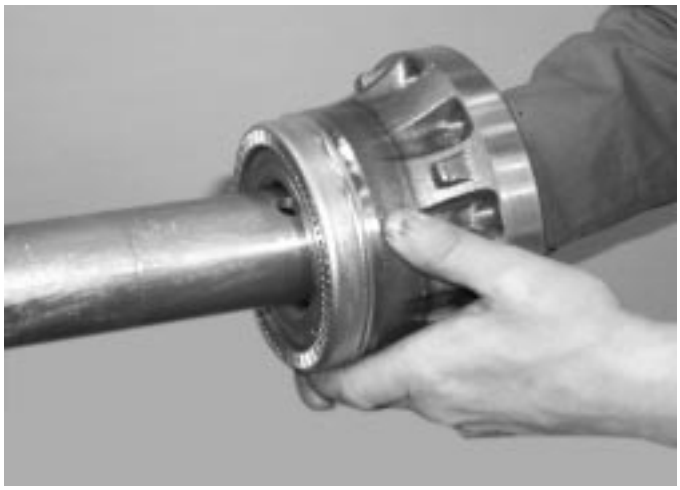
HUB END REASSEMBLY

1. Follow instructions contained in swivel / axle bed reassembly section, before attempting to reassemble hub end.

2. Fit Unitised hub bearing guide sleeve onto swivel stub .
(see chart at front of swivel section)

3. Lightly smear the axle stub bearing journal with a thin layer of anti-fretting assembly paste, white
i.e Optimol Paste White T (Castrol) or equivalent.

4. Offer new unitised bearing onto swivel stub.



OVERHAUL PROCEDURES

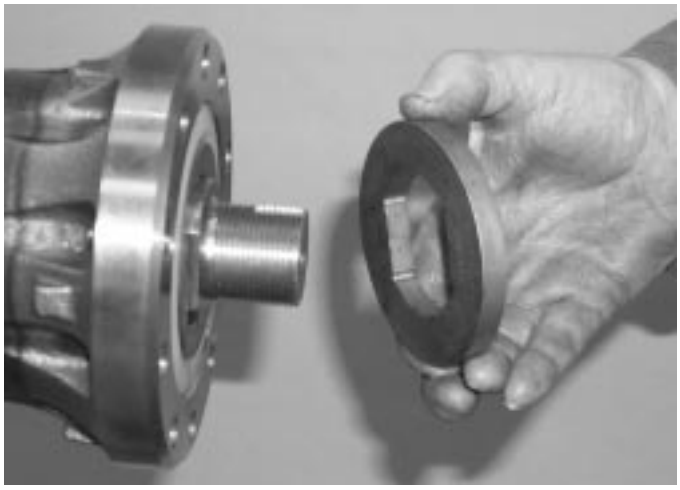
HUB END REASSEMBLY CONTINUED

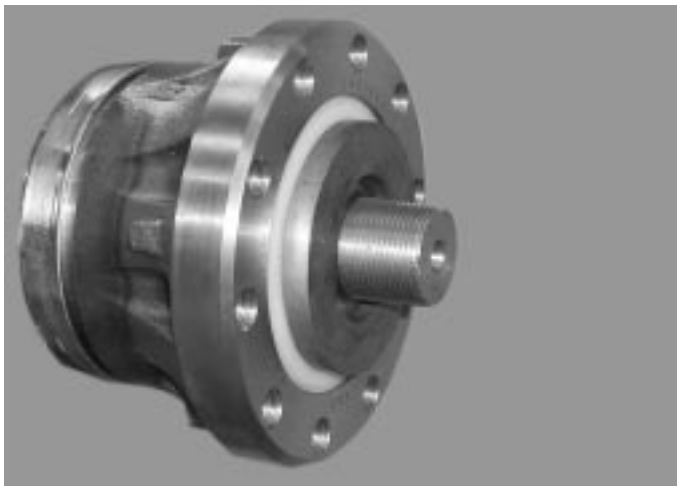
5. Place unitised hub bearing thrust washer onto axle stub.

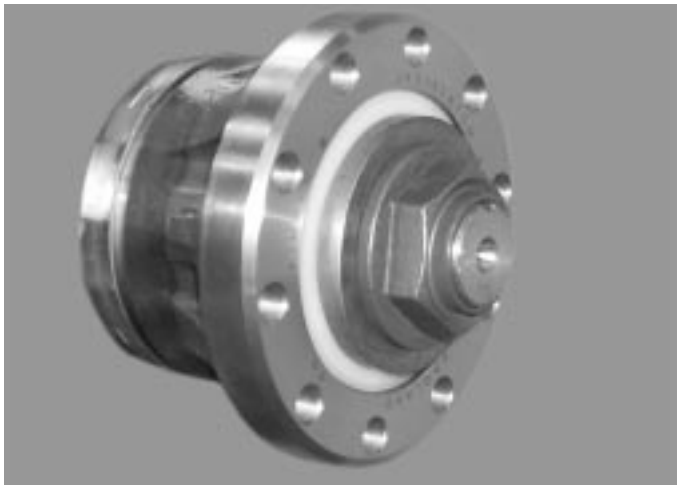
6. Fit hub nut.

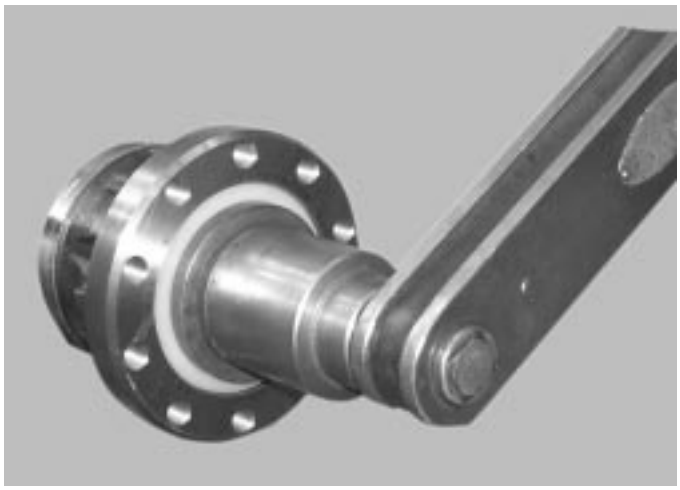
7. Tighten to specified torque.

NOTE:-
ROTATE UNITISED HUB BEARING WHILST TIGHTENING.









OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

8. Stake the hub nut by deforming with a round nosed chisel.

9. Using a modified hub flange bolt as a guide. carefully position brake disc onto unitised hub bearing.

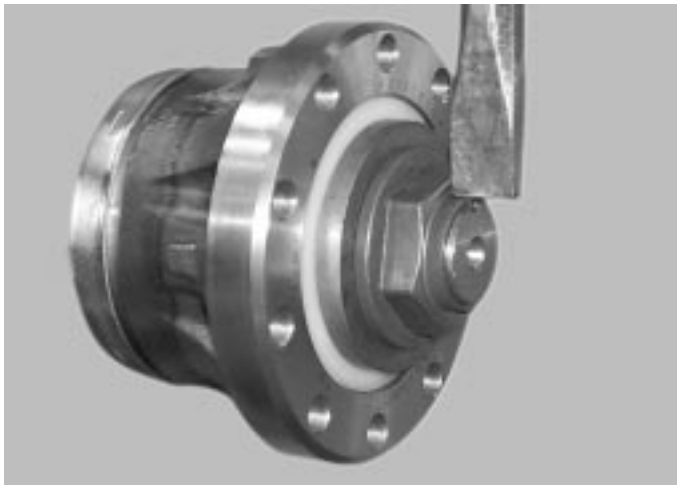
10. Tap securely home
(using a hide faced hammer to avoid damaging the brake disc itself.)

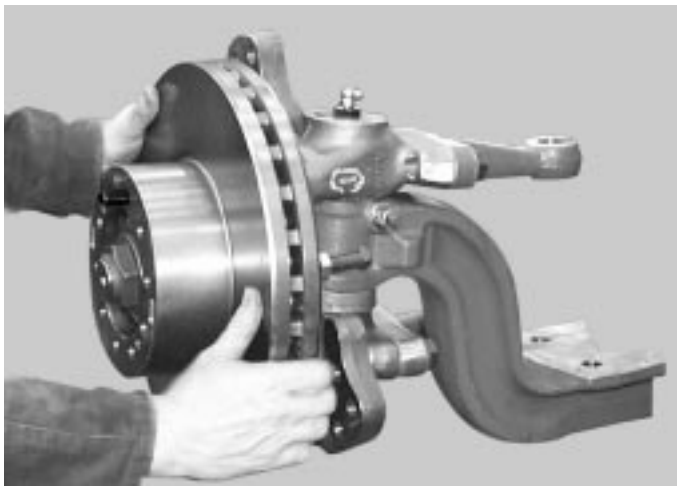
11. Remove the modified hub flange bolt at this point.

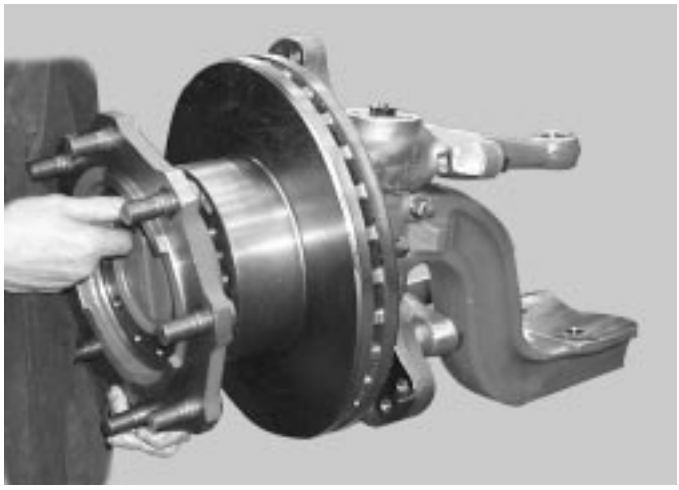
12. Carefully offer hub flange up to brake disc / unitised hub bearing assembly and hold in position by inserting 1 - off hub flange bolt and tightening hand tight.

13. Insert remainder of hub flange bolts.

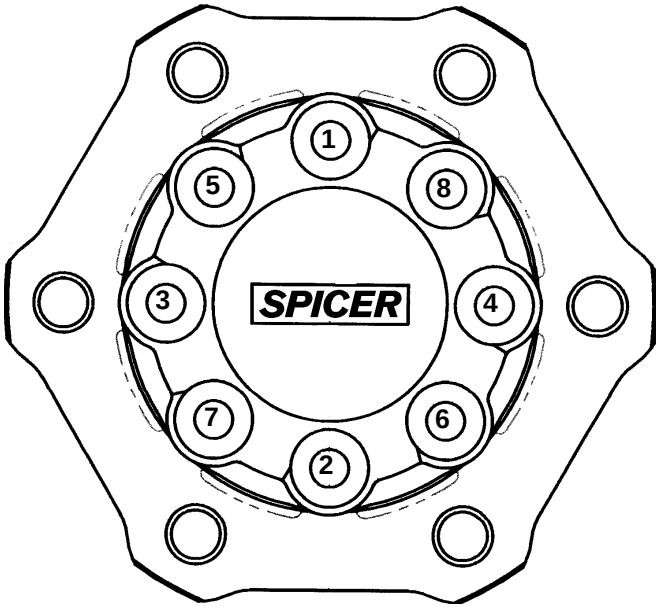
14. Tighten to correct torque using selection procedure as shown on following page.



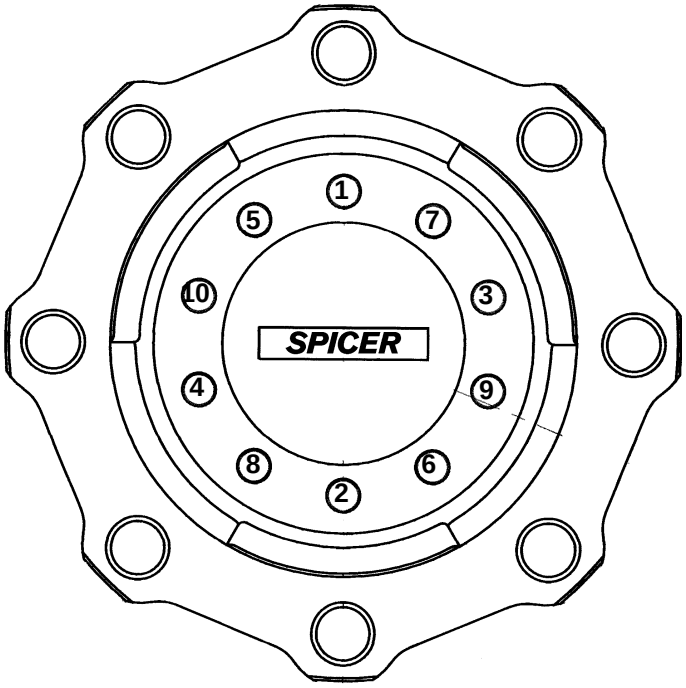




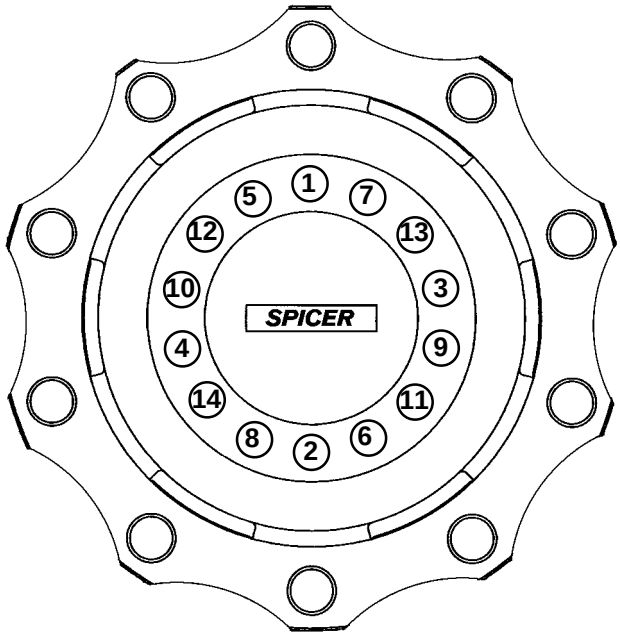
HUB FLANGE BOLT TIGHTENING TORQUE SEQUENCE FOR 8 BOLT FIXING



HUB FLANGE BOLT TIGHTENING TORQUE SEQUENCE FOR 10 BOLT FIXING



HUB FLANGE BOLT TIGHTENING TORQUE SEQUENCE FOR 14 BOLT FIXING



OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

15. Once the hub flange has been correctly fitted; it is necessary to check the axial run out of the brake disc.

16. Position a metric dial test indicator onto axle in a suitable position as shown.

NOTE:-
POSITION MAY VARY DEPENDENT ON AXLE SPECIFICATION

17. Position stylus of dial test indicator onto brake disc as shown.

18. Rotate the hub through 360° and note any movement of the dial test indicator.

NOTE:-
MAXIMUM AXIAL RUNOUT IS 0.1mm

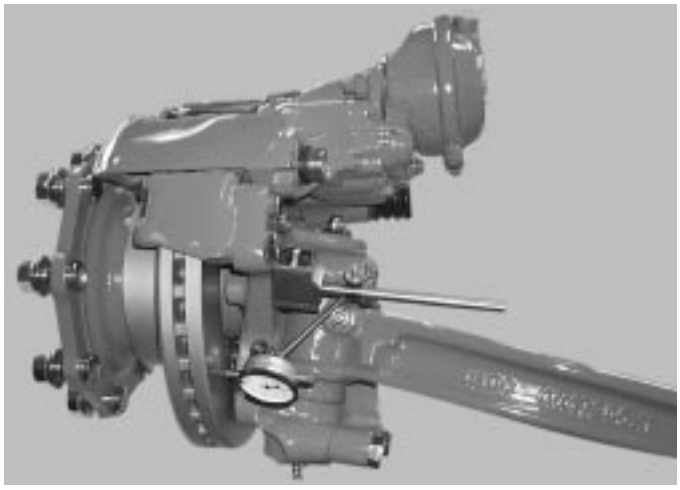
19. Should axial runout exceed 0.1mm. the brake disc is out of specification .

20. Remove and check out of specification disc to ensure no damage has occured to the mounting faces, or that no dirt is present.

21. Remove any dirt found on the mounting faces and refit and re check disc.

NOTE:-
DAMAGED DISCS SHOULD BE REPLACED AS A MATTER OF COURSE!

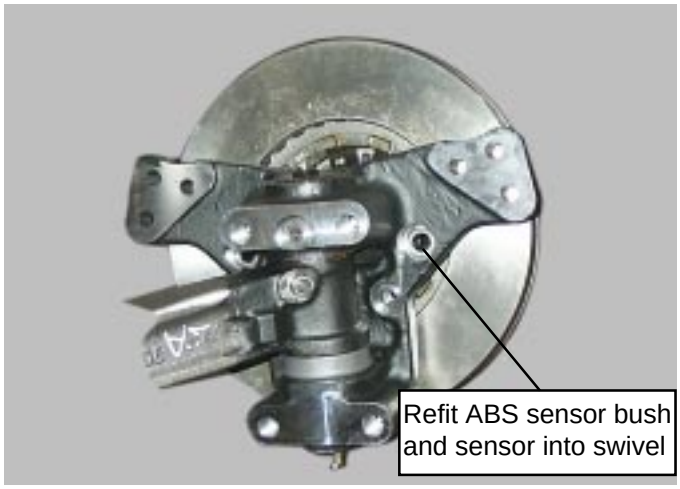
22. Should it be found that a cleaned and refitted disc is still out of specification; it must be replaced.



OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

23. Refit ABS sensor bush and sensor into swivel



NOTE:-
A NEW SENSOR BUSH SHOULD BE FITTED WHENEVER A NEW SENSOR IS FITTED.
IF FITTING A NEW SENSOR AND BUSH INTO AN ABS READY AXLE. SENSOR AND BUSH SHOULD BE SUPPLIED FROM THE SAME MANUFACTURER.

24. Push sensor through bush until it comes into contact with polewheel on hub assembly.

25. Rotate hub bearing assembly through at least one revolution.

THIS SERVES TO SET THE CORRECT GAP BETWEEN SENSOR AND POLEWHEEL.

OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

26. Check A.B.S. sensor performance as follows :-

Before commencement of this check It is important that the number of teeth be checked and found to be the correct, on both LH and RH hubs.

a) Insert the probes from a volt-meter into the two plugs in the sensor connector.
b) set the voltmeter to read mili-volts AC.
c) Rotate the hub in any direction at a constant speed of 60Hz (7Kph).
To determine this speed use the following calculation ;

$$RPM = \frac{60Hz}{z} \times 60 \text{ secs}$$

where z = the number of teeth on the pole wheel.

Note :- The reading may not be steady due to the possibility of pole wheel run out and the inconsistent speed of the wheel.

d) The maximum reading (Vmax) must not be more than 80% greater than the minimum reading (Vmin). ie.

$$\frac{Vmax}{Vmin} \leq 1.8$$

If the following is true then it is likely that there is excessive pole wheel runout. The pole wheel installation will therefore need to be inspected and remounted or replaced.

$$\frac{Vmax}{Vmin} > 1.8$$

e) The minimum reading must be greater than the voltage threshold (Vt) ie.

$$Vmin. > Vt$$

$$Vt. = 60mV$$

If this is not the case, then the sendsor gap is too large or there may be excessive pole wheel runout. The pole wheel will therefore need to be inspected and remounted or replaced.

f) If sections d) and e) are satisfied, then the installation can be considered as satisfactory.

Note :- The above test procedure is as recommended by A.B.S. manufacturers.

OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

27. Using suitable lifting equipment, support the brake caliper.

WARNING!
BRAKE CALIPER IS HEAVY.

28. Offer brake caliper up to brake bracket. (Ensure correct hand of brake caliper is selected)

29. Insert brake caliper retaining bolts and tighten hand tight.

30. Tighten brake caliper bolts to secure assembly.

31. Remove caliper lifting equipment

WARNING!
BRAKE CALIPER IS HEAVY
ENSURE WEIGHT IS FULLY SUPPORTED BY RETAINING BOLTS BEFORE REMOVING LIFTING EQUIPMENT.

32. Tighten brake caliper bolts to correct torque.

33. If the brake caliper air chamber has been removed; Refit to caliper and tighten nuts to correct torque.

NOTE!
TAKE CARE NOT TO DAMAGE PAD WEAR SENSOR CABLE DURING REASSEMBLY OF CHAMBER TO CALIPER.

OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

34. Refit lockstop screws and adjusting nuts

35. Reset lockstop screws to achieve correct lock angles as shown on installation drawing or vehicle manufacturers specifications.

NOTE:-
DO NOT ALLOW LOCKSTOP THREADS TO PROTRUDE THROUGH FRONT FACE OF SWIVEL.

36. Check wheel alignment as follows :-

a) Set axle in straight ahead position.

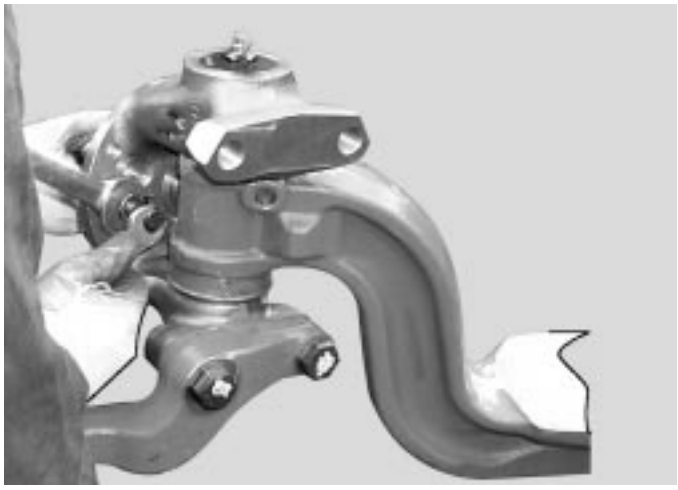
b) At a point level with wheel centre, measure distance over hubs / wheel rims, both in front and behind axle centre.

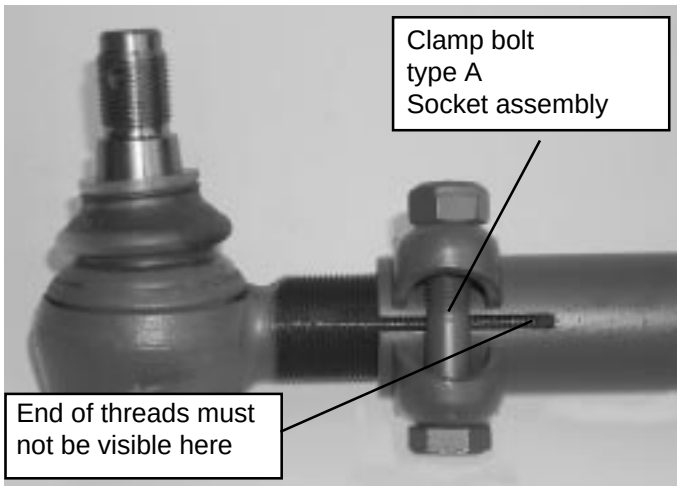
c) Front measurement 'B' should be 0.0" to 0.04" (0.0 to 1mm) **LESS** than rear measurement 'A'.

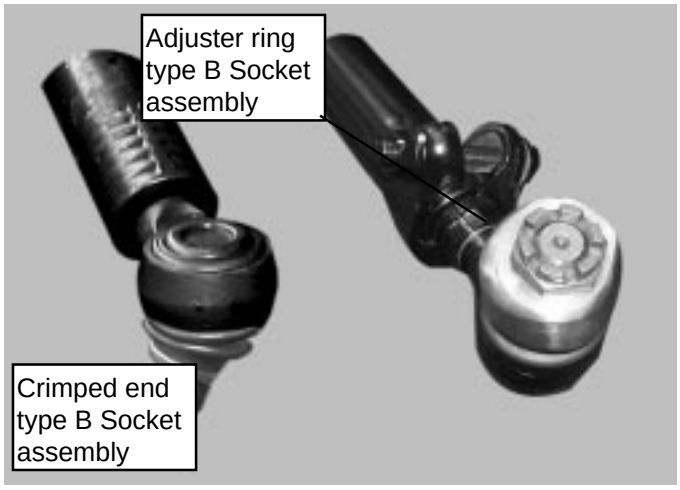
d) Any adjustment on type A socket and tie rod assemblies can be effected by slackening clamp bolts in ball sockets and rotating track rod tube.
For type B socket and tie rod assemblies, slacken the clamped end of the assembly and use the adjuster ring.

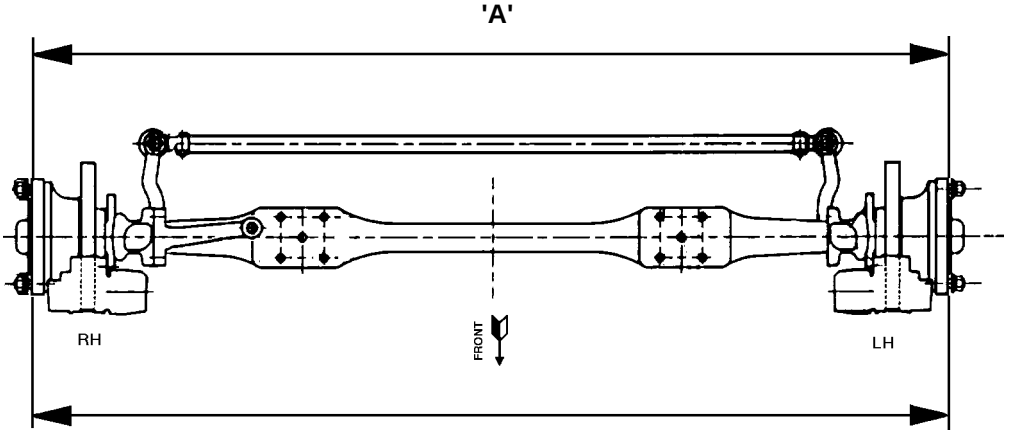
e) After adjustment, tighten clamp bolts to specified torque.

NOTE:-
WHEN ADJUSTING TYPE A TIE RODS, ENSURE SOCKET THREADS ARE EQUALLY POSITIONED IN EACH END OF THE TIE ROD AND THAT THE END OF THE SOCKET THREAD IS NOT VISIBLE THROUGH THE SAWCUT









OVERHAUL PROCEDURES

HUB END REASSEMBLY CONTINUED

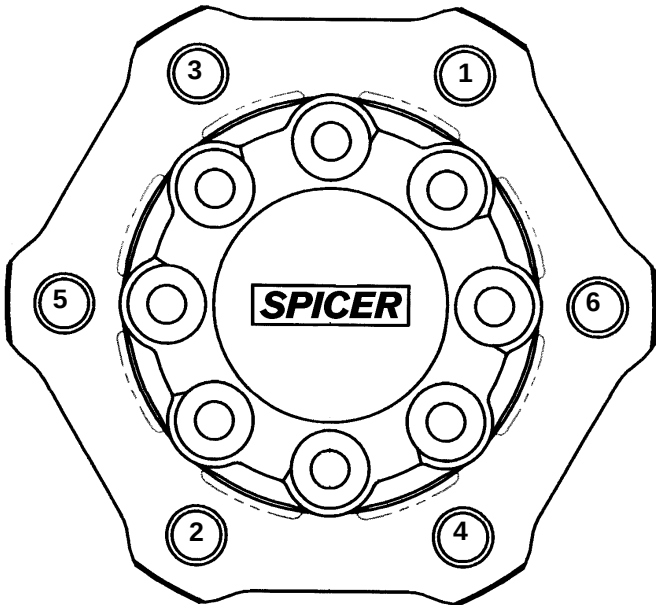
37. Re-connect brake to vehicle hydraulic system as recommended in brake manufacturer's manual.

38. Clean interfaces of wheelnuts, wheel rim & hub then re-fit road wheels securing with wheel nuts and tighten in correct sequence (as shown on following page) to specified torque.

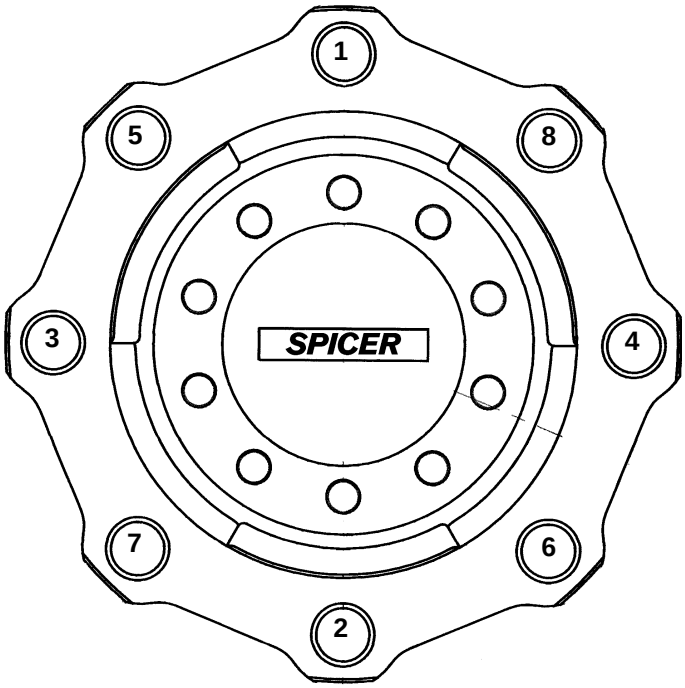
NOTE:-
INTERFACES MUST BE FREE FROM DIRT, INCLUDING BRAKE LINER MATERIAL DEBRIS, RUST AND PAINT. FAILURE TO KEEP INTERFACES CLEAN CAN AND WILL CAUSE WHEEL RIM TO DISTORT UPON TIGHTENING OF WHEEL NUTS
FOR FURTHER DETAILS SEE BS AU50 : part 2 : section 7A : 1995

39. Remove axle supports and lower vehicle to ground.

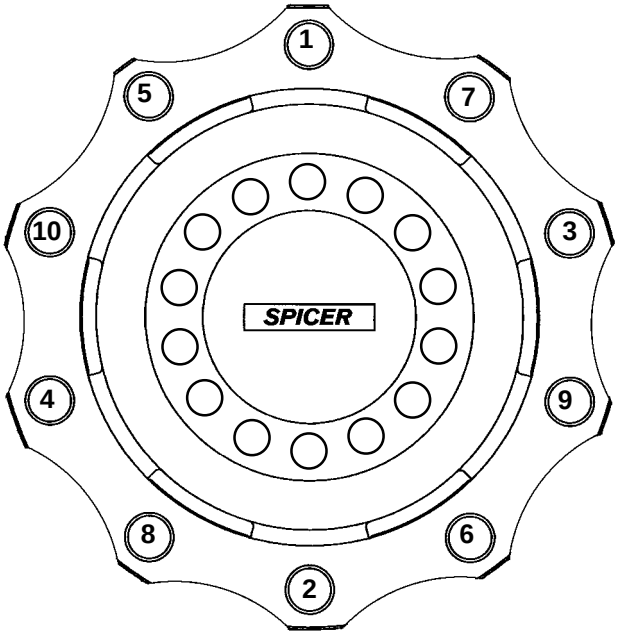
WHEELNUT TIGHTENING TORQUE SEQUENCE FOR 6 STUD FIXING



WHEELNUT TIGHTENING TORQUE SEQUENCE FOR 8 STUD FIXING



WHEELNUT TIGHTENING TORQUE SEQUENCE FOR 10 STUD FIXING

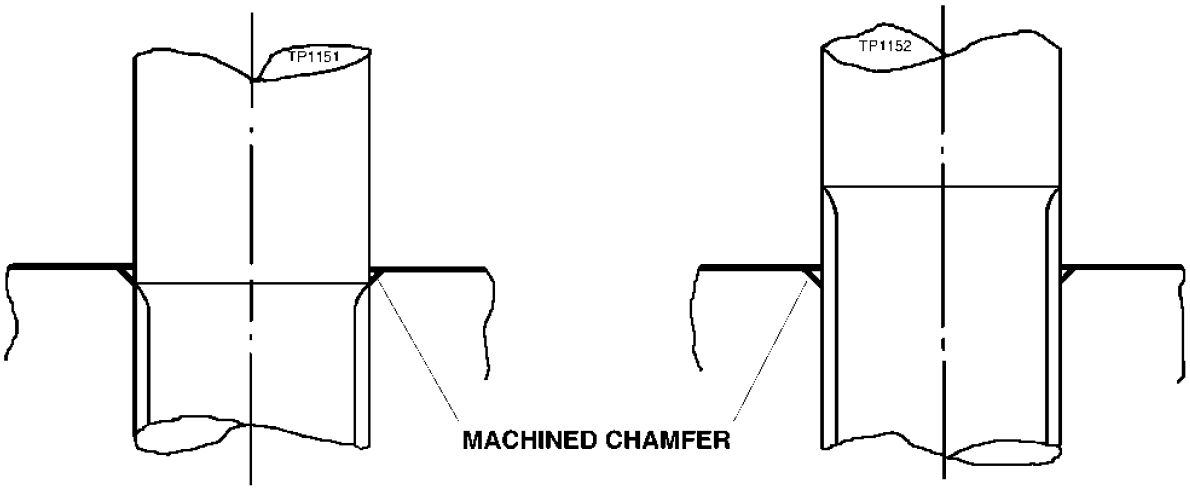


TP1193

SPICER SPECIALITY AXLE DIVISION

STANDARD STUDS - FITTED INTO MACHINED CHAMFERED HOLES

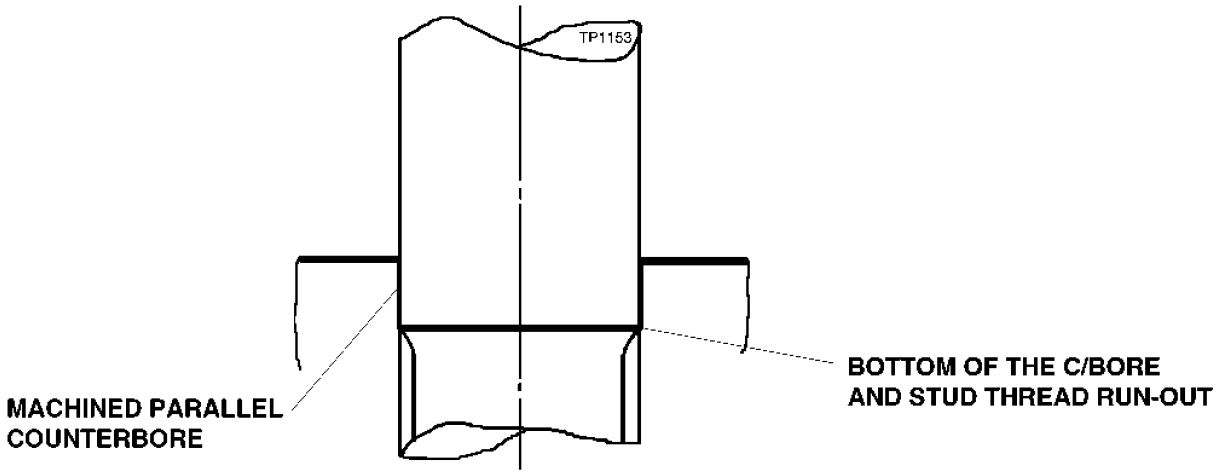
STUDS TO BE INSERTED UNTIL THREAD RUN-OUT LOCKS INTO PARENT METAL



IMPORTANT :- THIS STUD FITTING PROCEDURE IS TO BE USED IN LIEU OF STATED TORQUE VALUES ON EXISTING ARRANGEMENTS.
NEW ARRANGEMENTS WILL SPECIFY TD183/1 FROM THE DATE OF ISSUE.

SPECIAL STUDS - FITTED INTO MACHINED PARALLEL COUNTERBORE

STUDS TO BE INSERTED UNTIL CORRECT TORQUE VALUE IS OBTAINED -
AS SHOWN ON RELEVANT ARRANGEMENT DRAWING

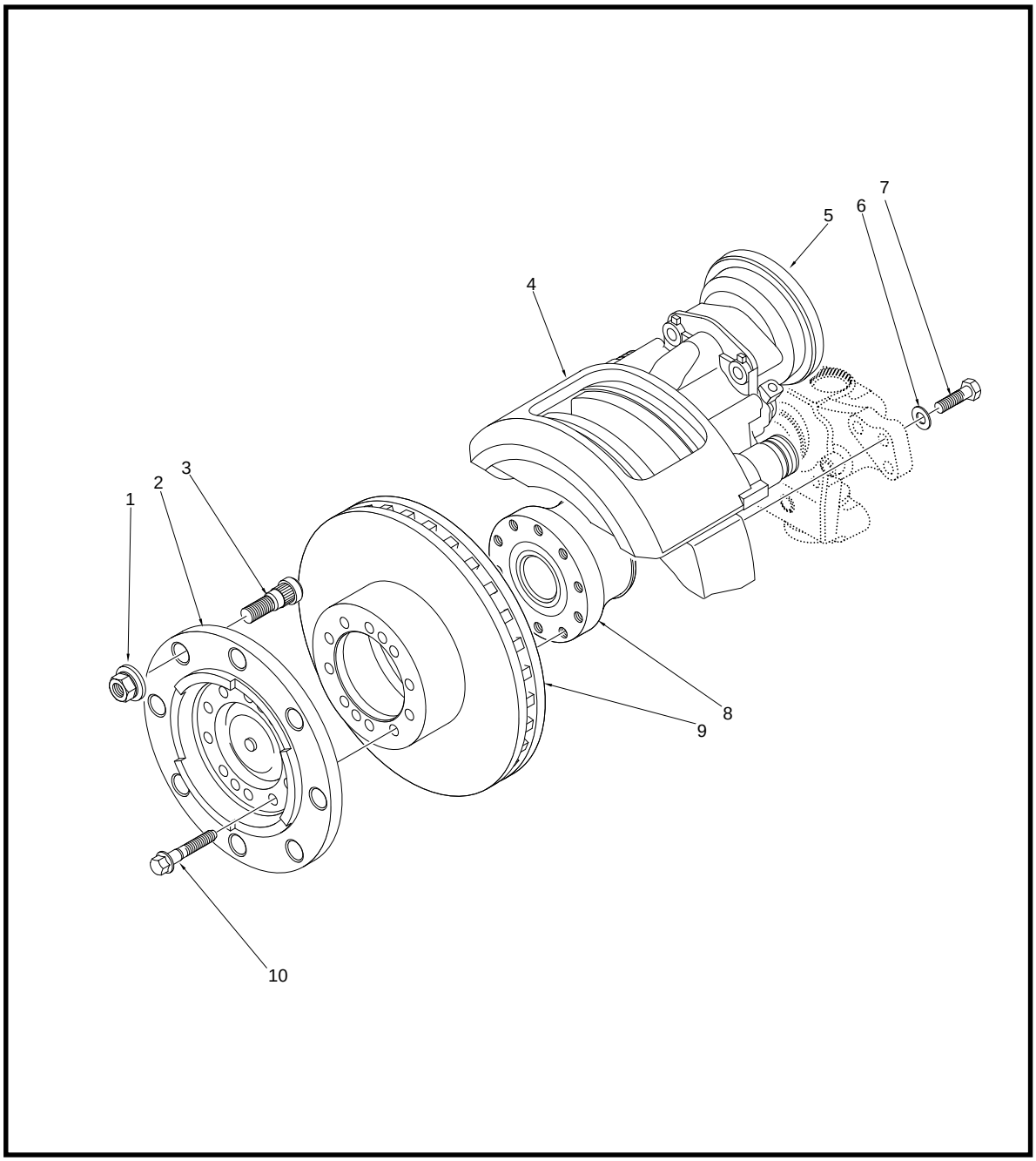


THIS SPECIFICATION IS FOR STUD FITTING ONLY ;
NUTS & SETSCREWS MUST BE TORQUED TO VALUE SPECIFIED

Alteration Numbers									
ISSUE A									

DISTRIBUTION	STUD FITTING PROCEDURES	TD183/1
Front Axle B.U. Drive Axle B. U. Production		SHT 1 OF 1

ILLUSTRATION OF NDS HUB END WITH SEPARATE BRAKE BRACKET



PART NUMBER	DESCRIPTION
1	Wheel nut (Not Supplied By Spicer Speciality Axles)
2	Hub flange
3	Wheel stud
4	Brake Caliper
5	Air chamber
6	Brake Caliper Mounting Washer
7	Brake Caliper Mounting Bolt
8	Unitised Hub Bearing
9	Brake Disc
10	Hub Flange Retaining Bolt

APPLICATION POLICY
Capability ratings, features and specifications vary depending upon the model type of service. Applications approvals must be obtained from Spicer Speciality axle division. We reserve the right to change or modify our product specifications, configurations, or dimensions at any time without notice.

SPICER SPECIALITY AXLE DIVISION
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