National Défense
Defence nationale

D-30-108-000/SF-004
1989-07-12

SPECIFICATION

FOR

REBUILDING HUB AND DRUM ASSEMBLY

(USED IN TRUCKS, UTILITY, LIGHT, 4 BY 4 MILITARY DESIGN ILTIS CDN SERIES)

LEFT FRONT NSN 2530-21-896-4544

LEFT REAR NSN 2530-21-896-4532

RIGHT FRONT NSN 2530-21-896-4531

RIGHT REAR NSN 2530-21-896-4533

1. SCOPE

1.1 Scope.- This specification covers the requirements for rebuilding the hub and drum assembly used in Trucks, Utility, Light, 4 by 4 Military Design, ILTIS Canadian Series used by the Canadian Forces. The specification includes rebuilt standards, procedures, special tools, painting, preservation, packaging and quality assurance provisions.

1.2 Purpose.- The purpose of this specification is to establish high-quality standards for rebuilding the subject hub and drum assembly.

1.3 Responsibility.- The contractor shall be responsible for meeting the requirements specified herein.

2. APPLICABLE DOCUMENTS

2.1 Government documents.- The following documents form part of this specification to the extent specified herein. Unless otherwise specified, the issue or amendment of documents effective for a particular contract shall be that in effect on the date of the request for proposal.

OPI/BPR DSVEM 2

Issued on Authority of the Chief of the Defence Staff
Publiée avec l'autorisation du Chef de l'état-major de la Défense

Canada

SPECIFICATIONS AND STANDARDS

AQAP-4	NATO Inspection System Requirements for Industry
MIL-B-131	Barrier Material, Water-Vapour Proof, Flexible, Heavy (36 inch wide roll)
MIL-G-21164	Grease, Molybdenum Disulphide for Low and High Temperatures NATO Code G-353

Copies of this specification and the above documents may be obtained from the Department of National Defence, Ottawa, Ontario, K1A 0K2, Attention: DDDS 3-6.

2.2 Other Publications.- The following documents form part of this specification to the extent specified herein. Effective dates shall be those in effect on the date of manufacture. Source is shown.

Canadian Government Publishing Centre,
Supply and Services Canada,
Ottawa, Ontario, K1A 0S9

1-GP-12	Standard Paint Colours
1-GP-105	Primer, Quick Drying
20-GP-11	Coating Material, Protective for Rubber Surfaces
43-GP-3	Tape, Pressure Sensitive, Adhesive Grade B, Olive Drab
CAN/CGSB-3.8-M	Dry, Cleaning Solvent
31-GP-3	Corrosion, Preventive Compound, Cold Application, Soft Film

3. REQUIREMENTS

3.1 General.- The contractor shall rebuild each hub and drum assembly supplied by DND in accordance with the requirements of this specification using the procedures and standards specified in 3.5 and 3.6. The contractor shall return each rebuilt hub and drum assembly to DND as a complete rebuilt drop-in assembly packaged in a reusable storage and shipping container as specified herein.

3.1.1 The hub and drum assembly shall be completely disassembled and all components as listed in 3.6 shall be thoroughly cleaned and dried before being inspected for condition and wear. Dry cleaning solvent CAN/CGSB-3.8-M or commercial equivalent may be used for cleaning.

3.1.2 Parts damaged by corrosion shall be replaced.

3.1.3 All threaded holes shall be cleaned and retapped.

3.1.4 Brake drum braking surfaces shall be turned down. Drums which exceed the maximum permissable internal diameter or which have heat cracks extending to the outer edge of the drum shall be replaced.

3.1.5 Components listed in Table II Mandatory parts replacement shall be replaced with new Original Equipment Manufacturer (OEM) parts during rebuild.

3.1.6 Any components missing from the hub and drum assembly at time of disassembly will be replaced with serviceable components at time of rebuild. Table III lists components that could be missing.

3.1.7 All machined surfaces shall be free of nicks, burrs and scratches. Whenever practical, such defects shall be removed with a soft stone or crocus cloth.

3.1.8 The contractor shall use tools designed for the purpose of the operation to be performed. Tools other than the special tools listed in Table V must be approved by the Quality Assurance Authority (QAA).

3.1.9 The contractor shall ensure that all components are secured as per torque specifications listed in Table VI.

3.1.10 Grease used shall meet requirements of MIL-G-21164 or Design Authority approved equivalent.

3.1.11 The hub and drum assembly shall be painted, preserved and packaged in accordance with specifications in 5.

3.1.12 Upon completion of rebuild, the hub and drum assembly shall consist of all components listed in Table I. Figures 1 to 4 are provided for component identification and location with the assembly.

3.2 Hub and Drum Assembly Components.- The following table lists all of the components comprising the hub and drum assembly, see Figures 1 to 4 for component identification and location within the assembly.

Table I Hub and drum assembly components

Figure	Item	NSN	M.R.N.	Description	Qty
1	2		222 120 066	Bolt-hex. HD (M12 X 1.5 X 110)	1
1	3	5310-21-181-3582	N 11 186 4	Nut-hex. elastic (M12)	1
1	4	2530-21-894-1474	183 407 431 A	Trunnion	1
1	5	9390-12-175-2662	183 407 347	Boot	1
1	6	5330-12-175-8258	183 407 623	Felt-ring	1
1	7	5365-12-175-4446	183 407 383	Ring-retaining	1
1	8	5305-12-191-1067	N 014 723 4	Screw-socket hd. (M10 X 30)	3
1	9	5310-21-896-2498	N 012 028 1	Washer-lock (10 X 16 X 2.5)	3
1	10	2530-21-896-8636	B183 498 205	Arm ass'y-lh. fr. steering	1
1	10	2530-21-896-4506	B 183 598 005	Arm ass'y - lh. rr. steering	1
1	10	2530-21-896-8635	B 183 498 206	Arm ass'y-rh. rr. steering	1
1	10	2530-21-896-4507	B 183 598 006	Arm ass'y - r.r. steering	1
1	11	3120-12-175-5031	183 407 621 A	Bushing-upper	1
1	12	2530-21-894-1399	183 407 327 A	Arm-left front steering	1
1	12	2530-21-894-1452	183 501 573 A	Arm - left rear steering	1
1	12	2530-21-894-1473	183 407 328 A	Arm-right front steering	1
1	12	2530-21-894-1467	183 501 574 A	Arm-right rear steering	

Table I Hub and drum assembly components (cont'd)

Figure	Item	NSN	M.R.N.	Description	Qty
1	13	5365-12-189-1223	B 183 407 631 B	Bushing-lower	1
1	14	5330-12-180-5264	N 900 692 01	O-Ring (37.2 X 3)	1
1	15	5365-21-893-1690	N 042 455 1	Snap ring (A40 X 2.5)	1
1	16	5330-12-144-4140	N 900 693 01	O-Ring (40 X 2)	1
1	17	5340-21-175-6007	B 1-805.015	Cup-trunnion	1
1	18	5330-12-123-1930	N 900 694 01	O-Ring (54.2 X 5.7)	1
1	19	5310-12-175-6341	183 407 644	Nut-wheel hub	1
1	20	5330-12-175-8262	DM80X92X8/01201	Seal-hub	1
1	21	5330-12-176-0805	BAFU5SLDRW24 67	Seal-hub	2
1	22	5365-12-156-4467	N 012 340 1	Circlip (85 X 3)	2
1	23	2520-21-894-1398	183 407 253 A	Carrier-hub	1
1	24	3110-12-175-5032	183 407 625 A	Bearing-wheel	1
1	25	2530-21-894-1462	183 407 615 A	Wheel-hub	1
1	26	5360-12-175-6342	183 407 287	Spring-compression	1
1	27	5330-12-180-5264	N 900 692 01	O-Ring (37.2 X 3)	1
1	28	5310-12-175-6343	3831.39	Nut-drive axle	1
1	29	5310-21-893-8706	N 041 183 2	Nut-hex. elastic (M14)	1
1	30	2530-21-896-4498	B 183 501 579	Guard - rear lh dust boot	1
1	30	2520-12-194-1376	B 183 407 563 B	Guard-front dust boot	1
1	30	2520-12-179-5389	B 183 501 580	Guard-r.r. dust boot	1
1	31	5310-21-892-1668	N 012 027 1	Washer-lock (8 X 12.7 X 2)	2

Table I Hub and drum assembly components (cont'd)

Figure	Item	NSN	M.R.N.	Description	Qty
1	32	5305-21-893-8811	N 014 706 2	Screw-socket hd. (M8 X 12)	2
1	33	2530-21-175-3381	0350145012203	Ball joint-lower	1
1	34	5305-21-897-8314	N 010 218 3	Bolt-hex. hd (M6 X 25)	1
1	34	5305-21-897-8141	N 014 707 4	Screw-socket hd. (M8 X 15)	2
1	35	2530-12-184-1840	B 183 407 532	Stop-r.h. steering	1
1	35	2530-12-184-1839	B 183 407 531	Stop-l.f. steering	1
1	36	5306-21-897-8298	N 010 349 6	Screw-hex. hd. (M6 X 45)	1
1	37	5310-12-164-8509	N 011 524 2	Washer-flat (6.4 X 12.5 X 1.6)	1
1	38	5310-12-145-5638	N 011 183 4	Nut-hex. elastic (M6)	1
3	1	5305-21-897-8141	N 014 707 4	Scr.-socket hd. (M8 X 15)	11
3	2	5310-21-893-1668	N 012 027 1	Washer-lock (8 X 12.7 X 2)	11
3	3	2530-12-176-1751	183 609 215 A	Drum-brake	1
3	4		183 609 071	Plate ass'y-l.h. fr. Backing	1
3	4		183 609 072	Plate ass'y-r.h. fr. Backing	1
3	5	5360-12-182-0683	183 609 607	Spring - lower	2
4	5	2530-12-174-5808	183 611 062 A	Cylinder-front r.h. brake	2
4	5	2530-12-174-5807	183 611 061 A	Cylinder-front l.h. brake	2

Table I Hub and drum assembly components (cont'd)

Figure	Item	NSN	M.R.N.	Description	Qty
4	6	2530-12-180-6272	183 698 241	Kit-front wheel-repair	2
3	7	2530-12-129-4560	183 609 289	Retainer - spring	1
4	7	4730-12-182-8026	183 611 693	Ring-retaining	2
3	8	5360-12-129-4592	113 609 283	Spring	1
4	8	5340-12-182-0286	183 609 163	Plug	2
3	9	2530-12-182-4258	183 609 631	Rod - push left	1
3	9	2530-12-182-4259	183 609 632	Rod - push right	1
4	9	2530-21-896-9381	B 183 698 355	Retainer ass'y-brake shoe	2
3	10	5360-12-182-0682	183 609 605	Spring - upper	1
4	10	2530-12-129-4561	183 609 279	Pin-tensionner	2
3	11	2530-12-195-9551	183 609 625	Clamp	1
4	11	5310-21-893-8735	N 12 098 1	Washer-spring	6
3	12	2530-12-182-6988	183 611 681	Nut - adj. w/scr.	2
4	12	5305-12-141-9861	N 010 237 6	Screw-hex. hd. (M8 X 12)	6
3	13	2530-12-182-3889	183 609 187	Support	1
4	13	5340-12-121-7542	3.3590.0700.1	Cap-dust	1
3	14	2530-12-182-3047	183 609 525	Shoe - brake w/lever left	1
3	14	2530-12-182-3049	183 609 526	Shoe - brake w/lever right	1
4	14	2530-12-122-8797	431 616 789	Valve bleeder	1
3	15	2530-21-896-9380	B 183 698 353	Pinion ass'y - parts	2

Table I Hub and drum assembly components (cont'd)

Figure	Item	NSN	M.R.N.	Description	Qty
4	15	2530-12-182-3045	183 609 126	Backplate-brake r.h.f.	1
4	15	2530-12-182-3044	183 609 125	Backplate-brake l.h.f.	1
3	16	2530-21-121-0998	183 609 225	Pinion-adjusting	1
4	16	2530-21-896-9380	B 183 698 353	Pinion ass'y-parts	2
3	17	5310-12-182-0680	183 609 229	Washer	1
4	17	2530-12-182-3888	183 609 221	Pin-adjusting	2
3	18	5310-12-142-8151	N 012 231 4	Washer-spring (A10 X 18 X .8)	2
3	19	2530-12-182-3046	183 609 439	Backplate - brake l.r.	1
3	19	2530-12-182-3048	183 609 440	Backplate - brake r.r.	1
4	19	5310-12-121-7512	183 609 227	Washer	2
4	22	4710-12-181-9214	183 611 505	Line-brake front l.h.	1
4	22	4710-12-181-9215	183 611 506	Line-brake front r.h.	1
4	24	5360-12-193-5870	183 609 301 A	Spring	2
3	25	5305-12-153-5302	N 14 740 2	Scr.-socket hd (M6 X 16)	2
4	25	2530-12-182-6449	183 609 237	Shoe-brake	2
3	26	5310-12-148-0559	N 012 106 1	Washer-int. tooth (6.4 X 11 X .7)	2
4	26	2530-12-182-6989	183 698 151	Kit-brake lining repair	1
4	27	5320-21-897-8297	183 609 599	Rivet-brake lining	24
3	28	2530-12-122-7914	183 611 471	Valve-bleeder	1

Table I Hub and drum assembly components (cont'd)

Figure	Item	NSN	M.R.N.	Description	Qty
3	29	5340-12-182-0286	183 609 163	Plug	2
3	30	2530-12-175-2774	183 611 053 A	Cyl.-brake rear	1
4	30	5306-12-173-3421	183 601 139 A	Bolt-wheel	2
3	31	2530-21-896-4545	183 698 351	Kit-rear wheel repair	1
3	32		183 611 691	Ring-retaining	2
3	36	2530-21-896-9401	157 427 001	Cable-rear handbrake	1
3	37	5365-21-896-7473	183 711 089	Circlip	1

3.3 Mandatory Parts Replacement.- The following table lists parts to be replaced with OEM components during hub and drum rebuild, see Figure 1 to 4 for component identification.

Table II Mandatory parts replacement

Figure	Item	NSN	M.P.N.	Description	Qty
1	2		222 120 066	Bolt-hex. Hd (M12 X 1.5 X 110)	1
1	3	5310-21-181-3582	N 11 186 4	Nut-hex. Elastic (M12)	1
1	5	9390-12-175-2662	183 407 347	Boot	1
1	6	5330-12-175-8258	183 407 623	Felt-ring	1
1	7	5365-12-175-4446	183 407 383	Ring-retaining	1
1	8	5305-12-191-1067	N 014 723 4	Screw-socket hd. (M10 X 30)	3
1	9	5310-21-896-2498	N 012 028 1	Washer-lock (10 X 16 X 2.5)	3
1	11	3120-12-175-5031	183 407 621 A	Bushing-upper	1
1	13	5365-12-189-1223	B 183 407 631 B	Bushing-lower	1

Table II Mandatory parts replacement (cont'd)

Figure	Item	NSN	M.P.N.	Description	Qty
1	14	5330-12-180-5264	N 900 692 01	O-Ring (37.2 X 3)	1
1	15	5365-21-893-1690	N 042 455 1	Snap ring (A40 X 2.5)	1
1	16	5330-12-144-4140	N 900 693 01	O-Ring (40 X 2)	1
1	17	5340-21-175-6007	B 1-805.015	Cup-trunnion	1
1	18	5330-12-123-1930	N 900 694 01	O-Ring (54.2 X 5.7)	1
1	20	5330-12-175-8262	DM80X92X8/01201	Seal-hub	1
1	21	5330-12-176-0805	BAFU5SLDRW24 67	Seal-hub	2
1	24	3110-12-175-5032	183 407 625 A	Bearing-wheel	1
1	26	5360-12-175-6342	183 407 287	Spring-compression	1
1	29	5310-21-893-8706	N 041 183 2	Nut-hex. elastic (M14)	1
1	31	5310-21-892-1668	N 012 027 1	Washer-lock (8 X 12.7 X 2)	2
1	32	5305-21-893-8811	N 014 706 2	Screw-socket hd. (M8 X 12)	2
1	33	2530-21-175-3381	0350145012203	Ball joint-lower	1
1	34	5305-21-897-8314	N 010 218 3	Bolt-hex. hd (M6 X 25)	1
1	34	5305-21-897-8141	N 014 707 4	Screw-socket hd. (M8 X 15)	2
1	36	5306-21-897-8298	N 010 349 6	Screw-hex. hd. (M6 X 45)	1
1	37	5310-12-164-8509	N 011 524 2	Washer-flat (6.4 X 12.5 X 1.6)	1
1	38	5310-12-145-5638	N 011 183 4	Nut-hex. elastic (M6)	1
3	2	5305-21-897-8141	N 014 707 4	Scr.-socket hd. (M8 X 15)	12

Table II Mandatory parts replacement (cont'd)

Figure	Item	NSN	M.P.N.	Description	Qty
3	3	5310-21-893-1668	N 012 027 1	Washer-lock (8 X 12.7 X 2)	12
4	5	2530-12-174-5807	183 611 061 A	Cyl.-front l.h. brake	2
4	5	2530-12-174-5808	183 611 062 A	Cylinder-front r.h. brake	2
3	5	5360-12-182-0683	183 609 607	Spring - lower	2
4	8	5340-12-182-0286	183 609 163	Plug	2
3	9	2530-12-182-4259	183 609 632	Rod - push right	1
3	9	2530-12-182-4258	183 609 631	Rod - push left	1
4	9	2530-21-896-9381	B 183 698 355	Retainer ass'y-brake shoe	2
3	10	5360-12-182-0682	183 609 605	Spring - upper	1
3	11	2530-12-195-9551	183 609 625	Clamp	1
4	11	5310-21-893-8735	N 12 098 1	Washer-spring	6
4	12	5305-12-141-9861	N 010 237 6	Screw-hex. hd. (M8 X 12)	6
3	14	2530-12-182-3049	183 609 526	Shoe - brake w/lever right	1
3	14	2530-12-182-3047	183 609 525	Shoe - brake w/lever left	1
4	22	4710-12-191-9214	183 611 505	Line - brake front l.h.	1
4	22	4710-12-181-9215	183 611 506	Line-brake front r.h.	1
4	24	5360-12-193-5870	183 609 301 A	Spring	2
4	25	2530-12-182-6449	183 609 237	Brake - shoe front	1

Table II Mandatory parts replacement (cont'd)

Figure	Item	NSN	M.P.N.	Description	Qty
3	25	5305-12-153-5302	N 14 740 2	Scr.-socket hd (M6 X 16)	2
3	26	5310-12-148-0559	N 012 106 1	Washer - int. tooth (6.4 X 11 X .7)	2
3	27	5340-12-121-7542	3.3590.0700.1	Cap dust	1
3	28	2530-12-122-7914	183 611 471	Valve bleeder	1
3	30	2530-12-175-2774	183 611 053 A	Cyl - brake rear	1
3	36	2530-21-896-9401	157 427 001	Cable rear handbrake	1

3.4 Missing Components.- The following components could be missing from the hub and drum assembly when it arrives at the contractors for rebuild, see Figure 1 to 4 for component identification.

Table III Missing components

Figure	Item	NSN	M.P.N.	Description	Qty
1	2		222 120 066	Bolt-hex. Hd (M12 X 1.5 X 110)	1
1	3	5310-21-181-3582	N 11 186 4	Nut-hex. elastic (M12)	1
1	18	5330-12-123-1930	N 900 694 01	O-Ring (54.2 X 5.7)	1
1	26	5360-12-175-6342	183 407 287	Spring-compression	1
1	27	5330-12-180-5264	N 900 692 01	O-Ring (37.2 X 3)	1
1	28	5310-12-175-6343	3831.39	Nut-drive axle	1
1	30	2530-21-896-4498	B 183 501 579	Guard - rear l.h. dust boot	1
1	30	2520-12-179-5389	B 183 501 580	Guard-rear rh dust boot	1
1	30	2520-12-194-1376	B 183 407 563 B	Guard-front dust boot	1

Table III Missing components (cont'd)

Figure	Item	NSN	M.P.N.	Description	Qty
1	31	5310-21-892-1668	N 012 027 1	Washer-lock (8 X 12.7 X 2)	2
1	32	5305-21-893-8811	N 014 706 2	Screw-socket hd. (M8 X 12)	2
1	34	5305-21-897-8311	N 010 218 3	Bolt-hex. hd (M6 X 25)	1
1	34	5305-21-897-8141	N 014 707 4	Screw-socket hd. (M8 X 15)	2
1	35	2530-12-184-1839	B 183 407 531	Stop-l.h. steering	1
1	35	2530-12-184-1840	B 183 407 532	Stop-r.h. steering	1
1	36	5306-21-897-8298	N 010 349 6	Screw-hex. hd. (M6 X 45)	1
1	37	5310-12-164-8509	N 011 524 2	Washer-flat (6.4 X 12.5 X 1.6)	1
1	38	5310-12-145-5638	N 011 183 4	Nut-hex. Elastic (M6)	1
3	1	2530-12-176-1751	183 609 215 A	Drum-brake	1
4	8	5340-12-182-0286	183 609 163	Plug	2
4	13	5340-12-121-7542	3.3590.0700.1	Cap-dust	1
4	30	5306-12-173-3421	183 601 139 A	Bolt-wheel	2

3.5 Rebuild procedures.- The following provides the step by step procedures to be used in the rebuild of the hub and drum assembly.

3.5.1 Disassembly

3.5.1.1 Remove brake drum

(a) Remove the two wheel bolts securing the drum to the hub.

(b) Turn the brake shoe adjusters counter clockwise to completely retract the brake shoes and remove the brake drum.

CAUTION

If the adjusters are not loosened, the drum will catch on the brake shoes. This could result in the brake wheel cylinder tangs being broken.

(c) If necessary, screw three (M8 X 40) capscrews into the holes in the drum until it is removed.

3.5.1.2 Remove brake shoes

(a) Remove the upper and lower brake springs.

(b) Pull the shoes away from the cylinder, remove the push rod and clamp.

(c) Grasp the spring retainers with pliers and, while securing the retaining pin with your finger, push the retainer in and turn it one-quarter turn to release it from the pin.

(d) Remove the spring retainer, spring and pin from the backing plate.

(e) Remove the brake shoes.

(f) Disengage the handbrake brake cable from the front shoe.

3.5.1.3 Remove the wheel cylinder (rear unit)

(a) Remove the dust cap and bleeder screw.

(b) Remove the two socket head screws and internal tooth washers securing the cylinder to the backing plate and remove the cylinder.

3.5.1.4 Remove the brake adjuster support

(a) Remove the three Hex. Hd. screws and spring washers securing the adjuster support to the backing plate and remove the adjuster support.

3.5.1.5 Remove the handbrake cable

(a) Remove the circlip from the cable and pull the cable from the backing plate.

3.5.1.6 Remove drive axle dust boot guard

(a) Remove the two socket-head screws and lock-washers securing the guard to the hub carrier.

(b) Remove the drive axle dust boot guard.

3.5.1.7 Remove the lower ball joint

(a) Remove the securing nut from the ball joint.

WARNING

Stand clear of the ball joint during removal. The joint may come off with tremendous force, and fly off the hub carrier.

(b) Using ball joint remover (VW 267A) remove the ball joint from the hub carrier, see Figure 7.

3.5.1.8 Remove the wheel cylinders (front unit)

(a) Remove the brake adjusters from the wheel cylinders.

(b) Disconnect the inter-connecting brake line from the cylinders and remove it from the retainer on the backing plate.

(c) Remove the dust cap from the bleeder valve and remove the bleeder valve.

(d) Remove the three capscrews and lock-washers from the rear of each cylinder and remove the cylinders.

3.5.1.9 Remove steering stop

(a) Remove the two socket-head screws securing the stop to the hub carrier.

(b) Remove the steering stop.

3.5.1.10 Remove drive axle dust boot guard

(a) Remove the two socket-head screws and lock-washers securing the guard to the hub carrier.

3.5.1.11 Remove the lower ball joint

(a) Remove the securing nut from the ball joint.

WARNING

Stand clear of the ball joint during removal. The joint may come off with tremendous force, and fly off the hub carrier.

(b) Using ball joint remover (VW 267A) remove the ball joint from the hub carrier, see Figure 7.

3.5.1.12 Remove upper steering arm and spring trunnion

(a) Remove the three socket-head screws.

(b) Using a fibre hammer, tap the steering arm free of the hub-carrier.

(c) Pry the trunnion cup bushing from the hub carrier.

3.5.1.13 Remove spring trunnion from steering arm

(a) Remove the O-ring from the spring trunnion pivot.

(b) Remove the spring eye nut and bolt from the trunnion.

(c) Using a soft-jawed vice, clamp the steering arm and spring trunnion into the vise so that the trunnion pivot moves fully into the arm.

(d) Clean the grease from the trunnion pivot ball and remove the circlip from the pivot, see Figure 8.

(e) Reposition the steering arm in the vise with the trunnion upwards, and pull the trunnion from the arm.

(f) Remove the locking ring from the dust boot on the arm and remove the boot with the felt ring inside it.

(g) Remove the nut, flatwasher and bolt from the steering arm.

3.5.1.14 Remove the upper and lower steering arm bushings

(a) Place steering arm on pressing tool (VW 459-2), with the upper bushing facing upwards, on a press.

(b) Using clamping piece (VW 548), press the upper bushing from the arm; lower bushing will come with it, see Figure 9.

3.5.1.15 Remove hub from hub carrier

(a) Install two wheel bolts or (bolts of same size) in the hub diagonally opposite one another and clamp the hub assembly in a vise by the bolts.

(b) Using a punch and hammer, straighten the locking collar of the hub nut.

(c) Using wrench (PEISELER 2089), remove the hub nut, see Figure 10.

NOTE: Considerable force is required to loosen the hub nut as it was torqued to 400 Nm (290 ft-lb).

(d) Remove the hub assembly from the vise and remove the two wheel bolts.

(e) Install hub on support (2090), on a press.

NOTE: Remove socket head screws, as required, from the backing plate, so that the hub sits flush on the support.

(f) Place remover/installer (32-108) in the hub spindle and press the hub out of the hub carrier, see Figure 11.

3.5.1.16 Remove bearing race from hub spindle

(a) Install separator (KUKKO 17-2) under the bearing race.

(b) Install puller (44-2) with pressure-piece (40-105) on the hub.

(c) Remove the bearing race from the hub spindle, see Figure 12.

3.5.1.17 Remove seals and bearing from the hub carrier

(a) Install the hub carrier in a vise with the brake shoe side of the backing plate facing upward.

(b) Pry out the outer seal.

(c) Remove the outer snap ring.

(d) Reverse the hub carrier in the vise and pry out the dust seal and inner seal.

(e) Remove the inner snap ring.

(f) Remove the hub carrier from the vise and install it on support (2090), in a press.

NOTE: When removing the inner and outer bearing seals, a thin round piece of rubber from the bearing end may be present. Discard this material.

(g) Install extractor (MATRA 10-550) with mandrel (MATRA 30-505) on the bearing in the hub carrier and press the bearing from the hub carrier, see Figure 13.

3.5.1.18 Remove backing plate from hub carrier

(a) Remove the remaining socket head screws from the backing plate.

(b) Scribe match marks on the backing plate and the hub carrier.

(c) Support the backing plate, and press the hub carrier from the backing plate.

(d) Remove the two rubber grommets from the backing plate inspection holes.

3.5.2 Cleaning and inspection.- Clean all components listed in 3.6 with dry cleaning solvent CAN/CGSB-3.8-M or commercial equivalent and perform inspections to determine serviceability as per standards listed herein and in 3.6.

3.5.2.1 Brake Drum

(a) Measure the internal diameter of the brake drum and inspect for heat cracks.

(b) If the drum has an internal diameter of less than 280.7 mm and shows no signs of heat cracks extending to the outer edge, turn the drum.

NOTE: Remove as little metal as possible to obtain a smooth flat surface not exceeding 280.7 mm in diameter.

(c) If the drum exceeds 280.7 mm in diameter, shows signs of heat cracks extending to the outer edge, or cannot be turned to obtain a smooth flat surface of a maximum of 280.7 mm in diameter, replace the drum.

3.5.2.2 Spring trunnion

(a) Inspect the trunnion spring eye bolt holes for elongation.

(b) Inspect the pivot shaft for rust and pitting and repair as necessary.

(c) Measure the diameter of the shaft and ball, minimum diameter for the shaft is 29.8 mm and 24.97 mm for the ball.

(d) If bolt holes cannot be repaired, pitting cannot be removed, or the shaft or ball diameter does not meet standards, replace the spring trunnion.

3.5.2.3 Steering arm

(a) Inspect the steering arm for signs of damage from bending or twisting.

(b) If either condition exists, replace the steering arm.

3.5.2.4 Hub carrier and hub

(a) Inspect the seal and bearing surfaces.

(b) Remove nicks and informalities as necessary with a soft stone.

(c) Clean all threaded holes with a tap.

(d) Clean the wheel bolt holes with a tap.

(e) Place the hub on a surface plate and check for a bent spindle or rim surface. Replace the hub if either exists.

3.5.2.5 Brake backing plate

(a) Place the backing plate on a surface plate and check for warpage. Straighten as necessary.

(b) Inspect the brake pinion for binding, excessive looseness and damaged adjuster teeth.

(c) If binding exists, free up the pinion, if excessive looseness or damaged teeth exist, remove the pinion assembly and re-install a new one using riveting machine (AMB 101C).

3.5.2.6 Nut wheel hub

(a) If the nut has only been used once, inspect the sealing surface for nicks and scratches and remove as necessary.

(b) If the nut has been used twice or nicks and scratches cannot be successfully removed with a soft stone, replace the nut.

3.5.2.7 Axle dust boot guard

(a) Inspect the rubber of the guard for deep cracks or tears. Replace if either condition exists.

3.5.2.8 Steering stop (front hub)

(a) Inspect the stop for signs of damage caused by heavy impact.

(b) If distortion is evident, replace the stop.

3.5.2.9 Brake Adjuster Support

(a) Remove the brake adjuster nuts w/screw and inspect the teeth of the nuts.

(b) Clean the threads on the nuts and in the support.

(c) If adjuster nuts are excessively loose in the support, the teeth are damaged, or the support is damaged, replace the support or adjuster nuts as required.

3.5.3 Re-assembly.- Using serviceable components and mandatory replacement parts listed in 3.3, re-assemble the hub and drum assembly.

NOTE: It may be beneficial to paint the hub carrier, the non-machined surface of the hub spindle, backing plate, steering arm, brake drum, spring trunnion, and the dust boot guard bracket prior to assembly. Plug all holes and mask all machined surfaces prior to painting.

3.5.3.1 Install bearing and seals in hub carrier

(a) Place the hub carrier in a vise, with the outer portion of the hub facing upwards.

(b) Install the outer snap ring into its groove in the hub carrier.

(c) Remove the hub carrier from the vise and install it on support (2090) in a press.

(d) Apply a light coat of grease to the inner surface of the hub carrier.

(e) Using remover/installer (MATRA 10-550) and mandrel (MATRA 30-505), press a new bearing into the hub carrier until it is flush with the outer snapring.

(f) Install the inner snapring into its groove in the hub carrier.

(g) Lubricate all seal lips and the space between the seal and the bearing with grease.

(h) Using remover/installer (MATRA 10-550) and mandrel (MATRA 30-505), install the inner seal ensuring that the lip is towards the bearing.

(j) Using the same tools, install the dust seal (the narrow seal) with the lip facing out until it is flush with the carrier casing.

(k) Remove the carrier from the support and reverse it in the press.

(m) Using the remover/installer, install the outer oil seal ensuring the lip faces the bearing until the seal is flush with the carrier casing.

3.5.3.2 Install the backing plate

(a) With the steering arm flange positioned at 12 o'clock, install the backing plate on the hub carrier ensuring the scribe marks are aligned or with the wheel cylinder at the 12 o'clock position, or with brake shoe retaining pin holes at eleven and five o'clock position.

(b) Install the 11 or 12 socket head screws and lock washers and torque to 35 Nm (26 ft-lb) in a diagonally opposite sequence.

NOTE: The top (12 o'clock) bolt hole is left empty to provide clearance for the push rod rear hub only.

3.5.3.3 Install hub into hub carrier

(a) Apply a light coat of grease on the hub spindle.

(b) Using tube (VW 415 A), press the hub into the hub carrier ensuring it goes in straight, see Figure 14.

(c) Install two wheel bolts in the hub and clamp the hub in a vise.

(d) Apply a light coat of grease to the seal surface of the hub nut where it comes in contact with the seal.

(e) Install the nut on the hub spindle and using wrench (PEISELER 2089) torque the nut to 400 Nm (295 ft-lb).

(f) Lock the nut to the hub by peening the nut sleeve into the grooves in the hub spindle in two locations directly opposite each other.

NOTE: If the nut is being used for the second time, peen the sleeve at two new locations.

3.5.3.4 Install the handbrake cable (rear hub)

(a) Insert the handbrake cable through the back of the backing plate and secure it with the circlip.

3.5.3.5 Install the wheel cylinders (front hub)

(a) Remove the brake shoe adjusters and the bleeder valve from the wheel cylinders.

(b) Position the wheel cylinders on the backing plate (front cylinder with adjuster facing up and the rear cylinder with adjuster facing down) and loosely install three capscrews and lockwashers in each cylinder.

(c) Connect the brake line to each cylinder ensuring the rubber protective collar on the brake line goes under the retaining clip on the backing plate.

(d) Torque the cylinder capscrews to 25 Nm (18 ft lb).

(e) Apply a light coat of grease to the threads of the adjusters and install them into the cylinders ensuring the adjuster teeth mesh with the teeth of the adjuster pinion.

3.5.3.6 Install the wheel cylinders (rear hub)

(a) Remove the bleeder valve from the wheel cylinder.

(b) Position the wheel cylinder on the backing plate and loosely install two socket head screws and internal tooth lockwashers in the cylinder. Torque to 25 Nm (18 ft-lb)

3.5.3.7 Install the brake adjuster support (rear hub)

(a) Apply a light coat of grease to the threads of the adjuster nuts and install them into the support.

(b) Place the support on the backing plate ensuring the teeth of the adjuster nuts engage the teeth of the adjuster pinion.

(c) Install the three cap screws and spring washers and torque to 25 Nm (18 ft-lb).

3.5.3.8 Install the brake shoes (front hub)

(a) Turn the wheel cylinder pistons so that the groove lines up with the shoe.

(b) Install the shoes onto the backing plate, (top shoe has notch to the rear and bottom shoe has notch to the front) by placing the bottom into the adjusters and the top into the pistons.

(c) Install the retaining pin through the backing plate and shoe.

(d) Install the spring and retainer by grasping the retainer with pliers and pushing down with a quarter-turn twist.

(e) Using brake spring pliers, install the front brake spring by hooking the ends into the hole in the top shoe and the elongated hole in the bottom shoe.

(f) Install the rear spring by hooking the ends into the elongated hole in the top shoe and the circular hole in the bottom shoe.

3.5.3.9 Install the brake shoes (rear hub)

(a) Turn the wheel cylinder pistons so that the groove lines up with the shoes.

(b) Attach the handbrake cable to the arm on the front shoe.

(c) Install the shoes onto the backing plate, by placing the end of the shoe with the push-rod slot against the wheel cylinder.

(d) Install the retaining pin through the backing plate and shoe.

(e) Install the spring and retainer by grasping the retainer with pliers and pushing down with a quarter-turn twist.

(f) Spread the upper end of the shoes and insert the push-rod with the long tang to the front and outside of the shoe.

NOTE: Ensure the push-rod engages the handbrake lever, and the slot in the shoes. Also ensure the upper end of the shoes fit into the slots of the cylinder pistons. Ensure the clamp is installed on push-rod.

(g) Install the long spring at the top in the elongated holes of the shoes, and the two small springs at the bottom in the elongated holes of the shoes and the adjuster support.

(h) Secure the upper spring to the push-rod with the clamp.

3.5.3.10 Assemble steering arm and trunnion

(a) Place the steering arm on a press and press the lower bushing into the steering arm as far as it will go.

(b) Turn the steering arm over and using clamping piece (VW 548) press the upper bushing into the arm as far as it will go.

(c) Coat the felt ring with grease and install it in the dust boot.

(d) Install the dust boot on the steering arm and secure it with the locking ring.

(e) Apply a coat of grease to the bushings and the trunnion.

(f) Install the trunnion pivot through the steering arm bushings.

(g) Clamp the steering arm and trunnion in a soft jaw vise to press the trunnion pivot completely into the arm.

(h) Install the circlip in the recess on the pivot.

(j) Install the O-ring in the groove in the steering arm.

3.5.3.11 Install steering arm and trunnion

(a) Install a new trunnion cup bushing in the hub carrier and using a fibre hammer tap it in until it is flush with the carrier casing. Coat the bushing with grease.

(b) Install the steering arm and trunnion on the hub carrier so that the arm will face towards the right when viewing from the brake shoe side of the assembly. See Figure 5.

(c) Install the three socket head screws and lock washers and torque to 65 Nm (48 ft-lb).

(d) Ensure the trunnion will turn within the steering arm.

(e) Pry upward on the trunnion and check the upward movement. If upward play exceeds 1.3 mm, remove the steering arm from the hub carrier and replace the trunnion.

3.5.3.12 Install lower ball joint

(a) Install the ball joint to the hub carrier and install the nut.

(b) Torque the nut to 100 Nm (74 ft-lb).

3.5.3.13 Install the steering stop (front hub)

NOTE: Ensure the curved part of the spring trunnion is facing away from the backing plate.

(a) Install the steering stop on the hub carrier with two socket head screws.

(b) Torque the screws to 25 Nm (18 ft-lb).

3.5.3.14 Install drive axle dust boot guard

(a) Install the drive axle dust boot guard on the hub carrier with two socket head screws and lockwashers.

(b) Torque the screws to 25 Nm (18 ft-lb).

3.5.3.15 Install brake drum and bleeder valve

(a) Install the brake drum over the shoes.

(b) Install the bleeder screw and tighten.

(c) Install the rubber dust cap on the bleeder screw.

(d) Install two wheel bolts through the drum to hold it in place.

(e) Install the rubber plugs in the backing plate brake shoe inspection holes.

3.6 Rebuild standards.- The following table lists standards to be strictly adhered to when determining the serviceability of the components. For standards not listed herein, the contractor shall use good judgement to the minimum of SAE Standards and Practices. If the serviceability of a component is in doubt, the component shall be replaced and held for QA inspection and decision; see Figures 3 to 4 for identification.

Table IV Rebuild standards

Figure	Item	Description	Standards
2	4	Trunnion - Shaft dia. - Ball dia. - upward play at pivot	minimum 29.80 mm minimum 24.97 mm maximum 1.3 mm
2	12	Arm right rear steering	
2	12	Arm left rear steering	
2	12	Arm right front steering	
2	12	Arm left front steering	
2	19	Nut wheel hub	To be used only twice and then discarded
1	22	Circlip (85 X 3) Qty 2	
1	23	Carrier hub	
1	25	Wheel hub	
1	30	Guard - R.R. dust boot	
1	30	Guard - L.R. dust boot	

Table IV Rebuild standards (cont'd)

Figure	Item	Description	Standards
1	30	Guard-front dust boot	
1	35	Stop - R.H. steering	
1	35	Stop - L.H. steering	
3	3	Drum brake	Internal dia. new drum - 280.2 mm Max turning dia - 280.7 mm Max wear dia - 281.2 mm
3	19	Backplate - brake	
3	16	Pinion Assy	
3	12	Adjuster Nuts w/screws	
3	13	Adjuster Support	

Table V Special tools

Item	NSN	M.R.N.	Description
1	5120-21-896-7695	V/99.10	Puller-Two Jaw 44/2
2	5120-12-176-1099	VW 415 A	Tube (60 mm dia)
3	5120-12-162-4199	VW 459	Pressing - Tool
4	5120-21-896-7703	VW 548	Clamping - Piece
5	5120-12-176-1103	PEISELER 2089	Wrench - Spl. Socket
6	4910-12-176-2604	PEISELER 2090	Support
7	5120-12-176-1090	VW 267 A	Tool - Ball Joint Remover
8	5120-12-176-1100	MATRA 10-550	Extractor
9	5120-12-176-1104	MATRA 30-505	Mandrel
10	5120-12-176-1101	MATRA 32-108	Installer

Table V Special tools (cont'd)

Item	NSN	M.R.N.	Description
11	5120-12-176-1102	MATRA 40-105	Piece - Pressure
12	5120-21-896-7689	KUKKO 17/2	Separator
13	5120-21-899-4915	AMB 101C	Machine - Riveting
14	5120-21-899-4916	AMB 102	Cylinder - Star.

3.7 Special tools.- Table V lists the special tools recommended for use in rebuilding the hub and drum assembly, see Figure 15 for identification.

3.8 Torque specifications.- The following table lists torque specifications to be used when rebuilding the hub and drum assembly.

Table VI Torque specifications

Description	Nm	ft-lb
Ball Joint to Hub Carrier	100	74
Brake Backing Plate to Hub Carrier Soc. Hd. Screws	35	26
Brake Wheel Cylinder to Backing Plate Hex Hd. Screws	25	18
Drive Axle Dust Boot Guard to Hub Carrier Soc. Hd. Screws	25	18
Spindle to Hub Carrier Nut	400	295
Steering Arm to Hub Carrier Soc. Hd. Screws	65	48
Steering Arm Stop to Hub Carrier Soc. Hd. Screws	25	18

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection requirements.- DND Quality Assurance at source is required. The contractor is responsible for carrying out inspections and processing to meet quality assurance requirements acceptable to the Quality Assurance Authority.

4.1.1 The contractor's system of inspection shall meet the requirements of AQAP-4.

4.1.2 The Quality Assurance Authority reserves the right to perform any inspections considered necessary to ensure that material and services conform to specified and contractual requirements.

5. PAINTING, PRESERVATION, PACKAGING AND MARKING

5.1 Painting.- All openings, threads and exposed rubber and machined surfaces including the braking surface of the brake drum shall be masked prior to the following painting procedure.

(a) Prime with a 0.0005 inch thick coat of vinyl wash primer, Pittsburg Y-4002 or equivalent.

(b) Apply a 0.0015 inch thick coat of red oxide primer, Pittsburg Y-70138 or equivalent.

(c) Apply a 0.0015 inch thick coat of vinyl black finish paint, Pittsburg Y-011 or equivalent.

5.2 Preservation.- After final rebuild acceptance by Quality Assurance Authority, the contractor shall place the hub and drum assembly into preservation in the following manner:

(a) Brake linings and drum braking surface shall not be coated in any manner.

(b) All exposed machined surfaces shall be coated with Corrosion, Preventive Compound, Cold Application, Soft Film, 31-GP-3.

(c) The drive axle nut, O-ring, and spring; the hub nut O-ring; the spring eye nut and bolt; and the brake line nut, bolt and washer shall be kept in their original packaging, placed in a separate cardboard box and placed in the shipping container with the hub and drum assembly.

(d) The dust boot guard rubber shall be coated with 20-GP-11.

5.3 Packaging.- A legible stamped or engraved metal plate shall be attached to the hub and drum assembly in an approved location showing the following information:

(a) Name of firm or workshop that rebuilt the hub and drum assembly.

(b) Day, month and year of rebuild.

(c) Firm or workshop order number.

(d) The drop-in hub and drum assembly NSN, and description "HUB AND DRUM ASS'Y - RIGHT FRONT - LEFT FRONT".
RIGHT REAR LEFT REAR

5.3.1 Each drop-in hub and drum assembly shall be properly tagged with a CF 942, NSN 8135-21-872-2435, Identity and Condition Tag and a CF 2248, NSN 7530-21-870-3866, Lubrication Record for Shipment and Preservation Tag.

5.3.2 The hub and drum assembly shall be wrapped in barrier paper and sealed with tape pressure sensitive.

5.3.3 The hub and drum assembly shall be wrapped in a polyurethane bag. Sufficient desicant shall be included in the bag prior to sealing to prevent condensation.

5.4 Packing.- After final acceptance by the Quality Assurance Authority, the hub and drum assembly shall be placed in a cardboard box containing a 2 inch thickness of styrofoam on the bottom and the spring trunnion end. A 8 inch square block of styrofoam shall be placed on top of the hub and drum assembly to prevent upward movement and the box sealed and placed in a shipping and storage container provided by DND.

5.4.1 Prior to packing, the contractor shall ensure that the shipping and storage container is in first class condition by performing the following as required:

(a) Patching all holes.

(b) Installing new hardware for the lid as required.

(c) Painting the surface of the container with paint.

5.5 Marking.- The shipping and storage containers shall have the rebuild date, NSN and description of the hub and drum assembly, Qty 1, and weight stencilled on both ends, and "REUSABLE CONTAINER, DO NOT DESTROY, C.F. PROPERTY" stencilled on both sides.

5.5.1 The container shall be properly tagged with a CF 942A, NSN 7690-21-868-6739 Identity and Condition Label and a CF 2248, NSN 7530-21-870-3866 Lubrication Record for Shipment and Preservation Tag.

6. **NOTES**

6.1 Ordering data.- Procurement documents should specify the title, number, and date of this specification.

6.2 Design Authority.- The Design Authority is the Director of Support Vehicles Engineering and Maintenance.

6.3 Quality Assurance Authority.- The Quality Assurance Authority will be specified in the contract.

6.4 Returnable Parts.- The following used components shall be returned to DND through channels as specified in the contract:

(a) All lower ball joints.

(b) All wheel cylinders.

(c) All brake shoes.

(d) All handbrake cables.

(e) All components not meeting specifications.

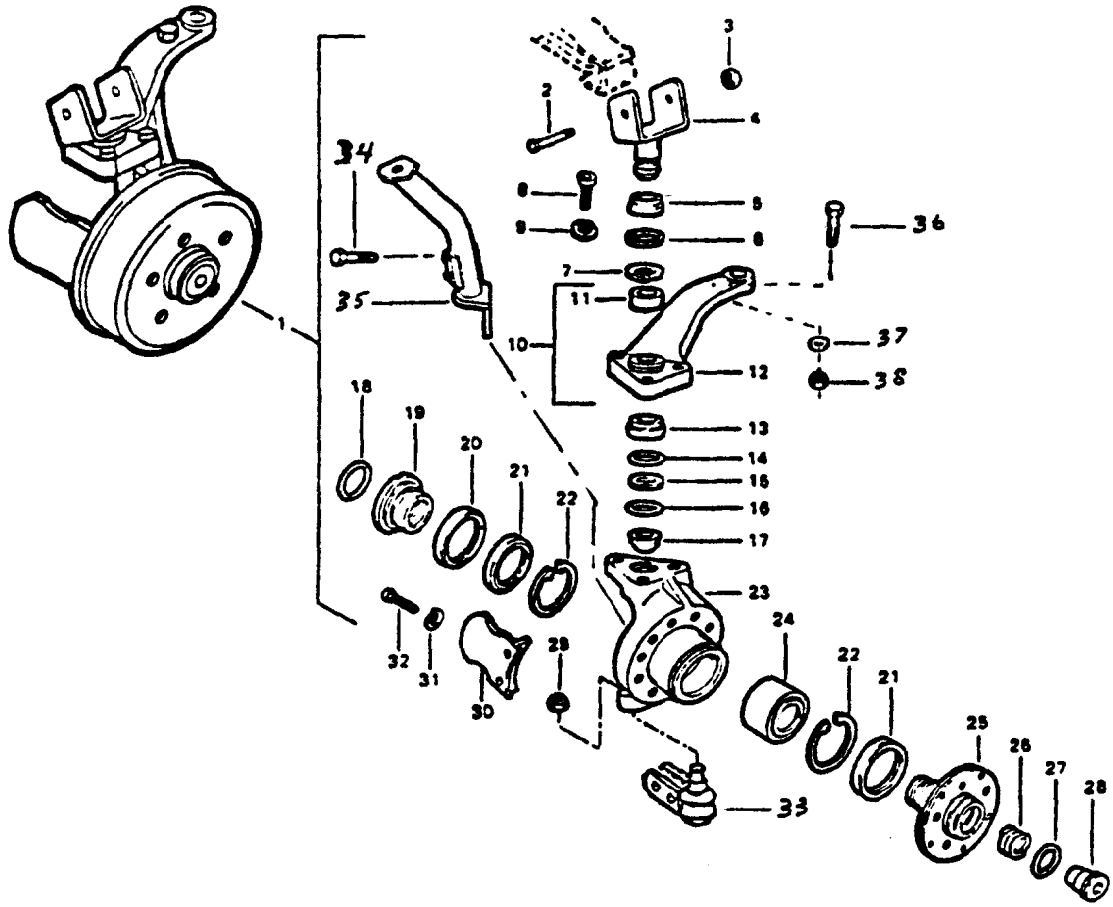


Figure 1 Front hub assembly

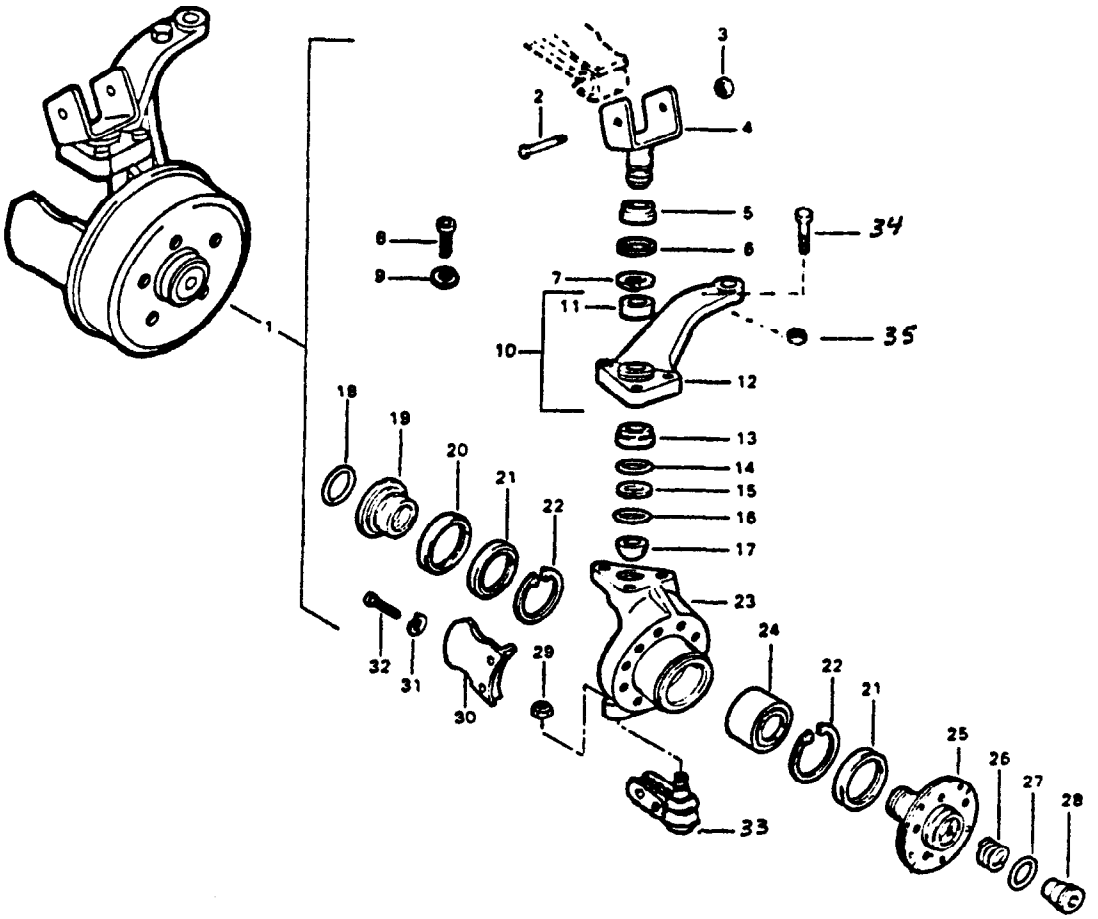


Figure 2 Rear hub assembly

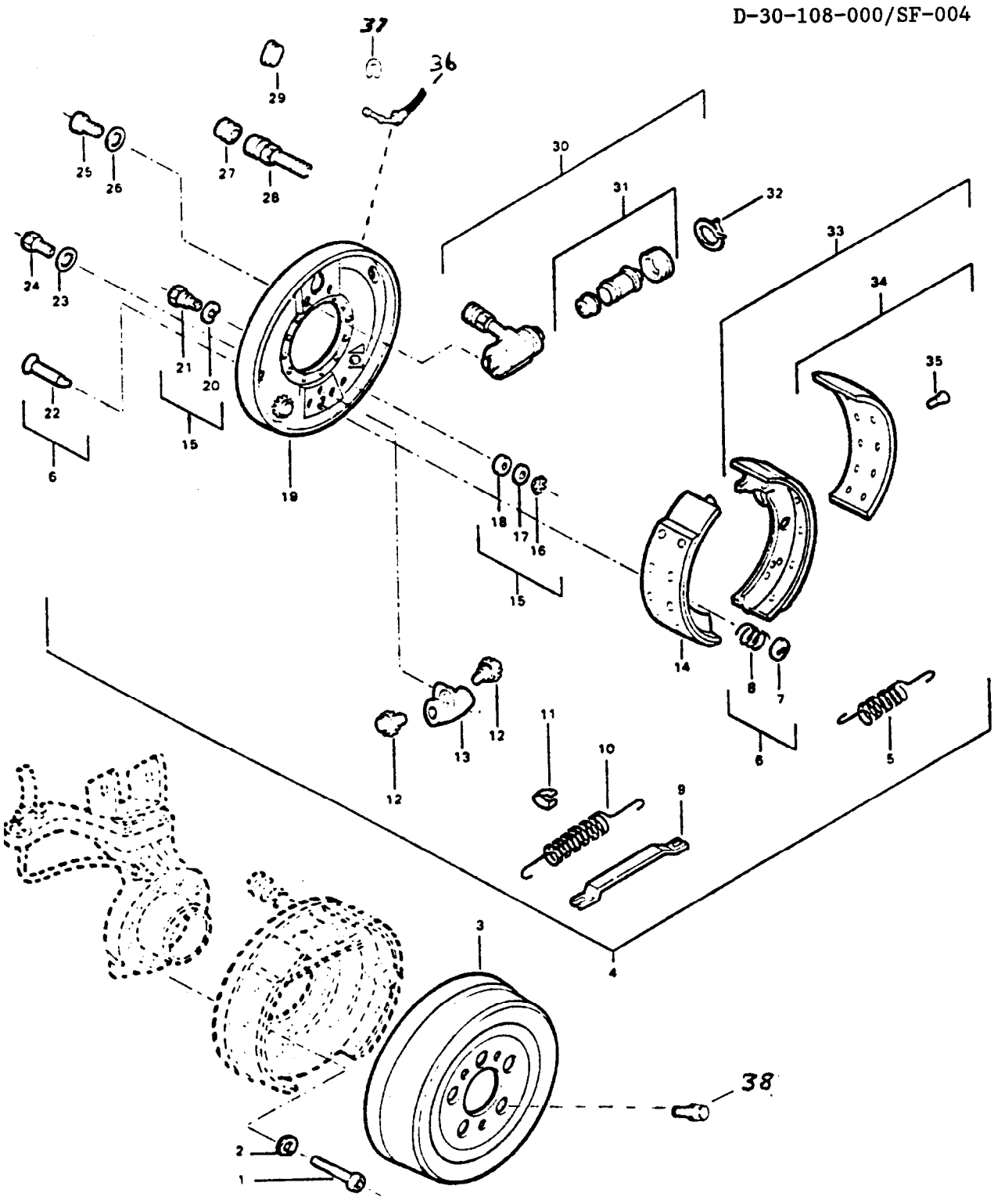


Figure 3 Left rear brake assembly

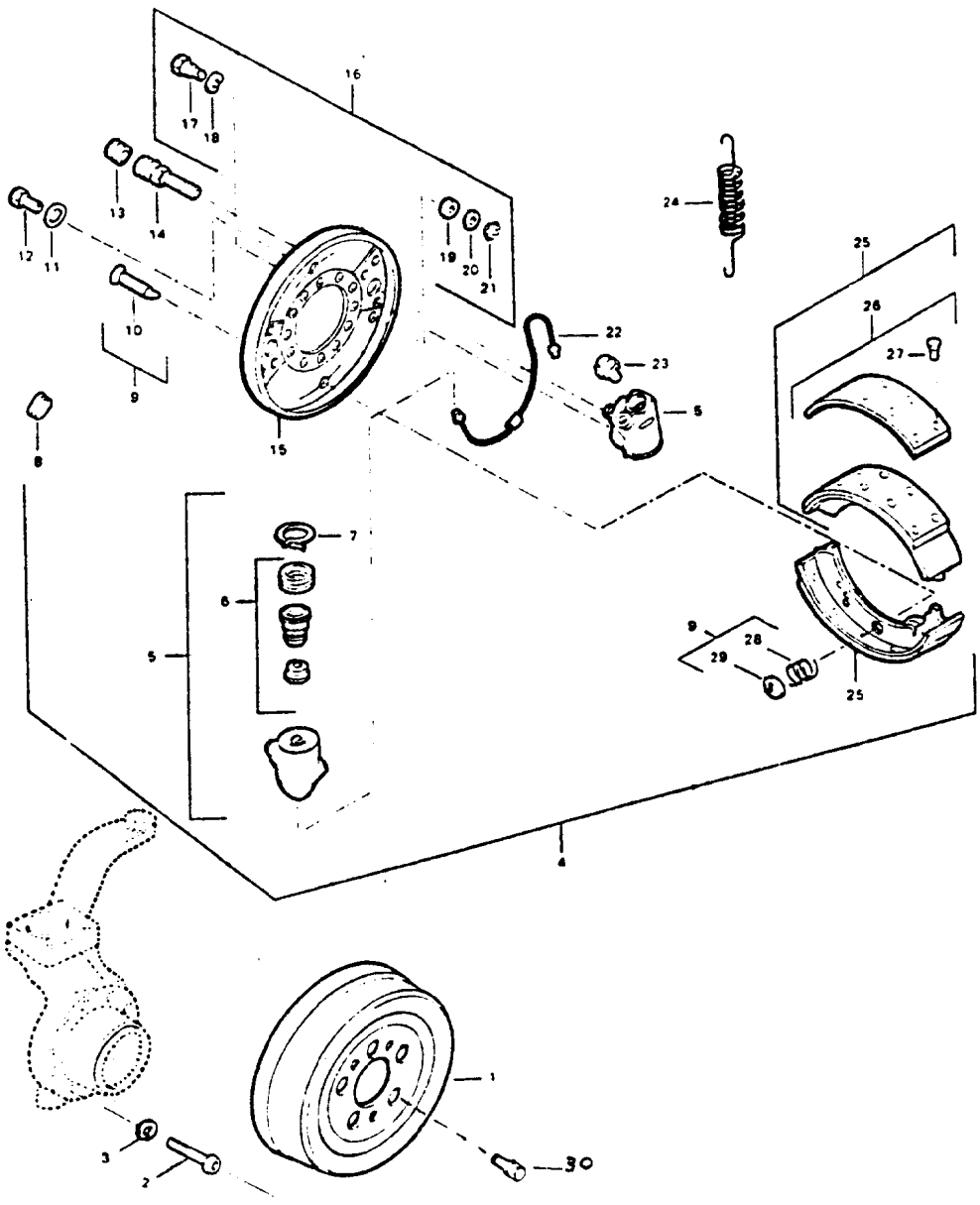


Figure 4 Left front brake assembly

FRONT

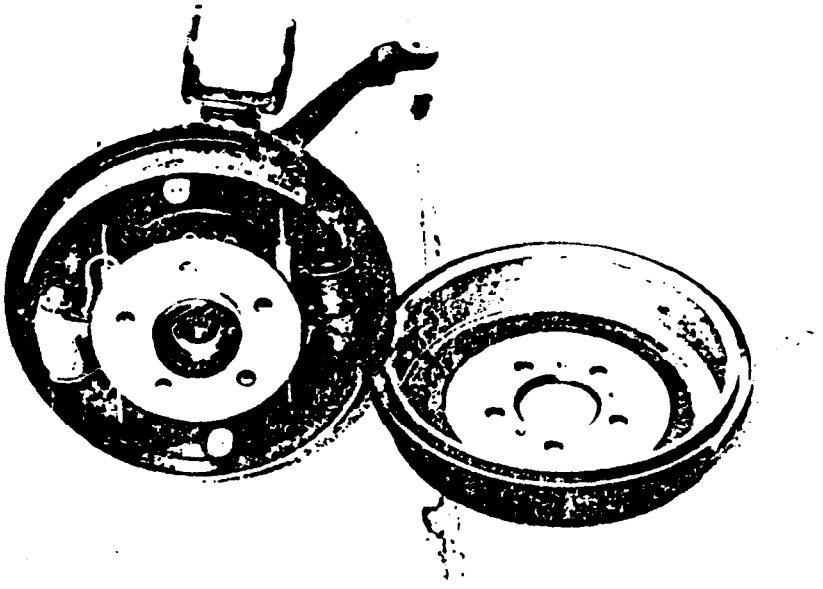
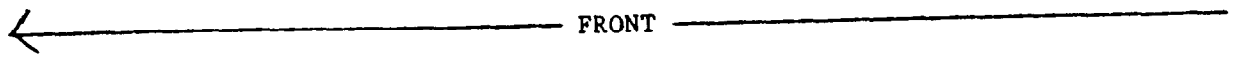


Figure 5 Left front hub assembly



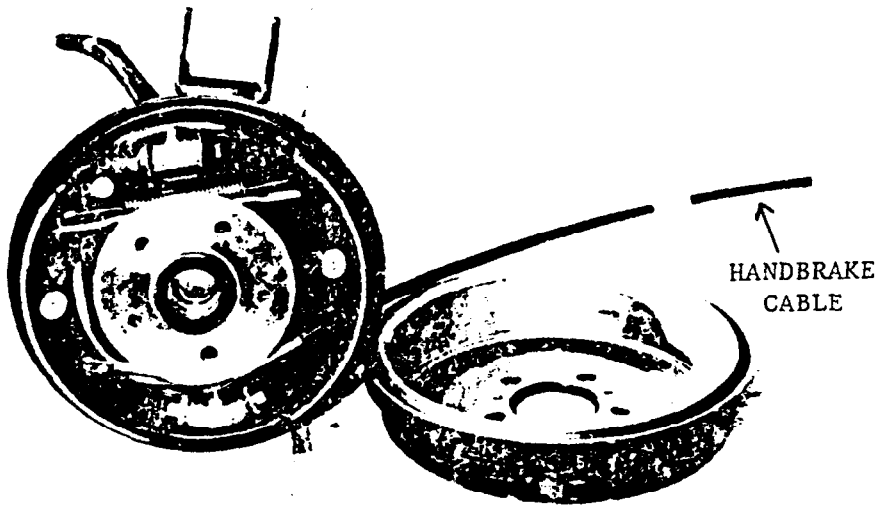


Figure 6 Left rear hub assembly

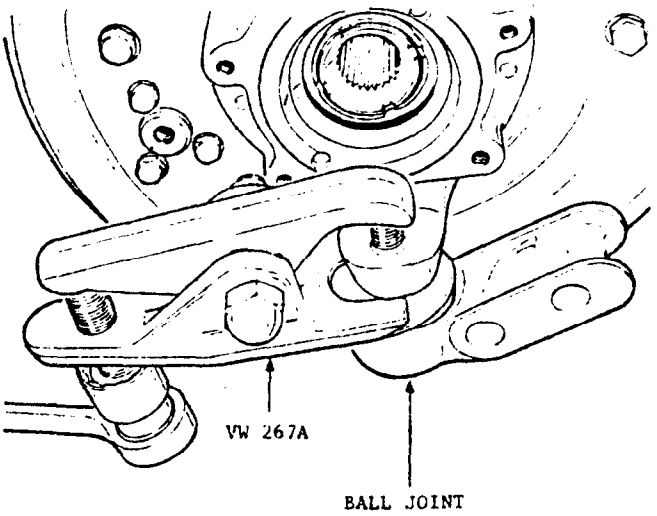


Figure 7 Removal of ball joint from hub carrier

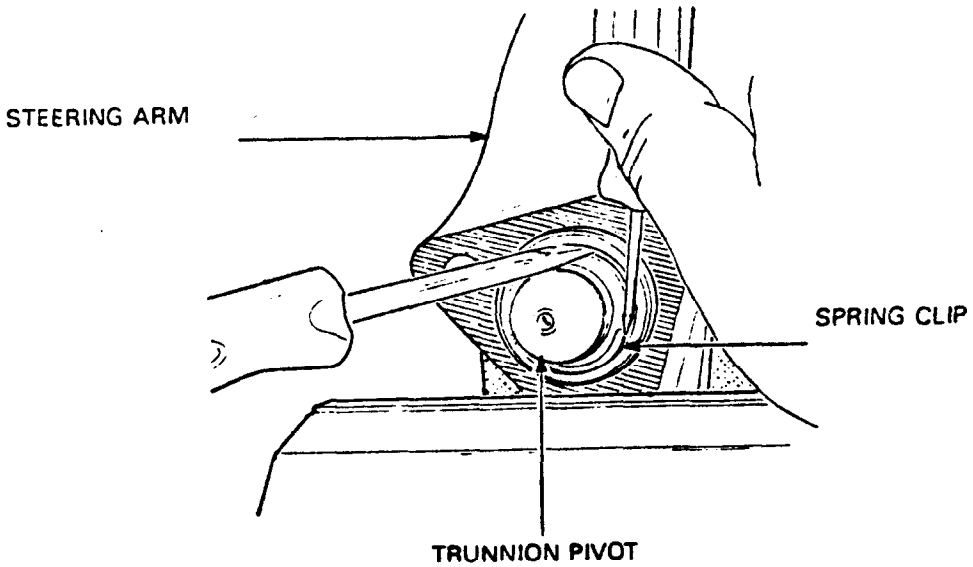


Figure 8 Removal of circlip from trunnion pivot

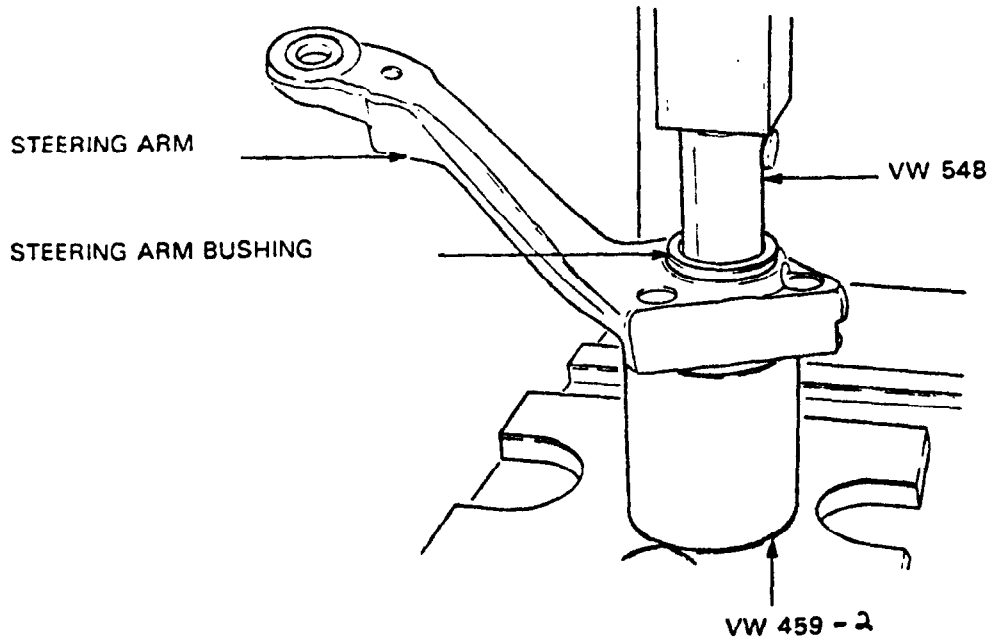


Figure 9 Removal of steering arm bushings

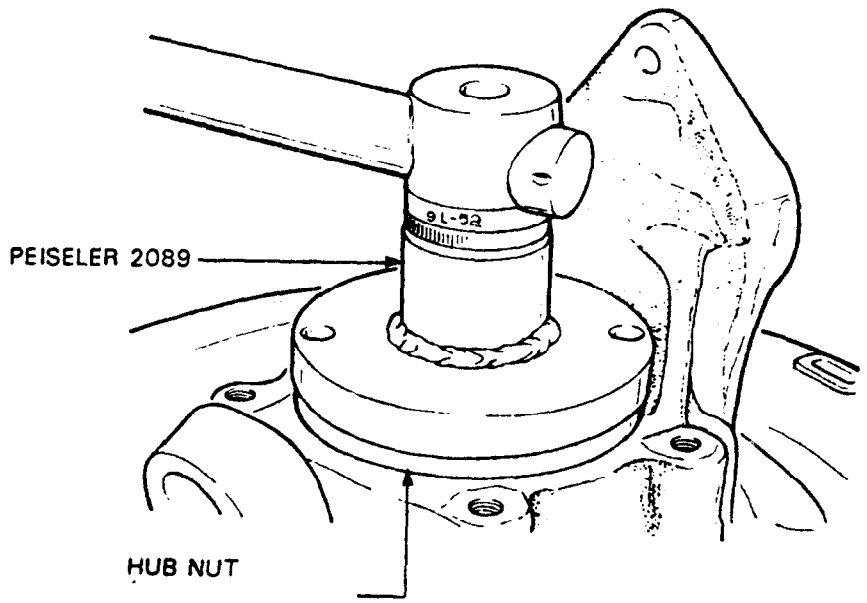


Figure 10 Removing hub nut

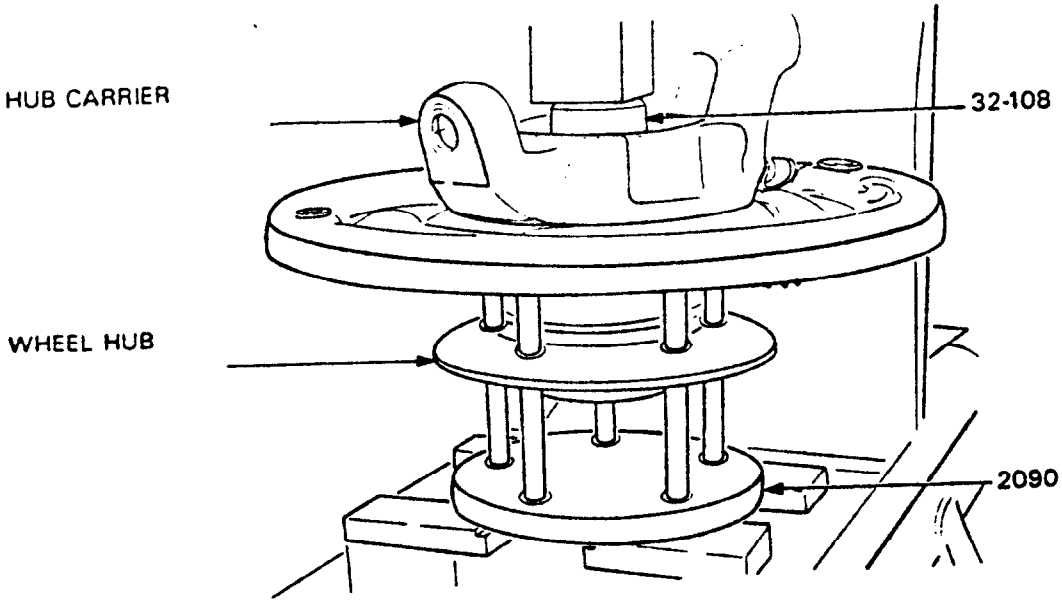


Figure 11 Removal of hub from hub carrier

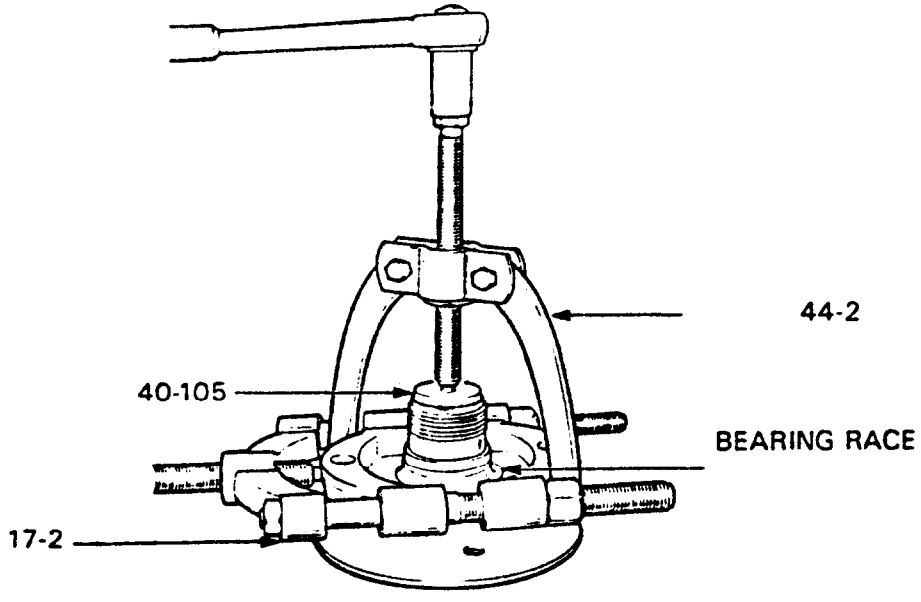


Figure 12 Removal of bearing race from hub spindle

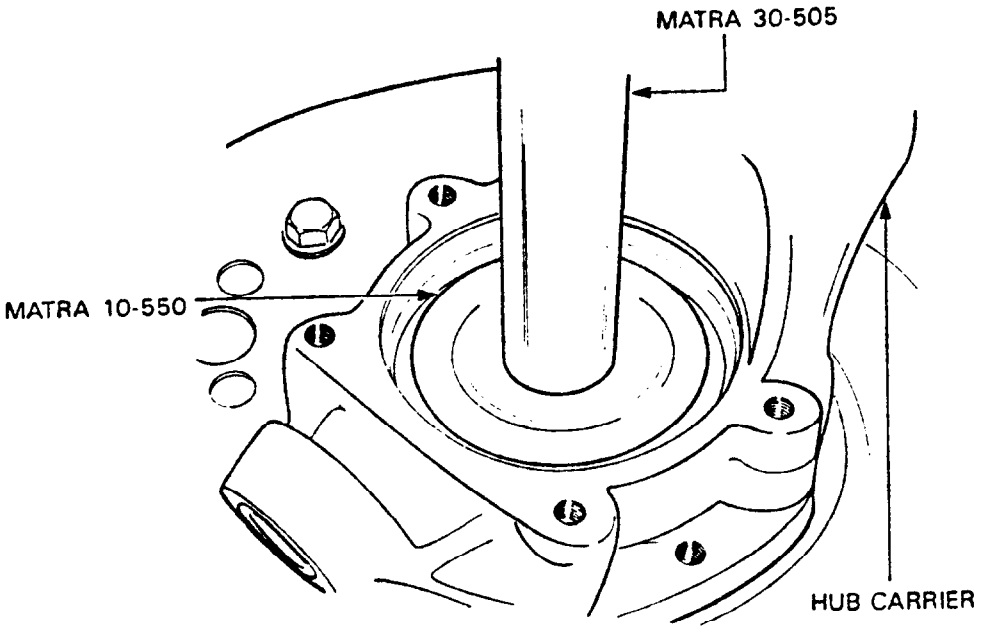


Figure 13 Removal of bearing from hub carrier

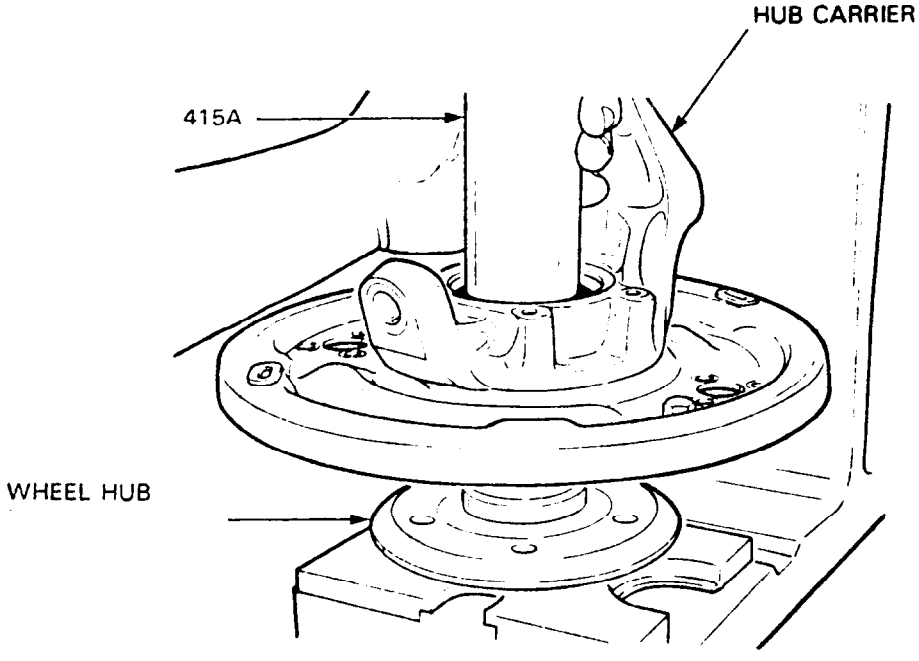


Figure 14 Installing hub into hub carrier

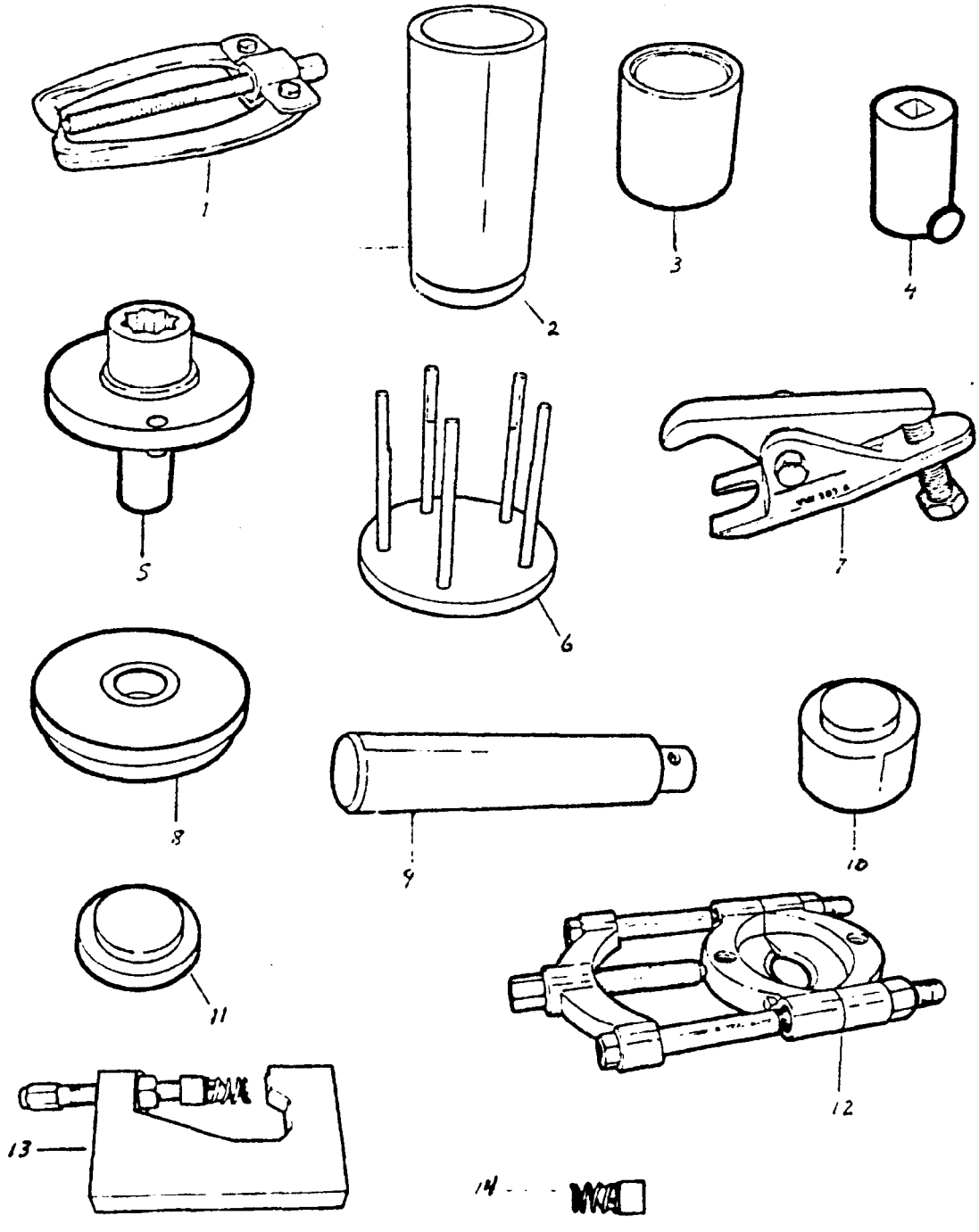


Figure 15 Special tools