



Service Bulletin **SB2X-32-13R2**

Issued: 15 Dec 2005

Revised: 24 Apr 2015

Models SR20 and SR22

ATA 32-42: Brakes Wheel Conversion and Brake Upgrade

COMPLIANCE

Optional: Accomplishment of this Service Bulletin is at the owner's option.

This Service Bulletin has been revised to add Compliance information. Operators who have successfully complied with the original release of this Service Bulletin, dated 15 Dec 2005, or subsequent revisions need take no further action.

Operators who have not complied with this Service Bulletin may choose to perform Optional Service Bulletin SB2X-32-21, Brake, Wheel, and Tire Upgrade Kit, instead of performing this Service Bulletin.

Note: Perform Mandatory Service Bulletin SB2X-32-14, Main Landing Gear Fairing Modification for Inspection Hole, prior or concurrent to installation of either this Service Bulletin or Service Bulletin SB2X-32-21. Failure to do so may result in misalignment of the inspection hole with the brake caliper temperature Indicator.

EFFECTIVITY

Cirrus Design SR20 serial numbers 1005 thru 1600.

Cirrus Design SR22 serial numbers 0002 thru 1739.

APPROVAL

FAA approval has been obtained on all technical data in this Service Bulletin that affects type design.

PURPOSE

To improve braking operations, upgrades to the wheel and brake assembly have been developed that increase brake lining service life and energy-absorbing capacity. This Service Bulletin provides instructions for wheel and brake assembly upgrades.

DESCRIPTION

This Service Bulletin contains instructions for the modification of the wheel assemblies and installation of improved brake assemblies.

WARRANTY INFORMATION

Part and labor costs for this Service Bulletin are at the owner's expense.

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MANPOWER REQUIREMENTS

Kit 70123-001: 11.25 manhours

Kit 70123-002: 7.25 manhours

Kit 70122-001: 5.0 manhours

OTHER PUBLICATIONS AFFECTED

SR20 Airplane Maintenance Manual (P/N 12137-001)

SR20 Illustrated Parts Catalog (P/N 12138-001)

SR22 Airplane Maintenance Manual (P/N 13773-001)

SR22 Illustrated Parts Catalog (P/N 13774-001)

WEIGHT AND BALANCE

Component	Weight Change	Arm
Kit 70123-001: Brake Cylinder w/ Torque Plate	2.4 lb	157.5 inch
Kit 70123-002: Brake Cylinder w/ Torque Plate	2.4 lb	157.5 inch
Kit 70122-001: Brake Cylinder	1.8 lb	157.5 inch

MATERIAL INFORMATION

The following parts are required to comply with this Service Bulletin. Parts can be obtained from an Authorized Cirrus Design Service Center or Parts Distributor.

Serials SR20-1005 thru 1194: Order kit 70123-001 to obtain the following parts.

Item No.	Description	P/N or Spec.	Supplier	Quantity
1	Brake Hose	50555-072	Cirrus Design	2
2	Brake Line, Main Landing Gear, LH	14445-001	Cirrus Design	1
3	Brake Line, Main Landing Gear, RH	14445-002	Cirrus Design	1
4	Conversion Kit	199-258	Parker Hannifin	1
6	• Brake Cylinder w/ Torque Plate	30-52AB	Parker Hannifin	2
8	• Master Cylinder Assembly	10-24C	Parker Hannifin	4
9	• Product Reference Memo - Organic Lining Condition Procedure	PRM13A	Parker Hannifin	1
11	• Lining Wear Indicator	120-16900	Parker Hannifin	1
12	• Service Bulletin Kit	SB7084-1	Parker Hannifin	2
14	•• Brake Disc	164-01501	Parker Hannifin	1
16	•• Grease Seal Felt	154-00300	Parker Hannifin	2

Item No.	Description	P/N or Spec.	Supplier	Quantity
17	• Grease Seal Ring	153-00400	Parker Hannifin	4
21	• Washer (AN960-516)	095-10500	Parker Hannifin	3
23	• Nut (MS21044-N5)	094-10400	Parker Hannifin	3
24	• Nameplate, Replacement	166-19700	Parker Hannifin	1
25	• Nameplate, Warning	166-20000	Parker Hannifin	1
26	• Service Bulletin	SB7084	Parker Hannifin	1
28	Axle Fitting	13284-001	Cirrus Design	2
29	Bolt, 3-inch	AN6-30A	Cirrus Design	4
30	Bolt, 2 1/8-inch	AN6-21A	Cirrus Design	4
31	Bolt, 2-inch	NAS6606-32	Cirrus Design	4
32	Bolt, 2 1/2-inch	NAS6606-40	Cirrus Design	4
33	Washer, 0.063-inch thick	NAS1149D0663K	Cirrus Design	4
34	Washer, 0.032-inch thick	NAS1149D0632K	Cirrus Design	24
35	Nut	MS21042-6	Cirrus Design	16
36	Spacer	NAS43DD3-12FC	Cirrus Design	8
37	Service Bulletin	SB2X-32-13R2	Cirrus Design	1

Serials SR20-1195 thru 1600: Order kit 70123-002 to obtain the following parts.

Item No.	Description	P/N or Spec.	Supplier	Quantity
1	Brake Hose	50555-072	Cirrus Design	2
4	Conversion Kit	199-258	Parker Hannifin	1
6	• Brake Cylinder w/ Torque Plate	30-52AB	Parker Hannifin	2
8	• Master Cylinder Assembly	10-24C	Parker Hannifin	4
9	• Product Reference Memo - Organic Lining Condition Procedure	PRM13A	Parker Hannifin	1
11	• Lining Wear Indicator	120-16900	Parker Hannifin	1
12	• Service Bulletin Kit	SB7084-1	Parker Hannifin	2
14	• Brake Disc	164-01501	Parker Hannifin	1
16	• Grease Seal Felt	154-00300	Parker Hannifin	2
17	• Grease Seal Ring	153-00400	Parker Hannifin	4
21	• Washer (AN960-516)	095-10500	Parker Hannifin	3

Item No.	Description	P/N or Spec.	Supplier	Quantity
23	•• Nut (MS21044-N5)	094-10400	Parker Hannifin	3
24	•• Nameplate, Replacement	166-19700	Parker Hannifin	1
25	•• Nameplate, Warning	166-20000	Parker Hannifin	1
26	•• Service Bulletin	SB7084	Parker Hannifin	1
36	Spacer	NAS43DD3-12FC	Cirrus Design	8
37	Service Bulletin	SB2X-32-13R2	Cirrus Design	1

Serials SR22-0002 thru 1739: Order kit 70122-001 to obtain the following parts.

Item No.	Description	P/N or Spec.	Supplier	Quantity
5	Conversion Kit	199-260	Parker Hannifin	1
7	• Brake Cylinder	091-21202	Parker Hannifin	2
10	• Product Reference Memo - Metallic Lining Condition Procedure	PRM14A	Parker Hannifin	1
11	• Lining Wear Indicator	120-16900	Parker Hannifin	1
13	• Service Bulletin Kit	SB7085-1	Parker Hannifin	2
15	•• Brake Disc	164-02504	Parker Hannifin	1
16	•• Grease Seal Felt, Inboard	154-00300	Parker Hannifin	1
17	•• Grease Seal Ring, Inboard	153-00400	Parker Hannifin	2
18	•• Grease Seal Felt, Outboard	154-01300	Parker Hannifin	1
19	•• Grease Seal Ring, Outboard (Outer)	153-01500	Parker Hannifin	1
20	•• Grease Seal Ring, Outboard (Inner)	153-00300	Parker Hannifin	1
22	•• Washer (AN960-516L)	095-10700	Parker Hannifin	3
23	•• Nut (MS21044-N5)	094-10400	Parker Hannifin	3
24	•• Nameplate, Replacement	166-19700	Parker Hannifin	1
25	•• Nameplate, Warning	166-20000	Parker Hannifin	1
27	•• Service Bulletin	SB7085	Parker Hannifin	1
37	Service Bulletin	SB2X-32-13R2	Cirrus Design	1

ACCOMPLISHMENT INSTRUCTIONS

- A. Remove key from ignition.
- B. Set BAT 1, BAT 2, and AVIONICS switches to OFF positions.

WARNING: Verify wheels are blocked and parking brake is in OFF position.

- C. Remove main gear fairings. (Refer to AMM 32-10)
- D. Raise airplane on jacks. (Refer to AMM 7-10)
- E. Upgrade brake system. (See Figure 01), (See Figure 02)
 - 1. Remove brake cylinder.
 - a. Disconnect brake hose from brake cylinder fitting, and cap.
 - b. Remove bolts and washers securing back plate to brake cylinder. Discard existing back plate.
 - c. Carefully slide brake cylinder out of torque plate. Discard existing brake cylinder.
 - 2. Remove wheel assembly. (Refer to AMM 32-41)
 - a. Deflate tire and tube completely.

WARNING: Do not attempt to remove valve core until tire has been completely deflated. The valve core will be ejected at high velocities if unscrewed before air pressure has been released.

- b. Remove valve core.
 - c. Remove cotter pin from axle and remove axle nut.
 - d. Remove wheel/tire assembly from axle.
 - e. *For kit 70123-001 or 70123-002:* Remove bolts, nuts, and washers securing washer plate, torque plate, axle, and inboard wheel fairing bracket to axle flange. Retain washer plate, axle, and inboard wheel fairing bracket. Discard existing torque plate and attaching hardware.
 - 3. *For kit 70123-001:* Upgrade axle fittings. (Refer to AMM 32-10)

CAUTION: Bolts may need to be backed off to remove axle fitting from strut. Do not use force to tap bolts loose as delamination of strut may occur.

- a. At upper axle fitting, remove bolts, washers, shims, plates, and nuts securing strut to axle fitting and upper wheel fairing bracket. Retain shims and plates. Discard existing axle fitting and attaching hardware.
 - b. Position replacement axle fitting (item 28) and shim to strut.
 - c. For top holes on upper axle fitting, install bolts (item 31), washers (item 34), shims, plates, and nuts (item 35) securing axle fitting to strut.
 - d. For bottom holes on upper axle fitting, install bolts (item 32), washers (item 34), shims, plates, and nuts (item 35) securing axle fitting and upper wheel fairing bracket to strut.
 - 4. Disassemble wheel.

WARNING: Injury can result when attempting to separate wheel halves with tube inflated. Care must also be taken to avoid damaging wheel halves when breaking tire beads loose.

- a. Separate tire beads from wheel halves by applying even pressure around the entire side-wall of the tire.
 - b. Remove nuts, washers, and bolts securing wheel halves together. Discard washers and nuts.

Note: Wheel halves will be reused for wheel conversion.

- c. Mark wheel halves to note relationship to each other in reassembly.
 - d. Separate inner wheel half and outer wheel half
 - e. Remove tire, tube, and brake disc. Discard brake disc.
 - f. Remove snap rings, felt seals, grease seals, and bearing cones from wheel halves. Discard felt and grease seals.
 - g. Inspect wheel halves and components for condition. (Refer to IAW Parker AWBCMM0001 Component Maintenance Manual, Issue 6 or later)
5. Replace labels. (See Figure 01), (See Figure 02)
- a. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Plastic Scraper	-	Any Source	Removal
Isopropyl Alcohol	TT-I-735 Grade A or B	Any Source	Clean
Cotton Cloth (clean and lint free)	-	Any Source	Clean

CAUTION: To prevent damage to wheel half surface, do not use sharp or metal tool to remove labels.

Note: It is permissible to install the replacement warning label adjacent to the existing warning label. If retaining the existing label, do not apply replacement warning label over existing warning label.

- b. Using plastic scraper at outboard wheel half, remove labels from wheel half.
 - c. Solvent clean installation area with isopropyl alcohol. (Refer to AMM 20-30)
- Note:** On the replacement nameplate label, the manufacturing date code includes "R" between the month and year to indicate a replacement nameplate.
- d. On outboard wheel half opposite from inflation valve hole, apply replacement nameplate label (item 24) on outboard wheel half.
 - e. Adjacent to the inflation valve hole, install warning label (item 25) on outboard wheel half.
6. For kit 70123-001 or 70123-002: Upgrade brake line and/or hose.
- a. Disconnect brake hose from brake line fitting. Discard brake hose.
 - b. For kit 70123-001: Remove and discard strut assembly brake line. (Refer to AMM 32-42)
 - c. For kit 70123-001: Install replacement strut assembly brake line (item 2), (item 3). (Refer to AMM 32-42)
 - d. Connect replacement brake hose (item 1) to brake line fitting, then cap brake hose fitting.
7. For kit 70123-001 or 70123-002: Upgrade master cylinder assembly.
- a. Remove and discard master cylinder assembly. (Refer to AMM 32-42)
 - b. Position spacers (item 36) to inner floorboard mounting points for master cylinder assembly.
 - c. Install replacement master cylinder assembly (item 8). (Refer to AMM 32-42)
 - d. Repeat upgrade for each master cylinder assembly.

8. Assemble wheel.

- a. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Talcum Powder	-	Any Source	Lubrication.
Bearing Grease	MIL-G-81322	Any Source	Lubrication.

- b. Apply light coat of talcum powder to surface of tube and inside of tire.
- c. Position tire and tube in outboard wheel half ensuring valve stem is protruding through hole in wheel half.
- d. Place outboard wheel half in proper alignment position with inboard wheel half and apply light force to mate the wheel halves together. Do not pinch tube between wheel halves.
- e. *For kit 70123-001 or 70123-002:* Install attaching hardware.
- (1) Insert brake disc (item 14) into inboard wheel half and align bolt holes with outboard wheel half.
 - (2) Install nuts (item 23), washers (item 21), and existing bolts.
- f. *For kit 70122-001:* Install attaching hardware.
- (1) Insert brake disc (item 15) into inboard wheel half and align bolt holes with outboard wheel half.
 - (2) Install nuts (item 23), washers (item 22), and existing bolts.

CAUTION: Uneven torque of nuts can cause bolt failure with resultant wheel failure.

- g. Torque nuts evenly to half the final torque, then evenly to 150 in-lb (17 Nm) dry.
- h. Clean and repack bearing cones.
- i. *For kit 70123-001 or 70123-002:* Install grease seals.
- (1) Apply light coat of bearing grease to inner diameter and inner face of grease seal felts (item 16).
 - (2) Install bearing cones, grease seal rings (item 17), and grease seal felts (item 16) into wheel halves and secure with snap rings.
- j. *For kit 70122-001:* Install grease seals.
- (1) Apply light coat of bearing grease to inner diameter and inner face of grease seal felts (item 16), (item 18).
 - (2) At inboard wheel, install bearing cones, grease seal rings (item 17), and grease seal felt (item 16) into inboard wheel half and secure with snap ring.
 - (3) At outboard wheel, install bearing cones, inner grease seal ring (item 20), grease seal felt (item 18), and outer grease seal ring (item 19) into outboard wheel half and secure with snap ring.
9. *For kit 70123-001:* Modify inboard wheel fairing bracket. (See Figure 01)
- a. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Bandsaw	-	Any Source	Cutting.
Deburring Tool	-	Any Source	Deburring.

- b. At upper fitting attachment end of inboard wheel fairing bracket, measure and mark 0.44 inch (1.12 cm) horizontally and vertically from corner.
 - c. Connect line between both marks.
 - d. Using bandsaw, cut marked area from bracket.
 - e. Deburr cut edge of bracket.
10. *For kit 70123-001 or 70123-002:* Install torque plate.
- a. Position torque plate for brake cylinder (item 6) to axle fitting. At top holes of lower axle fitting, install bolts (item 29), nuts (item 35), and washers (items 33 and 34) securing axle, washer plate, torque plate, and inboard wheel fairing bracket to axle fitting. Torque to 160-190 in-lb (17.6 - 20.9 Nm).
 - b. At bottom holes of upper axle fitting, install bolts (item 30), nuts (item 35), and washers (item 34) securing axle, washer plate, and torque plate to axle fitting. Torque to 160-190 in-lb (17.6 - 20.9 Nm).
11. Install wheel assembly. (Refer to AMM 32-41)
- a. Carefully slide wheel/tire assembly onto axle making sure inboard bearing is seated.
 - b. While rotating wheel/tire assembly, install axle nut and torque to 200 in-lb (22.6 Nm) to seat bearing.
 - c. Back off axle nut to zero torque.

Note: Wheel to spin 1 - 2 rotations when spun by hand. Additional washers may be required to meet torque and fit-up requirements.

- d. While rotating wheel, re-torque to 100 - 150 in-lb (11.3 - 17.0 Nm).
 - e. Rotate axle nut to nearest slot and cotter pin hole, and install cotter pin.
12. Install brake cylinder.

CAUTION: Thoroughly clean parts before assembling.

- a. Acquire necessary tools, equipment, and supplies.

Description	P/N or Spec.	Supplier	Purpose
Silicon Spray	-	Any Source	Lubrication.

- b. *For kit 70123-001 or 70123-002:* Remove bolts and washers securing back plate to brake cylinder (item 6).
 - c. *For kit 70122-001:* Remove bolts and washers securing back plate to brake cylinder (item 7).
- Note:** Dry film lubricants such as silicone spray should be applied to anchor bolts and torque plate bushing to assist sliding motion. Exercise care to insure that linings do not become contaminated with fluid or lubricant. For best service life, cylinders must slide freely in torque plate.
- d. Install brake cylinder in torque plate by sliding anchor bolts into torque plate bushings.
 - e. Position back plate to brake cylinder, then install bolts and washers securing back plate to brake cylinder. Torque to 90 in-lb (10.2 Nm).
 - f. Uncap and attach brake hose to brake cylinder fitting.
13. Repeat brake system upgrade on opposite side of airplane.
- F. Bleed the brake system. (Refer to AMM 32-42)

- G. Inflate tires and adjust pressure. (Refer to AMM 12-10)
- H. *For kit 70123-001 or 70123-002:* Make appropriate maintenance log book entry that P/N 40-414 wheel assemblies were converted to P/N 40-75P configuration per SB7084.
- I. *For kit 70122-001:* Make appropriate maintenance log book entry that P/N 40-75P wheel assemblies were converted to P/N 40-406 configuration per SB7085.
- J. Remove airplane from jacks. (Refer to AMM 7-10)
- K. Install main gear fairings. (Refer to AMM 32-10)
- L. *For kit 70123-001 or 70123-002:* Condition brake linings. Refer to Product Reference Memo - Organic Lining Condition Procedure ([item 9](#)).
- M. *For kit 70122-001:* Condition brake linings. Refer to Product Reference Memo - Metallic Lining Condition Procedure ([item 10](#)).
- N. Complete airplane records by noting compliance with SB2X-32-13R2 in Aircraft Logbook.

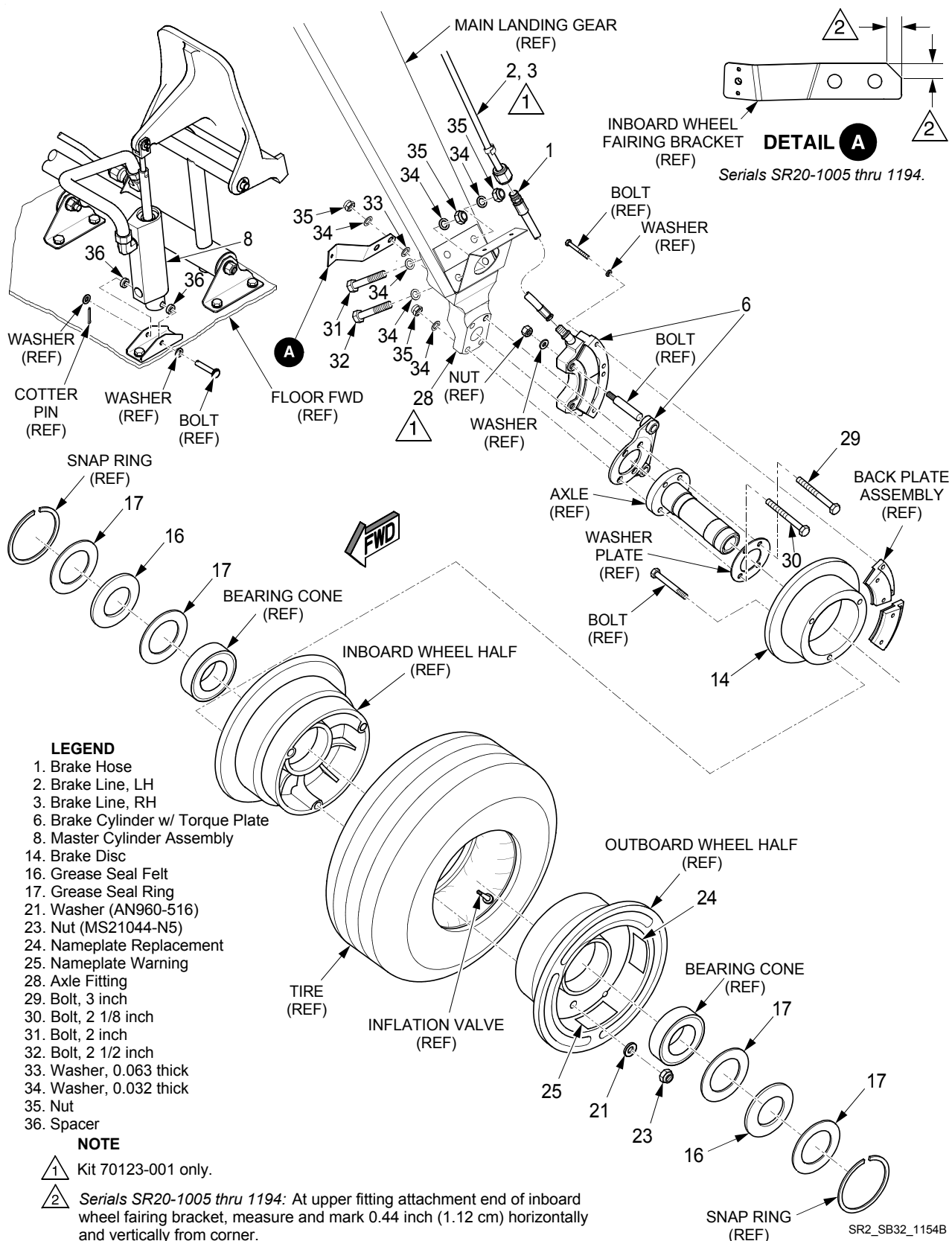


Figure 01 - Wheel Conversion and Brake Upgrade (Serials SR20-1005 thru 1600)

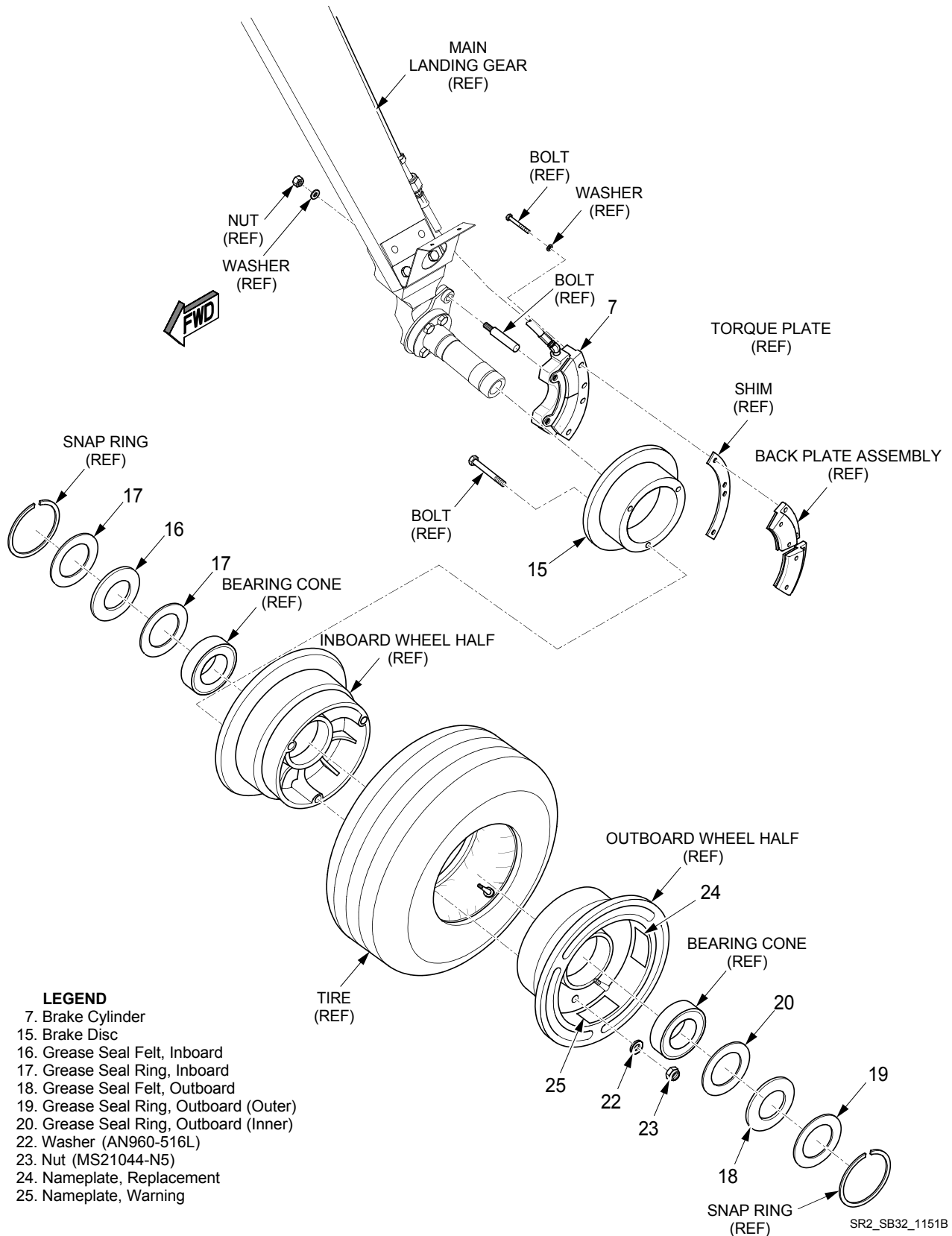


Figure 02 - Wheel Conversion and Brake Upgrade (Serials SR22-0002 thru 1739)

A cartoon illustration of a man in a suit standing next to a door. The door has a sign that says "TECH PUBS" and a handle that says "FEEDBACK". A large, multi-colored, stylized cloud or smoke plume is emerging from the door handle area. The man is looking at the door with a concerned expression. The background is white.

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STAMP



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