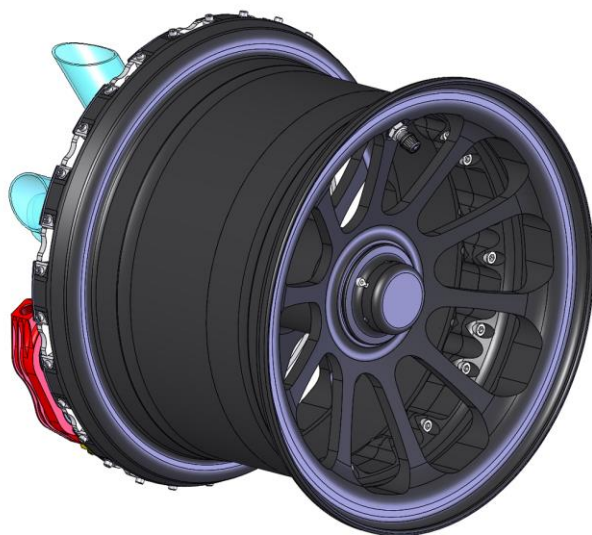
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Instructions for Continued Airworthiness and Installation Instructions 8.50-10 LE [RF-024]



Revision	Description	Date
IR	Initial Release	5-November-2018
A	Updated section 1.7 to clarify this STC does not include approval of an alternative tire to those listed in the TCDS.	15-February-2019

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1 GENERAL

This manual defines the installation instructions and instructions for continued airworthiness for the BERINGER 10" wheel and brake kit as defined by STC-019. In addition to the information in this document, use common sense.

1.1 Applicable Aircraft

Aircraft eligible for this installation are as listed on the AML associated with the STC.

1.2 Weight and Balance

The BERINGER STC-019 wheel and brake kit weighs 11.6 LBS per side. The master cylinder and brake pedal assembly weighs 1.3 LBS each.

1.3 Special Tools

The BERINGER bleeding kit is recommended

1.4 Cleaning

The aluminum parts are anodized to provide corrosion protection. This thin coating does not protect against cleaning agents with any acidity or agents with alkalinity greater than 9. These type of agents may damage or remove the protective anodizing. For cleaning the brake parts we recommend using only soap and water.

1.5 Torque

Unless otherwise specified, all fasteners should be torqued per AC 43.13-2B Acceptable Methods-Aircraft Alterations.


1.6 Reference Documents

Unless otherwise specified, all installation instructions, maintenance manuals, approval documents, etc., mentioned in this writing refer to the listed text or the most current FAA approved revision.

1.7 Limitations

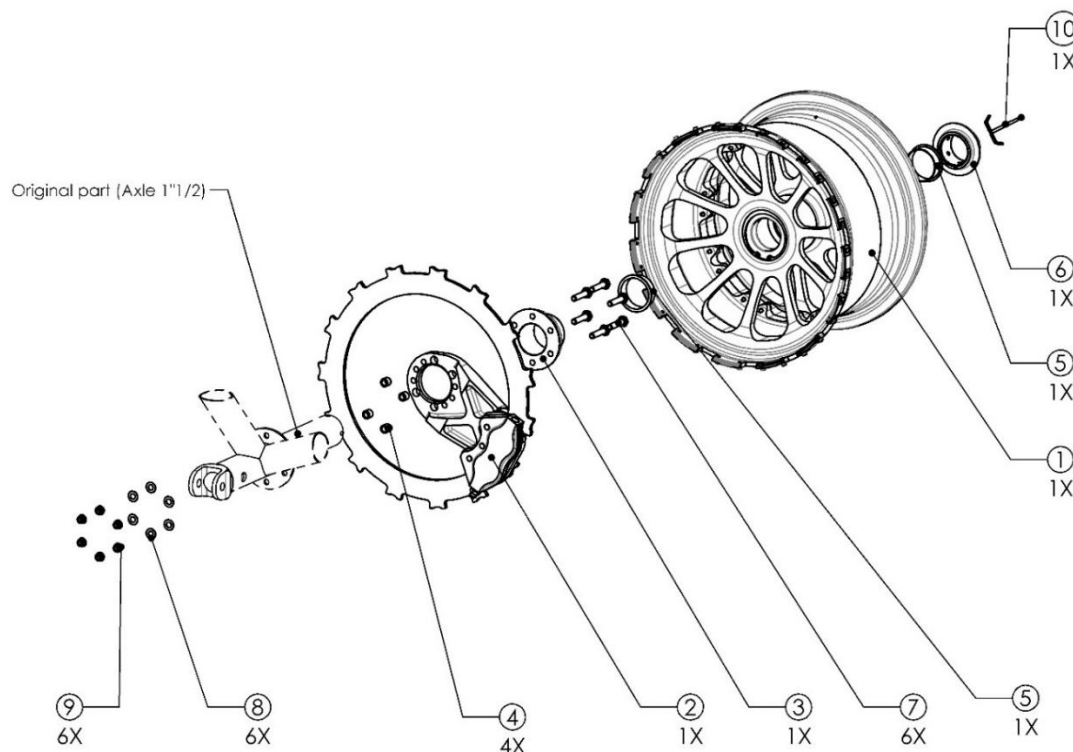
The ETSO testing for this wheel and brake kit was completed using the Desser 31" Tundra Tire. Taxi testing for the STC wheel and brake approval was completed using the 35" Bushwheel. However, separate approval is needed for legal installation as neither of these tires are included with the Beringer STC-019. As of this writing there is no STC approval for the installation of the 31" Desser Tundra Tire on PA-18 aircraft. The 35" Bushwheel can be installed on PA-18 aircraft via STC SA01015SE. It is up to the installer to determine compatibility of a tire STC with Beringer STC-019.

Description	Part Number	Manufacturer
31" Desser Tundra Tire	AA4AL	Desser Tire & Rubber Co., LLC
35" Bushwheel	351510.R1	ABI, LLC

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2 Wheel and Brake REMOVAL and INSTALLATION for 1.5" AXLES

Refer to the assembly drawing and part list below as needed. The instructions in this section apply to both the left and right side.



Weight: 5556.82 g

10	MS24665-362	Cotter Pin/Goupille fendue 3.175x63.5	1
9	MS21042-4	Self locking Nut AN4 / Ecrou frein AN4	6
8	NAS1149F0416P	AN4 fine_Washer/ Rondelle AN4 fine	6
7	AN4-11A	AN4_Bolt/ Vis AN4	6
6	ECR-006(A)	1.5" _Threaded cap / Bouchon ecrou	1
5	BGE-035(A)	B-BE-013_Bearing spacer 1,5" / Bague Rlt 1,5"	2
4	BGE-017.3(A)	AN6/AN4_Bushing/Bague	4
3	BGE-033(A)	2P32-10-4_Caliper Spacer Axis 1,5" /Bague étrier axe 1,5"	1
2	EA-010.1N(B)	2P32-10-4_Brake Caliper / Etrier de frein	1
1	RF-024(C)	8.50x10" LE_Main Wheel Assy/ Roue Freinée	1
REP	PART NUMBER	DESCRIPTION	QTY.

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2.1 Remove Existing Wheels and Brakes

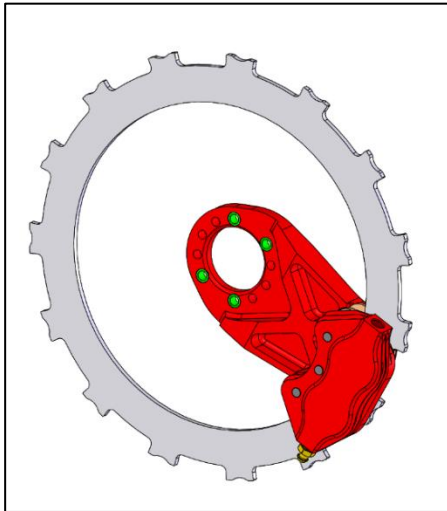
Remove the existing wheels and brakes per the manufacturer's instructions.

2.2 Clean the Axle

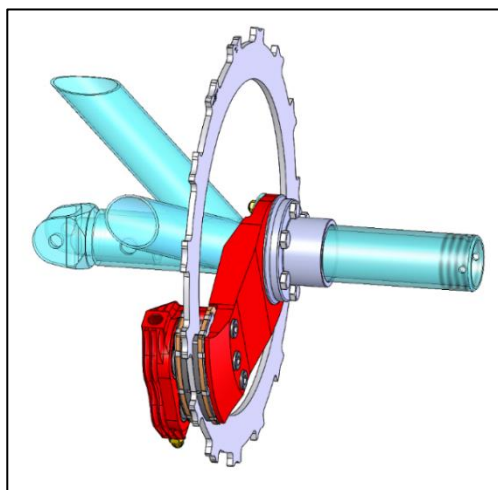
- Remove any stickers on the axle.
- Clean the axle with Scotch Brite or similar product to remove any rust or dirt. Any irregularities will make it difficult to install the wheel.


2.3 Install Caliper, Disc, and Bearing Spacer

- Install the four included bushings into the holes as shown in the pictures below.



- Install the brake caliper assembly onto the axle with the bearing stop. Secure with the six provided AN bolts.
- The caliper must be oriented forward or aft with the bleeder fitting facing down.
- The disc can be installed with the caliper, or after the caliper is secured.



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2.4 Install Tire

See section below for information about tire installation.

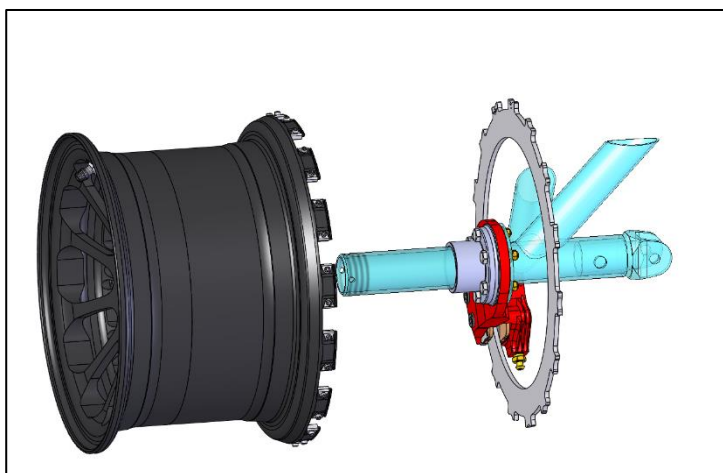
2.5 Install Bearing Spacers

- Put a small amount of Bel-Ray grease or equivalent on the two bearing spacers.
- Install the bearing spacers into the bearings. Press the bearing spacers in by hand.



2.6 Install Wheel Assembly (Tire not shown)

- Put a small amount of grease on the axle. Use Bel-Ray grease or equivalent.
- Install the wheel assembly onto the axle and align the disc and the slots in the wheel. Verify contact with the bearing stop.
- Check that the disc does not extend past the clips.
- *The picture below is the normal position of a new kit. As the brake pads wear, the disc will float outboard.*





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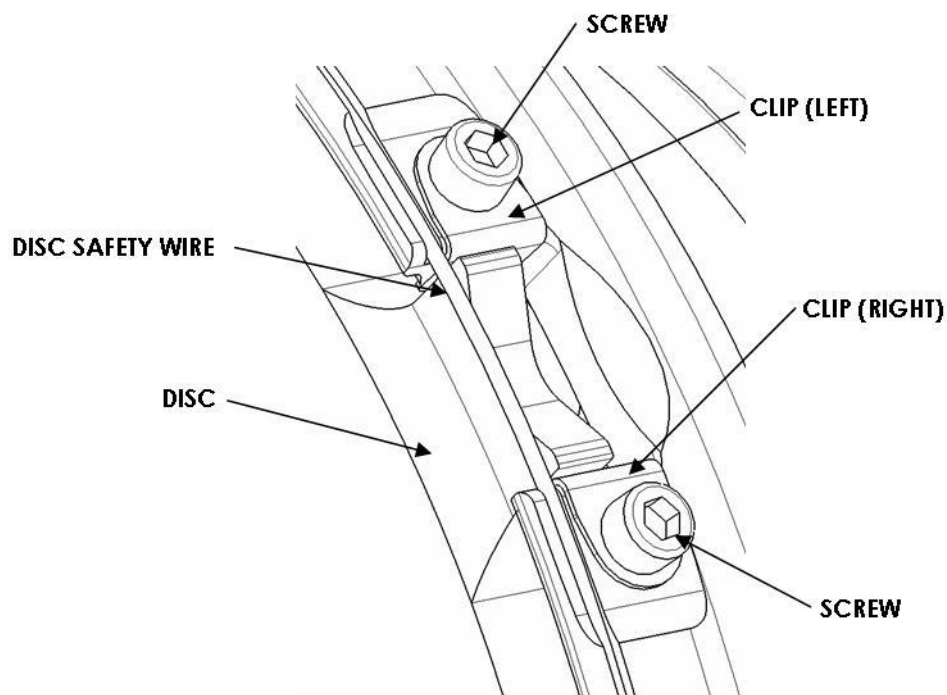
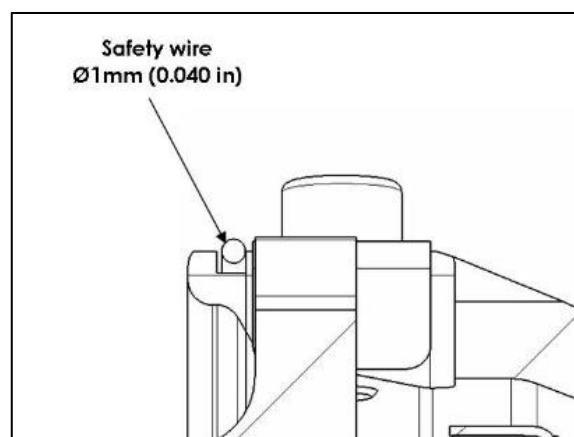
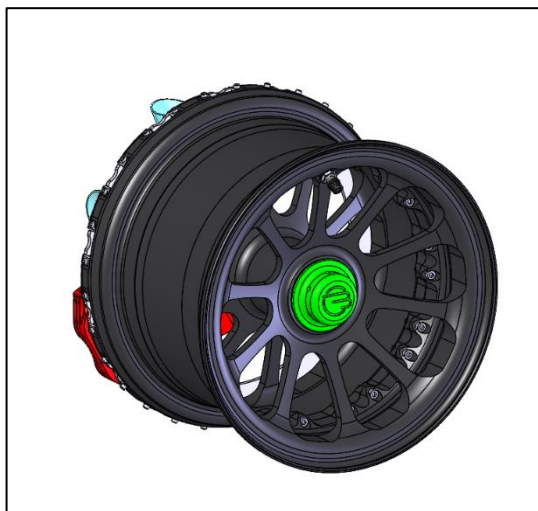
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2.7 Axle Nut

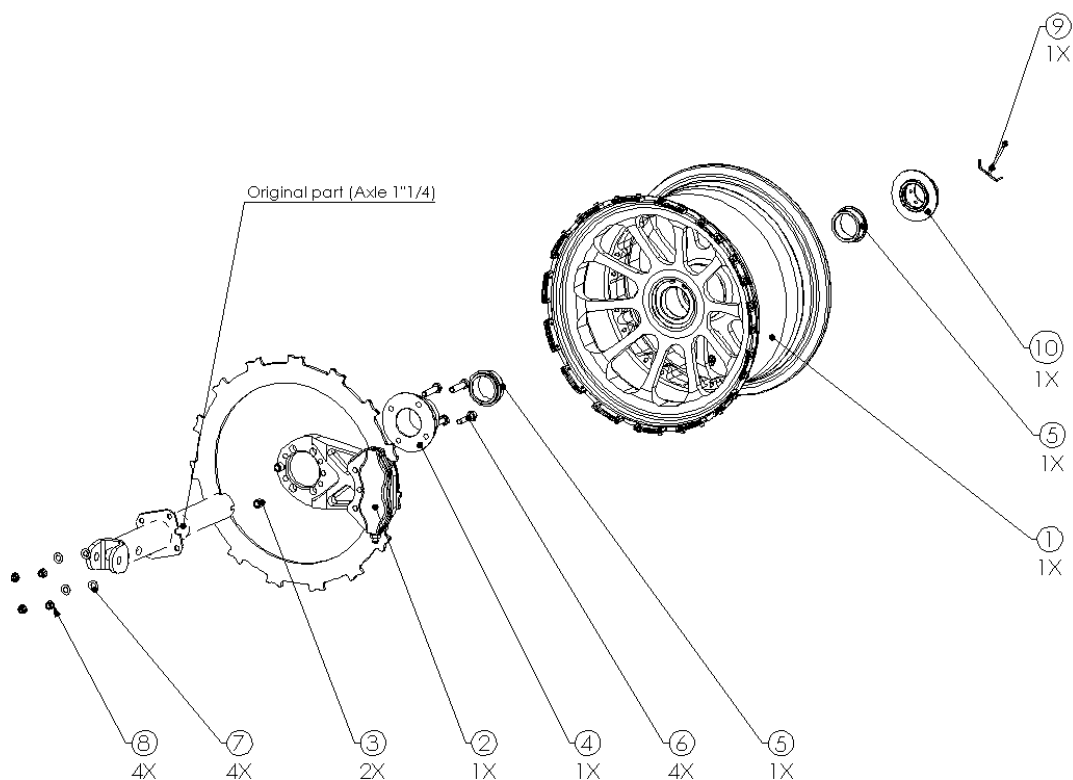
- Tighten the threaded axle cap by hand until it contacts the bearing spacer. *Do not use the original axle nut.*
- Insert the cotter pin.
- Install .040 safety wire in the groove to limit lateral motion of the disc.




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3 Wheel and Brake REMOVAL and INSTALLATION for 1.25" AXLES

Refer to the assembly drawing and part list below as needed. The instructions in this section apply to both the left and right side.



10	ECR-006.1(A)	1,25" Threaded cap / Bouchon ecrou	1
9	MS24665-362	Cotter Pin/Goupille fendue 3.175x63.5	1
8	MS21042-4	Self locking Nut AN4 / Ecrou frein AN4	4
7	NAS1149F0416P	AN4 fine_Washer/ Rondelle AN4 fine	4
6	AN4-11A	AN4_Bolt/ Vis AN4	4
5	BGE-037(A)	B-BE-013_Bearing spacer 1,25" / Bague Rlt Axe 1,25"	2
4	BGE-036(A)	2P32-10-4_Caliper Spacer 1,25" / Bague étrier axe 1,25"	1
3	BGE-017.3(A)	AN6/AN4_Bushing/Bague	2
2	EA-010.1N(B)	2P32-10-4_Brake Caliper / Etrier de frein	1
1	RF-024(C)	8.50x10" LE_Main Wheel Assy/ Roue Freinée	1
REP	PART NUMBER	DESCRIPTION	QTY.

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3.1 Remove Existing Wheels and Brakes

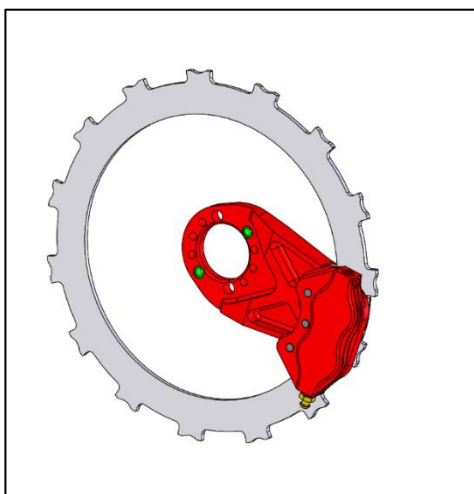
Remove the existing wheels and brakes per the manufacturer's instructions.

3.2 Clean the Axle

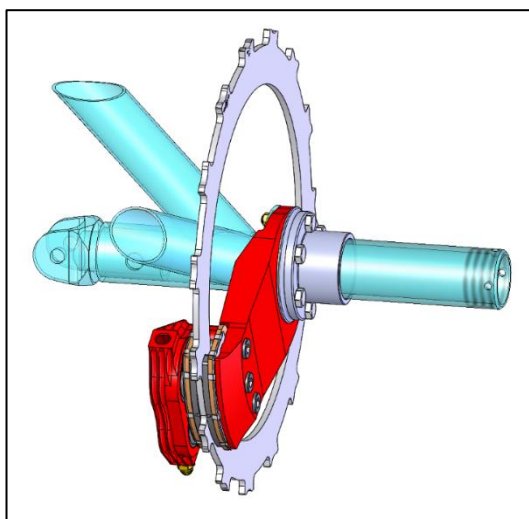
- Remove any stickers on the axle.
- Clean the axle with Scotch Brite or similar product to remove any rust or dirt. Any irregularities will make it difficult to install the wheel.


3.3 Install Caliper, Disc, and Bearing Spacer

- Install the two included bushings into the holes as shown in the pictures below. Change the placement of the bushings as needed to achieve the desired caliper orientation.



- Install the brake caliper assembly onto the axle with the bearing stop. Secure with the four provided AN bolts.
- The caliper must be oriented forward or aft with the bleeder fitting facing down.
- The disc can be installed with the caliper, or after the caliper is secured.



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		<p>Document Number:</p> <p>ICA-STC-019</p>

3.4 Install Tire

See section below for information about tire installation.

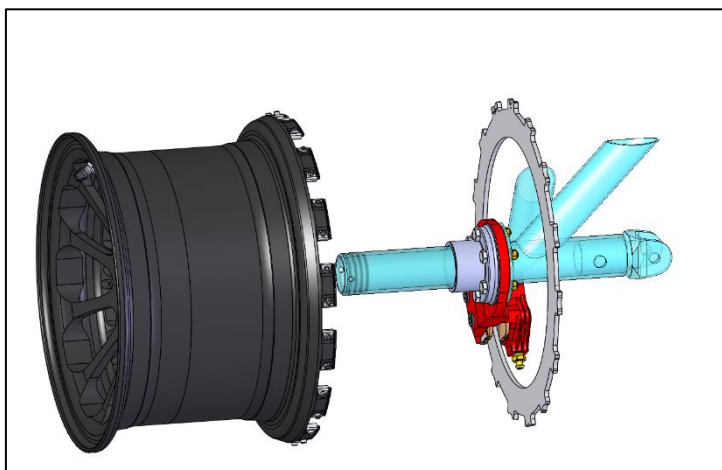
3.5 Install Bearing Spacers

- Put a small amount of Bel-Ray grease or equivalent on the two bearing spacers.
- Install the bearing spacers into the bearings. Press the bearing spacers in by hand.



3.6 Install Wheel Assembly (Tire not shown)

- Put a small amount of grease on the axle. Use Bel-Ray grease or equivalent.
- Install the wheel assembly onto the axle and align the disc and the slots in the wheel. Verify contact with the bearing stop.
- Check that the disc does not extend past the clips.
- *The picture below is the normal position of a new kit. As the brake pads wear, the disc will float outboard.*





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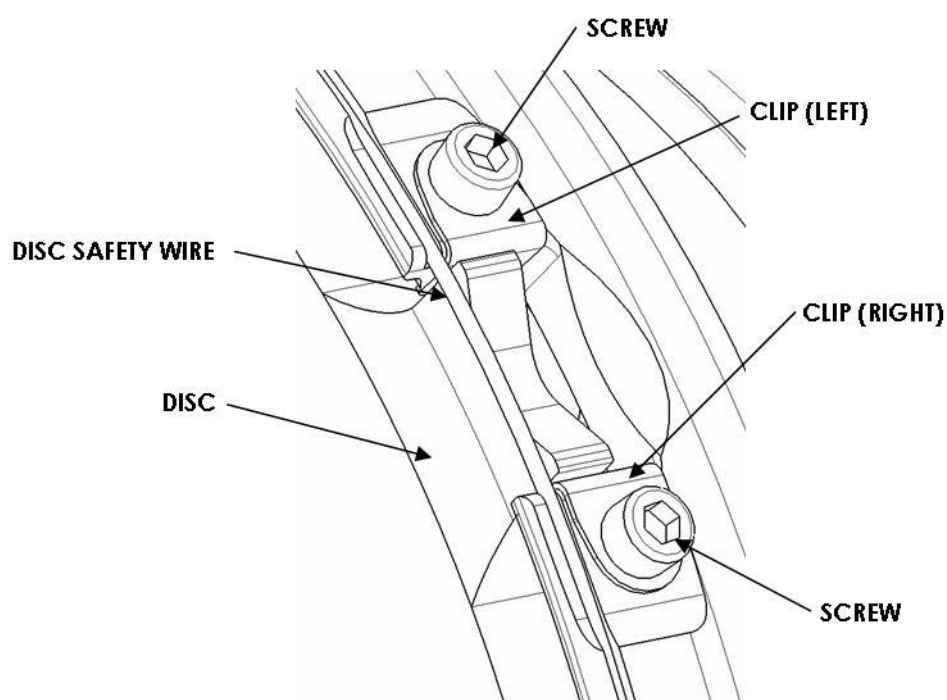
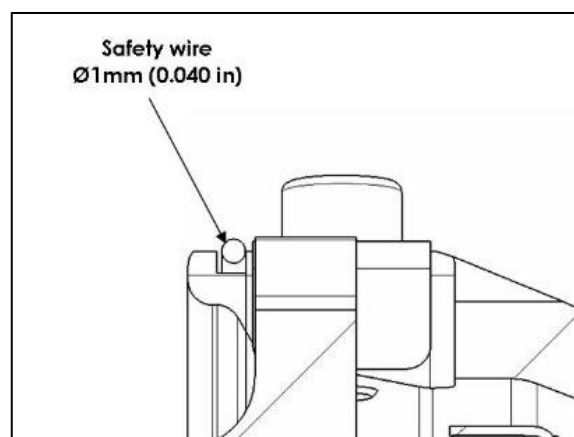
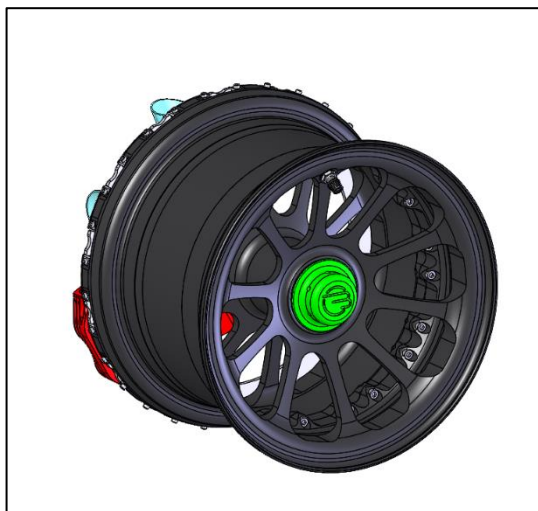
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3.7 Axle Nut

- Tighten the threaded axle cap by hand until it contacts the bearing spacer. *Do not use the original axle nut.*
- Insert the cotter pin.
- Install .040 in safety wire in the groove to limit lateral motion of the disc.



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4 Tire Installation

4.1 Installation

- Remove the 20 cap screws holding the two wheel halves together using a metric allen wrench or hex key. If this is not the first installation and a tire is already on the wheel, verify that the tire is completely deflated before removing the wheel fasteners.



- Clean the contact area of the tire with a clean rag and acetone. Tire lubricant used to remove the tire from a previous wheel, or during manufacturing can cause slippage on the new wheel.



- Install the BERINGER wheel halves. Be sure to install the O-ring in the groove between the two wheel halves if using any tire besides an Alaskan Bushwheel. The O-ring must be changed at each applicable tire change.



- Tighten all fasteners evenly using a star pattern and torque to 55 IN-LBS.
- Inflate tubeless tires using the valve stem on the wheel. Inflate Alaska Buswheel tires using the valve stem on the tire. Inflate per tire manufacturer's specifications.



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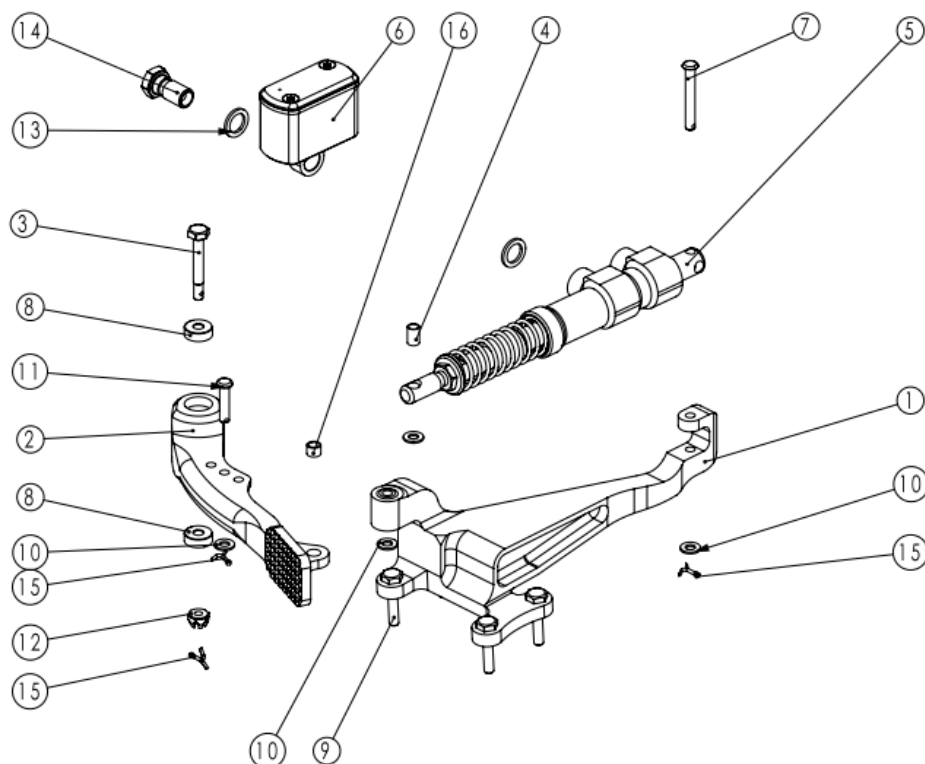
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5 REMOVAL and INSTALLATION of Brake Pedal and Master Cylinder (1.5" and 1.25" axle)



16	BGE-029 A	Spacer	1
15	MS24665-132	Carrier Pin	3
14	HYD-003P	Barrel Bolt	1
13	HYD-0058	Copper Seal	2
12	AN310-3	Nut	1
11	MS20392-2C23	Clevis Pin	1
10	R-AP-004	Washer	4
9	AN3-10A	Axle Bolt	4
8	B-BE-006	BEARING	2
7	MS20392-2C41	Clevis Pin	1
6	RV-001N A	Reservoir	1
5	MP-001.4N A	Master cylinder	1
4	BGE-027 A	Spacer	1
3	VIS-025 A	Screw	1
2	AV-CUB-102 C	Pedal	1
1	AV-CUB-103 B	Left Support	1
REP	PART NUMBER	DESCRIPTION	QTY.



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5.1 Remove existing equipment

- Remove seat, battery, and flap handle as necessary to allow access to the rear brake controls.
- Remove the connecting rod between the rear brake pedal and the front brake pedal.
- Drain the fluid from the brake system and disconnect brake lines and fittings from the existing master cylinder.
- Remove the AN bolts attaching the assembly to the floor. Remove the assembly.



5.2 Installation of BERINGER equipment


- Orient the banjo fitting as needed. Tighten the banjo bolt to 148 in-lbs.
- *Copper seals cannot be re-used after being torqued. They must be changed each time the fitting is removed.*
- *If under torque is applied a leak may occur. If over torque is applied the banjo bolt may break or damage the internal threads.*
- Connect the brake line to the 3/8 fitting provided.
- *Brake lines must not touch other parts or be twisted.*



5.3 Bleed the System

- Bleed the brake system using the BERINGER bleeding kit or equivalent.
- Use only MIL-H-5606 brake fluid or the equivalent military grade MIL-PRF-87257.
- Position the master cylinder so that the banjo bolts are vertical. In future, this orientation can be attained by unpinning the master cylinder from the support. On first installation; however, it is simpler to do the bleeding prior to bolting the assembly to the floor.
- Bleed the system from the caliper upwards.



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5.4 Install Hardware

- Install the mounting bracket to the floorboards using AN3 bolts.
- Reconnect the connecting rod from the pilot brake pedal to the rear brake. Verify that the master cylinder is fully extended when the pilot brake pedal is released. Adjust the length of the connecting rod as needed to achieve this



6 Brake Conditioning **[DON'T SKIP THIS STEP]**

BERINGER brakes need to be conditioned prior to use.

6.1 Purpose

The objective of conditioning is to build up heat on the disc with minimum brake pressure so that the coating on the disc is removed and high spots on the pads are made flush with the disc. If too much pressure is applied before conditioning is complete, the pad may leave deposits on the disk which will harden and then gouge the pads, greatly reducing the life of the pads and reducing the effectiveness of the disc. If this happens, it is necessary to remove the discs and sand these deposits flush using sand paper. Finish with 200 grit sandpaper. Before the disc coating is removed, brake torque can be as low as 50% of the rated brake torque. Consider this when preparing to do the conditioning and ensure you have a long and clear straight stretch to begin the conditioning procedure.


6.2 Conditioning Procedure

- Taxi the aircraft for 1500 feet with light brake pressure. If a turn is necessary use a steerable tailwheel if possible, or use very light brake pressure to initiate a wide turn.
- Perform two consecutive decelerations from 30-35 MPH to 5 MPH applying light brake pressure. Do not come to a complete stop and do not apply full brake effort.
- Allow the brakes to cool to ambient temperature. The brake disc should have light scratches and discoloration associated with heat.
- Apply brakes as needed to hold the aircraft at full power. If the brakes hold, the conditioning is complete. If the brakes do not hold, repeat the conditioning procedure.

6.3 Initial Use

Completing the procedure above conforms the discs per the requirements of the STC. However, note that the brake performance will continue to improve during the first few hours of use.

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7 Inspections

7.1 Preflight

Before each flight verify that all fasteners, cotter pins, and other equipment is in place per the installation instructions

7.2 Annual Inspection

Inspection		Operation	
Component	Wear Limit	Each Scheduled Maintenance	
Master Cylinder, Brake Caliper, hydraulic lines and fittings	Visible cracks or leaks	General visual inspection	Check for cracks or leaks
Wheel, Caliper, brake pedal, brake pedal base	Visible cracks	General visual inspection	Check for cracks
<i>If cracks are observed, replace the entire component. If leaks are observed at a hydraulic fitting, check the torque on the fitting. If the leak persists, replace the copper crush washers and retorque the fitting. If the leak persists, replace the entire component. If leaks are observed originating other than at a hydraulic fitting, replace the entire component.</i>			

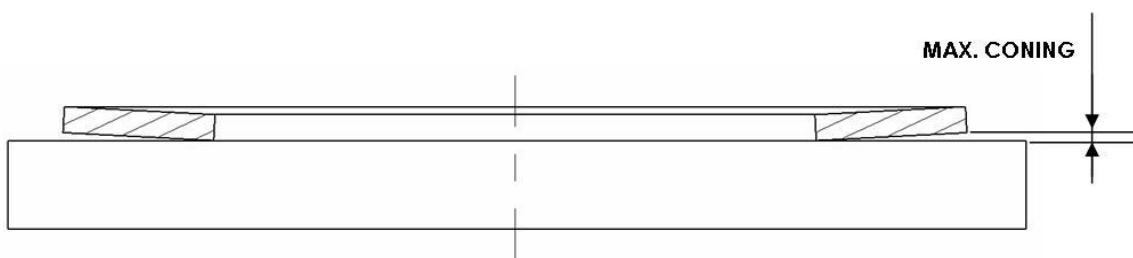
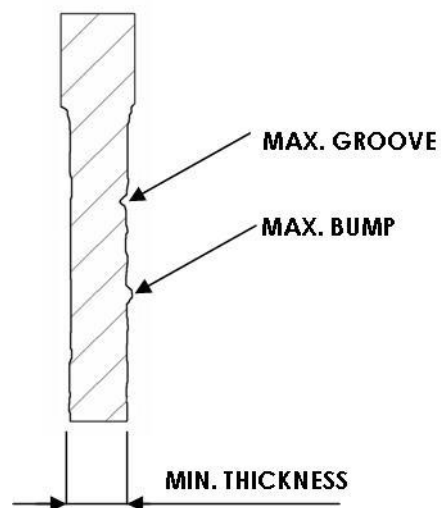
8 Wear Limits

8.1 Disc

The wear limits in this section must be checked each time the pads are changed and at each annual inspection. A disc beyond wear limits must be changed. It is necessary to replace both discs at the same time.

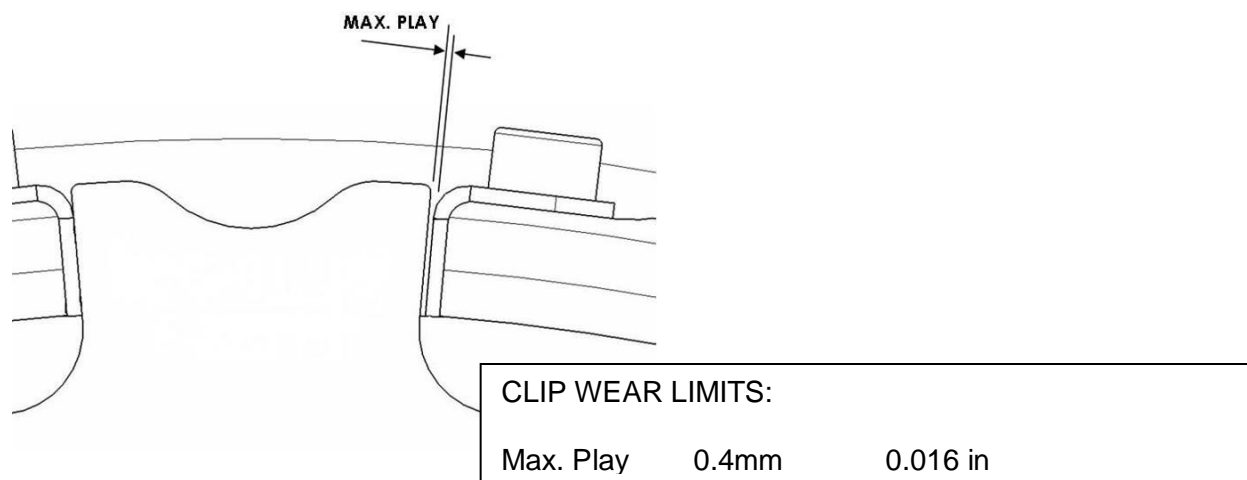
DISC WEAR LIMITS:

DISC Min. Thickness	3.6mm	0.14 in
Max. Coning	0.3mm	0.012 in
Max. Groove	0.2mm	0.008 in
Max. Bump	0.2mm	0.008 in



8.2 Clips

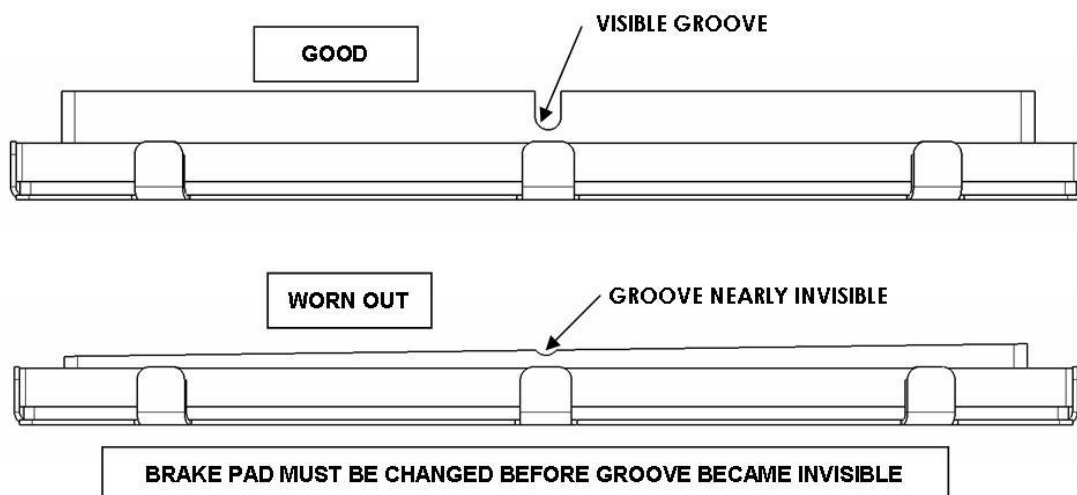
The wear limits in this section must be checked each time the discs are changed and at each annual inspection. Clips beyond wear limits must be replaced. Install fasteners with Loctite 271 and torque to 13 in-lbs.



8.3 Brake Pads

The wear limits in this section must be checked during each preflight inspection and at each annual inspection. Pads beyond wear limits must be changed. It is permissible to change brake pads on only one side of the aircraft if the brake pads to remain are not worn past 50%. For every two changes of brake pad, the discs must be replaced.

PAD WEAR LIMITS:	
Min. Thickness	Brake pads must be changed before the groove disappears completely. Friction material min. thickness 1.0mm (0.040 in)





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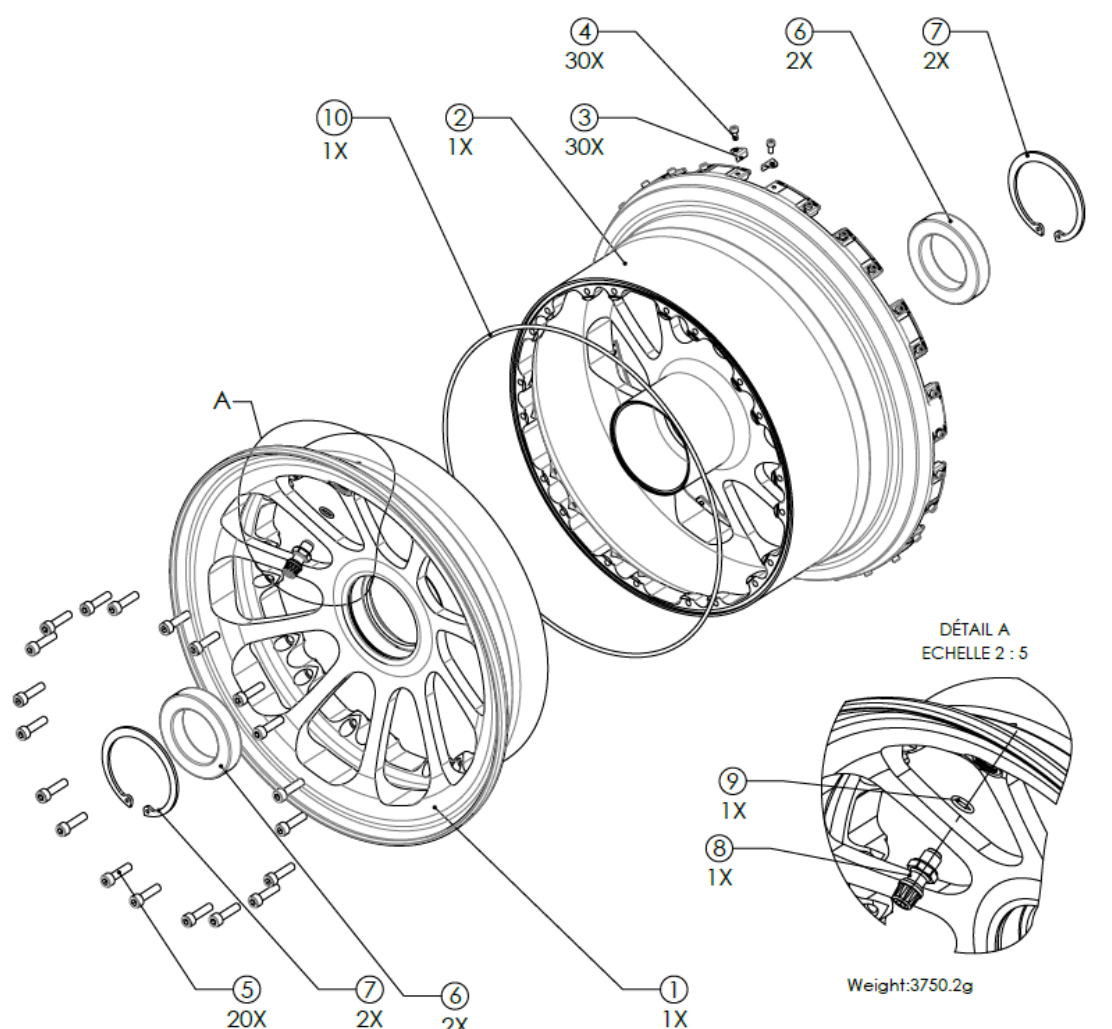
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9 Maintenance and Replacement of Master Cylinders

The master cylinders are maintenance free. In case of damage, do not attempt disassembly or repair of the master cylinder. Repair or overhaul can only be performed by the manufacturer.

10 Maintenance and Replacement of Wheels



10	J-JTR-040N	8.50x10" O-ring / Joint torique	1
9	J-JTR-017N	Valve O-Ring / Joint Valve	1
8	A-001	Valve	1
7	C-AL-003	Circlip D62	2
6	B-BE-013	D62_Bearing / Roulement	2
5	V-CHC-052	Screw M5x20 / Vis M5x20	20
4	V-CHC-005	Clip Screw / Vis Clip	30
3	CLP-001(B)	Clip 6"	30
2	JAI-031(B)	Wheel 10" Inner wheel half / Jante intérieure	1
1	JAE-029(C)	Wheel 10" Outer wheel half / Jante extérieure	1
REP	PART NUMBER	DESCRIPTION	QTY.

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10.1 Wheels

A wheel half must be replaced if 15% of any one square inch is corroded or missing anodizing.

10.2 Bearings

Bearings are sealed type and do not require maintenance. If the bearings no longer spin freely they can be replaced per the following instructions:

- Disassemble the two wheel halves.
- Remove the snapping retaining the bearing.
- Place the wheel half in an oven at 230 to 250 °F for 30 minutes. If it is the outer wheel half, the valve and valve o-ring must be removed before heating in the oven.
- Remove the wheel half from the oven and immediately remove the bearing. If the bearing does not fall out, tap gently and evenly with a rubber mallet or use a suitable arbor press.
- Clean the bearing bore with soap and water.
- Reheat the wheel half per the previous instructions.
- Remove the wheel half from the oven and immediately install the new bearing. If the bearing does not drop into the bore, tap gently and evenly with a rubber mallet or use a suitable arbor press.
- Replace the snapping.



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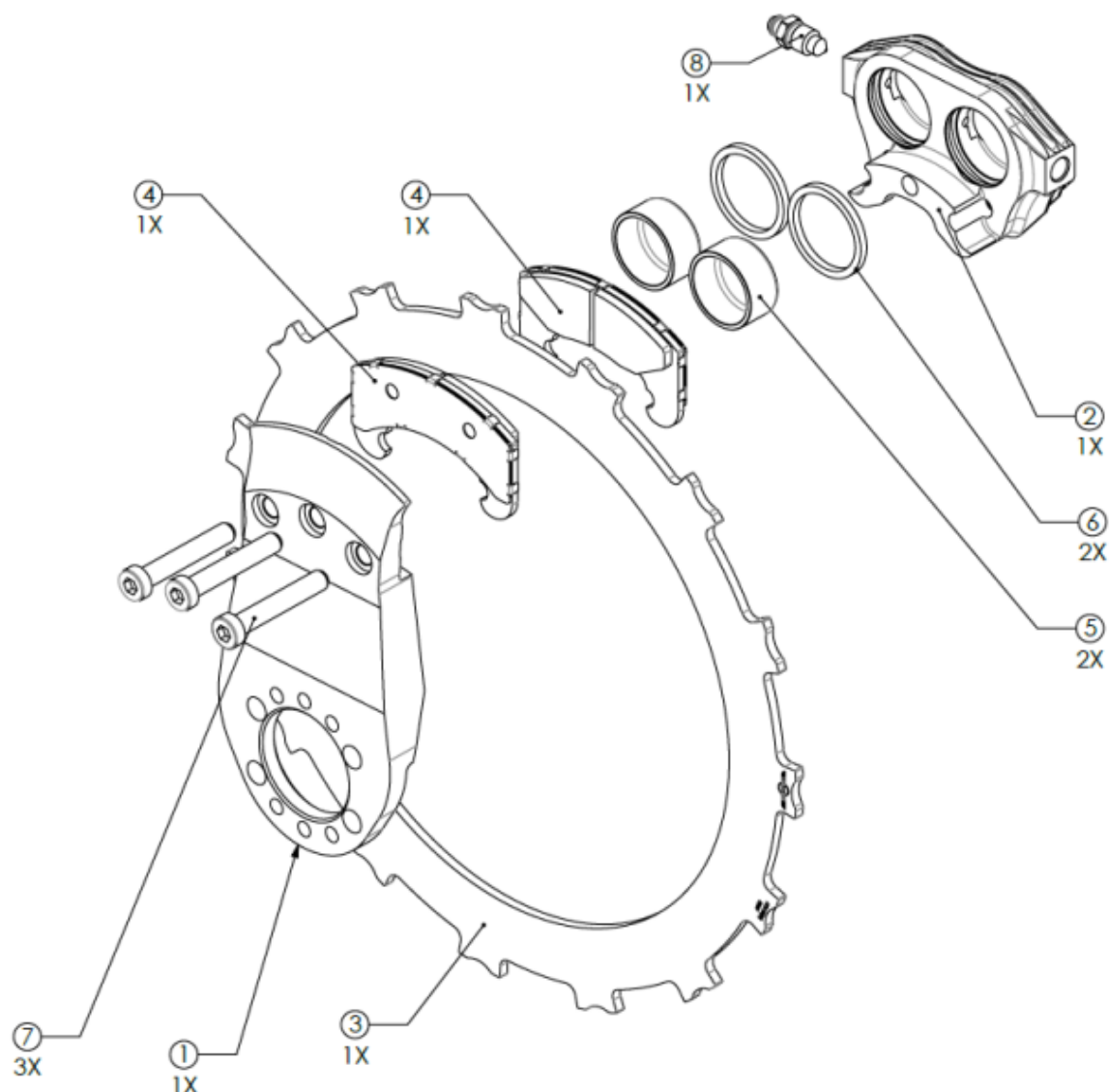
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11 Maintenance and Replacement of Brake Components



8	HYD-001P	Bleeder / Vis de purge	1
7	VIS-015(A)	Screw M8x49 / Vis M8x49	3
6	JNT-006H(A)	Piston seal 2P32 / Joint 2P32	2
5	PSE-002(A)	P32_Piston	2
4	PQT-009(A)	2P32_Brake pad / Plaquette de frein	2
3	DSC-015(A)	Brake Disc 10" - 4mm / Disque 10" 4mm	1
2	ETR-003(B)	2P32_Caliper Housing / Carter étrier	1
1	RNF-010(C)	Back Plate Wheel 10" / Renfort étrier 10"	1
REP	PART NUMBER	DESCRIPTION	QTY.

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11.1 Disc

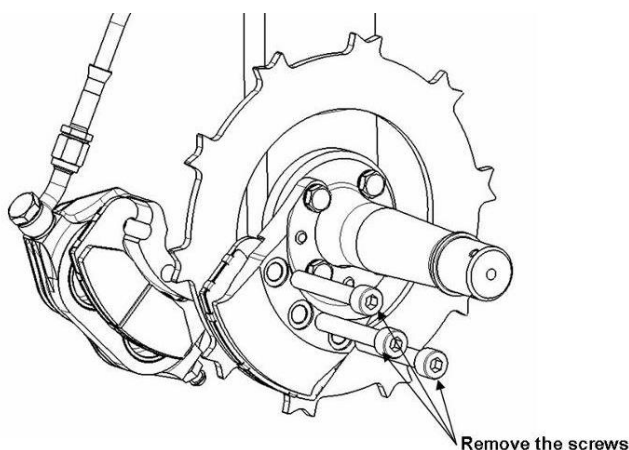
The disc can be replaced per the following instructions:

- Remove the wheel.
- The disc can now be replaced.

11.2 Brake Pads

The brake pads can be replaced per the following instructions:


- Remove the wheel
- To replace the brake pads, remove one of the outside bolts that retain the brake pads. The picture below shows the removal of all three bolts, but only one is necessary. The brake pad can now pivot around the remaining outside bolt and be easily removed. The new pads can be installed in the reverse order. Use Loctite 243 when replacing the bolt and torque to 220 in-lbs.



11.3 Pistons

The brake pistons can be replaced per the following instructions:

- Remove the wheel.
- Drain the brake fluid.
- Remove the Caliper from the Axle.
- Remove the disc, all three screws retaining the brake pads, and the brake pads.
- Remove the pistons by hand or by using air pressure. Very low air pressure can be used to remove pistons. Make sure that the pistons are pointed towards a towel on a work bench when using air as the pistons can eject at high velocities.
- Clean the pistons and caliper housing with soap and water and wipe dry with a cloth.
- Remove piston seals with a plastic tool.
- Lubricate new seals with a thin coat of silicone grease per MIL-S-8660 or SAE AS 8660. Insert seals into piston groove by hand.
- Lubricate the outside of the piston with silicon grease.
- Insert new pistons into the caliper housing by hand.
- Reinstall the caliper on the axle.

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12 Airworthiness Limitations

The Airworthiness Limitations Section is FAA approved and specifies maintenance required under Secs. 43.16 and 91.403 of the Federal Aviation Regulations unless an alternate program has been approved by the FAA.

No additional airworthiness limitations have been imposed by this modification.

This modification does not affect the airworthiness section of the FAA Approved Maintenance manual.

13 Troubleshooting

This paragraph provides information necessary to identify, diagnose and correct potential problems which may occur with the wheel or brake assemblies.

TROUBLE	PROBABLE CAUSE	CORRECTION
Excessive pedal travel or spongy pedal feel.	Air in hydraulic system	Bleed the hydraulic system
	Leak in the system	Locate leak and repair
	Wrong fluid used caused degradation of master cylinder seals	Return to manufacturer for replacement
Brake drag	Residual brake pressure due to improper adjustment of connecting rod. Some pedal force remains on master cylinder.	Adjust the length of the connecting rod between the pilot brake pedals and the rear brake pedals. Ensure master cylinder is completely released when pedal is released.
	Residual brake pressure due to excessive pressure in the reservoir	Open and close the reservoir to release the pressure
	Wrong fluid used caused degradation of master cylinder seals	Return to manufacturer for replacement
Rapid wear of discs or pad	Improper conditioning of pads and/or disc	Replace components and follow conditioning procedure
Limited brake power	Improper or incomplete conditioning of pads and/or disc	Inspect components and replace if needed. Follow conditioning procedure.
	Leak in system	Inspect for leaks and tighten fittings as needed or replace leaking components.