



**Instructions for Continued
Airworthiness**

Project Reference
STC-012

ICA-STC-012





REV. 4

Instructions for Continued Airworthiness and Installation Instructions

for BERINGER wheels and brakes on
EXTRA 300 aircraft

Document Reference(*)
ICA-STC-012

Project Reference
STC-012

PREPARED(**)	CHECKED(**)	APPROVED(**)
Design Office Staff	Certification Manager	Accountable Manager
Guillaume MASSON  	Célia BERTELOOT  	Claire BERINGER  
15/02/2022	07 Mar 2022	08 Mar 2022

(*) I.a.w. the numbering system defined in the APDOA manual.

(**) Authorised signatories shall be as defined in the APDOA manual.

TABLE

1 LOG OF REVISIONS3

2 INTRODUCTION3

2.1 PURPOSE OF THE DOCUMENT3

2.2 APPLICABLE CERTIFICATION REQUIREMENTS3

2.3 EFFECTIVITY3

3 GENERAL4

3.1 COMPONENTS LIST4

3.2 WEIGHT AND BALANCE4

3.3 TIRES4

3.4 TORQUE4

3.5 STANDARD PRODUCT AND TOOLS4

4 REMOVAL AND INSTALLATION5

4.1 PRE-ASSEMBLY OF THE CALIPER ON THE AXLE5

4.2 DRILLING OF THE FAIRINGS6

4.3 MAIN WHEELS AND BRAKES9

4.4 SENS AIR INSTALLATION12

4.5 MASTER CYLINDERS13

4.6 BRAKE FLUID16

4.7 BRAKE LINES - HYDRAULIC SCHEMA16

5 INITIAL USE19

6 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS19

7 AIRWORTHINESS LIMITATIONS SECTION20

8 ASSOCIATED DOCUMENTS20

	Instructions for Continued Airworthiness	Project Reference	ICA-STC-12
		STC-012	REV. 4

1 LOG OF REVISIONS

Rev. No	Rev. date	Description
0	21.01.2015	Initial edition
1	14.09.2015	Update
2	14.09.2015	Change of master cylinder hydraulic fitting
3	18.01.2017	Wheel RF-08(A) replaces wheel RF-005(B)
4	19 Oct. 2021	- Administrative change: MM-STC-012 becomes ICA-STC-012. New maintenance document structure. - Addition of SensAIR system as an option. - Addition of a fairing plate and detailed installation instructions

2 INTRODUCTION

2.1 Purpose of the document

This manual gives removal and installation instructions of BERINGER wheels and brake system STC on the Extra 300 aircraft and guide you toward BERINGER maintenance system for continued airworthiness instructions.

NOTE: These BERINGER products have been fully tested and certified on the aircraft.

NOTE: Wheels and brake assemblies are TSO C26/ETSO C26 approved, for detailed maintenance and overhaul procedures, please refer to the Servicing Manuals of BERINGER, in §6.

CAUTION: Substitution of parts by other than originally certified parts may cause failure of brake system. BERINGER quality process assures that replacement parts are produced and controlled with the same quality level as originally certified.

2.2 Applicable Certification Requirements

- CS-23
- FAR part 23

2.3 Effectivity

Type: EA 300

Models: EA 300, EA 300/200, EA 300/L, EA 300/LC, EA 300/LT, EA 300/S, EA 300/SC

	Instructions for Continued Airworthiness	Project Reference STC-012	ICA-STC-12
			REV. 4

3 GENERAL

3.1 Components list

This STC scope includes Main wheels, brakes (master cylinder, caliper, lines...) and axles as replacement parts to original equipment. All the assemblies are listed in NP-STC-012, at the last revision.

For the assembly detailed composition to piece part, refer to the BERINGER Illustrated Part Catalogues (IPC) that are available in the maintenance documents MM-0x-001, sorted per product family, see §6.

In option, BERINGER pressure measurement device is available for this STC:

Assembly / Product Name	BERINGER Reference number
5" wheel SensAIR (option)	TP-005

3.2 Weight and Balance

BERINGER Assembly Name	Weight (Kg)	Weight (Lbs)
Main wheels and brake	3,382	7,456

(Weight is given without the tire and per wheel)

Refer to local regulation requirements to determine if mass and balance must be updated.

3.3 Tires

Wheel	Size	Ply	Type	Inflation pressure
Main	5.00-5	8	Tubeless	62 PSI

3.4 Torque

All torques for BERINGER product assembly are specified in the installation instructions in this document or in the maintenance working cards.

For interface parts with aircraft, unless otherwise specified by BERINGER, all fasteners should be torqued as per Aircraft Manual.

3.5 Standard product and tools

- Tire lubricant : Tire lubricant or liquid soap
- Hydraulic fluid : Mineral
- Tire mounting tool: To refer to MM-02-002.
- Torque wrench
- Paint marker
- Bearing grease







4 REMOVAL AND INSTALLATION

4.1 Pre-assembly of the caliper on the axle

Tools required:

- Loctite 271
- Dynamometric wrench
- Marker pen
- 4 Screws V-FHC-003
- 3 Screws for centering type AN4 or AN5
- Screwing machine
- 2 Calipers EA-002.2N
- 2 Discs DSC-008.2
- 2 Axles FUS-009.3



<p>1. Apply Loctite 271 on the 4 screws as per the picture</p>	
<p>2. Insert the disc in the caliper between the brake pads and center the axle on the caliper with the 3 screws type AN4 and AN5</p>	
<p>3. Screw the 2 screws V-FHC-003 on the axle</p>	
<p>4. Tighten the screws V-FHC-003 with dynamometer wrench: torque 12N.m</p>	
<p>Technical tip : Use your thumb to maintain the disc in position while screwing</p>	
<p>5. Mark the position of the screws V-FHC-003 with marker pen</p> <p>Repeat the procedure for the other caliper</p>	

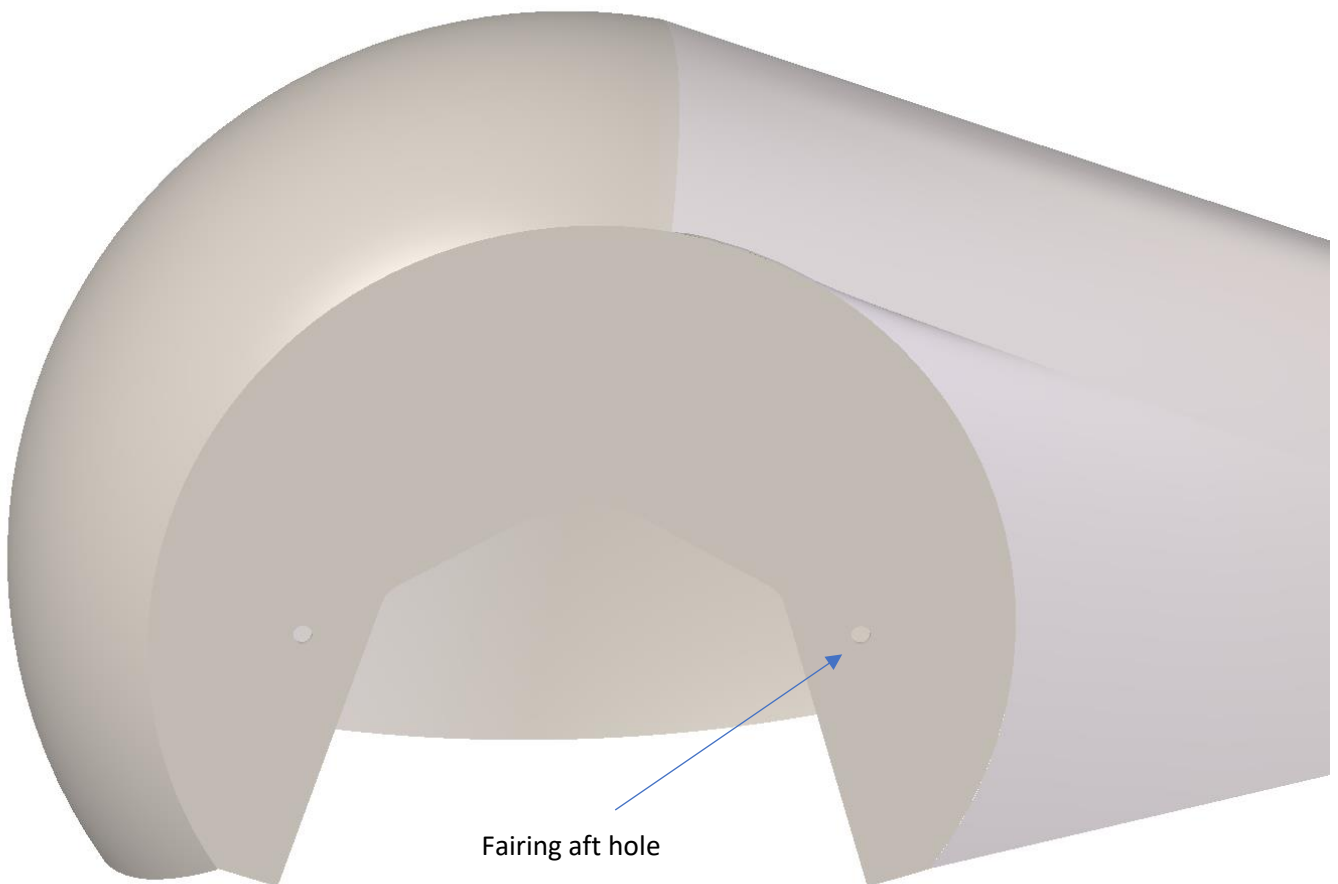
4.2 Drilling of the Fairings

REMOVAL:

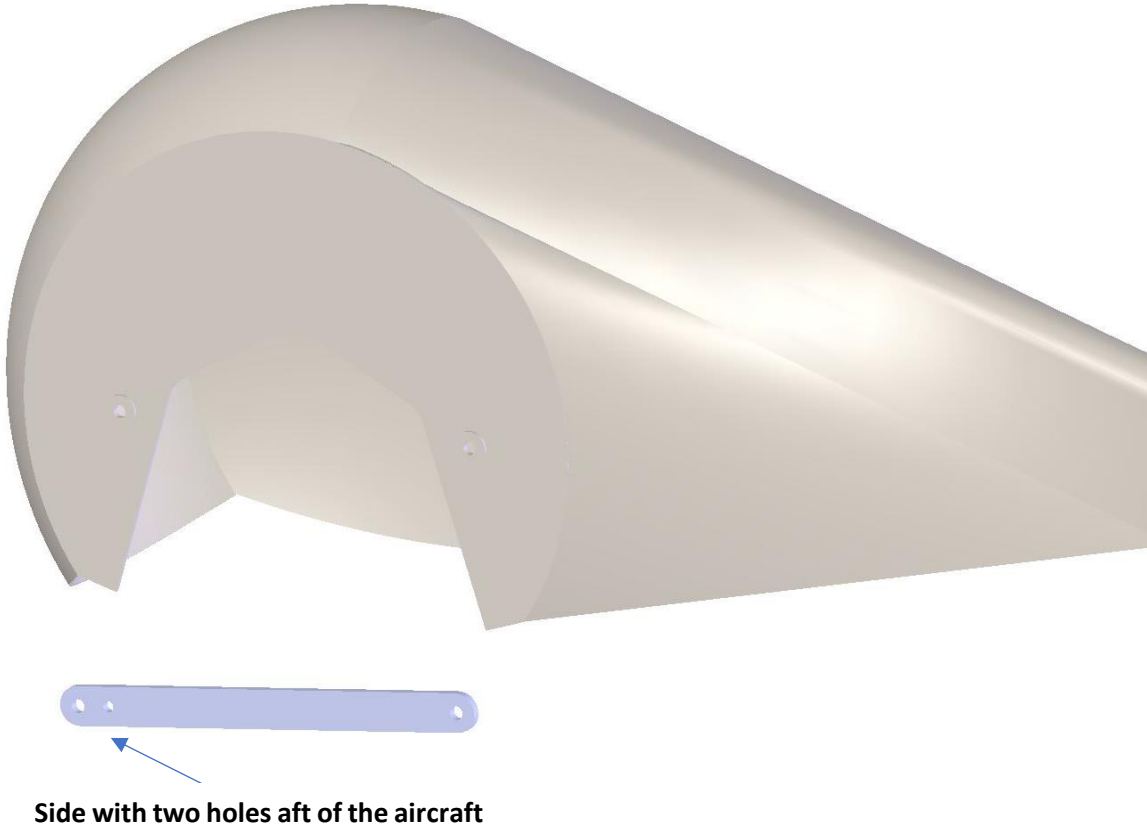
- a) Remove wheel fairings

PROCEDURE:

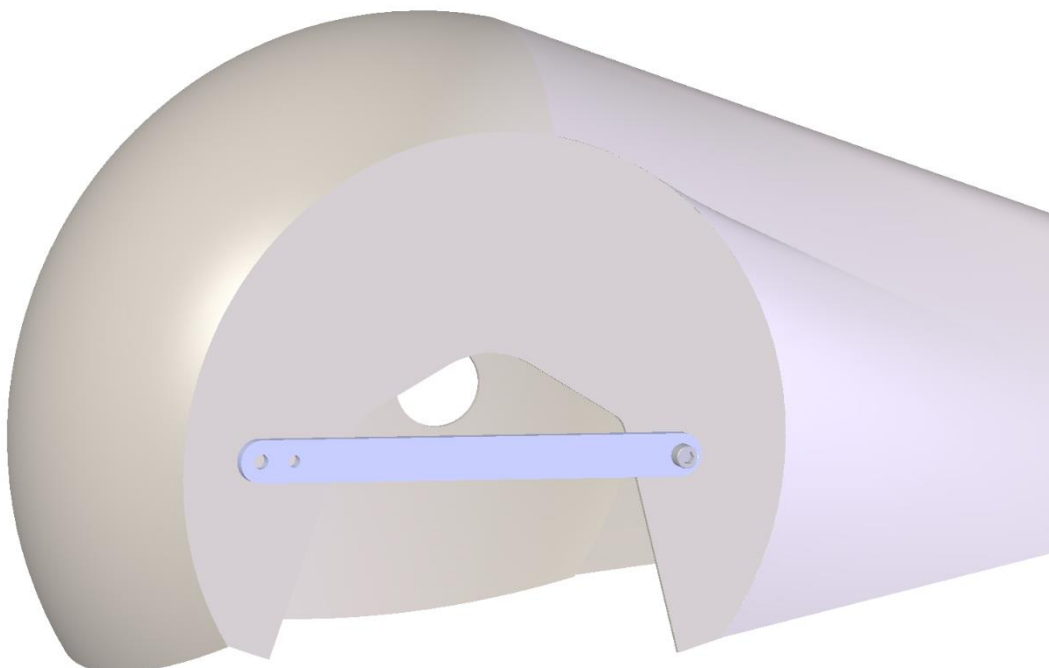
- 1- Drill the fairing aft hole with ¼" (6.35mm) drill



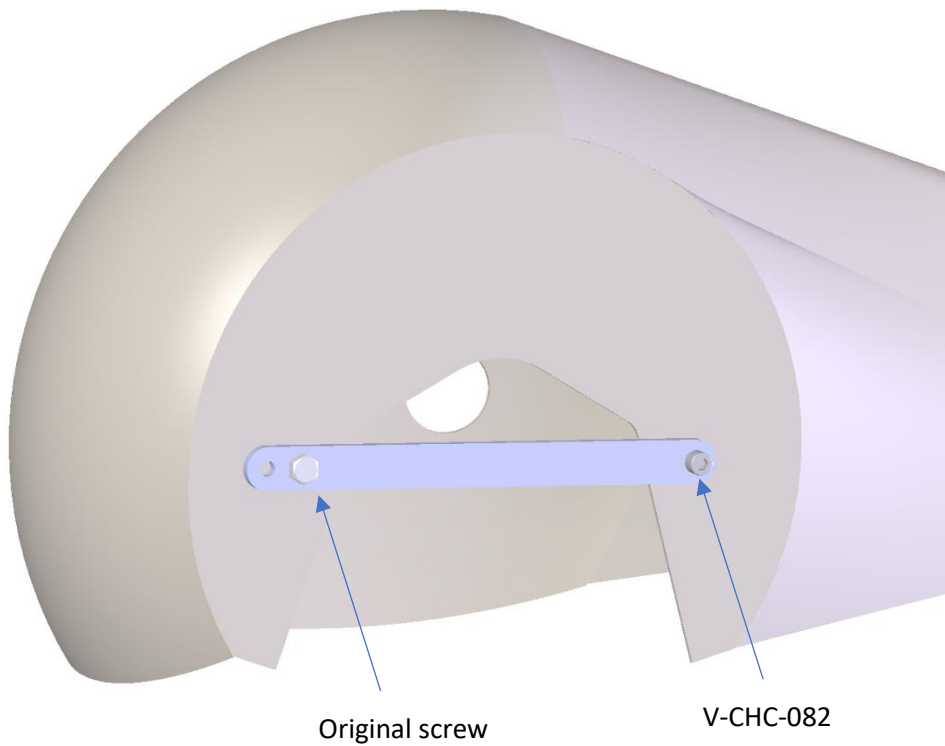
- 2- Present tool AV-EXT-061 on the fairing, side with two holes aft of the aircraft



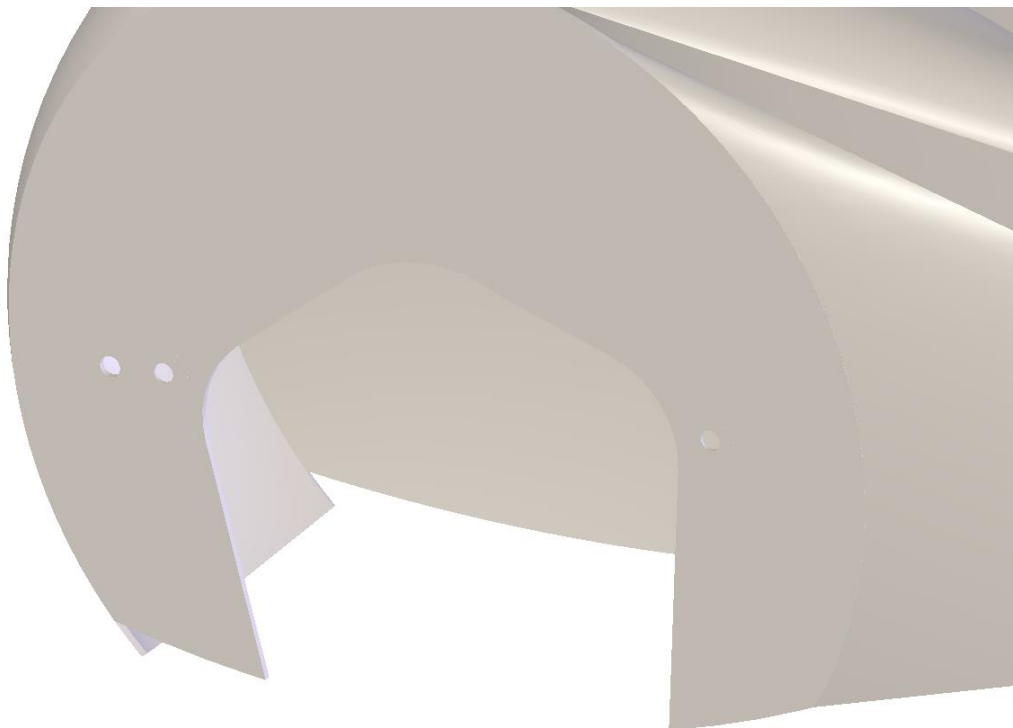
- 3- Screw AV-EXT-061 tool on the aft hole with V-CHC-082



- 4- Screw AV-EXT-061 tool on the fore hole with original screw

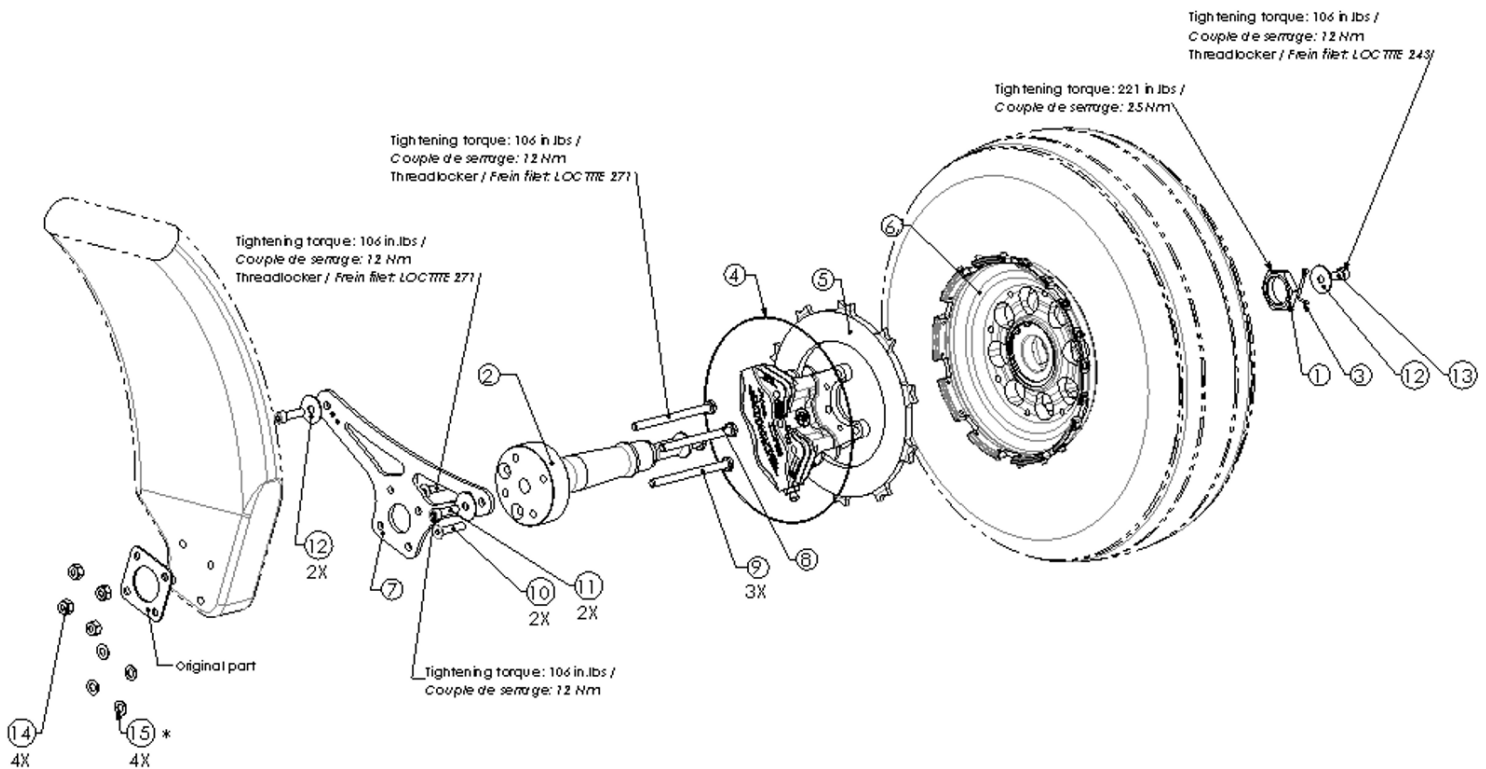


- 5- Drill the new fairing fore hole with 1/4" (6.35mm) drill



- 6- Repeat operations 1 to 5 on the other fairing

4.3 Main wheels and Brakes



15*	NAS1149F0432P	Washer AN4 / Rondelle AN4 Std	4
14	MS21044N-4	1/4-28_self-locking Nut/Ecrou NL	4
13	V-CHC-040	M6-12 (Q12.9)_Screw / Vis	1
12	R-AP-012	LL6_Washer/ Rondelle	3
11	V-CHC-082	1/4-28 UNF L=7/8" ASTM A574 + GEO_Screw/Vis Chc	2
10	V-FHC-003	Screw	2
9	NAS6604-48	Screw NAS6604-48 / Vis H 6.35x88.11	3
8	NAS6604-43	Screw NAS6604-43 / Vis H 6.35x80.19	1
7	PT-008L	EXTRA Left Fairing plate / Platine gauche de carénage	1
6	RF-018	5.00x5" HL_Main Wheel Assy/ Roue freinée	1
5	EA-002.2N	2P32-5-7.2_Brake Caliper/ Etrier de frein	1
4	ZPA02	Safety Wire/Fil a freiner	1
3	L-V-004	2.5x36_Cotter Pin/Goupille fendue	1
2	FUS-009.3	EXTRA_Axle 5.00x5 HL T2/ Fusée alu 5.00x5" HL T2	1
1	ECR-002	M25x1.5_Axle Nut/Ecrou	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-EXT-012(L or R)			

*Can be removed if nut thread engagement is not acceptable

REMOVAL:

- a) Remove original wheel, axle and brake assy. from the gear leg
- b) Remove flexible hoses

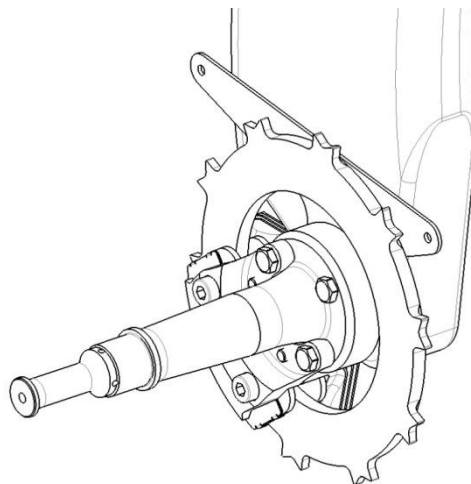
INSTALLATION:

- a) Place the fairing plate, axle and the brake assembly in position on the gear leg, as per the drawing above. Brake calipers are fixed at the same place as the original brake unit.
- b) Apply a thin coat of corrosion inhibitive sealant type CA1000 from PRC De Soto (or equivalent) on next contact surfaces:
 - between axle fairing plate
 - on axle bolts
- c) Install the 4 bolts, the Axle washer and the 4 self-locking nuts.

NOTE: Bolt head must be on wheel side.
There are 3 bolts size AN4-32A and 1 shorter bolt size AN4-30A

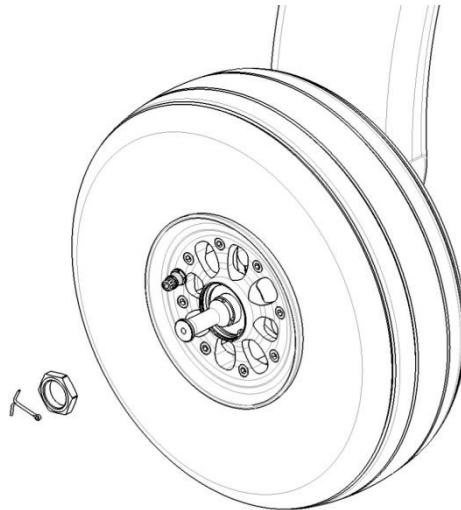
- d) Torque the nuts to appropriate torque – refer to the aircraft maintenance manuals for axle bolt torque value
- e) Apply a thin coat of grease on wheel bearings.
- f) Insert the wheel through the axle while placing the disc in wheel slots.

NOTE: Do not force, the disc must be properly positioned to fit inside wheel slots



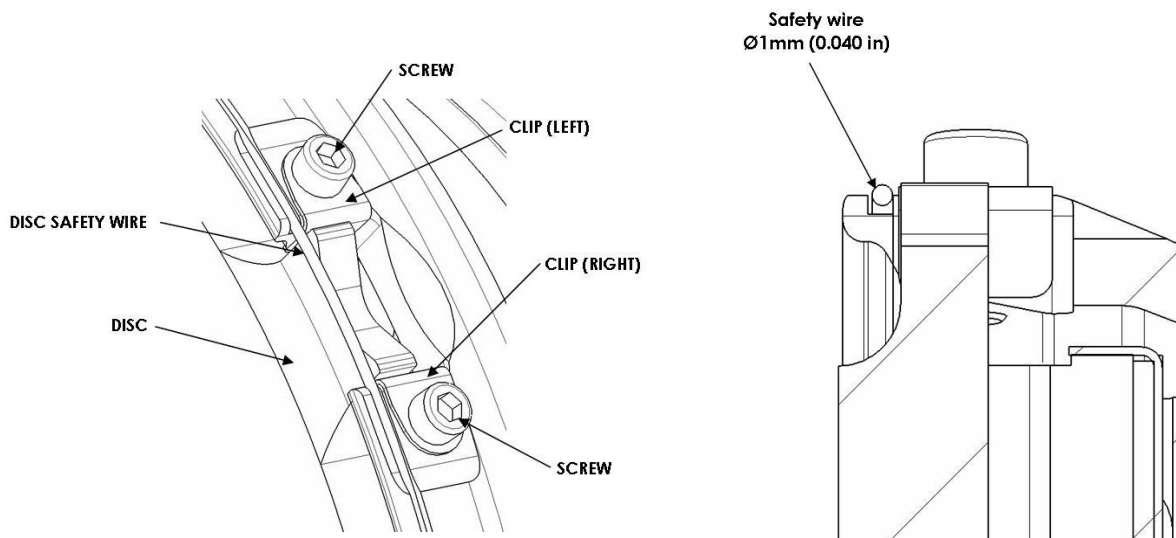
- g) Apply a thin coat of grease on axle thread. Screw the axle nut to contact
- h) Torque axle nut to 40 N.m (350 in.lb)
- i) Insert a new cotter pin to secure the axle nut

CAUTION: Cotter pin must be in place to prevent the loose of axle nut.



- j) Place the safety wire (stainless steel 1mm – 0.040”) in the ring groove all around the wheel.

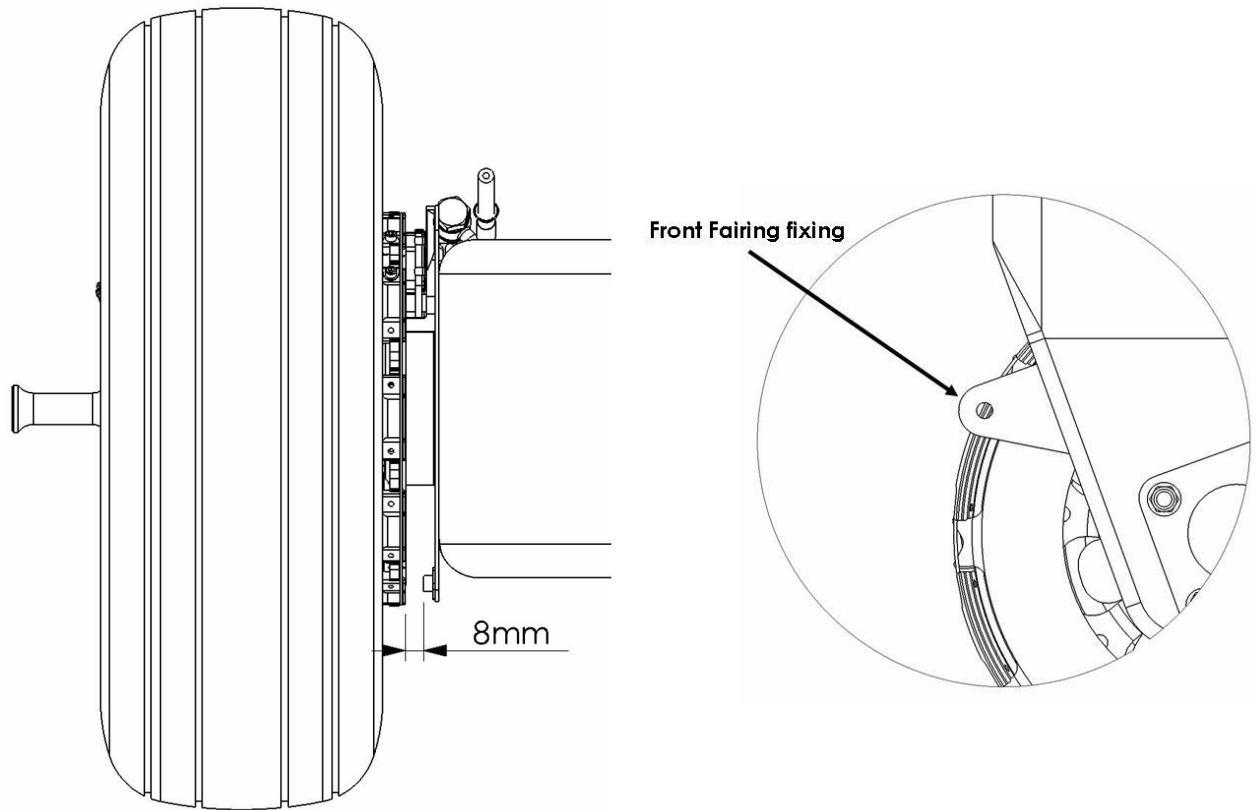
CAUTION: This safety wire must be in place to secure the disc.



- k) After the bleeding of the brake system, install wheel fairings

- l) Install short bolts on the inner side of the fairing (fuselage side) because it may touch the wheel rim.

CAUTION: Use short bolts because it may touch the wheel rim, especially on the front screw.



- m) Between the fairing fixing plate and the rim the standard distance is 8mm and the minimum required distance is 5mm to avoid any contact between the wheel rim and the fairing fixing screws.
- n) On the axle end (wing tip side) adjust the length with washers if required so that the fairing is in place

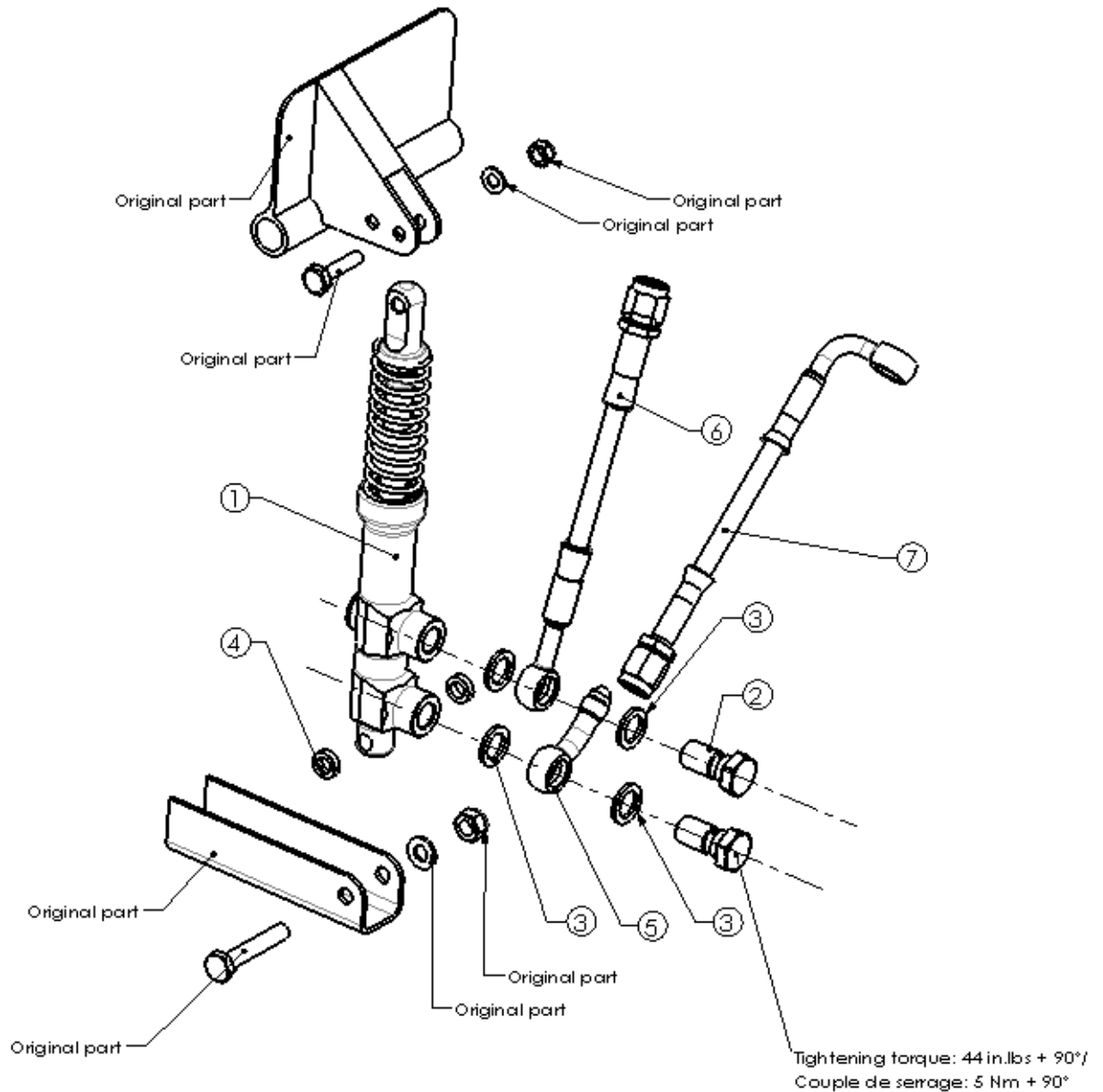
4.4 SensAIR installation

SensAIR system is an optional device located inside the tire, around the rim. Refer to SM-08 document to get installation procedure, available on BERINGER Website.



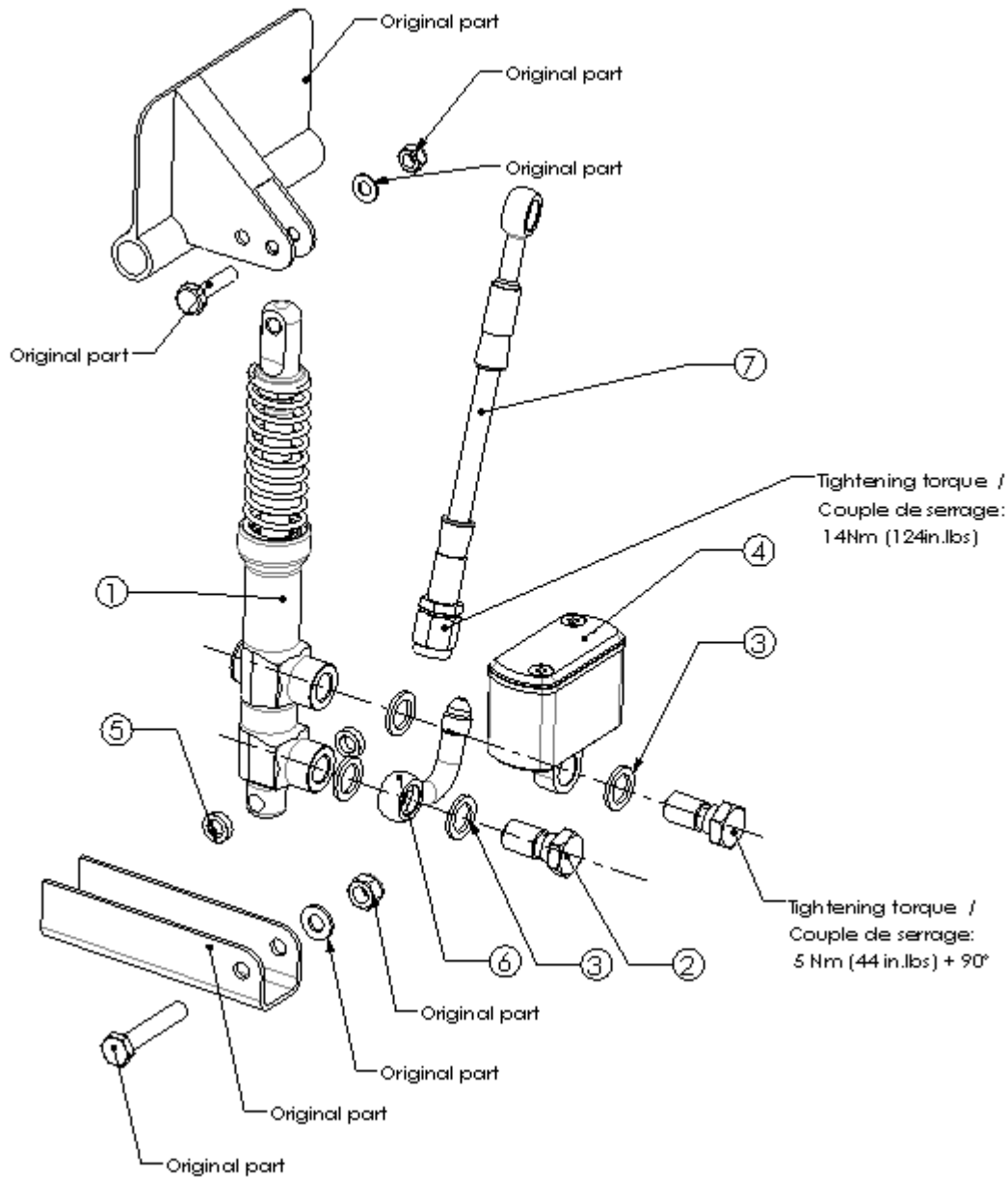
4.5 Master Cylinders

Front RH Master cylinder Assy



7	AV-EXT-001.2	Extra Brake Line 1.2 / Durite 1.2	1
6	AV-EXT-001.1	Extra_Brake Line 1.1 / Durite 1.1	1
5	HYD-022VC	3/8x24_Hydraulic fitting/ banjo 20° à visser	1
4	RDL-011	RONDELLE CALAGE n6x10x3	2
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
1	MP-003.4N	MC12.2 NBR (176mm)_Master Cylinder/ Maitre cylindre	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-EXT-011			

Rear RH Master cylinder Assy



7	AV-EXT-001.1	Extra_Brake Line 1.1 / Durite 1.1	1
6	HYD-049VC	3/8x24_Hydraulic fitting/ banjo 90° à visser	1
5	RDL-011	RONDELLE CALAGE n6x10x3	2
4	RV-001N	Minéral 20 ml (Sortie Centrale)_Intégral Reservoir Assy / Reservoir Intégral	1
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
1	MP-003.4N	MC12.2 NBR (176mm)_Master Cylinder/ Maitre cylindre	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-EXT-010			

	Instructions for Continued Airworthiness	Project Reference	ICA-STC-12
		STC-012	REV. 4

NOTE: Same master cylinders are used on rear and front seat, LH and RH.
The original fluid reservoir is not used any more and should be definitively removed.
The new reservoirs are going to be installed directly on the rear master cylinders.
The Position of pedals remains the same as original equipment

REMOVAL:

- a) Disconnect inlet and outlet hose
- b) Remove original master cylinders from the pedal assembly
- c) Remove the fluid reservoir from the engine firewall
- d) Place the reservoir bolts with washers in their original thread and lock them
- e) Seal the open hole (where the hydraulic line was passing through) with high temperature silicone paste
- f) Remove all the brake lines with fittings they are not going to be used anymore

INSTALLATION:

- a) Pre-assemble master cylinders with the reservoir, banjo bolt and copper seals

NOTE: Refer to the hydraulic schema to choose the corresponding brake lines and fittings

- b) Torque tighten the banjo bolt to 5 N.m + 90° (44 in-lb + 90°)

CAUTION: Do not lubricate the hydraulic threads with any grease.

NOTE: If under torque is applied there may be a leakage, if over torque is applied the banjo bolt may broke or damage the internal thread

CAUTION: Copper seals cannot be re-used after being locked because they may leak. They must be changed each time the fitting is removed.

- c) Do checks of brake pedal to make sure it moves easily and is free of parasite friction, if necessary grease the brake pedal axle.
- d) Lubricate the new or polished bolts with grease MIL-G-81322

NOTE: Upper and lower bolts must be like new and free of scratches

- e) Lubricate inner bore of master cylinder ends with grease MIL-G-81322
- f) Insert master cylinder body in the pedal assembly, place the two spacers on the lower end and insert the lower bolt. Place the washer and nut. Then place and torque the upper bolt, washer and nut.

NOTE: a small play should be observed between master cylinder body and his fixing.

- g) Present master cylinder clevis in front of pedal assembly. No lateral effort should be applied to position the master cylinder clevis at the right place

CAUTION: Wrong adjustment of master cylinder will cause premature wear, and a possible failure of master cylinder

- h) Move brake pedal and check for any parasite friction.
- i) Check that when brake pedal is released the master cylinder is fully extended

	Instructions for Continued Airworthiness	Project Reference	ICA-STC-12
		STC-012	REV. 4

CAUTION: Master cylinder length axle to axle is 176 mm (6.9 in) this dimension is adjusted at factory and should not be changed.

- j) Make sure that the bolts and nuts are properly torque and secured
- k) Do the same operation for each master cylinder
- l) Then connect brake lines to original fittings

CAUTION: Brake lines must not touch other parts or be twisted

CAUTION: Make sure that the brake lines and fittings do not touch other parts or controls in the full range of rudder pedal movement and for each of the rudder pedal position.

4.6 Brake Fluid

Brake fluid required by the new brakes is per MIL-PRF-87257. The sticker on the fluid reservoir must be replaced by the new one delivered in the kit.

CAUTION: Standard MIL-H-5606 Brake fluid is replaced by fire resistant fluid: MIL-PRF-87257, make sure that only this brake fluid is used.

4.7 Brake lines - Hydraulic Schema

Brake lines are made from Teflon and stainless steel hose braided.

CAUTION: Brake lines and hydraulic schema are different from original. Make sure that new brake lines are connected properly. The brake system will not work if brake lines are not connected properly.

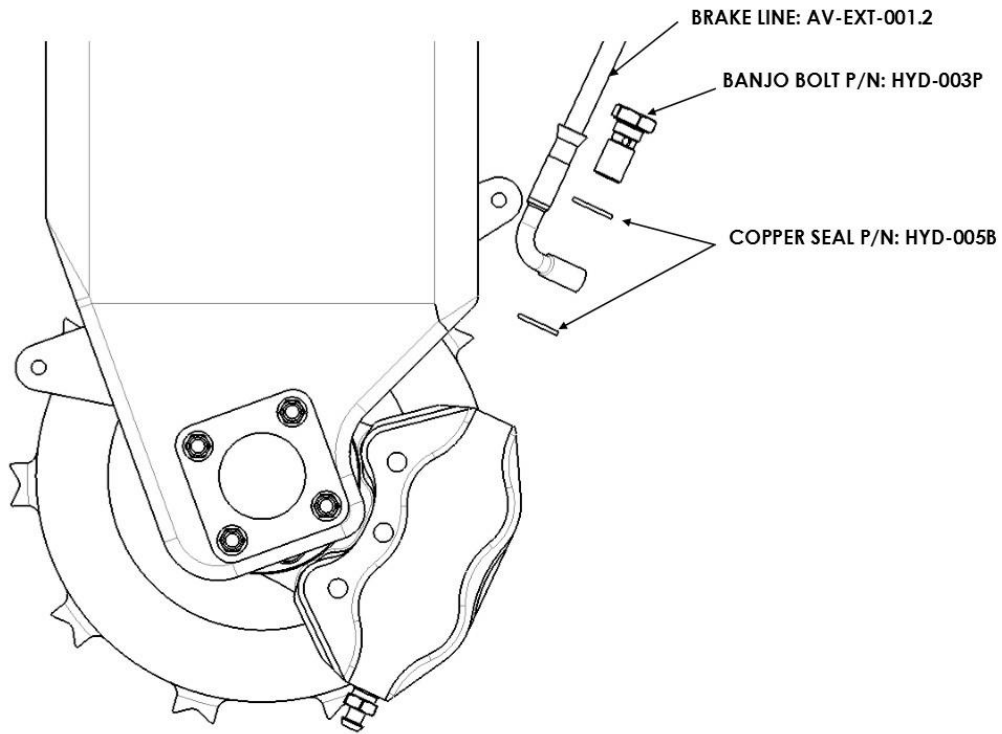
INSTALLATION:

- a) On the brake caliper : install flexible brake line AV-EXT-001.2
- b) Torque tighten the banjo bolt to 5 N.m + 90° (44 in-lb + 90°)

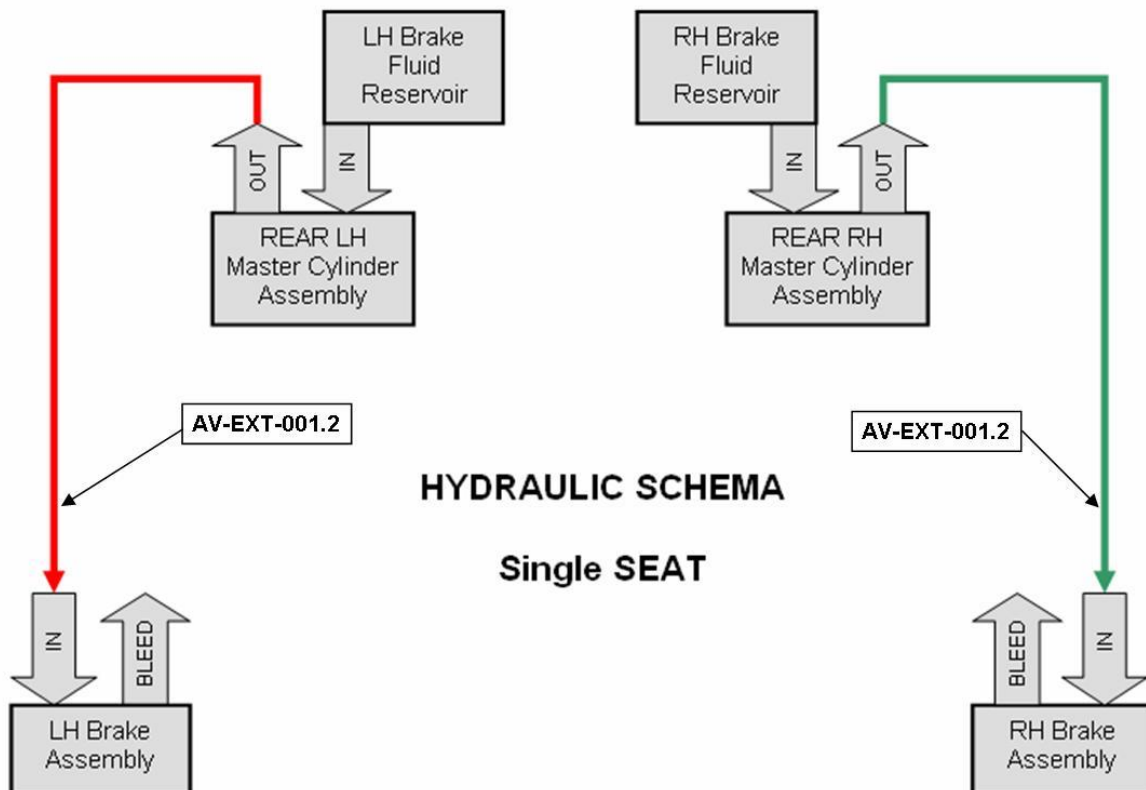
CAUTION: Do not lubricate the hydraulic threads with any grease.

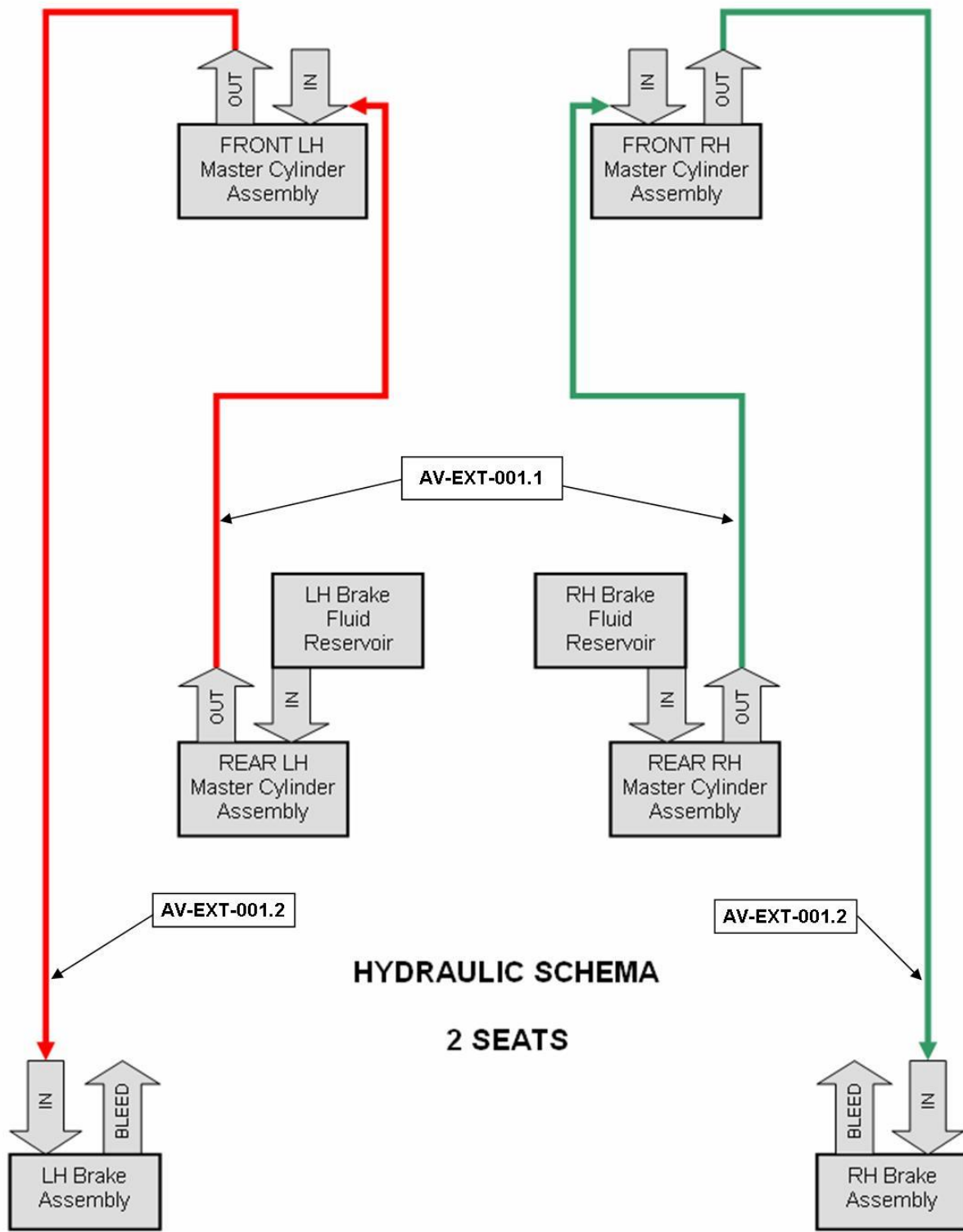
NOTE: If under torque is applied there may be a leakage, if over torque is applied the banjo bolt may broke or damage the internal thread

CAUTION: Copper seals cannot be re-used after being locked because they may leak. They must be changed each time the fitting is removed.



- c) Brake lines are going along the fuselage structure in the same location as the original brake lines
- d) Secure the brake lines with plastic straps





	Instructions for Continued Airworthiness	Project Reference STC-012	ICA-STC-12
			REV. 4

5 INITIAL USE

BERINGER brakes need to be bled and conditioned prior to use.

For procedure instructions, refer to the following manuals available on BERINGER website:

- BRAKE BLEEDING procedure MM-00-003
- BRAKE CONDITIONING procedure MM-01-002

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

6 INSTRUCTIONS FOR CONTINUED AIRWORTHINESS

All instructions for continued airworthiness are provided through the Servicing Manuals (SM) and Maintenance Manual (MM) of BERINGER.

- The Servicing Manuals (SM) sums-up the parts replacement scheme, the maintenance intervals, troubleshooting and the Maintenance Working Cards to be used for each BERINGER assembly.
- The Maintenance Manual (MM) describes each maintenance step for all BERINGER products.

Refer to the maintenance guide **SM-00** for **general guidance**.

The SM breakdown structure is as follows:

Servicing Manual Reference	Product Type	Product Reference
SM-01	Brake Assembly	EA-xxx
SM-02	Nose/Tail wheel	RA-xxx
SM-02	Main wheel	RF-xxx
SM-03	Control-stick Master-Cylinders	MM-xxx
SM-03	Longitudinal Master-Cylinders	MP-xxx
SM-04	Parking Brake	FP-xxx
SM-05	Brake Pressure regulator	RE-xxx
SM-06	Brake Pressure limiter	LM-xxx
SM-07	Shock Wheel	LL-xxx
SM-08	SensAIR device	TP-xxx
SM-09	Tyre 5x2.00-3.7 & 6x2.00-3.7	PAR-xxx
SM-10	Carbon Fairing	CR-xxx

All documents are all available on:



BERINGER website: www.beringer-aero.com/Support
Go to Support section.

	Instructions for Continued Airworthiness	Project Reference	ICA-STC-12
		STC-012	REV. 4

7 AIRWORTHINESS LIMITATIONS SECTION

The Airworthiness Limitations section is FAA approved and specifies maintenance required under §§43.16 and 91.403 of Title 14 of the Code of Federal Regulations unless an alternative program has been FAA approved.

8 ASSOCIATED DOCUMENTS

Document reference	Document title
NP-STC-012	Part Nomenclature
MM-00-003	BRAKE BLEEDING procedure
MM-01-002	BRAKE CONDITIONING procedure
SM-00	BERINGER PRODUCTS MAINTENANCE GUIDE
SM-02	Wheels Servicing Manual

Refer to the latest revision.