



Instructions for Continued Airworthiness

Project Reference
STC-017

ICA-STC-017

REV. 6

Instructions for Continued Airworthiness and Installation Instructions







for BERINGER wheels and brakes on
Piper PA-46 aircraft

Document Reference^(*)

ICA-STC-017

Project Reference

STC-017

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

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

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1 LOG OF REVISIONS

Rev. No	Rev. date	Description
0	06.12.2017	Initial release
1	16.03.2018	Internal update
2	28.03.2018	Internal update
3	12.02.2019	Extensive update based on FAA comments. Removed wheel and brake maintenance information and reference MM-ETSO-006 instead. Changed document title from MM-STC-017 to ICA-STC-017.
4	19.10.2021	Administrative change: MM-STC-017 becomes ICA-STC-017: includes new maintenance document structure and addition of SensAIR system as an option.
5	02 May 2023	Administrative change : Correction of the Beringer assembly weight: it was given with the tire weight whereas it should be given without the tire weight.
6	03 Oct 2024	Modification of Main wheel axle for PA-46 310P, 350P, 350T

2 INTRODUCTION

2.1 Purpose of the document

This manual gives removal and installation instructions of BERINGER wheels and brake system STC on the Piper PA-46 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: Piper Aircraft

Models: PA-46-310P (Malibu), PA-46-350P (Malibu Mirage) , PA-46-500TP (Malibu Meridian) and PA-46R-350T (Malibu Matrix)

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3 GENERAL

3.1 Components list

This STC scope includes Main and Nose wheels, brakes (master cylinder, caliper, lines...) and axles as replacement parts to original equipment. All the assemblies are listed in BOM-STC-017, 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
6" wheel SensAIR (option)	TP-006
5" wheel SensAIR (option)	TP-005

3.2 Weight and Balance

This table below gives the total weight of BERINGER equipment without tires:

BERINGER Assembly Name	Weight (Kg)	Weight (Lbs)
Main wheels and brake	14.34	31.61
Nose wheel	1.89	4.16

(Weights are given without tires)

NOTE: The data in the table above is given for information only and do not include fasteners not provided by BERINGER.

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

3.3 Tires

Tires	Size	Ply rating	Minimum speed rating	Type	Inflation pressure
Main	6.00-6	8	120 Mph	Tubeless	Not changed – refer to aircraft manual
Nose	5.00-5	8	120 Mph	Tubeless	Not changed – refer to aircraft manual

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.

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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

3.6 Gear and Gear door rigging pre-check

Prior to removal of any components, installer must perform gear swings to ensure all proper gear rigging and clearances IAW the Piper maintenance or service manuals.

Installer must ensure correct gear door rigging and clearances IAW the Piper maintenance or service manuals. Installer must ensure that all tires currently installed on aircraft have adequate clearance prior to installation of STC-017.

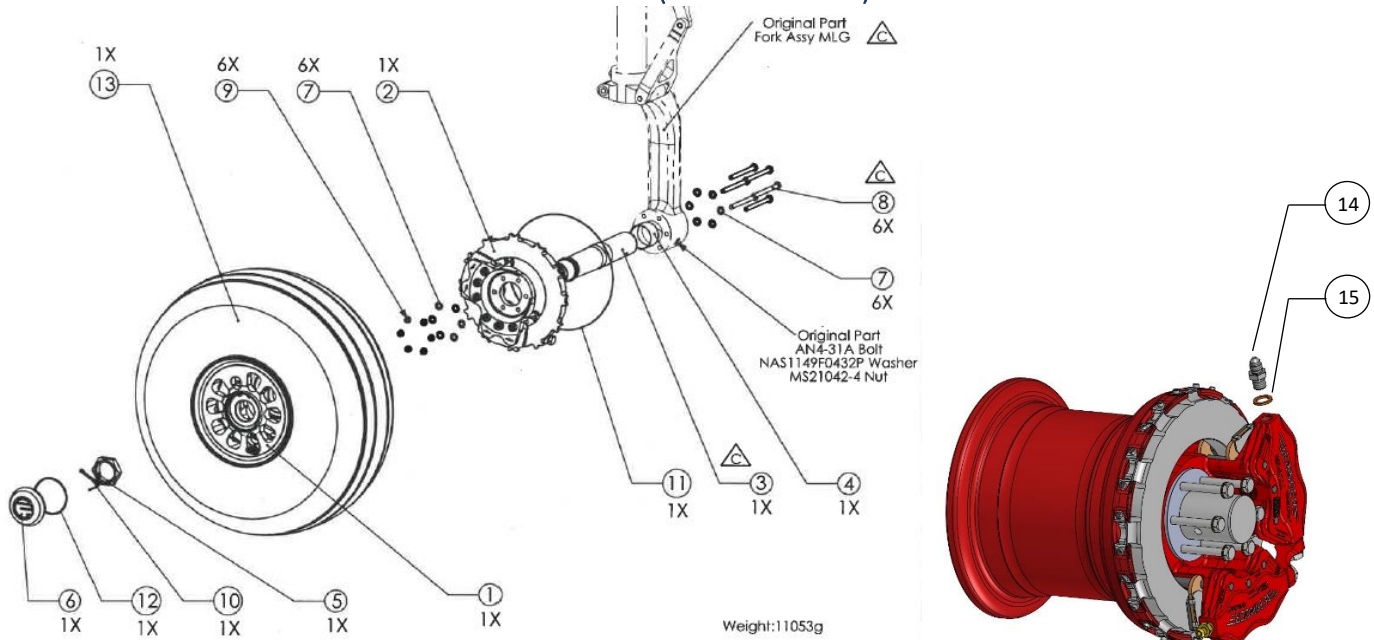
Installer must comply with or find aircraft in compliance with Piper Service Letter 1286D.

Beringer Aero is not responsible for any damages induced to aircraft due to incorrect rigging of gear or gear doors or not following these requirements.

4 REMOVAL AND INSTALLATION

4.1 Main wheels and Brakes installation

PA-46-500TP (Malibu Meridian)



15	HYD-005B	Copper Seal/ Joint cuivre	1
14	HYD-006	M10x1-3/8x24_Adaptor / Adaptateur	1
13	-	6.00x6" _Tire/Pneu	
12	J-JTR-020N	BCH-004 _O-Ring /Joint	1
11	ZPA02	Safety Wire/Fil à freiner	1
10	MS24665-360	Ø3.175-50.8 _Cotter Pin/Goupille fendue	1
9	MS21042-4	Self locking Nut AN4 / Ecrou frein AN4	6
8	AN4-27A	AN4 _Bolt/Vis	6
7	NAS1149F0432P	Washer AN4 / Rondelle AN4 Std	12
6	BCH-004	6.00x6"HL-HE _Wheel cap/ Bouchon de roue	1
5	ECR-001	M35x1.5 _Axle nut /Ecrou	1
4	AV-PER-202	PA46 6.00x6" HL _Main wheel axle spacer/Entretoise axe principal	1
3	AV-PER-201	PA46 6.00x6"HL _Main wheel Axle/Axe principal	1
2	EA-004.2NL Or EA-004.2 NR	4P32-6-15 _Left (or Right) Brake Assy T8 / Etrier De Frein Gauche (ou Droit) T8	1
1	RF-017	6.00x6" HL _Wheel Assy/ Roue freinée	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-220			

The instructions apply to both the left and right side.

➤ Remove Existing Wheels and Brakes

- Remove the existing wheels and brakes per the aircraft manufacturer's instructions.
- Remove the landing gear leg per the manufacturer's instructions.
- Remove the axle from the landing gear leg per the manufacturer's instructions.



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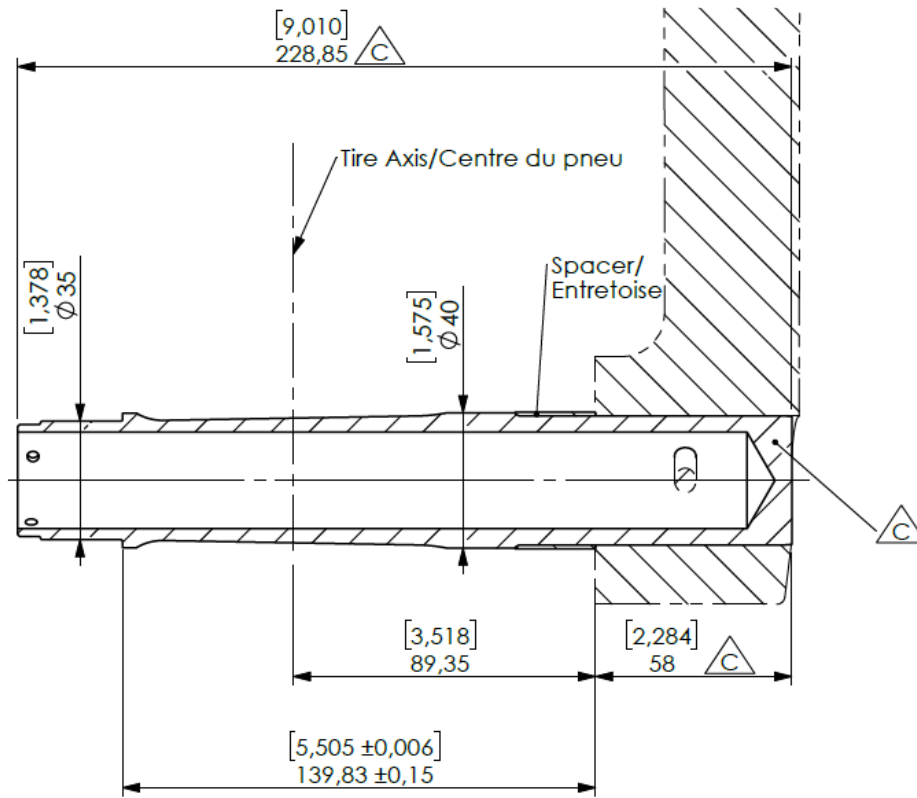
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➤ Assemble the Axle and Spacer for PA-46-500TP

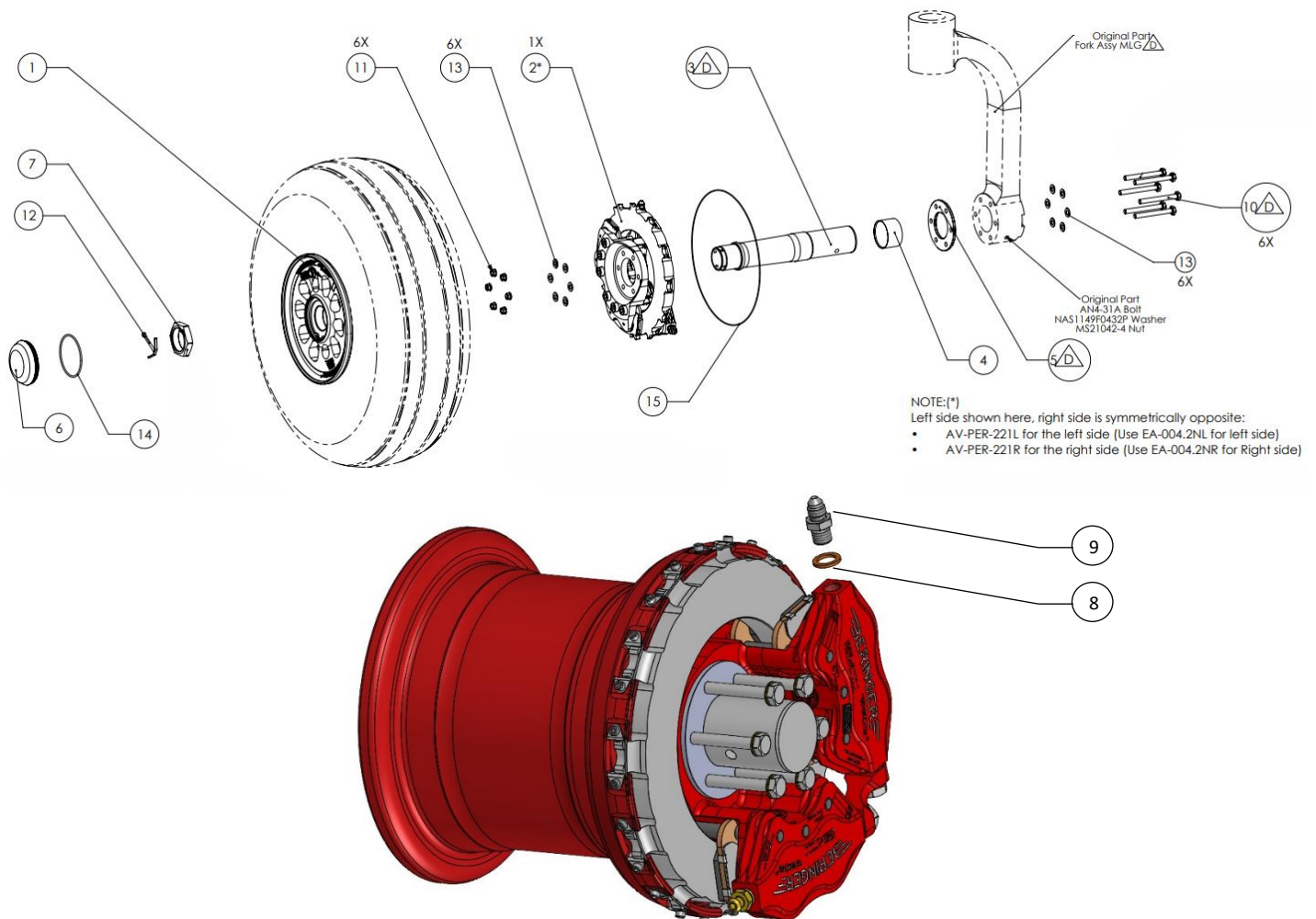
- Assemble the axle AV-PER-201 and the spacer AV-PER-202. Refer to the pictures and drawing below.
- Press the axle and spacer assembly in the original landing gear leg until the spacer face just contacts the landing gear leg surface. ***Do not use unnecessary force to install the axle, this can flare the thin edge of the spacer. The interface between the axle and spacer must be smooth and without profile discontinuity or the inner bearing of the wheel will not install properly.***





Axle Installation for PA-46-500TP

PA-46-310P, PA-46-350P, PA-46R-350T



15	ZPA02	Safety Wire/Fil à freiner	1
14	J-JTR-020N	BCH-004_O-Ring /Joint	1
13	NAS1149F0432P	Washer AN4 / Rondelle AN4 Std	12
12	MS24665-360	Ø3.175-50.8_Cotter Pin/Goupille fendue	1
11	MS21042-4	Self locking Nut AN4 / Ecrou frein AN4	6
10	AN4-23A	AN4-23A_Bolt/Vis	6
9	HYD-006	M10x1-3/8x24_Adaptor / Adaptateur	1
8	HYD-005B	Copper Seal/ Joint cuivre	1
7	ECR-001	M35x1.5_Axle nut /Ecrou	1
6	BCH-004	6.00x6"HL-HE_Wheel cap/ Bouchon de roue	1
5	AV-PER-213	PA46 (310 & 350) 6.00x6" HL_ Washer / Rondelle	1
4	AV-PER-202	PA46 6.00x6" HL_Main wheel axle spacer/Entretoise axe principal	1
3	AV-PER-211	PA46 (310 & 350) 6.00x6"HL_Main wheel Axle/Axe principal	1
2	EA-004.2NL Or EA-004.2NR	4P32-6-15_Left or Right Brake Assy T8	1
1	RF-017	6.00x6" HL_Wheel Assy/ Roue freinée	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-221			



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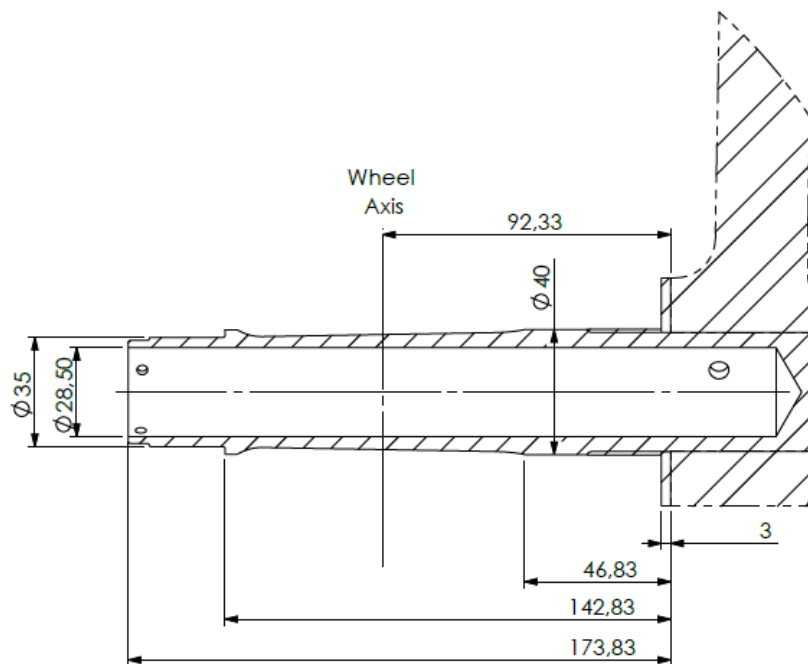
The instructions apply to both left and right side.

➤ Remove Existing Wheels and Brakes

- Remove the existing wheels and brakes per the aircraft manufacturer's instructions.
- Remove the landing gear leg per the manufacturer's instructions.
- Remove the axle from the landing gear leg per the manufacturer's instructions.

➤ Assemble the Axle and Spacer for PA-46-310P, PA-46-350P, PA-46R-350T

- Assemble the axle AV-PER-211 and the spacers AV-PER-202 and AV-PER-213. Refer to the pictures and drawing below.
- Press the axle and spacer assembly in the original landing gear leg until the spacer face just contacts the landing gear leg surface. ***Do not use unnecessary force to install the axle, this can flare the thin edge of the spacer. The interface between the axle and spacer must be smooth and without profile discontinuity or the inner bearing of the wheel will not install properly.***



Axle Installation for PA-46-310P, PA-46-350P, and PA-46R-350T



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Instructions from this point forward apply to all models

➤ Match Drill Axle Bolt

- Match drill through for an AN-4.
- Secure with an AN-31A fastener.



➤ Brake Installation

- Install the landing gear leg per the aircraft manufacturer's instructions.
- Apply a thin coat of corrosion protection sealant (type CA from PRC De Soto or equivalent) on the six AN bolts and on the face of the gear leg where the caliper will contact.
- Install the brake assembly as shown in the images below.



- Install the six AN bolts, washers, and nuts per the drawing. ***The bolt head must be on the inboard side. If reversed, the nuts will contact the wing skin when retracted.***



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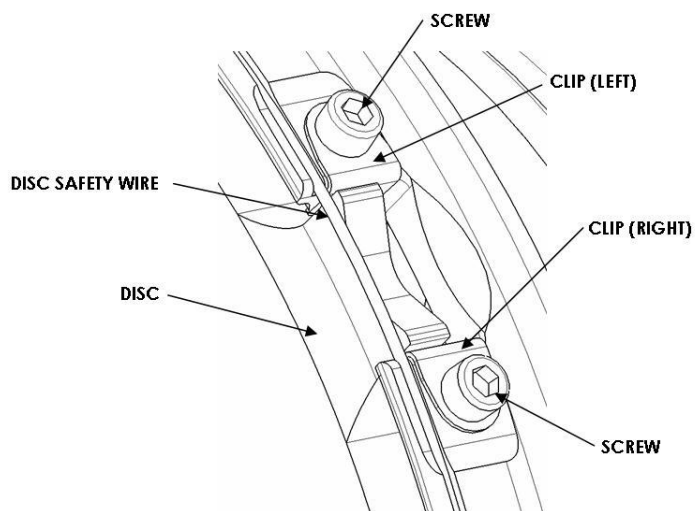
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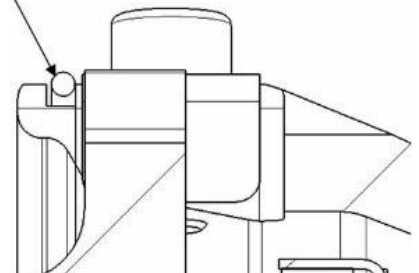
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➤ Wheel Installation

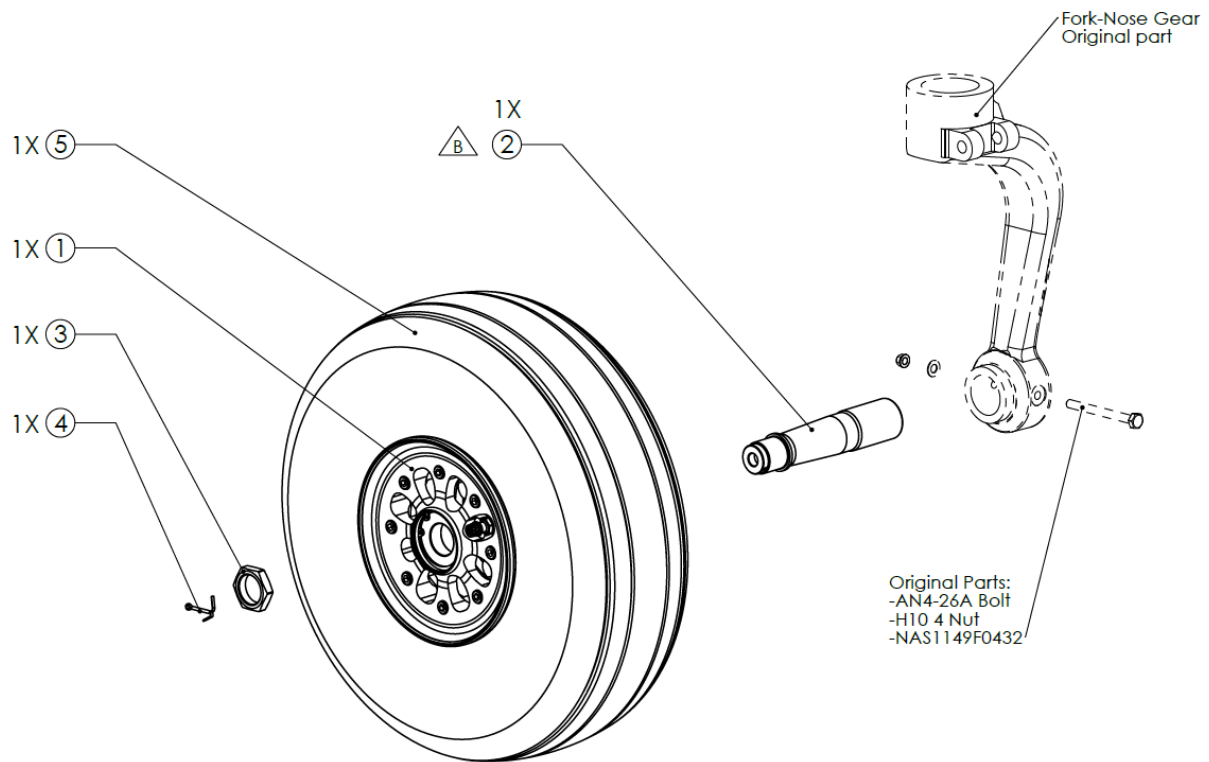
- Apply a thin coat of anti-corrosion grease on the inside surface of the wheel bearings.
- Install the wheel on the axle and align the disk into the slots in the wheel.
- Install the axle nut until it contacts the bearing and torque to 35 Nm (310 IN-LBS).
- Secure with the cotter pin.
- Install the wheel cap.
- Install safety wire in the ring groove around the wheel.
- Check the tire inflation per the aircraft manufacturer's specifications.



Safety wire
Ø1mm (0.040 in)



4.2 Nose Wheel INSTALLATION



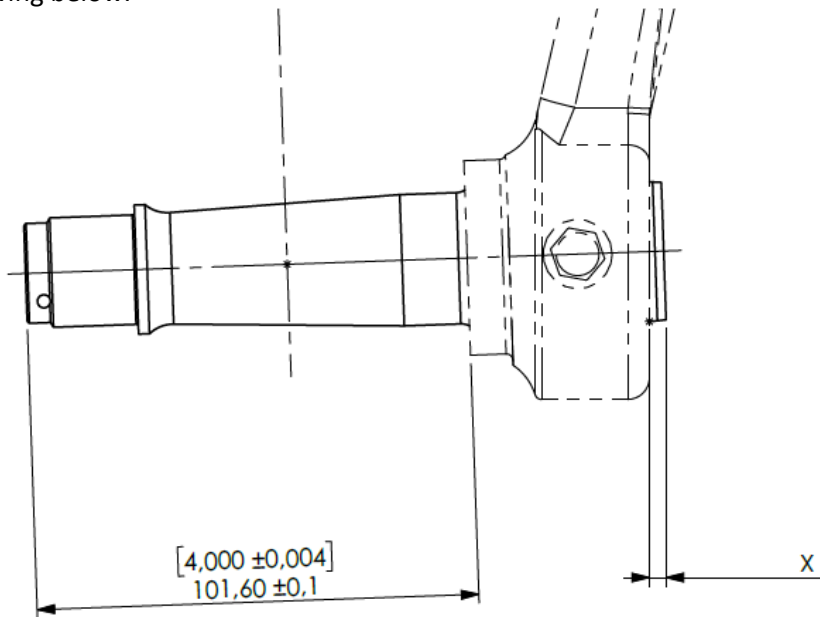
4	L-V-004	2.5x36_Cotter Pin/ Goupille élastique	1
3	ECR-002	M25x1.5_Axle Nut/Ecrou	1
2	AV-PER-103	PA46 5.00x5" HL_Nose wheel Axle/Axe roue avant	1
1	RA-014	5.00x5" HL (Ø25-30)_Nose Wheel Assy/ Roue Avant	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-140			

Remove Existing Wheel

- Remove the existing nose wheel per the aircraft manufacturer's instructions.
- Remove the nose gear leg per the manufacturer's instructions.
- Remove the nose wheel axle per the manufacturer's instructions.

Axle Installation

- Press the axle into the original landing gear until the 101.6mm measurement is achieved as shown in the drawing below.



- Match drill through for an AN4 bolt.
- Secure the axle with an AN4-26A bolt as shown in the drawing.

Wheel Installation

- Apply a light coat of anti-corrosion grease on the inside of the wheel bearings.
- Install the wheel on the axle.
- Install the axle nut and torque to 24 Nm (220 IN-LBS)
- Secure axle nut with the cotter pin.
- Check tire inflation pressure per the aircraft manufacturer's specifications.

4.3 SensAIR installation

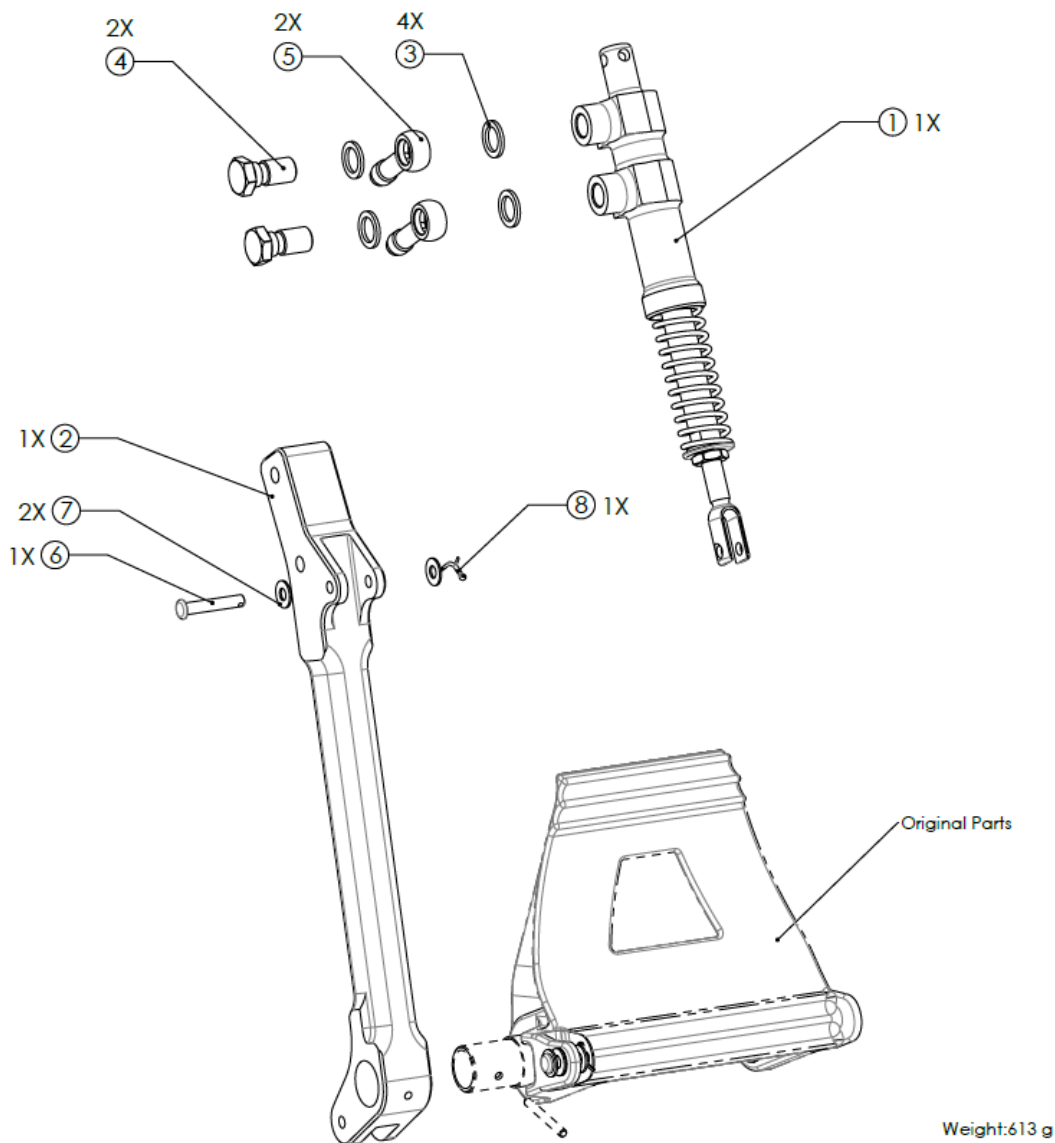
SensAIR system is an optional device located inside the tire, around the rim.

Refer to SM-08 document to get installation procedure, available on BERINGER Website.



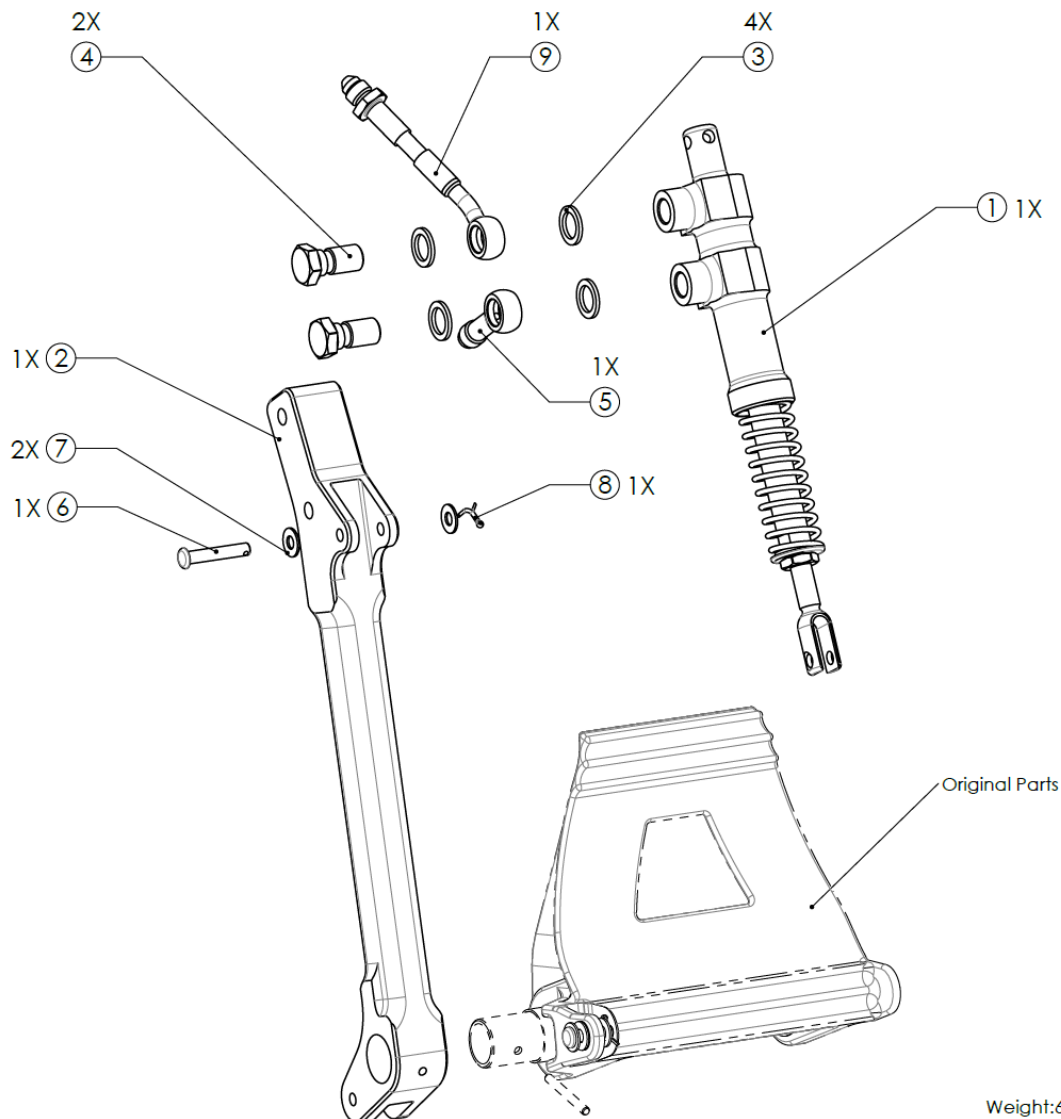
4.4 Master Cylinder INSTALLATION

PA-46 Master cylinder Co-pilot Right Assy



8	MS24665-132	1.58x12.7_Cotter Pin/ Goupille fendue	1
7	NAS1149F0332P	AN3 Std_Washer/Rondelle	2
6	MS20392-2C31	3/16_Clevis Pin/Pion	1
5	HYD-019VC	3/8x24_Hydraulic fitting/ banjo droit à visser	2
4	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	AV-PER-102	PA46_Master Cylinder Support/ Support MC	1
1	MP-001.2N	Master Cylinder 9/16" NBR/ Maitre cylindre 14.5 NBR	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-131			

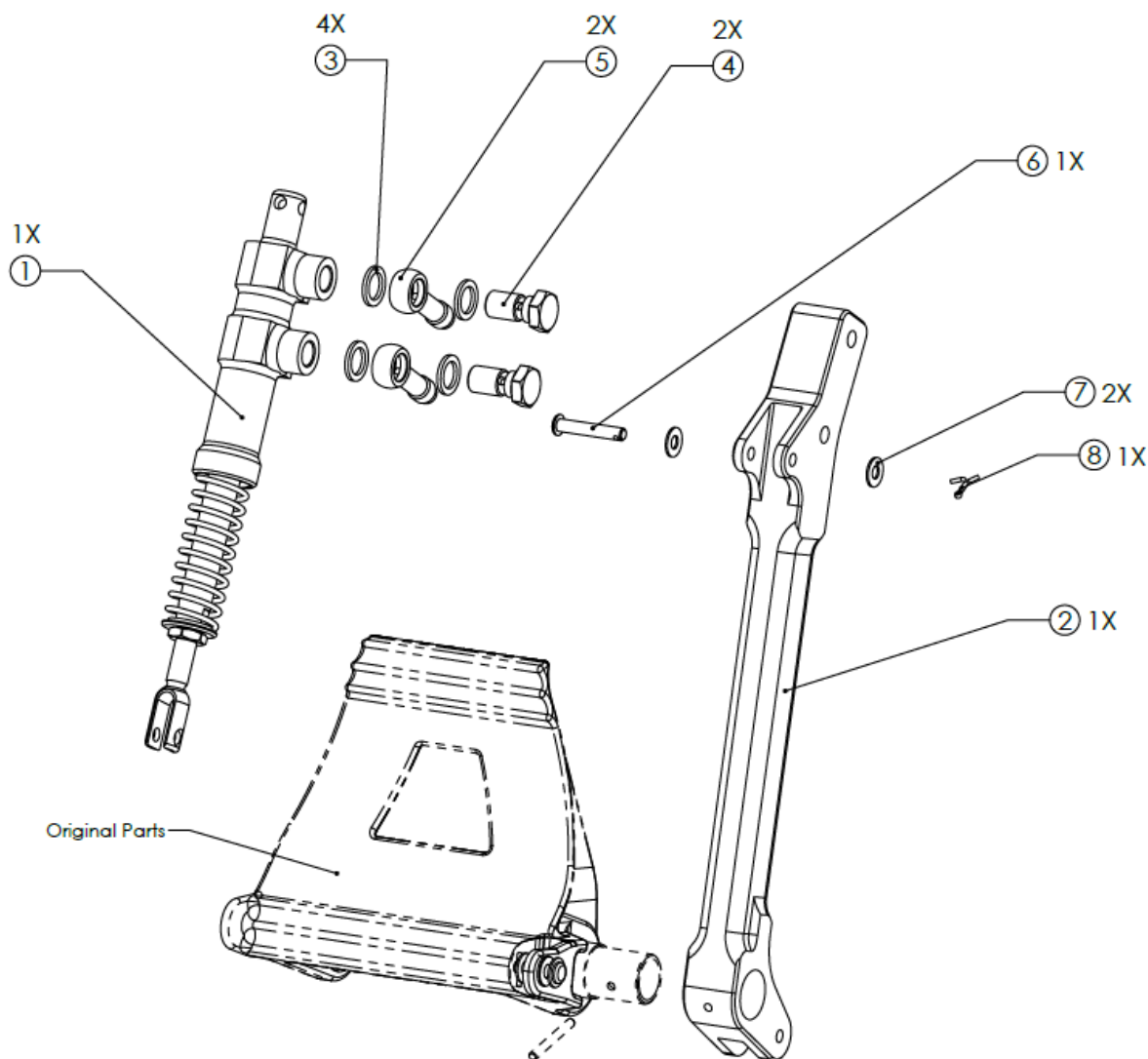
PA-46 Master cylinder Co-pilot Left Assy



Weight:625 g

9	AV-PER-110.2	PA46_MC Brake line/Durite MC	1
8	MS24665-132	1.58x12.7_Cotter Pin/ Goupille fendue	1
7	NAS1149F0332P	AN3 Std_Washer/Rondelle	2
6	MS20392-2C31	3/16_Clevis Pin/Pion	1
5	HYD-019VC	3/8x24_Hydraulic fitting/ banjo droit à visser	1
4	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	AV-PER-102	PA46_Master Cylinder Support/ Support MC	1
1	MP-001.2N	Master Cylinder 9/16" NBR/ Maitre cylindre 14.5 NBR	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-134			

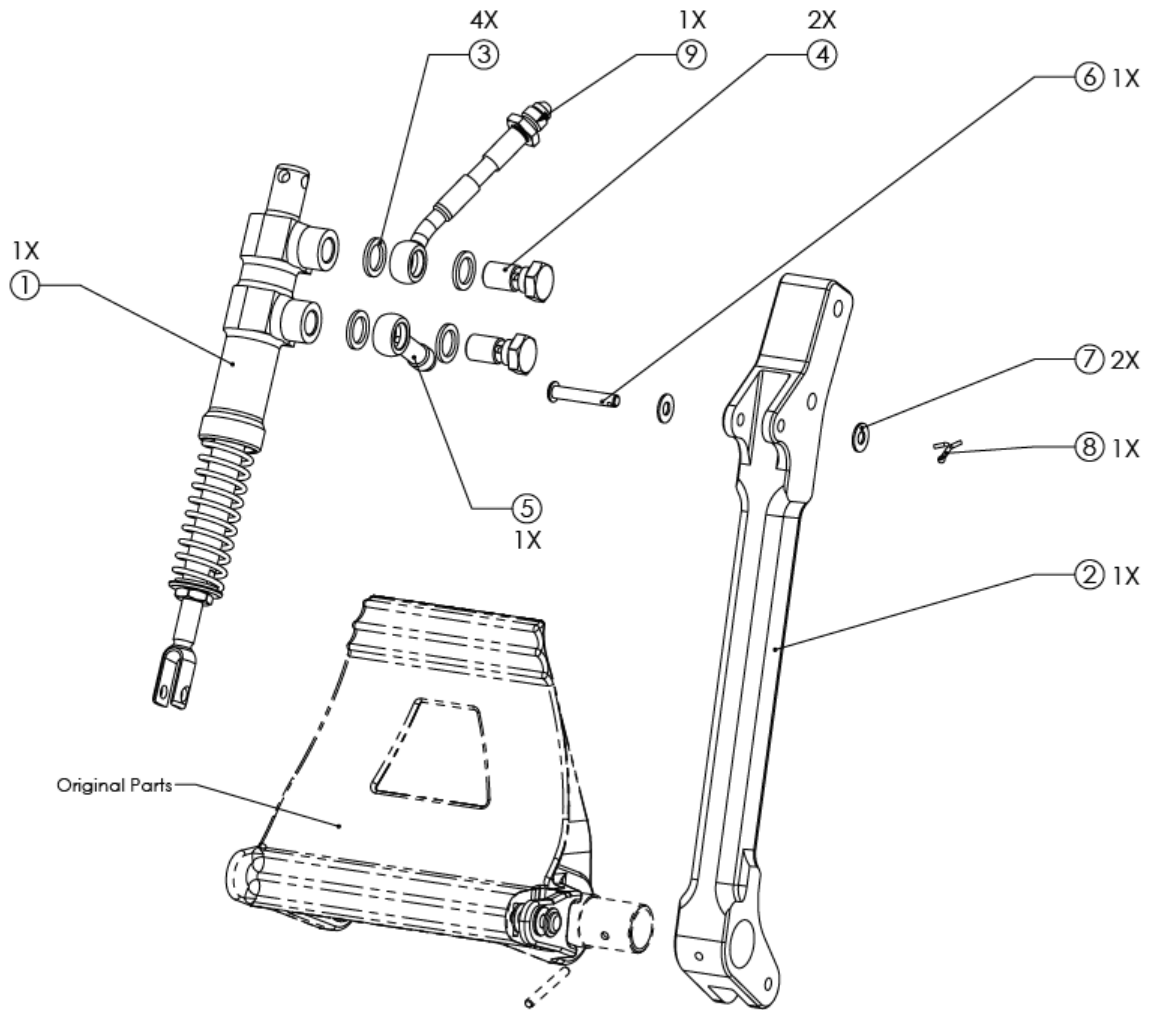
PA-46 Master cylinder Pilot Left Assy



Weight: 613 g

8	MS24665-132	1.58x12.7_Cotter Pin/ Goupille fendue	1
7	NAS1149F0332P	AN3 Std_Washer/Rondelle	2
6	MS20392-2C31	3/16_Clevis Pin/Pion	1
5	HYD-019VC	3/8x24_Hydraulic fitting/ banjo droit à visser	2
4	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	AV-PER-102	PA46_Master Cylinder Support/ Support MC	1
1	MP-001.2N	Master Cylinder 9/16" NBR/ Maitre cylindre 14.5 NBR	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-132			

PA-46 Master cylinder Pilot Right Assy



Weight: 625 g

9	AV-PER-110.2	PA46_MC Brake line/Durite MC	1
8	MS24665-132	1.58x12.7_Cotter Pin/ Goupille fendue	1
7	NAS1149F0332P	AN3 Std_Washer/Rondelle	2
6	MS20392-2C31	3/16_Clevis Pin/Pion	1
5	HYD-019VC	3/8x24_Hydraulic fitting/ banjo droit à visser	1
4	HYD-003P	M10x1_Banjo Bolt/ Vis Banjo	2
3	HYD-005B	Copper Seal/ Joint cuivre	4
2	AV-PER-102	PA46_Master Cylinder Support/ Support MC	1
1	MP-001.2N	Master Cylinder 9/16" NBR/ Maitre cylindre 14.5 NBR	1
REP	PART NUMBER	DESCRIPTION	QTY.
AV-PER-133			



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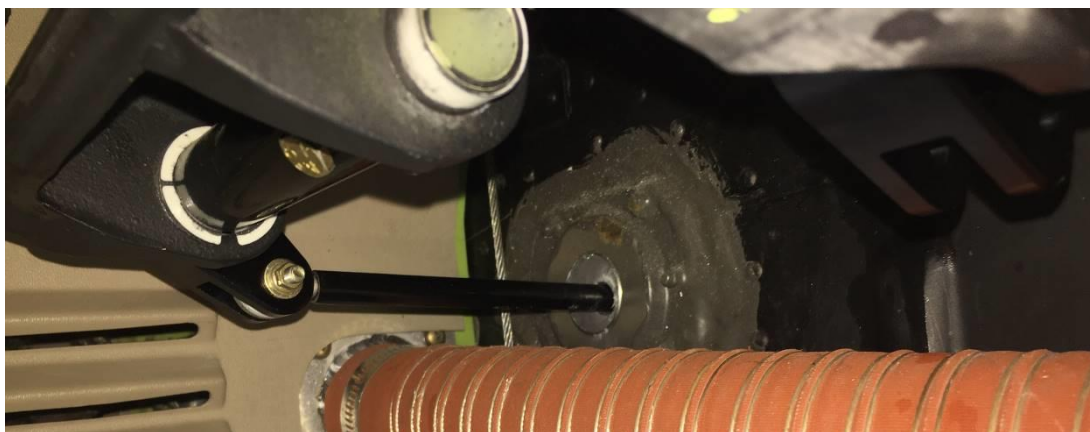
➤ Remove Existing Master Cylinders and Pedals

- Remove the original master cylinders and pedal assemblies from the aircraft per the aircraft manufacturer's instructions.
- Label each pedal with masking tape.
- Remove the original master cylinders from the pedals per the aircraft manufacturer's instructions.

➤ Install Beringer Master Cylinders

- Install one Beringer master cylinder and one master cylinder support onto each of the four pedals as shown in the four drawings above.
- Install the pedal assemblies into the aircraft per the manufacturer's instructions. The master cylinder support contains the same attach point geometry as the original assembly.
- Connect the brake lines per the Hydraulic Schematic on the next page. The ports on the Beringer master cylinders are laser engraved with 'IN' and 'OUT'. Torque banjo bolts to 5 N.m + 90° (44 in lbs + 90°).

WARNING: Make sure to reattach the rudder connecting rods to the lower part of the master cylinder supports on the Pilot RH and Copilot LH.



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4.6 Gear and gear door clearance post-checks

Installer must disconnect main gear doors and nose gear doors and perform a gear retraction and run the gear to the halfway up point and cut off pump and manipulate the gear the rest of the way up by hand to ensure correct and adequate clearances within the gear wells IAW Piper maintenance or service manuals.

Installer must swing the gear back down to the down and locked position and re-connect the gear doors and perform another gear retraction, again, to the halfway up point and cut the pump off and run the rest of way up by hand to ensure proper and adequate gear door clearance.

Installer must swing the gear back down by hand to ensure gear door and tire clearances are met. If any gear doors are touching or are not making adequate clearance, consider slight gear door trimming to make adequate clearances IAW Piper maintenance or service manuals and/or AC 43.13-1B. All gear or gear door adjustments to be made IAW Piper maintenance or service manuals.

Beringer Aero is not responsible for any damages induced to aircraft by not following these requirements.

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.

NOTE: Part number T-375, included with the STC-017 kit, is a tow-bar adapter to be used with Brackett tow bars used at most FBO's. It is not used in installation and is not part of the aircraft.

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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.

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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
BOM-STC-017	Part Nomenclature
MM-00-003	BRAKE BLEEDING procedure
MM-01-002	BRAKE CONDITIONING procedure
SM-00	BERINGER PRODUCTS MAINTENANCE GUIDE
SM-01	Brake Servicing Manual
SM-02	Wheels Servicing Manual

Refer to the latest revision.