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Installation and Maintenance Manual
Van's RV3,4,6,6A,7,7A,8,8A,9,9A,10,12,14 and 14A

This documents contains **72** *pages - Original in color*

E						
D						
C						
B						
A	19/07/2017	GAILLARD.C	BERINGER.G	SALLÉ.S	Edition initiale	TERMINÉ
	Date	***Name - Visa Redaction***	***Name – Visa Verification***	***Name – Visa Approbation***	***Modifications***	***Etat***

Nature du document	**Ref document:**
Installation and maintenance manual	**BRG-MM-002(A)**

MODIFICATION LIST

REV	Modifications
A	Edition initiale
B	
C	
D	
E	

Référence documents

Title	Assembly reference	Rev
Van's RV14A,14 Main Wheel Assy	AV-VANS-220	A
Van's RV3 Main Wheel Assy	AV-VANS-320	A
Van's RV8 Main Wheel Assy	AV-VANS-420	A
Van's RV10 Main Wheel Assy	AV-VANS-520	A
Van's RV6,6A,7,7A,8A,9,9A Main Wheel Assy	AV-VANS-620	A
Van's RV10,14A, Nose Wheel	AV-VANS-530	A
Van's RV6A,7A,8A,9A Nose Wheel	AV-VANS-630	A

SOMMAIRE

1. General

This manual gives the installation procedures of BERINGER wheel and brake system on the Van's RV3,4,6,6A,7,7A,8,8A,9,9A,10,12,14 and 14A .

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.

BERINGER brake system functioning is similar to original brake system.

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.

Note: after each part number the (-) indicates the minor revision status starting from letter A then B, C,

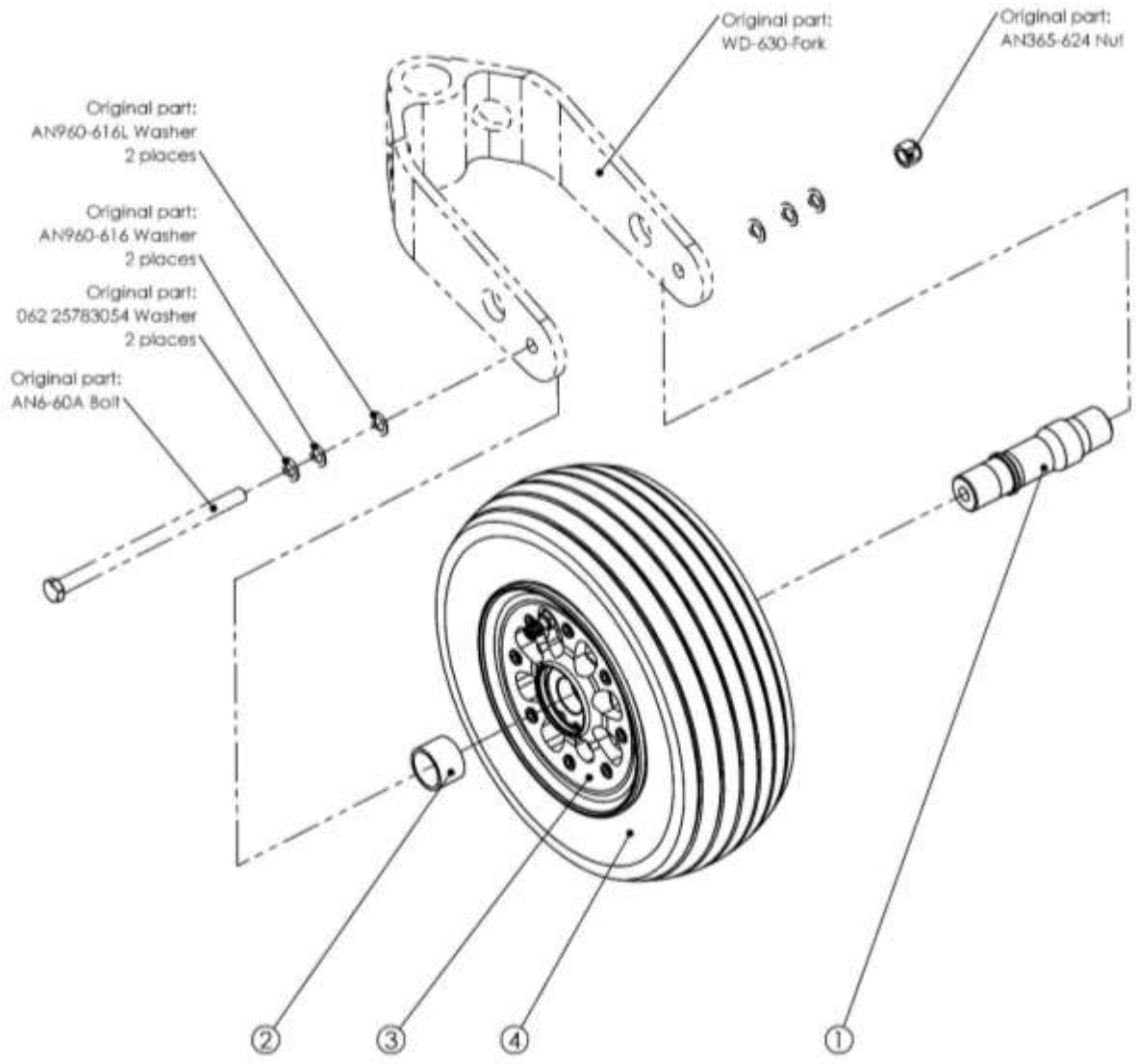
2. Tightening Torque

Description	Torque tightening	
	IN-LBS	N/m
AV-VANS-005	247.8	28
Axle bolt AN4	95.5	10.8
Axle bolt AN5	154.9	17.5
HYD-003P	148	17
ECR-002	141.6	16

3. Nose wheel Kit

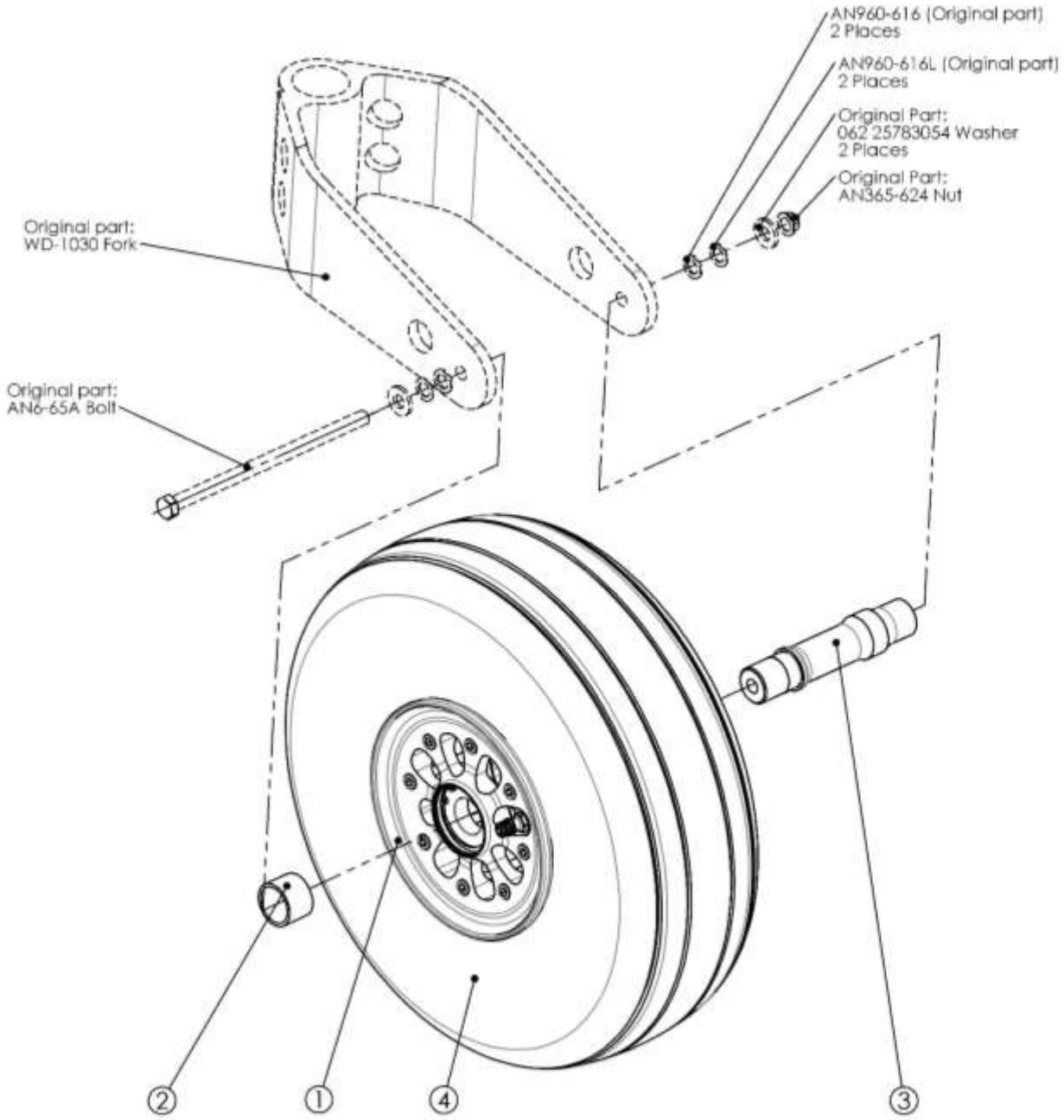
3.1. RV6A,RV7A,RV8A and RV9A

3.1.1. Nose wheel Assy (Drawing reference: AV-VANS-630)



REF	PART NUMBER	DESCRIPTION	QTY.
4	PAC01	Tire 11x4.00x5"	1
3	RA-013(A)	Wheel Assy.	1
2	AV-VANS-004(A)	Bearing spacer	1
1	AV-VANS-001(A)	Axe roue AV RV7A	1

3.2. RV10 and RV14A

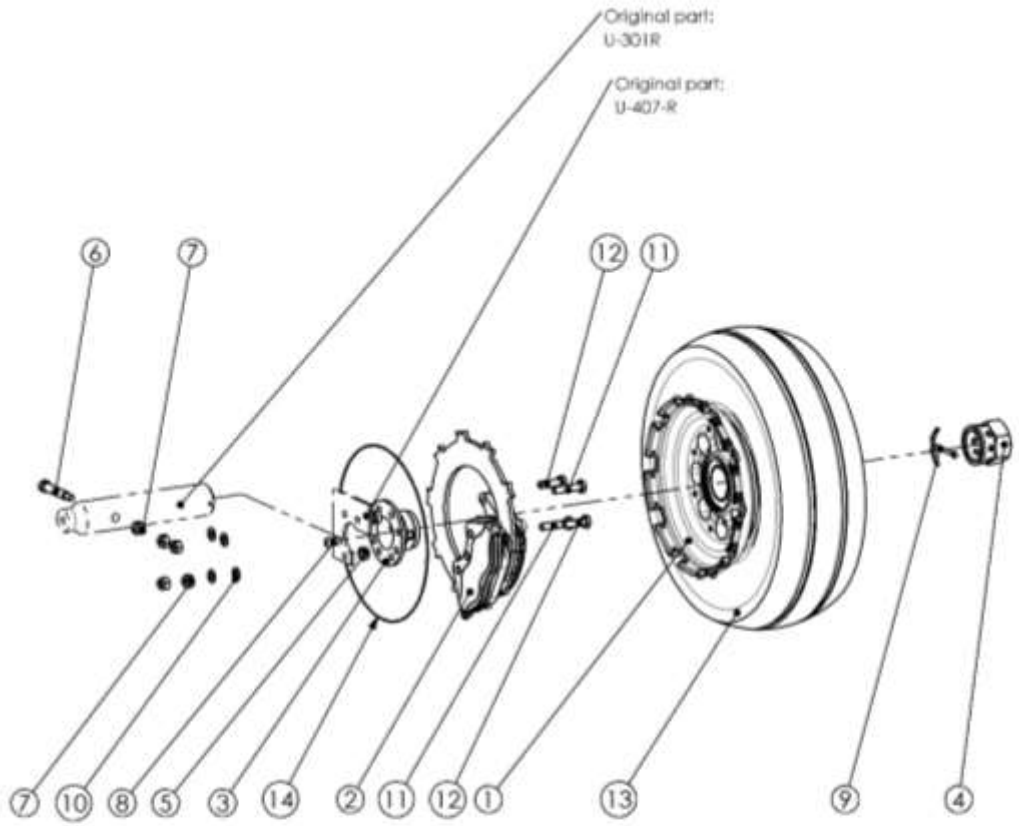


4	PAA02	Tire 5.00-5 TUBELESS	1
3	AV-VANS-010(A)	Axle	1
2	AV-VANS-004(A)	Bearing spacer	1
1	RA-014(A)	Wheel Assy.	1
REF	PART NUMBER	DESCRIPTION	QTY.

4. Finishing Kit for main wheels

4.1. RV3

4.1.1. Main wheel Assy Right (Drawing reference: AV-VANS-320R)

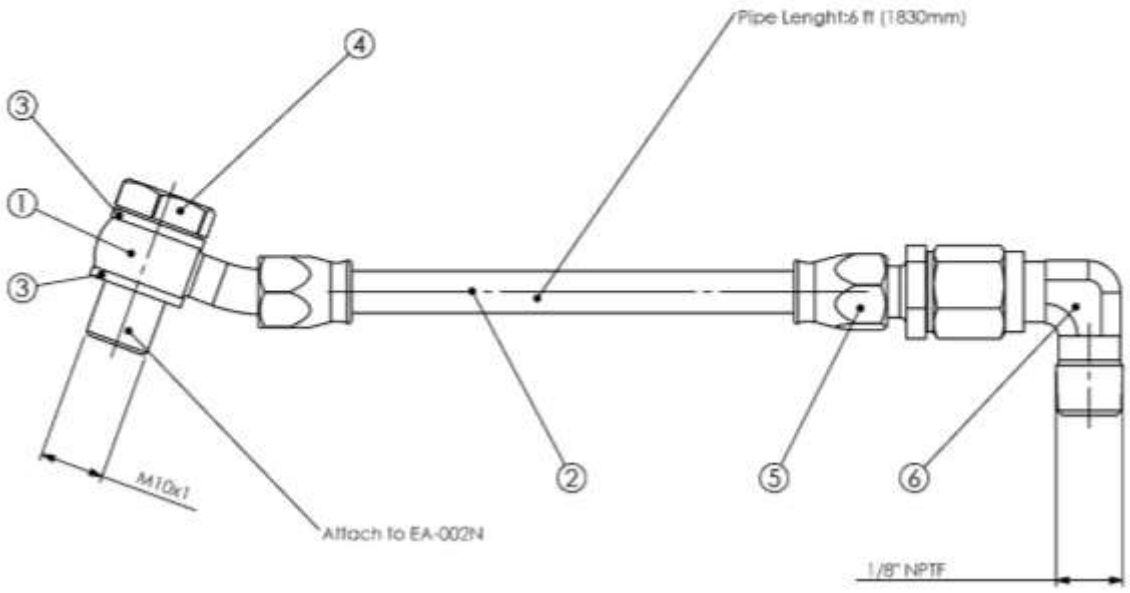


14	-	Safety Wire	1
13	Tire	Tire 11x4.00-5	1
12	AN4-7A	Bolt	2
11	AN4-11A	Bolt	2
10	NAS1149F0432P	Washer	4
9	L-V-003	Cotter Pin	1
8	V-BHC-004(A)	Screw	1
7	C-HN-003	self-locking nut	5
6	V-EP-001	Screw	1
5	RDL-008(A)	Spacer	3
4	AV-VANS-005(A)	Nut1.25"x16	1
3	AV-VANS-003(A)	Caliper plate	1
2	EA-002H(A)	Brake Assy	1
1	EP-020(A)	Main Wheel Assy.	1
REF	PART NUMBER	DESCRIPTION	QTY.

4.1.2. Main wheel Assy Left (Drawing reference: AV-VANS-320L)

Same assembly AV-VANS-320R (Symetrical assembly)

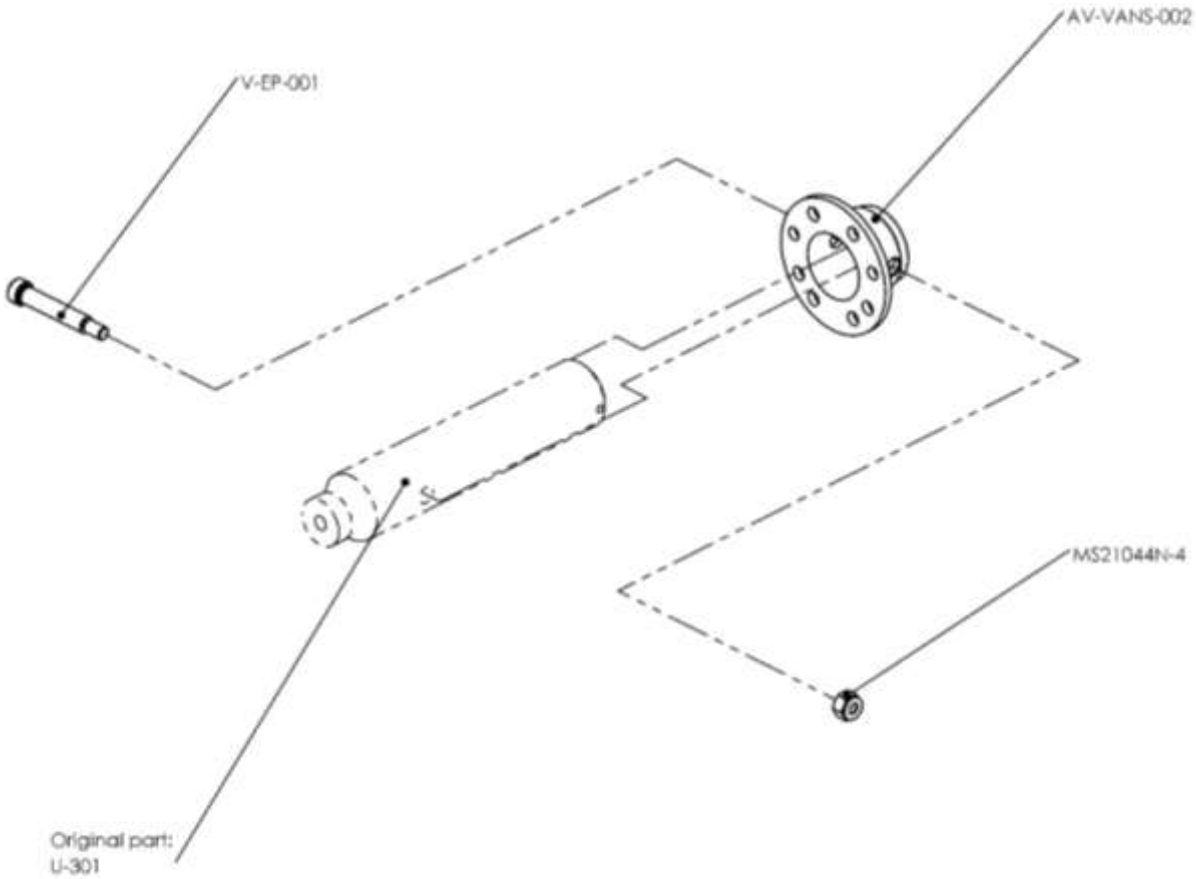
4.1.3. Hose Main wheel Assy Right and Left (Drawing reference: AV-VANS-410)



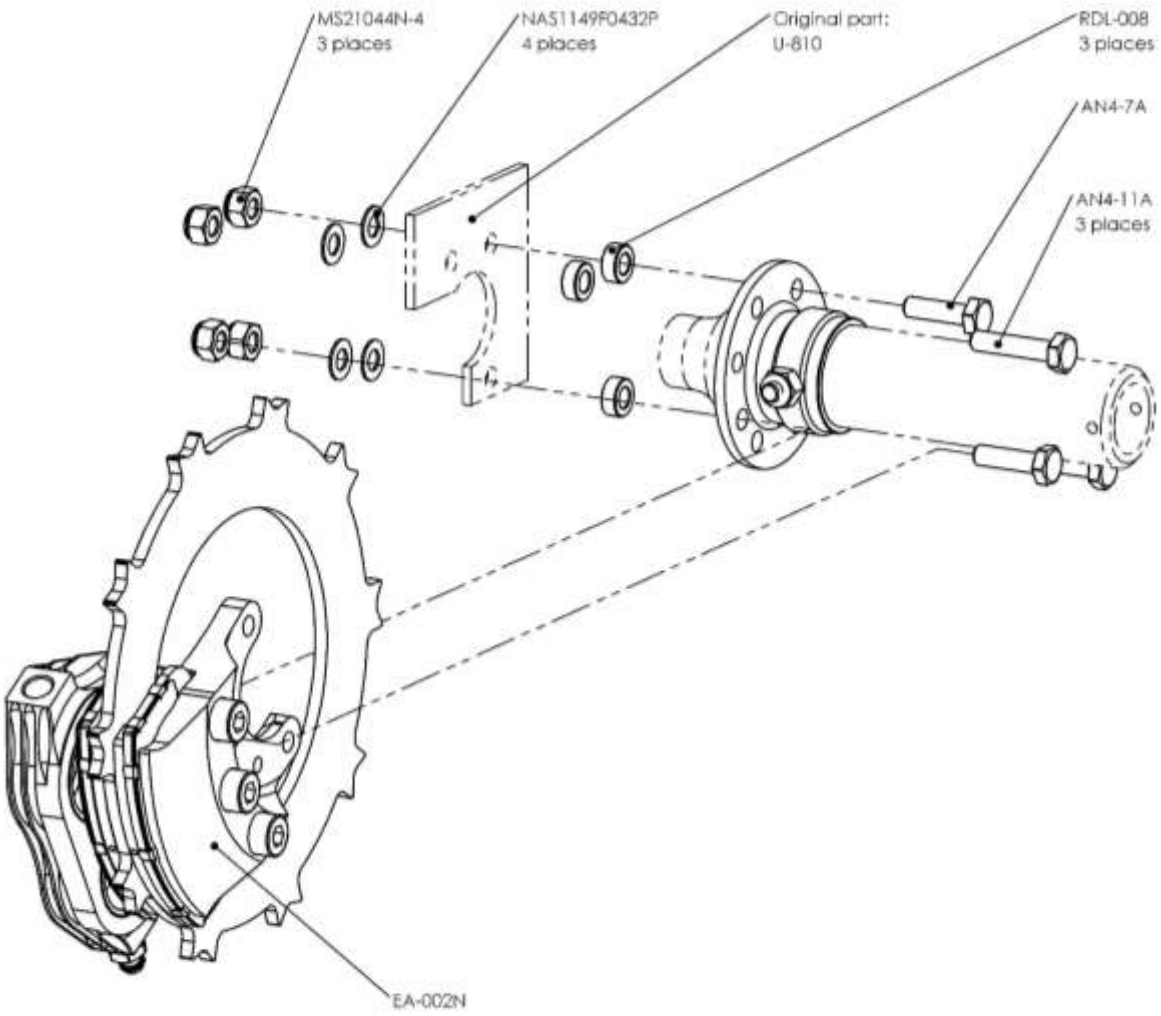
REP	PART NUMBER	DESCRIPTION	QTY.
6	HYD-028D	90° Elbow	1
5	HYD-008DP	Raccord femelle 3/8x24	1
4	HYD-003P	Banjo Bolt	1
3	HYD-005B	Copper Seal	2
2	HYD-032	Durite tressée non gainé	1
1	HYD-002DP	Banjo	1

4.1.4. Installation Main wheel Assy Right and left (Drawing reference: AV-VANS-320R)

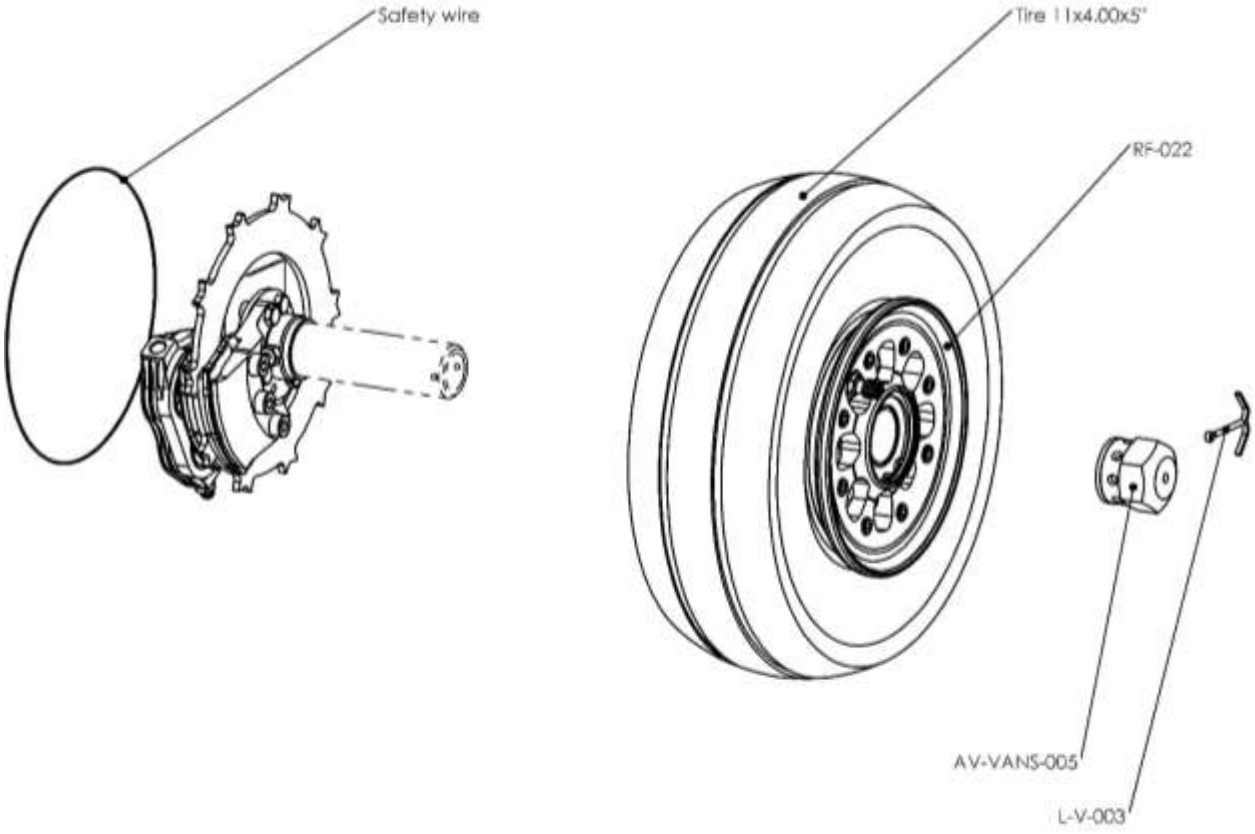
a) Assemble the brake caliper on the landing gear.



b) Assemble the brake caliper on the landing gear.

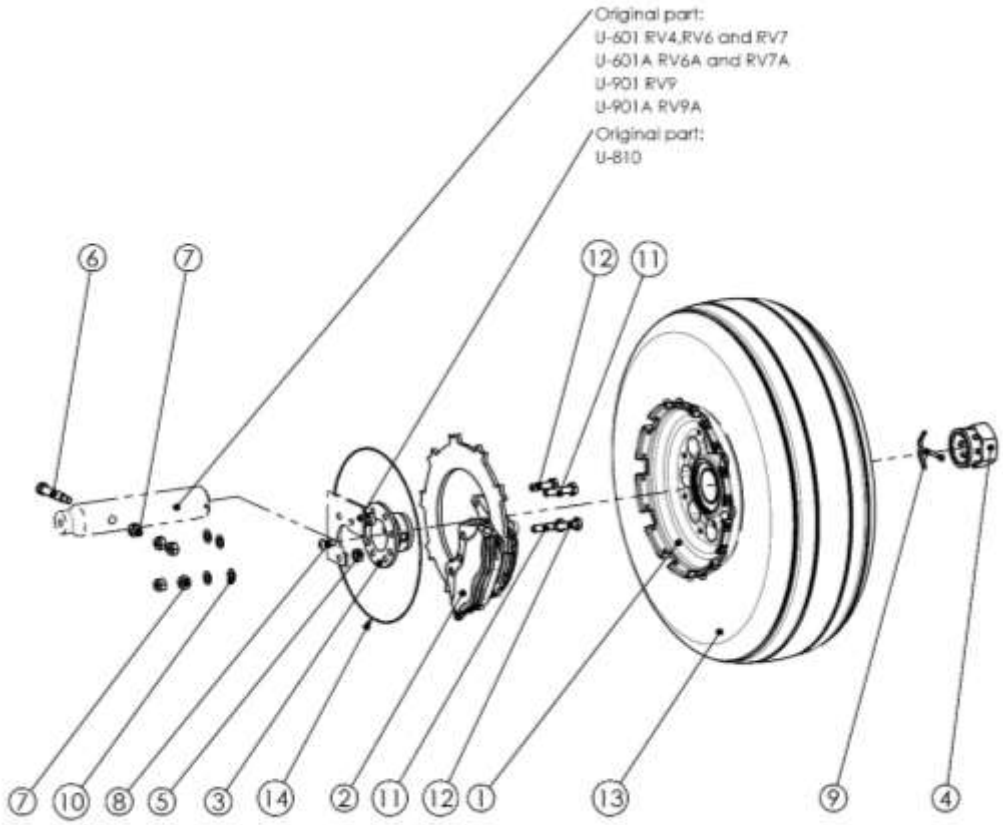


c) Assemble the main wheel



4.2. RV4, RV6, RV6A,RV7,RV7A,RV8A,RV9 and RV9A

4.2.1. Main wheel Assy Right (Drawing reference: AV-VANS-620R)

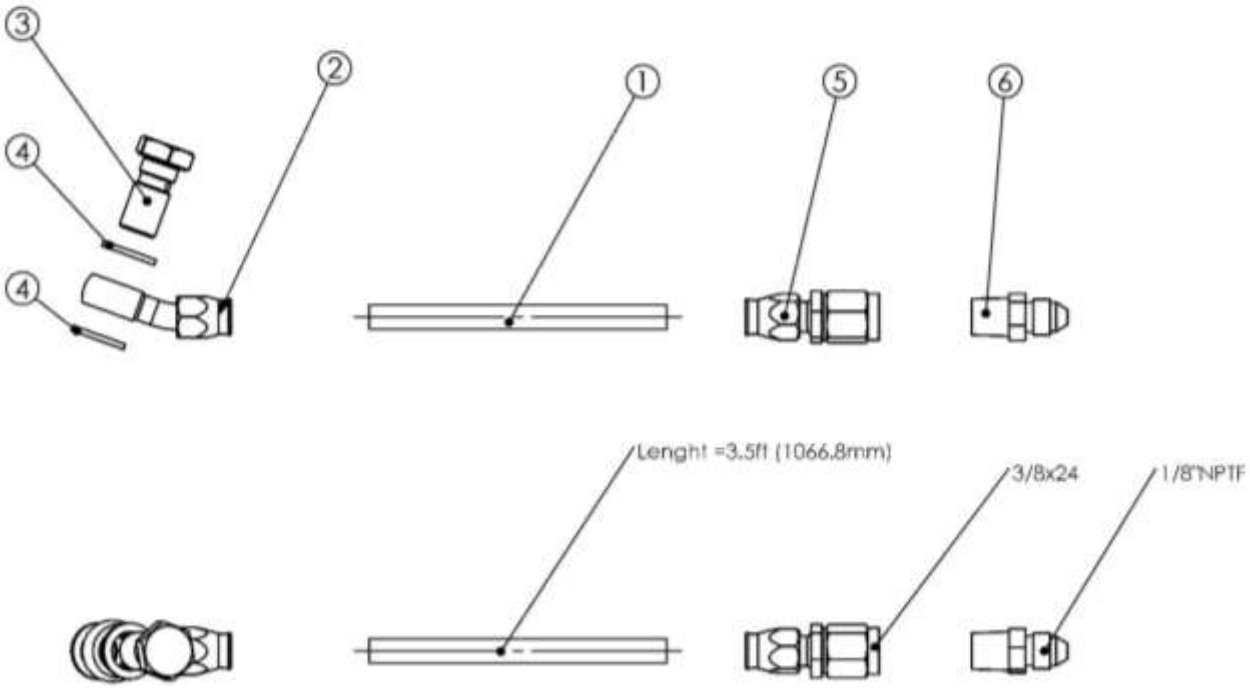


14	-	Safety Wire	1
13	PAA02	PAA02	1
12	AN4-7A	Bolt	2
11	AN4-11A	Bolt	2
10	NAS1149F0432P	Washer	4
9	L-V-003	Cotter Pin	1
8	V-BHC-004(A)	Screw	1
7	E-HN-003	self-locking Nut	5
6	V-EP-001	Screw	1
5	RDL-006(A)	Spacer	3
4	AV-VANS-005(A)	Nut 1.25"x16	1
3	AV-VANS-002(A)	Caliper plate	1
2	EA-002N(A)	Brake Assy	1
1	W-022(A)	Main Wheel Assy.	1
REF	PART NUMBER	DESCRIPTION	QTY.

4.2.2. Main wheel Assy Left (Drawing reference: AV-VANS-620L)

Same assembly AV-VANS-620R (Symetrical assembly)

4.2.3. Hose Main wheel Assy Right and Left (Drawing reference: AV-VANS-610)

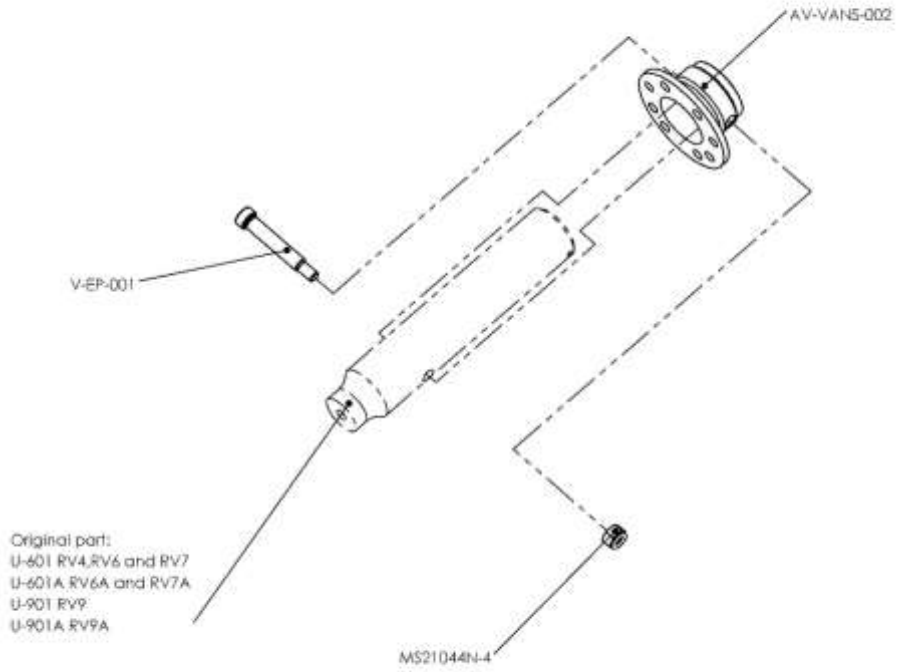


Note:
Qty 10 ZGA01 Brake line Clamp

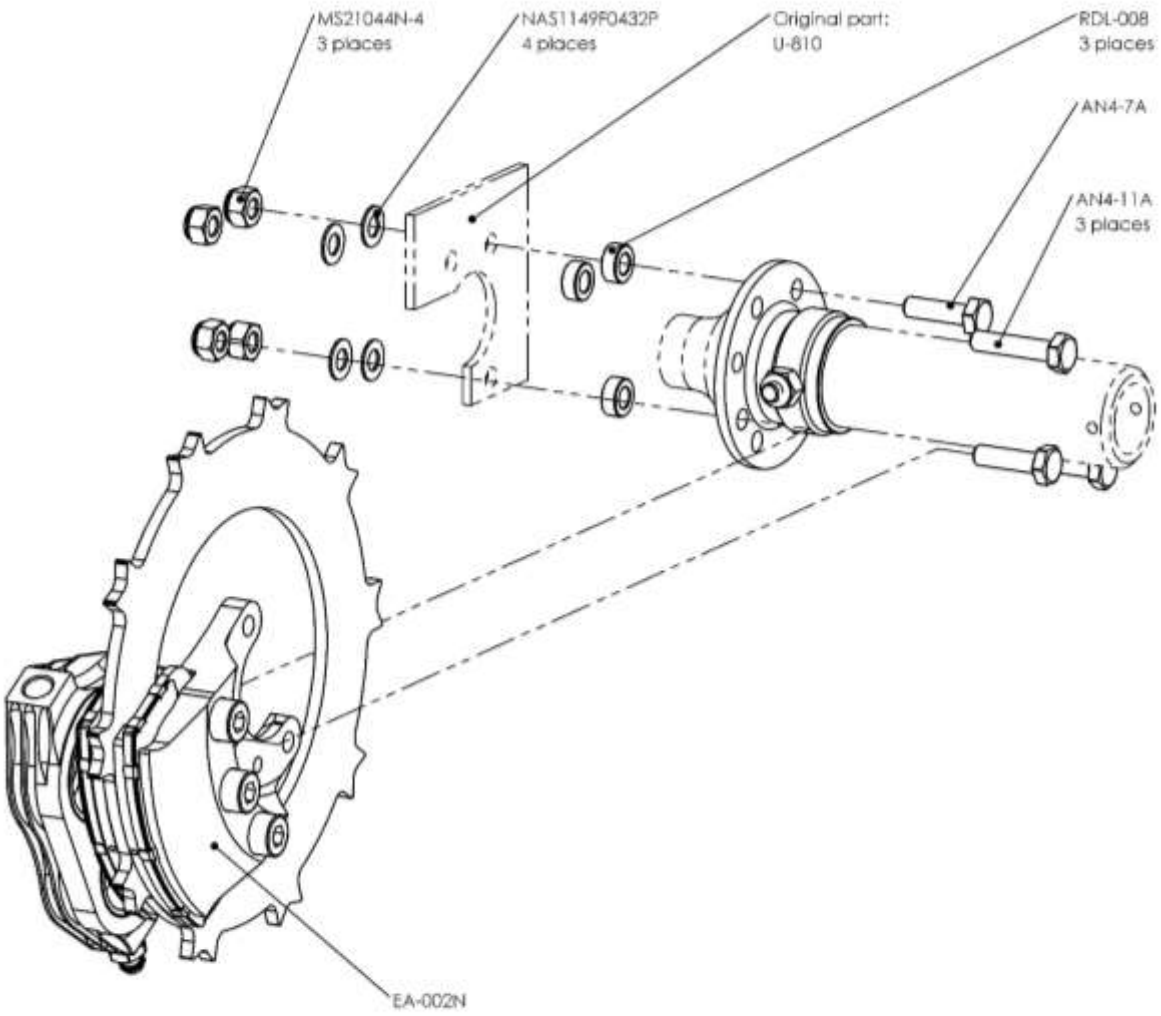
REF	PART NUMBER	DESCRIPTION	QTY.
6	HYD-024D	Adaptator	1
5	HYD-008OP	Raccord femelle 3.8x24 (Réf G: 6001-03P)	1
4	HYD-005B	Copper Seal	2
3	HYD-003P	Banjo Bolt	1
2	HYD-002OP	Banjo	1
1	HYD-032	Durite tressée non gainé (réf G-600-03)	1

4.2.4. Installation Main wheel Assy Right and left (Drawing reference: AV-VANS-620R)

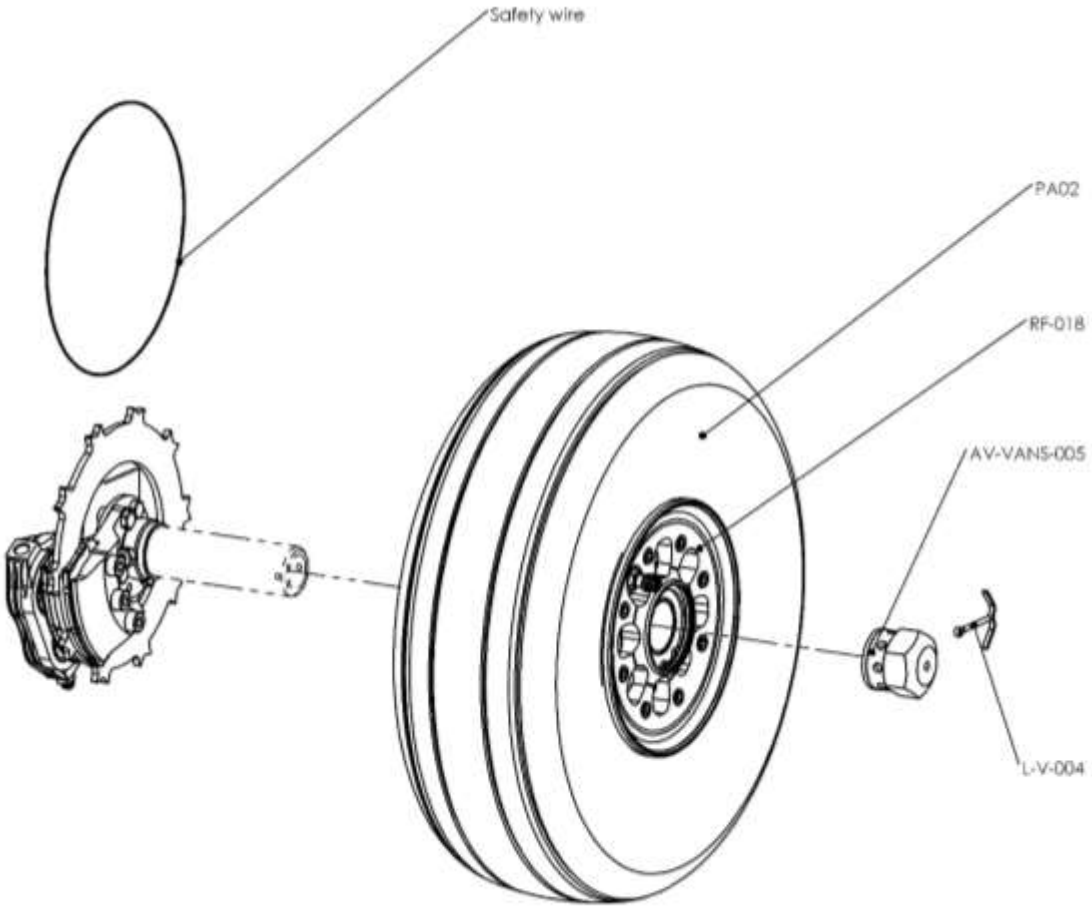
a) Assemble the caliper plate on the landing gear.



b) Assemble the brake caliper on the landing gear.

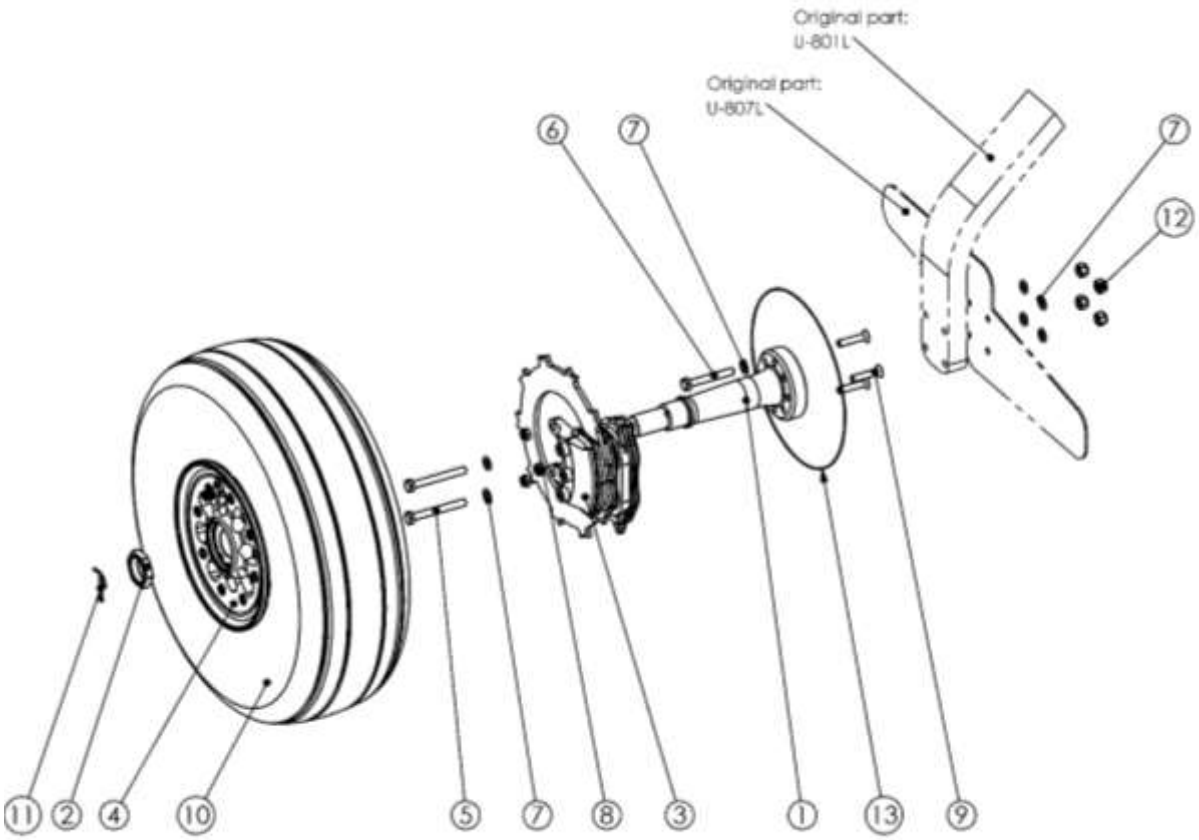


c) Assemble the main wheel



4.3. RV8 Grove Landing Gear

4.3.1. Main wheel Assy Left (Drawing reference: AV-VANS-420L)

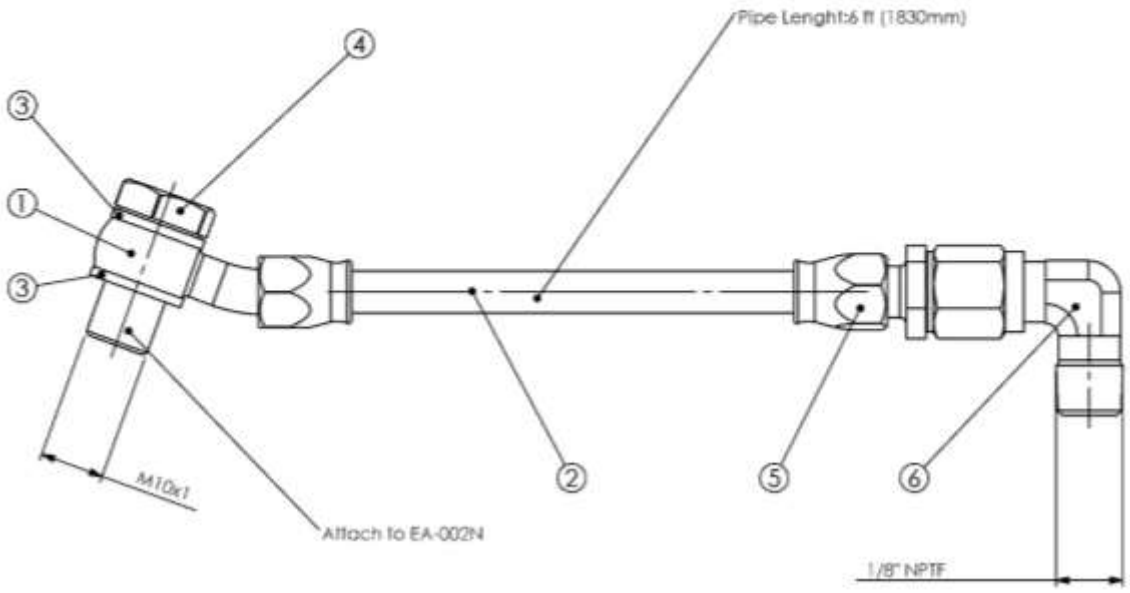


13	-	Safety Wire	1
12	MS21044N4	self-locking nut	4
11	L-V-004	Cotter Pin	1
10	FAA02	FAA02	1
9	V-FHC-007	Screw	3
8	L-HM-003	self-locking nut	3
7	NAS1149F0432P	Washer	8
6	AN4-17A	Axle bolt	2
5	AN4-22A	Axle bolt	2
4	RT-018(A)	Main Wheel Assy.	1
3	EA-003N(A)	Brake Assy	1
2	[illegible]	Axle nut	1
1	[illegible]	Axle	1
REF	PART NUMBER	DESCRIPTION	QTY.

4.3.2. Main wheel Assy Right (Drawing reference: AV-VANS-420R)

Same assembly AV-VANS-420L (Symetrical assembly).

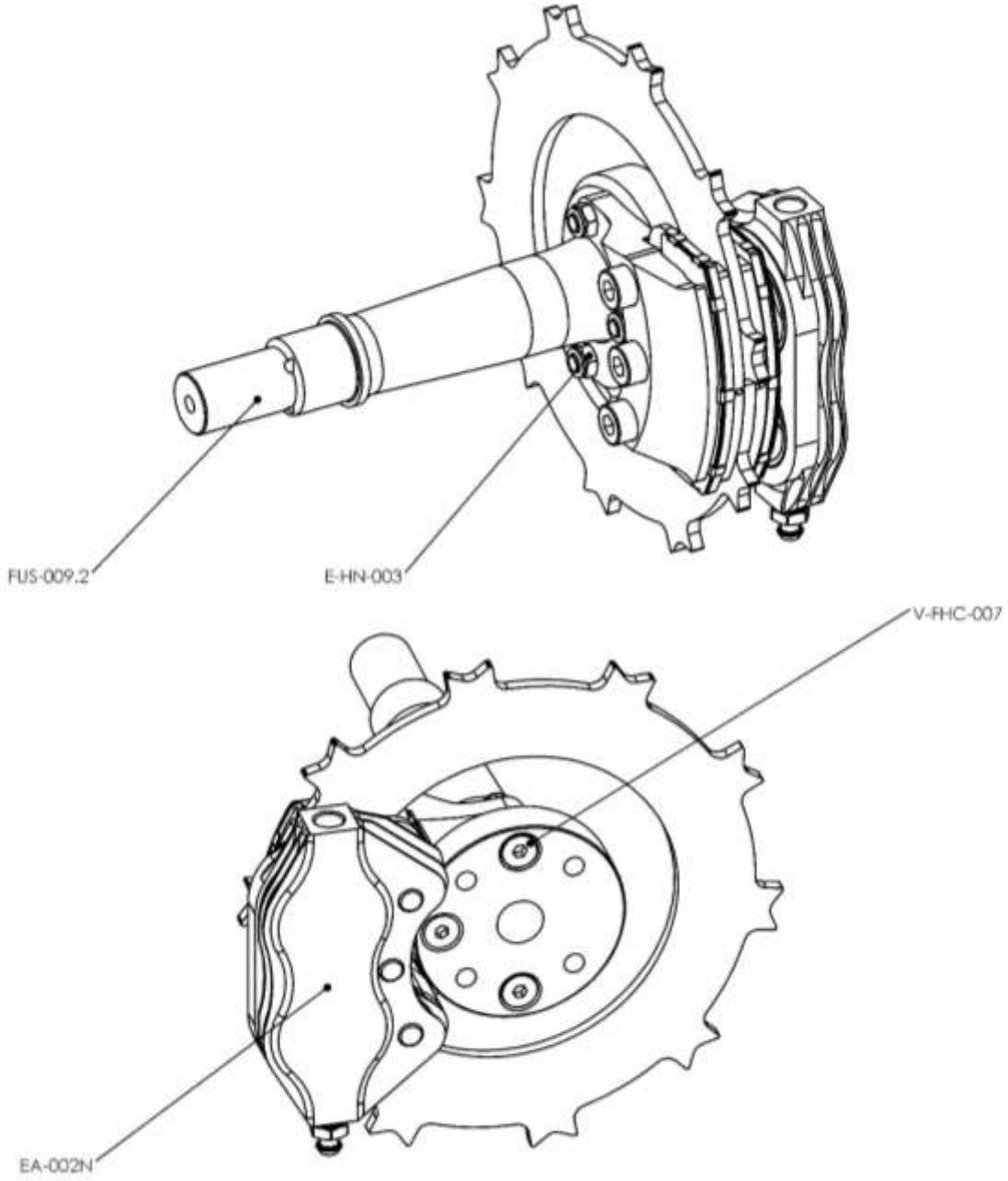
4.3.3. Hose Main wheel Assy Right and Left (Drawing reference: AV-VANS-410)



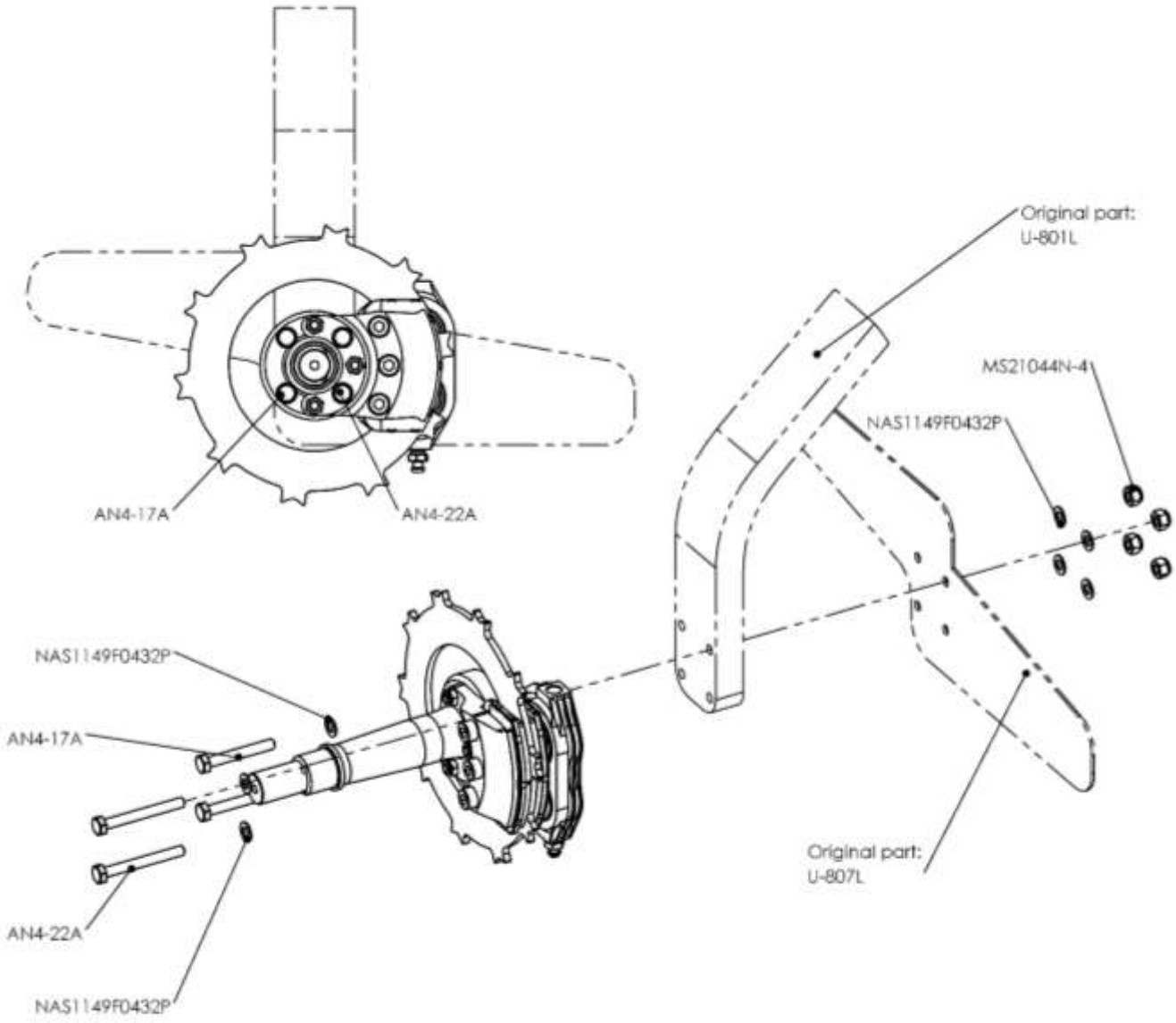
6	HYD-028D	90° Elbow	1
5	HYD-008OF	Raccord femelle 3/8x24	1
4	HYD-003F	Banjo Bolt	1
3	HYD-005B	Copper Seal	2
2	HYD-032	Durite tressée non gainé	1
1	HYD-002OF	Banjo	1
REP	PART NUMBER	DESCRIPTION	QTY.

4.3.4. Installation Main wheel Assy Right and left (Drawing reference: AV-VANS-420L)

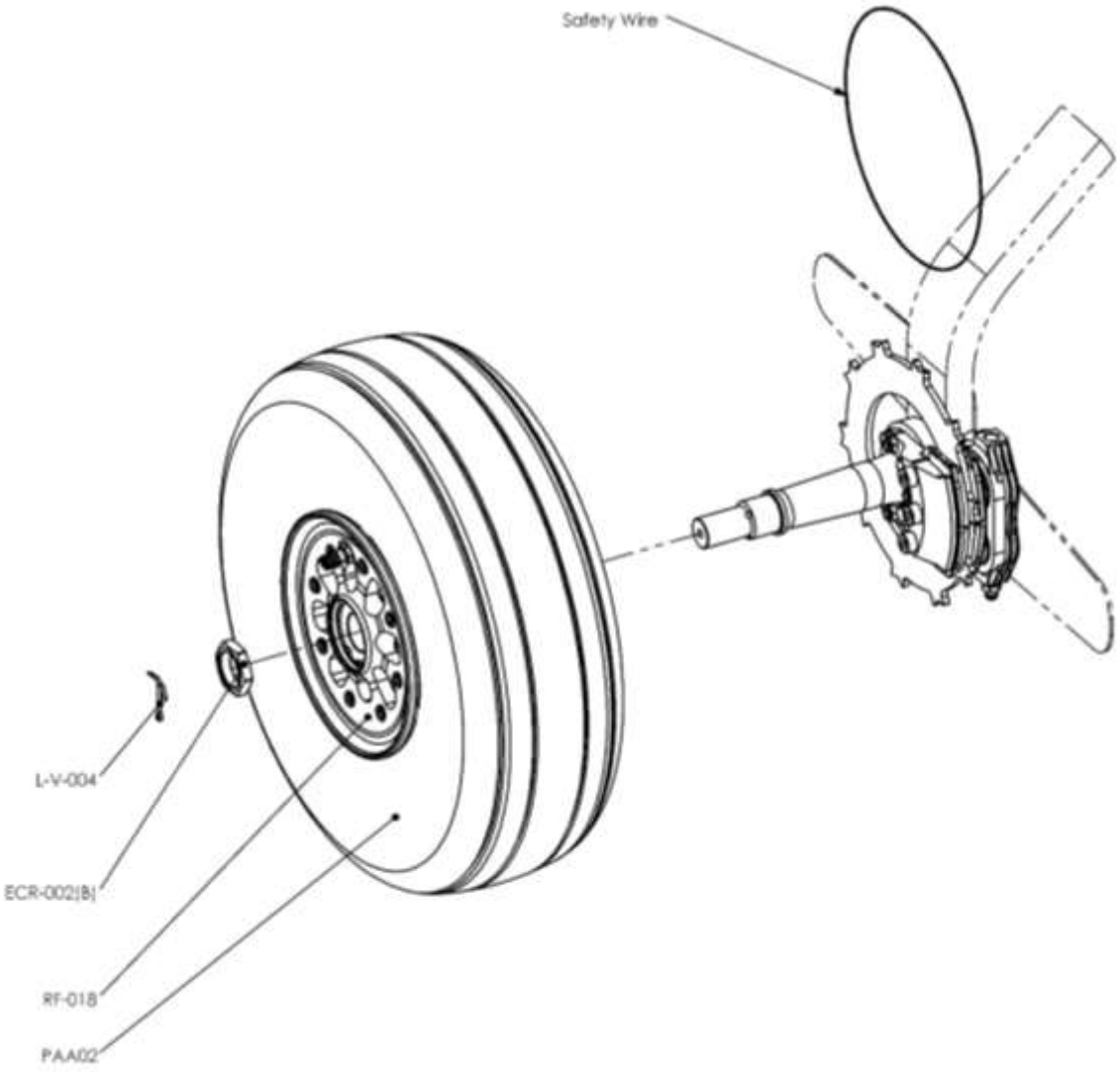
a) This assembly is mounted in factory.



b) Assemble the brake caliper on the landing gear.

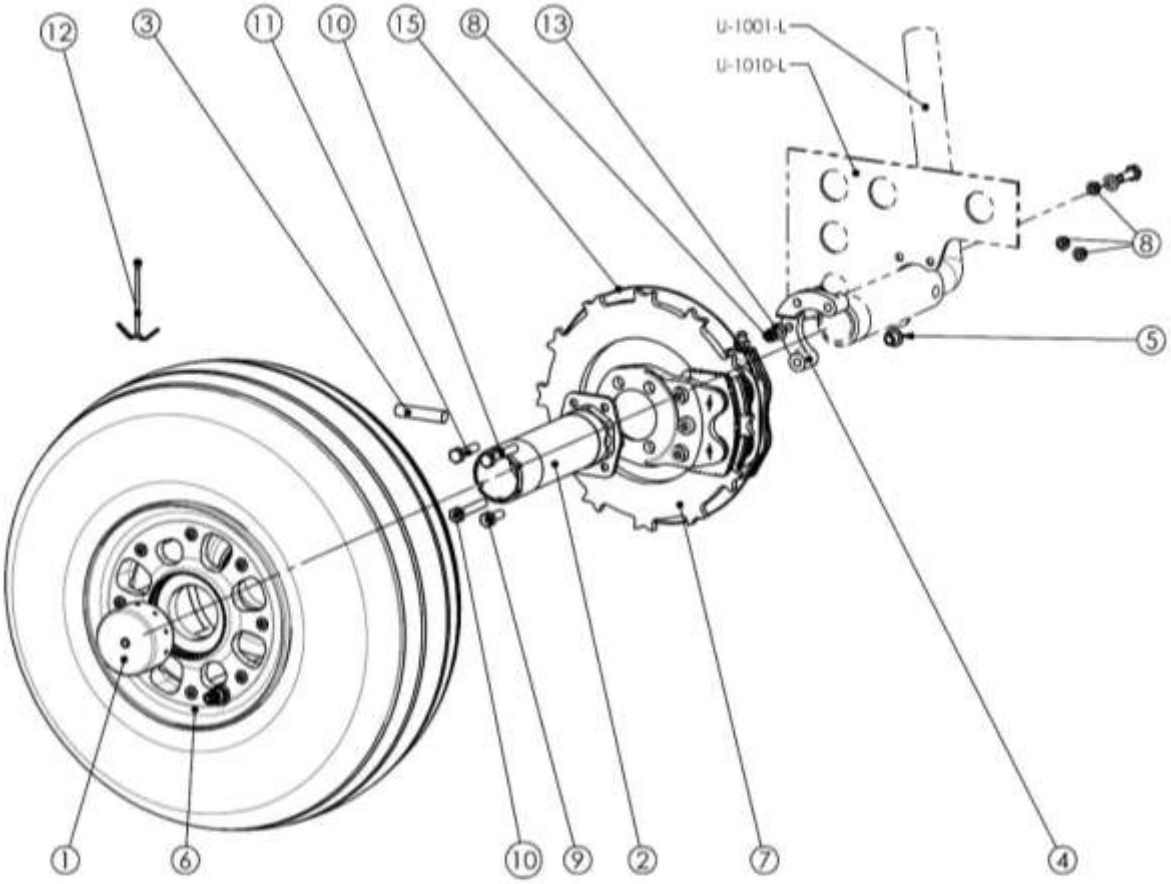


c) Assemble the main wheel



4.4. RV10

4.4.1. Main wheel Assy Left (Drawing reference: AV-VANS-520L)

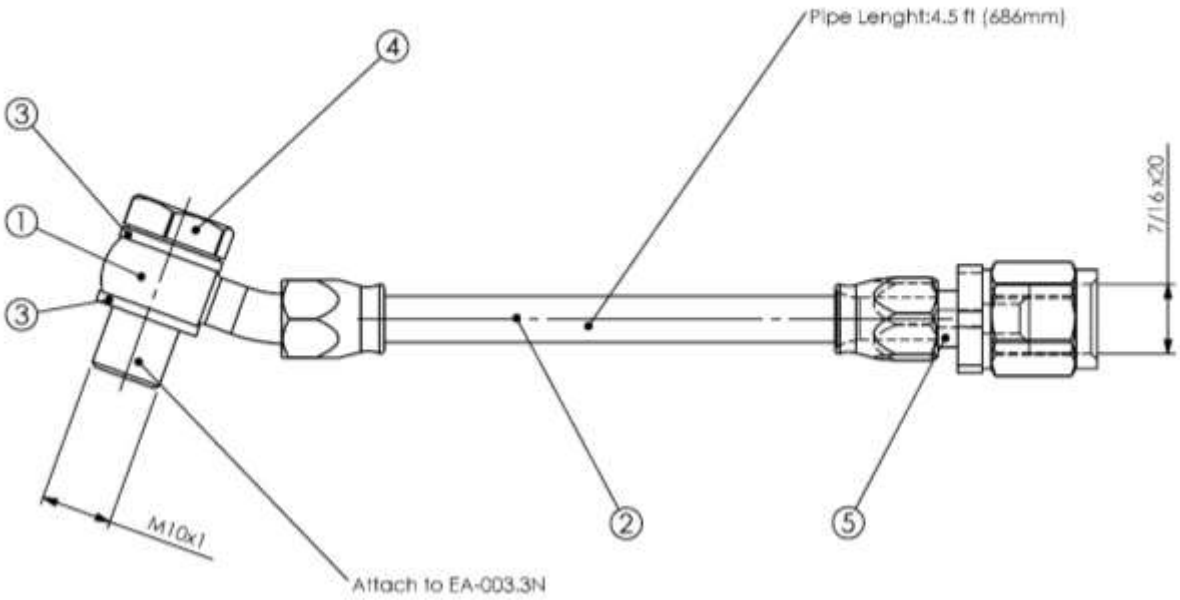


15	-	Safety Wire	1
14	025-501-1	Tire 15x6.00-6	1
13	NAS1149F0432P	Washer	2
12	I-V-005	Cotter Pin	1
11	AN4-11A	Bolt	1
10	AN4-13A	Bolt	2
9	AN4-6A	Bolt	2
8	MS21042-4	Self locking Nut	8
7	EA-003.3H(B)	Brake Assy.	1
6	RF-016(A)	Wheel Assy.	1
5	BDE-017.1(A)	Spacer	1
4	AV-VANS-016L(A)	Left Spacer	1
3	AV-VANS-014(B)	Axle	1
2	AV-VANS-011(B)	Axle	1
1	AV-VANS-012(A)	Nut	1
Item	PART NUMBER	Description	QTY

4.4.2. Main wheel Assy Right (Drawing reference: AV-VANS-520R)

Same assembly AV-VANS-520L (Symetrical assembly) Replace Item 04 (AV-VANS-016L) by (AV-VANS-016R)

4.4.3. Hose Main wheel Assy Right and Left (Drawing reference: AV-VANS-510)

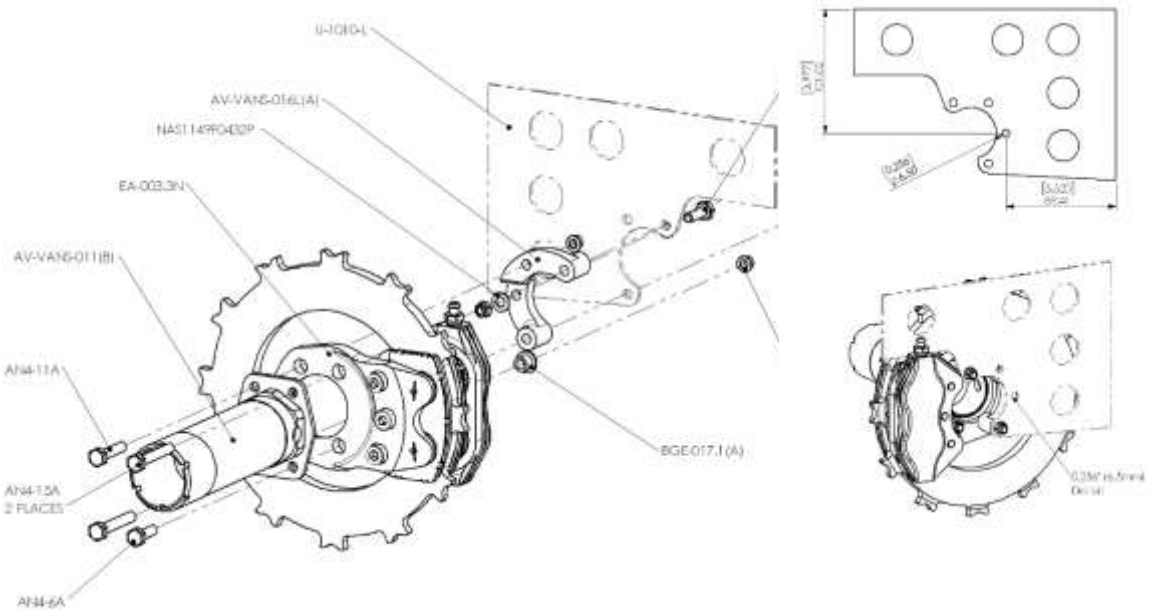


Note:
Qty 10 ZGA01 Brake line Clamp

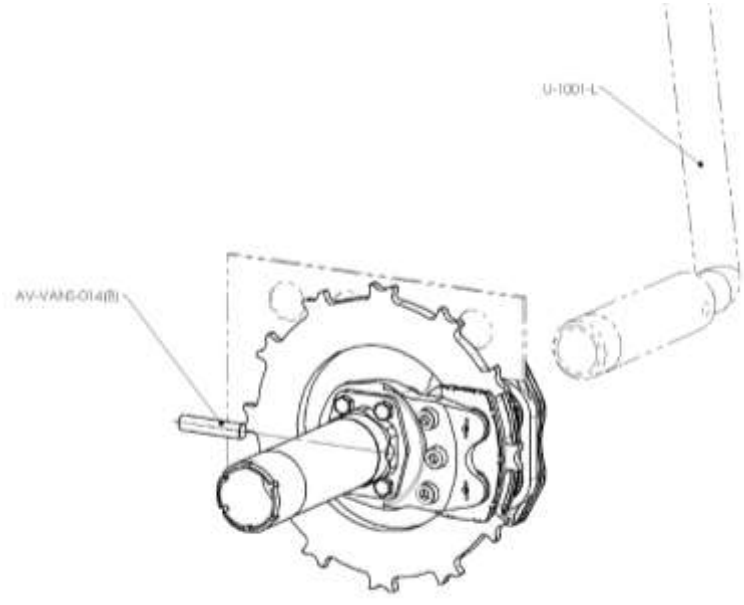
5	HYD-009OC	Raccord droit 7/16x20	1
4	HYD-003P	Banjo Bolt	1
3	HYD-005B	Copper Seal	2
2	HYD-032	Durite tressée non gainé	1
1	HYD-002OP	Banjo	1
REF	PART NUMBER	DESCRIPTION	QTY.

4.4.4. Installation Main wheel Assy Right and left (Drawing reference: AV-VANS-520L)

a) Assemble the left brake assembly using the parts and hardware from the drawing below. (Drilling U-1010-L)

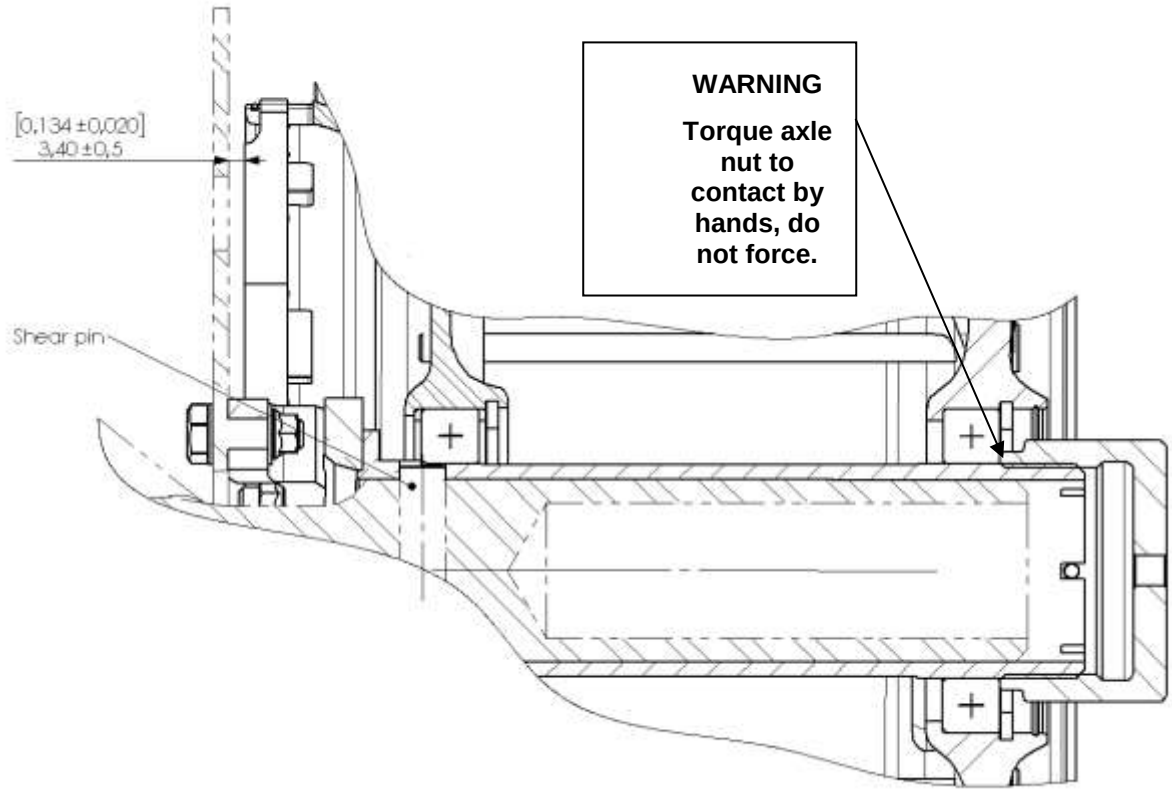


b) Grease the landing gear leg axle and slide the left brake assembly on the axle of the U-1001-L Main Gear leg and secure it in place with the shear pin.



c) Insert the shear pin.

CAUTION: Make sure that the shear pin is fully in place and that the distance between the disc and the fairing plate is as per the next drawing



d) Apply a thin coat of grease on wheel bearings

Insert the wheel through the axle while placing the disc in wheel slots between the clips.

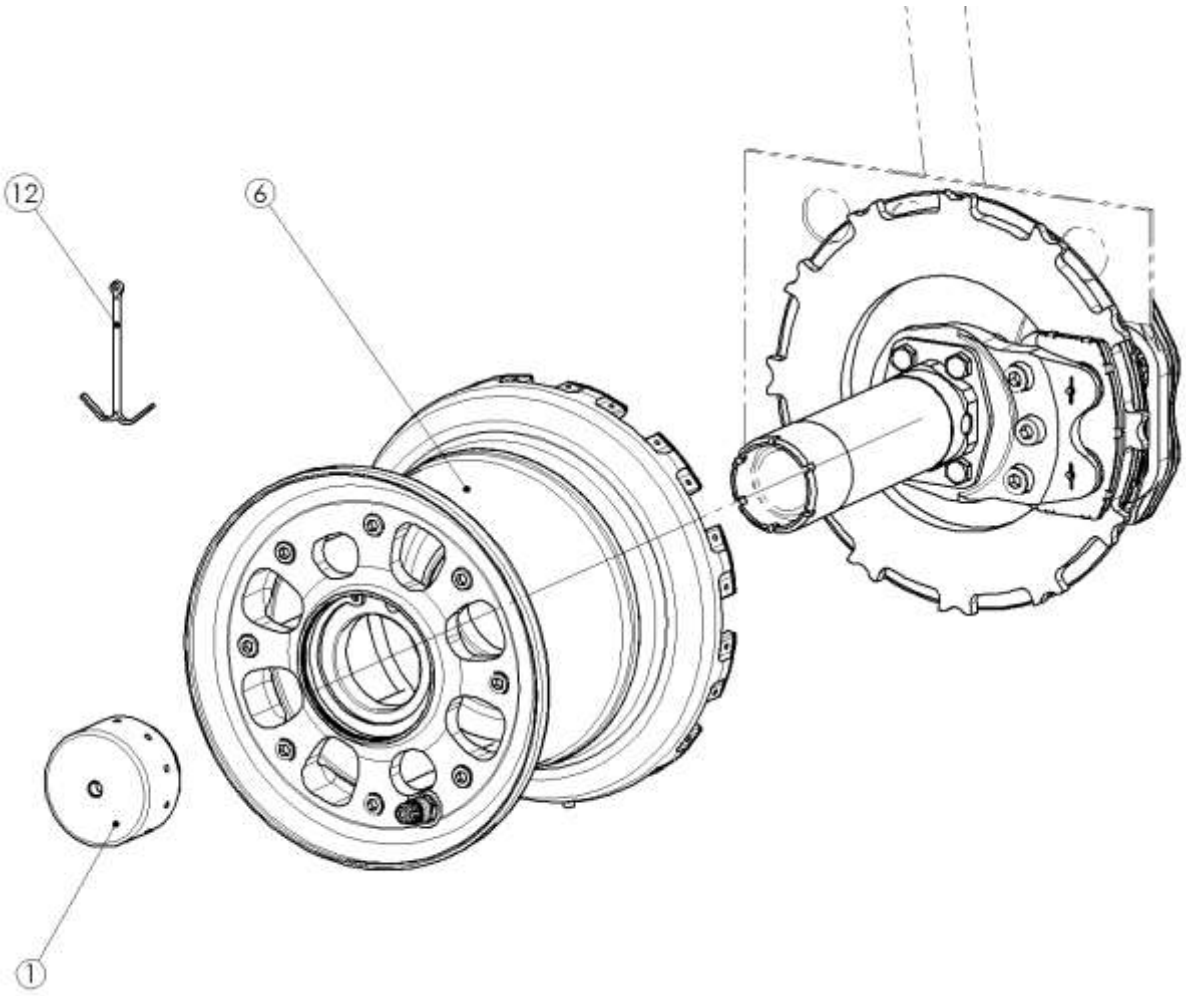
NOTE: Do not force, the disc has to be properly positioned to fit inside wheel slots.

e) Apply a thin coat of grease on axle thread. Screw the axle nut to contact

f) Torque axle nut to contact by **hands, do not force. (WARNING)**

g) Insert a new cotter pin to secure the axle nut

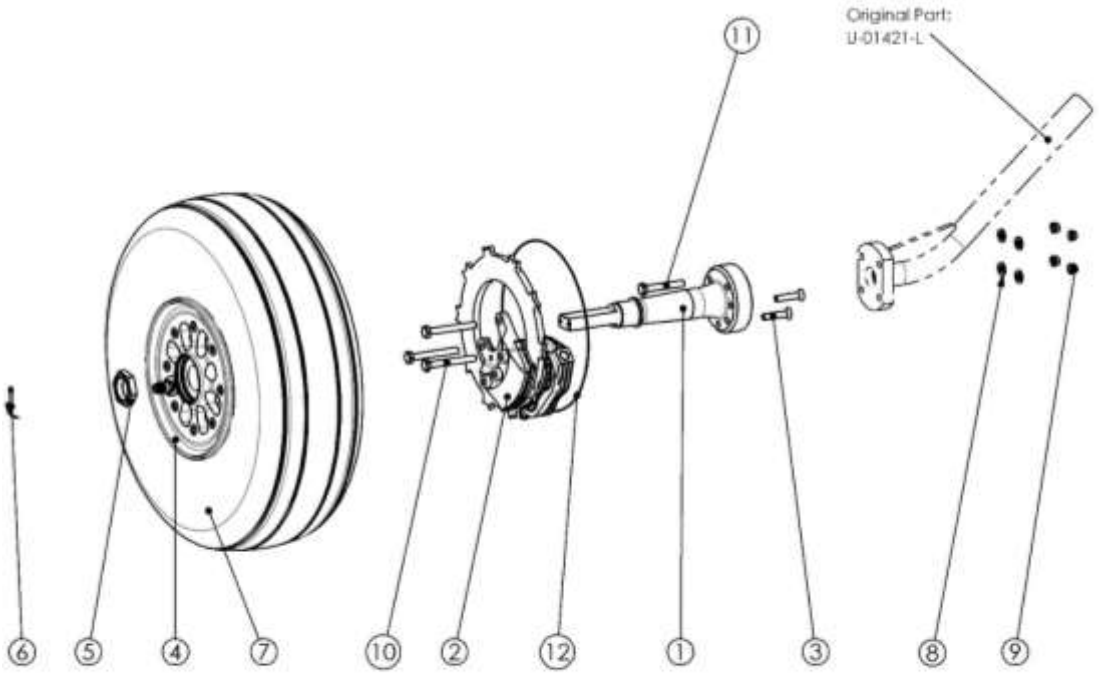
CAUTION: Cotter pin must be in place to prevent the loose of axle nut.



h) Place a new safety wire (stainless steel 1mm – 0.040") in the ring groove all around the wheel. This safety wire must be in place to secure the disc.

4.5. RV14

4.5.1. Main wheel Assy Left (Drawing reference: AV-VANS-220L)

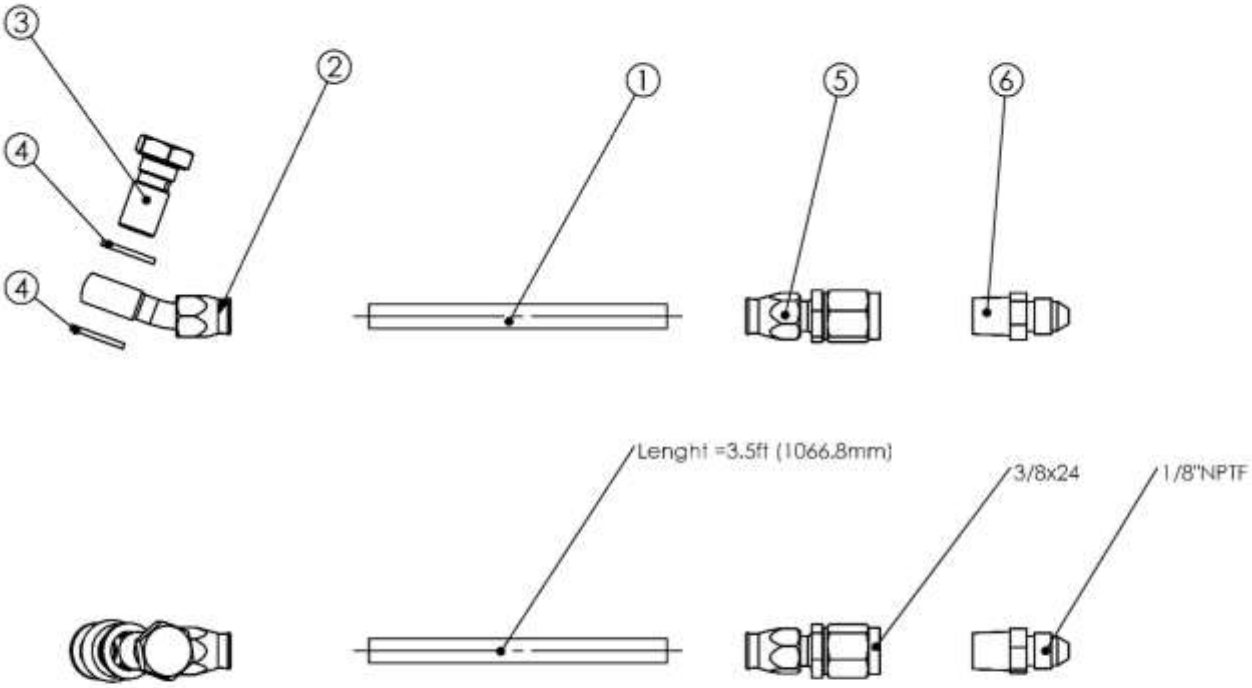


12	-	Safety Wire	1
11	AN4-16A	Screw	1
10	AN4-21A	Screw	3
9	MS21042-4	Self locking Nut	4
8	NAS1149F0663P	Washer	4
7	FAA02	Tire 5.00-5 TUBELESS	1
6	I-V-004	Cotter Pin	1
5	ECR-002(B)	Axle nut	1
4	RF-018(A)	Main Wheel Assy.	1
3	V-FHC-007	Screw	2
2	EA-002.2N(A)	Brake Assy.	1
1	AV-VANS-200(A)	Axle	1
REF	PART NUMBER	DESCRIPTION	QTY.

4.5.2. Main wheel Assy Right (Drawing reference: AV-VANS-220R)

Same assembly AV-VANS-220L (Symetrical assembly).

4.5.3. Hose Main wheel Assy Right and Left (Drawing reference: AV-VANS-610)

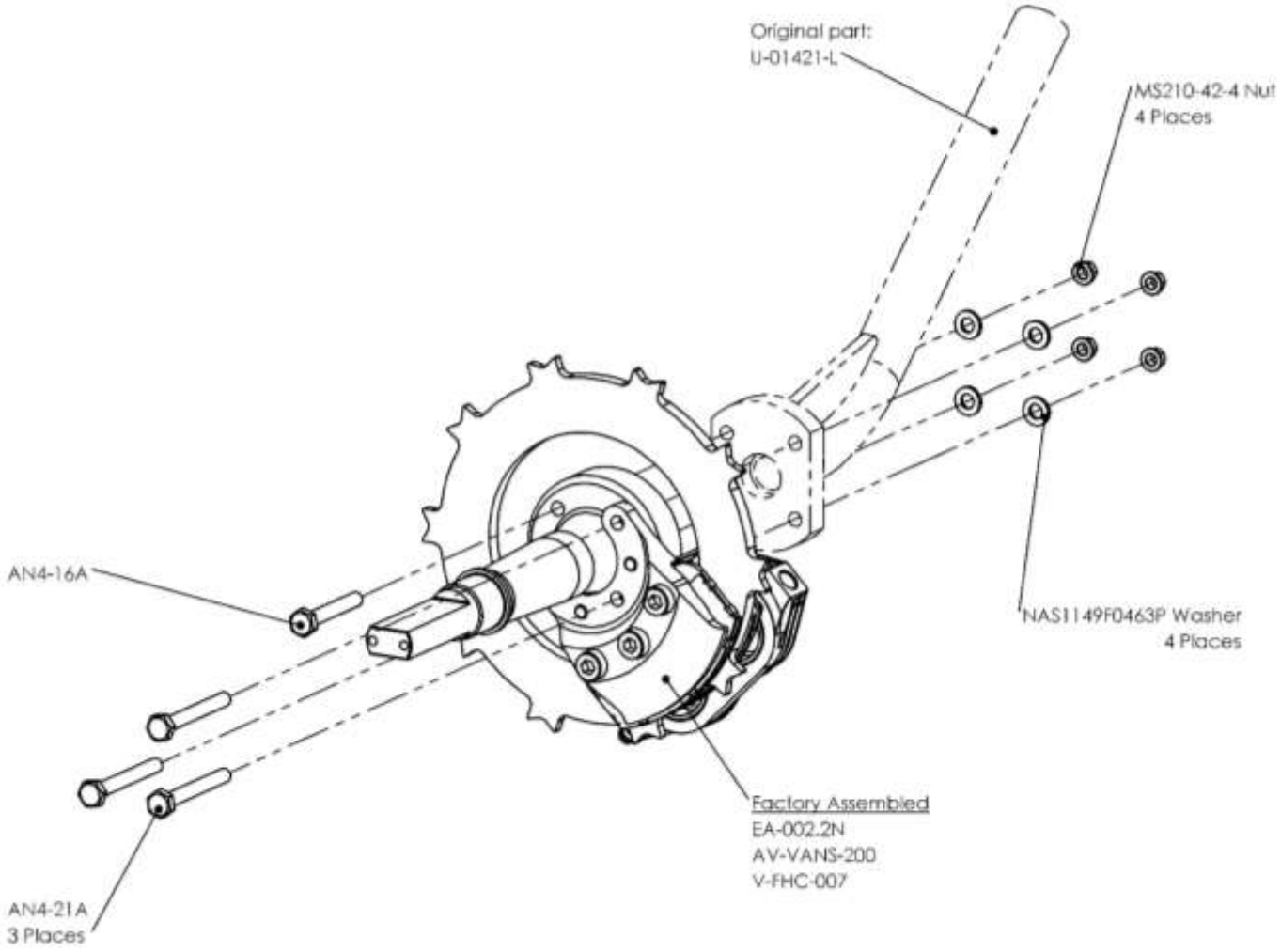


Note:
Qty 10 ZGA01 Brake line Clamp

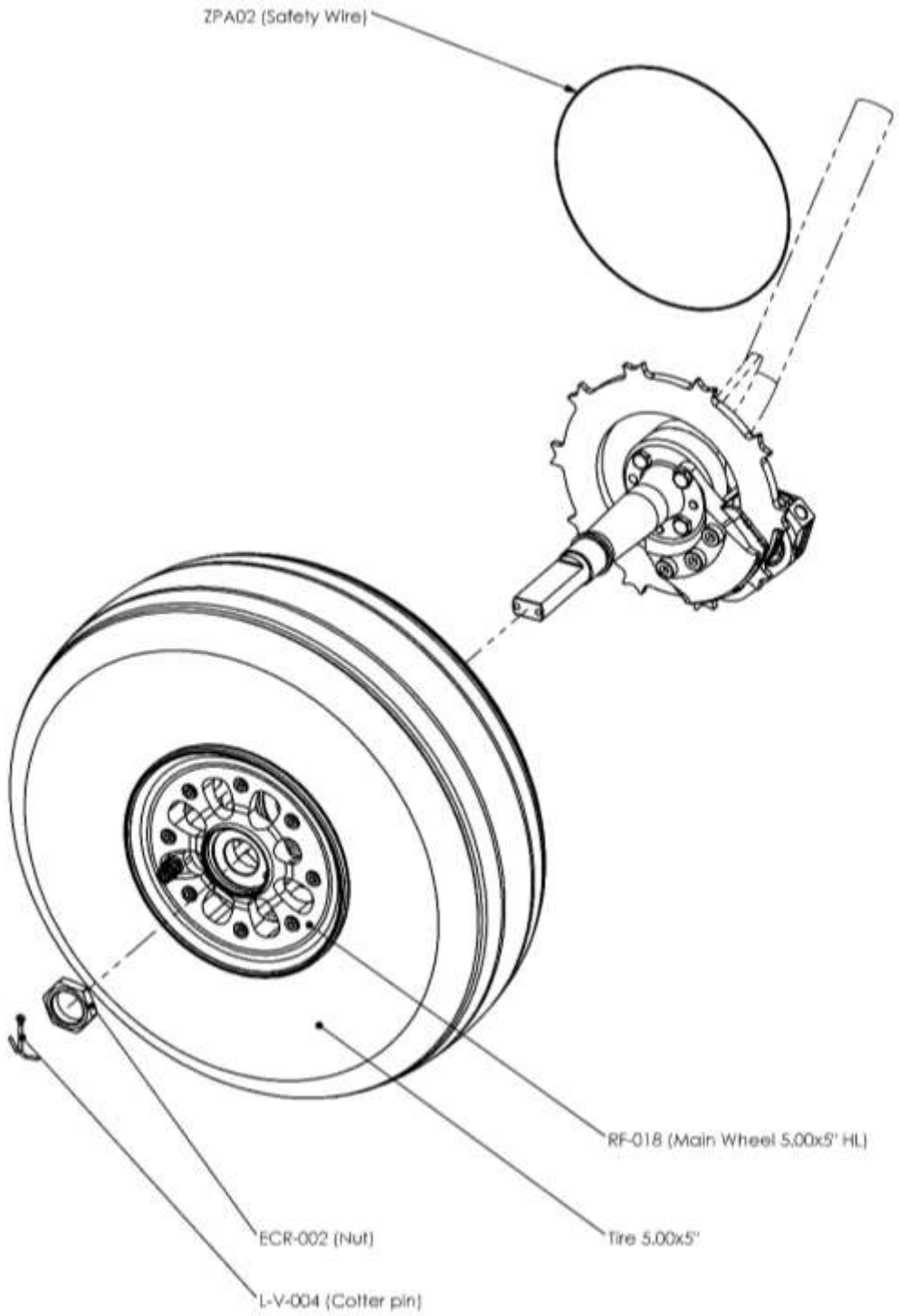
REF	PART NUMBER	DESCRIPTION	QTY.
6	HYD-024D	Adaptator	1
5	HYD-008OP	Raccord femelle 3,8x24 (Réf G: 6001-03F)	1
4	HYD-005B	Copper Seal	2
3	HYD-003P	Banjo Bolt	1
2	HYD-002OP	Banjo	1
1	HYD-032	Durite tressée non gainé (réf G:600-03)	1

4.5.4. Installation Main wheel Assy Left and right

a) Assemble the brake caliper on the landing gear.



b) Assemble the main wheel

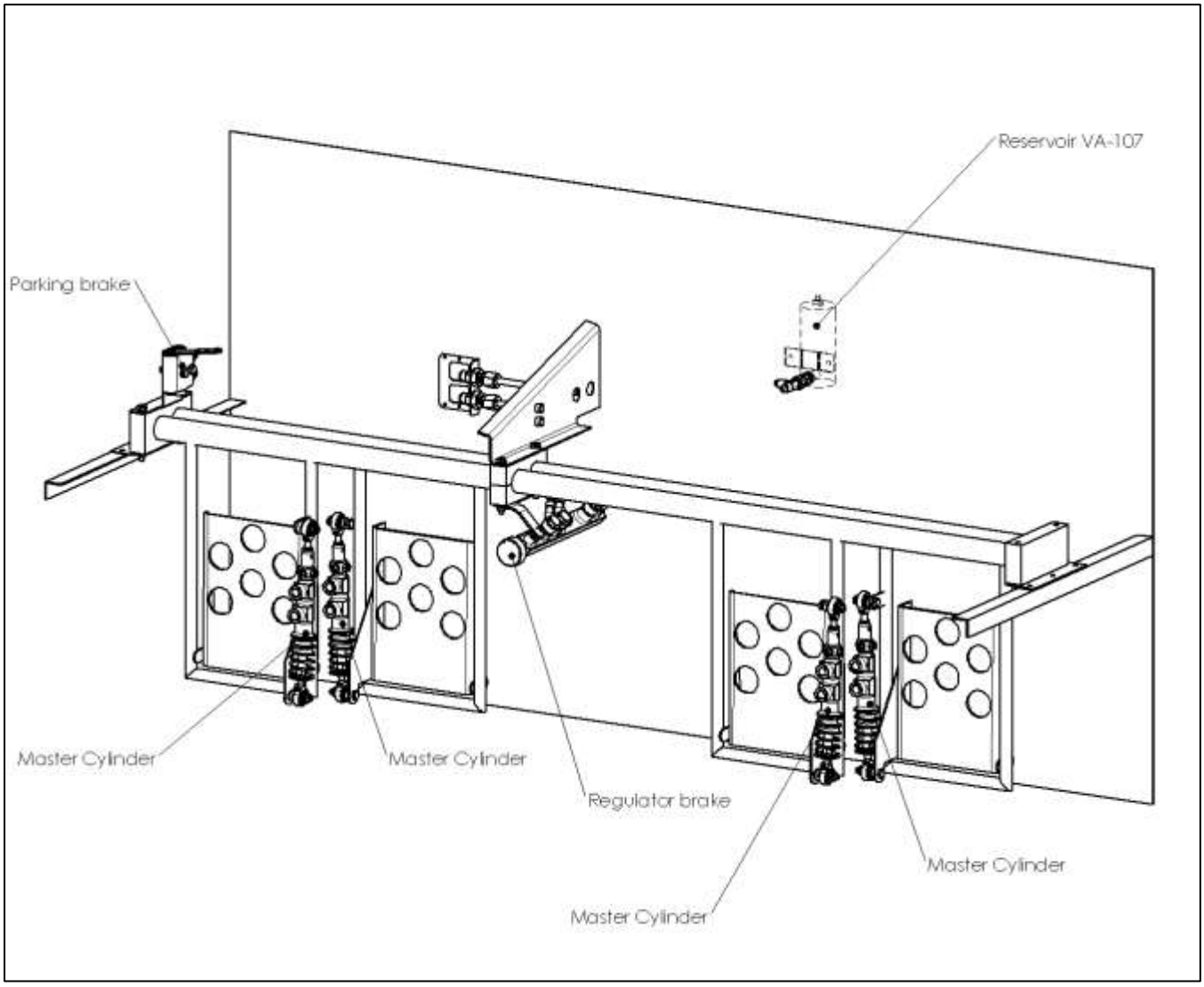


5. Fuselage Kit

5.1. Fuselage Kit VANS RV6,RV6A,RV7,RV7A,RV9,RV9A,RV10 and RV14.

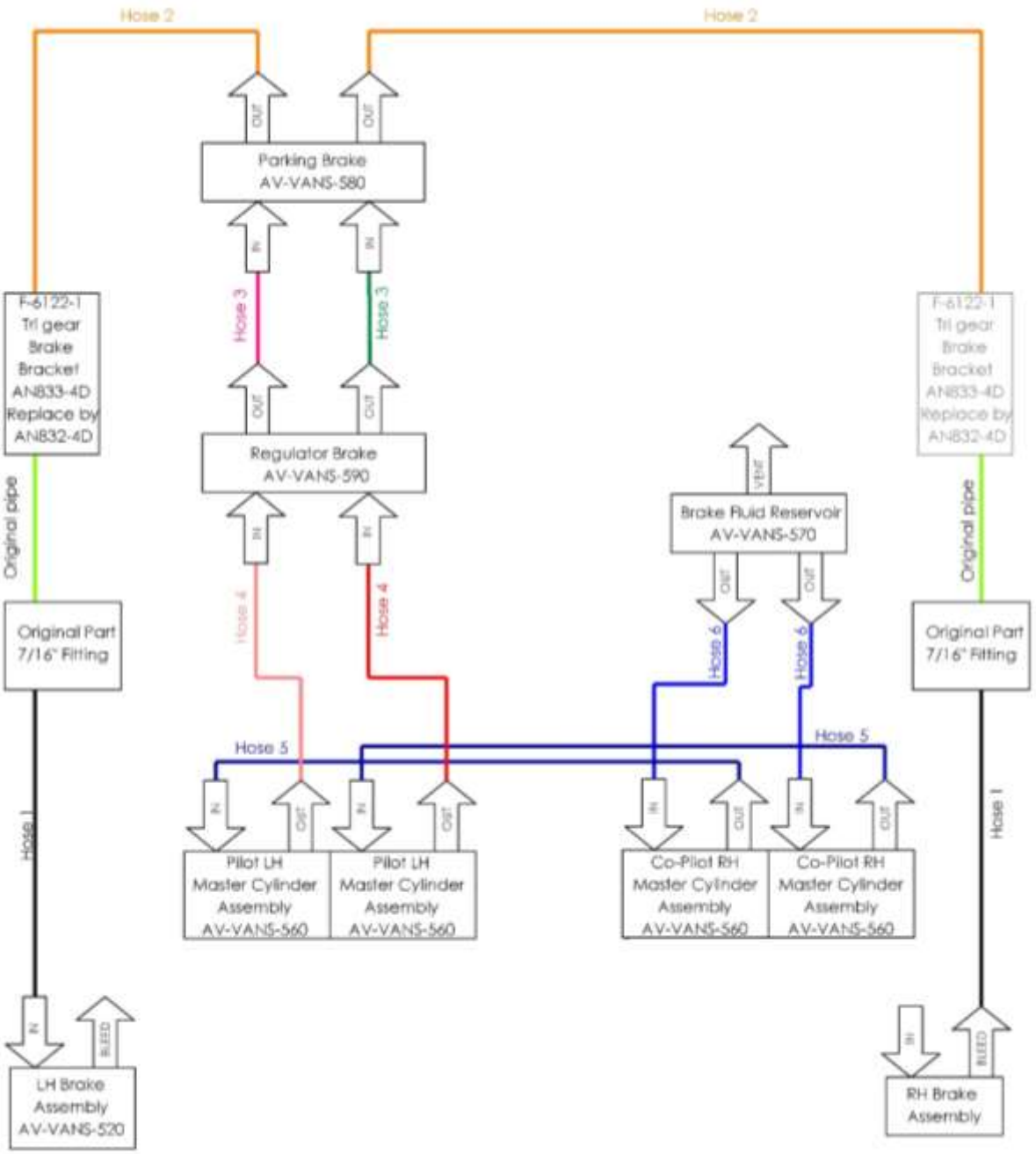
In the fuselage Kit, BERINGER offers 4 optional.

- Basic Kit only Pilot Master cylinder.
- Basic Kit + Copilote Master cylinder.
- Basic Kit only Pilot Master cylinder + Parking brake valve.
- Basic Kit + Copilote Master cylinder + Parking brake valve.
- Regulator Kit.
- Parking brake valve Kit.

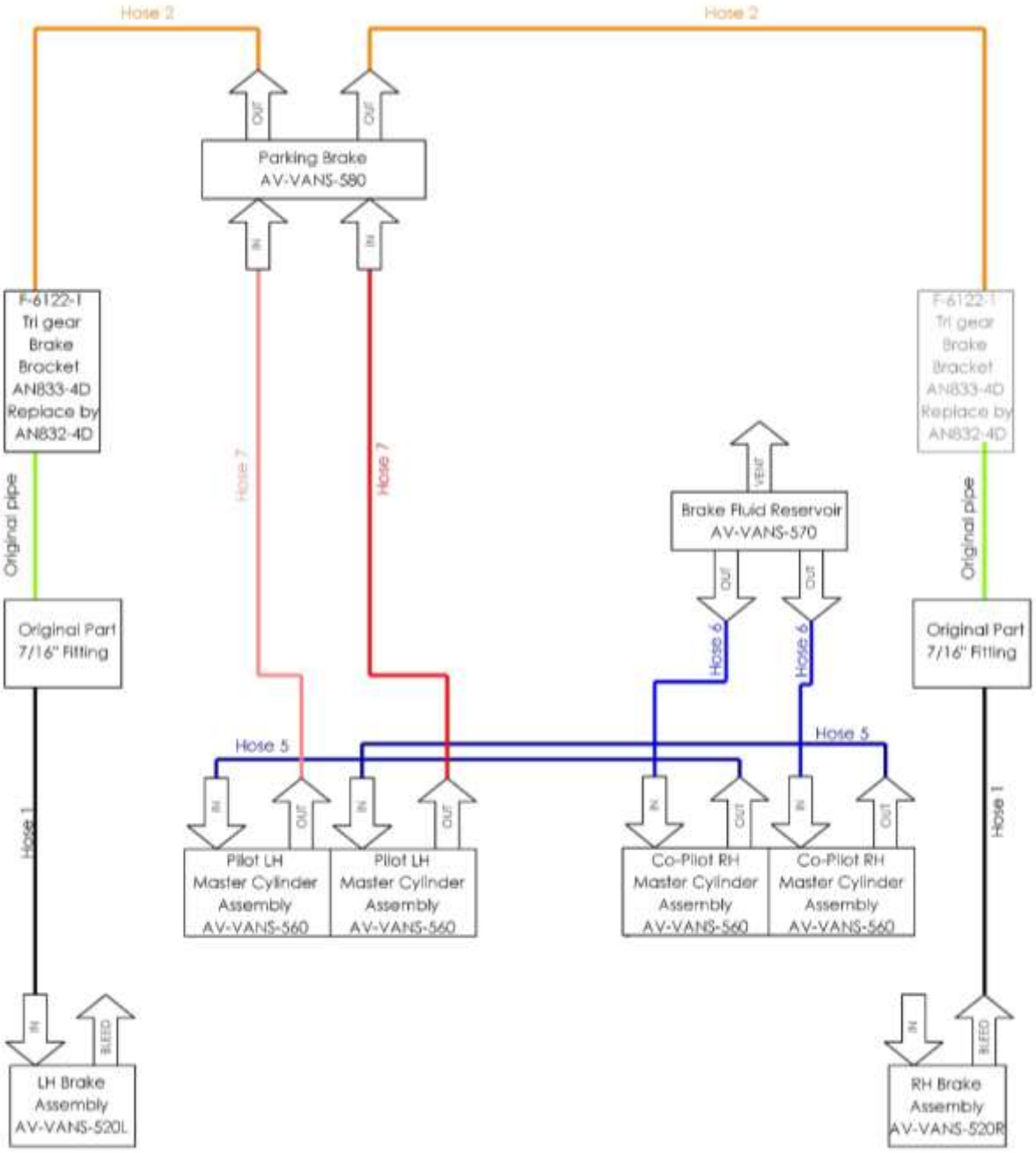


5.1.1. Complite Hydraulic digram (Drawing reference AV-VANS-550)

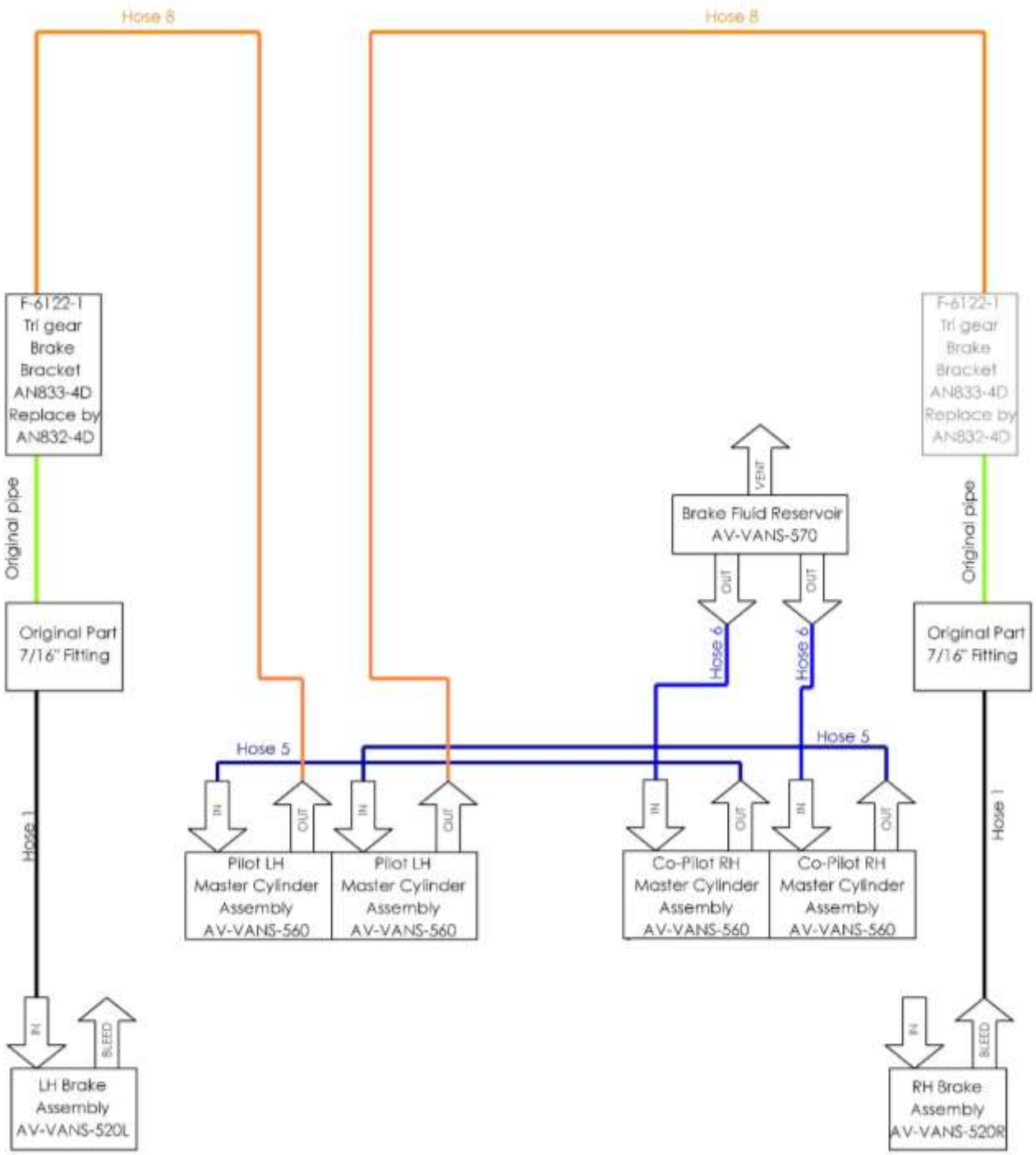
5.1.1.1 Basic+parking+copilot+regulator Kit (SRVFU04)+ (SRVFU06).



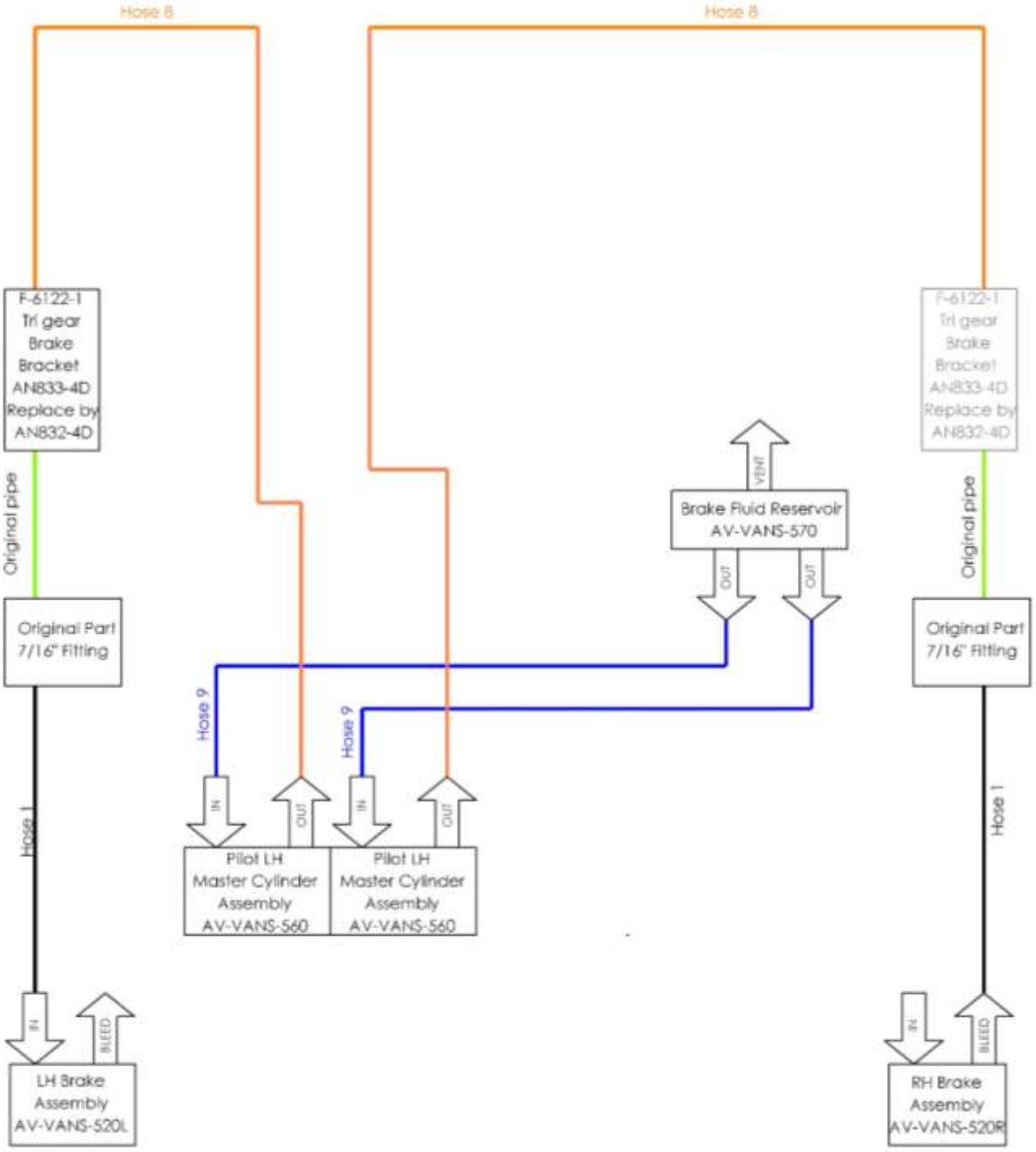
5.1.1.2 Basic+parking+copilot Kit(SRVFU04)



5.1.1.3 Basique+copilot (SRVFU02)



5.1.1.4 Basique (SRVFU01)

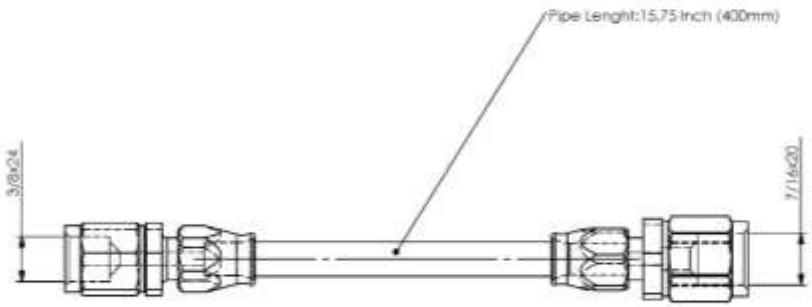


5.1.2. Brake line

5.1.2.1 Hose 01 (Main wheel / Fuselage)

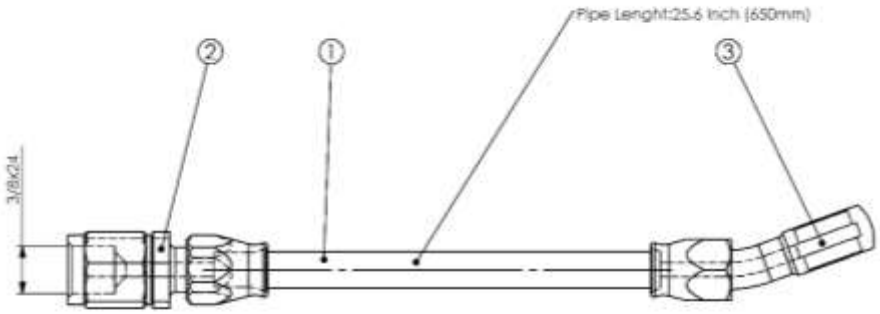
- For RV 3 see §4.1.3
- For RV 4,6,6A,7,7A,8A,9 and 9A see §4.2.3
- For RV 8 see §4.3.3
- For RV 10 see §4.4.3
- For RV 14 see §4.5.3

5.1.2.2 Hose 02 (Fuselage/FP)



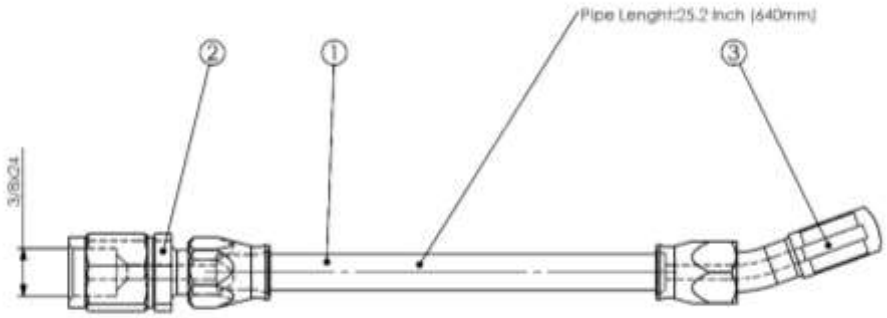
2	HYD-008CF	Raccord femelle 3/8x24	1
1	HYD-007CC	Raccord droit 7/16x20	1
1	HYD-030	Durite tresse non gainé	1
REF	PART NUMBER	DESCRIPTION	QTY.

5.1.2.3 Hose 03 (FP/Regulator)



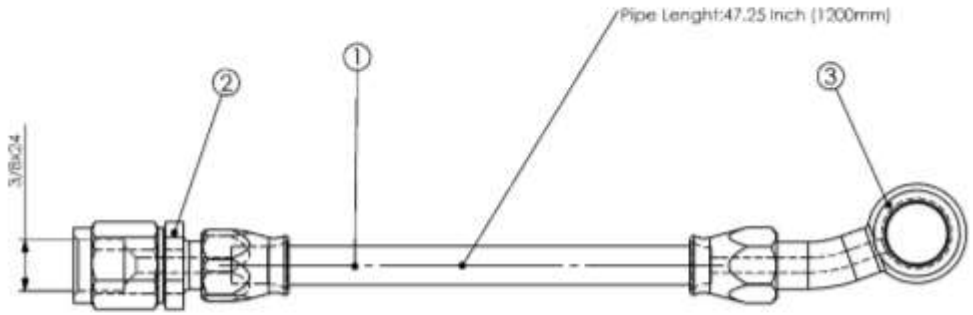
3	HYD-08DOF	Tuyau	1
2	HYD-08BOF	Raccord femelle 3/8x24	1
1	HYD-022	Durite tressée non gainé	1
REF	PART NUMBER	DESCRIPTION	QTY.

5.1.2.4 Hose 04 (Regulator/MC Pilot)



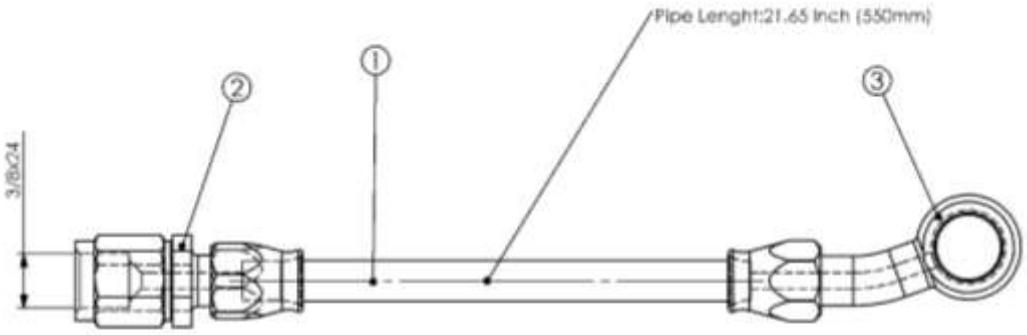
3	HYD-08DOF	tuyau	1
2	HYD-08BOF	Raccord femelle 3/8x24	1
1	HYD-022	Durite tressée non gainé	1
REF	PART NUMBER	DESCRIPTION	QTY.

5.1.2.5 Hose 05 (MC Pilot/MC Copilot)



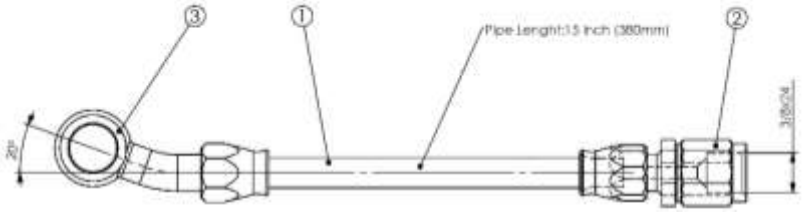
3	HYD-022DP	Banjo	1
2	HYD-008DP	Raccord femelle 3.8x24	1
1	HYD-030	Durite tressée non gainé	1
REF	PART NUMBER	DESCRIPTION	QTY.

5.1.2.6 Hose 06 (MC Copilot-Reservoir)



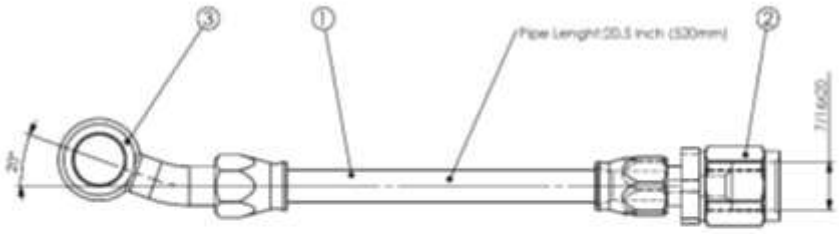
3	HYD-022DP	Banjo	1
2	HYD-008DP	Raccord femelle 3.8x24	1
1	HYD-030	Durite tressée non gainé	1
REF	PART NUMBER	DESCRIPTION	QTY.

5.1.2.7 Hose 07 (MC pilot-FP)



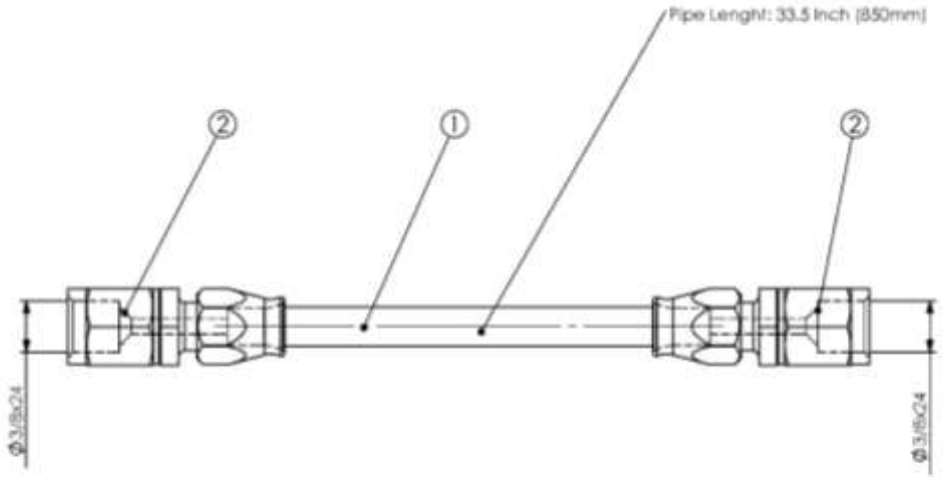
3	[illegible]	[illegible]	1
2	[illegible]	[illegible]	1
1	[illegible]	[illegible]	1
REF	[illegible]	[illegible]	QTY.

5.1.2.8 Hose 08 (Fuselage -MC pilot)



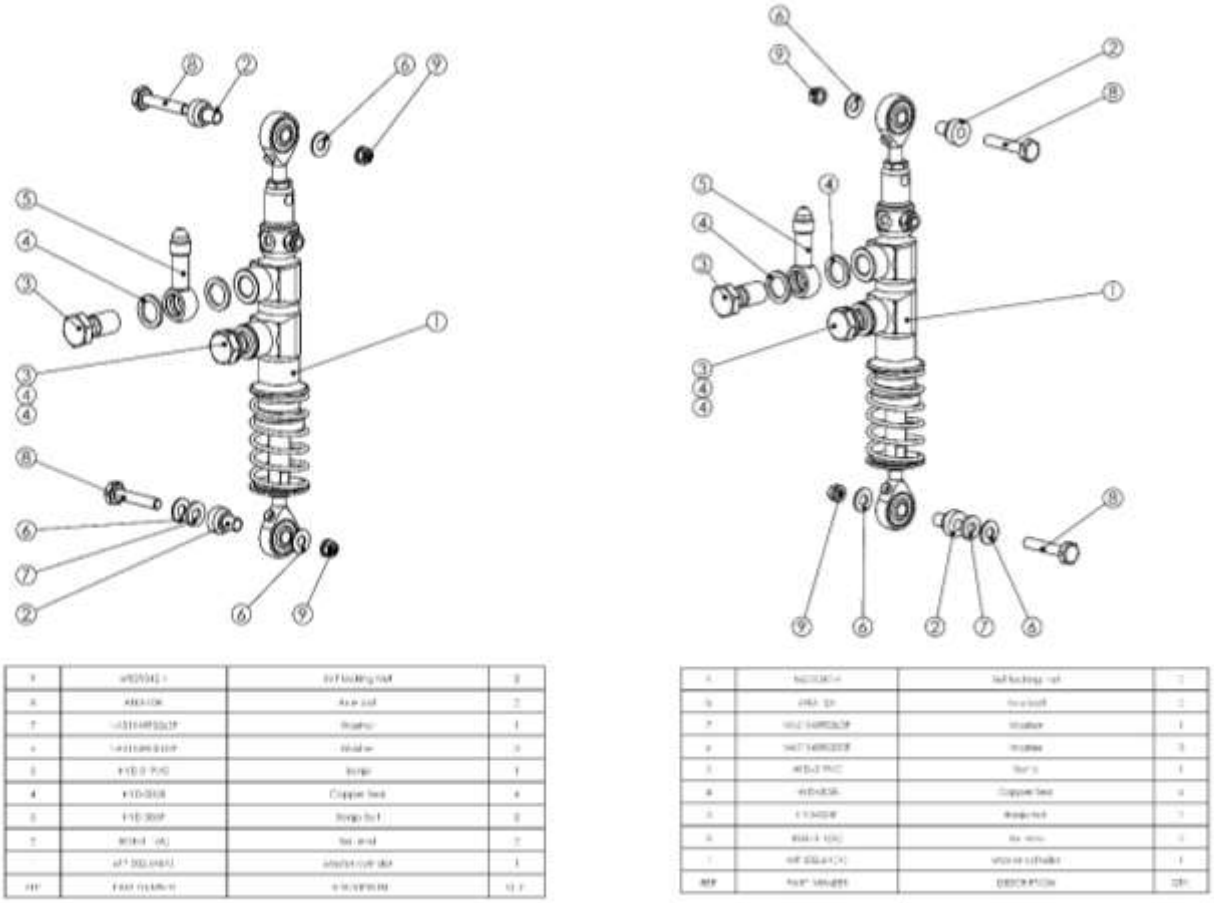
3	[illegible]	[illegible]	1
2	[illegible]	[illegible]	1
1	[illegible]	[illegible]	1
REF	[illegible]	[illegible]	QTY.

5.1.2.9 Hose 09 (MC pilot-Reservoir)

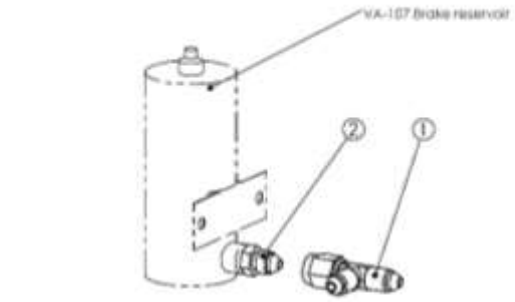


2	HYD.006OF	Straight fermale 3/8x24	2
1	HYD.032	Stainless steel brake hose	1
REF	PART NUMBER	Designation	QTY.

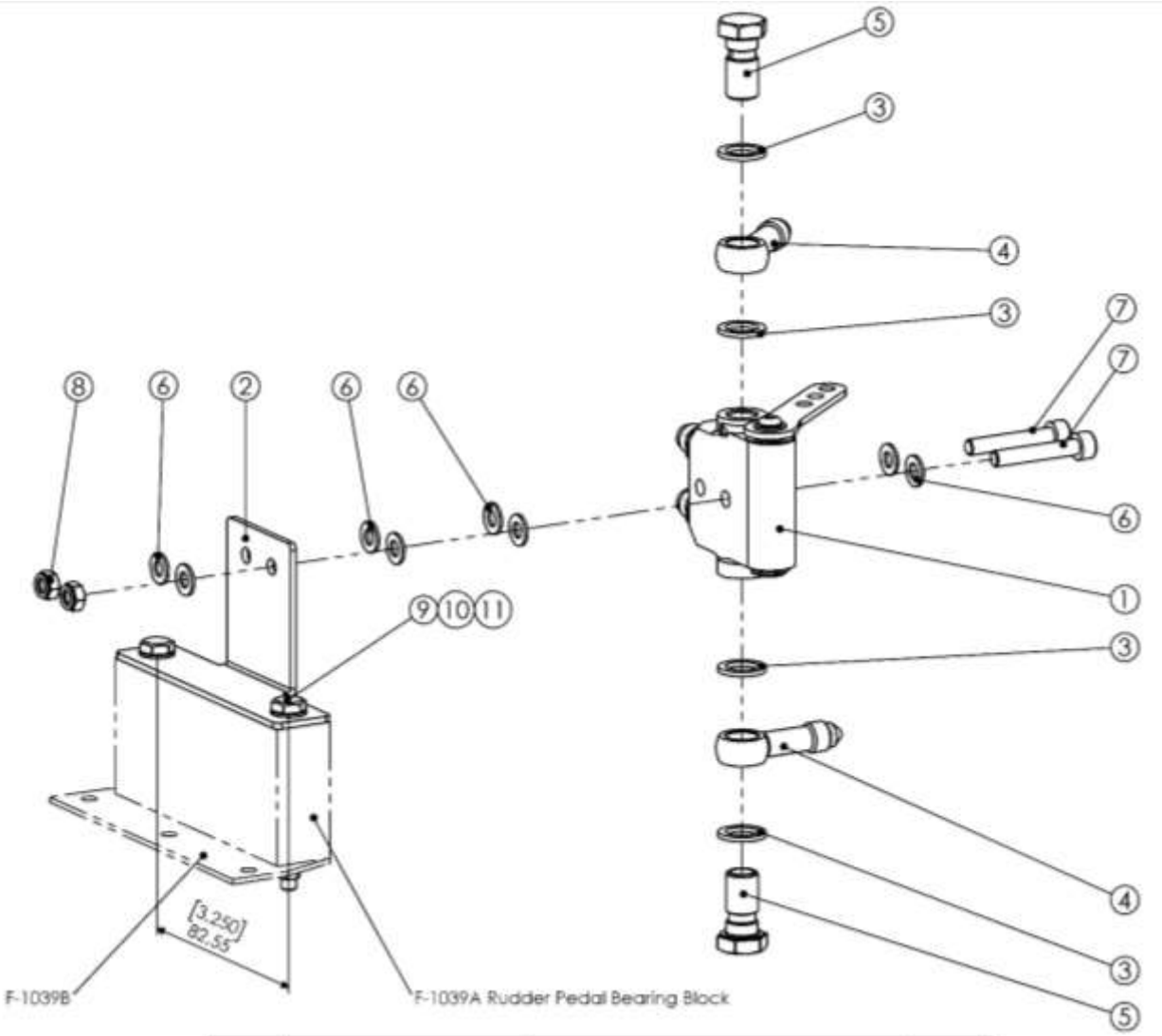
5.1.3. Assembly Master cylinder right and left (Drawing reference AV-VANS-560)



5.1.4. Assembly Brake reservoir (Drawing reference AV-VANS-570)

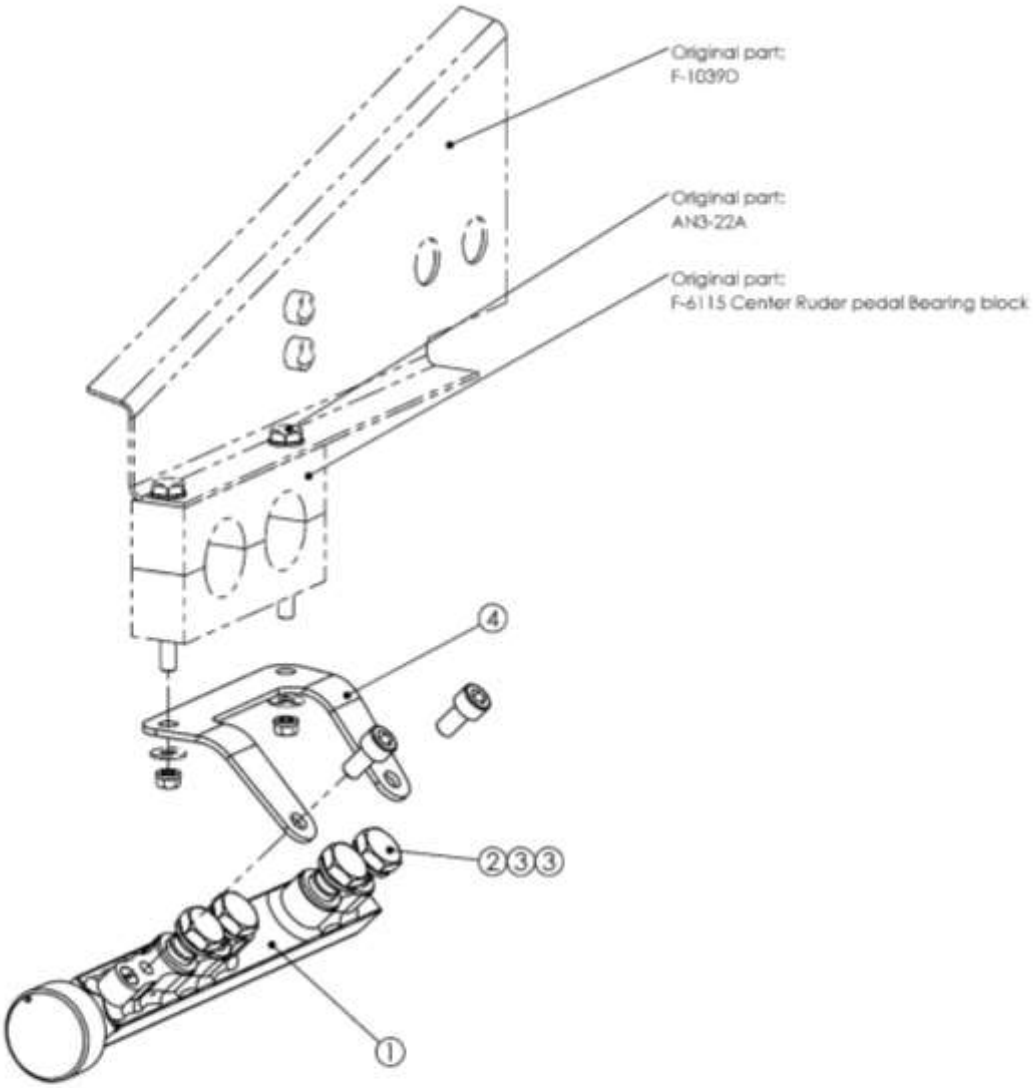


5.1.5. Assembly Parking brake valve(Drawing reference AV-VANS-580)



REP	PART NUMBER	DESCRIPTION	QTY.
11	MS21042-4	Self locking Nut	2
10	NAS1149F0300P	Washer	4
9	AN3-22A	Axle bolt	2
8	E-HW-002	self-locking Nut	2
7	V-CHC-041	Screw	2
6	F-AP-004	Washer	8
5	HYD-003P	Banjo Bolt	2
4	HYD-011PVC	Banjo	2
3	HYD-005B	Copper Seal	4
2	AV-VANS-015(A)	Support	1
1	FP-001(A)	Parking Brake	1

5.1.6. Assembly Parking brake valve(Drawing reference AV-VANS-590)



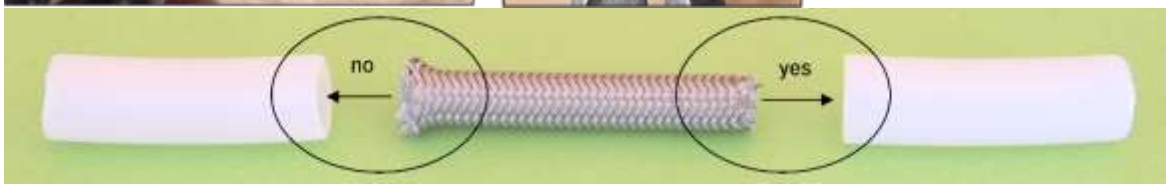
4	AV-VANS-00a (A)	Elbow	1
3	HYD-0008	Copper Seal	8
2	HYD-003F	Banjo Bolt	4
1	RR-0011(R)	Regulator	1
REF	PART NUMBER	DESCRIPTION	QTY.

6. Brake line

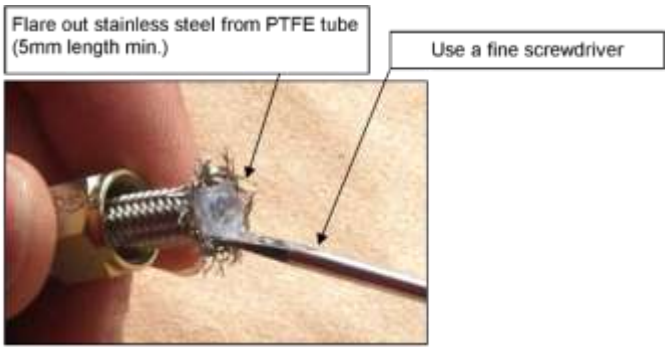
A. Banjo Assembly

B. Cut the hose

- Using a fine tooth saw blade or cutter plier, cut hose to the required length.
- Clean any loose debris from both the cut ends and inside the hose.
- Then use a flat pliers to make the hole circular, as shown on the picture below.

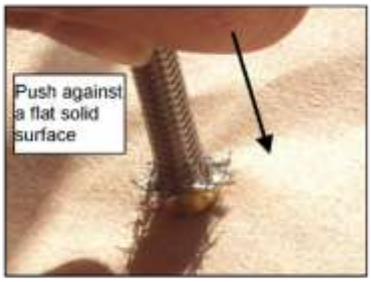


C. Put the nut in the hose



D. Put the olive

Push the olive onto the end of PTFE inner tube and under the stainless steel braid. **Make sure that all stainless steel filaments are outside of the olive.**



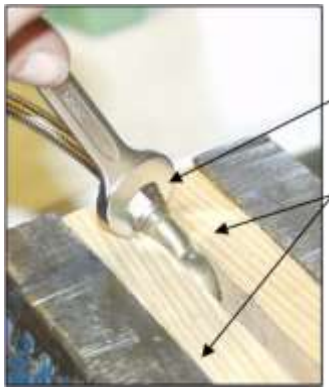
Make sure that PTFE tube is fully homed in the olive.

E. Put the banjo

Push between hands the main fitting body and hose as shown on left picture.

Turn with hand the main fitting body to start threading the socket as shown on picture below.

F. Tightening torque the socket



Torque tightening the socket at 10N.m to 15N.m (90 IN-LBS to 132 IN-LBS)

Maintain with wood plates to preserve the main fitting body

7. Maintenance

7.1. Equipment concerned

- Nose wheel without brake:
  - P/N: RA-014

- 4 main wheels for brake application:
  - P/N: RF-016
  - P/N: RF-018
  - P/N: RF-022

- 4 brake assemblies:
  - P/N: EA-002N
  - P/N: EA-002.2N
  - P/N: EA-003.3N

Notes :

- L and R indicates the Left and Right brake assemblies

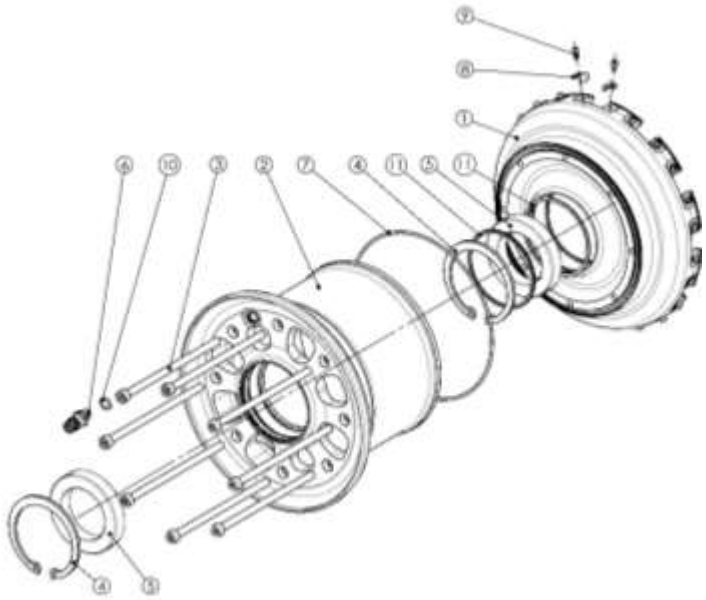
7.2. Quick Reference Specifications

7.2.1. Tires:

Wheel	Tire Size	Type	Max. Inflation pressure
RA-014(-) RF-018(-) RF-022(-)	5.00-5	Tubeless	88 PSI
RF-016(-)	15x6.00-6	Tubeless	112 PSI

7.2.2. Main Wheels:

7.2.2.1 6.00-6 Main wheel assembly RF-016(A):

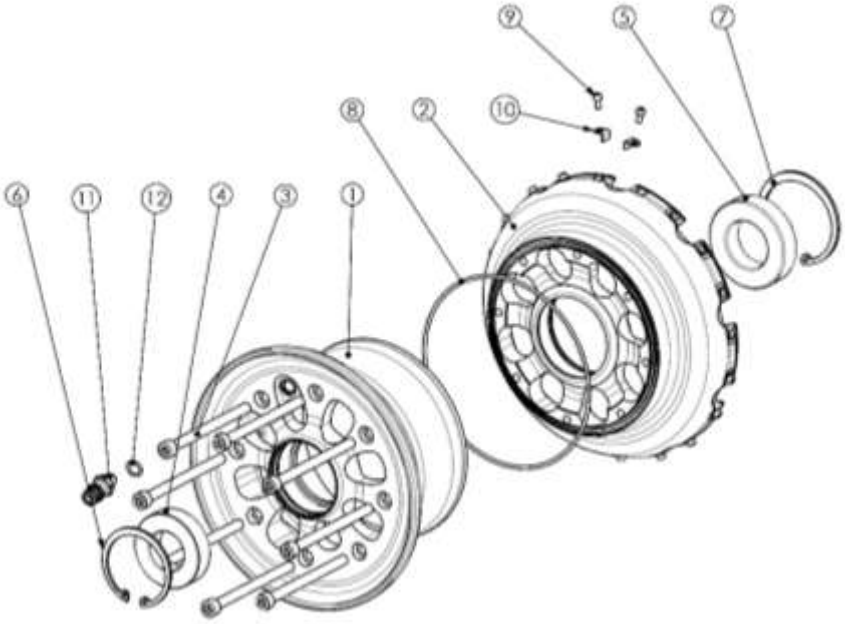


REP	PART NUMBER	DESCRIPTION	QTY.
11	BGE-025(A)	Spacer	2
10	J-JTR-017N	O-Ring	1
9	V-CHC-005	Clip Screw	24
8	CLP-001(B)	Clip	24
7	J-JTR-007N	O-Ring	1
6	A-001	Valve	1
5	B-BE-014	BEARING	2
4	C-AL-006	CIRCLIP	2
3	V-CHC-004	Screw	8
2	JAE-024(A)	Outer Whell half	1
1	JAI-012(B)	Inner wheel half	1

	Torque		Threadlocker
Wheel screw	12 N.m	105 in-lb	medium strength (Loctite 243 recommended
Clip screw	1.5 N.m	13 in-lb	high strength (Loctite 271 recommended)

- ***Clip – disc maximum play:*** 0.4mm (0.016")
- ***Disc safety wire:***:1.01mm (0.040") stainless steel grade 302

7.2.2.2 5.00-5 Main wheel assembly RF-018(A)

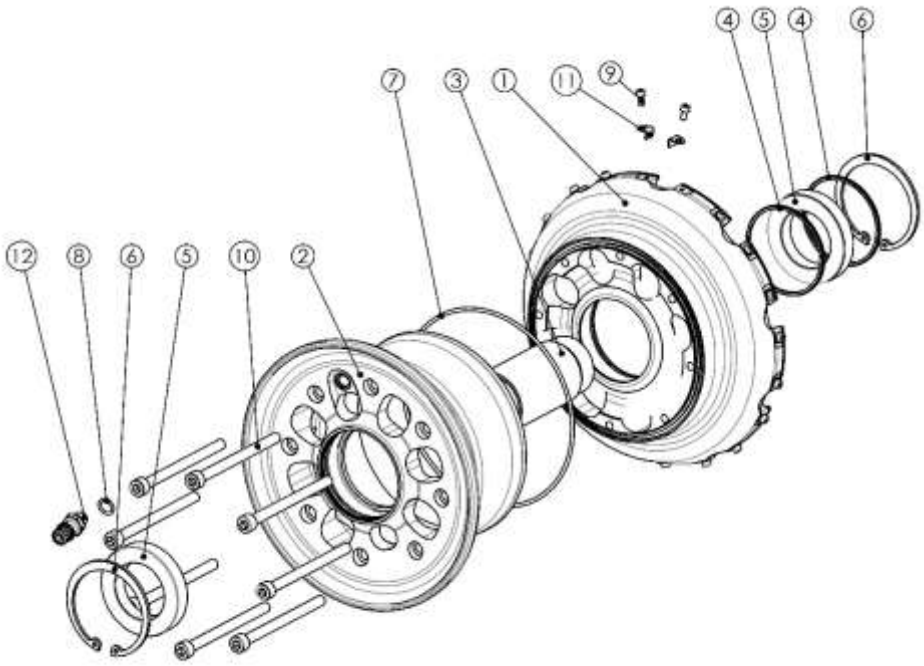


12	J-JTR-017N	O-Ring	1
11	A-001	Valve	1
10	CLP-002(D)	Clip	20
9	V-CHC-005	Clip Screw	20
8	J-JTR-006N	O-Ring	1
7	C-AL-002	Circlip	1
6	C-AL-001	Circlip	1
5	B-BE-002	Bearing	1
4	B-BE-001	Bearing	1
3	V-CHC-020	Assy. Screw	8
2	JAE-026(A)	Outer wheel half	1
1	JAI-028(A)	Inner wheel half	1
REP	PART NUMBER	DESCRIPTION	QTY.

	Torque		Threadlocker
Wheel screw	10 N.m	87 in-lb	medium strength (Loctite 243 recommended
Clip screw	1.5 N.m	13 in-lb	high strength (Loctite 271 recommended)

- ***Clip – disc maximum play:*** 0.4mm (0.016")
- ***Disc safety wire:***:1.01mm (0.040") stainless steel grade 302

7.2.2.3 5.00-5 Main wheel assembly RF-022:



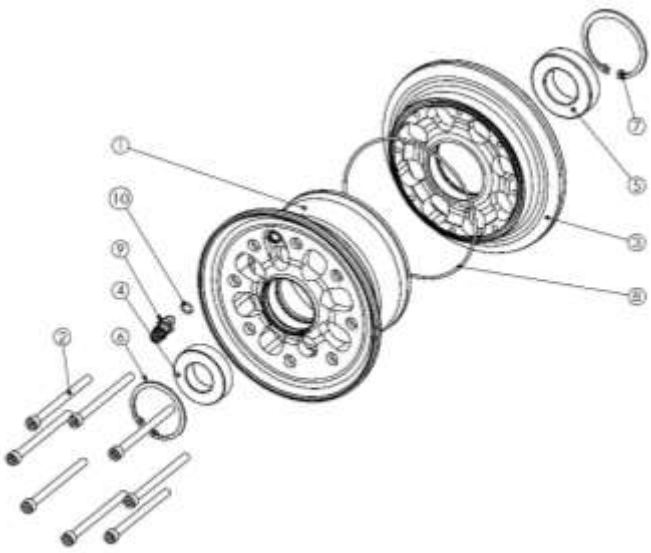
REP	PART NUMBER	DESCRIPTION	QTY.
12	A-001	Valve	1
11	CLP-002(D)	Clip	20
10	V-CHC-020	Assy. Screw	8
9	V-CHC-005	Clip Screw	20
8	J-JTR-017N	O-Ring	1
7	J-JTR-006N	O-Ring	1
6	C-AL-002	Circlip	2
5	B-BE-007	Bearing	2
4	BGE-015(A)	Spacer	2
3	AV-VANS-003(A)	Spacer	1
2	JAE-028(A)	Outer wheel half	1
1	JAI-028(A)	Inner wheel half	1

	Torque		Threadlocker
Wheel screw	10 N.m	87 in-lb	medium strength (Loctite 243 recommended
Clip screw	1.5 N.m	13 in-lb	high strength (Loctite 271 recommended)

- ***Clip – disc maximum play:*** 0.4mm (0.016")
- ***Disc safety wire:***:1.01mm (0.040") stainless steel grade 302

7.2.3. Nose Wheels:

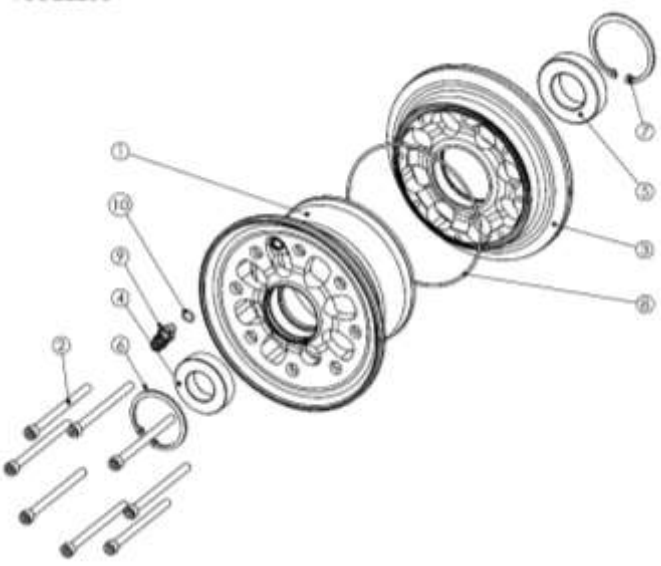
7.2.3.1 5.00-5 Nose wheel assembly RA-014(A):



REP	PART NUMBER	DESCRIPTION	QTY.
10	J-JTR-017N	O-Ring	1
9	A-001	Valve	1
8	J-JTR-006N	O-Ring	1
7	C-AL-002	Circlip	1
6	C-AL-001	Circlip	1
5	B-BE-002	Bearing	1
4	B-BE-001	Bearing	1
3	JAI-029(A)	Inner Wheel half	1
2	V-CHC-020	Assy. Screw	8
1	JAE-026(A)	Outer wheel half	1

	Torque		Threadlocker
Wheel screw	10 N.m	87 in-lb	medium strength (Loctite 243 recommended

7.2.3.2 5.00-5 Nose wheel assembly RA-015(A):



REP	PART NUMBER	DESCRIPTION	QTY.
10	J-JTR-017N	O-Ring	1
9	A-001	Valve	1
8	J-JTR-006N	O-Ring	1
7	C-AL-002	Circlip	1
6	C-AL-001	Circlip	1
5	B-BE-002	Bearing	1
4	B-BE-001	Bearing	1
3	V-CHC-035	Assy. Screw	8
2	JAI-029(A)	Inner Wheel half	1
1	JAE-027(A)	Outer wheel half	1

	Torque		Threadlocker
Wheel screw	10 N.m	87 in-lb	medium strength (Loctite 243 recommended

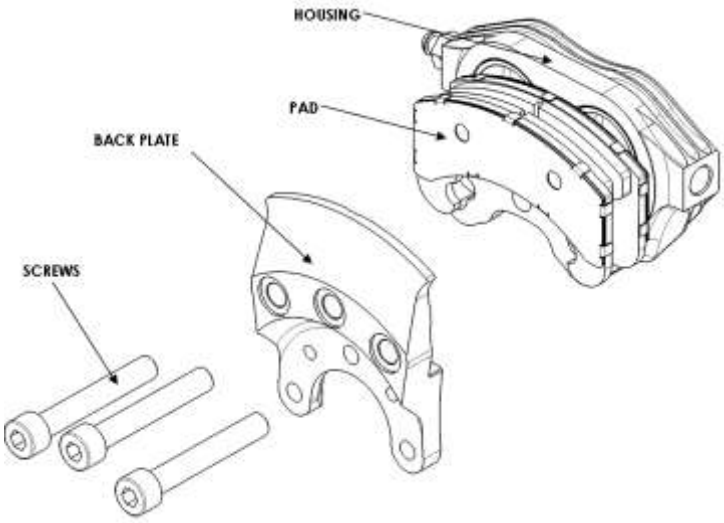
7.2.4. Brake caliper:

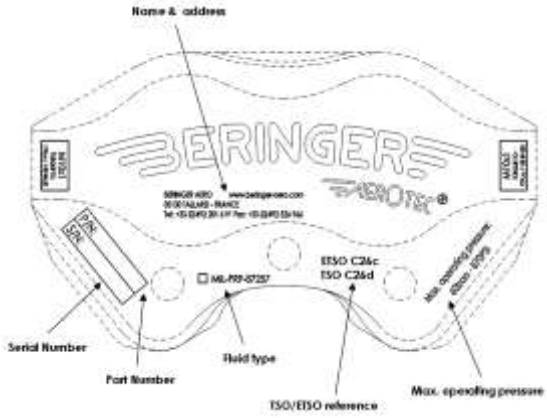
7.2.4.1 Description

Brake caliper are made of aluminium alloy. A thin anodizing coating protects aluminium from corrosion. Anodizing does not protect from nicks and scratches.

Calipers are in 2 separated parts bolted together: the housing with pistons and the back side or back plate.

To assure equal pressure on both brake pads, disc is floating and brake pads can slide on 2 of the 3 assembly screws.





Brake housing is equipped with the same inlet port on each side to be used on left or right strut of the aircraft. The unused port is sealed by a bleeding screw. Inlet and outlet port have Metric M10x1 internal thread.

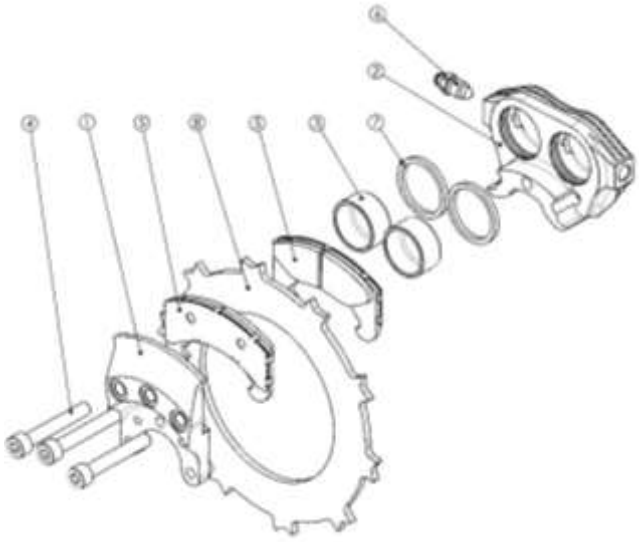
Hydraulic fluid	MIL-PRF-87257

Lubrication *

Piston	Thick silicone grease (-50°C to 200°C) compliant with FDA CFR art. 178.3570 (liquid grease in spray is not allowed)
Piston seal	Thick silicone grease (-50°C to 200°C) compliant with FDA CFR art. 178.3570 (liquid grease in spray is not allowed)

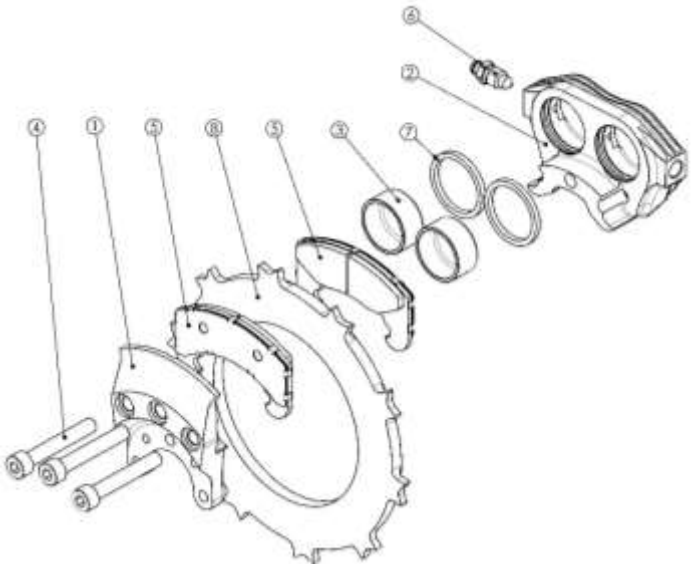
* Lubricate cylinder, seal groove, piston seal, and piston with a coat of silicone grease at each time of assembly.

7.2.4.2 Brake caliper assembly EA-002N(A) / EA-002.2N(-):



EA-002N(A)

REP	PART NUMBER	DESCRIPTION	QTY.
8	DSC-008(A)	Brake disc	1
7	JNT-006N(A)	Piston seal	2
6	HYD-001P	Bleeder	1
5	PQT-009(A)	Brake pad	2
4	VIS-003(A)	Screw	3
3	PSE-002(A)	Piston	2
2	ETR-003(B)	Cylinder	1
1	RNF-003(A)	Back plate	1



EA-002.2N(A)

REP	PART NUMBER	DESCRIPTION	QTY.
8	DSC-008.2(A)	Brake disc	1
7	JNT-006N(A)	Piston seal	2
6	HYD-001P	Bleeder	1
5	PQT-009(A)	Brake pad	2
4	VIS-003(A)	Screw	3
3	PSE-002(A)	Piston	2
2	ETR-003(B)	Cylinder	1
1	RNF-003.2(A)	Back plate	1

Assembly screw:

Torque	25 N.m	220 in-lb
Threadlocker	medium strength (Loctite 243 recommended)	
Hydraulic fluid	MIL-PRF-87257	

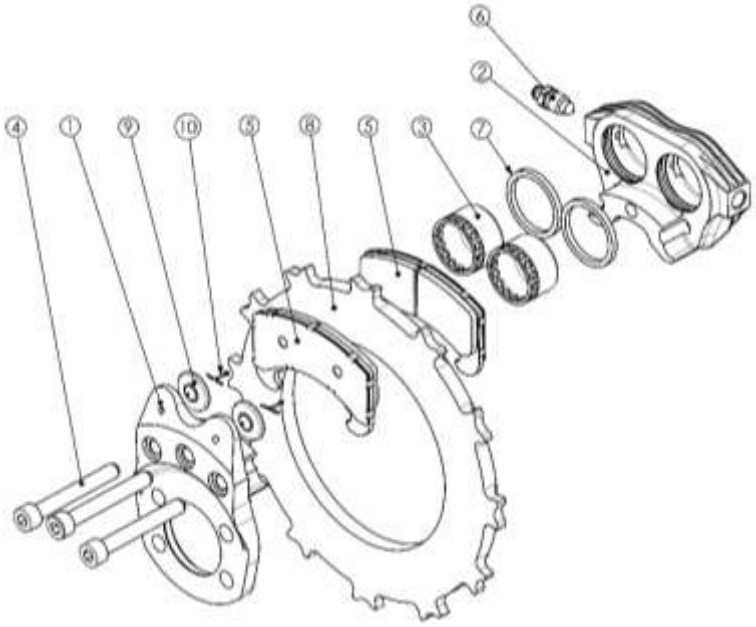
Brake Disc DSC-008(-) / DSC-008.2(-):

Max. coning	0.3mm	0.012 in
Max. groove or bump	0.2mm	0.008 in
DSC-008 Minimum thickness	3.8mm	0.150 in
DSC-008.2 Minimum thickness	6.6mm	0.260 in

Brake Pad PQT-009(-):

Minimum thickness of friction material	1.0mm	0.040 in

7.2.4.3 Brake caliper assembly EA-003.3N(A)



REP	PART NUMBER	DESCRIPTION	QTY.
10	L-V-001	Cotter Pin	2
9	BTR-001(A)	Back Stop	2
8	DSC-009.3(A)	Brake disc	1
7	JNT-006N(A)	Piston seal	2
6	HYD-001P	Bleeder	1
5	PQT-010(A)	Brake pad	2
4	VIS-006(A)	Assy screw	3
3	PSE-004(A)	Piston	2
2	ETR-003(B)	Cylinder	1
1	RNF-005.1(B)	Back plate	1

Assembly screw:

Torque	25 N.m	220 in-lb
Threadlocker	medium strength (Loctite 243 recommended)	

Brake Disc DSC-009.3(-):

Max. coning	0.3mm	0.012 in
Max. groove or bump	0.2mm	0.008 in
Minimum thickness	8.4mm	0.330 in

Brake Pad PQT-010(-):

Minimum thickness of friction material	1.0mm	0.040 in

7.3. Cleaning

The aluminium parts are protected from corrosion with an anodizing coating. This thin coating does not protect against basic agent with pH > 9.

CAUTION: Cleaning the wheel and brake parts with basic agent may remove totally the anodizing coating

Acid agent may also attack the anodizing.

For cleaning the wheel and brake parts we recommend using only water and soap or dry clothes.

7.4. Conditionning Procedure for Brake Pads

When new brake pads have been installed, it is important to condition them properly to obtain the service life designed into them. Rated brake torque value is reached only after a full conditioning of brake pads and disc.

CAUTION: Brake torque value can be only 50% of rated brake torque before the conditioning. It means that even with full brake effort the aircraft will not stop as usual. Pilot must take into consideration this parameter to avoid loose of aircraft control during the conditioning procedure.

CONDITIONNING PROCEDURE:

1. Taxi aircraft for 500m (1500 feet) with light brake effort.
2. Perform two (2) consecutive stops from 30 – 35 knots down to 5 knots. Apply light brake effort during these two stops; do not try to apply full brake effort.
3. Allow the brakes to cool down for 10 to 15 minutes.
4. Apply brakes and check for restraint at high static throttle. If brakes hold, conditioning is complete.
5. If brakes cannot hold aircraft during static run-up, allow the brakes to cool completely and repeat steps 1 through 4.

This conditioning procedure will wear off high spots and prepare pads and disc friction surfaces. A visual inspection of disc will indicate the pads condition: a smooth surface with light and regular grooves indicates that pads and disc are properly conditioned.

NOTE: A rough surface of disc with deep grooves and isolated bumps indicates that an excessive brake effort has been applied during conditioning. In this case, bumps must be sanded and conditioning procedure repeated.

CAUTION: A wrong conditioning may affect brake performances and increase wear of pads and disc.

7.5. Scheduled maintenance checks

7.5.1. 100h / Annual inspection

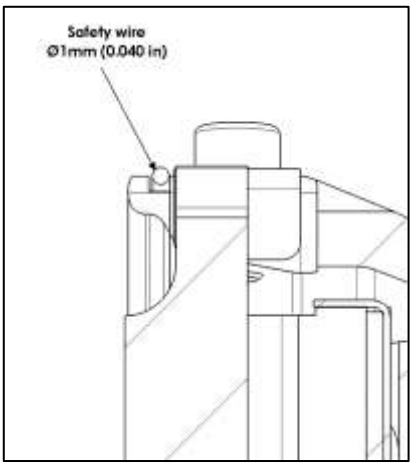
Inspection		Operation	
Component	**Wear limit**	**100h**	**Annual inspection**
Brake assembly	-	Apply brakes, examine system for leaks	
Brake assembly	-	Visual inspection	Check pistons retraction, check bolt torque
Brake Pads	1mm 0.040 in	Check brake pad wear	
Brake Disc DSC-008	3.8 mm 0.150 in	Check disc wear	Examine for cracks or corrosion Check disc wear
Brake Disc DSC-008.2	6.6 mm 0.260 in	Check disc wear	Examine for cracks or corrosion Check disc wear
Wheel - Brake Disc	0.4 mm 0.016 in	Visual inspection	Check play between disc and wheel Clips
Main wheels	-	Visual inspection	Examine bearings, valve, axles and wheel flanges
Main wheel tires	-	Visual inspection Check inflation pressure and wear	
Hydraulic Hoses and fittings	-	Examine for damage, leak and corrosion	

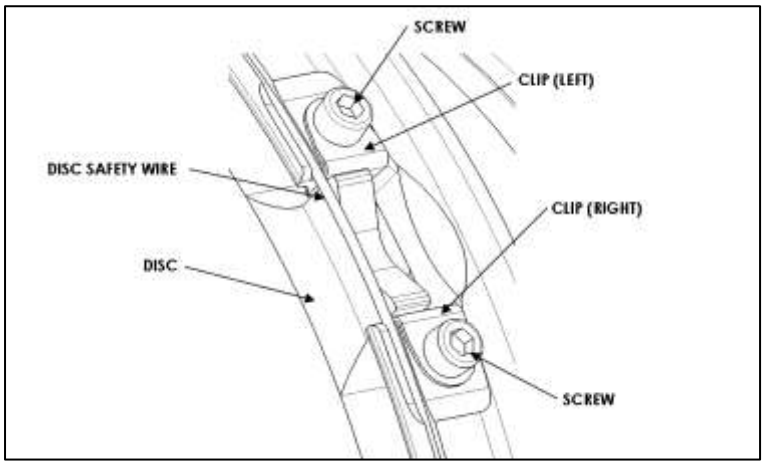
7.5.2. Safety maintenance checks

7.5.2.1 Safety wire

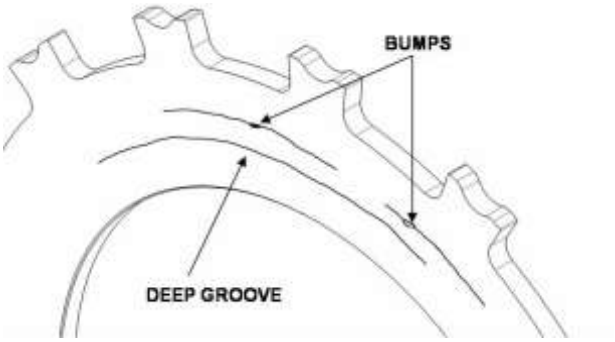
Wheel axle and his securing device must be in place.

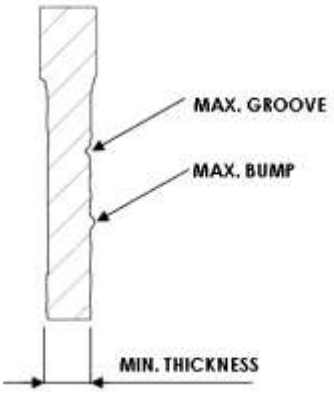
In case of a main wheel with brake, the safety wire must be in place to prevent the disc from going out the slots.





7.5.2.2 Brake disc

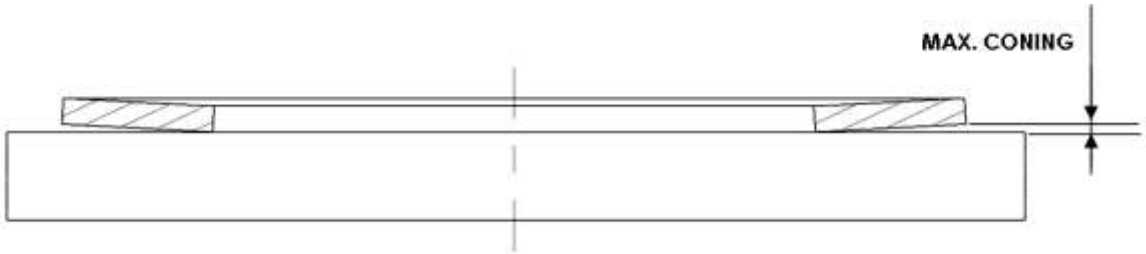




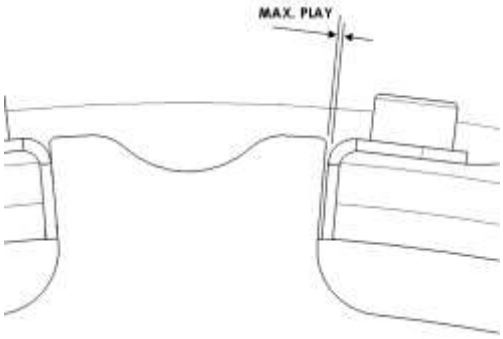
a) Thickness Disc wear limits

	Min Thickness	
DSC-008	3.8mm	0.150"
DSC-008.2	3.8mm	0.260"

b) Geometrical Disc wear limits

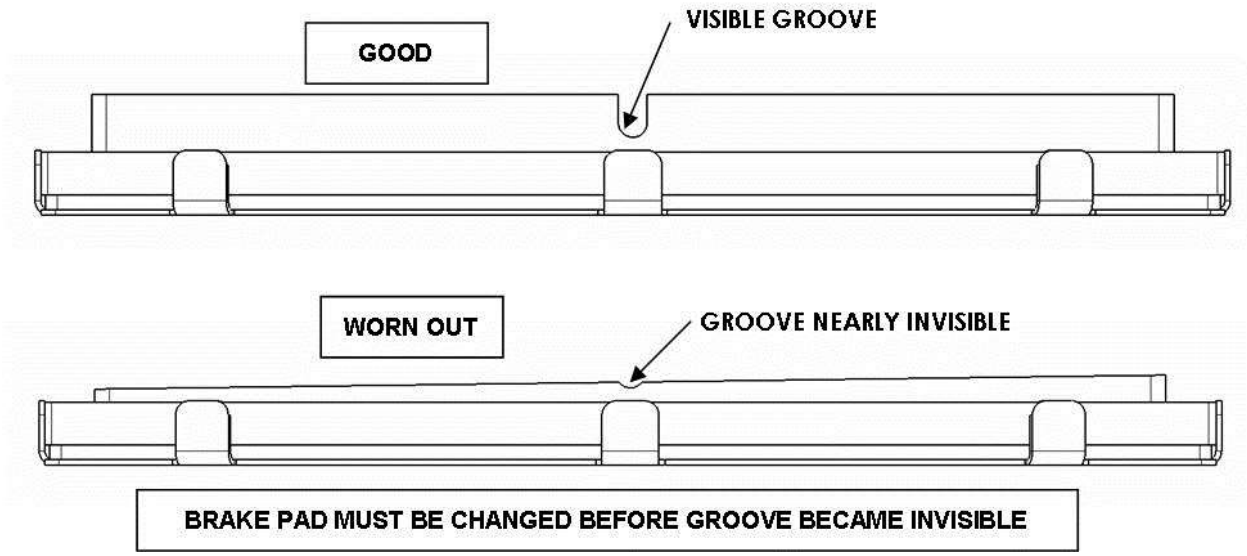


c) Clip wear limits



d) Pad wear limits

Min thickness groove nearly invisible.



7.5.3. Replacement schedule of wear parts

Replacement schedule of wear parts		
Component - item	**Note**	**Replacement schedule**
Wheel assembly bolts	a	On condition Immediate replacement if corroded
Main wheel bearings	b	On condition Immediate replacement if corroded or damaged
Bearing retaining ring	-	On condition 10 years
Main Wheel O-ring seals	-	At each tire change 5 years
Main wheel disc clips	a	On condition If found worn, all key disc must be replaced
Brake caliper seals and pistons	b	10 years
Brake assembly screws	b	On condition 10 years
Brake pads	c	On condition Replace after each brake disc change 5 years
Brake discs	b	On condition 10 years

NOTE:

a All screws of the assembly must be changed at the same time. It is not allowed to change only few of them.

b Parts must be changed by pair on both left and right sides at the same time. When new brake discs are installed brake pads must be changed to new ones even if not worn out.

c Brake pads must be changed all 4 at the same time even if not worn out (the 2 on left side and the 2 on right side).

7.5.4. Airworthiness Limitations

a) GENERAL:

This airworthiness limitations Section (ALS) is FAA approved and specifies maintenance required under § 43.16 and 91.403 of the FAR unless an alternate program has been FAA approved.

b) LIFE LIMITED PARTS:

The replacement time of life limited components listed next must be accomplished not later than the specified period of operation for that component.

Component	Time limit	Maintenance interval	Complete overhaul interval
Brake assembly	-	2500 flying hours or 5 years*	10,000 flying hours or 20 years*
Wheel assembly	-	1000 flying hours or 10 years*	10,000 flying hours or 20 years*

*Whichever limit occurs first

7.6. Disassembly – Reassembly – Tire change

7.6.1. Disassembly:

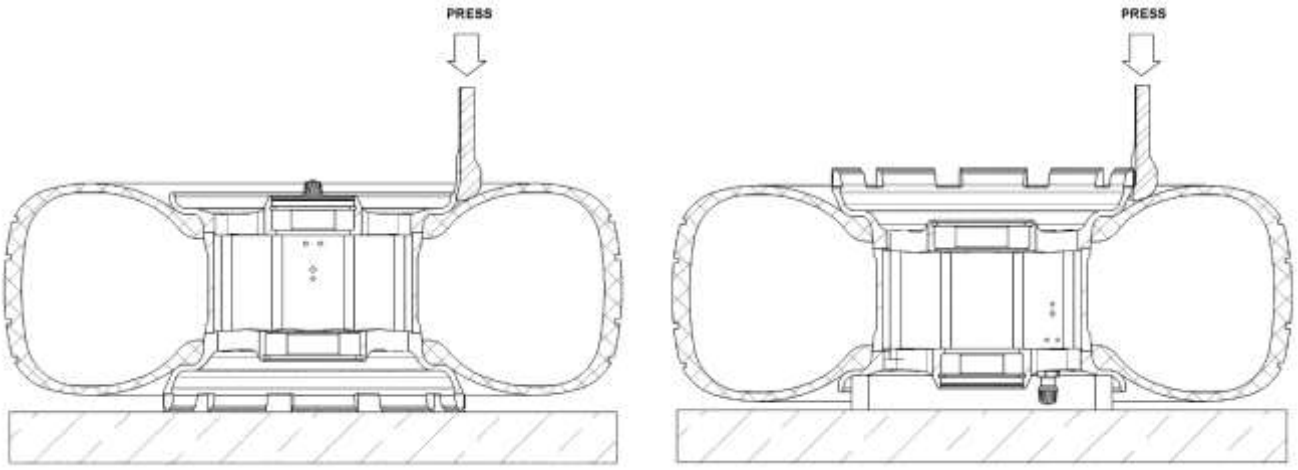
WARNING: Do not attempt to disassemble wheel until tire has been completely deflated. Otherwise, serious injury to personnel or damage to equipment can result.

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

a) remove wheel from aircraft

b) remove valve cap and apply a tire deflator to release tire pressure completely. Then remove the valve core.

c) break the beads away from the wheel flanges by applying pressure by hand or using a wood or plastic tool as close to the tire bead as possible. Tire lubricant may be used to help. Repeat the operation every 90° on both sides, see pictures next:



CAUTION: Do not pry between tire bead and wheel flange, this may destroy the structural and sealing properties of the wheel and tire.

d) Remove all screws holding wheel halves together.

CAUTION: Do not use impact or power wrenches

Do not remove assembly screws before the tire beads are fully free from the wheel.

e) Separate wheel halves, remove the tire and o-ring
f) Carefully lay the wheel halves on a flat clean bench.

CLEANING:

a) Clean all metal parts using water and soap, then wipe dry with a clean cloth. Valve core and central spacer must not be cleaned with solvent.

CAUTION: Do not use basic or acid agent on wheel halves. Anodizing can be totally removed within few minutes in contact with basic agent. Make sure that cleaning soap is not basic.

CAUTION: Sealing of ball bearings must not be damaged or cleaned with solvent.

b) Clean wheel bead seat with dry-cleaning solvent and wipe dry with a clean cloth.

CAUTION: oily solvent must not be used on wheel bead seat because tire will not stick properly on the wheel.

WARNING: Dry-cleaning solvents are toxic and volatile. Use a well-ventilated room. Avoid contact with skin or clothing. Do not inhale the vapor.

c) Apply air pressure to dry internal threads

CAUTION: oily solvent or oily air pressure must not be used on internal thread because threadlocker will not properly lock the screws.

7.6.2. Reassembly:

Tools and lubricants required:

- Plywood tool with conical bushing P/N: OT-002
- Threadlocker medium strength Loctite 243
- Tire lubricant
- Dry-cleaning solvent
- Torque wrench
-

a) Check ball bearings and seals, replace them if required.
b) Make sure that the inside of tire is clean and dry. Clean tire bead seat with a cloth impregnated with dry-cleaning solvent as to remove residual grease or wax.

CAUTION: oily solvent must not be used on tire bead seat because tire will not stick properly on the wheel.

c) Place the outer wheel half on the plywood tool.
d) Insert the conical bushing made from polished aluminium on the central spacer.
e) Spray tire lubricant on the tire beads and on the conical bushing
f) Insert the tire on the assembly with red spot in front of the valve
g) Place the second part of the plywood tool on the assembly and screw the 3 butterfly nuts. Press the tire till the conical bushing can be removed.

h) Place the inner wheel flange on the table and position the large o-ring in the groove.
i) Return the plywood tool with assembly onto the inner wheel flange. Position the assembly so that bolt holes are aligned.

CAUTION: Care should be taken to ensure that the o-ring is in place

j) Put a drop of threadlocker at the end of each screw. Then insert the 8 screws and align the bolt holes so that no force is required to screw them.
k) Screw to contact with torque 2 to 4 N.m (17 to 35 in-lbs)

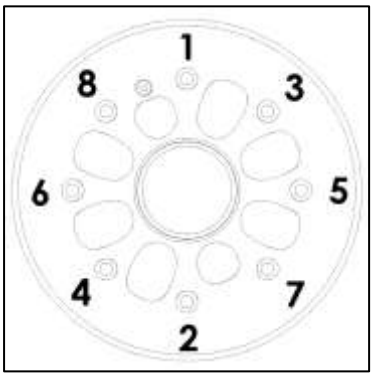
CAUTION: using a wrong threadlocker or not from recommended type may cause loose of screws or removal problem.

l) Then torque tighten with a torque wrench to 10 N.m (87 in-lbs)

NOTE: Respect the order when torque tightening

m) Torque tighten a second time each screw

CAUTION: Do not use impact or power wrenches



n) Screw the valve core
o) Place the wheel in a protective enclosure and inflate to maximum tire rated pressure
p) Measure the inflation pressure 24h later and check that the pressure drop is not more than 10%.

CAUTION: If the pressure drop is higher than 10% it means there is a leakage, the wheel must be disassembled to check for eventual defect.

q) Then adjust the pressure to the one recommended by the aircraft manufacturer.

7.7. Maintenance of wheel assembly

The maintenance consists in the inspection of the wheel parts and if required the replacement of next parts: - sealed ball bearings

- circlips
- assembly screws
- clips

NOTE:Maintenance can be performed by BERINGER service center.

7.7.1. Disassemble the wheel

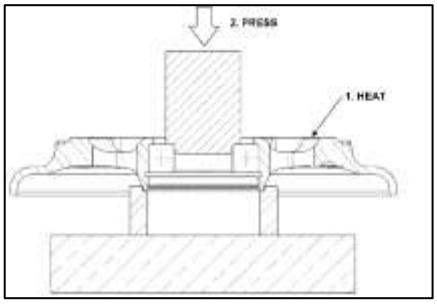
- For disassemble the nose wheel see §7.2.3
- For disassemble the main wheel see §7.2.2

G. Remove circlips on wheel half with lock ring pliers

H. Disassembly of the wheel bearing

➢ Place wheel flange in an oven at 110°C (230°F) to 120°C (250°F) for 30 minutes.

➢ Remove wheel half from heat source and immediately remove bearing. If the bearing does not fall out by himself: tap it evenly with a fiber drift pin or use a suitable arbor press.



CAUTION: Do not reuse a ball bearing that has already been mounted, even if in new condition.

I. Remove clips
For main Wheel only: remove screws and clips if they are out of tolerance.

CAUTION: Clip screws have been mounted with threadlocker: do not force while screwing out the small screws otherwise you may break the screw.

J. Cleaning

Clean all metal parts using water with soap or cleaning solvent and wipe dry with a clean cloth.

CAUTION: Do not use basic or acid agent on wheel halves. Anodizing can be totally removed within few minutes in contact with basic agent. Make sure that cleaning soap is not basic.

Apply air pressure to dry internal threads

CAUTION: Oily solvent or oily air pressure must not be used on internal thread because threadlocker will not properly lock the screws.

K. Inspection

Visually inspect wheel flanges for cracks, nicks, corrosion, or other damage.

Causes for replacement of wheel flanges:

- Signs of deep corrosion in critical areas
- Anodizing color removed on more than 15% of external surface
- Heavy nicks
- Deformed flanges
- Damaged bearing bore

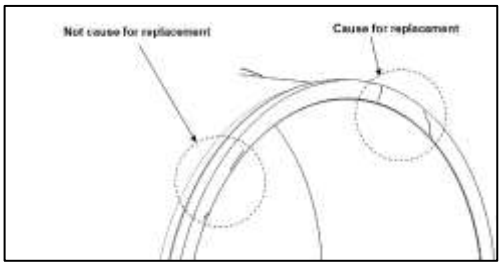
CAUTION: Anodizing coating must not be painted.

Do not use sandpaper on any parts. Sandpaper will remove anodizing coating.

Visually inspect outer wheel half for scratches, nicks, corrosion, or other damage.

Causes for replacement of outer wheel half :

- Signs of deep corrosion in critical areas
- Anodizing color removed on more than 15% of external surface
- Heavy nicks
- Scratches on sealing surfaces in contact with o-ring



7.7.2. *Reassemble the wheel*

A. Assembly of the wheel bearing

- Place wheel flange in an oven at 110°C (230°F) to 120°C (250°F) for 30 minutes, never exceed 150°C (300°F)

CAUTION: **Do not attempt to install bearing without heating the wheel flange, it will damage bearing bore.**

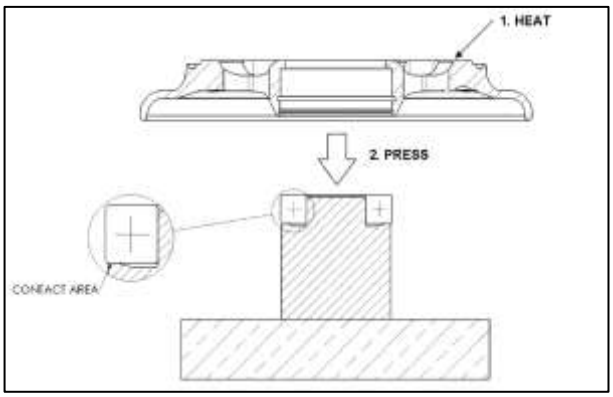
- Use a new sealed ball bearing

CAUTION: **Do not reuse a ball bearing that has already been mounted, even if in new condition.**

CAUTION: **Use only a ball bearing from BERINGER. There are many different qualities in ball bearings and most of them are not compliant with BERINGER requirements.**

- Install the ball bearing into bearing bore of heated wheel flange using appropriate tool. Tap gently into place with a fiber drift making sure cup is evenly seated against shoulder of wheel half.

CAUTION: **Do not use a hammer to press bearing, it will damage balls and cause failure of ball bearing**



B. After cooling down period, install new circlips
C. Check that circlips are in place

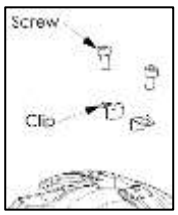
CAUTION: **Circlips maintain ball bearing, if circlips are not in place bearing can slide out and cause the blocking of the wheel.**

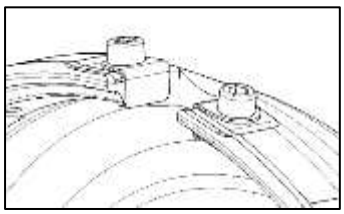
D. If clips (drive keys) have been removed then install new clips and new screws
E. Put a drop of threadlocker high strength (Loctite 271 recommended) on each end of the clip screw

CAUTION: **using a wrong threadlocker or not from recommended type may cause loose of screws or removal problem. Do not leave threadlocker more than few minutes on the screw.**

F. Torque tighten to 1.5 N.m (13 in-lb) while pressing the clip onto the rim with a grip
G. Check that disc slides without effort in wheel slots.

NOTE: If disc cannot slide in the slots, remove concerning clip and install again.





7.8. Brake Assembly

7.8.1. Disassembly – Reassembly – Brake Pads change

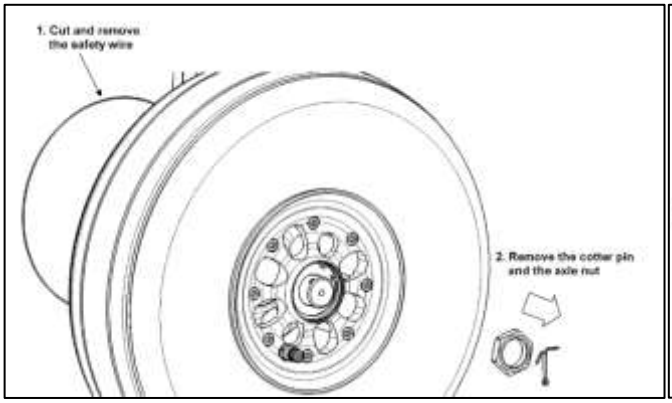
ON AIRCRAFT PADS CHANGE:

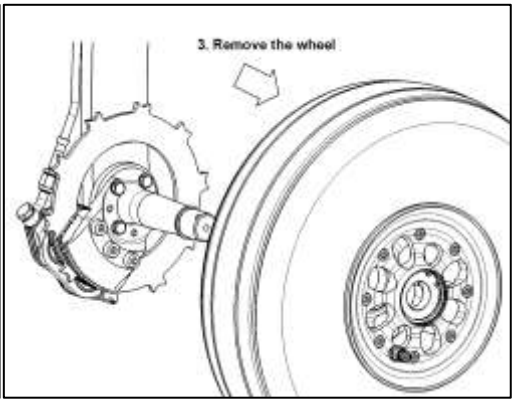
a) Remove wheel fairings and lift up the aircraft so that the wheels can be removed from the axle.

CAUTION: Respect the procedures of the aircraft manufacturer

WARNING: Insure aircraft is secure and stable before beginning any work. Working under an improperly stabilized aircraft could cause injury or death

b) Remove the cotter pin and the axle nut. Cut and remove the safety wire
c) Pull off the wheel with hands





d) Remove the 3 caliper assembly screws or only one screw on the side

NOTE: Do not remove the caliper back plate from the axle

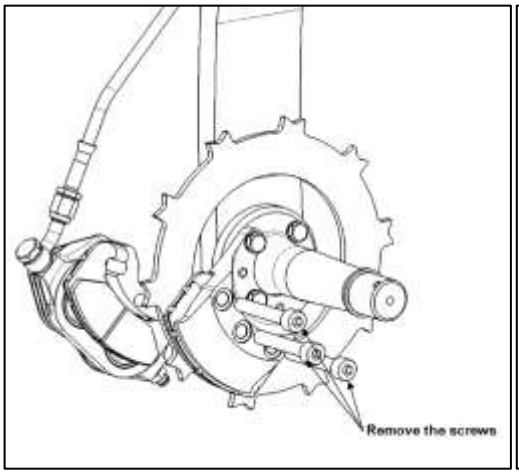
Do not disconnect the hydraulic fitting

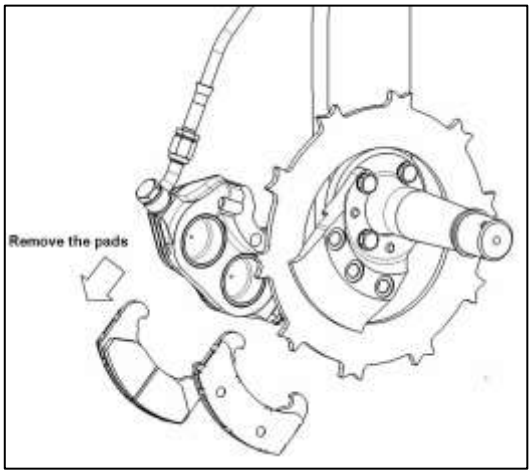
CAUTION: While the caliper housing is separated do not apply brake pressure

e) Remove the old brake pads

NOTE: The disc has not to be removed during the pad change

It is recommended to leave the disc in place





f) Clean all around pistons with a dry cloth to remove dust

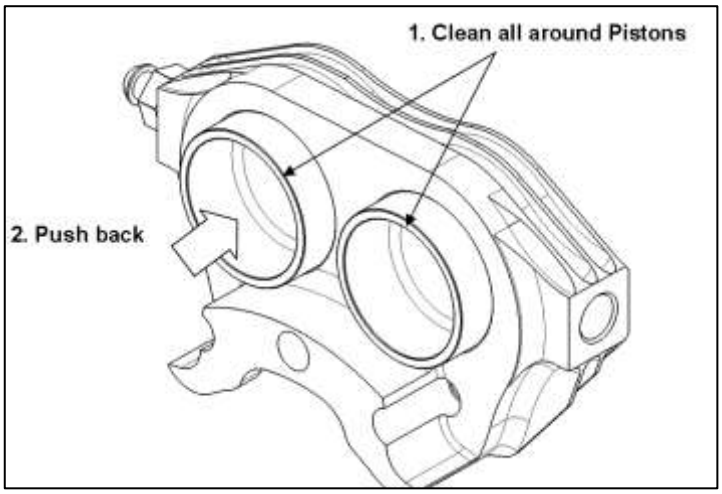
CAUTION: **Do not use solvent of any type to clean caliper housing and pistons. Solvent will penetrate to piston seals and may damage them. Use only a dry cloth.**

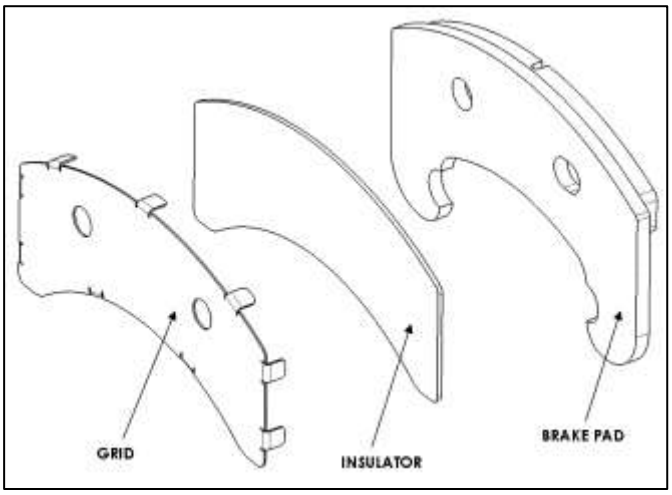
g) Push back the pistons with fingers

CAUTION: **If pushing back with hands is too hard then pistons and seals are sticking or may be blocked for other reason. Maintenance is required with change of seals and eventual change of other parts.**

h) Insert new pads

CAUTION: **Never mix old and new pads. All 4 pads (2 left and 2 right) must be replaced at the same time**





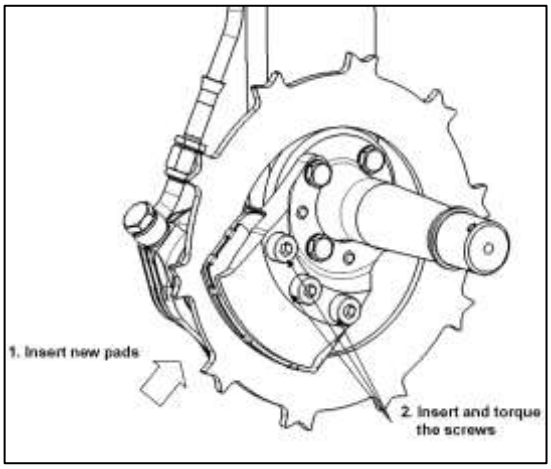
NOTE: **Pad insulator and grid should not be reused, they come together with new brake pads**

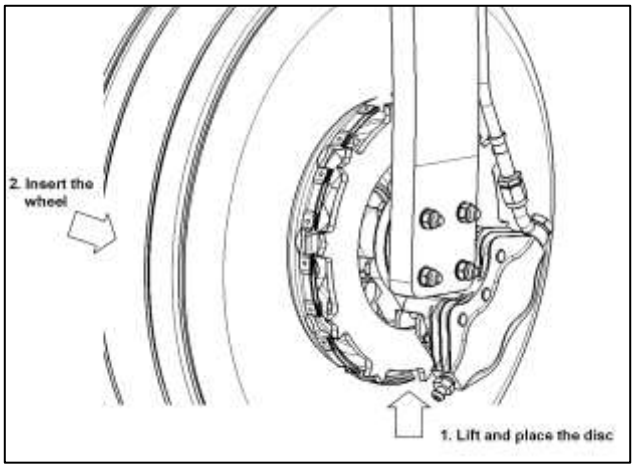
i) Put a drop of threadlocker medium strength (Loctite 243 recommended) on each end of the assembly screw.

CAUTION: **using a wrong threadlocker or not from recommended type may cause loose of screws or removal problem.**

j) Screw to contact and torque tighten to 25 N.m (220 in-lb)
k) torque all screws a second time to 25 N.m (220 in-lb)

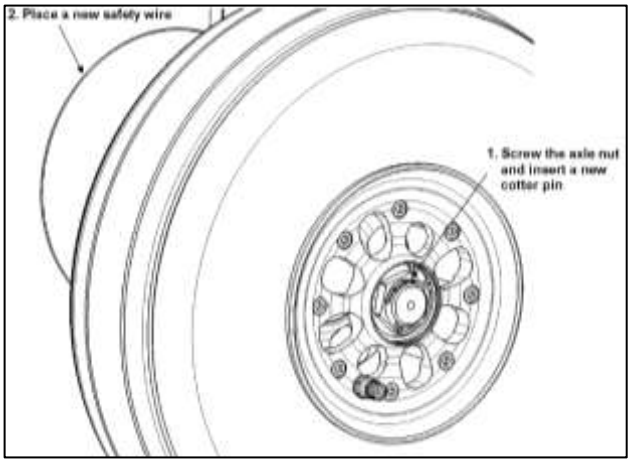
CAUTION: Check that brake pads can slide without effort

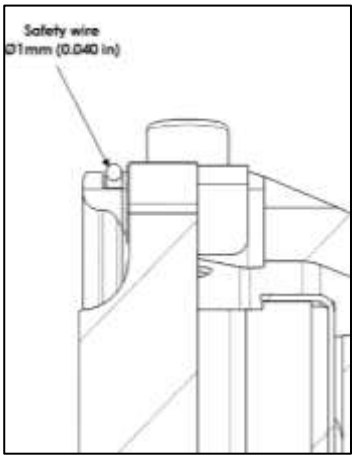




l) Insert the wheel on the axle while placing the disc in wheel slots
m) Screw the axle nut to the required torque
n) Secure the axle nut with a cotter pin
o) Place a new safety wire (stainless steel 1mm – 0.040")
p) Apply brake pressure 5-10 times and check brake fluid level in the reservoir
q) Check the brake efficiency and also the residual drag on the wheel

CAUTION: When the brakes are released you must be able to turn the wheel easily by hand.





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CAUTION: Brake torque value can be only 50% of rated brake torque before the conditioning. It means that even with full brake effort the aircraft will not stop as usual. Pilot must take into consideration this parameter to avoid loose of aircraft control during the conditioning procedure.

8. 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
1.Brakes won't hold	Improper conditioning of brake pads and disc	See the conditioning procedure §2
	Brake fluid or grease on disc and pads	Clean the disc and change the pads
	Wrong brake fluid has caused blocking of pistons	Change all seals of the system, put the right fluid
	Pads worn below minimum wear limits	Change brake pads
	Insufficient hydraulic pressure Improper master cylinder bore	Check the master cylinder type and geometry
2.Excessive toe pedal travel, spongy pedal or lever	Air in hydraulic system	Bleed the hydraulic system
	Leak in the system	Locate leak and repair
	Improper brake lines, too expandable	Replace brake lines
	Caliper assembly bolts are not tighten	Torque bolts to proper value
	Improper adjustment of master cylinder: does not release completely	Modify the pedal geometry or length of master cylinder
	Defective seal in master cylinder	Replace
3.Brake drag	Residual brake pressure due to improper adjustment of master cylinder: does not release completely	Modify the pedal geometry or length of master cylinder
	Residual brake pressure due to excessive pressure in the reservoir	Open and close the reservoir to release the pressure
	Wrong brake fluid has caused blocking of pistons	Change all seals of the system, put the right fluid
	Improper brake assembly fixing	Inspect and repair
	Pistons do not retract	Inspect for damage, change seals and pistons
	Pads are blocked and do not release	Inspect and repair
4.Rapid disc and pads wear	Improper conditioning of pads and disc	See the conditioning procedure §2
	Frequent overheating of disc and pads, brake is not adapted to the use	Replace brake assembly by another model with increased energy capacity

	Excessive rusting, scoring or pitting of brake disc	Repair or replace the disc and pads
5.Cracked or distorted wheel flanges	Improper tire inflation pressure	Replace wheel flange, check tire inflation pressure
	Loads applied excess the wheel load ratings	Change wheel model for a stronger one
6.Rapid decrease of tire pressure (10 PSI per day)	Improper tire mounting, damaged seal	Disassemble and replace seals
	Leak at valve core	Replace valve core
7.Medium decrease of tire pressure (10 PSI per week)	Improper tire	Use only tubeless tires
	Scratches on sealing faces	Replace the part by a new one
	Defective valve core	Replace valve core
8.Slow decrease of tire pressure (10 PSI per month)	Standard decrease of pressure with some tubeless tires	Inflate tire to the appropriate pressure. Check inflation pressure every month.