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PROPRIETARY INFORMATION

PPS 28.06

PRODUCTION PROCESS STANDARD

LUBRICATION OF THE DASH 8 AIRCRAFT

Issue 1
- This is a new Production Process Standard (PPS).
- Direct PPS related questions to christie.chung@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

Signed original on file. Validation of paper prints is the responsibility of the user.

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	Quality	

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1 SCOPE

1.1 Unless otherwise specified by the engineering drawing, use this Production Process Standard (PPS) to determine the type of lubricant, method of application and component items requiring lubrication for the DASH 8 aircraft.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. do not supersede the procedure or requirements specified in this PPS. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Toronto, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 13.26 - General Subcontractor Provisions.

3.2 PPS 31.17 - Solvent Usage.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Solvent as specified in PPS 31.17.

4.1.2 Lubricants as specified in Table I.

4.1.3 Wiping cloth (e.g., DSC 378-2).

4.2 Equipment

4.2.1 Oil cans, trigger operated, pressure type.

4.2.2 Grease gun, with standard grease fittings.

4.2.3 Grease gun, with needle point nozzle MS 24203 or equivalent.

5 PROCEDURE

5.1 General

5.1.1 Apply lubricant to clean, dry surfaces. If necessary, solvent clean before lubrication according to PPS 31.17.

5.1.2 Do not apply lubricants if the temperature is below 32°F (0°C).

5.1.3 Do not mix grease from different manufacturers or specifications in the same component. The properties of one grease can decrease the lubrication performance of the other grease. This could possibly cause unsatisfactory lubrication and failure of the component.

5.1.4 Avoid the use of excessive quantities of lubricant. Remove excess lubricant.

5.1.5 Clean parts onto which lubricant has spilled immediately by solvent cleaning according to PPS 31.17.

5.2 Lubrication of Landing Gear

5.2.1 Unless otherwise specified by the engineering drawing, apply lubricant and method to the locations as specified in Table II only. The use of incorrect lubricants may cause deterioration of seals due to incompatibility with the grease or oil and increased wear on parts. Refer to Table I for the military and commercial designations of the lubricants specified.

5.2.2 Unless otherwise specified by the engineering drawing and exceptions specified herein (e.g., Main Landing Gear (MLG) shock strut lower bearing, areas where seal popping have been observed, etc.), inject sufficient grease through the fittings until grease is seen extruding from the associated joint. This ensures that the joint has been adequately greased.

5.2.3 Apply grease only one time with a manual grease gun to the MLG shock strut lower bearing. If you apply too much grease, you will contaminate the hydraulic fluid in the shock strut.

5.2.4 Apply grease with a manual grease gun to the Nose Landing Gear (NLG) upper and lower drag strut attachment. Deliver the grease at a slow rate to avoid pressure build up. If you do not use a manual grease gun, you can cause damage to the spherical bearing seal.

5.2.5 To assist with NLG installation, manually grease the drag strut trunnion fitting and shock strut trunnion fitting (see Figure 5). Apply a thin layer of grease evenly around the trunnion fitting.

5.2.6 Following lubrication, ensure lub fittings are wiped clean of any grease and check for positive retention. Dislodging, movement and/or gap between the fitting and the mounting face is unacceptable.

6 REQUIREMENTS

6.1 Only the lubricants specified herein, or on the engineering drawing shall be used.

6.2 Excess lubricant shall be removed by wiping with a clean, dry cloth.

6.3 Ensure adjacent areas have not been contaminated during lubrication.

7 SAFETY PRECAUTIONS

7.1 Observe standard plant safety precautions when performing the procedure specified herein.

7.2 Refer to PPS 31.17 for the safety precautions for handling and using solvents.

7.3 Ensure the lockpins are installed in the door mechanisms of the MLG and NLG prior to lubricating the aircraft. The door mechanisms can accidentally close the landing gear doors. This can cause injuries to the persons and damage to the equipment.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for lubrication of DASH 8 aircraft shall have a good working knowledge of the applicable procedure and requirements as specified herein and shall have exhibited their competency to their supervisor.

TABLE I - LUBRICANTS - MILITARY/COMMERCIAL DESIGNATION

SPECIFICATION NO.	DESCRIPTION	COMMERCIAL DESIGNATION
MIL-G-21164	Grease, Synthetic, Landing Gear Wheel Bearing	Kluber Isoflex Topas NB-52 Grease
None		Mobil Aviation Grease SHC 100 (Product No. 53006-3) See Note 1
MIL-PRF-23827C Type I (Note 2)	Grease, Aircraft and Instrument, Gear and Actuator Screw	Aeroshell Grease 33, Type I Royco 27A1, Type I Mobil Grease 33, Type I Petronomics Plus M-P Aircraft Grease, Type I
MIL-PRF-23827C Type II (Note 2)		Aeroshell Grease 7, Type II Castrol Al/Braycot 627, Type II Supermil Grease A 728832, Type II
MIL-PRF-7870C	General Purpose Lubricating Oil, Low Temperature	Aeroshell Fluid 3 Royco 363 NYCOLUBE 7870

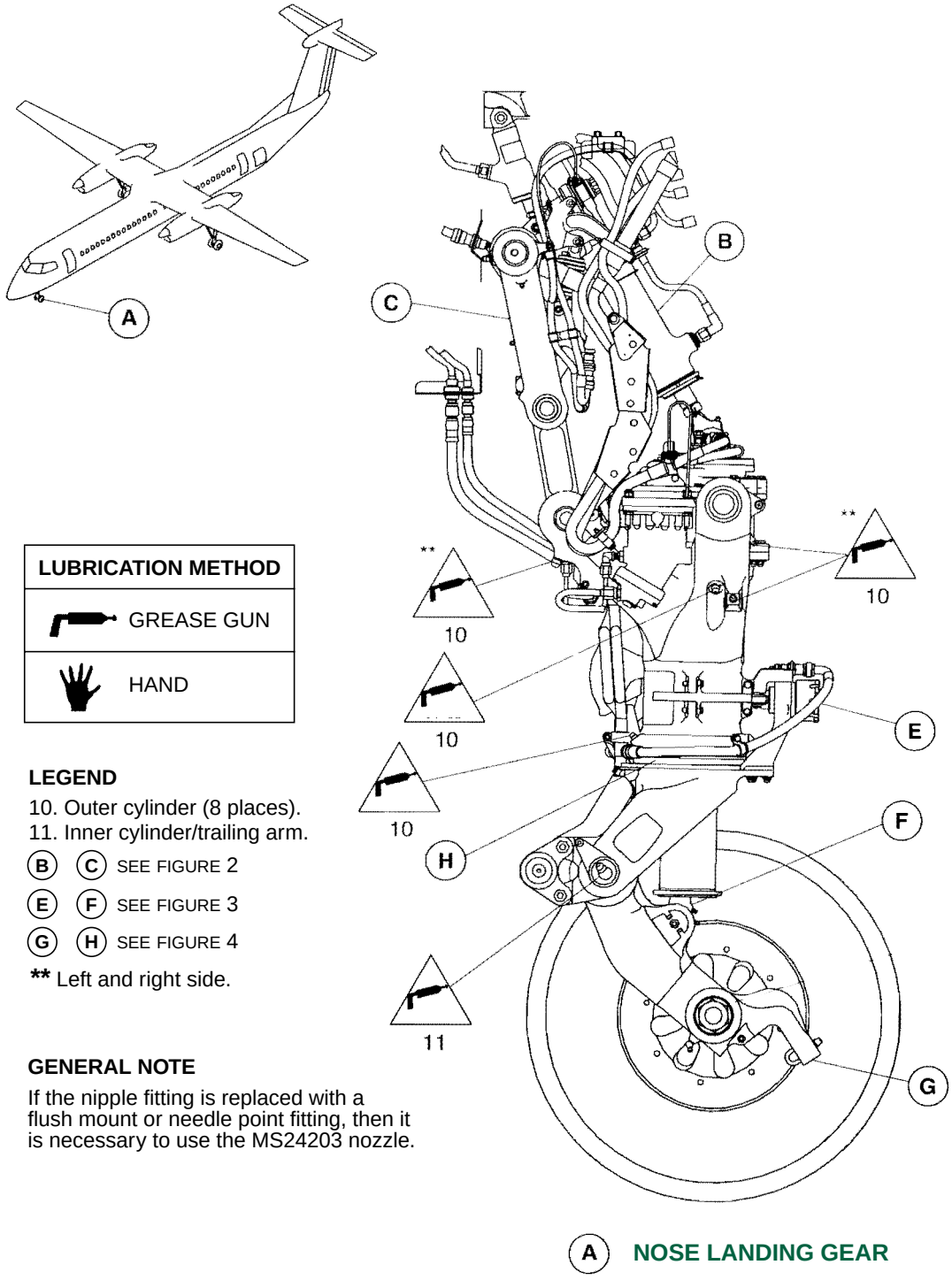
Note 1. **Do not** use Mobilith SHC 100 as this is a consumer grade grease that visually resembles Mobile SHC 100, but it is not approved for aviation use.
Note 2. Intermixing grease of different Types is not allowed.

TABLE II - AIRCRAFT LUBRICATION SCHEDULE

COMPONENT	ITEM	FIGURE	LUBRICANT	METHOD
NOSE LANDING GEAR (NLG)	RETRACTOR ACTUATOR ASSEMBLY	Figure 2	MIL-PRF-23827C Type I or Type II	Grease Gun
	DRAG STRUT ASSEMBLY			
	NOSEWHEEL CENTER ACTUATOR	Figure 3		
	OUTER CYLINDER	Figure 1		
	INNER CYLINDER/TRAILING ARM			
	LEVER LINK ASSEMBLY	Figure 3		
	TRAILING ARMS	Figure 4		
	THRUST COLLAR			
	DRAG STRUT TRUNNION FLITTING AT WHEELWELL SIDEWALL	Figure 5		
	SHOCK STRUT TRUNNION FITTING AT WHEELWELL SIDEWALL			

TABLE II - AIRCRAFT LUBRICATION SCHEDULE

COMPONENT	ITEM	FIGURE	LUBRICANT	METHOD
MAIN LANDING GEAR (MLG)	LOWER TORQUE ARM ATTACHMENT PIN	Figure 6	MIL-PRF-23827C Type I or Type II	Grease Gun
	UPPER TO LOWER TORQUE ARM PIVOT			
	UPPER TORQUE ARM TO SHOCK STRUT ATTACHMENT			
	DRAG STRUT TO SHOCK STRUT ATTACHMENT			
	STABILIZER BRACE TO NACELLE STRUCTURE			
	YOKE TO NACELLE STRUCTURE ATTACHMENT			
	SHOCK STRUT LOWER BEARING			
	RETRACTOR ACTUATOR ROD END	Figure 7		
	YOKE LOWER END ATTACHMENT PIN			
	DRAG STRUT TO NACELLE STRUCTURE ATTACHMENT			
	STABILIZER BRACE TO YOKE ATTACHMENT			
	UPLOCK MECHANISM	Figure 8		
	EMERGENCY ACTUATOR ROD END			
	RETRACTION ACTUATOR LUG END			
	STABILIZER BRACE PIVOT	Figure 9		
	DOWNLOCK ASSEMBLY			
	LOCK ACTUATOR ASSEMBLY			
	LOCK SPRING	Figure 10		
NLG DOOR HINGES AND LINKAGES	DOOR LINKAGES	Figure 11	MIL-PRF-23827C Type II	Grease Gun
	DOOR HINGES		MIL-PRF-7870C	
MLG DOOR HINGES AND LINKAGES	AFT DOOR LINKAGES	Figure 12	MIL-PRF-23827C Type II	Grease Gun
	DOOR ACTUATOR			
	FWD DOOR LINKAGES	Figure 13		



LUBRICATION METHOD
GREASE GUN
HAND

LEGEND

10. Outer cylinder (8 places).
11. Inner cylinder/trailing arm.

(B) (C) SEE FIGURE 2

(E) (F) SEE FIGURE 3

(G) (H) SEE FIGURE 4

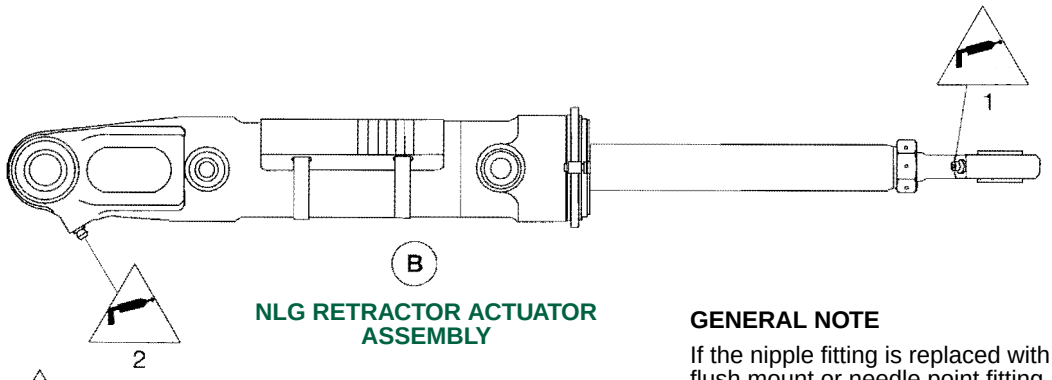
** Left and right side.

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

(A) **NOSE LANDING GEAR**

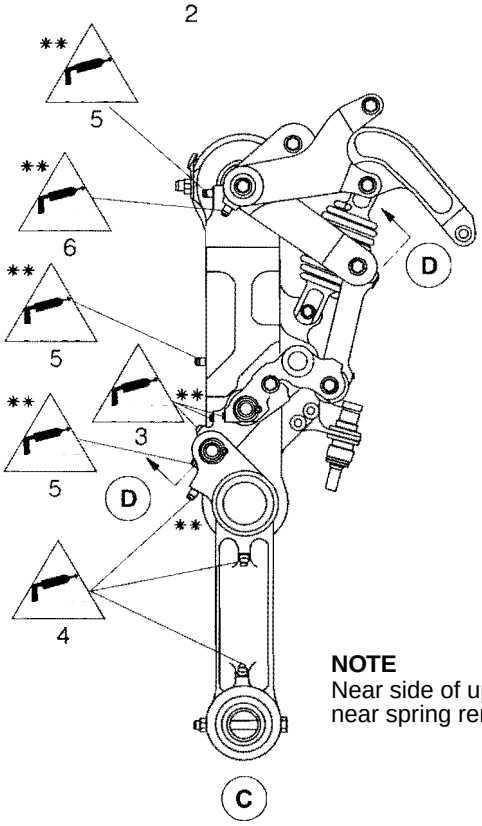
FIGURE 1 - LUBRICATION OF THE NOSE LANDING GEAR



NLG RETRACTOR ACTUATOR ASSEMBLY

GENERAL NOTE

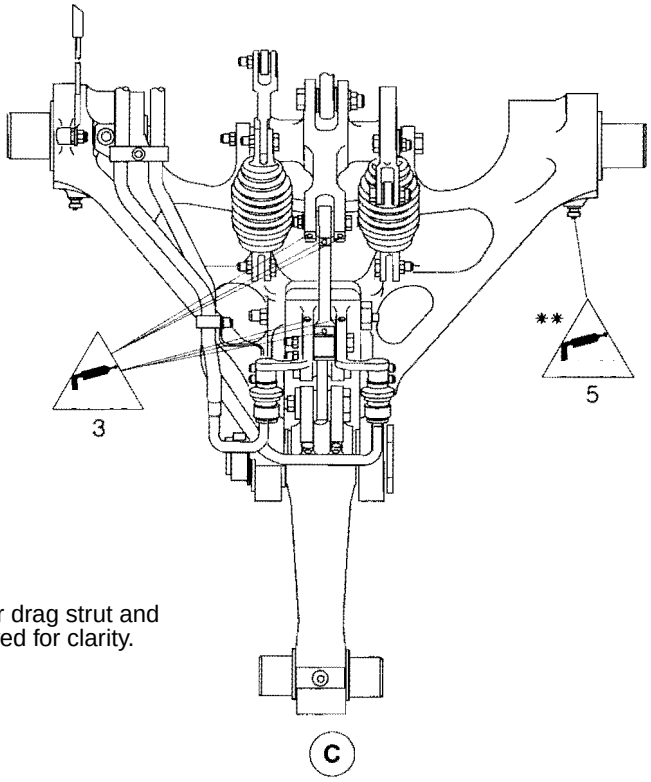
If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.



NLG DRAG STRUT ASSEMBLY

NOTE

Near side of upper drag strut and near spring removed for clarity.



NLG DRAG STRUT ASSEMBLY (ROTATED 90º)

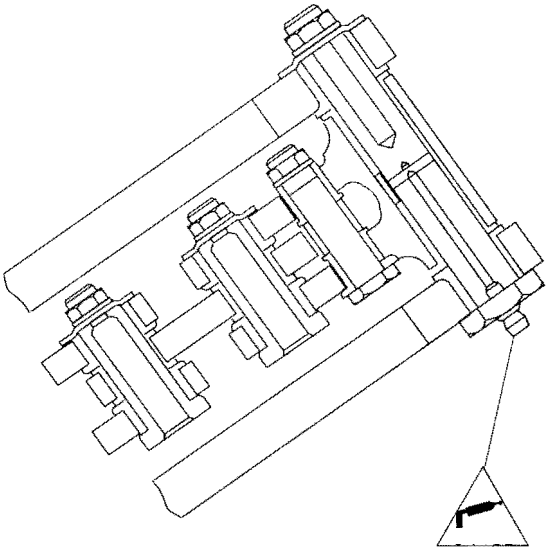
LEGEND

1. Retraction actuator rod end.
2. Retraction actuator cylinder lug.
3. Drag strut links and pivot tube (10 places).
4. Lower drag strut (4 places).
5. Upper drag strut (8 places).
6. Drag strut pivot tube (2 places).

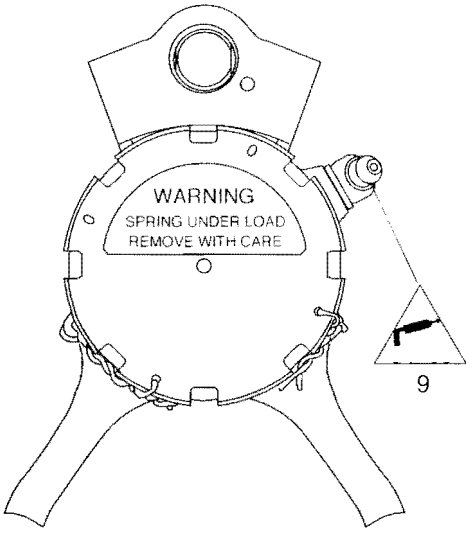
****** Left and right side.

LUBRICATION METHOD	
	GREASE GUN

FIGURE 2 - LUBRICATION OF THE NOSE LANDING GEAR

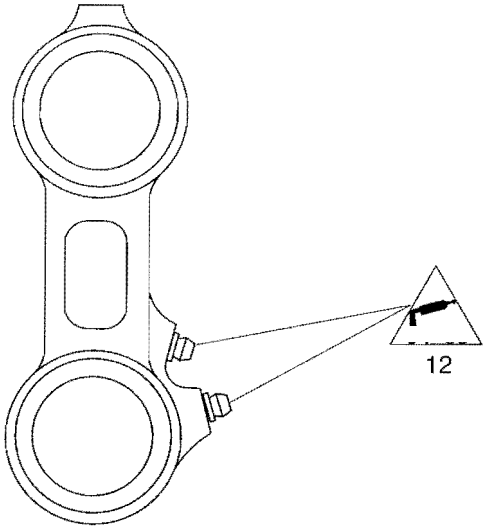


D – D



E

NOSEWHEEL CENTERING ACTUATOR



F

LEVER LINK ASSEMBLY

LEGEND

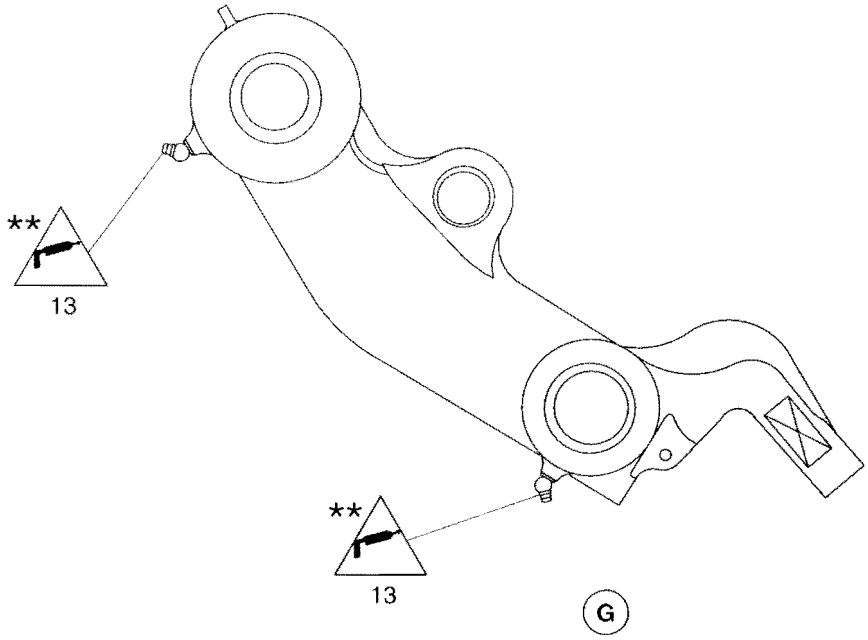
7. Upper lock link pin.
9. Nosewheel center actuator.
12. Lever link (2 places).

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

LUBRICATION METHOD
GREASE GUN

FIGURE 3 - LUBRICATION OF THE NOSE LANDING GEAR



G

TRAILING ARM

GENERAL NOTE

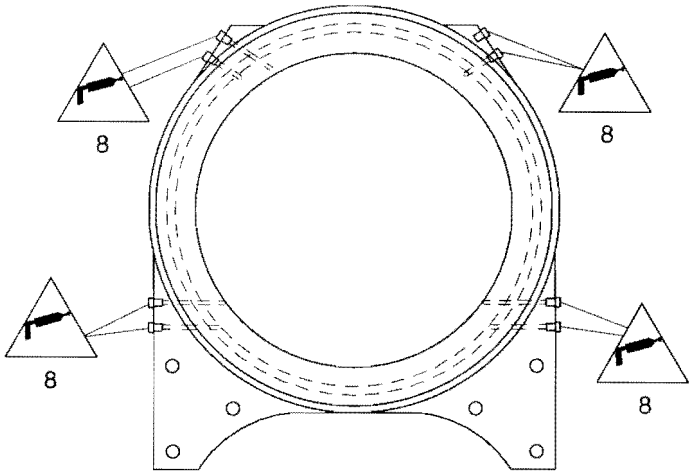
If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

LEGEND

8. Thrust collar (8 places).
13. Trailing arm (4 places).

** Left and right side.

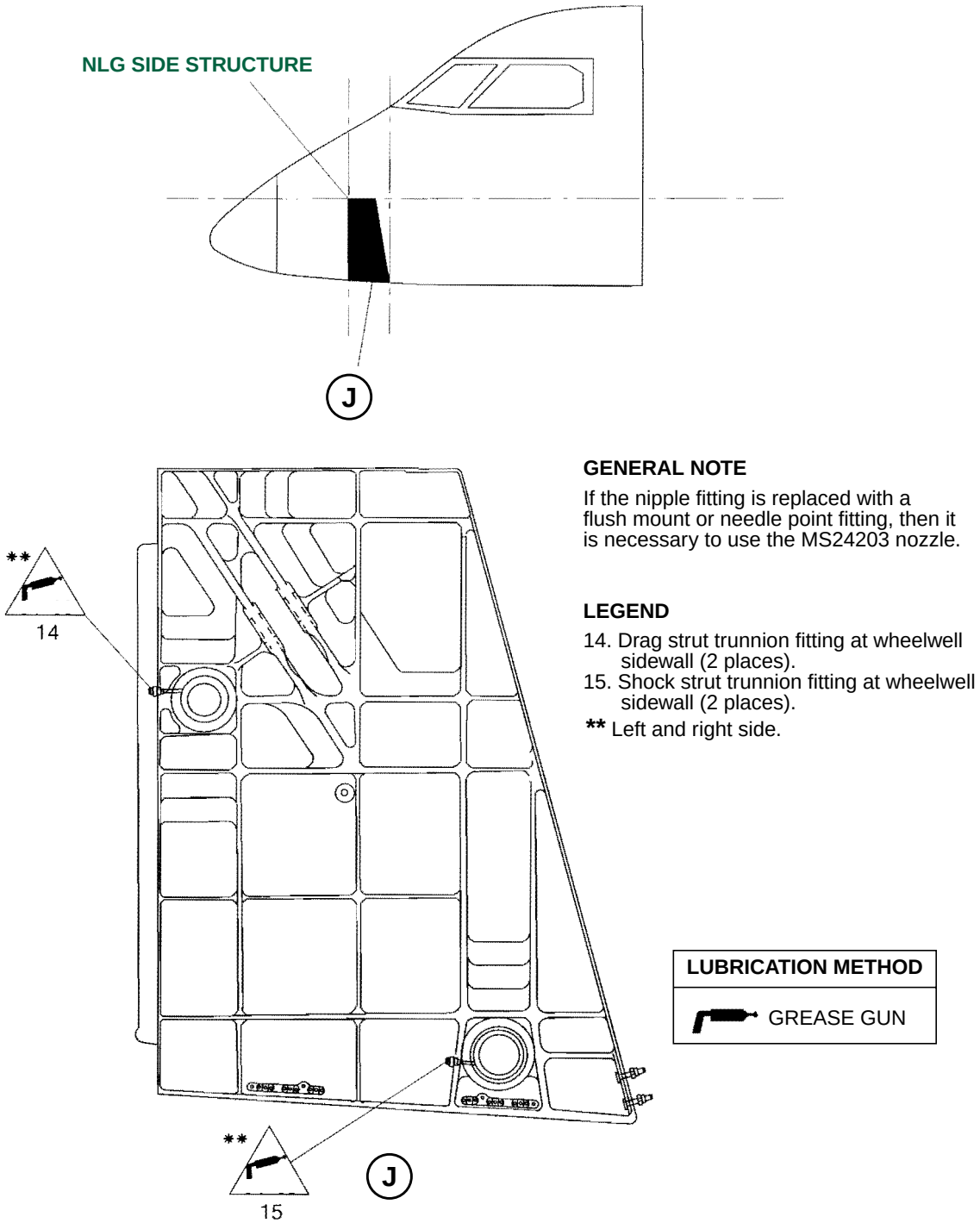
LUBRICATION METHOD
GREASE GUN



H

THRUST COLLAR

FIGURE 4 - LUBRICATION OF THE NOSE LANDING GEAR



GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

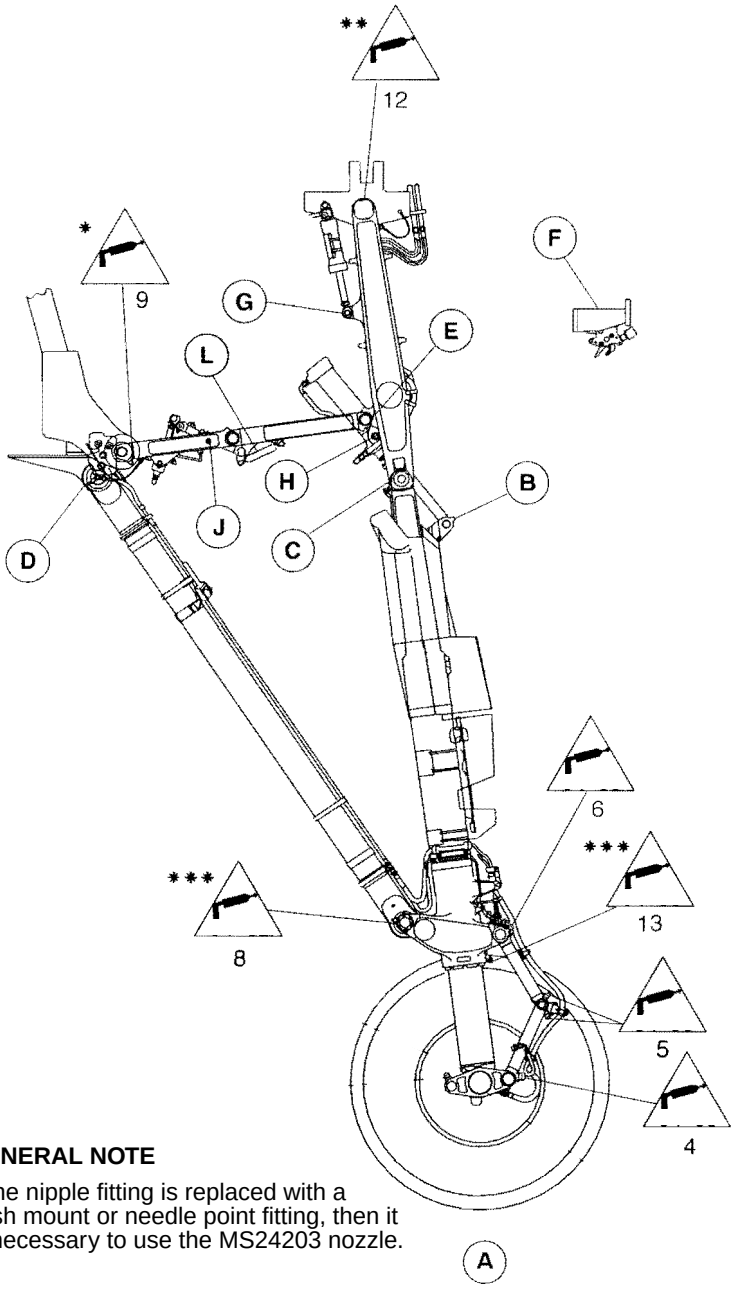
LEGEND

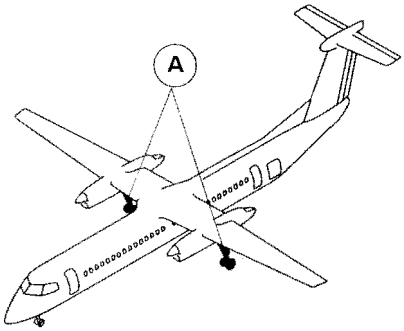
14. Drag strut trunnion fitting at wheelwell sidewall (2 places).
15. Shock strut trunnion fitting at wheelwell sidewall (2 places).

** Left and right side.

LUBRICATION METHOD
GREASE GUN

FIGURE 5 - LUBRICATION OF THE NOSE LANDING GEAR





LEGEND

4. Lower torque arm attachment pin (5 places).
5. Upper to lower torque arm pivot (2 places).
6. Upper torque arm to shock strut attachment (5 places).
8. Drag strut to shock strut attachment (3 places).
9. Stabilizer brace to nacelle structure attachment (6 places).
12. Yoke to nacelle structure attachment (2 places).
13. Shock strut lower bearing.

***** Left and right stabilizer.

****** Left and right side.

******* Use manual grease gun only.

(B) (C) (D) (E)	SEE FIGURE 7
(F) (G) (H)	SEE FIGURE 8
(J)	SEE FIGURE 9
(L)	SEE FIGURE 10

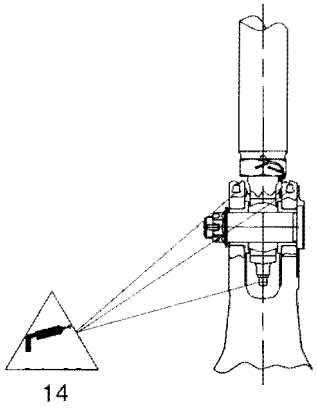
LUBRICATION METHOD	
	GREASE GUN
	HAND

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

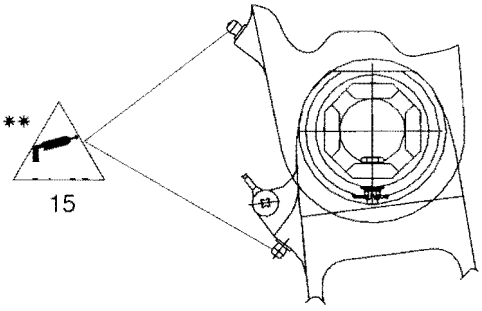
MAIN LANDING GEAR

FIGURE 6 - LUBRICATION OF THE MAIN LANDING GEAR



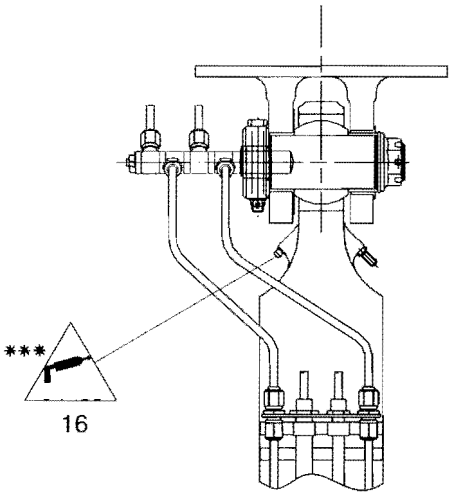
B

RETRACTION ACTUATOR ROD END



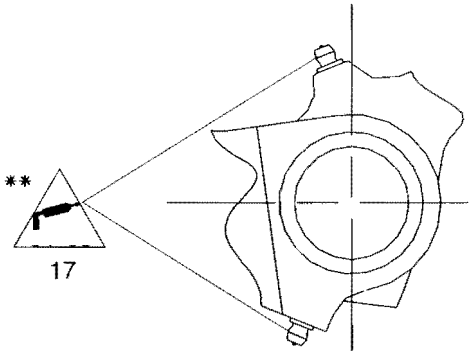
C

YOKE LOWER END ATTACHMENT PIN



D

DRAG STRUT TO NACELLE STRUCTURE ATTACHMENT



E

STABILIZER BRACE TO YOKE ATTACHMENT

LUBRICATION METHOD
GREASE GUN

LEGEND

14. Retraction actuator rod end (3 places).
15. Yoke lower end attachment pin (6 places).
16. Drag strut to nacelle structure attachment.
17. Stabilizer brace to yoke attachment (6 places) (6 places).

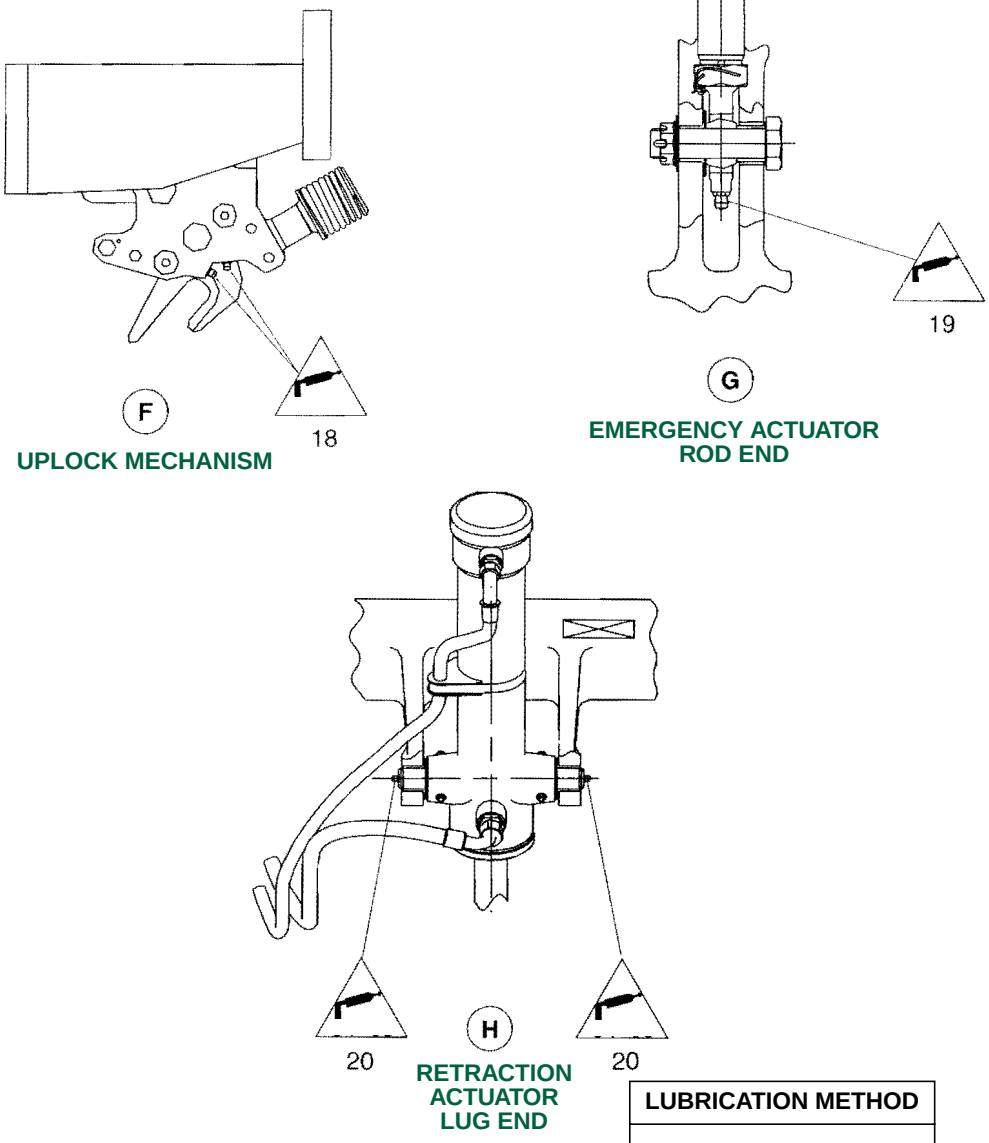
** Left and right side.

*** Use manual grease gun only.

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

FIGURE 7 - LUBRICATION OF THE MAIN LANDING GEAR



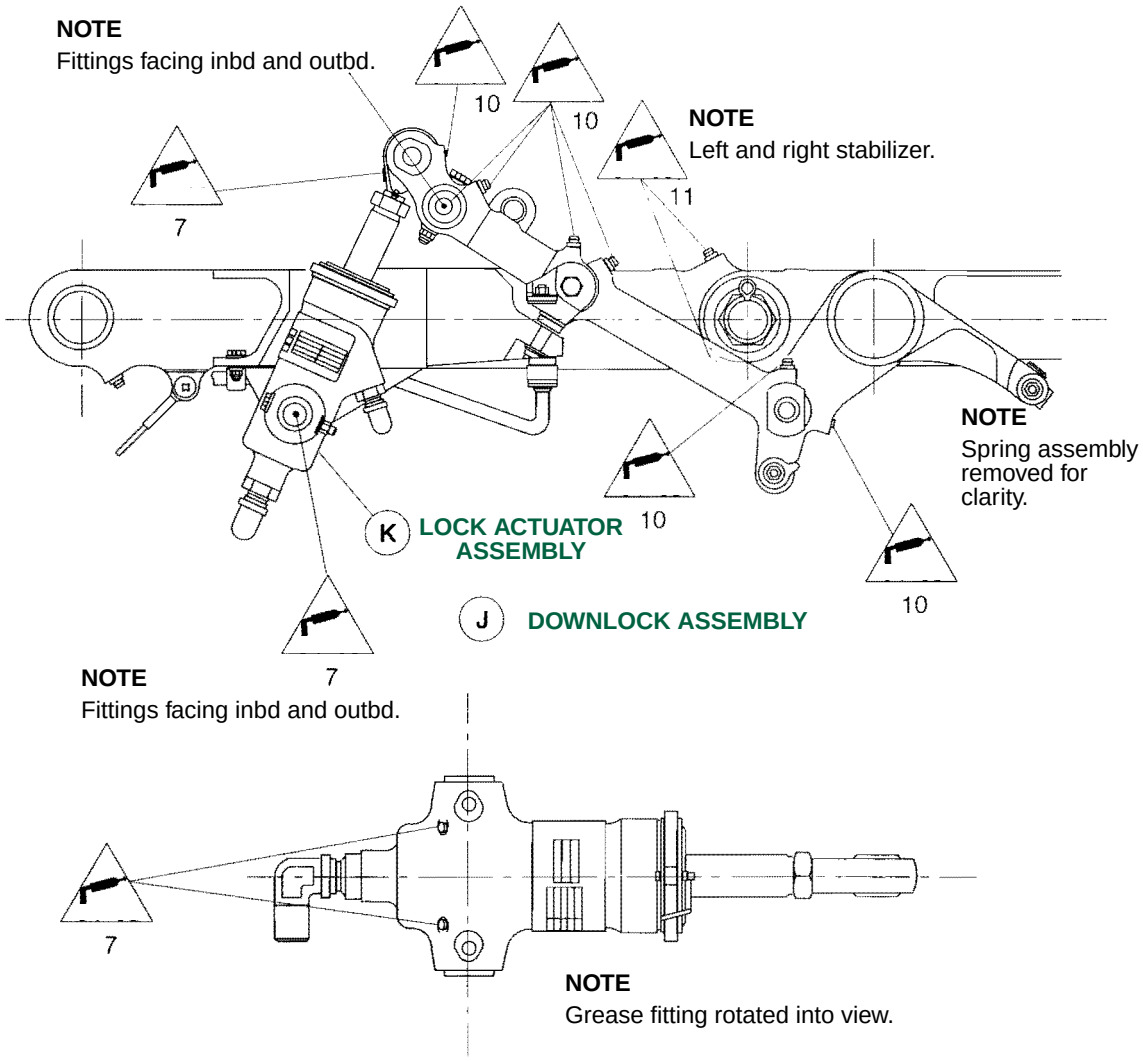
LEGEND

18. Uplock mechanism
    (2 places inboard, 2 places outboard).
19. Emergency actuator rod end.
20. Retraction actuator lug end
    (2 places).

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

FIGURE 8 - LUBRICATION OF THE MAIN LANDING GEAR



LEGEND

7. Lock actuator assembly (5 places).
10. Downlock assembly (11 places).
11. Stabilizer brace pivot (6 places)

****** Left and right side.

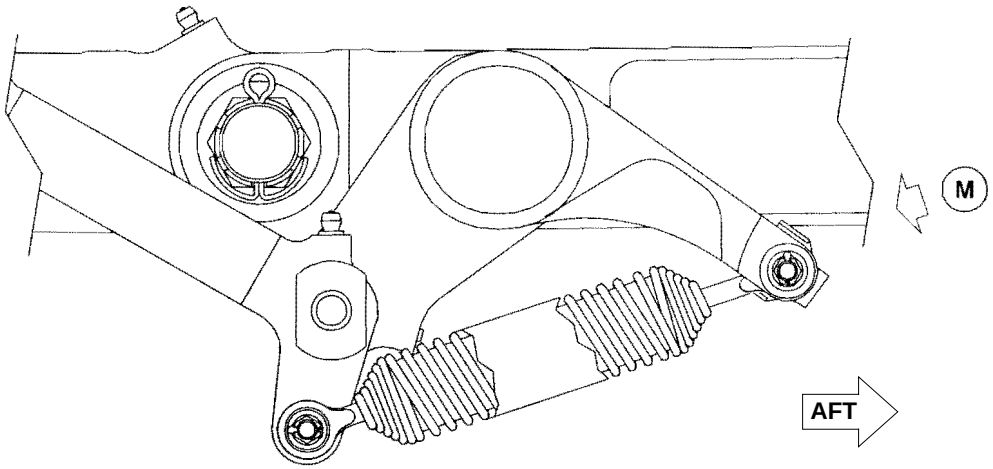
K
LOCK ACTUATOR ASSEMBLY

LUBRICATION METHOD
GREASE GUN

GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.

FIGURE 9 - LUBRICATION OF THE MAIN LANDING GEAR



LUBRICATION METHOD
GREASE GUN

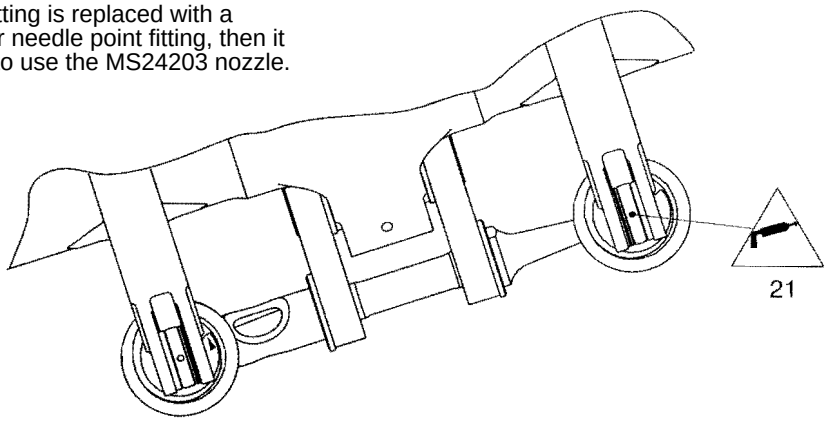
L

LEGEND

21. Lock-spring
(2 places).

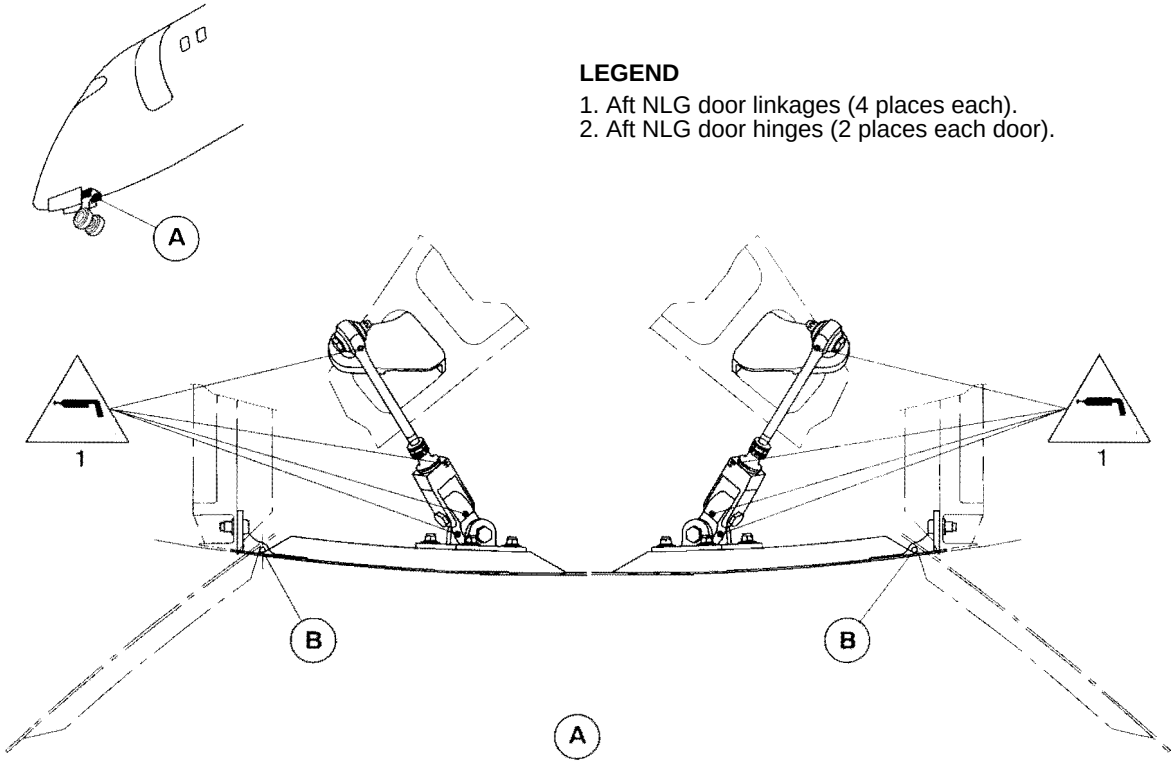
GENERAL NOTE

If the nipple fitting is replaced with a flush mount or needle point fitting, then it is necessary to use the MS24203 nozzle.



M **LOCK-SPRING**

FIGURE 10 - LUBRICATION OF THE MAIN LANDING GEAR



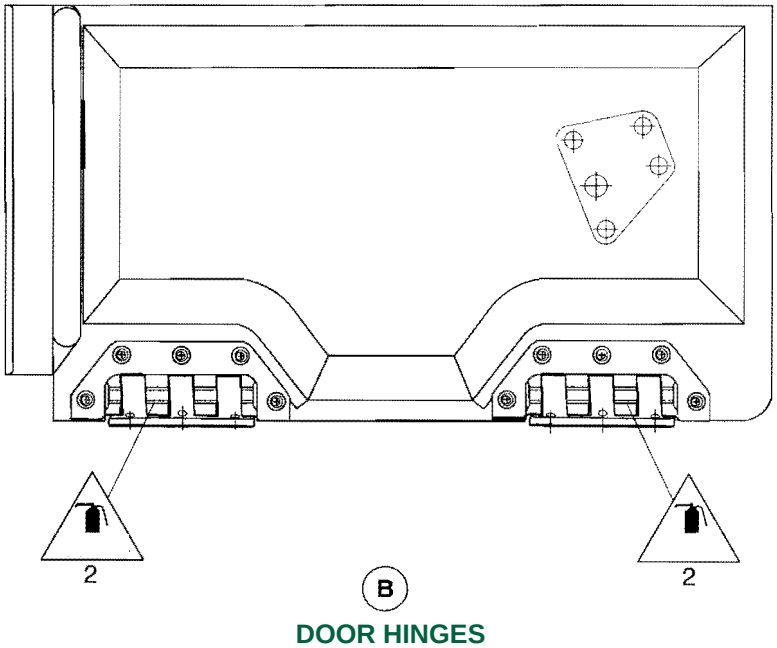
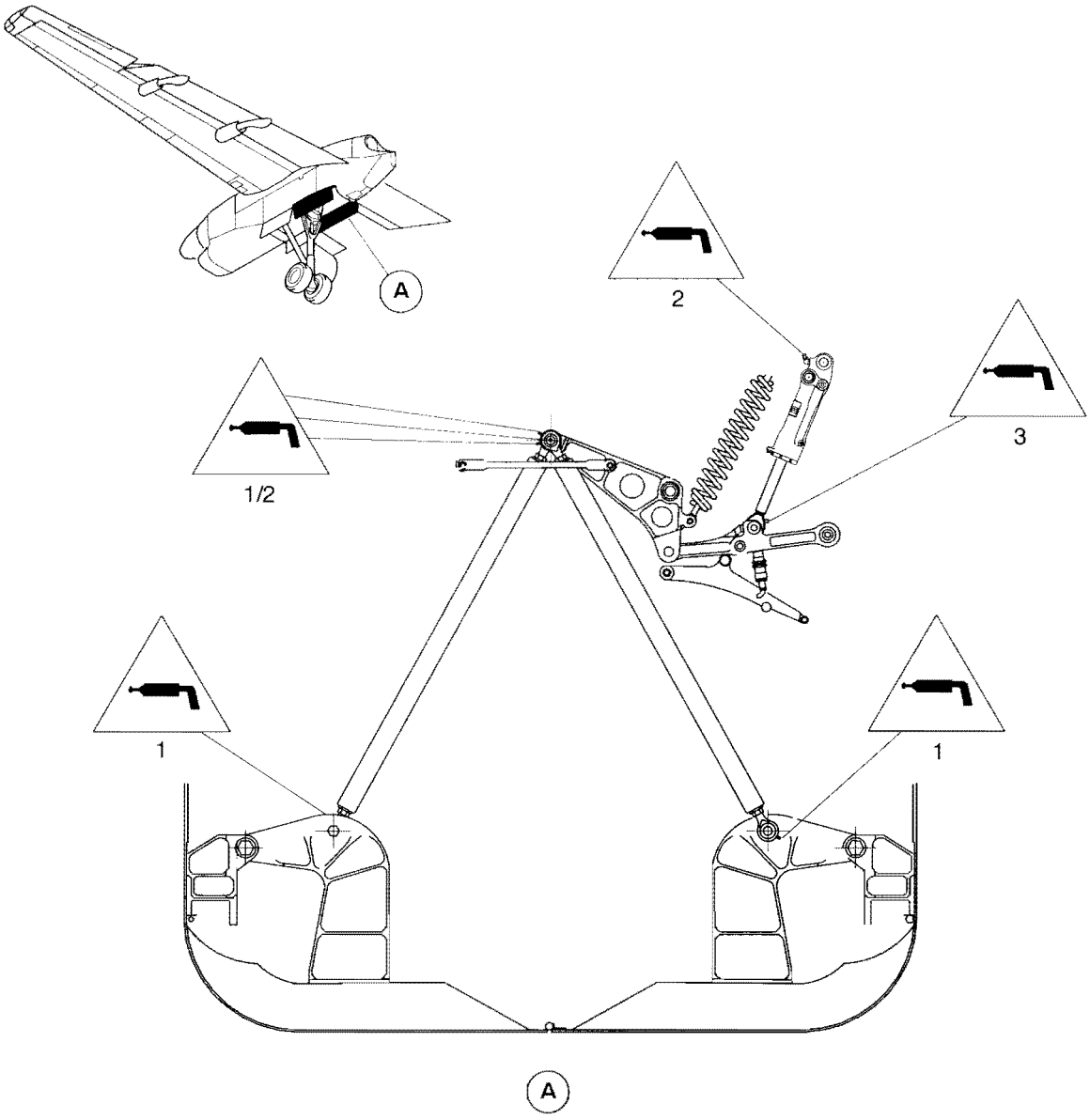


FIGURE 11 - NLG DOOR HINGES AND LINKAGES



VIEW LOOKING AFT
DOORS SHOWN IN CLOSED POSITION

LEGEND

1. MLG aft door linkages (2 places each).
2. MLG aft door linkage (1 place).
3. MLG door actuator (2 places).

LUBRICATION METHOD
GREASE GUN

FIGURE 12 - MLG DOOR HINGES AND LINKAGES

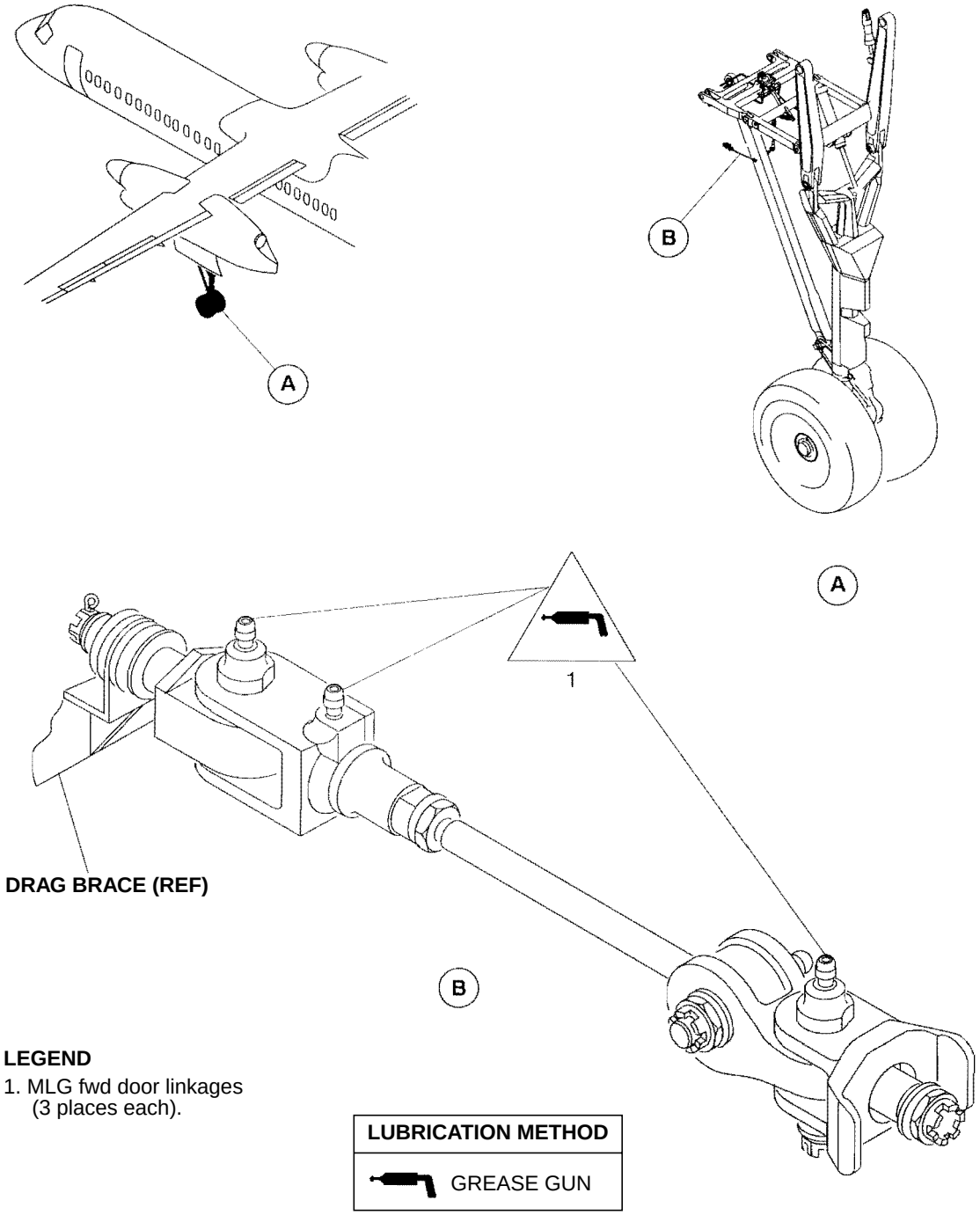


FIGURE 13 - MLG DOOR HINGES AND LINKAGES