Le dossier technique se compose de 13 pages, numérotées de 1/13 à 13/13.
Dès que le dossier technique vous est remis, assurez-vous qu'il est complet.
S'il est incomplet, demandez un autre exemplaire au chef de salle.

DOSSIER TECHNIQUE

BACCALAURÉAT PROFESSIONNEL

AVIATION GENERALE

EPREUVE E2 (U2)

ANALYSE DE SYSTEMES D'AERONEF

MISE EN SITUATION

Un pilote entreprend, un vol local avec un avion monomoteur de l'aéroclub situé sur l'aérodrome.
Cet avion porte le numéro de série **S/N 0028**.
Il prend connaissance du carnet de route de l'appareil, constate qu'il est sorti de maintenance récemment. Au cours de cette visite, le système de freinage a été inspecté. Les éléments de freinage ont été contrôlés dimensionnellement (fiche de relevé, DT 6/13) et l'étrier gauche a été changé. La purge du circuit de freinage a été réalisée.

Détail du vol :
Seulement deux vols ont eu lieu depuis. Le plein est fait.
L'Aircraft Technical Log ne présente aucune anomalie concernant l'appareil ce qui est confirmé par le carnet de route de l'avion.
La météo est correcte pour entreprendre un vol ce jour et il n'y a aucune interdiction ou restriction sur le terrain et ses alentours.
Le pilote effectue consciencieusement la visite prévol intérieure et extérieure dans le hangar en suivant la procédure du manuel de vol. Aucune anomalie n'est détectée.
Le pilote sort l'avion du hangar, le stationne sur l'aire prévu à cet effet et suit la procédure de mise en route.
Le terrain est contrôlé, il annonce donc ses intentions à la tour de contrôle qui l'autorise à entreprendre son vol.
Le pilote note l'heure bloc et lâche les freins. Le vol commence et le pilote réalise les vérifications au roulage. Aucune anomalie n'est à constater.
Le pilote s'aligne, décolle, effectue son vol et environ 30 min plus tard est en phase finale pour la piste en service.
À l'atterrissage, le toucher des roues se fait en deux points.
Arrive la phase de décélération. Le pilote exerce une pression sur chacune des pédales de manière symétrique.
Subitement l'avion dévie de sa trajectoire vers la droite.
Le pilote relâche les freins et reprend le contrôle de la trajectoire grâce au train avant qui est dirigeable.
Il freine de nouveau, et le même phénomène se reproduit.
Il redresse la trajectoire après cette nouvelle embardée.
Le pilote laisse décélérer l'avion de lui-même.
Le pilote évacue la piste par la troisième sortie, cet événement l'a obligé à se servir de toute la longueur de piste disponible pour diminuer sa vitesse à une valeur convenable pour tourner.
Il emprunte le taxiway, remonte jusqu'au parking aviation générale, effectue les items de la check-list qui conduisent à l'arrêt du moteur.
Il enclenche le frein de parking.
A son arrivée à l'aéroclub, le pilote remplit le carnet de route et mentionne l'avarie sous l'intitulé "freinage dissymétrique".
Il appose les mêmes indications sur l'Aircraft Technical Log.

FIGURE 4-1 "WALK-AROUND" ON TOP HALF OF PAGE

4.3 NORMAL PROCEDURES CHECK LIST

PREFLIGHT
Control wheel……release belts
Master switch……ON
⋮
Inspection covers……secure
Nose wheel tire……check
Nose gear strut……proper inflation (3.25 in.)
Air inlets……clear
Alternator belt……check tension
Tow bar and control locks…stow
Baggage……stowed properly – secure
Baggage door……close and secure
Fuel strainer……drain
Primary flight controls…proper operation
Cabin door……close and secure
Required papers……on board

BEFORE STARTING ENGINE
Brakes……set
Carburetor heat……full COLD
Fuel selector……desired tank

STARTING ENGINE WHEN COLD
Throttle……1/4" open
⋮
Oil pressure……check

STARTING ENGINE WHEN HOT
Throttle……1/2" open
Master switch……ON
Electric fuel pump……ON
Mixture……full RICH
Starter……engage
Throttle……adjust
Oil pressure……check

STARTING ENGINE WHEN FLOODED
Throttle……open full
⋮
Oil pressure……check

STARTING WITH EXTERNAL POWER SOURCE
Master switch……OFF
⋮
Master switch……ON – check ammeter

TAXIING
Chocks……removed
Taxi area……clear
Throttle……apply slowly
Brakes……check
Steering……check

GROUND CHECK
Throttle……2000 RPM
⋮
Throttle……retard

BEFORE TAKEOFF
Master switch……ON
⋮
Air conditioner……OFF

NORMAL TAKEOFF
Flaps……set
Tab……set
Accelerate to 52 to 65 KIAS, back pressure to rotate to climb attitude

SHORT FIELD, OBSTACLE CLEARANCE
Flaps……25 degrees (second notch)
⋮
Accelerate to best flaps up rate of climb speed – 76 KIAS

SOFT FIELD
Flaps……25 degrees (2nd notch)
⋮
Flaps……retract slowly

CLIMB
Best rate (flaps up)……76 KIAS
⋮
Electric fuel pump……OFF > 400 AGL

CRUISING
Reference performance charts and Avco-Lycoming Operator's Manual.
Normal max power……75%
Power……set per power table
Mixture……adjust

ARRÉTÉ DU 12 JANVIER 1993 & ANNEXE 6 - OACI
Chapitre 1.1 Heures de vol "bloc à bloc"

Ce sont les heures écoulées entre le moment où l'aéronef commence à se déplacer par ses propres moyens en vue du décollage jusqu'au moment où il s'immobilise à la fin du vol.
Ces heures sont également appelées "FLIGHT TIME", "BLOCK TO BLOCK", "CHOCK TO CHOCK", "CALE A CALE".
Seul ce concept est applicable en aviation générale.

AIRPLANE MAINTENANCE MANUAL

CARD 1 OF 6

(S/N's 0001 & UP)

AIRCRAFT, INC.

PART NUMBER 761-883

April 15, 2008

1A1

CHAPTER 32 - LANDING GEAR

TABLE OF CONTENTS (continued)

GENERAL

WARNING: FAILURE TO CONSULT APPLICABLE VENDOR PUBLICATION(S), WHEN SERVICING OR INSPECTING VENDOR EQUIPMENT INSTALLED IN PIPER AIRCRAFT, MAY RENDER THE AIRCRAFT UNAIRWORTHY. (SEE INTRODUCTION - SUPPLEMENTARY PUBLICATIONS.)

In this chapter are instructions for the removal, disassembly, inspection, overhaul, and installation of the landing gear, nose gear alignment, and the repair and service of the brake system and its components.

1. Description

The landing gear is a fixed tricycle type, fitted with three 6.00 x 6 wheels. The landing gear struts are the air-oil type. The nose gear, steerable through a wide arc, allows a short turning radius in each direction. A spring device is attached to the rudder pedal torque tube assembly to provide rudder trim and to aid in nose wheel and rudder centering. Bungee springs on the push rods make lighter and smoother ground steering possible. A shimmy damper is incorporated in the nose wheel steering mechanism.

The two main wheels are equipped with a single disc hydraulic brake assembly connected to a cylinder actuated by a hand lever, or by individual cylinders attached to each rudder pedal. A brake fluid reservoir is installed on the left forward face of the engine firewall.

Wheel pants are standard equipment on the Archer III.

2. Troubleshooting

It may be necessary to place the airplane on jacks when troubleshooting the landing gear system (see 71-10-00).

CHART 1 (Sheet 1 of 2)
TROUBLESHOOTING LANDING GEAR

Trouble	Cause	Remedy
Nose landing gear shimmies during fast taxi, takeoff, or landing.	Internal wear in shimmy dampener.	Replace shimmy dampener.
	Worn steering horn bolt holes.	Replace horn assembly.
	Excessive free play in steering bungees.	Rework or replace.
	Shimmy dampener or bracket loose at mounting.	Replace necessary part and bolts.
	Tire out of balance.	Check balance and replace tire if necessary.
	Worn or loose wheel bearings.	Replace or adjust wheel bearings.
	Worn torque link bolts or bushings.	Replace bolts or bushings.
	Improper nose wheel fairing.	Replace with proper fairing.

C. Hand/Parking Brake Master Cylinder

(1) Removal (Refer to Figure 6.)

(a) Disconnect inlet supply line from the fitting at the top of cylinder and drain fluid from reservoir and line into a suitable container.

(b) Disconnect pressure line from the fitting on cylinder and drain fluid from cylinder line.

(c) Disconnect the end of cylinder rod from brake handle by removing cotter pin that safeties the connecting clevis pin. Remove clevis pin and spacer washers.

(d) Disconnect base of cylinder from mounting bracket by removing attaching bolt assembly.

(e) Remove handle assembly by removing attaching bolt assembly holding handle to mounting bracket.

(2) Disassembly (Refer to Figure 7.)

(a) Remove cylinder from mounting bracket.

(b) To disassemble cylinder, remove piston rod assembly by removing snap ring from the annular slot at the rod end of cylinder. Draw piston rod assembly from cylinder.

(c) Disassemble piston rod assembly by removing small snap ring securing the retainer bushing, spring, piston, seal, gland, and the large retainer spring.

(d) Remove O-rings from piston and gland.

(3) Assembly

NOTE: Use a small amount of hydraulic fluid (MIL-H-5606) on O-ring and component parts to prevent damage and for ease of handling during assembly.

(a) Install new O-ring on inside and outside of packing gland and on outside of piston. (Use a cone placed against the piston when installing Teflon O-ring on piston. The cone may be plastic or metal with dimensions per Figure 7.)

(b) To assemble piston rod assembly, install on rod, in order: roll pins, return spring retainer washer, retaining spring, packing gland with O-rings, seal, piston with O-ring, spring, and retainer bushing. Secure with snap ring on rod end.

(c) Insert piston rod assembly in housing and secure packing gland with snap ring.

(d) Install cylinder. (Refer to installation of brake master cylinder.)

(4) Installation (Refer to Figure 6.)

(a) Install brake handle assembly between its mounting bracket and secure with bolt, washers, nut, and cotter pin. Washers must be placed on each side of handle, between the bracket, and under the nut.

(b) Place cylinder between mounting bracket and secure base end with bolt, washers, nut, and cotter pin. Place washers on each side of cylinder and under the nut.

(c) Connect rod end of cylinder to brake handle with a clevis pin and thin washers. Safety the clevis with a cotter pin.

(d) Connect pressure line to fitting at bottom of cylinder.

(e) Connect inlet supply line to the fitting at the top of cylinder and secure with spring clamp.

(f) Bleed brake system. (Refer to bleeding brakes.)

(5) Cleaning, Inspection and Repair

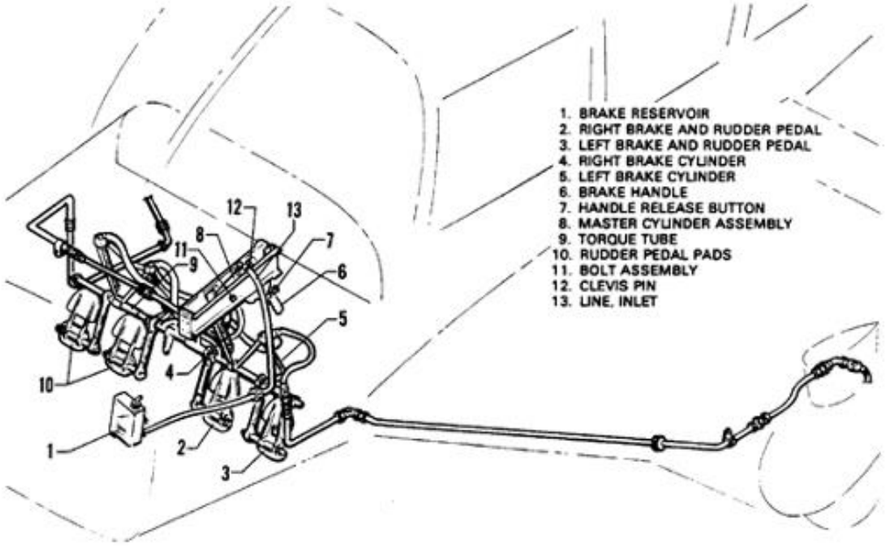
(a) Clean cylinder parts with a suitable solvent and dry thoroughly.

(b) Inspect interior walls of cylinder for scratches, burrs, corrosion, etc.

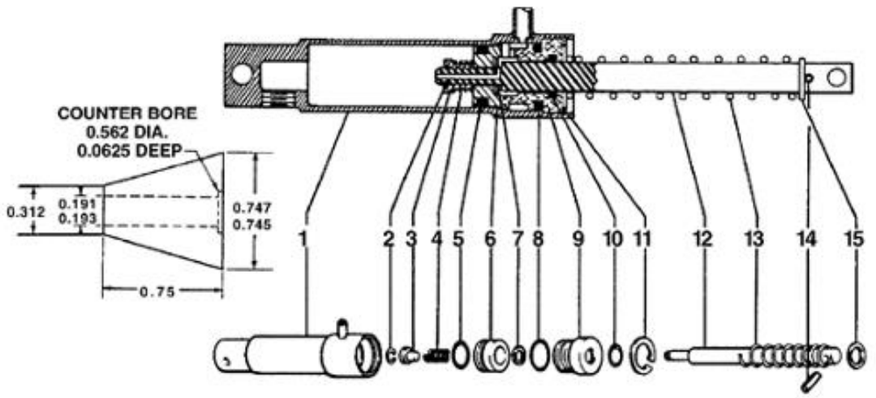
(c) Inspect the general condition of the fitting threads of cylinder.

(d) Check piston for scratches, burrs, corrosion, etc.

(e) Cylinder repairs are limited to polishing out small scratches, burrs, etc., and O-rings.

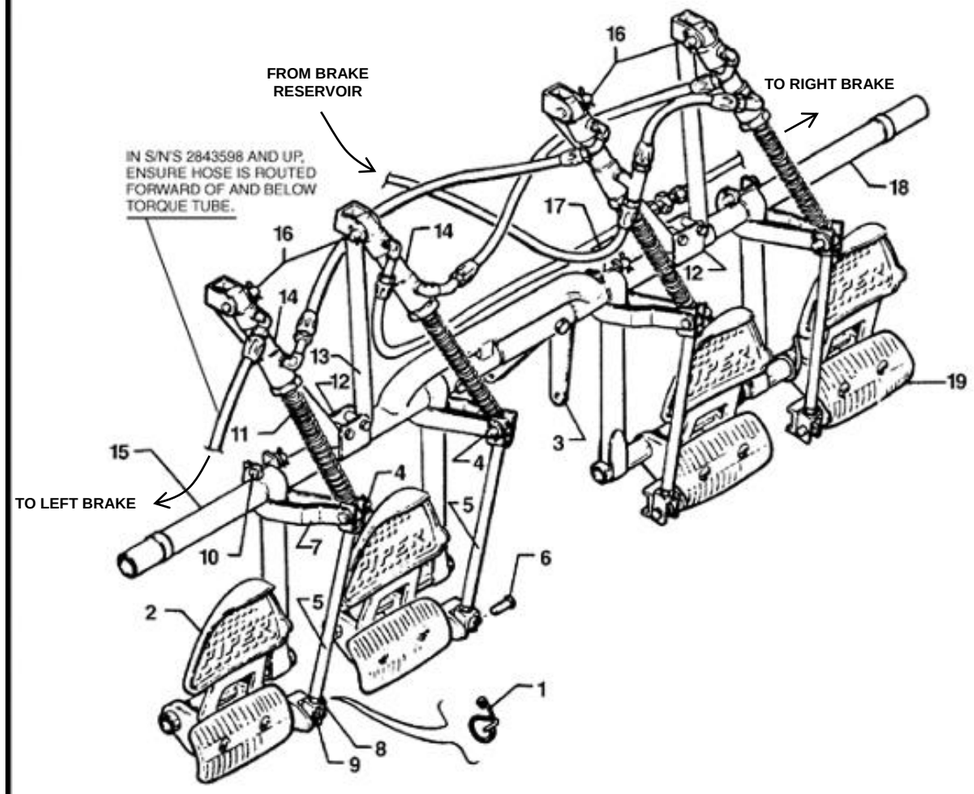


Brake System Installation
Figure 6



1. HOUSING
2. SNAP RING
3. RETAINER BUSHING
4. SPRING
5. O-RING
6. PISTON
7. DYNA SEAL
8. O-RING
9. PACKING GLAND
10. O-RING
11. SNAP RING
12. PISTON ROD
13. RETAINING SPRING
14. ROLL PIN
15. WASHER

Hand / Parking Brake Master Cylinder
Figure 7



1. SPRING CLIP
2. TOE BRAKE PEDAL
3. TRIM CONTROL ATTACHMENT ARM
4. CLEVIS PIN, WASHER & COTTER PIN
5. CLEVIS ASSEMBLY
6. CLEVIS PIN
7. IDLER ARM
8. JAM NUT
9. CLEVIS PIN, WASHER & COTTER PIN
10. CLEVIS PIN, WASHER & COTTER PIN
11. RETURN SPRING
12. BRACKET
13. BRACE ASSEMBLY
14. HYDRAULIC CYLINDER ASSEMBLY
15. LEFT TUBE ASSEMBLY
16. CLEVIS PIN & COTTER PIN
17. FLEXIBLE HOSE ASSEMBLY
18. RIGHT TUBE ASSEMBLY
19. PEDAL PADS

Toe Brake Installation
Figure 8

D. Toe Brake Brake Cylinder(s)

(1) Removal (Refer to Figure 8.)

(a) Disconnect upper and lower lines from cylinder and cap lines to prevent fluid leakage, or drain fluid from brake reservoir and master cylinder.

(b) Remove cylinder from its attachment fittings by removing cotter pins that safety the cylinder attaching pins, and removing pins.

(2) Disassembly

Cleveland Cylinder Number 10-30. (Refer to Figure 9.)

(a) Remove cylinder from its mounting bracket. (Refer to removal of brake cylinder.)

(b) To disassemble cylinder, remove piston rod assembly by removing retaining ring from the annular slot in cylinder housing. Draw piston rod assembly from cylinder.

(c) Disassemble piston rod assembly by removing retaining ring, sleeve, spring, piston assembly, O-ring, gland, and return spring.

(d) Remove O-rings from piston and packing gland.

(3) Assembly

NOTE: Use a small amount of hydraulic fluid (MIL-H-5606) on O-ring and component parts to prevent damage, and for ease of handling during reassembly.

Cleveland Cylinder Number 10-30. (Refer to Figure 9.)

(a) Install new O-rings on inside and outside of packing gland on outside of piston.

(b) To assemble piston rod assembly, install on the rod, in order: roll pin, washer, spring, washer, packing gland with O-rings, seal, piston assembly with O-ring, spring, sleeve, and retaining ring.

(c) Insert piston rod assembly in cylinder and secure with retaining ring.

(d) Install cylinder. (Refer to installation of brake cylinder.)

(4) Installation (Refer to Figure 8.)

(a) Position cylinder at its mounting points and attach with clevis pins. Safety the pins with cotter pins.

(b) Connect brake lines to cylinder fittings.

(c) Bleed brakes.

(5) Cleaning, Inspection and Repair

(a) Clean cylinder parts with a suitable solvent and dry thoroughly.

(b) Inspect interior walls of cylinder for scratches, burrs. corrosion, etc.

(c) Inspect general condition of the cylinder fitting threads.

(d) Check piston and valve for scratches, burrs, corrosion, etc.

(e) Repairs to cylinder are limited to polishing out small scratches, burrs, etc., and replacing valve, washer, seal, and O-rings.

G. Brake System Leak Check

Pull for a good, firm hand brake and lock parking brake mechanism. Allow system to stand for approximately 10 minutes. Grip park brake handle; it must not be able to be pulled aft further than the original set. If handle can be pulled toward the panel and feels spongy, a leak is in the system. A leak may appear at any one of the connections throughout system or internally in master brake cylinder or wheel brake assemblies.

TROUBLE SHOOTING

Brakes do not work properly, Do not hold static engine run-up with the usual pedal force.	Leak in system	If brake master cylinders or wheel brake assemblies are leaking, they should be repaired or replaced
	Air in system	Bleed brake system
	Brake fluid level low	Fill fluid reservoir
	Worn brake lining	Replace brake lining and bleed brake system
	Defective caliper	Repair or replace caliper
	Defective master cylinder	Repair or replace cylinder
	Defective connector	Repair or replace connector or replace seals or O-rings
	Defective hose or pipe	Repair or replace hose

FICHE DE RELEVES DE MENSURATION DES ELEMENTS DE FREINAGE

Organes		Contrôles	Valeur mini	Constats
Plaquettes	D	Épaisseur	2,5 mm	3,4 mm
	G	Épaisseur		3,5 mm
Disques	D	Épaisseur	5,2 mm	6 mm
	G	Épaisseur		6 mm
Etriers	D	Jeux et fonctionnement		Correct
	G	Jeux et fonctionnement		Pièce neuve

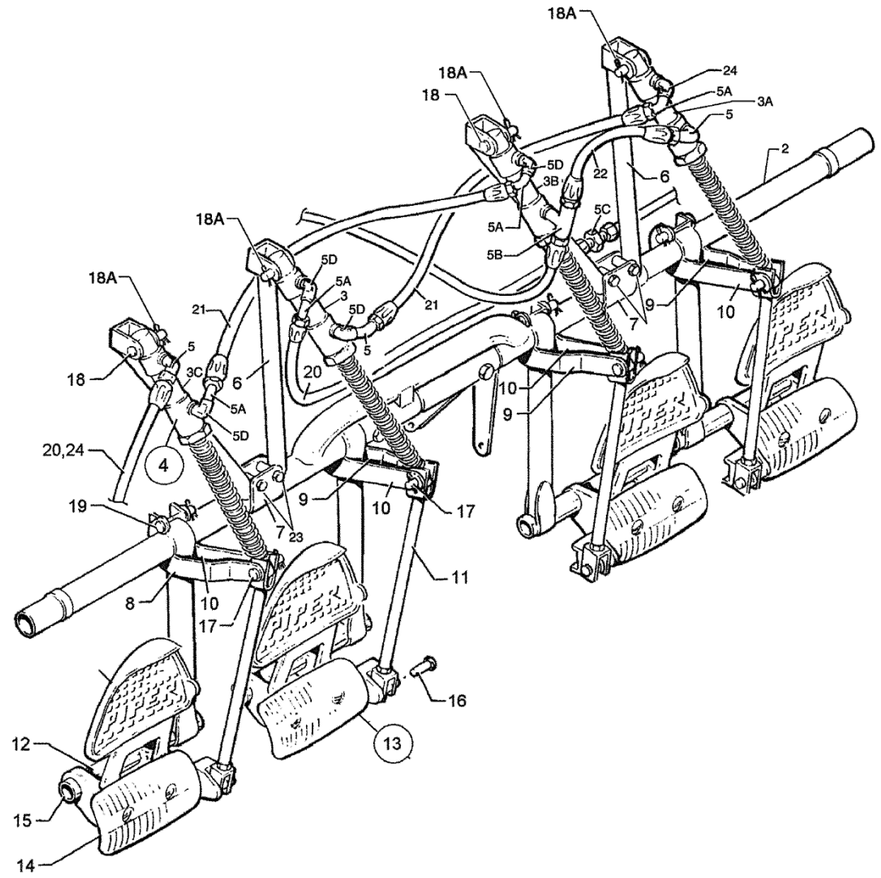


Figure 29. Toe Brake Installation

Reissued: December 10, 2006

Figure and Index Number	Part Number	Nomenclature	No. Req.	Serial Numbers Affected
29-	63476 (P)	DRAWING - Dual Toe Brake Line Installation		
	35135 (BN)	DRAWING - Control System Installation		
-1	63473-007	CYLINDER ASSY - Dual Toe Brake	REF	
2	63459-019	PEDAL ASSY	1	
3	63481-009	FITTING ASSY	1	
3A	63481-002	FITTING ASSY	1	
3B	63481-003	FITTING ASSY	1	
3C	63481-005	FITTING ASSY	4	
4	455-968	CYLINDER ASSY - Master, Cleveland (See Figure 30 for component parts)	REF	
-4A	455-944	CYLINDER ASSY - Master, Gar-Kenyon (optional) (See Figure 30 for component parts)	REF	
5	458-894	ELBOW - (MS20822-4D)	3	
5A	558-806	ELBOW - (MS20823-4D)	4	
5B	691-220	TEE - (MS20825-4D)	1	
5C	491-050	UNION - (AN815-4D)	1	
5D	458-904	ELBOW - (AN914-1D)	5	
6	63464-000	BRACE ASSY - Toe brake	2	
7	63468-000	BRACKET - Toe brake	2	
8	63469-000	ARM - Toe brake	1	
9	63469-001	ARM - Toe brake	3	
10	63470-000	ARM - Toe brake	4	
11	79430-000	CLEVIS ASSY - Toe brake (non-adjustable)	4	
12	63478-000	SPACER - Toe brake	4	
-12A	400-443	BOLT - (AN3-12A)	4	
-12B	690-612	WASHER - (NAS1149F0363P)	4	
-12C	404-526	NUT - (MS21042-3)	4	
13	63485-000	PEDAL ASSY - Toe brake, left inboard	1	
-13A	63485-002	PEDAL ASSY - Toe brake, left outboard	1	
-13B	63485-001	PEDAL ASSY - Toe brake, right inboard	1	
-13C	63485-003	PEDAL ASSY - Toe brake, right outboard	1	
14	62867-002	. PAD ASSY - Brake pedal	1	
15	453-714	BEARING - Brake pedal	8	
16	424-175	PIN - Flat head (MS20392-2C13)	4	
-16A	690-612	WASHER - (NAS1149F0363P)	4	
-16B	690-609	WASHER - (NAS1149F0332P)	4	
-16C	424-051	COTTER PIN - (MS24665-132)	4	
17	424-181	PIN - Flat head (MS20392-2C25)	4	
18	424-184	PIN - Flat head (MS20392-2C31)	4	
18A	424-051	COTTER PIN - (MS24665-132)	4	
-18B	690-612	WASHER - (NAS1149F0363P)	4	
19	424-189	PIN - Flat head (MS20392-2C39)	4	
20	63901-009	HOSE ASSY - Flexible (See item 29-24)	2	
-20A	63901-059	HOSE ASSY - Flexible (optional) (See item 29-24)	2	
21	63901-021	HOSE ASSY - Flexible	2	
-21A	63901-061	HOSE ASSY - Flexible (optional)	2	
22	63901-022	HOSE ASSY - Flexible	1	
-22A	63901-062	HOSE ASSY - Flexible (optional)	2	
23	400-444	BOLT - (AN3-13A)	4	
-23A	690-612	WASHER - (NAS1149F0363P)	4	
-23B	404-526	NUT - (MS21042-3)	4	
-24	63901-063	HOSE ASSY - Flexible	1	2843598 and up Entegra; 2843601 and up Non Entegra
-24A	63901-028	HOSE ASSY - Flexible (optional)	1	2843598 and up Entegra; 2843601 and up Non Entegra

-ITEM NOT ILLUSTRATED

When ordering, always specify Part Number, Description, and Serial Number of Aircraft

Revised: June 10, 2008

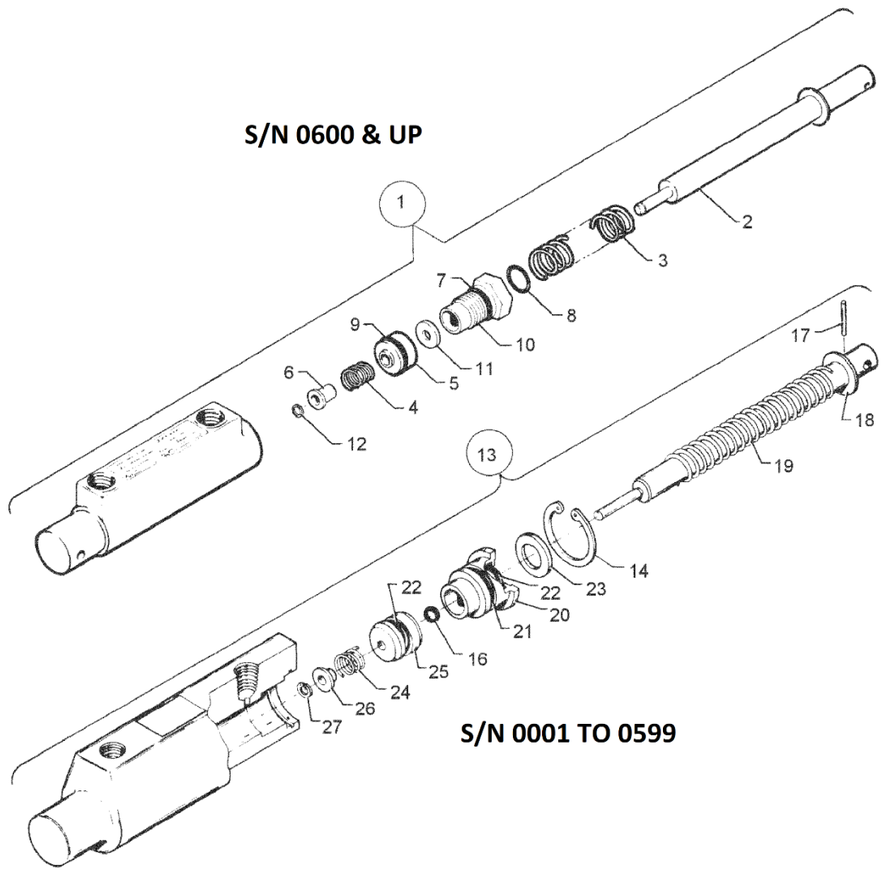


Figure 30. Toe Brake Master Cylinder Assembly

Reissued: December 10, 2006

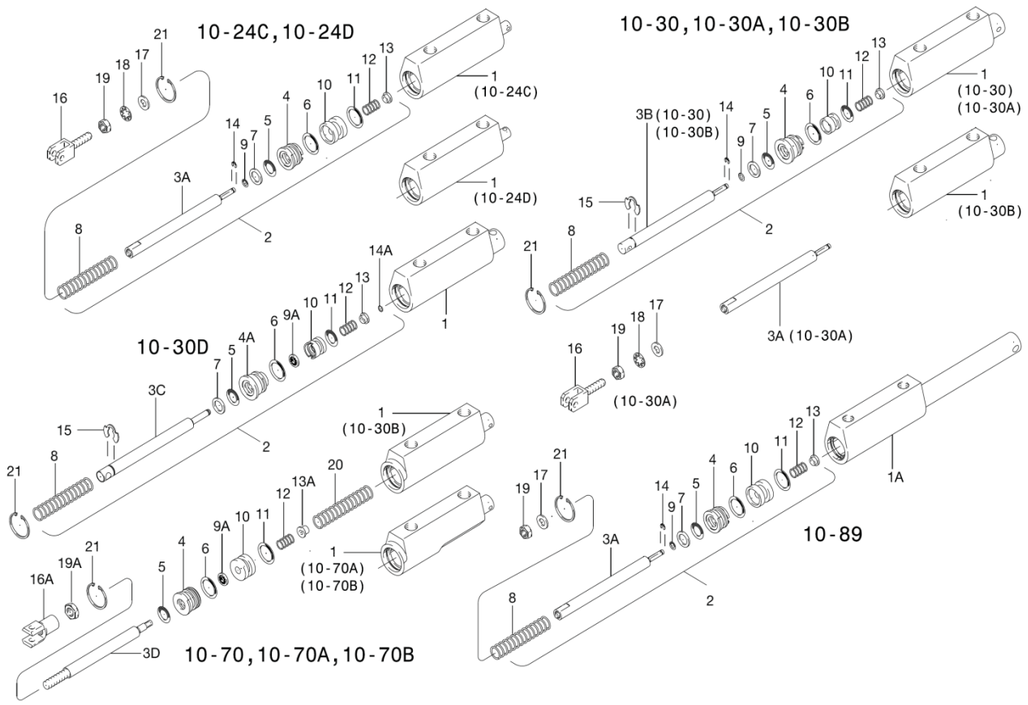
Figure and Index Number	Part Number	Nomenclature	No. Req.	Serial Numbers Affected
30-	35135 (BM)	DRAWING - Control System Installation		
1	455-944	CYLINDER ASSY - Master, Gar-Kenyon (17000)	4	
2	757-480	. PISTON ROD AND RING ASSY - Includes spring retaining ring (95404)	1	
3	762-276	. SPRING - (17005)	1	
4	762-277	. SPRING - (17006)	1	
5	757-479	. PISTON - (17003)	1	
6	762-275	. SLEEVE - (17007)	1	
7	752-584	. O-RING - (MS28775-113)	1	
8	484-788	. O-RING - (MS28775-012)	1	
9	752-585	. O-RING - (MS28775-110)	1	
10	754-848	. FITTING - (17002)	1	
11	494-177	. SEAL - (110-3/16)	1	
12	762-531	. RING - Retaining (XRC-313)	1	
13	455-968	CYLINDER ASSY - Master, Cleveland (10-30)	4	
14	762-587	. RING - Snap (155-04700)	1	
16	484-675	. O-RING - (MS28775-006)	1	
17	757-318	. ROLL PIN - (MS16562-16)	1	
18	690-620	. WASHER - (NAS1149F0632P)	1	
19	756-118	. SPRING - (82-9)	1	
20	755-082	. GLAND - Packing (114-25)	1	
21	756-018	. O-RING - (101-50113)	1	
22	484-748	. O-RING - (AN6227-8)	2	
23	756-621	. WASHER - Wiper (095-1300)	1	
-24	757-580	. SPRING - (082-021)	1	
-25	763-450	. PISTON - (148-25)	1	
-26	758-457	. BUSHING - (145-05800)	1	
27	762-586	. RING - Snap (155-48)	1	

-ITEM NOT ILLUSTRATED

When ordering, always specify Part Number, Description, and Serial Number of Aircraft

Reissued: December 10, 2006

10-24C, 10-24D, 10-30, 10-30A, 10-30B, 10-30D, 10-70, 10-70A, 10-70B, 10-89



NOTE: Parts list for reference only. Contact the airframe manufacturer to order master cylinders and components listed.

FIG.	PART NO.	DESCRIPTION	PER ASSY. 10-24C	10-24D	10-30 (2)	10-30A	10-30B (1) (2)	10-30D	10-70	10-70A	10-70B	10-89
1	144-03200	Cylinder Body			1	1						
	144-03700	Cylinder Body	1									
	144-03701	Cylinder Body		1								
	144-06800	Cylinder Body							1			
	144-07300	Cylinder Body								1	1	
	144-11900	Cylinder Body					1	1				
1A	144-11500	Cylinder Body										1
2	182-02000	Piston Rod Assembly	1	1								
	182-02200	Piston Rod Assembly			1							
	182-07500	Piston Rod Assembly										1
	(3)	Piston Rod Assembly					1					
	182-08500	Piston Rod Assembly						1				
3A	142-03700	Rod-Piston	1	1		1						1
3B	142-03900	Rod-Piston			1							
	(3)	Rod-Piston					1					

(Continued on next page)

10-24C, 10-24D, 10-30, 10-30A, 10-30B, 10-30D, 10-70, 10-70A, 10-70B, 10-89

(Continued from previous page)

FIG.	PART NO.	DESCRIPTION	PER ASSY. 10-24C	10-24D	10-30 (2)	10-30A	10-30B (1) (2)	10-30D	10-70	10-70A	10-70B	10-89
3C	142-13700	Rod-Piston						1				
3D	142-07900	Rod-Piston							1	1	1	
4	141-01200	End Gland	1	1								1
	141-02500	End Gland			1	1	1					
	141-04400	End Gland							1	1		
	141-04401	End Gland									1	
	141-09000	End Gland						1				
5	101-00700	O-Ring (MS28775-012)	1	1					1	1	1	1
	101-00800	O-Ring (MS28775-110)			1	1	1	1				
6	101-01100	O-Ring (MS28775-113)	1	1	1	1	1	1	1	1	1	1
7	095-01300	Washer-Wiper	1	1	1	1	1	1				1
8	082-00900	Spring-Return			1	1	1					
	082-05200	Spring-Return	1	1								1
	082-14500	Spring-Return						1				
9	101-00100	O-Ring	1	1	1	1	1					1
9A	095-02600	Washer-Seal						1	1	1	1	
10	148-02300	Piston	1	1								1
	148-02500	Piston			1	1	1					
	148-03800	Piston							1	1	1	
	148-09200	Piston						1				
11	101-00800	O-Ring (MS28775-110)			1	1	1	1				
	101-01100	O-Ring (MS28775-113)	1	1					1	1	1	1
12	082-02100	Spring-Piston	1	1	1	1	1	1				1
	082-05600	Spring-Piston							1	1	1	
13	145-01500	Spring Guide						1				
	145-05800	Bushing	1	1	1	1	1					1
13A	145-06500	Spring Guide							1	1	1	
14	155-04800	Snap Ring	1	1	1	1	1					1
14A	155-00500	Snap Ring						1				
15	155-05000	Snap Ring-Rod			1		1	1				
16	143-00400	Clevis	1	1		1						
16A	143-01300	Clevis							1	1	1	
17	095-10100	Washer (AN960-616L)	1	1		1						
	095-10200	Washer (AN960-416L)										1
18	095-15600	Washer-Star (MS35333-40)	1	1		1						
19	094-03000	Nut-Check (AN316-4)	1	1		1						1
19A	094-04300	Nut-Check (AM316-5)							1	1	1	
20	082-07400	Spring-Return							1	1	1	
21	155-01200	Snap Ring	1	1								1
	155-04700	Snap Ring			1	1	1	1				
	155-05500	Snap Ring							1	1	1	

	199-510	Repair Kit (5, 6, 9)	1	1								
	199-512	Repair Kit (5, 6, 7, 9, 9A, 12, 14, 14A, 15)			1	1	1	1				
	199-521	Repair Kit (5, 6, 9A)							1	1	1	

NOTES:

(1) Inactive Assembly - Spares support only for parts listed.

(2) SB7093-1 Service Bulletin Kit upgrades 10-30 and 10-30B to 10-30D configuration per SB7093.

(3) Inactive Part - No longer available for spares support.

Bore (inch)	Stroke (inch)	Displ. (cu. inch)	Cleveland P/N	Installed Length (inch)	Type	Port Size	Wt. (lbs)	Comments
.552	1.94	.43	10-30	7.63	Push	1/8-27 N.P.T.	.58	Ports in-line, no fittings, extruded aluminum body. Upgrade to 10-30D per SB7093 for Grob Aircraft only.
.552	1.96	.46	10-30A	8.41	Push	1/8-27 N.P.T.	.58	Same as 10-30, but uses rod end clevis.
.552	2.00	.43	10-30B	7.50	Push	1/8-27 N.P.T.	.58	Obsolete design, superseded by 10-30D per SB7093.
.552	1.25	.278	10-30C	6.81	Push	1/8-27 N.P.T.	.73	Uses a custom mount with pivot pins on the side of the housing, adjacent to the inlet fitting.
.552	2.00	.43	10-30D	7.528	Push	1/8-27 N.P.T.	.58	Upgrades 10-30. Supersedes 10-30B.
.562	1.25	.31	10-5B	8.37	Push	7/16-20	.65	Without parking valve, ports 180° apart, fitting 45°.
.562	1.25	.31	10-5C	8.37	Push	7/16-20	.65	With parking valve, ports 180° apart, fitting 45° and 90°.
.562	1.25	.278	10-5E	8.37	Push	7/16-20	.65	With parking valve, ports 180° apart, fitting 45°
.563	1.29	.31	10-5	8.35	Push	Outlet, 7/16-20 Inlet, 1/8-27 N.P.T.	.63	With parking valve, ports 90° apart, fitting 45°.
.563	1.64	.39	10-19 (1)	8.35	Push	7/16-20	.58	Ports in-line, fittings 90°, extruded aluminum body. See note 1.
.563	1.64	.39	10-19D (1)	8.35	Push	1/8-27 N.P.T.	.53	Ports in-line, no fittings, extruded aluminum body. See note 1.
.563	1.64	.39	10-19F (1)	8.35	Push	Outlet, 7/16-20 Inlet, 1/8-27 N.P.T.	.55	Ports in-line, straight fitting, extruded aluminum body. See note 1.
.563	1.64	.39	10-19G (1)	8.01	Push	1/8-27 N.P.T.	.53	Ports in-line, no fittings, extruded aluminum body. See note 1.
.563	1.64	.39	10-19H (1)	8.36	Push	1/8-27 N.P.T.	.58	Ports in-line, fittings 90°, extruded aluminum body. See note 1.
.563	1.64	.39	10-19J (1)	8.33	Push	1/8-27 N.P.T.	.53	Ports in-line, no fittings, extruded aluminum body. See note 1.
.563	1.64	.39	10-20	7.48	Push	1/8-27 N.P.T.	.52	Ports in-line, no fittings, no rod clevis, extruded aluminum body.
.563	1.64	.39	10-20A	7.37	Push	1/8-27 N.P.T.	.52	Ports in-line, no fittings, no rod clevis, extruded aluminum body.
.62	.875	.26	010-05701	8.610	Push	7/16-20	.65	Reservoir - capacity: 3.0 cu. in. Bell P/N 222-380-011-103.
.625	1.09	.306	10-34	7.96	Push	1/8-27 N.P.T.	.59	Reservoir - capacity: 3.41 cu. in., mounting hole: .190 Dia.
.625	1.09	.306	10-35	7.96	Push	1/8-27 N.P.T.	.59	Reservoir - capacity: 3.41 cu.in., mounting hole: .250 Dia.
.6245	1.25	.36	10-38	7.85	Push	1/8-27 N.P.T.	.59	Reservoir - capacity: 3.0 cu.in
.625	1.20	.36	10-39	7.82	Push	1/8-27 N.P.T.	.60	Reservoir - capacity: 3.0 cu.in
.625	1.20	.36	10-45	7.45	Push	1/8-27 N.P.T.	.52	Reservoir - capacity: 3.0 cu. in., mounting hole: .190 Dia.
.625	1.50	.46	10-46	7.34	Push	1/8-27 N.P.T.	.48	Ports in-line, no fittings.

CLEVELAND TECHNICAL PUBLICATION
Maintenance des éléments du système de freinage

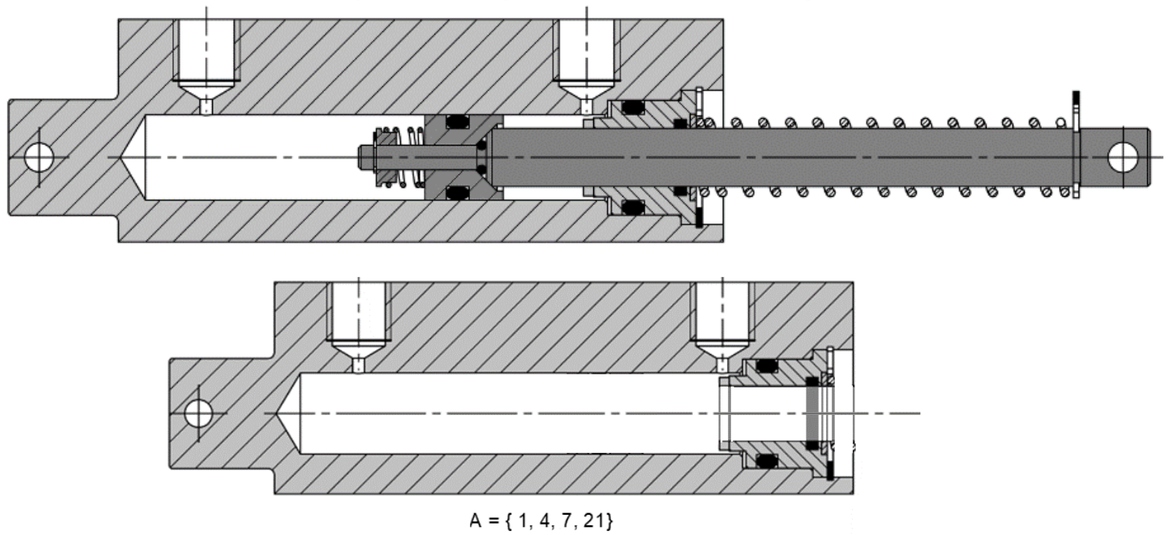
Il convient de surveiller :

1) L'usure des plaquettes de frein (toutes les 200 heures), en mesurant l'épaisseur de la plaquette, et en surveillant la garde restante des têtes de rivets. Cleveland préconise le changement des garnitures lorsque l'on arrive à une épaisseur de 2,5 mm, pour chacune des plaquettes.
Certaines plaquettes comportent un témoin d'usure qu'il convient de surveiller.
Le remplacement s'effectue sans difficultés, il faut d'abord dériveter par perçage les anciennes plaquettes, puis sertir les nouvelles par des rivets tubulaires (réf. Cleveland 066 10500).

2) L'usure des disques de frein : Vérifier également toutes les 200 heures l'état de surface des disques (pas de traces de frottement des rivets) ainsi que leur épaisseur. Celle-ci ne doit pas être inférieure à 5,2 mm.

3) Le liquide de frein : Le niveau du liquide dans le réservoir sera contrôlé toutes les 50 heures. (AEROSHELL Fluid 41 par exemple). On surveillera également la course des pistons de maître-cylindre pour détecter l'éventuelle présence de bulles d'air ; dans ce cas le début de la course est souple, et il faut "pomper" plusieurs fois au pied pour retrouver la fermeté de la pédale.

Maitre-cylindre – Repère ensemble cinématique



SERVICE BULLETIN SB 7093

UPGRADE OF 10-30 and 10-30B MASTER CYLINDER ASSEMBLY TO 10-30D

EFFECTIVITY: Parker Part Number 10-30 and 10-30B Master Cylinder Assemblies

APPLICABILITY: aircraft equipped with 10-30 or 10-30B master cylinder assemblies. New 10-30D master cylinders are configured to be directly interchangeable with and replace the 10-30B and the 10-30 assemblies that have been modified to meet the 10-30B configuration.

REASON: Parker created the 10-30D configuration to accommodate the more robust piston retention method required for Grob applications. Due to the loads seen during aerobatic operation, separation of piston retainer ring may occur and cause loss of directional control and compromise brake effectiveness.

DESCRIPTION: The 10-30D Master Cylinder provides extended service life with a revised piston retention method, new piston, and enhanced check valve seal. Mounting arrangements and pressure rating remain the same as the 10-30B configuration.

MATERIALS: All FOUR master cylinders are to be upgraded to or exchanged with 10-30D units. Mixed configurations are not approved.

Service Bulletin SB7093 may be satisfied by one of two methods;

1. ordering and installing Service Bulletin Kit part number SB7093-1.

FOUR SB7093-1 kits must be ordered for each aircraft.

Kit parts list for Service Bulletin Kit P/N SB7093-1, Upgrade of Part Number 10-30 or 10-30B Master Cylinder Assembly to 10-30D configuration, includes the following:

Parker P/N	Description	Quantity
182-08500	Piston Rod assembly	1
155-04700	Snap Ring	1
166-26900	Nameplate	1
SB7093	Service Bulletin (This Document)	1

Each Service Bulletin Kit P/N SB7093-1 will upgrade ONE master cylinder.

OR, 2. by ordering and installing a factory built master cylinder part number 10-30D.

Parker P/N	Description	Quantity
10-30D	Master Cylinder Assy.	4

ACCOMPLISHMENT INSTRUCTIONS: The 10-30B master cylinder assembly and 10-30 assemblies which have previously been reworked into the 10-30B configuration may be converted to the 10-30D configuration. The 10-30 configuration did not bear an original serial number from the Parker Aircraft Wheel and Brake Division. Alternately factory built master cylinder assemblies part number 10-30D may be installed.

1) During or before next overhaul remove existing master cylinders and replace each unit with a factory built master cylinder part number 10-30D.

2) If step 1 has been completed proceed to step 9. If installing Service Bulletin Kit part number SB7093-1 remove and disassemble the existing master cylinders in accordance with CM10-30, Revision C or subsequent revisions.

3) Discard rod assembly part number 182-07900.

4) Inspect cylinder body for overall serviceable condition. Examine bore for damage and wear that would render the body unserviceable. Replace as required.

SERVICE BULLETIN SB 7093

5) Complete reassembly of Master Cylinder incorporating Service Bulletin Kit part number SB7093-1 shown above by installing new piston rod assembly (182-08500) and snap ring (155-04700) with sharp edge of ring facing away from gland.

6) Clean body with Zero Tri ® (Product of LPS Laboratories, Tucker, GA, USA.) or other non- CFC, non-trichloroethane, greaseless cleaner to remove all oil residues. Nameplates will not adhere to dirty or oily surfaces. Apply new nameplate on opposite side from original nameplate.

CAUTION: DO NOT REMOVE CURRENT NAMEPLATE(S). RETAIN ORIGINAL DATE OF MANUFACTURE AND SERIAL NUMBER.
DO NOT CONTAMINATE SEALS WITH CLEANER.

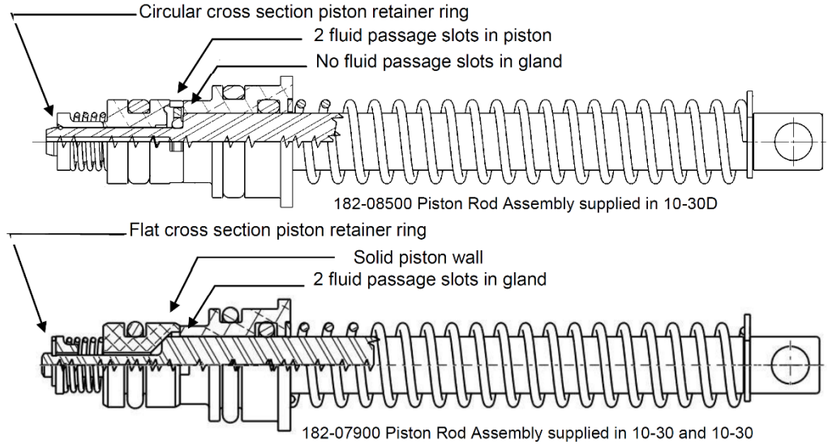
7) The oldest o-ring cure date is included on the replacement nameplate but may also be added in permanent ink on body adjacent to added nameplate.

8) Test per CM10-30, Revision C or subsequent revisions. Available on-line at www.clevelandwheelsandsbrakes.com

9) Mount cylinders in aircraft and bleed to remove all traces of air from the hydraulic system per airframe maintenance manual.

10) Record the overhaul activity in the aircraft log noting serial number removed, date removed, date, serial number replaced, flight hours on master cylinder at time of removal, and flight hours at time of reinstallation

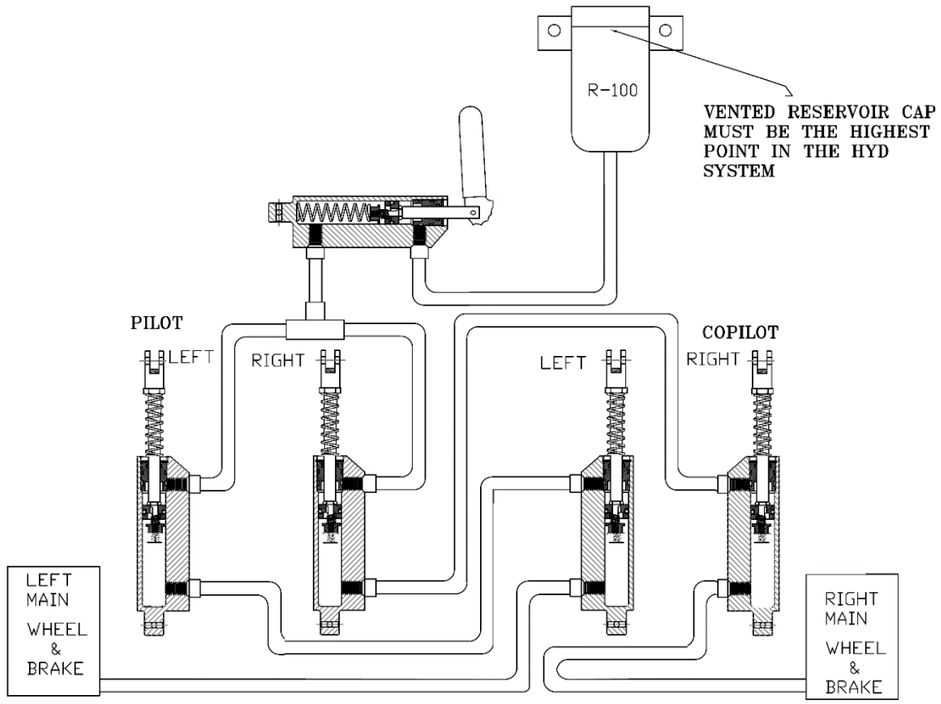
VISUAL DISTINCTION:



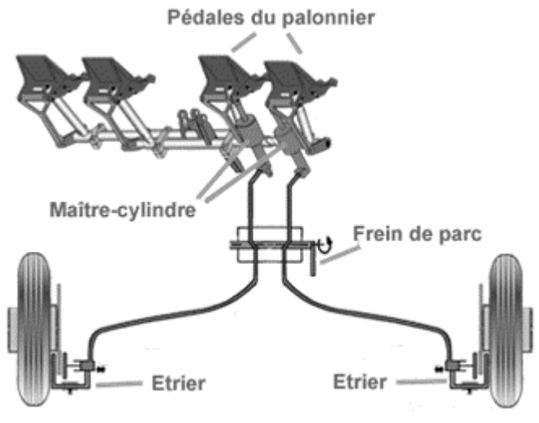
CIRCUIT DE FREINAGE DES AVIONS

Principe fonctionnement

Actuellement tous les avions de conception récente ont recours à l'hydraulique pour le circuit de freinage. Un réservoir de liquide hydraulique est soit unique pour les deux atterrisseurs (schéma ci-dessous) soit réparti dans chaque maître-cylindre (exemple ci-contre).

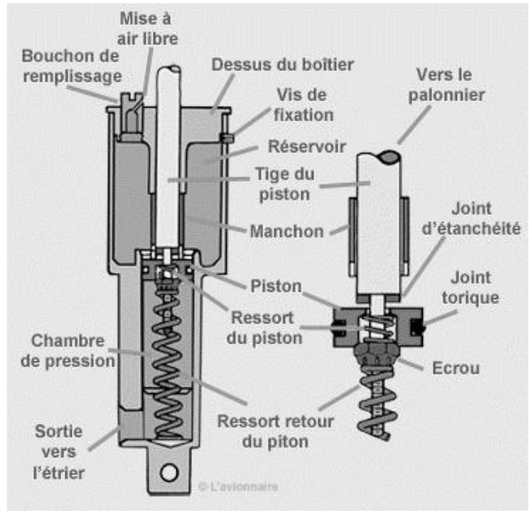


En appuyant avec les pieds sur le haut des pédales du palonnier, le pilote actionne les maîtres-cylindres. Chaque maître-cylindre agit par l'intermédiaire d'une tuyauterie hydraulique sur un ou plusieurs pistons placés dans l'étrier. Les systèmes de freinage simples comprennent un disque d'acier fixé à la roue, l'étrier est fixé à la jambe de l'atterrisseur. L'étrier comporte deux mâchoires, une est fixe et l'autre actionnée par un piston sur lequel agit le fluide hydraulique. Ce piston va comprimer la mâchoire mobile sur le disque solidaire de la roue. Chaque roue ayant son propre circuit, le freinage peut être simultané (action sur les deux pédales en même temps) soit différentiel pour le guidage au sol.



Maître-cylindre

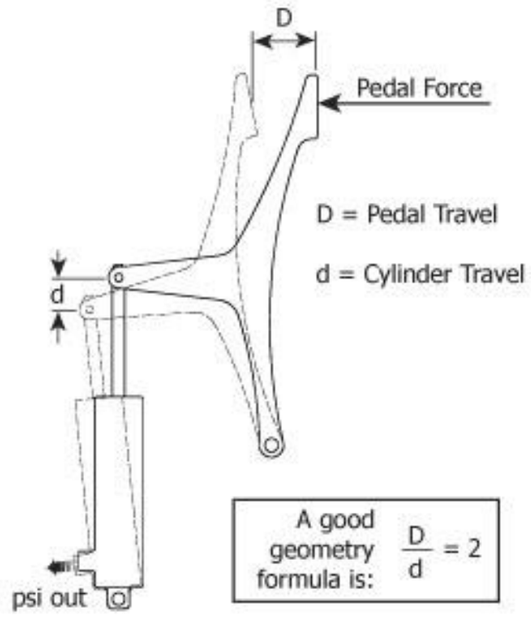
Lorsque le piston est en position haute (freins non appliqués) le fluide est libre de passer du réservoir à la chambre de pression pour remplacer le fluide qui aurait pu être perdu dû à une légère fuite. Quand le pilote commence a appuyé sur la pédale de frein, le piston descend en emprisonnant le fluide qui se trouve entre la face inférieure du piston et l'ensemble du frein de roue. Si le pilote continu à appuyer sur la pédale le piston continue à descendre et force le fluide à sortir de la chambre vers l'étrier. En relâchant la pression sur la pédale, le ressort renvoie le piston vers le haut, et le fluide retourne dans la chambre de pression.



Brake pedal geometry

La géométrie de la pédale de frein joue un rôle important dans les performances d'un système de freinage. Le maitre-cylindre doit délivrer la bonne pression et le volume de fluide à l'étrier pour un freinage optimal.

La pédale de frein est conçue selon une règle géométrie de 2 pour 1. Il s'agit du rapport entre le course de la pédale et la course de la tige du maitre-cylindre. Ainsi, 1 inch de course de pédale correspond à 0,5 inch de course de la tige du maitre-cylindre. Une force sur la pédale d'environ 75 livres se traduira par une force de 500 PSI à l'étrier à l'aide d'un maitre-cylindre 5/8 inch de diamètre de piston standard.



FORMULAIRE

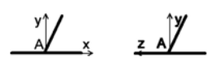
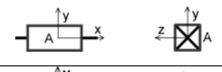
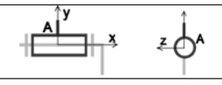
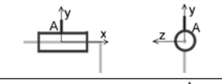
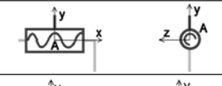
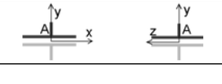
Tableau des écarts normalisés pour les alésages.

PRINCIPAUX ECARTS EN MICRONMETRES								Température de référence: 20 °C					
ALESAGES	Jusqu'à 3 inclus	3 à 6 inclus	6 à 10	10 à 18	18 à 30	30 à 50	50 à 80	80 à 120	120 à 180	180 à 250	250 à 315	315 à 400	400 à 500
D 10	+ 60 + 20	+ 78 + 30	+ 98 + 40	+ 120 + 50	+ 149 + 65	+ 180 + 80	+ 220 + 100	+ 260 + 120	+ 305 + 145	+ 355 + 170	+ 400 + 190	+ 440 + 210	+ 480 + 230
F 7	+ 16 + 6	+ 22 + 10	+ 28 + 13	+ 34 + 16	+ 41 + 20	+ 50 + 25	+ 60 + 30	+ 71 + 36	+ 83 + 43	+ 96 + 50	+ 108 + 56	+ 119 + 62	+ 131 + 68
G 6	+ 8 + 2	+ 12 + 4	+ 14 + 5	+ 17 + 6	+ 20 + 7	+ 25 + 9	+ 29 + 10	+ 34 + 12	+ 39 + 14	+ 44 + 15	+ 49 + 17	+ 54 + 18	+ 60 + 20
H 6	+ 6 0	+ 8 0	+ 9 0	+ 11 0	+ 13 0	+ 16 0	+ 19 0	+ 22 0	+ 25 0	+ 29 0	+ 32 0	+ 36 0	+ 40 0
H 7	+ 10 0	+ 12 0	+ 15 0	+ 18 0	+ 21 0	+ 25 0	+ 30 0	+ 35 0	+ 40 0	+ 46 0	+ 52 0	+ 57 0	+ 63 0
H 8	+ 14 0	+ 18 0	+ 22 0	+ 27 0	+ 33 0	+ 39 0	+ 46 0	+ 54 0	+ 63 0	+ 72 0	+ 81 0	+ 89 0	+ 97 0
H 9	+ 25 0	+ 30 0	+ 36 0	+ 43 0	+ 52 0	+ 62 0	+ 74 0	+ 87 0	+ 100 0	+ 115 0	+ 130 0	+ 140 0	+ 155 0
H 10	+ 40 0	+ 48 0	+ 58 0	+ 70 0	+ 84 0	+ 100 0	+ 120 0	+ 140 0	+ 160 0	+ 185 0	+ 210 0	+ 230 0	+ 250 0
H 11	+ 60 0	+ 75 0	+ 90 0	+ 110 0	+ 130 0	+ 160 0	+ 190 0	+ 210 0	+ 250 0	+ 290 0	+ 320 0	+ 360 0	+ 400 0
H 12	+ 100 0	+ 120 0	+ 150 0	+ 180 0	+ 210 0	+ 250 0	+ 300 0	+ 350 0	+ 400 0	+ 460 0	+ 520 0	+ 570 0	+ 630 0
H 13	+ 140 0	+ 180 0	+ 220 0	+ 270 0	+ 330 0	+ 390 0	+ 460 0	+ 540 0	+ 630 0	+ 720 0	+ 810 0	+ 890 0	+ 970 0
J 7	+ 4 - 6	+ 6 - 6	+ 8 - 7	+ 10 - 8	+ 12 - 9	+ 14 - 11	+ 18 - 12	+ 22 - 13	+ 26 - 14	+ 30 - 16	+ 36 - 16	+ 39 - 18	+ 43 - 20
K 6	0 - 6	+ 2 - 6	+ 2 - 7	+ 2 - 9	+ 2 - 11	+ 3 - 13	+ 4 - 5	+ 4 - 18	+ 4 - 21	+ 5 - 24	+ 5 - 27	+ 7 - 29	+ 8 - 32
K 7	0 - 10	+ 3 - 9	+ 5 - 10	+ 6 - 12	+ 6 - 15	+ 7 - 18	+ 9 - 21	+ 10 - 25	+ 12 - 28	+ 13 - 33	+ 16 - 36	+ 17 - 40	+ 18 - 45

Convention d'unités et formule

1 bar = 14,5 PSI = 0,1 N/mm² $P = \frac{F}{S}$ avec P en $\frac{N}{mm^2}$ F en Newton et S en mm²

Symboles des liaisons mécaniques

LIAISONS ELEMENTAIRES	Représentation plane
Liaison encastrement	
Liaison glissière	
Liaison pivot	
Liaison pivot glissant	
Liaison hélicoïdale	
Liaison plane	

GLOSSAIRE

Anglais	Français
Taxiing	Roulage
Log	Register
Device	Dispositive
Release	Relache, sortie
leak	fuite
Worn	usé
Hose	conduite
pipe	tuyauterie
To pull	tirer
To allow	laisser
To stand	Rester dans la position
To grip	immobiliser
Further	Plus, davantage
Set	position
Spongy	spongieux
throughout	Tout au long de
To order	commander
Bore	Alesage
Stroke	course
Caliper	Etrier

Calcul d'une section:

$S = \pi \times r^2$
avec S en mm^2
si r en mm