

ERCOUPE BRAKE MASTER CYLINDER REPLACEMENT

STC SA01407CH



*415-C / 415-CD / 415-D / Model E
Model G / F-1 / F-1A*

Alpha
aviation, inc.

1500 E. Main St, Owatonna MN 55060

1-800-653-5112

www.ALPHAAVIATION.com

**** FOR REVIEW ONLY - NO STC AUTHORIZATION ****



TEL: (262) 534-4233
FAX: (262) 534-2395

F.R.A. ENTERPRISES, INC.

32032 Washington Avenue
P.O. Box 355



Rochester, WI 53167

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STC SA01407CH

SS1300A JUN. 06, 2000
Revision A APR 29, 2002

SMK-88 BRAKE MASTER CYLINDER REPLACEMENT INSTALLATION INSTRUCTIONS

APPLICATION: Ercoupe Models 415-C, 415-CD, (TC-A718) and 415-D, E, G and Forney Model F-1, F-1A (TC-A787) with MASTER CYLINDER installed on aft side of the firewall and under the toe-floorboard.

BACKGROUND: This SKYPORT kit accomplishes the replacement of the original brake MASTER CYLINDER (SCOTT Model 4350) with an improved and currently manufactured unit. Outstanding results are obtained when combined with a CLEVELAND wheel brake assembly installed. It will work with GOODYEARs but they should have new linings and discs. GOODRICH-HAYES brakes will require the continued use of a rebuilt old Scott Master Cylinders (4350). GOODYEAR and GOODRICH users should consider SKYPORT's Kit SMK-20 instead.

The original MASTER CYLINDER (part number 415-33449/F33449) and related replacement parts have been out of production/supply for many years. Additionally repeated use has worn many of the close tolerance parts. O-ring replacement no longer repairs even minor leakage. Continuance of a rebuilding effort without re-engineering/manufacturing of worn parts has become unproductive.

Therefore a replacement "off-the-shelf" unit has become necessary. The best replacement in terms of size, ease of installation and economy is the one supplied in this kit (P/N SS13000). This MASTER CYLINDER is made in the USA

The original MASTER CYLINDER had a displacement of 1.2 cubic inches with a fluid capacity of 0.90. Piston Diameter was 1-1/16 inch and it is designed to operate at 250 psi.

This replacement has a stroke length of 1.191" and a fluid capacity of .460 cubic inches. Standard working PSI is 400-1200 with a normal expected working cycle of 100,000 operations before servicing. Full brake application depresses the piston .375" or .115 cubic inch displacement. Reserve stroke of .816" and .345 cubic inches of fluid exists. MIL-H-5606 (red) fluid remains the system staple.

The Ercoupe/Forney(*) brake system consists of a reservoir (**) and a single MASTER CYLINDER, which applies pressure simultaneously to both left and right single wheel cylinders. The original reservoir system remains as well as all fluid tubes/hoses. Having a smaller bore, the new unit's performance is much improved since the pedal force is now linear to the brake action received, which was not the case before.

*-Factory installation of rudder pedals in later Forney's moved the MASTER CYLINDER aft to the handbrake assembly near the seat(s). SKYPORT Kit SMK-88F covers this configuration.

**-Reservoir replacement kits are available. See SKYPORT kits SMK-98 or SMK-98F.

If ever needed after installation an O-RING/SEAL/SPRING replacement kit is available. See SKYPORT kit SMK-88R.



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SMK-88 INSTALLATION STEPS BRAKE MASTER CYLINDER REPLACEMENT

1. Refer to the appropriate model AIRCRAFT SERVICE MANUAL.
2. Secure the aircraft and relieve any brake pressure on the system.
3. Refer to ILLUSTRATION: (A) and (B). Remove the original Scott MASTR CYLINDER. Retain and reuse the mounting hardware indicated. Discard master cylinder clevis rod end, spacer and two cotter keys. If assigned, return the old original MASTER CYLINDER for CORE CREDIT.
4. Before installation of the new MASTER CYLINDER, part number SS13000 install the parts in place as shown on ILLUSTRATION (C).
5. See ILLUSTRATION: (D) and (E). Install the new MASTER CYLINDER in the aircraft as shown. Ensure the indicated hardware is utilized. Note the orientation of the inlet/outlet ports. Do not over tighten the lower mounting bolt/nut as the cylinder must rotate without any interference upon application of the brakes.
6. Check for clearance between the brake pedal arm and the top of the piston shaft protruding through the bottom of the new clevis rod end. A clearance of .125 is adequate. See ILLUSTRATION (E).
7. Check and rig hand parking brake cable. (415 models only)
8. Refill reservoir/system. Use only hydraulic "RED" fluid, MILH-5606. Bleed brakes as prescribed in the service manual. Ground check system and recheck for leaks. Correct problems as necessary.
9. Complete the FAA FORM 337 and make an appropriate entry in the log book.
10. Weight & Balance Information.

Master Cylinder and parts removed:	MASTER CYLINDER=	13.0 oz. empty
	Hardware=	00.25 approx.

New Master Cylinder and parts added:	MASTER CYLINDER=	07.0 oz. empty
	Hardware=	00.5 approx.



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**SMK-88
PARTS LIST
BRAKE MASTER CYLINDER REPLACEMENT**

<u>PART NUMBER</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
REMOVED:		
33449	MASTER (SCOTT MODEL 4350) BRAKE CYLINDER	1
4008-2	CLEVIS ROD END	1
NAS43-DD3-52	SPACER	1
AN380-2-2	COTTER KEY (OLD ONES)	2
REPLACEMENTS:		
SS13000	MASTER BRAKE CYLINDER	1
AN844-4D	ELBOW 45 DEGREE	1
MS24665-132	COTTER KEY (REPLACEMENTS)	2

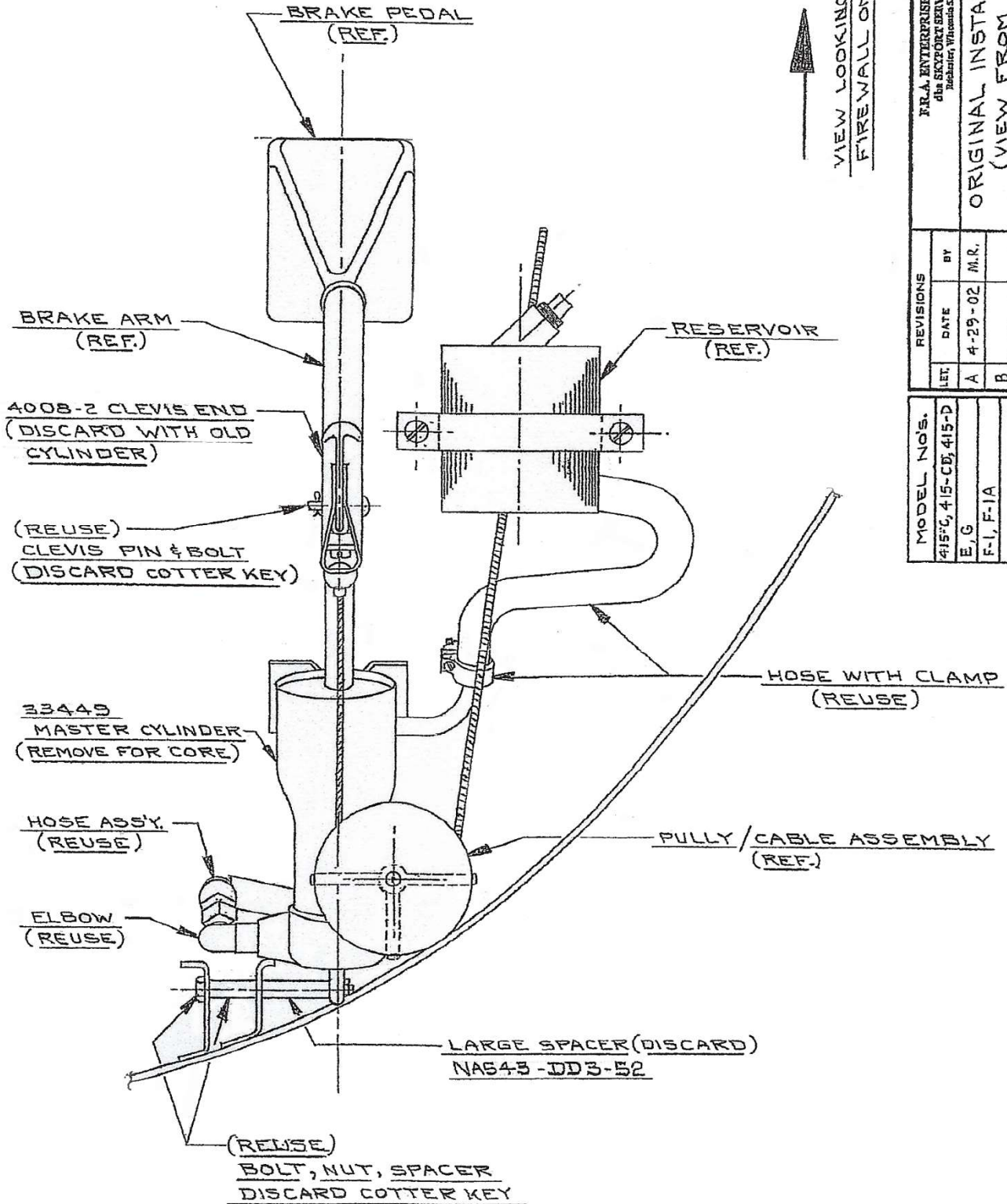
LIST OF ILLUSTRATIONS:

- | | |
|-------------------------------|--|
| (A) ORIGINAL INSTALLATION | Front to aft view (WITH HARDWARE IDENTIFICATION) |
| (B) ORIGINAL INSTALLATION | Left side view (WITH HARDWARE IDENTIFICATION) |
| (C) PRE-INSTALLATION BUILD UP | (NEW MASTER CYLINDER) |
| (D) COMPLETED INSTALLATION | (FRONT TO AFT VIEW) |
| (E) COMPLETED INSTALLATION | (LEFT SIDE VIEW) |

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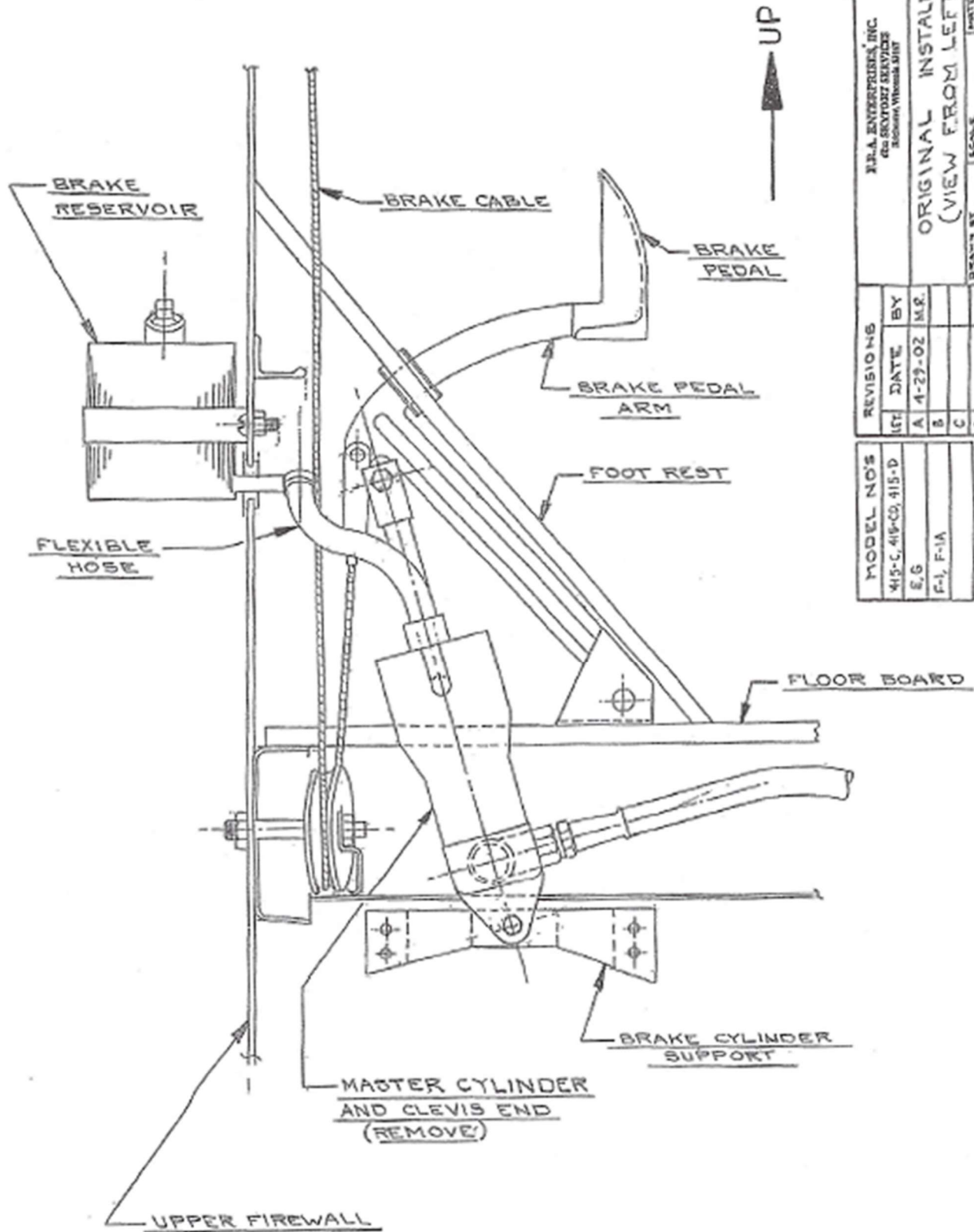


VIEW LOOKING AFT WITH
FIREWALL OMITTED



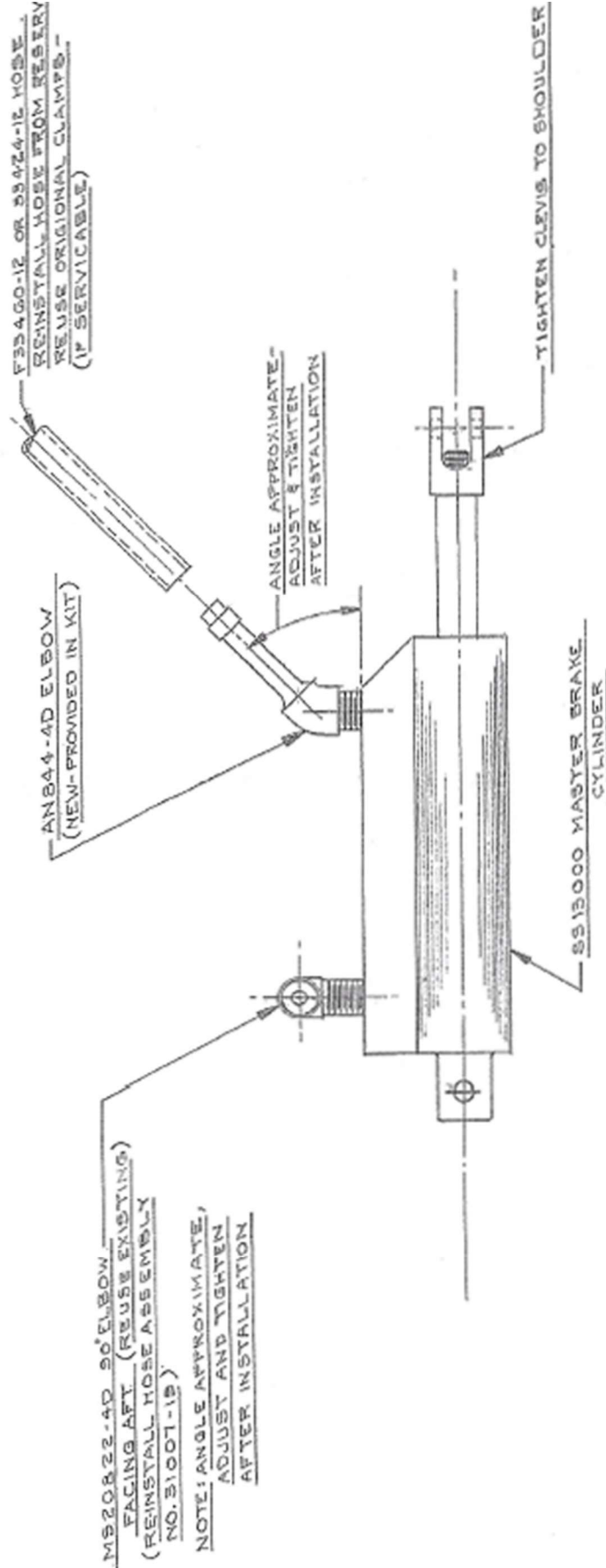
F.R.A. ENTERPRISES, INC. dba SKYPORT SERVICES Tuckaheer, Wisconsin 53187		ORIGINAL INSTALLATION (VIEW FROM FRONT)		SCALE NONE	MATERIAL \checkmark H \rightarrow
REVISIONS		DRAWN BY ENR18T	CHECKED BY M. Reed	DATE 7-21-99	DRAWING NO. SMK-88-A
LET.	DATE	BY	M.R.	TOL	\checkmark H \rightarrow
A	4-29-02	M.R.	M.R.	TOL	\checkmark H \rightarrow
B					
C					
D					
E					
MODEL NO'S. 415-C, 415-CD, 415-D E, G F-1, F-1A					

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R.P.A. ENTERPRISES, INC. 620 SEVYORT SERVICE SACRAMENTO, WISCONSIN 53581		ORIGINAL INSTALLATION (VIEW FROM LEFT - REF. ONLY)		DRAWN BY ENRIGHT W. H.	SCALE NONE	DATE 7-20-55	PART NO. SMK-88-B
MODEL NO'S 415-C, 415-D, 415-E, 415-F, 415-G		REVISIONS 1ST DATE BY A 4-29-02 M.P.		MATERIAL NONE		APPROVED BY W. H.	
B		C		D		E	
F		G					

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REVISIONS		DATE		BY	
A	4-29-02	M.R.			
B					
C					
D					
E					

MODEL NO'S.
415-C, 415-CD, 415-D
E, G
F-1, F-1A

* APPLIES TO THOSE MODELS WITH THE MASTER
CYLINDER INSTALLED JUST AFT OF THE FIREWALL
AND UNDERNEATH THE TOE-FLOORBOARD

TRIA ENTERPRISES, INC.
AN AIRPORT SERVICE
Business, Wichita, KS 67207

PRE INSTALLATION BUILD-UP
ILLUSTRATION

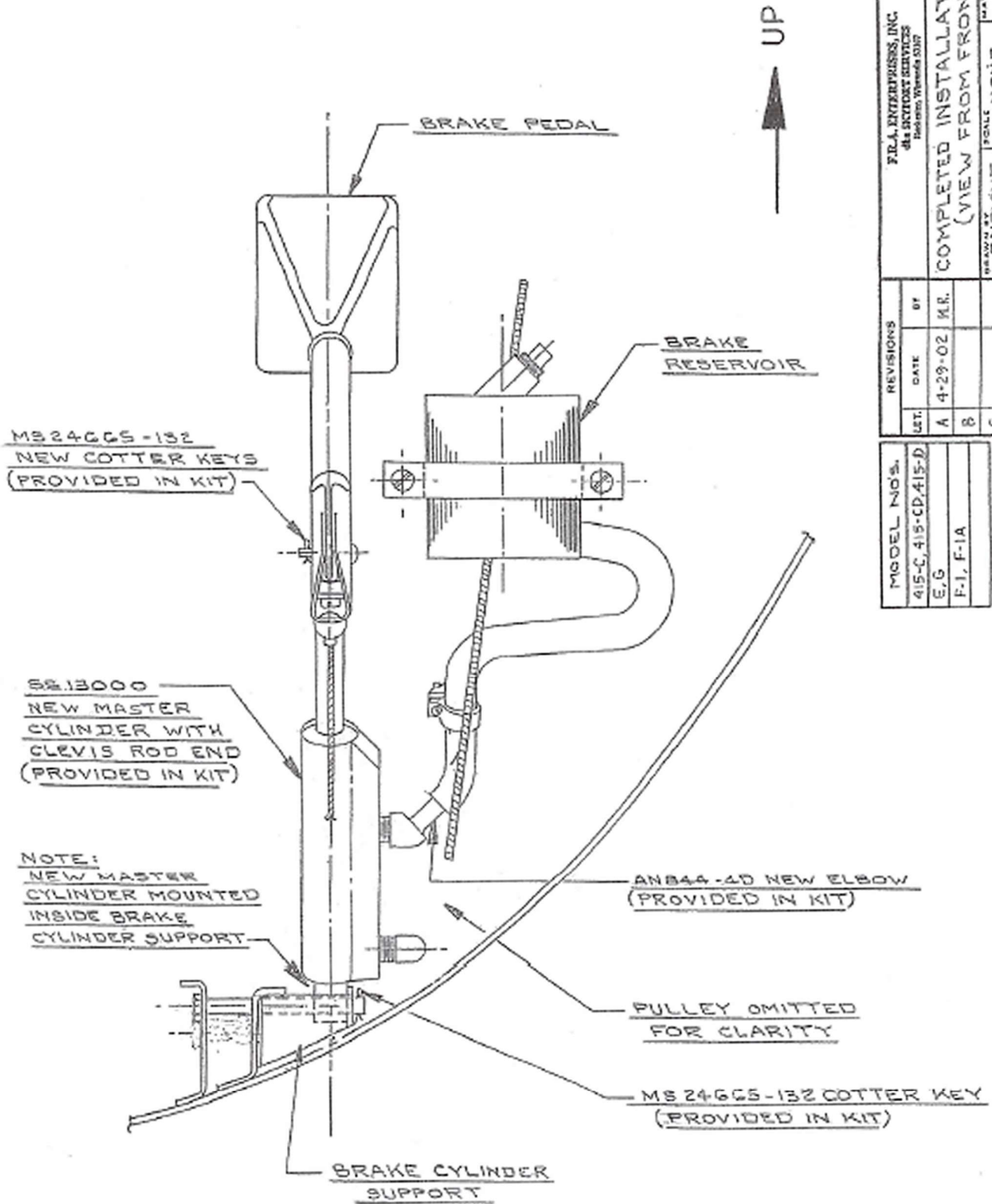
SCALE: 1 = 1

DRAWN BY: *Chris Pineda* DATE: 7-10-99

APP'D: *[Signature]* TOL: *[Signature]*

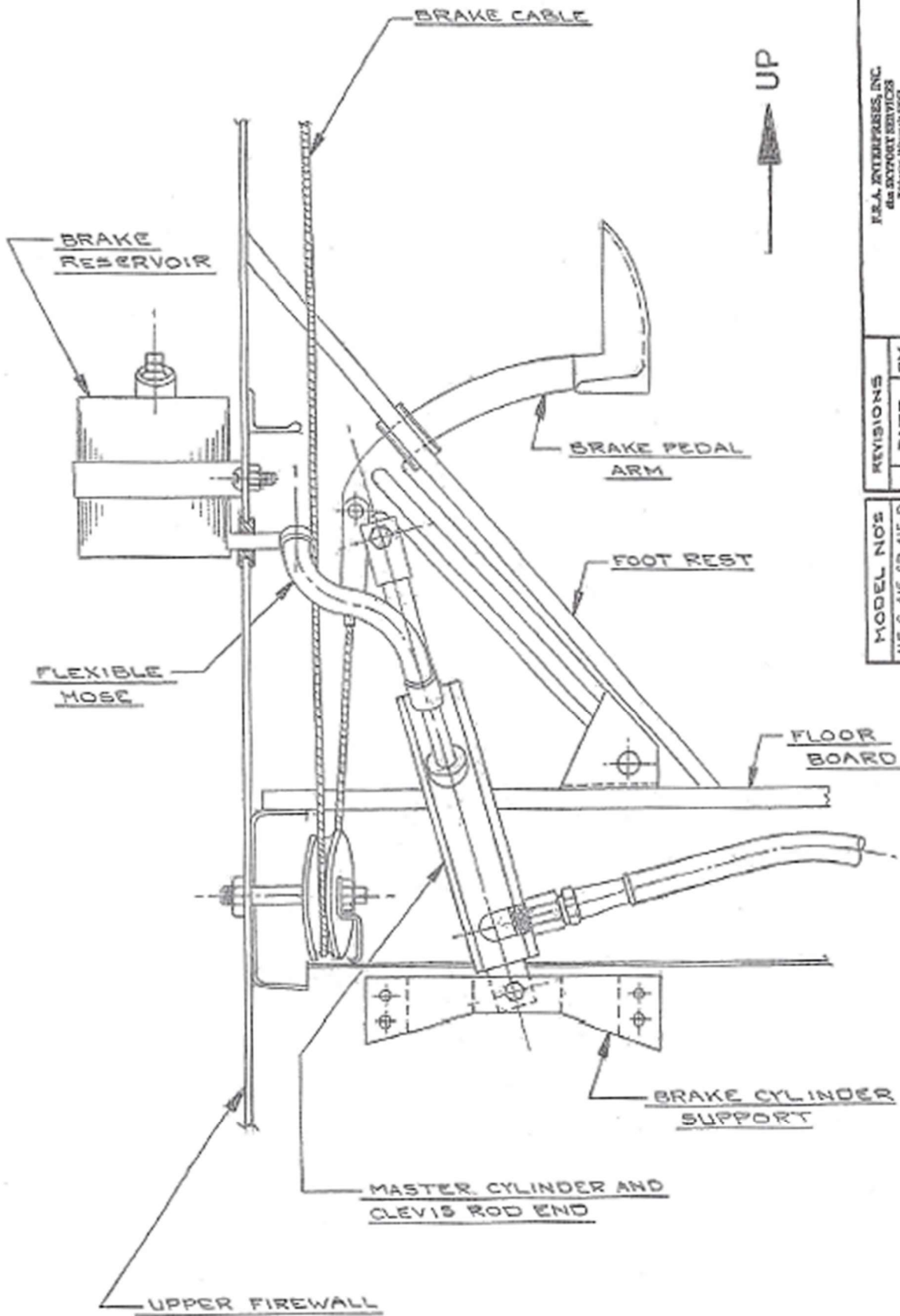
DRAWING NO.: SMK-88-C

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F.I.A. ENTERPRISES, INC. 415-KENTWOOD SERVICES 1800 W. WILSON, WILSON, WYOMING 83097		COMPLETED INSTALLATION (VIEW FROM FRONT)		SCALE NONE	MATERIAL
MODEL NO'S. 415-C, 415-CD, 415-D E, G F-1, F-1A		REVISIONS LIST DATE BY	DRAWING NO. SMK-88-D	DATE 7-21-99	TO H. Brown
A	4-29-02	K.R.			
B					
C					
D					
E					

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F.R.A. ENTERPRISES, INC. 604 EXETER SERVICES Madison, Wisconsin 53707		COMPLETED INSTALLATION (VIEW FROM LEFT - REF. ONLY)		SCALE: NONE DATE: 4-20-02 APPR.: <i>[Signature]</i>	PART NO. SMK-88-E
REVISIONS		DRAWN BY: <i>[Signature]</i>	CHECKED BY: <i>[Signature]</i>	TRACED BY: <i>[Signature]</i>	MATERIAL:
MFR. DATE	BY	M.R.	DATE	APPR.	PART NO.
A 4-29-02	[]	[]	4-20-02	[]	SMK-88-E
B	[]	[]	[]	[]	[]
C	[]	[]	[]	[]	[]
D	[]	[]	[]	[]	[]
E	[]	[]	[]	[]	[]
F	[]	[]	[]	[]	[]
G	[]	[]	[]	[]	[]

MODEL NO'S 415-C, 415-CD, 415-D E, G F-1, F-1A

FAA APPROVED MODEL LIST (AML) NO. SA01407CH
 ALPHA AVIATION, INC.

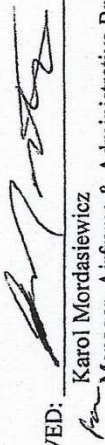
FOR
 INSTALLATION OF REPLACEMENT BRAKE MASTER CYLINDER

ISSUE DATE: 03/08/01

ITEM	AIRCRAFT MAKE	AIRCRAFT MODEL	ORIGINAL TYPE CERTIFICATE NUMBER	CERTIFICATION BASIS FOR ALTERATION	INSTALLATION INSTRUCTIONS		AFM SUPPLEMENT NUMBER/DATE	AML AMENDMENT DATE
					NUMBER	REVISION NO. & DATE		
1	Univair Aircraft Corporation	415-C, 415-CD	A-718	CAR 4a	SMK-88 (P/N SS1300A)	None, Dated 06/06/00*	N/A	--
2	Univair Aircraft Corporation	415-D, E, G, F-1, F-1A	A-787	CAR 3	SMK-88 (P/N SS1300A)	None, Dated 06/06/00*	N/A	--

* or latter FAA Approved Revisions.

FAA APPROVED:



Karol Mordasiewicz
 Manager, Airframe & Administrative Branch
 Chicago Aircraft Certification Office

Date Reissued: 09/08/05; 06/26/09; 06/10/16

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