

LUFTFAHRZEUG – FLUGHANDBUCH (AFM)
MANUEL DE VOL DE L'AERONEF

für das Luftfahrzeug HB - OZV
pour l'aéronef

Die den Betrieb des Luftfahrzeuges betreffenden Unterlagen sind vom Bundesamt für Zivilluftfahrt als Luftfahrzeug-Flughandbuch genehmigt oder anerkannt. Sie bilden eine Grundlage des Lufttüchtigkeitszeugnisses

Nr.
no 2979

und dürfen nur durch das Bundesamt für Zivilluftfahrt oder in dessen Auftrag geändert werden.

Bei Änderungen in der Ausrüstung ist dem Bundesamt für Zivilluftfahrt unverzüglich ein Arbeitsbericht im Doppel unter Angabe von Gewicht und Hebelarm der ein- und ausgebauten Teile zusammen mit dem vorliegenden Flughandbuch zuzustellen.

Das Luftfahrzeug darf nur nach diesem Flughandbuch, das an Bord mitzuführen ist, betrieben werden.

Der Zulassungsbereich des Luftfahrzeuges ist im Anhang zum Flughandbuch festgelegt.

Les documents relatifs à l'exploitation de l'aéronef sont approuvés ou reconnus par l'Office fédéral de l'aviation civile en tant que manuel de vol de l'aéronef. Ils forment une base du certificat de navigabilité

et ne peuvent être modifiés que par l'Office fédéral de l'aviation civile ou sur son ordre.

Lors de changements dans l'équipement, il y a lieu d'envoyer immédiatement à l'Office fédéral de l'aviation civile, avec le présent manuel de vol, un rapport de travail en deux exemplaires, et d'indiquer le poids ainsi que le bras de levier des parties installées ou déposées.

L'aéronef ne peut être exploité que d'après le présent manuel de vol, qui doit se trouver à bord.

Le champ d'utilisation de l'aéronef est fixé dans l'annexe du manuel de vol.

3003 Bern, den
3003 Berne, le 10.12.84

BUNDESAMT FUER ZIVILLUFTFAHRT, Sektion Flugmaterial
OFFICE FEDERAL DE L'AVIATION CIVILE, Section du matériel aéronautique
i.A. / p.o. *Rüegg*

Rüegg

Bemerkungen / Observations

2. Anzahl Personen an Bord
Nombre de personnes à bord

2.1 Mindestflugbesatzung *
Equipage minimal de conduite

1 pilote			
3			

2.2 Höchstzulässige Anzahl
Passagiere
Nombre maximal de passagers

* Allfällige besondere Betriebsvorschriften bleiben vorbehalten.
D'éventuelles prescriptions d'exploitation particulières restent réservées.

DUPLICATA

Hauptsächlichste Daten des Luftfahrzeuges HB - OZV
Données principales de l'aéronef

1. Gewichte und Schwerpunktlage
Poids et position du centre de gravité

1.1 Höchstzulässiges Abfluggewicht Kat. * 1089 kp 2400 lbs
Poids maximal autorisé au décollage Cat. ☒ N

* Andere Kategorien siehe Flughandbuch
Autres catégories voir manuel de vol

1.2 Höchstzulässiges Landegewicht 1089 kp 2400 lbs
Poids maximal autorisé à l'atterrissage

1.3 Rüstgewicht
Poids à vide

Im Rüstgewicht sind inbegriffen:
Dans le poids à vide sont compris:

☒ Ausrüstung gemäss Ausrüstungsliste
L'équipement selon la liste d'équipement

☒ Nicht verwendbarer Treibstoff
Le carburant non utilisable

☐ Nicht verwendbarer Schmierstoff
Le lubrifiant non utilisable







☐ Verwendbarer Schmierstoff
Le lubrifiant utilisable

☐ Hydraulikflüssigkeit
Le liquide hydraulique

☐ Ballast (sofern eingebaut)
Lest (si installé)

☐ Getriebeöl
Le lubrifiant de boîtes
de transmission

☐

Datum Date	Rüstgewicht Poids à vide	Schwerpunktlage Position du centre de gravité	Rüstgewichtsmoment Moment du poids à vide	Zuladung Charge utile
	kg / lbs	m / in	kgm / lbs. in	kg / lbs
22.04.84	1443	86,4	124675	957  12
9.6.89	1447	86,33	124943	953  41
16.8.93	1474	89,3	131635	926  41
16.01.2007	1431	86,43	123691	969  41
29.10.2009	1431.2	86,41	123671	968.8  41
24.02.2010	1428,3	86,45	123490	971.7  41
		See next page		

PREPARED	PIPER AIRCRAFT CORP DEVELOPMENT CENTER, VERO BEACH, FLA.	
CHECKED		
APPROVED	REPORT VB-163	PAGE _____

AIRPLANE FLIGHT MANUAL

MODEL PA-28-180

SERIAL NOS. 671 THRU 5600

FAA IDENTIFICATION NO. HB-02V

SERIAL NO. 28-4613

THIS DOCUMENT MUST BE KEPT IN AIRPLANE AT ALL TIMES.

FAA APPROVED: Original signed by Walter R. Haldeman *
Walter R. Haldeman
Chief, Engineering & Manufacturing Branch
Southern Region - - - Atlanta, Georgia


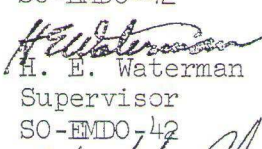
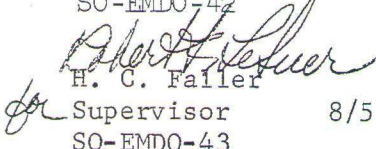
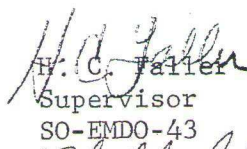
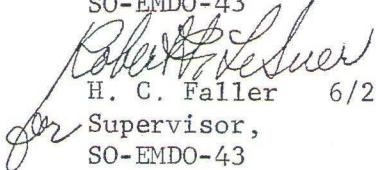
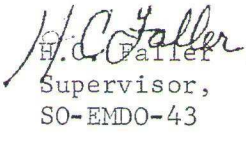
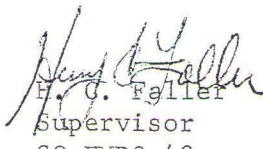
DATE: August 3, 1962

FAA APPROVED: Gene Dearing For Retype Only.
Gene Dearing
Aerospace Engineer

DATE: August 12, 1964

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Log of Revisions

<u>REVISION NO.</u>	<u>PAGE</u>	<u>DESCRIPTION</u>	<u>APPROVED</u>	<u>DATE</u>
1	1	Deleted Propeller Pitch Information. Added Static R.P.M. Information	 H. E. Waterman Supervisor SO-EMDO-42	5/25/64
2	2	Placards Section: Added Placard No. 5	 H. E. Waterman Supervisor SO-EMDO-42	7/8/64
3	2	Added to Placard No. 3: "BAGGAGE, MAX. 200 LBS., SEE WEIGHT AND BALANCE DATA FOR BAGGAGE LOADINGS BETWEEN 150 LBS. AND 200 LBS."	 H. C. Faller Supervisor SO-EMDO-43	8/5/64
	1	Added Sensenich M76EMMS		
4	3	Item 5 added to Procedures Section.	 H. C. Faller Supervisor SO-EMDO-43	10/20/64
5	1	Limitations Section: Revised Oil Temperature and Fuel Pressure Range	 H. C. Faller Supervisor, SO-EMDO-43	6/23/65
6	1	Limitation Section: Add note to Engine Limits	 H. C. Faller Supervisor, SO-EMDO-43	1/5/66
7	2	C. G. Range: 1975 lbs. 85.9 In. 95.9 In. 1650 lbs. 84.0 In. 95.9 In. Was 18.50 lbs. 85.1 In. 95.9 In.		
	4	Added Procedures Section And Item 6		
	2	Added Placard No. 6	 H. C. Faller Supervisor SO-EMDO-43	5/20/66

FAA APPROVED 8/3/62

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APPROVED	REPORT VB-163	PAGE <u>III</u>

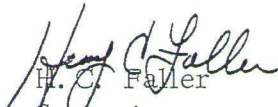
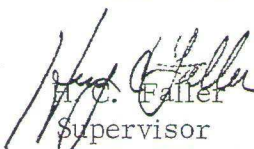
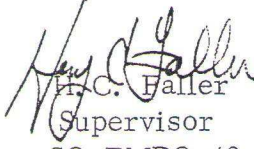
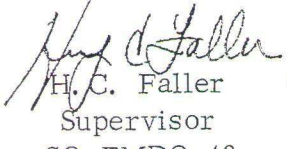
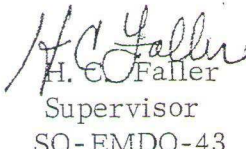
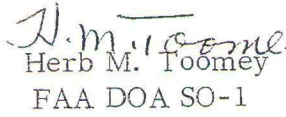
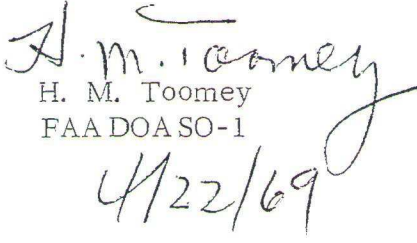
Log of Revisions

<u>Revision No.</u>	<u>Page</u>	<u>Description</u>	<u>Approved</u>	<u>Date</u>
8	1	Revised Oil Temperature, Oil Pressure and Fuel Pressure Limitations		
	2,3	Revised Placards No. 3 and No. 5		
	5	Added Page 5		
		Procedures Section - Added Item 7		
	6	Added Page 6	<i>Herbert T. Herald</i> for Henry C. Faller Supervisor SO-EMDO-43	7/15/66
9	1	Limitations Section Add "or O-360-A4A	<i>Henry C. Faller</i> Henry C. Faller Supervisor SO-EMDO-43	8/2/66
10	2,3	C.G. Range - Placard No. 1 and Placard No. 3 revised to include utility category operations. Added utility category max. wt. and approved maneuvers		
	4	Procedures Section - Added to Item 3 "For Normal Category Operation". Added Placard No. 7.		
	3	Placards Section - Added utility category operation to Item 4.		
	1	Added Utility Category		
	2	Added maximum positive load factor for Utility Category. Added Baggage Capacity.	<i>Henry C. Faller</i> Henry C. Faller Supervisor SO-EMDO-43	12/6/66

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APPROVED	REPORT VB-163	PAGE <u>IV</u>

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
11	3	Placards Section: Revised Placard No. 1 to read, "In Full View of the Pilot"	 H. C. Faller Supervisor SO-EMDO-43	5/12/67
12	2	Revised C. G. Range	 H. C. Faller Supervisor SO-EMDO-43	9/25/67
13	3, 4	Revised Placard No. 4 and No. 7 to read: "In full view of the pilot"	 H. C. Faller Supervisor SO-EMDO-43	4/2/68
14	1	Added Aircraft Serial Numbers 1571 and 1573 to Engine and Propeller Limitations	 H. C. Faller Supervisor SO-EMDO-43	6/3/68
15	1	Added Propeller Designations	 H. C. Faller Supervisor SO-EMDO-43	6/24/68
16	Title	Allocated Piper Report No. VB-163 to this Manual.	 Herb M. Toomey FAA DOA SO-1	11/14/68
17	Title	Added Applicable Serial Nos. 1 Thru 4377	 H. M. Toomey FAA DOA SO-1	4/22/69
	1	Added Supplement No. 1		

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REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
18	Title	Changed applicable Serial Nos. from 1 thru 4377 to 1 thru 5600.	<i>H. M. Toomey</i> H. M. Toomey FAA DOA SO-1	7/15/69
19	Title	Changed applicable Serial Nos. from 1 thru 5600 to 671 thru 5600.	<i>H. M. Toomey</i> H. M. Toomey FAA DOA SO-1	9/23/69
20	2	Added Forward Intermediate and Forward Gross Weight Points	<i>H. M. Toomey</i> H. M. Toomey FAA DOA SO-1	5/8/70
21	2	Deleted Forward Intermediate and Forward Gross Weight Points	<i>G. C. Stephen</i> G. C. Stephen FAA DOA SO-1	9/14/70
22	1	Changed oil pressure gauge markings	<i>Ward Evans</i> Ward Evans	7-25-75

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Piper Model PA-28-180
Normal and Utility Categories

AIRPLANE FLIGHT MANUAL

1. Limitations Section

The following limitations must be observed in the operation of this airplane.

Engine Lycoming O-360-A3A or O-360-A4A

Engine Limits Maximum permissible RPM for takeoff, 2475. For all other operations, 2700 rpm, 180 hp, (A/C S/N 28-671 to 1760A).
For all operations, 2700 rpm, 180 hp, (A/C S/N 28-1571, 1573, 1761 and up).

Fuel 91/96 minimum octane aviation fuel.

Propeller Sensenich M76 EMM or 76EM8 (S/N 671 to 1760A)
Sensenich M76 EMMS or 76EM8S5 (S/N 1571, 1573, 1761 & up).
Maximum diameter 76 inches, minimum diameter 76 inches.
Static RPM at maximum permissible throttle setting. Not over 2450, not under 2275. No additional tolerance permitted.

Power Instruments

Oil temperature: GREEN arc (normal operating range) 120°F to 245°F; YELLOW arc (caution range) 60°F to 120°F; RED line (maximum) 245°F (S/N 671 to S/N 1760A)

Oil Temperature: GREEN arc (normal operating range) 75°F to 245°F; RED line (maximum) 245°F (S/N 1571, 1573, 1761 & up).

Oil Pressure: GREEN arc (normal operating range) 60 psi to 90 psi; YELLOW ARC (caution range) 25 psi to 60 psi; RED line (minimum) 25 psi when installed or 60 psi when installed; RED line (maximum) 90 psi.

Fuel Pressure: GREEN arc (normal operating range) .5 psi to 5 psi; RED line (minimum) .5 psi; RED line (maximum) 5 psi (S/N 671 to S/N 1760A)

Fuel Pressure: GREEN arc (normal operating range) .5 psi to 8 psi; RED line (minimum) .5 psi; RED line (maximum) 8 psi (S/N 1571, 1573, 1761 and up)

Tachometer: GREEN arc (normal operating range) 500 to 2700 rpm; RED line (maximum continuous power) 2700 rpm.

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Airspeed Limits	Never exceed	171 mph
	Maximum structural cruise	140
	Maneuvering	129
	Flaps extended	115
	Maximum positive load factor	3.8 Normal Category
	Maximum positive load factor	4.4 Utility Category
	Maximum negative load factor	No inverted maneuvers approved.

Maximum Weight 2400 lbs - Normal Category; 150 lbs - Utility Category.

Baggage Capacity 200 lbs

C. G. Range The datum used is 78.4 inches ahead of wing leading edge at the intersection of the straight and tapered section.

1. Normal Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
2400	92.1	94.5
2200	89.2	95.9
1975	85.9	95.9
1650	84.0	95.9

2. Utility Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
1950	85.8	86.5
1650	84.0	86.5

Straight line variation between points given.

NOTE: It is the responsibility of the airplane owner and the pilot to insure that the airplane is properly loaded. See weight and section for proper loading instructions.

Maneuvers

1. Normal Category - All acrobatic maneuvers including spins prohibited.
2. Utility Category - Approved maneuvers for Utility Category only.

	<u>Entry Speed</u>
Spins (Flaps Up)	Stall
Steep Turns	129 mph
Lazy Eights	129
Chandelles	129

FAA APPROVED 8/3/62

REVISED 9/14/70 Rev. No. 21

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Placards

1. In full view of the pilot:

"THIS AIRPLANE MUST BE OPERATED AS A NORMAL OR UTILITY CATEGORY AIRPLANE IN COMPLIANCE WITH THE OPERATING LIMITATIONS STATED IN THE FORM OF PLACARDS, MARKINGS AND MANUALS.

ALL MARKINGS AND PLACARDS ON THIS AIRPLANE APPLY TO ITS OPERATION AS A UTILITY CATEGORY AIRPLANE. FOR NORMAL AND UTILITY CATEGORY OPERATIONS, REFER TO THE AIRPLANE FLIGHT MANUAL.

FOR SPIN RECOVERY, USE FULL RUDDER AGAINST SPIN, FOLLOWED IMMEDIATELY BY FORWARD WHEEL.

NO ACROBATIC MANEUVERS (INCLUDING SPINS) ARE APPROVED FOR NORMAL CATEGORY OPERATIONS."
2. Adjacent to upper door latch:

"ENGAGE LATCH BEFORE FLIGHT."
3. On the inside of the baggage compartment door:

"MAXIMUM BAGGAGE 125 LBS." (S/N 671 to 1760A)
 (MAXIMUM BAGGAGE MAY BE INCREASED TO 200 LBS. IN ACCORDANCE WITH PIPER SERVICE SPARES LETTER NO. 242)

UTILITY CATEGORY OPERATION - NO BAGGAGE OR AFT PASSENGERS ALLOWED. NORMAL CATEGORY OPERATION - SEE AIRPLANE FLIGHT MANUAL WEIGHT AND BALANCE SECTION FOR BAGGAGE AND AFT PASSENGER LIMITATIONS.
4. In full view of the pilot:

"ROUGH AIR OR MANEUVERING SPEED 129 MPH."

"UTILITY CATEGORY OPERATION - NO AFT PASSENGERS ALLOWED."
5. On the instrument panel in full view of the pilot when the oil cooler winterization kit is installed:

"OIL COOLER WINTERIZATION PLATE TO BE REMOVED WHEN AMBIENT TEMPERATURE EXCEEDS 50° F."
6. On the instrument panel in full view of the pilot when the autoflite is installed:

"FOR HEADING CHANGES: PRESS DISENGAGE SWITCH ON CONTROL WHEEL. CHANGE HEADING, RELEASE DISENGAGE SWITCH."

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Placards (Cont'd) 7. In full view of the pilot: "UTILITY CATEGORY ONLY."
Acrobatic maneuvers are limited to the following:

		Entry Speed
	Spins (Flaps Up).....	Stall
	Steep Turns.....	129 mph
	Lazy Eights.....	129
	Chandelles.....	129
Airspeed	RED radial line	Never exceed 171 mph (148 knots)
Instrument	YELLOW arc	Caution Range 140 to 171 mph (121 to 148 knots)
Markings	GREEN arc	Normal Operating Range 67 to 140 mph (58 to 121 knots)
	WHITE arc	Flap Down Range 57 to 115 mph (50 to 100 knots)

2. Procedures
Section

1. The stall-warning system is inoperative with the master switch off.
2. Electric fuel pump must be on for both landing and takeoff.
3. The PA-28-180 airplane is approved under FAA Regulation CAR 3 which prohibits intentional spins for normal category operation. The following information is noteworthy:
 - a. The stall characteristics of the PA-28-180 are normal with the nose pitching down moderately following the stall, occasionally with a moderate roll which can be corrected by normal use of ailerons and rudder against the roll.
 - b. Prolonged use of full rudder during stall practice may result in a rapid roll followed by a spin and should be avoided. Recovery from an incipient spin may be effected in less than one additional turn by use of opposite rudder followed by full forward control wheel.
 - c. In the event that a fully developed spin is inadvertently experienced, recovery is best made by using full opposite rudder followed by full forward wheel and full opposite aileron. The control positions against the spin should be maintained during the entire recovery, which may require several turns and a substantial loss of altitude if the airplane is loaded heavily with a rearward center of gravity.
4. Except as noted above, all operating procedures for this airplane are normal.

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Procedures Section
(Cont'd.)

5. (Electric Pitch Trim Installation Only)

The following emergency information applies in case of electric pitch trim malfunction:

- a. In case of malfunction, disengage electric pitch trim by pulling out circuit breaker on instrument panel.
- b. In emergency, electric pitch trim may be overpowered using manual pitch trim.
- c. In cruise configuration, malfunction results in 10⁰ pitch change and 30 Ft. altitude variation.

6. (Autoflite Installation Only)

The following emergency information applies in case of autoflite malfunction:

- a. In case of malfunction PRESS disconnect switch on pilot's control wheel.
- b. Rocker switch on instrument panel - OFF.
- c. Unit may be overpowered manually.
- d. In cruise configuration malfunction, 3 seconds delay results in 60⁰ bank, and 100 Ft. altitude loss.
- e. In approach configuration malfunction, 1 second delay results in 10⁰ bank and 0 Ft. altitude loss.

7. (AutoControl III Installation Only)

I. Limitations:

Pilot off during take off and landing.

II. Procedures:

- a. Normal Operation
Refers to Manufacturer's Operation Manual.
- b. Emergency
 - 1. In case of malfunction, disengage manual controls.
 - 2. In emergency, pilot may be overpowered manually.
 - 3. In cruise configuration malfunction, 3 seconds delay results in 60⁰ bank and 100 Ft. altitude loss.
 - 4. In approach configuration malfunction, 1 second delay results in 10⁰ bank and 0 Ft. altitude loss.

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3. Performance Section

The following performance figures were obtained during FAA Type tests and may be realized under conditions indicated with the airplane and engine in good condition and with average piloting technique. All performance is given for 2400 pounds.

Loss of altitude during stalls varied from 125 to 200 feet, depending on configuration and power.

Stalling speeds, in mph, power off, versus angle of bank (Calibrated Airspeed):

Angle of bank	0	20	40	50	60
Flaps Up	67	69	76	83	94
Flaps Down	57	--	--	--	--

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SUPPLEMENT NO. 1 TO PIPER MODEL PA-28 FLIGHT MANUAL

MODELS AFFECTED: Piper PA-28 models equipped with
Lycoming O-360-A3A engine and
Sensenich M76EMM-0, M76EMMS-0,
76EM8S5-0 or 76EM8-0 propeller.

PROPELLER LIMITS

Avoid continuous operation between 2150 and 2350 RPM.

The aircraft tachometer must be placarded to show a red
arc between 2150 and 2350 RPM in accordance with Piper
Service Letter No. 526.

NOTE: This document must be attached to the Airplane
Flight Manual.

FAA DOA SO-1
APPROVED

H. M. Toomey
H. M. Toomey

DATE

4/22/69

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AIRPLANE FLIGHT MANUAL

SUPPLEMENT NO. 2

CENTER OF GRAVITY RANGE

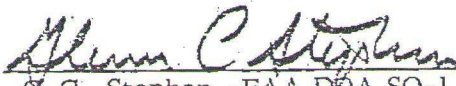
FOR

MODEL PA-28-180

THIS AIRPLANE FLIGHT MANUAL SUPPLEMENT IS APPLICABLE TO AIRCRAFT WITH SERIAL NUMBERS 28-671 TO 28-3072, INCLUSIVE, WHEN PIPER PART NO. 65280-00 TUBE-LANDING GEAR STRUT PISTON IS INSTALLED.

SERIAL NUMBERS 28-3073 TO 28-5859 MAY USE THIS SUPPLEMENT WITH NO ADDITIONAL MODIFICATION TO THE AIRCRAFT.

THIS DOCUMENT MUST BE ATTACHED TO THE AIRPLANE FLIGHT MANUAL

FAA APPROVED: 
 G. C. Stephen, FAA DOA SO-1
 Piper Aircraft Corporation

DATE: September 14, 1970

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Supplement Model PA-28-180
CHECKED		
APPROVED	REPORT VB-261	PAGE <u>ii</u>

PIPER MODEL PA-28-180

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
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FAA APPROVED 9/14/70

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Supplement Model PA-28-180
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PIPER MODEL PA-28-180
NORMAL AND UTILITY CATEGORIES

AIRPLANE FLIGHT MANUAL SUPPLEMENT

This supplement must be attached to the Airplane Flight Manual dated August 3, 1962 or August 12, 1964 or April 22, 1969, when the expanded C. G. Envelope is used. The information contained herein supplements the information of the basic Airplane Flight Manual; for limitations, procedures, and performance data not contained in this document, consult the manual proper.

1. Limitations Section The following limitations must be observed in the operation of this airplane with this center of gravity range:

Maximum Weight 2400 lbs.

C. G. Range The datum used is 78.4 inches ahead of wing leading edge at the intersection of the straight and tapered section.

1. Normal Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
2400	91.0	94.5
2200	87.8	95.9
2150	87.0	95.9
1650	84.0	95.9

2. Utility Category

Weight (Pounds)	Forward Limit (In. Aft of Datum)	Rearward Limit (In. Aft of Datum)
1950	85.8	86.5
1650	84.0	86.5

2. Procedures "No Change"

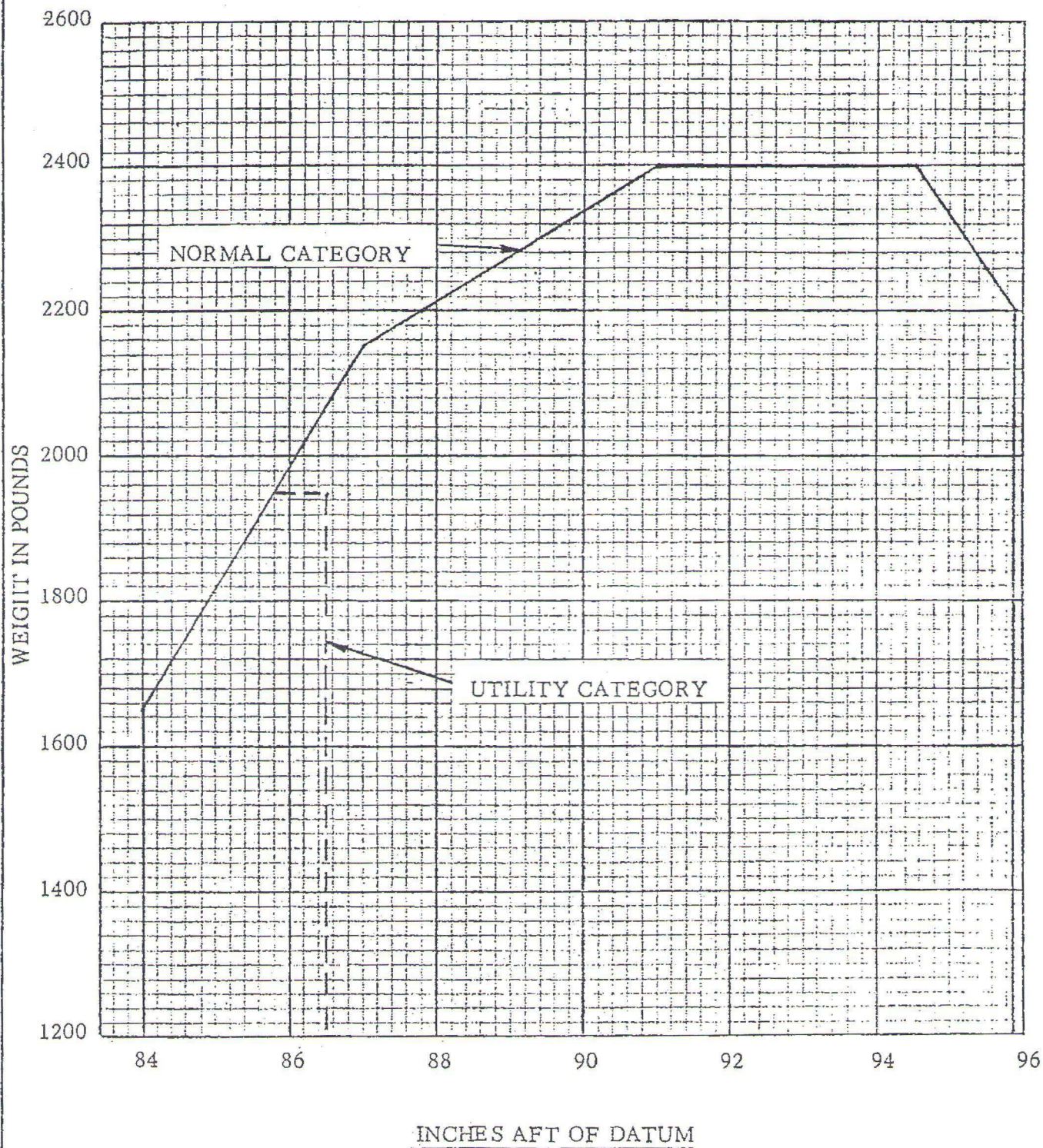
3. Performance "No Change"

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PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Airplane Flight Manual Supplement Model PA-28-180
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C. G. RANGE AND WEIGHT



PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED		PAGE _____ Title _____

REPORT VB-165

EQUIPMENT LIST

MODEL PA-28-180

(SERIAL NOS. 4378 THRU 5859)

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
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Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	13	Added: R. C. Allen Turn Coordinator #80-9	<i>J. McClean</i>	1-27-69
2	15	Changed Narco Mark 12A to read: Narco Mark 12A or Narco Mark 12B	<i>J. McClean</i>	2-2-69
	17	Added: Narco Mark VIII Narco VOA-50M Omni Convertor Narco VOA-40 Omni Convertor (2)		
3	17	Added: Narco Mark 16 Installations	<i>J. McClean</i>	7-16-69
	18	Added: Adjustable Front Seat Instal- lations and Overhead Vent System		
4	12	Added: Strobe Light, Whelen Engineering Company	<i>J. McClean</i>	10-3-69
5	18	Removed Piper Drawing 65766 from Inertia Safety Belt (Set of 2)	<i>J. McClean</i>	11-5-69
6	18	Under Exterior Finish Changed 1st Trim Color to Trim Color and 2nd Trim Color to Accent Color	<i>J. McClean</i>	12-4-69
7	18	Added: Alternate Static Source	<i>J. McClean</i>	3-18-70
8	4	Revised C. G. Envelope	<i>J. McClean</i>	5-8-70
	4a	Added New Page		
9	10	Added: Individual Rear Seats	<i>J. McClean</i>	7-10-70
	12	Deleted: Strobe Light Added: Red and Red/White Strobe Lights		
	14	Added: AutoFlite II		
	18	Added: Audio Selector Panel		
	19	Added: New Page and Headrests		

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
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Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
10	14	Deleted: Flight Manual Supplement	<i>[Signature]</i>	7-16-70
11	Title	Added: Serial Nos. 4378 thru 5859		
	4a	Deleted: Page 4a		
	10	Deleted: Individual Rear Seats		
	12	Added: Strobe Light		
		Deleted: Red and Red/White Strobe Lights		
	14	Deleted: AutoFlite II		
	18	Deleted: Audio Selector Panel		
	19	Deleted: Headrests and Page 19	<i>N. Tennant</i>	17 AUG. 1970



HB-

OZU

Muster
Type

PA 28-180

Ort und Datum
Lieu et date

Bex, 14.06.2017

Bezugsebene gemäss Geräte-Kennblatt

Plan de référence selon la fiche de navigabilité

78,4 in en avant du bord d'attaque de l'aile

Horizontallage gemäss Geräte-Kennblatt

Référence horizontale selon la fiche de navigabilité

repères sur côté gauche du fuselage

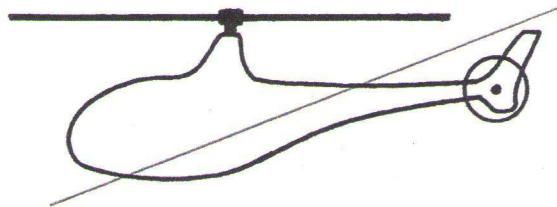
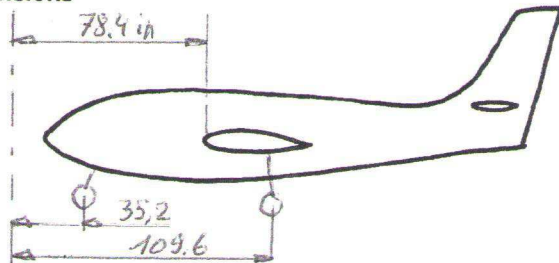
Grund der Wägung

Raison de la pesée

Pesée "10 ans" selon TM nr 73.920-12

Abmessungen

Dimensions



Alle Masse sowie Bezugsebene in die Figur eintragen

Reporter le plan de référence et les cotes des points de pesée sur le croquis approprié

Wägung Pesée

mit Ausrüstung gemäss Ausrüstungsliste des Luftfahrzeug-Flughandbuchs (AFM)
avec l'équipement installé selon la liste du manuel de vol de l'aéronef (AFM)

Verwendete Wagen Balances utilisées	Hersteller Constructeur	Werknummer No. de série	Eichdatum Date de calibr.
Links / A gauche	Evergreen	1460	18.03.2015
Rechts / A droite	Evergreen	1754	18.03.2015
Vorne/Hinten / En avant/En arrière	Evergreen	1459	18.03.2015

} prochain 18.03.2018

Wägung Nr.
Pesée no.

1

Wägepunkt Point de pesée	Masse brutto Masse brute	Tara Tare	Masse netto Masse net
Links / A gauche			494
Rechts / A droite			499
Vorne/Hinten / En avant/En arrière			463
Total			1456

Wägung Nr.
Pesée no.

2

Links / A gauche			497
Rechts / A droite			503
Vorne/Hinten / En avant/En arrière			462
Total			1462

Hinweis / Note

Ist die Abweichung in den Ergebnissen 1 und 2 grösser als 1%, ist eine 3. Wägung durchzuführen.
Au cas où la différence entre les résultats 1 et 2 est supérieure à 1%, effectuer une 3ème pesée.

Wägung Nr.
Pesée no.

3

Links / A gauche			
Rechts / A droite			
Vorne/Hinten / En avant/En arrière			
Total			

Schwerpunktbestimmung

Détermination du centrage

Durchschnittswerte aus den Wägungen / Valeurs moyennes des pesées

	Masse	Arm/Bras	Moment
Wägepunkt links / Point de pesée gauche	495.5	109.6	54306.8
Wägepunkt rechts / Point de pesée droit	504	109.6	54909.6
Wägepunkt vorn/hinten / Point de pesée AV/AR	462.5	35.2	16280
Für die Auswertung massgebend / Valeurs à utiliser pour le dépouillement	1459	86.02	125496.4

Übertragen auf Blatt 2
A reporter sur la feuille 2

Verteilung:
Distribution:

BAZL/OFAC
Halter/Expl.
Insp.

weiss/blanc
gelb/jaune
rosa/rosé

Gewogen durch:

Pesée effectuée par:

Melanie CH.66-2101



Auswertung der Wägung (Motorflugzeuge und Helikopter)
Dépouillement de la pesée (Avions à moteur et hélicoptères)

Tabelle I Gewogene, aber nicht zur Leermasse gehörende Teile
Equipements pesés, mais ne faisant pas partie de la masse à vide

Bezeichnung / Désignation	Masse	Arm/Bras	Moment
Total Abzüge / Total à retrancher			

Tabelle II Nicht gewogene, aber zur Leermasse gehörende Teile
Equipements non pesés, mais faisant partie de la masse à vide

Bezeichnung / Désignation	Masse	Arm/Bras	Moment
Total Zuschläge / Total à ajouter			

Leermasse (Gemäss Definition des Luftfahrzeug-Flughandbuchs)
Masse à vide (Selon définition du Manuel de Vol de l'aéronef)

		Masse	Arm/Bras	Moment
Übertrag Blatt 1:	/ Report feuille 1:	1450	86.02	125496.4
Öl	/ Huile SG:	- 15	32.5	- 488
Nicht verwendbarer Treibstoff	/ Essence non-consommable incl. SG:			
Nicht verwendbarer Treibstoff	/ Essence non-consommable SG:			
Abzüge gemäss Tabelle I	/ A retrancher selon table I			
Zuschläge gemäss Tabelle II	/ A ajouter selon table II			
Leermasse	/ Masse à vide	1444	86.57	125008.4

Resultat zu übertragen in AFM Deckblatt B
Résultat à reporter à la page de garde B AFM

Schwerpunktlage leer / Centrage à vide (falls vorgeschrieben / si prescrit)

Leermasse-Schwerpunktbereich gemäss Gerätekenntblatt bei _____ kg/lbs von _____ m/in bis _____ m/in
Domaine de centrage à vide selon fiche de navigabilité à _____ de _____ à _____

Anmerkung: Der Schwerpunktbereich leer muss eingehalten werden, andernfalls ist das Luftfahrzeug durch Zugabe oder Entfernen von Ballast auszutrimmen.
Note: Le domaine de centrage à vide doit être respecté, sinon l'aéronef doit être équilibré en ajoutant ou retranchant du lest.

Verteilung: BAZL/OFAC
Distribution: Halter/Expl.
Insp.

weiss/blanc
gelb/jaune
rosa/rosé

Auswertung: *Salama*
Dépouillement: *CH.66-2101*

Eintragung AFM: *Salama*
Report dans l'AFM: *CH.66-2101*

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-165	PAGE 1 Section 1

WEIGHT AND BALANCE DATA
MODEL PA-28-180 CHEROKEE

Airplane Serial Number 28- 4613

Registration Number HB-02V

Date JAN 10. 1968

AIRPLANE EMPTY WEIGHT

Item	Weight (lbs)		C.G. Arm (Inches Aft of Datum)	Moment (In-lbs)
	Actual	Computed		
Standard Empty Weight *	1465		86.82	127195.6
Optional Equipment				
Unusable Fuel (3 Pints)	2.2		103.0	227
Licensed Empty Weight = Total of Above Items	1467.2		86.84	127422.2

* Standard Empty Weight includes paint, hydraulic fluid and ENGINE OIL

AIRPLANE USEFUL LOAD

(Gross Weight) - (Licensed Empty Weight) = Useful Load

Normal Category: (2400 lbs) - (1467.2 lbs) = 932.8 lbs.

Utility Category: (1950 lbs) - (1467.2 lbs) = 482.8 lbs.

THIS LICENSED EMPTY WEIGHT, C.G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO FORM FAA-337 WHEN ALTERATIONS HAVE BEEN MADE.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-165	PAGE 1 Section 1

WEIGHT AND BALANCE DATA
MODEL PA-28-180 CHEROKEE

Airplane Serial Number 28 -4613

Registration Number _____

Date _____

AIRPLANE EMPTY WEIGHT

Item	Weight (lbs)	C. G. Arm (Inches Aft of Datum)	Moment (In-lbs)
Standard Empty Weight * Actual Computed			
Optional Equipment			
Unusable Fuel (3 Pints)	2.2	103.0	227
Licensed Empty Weight = Total of Above Items			

* Standard Empty Weight includes paint, hydraulic fluid and undrainable engine oil.

AIRPLANE USEFUL LOAD

(Gross Weight) - (Licensed Empty Weight) = Useful Load

Normal Category: (2400 lbs) - (lbs) = lbs.

Utility Category: (1950 lbs) - (lbs) = lbs.

THIS LICENSED EMPTY WEIGHT, C. G. AND USEFUL LOAD ARE FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO FORM FAA-337 WHEN ALTERATIONS HAVE BEEN MADE.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
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C.G. RANGE AND WEIGHT INSTRUCTIONS

1. Add the weight of all items to be loaded to the licensed empty weight.
2. Use the loading graph to determine the moment of all items to be carried in the airplane.
3. Add the moment of all items to be loaded to the licensed empty weight moment.
4. Divide the total moment by the total weight to determine the C.G. location.
5. By using the figures of Item 1 and Item 4, locate a point on the C.G. range and weight graph. If the point falls within the C.G. envelope, the loading meets the weight and balance requirements.

SAMPLE LOADING PROBLEM (Normal Category)

	Weight (lbs)	Arm Aft Datum (Inches)	Moment (In - Lbs)
Licensed Empty Weight			
Oil (8 quarts)	15	32.5	488
Pilot and Front Passenger	340	85.5	29070
Passengers, Aft * (Rear Seat)	340	118.1	40154
Fuel (50 Gal. Maximum)		95.0	
Baggage *		142.8	
Total Loaded Airplane			

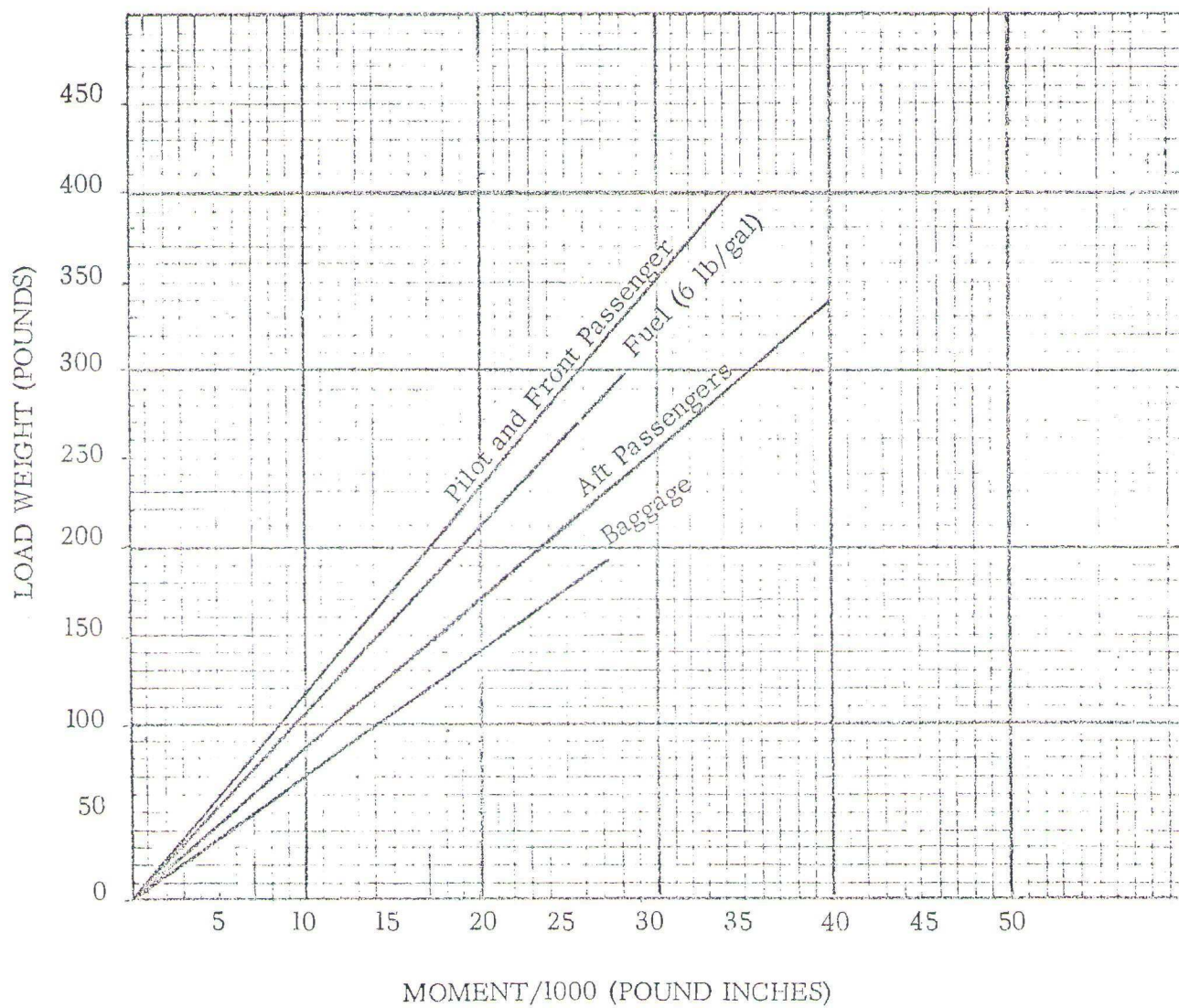
The center of gravity (C.G.) of this sample loading problem is at _____ inches aft of the datum line. Locate this point () on the C.G. range and weight graph. Since this point falls within the weight - C.G. envelope, this loading meets the weight and balance requirements.

IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

* Utility Category Operation, - No baggage or aft passengers allowed.

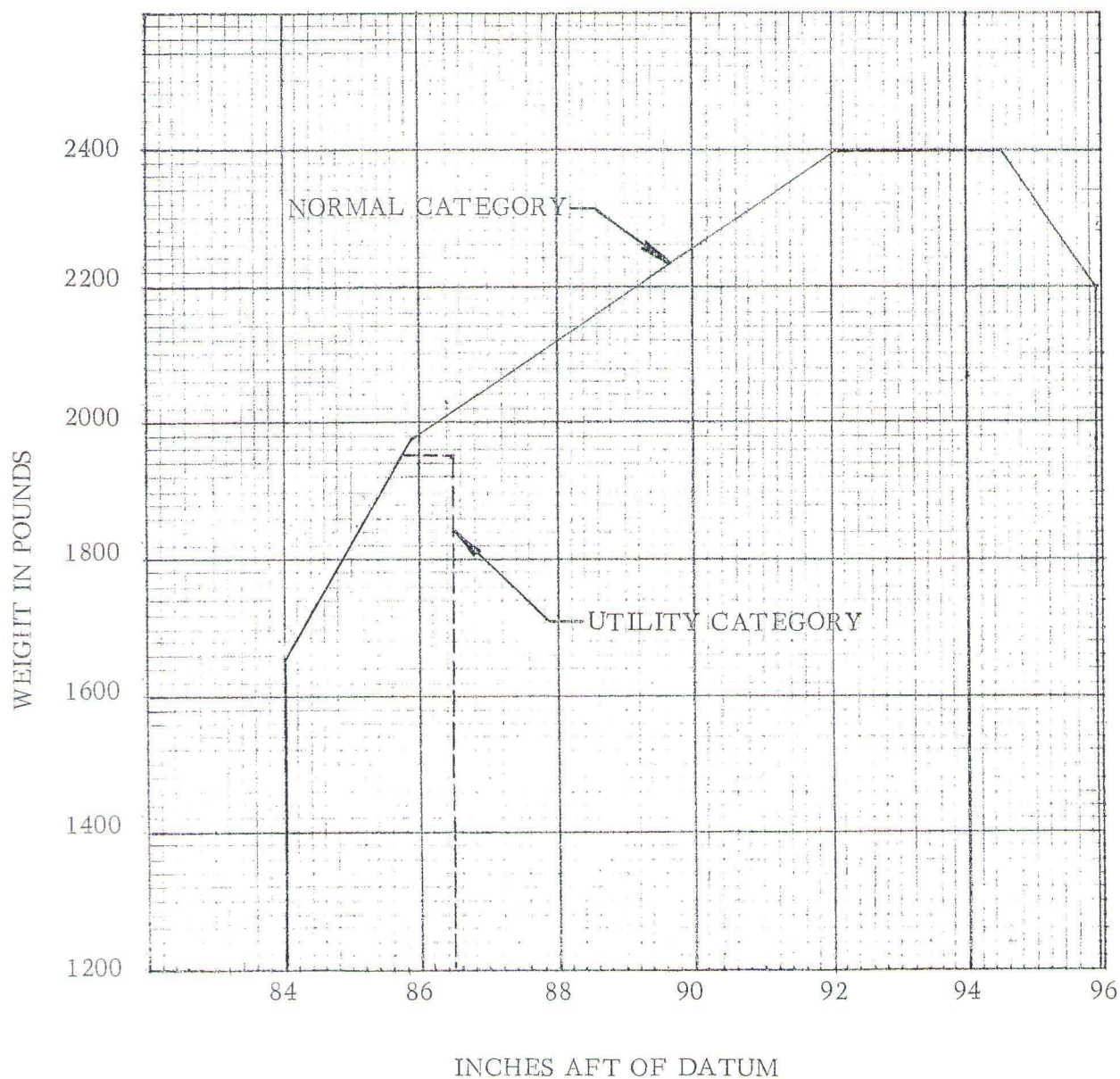
PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight & Balance Data Model PA 28-180
CHECKED		
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LOADING GRAPH



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C. G. RANGE AND WEIGHT



(S/N 671 THRU S/N 5859, INCLUSIVE)

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
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WEIGHT AND BALANCE DATA

WEIGHING PROCEDURE

At the time of delivery, Piper Aircraft Corporation provides each airplane with the licensed empty weight and center of gravity location. This data is on Page 1, Section 1 of this Flight Manual.

The removal or addition of an excessive amount of equipment or excessive airplane modifications can affect the licensed empty weight and empty weight center of gravity. The following is a weighing procedure to determine this licensed empty weight and center of gravity location:

1. PREPARATION

- a. Be certain that all items checked in the airplane equipment list are installed in the proper location in the airplane.
- b. Remove excessive dirt, grease, moisture, foreign items such as rags and tools from the airplane before weighing.
- c. Defuel airplane. Then open all fuel drains until all remaining fuel is drained. Operate engine on each tank until all undrainable fuel is used and engine stops.
- d. Drain all oil from the engine, by means of the oil drain, with the airplane in ground attitude. This will leave the undrainable oil still in the system. Engine oil temperature should be in the normal operating range before draining.
- e. Place pilot and co-pilot seats in fourth (4th) notch, aft of forward position. Put flaps in the fully retracted position and all control surfaces in the neutral position. Tow bar should be in the proper location and all entrance and baggage doors closed.
- f. Weigh the airplane inside a closed building to prevent errors in scale readings due to wind.

2. LEVELING

- a. With airplane on scales, block main gear oleo pistons in the fully extended position.
- b. Level airplane (see diagram) by deflating nose wheel tire, to center bubble on level.

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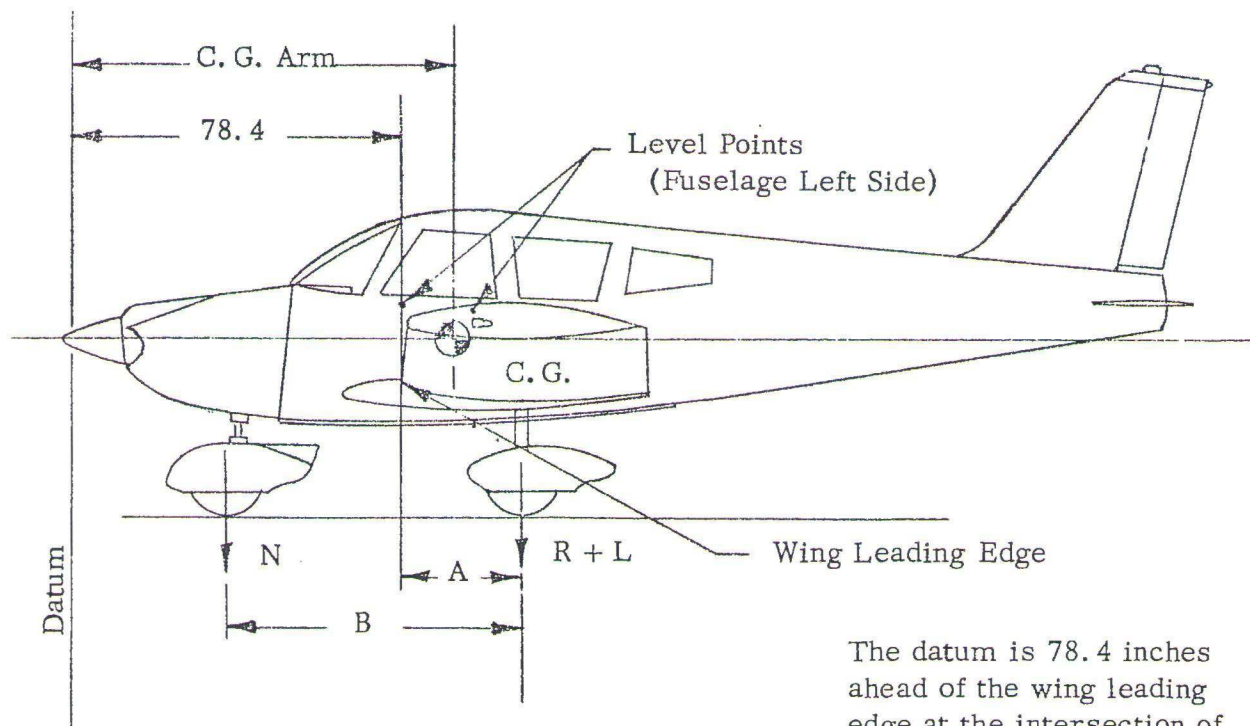
3. WEIGHING - AIRPLANE EMPTY WEIGHT

- a. With the airplane level and brakes released, record the weight shown on each scale. Deduct the tare, if any, from each reading.

Scale Position and Symbol	Scale Reading	Tare	Net Weight
Nose Wheel (N)			
Right Main Wheel (R)			
Left Main Wheel (L)			
Airplane Empty Weight, as Weighed (T)			

4. EMPTY WEIGHT CENTER OF GRAVITY

- a. The following geometry applies to the PA-28-180 D airplane when airplane is level (See Item 2) .



A =

B =

The datum is 78.4 inches ahead of the wing leading edge at the intersection of the straight and tapered section.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
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- b. Obtain measurement "A" by measuring from a plumb bob dropped from the wing leading edge, at the intersection of the straight and tapered section, horizontally and parallel to the airplane centerline, to the main wheel centerline.
- c. Obtain measurement "B" by measuring the distance from the main wheel centerline, horizontally and parallel to the airplane centerline, to each side of the nose wheel axle. Then average the measurements.
- d. The empty weight center of gravity (as weighed including optional equipment and undrainable oil) can be determined by the following formula:

$$\text{C.G. Arm} = 78.4 + A - \frac{B(N)}{T}$$

$$\text{C.G. Arm} = 78.4 + (\quad) - \frac{(\quad) (\quad)}{(\quad)} = \quad \text{inches}$$

5. LICENSED EMPTY WEIGHT AND EMPTY WEIGHT CENTER OF GRAVITY

	Weight	Arm	Moment
Empty Weight (as weighed)			
Unusable Fuel (3 pints)	+ 2.2	103.0	+ 227
Licensed Empty Weight			

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
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WEIGHT AND BALANCE
STANDARD EQUIPMENT LIST
MODEL PA-28-180

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Engine Accessories</u>			
<u> </u>	Engine - Lycoming Model 0-360-A3A	274.4	26.1	7162
<u> X </u>	Engine - Lycoming Model 0-360-A4A	282.4	26.1	7371
<u> X </u>	Fuel Pump, Electric Auxiliary, Bendix Model 478360	1.8	41.8	75
<u> X </u>	Fuel Pump, Engine Drive, Lycoming Drawing No. 73297, 74082, 75148 or 75246	1.6	41.3	66
<u> X </u>	Oil Cooler, Piper Dwg., Harrison #C-8526250	2.6	18.1	47
<u> X </u>	Filter, Fram Model CA-161 PL or AG No. A48C or Purolator AFP-2 Bracket BA-3	.9	20.1	18
<u> </u>	Alternator, 35 Amp., Chrysler No. 2098615	12.5	19.0	238
<u> X </u>	Alternator, 60 Amp., Chrysler No. 2642210 or 2642997	12.5	19.0	238
<u> </u>	Starter-Lycoming 74092 (Delco Remy 1109511) *	18.0	19.5	351
<u> X </u>	Starter-Lycoming 76211 (Prestolite MZ4206) *	18.0	19.5	351
	<u>Propeller and Propeller Accessories</u>			
<u> </u>	Propeller, Sensenich M76EMM or 76EM8	34.5	10.1	348
<u> X </u>	Propeller, Sensenich M76EMMS60 or 76EM8S5-0-60	38.5	8.8	339
<u> X </u>	Spinner and Attachment Plates	4.3	8.0	34

* Included in Engine Weight.

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Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Landing Gear and Brakes</u>			
	Two Main Wheel Assemblies 6.00-6	32.0	109.6	3507
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-28 Brake Assembly No. 30-18			
	(b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes			
<u>X</u>	Two Main Wheel Assemblies	32.3	109.6	3540
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-86 Brake Assembly No. 30-55			
	(b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes			
<u>X</u>	One Nose Wheel 6.00-6	12.5	34.8	435
	(a) Cleveland Aircraft Products Wheel Assembly No. 38501 (Less Brake Drum)			
	(b) One Nose Wheel 4-Ply Rating Tire 6.00-6 with Regular Tubes			
	<u>Electrical Equipment</u>			
<u>X</u>	Stall Warning Device, Safe Flight Inst. Corporation No. C52207-4	.2	80.2	16
	Voltage Regulator, Delco-Remy #118704	1.5	168.5	253
	Voltage Regulator, Chrysler #2098613	.5	57.8	29
<u>X</u>	Voltage Regulator, Wico Electric #X-16300B	.5	57.8	29
	Battery 12V, 25 A.H., Rebat Model S-25	21.5	168.0	3612

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
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	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Instrument</u>			
<u>X</u>	Compass - Piper Drawing 67462	.9	65.7	59
<u>X</u>	Airspeed Indicator, Piper Drawing 63205-2	.6	66.8	40
<u>X</u>	Tachometer, Piper Drawing 62177-3	.7	66.2	46
<u>X</u>	Altimeter, Piper Drawing 67467	1.0	65.9	66
<u>X</u>	Engine Cluster, Piper Drawing 65852-2	.8	67.4	54
	Engine Cluster, Piper Drawing 67441-2	.8	67.4	54
	Engine Cluster, Piper Drawing 95241-4	.8	67.4	54
	Engine Cluster, Piper Drawing 95241-2	.8	67.4	54
	<u>Miscellaneous</u>			
<u>X</u>	Forward Seat Belts (2)	1.5	86.9	130
<u>X</u>	Aft Seat Belts (2)	1.4	123.0	172
<u>X</u>	Flight Manual	-----	-----	-----
<u>X</u>	Tow Bar	1.3	133.0	173

THE ABOVE ITEMS ARE INCLUDED IN THE AIRPLANE STANDARD EMPTY WEIGHT.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 11 Section 1

OPTIONAL EQUIPMENT LIST

MODEL PA-28-180

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Engine Accessories</u>			
<u>X</u>	Vacuum Pump, Airborne Mechanisms Model No. 10-113A1, 113A5 or 200 cc and Drive	5.0	37.0	185
<u>X</u>	Oil Filter - Lycoming No. 74911 (AC of 81A No. 6437032)	3.3	40.5	134
<u>X</u>	Vacuum Regulator and Filter	2.2	57.0	125
	<u>Electrical Equipment</u>			
	Rotating Beacon, Grimes #40-0101-7-12 or Grimes #40-0101-15-12	1.5	263.4	395
<u>X</u>	Landing Light, G. E. Model 4509	.5	18.1	9
<u>X</u>	Navigation Light (Rear)(1) Grimes Model 2064 (White)	.2	281.0	56
<u>X</u>	Navigation Lights (2) Grimes Model A1285 (Red and Green)	.4	106.6	43
	Battery 12V, 35 A.H., Rebat R-33 or R-35 (Weight 27.0 lbs.)	5.5 * 27.0	168.0	924 4536
<u>X</u>	Cabin Light	.3	104.0	31
<u>X</u>	Cabin Speaker	.8	104.0	83
	Rotating Beacon, Whelen Model WRM L-12	1.6	263.4	421

* Weight and moment difference between standard and optional equipment.

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 12 Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Electrical Equipment</u> (Cont'd)			
<u> </u>	Auxiliary Power Receptacle PAC 62355-3	2.7	168.0	454
<u> </u>	External Power Cable PAC 62355-2	4.6	142.8	657
<u> X </u>	Piper Pitch Trim	4.0	158.0	632
<u> X </u>	Heated Pitot Head	.4	100.0	40
<u> X </u>	Strobe Light, Whelen Engineering Co.	2.7 1.6	217.4 203.4	587 421

Instruments

<u> </u>	Suction Gauge-Piper Drawing 67481	.5	67.2	34
<u> </u>	Suction Gauge-U. S. Gauge AW1821AFO3	.5	67.2	34
<u> </u>	Suction Gauge-Airborne Mechanisms 1G3-4	.5	67.2	34

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 13 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u> (Cont'd)			
	Turn and Bank, Piper Drawing 41711-2	2.2	64.9	143
<input checked="" type="checkbox"/>	Rate of Climb, Garwin #22-201-01-1A PAC 67468	1.0	65.9	66
	Directional Gyro, Garwin (3")	2.4	64.7	155
	Directional Gyro, AIM (3")	3.1	64.0	198
<input checked="" type="checkbox"/>	Artificial Horizon, Garwin (3") RC Allen	1.8	64.9 65.6	117 144
	Artificial Horizon, AIM (3")	2.2	64.4	142
<input checked="" type="checkbox"/>	Air Temperature Gauge, Rochester Manufacturing Co., No. 1592-C2 or NHM-70 (Manning, Maxwell & Moore)	.2	82.6	17
<input checked="" type="checkbox"/>	Clock, 8-Day, MIL-C-7939	.4	67.4	27
<input checked="" type="checkbox"/>	Tru-Speed Indicator, PAC 62143-2	Same as Standard Equipment Weight		
<input checked="" type="checkbox"/>	Pictorial Rate of Turn, Mitchell 52D69	1.3	65.3	85
	Brittain Turn Coordinator TC-100(12)	2.6	64.7	168
	Exhaust Gas Temperature	.7	60.4	42
	Attitude Gyro, R. C. Allen (3")	2.2	65.6	144
<input checked="" type="checkbox"/>	Directional Gyro, R. C. Allen (3")	3.3	64.8	214
	Manifold Pressure Gauge, PAC 21962	1.1	65.8	72
	Rate of Climb, Standard Precision SP-1403-(1)-PIP	.5	65.9	33
	Rate of Climb, Karnish #AC-135-3	1.0	65.9	66
	R. C. Allen Turn Coordinator #80-9	2.3	64.7	149

PREPARED		PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180	
CHECKED				
APPROVED		REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 14 Section 1	
Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>AutoPilots</u>			
	AutoControl III			
	Roll Servo, Mitchell #1D363-183R	2.5	122.2	306
	Console, Mitchell #1C338	1.2	65.1	78
	Cables	.7	95.5	67
	Attitude Gyro, Mitchell #52D66 (Garwin)	1.9	64.9	123
	Attitude Gyro, Mitchell #52D66 (AIM)	2.3	64.4	148
	Directional Gyro, Mitchell #52D54P (Garwin)	2.5	64.7	162
	Directional Gyro, Mitchell #52D54P (AIM)	3.2	64.0	205
	Omni Coupler	.9	64.3	58
	<u>AutoFlite</u>			
	Roll Servo, Mitchell #1D363-183R	2.6	122.2	318
	Gyro Amplifier, Mitchell #1C359	1.8	111.8	201
	Cables	1.0	95.5	96
	Panel Unit	.3	67.9	20
X	GPS Garmin GA56 Antenna and cable	0.3	105.0	32
X	Power Flarm System	1.7	83.1	141
X	ELT Arlex ME406 /antenne	2.8	106.2	297
X	COM VHF TRIG T796	2.2	64	141
X	Blind Encoder ACK A-30	1.6	64.7	104
X	GARMIN GTX 328 XPDR	4.2	59.5	250

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 15 Section 1

	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	<u>Radio</u>			
<u> </u>	PM-1 Marker Beacon			
<u> </u>	Receiver	1.1	121.3	133
<u> </u>	Panel Unit	.3	68.1	20
<u> </u>	Cable	.3	85.0	26
<u> </u>	Piper Radio Compass PRC-3	4.5	64.4	290
<u> </u>	Piper VHF Transceiver PTR-1	5.0	64.8	324
<u> </u>	Piper Omni Convertor 0-1	2.5	65.3	163
<u> </u>	King KX150B	9.1	61.9	563
<u> X </u>	Omni Receiving Antenna, Narco VRP-37	1.4	203.0	284
<u> X </u>	VHF Antenna, Transmitting VHF-1	.3	157.8	47
<u> </u>	VHF Antenna, Transmitting VHF-2	.3	192.8	58
<u> X </u>	Cable, VHF-1	.4	118.0	47
<u> </u>	Cable, VHF-2	.5	135.0	68
<u> X </u>	Low Frequency Antenna	.5	167.0	84
<u> </u>	Loop Antenna (PRC-3)	.3	54.5	16
<u> </u>	Omni Tracker (#1D482)	.5	54.9	27
<u> </u>	Narco Mark 12A or Narco Mark 12B			
<u> </u>	Transceiver, Single	6.0	61.9	371
<u> </u>	Transceiver, Dual	12.0	61.9	743
<u> </u>	Modulator-Power Unit, Single	4.0	186.0	744

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data
CHECKED		Model PA-28-180
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 16 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Radio</u> (Continued)			
_____	Modulator-Power Unit, Dual	8.0	186.0	1488
_____	Cable, Single	1.7	120.0	204
_____	Cable, Dual	3.4	120.0	408
_____	Narco VOA-6 Omni Convertor	1.8	64.4	116
_____	Narco VOA-5 Omni Convertor	3.1	64.4	200
_____	Narco VOA-4 Omni Convertor	3.0	64.4	193
_____	Narco VOA-4 Omni Convertor	3.0	64.4	193
_____	Narco ADF-31A, Piper Drawing 67456			
_____	Panel Unit	4.8	63.5	305
_____	Sensor Unit and Doublers	2.2	162.7	358
_____	Sensor Cable	2.3	105.6	243
_____	Sense Antenna and Cable	.4	150.0	60
_____	Bendix ADF-T-12			
_____	Receiver	3.8	65.8	250
_____	Audio Amplifier	.8	56.0	45
_____	Radio Compass	1.7	66.4	113
_____	Loop Antenna	1.2	160.8	193
_____	Cable, Antenna	1.5	108.0	162
_____	Sense Antenna and Cable	.4	150.0	60
_____	Narco VOA-8 Omni Convertor	3.3	64.4	213
_____	Narco VOA-9 Omni Convertor	3.4	64.4	219

PREPARED		PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.		Weight and Balance Data Model PA-28-180	
CHECKED					
APPROVED		REPORT VB-165 OPTIONAL EQUIPMENT LIST		PAGE 17 Section 1	
		ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
Check if Installed	Radio (Cont'd)				
	Narco - UDI-111 DME	8.6	62.6	538	
	Narco Mark III	7.5	62.7	470	
	Narco UDI-4 DME				
	Receiver	8.5	61.7	524	
	Antenna	.3	113.9	34	
	Cable, Antenna	.4	100.0	40	
	UGR-2 Glide Slope				
	Receiver	2.4	173.8	417	
	Cable	2.1	128.0	269	
	Antenna	.4	92.4	37	
	Cable, Antenna	.5	145.0	73	
	Transmitter Selector (Dual VHF Only)	.7	66.3	46	
X	Microphone	.5	75.0	38	
	Headset	.5	65.0	33	
	Junction Box	.6	66.3	40	
	Narco Mark VIII	7.5	62.7	470	
	Narco VOA-50M Omni Convertor	2.1	64.9	136	
	Narco VOA-40 Omni Convertor	1.9	64.9	123	
	Narco VOA-40 Omni Convertor	1.9	64.9	123	
	Narco Mark 16				
	Transceiver, Single	7.5	61.9	464	
	Transceiver, Dual	15.0	61.9	929	

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA-28-180
CHECKED		
APPROVED	REPORT VB-165 OPTIONAL EQUIPMENT LIST	PAGE 18 Section 1

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Miscellaneous</u>			
<input checked="" type="checkbox"/>	Nose Wheel Fairing, Piper Drawing 65348	3.8	34.8	132
<input checked="" type="checkbox"/>	Main Wheel Fairing, Piper Drawing 65237	7.0	109.6	767
<input checked="" type="checkbox"/>	Assist Step	1.8	156.0	281
	Toe Brakes (Dual)	10.5	54.6	573
<input checked="" type="checkbox"/>	Toe Brakes (Single)	5.0	54.6	273
	Fire Extinguisher-Stop Fire #A-20	7.5	93.0	698
	Inertia Safety Belt, (Set of 2)	2.5	111.6	279
<input checked="" type="checkbox"/>	Assist Strap and Coat Hooks	.2	109.5	22
<input checked="" type="checkbox"/>	Lighter	.2	67.9	14
	Fire Extinguisher, Kidde Kompact VI (With Brackets)	5.3	85.0	451
	Adjustable Front Seat (Left)	3.8 *	85.5	325
	Adjustable Front Seat (Right)	3.8 *	85.5	325
	Overhead Vent System	1.2	130.0	156
	Alternate Static Source	.4	66.0	26
	Calibrated Alternate Static Source			
	Placard Required: Yes <input type="checkbox"/> No <input type="checkbox"/>			

TOTAL OPTIONAL EQUIPMENT

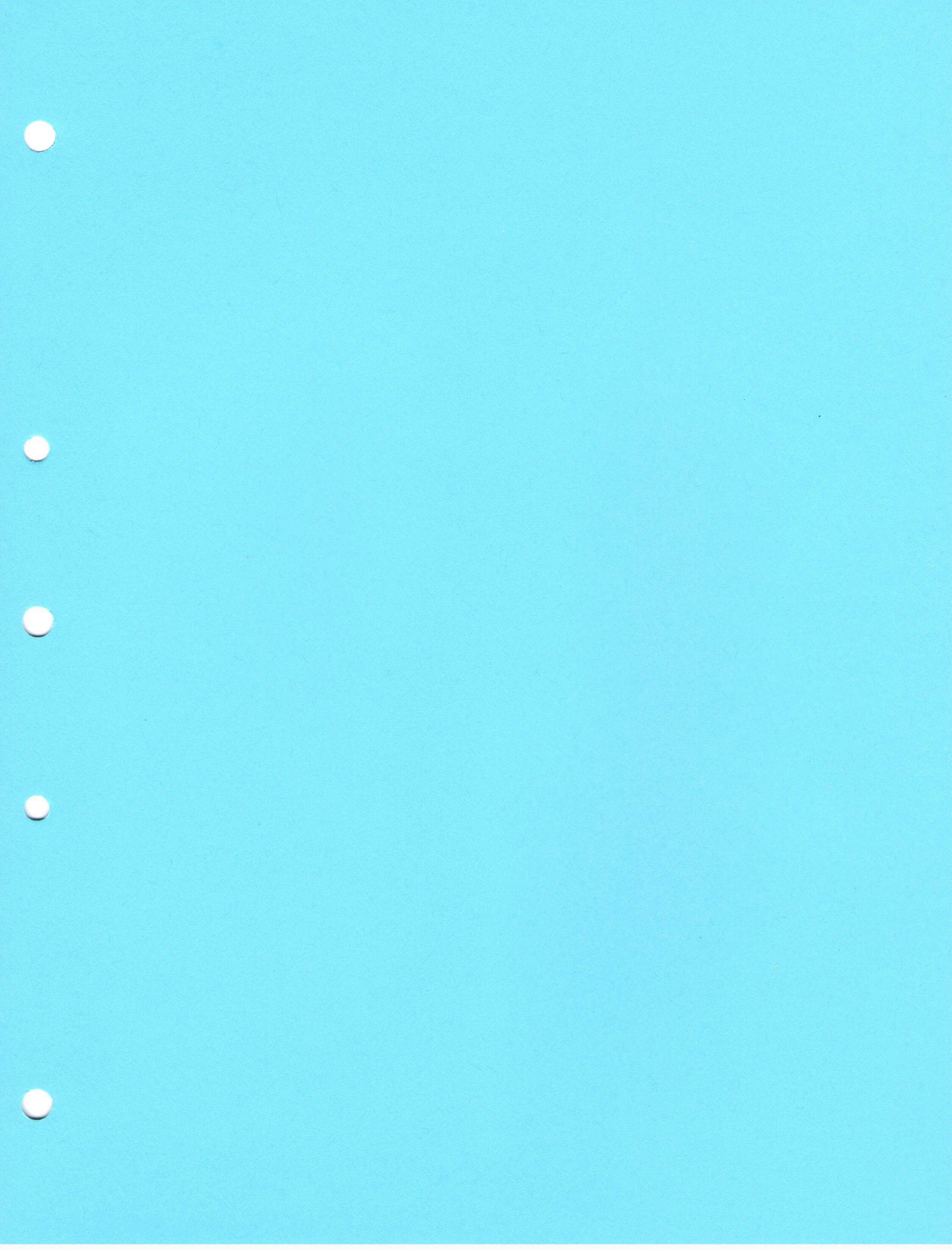
EXTERIOR FINISH

Base Color white Registration No. Color BLUE

Trim Color solid Blue and Gray Type Finish _____

Accent Color _____

* Weight and moment difference between standard and optional equipment.



MADRAS AIR SERVICE
FAA APPROVED AIRPLANE FLIGHT MANUAL SUPPLEMENT
TO
PIPER PA-28-180, PA-28R-180, AND PA-28R-200
FAA APPROVED AIRPLANE FLIGHT MANUAL

The information in this document is FAA approved material which, together with the basic FAA Approved Airplane Flight Manual, is applicable and must be carried in the basic manual when the airplane is modified by the installation of Deemers Super Tips in accordance with Supplemental Type Certificate SA549NW.

The information in this document supersedes the basic manual only where covered by items contained in this supplement. For Limitations, Procedures, and Performance not contained in this supplement, consult the basic manual.

I. LIMITATIONS

No change

II. PROCEDURES

No change

III. PERFORMANCE

The aircraft performance with Deemers Super Tips as installed by STC SA549NW is equal to or better than the original.

IV. LOADING

No change

FAA APPROVED:

Charles C. Schroeder

Chief, Engineering and Manufacturing Branch
Northwest Region

DATE: December 5, 1977

AMENDED DATE: September 24, 1979

AMENDED DATE: January 9, 1980

Hermann LIESE Flugtechnik
Truderingerstr. 2
D-82008 UNTERHACHING
Tel./Fax: 089 6113249

Umrüstanweisung
Schalldämpfer LIESE
V76-L für das Flugzeug
Piper PA-28-151 bis -181

Seite 4
von 4
Ausgabe 3/95

STÜCKLISTE Schalldämpfer Piper PA-28 Z.Nr. LIESE-PA-28-01

2	Befestigungsschelle	2		LIESE-PA-28-03	
1	Schalldämpfer	1		LIESE-PA-28-02	
Nr	Benennung	Stck	Werkst.	Z-Nr/Norm	Abmessung

8.) Anhang zum Flughandbuch: Die untenstehende Seite ist auszuschneiden und dem FBH beizulegen.

Hermann LIESE FLUGTECHNIK
Truderingerstr. 2
D-82008 UNTERHACHING
Tel./Fax: 089 6113249

Anhang zum Flughandbuch
Piper PA28-151,-160,-161,-180 und -181
für die
Schalldämpferanlage LIESE-V76-L

Abschnitt I: Allgemeines

Dieses Flugzeug ist mit einem Schalldämpfer LIESE-V76-L ausgerüstet.

Zur Aufrechterhaltung der Lufttüchtigkeit sind die folgenden Punkte zu beachten.

Abschnitt II: Betriebsgrenzen

unverändert gültig

Abschnitt III: Notverfahren

unverändert gültig.

Abschnitt IV: Normale Verfahren

- 1.) Tägliche Wartung, Vorflugkontrolle.
- 1.1) Befestigung des Schalldämpfers auf festen Sitz prüfen.
- 1.2) Sichtprüfung des Schalldämpfers auf äußere Beschädigungen.

Abschnitt V: Flugleistungen

unverändert gültig

Abschnitt VI: Gewicht und Schwerpunktlage

Durch den Einbau des Schalldämpfers LIESE-V76-L ergibt sich folgende

Änderung: Zusätzliche Masse: 0.9 Kg
bei Station : 0.4 m

Der Einbau des Schalldämpfers LIESE-V76-L ist in das Ausrüstungsverzeichnis aufzunehmen.

WARTUNGANWEISUNG

50 h Kontrolle:

1. Befestigungsschellen auf Zustand und festen Sitz prüfen und gegebenenfalls nachziehen.
2. Sichtprüfung des Schalldämpfers auf Rißbildung.

 FLARM Technology Ltd. Lindenstrasse 4 CH-6340 Baar	AIRCRAFT FLIGHT MANUAL SUPPLEMENT	Date: 2015-05-20 Version: 1 Page: 1 of 18 Document Number: FTD-9-AFMS
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FLARM COLLISION AVOIDANCE SYSTEM

Registration: HB-OZV		Date: 2015-11-30	
	Manufacturer	Type	Serial No.
Aircraft	PIPER AIRCRAFT, INC.	PA-28	28-4613
PowerFLARM			
FLARM Display			

This document must be carried in the aircraft at all times. It describes the operating procedures with FLARM installed.

This supplement must be attached to the approved Aircraft Flight Manual. The information contained in this document supplements or supersedes the basic manual only in those areas listed. For limitations, procedures, performance, and loading information not contained in this supplement, consult the original Aircraft Flight Manual.

This supplement is only approved for the aircraft listed above. The supplement can be validated by scanning the QR Code below.



<https://flarm.com/validate/80b1d3a8>

This Flight Manual Supplement is EASA approved.

Approval Number: 10055051
Date of issue: 08 October 2015

 FLARM Technology Ltd. Lindenstrasse 4 CH-6340 Baar	AIRCRAFT FLIGHT MANUAL SUPPLEMENT	Date: 2015-05-20 Version: 1 Page: 2 of 18
		Document Number: FTD-9-AFMS

Log of Revisions

Ver.	Date	Summary of changes
1	2015-05-20	Initial version

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1 General

General Aviation has been confronted since years with dramatic mid-air collision accidents. With the extreme fine shape and relatively high cruise speed of modern airplanes, the human vision has reached its limit of detection. Another aspect is airspace restrictions for VFR traffic that create an augmentation of traffic density in certain areas, and the associated airspace complexity that requires more pilot attention to the navigation material. These have a direct impact on the probability of a collision affecting powered aircraft, gliders, and rotorcraft operations.

This type of equipment in General Aviation is not required by technical specifications or by operational regulations, but is recognized by the regulators as an important step toward improved aviation safety. Therefore, it is not considered as essential for flight and may be used for **situation awareness only** on basis of non-interference with certified equipment necessary for safe flight and no hazard to persons on board.

Correct antenna installation has a great effect on the transmission/receiving range. The pilot shall ensure that no masking of the antenna occurs, especially when the antennas are located in the cockpit.

FLARM will only warn about other aircraft that are likewise equipped with a compatible device. PowerFLARM Core ADS-B does however also receive ADS-B and Mode-C/S transponder equipped aircraft but is not detected by ACAS/TCAS/TPAS/TAS/PCAS or Air Traffic Control. Likewise, FLARM does not communicate with FIS-B or TIS-B systems.

The firmware must be updated to the latest version at least every 12 months, according to the instructions given in the manual and in the Instructions for Continued Airworthiness. Failure to do so can lead to the device not being able to communicate with other aircraft or not operate at all.

A dedicated switch provides ready disconnection of all equipment connected to the Collision Avoidance System (PowerFLARM Core, FLARM display, and other parts used with the installation) from the electrical bus in case of fumes, fire, interference, or when flying over territories where the SRD/ISM frequency is not available for air-to-air communication. This switch is labeled "FLARM".

By using FLARM you agree to the **End User License Agreement (EULA)** and **Terms of use of FLARM** (part of the EULA) valid at time of use. The EULA that was valid when this AFM Supplement was published can be found in Appendix 1.

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1.1 PowerFLARM Core

PowerFLARM Core is installed behind the instrument panel or as per installer's decision regarding available space. A dedicated USB data loader socket may be installed in the instrument panel.

There are two different PowerFLARM Core models:

- PowerFLARM Core Pure** Only communicates with other FLARM devices.
- PowerFLARM Core ADS-B** Also receives and warns about ADS-B and Mode-C/S transponder equipped aircraft.

For detailed description and instructions, please see the PowerFLARM manual. The latest revision is available from the FLARM website (www.flarm.com).

1.2 FLARM display

The FLARM display is installed in the instrument panel.

For detailed information, refer to the display manufacturer's manual.

The approved displays are listed in the document "FTD-7 Approved displays for PowerFLARM Core" available from the FLARM website (www.flarm.com).

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2 Operating Limitations

1. **This FLARM installation is approved for situation awareness only.** A corresponding placard is installed on the instrumental panel, in proximity of the display.
2. **Maneuvering must not be based solely on the use of information presented on the FLARM display or aural annunciations.** FLARM does not give any guidance on avoiding action. The azimuth and height accuracy of the computed traffic cannot always provide reliable warnings and only the calculated most threatening traffic is announced. Therefore, it is the pilot's responsibility to evaluate by any means traffic position and altitude, obstacle shape, terrain, the meteorological situation, and flying the aircraft at all times, prior to executing any evasive maneuver.

Under no circumstances should a pilot or crewmember adopt different tactics or deviate from the normal principles of safe airmanship.

3. **It is the pilot's responsibility to verify, prior to entering any state's territory, that the SRD/ISM frequency is permitted for use in air-to-air communication.** When such an acceptance does not explicitly or implicitly exist, the equipment shall be turned OFF. This verification is part of flight planning.
4. **The pilot shall not intentionally generate uncoordinated warnings that might frighten pilots of other aircraft.** Any intentional maneuver of this kind has to be carefully coordinated and agreed in advance. Unexpected reactions might be especially hazardous when lateral, vertical, or time separations are small.
5. **The system shall be turned off when operating in IMC.**

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3 Emergency Procedures

In case of **Fire, Smoke, Electrical Burning Smell or Electromagnetic Interference**, follow the Emergency procedure of the basic AFM.

FLARM is normally installed on a non-essential bus. However, on old aircraft it is possible that only an avionics bus or even only a main bus is available for all electrical consumers. The basic Emergency procedure might require this bus to be disconnected, which will generate a total loss of Navigation, Communication and ATC detection. This is classified as a catastrophic failure condition under IMC conditions.

The dedicated FLARM switch will help to rapidly determine if the FLARM installation is faulty or not, allowing resumption of operation of essential equipment as per the Emergency procedure of the basic Aircraft Flight Manual.

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4 Normal Operating Procedures

It is recommended to carry the PowerFLARM manual and the display manual on board the aircraft. To make good use of the information contained in these manuals, the pilot should know the hardware model and the obstacle database currently installed in the PowerFLARM.

4.1 Self-test

To switch on FLARM, the aircraft electrical power shall be available on the corresponding bus and the dedicated FLARM switch must be turned ON.

After switching on, the system performs a self-test routine, lights up all LEDs or the LCD screen, and displays either error codes or version information. The display manual describes how errors and version numbers are shown. If an error is shown, the system is not ready for operation.

When FLARM shifts to normal operation, it waits until it has acquired an adequate GPS position fix. When switching on the device after a long period or in a new location, this procedure can take several minutes. Without a proper GPS position fix, the system is not ready for operation.

Before departure, the pilot must ensure that FLARM has acquired a GPS fix and that no errors are shown (refer to the display manual).

4.2 Presentation of information and collision warnings

FLARM can show and warn about other aircraft, obstacles, and alert zones.

When there is no threat, FLARM can show information about surrounding aircraft. The types of aircraft that are shown (FLARM/ADS-B/Mode-C/S, range limits, etc.) are defined in the settings during installation. How the information is shown is described in the display manual.

When FLARM calculates a risk for an imminent collision, it will give visual and aural warnings. There are three levels of warnings, depending on time to impact. The different warnings start at approximately 18s, 12s, and 8s respectively. The display will show the relative bearing and vertical angle to the intruder (Mode-C/S traffic will only be shown as approximate range and vertical angle). When receiving a warning, immediately identify the intruder visually and take corrective action, if required. Never take corrective action based solely on collision warnings or displayed traffic.

If there are several threats, FLARM will only warn about the calculated most imminent threat.

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Depending on the phase of the flight, FLARM uses different movement models, forecasting methods and warning calculations to provide the pilot with the best possible support without causing a distraction. For example, when a glider is circling, the system sensitivity is reduced. These models and processes have been optimized, but are nevertheless a compromise and may be wrong.

Obstacle collision warnings are always given without bearing, when there is an obstacle in the calculated future flight path. Warnings are only given about obstacles that are in the current database. The database should be update with the AIRAC cycle, or at least once per year.

For detailed information, see the display manual.

4.3 Radio range


Compatible FLARM devices must be within range in order to be able to provide warnings. The range is very much determined by the type, installation and position of the radio antennas, as well as the relative position of the two aircraft. Under optimal conditions, the system can give a range of well over 10 km. Normally, range should be minimum 3-10 km. The radio signals can only be received by line of sight. There is e.g. no FLARM communication between two aircraft on opposite sides of the same mountain. If there is only one FLARM antenna on top of the aircraft, the range directly below the aircraft will be zero or very limited. Using multiple antennas (antenna diversity) is strongly recommended during installation. It is not allowed to install antenna splitters.

4.4 GPS signal quality

FLARM has to know its current position in order to operate. For this reason, FLARM will only operate in the presence of a high quality 3D GPS position. GPS reception is greatly influenced by the installation and position of the GPS antenna and aircraft attitude. This is particularly true during turns, when flying close to mountain slopes, and in areas known for poor reception. If the installation is poor, the GPS signal quality may be reduced. In particular, there can be rapid degradation of height calculations. FLARM resumes operation as soon as the GPS reception quality is adequate.

4.5 Pressurized cabin

PowerFLARM Core ADS-B uses your aircraft's Mode-S transponder altitude in case such is present and operating. This is an important element to verify the GPS position quality and to ensure an accurate and smooth altitude processing. In PowerFLARM Core Pure, or if your aircraft does not have a functioning Mode-S transponder, FLARM will use an internal pressure sensor to determine the pressure

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altitude. In such case, if installed in a pressurized aircraft, the FLARM system will not operate correctly.

4.6 Predicted flight path and accuracy

When two aircraft are close to each other and they are at the same or similar altitude, or if GPS reception is poor, the vertical angle indication is imprecise and might fluctuate.


FLARM calculates the predicted flight path of the aircraft to which it is fitted for the next 20 seconds. This prediction is based on past data, current position- and movement data, plus a movement prediction model that is optimized for the configured aircraft type. This forecast is associated with a number of uncertainties that increase with the extension of the forecast time. There is no guarantee that an aircraft will actually follow the predicted flight path. For this reason, the warnings issued might not be accurate in all cases.

4.7 Effect of wind

The aircraft's track calculated from the GPS position fixes relates to a fixed system of terrestrial coordinates. In strong wind, there may be a substantial to massive difference between aircraft heading and track, leading to a distortion of the threat bearing. If the wind speed is one third of True Airspeed (TAS) and the aircraft heading is perpendicular to the wind, the threat indication displayed has an error of about 18°. If the wind is very strong, the track can deviate up to 180° from the heading. Under such circumstances, the warnings given are unusable.

4.8 Data protection

The transmitter has little control over what the receiver does with the data; especially when the receiver is not a design built according to FLARM's specifications. It is possible that such data may be captured and stored by other aircraft, or by ground stations, or used for other purposes. This opens up a range of possibilities, some of which may be in the pilot's own interest (e.g. automated generation of an aircraft launch logging system, aircraft tracking, or search & rescue), while others may not be (e.g. detecting airspace infringements or failure to take avoiding action prior to a collision). When FLARM makes a transmission, the signal also bears identification elements.

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5 Performance

No change to basic flight manual.

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6 Weight and Balance

No change to basic flight manual.

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7 System description

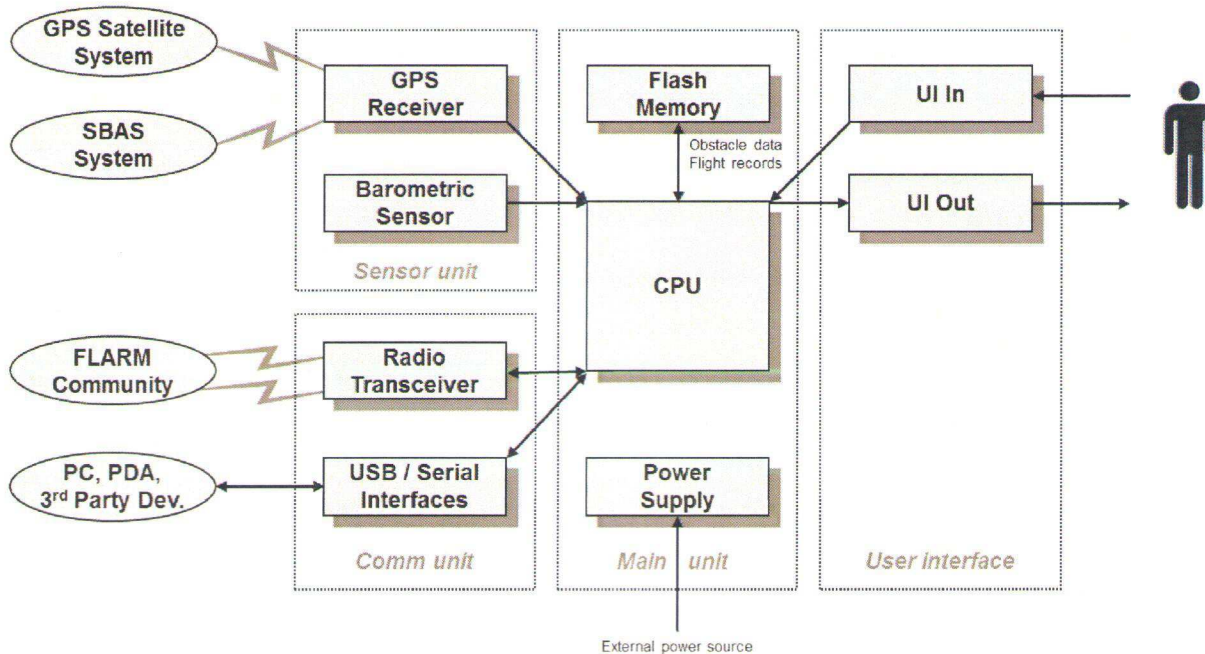
FLARM receives position and movement information from an internal GPS receiver with a GPS antenna usually mounted on the glareshield. A pressure sensor further enhances the accuracy of position measurements. The predicted flight path is calculated by FLARM and the information is transmitted by radio. Provided they are within receiving range, the signals are received by other aircraft also equipped with FLARM devices. The received signal is compared with own predicted flight path by the receiving aircraft. At the same time, FLARM compares own predicted flight path with data on obstacles stored in an optional database.

PowerFLARM Core ADS-B also receives ADS-B and Mode-C/S transponder equipped aircraft.

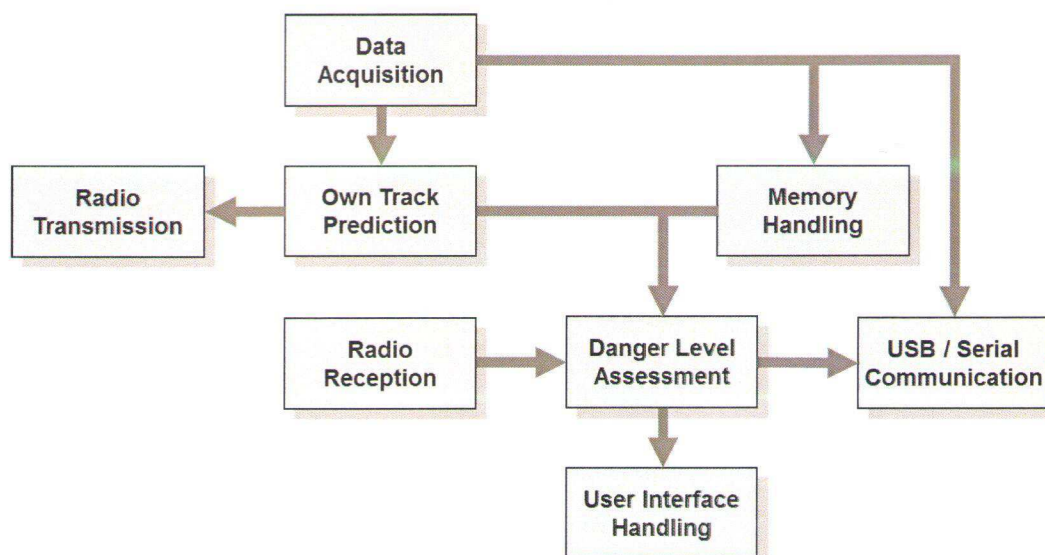
The GPS and collision information received from other aircraft can also be made available for connected equipment (e.g. additional displays, speech synthesizers, and PDAs) via a serial data output.

Obstacle information relating to line obstacles has been simplified. For example, FLARM assumes that a power line is absolutely straight between two fixed points with no slack.

7.1 Hardware scheme



7.2 Software scheme



7.3 Radio transmission

The FLARM system uses a data communication frequency in the SRD860 band or in an ISM band in different parts of the world. Both bands are free to use within prescribed limitations. The bands are however also free to use by anybody else who adheres to the limitations. Because of the limitations in power output, ground based use in these frequency bands does not have an effect on FLARM communication.

There are two versions of PowerFLARM Core. Each version works only in either of the two bands (SRD860 or ISM). The version can be identified from the last letter in the Part No. The letter **E** indicates an SRD860 version and the letter **A** indicates an ISM version. As an example, FLAPFC11**E** indicates an SRD860 version.

The radio transmission protocol employed by FLARM places no limit on the number of devices that may be operated within a given range. An increasing number of devices within range is only associated with a reduction in the probability that a particular coded signal will be received ("graceful degradation"). The probability is small that subsequent signals will not be received from the same transmitter.

The following frequencies are used within the specified areas.

Area	Frequency	Version
Africa	868.2 – 868.4 MHz	E
Australia	917.0 – 926.6 MHz	A
Europe	868.2 – 868.4 MHz	E
Israel	916.2 MHz	A
New Zealand	869.2 MHz	E
North America	902.2 – 927.8 MHz	A
South America	917.0 – 926.2 MHz	A

7.4 Electrical installation

FLARM is normally installed on a non-essential bus. This is not always possible as certain older aircraft only have one avionics bus that is essential when flying under IFR. The FLARM installation is protected with a circuit breaker. A dedicated power switch is provided with this installation to readily disconnect the FLARM installation when required by emergency or operational needs. The pilot must be confident with the electrical bus topology and the FLARM installation.

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8 Continuing airworthiness

8.1 Pre-flight inspection

Inspect the external and internal antennas to ensure that they are clean and not damaged. Power on FLARM and verify that no error occurs during the boot sequence. If an error occurs, switch off FLARM. The flight can be carried out even with FLARM unserviceable.


8.2 Annual maintenance

Annual maintenance is required every 12 months as part of the Aircraft Maintenance Program (AMP). This includes, but is not limited to, installing the newest available firmware for PowerFLARM Core.

The complete instructions are available in "Instructions for Continued Airworthiness" (document FTD-9-60).

8.3 Service life limit / Overhaul

All Parts are "**on condition**".

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Appendix 1 – EULA

END USER LICENSE AGREEMENT

By purchasing or using a FLARM device or by downloading, installing, copying, accessing, or using any FLARM Technology Ltd. (hereafter "FLARM Technology") software, firmware, license key, or data, you agree to the following terms and conditions. If you do not agree with the terms and conditions do not purchase or use the FLARM device and do not download, install, copy, access, or use the software, firmware, license key, or data. If you are accepting these terms and conditions on behalf of another person, company, or other legal entity, you represent and warrant that you have full authority to bind that person, company, or legal entity to these terms and conditions.

If you are purchasing or using a FLARM device, the terms "firmware", "license key", and "data" refer to such items installed or available in the FLARM device at time of purchase or use, as applicable.

1. License and Limitation of use

- 1.1. **License.** Subject to the terms and conditions of this Agreement, FLARM Technology hereby grants to you a non-exclusive, non-transferable right to download, install, copy, access, and use the software, firmware, license key, or data in binary executable form solely for your own personal or internal business operations. You acknowledge that the software, firmware, license key, or data and all related information are proprietary to FLARM Technology and its suppliers.
- 1.2. **Limitation of use.** Firmware, license keys, and data may only be used as embedded in and for execution on devices manufactured by or under license from FLARM Technology. License keys and data may only be used in the specific devices, by serial number, for which they were sold or intended. Software, firmware, license keys, and data with an expiration date may not be used after the expiration date. Right to download, install, copy, access, or use software, firmware, license key, or data with an expiration date does not imply right to upgrade or extension of the license beyond the expiration date. No other licenses are granted by implication, estoppel or otherwise.

2. Terms of use of FLARM

- 2.1. Every FLARM installation must be approved by licensed Part-66 certifying staff or the national equivalent. A FLARM installation requires an EASA Minor Change Approval or the national equivalent.
- 2.2. FLARM must be installed according to the Installation Instructions and the EASA Minor Change Approval, or the national equivalent.
- 2.3. FLARM cannot warn in all situations. In particular warnings may be incorrect, late, missing, not being issued at all, show other threats than the most dangerous or distract the pilot's attention. FLARM does not issue resolution advisories. FLARM can only warn of aircraft that are equipped with FLARM, SSR transponders (in specific FLARM devices), or of up-to-date obstacles stored in its database. The use of FLARM does not allow a change of flight tactics or pilot behavior. It is the sole responsibility of the pilot in command to decide upon the use of FLARM.
- 2.4. FLARM may not be used for navigation, separation, or under IMC.

- 2.5. FLARM does not work if GPS is inoperative, degraded, or unavailable for any reason.
- 2.6. The most recent Operating Manual must be read, understood and followed at all times.
- 2.7. The firmware must be replaced once per year (every 12 months). The firmware must also be replaced earlier if a Service Bulletin or other information is published with such instruction. Failure to replace the firmware may render the device inoperable or incompatible with other devices, with or without warning or notice thereof.
- 2.8. Service Bulletins are published as a Newsletter by FLARM Technology. You are required to sign up for the Newsletter on www.flarm.com to ensure that you are informed of published Service Bulletins. If you are entering into this agreement in a form where your email address is available (e.g. online shop) you may be automatically signed up for the Newsletter.
- 2.9. After power-up, FLARM performs a self-test which must be monitored by the pilots. If a malfunction or defect is observed or suspected, FLARM must be disconnected from the aircraft by maintenance before the next flight and the device inspected and repaired, as applicable.
- 2.10. The pilot in command is solely responsible to operate FLARM according to applicable national regulations. Regulations might include, but are not limited to, airborne usage of radio frequencies, aircraft installation, safety regulations, or regulations for sports competitions.
3. **Intellectual Property.** No part of the software, firmware, license keys, data (including obstacle databases), the FLARM radio protocol and messages, and the FLARM hardware and design may be copied, altered, reverse engineered, decompiled or disassembled without an explicit and written approval by FLARM Technology. Software, firmware, license keys, data (including obstacle databases), the FLARM radio protocol and messages, the FLARM hardware and design, and the FLARM logos and name are protected by copyright, trademark and patent laws.
4. **Manipulation.** It is forbidden to intentionally feed artificially generated signals to the FLARM device, its GPS antenna or the external/internal GPS antenna connections.
5. **FLARM Data and Privacy**
 - 5.1. FLARM devices receive, collect, store, use, send, and broadcast data to enable the system to work, improve the system, and to enable troubleshooting. This data may include, but is not limited to, configuration items, aircraft identification, own positions, and such data of other aircraft. FLARM Technology may receive, collect, store, and use this data for said purposes and in addition for Search and Rescue (SAR) purposes.



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- 5.2. FLARM Technology may share data with its partners for aforementioned purposes. FLARM Technology may in addition publicly make available data from a FLARM device (Flight Tracking), unless the FLARM device in question has been configured to limit tracking. If a FLARM device has been configured to limit tracking, SAR and other services may not be available.
- 5.3. Data sent or broadcast by FLARM devices may only be used at own risk and under the same conditions as the FLARM device itself. FLARM Technology is not responsible for any third party device, software, or service receiving, collecting, storing, using, sending, broadcasting, or making publically available data regardless of whether legally or illegally.
6. **Warranty, Limitation of Liability, and Indemnification**
- 6.1. **Warranty.** FLARM devices, software, firmware, license keys, and data are provided on an "as is" basis without warranty of any kind — either expressed or implied — including, without limitation, any implied warranties of merchantability or fitness for a particular purpose. FLARM Technology does not warrant the performance of the device, software, firmware, license key, or data or that the device, software, firmware, license key, or data will meet your requirements or operate error free.
- 6.2. **Limitation of Liability.** In no event shall FLARM Technology be liable to you or any party related to you for any indirect, incidental, consequential, special, exemplary, or punitive damages (including, without limitation, damages for loss of business profits, business interruption, loss of business information, loss of data or other such pecuniary loss), whether under a theory of contract, warranty, tort (including negligence), products liability, or otherwise, even if FLARM Technology has been advised of the possibility of such damages. In no event will FLARM Technology's total aggregate and cumulative liability to you for any and all claims of any kind arising hereunder exceed the amount of fees actually paid by you for the device, license keys or data giving rise to the claim in the twelve months preceding the claim. The foregoing limitations will apply even if the above stated remedy fails of its essential purpose.
- 6.3. **Indemnification.** You will, at your own expense, indemnify and hold FLARM Technology, and all officers, directors, and employees thereof, harmless from and against any and all claims, actions, liabilities, losses, damages, judgments, grants, costs, and expenses, including reasonable attorneys' fees (collectively, "Claims"), arising out of any use of a FLARM device, software, firmware, license key, or data by you, any party related to you, or any party acting upon your authorization.
7. **General terms**
- 7.1. **Governing Law.** This Agreement shall be governed by and construed in accordance with the internal law of Switzerland (to the exclusion of Swiss Private International Law and of international treaties, in particular the Vienna Convention on the International Sale of Goods dated April 11, 1980).
- 7.2. **Severability.** If any term or provision of this Agreement is declared void or unenforceable in a particular situation, by any judicial or administrative authority, this declaration shall not affect the validity or enforceability of the remaining terms and provisions hereof or the validity or enforceability of the offending term or provision in any other situation. To the extent possible the provision will be interpreted and enforced to the greatest extent legally permissible in order to effectuate the original intent, and if no such interpretation or enforcement is legally permissible, shall be deemed severed from the Agreement.
- 7.3. **Headings.** The Article and Section headings contained in this Agreement are included for reference purposes only and shall not affect the meaning or interpretation of this Agreement.
- 7.4. **No Waiver.** The failure of either party to enforce any rights granted hereunder or to take action against the other party in the event of any breach hereunder shall not be deemed a waiver by that party as to subsequent enforcement of rights or subsequent actions in the event of future breaches.
- 7.5. **Amendments.** FLARM Technology reserves the right, in its sole discretion, to amend this Agreement from time to time by posting an updated version of the Agreement on www.flarm.com, provided that disputes arising hereunder will be resolved in accordance with the terms of the Agreement in effect at the time the dispute arose. We encourage you to review the published Agreement from time to time to make yourself aware of changes. Material changes to these terms will be effective upon the earlier of (i) your first use of the FLARM device, software, firmware, license key, or data with actual knowledge of such change, or (ii) 30 days from publishing the amended Agreement on www.flarm.com. If there is a conflict between this Agreement and the most current version of this Agreement, posted at www.flarm.com, the most current version will prevail. Your use of the FLARM device, software, firmware, license key, or data after the amended Agreement becomes effective constitutes your acceptance of the amended Agreement. If you do not accept amendments made to this Agreement, then it is your responsibility to stop using the FLARM device, software, firmware, license key, and data.
- 7.6. **Governing Language.** Any translation of this Agreement is done for local requirements and in the event of a dispute between the English and any non-English versions, the English version of this Agreement shall govern.