

PREPARED	PIPER AIRCRAFT CORP. DEVELOPMENT CENTER, VERO BEACH, FLA.	Weight and Balance Data Model PA 28-140
CHECKED		
APPROVED		PAGE <u>1</u> Section <u>1</u>

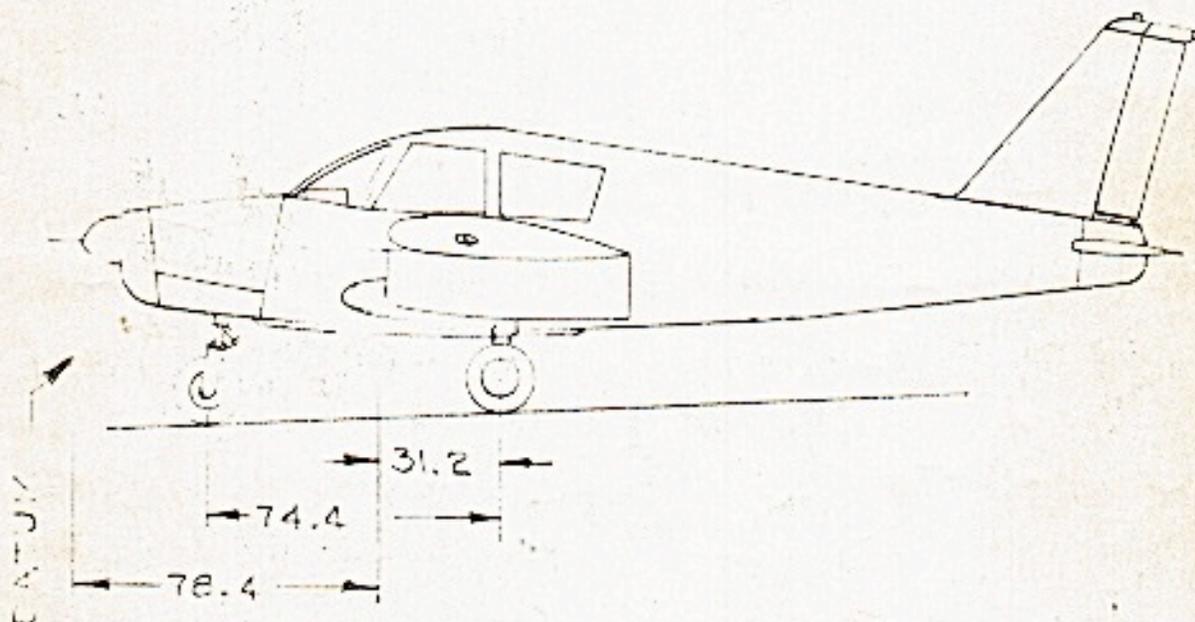
ACTUAL WEIGHT AND BALANCE

MODEL PA 28-140

SERIAL NUMBER 28- 20542

CERTIFICATE NUMBER N-6469W

DATE 9-12-67



EMPTY WEIGHT AS WEIGHED (INCLUDES ITEMS CHECKED ON EQUIPMENT LIST)

LEFT WHEEL 128.00

RIGHT WHEEL 128.00

NOSE WHEEL 125.00

TOTAL 1281.00

*Supervisor
FAA 337 dated
7-20-76
Joe [Signature]*

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WEIGHT AND BALANCE
STANDARD EQUIPMENT LIST
MODEL PA 28-140

Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
	<u>Engine Accessories</u>			
X	Engine - Lycoming Model O-320-E2A	272.0	26.1	7099
X	Fuel Pump, Electric Auxiliary, Bendix Model 478360	1.8	41.8	75
X	Fuel Pump, Engine Driven, Lycoming Dwg. No. 73297, 74082, 75148 or 75246	1.6	41.3	66
X	Oil Cooler, Piper Dwg. Harrison #C-8526250	2.6	18.1	47
	Filter, Fram Model CA-161PL or AC No. A48C or Purolator AFP-2	.9	20.1	18
X	Starter - Lycoming #69952 (Delco Remy #1109657)	16.5	19.5	322
X	Starter - Lycoming #76210 (Prestolite MZ 4204)	16.5	19.5	322
X	Alternator, 35 Amp., Chrysler No. 2098615	12.5	19.0	238
	<u>Propeller and Propeller Accessories</u>			
X	Propeller, Sensenich M74DM58	30.0	10.1	303
X	Spinner and Attachment Plates	2.0	8.0	16
	<u>Landing Gear and Brakes</u>			
X	Two Main Wheel Assemblies 6.00-6 (a) Cleveland Aircraft Products (2) Wheel Assembly No. 40-86 (2) Brake Assembly No. 30-55 (b) Two Main 4-Ply Rating Tires 6.00-6 with Regular Tubes	32.0	109.6	3507
X	One Nose Wheel 6.00-6 (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	14.0	34.3	480

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Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
	<u>Electrical Equipment</u>			
<u>X</u>	Stall Warning Device, Safe Flight Inst. Corp. No. C52207-4	.2	80.2	16
<u>X</u>	Voltage Regulator, Chrysler No. 2098613	.5	57.8	29
<u>X</u>	Battery 12V., 25 A.H., Rebat Model S-25	21.5	114.9	2470
	<u>Instruments</u>			
<u>X</u>	Compass - Airpath No. C2350-L41	.9	66.6	60
	Airspeed Indicator, PAC 63205	.6	67.7	41
	Tachometer, AC 1548302	.8	67.7	54
<u>X</u>	Tachometer, Stewart Warner PAC 62177	.7	67.7	47
	Altimeter, Aero Marine No. 522	1.4	66.8	94
<u>X</u>	Engine Cluster - Piper Dwg. 63922	.8	68.8	55
	Engine Cluster - Piper Dwg. 63922-2	.8	68.8	55
	<u>Miscellaneous</u>			
<u>X</u>	Fwd. Seat Belts	1.0	86.9	87
<u>X</u>	Flight Manual	-----		-----
	TOTAL			
	AIRCRAFT AVERAGE EMPTY WEIGHT AS CALCULATED (INCLUDES ITEMS CHECK ON STANDARD EQUIPMENT LIST)	-----	-----	-----

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OPTIONAL EQUIPMENT LIST
MODEL PA 28-140

Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
	<u>Engine Accessories</u>			
<u>X</u>	Vacuum Pump, Airborne Mechanisms Model No. 10-113A1 or 113A5 or 200 cc	3.6	36.3	131
<u>X</u>	Starter - Lycoming 74092 (Delco Remy 1109511)	18.0	19.5	351
	Starter - Lycoming 76211 (Prestolite MZ 4206)	18.0	19.5	351
	Oil Filter - Lycoming #74911 (AC 81-A #6437032)	2.0	36.3	73
	<u>Electrical Equipment</u>			
<u>X</u>	Rotating Beacon, Grimes Model D7080	2.0	263.4	527
<u>X</u>	Landing Light, G. E. Model 4509	.5	18.1	9
<u>X</u>	Navigation Lights (2) Grimes Model A1285 Red and Green	.4	106.6	43
<u>X</u>	Navigation Light (Rear) (1) Grimes Model 2064 (White)	.1	280.9	28
	Battery 12V., 35 A.H. Reading R-35	27.0	114.9	3102
	Roll Servo Mitchell 1X221E-CH-1	2.8	60.6	170
	Console Amplifier and Cables Mitchell 1X214E	1.8	66.6	120
<u>X</u>	Cabin Light and Speaker	1.1	99.4	105
	Rotating Beacon, Whelan Model WRM L-12	1.6	263.4	421
<u>X</u>	Auxiliary Power Receptacle 65529	2.6	126.0	328
<u>X</u>	External Power Cable 62355-7	4.6	129.0	593
	Piper AutoControl - Mitchell #AKO85	4.5	60.0	270
	Piper Pitch Trim	3.0	158.0	474

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Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
	<u>Instruments</u>			
<u>X</u> <input checked="" type="checkbox"/>	Turn and Bank, Pioneer A-5	1.5	66.4	100
<u>X</u> <input checked="" type="checkbox"/>	Suction Gauge, AN5771-11	.4	68.1	27
<u> </u>	Suction Gauge, U. S. Gauge AW1821AFO3	.4	68.1	27
<u> </u>	Suction Gauge, Airborne Mech. 163-4	.4	68.1	27
<u>X</u> <input checked="" type="checkbox"/>	Altimeter, AN5760-2 (C-12 or C-13)	Same as Standard Equipment Weight		
<u> </u>	Rate of Climb, Pioneer C-7	1.4	66.8	94
<u>X</u> <input checked="" type="checkbox"/>	Rate of Climb, AN5825	1.4	66.8	94
<u>X</u> <input checked="" type="checkbox"/>	Directional Gyro, AN5735-1A	2.5	66.6	167
<u>X</u> <input checked="" type="checkbox"/>	Artificial Horizon, AN5736-1A	2.7	66.1	179
<u>X</u> <input checked="" type="checkbox"/>	Air Temperature Gauge, Rochester Manufacturing Co., No. 1592-C2	.2	82.6	17
<u>X</u> <input checked="" type="checkbox"/>	Clock, 8 Day - MIL-C-7939	.4	68.3	27
<u> </u>	Directional Gyro, Mitchell #52B15E (Auto Pilot)	4.3	66.6	286
<u> </u>	Artificial Horizon, Mitchell #52B9 (Auto Pilot)	4.5	66.1	298
<u> </u>	Piper Course Selector PAC 31058	3.0	66.6	200
<u> </u>	Tru-Speed Indicator, PAC 62143	Same as Standard Equipment Weight		

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Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM (INCHES)	MOMENT (POUND- INCHES)
	<u>Instruments</u>			
	AutoControl II			
	Roll Servo, Mitchell #1X221E-CH-1	2.8	60.6	170
	Console, Mitchell #1X224E-3	1.3	66.6	87
	Directional Gyro, Mitchell #52B15E	4.3	66.6	286
	or Directional Gyro, Course Selector PAC Dwg. 31058-2	3.0	66.6	200
	Artificial Horizon, Mitchell #52B9	4.5	66.1	298

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Check if Installed	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
	<u>Radio</u>			
	Piper Radio Compass PRC-3	4.5	64.4	290
	Piper VHF Transceiver PTR-1	5.0	64.8	324
X	Piper Omni Convertor O-1	2.5	65.3	163
	King KX150A	9.1	62.8	572
X	Omni Receiving Antenna, Narco VTP-37	1.2	203.0	243
X	VHF Transmitting Antenna, Narco VTP-17	.7	131.0	92
	Low Frequency Antenna	.5	167.0	84
	Loop Antenna (PRC-3)	.3	54.5	16
X	Narco Mark 12A VHF Transceiver	9.0	59.4	535
	Narco VOA-6 Omni Convertor	1.8	65.3	118
	Narco VOA-5 Omni Convertor	2.9	65.3	189
	Narco VOA-4 Omni Convertor	2.9	65.3	189
	Narco Omnigator VTR-2A Installation (Less Ant.)	14.0	58.0	812
	Marker Antenna	1.2	64.8	78
	Narco Mark III	7.5	63.5	476
	Piper Radio Compass PRC-4	4.9	64.4	316
	Loop Antenna (PRC-4)	.4	112.6	45
	Piper Omni Convertor OL-1	2.8	65.3	183

	ITEM	WEIGHT (LBS.)	ARM AFT DATUM	MOMENT
Check if Installed	<u>Radio (Cont'd.)</u>			
_____	Narco ADF-31 (Panel Unit)	4.8	64.4	309
_____	Loop Antenna (ADF-31)	2.5	114.9	287
_____	Loop Cable (ADF-31)	2.3	89.0	205
	<i>NARCO AT-52A TRAWsponder</i>	<i>2.75</i>	<i>64.0</i>	<i>176.0</i>
	<i>NARCO "L" loop antenna</i>	<i>1.2</i>	<i>121.6</i>	<i>24.32</i>
	<i>wiring</i>	<i>11.0</i>	<i>90.0</i>	<i>90.0</i>
	<u>Miscellaneous</u>			
_____	Fire Extinguisher - Stop Fire #A-20	7.5	93.0	698
_____	Nose Wheel Fairing	3.3	34.3	113
_____	Main Wheel Fairing	7.4	109.6	811
_____	Toe Brakes (Dual)	10.5	54.6	574
<u>X</u>	Toe Brakes (Single)	5.0	54.6	273
<u>X</u>	Assist Step	1.8	156.0	281
<u>X</u>	Jump Seat (2)	16.5	118.0	1947
_____	Inertia Safety Belt PAC 65766	2.5	111.6	279
	TOTAL	_____	_____	_____
	AIRCRAFT EMPTY WEIGHT	_____	_____	_____
	OPTIONAL EQUIPMENT	_____	_____	_____
	LICENSED EMPTY WEIGHT TOTAL	_____	_____	_____
	EMPTY C. G. AFT DATUM IS _____			

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IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY. THE EMPTY WEIGHT C. G. IS FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO FORM FAA-337 WHEN ALTERATIONS HAVE BEEN MADE.

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 weight 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 all weight and balance requirements.

Note: With Optional Jump Seats installed, aft passenger weight is restricted only by Airplane Weight and Balance limitations (See page 10 of this Section).
Baggage capacity is limited to 200 pounds by tie-down requirements.

SAMPLE LOADING PROBLEM (NORMAL CATEGORY)

	WEIGHT (LBS.)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
LICENSED EMPTY WEIGHT	1305.05	84.48	110255.75 ⁶⁻⁶⁻⁹⁸
OIL (2 GAL.)	15	32.5	488
PILOT & PASSENGER	340	85.5	29070
PASSENGERS (AFT) *	340	117.0	39780
FUEL (29.0 GAL.)	174	95.0	16530
BAGGAGE *	0	117.0	

TOTAL LOADED
AIRPLANE

X 2174.05 ^{NO CAN DO! 2150 max}

197123.75

$$\frac{194650.52}{2150.00} = 90.54$$

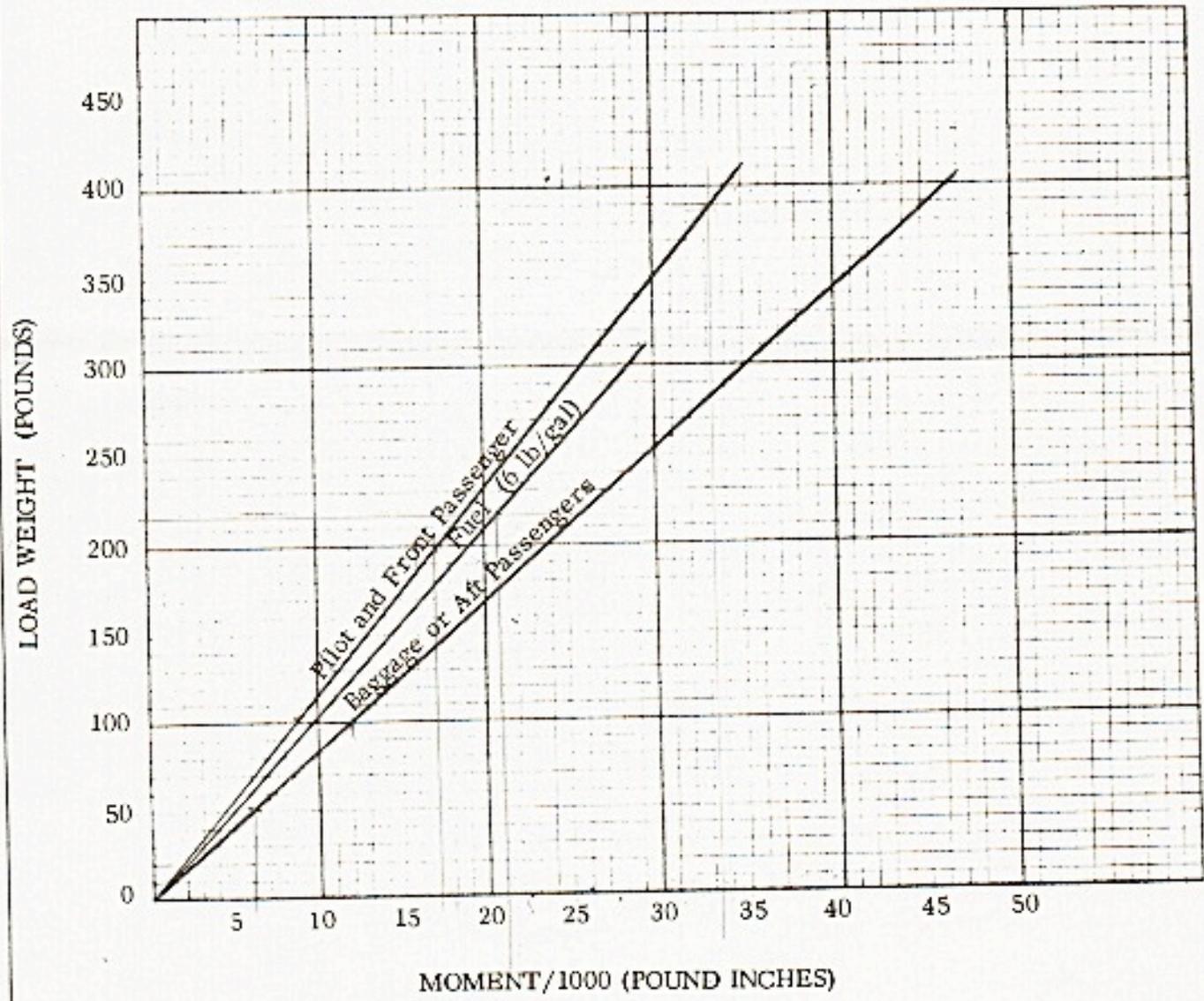
INCHES (ARM AFT DATUM)

LOCATE THIS POINT (90.54) ON THE C. G. RANGE AND WEIGHT GRAPH. SINCE THIS POINT FALLS WITHIN THE C. G. ENVELOPE THE LOADING MEETS ALL WEIGHT AND BALANCE REQUIREMENTS.

* UTILITY CATEGORY OPERATION - NO BAGGAGE OR AFT PASSENGERS ALLOWED.

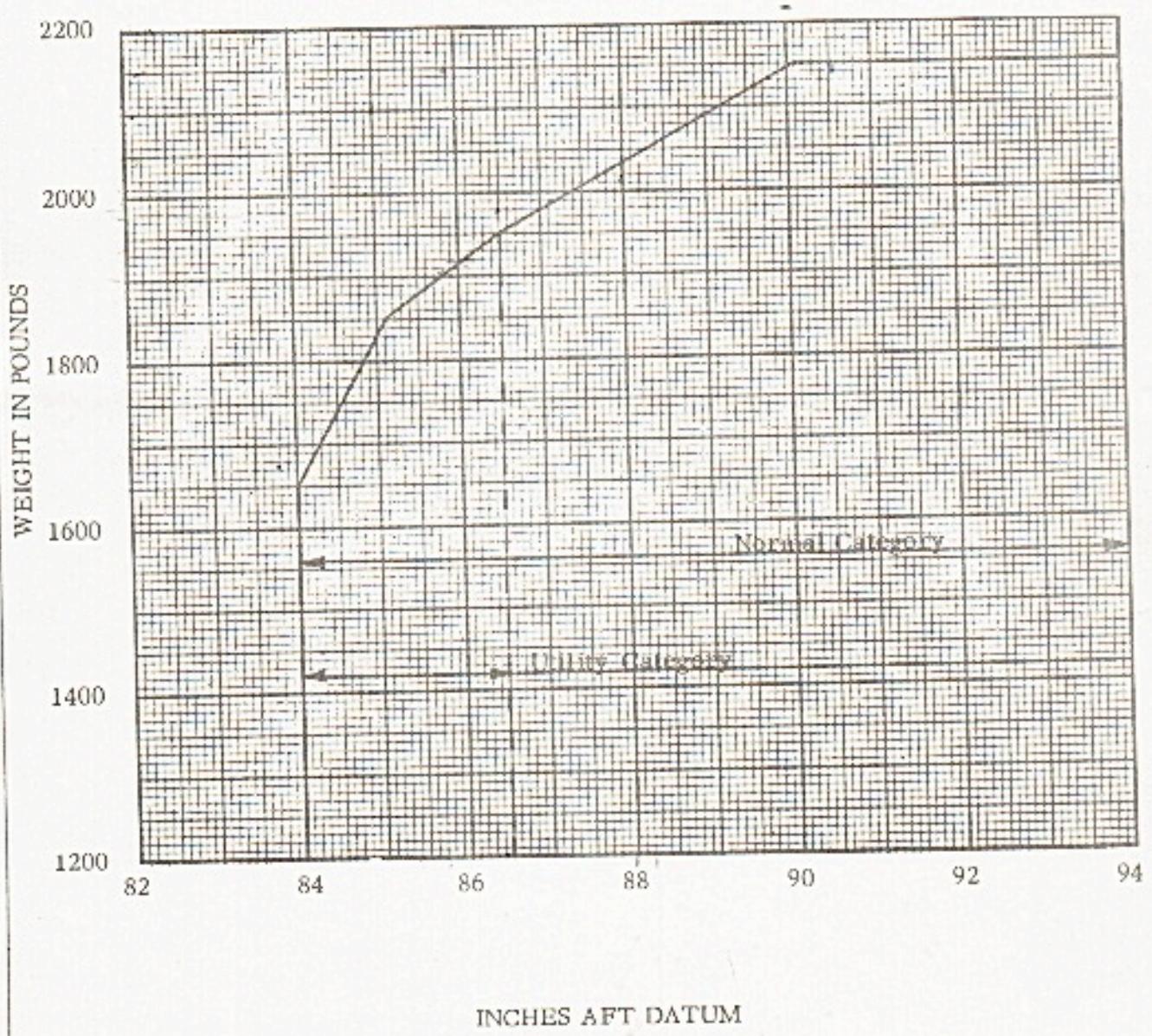
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LOADING GRAPH



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C. G. RANGE AND WEIGHT



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AIRPLANE FLIGHT MANUAL

MODEL PA-28-140

N-6469W

SERIAL NUMBER 28-20542

FAA APPROVED:

H. E. Waterman
H. E. Waterman
Supervisor, EMDO 42
FAA Southern Region
Atlanta, Georgia

DATE:

February 14, 1964

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Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	1	Deleted Propeller - And Static RPM - Information	<i>for</i> <i>H. E. Waterman</i> H. E. Waterman Supervisor SO-EMDO-42	3/24/64
2	1	Added Static R.P.M. Information	<i>for</i> <i>H. E. Waterman</i> H. E. Waterman Supervisor SO-EMDO-42	5/25/64
3	3	Placards Section: Added Placard No. 4	<i>H. E. Waterman</i> H. E. Waterman Supervisor SO-EMDO-42	7/8/64
4	2	Maneuvers Section: Deleted Stalls in Utility Category	<i>H. C. Faller</i> H. C. Faller Supervisor SO-EMDO-43	8/31/64
5c	2,3	Increased Gross Weight to 2150 and Baggage Capacity to 200 Lbs.	<i>H. C. Faller</i> H. C. Faller Supervisor SO-EMDO-43	5/21/65
6	1	Limitations Section: Revised Oil Temperature and Fuel Pressure Range	<i>for</i> <i>Robert H. Lauer</i> H. C. Faller Supervisor, SO-EMDO-43	6/23/65
7	1	Static RPM Corrected	<i>for</i> <i>Robert H. Lauer</i> H. C. Faller Supervisor SO-EMDO-43	8/12/65
8	1	Revised Static RPM, Oil Temperature and Fuel Pressure Limitations	<i>for</i> <i>H. T. Herold</i> H. C. Faller Supervisor SO-EMDO-43	12/13/65
	2	Added Note to Maximum Weight Callout		
	3	Revised Placard No. 4		

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Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
9	3	Procedure Section. Added Item No. 4 "Electric Pitch Trim Procedures"		
	4	Added Page 4	<i>H. C. Valler</i> H. C. Valler Supervisor SO-EMDO-43	3/16/66
10	4	Add Procedures Section And Item 5		
	3	Added Placard No. 5	<i>H. C. Valler</i> H. C. Valler Supervisor SO-EMDO-43	5/20/66

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Piper Model PA 28-140
Normal and Utility Categories

FAA Identification No. _____

Serial No. _____

AIRPLANE FLIGHT MANUAL

1. Limitations Section. The following limitations must be observed in the operation on this airplane:

Engine Lycoming O-320-E2A
 Engine Limits For all operations 2700 rpm, 150 Hp.
 Fuel 80/87 Octane Aviation Fuel
 Propeller Sensenich M74DM, Maximum diameter 74 inches. Minimum diameter 72 1/2 inches. Static RPM at Maximum permissible throttle setting:
 2150 - 2425 for Maximum allowable weight of 1950 lbs.
 2275 - 2425 for Maximum allowable weight of 2150 lbs.
 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 20,000 to 20,550).
 Oil temperature: GREEN arc (normal operating range) 75° F. to 245° F.; RED line (maximum) 245° F. (S/N 20,551 and Up).
 Oil pressure: GREEN arc (normal operating range) 60 psi to 85 psi; YELLOW arc (caution range) 25 psi to 60 psi; RED line (minimum) 60 psi; RED line (maximum) 85 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 20,000 to 20,550).
 Fuel Pressure: GREEN arc (normal operating range) .5 psi to 8 psi; RED line (minimum) .5 psi; RED line (maximum) 8 psi (S/N 20,551 and Up).

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

Airspeed Limits	Never Exceed	171
(Calibrated Airspeed)	Maximum structural cruise	140
(Miles per Hour)	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.

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Maximum Weight 2150 Lbs. (See Limitations Section for Static RPM limits.)

Baggage Capacity 200 Lbs.

C. G. Range The datum used is 78.4 inches ahead of the 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)
2150	90.1	94.0
1950	86.5	94.0
1850	85.1	94.0
1650	84.0	94.0

2. Utility Category

Weight (Pounds)	Forward Limit (In. aft of datum)	Rearward Limit (In. aft of datum)
1950	86.5	86.5
1850	85.1	86.5
1650	84.0	86.5

Straight line variation between given points.

Note: It is the responsibility of the airplane owner and/or the pilot to insure that the airplane is properly loaded. See weight and balance section for loading information.

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

	Entry Speed
Spins (Flaps Up)	Stall
Steep Turns	129
Lazy Eights	129
Chandelles	129

Placards

1. On the instrument panel 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.

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Placards (Cont'd)

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 aft side of baggage compartment: "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. 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.
5. 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."

Airspeed Instrument Markings	RED radial line	Never Exceed	171 mph (148 knots)
	YELLOW arc	Caution Range (Smooth Air Only)	140 to 171 mph (121 to 148 knots)
	GREEN arc	Normal Operating Range	64 to 140 mph (56 to 121 knots)
	WHITE arc	Flaps Down Range	55 to 115 mph (48 to 100 knots)

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2. Procedures Section

1. The stall warning system is inoperative with the master switch off.
2. The electric fuel pump must be on for both takeoff and landing.
3. Except as noted above, all operating procedures for this airplane are normal.
4. (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 10° pitch change and 30 Ft. altitude variation.
5. (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 60° bank, and 100' altitude loss.
 - e. In approach configuration malfunction, 1 second delay results in 10° bank and 0' altitude loss.

3. Performance Section

All performance is given for a weight of 2150 pounds.

Loss of altitude during stalls can be as great as 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	64	66	73	80	91
Flaps Down	55	--	--	--	--

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Rev. No. 10