WEIGHT AND BALANCE CALCULATIONS

Aircraft Manufacturer:

Owner's Name:
and Address

Serial Number: **28-7305325**
Model: **pa28-180**
Registration: **N55167**

Moment Arms (Measured):

Main Wheels	**110**	in.
Fuel		in.
Nose Wheel	**29.8**	in.

Maximum Gross Weight:	2450 **lb.**	
Maximum Forward C.G. Limit:	83 **in.**	aft of datum.
Maximum Aft C.G. Limit:	93 **in.**	aft of datum.

Empty Center of Gravity Calculation (includes oil and coolant)

Location	*Scale*	*Tare*	*Net Weight*	*Arm*	*Moment*
Left Wheel	555.0 lb.	lb.	555.0 lb.	110 in.	60828 in-lb
Right Wheel	562.2 lb.	lb.	562.2 lb.	110 in.	61617 in-lb
Nose Wheel	417.8 lb.	lb.	417.8 lb.	29.8 in.	12450 in-lb
Totals:	1645		**1535.0** lb.		**134896** in-lb

Empty C of G = Total Moment / Total Weight = **87.9** in.

Notes:

a. Datum is

b. Fuselage is level per TDCS.

c. Weighing conducted inside

I certify that this data has been prepared in accordance with AC43.13-1B and to the best of my knowledge represents the true empty weight and centre of gravity of this aircraft.

Signed: W. [signature]
AME 2691573

Dated: 14 Sept 2005

REPORT VB-439

WEIGHT & BALANCE DATA

AND

EQUIPMENT LIST

MODEL PA-28-180

DATE May 17, 1972

APPLICABLE TO SERIAL NUMBERS 28-7305001 THROUGH 28-7305601

AND SERIAL NUMBER 28-E13

Log of Revisions

REVISION NO.	PAGE	DESCRIPTION	APPROVED	DATE
1	All	Retyped Entire Report		
	1	Rephrased Empty Weight Definition		
	10	Replaced Altimeter 99009-2, -3, -4 or -5 with PS50008-2 or -3		
	13	Replaced Turn Coordinators 99001 and 99004 and Turn and Bank 99005 with Turn and Slip PS50030-2 or -3		
		Manifold Pressure Gauge changed from 99006 to PS50031-3 or -4		
	19	Corrected King KT76/78 and King KMA-20 Weights, Arms, and Moments	N. Tennant	3 AUG. 1972
2	4	Corrected Graph of Flight Envelope	Moldovan	21 Aug. 1972
3	8	Corrected Engine, Fuel Pump, Oil Cooler and Air Filter Weights, Arms and Moments.		
	16	Corrected COMM Antenna Cable Arms and Moments.		
	16a	Added Page and Anti Static Kit	N. Tennant	30 NOV 1972
4	15	Added King KX-175, KN-73, KN-77 and KNI-520 Installations	N. Tennant	25 JAN 1973
5	15	Corrected KX-175 (2nd) Moment	N. Tennant	30 JAN 1973
6	TITLE	Added Serial Number Effectivity	N. Tennant	12 Sept. 1973
7	TITLE	Added Serial Number 28-E13	[signature]	14 May 1974

WEIGHT AND BALANCE DATA

MODEL PA-28-180 CHEROKEE

Airplane Serial Number 28-7305325

Registration Number _____

Date _____

AIRPLANE EMPTY WEIGHT

Item		Weight (lbs)	x C.G. Arm (Inches Aft of Datum)	= Moment (In-Lbs)
*Empty Weight	Actual Computed			
Unusable Fuel (13-1/3 pints)		10.0	103.0	1030
Standard Empty Weight				
Optional Equipment				
Licensed Empty Weight				

*Empty weight is defined as dry empty weight (including paint and hydraulic fluid) plus 1.8 lbs. undrainable engine oil

AIRPLANE USEFUL LOAD

	(Gross Weight)	-	(Licensed Empty Weight)	= Useful Load
Normal Category:	(2450 lbs)	-	(lbs)	= lbs.
Utility Category:	(1950 lbs)	-	(lbs)	= lbs.

THIS LICENSED EMPTY WEIGHT, C.G. AND USEFUL LOAD FOR THE AIRPLANE AS DELIVERED FROM THE FACTORY. REFER TO APPROPRIATE AIRCRAFT RECORD 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 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)

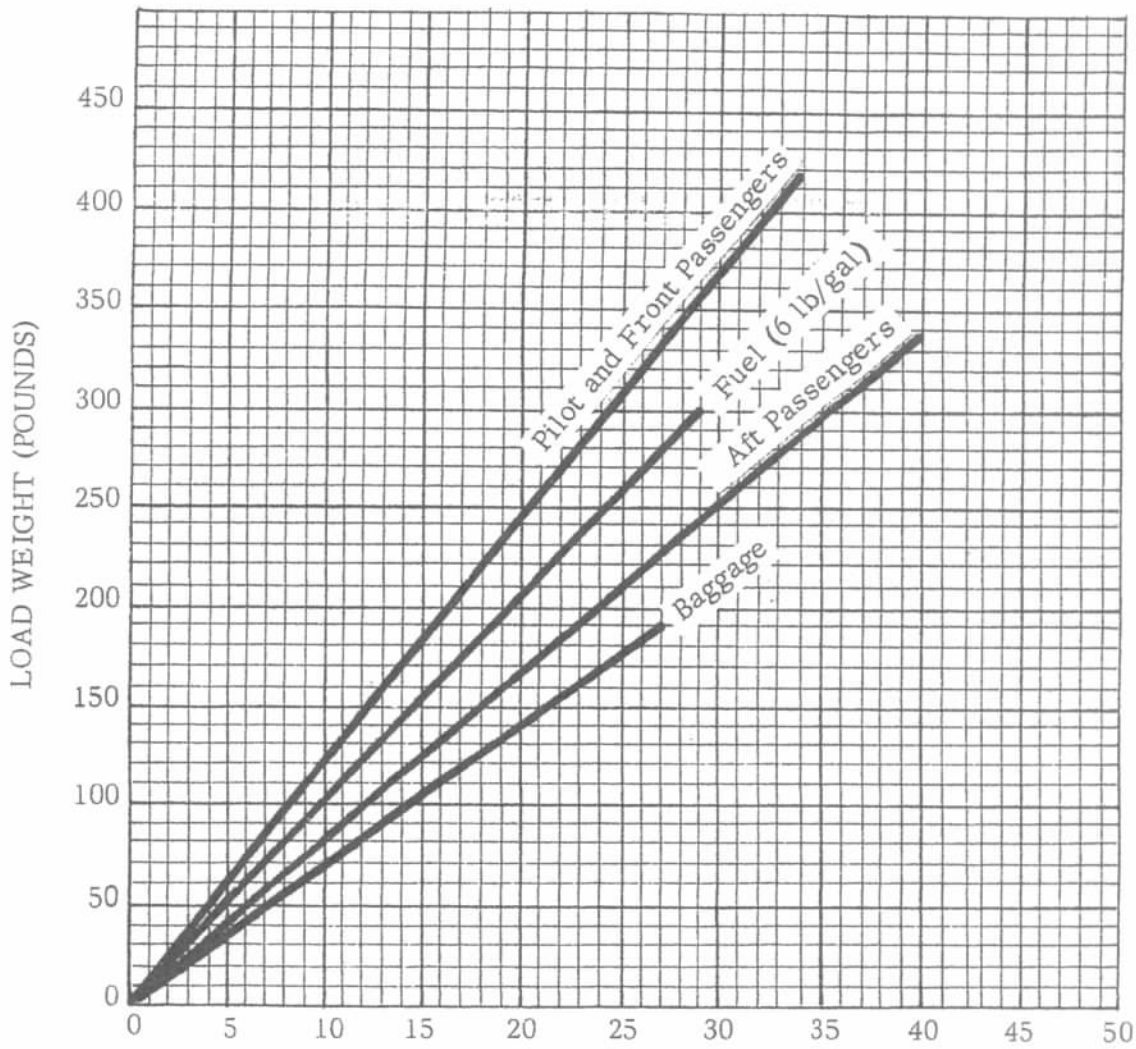
	Weight (lbs)	Arm Aft Datum (Inches)	Moment (In - lbs)
Licensed Empty Weight			
Oil (8 quarts)	15	27.5	413
Pilot and Front Passenger	340	80.5	27370
Passengers, Aft* (Rear Seat)	340	118.1	40154
Fuel (50 Gal. Maximum)		95.0	
Baggage *		142.8	
Total Loaded Airplane			

The center of gravity (C. G.) of this sample loading 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.

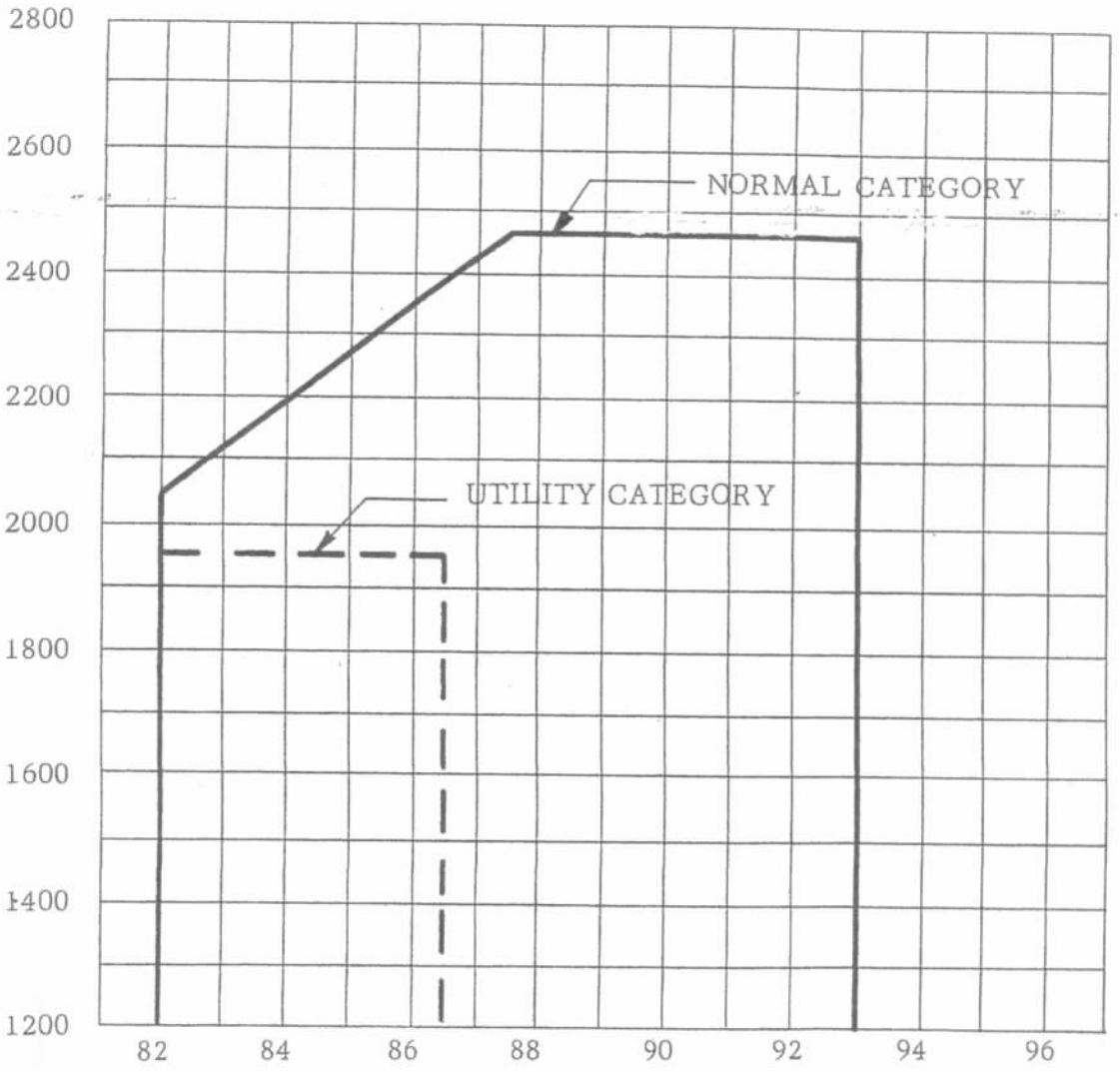
IT IS THE RESPONSIBILITY OF THE PILOT AND AIRCRAFT OWNER TO INSURE THAT THE AIRPLANE IS LOADED PROPERLY.

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

LOADING GRAPH



C. G. RANGE AND WEIGHT



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 report.

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 the 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.

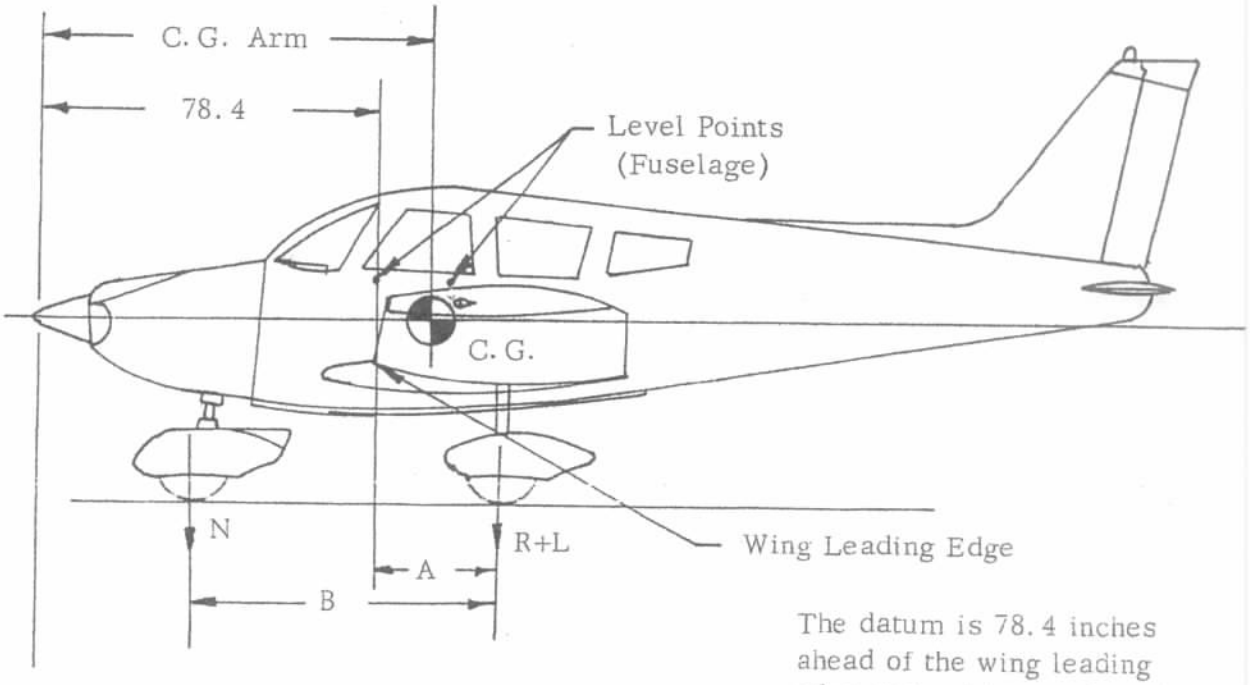
3. WEIGHING - AIRPLANE EMPTY WEIGHT

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 airplane when airplane is level (See Item 2).



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

A =

B =

b. Obtain measurement "A" by measuring from a plumb bob dropped from one 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 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 (13-1/3 pints)	+10.0	103.0	+1030
Licensed Empty Weight			

WEIGHT AND BALANCE
STANDARD EQUIPMENT LIST
MODEL PA-28-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Engine Accessories			
_____	Engine - Lycoming Model 0-360-A4A	288.9	21.1	6096
_____	Fuel Pump, Electric Auxiliary, Bendix Model 478360	1.8	36.8	66
_____	Fuel Pump, Engine Driven, Lycoming Dwg. No. 73297, 74082, 75148 or 75246	1.7	36.3	62
_____	Oil Cooler, Piper Dwg., Harrision #C-8526250	1.9	41.3	78
_____	Air Filter, Fram Model CA-161 PL or Purolator AFP-2	.9	29.5	27
_____	Alternator, 60 Amp., Chrysler No. 2642997	12.5	14.0	175
_____	Starter-Lycoming 76211 (Prestolite MZ4206)*	18.0	14.5	261
	Propeller and Propeller Accessories			
_____	Propeller, Sensenich 76EM8S5-0-60	38.5	3.8	146
_____	Spinner and Attachment Plates	4.3	3.0	13

* Included in Engine Weight.

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Landing Gear and Brakes			
_____	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			
_____	One Nose Wheel 6.00-6	12.8	29.8	381
	(a) Cleveland Aircraft Products Wheel Assembly No. 40-76B (Less Brake Drum)			
	(b) One Nose Wheel 4-Ply Rating Tire 6.00-6 with Regular Tube			
	Electrical Equipment			
_____	Stall Warning Device, Safe Flight Instrument Corporation No. C52207-4	.2	80.2	16
_____	Voltage Regulator, Wico Electric #X-16300B	.5	51.9	26
_____	Battery 12V, 25A.H., Rebat Model S-25	21.5	168.0	3612
_____	Overvoltage Relay, Wico Electric No. X16799	.5	55.4	28

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Instrument			
_____	Compass - Piper Dwg. 67462	.9	59.9	54
_____	Airspeed Indicator, Piper Dwg. 63205-2	.6	61.8	37
_____	Tachometer, Piper Dwg. 62177-3	.7	61.2	43
_____	Altimeter, Piper PS50008-2 or -3	1.0	60.9	61
_____	Engine Cluster, Piper Dwg. 95241-4	.8	62.4	50
_____	Engine Cluster, Piper Dwg. 95241-2	.8	62.4	50
	Miscellaneous			
_____	Forward Seat Belts (2) . 75 lbs. each	1.5	81.9	123
_____	Inertia Safety Belts (2) 0.9 lbs. each	1.8	119.6	215
_____	Rear Seat Belts (2) .70 lbs. each	1.4	123.0	172
_____	Rear Seats (2)	22.8	124.2	2832
_____	Flight Manual	---	---	---
_____	Tow Bar	1.3	161.8	210
_____	Nose Wheel Fairing - Piper Dwg. 65348	3.8	29.8	113
_____	Main Wheel Fairings - Piper Dwg. 65237	7.0	109.6	767

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

OPTIONAL EQUIPMENT LIST
MODEL PA-28-180

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Engine Accessories			
_____	Vacuum Pump, Airborne Mfg. Co. Model No. 10-113A1, 113A5, or 200cc and Drive	5.0	32.0	160
_____	Oil Filter - Lycoming No. 75528 (AC #OF5578770)	3.3	35.5	117
_____	Vacuum Regulator	.7	52.0	36
_____	Vacuum Filter	.3	52.0	16
	Electrical Equipment			
_____	Rotating Beacon, Grimes #40-0101-15-12	1.5	263.4	395
_____	Landing Light, G.E. Model 4509	.5	13.1	7
_____	Navigation Lights (2) Grimes Model A1285 (Red and Green)	.4	106.6	43
_____	Navigation Light (Rear) (1) Grimes Model 2064 (White)	.2	281.0	56
_____	Battery 12V, 35 A.H. Rebat R-35 (Weight 27.0 lbs.)	5.5	* 168.0	924

*Weight and moment difference between standard and optional equipment.

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Electrical Equipment (continued)			
_____	Cabin Light	.3	99.0	30
_____	Cabin Speaker	.8	99.0	79
_____	Auxiliary Power Receptacle, Piper Dwg. 65647	2.7	178.5	482
_____	External Power Cable 62355-2	4.6	142.8	657
_____	Piper Pitch Trim	4.3	155.3	668
_____	Heated Pitot Head	.4	100.0	40
_____	Red Strobe Light, Whelen Engineering Co.			
_____	Power Supply, Whelen Model HS	2.3	198.0	455
_____	Light (Fin Tip)	.4	263.4	105
_____	Cable	.4	230.7	92
_____	Red/White Strobe Light, Whelen Engineering Co.			
_____	Power Supply, Whelen Model HD, T3	3.0	198.0	594
_____	Light (Fin Tip)	.4	263.4	105
_____	Cable	.4	230.7	92
_____	Lights (Wing Tip) (2)	.3	106.6	32
_____	Cables	2.0	115.6	231

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Instruments			
_____	Suction Gauge, Piper Dwg. 99480-0 or -2	.5	62.2	31
_____	Vertical Speed, Piper Dwg. 99010-2, -4 or -5	1.0	60.9	61
_____	Attitude Gyro, Piper Dwg. 99002-2, -3, -4 or 05	2.2	59.4	131
_____	Directional Gyro, Piper Dwg. 99003-2, -3 -4, or -5	2.6	59.7	155
_____	Air Temperature Gauge, Piper Dwg. 99479 -0 or -2	.2	72.6	15
_____	Clock Piper Dwg. 99478	.4	62.4	25
_____	Tru-Speed Indicator, Piper Dwg. 62143-2 or -13	(Same as Standard Equipment Weight)		
_____	Turn and Slip Indicator, Piper PS50030-2 or -3	2.6	59.7	155
_____	Manifold Pressure Gauge, Piper PS50031-3 or -4	.9	60.8	55
_____	Exhuast Gas Temperature, Piper Dwg. 99026	.7	55.4	39

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	AutoPilots			
_____	Autocontrol III			
_____	Roll Servo, #1C363-1-183R	2.5	122.2	306
_____	Console, #1C338	1.2	60.1	72
_____	Cables	.7	95.5	67
_____	Attitude Gyro, #52D66	2.3	59.4	137
_____	Directional Gyro, #52D54	3.2	59.0	189
_____	Omni Coupler, #1C388	.9	59.3	53
_____	AutoFlite II			
_____	Roll Servo, #1C363-1-183R	2.5	122.2	306
_____	Cable	.7	93.4	65
_____	Panel Unit, #52D75-3 or -4	2.4	59.4	143

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio			
_____	Narco Mark 16 (VHF Comm/Nav)			
_____	Transceiver, Single	7.5	56.9	427
_____	Transceiver, Dual	15.0	56.9	854
_____	Narco VOA-50M Omni Converter	2.1	59.9	126
_____	Narco VOA-40 (M) Omni Converter	1.9	59.9	114
_____	Narco VOA-40 Omni Converter	1.9	59.9	114
_____	Narco Comm 10A VHF Transceiver	3.9	57.4	224
_____	Narco Comm 11A VHF Transceiver	3.6	57.4	207
_____	Narco Dual Comm 11A VHF Transceiver	7.1	57.4	408
_____	Narco Nav 10 VHF Receiver	1.9	58.6	111
_____	Narco Nav 11 VHF Receiver	2.8	58.6	164
_____	Narco Nav 12 VHF Receiver	3.4	58.6	199
_____	Narco Dual Nav 11 VHF Receiver	5.6	58.6	328
_____	King KX-175 VHF Transceiver	9.4	56.6	532
_____	King KN-73 Glideslope Receiver	3.2	184.3	590
_____	King KN-77 VOR/LOC Converter	3.4	183.5	631
_____	King KNI-520 VOR/ILS Indicator	1.7	60.5	103
_____	King KX-175 VHF Transceiver (2nd)	8.6	56.6	487
_____	King KN-77 VOR/LOC Converter	4.2	183.5	771
_____	King KNI-520 VOR/ILS Indicator	1.7	60.5	103

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio (continued)			
_____	Genave 200A (VHF Comm/Nav)	5.9	57.7	340
_____	Genave 300 (VHF Comm/Nav)	5.9	57.7	340
_____	Genave Alpha 360	5.0	56.9	285
_____	Genave Theta 100	1.6	59.6	95
_____	King KX 170/175 ( ) (VHF Comm/Nav)			
_____	Transceiver, Single	7.5	56.6	425
_____	Transceiver, Dual	15.0	56.6	849
_____	King KI 201 ( ) VOR/LOC Ind.	2.5	59.6	149
_____	King Dual KI 201 ( ) VOR/LOC Ind.	5.0	59.9	300
_____	King KI 211 ( ) VOR/LOC/GS Ind.	3.3	59.9	198
_____	Nav Receiving Antenna	.5	265.0	133
_____	Cable, Nav Antenna	.9	157.0	141
_____	#1 VHF Comm Antenna	.3	157.8	47
_____	Cable, Antenna #1 VHF	.4	103.4	41
_____	#2 VHF Comm Antenna	.3	192.8	58
_____	Cable, Antenna #2 VHF	.5	120.9	60

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio (continued)			
_____	Anti Static Kit			
_____	#1 VHF Comm Antenna	1.0	160.8	161
_____	Cable #1 VHF Comm Antenna	0.4	103.4	41
_____	#2 VHF Comm Antenna	1.0	195.8	196
_____	Cable #2 VHF Comm Antenna	0.5	120.9	60
_____	Low Frequency Antenna	0.5	147.5	74
_____	Static Wicks	------	-----	-----

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio (continued)			
_____	Narco ADF-31			
_____	Panel Unit	5.0	58.5	293
_____	Sensor Unit	2.5	162.7	407
_____	Sensor Cable	2.3	100.6	231
_____	Sense Antenna and Cable	.4	150.0	60
_____	Bendix ADF-T-12C			
_____	Bendix ADF-T-12D			
_____	Receiver	3.5	59.4	208
_____	Audio Amplifier	.8	52.4	42
_____	Servo Indicator	1.7	60.9	104
_____	Loop Antenna	1.3	160.8	209
_____	Cable, Interconnecting	2.3	108.0	248
_____	Sense Antenna and Cable	.4	150.0	60
_____	King KR-85			
_____	Receiver	4.3	59.4	255
_____	Servo Indicator	1.2	61.3	74
_____	Loop Antenna	1.3	161.5	210
_____	Loop Cable	1.8	108.0	194
_____	Audio Amplifier	.8	51.0	41
_____	Sense Antenna and Cable	.4	150.0	60

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio (continued)			
	PM-1 Marker Beacon			
	Receiver	1.1	121.3	133
	Remote Unit	.3	128.4	39
	Cable	.3	80.0	24
	UGR-2 Glide Slope			
	Receiver	2.4	173.8	417
	Cable	1.8	128.0	230
	Antenna	.4	87.4	35
	Cable, Antenna	.5	145.0	73
	Narco AT6-A Transponder			
	Panel Unit	2.0	59.4	119
	Remote Unit	5.7	203.0	1157
	Antenna and Cable	.3	197.0	59
	Cable, Interconnecting	.4	133.7	53

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Radio (continued)			
_____	Narco AT50 Transponder			
_____	Panel Unit	* 3.0	57.3	172
_____	King KT76/78 Transponder			
_____	Panel Unit	3.1	58.1	180
_____	Antenna & Cable	---	--	---
_____	King KMA-20 Audio Panel	2.8	60.2	169
_____	Antenna	.5	116.3	58
_____	Cable	.4	87.5	35

* Weight includes Antenna and Cable

Check if Installed	ITEM	WEIGHT (LBS)	ARM AFT DATUM (INCHES)	MOMENT (POUND-INCHES)
	Miscellaneous (continued)			
_____	Lighter	.2	62.9	13
_____	Assist Strap and Coat Hook	.2	109.5	22
_____	Overhead Vent System	1.2	130.0	156
_____	Alternate Static Source	.4	61.0	24
	Calibrated Alternate Static Source			
	Placard Required: Yes _____ No _____			
_____	Headrest (2) (Front)	2.2	94.5	208
_____	Headrest (2) (Rear)	2.2	132.1	291
_____	Air Conditioning Installation 99575-0	67.4	102.8	6929
_____	Zinc Chromate Finish	5.0	158.0	790
	TOTAL OPTIONAL EQUIPMENT			

EXTERIOR FINISH

Base Color _____ Registration No. Color _____

Trim Color _____ Type Finish _____

Accent Color _____