(k) Instruments
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
192	Control Wheel Digital Clock Piper Dwg. 87347-3	X	0.3	71.9	22
193	Outside Air Temperature Gauge Piper Dwg. 79316-0 (Dresser Industries P/N NHM-70)	X	0.2	72.6	15
195	Gyro Suction Gauge Piper Dwg. 99480-0 (Airborne P/N 1G10-1) or (AN Std. P/N AN577-11)	X	0.5	62.2	31
197	Vacuum Regulator (Airborne P/N 2H3-19)	X	0.6	49.6	30
199	Vacuum Filter Piper Dwg. 66673-0 (Airborne P/N 1J7-1)	X	0.3	49.6	15

(l) Autopilots
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
205	AutoFlite II				
	Cert. Basis STC SA3162SW-D	____	5.6	91.8	514
207	AutoControl IIIB	X	9.6	77.6	745
	a. Directional Gyro 52D54	X	2.9	60.0	174
	b. Omni Coupler IC-388	X	1.0	60.3	60
	Cert. Basis STC SA3161SW-D				
209	AltiMatic IIIC	____	24.3	147.7	3589
	a. Directional Gyro 52D54	____	2.9	60.0	174
	b. Omni Coupler IC-388	____	1.0	60.3	60
	c. G/S Coupler IC-493	____	1.4	53.1	74
	Cert. Basis STC SA3323SW-D				
211	Century 21 Autopilot				
	Cert. Basis - STC SA3352SW	____	12.0	69.0	828

(l) Autopilots
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
213	Century 41 Autopilot	______	23.0	122.0	2806
	a. Horizon Indicator 52D267	______	2.8	59.3	166
	b. Steering Horizon 52D177	______	3.3	59.1	195
	c. Steering Horizon 52C77	______	3.7	58.8	218
	d. Directional Gyro 52D254	______	3.3	59.4	166
	Cert. Basis - STC SA3359SW				

(m) Radio Equipment
(Optional Equipment)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
219	Bendix - AS-2015A-7 or -9 Audio Panel	_____	1.0	66.4	66
221	Bendix - CN 2013-1 Comm/Nav Cert. Basis - TSO C34c, C35d, C36c, C37b, C38b, C40a	_____	7.5	61.4	461
223	Bendix - CN 2013-2 Com/Nav w/G.S. Receiver Cert. Basis - TSO C34c, C35d, C36c, C37b, C38b, C40a	_____	8.2	61.4	504
225	Bendix - CN 2013-4 Com/Nav w/G.S. Receiver & M.B. Receiver	_____	8.5	61.4	522
227	Bendix - ADF 2070 Cert. Basis - TSO C41c, C2a	_____	6.0*	105.0	630
229	Bendix - TR 2060 Transponder Cert. Basis - TSO C74c	_____	2.8*	63.6	178
231	Bendix - CN 2011 Dual Com/Nav Cert. Basis - TSO C34c, C35d, C37b, C40a	_____	16.8	66.8	1122

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
233	Bendix - IN 2014B Indicator				
	a. Single	_____	1.9	63.4	121
	b. Dual	_____	3.8	63.4	241
	Cert. Basis - TSO C36c, C40a, C66c				
235	Bendix DME 2030				
	Cert. Basis - TSO C66a	_____	10.3*	185.0	1906

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
241	Collins VHF-250 or VHF-251 Comm Transceiver				
	a. Single	_____	4.0	56.9	228
	b. Dual	_____	8.1	56.9	461
	Cert. Basis - TSO C37b, C38b				
243	Collins VIR-350 or VIR-351 Nav Receiver				
	a. Single	_____	3.9	57.4	224
	b. Dual	_____	7.9	57.4	453
	Cert. Basis - TSO C40a, C36c				
245	Collins IND-350 ( ) VOR/ LOC Indicator				
	a. Single	_____	1.0	60.2	60
	b. Dual	_____	2.0	60.2	120
	Cert. Basis - TSO C40a, C36c				
247	Collins IND-351 ( ) VOR/ LOC/GS Indicator				
	Cert. Basis - TSO C40a, C36c	_____	1.3	60.2	78

(m) Radio Equipment (Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
249	Collins DME-451 W/Ind. 451/450 Cert. Basis - TSO C66a	______	8.0	174.9	1399
251	Collins GLS-350 Glide Slope Receiver Cert. Basis - TSO C34c	______	2.0	181.8	364
253	Collins DCE 400 Distance Computing Equipment Cert. Basis - TSO C40a	______	2.1	58.9	124
254	Collins ANS 351 R-Nav Cert. Basis - TSO C36c	______	3.8	58.2	221
255	Collins RCR-650 ADF Receiver and Antenna and IND-650 Indicator Cert. Basis - TSO C41c	______	7.7	104.8	807
256	Collins RCR-650A ADF Receiver and Antenna and IND-650A Indicator Cert. Basis - TSO C41c	______	8.4	100.9	848

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
257	Collins AMR-350 Audio/ Marker Panel Cert. Basis - TSO C35d, C50b	_____	*3.3	110.0	363
259	Collins TDR-950 Transponder Cert. Basis - TSO C74c	_____	*2.8	63.2	177
267	King - KN 53 Nav/ Receiver	_____	2.8	63.8	179
269	King - KN 53 Nav/ Receiver w/ G.S. Receiver				
	a. Single	_____	3.1	63.8	198
	b. Dual	_____	6.2	63.8	396

*Weight includes antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
270	King KX 155 VHF Nav Comm Transceiver				
	a. With Audio Amplifier	_____	5.0	58.1	291
	b. With Glide Slope Receiver	_____	5.3	58.1	308
	c. Without Glide Slope Receiver	_____	4.8	58.1	279
	Cert. Basis - TSO C37b, C38b, C40a, C36a				
271	King KX 165 VHF Nav Comm Transceiver				
	a. With Glide Slope Receiver	_____	5.7	58.0	331
	b. Without Glide Slope Receiver	_____	5.1	58.1	296
	Cert. Basis - TSO C37b, C38b, C40a, C36a				
272	King KX 170 ( ) VHF Comm/Nav				
	a. Transceiver, Single	_____	7.3	56.6	413
	b. Transceiver, Dual	_____	14.6	56.6	826

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
273	King KX 175 ( ) VHF				
	a. Transceiver	X	11.4	56.6	645
	b. King KN 75 Glide Slope Receiver	X	1.6	184.3	295
	c. King KN 72 VOR/LOC Converter	X	1.3	183.6	239
	d. King KI 204 VOR/ILS Indicator	X	1.7	60.5	103
	Cert. Basis - TSO C3bc, C37b, C38b, C40a				
274	King KX 175 ( ) VHF				
	a. Transceiver (2nd)		10.0	56.6	566
	b. King KN 72 VOR/LOC Converter		1.3	183.6	239
	c. King KI 203 VOR/LOC Indicator		1.6	60.5	97
	Cert. Basis - TSO C36c, C37b, C38b, C40a				

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
275	King KY-196E Transceiver W/RB 125 Power Booster				
	a. Single	X	5.7	77.0	439
	b. Dual		11.4	77.0	878
	Cert. Basis - TSO C37b, c38b				
276	King KY-197 Transceiver				
	a. Single		4.2	58.7	246
	b. Dual		8.4	58.7	492
	Cert. Basis - TSO C37b, C38b				
277	King KI 202 VOR/LOC Indicator Cert. Basis - TSO C40a, C36c		1.3	60.9	79

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
278	King KI 208 VOR/LOC Indicator				
	a. Single	_____	1.0	59.6	60
	b. Dual	_____	2.0	59.9	120
	Cert. Basis - TSO C34c, C36c, C40a				
279	King KI 209 VOR/LOC/GS Indicator				
	Cert. Basis - TSO C34c, C36c, C40a	_____	1.2	59.9	72
281	King KN 74 R-Nav	_____	4.7	56.6	266
282	King ~~KNS-80~~ R-Nav (KNS81)	X	7.0	56.6	396
	a. King KA-20 14 VDC Blower	_____	0.9	53.9	49
283	King KI 206 R-Nav Indicator				
	Cert. Basis - TSO C34c, C36c, C40a	_____	1.3	60.9	79
284	King KN-62A DME (KN 63)	X	3.3	58.3	193

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
285	King KN 65A DME Cert. Basis - TSO C66a	_____	13.0	174.9	2274
286	King KR-85 ADF with KA-42B Loop and Sense Antenna	_____	9.5	85.2	809
	a. Audio Amplifier Cert. Basis - TSO C41b	_____	0.8	51.0	41
287	King KR 85 Digital ADF	X _____	8.6	85.2	733
	a. Audio Amplifier Cert. Basis - TSO C41b	X _____	0.8	51.0	41
288	King KR-86 ADF with KA-42B Loop and Sense Antenna				
	a. First	_____	7.6	91.6	696
	b. Second	_____	10.6	107.0	1134
	c. Audio Amplifier	_____	0.8	51.0	41
289	King KR 86 ADF				
	a. First	_____	6.7	91.6	614
	b. Second	_____	9.7	107.0	1038
	c. Audio Amplifier	_____	0.8	51.0	41

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
293	King KR 87 ADF				
	a. Receiver and Indicator				
	Single	_____	4.0	59.0	236
	Dual	_____	7.4	58.6	434
	b. KA 44 Antenna				
	Single	_____	2.8	147.4	413
	Dual	_____	5.8	161.4	936
	c. KA 44B Antenna				
	Single	_____	3.6	150.6	542
	Dual	_____	7.4	188.9	680
	d. Audio Amplifier	_____	0.8	51.0	41
	Cert. Basis - TSO C41c				

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(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
295	King KMA 20 ( ) Audio Panel Cert. Basis - TSO C35c, C50b	X	*3.7	70.8	262
297	King KMA-24 Audio Control Panel Cert. Basis - TSO C35d, C50b		1.7	65.3	111
299	King KT 76 ( ) Transponder Cert. Basis - TSO C74b		*3.1	58.1	180
305	Narco Comm 120 VHF Transceiver a. Single b. Dual Cert. Basis - TSO C37b, C38b		4.8 8.6	56.9 57.4	273 494
	Garrecht Mode S Transponder P/N VT0201	X	2.2	58.1	128
	JPI EDM700 P/N EGT701-6C	X			

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
307	Narco Nav 121 VHF Receiver				
	a. Single	____	3.1	58.4	181
	b. Dual	____	6.2	58.4	362
	Cert. Basis - TSO C36C, C40c, C66a				
309	Narco Nav 122 VHF Receiver				
	a. Single	____	*5.1	99.4	507
	b. Dual	____	*8.6	82.9	713
	Cert. Basis - TSO C35d, C36c, C40c, C66a				
311	Narco Nav 122A VHF Receiver				
	a. Single	____	*5.2	98.5	512
	b. Dual	____	*8.8	82.2	723
	Cert. Basis - TSO C34c, C35d, C36c, C40c, C66a				
313	Narco Nav 124A VHF Receiver				
	a. Single	____	*6.2	92.3	572
	b. Dual	____	*10.9	77.2	841
	Cert. Basis - TSO C35d, C36c, C40a, C66a				

*Weight includes marker antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
315	Narco Nav 124R VHF Receiver Cert. Basis - TSO C36c, C40a, C66a	_____	4.4	57.5	253
317	Narco ID 124 VOR/LOC/GS Indicator				
	a. Single	_____	1.2	60.5	73
	b. Dual	_____	2.4	60.5	145
	Cert. Basis - TSO C34c, C35d, C36c, C40c				
319	Narco UGR-2A Glide Slope				
	a. Single	_____	4.2	154.0	647
	b. Dual	_____	8.4	220.0	1848
	Cert. Basis - TSO C34b				
321	Narco CP135 Audio Selector Panel Cert. Basis - TSO C50b	_____	2.2	55.0	121
323	Narco CP135M Audio Selector Panel Cert. Basis - TSO C50b, C35d	_____	*3.7	114.3	423

*Weight includes marker antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
325	Narco CLC-60A R-Nav	______	9.6	140.1	1345
	a. Narco SA-11 Adapter	______	0.7	174.0	122
	Cert. Basis - TC 2A13				
327	Narco DME-190 TSO				
	Cert. Basis - TSO C66a	______	*5.9	60.9	359
329	Narco DME-195				
	Receiver and Indicator				
	Cert. Basis - TSO C66a	______	*13.2	154.5	2039
331	Narco ADF-141				
	a. Single	______	*8.9	91.2	812
	b. Dual	______	**17.9	107.6	1926
	Cert. Basis - TSO C41c				
333	Narco AT150 Transponder				
	Cert. Basis - TSO C74c	______	*3.0	57.3	172
	a. Narco AR-500 Altitude Encoder				
	Cert. Basis - TSO C88	______	1.0	51.5	52

*Weight includes antenna and cable.
**Weight includes dual antenna and cable.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
345	Antenna and Cable				
	a. Nav Receiving	X	1.4	195.7	274
	b. #1 VHF Comm		0.7	125.7	88
	c. #2 VHF Comm		0.8	147.5	118
	d. Glide Slope (Single)		0.9	122.2	110
	e. Glide Slope (Dual)		2.8	154.0	431
	f. Single ADF Sense		0.4	147.5	59
347	Anti-Static Antenna and Cable				
	a. #1 VHF Comm	X	1.4	144.3	202
	b. #2 VHF Comm	X	1.5	170.7	256
	c. Single ADF Sense		0.5	147.5	74
348	Marker Beacon Antenna Piper PS50040-15 King KA-23 or Narco VMA-15 or Comant CI-102	X	Included as part of the Marker Beacon Installation		
349	Marker Beacon Antenna Comant CI 102 Piper Dwg. 39737-3		*1.2	192.0	230

*Weight includes antenna coax wire to Marker Beacon Receiver.

(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
350	Emergency Locator Transmitter (C.C.C. Model CIR-11-2)	X	1.7	254.0	432
	a. Antenna and Coax	X	0.2	240.0	48
	b. Shelf and Access Hole	X	0.5	253.5	127
	Cert. Basis - TSO C91				
351	Emergency Locator Transmitter (Narco Model ELT-10)		3.5	254.0	889
	a. Antenna and Coax		0.3	240.0	72
	b. Shelf and Access Hole		0.5	253.5	127
	Cert. Basis - TSO C91				
	ELT Kannad 406 AF-C	X	1.9	254.0	483

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(m) Radio Equipment
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
351	Headphone Wm. J. Murdock P/N P-23 300 Ohms with MC162A Cushions or Telex Comm. P/N 61650-03	X	0.5	69.9	35
353	Microphone a. Telex Acoustics P/N 60837-17 (Model 66C)		0.3	69.9	21
	b. Narco P/N M700B		0.6	74.9	45
	c. Telex Acoustics P/N 62800-04 (Model 100T/NH)	X	0.3	69.9	21
355	Boom Microphone - Headset Piper Dwg. 37921-2 Telex 5 x 5 Mark II (P/N 62629-00)		0.3	80.5	24
357	Cabin Speaker, Installation Piper Dwg. 99746-0	X	1.1	99.0	109

(n) Miscellaneous (Optional Equipment)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
387		Zinc Chromate Finish Piper Dwg. 79700-2	X	5.0	158.0	790
389		Stainless Steel Control Cables Piper Dwg. 79700-9	X	(Same as standard equipment)		
391		Air Conditioner, Piper Dwg. 35878-2		59.6	126.6	7545
393		Overhead Vent System				
		a. Piper Dwg. 76304-23		6.4	159.6	1021
		b. Piper Dwg. 79853-4		5.7	148.9	849
395		Overhead Vent System with Ground Ventilating Blower				
		a. Piper Dwg. 76304-24	X	14.9	172.2	2566
		b. Piper Dwg. 79853-5		14.2	168.5	2393
397		Assist Step, Piper Dwg. 65384	X	1.8	156.0	281
399		Super Cabin Sound Proofing Piper Dwg. 79601-4	X	18.1	86.8	1571
401	C	Adjustable Front Seat (Left) Piper Dwg. 79591-2	X	*6.6	80.3	530

*Weight and moment difference between standard and optional equipment.

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
403	Adjustable Front Seat (Right) Piper Dwg. 79591-3	_____	*6.6	79.6	525
405	Headrests (2) Front Piper Dwg. 79337-18	X	2.2	94.5	208
407	Headrests (2) Rear Piper Dwg. 79337-18	X	2.2	132.1	291
409	Oversize Headrest (2) Front Piper Dwg. 79764-2	_____	3.2	94.5	302
411	Oversize Headrests (2) Rear Piper Dwg. 79764-2	_____	3.2	132.1	423
413	Inertia Safety Belts (Rear) (2) 0.8 lbs. each Piper PS50039-4-14 (Pacific Scientific P/N 1107319-01 Black) or (American Safety Eqpt. Corp. P/N 500853-401)	X	1.6	140.3	224

*Weight and moment difference between standard and optional equipment.

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.		Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
415	C	Shoulder Harness - Inertia (Front) (2) Piper PS50039-4-20 (Pacific Scientific 1107447-13 Black)	_____	1.3	119.5	155
417		Shoulder Harness - Fixed (Rear) (2) Piper PS50039-4-22 (American Safety Eqpt. Corp. 501385-403) (Davis Acft. Prod. Inc. FDC-7275-16-2) (Black)	_____	1.1	140.3	154
419		Shoulder Harness - Inertia (Rear) (2) Piper PS50039-4-19 (Pacific Scientific 1107447-01 Black)	_____	1.3	140.3	182
421		Assist Strap Piper Dwg. 79455-0	_____	0.2	109.5	22

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
423	Curtain and Rod Installation Piper Dwg. 67955-2	_____	4.2	124.0	521
425	Luxurious Interior Piper Dwg. 67952-2	X	*17.0	101.9	1732
427	Fire Extinguisher Piper Dwg. 37872-2 (Graviner HA1014-01)	_____	5.6	57.9	324
429	Oxygen System - Scott Aviation MKIII (Portable System) Scott 802180-04 Piper Dwg. 35822-4	_____	19.2	118.1	2268
431	Fixed Oxygen System - Scott Aviation Ambassador MK III System Piper Dwg. 36960-4				
	a. Charged	_____	38.5	173.9	6695
	b. Uncharged	_____	34.5	173.2	5975

*Weight and moment difference between standard and optional equipment.

(n) Miscellaneous
(Optional Equipment) (cont)

Item No.	Item	Mark if Instl.	Weight (Pounds)	Arm (In.) Aft Datum	Moment (Lb-In.)
433	Clip Installation - Map Piper Dwg. 37907-2	____	0.1	70.0	7
435	Locking Gas Cap Piper Dwg. 39830-2	X	*0.1	94.1	9

*Weight and moment difference between standard and optional equipment.

TOTAL OPTIONAL EQUIPMENT	____	____	____

TABLE OF CONTENTS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

TABLE OF CONTENTS

SECTION 7

DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYSTEMS

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DESCRIPTION AND OPERATION OF THE AIRPLANE AND ITS SYTEMS

7.1 THE AIRPLANE

The Turbo Arrow IV is a single engine, retractable landing gear, all metal airplane featuring the tail surfaces in a "T" configuration. It has seating for up to four occupants, a 200 pound luggage compartment, and a turbocharged 200 HP engine.

7.3 AIRFRAME

With the exception of the steel engine mount, the landing gear, miscellaneous steel parts, the cowling, and the lightweight plastic extremities (tips of wings, tail fin, rudder and stabilator), the basic airframe is of aluminum alloy. Aerobatics are prohibited in this airplane since the structure is not designed for aerobatic loads.

The fuselage is a semi-monocoque structure. There is a front door on the right side. A cargo door is installed aft of the rear seat.

The wing is of a conventional design semi-tapered and employs a laminar flow NACA 65_2-415 airfoil section. The main spar is located at approximately 40% of the chord aft of the leading edge. The wings are attached to the fuselage by the insertion of the butt ends of the spar into a spar box carry-through, which is an integral part of the fuselage structure. The bolting of the spar ends into the spar box carry-through structure, which is located under the aft seats, provides in effect a continuous main spar. The wings are also attached fore and aft of the main spar by an auxiliary front spar and a rear spar. The rear spar, in addition to taking torque and drag loads, provides a mount for flaps and ailerons. The four-position wing flaps are mechanically controlled by a handle located between the front seats. When fully retracted, the right flap locks into place to provide a step for cabin entry. Each wing contains one fuel tank.

A vertical stabilizer, an all-movable horizontal stabilator, and a rudder make up the empennage. The stabilator, which is mounted on top of the fin, incorporates an anti-servo tab which improves longitudinal stability and provides longitudinal trim. This tab moves in the same direction as the stabilator, but with increased travel.

7.5 ENGINE AND PROPELLER

The engine is a six cylinder, horizontally opposed, fuel injected, turbocharged engine, rated at 200 horsepower at 2575 RPM and 41 inches MAP from sea level to 12,000 feet density altitude. It is equipped with an oil cooler with a low temperature bypass system and engine mounted oil filter. A winterization plate is provided to restrict air during winter operation. (See Winterization in Handling and Servicing Section.) The turbocharger control system is a fixed, ground adjustable orifice ("fixed wastegate"), and is adjusted to provide 41 inches MAP at full throttle at 12,000 feet density altitude. Throttle position controls engine power and no separate turbocharger control system is utilized. An overboost valve prevents manifold pressure from exceeding 42 inches Hg. should the throttle inadvertently be opened too far below 12,000 feet density altitude. Should this occur, the amber "overboost" warning light in the annunciator panel will illuminate.

The engine induction system is provided with two independent air sources, an induction air filter box with filter, and interconnecting ducting. The primary air inlet is located above No. 1 cylinder (right rear) in the engine rear baffle. Induction air enters at this point and is ducted to the induction filter box, thru the filter and is further ducted to the turbocharger compressor inlet. The induction air filter box incorporates an alternate air valve. This valve may be manually operated (opened) with the alternate air control, allowing air to bypass the filter, supplying heated air directly to the compressor inlet. Should the primary air source become blocked, the alternate air valve will open automatically due to the sucking action of the turbocharger compressor. The heated air provided by the alternate air source will protect against induction system blockage caused by snow or freezing rain, or by the freezing of moisture accumulated in the induction air filter. The alternate air is unfiltered and therefore should not be used during ground operation when dust or other contaminates might enter the system. The primary (filtered air) induction source should always be used for takeoff.

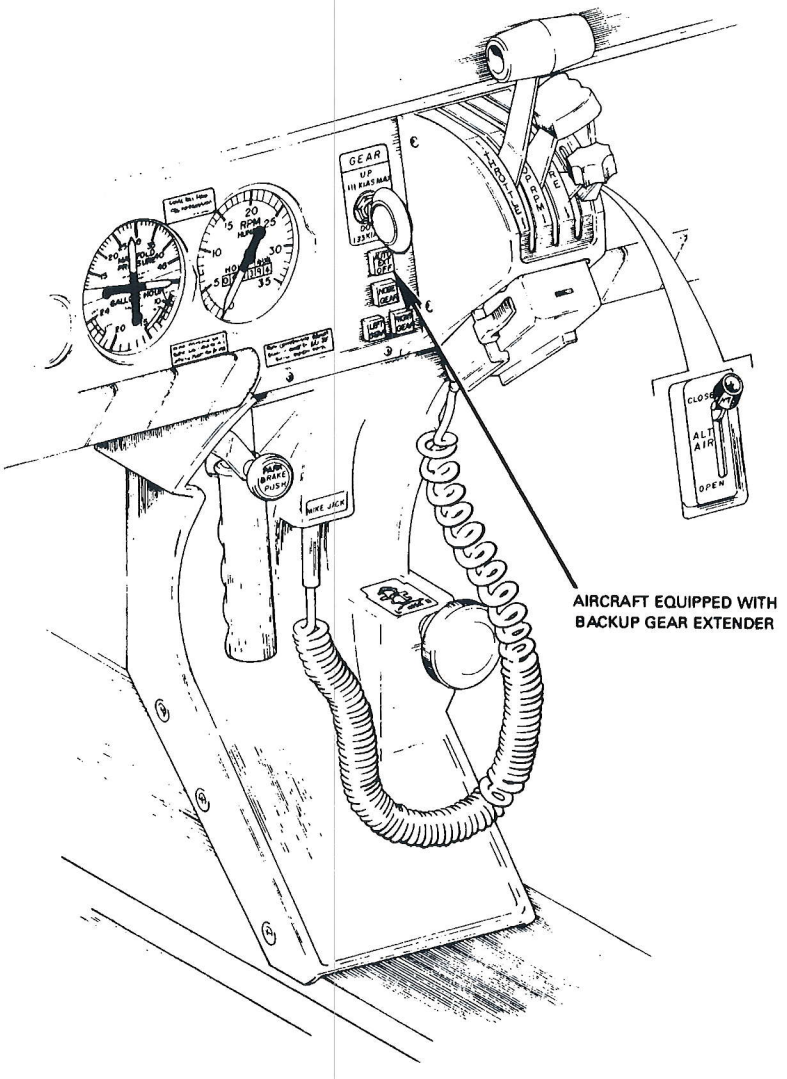
A RayJay turbocharger on the engine is operated by the engine exhaust gases. The exhaust gases drive a turbine wheel which is coaxial with a compressor wheel. Induction air entering the compressor wheel is compressed and delivered to the engine induction distribution system and hence to each cylinder. The amount of induction air compression is a function of engine power - low power, low compression; high power, higher compression. Any excessive pressure (and flow) is expelled by the overboost valve discussed previously.

The fuel injection system incorporates a metering system which measures the rate at which turbocharged air is being used by the engine and dispenses fuel to the cylinders proportionally. Fuel is supplied to the injector pump at a greater rate than the engine requires. The fuel injection system is a "continuous flow" type.

A combination fuel flow indicator and manifold pressure gauge is installed in the left side of the instrument panel. The fuel flow indicator is connected to the fuel flow divider and monitors fuel pressure. The instrument converts fuel pressure to an approximate indication of fuel flow in gallons per hour and percentage of cruise power.

To obtain maximum efficiency and time from the engine, follow the procedures recommended in the Teledyne Continental Operator's Manual provided with the airplane.

The Hartzell constant speed propeller is controlled by a governor mounted on the left forward side of the crankcase. The governor is controlled by a cable from the power control quadrant. A choice of a two bladed (standard) propeller or a three bladed (optional) propeller is offered.



CONTROL QUADRANT AND CONSOLE
Figure 7-1

7.7 ENGINE CONTROLS

Engine controls consist of a throttle control, a propeller control and a mixture control lever. These controls are located on the control quadrant on the lower center of the instrument panel (Figure 7-1) where they are accessible to both the pilot and the copilot. The controls utilize teflon-lined control cables to reduce friction and binding.

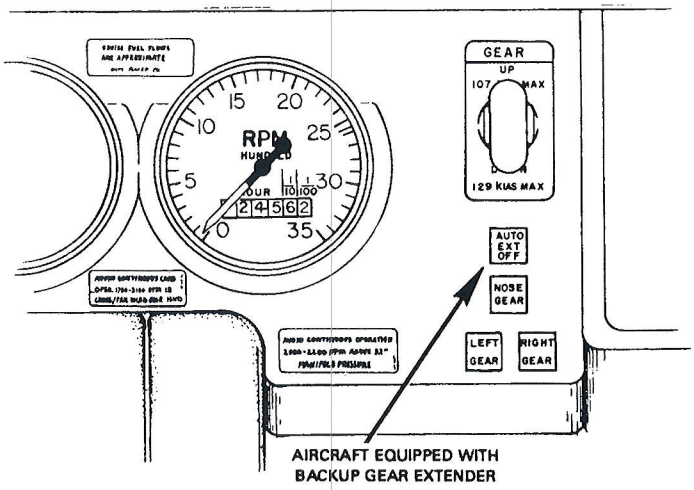
The throttle lever is used to adjust the manifold pressure. It incorporates a gear up warning horn switch which is activated during the last portion of travel of the throttle lever to the low power position. If the landing gear is not locked down, the horn will sound until the gear is down and locked or until the power setting is increased. This is a safety feature to warn of an inadvertent gear up landing.

The propeller control lever is used to adjust the propeller speed from high RPM to low RPM.

The mixture control lever is used to adjust the air to fuel ratio. The engine is shut down by the placing of the mixture control lever in the full lean position. In addition, the mixture control has a lock to prevent activation of the mixture control instead of the pitch control. For information on the leaning procedure, see the Continental Operator's Manual.

The friction adjustment lever on the right side of the control quadrant may be adjusted to increase or decrease the friction holding the throttle, propeller, and mixture controls in a selected position.

The alternate air control is located to the right of the control quadrant. When the alternate air lever is in the up, or closed, position the engine is operating on filtered air; when the lever is in the down, or open, position the engine is operating on unfiltered, heated air (refer to Figure 7-1).



LANDING GEAR SELECTOR
Figure 7-3

7.9 LANDING GEAR

The Turbo Arrow IV is equipped with a retractable tricycle landing gear, which is hydraulically actuated by an electrically powered reversible pump. The pump is controlled by a selector switch on the instrument panel to the left of the control quadrant (Figure 7-3). The landing gear is retracted or extended in about seven seconds.

Some aircraft have a backup gear extender system which incorporate a pressure sensing device that lowers the gear regardless of gear selector position, depending upon airspeed and engine power (propeller slipstream). Gear extension is designed to occur, even if the selector is in the up position, at airspeeds below approximately 103 KIAS with power off. The extension speeds will vary from approximately 78 KTS to approximately 103 KIAS depending on power settings and altitude. The device also prevents the gear from retracting at airspeeds below approximately 78 KTS with full power, though the selector switch may be in the up position. This speed increases with reduced power and/or increased altitude. Manual override of the device is provided by an emergency gear lever. The sensing device operation is controlled by differential air pressure across a flexible diaphragm which is mechanically linked to a

hydraulic valve and an electrical switch which actuates the pump motor. A high pressure and static air source for actuating the diaphragm is provided in a mast mounted on the left side of the fuselage above the wing. Any obstruction of the holes in this mast will cause the gear to extend. An optional heated mast is available to alleviate obstruction in icing conditions. The optional heated mast is turned on whenever the "PITOT HEAT" is turned on.

WARNING

Avoid ejecting objects out of the pilot storm window which could possibly enter or obstruct the holes in the mast.

The emergency gear lever, when placed in the raised position, can be used to override the system, and gear position is then controlled by the selector switch regardless of airspeed/power combinations. The emergency gear lever is provided with a locking device which may be used to lock the override lever in the up position. The lock is located on the left side panel of the console below the level of the manual override lever. To lock the override lever in the up position, raise the override lever to the full up position and push the pin in. A yellow warning light located below the gear selector switch (Figure 7-3) flashes to warn the pilot that the automatic gear lowering system is disabled. The lock is spring-loaded to the off position to aid disengagement. To disengage the lock raise the override lever and release. The lever will return to its normal position and the yellow flashing light will extinguish. The lever must also be locked in the raised (up) position when gear-up stalls are practiced.

The emergency gear lever, when used for emergency extension of the gear, manually releases hydraulic pressure to permit the gear to free-fall with spring assistance on the nose gear. The lever must be placed in the downward position for emergency extension and held down on those aircraft equipped with a lever return spring. During normal landing gear operation, the Emergency Gear Extension Lever, located between the front seats to the left of the flap handle (Figure 7-9), should be in the up position to permit proper gear extension/retraction. For aircraft equipped with the backup gear extender, the Emergency Gear Extension Lever should be in the normal/disengaged position to permit normal gear extension/retraction. On those aircraft not equipped with the spring, the lever must be returned to the raised position before the gear can be retracted.

Gear down and locked positions are indicated by three green lights located below the selector, and a red "Warning Gear Unsafe" light is located at the top of the panel. An all lights out condition indicates the gear is up. The landing gear should not be retracted above a speed of 111 KIAS and should not be extended above a speed of 133 KIAS.

The main landing gear uses 6.00 x 6 wheels. The main gear incorporate brake drums and Cleveland single disc hydraulic brake assemblies. The nose wheel carries a 5.00 x 5 four ply tire and the main gear use 6.00 x 6 six ply tires. All three tires are tube type.

A micro-switch in the throttle quadrant activates a warning horn and red "Warning Gear Unsafe" light under the following conditions:

(a) Gear up and power reduced below approximately 14 inches of manifold pressure.
(b) On aircraft equipped with the backup gear extender, if the system has extended the landing gear and the gear selector is UP, with the reduced below approximately 14 inches of manifold pressure.
(c) Gear selector switch "UP" while on the ground and throttle in retarded position.

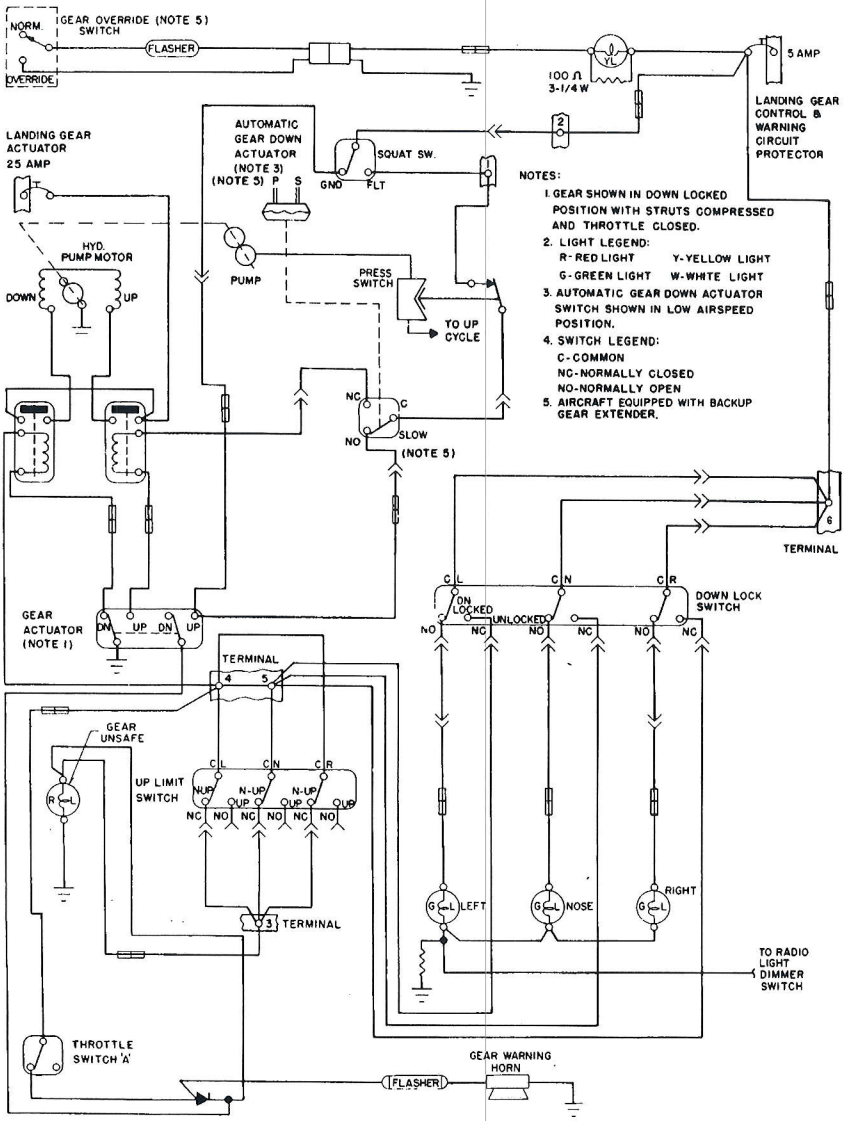
On aircraft which are NOT equipped with the backup gear extender an additional switch is installed which activates the warning horn and light whenever the flaps are extended beyond the approach position (10°) and the landing gear are not down and locked.

The gear warning horn emits a 90 cycle per minute beeping sound in contrast to the stall warning horn which emits a continuous sound.

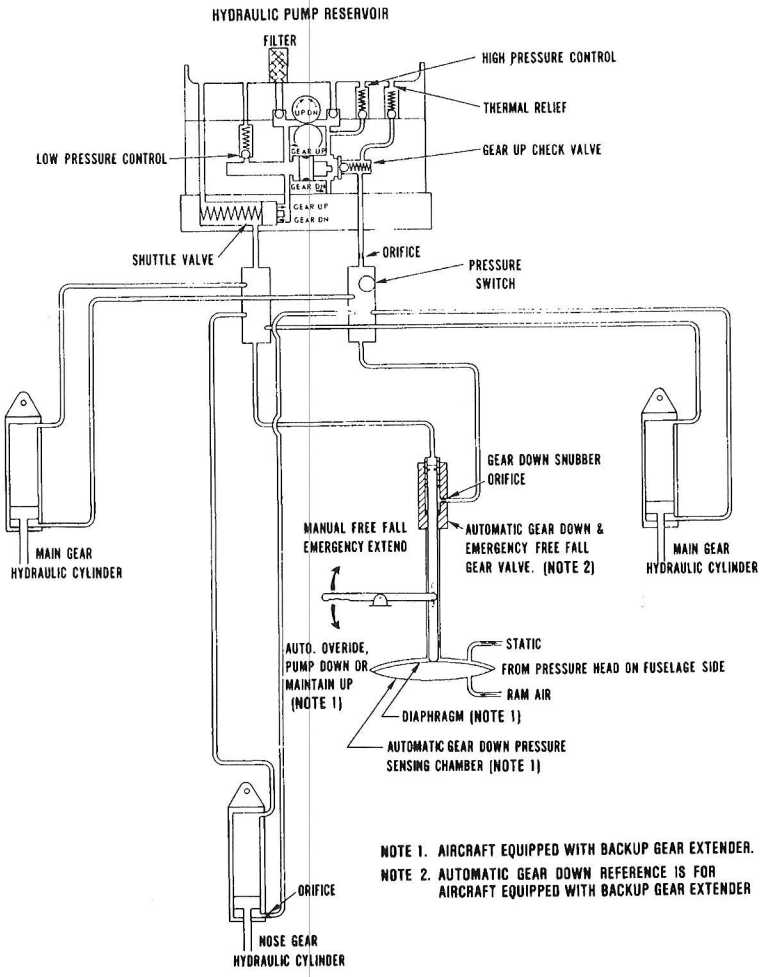
The nose gear is steerable through a 30 degree arc each side of center through the use of the rudder pedals. As the nose wheel retracts, the steering linkage disengages to reduce rudder pedal loads in flight. The nose wheel is equipped with a hydraulic shimmy dampener to reduce nose wheel shimmy. A bungee assembly is also included to reduce ground steering effort and to dampen shocks and bumps during taxiing

The oleo struts are of the air-oil type, with normal extension being 2.75 ± .25 inches for the nose gear and 2.5 ± .25 inches for the main gear under normal static load (empty weight of airplane plus full fuel and oil).

The standard brake system includes toe brakes on the left and right set of rudder pedals and a hand brake located below and near the center of the instrument panel. The toe brakes and the hand brake have individual brake cylinders, but all cylinders use a common reservoir. The parking brake is incorporated in the lever brake and is operated by pulling back on the lever and depressing the knob attached to the top of the handle. To release the parking brake, pull back on the brake lever; then allow the handle to swing forward.

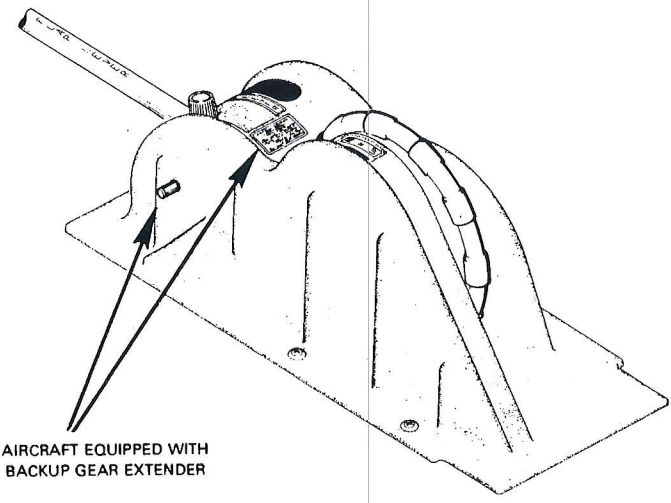


LANDING GEAR ELECTRICAL SCHEMATIC
Figure 7-5



LANDING GEAR HYDRAULIC SCHEMATIC

Figure 7-7



FLIGHT CONTROL CONSOLE
Figure 7-9

7.11 FLIGHT CONTROLS

Dual flight controls are provided as standard equipment. A cable system provides actuation of the control surfaces when the flight controls are moved in their respective directions.

The horizontal surface (stabilator) is mounted atop the fin in a "T" configuration and features a trim tab/servo mounted on the trailing edge. This tab serves the dual function of providing trim control and pitch control forces. The trim function is controlled by a trim control wheel located on the control console between the two front seats (Figure 7-9). Rotating the wheel forward gives nose down trim and rotation aft gives nose up trim.

The rudder is conventional in design and incorporates a rudder trim. The trim mechanism is a spring-loaded recentering device. The trim control is located on the right side of the pedestal below the throttle quadrant. Turning the trim control clockwise gives nose right trim and counterclockwise rotation gives nose left trim.

Manually controlled flaps are provided . They are extended by a control cable and are spring-loaded to the retracted (up) position. The control is located between the two front seats on the control console. To extend the

flaps pull the handle up to the desired flap setting of 10, 25 or 40 degrees. To retract, depress the button on the end of the handle and lower the control.

When extending or retracting flaps, there is a pitch change in the aircraft. This pitch change can be corrected either by stabilator trim or increased control wheel force. When the flaps are in the retracted position the right flap, provided with a over-center lock mechanism, acts as a step.

NOTE

The right flap will support a load only in the fully retracted (up) position. When loading and unloading passengers make sure the flaps are in the retracted (up) position.

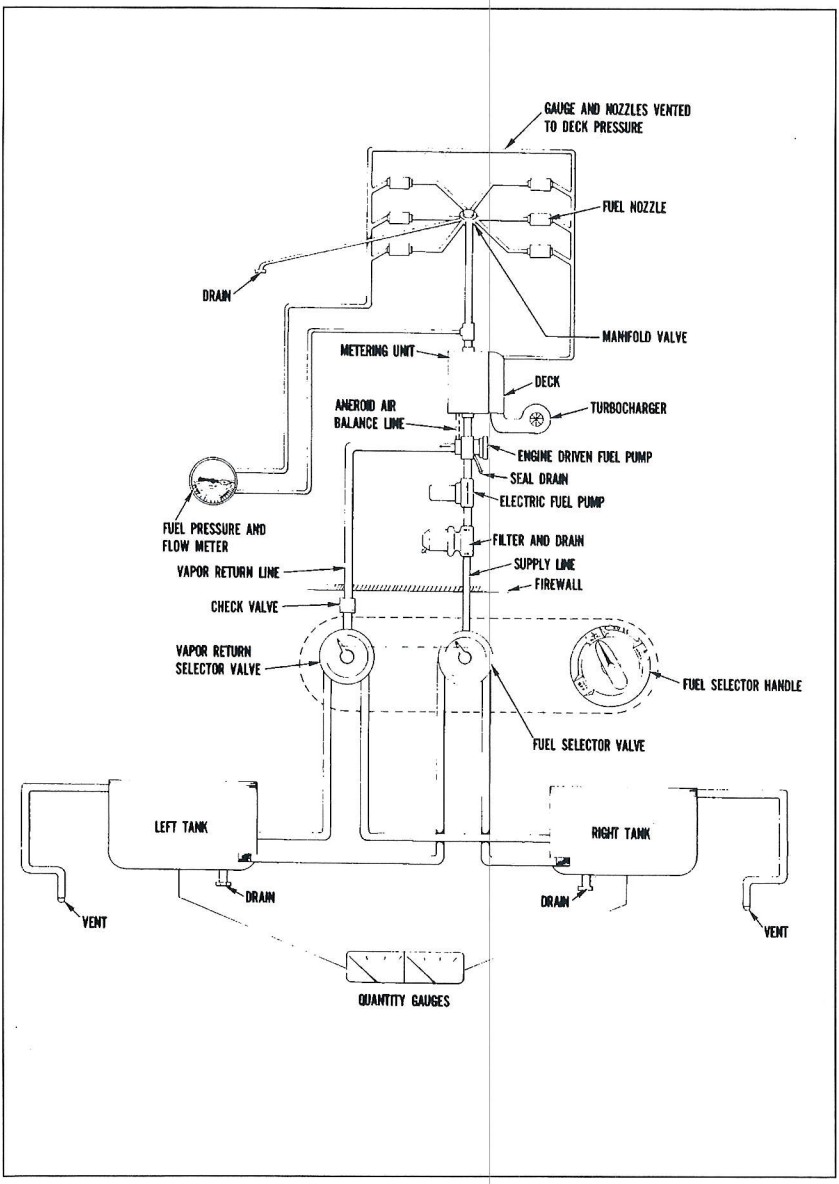
7.13 FUEL SYSTEM

The fuel system was designed with simplicity in mind. It incorporates two fuel tanks, one in each wing containing 38.5 U.S. Gallons, giving a total capacity of 77 gallons, of which 72 gallons are usable. Each tank is equipped with a filler neck indicator tab to aid in determining fuel remaining when the tanks are not full. Usable capacity to the bottom of the indicator tab is 25 gallons. The minimum fuel grade is 100 or 100LL Aviation Grade. The tanks are attached to the leading edge of the wing with screws and are an integral part of the wing structure. This allows removal for service. The tanks are vented individually by a vent tube which protrudes below the bottom of the wing at the rear inboard corner of each tank. The vents should be checked periodically to ascertain that the vent is not obstructed and will allow free passage of air.

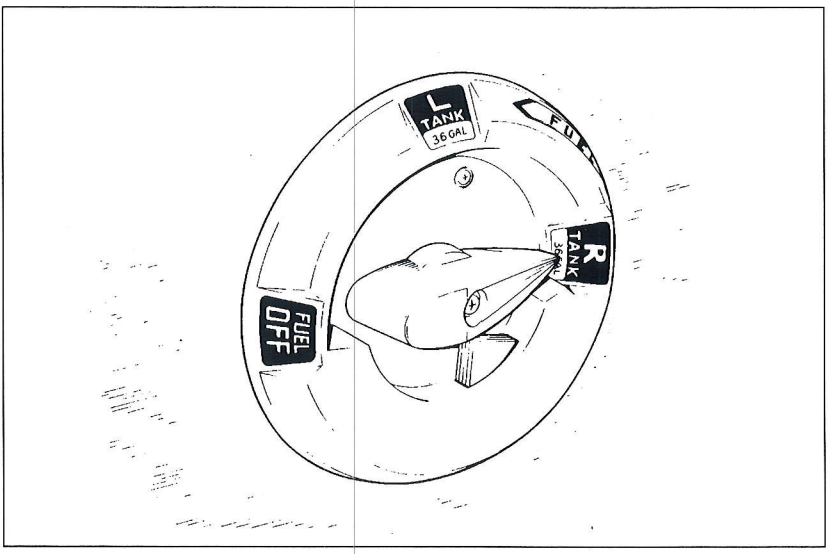
Each fuel tank has an individual quick drain located at the bottom inboard rear corner. The fuel strainer also incorporates a quick drain, which is located on the left lower portion of the firewall. The quick drain protrudes thru the cowling to allow easy draining of the fuel strainer. To avoid the accumulation of water and sediment, the fuel tank sumps and strainer should be drained daily prior to first flight and after refueling.

CAUTION

When draining fuel, care should be taken to ensure that no fire hazard exists before starting the engine.



FUEL SYSTEM SCHEMATIC
Figure 7-11



FUEL SELECTOR
Figure 7-13

A fuel tank selector allows the pilot to control the flow of fuel to the engine, and is located on the left side wall below the instrument panel. It has three positions: OFF, LEFT TANK and RIGHT TANK. The arrow on the handle of the selector points to the tank which is supplying fuel to the engine. The vapor return from the engine is also routed back to the tank selected. When the selector valve is in the OFF position, vapor return is routed back to the right fuel tank. The valve also incorporates a safety latch which prevents inadvertently selecting the "OFF" position.

The engine fuel injection system is a "continuous flow" type, which utilizes a vapor return line leading back to the fuel tanks. This line provides a route back to the tanks for vapor laden fuel that has been separated in the injector pump swirl chamber. The engine has an engine driven fuel pump that is a part of the fuel injection system. An auxiliary fuel pump is also provided. The purpose of the electrically powered auxiliary fuel pump is to supply fuel to the engine in case of engine driven fuel pump shaft failure or malfunction, for ground and inflight engine starting, and for vapor suppression. The auxiliary fuel pump switch is located on the instrument panel above the engine control quadrant, and is a three position rocker switch; LO, HI and OFF. The LO auxiliary fuel pressure is selected by pushing the top of the switch. The HI auxiliary fuel pressure is selected by pushing the bottom of the switch, but this can be done only after unlatching the adjacent guard. W hen the HI auxiliary fuel pump is activated, an amber light near the annunciation panel is illuminated. This light dims whenever the pump pressure reduces automatically and manifold pressure is below approximately 21 inches.

In case of a failed engine driven fuel pump, the auxiliary electric fuel pump should be set on HI. Adequate pressure and fuel flow will be supplied for up to approximately 75% power. Manual leaning to the correct fuel flow will be required at altitudes above 15,000 feet and for engine speeds less than 2300 RPM . An absolute pressure switch automatically selects a lower fuel pressure when the throttle is reduced below 21" Hg manifold pressure and the HI auxiliary fuel pump is on.

NOTE

Excessive fuel pressure and very rich fuel/air mixtures will occur if the HI position is energized when the engine fuel injection system is functioning normally.

Low auxiliary fuel pressure is available and may be used during normal engine operation both on the ground and inflight for vapor suppression should it be necessary as evidenced by unstable engine operation or fluctuating fuel flow indications during idle or at high altitudes.

A spring loaded OFF primer button switch is located on the instrument panel and is used to select HI auxiliary fuel pump operation for priming, irrespective of other switch positions. The primer button may be used for both hot or cold engine starts.

On airplanes equipped with an optional engine primer system (identified by Placard below primer button shown in Figure 7-21), the primer switch location and actuation is the same as the basic airplane. However, this system does provide a separate primer system as an integral part of the engine fuel system. An electrically operated diverter valve is located in the metered fuel supply line between the air throttle valve and the manifold valve. Other components are two primer nozzles, located in the intake manifold on each side of the engine, the interconnecting fuel lines, and fine wire spark plugs. Actuation of the engine primer switch operates the auxiliary electric fuel pump on Hi and energizes the diverter valve which supplies fuel to each primer nozzle. The diverter valve does not shut off all fuel flow to the manifold valve, therefore some quantity of fuel is also supplied to each cylinder nozzle during priming. Operation of the auxiliary fuel pump on Hi and LO is unchanged.

7.15 ELECTRICAL SYSTEM

All switches are grouped in a switch panel above the power quadrant. On the lower right side of the instrument panel is the circuit breaker panel, with each breaker clearly marked to show what circuit it protects. Also, circuit provisions are made to handle the addition of communications and navigational equipment.

Standard electrical accessories include alternator, starter, electric fuel pump, stall warning indicator, ammeter, and annunciator panel.

The annunciator panel includes alternator and low oil pressure indicator lights. When the optional gyro system is installed, the annunciator panel also includes a low vacuum indicator light. The annunciator panel lights are provided only as a warning to the pilot that a system may not be operating properly, and that he should check and monitor the applicable system gauge to determine when or if any necessary action is required.

Optional electrical accessories includes navigation, ground recognition, anti-collision, landing, instrument and cabin dome lights. Navigation and radio lights are controlled by a rheostat switch on the left side of the switch panel. The instrument panel lights are controlled by a rheostat switch on the right side of the panel.

An optional light, mounted in the overhead panel, provides instrument and cockpit lighting for night flying. The light is controlled by a rheostat switch located adjacent to the light. A map light window in the lens is actuated by an adjacent switch.

An optional wing tip/recognition light system consists of 2 lights (one in each wing tip) and is operated by a split landing light/recognition light rocker type switch mounted on the switch panel.

WARNING

When optional panel lights are installed, rheostat switch must be off to obtain gear lights full intensity during daytime flying. When aircraft is operated at night and panel light rheostat switch is turned on, gear lights and over boost light will automatically dim.

CAUTION

Do not use cigar lighter receptacles as power sources for any devices other than the cigar lighters supplied with the airplane. Any other device plugged into these receptacles may be damaged.

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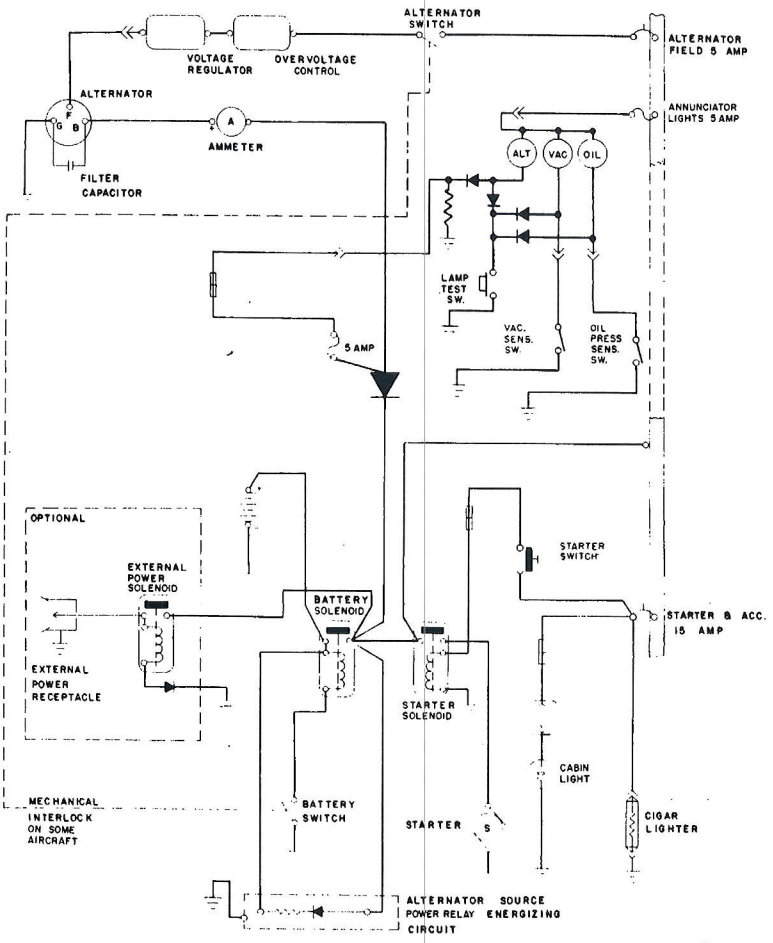
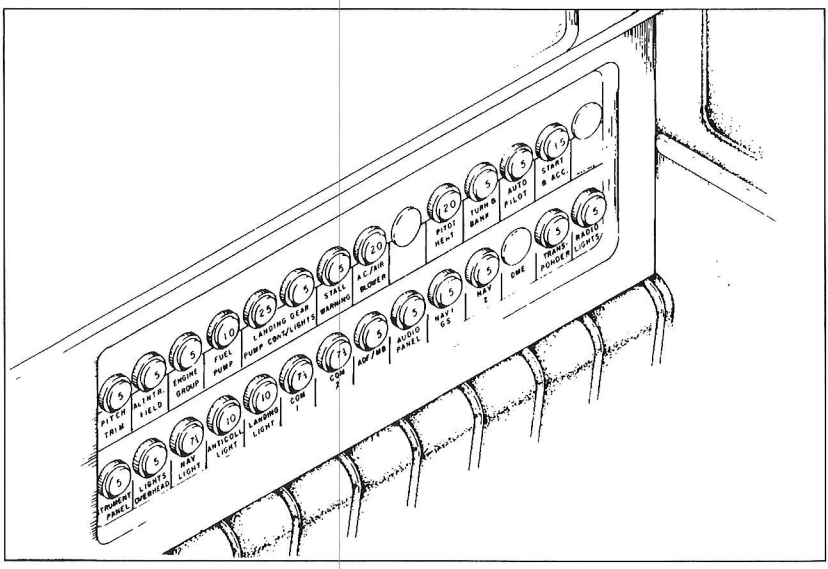


ALTERNATOR AND STARTER SCHEMATIC
Figure 7-15



CIRCUIT BREAKER PANEL
Figure 7-17

The anti-collision and landing lights are controlled by rocker switches on the switch panel.

WARNING

Strobe lights should not be operating when flying through overcast and clouds since reflected light can produce spacial disorientation. Do not operate strobe lights in close proximity to ground, such as during takeoff and landing.

NOTE

On airplanes with interlocked BAT and ALT switches, the ALT switch is mechanically interlocked with the BAT switch. When ALT switch is turned ON, the BAT switch will also be turned ON. On airplanes with separate BAT and ALT switch operations, the switches may be positioned independently as desired.

The primary electrical power source is a 14-volt, 65-amp alternator, which is protected by a voltage regulator and an overvoltage relay. The alternator provides full electrical power output even at low engine RPM. This provides improved radio and electrical equipment operation and increases battery life by reducing battery load.

Secondary power is provided by a 12-volt, 25-ampere hour battery.

The ammeter as installed does not show battery discharge; rather it shows the electrical load placed on the system. With all the electrical equipment off, and the master switch on, the ammeter will indicate the charging rate of the battery. As each electrical unit is switched on, the ammeter will indicate the total ampere draw of all the units including the battery. For example, the average continuous load for night flying with radios on is about 30 amperes. The 30 ampere value plus 2 amperes for charging the battery will then show on the ammeter, indicating the alternator is functioning properly.

Solenoids, provided in the battery and starter circuits, are used to control high current drain functions remotely from the cabin.

7.17 VACUUM SYSTEM

The vacuum system is designed to operate the air driven gyro instruments. This includes the directional and attitude gyros when installed. The system consists of an engine vacuum pump, a vacuum regulator, a filter and the necessary plumbing.

The vacuum pump is a dry type pump which eliminates the need for an air/oil separator and its plumbing. A shear drive protects the engine from damage. If the drive shears the gyros will become inoperative.

The vacuum gauge, mounted on the right instrument panel to the right of the radios, (refer to Figure 7-21) provides valuable information to the pilot about the operation of the vacuum system. A decrease in pressure in a system that has remained constant over an extended period, may indicate a dirty filter, dirty screens, possibly a sticking vacuum regulator or leak in system (a low vacuum indicator light is provided in the annunciator panel). Zero pressure would indicate a sheared pump drive, defective pump, possibly a defective gauge or collapsed line. In the event of any gauge variation from the norm, the pilot should have a mechanic check the system to prevent possible damage to the system components or eventual failure of the system.

A vacuum regulator is provided in the system to protect the gyros. The valve is set so the normal vacuum reads 4.8 to 5.1 inches of mercury, a setting which provides sufficient vacuum to operate all the gyros at their rated RPM. Higher settings will damage the gyros and with a low setting the gyros will be unreliable. The regulator is located behind the instrument panel.

7.19 PITOT-STATIC SYSTEM

The system supplies both pitot and static pressure for the airspeed indicator, altimeter and vertical speed indicator (when installed).

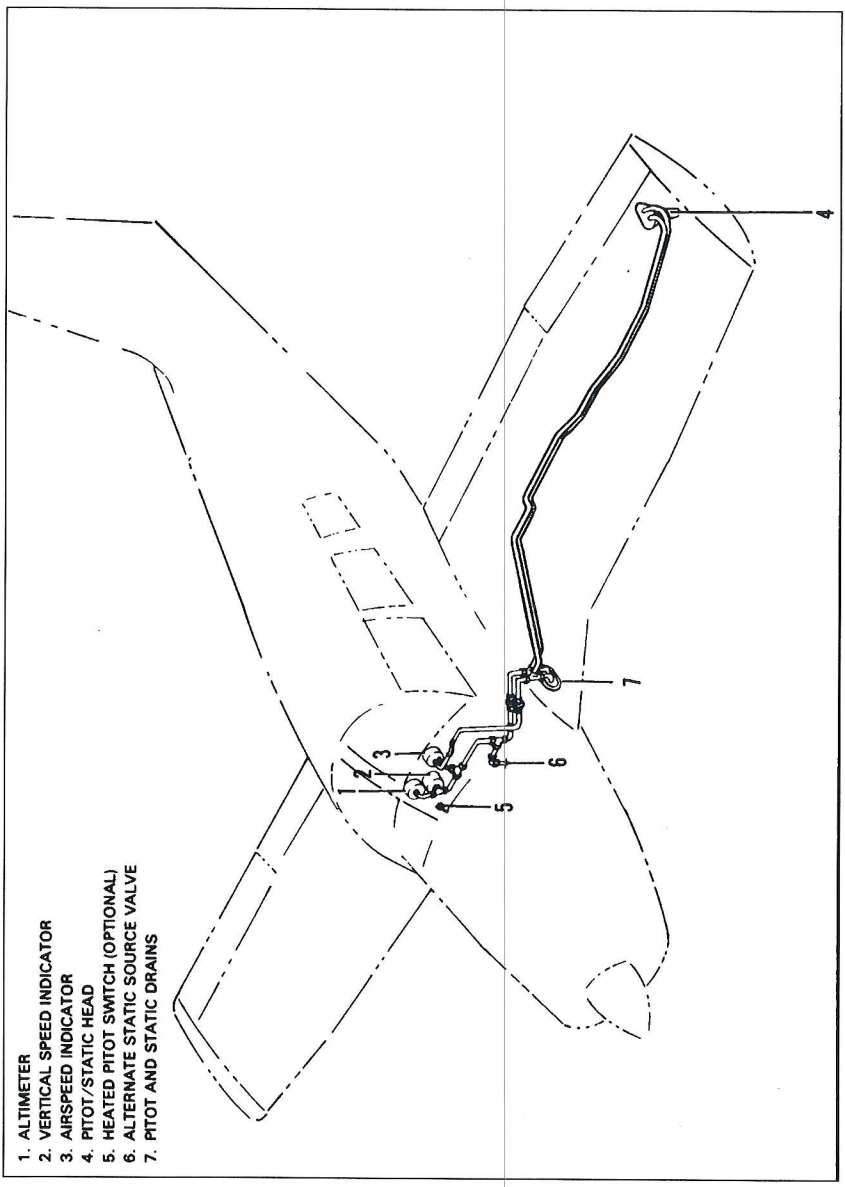
Pitot and static pressure is picked up by the pitot head on the bottom of the left wing. An optional heated pitot head, which alleviates problems with icing or heavy rain, is available. The switch for pitot heat is located on the switch panel. Push-button type pitot and static drains are located on the lower left sidewall of the cockpit.

An alternate static source is available as optional equipment. The control valve is located below the left side of the instrument panel. When the valve is set in the alternate position, the altimeter, vertical speed indicator and airspeed indicator will be using cabin air for static pressure. The storm window and cabin vents must be closed and the cabin heater and defroster must be on during alternate static source operation. The altimeter error is less than 50 feet unless otherwise placarded.

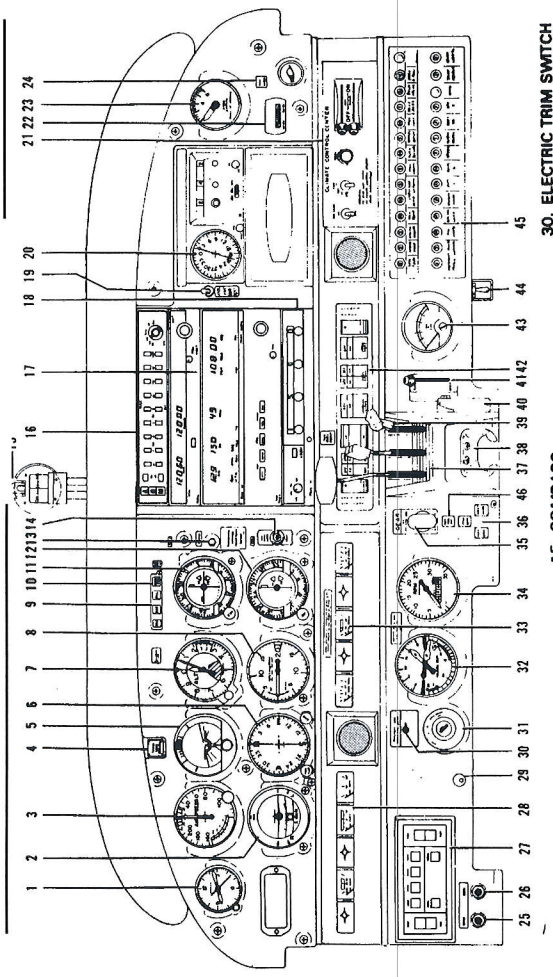
To prevent bugs and water from entering the pitot pressure holes when the airplane is parked, a cover should be placed over the pitot head. A partially or completely blocked pitot head will give erratic or zero readings on the instruments.

NOTE

During preflight, check to make sure the pitot cover is removed.



PITOT-STATIC SYSTEM
Figure 7-19



1. CLOCK
2. TURN COORDINATOR
3. AIRSPEED INDICATOR
4. WARNING - GEAR UNSAFE LIGHT
5. ATTITUDE GYRO
6. DIRECTIONAL GYRO
7. ALTIMETER
8. VERTICAL SPEED INDICATOR
9. ANNUNCIATOR DISPLAY
10. OVER BOOST LIGHT
11. OMNI AND GLIDE SLOPE INDICATOR
12. OMNI INDICATOR
13. PRIMER BUTTON
14. AIR CONDITIONER DOOR LIGHT
15. COMPASS
16. AUDIO CONTROL PANEL
17. COMMUNICATIONS TRANSCEIVER/RNAV
18. TRANSPONDER
19. RADIO MASTER SWITCH
20. ADF
21. CLIMATE CONTROL CENTER
22. HOUR METER
23. GYRO SUCTION GAUGE
24. GROUND CLEARANCE SWITCH
25. MIKE JACK
26. PHONE JACK
27. AUTOPILOT
28. CLUSTER GAUGES
29. NAV 1, NAV 2 SWITCH
30. ELECTRIC TRIM SWITCH
31. IGNITION SWITCH
32. MANIFOLD PRESSURE/ FUEL FLOW GAUGE
33. CLUSTER GAUGE
34. TACHOMETER
35. GEAR SELECTOR SWITCH
36. GEAR INDICATOR LIGHTS
37. CONTROL QUADRANT
38. MIKE ATTACHMENT
39. MIXTURE CONTROL LOCK
40. FRICTION LOCK
41. ALTERNATE AIR
42. CONTROL SWITCHES
43. EGT
44. EMERGENCY BUS SWITCH
45. CIRCUIT BREAKER PANEL
46. AUTO-EXT OFF LIGHT*

* AIRCRAFT EQUIPPED WITH BACKUP GEAR EXTENDER

INSTRUMENT PANEL
Figure 7-21

7.21 INSTRUMENT PANEL

The instrument panel is designed to accommodate the customary advanced flight instruments and the normally required power plant instruments. The artificial horizon and directional gyro are vacuum operated and are located in the center of the left hand instrument panel. The vacuum gauge is located on the right hand instrument panel. The turn indicator, on the left side, is electrically operated.

The radios are located in the center section of the panel, and the circuit breakers are in the lower right corner of the panel. An optional radio master switch is located near the top of the instrument panel between the radio stacks. It controls the power to all radios through the aircraft master switch. An emergency bus switch is also provided to provide auxiliary power to the avionics bus in event of a radio master switch circuit failure. The emergency bus switch is located behind the lower right shin guard left of the circuit breaker panel.

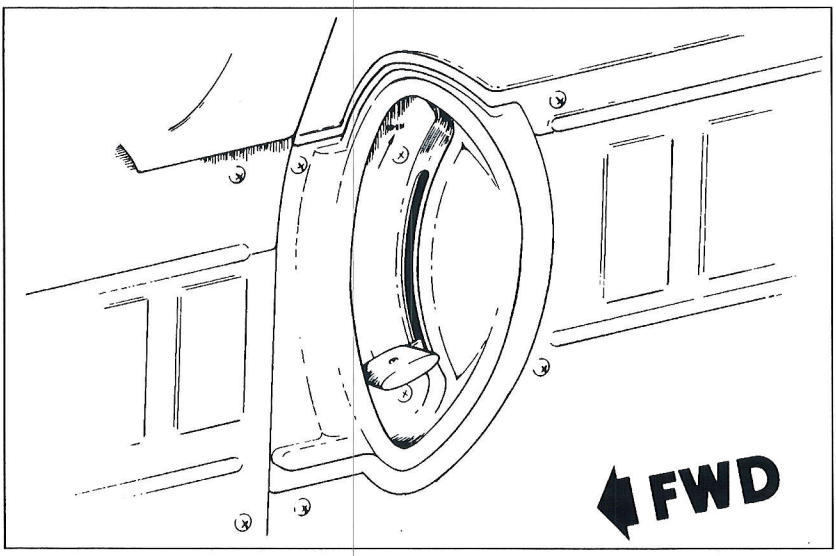
An annunciator panel is mounted in the upper instrument panel to warn the pilot of a possible malfunction in the alternator, oil pressure, and vacuum systems. The overboost light is located beside the annunciator panel.

A ground clearance energy saver system is available to provide direct power to Comm #1 without turning on the master switch. An internally lit pushbutton switch, located on the instrument panel, provides annunciation for engagement of the system. When the button is engaged direct aircraft battery power is applied to Comm #1 audio amplifier (speaker) and radio accessories. The switch must be turned OFF or depletion of the battery could result.

The manifold pressure line has a drain valve located behind and below the manifold pressure gauge. This allows any moisture which may have collected from condensation to be pulled into the engine. This is accomplished by depressing the valve for 5 seconds while operating the engine at 1000 RPM.

NOTE

Do not depress the valve when manifold pressure exceeds 25 inches Hg.



CABIN DOOR LATCH
Figure 7-23

7.23 CABIN FEATURES

All seat backs have three position: normal, intermediate and recline. The adjustment lever is located at the base of the seat back on the outboard side of the seat. The front seats adjust fore and aft for ease of entry and occupant comfort. An armrest is located on the side panels adjacent to the front seat. The rear seats are easily removed to provide room for bulky items. Rear seat installations incorporate leg retainers with latching mechanisms which must be released before the rear seats can be removed. Releasing the retainers is accomplished by depressing the plunger behind each rear leg. Optional headrests are available.

Shoulder harnesses with inertia reels are provided for each front seat occupant. On aircraft serial numbers 28R-7931001 through 28R-8431032, shoulder harnesses with inertia reels were provided as optional equipment for the occupants of the rear seats. On aircraft serial numbers 28R-8531001 and up, shoulder harnesses with inertia reels are provided as standard equipment for the occupants of the rear seats. A check of the inertia reel mechanism can be made by pulling sharply on the strap and checking that the reel will lock in place under sudden stress. This locking feature

prevents the strap from extending and holds the occupant in place. Under normal movement, the strap will extend and retract as required. On earlier aircraft provided with a single strap adjustable shoulder harness located above the side window for each front seat, the shoulder strap is routed over the shoulder adjacent to the window and attached to the lap belt in the general area of the occupant's hip. Adjust this fixed strap so that all controls are accessible while maintaining adequate restraint tor the occupant. Shoulder harnesses should be routinely worn during takeoff, landing, and whenever an inflight emergency situation occurs.

Additional features include pilot storm window, two sun visors, ash trays for each occupant, map pockets located on the side panels below the instrument panel, miscellaneous pockets on the rear of the front seat backs, armrests for the front occupants, cabin or baggage door locks and ignition lock.

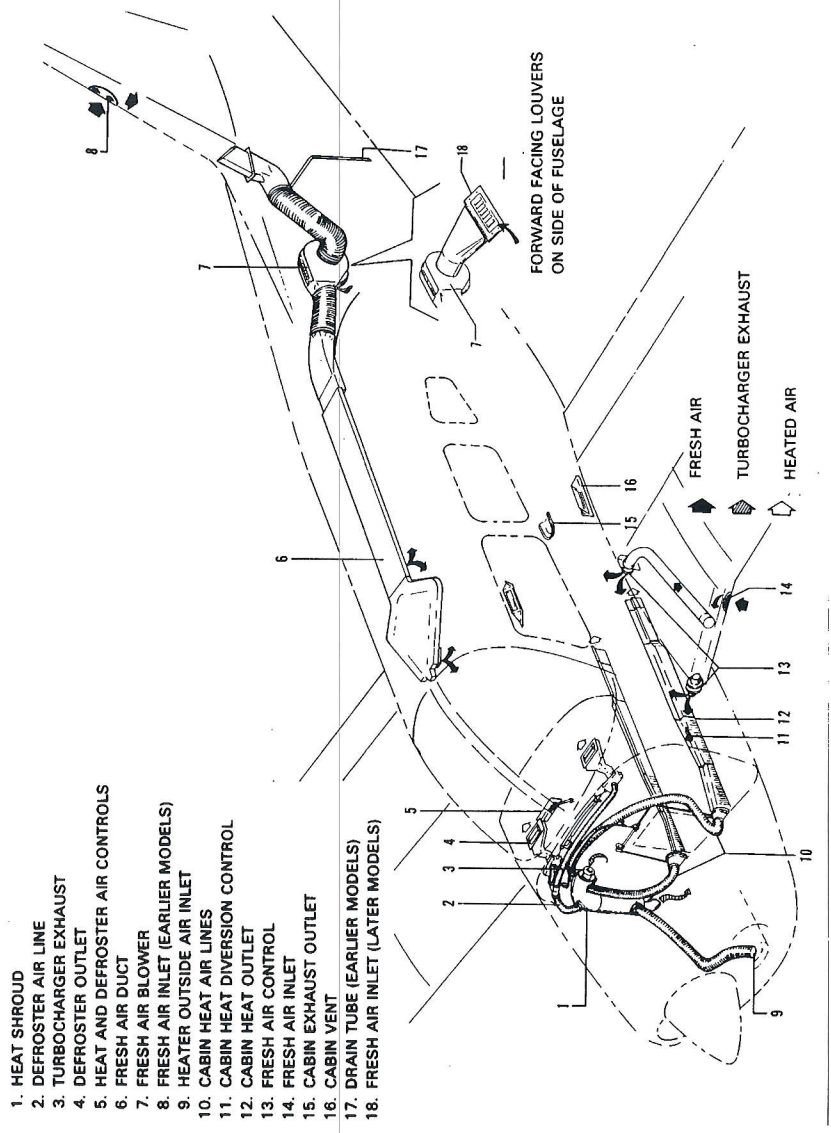
The cabin door is double latched. To close the cabin door, hold the door closed with the arm set while moving the side door latch to the "LATCHED" position. Then engage the top latch. Both latches must be secured before night.

7.25 BAGGAGE AREA

A large baggage area, located behind the rear seats, is accessible either from the cabin or through a large outside baggage door on the right side of the aircraft. Maximum capacity is 200 lbs. Tie-down straps are provided and should be used at all times.

NOTE

It is the pilot's responsibility to be sure when the baggage is loaded that the aircraft C.G. falls within the allowable C.G. Range. (See Weight and Balance Section.)



HEATING, VENTILATING AND DEFROSTING SYSTEM
Figure 7-25

7.27 HEATING, VENTILATING AND DEFROSTING SYSTEM

The heating system is designed to provide maximum comfort for the occupants during winter and cool weather flights. The system includes a heat shroud, heat ducts, defroster outlets, heat and defroster controls.

CAUTION

When cabin heat is operated, heat duct surface becomes hot. This could result in burns if arms or legs are placed too close to heat duct outlets or surface.

An opening in the front of the lower cowl admits ram air to the heater shroud and then the air is ducted to the heater shut-offs on the right and left side of the fire wall. When the shut-off's are opened the heated air then enters the heat ducts located along each side of the center console. Outlets in the heat duct are located at each seat location. Airflow to the rear seats can be regulated by controls in the heat ducts located between the front seats. The temperature of the cabin is regulated by the heater control located on the right side of the instrument panel.

Defrosting is accomplished by heat outlets located on the right and left side of the cowl cover. Heated air is ducted directly to defroster shut-off valves at the fire wall, then to the defroster outlets. The airflow is regulated by a defroster control located below the heat control.

To aid air distribution, the cabin air is exhausted overboard by an outlet located on the bottom of the fuselage. Cabin exhaust outlets are located below and outboard of the rear seats. The above features are removed when air conditioning is installed.

An optional overhead ventilating system with outlets over each seat is also available. An additional option to aid in fresh air circulation on models without air conditioning is a cabin air blower to force air through the overhead vent system. This blower is operated by a fan switch with three positions - "OFF," "LOW," and "HIGH." The switch is located on the right side of the instrument panel with the heater and defroster controls.

7.29 STALL WARNING

An approaching stall is indicated by a stall warning horn which is activated between five and ten knots above stall speed. Mild airframe buffeting and gentle pitching may also precede the stall. Stall speeds are shown on graphs in the Performance Section. The stall warning horn emits a continuous sound. The landing gear warning horn is different in that it emits a 90 cycle per minute beeping sound. The stall warning horn is activated by a lift detector installed on the leading edge of the left wing. During preflight, the stall warning system should be checked by turning the master switch "ON," lifting the detector and checking to determine if the horn is actuated.

7.31 FINISH

All exterior surfaces are primed with etching primer and finished with acrylic lacquer. An optional polyurethane finish is available.

7.33 AIR CONDITIONING*

The air conditioning system is a recirculating air system. The major components include an evaporator, a condenser, a compressor, a blower, switches and temperature controls.

The evaporator is located behind the rear baggage compartment. This cools the air used for the air conditioning system.

The condenser is mounted on a retractable scoop located on the bottom of the fuselage and to the rear of the baggage compartment area. The scoop extends when the air conditioner is ON and retracts to a flush position when the system is OFF.

The compressor is mounted on the rear left side of the engine. It has an electric clutch which automatically engages or disengages the compressor to the belt drive system of the compressor.

* Optional equipment

Air from the baggage area is drawn through the evaporator by the blower and distributed through an overhead duct to individual outlets located adjacent to each occupant.

The switches and temperature control are located on the lower right side of the instrument panel in the climate control center panel. The temperature control regulates the temperature of the cabin. Turning the control clockwise increases cooling; counterclockwise decreases cooling.

The fan speed switch and the air conditioning ON-OFF switch are inboard of the temperature control. The fan can be operated independently of the air conditioning; however, the fan must be on for air conditioner operation. Turning either switch off will disengage the compressor clutch and retract the condenser door. Cooling air should be felt within one minute after the air conditioner is turned on.

NOTE

If the system is not operating in 5 minutes, turn the system OFF until the fault is corrected.

The fan switch allows operation of the fan with the air conditioner turned OFF to aid in cabin air circulation. "LOW" or "HIGH" can be selected to direct a flow of air through the air conditioner outlets in the overhead duct. These outlets can be adjusted or turned off individually.

The condenser door light is located to the right of the engine instrument cluster in front of the pilot. The door light illuminates when the door is open and is off when the door is closed.

A circuit breaker on the circuit breaker panel protects the air conditioning electrical system.

Whenever 38 inches Hg or more manifold pressure is used a manifold pressure switch disengages the compressor and retracts the scoop. This allows maximum power and maximum rate of climb. The fan continues to operate and the air will remain cool for about one minute. When the throttle is retarded so that less then 38 inches Hg manifold pressure is used, the clutch will engage, the scoop will extend, and the system will again supply cool, dry air.

7.35 PIPER EXTERNAL POWER*

An optional starting installation known as Piper External Power (PEP) is accessible through a receptacle located on the right side of the fuselage aft of the wing. An external battery can be connected to the socket, thus allowing the operator to crank the engine without having to gain access to the airplane's battery.

7.37 EMERGENCY LOCATOR TRANSMITTER*

The Emergency Locator Transmitter (ELT) meets the requirements of FAR 91.52. It operates on self-contained batteries and is located in the aft fuselage section. It is accessible through a rectangular cover on the right hand side. A number 2 Phillips screwdriver is required to remove the cover.

A battery replacement date is marked on the transmitter. To comply with FAA regulations, the battery must be replaced on or before this date. The battery must also be replaced if the transmitter has been used in an emergency situation or if the accumulated test time exceeds one hour, or if the unit has been inadvertently activated for an undetermined time period.

NOTE

If for any reason a test transmission is necessary, the test transmission should be conducted only in the first five minutes of any hour and limited to three audio sweeps. If tests must be made at any other time, the tests should be coordinated with the nearest FAA tower or flight service station.

NARCO ELT 10 OPERATION

On the ELT unit itself is a three position switch placarded "ON," "OFF" and "ARM." The ARM position sets the ELT so that it will transmit after impact and will continue to transmit until its battery is drained. The ARM position is selected when the ELT is installed in the airplane and it should remain in that position.

*Optional equipment

To use the ELT as a portable unit in an emergency, remove the cover and unlatch the unit from its mounting base. The antenna cable is disconnected by a left quarter-turn of the knurled nut and a pull. A sharp tug on the two small wires will break them loose. Deploy the self-contained antenna by pulling the plastic tab marked "PULL FULLY TO EXTEND ANTENNA." Move the switch to ON to activate the transmitter.

In the event the transmitter is activated by an impact, it can only be turned off by moving the switch on the ELT unit to OFF. Normal operation can then be restored by pressing the small clear plastic reset button located on the top of the front face of the ELT and then moving the switch to ARM.

A pilot's remote switch located on the left side panel is provided to allow the transmitter to be turned on from inside the cabin. The pilot's remote switch is placarded "ON" and "ARMED." The switch is normally in the ARMED position. Moving the switch to ON will activate the transmitter. Moving the switch back to the ARMED position will turn off the transmitter only if the impact switch has not been activated.

The ELT should be checked to make certain the unit has not been activated during the ground check. Check by selecting 121.50 MHz on an operating receiver. If there is an oscillating chirping sound, the ELT may have been activated and should be turned off immediately. This requires removal of the access cover and moving the switch to OFF, then press the reset button and return the switch to ARM. Recheck with the receiver to ascertain the transmitter is silent.

CCC CIR 11-2 OPERATION

On the unit itself is a three position selector switch placarded "OFF," "ARM" and "ON." The ARM position is provided to set the unit to the automatic position so that it will transmit only after impact and will continue to transmit until the battery is drained to depletion or until the switch is manually moved to the OFF position. The ARM position is selected when the transmitter is installed at the factory and the switch should remain in that position whenever the unit is installed in the airplane. The ON position is provided so the unit can be used as a portable transmitter or in the event the automatic feature was not triggered by impact or to periodically test the function of the transmitter.

Select the OFF position when changing the battery, when rearming the unit if it has been activated for any reason, or to discontinue transmission.

NOTE

If the switch has been placed in the ON position for any reason, the OFF position has to be selected before selecting ARM. If ARM is selected directly from the ON position, the unit will continue to transmit in the ARM position.

A pilot's remote switch, located on the left side panel, is provided to allow the transmitter to be controlled from inside the cabin. The pilot's remote switch is placarded "ON," "AUTO/ARM" and "OFF/RESET." The switch is normally left in the AUTO/ARM position. To turn the transmitter off, move the switch momentarily to the OFF/RESET position. The aircraft master switch must be ON to turn the transmitter OFF. To actuate the transmitter for tests or other reasons, move the switch upward to the ON position and leave it in that position as long as transmission is desired.

The unit is equipped with a portable antenna to allow the locator to be removed from the aircraft in case of an emergency and used as a portable signal transmitter.

The locator should be checked during the ground check to make certain the unit has not been accidentally activated. Check by tuning a radio receiver to 121.50 MHz. If there is an oscillating sound, the locator may have been activated and should be turned off immediately. Reset to the ARM position and check again to insure against outside interference.

TABLE OF CONTENTS

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

TABLE OF CONTENTS

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

Paragraph No. | Page No.

SECTION 8

AIRPLANE HANDLING, SERVICING AND MAINTENANCE

8.1 GENERAL

This section provides general guidelines relating to the handling, servicing and maintenance of the Turbo Arrow IV.

Every owner should stay in close contact with his Piper dealer or distributor and Authorized Piper Service Center to obtain the latest information pertaining to his aircraft and to avail himself of the Piper Aircraft Service Back-up.

Piper Aircraft Corporation takes a continuing interest in having the owner get the most efficient use from his aircraft and keeping it in the best mechanical condition. Consequently, Piper Aircraft from time to time issues Service Bulletins, Service Letters and Service Spares Letters relating to the aircraft.

Service Bulletins are of special importance and should be complied with promptly. These are sent to the latest registered owners, distributors and dealers. Depending on the nature of the bulletin, material and labor allowances may apply, and will be addressed in the body of the Bulletin.

Service Letters deal with product improvements and service hints pertaining to the aircraft. They are sent to dealers, distributors and occasionally (at the factory's discretion) to latest registered owners, so they can properly service the aircraft and keep it up to date with the latest changes. Owners should give careful attention to the Service Letter information.

Service Spares Letters offer improved parts, kits and optional equipment which were not available originally and which may be of interest to the owner.

If an owner is not having his aircraft serviced by an Authorized Piper Service Center, he should periodically check with a Piper dealer or distributor to find out the latest information to keep his aircraft up to date.

Piper Aircraft Corporation has a Subscription Service for the Service Bulletins, Service Letters and Service Spares Letters. This service is offered to interested persons such as owners, pilots and mechanics at a nominal fee, and may be obtained through Piper dealers and distributors.

A service manual, parts catalog, and revisions to both, are available from your Piper dealer or distributor. Any correspondence regarding the airplane should include the airplane model and serial number to ensure proper response.

8.3 AIRPLANE INSPECTION PERIODS

The Federal Aviation Administration (FAA) occasionally publishes Airworthiness Directives (ADs) that apply to specific groups of aircraft. They are mandatory changes and are to be complied with within a time limit set by the FAA. When an AD is issued, it is sent by the FAA to the latest registered owner of the affected aircraft and also to subscribers of their service. The owner should periodically check with his Piper dealer or A & P mechanic to see whether he has the latest issued AD against his aircraft.

The Owner Service Agreement which the owner receives upon delivery of the aircraft should be kept in the aircraft at all times. This identifies him to authorized Piper dealers and entitles the owner to receive service in accordance with the regular service agreement terms. This agreement also entitles the transient owner full warranty by any Piper dealer in the world.

One hundred hour inspections are required by law if the aircraft is used commercially. Otherwise this inspection is left to the discretion of the owner. This inspection is a complete check of the aircraft and its systems, and should be accomplished by a Piper Authorized Service Center or by a qualified aircraft and power plant mechanic who owns or works for a reputable repair shop. The inspection is listed, in detail, in the inspection report of the appropriate Service Manual.

An annual inspection is required once a year to keep the Airworthiness Certificate in effect. It is the same as a 100-hour inspection except that it must be signed by an Inspection Authorized (IA) mechanic or a General Aviation District Office (GADO) representative. This inspection is required whether the aircraft is operated commercially or for pleasure.

A Progressive Maintenance program is approved by the FAA and is available to the owner. It involves routine and detailed inspections at 50-hour intervals. The purpose of the program is to allow maximum utilization of the aircraft, to reduce maintenance inspection cost and to maintain a maximum standard of continuous airworthiness. Complete details are available from Piper dealers.

A spectographic analysis of the oil is available from several sources. This system, if used intelligently, provides a good check of the internal condition of the engine. For this system to be accurate, oil samples must be sent in at regular intervals, and induction air filters must be cleaned or changed regularly.

8.5 PREVENTIVE MAINTENANCE

The holder of a Pilot Certificate issued under FAR Part 61 may perform certain preventive maintenance described in FAR Part 43. This maintenance may be performed only on an aircraft which the pilot owns or operates and which is not used to carry persons or property for hire, except as provided in applicable FAR's. Although such maintenance is allowed by law, each individual should make a self-analysis as to whether he has the ability to perform the work.

All other maintenance required on the airplane should be accomplished by appropriately licensed personnel.

If maintenance is accomplished, an entry must be made in the appropriate logbook. The entry should contain:

(a) The date the work was accomplished.
(b) Description of the work.
(c) Number of hours on the aircraft.
(d) The certificate number of pilot performing the work.
(e) Signature of the individual doing the work.

8.7 AIRPLANE ALTERATIONS

If the owner desires to have his aircraft modified, he must obtain FAA approval for the alteration. Major alterations accomplished in accordance with Advisory Circular 43.13-2, when performed by an A & P mechanic, may be approved by the local FAA office. Major alterations to the basic airframe or systems not covered by AC 43.13-2 require a Supplemental Type Certificate.

The owner or pilot is required to ascertain that the following Aircraft Papers are in order and in the aircraft.

(a) To be displayed in the aircraft at all times:
  (1) Aircraft Airworthiness Certificate Form FAA-8100-2.
  (2) Aircraft Registration Certificate Form FAA-8050-3.
  (3) Aircraft Radio Station License if transmitters are installed.

(b) To be carried in the aircraft at all times:
  (1) Pilot's Operating Handbook.
  (2) Weight and Balance data plus a copy of the latest Repair and Alteration Form FAA-337, if applicable.
  (3) Aircraft equipment list.

Although the aircraft and engine logbooks are not required to be in the aircraft, they should be made available upon request. Logbooks should be complete and up to date. Good records will reduce maintenance cost by giving the mechanic information about what has or has not been accomplished.

8.9 GROUND HANDLING

(a) Towing

The airplane may be moved on the ground by the use of the nose wheel steering bar that is stowed in the rear baggage compartment or by power equipment that will not damage or excessively strain the nose gear steering assembly. The steering bar is engaged by inserting it into the nose wheel axle.

CAUTION

When towing with power equipment, do not turn the nose gear beyond its steering radius in either direction, as this will result in damage to the nose gear and steering mechanism.

CAUTION

Do not tow the airplane when the controls are secured.

In the event towing lines are necessary, ropes should be attached to both main gear struts as high up on the tubes as possible. Lines should be long enough to clear the nose and/or tail by not less than fifteen feet, and a qualified person should ride in the pilot's seat to maintain control by use of the brakes.

(b) Taxiing

Before attempting to taxi the airplane, ground personnel should be instructed and approved by a qualified person authorized by the owner. Engine starting and shut-down procedures as well as taxi techniques should be covered. When it is ascertained that the propeller back blast and taxi areas are clear, power should be applied to start the taxi roll, and the following checks should be performed:

(1) Taxi a few feet forward and apply the brakes to determine their effectiveness.
(2) Taxi with the propeller set in low pitch, high RPM setting.
(3) While taxiing, make slight turns to ascertain the effectiveness of the steering.
(4) Observe wing clearance when taxiing near buildings or other stationary objects. If possible, station an observer outside the airplane.
(5) When taxiing over uneven ground, avoid holes and ruts.
(6) Do not operate the engine at high RPM when running up or taxiing over ground containing loose stones, gravel, or any loose material that may cause damage to the propeller blades.

(c) Parking

When parking the airplane, be sure that it is sufficiently protected from adverse weather conditions and that it presents no danger to other aircraft. When parking the airplane for any length of time or overnight, it is suggested that it be moored securely.

(1) To park the airplane, head it into the wind if possible.
(2) Set the parking brake by pulling back on the brake lever and depressing the knob on the handle. To release the parking brake, pull back on the handle until the catch disengages; then allow the handle to swing forward.

CAUTION

Care should be taken when setting brakes that are overheated or during cold weather when accumulated moisture may freeze a brake.

(3) Aileron and stabilator controls should be secured with the front seat belt and chocks used to properly block the wheels.

(d) Mooring

The airplane should be moored for immovability, security and protection. The following procedures should be used for the proper mooring of the airplane:

(1) Head the airplane into the wind if possible.
(2) Retract the flaps.
(3) Immobilize the ailerons and stabilator by looping the seat belt through the control wheel and pulling it snug.
(4) Block the wheels.
(5) Secure tie-down ropes to the wing tie-down rings and to the tail skid at approximately 45 degree angles to the ground. When using rope of non-synthetic material, leave sufficient slack to avoid damage to the airplane should the ropes contract.

CAUTION

Use bowline knots, square knots or locked slip knots. Do not use plain slip knots.

NOTE

Additional preparations for high winds include using tie-down ropes from the landing gear forks and securing the rudder.

(6) Install a pitot head cover if available. Be sure to remove the pitot head cover before flight.
(7) Cabin and baggage doors should be locked when the airplane is unattended.

8.11 ENGINE AIR FILTER

(a) Removing Engine Air Filter

(1) Remove the upper cowl.
(2) Remove the wing nuts securing the filter box cover. Remove the filter.

(b) Cleaning Engine Air Filter

The induction air filter must be cleaned at least once every 50 hours, and more often, even daily, when operating in dusty conditions. Extra filters are inexpensive, and a spare should be kept on hand for use as a rapid replacement.

To clean the filter:
(1) Tap the filter gently to remove dirt particles, being careful not to damage the filter. DO NOT wash the filter in any liquid. DO NOT attempt to blow out dirt with compressed air.
(2) If the filter is excessively dirty or shows any damage, replace it immediately.
(3) Wipe the filter housing with a clean cloth soaked in unleaded gasoline. When the housing is clean and dry, install the filter.

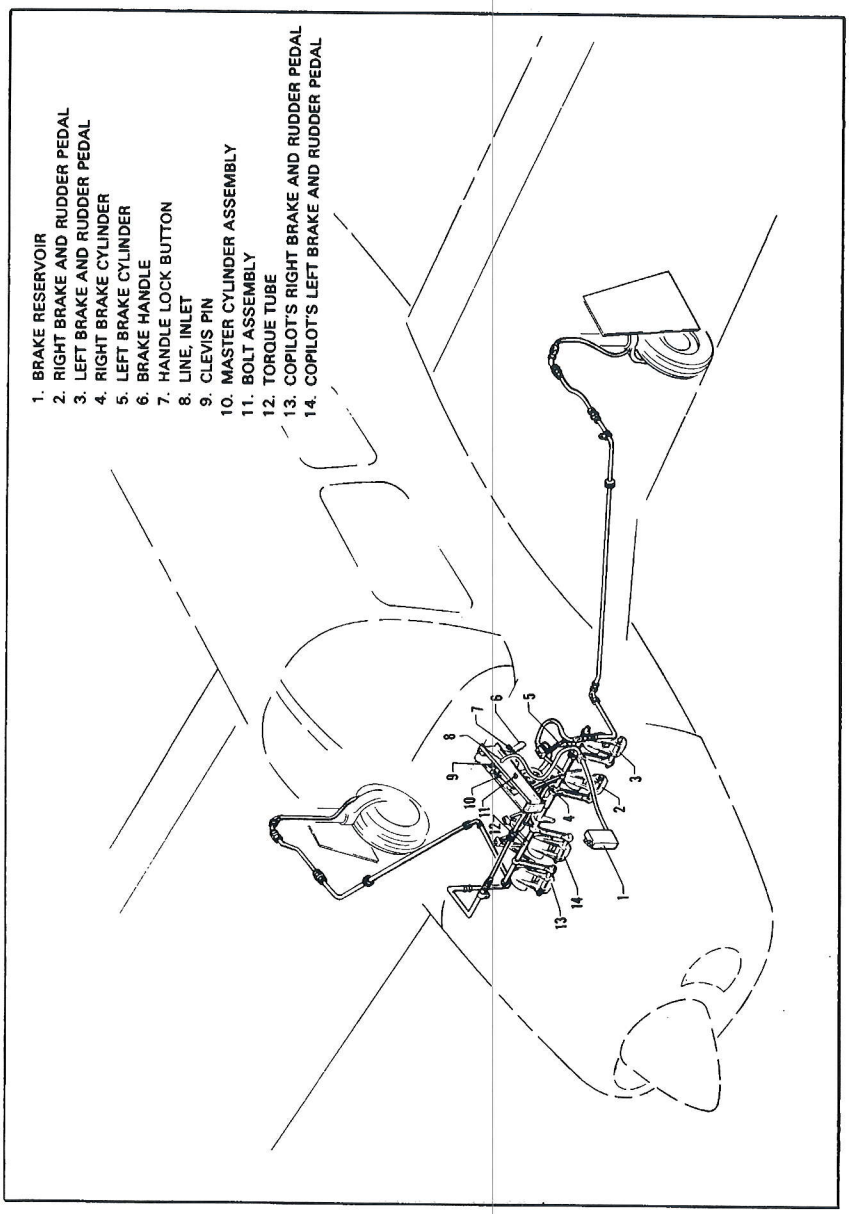
(c) Installation of Engine Air Filter

After cleaning or when replacing the filter, install the filter in the reverse order of removal.

8.13 BRAKE SERVICE

The brake system is filled with MIL-H-5606 (petroleum base) hydraulic brake fluid. The fluid level should be checked periodically or at every 100-hour inspection and replenished when necessary. The brake reservoir is located on the left side of the fire wall in the engine compartment. If the entire system must be refilled, fill with fluid under pressure from the brake end of the system. This will eliminate air from the system.

No adjustment of the brake clearances is necessary. If after extended service brake blocks become excessively worn, they should be replaced with new segments.



BRAKE SYSTEM
Figure 8-1

8.15 LANDING GEAR SERVICE

The main landing gear uses 6.00 x 6 wheels with 6.00 x 6, six-ply rating tires and tubes. The nose wheel uses a 5.00 x 5 wheel with a 5.00 x 5 four-ply rating, type III tire and tube. (Refer to Paragraph 8.23.)

Wheels are removed by taking off the hub cap, cotter pin, axle nut, and the two bolts holding the brake segment in place. Mark tire and wheel for reinstallation; then dismount by deflating the tire, removing the three through-bolts from the wheel and separating the wheel halves.

Landing gear oleos on the Turbo Arrow IV should be serviced according to the instructions on the units. The main oleos should be extended under normal static load until 2.5 ± .25 inches of oleo piston tube is exposed, and the nose gear should show 2.75 ± .25 inches. To add air to the oleo struts, attach a strut pump to the valve assembly near the top of the oleo strut housing and pump the oleo to the desired position. To add oil, jack the aircraft, release the air pressure in the strut, remove the valve core and add oil through this opening with the strut extended. After the strut is full, compress it slowly and fully to allow excess air and oil to escape. With the strut still compressed reinsert the valve stem and pump up the strut as above.

In jacking the aircraft for landing gear or other service, two hydraulic jacks and a tail stand should be used. At least 250 pounds of ballast should be placed on the base of the tail stand before the airplane is jacked up. The hydraulic jacks should be placed under the jack points on the bottom of the wing and the airplane jacked up until the tail skid is at the right height to attach the tail stand. After the tail stand is attached and the ballast added, jacking may be continued until the airplane is at the height desired.

The steering arms from the rudder pedals to the nose wheel are adjusted at the rudder pedals or at the nose wheel by turning the threaded rod end bearings in or out. Adjustment is normally accomplished at the forward end of the rods and should be done in such a way that the nose wheel is in line with the fore and aft axis of the plane when the rudder pedals and rudder are centered. Alignment of the nose wheel can be checked by pushing the airplane back and forth with the rudder centered to determine that the plane follows a perfectly straight line. The turning arc of the nose wheel is 30° in either direction and is factory adjusted at stops on the bottom of the forging.

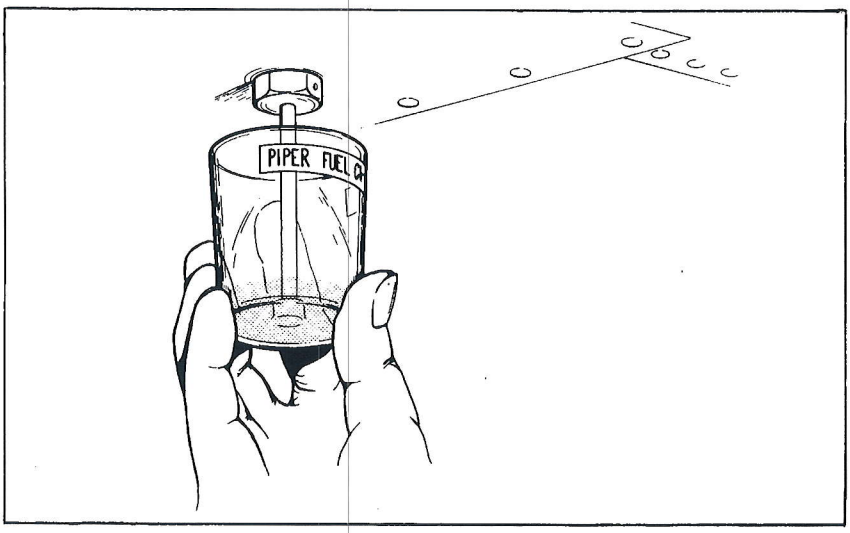
8.17 PROPELLER SERVICE

The spinner and backing plate should be cleaned and inspected for cracks frequently. Before each flight the propeller should be inspected for nicks, scratches, and corrosion. If found, they should be repaired as soon as possible by a rated machanic, since a nick or scratch causes an area of increased stress which can lead to serious cracks or the loss of a propeller tip. The back face of the blades should be painted when necessary with flat black paint to retard glare. To prevent corrosion, the surface should be cleaned and waxed periodically.

8.19 OIL REQUIREMENTS

The oil capacity of the engine is 8 quarts, and the minimum safe quantity is 3 quarts. It is recommended that the oil be changed every 50 hours and sooner under unfavorable operating conditions. The following grades are recommended for the specified temperatures:

Average Ambient Air Temperature For Starting	Oil Specification	Single Viscosity Grade	Multi-Viscosity Grades
Above 40° F	MHS-24A	SAE 50	See TCM Operator's Manual
Below 40° F	MHS-24A	SAE 30	



FUEL DRAIN
Figure 8-3

8.21 FUEL SYSTEM

(a) Servicing Fuel System

At every 50-hour inspection, the fuel screen in the strainer must be cleaned. The fuel strainer is located on the forward left lower side of the fire wall. It is accessible by removing the lower cowling. After cleaning, a small amount of grease applied to the gasket will facilitate reassembly.

(b) Fuel Requirements (AVGAS ONLY)

The minimum aviation grade fuel for the PA-28RT-201T is 100. Since the use of lower grades can cause serious engine damage in a short period of time, the engine warranty is invalidated by the use of lower octanes.

Whenever 100 or 100LL grade fuel is not available, commercial grade 100/130 should be used. (See Fuel Grade Comparison Chart.) Refer to the latest issue of Continental Service Bulletin "Fuel and Oil Grades."

A summary of the current grades as well as the previous fuel designations is shown in the following chart:

FUEL GRADE COMPARISON CHART

Previous Commercial Fuel Grades (ASTM-D910)			Current Commercial Fuel Grades (ASTM-D910-75)			Current Military Fuel Grades (MIL-G-5572E) Amendment No. 3		
Grade	Color	Max. TEL ml/U.S. gal.	Grade	Color	Max. TEL ml/U.S. gal.	Grade	Color	Max. TEL ml/U.S. gal.
80/87	red	0.5	80	red	0.5	80/87	red	0.5
91/98	blue	2.0	*100LL	blue	2.0	none	none	none
100/130	green	3.0	100	green	**3.0	100/130	green	**3.0
115/145	purple	4.6	none	none	none	115/145	purple	4.6

* - Grade 100LL fuel in some overseas countries is currently colored green and designated as "100L."
**- Commercial fuel grade 100 and grade 100/130 (both of which are colored green) having TEL content of up to 4 ml/U.S. gallon are approved for use in all engines certificated for use with grade 100/130 fuel.

The operation of the aircraft is approved with an anti-icing additive in the fuel. When an anti-icing additive is used it must meet the specification MIL-I-27686, must be uniformly blended with the fuel while refueling, must not exceed .15% by volume of the refueled quantity, and to ensure its effectiveness should be blended at not less than .10% by volume. One and one half liquid ozs. per ten gallon of fuel would fall within this range. A blender supplied by the additive manufacturer should be used. Except for the information contained in this section, the manufacturer's mixing or blending instructions should be carefully followed.

CAUTION

Assure that the additive is directed into the flowing fuel stream. The additive flow should start after and stop before the fuel flow. Do not permit the concentrated additive to come in contact with the aircraft painted surfaces or the interior surfaces of the fuel tanks.

CAUTIONS

Some fuels have anti-icing additives pre-blended in the fuel at the refinery, so no further blending should be performed.

Fuel additive can not be used as a substitute for preflight draining of the fuel system drains.

(c) Filling Fuel Tanks

Observe all safety precautions required when handling gasoline. Fill the fuel tanks through the filler located on the forward slope of the wing. Each wing holds a maximum of 38.5 U.S. gallons. When using less than the standard 77 gallon capacity, fuel should be distributed equally between each side. There is approximately 25 gallons in the fuel tank when fuel level is even with bottom of filler neck indicator.

(d) Draining Fuel Strainer, Sumps and Lines

The fuel system sumps and strainer should be drained daily prior to the first flight and after refueling to avoid the accumulation of contaminants such as water or sediment. Each fuel tank is equipped with an individual quick drain located at the lower inboard rear corner of the tank. The fuel strainer is equipped with a quick drain located on the front lower corner of the fire wall. Each of the fuel tank sumps should be drained first. Then the fuel strainer should be drained twice, once with the fuel selector valve on each tank. Each time fuel is drained, sufficient fuel should be allowed to flow to ensure removal of contaminants. This fuel should be collected in a suitable container, examined for contaminants, and then discarded.

CAUTIONS

When draining any amount of fuel, care should be taken to ensure that no fire hazard exists before starting the engine.

After draining, each quick drain should be checked to make sure it has closed completely and is not leaking.

(e) Draining Fuel System

The bulk of the fuel may be drained from the fuel cells by the use of a siphon hose placed in the cell or tank through the filler neck. The remainder of the fuel may be drained by opening all the drain valves.

CAUTION

When draining fuel, be sure that no fire hazard exists before starting the engine.

8.23 TIRE INFLATION

For maximum service from the tires, keep them inflated to the proper pressure of 27 psi for nose tire and 30 psi for main tires. All wheels and tires are balanced before original installation, and the relationship of tire, tube and wheel should be maintained upon reinstallation. In the installation of new components, it may be necessary to rebalance the wheels with the tires mounted. Unbalanced wheels can cause extreme vibration in the landing gear. When checking tire pressure, examine the tires for wear, cuts, bruises and slippage.

8.25 BATTERY SERVICE

Access to the 12-volt battery is through the baggage compartment. The battery container has a plastic drain tube which is normally closed off with a cap. The cap should be opened periodically to remove battery acid which may have collected in the tube.

The battery fluid level must not be brought above the baffle plates. It should be checked every 30 days to determine that the fluid level is proper and the connections are tight and free of corrosion. Do not fill the battery with acid - use water only.

If the battery is not properly charged, recharge it starting with a rate of four amperes and finishing with a rate of two amperes. The battery should be removed from the airplane for charging, and quick charges are not recommended.

The external power receptacle, if installed, is located on the right side of the fuselage aft of the baggage compartment door.

Refer to the Turbo Arrow IV Service Manual for battery servicing procedure.

8.27 CLEANING

(a) Cleaning Engine Compartment

Before cleaning the engine compartment, place a strip of tape on the magneto vents to prevent any solvent from entering these units.

(1) Place a large pan under the engine to catch waste.
(2) With the engine cowling removed, spray or brush the engine with solvent or a mixture of solvent and degreaser. In order to remove especially heavy dirt and grease deposits, it may be necessary to brush areas that were sprayed.

CAUTION

Do not spray solvent into the alternator, vacuum pump, starter, or air intakes.

(3) Allow the solvent to remain on the engine from five to ten minutes. Then rinse the engine clean with additional solvent and allow it to dry.

CAUTION

Do not operate the engine until excess solvent has evaporated or otherwise been removed.

(4) Remove the protective tape from the magnetos.
(5) Lubricate the controls, bearing surfaces, etc., in accordance with the Lubrication Chart.

(b) Cleaning Landing Gear

Before cleaning the landing gear, place a plastic cover or similar material over the wheel and brake assembly.

(1) Place a pan under the gear to catch waste.
(2) Spray or brush the gear area with solvent or a mixture of solvent and degreaser, as desired. Where heavy grease and dirt deposits have collected, it may be necessary to brush areas that were sprayed, in order to clean them.
(3) Allow the solvent to remain on the gear from five to ten minutes. Then rinse the gear with additional solvent and allow to dry.
(4) Remove the cover from the wheel and remove the catch pan.
(5) Lubricate the gear in accordance with the Lubrication Chart.

CAUTION

Do not brush the micro switches.

(c) Cleaning Exterior Surfaces

The airplane should be washed with a mild soap and water. Harsh abrasives or alkaline soaps or detergents could make scratches on painted or plastic surfaces or could cause corrosion of metal. Cover areas where cleaning solution could cause damage. To wash the airplane, use the following procedure:

(1) Flush away loose dirt with water.
(2) Apply cleaning solution with a soft cloth, a sponge or a soft bristle brush.
(3) To remove exhaust stains, allow the solution to remain on the surface longer.
(4) To remove stubborn oil and grease, use a cloth dampened with naphtha.
(5) Rinse all surfaces thoroughly.
(6) Any good automotive wax may be used to preserve painted surfaces. Soft cleaning cloths or a chamois should be used to prevent scratches when cleaning or polishing. A heavier coating of wax on the leading surfaces will reduce the abrasion problems in these areas.

(d) Cleaning Windshield and Windows

(1) Remove dirt, mud and other loose particles from exterior surfaces with clean water.
(2) Wash with mild soap and warm water or with aircraft plastic cleaner. Use a soft cloth or sponge in a straight back and forth motion. Do not rub harshly.
(3) Remove oil and grease with a cloth moistened with kerosene.

CAUTION

Do not use gasoline, alcohol, benzene, carbon tetrachloride, thinner, acetone, or window cleaning sprays.

(4) After cleaning plastic surfaces, apply a thin coat of hard polishing wax. Rub lightly with a soft cloth. Do not use a circular motion.
(5) A severe scratch or mar in plastic can be removed by rubbing out the scratch with jeweler's rouge. Smooth both sides and apply wax.

(e) Cleaning Headliner, Side Panels and Seats

(1) Clean headliner, side panels, and seats with a stiff bristle brush, and vacuum where necessary.
(2) Soiled upholstery, except leather, may be cleaned with a good upholstery cleaner suitable for the material. Carefully follow the manufacturer's instructions. Avoid soaking or harsh rubbing.

CAUTION

Solvent cleaners require adequate ventilation.

(3) Leather should be cleaned with saddle soap or a mild hand soap and water.

(f) Cleaning Carpets

To clean carpets, first remove loose dirt with a whisk broom or vacuum. For soiled spots and stubborn stains use a nonflammable dry cleaning fluid. Floor carpets may be cleaned like any household carpet.

8.29 WINTERIZATION

For winter operation a winterization kit is installed on the inlet opening of the oil cooler outboard chamber of the plenum chamber. This kit should be installed whenever the ambient temperature is 50° F or less. When the kit is not being used it can be stowed on the forward right hand side of the fire wall (long flange down) using the screw provided.

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TABLE OF CONTENTS

SECTION 9

SUPPLEMENTS

TABLE OF CONTENTS

SECTION 9

SUPPLEMENTS