

SECTION 6 - WEIGHT AND BALANCE

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6.1 AIRCRAFT WEIGHING PROCEDURE

6.1.1 Definitions, Symbols and Units

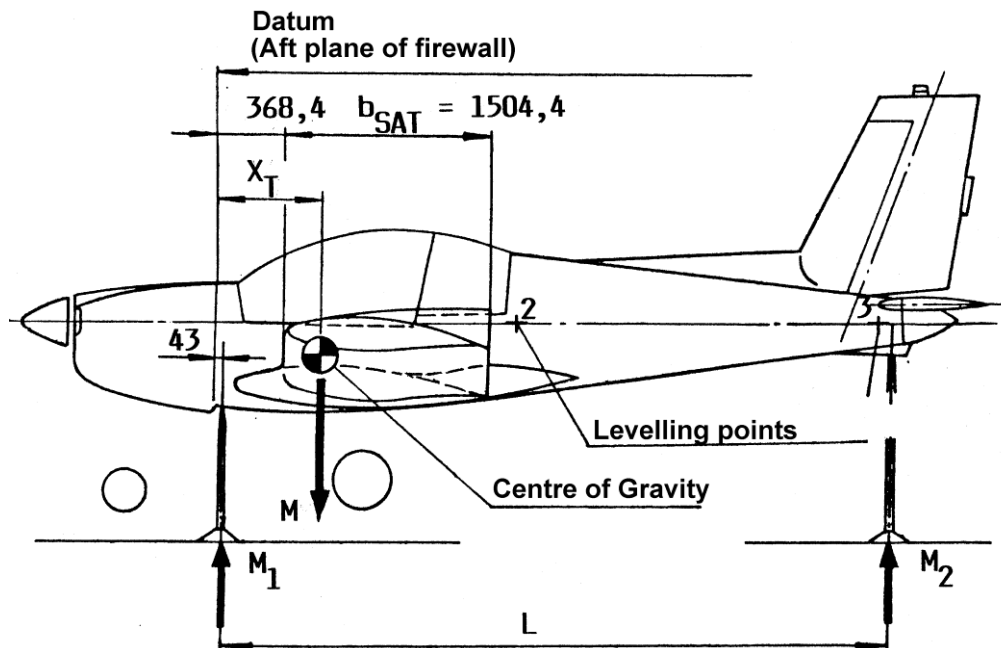


Fig. 6-1

NOTE:

Measures in figure are in millimetres.

M_1	:	Front scale (including jack) reading	kg, (lb)
M_2	:	Rear scale (including jack) reading	kg, (lb)
M_3	:	Total $M_1 + M_2$	kg, (lb)
M_4	:	Front jack weight	kg, (lb)
M_5	:	Rear jack weight	kg, (lb)
M_6	:	Total $M_4 + M_5$	kg, (lb)
M	:	Basic empty weight	kg, (lb)
L	:	Distance between jacking points	m, (inch)
S	:	Static moment $S = M \times X_T$	kgm, (lb inch)
b_{MAC}	:	Mean aerodynamic chord length	m, (inch)
X_T	:	Centre of gravity arm (measured from datum)	(m), (inch)
X_T	:	Centre of gravity position	(% b_{MAC})

- Weighing of the aircraft - weighing is carried out in order to determine the aircraft weight, centre of gravity and static moment. The aircraft shall be weighed in levelled position. It is supported by adjustable jacks at the first fuselage bulkhead and tail skid spar jacking points.
- Position of the aircraft - Levelled, as determined by the levelling points No.Nib 2 - Nib 3 located on the rear part of the fuselage.

6.1.2 Calculation Formulas

- (1) Standard Empty Weight:
 $M = M_3 - M_6$ kg,(lb)
- (2) Centre of Gravity Arm (measured from datum):
 $X_T = L \cdot \frac{M_2 - M_5}{M} + 0,043$ (m)
 $X_T = L \cdot \frac{M_2 - M_5}{M} + 1,7$ (inch)
- (3) Static Moment:
 $S = M \cdot X_T$ kgm, (lbinch)
- (4) Centre of Gravity position:

System of units	Calculation formula	Result
Metric	$\overline{X_T} = \left(\frac{X_T - 0,368}{1,504} \right) \cdot 100$ $\overline{X_T} = \left(\frac{S/M - 0,368}{1,504} \right) \cdot 100$	% b _{MAC}
Imperial	$\overline{X_T} = \left(\frac{X_T - 14,5}{59,23} \right) \cdot 100$ $\overline{X_T} = \left(\frac{S/M - 14,5}{59,23} \right) \cdot 100$	

Fig. 6-2

CAUTION:

THE WEIGHT AND CENTRE OF GRAVITY POSITION CHECK MAY BE CARRIED OUT EITHER IN THE METRIC OR IN THE IMPERIAL UNITS SYSTEM; HOWEVER, THE USER MUST SELECT AND USE ONLY ONE SINGLE SYSTEM.

6.3 WEIGHT AND BALANCE RECORD

At the time of licensing the manufacturer provides each airplane with the basic empty weight and centre of gravity position data. This information is entered in the Basic Empty Weight and Balance Record at the first row (ON DELIVERY) and on the production placard in aircraft, which is located in baggage compartment behind the seats.

The basic empty weight and C/G position:

Aircraft	Z242L	S/N		Registration mark	
Basic empty weight kg/lb		Centre of gravity m / inch		Static moment kgm / lb.inch	
730 / 1609.4		0.653 / 25.71		476.7 / 41377	

NOTE:

The tabled values correspond to the following conditions:

- (1) Actual aircraft status/equipment
- (2) The aircraft system contain
 - unusable fuel
 - maximum oil quantity
- (3) Brake system
 - filled with hydraulic fluid
- (4) Position of seats
 - extreme front
- (5) Canopy
 - closed

Fig. 6-3

CAUTION:

- (1) WHENEVER NEW EQUIPMENT IS ADDED OR ANY ALTERNATIONS IS PERFORMED, THE RESPONSIBLE PERSON MUST RECALCULATE OR REPEAT THE WEIGHING OF THE AIRPLANE BASIC EMPTY WEIGHT (DEPENDING ON THE NATURE OF CHANGE).
- (2) HISTORY OF CHANGES IN THE AIRPLANE EQUIPMENT LEADING TO CHANGES OF THE WEIGHT AND THE STATIC MOMENT IS TO BE ENTERED INTO THE "BASIC EMPTY WEIGHT AND BALANCE RECORD".
- (3) THE LIST OF WEIGHTS AND CORRESPONDING ARMS OF THE PARTS OF EQUIPMENT IS IN SECTION 6.7.

Form for recalculation of weights and static moment of basic empty weight

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NOTE:

The arms and moments of the items installed in front of the datum, bear negative sign and their moments must be subtracted.

Fig. 6-4

6.5 WEIGHT AND BALANCE DETERMINATION FOR FLIGHT

6.5.1 Static moments of variable load

The variable load arms for the calculation of static moments are as follows.

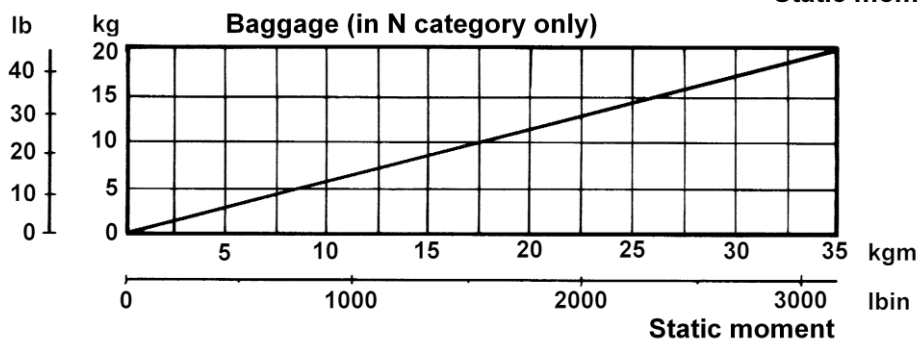
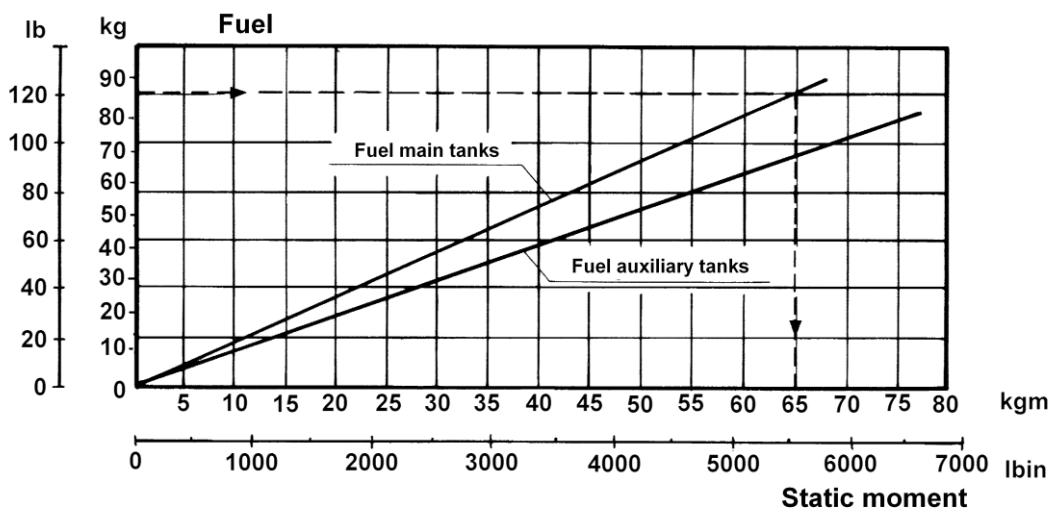
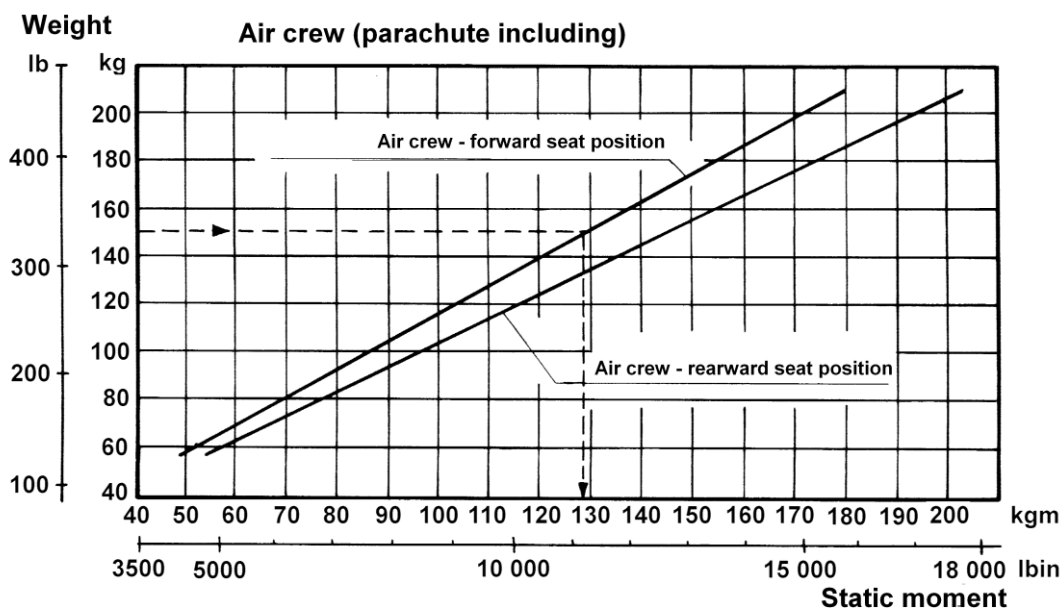
Variable Load	Specification		Arm	
			m	inch
Pilots	Position of seats L 242	front	0,856	33,700
		middle	0,906	35,670
		rear	0,956	37,640
	Position of seats E 242	1 position	0,856	33,700
		2 position	0,881	34,600
		3 position	0,906	35,670
		4 position	0,931	36,600
		5 position	0,956	37,640
Fuel	Main tanks		0,750	29,530
	Auxiliary tanks		0,948	37,320
Oil			-0,434	-17,090
Baggage In category N only.			1,766	69,530

The static moments of the particular variable loads are calculated:

- as the product of the particular arm and the variable load weight
- from the graph of: **Air crew, Fuel, Baggage** (see Fig. 6-6) static moments

Fig. 6-5

Graphs of Air crew, Fuel, Baggage static moments



6.5.2 Weight and balance check procedure

CAUTION:

THE PILOT IS OBLIGED TO CHECK THE TAKE-OFF WEIGHT, THE VARIABLE LOAD AND THE CENTRE OF GRAVITY POSITION BEFORE EACH FLIGHT.

The calculation shall be carried out on the “Weight and Balance Record”.

Weight and Balance Record

No.	Date:		Type: Z 242L	S/N:			
				Registration Mark:			
	Description:		Maximum permissible variable load	Weight		Static moment	
				kg	lb	kgm	lb inch
1.	Basic Empty Weight		-				
2.	Seats	left	max. 100 kg* (220 lb)				
		right	max. 100 kg* (250 lb)				
3.	MAIN TANKS.....litres (.....U.S.gal)						
4.	Category Z	AUXILIARY TANKSlitres (.....U.S.gal)					
5.		Baggage – total max. 20 kg (44,10 lb)					
6.	Σ						
7.	Check C/G position :			$\bar{X}_T =$ %b _{MAC}			

* applicable for L 242 and E 242 seats

Fig. 6-7

Calculating procedure:

- (1) The Basic empty weight and Static moment are determined in Section 6.3.
- (2) The procedure for calculating the static moments of variable loads is described in Section 6.5.1.
- (3) Sum up the Weights and the static moments in the “Weight and balance record” columns.
- (4) The loading of the airplane is ACCEPTABLE if the intersection of the “static moment” and “total weight” lines lay within the loading envelope in appropriate category in the “Centre of gravity position check graph” - Section 6.5.3.

Sample problem

Task:

Check the take-off weight and the centre of gravity position for the following flight conditions:

- (1) Basic empty weight - 760 kg,
Static moment - 447 kgm
- (2) Left pilot 73 kg (front position of seat)
- (3) Right pilot 96 kg (rear position of seat)
- (4) Fuel in the main tanks 2x60 litres
- (5) Fuel in the auxiliary tanks 2x20 litres
- (6) Total weight of baggage 20 kg

NOTE:

Conversion units of fuel:

1 liters	= 0,72 kg	= 1,587 lb
1 U.S.gal.	= 2,725 kg	= 6,010 lb

Calculation

- (1) Enter the basic empty weight/moment values into "Weight and balance record" line (1) (see task - weight 760 kg, static moment 447 kgm).
- (2) Determine the values of static moments for the left and right pilots according to Sect. 6.3:
 - a) Left pilot $73 \times 0,856 = 62,5 \text{ kgm}$
 - b) Right pilot $96 \times 0,956 = 91,8 \text{ kgm}$

Enter the weights and static moments of the pilot into line (2).

NOTE:

For determining the static moments of the pilots, the position of the seat must be observed.

- (3) Calculate the fuel weight in the main tanks. Conversion coefficient is $0,72 \text{ kg} = 1 \text{ litres of fuel}$
Fuel weight = $120 \times 0,72 = 86,4 \text{ kg}$
According to Sect. 6.3., determine the fuel static moment in the main tanks = $86,4 \times 0,750 = 64,8 \text{ kgm}$
The weight and the fuel static moment in the main tanks are entered on line (3).
- (4) Calculate the fuel weight in the auxiliary tanks. Conversion coefficient is $0,72 \text{ kg} = 1 \text{ litres of fuel}$
Fuel weight = $40 \times 0,72 = 28,8 \text{ kg}$
According to Sect. 6.3., determine the fuel static moment in the auxiliary tanks = $28,8 \times 0,948 = 27,3 \text{ kgm}$
The weight and the fuel static moment in the main tanks are entered on line (4).
- (5) According to Sect. 6.3., determine the value of static moment of the baggage = $20 \times 1,766 = 35,3 \text{ kgm}$
Enter the weight and the static moment of the baggage on line (5).
- (6) Calculate sums of the weights and of the static moments and enter them on line (6).
 Σ of weights = 1064,2 kg (point A - graph)
 Σ of static moments = 728,7kgm (point B - graph)
- (7) The check of the centre of gravity position shows the compliance with the limitation envelope in the "C/G position check" graph, Section 6.5.3.
The resulting centre of gravity position is 21.0 % b_{MAC} .

Filled Weight and Balance Record according to the example

No.	Date:		Type: Z 242L	S/N: example			
				Registration Mark: example			
	Description:		Maximum permissible variable load	Weight		Static moment	
				kg	lb	kgm	lb inch
1.	Basic Empty Weight		-	760		447	
2.	Seats	left	max. 100 kg* (220 lb)	73		62,5	
		right	max. 100 kg* (250 lb)	96		91,8	
3.	MAIN TANKS.....litres (.....U.S.gal)			86,4		64,8	
4.	Category N	AUXILIARY TANKSlitres (.....U.S.gal)		28,8		27,3	
5.		Baggage – total max. 20 kg (44,10 lb)		20		35,3	
6.	Σ			1064,2		728,7	
7.	Check C/G position acc. to graph 6.5.3 / Fig. 6-8 or calculate see 6.1.2 (4)			$\bar{X}_T = 21 \%b_{MAC}$			

* applicable for L 242 and E 242 seats

Fig. 6-8

CONCLUSION: The point 3 is situated in diagram the permissible centre of gravity and NORMAL category weight limit range. With regard to weight and centre of gravity the flight may be executed.

6.5.3 Centre of gravity position check diagram

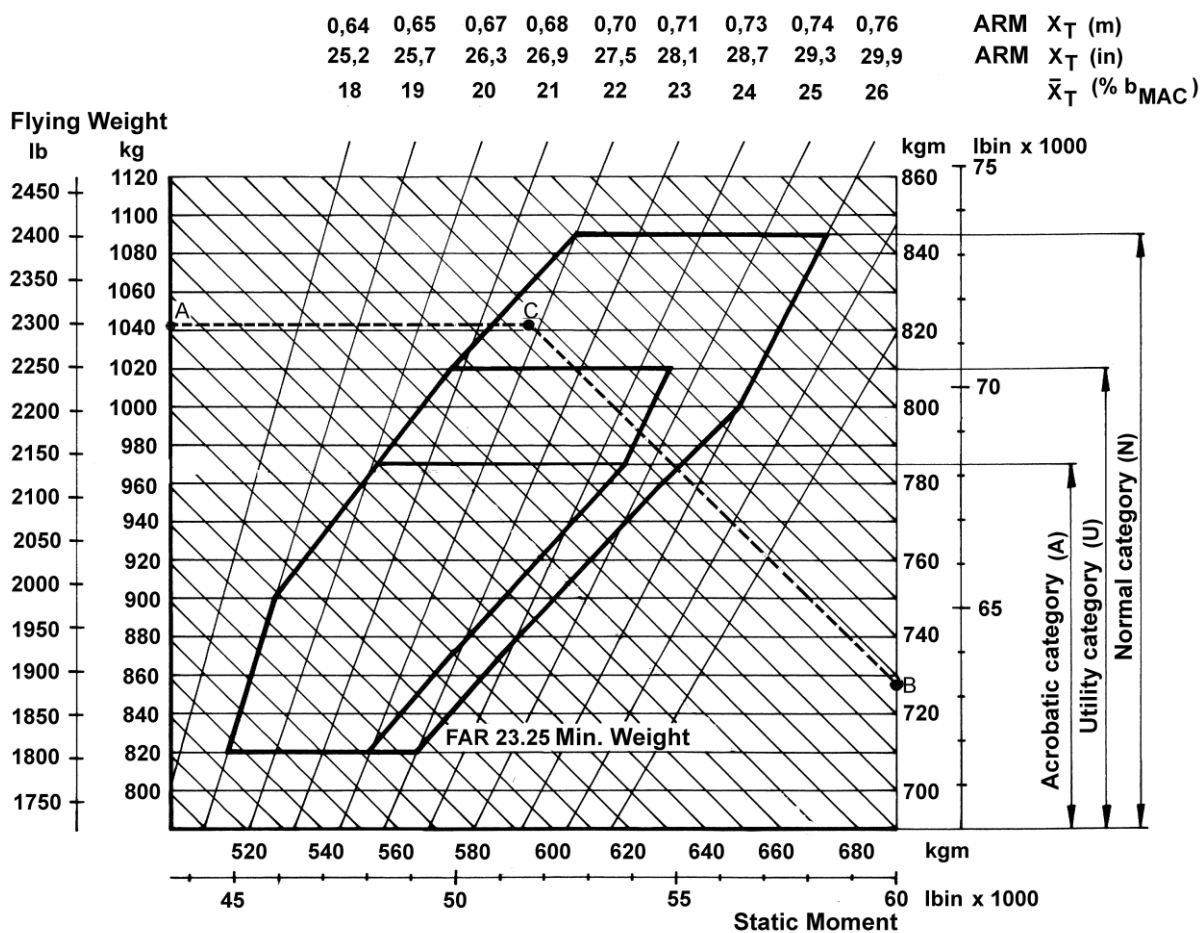


Fig. 6-9

6.7 **EQUIPMENT LIST**

Abbreviations:

- A - Avionics
- E - Electric
- I - Instruments
- P - Powerplant
- R - Airframe

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
A1	VHF COMM Transceiver	Bendix/King KY 96A	1,320	2,91	0,280	11,0
A2	VHF COMM Transceiver	Bendix/King KY 196A	1,270	2,80	0,280	11,0
A3	Audio Control Console	Bendix/King KA 134	0,360	0,79	0,333	13,8
A4	Audio Control Console	Bendix/King KMA 24	0,770	1,70	0,330	13,0
A5	Audio Control Console	Bendix/King KMA 24 H-70	0,770	1,70	0,330	13,0
A6	Audio Control Console	Garmin GMA 340	0,736	1,62	0,330	13,0
A7	Integrated Navigation system	Bendix/King KNS-81	2,300	5,07	0,264	10,4
A8	Audio Control Console	N.A.T Canada AA 12	0,450	0,99	0,335	13,1
A9	NAV COMM Transceiver	Bendix/King KX 155 (A)	2,400	5,29	0,280	11,0
A10	NAV COMM Transceiver	Bendix/King KX 165 (A)	2,560	5,64	0,280	11,0
A11	Electric Horizontal Situation Indicator	Sandell SN-3308	1,315	2,90	0,320	12,6
A12	Horizontal Situation Indicator	Bendix/King KI 525A	1,800	3,97	0,230	9,1
A13	Horizontal Situation Indicator	Bendix/King KI 825	1,400	3,08	0,320	12,6
A14	Slaving Accessory	Bendix/King KA 51B	0,100	0,22	0,410	16,1
A15	Directional Gyro	Bendix/King KG 102A	2,000	4,41	2,200	86,6
A16	Magnetic Slaving Transmitter	Bendix/King KMT 112	1,973	4,35	0,775	30,5
A17	ADF (Automatic Direction Finder)	Bendix/King KR 87	1,450	3,20	0,226	10,5

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
A18	ADF Indicator	Bendix/King KI 227	0,320	0,71	0,406	16,0
A19	ADF Indicator	Bendix/King KI 227.01	0,320	0,71	0,406	16,0
A20	RMI (Radio Magnetic Indicator)	Bendix/King KI 229	1,300	2,87	0,323	12,7
A21	ADF antenna	Bendix/King KA 44B	1,270	2,80	1,600	63,0
A22	Transponder	Bendix/King KT 71	1,760	3,88	0,297	11,7
A23	Transponder	Bendix/King KT 76A	1,410	3,11	0,238	9,4
A24	Transponder	Bendix/King KT 76C	0,950	2,00	0,238	9,4
A25	Transponder	Garmin GTX 327	1,100	2,39	0,238	9,4
A26	DME	Bendix/King KN 62A	1,180	2,60	0,295	11,6
A27	DME	Bendix/King KN 63	1,270	2,80	2,190	86,2
A28	DME	Bendix/King KN 64	1,18	2,60	0,295	11,6
A29	DME Indicator	Bendix/King KDI 572	1,630	3,59	0,263	10,4
A30	DME/Transponder Antenna	Bendix/King KA 60	0,090	0,20	0,200	7,9
A31	VOR-ILS Indicator	Bendix/King KI 202	0,590	1,30	0,347	13,7
A32	VOR-ILS Indicator	Bendix/King KI 203	0,730	1,61	0,307	12,1
A33	VOR-ILS Indicator	Bendix/King KI 204	0,780	1,72	0,306	12,0
A34	VOR-ILS Indicator	Bendix/King KI 206	0,590	1,30	0,307	12,1
A35	VOR-LOC Indicator	Bendix/King KI 208	0,400	0,88	0,306	12,0
A36	VOR-LOC-GS Indicator	Bendix/King KI 209	0,500	1,10	0,306	12,0
A37	VLOC-GPS Indicator	Garmin GI 106 A	0,640	1,40	0,307	11,8
A38	Marker	Bendix/King KR 21	0,250	0,55	0,376	14,8
A39	Marker	Bendix/King KR 22	0,180	0,39	0,388	15,2

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
A40	Encoding Altimeter	Bendix/King KEA 129	0,860	1,90	0,343	13,5
A41	Encoding Altimeter	Bendix/King KEA 130	0,860	1,90	0,343	13,5
A42	Encoding Altimeter- Digitizer	Bendix/King D-120-P2T	0,450	0,99	0,396	14,5
A43	Encoding Altimeter-Digitizer	Terra Avionics AT 3000	0,150	0,33	0,400	15,7
A44	Encoding Altimeter-Digitizer	Ameri King AK 350	0,181	0,40	0,386	15,2
A45	COMM Antenna	Comant Industries CI 122	0,220	0,49	2,575	101,4
A46	COMM Antenna	Comant Industries CI 292-1	0,220	0,48	2,470	92,2
A47	COMM Antenna	Dorne & Margolin DM C63-1A	0,227	0,50	2,470	92,2
A48	NAV Antenna	Comant Industries CI 158C	0,158	0,35	4,476	176,2
A49	NAV Antenna	Comant Industries CI 157P	0,220	0,48	4,600	181,1
A50	NAV Antenna	Comant Industries CI 159C	0,220	0,48	4,600	181,1
A51	Marker Antenna	Comant Industries CI 102	0,270	0,60	2,250	88,6
A52	GPS	Garmin 100 AVD	0,794	1,75	0,368	14,5
A53	GPS	Garmin 150 AVD	0,970	2,14	0,368	14,5
A54	GPS	Garmin 155 XL	0,930	2,05	0,368	14,5
A55	GPS	Bendix/King KLN 90A	2,860	6,31	0,266	10,5
A56	COMM/NAV/GPS system	Garmin GNS 430	2,270	5,00	0,368	14,5
A57	GPS Antenna	Bendix/King KA 91	0,270	0,60	2,075	81,7
A58	GPS Antenna	Bendix/King KA 92	0,227	0,50	2,075	81,7
A59	GPS Antenna	Garmin 100 AVD	0,250	0,55	2,075	81,7
A60	GPS Antenna	Garmin 150 AVD	0,250	0,55	2,075	81,7
A61	GPS Antenna	Garmin GA 56	0,120	0,25	1,889	74,4

[illegible]

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
E1	Battery	Gill G-246	19,000	41,89	1,775	69,9
E2	Battery	CONCORDE RG 24-20	19,000	41,89	1,775	69,9
E3	Battery	Varley AK 24/18 Ah	19,000	41,89	1,775	69,9
E4	Annunciator Lights Panel	Mikrotechna 08 LUN 2697.04-8	0,400	0,88	0,360	14,2
E5	Ignition Switch BENDIX	10-357200-1 10-357200-1H	0,215	0,47	0,386	15,2
E6	Anticollision Beacon	Whelen Engineering WRML	0,680	1,50	4,825	200,0
E7	Anticollision Beacon	Universal Corp. FS-4400	0,482	1,06	4,825	200,0
E8	Map Light	Antreg KLSRK-45	0,250	0,55	0,760	30,0
E9	Landing Light	Hella 1x2 001 517-05	0,400	0,88	0,584	23,0
E10	Taxi Light	Hella 1x2 001 517-07	0,400	0,88	0,584	23,0
E11	Position Light Green	Hella 2LA 001 627-00	0,170	0,37	1,447	57,0
E12	Position Light Red	Hella 2LA 001 627-02	0,170	0,37	1,447	57,0
E13	Position Light White	Hella 2LA 001 625-00	0,070	0,15	5,671	223
E14	Position Light Green	Whelen Engineering A 650 PG 28	0,113	0,25	1,447	57,0
E15	Position Light Red	Whelen Engineering A 650 PR 28	0,113	0,25	1,447	57,0
E16	Position Light White	Whelen Engineering A 555	0,100	0,22	5,671	223
E17	Strobe Lights Convertor	Whelen Engineering A 413 HDACF 14-28	1,400	3,09	1,562	61,5
E18	Turn and bank Alternate Source	Whelen Engineering 6CX2S A212/1,1s	1,300	2,87	1,625	64,0
E19	Intercom	ZLIN AIRCRAFT Z 42.8623	0,200	0,44	0,113	4,45
E20	Intercom	Signtronic SPA-400 TSO	0,150	0,33	0,360	14,2

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
I1	Airspeed Indicator	LUN 1106.xx-8	0,400	0,88	0,355	14,0
I2	Airspeed Indicator	LUN 1107.xx-8	0,500	1,10	0,356	14,0
I3	Altimeter	UI 5934 D-1	0,861	1,90	0,312	12,3
I4	Altimeter	UI 5934 D-3	0,861	1,90	0,312	12,3
I5	Altimeter	LUN 1124.xx-8	0,650	1,43	0,310	12,2
I6	Vertical Speed Indicator	LUN 1144.xx-8	0,500	1,10	0,352	13,9
I7	Vertical Speed Indicator	LUN 1147.xx-8	0,500	1,10	0,352	13,9
I8	Vertical Speed Indicator	UI 7030	0,544	1,20	0,357	14,1
I9	Turn and Bank Indicator	LUN 1213.xx-8	0,950	2,09	0,350	13,8
I10	Turn and Bank Indicator	S-TEC 6407-28L	0,771	1,70	0,335	13,2
I11	Turn and Bank Indicator	UI 9013 N-5	0,771	1,70	0,334	13,5
I12	Directional Gyro	AIM 205-1BL	1,320	2,91	0,333	13,1
I13	Directional Gyro	AIM 205-2BL	1,320	2,91	0,333	13,1
I14	Directional Gyro	LUN 1272-8	1,500	3,30	0,342	13,4
I15	Attitude Gyro	AIM 510-8D	1,360	3,00	0,319	12,6
I16	Attitude Gyro	LUN 1241.A8G8W	1,600	3,53	0,350	13,8
I17	Attitude Gyro	AIM 1200	1,360	3,00	0,319	12,6
I18	Clock	Astrotech LC 2	0,150	0,33	0,380	15,0
I19	Clock	MD 91 LET	0,200	0,44	0,385	15,2
I20	Magnetic Compass	27 LUN 1224-8	0,200	0,44	0,385	15,2
I21	R.P.M. Indicator	AIM 3330-0017	0,350	0,77	0,371	14,6
I22	R.P.M. Indicator	Mitchell CD-112-5021	0,350	0,77	0,371	14,6

Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
I23	R.P.M. Indicator	Mitchell CD-112-5022	0,350	0,77	0,371	14,6
I24	R.P.M. Indicator	Mitchell CD-112-5024	0,350	0,77	0,371	14,6
I25	Fuel Indicator	LUN 1639.xx	0,700	1,54	0,364	14,3
I26	CHT/EGT Indicator	Alcor 47 028	0,181	0,40	0,378	14,9
I27	Manifold Pressure Indicator	LUN 1401.xx-8	0,220	0,49	0,373	14,7
I28	Accelerometer	AM 10.13	0,270	0,60	0,374	14,7
I29	V-A Meter	LUN 2744.xx-8	0,400	0,88	0,368	14,5
I30	Motor-Hours Counter	Hobbs 15 124	0,050	0,11	0,400	15,7
I31	ELT	ACK Technologies E-01	1,500	3,31	1,700	66,9
I32	ELT	Pointer 3000	0,860	1,90	1,700	66,9
I33	Outside Air Thermometer	Rn 45(8)	0,150	0,33	0,600	23,6
I34	Outside Air Thermometer	SCOTT 2716	0,150	0,33	0,600	23,6
I35	Rear Accelerometer	L242.8279	0,330	0,73	1,925	75,8
I36	Monitoring Accelerometer Unit	AMU1.01	0,130	0,29	0,940	37,0
I37	Clock	DAVTRON M800	0,340	0,74	0,24	9,4
I38	ELT	ARTEX ME-406	0,840	1,87	1,50	59,0
I39	ELT	KANNAD 406 AF	0,840	1,87	1,50	59,0

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Item	Designation	Model	Weight		Arm	
			kg	lb	m	inch
R1	First Aid Kit	C 142.8261	0,550	1,21	1,081	42,6
R2	Towing Gear	C 142.8400	1,141	2,52	4,766	187,6
R3	Towing Gear	L 242.8400	2,000	4,41	5,300	208,7
R4	Rear-view Window	Z 142.8265	0,290	0,64	0,776	30,6
R5	Front Curtains	Z 142.8171	0,286	0,63	1,666	45,9
R6	Front Curtains - extended	C 142.8171	0,300	0,66	1,166	45,9
R7	Rear Curtains	Z 142.8173	0,420	0,92	1,700	66,9
R8	Map Lamp	L 242.8940	0,250	0,55	0,760	29,9
R9	Supplementary Lighting	Z 142.8950	0,250	0,55	1,364	53,7
R10	Parachute Back-rest	C 142.8160	1,300	2,87	1,078	42,4
R11	Portable Fire Extinguisher	T1H or T1 FM 100	2,500	5051	0,650	25,6
R12	Nose Wheel Cover	L 242.5730	1,800	3,97	-0,600	-23,6
R13	Main Wheel Cover L.H.	L 242.5710 or L 242.5750	2,800	6,17	1,150	45,3
R14	Main Wheel Cover R.H.	L 242.5720 or L 242.5760	2,800	6,17	1,150	45,3
R15	Covers for IFR Flight Training	L 242.8150	0,500	1,10	0,766	30,1
R16	Covers for IFR Flight Training	Z 143.8192	0,500	1,10	0,776	30,6
R17	Alternate Static Pressure Source	L 242.8259	0,100	0,22	0,400	15,7
R18	Main Wheel for Barum	K 22-0100-7	3,500	7,72	1,150	45,3
R19	Main Wheel for Goodyear	K 22-3100-7	4,400	9,70	1,150	45,3
R20	Tire	Barum 420x150	4,100	9,04	1,150	45,3
R21	Tire	Goodyear 6.00-6.5	2,670	5,89	1,150	45,3
R22	Air Tube	Barum 420x150	1,050	2,31	1,150	45,3

Fig. 6-10