PART 1 - INTRODUCTION

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LIST OF FIGURES

INTRODUCTION

This appendix contains the performance data and graphs necessary for the planning of a specific mission from takeoff to landing, including an explanatory text of the data presented in each part. The information contained in the graphs is based on, and is consistent with, the operational procedures and techniques recommended in this manual. The data is presented in graphic form. However, in some cases, for simplicity and clarity, it is given in tables.

The associated conditions of the performance data are given in each graph or table, together with other necessary specifications (flap position, etc.). When this is not specified, the graphs are based on zero wind and ISA atmospheric conditions. The engine data is based on the use indistinctly of JP-8, JP-5, JET A or JET A-1 fuels.

AIRSPEED CORRECTION FOR POSITION ERROR

The airspeed correction graphs show the airspeed correction due to the location of the static vents. The graphs show the calibrated airspeed (CAS) as a function of indicated airspeed (IAS) in ground effect, Figure 1-1, and out of ground effect, Figure 1-2. In both cases the graphs for the normal and the emergency systems are shown.

The graphs with ground effect are shown with the flap position 10º and 15º.

The graphs without ground effect are shown with different flap positions (0°, 10°, 15°, and 23°) with aircraft weight as a parameter.

ALTIMETER CORRECTION FOR POSITION ERROR

The altitude calibration graphs show the correction due to the location of the static vents. The graphs show the altitude correction (ΔHp) which has to be added to the indicated pressure altitude (Hpi) as a function of the indicated airspeed (IAS) in ground effect, Figure 1-3, and out of ground effect, Figure 1-4. In both cases, the normal and the emergency system graphs are shown.

The graphs with ground effect are shown for different flap positions (10° and 15°) with the indicated pressure altitude as a parameter.

The graphs without ground effect are shown for different flap positions (0°,10°,15°, and 23°) at sea level with the aircraft weight as a parameter with low speed. At high speed the weight correction is negligible and it is corrected with altitude as a parameter.

In this case, the true pressure altitude (Hp) equals:

$$Hp = Hpi + \Delta Hp$$

CALIBRATED AIRSPEED CORRECTION FOR COMPRESSIBILITY

The graph in Figure 1-5 shows the correction (ΔVc) which has to be subtracted from the calibrated airspeed (CAS) in order to obtain the equivalent airspeed (EAS).

$$EAS = CAS - \Delta Vc$$

TRUE AIRSPEED

The true airspeed (TAS) can be obtained from equivalent airspeed by means of the graph of Figure 1-6 knowing the calibrated airspeed.

TEMPERATURE VARIATION FROM ISA

The Figure 1-7 allows to obtain the temperature deviation from standard day, once the ambient temperature is known, with the pressure altitude as a parameter. Also, the Figure 1-8 shows the conversion between Fahrenheit and Centigrade.

STANDARD ATMOSPHERE

The standard atmosphere table (Figure 1-9) shows the standard atmospheric values as defined by the International Civil Aviation Organisation (ICAO). The ICAO assumes a temperature of 15°C (59°F) and a pressure of 1013 mb (29.92 inches of mercury) as the standard conditions at sea level. The temperature variation (temperature gradient) is approximately constant, -2°C for every 1000 ft from sea level up to 36089 ft. In Figure 1-9 the ISA atmosphere values are shown in function of the pressure altitude.

CONVERSION TABLES

Figure 1-10 presents the conversion from Pressure Altitude to QFE in mb and millimetres of Hg.

Figure 1-11 presents the conversion from Pressure Altitude or QFE to QNH in mb as function of airport elevation.

EXAMPLE

Given:

1. Aircraft weight: 23.000 kg

2. Flaps: 0º

3. Altimeter reading (supposing instrument error nil): 10.000 feet

4. Airspeed indicator reading (supposing instrument error nil): 185 KIAS

5. Outside air temperature indicator reading (supposing instrument error nil): 0ºC

6. Wind speed: 10 knots (headwind)

Calculate the true pressure altitude and the true airspeed.

1.	ΔH_{po} (Figure 1-4, sheet 1)	-40 ft (insignificant)
2.	True pressure altitude	10.000 ft
3.	Temperature variation from standard (Figure 1-7)	ISA+5°C
4.	Calibrated arispeed (Figure 1-2, sheet 1)	187 kts
5.	Correction for compressibility ΔV_c (Figure 1-5)	+1 kts
6.	Equivalent airspeed $V_E = V_C - \Delta V_c$	186 kts
7.	True airspeed (Figure 1-6)	217 kts
8.	Ground speed.	207 kts

AIRSPEED CALIBRATION, IN GROUND EFFECT

DATE: JUL. 2000   **AIRCRAFT:**   C-295M
DATA BASIS: FLIGHT TEST   **ENGINES:**   PW 127-G
                                              PROPELLERS: HS 568F-5
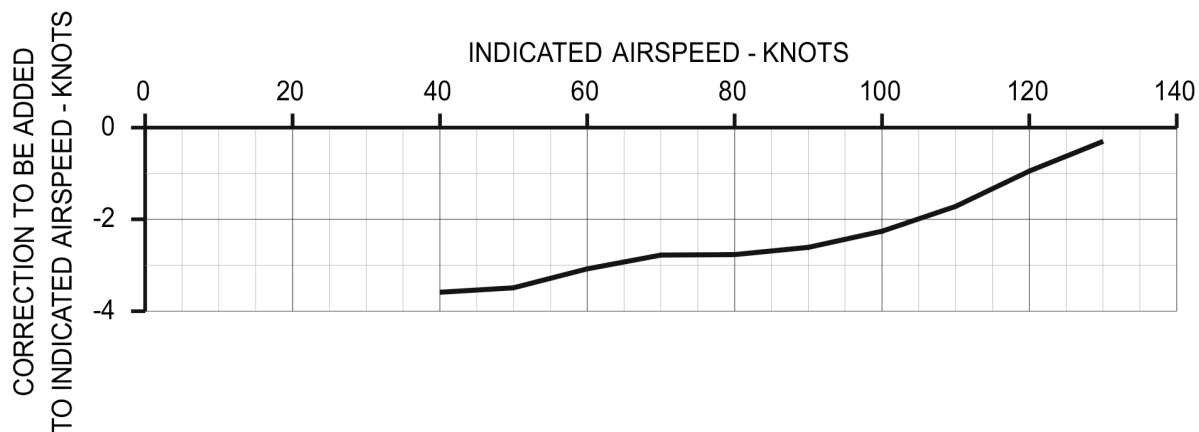
NORMAL SYSTEM

EMERGENCY SYSTEM

Figure 1-1 Airspeed Calibration. In Ground Effect. Normal and Emergency System

AIRSPEED CALIBRATION, OUT OF GROUND EFFECT
NORMAL SYSTEM

DATE:	JUL. 2000	**AIRCRAFT:**	C-295M
DATA BASIS:	FLIGHT TEST	**ENGINES:**	PW 127-G
		PROPELLERS:	HS 568F-5
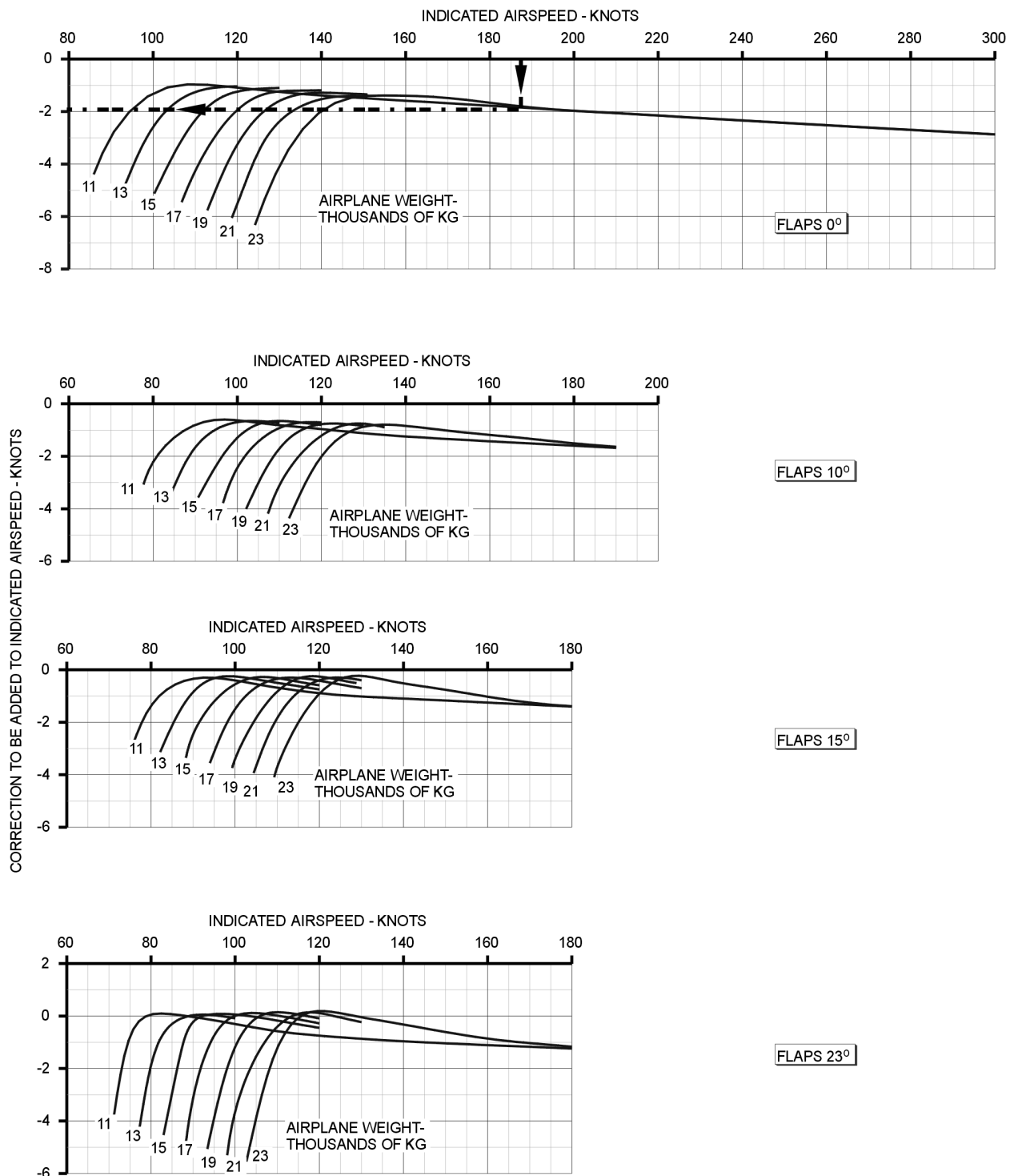
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Figure 1-2 (Sheet 1 of 2) Airspeed Calibration. Out of Ground Effect

AIRSPEED CALIBRATION, OUT OF GROUND EFFECT
EMERGENCY SYSTEM

DATE: JUL. 2000   **AIRCRAFT:** C-295M
DATA BASIS: FLIGHT TEST   **ENGINES:** PW 127-G
                                    PROPELLERS: HS 568F-5
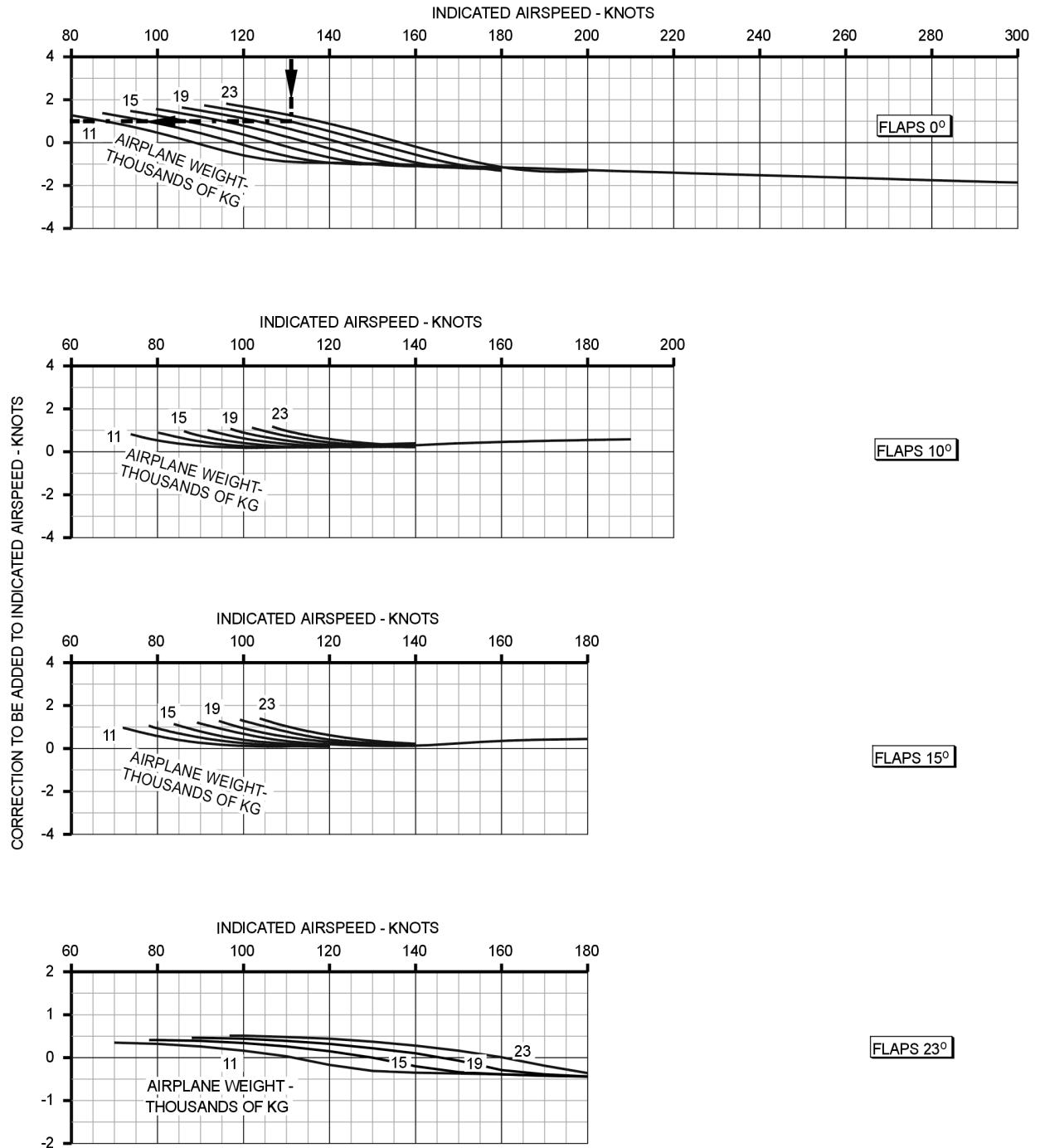
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Figure 1-2 (Sheet 2 of 2) Airspeed Calibration. Out of Ground Effect

ALTITUDE CALIBRATION, IN GROUND EFFECT

DATE:	JUL. 2000	**AIRCRAFT:**	C-295M
DATA BASIS:	FLIGHT TEST	**ENGINES:**	PW 127-G
		PROPELLERS:	HS 568F-5
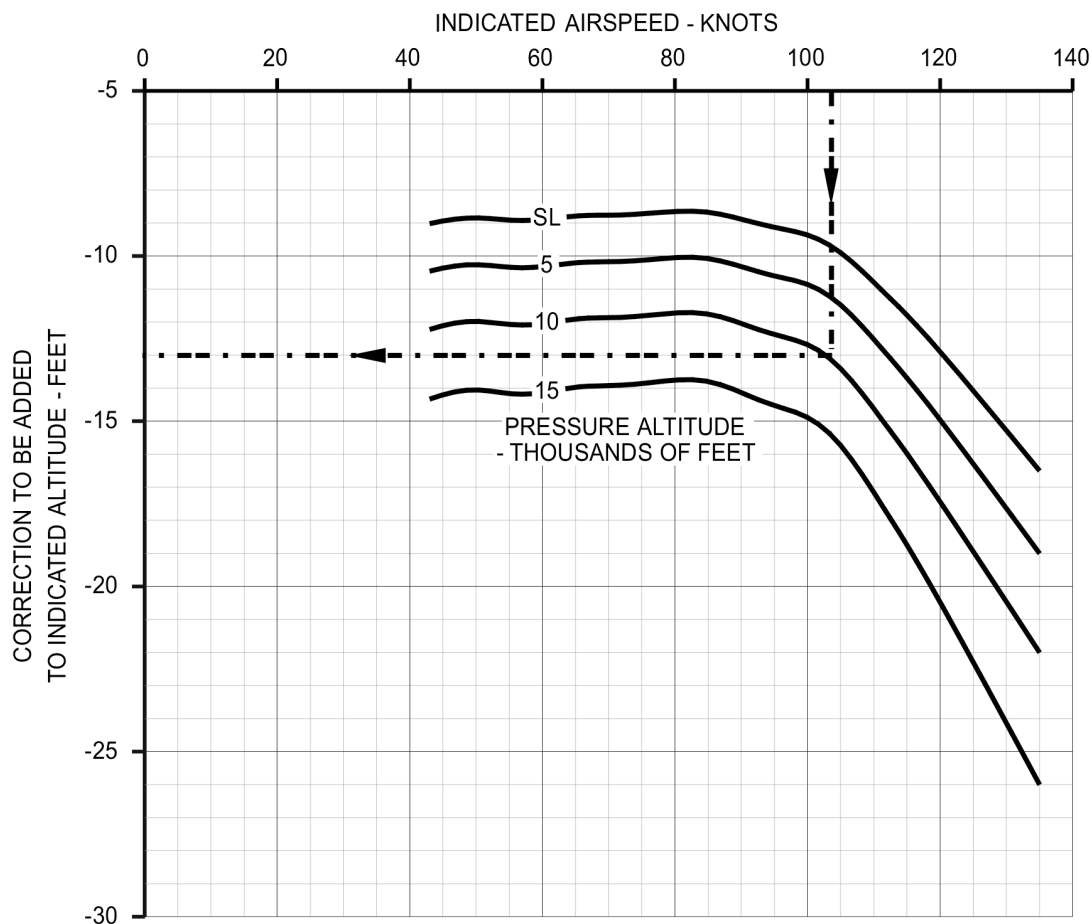
NORMAL SYSTEM
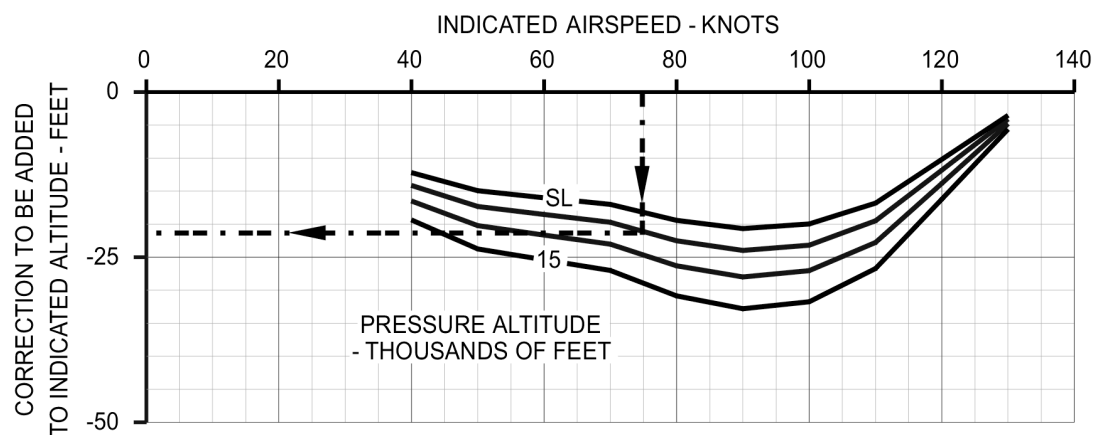
EMERGENCY SYSTEM

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Figure 1-3 Altitude Calibration. In Ground Effect. Normal and Emergency System

ALTITUDE CALIBRATION, OUT OF GROUND EFFECT
NORMAL SYSTEM

DATE: JUL. 2000
DATA BASIS: FLIGHT TEST
AIRCRAFT: C-295M
ENGINES: PW 127-G
PROPELLERS: HS 568F-5
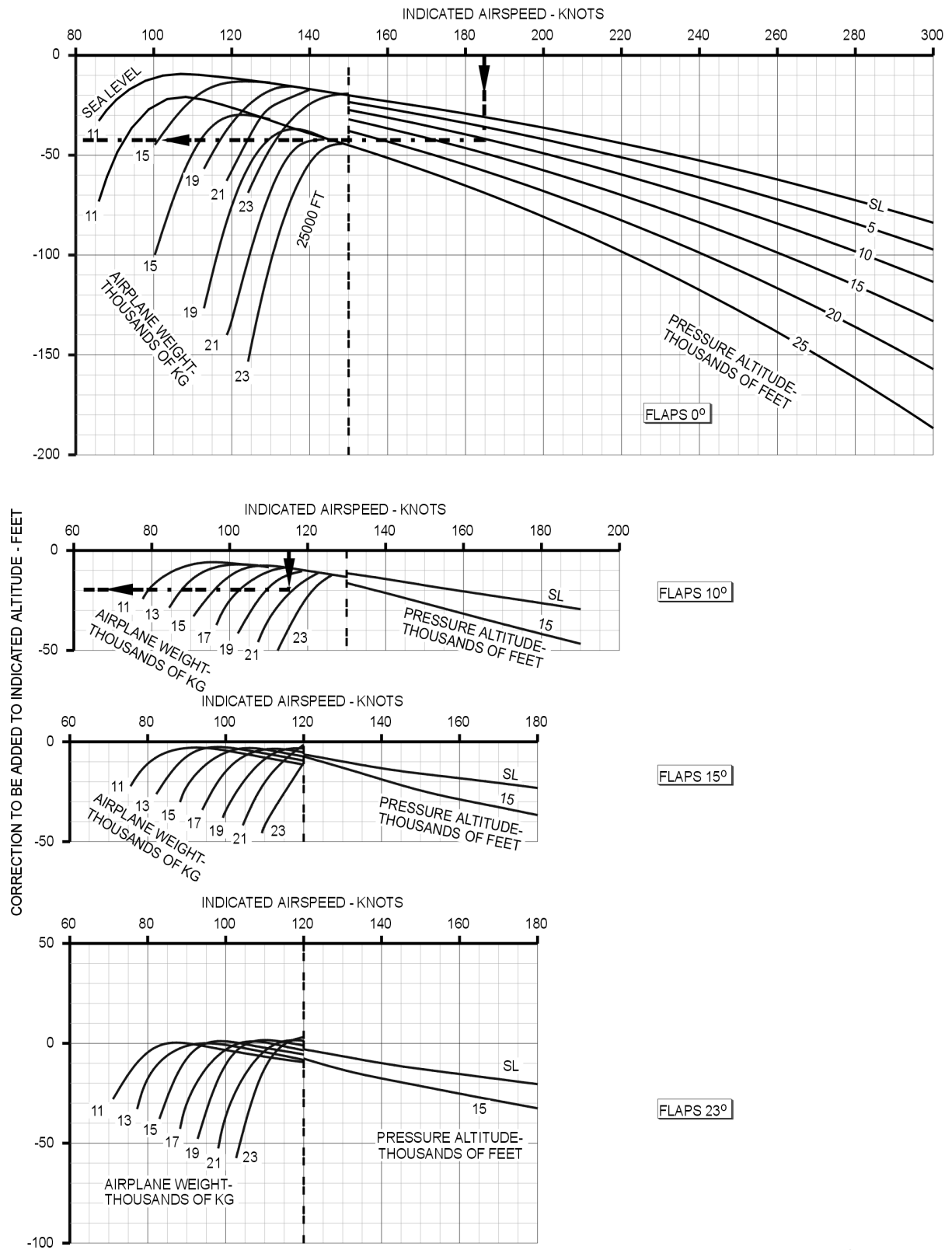
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Figure 1-4 (Sheet 1 of 2) Altitude Calibration. Out of Ground Effect

ALTITUDE CALIBRATION, OUT OF GROUND EFFECT
EMERGENCY SYSTEM

DATE: JUL. 2000
DATA BASIS: FLIGHT TEST

AIRCRAFT: C-295M
ENGINES: PW 127-G
PROPELLERS: HS 568F-5
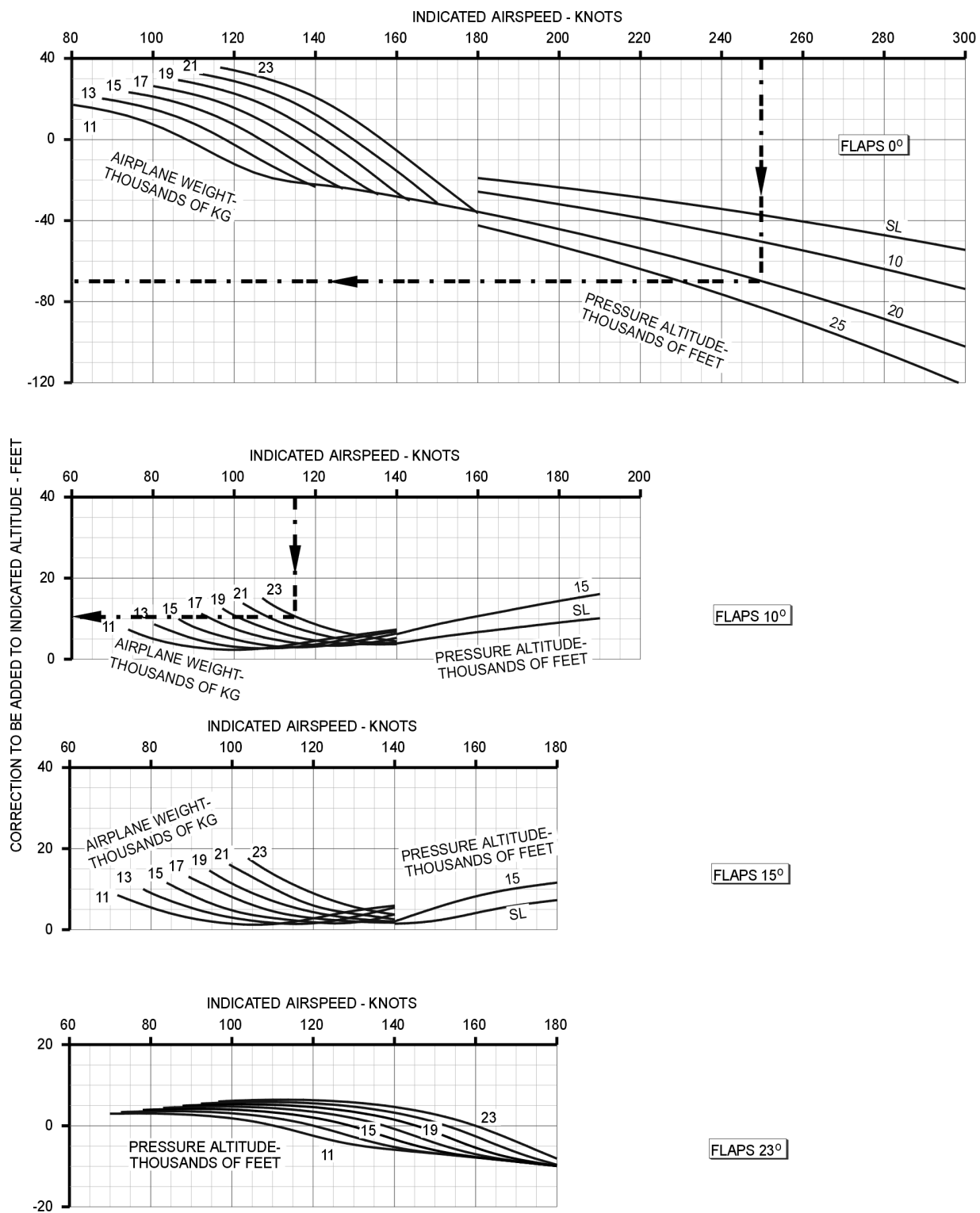
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Figure 1-4 (Sheet 2 of 2) Altitude Calibration. Out of Ground Effect

COMPRESSIBILITY CORRECTION TO CALIBRATED AIRSPEED
EAS = CAS - $\triangle V_c$

DATE: OCT. 1991
DATA BASIS: CALCULATED

Figure 1-5 Compressibility Correction to Calibrated Airspeed
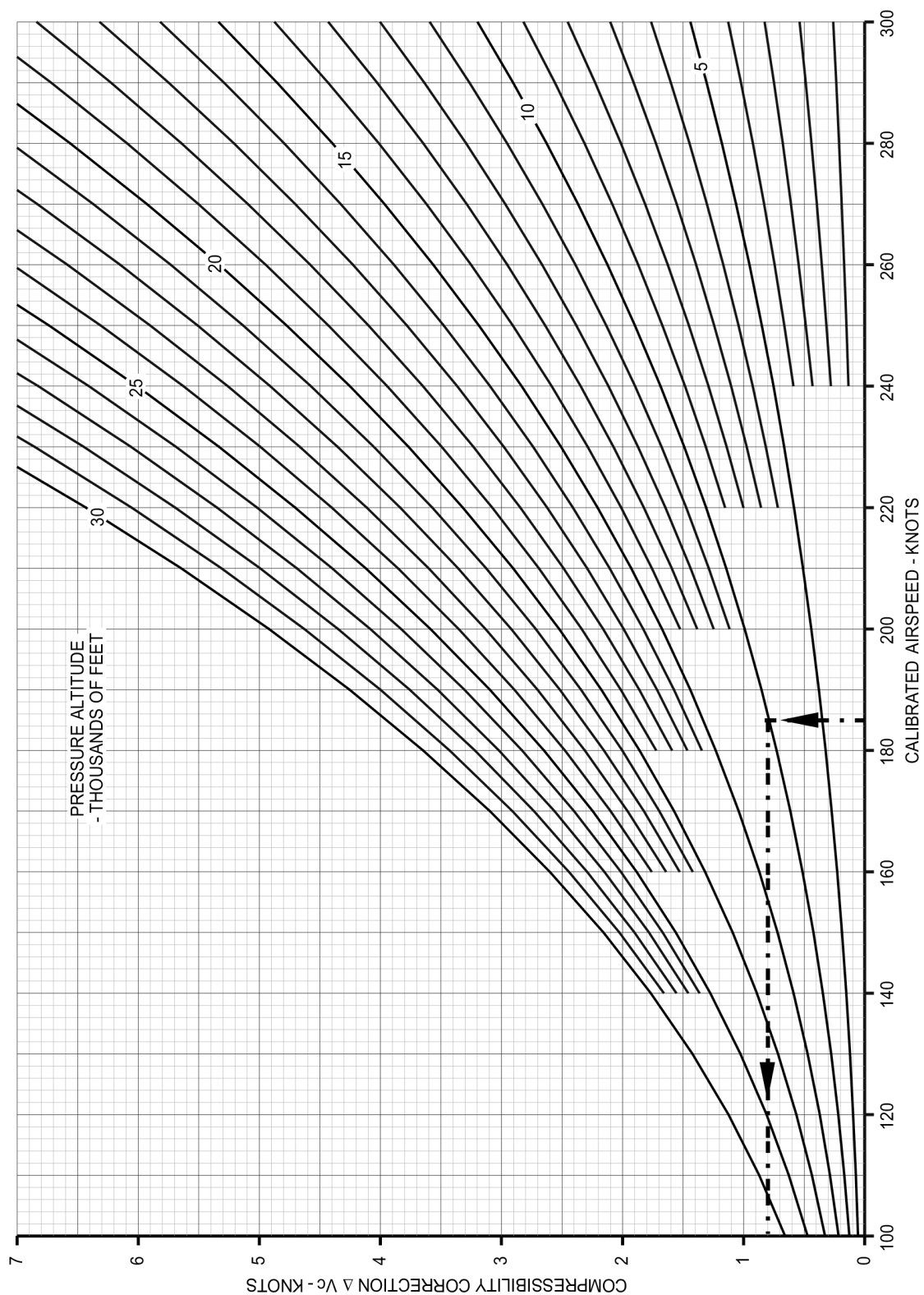
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CAS - TAS AIRSPEED CONVERSIONS

DATE: OCT. 1991
DATA BASIS: CALCULATED
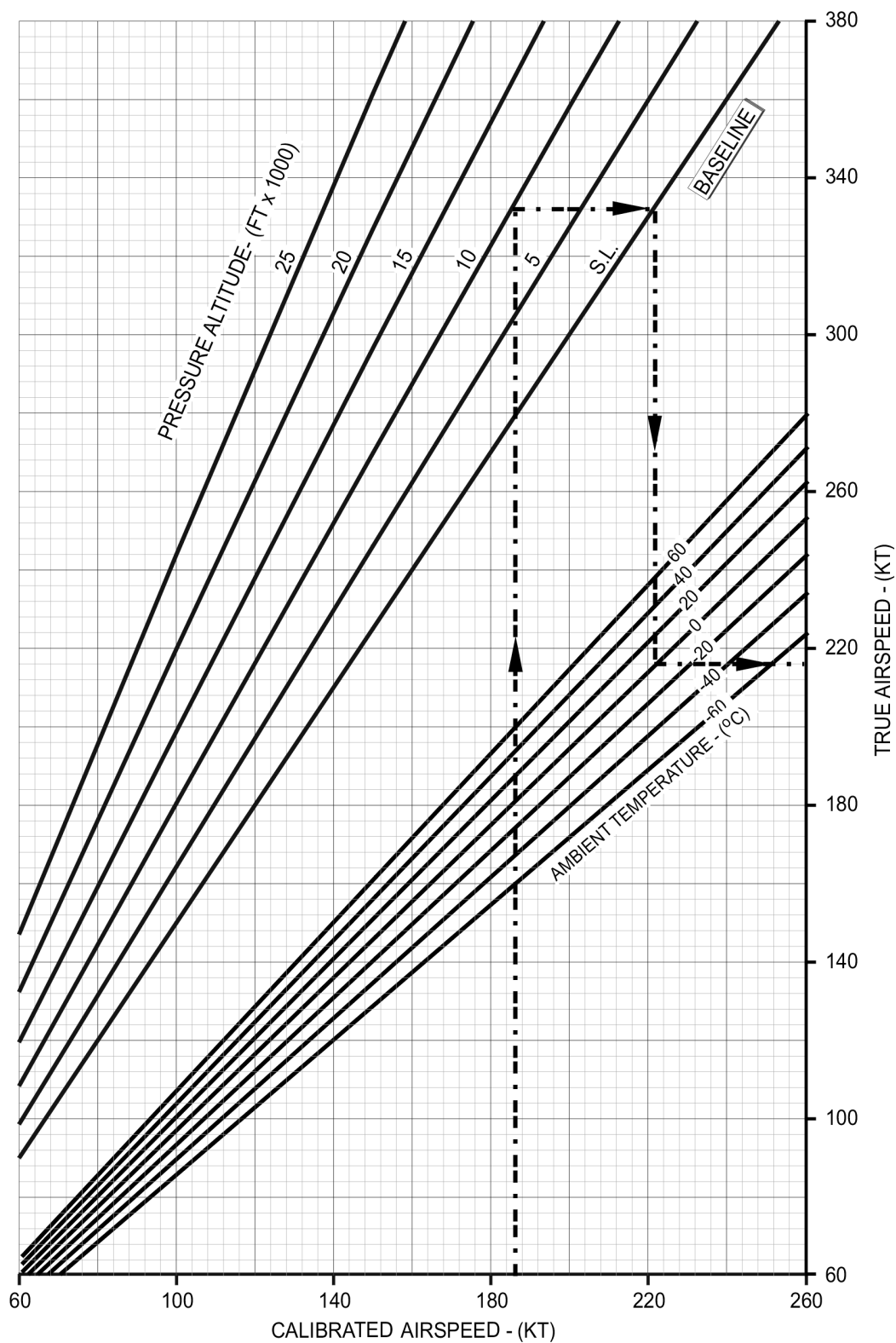
15-A-156150-C-0117B-00008-A-01-1IÉò

Figure 1-6 CAS-TAS Airspeed Conversions

TEMPERATURE VARIATION FROM ISA

DATE: OCT. 1991
DATA BASIS: CALCULATED

Figure 1-7 Temperature Variation from ISA
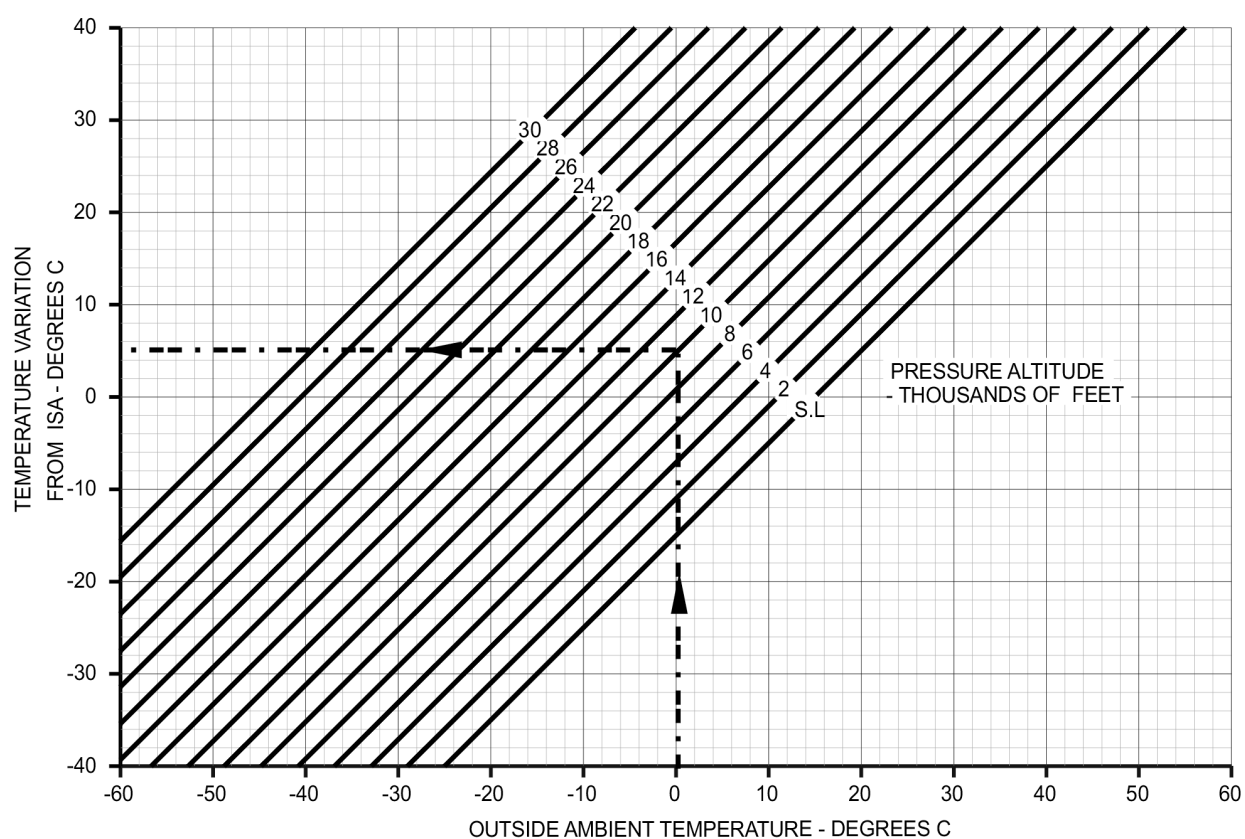
15-A-156150-C-0117B-00009-A-01-1IÉò

TEMPERATURA CONVERSION

DATE: MAY. 1990
DATA BASIS: CALCULATED

15-A-156150-C-0117B-00010-A-01-1IÉò
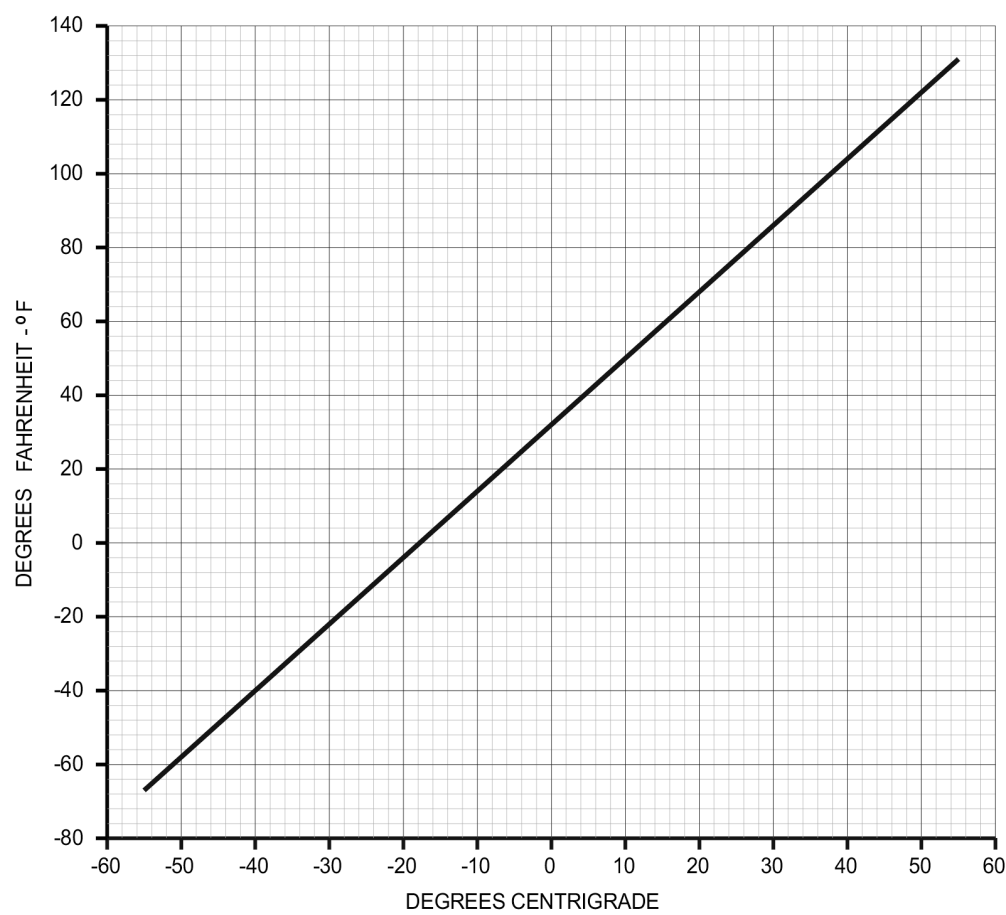
Figure 1-8 Temperature Conversion

STANDARD ATMOSPHERE TABLE

Pressure Altitude (ft)	Density Ratio σ	$1/\sqrt\sigma$	Temperature			Pressure		
			Ratio θ	°C	°F	Ratio δ	mb	In Hg
0	1.0000	1.0000	1.0000	15.00	59.00	1.0000	1013.25	29.92
1000	0.9711	1.0148	0.9931	13.02	55.43	0.9644	977.17	28.86
2000	0.9428	1.0299	0.9862	11.04	51.87	0.9298	942.13	27.82
3000	0.9151	1.0453	0.9794	9.06	48.30	0.8962	908.12	26.82
4000	0.8881	1.0611	0.9725	7.08	44.74	0.8637	875.11	25.84
5000	0.8617	1.0773	0.9656	5.09	41.17	0.8320	843.07	24.90
6000	0.8359	1.0938	0.9587	3.11	37.60	0.8014	812.00	23.98
7000	0.8106	1.1107	0.9519	1.13	34.04	0.7716	781.85	23.09
8000	0.7860	1.1279	0.9450	-0.85	30.47	0.7428	752.62	22.22
9000	0.7620	1.1456	0.9381	-2.83	26.90	0.7148	724.28	21.39
10000	0.7385	1.1637	0.9312	-4.81	23.34	0.6877	696.82	20.58
11000	0.7156	1.1822	0.9244	-6.79	19.77	0.6614	670.20	19.79
12000	0.6932	1.2011	0.9175	-8.77	16.21	0.6360	644.41	19.03
13000	0.6713	1.2205	0.9106	-10.76	12.64	0.6113	619.43	18.29
14000	0.6500	1.2403	0.9037	-12.74	9.07	0.5875	595.24	17.58
15000	0.6292	1.2606	0.8969	-14.72	.51	0.5643	571.82	16.89
16000	0.6090	1.2815	0.8900	-16.70	1.94	0.5420	549.15	16.22
17000	0.5892	1.3028	0.8831	-18.68	-1.62	0.5203	527.22	15.57
18000	0.5699	1.3246	0.8762	-20.66	-5.19	0.4994	506.00	14.94
19000	0.5511	1.3470	0.8694	-22.64	-8.76	0.4791	485.48	14.34
20000	0.5328	1.3700	0.8625	-24.62	-12.32	0.4595	465.63	13.75
21000	0.5150	1.3935	0.8556	-26.61	-15.89	0.4406	446.45	13.18
22000	0.4976	1.4176	0.8487	-28.59	-19.46	0.4223	427.91	12.64
23000	0.4807	1.4424	0.8419	-30.57	-23.02	0.4046	410.01	12.11
24000	0.4642	1.4678	0.8350	-32.55	-26.59	0.3876	392.71	11.60
25000	0.4481	1.4938	0.8281	-34.53	-30.15	0.3711	376.01	11.10
26000	0.4325	1.5206	0.8212	-36.51	-33.72	0.3552	359.89	10.63
27000	0.4173	1.5480	0.8144	-38.49	-37.29	0.3398	344.33	10.17
28000	0.4025	1.5762	0.8075	-40.47	-40.85	0.3250	329.32	9.72
29000	0.3881	1.6052	0.8006	-42.45	-44.42	0.3107	314.85	9.30
30000	0.3741	1.6349	0.7937	-44.44	-47.98	0.2970	300.90	8.89

Figure 1-9 Standard Atmosphere Table

PRESSURE ALTITUDE CONVERSION TABLE
MB- INCHES OF MERCURY

QFE mb	in. Hg	PRESS. ALTIT. ft	QFE mb	in. Hg	PRESS. ALTIT. ft	QFE mb	in. Hg	PRESS. ALTIT. ft	QFE mb	in. Hg	PRESS. ALTIT. ft
1040	30.71	-723	928	27.40	2412	816	24.10	5870	704	20.79	9736
1038	30.65	-669	926	27.34	2471	814	24.04	5935	702	20.73	9809
1036	30.59	-616	924	27.29	2529	812	23.98	6000	700	20.67	9883
1034	30.53	-562	922	27.23	2588	810	23.92	6065	698	20.61	9956
1032	30.47	-508	920	27.17	2647	808	23.86	6131	696	20.55	10030
1030	30.42	-454	918	27.11	2706	806	23.80	6197	694	20.49	10105
1028	30.36	-400	916	27.05	2766	804	23.74	6262	692	20.43	10179
1026	30.30	-346	914	26.99	2825	802	23.68	6328	690	20.38	10253
1024	30.24	-292	912	26.93	2884	800	23.62	6394	688	20.32	10328
1022	30.18	-238	910	26.87	2944	798	23.56	6461	686	20.26	10403
1020	30.12	-184	908	26.81	3004	796	23.51	6527	684	20.20	10478
1018	30.06	-129	906	26.75	3063	794	23.45	6593	682	20.14	10553
1016	30.00	-75	904	26.69	3123	792	23.39	6660	680	20.08	10628
1014	29.94	-20	902	26.64	3183	790	23.33	6727	678	20.02	10704
1012	29.88	34	900	26.58	3243	788	23.27	6794	676	19.96	10780
1010	29.83	89	898	26.52	3303	786	23.21	6861	674	19.90	10855
1008	29.77	144	896	26.46	3364	784	23.15	6928	672	19.84	10932
1006	29.71	199	894	26.40	3424	782	23.09	6995	670	19.78	11008
1004	29.65	254	892	26.34	3485	780	23.03	7063	668	19.73	11084
1002	29.59	309	890	26.28	3545	778	22.97	7130	666	19.67	11161
1000	29.53	364	888	26.22	3606	776	22.92	7198	664	19.61	11238
998	29.47	419	886	26.16	3667	774	22.86	7266	662	19.55	11315
996	29.41	474	884	26.10	3728	772	22.80	7334	660	19.49	11392
994	29.35	530	882	26.05	3789	770	22.74	7402	658	19.43	11469
992	29.29	585	880	25.99	3850	768	22.68	7470	656	19.37	11547
990	29.23	641	878	25.93	3911	766	22.62	7539	654	19.31	11625
988	29.18	697	876	25.87	3973	764	22.56	7607	652	19.25	11703
986	29.12	752	874	25.81	4034	762	22.50	7676	650	19.19	11781
984	29.06	808	872	25.75	4096	760	22.44	7745	648	19.14	11859
982	29.00	864	870	25.69	4157	758	22.38	7814	646	19.08	11938
980	28.94	920	868	25.63	4219	756	22.32	7883	644	19.02	12016
978	28.88	977	866	25.57	4281	754	22.27	7952	642	18.96	12095
976	28.82	1033	864	25.51	4343	752	22.21	8022	640	18.90	12174
974	28.76	1089	862	25.45	4406	750	22.15	8091	638	18.84	12254
972	28.70	1146	860	25.40	4468	748	22.09	8161	636	18.78	12333
970	28.64	1202	858	25.34	4530	746	22.03	8231	634	18.72	12413
968	28.58	1259	856	25.28	4593	744	21.97	8301	632	18.66	12493
966	28.53	1316	854	25.22	4656	742	21.91	8371	630	18.60	12573
964	28.47	1372	852	25.16	4718	740	21.85	8442	628	18.54	12653
962	28.41	1429	850	25.10	4781	738	21.79	8512	626	18.49	12734
960	28.35	1486	848	25.04	4844	736	21.73	8583	624	18.43	12815
958	28.29	1543	846	24.98	4907	734	21.67	8654	622	18.37	12896
956	28.23	1601	844	24.92	4971	732	21.62	8725	620	18.31	12977
954	28.17	1658	842	24.86	5034	730	21.56	8796	618	18.25	13058
952	28.11	1715	840	24.81	5098	728	21.50	8867	616	18.19	13140
950	28.05	1773	838	24.75	5161	726	21.44	8939	614	18.13	13222
948	27.99	1830	836	24.69	5225	724	21.38	9010	612	18.07	13304
946	27.94	1888	834	24.63	5289	722	21.32	9082	610	18.01	13386
944	27.88	1946	832	24.57	5353	720	21.26	9154	608	17.95	13469
942	27.82	2004	830	24.51	5417	718	21.20	9226	606	17.90	13551
940	27.76	2062	828	24.45	5481	716	21.14	9299	604	17.84	13634
938	27.70	2120	826	24.39	5546	714	21.08	9371	602	17.78	13717
936	27.64	2178	824	24.33	5610	712	21.03	9444	600	17.72	13801
934	27.58	2236	822	24.27	5675	710	20.97	9516	598	17.66	13884
932	27.52	2295	820	24.21	5740	708	20.91	9589	596	17.60	13968
930	27.46	2353	818	24.16	5805	706	20.85	9662	594	17.54	14052

Figure 1-10 Pressure Altitude Conversion Table MB - Inches of Mercury

PRESSURE ALTITUDE – QNH CONVERSION TABLE

QFE:mb
PRESSURE
ALTITUDE: ft

QNH (mb)	AIRFIELD ELEVATION									
	-500	0	500	1000	1500	2000	2500	3000	3500	4000
980	998	980	962	945	928	911	894	878	862	846
	420	920	1420	1920	2420	2920	3420	3920	4420	4920
985	1003	985	967	950	932	915	899	882	866	850
	280	780	1280	1780	2280	2780	3280	3780	4280	4780
990	1008	990	972	955	937	920	903	887	871	854
	141	641	1141	1641	2141	2641	3141	3641	4141	4641
995	1013	995	977	959	942	925	908	891	875	859
	2	502	1002	1502	2002	2502	3002	3502	4002	4502
1000	1018	1000	982	964	947	930	913	896	880	863
	-136	364	864	1364	1864	2364	2864	3364	3864	4364
1005	1023	1005	987	969	952	934	917	901	884	868
	-274	226	726	1226	1726	2226	2726	3226	3726	4226
1010	1028	1010	992	974	956	939	922	905	889	872
	-411	89	589	1089	1589	2089	2589	3089	3589	4089
1013	1032	1013	995	977	960	942	925	908	891	875
	-500	0	500	1000	1500	2000	2500	3000	3500	4000
1015	1033	1015	997	979	961	944	927	910	893	877
	-548	-48	452	952	1452	1952	2452	2952	3452	3952
1020	1039	1020	1002	984	966	948	931	914	898	881
	-684	-184	316	816	1316	1816	2316	2816	3316	3816
1025	1044	1025	1007	989	971	953	936	919	902	886
	-819	-319	181	681	1181	1681	2181	2681	3181	3681
1030	1049	1030	1012	993	976	958	941	923	907	890
	-954	-454	46	546	1046	1546	2046	2546	3046	3546
1035	1054	1035	1017	998	980	963	945	928	911	894
	-1089	-589	-89	411	911	1411	1911	2411	2911	3411
1040	1059	1040	1021	1003	985	967	950	933	916	899
	-1223	-723	-223	277	777	1277	1777	2277	2777	3277
1045	1064	1045	1026	1008	990	972	954	937	920	903
	-1356	-856	-356	144	644	1144	1644	2144	2644	3144
1050	1069	1050	1031	1013	995	977	959	942	925	908
	-1489	-989	-489	11	511	1011	1511	2011	2511	3011

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Figure 1-11 (Sheet 1 of 3) Pressure Altitude - QNH Conversion Table

PRESSURE ALTITUDE – QNH CONVERSION TABLE

QFE:mb
PRESSURE
ALTITUDE: ft

QNH (mb)	AIRFIELD ELEVATION									
	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000
980	830	814	799	784	769	755	741	727	713	699
	5420	5920	6420	6920	7420	7920	8420	8920	9420	9920
985	834	819	803	788	774	759	745	730	716	703
	5280	5780	6280	6780	7280	7780	8280	8780	9280	9780
990	839	823	808	793	778	763	749	734	720	707
	5141	5641	6141	6641	7141	7641	8141	8641	9141	9641
995	843	827	812	797	782	767	753	738	724	710
	5002	5502	6002	6502	7002	7502	8002	8502	9002	9502
1000	847	832	816	801	786	771	757	742	728	714
	4864	5364	5864	6364	6864	7364	7864	8364	8864	9364
1005	852	836	820	805	790	775	761	746	732	718
	4726	5226	5726	6226	6726	7226	7726	8226	8726	9226
1010	856	840	825	809	794	779	765	750	736	722
	4589	5089	5589	6089	6589	7089	7589	8089	8589	9089
1013	859	843	827	812	797	782	767	753	738	724
	4500	5000	5500	6000	6500	7000	7500	8000	8500	9000
1015	860	845	829	813	798	783	769	754	740	726
	4452	4952	5452	5952	6452	6952	7452	7952	8452	8952
1020	865	849	833	818	802	787	773	758	744	729
	4316	4816	5316	5816	6316	6816	7316	7816	8316	8816
1025	869	853	837	822	806	791	777	762	747	733
	4181	4681	5181	5681	6181	6681	7181	7681	8181	8681
1030	874	858	842	826	811	795	781	766	751	737
	4046	4546	5046	5546	6046	6546	7046	7546	8046	8546
1035	878	862	846	830	815	799	784	770	755	741
	3911	4411	4911	5411	5911	6411	6911	7411	7911	8411
1040	882	866	850	834	819	804	788	774	759	745
	3777	4277	4777	5277	5777	6277	6777	7277	7777	8277
1045	887	870	854	839	823	808	792	778	763	748
	3644	4144	4644	5144	5644	6144	6644	7144	7644	8144
1050	891	875	859	843	827	812	796	782	767	752
	3511	4011	4511	5011	5511	6011	6511	7011	7511	8011

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Figure 1-11 (Sheet 2 of 3) Pressure Altitude - QNH Conversion Table

PRESSURE ALTITUDE – QNH CONVERSION TABLE

PRESSURE
ALTITUDE: ft

QNH (mb)	AIRFIELD ELEVATION									
	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000
980	686	672	659	646	634	621	609	597	585	574
	10420	10920	11420	11920	12420	12920	13420	13920	14420	14920
985	689	676	663	650	637	625	613	600	589	577
	10280	10780	11280	11780	12280	12780	13280	13780	14280	14780
990	693	680	667	654	641	628	616	604	592	580
	10141	10641	11141	11641	12141	12641	13141	13641	14141	14641
995	697	683	670	657	644	632	619	607	595	583
	10002	10502	11002	11502	12002	12502	13002	13502	14002	14502
1000	701	687	674	661	648	635	623	611	598	587
	9864	10364	10864	11364	11864	12364	12864	13364	13864	14364
1005	704	691	677	664	651	639	626	614	602	590
	9726	10226	10726	11226	11726	12226	12726	13226	13726	14226
1010	708	694	681	668	655	642	630	617	605	593
	9589	10089	10589	11089	11589	12089	12589	13089	13589	14089
1013	710	697	683	670	657	644	632	619	607	595
	9500	10000	10500	11000	11500	12000	12500	13000	13500	14000
1015	712	698	685	671	658	646	633	621	608	596
	9452	9952	10452	10952	11452	11952	12452	12952	13452	13952
1020	716	702	688	675	662	649	636	624	612	600
	9316	9816	10316	10816	11316	11816	12316	12816	13316	13816
1025	719	705	692	679	665	653	640	627	615	603
	9181	9681	10181	10681	11181	11681	12181	12681	13181	13681
1030	723	709	696	682	669	656	643	631	618	606
	9046	9546	10046	10546	11046	11546	12046	12546	13046	13546
1035	727	713	699	686	673	659	647	634	622	609
	8911	9411	9911	10411	10911	11411	11911	12411	12911	13411
1040	731	717	703	689	676	663	650	637	625	613
	8777	9277	9777	10277	10777	11277	11777	12277	12777	13277
1045	734	720	707	693	680	666	654	641	628	616
	8644	9144	9644	10144	10644	11144	11644	12144	12644	13144
1050	738	724	710	697	683	670	657	644	632	619
	8511	9011	9511	10011	10511	11011	11511	12011	12511	13011

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Figure 1-11 (Sheet 3 of 3) Pressure Altitude - QNH Conversion Table

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