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TRANSMITTAL LETTER

Subject: Revision 45 of the AOM–145/1114-02 Airplane Operations Manual

Dear Sir or Madam,

You are receiving revision 45 of the AOM-145/1114.

Due to editorial system changes and inclusion of a copyright statement, you are receiving entire sections. The items actually modified by Revision 45 are identified by revision marks. Pages not revised bring the revision marks only at the footer.

To better understand the changes and get detailed information regarding the relevant items revised, please refer to the Highlights of Change.

This revision incorporates the preceding temporary revision.
Therefore all yellow pages should be discarded from the manual.

The revised pages supersede the current ones. Therefore, the affected pages should be replaced and the new pages inserted following the numbered sequence.

In case of question, please contact:
Flight Operations Engineering & Support

E-mail: opereng@embraer.com.br or phone: +55 12 3313-1706

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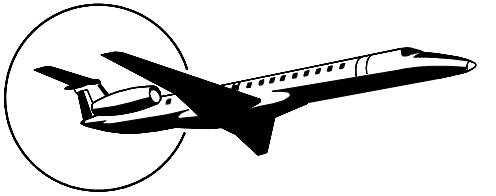

EXPRESSJET AIRLINES, INC.

AIRPLANE OPERATIONS MANUAL VOLUME 1

EMBRAER S.A.

This manual is applicable to the EMB-145 airplanes EP and LR models equipped with AE3007A1P engines and to the EMB-135 airplanes ER and LR models equipped with AE3007A1/3 engines and to the EMB-145 XR model equipped with AE3007A1E engines and operating under FAA certification.

THIS PUBLICATION IS INCOMPLETE WITHOUT AIRPLANE OPERATIONS MANUAL AOM–145/1114 VOLUME 2

AOM–145/1114-02
OCTOBER 31, 1996
REVISION 45 – NOVEMBER 30, 2022

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Airplane Operations Manual
AOM–145/1114

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Please use this Customer Comment Form to notify us of any discrepancies or problems you find in the Airplane Operations Manual. We would also welcome constructive suggestions on how we can further improve our documentation or service.

Your feedback will be acknowledged, and we will advise you of the action we intend to take.

Sincerely,
Flight Operations Engineering & Support

Please return this form to:

EMBRAER S.A.

Av. Brigadeiro Faria Lima, 2170 – PC 176
São José dos Campos - SP – BRASIL
CEP 12227-901

Phone: +55 12 3313-1706
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Airplane Operations Manual
AOM–145/1114

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HIGHLIGHTS OF CHANGE

REVISION 45 – NOVEMBER 30, 2022

• 1-00-30 code 01	Added EICAS Version 24 applicable to airplanes equipped SB145-34-0125.
• 1-00-35 code 01	Added information related to Automatic Dependent Surveillance Broadcast out (ADS-B OUT) operations applicable to airplanes Post-Mod SB145DGR-34-0002. Added Service Bulletin SB145-34-0123 applicable to the FMZ2010 Honeywell FMS (FMS 6.1.1) to the Service Bulletin Table. Added Service Bulletin SB145-34-0125 applicable to the installation of LPV and Baro-VNAV.
• 1-01-05 code 08	Added applicability to Takeoff with Flaps 18º according to the AFM.
• 1-01-05 code 21	Added applicability to Takeoff with Flaps 18º according to the AFM.
• 1-01-50 code 02	Changed information related to Operation in Icing Conditions according to the AFM.
• 1-01-60 code 09	Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123.
• 1-01-60 code 10	Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123. Added information related to LPV and Baro-VNAV operations applicable to airplanes Post-Mod SB145-34-0125.
• 1-02-80 code 01	Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123. Added information related to LPV and Baro-VNAV operations applicable to airplanes

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Post-Mod SB145-34-0125.

- 1-03-14 code 03 — Added step to the Landing Gear/Lever Disagree procedure according to the AFM.
- 1-03-59 code 03 — Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123.
  Added information related to LPV and Baro-VNAV operations applicable to airplanes Post-Mod SB145-34-0125.
- 2-02-00 code 01 — Deleted information from the Table of Contents related to Pilot and Passenger Convenience Items.
- 2-04-00 code 01 — Editorial Revisions.
- 2-04-10 code 01 — Added inhibition phase of EICAS message CHECK XPDR applicable to airplanes Post-Mod SB145-34-0125.
- 2-04-13 code 01 — Added information related to TCAS FAIL and TCAS OFF annunciators applicable to airplanes Post-Mod SB145-34-0125.
- 2-04-40 code 01 — Added information related to TCAS FAIL and TCAS OFF annunciators applicable to airplanes Post-Mod SB145-34-0125.
- 2-12-05 code 01 — Added information related to Landing Gear in Transit position indication applicable to airplanes Post-Mod SB145-34-0125.
- 2-18-00 code 01 — Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123.
  Added information related to LPV and Baro-VNAV operations applicable to airplanes Post-Mod SB145-34-0125.

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• 2-18-19 code 01	Added EICAS message applicable to airplanes Post-Mod SB145-34-0125.
• 2-18-35 code 04	Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123. Added information related to LPV and Baro-VNAV operations applicable to airplanes Post-Mod SB145-34-0125.
• 2-18-60 code 02	Added information related to Baro-VNAV operations applicable to airplanes Post-Mod SB145-34-0125.
• 2-18-65 code 02	Added information related to the FMZ2010 Honeywell FMS (FMS 6.1.1) applicable to airplanes Post-Mod SB145-34-0123. Added information related to RNP operations applicable to airplanes Post-Mod SB145-34-0125.
• 2-18-70 code 02	Added information related to LPV operations applicable to airplanes Post-Mod SB145-34-0125.
• 2-18-95 code 01	Added information related to Automatic Dependent Surveillance Broadcast out (ADS-B OUT) operations applicable to airplanes Post-Mod SB145DGR-34-0002.

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1-02-01	1	01	REVISION 41	ALL
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1-02-05	1	01	REVISION 41	ALL
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1-02-09	1	01	REVISION 41	ALL
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1-02-13	1	01	REVISION 37	ALL
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1-02-17	12	01	REVISION 37	
1-02-17	1	02	REVISION 37	Panel II
1-02-17	2	02	REVISION 37	
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1-02-17	6	02	REVISION 37	
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1-02-17	10	02	REVISION 37	
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1-02-29	3	01	REVISION 44	
1-02-29	4	01	REVISION 44	
1-02-33	1	01	REVISION 41	ALL
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1-02-73	2	01	REVISION 42	
1-02-73	3	01	REVISION 42	
1-02-73	4	01	REVISION 42	
1-02-77	1	01	REVISION 43	Panel I
1-02-77	2	01	REVISION 43	
1-02-77	1	02	REVISION 43	Panel II
1-02-77	2	02	REVISION 43	
1-02-78	1	01	REVISION 33	ALL
1-02-78	2	01	REVISION 33	
1-02-79	1	01	REVISION 41	ALL
1-02-79	2	01	REVISION 41	
1-02-79	3	01	REVISION 43	
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1-02-79	11	01	REVISION 41	
1-02-79	12	01	REVISION 42	
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1-02-79	26	01		REVISION 41	
1-02-79	27	01		REVISION 41	
1-02-79	28	01		REVISION 41	
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1-02-79	30	01		REVISION 41	
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1-02-79	34	01		REVISION 44	
1-02-79	35	01		REVISION 44	
1-02-79	36	01		REVISION 44	
1-02-80	1	01	*	REVISION 45	ANAC/FAA FMZ 2000 / FMZ 2010 FMS (NZ 6.1.1)
1-02-80	2	01	*	REVISION 45	
1-02-80	3	01	*	REVISION 45	
1-02-80	4	01	*	REVISION 45	
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1-02-80	11	01	*		REVISION 45	
1-02-80	12	01	*		REVISION 45	
1-02-80	13	01	*		REVISION 45	
1-02-80	14	01	*		REVISION 45	
1-02-80	15	01	*		REVISION 45	
1-02-80	16	01	*		REVISION 45	
1-02-80	17	01	*		REVISION 45	
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1-02-80	23	01	*		REVISION 45	
1-02-80	24	01	*		REVISION 45	
1-02-80	25	01	*		REVISION 45	
1-02-80	26	01	*		REVISION 45	
1-02-80	27	01	*	new	REVISION 45	
1-02-80	28	01	*	new	REVISION 45	
1-02-80	29	01	*	new	REVISION 45	
1-02-80	30	01	*	new	REVISION 45	
1-02-81	1	01			REVISION 44	ALL
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1-02-83	2	02	REVISION 42	
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1-02-94	1	01	REVISION 39	ALL
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1-02-95	2	05	REVISION 42	
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1-03-00	3	01	REVISION 39	
1-03-00	4	01	REVISION 39	
1-03-01	1	03	REVISION 40	FAA
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1-03-02	1	03	REVISION 43	FAA
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1-03-02	3	03	REVISION 44	
1-03-02	4	03	REVISION 43	
1-03-03	1	03	REVISION 40	FAA
1-03-03	2	03	REVISION 40	
1-03-03	3	03	REVISION 40	
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1-03-11	6	03		REVISION 42	
1-03-11	7	03		REVISION 42	
1-03-11	8	03		REVISION 42	
1-03-14	1	03	*	REVISION 45	FAA
1-03-14	2	03	*	REVISION 45	
1-03-20	1	03		REVISION 40	FAA
1-03-20	2	03		REVISION 40	
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1-03-20	6	03		REVISION 40	
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1-03-20	10	03		REVISION 40	
1-03-24	1	03		REVISION 40	FAA
1-03-24	2	03		REVISION 40	
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1-03-24	4	03		REVISION 40	
1-03-26	1	03		MAR 30, 2001	FAA
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1-03-45	9	03	REVISION 43	
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1-03-53	6	03	REVISION 40	
1-03-53	7	03	REVISION 40	
1-03-53	8	03	REVISION 40	
1-03-56	1	03	REVISION 41	FAA
1-03-56	2	03	REVISION 41	
1-03-56	3	03	REVISION 41	
1-03-56	4	03	REVISION 41	
1-03-56	5	03	REVISION 44	
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1-03-56	11	03	REVISION 41	
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1-03-59	6	03	*	REVISION 45	
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1-03-59	8	03	*	REVISION 45	
1-03-59	9	03	*	REVISION 45	
1-03-59	10	03	*	REVISION 45	
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1-03-65	1	03		REVISION 25	FAA
1-03-65	2	03		REVISION 25	
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1-03-70	8	03	REVISION 43	
1-03-70	9	03	REVISION 43	
1-03-70	10	03	REVISION 43	
1-03-70	11	03	REVISION 43	
1-03-70	12	03	REVISION 43	
1-03-70	13	03	REVISION 43	
1-03-70	14	03	REVISION 43	
1-03-70	15	03	REVISION 43	
1-03-70	16	03	REVISION 43	
1-03-70	17	03	REVISION 43	
1-03-70	18	03	REVISION 43	
1-03-70	19	03	REVISION 43	
1-03-70	20	03	REVISION 43	
1-03-70	21	03	REVISION 43	
1-03-70	22	03	REVISION 43	
1-03-70	23	03	REVISION 43	
1-03-70	24	03	REVISION 43	
1-03-70	25	03	REVISION 43	
1-03-70	26	03	REVISION 43	
1-03-70	27	03	REVISION 43	
1-03-70	28	03	REVISION 43	
1-03-70	29	03	REVISION 43	
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1-04-10	1	05	REVISION 27	145 A1/P
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1-04-10	1	09	DEC 20, 2002	145 A1E FAA Ib
1-04-10	2	09	DEC 20, 2002	
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1-04-10	4	09	DEC 20, 2002	
1-04-10	5	09	DEC 20, 2002	
1-04-10	6	09	DEC 20, 2002	
1-04-10	7	09	DEC 20, 2002	
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1-04-10	9	09	DEC 20, 2002	
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1-04-10	6	10	JUN 29, 2001	
1-04-10	7	10	JUN 29, 2001	
1-04-10	8	10	JUN 29, 2001	
1-04-10	9	10	JUN 29, 2001	
1-04-10	10	10	JUN 29, 2001	
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1-04-15	1	05	MAR 30, 2001	145 A1/P FAA lb
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1-04-15	4	05	JUN 28, 2002	
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1-04-15	10	09	DEC 20, 2002	
1-04-15	11	09	DEC 20, 2002	
1-04-15	12	09	DEC 20, 2002	
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1-04-15	21	09	DEC 20, 2002	
1-04-15	22	09	DEC 20, 2002	
1-04-15	23	09	DEC 20, 2002	
1-04-15	24	09	DEC 20, 2002	
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1-04-15	39	09	DEC 20, 2002	
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1-04-15	51	09	DEC 20, 2002	
1-04-15	52	09	DEC 20, 2002	
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1-04-15	49	10	REVISION 26	
1-04-15	50	10	REVISION 26	
1-04-15	51	10	REVISION 26	
1-04-15	52	10	REVISION 26	
1-04-15	53	10	REVISION 26	
1-04-15	54	10	REVISION 26	
1-04-15	55	10	REVISION 26	
1-04-15	56	10	REVISION 26	
1-04-15	57	10	REVISION 26	
1-04-15	58	10	REVISION 26	
1-04-15	59	10	REVISION 26	
1-04-15	60	10	REVISION 26	
1-04-15	61	10	REVISION 26	
1-04-15	62	10	REVISION 26	
1-04-15	63	10	REVISION 26	
1-04-15	64	10	REVISION 26	
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1-04-15	68	10	REVISION 26	
1-04-15	69	10	REVISION 26	
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1-04-15	89	10	REVISION 28	
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1-04-20	7	02	REVISION 42	
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1-04-20	17	02	REVISION 42	
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1-04-20	20	09	REVISION 42	
1-04-20	1	10	REVISION 42	135 lb
1-04-20	2	10	REVISION 42	
1-04-20	3	10	REVISION 42	
1-04-20	4	10	REVISION 42	
1-04-20	5	10	REVISION 42	
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1-04-20	10	10	REVISION 42	
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1-04-20	19	10	REVISION 42	
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1-04-25	1	05	REVISION 36	145 A1/P FAA lb
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1-04-25	4	09	REVISION 36	
1-04-25	1	10	REVISION 36	135 A1/3 FAA lb
1-04-25	2	10	REVISION 36	
1-04-25	3	10	REVISION 39	
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1-04-30	1	02	REVISION 41	135/145 FAA lb
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1-04-30	25	02	REVISION 41	
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1-04-30	29	02	REVISION 41	
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1-04-30	1	09	REVISION 41	145XR A1E FAA Ib
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1-05-05	15	02	REVISION 42	
1-05-05	16	02	REVISION 42	
1-05-05	1	10	REVISION 38	135/140 A1/3 lb
1-05-05	2	10	REVISION 38	
1-05-05	3	10	REVISION 38	
1-05-05	4	10	REVISION 38	
1-05-05	5	10	REVISION 38	
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1-05-05	1	15	REVISION 38	145XR A1E lb
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1-05-05	3	15	REVISION 38	
1-05-05	4	15	REVISION 38	
1-05-05	5	15	REVISION 38	
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1-05-05	7	15	REVISION 38	
1-05-05	8	15	REVISION 38	
1-05-05	9	15	REVISION 38	
1-05-05	10	15	REVISION 38	
1-05-05	11	15	REVISION 38	
1-05-05	12	15	REVISION 38	
1-05-05	13	15	REVISION 38	
1-05-05	14	15	REVISION 38	
1-05-05	15	15	REVISION 38	
1-05-05	16	15	REVISION 38	
1-05-07	1	02	DEC 20, 2002	lb
1-05-07	2	02	DEC 20, 2002	
1-05-10	1	02	REVISION 40	145 A1 and A1P lb
1-05-10	2	02	REVISION 40	
1-05-10	3	02	REVISION 40	
1-05-10	4	02	REVISION 40	
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1-05-10	21	02	REVISION 40	
1-05-10	22	02	REVISION 40	
1-05-10	1	10	REVISION 28	135/140 A1/3 lb
1-05-10	2	10	REVISION 27	
1-05-10	2A	10	REVISION 27	
1-05-10	2B	10	REVISION 25	
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1-05-10	5	10	OCT 02, 2001	
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1-05-10	7	10	OCT 02, 2001	
1-05-10	8	10	OCT 02, 2001	
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1-05-10	16	10	OCT 02, 2001	
1-05-10	17	10	OCT 02, 2001	
1-05-10	18	10	OCT 02, 2001	
1-05-10	1	15	REVISION 28	145XR A1E lb
1-05-10	2	15	REVISION 28	
1-05-10	2A	15	REVISION 28	
1-05-10	2B	15	REVISION 25	
1-05-10	3	15	DEC 20, 2002	
1-05-10	4	15	DEC 20, 2002	
1-05-10	5	15	DEC 20, 2002	
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1-05-10	7	15	DEC 20, 2002	
1-05-10	8	15	DEC 20, 2002	
1-05-10	9	15	DEC 20, 2002	
1-05-10	10	15	DEC 20, 2002	
1-05-10	11	15	DEC 20, 2002	
1-05-10	12	15	DEC 20, 2002	
1-05-10	13	15	DEC 20, 2002	
1-05-10	14	15	DEC 20, 2002	
1-05-10	15	15	DEC 20, 2002	
1-05-10	16	15	DEC 20, 2002	
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1-05-10	23	15	DEC 20, 2002	
1-05-10	24	15	DEC 20, 2002	
1-05-10	25	15	DEC 20, 2002	
1-05-10	26	15	DEC 20, 2002	
1-05-10	27	15	DEC 20, 2002	
1-05-10	28	15	DEC 20, 2002	
1-05-10	29	15	DEC 20, 2002	
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1-05-10	39	15	DEC 20, 2002	
1-05-10	40	15	DEC 20, 2002	
1-05-10	41	15	DEC 20, 2002	
1-05-10	42	15	DEC 20, 2002	
1-05-10	43	15	DEC 20, 2002	
1-05-10	44	15	DEC 20, 2002	
1-05-10	45	15	DEC 20, 2002	
1-05-10	46	15	DEC 20, 2002	
1-05-10	47	15	DEC 20, 2002	

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1-05-10	51	15	DEC 20, 2002	
1-05-10	52	15	DEC 20, 2002	
1-05-10	53	15	DEC 20, 2002	
1-05-10	54	15	DEC 20, 2002	
1-05-10	55	15	DEC 20, 2002	
1-05-10	56	15	DEC 20, 2002	
1-05-10	57	15	DEC 20, 2002	
1-05-10	58	15	DEC 20, 2002	
1-05-10	59	15	DEC 20, 2002	
1-05-10	60	15	DEC 20, 2002	
1-05-10	61	15	DEC 20, 2002	
1-05-10	62	15	DEC 20, 2002	
1-05-10	63	15	DEC 20, 2002	
1-05-10	64	15	DEC 20, 2002	
1-05-10	65	15	DEC 20, 2002	
1-05-10	66	15	DEC 20, 2002	
1-05-10	67	15	DEC 20, 2002	
1-05-10	68	15	DEC 20, 2002	
1-05-10	69	15	DEC 20, 2002	
1-05-10	70	15	DEC 20, 2002	
1-05-15	1	02	REVISION 40	145 A1 and A1P lb
1-05-15	2	02	REVISION 40	
1-05-15	3	02	REVISION 40	
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1-05-15	9	02	REVISION 40	
1-05-15	10	02	REVISION 40	
1-05-15	11	02	REVISION 40	
1-05-15	12	02	REVISION 40	
1-05-15	13	02	REVISION 40	
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1-05-15	15	02	REVISION 40	
1-05-15	16	02	REVISION 40	
1-05-15	17	02	REVISION 40	
1-05-15	18	02	REVISION 40	
1-05-15	19	02	REVISION 40	
1-05-15	20	02	REVISION 40	
1-05-15	21	02	REVISION 40	
1-05-15	22	02	REVISION 40	
1-05-15	1	10	REVISION 34	135/140 A1/3 lb
1-05-15	2	10	REVISION 18	
1-05-15	3	10	JUN 29, 2001	
1-05-15	4	10	OCT 02, 2001	
1-05-15	5	10	JUN 29, 2001	
1-05-15	6	10	OCT 02, 2001	
1-05-15	7	10	JUN 29, 2001	
1-05-15	8	10	OCT 02, 2001	
1-05-15	9	10	JUN 29, 2001	
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1-05-15	14	10	OCT 02, 2001	
1-05-15	15	10	OCT 02, 2001	
1-05-15	16	10	JUN 29, 2001	
1-05-15	1	15	REVISION 34	145XR A1E lb
1-05-15	2	15	REVISION 24	
1-05-15	3	15	DEC 20, 2002	
1-05-15	4	15	DEC 20, 2002	
1-05-15	5	15	DEC 20, 2002	
1-05-15	6	15	DEC 20, 2002	
1-05-15	7	15	DEC 20, 2002	
1-05-15	8	15	DEC 20, 2002	
1-05-15	9	15	DEC 20, 2002	
1-05-15	10	15	DEC 20, 2002	
1-05-15	11	15	DEC 20, 2002	
1-05-15	12	15	DEC 20, 2002	
1-05-15	13	15	DEC 20, 2002	
1-05-15	14	15	DEC 20, 2002	
1-05-15	15	15	DEC 20, 2002	
1-05-15	16	15	DEC 20, 2002	
1-05-20	1	02	REVISION 40	145 A1 and A1P lb
1-05-20	2	02	REVISION 40	
1-05-20	3	02	REVISION 40	
1-05-20	4	02	REVISION 40	
1-05-20	1	10	REVISION 25	135 140 A1/3 lb
1-05-20	2	10	REVISION 25	
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1-05-20	3	15	REVISION 25	
1-05-20	4	15	REVISION 25	
1-05-25	1	02	REVISION 40	145 A1 and A1P lb
1-05-25	2	02	REVISION 40	
1-05-25	3	02	REVISION 40	
1-05-25	4	02	REVISION 40	
1-05-25	5	02	REVISION 40	
1-05-25	6	02	REVISION 40	
1-05-25	7	02	REVISION 40	
1-05-25	8	02	REVISION 40	
1-05-25	1	10	REVISION 40	135/140 A1/3 lb
1-05-25	2	10	REVISION 38	
1-05-25	3	10	REVISION 38	
1-05-25	4	10	REVISION 40	
1-05-25	5	10	REVISION 40	
1-05-25	6	10	REVISION 38	
1-05-25	1	15	REVISION 34	145XR A1E lb
1-05-25	2	15	REVISION 34	
1-05-25	3	15	REVISION 34	
1-05-25	4	15	REVISION 34	
1-05-25	5	15	REVISION 34	
1-05-25	6	15	REVISION 34	
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1-05-30	1	03	REVISION 40	145 A1 and A1P FAA

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1-05-30	5	03	REVISION 40	
1-05-30	6	03	REVISION 40	
1-05-30	7	03	REVISION 40	
1-05-30	8	03	REVISION 40	
1-05-30	9	03	REVISION 40	
1-05-30	10	03	REVISION 40	
1-05-30	11	03	REVISION 40	
1-05-30	12	03	REVISION 40	
1-05-30	13	03	REVISION 40	
1-05-30	14	03	REVISION 40	
1-05-30	15	03	REVISION 40	
1-05-30	16	03	REVISION 40	
1-05-30	1	12	REVISION 44	135 A1/3 FAA
1-05-30	2	12	REVISION 44	
1-05-30	3	12	REVISION 44	
1-05-30	4	12	REVISION 44	
1-05-30	5	12	REVISION 44	
1-05-30	6	12	REVISION 44	
1-05-30	7	12	REVISION 44	
1-05-30	8	12	REVISION 44	
1-05-30	9	12	REVISION 44	
1-05-30	10	12	REVISION 44	
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1-05-30	1	15	REVISION 38	145XR A1E FAA lb
1-05-30	2	15	REVISION 38	
1-05-30	3	15	REVISION 38	
1-05-30	4	15	REVISION 38	
1-05-30	5	15	REVISION 38	
1-05-30	6	15	REVISION 38	
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1-05-30	8	15	REVISION 38	
1-05-30	9	15	REVISION 38	
1-05-30	10	15	REVISION 38	
1-05-30	11	15	REVISION 38	
1-05-30	12	15	REVISION 38	
1-05-30	13	15	REVISION 38	
1-05-30	14	15	REVISION 38	
1-05-30	15	15	REVISION 38	
1-05-30	16	15	REVISION 38	
1-05-30	17	15	REVISION 38	
1-05-30	18	15	REVISION 38	
1-05-35	1	02	REVISION 39	145 A1, A1P lb
1-05-35	2	02	REVISION 39	
1-05-35	3	02	REVISION 39	
1-05-35	4	02	REVISION 39	
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1-05-35	12	02	REVISION 39	
1-05-35	13	02	REVISION 39	
1-05-35	14	02	REVISION 39	
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1-05-35	17	02	REVISION 39	
1-05-35	18	02	REVISION 39	
1-05-35	19	02	REVISION 39	
1-05-35	20	02	REVISION 39	
1-05-35	21	02	REVISION 39	
1-05-35	22	02	REVISION 39	
1-05-35	23	02	REVISION 39	
1-05-35	24	02	REVISION 39	
1-05-35	25	02	REVISION 39	
1-05-35	26	02	REVISION 39	
1-05-35	1	07	REVISION 39	135 A1/3 lb
1-05-35	2	07	REVISION 39	
1-05-35	3	07	REVISION 39	
1-05-35	4	07	REVISION 39	
1-05-35	5	07	REVISION 39	
1-05-35	6	07	REVISION 39	
1-05-35	7	07	REVISION 39	
1-05-35	8	07	REVISION 39	
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1-05-35	33	07	REVISION 39	
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1-05-35	42	07	REVISION 39	
1-05-35	43	07	REVISION 39	
1-05-35	44	07	REVISION 39	
1-05-35	45	07	REVISION 39	
1-05-35	46	07	REVISION 39	
1-05-35	1	09	REVISION 39	145 XR A1E lb
1-05-35	2	09	REVISION 39	
1-05-35	3	09	REVISION 39	
1-05-35	4	09	REVISION 39	
1-05-35	5	09	REVISION 39	
1-05-35	6	09	REVISION 39	
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1-05-35	8	09	REVISION 39	
1-05-35	9	09	REVISION 39	
1-05-35	10	09	REVISION 39	
1-05-35	11	09	REVISION 39	
1-05-35	12	09	REVISION 39	
1-05-35	13	09	REVISION 39	
1-05-35	14	09	REVISION 39	
1-05-35	15	09	REVISION 39	
1-05-35	16	09	REVISION 39	
1-05-35	17	09	REVISION 39	
1-05-35	18	09	REVISION 39	
1-05-35	19	09	REVISION 39	

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1-05-35	20	09	REVISION 39	
1-05-35	21	09	REVISION 39	
1-05-35	22	09	REVISION 39	
1-05-40	1	02	MAR 28, 2002	145 A1, A1P lb
1-05-40	2	02	MAR 28, 2002	
1-05-40	3	02	MAR 28, 2002	
1-05-40	4	02	MAR 28, 2002	
1-05-40	5	02	MAR 28, 2002	
1-05-40	6	02	MAR 28, 2002	
1-05-40	7	02	MAR 28, 2002	
1-05-40	8	02	MAR 28, 2002	
1-05-40	9	02	MAR 28, 2002	
1-05-40	10	02	MAR 28, 2002	
1-05-40	11	02	MAR 28, 2002	
1-05-40	12	02	MAR 28, 2002	
1-05-40	13	02	MAR 28, 2002	
1-05-40	14	02	MAR 28, 2002	
1-05-40	15	02	MAR 28, 2002	
1-05-40	16	02	MAR 28, 2002	
1-05-40	17	02	MAR 28, 2002	
1-05-40	18	02	MAR 28, 2002	
1-05-40	19	02	MAR 28, 2002	
1-05-40	20	02	MAR 28, 2002	
1-05-40	1	07	REVISION 27	145 XR A1E lb
1-05-40	2	07	REVISION 27	
1-05-40	3	07	REVISION 27	
1-05-40	4	07	REVISION 27	
1-05-40	5	07	REVISION 27	

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1-05-40	8	07	REVISION 27	
1-05-40	9	07	REVISION 27	
1-05-40	10	07	REVISION 27	
1-05-40	11	07	REVISION 27	
1-05-40	12	07	REVISION 27	
1-05-40	13	07	REVISION 27	
1-05-40	14	07	REVISION 27	
1-05-40	15	07	REVISION 27	
1-05-40	16	07	REVISION 27	
1-05-40	17	07	REVISION 27	
1-05-40	18	07	REVISION 27	
1-05-40	19	07	REVISION 27	
1-05-40	20	07	REVISION 27	
1-05-40	21	07	REVISION 27	
1-05-40	22	07	REVISION 27	
1-05-40	1	08	REVISION 33	135 A1/3 lb
1-05-40	2	08	REVISION 33	
1-05-40	3	08	REVISION 33	
1-05-40	4	08	REVISION 33	
1-05-40	5	08	REVISION 33	
1-05-40	6	08	REVISION 33	
1-05-40	7	08	REVISION 33	
1-05-40	8	08	REVISION 33	
1-05-40	9	08	REVISION 33	
1-05-40	10	08	REVISION 33	
1-05-40	11	08	REVISION 33	

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1-05-40	15	08	REVISION 33	
1-05-40	16	08	REVISION 33	
1-05-40	17	08	REVISION 33	
1-05-40	18	08	REVISION 33	
1-05-45	1	06	REVISION 39	145 A1 and A1P FAA lb
1-05-45	2	06	REVISION 39	
1-05-45	3	06	REVISION 39	
1-05-45	4	06	REVISION 39	
1-05-45	5	06	REVISION 39	
1-05-45	6	06	REVISION 39	
1-05-45	7	06	REVISION 39	
1-05-45	8	06	REVISION 39	
1-05-45	1	08	REVISION 39	135/140 A1/3 FAA lb
1-05-45	2	08	REVISION 39	
1-05-45	3	08	REVISION 39	
1-05-45	4	08	REVISION 39	
1-05-45	5	08	REVISION 39	
1-05-45	6	08	REVISION 39	
1-05-45	7	08	REVISION 39	
1-05-45	8	08	REVISION 39	
1-05-50	1	02	REVISION 38	145 A1 and A1P FAA lb
1-05-50	2	02	REVISION 38	
1-05-50	3	02	REVISION 38	
1-05-50	4	02	REVISION 38	
1-05-50	5	02	REVISION 38	

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1-05-50	11	02	REVISION 38	
1-05-50	12	02	REVISION 38	
1-05-50	13	02	REVISION 38	
1-05-50	14	02	REVISION 38	
1-05-50	15	02	REVISION 38	
1-05-50	16	02	REVISION 38	
1-05-50	17	02	REVISION 38	
1-05-50	18	02	REVISION 38	
1-05-50	19	02	REVISION 38	
1-05-50	20	02	REVISION 38	
1-05-50	21	02	REVISION 38	
1-05-50	22	02	REVISION 38	
1-05-50	1	09	REVISION 34	145 XR A1E FAA lb
1-05-50	2	09	REVISION 34	
1-05-50	3	09	REVISION 34	
1-05-50	4	09	REVISION 34	
1-05-50	5	09	REVISION 34	
1-05-50	6	09	REVISION 34	
1-05-50	7	09	REVISION 34	
1-05-50	8	09	REVISION 34	
1-05-50	9	09	REVISION 34	
1-05-50	10	09	REVISION 34	
1-05-50	11	09	REVISION 34	

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1-05-50	15	09	REVISION 34	
1-05-50	16	09	REVISION 34	
1-06-00	1	01	REVISION 34	ALL
1-06-00	2	01	REVISION 17	
1-06-10	1	01	SEP 20, 1999	ALL
1-06-10	2	01	SEP 20, 1999	
1-06-10	3	01	SEP 20, 1999	
1-06-10	4	01	SEP 20, 1999	
1-06-15	1	02	REVISION 37	135/140/145 lb
1-06-15	2	02	REVISION 37	
1-06-15	3	02	REVISION 37	
1-06-15	4	02	REVISION 37	
1-06-15	5	02	REVISION 37	
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1-06-15	8	02	REVISION 39	
1-06-15	9	02	REVISION 37	
1-06-15	10	02	REVISION 37	
1-06-15	11	02	REVISION 37	
1-06-15	12	02	REVISION 38	
1-06-15	13	02	REVISION 38	
1-06-15	14	02	REVISION 37	
1-06-30	1	02	REVISION 42	lb
1-06-30	2	02	REVISION 42	
1-06-30	3	02	REVISION 42	

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1-06-30	6	02	REVISION 42	
1-06-30	7	02	REVISION 42	
1-06-30	8	02	REVISION 42	
1-06-30	9	02	REVISION 42	
1-06-30	10	02	REVISION 42	
1-06-30	11	02	REVISION 42	
1-06-30	12	02	REVISION 42	
1-06-30	13	02	REVISION 42	
1-06-30	14	02	REVISION 42	
1-06-40	1	03	REVISION 31	FAA lb
1-06-40	2	03	REVISION 29	
1-06-40	3	03	REVISION 29	
1-06-40	4	03	REVISION 29	
1-06-40	5	03	REVISION 29	
1-06-40	6	03	REVISION 29	
1-06-40	7	03	REVISION 29	
1-06-40	8	03	REVISION 29	
1-06-40	9	03	REVISION 29	
1-06-40	10	03	REVISION 29	
1-06-40	11	03	REVISION 29	
1-06-40	12	03	REVISION 29	
1-06-40	13	03	REVISION 29	
1-06-40	14	03	REVISION 29	
1-06-40	15	03	REVISION 29	
1-06-40	16	03	REVISION 29	
1-06-40	17	03	REVISION 29	

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1-06-40	21	03	REVISION 29	
1-06-40	22	03	REVISION 29	
1-06-40	23	03	REVISION 29	
1-06-40	24	03	REVISION 29	
1-06-50	1	01	SEP 20, 1999	Balance Chart
1-06-50	2	01	SEP 20, 1999	
1-06-50	3	01	JUN 28, 2002	
1-06-50	4	01	SEP 20, 1999	
1-07-00	1	01	REVISION 38	ALL
1-07-00	2	01	REVISION 38	
1-07-10	1	30	REVISION 17	135
1-07-10	2	30	REVISION 26	
1-07-10	3	30	MAR 30, 2001	
1-07-10	4	30	JUN 28, 2002	
1-07-10	1	40	REVISION 23	145
1-07-10	2	40	REVISION 26	
1-07-10	3	40	MAR 30, 2001	
1-07-10	4	40	JUN 28, 2002	
1-07-10	1	70	REVISION 24	145XR
1-07-10	2	70	REVISION 26	
1-07-10	3	70	DEC 20, 2002	
1-07-10	4	70	DEC 20, 2002	
1-07-20	1	01	SEP 20, 1999	ALL
1-07-20	2	01	SEP 20, 1999	
1-07-30	1	31	REVISION 36	135 Interior 1

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1-07-30	1	70	REVISION 36	145 Interior 1 +145 XR
1-07-30	2	70	REVISION 36	
1-07-30	3	70	REVISION 36	
1-07-30	4	70	REVISION 36	
1-07-50	1	01	REVISION 19	ALL
1-07-50	2	01	REVISION 25	
1-07-60	1	01	OCT 02, 2001	ALL
1-07-60	2	01	SEP 20, 1999	
1-07-70	1	01	REVISION 37	All but cart stowage unit
1-07-70	2	01	REVISION 37	
1-07-70	3	01	REVISION 37	
1-07-70	4	01	REVISION 37	
1-07-70	5	01	REVISION 37	
1-07-70	6	01	REVISION 38	
1-07-70	7	01	REVISION 37	
1-07-70	8	01	REVISION 37	
1-07-80	1	01	DEC 20, 2002	ALL
1-07-80	2	01	DEC 20, 2002	
1-07-80	3	01	DEC 20, 2002	
1-07-80	4	01	DEC 20, 2002	
1-07-80	5	01	DEC 20, 2002	
1-07-80	6	01	DEC 20, 2002	
1-07-80	7	01	DEC 20, 2002	
1-07-80	8	01	DEC 20, 2002	
1-07-90	1	01	REVISION 30	ALL
1-07-90	2	01	REVISION 30	
1-07-90	3	01	REVISION 30	

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1-07-95	1	01	REVISION 39	135, 140, 145
1-07-95	2	01	REVISION 39	
1-08-00	1	01	REVISION 40	ALL
1-08-00	2	01	REVISION 40	
1-08-00	3	01	REVISION 40	
1-08-00	4	01	REVISION 40	
1-08-06	1	01	REVISION 36	ANAC/FAA
1-08-06	2	01	REVISION 36	
1-08-06	3	01	REVISION 38	
1-08-06	4	01	REVISION 36	
1-08-06	5	01	REVISION 36	
1-08-06	6	01	REVISION 36	
1-08-06	7	01	REVISION 36	
1-08-06	8	01	REVISION 36	
1-08-06	9	01	REVISION 36	
1-08-06	10	01	REVISION 36	
1-08-23	1	02	REVISION 40	FAA/EASA
1-08-23	2	02	REVISION 39	
1-08-28	1	01	REVISION 40	ALL
1-08-28	2	01	REVISION 36	
1-08-28	3	01	REVISION 36	
1-08-28	4	01	REVISION 36	
1-08-32	1	01	REVISION 27	ALL
1-08-32	2	01	REVISION 27	
1-08-33	1	01	REVISION 40	ALL
1-08-33	2	01	REVISION 40	
1-08-33	3	01	REVISION 40	

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1-08-33	6	01	REVISION 40	
1-08-33	7	01	REVISION 40	
1-08-33	8	01	REVISION 40	
1-08-49	1	01	REVISION 27	ALL
1-08-49	2	01	REVISION 27	
1-08-52	1	01	REVISION 27	ALL
1-08-52	2	01	REVISION 27	
1-08-54	1	01	REVISION 27	ALL
1-08-54	2	01	REVISION 27	
1-08-54	3	01	REVISION 27	
1-08-54	4	01	REVISION 13	
1-08-55	1	01	REVISION 27	ALL
1-08-55	2	01	REVISION 27	
1-08-55	3	01	REVISION 27	
1-08-55	4	01	REVISION 27	
1-08-55	5	01	REVISION 27	
1-08-55	6	01	REVISION 27	
1-08-57	1	01	REVISION 27	ALL
1-08-57	2	01	REVISION 27	
1-08-57	3	01	REVISION 27	
1-08-57	4	01	REVISION 27	
1-08-57	5	01	REVISION 27	
1-08-57	6	01	REVISION 27	
1-08-78	1	01	REVISION 27	ALL
1-08-78	2	01	REVISION 27	
1-09-00	1	03	REVISION 36	ALL

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1-10-00	1	01	REVISION 30	ALL
1-10-00	2	01	REVISION 13	
1-10-05	1	01	REVISION 36	ALL except shuttle
1-10-05	2	01	REVISION 36	
1-10-05	3	01	REVISION 36	
1-10-05	4	01	REVISION 36	
1-10-05	5	01	REVISION 36	
1-10-05	6	01	REVISION 36	
1-10-05	7	01	REVISION 36	
1-10-05	8	01	REVISION 36	
1-10-06	1	01	JAN 21, 2002	layout option 1
1-10-06	2	01	JAN 21, 2002	
1-10-06	3	01	JAN 21, 2002	
1-10-06	4	01	JAN 21, 2002	
1-10-06	5	01	JAN 21, 2002	
1-10-06	6	01	JAN 21, 2002	
1-10-08	1	01	SEP 29, 2000	145 Interior 1 - 50 pax
1-10-08	2	01	SEP 29, 2000	
1-10-08	1	10	SEP 29, 2000	135 Interior 1 - 37 pax
1-10-08	2	10	SEP 29, 2000	
1-10-10	1	01	REVISION 13	ALL
1-10-10	2	01	REVISION 31	
1-10-15	1	01	DEC 20, 2002	ALL
1-10-15	2	01	DEC 20, 2002	
1-10-15	3	01	DEC 20, 2002	
1-10-15	4	01	DEC 20, 2002	
1-10-20	1	01	SEP 20, 1999	ELT 110-4 (ARTEX)

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1-10-20	4	01	SEP 20, 1999	
1-10-20	1	03	REVISION 31	ELT C406-2
1-10-20	2	03	REVISION 31	
1-10-20	3	03	REVISION 31	
1-10-20	4	03	REVISION 31	
1-10-25	1	01	SEP 20, 1999	ALL
1-10-25	2	01	SEP 20, 1999	
1-10-30	1	01	SEP 20, 1999	ALL except Shuttle
1-10-30	2	01	SEP 20, 1999	
1-10-35	1	01	REVISION 30	ALL
1-10-35	2	01	REVISION 30	
1-10-35	3	01	REVISION 31	
1-10-35	4	01	REVISION 31	
1-11-00	1	01	REVISION 26	ALL
1-11-00	2	01	REVISION 13	
1-11-05	1	02	REVISION 30	FAA
1-11-05	2	02	REVISION 13	
1-11-40	1	01	REVISION 31	Airstair
1-11-40	2	01	REVISION 29	
1-11-40	3	01	REVISION 19	
1-11-40	4	01	REVISION 29	
1-11-40	5	01	AUG 24, 2001	
1-11-40	6	01	SEP 20, 1999	
1-11-40	7	01	REVISION 31	
1-11-40	8	01	REVISION 30	
1-11-40	9	01	REVISION 30	

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1-11-40	10	01	REVISION 25	
1-11-40	11	01	REVISION 30	
1-11-40	12	01	REVISION 30	
1-11-40	1	02	REVISION 31	Jetway
1-11-40	2	02	REVISION 31	
1-11-40	3	02	REVISION 19	
1-11-40	4	02	REVISION 29	
1-11-40	5	02	AUG 24, 2001	
1-11-40	6	02	SEP 20, 1999	
1-11-40	7	02	REVISION 31	
1-11-40	8	02	REVISION 30	
1-11-40	9	02	REVISION 30	
1-11-40	10	02	REVISION 25	
1-11-40	11	02	REVISION 30	
1-11-40	12	02	REVISION 30	
1-11-45	1	01	REVISION 18	ALL
1-11-45	2	01	REVISION 33	
1-11-45	3	01	REVISION 31	
1-11-45	4	01	REVISION 18	
1-12-00	1	01	REVISION 42	ALL
1-12-00	2	01	REVISION 42	
1-12-00	3	01	REVISION 42	
1-12-00	4	01	REVISION 42	
1-12-05	1	01	REVISION 31	ALL
1-12-05	2	01	REVISION 13	
1-12-05	3	01	OCT 02, 2001	
1-12-05	4	01	SEP 20, 1999	
1-12-05	5	01	SEP 20, 1999	

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Page Block	Page	Code	Change	Applicability (model, engine, certification, other)
1-12-05	6	01	SEP 20, 1999	
1-12-10	1	01	REVISION 39	ALL
1-12-10	2	01	REVISION 39	
1-12-10	3	01	REVISION 39	
1-12-10	4	01	REVISION 39	
1-12-10	5	01	REVISION 39	
1-12-10	6	01	REVISION 39	
1-12-10	7	01	REVISION 39	
1-12-10	8	01	REVISION 39	
1-12-10	9	01	REVISION 39	
1-12-10	10	01	REVISION 39	
1-12-10	11	01	REVISION 39	
1-12-10	12	01	REVISION 39	
1-12-15	1	01	REVISION 30	ALL
1-12-15	2	01	REVISION 23	
1-12-15	3	01	APR 28, 2000	
1-12-15	4	01	APR 28, 2000	
1-12-20	1	01	REVISION 42	ALL
1-12-20	2	01	REVISION 42	
1-12-20	3	01	REVISION 42	
1-12-20	4	01	REVISION 42	
1-12-20	5	01	REVISION 42	
1-12-20	6	01	REVISION 42	
1-12-20	7	01	REVISION 42	
1-12-20	8	01	REVISION 42	
1-12-20	9	01	REVISION 42	
1-12-20	10	01	REVISION 42	
1-12-20	11	01	REVISION 42	

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Page Block	Page	Code	Change	Applicability (model, engine, certification, other)
1-12-20	12	01	REVISION 42	
1-12-20	13	01	REVISION 42	
1-12-20	14	01	REVISION 42	
1-12-25	1	02	REVISION 38	With and without Stub Tank
1-12-25	2	02	REVISION 38	
1-12-25	3	02	REVISION 38	
1-12-25	4	02	REVISION 38	
1-12-25	5	02	REVISION 38	
1-12-25	6	02	REVISION 38	
1-12-25	7	02	REVISION 38	
1-12-25	8	02	REVISION 38	
1-12-25	9	02	REVISION 38	
1-12-25	10	02	REVISION 38	
1-12-25	11	02	REVISION 38	
1-12-25	12	02	REVISION 38	
1-12-25	13	02	REVISION 38	
1-12-25	14	02	REVISION 38	
1-12-25	15	02	REVISION 38	
1-12-25	16	02	REVISION 38	
1-12-25	17	02	REVISION 38	
1-12-25	18	02	REVISION 38	
1-12-25	19	02	REVISION 38	
1-12-25	20	02	REVISION 38	
1-12-25	21	02	REVISION 38	
1-12-25	22	02	REVISION 38	
1-12-25	23	02	REVISION 38	
1-12-25	24	02	REVISION 38	
1-12-25	25	02	REVISION 38	

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Page Block	Page	Code	Change	Applicability (model, engine, certification, other)
1-12-25	26	02	REVISION 38	
1-12-25	27	02	REVISION 38	
1-12-25	28	02	REVISION 38	
1-12-30	1	01	REVISION 38	ALL
1-12-30	2	01	REVISION 37	
1-12-30	3	01	REVISION 37	
1-12-30	4	01	REVISION 37	
1-12-35	1	01	REVISION 37	ALL
1-12-35	2	01	REVISION 37	
1-12-40	1	01	SEP 20, 1999	ALL
1-12-40	2	01	SEP 20, 1999	
1-12-40	3	01	DEC 20, 2002	
1-12-40	4	01	DEC 20, 2002	
1-12-40	5	01	DEC 20, 2002	
1-12-40	6	01	DEC 20, 2002	
1-12-43	1	01	REVISION 42	ALL
1-12-43	2	01	REVISION 42	
1-12-45	1	01	REVISION 38	ALL
1-12-45	2	01	REVISION 38	
1-12-50	1	01	REVISION 29	ALL
1-12-50	2	01	REVISION 13	
1-12-50	3	01	SEP 20, 1999	
1-12-50	4	01	SEP 20, 1999	
1-12-60	1	01	REVISION 42	ALL
1-12-60	2	01	REVISION 42	
1-12-60	3	01	REVISION 42	
1-12-60	4	01	REVISION 42	
1-12-60	5	01	REVISION 42	

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Page Block	Page	Code	Change	Applicability (model, engine, certification, other)
1-12-60	6	01	REVISION 42	
1-12-60	7	01	REVISION 42	
1-12-60	8	01	REVISION 42	
1-12-60	9	01	REVISION 42	
1-12-60	10	01	REVISION 42	
1-12-60	11	01	REVISION 42	
1-12-60	12	01	REVISION 42	
1-12-60	13	01	REVISION 42	
1-12-60	14	01	REVISION 42	
1-12-60	15	01	REVISION 42	
1-12-60	16	01	REVISION 42	
1-12-60	17	01	REVISION 42	
1-12-60	18	01	REVISION 42	
1-12-60	19	01	REVISION 42	
1-12-60	20	01	REVISION 42	
1-12-60	21	01	REVISION 42	
1-12-60	22	01	REVISION 42	
1-12-60	23	01	REVISION 42	
1-12-60	24	01	REVISION 42	
1-12-60	25	01	REVISION 42	
1-12-60	26	01	REVISION 42	
1-12-60	27	01	REVISION 42	
1-12-60	28	01	REVISION 42	
1-12-60	29	01	REVISION 42	
1-12-60	30	01	REVISION 42	
1-12-60	31	01	REVISION 42	
1-12-60	32	01	REVISION 42	

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VERSION 24 (ONLY APPLICABLE TO AIRPLANES POST-MOD. SB 145-34-0125)

The EICAS 24 features implemented in the software are described below:

Navigation and Communication systems

- New message:
  - CHECK XPDR.
- TCAS OFF and TCAS FAIL annunciations on PFD/MFD flash for 10 s and remain steady displayed as long as the condition persists.

Landing Gear and Brakes system

- With the conditions for Landing Gear in Transit position unchanged for more than 20 seconds, the following occurs:
  - The indication crosshatched in amber and black turns to red and black, and
  - The EICAS message LG/LEVER DISAGREE is displayed.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-00-0025	Installation of a placard containing the Maximum Zero Fuel Weight (MZFW) increased from 15600 kg (34392 lb) to 16000 kg (35274 lb).
SB 145-00-0028	Increases the MTOW of the EMB-135ER Model.
SB 145DGR-34-0002	Installation of the ADS-B (Automatic Dependent Surveillance - Broadcast) out system (Universal FMS).
SB 145-00-0031	Configures airplane for Operations on Runways up to 8500 ft.
SB 145-00-0032	Modifications to meet increased MTOW and MZFW requirements.
SB 145-00-0033	Installation of a placard stating certification for Operations on Runways up to 8500 ft.
SB 145-21-0006	Replaces the Air Conditioning Digital Controller.
SB 145-21-0011	Improves the air conditioning in the Passenger Cabin.
SB 145-21-0050	Modification for airplane Operations on Runways up to 10000 ft.
SB 145-22-0001	Configures airplane for CAT II Operation.
SB 145-23-0003	Introduces VHF Channel Spacing of 8.33 KHz.
SB 145-23-0028	Incorporates aural alert for CMU message.
SB 145-25-0261	Baggage Compartment Liner reinforcement.
SB 145-25-0287	Installs cut out access to unlock jammed Slide Door.
SB 145-25-0302	Improvements on the Lavatory Bifold Door.
SB 145-26-0004	Replacement of the Smoke Detector Sensor in the Baggage Compartment for Class “C”.
SB 145-26-0007	Engine and APU Fire Extinguish Bottle Monitoring Systems - modification to Electrical Circuitry.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-26-0014	Smoke Detector Sensor replacement.
SB 145-27-0015	Inclusion of movable primary stop on Rudder Control System.
SB 145-27-0100	HSCU replacement.
SB 145-27-0101	Electromechanical Gust Lock new logic.
SB 145-27-0115	Electromechanical Gust Lock Lever redesign.
SB 145-27-0125	Electromechanical Gust Lock Caution Light new operation logic.
SB 145-27-0126	Electromechanical Gust Lock Lever redesign.
SB 145-28-0018	Installation of High Level Exceeding Indication System.
SB 145-30-0019	Improves the Piccolo Burst Monitoring System.
SB 145-30-0021	Replaces the Anti-Icing System Valves.
SB 145-30-0028	Installs the new TAT Sensor Heater Electrical Configuration.
SB 145-30-0033	Incorporates changes to the Windshield Heating System.
SB 145-30-0054	Cockpit Windshield Wiper System removal and rain repellent coating application.
SB 145-30-0055	Cockpit Windshield Wiper System reinstallation.
SB 145-31-0009	Incorporates EICAS 15A Version.
SB 145-31-0016	Incorporates EICAS 16.5 Version.
SB 145-31-0020	Incorporates EICAS 17 Version.
SB 145-31-0021	Includes a new Oil Pressure Sensor.
SB 145-31-0022	Improves the strap for CAT II configuration for EICAS 16.5 Version.
SB 145-31-0028	Replaces AWU.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-31-0038	Incorporates Modifications to Extend the Speed Envelope of the EMB-145XR Model.
SB 145-31-0040	Configures the EMB-145XR Model for CAT II Operation.
SB 145-31-0042	Incorporates EICAS 20.5 Version.
SB 145-31-0051	Replaces AWU-5 and previous versions by AWU-6.
SB 145-31-0057	IC-600 upgrade to version 24.
SB 145-32-0002	Changes the Travel Limits of the Nose Wheel Steering System.
SB 145-32-0030	Replaces Brakes, Tires and Wheels for the LR Version.
SB 145-32-0057	Nose Wheel Steering Disengagement Switch installation.
SB 145-32-0065	Incorporates the use of Towbarless Tug.
SB 145-32-0086	Incorporates the use of Towbarless Tug.
SB 145-32-0102	Incorporates the use of Towbarless Tug.
SB 145-32-0104	Changes Nose Wheel Steering System logic.
SB 145-33-0040	Provides instructions to disable temporarily and enable the Dim Mode of the Cabin Lighting System.
SB 145-34-0046	Improves TCAS/AWU interface.
SB 145-34-0049	Changes the Integrated Standby Instrument System (ISIS) into new P/N C16221GC03 - Amendment A.
SB 145-34-0088	Introduces time delay in the transition from Landing to Go-Around configuration.
SB 145-34-0089	Incorporates modifications related to Mode S Elementary Surveillance Transponders.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-34-0096	Incorporates modifications related to Mode S Enhanced Surveillance Transponders.
SB 145-34-0106	Reconfiguration of the TCAS Performance Limit.
SB 145-34-0112	Direct connect EGPWS to GPS Universal information and upgrades EGPWS software version to -228.
SB 145-34-0116	Electronic Flight Bag (EFB) Upgrade from WINDOWS XP to WINDOWS 7.
SB 145-34-0117	EGPWS upgrade to PN 965-0976-003-228-228.
SB 145-34-0118	Installs the ADS-B Out on airplanes equipped with Honeywell FMS (FMZ2000).
SB 145-34-0121	Installs the ADS-B Out on airplanes equipped with Universal FMS (UNS-1K).
SB 145-34-0123	Installs the FMZ2010 Honeywell FMS (FMS 6.1.1).
SB 145-34-0125	Installs LPV and Baro-VNAV.
SB 145-35-0008	Rework of the Oxygen Module Assembly.
SB 145-36-0028	Changes EBV S/O Valve by a Pressure Regulator Valve.
SB 145-36-0030	Improves the Bleed Air Leak Detection System.
SB 145-49-0010	Improves the Auxiliary Power Unit (APU).
SB 145-49-0012	Changes Auxiliary Power Unit (APU) Electronic Sequence Unit (ESU) feeder bus.
SB 145-49-0014	Replaces the APU Air Inlet Frame.
SB 145-49-0025	Improvement of APU starting conditions.
SB 145-52-0040	Lock Pin installation.
SB 145-53-0064	Increases the MZFW of the EMB-145ER and EP Models.
SB 145-53-0065	Reduces MTOW of the EMB-145LR Model.
SB 145-53-0066	Updates MTOW of the EMB-145LR Model.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-53-0068	Increases the maximum gross weights of the EMB-145LR Model.
SB 145-71-0003	Implements the Protection Guard for the Engine Start Switches.
SB 145-73-0010	Incorporates FADEC B5.1.1 Version on AE3007A and A1/1 Engines.
SB 145-73-0011	Incorporates FADEC B5.1.1 Version on AE3007A1 Engines.
SB 145-73-0012	Incorporates FADEC B5.1.1 Version on AE3007A1P Engines.
SB 145-73-0013	Incorporates FADEC B5.1.1 Version on AE3007A1/3 Engines.
SB 145-73-0014	Incorporates FADEC B5.1.1 Version on AE3007A3 Engines.
SB 145-73-0021	Incorporates FADEC B7.6 Version on AE3007A and A1/1 Engines.
SB 145-73-0022	Incorporates FADEC B7.6 Version on AE3007A1 Engines.
SB 145-73-0023	Incorporates FADEC B7.6 Version on AE3007A1P Engines.
SB 145-73-0024	Incorporates FADEC B7.6 Version on AE3007A1/3 Engines.
SB 145-73-0025	Incorporates FADEC B7.6 Version on AE3007A3 Engines.
SB 145-73-0026	Incorporates FADEC B7.6 Version on AE3007A1E Engines.
SB 145-73-0027	Incorporates FADEC B8.0 Version on AE3007A1P Engines.
SB 145-73-0028	Incorporates FADEC B8.0 Version on AE3007A1E Engines.
SB 145-73-0029	Incorporates FADEC B8.0 Version on AE3007A1 Engines.

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SERVICE BULLETIN TABLE

SB	SUBJECT
SB 145-73-0030	Incorporates FADEC B8.0 Version on AE3007A1/1 Engines.
SB 145-73-0031	Incorporates FADEC B8.0 Version on AE3007A1/3 Engines.
SB 145-77-0002	Includes Placard for 95 psi Oil Pressure Limit.
SB 145-77-0003	Includes Placard for 115 psi Oil Pressure Limit.
SB 145-77-0004	New EICAS N2 Red Line Margin for A1 and A1/3 Engines.
SB T-62T-49-152	Incorporates Modification to Permit APU Start Above 25000 ft.

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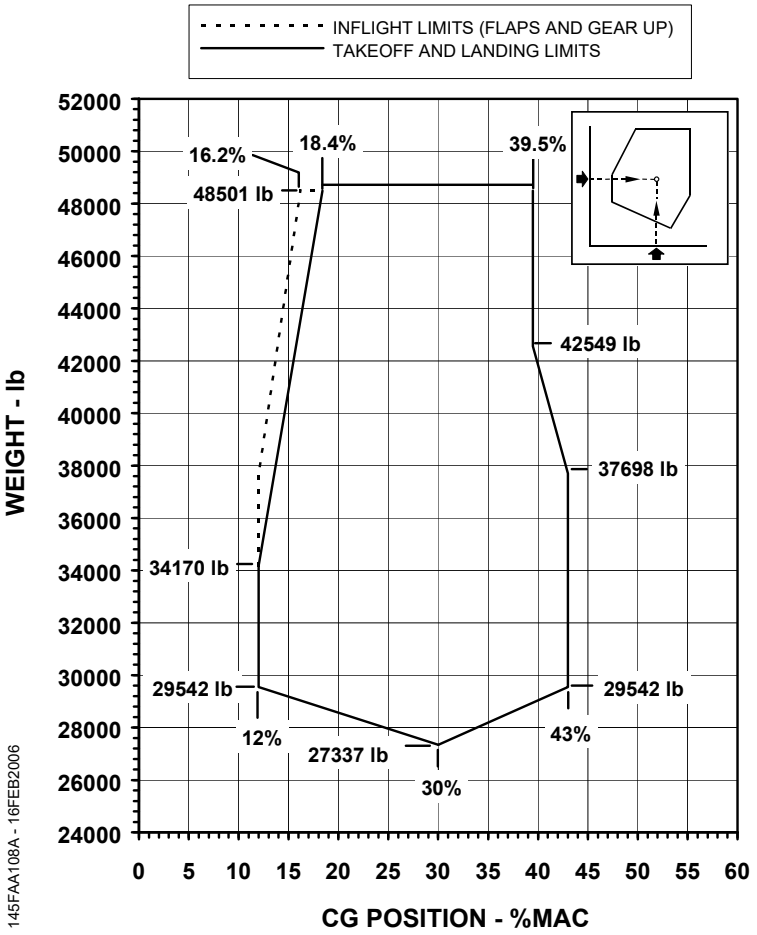
WEIGHT AND CENTER OF GRAVITY

EMB-145 LR MODEL - TAKEOFF WITH FLAPS 9° OR 18º

APPLICABLE TO AIRPLANES PRE-MOD. SB 145-53-0068.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
48722 lb	48501 lb	42549 lb	39462 lb



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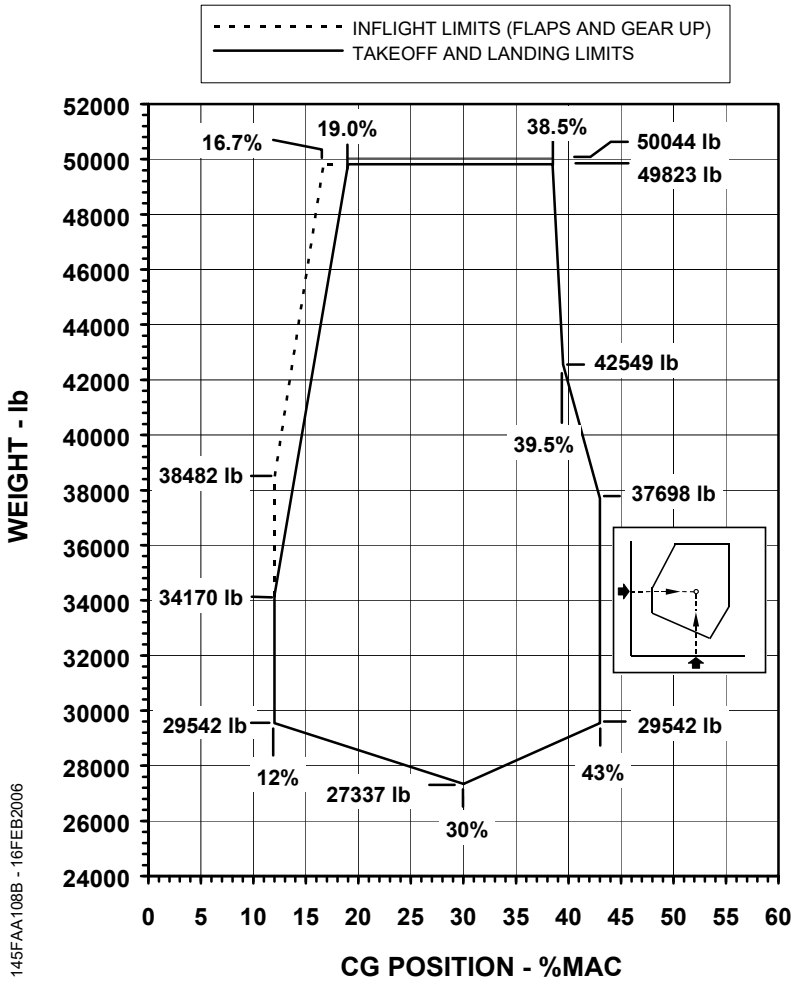
APPLICABLE TO AIRPLANES POST-MOD. SB 145-53-0068 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
50044 lb	49823 lb	43651 lb	40564 lb



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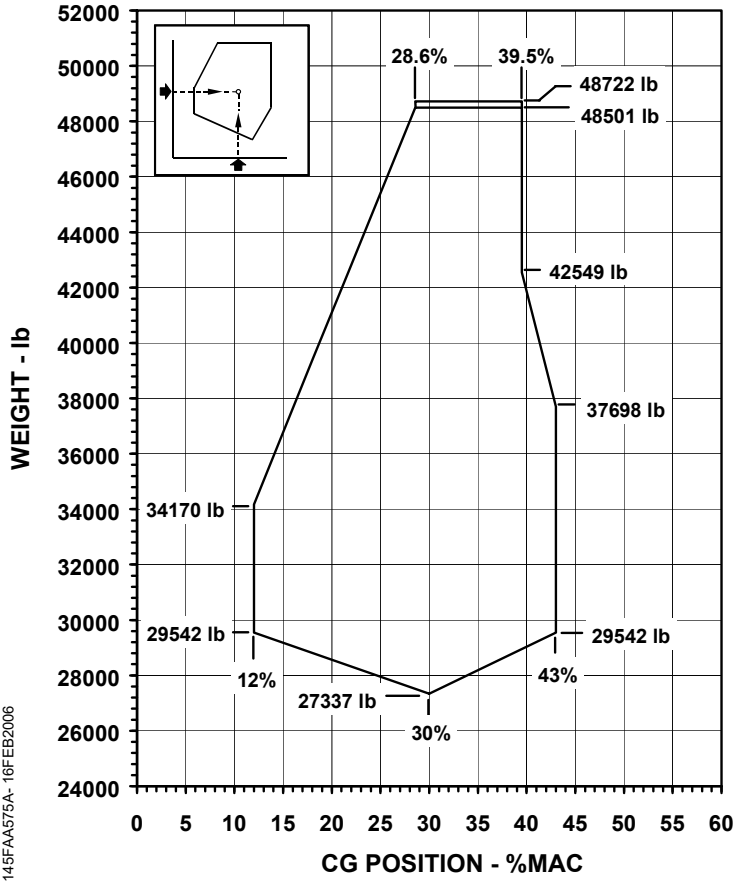
EMB-145 LR MODEL - TAKEOFF WITH FLAPS 22°

APPLICABLE TO AIRPLANES PRE-MOD. SB 145-53-0068.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
48722 lb	48501 lb	42549 lb	39462 lb



NOTE: For inflight and landing limits refer to standard CG Envelope.

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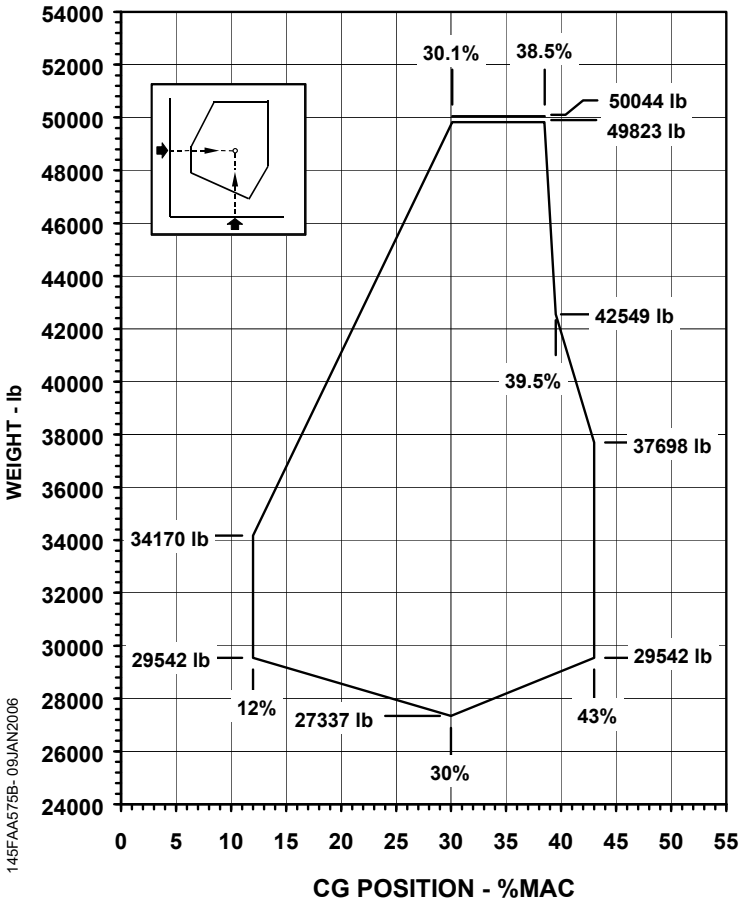
APPLICABLE TO AIRPLANES POST-MOD. SB 145-53-0068 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
50044 lb	49823 lb	43651 lb	40564 lb



NOTE: For inflight and landing limits refer to standard CG Envelope.

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To comply with the performance and operating limitations of the regulations, the maximum allowable takeoff and landing operational weights may be equal to, but not greater than, the design limits.

The takeoff weight (weight at brake release or at start of takeoff run) is the lowest among MTOW and the following weights:

- Maximum takeoff weight for altitude and temperature determined from Maximum Takeoff Weight - Climb Limited chart.
- Maximum takeoff weight, as limited by runway length and determined from Maximum Takeoff Weight - Field Length Limited chart.
- Maximum takeoff weight, as limited by brake energy and determined from Maximum Takeoff Weight - Brake Energy Limited chart.
- Maximum takeoff weight, as limited by obstacle clearance, enroute, and landing operating requirements.

The landing weight is the lowest among MLW and the following weights:

- Maximum approach and landing weight for altitude and temperature determined from Maximum Landing Weight - Climb Limited charts.
- Maximum landing weight, as limited by runway length and determined from Maximum Landing Weight - Field Length Limited chart.
-

LOADING

The airplane must be loaded in accordance with the information contained in the Weight and Balance Manual.

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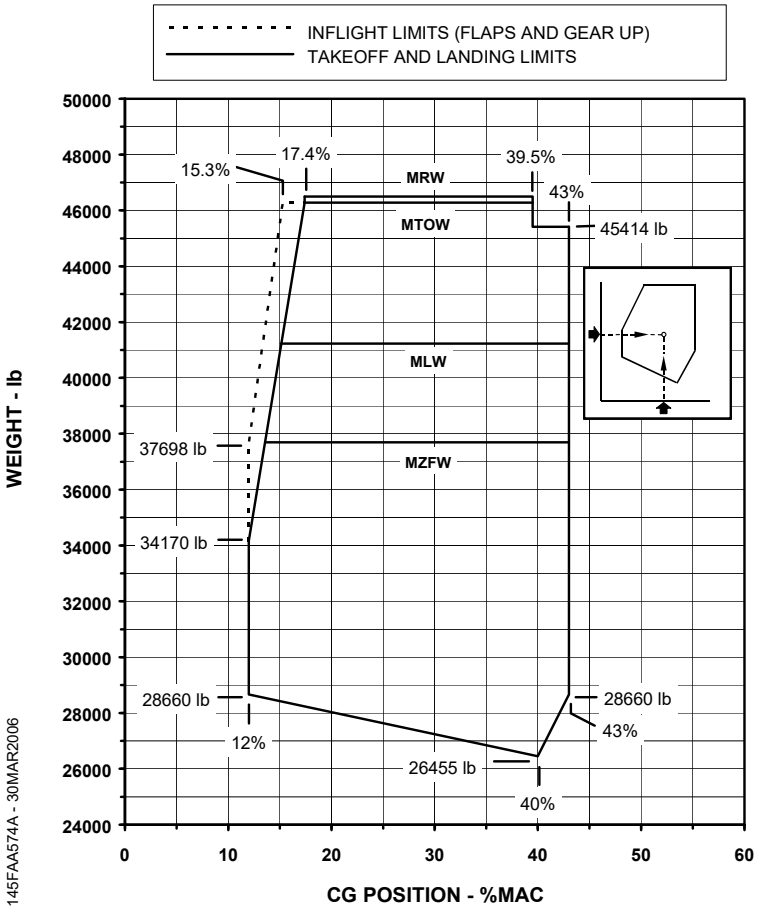
WEIGHT AND CENTER OF GRAVITY

EMB-145 EP MODEL - TAKEOFF WITH FLAPS 9° OR 18º

APPLICABLE TO AIRPLANES PRE-MOD. SB 145-53-0064.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
46495 lb	46275 lb	41226 lb	37698 lb



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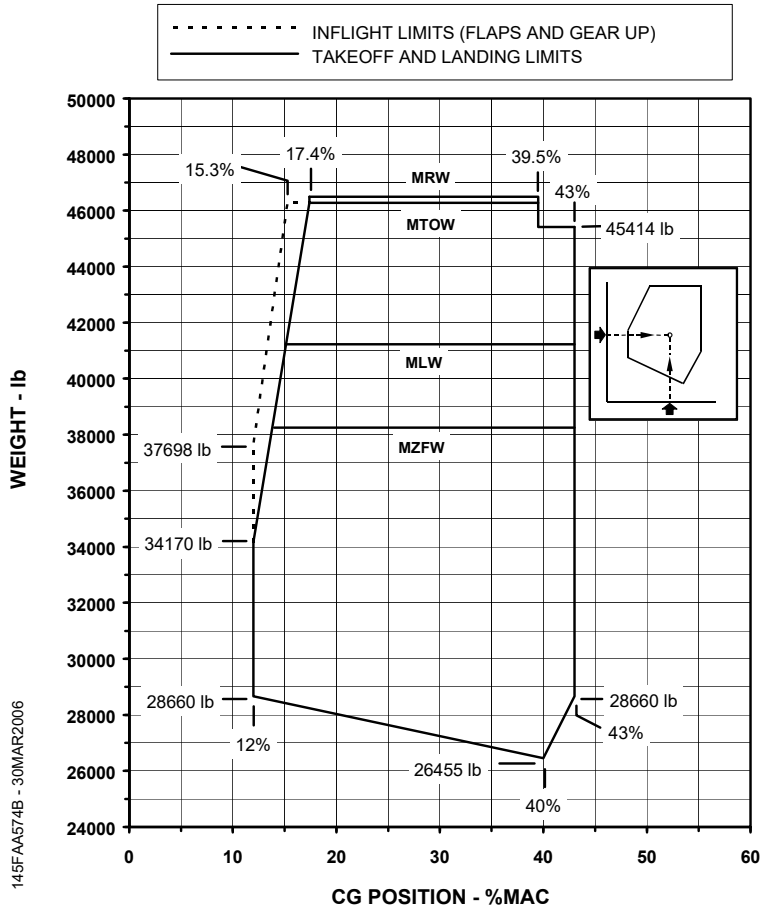
APPLICABLE TO AIRPLANES POST-MOD. SB 145-53-0064 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
46495 lb	46275 lb	41226 lb	38250 lb



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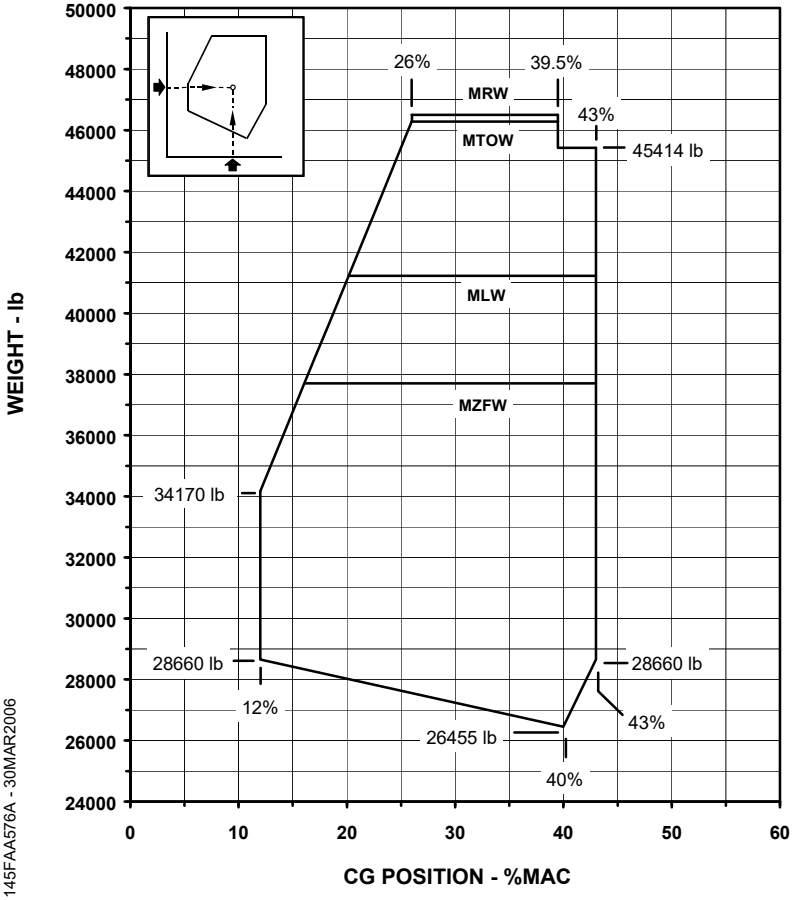
EMB-145 EP MODEL - TAKEOFF WITH FLAPS 22°

APPLICABLE TO AIRPLANES PRE-MOD. SB 145-53-0064.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
46495 lb	46275 lb	41226 lb	37698 lb



NOTE: For inflight and landing limits refer to standard CG Envelope.

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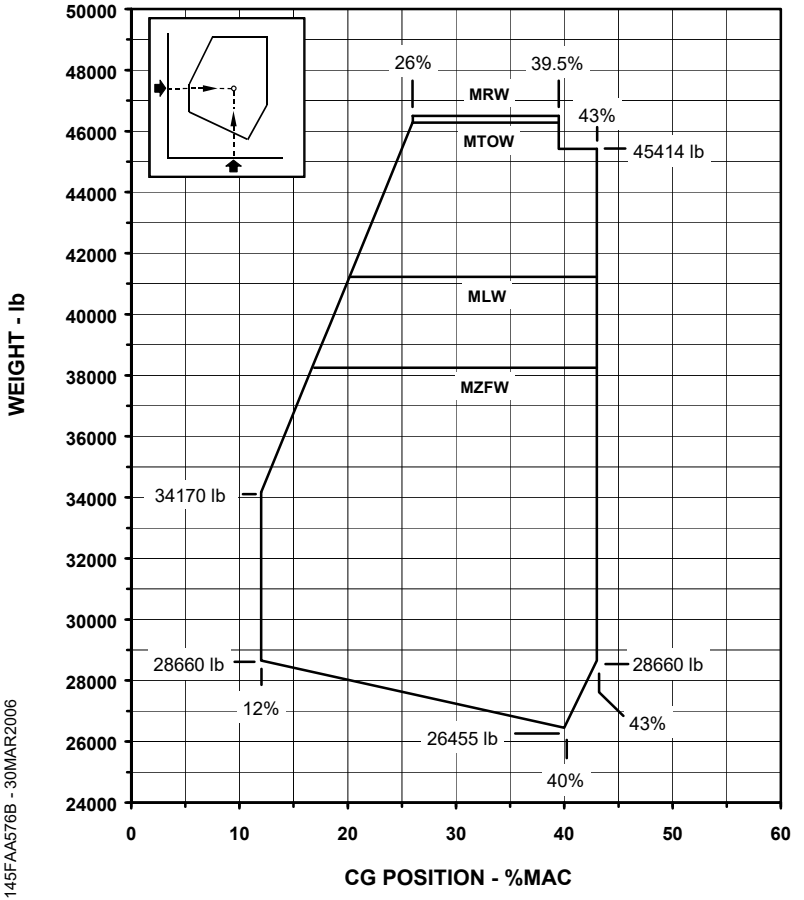
APPLICABLE TO AIRPLANES POST-MOD. SB 145-53-0064 OR EQUIPPED WITH AN EQUIVALENT MODIFICATION FACTORY INCORPORATED.

MAXIMUM WEIGHT			
Max. Ramp Weight (MRW)	**Max. Takeoff Weight (MTOW)**	**Max. Landing Weight (MLW)**	**Max. Zero Fuel Weight (MZFW)**
46495 lb	46275 lb	41226 lb	38250 lb



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NOTE: For inflight and landing limits refer to standard CG Envelope.

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To comply with the performance and operating limitations of the regulations, the maximum allowable takeoff and landing operational weights may be equal to, but not greater than, the design limits.

The takeoff weight (weight at brake release or at start of takeoff run) is the lowest among MTOW and the following weights:

- Maximum takeoff weight for altitude and temperature determined from Maximum Takeoff Weight - Climb Limited chart.
- Maximum takeoff weight, as limited by (dry or wet) runway length and determined from Maximum Takeoff Weight - Field Length Limited chart (if applicable, determined from Takeoff Distance on Contaminated Runway and Accelerate Stop Distance on Contaminated Runway charts).
- Maximum takeoff weight, as limited by brake energy and determined from Maximum Takeoff Weight - Brake Energy Limited chart.
- Maximum takeoff weight, as limited by obstacle clearance, enroute, and landing operating requirements.

The landing weight is the lowest among MLW and the following weights:

- Maximum approach and landing weight for altitude and temperature determined from Maximum Landing Weight - Climb Limited charts.
- Maximum landing weight, as limited by (dry or wet) runway length and determined from Maximum Landing Weight - Field Length Limited chart (if applicable, determined from Landing Distance on Contaminated Runway charts).

LOADING

The airplane must be loaded in accordance with the information contained in the Weight and Balance Manual.

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ICE AND RAIN PROTECTION

OPERATION IN ICING CONDITIONS

Maximum Temperature for Anti-icing Operation ..... 10°C
Minimum Temperature for Manual Anti-Icing Operation ..... -40°C
Single engine or single bleed maximum altitude operation in icing conditions..... 15000 ft
Holding configuration:
- Landing Gear..... UP
- Flaps..... UP
- Minimum Airspeed..... 200 KIAS

NOTE: - There is no temperature limitation for anti-icing system automatic operation.

- Use Static Air Temperature (SAT) on ground or for takeoff operations and Total Air Temperature (TAT) for operations in flight.
- Icing conditions may exist whenever the Static Air Temperature (SAT) on the ground or for takeoff, or Total Air Temperature (TAT) in flight, is 10°C or below and visible moisture in any form is present (such as clouds, fog with visibility of one mile or less, rain, snow, sleet, and ice crystals).
- Icing conditions may also exist when the SAT on the ground and for takeoff is 10°C or below when operating on ramps, taxi ways, or runways where surface snow, ice, standing water, or slush may be ingested by the engines, or freeze on engines, nacelles, or engine sensor probes.
- Takeoff is prohibited with frost, ice, snow or slush adhering to wings, control surfaces, engine inlets, or other critical surfaces (refer to the applicable requirements).
- There are many methods to ensure the wing is clear of ice. If visual inspection or installed clear ice detectors do not indicate wing contamination, a tactile (hand on surface) check of the wing leading edge and the upper surface must be accomplished prior to takeoff. The tactile check must also be performed when the holdover time is exceeded after airplane de/anti-icing fluids are applied. This check should be performed whenever the outside temperature is less than 6°C or if it cannot be ascertained that the wing fuel temperature is above 0°C, and:
  - there is visible moisture,
  - water is present on the wing,

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- the difference between the dew point and the outside air temperature is 3°C or less, or
- the atmospheric conditions have been conducive to frost formation.

CAUTION:
- ON GROUND, DO NOT RELY ON VISUAL ICING EVIDENCE OR ICE DETECTOR ACTUATION TO TURN ON THE ANTI-ICING SYSTEM. USE THE TEMPERATURE AND VISUAL MOISTURE CRITERIA AS SPECIFIED ABOVE. DELAYING THE USE OF THE ANTI-ICING SYSTEM UNTIL ICE BUILD-UP IS VISIBLE FROM THE COCKPIT MAY RESULT IN ICE INGESTION AND POSSIBLE ENGINE DAMAGE OR FLAME-OUT.
- DO NOT USE APU BLEED AS PNEUMATIC SOURCE FOR ANTI-ICING SYSTEM.

WINDSHIELD WIPER OPERATION

Maximum Airspeed for Windshield Wiper Operation .... 170 KIAS

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FMZ 2010 FLIGHT MANAGEMENT SYSTEM

GENERAL LIMITATIONS

The following limitations are applicable to Honeywell Flight Management System version NZ 6.1.1:

- The Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number D200802000002 (or later revision of the manual) for the software version NZ 6.1.1 or an Operating Manual accepted by the certification authority, must be immediately available to the flight crew whenever navigation is predicated on the use of the FMS. The software status stated in the Pilot's Manual must match that displayed on the FMS Control Display Unit (CDU).
- Honeywell software version NZ 6.1.1 must be installed.
- RNAV equipment has a performance limitation necessitating alternate airport flight planning operational mitigation.
- Availability of suitable approved backup navigation equipment to divert and land at an alternate destination is required for RNP terminal and approach operations with single FMS or single GPS.
- Approved GPS FDE availability prediction program and suitable backup navigation to divert and land at an alternate destination is required for RNP operations with TSO-C129/129a sensor and to TSO-C145c/146c sensor operating outside SBAS coverage area. Operations requiring use of GPS enroute/remote coverage prediction must rely on approved offline prediction program.
- GPS/SBAS service availability is required to be confirmed for RNP operations with TSO-C145c/146c sensor operating within SBAS coverage area.
- The Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish instrument RNAV operations based on FMS guidance.
- RNAV/RNP operations must not be performed following the guidance from HGS Model 3300.

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- FMS-coupled vertical guidance is not available. During FMS operation with autopilot engaged, the pilot must select the appropriate vertical guidance mode through the Flight Guidance Controller.
- Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must use the primary barometric altimeter to ensure compliance with all altitude restrictions, particularly during instrument approach operations.
- It is required coordination with the ATC prior to employing the temperature compensation feature.
- FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation database. The FMS database must incorporate the current update cycle.
- IFR operation based on FMS guidance is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.
- The pilots must compare any procedures/route retrieved from the FMS database with those published on the procedure charts. Differences between the charts and the FMS information up to 3° are acceptable. Otherwise, the coded procedure must not be used.
- Operation in the following region using FMS as primary navigation source is prohibited: north of 72°30.0' N and south of 59°30.0' S.
- For areas in which the magnetic database error may differ in more than 3° from the published charts, the following functions must be performed using true heading:
  - Manual creation of waypoints by place/bearing/distance,
  - Manual creation of waypoints by place/bearing/place/bearing,
  - Holding inbound course,

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- FIX INFO bearings, and
- DIRECT-TO with intercept course.

NOTE: To define course and bearing references to TRUE north in the FMS, insert the character "T" after the course/bearing value.

- The regions where the magnetic database error may differ in more than 3° from published charts are the following:

Until December 31, 2024	
LATITUDE	**LONGITUDE**
North of 55°00' N	East of 180°00' W West of 105°00' W
North of 58°30' N	East of 100°00' W West of 020°00' W
North of 65°00' N	East of 020°00' W West of 005°00'E
North of 65°00' N	East of 170°00' E West of 180°00' E
South of 50°00' S	East of 120°00' E West of 165°00' E

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From January 01, 2025, until December 31, 2029	
LATITUDE	**LONGITUDE**
North of 50°00' N	East of 180°00' W West of 130°00' W
North of 55°00' N	East of 130°00' W West of 080°00' W
North of 47°30' N	East of 080°00' W West of 000°00'
North of 55°00' N	East of 000°00' West of 030°00' E
North of 65°00' N	East of 030°00' E West of 070°00' E
North of 70°00' N	East of 110°00' E West of 125°00' E
North of 60°00' N	East of 140°00' E West of 170°00' E
North of 55°00' N	East of 170°00' E West of 180°00' E
South of 10°00' S North of 30°00' S	East of 075°00' W West of 057°00' W
South of 05°00' S North of 30°00' S	East of 010°00' W West of 015°00' E
South of 50°00' S	East of 115°00' E West of 180°00' E

- RNAV/RNP operations with DGR or DR annunciated on the PFD are prohibited.
- FMS performance management information is only supplementary. The flight crew must use fuel information primarily from the MFD and EICAS display.
- Use of the UNDO function is prohibited with departure and arrival procedures and approaches linked in the flight plan.
- Airplane is not approved for RNP less than 0.3 operations.
- Airplane is not approved for RNP AR operations.
- Airplane is not approved for procedures containing RF legs.
- Airplane is not approved for FRT leg transitions.

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- Airplane is not approved for pre-planned parallel offsets.
- Airplane is not approved for TOAC.
- Airplane is not approved for RNAV Holding.
- For operations using RNP 1 to RNP less than 2 the use of Flight Director is required.
- For operations using RNP 0.3 to RNP less than 1 the use of GPS and Flight Director is required.
- Airplane is not approved for missed approach operations less than RNP 1.

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APPROACH LIMITATIONS

- LP, LNAV/VNAV, LPV, ILS, LOC, LOC-BC, LDA, SDF, and MLS approaches, using the FMS for guidance, are prohibited.
- Approved GPS FDE availability prediction program and suitable backup navigation to divert and land at an alternate destination is required for RNP approach operations with TSO-C129/129a sensor and to TSO-C145c/146c sensor operating outside SBAS coverage area.
- GPS/SBAS service availability is required to be confirmed for RNP approach operations with dual FMS and dual TSO-C145c/146c GPS sensor operating within SBAS coverage area.
- Use of FMS guidance for conducting instrument approach operations is conditioned to the display of the APP annunciator set on PFD once within 2 NM from the final approach fix.
- Use of FMS guidance for conducting instrument approach procedures is prohibited with the FMS operating in the degrade or dead-reckoning mode (DGR or DR annunciation set on PFD).
- The pilot must review the complete transition-approach, comparing the waypoints and altitudes displayed on the FMS with those on the published procedure prior to activation to insure that the correct procedure and transition are selected.
- The Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish approach operations based on FMS guidance.
- Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must rely on the altimeter as the primary vertical reference during the final approach segment, including step down fixes.
- FMS Missed Approaches using the CDU Mode Select Button during the final approach segment is prohibited.

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REMOTE OPERATIONS LIMITATIONS

- RNP remote operations are conditioned by approved dispatch GPS FDE availability prediction for airplanes not equipped with optional dual IRS configuration. The maximum allowable for a predicted loss of GPS FDE capability is 34 minutes. Operations requiring use of GPS enroute/remote coverage prediction must rely on approved offline prediction program.
- RNP 10 operations for airplanes equipped with optional dual IRS configuration meet the applicable performance criteria for up to 6.2 hours of flight time without GPS position update.

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NAVIGATION OPERATIONAL APPROVALS

The Honeywell Flight Management System, with the software version NZ 6.1.1 (identified on the FMS NAV IDENT PAGE) has been demonstrated capable of and has been shown to meet the requirements for the following operations:

ENROUTE, TERMINAL, AND APPROACH OPERATIONS

The installed single or dual FMZ 2010 equipment complies with FAA AC 20-138D for navigation using GPS and GPS/SBAS (within the coverage of a satellite-based augmentation system complying with ICAO Annex 10) for enroute, terminal area, non-precision approach, when the following equipment is installed and operative:

- For RNAV 1 and 2, and RNP 1:
  - 1 FMS,
  - 1 AHRS/IRS,
  - 1 CDU,
  - 4 Displays Units,
  - 1 GPS (1),
  - 1 VOR/DME module (1), and
  - 1 Flight Director.

NOTE: 1) Requirement for VOR/DME may be replaced by dual FMS and dual GPS/SBAS equipment.

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- For RNP 2:
  - 2 FMS,
  - 2 AHRS/IRS,
  - 2 CDU,
  - 4 Displays Units,
  - 2 GPS (1), and
  - 1 Flight Director.

  NOTE: 1) Dual GPS is the primary navigation system to support RNP 2.

- For RNP APCH operations with LNAV minima:
  - 1 FMS (1),
  - 1 AHRS/IRS,
  - 1 CDU (2),
  - 4 Displays Units,
  - 1 GPS (1),
  - 1 VOR/DME module (1), and
  - 1 Flight Director.

  NOTE: 1) GPS is the only approved sensor for RNP APCH operation. Although replacing the requirement for retaining VOR/DME as backup navigation equipment by dual FMS and dual GPS/SBAS may be considered acceptable by some local authorities.

  2) In case of dispatch with single FMS, the available CDU must control the available FMS.

REMOTE/OCEANIC OPERATIONS

The installed dual FMZ 2010 equipment complies with the requirements of the FAA AC 20-138D regarding multi-sensor system operation in remote and oceanic flight, when the following equipment is installed and operative:

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- For RNP 4 and RNP 10 (1):
  - 2 FMS,
  - 2 AHRS/IRS (2),
  - 2 CDU,
  - 4 Displays Units,
  - 2 GPS (2), and
  - 1 Flight Director.

NOTE: 1) The term RNP 10 must be understood as RNAV 10 as per ICAO nomenclature.

2) Two long range sensors are required. Dual GPS is the primary navigation system to support RNP 4. Dual GPS and/or dual IRS meet the criteria for RNP 10 operations.

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FMZ 2010 FLIGHT MANAGEMENT SYSTEM

GENERAL LIMITATIONS

The following limitations are applicable to Honeywell Flight Management System version NZ 6.1.1:

- The Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number D200802000002 (or later revision of the manual) for the software version NZ 6.1.1 or an Operating Manual accepted by the certification authority, must be immediately available to the flight crew whenever navigation is predicated on the use of the FMS. The software status stated in the Pilot's Manual must match that displayed on the FMS Control Display Unit (CDU).
- Honeywell software version NZ 6.1.1 must be installed.
- RNAV equipment has a performance limitation necessitating alternate airport flight planning operational mitigation.
- Availability of suitable approved backup navigation equipment to divert and land at an alternate destination is required for RNP terminal and approach operations with single FMS or single GPS.
- Approved GPS FDE availability prediction program and suitable backup navigation to divert and land at an alternate destination is required for RNP operations with TSO-C129/129a sensor and to TSO-C145c/146c sensor operating outside SBAS coverage area. Operations requiring use of GPS enroute/remote coverage prediction must rely on approved offline prediction program.
- If GPS/SBAS service availability can be confirmed through service provider services (e.g.: NOTAM), then the use of prediction programs may not be required for RNP/RNAV operations with TSO-C145c/146c sensor operating within SBAS coverage area.
- For airplanes Pre-Mod. SB145-34-0125, the Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish instrument RNAV operations based on FMS guidance.
- RNAV/RNP/Baro-VNAV operations must not be performed following the indications from HGS (raw data or flight director guidance).

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- For airplanes Pre-Mod. SB145-34-0125, FMS-coupled vertical guidance is not available. During FMS operation with autopilot engaged, the pilot must select the appropriate vertical guidance mode through the Flight Guidance Controller.
- Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must use the primary barometric altimeter for all flight operations to ensure compliance with all altitude restrictions.
- The Flight Director must be coupled to the VNAV mode (autopilot coupled or not coupled), for coupled Baro-VNAV operations.
- During takeoff and go-around, the Baro-VNAV must not be coupled to the flight director below 400 ft or prior to reaching the applicable acceleration altitude, whichever is higher.
- Baro-VNAV must not be used with altimeter adjustments referencing height above a ground location (QFE) rather than mean sea-level (QNH).
- The FMS does not correct the speed targets during Baro-VNAV operation, including approach and go-around speeds for flap and landing gear positions, ice accretion or non-normal conditions. It is the pilot responsibility to ensure that the speeds are within the limits during all operations.
- It is required coordination with the ATC prior to employing the temperature compensation feature.
- FMS instrument approaches must be accomplished in accordance with approved instrument approach procedures that are retrieved from the FMS navigation database. The FMS database must incorporate the current update cycle.
- IFR operation based on FMS guidance is prohibited unless the pilot verifies the currency of the database or verifies each selected waypoint for accuracy by reference to current approved data.
- The pilots must compare any procedures/route retrieved from the FMS database with those published on the procedure charts. Differences between the charts and the FMS information up to 3° are acceptable. Otherwise, the coded procedure must not be used.

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- Operation in the following region using FMS as primary navigation source is prohibited: north of 72°30.0' N and south of 59°30.0' S.
- For areas in which the magnetic database error may differ in more than 3° from the published charts, the following functions must be performed using true heading:
  - Manual creation of waypoints by place/bearing/distance,
  - Manual creation of waypoints by place/bearing/place/bearing,
  - Holding inbound course,
  - FIX INFO bearings, and
  - DIRECT-TO with intercept course.

NOTE: To define course and bearing references to TRUE north in the FMS, insert the character "T" after the course/bearing value.

- The regions where the magnetic database error may differ in more than 3° from published charts are the following:

Until December 31, 2024	
LATITUDE	**LONGITUDE**
North of 55°00' N	East of 180°00' W West of 105°00' W
North of 58°30' N	East of 100°00' W West of 020°00' W
North of 65°00' N	East of 020°00' W West of 005°00' E
North of 65°00' N	East of 170°00' E West of 180°00' E
South of 50°00' S	East of 120°00' E West of 165°00' E

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From January 01, 2025, until December 31, 2029	
LATITUDE	**LONGITUDE**
North of 50°00' N	East of 180°00' W West of 130°00' W
North of 55°00' N	East of 130°00' W West of 080°00' W
North of 47°30' N	East of 080°00' W West of 000°00'
North of 55°00' N	East of 000°00' West of 030°00' E
North of 65°00' N	East of 030°00' E West of 070°00' E
North of 70°00' N	East of 110°00' E West of 125°00' E
North of 60°00' N	East of 140°00' E West of 170°00' E
North of 55°00' N	East of 170°00' E West of 180°00' E
South of 10°00' S North of 30°00' S	East of 075°00' W West of 057°00' W
South of 05°00' S North of 30°00' S	East of 010°00' W West of 015°00' E
South of 50°00' S	East of 115°00' E West of 180°00' E

- RNAV/RNP operations with DGR or DR annunciated on the PFD are prohibited.
- FMS performance management information is only supplementary. The flight crew must use fuel information primarily from the MFD and EICAS display.
- Use of the UNDO function is prohibited with departure and arrival procedures and approaches linked in the flight plan.
- Airplane is not approved for RNP less than 0.3 operations.
- Airplane is not approved for RNP AR operations.
- Airplane is not approved for procedures containing RF legs.
- Airplane is not approved for FRT leg transitions.

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- Airplane is not approved for pre-planned parallel offsets.
- Airplane is not approved for TOAC.
- Airplane is not approved for RNAV Holding.
- For airplanes Pre-Mod. SB145-34-0125, operations using RNP 1 to RNP less than 2 require the use of Flight Director.
- For operations using RNP 0.3 to RNP less than 1 the use of GPS is required. For airplanes Pre-Mod. SB145-34-0125, the use of the Flight Director is also required.
- Airplane is not approved for missed approach operations less than RNP 1.

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APPROACH LIMITATIONS

- LP, ILS, GLS, LOC, LOC-BC, LDA, SDF, and MLS approaches, using the FMS for guidance, are prohibited.
- For airplanes Pre-Mod. SB145-34-0125, LNAV/VNAV and LPV approaches, using the FMS for guidance, are prohibited.
- Approved GPS FDE availability prediction program and suitable backup navigation to divert and land at an alternate destination is required for RNP approach operations with TSO-C129/129a sensor and to TSO-C145c/146c sensor operating outside SBAS coverage area.
- If GPS/SBAS service availability can be confirmed through service provider services (e.g.: NOTAM), then the use of prediction programs may not be required for RNP/RNAV operations with TSO-C145c/146c GPS sensor operating within SBAS coverage area.
- Use of FMS guidance for conducting instrument approach operations is conditioned to the display of the APP annunciator set on PFD once within 2 NM from the final approach fix.
- Use of FMS guidance for conducting instrument approach procedures is prohibited with the FMS operating in the degrade or dead-reckoning mode (DGR or DR annunciation set on PFD).
- The pilot must review the complete transition-approach, comparing the waypoints and altitudes displayed on the FMS with those on the published procedure prior to activation to ensure that the correct procedure and transition are selected.
- For airplanes Pre-Mod. SB145-34-0125, the Flight Director must be coupled to the LNAV mode (autopilot coupled or not coupled), to accomplish approach operations based on FMS guidance.
- The Flight Director must be coupled to the LNAV/VGP mode (autopilot coupled or not coupled) to perform instrument approach operations to LNAV/VNAV or LPV line of minima.

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- Advisory vertical guidance deviation information is only an aid to help pilots comply with altitude restrictions. When using advisory vertical guidance, the pilot must rely on the altimeter as the primary vertical reference for compliance with all altitude restrictions associated with the instrument approach procedure, including compliance with all associated step-down fixes.
- Only the LNAV/VNAV or LPV line of minima on an approach chart can guarantee the vertical path. For airplanes Post-Mod. SB145-34-0125, when performing an approach to LNAV minimums and the approach chart also contains LNAV/VNAV line of minima with step-down fixes, vertical path is not guaranteed. When performing an approach to LNAV only minimums, VNAV guidance provided by the Baro-VNAV function must be considered as advisory only. The pilot must ensure compliance with ATC clearances and altitude restrictions by using the primary barometric altimeter.
- Use of Baro-VNAV to the LNAV/VNAV minimum may not be authorized at airports with remote altimeter setting. In this case, use the LNAV minimum.
- The use of temperature compensation feature is required if Baro-VNAV operation outside the temperature limits published on approach procedure chart is intended.
- FMS Missed Approaches using the CDU Mode Select Button during the final approach segment is prohibited.

REMOTE OPERATIONS LIMITATIONS

- RNP remote operations are conditioned by approved dispatch GPS FDE availability prediction for airplanes not equipped with optional dual IRS configuration. The maximum allowable for a predicted loss of GPS FDE capability is 25 minutes for RNP 4 operation and 34 minutes for RNP 10 operation. Operations requiring use of GPS enroute/remote coverage prediction must rely on approved offline prediction program.
- RNP 10 operations for airplanes equipped with optional dual IRS configuration meet the applicable performance criteria for up to 6.2 hours of flight time without GPS position update.

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AUTOPILOT (AIRPLANES POST-MOD. SB145-34-0125)

The Minimum Use Height (MUH) during LPV approach is 160 ft.

NAVIGATION OPERATIONAL APPROVALS

The Honeywell Flight Management System, with the software version NZ 6.1.1 (identified on the FMS NAV IDENT PAGE) has been demonstrated capable of and has been shown to meet the requirements for the following operations:

ENROUTE, TERMINAL, AND APPROACH OPERATIONS

The installed single or dual FMZ 2010 equipment complies with FAA AC 20-138D for navigation using GPS and GPS/SBAS (within the coverage of a satellite-based augmentation system complying with ICAO Annex 10) for enroute, terminal area, non-precision approach, and for airplanes Post-Mod. SB145-34-0125 approach procedures with vertical guidance operations when the following equipment is installed and operative:

- For RNAV 1 and 2, and RNP 1:
  - 1 FMS,
  - 1 AHRS/IRS,
  - 1 CDU,
  - 4 Displays Units,
  - 1 GPS (1),
  - 1 VOR/DME module (1), and
  - 1 Flight Director for airplanes Pre-Mod. SB145-34-0125.

NOTE: 1) Requirement for VOR/DME may be replaced by dual FMS and dual GPS/SBAS equipment.

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- For RNP 2:
  - 2 FMS,
  - 2 AHRS/IRS,
  - 2 CDU,
  - 4 Displays Units,
  - 2 GPS (1), and
  - 1 Flight Director for airplanes Pre-Mod. SB145-34-0125.

  NOTE: 1) Dual GPS is the primary navigation system to support RNP 2.

- For RNP APCH operations with LNAV minima:
  - 1 FMS (1),
  - 1 AHRS/IRS,
  - 1 CDU (2),
  - 4 Displays Units,
  - 1 GPS (1),
  - 1 VOR/DME module (1), and
  - 1 Flight Director for airplanes Pre-Mod. SB145-34-0125.

  NOTE: 1) GPS is the only approved sensor for RNP APCH operation. Although replacing the requirement for retaining VOR/DME as backup navigation equipment by dual FMS and dual GPS/SBAS may be considered acceptable by some local authorities.

  2) In case of dispatch with single FMS, the available CDU must control the available FMS.

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- For RNP APCH operations to LNAV/VNAV minima (airplanes Post-Mod. SB145-34-0125):
  - 1 FMS (1),
  - 1 AHRS/IRS,
  - 1 CDU (1),
  - 4 Displays Units,
  - 1 GPS,
  - 2 ADS RVSM compliant,
  - 1 TAT, and
  - 1 Flight Director.

  NOTE: 1) In case of dispatch with single FMS, the available CDU must control the available FMS.
- For RNP APCH operations to LPV minima (airplanes Post-Mod. SB145-34-0125):
  - 2 FMS,
  - 2 AHRS/IRS,
  - 2 CDU,
  - 4 Displays Units,
  - 2 GPS,
  - 2 ADS RVSM compliant,
  - 1 TAT, and
  - 2 Flight Directors.

REMOTE/OCEANIC OPERATIONS

The installed dual FMZ 2010 equipment complies with the requirements of the FAA AC 20-138D regarding multi-sensor system operation in remote and oceanic flight, when the following equipment is installed and operative:

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- For RNP 4 and RNP 10 (1):
  - 2 FMS,
  - 2 AHRS/IRS (2),
  - 2 CDU,
  - 4 Displays Units,
  - 2 GPS (2), and
  - 1 Flight Director for airplanes Pre-Mod. SB145-34-0125.

NOTE: 1) The term RNP 10 must be understood as RNAV 10 as per ICAO nomenclature.

2) Two long range sensors are required. Dual GPS is the primary navigation system to support RNP 4. Dual GPS and/or dual IRS meet the criteria for RNP 10 operations.

BAROMETRIC VERTICAL NAVIGATION (AIRPLANES POST-MOD. SB145-34-0125)

The airplanes Post-Mod. SB145-34-0125 have been demonstrated compliant with the requirements of the FAA AC 20-138D, regarding the barometric vertical navigation (Baro-VNAV) coupled to the Flight Director in enroute, terminal, and non-precision approach operations, when used in accordance with the limitations and operational procedures contained in this manual.

TEMPERATURE COMPENSATION (AIRPLANES POST-MOD. SB145-34-0125)

The temperature compensation feature complies with RTCA/DO-283B, Appendix H.

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FMZ 2000 FLIGHT MANAGEMENT SYSTEM

The information contained herein supplements the information of the basic AOM Normal Procedures.

HOLDING

If a Holding Pattern entering is necessary:

FMS ..... AS REQUIRED

The pilot must check the entry type and turn direction of holding pattern before entering it. For entry types other than the direct one, the pilot must activate the procedure holding pattern as soon as the approach procedure is retrieved from the Navigation Data Base.

NOTE: The FMS normal operating procedures are contained in the Honeywell Flight Management System (FMS) Pilot's Operating Manual, Honeywell Publication Number A28-1146-122-00, August 1997 edition (or later revision of the manual) for the software version NZ4.8 and in the Honeywell Publication Number A28-1146-133-00, February 1999 edition (or later revision of the manual) for the software version NZ5.2.

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FMS SOURCE SELECTION

Flight Plan ..... SELECT OR CREATE

FMS Source ..... SELECT

The FMS can be selected as the navigation source through the FMS Selector Button located on the Display Control Panel.

FMS Label ..... CHECK

The FMS label appears on the associated PFD and MFD.

On PFD:

For airplanes Pre-Mod. SB 145-22-0001 or Post-Mod. SB 145-31-0009 or equipped with an equivalent modification factory-incorporated, if the FMS is the navigation source for only one side the color will be magenta, otherwise it will be amber.

For airplanes Post-Mod. SB 145-22-0001 or equipped with an equivalent modification factory incorporated, the FMS label will be always magenta.

On MFD the label will be always magenta.

For FMS coupling to the Autopilot/Flight Director:

NAV Mode (Flight Guidance Controller) ..... SELECT

The FMS will be coupled to the Autopilot/Flight Director when is selected and valid at the on side EHSI and crew selects the NAV mode on the associated Flight Guidance Controller. Once coupled the autopilot will follow the preselected flight plan on the FMS.

APPROACH

CAUTION: FOR AIRPLANES UNDER FAA AND JAA CERTIFICATION, ONLY PERMITTED WITH SOFTWARE NZ4.8 MOD C OR NZ5.2 MOD B OR LATER SOFTWARE VERSION INSTALLED.

The FMS GPS, NDB, RNAV, VOR, VOR/DME and VFR approaches may be linked into the flight plan and laterally coupled to the autopilot/Flight Director.

ILS approaches can be retrieved from the navigation data base and linked to the flight plan, but cannot be armed or activated as FMS approaches. The FMS can be used to provide navigation up to the final approach course at the point that the PFD must be changed to display raw ILS data.

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TRANSITION FROM FMS TO AUTOPILOT ILS APPROACH

ILS Frequency ..... SELECT AS REQUIRED
Radio Altitude ..... SELECT AS REQUIRED
HDG Mode (Flight Guidance Controller) ..... SELECT
Before selection, set the desired interception course on heading bug.

Navigation Source ..... SELECT
Select the NAV source on the Display Control Panel (LOC course selected on the PFD).

Autopilot/Flight Director ..... AS REQUIRED
When cleared for Approach:
APR Mode (Flight Guidance Controller)..... SELECT

ARC DME APPROACH USING FMS

Pilot Not-Flying ..... CHECK DME
During Arc DME approach using FMS the pilot not-flying must check DME Raw Data.

MISSED APPROACH

CAUTION: ONLY PERMITTED FOR AIRPLANES WITH SOFTWARE NZ4.8 MOD C OR NZ5.2 MOD B OR LATER SOFTWARE VERSION INSTALLED.

Go-Around Button..... PRESS
Thrust Levers..... MAX
Verify that airplane rotates to 10° nose up wings level (Pitch Mode) and changes to Speed Hold Mode after 20 seconds.

Flaps ..... 9°
With positive rate of climb:
Landing Gear..... UP
Airspeed..... APPROACH CLIMB SPEED OR ABOVE

NOTE: During the GO-AROUND procedure, the DON'T SINK aural warning may sound. In this case monitor the sink rate and follow the GO-AROUND guidance.

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NAV Mode (Flight Guidance Controller) ..... SELECT

Reselecting the NAV mode the airplane will regain the lateral guidance from the FMS to fly the missed approach legs to the missed holding point and to enter holding, as required.

FMZ 2010 FLIGHT MANAGEMENT SYSTEM

The information contained herein supplements the information of the basic AOM Normal Procedures.

BEFORE START

FMS..... AS REQUIRED

HOLDING

If a Holding Pattern entering is necessary:

FMS ..... AS REQUIRED

The pilot must check the entry type and turn direction of holding pattern before entering it. For entry types other than the direct one, the pilot must activate the procedure holding pattern as soon as the approach procedure is retrieved from the navigation database.

FMS SOURCE SELECTION

Flight Plan ..... SELECT OR CREATE

FMS Source ..... SELECT

The FMS can be selected as the navigation source through the FMS Selector Button located on the Display Control Panel.

FMS Label..... CHECK

The FMS label appears on the associated PFD and MFD.
On PFD and MFD the FMS label will be always magenta.

For FMS coupling to the Autopilot/Flight Director:

NAV Mode (Flight Guidance Controller) ..... SELECT

The FMS will be coupled to the Autopilot/Flight Director when is selected and valid at the on side EHSI and crew selects the NAV mode on the associated Flight Guidance Controller. Once coupled the autopilot will follow the preselected flight plan on the FMS.

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APPROACH

The FMS GPS, NDB, RNAV, VOR, VOR/DME, and VFR approaches may be linked into the flight plan and laterally coupled to the Autopilot/Flight Director.

ILS approaches can be retrieved from the navigation database and linked to the flight plan, but cannot be armed or activated as FMS approaches. The FMS can be used to provide navigation up to the final approach course at the point that the PFD must be changed to display raw ILS data.

TRANSITION FROM FMS TO AUTOPILOT ILS APPROACH

ILS Frequency ..... SELECT AS REQUIRED

Radio Altitude ..... SELECT AS REQUIRED

HDG Mode (Flight Guidance Controller) ..... SELECT

Before selection, set the desired interception course on heading bug.

Navigation Source ..... SELECT

Select the NAV source on the Display Control Panel (LOC course selected on the PFD).

Autopilot/Flight Director ..... AS REQUIRED

When cleared for Approach:

APR Mode (flight guidance controller)..... SELECT

ARC DME APPROACH USING FMS

Pilot Not-Flying ..... CHECK DME

During Arc DME approach using FMS the pilot not-flying must check DME Raw Data.

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LPV APPROACH (AIRPLANES POST-MOD. SB145-34-0125)

Prior to the IAF:

Approach Procedure ..... LOAD

Prior to the FAF:

VNV Button ..... PRESS
APR Button ..... PRESS
LPV Armed ..... VERIFY

After the FAF:

LPV Active ..... VERIFY

NOTE: LPV indications will be not displayed if the navigation source is copied (FMS 2 is selected on PFD 1 or FMS 1 is selected on PFD 2 as the navigation source).

LNAV/VNAV APPROACH (AIRPLANES POST-MOD. SB145-34-0125)

Prior to the IAF:

Approach Procedure ..... LOAD

Prior to the FAF:

VNV Button ..... PRESS
APR Button ..... PRESS
VGP Armed ..... VERIFY

After the FAF:

VGP Active ..... VERIFY

MISSED APPROACH

Go-Around Button ..... PRESS
Thrust Levers ..... MAX

Verify that airplane rotates to 10° nose up wings level (Pitch Mode) and changes to Speed Hold Mode after 20 seconds.

Flaps ..... 9°

With positive rate of climb:

Landing Gear ..... UP
Airspeed ..... APPROACH CLIMB SPEED OR ABOVE

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NOTE: During the GO-AROUND Procedure DON'T SINK aural warning may sound. In this case monitor the sink rate and follow the GO-AROUND guidance.

For airplanes Pre-Mod. SB145-34-0125

NAV Mode (Flight Guidance Controller)..... SELECT

Reselecting the NAV mode the airplane will regain the lateral guidance from the FMS to fly the missed approach legs to the missed holding point and to enter holding, as required.

For airplanes Post-Mod. SB145-34-0125

LNAV Mode (flight guidance controller)..... CHECK IF ARMED

When flying an ILS or non-RNAV approach, by reselecting the FMS source the airplane will regain the lateral guidance from the FMS to fly the missed approach legs to the missed holding point and to enter holding, as required.

BEFORE LANDING (AIRPLANES POST-MOD. SB145-34-0125)

PFD Speed ..... SET $V_{APP\ CL}$

Set Approach Climb Speed via Speed Intervention function on FMS.

LATERAL DEVIATION SCALE

When the FMS is selected as the navigation source the cross track deviation scale and pointer, if valid, will be displayed. The lateral deviation scale is defined by the FMS according to the values displayed on the RNP SETTINGS page. The PROGRESS 1/3 page displays the active RNP value, which is the two dots deviation on the lateral scale. For airplanes Post-Mod. SB145-34-0125 such information is also displayed on the PFD.

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VERTICAL DEVIATION SCALE

When the FMS is selected as the navigation source the vertical track deviation scale and pointer, if valid, will be displayed. The vertical deviation values are the following:

DEVIATION	ENROUTE (ft)	TERMINAL (ft)	APPROACH (ft)
0	0	0	0
1 dot	250	250	75
2 dots	500	500	150

For airplanes Post-Mod. SB145-34-0125 the vertical deviation full-scale value readout is displayed below the scale on the PFD.

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RVSM OPERATION

The RVSM operation reduces the EMB-145 minimum vertical separation from 2000 ft to 1000 ft between FL 290 and FL 370.

Airworthiness approval alone does not authorize flight into airspace for which an RVSM operational approval is required by an ICAO Regional Navigation Agreement.

LIMITATIONS

MINIMUM EQUIPMENT REQUIRED

During RVSM operation it is necessary that the following equipment and instruments be in proper operating condition:

- 2 Primary Altitude Measurement Systems;
- 1 Autopilot with Altitude Hold Mode operative;
- 1 Altitude Alerter;
- 1 Transponder.

NOTE: - An operating transponder may not be required for entry into all designated RVSM airspace. The operator should determine the requirement for an operational transponder in each RVSM area where operations are intended. The operator should also determine the transponder requirements for transition areas next to RVSM airspace.

- Should any of the required equipment fail prior to the airplane entering RVSM airspace, the pilot should request a new clearance to avoid entering this airspace.

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EMERGENCY AND ABNORMAL PROCEDURES

The procedures presented in the basic AOM Emergency/Abnormal Procedures remain unchanged, except as amended herein.

- In case of emergency or abnormal situation or contingencies (equipment failures, weather, etc.) which affect the ability to maintain the cleared flight level, notify ATC and co-ordinate an action plan that is appropriate to the airspace concerned;
- Notify ATC when encountering greater than moderate turbulence;
- If unable to notify ATC and obtain an ATC clearance prior to deviating from the cleared flight level, follow any established contingency procedures and obtain ATC clearance as soon as possible.

NORMAL PROCEDURES

The procedures presented in the basic AOM Normal Procedures remain unchanged, except as amended herein.

EXTERNAL SAFETY INSPECTION - NOSE SECTION

Sensors, Pitot Tubes and Static Ports ..... CONDITION, NO OBSTRUCTION

Particular attention should be paid to the condition of static sources and to the marked area on the fuselage skin near each primary static source.

BEFORE TAKEOFF

Altimeters ..... SET TO THE AIRFIELD QNH

Altitude Indications ..... CHECK

NOTE: - An alternative procedure using QFE may also be used.
- The maximum difference between altimeters indication should not exceed 23 m (75 ft).

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It has been observed that, during normal operation when flying with the autopilot using ADC 1 as source of information and transponder 2 is selected for transmitting altitude information to ATC or vice versa, the altitude difference between the two ADC's, however small it is, is seen by ATC as discrepancy between the assigned altitude and the actual altitude, adding to the altitude overall error. For this reason, when the autopilot uses ADC 1 as source of information, transponder 1 should be used to report altitude because during normal operation it is connected to ADC 1. The same logic applies when using ADC 2 as source of information, that is, transponder 2 should be used.

CRUISE

Be sure that all required equipment are in proper operating condition.

Ensure that the airplane is flown at the cleared flight level and that ATC clearances are fully understood and followed. Do not depart from cleared flight level without a positive clearance from ATC except for a contingency or emergency situation.

While changing flight levels, do not overshoot or undershoot the cleared flight level by more than 45 m (150 ft).

The autopilot should be operative and engaged during level cruise, except for circumstances such as the need to re-trim the airplane or when it must be disengaged due to turbulence.

AFTER LANDING

In case of failure or malfunction, the following information should be recorded when appropriate:

a) Primary and standby altimeter readings;
b) Altitude selector setting;
c) Subscale setting on altimeter;
d) Flight Director used with the Autopilot to control the airplane and any differences when the other Flight Director was coupled;
e) Use of air data computer selector for fault diagnosis procedure;
f) The transponder selected to provide altitude information to ATC and any difference noted when an alternative transponder was selected.

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ENHANCED/GROUND PROXIMITY WARNING

Aural Warning: WHOOP-WHOOP PULL UP or PULL UP (for EGPWS), SINK RATE, TERRAIN TERRAIN or TERRAIN TERRAIN PULL UP (for EGPWS), CAUTION TERRAIN (for EGPWS), OBSTACLE OBSTACLE PULL UP (for EGPWS), CAUTION OBSTACLE (for EGPWS), DON`T SINK DON`T SINK, TOO LOW TERRAIN, TOO LOW GEAR, TOO LOW FLAPS, GLIDE SLOPE and BANK ANGLE voice messages may be generated, but are not associated with GPWS/EGPWS EICAS message.

When an EGPWS/GPWS alert occurs, use the flight controls and thrust as necessary to correct the airplane attitude, flight path and configuration according to the voice message presented to provide terrain clearance.

CAUTION: FOR EGPWS, THE TERRAIN DISPLAY IS INTENDED TO BE USED AS A SITUATIONAL TOOL ONLY AND MAY NOT PROVIDE THE ACCURACY AND/OR FIDELITY ON WHICH TO SOLELY BASE TERRAIN AVOIDANCE MANEUVERING DECISIONS.

WINDSHEAR PREVENTION/RECOVERY

Aural Warning: WINDSHEAR voice message is generated if WDSHEAR red indication is presented (GPWS warning may also be activated).

Thrust Levers	MAX
Go-around Buttons	PRESS

Rotate the airplane smoothly to minimize altitude loss. Flight guidance on EADI must be followed.

NOTE: Pitch attitude may be well above normal angles.

Maintain airplane configuration. Do not change gear and flap position until terrain clearance is assured and above 1500 ft AGL or after WDSHEAR label is removed from PFD.

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TRAFFIC AND COLLISION AVOIDANCE

Aural Warning: According to the Traffic Advisory (TA) and Resolution Advisory (RA) associated.

The pilot must not initiate evasive maneuvers using information from the traffic display or the voice message only, without visually sighting the traffic. The traffic display and advisories are intended for assistance in visually locating the traffic.

Compliance with TCAS resolution advisory is required unless the pilot considers it unsafe to do so. Maneuvers which are in the opposite direction of the RA are extremely hazardous, especially RAs involving altitude crossing, and are prohibited unless it is visually determined to be the only means to assure safe separation.

TRANSPONDER

In compliance with FAA Airworthiness Directive 2006-19-04, during all flight phases, after completion of any 4096 ATC Code change (also referred to as Mode A Code), check the status of the transponder. If the transponder indicates that it is in standby mode, re-select the desired mode (i.e., the transponder should be in the active mode).

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RNP APPROACH

INTRODUCTION

The material contain herein is a guidance to perform RNP APCH operations.

According to AC 90-105, airplanes conducting GPS approaches under AC 90-94 meet the airworthiness requirements of RNP Approach Operations.

NOTE: Compliance with the above regulations does not constitute operational approvals.

In addition to the guidance of this section, the operator must continue to ensure they comply with the general operating requirements; checking Notices to Airmen (NOTAMs), availability of Navigational Aids (NAVAIDs) for overlay approaches, airworthiness of airplane systems, and aircrew qualification. Pilots should assess their capability to navigate (potentially to an alternate destination) in case of GPS outages or predicted unavailability. In these situations, pilots should rely on other equipment, delay departure, or discontinue IFR operations.

Any required alternate airport should have an approved instrument approach procedure other than GPS which is anticipated to be operational at the estimated time of arrival.

NAVIGATION DATA VALIDATION

The navigation database must be obtained by a supplier complying with AC 20-153 or equivalent and is expected to be current for the duration of the flight.

NOTE: If the AIRAC cycle will change during the flight, the locations of the waypoints used to define procedures must be verified with current navigational charts.

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GENERAL GUIDANCE

While performing RNP APCH operations, pilots are required to use the Flight Director and/or Autopilot in lateral navigation mode.

RNP APCH operations require flight crew monitoring of lateral track deviations on the PFD to ensure the airplane remains within the bounds defined by the procedure. The lateral scale and CDI are automatically changed according the current phase of flight as presented in the following table:

DEVIATION	ENROUTE (nm)	TERMINAL (nm)	APPROACH (nm)
0	0	0	0
1 dot	2.5	0.5	0.15
2 dots	5.0	1.0	0.30

NOTE: In the PFD display, the phases of flight are identified as follows:
- Terminal phase is presented as TERM.
- Approach phase is presented as APP.
- Enroute is recognized in case neither of these two denominations is presented.

All pilots are expected to maintain centerlines, as depicted by onboard lateral deviation indicators and/or flight guidance. For normal operations, cross-track error/deviation (the difference between the RNAV system computed path and the airplane position relative to the path) should be limited to half the navigation accuracy associated with the procedure (i.e., 0.15 nm for RNP APCH operations).

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PRIOR TO FLIGHT

Airplane Minimum Configuration ..... CHECK

Check the airplane configuration complies with the applicable list below:

For RNP APCH Operation:

- 1 FMS.
- 1 GPS.
- 1 DME (*).
- 1 VOR/LOC (*).
- 1 ADF(*).
- 4 Display units.
- 1 Flight Director.
- 1 CDU.

(*) Since the Flight crew should ensure sufficient means are available to navigate and land at the destination or at an alternate aerodrome in the case of loss of RNP APCH airborne, this equipment may be required to comply with this condition. This equipment may also be required to comply with the missed approach procedure if it is based on conventional navaids.

NAV Database ..... VERIFY CURRENCY

Verify that the Navigation Data Base (NDB) is current for the duration of the flight.

Predictive RAIM ..... CONFIRM AVAILABLE

The performance capability may be checked from an offline station, or with the airplane own capability. If using the airplane capability, insert the appropriate GPS NOTAMs to allow for an accurate predictive RAIM.

NOTAM NAVAIDS ..... DESELECT

Deselect manually the appropriate NAVAIDs in accordance with NOTAMs.

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APPROACH BRIEFING

Procedure ..... CONFIRM

The flight crew must retrieve the approach procedure by procedure name from the FMS and confirm that the correct approach and missed approach procedures have been selected by comparing the FMS waypoints and distances with the aeronautical charts.

Display Control Panel ..... SET

Select the FMS as the source for the PFD and Bearing Pointer.

NOTE: - The manual entry or creation of new waypoints, by manual entry of latitude and longitude or position/bearing/distance values is not permitted.

- Slight differences between the navigation information portrayed in the chart and CDI (magenta) may occur. Differences of 3° or less are considered acceptable.

LNAV Mode ..... AS REQUIRED

GPS is in use by the FMS ..... CONFIRM

NOTE: If the ETA is more than 15 minutes from the pre-flight ETA, a new RAIM availability check should be performed.

APPROACH

Track deviation ..... MONITOR

The deviation can be monitored through the lateral scales and CDI on PFD. Lateral deviation should not exceed 0.15 nm except briefly during and immediately after turns. If the deviation exceeds this limit perform a missed approach.

At the IAF:

Altimeters..... SET

2 NM before the FAF:

APP Annunciation..... CHECK

The annunciation indicates that the FMS is in the flight approach phase and the lateral deviation scaling has been set to approach scale factor.

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ABNORMAL PROCEDURES

In case of loss of GPS based navigation capability, alternate non-GPS procedures at the destination airport must be available.

LOSS OF SIGNAL IN SPACE

During a RNP APCH operation, if at any time GPS signal is lost the APP annunciation is removed, the DGR (or DR) PFD annunciation is displayed, and the deviations remain displayed and valid.

In any case, if not visual, perfom a missed approach using alternate sources (VOR, NDB or visual references).

DEGRADED NAVIGATION

The navigation will be degraded whenever the FMS cannot guarantee that the accuracy of the system meets the requirements for the current phase of flight (DGRAD annunciator) or if the sensors being used for navigation are not approved for the current phase of flight.

Select the non-affected FMS. For single FMS installations, if not visual, perform missed approach.

For airplanes equipped with FMZ 2010 FMS, in case one FMS (single FMS) or both FMS (dual FMS) are affected, use the procedures from the following table.

OPERATION	REQUIRED ACTION
Non-RNP Terminal or Enroute	Crosscheck FMS data with raw data from VOR, DME, and NDB. De-select error causing sensor, if detectable. Otherwise, contact ATC and revert to an alternative means of navigation (VOR, DME, or NDB).
RNAV/RNP	Contact ATC, advise of any loss of the RNAV/RNP capability or inability to continue RNAV/RNP.

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FMS FAILURE

Select the cross side FMS. For single FMS installation, if not visual, perform missed approach.

FLIGHT DIRECTOR FAILURE

If flight director is lost, if not visual, perform missed approach.

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PERFORMANCE BASED NAVIGATION (PBN)

INTRODUCTION

The material contain herein is a guidance to perform PBN operation. It does not consider AC-90-105 or AMC-20-27 which deal with RNP APCH operation. For RNP APCH operation, refer to 1-02-80 RNP Approach.

In addition to the guidance of this section, the operator must continue to ensure compliance with the general operating requirements; checking Notices to Airmen (NOTAMS), availability of Navigational Aids (NAVAID), airworthiness of airplane systems, and flight crew qualification.

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NAVIGATION DATA VALIDATION

The navigation database must be obtained by a supplier complying with AC 20-153 or equivalent and is expected to be current for the duration of the flight.

NOTE: If the AIRAC cycle will change during the flight, the locations of the waypoints used to define procedures must be verified with current navigational charts.

GENERAL GUIDANCE

While performing PBN operations, pilots are encouraged to use the Flight Director and/or Autopilot in lateral navigation mode.

The following table presents the EMBRAER ERJ-145 capabilities in terms of the navigation specifications related to PBN. The information provided is based on AFM statements and, when there is no AFM statement, on analysis of the respective guidance material.

It is important to note that some guidance material that are listed on the table may either refer to other documentation for purposes of alternative compliance or may have been superseded by subsequent guidance material.

The ERJ-145 capabilities listed in this publication do not imply operational approval. Appropriate approval from the appropriate local authorities must be granted for each intended operation(s).

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The airplane is compliant with AC 90-100A (RNAV 1 and RNAV 2) and with TGL-10 (P-RNAV and B-RNAV).

RNAV SPECIFICATIONS			
Operation	**Sensors that may be used**	**Guidance FAA**	**Guidance EASA**
RNAV 10 (RNP 10) (1)	2 GNSS (2) 2 IRS+2 GPS 2 IRS (3)	Order 8400.12A	Order 8400.12A
RNAV 5	GNSS DME/DME VOR/DME	AC 90-96A (5a)	AMC 20-4 (5b)
RNAV 2	All permitted sensors (4) GNSS (2) DME/DME DME/DME/IRU (4)	AC 90-100A (6)	-
RNAV 1	All permitted sensors (4) GNSS (2) DME/DME DME/DME/IRU (4)	AC 90-100A (6)	TGL 10 (P-RNAV)

For P-RNAV operations, VOR/DME may be used as a sensor for positioning.

(1) Dual FMS is required.

(2) Off Line RAIM prediction is required.

(3) This operation is permitted up to 6.2 hours after the system is placed in the navigation mode.

(4) Only applicable for airplane with dual IRS installation (FMS HNL).

NOTE: For airplanes equipped with two AHRS and one additional IRS dedicated to HGS, only navigation based on GPS is allowable.

(5a) According to AC 90-96A, the airplane should be considered eligible for B-RNAV/RNAV 5 operations if the AFM shows the appropriate instrument flight rules (IFR) navigation system installation has received airworthiness approval in accordance with the current edition of AC 20-130. According to AFM, the EMB-145 RNAV system installation is compliant with AC 20-130A.

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(5b) AMC 20-4 defines that installations in accordance with AC 20-130() is an acceptable means of compliance for Basic RNAV systems, with no further substantiation. According to AFM, the EMB-145 RNAV system installation is compliant with AC 20-130A.

(6) NO AFM STATMENT - The AC 90-100A compliance table lists that the EMB-145 complies with AC-90-100A, therefore it is capable of RNAV 1 operation. Approval using DME/DME/IRU may be obtained only by those airplanes equipped with dual IRS. The airplanes with AHRS may obtain such approval using GPS.

LIMITATIONS

- For RNAV operations in terminal airspace, obstacle clearance protection, up to the Final Approach FIX (FAF), will assume that airplane comply with the required RNAV accuracy requirements;
- Obstacle clearance altitude is based upon the infrastructure giving the poorest precision;
- The minimum flight crew are 2 Pilots;
- The system must display essential information in the Pilot's primary field of view such as:
  - Lateral deviation;
  - TO/FROM waypoints;
  - Failure flag (failure of RNAV system);
- Where DME/DME/IRS is used, the flight crew must ensure initialization on the runway either by means of a manual runway threshold or intersection update, as applicable. This is to preclude any inappropriate or inadvertent position shift after takeoff;
- Where GNSS is used, the signal must be acquired before the takeoff roll commences and GNSS position may be used instead of runway update;
- Where reliance is placed on the use of radar to assist contingency procedures, its performance has been shown to be adequate for that purpose, and the requirement for a radar service is identified in the AIP;
- RNAV operations must use FMS to control all lateral navigation functions. For FMS limitations, refer to Section 1-01-60 (Limitations, System: FMS) of AOM;

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- The airplane RNAV system must display the following information to the flight crew:
  - The active (TO) waypoint and distance/bearing to this point;
  - Ground speed or time to the active (TO) waypoint;
  - For P-RNAV, automatic tuning of VOR and DME used for position updating together with the capability to inhibit individual NAVAIDs;
  - RNAV system failures; alternate means of displaying navigation information, that is sufficient to perform cross-checks.

NORMAL PROCEDURES

PRE-FLIGHT PLANNING

NOTAM NAVAIDS ..... VERIFY

Verify the availability of the intended RNAV procedure. Verify also if any NAVAID identified in the AIP and on the relevant charts as critical for a specific RNAV procedure is not available.

Airplane Minimum Configuration ..... CHECK

Check if the airplane configuration complies with the applicable list below:

For all but RNAV 10 operations:

– 1 GPS (*) ;
– 1 VOR (*);
– 1 DME (*);
– 1 IRS (*);
– 1 FMS;
– 1 CDU;
– 4 Display units;
– 1 Flight Director.

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For RNAV 10 operations:

– 2 GPS (*);
– 2 IRS (*);
– 2 FMS;
– 2 CDU;
– 4 Display units;
– 1 Flight Director.

(*) Verify required positioning sensors for the intended operation, acording to RNAV Specifications table.

Navigation Infrastructure ..... CHECK AVAILABILITY

Check minimum equipment required acording to local regulation.

Navigation Database..... CHECK

The navigation database must be appropriate for the region of the intended operation and must include the NAVAIDS, waypoints, and coded terminal airspace procedures for the departure, arrival and alternate airfields. In this case, affected procedures must be prohibited by an operator's notice to the flight crew.

RNAV System (if required)..... CONFIRM AVAILABILITY

When dual RNAV system is required on the AIP.

RAIM (if applicable)..... CONFIRM AVAILABILITY

– Confirmation is necessary if a stand-alone GPS is to be used for RNAV 1 and RNAV 2 operations.
– Confirmation is necessary if dual GPS is to be used for RNP 10 operations.

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DEPARTURE (RNAV 1/P-RNAV/RNAV 2)

NAV Database (both pilots) ..... VERIFY CURRENCY

Airplane Position Entry ..... CHECK

Desired Path (PNF) ..... VERIFY

Airplane Position relative to the Path..... CHECK

Flight Plan ..... CHECK

Compare the navigation charts with the MAP display and the MCDU.

NOTE: - A procedure shall not be used if doubt exists as to the validity of the procedure in the navigation database;
- The creation of new waypoints by manual entry into the RNAV system by the flight crew is not permitted;
- Route modifications in the terminal area may take form of radar headings or direct to clearances.

Airplane Minimum Configuration ..... VERIFY AVAILABILITY

Also, where applicable, verify if the correct airport and runway data have been loaded.

Flight Progress..... MONITOR

During the procedure and where feasible, monitor navigation reasonableness by cross-check with conventional NAVAIDs using the primary displays with the MCDU.

NOTE: When automatic update for departure is not available, the procedure should be flown by conventional navigation means. A transition to the RNAV structure should be made at the point where the airplane has entered DME/DME coverage and has had sufficient time to achieve an adequate input. If a procedure is designed to be started conventionally, then the latest point of transition to the RNAV structure will be marked on the charts. If a Pilot elects to start a RNAV procedure using conventional methods, there may not be any indication on the charts of the transition point to the RNAV structure.

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CONTINENTAL ENROUTE (B-RNAV/RNAV 5/RNAV 1/RNAV 2)

Cleard Flight Plan ..... CHECK

Flight crew should cross-check the cleared flight plan by comparing charts or other applicable resources with the navigation system textual display and the airplane map display, if applicable. If required, the exclusion of specific NAVAIDs should be confirmed.

Flight Progress ..... MONITOR

During the flight, and where feasible, monitore navigational reasonableness by cross-check with conventional NAVAIDs using the primary displays in conjunction with the RNAV control and display unit (CDU).

REMOTE ENROUTE (RNAV 10)

Dual FMS and GPS ..... CHECK AVAILABILITY

At least two FMS and two GPS must be operational at the oceanic entry point. If this is not the case, then the pilot should consider an alternate route which does not require that particular equipment or regard to make a diversion for repairs.

Before entering oceanic airspace:

Airplane Position ..... CHECK

The position of the airplane must be checked as accurately as possible by using external NAVAIDs. This may require DME/DME and/or VOR checks to determine navigation system errors through displayed and actual positions.

NOTE: Operator in-flight operating drills must include mandatory cross-checking procedures to identify navigation errors in sufficient time to prevent airplane from inadvertent deviation from ATC-cleared routes.

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ARRIVAL (RNAV 1/P-RNAV AND RNAV 2)

RNAV arrival operation may only be performed down to the FAF, and shall not be used on Final Approach, i.e. from FAF to RWY or during Missed Approach.

Active Flight Plan ..... CHECK

Prior to the arrival phase, verify that the correct terminal procedure has been loaded. Then, compare the charts with the MAP display and the MCDU. This includes confirmation of the waypoint sequence, reasonableness of track angles and distances, any altitude or speed constraints, and, where possible, which waypoints are fly-by and which are fly-over.

NOTE: If required by procedure, a check will need to be made to confirm that updating will exclude a particular NAVAID. A procedure shall not be used in case of doubt regarding the procedure in the navigation database.

Flight Progress..... MONITOR

During the procedure and where feasible, monitor navigation reasonableness by cross-checks with the conventional NAVAIDs using the primary displays with the MCDU.

NOTE: - When the contingency plan is to revert to a conventional arrival procedure the flight crew must make the necessary preparation.

- For VOR/DME RNAV procedure (P-RNAV only), the reference VOR/DME used for the construction of the procedure must be displayed and checked by the flight crew. Incase there is no GNSS updating, a check for navigation reasonableness is required during the descent phase before reaching the Initial Approach FIX (IAF). For GNSS-based RNAV systems, the absence of an integrity alarm is considered sufficient. If the check fails, a conventional procedure must be flown.

- Route modifications in the terminal area may take the form of radar headings or “direct to” clearances and the flight crew must be capable of reacting in a timely manner. This may include the insertion of tactical waypoints loaded from the database. Manual entry or modification by the flight crew of a loaded procedure, using temporary waypoints or fixes not provided in the database is not permitted.

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Altitude/Speed Constraints ..... CHECK

Flight crew must be aware of any published altitude or speed constraints in the procedure.

CONTINGENCY PROCEDURES

ATC ..... NOTIFY

Notify any problem with the RNAV system that results in the loss of required navigation capability, together with the proposed course of action.

COMMUNICATION FAILURE

Continue with the RNAV procedure in accordance with the published lost communication procedure.

RNAV CABABILITY LOSS

Navigate using an alternative means of navigation. The alternate means does not need to be based on RNAV system.

NAVIGATION SENSORS FAILURE

Discontinue the RNAV procedure following the approved missed approach procedure or if feasible revert to a conventional or IRS procedure and inform ATC.

MULTIPLE SYSTEM FAILURES

If multiple system failures occur such as those affecting GNSS, Flight Director, and any other used for RNAV procedure, perform a missed approach and inform ATC.

If the Autopilot fails, continue the approach using manually, and in case the flight path cannot be followed, perform a missed approach procedure and inform ATC.

If the DGRAD annunciation is displayed:

Select the non-affected FMS. For single FMS installations, use the procedures from the following tables:

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Operation	Required Action
Non-RNP Terminal or En-route (including B-RNAV)	Crosscheck FMS data with raw data from VOR, DME and NDB. De-select sensor causing error, if detectable.
P-RNAV	Contact ATC, advise inability to continue P-RNAV.
Non-RNP (excluding GPS required) Approach	Use alternate sourse (VOR, NDB or visual references) if available. If not, declare Missed Approach.
Non-RNP Remote	Crosscheck FMS data with raw data from GPS or IRS. De-select error causing sensor, if detectable.

FMS 1(2) FAILURE

Select the cross-side FMS.

In case both FMS are unavailable, use the procedures from the following table:

Operation	Required Action
Non-RNP Terminal or En-route	Use alternate sourse (VOR, NDB, DME).
B-RNAV, P-RNAV	Contact ATC, advise inability to continue B-RNAV or P-RNAV operations.
Non-RNP (excluding GPS required) Approach	Use alternate sourse, if available (VOR, NDB or visual references) if available. If not, declare Missed Approach.
Remote Operations	Contact ATC and declare loss of long range navigation capability.

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INCIDENT REPORTING

Significant incidents associated with the operation of the airplane which affect or could affect the safety of RNAV operations, need to be reported on the appropriate report manifest.
Specific examples may include:

- Airplane system malfunctions during RNAV operations which lead to:
  - Navigations errors not associated with transitions between different navigation modes;
  - Significant navigation errors attributed to incorrect data or a navigation database coding error;
  - Unexpected deviations in lateral or vertical flight path not cause by Pilot input;
  - Significant misleading information without a failure warning;
  - Total loss or multiple navigation equipment failure.
- Problems with ground navigational facilities leading to significant navigational errors not associated with transitions between different navigation modes.

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LANDING GEAR/LEVER DISAGREE

EICAS WARNING: LG/LEVER DISAGREE
LIGHT: Master Warning.
EICAS Indication: Landing gear indication may be present one or more boxes cross-hatched or red.

Airspeed ..... MAXIMUM 200 KIAS
Landing Gear ..... CYCLE
If the message persists:
- In a retraction:
  - Landing Gear ..... DOWN
  - Airspeed ..... MAXIMUM 250 KIAS
  - Land at the nearest suitable airport. Leave and avoid icing conditions.
- In an extension:
  - ABNORMAL LANDING GEAR EXTENSION Procedure ..... ACCOMPLISH

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NAVIGATION

AHRS ALIGNMENT

EICAS ADVISORY: AHRS 1 (2) ALN

This message is normally presented during alignment phase. No action is required.

AHRS ALIGNMENT FAULT

EICAS CAUTION: AHRS 1 (2) ALN FAULT
LIGHT: Master Caution

Check and reenter present position. If necessary, reenter present position once again.

AHRS ATTITUDE MODE

EICAS ADVISORY: AHRS 1 (2) ATT MODE

Associated AHRS Reversionary Button ..... PRESS
If cross-side AHRS is not available:

Maintain wings level and constant airspeed until AHRS 1 (2) ALN message is no longer displayed and attitude is recovered (approximately 20 seconds).

CAUTION:
- ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NORMAL OPERATIONAL MODE.
- AHRS MAGNETIC HEADING IS NOT AVAILABLE.

NOTE: The Autopilot is not available while AHRS 1 (2) ALN is being displayed.

AHRS BASIC MODE

EICAS ADVISORY: AHRS 1 (2) BASIC MODE

Affected AHRS is reverted to the basic mode due to the TAS signal lost.

AHRS EXCESSIVE MOTION

EICAS ADVISORY: AHRS 1 (2) EXC MOTION

Make sure the airplane is completely stationary.

The AHRS will restart a full alignment 30 seconds after the motion is stopped.

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AHRS FAIL

EICAS CAUTION: AHRS 1 (2) FAIL
LIGHT: Master Caution

Associated AHRS Reversionary Button..... PRESS

NOTE: The Autopilot is not available.

AHRS NO MAGNETIC HEADING

EICAS ADVISORY: AHRS 1 (2) NO MAG HDG

Enter Magnetic Heading.

AHRS NO PRESENT POSITION

EICAS ADVISORY: AHRS 1 (2) NO PPOS

Enter Present Position.

AHRS ON BATTERY

EICAS ADVISORY: AHRS 1 (2) ON BATT

Associated AHRS will operate for 40 minutes.

AHRS OVERHEAT

EICAS CAUTION: AHRS 1 (2) OVERHEAT
LIGHT: Master Caution

AHRS data is valid for 30 minutes after failure. Use standby indicators for reference.

CDU DATA BUS FAIL FMS ANNUNCIATION (UNS-1K)

CONDITION: Affected FMS is not updating CDU.
CDU DATA BUS FAIL message presented on FMS.

Affected FMS ..... OFF, then ON

If CDU DATA BUS FAIL message persists:

Affected FMS ..... OFF

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CENTRAL MAINTENANCE COMPUTER FAILURE

EICAS ADVISORY: CMC FAIL
Crew awareness.

CHECK IC SOFTWARE

EICAS CAUTION: CHECK IC 1 (2) SW
LIGHT: Master Caution
Do not takeoff.

CHECK TRANSPONDER

EICAS CAUTION: CHECK XPDR
LIGHT: Master Caution
Crew awareness.

CHECKLIST MISMATCH

EICAS ADVISORY: CHECKLIST MISMATCH
Do not use Checklist Display.

DAU AIRPLANE ID MISCOMPARE

EICAS CAUTION: DAU AC ID MISCMP
Do not takeoff.

DAU FAILURE

EICAS CAUTION: DAU 1 (2) A FAIL with Master Caution Light or
EICAS ADVISORY: DAU 1 (2) B FAIL
If on ground, do not takeoff.
Confirm the failed side and channel.

For DAU 1 A FAIL caution message proceed:
DAU 1 Reversion..... ON
Check DAU 1 REVERSION message on EICAS.

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NOTE: The following indications and messages will not be available:

- Indications: Engine 1 oil (temperature and pressure), Battery 1 and 2 temperature, fuel tank temperature, roll trim position, cockpit temperature, Bleed 1 temperature.
- Messages: BLD 1 OVTEMP, E1 FUEL LO TEMP, FUEL TANK LO TEMP.

- BLD 1 LOW TEMP message will appear.

For DAU 2 A FAIL caution message proceed:
DAU 2 Reversion ..... ON
Check DAU 2 REVERSION message on EICAS.

NOTE: The following indications and messages will not be available:

- Indications: Engine 2 oil (temperature and pressure), Hydraulic quantity 1 and 2, yaw trim position, cabin temperature, Bleed 2 temperature.
- Messages: BLD 2 OVTEMP, E2 FUEL LO TEMP, HYD 1 LO QTY, HYD 2 LO QTY.

- BLD 2 LOW TEMP and APU OIL HI TEMP messages will appear.

If both channels of one DAU have failed:
Exit or avoid icing conditions.
Land at the nearest suitable airport.

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NOTE: - If both channels of DAU 1 have failed, the messages and indications associated with the following systems will not be available:

- All messages and indications: Oxygen, Steering, Pressurization, Landing Gear, Roll Trim, and the message EMERG LIGHT NOT ARMED.
- Some messages and indications: Doors, Stall Protection, Electrical, Fire Protection, Fuel, APU, Power Plant, Thrust Reverser, Flap, Spoiler, Brakes, Air Conditioning, Ice And Rain Protection, Hydraulic.

- If both channels of DAU 2 have failed, the messages and indications associated with the following systems will not be available:
  - All messages and indications: Smoke, Hydraulic, Rudder, Yaw Trim.
  - Some messages and indications: Doors, Stall Protection, Electrical, Fire Protection, Fuel, APU, Power Plant, Thrust Reverser, Flap, Spoiler, Brakes, Air Conditioning, Ice And Rain Protection.

DAU MISCOMPARE

EICAS CAUTION: DAU 1 (2) ENG MISCOMP or DAU 1 (2) SYS MISCOMP or DAU 1 (2) WRN MISCOMP

LIGHT: Master Caution

Associated DAU Reversion ..... ON
Check associated DAU REVERSION message on EICAS.

Analyze the situation before and after the reversion, and take the appropriate corrective action.

NOTE: For each miscompare message and each side, check the following parameters before and after the reversion:

- Engine: N1, N2, ITT.
- System: Battery voltage and temperature, takeoff temperature, hydraulic pressure, oxygen pressure.
- Warning: all warning messages, if any.

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DAU REVERSION

EICAS ADVISORY: DAU 1 (2) REVERSION

If the reversionary condition is not required, press the associated DAU Reversionary Button to remove it.

DISPLAY FAILURE

EICAS CAUTION: CHECK PFD 1 (2) message is presented if PFD is the failed display.

LIGHT: Master Caution

Confirm the failed display.

If PFD failed:

Associated MFD Selector Knob ..... PFD

If EICAS failed:

MFD Selector Knob (as required) ..... EICAS

If all main panel displays failed:

Exit or avoid icing conditions.

RMU ..... AS REQUIRED

Use RMU to access power plant or navigation data.

Land at the nearest suitable airport.

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DISPLAY FAN FAILURE

EICAS ADVISORY: DU 1 (2, 3, 4, 5) FAN FAIL

An overheat condition may arise in the associated display. In this case, it will be shut down automatically. Use reversionary capabilities.

DISPLAY OVERHEAT

EICAS ADVISORY: DU 1 (2, 3, 4, 5) OVHT

An overheat condition may arise in the associated display. In this case, it will be shut down automatically. Use reversionary capabilities.

FDAU FAIL

EICAS ADVISORY: FDAU FAIL

Crew awareness.

FLIGHT DATA RECORDER FAILURE

EICAS CAUTION: DFDR FAIL
LIGHT: Master Caution

Crew awareness.

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FMS NAVIGATION PERFORMANCE DEGRADED / FMS IN DEAD RECKONING MODE

Verify airplane position by using VOR/DME information (enroute and terminal operations) or other sources as appropriate (oceanic).

If conducting an instrument approach, discontinue use of FMS for approach guidance and select an alternate source of navigation, if available.

In case of one FMS (single FMS) or both FMS (dual FMS) entering in Dead Reckoning Mode and EGPWS is installed:

EGPWS TERRAIN SYS OVRD Button..... PRESS

The Terrain Awareness Alerting and Display functions on MFD will be inhibited. This will not affect the basic GPWS functions (modes 1 to 7).

If the FMS is restored after a period of inadequacy:

EGPWS TERRAIN SYS OVRD Button ..... PRESS

The Terrain Awareness will be enabled.

NOTE: For the FMZ 2000 FMS and the FMZ 2010 FMS, the DGRAD annunciator indicates that the FMS cannot guarantee that the accuracy of the system meets the requirements for the current phase of flight.

- Except in the case of conducting an instrument approach procedure, the FMS may still be accurate and may be used for navigation, provided the crew can confirm the position through other means, such as cross checking the VOR/DME raw data.
- For the FMZ 2010 FMS, the best estimate of the airplane position will be provided by the FMS based on airspeed and heading inputs, but it cannot guarantee the required accuracy for any of the flight phases. The pilot should cross check position with other navaids, station overfly, or visually.

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LPV UNAVAILABLE (AIRPLANES POST-MOD. SB145-34-0125)

If on approach:

MISSED APPROACH Procedure ..... ACCOMPLISH

Consider the possibility of continuing and performing the landing if under visual conditions and the airplane position and attitude assure a safe landing.

Perform an approach with non-LPV minima.

GPS FAILED

In case of GPS fail (GPS FAILED Scratchpad Message for single GPS or GPS 1 FAILED and GPS 2 FAILED Scratchpad Messages for dual GPS) associated with FMS Navigation Performance Degraded:

FMS NAVIGATION PERFORMANCE DEGRADED /
FMS IN DEAD RECKONING MODE
Abnormal Procedure ..... Accomplish

In case of GPS fail (GPS FAILED Scratchpad Message for single GPS or GPS 1 FAILED and GPS 2 FAILED Scratchpad Messages for dual GPS) and EGPWS is installed:

EGPWS TERRAIN SYS OVRD Button ..... PRESS

The Terrain Awareness Alerting and Display functions on MFD will be inhibited. This will not affect the basic GPWS functions (modes 1 to 7).

IC AIR/GROUND CONDITION SIGNAL INOPERATIVE

EICAS CAUTION: IC 1 (2) WOW INOP
LIGHT: Master Caution
Do not take off.

IC CONFIGURATION FAILURE

EICAS ADVISORY: IC 1 (2) CONFIG FAIL

Crew awareness.

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IC FAILURE/IC BUS FAILURE

EICAS CAUTION: IC BUS FAIL may be presented
LIGHT: Master Caution if IC BUS FAIL message is presented
CONDITION: Associated Display Units blank and with a red X drawn over them.

The following features will be inoperative:

- EICAS messages miscompare monitoring,
- Takeoff speeds synchronization,
- Check List Display synchronization, and
- Flight Director mode synchronization.

If IC 1 failed (loss of PFD 1, MFD 1 and EICAS):
SG 1 Button ..... PRESS

NOTE: - In case of IC 1 failure, the PTRIM MAIN (BACKUP) INOP or PIT TRIM 1 (2) INOP messages may not be available, and
- The autopilot is not available.

If IC 2 failed (loss of MFD 2 and PFD 2):
SG 2 Button ..... PRESS

IC FAN FAILURE

EICAS ADVISORY: IC 1 (2) FAN FAIL

An overheat condition may arise in the associated IC. In this case, turn the IC off by pulling its respective circuit breaker (C3 or D31 or D32).

IC OVERHEAT

EICAS CAUTION: IC 1(2) OVERHEAT

If there is smoke associated to IC 1 OVERHEAT message:
IC 1 Circuit Breaker (C3) ..... PULL
Backup Battery..... OFF
SG 1 Button ..... PRESS
If smoke persists:
ELECTRICAL SYSTEM
FAILURE OR SMOKE Procedure..... ACCOMPLISH

If there is smoke associated to IC 2 OVERHEAT message:

IC 2 Circuit Breaker (D31 or D32) ..... PULL

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SG 2 Button ..... PRESS

If smoke persists:

ELECTRICAL SYSTEM

FAILURE OR SMOKE Procedure ..... ACCOMPLISH

IC'S CONFIGURATION MISMATCH

EICAS CAUTION: CHK IC CONFIG with Master Caution Light or
EICAS ADVISORY: CONFIG MISMATCH

Do not take off.

INTEG ANNUNCIATOR ON (UNS-1K)

Discontinue the use of FMS whenever using the GPS source solely. If possible and feasible, select an alternate source of navigation for approach guidance.

IRS ALIGNMENT

EICAS ADVISORY: IRS 1 (2) ALN

IRU Mode Select Switch ..... CHECK NAV

This message is only presented during alignment phase or while the IRU mode select switch is set at ALIGN position.

IRS ALIGNMENT FAULT

EICAS CAUTION: IRS 1 (2) ALN FAULT

Check and reenter present position. If necessary, reenter present position once again.

IRS ATTITUDE MODE

EICAS ADVISORY: IRS 1 (2) ATT MODE

On ground:

IRU Mode Select Switch ..... OFF

Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch ..... NAV

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IRS EXCESSIVE MOTION

EICAS ADVISORY: IRS 1 (2) EXC MOTION

Make sure the airplane is completely stationary.

The IRU will restart a full alignment 30 seconds after the motion is stopped.

IRS FAIL

EICAS CAUTION: IRS 1 (2) FAIL

During power on or alignment phases:

IRU Mode Select Switch ..... OFF
Wait until POWER-OFF phase is finished (MSU annunciator lights extinguished).

IRU Mode Select Switch ..... NAV

In flight:

Reversionary Panel IRS Button ..... PRESS

If cross-side IRU is not available:

IRU Mode Select Switch ..... ATT
Maintain wings level and constant airspeed until attitude display recovers (approximately 20 seconds).

Magnetic Heading ..... ENTER

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

NOTE: Autopilot is available if the IRS 1(2) ATT MODE message is displayed and the IRS 1(2) ALN message is extinguished.

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IRS ON BATTERY

EICAS ADVISORY: IRS 1 (2) ON BATT

Associated IRU will operate for 40 minutes.

IRS OVERHEAT

EICAS CAUTION: IRS 1 (2) OVERHEAT

Operate affected IRU until completion of the flight.

If MSU FAULT annunciator is lighted, IRS 1 (2) FAIL message is presented or inertial data ceases to be transmitted by IRU:

Associated IRS Reversionary Button ..... PRESS
Affected IRU Mode Select Switch ..... OFF

NOTE: The Autopilot is not available.

If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is necessary:

IRU Mode Select Switch..... ATT

CAUTION: FOR IRS IN ATTITUDE MODE, NAVIGATION AND ATTITUDE OUTPUTS ARE NOT AS ACCURATE AS IN THE NAV MODE. MAGNETIC HEADING MUST BE ENTERED AND UPDATED PERIODICALLY FROM THE BEST AVAILABLE ALTERNATIVE SOURCE, THROUGH THE FMS CDU.

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IRS/MSU FAILURE ANNUNCIATION

LIGHT	OPERATION PHASE		
	POWER ON	ALIGNMENT	IN FLIGHT
ALIGN	– No light: – Check IRS CB's. – Set mode select switch to ALIGN or NAV. – Press MSU Test switch. Annunciator bulb must be replaced if the other MSU annunciators do light.	– Flashes immediately after entry: – Check and reenter latitude or longitude. – Reenter same latitude or longitude. – Flashes at the end of alignment: – Enter latitude. – Check and reenter latitude. – Allow additional time for alignment.	– Flashes: – Select the remaining IRU by pressing the IRS Button on the associated reversionary panel. – If necessary set mode select switch to ATT.
FAULT	– Set mode select switch to OFF for at least 3 sec. Then set mode select switch back to ALIGN or NAV.	– Associated with ALIGN annunciation: – Recheck coordinates and reenter latitude. – Allow additional time for alignment. – Try new alignment. Set mode select switch to OFF for at least 3 sec, then to ALIGN, and enter present position.	– Select the remaining IRU by pressing the IRS Button on the associated reversionary panel. – If necessary set mode select switch to ATT.

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IRS/MSU FAILURE ANNUNCIATION (Continued)

LIGHT	OPERATION PHASE		
	POWER ON	ALIGNMENT	IN FLIGHT
ON BATT	–Check IRS CB's. –If the annunciator remains lighted, do not takeoff.	*******	– The IRU operates on backup DC power and will operate for 30 minutes.
BATT FAIL	– Do not takeoff.	*******	*******
NO AIR	–Do not takeoff.	*******	– Operate IRU until completion of flight. – If fault annunciator is ON or inertial data ceases to be transmitted by IRU, select the remaining IRU and set mode select switch for affected IRU to OFF. If IRU is OFF, the airplane is near the end of the flight and additional attitude reference is needed, set mode select switch to ATT.

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MESSAGE MISCOMPARISON

INDICATION: CAS MSG indication on PFD.

Pilot's MFD Selector Knob ..... EICAS
Copilot's MFD Selector Knob ..... EICAS

Compare the messages displayed on the copilot's MFD with the messages presented on the pilot's MFD to check which is the discrepant message. Analyze the situation to check whether the discrepant message is spurious or not, and take the appropriate corrective action.

NAV/FLIGHT INSTRUMENTS FAILURE

CAUTION: IN THE EVENT OF TOTAL LOSS OF DISPLAY INFORMATION, EXIT OR AVOID ICING CONDITIONS.

NOTE: For EMB-145 XR model if one ADC fails, indicated by a "X" (red) over the IAS and altitude tapes and a VS (red) annunciation displayed in the PFD, the maximum airspeed allowed is Mach 0.78.

ANNUNCIATOR /FAILURE	LOCATION	ACTION
ATT FAIL (red)	PFD	Use cross-side attitude by pressing the AHRS (IRS) button on associated reversionary panel or use standby attitude indicator.
"X" (red) over IAS tape		Use cross-side airspeed by pressing the ADC button on associated reversionary panel or use standby airspeed indicator.
"X" (red) over altitude tape		Use cross-side altitude by pressing the ADC button on associated reversionary panel or use standby altimeter.
"X" (red) over course scale		Select another sensor.

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NAV/FLIGHT INSTRUMENTS FAILURE (Continued)

ANNUNCIATOR /FAILURE	LOCATION	ACTION
VS (red)	PFD	Use cross-side vertical speed by pressing the ADC button on associated reversionary panel.
ROL, PIT, ATT, IAS or ALT (amber)		Compare data with Standby Indicator. For altitude compare the PFD altimeters setting also. If required, use cross-side data by pressing the appropriate button on associated reversionary panel.
PFD or EICAS Blank or "X" (red)		Use the MFD Knob to present the required information on MFD.
RA (amber)		Compare both Radio Altimeter indications. If required, consider only the lower altitude indication. Otherwise, disregard Radio Altitude. If RA displayed in the center, the RA is failed.
RA1 (2) (amber)	PFD MFD	Radio altimeter automatic reversion has occurred. No action is required.
HDG FAIL (red)		Use cross-side heading by pressing the AHRS (IRS) button on associated reversionary panel or use RMU or standby attitude indicator.
HDG (amber)		Compare data with the Magnetic Compass. After identifying the failed side, use cross-side data by pressing the AHRS (IRS) button on associated reversionary panel.

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NAV/FLIGHT INSTRUMENTS FAILURE (Continued)

ANNUNCIATOR /FAILURE	LOCATION	ACTION
MENU INOP (amber)	MFD	Crew awareness.
ATT:CAGE (amber)	ISIS	Press the CAGE push button in order to recover attitude indication. Caging the ISIS in flight will result in loss of attitude indication for up to 10 seconds and the amber message ATT 10s will be presented during this time. Until attitude indication is available again use the primary indication source.
ATT, ALT, SPD, M, HDG (red)		Use the primary indication source.
Errors in attitude indication	Standby Attitude Instrument	Maintain a straight and leveled flight using the primary indication source. Wait 3 minutes. If error persists, cage the instrument and monitor for 5 min after uncaging.

RADIO ALTIMETER FAIL

EICAS ADVISORY: RAD ALT 1 (2) FAIL or RAD ALT FAIL

If one Radio altimeter is lost (RAD ALT 1 (2) FAIL is presented):

Automatic reversion ..... CONFIRM

Automatic reversion may be confirmed through the RA1 (2) amber annunciator presented on both PFDs. In this case the CAT II logic is assured.

If both Radio Altimeters are lost (RAD ALT FAIL is presented):

Do not perform CAT II approaches.

If already performing a CAT II approach procedure:

MISSED APPROACH Procedure ..... PERFORM

Perform a normal MISSED APPROACH Procedure, unless the approach is continued under visual conditions and the airplane position and attitude assure a safe landing.

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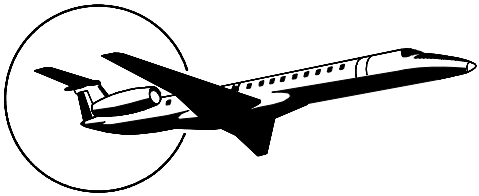

AIRPLANE OPERATIONS MANUAL
VOLUME 2

EMBRAER S.A.

THIS PUBLICATION IS INCOMPLETE WITHOUT AIRPLANE OPERATIONS MANUAL AOM–145/1114 VOLUME 1

AOM–145/1114-02
OCTOBER 31, 1996
REVISION 45 – NOVEMBER 30, 2022

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Airplane Operations Manual
AOM–145/1114

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Your feedback will be acknowledged, and we will advise you of the action we intend to take.

Sincerely,
Flight Operations Engineering & Support

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Airplane Operations Manual
AOM–145/1114

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2-04-13	13	01		REVISION 44	
2-04-13	14	01		REVISION 44	
2-04-13	15	01		REVISION 44	
2-04-13	16	01		REVISION 44	
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2-04-13	23	01	*	REVISION 45	
2-04-13	24	01	*	REVISION 45	
2-04-15	1	01		REVISION 37	ALL
2-04-15	2	01		REVISION 37	
2-04-15	3	01		REVISION 38	
2-04-15	4	01		REVISION 37	
2-04-15	5	01		REVISION 39	
2-04-15	6	01		REVISION 39	
2-04-20	1	01		REVISION 30	ALL
2-04-20	2	01		REVISION 23	
2-04-25	1	01		REVISION 43	ALL
2-04-25	2	01		REVISION 43	
2-04-25	3	01		REVISION 43	
2-04-25	4	01		REVISION 43	
2-04-25	5	01		REVISION 43	
2-04-25	6	01		REVISION 43	
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2-04-30	2	01		REVISION 42	
2-04-30	3	01		REVISION 42	
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2-04-30	13	01	REVISION 42	
2-04-30	14	01	REVISION 42	
2-04-30	15	01	REVISION 42	
2-04-30	16	01	REVISION 42	
2-04-30	17	01	REVISION 42	
2-04-30	18	01	REVISION 42	
2-04-30	19	01	REVISION 42	
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2-04-30	24	01	REVISION 42	
2-04-30	25	01	REVISION 42	
2-04-30	26	01	REVISION 42	
2-04-30	27	01	REVISION 42	
2-04-30	28	01	REVISION 42	
2-04-30	29	01	REVISION 42	
2-04-30	30	01	REVISION 42	
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2-04-30	32	01	REVISION 42	
2-04-30	33	01	REVISION 42	
2-04-30	34	01	REVISION 42	
2-04-30	35	01	REVISION 42	

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2-04-30	41	01	REVISION 42	
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2-04-30	43	01	REVISION 42	
2-04-30	44	01	REVISION 42	
2-04-30	45	01	REVISION 42	
2-04-30	46	01	REVISION 42	
2-04-35	1	01	REVISION 39	ALL
2-04-35	2	01	REVISION 39	
2-04-35	3	01	REVISION 39	
2-04-35	4	01	REVISION 39	
2-04-35	5	01	REVISION 39	
2-04-35	6	01	REVISION 39	
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2-04-35	8	01	REVISION 39	
2-04-35	9	01	REVISION 39	
2-04-35	10	01	REVISION 39	
2-04-35	11	01	REVISION 39	
2-04-35	12	01	REVISION 39	
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2-04-40	9	01		REVISION 42	
2-04-40	10	01		REVISION 42	
2-04-40	11	01		REVISION 42	
2-04-40	12	01		REVISION 42	
2-04-40	13	01		REVISION 42	
2-04-40	14	01		REVISION 42	
2-04-40	15	01		REVISION 42	
2-04-40	16	01		REVISION 42	
2-04-40	17	01		REVISION 42	
2-04-40	18	01	*	REVISION 45	
2-04-40	19	01		REVISION 42	
2-04-40	20	01		REVISION 42	
2-05-00	1	01		MAR 28, 2002	ALL
2-05-00	2	01		MAR 28, 2002	
2-05-05	1	01		REVISION 36	ALL
2-05-05	2	01		REVISION 36	
2-05-05	3	01		REVISION 36	
2-05-05	4	01		REVISION 36	
2-05-05	5	01		REVISION 36	
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2-05-10	2	01	REVISION 29	
2-05-10	3	01	MAR 28, 2002	
2-05-10	4	01	MAR 28, 2002	
2-05-10	5	01	REVISION 22	
2-05-10	6	01	REVISION 26	
2-05-10	6A	01	JUN 28, 2002	
2-05-10	6B	01	JUN 28, 2002	
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2-05-10	8	01	REVISION 22	
2-05-10	9	01	MAR 28, 2002	
2-05-10	10	01	JUN 28, 2002	
2-05-10	11	01	MAR 28, 2002	
2-05-10	12	01	MAR 28, 2002	
2-05-10	13	01	MAR 28, 2002	
2-05-10	14	01	MAR 28, 2002	
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2-05-10	16	01	REVISION 29	
2-05-10	17	01	REVISION 29	
2-05-10	18	01	REVISION 22	
2-05-10	19	01	MAR 28, 2002	
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2-05-10	25	01	REVISION 22	
2-05-10	26	01	REVISION 29	
2-05-10	27	01	REVISION 29	
2-05-10	28	01	REVISION 29	
2-05-15	1	01	MAR 28, 2002	ALL
2-05-15	2	01	MAR 28, 2002	
2-05-15	3	01	MAR 28, 2002	
2-05-15	4	01	MAR 28, 2002	
2-05-15	5	01	MAR 28, 2002	
2-05-15	6	01	MAR 28, 2002	
2-05-15	7	01	REVISION 29	
2-05-15	8	01	REVISION 22	
2-05-20	1	01	REVISION 41	ALL
2-05-20	2	01	REVISION 41	
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2-05-20	4	01	REVISION 41	
2-05-20	5	01	REVISION 41	
2-05-20	6	01	REVISION 41	
2-06-00	1	01	JAN 21, 2002	ALL
2-06-00	2	01	JAN 21, 2002	
2-06-05	1	01	JAN 21, 2002	Cockpit lighting
2-06-05	2	01	JAN 21, 2002	
2-06-05	3	01	JAN 21, 2002	
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2-06-05	7	01	JAN 21, 2002	
2-06-05	8	01	JAN 21, 2002	
2-06-10	1	01	REVISION 44	Pax cab lighting
2-06-10	2	01	REVISION 44	
2-06-10	3	01	REVISION 44	
2-06-10	4	01	REVISION 44	
2-06-10	5	01	REVISION 44	
2-06-10	6	01	REVISION 44	
2-06-10	7	01	REVISION 44	
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2-06-15	1	01	DEC 20, 2002	External lighting
2-06-15	2	01	DEC 20, 2002	
2-06-15	3	01	DEC 20, 2002	
2-06-15	4	01	DEC 20, 2002	
2-06-15	5	01	JAN 21, 2002	
2-06-15	6	01	JAN 21, 2002	
2-06-15	7	01	JAN 21, 2002	
2-06-15	8	01	JAN 21, 2002	
2-06-20	1	01	REVISION 24	Emergency lighting
2-06-20	2	01	REVISION 25	
2-06-20	3	01	JAN 21, 2002	
2-06-20	4	01	JAN 21, 2002	
2-06-20	5	01	JAN 21, 2002	
2-06-20	6	01	JAN 21, 2002	
2-07-00	1	01	JAN 21, 2002	ALL
2-07-00	2	01	JAN 21, 2002	
2-07-05	1	01	JAN 21, 2002	General

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2-07-10	1	01	JAN 21, 2002	Engine and APU fire protection
2-07-10	2	01	JAN 21, 2002	
2-07-10	3	01	JAN 21, 2002	
2-07-10	4	01	JAN 21, 2002	
2-07-10	5	01	JAN 21, 2002	
2-07-10	6	01	JAN 21, 2002	
2-07-10	7	01	REVISION 30	
2-07-10	8	01	REVISION 30	
2-07-10	9	01	JAN 21, 2002	
2-07-10	10	01	JAN 21, 2002	
2-07-15	1	01	JAN 21, 2002	Lavatory fire protection
2-07-15	2	01	JAN 21, 2002	
2-07-15	3	01	JAN 21, 2002	
2-07-15	4	01	JAN 21, 2002	
2-07-15	1	02	REVISION 44	145 ALL
2-07-15	2	02	REVISION 44	
2-07-15	3	02	REVISION 44	
2-07-15	4	02	REVISION 44	
2-07-15	5	02	REVISION 44	
2-07-15	6	02	REVISION 44	
2-07-20	1	01	REVISION 44	Baggage compart protection
2-07-20	2	01	REVISION 44	
2-07-20	3	01	REVISION 44	
2-07-20	4	01	REVISION 44	
2-07-20	5	01	REVISION 44	
2-07-20	6	01	REVISION 44	
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2-08-00	1	02	REVISION 31	EMB145 XR
2-08-00	2	02	REVISION 24	
2-08-05	1	01	REVISION 39	ALL except XR
2-08-05	2	01	REVISION 39	
2-08-05	3	01	REVISION 39	
2-08-05	4	01	REVISION 39	
2-08-05	5	01	REVISION 39	
2-08-05	6	01	REVISION 39	
2-08-05	7	01	REVISION 39	
2-08-05	8	01	REVISION 39	
2-08-05	9	01	REVISION 39	
2-08-05	10	01	REVISION 39	
2-08-05	11	01	REVISION 39	
2-08-05	12	01	REVISION 39	
2-08-05	13	01	REVISION 39	
2-08-05	14	01	REVISION 39	
2-08-05	1	02	REVISION 39	EMB145 XR
2-08-05	2	02	REVISION 39	
2-08-05	3	02	REVISION 39	
2-08-05	4	02	REVISION 39	
2-08-05	5	02	REVISION 39	
2-08-05	6	02	REVISION 39	
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2-08-05	14	02	REVISION 39	
2-08-05	15	02	REVISION 39	
2-08-05	16	02	REVISION 39	
2-08-05	17	02	REVISION 39	
2-08-05	18	02	REVISION 39	
2-08-10	1	01	REVISION 38	ALL except XR
2-08-10	2	01	REVISION 38	
2-08-10	3	01	REVISION 38	
2-08-10	4	01	REVISION 38	
2-08-10	5	01	REVISION 38	
2-08-10	6	01	REVISION 38	
2-08-10	1	02	REVISION 27	EMB145 XR
2-08-10	2	02	REVISION 27	
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2-08-10	4	02	REVISION 27	
2-08-10	5	02	REVISION 27	
2-08-10	6	02	REVISION 27	
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2-08-10	8	02	REVISION 27	
2-08-10	9	02	REVISION 27	
2-08-10	10	02	REVISION 27	
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2-09-00	2	01	JAN 21, 2002	
2-09-05	1	01	REVISION 37	General
2-09-05	2	01	REVISION 37	
2-09-05	3	01	REVISION 37	
2-09-05	4	01	REVISION 37	
2-09-05	5	01	REVISION 37	
2-09-05	6	01	REVISION 37	
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2-09-05	9	01	REVISION 37	
2-09-05	10	01	REVISION 37	
2-09-05	11	01	REVISION 37	
2-09-05	12	01	REVISION 37	
2-10-00	1	01	REVISION 41	All except China Eastern
2-10-00	2	01	REVISION 41	
2-10-00	3	01	REVISION 41	
2-10-00	4	01	REVISION 41	
2-10-05	1	01	DEC 20, 2002	ALL
2-10-05	2	01	DEC 20, 2002	
2-10-05	3	01	DEC 20, 2002	
2-10-05	4	01	DEC 20, 2002	
2-10-10	1	01	DEC 20, 2002	ALL
2-10-10	2	01	DEC 20, 2002	
2-10-10	3	01	JUN 28, 2002	
2-10-10	4	01	JUN 28, 2002	
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2-10-15	4	01	DEC 20, 2002	
2-10-20	1	01	DEC 20, 2002	ALL
2-10-20	2	01	JUN 28, 2002	
2-10-25	1	01	DEC 20, 2002	ALL
2-10-25	2	01	JUN 28, 2002	
2-10-30	1	01	REVISION 37	ALL
2-10-30	2	01	REVISION 37	
2-10-30	3	01	REVISION 37	
2-10-30	4	01	REVISION 37	
2-10-30	5	01	REVISION 37	
2-10-30	6	01	REVISION 37	
2-10-35	1	01	REVISION 30	ALL
2-10-35	2	01	REVISION 23	
2-10-40	1	01	REVISION 41	ALL
2-10-40	2	01	REVISION 42	
2-10-40	3	01	REVISION 42	
2-10-40	4	01	REVISION 42	
2-10-40	5	01	REVISION 42	
2-10-40	6	01	REVISION 42	
2-10-40	7	01	REVISION 42	
2-10-40	8	01	REVISION 42	
2-10-40	9	01	REVISION 42	
2-10-40	10	01	REVISION 42	
2-10-50	1	01	REVISION 41	ALL
2-10-50	2	01	REVISION 41	
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2-10-50	8	01	REVISION 41	
2-10-50	9	01	REVISION 41	
2-10-50	10	01	REVISION 41	
2-10-50	11	01	REVISION 41	
2-10-50	12	01	REVISION 41	
2-10-50	13	01	REVISION 41	
2-10-50	14	01	REVISION 41	
2-10-50	15	01	REVISION 41	
2-10-50	16	01	REVISION 41	
2-10-50	17	01	REVISION 42	
2-10-50	18	01	REVISION 41	
2-10-50	19	01	REVISION 41	
2-10-50	20	01	REVISION 41	
2-10-50	21	01	REVISION 41	
2-10-50	22	01	REVISION 41	
2-10-60	1	01	REVISION 39	ALL
2-10-60	2	01	REVISION 39	
2-10-60	3	01	REVISION 39	
2-10-60	4	01	REVISION 40	
2-10-60	5	01	REVISION 39	
2-10-60	6	01	REVISION 39	
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2-10-70	2	01		JUN 28, 2002	
2-10-70	3	01		JUN 28, 2002	
2-10-70	4	01		JUN 28, 2002	
2-10-70	5	01		JUN 28, 2002	
2-10-70	6	01		JUN 28, 2002	
2-11-00	1	01		JAN 21, 2002	ALL
2-11-00	2	01		JAN 21, 2002	
2-11-05	1	01		JAN 21, 2002	General
2-11-05	2	01		JAN 21, 2002	
2-11-05	3	01		JAN 21, 2002	
2-11-05	4	01		JAN 21, 2002	
2-11-05	5	01		REVISION 30	
2-11-05	6	01		REVISION 21	
2-11-05	7	01		JAN 21, 2002	
2-11-05	8	01		JAN 21, 2002	
2-12-00	1	01		REVISION 38	All except China Eastern
2-12-00	2	01		REVISION 38	
2-12-05	1	01	*	REVISION 45	ALL
2-12-05	2	01	*	REVISION 45	
2-12-05	3	01	*	REVISION 45	
2-12-05	4	01	*	REVISION 45	
2-12-05	5	01	*	REVISION 45	
2-12-05	6	01	*	REVISION 45	
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2-12-05	10	01	*	REVISION 45	
2-12-05	11	01	*	REVISION 45	
2-12-05	12	01	*	REVISION 45	
2-12-05	13	01	*	REVISION 45	
2-12-05	14	01	*	REVISION 45	
2-12-05	15	01	*	REVISION 45	
2-12-05	16	01	*	REVISION 45	
2-12-10	1	01		REVISION 40	ALL
2-12-10	2	01		REVISION 40	
2-12-10	3	01		REVISION 40	
2-12-10	4	01		REVISION 40	
2-12-10	5	01		REVISION 40	
2-12-10	6	01		REVISION 40	
2-12-10	7	01		REVISION 40	
2-12-10	8	01		REVISION 40	
2-12-10	9	01		REVISION 40	
2-12-10	10	01		REVISION 40	
2-12-10	11	01		REVISION 40	
2-12-10	12	01		REVISION 40	
2-12-15	1	01		REVISION 40	ALL
2-12-15	2	01		REVISION 40	
2-12-15	3	01		REVISION 40	
2-12-15	4	01		REVISION 40	
2-12-15	5	01		REVISION 40	
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2-12-15	9	01	REVISION 40	
2-12-15	10	01	REVISION 40	
2-12-15	11	01	REVISION 40	
2-12-15	12	01	REVISION 40	
2-13-00	1	02	REVISION 38	XR
2-13-00	2	02	REVISION 38	
2-13-05	1	01	JUN 29, 2001	ALL
2-13-05	2	01	JUN 29, 2001	
2-13-05	3	01	JUN 29, 2001	
2-13-05	4	01	JUN 29, 2001	
2-13-10	1	02	REVISION 38	XR
2-13-10	2	02	REVISION 38	
2-13-10	3	02	REVISION 38	
2-13-10	4	02	REVISION 38	
2-13-10	5	02	REVISION 38	
2-13-10	6	02	REVISION 38	
2-13-10	7	02	REVISION 38	
2-13-10	8	02	REVISION 38	
2-13-10	9	02	REVISION 38	
2-13-10	10	02	REVISION 38	
2-13-10	11	02	REVISION 38	
2-13-10	12	02	REVISION 38	
2-13-10	13	02	REVISION 38	
2-13-10	14	02	REVISION 38	
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2-13-10	18	02	REVISION 38	
2-13-10	19	02	REVISION 38	
2-13-10	20	02	REVISION 38	
2-13-15	1	01	JUN 29, 2001	ALL
2-13-15	2	01	JUN 29, 2001	
2-13-15	3	01	JUN 29, 2001	
2-13-15	4	01	JUN 29, 2001	
2-13-15	5	01	JUN 29, 2001	
2-13-15	6	01	JUN 28, 2002	
2-13-15	7	01	JUN 29, 2001	
2-13-15	8	01	JUN 29, 2001	
2-13-15	9	01	AUG 24, 2001	
2-13-15	10	01	JUN 29, 2001	
2-13-20	1	02	REVISION 42	ANAC/FAA
2-13-20	2	02	REVISION 42	
2-13-20	3	02	REVISION 42	
2-13-20	4	02	REVISION 42	
2-13-20	5	02	REVISION 42	
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2-13-20	7	02	REVISION 42	
2-13-20	8	02	REVISION 42	
2-13-20	9	02	REVISION 42	
2-13-20	10	02	REVISION 42	
2-13-20	11	02	REVISION 42	
2-13-20	12	02	REVISION 42	
2-13-25	1	01	REVISION 41	ALL
2-13-25	2	01	REVISION 42	
2-13-25	3	01	REVISION 41	

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2-13-25	4	01	REVISION 41	
2-13-25	5	01	REVISION 41	
2-13-25	6	01	REVISION 41	
2-13-25	7	01	REVISION 41	
2-13-25	8	01	REVISION 41	
2-13-30	1	01	JUN 29, 2001	ALL
2-13-30	2	01	JUN 29, 2001	
2-13-30	3	01	REVISION 18	
2-13-30	4	01	REVISION 32	
2-13-30	5	01	JUN 29, 2001	
2-13-30	6	01	AUG 24, 2001	
2-13-35	1	01	REVISION 18	ALL
2-13-35	2	01	REVISION 27	
2-13-35	3	01	REVISION 18	
2-13-35	4	01	REVISION 30	
2-13-35	5	01	JUN 29, 2001	
2-13-35	6	01	AUG 24, 2001	
2-14-00	1	02	REVISION 29	XR
2-14-00	2	02	REVISION 25	
2-14-05	1	01	REVISION 18	ALL
2-14-05	2	01	REVISION 29	
2-14-05	2A	01	REVISION 29	
2-14-05	2B	01	REVISION 29	
2-14-05	3	01	REVISION 23	
2-14-05	4	01	REVISION 32	
2-14-05	5	01	JUN 28, 2002	
2-14-05	6	01	DEC 20, 2002	
2-14-05	6A	01	REVISION 29	

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2-14-05	6B	01	REVISION 29	
2-14-05	7	01	JUN 28, 2002	
2-14-05	8	01	JUN 28, 2002	
2-14-10	1	01	REVISION 43	ALL
2-14-10	2	01	REVISION 43	
2-14-10	3	01	REVISION 43	
2-14-10	4	01	REVISION 43	
2-14-10	5	01	REVISION 43	
2-14-10	6	01	REVISION 43	
2-14-10	7	01	REVISION 43	
2-14-10	8	01	REVISION 43	
2-14-10	9	01	REVISION 43	
2-14-10	10	01	REVISION 43	
2-14-10	11	01	REVISION 43	
2-14-10	12	01	REVISION 43	
2-14-10	13	01	REVISION 43	
2-14-10	14	01	REVISION 43	
2-14-10	15	01	REVISION 43	
2-14-10	16	01	REVISION 43	
2-14-10	17	01	REVISION 43	
2-14-10	18	01	REVISION 43	
2-14-15	1	02	REVISION 41	High Alt
2-14-15	2	02	REVISION 41	
2-14-15	3	02	REVISION 41	
2-14-15	4	02	REVISION 41	
2-14-15	5	02	REVISION 41	
2-14-15	6	02	REVISION 41	
2-14-15	7	02	REVISION 41	

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2-14-15	11	02	REVISION 41	
2-14-15	12	02	REVISION 41	
2-14-15	13	02	REVISION 41	
2-14-15	14	02	REVISION 41	
2-14-15	15	02	REVISION 41	
2-14-15	16	02	REVISION 41	
2-14-20	1	01	JUN 29, 2001	ALL
2-14-20	2	01	JUN 29, 2001	
2-14-20	3	01	JUN 29, 2001	
2-14-20	4	01	JUN 29, 2001	
2-14-25	1	01	REVISION 29	ALL
2-14-25	2	01	REVISION 18	
2-15-00	1	02	REVISION 41	XR
2-15-00	2	02	REVISION 41	
2-15-05	1	01	REVISION 41	ALL
2-15-05	2	01	REVISION 41	
2-15-10	1	01	REVISION 43	ALL
2-15-10	2	01	REVISION 43	
2-15-10	3	01	REVISION 43	
2-15-10	4	01	REVISION 43	
2-15-10	5	01	REVISION 43	
2-15-10	6	01	REVISION 43	
2-15-10	7	01	REVISION 43	
2-15-10	8	01	REVISION 43	
2-15-10	9	01	REVISION 43	

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2-15-10	11	01	REVISION 43	
2-15-10	12	01	REVISION 43	
2-15-10	13	01	REVISION 43	
2-15-10	14	01	REVISION 43	
2-15-10	15	01	REVISION 43	
2-15-10	16	01	REVISION 43	
2-15-10	17	01	REVISION 43	
2-15-10	18	01	REVISION 43	
2-15-15	1	02	REVISION 41	145 + XR
2-15-15	2	02	REVISION 42	
2-15-15	3	02	REVISION 42	
2-15-15	4	02	REVISION 41	
2-15-15	5	02	REVISION 42	
2-15-15	6	02	REVISION 42	
2-16-00	1	01	OCT 02, 2001	ALL except shuttle 135
2-16-00	2	01	OCT 02, 2001	
2-16-05	1	01	REVISION 44	ALL except Shuttle 135
2-16-05	2	01	REVISION 44	
2-16-10	1	01	REVISION 26	ALL except shuttle 135
2-16-10	2	01	REVISION 20	
2-16-10	3	01	OCT 02, 2001	
2-16-10	4	01	OCT 02, 2001	
2-16-10	5	01	OCT 02, 2001	
2-16-10	6	01	OCT 02, 2001	
2-16-10	7	01	OCT 02, 2001	
2-16-10	8	01	OCT 02, 2001	

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2-16-10	9	01	OCT 02, 2001	
2-16-10	10	01	OCT 02, 2001	
2-16-10	11	01	OCT 02, 2001	
2-16-10	12	01	OCT 02, 2001	
2-16-15	1	01	REVISION 41	ALL except Shuttle 135
2-16-15	2	01	REVISION 41	
2-16-15	3	01	REVISION 41	
2-16-15	4	01	REVISION 41	
2-16-15	5	01	REVISION 41	
2-16-15	6	01	REVISION 41	
2-16-20	1	01	REVISION 31	ALL
2-16-20	2	01	REVISION 20	
2-16-25	1	01	OCT 02, 2001	ALL
2-16-25	2	01	OCT 02, 2001	
2-16-25	3	01	OCT 02, 2001	
2-16-25	4	01	OCT 02, 2001	
2-16-25	5	01	OCT 02, 2001	
2-16-25	6	01	OCT 02, 2001	
2-16-30	1	01	REVISION 38	ALL except Shuttle 135
2-16-30	2	01	REVISION 36	
2-16-30	3	01	REVISION 36	
2-16-30	4	01	REVISION 36	
2-16-30	5	01	REVISION 36	
2-16-30	6	01	REVISION 36	
2-17-00	1	01	JUN 29, 2001	ALL
2-17-00	2	01	JUN 29, 2001	
2-17-05	1	01	JUN 29, 2001	ALL

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2-17-05	2	01	JUN 29, 2001	
2-17-10	1	01	REVISION 28	ALL
2-17-10	2	01	REVISION 18	
2-17-10	3	01	REVISION 28	
2-17-10	4	01	REVISION 18	
2-17-10	5	01	JUN 29, 2001	
2-17-10	6	01	JUN 29, 2001	
2-17-10	7	01	JUN 29, 2001	
2-17-10	8	01	JUN 29, 2001	
2-17-15	1	01	REVISION 39	ALL
2-17-15	2	01	REVISION 39	
2-17-15	3	01	REVISION 39	
2-17-15	4	01	REVISION 39	
2-17-15	5	01	REVISION 39	
2-17-15	6	01	REVISION 39	
2-17-15	7	01	REVISION 39	
2-17-15	8	01	REVISION 39	
2-17-15	9	01	REVISION 39	
2-17-15	10	01	REVISION 39	
2-17-15	11	01	REVISION 39	
2-17-15	12	01	REVISION 39	
2-17-20	1	01	REVISION 43	ISIS THALES
2-17-20	2	01	REVISION 43	
2-17-20	3	01	REVISION 43	
2-17-20	4	01	REVISION 43	
2-17-20	5	01	REVISION 43	
2-17-20	6	01	REVISION 43	
2-17-20	7	01	REVISION 43	

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2-17-20	10	01		REVISION 43	
2-17-20	11	01		REVISION 43	
2-17-20	12	01		REVISION 43	
2-17-20	13	01		REVISION 43	
2-17-20	14	01		REVISION 43	
2-17-20	15	01		REVISION 43	
2-17-20	16	01		REVISION 43	
2-17-25	1	01		REVISION 37	ALL
2-17-25	2	01		REVISION 38	
2-17-25	3	01		REVISION 38	
2-17-25	4	01		REVISION 39	
2-17-25	5	01		REVISION 39	
2-17-25	6	01		REVISION 37	
2-17-25	7	01		REVISION 37	
2-17-25	8	01		REVISION 37	
2-17-30	1	01		REVISION 38	ALL
2-17-30	2	01		REVISION 38	
2-17-30	3	01		REVISION 38	
2-17-30	4	01		REVISION 38	
2-17-30	5	01		REVISION 38	
2-17-30	6	01		REVISION 38	
2-17-35	1	01		REVISION 33	ALL but MFDAU
2-17-35	2	01		REVISION 22	
2-17-35	3	01		REVISION 33	
2-17-35	4	01		REVISION 33	
2-18-00	1	01	*	REVISION 45	ALL

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2-18-00	5	01	*	new	REVISION 45	
2-18-00	6	01	*	new	REVISION 45	
2-18-01	1	01			MAR 30, 2001	ALL
2-18-01	2	01			MAR 30, 2001	
2-18-05	1	01			MAR 30, 2001	RMS
2-18-05	2	01			AUG 24, 2001	
2-18-07	1	01			REVISION 29	Integrated Com. Unit
2-18-07	2	01			REVISION 17	
2-18-09	1	01			MAR 30, 2001	Integrated Nav. Unit
2-18-09	2	01			MAR 30, 2001	
2-18-11	1	01			REVISION 43	ALL RMU
2-18-11	2	01			REVISION 43	
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2-18-11	4	01			REVISION 43	
2-18-11	5	01			REVISION 43	
2-18-11	6	01			REVISION 43	
2-18-11	7	01			REVISION 43	
2-18-11	8	01			REVISION 43	
2-18-11	9	01			REVISION 43	
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2-18-11	11	01			REVISION 43	
2-18-11	12	01			REVISION 43	
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2-18-11	20	01	REVISION 43	
2-18-11	21	01	REVISION 43	
2-18-11	22	01	REVISION 43	
2-18-11	23	01	REVISION 43	
2-18-11	24	01	REVISION 43	
2-18-11	25	01	REVISION 43	
2-18-11	26	01	REVISION 43	
2-18-11	27	01	REVISION 43	
2-18-11	28	01	REVISION 43	
2-18-11	29	01	REVISION 43	
2-18-11	30	01	REVISION 43	
2-18-11	31	01	REVISION 43	
2-18-11	32	01	REVISION 43	
2-18-11	33	01	REVISION 43	
2-18-11	34	01	REVISION 43	
2-18-11	35	01	REVISION 43	
2-18-11	36	01	REVISION 43	
2-18-11	37	01	REVISION 43	
2-18-11	38	01	REVISION 43	
2-18-11	39	01	REVISION 43	
2-18-11	40	01	REVISION 43	
2-18-11	41	01	REVISION 43	
2-18-11	42	01	REVISION 43	
2-18-11	43	01	REVISION 43	

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2-18-11	46	01		REVISION 43	
2-18-11	47	01		REVISION 43	
2-18-11	48	01		REVISION 43	
2-18-11	49	01		REVISION 43	
2-18-11	50	01		REVISION 43	
2-18-11	51	01		REVISION 43	
2-18-11	52	01		REVISION 43	
2-18-11	53	01		REVISION 43	
2-18-11	54	01		REVISION 43	
2-18-11	55	01		REVISION 43	
2-18-11	56	01		REVISION 43	
2-18-13	1	01		MAR 30, 2001	Tuning Backup Control
2-18-13	2	01		MAR 30, 2001	
2-18-13	3	01		MAR 30, 2001	
2-18-13	4	01		MAR 30, 2001	
2-18-13	5	01		AUG 24, 2001	
2-18-13	6	01		MAR 30, 2001	
2-18-15	1	01		REVISION 36	Digital Audio Panel
2-18-15	2	01		REVISION 36	
2-18-15	3	01		REVISION 36	
2-18-15	4	01		REVISION 36	
2-18-15	5	01		REVISION 36	
2-18-15	6	01		REVISION 36	
2-18-19	1	01	* new	REVISION 45	EICAS messages
2-18-19	2	01	* new	REVISION 45	
2-18-20	1	01		REVISION 27	Communication Control

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2-18-20	2	01	REVISION 19	
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2-18-20	5	01	JUN 28, 2002	
2-18-20	6	01	JUN 28, 2002	
2-18-20	7	01	JUN 28, 2002	
2-18-20	8	01	MAR 30, 2001	
2-18-20	9	01	MAR 30, 2001	
2-18-20	10	01	MAR 30, 2001	
2-18-22	1	04	JUN 28, 2002	3rd VHF COM/CMU
2-18-22	2	04	MAR 28, 2002	
2-18-22	3	04	MAR 28, 2002	
2-18-22	4	04	MAR 28, 2002	
2-18-22	5	04	MAR 28, 2002	
2-18-22	6	04	MAR 28, 2002	
2-18-23	1	01	REVISION 17	SELCAL
2-18-23	2	01	REVISION 33	
2-18-24	1	02	OCT 02, 2001	CMU mark III
2-18-24	2	02	JAN 21, 2002	
2-18-24	3	02	OCT 02, 2001	
2-18-24	4	02	OCT 02, 2001	
2-18-24	5	02	OCT 02, 2001	
2-18-24	6	02	OCT 02, 2001	
2-18-24	7	02	OCT 02, 2001	
2-18-24	8	02	OCT 02, 2001	
2-18-24	9	02	MAR 28, 2002	
2-18-24	10	02	OCT 02, 2001	
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2-18-60	2	02	*	new	REVISION 45	
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VISUAL WARNINGS

Visual warnings are provided through lights, illuminated buttons, EICAS messages and displays indications.

WARNING LIGHTS

Some of the airplane systems are actuated by illuminated buttons. When under normal operating conditions, such buttons are not illuminated. If the pilot has commanded the button to a position that requires crew attention, a striped bar is illuminated inside the button. There are some exceptions such as the windshield heating, the GPU, the ice protection wing and stab, and the APU bleed buttons, which are illuminated under normal operating conditions.

Some systems also provide indicating lights, for system status indication. Further details on such lights are provided in the associated systems description section.

Master warning and caution lights are installed on each pilot glareshield panel. Such lights blink when any warning or caution message is presented on the EICAS or generated in the Aural Warning Unit (AWU). To stop blinking, pilots must press the associated light. To find information on illuminated buttons and any specific warning light, refer to the associated system's description.

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EICAS MESSAGES

EICAS messages are presented in the upper right corner of the EICAS display. In case of a simultaneous failure in the EICAS and MFD displays, the RMUs are capable of presenting some messages.

EICAS MESSAGES LEVELS

There are three message levels: warning, caution, and advisory:

- **Warning** messages are red colored and require immediate crew action. Warning messages are always presented on the top of the list, in the same order they are generated.
- **Caution** messages are amber colored and require immediate crew awareness. They follow warning in criticality level and in display presentation.
- **Advisory** messages are cyan and are dedicated to minor failures or system status. Advisory messages are displayed below caution messages.

A fourth level is provided for maintenance purposes, but it is not presented to the flight crew, and its access can only be made on the ground.

When the message is generated, it is displayed blinking at the top of the associated group. To stop blinking, press the associated master button on the glareshield. Advisory messages will stop blinking after 5 seconds.

EICAS MESSAGES PRIORITY LOGIC

If more than one message is simultaneously presented, warning will precede caution messages, which will precede advisories. The space is provided for the simultaneous display of up to 15 messages. An END label is provided after the last message, to indicate end of message listing. If more than 15 messages are being generated, a knob in the display bezel permits paging through the remaining messages. In this case, a status line is provided in the sixteenth line, to indicate how many messages are not being currently presented and where they are (above or below the currently presented messages). END label and warning messages can not be scrolled out of the display. Due to this characteristic, caution and advisory messages will be scrolled in the area left blank below the warning messages. If a new message is generated during a scrolling, it will be automatically displayed at the top of the associated group.

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INHIBITION LOGIC

To avoid its nuisance effect upon the flight crew, inhibition logic is provided to prevent some messages from being displayed during takeoff and approach/landing phases. The inhibition logic is as follows:

Takeoff Phase:

Inhibition is valid when the airplane crosses V_1 –15 kt. The inhibition is deactivated when one of the following conditions is accomplished:

- radio altitude is greater than 400 ft or;
- calibrated airspeed is less than 60 kt or;
- after 1 minute.

Approach/landing Phase:

Inhibition is valid from the point when airplane crosses 200 ft radio altitude. The inhibition is deactivated when one of the following conditions is accomplished:

- airplane is on the ground for 3 seconds or more;
- after 1 minute.

IC-600 RESULTS SELF-CHECK

The results of both IC-600 computations are continuously compared to check for any inconsistency between both sides. A dedicated amber annunciation, “CAS MSG”, is provided on the PFDs to indicate whenever a difference between both IC-600s has been found, thus leading to possible unreliable messages.

EICAS MESSAGE DICTIONARY

The following table presents all the EICAS messages. Type column indicates whether the message’s nature is Warning (W), Caution (C), or Advisory (A).
The number in column INHIBITION indicates the following:
- (1) Message is inhibited during takeoff;
- (2) Message is inhibited during takeoff and approach/landing;
- (3) Message is not inhibited;
- (4) Message is inhibited during approach/landing;
- (5) Message is inhibited on the ground and on all flight phases excluding takeoff.

For further information regarding each message’s logic, refer to the associated system’s description.

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	W	SERVICE DOOR OPN	2
	C	ACCESS DOORS OPN	2
	C	BAGGAGE DOOR OPN	2
	C	EMERG EXIT OPN	2
	C	FUELING DOOR OPN	2
2-4 CREW AWARENESS	W	GPWS	3
	W	NO TAKEOFF CONFIG	4
	W	SPS 1 (2) INOP	3
	C	AURAL WARN FAIL	2
	C	CHECK IC 1 (2) SW	2
	C	CHECK PFD 1 (2)	2
	C	CHK IC CONFIG	2
	C	DAU AC ID MISCMP	2
	C	DAU 1 (2) A FAIL	2
	C	DAU 1 (2) ENG MISCOMP	2
	C	DAU 1 (2) SYS MISCOMP	2
	C	DAU 1 (2) WRN MISCOMP	2
	C	GPWS INOP	3
	C	IC BUS FAIL	2
	C	IC 1 (2) OVERHEAT	2
	C	IC 1 (2) WOW INOP	2
	C	SPS ADVANCED	3
	C	STICK PUSHER FAIL	3
	C	TERR INOP	3
	C	WINDSHEAR INOP	3
	A	CHECKLIST MISMATCH	2
	A	CMC FAIL	2
	A	CONFIG MISMATCH	2
	A	IC 1 (2) CONFIG FAIL	2
	A	IC 1 (2) FAN FAIL	2
	A	DAU 1 (2) B FAIL	2
	A	DAU 1 (2) REVERSION	2
	A	DU 1 (2, 3, 4, 5) FAN FAIL	2
	A	DU 1 (2, 3, 4, 5) OVHT	2
	A	SPS/ICE SPEEDS	1

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SECTION	TYPE	MESSAGE	INHIBITION
2-5 ELECTRICAL	W	BATT 1 (2) OVTEMP	3
	W	ELEC ESS XFR FAIL	3
	C	115 VAC BUS OFF	2
	C	APU CNTOR CLSD	2
	C	APU GEN OFF BUS	2
	C	APU GEN OVLD	2
	C	BATT 1 (2) OFF BUS	2
	C	BKUP BATT OFF BUS	2
	C	DC BUS 1 (2) OFF	2
	C	ELEC EMERG ABNORM	2
	C	ESS BUS 1 (2) OFF	2
	C	GEN 1 (2, 3, 4) OFF BUS	2
	C	GEN 1 (2, 3, 4) OVLD	2
	C	SHED BUS 1 (2) OFF	2
	A	GEN 1 (2, 3, 4) BRG FAIL	2
2-6 LIGHTING	C	EMERG LT NOT ARMD	2
2-7 FIRE PROTECTION	W	APU FIRE	3
	W	BAGG SMOKE	2
	W	ENG 1 (2) FIRE	3
	W	LAV SMOKE	2
	C	APU EXTBTL INOP	2
	C	APU FIREDET FAIL	2
	C	BAGG EXT BTL INOP	2
	C	E1 (2) EXTBTLA (B) INOP	2
	C	E1 (2) FIREDET FAIL	2
2-8 FUEL	W	FUEL 1 (2) LO LEVEL	2
	W	FUEL XFER CRITICAL	2
	C	APU FUEL LO PRESS	2
	C	APU FUEL SOV INOP	2
	C	E1 (2) FUEL LO PRESS	2
	C	E1 (2) FUEL SOV INOP	2
	C	FUEL IMBALANCE	2
	C	FUEL TANK LO TEMP	2
	C	FUEL XFEED FAIL	2
	C	FUELING DOOR OPN	2
	C	FUEL EQ XFEED OPN	2
	C	FUEL CONFIG DISAG	2

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SECTION	TYPE	MESSAGE	INHIBITION
2-8 FUEL	C	FUEL VENT OPEN	2
	C	FUEL XFER INOP	2
	C	FUEL XFER OVFLOW	2
	C	XFER ISOL FAIL	2
	C	DEFUEL NOT CLOSED	2
	A	APU FUEL SOV CLSD	2
	A	E 1(2) FUELSOV CLSD	2
	A	FUEL XFEED OPEN	2
	A	FUEL LR CONFIG	2
2-9 APU	C	APU FAIL	2
	C	APU OIL HI TEMP	2
	C	APU OIL LO PRESS	2
2-10 POWERPLANT	W	ATTCS FAIL	5
	W	E1 (2) ATTCS NO MRGN	2
	W	E1 (2) OIL LOW PRESS	2
	W	E1 (2) LOW N1	2
	W	ENG 1-2 OUT	1
	C	E1 (2) ATS SOV OPN	2
	C	E1 (2) CTL A (B) FAIL	2
	C	E1 (2) CTL FAIL	2
	C	E1 (2) EXCEEDANCE	2
	C	E1 (2) FPMU NO DISP	2
	C	E1 (2) FUEL LO TEMP	2
	C	ENG NO TO DATA	2
	C	ENG REF A/I DISAG	2
	C	ENG1 (2) REV DISAGREE	2
	C	E1 (2) NO DISP	2
	C	ENG 1 (2) OUT	1
	C	FADEC ID NO DISP	2
	C	ENG 1 (2) REV FAIL	2
	C	ENG 1 (2) TLA FAIL	2
	A	CHECK XXX PERF (XXX = A, A1, A1P, A3, A1/3, A1E)	2
	A	E1 (2) SHORT DISP	2
	A	E1 (2) ADC DATA FAIL	2
	A	E1 (2) FUEL IMP BYP	2
	A	E1 (2) OIL IMP BYP	2

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SECTION	TYPE	MESSAGE	INHIBITION
2-10 POWERPLANT	A	E1 (2) IDL STP FAIL	2
	A	E1 (2) CTL A (B) DEGRAD	2
2-11 HYDRAULIC	C	HYD SYS 1 (2) FAIL	2
	C	HYD SYS 1 (2) OVHT	2
	A	E1 (2) HYD PUMP FAIL	2
	A	E1 (2) HYDSOV CLSD	2
	A	HYD PUMP SELEC OFF	2
	A	HYD1 (2) LO QTY	2
2-12 LANDING GEAR AND BRAKES	W	LG/LEVER DISAGREE	3
	C	BRAKE OVERHEAT	3
	C	BRK INBD INOP	1
	C	BRK OUTBD INOP	1
	C	EMRG BRK LO PRES	1
	C	LG AIR/GND FAIL	3
	C	STEER INOP	2
	C	NLG/UPDOOR OPN	2
	C	BRAKE DEGRADED	1
2-13 FLIGHT CONTROLS	W	PIT TRIM 1 (2) INOP	2
	W	PTRIM MAIN INOP	2
	W	PTRIM BACKUP INOP	2
	C	AIL SYS 1 (2) INOP	2
	C	FLAP FAIL	2
	C	PTRIM CPT SW FAIL	3
	C	PTRIM F/O SW FAIL	3
	C	PTRIM BKP SW FAIL	3
	C	RUDDER OVERBOOST	2
	C	RUDDER SYS 1 (2) INOP	2
	C	RUD HDOV PROT FAIL	2**
	C	SPBK LVR DISAGREE	2
	C	SPOILER FAIL	2
	A	FLAP LOW SPEED	2
2-14 PNEUMATICS, AIR CONDITIONING AND PRESSURIZATION	W	BLD 1 (2) LEAK	2
	W	BLD APU LEAK	2
	W	BLD 1 (2) OVTEMP	2
	C	APU BLD VLV FAIL	2
	C	BLD 1 (2) LOW TEMP	2
	C	BLD 1 (2) VLV FAIL	2

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SECTION	TYPE	MESSAGE	INHIBITION
2-14 PNEUMATICS, AIR CONDITIONING AND PRESSURIZATION	C	CROSS BLD FAIL	2
	C	CROSS BLD SW OFF	2
	C	ELEKBAY OVTEMP	2
	C	HS VLV 1 (2) FAIL	2
	C	PACK 1 (2) OVHT	2
	C	PACK 1 (2) OVLD	2
	C	PACK 1 (2) VLV FAIL	2
	C	PRESN AUTO FAIL	2
	C	RAM AIR VLV FAIL	2
	A	BLD 1 (2) VLV CLSD	2
	A	HI ALT LDG-T/O	2
	A	CROSS BLD OPEN	2
	A	PACK 1 (2) VLV CLSD	2
2-15 ICE AND RAIN PROTECTION	W	ICE COND-A/I INOP	2
	C	A/ICE LOW CAPACITY	3
	C	A/ICE SWITCH OFF	2
	C	AOA 1 (2) HEAT INOP	2
	C	E1 (2) A/ICE FAIL	2
	C	ICE DET1 (2) FAIL	2
	C	ICE DETECTORS FAIL	2
	C	NO ICE-A/ICE ON	2
	C	PITOT 1 (2, 3) INOP	2
	C	STAB A/ICE FAIL	2
	C	TAT 1 (2) HEAT INOP	2
	C	W/S 1 (2) HEAT FAIL	2
	C	WG A/ICE FAIL	3
	A	ENG A/ICE OVERPRES	3
	A	ICE CONDITION	2
2-16 OXYGEN	C	OXYGEN LO PRESS	2
2-17 FLIGHT INSTRUMENTS	C	DFDR FAIL	2
	A	FDAU FAIL	2
	A	RAD ALT 1 (2) FAIL	1
	A	RAD ALT FAIL	1

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SECTION	TYPE	MESSAGE	INHIBITION
2-18 NAVIGATION AND COMMUNICATION	C	AHRS 1 (2) ALN FAULT	2
	C	AHRS 1 (2) FAIL	2
	C	AHRS 1 (2) OVERHEAT	2
	C	CHECK XPDR	2
	C	HGS FAIL	3
	C	IRS 1 (2) ALN FAULT	2
	C	IRS 1 (2) FAIL	2
	C	IRS 1 (2) OVERHEAT	2
	A	A III NOT AVAIL	3
	A	AHRS 1 (2) ALN	2
	A	AHRS 1 (2) ATT MODE	2
	A	AHRS 1 (2) BASIC MODE	2
	A	AHRS 1 (2) EXC MOTION	2
	A	AHRS 1 (2) NO MAG HDG	4
	A	AHRS 1 (2) NO PPOS	1
	A	AHRS 1 (2) ON BATT	2
	A	IRS 1 (2) ALN	2
	A	IRS 1 (2) ATT MODE	2
	A	IRS 1 (2) EXC MOTION	2
	A	IRS 1 (2) ON BATT	2
2-19 AUTOPILOT	W	AUTOPILOT FAIL	2
	C	AUTO TRIM FAIL	2
	C	AP ELEV MISTRIM	2
	C	AP AIL MISTRIM	2
	C	LATERAL MODE OFF	3
	C	VERTICAL MODE OFF	3
	C	YAW DAMPER FAIL	2

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DISPLAYS INDICATIONS

Many of the airplane's parameters are indicated on one of the displays, in analogic or digital format.

ANALOGIC INDICATIONS

Analogic indications are provided as pointers moving over a scale, which may be graduated or not. In both cases, if the pointer indicates a value out of the normal range for that parameter, both pointer and scale become amber or red, if the parameter goes deeply into the out of range area. Pointers are removed if the parameter signal becomes invalid. For some parameters, scale may also be removed in this condition. Scale and pointer are not presented for some parameters, when they are not required, as for EADI chevrons, V_1, V_R, V_2 speed bugs, trend vectors, etc.

DIGITAL INDICATIONS

Digital indications are provided as green characters for normal values. If the associated parameter goes outside its normal range, digits become amber, with an amber box surrounding them. Both digits and box become red if the parameter goes deeply into the out of range area. If the parameter signal becomes invalid, digits are replaced by amber dashes, without boxes.

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CONTROLS AND INDICATORS

GLARESHIELD PANEL

1 - MASTER WARNING BUTTON

- Acknowledges the warning messages and stops the associated blinking when pressed.
- A red light blinks inside the button when a new warning message is displayed on the EICAS.

2 - MASTER CAUTION BUTTON

- Acknowledges the caution messages and stops the associated blinking when pressed.
- An amber light blinks inside the button when a new caution message is displayed on the EICAS.

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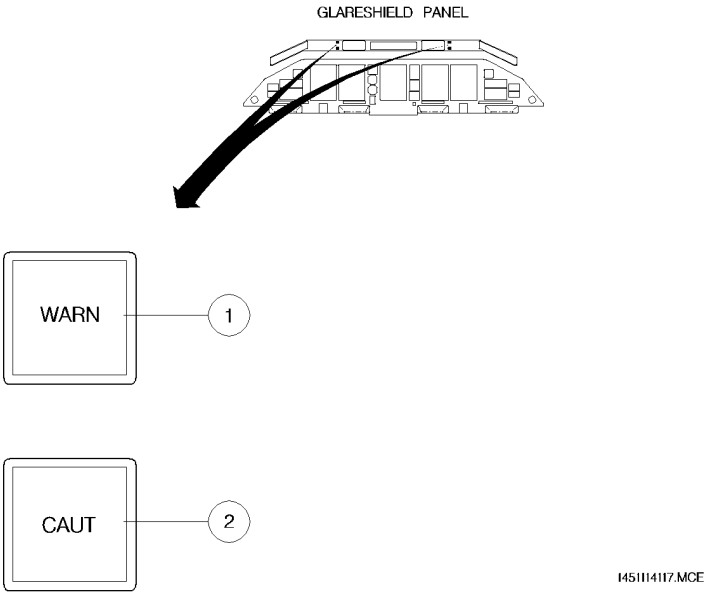
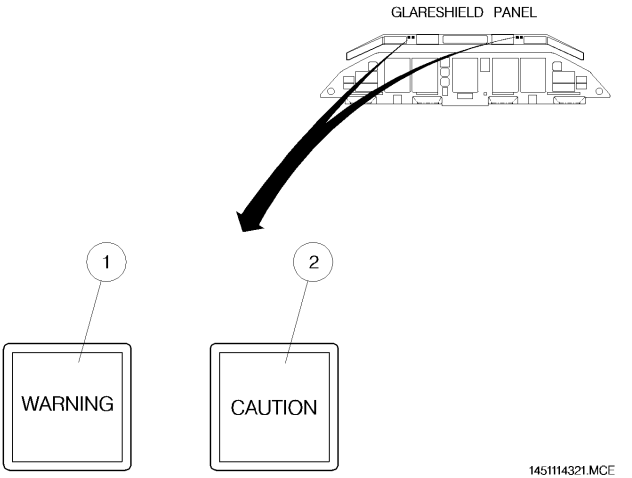


GLARESHIELD PANEL



GLARESHIELD PANEL (OPTIONAL)

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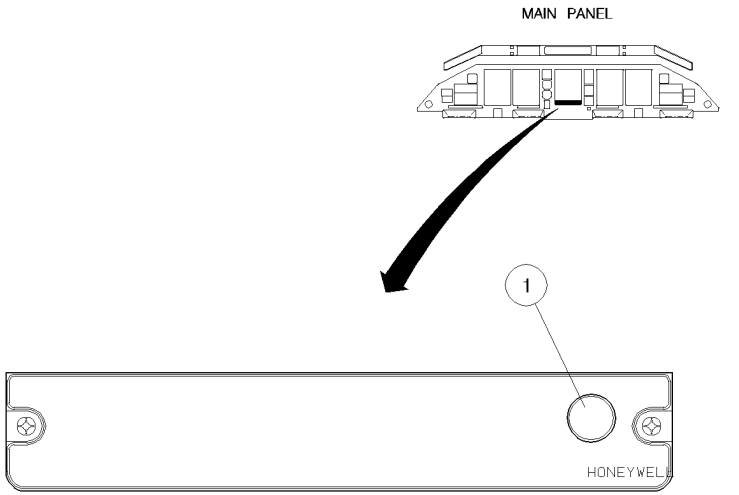
EICAS BEZEL

1 - MESSAGE SCROLLING KNOB

- To be used when displayed EICAS messages can not be presented at once.
- By rotating the knob clockwise, advances through EICAS messages. Rotated counterclockwise moves backward through EICAS messages.



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EICAS BEZEL

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PRIMARY FLIGHT DISPLAY

1 - EICAS CHECK SUM FAIL COMPARISON MONITOR DISPLAY

- Color: amber.
- Label: CAS MSG.
- Displayed when the number of active EICAS messages in each IC-600 is found to be different.

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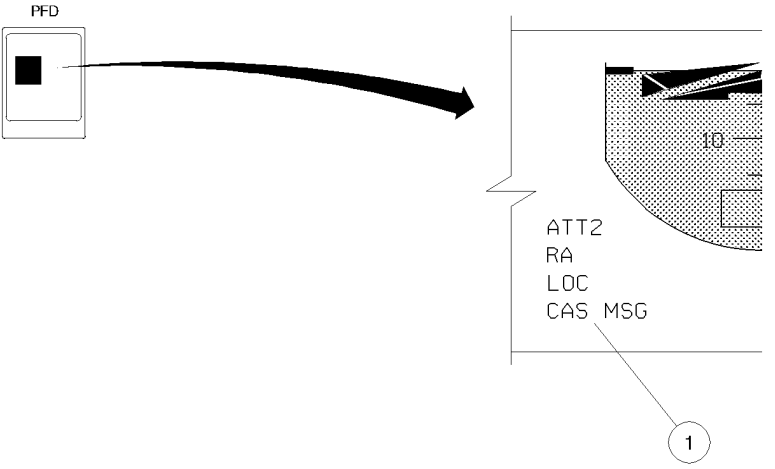

PRIMARY FLIGHT DISPLAY

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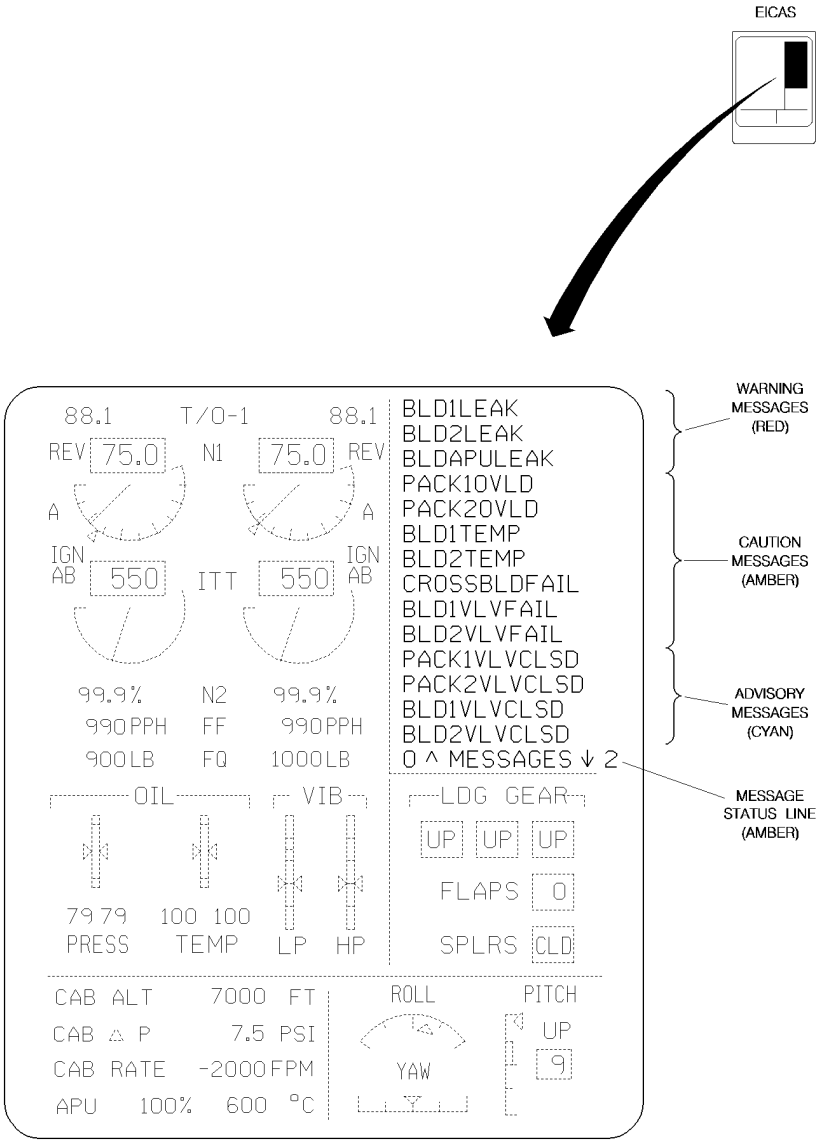
EICAS DISPLAY



EICAS MESSAGES EXAMPLE

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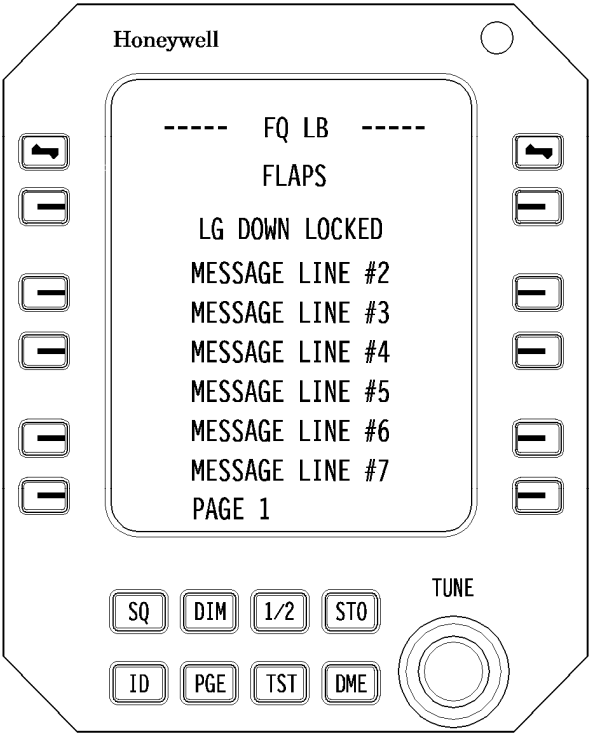
RMU DISPLAY



RMU MESSAGES EXAMPLE

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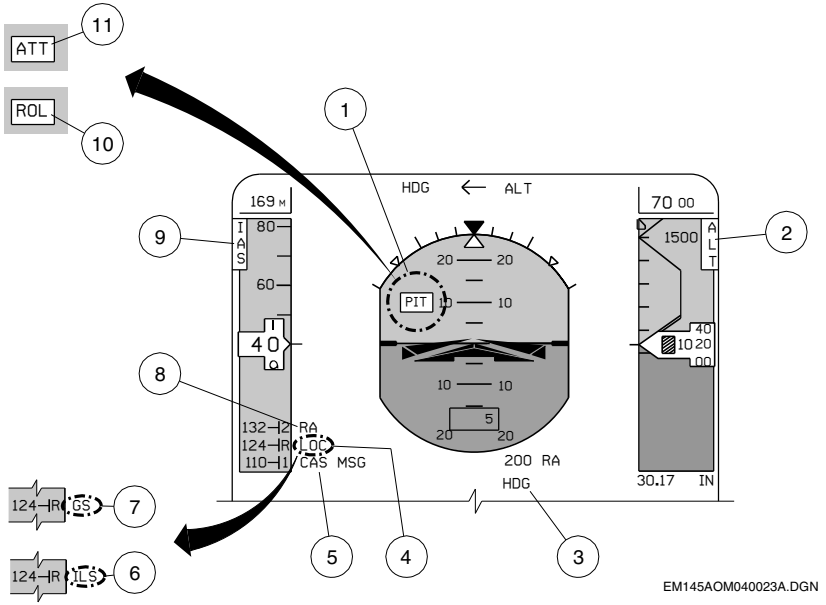

COMPARISON MONITOR ANNUNCIATORS

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CAUTION ANNUNCIATORS

The amber caution annunciators are described as follows:

1 - FD FAIL

- If a flight director fails, **FD FAIL** is displayed in the lateral mode annunciator box, and the flight director mode annunciators and command cue are removed.

2 - AP/YD

- Autopilot and yaw damper caution annunciators. **AP/YD** are displayed above the attitude sphere, below the flight director mode annunciators. Refer to PFD Additional Annunciators for more information.

3 - GND PROX

- When the EGPWS indicates a caution conditions **GND PROX** is displayed in the upper right of the ADI sphere. The following aural alerts are considered cautionary:
  - "SINK RATE";
  - "DON'T SINK";
  - "TOO LOW TERRAIN";
  - "TOO LOW FLAPS";
  - "TOO LOW GEAR";
  - "GLIDESLOPE";
  - "CAUTION TERRAIN";
  - "CAUTION OBSTACLE".

4 - MSG

- The FMS message annunciator (**MSG**) is displayed to the upper right of the HSI compass. The **MSG** annunciator flashes until the FMS message is cleared from the scratchpad.

5 - TCAS FAIL

- Amber **TCAS FAIL** caution annunciator is displayed to the upper left on the vertical speed display.
- For airplanes Post-Mod. SB 145-34-0125, the **TCAS FAIL** caution annunciator flashes for 10 s and remain steady displayed as long as the condition persists.

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6 - DISTANCE DISPLAY FAILURES

– If the DME or FMS distance signal fails, the digital readout is replaced with amber dashes.

7 - COURSE SELECT FAILURE

– If the course select signal fails, the digital readout is replaced with amber dashes and the course pointer is removed from the display. This indication is also given for an invalid heading display or FMS source.

8 - AOA

– Angle of attack information (and calibrated airspeed) are used to calculate stall speed for low speed awareness. If the angle of attack information or indicated airspeed information is invalid, AOA is displayed to the lower right of the airspeed tape.

9 - ATT1 OR ATT2

– If the pilot and copilot are using their normal onside attitude source, there is no attitude source annunciator. If the pilot and copilot have selected the same attitude source, that attitude source (**ATT1** or **ATT2**) is annunciated to the lower left of the attitude sphere on both PFDs.

10 - RA

– If a radio altimeter fails, **RA** is displayed in the digital radio window.

11 - MAX/MIN SPD

– These annunciators are displayed to the left of the attitude sphere. **MIN SPD** is displayed when the vertical speed or airspeed hold mode is engaged and the indicated airspeed drops below 80 kt. **MAX SPD** is displayed anytime indicated airspeed exceeds V_{MO}/M_{MO}.

12 - SG1 OR SG2

– When the symbol generator reversion is selected and one symbol generator is driving both pilot's and copilot's displays, that symbol generator is annunciated (**SG1** or **SG2**) to the upper left of the attitude sphere on both PFDs.

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13 - ADC1 OR ADC2

- If the pilot and copilot are using their normal onside air data source, there is no air data annunciator. If the pilot and copilot have selected the same air data source (**ADC1** or **ADC2**) is annunciated to the upper left of the attitude sphere on both PFDs.

14 - WDSHEAR

- When the windshear detection system detects windshear, **WDSHEAR** is displayed to the upper left of the attitude sphere. The annunciator flashes for 10 seconds and then goes on steady. The annunciator is **amber** (caution) if the performance is being increased, and **red** (warning) if the performance is being decreased. If the go-around button is pushed during a windshear caution or warning, the flight director vertical flight director guidance directs the airplane.

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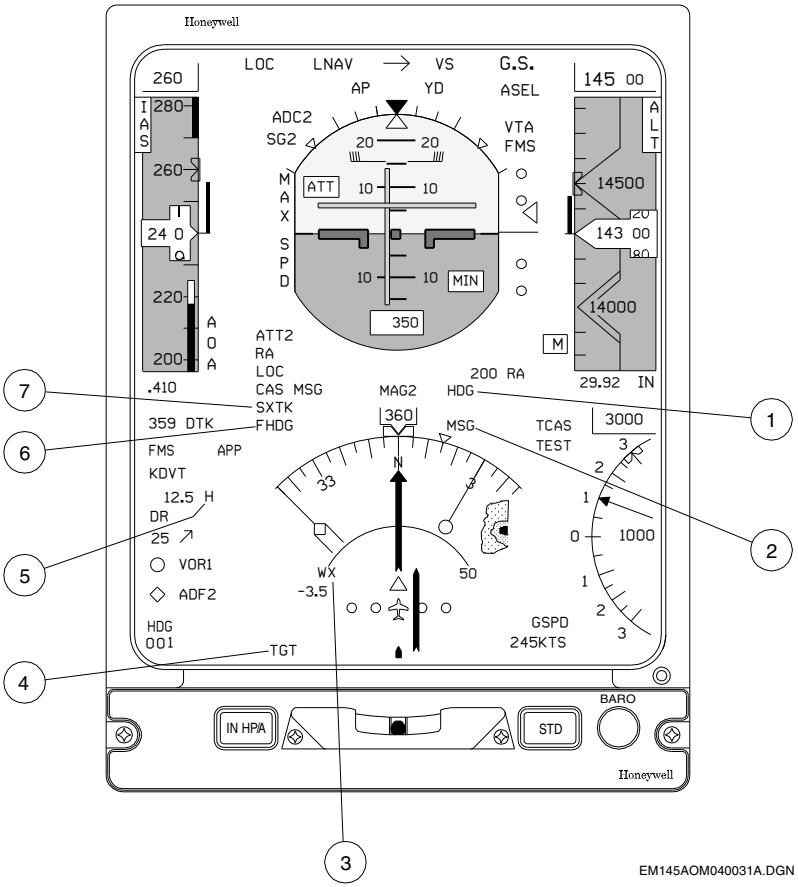

EM145AOM040031A.DGN

MESSAGES ON THE PFD

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VERTICAL SPEED DISPLAY

The picture above shows the location of the annunciator described below:

1 - TCAS STATUS ANNUNCIATOR

Annunciator	Color	TCAS Status
TA ONLY	white	TCAS is in traffic advisory mode only.
TCAS OFF (1)	white	TCAS is off.
TCAS TEST	white	TCAS is in self-test.
TCAS FAIL (2)	amber	TCAS data is invalid.
RA FAIL	red	Resolution advisories are not available.

NOTE: 1) For airplanes Post-Mod. SB 145-34-0125, the TCAS OFF annunciator flashes for 10 s and remain steady displayed as long as the condition persists.

2) For airplanes Post-Mod. SB 145-34-0125, the TCAS FAIL annunciator flashes for 10 s and remain steady displayed as long as the condition persists.

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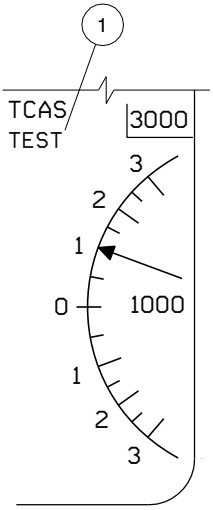

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VERTICAL SPEED DISPLAY ON THE PFD

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PFD SELF-TEST DISPLAY

To run the EFIS self-test, push and hold the TEST button on the display controller. The PFD displays the following:

- Course select, heading select, radio altitude set, distance, and groundspeed/time-to-go digital displays are replaced with amber (horizontal) dashes.
- Attitude and heading displays are flagged.
- All pointers/scales are flagged.
- All heading bugs/pointers are removed.
- Flight director command cue is removed.
- Radio altimeter digital readout displays radio altimeter self-test value.
- The comparison monitor annunciators are displayed (in amber) **ATT**, **HDG**, and **ILS** (if ILS sources are selected on both sides).
- **TEST** in magenta is annunciated to the upper left of the ADI.
- The annunciator **WDSHEAR** in red is displayed.
- Flight director mode annunciators are removed.
- Radio altitude minimum is displayed at the last set value.

NOTE: The amber annunciator **FD FAIL** is not displayed during the self test.

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6 - INTRUDER'S ALTITUDE

- Indicated by a solid two-digit number below or above the intruder's symbol.
- Color: Same as of the associated symbol.
- Normal presentation is relative altitude, which displays the intruder's relative altitude in hundreds of feet. A plus or minus signal indicates if the intruder is above (+) or below (–) the airplane.
- Two question marks ("??") are displayed if the intruder's relative altitude is greater than 9900 ft, below or above.
- If intruder is below the airplane, intruder's altitude is displayed below its symbol.
- If intruder is above the airplane, intruder's altitude is displayed above its symbol.

7 - RESOLUTION ADVISORY INDICATION

- Indicated by a solid red square.

8 - TRAFFIC ADVISORY INDICATION

- Indicated by a solid amber circle.

9 - OTHER TRANSPONDER REPLYING TRAFFIC INDICATION

- Indicated by a hollow cyan diamond.
- Indicates other airplanes equipped with transponder within the specified range and 2700 ft of vertical separation.
- Not displayed if a TA or RA is in process.

10 - OUT OF RANGE INTRUDER

- Indicates detected intruders that are out of display range.
- Indicated as half the associated symbol.

11 - INTRUDER'S ALTITUDE MODE INDICATION

- Indicates whether the selected intruder's altitude is relative or flight level.

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12 - TCAS BAND SELECTED

- Indicates whether the selected band for TCAS is below or above.

13 - TCAS MODE ANNUNCIATIONS

- Indicates current TCAS mode.
- Colors and labels are as follows, in the order of priority:
  - TCAS TEST - white
  - TCAS OFF (1) - white
  - TCAS FAIL (2) - amber
  - TA ONLY - white
  - TCAS - white
  - TCAS AUTO - white

NOTE: 1) For airplanes Post-Mod. SB 145-34-0125, the TCAS OFF annunciator flashes for 10 s and remain steady displayed as long as the condition persists.

2) For airplanes Post-Mod. SB 145-34-0125, the TCAS FAIL annunciator flashes for 10 s and remain steady displayed as long as the condition persists.

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GENERAL

The EMB-145 landing gear incorporates braking and steering capabilities. The extension/retraction, steering and braking functions are hydraulically assisted, electronically controlled and electronically monitored. EICAS indications and messages alert crew to system status and failures. Each landing gear is equipped with alternate means of actuation in case of normal actuation system failure.

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AIR/GROUND INDICATION SYSTEM

Air/ground indication is determined by a system that detects landing gear shock absorber compression and relays information to the landing gear electronic unit for gear control. The system consists of five weight-on-wheel proximity switches. Two of them are installed on each main landing gear leg and one on the nose landing gear leg.

The Landing Gear Electronic Unit (LGEU) processes the main landing gear proximity switches' signals information in four independent channels and controls various equipment operations. Logic processing includes the position signal and its validity. If all proximity switch signals are valid, four signals are processed to assure that at least three signals indicate identical status for releasing the air/ground signal output.

Should one proximity switch signal be invalid, the logic will process the remaining three signals so that at least two indicate the same status. If a second proximity switch is invalid, the two remaining signals are processed only if both send the same signal. Disagreement between these two remaining proximity switches causes the Landing Gear Electronic Unit to de-energize the channels and provide a default output signal.

The nose landing gear proximity switch signal is sent only to the thrust reverser logic (if installed) and steering control.

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LANDING GEAR OPERATION

Landing gear retraction and extension are powered by the hydraulic system 1. An accumulator prevents pressure fluctuations and assists gear retraction after takeoff. The main landing gear legs retract inboard, while the nose landing gear retracts forward. Each main gear leg is mechanically linked to its respective door, which remains open when the gear is down. The doors close automatically when the main landing gear is retracted. The nose landing gear doors are hydraulically actuated and operate in sequence with the nose gear.

Gear retraction and extension are electrically commanded. If normal extension fails, the landing gear can be extended through an electrical override system. If the electrical override is not available, a free-fall system allows gear extension. Gear position is indicated on the EICAS display.

LANDING GEAR RETRACTION

Landing gear retraction is commanded through the Landing Gear Lever, installed on the main panel. Positioning the lever to the UP position signals the LGEU to command the Nose Gear Door Solenoid Valve and the Landing Gear Electrovalve. This allows pressure from the hydraulic system 1 to simultaneously reach landing gear and down unlock actuators. All gear legs are then retracted into their respective wheel wells.

The LGEU logic only allows the nose gear doors to close after the nose landing gear is locked in the UP position. When the uplock boxes are actuated, the proximity switches signal the LGEU that the gear is up and locked and that the Landing Gear Electrovalve may be deenergized. Nose landing gear door actuators are kept pressurized, but the gear actuator lines are connected to the return.

To preclude an inadvertent retraction command while on the ground, the air/ground system provides a signal to a solenoid inside the Landing Gear Lever. This locks the lever and prevents movement towards the UP position. For emergency purposes only, a lock release button is provided beside the lever, allowing this protection to be overriden.

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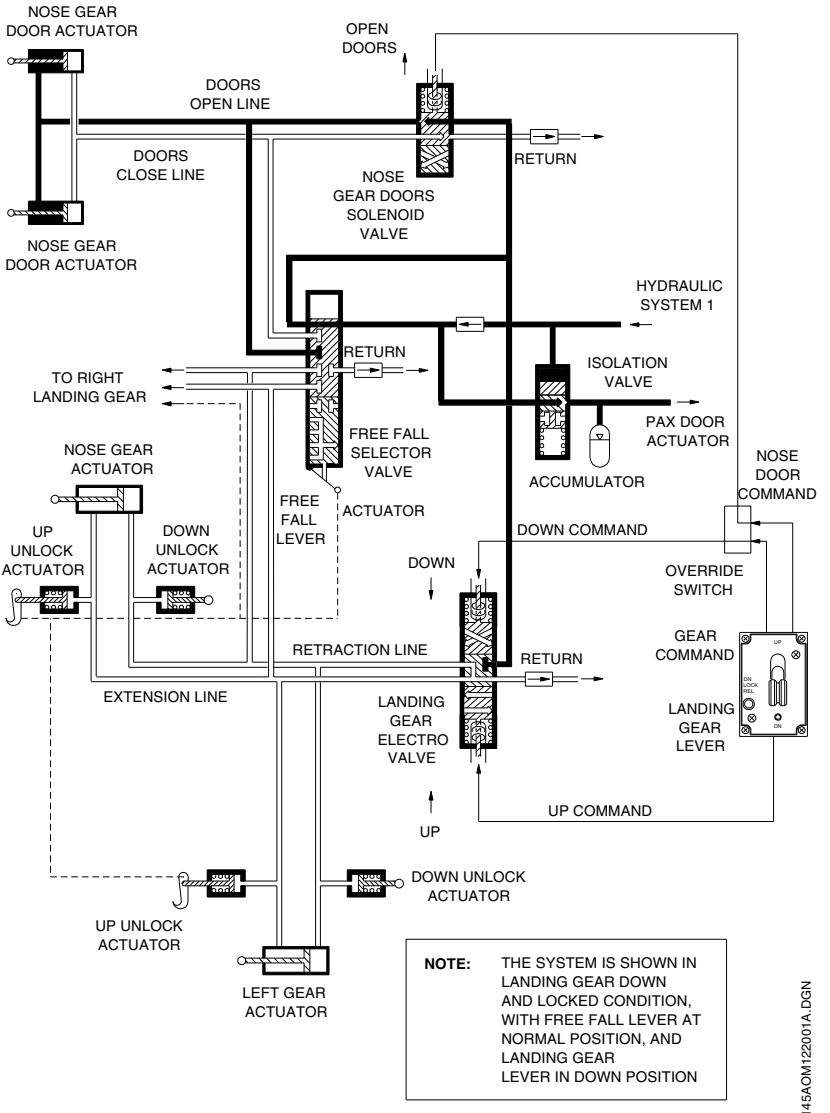

LANDING GEAR SCHEMATIC

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LANDING GEAR EXTENSION

NORMAL EXTENSION

Positioning the Landing Gear Lever to the DOWN position signals the LGEU to command the Landing Gear Electrovalve and the Nose Gear Doors Solenoid Valve. This allows pressure from the hydraulic system 1 to simultaneously reach the landing gear and door actuators, and also the up unlock actuators.

When the gear legs reach the down position, the down lock boxes are actuated. The proximity switches signal the LGEU that the gear is down and locked and that the Landing Gear Electrovalve may be de-energized.

ELECTRICAL OVERRIDE EXTENSION

The Electrical Override system is used to extend the landing should there occur a normal landing gear extension failure. This system bypasses the LGEU and actuates directly the Landing Gear Electrovalve and the Nose Gear Doors Solenoid Valve. The control switch is installed inside the free-fall lever compartment, on the floor, beside the copilot's seat. Extension through override is made in steps, first opening the doors and then extending the gear. When extension is completed, selecting the override switch to normal position deenergizes the Landing Gear Electrovalve and depressurizes all lines. The switch is safeguarded, being in the non-actuated position whenever the compartment door is closed.

FREE-FALL EXTENSION

Free-Fall extension is available in case of failure of both normal extension and electrical override extension. Actuation of free-fall landing gear extension is performed by pulling up the lever installed inside the free-fall lever compartment, on the floor, beside the copilot's seat.

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This mechanically actuates the Free-Fall Selector Valve and unlocks the three landing gear legs uplocks. The Free-Fall Selector Valve isolates the hydraulic system pressure and connects the landing gear system hydraulic lines to the return. With the system unpressurized and the uplocks deactivated, all gear legs fall by gravity until they reach their downlock devices. If one main gear does not lock down, increase the aerodynamic drag by side slipping the airplane to help lock the affected leg.

Once actuated, the free-fall lever remains locked in the vertical position until mechanically released.

LANDING GEAR WARNING

A LANDING GEAR voice message is provided to alert pilots any time the airplane is in a landing configuration and the gear legs are not locked down. The warning may be activated under one of three conditions:

1. Radio Altitude below 1200 ft, Flap Selector Lever set lower than 22°, one thrust lever set below 59° and the other thrust lever set below 45° (or the associated engine inoperative).

   NOTE: In case of Radio Altimeter loss, the message may be activated at any altitude, but may be canceled through the Landing Gear Warning Cutout Button.

2. Radio Altitude below 1200 ft, Flap Selector Lever between 22° and 45°, one thrust lever set below 59° and the other thrust lever set below 45° (or the associated engine inoperative).

   NOTE: - The Voice message cannot be canceled.
   - In case of Radio Altimeter loss, the message may be activated at any altitude.

3. Flap Selector Lever set at 45°.

   NOTE: The Voice message cannot be canceled.

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EICAS MESSAGES

TYPE	MESSAGE	MEANING
WARNING	LG/LEVER DISAGREE (1)	After 20 seconds of gear command, at least one landing gear is not in the selected position. After 20 seconds of gear command to the UP position, once "NLG UP/DOOR OPN" is displayed on EICAS.
CAUTION	LG AIR/GND FAIL (2)	LGEU failure, failure of two weight-on-wheel proximity switches, or nose weight-on-wheel proximity switch in disagreement with air/ground system indication.
	NLG UP/DOOR OPN (if applicable)	Nose LG is locked up and nose LG door is open.

NOTE: 1) For airplanes Post-Mod. SB 145-34-0125, the message is displayed when the Landing Gear in Transit position remain unchanged for more than 20 seconds.

2) If the message is displayed for about 3 or 5 seconds during the landing gear extension only and extinguishes when the landing gear is down and locked, it could be considered a false indication and should be disregarded.

CONTROLS AND INDICATORS

LANDING GEAR CONTROL BOX

1 - LANDING GEAR LEVER

UP - Selects landing gear retraction.

DOWN - Selects landing gear extension.

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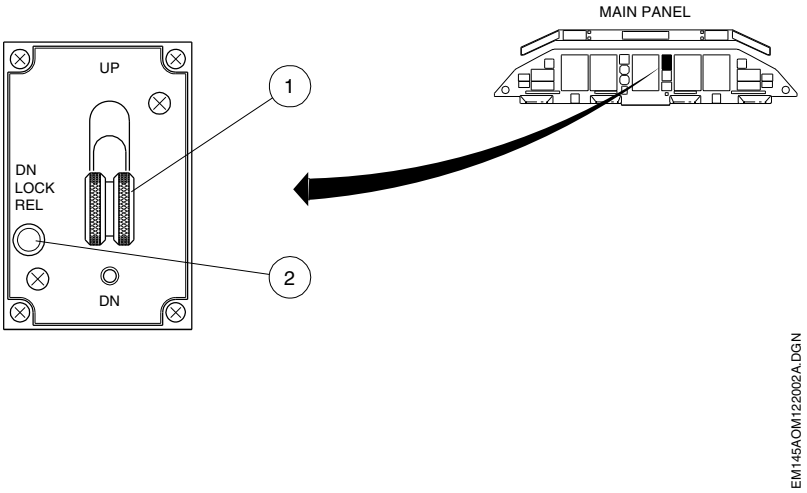
2 - DOWNLOCK RELEASE BUTTON

- Mechanically releases the lever lock, allowing the landing gear lever to be moved to the UP position when on the ground or in case it cannot be moved to the UP position after takeoff.



LANDING GEAR CONTROL BOX

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FREE-FALL LEVER COMPARTMENT

1 - FREE-FALL LEVER

- When pulled up, depressurizes the landing gear hydraulic line and releases all gear uplocks.
- The lever is kept at the actuated position by a mechanical lock.

2 - FREE-FALL LEVER UNLOCK BUTTON

- When pressed, unlocks the free-fall lever, allowing it to be returned to the normal position, thus restoring the hydraulic operation of the landing gear.

3 - ELECTRICAL OVERRIDE SWITCH (GUARDED)

NORMAL - Landing gear retraction and extension are automatically performed and controlled by the Landing Gear Electronic Unit.

DOORS - Opens the nose landing gear doors.

GEAR/ DOORS - Extends the landing gear.

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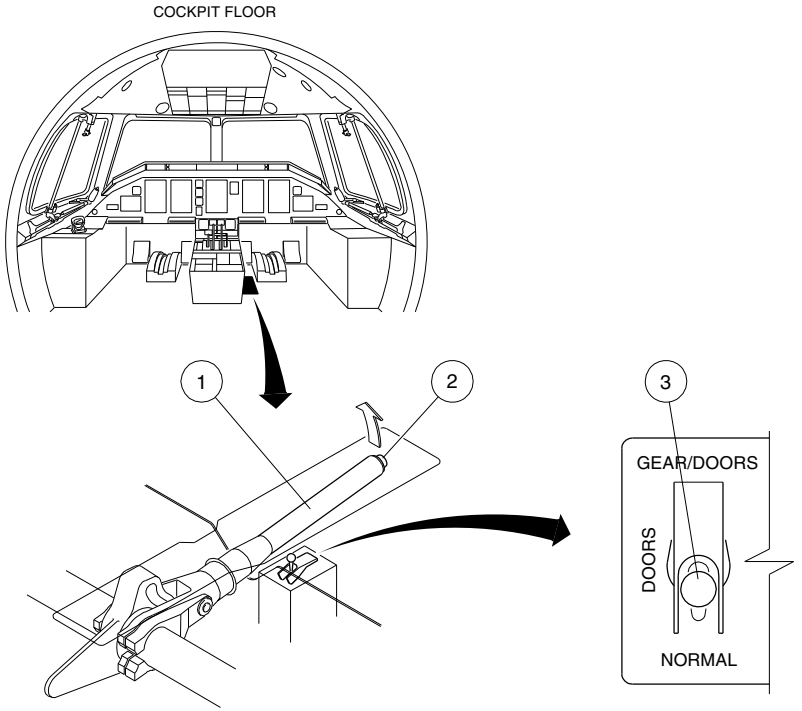

FREE-FALL LEVER COMPARTMENT

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LANDING GEAR WARNING CUTOUT BUTTON (guarded)

- When pressed, this button cancels the landing gear warning voice message if the Radio Altimeter is inoperative with Flap Selector Lever set lower than 22°, one thrust lever set below 59° and the other thrust lever set below 45° (or the associated engine inoperative).
- An amber indication bar illuminates inside the button and remains illuminated to indicate that a cancel action was performed.
- The amber indication bar extinguishes if the Thrust Levers are advanced or Flap Selector Lever is set at 22° or higher or landing gear is down and locked.

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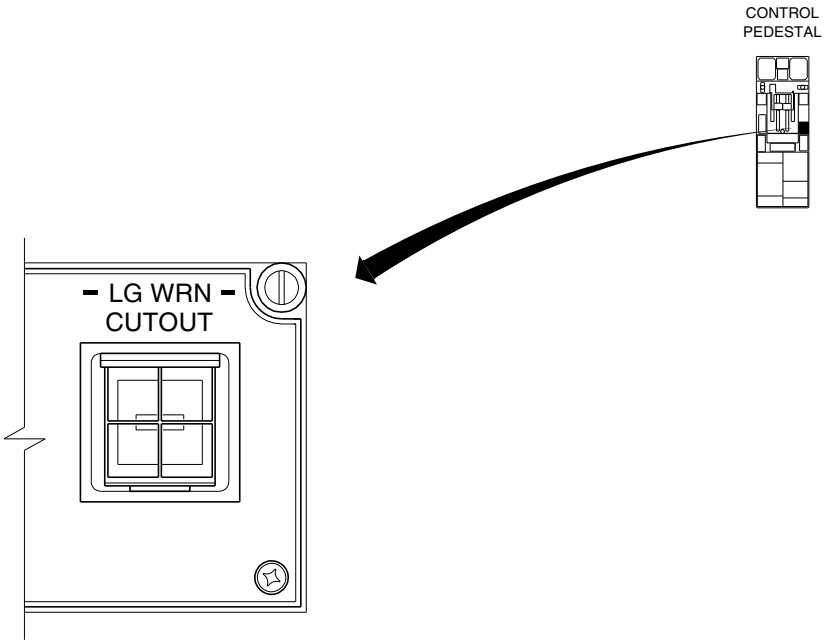

NOTE: THE LANDING GEAR WARNING CUTOUT BUTTON MAY ALSO BE LOCATED ON THE MAIN PANEL.

EM145AOM122004A.DGN

LANDING GEAR WARNING CUTOUT BUTTON

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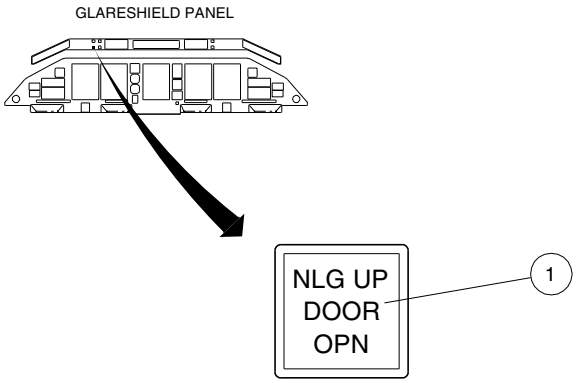
GLARESHIELD PANEL

1 - NOSE LANDING GEAR DOORS INDICATION LIGHT (IF INSTALLED)

– Illuminates to indicate that the nose landing gear is locked in the retracted position and at least one door is not closed.



EM145AOM122005A.DGN

GLARESHIELD PANEL

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EICAS INDICATIONS

1 - LANDING GEAR POSITION

- Position is indicated by three boxes, one for each gear.
- Landing gear down and locked is indicated by a green DN label inside a green box.
- Landing gear in transit is indicated when the box is crosshatched in amber and black.

  For airplanes Post-Mod. SB 145-34-0125, when the conditions for Landing Gear in Transit position remain unchanged for more than 20 seconds, the following occurs:
  - The indication crosshatched in amber and black turns to red and black, and
  - The EICAS message LG/LEVER DISAGREE is displayed.
- Landing gear up and locked is indicated by a white UP label inside a white box.
- Landing gear lever disagreement (landing gear is not in the selected position after 20 seconds) is indicated by a box cross-hatched in red and black or by a red label (UP or DN) inside a red box.
- Indication of landing gear downlocked is also presented on the RMU through the green LG DOWN LOCKED legend.

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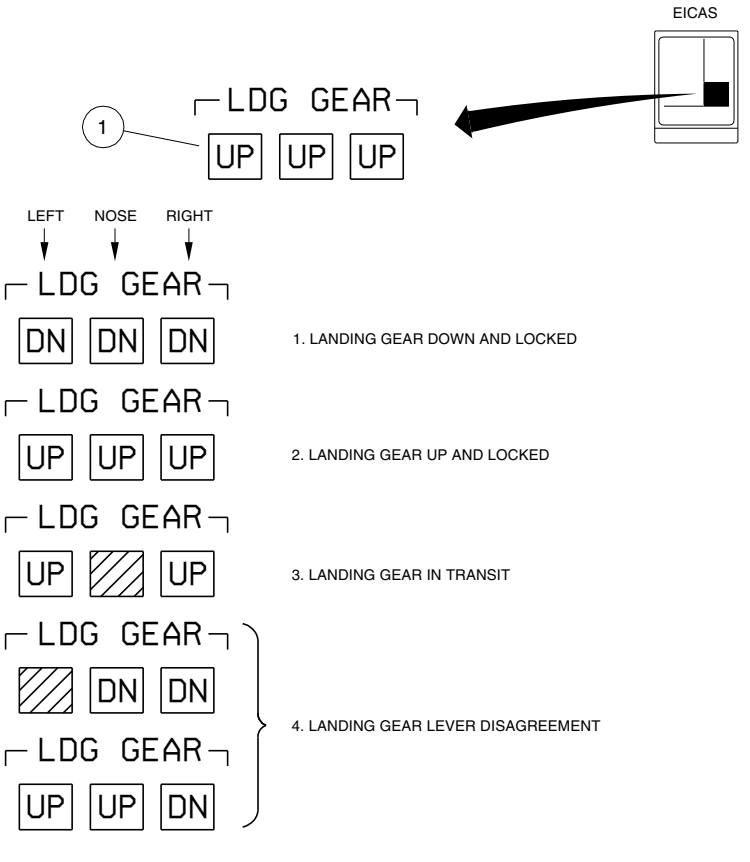

LANDING GEAR POSITION INDICATION ON EICAS

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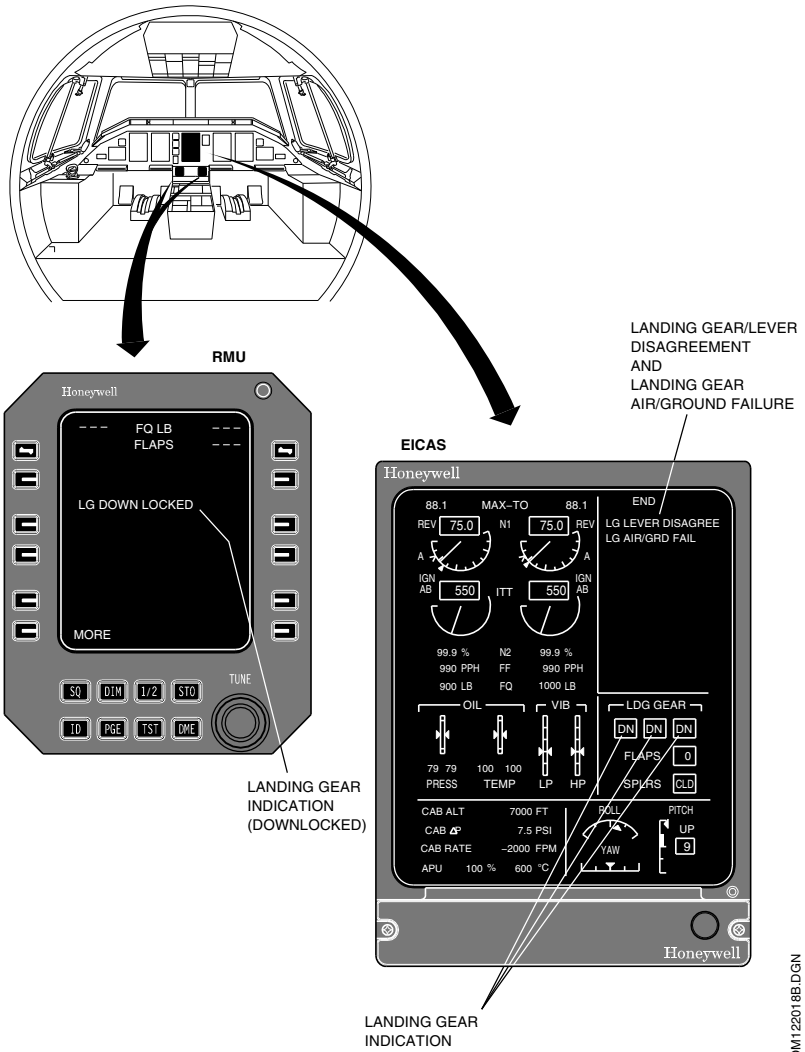

LANDING GEAR INDICATIONS

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EICAS MESSAGES

TYPE	MESSAGE	MEANING
CAUTION	CHECK XPDR	The transponder is not operational.

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FLIGHT MANAGEMENT SYSTEM

The FMZ 2010 Flight Management System (FMS) operates with the FMS NZ6.1.1 software, indicated on its NAV IDENT page. The FMS NZ6.1.1 controls a complete range of navigation functions. The primary purpose of a Flight Management System (FMS) is to manage navigation sensors to produce a composite lateral position and provide lateral flight path guidance together with performance predictions for trip planning. For additional information on functions and operation, refer to the manufacturer's manual.

The FMS consists of the following components:

- NZ-2010 Navigation Computer (NZ),
- IM-803 Configuration Module,
- Control Display Unit (CDU), and
- Data Loader (DL).

The FMS operates in the following situations: Oceanic, Remote, North Atlantic Minimum Navigation Performance Specification Airspace, Enroute, Terminal, Non-Precision Approach, and Required Navigation Performance.

The FMS interfaces with the followings systems and equipment:

- GPS sensor(s) - The GPS receives satellite data through the active GPS antenna, and provides Latitude, Longitude, and ground speed for FMS navigation.
- ADC 1 and 2 - Air data computer provides barometric altitude and Airspeed to FMS computer.
- AHRS 1 and 2 - Provides latitude, longitude, ground speed, and Heading information for FMS Navigation, FMS wind computation and for FMS Dead Reckoning Mode.
- VOR and DME radios - provides track angle to VOR stations and Distance to DME stations, allowing FMS to compute navigation data.
- MFD and PFD - The FMS provides Navigation guidance on the PFD HSI, when FMS is selected as Navigation Source on DC-550 panel, and also next waypoint, Distance to waypoint and Lateral Flight Plan on navigation MAP data on the MFD.

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- RMU 1 and 2 - The RMU interfaces with the FMS computer to control the operating frequencies, modes, and channels of the various radios. For the dual configuration, each RMU supplies each respective on-side NZ.
- COM 1 and 2, NAV 1 and 2 - The FMS includes a radio-tuning page on which the pilot can manually select the VHF NAV and COM frequencies. Only the NAV frequency is fed back to the FMS computer for verification of the tuning action. COM 1 and 2 interface with FMS through the RMUs. The FMS can also automatically select the NAV radio frequencies.
- The FMS also provides latitude and longitude to TCAS and EGPWS.

The Control Display Unit (CDU), located on the control pedestal, provides control functions management and operating modes for proper FMS operation.

The FMS Part Number may be identified following the steps below:

1. Push the NAV key to access the NAV INDEX 1/2 page.
2. Push NEXT to access the NAV INDEX page 2/2.
3. Push the MAINTENANCE key to access the maintenance page.
4. Push NEXT key twice to access the Return to Service Page.
5. Read the FMS PN according to the following table.

FMS PN	RELATED FMS PN OBTAINED VIA RETURN TO SERVICE PAGE
7018879-03046	FMS_NZ_GEN18001

Some additional features available for airplanes with FMS NZ6.1.1 software version are:

- Custom database changes: The custom database consists of pilot-defined waypoints and stored flight plans. In which up to 1000 pilot-defined waypoints can be stored. The pilot can store commonly flown routes using the pilot-defined flight plan procedure. It can retain up to 3000 flight plans with a total of 45000 waypoints (whichever comes first). Each flight plan with the maximum of 100 waypoints.

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- Automated Holding to Altitude (HA) leg sequencing: It removes the need to manually sequence an HA leg when achieves an HA altitude constraint. It adds to the streamlining of auto sequencing for all FMS leg types. When the airplane achieves the HA altitude constraint, the FMS deletes the holding pattern, resulting in an immediate exit of the holding pattern. It is possible to delete the hold manually from the flight plan before entering the pattern. Manually exit is inhibited when in the pattern.
- Enroute holding procedures: It allows the flight crew to select a published holding procedure from the database or insert a manual hold into the flight plan at any enroute waypoint. When the crew selects a hold at an enroute waypoint, the FMS determines if there is a database defined hold at that waypoint. When a hold is defined at that waypoint, it is possible to select the database hold or a default hold. If there is no database hold, the FMS shows the default hold and it is possible to change before inserting it into the flight plan. If multiple patterns exist for a particular fix, all are displayed on the page and the crew chose the one to be activated.
- Navigation database changes: It allows the inclusion of circling approaches and Multi-RNAV runways, i.e., multiple approaches with the same guidance RNAV to the same runway are annotated with an alphabetical suffix beginning at the end of the alphabet and working backwards for subsequent procedures.
- Circling approaches: Added to the navigation database and applicable to all runways at an airport. It is allowed to change the runway subsequently without having to reselect the circling approach. When a runway is selected with a circling approach and the runway is the missed approach point, the FMS use the higher altitude constraint of the missed approach point rather than the runway altitude.
- RNP Settings Page: Display and modify the RNP values and is accessed through RNP on PROGRESS 2/3 PAGE. It is possible to the crew to entry the RNP values for each phase of flight or a manual override RNP value.

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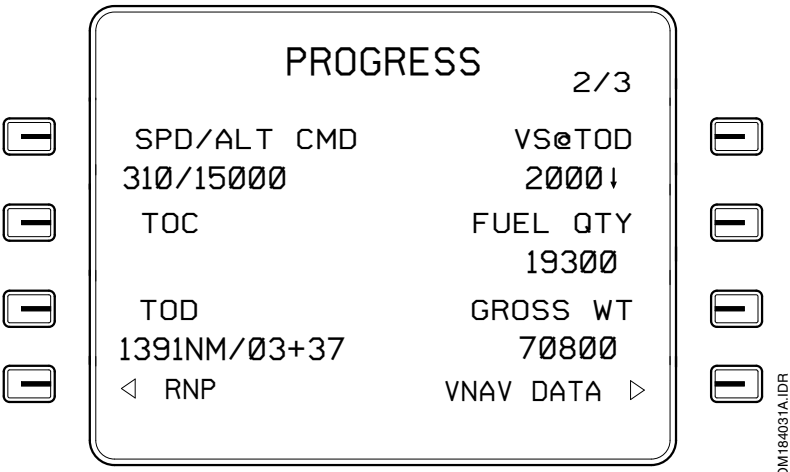
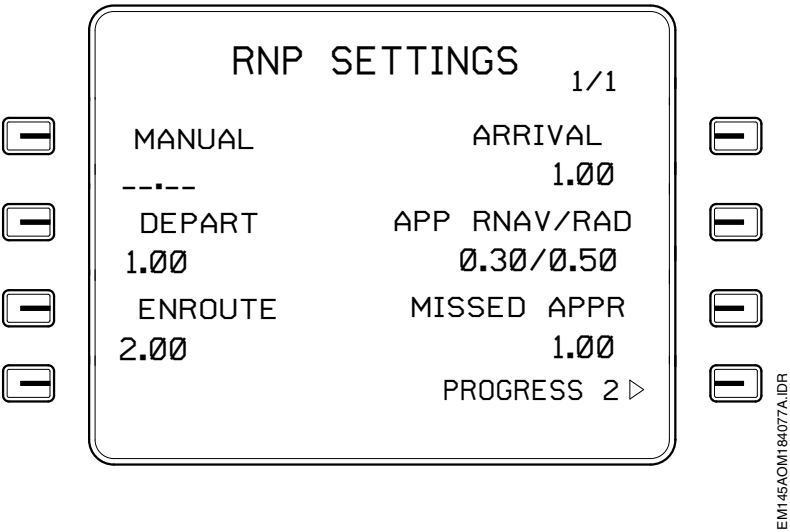


PROGRESS 2/3 PAGE WITH RNP



RNP SETTINGS PAGE

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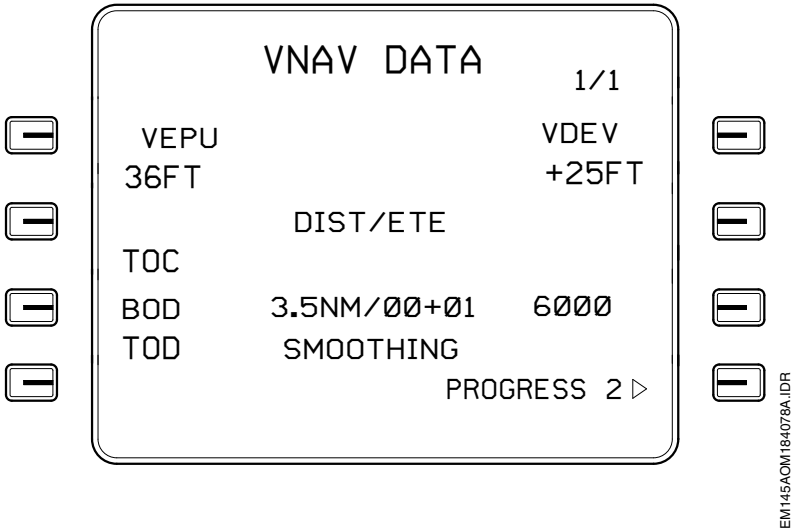
– VNAV Data: Displays vertical data for the entire flight (Vertical deviation, TOC, BOD, TOD distance, ETE, and altitude). For airplanes Post-Mod. SB145-34-0125, temperature compensation is available when Baro-VNAV is enabled. It is accessed through VNAV DATA on PROGRESS 2/3 PAGE.



VNAV DATA PAGE

– Vectors to Final: Allows the flight crew to comply with ATC-directed vectoring in the terminal area by removing unneeded approach waypoints from the flight plan.

When vector operations are being conducted and LNAV is armed, the FMS computes a capture point as the first intersection of the current track from the selected heading with the flight plan to determine the TO and FROM waypoints (flight plan cleanup).

When armed, LNAV engages the intercept course with the airplane within normal capture range of the inbound course to the active waypoint.

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When a vectored approach transition is selected, the FMS creates an approach consisting of an intercept leg leading to the FAF and removes any legs existing in the approach before the FAF. Only the approach legs before the FAF are removed, the departure, cruise, and arrival legs remain in the flight plan.

If there is no published approach transition and the initial fix of the approach is the FAF, there is no course available for leg construction. In this condition, the course field is dashed, and pilot entry is required.

The vectored approach transition is the default selection on the APPROACH TRANS page.

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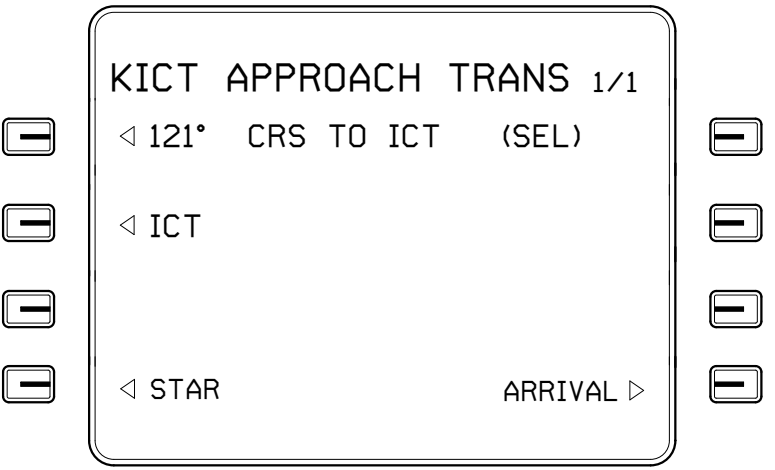

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APPROACH TRANS PAGE WITH INCLUSION OF VECTORED APPROACH

When vector operations are being conducted in TERM area with the FAF not sequenced, the ACT VECTORS displays and FLY VECTORS TO INTERCEPT displays as the FROM waypoint.

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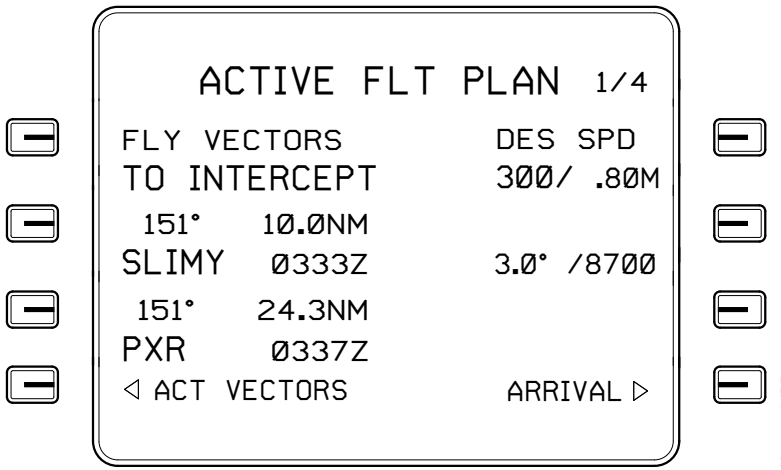

ACTIVE FLIGHT PLAN PAGE WITH FLY VECTORS TO INTERCEPT AS THE FROM WAYPOINT

If a vectored approach transition is selected during preflight, FLY VECTORS TO INTERCEPT is inserted as a segment into the flight plan immediately prior to the FAF.

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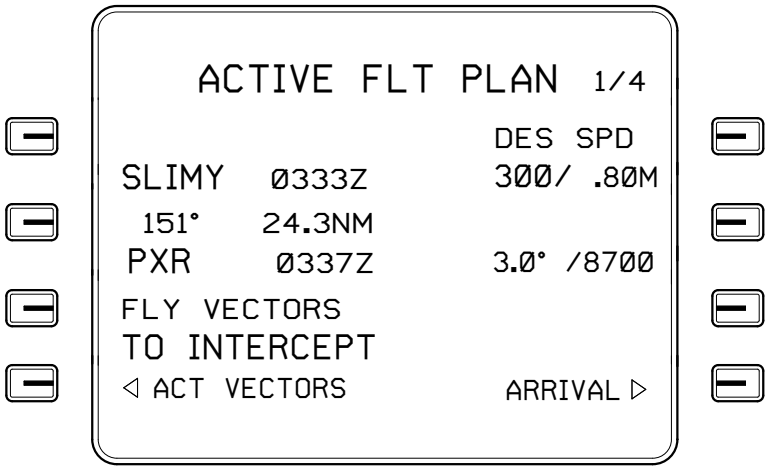

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ACTIVE FLIGHT PLAN PAGE WHEN A VECTORED APPROACH TRANSITION IS SELECTED DURING PREFLIGHT

Selecting the ACT VECTORS makes the FLY VECTORS TO INTERCEPT the FROM waypoint and results in LNAV to drop.

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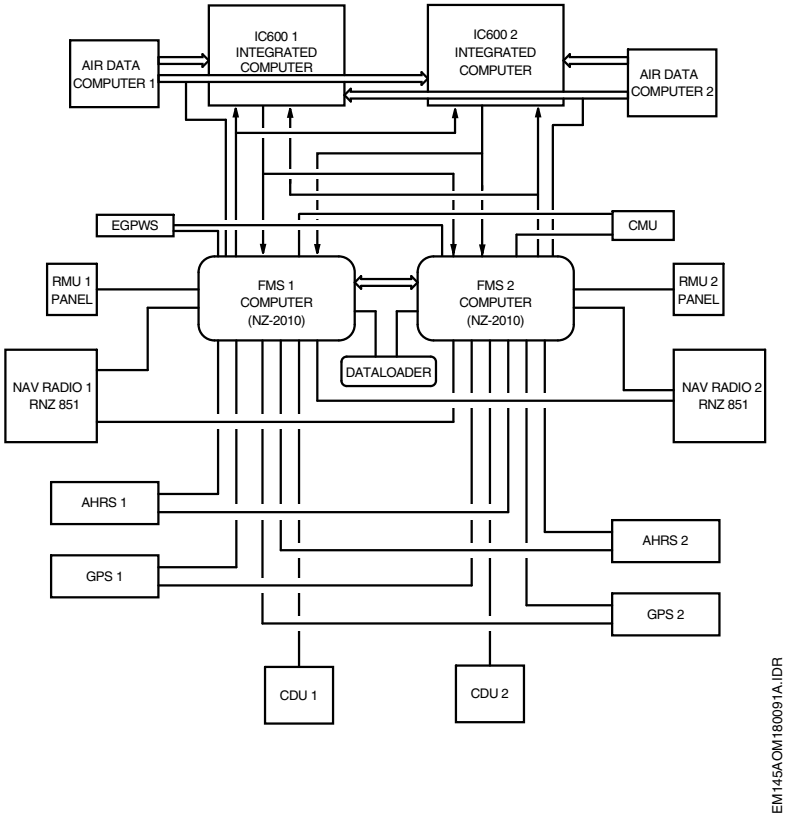

FMS SCHEMATIC

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FMS OPERATING MODES

FMS FUNCTIONS

NAVIGATION

The position determination function computes the airplane position and velocity for all phases of flight. The FMS receives navigation data from various sensors on board the airplane. The priority of the navigation modes is as follows:

– GPS,
– DME/DME,
– VOR/DME, and
– IRS.

The GPS is the most accurate sensor. When GPS is in use, the other sensors are still monitored for position differences, but they do not contribute to FMS position, unless the GPS becomes inaccurate, unavailable, or is manually deselected. In this case, the FMS automatically tunes the DME/DME in order to provide position. When DME/DME is not accurate, the VOR/DME is selected.

If all position sensors and radios are lost, the FMS shifts to Degrade Mode (DGRAD) and in approximately 2 minutes it enters the Dead Reckoning Mode (DR). In this mode, the position is calculated using the last known airplane position. The ground speed and track are estimated with AHRS heading, ADC TAS and the last known wind data.

The lateral navigation (LNAV) function of the FMS calculates navigation information relative to selected geographical points. The pilot can define flight plan routes worldwide. The system outputs information and steering signals that show the pilot or flight guidance system (FGS/Autopilot/Flight Director) how to guide the airplane along the desired route. Routes are defined from the present position of the airplane to a destination waypoint along a great circle route or through a series of great circle legs defined by intermediate waypoints.

The vertical navigation (VNAV) provides vertical guidance with steering targets to FGS to guide the airplane in the vertical profile. A deviation scale for the VNAV is located on the PFD, on the same place where the glide slope scale.

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For airplanes Post-Mod. SB145-34-0125, the FMZ2010 with the FMS NZ6.1.1 software also provides the functions: barometric-vertical navigation (Baro-VNAV) and Localizer Performance with Vertical guidance (LPV) operations. The application of the service bulletin by itself does not allow their usage without operational approval and training as required by airworthiness authority.

FLIGHT PLANNING

The flight planning function computes the active flight plan with both lateral and vertical definition.

The navigation computer has the ability to store and retrieve information of navaids and earth reference points such as airports, navaids, intersections, runways and routes. This information is stored in a database, which is updated every 28 days from a USB drive via the data loader. A reserved area of the internal database memory is used to store up to 1000 pilot-defined waypoints, which are only updated when changed in memory by the operator.

The operation of saving a Flight Plan may prevent the Speed Intervention function on the FMS, depending on how many waypoints on all Flight Plans have been stored in the Custom Database.

DATABASE

The database contains worldwide coverage of navaids, airways, departure procedures, approach procedures, Standard Terminal Arrival Routes (STARs), airports and runways. This information is updated every 28 days.

FMS MODES

The dual FMS configuration provides four operating modes that may be accessed through the FMS MAINTENANCE 1/3 page:

DUAL MODE

In this mode, the following information is automatically transferred to the cross-side FMS: flight plan, performance data, waypoints defined by the pilot, flight plans created in one system and radio tuning.

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INITIATED TRANSFER MODE

In this mode the flight plan and performance data entry will only be transferred to the cross-side FMS through the prompt command available in the last page of the ACTIVE FLT PLAN pages. Waypoints defined by the pilot, created flight plans and radio tuning are automatically transferred to the cross-side FMS.

INDEPENDENT MODE

In this mode, only the radio tuning is automatically transferred to the cross-side FMS.

NOTE: To operate in the INDEPENDENT mode, it is necessary to use the same software version and same settings in the Configuration Modules. If any of these requirements is not accomplished, the system automatically passes for the possible operating mode. For instance, if only the CUSTOM database differs in both systems, the operating mode automatically switches from DUAL to INDEPENDENT.

SINGLE MODE

No information is exchanged between both systems.

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FMS CONTROLS AND INDICATORS

CONTROL DISPLAY UNIT (CDU)

TEXT COLORS

The colors are designed to highlight important information. Color assignments are coordinated as much as possible with other displays. See below the parameters associated to each color:

Vertical	Cyan (Blue)
Atmospheric Data	Cyan (Blue)
Lateral	Green
FROM Waypoint	Yellow
TO Waypoint	Magenta
Prompts and Titles	White
Flight Plan Names	Orange
Index Selections	Green

1 - ANNUNCIATORS

The annunciators are located on the top of the LCD display.

- Colors:
  - White: indicating advisory annunciation.
  - Amber: indicating alerting annunciation.

DSPLY (White)	Illuminates when the CDU displays a page that is not relative to the current airplane lateral or vertical flight path. This annunciator is not shown on the PFD.
DR (Amber)	Illuminates when a radio updating loss occurs, as well as all other position sensors, for a period longer than 2 minutes.
DGRAD (Amber)	Illuminates when the FMS cannot guarantee the position accuracy for the present phase of the flight.

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MSG - (CD-810 and CD-820) FMS MSG - (CD-830) (White)	Illuminates when there is a message (advisory or alert) on the scratchpad. The annunciator turns off when the message is cleared from the scratchpad.
OFFSET (White)	Illuminates when a lateral offset path has been entered in the FMS. The annunciator turns off when the offset is removed.
APRCH (White)	Illuminates when the FMS is selected as navigation source and the following conditions are valid: a non-precision instrument approach has been activated from the navigation database, the airplane position is between 2 NM outside the final approach fix and the missed approach point, the DGRAD must be off and FMS using approved sensors for non-precision approach.

NOTE: The FMS transmits all the annunciators to the PFD, except the DSPLY annunciator, so the pilot must not trust only on the FMS CDU for checking the FMS system status.

2 - LINE SELECT BUTTONS

There are four line select buttons on each side of the CDU that provide the following functions:

- Select submodes within major modes when in an indexed display,
- Used as direct access to the other FMS modes when in a non-indexed display, and
- Enter data to the scratchpad.

For airplanes equipped with Control Display Unit CD-830, the Line Select Buttons are touch-sensitive keys. The feedback to the touch is the display of a cyan highlight round the button. The selection of the button only occurs when the touch and the lift off are from the same area.

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3 - BRIGHTNESS CONTROL BUTTON

- Used to manually control the brightness of the display.
- To adjust the brightness, press up or down the Bright/Dim button, and a control bar is displayed in the scratchpad.
- The brightness can be adjusted so that, during daylight conditions, the display cannot be seen.

4 - GROUP OF FUNCTIONS BUTTONS

PERF	Displays the performance pages.
NAV	Displays the NAV index pages.
FPL	Displays the first page of the active flight plan when the flight plan was previously entered. Also used to create a flight plan manually, to select a stored flight plan, and to create a flight plan for storage.
PROG	Displays the first progress page, the status of the flight.
DIR	Start the DIRECT-TO Function and displays the FLPN page with the prompts for the PATTERN and INTERCEPT functions.
ATC (FANS)	If interface is installed, it displays the ATC pages. If not installed, it returns a message that the function is not available.
VIDEO (CD-820)	Returns a scratchpad message that the function is not available.
GRAPHIC (CD-820)	Returns a scratchpad message that the function is not available.
BACK (CD-820)	Displays the last page that was selected when that page is available.

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FN (CD-820)	When a special function is defined by the FMS, this function is shown in reverse video (magenta) as an annunciator under the FN function key. Press FN to perform the function when the annunciator is shown. When a special function is not defined by the FMS, the area directly under the FN function key is empty. Pressing FN when no annunciator is shown returns a message that FN is not available.
MENU (CD-830)	Displays the MENU pages.

5 - ALPHANUMERIC BUTTONS

– Consist of alphabet letters, the numbers 0 through 9, a decimal, and a slash. It is used to enter inputs to the FMS. A SP (Space) key is used to insert a space following a character in the scratchpad, and a +/- (Plus/Minus) key will result in a - being entered, changing to + in a subsequent press.

– The alphanumeric keys make entries only on the scratchpad.

6 - EDITION BUTTONS

PREV	Changes the current page to the previous page.
NEXT	Changes the current page to the next page.
CLR	Clears alphanumeric entries in the scratchpad or a scratchpad message.
DEL	Works together with line select buttons in order to delete waypoints and other items displayed on the CDU. This button is inhibited when a message is displayed.

7 - SCRATCHPAD

– It is the working area, located on the bottom line of the display, where the pilot can enter data and/or verify data before line selecting the data into its proper position.

– Data is retained on the scratchpad throughout all mode and page changes.

– The scratchpad also displays advisory and alerting messages.

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8 - TOUCH SCREEN (If applicable)

For airplanes equipped with Control Display Unit CD-830, the display of the CDU is touch-sensitive.

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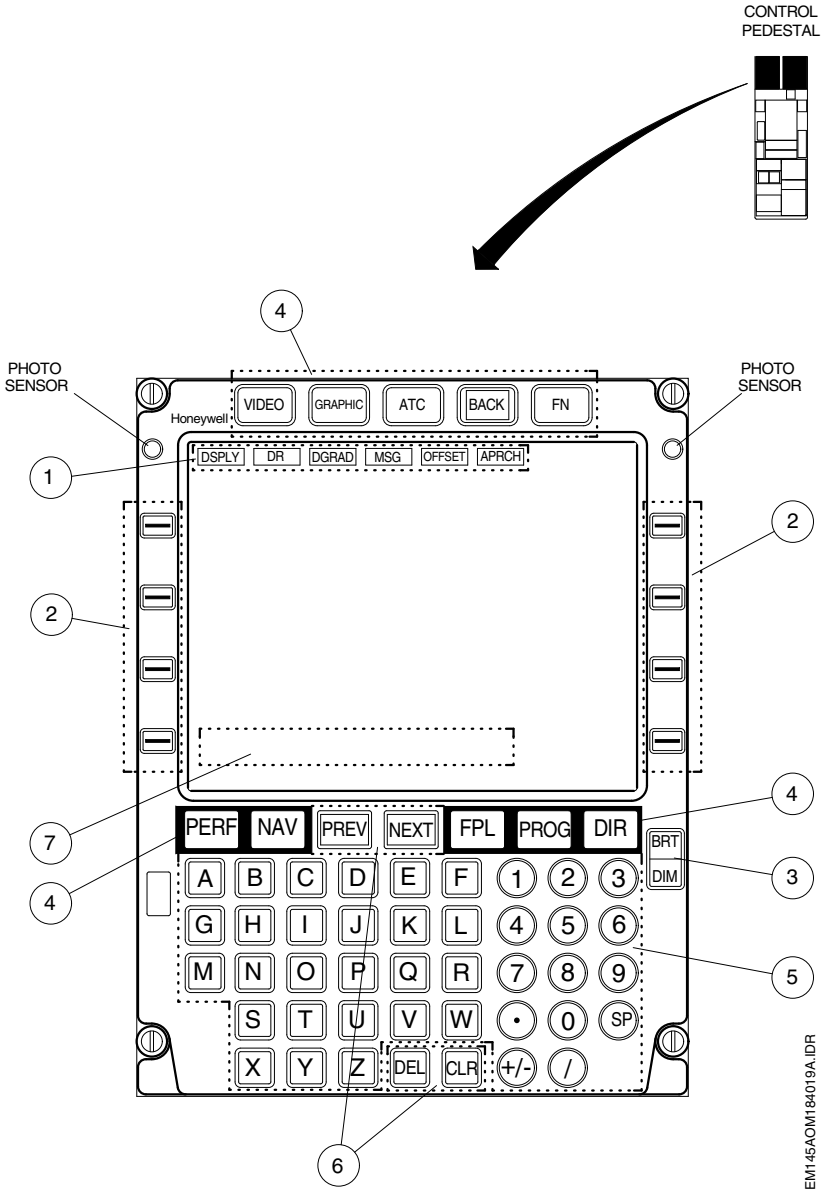

FMZ2010 FMS CD-820 CONTROL PANEL

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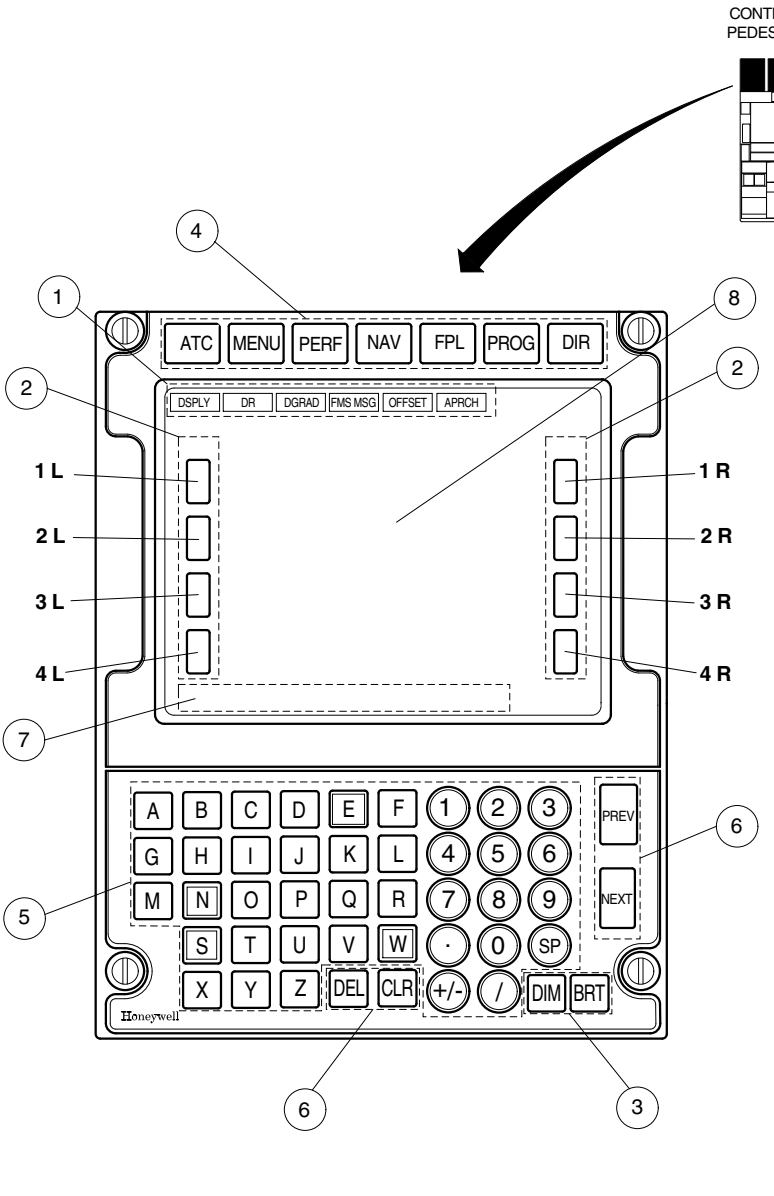

FMZ2010 FMS CD-830 CONTROL PANEL

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JOYSTICK (OPTIONAL)

The joystick functions are available through the joystick controller that is located on the control pedestal and through the selection of the MFD JSTK menu.

When the MFD joystick menu is selected, the joystick controller is available to control the Designator Symbol movement on the MFD FMS flight plan.

JOYSTICK OPERATION

On power-up, the designator is co-located with the present flight plan waypoint position.

If MAP mode is selected, moving the joystick controller, will cause the Designator Symbol to be displayed in blue color with a broken line which moves in the same direction from its last waypoint position.

If PLAN mode is selected, moving the joystick controller, the flight plan moves to the opposite direction from its last position, while the Designator Symbol remains fixed at the center of the plan format.

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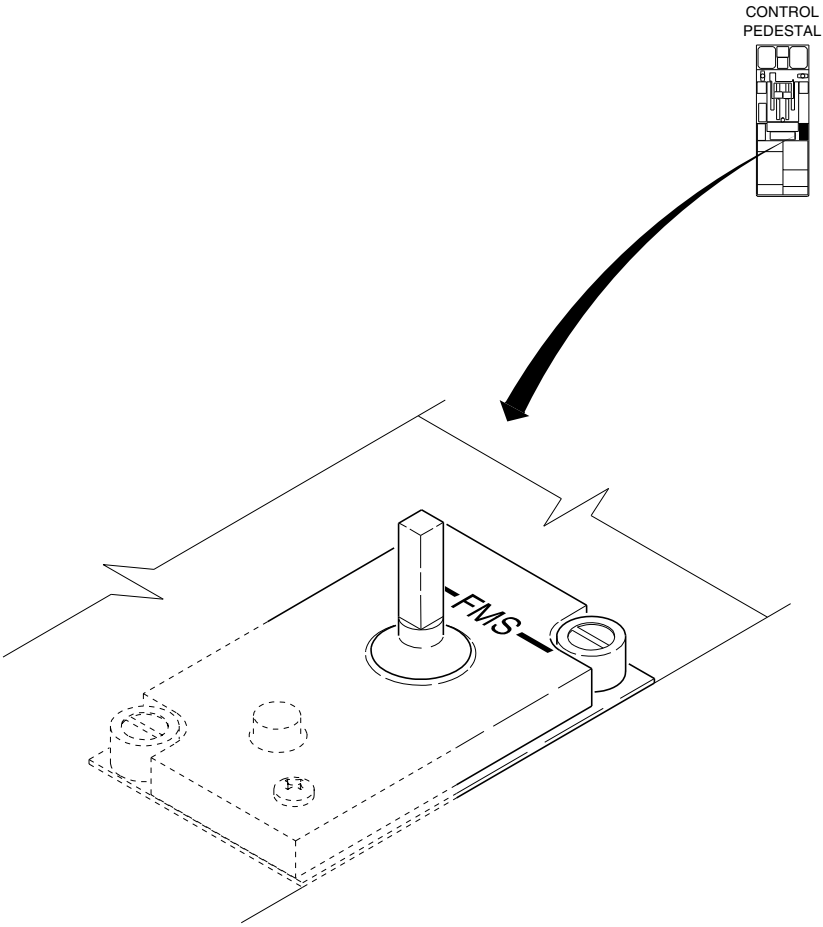

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JOYSTICK CONTROLLER

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JOYSTICK MENU BUTTONS FUNCTION AT MAP MODE

- SKIP ("SKP") button: Skips the designator to the position of the next waypoint in the flight plan in case of the designator is co-located with a plan waypoint. Otherwise, the designator broken line tail skips to the next waypoint in the flight plan.
- RECALL ("RCL") button: Positions the designator at the present position of the airplane and removes the designator box from the display in case of the designator is co-located with the flight plan waypoint. Otherwise, the designator is positioned over the waypoint from which the designator line is extended and the designator line is removed from the display.
- ENTER ("ENT") button: The latitude and longitude coordinates of the designator are transmitted to the selected FMS scratchpad as a requested waypoint.

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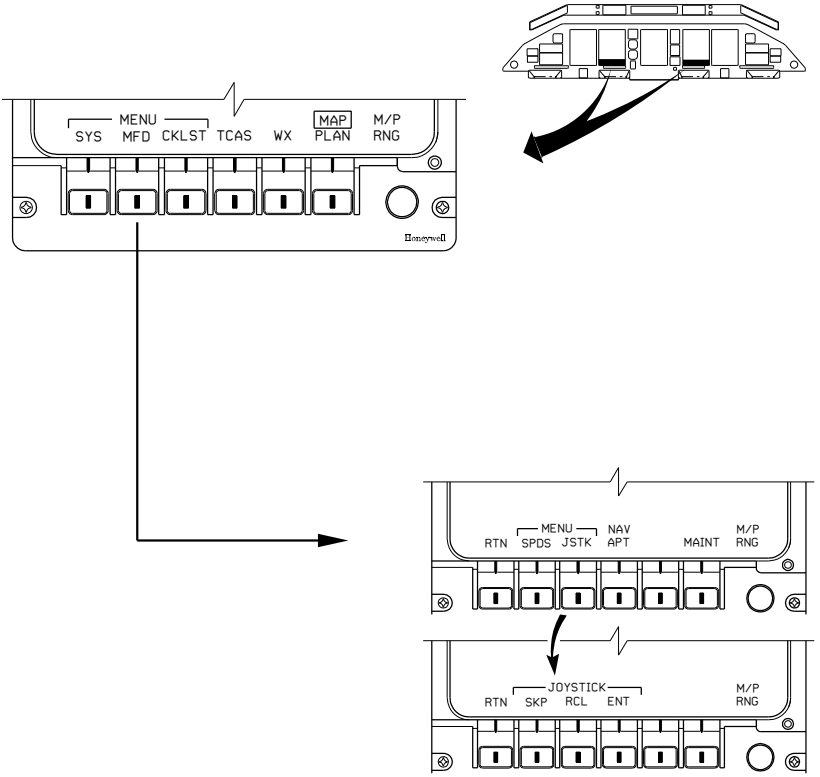

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MFD JOYSTICK MENU

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BAROMETRIC VERTICAL NAVIGATION (BARO-VNAV) (AIRPLANES POST-MOD. SB145-34-0125)

Vertical Navigation is an advisory only function in the FMS to aid the pilot during descents. With Baro-VNAV, the VNAV is coupled to the autopilot and flight director and provides vertical navigation targets to the Flight Guidance Computer (FGC). The Baro-VNAV provides vertical guidance for all phases of flight.

The VNAV function activates when the following conditions are met:

- Each FMS Position initialized,
- Performance initialized,
- Flight plan closed by entering the destination waypoint as the last waypoint in the flight plan,
- Altitude Preselect set,
- FMS as the primary source of navigation, and
- VNV pushbutton pressed.

BARO-VNAV COMPONENTS

The main components of the VNAV feature are the following:

- Flight Guidance Controller (GC-550),
- Integrated Computer (IC-600), and
- Flight Management System (FMS).

The selection of VNV pushbutton on the Flight Guidance Controller, arms the VNAV and, when it is already engaged, disengages the VNAV. Selection of VS, ALT, or SPD vertical submodes and go-around also disengages the VNAV.

NOTE: The VNAV engages automatically if already armed and the conditions for engagement are satisfied.

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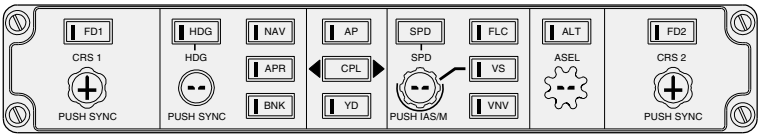

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GUIDANCE CONTROLLER PANEL (GC-550) WITH "VNV" BUTTON

The Flight Director uses the existing Flight Guidance Computer Vertical Mode control logic with the following targets and information supplied by the FMS:

- VNAV submode,
- Altitude targets,
- Airspeed/mach targets, and
- Vertical speed/angle targets.

The FMS determines which targets the FGC will fly. The FMS CDU and the PFD display the VNAV information.

For VNAV operation, at least one ADC and one IRS data must be valid.

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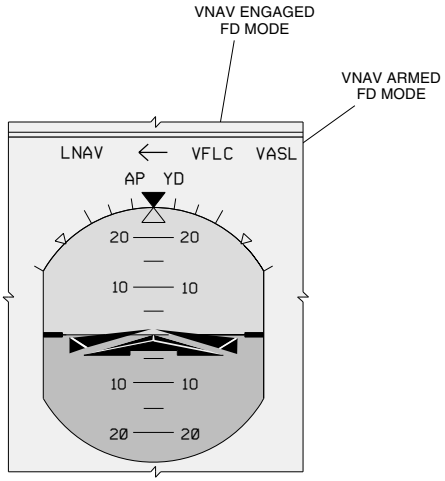
VNAV INDICATIONS

The indications related to VNAV are displayed on the PFD, MFD, EICAS, and CDU.

PFD INDICATIONS

The following figures show the indications on the PFD.



VNAV ARMED AND ENGAGED ON PFD

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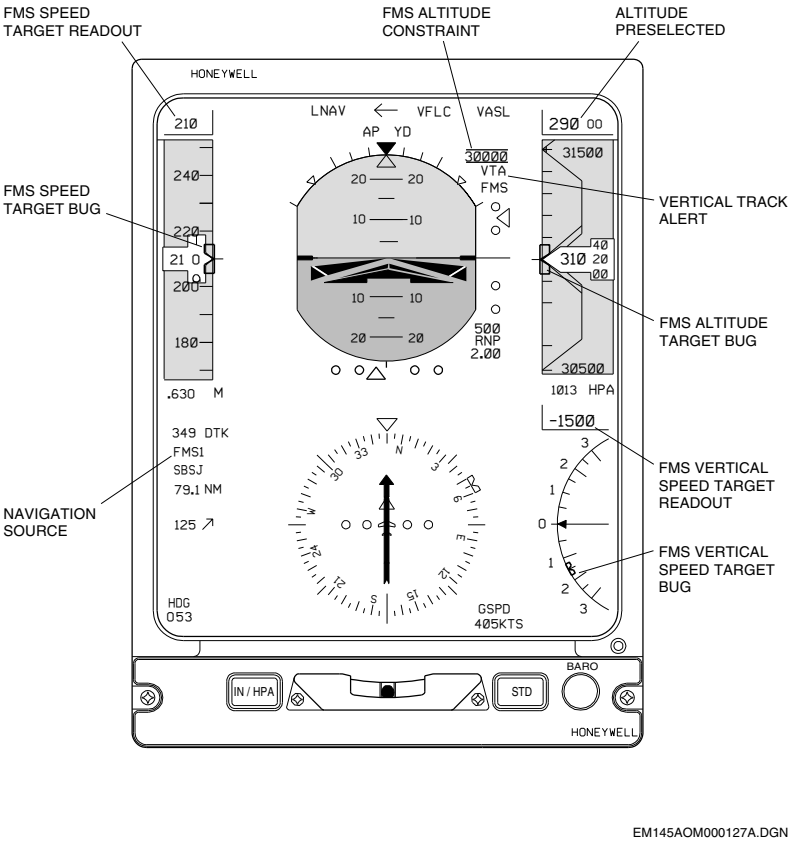

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FMS TARGET BUGS AND READOUTS

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The annunciation related to the VNAV on PFD is displayed in white for "VNAV Armed Mode" and magenta for "VNAV Engaged Mode". When VNAV is engaged, the speed target readout is also presented in magenta and its control is done by the FMS, not by the Speed Knob.

The altitude preselected is set via ASEL Knob on Guidance Controller Panel.

Altitude constraints are "AT", "AT or ABOVE", or "AT or BELOW". They are displayed in Magenta and in ft, with up to five digits and resolution of one foot. They are defined according to Navigation database procedures or flight crew commands on CDU. When the flight crew plan to be at a certain altitude or have a limitation at, below or above a certain altitude. The altitude constraint is not displayed in the PFD when it is equal to the preselector altitude.

A vertical track alert (VTA) is issued anytime the FMS commands a vertical track change. A VTA is issued 60 seconds before changing from level flight to either a climb or descent. When the airplane is completing a climb or descent, the vertical alert is issued 1000 ft before the level-off altitude. A vertical alert is not issued when the level-off altitude is equal to the preselected altitude. When the VTA (Amber) indication is displayed in the PFD, the VTA aural alert is also activated. The VTA aural alert consists in a single C chord.

The altitude alert is activated 1000 ft before the FMS altitude constraint, when this altitude is equal to the altitude constraint. The altitude alert consists in a double C chord.

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The following table contains the type of altitude constraints, descriptions, and indications on the PFD.

ALTITUDE CONSTRAINT	VNAV COMMAND	INDICATION ON PFD (I.E. 10000 ft)
AT	Fly to a specific altitude	10000
AT or ABOVE	Fly to a specific altitude or higher, not below	10000
AT or BELOW	Fly to a specific altitude or below, not higher	10000
WINDOW Constraint (during climb)	Fly to a specific range of altitude, not higher than upper limit, nor below lower limit	10000
WINDOW Constraint (during descent)		10000

NOTE: WINDOW Constraints can not be manually input on the flight plan, but they are present in specific departure procedures and SID, and also in specific approach procedures and STAR.

The FMS vertical deviation indication represents the deviation in feet from the airplane current position to the planned descent path. It has two dots above and two dots below the center mark. When the pointer is above the center mark, it indicates that the airplane is below the path. When the pointer is below the center mark, it indicates that the airplane is above the path.

The FMS Vertical Deviation Scale Factor changes as function to the FMS Phase on Flight Plan, according to the following table.

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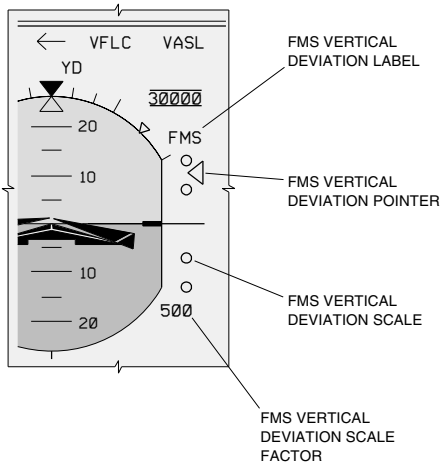
FMS PHASE ON FLIGHT PLAN	FMS VERTICAL DEVIATION SCALE FACTOR (ft)
Approach	150
Other Phases	500

The vertical deviation scale factor is the deviation related to two dots.

For instance, when the scale factor is 500 ft and the pointer is on the second dot above the center mark, the airplane is 500 ft below the planned descent path.



EM145AOM000128A.DGN

FMS VERTICAL DEVIATION INDICATION

EICAS

In the condition of VNAV failure, the CAS message "VERTICAL MODE OFF" (caution) is displayed. If already on final approach, the flight crew needs to perform a missed approach procedure.

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CDU

The scratchpad messages related to the VNAV are shown in the following table:

SCRATCHPAD MESSAGE	CONDITION
PERF-VNAV NOT AVAILABLE	Any of the PERFORMANCE INIT data is incomplete and VNAV armed is attempted. This message is displayed only in air.
RESET ALT SEL?	The FMS is commanding a change of altitude, but the altitude selector has not been reset. The airplane cannot change altitude until the selector has been reset.
UNABLE NEXT ALT	If the airplane is unable to meet the altitude constraint.
VERT DIR OVER MAX ANG	The angle computed during a VERTICAL DIRECT TO exceeds the limit (6°).
VERT DIR UNDER MIN ANG	The angle computed during a VERTICAL DIRECT TO is under the limit (1°).

The altitude constraint indications on the CDU are the following:

- An entry of 10000A (letter "A" following the altitude) indicates AT or ABOVE,
- An entry of 10000B (letter "B" following the altitude) indicates AT or BELOW, and
- An entry of 10000 (no letter following the altitude) indicates AT.

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VNAV SUBMODES

VNAV ARM (VNAV)

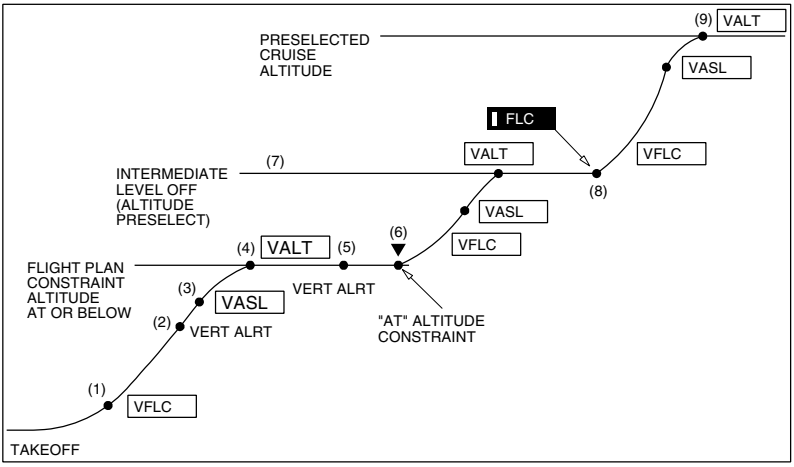
VNAV ARM becomes the active mode when the "VNV" button is pressed and the conditions for VNAV engagement are set. Using the position and altitude data, the FMS determines when to capture and which VNAV submode is correct. While in the armed mode, the FMS does not vertically control the airplane.

VNAV FLIGHT LEVEL CHANGE (VFLC)

In this mode, the Flight Guidance Computer (FGC) follows the FMS speed target readout, controlling the pitch of the airplane for both climb and descent.

When in other modes of VNAV, a transition to VFLC is made by setting the altitude preselector to other than current altitude and pressing the FLC button on the Guidance Controller Panel.

The elements of a VNAV climb profile are the following:



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VNAV CLIMB PROFILE

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An example of a VNAV climb profile consists of the following:

- VNAV is engaged in a VFLC airspeed climb after takeoff (1).
- 1000 ft before reaching the constraint altitude, a VTA is given (2).
- The flight guidance computer changes to VASL to capture the altitude constraint (3).
- The flight guidance computer changes to VALT at the constraint altitude (4).
- One minute before the constrained lateral waypoint is reached, a VTA is issued indicating an automatic climb begins at the waypoint.The altitude preselector is set higher than the constraint altitude (5).
- The FMS directs the Flight Guidance Computer to change to VFLC as the waypoint is passed (6).
- The flight guidance computer performs a normal level off at the intermediate altitude preselector changing from VFLC to VASL to VALT with the normal 1000 ft selector alert (7).
- ATC clearance is received to the cruise altitude and the selector is dialed to the cleared altitude. The "FLC" button is pushed to resume the climb (8).
- The flight guidance computer performs a normal level off at the cruise altitude changing from VFLC to VASL to VALT with the normal 1000 ft selector alert and the speed command changes to the cruise value (9).

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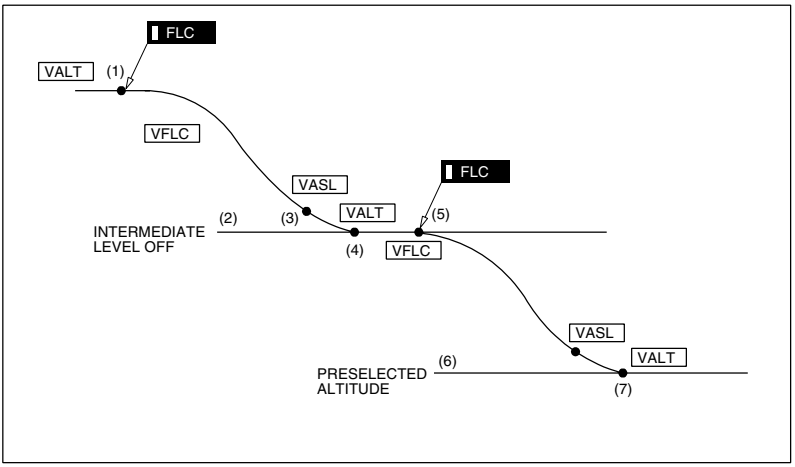
The elements of a VNAV FLC (IAS or MACH hold) descent profile are the following:



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VNAV FLIGHT LEVEL CHANGE DESCENT

A VFLC descent can be engaged at any time by using the following:

- From cruise altitude (1), dial down the altitude preselector to the ATC cleared altitude (2).
- Press "FLC" if already engaged in a VNAV mode or "VNV" if not already in VNAV. The flight guidance computer changes to VFLC and begins a descent (1).
- 1000 ft before the altitude preselected (2) is reached, the normal altitude alert is issued, and the flight guidance computer does a normal level off switching from VFLC to VASL (3) to VALT (4).
- An ATC clearance (5) is received to a lower altitude and the altitude preselector is lowered (6). "FLC" is pressed (5) and the airplane begins a descent.
- 1000 ft before the altitude preselector (6), the normal altitude alert is issued and the flight guidance computer does a normal level off switching from VFLC to VASL to VALT (7).

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– Excessive descent rate may be achieved if the programmed descent speed is higher than current cruise speed. Pilots must use the engine thrust to control the initial rate of descent.

VNAV ALTITUDE CAPTURE (VASL)

This mode is used to level the airplane at the VNAV supplied altitude target. The altitude target is either an altitude constraint or the altitude preselector setting. Preselector Altitude modification while in VASL results in a Flight Director Mode transition to VALT.

VNAV ALTITUDE HOLD (VALT)

This mode is the same as altitude hold. The FGC maintains altitude by controlling pitch. When VNAV is disengaged while in VALT, and lateral mode is not ROL, the flight director mode becomes PITCH HOLD, not altitude hold.

VNAV PATH (VPTH)

In this mode, VNAV controls the airplane along a geometric path downward to a waypoint altitude constraint. The path angle is either an FMS computed value, procedure specified, or pilot entered. The airplane is not going to fly below the altitude preselected.

VPTH default descent angle is part of performance initialization. However, after the angle is displayed for each waypoint, it is possible to the flight crew to change it as required, from 1 to 6 degrees.

The LNAV must be engaged for VPTH to be operational.

A VNAV path descent engages from VALT when the altitude preselector has been dialed down before the TOD point is reached.

The VNAV path descent mode is used to descend to a new flight level at a calculated or prescribed angle (from 1 to 6 degrees).

The VNAV angle is always displayed on CDU for path descents.

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The path is always followed, except when the airplane speed approaches the following:

- V_{MO}/M_{MO},
- Landing gear or flap placard speed, or
- V_{REF}.

VNAV tries to satisfy both the altitude preselector and the waypoint constraint altitude. However, VNAV never flies through the altitude preselector.

When using VPTH and a missed approach is executed, it is necessary to reset the altitude preselector to the missed approach altitude.

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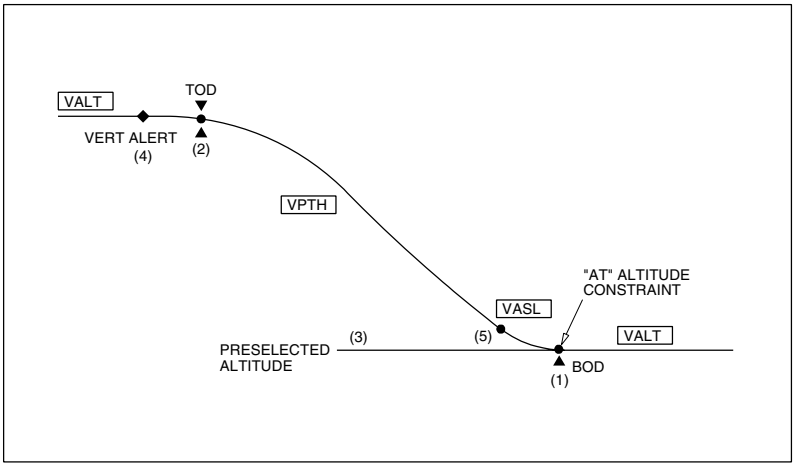
The steps of a VNAV path descent profile are the following:



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VNAV PATH DESCENT PROFILE

- An altitude constraint is entered at a waypoint (1).
- The FMS calculates an angle and TOD (2) for the path descent.
- The altitude preselector is set to the ATC cleared altitude (3).
- One minute before reaching the TOD, a VTA is issued (4) and the vertical deviation scale is displayed on the EFIS. If the altitude preselector is not at a lower altitude, the message "RESET ALT SEL?" is displayed on the FMS CDU.
- At the TOD, the flight guidance computer changes from VALT to VPTH and begins a descent (2).
- The flight guidance computer does a normal level off changing from VPTH to VASL (5) to VALT (1).

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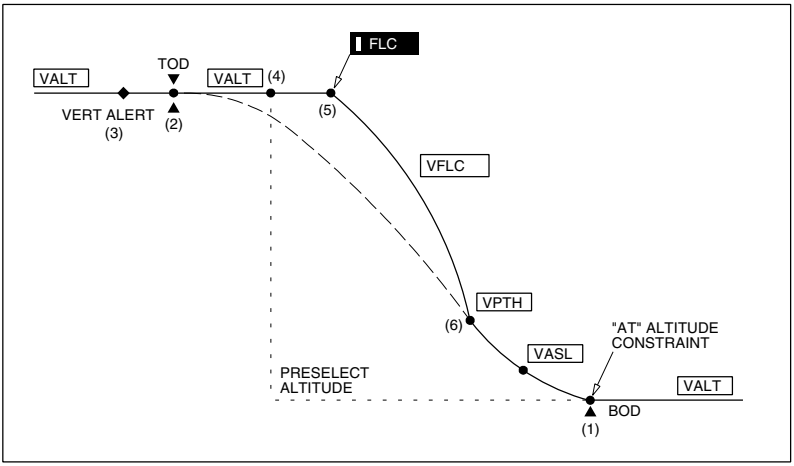
The scenario of a VNAV late path descent occurs when ATC has not given descent clearance by the time the TOD is reached. The steps are the following:



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VNAV LATE PATH DESCENT

- An altitude constraint is entered at a waypoint (1).
- The FMS calculates an angle and TOD (2) for the path descent.
- One minute before reaching the TOD, a VTA is issued (3) and the vertical deviation scale is displayed on the PFD.
- If the altitude preselector is not at a lower altitude, the message "RESET ALT SEL?" is displayed.
- When past the TOD and more than 500 ft above the path, the flight guidance computer remains in VALT.
- The altitude preselector is then set (4) to the ATC cleared altitude.
- Pressing the "FLC" button (5) begins descent.

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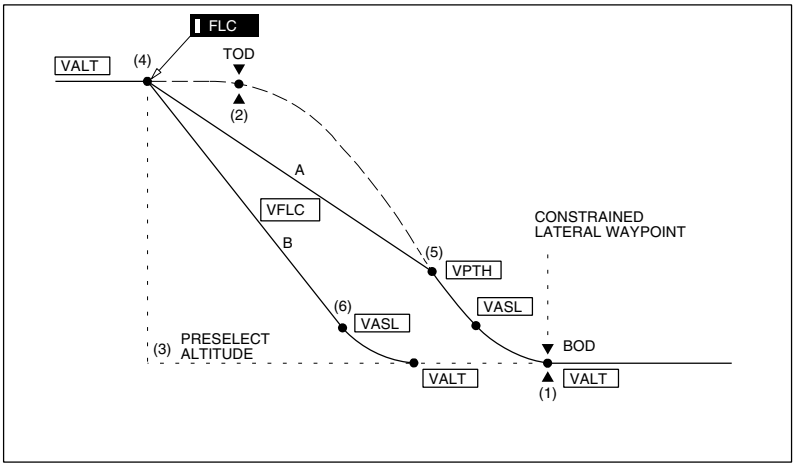
- The FMS issues a mode request to the Flight Director from to VALT to VFLC to begin the descent once engine thrust is reduced sufficiently. The descent rate in VFLC mode is governed by engine thrust and descent speed target (as specified in the Performance Initialization page). If the airplane is less than 500 ft from the path when the "FLC" button is pushed, the FMS switches directly to VPTH mode.
- When the path intercept criteria are satisfied the FMS issues a mode request to the flight director to change from VFLC mode to VPTH mode and continues the descent along the path (6).
- The flight guidance computer does a normal level off switching from VPTH to VASL and finally to VALT (1).

VNAV EARLY DESCENT TO CAPTURE PATH

An early descent to capture a path scenario occurs when ATC instructs a descent before the established TOD point is reached. The steps are the following:



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VNAV EARLY DESCENT TO CAPTURE PATH

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- An altitude constraint is entered at a waypoint (1).
- The FMS calculates an angle and TOD (2) for the path descent.
- The altitude preselector is set to the ATC cleared altitude (3).
- Pressing the "FLC" button (4) starts the descent.
- The FMS issues a mode request to the Flight Director from VALT to VFLC and begins to descend once engine thrust is reduced sufficiently. The descent rate in VFLC is governed by engine thrust and speed target (as specified in the Performance initialization pages).
- If the airplane is less than 500 ft from the path when the "FLC" button is pressed, the FMS changes directly to VPTH mode.
  - VFLC path "A" is followed when the airplane descent rate is relatively small (engine thrust is nearly proportional to the thrust required to maintain level flight at target airspeed).
    - Path intercept criteria are satisfied; the FMS issues a mode request to the flight director to switch from VFLC to VPTH mode and continues descending along the path (5).
  - VFLC path "B" is followed when the airplane descent rate is high (engine thrust is low relative to the thrust required to maintain level flight at target airspeed);
    - Path intercept criteria are not satisfied, the FMS continues descending in FLC mode until VASL is captured (6).
- A normal level off is performed changing from a VPTH or VFLC to VASL and finally to VALT (1).

VERTICAL DIRECT-TO

A vertical direct-to is performed to an altitude constraint at a waypoint in the flight plan and is used for climbs and descents. The altitude constraint must be in the flight plan before the vertical DIRECT-TO is executed. The airplane does not respond to the vertical DIRECT-TO unless the altitude selector is properly set above for climbs and below for descents.

When VNAV is engaged, the VNAV submode changes to VFLC for climbs or to VPTH for descents. All altitude constraints between the airplane and the selected constraint are removed from the flight plan. No lateral changes are made to the flight plan.

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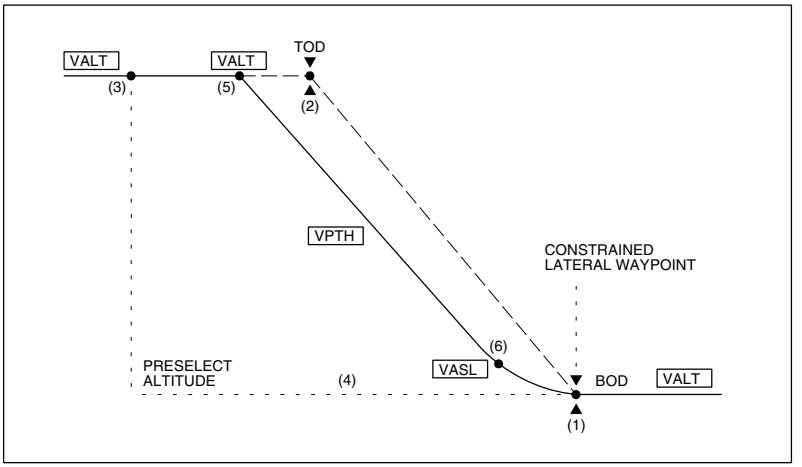
The steps for VNAV early path descent using vertical DIRECT-TO are the following:



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VNAV EARLY PATH DESCENT USING VERTICAL DIRECT-TO

- An altitude constraint is entered at a waypoint (1).
- The FMS calculates an angle and TOD (2) for the path descent.
- The altitude preselector is set (3) to the ATC cleared altitude (4).
- A vertical direct-to is performed (5) to the constrained waypoint (1).
- The FMS calculates the new descent path angle and the flight guidance computer transitions to VPTH.
- The calculated angle is limited from 1 to 6 degrees. When the actual angle is less than 1 or greater than 6 degrees, the FMS starts a descent to intercept the limiting angle of 1 or 6 degrees.
- The flight guidance computer does a normal level off, changing from VPTH to VASL (6) to VALT (1).

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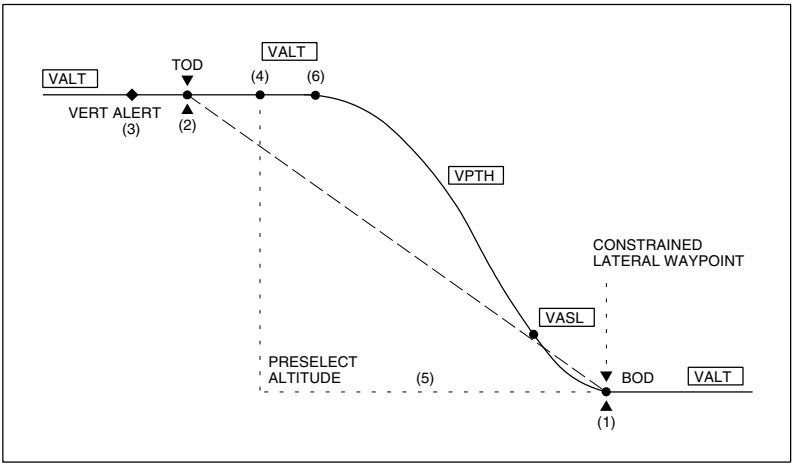
A VNAV late path descent using vertical DIRECT-TO scenario occurs when a descent clearance is not received before the TOD is reached. The steps are the following:



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VNAV LATE PATH DESCENT USING VERTICAL DIRECT-TO

- An altitude constraint is entered at a waypoint (1).
- The FMS calculates an angle and TOD (2) for the path descent.
- One minute before reaching the TOD, a VTA is issued (3) and the vertical deviation scale is displayed on the PFD.
- If the altitude preselector is not at a lower altitude, the message "RESET ALT SEL?" is displayed on the FMS CDU.
- At the TOD (2), the flight guidance computer remains in VALT and remains level through the TOD.
- The altitude preselector is set (4) to the ATC cleared altitude (5).
- A vertical DIRECT-TO is performed (6) to the constrained waypoint (1).
- The FMS calculates the angle and the flight guidance computer transitions to VPTH.
- The flight guidance computer does a normal level off, changing from VPTH to VASL to VALT (1).

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VNAV VERTICAL GLIDE PATH (VGP)

The Vertical Glide Path (VGP) permits crew management of the altitude preselector during FMS managed non-precision approaches. Lateral and Vertical guidance are provided to the runway threshold or missed approach point, whichever occurs first.

VGP mode is armed by pressing the approach "APR" button on the Flight Guidance Controller Panel and the following conditions occur:

- FMS1 or FMS2 selected as the primary navigation source on the Master Flight Director,
- An FMS-based approach has been selected in the active flight plan,
- The FMS is not in dead reckoning (DR) mode,
- A NDB angle to the MAP exists,
- Altitude and angle constraint values from the NAV DB have not been changed,
- When there is an altitude constraint on the Final Approach Fix (FAF), the airplane must be in ALT HOLD at the FAF altitude,
- No DIRECT-TO the MAP has been executed,
- FMS is not in degraded state of operation,
- Vertical path intercept occurs, and
- The airplane is within 50 NM of the destination.

VGP mode is captured when the following conditions occur:

- The VGP mode is armed,
- LNAV is active,
- The airplane, when holding, must be established on the inbound course to the FAF,
- The active waypoint is the FAF or along track distance to the FAF is less than 5 NM,
- The airplane is able to capture the final approach slope, and
- With a course reversal hold leg (HF) on the FAF, the airplane must be established inbound to the FAF and be exiting the hold.

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VGP is not captured until LNAV and VNAV are captured.

Preselector Altitude modification is permitted while "VGP" is captured. When it is modified while "VGP" is armed, it results in a transition to VASL (VNAV equivalent of ASEL) and ultimately VALT.

While VNAV respects the altitude preselector and levels off appropriately at the value set in the altitude preselector window, when "VGP" is engaged and the airplane descends, the FD ignores the preselected altitude (if below current altitude) and continues the descent to the runway. Then it is possible to set the preselector altitude to the missed approach altitude.

Descents in the VGP mode allow the flight crew to set the altitude preselector to the missed approach altitude without affecting the descent path.

VGP mode is automatically canceled when any of the VGP arming conditions is no longer true. A scratchpad message "VGP UNAVAILABLE" is displayed when the "APR" button is pressed and the arming criterion mentioned previously is not met. The message is self-clearing when the FAF is sequenced.

VNAV AND HOLDING OR ORBIT PATTERNS

There are some special considerations for holding and orbits during VNAV operation:

- When the holding or orbit pattern is entered while in VFLC, the airplane remains in VFLC and continues the climb or descent.
- When the holding or orbit pattern is entered while in VALT, the airplane remains in VALT.
- When a present position (PPOS) holding pattern is entered while in a path descent (VPTH), the VNAV changes to VFLC while in holding.

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- Path descents are not used during holding pattern operations. When the hold is entered while in VPTH, VNAV changes to VALT. To continue the descent, the pilot must manually select VFLC.
- If VNAV is engaged while executing a holding pattern course reversal on an approach, VNAV operates with VS targets (VPTH or VGP) to satisfy altitude constraints.
- Once established inbound on the final approach course, VNAV disregards the holding altitude constraint.
- VNAV guidance is provided in holding patterns and procedure turns to arrive at the Final Approach Fix (FAF) on the final approach descent path.

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GO-AROUND OPERATIONS (MISSED APPROACH PROCEDURE)

The Go-Around is initiated through the TO/GA buttons on the throttles. If either button is pushed, the following sequence occurs:

- FMS outputs the missed approach waypoints to the EFIS.
- The FD vertical engaged mode cancels VNAV mode and transitions to the GA mode.
- The FD lateral engaged mode transitions to ROL (Wings Level) and LNAV arm unless:
  - Radar Altitude < 200 ft (LNAV arm is delayed until RA > 200 ft), or
  - LNAV is already the active lateral mode (if LNAV is previously engaged, it remains engaged upon GA activation).
- Once engaged, the ROL mode remains as the active mode until the LNAV captured logic is satisfied. If the current heading is divergent to the FMS flight plan, the pilot must change the airplane heading manually to intercept the FMS flight plan.

NOTE: When LNAV arms and the FMS is set or it is manually set as the primary source of navigation, the LNAV engages as soon as the engagement criteria are satisfied.

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SPEED COMMAND

The FMS is capable of controlling the airplane speed during departure, climb, cruise, descent, approach, and go-around.

The Speed Command manages the airplane speed under the following methods:

- Automatic: The FMS automatically changes the speed command throughout the flight to accommodate airplane configuration and phase of flight,
- Waypoint Speed Constraint: The FMS changes the speed command to cross a waypoint at a specified speed constraint, and
- Speed Intervention: Allows the pilot to enter into the FMS a specified speed to fly. While flying the specified speed, the FMS continues to provide Speed Protection.

SPEED PROTECTION

The FMS provides two types of speed protection:

- Speed Reversion: Automatic transition from VPTH to VFLC.
- Latched Speed: Automatic transitions from one submode of VNAV to another.

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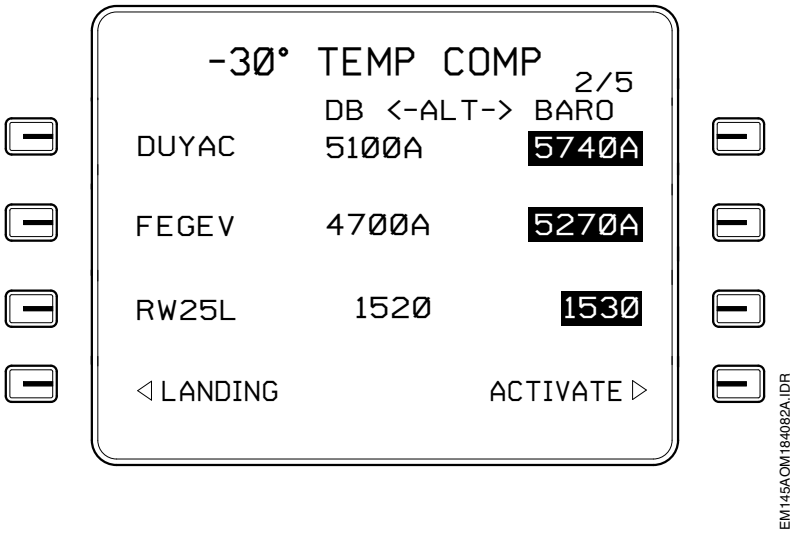
TEMPERATURE COMPENSATION

With Baro-VNAV, the FMS includes the Temperature Compensation function. It provides temperature compensated VNAV altitudes during operations in nonstandard temperatures. When a vertical path is defined using barometric altitude, the FMS supplies temperature compensation capability for the altitude constraints. It is available for all the waypoints in departure, approach, approach transitions, and missed approach segments of the flight plan.

The flight crew must compensate for temperature effects on minimum altitude or decision altitude. If temperature compensation is not activated, the flight crew must adhere to temperature limits of the procedure.

NOTE: Before employing temperature compensation, the flight crew must coordinate the use of the feature with ATC. Failure to do so could result in a loss of vertical separation with other traffic.



TEMP COMP PAGE

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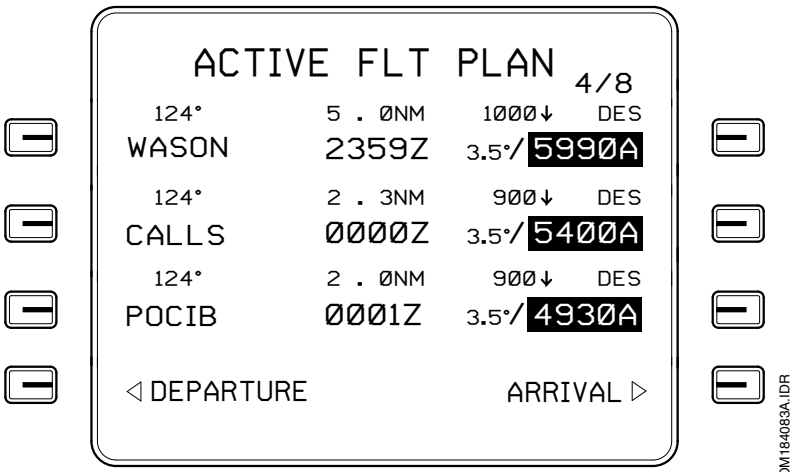
The TEMP COMP page list the waypoints in the flight plan that has altitude temperature correction applied. All the waypoints in departure, approach, approach transitions, and missed approach segments of the flight plan are included on this page.

The altitudes in the BARO column lists the corresponding temperature compensated altitude values. If a waypoint does not have a navigation database altitude constraint, the DB and BARO fields are blank. Temperature compensation is activated by pushing 4R (ACTIVATE) on the TEMP COMP page. When temperature compensation is active, the temperature compensated altitudes are displayed in reverse video on the ACTIVE FLT PLAN pages.



ACTIVE FLT PLAN PAGE WITH TEMPERATURE COMPENSATED ALTITUDE CONSTRAINTS

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REQUIRED NAVIGATION PERFORMANCE (RNP)

RNP operation is the ability of the airplane navigation system to monitor the navigation performance it achieves and inform the crew if the requirement is not met during an operation. The FMS receives navigation data from various sensors on board the airplane and chooses the sensors providing the most accurate airplane position. The sensors used by the FMS are listed in priority order as follows: GPS, DME-DME, and VOR-DME. In case of sensor failure, the FMS will automatically switch to the next available sensor following the priority order as described.

The FMS includes pages where the flight crew can set and/or monitor the progress of RNP parameters and new messages for RNP operations, which will be displayed on CDU scratchpad together with an amber annunciation "MSG" on the PFD.

The user interface is achieved through system controls (CDU scratchpad), alerting functions (PFD, CDU)), and for airplanes Post-Mod. SB145-34-0125 also indications on PFD. These functions provide the means for system initialization, flight planning and progress monitoring, active guidance control, and presentation of navigation data for flight crew situational awareness.

RNP INDICATIONS

The RNP functionality includes indications on FMS CDU scratchpad. For airplanes Post-Mod. SB145-34-0125 there are indications also on the PFD.

FMS CDU INDICATIONS AND ALERTS

The FMS provides the following RNP alerts and advisories on the CDU scratchpad and triggers the MSG annunciation on PFD:

– DEGRADE Alert – The degrade annunciation will be triggered when the EPU reaches a value higher than the RNP. The indication DGRAD is lit on CDU. For airplanes Post-Mod. SB145-34-0125 the PFD displays the DGR indication in amber.

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– UNABLE RNP Alert – The UNABLE RNP message is displayed and the DEGRADE annunciator is lighted when EPU is higher than RNP or when horizontal integrity limit (i.e., RAIM) receiver autonomous integrity monitoring is higher than the integrity alarm limit.

The maximum time required for the FMS to annunciate Degrade and Unable RNP alerts is based on the phase of flight. These times are described on the following table:

PHASE OF FLIGHT	TIME TO ALARM
Approach	6 seconds
Departure/Arrival/Missed Approach	6 seconds
Enroute	24 seconds
Remote	54 seconds

– UNABLE RNP NEXT WP Alert – This message alerts the crew that the current EPU exceeds the RNP required at the next waypoint.

– PILOT RNP CANCEL NEXT WP Alert – The alert PILOT RNP CANCEL NEXT WP is displayed when the pilot entered (i.e., manual) RNP is automatically canceled. This occurs when the airplane is within the waypoint sequence alert distance and the RNP on the next leg is less than the current, pilot entered RNP.

– PILOT RNP CANCELED Alert – The alert PILOT RNP CANCELLED is displayed when the active waypoint has a smaller RNP than the pilot entered RNP.

– GPS RAIM ABOVE LIMIT Alert – The alert GPS RAIM ABOVE LIMIT is displayed when global positioning system (GPS) is required and the RAIM value is above the limit.

NOTE: The FMS does not provide an indication to the crew of an excessive lateral (cross-track) deviation. Lateral deviation is not considered in the display of the RNP integrity alert. It is the pilot's responsibility to monitor lateral deviation and take appropriate action to ensure the airplane follows the flight plan with minimal error.

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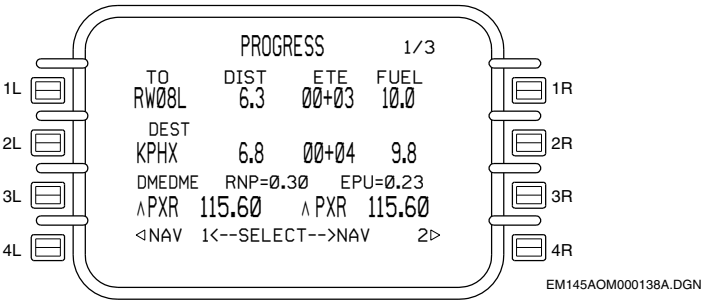

FMS PROGRESS WITH RNP INFORMATION

RNP OPERATION

The RNP value used by the system is based on the following priority order:

- Manual entry,
- Navigation database specified, or
- Phase of flight default.

The RNP number can be manually entered on FMS by accessing the SET RNP page. If a valid manually entered RNP value is higher than the RNP value for the current phase of flight results in display of the CONFIRM ENTRY reverse video prompt at CDU.

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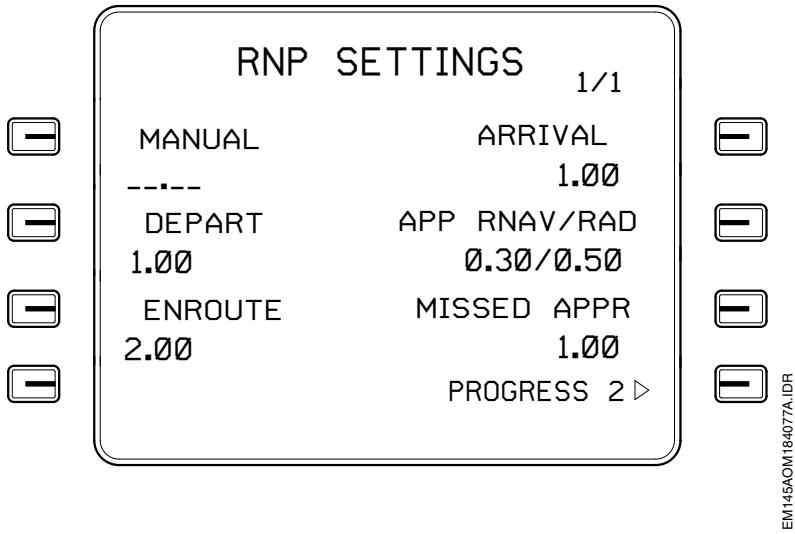

RNP SETTINGS PAGE

The default values for each phase of flight are:

- Departure = 1.0
- En route = 2.0
- Arrival = 1.0
- Approach = 0.3
- Missed approach = 1.0
- Oceanic/remote = 2.0

When the crew entries a manual override RNP value, it is retained until the flight plan is cleared, or completed, unless automatically canceled or manually deleted. When there is no entry, dashes are displayed.

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PFD INDICATIONS (AIRPLANES POST-MOD. SB145-34-0125)

RNP Label: The RNP label is displayed always in white on PFD whenever the RNP indications are displayed.

Lateral Deviation Scale Factor: The Lateral Deviation Scale Factor (RNP value) represents a designation for the navigational performance accuracy required (for example, RNP 0.3, RNP 1.0, and so on) at any given time. It is displayed in magenta on PFD under normal conditions. The Lateral Deviation Scale Factor is provided by the FMS or entered manually. When the Lateral Deviation Scale factor is invalid, it is displayed as four amber dashes.

Lateral Deviation Scale: The lateral deviation scale consists of one centered tick mark and two dots on each side of the center tick mark and is displayed in white under normal conditions. The center tick mark represents the center of the airplane desired track. The two dots represent the lateral deviation in NM in relation to the lateral deviation scale factor (for instance, 2x dots = 1x RNP).

Lateral Deviation Pointer: The Lateral Deviation Pointer represents the current airplane lateral deviation in relation to the central tick mark. The pointer is displayed as a magenta "triangle" that moves in relation to the center tick mark to the right or to the left corresponding to the airplane lateral deviation. The FMS also sets the course deviation indicator (CDI) sensitivity based on the RNP value. The CDI is set such that two dots of cross track deflection are equal to the RNP value.

Estimated Positioning Uncertainty (EPU): The EPU is a measure in NM which conveys the current position estimation performance. The EPU is not an estimate of the actual error, but a defined statistical indication of potential error. The EPU is displayed graphically on PFD as magenta horizontal lines and winglets attached to the lateral deviation pointer. The initial position of the winglets is the center of the lateral deviation pointer and it expands to the left and right or retracts as the EPU value increases or decreases. The Lateral Deviation Pointer and EPU move as a group to the left or right in accordance to the airplane lateral deviation in NM. If EPU is invalid, the Lateral Deviation Pointer is displayed as a red X.

Vertical Deviation Scale Factor: The Vertical Deviation Scale Factor indicates the airplane vertical current position relative to the desired track and is displayed in magenta every time the vertical deviation scale is displayed.

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Vertical Deviation Scale: The Vertical Deviation Scale is displayed in magenta on the PFD in feet. It is only displayed when the airplane enters into any path descending modes. With engaged VNAV mode the vertical deviation scale reference is displayed in amber and flash in the condition of deviation exceedance. Vertical scaling changes according to the phase of flight, according to the following table.

PHASE OF FLIGHT	VERTICAL DEVIATION SCALE
Approach	75 ft/dot
Ground Departure Airborne Enroute Oceanic/Remote Arrival Missed Approach	250 ft/dot

FMS POS Monitor: The FMS position comparison monitor provides an indication to the flight crew that there is a difference between the pilot and copilot FMS present position. The FMS position monitor is activated when the FMS position difference in nautical miles exceeds the RNP value. The FMS POS annunciation is displayed in amber on PFD.

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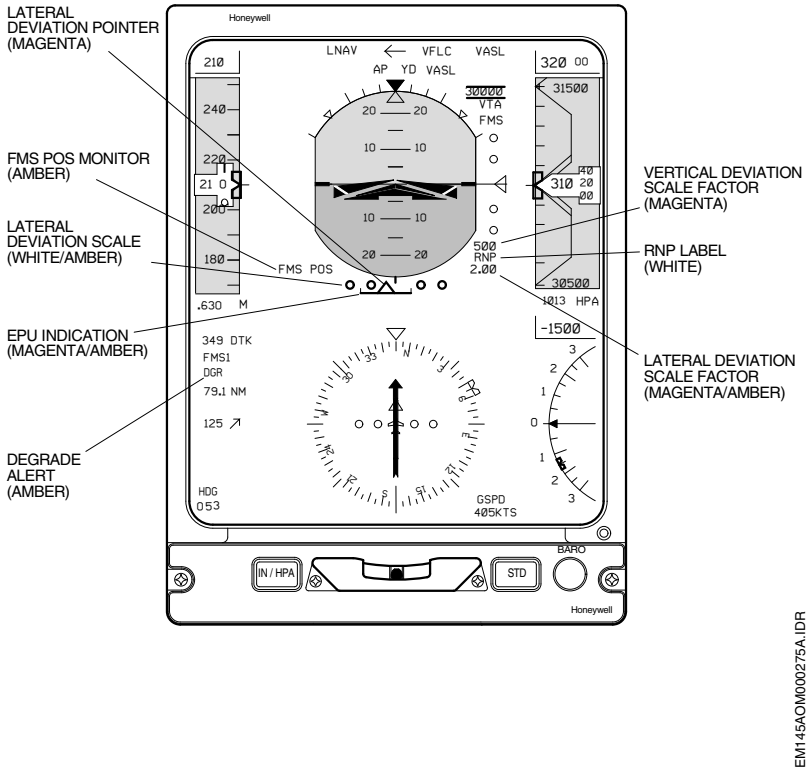
The RNP indications on PFD are illustrated in the following figure:



RNP INDICATIONS ON PFD

Exceedance Indications: When the EPU value is higher than the current applicable RNP value, the Lateral Deviation Scale, Lateral Deviation Scale Factor, EPU, and Lateral Deviation Pointer turn into amber and flashes for 5 seconds than become steady on PFD.

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An example of exceedance condition and indication in the following figures:

RNP = 1.0, EPU = 0.5, LAT DEV = 0.3

RNP = 1.0, EPU = 1.0, LAT DEV = 0

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RNP SYMBOLOGY IN NORMAL AND EPU EXCEEDANCE CONDITIONS

The same indications return to the original colors when the exceedance condition is not present anymore.

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LOCALIZER PERFORMANCE WITH VERTICAL GUIDANCE (LPV) (AIRPLANES POST-MOD. SB145-34-0125)

Localizer Performance with Vertical Guidance (LPV) are approach procedures based on SBAS (Satellite-Based Augmentation System), also known by WAAS (Wide Area Augmentation System).

SBAS is intended to enable airplane to rely on GPS for all phases of flight, including precision approaches to any airport within its coverage area.

When LPV approach mode is active, the SBAS-enabled GPSs calculate the path deviations (lateral and vertical axes) which are displayed on the PFD.

The lateral and vertical deviation data for LPV approaches are the angular deviations of the airplane from the glide path for the approach defined by the Final Approach Segment (FAS) data block. The angular deviation is calculated from the Runway Threshold to simulate the angular deviation provided by an ILS glideslope. The FMS uses the lateral and vertical deviation data provided by the GPS to compute the lateral and vertical steering commands necessary for the guidance to capture and track the LPV path.

LPV APPROACH LOADING

The LPV approach information is stored in the FMS Navigation Database (NDB) and is selected through FMS CDU.

When an LPV approach is available for a runway, the FMS indicates the SBAS/LPV approach in the CDU ARRIVAL page by displaying:

- The SBAS Channel,
- The Selected Approach Reference ID, and
- The ACTIVATE prompt.

The flight crew shall load the LPV approach to be flown and press the VNV button then press the APR button on guidance controller (GC-550) to arm and perform the LPV approach.

Once active, the LPV indications (status, lateral and vertical deviations) are removed only by performing a Go-Around or proceeding to land.

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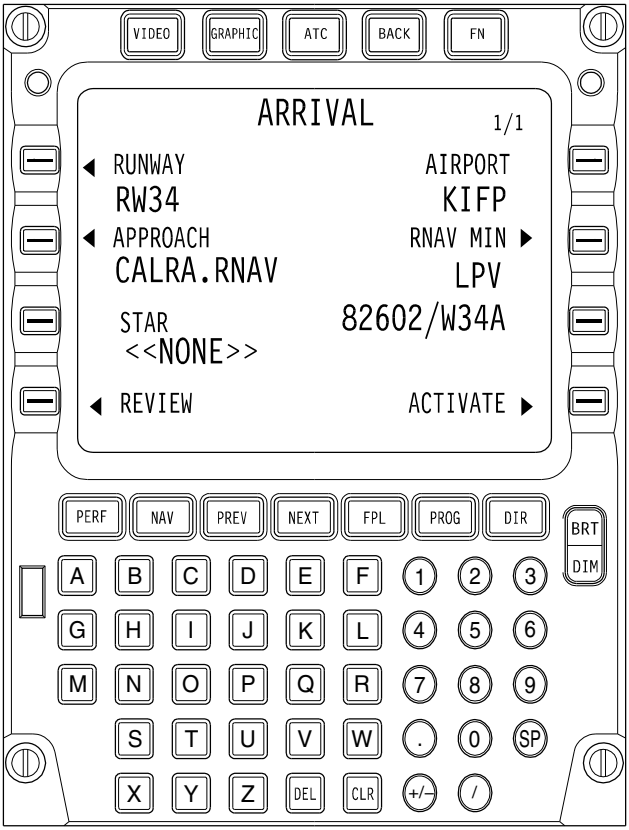

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CDU ARRIVAL PAGE

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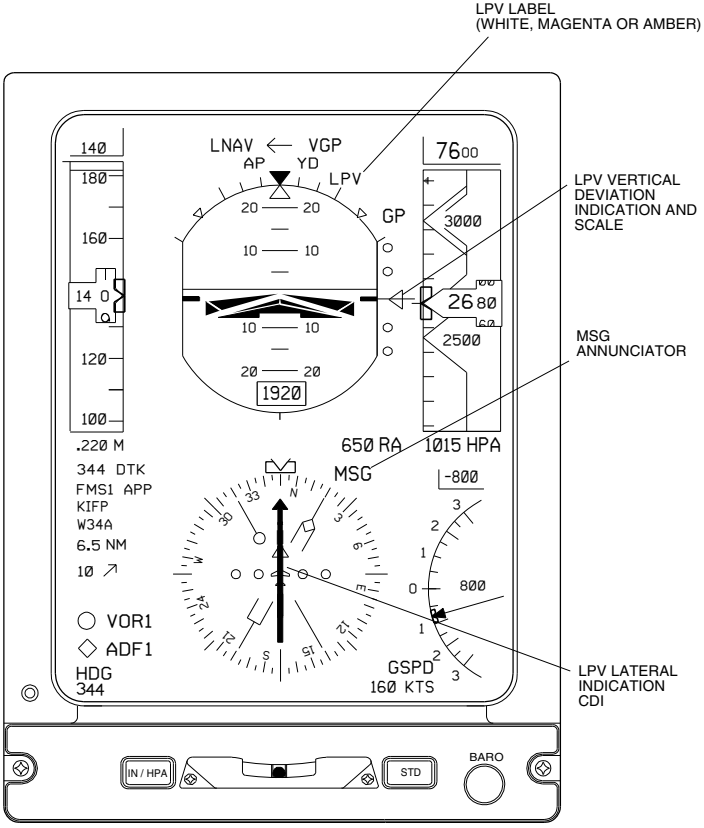
LPV INDICATIONS



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LPV INDICATIONS ON PFD

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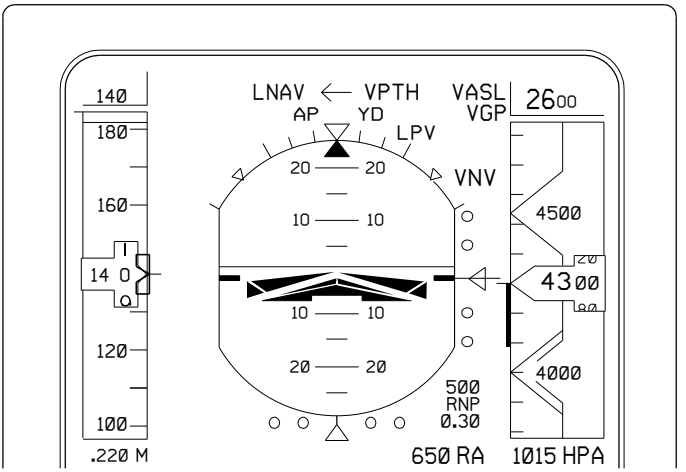
LPV ARMED ANNUNCIATION

The LPV Approach Annunciation "LPV" is displayed in White, indicating LPV Armed, when the airplane is within 30 NM of the destination. No crew action is required in this mode.



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LPV ARMED ANNUNCIATION

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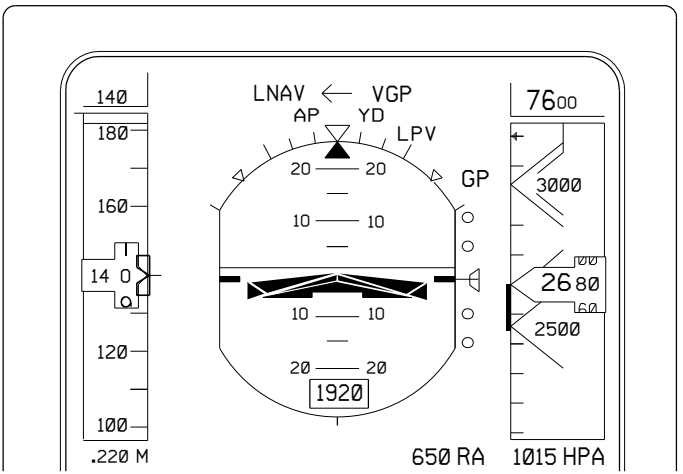
LPV ACTIVE ANNUNCIATION

The LPV Approach Annunciator "LPV" is displayed in magenta, on PFD indicating LPV is active when the FMS sets the Approach annunciator approximately 2 NM before the Final Approach Fix (FAF). The magenta "LPV" annunciation flashes for 5 seconds and then remains steady.The LPV active indication alert the flight crew that the computed lateral and vertical deviations for the final approach segment are provided by the SBAS sensor.

When the LPV is Active, all RNP symbology (when applicable) is removed from the PFD.



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LPV ACTIVE ANNUNCIATION

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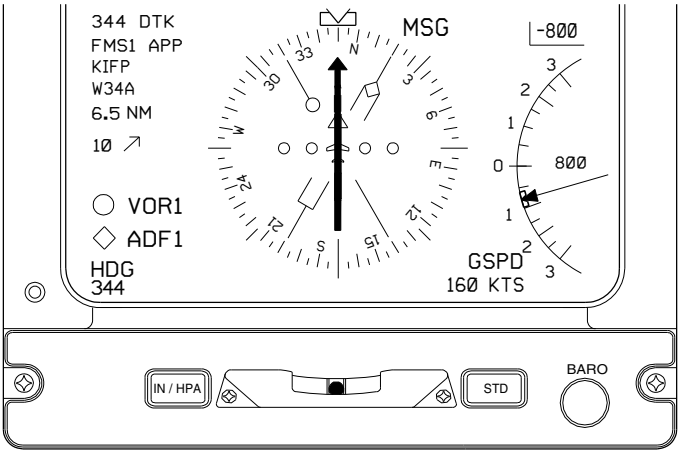
FINAL APPROACH SEGMENT (FAS) DATA BLOCK

The Airport Identifier, Approach Reference ID, and the distance to the Runway Threshold are displayed in magenta when LPV is active, and positioned below the FMS APP annunciation in the lower left portion of the PFD.

The Channel Identifier is not displayed on the PFD. It is only presented in the arrival page in the CDU.



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FAS APPROACH AND AIRPORT IDENTIFIER

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LPV UNAVAILABLE ANNUNCIATION

The LPV Approach Annunciator "LPV" is displayed in Amber on the PFD to indicate that the LPV approach is unavailable. When the LPV mode is unavailable, the annunciator turns Amber and flashes for 10 seconds and then remains steady. The Flight Director changes to basic mode (ROL and PIT).

If LPV status transitions to "Unavailable", the system displays the vertical deviation scale with a red-X, regardless of FMS vertical deviation data validity.

NOTE: Due to the system architecture, when the LPV becomes unavailable, the LPV amber indication and vertical deviation with Red-X may not be displayed (LPV indication is removed and Vertical deviation shows the Baro-VNAV linear deviations), however the flight director changes to basic mode.

If LPV is Unavailable on the Coupled PFD, AFCS disallows guidance panel selection of the APR or VNV buttons by the flight crew in order to prevent re-entry into VNAV.

When the "LPV" is unavailable, the flight crew needs to reload an approach with non-LPV minima. If already on approach, the flight crew needs to perform a missed approach.

It is possible to select the FMS1/GPS1 or FMS2/GPS2 as source for the Flight Director Guidance using the CPL pushbutton on the Guidance Controller Panel (GC-550). However, LPV indications will not be displayed if the navigation source is copied (FMS2 is selected on PFD1 or FMS1 is selected on PFD2).

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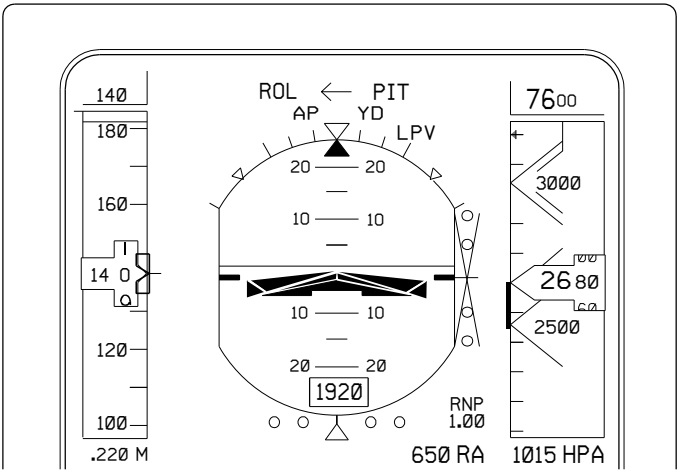

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LPV UNAVAILABLE ANNUNCIATION ON PFD

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LPV ALERTS AND ADVISORY MESSAGES

The following LPV Alerts/Advisory CDU scratchpad messages illuminate the "MSG" annunciator on the PFD. The conditions that generate the scratchpad messages are the following:

- **LPV UNAVAIL-USE LNV/VNV:** The LPV UNAVAIL-USE LNV/VNV message is displayed in white in the CDU scratchpad when:
  - The Approach Mode is "LPV Approach", and
  - All GPS are reporting SBAS invalid.

  The flight crew must select and use an approach with non-LPV minimum. If already on approach, perform a missed approach.

- **LPV UNAVAIL-LPV LOAD-1:** The LPV UNAVAIL-LPV LOAD-1 message is displayed in white in the CDU scratchpad when all the following conditions are met:
  - FAS data block message from FMS is not received by GPS (FAS data block transmission from FMS not successful).

  The flight crew must select and use an approach with non-LPV minimum. If already on approach, perform a missed approach.

- **LPV UNAVAIL-LPV LOAD-2:** The LPV UNAVAIL-LPV LOAD-2 message is displayed in white in the CDU scratchpad when either of the following conditions are met:
  - The SBAS Service Provider ID in the FAS Data Block does not match the SBAS Service Provider ID from the source selected GPS receiver, and
  - The Channel ID in the FAS Data Block does not match the Channel ID from the source selected GPS receiver.

  The flight crew may try to reload the approach a second time. If second try is not successful, select and use an approach with non-LPV minimum. If already on approach, perform a missed approach.

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MISSED APPROACH FOLLOWING AN LPV APPROACH

During an LPV approach, a missed approach is selected by pressing the GA button or selecting the missed approach prompt on the CDU.

The following takes place when a missed approach is initiated:

- The FMS becomes the source for lateral and vertical deviation indications,
- The LPV approach status display is removed and;
- The FAS data block is cleared from memory.

LPV INACTIVE STATUS

When an LPV approach is inactive, no "LPV" annunciation is displayed on the PFD. LPV inactive provides indication to the crew that the LPV approach is either not loaded (if an LPV approach was not selected on the CDU), or that the distance to destination for the loaded LPV approach is greater than 30 NM.

If, for any reason, the LPV is operationally not available or operationally not allowed to be used, the pilot will need to select RNAV MIN at Line Select Key (LSK) 2R, and then select a different type for the approach with non-LPV minima.

EGPWS MODE 5 ALERTING

An EGPWS Mode 5 alerting for the LPV Approach is also generated in case of an excessive downward vertical deviation within the mode 5 alerting window.

LPV MISCOMPARE MONITORS

The LPV system incorporate lateral and vertical deviation miscompare monitor that will check for miscomparisons between displayed deviation data on each PFD, where a miscompare results in an amber alert message on the PFD.

If either the LPV lateral deviation or the LPV vertical deviation miscompare monitor trip, the annunciation GPS in amber will be displayed in the same location as the existing LOC/GS/ILS indications on the PFD (for the localizer/glideslope comparison monitors).

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AUTOMATIC DEPENDENT SURVEILLANCE - BROADCAST (ADS-B) OUT

INTRODUCTION

NOTE: ADS-B OUT information is applicable only to airplanes Post-Mod. SB 145-34-0118 or Post-Mod. SB 145DGR-34-0002 or equipped with an equivalent modification factory incorporated.

The use of ADS-B Out provides accurate information and frequent updates to airspace users and controllers. It supports improved use of airspace, reduced ceiling restrictions, visibility restrictions, improved surface surveillance, and enhanced safety through the conflict management.

ADS-B Out is a function of the transponder that allows broadcast of information provided by the following sources:

- ADC: Airspeed, Barometric Pressure Setting and Altitude, Vertical Rate;
- GPS: Latitude, Longitude, East and North Velocity, GNSS Altitude and Track angle (Compliant with TSO-C145 and TSO-C146);
- IC-600: Selected Altitude;
- IRS: Magnetic Heading;
- TCAS: Active Resolution Advisories, Multiple Threat Encounter, TCAS Operational Status, Threat Identity Data (Altitude, Bearing, Range and Identifier);
- RMU: Call Sign/Flight ID, Emergency Code, Surveillance Status;
- Strap Module: Emitter Category, ICAO address, Aircraft Length and Width;
- Transponder: Navigation Accuracy Category (Position and Velocity), Altitude and Vertical Rate Sources, Airspeed Type (IAS or TAS), Track Angle or Heading, TCAS Resolution Advisory Active.

The ADS-B Out is automatically active whenever the transponder is not in standby mode or not failed.

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The ADS-B Out functionality does not change the existing transponder functions, such as Mode A/C, Mode S, Mode S Elementary Surveillance, and Mode S Enhanced Surveillance. The flight crew interfaces with the transponder remain unchanged with the addition of ADS-B Out function.

The ADS-B OUT function may be degraded or unavailable in case of GPS outages, GPS fail or transponder fail. The RMU ATC/TCAS CONTROL page and MAIN TUNING page provide the ADS-B OUT function status.

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