

TRAINING MANUAL

Embraer ERJ-190 Series (GE CF34) B1.1 and B2 (-sub) categories

AIRPLANE GENERAL (ATA 05 – ATA12)

Level 1



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TABLE OF CONTENTS

DOCUMENTATION	6
	6
DOCUMENTATION ACCESS	8
AMM PART I - SYSTEM DESCRIPTION SYSTEM (SDS)	
AMM PART II - MAINTENANCE PRACTICES AND PROCEDUR	ES (MPP)
AIRCRAFT MAINTENANCE TASK ORIENTED SUPPORT	SISIEIVI
	14
	14
	10 19
	20
WIRING MANUAL (WM)	20
AIRCRAFT II I USTRATED PARTS CATALOGUE (AIPC)	22
STRUCTURAL REPAIR MANUAL PART 1 (SRM 1)	26
STRUCTURAL REPAIR MANUAL PART 2 (SRM 2)	
OTHER DOCUMENTATION	
ATA 05 TIME LIMITS AND MAINTENANCE CHECKS	
INTRODUCTION	52
SCHEDULED MAINTENANCE CHECKS	52
UNSCHEDULED MAINTENANCE CHECKS	55
ATA 06 DIMENSIONS AND AREAS	56
INTRODUCTION	56
DESCRIPTION	58
ATA 07 AIRCRAFT JACKING	76
INTRODUCTION	76
COMPLETE AIRCRAFT JACKING	78
BEFORE COMPLETE AIRCRAFT JACKING	80
JACKING POINTS LOCATION	82
NOSE AND MAIN GEAR JACKING POINTS	84
ATA 08 LEVELING AND WEIGHING	
ATA 09 TOWING AND TAXIING	

INTRODUCTION	92
TOWING WITH TOWBAR	94
TOWING OPERATION	96
TOWBARLESS TOWING	98
TAXIING REGULATIONS	100
ATA 10 PARKING AND MOORING	102
INTRODUCTION	102
MINIMUM DISTANCES	104
NORMAL AIRCRAFT PARKING	106
LONG TERM PARKING	110
MOORING THE AIRCRAFT	112
ATA 11 PLACARDS AND MARKINGS	114
	114
ATA 12 SERVICING	116
INTRODUCTION	116
REPLENISHING	118
FUEL TANK SERVICING	120
HYDRAULIC AND LANDING GEAR SYSTEM SERVICING	122
ENGINE AND AUXILIARY POWER UNIT SERVICING	124
SERVICING WATER/WASTE	126
GASEOUS SERVICING	128
SCHEDULED SERVICING	130
UNSCHEDULED SERVICING	132



TABLE OF FIGURES

DOCUMENTATION	7
DOCUMENTATION ACCESS	9
AMM PART I – SDS EXAMPLE	11
AMM PART II – MPP EXAMPLE	13
AMTOSS CODES AND SUBDIVISION	15
AIRCRAFT MAINTENANCE MANUAL	17
FAULT ISOLATION MANUAL USED AWITH AIRCRAFT CMC (CENT	RAL
MAINTENANCE COMPUTER)	19
RMM AND CMM	21
WIRING MANUAL AND SYSTEM SCHEMATIC MANUAL	23
AIRCRAFT ILLUSTRATED PARTS CATALOGUE (AIPC)	25
SRM 1	27
SRM 2, DAMAGE REPORT FORM EXAMPLE	29
SRM 2 USAGE	31
EXAMPLE OF ARM AND ITEM	33
EXAMPLE OF NDT MANUAL	35
EMB 190 AND 195	37
FUSELAGE AND AIR CONDITIONING PACKS	39
COCKPIT AND CABIN SECTION	41
SEAT CAPACITY	43
LANDING GEAR	45
TURNING RADIUS	47
CF34-10E HIGH BYPASS TURBOFAN ENGINES	49
AIRCRAFT DATA	51
CHAPTER 05	53
HORIZONTAL MEASUREMENTS	57
AIRCRAFT MEASUREMENTS EMB 190	59
AIRCRAFT MEASUREMENTS EMB 195	61
AIRCRAFT DOORS	63
FUSELAGE STATIONS	65
WING STATIONS	66
HORIZONTAL STABILIZER STATIONS	67
VERTICAL STABILIZER STATIONS	68

POWERPLANT AND PYLON STATIONS	69
MAJOR AIRCRAFT ZONES	71
SUB-ZONES	73
ACCESS PANELS IDENTIFICATION	75
LANDING GEAR JACKING , JACKING POINTS	77
COMPLETE AIRCRAFT JACKING	79
CG POSITION	81
JACKING POINTS LOCATION	83
MAIN AND NOSE GEAR JACKING POINTS	85
WEIGHING PROCEDURES	87
WEIGHING THE AIRCRAFT, WEIGHING KIT AND JACKS OR G	ROUND
SCALES	
AIRCRAFT LEVELING	91
CHAPTER 9 TOWING AND TAXIING	93
GROUND TOWING REQUIREMENTS (EXAMPLE)	95
BEFORE TOWING	97
TOWBARLESS USING GSE 200 OR GSE 422	
TAXI REGULATIONS	101
TYPES OF PARKING	103
MINIMUM DISTANCES	105
NORMAL AIRCRAFT PARKING	107
NORMAL AICRAFT PARKING IN COLD WEATHER CONDITIONS	109
LONG TERM PARKING	111
MOORING THE AIRCRAFT	113
EXTERIOR SCREED – PRINTED MARKINGS	115
CHAPTER 12	117
REPLENISHING	119
FUEL TANK SERVICING	121
HYDRAULIC AND LANDING GEAR SYSTEM SERVICING	123
ENGINE AND APU SERVICING	125
WATER WASTE SERVICING	127
GASEOUS SERVICING	129
SCHEDULED SERVICING	131
UNSCHEDULED SERVICING	133



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DOCUMENTATION

INTRODUCTION

All maintenance checks, inspections, repairs, replacements and troubleshooting must be performed in accordance with valid documentation. The related documentation necessary to maintain the aircraft includes:



	TECHNICAL PUBLICATION	REVISION	CUSTOMIZATION
AIPC	Aircraft Illustrated Parts Catalog	Monthly	Always
AMM	Aircraft Maintenance Manual	Quarterly	Always
ARM	Aircraft Recovery Manual	Semiannually	On request
APM	Aircraft Planning Manual	Semiannually	On request
CMM	Component Maintenance Manual	Semiannually	Not Applicable
CPC	Consumable Products Catalog	Semiannually	Not Applicable
CPM	Corrosion Prevention Manual	Annually	Always
FIM	Fault Isolation Manual	Quarterly	Always
ITEM	Illustrated Tool and Equipment Manual	Quarterly	On request
IGFER	Instruction for Ground Fire Extinguishing and Rescue	Semiannually	On request
MFEP	Maintenance Facility&Equipment Planning	Semiannually	On request
MPD	Maintenance Planning Document	Annually	On request

	TECHNICAL PUBLICATION		CUSTOMIZATION
NDT	Nondestructive Testing Manual	Annually	Always
PIL	Parts Information Letter	As required	Not Applicable
PPBM	Power Plant Buildup Manual	Quarterly	Not Applicable
RMM	Ramp Maintenance Manual	Quarterly	Always
SB / IB	Service / Information Bulletin	As required	Not Applicable
SNL	Service News Letter (SNL)	As required	Not Applicable
SWPM	Standard Wiring Practices Manual	Semiannually	On request
SM	Standards Manual	Semiannually	Not Applicable
SRM	Structural Repair Manual	Quarterly	Always
SSM	System Schematic Manual	Semiannually	Always
TCS	Task Card System	-	Always
WM	Wiring Manual	Quarterly	Always

DOCUMENTATION



DOCUMENTATION ACCESS

Access to the available Aircraft Documentation is given in different ways. Generally the data can be available in digital or hardcopy format. Digital data can be available via CD/DVD, Server Access or through the Internet.

Internet access is given via the FlyEmbraer Technical Publications tool under: www.flyembraer.com

FlyEmbraer offers a user-friendly interface with easy navigation, a search tool, filtering capabilities and features for downloading, updating and distributing.



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🖶 🏟 🤯 Maintenance Publications, Parts Publications and Service Bulletins	슯	Ŀ	NDT-1936 - DOORS	11 KB	
🖷 🧌 🚘 SB - Service Bulletin	슯		NDT-1936 - PART 5-52 - TABLE OF CONTENTS	46 KB	
🛱 🧌 📴 IB - Information Bulletin	숡		NDT-1936 - PART5-52-10-00-211-801 - FORWARD PASSENGER-DOOR STRUCTURE, HANDLE	133 KB	
🖶 🏟 🚘 SNL - Service News Letters			BOX AND VENT VALVE - INTERNAL		
A Pile - Parts Information Letters	1		NDT-1936 - PART5-52-10-00-211-802 - AFT PASSENGER-DOOR STRUCTURE, HANDLE BOX	137 KB	
B	会		NDT-1936 - PART5-52-10-00-212-801 - FORWARD PASSENGER DOOR STOPS AT FUSEI AGE -	161 KB	
🗟 🏟 🚘 AMM-(Part I) 1933 - System Description Section		_	EXTERNAL		
	슯		NDT-1936 - PART5-52-10-00-212-802 - AFT PASSENGER DOOR STOPS AT FUSELAGE -	161 KB	
■ chi Cart 1) 2558 - System Description Section	4			02 KB	
월 술 🔄 AMM-(Part II) 1933 - Aircraft Maintenance Manual	5-0		NDT-1930 - PARTS-52-10-00-213-801 - FORWARD PASSENGER DOOR STOPS AT DOOR -	93 KB	
	슯		NDT-1936 - PART5-52-10-00-213-802 - AFT PASSENGER DOOR STOPS AT DOOR - INTERNAL	128 KB	
■ ŵ Ca AMM-(Part II) 2558 - Aircraft Maintenance Manual	숡		NDT-1936 - PART5-52-10-00-214-801 - FORWARD PASSENGER DOOR STOPS AT DOOR AND	160 KB	
■ 🙀 🔁 APM-1997 - Arront Planning Manual			FUSELAGE - EXTERNAL		
CARAM-2415 - Aircraft Recovery Manual	1		NDT-1936 - PART5-52-10-00-214-802 - AFT PASSENGER DOOR STOPS AT DOOR AND FUSELAGE - EXTERNAL	159 KB	
GORM - Component Maintenance Manual Vendor - Embraer 1/0/1/5/190/195	会		NDT-1936 - PART5-52-10-00-214-803 - FORWARD PASSENGER DOOR STRUCTURE HANDLE	49 KB	
W = CPC-1841 - Consumable Products Catalogue		_	BOX AND VENT VALVE - EXTERNAL		
Gen Argan Control of Prevention Manual	슯		NDT-1936 - PART5-52-10-00-214-804 - AFT PASSENGER DOOR STRUCTURE, HANDLE BOX	48 KB	
a CPM-240 - Cultosion Prevention Manual	÷			150 KP	
a Controllar Controllar Controllar Controllar		-	EXTERNAL	135 105	
a CFIM-2402 - Fault Isolation Manual	슯		NDT-1936 - PART5-52-10-00-214-806 - AFT PASSENGER DOOR STOPS AT DOOR - EXTERNAL	133 KB	
	슯		NDT-1936 - PART5-52-20-00-211-801 - OVERWING EMERGENCY DOOR STRUCTURE AND	79 KB	
G GFER-1925 - Instructions for Ground Fire Extinguishing and Rescue			HANDLE BOX - INTERNAL		
A Call TEM-1586 - Illustrated Tool and Equipment Manual	1		NDT-1936 - PART5-52-20-00-213-801 - OVERWING EMERGENCY DOOR STRUCTURE AND HANDLE BOX - INTERNAL	75 KB	
🖷 👷 🔤 MFEP-2412 - Maintenance Facility and Equipment Planning	슯		NDT-1936 - PART5-52-20-00-214-801 - OVERWING EMERGENCY DOOR STRUCTURE AND	75 KB	
🖷 🙀 🔄 MPD-1935 - Maintenance Planning Document		_	HANDLE BOX - EXTERNAL		
🖷 🙀 🔄 MPD-2403 - Maintenance Planning Document	슯		NDT-1936 - PART5-52-20-00-214-802 - OVERWING EMERGENCY DOOR STRUCTURE AND	77 KB	
🖷 🍦 🚞 MPD-2557 - Maintenance Planning Document	4			111 1/0	
🖷 🏟 🚘 MRB-1928 - Maintenance Review Board Report			AND VENT VALVE - INTERNAL	TTRD	
🕴 🛱 🌮 NDT-1936 - Nondestructive Testing Manual	슯		NDT-1936 - PART5-52-30-00-211-802 - AFT CARGO STRUCTURE, HANDLE BOX AND VENT	116 KB	-
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DOCUMENTATION ACCESS



AMM PART I - SYSTEM DESCRIPTION SYSTEM (SDS)

Purpose:

- Detailed description and explanation of the location, configuration, function, operation and control of the complete system (chapter), and its subsystems.
- Enable the operator / mechanic / trainee to understand the three levels of overall construction, operation and function to the extent necessary to perform adequate maintenance and fault isolation of the system.

Available links: FIM, AIPC, ITEM, MPP, SM, SSM, WM.

Arrangement:







EM170SDS240043.DGN

lost.



AMM PART II - MAINTENANCE PRACTICES AND PROCEDURES (MPP)

Purpose:

Contains all necessary maintenance practice and procedure data to enable the mechanic to maintain the aircraft properly, at the level of line, hangar / service centre maintenance actions, or line ramp level.

Available links:

WM, AIPC, CMM, SWPM, CPM, FIM, MPP, SDS, SM, SRM, SSM, ITEM.

Arrangement:

PAGEBLOCKS							
4	Ą	Ą	Ą	Ą	Ą	Ą	4
COMPONENT	MAINTENANCE	SERVICING	REMOVAL	ADJUSTMENT	INSPECTION	CLEANING	REPAIRS
LOCATION	PRACTICES		INSTALLATION	TEST	CHECK	PAINTING	
(100)	(200)	(300)	(400)	(500)	(600)	(700)	(800)





AIRCRAFT MAINTENANCE MANUAL *EFFECTIVITY: ALL* Integrated Drive Generator (IDG) - Removal/Installation Figure 401 - Sheet 1



EFFECTIVITY: ALL

- 1. General
 - A. This section gives the procedures to remove and install the IDGs.
 - B. IDG 1 is installed on the left engine gearbox and IDG 2 is installed on the right engine gearbox.
 - C. The procedures in this section are given in the sequence below.

TASK NUMBER	DESCRIPTION	EFFECTIVITY
24-21-01-000-801-A	Integrated Drive Generator (IDG) - Removal	ALL
24-21-01-400-801-A	Integrated Drive Generator (IDG) - Installa- tion	ALL

D. The abbreviations and acronyms used in this section are given in the sequence below:

ABBREVIATION	DESCRIPTION	
°C	Degree Celsius	
°F	Degree Fahrenheit	
AC	Alternating Current	
IDG	Integrated Drive Generator	
lb.in	Pound Inch	
LH	Left-Hand	
MCDU	Multifunction Control Display Unit	
N.m	Newton Meter	
RH	Right-Hand	
SSPC	Solid State Power Controller	



AMM PART II – MPP EXAMPLE



MAINTENANCE PRACTICES AND PROCEDURES (MPP)

The AMM provides sufficient information to enable a mechanic to service troubleshoot, test, adjust and repair systems and to remove and install any component on the line or in the hangar. This AMM is written in accordance with the ATA 100 Revision 28 recommendations. Revision 28 has, among other things, these two recommendations

- Simplified English
- Prepared for AMTOSS (Aircraft Maintenance Task Oriented Support System)

AIRCRAFT MAINTENANCE TASK ORIENTED SUPPORT SYSTEM (AMTOSS)

AMTOSS eases maintenance procedures by giving the specific procedure (task) and the primary steps of procedures (sub tasks) a different number identification code.

The identification code numbers have a minimum of five elements and a maximum of seven. The elements are:

- > An extension to the three ATA 100 Chapter, section and subject numbering.
- After the first three elements a function code will follow. This code identifies the type of work that has to be done.
- The fifth element shows the task or sub task identification number. This number is applicable to the task/sub task only and is counting the sequence of the task or sub task. Numbers 801 thru 999 are for tasks and 001 thru 800 for sub tasks.
- The sixth element identifies the differences in configuration and the related procedures and techniques.
- Tasks/sub tasks that are special to the operator, or which are written by sub contractors are identified in the seventh element.

FUNCTION CODES

The function codes used in AMTOSS are from 000 thru 900. Each code represents the following function:

- > 000 Removal
- > 100 Cleaning
- > 200 Inspection/Check
- > 300 Repair
- > 400 Installation
- ➢ 500 Material Handling
- > 600 Servicing, preserving, lubrication
- > 700 Testing
- > 800 Miscellaneous,e.g.rigging, fault isolation
- 900 Change Removal and installation

Each of the codes represents the task. The codes are subdivided to identify the tasks or sub tasks following. The page below shows the application of the function codes 400.

Further information is found in the AMM Introduction section.





NOTE: SUBTASK ARE THE MAINTENANCE ACTIONS REQUIRED TO ACCOMPLISH A TASK. UNIQUE

IDENTIFIERS FOR SUBTASK FUNCTIONS SHALL COMMENCE AT 001 AND TERMINATE AT 800.

AMTOSS CODES AND SUBDIVISION



AIRCRAFT MAINTENANCE MANUAL

Division of Subject Matter:

The first section of the AMM is the "Introduction".

This section provides an introduction to the manual and instructions how to use the manual correctly. It is strongly recommended to read this section of the manual.

The introduction section also includes a list of the chapters that are included in the manual.

Each chapter has the following items filed at the front:

- Effectivity Code Cross Reference List
- Highlights page(s) for each revision
- List of Effective Pages
- List of Effective Temporary Revisions
- Service Bulletins
- Table of Content

Effectivity:

Effectivity Codes are used in the AMM to allow many operators with different configuration aircraft to correctly apply the manual to their aircraft. The effectivity is shown in the lower left hand corner of each page in the AMM. The following are the effectivities used:

- > MASTER
- > ALL OPERATORS
- An operators prefix e.g. "LX" (Swiss)
- An "E" Code (E + a number, e.g. E26-018)

If a chapter has one or more pages with an E code, there will be a green "Effectivity code cross reference list" in the beginning of the chapter. This list identifies the aircraft serial numbers that are affected by the E-code.

An Effectivity box may have more information, e.g. "Collins", to point out an item that differs in configuration.

MASTER:

Always means a "master" manual. It is possible for an operator to have a master manual.

ALL:

"All" is always shown together with an operator prefix or "ALL OPERATORS" in the box. Example:

EFFECTIVITY: ALL LX

In this case, it means that the page applies to all LX aircraft. EFFECTIVITY: ALL OPERATORS This page applies to all aircraft. E Codes: The E code is shown together with MASTER or an operator prefix. Example:

EFFECTIVITY: E26-018 MASTER

If a chapter has one or more pages with an E code, there will be a green "Effectivity code cross reference list" in the beginning of the chapter. This list identifies the aircraft serial numbers that are affected by the E code.



EFFECTIVITY: OPERATORS	24-21-01	General Page 401 Dec 08/03
EFFECTIVITY: LX	24-21-01	General Page 401 Dec 08/03
EFFECTIVITY: E 26 018	24-21-01	General Page 401 Dec 08/03

AIRCRAFT MAINTENANCE MANUAL



FAULT ISOLATION MANUAL (FIM)

Purpose:

- Provides summarized information and procedures to isolate and repair faults of the aircraft, in order to avoid or reduce dispatch delays and improve the dispatch reliability. It will at all times give sensible and practical fault diagnosis to the users of this publication.
- The Fault Reporting Section of the FIM provides means to effectively report failures of the aircraft to the maintenance crew using the appropriate fault codes and nomenclature. By doing this, communication time and errors are reduced and fault reporting and fault history consistency and accuracy are increased.
- The procedures in this FIM were not prepared to cover intermittent faults. However, if you have an intermittent fault, you should search on the FIM a troubleshooting procedure that corresponds to this intermittent fault and try to troubleshoot it, but only if your airline's policies for intermittent faults allow you to do so. If you do not solve the fault, please contact EMBRAER Technical Support Department.

Available links: AMM, WM, AIPC.

The Fault Isolation Manual covers these faults:

CAS Messages

These are the messages displayed on the CAS message window of the EICAS display. CAS messages are displayed on the cockpit displays to tell the flight crew of any problem with the aircraft or any other conditions of the aircraft. Each CAS message has a unique 8-digit fault code. The category and color of the message are defined according to its criticality:

- Warning (Red)
- Caution (Amber)
- Advisory (Cyan)
- Status (White)

Observed Faults

Observed faults are problems that may be sensed by the flight crew or by the ground crew and are not annunciated by the CAS. Each observed fault has an unique 8-digit fault code.

Cabin Faults

Cabin faults are the problems or malfunctions which can occur with the systems and equipment in the passenger cabin area. Each cabin fault has an unique 8-digit fault code.

Maintenance Messages

Maintenance messages are those stored in the Central Maintenance Computer (CMC), that help to find the cause of a CAS message or any other fault. Each maintenance message has an unique 11-digit fault code.

The CMC receives fault reports from several aircraft systems. It processes the data received and shows the applicable maintenance message on the CMC screen on the MFD 2 or on the screen of a PC connected to the Local Area Network (LAN). Maintenance messages can be CAS-correlated or uncorrelated. When a CAS message is shown to the flight crew and there are correlated maintenance messages, the CMC will show the CAS and the correlated maintenance message(s).

The purpose of maintenance messages is to give information that help the troubleshooting routine and are not necessarily related to the need of an immediate maintenance action.









FAULT ISOLATION MANUAL USED AWITH AIRCRAFT CMC (CENTRAL MAINTENANCE COMPUTER)



RAMP MAINTENANCE MANUAL (RMM)

Purpose:

Provides information which can improve the ground handling and avoid delays when difficulties are encountered for the dispatchability, at ramp level.

Arrangement:

COMPONENT MAINTENANCE MANUAL (CMM)

Purpose :

Provides information and procedures applicable to a workshop environment for the return of a component to a serviceable condition.

Arrangement:



ATA 05 – ATA12 **AIRPLANE GENERAL**

ELEB



LIEBHERR COMPONENT MAINTENANCE MANUAL

Energy Sources (3)

> Energy Sources for Testing in the Hydraulic Test Bench Table 1006

190-70980

IDENTIFICATION	QTY	CHARACTERISTICS
Dynamic Test Bench	1	Range: 0 to 34.5 MPa (0 to 5000 psi) Flow Rate: 0 to 75.7 l/mim (0 to 20 GPM)
Static Test Bench	1	Range: 0 to 68.9 MPa (0 to 10000 psi)

(4) Test Parameters

Test Parameters for Test and Fault Isolation Table 1007

PARAMETERS	CHARACTERISTICS			
Hydraulic Fluid	Fire Resistant Phosphate Ester Hydraulic fluid per AS1241			
Hydraulic Fluid Temperature	21 to 49°C (70 to 120.2 °F)			
Hydraulic Fluid Cleanliness Requirements	Class 5 or better (Refer to AS4059)			

C. Job Set-up

WARNING: HYDRAULIC FLUID IS POISONOUS TO THE SKIN, EYES AND RESPIRATORY TRACT. USE SKIN AND EYES PROTECTION. DO NOT LET THE HYDRAULIC FLUID TOUCHES YOUR SKIN FOR A LONG TIME. USE ONLY IN AREAS AIRFLOW. IF IT TOUCHES YOUR SKIN OR GETS IN YOF WITH WATER AND GET MEDICAL AID.

CAUTION: THE MLG RETRACTION ACTUATOR HYDRAULIC FLUID. IT IS NOT FLUID WILL DAMAGE A W RUBBER, COPPER



RMM AND CMM



WIRING MANUAL (WM)

Purpose:

Provides the necessary information concerning the wiring diagrams to enable fault isolation and maintenance.

Arrangement:

SYSTEM SCHEMATIC MANUAL (SSM)

Purpose:

- Provides technical information to aid the maintenance personnel in understanding the aircraft systems and performing the fault isolation procedures at the LRU (Line Replaceable Unit) level.
- The information is presented through diagrams, with indication of component location, system interface, and references to other manuals (SSM, SDS, MPP and WM).

Available links: SSM-Internal link, SDS MPP, WM.

Arrangement:







WIRING MANUAL AND SYSTEM SCHEMATIC MANUAL



AIRCRAFT ILLUSTRATED PARTS CATALOGUE (AIPC)

Purpose:

The AIPC is provided by the manufacturer for use in provisioning, requisitioning, storing and issuing replaceable parts and units, and for identifying parts. The AIPC is a companion document to the AMM and includes all parts for which maintenance practice has been provided.

Section Numbering

The section numbering is made of three elements, whereby the first and second element represents the chapter/section breakdown according ATA 100.

To enable quick location of installation figures and to simplify the task of locating items within the IPC, the third element in the Chapter numbering is designated to aircraft major zones as follows:

- > 00 Electrical installations in all applicable zones
- > 01 Forward fuselage and cockpit
- > 02 Center fuselage and cabin
- > 03 Aft fuselage and cargo compartment
- ➢ 04 Wings
- > 05 Engine and nacelles





AIRCRAFT ILLUSTRATED PARTS CATALOGUE (AIPC)



STRUCTURAL REPAIR MANUAL PART 1 (SRM 1)

Purpose:

The Structural Repair Manual part I (SRM I) is intended for use in requisitioning, storing, furnishing, identifying replacement parts, and illustrating assembly and disassembly relationships.

It has been prepared in accordance with the Air Transport Association (ATA) Specification 2200.

The SRM I breakdown is defined by the Drafting Standard Manual (DSM). Basically, the information contained herein permits the operator to identify and assess the damage and restore the structural integrity of the aircraft by means of a repair or by replacing the damage part.

Available links: MPP, NDT, CPM, SM, ITEM, CPC.

ATA 05 – ATA12 **AIRPLANE GENERAL**



Figure 05 - SUB-STRUCTURE EXIT EMERGENCY ASSY, CENTER FUSELAGE II Sheet 2 of 2



52-20-00

EIC ITEM		NOMENCLATURE		GAUGE	USAGE	UNITS PER		
05 - 1	190-83020-403	STRUCTURESUB ASSY-OWE DOOR		(11)	5 - 247	REF		
- 1A	190-83020-407	STRUCTURESUB ASSY-OWE DOOR			256 - 99999	REF		
10	190-83004-001	.UPPER INTERNAL SKIN-OWE DOOR AL	2024-0 CLAD	0.063	5 - 5	1		
10A	190-83004-003	.UPPER INTERNAL SKIN-OWE DOOR AL	2024-0 CLAD	0.063	29 - 99999	1		
20	190-83005-001	.LWR INTERNAL SKIN-OWE DOOR AL	2024-0 CLAD	0.050	5 - 5	1		
20A	190-83005-003	.LOWER INTERNAL SKIN-OWE DOOR AL	2024-0 CLAD	0.050	29 - 99999	1		
30	190-83027-001	.SPLICEINNER SKIN-OWE DOOR,AL	2024-T3 CLAD	0.063		2		
40	190-83006-401	.FRAME EDGE, EQ-OWE DOOR, AL	7475-T7351 AL	1.750		2		
50	190-83016-002	.CORNER PLATE-OWE DOOR AL	2024-0 CLAD	0.063		2		
60	190-83016-001	.CORNER PLATE-OWE DOOR AL	2024-0 CLAD	0.063		2		
70	190-83087-401	.LOWER BEAMASSY-OWE DOOR RPLD BY P/N:: 190-83012-405			5 - 247	1		
70A	190-83012-405	.LOWER BEAMEQ-OWE DOOR,AL RPLS P/N:: 190-83087-401				1		
80	190-83025-901	.SPRINGPLATE-OWE DOOR,ST	-	-		1		
90	190-83086-401	.UPPER BEAMASSY-OWE DOOR				1		
100	190-83082-001	.VERTICAL STOP-OWE DOORAL	2024-0 CLAD	0.050		1		
110	190-83021-003	.VERTICAL STOP-OWE DOORST	STEEL A286	0.063		1		
120	190-83015-002	.CORNER FITTING-OWE DOOR AL	7475-T7351 AL	1.750		2		
130	190-83015-001	.CORNER FITTING-OWE DOORAL	7475-T7351 AL	1.750		2		
140	190-83007-001	.ANTERNAL FRAME UPPER-OWE DOOR,AL	2024-0 CLAD	0.040		1		
150	190-83007-002	.INTERNAL FRAME UPPER-OWE DOOR, AL	2024-0 CLAD	0.040		1		
160	190-83013-001	.UPPER SPAR-OWE DOOR AL	2024-0 CLAD	0.063		1		
170	190-83008-002	.INTERNAL FRAME BOX-OWE DOOR, AL	2024-0 CLAD	0.063		1		
180	190-83017-001	.ANGLE-OWE DOORAL	2024-0 CLAD	0.063		4		
190	190-83008-001	.INTERNAL FRAME BOX-OWE DOOR, AL	2024-0 CLAD	0.063		1		
200	190-83014-001	.LOWER SPAR-OWE DOOR AL	2024-0 CLAD	0.063		2		
210	190-83009-002	.INTERNAL FRAME LOWER-OWE DOOR, AL	2024-0 CLAD	0.040		1		
220	190-83009-001	.INTERNAL FRAME LOWER-OWE DOOR, AL	2024-0 CLAD	0.040		1		
SUB-STRUCTURE EXIT EMERGENCY ASSY, CENTER FUSELAGE II								
ITEM NOT ILLUSTRATED								
Embraer 195 - SRMI 2411 F2 20 00 Fig. 05								
52-20-00 Page 3 of 3 Rev 18 - Mar 20/12								

SRM 1



STRUCTURAL REPAIR MANUAL PART 2 (SRM 2)

Purpose:

All the repair instructions and allowable damage data can be found in the SRM 2.

Damage not covered by typical or general repair procedures contained in the SRM has to be treated separately. In such case, Embraer will evaluate or develop a specific repair design.

Improved repair techniques can be included in this manual as a result of the experience acquired over the extended lifetime of the aircraft, as well as new repairs, when the service experience shows its necessity.

Available links: MPP, NDT, CPM, SM, ITEM, CPC.

ATA 05 – ATA12 AIRPLANE GENERAL





SRM 2, DAMAGE REPORT FORM EXAMPLE



HOW TO USE THIS MANUAL

Structure Identification

Identify the damaged component, using the table of contents for chapters 52 to 57, 71 and 78:

- Identify the major structural element and its corresponding chapter. Example: Stabilizers - Chapter 55.
- Identify the section of the main structural element. Example: Horizontal Stabilizer -55-10.
- Identify the structural subject that applies to the damaged area. Example: Horizontal Stabilizer Skin - 55-10-01.

References

References are used in the text body to create links to manuals, tasks, figures, tables or footnotes.

All references given in the SRM can be made by using the terms "refer to", "referring to" or simply between parenthesis.

All the procedures referred to in the SRM tasks will be done in their entirety, and this rule is applicable to references followed by the terms "refer to", "referring to", or shown between parenthesis.

Damage Assessment

Note: All the steps in the task must be done in the sequence they are given.

Assess the damage to the structure and check for allowable damage, per the appropriate chapter, section, and subject related to the structural element.

Once the damage extent has been verified, check whether the damage:

- > Is allowable or requires minor corrective action.
- Is repairable (general or typical repair).
- Requires replacement.
- Is not in the SRM and shall be addressed by Embraer.

Repair

If the damage is allowable, treat it by using the information in pageblock 1 in each chapter.

If the damage is repairable, repair it by using, as applicable:

- > General repairs described in chapter 51.
- Typical repairs described in chapters 52 thru 57, 71 and 78, in pageblock 2.

If the damage is not within the limits specified in the SRM, it is mandatory that you report it to Embraer, per item D below.

How to report to Embraer

Whenever a damage is reported to Embraer, use the Damage Report Forms shown in the SRM as applicable and attach damage sketches as described in the SRM.

Results of the preliminary inspections on the internal and/or adjacent structure by doing visual, detailed visual or nondestructive inspection, as applicable, will make sure that all types of damage will be reported

Embraer ERJ-190 Series (GE CF34) B1.1. and B2



EFFECTIVITY: ALL

How to give the Precise Location of a Thickness Reduction Damage to the Skin Figure 5

LENGTH 50.8 mm 127.0 mm 152.0 mm 178.0 mm 191.0 mm 25.4 mm 76.2 mm 102.0 mm 0.0 (1.0 in) (2.0 in) (3.0 in) (4.0 in) (5.0 in) (6.0 in) (7.0 in) (7.5 in) -INITIAL SURFACE 76.2 mm 33.0 mm 25.4 mm 21.1 mm POINT A (3.0 in) (1.0 in) (0.83 in) (1.30 in) POINT B LESS THAN 0.076 mm (0.003 in)IN DEPT 12.7 mm 12.0 mm (0.50 in) (0.40 in) 6.35 mm (0.25 in) 0.076 mm 0.18 mm 0.43 mm 0.30mm 0.051 mm (0.003 in) (0.007 in) (0.017 in) (0.012 in) (0.002 in) 0.28 mm 0.127 mm (0.011 in) (0.005 in)



EFFECTIVITY: ALL

FRAME XX

How to show Data on a Combined Damage: Dent plus Thickness Reduction Damage Figure 6



SECTION A-A

NOTES:

1 - DEPTH OF DENT GRADUALLY SMOOTHS OUT TO ZERO ON DENT BOUNDARY.

2 - ELEVATION VIEWS MIGHT BE NECESSARY FOR THE DENT AND THICKNESS REDUCTION DAMAGE.



OTHER DOCUMENTATION

AIRCRAFT RECOVERY MANUAL (ARM)

Purpose:

Contains information in sufficient detail to effect recovery in the most expeditious manner while maintaining consideration of recovery personnel safety and prevention of additional damage to the aircraft.

AIRPORT PLANNING MANUAL (APM)

Purpose:

Provides necessary information to enable a proper planning of the airports for the aircraft operation.

CONSUMABLE PRODUCTS CATALOGUE (CPC)

Purpose:

Provides the information about the consumable materials used to overhaul and repair the aircraft.

CORROSION PREVENTION MANUAL (CPM)

Purpose:

Provides information on materials and procedures for prevention and removal of corrosion damage to aircraft as well as to display EMBRAER's recommendations about frequent corrosion troubles.

ILLUSTRATED TOOL AND EQUIPMENT MANUAL (ITEM)

Purpose:

Provides all information about GSE (Ground Support Equipment) to support the operation and maintenance of the aircraft and all its onboard equipment.

INSTRUCTIONS FOR GROUND FIRE EXTINGUISHING AND RESCUE MANUAL (IGFER)

Purpose:

To provide the necessary information to guide ground rescue teams while rescuing passengers in case of aircraft accidents.

Available links: APUBM, CPM, FIM, MPP, PPBM, SDS, SM, SRM, ITM, NDT, WM, SWPM.

MAINTENANCE FACILITY & EQUIPMENT PLANNING (MFEP)

Purpose:

- Provides aircraft characteristics to assist airline personnel responsible for service, line maintenance, overhaul facilities and equipment planning.
- It identifies and describes aircraft maintenance and operational facility requirements.

ATA 05 – ATA12 AIRPLANE GENERAL







MAINTENANCE REVIEW BOARD (MRB)

Purpose:

This report outlines the initial minimum scheduled maintenance/inspection requirements to be used in the development of an approved continuous airworthiness maintenance program for the airframe, engines (on-wing engine only), systems, and components of the aircraft.

NONDESTRUCTIVE TESTING MANUAL (NDT)

Purpose:

Provides all general procedures of nondestructive tests acceptable by Embraer for investigating the quality and integrity of materials and components.

SERVICE BULLETIN (SB)

Purpose:

Presents modifications or special inspections to be carried out on inservice aircraft.

Arrangement:

- Planning information: involves those aspects related to plan the aircraft maintenance opportunity/necessity for the SB incorporation.
- Material information to assist the operator in obtaining the material necessary for the SB incorporation.
- Accomplishment instructions: presents the step-by-step instructions and illustrations for accomplishing the work.

INFORMATION BULLETIN (IB)

Purpose:

It is used to transmit information, which are not related to actions requiring a record of accomplishment.

Arrangement:

- > Purpose
- Effectivity (applicability)
- Description
- Approval
- References
- Affected Publications

STANDARD WIRING PRACTICES MANUAL (SWPM)

Purpose:

> Allows the operator to repair, manufacture and handle all harnessrelated components.

TASK CARD SYSTEM (TCS)

Purpose:

Provides a reliable tasks list that can be customized by operators to support the MPD and suit the operators needs.

ATA 05 – ATA12 AIRPLANE GENERAL





EXAMPLE OF NDT MANUAL



ATA 04 AIRCRAFT GENERAL

INTRODUCTION

The EMB 190 and the EMB 195 are low wing, twin engine jet airplanes of conventional structure, designed for medium to short range operations.

It also features a pressurized cabin. The fuselage has a so-called double bubble design.

The first flight of the EMB 190 was in March 12 2004 (PP-XMA), the first flight of the EMB 195 in December 7 2004 (PP-XMJ).

The Embraer Lineage 1000 is the business jet version of the EMB 190 and has an extended range of up to 4.200 nm due to auxiliary fuel tanks in both cargo compartments. Luxury seating for up to 19 passengers can be fitted to the Lineage cabin.




EMB 190 AND 195



DESCRIPTION

FUSELAGE AND AIR CONDITIONING PACKS

The fuselage is pressurized between the forward pressure bulkhead, located forward of the cockpit, and the aft pressure bulkhead, which is located behind the aft electronics bay.

Normal pressurization control is automatic, and the conditioned air is provided by two air conditioning packs located in the unpressurized area forward of the wing root.





FUSELAGE AND AIR CONDITIONING PACKS



COCKPIT AND CABIN SECTIONS

The cockpit can accommodate 2 crewmembers in the pilot seats and one observer on the jump seat.

The Embraer 190 is designed for 98 passengers and the Embraer 195 is designed for 108 passengers.

There are 2 galleys and 2 toilets - one of each in the front and the aft sections of the cabin.

The cabin also features a wardrobe next to the forward passenger entrance.

There are **2** cargo compartments below the passenger cabin - one in front and one behind the wing fairing.





COCKPIT AND CABIN SECTION



SEAT CAPACITY

The Embraer 190 has a seat capacity of 98 seats. The Embraer 195 has a seat capacity of 108 seats.





Embraer 190-100 EMBRAER 190-100 98 Seats 98 seats

MTOW : 47790 kg / 105357 lbs

MLW : 43000 kg / 94797 lbs

MZFW : 40800 kg / 89947 lbs



EMBRAER 190-200
108 seats
MTOW : 48790 kg / 107562 lbs
MLW : 45000 kg / 99206 lbs
MZFW : 42500 kg / 93695 lbs

SEAT CAPACITY



LANDING GEAR

The nose landing gear is a forward retracting twin-wheel nose landing gear (NLG) with a normal steering angle of about 76°.

The NLG shock absorber is of the oleo-pneumatic type.

The steering motor, one taxi light and one landing light are mounted on the NLG.

When the NLG is extended, the rear doors remain open while the front doors close after extension or retraction.

The main landing gears (MLG) also have oleo-pneumatic shock absorbers and twin wheels retracting sideways.







TURNING RADIUS

With a full deflection of the nose wheels, the EMB 190 can theoretically turn on taxiways as narrow as 21.40 m (70 ft 3 in.).

The EMB 195 can turn on taxiways as narrow as 22.68 m (74 ft 5 in).

In a maximum turn, either the left or the right MLG remains stationary, marking the centre of the turn.

Note: That the tail requires the largest clearance, which is not visible.



	EMB 190	EMB 195
Nose wheels	14.07m (46ft 2in.)	15.10m (49ft 7in.)
Nose tip	18.12m (59ft 5in.)	19.13m 62ft 9in.)
Wing tip	18.39m (60ft 4in.)	18.61m (61ft 1in.)
Tail	20.51m (67ft 4in.)	21.90m (71ft 10in.)
Minimum taxiway for turn with full nose wheel deflection	21.40m (70ft 3in.)	22.68m (74ft 5in.)



TURNING RADIUS



CF34-10E HIGH BYPASS TURBOFAN ENGINES

The two wing-mounted **CF34-10E** high bypass turbofan engines are based on the CF34 engine family, which is widely used in aviation.

Engine controls and fuel scheduling are provided by a full-authority digital engine control (FADEC) with fully modular design.

The **CF34-10E** incorporates the aerodynamic efficiency of a wide cord fan which produces most of the engine's 20000 lbs maximum thrust

To enhance aircraft braking capability, the engine is equipped with a thrust reverser system.



CF34-10E high bypass turbofan engine



FADEC

CF34-10E HIGH BYPASS TURBOFAN ENGINES



AIRCRAFT DATA

The **EMB 190** can climb to 30,000 ft within 15 minutes and has a certified ceiling of 41,000 ft with a maximum cruising speed of mach 0.82

The EMB 195 can climb to 30,000 ft within 17 minutes and has a certified ceiling of 41,000 ft with a maximum cruising speed of mach 0.82.

Depending on the long or **normal range version**, both aircrafts can reach destinations upwards of 2,000 nautical miles with standard reserves left in the tanks.

ATA 05 – ATA12 AIRPLANE GENERAL



Variant	EMB 190	EMB 195	
Flight Deck Crew	2	2	
Passenger Capacity	114 (1-class, 29"/30")	122 (1-class, 30"/31")	
	106 (1-class, 31")	118 (1-class, 31")	
	98 (1-class, 32")	108 (1-class, 32")	
	94 (2-class, standard)	106 (2-class, standard)	
Length	<mark>36</mark> 24 m (118 ft 11 in)	38.65 m (126 ft 10 in)	
Wingspan	28. 72 m (94 ft 3 in)		
Height	10. 48 m (34 ft 7 in)		
Empty Weight	28,080 kg (61,900 lb)	28,970 kg (63,900 lb)	
Maximum Take Off Weight	47,790 kg (105,400 lb) (STD)	48,790 kg (107,600 lb) (STD)	
	50,300 kg (111,000 lb) (LR)	50,790 kg (112,000 lb) (LR)	
	51,800 kg (114,000 lb) (AR)	52,290 kg (115,300 lb) (AR)	
Maximum Payload Weight	13,080 kg (28,800 lb)	13,650 kg (30,100 lb)	
Takeoff Run at MTOW	2,056 m (6,745 ft)	2,179 m (7,149 ft)	
Powerplants	2x GE CF34-10E turbofans		
	82.3 kN (18,500 lbf) thrust each		
	89 kN (20,000 lbf) APR thrust each		
Max Speed	890 km/h (481 kn, Mach 0.82)		
Range	STD: 3,334 km (1,800 nm)	STD: 2,593 km (1,400 nm)	
	LR: 4,260 km (2,300 nm)	LR: 3,334 km (1,800 nm)	
	AR: 4,448 km (2,402 nm)	AR: 4,077 km (2,201 nm)	
Maximum Fuel Load	(12,971 kg (28,600 lb)		
Service Ceiling	41,000 ft (12,500 m)		
	1		
Outer width	3.01 m (9 ft 11 in)		
Inside width	2.74 m (9 ft 0 in)		
Outer height	3.35 m (11 ft 0 in)		
Inside height	2.00 m (6 ft 7 in)		

AIRCRAFT DATA



ATA 05 TIME LIMITS AND MAINTENANCE CHECKS

INTRODUCTION

Chapter 05, time limits and maintenance checks of the aircraft maintenance manual, provides inspection procedures for various scheduled and unscheduled checks.

The data concerning detailed time limits and scheduled maintenance checks can be found in the "Maintenance Planning Guide".

SCHEDULED MAINTENANCE CHECKS

Some examples for scheduled checks:

05-21-00-211-802 Center-Fuselage I and II Lower Portion and Keel Beam at areas covered by Forward Wing-to-Fuselage Fairing - Internal General Visual Inspection

05-21-00-211-803 Forward Pressure Bulkhead and Radome – Internal General Visual Inspection

05-22-00-211-801 Horizontal Stabilizer, Horizontal Stabilizer Fairings (Leading Edge and Tips) - Internal

05-22-00-211-802 Horizontal Stabilizer Fairings (Sliding Plate and Fairing), Rear Fuselage Skin Covered by Horizontal Stabilizer Fairings - Internal General Visual Inspection

05-23-00-211-801 Pylon And Wing Lower Skin Panel Covered By Pylon Fairing – Internal General Visual Inspection

05-23-00-211-802 Inlet Cowl - Internal General Visual Inspection

05-24-00-211-812 EWIS Components in the Wing Stub Rear-Box - Internal General Visual Inspection

05-24-00-211-813 EWIS Components in the Wing Rear Box – Internal General Visual Inspection

05-24-00-211-814 EWIS Components in the Wing Leading Edge - Internal General Visual Inspection

05-24-00-212-801 Wing and Winglet Upper and Lower Surfaces - External

05-24-00-212-802 Main Landing Gear, Main Landing Gear Compartment And Doors – External General Visual Inspection

05-24-00-212-803 Wing Leading Edge, Wing Slats, Wing Root Landing Light Fairing, Winglet Leading Edge and Wing Tip Fairing - External General Visual Inspection

05-24-00-212-804 Flap, Aileron, Spoilers, Wing Trailing Edge, Flap Track Fairings and Shrouds - External

05-24-00-213-809 Interface Connectors and Overbraids in the Wing - Detailed Visual Inspection

05-24-00-212-805 EWIS Components in the Wing Trailing Edge - External General Visual Inspection

05-25-00-211-801 Forward Passenger Door - Internal General Visual Inspection

05-25-00-211-802 Aft Passenger Door - Internal General Visual Inspection

05-25-00-211-803 Forward Service Door - Internal General Visual Inspection

05-25-00-211-804 Aft Service Door - Internal General Visual Inspection

05-26-00-212-801 EWIS Components in the Main Landing Gear Bay - External General Visual Inspection





States inspection procedures for various scheduled and unscheduled checks

CHAPTER 05



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UNSCHEDULED MAINTENANCE CHECKS

Unscheduled maintenance checks have to be performed after the following occurrences:

- Lightning Strike
- Bird or Hail Strike
- Hard Landing and Off-Temperature Envelope
- High Drag/Side Load Landing Condition
- High Load Factor
- Maximum Operating Speed Envelope
- Maximum Flap Extended Speed
- Cabin Depressurization
- Toilet Overservicing
- Volcanic Ash Condition
- Sandstorm Condition
- Ice or Snow Condition
- High Energy Stop Condition
- Landing Gear Down Overspeed
- Landing Gear Free-Fall Condition
- > Tire Burst
- Overheated Wheels
- Engine or APU Fire Warning or Overheat Indication
- APU Volcanic Ash Condition
- High Thrust Failure
- Fuel Overflow
- > Wheel Overspeed
- > Engine-Driven Pump (EDP) Runs Dry or Fail
- Landing Gear Significant Vibration
- Brake Use During Towing Operation
- Cabin Door Pressed by Jetway
- Overweight Landing
- > Severe Turbulence or Maneuver, Buffeting Condition
- Battery Discharged
- > Oversteering
- Flap Altitude Exceedance
- > Tail Strike



ATA 06 DIMENSIONS AND AREAS

INTRODUCTION

The fuselage stations show the length measurements along the longitudinal axis.

All horizontal measurements are taken from the datum line (FS 0 which is located at the nose tip.)

The forward pressure bulkhead is located at station 760 and the fuselage is pressurized between the forward pressure bulkhead and the rear pressure bulkhead, which is located at station 29837.





HORIZONTAL MEASUREMENTS



DESCRIPTION

AIRCRAFT MEASUREMENTS EMB 190

The aircraft has a total length from the nose to the tail of 36.24 m, a height from the ground to the top of the vertical tail of 10.55 m and a vertical tail area of 16.20 m².

The distance from the nose gear to the main gear is 10.60 meters.

The aircraft has a total wingspan of 28.72m with a total wing area of 92.50 m^2 , a horizontal tail span of 12.01 m with a horizontal tail area of 26.00 m^2 and a fuselage external diameter of 3.01 m.

The distance from the left to right main gear is 5.94 meters.





AIRCRAFT MEASUREMENTS EMB 190



AIRCRAFT MEASUREMENTS EMB 195

The aircraft has a total length from the nose to the tail of 38.67m, a height from the ground to the top of the vertical tail of 10.55m and a vertical tail area of 16.20m².

The distance from the nose gear to the main gear is 13.83 meters.

The aircraft has a total wingspan of 28.72 meters with a total wing area of 92.05 m², a horizontal tail span of 12.08 meters with a horizontal tail area of $26m^2$ and a fuselage external diameter of 3.01 m.

The distance from the left to the right main gear is 5.94 meters.





AIRCRAFT MEASUREMENTS EMB 195



AIRCRAFT DOORS

Located on the left side of the fuselage are two main doors, which qualify as type 1 emergency exits.

Located on the right side of the fuselage are two service doors, which qualify as type 1 exits and two baggage compartment doors.





AIRCRAFT DOORS



FUSELAGE STATIONS

The aircraft stations are defined by a coordinate system using three main reference axes.

The point of origin for the longitudinal axis X, lateral axis Y and vertical axis Z is in front of the aircraft.

The ordinates are identified by the letter for the major axes, followed by the dimension in inches from the point of origin.

There are additional points of origin selected for locating major assemblies. These points are identified with a suffix letter indicating the assembly.

These assemblies are the wings, the vertical stabilizer, the horizontal stabilizer, the power plant and the engine pylons.





FUSELAGE STATIONS



WING STATIONS

NOTES:



WING STATIONS



HORIZONTAL STABILIZER STATIONS

NOTES:



HORIZONTAL STABILIZER STATIONS



VERTICAL STABILIZER STATIONS

NOTES:



VERTICAL STABILIZER STATIONS



POWERPLANT AND PYLON STATIONS

NOTES:





POWERPLANT AND PYLON STATIONS



AIRCRAFT ZONING SYSTEM

The aircraft zoning system provides identification of areas in the aircraft according to 8 major zones, major sub-zones and zones.

The major aircraft zones are:

- Lower fuselage zone 100
- Upper fuselage zone 200
- > Tail cone and horizontal and vertical tail zone 300
- Power plant and pylon zone 400
- Left wing zone 500
- Right wing zone 600
- Landing gear and landing gear wheel well doors zone 700
- Aircraft doors zone 800





MAJOR AIRCRAFT ZONES



SUB ZONES

The major zones are divided into major sub-zones, which are shown by the second digit of the major zone number.

The major sub-zones are further divided into zones using the third digit of the major zone number.




SUB-ZONES



ACCESS PANELS

To carry out maintenance on aircraft systems and their components, or to perform inspection of the aircraft structure, adequate access panels and doors are provided in the aircraft surface.

Each access panel has an identification number which consists of a three digit zone number followed by two or three letters.

The first letter shows the number of the panel within the zone in a logical in a logical sequence and the second letter indicates the location of the panel in relation to the aircraft. $^{\text{A}}$

An optional third letter is used to identify a floor, wall or ceiling panel.

Each panel has a fastener identification code, which identifies the type and the quantity of the fasteners for each panel.





ACCESS PANELS IDENTIFICATION



ATA 07 AIRCRAFT JACKING

INTRODUCTION

To replace components, the aircraft can be lifted either by using individual landing gear jacking, which permits replacement of wheels and brakes or by completely lifting the aircraft via the jacking points.

There are two main jacking points on the wing lower side and one jack point on the rear fuselage lower side. Procedures for lifting a damaged aircraft are described in the "Instructions for Ground Fire Extinguishing and Rescue" manual.

Note: It is important to obey that, above 44000 kg, only partial jacking is permitted.





LANDING GEAR JACKING , JACKING POINTS



COMPLETE AIRCRAFT JACKING

Complete aircraft jacking, also called three point fuselage jacking, is necessary to perform maintenance such as replacement, repair or functional checks to the landing gear and its components. It can also be used for aircraft weighing.

Tools and Equipment

ITEM GSE 026: JACKING ADAPTER KIT ITEM GSE 039: PLUMB - AIRCRAFT RIGGING ITEM GSE 070: WHEEL CHOCKS ITEM GSE 192: TRIPOD JACKS ITEM GSE 193: AIR MANIFOLD SET ITEM GSE 444: CENTER OF GRAVITY CALCULATION SOFTWARE

Safety Precaution Examples

Warning: THE INTEGRATED PITOT/STATIC/AOA AND TAT HEATING SYSTEMS MUST BE OFF DURING MAINTENANCE. THIS IS BECAUSE SYSTEMS THAT INTERFACE WITH MAU 1, MAU 3 AND SPDA 2 CAN CAUSE THE INTEGRATED PITOT/STATIC/AOA AND TAT SENSORS TO BECOME HOT. THESE SENSORS OPERATE AT HIGH TEMPERATURE. IF YOU TOUCH THEM, THEY WILL CAUSE INJURIES TO YOU.

Warning: KEEP THE AREA AROUND AND BELOW THE AIRCRAFT CLEAR OF PERSONS, WORKSTANDS, AND EQUIPMENT. DURING THE JACKING OR LOWERING PROCEDURES, THE CLEARANCE BETWEEN THE AIRCRAFT AND PERSONS, WORKSTANDS, AND EQUIPMENT MIGHT NOT BE SUFFICIENT, AND INJURY TO PERSONS AND/OR DAMAGE TO EQUIPMENT CAN OCCUR.

Caution: KEEP THE AIRCRAFT WEIGHT AND CENTER OF GRAVITY IN THE CORRECT LIMITS. IF YOU DO NOT OBEY THIS PRECAUTION, STRUCTURAL DAMAGE TO THE AIRCRAFT CAN OCCUR. **Note:** To correctly install each jacking adapter, put it in the jack point and turn it clockwise until it touches the surface of the housing.

The maximum fuel asymmetry between wings is 363 kg (800 lb).

Make sure that the hydraulic extension and the mechanical extension of the jacks are not more than the value specified on manual ITEM for the related jack model.

Above 44000 kg only partial jacking is permitted.

You can lift the aircraft with fuel tanks in full capacity condition, if the aircraft jacking envelop is obeyed.

It is not recommended to lift the aircraft with jacks when persons are inside, but if necessary, no more than 2 (two) persons can be in the aircraft. One person must be in the cockpit and the other in the aircraft rear. They must not walk inside the aircraft during the jacking procedure.

Make sure that the aircraft is lifted in the maximum 2.50 m on wings lower side from the jacking point to the ground.

Before jack the aircraft out of a hangar and in windy condition, make sure that the flaps are retracted and the horizontal stabilizers are in 0 ° position.

After you achieve the leveled position of the aircraft, this position must be maintained during the jacking procedure.

The plumb GSE 039 must not pass from the 1.5 degree nose-down attitude. If this occurs, do a check to find the cause. If necessary, do a repair before you lift the aircraft with jacks.



Complete aircraft jacking (three point fuselage jacking)

EMBRAER 190

Landing gear:

- replacement
- repair
- functional checks
- aircraft weighing



COMPLETE AIRCRAFT JACKING



BEFORE COMPLETE AIRCRAFT JACKING

Complete aircraft jacking must be performed in accordance with chapter 7 of the aircraft maintenance manual.

Before complete jacking of the aircraft several conditions have to be fulfilled:

- > All unnecessary equipment below and around the aircraft must be removed.
- The aircraft should only be jacked on level ground with the nose pointing into the wind, but preferably in a hangar with closed doors.
- Both main landing gears and the nose gear have to be safety locked to prevent inadvertent landing gear retraction.
- Install the GSE 070 on all landing gear wheels to prevent the airplane forward and aft movement before the jacks are set.
- > The emergency/parking brake must be released before jacking.
- > No one is allowed to enter the aircraft during jacking operation.
- The aircraft must be lifted to achieve a minimum clearance between the ground and the aircraft tires to assure sufficient clearance for main gear retraction.

Note: Before aircraft jacking, refer to the table mentioned in the AMM for weight limitations to ensure that the centre of gravity is within the jacking envelope.





ABOVE 44000 kg ONLY LANDING GEAR JACKING IS ALLOWED.

ltem	Weight (kg)
BEW	26982
Captain and First Officer	164
Fwd flight attendant	65
Aft flight attendant	65
Engine Oil	32
Hydraulic Fluid	54
Unusable Fuel	54
APU oil	2
Fwd lavatory fluid	8
Aft lavatory fluid	8
Fwd lavatory water	20
Fwd galley water	5,5
Aft lavatory water	20
Aft galley water	5,5
Flight kit	15
Crew baggage	15
Catering galley 1	80
Catering galley 2	256
OEW	27900

CG POSITION



JACKING POINTS LOCATION

The aircraft is fully lifted by the use of fuselage jacking points located behind panel 515CB for the LH inboard wing leading edge, and 615CB for the RH inboard wing leading edge.

The jacking point for the rear fuselage is located behind **panel 313BL**. After installing the jack pins and the jacks, the jacks should be operated simultaneously to ensure that jacking is symmetrical and that the aircraft remains level at all time during lifting.

When the desired height is reached the jacks have to be locked to prevent inadvertent lowering. To lower the aircraft, the surrounding area has to be cleared of obstructions, the emergency/parking brake must be released and the jacks have to be unlocked. All jacks should then be lowered slowly and symmetrically to ensure that the aircraft maintains a level attitude. As soon as the aircraft weight is off the jacks, wheel chocks should be installed and the emergency/parking brake set.





JACKING POINTS LOCATION



NOSE AND MAIN GEAR JACKING POINTS

The nose and main gear jacking points permit individual wheel and brake replacement without weight limitations, and can even be performed with one flat tire at any gear leg. Wind speeds versus Fuel weight have to be considered, based on the tables given in ATA Chapter 7:

TASK 07-10-01-500-803-A Partial Aircraft Jacking – Maintenance Practices

The **landing gear safety lock** pins have to be put into position, the **emergency/parking brake released**, and the jack has to be installed below the applicable landing gear leg jacking point. The jack then is raised until the landing gear tire is clear of the ground. After completion of the required maintenance the aircraft can then smoothly be lowered to the ground.

When the weight of the aircraft is off the jack it can be removed, the wheels chocked and the emergency/parking brake set.

Safety Precaution Examples

Warning:	MAKE SURE THAT THE LANDING GEAR SAFETY PINS ARE
_	INSTALLED. THIS IS TO PREVENT INJURIES TO PERSONS
	AND DAMAGE TO MATERIAL.

Note: Before you lift the aircraft on jacks, with the aircraft out of the a hangar and in a windy condition, make sure that the aircraft flaps are retracted and the horizontal stabilizers are at the 0 ° position.

Do not let the landing gear stay jacked for a time longer than necessary for servicing.





MAIN AND NOSE GEAR JACKING POINTS



ATA 08 LEVELING AND WEIGHING

INTRODUCTION

Chapter Eight of the Maintenance Manual describes the applicable procedures for leveling and weighing of the aircraft. Only the equipment as specified in the applicable manuals is to be used to perform these tasks. Please note that weighing the aircraft is accomplished using an electronic weighing kit and jacks, or with ground scales. Preparation of the aircraft and the weighing procedures are described in the Weight and Balance Manual.

Further note that only approved personnel may perform an aircraft weighing.

Safety Precaution Examples

- Warning: MAKE SURE THAT THE LANDING GEAR SAFETY PINS ARE INSTALLED. THIS IS TO PREVENT INJURIES TO PERSONS AND DAMAGE TO MATERIAL.
- Warning: DURING THE LIFTING PROCEDURE YOU MUST CONSIDER THE HORIZONTAL LOADS THAT CAN EXIST AT THE JACK POINT LOCATIONS. THESE FORCES CAN EASILY EXCEED THE MAXIMUM ALLOWABLE LOADS. IF THAT OCCURS, THE AIRCRAFT CAN SUDDENLY MOVE AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.
- Caution: MAKE SURE THAT THE INTEGRATED PITOT/STATIC/AOA SENSORS, TAT SENSORS, ICE DETECTORS AND STATIC PORT HAVE NO COVERS ON THEM BEFORE YOU DO THE MAINTENANCE PROCEDURE. THESE COMPONENTS CAN BECOME HOT DURING THE MAINTENANCE PROCEDURE. AS A RESULT, DAMAGE TO THEM WILL OCCUR IF YOU DO NOT REMOVE THE COVERS.
- Caution: MAKE SURE THAT THE INTEGRATED PITOT/STATIC/AOA SENSORS, TAT SENSORS, ICE DETECTORS AND STATIC PORT HAVE NO COVERS ON THEM BEFORE YOU DO THE MAINTENANCE PROCEDURE. THESE COMPONENTS CAN BECOME HOT DURING THE MAINTENANCE PROCEDURE. AS A RESULT, DAMAGE TO THEM WILL OCCUR IF YOU DO NOT REMOVE THE COVERS.
- Caution: EXAMINE ALL THE WORK AREAS TO MAKE SURE THAT YOU REMOVED ALL TOOLS AND EQUIPMENT AFTER YOU COMPLETED THE WORK. IF YOU DO NOT OBEY THIS PROCEDURE, DAMAGE TO THE AIRCRAFT CAN OCCUR.





Chapter Eight of the Maintenance Manual and The Weight and Balance Manual describes the applicable procedures for leveling and weighing of the aircraft





WEIGHING PROCEDURES



WEIGHING THE AIRCRAFT

To weigh the aircraft, first install the adapters and the load cells of the electronic weighing kit on the jacks, below the three jacking points on the fuselage. Lift the aircraft until the tires are off the ground, as specified in chapter 07.

To determine the weight of the aircraft, refer to the procedures given in the Weight and Balance Manual. After weighing, lower the aircraft as explained in chapter 07 and remove the load cells and the adapters of the electronic weighing kit from the jacks.





WEIGHING THE AIRCRAFT, WEIGHING KIT AND JACKS OR GROUND SCALES



AIRCRAFT LEVELING

Aircraft leveling is necessary before performing weighing operations, since it permits you to find the accurate centre of gravity of the aircraft. Aircraft leveling is done by lifting the aircraft until the tires are off the ground, as described in chapter 07, and installation of the PLUMB - AIRCRAFT RIGGING kit in the LH main landing gear wheel well.





AIRCRAFT LEVELING



ATA 09 TOWING AND TAXIING

INTRODUCTION

Chapter nine of the aircraft maintenance manual provides information regarding towing and taxiing of the aircraft.

The aircraft towing operations are only possible with the aid of a power equipment.

There are two different situations for aircraft towing:

- towing procedure for maintenance and
- pushback procedure to move the aircraft away from the terminal gate before flight.

There are two different ways for aircraft towing:

- > Towing with a towbar
- Towbarless towing

Please note that only approved personnel familiar with the required procedures may tow or taxi the aircraft.

Only approved persons who fully know the engine start and shutdown procedures, limitations, and taxiing techniques can taxi the aircraft.

The person must obey the local authorities' rules.





CHAPTER 9 TOWING AND TAXIING



TOWING WITH TOWBAR

Towing of the aircraft is performed when it must be moved without using the power of its own engines.

To tow the aircraft an approved tow bar with a shear section that breaks at a tension compression shear load is used to prevent damage to the landing gear or the aircraft structure if an excessive load occurs.

Towing with towbar is also permitted when:

- One tire (inboard or outboard) is completely flat on one or on the two MLGs or/and;
- > When one NLG tire is completely flat, and;

Note: A minimum of one tire of each LG must be in good condition and set with the correct pressure, and;

You obey the following conditions below:

- > Make sure that there are no passengers in the aircraft.
- The aircraft must be as light as possible to decrease the loads applied to the LGS.
- The maximum towing speed is 7 km/h (4 mph). You shall not at any time exceed this speed.
- Make sure that you replace the tires in good condition that you used during the towing procedure.

Before the definition of the ground towing factors, it is important to know if it is possible to tow the aircraft, considering its total weight, the ground characteristics and the wind speed. Depending on the ground characteristics and wind speed at the moment, the graphics in the AMM have to be consulted for towing on the following surfaces:

- > Dry concrete
- > Wet concrete
- Snow surface
- Icy surface

Note: The wind speeds in the figures cover all critical wind directions.

The aircraft maintenance manual provides a table for the ground towing factors that are most important in various conditions. On this table you can find the necessary drawbar pull and the total wheel-traction load for various aircraft weights, pavement slopes, friction coefficients and engine idle thrust.

Warning: WHEN YOU TOW THE AIRCRAFT, ALL PERSONS MUST BE A MINIMUM OF 3 METERS (10 FEET) FAR FROM THE DANGEROUS AREAS AROUND THE TOWING VEHICLE, TOWBAR, NOSE WHEEL, AND MAIN WHEELS. THE AIRCRAFT CHANGES POSITION DURING PUSHBACK AND TOWING AND CAN RUN OVER PERSONS ON THE GROUND. IF YOU DO NOT OBEY THIS PRECAUTION, A FATAL ACCIDENT CAN OCCUR.

Caution: REMOVE ALL TOOLS, EQUIPMENT, AND MATERIALS FROM THE TOWING AREA. MAKE SURE THAT THE AREA IS CLEAN.

ATA 05 – ATA12 AIRPLANE GENERAL





GROUND TOWING REQUIREMENTS (EXAMPLE)



TOWING OPERATION

Before and during aircraft towing the following safety precautions must be observed.

Towing without an approved tow bar is prohibited. Alternative devices can cause damage to the aircraft.

Before towing:

- Make sure that down lock safety pins are correctly installed and that all engine cowls are closed and latched.
- Make sure that the fuel asymmetry is maximum 363 kg (800 lb).
- Disengage the steering system with the switch installed on the control yoke or set the external steering disengagement switch to the "DISENGAGED" position and
- > Make sure that the green towing indication light illuminates.

During the towing operation, a technician must stay in the cockpit to set the emergency/parking brake, if necessary.

When all towing precautions are preformed which are described in the AMM, you can start the towing operation by the release of the emergency/parking brake. Tow the aircraft slowly straight ahead before making a turn, and obey the towing speed limitations, which are described in the AMM.

The maximum towing speed using a tow bar is 7 km/h (4 mph). You shall not at any time exceed this speed.

After completing of the towing operation, tow the aircraft in a straight line for a minimum of 3 meters (10 feet) or until the nose wheel steering system is in its active range of $\pm 76^{\circ}$.

Aircraft Towing

Perform towing in accordance with AMM Procedure 09-10-01. Aircraft towing is performed as follows:

- > Push the lock pin and put the tow bar lever in released position.
- Install the tow bar assembly on the towing attachment on the nose landing gear and push the lock pin and put the tow bar lever in towing position.
- Attach the other side of the tow bar assembly to the towing vehicle, remove the wheel chocks, and
- release the emergency/parking brake.

When towing is complete:

- set the emergency/parking brake,
- install the wheel chocks and
- remove the tow bar assembly from the towing vehicle.
- > Push the lock pin and put the tow bar lever in released position.
- > Finally, remove the tow bar assembly from the nose landing gear.





BEFORE TOWING



TOWBARLESS TOWING

It is possible to use a tug vehicle without a towbar to tow the aircraft.

One person is required in the cockpit to operate the steering system and the brakes; one person to operate the towbarless vehicle;

Note: For a safer procedure, Embraer recommends the aid of 4 more persons, as follows: one under each wingtip and one at the tail.

- One person at the left wing tip and one person at the right wing tip to monitor sufficient clearance during turns;
- One person behind the tail to monitor sufficient clearance during turns.

The towing supervisor is in control of the towing operation and must have visual and radio communication with all the towing and flight crewmembers at all times.

Note: The maximum fuel asymmetry between wings is 363 kg (800 lb).

GSE 200

When you use the Lektro (GSE 200) tug vehicle, obey these recommendations:

For a safer towing operation, only approved personnel must operate the towbarless towing vehicle GSE 200.

Note: Because the tug vehicle uses the rear wheels to steer, the operator must know the effect of this on the operation of the unit and be prepared to obey special precautions to prevent accidents.

To do this task, you must know all data supplied in GSE 200 Manufacturer's Operating Manual.

The maximum speed permitted for towing with GSE 200 is 10 km/h (6.3 mph), if the limitations that follow are obeyed:

- > The ground must be dry or wet concrete or asphalt;
- For a ground with ice or snow, the maximum speed permitted is 7 km/h (4.4 mph), if the towing vehicle does not have antiskid system.

GSE 422

When you use the towbarless towing vehicle (GSE 422), obey these recommendations:

For a safer towing operation, only approved personnel must operate the towbarless towing vehicle (GSE 422).

To do this task, you must know all data supplied in the towbarless towing vehicle (GSE 422) Manufacturer's Operating Manual.

Make sure that the towbarless towing vehicle has all settings correctly adjusted for the aircraft. Refer to the Manufacturer's Operating Manual for more data.

The maximum speed permitted for towing with GSE 422 is 30 km/h (18.8 mph), if the limitations that follow are obeyed:

- > The ground must be dry or wet concrete or asphalt;
- For a ground with ice or snow, the maximum speed permitted is 7 km/h (4.4 mph), if the towing vehicle does not have antiskid system.





TOWBARLESS USING GSE 200 OR GSE 422



TAXIING REGULATIONS

Only approved persons who are fully familiar with the engine start and shutdown procedures, aircraft limitations, and taxiing techniques are allowed to perform taxiing.

In addition, the applicable company procedures and regulations of local authorities must be obeyed.

Before aircraft taxiing, clear the area to be used. Install the landing gear safety pins, and make sure that the brakes and the nose wheel steering system are in serviceable condition.

The following cautions have to be observed:

- > The areas for taxiing must be free of obstacles and have the necessary space for the maneuvers.
- > Always obey the instructions in the operations manual.
- Further note that you should not use differential braking during the taxiing.
- For the most satisfactory operation, use minimum engine power or, when necessary, slight asymmetric power and the steering control of the nose wheels.

The aircraft requires a minimal pavement width for a 180° turn. However, during taxiing you should always perform turns with the largest radius possible given by the available space.

Taxi the aircraft at a speed applicable to ramp operations.

After aircraft taxiing, install the wheel chocks and set the emergency/parking brake.

Safety Precaution Examples

- Caution: THE AREAS FOR TAXIING MUST BE FREE OF OBSTACLES AND HAVE THE NECESSARY SPACE FOR THE MANEUVERS.
- Warning: MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED IN EACH LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.
- Caution: DO NOT USE THE BRAKES CONTINUOUSLY TO KEEP THE NECESSARY TAXI SPEED. IF YOU DO NOT GIVE THE BRAKES SUFFICIENT TIME TO COOL, THEY CAN BECOME TOO HOT. THIS CAN CAUSE DAMAGE TO THE BRAKES OR THE MELTING OF A WHEEL-THERMAL-FUSE PLUG AND CONSEQUENT DECREASE IN THE TIRE INFLATION PRESSURE.
- Caution: DO NOT TAXI THE AIRCRAFT WITH THE SHOCK STRUTS OF THE MAIN LANDING GEAR FULLY COMPRESSED. DAMAGE TO THE SHOCK STRUTS CAN OCCUR.

Caution: DO NOT OPERATE THE LANDING LIGHTS DURING THE TAXIING PROCEDURE.





TAXI REGULATIONS



ATA 10 PARKING AND MOORING

INTRODUCTION

Chapter 10 of the Maintenance Manual describes the applicable procedures for parking and mooring the aircraft.

In general, there are two types of parking:

- First, aircraft normal parking, which describes procedures for parking an aircraft for less than 7 days, including parking between flights and overnight. Or,
- Aircraft prolonged parking, which describes procedures for parking an aircraft for more than 7 days.

Normal Parking is divided for following conditions:

- Aircraft Normal Parking
- > Aircraft Normal Parking in Cold Weather Condition
- > Aircraft Normal Parking in Volcanic Ash Condition





Two types of parking:



Normal parking < 7 days



Prolonged parking > 7 days

TYPES OF PARKING



MINIMUM DISTANCES

Please note that the area where the aircraft is parked and moored should be paved and level, with ground tie down anchors available.

Also make sure that there is a minimum distance between the parked aircraft to permit their movement, and that there is a distance of at least 4.5 meters (15 ft) between an operating APU exhaust port and an adjacent aircraft fuel tank vent.





MINIMUM DISTANCES



NORMAL AIRCRAFT PARKING

For normal aircraft parking make sure that the control handle of the landing gear is in the down position. Make sure that the safety pins are installed on each landing gear. Tow or taxi the aircraft into the position designated for parking.

Note: Before you park the aircraft, move it in a straight line for approximately 3 meters (10 ft), complete the aircraft towing in a straight line for a minimum of 3 m (10 ft) or until the nose wheel steering system is in the range of +/- 76 degrees.. This will remove all torsional stresses applied to the landing gear components and tires during a turn. Ground the aircraft.

Safety Precaution Examples

- Warning: MAKE SURE THAT THE AIRCRAFT IS IN A SAFE CONDITION BEFORE YOU DO THE MAINTENANCE PROCEDURES. THIS IS TO PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.
- Caution: YOU MUST SHELTER THE AIRCRAFT IN THE HANGAR WHEN THERE ARE WIND VELOCITIES OF 65 KT OR MORE. THE AIRCRAFT CAN RESIST WINDS OF LESS THAN 65 KT WHEN IT IS MOORED. IF YOU DO NOT OBEY THIS PRECAUTION, DAMAGE TO THE AIRCRAFT CAN OCCURS.
- Warning: MAKE SURE THAT THE DOWNLOCK PINS ARE INSTALLED IN EACH LANDING GEAR. WITHOUT THE DOWNLOCK PINS, THE LANDING GEAR CAN RETRACT AND CAUSE INJURIES TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.
- Warning: BE SURE TO CORRECTLY INSTALL THE RAT STOW LOCK PIN. IF THE RAT STOW LOCK PIN IS NOT CORRECTLY INSTALLED, AND THE RAT ACCIDENTALLY RECEIVES AN AUTOMATIC OR MANUAL DEPLOY COMMAND, THE RAT WILL EXTEND AND POSSIBLY CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.





NORMAL AIRCRAFT PARKING



NORMAL AIRCRAFT PARKING IN COLD WEATHER CONDITION

A cold weather condition is when the aircraft is parked in an ambient temperature lower than 0 °C (32 °F).

If the parking area has ice or snow on the surface, put one of the following items under the tires:

- a mat
- > a layer of thick sand or other applicable material.

This will prevent the tires from freezing to the ground.

Set the emergency/parking brake. Retract the flaps if they are extended. Put the chocks against the landing gear wheels and install the covers on the externally mounted aircraft components according to the AMM, using the same procedure as for the air data smart probe covers, the engine inlet covers, the tat sensor covers and the ice detector covers.

Do a check of the Chart "Allowed Ambient Temperature versus Exposure Time" for the Batteries.

Water and fluids in the Galley should be drained. All doors and windows should be closed.

NORMAL PARKING IN VOLCANIC ASH CONDITION

This procedure must be executed before the volcanic ash fallout and if the aircraft is to be parked outside in an open area.

Volcanic ash is a highly abrasive material that can corrode the contaminated surfaces.

All areas have to be covered according to the AMM procedure.

If the aircraft flies through a cloud of volcanic ash, makes a landing or takeoff, or does ground operations (towing, taxiing) in a volcanic ash fallout condition, (AMM TASK 05-50-10-200-801-A/600) must be accomplished.

Caution: DO NOT ENERGIZE THE AIRCRAFT AND DO NOT MOVE THE FLIGHT CONTROL SYSTEM SURFACES WITH THE AIRCRAFT CONTAMINATED WITH VOLCANIC ASH. IF YOU DO NOT OBEY THIS PRECAUTION, DAMAGE TO THE COMPONENTS CAN OCCUR.

Warning: WHEN THE HOLES, COMPONENTS AND/OR ACCESS PANELS ARE COVERED, MAKE SURE THAT THIS CONDITION IS VISIBLE FROM THE GROUND. ALSO, ATTACH A REMOVE-BEFORE- FLIGHT STREAMER TO THEM. IF YOU DO NOT OBEY THIS PRECAUTION, FAIL TO THE SYSTEMS CAN OCCUR, WHICH CAN CAUSE THE LOSS OF A SAFE FLIGHT CONDITION.




NORMAL AICRAFT PARKING IN COLD WEATHER CONDITIONS



LONG TERM PARKING

Long-term parking procedures apply to aircraft that must stay parked for more than seven days. When followed, these procedures will prevent the deterioration of aircraft components exposed to the elements.

These components include:

- > aircraft structure,
- > airborne equipment/furnishings and
- > system components.

There are different preservation procedures for the different times during which the aircraft must stay out of operation.

These times are specified as follows:

- Short out-of-operation time applicable to times up to 30 days and
- Short out-of-operation time applicable to times up to 60 days and
- Long out-of-operation time applicable to times longer than 60 days.

As well a procedure for prolonged parking in volcanic ash condition is available.

For details regarding these procedures, refer to the appropriate manuals.





Short out-of-operation time:

applicable to times from 7 to 60 days

Long out-of-operation time:

applicable to times longer than 60 days

LONG TERM PARKING



MOORING THE AIRCRAFT

The procedures for mooring the aircraft are used when the weather conditions are bad or unknown, and/or high wind speeds are expected.

For this procedure, tie down rings are installed in each primary brace strut of the main landing gear. Ropes are then used to tie the aircraft to tie down anchors installed in the floor.

The area where to moor the aircraft must be paved and level, with ground tiedown anchors available.





MOORING THE AIRCRAFT



ATA 11 PLACARDS AND MARKINGS

INTRODUCTION

Exterior and interior placards, labels and markings are screen-printed selfadhesive transfer type matte polyester or aluminum metal, attached to the aircraft.

Only exterior screen-printed markings, directly on the exterior of the aircraft are protected against contamination by weather, fuel and/or hydraulic fluid by a protective sealer.

Some of the labels have there part number printed on them for easier identification and reordering.





EXTERIOR SCREED – PRINTED MARKINGS



ATA 12 SERVICING

INTRODUCTION

Chapter 12 of the aircraft maintenance manual provides information about scheduled and unscheduled aircraft servicing, and is divided into the following sub chapters:

Replenishing, which provides information about the procedures to fill or charge the aircraft systems with fuel, oil, gas, and other fluids as required.

Servicing, which provides information about procedures such as landing gear lubrication and aircraft cleaning.

Unscheduled servicing, which provides information about aircraft cold weather maintenance.

Please note that you must always refer to the procedures outlined in the applicable manuals to perform these tasks.

ATA 05 – ATA12 AIRPLANE GENERAL



CHAPTER 12



NOTE:

Refer to procedures outlined in the applicable manuals to perform these tasks!

CHAPTER 12



REPLENISHING

Replenishing details the procedures to fill or charge the aircraft systems with fuel, oil, gas, and other fluids as needed.

This section contains the following subsections: Fuel tank servicing, Engine and APU servicing, Hydraulic and landing gear system servicing, Oxygen system servicing and water servicing.





REPLENISHING



FUEL TANK SERVICING

Fuel tank servicing can be performed using the following methods:

- The fuel tanks can be refueled/ defueled by the use of the pressure refueling/ defueling system, which automatically controls the entire process and stops the refueling/ defueling process at the correct quantity. Pressure refueling/ defueling is performed by the use of the pressure fueling/ defueling adapter and the fuel control panel.
- The fuel tanks can be refueled/ defueled by the use of gravity refueling/ defueling. To accomplish this, the aircraft has two filler caps on top of the wings. Fuel tank draining for removal of water or other contamination can be carried out by using the drain valves installed at the lowest part of the inboard tanks. The fuel measuring stick assemblies located on each wing lower surface provide a visual indication of the total fuel quantity on each wing. They are used if no electrical power is available to the aircraft or if there is a malfunction of the fuel quantity indicating system. Please note that you must refer to the procedures outlined in the applicable manuals to perform these tasks!

AMM References:

12-11-01-650-801 Fuel Tank - Pressure Refueling 12-11-01-650-802 Fuel Tank - Pressure Defueling

12-11-03-650-801 Fuel Tank - Gravity Refueling

12-11-05-680-801 Fuel Tank - Water Draining 12-11-05-680-802 Fuel Tank - Remaining Fuel Draining

12-11-07-200-801 Fuel Magnetic Level - Check

Safety Precaution Examples

- Warning: MAKE SURE THAT THE AIRCRAFT IS IN A SAFE CONDITION BEFORE YOU DO THE MAINTENANCE PROCEDURES. THIS IS TO PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.
- Warning: READ THE FUEL SYSTEM SAFETY PRECAUTIONS TO PREVENT INJURY TO PERSONS AND DAMAGE TO MATERIAL.
- Caution: DURING THE REFUELING PROCEDURE, LOOK AT THE PRESSURE RELIEF VALVE AREA IN THE LEFT AND RIGHT WING TANKS TO SEE IF THERE IS A FUEL OVERFLOW. OVERFILLING CAUSES A FUEL OVERFLOW THROUGH THE NACA AIR INLET AND PRESSURE RELIEF VALVE. IF AN OVERFLOW OCCURS AND THE PRESSURE RELIEF VALVE DOES NOT OPEN, DAMAGE TO THE AIRCRAFT STRUCTURE CAN OCCUR.
- Caution: WHEN YOU FULLY DEFUEL THE TANK, YOU MUST STOP WHEN THE INDICATION SHOWS 0. IN THIS SITUATION THERE IS A SMALL QUANTITY OF FUEL IN THE TANK THAT PREVENTS DAMAGE TO THE FUEL PUMP. DAMAGE TO THE FUEL PUMP WILL OCCUR IF IT OPERATES WITH NO FUEL (DRY OPERATION).
- Caution: IF YOU APPLY SUCTION DURING THE PROCEDURE, DO NOT EXCEED THE MAXIMUM SUCTION PRESSURE OF 4 PSIG (0.3 BAR). IF YOU DO NOT OBEY THIS PRECAUTION, DAMAGE TO THE EQUIPMENT CAN OCCUR.





FUEL TANK SERVICING



HYDRAULIC AND LANDING GEAR SYSTEM SERVICING

The section "hydraulic and landing gear system servicing" provides information about the servicing procedure on the accumulators of the No. 1, No. 2, and No. 3 hydraulic systems, and also the procedures used to pressurize the landing gear shock struts.

Detailed procedures about landing gear servicing can be found in Chapter 32 of the aircraft maintenance manual.

Always refer to the procedures outlined in the applicable manuals to perform these tasks!

AMM References:

12-12-01-200-801 Hydraulic Reservoir Level - Check

12-12-01-600-801 Hydraulic Reservoir - Servicing

12-12-01-680-801 Hydraulic Reservoir - Draining

12-12-01-600-802 Hydraulic Reservoir - Servicing (Routine Check)

12-12-05-610-801 Emergency/Parking Brake Accumulator - Servicing

12-12-07-600-801 Main-Landing-Gear Shock Strut with the Aircraft on the Ground Using Oil Filling GSE 384 - Servicing

12-12-07-600-802 Main-Landing-Gear Shock Strut with the Aircraft on Jacks NOT Using Oil Filling GSE 384 - Servicing

12-12-07-600-803 Main-Landing-Gear Shock Strut with the Aircraft on the Ground NOT Using Oil Filling GSE 384 - Servicing

12-12-07-600-804 Main-Landing-Gear Shock Strut with the Aircraft on Jacks Using Oil Filling GSE 384 - Servicing

12-12-07-600-806 Main-Landing-Gear Shock Strut with the Aircraft on the Ground (Simplified) - Servicing

12-12-07-600-810 Main-Landing-Gear Shock Strut Draining and Hydraulic Fluid Replacement - Servicing

12-12-08-600-802 Main-Landing-Gear Shimmy Damper - Servicing

12-12-09-600-801 Nose Landing Gear Shock Strut with the Aircraft on the Ground - Servicing

12-12-09-600-802 Nitrogen Pre-charge of the Nose-Landing-Gear Shock Strut - Servicing

12-12-09-600-803 Nose Landing Gear Shock Strut with the Aircraft on Jacks - Servicing

12-12-09-600-804 Nose Landing Gear Shock Strut N2 Chamber – Servicing

12-12-09-600-805 Nose-Landing-Gear Shock Strut Draining and Hydraulic Fluid Replacement with the Aircraft on the Jacks - Servicing

12-12-09-600-806 Nose-Landing-Gear Shock Strut Draining and Hydraulic Fluid Replacement with the Aircraft on the Ground - Servicing

12-12-11-600-801 Hydraulic System Ecology Bottle - Servicing

Safety Precaution Examples

Warning: THE HYDRAULIC SYSTEM HAS PHOSPHATE-ESTER HYDRAULIC FLUID. PUT ON APPROVED RUBBER GOGGLES AND RUBBER GLOVES WHEN YOU WORK ON THE HYDRAULIC SYSTEM. IF THE FLUID TOUCHES YOU, FLUSH YOUR SKIN WITH WATER. IF IT GETS IN YOUR EYES, FLUSH THEM WITH WATER AND GET MEDICAL AID. THE FLUID CAN CAUSE SKIN AND EYE IRRITATION.

Warning: OBEY ALL HYDRAULIC SAFETY PRECAUTIONS WHEN YOU DO WORK ON THE HYDRAULIC SYSTEM COMPONENTS. IF YOU DO NOT OBEY THE SAFETY PRECAUTIONS, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.





HYDRAULIC AND LANDING GEAR SYSTEM SERVICING



ENGINE AND AUXILIARY POWER UNIT SERVICING

The section "engine and auxiliary power unit servicing" provides all required information to refill the engine and auxiliary power unit oil system. Engine oil servicing is performed through the applicable service panels on the engine nacelles, and auxiliary power unit oil servicing is performed through a service panel on the aircraft rear fuselage.

Please note that the oil used to service the engine and APU must be listed on the table of approved oils. Also note that you must refer to the procedures outlined in the applicable manuals to perform these tasks.

Safety Precaution Examples

Warning: MAKE SURE THAT THE AIRCRAFT IS IN A SAFE CONDITION BEFORE YOU DO THE MAINTENANCE PROCEDURES. THIS IS TO PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

Warning: OBEY ALL POWERPLANT SAFETY PRECAUTIONS. IF YOU ARE NOT CAREFUL DURING THE POWERPLANT MAINTENANCE, INJURY TO PERSONS AND/OR DAMAGE TO EQUIPMENT CAN OCCUR.

Warning: DO NOT TOUCH THE EXHAUST DUCT AND ENGINE COMPONENTS UNTIL THEY ARE COOL. THE TEMPERATURE CAN STAY HIGH FOR A LONG TIME AFTER THE ENGINE STOPS. IF YOU DO NOT OBEY THIS PRECAUTION, YOU CAN BURN YOURSELF.

Warning: ENGINE OIL IS TOXIC AND FLAMMABLE. USE PERSONAL PROTECTION EQUIPMENT, IN A WELL-VENTILATED AREA.

AMM References:

12-13-01-200-801 Engine Oil Level - MFD Check

12-13-01-200-802 Engine Oil Level - Engine Check

- 12-13-01-612-801 Engine Oil Filling
- 12-13-01-680-801 Engine Oil Draining
- 12-13-05-200-801 APU Oil level Check

12-13-05-200-802 EFFECTIVITY: ON ACFT WITH APU OIL LEVEL INSPECTION ACCESS PANEL OR POST-MOD SB 190-53-0004

APU Oil Level - Check Through Quick Access Panel

12-13-05-612-801 APU Oil - Filling

12-13-05-680-801 APU Oil - Draining

12-13-09-610-801 Integrated Drive Generator Oil - Servicing

12-13-09-680-801 Integrated Drive Generator Oil - Draining

12-13-09-900-801 Integrated Drive Generator Oil and Filter Element - Change

12-13-09-210-801 Integrated Drive Generator Oil Level - Check

12-13-11-612-801 Air Turbine Starter Oil - Replacement





! NOTE !

Oil must be listed on the table of approved oils!

ENGINE AND APU SERVICING



SERVICING WATER/WASTE

The section "water/waste" provides information on how to service the water and waste systems.

The waste system is serviced through a door installed on the lower right side of the fuselage aft section, while the potable water system is serviced through a door installed on the lower left side of the fuselage aft section.

It is recommended that water be removed from the water tank after the last flight of each day if the temperature is expected to fall below freezing.

Again, always refer to the procedures outlined in the applicable manuals to perform these tasks!

Safety Precaution Examples

Warning: MAKE SURE THAT THE AIRCRAFT IS IN A SAFE CONDITION BEFORE YOU DO THE MAINTENANCE PROCEDURES. THIS IS TO PREVENT INJURY TO PERSONS AND/OR DAMAGE TO THE EQUIPMENT.

Warning: DO NOT TOUCH THE DRAIN MAST. IF YOU TOUCH IT, YOU WILL BE BURNED.

Caution: THE MAXIMUM PRESSURE FOR FILLING IS 379.3 kPa (55 Psi).

Warning: PUT ON RUBBER GLOVES, GOGGLES AND PROTECTION CLOTHES WHEN YOU USE CLEANING AND DISINFECTANT SOLUTION. THESE PRODUCTS CAN CAUSE INJURY TO YOU.

AMM References:

12-14-01-613-801 Potable Water System - Filling

12-14-01-613-802 Potable Water System (Fill/Drain Valve De-energized) - Filling

12-14-01-613-803 Potable Water System (Icing Condition) - Filling

12-14-01-670-801 Potable Water System - Sterilization

12-14-01-680-801 Potable Water System - Draining

12-14-01-680-802 Potable Water System (Fill/Drain Valve De-energized) - Draining

12-14-01-680-803 Potable Water System (Icing Condition) - Draining

12-14-05-600-801 Waste Tank - Servicing

12-14-05-600-802 Waste Tank (Waste Drain Cable Malfunction) - Servicing







GASEOUS SERVICING

The section "gaseous servicing" provides information regarding filling procedures for the cockpit oxygen cylinder, the main and nose gear tire pressure and the hydraulic system accumulator.

Attention: Please note that all applicable safety precautions must be obeyed! In addition, you must refer to the procedures outlined in the applicable manuals to perform these tasks!

AMM References:

- 12-15-01-200-801 Main-Landing-Gear Tire Pressure Check
- 12-15-01-600-801 Main-Landing-Gear Tire Servicing
- 12-15-03-200-801 Nose-Landing-Gear Tire Pressure Check
- 12-15-03-600-801 Nose-Landing-Gear Tire Servicing
- 12-15-05-200-801 Hydraulic System Accumulator Pressure Charge Check
- 12-15-05-600-801 Hydraulic System Accumulator Servicing
- 12-15-06-614-801Cockpit Oxygen Cylinder Charging

Safety Precaution Examples

- Warning: DO NOT GO NEAR THE AIRCRAFT TIRES WHEN THEY ARE HOT. IF IT IS NECESSARY TO MEASURE THE TEMPERATURE OF THE TIRES, GO NEAR THEM FROM THE FRONT. DO NOT GO TO THE TIRES FROM THE SIDE. THE HIGH TEMPERATURE CAN CAUSE AN EXPLOSION OF THE TIRES.
- Warning: DO NOT LET HIGH PRESSURE GAS TOUCH YOUR SKIN. GAS BUBBLES IN YOUR BLOOD CAN KILL YOU.
- Warning: PUT ON APPROVED SAFETY CLOTHING AND GOGGLES WHEN YOU DO WORK ON PRESSURIZED SYSTEMS OR COMPONENTS. PRESSURIZED FLUID AND GAS ARE DANGEROUS AND CAN CAUSE INJURIES.
- Caution: DO NOT BLEED AIR FROM A HOT TIRE TO MAKE THE PRESSURE COME TO THE CORRECT LIMITS BECAUSE, AT AMBIENT TEMPERATURE, THEIR PRESSURE WILL BE LESS THAN THE CORRECT OPERATIONAL PRESSURE.





GASEOUS SERVICING



SCHEDULED SERVICING

The section "scheduled servicing" provides information regarding lubricating of the flight controls and landing gear mechanical system, cleaning servicing, like aircraft cleaning, and aircraft disinfect servicing.

Refer to the procedures outlined in the applicable manuals to perform these tasks!

AMM References:

12-21-01-640-801 Horizontal Stabilizer Trim Actuator - Ballscrew – Lubricating

12-21-02-640-801 Control Yoke Chain - Lubricating

12-21-03-640-801 Control-Yoke Disconnect System – Lubricating

12-21-04-640-801 Control-Column Disconnect System - Lubricating

12-21-05/300 EFFECTIVITY: ON ACFT WITH TRIM CONTROL PANEL UP TO P/N 170-00679-405

12-21-05-640-801 EFFECTIVITY: ON ACFT WITH TRIM CONTROL PANEL UP TO P/N 170-00679-405

Roll/Pitch Trim Switches - Lubrication

12-21-05-100-801 Roll/Pitch Trim Switches - Cleaning

12-21-07-640-801 Flap Actuator - Lubricating

12-21-07-640-802 Flap-Actuator Gearbox-Seal - Lubricating

12-21-08-640-801 Flap Track Mechanism Needle Rollers - Lubricating

12-21-09-640-801 Slat Pinion, Rack, Main Rollers, Side Rollers and Track - Lubricating

12-21-10-640-801 Flap Torque Tubes – Lubricating

12-21-11-640-801 Slat Torque Tubes - Lubricating

12-21-15-610-801 Rudder Pedal Damper – Servicing

12-21-16-610-801 Control Column Dampers - Servicing

12-21-18-640-801 Bearings of the Aileron Power-Control-Unit Toggle Links - Lubricating

12-21-19-640-801 Bearings of the Rudder Power-Control-Unit Toggle Links - Lubricating

12-21-20-640-801 Bearings of the Elevator Power-Control-Unit Toggle Links – Lubricating

12-22-01-100-801 External Aircraft - Cleaning

12-22-01-100-802 Passenger Cabin Windows - Cleaning

12-22-01-100-803 Passenger Cabin - Cleaning

12-22-01-100-804 Direct-Vision Windows - Cleaning

12-22-01-100-805 Equipment/Furnishing - Cleaning

12-22-01-100-806 Cargo Compartment - Cleaning

12-22-01-100-807 Cockpit - Cleaning

12-22-01-100-809 Windshield - Cleaning

12-22-01-100-810 Nose and Main Landing Gear - Cleaning

12-22-01-100-81 Cockpit/Passenger Cabin Panels and Grilles - Cleaning

12-22-01-100-812 Avionics bay/components - Cleaning

12-24-01-670-801 Passenger Cabin - Disinsect/Disinfect

12-24-01-670-802 Cargo Compartment - Disinfect

12-24-01-670-803 Cockpit - Disinsect/Disinfect

12-25-01-160-801 Airframe Drains - Cleaning

ISSUE 1, 24 Sep 2014

FOR TRAINING PURPOSES ONLY









UNSCHEDULED SERVICING

The section "unscheduled servicing" provides information regarding how to service an aircraft in cold weather conditions or how to perform a cold weather anti-icing and de-icing treatment.

Refer to the procedures outlined in the applicable manuals to perform these tasks!

AMM References:

12-31-01-600-801 EFFECTIVITY: ON ACFT WITH AMS SOFTWARE UP TO BLACK LABEL 6.0 OR PRE-MOD SB 190-21-0012/01

Cold Weather - TAT Servicing

12-31-01-660-801 Cold Weather - Anti-Icing and Deicing Treatment

12-31-01-212-801 Cold Weather - Critical Surfaces Visual Inspection

12-31-01-211-801 Anti-Icing and Deicing Fluid Residues - General Visual Inspection (Wings)

12-31-01-213-801 Anti-Icing and Deicing Fluid Residues - General Visual Inspection (Stabilizers)

Safety Precaution Examples

- Note: The performance characteristics of SAE Type II, Type III and IV deicing/anti-icing fluids may be degraded by excessive mechanical shearing or chemical contamination. Therefore, only compatible pumps, control valves, piping, and application devices must be used. The design of fluid transfer systems must be in accordance with the fluid manufacturers' recommendations.
- Caution: DO NOT APPLY TYPE II, III OR IV FLUID MANY TIMES WITHOUT SUBSEQUENT APPLICATION OF TYPE I FLUID OR HOT WATER. IF YOU DO NOT OBEY THIS PRECAUTION, RESIDUES CAN COLLECT IN AERODYNAMICALLY QUIET AREAS, CAVITIES, AND GAPS. THE RESIDUES CAN BECOME A LIQUID AGAIN AND FREEZE UNDER CERTAIN TEMPERATURES AND HIGH HUMIDITY CONDITIONS. AS A RESULT, DAMAGE TO THE FLIGHT CONTROL SYSTEM CAN OCCUR.

Warning: MAKE SURE THAT THE BRAKES ARE COOL BEFORE YOU APPLY DEICING AND ANTI-ICING FLUID TO THE WHEEL AREA. THE APPLICATION OF THE FLUID IN HOT SURFACES CAN CAUSE INJURY TO PERSONS.

Warning: MAKE SURE THAT THE TECHNICIAN IS TRAINED AND IS PREPARED TO DO THESE PROCEDURES.





UNSCHEDULED SERVICING



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