Aircraft Recovery Manual

MODEL	A/C EFFECTIVITY
BD-100-1A10 (CH-300)	20003-20457
BD-100-1A10 (CH-350)	20501-20999

BOMBARDIER
CHALLENGER

Publication No. CH 300 ARM

BOMBARDIER CHALLENGER* 300 and 350 (MODEL BD-100-1A10)

AIRCRAFT RECOVERY MANUAL

Bombardier Aerospace
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BD–100 AIRCRAFT RECOVERY MANUAL

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		10	Oct 31/2014				

BD–100 AIRCRAFT RECOVERY MANUAL

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SECTION 05 – Fire Fighting

SECTION 06 – Ground Safety

INTRODUCTION

1. Scope of the Manual

A. Bombardier Business Aircraft Customer Support (BBACS) prepared the Aircraft Recovery Manual to help an Airport Authority, an FBO, and/or an aircraft recovery crew if an accident occurs with a Bombardier Challenger BD–100–1A10 model Business Jet. Because there are many Completion Centers that do different passenger compartment layout, it is not possible to give all the different layouts in this manual.

B. Challenger BD–100–1A10 model referred in this manual, include:

- Challenger 300
- Challenger 350

C. No aircraft recovery operation will be the same as other recovery operations because of:

- The accident or the incident itself,
- The location of the aircraft,
- The amount of aid that is available locally,
- The weather conditions when the accident/incident occurred. Also, the effects of the weather before and during the recovery operation,
- The number of persons that are available to help with the recovery.

2. Manual Organization

A. There are six sections in this manual:

- Section 1 – INTRODUCTION
- Section 2 – AIRCRAFT RECOVERY
- Section 3 – AIRCRAFT – GENERAL
- Section 4 – EMERGENCY INFORMATION
- Section 5 – FIRE FIGHTING
- Section 6 – GROUND SAFETY

3. Correspondence

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4. Statement of Liability

A. This manual is intended to be used by Aircraft Crash Recovery crews involved in the recovery of any Bombardier BD–100–1A10 Challenger model Business Jet which becomes involved in an accident or incident. It is also intended to help those persons planning for the unlikely event that will require recovery actions. The actions described in this manual are intended as recommendations only, as to how aircraft recovery tasks should be carried out. Any omission of a task or an action, or any omission to a task or action, shall not be interpreted as an admission of liability by Bombardier Inc., or any of its sub–groups of affiliates or related entities.

5. Technical Glossary

A. Refer to Table 1 for a Technical Glossary of aircraft terminology and abbreviations.

Table 1– Technical Glossary

A/C	Aircraft
ac	Alternating Current
AFFF	Aqueous Fire Fighting Foam
APU	Auxiliary Power Unit
AUX	Auxiliary
CBR	California Bearing Ratio
dc	Direct Current
DISCH	Discharge
ELECT PWR	Electrical Power
ENG	Engine

Table 1– Technical Glossary	
EQP	Equipment Bay
FBO	Fixed Base Operator
FS	Fuselage Station
FT/SEC	Feet per second
IATP	International Air Technical Pool
ICAO	International Civil Aviation Organization
IIC	Investigator–in–Charge
KM/H	Kilometers per hour
LWR FUS	Lower Fuselage
mm	Millimeter
mph	miles per hour
MLG	Main Landing Gear
NLG	Nose Landing Gear
T/E	Trailing Edge
TYP	Typical

6. Dimensions

A. Linear dimensions given in this manual are in inches. The metric equivalents are given in parentheses ( ).

AIRCRAFT RECOVERY

1. Quick Reference Guide

A. The leader of the recovery operation can use the Quick Reference Guide that follows as a checklist for the recovery team to refer to.

(1) Do the weight and balance

(a) Find the weight and balance of the aircraft to make an estimate of the limits to jack and tow the aircraft.

(b) Record the quantity and location of cargo and fuel to calculate the weight and balance.

NOTE: You may have to calculate the weight and balance more than one time during the recovery operations.

(2) Get initial data about the incident

(a) Set up interfaces with the Investigator–in–Charge (IIC), local authorities, the aircraft manufacturer's (Bombardier) representative, and the owner's agent or representative.

(b) Tell the recovery crew surveyor to make a full estimate of the site as quickly as possible. The type of accident site can have an effect on the aircraft removal.

(c) Make a note of the slope of the terrain, the ground cover (e.g. trees, grass, rock), and the distance from the runways, taxiways, and aprons.

(d) Make an analysis of the ground condition to calculate the bearing area necessary to lift and move the aircraft.

(e) Choose suitable personnel (as well as the recovery crew members) and make an estimate of the necessary equipment, and related manuals.

(f) Get accommodations, transportation, work visas (when necessary), and money for the recovery team.

NOTE: The IIC must be at the site before this occurs.

(g) At the site, speak to local airport authorities, regulatory authorities, and national investigating authorities.

Get data on the items that follow:

- Local environment
- Climate
- Terrain structure
- Communications
- Local regulations for the defueling of the aircraft.

(3) Set Up Interfaces

(a) Make a detailed aircraft recovery plan (use a general recovery plan).

(b) Get permission from local and national authorities to continue with the recovery operation. It is necessary for the different authorities to find the cause(s) of an aircraft accident. You must know and follow the regulatory authority regulations, and the laws of the country in which the accident occurs.

(c) Move personnel and equipment to the recovery site.

(d) Prepare hangar and/or parking space for the aircraft. Refer to section 3 figure 1 for aircraft dimensions.

(e) Make sure that cranes are locally available. Also, make sure that other heavy equipment, building materials and access roads are available. Some operators are member of an organization that share their technical facilities, services and recovery equipment (recovery kits). The International Air Technical Pool (IATP) is the organization that manages the recovery pool arrangement.

(f) If components are removed from the aircraft for recovery purposes, the center of gravity weight and balance location must be re–calculated before the aircraft is moved.

(g) If possible, remove all health risk payload (fuel, oils, dangerous materials, catering, oxygen, squibs, galley and lavatory disposal and water) from the aircraft.

NOTE: Follow the applicable local regulations concerning defueling.

(h) If possible, remove the baggage, cargo and flyaway kit.

(i) If required, remove primary components as necessary.

(j) Refer to Section 6 – GROUND SAFETY for data on the installation of the ground lockpins. These lockpins are used, where possible, to safety the landing gear for operations on the ground.

(k) Prepare to tether, lift and move the aircraft.

(l) Complete the aircraft damage report when the aircraft recovery is completed. The damage report is made by the Bombardier investigating team, or a Technical Support/Engineering team that is specially assembled for the task.

2. Planning for Aircraft Recovery

A. General

CAUTION: THE SPECIAL PROBLEMS THAT ARE RELATED TO AN AIRCRAFT RECOVERY OPERATION MAKE IT NECESSARY FOR ONE APPROVED PERSON TO DIRECT ALL OF THE OPERATION.

(1) Refer to the International Civil Aviation Organization (ICAO) document No. 9137–AN/898, Airport Services Manual; Part 5, "Removal Of Disabled Aircraft" as an aid for aircraft recovery.

(2) The document gives the procedures to use for the recovery and/or the removal of a disabled aircraft. Some advanced procedures that are necessary are as follows:

(a) When you have to move an aircraft that cannot taxi or be towed with an approved towbar or towing bridle, use other recovery procedures. The aircraft may be lifted with pneumatic bags or cranes and move on a trailer or dollies.

(b) Advance planning is important to make sure that the equipment and persons with the skills to do a recovery operation are available when necessary.

(c) Prepare a full "Aircraft Recovery Plan" which may be started as soon as an accident occurs and at the request of the IIC.

(d) Make sure to have the necessary emergency procedures. Give to the applicable personnel, the tasks they are responsible for.

(e) Tell all major users of the airport about the airport management policies that apply to the removal of disabled aircraft. Include applicable parts of this document in the airport procedure.

NOTE: We recommend that a copy of this document be in the airport's "Aircraft Recovery Plan."

B. Aircraft Recovery Plan

(1) The Aircraft Recovery Plan includes:

(a) Guidelines for the fast removal of a disabled aircraft from airport operational areas as well as the time necessary to prevent secondary damage to the aircraft.

(b) Detailed grid maps for use during aircraft recovery operations. The maps must show the topography of the airport site, approaches and adjacent areas. They must also show roads, ditches, gates, ground conditions and other factors that could have an effect on the aircraft recovery operations.

(c) Details about access roads to all parts of the airport that are near overhead power lines or bridges, specially those roads necessary for heavy equipment such as cranes.

(d) Bombardier's data on the Challenger Series aircraft that uses the airport. For aircraft recovery, the important data is the weight and balance, lifting and moving, and weight reduction numbers.

(e) The type and location of heavy or special equipment and the time necessary for the equipment to get to the airport. Equipment to defuel aircraft must be available to move to all areas or locations. Because of the dimensions of the Challenger Series aircraft, cranes and slings can be used to lift the aircraft. Because of this, you can include the availability of cranes in the recovery plan.

NOTE: If not available, try to get aircraft recovery kits from other airports as quickly as possible.

The ICAO "Airport Services Manual", Part 5, gives a worldwide list of aircraft recovery kits.

(f) Sources of personnel with different skills, ranging from laborers to aircraft mechanics.

(g) The requirement for food, clothes, and shelter for the recovery crew.

(h) Flexible procedures for communications, security and safety for the recovery operations, that are correct for the site.

(i) An active inventory of local salvage equipment that is available to the airport. The operator can get aircraft removal equipment and crews through contracts with airport owners, military airfields or aeronautical industries near the airport.

(j) Airport rules must make sure of the items that follow:

1 The airport owner's right to close all or part of the airport as necessary.

2 The limits of liability and penalties for violations.

NOTE: An agreement must received from the IIC or the senior official of the investigation team, before the airport owner can move a disabled aircraft.

(k) Contracts/agreements between aircraft operators and fixed base operators must give each of them the capacity to move the types of aircraft they use or those on which they do servicing. The movement must include minimum risk of damage to the aircraft and to the airport. The contracts/agreements can be with a single operator, a cooperative procedure with the airport authorities or a joint procedure by more than one operator at the applicable airport. We recommend that operators put their removal equipment together because of:

1 The logistical and time saving advantages of recovery kits that they own together.

2 The economic advantages to single operators (they can buy fewer kits).

3 The improvements that come with more equipment because a larger number of operators are together.

(l) The contracts/agreements must record the fixed base operator's procedures and capacity to do non–routine aircraft repairs on runways.

(m) Procedures and agreements for airports used jointly by civil and military aviation.

(n) Analysis of data on recovery equipment, it shows that the type of recovery equipment used does not affect the actual removal time.

(o) In the procedures for recovery equipment, look carefully at the items that follow:

1 The full system to lift and to move the aircraft.

2 The mixture of recovery system components and the support equipment necessary to move dangerous materials. Also, other equipment such as cranes, dollies, and flatbed trucks.

NOTE: To move the Bombardier Challenger Series aircraft, we recommend a tractor/trailer with a bed of equally low height. This will decrease the height the recovery team must lift a damaged aircraft.

3 The availability of winch equipped heavy equipment (bulldozer, tractor etc.).

3. Moving the Aircraft

A. General

(1) The primary reason to move the aircraft is for recovery as quickly as possible without further primary or secondary damage. An up–to–date recovery plan is the best procedure to decrease recovery time. Procedures for the recovery, as well as a group of trained personnel must be included in the plan.

(2) A correct estimate of the damage to the aircraft is very important. This will help to find, in the shortest time, the procedure to do the recovery operation.

B. Steps and Recommendations for an Efficient Aircraft Recovery

(1) Before you start a recovery operation, make sure of the correct safety precautions:

(a) Remove the aircraft batteries as quickly as possible. If it is not possible to remove the batteries, disconnect and insulate the battery connectors. Refer to Figure 1 for battery locations.

(b) Close oxygen bottle valve.

(c) If necessary, defuel the damaged aircraft to increase the speed of the recovery operation.

NOTE: Follow the applicable local regulations concerning defueling.

(2) Examine how the accident occurred. This will help to make an estimate of the damage that occurred to the aircraft.

(3) After a check of the obvious damage, examine the structural condition of the aircraft.

(4) Look for possible damage to other areas of the aircraft. The following are indications of damage:

(a) Bulges in the wing or fuselage skin panels, at structural joints, or heavy fittings, are indications of internal damage.

(b) Rivets, bolts, or fasteners of all types that tilt, are cut or loose, are also indications of damage.

(c) Torn, cracked or buckled fairings and other non–structural parts are causes for close inspection of the structure below them. Think that damage to the structure below these parts is possible until a close inspection shows differently.

NOTE: A close inspection may not be possible if the aircraft is wheels–up.

(5) Make a list of missing or unserviceable items as you make an estimate of the damage.

(6)WARNING: FIND OUT IF THE STRUCTURE OF A DAMAGED AIRCRAFT CAN HOLD ITS WEIGHT BEFORE YOU LOWER IT ON THE LANDING GEAR FROM TRESTLES OR JACKS. IF YOU DO NOT DO THIS, YOU CAN CAUSE INJURY TO PERSONS OR MORE DAMAGE TO THE STRUCTURE.

Do an inspection of the aircraft structure before it comes off the trestles or jacks to see if it is sufficiently strong to tow the aircraft on its landing gear. Lower the landing gear only if:

(a) The IIC agrees.

(b) It is safe.

(c) No more damage will occur.

On Challenger 300 A/C

(7)CAUTION: DO NOT REMOVE FUEL, CARGO, OR THE ENGINES IF THEY KEEP THE AIRCRAFT'S CENTER OF GRAVITY. THIS WILL PREVENT AN OVERLOAD AT THE JACKING POINT.

The maximum weight of the aircraft on jacks are as follows:

NOTE: These weights are for a undamaged aircraft. The damage caused by an accident may cause lower maximum permitted loads at the jacking points. Refer to Figure 2 for jacking point locations. It can be better to put the aircraft on trestles (assembled on–site) if there is structural damage.

(a) The maximum permitted weight of the aircraft on jacks is 30 650 lb (13 902.6 kg).

(b) The maximum vertical jack loads for each jack location are as follow:

- 5 530 lb (2 505 kg) on the forward (nose) jacking point.
- 13 420 lb (6 090 kg) on each wing jacking point.

On Challenger 350 A/C

(8)CAUTION: DO NOT REMOVE FUEL, CARGO, OR THE ENGINES IF THEY KEEP THE AIRCRAFT'S CENTER OF GRAVITY. THIS WILL PREVENT AN OVERLOAD AT THE JACKING POINT.

The maximum weight of the aircraft on jacks are as follows:

NOTE: These weights are for a undamaged aircraft. The damage caused by an accident may cause lower maximum permitted loads at the jacking points. Refer to Figure 2 for jacking point locations. It can be better to put the aircraft on trestles (assembled on–site) if there is structural damage.

(a) The maximum permitted weight of the aircraft on jacks is 31 420 lb (14 251.87 kg).

(b) The maximum vertical jack loads for each jack location are as follow:

- 5 327 lb (2 416kg) on the forward (nose) jacking point.
- 13 830 lb (6 273 kg) on each wing jacking point.

(9) If required, remove the baggage and cargo from the aircraft. The baggage compartment door opens in and up.

(10) Examine the damage to the fuel system to find the best procedure to defuel the aircraft. The single–point refuel/defuel adaptor, fuel lines and tanks can have damage. Refer to Figure 3.

(11) Alternative procedures to defuel the aircraft are as follows:

NOTE: Follow the applicable local regulations concerning defueling.

(a) Suction defueling procedure.

1 The suction will break when one of the inlet points becomes open. This procedure is slow and can mean that the fuel tank is not fully drained.

(b) Gravity defueling procedure.

WARNING: MAKE SURE THAT THE FUEL LEVEL IN THE TANK IS BELOW THE OPENING OF THE GRAVITY FUELING ADAPTER. IF IT IS NOT, FUEL WILL SPILL OUT OF THE TANK. THIS CAN CAUSE INJURY TO PERSONS.

1 Fuel will come out from the tank(s) if the tank is higher than the gravity fuel adaptor. To prevent this, make sure the fuel level in the tank is below the gravity fueling adaptor before opening.

2 If available, use a gravity defueling adaptor to drain fuel from the underwing fuel drains into approved containers. Use the suction procedure at the single point refuel/defuel position. Use a suction hose in the overwing and center tank gravity fueling adapter to remove the fuel if it is not possible to remove it through the pressure refuel/defuel adaptor.

3 The quantity of fuel in the tank and the attitude of the aircraft will control the amount of fuel you can remove.

(12) WARNING: BEFORE YOU REMOVE THE ENGINE, MAKE SURE THAT THE AIRCRAFT IS STABLE. IF IT IS NOT STABLE, THE AIRCRAFT CAN FALL AND CAUSE INJURY TO PERSONS AND DAMAGE TO THE AIRCRAFT.

If the engines have to be removed to keep the weight and balance, make sure the aircraft is level before the release of the load on the yokes. The aircraft must also be stable to prevent movement because of an imbalance when an engine is removed.

On Challenger 300 A/C

(13) In recovery operations, there are two basic situations that will occur:

- You can tow the aircraft on its landing gear.
- You must lift the aircraft on to a transport.

(a) If the landing gear stays serviceable after the aircraft has run off the runway or taxiway, it may be possible to tow it by the main landing gear (Refer to Section 6, Figure 3).

(b) If the landing gear has flat tire(s), there are some tow limits. Refer to Figure 4 for towing restriction with flat tire.

(c) Make an estimate of the ground's load–bearing capacity and the slope of the terrain in the recovery area. Make the path to tow the aircraft as smooth as possible if it does not have concrete or asphalt. Refer to Figure 5 for landing gear measurements and tire pressures.

(d) If the landing gear is unserviceable, use pneumatic lifting bags or cranes and slings to lift the aircraft. Then put it on dollies or on a flatbed trailer.

On Challenger 350 A/C

(14) In recovery operations, there are two basic situations that will occur:

- You can tow the aircraft on its landing gear.
- You must lift the aircraft on to a transport.

(a) If the landing gear stays serviceable after the aircraft has run off the runway or taxiway, it may be possible to tow it by the main landing gear (Refer to Section 6, Figure 3).

(b) If the landing gear has flat tire(s), there are some tow limits. Refer to Figure 4 for towing restriction with flat tire.

(c) Make an estimate of the ground's load–bearing capacity and the slope of the terrain in the recovery area. Make the path to tow the aircraft as smooth as possible if it does not have concrete or asphalt. Refer to Figure 6 for landing gear measurements and tire pressures.

(d) If the landing gear is unserviceable, use pneumatic lifting bags or cranes and slings to lift the aircraft. Then put it on dollies or on a flatbed trailer.

(15) CAUTION: INFLATE THE FORWARD AND AFT LIFTING BAGS SUFFICIENTLY TO KEEP THE AIRCRAFT STABLE. PUT THE BAGS IN AREAS OF SUFFICIENT STRENGTH TO PREVENT MORE DAMAGE TO THE AIRCRAFT.

Lift an aircraft that is on its fuselage with lifting bags put below each wing, the forward fuselage and the aft fuselage. Refer to Figure 7 for the recommended position of the pneumatic bags. Keep the aircraft stable with cables while you lift it, or while it is on the pneumatic bags. Inflate the pneumatic bags sufficiently to allow the installation of trestles or jacks at the nose, wings and the rear fuselage support. Put the cables at the nose jack point and the rear mooring points.

(16) Use a nose jack and normal jacking procedures to lift a nose–down aircraft around the MLG axis.

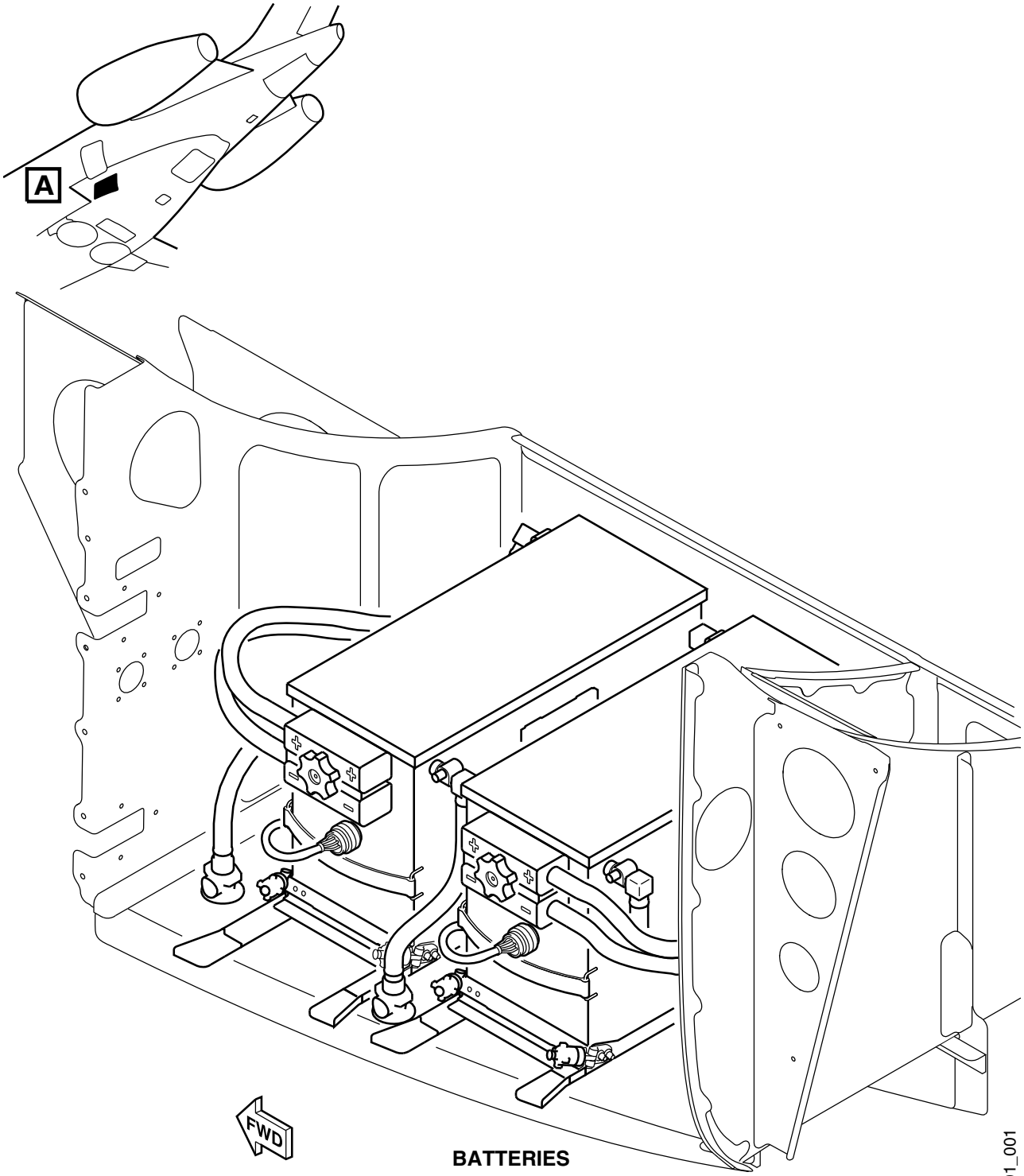
(17) When you use cranes and slings to lift the aircraft, you must make an estimate of the damage to the structure. This will help to find how much damage has occurred and the location of strong frames to transmit the sling loads. Because each aircraft recovery operation is different, Bombardier cannot recommend special sling locations. Generally, use the nose jacking point (FS319.75), the passenger door aft frame and the forward engine mounts to lift the aircraft. Refer to Figure 8 for the strongest frames locations.

(18) Lift the aircraft only in periods of very light or no winds. Because of the large areas of wing, empennage and fuselage, small gusts of wind can cause large pendulum movements.

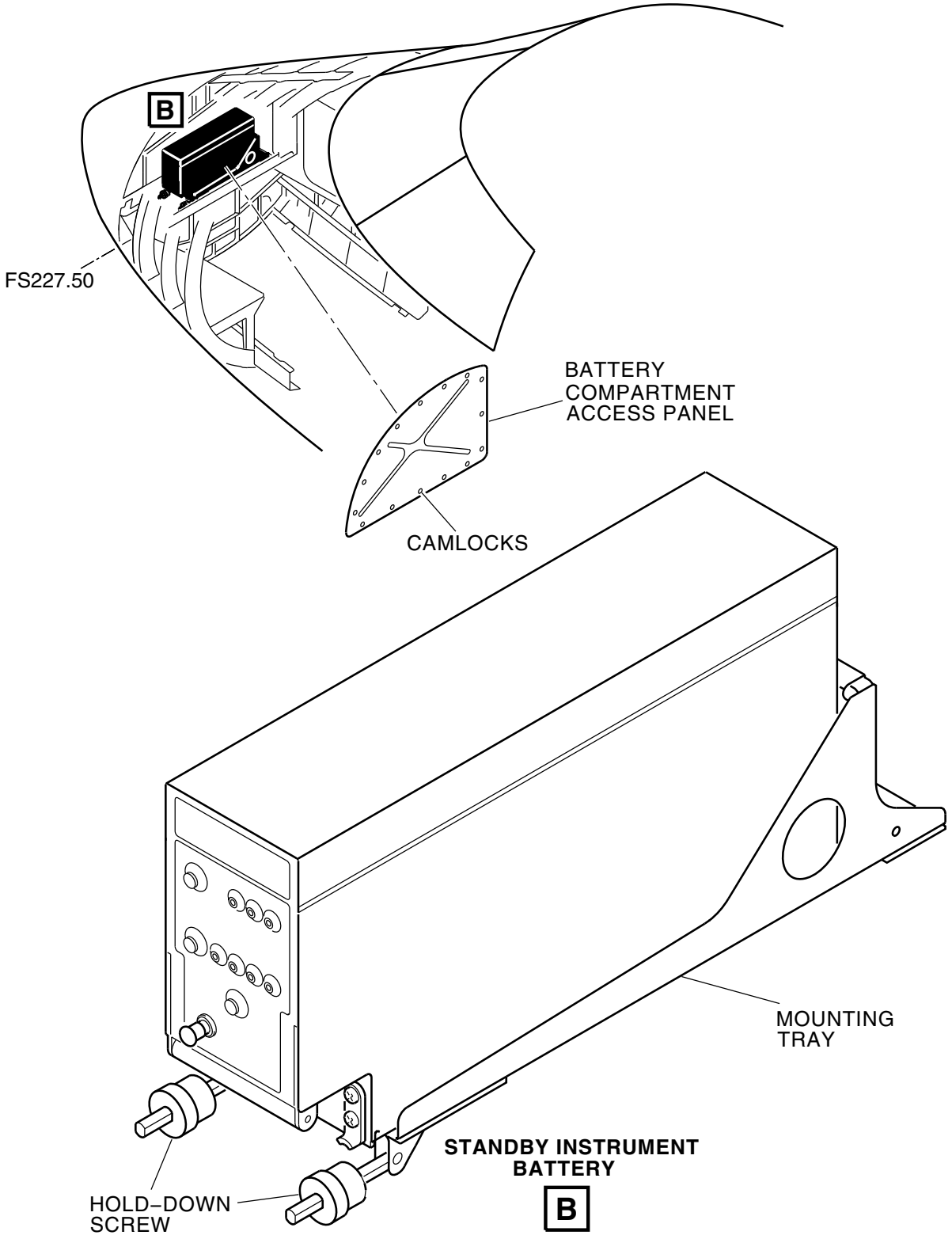
(19) Make the aircraft stable during the lift. To help control its movements during the lift, attach ropes to available strong points, such as the landing gear. If the engines are removed, attach ropes to the forward engine mounts. During the lift, first level the aircraft then lift it sufficiently high to put it on jacks or a flatbed trailer.

(20) If the aircraft cannot move on its landing gear, move it on a flatbed trailer. Refer to Figure 8.

(21) Cranes and slings can be faster and easier to use in the recovery of the Bombardier Challenger Series aircraft.



Aircraft Batteries
Figure 1 (Sheet 1 of 2)



Aircraft Batteries
Figure 1 (Sheet 2 of 2)

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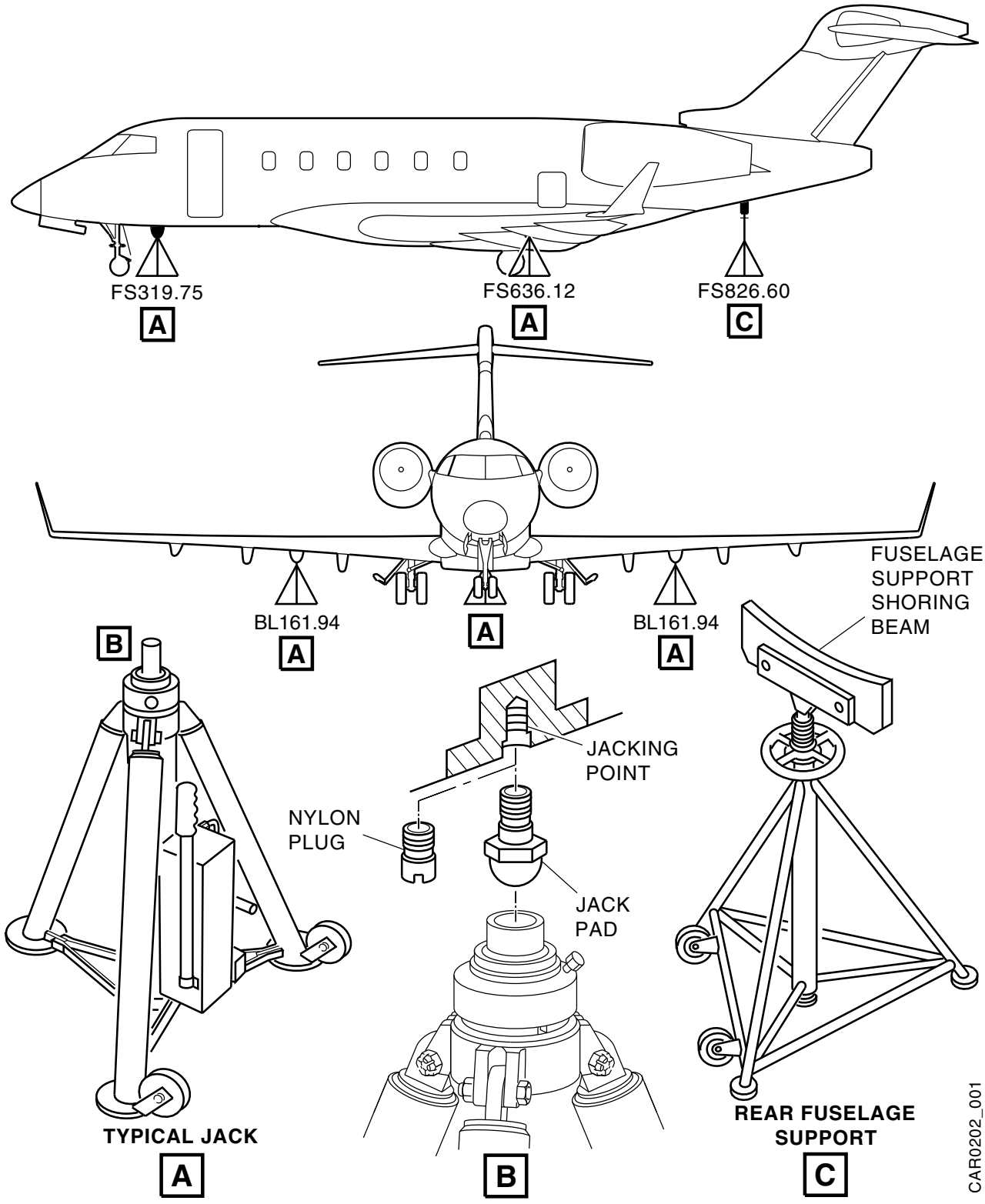
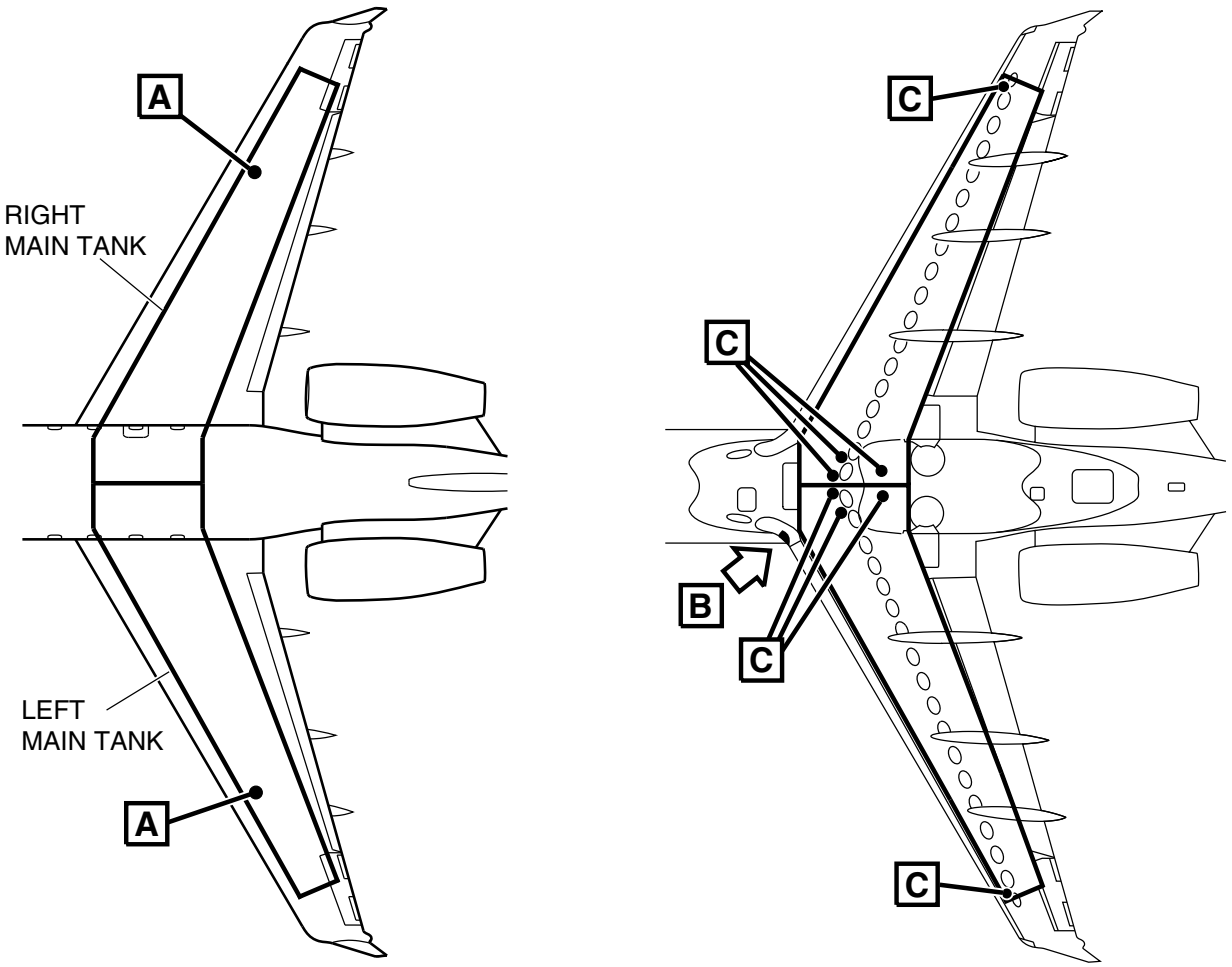
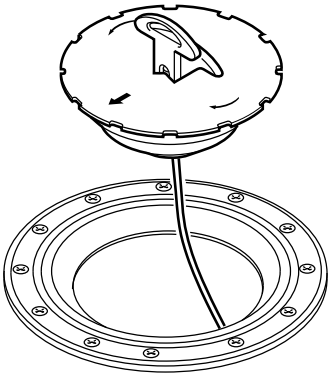


Structural Jacking Points and Adapters
Figure 2

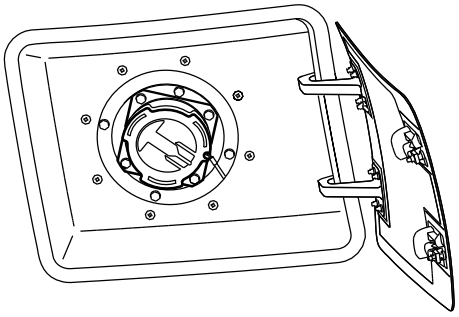
EFFECTIVITY: ALL





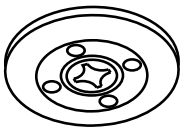
GRAVITY FILLER CAP

A



PRESSURE REFUEL/DEFUEL ADAPTOR

B

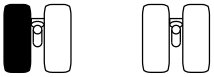
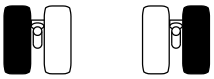


WATER DRAIN VALVE

C

CAR0203_031

Aircraft Defueling
Figure 3

ITEM NO.	MAIN GEAR CONDITION	TIRE FOOTPRINT EXAMPLES	PERMITTED TO TAXI?	PERMITTED TO TOW?	DISTANCE PERMITTED TO TAXI AND TOW	NOSE WHEEL ANGLE OF TURN	REMARKS
1	ONLY ONE FLAT TIRE (ANY TIRE)		YES	YES	UNLIMITED	NORMAL	SEE NOTES 1, 2, 5
2	TWO FLAT TIRES (ONE ON EACH AXLES)		YES	YES	UNLIMITED	NORMAL	SEE NOTES 1, 3, 4, 5
3	TWO FLAT TIRES (ON ONE AXLES)		YES	YES BOTH MAIN GEAR ONLY (BRIDLE)	MINIMUM TO CLEAR RUNWAY	10 DEGREES MAXIMUM	SEE NOTES 1, 3, 4, 5, 6
4	THREE FLAT TIRES (ANY COMBINATION)		YES	YES BOTH MAIN GEAR ONLY (BRIDLE)	MINIMUM TO CLEAR RUNWAY	10 DEGREES MAXIMUM	SEE NOTES 1, 3, 4, 5, 6
5	FOUR FLAT TIRES		YES	YES BOTH MAIN GEAR ONLY (BRIDLE)	MINIMUM TO CLEAR RUNWAY	10 DEGREES MAXIMUM	SEE NOTES 1, 3, 4, 5, 6
NOSE GEAR CONDITION							
6	ONE FLAT TIRE		YES	YES	UNLIMITED	UNLIMITED	SEE NOTES 1, 2, 4
7	TWO FLAT TIRES		YES	YES BOTH MAIN GEAR ONLY (BRIDLE)	MINIMUM TO CLEAR RUNWAY	10 DEGREES MAXIMUM	SEE NOTES 1, 2, 5, 6

CAUTION

TO TAXI OR TO TOW WITH TWO FLAT TIRES ON SAME GEAR CAN RESULT IN WHEEL DAMAGE.

NOTES

1 Avoid sharp turns, abrupt starts and stops.

2 Maximum speed permitted to taxi or to tow aircraft = 5 mph (8kmh).

3 Maximum to taxi or to tow = 2 mph (3kmh).

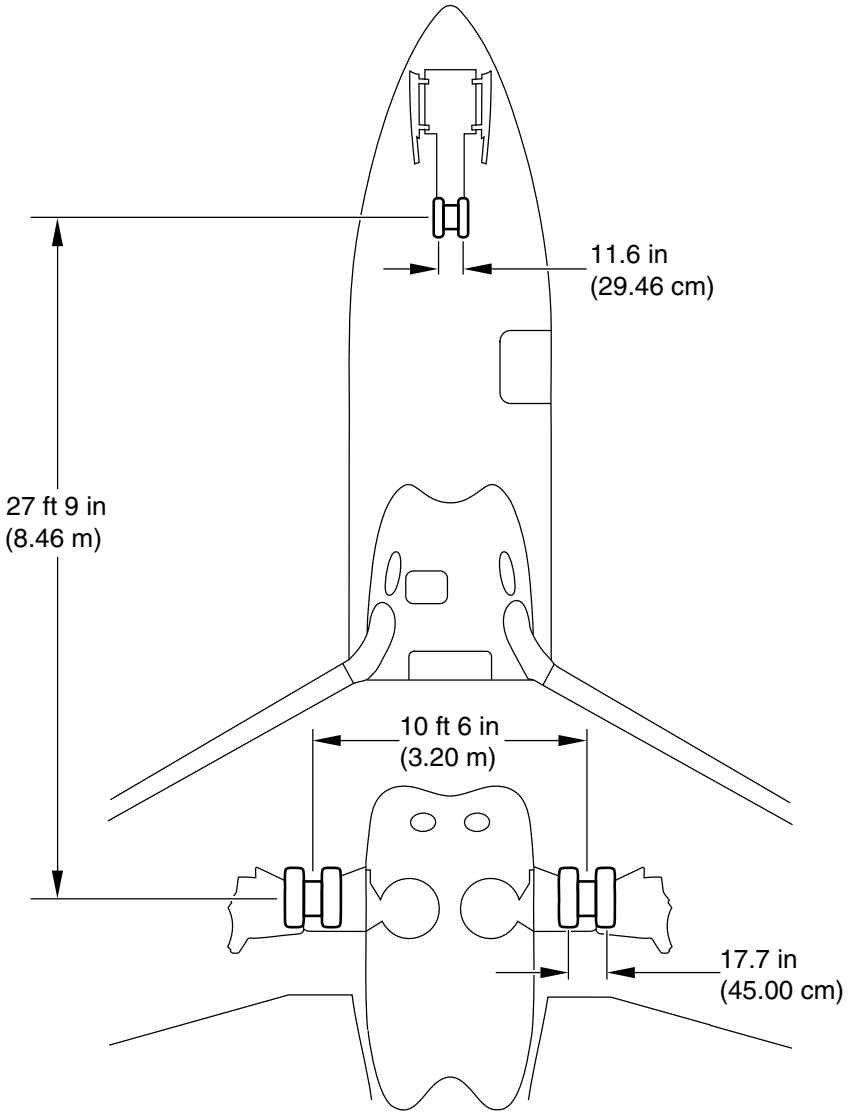
4 After you clear the runway, or if additional tire fails, the airplane should be stopped and serviceable wheel/tire assembly(ies) installed to obtain item number 2 or 6.

5 After any tire failure or excessive heat condition the affected wheel assembly must be inspected per applicable Goodyear Overhaul Manaul prior to futher use.

6 Under a multiple failed tire condition, the affected landing gear assemblies and linkage must be inspected for possible structural damage.

CAR02_041

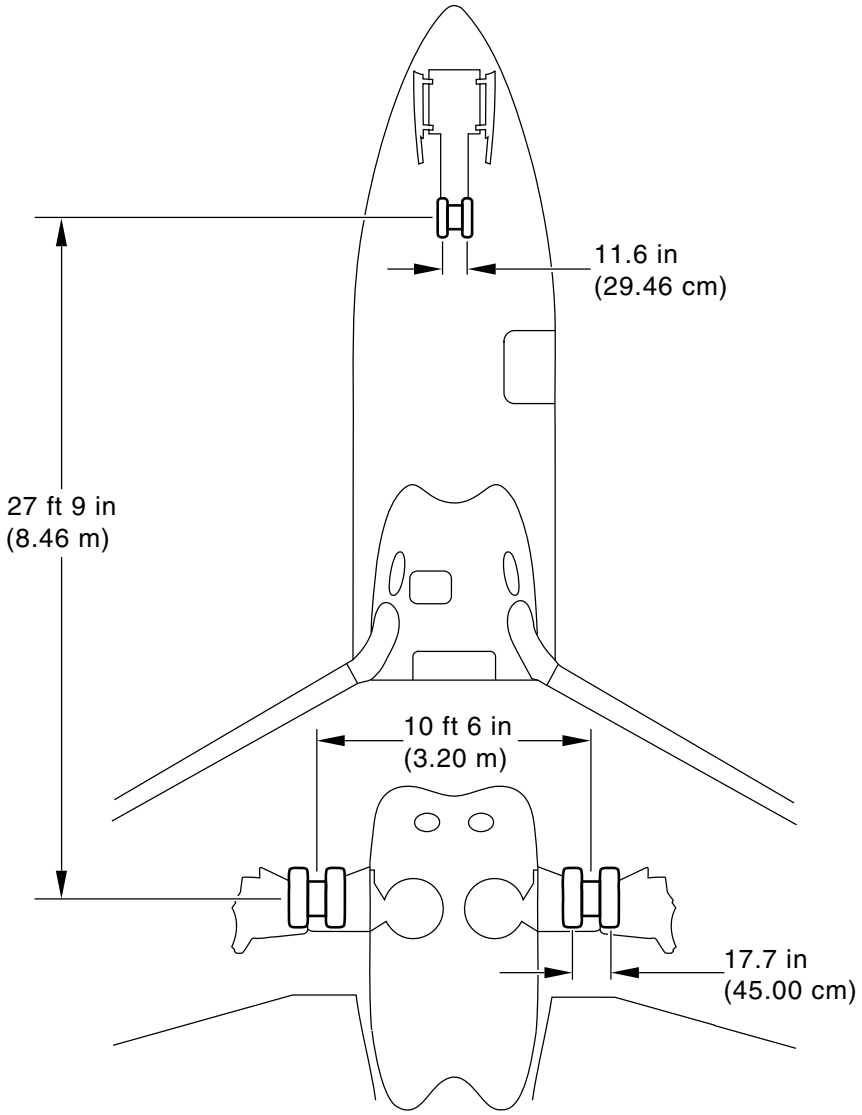
Towing/Taxiing with Flat Tires
Figure 4



CHALLENGER 300	
MAXIMUM RAMP WEIGHT	39,000 (17,690 kg)
NOSE TIRE PRESSURE	109–114 PSI UNLOADED 113–119 PSI LOADED
MAIN GEAR TIRE PRESSURE	151–159 PSI UNLOADED 157–165 PSI LOADED

CAR0205_001

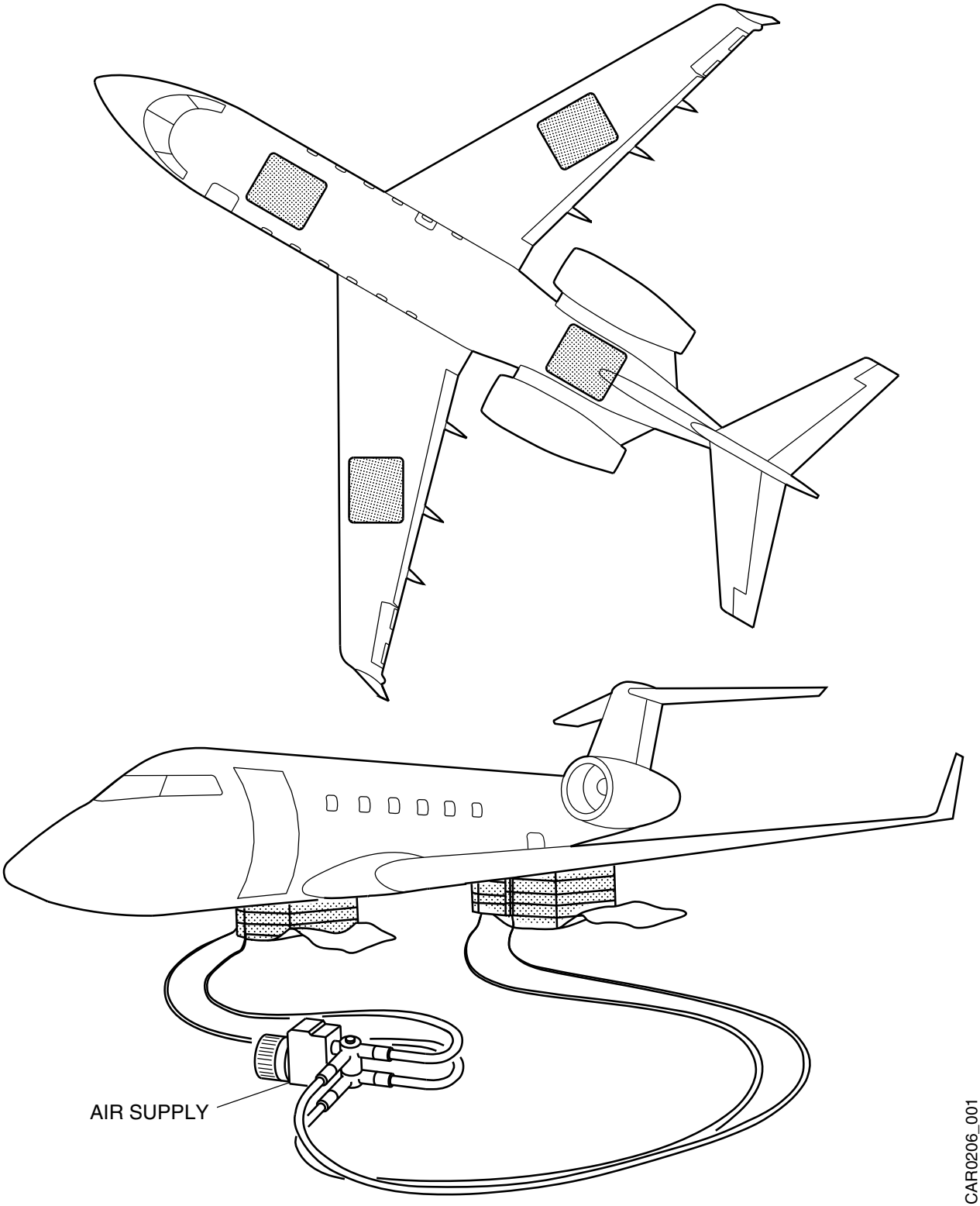
Landing Gear Measurements
Figure 5



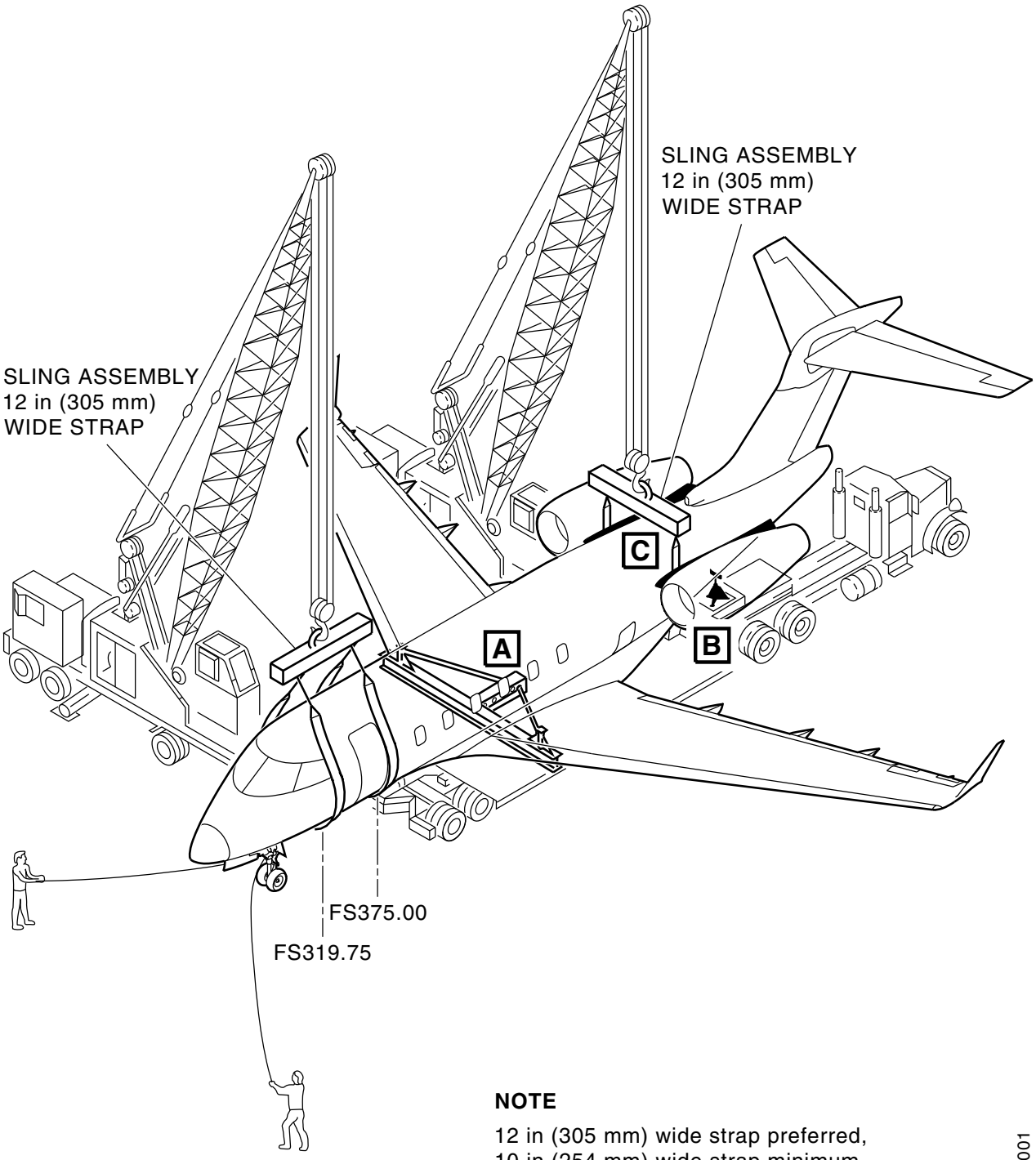
CHALLENGER 350	
MAXIMUM RAMP WEIGHT	
NOSE TIRE PRESSURE	109–114 PSI UNLOADED 113–119 PSI LOADED
MAIN GEAR TIRE PRESSURE	151–159 PSI UNLOADED 157–165 PSI LOADED

BAR0205_001

Challenger 350 – Landing Gear Measurements
Figure 6



Lifting with Pneumatic Bags
Figure 7

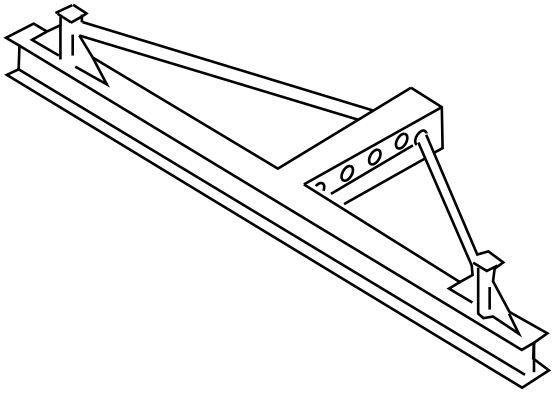


NOTE

12 in (305 mm) wide strap preferred,
10 in (254 mm) wide strap minimum,
check sling load rating and
use multiple slings to carry
load safely.

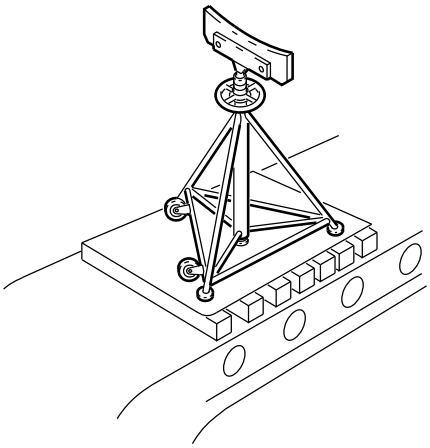
CAR0207_001

Aircraft Recovery with Cranes and Slings
Figure 8 (Sheet 1 of 2)



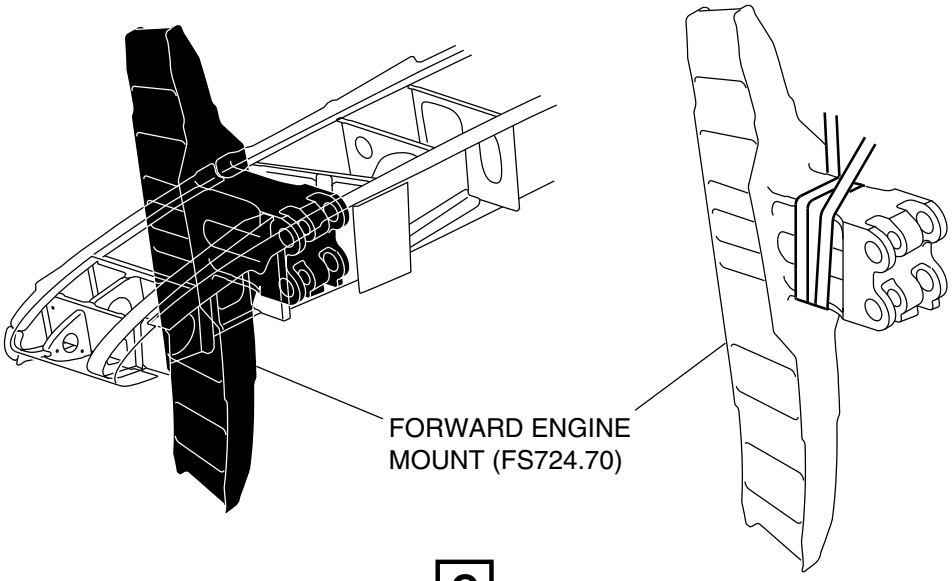
WING JACK POINT BEAM

A



REAR FUSELAGE SUPPORT

B



C

CAR0207_002

Aircraft Recovery with Cranes and Slings
Figure 8 (Sheet 2 of 2)

4. Terrain Consideration

A. General

(1) Type of terrain, weather conditions and structural damage to the aircraft are factors to find the bearing area necessary to lift and move the aircraft. Get an experienced civil engineer or earthworks contractor to make an assessment of the terrain surface conditions, bearing loads and areas.

B. Factors to Find the Most Practical Recovery Plan

(1) Make an estimate of the general terrain to find the best routing to tow the aircraft. Structural damage to the aircraft can occur if it moves over terrain that is not smooth. If necessary, grade the proposed tow routing to give a smooth surface for the aircraft and tow vehicle(s).

(2) Make an estimate of how hard and smooth the surface is. Also, the possible effect of rainfall and drainage on the load–bearing capacity of the terrain. Find the safe bearing load and surface area of the terrain. The ground must have the same condition for a depth of 8 in (20.3 mm), because the force necessary to tow an aircraft changes as a function of the strength of the terrain.

(3) The type of terrain shows the applicable procedure to lift the aircraft:

(a) Refer to Figure 2 for the use of jacks .

(b) Refer to Figure 7 for the use of pneumatic bags.

(c) Refer to Figure 8 for the use of mobile cranes and slings.

C. Ground Conditions

(1) Ground conditions are one of the primary factors in aircraft recovery operations. Ground conditions have an effect on decisions to tow the aircraft, put tethers in the ground, or set shoring (cribbing). From the results of ground tests, the recovery team makes decisions about reinforcement of the terrain and the shoring (cribbing) base.

(2) The California Bearing Ratio (CBR) is known as the standard for different ground conditions.

(a) For ground conditions that are related to shoring the aircraft (Refer to Table 1).

(b) For the related bearing strength of different ground conditions (Refer to Table 2).

Table 1 – Ground Conditions To Shore the Aircraft

Surface Type	Shoring (Cribbing) Necessary For Loads That Roll				Shoring (Cribbing) Necessary For Loads To Jack			
	Max Allowable Contact Pressure		Minimum Contact Area Needed		Max Allowable Contact Pressure		Minimum Contact Area Needed	
	psi	kPa	Each 2 000 lb/in²	Each 141.61 kg/cm²	psi	kPa	Each 2 000 lb/in²	Each 141.61 kg/cm²
Soft Wet Clay or Wet Organic Terrain	18.0	124.0	111.0	7.8	8.0	55.0	2 500.0	175.77
Loose Sand or Sandy Terrain	65.0	448.0	31.0	2.18	35.0	241.0	571.0	40.15
Sand with Clay	100.0	690.0	20.0	1.41	50.0	345.0	400.0	28.12
Well Graded Sand and Medium Clay	180.0	1 241.0	11.0	0.77	85.0	586.0	235.0	16.52
Sandy Gravel, Clay–Gravel or Dry Clay	300.0	2 068.0	6.7	0.47	165.0	1 138.0	121.0	8.51
Compacted Sandy Clay–Gravel	N/A	N/A	N/A	N/A	200.0	1 379.0	100.0	7.03

Table 2 – California Bearing Ratio (CBR) Soil Bearing Strength					
Surface Type	**Safe Bearing Load**		**Approximate Bearing Area Necessary**		
			10 000 lb		**5 000 kg**
	psi	**kPa**	**in²**	**ft²**	**m²**
Slate or Rock	230.0	1 586.0	44.0	0.31	0.062
Concrete	156.0	1 076.0	64.0	0.54	0.091
Hard Pan and Small Gravel or Sand	138.0	951.0	72.5	0.50	0.103
Small Gravel and Sand	100.0	689.0	100.0	0.69	0.142
Gravel, Course Sand or Medium Clay	62.0	427.0	161.0	1.12	0.229
Loose Sand and Gravel Mixture	42.0	290.0	238.0	1.65	0.340
Medium stiff Clay	35.0	241.0	286.0	1.98	0.407
Loose Sand	30.0	207.0	333.0	2.31	0.474
Soft Clay or Earth	15.5	107.0	645.0	4.48	0.917

AIRCRAFT - GENERAL

1. Model Designation and Type

A. The Bombardier Challenger Series Business Jet is made by Bombardier Aerospace. The aircraft is swept–wing monoplane with pressurized cabin, operated by two crew.

B. The aircraft has two Honeywell AS907 Turbofan engines.

2. Aircraft Dimensions

On Challenger 300 A/C

A. Refer to Figure 1 for all basic dimensions, including ground clearances.

On Challenger 350 A/C

B. Refer to Figure 2 for all basic dimensions, including ground clearances.

3. Dangerous Areas

A. Persons who do aircraft recovery operations must know of the dangerous areas around the engines and the APU. Refer to Figure 3.

4. Doors

A. The aircraft has the doors that follow:

- Passenger/crew entrance door,
- Baggage compartment door on the left side of the aircraft,
- Aft equipment compartment door at the bottom of the rear fuselage,
- Different small service and access doors,
- Overwing emergency exit door located on the right side of the passenger compartment.

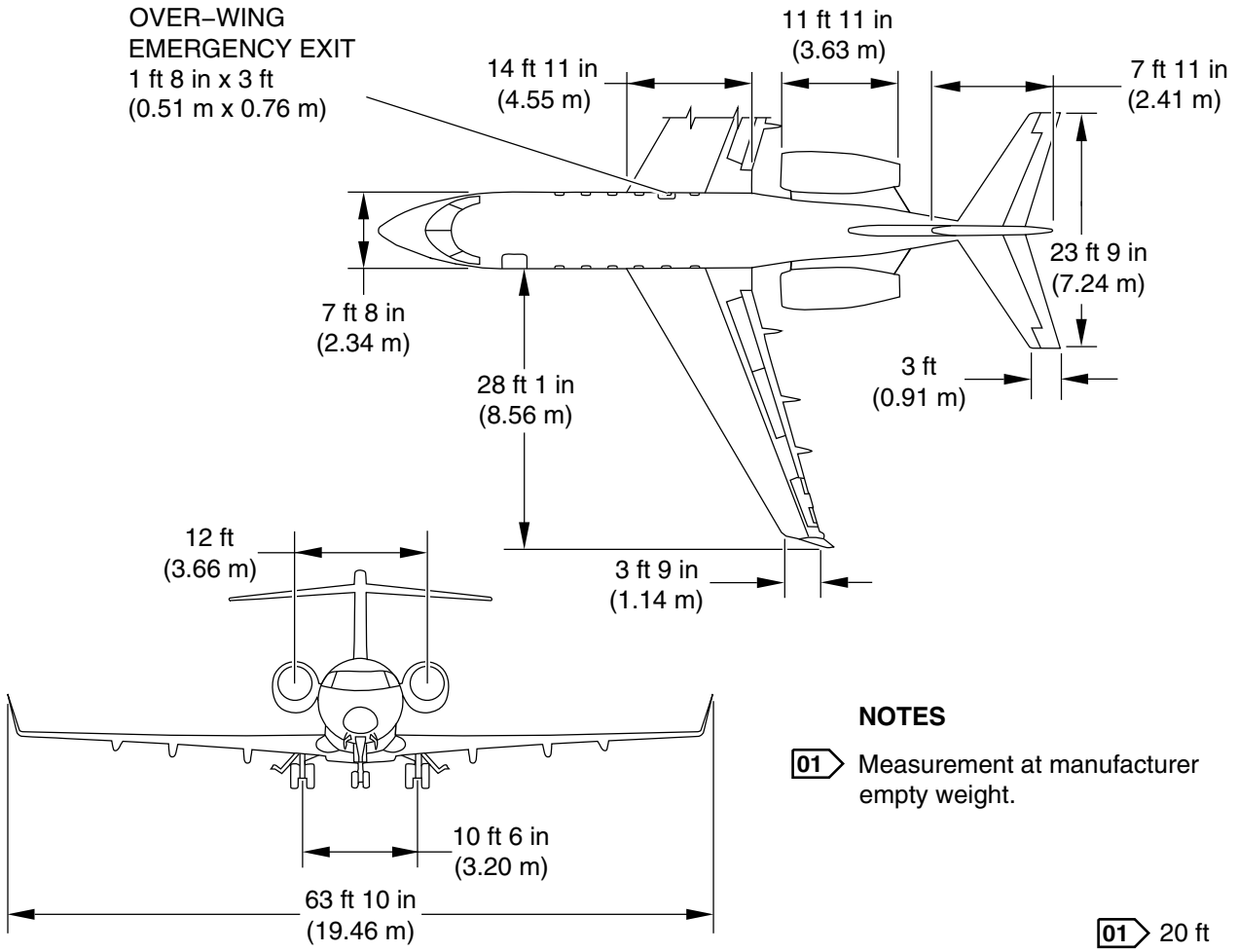
NOTE: The entrance stairs attach to the passenger/crew door.

5. Composite Materials

A. Composite materials such as: Kevlar, Graphite, Fiberglass and Fiberlam are used in many components of the Bombardier Challenger Series aircraft. Refer to Figure 4 for the locations of the composite materials.

6. Interior Configurations

A. Internal configurations will change according to customer options installed at the completion centers.



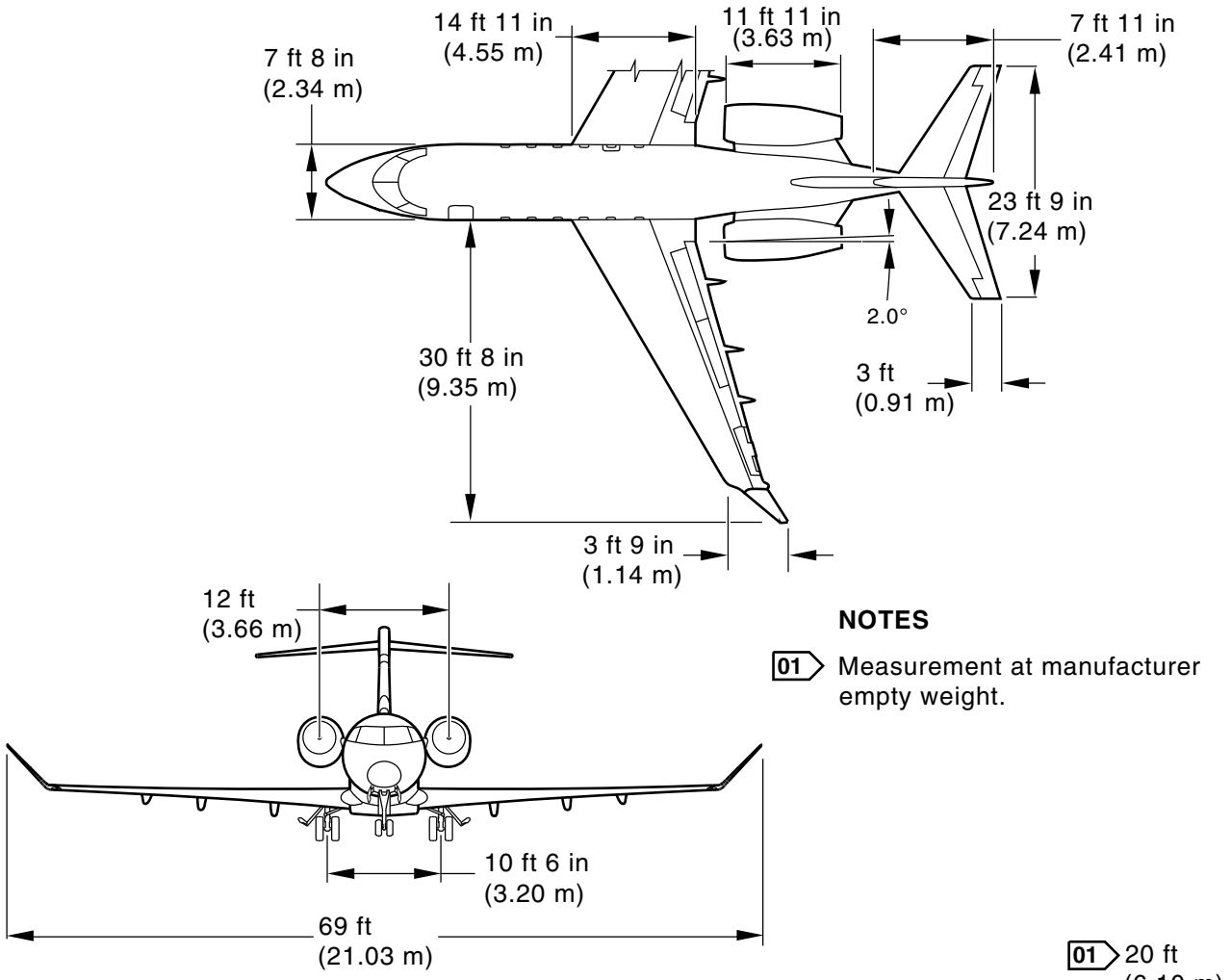
NOTES

01 Measurement at manufacturer empty weight.

PASSENGER COMPARTMENT DIMENSIONS		
LENGTH	28 ft 7 in	8.71 m
WIDTH (FLOOR LINE)	5 ft 1 in	1.55 m
WIDTH CENTERLINE	7 ft 2 in	2.18 m
HEIGHT	6 ft 1 in	1.85 m
VOLUME	896 ft^3	25.37 m^3
FLOOR AREA	146 ft^2	13.56 m^2

Challenger 300 – Aircraft Basic Dimensions & Ground Clearances
Figure 1

EFFECTIVITY: ALL



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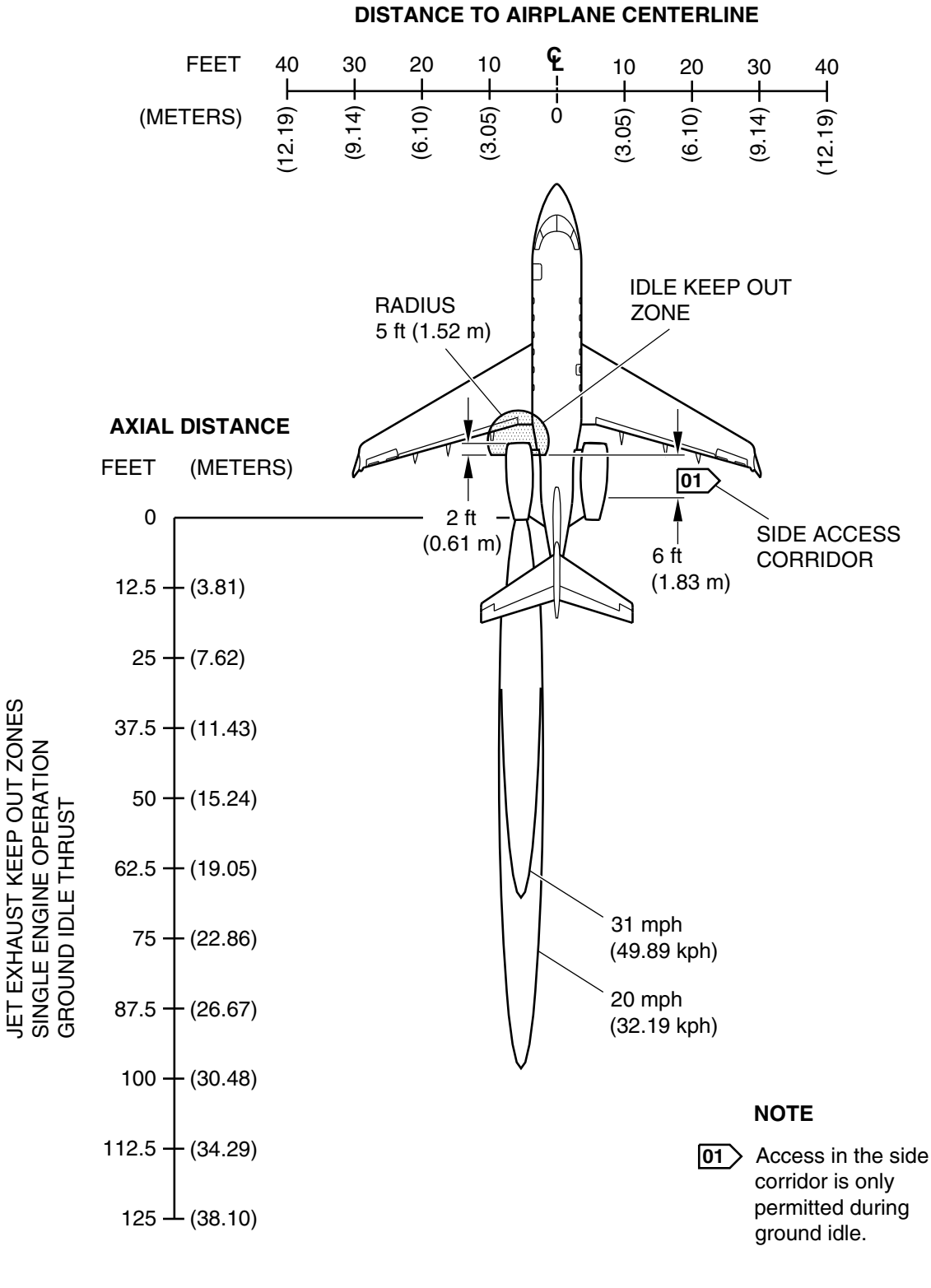
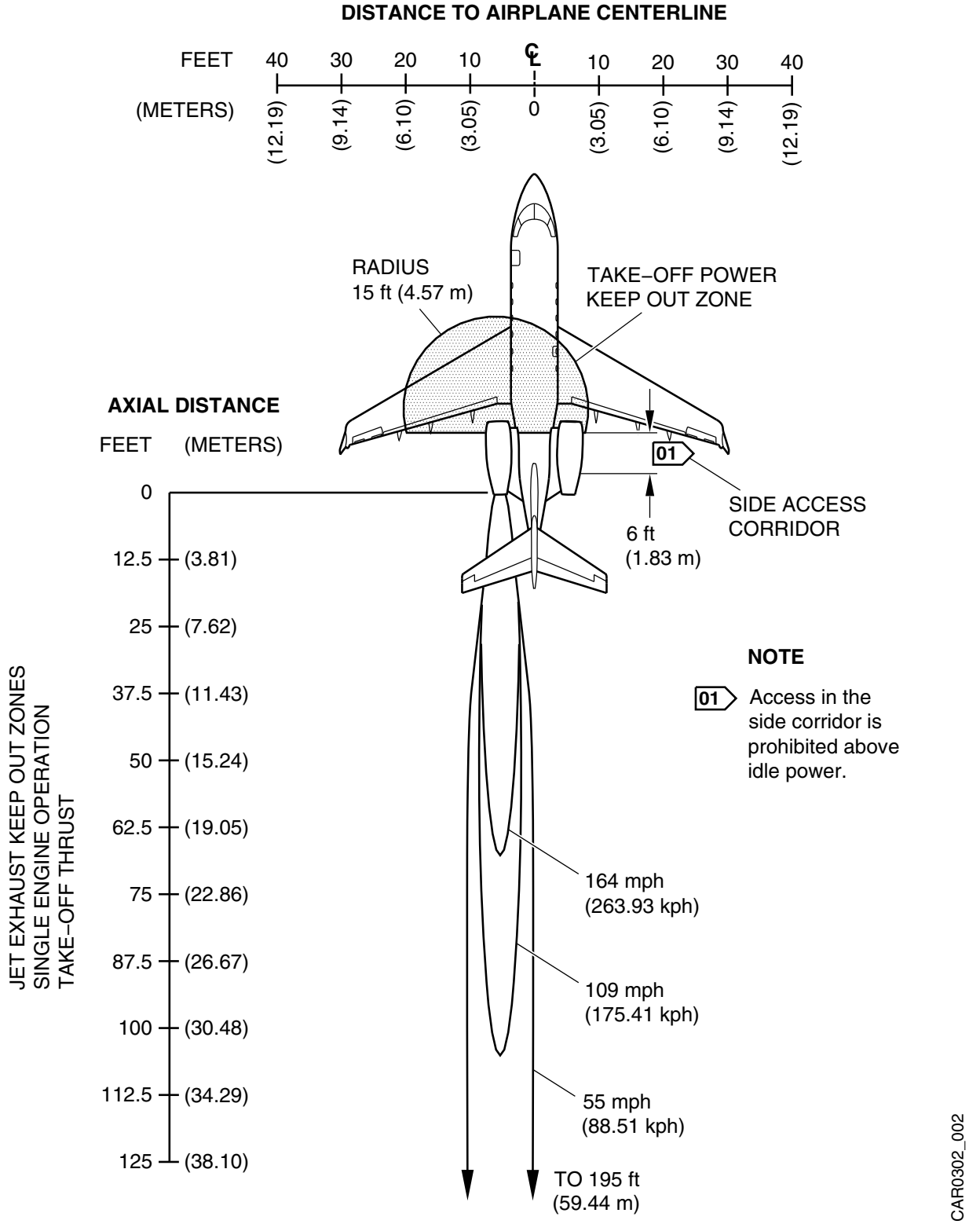
HEIGHT	6 ft 1 in	1.85 m
VOLUME	896 ft^3	25.37 m^3
FLOOR AREA	146 ft^2	13.56 m^2

Challenger 350 – Aircraft Basic Dimensions & Ground Clearances
Figure 2

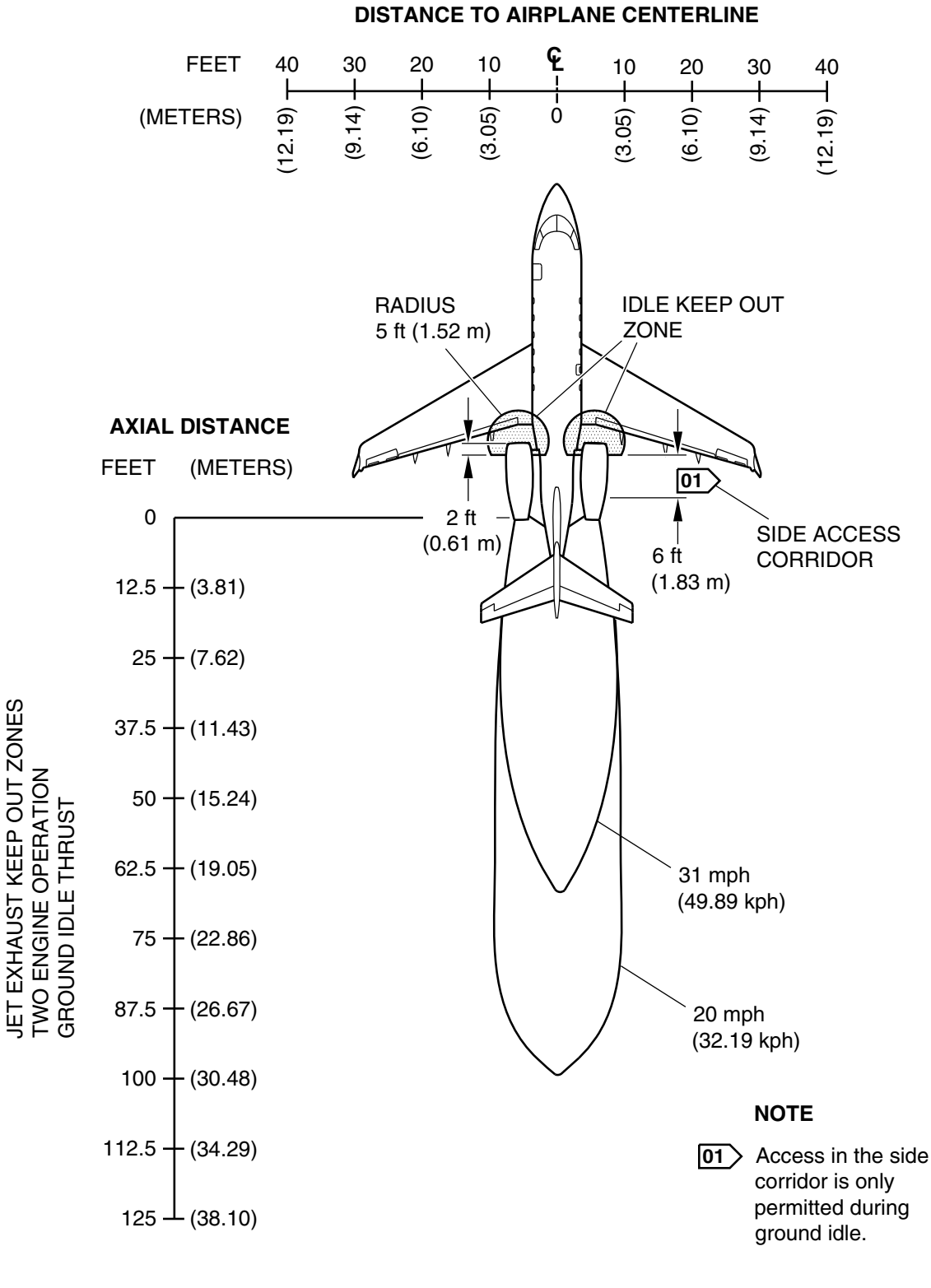


Dangerous Areas – Engine Intake and Exhaust
Figure 3 (Sheet 1 of 4)

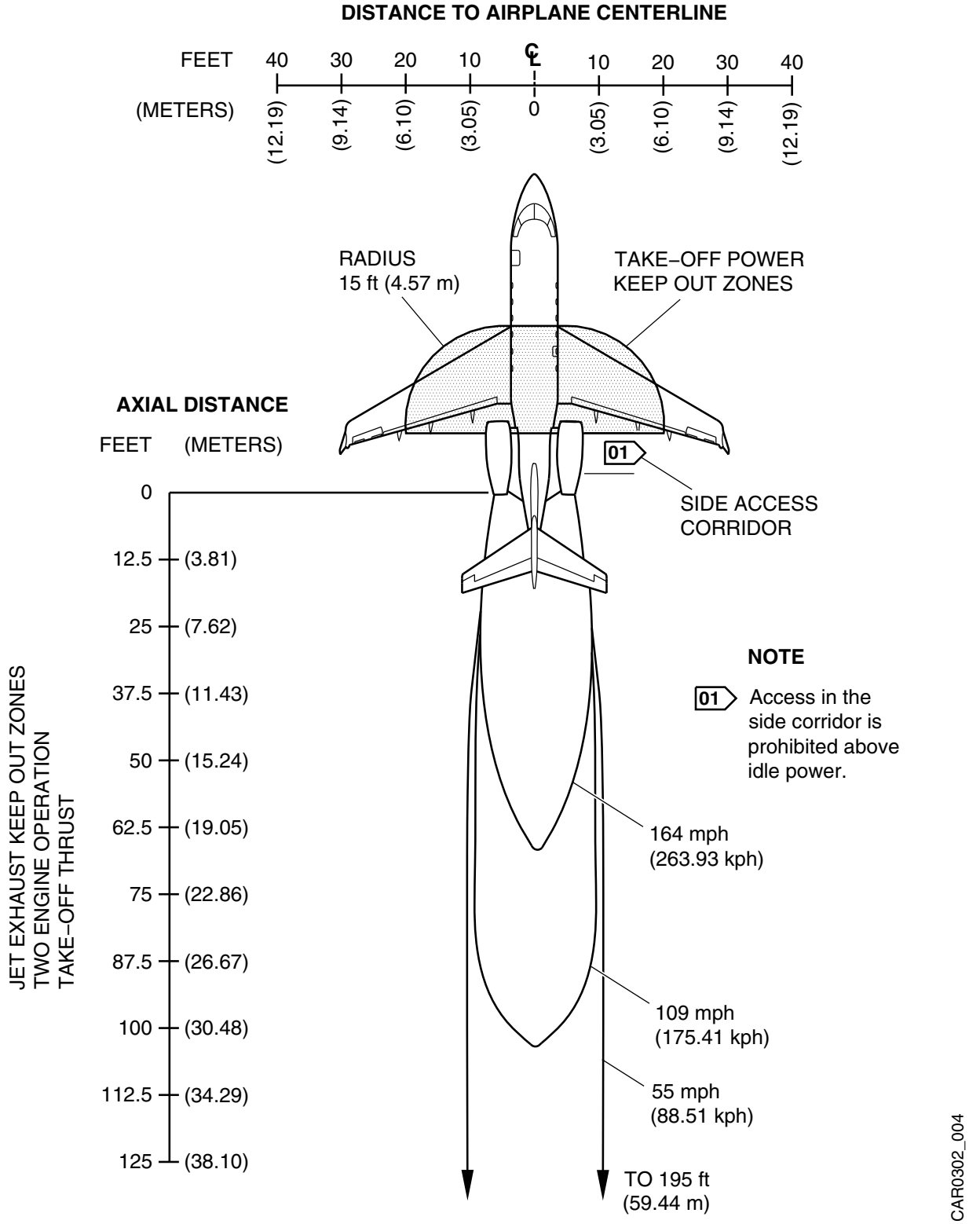
EFFECTIVITY: ALL



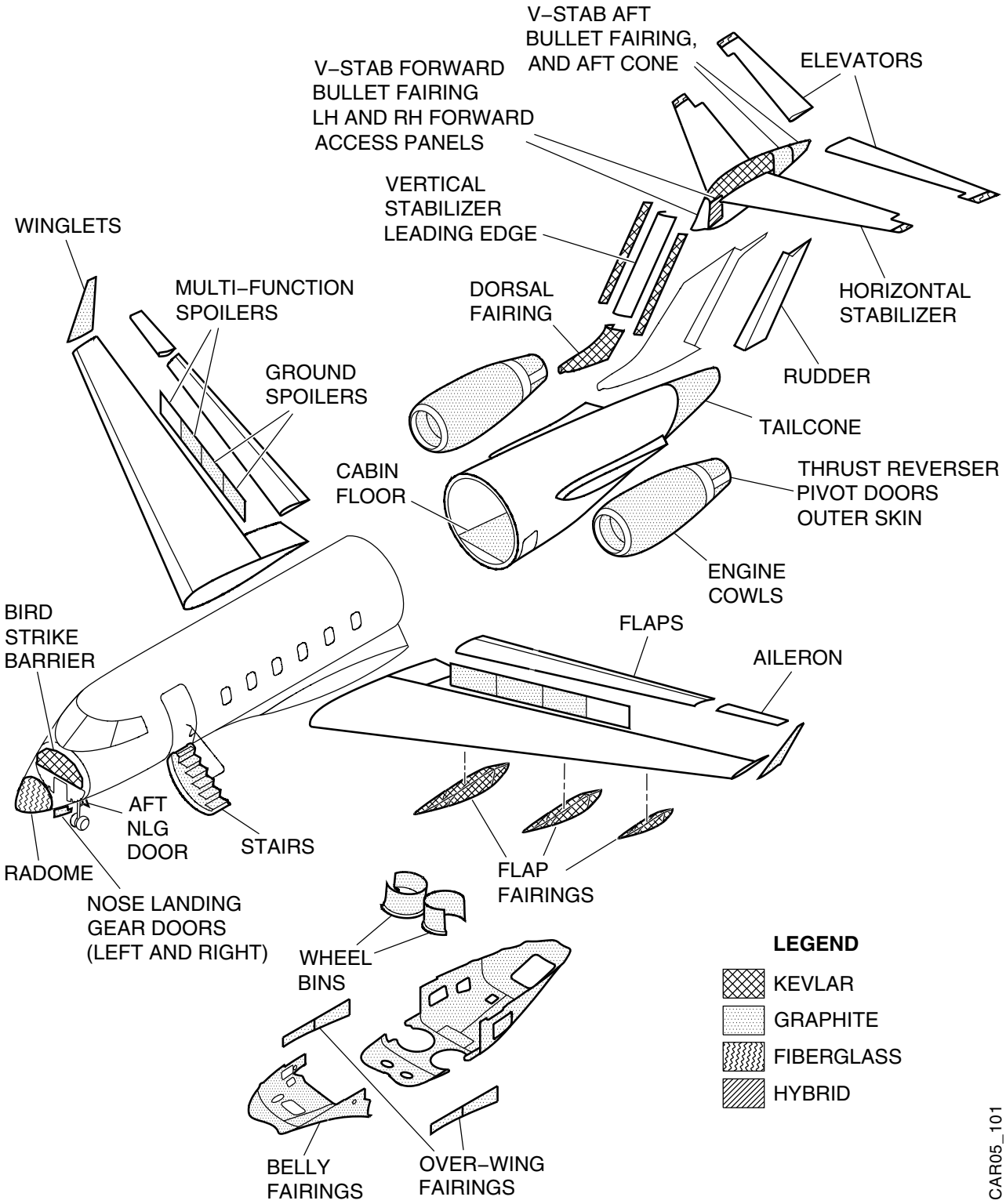
Dangerous Areas – Engine Intake and Exhaust
Figure 3 (Sheet 2 of 4)



Dangerous Areas – Engine Intake and Exhaust
Figure 3 (Sheet 3 of 4)



Dangerous Areas – Engine Intake and Exhaust
Figure 3 (Sheet 4 of 4)



Composite Materials
Figure 4

EFFECTIVITY: ALL

EMERGENCY INFORMATION

1. Emergency Access

A. Passenger Door

(1) The Passenger Entrance Door is on the left side of the aircraft, just after the flight compartment. The door serves as a Type I Emergency Exit, Refer to Figure 1.

(2) Dimensions:

- Height 6 ft 2 in (1.88 m)
- Width 2 ft 6 in (0.76 m)
- Height to the sill (one step below the floor line) 4 ft 3 in (1.30 m).

(3) To Open the Passenger Door from the external side do the following:

WARNING: FULLY RELEASE THE CABIN PRESSURE FROM THE AIRCRAFT BEFORE YOU TRY TO OPEN THE DOORS. IF YOU DO NOT DO THIS, THE CABIN PRESSURE CAN DECREASE SUDDENLY. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE THAT THE AREA OUTBOARD OF THE PASSENGER DOOR IS CLEAR BEFORE YOU OPEN THE DOOR. IF YOU DO NOT DO THIS, YOU CAN CAUSE DAMAGE TO EQUIPMENT AND INJURY TO PERSONNEL.

(a) Pull the external door handle outboard and to its top released position.

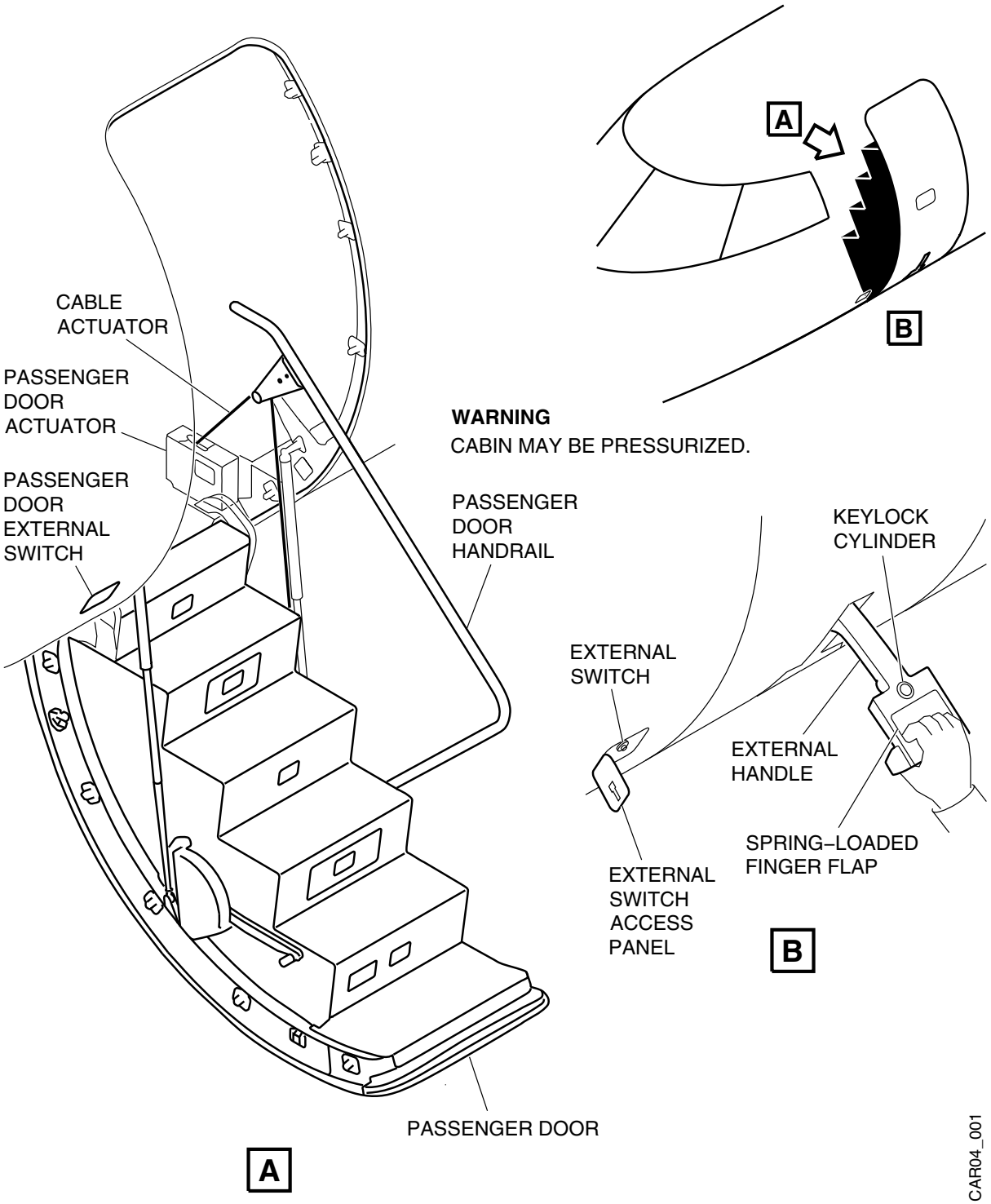
NOTE: The external door handle will not release if the cabin pressure has not lowered to the correct pressure.

(b) Let the passenger door drop by gravity to the full open position.

NOTE: The passenger door actuator will control the decent of the door.

The passenger door will open in less than 9 seconds.

The passenger door telescopic struts will stop the door at the correct position.



Passenger/Crew Door
Figure 1

EFFECTIVITY: ALL

B. Overwing Emergency–Exit Door

(1) The overwing emergency–exit door is on the right side of the passenger compartment. It opens in and operates from the internal or external side the aircraft. The door serves as a Type III Emergency Exit. Refer to Figure 2.

(2) Dimensions:

- Height 3 ft (0.91 m)
- Width 1 ft 8 in (0.52 m)

(3) To open the overwing emergency–exit door from the external side do the following:

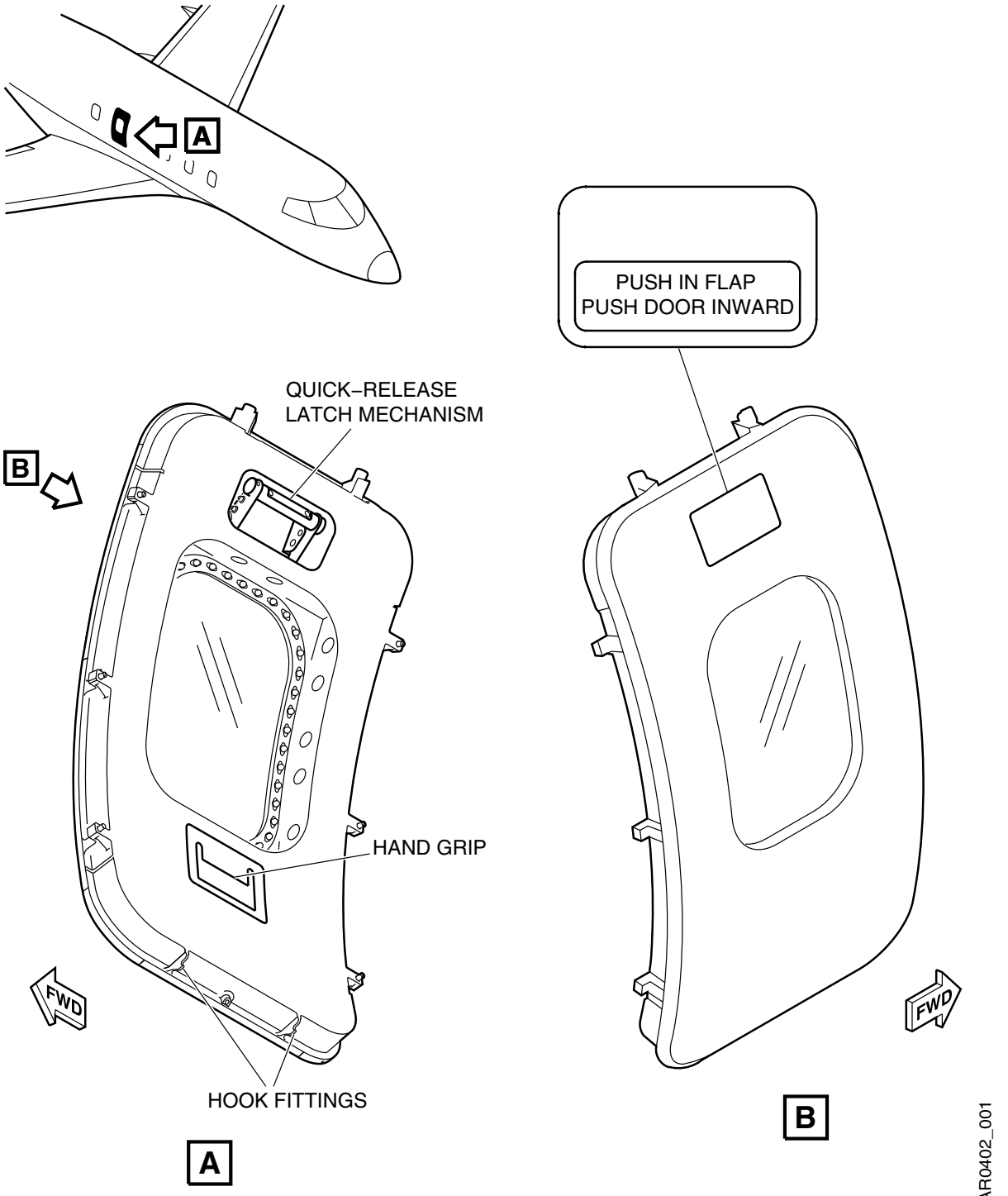
(a) Apply hand pressure on the outside push plate and push the overwing–exit door into the aircraft.

(4) To open the overwing emergency–exit door from the inside do as follows:

(a) Pull the upper latch handle marked EXIT PULL.

(b) Hold the overwing emergency–exit door at the lower hand grip and the upper latch handle.

(c) Tilt the overwing emergency–exit door inboard and lift the door out of the bottom hooks and the pin fittings.



Overwing Emergency–Exit Door
Figure 2

EFFECTIVITY: ALL

C. Baggage Door

(1) The baggage compartment door is a plug–type access door on the left hand side of the aft fuselage section, forward of the aft pressure bulkhead. Refer to Figure 3.

(2) Dimensions:

- Height 2 ft 6 in (0.76 m)
- Width 2 ft (0.61 m)
- Height to sill floor line 5 ft 4 in (1.62 m).

(3) To open the baggage compartment door with the external handle do as follows:

(a) Push the external handle trigger marked PUSH to let the handle move out.

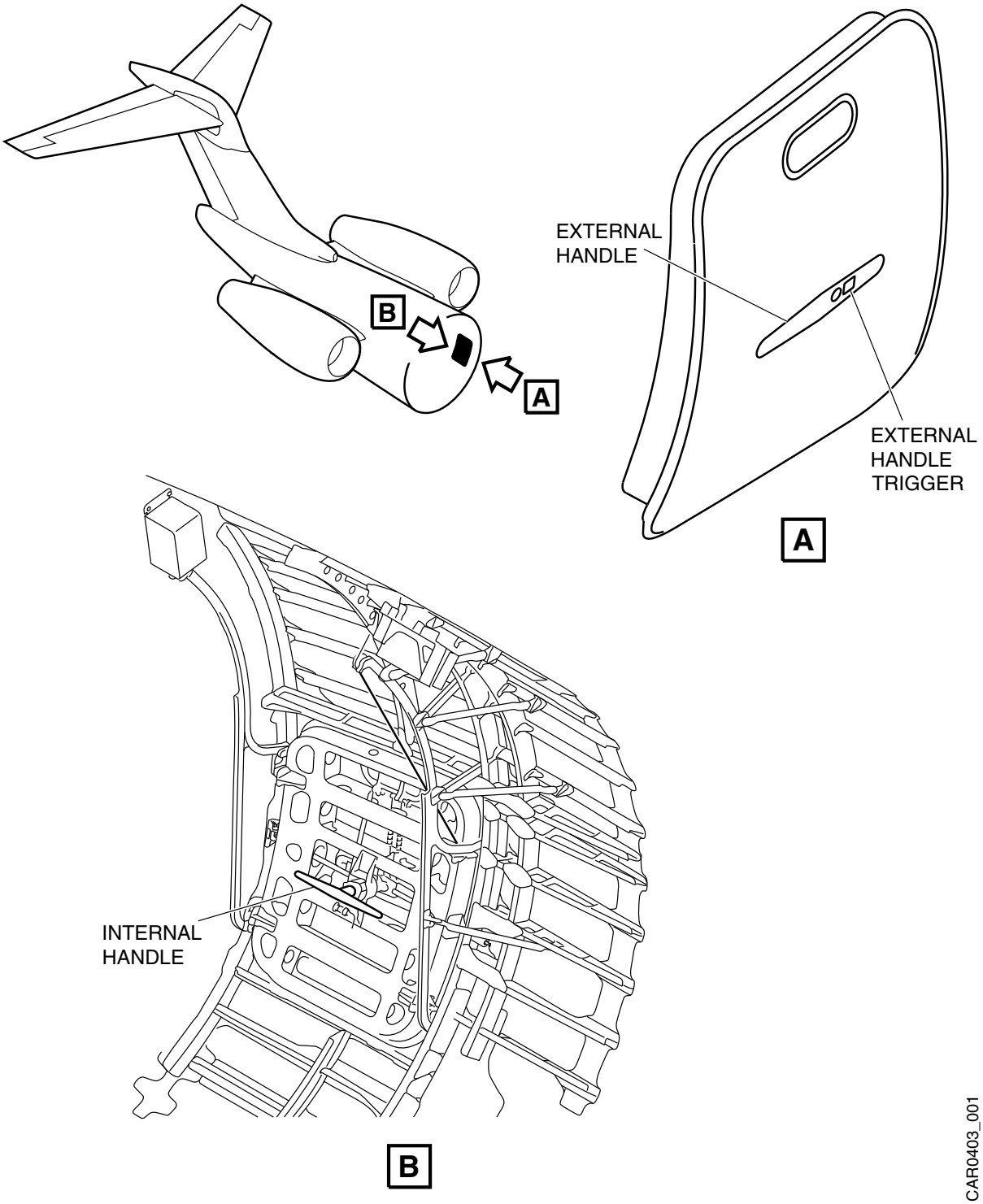
(b) Turn the external handle counterclockwise to the UNLOCKED position.

(c) Push the door in and up on its tracks until the rollers touch the track stops and the opening is clear.

(4) To open the baggage compartment door with the internal handle do as follows:

(a) Pull the knob and turn the handle clockwise to release the latch.

(b) Pull the door in and up on the tracks until the rollers contact the track stops and the opening is clear.



Baggage Door
Figure 3

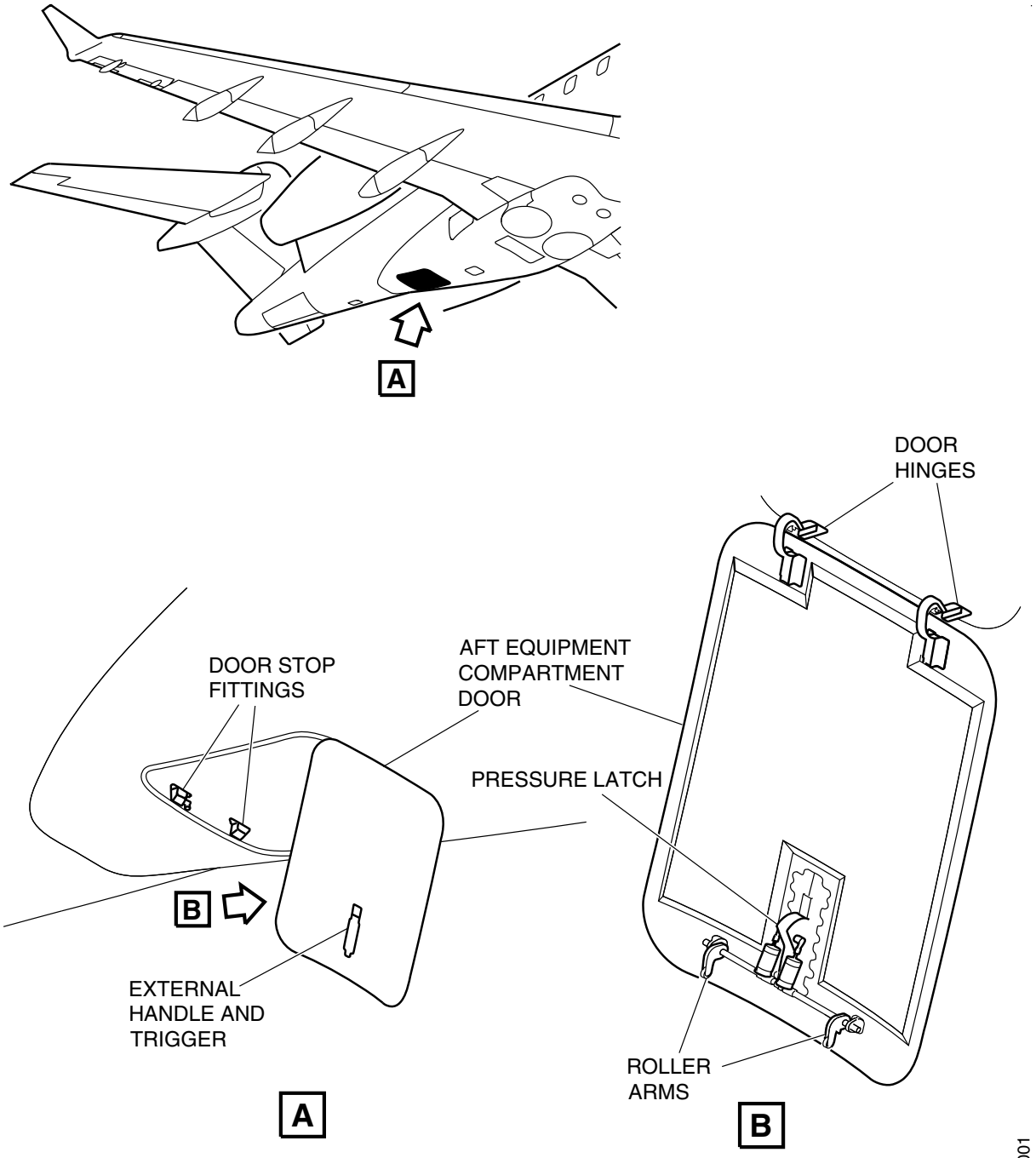
D. Aft Equipment–Compartment Door

(1) The aft equipment compartment of the Bombardier Challenger 300 Business Jet is a non–pressurized area. Access to the aft equipment compartment is through a door in the aft fuselage fairing. The door has a hinge at the forward end. It opens down and forward. Refer to Figure 4.

(2) To open the aft equipment–compartment door do as follows:

(a) Push the external handle trigger marked PUSH to let the door handle move out.

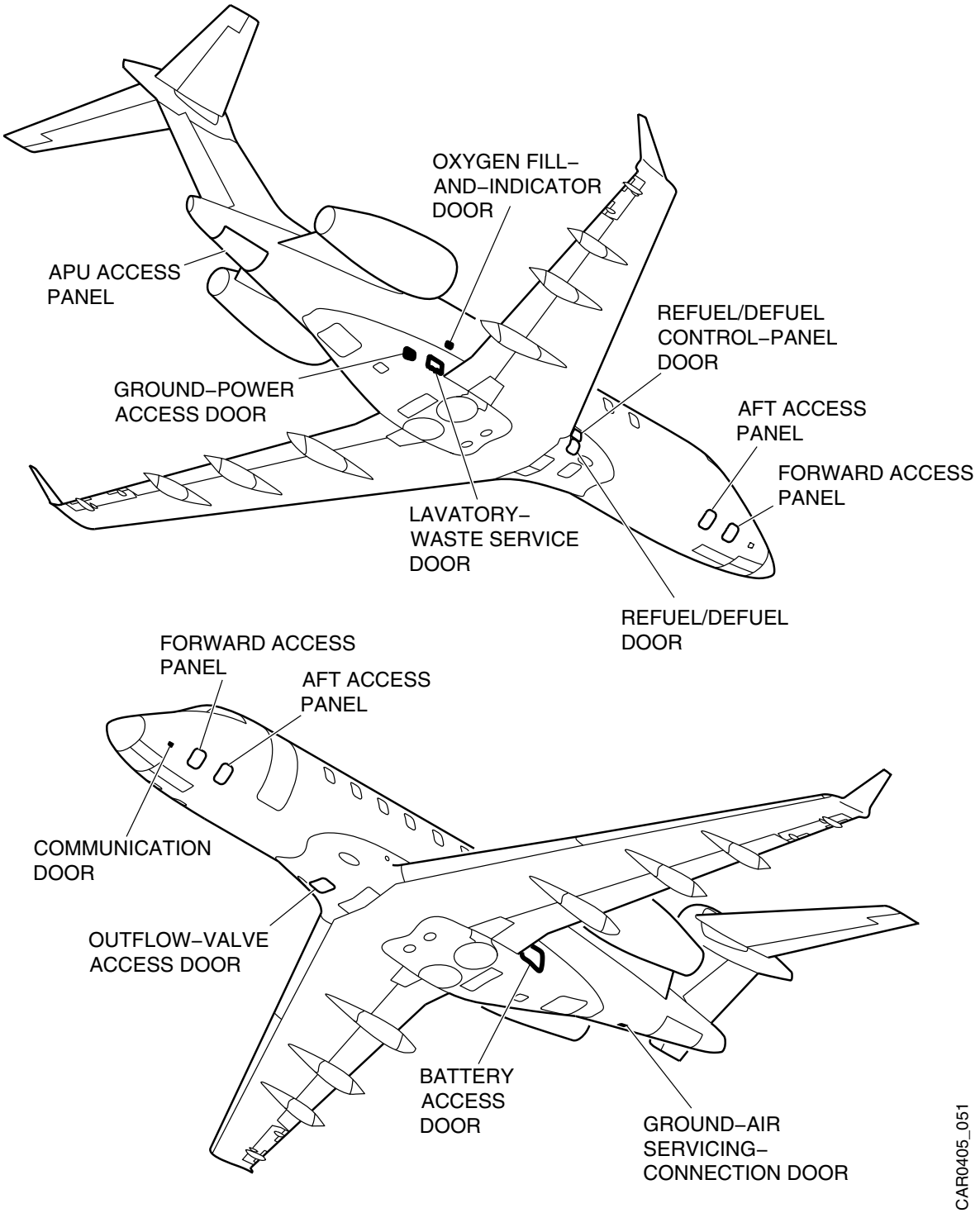
(b) Hold the door, turn the handle clockwise through 90°, and open the door.



Aft Equipment–Compartment Door
Figure 4

E. Service Doors and Panels

(1) The service doors and panels give access to equipment and systems all through the fuselage. The service doors and panels are made from light alloy or graphite with Nomex honeycomb material. Refer to Figure 5.



Service Doors and Panels
Figure 5

EFFECTIVITY: ALL

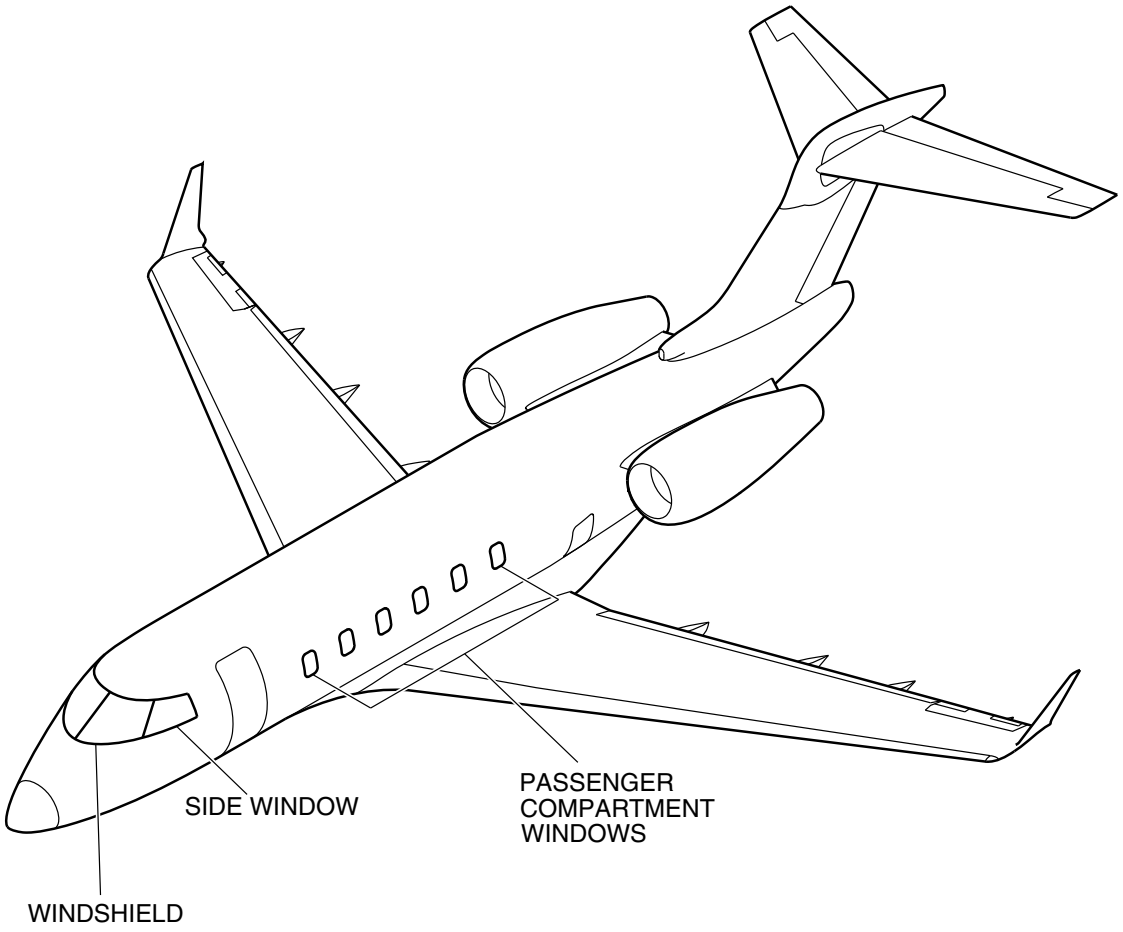
F. Windshields and Windows

(1) The flight compartment has two windshields and two side windows. The Passenger Compartment has six windows maximum on each side. On the right side of the fuselage, one of the windows is in the Overwing Emergency–Exit Door. All of the other passenger windows attach permanently to their surround structure. Refer to Figure 6.

(2) The windshields are made with layers of acrylic, polyvinyl butyl (PVB) and glass.

(3) The side windows are made with layers of acrylic and PVB.

WARNING: DO NOT TRY TO CHOP THROUGH THE WINDOWS. GO THROUGH THE EMERGENCY BREAK-IN ZONE. IF YOU DO NOT DO THIS, YOU CAN CAUSE INJURY TO PERSONS.



Windows
Figure 6

EFFECTIVITY: ALL

FIRE FIGHTING

1. General

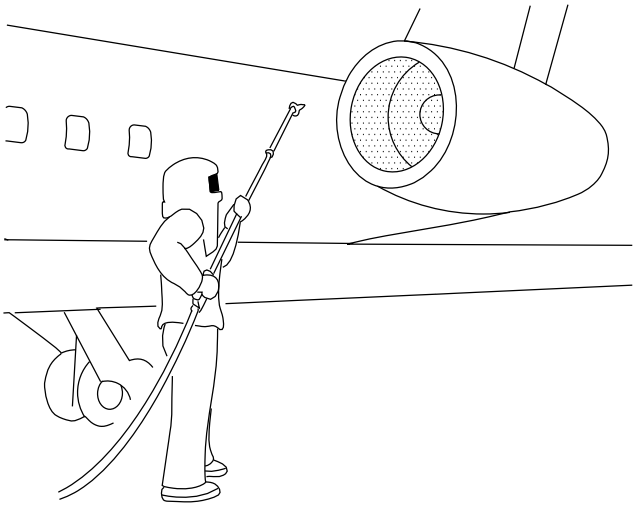
WARNING: BE VERY CAREFUL NEAR THE OXYGEN BOTTLES IN THE LAVATORY SECTION. THE STANDARD OXYGEN BOTTLE HAS A CAPACITY OF 77 FT^3 (2.18M^3) AND THE OPTIONAL OXYGEN BOTTLE HAS A CAPACITY OF 115 FT^3 (3.26M^3). IF THESE BOTTLES ARE DAMAGED AND RELEASE THE OXYGEN, AN EXPLOSION CAN OCCUR. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: MAKE SURE THAT YOU DISCONNECT THE ELECTRICAL POWER TO THE ENGINE FIRE-EXTINGUISHER BOTTLES. THE EXTINGUISHER BOTTLES HAVE PYROTECHNIC SQUIBS. IF YOU DO NOT DISCONNECT THE ELECTRICAL POWER, THERE CAN BE AN EXPLOSION. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

A. The sentences below give the classes used for fire fighting.
   - For brake and wheel fires use only dry powder or class D fire extinguishers.
   - For all other parts of the aircraft use class B or C fire extinguishers.

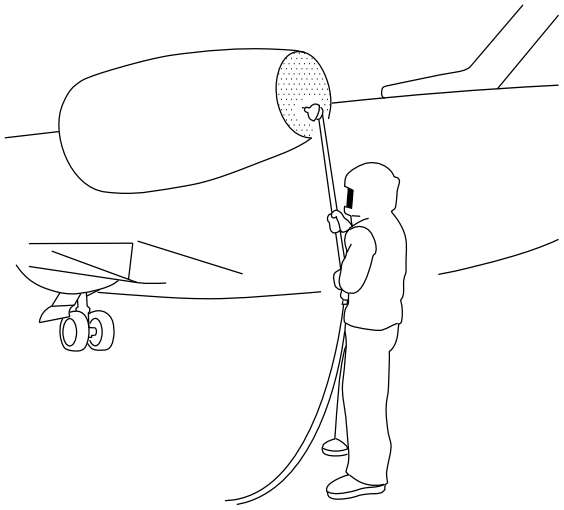
Aerodrome Category for Rescue and Fire Fighting		
	Category	Regulation
International Civil Aviation Organization (ICAO)	4	ICAO Annex 14 – Aerodrome
Federal Aviation Administration (FAA)	A	FAR 139.315
Transport Canada (TC)	4	CAR 303 Supart 3

B. Refer to Figure 1 for typical fire–fighting with small equipment.



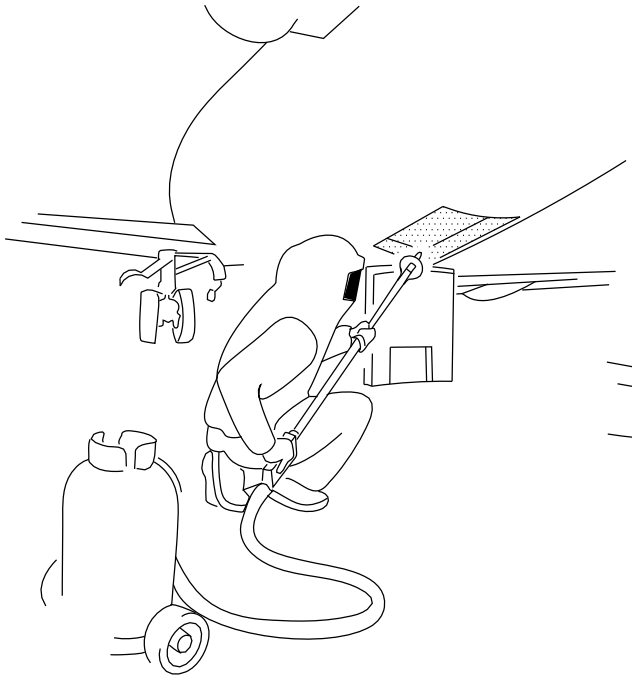
INTERNAL ENGINE FIRE

A



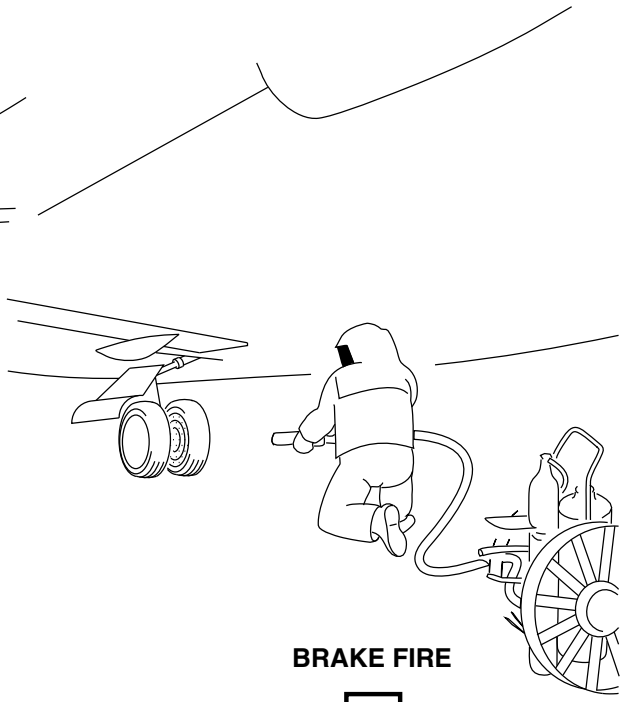
EXHAUST NOZZLE FIRE

B



AFT EQUIPMENT COMPARTMENT FIRE

C



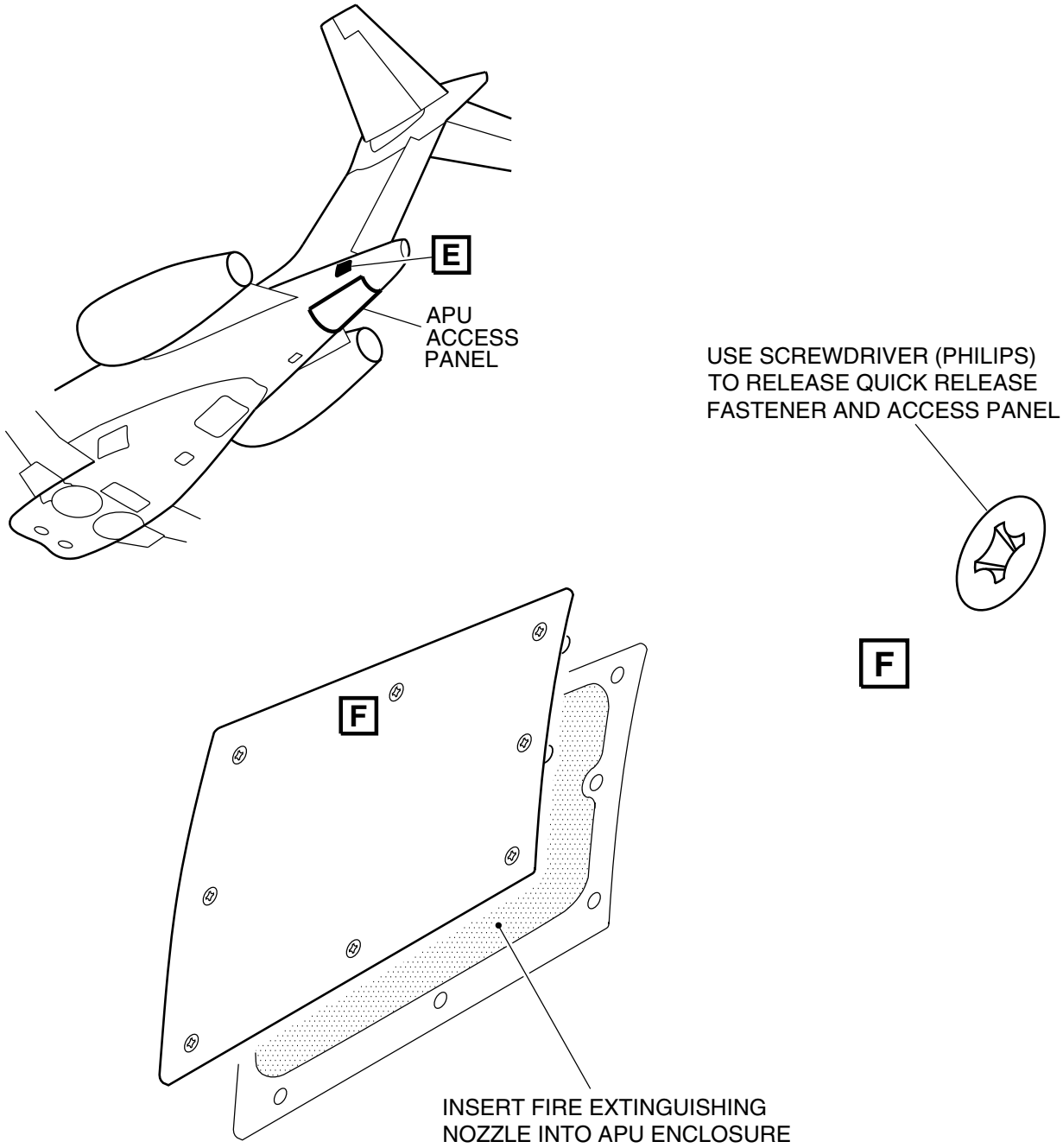
BRAKE FIRE

D

CAR05_001

Fire Fighting
Figure 1 (Sheet 1 of 2)

EFFECTIVITY: ALL



APU COMPARTMENT FIRE

E

CAR05_002

Fire Fighting
Figure 1 (Sheet 2 of 2)

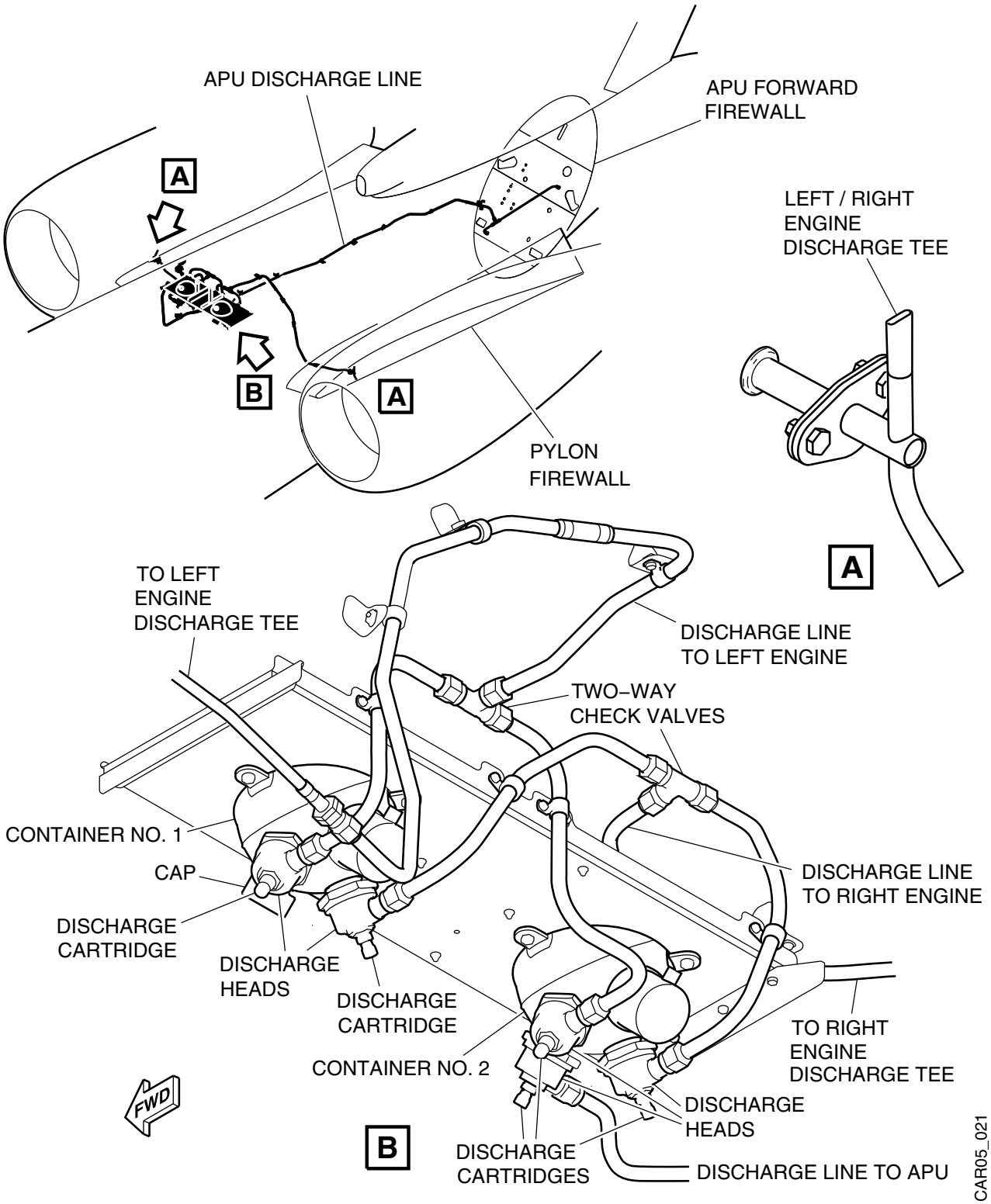
EFFECTIVITY: ALL

2. On–Board Fire–Fighting Equipment

A. The extinguishing system supplies fire extinguishant to the engines and auxiliary power unit (APU) through a distribution system controlled in the flight compartment. The extinguishing system also has a portable fire extinguisher for manual operation in the aircraft. Refer to Figure 2.

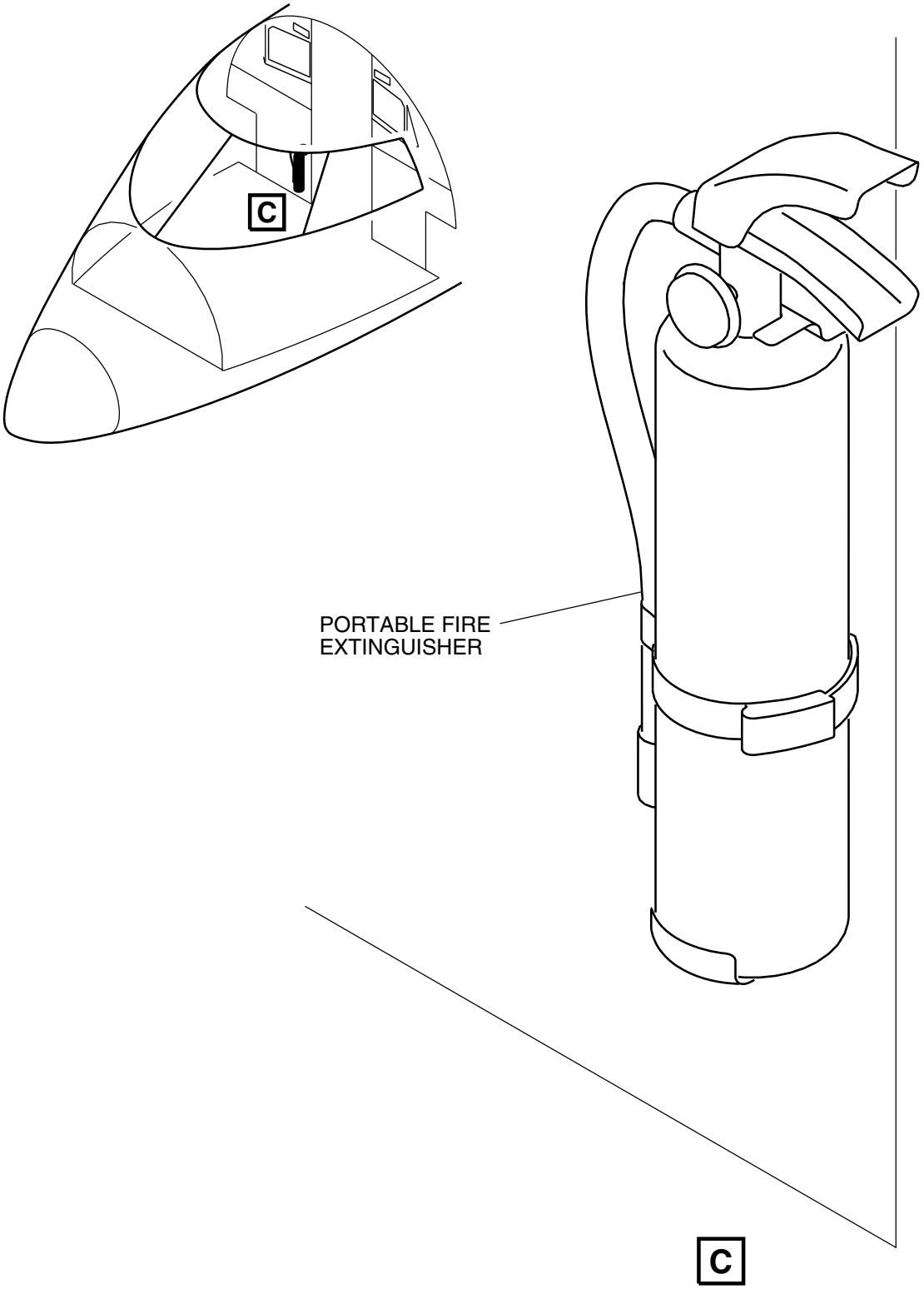
B. The Bombardier Challenger 300 has two identical crew–operated in–flight fire–fighting systems. Each system has a spherical fire bottle of Halon 1301 located in the aircraft aft section. The bottles are pressurized with dry nitrogen at a pressure of 600 psi (4 137 kPa) to push the Halon. There are three pyrotechnic squibs to discharge and direct the Halon. One or both systems can be directed at No 1 or No 2 engine. Only No. 2 system can be directed at the APU.

C. There is a portable fire extinguisher on the flight compartment bulkhead behind the co–pilot's seat. The fire extinguisher contains 3.5 pounds (1.59 kg) of Halon 1211.



On–Board Fire–Fighting Equipment
Figure 2 (Sheet 1 of 2)

EFFECTIVITY: ALL



On–Board Fire–Fighting Equipment
Figure 2 (Sheet 2 of 2)

EFFECTIVITY: ALL

3. Engine/APU Fire Controls

On Challenger 300 A/C

A. The control and monitor panels are in the flight compartment. Refer to Figure 3 and Figure 4.

On Challenger 350 A/C

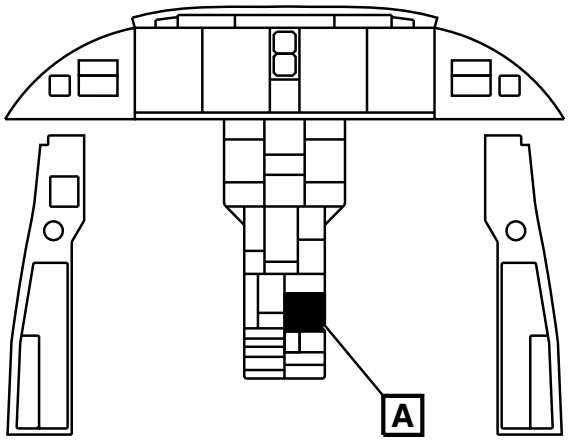
B. The control and monitor panels are in the flight compartment. Refer to Figure 3 and Figure 5.

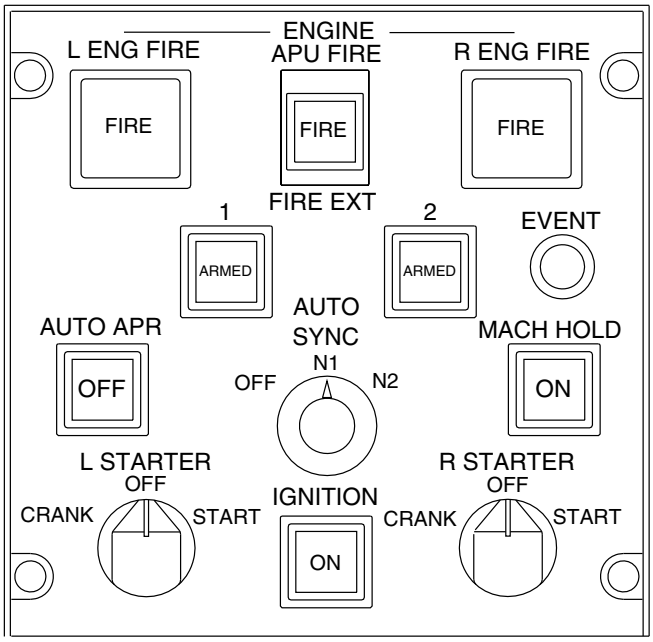
C. To stop the engines do the following:

- On the Center Pedestal set the LEFT ENGINE RUN and/or RIGHT ENGINE RUN switch to OFF.
- Push the LEFT ENG FIRE and/or RIGHT ENG FIRE pushbutton annunciator(s) (PBA) in the flight compartment panel. This shuts off the applicable engine fuel, hydraulics, electrical systems and bleed air.

D. To stop the APU:

- On the ground, the APU should stop automatically if a fire occurs. If it does not or if you need to manually stop the APU, do the following:
- On the Center Pedestal set the APU RUN switch to OFF.
- Push the APU FIRE PBA in the flight compartment panel. This shuts off the APU fuel and electrical system.





A

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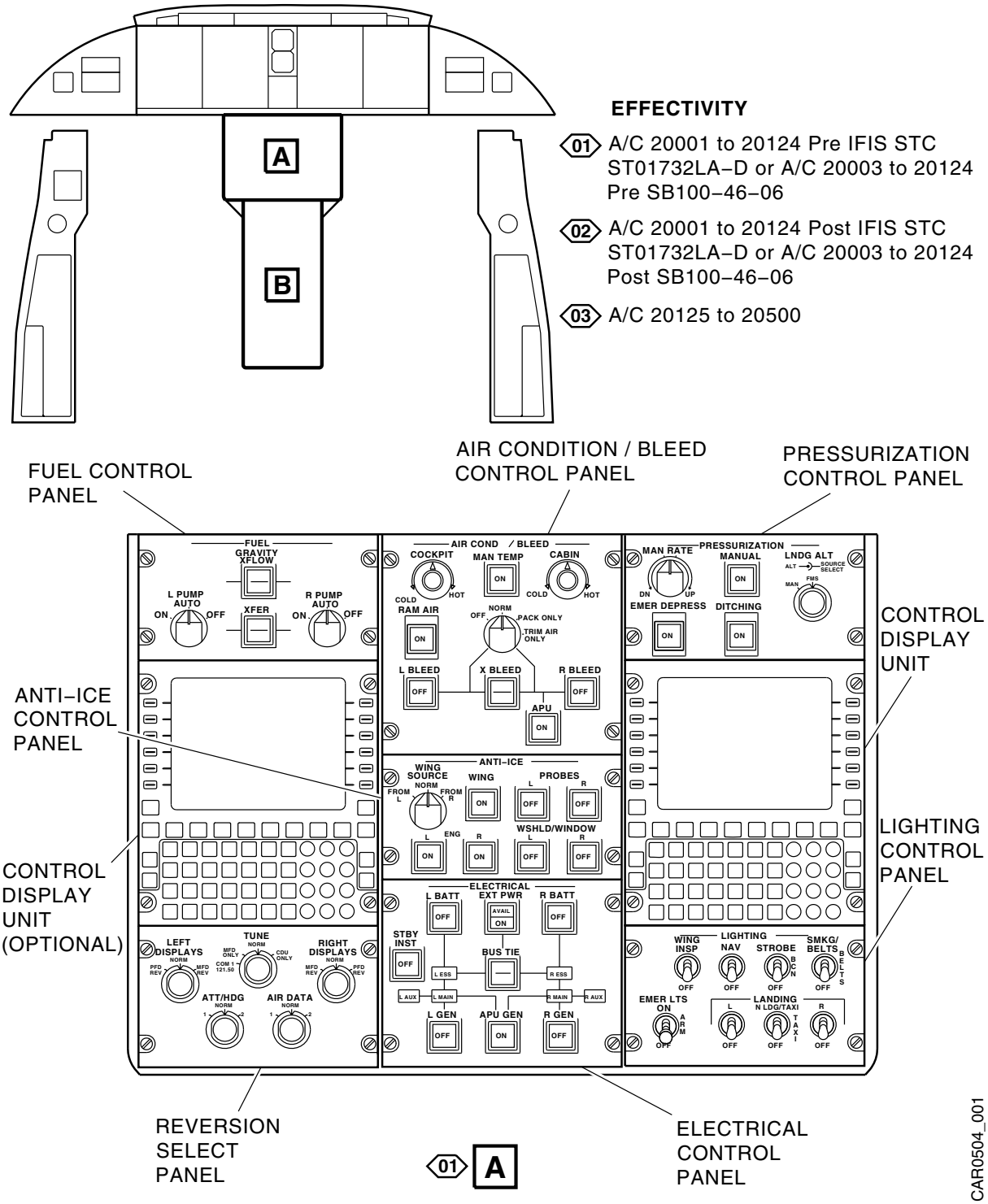
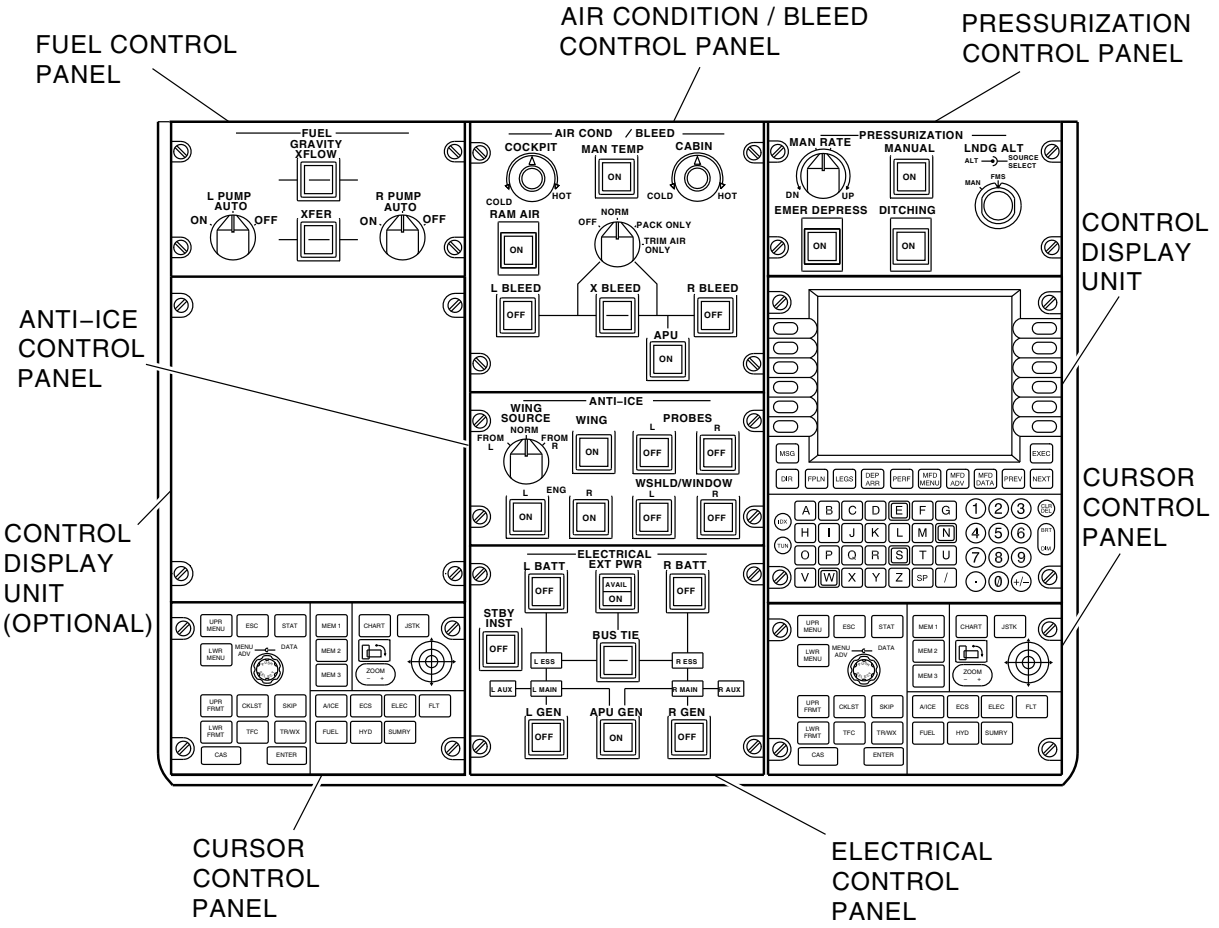
Engines/APU Fire Controls
Figure 3



Center Pedestal – Component Location
Figure 4 (Sheet 1 of 5)

EFFECTIVITY: ALL

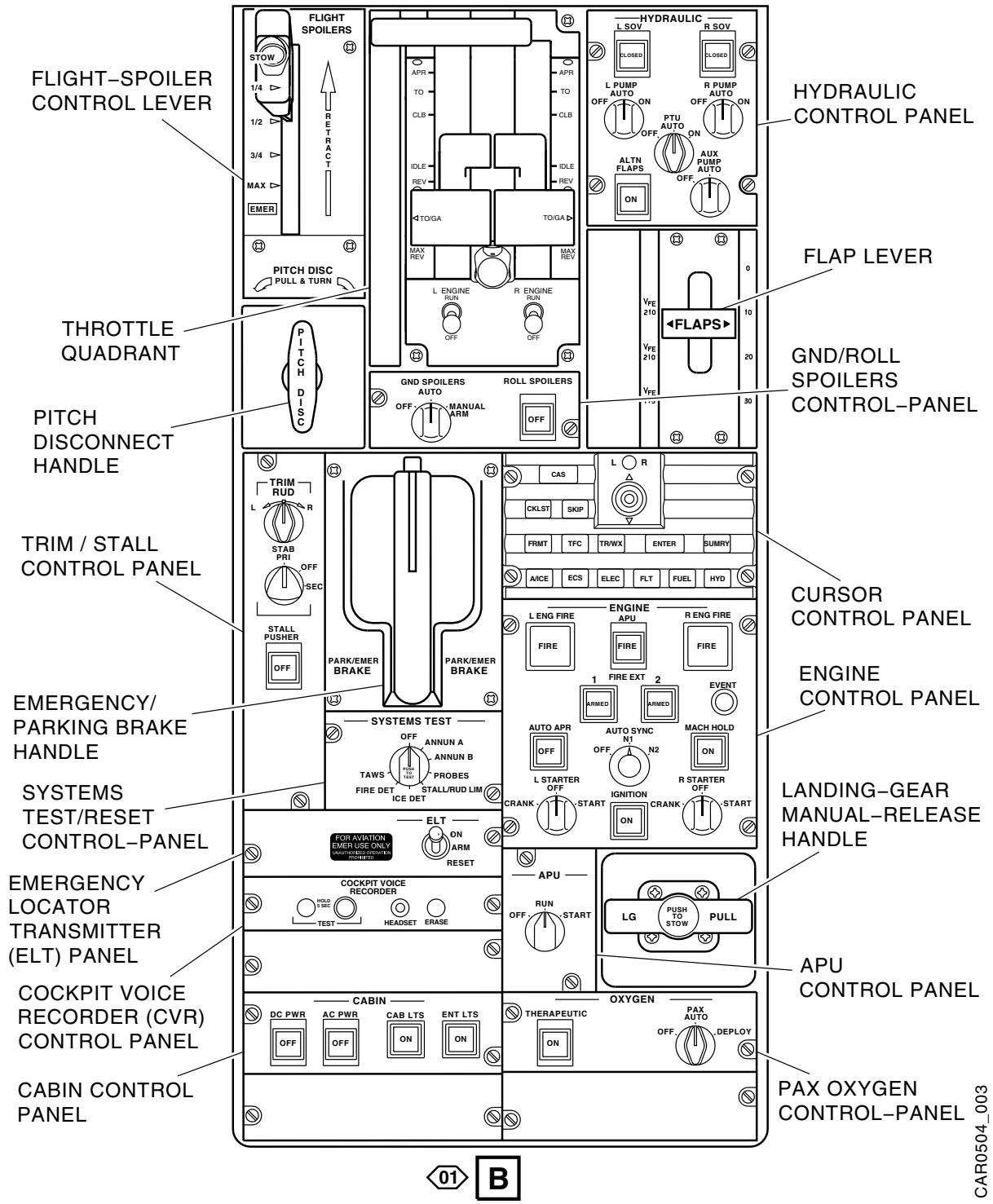


02 03 A

CAR0504_002

Center Pedestal – Component Location
Figure 4 (Sheet 2 of 5)

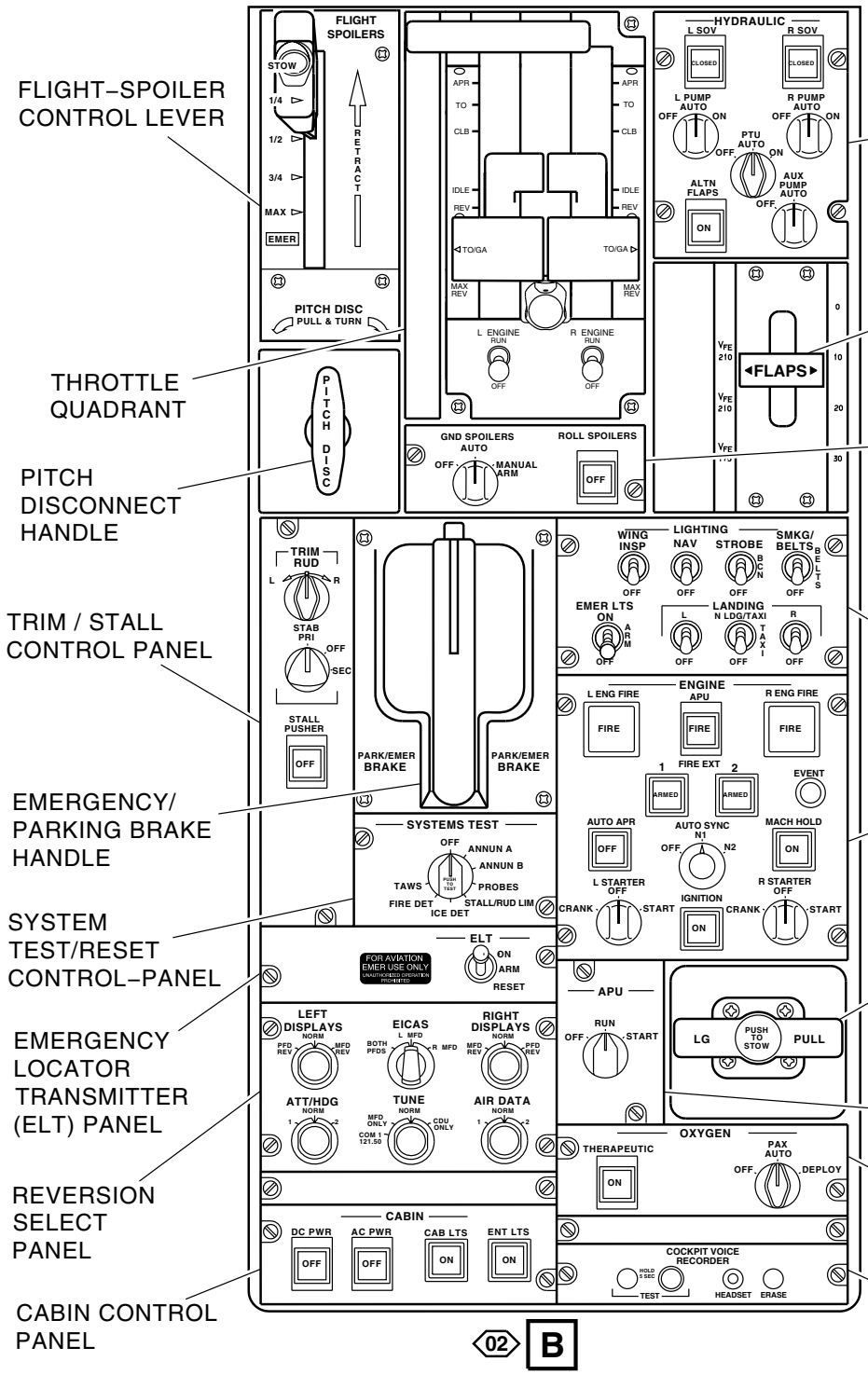
EFFECTIVITY: ALL



01 B

Center Pedestal – Component Location
Figure 4 (Sheet 3 of 5)

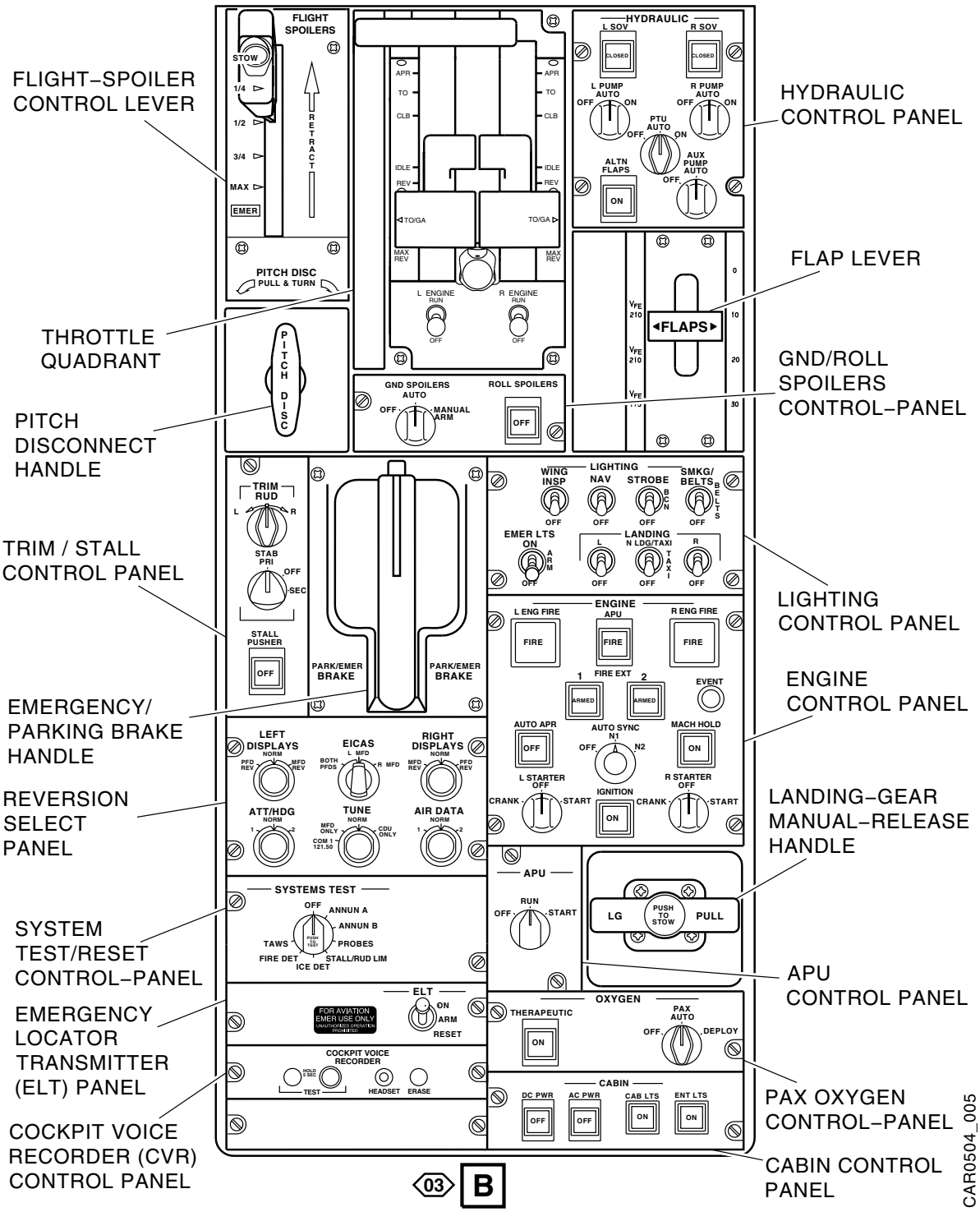
EFFECTIVITY: ALL



02 B

Center Pedestal – Component Location
Figure 4 (Sheet 4 of 5)

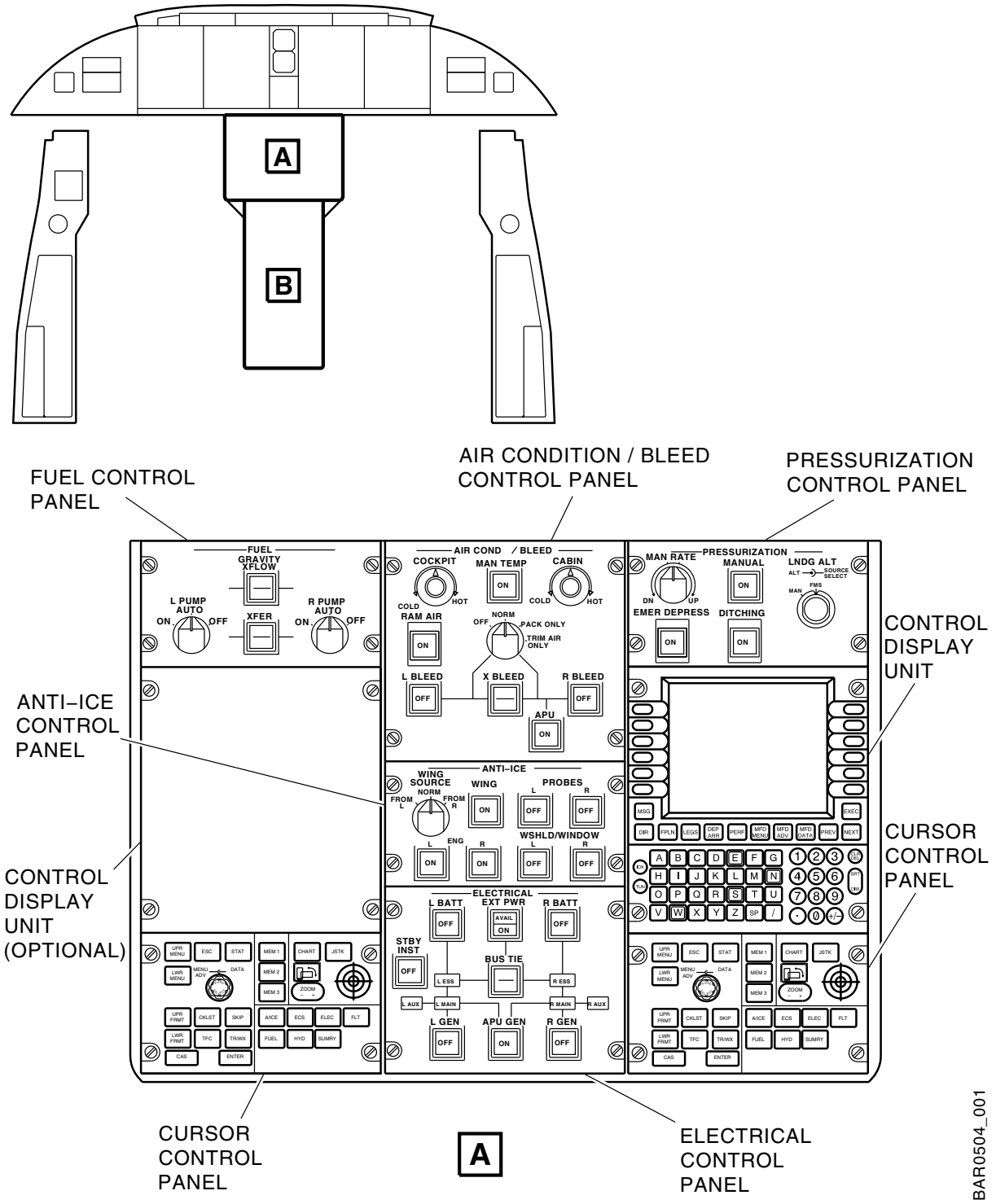
EFFECTIVITY: ALL



03 B

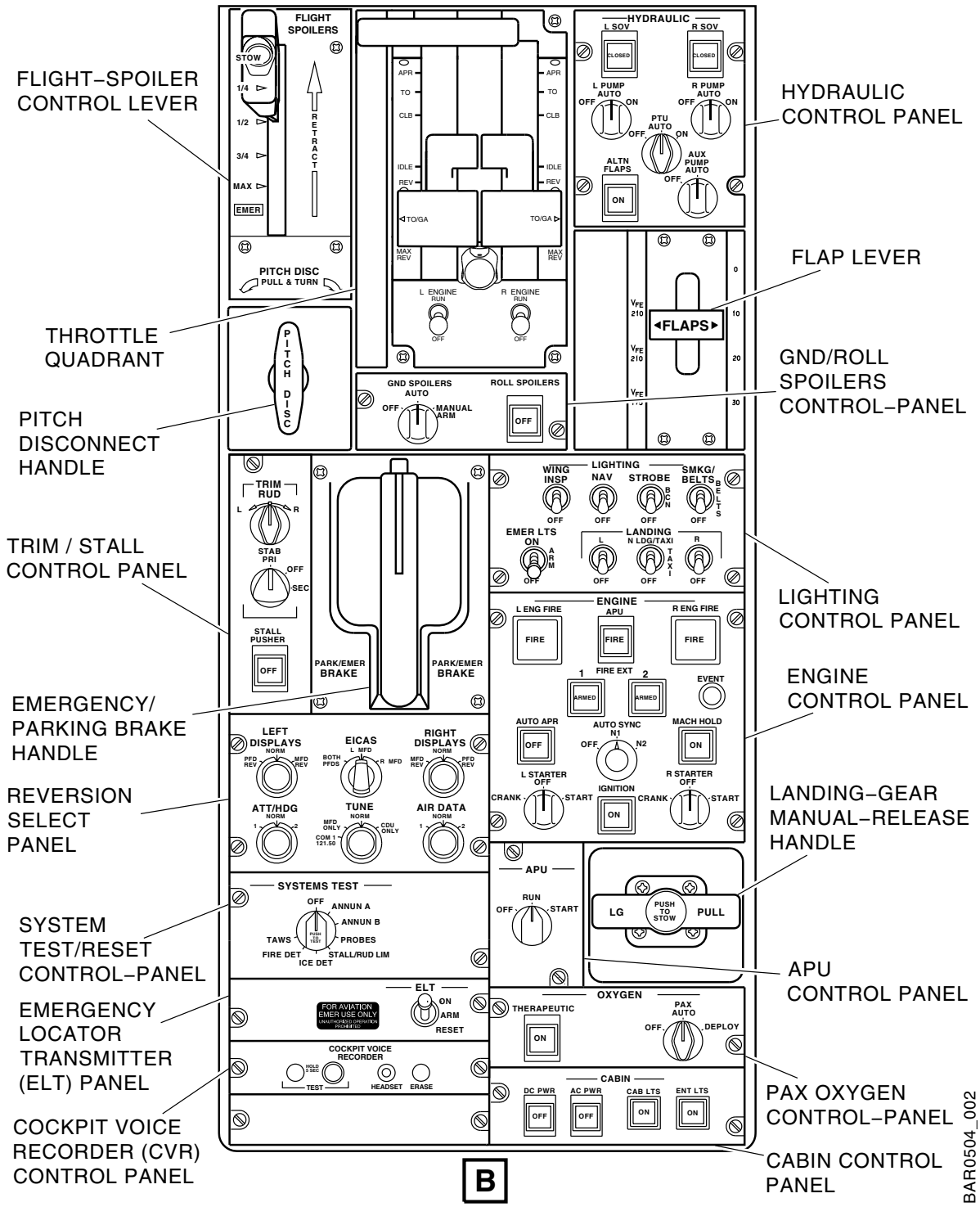
Center Pedestal – Component Location
Figure 4 (Sheet 5 of 5)

EFFECTIVITY: ALL



Center Pedestal – Component Location
Figure 5 (Sheet 1 of 2)

EFFECTIVITY: ALL



Center Pedestal – Component Location
Figure 5 (Sheet 2 of 2)

EFFECTIVITY: ALL

4. Electrical Control Panels and Battery Locations

A. Refer to Figure 6 and Figure 12 for aircraft and Integrated Standby Instrument (ISI) battery locations.

B. To isolate electrical power do the following:

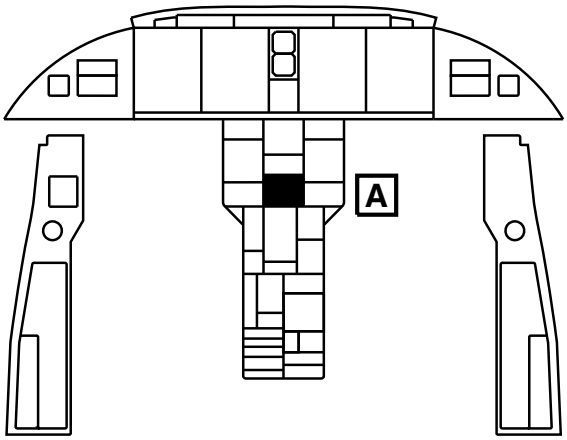
- If engines are running select the L GEN and/or R GEN switch(es) to OFF.
- Push the L BATTERY and/or R BATTERY PBA to OFF.
- Push the STBY INST battery PBA to OFF.

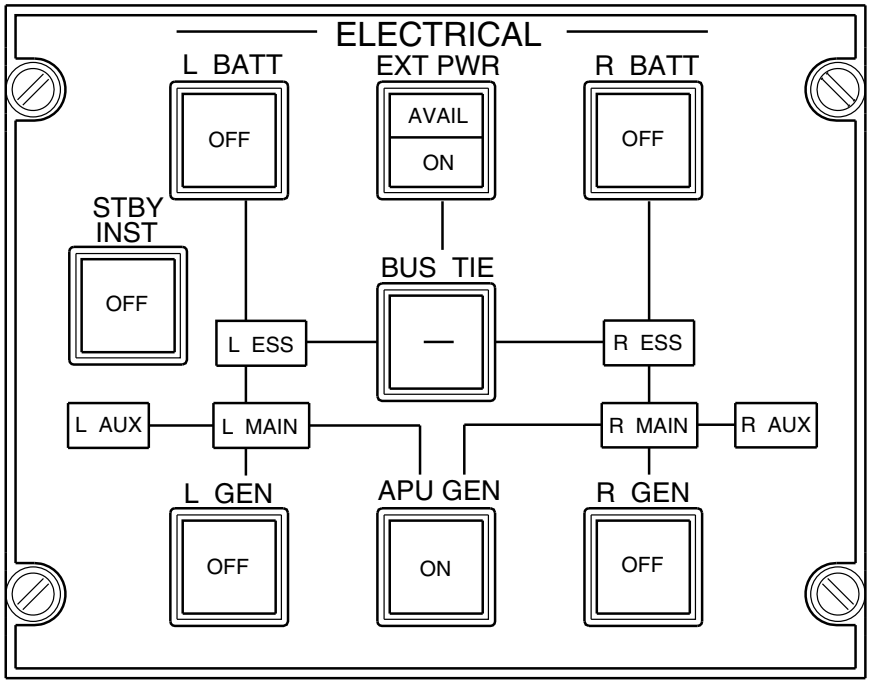
C. To disconnect main battery do the following:

- Open the aft compartment access door.
- Disconnect the battery power connector from the battery.
- Disconnect the electrical connector from the battery.

D. To disconnect Integrated Standby Instrument (ISI) battery:

- In the Nose Landing Gear Wheelwell, remove the access door 121ALZ. Refer to Figure 12.
- Disconnect the battery connector from the battery.





A

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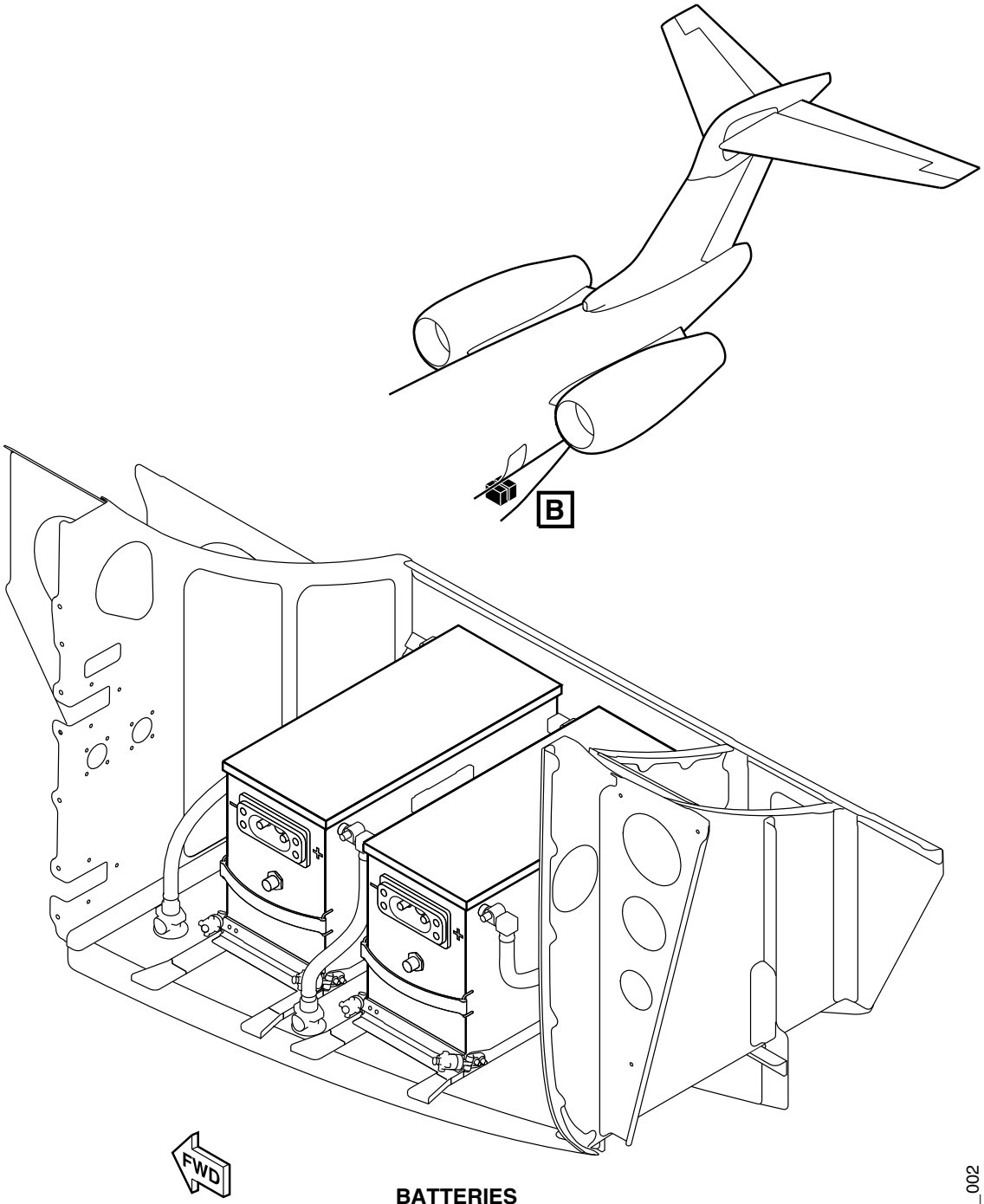
Electrical Control Panel and Battery Locations
Figure 6 (Sheet 1 of 2)



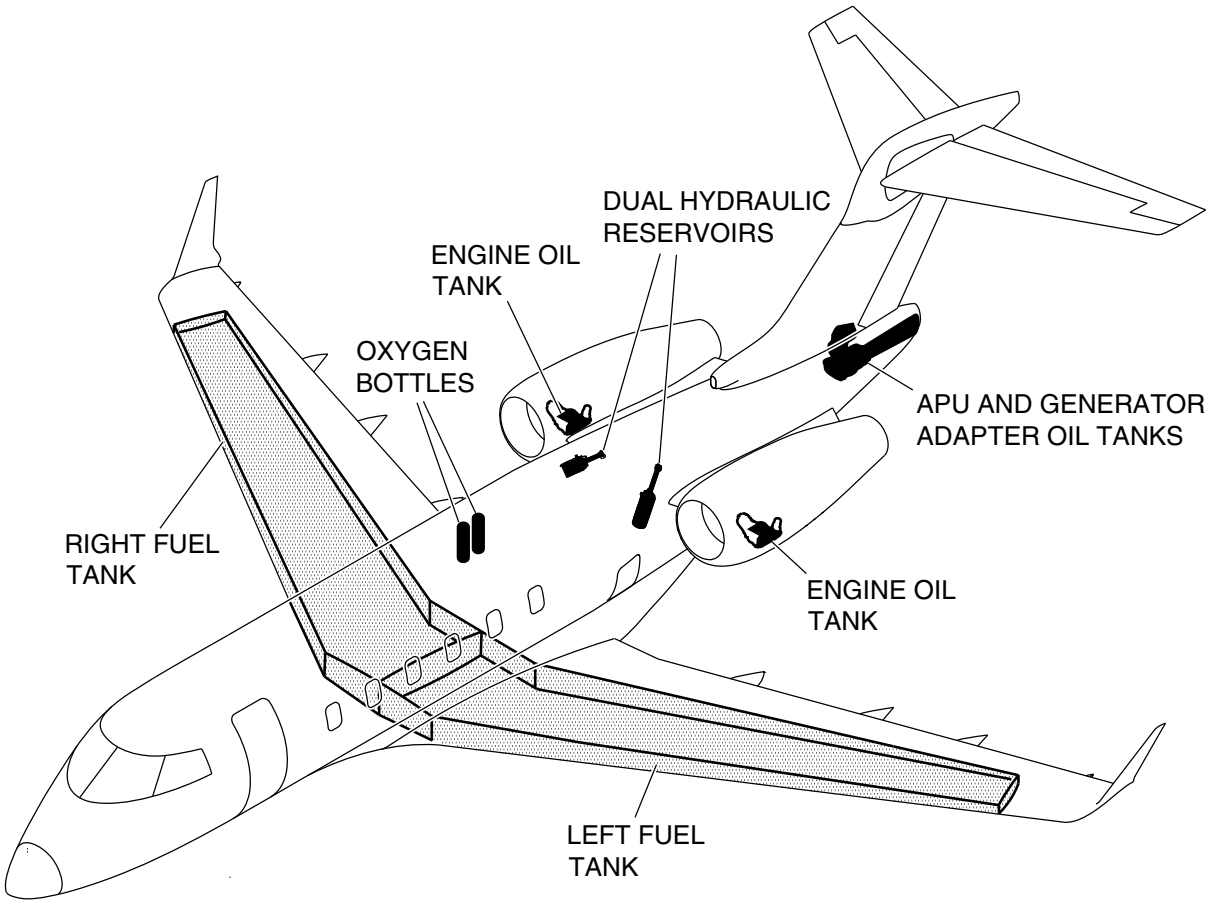
Electrical Control Panel and Battery Locations
Figure 6 (Sheet 2 of 2)

5. Flammable Fluids and Gases

Table 2 lists all flammable fluids and gases carried on the aircraft. The table also gives the specifications and the commercial grades and capacities. Refer to Figure 7 for locations of the reservoirs and tanks.

Table 2 – Flammable Fluids and Gases

	CAPACITY					Specification or Commercial Grades
	Cubic Inches	U.S Gallons	Imperial Gallons	Liters	Weight	
Fuel System Total Capacity	—	2 096	1 745	7 934	14 150 lbs 6 424 kg @6.75 lb/usg	ASTM D1655 Jet A Jet A–1 Jet B JP– 4
Engine Oil Tanks	—	Left: 1.26 Right: 1.51	Left: 1.03 Right: 1.19	Left: 4.7 Right: 5.7	—	MIL–PRF–23699 Type 2 Mobil Jet Engine Oil II
Hydraulic Reservoirs	RH–52.5 LH–75 AUX–15	2.27 3.25 0.65	—	8.60 12.30 2.46	—	CMS 564–03 Type IV
APU Oil Tanks	—	0.50	0.42	1.9	—	MIL–PRF–23699 Type 2 Mobil Jet Engine Oil II
Oxygen Bottle System Pressure 1850 PSI	Basic: 77 FT^3 option: 115 FT^3	—	—	Basic: 2 180 option: 3 256	—	Therapeutic Oxygen MIL–PRF–27210 Type 1



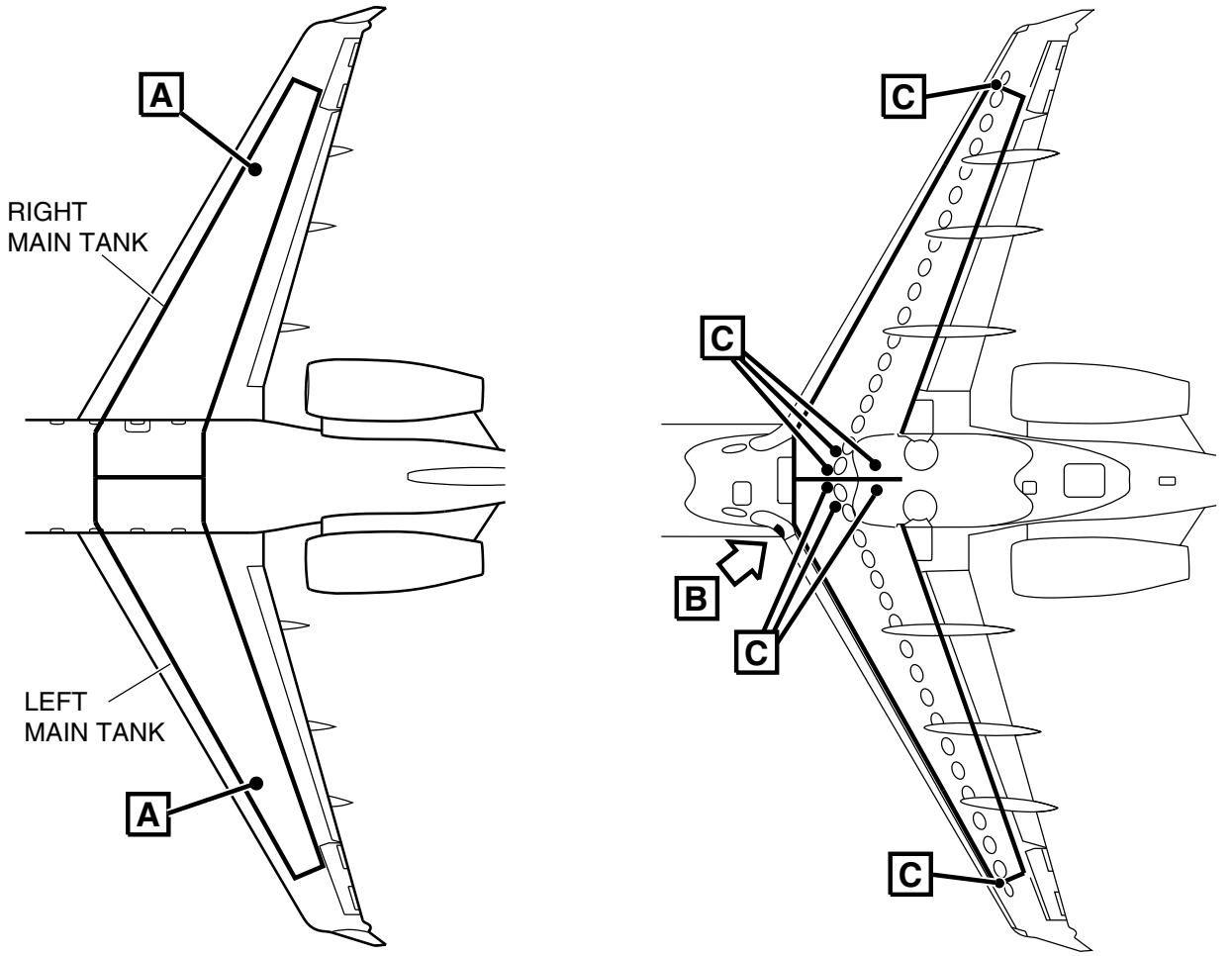
Flammable Fluids and Gasses
Figure 7

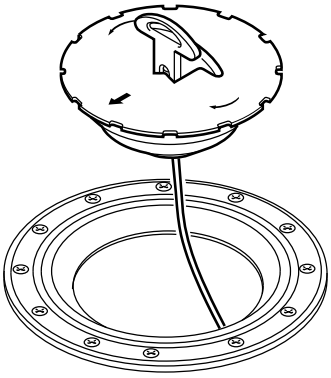
6. Fuel System General Layout

A. The wing fuel is contained in a wet wing–box structure. The structure is divided in two wing tanks at the wing center line. The fuel is contained between the front and the rear spars in the left and the right tanks., Refer to Figure 8.

B. Feed/collector tanks are integrally contained within each tank. Baffles in each wing tank restrict fuel sloshing thus limiting center of gravity shifts with changes in aircraft attitude. Swing check valves on the baffles allow fuel flow in the inboard direction only. Flush, self–closing dual seal water drain valves are located at all the low points of the system.

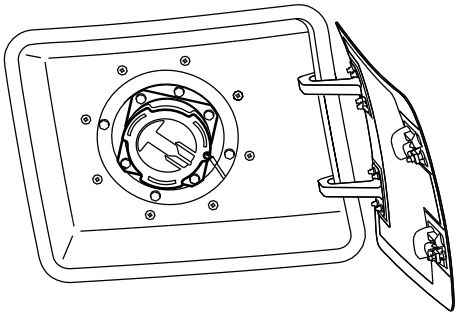
C. Refer to Figure 9 for the fuel system indication in the flight compartment, .





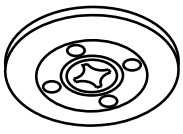
GRAVITY FILLER CAP

A



PRESSURE REFUEL/DEFUEL ADAPTOR

B

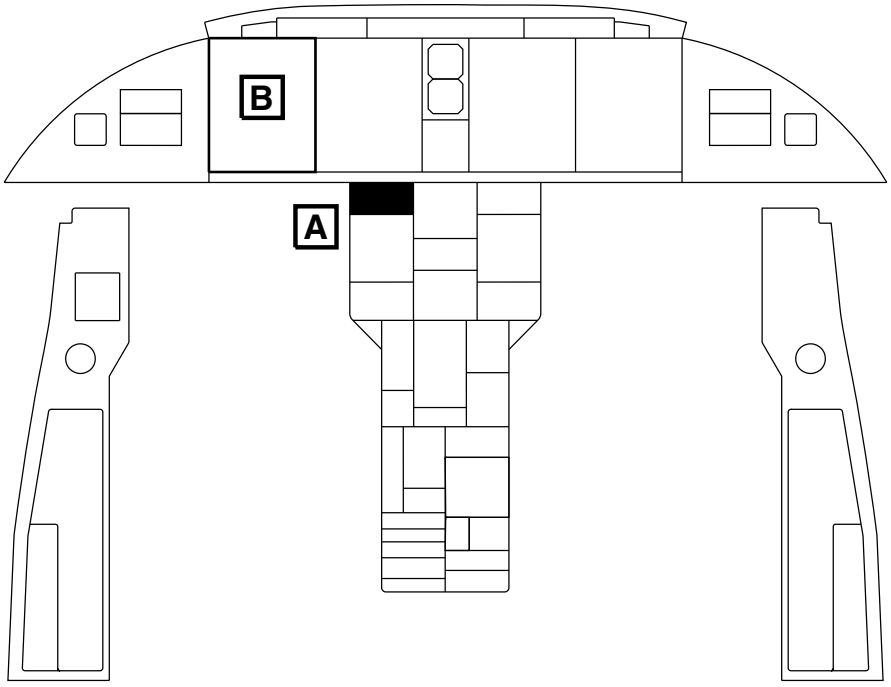


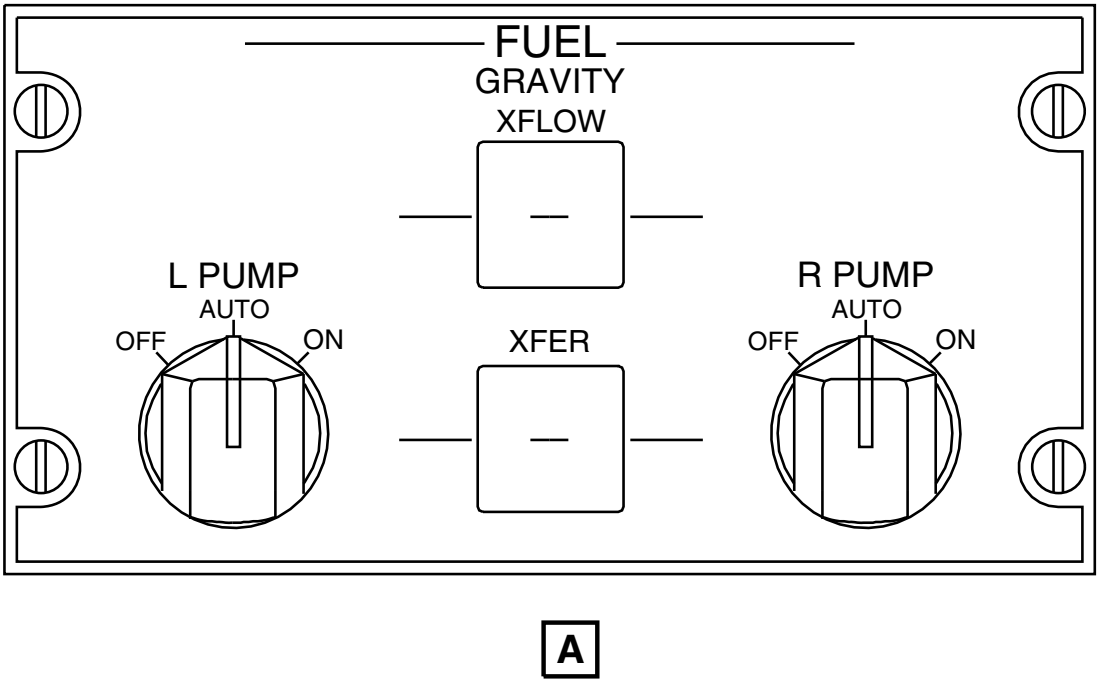
WATER DRAIN VALVE

C

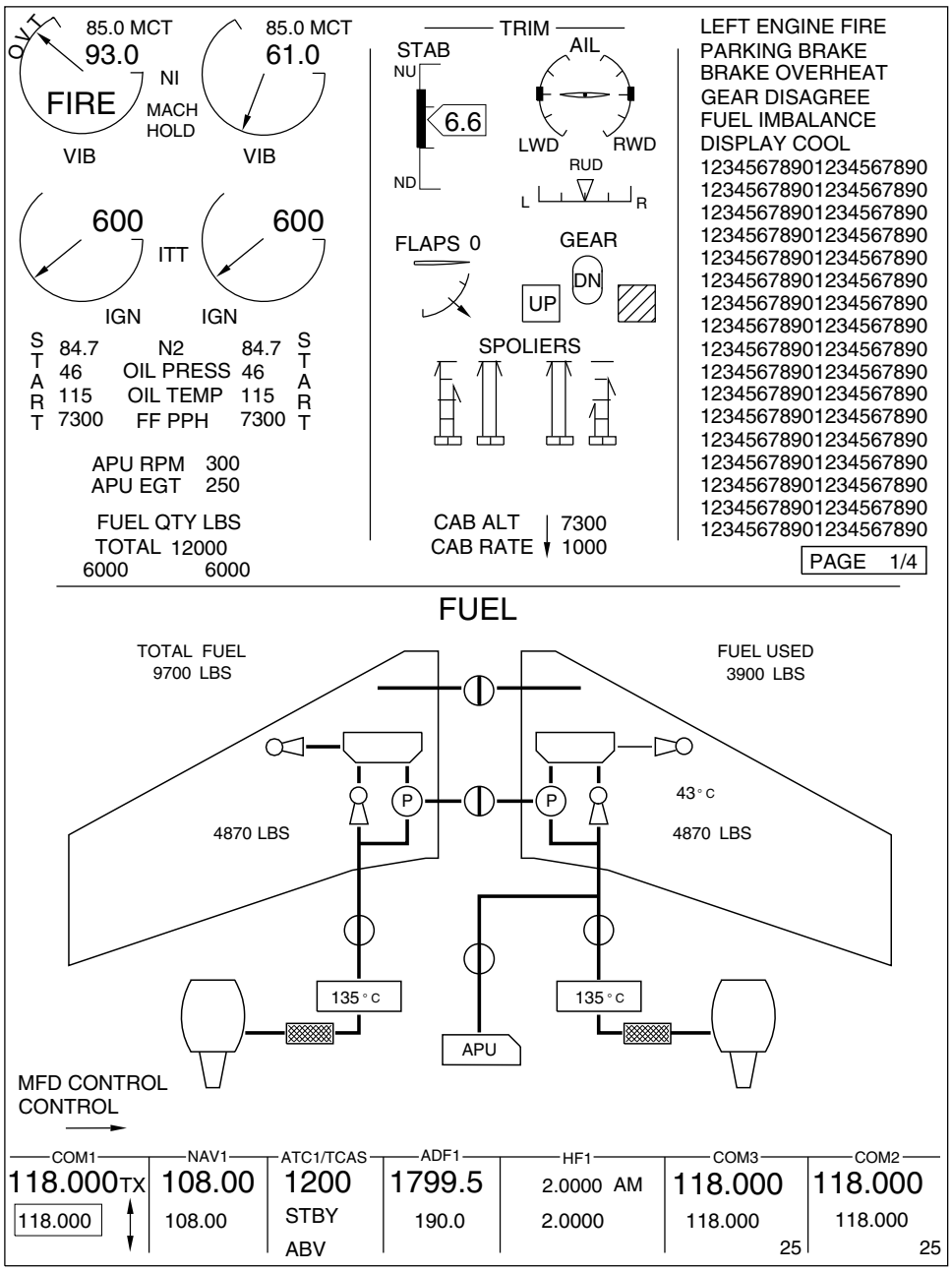
CAR0507_071

Fuel System Layout
Figure 8





Fuel Controls in the Flight Compartment
Figure 9 (Sheet 1 of 2)



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B

Fuel Controls in the Flight Compartment
Figure 9 (Sheet 2 of 2)

7. Emergency Break–In Zone

A. The emergency break–in–zone on the Challenger 300 is 16 in (406 mm) wide by 30 in (762 mm) long. The emergency break–in–zone is located between FS345.00 and FS375.00 and between LBL8.00 and RBL8.00. Refer to Figure 10.

8. Tires

A. If the wheels on the aircraft become hotter than usual (for example, because of hard braking or under–inflation), there is a possibility that the fusible plugs can melt. This will release tire pressure quickly. It is important for persons not to approach the wheels from the sides. Refer to Figure 1.

9. Composite Material Fire Precautions

A. General

(1) With the new generation aircraft, composite materials are widely used. These materials are made by bonding layers of fiber together in a "criss–cross" pattern with resins, epoxies and phenols. Refer to Figure 11 for the locations of the composite structures on the Bombardier Challenger 300.

B. Dangerous Effects of Free Fibers

(1) In the case of an aircraft fire, the bonding agents (resins, epoxies and phenols) can become unstable and break down. This releases dangerous gases into the atmosphere. Fire fighters and other personnel should avoid the downwind area of the fire, specially when they do not use self–contained breathing equipment. As well as dangerous gases, the fire also releases small particles of free fibers.

(2) When the fire is extinguished and the structure becomes cool, the bonding agents stop the release of these free fibers. However, the hazards due to the release of free fibers continues and can become a long term problem. This is because:

- When The free fibers come in contact with fire, the fibers tend to break into shorter lengths and smaller diameters. This makes them light and easily airborne. The free fibers also absorb pyrolytic acid. This poisonous material is picked up from the burned materials. The smoke from the fire can carry the free fibers and can therefore send the contamination over a large area.

- Without correct protection, personnel can breathe in the free fibers and they can bond to a person's respiratory system. They can also move to other internal organs and cause damage. The free fibers are very stable and there is no deterioration of the fibers in the body.

- They will burn the eyes.

- The ends of the fibers are very sharp. This will let them pass through clothing and skin. If you rub the affected area, you can cause dermatitis which will require medical treatment.

C. Control of Free Fibers

(1) As soon as the fire fighting and medical activities are completed, take steps to limit the spread of the free fibers. This is important when you move the damaged aircraft.

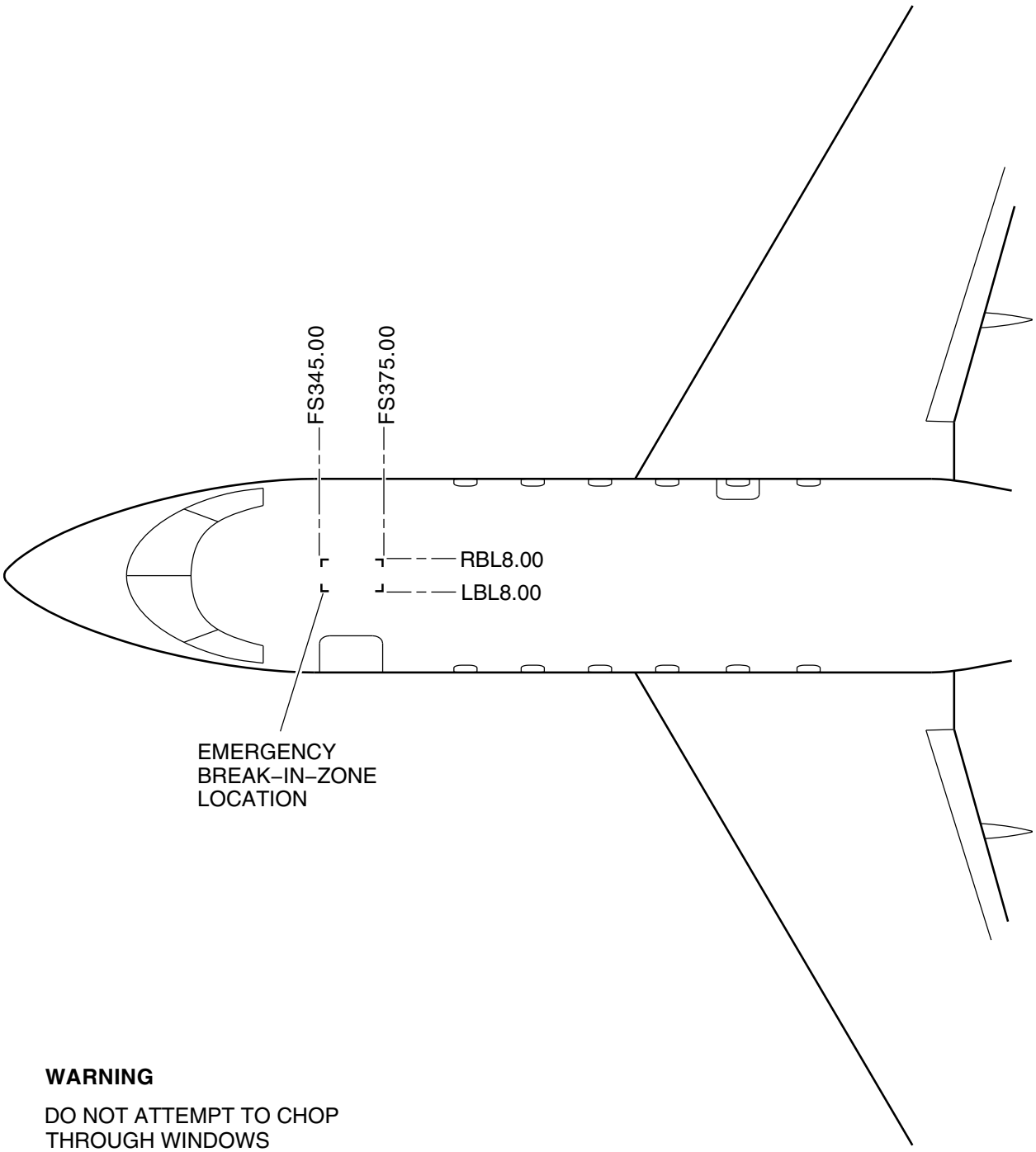
(2) Treat the components that can release free fibers as follows:

- Keep the materials wet with Aqueous Fire Fighting Foam (AFFF) or water. With the AFFF, wet the materials every six hours

NOTE: Light oil, clear liquid furniture wax, polyacrylic acid or strippable paint, are all good materials to contain free fibers. These liquids are not considered to be a problem to future investigations.

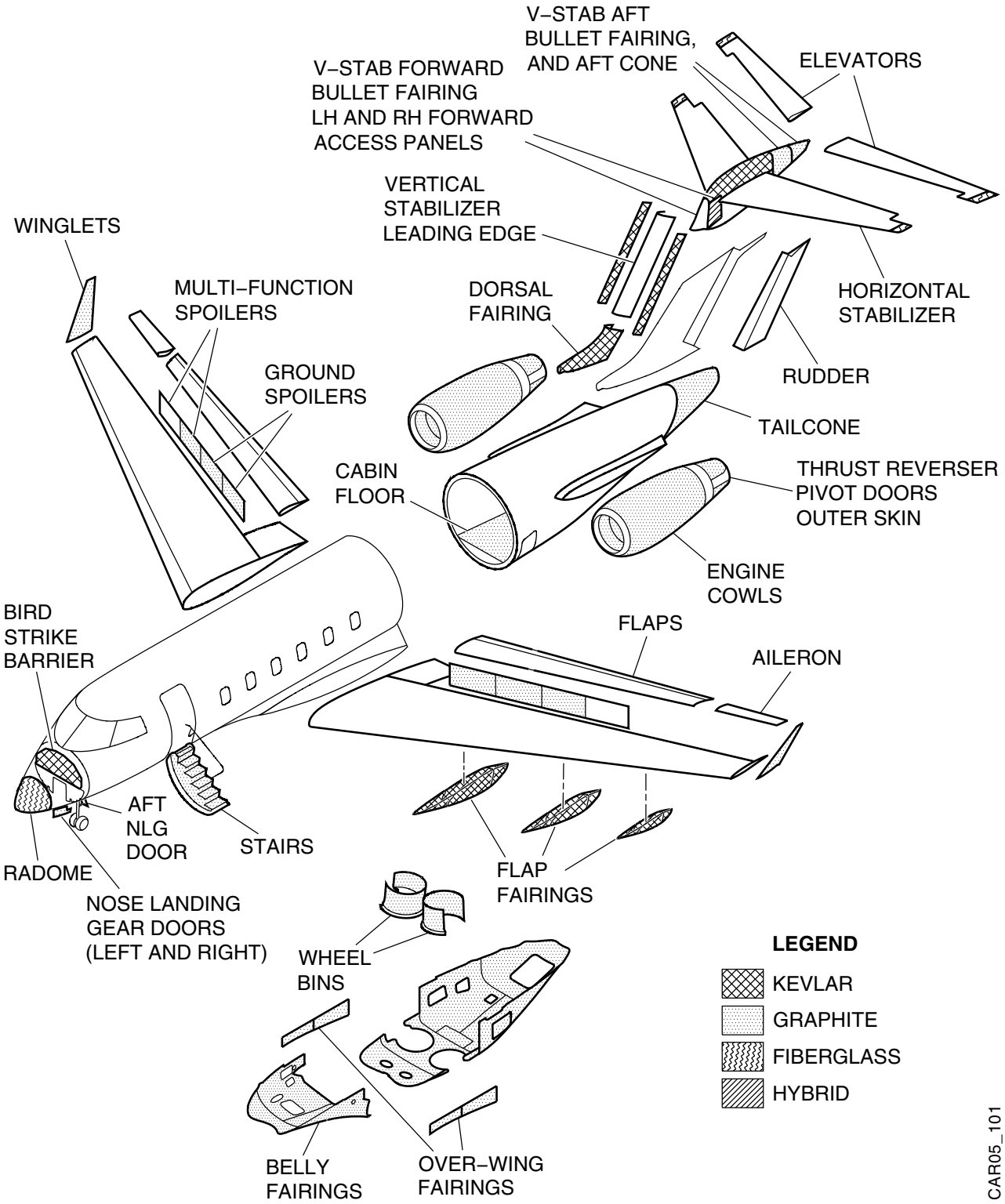
- Move the damaged aircraft the minimum distance possible and keep it on paved surfaces when possible. This will make the removal of the contamination more efficient.

(3) All personnel that work in the free fiber contaminated area must wear disposable paper coveralls, heavy boots, thick leather gloves, goggles, and a dust mask. They must discard the paper coveralls and dust mask when they leave the contaminated area.

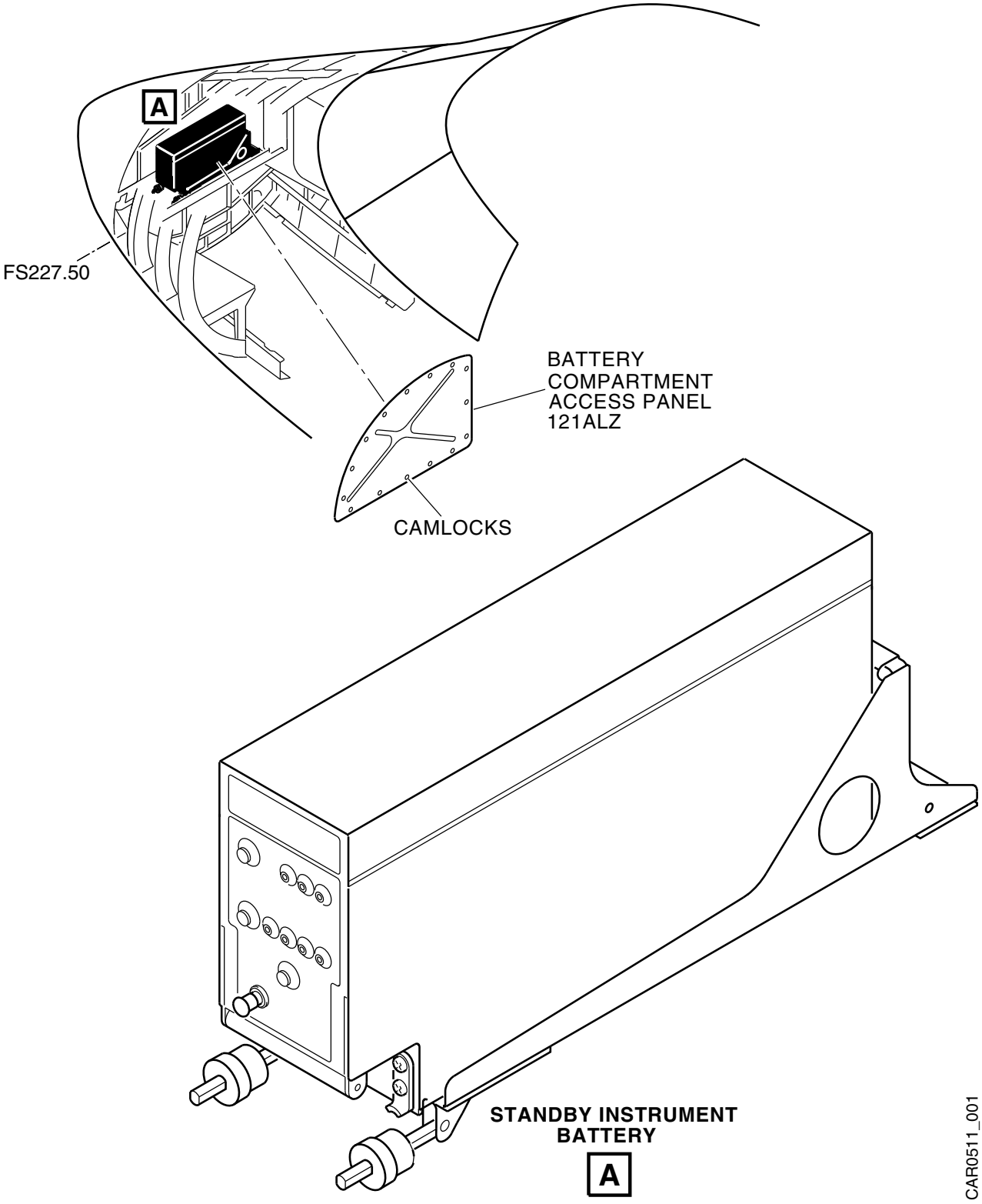


Emergency Break–in–zone
Figure 10

EFFECTIVITY: ALL



Composite Materials
Figure 11



Standby Instrument Battery
Figure 12

GROUND SAFETY

1. Towing the Aircraft

A. General

(1) If the aircraft cannot be taxied, push or tow the aircraft to move it.

(2) To push or tow the aircraft, attach the towbar to the nose wheel axle with the lugs on the towbar. Let the two vehicules control movement of the aircraft. If the aircraft is being pushed and you apply the aircraft brakes hard, this can cause the nose gear to come off the ground.

On Challenger 300 A/C

(3) Refer to Figure 1 and Figure 2 for the tow bar installation and turn radii.

On Challenger 350 A/C

(4) Refer to Figure 1 and Figure 3 for the tow bar installation and turn radii.

B. Towing the Aircraft with Bridle

Table 1 – Towing Equipment	
Reference	**Designation**
TBD	Towing Bridle
23X–51–01	Headset with Microphone and Lead
23–00–02	Headset Extension Cord

(1) Installation of Towing Bridle

CAUTION: DO NOT INSTALL THE WIRE ROPE ASSEMBLIES ON TOP OF THE BRAKE LINES OR WIRING HARNESS. MAKE SURE THAT ONLY THE LEATHER BINDING OF THE WIRE ROPE ASSEMBLIES TOUCHES THE MAIN LANDING GEAR. IF YOU DO NOT OBEY THESE INSTRUCTIONS, YOU CAN CAUSE DAMAGE TO EQUIPMENT.

(a) Attach the rope assemblies around each main landing gear as follows:

1 To tow the aircraft forward, release the clamps that hold the brake lines to the main beam. Put the wire rope assemblies behind the brake lines on the main beam, then around the main beam. Refer to Figure 4.

2 To tow the aircraft rearward, put the wire rope assemblies over the trailing arm link and below the axle of each MLG. Refer to Figure 4.

NOTE: Loosen or remove the retaining clips to put the wire rope assembly between the MLG and the brake lines and the wire harness.

WARNING: MAKE SURE THAT THERE ARE NO KINKS IN THE WIRE ROPE ASSEMBLIES. KINKS CAN CAUSE THE WIRE ROPE ASSEMBLIES TO BREAK. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT.

3 Tow the aircraft. Obey all the safety precautions (Refer to Paragraph D).

(2) Removal of Towing Bridle

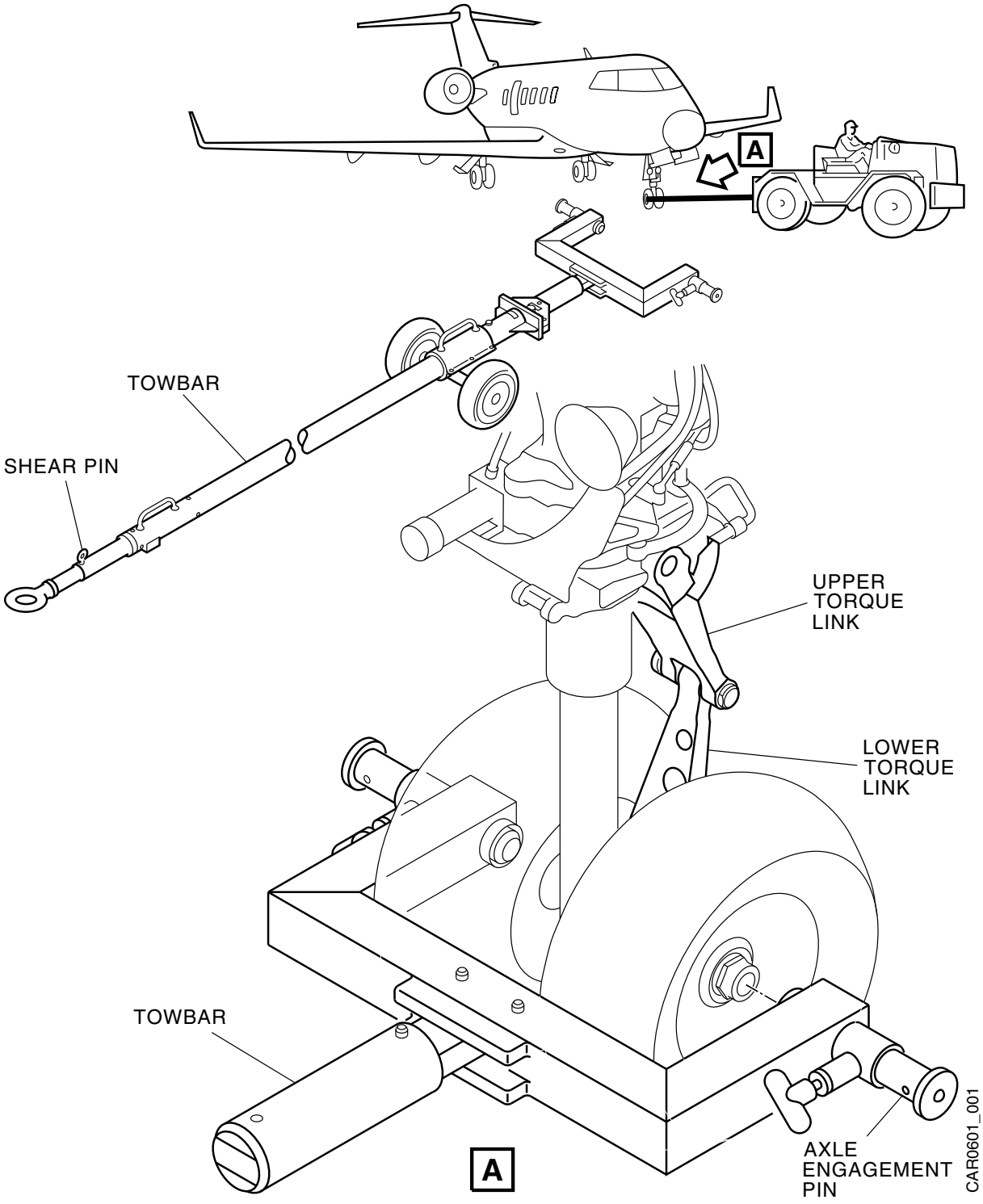
(a) Disconnect the wire rope assemblies from the anchor shackles.

(b) Remove the wire rope assemblies from the MLG.

(c) Clean, lubricate, and put the towing bridle into storage.

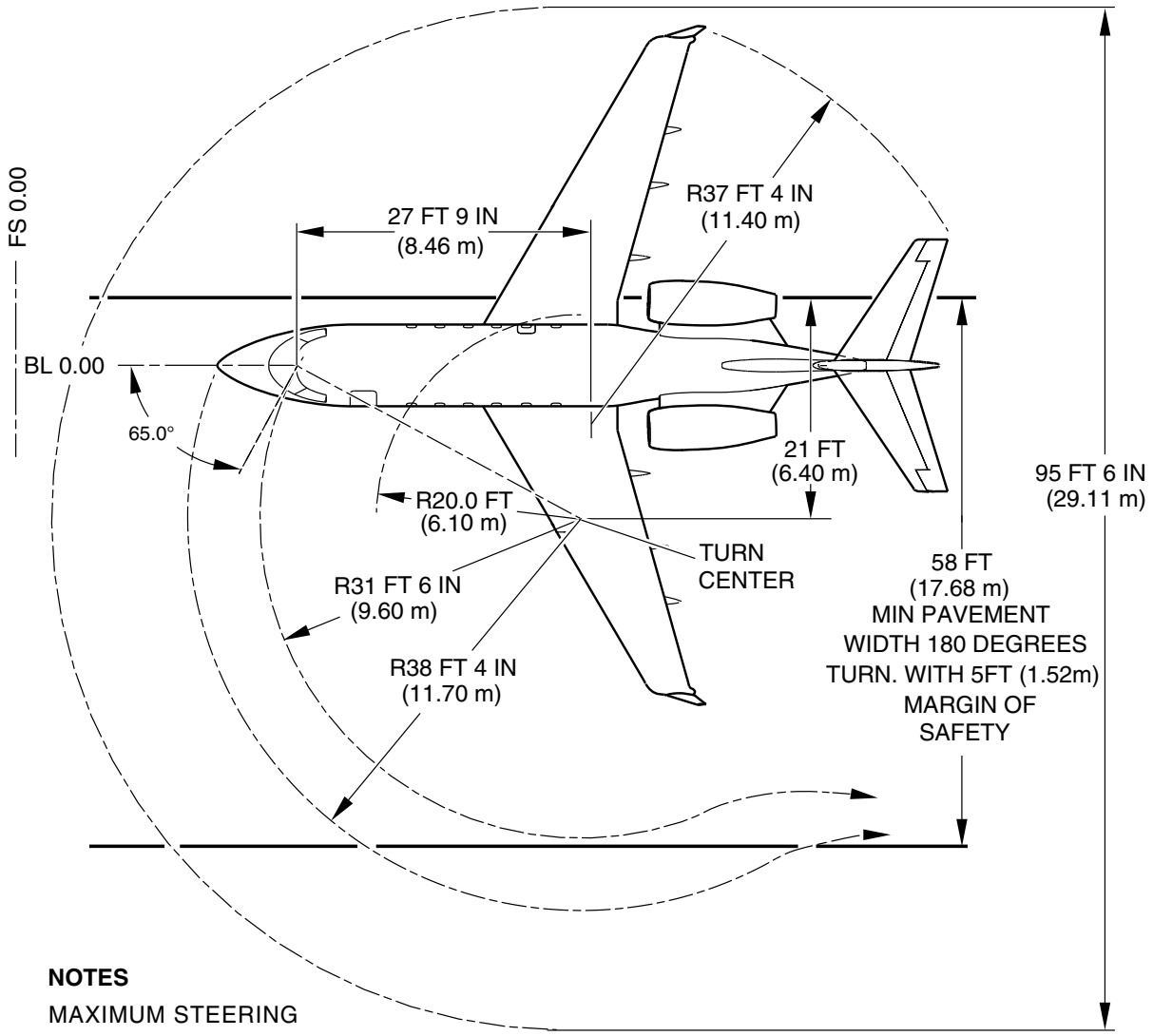
C. Ground Lockpins

(1) Refer to Figure 5 and Figure 6 for landing gear ground lockpins installation.



Equipment to Tow the Aircraft
Figure 1

EFFECTIVITY: ALL



NOTES

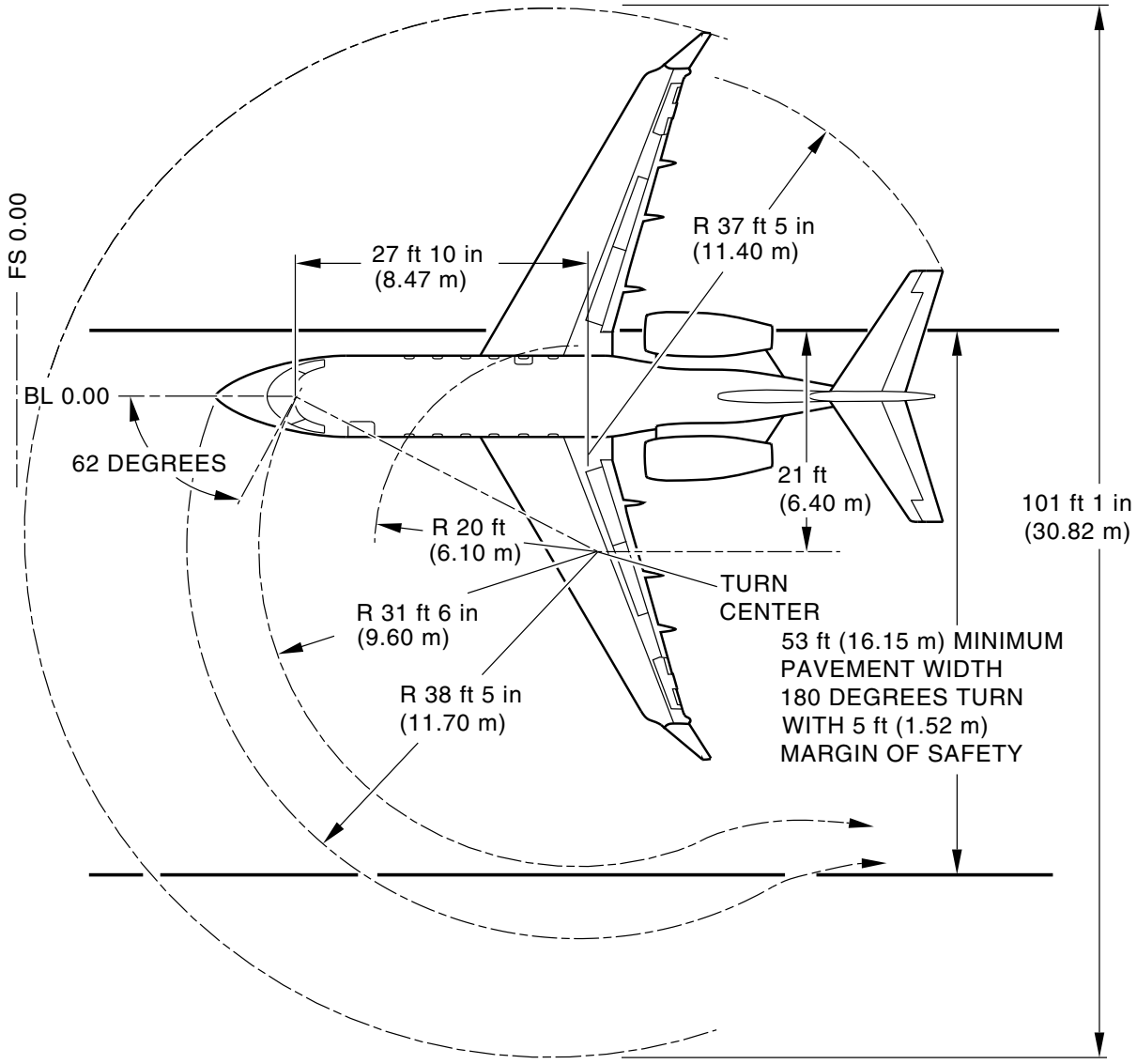
MAXIMUM STEERING

SYMMETRICAL & IDLE THRUST
NO DIFFERENTIAL BRAKING
65 DEGREES STEERING ANGLE
3 DEGREES SLIP
DRY RUNWAY
SLOW CONTINUOUS TURN
MAX AIRCRAFT WEIGHT
AFT CENTER OF GRAVITY.

CAR06_021

Challenger 300 – Turn Radii
Figure 2

EFFECTIVITY: ALL

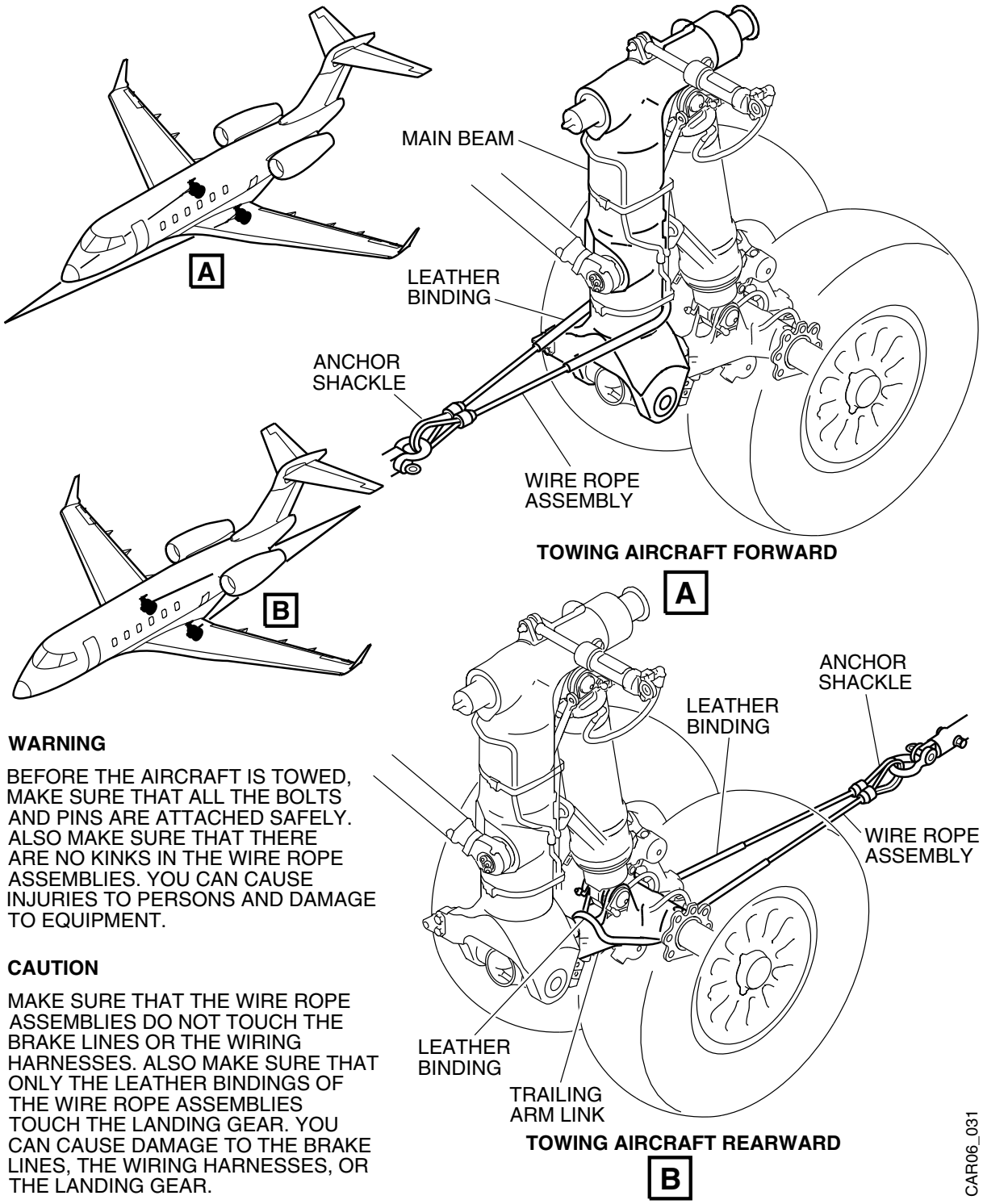


NOTES
Maximum steering
Symmetrical and idle thrust
No differential braking
65 Degrees steering angle
3 Degrees slip
Dry runway
Slow continuous turn
Maximum aircraft weight
Aft center of gravity.

BAR06_001

Challenger 350 – Turn Radii
Figure 3

EFFECTIVITY: ALL



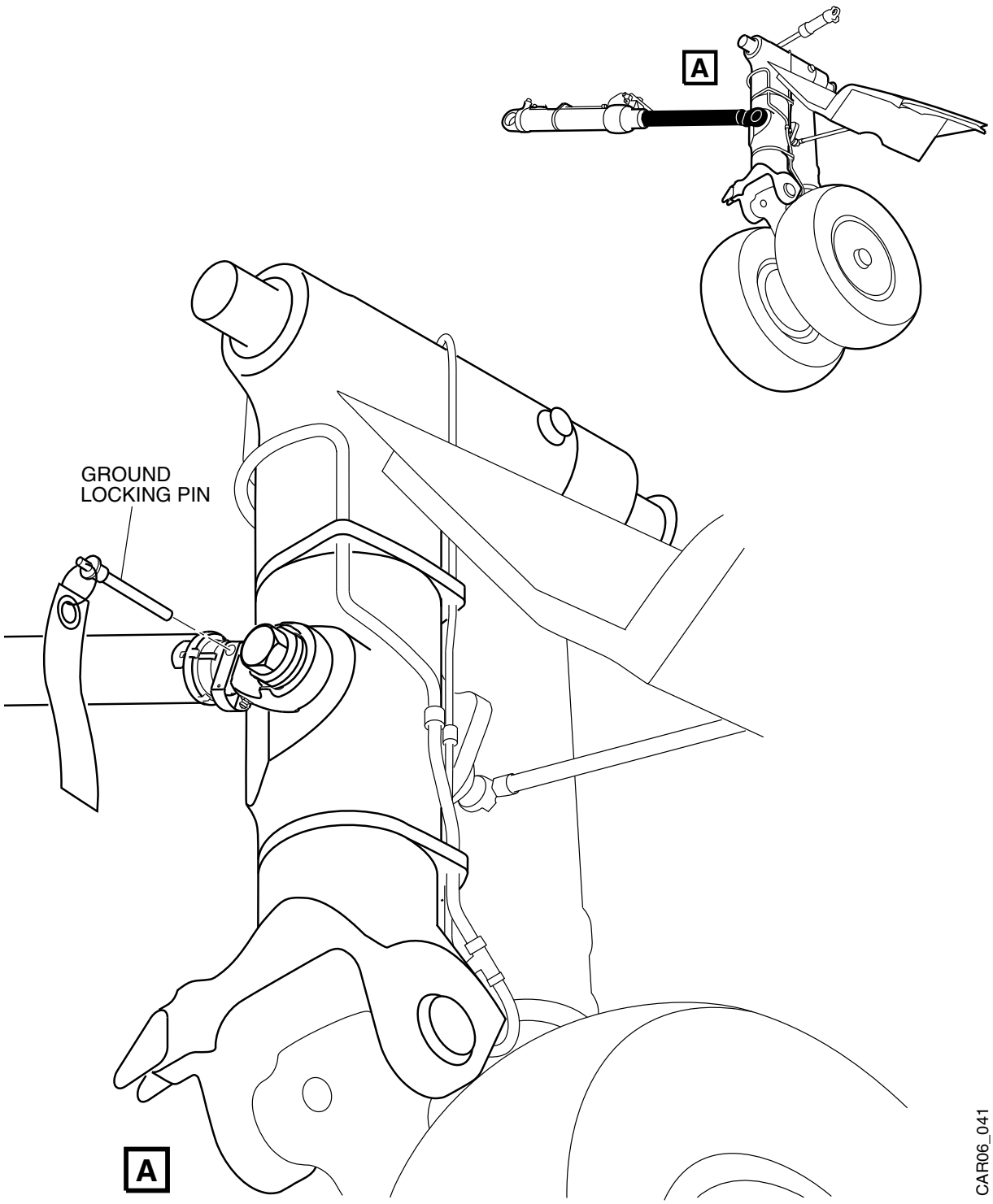
WARNING

BEFORE THE AIRCRAFT IS TOWED, MAKE SURE THAT ALL THE BOLTS AND PINS ARE ATTACHED SAFELY. ALSO MAKE SURE THAT THERE ARE NO KINKS IN THE WIRE ROPE ASSEMBLIES. YOU CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT.

CAUTION

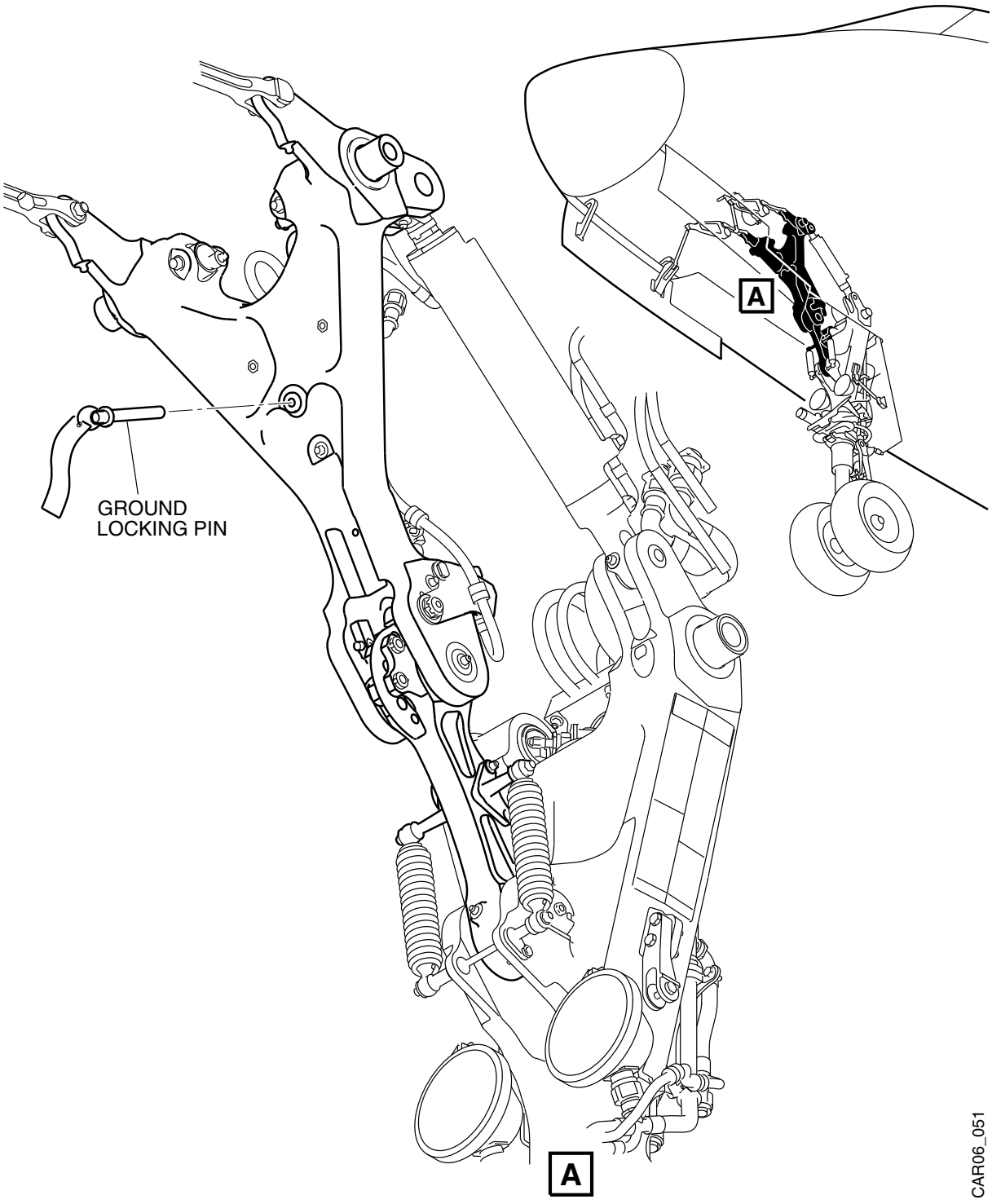
MAKE SURE THAT THE WIRE ROPE ASSEMBLIES DO NOT TOUCH THE BRAKE LINES OR THE WIRING HARNESSES. ALSO MAKE SURE THAT ONLY THE LEATHER BINDINGS OF THE WIRE ROPE ASSEMBLIES TOUCH THE LANDING GEAR. YOU CAN CAUSE DAMAGE TO THE BRAKE LINES, THE WIRING HARNESSES, OR THE LANDING GEAR.

Towing by MLG
Figure 4



Main Landing–Gear (MLG) Lockpin
Figure 5

EFFECTIVITY: ALL



Nose Landing–Gear (NLG) Lockpin
Figure 6

EFFECTIVITY: ALL

D. Safety Precautions

CAUTION: WHEN YOU TOW THE AIRCRAFT, OBEY THE PRECAUTIONS THAT FOLLOW:

- OBEY ALL LOCAL AIRPORT REGULATIONS.
- APPLY TOWBAR LOADS SLOWLY AND CAREFULLY.
- MAKE ALL CHANGES TO THE SPEED OR THE DIRECTION SLOWLY.
- KEEP THE TURNS AS LARGE AS POSSIBLE.
- DO NOT USE THE AIRCRAFT BRAKES TO STOP THE AIRCRAFT UNLESS THERE IS AN EMERGENCY.
- DO NOT TOW THE AIRCRAFT IN A FORWARD DIRECTION AT MORE THAN 5 MPH (8 KM/H).
- DO NOT MOVE THE AIRCRAFT REARWARD AT MORE THAN 3 MPH (5 KM/H).
- MAKE SURE THAT YOU PUT THE NOSEWHEEL IN THE CENTER POSITION BEFORE THE AIRCRAFT IS PARKED.

IF YOU DO NOT OBEY THESE PRECAUTIONS, DAMAGE TO THE EQUIPMENT CAN OCCUR.

(1) Make sure that the tires are correctly inflated, if possible.

(2) Make sure that lockpins are installed in the NLG and MLG. Refer to Figure 5 and Figure 6.

(3) Remove all items from around the aircraft, such as ground equipment, that can prevent the movement of the aircraft.

(4) Make sure that the nosewheel steering is turned off.

CAUTION: BEFORE YOU TOW THE AIRCRAFT, MAKE SURE THAT THERE IS A MINIMUM LOAD OF 1 050 LB (476.2 KG) ON THE NOSEWHEEL. IF YOU DO NOT DO THIS, YOU CAN CAUSE DAMAGE TO THE AIRCRAFT.

(5) A minimum load of 1000 lbs (454 kg) is necessary on the nose wheel before you tow the aircraft. Refer to the Bombardier Challenger Series aircraft Weight and Balance Manual to determine the load on the nose wheel. Add the applicable ballast as necessary.

(6) Make sure that the landing gear selector–handle is set to the DN position.

(7) Put a qualified technician in the flight compartment to monitor the brake system pressure and operate the aircraft brakes.

WARNING: WHEN YOU PREPARE THE AIRCRAFT FOR TOWING, OBEY THE PRECAUTIONS THAT FOLLOW:

- MAKE SURE THAT THE NOSEWHEEL STEERING IS SET TO THE OFF POSITION.
- MAKE SURE THAT THE NOSEWHEEL IS IN THE CENTER POSITION.
- MAKE SURE THAT THE EXTERNAL SERVICING EQUIPMENT IS DISCONNECTED.
- MAKE SURE THAT ALL EXTERNAL DOORS AND PANELS ARE CLOSED AND LATCHED.

IF YOU DO NOT OBEY THESE PRECAUTIONS, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(8) If possible, put the Battery Master switch to ON.

(9) Connect the intercom system between the driver of the tow vehicule and the technician in the flight compartment.

(10) In an area that has little space, have a person at each wingtip to make sure of sufficient clearance from objects and the aircraft.

(11) Before you move the aircraft rearward, have a person at the tail to make sure of sufficient clearance from objects and the aircraft.

(12) Remove the chocks and release the parking brake.

(13) Tow the aircraft not more than 5 MPH (8 KM/H) or push the aircraft not more than 3 MPH (5 KM/H).

(14) After the tow operation, make sure the nose wheels are put to the center position. Do the operations that follow:

(a) Apply the parking brake.

(b) Chock the wheels.

(c) Release the parking brake.

(d) Disconnect the tow vehicule.

(e) Remove the tow bar or the towing bridle and park the aircraft.

NOTE: In some cases, after a tow operation there is a difference between the MLG strut heights. A qualified technician can make sure the servicing of the struts is correct.