

ATR 42-300

Aircraft Handling Manual



	ATR 42-300 AIRCRAFT HANDLING MANUAL	
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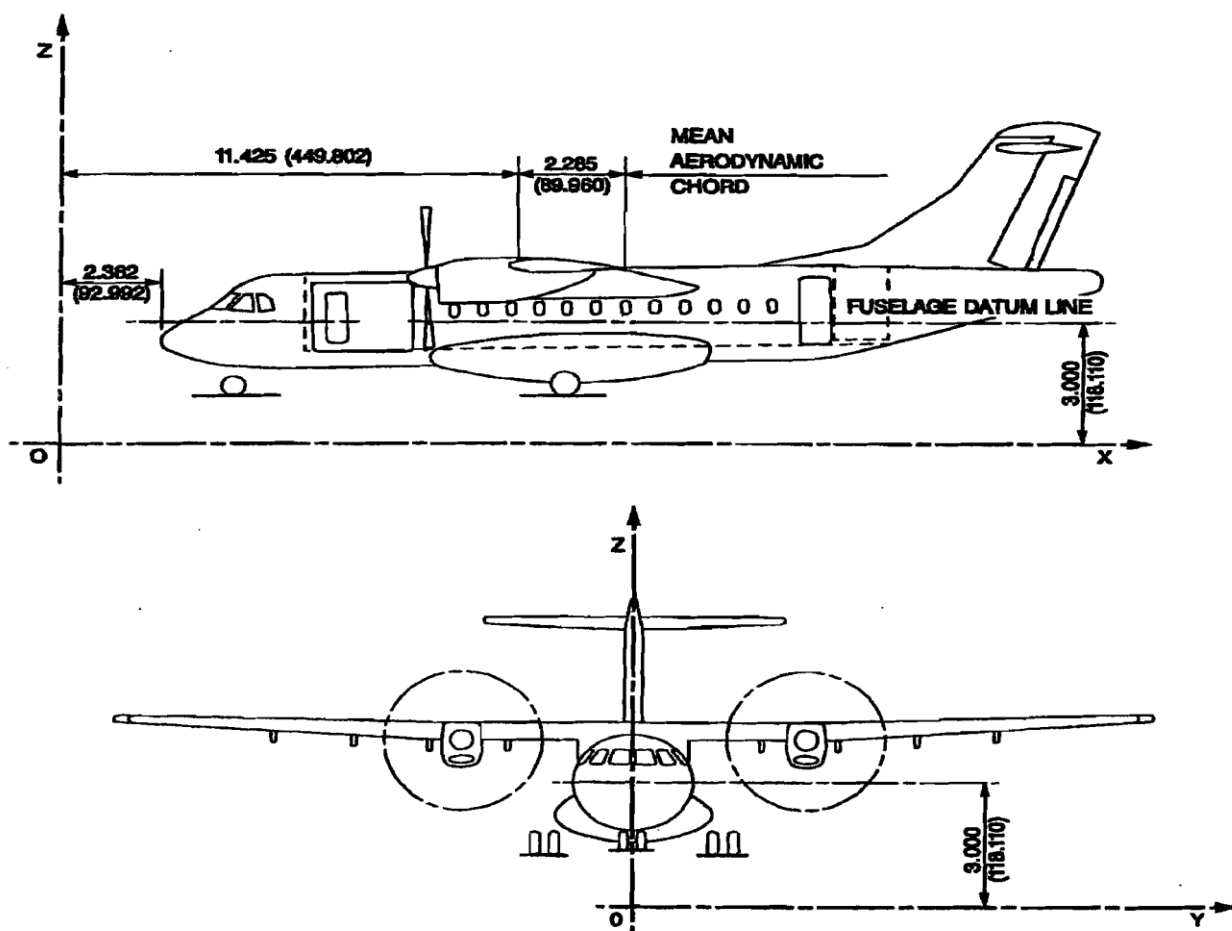
	ATR 42-300 AIRCRAFT HANDLING MANUAL GENERAL	
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1 GENERAL

1.1 LIST OF AIRCRAFT

This manual is effective for the following aircraft

Model	Registration number	Configuration
ATR 42	LY-ETM	Cargo



NOTE : DIMENSIONS ARE NOTED IN METERS (INCHES)



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1.2 WEIGHT AND BALANCE DEFINITION

1	BASIC WEIGHT	:	Aircraft weight including the furnishing fixed equipment.
2	DRY OPERATING WEIGHT (DOW)	:	Basic weight plus crew. Operational items (such as ballast fuel, stretcher ..., if applied).
3	DEADLOAD	:	Gross weight of the cargo, mail, baggage and empty ULDs.
4	OPERATING WEIGHT	:	Dry operating weight plus take off fuel.
5	PAYLOAD	:	Weight of the cargo, mail and ULDs (these may be revenue and/or nonrevenue).
6	ZERO FUEL WEIGHT (ZFW)	:	Dry operating weight plus payload.
7	TAKE OFF WEIGHT (TOW)	:	Zero fuel weight plus take off fuel.
8	DEADLOAD WEIGHT (DLW)	:	Zero fuel weight
9	MAXIMUM TAKE OFF WEIGHT (MTOW)	:	Maximum weight at brake release as limited by aircraft (MTOW) strength and airworthiness requirements.
10	MAXIMUM ZERO FUEL WEIGHT (MZFW)	:	Maximum weight for landing as limited by aircraft (MLDW) strength and airworthiness requirements.
11	MAXIMUM ZERO FUEL WEIGHT (MZFW)	:	Maximum weight allowed before usable fuel must be (MZFW) loaded in the aircraft as limited by strength and airworthiness requirements.
12	MAXIMUM TAXI WEIGHT (MTW)	:	Maximum weight for ground maneuver as limited by (MTW) aircraft strength and airworthiness requirements. (It includes weight of taxi fuel)
13	CG	:	Center of gravity.
14	BA	:	Balance arms which are a true measure in inches from the reference datum

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- | | | | |
|----|---|---|--|
| 15 | %MAC (Percentage of Mean Aerodynamic Chord) | : | The location of the aircraft CG relative to the leading edge of mean aerodynamic chord (MAC) |
| 16 | Index | : | The parameter used to express the variation or location of CG which is the shortened moment of a certain I weight |
| 17 | Basic index (BI) | : | The CG of aircraft basic weight expressed with index |
| 18 | Dry Operating Index (DOI) | : | The CG of aircraft dry operating weight expressed with index. |
| 19 | Laden Index Zero Fuel Weight (LIZFW) | : | The CG of aircraft zero fuel weight expressed with (LIZFW) index. |
| 20 | Laden Index take off weight | : | The CG of aircraft take off weight expressed with (LITOW) index. |
| 21 | Index of deadload weight (DLI) | : | The CG of aircraft dead load weight expressed with (DLI) index |
| 22 | %MAC of Zero Fuel Weight (MACZFW) | : | The CG of aircraft zero fuel weight expressed with % MAC |
| 23 | %MAC of take off weight (MACTOW) | : | The CG of aircraft take off weight expressed with % MAC |
| 24 | %MAC of dead load weight (MACDLW) | : | The CG of aircraft dead load weight expressed with %MAC |
| 25 | Take off fuel | : | The amount of fuel on board less the fuel consumed before the take off run. |
| 26 | Taxi fuel | : | A standard quantity of fuel to cover engine starts and ground maneuvers until start of take off, APU consumption, the amount may be increased when required by local conditions. |
| 27 | Trip fuel | : | Fuel required to fly from the airport of departure to the planned destination, based on "Planned Operating Conditions". This amount shall include fuel for take off, acceleration, climb, cruise, descent, approach and landing. |

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- 28 Ballast fuel : The fuel in lieu of payload which is specifically loaded for longitudinal balance control.
- 29 Usable fuel : Fuel available for aircraft propulsion.
- 30 Unusable fuel : Fuel can not be used to technical limitations and must be included in weight and balance concerns.

	ATR 42-300 AIRCRAFT HANDLING MANUAL AIRCRAFT LIMITATIONS & FEATURES	
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2 AIRCRAFT LIMITATIONS & FEATURES

2.1 CERTIFICATE LIMITATIONS

2.1.1 AIRCRAFT GROSS WEIGHT LIMITATIONS

Item	Maximum limitation
	LY - ETM
Max. Taxi weight	17070
Max. Zero fuel weight	15540
Max. Take off weight	16900
Max. Landing weight	16400

2.1.2 PERFORMANCE OPERATING WEIGHT

To comply with the performance requirements of the aircraft manufacturer, the maximum allowable take off and landing weights may be less than structural limits.

The maximum allowable weight for that flight that must not exceed the least of the following weights:

- Maximum allowable takeoff weight for the runway intended to be used (including corrections for altitude and gradient, and wind and temperature conditions existing at the takeoff time).
- Maximum takeoff weight considering anticipated fuel and oil consumption that allows compliance with applicable enroute performance limitations.
- Maximum take off weight considering anticipated fuel and oil consumption that allows compliance with landing distance limitations or arrival at the destination and alternate airports.

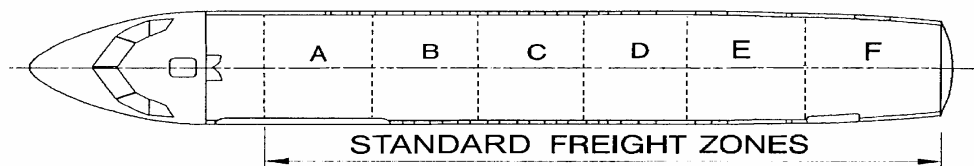
ATR 42-300 AIRCRAFT HANDLING MANUAL AIRCRAFT LIMITATIONS & FEATURES		
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2.2 STANDARDIZED WEIGHT AND INDEX

CARGO KG	INDEX A	INDEX B	INDEX C	INDEX D	INDEX E	INDEX F	FUEL	
							KG	INDEX
0-50	-2	-1	0	1	2	3	0-600	1
51-100	-4	-2	0	2	4	6	601-1000	2
101-150	-6	-3	0	4	7	9	1001-1400	3
151-200	-8	-4	0	5	8	12	1401-1800	4
201-250	-11	-5	1	6	11	15	1801-2200	5
251-300	-13	-6	1	7	13	17	2201-2600	6
301-350	-15	-7	1	8	15	20	2601-3000	7
351-400	-17	-8	1	10	18	23	3001-3400	8
401-450	-19	-9	1	11	20	27	3401-3800	9
451-500	-21	-10	1	12	22	30	3801-4200	10
501-550	-23	-11	1	13	24	33	4201-4500	11
551-600	-25	-12	1	14	28	37		
601-650	-27	-12	1	15	28	40		
651-700	-30	-13	2	17	31	43		
701-750	-32	-14	2	18	33	46		
751-800	-34	-15	2	19	35	49		
801-850	-36	-16	2	20	37	52		
851-900	-38	-17	2	21	39	55		
901-950	-40	-18	2	23	41	58		
951-1000	-42	-19	2	24	43	61		
1001-1050	-44	-20	2	25	45	64		
1051-1100	-46	-21	3	26	47	67		
1101-1150	-48	-21	3	27	49	70		
1151-1200	-50	-21	3	28	51	73		
1201-1250	-52	-21	3	29	53	76		
1251-1300	-54	-21	4	30	55	79		
1301-1350					57	81		
1351-1400					59	84		
1401-1450						87		
1451-1500						90		

A	B	C	D	E	F
Max load 1270 kg	Max load 1220 kg	Max load 1220 kg	Max load 1220 kg	Max load 1400 kg	Max load 1500 kg

CABIN LAYOUT





	ATR 42-300 AIRCRAFT HANDLING MANUAL AIRCRAFT LIMITATIONS & FEATURES		

Config.	Configuration Info	A/C REG	Mass Kg	Index
A	Aircraft prepared for Cargo-services. Crew 2/0. For additional crew see B.	LY-ETM	10291	-50
B	Observer seat Kg/Index	No.	Kg	Index
		1	+85	-5.0

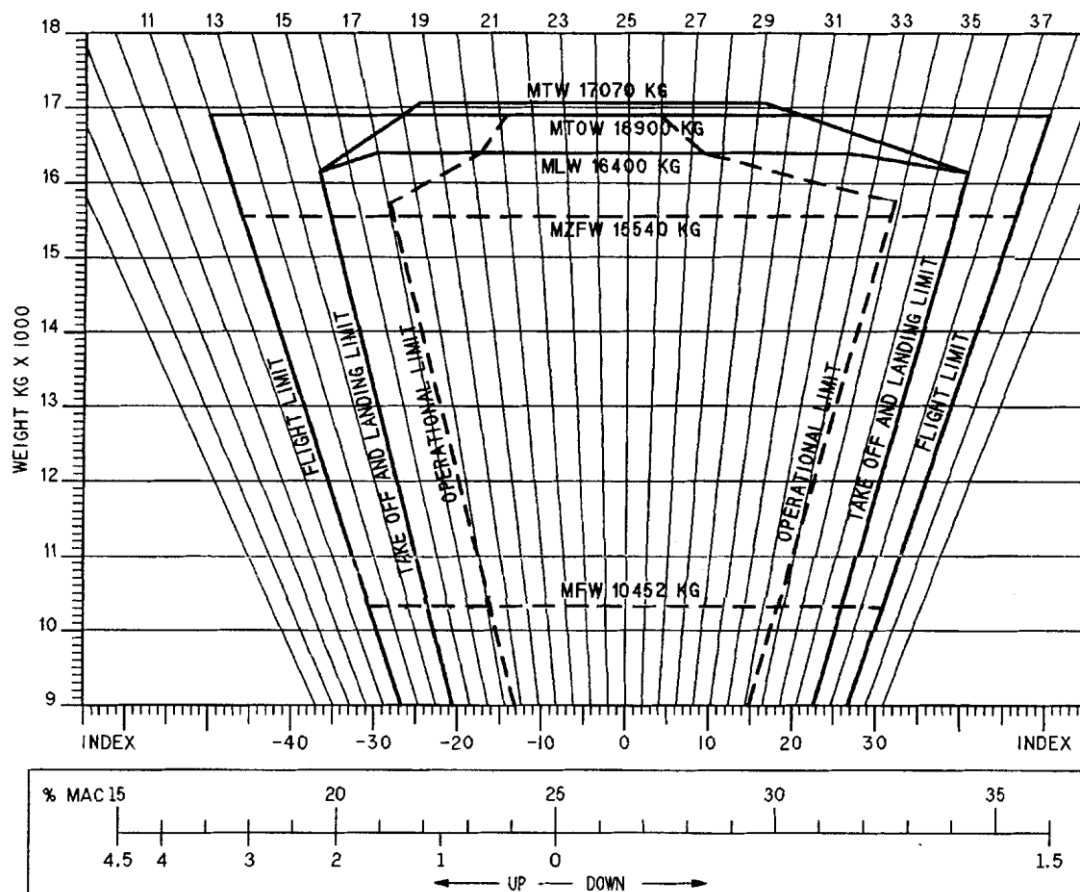
Version vs. max

REG	MTM	MTOM	MLM	MZFW	MFM*	Pax. layout
LY-ETM	17.070	16.900	16.400	15.540	10.452	N/A

*MFM – minimum flight mass

**!!! FOR EMPTY FERRY FLIGHTS AND/OR
LIGHT LOADED FLIGHTS BALLAST WEIGHTS
ARE NEEDED TO BALANCE THE AIRCRAFT !!!!**

**!!! TO PROTECT FROM TIP UP DURING
LOADING/UNLOADING SECTION “F”
MUST BE TOTALLY UNLOADED BEFORE
ANY FREIGHT HANDLING IN OTHER**



ATR 42-300 AIRCRAFT HANDLING MANUAL AIRCRAFT LIMITATIONS & FEATURES		
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2.3 STANDARDIZED WEIGHT PER CREW

Specification		Standard weight (KG)	Charter flight	Definition of age
Crew	Cockpit crew	90		-

2.4 LAST MINUTE CHANGE

The LMC tolerance is ± 300 kg. If exceeded, a new loadsheet is required.

The following must be checked:

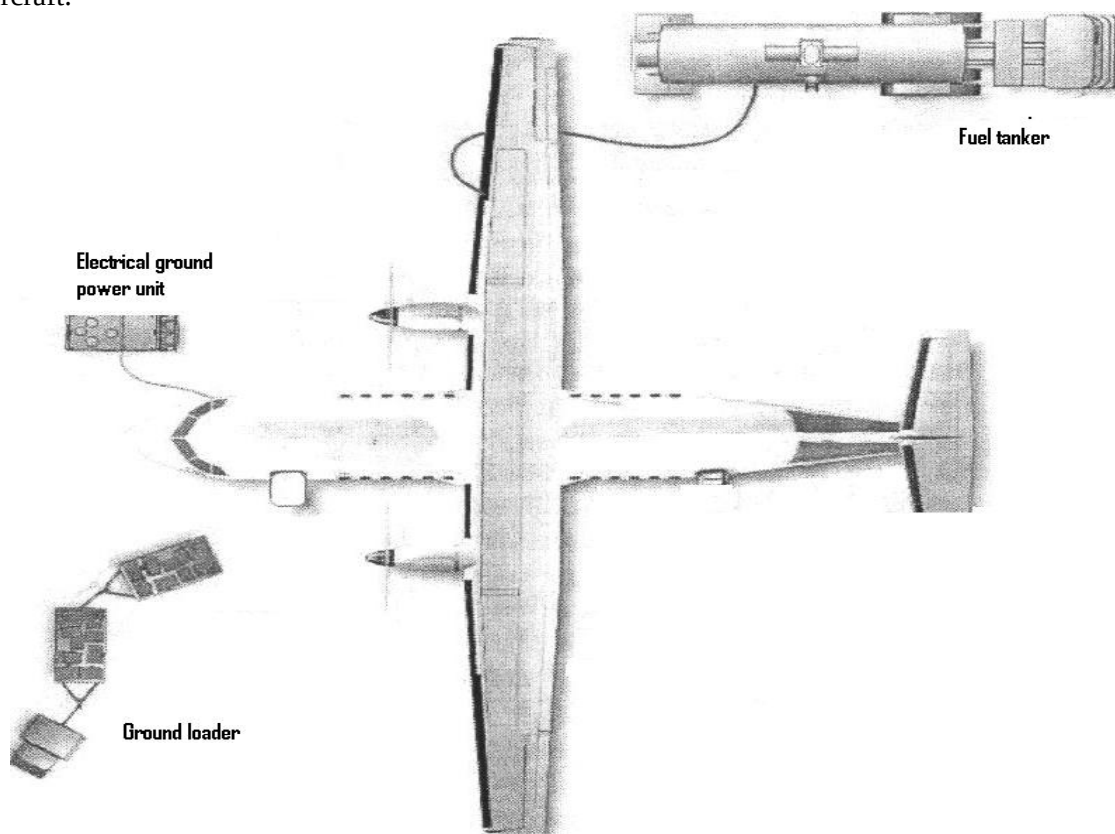
- a. Traffic load only:
 - The LMC positive total weight is lower than the underload before LMC.
 - No loading limitation exceeded.
 - The balance at MACZFW and MACTOW remains within the allowed limits.
 - All the LMC data on the loadsheet is completed.
- b. Useable fuel only:
 - Issue the new loadsheet when change in fuel figures

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3. AIRCRAFT SERVICING

3.1 ARRANGEMENT OF GROUND HANDLING EQUIPMENT

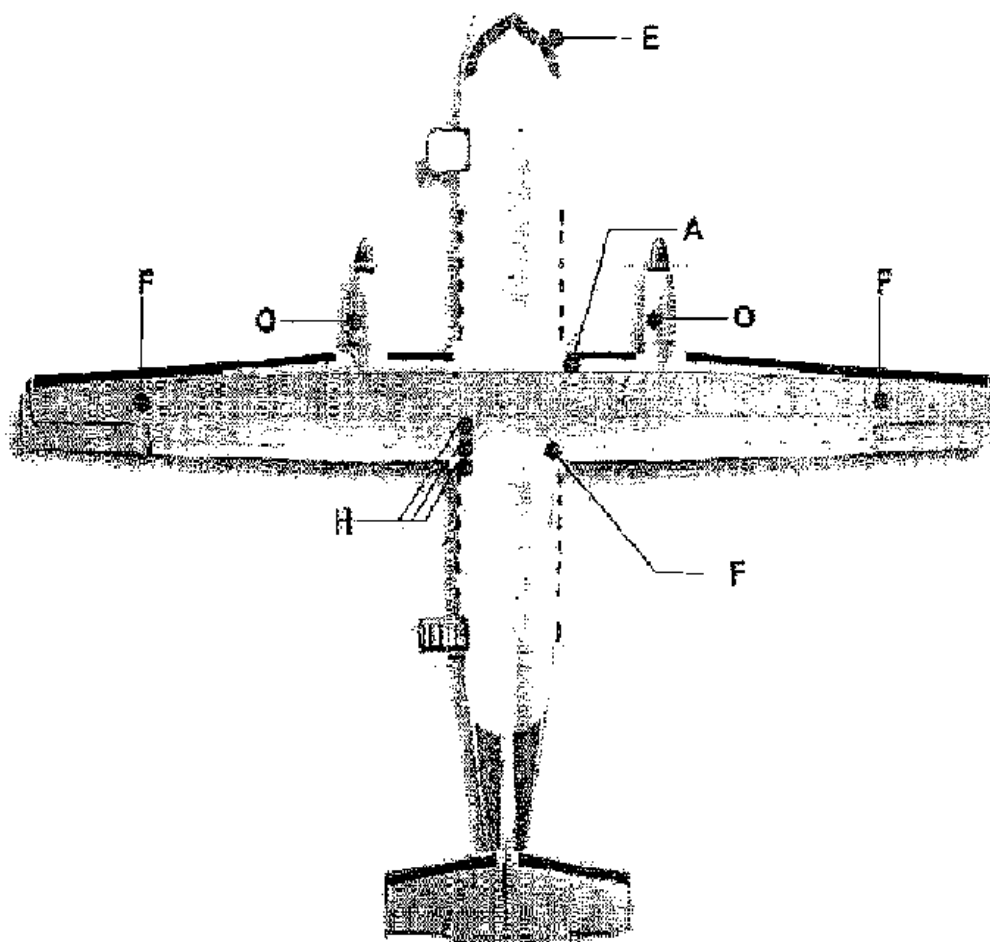
This diagram shows an example of the arrangement of ground handling equipment for the ATR 42-300 aircraft:



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3.2 SERVICING POINTS

This diagram shows the locations of the servicing points of the ATR 42-300 aircraft from a top view:



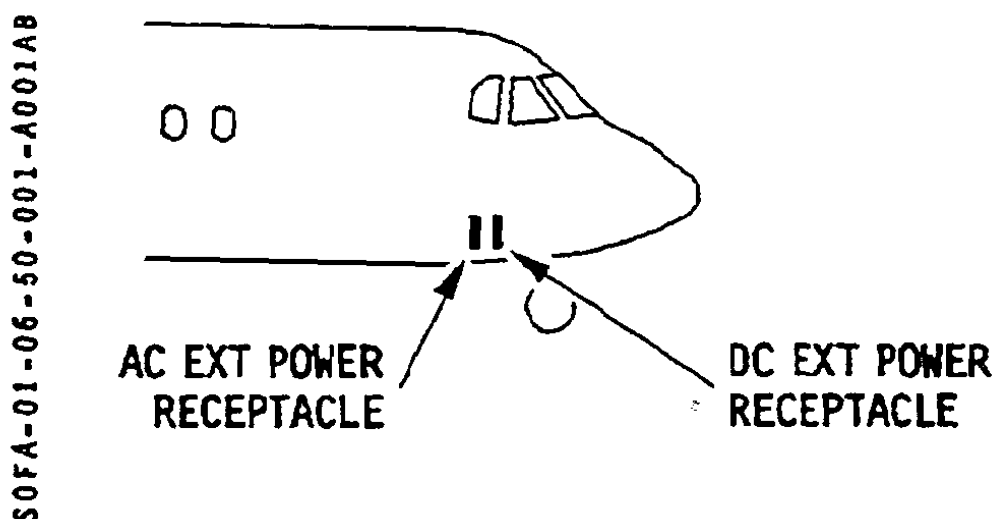
NOTE :

- A: Air conditioning
- E: Electrical
- F: Fuel
- H: Hydraulic
- O: Oil Engine

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3.3 EXTERNAL POWER

The DC and ACW electrical distribution system can be supplied from ground power sources, connected via the separate “External Power” receptacles which are located on the lower right side of the fuselage, just aft of the nose gear.



The specification of the DC GPU for ATR 42 requires the ground unit to be able to provide a steady current of 300 to 400 Amp under 28 volts to insure correct functioning of all electrical services prior to startup.

For engine start, the GPU must be able to provide ADDITIONNAL STARTER CURRENT of 1000Amp while keeping more than 12 volts (ie 16 KW instantaneous power).

CAUTION : If DC EXT PWR voltage on maintenance panel still shows less than 26 v despite the full load shedding, the GPU MUST BE CONSIDERED AS COMPLETELY UNUSABLE.

If DC EXT PWR voltage on maintenance panel is above 26 v, the DC GPU may be used to maintain aircraft batteries charge whilst using all other ground services normally (cargo door, refueling, cabin lighting, etc...)

WARNINGS : Do not disconnect external power while the GPU is supplying power to the aircraft.

Failure to obey this may cause serious burn injuries and blindness to personnel, and severe damage to the external power receptacle and GPU power cable connector.

If the external power earth grounded neutral is open, the aircraft will have an electrical potential above earth ground, which may cause an electric shock with possible serious injuries to personnel touching the aircraft. If an electric arc is observed when touching the aircraft, make sure that all personnel are kept clear of the aircraft and contact maintenance, or the commander immediately.

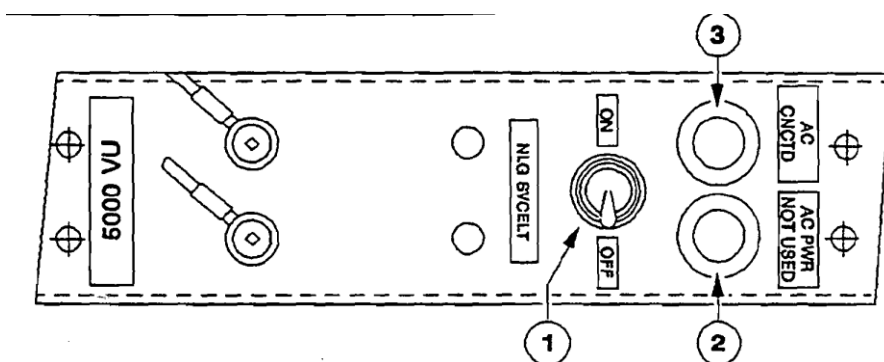
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CAUTIONS : When using a mobile GPU, check voltage and frequency to be within limits. Voltage below or above specified limits may cause damage to aircraft electrical equipment.

A mobile GPU must never be left connected to a tractor when the GPU power cable is connected to an aircraft. This to avoid damage to the GPU and/or the aircraft if the tractor is moved.

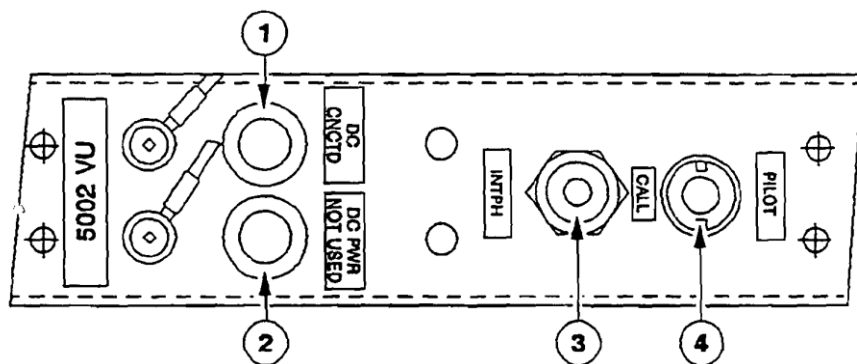
When using a combustion engine driven GPU, make sure a hand fire extinguisher of suitable size and type is mounted externally on the GPU, or is available in close vicinity to the GPU. The fire extinguisher shall be sealed and date labeled.

This is an illustration of the AC External Power receptacle panel



- 1 – Nose Landing Gear Service Light Switch: allows operation of the service light in nose gear bay.
- 2 – “AC Power not used” light (white): is ON when AC external power is connected and AC External Power Contactor is opened.
- 3 – “AC Connected” light (white): is ON when AC external power is connected.

This is an illustration of the DC External Power receptacle panel

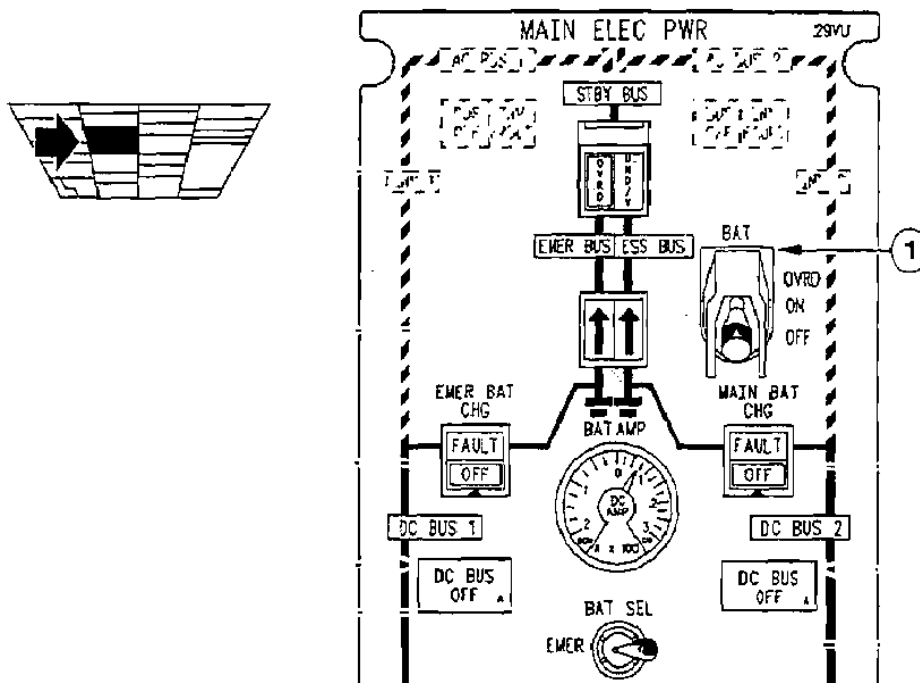


- 1 – “DC connected” light (white): is on when DC external power is connected to the aircraft.

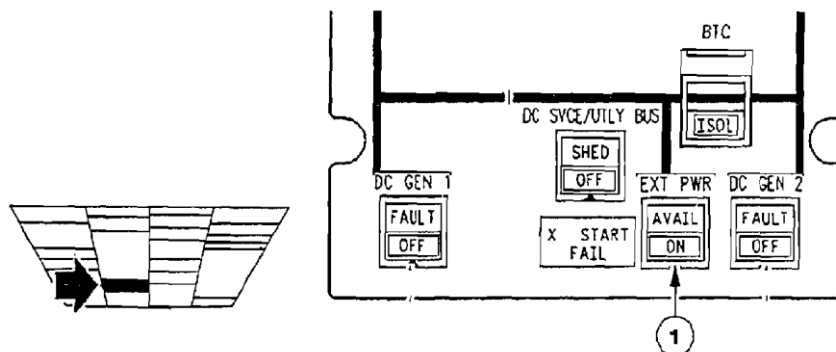
ATR 42-300 **AIRCRAFT HANDLING MANUAL** AIRCRAFT SERVICING

- 2 – DC Power not used light (white): is on when DC external power is connected to the aircraft, and DC external power contactor is opened.
- 3 – Interphone Jack: used by ground mechanic to connect a headset to communicate with crew.
- 4 – Pilot call button: when depressed, sends a call (aural and visual) to the cockpit: “Mechanic call” light illuminates on the overhead panel.

The illustration below shows “MAIN ELEC PWR” panel.



1 – Battery toggle switch





1 – EXT PWR pushbutton:

AVAIL illuminates green when conditions of DC external power connection are met
ON allows to connect DC external power

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3.3.1 CONNECTING EXTERNAL POWER, FLIGHT DECK MANNED

Before connecting external power, according to the procedure below, you must be aware of the **WARNINGS** and **CAUTIONS** as described in 3.3 EXTERNAL POWER.

Follow these steps to connect external power to the aircraft:

Step	Action
1	Make sure the GPU is switched off electrically.
2	Inspect the external power cable connector and cable for damage.
3	When the aircraft has come to a complete stop: ▪ Open the external power access door ▪ Connect the external power cable connector to the DC external power receptacle ▪ Make sure the cable connector is fully engaged.
4	Switch on the GPU electrically and check that: ▪ The white “DC Connected” light comes on

3.3.2 DISCONNECTING EXTERNAL POWER, FLIGHT DECK MANNED

Before disconnecting external power, according to the procedure below, you must be aware of the **WARNINGS** and **CAUTIONS** as described in 3.3 EXTERNAL POWER.

Follow these steps to disconnect external power from the aircraft:

Step	Action
1	Make sure the white “DC PWR NOT USED” light is on.
2	Switch off the GPU electrically and check that: ▪ The “DC CNCTD” light is out.
3	Disconnect the external power cable connector.
4	Close the DC external power access door.
5	Stow the external power cable and connector on the GPU
6	Shut down the GPU (when applicable).

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3.3.3 CONNECTING EXTERNAL POWER, FLIGHT DECK UNMANNED

Before connecting external power, according to the procedure below, you must be aware of the **WARNINGS** and **CAUTIONS** as described in 3.3 EXTERNAL POWER.

Follow these steps to connect external power to the aircraft:

Externally. Steps 1 – 4 are performed externally	
Step	Action
1	Make sure the GPU is switched off electrically.
2	Inspect the external power cable connector and cable for damage.
3	Check that the aircraft is properly chocked and: ▪ Open the DC external power access door ▪ Connect the external power cable connector to the DC external power receptacle ▪ Make sure the cable connector is fully engaged.
4	Switch on the GPU electrically and check that: ▪ The white “DC Connected” light comes on
Flight deck. Steps 5 to 7 is performed on the flight deck	
5	Check that the green “EXT PWR AVAIL” light is on. If neither light is on, call maintenance or the Commander for assistance.
6	Place the “BAT” toggle switch in the “ON” position
7	Push the “EXT PWR” pushbutton and check that the switch-light comes on.

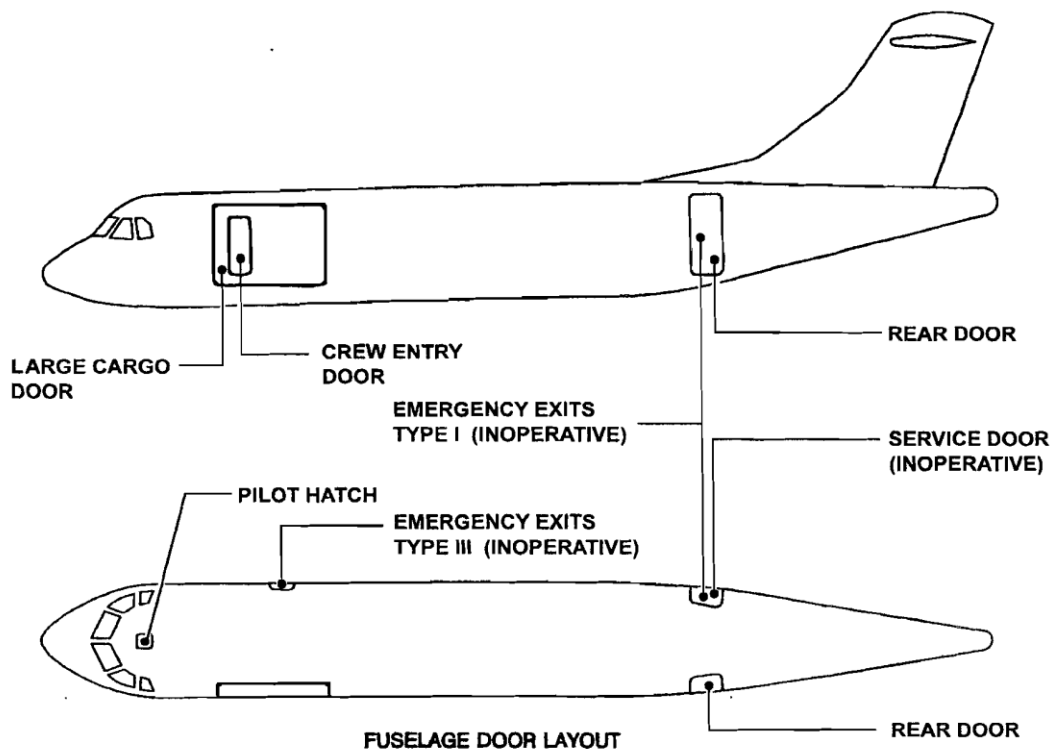
3.3.4 DISCONNECTING EXTERNAL POWER, FLIGHT DECK UNMANNED

Before disconnecting external power, according to the procedure below, you must be aware of the **WARNINGS** and **CAUTIONS** as described in 3.3 EXTERNAL POWER.

Follow these steps to disconnect external power from the aircraft:

Flight deck. Steps 1-3 are performed on the flight deck	
Step	Action
1	Push the “EXT PWR” pushbutton and check that the switch-light goes off.
2	Check that the red “INV FAULT” light is on.
3	Place the “BAT” toggle switch in the “OFF” position and check that “EXT PWR” pushbutton illuminates green “AVAIL” light.
Externally. Steps 4 to 8` are performed externally	
4	Switch off the GPU electrically and check that: ▪ The white “DC CNCTD” light is out.
5	Disconnect the external power cable connector.
6	Close the DC external power access door
7	Stow the external power cable and cable connector on the GPU.
8	Shut down the GPU (when applicable).

3.5 AIRCRAFT DOORS

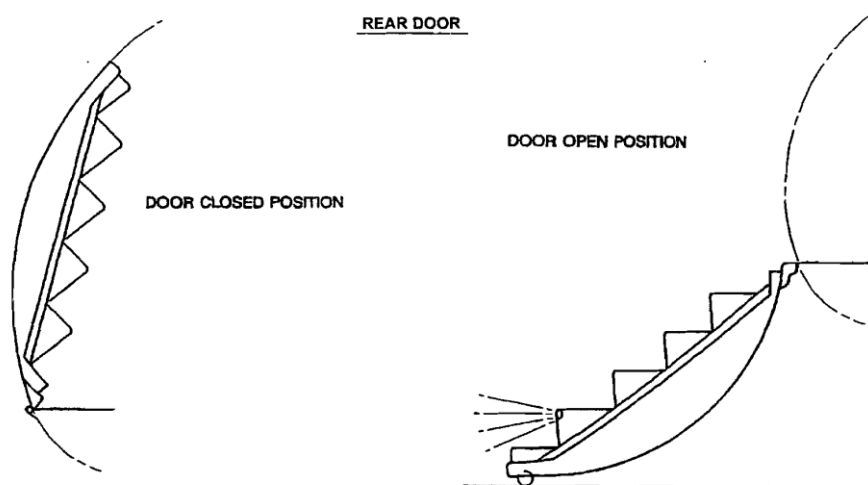


3.5.1 REAR DOOR (left side)

Rear door is an outward opening, non plug type door with a net opening of 64 cm (25 in) wide (without hand-rail(s)) and 1.73 m (68 in) high.

The mechanism is essentially composed of a handle, a lifting cam and one locking shoot bolt placed on the rear part of the door.

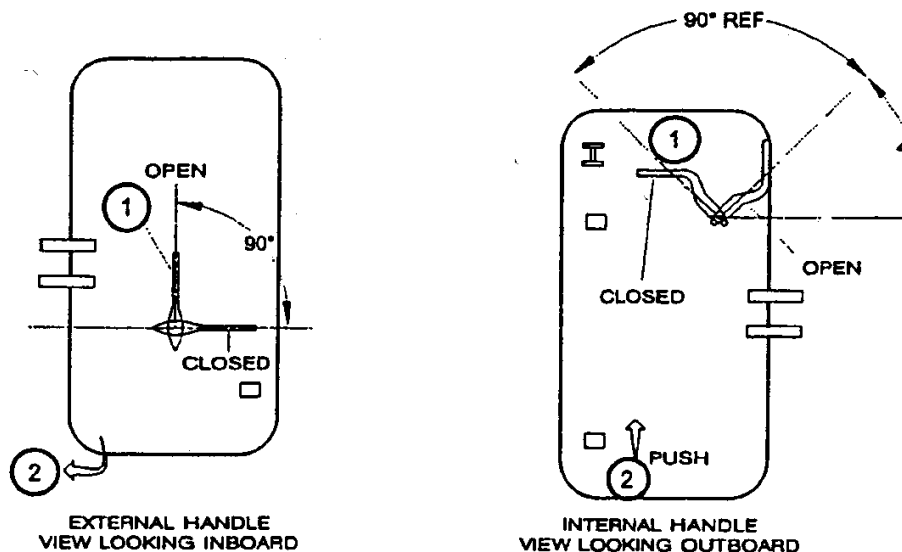
The door mechanism is driven by an external handle allowing the door to be operated from outside only of the aircraft.



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3.5.2 CREW ENTRY DOOR

The Crew Entry door is located on the left side of the fuselage and it is embedded in the Large Cargo Door. The Crew Entry door is outward opening non plug type door with a net opening of 944 mm (24 in) wide and 1889 mm (48 in) high. The Crew Entry door has two hinges on the fore edge and it is latched by five shoot bolts which are locked by two latch-locks. A pressure vent door is operated simultaneously with the latch-locks. The door mechanism is driven by both internal and external handles allowing the door to be operated from inside or outside of the aircraft. The door is equipped with a hold-open device that engages the external handle when the door is open. Two microswitches installed on the surround at shoot bolt locations and one microswitch installed on the door at latch-lock location provide a signal alerting, if the door is not fully latched and locked.



OPENING FROM OUTSIDE:

1. Turn the outer handle 90 degrees counter clockwise (from horizontal to vertical position).
2. Push the door until the outer handle engages the hold open mechanism.

OPENING FROM INSIDE:

1. Pull the inner handle and then rotating it 90 degrees clockwise.
2. Push the door until the outer handle engages the hold open mechanism.

3.5.3 SERVICE DOOR (Right side)

The service door is an outward opening, non plug type door with a net opening of 69 cm (27") wide and 1.27 m (50") high. Opened position is forward. This door is blocked closed and can be operated for maintenance purpose only.

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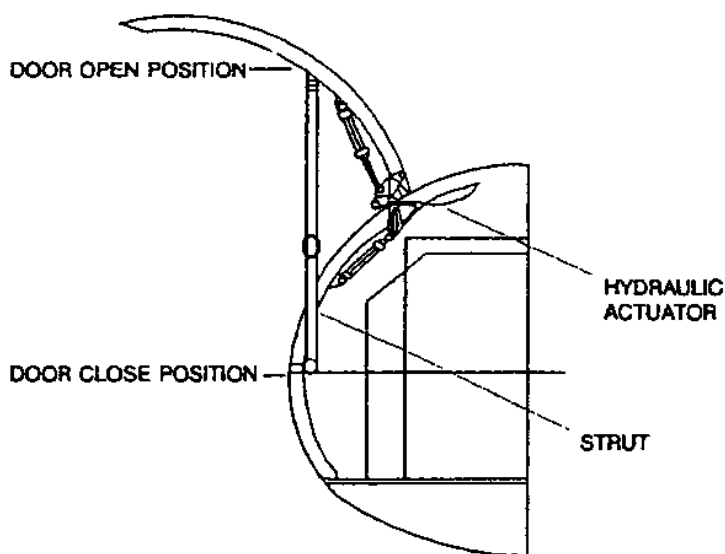
3.5.4 INTERNAL DOORS

A smoke barrier door separates the cargo compartment and the cockpit. Four safety pins are provided on each side of the door in order to get rid of it in case of emergency.

NOTE : The door must be closed during flight.

3.5.5 LARGE CARGO DOOR

The large cargo door is an outward opening, non plug type door hinged at its upper edge giving a net clear opening of 2946 mm (116 in) wide by 1803 mm (71 in) high and with a max opening angle of 110°.



VIEW
LOOKING
FORWARD

Door actuation system is hydraulically powered and electrically controlled (see schematic: P1F/1G). Two operating modes are available:

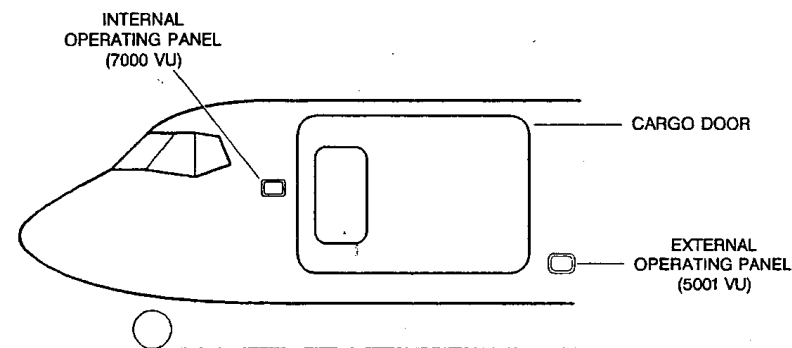
Normal : operation through control devices and indications provided on the external panel (access to controls into cockpit not required).

Back-up : when normal mode not available, back-up function can be armed through a switch on internal panel. Then door is operated via external panel controls (indications are not available in back-up mode).

External marking close to the door and panel reports instructions and "caution" information for the operator. See schematic P 1H.

A hold-open strut maintains the cargo door in the opened position. It also protects the door from wind gusts. The hold open strut should be used anytime the door is in the open

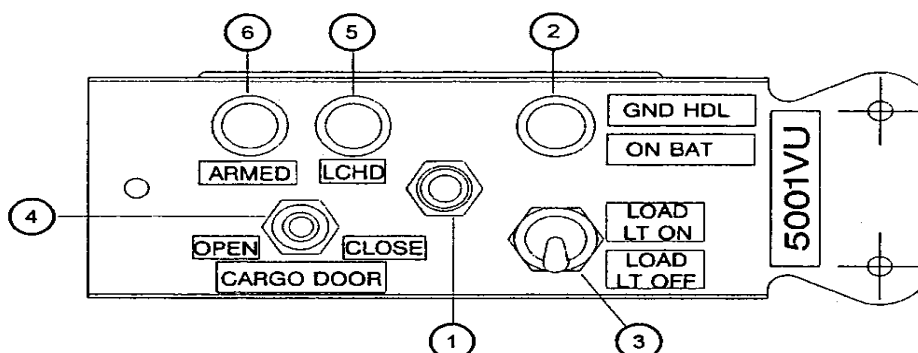
position.



CARGO DOOR OPERATION

The cargo door is unlocked by two levers and operated (both in “normal” and “back-up” mode) from a panel, provided with a cover, located outside of the aircraft

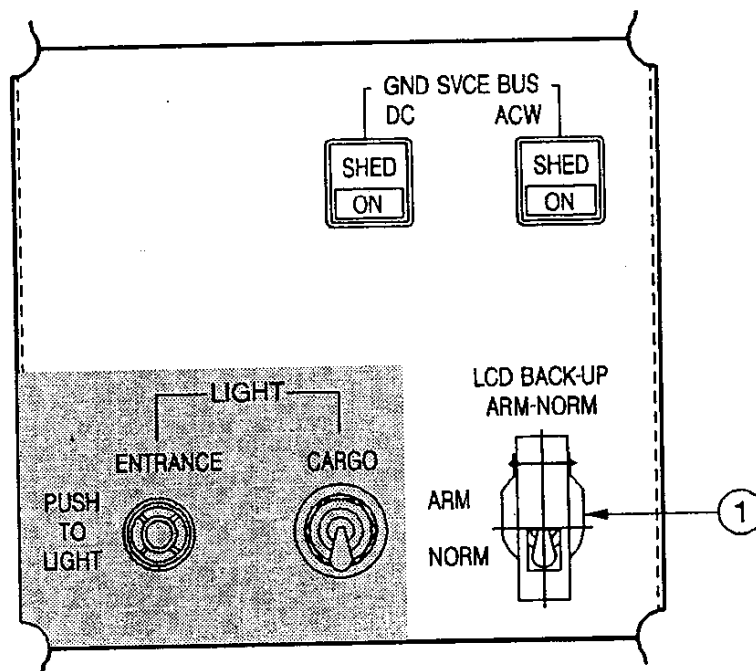
EXTERNAL OPERATING PANEL (5001VU)



- ① **Panel cover microswitch**
Connects the Ground Handling Bus on line when the panel cover is opened.
- ② **Ground Handling Bus “ON BAT” red light**
Is ON when Ground handling Bus is directly supplied by Hot Main Bat Bus.
Note : This light shows that main battery is emptying even if the BAT Toggle switch is in “OFF” position (visible even when the panel cover is closed).
- ③ **Load light switch**
Allows activation of the cargo compartment lights from outside.
- ④ **Door actuation Selection Switch**
Is used to operate the door (opening or closing) when the “SELECTED ARMED” green light is ON (indication available in “normal” mode only).
- ⑤ **“Cargo Door Latched” blue light** (available in “normal” mode only)
Is ON when all door hooks and latch locks are fully engaged.
- ⑥ **“Selected armed” green light** (available in “normal” mode only).
Is ON when the following conditions are met:
 - Panel cover opened
 - Door unlocked by operating handles: all hooks are disengaged and latchlock #2 and #6 are unlocked.

Note : All the lights of the operating panel may be tested by depressing them.
As long as the cargo door is not closed and all hooks not engaged and locked, the CARGO “UNLK” light illuminates amber on the cockpit overhead panel. The CARGO “UNLK” light also illuminates as long as “back-up” actuation mode is armed (via switch on internal panel close to cargo door).

INTERNAL OPERATING PANEL(7000VU) IN CARGO COMPARTMENT



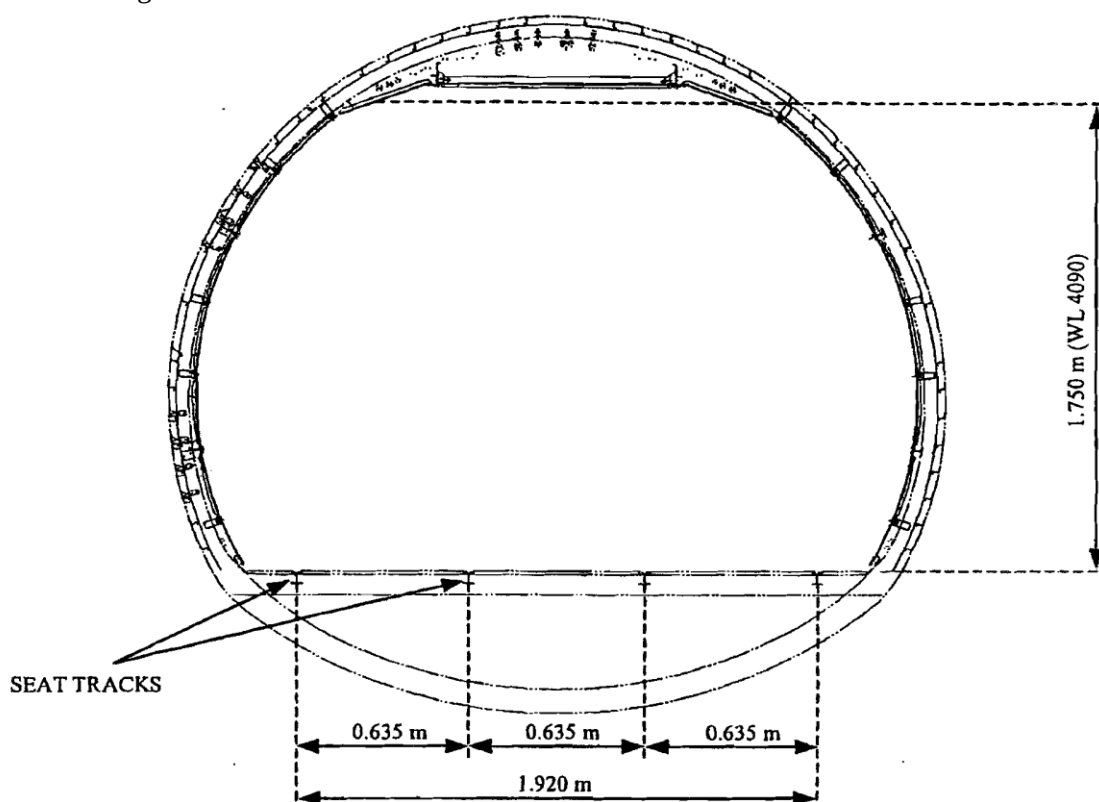
① Back-up Actuation Mode toggle switch

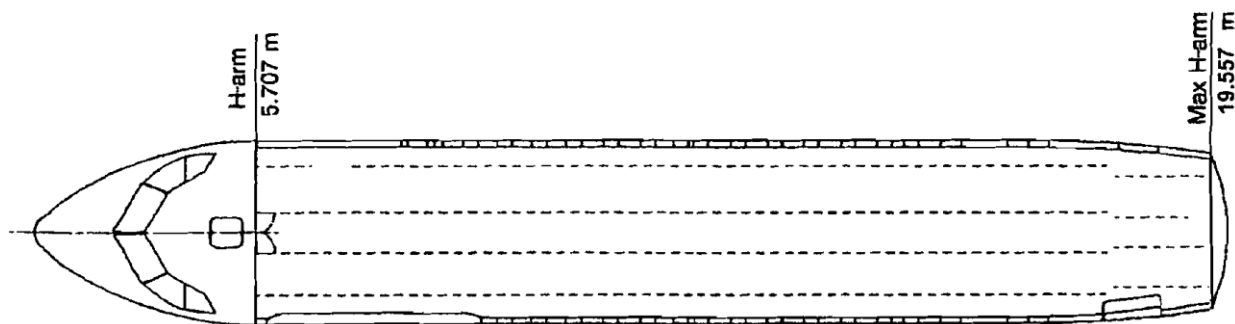
In order to assure LCD actuation in case of normal actuation mode control loss due to failure of main electrical equipment, it allows in ARM position to override latching/locking monitoring functions.

4. LOADING

4.1 CARGO COMPARTMENT

The cargo compartment extends from the cockpit partition 45.44 feet to the aft pressure bulkhead. The cargo compartment is designed to load one 88 inch wide by 54 inch pallet and three 88 inch wide by 108 inch long pallets with a maximum localized load height of 64 inches and a maximum pallet side height of 55.11 inches. Bulk freight may also be loaded behind the designated pallet area or in the absence of any pallet(s). The compartment floor structure is capable of supporting 408 pounds per foot and all floor panels are capable of carrying a surface distributed load of 82 pounds per square foot without appreciable deformation, while also bearing a local indentation load of 1,310 pounds per square inch without any panel core crushing.





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4.2 CARGO COMPARTMENT SPECIFICATIONS

1. Cargo Compartment

Height.....	68.9"
Width (floor).....	89"
Length.....	45.44"
Overall Usable Cargo Volume.....	1,533 cubic feet
Maximum Floor loading.....	81.9 pounds per square foot
2. Door Openings

Large Cargo Door.....	116.00" x 71.00"
Rear Door.....	27" x 50"

4.3 CARGO COMPARTMENT LIMITS

LD3.....	2645.00 Lbs
88" x 108" Pallet.....	3,637.62 Lbs
88" x 54" Pallet.....	1818.00 Lbs
Forward Crash Net.....	19,290.45 Lbs
Forward Transverse Crash Net.....	3,086.47 Lbs
Intermediate Transverse Crash Net.....	3,527.39 Lbs

WARNING: Good judgment must be used to position piercing or penetrating type cargo.

Load cargo of a piercing or penetrating nature at least 4¼ feet aft of compressible cargo (density lower than 15.6 lb/cu. feet) To prevent penetration through the crash nets (forward crash net, forward transverse crash net, intermediate transverse crash net) when subject to a 9G forward load.



Always load at least 4¼ feet of compressible cargo (density lower than 15.6 lb/cu. feet) between a crash net (forward crash net, forward transverse crash net, intermediate transverse crash net) and incompressible cargo (density higher than 15.6 lb/cu. feet), when the net precedes the incompressible cargo.

When it is necessary to install the forward transverse crash net at its forward limit (STA 6620), port and starboard attachment points must be translated for the same length respect to the forward limit.

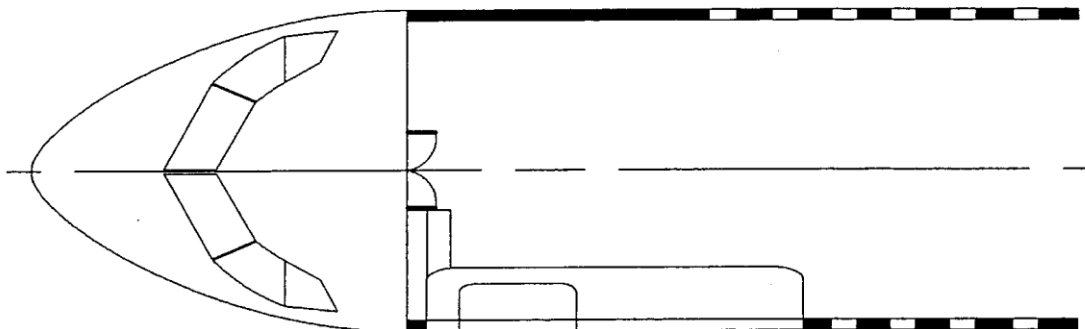
	ATR 42-300	
	AIRCRAFT HANDLING MANUAL	
	LOADING	

4.4 PACKAGE SIZE DIMENSIONS

The maximum dimensions of the package which can be loaded in cargo compartment are given in following tables. Dimensions are given in centimeters.

NOTE : Lengths are determined for packages in full contact with compartment floor during loading operations and storage. Tilting, twisting, bending and/or rotating packages through door opening will allow additional lengths in most cases, but these should be determined for each special situation depending on allowable conditions.

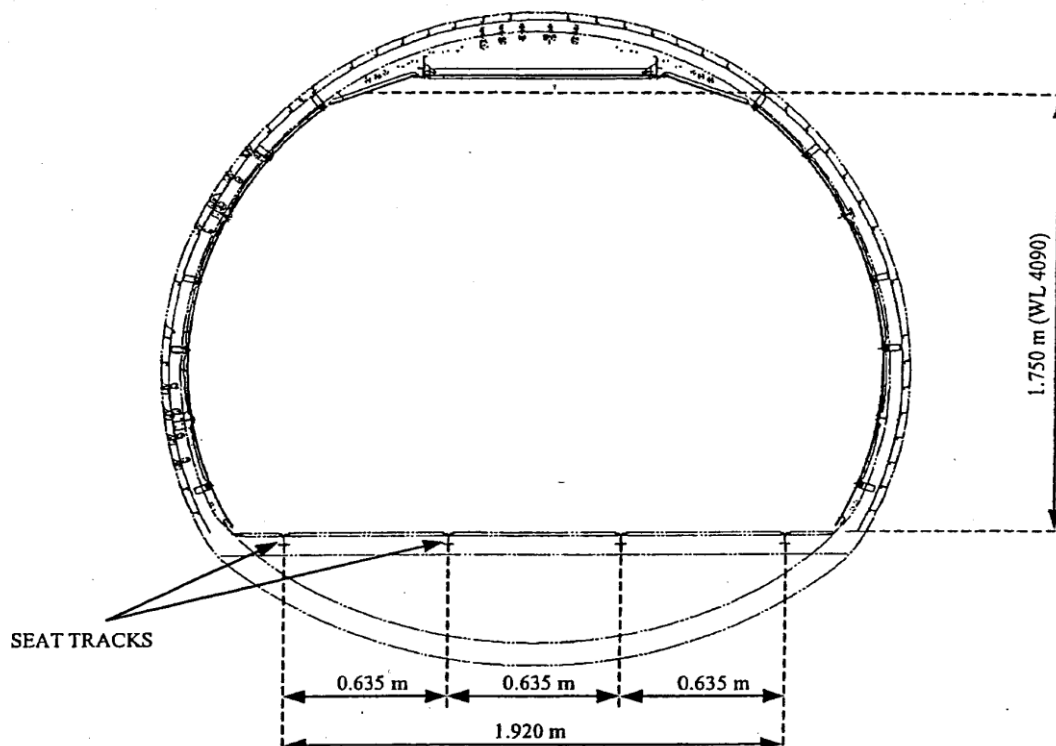
Cargo Compartment (Large Cargo Door):



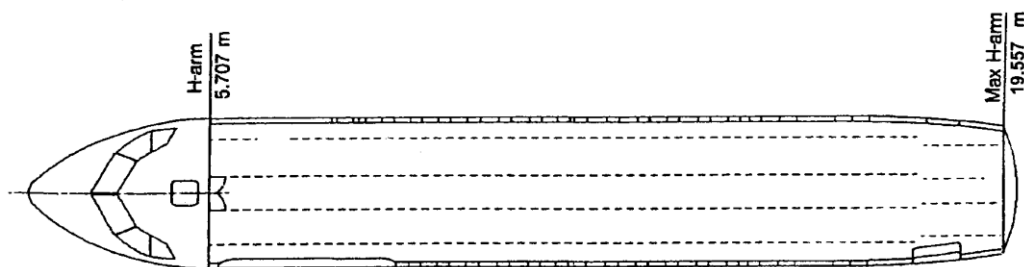
Height (cm)	5/35	35/50	50/80	80/100	100/110	120/140	140/160	160/175
Width (cm)	Length (cm)							
20	1342	1342	1342	1342	1342	1342	799	799
40	997	997	997	997	997	997	651	651
60	794	794	794	794	794	794	550	550
80	661	661	661	661	661	661	477	477
100	566	566	566	566	566	566	421	421
120	496	496	496	496	496	496	378	378
140	441	441	441	441	441	441	343	343
160	398	398	398	398	398	398	314	
180	363	363	363	363	363	363		
200	334	334	334	334	334	334		

4.5 CARGO COMPARTMENT FLOOR CAPABILITY

The dimensions, maximum available, width and height for the loads are presented in the figure 4.1.



Typical cross section (STA 5707 - STA 17319)



Description of Cargo Compartment

Figure 4.1



	ATR 42-300 AIRCRAFT HANDLING MANUAL LOADING	
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4.6 LOADING PRECAUTIONS

The ATR 42-300 has a “nose heavy” tendency. Because of this, no tail stand is provided for this aircraft. For the ATR 42-300 to tip on its tail during ground loading, the aircraft would have to reach 63% MAC. To protect it from tip up, stations 17319 and 19557 (compartment F), must be loaded last and completely unloaded first during any loading/unloading operation.

For empty ferry flights and/or light loaded flights, ballast weights will be needed to balance the aircraft.

Freight shall never be loaded above the “water mark” or red line painted in the cargo compartment of the ATR. This water mark is located at 64 inches above the floor and provides adequate clearance for the smoke detectors and lights to function.

It is prohibited to carry freight between the forward 9G crash net and the cockpit partition.

Cargo of a piercing or penetrating nature must be loaded at least 4¼ feet aft of compressible cargo (density lower than 15.6 lb/cu. ft) to prevent penetration through the crash nets. This precaution must be exercised for each crash net used in the loading process

4.7 RESTRAINT REQUIREMENTS

ATR 42-300 cargo must be restrained to prevent for the following ULTIMATE directional loads:

Direction	Gravitational Units “G’s”
Forward	9.00
Up	3.00
Side (Left/Right)	3.00

	ATR 42-300 AIRCRAFT HANDLING MANUAL LOADING	
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4.8 ATR LOADING

Containerized freight volume 30.0 m³ (1,057 cu. ft)
 Bulk available volume 11.9 m³ (421 cu. ft)

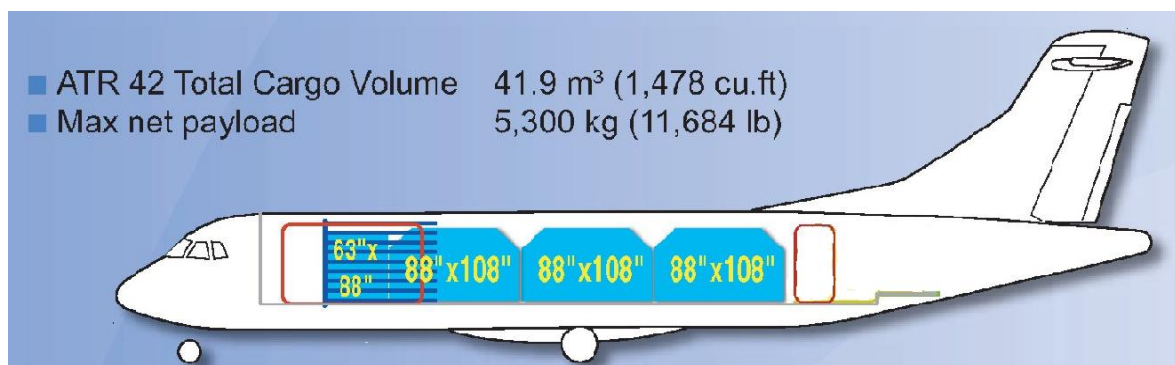


Figure 4.2 The ATR has three sections to carry one full cookie sheet in the two aft sections and 1½ cookie sheets in the forward section.

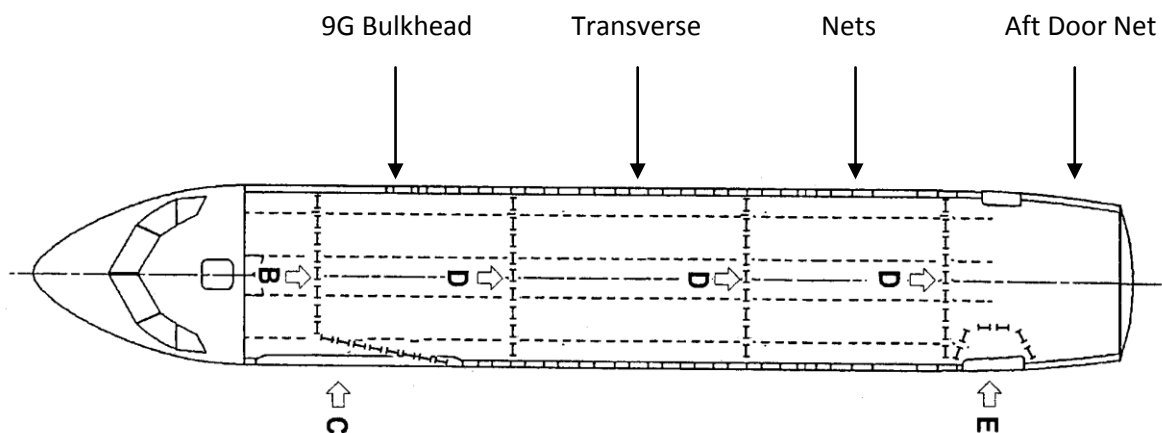


Figure 4.3 The ATR bulk freight configuration