

TOWING

FED 650-665,667-699

FED ALL

1. Towing by the Nose Gear

WARNING: MAKE SURE THAT DURING THE TOWING OPERATION, NO PERSONS GO WHERE THE AIRCRAFT CAN CAUSE THEM INJURY.

This procedure is for towing of the aircraft in maintenance configuration. It is also permitted to use this procedure to disengage the aircraft from the gate area in these conditions:

- A push back with one or several turns or stops and starts and
 - A forward tow without turns or multiple stops/starts.
-

NOTE: Operational towing, i.e. towing an aircraft, loaded with passengers, fuel, and cargo, from the terminal gate or parking area, to a remote location is not permitted.

NOTE: For aircraft with cabin and/or cargo compartment(s) floor panels removed, smooth and low-speed towing is recommended.

FED 716-746,748-799

A. General

(Ref. Fig. 001)

Two tow fittings are provided on the nose landing gear. The front fitting is used for rearward pushing or forward pulling with the tractor placed in front of the aircraft. The rear fitting serves for rearward pulling with the tractor aft of the nose landing gear under the fuselage.

A. **FED 650-665,667-699**

General

(Ref. Fig. 002)

A towing fitting is provided on front of nose landing gear and is used for rearward pushing or forward pulling with a tractor placed forward of the nose gear.

NOTE: Towing by the nose gear from the rear is not permitted with the engines at idle (ground idle).

(Ref. Fig. 003)

FED 650-651,731-739

(1) Equipment and Materials

ITEM	DESIGNATION
(1)C22783, (ZT-32-002-02 Optional)	Ground Safety Pin MLG
(2)C23157100-1, (ZT-32-002-01 Optional)	Ground Safety Pin NLG
(3)	Special tractor
(4)	Bar-Towing, Nose Gear Forward Fitting
(5)C22646	Safety Pin
Referenced Procedures	
- (Ref. 05-57-00, P. Block 001)	Aircraft Stability
- (Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
- (Ref. 24-41-00, P. Block 301)	AC External Power Control
- (Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
- (Ref. 32-00-00, P. Block 301)	Landing Gear - General
- (Ref. 80-00-00, P. Block 301)	Starting - General

FED 650-665,667-699,731-739

(2) **FED 650-651,731-739**

Towing forces
(Ref. Fig. 004)

To push the aircraft rearwards with the engines at idle
the engine thrust must be added.

FED 650-665,667-699,731-739

POST SB 32-6040 for FED 650-651,731-739

(1) Equipment and Materials

ITEM	DESIGNATION
(1)C22783	Ground Safety Pin MLG

ITEM	DESIGNATION
(2)C23157 100-1	Ground Safety Pin NLG
(3)	Special tractor
(4)	Bar-Towing, Nose Gear Forward Fitting
(5)C22646	Safety Pin
Referenced Procedures	
(Ref. 05-57-00, P. Block 001)	Aircraft Stability
(Ref. 32-00-00, P. Block 301)	Landing Gear - General
(Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
(Ref. 24-41-00, P. Block 301)	AC External Power Control
(Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
(Ref. 80-00-00, P. Block 301)	Starting - General

- (2) Towing forces
(Ref. [Fig.004](#))

To push the aircraft rearwards with the engines at idle the engine thrust must be added.

FED 716-730,740-746,748-799

- (1) Equipment and Materials

ITEM	DESIGNATION
(1)C22783	Ground Safety Pin MLG
(2)C23157-0-1	Ground Safety Pin NLG
(3)	Special tractor
(4)	Bar-Towing, Nose Gear Forward Fitting
(5)C22646	Safety Pin

ITEM	DESIGNATION
Referenced Procedures	
(Ref. 05-57-00, P. Block 001)	Aircraft Stability
(Ref. 32-00-00, P. Block 301)	Landing Gear - General
(Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
(Ref. 24-41-00, P. Block 301)	AC External Power Control
(Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
(Ref. 80-00-00, P. Block 201)	Starting - General

- (2) Towing forces
(Ref. [Fig.004](#))

To push the aircraft rearwards with the engines at idle the engine thrust must be added.

FED 716-730,740-742,746,748-749

POST SB 32-6040 for FED 716-730,740-742,746,748-749

- (1) Equipment and Materials

ITEM	DESIGNATION
(1)C22783	Ground Safety Pin MLG
(2)C23157 100-1	Ground Safety Pin NLG
(3)	Special tractor
(4)	Bar-Towing, Nose Gear Forward Fitting
(5)C22646	Safety Pin
Referenced Procedures	
(Ref. 05-57-00, P. Block 001)	Aircraft Stability
(Ref. 32-00-00, P. Block 301)	Landing Gear - General
(Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation

P.Bik EFFECTIVITY: ALL

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ITEM	DESIGNATION
(Ref. 24-41-00, P. Block 301)	AC External Power Control
(Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
(Ref. 80-00-00, P. Block 201)	Starting - General

- (2) Towing forces
 (Ref. Fig. 004)
 To push the aircraft rearwards with the engines at idle
 the engine thrust must be added.

FED ALL

B. Precautions

WARNING: OBEY THESE SAFETY PRECAUTIONS DURING MOVEMENT OF THE AIRCRAFT (TOWING, PUSHBACK OR TAXIING).
 MAKE SURE THAT:

- THE PATH OF THE AIRCRAFT IS CLEAR OF PERSONS, EQUIPMENT OR OTHER OBSTACLES,
- NO PERSONS GO NEAR THE TOW TRACTOR, TOWBAR, LANDING GEARS, ENGINE NACELLES OR BELOW THE AIRCRAFT FUSELAGE,
- ONLY QUALIFIED PERSONS ARE ON THE TRACTOR AND NO PERSONS SIT OR STAND ON THE TOWBAR,
- NO PERSONS GO NEAR THE AIRCRAFT BEFORE IT IS FULLY STOPPED.
 THERE IS A RISK OF INJURY OR DEATH IF YOU DO NOT OBEY THESE INSTRUCTIONS.

WARNING: BEFORE POSITIONING THE NOSE GEAR ON THE TRACTOR, THE NOSE WHEEL STEERING SYSTEM MUST BE DEACTIVATED BY USING SAFETY PIN C22646.

WARNING: BEFORE POSITIONING THE LOCKING DEVICES, MAKE CERTAIN THAT THE LANDING GEAR IS DOWNLOCKED (Ref. 32-00-00, P. Block 301) .

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED.

WARNING: IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

CAUTION: AIRCRAFT MAY BE TOWED WITHOUT LANDING GEAR GROUND SAFETY PINS INSTALLED DURING NORMAL PUSHBACK AND TAXIING PROCEDURES IF FULL HYDRAULIC PRESSURE IS AVAILABLE ON THE AIRCRAFT, THE LANDING GEAR LEVER IS IN THE FULL DOWN POSITION, AND ALL INDICATING LIGHTS SHOW THAT THE GEAR IS DOWN AND LOCKED. INSTALLATION OF ALL LANDING GEAR GROUND SAFETY PINS IS REQUIRED IF THE AIRCRAFT IS SITTING OR BEING TOWED IN A MAINTENANCE STATUS.

CAUTION: THE LANDING GEAR BRACE STRUT LOCKING DEVICES MUST ALWAYS BE FITTED WHEN THE AIRCRAFT IS ON THE GROUND OR BEING TOWED. USE ONLY TOWING EQUIPMENT DESIGNED OR APPROVED BY THE AIRCRAFT MANUFACTURER.

CAUTION: TOWING THE AIRCRAFT WITH ENGINE COWLINGS OPEN IS SPECIFICALLY FORBIDDEN DUE TO POSSIBILITY OF DAMAGE TO COWLS AND NACELLE STRUCTURE. ALL COWLS (FAN, REVERSER AND CORE) MUST BE CLOSED AND LATCHED, PRIOR TO TOWING.

C. Towing Preparation

(1) Landing gear safety pins

FED 650-651,716-746,748-799

(Ref. [Fig.005](#))

FED 650-665,667-699,716-742,746,748-749

POST SB 32-6040 for FED 650-651,716-742,746,748-749

(Ref. Fig. [006](#))

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(Ref. [Fig.007](#))

The landing gear must be mechanically secured in downlocked position during towing operation by inserting ground safety pins.

WARNING: WHENEVER THE GROUND SAFETY PIN IS INSTALLED ON THE NOSE GEAR TELESCOPIC STRUT ALWAYS VISUALLY CHECK THAT :

- IT HAS COMPLETELY AND EASILY ROTATED THE FORK-TYPE LEVER OF THE GROUND LOCKING SYSTEM.
 - ITS STOP FLANGE ABUTS AGAINST THE HOUSING OF THE TELESCOPIC STRUT LOCKING SYSTEM (FULL INSERTION).
-

WARNING: WHEN THE GROUND SAFETY PIN IS REMOVED, VISUALLY CHECK THE DOWN POSITION OF THE FORK-

TYPE LEVER ON THE TELESCOPIC STRUT GROUND
LOCKING SYSTEM.

NOTE: It is optional to install the landing gear safety devices when you tow or push the aircraft during flight operations. (To put the aircraft in position for the flight crew at arrival or departure).

- (2) Make sure that the aircraft is stable (Ref. 05-57-00, P. Block 001) .
- (3) Ground crew interphone box
(Ref. [Fig.008](#))
For towing purposes the nose wheel steering system must be deactivated.
This is carried out by a two position towing lever which must be set in the towing position and locked by a safety pin.

- (4) Towing angles

CAUTION: IF THE AIRCRAFT WEIGHT EXCEEDS 164 T, STEERING ANGLE IS LIMITED TO 65°.

- The maximum angle allowed on each side of the aircraft center line is 95° whatever towing arrangement is used(Ref. [Fig.009](#)) .
- Four fixed indicators are located on the nose landing gear. The center position is indicated by a forward and a rear slot.
Red marks indicate the 95° maximum steering angle (Ref. [Fig.009](#)) .
 - This angle is restricted to 40 deg. in case of rearward pulling using rear fitting, with tractor under fuselage, and engines idling. This is to reduce possibility of fan ingestion. (Ref. [Fig. 010](#))

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- (5) Towing loads
- Towing load applied to nose gear must not exceed 18210 daN (40936 lbf.).
 - Ultimate shear strength of safety pins on towing bar is 1750 m.daN (12907.33 lbf.ft.).
- (6) Energize the aircraft electrical network
During towing operations several aircraft systems have to be electrically supplied.

Before supplying the aircraft electrical network, the Cockpit Safety check must be performed.

- (a) With the tractor (if the tractor is equipped with a GPU) (Ref. Fig. 011)
 - open access door 121EL
 - connect a ground power unit provided on the tractor to a ground power receptacle located underneath the fuselage aft of the nose gear well
 - energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .
- (b) Or with the APU
 - energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
- (c) Or with the engine
 - start engine 2 (Ref. 80-00-00, P. Block 301) .

FED 716-730,740-746,748-799

- (5) Towing loads
 - Towing load applied to nose gear must not exceed 18210 daN (40936 lbf.).
 - Ultimate shear strength of safety pins on towing bar is 1750 m.daN (12907.33 lbf.ft.).
- (6) Energize the aircraft electrical network
 - During towing operations several aircraft systems have to be electrically supplied.
 - Before supplying the aircraft electrical network, the Cockpit Safety check must be performed.
 - (a) With the tractor (if the tractor is equipped with a GPU) (Ref. Fig. 011)
 - open access door 121EL
 - connect a ground power unit provided on the tractor to a ground power receptacle located underneath the fuselage aft of the nose gear well
 - energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .

- (b) Or with the APU
 - energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
- (c) Or with the engine
 - start engine 2 (Ref. 80-00-00, P. Block 201) .

FED ALL

- (7) Lighting System (Ref. Fig. 012) If necessary, the cockpit DOME lights must be switched ON. At night, if the anti-collision lighting is required by local airport regulations or by airline procedures the BEACON/STROBE lighting must be turned ON.
- (8) Landing gear and brake system (Ref. Fig. 013)
 - During towing maneuvers, one person shall be in the flight compartment in order to operate the brakes, if required.
 - Before the breakaway, release the brakes and make sure that on the panel 4VU, the pressure indication on the yellow brake pressure triple indicator is correct (3000 psi (206 bars)). The pointer must be in the green zone. The 3000 psi (206 bars) pressure permits seven brake applications.
 - If necessary, pressurize the yellow hydraulic system (Ref. 29-23-00, P. Block 301) .
 - Pressurize the yellow hydraulic system during towing operations (Ref. 29-23-00, P. Block 301) .

NOTE: If you energized the aircraft electrical network with the engine, do not pressurize the yellow hydraulic system.

- (9) Communication systems
 - (a) VHF system
 - If communication between the aircraft and the control tower is necessary, the VHF communication system No.1 must be activated. (Ref. Fig. 014 015)
 - (b) Flight interphone system (Ref. Fig. 016) During the towing operation, the flight interphone system must be used providing communication between the flight compartment and the ground crew. The ground crew boomset connection is located in the electric ground power receptacle aft of the nose landing gear well.

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D. Towing Operation

Normal towing operation should only be carried out on suitable ground surfaces.

The conventional towbar is equipped with one calibrated shear pin and two calibrated turn shear pins for gear protection against excessive loads.

NOTE: We recommend that you use a towbar that has a damping system.

NOTE: For the requirements related to towbars and towbar tractors, refer to AC 5-8.

Shock absorber reaction tends to induce a rocking movement after the aircraft is stopped. Consequently, sufficient space must be left around the aircraft for all nose gear towing maneuvers. Towing should be carried out slowly and smoothly.
Speed limits:

- Doors closed and locked or removed (passenger/crew door(s), lower deck cargo doors and main deck cargo door), for a tractor with a towbar, a maximum speed of 25 km/h (15.5 mph) is permitted.
- Passenger/crew door(s) open in vertical position, a maximum speed of 10 km/h (6.21 mph) is permitted. In this configuration, the main deck cargo door must be closed. On interphone box 3WC, position towing control lever in "towing" position and lock lever by installing safety pin C22646(Ref. Fig. 008) .

E. Towbar Disconnection(Ref. Fig. 017) After

"Pushback" (hydraulic pressure available) the tow-bar must be disconnected from the nose gear fittings before removing the tow lever safety pin.

In the case of nose wheel deflection, this is to avoid pressurization of the steering actuators so that the wheels align before the disconnection of the towbar.

F. Close-up

- (1) De-energize the aircraft electrical network.
 - (a) If you energized with the tractor:
(Ref. Fig. 011)
 - de-energize the aircraft electrical network
(Ref. 24-41-00, P. Block 301)
 - disconnect ground power unit provided on the tractor from ground power receptacle located underneath the fuselage aft of the nose gear well

- close access door 121EL.
- (b) If you energized with the APU:
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
- (c) If you energized with the engine:
 - stop engine 2 (Ref. 80-00-00, P. Block 301) .
- (2) Position wheel chocks.
- (3) Apply parking brake.

FED 716-730,740-746,748-799

D. Towing Operation

Normal towing operation should only be carried out on suitable ground surfaces.

The conventional towbar is equipped with one calibrated shear pin and two calibrated turn shear pins for gear protection against excessive loads.

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E. Towbar Disconnection

(Ref. Fig. 017)

After "Pushback" (hydraulic pressure available), the towbar must be disconnected from the nose gear fittings before removing the tow lever safety pin.

In the case of nose wheel deflection, this is to avoid pressurization of the steering actuators so that the wheels align before the disconnection of the towbar.

F. Close-up

- (1) De-energize the aircraft electrical network.
 - (a) If you energized with the tractor: (Ref. Fig. 011)
 - de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
 - disconnect ground power unit provided on the tractor from ground power receptacle located underneath the fuselage aft of the nose gear well
 - close access door 121EL.
 - (b) If you energized with the APU:
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) If you energized with the engine:
 - stop engine 2 (Ref. 80-00-00, P. Block 201) .
- (2) Position wheel chocks.
- (3) Place parking brake control handle in OFF (released) position.

FED ALL

2. Towing by the Nose Gear with Towbarless Tractor ((Ref. Fig. 018))

WARNING: MAKE SURE THAT DURING THE TOWING OPERATION, NO PERSONS GO WHERE THE AIRCRAFT CAN CAUSE THEM INJURY.

CAUTION: WHEN YOU USE A TOWBARLESS TRACTOR, MAKE SURE THAT YOU OBEY FULLY ALL THE INSTRUCTIONS IN THIS PROCEDURE. IF YOU DO NOT, THE TRACTOR CAN CAUSE IMPORTANT SCRAPING OR OTHER DAMAGE TO THE NLG AND TO THE AIRFRAME STRUCTURE AROUND THE NLG.

This procedure is for towing of the aircraft in maintenance configuration. It is also permitted to use this procedure to disengage the aircraft from the gate area in these conditions:

- A push back with one or several turns or stops and starts and
- A forward tow without turns or multiple stops/starts.

NOTE: Operational towing, i.e. towing an aircraft, loaded with passengers, fuel, and cargo, from the terminal gate or parking area, to a remote location, is not permitted.

NOTE: For aircraft with cabin and/or cargo compartment(s) floor panels removed, smooth and low-speed towing is recommended.

A. General

When this towing procedure is applied, the aircraft is towed by the nose gear, without towbar.

The nose gear is jacked up and positioned at the appropriate location on the tractor. It is held in place by means of a hydraulic system.

FED 650-665,667-699,731-739

(1) Equipment and Materials

ITEM	DESIGNATION
(1)C22783, (ZT-32-002-02 Optional)	Ground Safety Pin MLG
(2)C23157-0-1, (ZT-32-002-01 Optional)	Ground Safety Pin NLG
(3)	Special tractor
(4)C22646	Safety Pin
Referenced Procedures	
- (Ref. 05-51-22, P. Block 001)	Inspection after NLG Towing Overload or Overrun
- (Ref. 05-57-00, P. Block 001)	Aircraft Stability
- (Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
- (Ref. 24-41-00, P. Block 301)	AC External Power Control
- (Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
- (Ref. 32-00-00, P. Block 301)	Landing Gear - GENERAL
- (Ref. 80-00-00, P. Block 201)	Starting - General

(2) Qualification of the tractor

NOTE: Towbarless tractors are subject to specific qualification procedure. Before towing be sure that the tractor is qualified for towbarless towing for this A/C. For more information on the towbarless tractors, refer to the SIL 09-002.

B. Precautions

WARNING: OBEY THESE SAFETY PRECAUTIONS DURING MOVEMENT OF THE AIRCRAFT (TOWING, PUSHBACK OR TAXIING). MAKE SURE THAT:

- THE PATH OF THE AIRCRAFT IS CLEAR OF PERSONS, EQUIPMENT OR OTHER OBSTACLES,
- NO PERSONS GO NEAR THE TOW TRACTOR, TOWBAR, LANDING GEARS, ENGINE NACELLES OR BELOW THE AIRCRAFT FUSELAGE,
- ONLY QUALIFIED PERSONS ARE ON THE TRACTOR AND NO PERSONS SIT OR STAND ON THE TOWBAR,
- NO PERSONS GO NEAR THE AIRCRAFT BEFORE IT IS FULLY STOPPED.
THERE IS A RISK OF INJURY OR DEATH IF YOU DO NOT OBEY THESE INSTRUCTIONS.

WARNING: BEFORE POSITIONING THE NOSE GEAR ON THE TRACTOR, THE NOSE WHEEL STEERING SYSTEM MUST BE DEACTIVATED BY USING SAFETY PIN C22646.

WARNING: BEFORE POSITIONING THE LOCKING DEVICES, MAKE CERTAIN THAT THE LANDING GEAR IS DOWNLOCKED (Ref. 32-00-00, P. Block 301) .

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED. IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

CAUTION: AIRCRAFT MAY BE TOWED WITHOUT LANDING GEAR GROUND SAFETY PINS INSTALLED DURING NORMAL PUSHBACK AND TAXIING PROCEDURES IF FULL HYDRAULIC PRESSURE IS AVAILABLE ON THE AIRCRAFT, THE LANDING GEAR LEVER IS IN THE FULL DOWN POSITION, AND ALL INDICATING LIGHTS SHOW THAT THE GEAR IS DOWN AND LOCKED. INSTALLATION OF ALL LANDING GEAR GROUND SAFETY PINS IS REQUIRED

IF THE AIRCRAFT IS SITTING OR BEING TOWED IN A MAINTENANCE STATUS.

CAUTION: THE LANDING GEAR BRACE STRUT LOCKING DEVICES MUST ALWAYS BE FITTED WHEN THE AIRCRAFT IS ON THE GROUND OR BEING TOWED. USE ONLY TOWING EQUIPMENT DESIGNED OR APPROVED BY THE AIRCRAFT MANUFACTURER.

CAUTION: TOWING THE AIRCRAFT WITH ENGINE COWLINGS OPEN IS SPECIFICALLY FORBIDDEN DUE TO POSSIBILITY OF DAMAGE TO COWLS AND NACELLE STRUCTURE. ALL COWLS (FAN, REVERSER AND CORE) MUST BE CLOSED AND LATCHED, PRIOR TO TOWING.

C. Towing Preparation

FED 716-730,740-746,748-799

(1) Equipment and Materials

ITEM	DESIGNATION
(1) C22783	Ground Safety Pin MLG
(2) C23157-0-1	Ground Safety Pin NLG
(3)	Special Tractor
(4) C22646	Safety Pin
Referenced Procedures	
- (Ref. 05-51-22, P. Block 001)	Inspection after NLG Towing Overload or Overrun
- (Ref. 05-57-00, P. Block 001)	Aircraft Stability
- (Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
- (Ref. 24-41-00, P. Block 301)	AC External Power Control
- (Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
- (Ref. 32-00-00, P. Block 301)	Landing Gear - General
- (Ref. 80-00-00, P. Block 201)	Starting - General

(2) Qualification of the tractor

NOTE: Towbarless tractors are subject to specific qualification procedure. Before towing be sure that the tractor is qualified for towbarless towing for this A/C. For more information on the towbarless tractors, refer to the SIL 09-002.

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WARNING: BEFORE POSITIONING THE LOCKING DEVICES, MAKE CERTAIN THAT THE LANDING GEAR IS DOWNLOCKED (Ref. 32-00-00, P. Block 301) .

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED.
IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

CAUTION: AIRCRAFT MAY BE TOWED WITHOUT LANDING GEAR GROUND SAFETY PINS INSTALLED DURING NORMAL PUSHBACK AND TAXIING PROCEDURES IF FULL HYDRAULIC PRESSURE IS AVAILABLE ON THE AIRCRAFT, THE LANDING GEAR LEVER IS IN THE FULL DOWN POSITION, AND ALL INDICATING LIGHTS SHOW THAT THE GEAR IS DOWN AND LOCKED. INSTALLATION OF ALL LANDING GEAR GROUND SAFETY PINS IS REQUIRED

IF THE AIRCRAFT IS SITTING OR BEING TOWED IN A MAINTENANCE STATUS.

CAUTION: THE LANDING GEAR BRACE STRUT LOCKING DEVICES MUST ALWAYS BE FITTED WHEN THE AIRCRAFT IS ON THE GROUND OR BEING TOWED. USE ONLY TOWING EQUIPMENT DESIGNED OR APPROVED BY THE AIRCRAFT MANUFACTURER.

CAUTION: TOWING THE AIRCRAFT WITH ENGINE COWLINGS OPEN IS SPECIFICALLY FORBIDDEN DUE TO POSSIBILITY OF DAMAGE TO COWLS AND NACELLE STRUCTURE. ALL COWLS (FAN, REVERSER AND CORE) MUST BE CLOSED AND LATCHED, PRIOR TO TOWING.

C. Towing Preparation

FED ALL

(1) **FED 650-651,716-746,748-799**

Landing gear safety pins
(Ref. Fig. 005)

(1) **FED 650-665,667-699,716-742,746,748-749**

POST SB 32-6040 for FED 650-651,716-742,746,748-749

Landing gear safety pins
(Ref. Fig. 006)

FED ALL

The landing gear must be mechanically secured in downlocked position during towing operation by inserting ground safety pins.

WARNING: WHENEVER THE GROUND SAFETY PIN IS INSTALLED ON THE NOSE GEAR TELESCOPIC STRUT ALWAYS VISUALLY CHECK THAT :

- IT HAS COMPLETELY AND EASILY ROTATED THE FORK-TYPE LEVER OF THE GROUND LOCKING SYSTEM.
 - ITS STOP FLANGE ABUTS AGAINST THE HOUSING OF THE TELESCOPIC STRUT LOCKING SYSTEM (FULL INSERTION).
-

WARNING: WHEN THE GROUND SAFETY PIN IS REMOVED, VISUALLY CHECK THE DOWN POSITION OF THE FORK-TYPE LEVER ON THE TELESCOPIC STRUT GROUND LOCKING SYSTEM.

NOTE: It is optional to install the landing gear safety devices when you tow or push the aircraft during flight operations. (To put the aircraft in position for the flight crew at arrival or departure).

- (2) Make sure that the aircraft is stable (Ref. 05-57-00, P. Block 001) .
- (3) Ground crew interphone box (Ref. Fig. 019) For towing purposes the nose wheel steering system must be set in the towing position and locked by a safety pin. For towing purposes the nose wheel steering system must be set in the towing position and locked by a safety pin.
- (4) Towing angles

WARNING: IF THE AIRCRAFT WEIGHT EXCEEDS 164T, STEERING ANGLE IS LIMITED TO 65°.

The maximum angle allowed on each side of the aircraft center line is 95° whatever the towing arrangement used(Ref. Fig. 020) .

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- (5) Towing loads
 - Towing load applied to nose gear must not exceed 18210 daN (40936 lbf).
 - Torque applied to nose gear must not exceed 1750 daN (12900 lbf.ft).
- (6) Energize the aircraft electrical network
 - During towing operations several aircraft systems have to be electrically supplied.
 - Before supplying the aircraft electrical network, the cockpit safety check must be performed.
 - (a) With the tractor (if the tractor is equipped with a GPU) (Ref. Fig. 021)
 - open access door 121EL
 - connect a ground power unit provided on the tractor to a ground power receptacle located underneath the fuselage aft of the nose gear well

-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .

(b) Or with the APU

-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .

(c) Or with the engine

-start engine 2 (Ref. 80-00-00, P. Block 301) .

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(5) Towing loads

-Towing load applied to nose gear must not exceed 18210 daN (40936 lbf).

-Torque applied to nose gear must not exceed 1750 daN (12900 lbf.ft).

(6) Energize the aircraft electrical network

During towing operations several aircraft systems have to be electrically supplied.

Before supplying the aircraft electrical network, the cockpit safety check must be performed.

(a) With the tractor (if the tractor is equipped with a GPU)
(Ref. Fig. 021)

-open access door 121EL

-connect a ground power unit provided on the tractor to a ground power receptacle located underneath the fuselage aft of the nose gear well

-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .

(b) Or with the APU

-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .

(c) Or with the engine

-start engine 2 (Ref. 80-00-00, P. Block 201) .

FED ALL

(7) Lighting system

If necessary, the cockpit DOME lights must be switched ON.

At night, if the anti-collision lighting is required by local airport regulations or by airline procedures the BEACON/STROBE lighting must be turned ON.

(8) Landing gear and brake system (Ref. Fig. 022)

WARNING: WHEN YOU TOW THE AIRCRAFT WITH A TOWBARLESS TRACTOR, THE PARKING BRAKE OR THE BRAKE PEDALS SHALL ONLY BE USED IN CASE OF EMERGENCY.

IF YOU APPLY THE PARKING BRAKE OR THE BRAKE PEDALS, YOU CAN CAUSE:

-OVERLOAD TO THE NOSE LANDING GEAR

-DAMAGE TO THE TOWBARLESS TRACTOR

-INJURY TO MAINTENANCE PERSONNEL

IF THIS OCCURS, YOU MUST REFER TO AIRBUS.

-During towing maneuvers, one person shall be in the flight compartment in order to operate the brakes, if required.

-Before the breakaway, release the brakes and make sure that on the panel 4VU, the pressure indication on the yellow brake pressure triple indicator is correct (3000 psi (206 bars)). The pointer must be in the green zone.

-The 3000 psi (206 bars) pressure permits seven brake applications.

-If necessary, pressurize the yellow hydraulic system (Ref. 29-23-00, P. Block 301) .

-Pressurize the yellow hydraulic system during towing operations (Ref. 29-23-00, P. Block 301) .

NOTE: If you energized the aircraft electrical network with the engine, do not pressurize the yellow hydraulic system.

(9) Communication systems

(a) VHF system

If communication between the aircraft and the control tower is necessary, the VHF communication system No. 1 must be deactivated.

(Ref. Fig. 023)

(Ref. Fig. 024)

(b) Flight interphone system (Ref. Fig. 019) During the towing operation, the flight interphone system

must be used to establish communication between the flight compartment and the ground crew. The ground crew boomset connection is located in the electric ground power receptacle aft of the nose landing gear well.

D. Towing Operation

- (1) Select the A/C type on the towbarless tractor, if necessary.
- (2) Load NLG on the towbarless tractor

CAUTION: WHEN YOU PUT THE NOSE LANDING GEAR ON THE TRACTOR, BE CAREFUL TO ALIGN THE CLAMPING DEVICE OF THE TRACTOR WITH THE NLG AXIS. THE GAP BETWEEN THE CRADLE AND THE TORQUE LINK IS VERY SMALL. THUS, IF YOU DO NOT ALIGN THE CLAMPING DEVICE WITH THE NLG AXIS, THERE IS A RISK OF DAMAGE TO THE TORQUE LINK PIN.

WARNING: MAKE SURE THAT NLG CANNOT BE DISENGAGED FROM THE TRACTOR.

- (3) Towing
Normal towing operation should only be carried out on suitable ground surfaces.
Shock absorber reaction tends to induce a rocking movement after the aircraft is stopped. Consequently sufficient space must be left around the aircraft for all nose gear towing maneuvers. Towing should be carried out slowly and smoothly.
Speed limits:
 - Doors closed and locked or removed, for a tractor without a tow bar, a maximum speed of 32 km/h (19.8 mph) is permitted.
 - Passenger/crew doors fully open and locked and/or cargo doors open in vertical position, a maximum speed of 10 km/h (6.21 mph) is permitted.On interphone box 3WC, position towing control lever in "towing" position and lock lever by installing safety pin C22646
On interphone box 3WC, position towing control lever in "towing" position and lock lever by installing safety pin C22646(Ref. Fig. 025)

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E. Close-up

NOTE: It is advisable to stop with the nose wheels in the aircraft centerline.

- (1) De-energize the aircraft electrical network
 - (a) If you energized with the tractor (Ref. Fig. 021)
 - de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
 - disconnect ground power unit provided on the tractor from ground power receptacle located underneath the fuselage aft of the nose gear well
 - close access door 121EL.
 - (b) If you energized with the APU
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) If you energized with the engine
 - stop engine 2 (Ref. 80-00-00, P. Block 301) .
- (2) Position wheel shocks
- (3) Apply parking
- (4) Unload the NLG from the towbarless tractor.
- (5) Remove safety pin and ensure that control lever is in "normal" position.

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E. Close-up

NOTE: It is advisable to stop with the nose wheels in the aircraft centerline.

- (1) De-energize the aircraft electrical network
 - (a) If you energized with the tractor (Ref. Fig. 021)
 - de-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301)
 - disconnect ground power unit provided on the tractor from ground power receptacle located underneath the fuselage aft of the nose gear well
 - close access door 121EL.

- (b) If you energized with the APU
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
- (c) If you energized with the engine
 - stop engine 2 (Ref. 80-00-00, P. Block 201) .
- (2) Position wheel shocks
- (3) Apply parking
- (4) Unload the NLG from the towbarless tractor.
- (5) Remove safety pin and ensure that control lever is in "normal" position.

FED ALL

3. Towing by the Main Landing Gear

WARNING: MAKE SURE THAT DURING THE TOWING OPERATION:

- NO PERSONS GO WHERE THE AIRCRAFT CAN CAUSE THEM INJURY OR CAN KILL THEM
- NO OBJECTS STAY WHERE THE ENGINES CAN BLOW THEM AWAY OR CAN PULL THEM INTO THE ENGINES BY SUCTION.

CAUTION: DO NOT TOW OR MOVE THE AIRCRAFT ON THE GROUND IF THE ENGINE COWLS ARE OPEN. MOVEMENT OF THE AIRCRAFT WITH THE COWLS OPEN CAN CAUSE DAMAGE TO THE COWLS AND THE NACELLE STRUCTURE.

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED. IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

NOTE: Towing by the main landing gear is performed either forward or rearwards on soft and muddy ground. Use only towing equipment designed or approved by the aircraft manufacturer. The landing gear must be downlocked and secured by means of the ground safety pins.

A. General

Two tow fittings are provided on each main landing gear. The front fittings are used for forward pulling with the tractor placed in front of the aircraft.

The rear fittings serve for rearward pulling with the tractor placed behind of the aircraft.

(1) Equipment and Materials

ITEM	DESIGNATION
(1) C22646 (2) C22783	Safety Pin Ground Safety Pin MLG
(3)C23157-0-1	Ground Safety Pin NLG
On A/C 650-665, 667-699, 716-742, 746-746, 748-749, POST SB 32-6040 for Fed 650651 716742 746746 748749 (3)C23157 100-1	Ground Safety Pin NLG
On A/C 001-999 (4) (5)	Movable Taxiway Plates Special Tractor
(6)98A09001001000	Bar-Steering-Nose Wheel
(6)98A09003000000	Bar-Steering-Nose Wheel
(7)98F09103500000 (8)D22800000	Cable,Towing MLG Towing Lifting and Debogging Fittings
Referenced Procedures	
(Ref. 05-57-00, P. Block 001)	Aircraft Stability
(Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
(Ref. 24-41-00, P. Block 301)	AC External Power Control
(Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
(Ref. 32-00-00, P. Block 301)	Landing Gear - General
(Ref. 80-00-00, P. Block 301)	Starting - General

B. Precautions

WARNING: OBEY THESE SAFETY PRECAUTIONS DURING MOVEMENT OF THE AIRCRAFT (TOWING, PUSHBACK OR TAXIING).
MAKE SURE THAT:

- THE PATH OF THE AIRCRAFT IS CLEAR OF PERSONS, EQUIPMENT OR OTHER OBSTACLES,
- NO PERSONS GO NEAR THE TOW TRACTOR, TOWBAR, LANDING GEARS, ENGINE NACELLES OR BELOW THE AIRCRAFT FUSELAGE,
- ONLY QUALIFIED PERSONS ARE ON THE TRACTOR AND NO PERSONS SIT OR STAND ON THE TOWBAR,
- NO PERSONS GO NEAR THE AIRCRAFT BEFORE IT IS FULLY STOPPED.
THERE IS A RISK OF INJURY OR DEATH IF YOU DO NOT OBEY THESE INSTRUCTIONS.

WARNING: BEFORE POSITIONING THE LOCKING DEVICES, MAKE CERTAIN THAT THE LANDING GEAR IS DOWNLOCKED (Ref. 32-00-00, P. Block 301) .

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED.
IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

CAUTION: THE LANDING GEAR BRACE STRUT LOCKING DEVICES MUST ALWAYS BE FITTED WHEN THE AIRCRAFT IS ON THE GROUND OR BEING TOWED.
USE ONLY TOWING EQUIPMENT DESIGNED OR APPROVED BY THE AIRCRAFT MANUFACTURER.

CAUTION: TOWING THE AIRCRAFT WITH ENGINE COWLINGS OPEN IS SPECIFICALLY FORBIDDEN DUE TO POSSIBILITY OF DAMAGE TO COWLS AND NACELLE STRUCTURE. ALL COWLS (FAN, REVERSER AND CORE) MUST BE CLOSED AND LATCHED, PRIOR TO TOWING.

C.

Towing Preparation

FED ALL

(1) **FED 650-665,667-699,731-739**

Landing gear safety pins

ITEM	DESIGNATION
(7)98F09103500000	Cable,Towing MLG
(8)D22800000	Towing Lifting and Debogging Fittings
Referenced Procedures	
(Ref. 05-57-00, P. Block 001)	Aircraft Stability
(Ref. 24-23-00, P. Block 301)	Auxiliary AC Generation
(Ref. 24-41-00, P. Block 301)	AC External Power Control
(Ref. 29-23-00, P. Block 301)	Yellow Auxiliary Power (Power Transfer Unit)
(Ref. 32-00-00, P. Block 301)	Landing Gear - General
(Ref. 80-00-00, P. Block 201)	Starting - General

B. Precautions

WARNING: OBEY THESE SAFETY PRECAUTIONS DURING MOVEMENT OF THE AIRCRAFT (TOWING, PUSHBACK OR TAXIING).

MAKE SURE THAT:

- THE PATH OF THE AIRCRAFT IS CLEAR OF PERSONS, EQUIPMENT OR OTHER OBSTACLES,
- NO PERSONS GO NEAR THE TOW TRACTOR, TOWBAR, LANDING GEARS, ENGINE NACELLES OR BELOW THE AIRCRAFT FUSELAGE,
- ONLY QUALIFIED PERSONS ARE ON THE TRACTOR AND NO PERSONS SIT OR STAND ON THE TOWBAR,
- NO PERSONS GO NEAR THE AIRCRAFT BEFORE IT IS FULLY STOPPED.

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THERE IS A RISK OF INJURY OR DEATH IF YOU DO NOT OBEY THESE INSTRUCTIONS.

WARNING: BEFORE POSITIONING THE LOCKING DEVICES, MAKE CERTAIN THAT THE LANDING GEAR IS DOWNLOCKED (Ref. 32-00-00, P. Block 301) .

WARNING: DURING TOWING/TAXIING OPERATIONS (LOW-SPEED OPERATIONS INCLUDED), EACH PERSON IN THE AIRCRAFT MUST BE IN A SEAT AND THE SEAT BELT MUST BE FASTENED.
IF THE SEAT BELT IS NOT FASTENED, THERE IS A RISK OF INJURY IF THE AIRCRAFT STOPS SUDDENLY.

CAUTION: THE LANDING GEAR BRACE STRUT LOCKING DEVICES MUST ALWAYS BE FITTED WHEN THE AIRCRAFT IS ON THE GROUND OR BEING TOWED.
USE ONLY TOWING EQUIPMENT DESIGNED OR APPROVED BY THE AIRCRAFT MANUFACTURER.

CAUTION: TOWING THE AIRCRAFT WITH ENGINE COWLINGS OPEN IS SPECIFICALLY FORBIDDEN DUE TO POSSIBILITY OF DAMAGE TO COWLS AND NACELLE STRUCTURE. ALL COWLS (FAN, REVERSER AND CORE) MUST BE CLOSED AND LATCHED, PRIOR TO TOWING.

C. Towing Preparation

FED ALL

(1) **FED 716-730,740-746,748-799**

Landing gear safety pins

FED 650-651,716-746,748-799

(Ref. Fig. 005)

FED 650-665,667-699,716-742,746,748-749

POST SB 32-6040 for FED 650-651,716-742,746,748-749

(Ref. Fig. 006)

The landing gear must be mechanically secured in the downlocked position during towing operation by inserting ground safety pins.

WARNING: WHENEVER THE GROUND SAFETY PIN IS INSTALLED ON THE NOSE GEAR TELESCOPIC STRUT, ALWAYS VISUALLY CHECK THAT:

- IT HAS COMPLETELY AND EASILY ROTATED THE FORK-TYPE LEVER OF THE GROUND LOCKING SYSTEM.
- ITS STOP FLANGE ABUTS AGAINST THE HOUSING OF THE TELESCOPIC STRUT LOCKING SYSTEM (FULL INSERTION).

WARNING: WHEN THE GROUND SAFETY PIN IS REMOVED, VISUALLY CHECK THE DOWN POSITION OF THE FORK-TYPE LEVER ON THE TELESCOPIC STRUT GROUND LOCKING SYSTEM.

NOTE: It is optional to install the landing gear safety devices when you tow the aircraft during flight operations.

FED ALL

- (2) Landing gear and brake system
(Ref. Fig. 013)

-During debogging maneuvers, one person shall be in the flight compartment in order to operate the brakes, if required.

-Before the breakaway, release the brakes and make sure that on the panel 4VU, the pressure indication on the yellow brake pressure triple indicator is correct (3000 psi (206 bars)). The pointer must be in the green zone.

The 3000 psi (206 bars) pressure permits seven brake applications.

-If necessary, pressurize the yellow hydraulic system (Ref. 29-23-00, P. Block 301) .

-Pressurize the yellow hydraulic system during towing operations (Ref. 29-23-00, P. Block 301) .

NOTE: If you energized the aircraft electrical network with the engine, do not pressurize the yellow hydraulic system.

- (3) Make sure that the aircraft is stable (Ref. 05-57-00, P. Block 001) .

- (4) Ground crew interphone box
(Ref. Fig. 008)

For towing purposes, the nose wheel steering system must be deactivated.

This is carried out by a two position towing lever which must be set in the towing position and locked by a safety pin.

- (5) Put the tractor, aligned with the aircraft centerline, in front of the aircraft.
- (6) If there is mud on the ground, put the movable taxiway plates in position in front of the wheels to make the ground hard.
- (7) Install the towing cable.
(Ref. Fig. 026)
 - (a) Make sure that the CABLE, TOWING-MLG (98F09103500000) has a traction shear pin calibrated to 50 000 +0-3000 daN (112404.5500 +0.0000 -6744.2670 lbf).
 - (b) Install the CABLE, TOWING-MLG (98F09103500000) in the forward fittings or the aft fittings of the main landing gear with the TOWING LIFTING and DEBOGGING FITTING (D22800000) and the tractor connector.

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- (c) Install the BAR-STEERING, NOSE WHEEL (98A09001001000) in the nose landing gear fitting to manually turn the nose wheels during the towing operation.

FED 650-665,667-699

- (c) Install the BAR-STEERING, NOSE WHEEL (98A09003000000) in the nose landing gear fitting to manually turn the nose wheels during the towing operation.

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- (8) Energize the aircraft electrical network.
During towing operations, several aircraft systems have to be electrically supplied.
Before supplying the aircraft electrical network, the Cockpit Safety check must be performed.

- (a) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .
 - (b) Or, with the APU:
 - energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) Or, with the engine:
 - start engine 2 (Ref. 80-00-00, P. Block 301) .
- (9) Remove the wheel chocks from the main landing gear wheels and nose landing gear wheels.
- (10) Lighting System
 (Ref. Fig. 012) .
 If necessary, the cockpit DOME lights must be switched ON.
 At night, if the anti-collision lighting is required by local airport regulations or by airline procedures, the BEACON/STROBE lighting must be turned ON.
- (11) Communication systems
- (a) VHF system
 If communication between the aircraft and the control tower is necessary, the VHF communication system No. 1 must be activated.
- FED 716-730,740-746,748-799**
- (8) Energize the aircraft electrical network.
 During towing operations, several aircraft systems have to be electrically supplied.
 Before supplying the aircraft electrical network, the Cockpit Safety check must be performed.
- (a) Energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .
 - (b) Or, with the APU:
 - energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) Or, with the engine:
 - start engine 2 (Ref. 80-00-00, P. Block 201) .
- (9) Remove the wheel chocks from the main landing gear wheels and nose landing gear wheels.

- (10) Lighting System
(Ref. Fig. 012) .
If necessary, the cockpit DOME lights must be switched ON.
At night, if the anti-collision lighting is required by local airport regulations or by airline procedures, the BEACON/STROBE lighting must be turned ON.
- (11) Communication systems

FED ALL

- (a) **FED 716-730,740-746,748-799**

VHF system

If communication between the aircraft and the control tower is necessary, the VHF communication system No. 1 must be activated.

FED ALL

(Ref. Fig. 027)

(Ref. Fig. 015)

- (b) Flight interphone system
(Ref. Fig. 028) .
During the towing operation, the flight interphone system must be used providing communication between the flight compartment and the ground crew.
The ground crew boomset connection is located in the electric ground power receptacle aft of the nose landing gear well.

C. Towing Operation

- (1) Approximate Towing Loads
(Ref. Fig. 029, 030)
- (a) Apply these coefficients for the friction between the tires and the ground:
Dry concrete or asphalt: 0.80 Wet asphalt: 0.75
Wet concrete: 0.57
Hard snow: 0.20
Ice: 0.05

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- (2) Towing
(Ref. Fig. 029, 030)
- (a) The maximum steering angle in the horizontal plane is 30 degrees on each side of the aircraft centerline.
When the towing is along the aircraft centerline, the nose landing gear keeps the limits.
- (b) The maximum angle in the vertical plane is 11 degrees which goes through the towing fitting of the main gear.
- (c) During the towing operations, put:
-one person in the cockpit to operate the brake pedals if necessary,
-two persons to monitor the wing tips.
- (3) During the towing operations, on the panel 4VU, you must monitor the pressure on the triple pressure indicator on the top gage.
-If the pressure is approximately 2000 psi (137.8951 bar), pressurize the Blue hydraulic system again (Ref. 29-23-00, P. Block 301) .
- (4) Tow the aircraft smoothly if possible and keep the tractor aligned with the aircraft centerline. You can make turns only if the ground conditions are good.

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- (2A) Towing
(Ref. Fig. 029, 030)
- (a) The maximum steering angle in the horizontal plane is 30 degrees on each side of the aircraft centerline.
When the towing is along the aircraft centerline, the nose landing gear keeps the limits.
- (b) The maximum angle in the vertical plane is 11 degrees which goes through the towing fitting of the main gear.
- (c) During the towing operations, put:
-one person in the cockpit to operate the brake pedals if necessary,
-two persons to monitor the wing tips.

(3A) During the towing operations, on the panel 4VU, you must monitor the pressure on the triple pressure indicator on the top gage.

-If the pressure is approximately 2000 psi (137.8951 bar), pressurize the Blue hydraulic system again (Ref. 29-23-00, P. Block 301) .

(4A) Tow the aircraft smoothly if possible and keep the tractor aligned with the aircraft centerline. You can make turns only if the ground conditions are good.

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4. Close-up

A. Visual Inspection

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- (1) When you have completed the towing operation, make sure that the nose wheels are aligned with the aircraft centerline.
- (2) De-energize the aircraft electrical network.
 - (a) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .
 - (b) If you energized with the APU:
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) If you energized with the engine:
 - stop engine 2 (Ref. 80-00-00, P. Block 301) .
- (3) Position wheel chocks.
- (4) Disconnect the CABLE, TOWING-MLG (98F09103500000) from the forward fittings or the aft fittings of the landing gear and from the tractor.

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- (2) Towing
(Ref. Fig. 029, 030)

- (a) The maximum steering angle in the horizontal plane is 30 degrees on each side of the aircraft centerline.
When the towing is along the aircraft centerline, the nose landing gear keeps the limits.
- (b) The maximum angle in the vertical plane is 11 degrees which goes through the towing fitting of the main gear.
- (c) During the towing operations, put:
 - one person in the cockpit to operate the brake pedals if necessary,
 - two persons to monitor the wing tips.
- (3) During the towing operations, on the panel 4VU, you must monitor the pressure on the triple pressure indicator on the top gage.
 - If the pressure is approximately 2000 psi (137.8951 bar), pressurize the Blue hydraulic system again (Ref. 29-23-00, P. Block 301) .
- (4) Tow the aircraft smoothly if possible and keep the tractor aligned with the aircraft centerline. You can make turns only if the ground conditions are good.

4. Close-up

A. Visual Inspection

- (1) When you have completed the towing operation, make sure that the nose wheels are aligned with the aircraft centerline.
- (2) De-energize the aircraft electrical network.
 - (a) De-energize the aircraft electrical network (Ref. 24-41-00, P. Block 301) .
 - (b) If you energized with the APU:
 - de-energize the aircraft electrical network (Ref. 24-23-00, P. Block 301) .
 - (c) If you energized with the engine:
 - stop engine 2 (Ref. 80-00-00, P. Block 201) .
- (3) Position wheel chocks.

(4) Disconnect the CABLE, TOWING-MLG (98F09103500000) from the forward fittings or the aft fittings of the landing gear and from the tractor.

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(5) Remove the BAR-STEERING, NOSE WHEEL (98A09001001000) from the front fitting of the nose landing gear.

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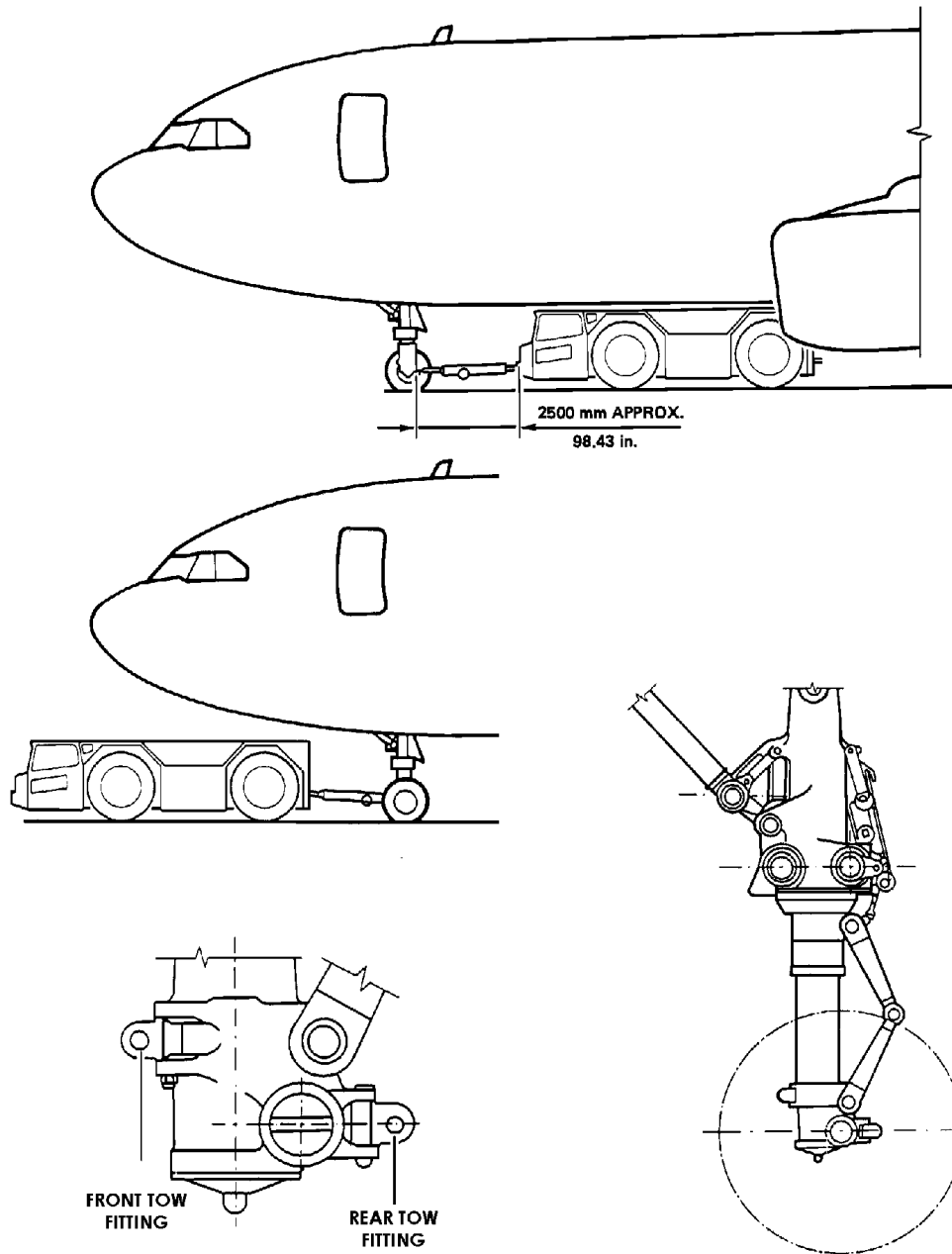
(5) Remove the BAR-STEERING, NOSE WHEEL (98A09003000000) from the front fitting of the nose landing gear.

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(6) Make sure that the work area is clean and clear of tools and other items.

(7) Apply parking brake.

- (8) Remove safety pin and ensure that control lever is in normal position.



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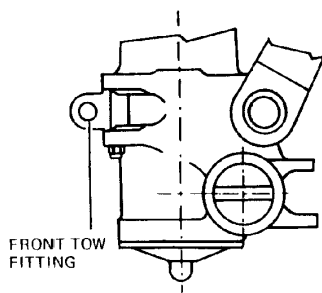
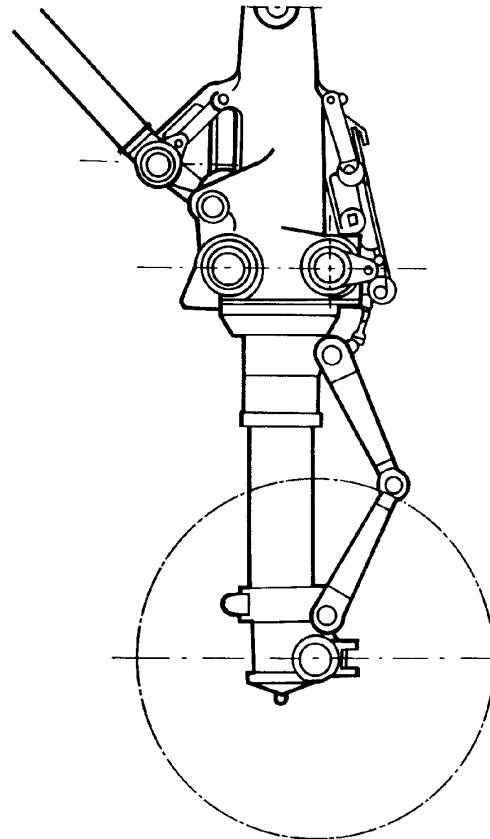
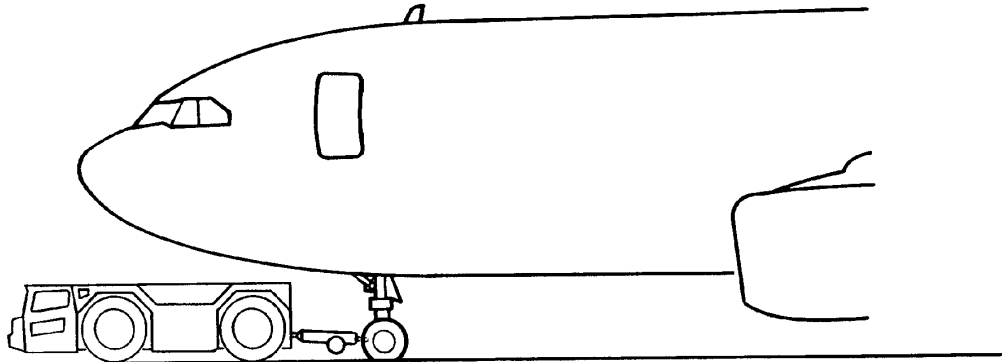
Figure 001Sheet 1

Figure 001. Towing By the Nose Gear(Sheet 1)

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P.Bik EFFECTIVITY: ALL

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Figure 002 Sheet 1

Figure 002. Towing By the Nose Gear (Sheet 1)

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P.Bik EFFECTIVITY: ALL

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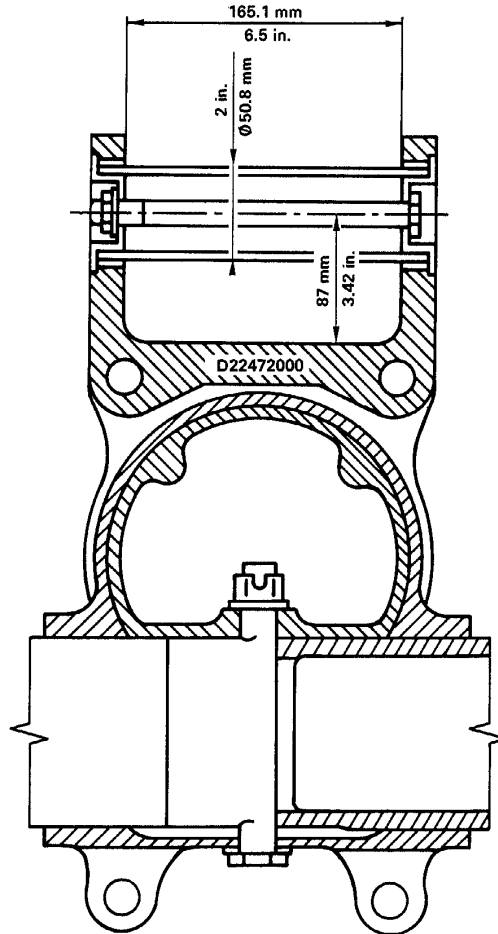


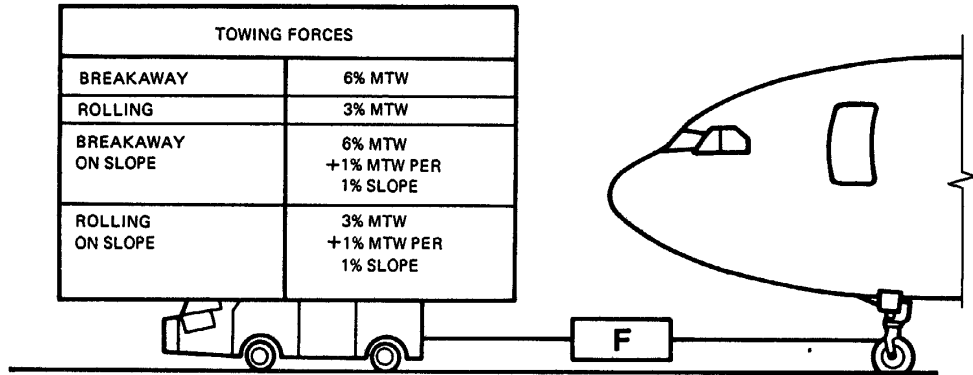
Figure 003 Sheet 1

Figure 003. Nose Gear Tow Fittings (Sheet 1)

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P.Bik EFFECTIVITY: ALL

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DN5

Figure 004 Sheet 1

Figure 004. Towing Forces (Sheet 1)

FED ALL

P.Bik EFFECTIVITY: ALL

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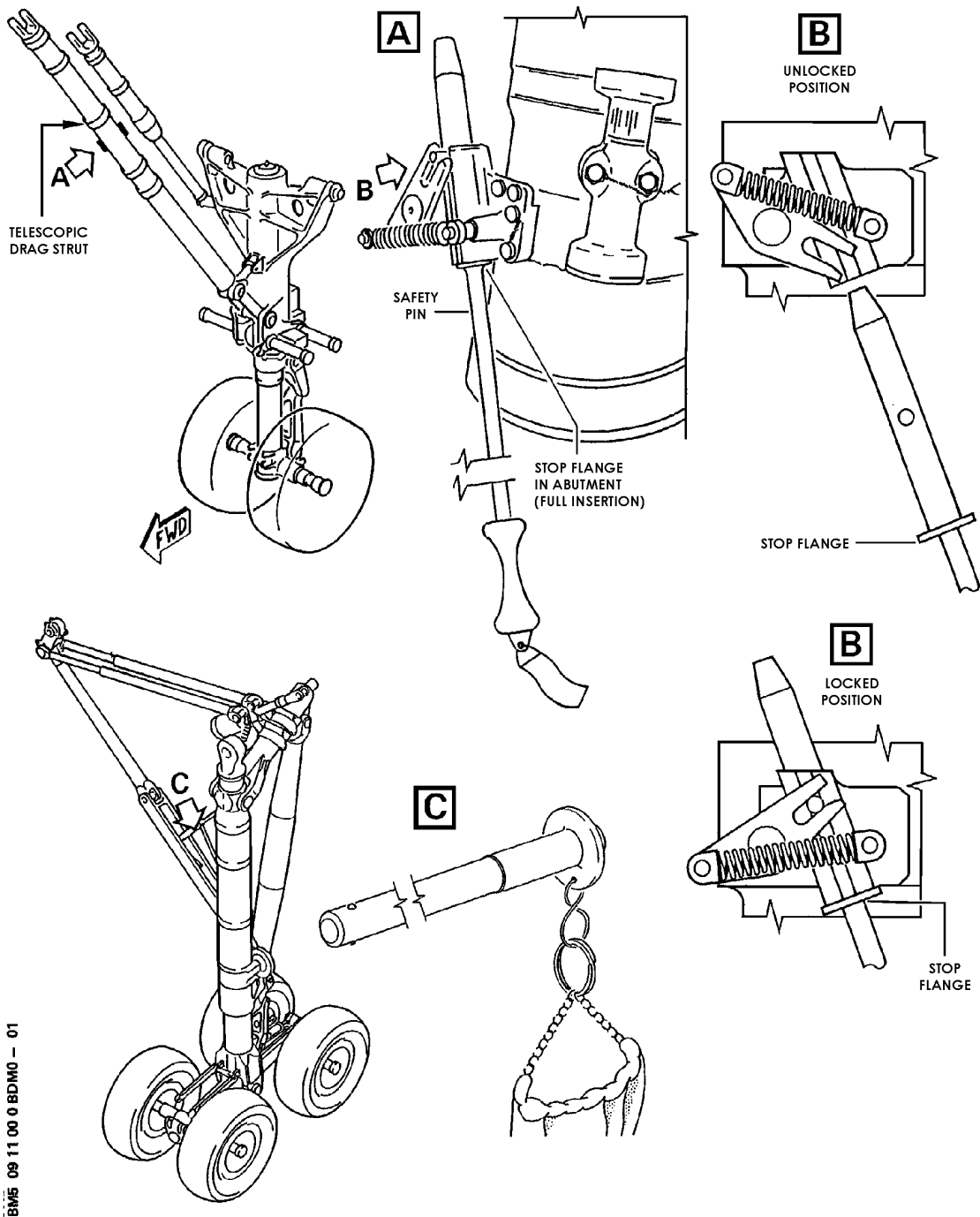


Figure 005Sheet 1
Figure 005. 1(Sheet 1)

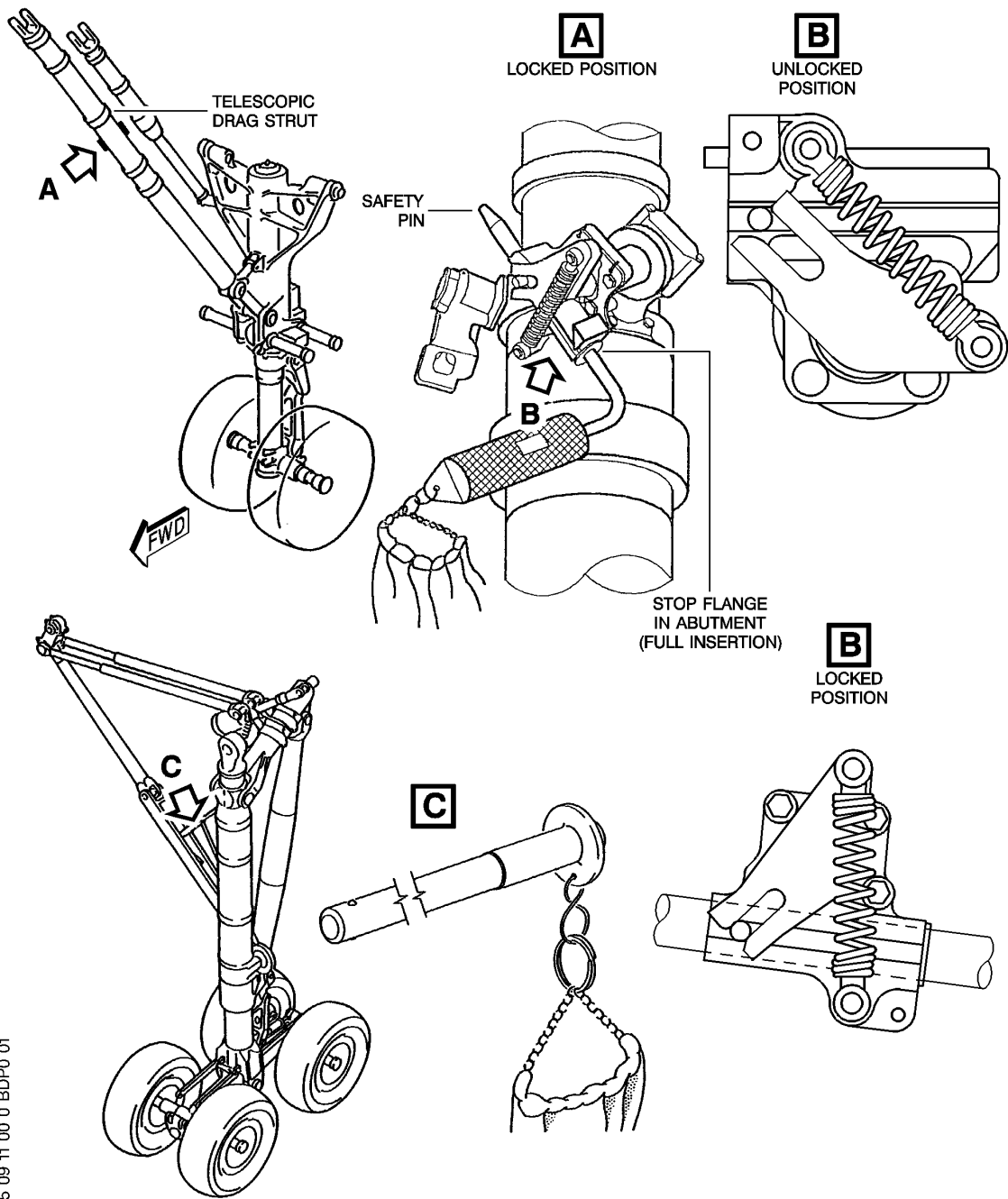
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Figure 006 Sheet 1

Figure 006. Nose and Main Gear Safety Pins (Sheet 1)

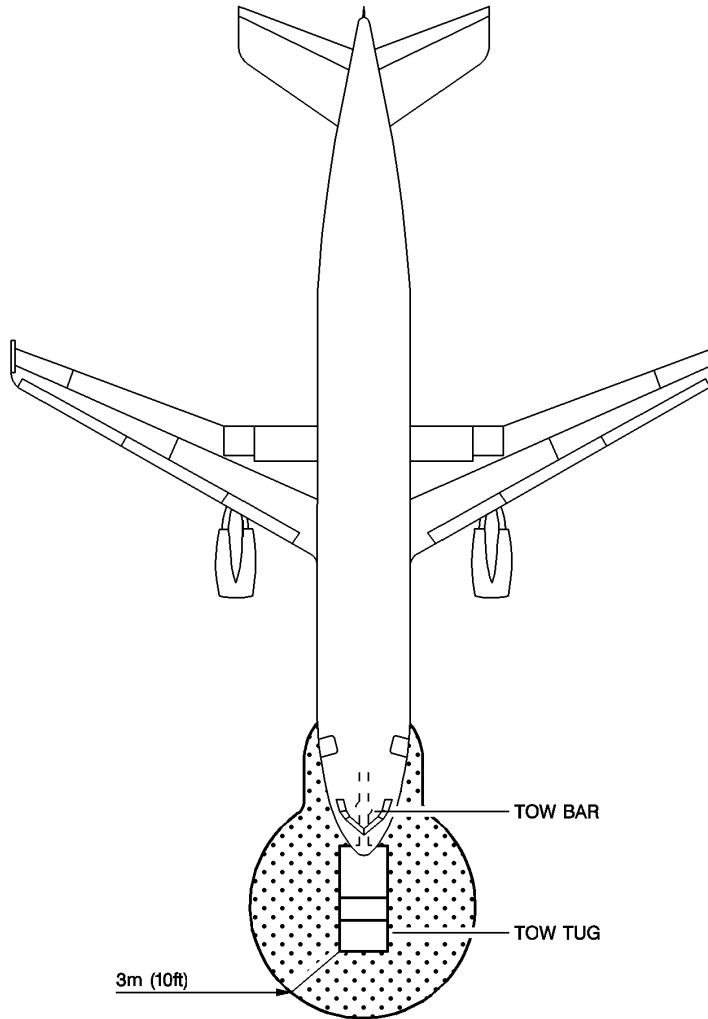
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NOTE : MAINTAIN A MINIMUM OF 3 METERS (10 FEET)
SEPARATION FROM THE NOSE WHEELS,
TOWBAR AND TUG WHILE AIRPLANE IS MOVING.

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Figure 007 Sheet 1

Figure 007. Towing - Hazard Areas (Sheet 1)

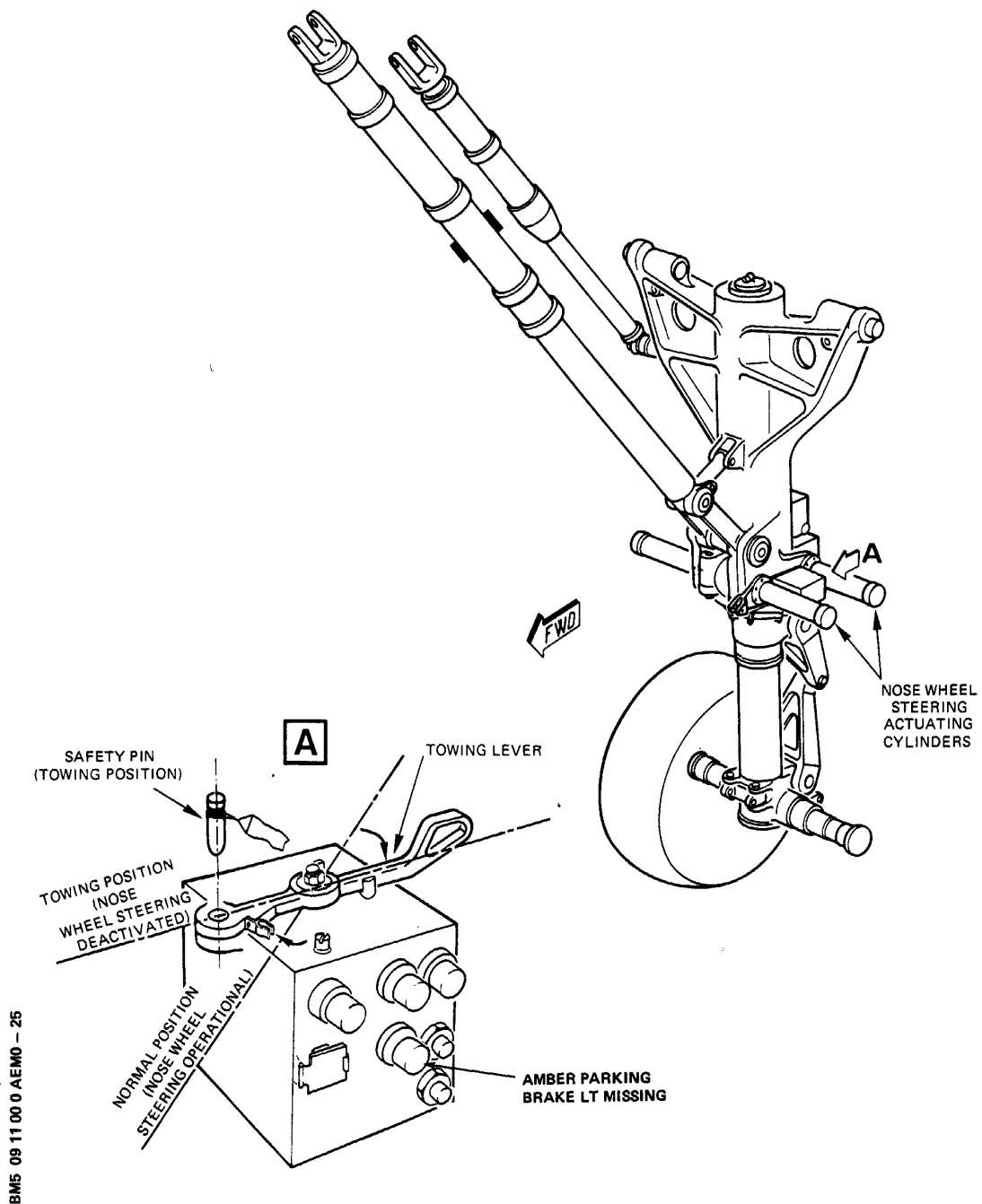
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Figure 008 Sheet 1
Figure 008. Interphone Box (Sheet 1)

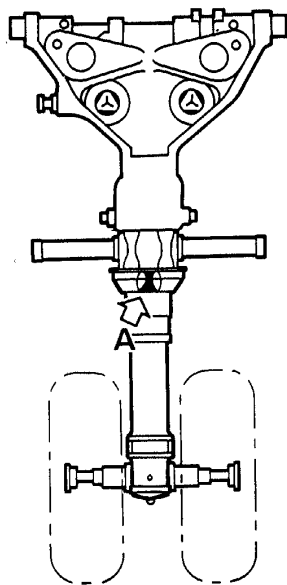
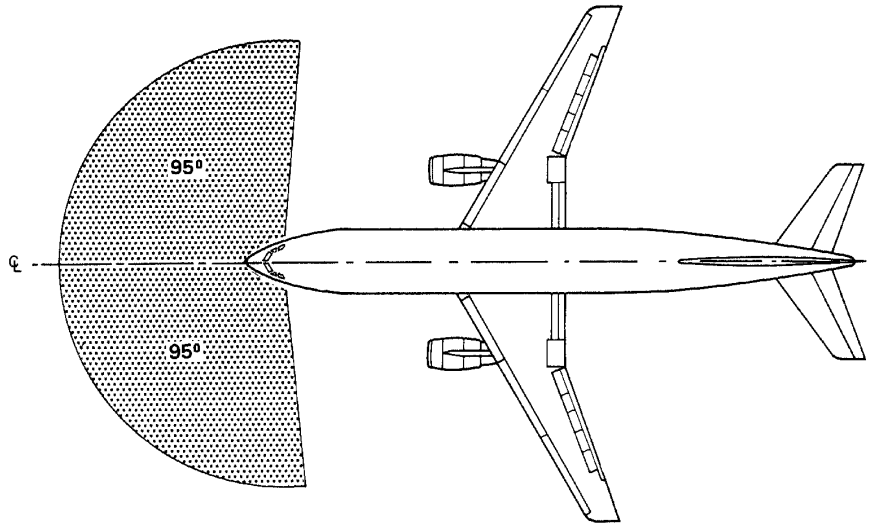
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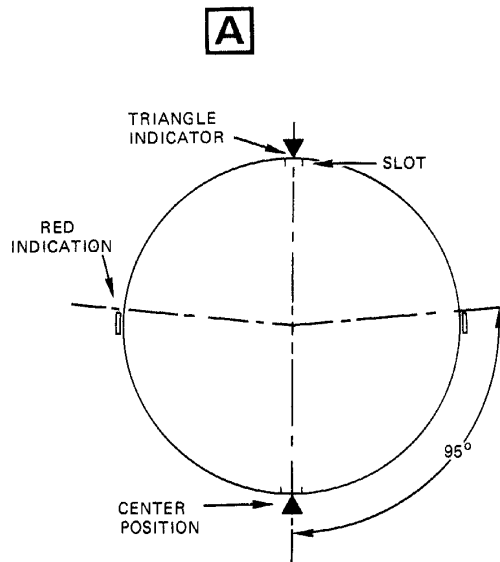


Figure 009 Sheet 1

Figure 009. Towing Angles (Sheet 1)

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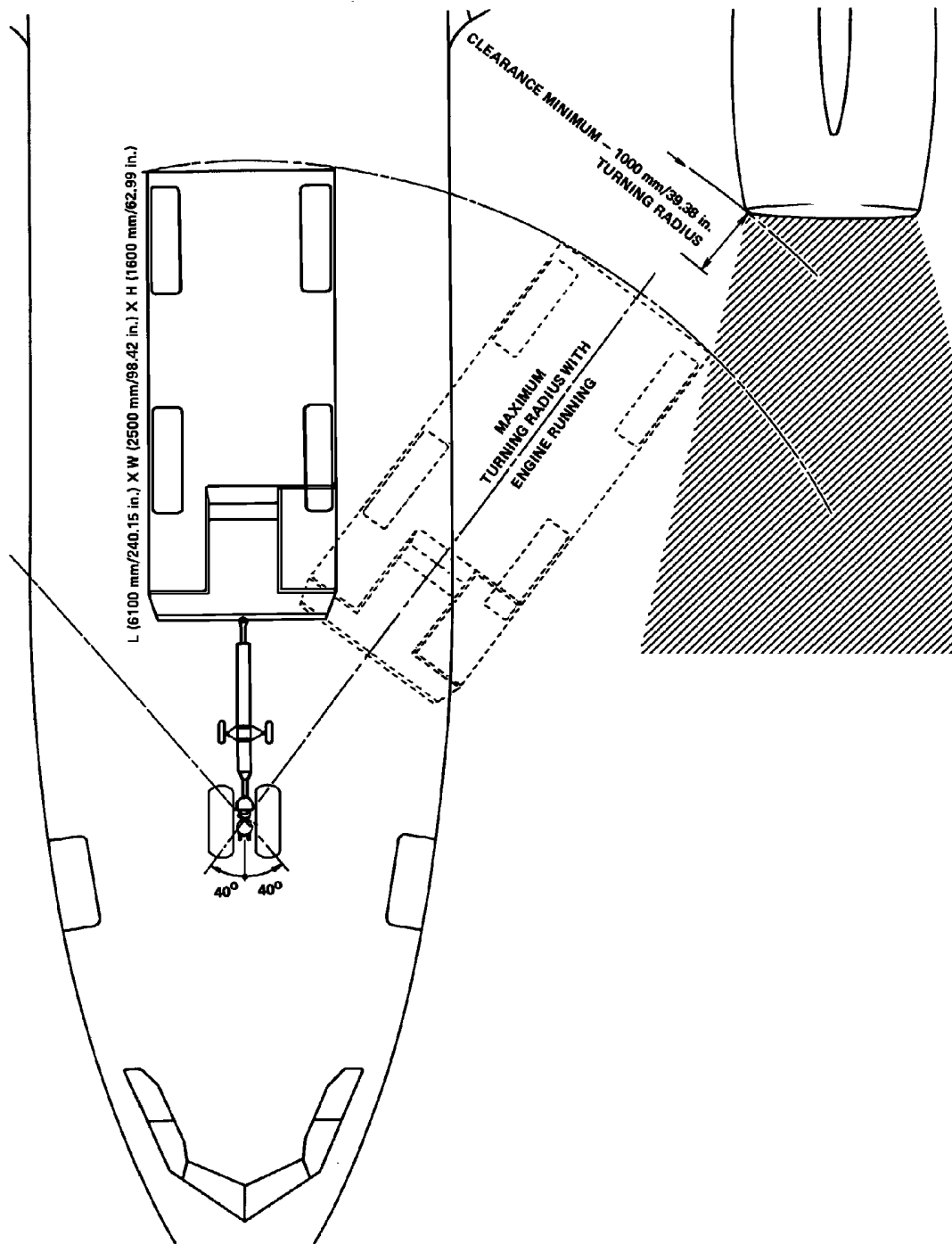


Figure 010Sheet 1

Figure 010. Aircraft Rearward Pulling - Tractor Under Fuselage Aft of Nose Gear(Sheet 1)

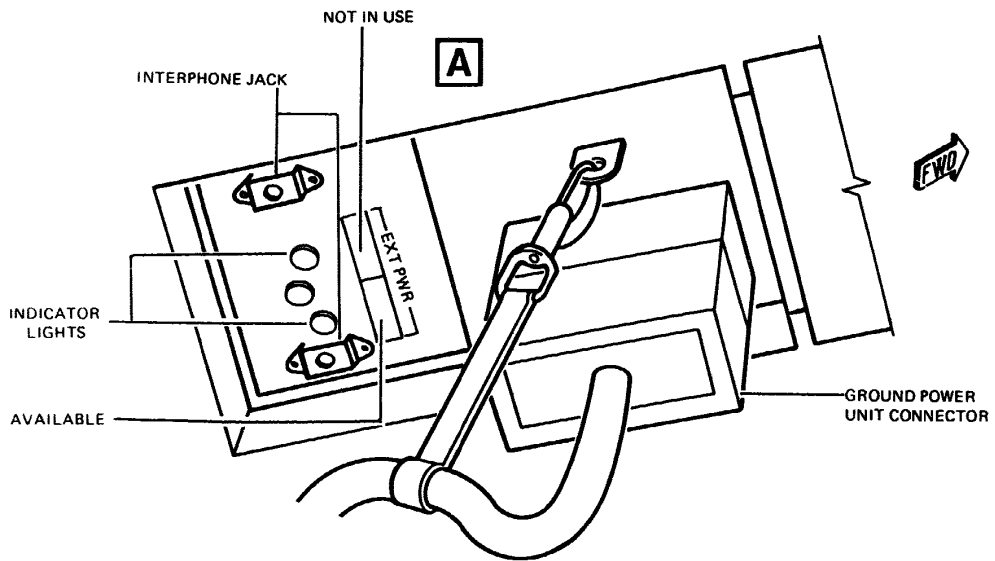
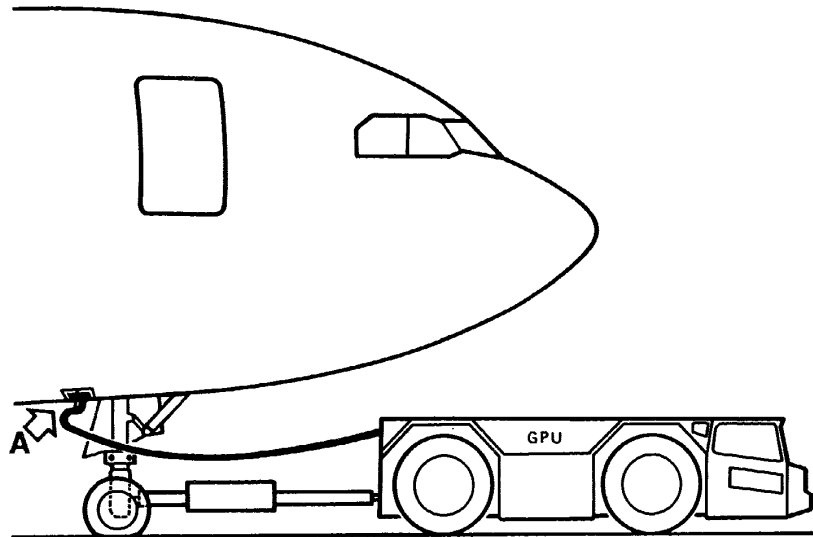
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Figure 011 Sheet 1
 Figure 011. Electrical Supply (Sheet 1)

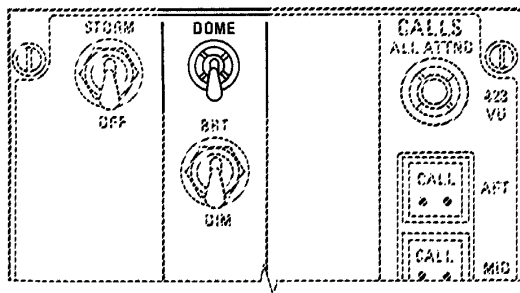
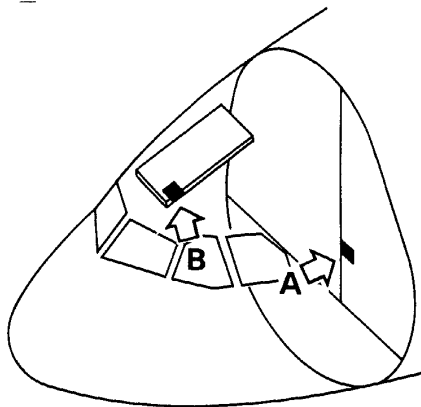
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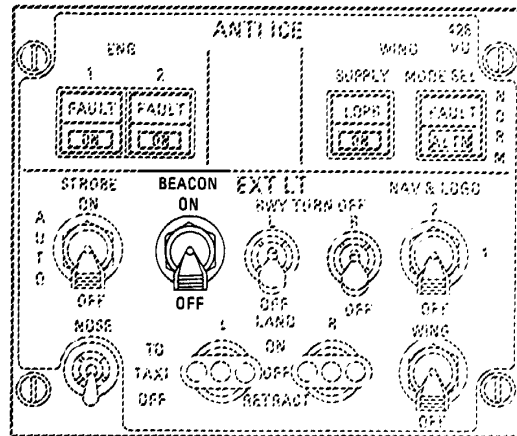
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B



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Figure 012 Sheet 1

Figure 012. Lighting Control Panel (Sheet 1)

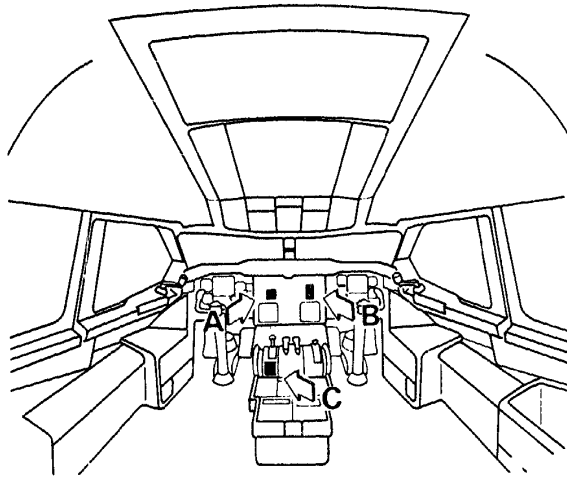
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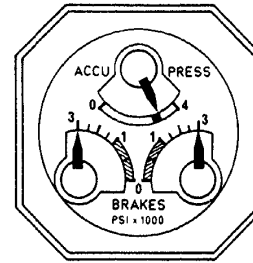
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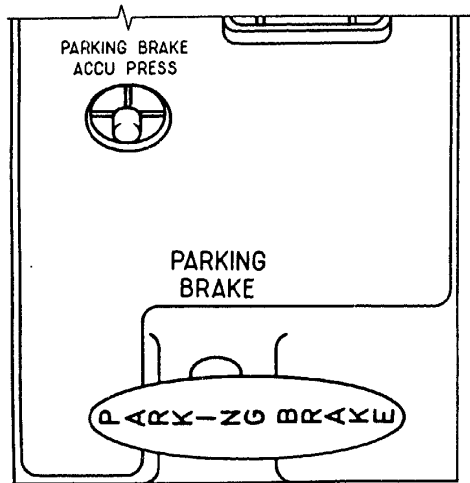
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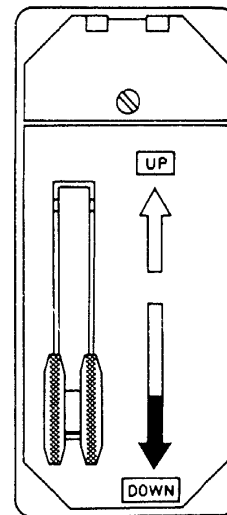
A



C



B



BM5 09 11 00 0 ALTO - 13

Figure 013 Sheet 1

Figure 013. Landing Gear and Brake System (Sheet 1)

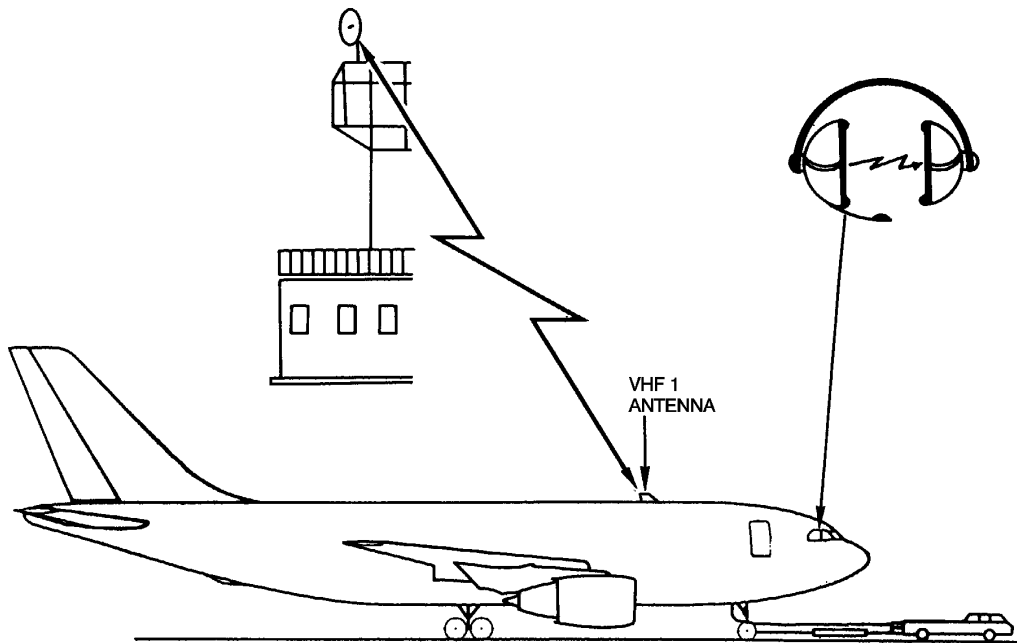
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Figure 014 Sheet 1
Figure 014. VHF System (Sheet 1)

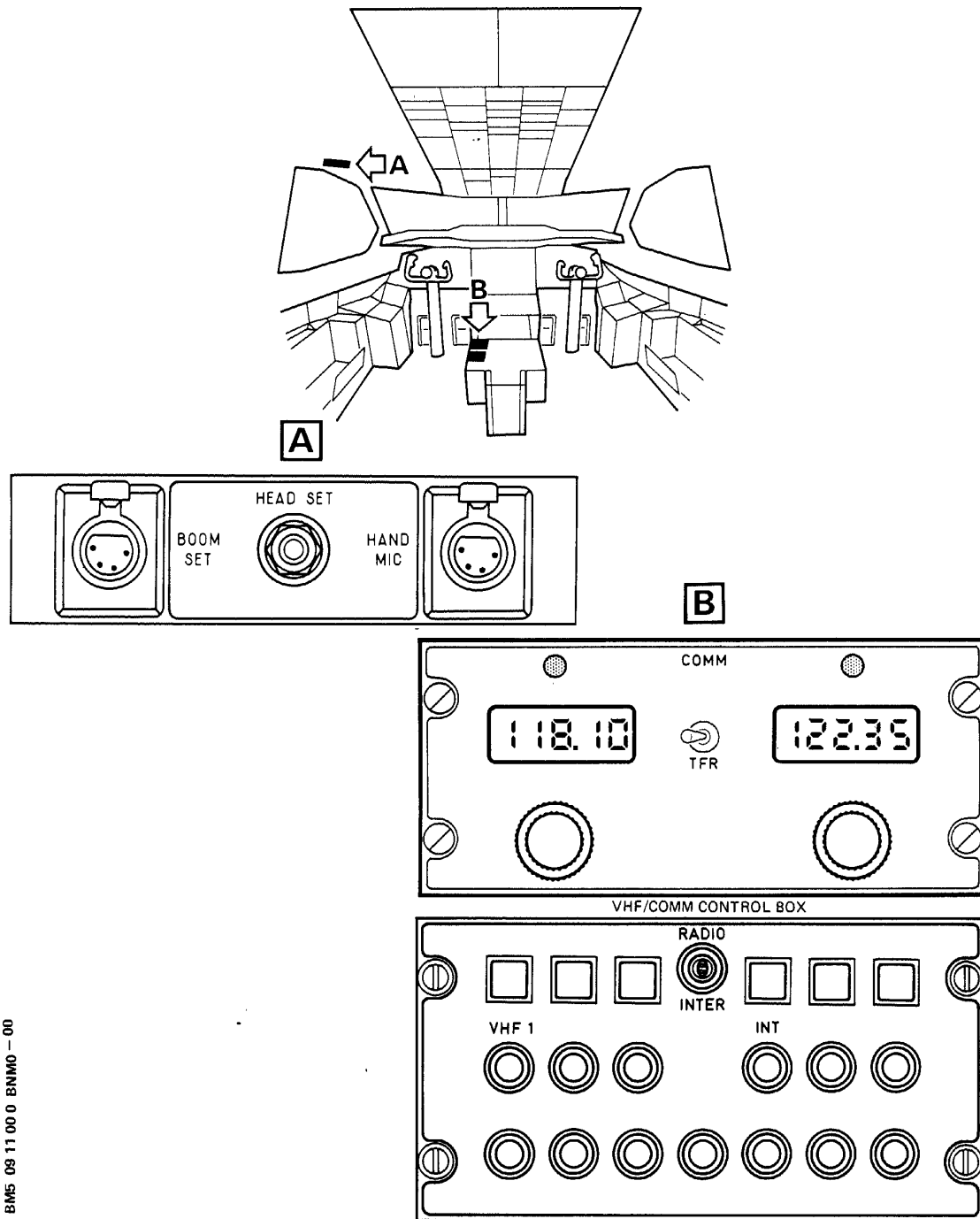
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Figure 015 Sheet 1

Figure 015. VHF System Controls (Sheet 1)

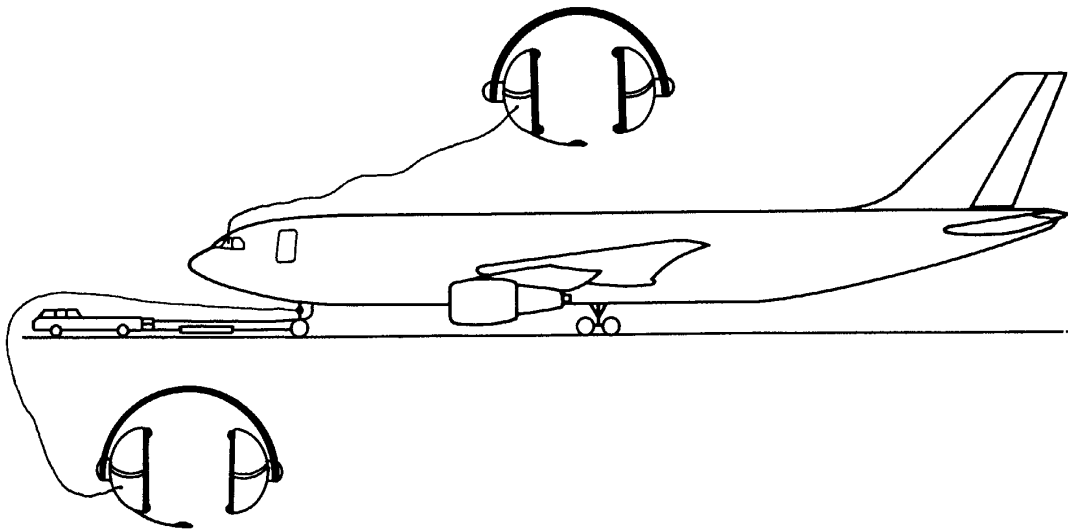
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Figure 016 Sheet 1

Figure 016. Flight Interphone System (Sheet 1)

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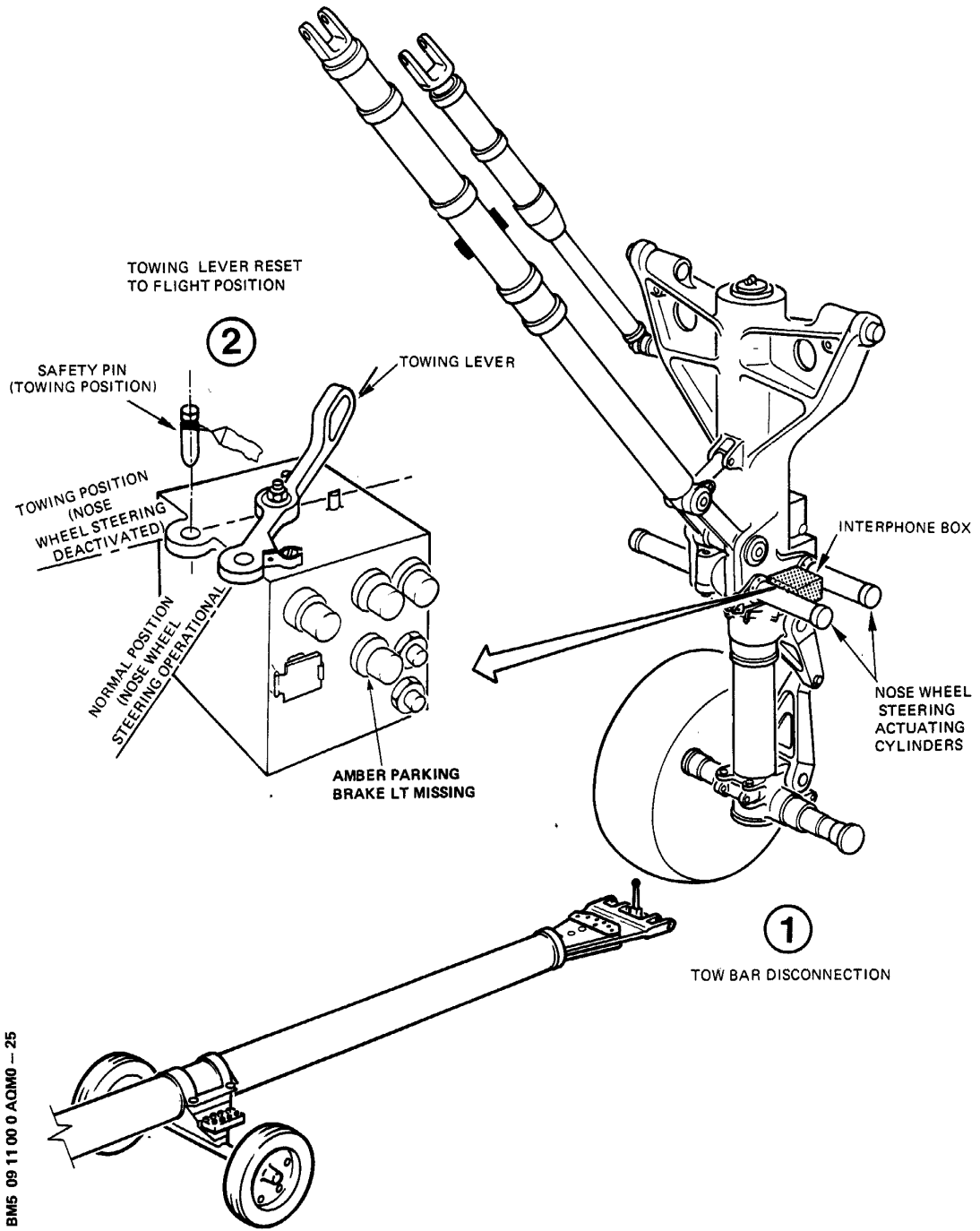


Figure 017 Sheet 1

Figure 017. Tow Bar Disconnection (Sheet 1)

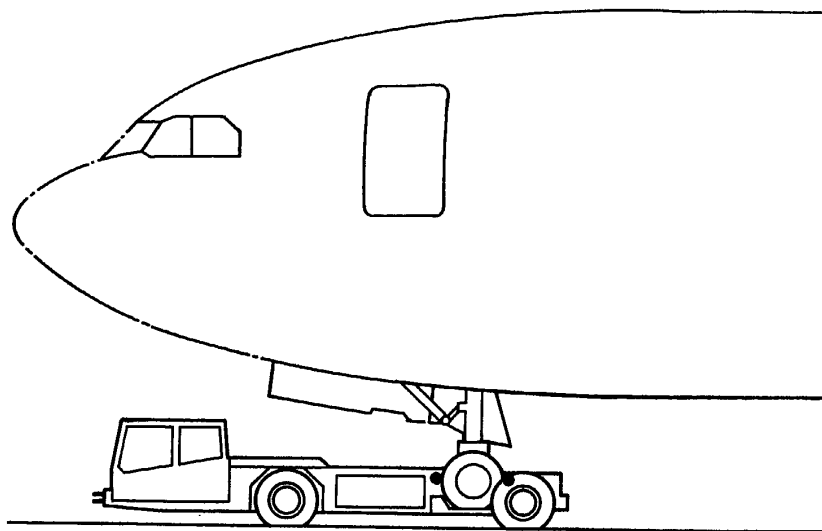
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Figure 018 Sheet 1

Figure 018. Towing by the Nose Gear (Sheet 1)

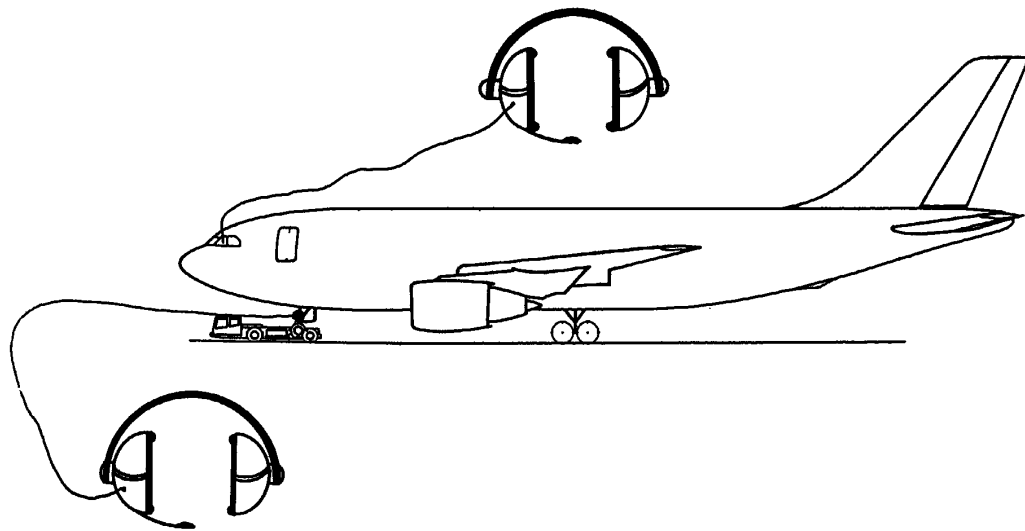
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Figure 019 Sheet 1

Figure 019. Flight Interphone System (Sheet 1)

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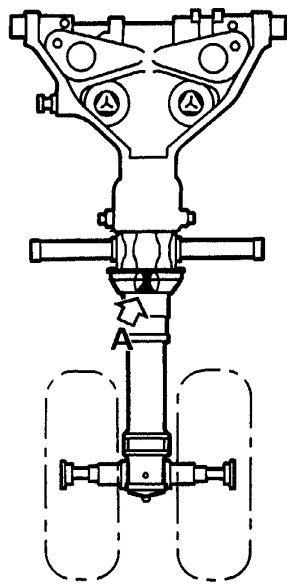
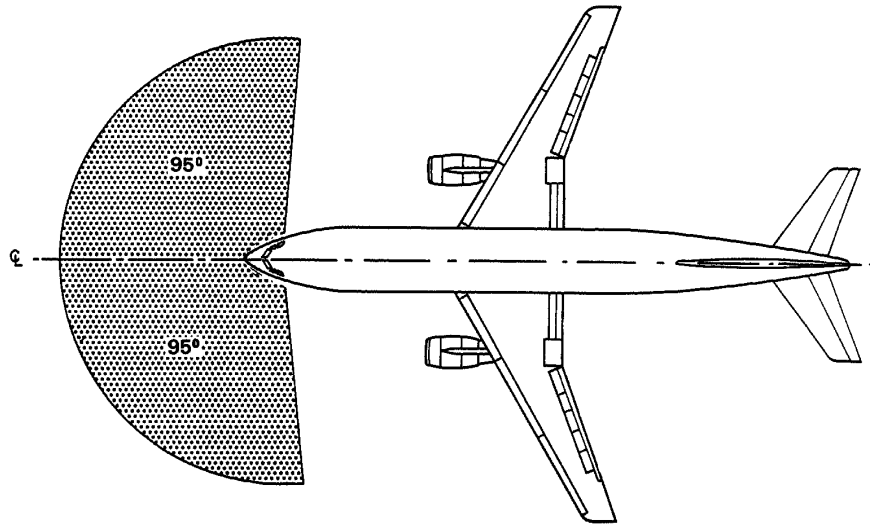
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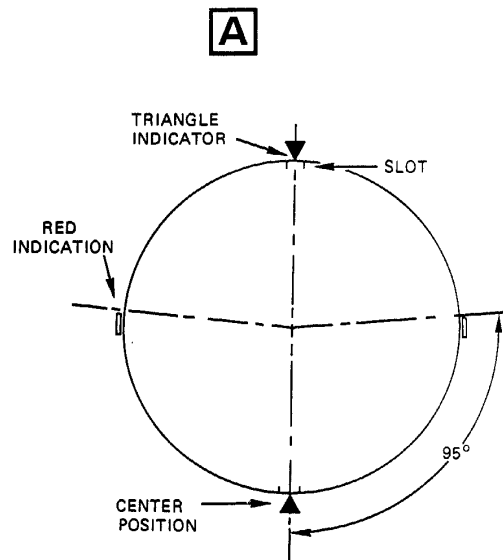


Figure 020 Sheet 1

Figure 020. Towing Angles (Sheet 1)

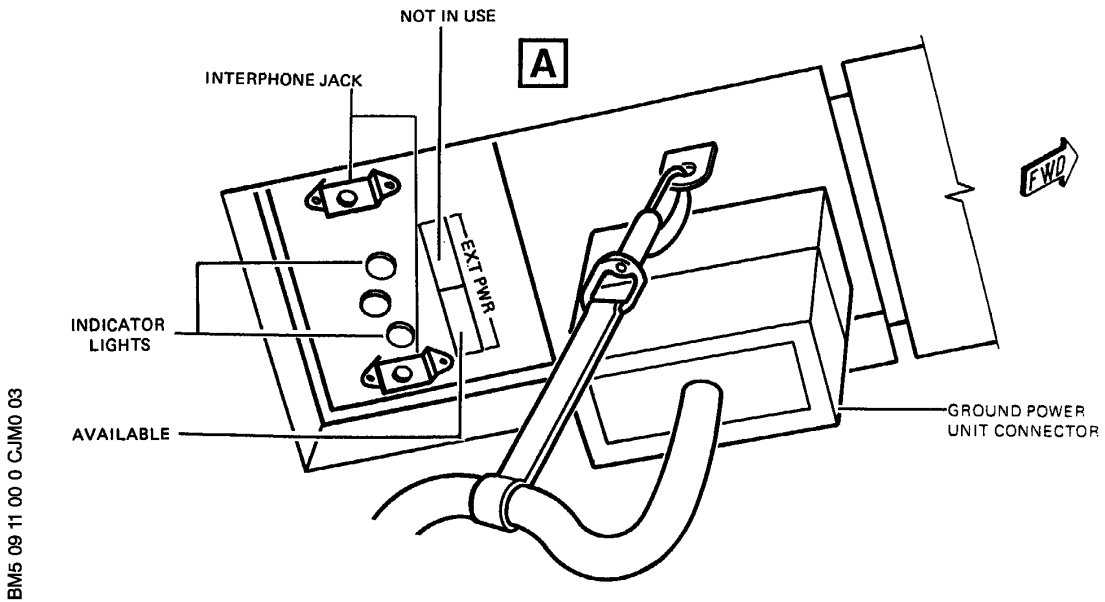
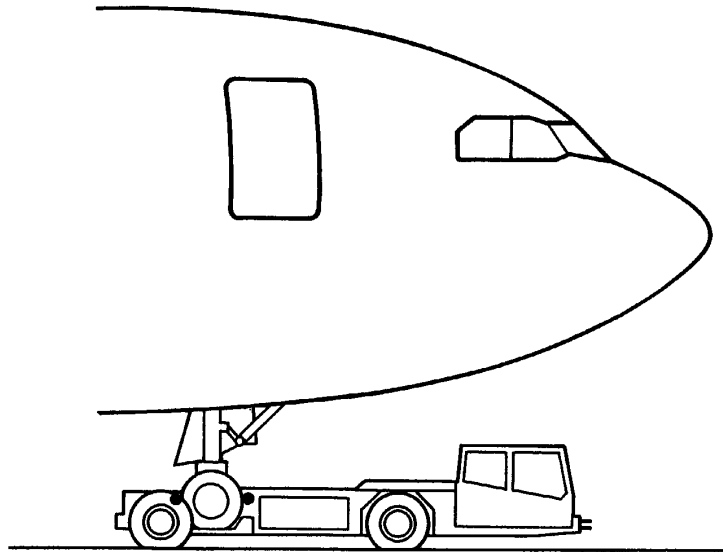
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Figure 021 Sheet 1

Figure 021. Electrical Supply (Sheet 1)

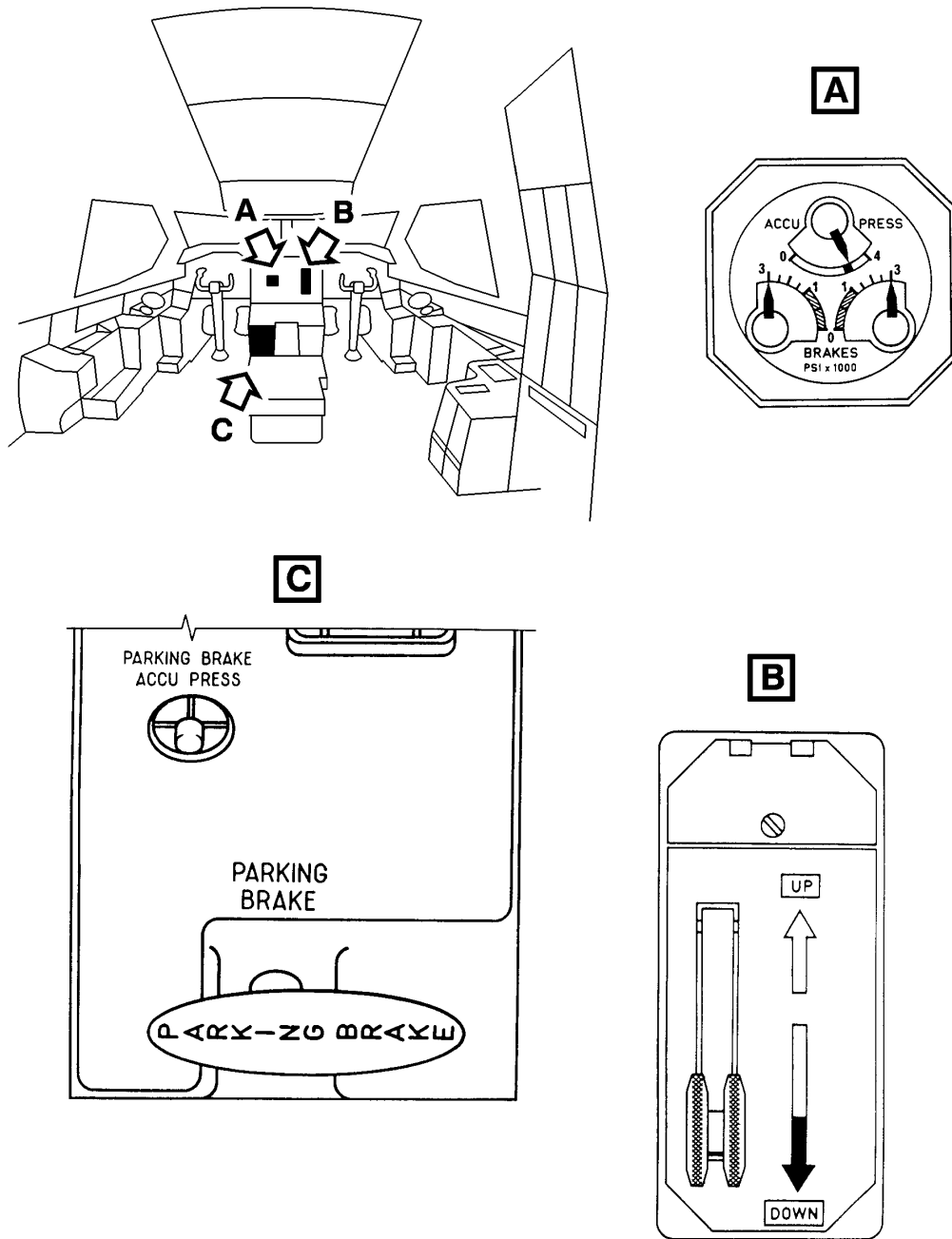
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Figure 022 Sheet 1

Figure 022. Landing Gear and Brake System (Sheet 1)

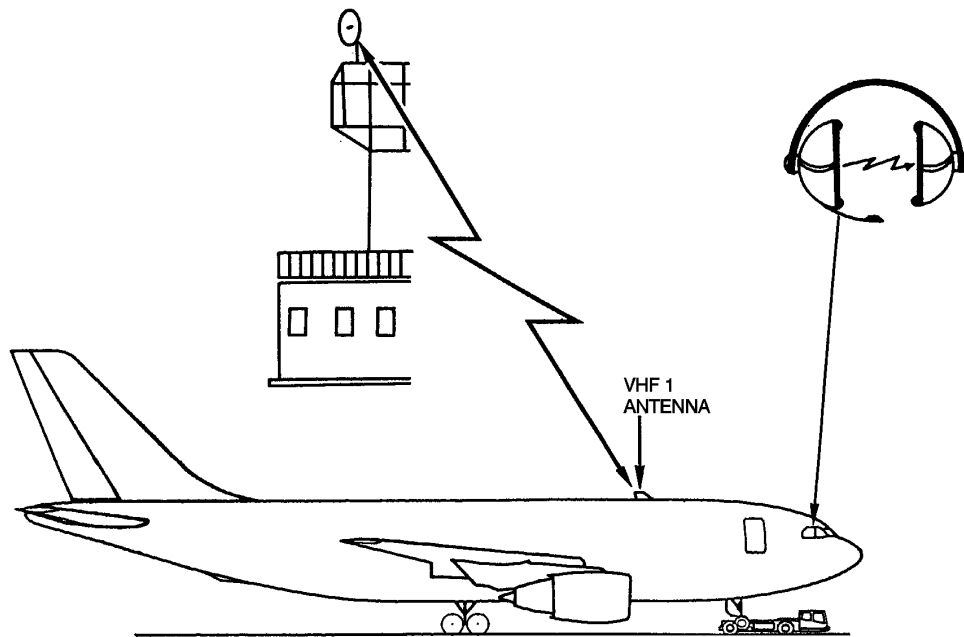
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Figure 023 Sheet 1
Figure 023. VHF System (Sheet 1)

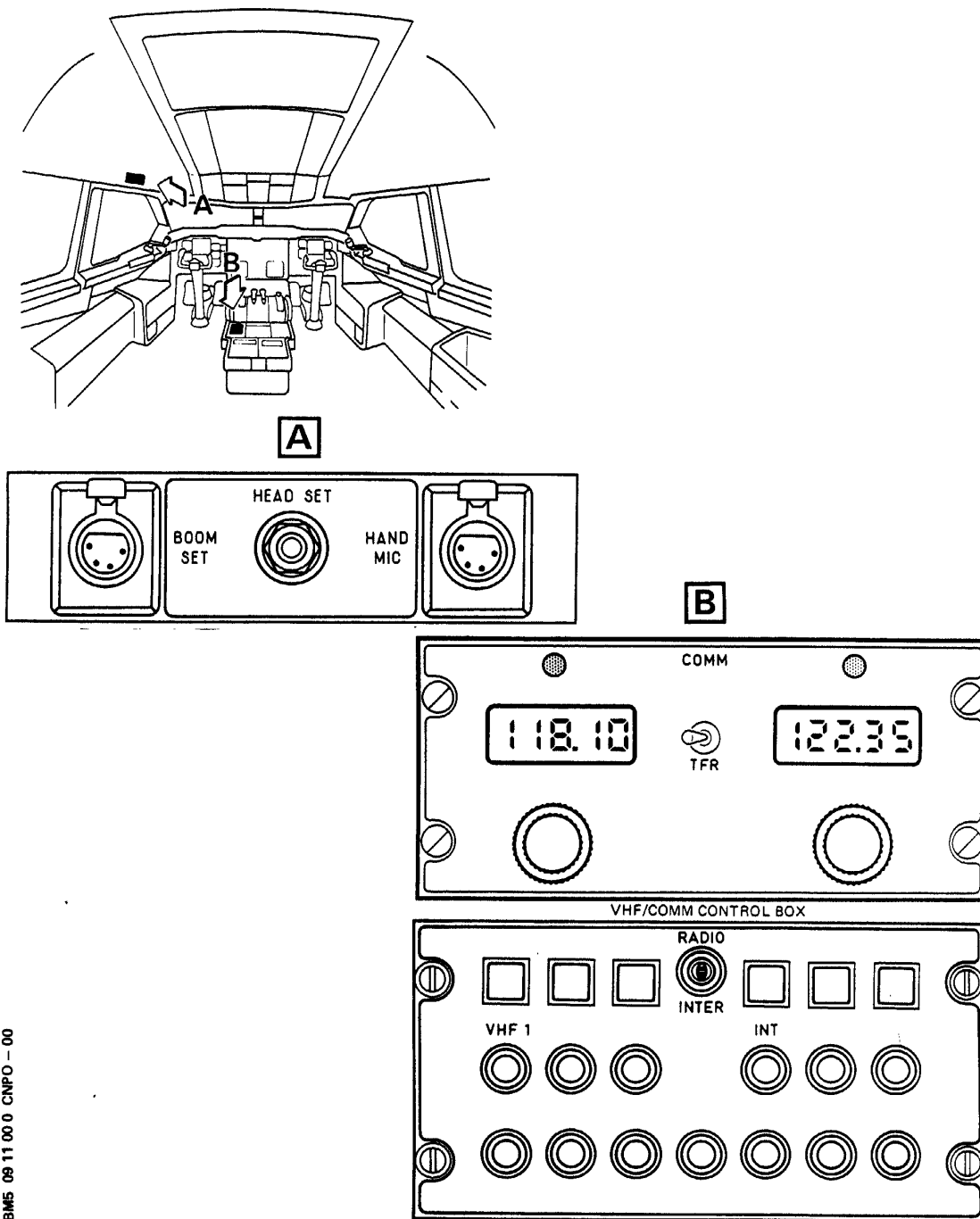
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Figure 024 Sheet 1

Figure 024. VHF System Controls (Sheet 1)

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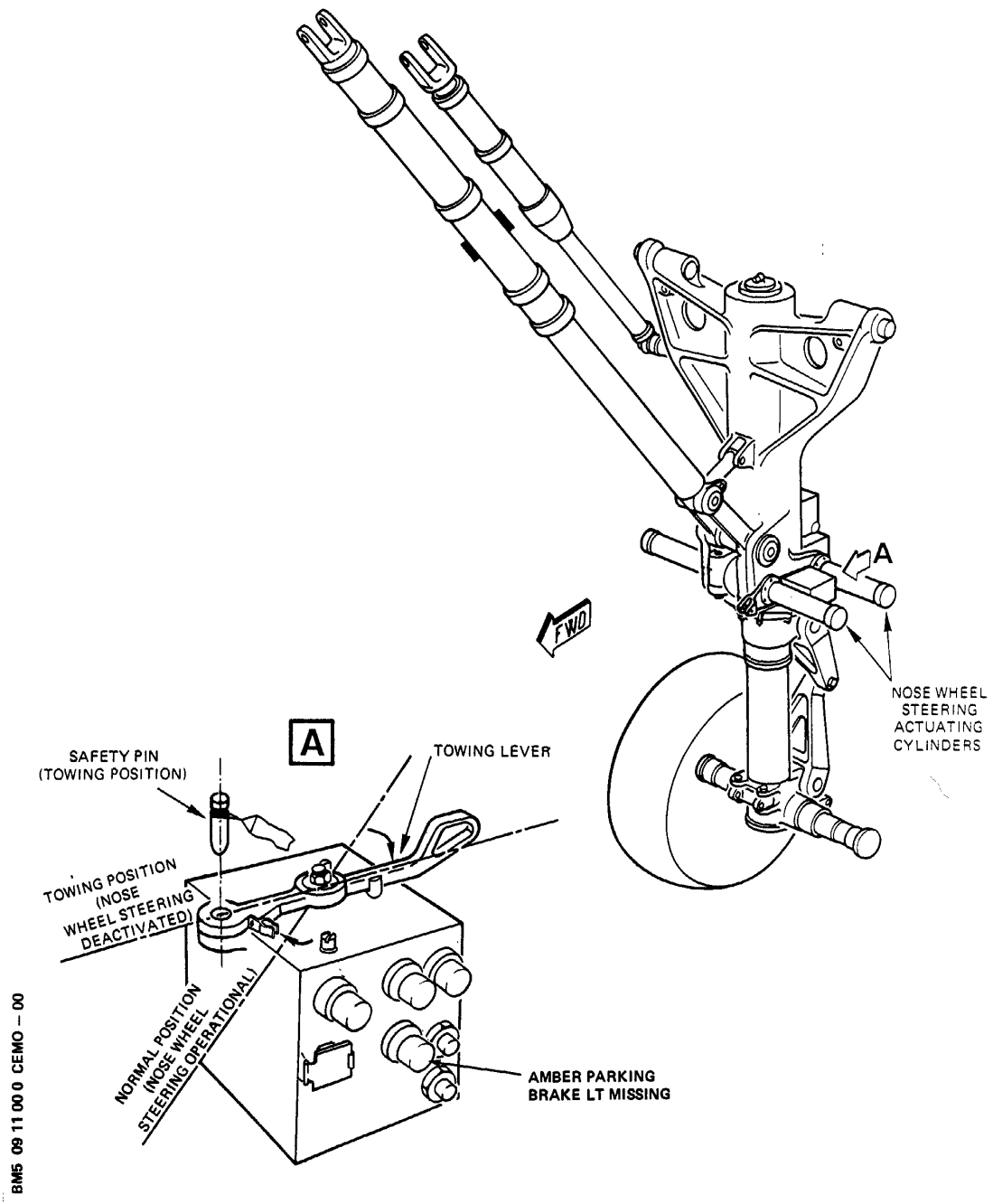


Figure 025Sheet 1
Figure 025. Interphone Box(Sheet 1)

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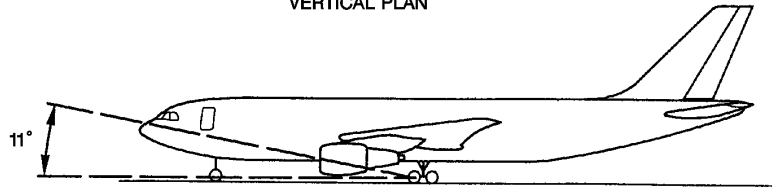
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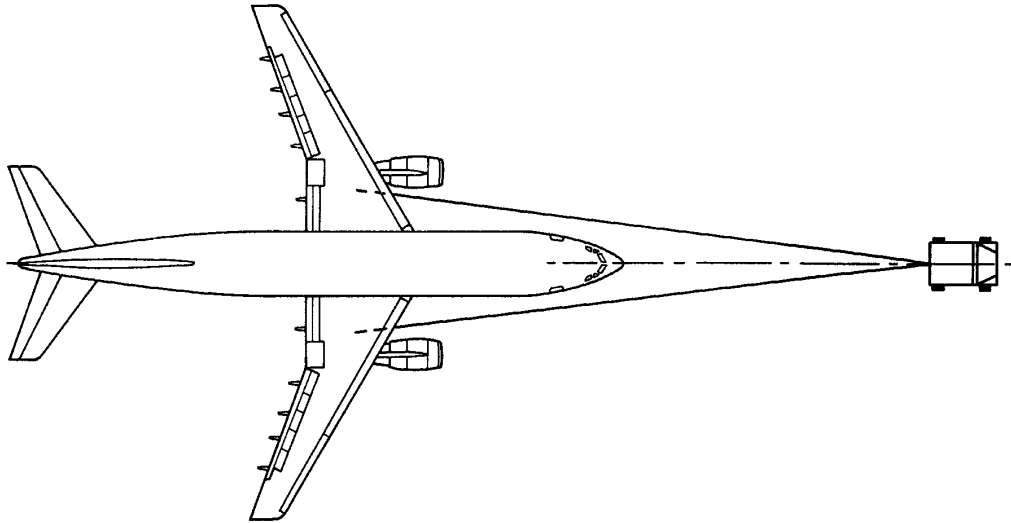
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VERTICAL PLAN



HORIZONTAL PLAN



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Figure 026Sheet 1

Figure 026. Installation of Towing Cable(Sheet 1)

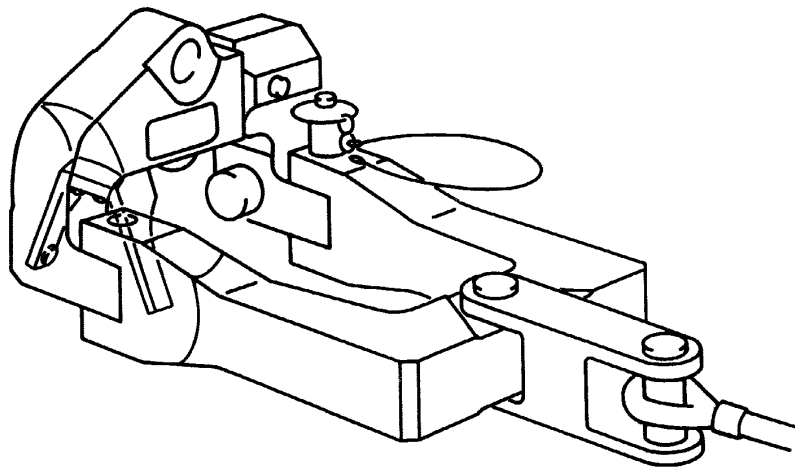
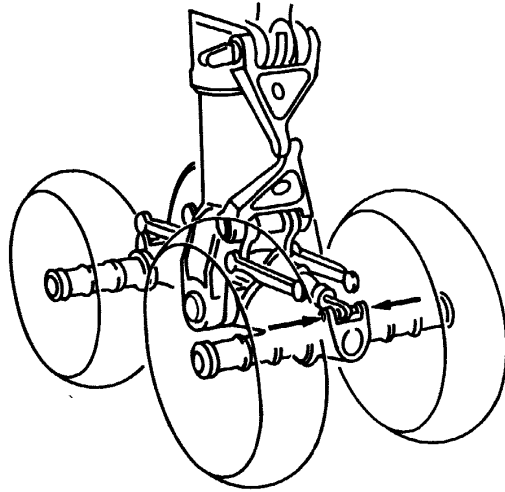
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Figure 027Sheet 1
Figure 027. VHF System(Sheet 1)

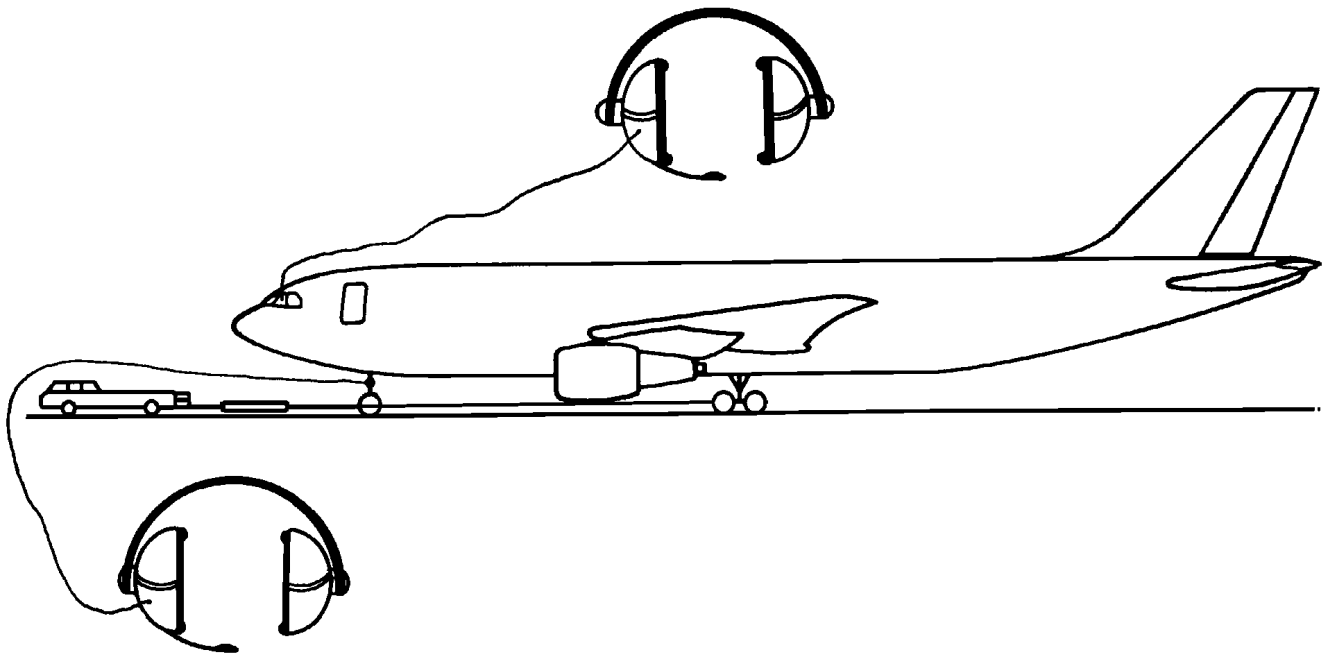
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Figure 028Sheet 1
Figure 028. Flight Interphone System(Sheet 1)

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P.Bik EFFECTIVITY: ALL

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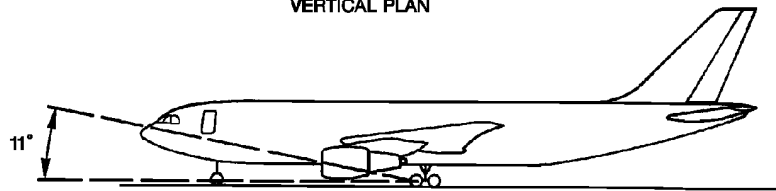
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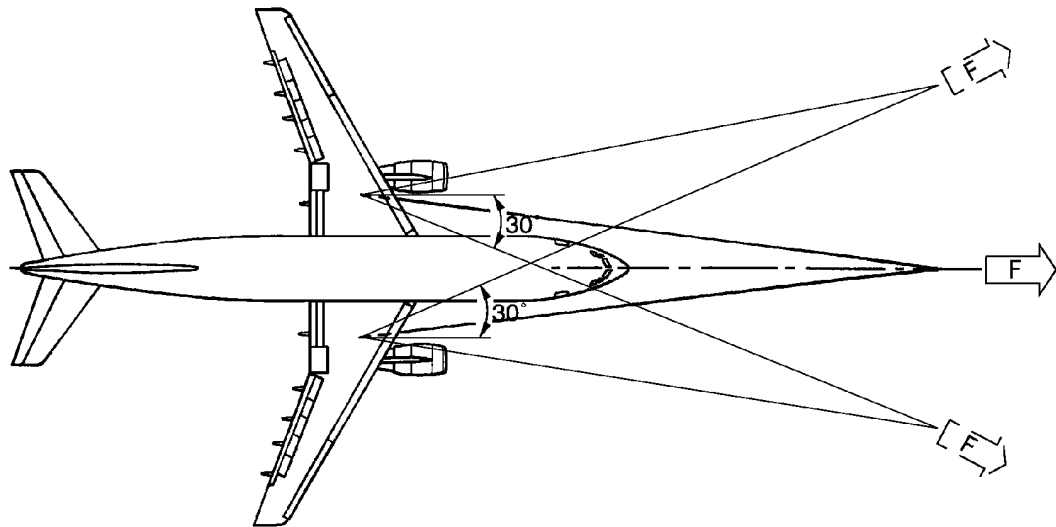
TOWING FORCES F	
BREAKAWAY	6% MTW
ROLLING	3% MTW
BREAKAWAY ON SLOPE	6% MTW +1% MTW PER 1% SLOPE
ROLLING ON SLOPE	3% MTW +1% MTW PER 1% SLOPE

MTW: MAXIMUM TAXI WEIGHT

VERTICAL PLAN



HORIZONTAL PLAN



BM5 09 11 00 0 BRMD 02

Figure 029Sheet 1

Figure 029. Towing with the Main Landing Gear from the Front(Sheet 1)

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P.Bik EFFECTIVITY: ALL

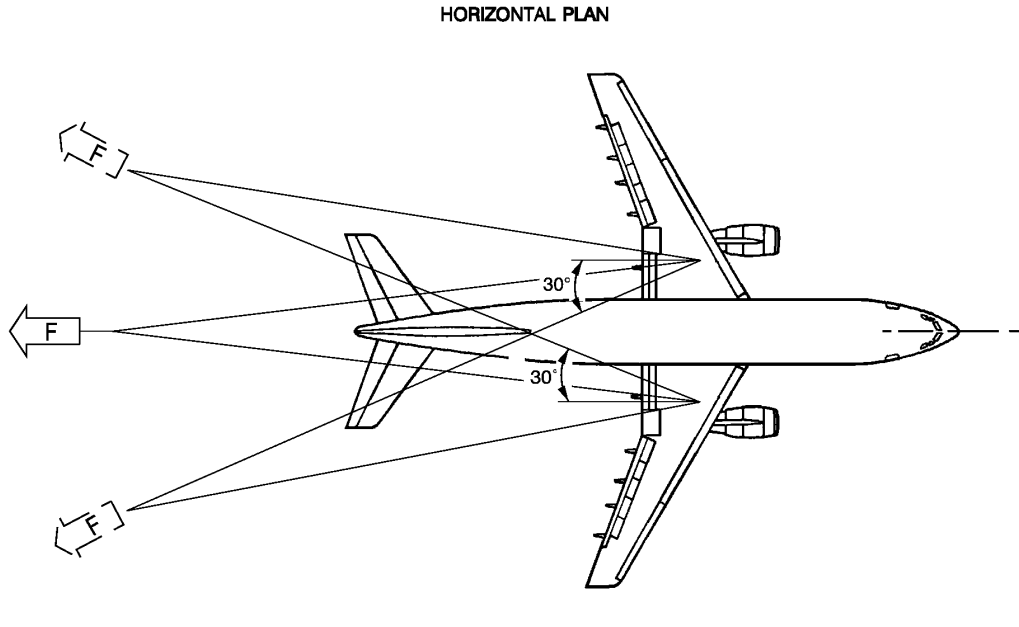
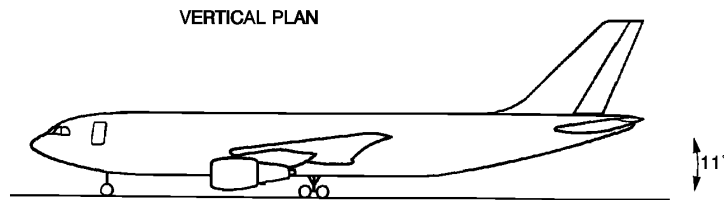
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TOWING FORCES F	
BREAKAWAY	6% MTW
ROLLING	3% MTW
BREAKAWAY ON SLOPE	6% MTW +1% MTW PER 1% SLOPE
ROLLING ON SLOPE	3% MTW +1% MTW PER 1% SLOPE

MTW: MAXIMUM TAXI WEIGHT



BMS 09 11 00 0 LKMO 00

Figure 030Sheet 1

Figure 030. Towing with the Main Landing Gear from the Rear(Sheet 1)

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