AIRBUS

C-295M
VT01 VERSION

FUNCTIONAL CHECK FLIGHTS AFTER MAINTENANCE ACTIONS INSTRUCTIONS HANDBOOK

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Keep this record in the first pages of the Manual immediately after the standard revisions record. When you receive the Temporary Revisions, insert them in the Manual and make the applicable entries in this record.

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1. Instructions

This Handbook contains the circumstances which require verification of maintenance actions to be performed by the accomplishment of a functional check flight and the description of such functional checks. These checks must only be performed after the required ground functional checks have been performed.

To ensure that appropriate levels of safety are maintained, the check flight should be conducted by pilots who have satisfactory experience with the check flight schedule and have received adequate familiarization of check flight techniques and safety precautions. Therefore, it is strongly recommended that manoeuvres are to be carried on by a Qualified Maintenance Check Pilot.

This Handbook must be used in conjunction with the relevant Aircraft Flight Manual and Aircraft Operations Manual.

2. Introduction

The following maintenance actions require a functional verification in flight:

A. Replacement of one or both outboard wings.

B. Replacement of rudder, rudder trim motor or the servo tab mechanism.
In the case of replacement of the rudder trim motor, the flight check is not required when the maximum deflections of the trim surfaces had been measured and recorded with the replaced motor and then those values set for the new motor after replacement.

C. Replacement of one or both elevators, elevator trim motors or servo tab mechanisms.
In the case of replacement of any trim motor, the flight check is not required when the maximum deflections of the affected surfaces had been measured and recorded with the replaced motor and then those values set for the new motor after replacement.

NOTE: In case of servo tab mechanism replacement or any modification of its installation, before first flight after maintenance, 2 turns shall be applied to shorten linking rod of ELEVATOR SERVO TAB once adjustment to zero as per design in the flight controls has been performed.

D. Replacement of one or both engines, propellers, RGBs or pitch angle actuators.

E. Instructions in a Service Bulletin.

F. Replacement of one or both AOA cones.

2. Flight Checks to be Performed

The following table includes the checks to be performed after each abovementioned maintenance action. A full description is provided hereafter.

	Par.	A	B	C	D	E	F
Longitudinal Characteristics. Trim	2.1	**X**		**X**		According To Service Bulletin	
Stalls and Stall Warning Check	2.2	**X**					**X**
Lateral-Directional Characteristics. Trim	2.3	**X**	**X**				
Engine Verification	2.4				**X**		
Anti-icing and de-icing system Checks	2.5	**X**			**X**		

Take Off conditions for the check flight, when Longitudinal or Lateral-Directional Characteristics, Stall and Stall Warning checks must be performed, will be as follows:

FUEL: Main Tanks: Full.
Auxiliary Tanks: As required (according to ballast required for C.G. setting).

WEIGHT: 15500 KG. ± 500 KG., 16500 KG. ± 500 KG., 17500 KG. ± 500 KG. or 18500 KG. ± 500 KG. (depending on aircraft weight, all of them are valid).

C.G.: 22 % ± 0.25 % M.A.C.

To perform these checks, the aircraft weight, must be: “Operational Empty weight + Crewmembers + Full Main tanks + minimum ballast to reach the required CG position”. This must be the weight used to choose the chart to be used in the flight check and it is only necessary to use one chart.

When loading the aircraft to obtain the required conditions, the following recommendations can be taken into account:

- To obtain the required CG it is important to load minimum ballast.
- Auxiliary tanks can be used to reach the flight check area.
- Difference between these weights and the ones of the charts is to consider fuel consumption to reach checks area.

For the rest of Maintenance Actions, the flight can be performed with any within limits Weight and CG.

All the check points specified on each paragraph need to be fulfilled in order to guarantee the compliance of the aircraft characteristics with the requirements in this specific area.

2.1. Longitudinal Characteristics. Trim.

NOTE: During the TO phase, to avoid excursions due to trim tabs misadjustments, the pilot may need to correct any aircraft tendency in pitch, roll or yaw.

2.1.1. Longitudinal Trim in Cruise configuration.

- Stabilize and trim the airplane in a level flight attitude between 15000 ft and 10000 ft, flaps UP, Landing Gear UP, PRS at CRZ1, and Power for Level Flight with the following indicated Torque settings: MAX-CRZ1, 50%-CRZ1, 40%-CRZ1 and 30%-CRZ1.

  Record the following data:

	MAX-CRZ1	50%TQ CRZ1	40%TQ CRZ1	30%TQ CRZ1
Elevator TRIM				
Airspeed (KIAS)				

Checks during stabilizations:

1. Elevator trim positions must be within limits established in Figure 2.1.1 (thick lines, nominal values; thin lines, up/low limits), according to actual aircraft weight.

2.1.2. Longitudinal Trim in Landing configuration

- Stabilize and trim the airplane in a level flight attitude between 15000 ft and 10000 ft, flaps DN, Landing Gear DOWN, PRS at CRZ1, and Power for Level Flight with the following indicated Torque settings: 70%-CRZ1 (or MAX-CRZ1, whichever is lesser), 50%-CRZ1 and 40%-CRZ1.

  Record the following data:

	70%TQ CRZ1	50%TQ CRZ1	40%TQ CRZ1
Elevator TRIM			
Airspeed (KIAS)			

Checks during stabilizations:

1. Elevator trim positions must be within limits established in Figure 2.1.1, according to actual aircraft weight.

   NOTE: Take into account that PRS position indicator will be flashing in the IEDS when PRS is selected out of TOGA position with flaps DOWN.

2.1.3. Required Maintenance Actions

In case the recorded values are outside the specific limits, proceed as follows:

a) The measured trim curve prints over the admitted tolerance range.
Actuate to shorten the linking rod of both (outboard left and right hand side) servo-tabs by means of turning the rod's end terminal a half turn per each cockpit half unit deviation from the nominal curve up to a maximum of 2 complete turns.

b) The measured trim curve prints under the admitted tolerance range.
Actuate to lengthen the linking rod of both (outboard left and right hand side) servo-tabs, by means of turning the rod's end terminal a half turn per cockpit half unit deviation from the nominal curve up to a maximum of 2 complete turns.

Flaps UP (0), Landing Gear UP & Flap DN (23), Landing Gear DOWN
2 Engines
P.L.F-CRZ1
WEIGHT: 15000 KG ± 500 KG
CG: 22%±1% M.A.C.

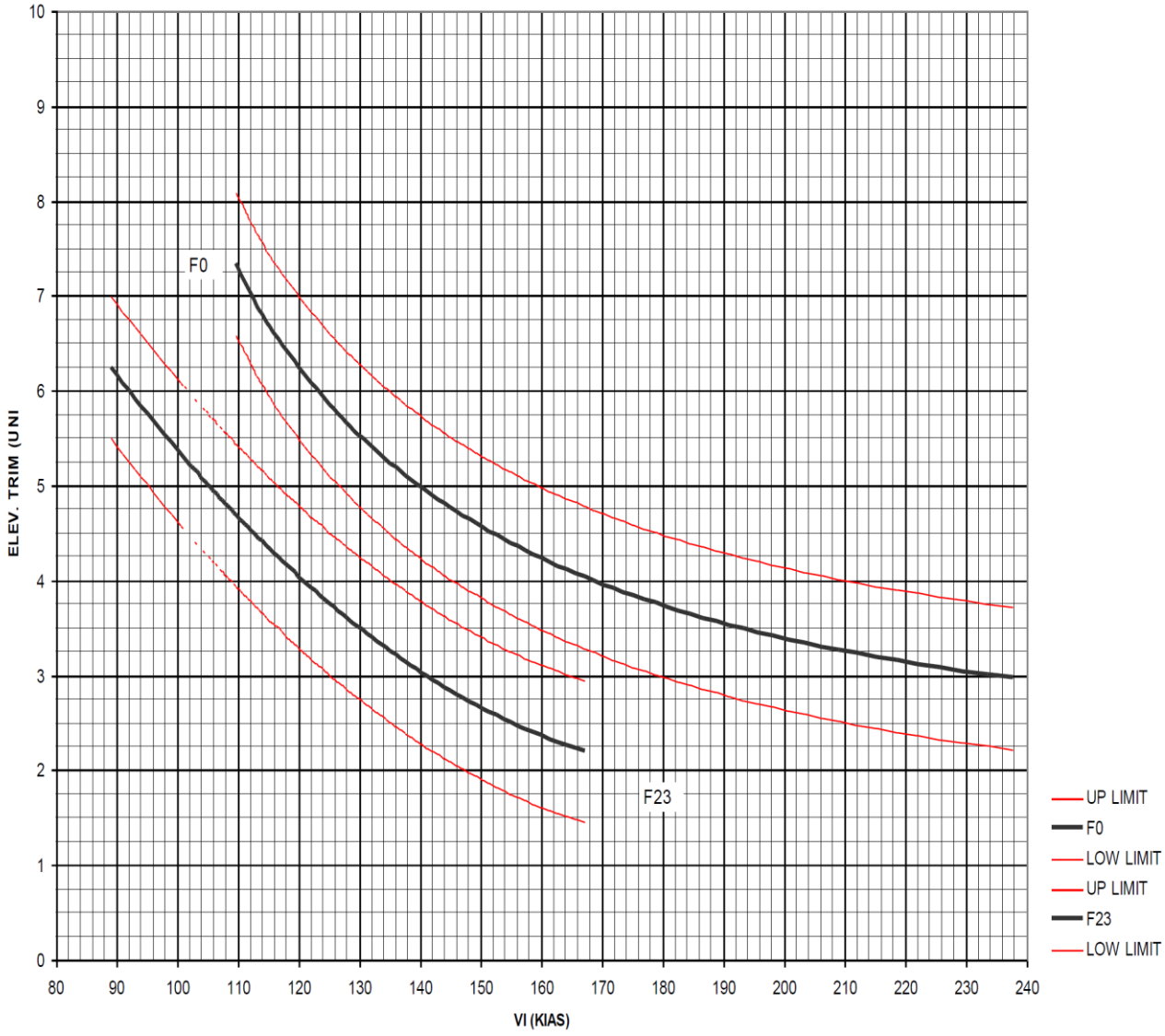

Figure 2.1.1 (Sheet 1 of 4) - Elevator Trim Position Limits

Flap UP (0), Landing Gear UP & Flap DN (23), Landing Gear DOWN
2 engines
P.L.F-CRZ1
WEIGHT 16000 KG ± 500 KG
CG: 22% ± 1% M.A.C.

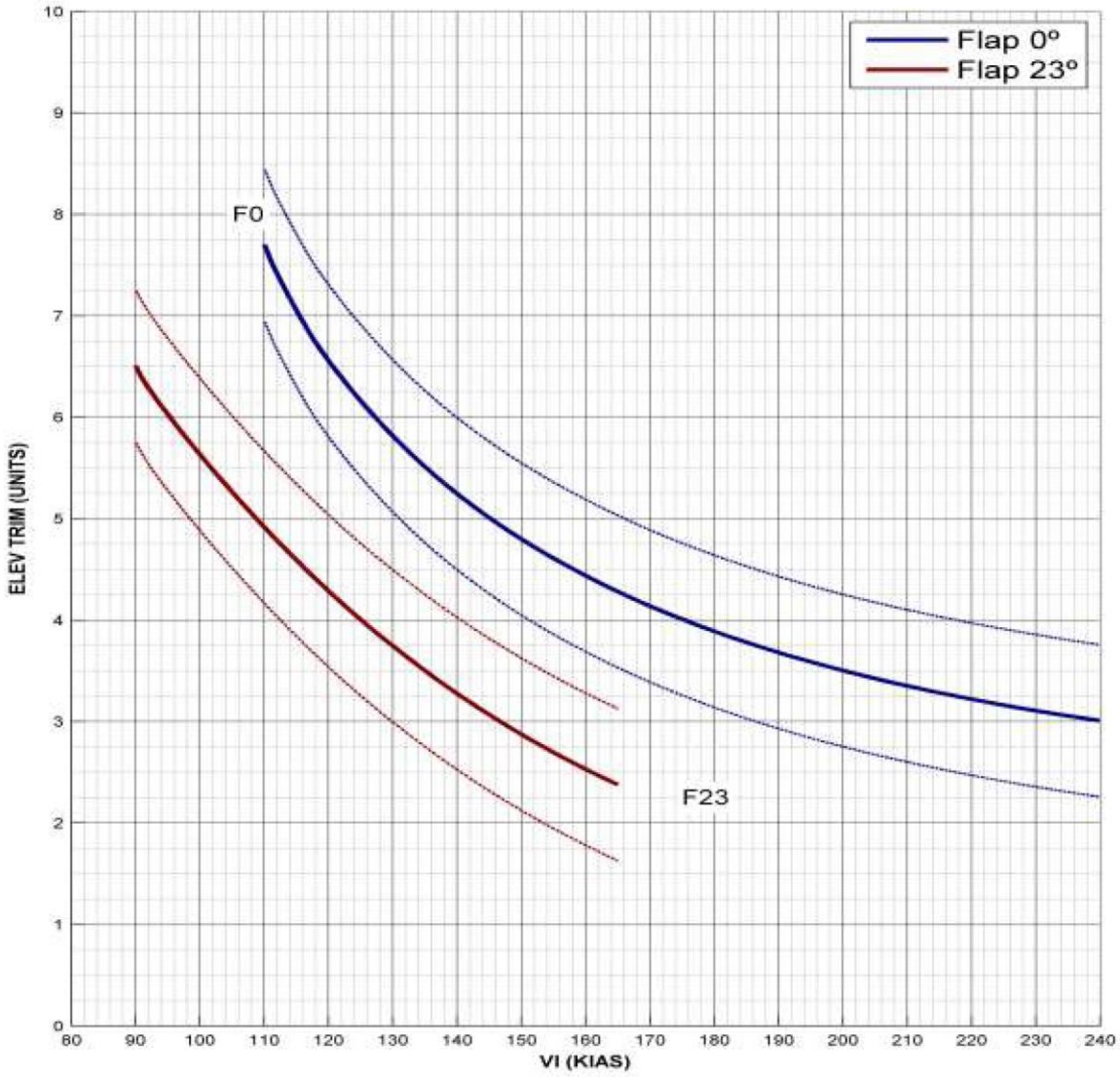

Figure 2.1.1 (Sheet 2 of 4) - Elevator Trim Position Limits

Flap UP (0), Landing Gear UP & Flap DN (23), Landing Gear DOWN
2 engines
P.L.F-CRZ1
WEIGHT: 17000 KG ± 500 KG
CG: 22% ± 1% M.A.C.

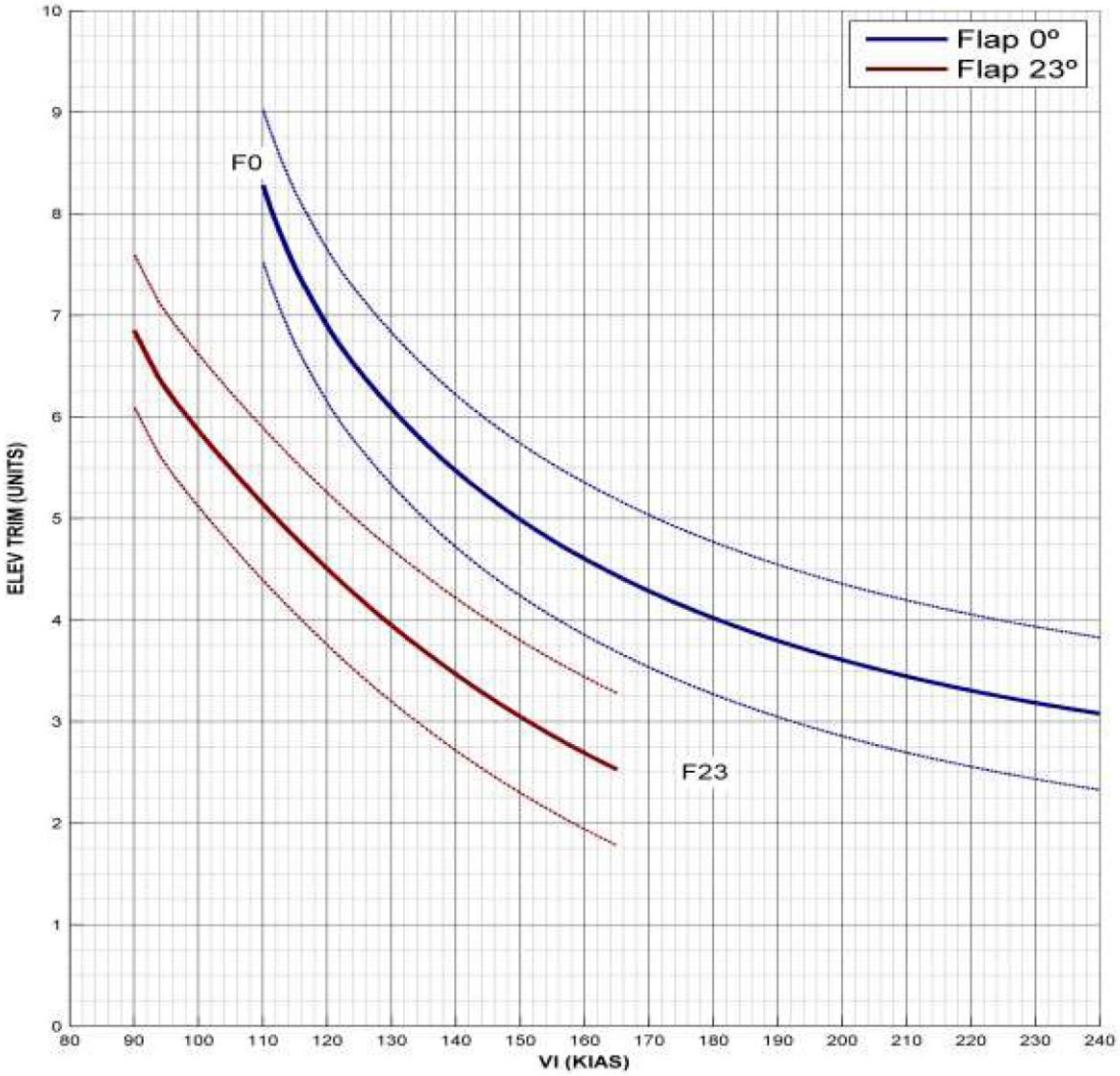

Figure 2.1.1 (Sheet 3 of 4) - Elevator Trim Position Limits

Flap UP (0), Landing Gear UP & Flap DN (23), Landing Gear DOWN
2 engines
P.L.F-CRZ1
WEIGHT: 18000 KG ± 500 KG
CG: 22% ± 1% M.A.C.

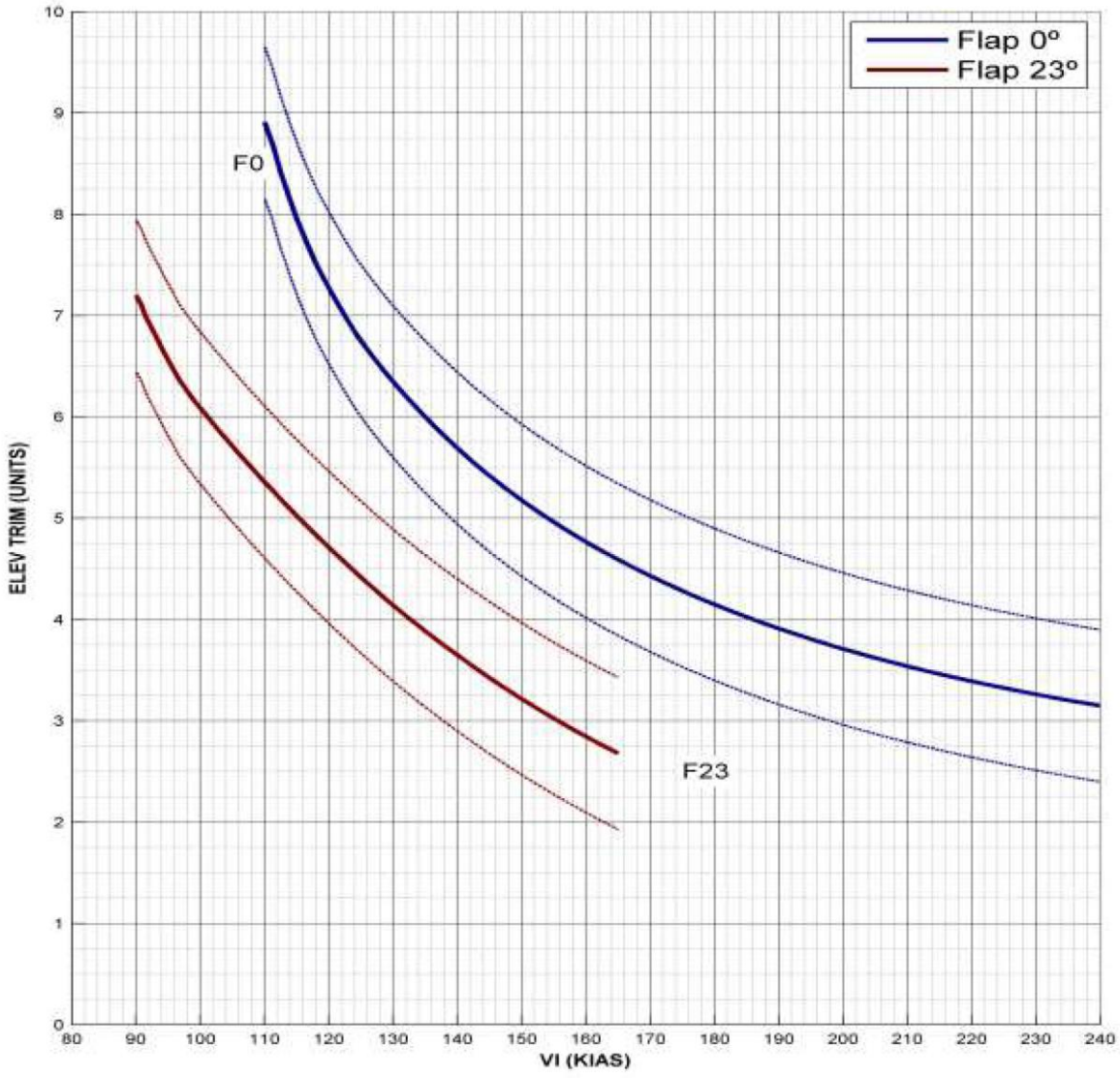

Figure 2.1.1 (Sheet 4 of 4) - Elevator Trim Position Limits

2.2. Stalls and Stall Warnings.

2.2.1. Pusher Speeds and Shaker Speeds.

- At altitude between 15000 ft and 10000 ft., with Power Lever at Flight Idle (no LOW selected), PRS at TOGA, perform wing level stalls, at an entry rate approximately of 1 KIAS/sec, with wing and tail de-icing OFF, in the aircraft configurations and trim speeds shown in the following table, according to actual weight (interpolate when necessary):

WEIGHT	Flap UP, LG UP	Flap TO, LG UP	Flap APP, LG UP	Flap DN, LG DOWN
14000 KG	V_T = 115 KIAS	V_T = 105 KIAS	V_T = 100 KIAS	V_T = 95 KIAS
15000 KG	V_T = 120 KIAS	V_T = 110 KIAS	V_T = 105 KIAS	V_T = 100 KIAS
16000 KG	V_T = 125 KIAS	V_T = 115 KIAS	V_T = 110 KIAS	V_T = 105 KIAS
17000 KG	V_T = 130 KIAS	V_T = 120 KIAS	V_T = 115 KIAS	V_T = 110 KIAS
18000 KG	V_T = 135 KIAS	V_T = 125 KIAS	V_T = 120 KIAS	V_T = 115 KIAS

Record for each stall:

	Flaps UP, LG UP		Flaps TO, LG UP		Flaps APP, LG UP		Flaps DN, LG DOWN	
NP								
F/C								
$V_{I\text{-}SHAKER}$								
$V_{I\text{-}PUSHER}$								
AOA								
Weight								

Check during stalls:

1. Aerodynamic stall (defined by a non-commanded nose drop or sharp wing drop), does not occur before Stick Pusher actuation.
2. Check that pusher speed values are between V_{SR} (the established ones in Figure 2.2.1.) and V_{SR}-5 KIAS, for all stalls performed.
3. Check that the Stall Warning speeds are always above Stick Pusher speeds.
4. Check that the Stall Warning appears inside of the yellow arc of the AOA cockpit indicator.

2.2.2. Manoeuvring Margins

a) Trim the aircraft in the following conditions:

- FLAPS TO
- LG UP
- PRS TOGA
- TQ As required to maintain R/C = 500 fpm.
- SPEED V_2 according with the actual weight.

(interpolate when necessary)

WEIGHT	V_2 ($1.13 \cdot V_{SR}$)
14000 KG	96
15000 KG	99
16000 KG	103
17000 KG	106
18000 KG	109

- While maintaining a constant speed V_2 and TQ setting, start a left turn increasing the roll angle checking that it can be obtained a bank angle of 30^o before the stall warning is reached.
- Record bank angle if the stall warning activates before 30^o bank angle.
- Repeat the same manoeuvre for right turn.

WEIGHT	V_2 (KIAS)	Φ (^{o})		Φ_{MIN} (^{o})
		LH	RH	
				30^o

b) Trim the aircraft in the following conditions:

- FLAPS DN
- LG DN
- PRS TOGA
- TQ As required to maintain R/D = 500 fpm.
- SPEED V_{REF} according with the actual weight.

(interpolate when necessary)

WEIGHT	V_{REF} ($1.23 \cdot V_{SR}$)
14000 KG	93
15000 KG	96
16000 KG	100
17000 KG	103
18000 KG	106

- While maintaining a constant speed V_{REF} and TQ setting, start a left turn increasing the roll angle checking that it can be obtained a bank angle of 40^o before the stall warning is reached.
- Record bank angle if the stall warning activates before 40^o bank angle.
- Repeat the same manoeuvre for right turn.

WEIGHT	V_{REF} (KIAS)	Φ (^{o})		Φ_{MIN} (^{o})
		LH	RH	
				40^o

2.2.3. Required Maintenance Actions

In case of some of the previous checks are not complied, a verification of the AOA indication system functionality and positioning is required.

Flaps UP, TO and APP with Landing Gear UP
Flaps DN (LNDG) with Landing Gear DOWN
2 engines
100% Np – Flight Idle High
CG: 22 ± 1% M.A.C.
Entry rate of 1 KIAS per second

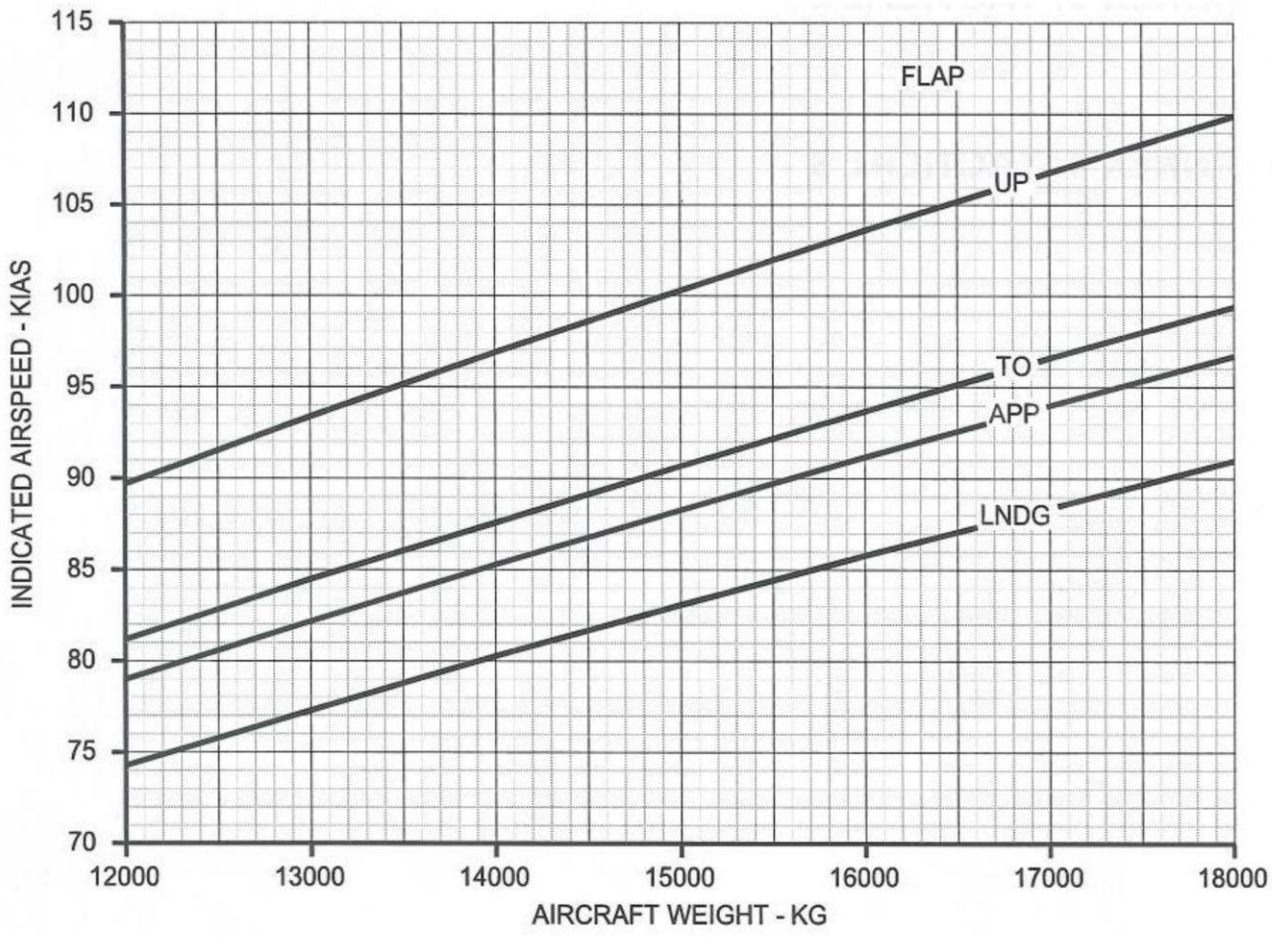

Figure 2.2.1 – V_{SR} SPEED

2.3. Lateral-Directional characteristics. Trim

NOTE: During the TO phase, to avoid excursions due to trim tabs misadjustments, the pilot may need to correct any aircraft tendency in pitch, roll or yaw.

2.3.1. Lateral-Directional Trim In Cruise Configuration

- Stabilize and trim the airplane in a level flight attitude between 15000 ft and 10000 ft, Flaps UP, Landing Gear UP, PRS at CRZ1, and Power for Level Flight with the following indicated Torque setting: 50%-CRZ1.

Record the following data:

	50% TQ CRZ1
Aileron TRIM	
Rudder TRIM	
Airspeed (KIAS)	

Checks during stabilization:

1. Aileron trim position indications must be around 0 unit (range from 0.5L to 0.5R units is acceptable).
2. Rudder trim position indication must be around 1L cockpit unit (range from 0 to 1.5L units is acceptable).

2.3.2. Maintenance Actions

2.3.2.1. Adjustment Of Lateral Trim

In case the lateral trim is outside the neutral position, follow the next procedure:

a) Aircraft tends to drop left wing.
The left aileron trim tab shall be actuated in order to lengthen its actuator linking rod, by means of turning the rod's end terminal half a turn per each cockpit unit deviation from neutral, and the right aileron trim tab shall be actuated in order to shorten its actuator linking rod, by means of turning its rod's end terminal half a turn per each unit deviation from neutral, up to a maximum of 3 complete turns.

b) Aircraft tends to drop right wing.
The right aileron trim tab shall be actuated in order to lengthen its actuator linking rod, by means of turning the rod's end terminal half a turn per each cockpit unit deviation from neutral, and the left aileron trim tab shall be actuated in order to shorten its actuator linking rod, by means of turning its rod's end terminal half a turn per each unit deviation from neutral, up to a maximum of 3 complete turns.

2.3.2.2. Adjustment Of Directional Trim

a) Aircraft trim cockpit indication to the right.
The directional trim tab shall be actuated in order to lengthen its actuator linking rod, by means of turning the rod's end terminal half a turn per each half cockpit unit deviation from green band, up to a maximum of 2 complete turns.

b) Aircraft trim cockpit indication to the left.
The directional trim tab shall be actuated in order to shorten its actuator linking rod, by means of turning the rod's end terminal half a turn per each half cockpit unit deviation from green band, up to a maximum of 2 complete turns.

2.4. Engine Verification

NOTE: When only one engine is replaced, point 2.4.1 must be performed.

When both engines are replaced, point 2.4.1 must be performed on one engine. Once checks successfully passed, point 2.4.1 must be performed on the other engine.

2.4.1. One Inoperative Engine Flight (Only in case of engine/propeller/RGB replacement)

- Stabilize the airplane in a level flight altitude between 15000 ft and 10000 ft in the following conditions:

  - FLAPS UP
  - LG UP
  - PRS CRZ1
  - TQ 70%-CRZ1 or MAX-CRZ1, whichever is lesser.

- Adjust the speed about 150 KIAS, climbing as necessary.

- Shut off the applicable engine following AOM procedures, but maintaining the power setting in both engines (do not retard the Power Level to FI, in order to check the RBS actuation).

Check after engine shutdown:

1. The proper propeller feathered condition, by the alignment of the appropriate yellow marks on spinner and blades.

2. Rudder pedal in the opposite side to the shutdown engine goes forward (RBS actuation).

- Restart engine following AOM procedures.

Check after engine restart:

1. The proper propeller unfeathered condition.

NOTE: If the propeller does not unfeather, SHUTDOWN the engine again following the AOM procedures, and refer to paragraph B of the procedure: IF RESTARTING IS NOT ADVISABLE.

2.4.2. Required Maintenance Action

In case of a no properly unfeathered conditions, proceed with an adjustment of the corresponding control mechanism, according to Maintenance Manual specifications.

2.5. Anti-Icing And De-Icing System Checks

Perform the following checks as corresponding in a level flight altitude between 15000 ft. and 10000 ft. Flaps UP, Landing Gear UP, PRS at CRZ1, and an indicated TQ setting of 70%-CRZ1 or MAX-CRZ1, whichever is lesser.

	Wing & tail de-icing	Propeller de-icing	Air inlet de-icing
Replacement of one or both outboard wings	X		
Replacement of one of both engines	X	X	X
Replacement of one of both propellers		X	

Engine air inlet anti-icing system check

- Press L and R pushbuttons. Check that the ON lights come and remain on.
- Let the system to perform 3 cycles. Check that no warnings, neither in the IEDS nor in the pushbuttons appear.
- Monitor boot inflation by visual inspection from the cockpit windows.
- Maintain the system ON to perform the Wing and Tail de-icing system check.

Propeller de-icing system check

- Check that the MODE SELECT is in LT ICE position.
- Press L and R pushbuttons. Check that the FAIL light in both pushbuttons comes on briefly and then goes off and that the ON lights come on and remain on.
- Let the system to operate for 3 minutes. Check that no warnings, neither in the IEDS nor in the pushbuttons appear.

- Move the Mode Selector to HV ICE and check that the ON lights remain on.

- Let the system to operate for 3 minutes. Check that no warnings, neither in the IEDS nor in the pushbuttons appear.

- Press again both pushbuttons to disconnect the system.

Wing and Tail de-icing system check

NOTE: Before start to check the Wing and Tail De-icing system, be sure that engines air inlet de-icing system has been connected about 10 minutes in advance.

- Set MODE SELECT de-icing selector in both LT ICE and HVY ICE positions, and check operation of the de-icing system on the wings and tail on the two automatic modes running through a complete cycle in both modes (3 min. and 1 min. respectively).

- Monitor wing boot inflation by visual inspection from the cockpit windows.

- Select MAN in the MODE SELECT and set de-icing supervision switch to TEST. Check that all four ON lights come on.

2.5.1. Required Maintenance Actions

In case of a no properly system operating conditions, proceed with the proper corrective actions, according to Maintenance Manual specifications.

3. List of Abbreviations and Symbols

AOA	Angle of Attack
AOM	Aircraft Operations Manual
APP	flaps deflection for APProach
APR	Auxiliary Power Reserve
CG	Centre of Gravity
CRZ	Cruise propeller regime
DN	flaps deflection for landing (full flaps) / landing gear down
FAR	Federal Aviation Regulation
F/C	Fuel Consumption
FI	Flight Idle
ft	feet
fpm	feet per minute
IAS	Indicated Air Speed
IEDS	Instrument Electronic Display System
KIAS	Knots Indicated AirSpeed
KG	Kilograms
lb	Pounds
LG	Landing Gear
MAC	Mean Aerodynamic Chord
MFCU	Mechanical Fuel Control Unit
NP	Propeller Speed (rpm)
PRS	Power Range Selector
PVM	Propeller Valve Module
RBS	Rudder Booster System
R/C	Rate of Climb

R/D	Rate of Descent
RGB	Reduction Gear Box
rpm	revolutions per minute
SAT	static air temperature
TOGA	Take-Off and Go Around
TQ	indicated Torque Value
V_I	Indicated Airspeed
V_R	Rotation Airspeed
V_{REF}	Reference Airspeed
V_{SR}	Stalling Reference Airspeed
V_T	Trim Airspeed
V_2	Take Off safety Airspeed
Φ	Roll Angle