

## MAXIMUM OPERATING SPEED ENVELOPE EXCEEDED - INSPECTION/CHECK

*EFFECTIVITY: ALL*

### 1. General

- A. This section gives the necessary actions following an overspeed event.
- B. The exceedance of the operating speed/Mach envelope will trigger the high-speed aural warning with triple chime.
- C. An overspeed inspection is required when the crew reports the trigger of the high-speed aural warning with triple chime or the FDR data analysis shows that the operating speed envelope was exceeded.
- D. The operating speed envelope is presented in the AFM (Aircraft Flight Manual) - Section 2 - Limitations and it is also shown here, in Figure 601.
- E. Based on the speed envelope, two threshold curves are set, in order to classify the severity of the overspeed event into one of the following three situations:
  - (1) Below the Low-Threshold Curve: The low-threshold curve defines an overspeed limit for which no inspection of the aircraft is required and the aircraft can be promptly returned to service, provided that the crew is sure that some requirements were observed.
  - (2) Between Low and High Threshold Curves: This region defines a situation clearly out of the aircraft envelope, but the operator can still restore the aircraft airworthiness, without Embraer involvement, provided that no discrepancies are found during the applicable inspections.
  - (3) Above High-Threshold Curve: The high-threshold curve defines an excess to the aircraft operating speed, within a high degree of severity for which the operator has still the necessary information to restore the aircraft airworthiness, but in this case Embraer shall be informed and receive the FDR data.
- F. The purpose of this section is to provide the operator all tools to analyze the flight data in order to restore the aircraft airworthiness. Embraer shall be involved only if one of the following situations occur:
  - (1) Send the FDR data and the inspections results to Embraer if any discrepancy is found during the inspection Phases I, II or III, but the operator is still responsible to ensure, based on the required inspections, that the aircraft can be returned to service, or;
  - (2) During any phased inspection, a discrepancy is found. In this situation, the operator shall send to Embraer the FDR data analysis and a report of the discrepancies found. To return the aircraft to service an Embraer disposition is required.
- G. The procedures in this section are given in the sequence below. The tasks identified with (◆) are part of the Scheduled Maintenance Requirements Document (SMRD).

TASK NUMBER	DESCRIPTION	EFFECTIVITY
05-50-04-200-801-A	OVERSPEED INSPECTION	ALL

TASK 05-50-04-200-801-A  
EFFECTIVITY: ALL

## 2. OVERSPEED INSPECTION

### A. General

- (1) The required actions following an overspeed event are visually presented in the flowchart shown in [Figure 602](#).
- (2) Once the crew reports the high-speed aural warning with triple chime trigger, the aircraft may be returned to service without any further action provided that the crew can guarantee all the three situations below:
  - (a) The speed remains below the low threshold curve, for all flight ratings;
  - (b) The overspeed does not last for more than 10 seconds.
  - (c) No more than one event occurs in the same flight.
- (3) If the crew cannot assure that all the three conditions above were respected, the FDR download must be performed and the data shall be analyzed.
- (4) If is not possible to do the FDR analysis immediately, a fly by of 10 FC is provided, once Phase-I inspection is done and no abnormality is detected.

NOTE: In this case, Phase-I inspection shall be done before next flight.

- (5) Within the fly-by period the FDR data is analyzed and compared with threshold values, then the necessary actions are determined.
- (6) For the event assessment the following parameters should be selected from the FDR ( [AMM TASK 31-31-00-700-803-A/500](#)):
  - Date;
  - Time (GMT);
  - Flight Number;
  - Pressure Altitude (PrAlt);
  - Indicated Airspeed (IAS);
  - Normal acceleration (NrAcc).

### B. References

REFERENCE	DESIGNATION
<a href="#">AMM TASK 05-50-05-200-801-A/600</a>	HIGH-LOAD-FACTOR FLIGHT CONDITION
<a href="#">AMM TASK 31-31-00-700-803-A/500</a>	FDR DATA - PERSONAL COMPUTER DOWNLOAD-ING
<a href="#">AMM TASK 32-00-01-910-801-A/200</a>	LG SAFETY PIN - INSTALLATION AND REMOVAL
AMM TASK 51-50-01-820-801-A/200	-
NDI 57-21-00-220-803-A00	-

(Continued)

REFERENCE	DESIGNATION
NDI TASK 55-10-00-210-803-A00	-
NDI TASK 55-10-00-210-804-A00	-
NDI TASK 55-10-00-210-805-A00	-
NDI TASK 55-10-00-210-806-A00	-
NDI TASK 55-10-00-220-801-A00	-
NDI TASK 55-30-00-210-806-A00	-
NDI TASK 55-30-00-220-803-A00	-
NDI TASK 55-30-00-220-811-A00	-
NDI TASK 55-30-00-220-819-A00	-
NDI TASK 55-30-00-220-829-A00	-
NDI TASK 55-30-00-220-830-A00	-
NDI TASK 55-30-00-220-841-A00	-
NDI TASK 57-11-00-220-808-A00	-
NDI TASK 57-11-00-220-809-A00	-
NDI TASK 57-11-00-220-817-A00	-
NDI TASK 57-11-00-220-839-A00	-
NDI TASK 57-11-00-220-862-A00	-
NDI TASK 57-21-00-210-801-A00	-
NDI TASK 57-21-00-210-816-A00	-
NDI TASK 57-21-00-220-805-A00	-

C. Zones and Accesses

Not Applicable

D. Tools and Equipment

Not Applicable

E. Auxiliary Items

Not Applicable

F. Consumable Materials

Not Applicable

G. Expandable Parts

Not Applicable

H. Persons Recommended

QTY	FUNCTION	PLACE
5	Do the task	AR

I. VMO or MMO Exceedance Detection

SUBTASK 200-002-A

- (1) Plot the threshold curves and the FDR data all together, in order to visually identify the severity of the event. To do this, do as follows:

- (a) Select from the FDR the parameters KIAS and Altitude during the overspeed occurrence.
- (b) Plot over the [Figure 603](#), the selected data.

**NOTE:** If the high-speed aural warning with triple chime has triggered more than once, add all the related sets of points from the FDR to the chart.

- (c) [Table 601](#), [Table 602](#) and [Table 603](#), present the points to plot the operational envelope and the threshold curves, if necessary.

**NOTE:** The values that follow are approximate and can change as the temperature changes.

Table 601 - OPERATIONAL ENVELOPE

Point	IAS (Knots)	Altitude (ft)
A	200	37000
B	250	37000
C	320	26000
D	320	10000
E	250	8000
F	250	0

Table 602 - LOW THRESHOLD CURVE COORDINATES

POINT	IAS (knots)	Altitude (ft)
A	200	37000
G	255	37000
H	330	25500
J	330	0

Table 603 - HIGH THRESHOLD CURVE COORDINATES

POINT	IAS (knots)	Altitude (ft)
A	200	37000
K	260	37000
L	350	24000
M	350	0

- (d) Analyze the FDR data relatively to the threshold curves and identify the point that is most distant from the threshold curves and chart origin. This point features the most critical instant within the overspeed event.
- (2) Refer to [Table 604](#) for the necessary actions considering the position of the most critical sample.

Table 604 - OVERSPEED SEVERITY AND REQUIRED ACTIONS

Most-critical Sample Position	Required Action
Below $T_{low}$	<p>No action is required and the aircraft can be re-turned to service, provided that:</p> <ul style="list-style-type: none"> <li>— The overspeed does not last for more than 10 seconds.</li> <li>— No more than one event occurs in the same flight.</li> </ul> <p>NOTE: If one of these conditions was not respected, consider it as an event between <math>T_{low}</math> and <math>T_{high}</math>.</p>
Between $T_{low}$ and $T_{high}$	<ol style="list-style-type: none"> <li>1. Do the Phase-I inspection before the next flight;</li> <li>2. If no discrepancy is found during Phase-I inspection, download the FDR and dispatch the aircraft by 10 FC. Otherwise, contact Embraer;</li> <li>3. Do the Phase-II inspection within the fly-by period;</li> <li>4. If no discrepancy is found during Phase-II inspection, return the aircraft to service. Otherwise, do the Phase-III inspection and contact Embraer;</li> <li>5. Send the FDR data and the inspections results to Embraer if any discrepancy is found during the inspection Phases I, II or III.</li> </ol>
Above $T_{high}$	<ol style="list-style-type: none"> <li>1. Do the Phase-I inspection before the next flight;</li> <li>2. If no discrepancy is found during Phase-I inspection, dispatch the aircraft by 10 FC. Otherwise, contact Embraer;</li> <li>3. Do the Phase-II and Phase-III inspections;</li> <li>4. If no discrepancy is found during Phase-II and Phase-III inspections, dispatch the aircraft. Otherwise, contact Embraer.</li> <li>5. Send the FDR data and the inspections results to Embraer if any discrepancy is found during the inspection Phases I, II or III.</li> </ol>

- (3) Check for the interval containing the off-envelope points if the Normal Acceleration does not exceed 2G. If such a case occurs, do [AMM TASK 05-50-05-200-801-A/600](#).

**NOTE:** This check is necessary once for a speed out of the envelope the threshold for this parameters decreases to 2.0 G.

J. Preparation

*SUBTASK 841-002-A*

- (1) Make sure that the landing gear safety pins are installed to the main and nose landing gears ( [AMM TASK 32-00-01-910-801-A/200](#)).
- (2) Make sure that aileron hydraulic systems I and II and rudder hydraulic systems I and II are off.
- (3) Make sure that the gust lock is disconnected.

K. Phase-I Inspection

*SUBTASK 212-002-A*

- (1) Do an external visual inspection (GVI) of entire aircraft for missing components, like doors, access panels and fairings.
- (2) Visually inspect (GVI) the aircraft doors and access panels and search for distortion, broken or missing latches and missing fasteners.
- (3) Visually inspect (GVI) the entire contour of the wing-to-fuselage fairing attachment, and search for flaking paint, missing sealant, pulled or missing screws.
- (4) Visually inspect (GVI) the aileron for general condition.
- (5) Visually inspect (GVI) the rudder I and II for general condition.
- (6) Visually inspect (GVI) the elevator for general condition.

L. Phase-II Inspection

*SUBTASK 212-003-A*

(1) Fuselage Inspection

- (a) Externally inspect the center sections of the fuselage from stringers 10L to 10R for distortion, buckling, flaking paint and pulled or missing rivets.

NOTE: If any of the regions inspected shows signs of damage, proceed to an internal inspection of the structure, at those points.

(2) Wing Inspection

- (a) Inspect the skin panels (NDI 57-21-00-220-803-A00, NDI TASK 57-21-00-220-805-A00) as applicable, the lower and upper skin/spar attachments (NDI TASK 57-21-00-210-801-A00) and NDI TASK 57-21-00-210-816-A00) and search for distortion, buckling, flaking paint and pulled or missing rivets.

NOTE: If any of the regions inspected shows signs of damage, proceed to an internal inspection of the structure, at those points.

- (b) Inspect the spar 1 - lower front fitting attachments and spar 2 - lower rear fitting attachments (NDI TASK 57-11-00-220-808-A00).
- (c) Inspect the fuselage bulkhead at frame 50 and its attachments to frame 50 (NDI TASK 57-11-00-220-809-A00, NDI TASK 57-11-00-220-862-A00) as applicable.
- (d) Inspect the lower skin - rear fitting-to-skin attachments and spars 1 & 2 - stub-to-wing attachments (NDI TASK 57-11-00-220-817-A00, NDI TASK 57-11-00-220-839-A00) as applicable.

- (e) Examine all the wing control surfaces and its attachments to the wing spars.

(3) Empennage Inspection

- (a) Inspect the entire surface of the horizontal stabilizer and search for distortion, buckling, flaking paint and pulled or missing rivets. (NDI TASK 55-10-00-210-805-A00, NDI TASK 55-10-00-210-806-A00, NDI TASK 55-30-00-220-841-A00) as applicable.
- (b) Inspect the hinge fitting of the Horizontal Stabilizer (NDI TASK 55-10-00-210-803-A00).
- (c) Inspect the hinge pin of the horizontal stabilizer (NDI TASK 55-10-00-210-804-A00).
- (d) Inspect the elevator support fittings (NDI TASK 55-10-00-220-801-A00).
- (e) Inspect the hinge fitting support of the vertical stabilizer NDI TASK 55-30-00-210-806-A00.
- (f) Inspect the rudder hinge fittings NDI TASK 55-30-00-220-803-A00.
- (g) Inspect the fin-to-fuselage attachment fitting to bulkhead 77 (NDI TASK 55-30-00-220-819-A00, NDI TASK 55-30-00-220-829-A00) as applicable.
- (h) Inspect the fin-to-fuselage attachment fitting to bulkhead 78 (NDI TASK 55-30-00-220-811-A00, NDI TASK 55-30-00-220-830-A00) as applicable.

(4) Flight Controls

- (a) Make sure that the elevator moves freely.
- (b) Examine the entire elevator surface for distortion, buckling, flaking paint and pulled or missing rivets.
- (c) Examine the elevator hinges for sings of deformation.
- (d) Make sure that the rudder moves freely.
- (e) Examine the entire rudder surface for distortion, buckling, flaking paint and pulled or missing rivets.
- (f) Examine the rudder hinges for sings of deformation.
- (g) Make sure that the aileron moves freely.
- (h) Examine the entire aileron surface for distortion, buckling, flaking paint and pulled or missing rivets.
- (i) Examine the aileron hinges for sings of deformation.

M. Phase-III Inspection

*SUBTASK 212-004-A*

- (1) Do the aircraft alignment check AMM TASK 51-50-01-820-801-A/200.

NOTE: If the overspeed occurred with the Main or Nose Landing Gear retracted, it is not necessary to do these topics of AMM TASK 51-50-01-820-801-A/200:

- Main Landing-Gear Alignment
- Nose Landing-Gear Alignment
- Main Landing-Gear Wheels Alignment
- Wheel Camber

(2) Contact Embraer if the aircraft does not pass the alignment check.

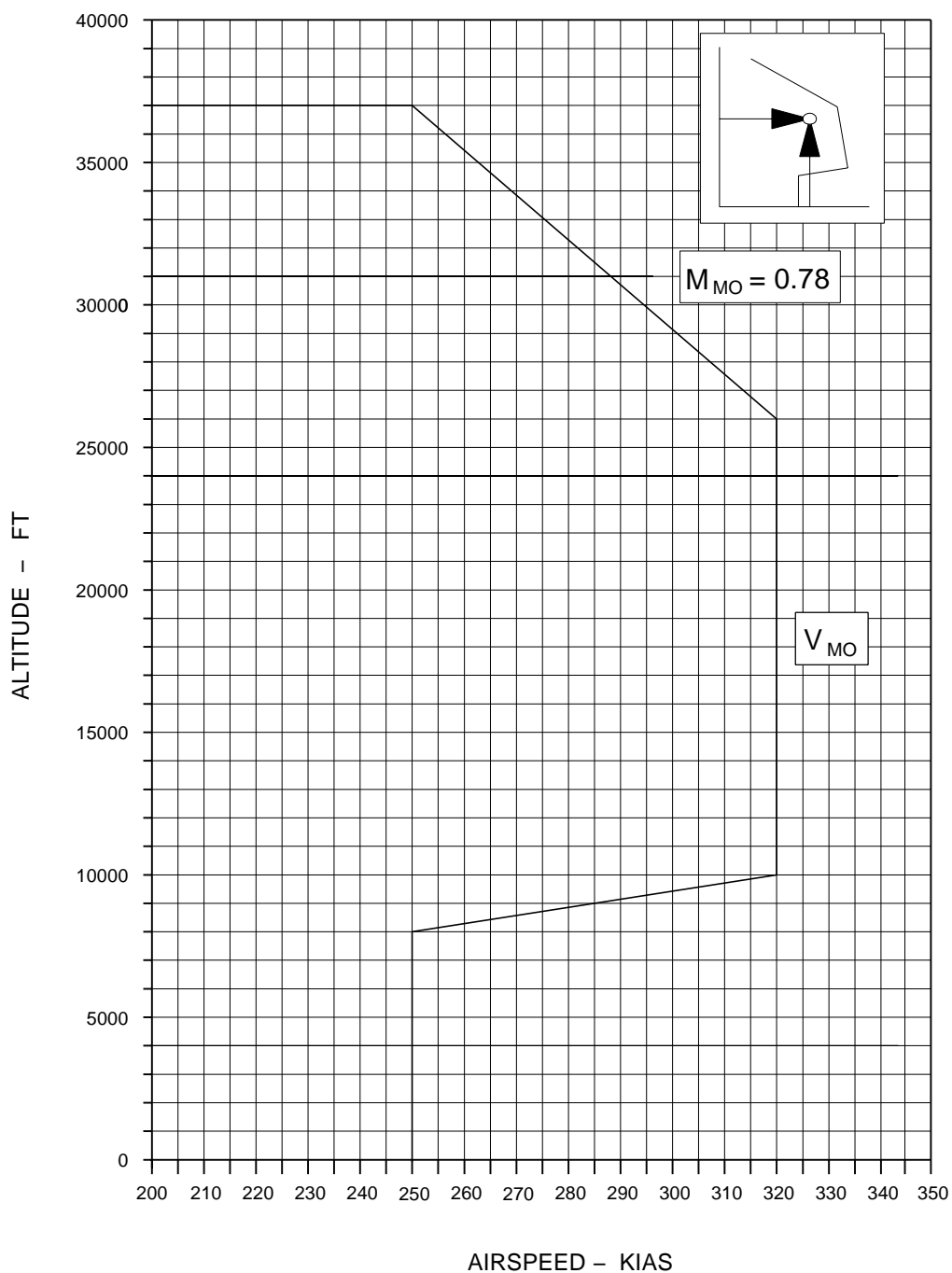
N. Follow-on

*SUBTASK 842-002-A*

(1) Install the panels or other items possibly removed for the inspection above.



EFFECTIVITY: ALL  
Operational Speed Envelope  
Figure 601

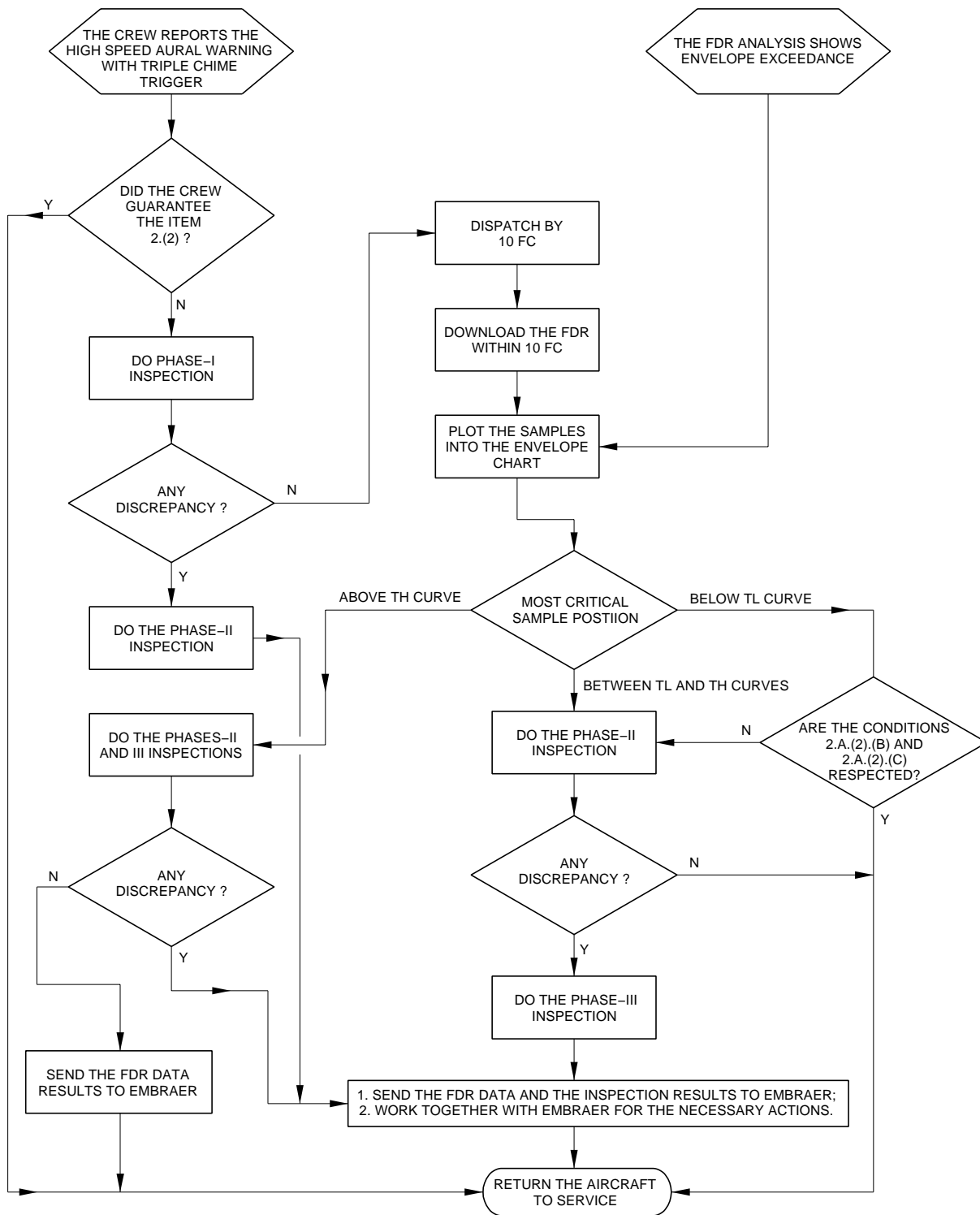


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EFFECTIVITY: ALL

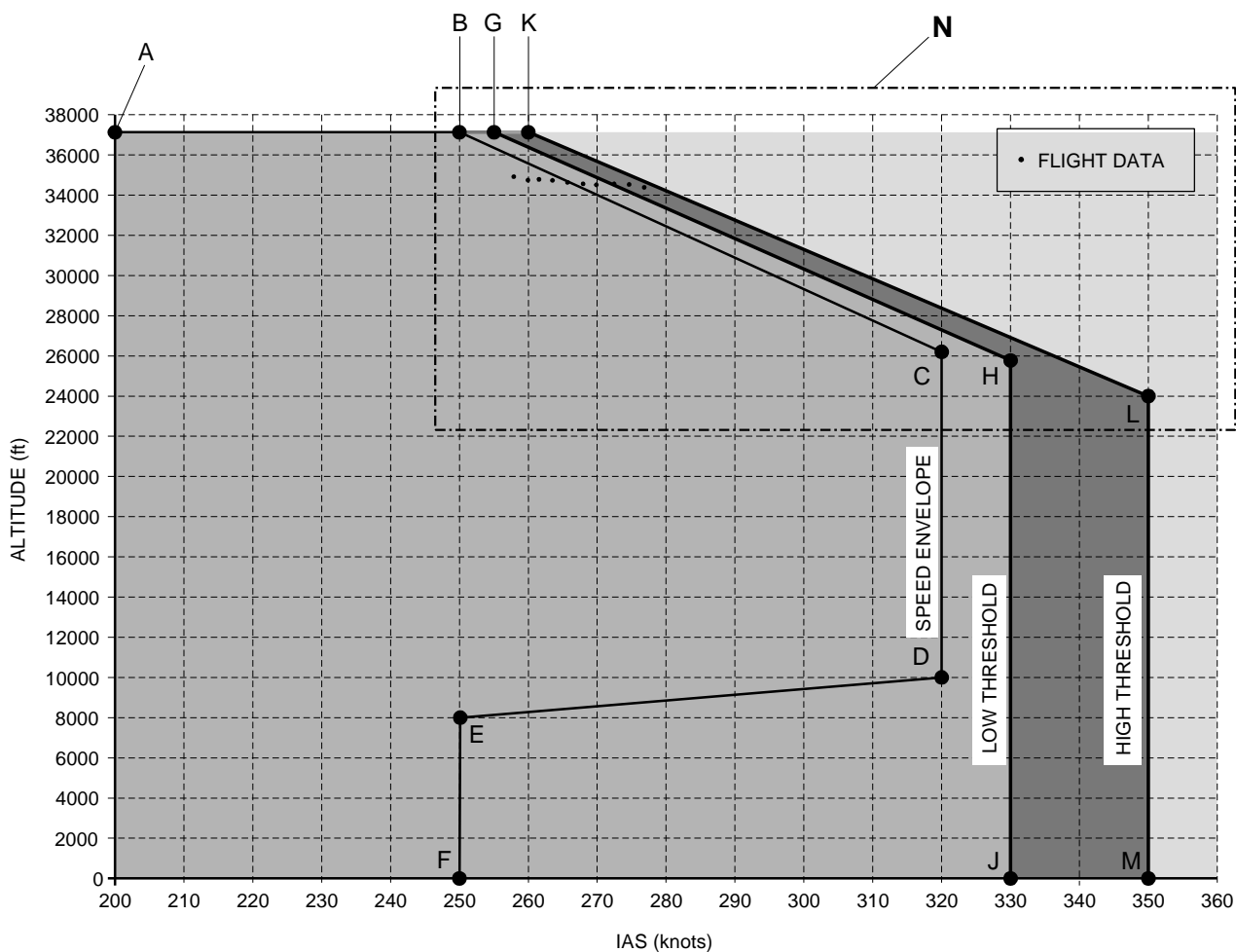
Overspeed Detection and Inspection Flowchart

Figure 602



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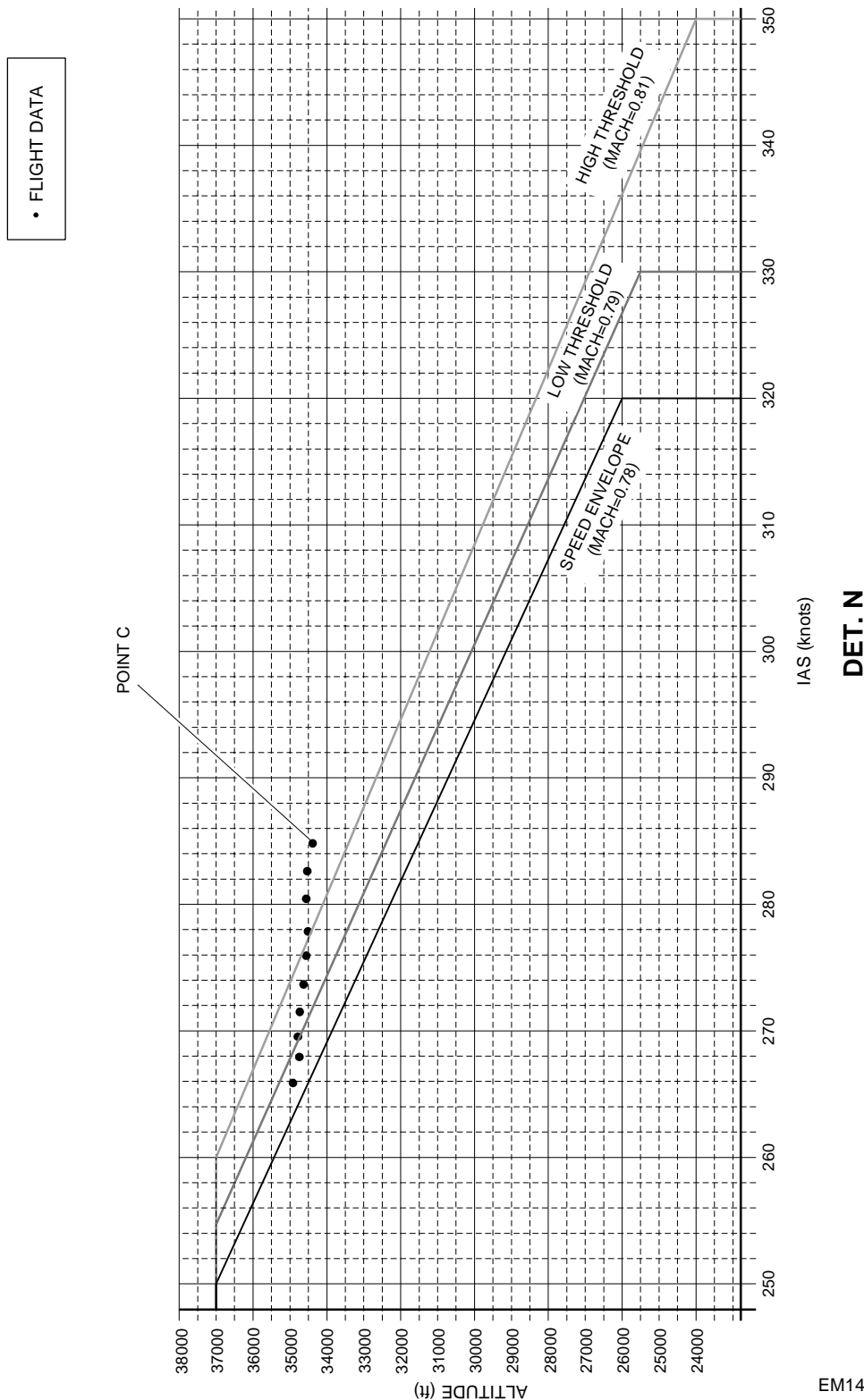
EFFECTIVITY: ALL  
VMO/MMO Threshold Chart  
Figure 603 - Sheet 1



- BELOW TLOW, NO ACTION, ACCORDING TO TABLE 604.
- BETWEEN TLOW AND THIGH, INSPECTIONS ACCORDING TO TABLE 604.
- ABOVE THIGH, INSPECTIONS ACCORDING TO TABLE 604.

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EFFECTIVITY: ALL  
VMO/MMO Threshold Chart  
Figure 603 - Sheet 2



**NOTES:**  
THE MOST CRITICAL SITUATION FOR OVERSPEED IS DETERMINED BY THE MOST DISTANT POINT FROM THE ENVELOPE.  
FOR THIS EXAMPLE, THE POINT C SHOULD BE TAKEN AS THE MOST CRITICAL EVENT.

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