



International Civil Aviation Organization

**WORKING PAPER**

A40-WP/454

TE/193

25/8/19

**(Information paper)**

**English only**

## ASSEMBLY — 40TH SESSION

### TECHNICAL COMMISSION

#### Agenda Item 30: Other issues to be considered by the Technical Commission

#### NECESSITY OF CALIBRATION OF GROUND POWER UNITS CONNECTED TO AIRCRAFT

(Presented by Iran (Islamic Republic of))

#### EXECUTIVE SUMMARY

As there are no regulations in place to monitor airport service companies in the ICAO documentation and Iran Civil Aviation Organization directly supervises airport service companies considering the country's need and the fact that the ground power device is the only device that directly affects the aircraft structure which can cause irreparable damage to the aircraft system, it is very important to control the output of this device before transmitting power. Also, apart from programmatic visits to all components by maintenance and periodic repairs, checking the correctness of the operator and controlling their output numbers according to the defined standard can reduce the likelihood of occurring damage to the aircraft electrical and electronic components and ensure flight safety. Accordingly, the Civil Aviation Organization of Iran has required handling services companies to calibrate ground power units in calibration companies licensed by the National Iranian Standards Organization. ICAO, therefore, needs to more emphasize the calibration of ground power units to prevent consequences in its documentation while formulating regulations related to the requirements of airport service companies.

<i>Strategic Objectives:</i>	This working paper relates to the Safety Strategic Objective.
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<i>Financial implications:</i>	N/A
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<i>References:</i>	Annex 6 — <i>Operation of Aircraft</i>
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## 1. INTRODUCTION

1.1 As Iran Civil Aviation Organization monitors airport service companies directly, it uses its own regulations (CAD6009) to monitor airport service companies. Since ground power units (GPUs) are the only device that directly affects the aircraft structure and can cause irreparable damage to the aircraft system, it is very important to control the output of this device before sending power. In addition to programmatic visits to all components by periodic maintenance, it is essential the performance accuracy of the markers and their output numbers control in accordance with the defined standard should be able to reduce the risk of damage to the aircraft electrical and electronic components and ensure flight safety.

1.2 Calibration is defined as a set of operations performed under certain conditions that determine the relationship between the values indicated by the measuring instrument and its corresponding quantities by the reference standard.

## 2. CALIBRATION

### 2.1 Types of calibration of aircraft ground power markers

2.1.1 Initial calibration shows the user how the device works. Parameters that are measured by the device are referred to traceable measurement standards, otherwise they cannot be trusted. Usually the initial calibration of the markers is tested and measured at its manufacturing stage, which may include:

- a) grading the device;
- b) adjusting the electrical circuits on the device, such as adjusting digital and analog indicators; and
- c) estimation of uncertainty and stability of the markers.

Following these steps, the measuring instrument is used according to its lifetime.

2.1.2 Recalibration is required to control and maintain the measurement processes performed by the device for measuring and comparing with the original device. The purpose of recalibration of the markers is improving quality at specified intervals, so that a balance is created between the costs of calibration and those resulting from non-calibration.

### 2.2 Location of calibration of aircraft ground power markers

- a) Calibration in reference laboratories.
- b) Calibration in places where the measuring instrument is used.

### 2.3 How to calibrate aircraft ground power indicators

2.3.1 The quality and cost of marker calibration depends on the marker calibration method and the number of points examined. The cost of calibration of markers is one of the most important determinants of its performance.

2.3.2 The marker calibration systems can be divided into three groups:

a) Calibration of markers for inspection and correction:

Corrections are applied according to the results obtained through inspection. As long as the error is within acceptable range, no correction is needed and the marker can be used. But, if the error value of the markers exceeds the acceptable limit, it is necessary to make the necessary decisions.

b) Marker calibration only for inspection:

Indicators can be used if the error values of the markers resulting from the inspection operations are within the specified range. Since markers are expensive to repair or correct, periodic inspections are permissible as long as periodic marker error is within the defined limits. If the errors exceed the defined limit, the marker must be replaced.

c) Marker calibration only for correction:

No inspection is conducted in this method, but decisions necessary to reach a concept equivalent to the new calibration and use of markers is made. For example, the zero-point correction of the markers, which is periodically performed, makes it possible to reuse it. In case the zero point has changed, the marker can be adjusted again.

**2.4 Condition of the main calibration device of the aircraft ground power markers:**

2.4.1 Because the calibration of ground-based aircraft electrical markers is carried out by means of comparative parameters calibrated by the original calibration device in the reference laboratory, the following should be specified with regard to the calibration status of the main device:

- a) calibration of the main calibration device;
- b) the actual accuracy of the original calibration device;
- c) date of subsequent calibration of the original calibration device; and
- d) keeping records of the original calibration device performed by a reference laboratory.

**2.5 Keeping records of the calibration of aircraft ground power markers:**

2.5.1 After performing calibration, the markers calibration status must be clear. This means that we should identify calibrated markers in some way.

2.5.2 The reasons for keeping these records are:

- a) possibility of checking status and changes over time to determine the sequence of performing marker calibration; and
- b) proving the claim of markers being calibrated.

2.5.3 Calibration records should include:

- a) precise identification information of desired markers (type, name, serial number);
- b) the name of the person responsible and place of performing calibration;
- c) calibration date;
- d) subsequent calibration date;
- e) acceptable error range;
- f) serial number of standards used to calibrate markers;
- g) details of any adjustments, services, repairs and changes made; and
- h) the name of the person who performed the calibration.

### 3. CONCLUSION

3.1 As there are no regulations in place to monitor airport service companies in the ICAO documentation and Iran Civil Aviation Organization directly supervises airport service companies considering the need of the country and the fact that the ground-based device is the only device directly affecting the aircraft structure causing irreparable damage to the aircraft system, it is very important to control the output of this device before transmitting power, and in addition to programmatic visits to all components by maintenance and periodic repairs, checking the correctness of the operator and controlling their output numbers according to the defined standard can reduce the risk of damage to the aircraft electrical and electronic components and ensure flight safety. Accordingly, the Civil Aviation Organization of Iran has required handling service companies to calibrate ground power units in Calibration Companies licensed by the National Iranian Standards Organization. ICAO, needs to more emphasize the calibration of ground-based power devices to prevent consequences in its documentation while formulating regulations related to the requirements of airport service companies.

3.2 The Assembly is invited to develop airport services regulations and require airport service companies to calibrate ground power units.

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