English Translation Version for Reference Only

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Approved by：Xu Chaoqun

China Civil Aviation Technical Standard Order

This China Civil Aviation Technical Standard Order (CTSO) is issued according to Part 37 of the China Civil Aviation Regulations (CCAR-37). Each CTSO is a criterion which the concerned aeronautical materials, parts or appliances used on civil aircraft must comply with when it is presented for airworthiness certification.

Stall Warning Instruments

1. Purpose.

This CTSO applies to manufacturers who apply for CTSOA for stall warning instruments. This CTSO specifies the minimum performance criteria that stall warning instruments must meet to obtain approval and use the applicable CTSO mark.

2. Applicability.

This CTSO applies to applications filed from the date of its entry into force. According to the equipment approved by this CTSO, the design should be re-applied to CTSOA in accordance with CCAR-21-R4 Part 21.353.

3. Requirements

Stall warning instruments manufactured and intended to be marked with this CTSO mark on or after the effective date of this CTSO shall

meet the standards as set forth in SAE Aeronautical Standard AS 403A, “Stall Warning Instrument”, (revised July 15, 1958), with exceptions, and revision and additions to the standards as described below.

Revision and additions:

(i) The following specifically numbered parts in AS 403A do not concern minimum performance and therefore are not essential to compliance with this section: Parts 3.1; 3.1.1; 3.1.2; 3.2 (a), (b), (c), (d), (e), and (f).

(ii) In lieu of Part 7, it is a requirement that stall warning instruments covered by this section be capable of successfully passing the tests in Parts 7.1 through 7.7.

(iii) Thermal shock: This test shall apply to any hermetically sealed component. The component shall be subject to four cycles of exposure to water at 85° ± 2° C. and 5° ± 2° C. without evidence of moisture penetration or damage to coating or enclosure. Each cycle of the test shall consist of immersing the component in water at 85° ± 2° C. for a period of 30 minutes, and then within 5 seconds of removal from the bath, the component shall be immersed for a period of 30 minutes in the other bath maintained at 5° ± 2° C. This cycle shall be repeated continuously, one cycle following the other until four cycles have been completed. Following this test, the indictor shall be subjected to the Sealing test specified in (iv). No indicator leakage shall occur as a result

of this test.

(iv) Sealing: This performance test shall apply to each hermetically sealed instrument. The instrument shall be immersed in a suitable liquid, such as water. The absolute pressure of the air above the liquid shall them be reduced to approximately 1 inch of mercury (Hg) and maintained for 1 minute, or until air bubbles cease to be given off by the liquid, whichever is longer. The absolute pressure shall then be increased by 2 ½ inches Hg. Any bubbles coming from within the indicator case shall be considered as leakage and shall be cause for rejection. Bubbles which are the result of entrapped air in the various exterior parts of the case shall not be considered as leakage. Other test methods which provide evidence equal to the immersion test of the integrity of the instrument's seals may be used. If the instrument incorporates nonhermetically sealed appurtenances, such as a case extension, these appurtenances may be removed prior to the sealing test.

(v) Power malfunction indication: Means shall be incorporated in the instrument to indicate when adequate power (voltage and/or current) is not being made available to all phases required for the proper operation of the instrument. The indicating means shall indicate a failure or a malfunction in a positive manner, and be readily discernible under any lighting condition normally encountered in aircraft.

4. Marking.

a. A permanent and clear marking shall be provided for at least one of the main components, and the marking shall include all information specified in CCAR-21-R4, Section 21.423 (b).

b. In addition to the above requirements, range or rating (voltage) shall be shown.

5. Application Data Requirements.

Applicants must submit relevant technical data to the person responsible for the review of the project to support design and production approval. Submissions include the Conformity Statement specified in CCAR-21-R4 Part 21.353(1)1 and a copy of the following data.

a. Operating instructions and instrument limitations. This content should fully describe the operation capability of the equipment.

b. Installation procedures and limitations. It must be ensured that the equipment is still compliant with the requirements of this CTSO after installing the equipment in accordance with this installation procedure. Limitations must determine any unique requirements for installation and must include the following statements in a commentary:

“This equipment meets the minimum performance standards and quality standards required by the technical standards. For installation of this equipment, a separate installation approval is required.”

c. Installation schematic diagram.

d. installation wiring diagram.

e. A list of replaceable parts (indicating part number) that make up the equipment. If applicable, it should include a cross-reference to the supplier part number.

f. Component Maintenance Manual (CMM). Equipment periodic maintenance, calibration and repair requirements should be included to ensure continuous airworthiness of the equipment. If applicable, the recommended inspection interval and service life should be included.

g. List of materials and process specifications.

h. Provide a description of the quality system, as required by CCAR-21-R4, Part 21.358, including functional test specifications, For approved designs, the quality system should ensure that any changes that may adversely affect the compliance of the CTSO's minimum performance standards are detected and the equipment is rejected accordingly.

i. Manufacturer's CTSO qualification test report.

j. Nameplate drawings shall contain the information required by Part 4 of this CTSO.

k. Define drawings and process lists for equipment design (including revisions). Small changes to the design shall comply with the requirements of Part 21.369 of CCAR-21-R4. The revision of the list of

drawings should be approved by the Administrator.

6. Manufacturer Data Requirements.

In addition to the data submitted directly to the Administrator, the following technical data should be prepared for review by the authorities:

a. A functional qualification specification used to verify that each piece of equipment meets the requirements of this CTSO;

b. Equipment calibration procedure;

c. Continuing airworthiness documents (submitted within 12 months of the issuance of CTSOA);

d. Schematic diagram;

e. Wiring diagram;

f. Materials and process specifications.

7. Furnished Data Requirements.

To submit one or more equipment manufactured in accordance with this CTSO to an organization (such as an operator or repair station), a copy of the data in Sections 5.a through 5.f of this CTSO and other data including proper installation, validation, use, and continuous airworthiness for the stall warning instruments.

8. Availability of Referenced Documents.

SAE documents can be ordered from the following address:

“Society of Automotive Engineers, Inc”.

"400 Commonwealth Drive, WARRENDALE, PA 15096-001, USA"

Copies can also be ordered through the website "www.sae.org".