

ICS 17.160
CCS A 56

JJG

**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

JJG 338-2013

Replacing JJG 338-1997

**Verification Regulation of Charge Amplifiers
(English Translation)**

Issued on: January 1, 1970

Implemented on: January 1, 1970

**Issued by: General Administration of Quality Supervision, Inspection and
Quarantine**

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7.5 Test cycle (15)

Appendix A is equivalent to the lower limit frequency derivation (16)

Appendix B assay format recommended by the original record (17)

Appendix C calibration certificate/test results in the notice page and format (21)

Introduction

This procedure based on JJF1002-2010 "national verification procedures to write rules" for JJG 338-1997 "electricity Charge Amplifier" revision, compared with JJG 338-1997, in addition to editorial changes, the major technical changes are as follows.

- The "attenuation block" changed to "gain block";
- Abolition of the "accuracy of synthesis" is defined;
- Modify the charge amplifier INES, increased levels of "a", the abolition of the "accuracy" "0.5dB maximum frequency" and "distortion" level determination conditions, to increase the "gain block error" level determination condition;
- Improve the technical requirements normalized error, linearity error, and distortion;
- The "limit frequency" instead of looking for "high-pass filter cutoff frequency attenuation limit amount" of judgment;
- The "low-pass filter cut-off frequency error" on the decision to "low-pass filter cutoff frequency attenuation limit Determined quantity";
- Canceled "0.5dB maximum frequency" test project;
- Added "digital normalized block" and "verification method normalized error";
- Increasing the amplitude-frequency characteristics and phase-frequency characteristics of the measurement performance requirements;
- Refine the measurement of performance requirements integrator errors.

The previous versions of the release JJG 338-1997 case.

- JJG 338-1983.

Charge amplifier test procedures

1 Scope

The order applies to the charge amplifier initial verification, subsequent verification and the use of checks.

2. References

This procedure references the following documents.

JJG 233-2008 piezoelectric accelerometer test procedures JJG 449-2001 octave and 1/3 octave filter test procedures JJG 834-2006 Dynamic Signal Analyzer JJF1156-2006 vibration, shock, speed measurement terms and definitions JJF1269-2010 integrated circuit piezoelectric sensors (IEPE) amplifier calibration specification GB/T 20485.1-2008 vibration and shock sensor calibration methods - Part 1. Basic Concepts for dated references, only the dated edition applies to this procedure; undated reference documents Member, the latest edition (including any amendments) applies to this procedure.

3 terminology and units of measurement the following terms and definitions apply to this procedure.

3.1 Gain block gainswitch Charge amplifier "output amplifier" function module selector switch or button, which variables G , the unit it is V/Unit.

3.2 normalized block unityswitch Selector switch or button charge amplifier "normalization amplifier" function module, also called "sensor sensitivity Block "the variables are represented by S units of pC/Unit.

3.3 transmission coefficient Charge amplifier input and output voltage ratio of the amount of charge, with the T , in units of pC/V.

4 Overview

The charge amplifier is a preamplifier piezoelectric transducer, whose output voltage is proportional to the input charge. Electric charge Amplifiers are widely used in vibration, shock, force, pressure, sound intensity and other non-power electrical measurement in.

--- Core charge conversion level of the charge amplifier is a specific form of an operational amplifier, shown in Figure 1. Wherein C_i Sensor and wire equivalent capacitance, C_f is the feedback capacitor charge conversion stage.

According to the theory of the op amp open-loop gain and high input impedance of the charge amplifier and the output voltage e_o the relationship between the input electromotive force e_i see equation (1).

Potentials U_{sum} point 1 is almost zero, so-called virtual place, so the capacitor plates charge C_i Q_i the relationship between the electromotive force e_i can be expressed as a formula (2).