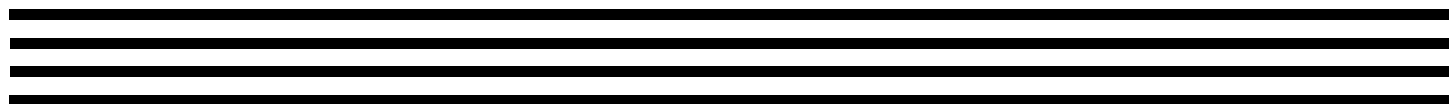


**ISA-S26-1968**

Approved October 22, 1966

Standard



# **Dynamic Response Testing of Process Control Instrumentation**



ISA-S26 — Dynamic Response Testing of Process Control Instrumentation

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## Foreword

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This Foreword is included for informational purposes and is not part of Standard S26.

This revision to the earlier series of ISA Recommended Practices has been prepared as a continuing part of the service of ISA toward a goal of uniformity in the field of instrumentation. To continue to be of service to those organizations and individuals who use it, this document should not be static. The Society welcomes all comments and criticism; address letters to the Standards and Practices Board Secretary, ISA, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, North Carolina 27709, telephone 919-549-5411, e-mail: standards@isa.org.

This document is an integration of four parts covering general recommendations for dynamic response testing, techniques for devices with pneumatic output signals, techniques for devices with electric output signals, and techniques for closed loop actuators for final control elements. The original editions were published in 1957, 1960, and 1961. The revisions providing pulse testing techniques, completed in 1966, have been added to the basic sine wave and step testing techniques. New or altered material is indicated by a vertical bar beside the text or drawing.

This composite ISA Standard was prepared by the Dynamic Response Testing Committee (SP26), established in 1956 with F. H. Winterkamp as Chairman. C. E. Ryker became Chairman in 1962. The purpose of this committee has been to establish guidelines for the successful application of dynamic response testing techniques to modern instruments and process lines. This subject has developed considerable interest among scientists and engineers concerned with accurate and efficient information from instrumental testing. The recommendations in this document are up-to-date with respect to the equipment commercially available to perform this type of testing.

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## 1 Purpose

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This ISA Standard constitutes a series recommending dynamic test procedures for measurement and control equipment for production processes.

With the continuing development and application of dynamic analysis to systems engineering, dynamic response test data are becoming an increasingly important part of overall performance data. Proper use of this standard should result in:

- a) Data that will characterize dynamic performance in a uniform comparable manner,
- b) data of value for control systems design as well as for performance characterization, and
- c) a maximum amount of useful data per testing dollar.

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## 2 Scope

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This ISA Standard establishes the basis for dynamic response testing of measurement and control equipment with pneumatic output and electric output and for closed loop actuators for externally actuated control valves and other final control elements. General recommendations applicable to all dynamic response testing and a brief glossary, defining terms as used in this standard, are also included. Tabular format is used to simplify application in the laboratory by those familiar with dynamic response testing. A minimum of discussion and descriptive material precedes the tabulation of recommended tests. Methods for sine wave, step, and pulse-type signals are included.

Final control elements take many forms, and the actuators may be powered and signalled pneumatically, electrically, or in combination. Externally actuated valves for controlling flow are most common in the process industries, but the final control element can be a controlled volume pump, motor speed control, or many others.

It would, of course, be desirable to have a system which relates the flow response of a control valve or a variable speed pump to the input signal of the closed loop actuator. It was the committee's feeling that it would not be practical to require this.

For the purpose of this ISA Standard, all final control elements will be considered as having an input signal and an output motion or rotation and no distinction will be made between power media.

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## 3 Factors to be considered in dynamic response testing

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### 3.1 Use of data

The application of dynamic response test data can be generally divided into two categories:

- 1) characterization of a control or measuring device.
- 2) control system design.