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Standard

Graphic Symbols for Distributed Control/Shared Display Instrumentation, Logic and Computer Systems

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Preface

This preface is included for informational purposes and is not part of ISA-S5.3.

This Standard has been prepared as a part of the service of ISA toward a goal of uniformity in the field of instrumentation. To be of real value, this document should not be static but should be subject to periodic review. Towards this end, the Society welcomes all comments and criticisms and asks that they be addressed to the Secretary, Standards and Practices Board, ISA, 67 Alexander Drive, P.O. Box 12277, Research Triangle Park, North Carolina 27709, telephone 919-549-8411, e-mail: standards@isa.org.

The ISA Standards and Practices Department is aware of the growing need for attention to the metric system of units in general, and the International System of Units (SI) in particular, in the preparation of instrumentation standards. The Department is further aware of the benefits to USA users of ISA Standards of incorporating suitable references to the SI (and the metric system) in their business and professional dealings with other countries. Towards this end this Department will endeavor to introduce SI and SI-acceptable metric units in all new and revised standards to the greatest extent possible. *The Metric Practice Guide,* which has been published by the American Society for Testing and Materials as ANSI designation Z210.1 (ASTM E380-76. IEEE Std. 268-1975), and future revisions, will be the reference guide for definitions, symbols, abbreviations, and conversion factors.

The systems referenced in this Standard are based on advances in control systems technology since the publication of ISA-S5.1, "Instrumentation Symbols and Identification." During recent years, technology has evolved in terms of microprocessor-based systems presently manufactured by many companies as "Distributed Control Systems."

These systems may include components identified as "computers" as distinct from the integral processor, which derives the various functions of the system. The computer component may be integrated into the overall system, via the communication link, or it may be a stand-alone computer.

In attempting to implement these systems, the need for supplementary symbolism has become apparent.

The symbols defined in ISA-S5.3 are intended to complement those of ISA-S5.1, "Instrumentation Symbols and Identification," for use on flow diagrams. In this way, the integration of distributed controllers and process computers into the more traditional instrument systems — analog, binary, and digital — can be depicted clearly on flow diagrams and other documents to give an overall and comprehensive picture of how process variables are measured and controlled.

Distributed control systems appear to be similar to each other; however, they are so diverse in philosophy that there must be a generic way to document their application.

The second printing of ISA-S5.3, dated April 1983, was published to correct errors in the original 1982 edition. The definition for communication link, Section 3, has been corrected and an omitted abbreviation, C.R.T., added. Minor clarifications were also made to the Appendix A artwork.

The ISA Standards Committee on Graphic Symbols for Distributed Control/Shared Display Instrumentation, Logic, and Computer Systems, SP5.3, operates within the ISA Standards and Practices Department, Dr. Thomas J. Harrison, Vice President. The persons listed below served as members of the SP5.3 Committee.

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This Standard was approved for publication by the ISA Standards and Practices Board in June 1982.

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Contents

1 Purpose

The purpose of this standard is to establish documentation for that class of instrumentation consisting of computers, programmable controllers, minicomputers and micro-processor based systems that have shared control, shared display or other interface features. Symbols are provided for interfacing field instrumentation, control room instrumentation and other hardware to the above. Terminology is defined in the broadest generic form to describe the various categories of these devices.

It is not the intent of this standard to mandate the use of each type symbol for each occurrence of a generic device within the overall control system. Such usage could result in undue complexity in the case of a Piping and Instrument Drawing (P&ID). If, for example, a computer component is an integral part of a distributed control system, the use of the computer symbol would normally be an undesirable redundancy. If, however, a separate general purpose computer is interfaced with the system, the inclusion of the computer symbol may provide the degree of clarity needed for control system understanding.

This standard attempts to provide the users with defined symbolism and rules for usage, which may be applied as needed to provide sufficient clarity of intent. The extent to which these symbols are applied to various types of drawings remains with the users. The symbols may be as simple or complex as needed to define the process.

2 Scope

This standard satisfies the requirements for symbolically representing the functions of distributed control/shared display instrumentation, logic, and computer systems. The instrumentation is generally composed of field hardware communication networks and control room operator devices. This standard is applicable to all industries using process control and instrumentation systems.

No effort will be made on the flow diagram to explain the internal construction, configuration, or method of operation of this type of instrumentation, logic and computer systems. Personnel needing to understand flow diagrams must have a basic understanding of the total system in order to correctly interpret the diagram. The type of computation or the use of the process variable within a program is not indicated except in those cases where the process variable is an integral part of the control strategy. In applications where all instrument system data base information is available to the computer via the communication link, the depiction of the computer interconnections is optional in order to conserve space on flow diagrams.

2.1 Application to work activities

This standard is intended for use whenever any reference to an instrument is required. Such references may be required for the following uses as well as others:

Flow diagrams, process and mechanical;

Instrumentation system diagrams;

Specifications, purchase orders, manifests, and other lists;