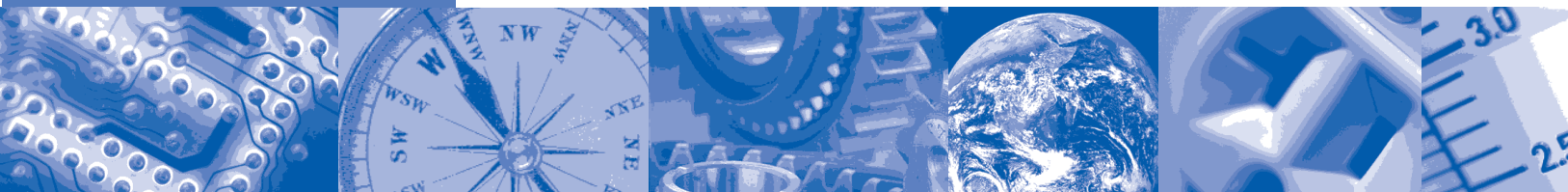


ISA-5.2-1976 (R1992)

Formerly ANSI/ISA-5.2-1976 (R1992)



Binary Logic Diagrams for Process Operations



ISA—The Instrumentation,
Systems, and
Automation Society

Reaffirmed 13 July 1992



Documents

Document Sharing Hub

ISA-5.2-1976 (R1992)
Binary Logic Diagrams for Process Operations

ISBN 0-87664-331-4

Copyright © 1976 by the Instrument Society of America. All rights reserved. Printed in the United States of America. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), without the prior written permission of the publisher.

ISA
67 Alexander Drive
P.O. Box 12277
Research Triangle Park, North Carolina 27709

Preface

This preface is included for informational purposes and is not part of ISA-5.2-1976 (R1992).

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. Toward 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, NC 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. Toward this end this Department will endeavor to introduce 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. 286-1975), and further revisions, will be the reference guide for definitions, symbols, abbreviation, and conversion factors.

It is the Policy of ISA to encourage and welcome the participation of all concerned individuals and interests in the development of ISA Standards. Participation in the ISA Standards making process by an individual in no way constitutes endorsement by the employer of that individual of ISA or any of the Standards which ISA develops.

The system described in this Standard is intended to meet the needs of people who are concerned with the operation of process systems. The guide for the Standard was American National Standards Institute (ANSI) Standard Y32.14.1973, Graphic Symbols for Logic Diagrams, which the committee attempted to follow so far as practical for the intended users of the ISA Standard.

The Committee also referred to National Electric Manufacturers Association Standards ICS 1-102, Graphic Symbols for Logic Diagrams, whose symbols bear resemblance to those of the ANSI Standard, and ICS 1-103, Static Switching Control Devices, which may eventually be supplanted by ICS 1-102. Reference was also made to National Fluid Power Association Recommended Standard T.3.7.68.2, Graphic Symbols for Fluidic Devices and Circuits. In addition, numerous other industrial standards were reviewed.

The following people served on the 1976 SP5.2 Committee:

NAME

COMPANY

George Platt, Chairman
Edward J. Blahut
Sanford Chalfin
Louis Costea
Russell C. Greer
Roy Lazar

Bechtel Power Company
Procon Incorporated, Pacific Operations
Fluor Corporation
Hunt-Wesson Foods, Incorporated
Bailey Meter Company
Carnation Company

Frank Mehle (deceased)
Gary L. Pierce
Chuck Simms
John Vance
Robert Woo

Procon Incorporated, Pacific Operation
Shell Oil Company
Fisher Controls Company
United Process Control Systems
Los Angeles Department of Water & Power

The following people served on the 1981 (reaffirmation) SP5.2 Committee:

NAME

COMPANY

Russell C. Greer, Chairman
Edward J. Blahut
Sanford Chalfin
Louis Costea
Roy Lazar
Gary L. Pierce
George Platt
Charles Simms
John Vance
Robert Woo

Bailey Controls Company
Blahut Engineering, Inc.
Fluor Corporation (retired)
Hunt-Wesson Foods, Inc.
Carnation Company
Shell Oil Company
Bechtel Power Corporation
Fisher Controls Company
Comsysco
Los Angeles Department of Water & Power

The 1976 edition of this Standard was approved by the ISA Standards and Practices Board in November, 1975.

NAME

COMPANY

W. B. Miller, Chairman
P. Bliss
E. J. Byrne
W. Calder
B. A. Christensen
L. N. Combs
R. L. Galley
R. G. Hand, Secretary
T. J. Harrison
T. S. Imsland
P. S. Lederer
O. P. Lovett, Jr.
E. C. Magison
R. L. Martin
A. P. McCauley
T. A. Murphy
R. L. Nickens
G. Platt
A. T. Upfold
K. A. Whitman

Moore Products Company
Pratt & Whitney Aircraft Company
Brown & Root, Inc.
The Foxboro Company
Continental Oil Company
E. I. du Pont de Nemours & Company (retired)
Bechtel Power Corporation
ISA
IBM Corporation
Fisher Controls Company
National Bureau of Standards
E. I. du Pont de Nemours & Company
Honeywell, Inc.
Tex-A-Mation Engineering Inc.
Glidden-Durkee Div. SCM Corporation
The Fluor Corporation, Ltd.
Reynolds Metals Company
Bechtel Power Corporation
Polysar Ltd.
Allied Chemical Corporation

This standard was reaffirmed by the ISA Standards and Practices Board in March, 1981.

NAME

COMPANY

T. J. Harrison, Chairman	IBM Corporation
P. Bliss	Consultant
W. Calder	The Foxboro Company
B. A. Christensen	Continental Oil Company
M. R. Gorden-Clark	Scott Paper Company
R. T. Jones	Philadelphia Electric Company
R. Keller	Boeing Company
O. P. Lovett, Jr.	Jorden Valve
E. C. Magison	Honeywell, Inc.
A. P. McCauley	Diamond Shamrock Corporation
E. M. Nesvig	ERDCO Engineering Corporation
R. L. Nickens	Reynolds Metals Company
G. Platt	Bechtel Power Corporation
R. Prescott	Moore Products Company
R. W. Signor	General Electric Company
W. C. Weidman	Gilbert Associates, Inc.
K. A. Whitman	Allied Chemical Corporation
L. N. Combs*	
R. L. Galley*	
R. G. Marvin*	
W. B. Miller*	Moore Products Company
J. R. Williams*	Stearns-Rogers, Inc.

*Director Emeritus



Documents

Document Sharing Hub

Document ID: 123456789

Contents

1 Purpose 9

2 Scope 9

3 Use of symbols 9

4 Symbols 11

5 Bibliography 18

Appendix A —General application example 19

Appendix B —Complex time-element example 26

Appendix C — Loss of power supply for memory 27

1 Purpose

1.1 The purpose of this Standard is to provide a method of logic diagramming of binary interlock and sequencing systems for the startup, operation, alarm, and shutdown of equipment and processes in the chemical, petroleum, power generation, air conditioning, metal refining, and numerous other industries.

1.2 The Standard is intended to facilitate the understanding of the operation of binary systems, and to improve communications among technical, management, design, operating, and maintenance personnel concerned with the systems.

2 Scope

2.1 The Standard provides symbols, both basic and non-basic, for binary operating functions. The use of symbols in typical systems is illustrated in appendices.

2.2 The Standard is intended to symbolize the binary operating functions of a system in a manner that can be applied to any class of hardware, whether it be electronic, electrical, fluidic, pneumatic, hydraulic, mechanical, manual, optical, or other.

3 Use of symbols

3.1 By using the symbols designated as "basic," logic systems may be described with the use of only the most fundamental logic building blocks. The remaining symbols, not basic, are more comprehensive and enable logic systems to be diagrammed more concisely. Use of the non-basic symbols is optional.

3.2 A logic diagram may be more or less detailed depending on its intended use. The amount of detail in a logic diagram depends on the degree of refinement of the logic and on whether auxiliary, essentially non-logic, information is included.

As an example of refinement of detail: A logic system may have two opposing inputs, e.g., a command to open and a command to close, which do not normally exist simultaneously; the logic diagram may or may not go so far as to specify the outcome if both the commands were to exist at the same time. In addition, explanatory notes may be added to the diagram to record the logic rationale.

Non-logic information may also be added, if desired, e.g., reference document identification, tag numbers, terminal markings, etc.

In these ways, the diagram may provide the level of detail appropriate, for example, for communication between a designer of pneumatic circuits and a designer of electric circuits, or may provide a broad-view system-description for a plant manager.