AMERICAN NATIONAL STANDARD

ANSI/ISA-96.02.01-2016

Guidelines for the Specification of Electric Valve Actuators

Approved 17 March 2016

ANSI/ISA-96.02.01-2016
Guidelines for the Specification of Electric Valve Actuators

ISBN: 978-1-941546-90-1

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

Preface

This preface, as well as all footnotes and annexes, is included for information purposes and is not part of ANSI/ISA-96.02.01-2016.

This document has been prepared as 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; Fax (919) 549-8288; 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, recommended practices, and technical reports to the greatest extent possible. *Standard for Use of the International System of Units (SI): The Modern Metric System*, published by the American Society for Testing and Materials as IEEE/ASTM SI 10-97, and future revisions, will be the reference guide for definitions, symbols, abbreviations, 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, recommended practices, and technical reports. Participation in the ISA standards-making process by an individual in no way constitutes endorsement by the employer of that individual, of ISA, or of any of the standards, recommended practices, and technical reports that ISA develops.

CAUTION — ISA ADHERES TO THE POLICY OF THE AMERICAN NATIONAL STANDARDS INSTITUTE WITH REGARD TO PATENTS. IF ISA IS INFORMED OF AN EXISTING PATENT THAT IS REQUIRED FOR USE OF THE DOCUMENT, IT WILL REQUIRE THE OWNER OF THE PATENT TO EITHER GRANT A ROYALTY-FREE LICENSE FOR USE OF THE PATENT BY USERS COMPLYING WITH THE DOCUMENT OR A LICENSE ON REASONABLE TERMS AND CONDITIONS THAT ARE FREE FROM UNFAIR DISCRIMINATION.

EVEN IF ISA IS UNAWARE OF ANY PATENT COVERING THIS DOCUMENT, THE USER IS CAUTIONED THAT IMPLEMENTATION OF THE DOCUMENT MAY REQUIRE USE OF TECHNIQUES, PROCESSES, OR MATERIALS COVERED BY PATENT RIGHTS. ISA TAKES NO POSITION ON THE EXISTENCE OR VALIDITY OF ANY PATENT RIGHTS THAT MAY BE INVOLVED IN IMPLEMENTING THE DOCUMENT. ISA IS NOT RESPONSIBLE FOR IDENTIFYING ALL PATENTS THAT MAY REQUIRE A LICENSE BEFORE IMPLEMENTATION OF THE DOCUMENT OR FOR INVESTIGATING THE VALIDITY OR SCOPE OF ANY PATENTS BROUGHT TO ITS ATTENTION. THE USER SHOULD CAREFULLY INVESTIGATE RELEVANT PATENTS BEFORE USING THE DOCUMENT FOR THE USER'S INTENDED APPLICATION.

HOWEVER, ISA ASKS THAT ANYONE REVIEWING THIS DOCUMENT WHO IS AWARE OF ANY PATENTS THAT MAY IMPACT IMPLEMENTATION OF THE DOCUMENT NOTIFY THE ISA STANDARDS AND PRACTICES DEPARTMENT OF THE PATENT AND ITS OWNER.

ADDITIONALLY, THE USE OF THIS DOCUMENT MAY INVOLVE HAZARDOUS MATERIALS, OPERATIONS OR EQUIPMENT. THE DOCUMENT CANNOT ANTICIPATE ALL POSSIBLE APPLICATIONS OR ADDRESS ALL POSSIBLE SAFETY ISSUES ASSOCIATED WITH USE IN HAZARDOUS CONDITIONS. THE USER OF THIS DOCUMENT MUST EXERCISE SOUND

PROFESSIONAL JUDGMENT CONCERNING ITS USE AND APPLICABILITY UNDER THE USER'S PARTICULAR CIRCUMSTANCES. THE USER MUST ALSO CONSIDER THE APPLICABILITY OF ANY GOVERNMENTAL REGULATORY LIMITATIONS AND ESTABLISHED SAFETY AND HEALTH PRACTICES BEFORE IMPLEMENTING THIS DOCUMENT.

THE USER OF THIS DOCUMENT SHOULD BE AWARE THAT THIS DOCUMENT MAY BE IMPACTED BY ELECTRONIC SECURITY ISSUES. THE COMMITTEE HAS NOT YET ADDRESSED THE POTENTIAL ISSUES IN THIS VERSION.

The following people served as members of ISA96.02 and contributed to this standard:

NAME	COMPANY
V. Mezzano, Chair	Fluor Corp.
W. Weidman, Managing Director	Consultant
L. Fletcher	Emerson Process Management
C. Johnson	Rotork Controls Inc.
A. Michelson	Sunbelt Supply
D. Quintero	Pentair Valves & Controls
S. Richardson	Kinetrol USA Inc.
S. Samy	CCI
K. Walker	Flowserve Corp.
J. Young	The Dow Chemical Company

The following people served as members of ISA96 and contributed to this standard:

NAME	COMPANY
V. Mezzano, Chair	Fluor Corp.
W. Weidman, Managing Director	Consultant
M. Bober	Copes-Vulcan
S. Boyle	Metso Automation USA Inc.
K. Enos	Rexa, Inc.
M. Ezekiel	BP Americas
E. Holtgraver	QTRCO Inc.
D. Leese	Automation Technology (ATI)
G. Liu	Consultant
S. Meunier	Cowan Dynamics Inc.
A. Michelson	Sunbelt Supply
D. Quintero	Pentair Valves & Controls
S. Samy	CCI
F. Washburn	Rotork Controls
L. Winkel	Flowserve
Y. Yermanos	Oleoducto de los Llanos Orientales
J. Young	The Dow Chemical Company

This standard was approved for publication by the ISA Standards and Practices Board on 2 March 2016.

NAME	COMPANY
N. Sands, Vice President	DuPont
D. Bartusiak	ExxonMobil Research & Engineering
P. Brett	Honeywell Inc.
E. Cosman	OIT Concepts, LLC
D. Dunn	Consultant

J. Federlein	Federlein & Assoc. LLC
B. Fitzpatrick	Wood Group Mustang
J. Gilsinn	Kenexis Consulting
J.-P. Hauet	KB Intelligence
J. Jamison	Encana Corp.
D. Lee	UCDS
K.-P. Lindner	Endress+Hauser Process Solutions AG
T. McAvinew	Consultant
V. Mezzano	Fluor Corp.
C. Monchinski	Automated Control Concepts Inc.
D. Reed	Rockwell Automation
H. Sasajima	Azbil Corp.
T. Schnaare	Rosemount Inc.
J. Tatera	Tatera & Associates Inc.
K. Unger	Consultant
I. Verhappen	Industrial Automation Networks
D. Visnich	Burns & McDonnell
W. Weidman	Consultant
J. Weiss	Applied Control Solutions LLC
M. Wilkins	Yokogawa
D. Zetterberg	Chevron Energy

This page intentionally left blank.

Contents

1 Scope

This standard covers the development of specifications, minimum design requirements and sizing criteria for electric actuators.

This standard is not intended to address the range of compact, light duty low torque electric actuators typically rated for less than 5.65 Nm (50 in-lbs), and it is not intended for electrically powered actuators that use hydraulic fluid for power transmission (refer to ANSI/ISA-96.06.01).

2 Purpose

The purpose of this standard is to provide a guide to assist the user in specifying electric valve actuators.

3 Design types

3.1 Actuator design categories

3.1.1 intrusive:
this version requires opening of the electrical enclosure for commissioning or troubleshooting activities such as setting of mechanical travel limit and torque switches, adjusting position feedback, and internal signal monitoring.

3.1.2 non-intrusive:
this version does not require opening of the electrical enclosure for commissioning or troubleshooting activities. Microprocessor-based controls, including status and diagnostics, are accessible externally to the actuator.

3.2 Actuator motion

3.2.1 part-turn:
an actuator which transmits torque to the valve for less than one revolution. It does not have to be capable of withstanding thrust. A combination of a multi-turn actuator plus a part-turn gearbox may be considered a part-turn actuator.

3.2.2 multi-turn:
an actuator which transmits torque to the valve/gearbox for at least one revolution. It may be capable of withstanding thrust. A combination of a multi-turn actuator plus a multi-turn gearbox may be considered a multi-turn actuator.

3.2.3 linear:
an actuator which transmits thrust to the valve for a defined linear stroke. A combination of a multi-turn actuator plus a linear drive may be considered a linear actuator.

4 User defined requirements

These items are required to properly specify an electric valve actuator. If these items are not explicitly covered in the specification and/or purchasing documents for the actuator, the actuator manufacturer’s standards will apply.