IFAC INFORMATION BULLETIN

No. 59 August 10, 1970

International Federation of Automatic Control

Published by the IFAC Secretary
G. Ruppel · Postfach 113
D 4000 Düsseldorf · Germany

## Automatic Control Terminology

### 1969 Annual Survey of U.S. Standards Activities

The 1969 U.S. compilation of control standards which updates the previous one on the year 1968 in IFAC Bulletin No. 52 gives terms, definitions, letter symbols, graphical symbols, abbreviations, and stylized codes für broad classes of hardware and software. It also includes work at the international level, stressing the evolution of and the growing need for cooperation in the development of worldwide standards.

IFAC is indebted to the magazine "Control Engineering" having given the permission to the reprint of the survey from the June 1970 issue, vol. 17, No. 6, pages 86 through 89.

**AEC** U.S. Atomic Energy Commission
Washington, D.C. 20545

The Div. of Reactor Development and Technology issued in December 1969 *Tentative Standard RDT C-16-1T. Supplementary Criteria*, and *Requirements for RDT Reactor Plant Protection Systems*. Cognizant Engineer is E. C. Wenzinger, Instrumentation and Control Branch.

**AIIE** American Institute of Industrial Engineers
345 East 47th St.
New York 10017

A reprint from the AIIE Journal, November 1965, lists some 700 terms in industrial engineering, and tentative definitions—terms such as control system, flow process chart, performance index, and sensitivity analysis. This manual is currently under review by a committee chaired by Prof. D. W. Karger, Rensselaer Polytechnic Institute, and a new edition is expected in 1971.

**ANSI** American National Standards Institute
1430 Broadway
New York 10018

ANSC C-100, Electrical Reference Measuring Instruments and Devices, met in October and heard subcommittee chairmen discuss draft documents on dc ratio devices (Carl Boyer), voltage type transformer dividers (R. F. Estoppey), ac/dc transfer devices (C. P. DeWitt), unsaturated standard cells (K. E. Miller), saturated standard cells (George Vincent), and dc null detection (J. R. Yeager). Chairman D. W. Braudaway will appoint one group to develop safety practices, and another to review proposed IEC/SC13B, *Recommendations on Standard Cells and Precision Resistors*. Standard C-100-3, *Precision Resistors*, has just been approved, and C-100-1, *Potentiometric Voltage Dividers*, will soon be voted a full standard.

**ASCE** American Society of Civil Engineers
345 East 47th Street
New York 10017

Manual 13, *Nomenclature on Hydraulics*, has been prepared by a task committee. It contains symbols, abbreviations, and a text of over 500 pages covering hydraulic terms.

The ASCE, along with the American Public Health Assn., the American Water Works Assn., and the Water Pollution Control Federation, has prepared a 387-page *Glossary of Water and Wastewater Control Engineering*. Although aimed at practicing engineers and those interested in pollution control, the glossary makes only minor references to control instrumentation.

**BEMA** Business Equipment Manufacturers Assn.
235 East 42nd St.
New York 10017

BEMA is the sponsor of ANSC X3, *Information Processing Standards*. The association works closely with the European Computer Manufacturers Assn. (ECMA), and together they supply much of the technical input to ISO TC 97. The following BEMA committees are working on projects of interest to the control engineer:

ANSC X3.2/ECMA/TC. and ISO TC97/SC2 are developing a code extension philosophy and procedure. Classes of control characters are being defined. The Escape character will provide for an infinite number of additional characters. A family of eight-bit codes is being developed; additional control characters will cater to the needs of graphic display devices.

ANSC X3.4.3 and ECMA/TC8 are working on clarification of the FORTRAN Standard (X3.9, X3.10).

ANSC X3.5 has completed a *Vocabulary for Information Processing*, which should be available from ANSI very soon. Terms were compiled and edited by computer and fed directly into a typesetting machine. ANSC X3.5.2 with ISO TC97/SC1 is developing a structured glossary in which terms applying to a specific area are defined in context and are related to each other. An alphabetical index aids in finding individual terms. This work provides a method for deriving terms having the same meaning for various languages.

ANSC X3.8 is developing standard representation for subject matter of common interest, including data elements for times, individuals, organizations, places, numeric values, and other elements involved in data interchange.

ANSC X3.9 has completed a work program for standardizing the channel level interface between the central processor and the device controller. Plug compatibility standards at the device level are anticipated in the future.

## IAP Instituto Argentino Del Petroleo
**Buenos Aires, Argentina**

Juan A. L. Lavenas, Director General, has announced the publication of a 30-page *Terminologia de Control Automatico*, prepared by a 14-man committee headed by Jorge P. Gonzalez. The booklet relates particularly to the petroleum and petrochemical industries, and extends the English-Spanish translation of ANSI C85.1-1963, sponsored by AACC and ASME. This IAP committee is also at work on standards for instrumentation symbols and identification, and instrument installation and inspection.

## IEC International Electrotechnical Commission
**1, rue de Varembe**
**Geneva, Switzerland**

IEC/TC1/WG37, chaired by Prof. Jean Charles of the Institut belge de Regulation et d'Automatisme, has prepared a new edition of the *International Electrotechnical Vocabulary Group 37, Automatic Controlling and Regulating Systems*. The vocabulary was discussed at an IEC meeting in Washington, D.C. D. H. Smith, Bell Telephone Laboratories, a member of IEC/TC65/WG1, represented the U.S.

IEC/TC3, Graphical Symbols, met in Copenhagen Jan. 14-17, 1969, to discuss graphical logic and functional symbols for diagrams of binary devices. The 21 delegates recommended both rectangular and semicircular symbols for inputs and outputs, combinative elements, delay elements, and sequential elements. The intent is to cover both electrical and nonelectrical systems, and to provide space inside the symbols for indicating function, terminal labels, and numbers. P. M. Larsen, Technical University of Denmark, was an observer for IFAC.

H. L. Mason of the U.S. National Bureau of Standards, Secretary of IEC/TC25/WG4, Letter Symbols for Automatic Control, reports that a draft was to have been presented at a meeting in Philadelphia, May 21 and 25, 1970.

IEC/TC65, Process Control Systems, has three working groups in addition to WG1 on terminology. WG2 is concerned with service conditions, WG3 with safety of process and environment, and WG4 with compatibility of signals (both electrical and nonelectrical) between system elements. W. H. Howe of SAMA attended the Baden-Baden meeting in June at which WG4 proposed 0-20 ma or 4-20 ma. For pneumatics, 3-15 psi, 3-27 psi, 0.2-1.0 kg/cm $^2$, and 0.2-1.0 bar were recommended.

## IEEE Institute of Electrical and Electronics Engineers
**345 East 47th St.**
**New York 10017**

The terms and definitions of *A Glossary of Modern Control Technology*, prepared by a group headed by G. S. Axelby, Westinghouse Electric Corp., will be included in the *IEEE Dictionary* to be published later this year.

## IFAC The International Federation for Automatic Controls
**Postfach 1139**
**Dusseldorf 1, Germany**

A Round Table on Standards and Terminology at the Fourth IFAC Congress, Warsaw, June 1969, presented reports on current progress and future plans from the following organizations:

*IEC/TC 1/WG 37, Servosystems and Automatic Regulators*
*IEC/TC 3, Graphical Symbols*
*IEC/TC 13, Measuring Instruments*
*IEC/TC 25, Letter Symbols and Signs*
*IEC/TC 45, Measurement of Ionizing Radiation*
*IEC/TC 65, Process Control Systems*
*IFIP/TC 1.1, Information Processing Terminology*
*IMEKO, International Measurement Confederation*
*ISO/TC 10/SC 3, Graphical Symbols for Instrumentation*
*ISO/TC 37, Terminology Principles and Coordination*
*ISO/TC 85/WG 1, Nuclear Energy*
*ISO/TC 97, Computers and Data Processing; WG K, Abbreviations for SI Units; SC 1, Glossary; and SC 8, Numerical Control of Machine Tools*
*ISO/TC 124, Industrial Process Control Instruments*
*OIML, International Organization for Legal Metrology*
*UCPTE, Interconnected Transmission Systems*

A summary of these reports is available from H. L. Mason, U.S. National Bureau of Standards, who is vice-chairman of IFAC Terminology Committee.

D. T. Broadbent of GEC-Elliott Automation, chairman of the Terminology Committee, is planning a 1972 edition of the *IFAC Multilingual Dictionary*, and will seek to resolve confusion over the terms sensing element, sensor, measuring converter, measuring transducer, and transmitter.

## IPC The Institute of Printed Circuits
**1717 Howard St.**
**Evanston, Ill. 60202**

IPC publishes a *Technical Manual* which currently includes 14 documents whose subjects range from standard tolerances to procedures for design, assembly, and test. A preliminary draft, IPC-T-50, on Terms and Definitions is awaiting approval.

## ISA Instrument Society of America
**530 William Penn Place**
**Pittsburgh 15219**

ISA published two new standards in 1969: S26, *Dynamic Response Testing of Process Control Instrumentation*, was compiled from previously published recommended practices. Pulse testing techniques were added to the basic sine wave and step testing techniques. S37.-

10, *Specifications and Tests for Piezoelectric Pressure and Sound-Pressure Transducers*, contains all new material.

S7.1, *Pneumatic Control Circuit Pressure Test*, and two previously published recommended practices were revised and approved for publication as standards, as was S7.2, *Color Code for Panel Tubing*.

S12.4, *Instrument Purging for Reduction of Hazardous Area Classification*, one of the electrical safety standards, has been completely rewritten with a change in technical content. S37.-1, *Electrical Transducer Nomenclature and Terminology*, an original aerospace recommended practice, has been rewritten for general use in the instrumentation community. S37.3, *Specifications and Tests for Strain Gauge Pressure Transducers*, another former aerospace recommended practice, has been rewritten to cover most industry and scientific fields.

ISA organized two new standards writing committees in 1969: SP55, Hardware Testing of Digital Process Computers, will prepare a guide for technical personnel whose duties include specifying, checking, testing, and determining the performance of digital process computers. The chairman is K. A. Whitman, Allied Chemical Corp., New York. SP56, Valve Connection Designations, will develop a uniform means of designating fluid connections for valves of all functional types. The chairman is Herbert Gilbert, Fluor Corp., Los Angeles.

ISA's SP5 Committee on Instrument Flow Plan Symbols, with G. Platt of Bechtel Corp. as chairman, is responsible for the publication in 1968 of Standard 5.1, *Instrument Symbols and Identification*, the activities of SP5.2, Process Logic Diagram Symbols, and SP5.3 Instrument-Computer Interties Committees. SP5.2 is developing a uniform means of specifying operating requirements of process systems controlled by binary instruments. A final draft of the standard is expected by June 1971. The SP5.3 Committee, chaired by C. Clay of Harvey Aluminum, is working in conjunction with ANSI Y32, but the scope has yet to be developed.

Work is continuing in the SP51 Committee on Measurement and Control Terminology. The committee was activated in June 1968 at the request of the Process Measurement and Control Section of SAMA. It is chaired by T. S. Imsland of Fisher Controls, who foresees 1974 publication.

The Control Centers Committee (CCC), established in 1969 by the Process Measurement and Control Div. of ISA, is now in the final stages of formulating a control center specification. Chairman R. Borut of M. W. Kellogg states that the specification will be used as a base for all deviations required. It includes graphic symbolization, terminology, construction, and piping and wiring specifications. The committee is also planning a Control Centers session at the 1970 ISA Annual Conference and Exhibit in Philadelphia.

The *IFAC Multilingual Dictionary of Automatic Control Terms* developed in 1967 under the leadership of D. T. Broadbent is still available from ISA. Published in six languages, it is to be updated by 1972.

Two new publications being drafted are a *Glossary on Digital Computer-Based Process Control*, under the direction of T. J. Williams, Purdue University, and a *Valve Handbook* edited by J. Hutchinson, Honeywell. The handbook will have 11 chapters prepared by as many members of the Final Control Elements Committee, Automatic Control Div.

## ISO International Organization for Standardization
**1, rue de Varembe**
**Geneva, Switzerland**

Secretary General Olle Sturen will publish a revision of *Directives for the Technical Work of ISO*. All recommendations are to be reviewed at five-year intervals.

For ISO/TC124/WG5, Dimensions of Instruments, W. H. Howe, consultant to SAMA, has discussed with the National Electrical Manufacturers Assn. and others a ten-page U.S. position document 2.3.1.2-U.S. It recommends a grid-pattern approach to replacing the German proposal for panel-mounted instruments with 12-mm widths and a fixed width/depth ratio. The U.S. document is only partly compatible with proposals of IEC/TC13/WG4, Relay Rack Mounted Measuring Instruments, chaired by M. M. Triplett.

Working Group 3 of ISO/TC124 met in Paris in November to discuss methods of testing and evaluating performance of controllers, positioners, and transmitters, both electrical and pneumatic.

Working Group 6 of ISO/TC124 met in Budapest in October to discuss $E_v$ values and face-to-face dimensions for valves. Hans Baumann of Masoneilan International was the U.S. delegate.

At a TC10/SC3 meeting in Berlin, Jan. 19-23, G. Platt, Bechtel Corp., and L. Costea, Hunt-Wesson Foods, represented the U.S. Flowchart letter symbols to designate instruments for analytical composition, event counting, scanning, emergency signaling, visual indication, and switching were all discussed. Graphical symbols for both manual and remotely actuated valves were proposed.

S. R. Beitler of ASME, chairman of the U.S. Committee for ISO/TC30, Fluid Flow in Closed Conduits, has prepared an excellent report on recent activities of TC30.

Publications completed during the past year by ISO/TC37, Terminology Principles and Coordination, are: R919-1969, *Guide for the Preparation of Classified Vocabularies* (example of method); R1087-1969, *Vocabulary of Terminology*; and R1149-1969, *Layout of Multilingual Classified Vocabularies*. Draft Recommendation 1951 on lexicographical symbols is being circulated for approval, and Draft Proposal 37N-186 on an international color code for languages is being edited before review.

ISO/TC97, Computers and Information Processing, has published R1028 (1969), *Flowchart Symbols for Information Processing*, which established graphical symbols useful for automatic data processing systems. SC1 Terminology, at meetings in Washington and Paris, has completed terms and definitions covering fundamentals, organization of data, representation of data, and preparation and handling of data. Task groups are at work on chapters covering mathematics and logic, arithmetic and logic operations, formalization and preparation of programs, and programming techniques. SC1 met again in Berlin, June 1-5.

J. Nitkiewicz, Ex-Cello Corp., headed the U.S. delegation to the meeting in Naples of TC97/SC8, which dealt with machine tool numerical control. About 50 terms and definitions were recommended for the consideration of SC8, grouped as General Terms, Programming, and Machine. Other terms were assigned but held for definitions review, some were not assigned but held for review, and others were deferred to SC1 or SC5 (Programming Languages). Adaptive control terms were considered at the May meeting in Berlin.

## NBS U.S. Department of Commerce National Bureau of Standards Washington, D.C. 20234

A reference collection of some 19,000 voluntary engineering standards prepared by 350 different U.S. technical societies and trade associations is maintained by W. J. Slattery of the Institute for Applied Technology. Its computer-compiled KWIC index permits him to refer an inquirer to any organization issuing a specific standard.

## NEMA National Electrical Manufacturers Assn. 155 East 44th St. New York 10017

NEMA sponsors several of the subcommittees of ANSI C39, Electrical Measuring Instruments. C39.3-1968, *Shock Test Mechanism*, is under review in a group headed by A. Uiga. C39.1-1964, *Indicating Instruments*, is also being revised.

NEMA standards recently issued are *Controls and Systems, Industrial*, ICS-1970 (including Enclosures for IS 1.1-1969), and *Oil Burner Primary Controls*, DC-9-1970.

## NFPA National Fluid Power Assn. P. O. Box 49 Thiensville, Wisc. 53092

*The Glossary of Terms for Fluid Power*, NFPA T2.70.1, has over 400 new or revised terms. It is being proposed as a revision to ANSI/B93.2-1965. The terms and their definitions are coordinated through a seven-digit numerical classification. Walter Kudlaty is chairman of the NFPA Terminology Committee.

*Method of Rating Performance of Fluidic Devices*, NFPA/T3.7.70.3, includes function, type, configuration, and operating limits of devices, and operating and performance characteristics for both steady-state and dynamic modes. The document shows methods of performance measurement, graphic means for uniformly presenting data, and data for control system design. Arthur Delmege, Vickers, is chairman of the NFPA Fluidics Project Group. Wayne Brown, Corning Glass Works, is the Fluidics Devices Section chairman.

Fluid Power Industrial Type Air Line Pressure Regulators, NFPA/T3.12.-70.3, establishes methods of test, methods of rating, port identification, and dimensional identification code. Jack Colter, Watts Regulator, is chairman, Chet Baker, Norgren Fluidics, section chairman.

## SAMA Scientific Apparatus Makers Assn. 1140 Connecticut Ave. N.W. Washington, D.C. 20036

The SAMA Standards Committee has organized a task force chaired by H. H. Gorrie of Bailey Meter Co. to establish an instrument industries position on changing to the metric system. This committee is expected to recommend an industry priority list for changeover. SAMA will welcome comments on this subject.

The SAMA Measurement and Test Instrument Section sponsors two ANSI committees—C39, Electrical Measuring Instruments, and C100, Electrical Reference Instruments. SAMA companies are also becoming more identified with international standards projects relating to measurement and test instruments. Plans are being made for underwriting travel expenses for U.S. delegates to overseas meetings of international standards committes. The Standards Committee in the section has coordinated manufacturer reviews of proposed domestic and international standards.

C39, chaired by L.J. Lunas of Westinghouse, plans to release the second edition of C39.6, *Digital Voltmeters*, in 1970. Reactivation is expected on projects for direct-acting recorders electrical instrument safety, and shock testing. C39.7, *Analog Voltmeters*, is being circulated for a one-year trial by Chairman M. M. Triplett.

The Section on Process Measurement and Control has a *Terminology Standard* in press. Work on valves related to face-to-face dimensions of larger valves, pressure testing, and seat leakage continues.

An Analytical Instrument Standards Committee directs the work of four task groups in the product areas of atomic absorption spectrophotometers, chromatographs, ion selective electrodes, and thermal analyzers. These four groups provide a forum for the leading makers of these types of analytical instruments. The principal activities include terminology, performance requirements, and testing procedures. No work has been published to date. Through this effort the association sponsors a research program on ion-selective electrodes at the National Bureau of Standards. With these grants it is intended that ion activity scales for each type of electrode can be established and standard reference materials specified for calibration.

## SCI Simulation Councils, Inc. P. O. Box 2228 La Jolla, Calif. 92037

The hybrid computer linkage system draft referred to in the April 1969 control standards report in CE is still undergoing revision, but should be completed shortly.Work continues on defining terms and methods of measurement for the patchable logic and mode-control portions of analog computers, and on typical bench-mark problems for acceptance testing of analog computers. The chairman is A. J. Mauceri of North American Rockwell.

## VRCI Variable Resistive Components Institute 1717 Howard St. Evanston, Ill. 60202

Two new standards on trimming potentiometers were recently approved—*Terms and Definitions* VRCI-T-110, and *Incoming Test Procedures* VRCI-T-210. The general chairman of the Standards and Nomenclature Committee is William Thoele, Helipot Div. of Beckman Instruments.


### Acknowledgement

C. M. Doolittle, President, AACC, and H. L. Mason, Chairman, AACC Terminology Committee, wish to thank the organizations whose responses made this report possible. The compilation was assisted by L. N. Combs, S. L. Dickerson, R. W. Henke, W. H. Howe, E. J. Mastascusa, A. J. Mauceri, J. I. Morgan, T. J. Pemberton, F. J. Rieman, R. H. Verity, and T. J. Williams.