1988 STANDARD for

STANDARD for GRAPHIC ELECTRICAL/ ELECTRONIC SYMBOLS FOR AIR-CONDITIONING AND REFRIGERATING EQUIPMENT

130-88

Standard 130

AIR-CONDITIONING & REFRIGERATION INSTITUTE

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Full document details: ARI Standard 130-1988 - Graphic Electrical and Electronic Symbols for Air-Conditioning and Refrigerating Equipment

Note

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TABLE OF CONTENTS

PART		PAGE
Section 1.	Purpose	1
Section 2.	Scope	1
Section 3.	Definitions	1
Section 4.	Fundamental Items	2
Section 5.	Transmission Path	3
Section 6.	Contacts, Switches, Contactors, Relays and Solenoids	3
Section 7.	Terminals and Connectors	7
Section 8.	Transformers, Inductors, Windings	7
Section 9.	Semiconductor Devices	7
Section 10.	Circuit Protectors	10
Section 11.	Acoustic Devices	10
Section 12.	Lamps and Visual Signaling Devices	10
Section 13.	Rotating Machinery	10
Section 14.	Voluntary Conformance	11

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GRAPHIC ELECTRICAL/ELECTRONIC SYMBOLS FOR AIR-CONDITIONING AND REFRIGERATING EQUIPMENT

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish, for air-conditioning and refrigerating equipment, preferred symbols to represent the functions of commonly used electrical and electronic parts in order to facilitate the understanding of electrical wiring diagrams.

1.1.1 This standard is intended for the guidance of the industry, including manufacturers, consulting engineers, distributors, installers, contractors, servicing personnel and other users.

1.2 *Review and Amendment.* This standard is subject to review and amendment as the technology of the industry advances.

Section 2. Scope

2.1 *Scope.* This standard applies to all electrical and electronic parts of air-conditioning and refrigerating systems including related accessories and controls.

Section 3. Definitions

3.1 *Graphic Symbols* for electrical engineering are a shorthand used to show graphically the functioning or interconnections of a circuit. A graphic symbol represents the *function* of a part in the circuit.* Graphic symbols are used on schematic or elementary diagrams, or as applicable on connection or wiring diagrams. Graphic Symbols are correlated with parts lists, descriptions, or instructions by means of designations. A symbol shall be considered as the aggregate of all its parts.

3.1.1 *IEC Identification.* Symbols that have been recommended by the International Electrotechnical Commission are indicated by IEC.

3.1.2 *Applications where shown* are examples of preferred combinations of symbols. No attempt has been made to list all possible applications. Additional applications may be devised provided they are a reasonable and intelligible use of other symbols (For application of symbols in electrical diagrams see ANSI Standard *Drafting Practices for Electrical and Electronics Diagrams*—Y14.15-1966; Y14.15a-1971 and Y14.15b-1973).

3.1.2.1 *Correlation of Symbol Parts.* For simplification of a diagram, parts of a symbol for a device, such as a relay or contactor, may be separated. If this is done, provide suitable designations to show proper correlation of the parts.

3.1.2.2 *Envelope.* An envelope may be used with a symbol and does not normally indicate evacuation or pressure. However, when used with electron-tube component symbols, the envelope indicates a vacuum enclosure unless otherwise specified.

3.2 *Schematic or Elementary Diagram.* A diagram which shows, by means of graphic symbols, the electrical connections and functions of a specific circuit arrangement. The schematic diagram facilitates tracing the circuit and its functions without regard to the actual physical size, shape, or location of the component device or parts.

3.3 *Orientation.* Except where noted, the orientation of a symbol on a drawing, including a mirror-image presentation, does not alter the meaning of the symbol. Letters and numbers that constitute a part of a symbol shall not be presented in mirror-image form.

3.4 *Line Width.* The width of a line does not affect the meaning of the symbol. In specific cases, a wider line may be used for emphasis.

3.5 *Symbol Size.* A symbol may be drawn to any proportional size that suits a particular drawing, depending on reduction or enlargement anticipated. If essential for purposes of contrast, some symbols may be drawn relatively smaller than the other symbols on a diagram. It is recommended that only two sizes be used on any one diagram.

3.5.1 *Relative Symbol Size.* The symbols shown in this edition of the standard are in their correct relative size. This relationship shall be maintained as nearly as possible on any particular drawing, regardless of the size of the symbol used.

3.5.2 *Arrowheads.* The arrowhead of a symbol may be closed→or open→unless otherwise noted in this standard.

3.5.3 *Angle of Connecting Lines.* In general, the angle at which a connecting line is brought to a graphic symbol has no particular significance unless otherwise noted or shown in this standard.

*For example, when a resistor is employed as a fuse, the fuse symbol is used. For reference designation information, see ANSI/IEEE 200-1975, *Reference Designations for Electrical and Electronics Parts and Equipment.*

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3.6 *Terminal Symbols.* The standard symbol for a terminal (o) may be added to each point of attachment of connecting lines to any one of the graphic symbols. Such added terminal symbols should not be considered as part of the individual graphic symbol, unless the terminal symbol is included in the symbol shown in the standard.

3.7 *Addition of Supplementary Data.* Details of type, impedance, rating, etc., may be added when required, adjacent to any symbol. If used, abbreviations should be from ANSI Y1.1 1972(R1984) Standard *Abbreviations for Use on Drawings and in Text.* Letter combinations used as parts of graphic symbols are not abbreviations.

Section 4. Fundamental Items

4.1 *Resistor.*

4.1.1 *Resistor, general.*



4.1.2 *Tapped Resistor.*



4.1.3 *Variable resistor: with adjustable contact.*

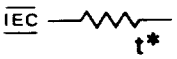


4.1.4 *Heating Resistor (Heater).*



4.2 *Thermistor.*

4.2.1 *General.*



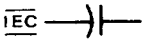
Note: The asterisk is not part of the symbol. It means to indicate an appropriate value.

4.2.2 *With Independent Integral Heater.*

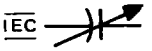


4.3 *Capacitor.*

4.3.1 *General.* If it is necessary to identify the capacitor electrodes, the curved element shall represent the outside electrode.

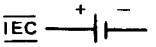


4.3.2 *Variable*

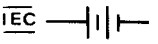


4.4 *Battery.* The long line is always positive, but polarity may be indicated in addition.

Example:



4.4.1 *Multicell.*

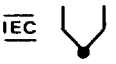


4.5 *Sensing link; fusible link, ambient temperature operated.*

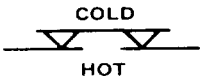


4.6 *Thermocouple (Dissimilar-metals device).*

4.6.1 *Temperature-Measuring Thermocouple.*



4.6.2 *Thermopile for pumping heat.*



4.7 *Spark Gap, Igniter Gap.*

Section 5. Transmission Path

5.1 *Transmission Path: Conductors, Cables, Wiring.*

5.1.1 *Factory Wired.*

5.1.2 *Field Installed or Sales Option, if specified.*

5.1.3 *Crossing of Paths or Conductors Not Connected.*

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