AHRI Standard 130
(formerly ARI 130)

2003 STANDARD for

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

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This standard supersedes ARI Standard 130-88.

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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 graphic symbols of commonly used electrical/electronic devices for air-conditioning and refrigerating equipment.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors and users.

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

Section 2. Scope

2.1 *Scope.* This standard applies to all electrical/electronic devices, sub-assemblies and assemblies used within air-conditioning and refrigerating equipment.

2.2 *Exclusions.* This standard does not apply to all electrical/electronic devices, sub-assemblies and assemblies used within air-conditioning and refrigerating equipment.

Section 3. Definitions

All terms in this document shall follow the standard industry definitions in the current edition of *ASHRAE Terminology of Heating, Ventilation, Air Conditioning and Refrigeration* unless otherwise defined in this section.

3.1 *Electrical/Electronic Diagram (Diagram).* A Diagram which takes the form of one or more of the types as defined
below.

3.1.1 *Connection Diagram (Writing Diagram).* A diagram which shows the connections of an installation or its devices. It may cover internal or external connections, or both, and contains such detail as is needed to make or trace connections that are involved. The Connection Diagram usually shows general physical arrangement of the devices.

3.1.2 *Interconnection Diagram.* A Diagram which shows only external connections between assemblies or equipment. The internal connections of the assemblies or equipment are usually omitted.

3.1.3 *Schematic Diagram (Elementary or Ladder 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 device.

3.2 *Graphic Symbols.* Representations used to show the functioning or interconnections of a circuit. A graphic symbol represents the function of a device in the circuit, for example, when a resistor is employed as a fuse, the fuse symbol is used. 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.

If there is no suitable symbol listed in this standard, additional symbols from IEEE Standard 315, ANSI/IEEE 280, and IEC Standard Publications 60617 and 60027-1 may be used.

3.2.1 *Applications.* Applications where shown are examples of preferred combinations of symbols.

3.3 *Reference Designation*. A combination of letters and numbers used on diagrams to identify and refer to a device without regard to its function. For Reference Designation information, see ANSI/IEEE 200-1975.

3.4 *"Shall"* or "*Should"*. "Shall" or "should" shall be interpreted as follows:

3.4.1 *Shall*. Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.4.2 *Should*. "Should" is used to indicate provisions which are not mandatory but which are desirable as good practice.

Section 4. Requirements

4.1 *General Requirements for Graphic Symbols*. The following covers basic criteria which are applicable to all graphic symbols.

4.1.1 *IEC Identification.* In this standard, graphic symbols that have been recommended by the International Electrotechnical Commission (IEC) are indicated by IEC. Symbols indicated by IEC may have been constructed from two or more IEC symbol elements necessary to describe the specific application.

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4.1.2 *Alternative Symbols.* When alternative symbols are shown, the relative position of the symbols does not imply a preference; however, alternative symbols identified as IEC are recommended.

4.1.3 *Applications.* No attempt has been made to list all possible applications. Additional applications may be devised provided they reasonably and intelligibly make use of other symbols.

4.1.4 *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.

4.1.5 *Line Convention.*

4.1.5.1 Line thickness and lettering size shall take into account the diagram size and the reproduction process, when it is felt that legibility may be affected.

4.1.5.2 Solid lines shall represent factory wiring and dashed lines shall represent field wiring when both are shown on the same diagram (Figure 1). If additional line conventions are used, they shall be identified in the legend.

FACTORY WIRING FIELD WIRING	—————— - - - - - - - - - -

Figure 1. Line Conventions For Diagrams

4.1.6 *Symbol Size.* Graphic symbols shall be drawn to any proportional size that suits a particular diagram, provided the selection of sizes takes into account the anticipated reproduction process.

4.1.7 *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/ASME Y1.1. Letter combinations used as parts of graphic symbols are not abbreviations.

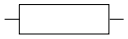
Section 5. Fundamental Items

5.1 *Resistor.*

5.1.1 *Resistor, General.*

IEC 

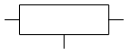
or

IEC 

5.1.2 *Tapped Resistor.*

IEC 

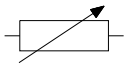
or

IEC 

5.1.3 *Variable Resistor: with Adjustable Contact.*

IEC 

or

IEC 

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