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ASHRAE Guideline 11-2021
Field Testing of HVAC Controls Components

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NOTE

Approved addenda, errata, or interpretations for this guideline can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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(This foreword is not a part of this guideline. It is merely informative and does not contain requirements necessary for conformance to the guideline.)

FOREWORD

ASHRAE Guideline 11 presents field testing procedures for specific devices that control the operation of an HVAC system. Field testing of HVAC controls components involves verifying the actual installation, location, and access to the various types of control devices used in HVAC systems. Some control devices can be tested on multiple levels, from a simple ON/OFF check to the computerized verification of performance criteria. The interaction and sequencing of controls devices is also covered. The results of the testing procedures define the operability of the device and ultimately the system.

This guideline supplements several related ASHRAE publications, including ASHRAE Standard 111, Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems*; ASHRAE Guideline 0,* The Commissioning Process*; and ASHRAE Guideline 1.1,* HVAC&R Technical Requirements for The Commissioning Process*.*

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Changes made for the 2021 edition include updated references.

1. PURPOSE

This guideline provides procedures for field testing and adjusting of control components used in building heating, ventilating, and air-conditioning (HVAC) systems.

2. SCOPE

This guideline covers the procedures, formats, and methods necessary for evaluation and documentation of the performance of devices and systems that control HVAC systems.

3. DEFINITIONS

Definitions of terms used in this guideline can be found in *ASHRAE Terminology of Heating, Ventilation, Air Conditioning, & Refrigeration* [1] and the ASHRAE Terminology online database.

control alarm: a signal—audible, visual, or both—that alerts an operator to an off-normal control condition or sensor value that may require some form of corrective action.

control component: smallest functional control element of an installation, such as a sensor or actuator.

control device: a device that can be used to control other components, such as a fan or heat exchanger, within a unit or system.

control point: the current value of a controlled variable; control point equals set point plus offset.

control safety: an element of the control system that detects one or more conditions that provide actions or indications to prevent equipment or personnel harm.

control sensor: device or instrument designed to detect and measure a control variable.

control sensor accuracy: conformity of an indicated control sensor value to an accepted standard value or true value. Quantitatively, it should be expressed as an error or an uncertainty.

control sequence: an organized narration specifying how the integrated functions of a device, system, or facility will perform. It should incorporate energy efficiency and environmental concerns with detailed, comprehensive control strategies—i.e., how each individual piece of equipment will be controlled and what information and adjustment will be available to the user. These may be provided in a combination of narratives, diagrams, and point lists for every unique type of equipment and for each system.

control system: *an* arrangement of elements interconnected and interacting in such a way so as to maintain or influence specified conditions in a prescribed manner.

4. GENERAL FORMAT FOR TESTING

4.1 Reasons for Testing. The components of control systems are essential for heating, ventilating, air-conditioning, and refrigeration (HVAC&R) systems to properly and efficiently perform their