Illuminating
ENGINEERING SOCIETY

IES TM-23-11

Lighting Control Protocols

IES TM-23-11

Lighting Control Protocols

Publication of this Technical Memorandum has been approved by the IES. Suggestions for revisions should be directed to the IES.

Prepared by:
The IES Controls Protocol Committee

Approved by the IES Board of Directors, April 4th, 2011, as a Transaction of the Illuminating Engineering Society of North America.

Published by the Illuminating Engineering Society of North America, 120 Wall Street, New York, New York 10005.

IES Standards and Guides are developed through committee consensus and produced by the IES Office in New York. Careful attention is given to style and accuracy. If any errors are noted in this document, please forward them to Rita Harrold, Director of Educational and Technical Development, at the above address for verification and correction. The IES welcomes and urges feedback and comments.

Printed in the United States of America.

ISBN # 978-0-87995-252-5

DISCLAIMER

IES publications are developed through the consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on lighting recommendations. While the IES administers the process and establishes policies and procedures to promote fairness in the development of consensus, it makes no guaranty or warranty as to the accuracy or completeness of any information published herein.
The IES disclaims liability for any injury to persons or property or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on this document

In issuing and making this document available, the IES is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the IES undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The IES has no power, nor does it undertake, to police or enforce compliance with the contents of this document. Nor does the IES list, certify, test or inspect products, designs, or installations for compliance with this document. Any certification or statement of compliance with the requirements of this document shall not be attributable to the IES and is solely the responsibility of the certifier or maker of the statement.

Prepared by the IES Lighting Controls Protocols Committee

Howard Wolfman,Chair
Richard Miller,Vice Chair

J. Anderson*
D. Antonuk
P. Ashar*
P. Baselici*
S. Berjansky
J. Bokelman
J. Briscoe*
S. Carlson*
M. DeJong*
S. Djokic*
P. Ericson
M. Goren
M. Hefter
M. Lunn
M. Maloney*
T. Martens*
R. McBride*
J. McCormick*
A. Mor
A. Parmar*
J. Perucho*
T. Reemtsma
C. Richmond
F. Rubinstein *
L. Schoeneman
S. Segal
J. Weinert
T. White
H. Yaphe

*Advisory

Contents

FOREWORD

This document is intended to serve as a technical resource for lighting specifiers integrating control into their projects. Lighting in commercial settings (and to some extent all places) can benefit from a coordinated control strategy for a number of reasons. Designers may wish to use control as a means of ensuring that their design intent for a given space is preserved. Security personnel may opt to use lighting control as a visual indicator of occupancy or to change lights in an emergency scenario. This can take the form of luminaires that energize on a schedule to indicate spaces where occupants are expected, or, in the converse, as an indication that people are in spaces where they are not expected.

As energy use codes have become more stringent, control has become a recognized means of reducing electrical consumption. Some form of control is now mandated in many state and local codes and ordinances. Control has been recognized as a component feature of overall energy efficiency by many certifying and accreditation agencies, e.g., Green Building Certification Institute (GBCI).

Lighting control can provide a means of giving workers input into their environment. This becomes increasingly necessary as specifiers are asked to consider the visual requirements for a work force that contains both aging and younger workers. The often conflicting visual needs throughout the demographic range of the North American corporate workforce require a solution that allows individuals to alter their visual environment to suit their physical needs as well as the requirements of a variety of tasks.

This Technical Memorandum seeks to provide unbiased information about the capabilities and shortcomings of the variety of technologies and approaches that exist and that may be appropriate for the lighting controls. More information on lighting controls, dimming technologies, and other considerations is available from the Illuminating Engineering Society.

1.0 INTRODUCTION

1.1 Scope

The goal of this Technical Memorandum is to increase the basic level of understanding among the various members of the lighting community about the possibilities of control as well as potential applications for those technologies. This increased baseline knowledge will encourage greater coordination among disciplines and will allow the continued integration of lighting control with other major building systems. Greater integration will ultimately lead to more efficient and healthier buildings enhancing the experience of the built environment for more people.

For the purposes of this discussion, control refers to the systems or commands that regulate the intensity of electric luminaires in response to some stimulus or action on the part of the building occupants. The stimulus can be direct, as when the moving of a switch from one position to the other completes an electrical circuit and causes the luminaires to energize, or it can be less direct and can relate to a variety of states or conditions within or without the physical confines of the space. Among the most common of these types of less direct control stimuli are occupancy, time, motion, and the presence or absence of daylight.

A document cannot possibly serve as the final authority on any topic, especially one that is undergoing as much rapid development as lighting control. Readers are cautioned to use this Technical Memorandum as a starting point toward a greater understanding of the possibilities and limitations of currently available lighting control technologies. For further information or for more technically specific wiring diagrams and rules for implementation, the reader is encouraged to follow the references provided at various points throughout the document.

1.2 Document Structure

Lighting Control technology is constantly evolving. A byproduct of this evolution is that some confusion exists among even experienced professionals as to the specific meaning of certain terms. To allow lighting specifiers with a variety of professional experiences to take part in this discussion, core concepts and terms are defined in the first section of the body of this Technical Memorandum (**Section 2**). These definitions are not intended to restrict the usage or development of language to describe aspects and features of the subject at hand, but rather to provide a common starting point for subsequent discussions in this document.

Basic architecture and associated terms for additional aspects of control can be found in **Section 3**.

A discussion of the available technologies for controlling various light sources including those light sources that do not require a separate technology or interface to be controlled is in **Section 4**.

Topology is a major means of distinguishing types of systems from each other and is covered at some length in **Section 5**.