

ISA–TR77.60.04-2013

**Fossil Fuel Power Plant
Human-Machine Interface —
Electronic Screen Displays**

Approved 26 November 2013



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Fossil Fuel Power Plant Human-Machine Interface – Electronic Screen Displays

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Preface

This preface, as well as all footnotes and annexes, is included for informational purposes only and is not part of ISA-TR77.60.04-2013. The purpose of this Technical Report is to provide advice and guidance in the development of Electronic Screen Displays for use in conjunction with real-time distributed control systems used in utility fossil-fired power plants with boilers of 200,000 lb/hr or greater capacity.

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Abstract

This report recognizes the substantial volumes of technical information already in existence on the topic of Electronic Screen Display development. The intention of this report is to provide a practical summary overview of the important considerations that apply to the development of effective Electronic Screen Displays. It is hoped to be a handy reference to those design engineers and power-plant operators who are directly involved in display development.

Keywords

Electronic Screen Displays, coding conventions, color coding, Electronic Screen Display alarm management, Electronic Screen Display control applications, Electronic Screen Display development, Electronic Screen Display elements, Electronic Screen Display organization, Electronic Screen Display status, Electronic Screen Display structure, Electronic Screen Display types, Electronic Screen Display replacement guidelines, display access, Distributed Control Systems (DCS)*, format standards, fossil fuel power plant, human-machine interface, navigation designs (standard), operator entry techniques, real-time DCS, shape coding, size coding, typical color conventions for black background, work station ergonomics.

NOTE - Distributed Control Systems are also referred to as Digital Control Systems.

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1 Scope

This technical report addresses the following issues relating to Electronic Screen Displays for operators of fossil-fired power plants with boilers of 200,000 lb/hr or greater: display structure, display elements, display access, operator entry techniques, display types, control applications, format standards, alarm management, display organization, work station ergonomics, coding conventions.

Recognizing the substantial volumes of technical reports on the topic of Electronic Screen Display development, the intent of this report is to provide a summary/overview of the important considerations that apply in the development of effective Electronic Screen Displays. For additional detailed guidance, please refer to Annex A — References.

2 Purpose

The purpose of this technical report is to provide advice and guidance in the development of Electronic Screen Displays for use primarily by operators in the control and monitoring of fossil-fired power plants.

3 Introduction

This technical report is provided for the benefit of design engineers and ultimately fossil-fired power plant operators. By following this technical report, the developer of Electronic Screen Displays will

- a) provide clear and efficient communication between the user and the digital control system, SCADA and/or PLC based system with HMI;
- b) accomplish display design based on the user's needs that are based on an assessment of planned control-operator functions to be performed; and
- c) provide a display design to obtain timely access to required information and controls in a logical structure convenient to the user.

Input from plant operating personnel in all phases of Electronic Screen Display development is critical to the development of effective displays. It is even recommended to have plant operating personnel help build many of the graphics to ensure a sense of ownership by operations personnel.

It is noted that the Human Machine Interface (HMI) to which this report is addressed is one of the three elements of a properly designed control system. The other two elements are properly designed and configured control logic as described in other ISA77 standards, and effective alarm management system as addressed in Clause 12 of this report, ISA-RP77.60.02-2010, *Fossil Fuel Power Plant Human Machine Interface: Hard Panel Alarms*, and ANSI/ISA-18.2-2009, *Management of Alarm Systems for the Process Industries*.

4 Display structure

Display structure establishes the relationship among displays and should reflect the relationships between functions and tasks to be performed through the Electronic Screen Displays. A function/ task analysis and goal assessment based on plant operating procedures is recommended to determine the goals and tasks to be accomplished. Refer to ISA-RP77.60.05-2001(R2012), *Fossil Fuel Power Plant, Human-Machine Interface: Task Analysis*.