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## Earth-moving machinery — Visual display of machine operation

*Engins de terrassement — Affichage visuel des fonctions de l'engin*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 127, *Earth-moving machinery*, Subcommittee SC 3, *Machine characteristics, electrical and electronic systems, operation and maintenance*.

This fourth edition cancels and replaces the third edition (ISO 6011:2003), which has been technically revised.

The main changes are as follows:

- provided an information classification process;
- Scope has been updated to include non-seated (standing or pedestrian) operator machines;
- removed Table 1.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

As the technology being applied to earth-moving machinery (EMM) has changed, the amount of information presented to the operator has increased.

An aspect of EMM that has seen a significant growth is operator assist features. Some of these features are used specifically for work efficiency, (e.g. return-to-dig depth, bucket levelling), while others are used for safety, (e.g. collision warning and avoidance). If the operator assist feature has different operational states, (e.g. on/off, stand-by, inactive) this information is also presented to the operator.

Another change that is becoming more prevalent is the availability of electric-powered EMM. With these machines, the information that an operator utilizes for management of the energy source of the EMM is different than what was needed with an internal combustion engine.

The energy sources available to EMM are growing to include battery power, hybrid, and others. ISO 6011:2003 contained internal combustion engine parameters. Machines that do not utilise an internal combustion engine as an energy source no longer have many of the items expressed in the previous edition of this document. Machines with an electric energy source would not have engine coolant temperature and engine oil pressure. Some electric machine indications are analogous to internal combustion engine machines, for example, battery state of charge is analogous to fuel level.

This document provides a process for classification of information to be displayed and the specific requirements associated with those classifications along with general requirements for visual displays; the requirements of what information to be provided could be handled by other standards and reference this document for guidance on how to present the information.

This document does not prescribe what information is to be provided to address risk reduction for safety requirements (see ISO 12100), rather it provides a framework for how this information is presented to the machine operator.

This document does not address the complexity of human factors for the perception of displayed information; there are informative references in this document to assist the user with this topic.

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