

## STANDARDS AUSTRALIA

**Amendment No. 1**  
**to**  
**AS 60204.1—2005**  
**Safety of machinery—Electrical equipment machines (IEC 60204-1, Ed.5 (FDIS)**  
**MOD)**  
**Part 1: General requirements**

**CORRECTION**

The 2005 edition of AS 60204.1 is amended as follows; the amendments should be inserted in the appropriate places.

SUMMARY: This Amendment corrects an error in the numbers of sub-clauses in Clause 9.2.

Published on 10 August 2006.

**Page 39 Clause 9.2**

*Delete* the existing Clause 9.2 and *substitute* the following:

**9.2 Control functions**

NOTE 1 Information on the safety-related aspects of control functions is given in ISO 13849-1 (1999), ISO 13849-2 (2003), and IEC 62061 (under preparation).

NOTE 2 This Subclause does not specify requirements for the equipment used to implement control functions. Examples of such requirements are given in Clause 10.

**9.2.1 Start functions**

Start functions shall operate by energizing the relevant circuit (see 9.2.5.2).

**9.2.2 Stop functions**

There are three categories of stop functions as follows:

- stop category 0: stopping by immediate removal of power to the machine actuators (i.e. an uncontrolled stop – see 3.56);
- stop category 1: a controlled stop (see 3.11) with power available to the machine actuators to achieve the stop and then removal of power when the stop is achieved;
- stop category 2: a controlled stop with power left available to the machine actuators.

NOTE – The categories of stop functions are different from the categories of safety-related parts of control systems (see AS 4024.1), and care should be taken to avoid confusion between these.

**9.2.3 Operating modes**

Each machine can have one or more operating modes determined by the type of machine and its application. When a hazardous situation can result from a mode selection, unauthorised and/or inadvertent selection shall be prevented by suitable means (for example key operated switch, access code).

Mode selection by itself shall not initiate machine operation. A separate actuation of the start control shall be required.

For each specific operating mode, the relevant safety functions and/or protective measures shall be implemented.

Indication of the selected operating mode shall be provided (for example the position of a mode selector, the provision of an indicating light, a visual display indication).

#### **9.2.4 Suspension of safety functions and/or protective measures**

Where it is necessary to suspend safety functions and/or protective measures (for example for setting or maintenance purposes), protection shall be ensured by:

- disabling all other operating (control) modes; and
- other relevant means (see 4.11.9 of ISO 12100-2:2003), that can include, for example, one or more of the following:
  - initiation of operation by a hold-to-run device or by a similar control device;
  - a portable control station with an emergency stop device and, where appropriate, an enabling device. Where a portable control station is in use, initiation of motion shall only be possible from that control station;
  - a cableless control station with a device to initiate stop functions in accordance with 9.2.7.3 and, where appropriate, an enabling device. Where a cableless control station is in use, initiation of motion shall only be possible from that control station;
  - limitation of the speed or the power of motion;
  - limitation of the range of motion.

#### **9.2.5 Operation**

##### **9.2.5.1 General**

The necessary safety functions and/or protective measures (for example interlocks (see 9.3)) shall be provided for safe operation.

Measures shall be taken to prevent movement of the machine in an unintended or unexpected manner after any stopping of the machine (for example due to locked-off condition, power supply fault, battery replacement, lost signal condition with cableless control).

Where a machine has more than one control station, measures shall be provided to ensure that initiation of commands from different control stations do not lead to a hazardous situation.

##### **9.2.5.2 Start**

The start of an operation shall be possible only when all of the relevant safety functions and/or protective measures are in place and are operational except for conditions as described in 9.2.4.

On those machines (for example mobile machines) where safety functions and/or protective measures cannot be applied for certain operations, manual control of such operations shall be by hold-to-run controls, together with enabling devices, as appropriate.

Suitable interlocks shall be provided to secure correct sequential starting.

In the case of machines requiring the use of more than one control station to initiate a start, each of these control stations shall have a separate manually actuated start control device. The conditions to initiate a start shall be:

- all required conditions for machine operation shall be met, and
- all start control devices shall be in the released (off) position, then
- all start control devices shall be actuated concurrently (see 3.6).

#### **9.2.5.3 Stop**

Stop category 0 and/or stop category 1 and/or stop category 2 stop functions shall be provided as indicated by the risk assessment and the functional requirements of the machine (see 4.1).

NOTE The supply disconnecting device (see 5.3) when operated achieves a stop category 0.

Stop functions shall override related start functions (see 9.2.5.2).

Where required, facilities to connect protective devices and interlocks shall be provided. If such a protective device or interlock causes a stop of the machine, it may be necessary for that condition to be signalled to the logic of the control system. The reset of the stop function shall not initiate any hazardous situation.

Where more than one control station is provided, stop commands from any control station shall be effective when required by the risk assessment of the machine.

#### **9.2.5.4 Emergency operations (emergency stop, emergency switching off)**

##### **9.2.5.4.1 General**

This document specifies the requirements for the emergency stop and the emergency switching off functions of the emergency operations listed in informative Annex E, both of which are, in this document, initiated by a single human action.

Once active operation of an emergency stop (see 10.7) or emergency switching off (see 10.8) actuator has ceased following a command, the effect of this command shall be sustained until it is reset. This reset shall be possible only by a manual action at that location where the command has been initiated. The reset of the command shall not restart the machinery but only permit restarting.

It shall not be possible to restart the machinery until all emergency stop commands have been reset. It shall not be possible to reenergize the machinery until all emergency switching off commands have been reset.

NOTE 1 Emergency stop and emergency switching off are complementary protective measures that are not primary means of risk reduction for hazards (for example trapping, entanglement, electric shock or burn) at a machine (see ISO 12100 (all parts)).

NOTE 2 Principles for the design of emergency stop equipment, including functional aspects, are given in ISO 13850.

##### **9.2.5.4.2 Emergency stop**

The emergency stop shall function either as a stop category 0 or as a stop category 1 (see 9.2.2). The choice of the stop category of the emergency stop depends on the results of a risk assessment of the machine.

In addition to the requirements for stop (see 9.2.5.3), the emergency stop function has the following requirements: