

Australian/New Zealand Standard™

**Electrical equipment for coal and shale  
mines—Electrical protection devices**

**Part 2: Earth-continuity monitoring  
devices**

## **AS/NZS 2081.2:2002**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-023, Electrical Equipment in Coal Mines. It was approved on behalf of the Council of Standards Australia on 16 July 2002 and on behalf of the Council of Standards New Zealand on 27 June 2002.

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The following are represented on Committee EL-023:

Australian Chamber of Commerce and Industry  
Australian Coal Association  
Australian Electrical and Electronic Manufacturers Association  
Australian Industry Group  
Department of Mineral Resources N.S.W.  
Department of Natural Resources and Mines (QLD)  
Electrical Apparatus Service Association  
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# Australian/New Zealand Standard™

## Electrical equipment for coal and shale mines—Electrical protection devices

### Part 2: Earth-continuity monitoring devices

Originated as part of AS C318—1958.  
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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-023, Electrical Equipment in Coal Mines, to supersede AS 2081.2—1988, *Electrical equipment for coal and shale mines—Electrical protection devices, Part 2: Earth-continuity monitoring devices*.

*This Standard incorporates Amendment No. 1 (August 2004). The changes required by the Amendment are indicated in the text by a marginal bar and amendment number against the clause, note, table, figure or part thereof affected.*

The AS/NZS 2081 series comprises the following parts:

- Part 1: General requirements
- Part 2: Earth-continuity monitoring devices (this Part)
- Part 3: Earth-leakage protection systems for use on earth-fault current limited systems (IT systems)
- Part 4: Lockout earth-fault protection devices
- Part 5: Earth-fault current limiters

The key objectives of the AS/NZS 2081 series are as follows:

- (a) To ensure touch and step time/voltage levels are within acceptable limits.
- (b) To minimize the risk of explosion due to arcing.
- (c) To ensure earth return path(s).
- (d) To ensure reliable operation under operating conditions.
- (e) To ensure performance criteria are maintained under operating conditions.
- (f) To minimize the risk of fires initiated by electrical arcing.
- (g) To minimize exposure to electrical contact with live parts.

In the AS/NZS 2081 series, levels were established using data provided in AS 3007.2 *Electrical installations—Surface mines and associated processing plants, Part 2: General—Protection requirements*, with respect to the physiological effects of electricity on the human body. The preservation of the integrity of other equipment was an important consideration in the preparation of this series.

This Standard differs from the previous edition in the following significant ways:

- (a) The inclusion of a typical system electrical diagram showing the application of all of the above protection system and highlighting the particular protection system as detailed in this Standard.
- (b) The replacement of the term ‘ambient temperature’ with ‘service temperature’, the range now being 0°C to +60°C.
- (c) The operation of a circuit interrupting device if the resistance between the pilot core and earth faults below 1 kΩ.
- (d) This Standard has been published as a Joint Australian/New Zealand Standard.

The term ‘informative’ has been used in this Standard to define the application of the appendix to which it applies. An ‘informative’ appendix is only for information and guidance.

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## FOREWORD

The interrelationship of the 'techniques' described in the five Parts of this series strives to create as safe a working environment as possible. In this environment of surface and underground mines electrically powered equipment is often mobile and supplied by trailing or reeling cables.

These 'techniques' are as follows:

- (a) The continuous checking that the equipment is earthed, by monitoring the pilot loop earth in the supply cable, its connection to the machine it is supplying and its termination at the substation supplying the machine (see this Standard).

NOTE: This system may incorporate remote start/stop features.

- (b) The measurement of leakage current to earth in a circuit and the initiation of isolation of that circuit, when the value reaches or exceeds a predetermined safe value (see AS/NZS 2081.3).
- (c) The pre-energization testing of a circuit, to determine that the phase-to-earth insulation value of each and every phase conductor is above a preset value, before the circuit can be energized (see AS/NZS 2081.4).
- (d) The use of earth current limiting devices, to minimize the risk of touch and step potential reaching a level which would cause risk to personnel (see AS/NZS 2081.5).

**STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND****Australian/New Zealand Standard****Electrical equipment for coal and shale mines—Electrical protection devices****Part 2: Earth-continuity monitoring devices****SECTION 1 SCOPE AND GENERAL****1.1 SCOPE**

This Standard sets out minimum performance requirements for earth-continuity monitoring devices, intended to monitor the pilot-earth loop(s) in cables supplying power to equipment used on a.c. power supply systems having an earth-fault current limitation system (IT system). The requirement to initiate tripping and prevent closure/interruption of the circuit device in the event of the earth-loop resistance exceeding a predetermined range are also covered.

Requirements are specified for remote stop/start/pilot control functions when incorporated in the earth-continuity monitoring device.

**NOTES:**

- 1 Whereas this Standard is based upon 50 Hz supply systems it is envisaged that equipment may be installed upon higher or low frequency supply systems.  
Consideration of the effects of these installations upon current limitation and effects upon the human body need to be considered. IEC 60479-1 and IEC 60479-2 should be referenced for the effects upon the human body of other supply frequencies.
- 2 Installation recommendations are provided in Appendix A.

**1.2 OBJECTIVE**

The objective of this Standard is to establish requirements for earth-continuity monitoring devices, in order to ensure that the monitored equipment is earthed to a level that will—

- (a) assist in ensuring that touch and step potential levels are within acceptable limits (see AS 3007.2) when used in conjunction with the other forms of protection as defined in the AS 2081 series;

NOTE: 'Touch and step potential' is referred to as 'Touch voltage' in AS 3007.2.

- (b) minimize the risk of explosion due to arcing;
- (c) ensure earth return path(s);
- (d) ensure reliable operation under normal operating conditions;
- (e) ensure performance criteria are maintained under normal operating conditions;
- (f) minimize the risk of fires caused by electrical arcing; and
- (g) minimize exposure to electrical contact with live parts.

**1.3 RELATIONSHIP TO REGULATIONS**

The requirements of this Standard may be read in conjunction with, but do not take precedence over, regulations of a regulatory authority that may apply in a specific area.