

Translated English of Chinese Standard: MT209-1990

www.ChineseStandard.net

Sales@ChineseStandard.net

MT

INDUSTRIAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA

MT 209-90

Electrical and electronic products for coal mine communication, testing and control –

General technical requirements

煤矿通信、检测、控制用电子电子产品

通用技术要求

MT 20901990 How to BUY & immediately GET a full-copy of this standard?

1. www.ChineseStandard.net;
2. Search --> Add to Cart --> Checkout (3-steps);
3. No action is required - Full-copy of this standard will be automatically & immediately delivered to your EMAIL address in 0~60 minutes.
4. Support: Sales@ChineseStandard.net. Wayne, Sales manager

Issued on: April 4, 1990

Implemented on: December 1, 1990

Issued by: National Energy Administration

Table of Contents

1 Subject content and scope of application.....	3
2 Normative references.....	3
3 General provisions	5
4 Environmental conditions	5
5 Use performance	8
6 Appearance.....	11
7 Structure	12
8 Electrical clearance and creepage distance.....	13
9 Major components and elements	13
10 Temperature rise.....	16
11 Electrical safety.....	16
12 Stability	17
13 Explosion-proof performance	19
14 Marking	19
Annex A Selection of severity level for special environmental conditions (supplementary).....	21
Annex B Effect of altitude on product temperature rise and insulation electrical strength (supplementary)	22
Annex C Explosion proof and mining - General products shall be tested (informative).....	23
Additional information:	24

Electrical and electronic products for coal mine communication, testing and control – General technical requirements

MT 209-90

This Standard is used in conjunction with MT 210 “Electrical and electronic products for coal mine communication, testing and control - Basic test method” and MT 211 “Electrical and electronic products for coal mine communication, testing and control - Quality inspection rules”.

1 Subject content and scope of application

1.1 This Standard specifies the basic technical requirements for electrical and electronic products for coal mine communication, testing and control (hereinafter referred to as products).

1.2 This Standard applies to:

- a. Coal mine communication, signal system and equipment;
- b. Monitoring, control, regulating system, equipment and instrumentation for coal mine infrastructure, production process and environment;
- c. Measurement and control equipment and instrumentation for electromechanical equipment in coal mines.

2 Normative references

GB 156 Rated voltage

GB 190 Label for packages of dangerous goods

GB 191 Packaging - Pictorial markings for handling of goods

GB 762 Standard current

GB 1497 Basic standards for low voltage electrical appliances

GB 2423.1 Basic environmental testing procedures for electrical and electronic products - Test A: Cold

GB 2423.2 Basic environmental testing procedures for electrical and electronic products - Test B: Dry heat

GB 2423.3 Basic environmental testing procedures for electrical and electronic products - Test Ca: Damp heat steady state

GB 2423.4 Basic environmental testing procedures for electrical and electronic products - Test Db: Damp heat, cyclic

GB 2423.5 Electrical and electronic products - Basic environmental test procedures - Test Ea: Shock

GB 2423.6 Basic environmental testing procedures for electrical and electronic products - Test Eb: Bump

GB 2423.10 Basic environmental testing procedures for electrical and electronic products - Test Fc: Vibration (sinusoidal)

GB 2681 Conductor color in electrical assembly devices

GB 2682 Color of indicator lights and push-buttons used in electrical assembly devices

GB 3047.1 Basic dimensions of panels, stands and cabinets

GB 3836.1 Electrical apparatus for explosive atmosphere - General requirements

GB 3836.2 Electrical apparatus for explosive atmosphere - Flameproof electrical apparatus d

GB 3836.3 Electrical apparatus for explosive atmosphere - Increased safety e

GB 3836.4 Electrical apparatus for explosive atmosphere - Intrinsically safe circuits and electrical apparatus

GB 4588.1 Technical requirements for single and double sided printed boards without metallized holes

GB 4588.2 Technical requirements for single and double sided printed boards with metallized holes

GB 4796 Classification of environmental parameters and severity of electrical and electronic products

GB 4798.1 Electrical and electronic applications - Environmental conditions of use - Storage

ZBY 120 Industrial automation instrumentation - Operating conditions temperature, humidity and atmospheric pressure

SJ 2313 Printed circuit board dimension series

MT 154.1 Preparation guidelines and management methods of coal mine electromechanical products

MT 210 Electrical and electronic products for coal mine communication, testing and control - Basic test method

standards in accordance with the type of the coal mine communication, testing and control products, AND shall comply with the relevant provisions of the corresponding national industry standards:

- a. Monitoring, control system and equipment: use functions, transmission distance, capacity, power supply method, input and output signals, quality indicators (bit error rate, accuracy or measurement error, etc.), transmission frequency, or rate;
- b. Testing instruments and sensors: use functions, power supply method, output signal, work system, sensitivity, measurement range, quality indicators (accuracy or measurement error);
- c. Communication system and equipment: use functions, power supply method, coverage, frequency used, signal method, capacity classification, network access requirements, voice quality, communication method, transmission attenuation, and defense.

5.1.5 The sound level of the coal mine underground signal product shall not be less than 85 dB.

5.2 Voltage and current

5.2.1 The rated voltage shall comply with the provisions of GB 156.

5.2.2 The rated current shall comply with the provisions of GB 762.

5.3 Signal system

5.3.1 General requirements

In the coal mine monitoring and control system, the switching signals and analog signals of the information transmitted between the substation and the sensor and the controlled device shall comply with the provisions of this Clause.

5.3.2 Switching value

5.3.2.1 When the output current of the active switch output signal at the high level output state is 2 mA, the output voltage shall be not less than 3 V; at the low level output state, when the input current is 2 mA, the output voltage shall be not more than 0.5 V.

5.3.2.2 At the inactive switch output state, when it is disconnected (cut off), the leakage resistance between the two outputs shall be not less than 100 k Ω ; when it is closed (connected) and the input current is 2 mA, the output end voltage shall be not more than 0.5 V.

5.3.3 Analog signal

5.3.3.1 DC analog signals shall be:

1 ~ 5 mA (load resistance 0 ~ 500 Ω or greater than 500 Ω).

4 ~ 20 mA (load resistance 0 ~ 350 Ω or greater than 350 Ω).

6.2 Metal parts shall not have corrosion and other mechanical damage.

6.3 The switch button shall be flexible and reliable in operation. The parts shall be tightened without loosening, AND the plugging moving parts shall be plugged freely.

6.4 The indicator lamps of different functions shall be distinguishable in colors, AND the function description symbols and texts as well as all product labels shall be clear, regular, and tightly installed.

6.5 The surface roughness of the flameproof joint face AND the flameproof holes shall comply with the relevant provisions, AND the surface shall be free from scratches, pinholes, or other defects.

7 Structure

7.1 General requirements

7.1.1 The product structure shall be such as able to ensure the safety, convenience, and reliability in the process of commissioning, running, operation, maintenance, handling and installation.

7.1.2 The same type of product shall be consistent in mechanical structure and electrical wiring.

7.1.3 The dimensions of the panel, frame and cabinet of the ground-surface control equipment shall comply with the provisions of GB 3047.1.

7.1.4 Products with operational and observational functions shall be designed for ease of operation and observation.

7.1.5 All ferrous metal components shall have a reliable protective layer. The fasteners shall be made of rust-proof or made of stainless steel AND shall be prevented from being automatically released.

7.1.6 The drawer or plug-in of the product which needs to be replaced shall be interchangeable. The drawer plug-in of different functions shall have obvious signs to distinguish OR take measures to prevent wrong-plugging.

7.1.7 Wiring devices, grounding terminals and equipment internal wiring shall be of sufficient strength AND ensure reliable connection.

7.2 Underground products

7.2.1 Products for underground coal mines shall comply with the provisions of clause 7.1 and this clause.

7.2.2 Explosion-proof and mining general products shall be provided with the necessary interlocking structure AND shall comply with the following provisions:

- a. The interlocking device shall be designed so that the general tool cannot relieve its interlocking functions;
- b. Explosion-proof products shall comply with the provisions of Clause 14 of GB 3836.2;

- c. Mining general products shall comply with the relevant provisions of national and industry technical standards.

7.2.3 Explosion-proof products with snap-action doors or covers shall comply with the requirements of Clause 5 in GB 3836.1.

7.2.4 Explosion-proof increased safety electrical products with exposed live parts shall use special fasteners AND shall comply with the provisions of clause 9.2 of GB 3836.1.

7.2.5 The product shall have a connecting piece which is used to connect the leading in cable or conductor. Portable products can be made into a permanent leading-in cable, without connecting piece. The flameproof product cable leading-in method shall be in line with the requirements of clause 12.1 of GB 3836.2.

7.2.6 As for the internal wiring, the increased safety products shall comply with the provisions of Clause 4 and 10 in GB 3836.3, the intrinsic safety products shall comply with the provisions of clause 4.2 and clause 4.10.2 of GB 3836.4.

7.2.7 The installation of intrinsically safe circuit elements shall comply with the provisions of clause 4.3 of GB 3836.4.

7.2.8 Adhesives used in explosion-proof products shall comply with the provisions of Clause 12 in GB 3836.1.

8 Electrical clearance and creepage distance

8.1 The electrical clearance and creepage distance of intrinsically safe products shall comply with the provisions of clause 4.6 of GB 3836.4.

8.2 The electrical clearance and creepage distances of the increased safety products shall comply with the requirements of Clause 5 and 6 in GB 3836.3.

8.3 The electrical clearance and creepage distance of the ground-surface products shall comply with the requirements of the corresponding national and industry technical standards.

8.4 The other parts of the products as not specified in the national and industry technical standards as well as the explosion-proof products shall comply with the requirements of clause 7.1.3 in GB 1497.

9 Major components and elements

9.1 Enclosure parts

9.1.1 The protective performance of the enclosure shall be specified in the product standard. The enclosure protection of the electrical products in coal mines shall comply with the following requirements:

- a. Intrinsically safe products shall comply with the provisions of clause 4.4 of GB 3836.4, AND the intrinsically safe products for underground coal mines (except those installed in the cavity) shall not be lower than IP43;

9.4.3 Insulation of intrinsically safe products and their associated equipment connecting conductors shall comply with the provisions of clause 4.10 of GB 3836.4, AND the current of the connecting conductors shall comply with the provisions of clause 4.1 of GB 3836.4.

9.4.4 The materials of the mining general product inner conductor shall comply with the relevant provisions of national and industry technical standards.

9.5 Electrical components and assemblies

9.5.1 Indicator lamp and button colors shall comply with the requirements of GB 2682.

9.5.2 The performance of the electrical components installed on the product shall comply with the product standard of the component itself.

9.5.3 The windings of the increased safety products shall comply with the requirements of Clause 8 in GB 3836.3, AND the measuring instruments and instrumentation transformers shall comply with the provisions of clause 15.2, 15.4 and 15.5 of GB 3836.3.

9.5.4 Reliable components and assemblies in intrinsically safe products and their associated equipment, such as power transformers, coupling transformers, damper winding, isolating capacitors, shunt elements, protective transistor assemblies and components shall comply with the rated value requirements of Clause 6 in GB 3836.4.

9.5.5 The safety gates in intrinsically safe products and associated equipment shall comply with the provisions of Clause 7 of GB 3836.4; the selection of electrical components shall comply with the provisions of Clause 5 in GB 3836.4; AND the relay and internal connectors shall comply with the requirements of clause 4.6.2 and 4.6.3 of GB 3836.4.

9.6 Printed circuit boards

9.6.1 Printed circuit board dimensions shall be in accordance with SJ 2313.

9.6.2 Printed circuit boards for underground products shall be protected against moisture.

9.6.3 The printed circuit board of the intrinsically safe circuit shall comply with the provisions of clause 4.6.1 of GB 3836.4.

9.6.4 The printed circuit boards shall comply with the provisions of GB 4588.1 ~ 4588.2.

9.7 Wiring device

9.7.1 Mining general type terminal block shall comply with the relevant provisions of the national and industry technical standards.

9.7.2 Intrinsically safe electrical equipment wiring device shall comply with the requirements of clause 4.5 in GB 3836.4.

9.7.3 Except for the mining general type and intrinsically safe type products, the wiring devices of other explosion-proof products shall comply with the provisions of Clause

11.2.1 Explosion-proof products shall be able to withstand 1 min of AC 50 Hz sine wave frequency withstand voltage test, without breakdown or flashover. Power frequency withstand voltage test voltage shall comply with the following requirements:

- a. Intrinsically safe products and their associated equipment shall comply with the provisions of clause 4.9 of GB 3836.4;
- b. Increased safety products shall comply with the provisions of clause 17.1 of GB 3836.3.

11.2.2 Ground-surface products shall comply with the corresponding national and industry technical standards.

11.2.3 For underground, other products and the ground-surface products having no corresponding national or industry technical standards shall comply with the requirements of clause 7.2.2 of GB 1497.

11.3 Grounding

11.3.1 As for the ground-surface products above the safe voltage (AC r.m.s. 50V), the metal components must be provided with grounding points AND shall comply with the applicable national and industry technical standards.

11.3.2 The grounding of explosion-proof products shall comply with the provisions of Clause 15 of GB 3836.1.

11.3.3 Intrinsically safe circuits are generally not allowed to use the grounding line as a circuit, unless otherwise for the purposes of grounding protection.

11.3.4 Mining general product grounding shall comply with the relevant provisions of national and industry technical standards.

11.4 Protection

11.4.1 When the product has a safety rated voltage of more than 24 V, it is necessary to take protective measures to prevent direct contact with the live parts.

11.4.2 Depending on the performance of the product, the short circuit protection, overload protection, zero voltage and under-voltage protection, and overvoltage protection are set, which are specified by the product standards, AND shall comply with the various technical standards.

12 Stability

12.1 The product shall be moisture resistant AND must pass the damp heat test of corresponding severity as specified in the following provisions:

- a. The underground coal mine products must take the cyclic damp heat test method as specified in GB 2423.4, with the severity level in high temperature 40 °C, 12 d;
- b. Daily use coal mine underground portable products shall take the cyclic damp heat test method as specified in GB 2423.4, with the severity level in high temperature 40 °C, 6 d;

13 Explosion-proof performance

13.1 Explosion-proof electrical products must comply with the provisions of GB 3836, AND shall pass the inspection and test by the national explosion-proof inspection departments, AND obtain the “explosion-proof certificate” as issued by the inspection department.

13.2 Explosion-proof electrical products shall pass the relevant tests as specified in GB 3836, the mining general products shall pass the tests as specified in the national and industry technical standards, AND the test items are as shown in Annex C.

13.3 Explosion-proof products shall be tested by the strength test as specified in Clause 19 and the flameproof performance test as specified in Clause 20 of GB 3836.2.

13.4 Intrinsically safe products shall be tested by the spark test in accordance with clause 8.4 of GB 3836.4.

13.5 The ground-surface products and the products related to the underground coal mine explosion-proof electrical equipment, components and elements shall be subjected to the corresponding test and examination.

13.6 Explosion-proof motors, lamps, plugging devices, switches, controllers and other electrical products supporting the electrical and electronic equipment for communication, testing and control in coal mine shall comply with part 3 of GB 3836.1, part 2 of GB 3836.2, part 2 of GB 3836.3, and the relevant provisions on the explosionproof electrical equipment for explosive atmosphere and mining general product by the national and industry technical standards.

14 Marking

14.1 Product marking, packaging marks and other signs must be specified in the product standard.

14.2 Product marking

14.2.1 The marking of explosion-proof type shall comply with the provisions of clause 30.1 of GB 3836.1.

14.2.2 The product shall have a nameplate. The ground-surface product nameplate shall indicate the product model and name, the main parameters, manufacturer name, date of manufacture (or number) or production lot number and so on. The nameplate and contents of the explosion-proof product shall comply with the provisions of clause 30.3, clause 30.4 and clause 30.5 of GB 3836.1. The nameplate and contents of the intrinsically safe product shall comply with the provisions of clause 9.1 of GB 3836.4. The nameplate and contents shall comply with the provisions of Clause 19 of GB 3836.3. The mining general products shall comply with the relevant provisions of national and industry technical standards.

14.2.3 Explosion-proof product enclosure shall be marked with an “Ex” explosion-proof mark at an eye-catching position, which shall comply with the provisions of clause 30.2 of GB 3836.1. Mining general products must be marked with

This is an excerpt of the PDF (Some pages are marked off intentionally)

Full-copy PDF can be purchased from 1 of 2 websites:

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, Sales@ChineseStandard.net

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

----- The End -----