



MINGRUI

MINGRUI OPTOELECTRONICS TECHNOLOGY

Baoding Mingrui Optoelectronics Technology Co., Ltd.

**MRD-BJ
Neutral Grounding Resistor**

Manual

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1. Brief Introduction to Product

Neutral Grounding Resistor is used to protect power transformers, power generators and other associated equipment in your power systems against 50/60 Hz faults (short circuit) and transient phenomena (lightning).

MINGRUI has outstanding technical researching team and superior equipments, specially concentrating on research & development, production, sales and service of neutral grounding series products of power distribution system. The neutral grounding resistor we developed and produced is applicable to 6~35KV power distribution nets in cities, large industrial enterprises, factories, airports, seaports, subway and etc. as well as 0.66KV system in mine digging and 0.4kv/6kv/10kv system in power plants.



2. Applicable Standards

The design of the product complies with the following standards:

DL/780-2001	Neutral Grounding Resistor in Power Distribution
IEC726	Dry-Type Power Transformer
DL/T620-1997	Overvoltage Protection and Insulation Co-ordination of AC Electrical Equipments
IEC60-1	Experimental Technique of High Voltage
GB1208-1997	Current Transformer
IEC60529:2001	Enclosure Protection Degree (IP code)
IEEE32-1972	Technique Terms and Experiment of Neutral Grounding Device
IEC60081	Insulation Co-ordination of Transmission and Distribution

Device of High Voltage.

DL/T593-1996 Common Specifications for Purchasing High Voltage Switch Equipment.

GB50150-1991 Electrical Equipment's Hand-over and Test Standard of Electrical Device Installation Project.

3. The Characteristic of the Product

3.1 Adopted high quality stainless steel, the product operates safely and reliably with the advantages of high conductivity, high temperature coefficient, corrosion resistance, thermostability, good oxidation resistance, high tensile strength, resistance stability.

3.2 The device also could be applied in medium power distribution system. When transformer is angle-connected, a grounding transformer could be applied and then the neutral grounding resistor is connected to it.

3.3 Resistance value could be designed from 1ohm to 2000ohm and current from 1A to 2000A

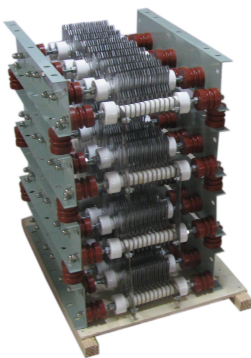
3.4 The cabinet could be installed indoor and outdoor. The cabinet body is corrosion-resistant and of high IP degree, made from stainless steel plate or painted cold rolled steel plate.

3.5 The counting function could be added to the device, which records times of grounding.

3.6 Optional Elements: -Isolated switch (convenient examination and repair)

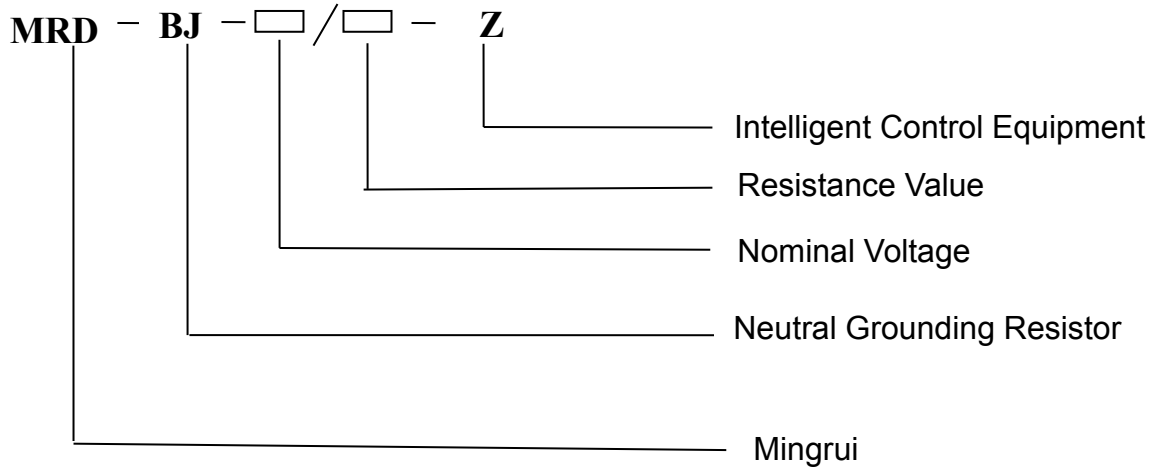
-Temperature & humidity controller

-Intelligent monitor(monitor un-balanced current/ temperature of resistor panel/ temperature of inside cabinet; measure transient current; records grounding times; with communication interface which could send monitored and recorded information to master-control room)





4. Model Meaning



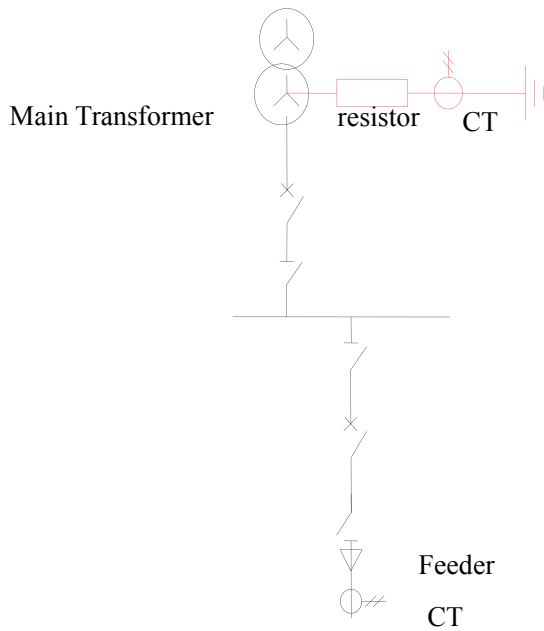
5. Typical Technology Parameters

Product Model	System Voltage (kV)	Rated Current (A)	Current Flowing Time in short Time (S)	Rated Resistor Value Ω ($\pm 5\%$)	Insulation Withstanding Voltage kV	
					8/20 μ S Thunder Stroke	1min Power Frequency
MRD-BJ-6/36.4	6.3	100	10	36.4	60	32
MRD-BJ-6/18.2	6.3	200	10	18.2	60	32
MRD-BJ-6/9.09	6.3	400	10	9.09	60	32
MRD-BJ-6/6.06	6.3	600	10	6.06	60	32
MRD-BJ-10/15.16	10.5	400	10	15.16	75	42
MRD-BJ-10/10.10	10.5	600	10	10.10	75	42
MRD-BJ-10/7.57	10.5	800	10	7.57	75	42
MRD-BJ-10/6.06	10.5	1000	10	6.06	75	42
MRD-BJ-35/20.20	35	1000	10	20.20	185	95
MRD-BJ-35/10.10	35	2000	10	10.10	185	95

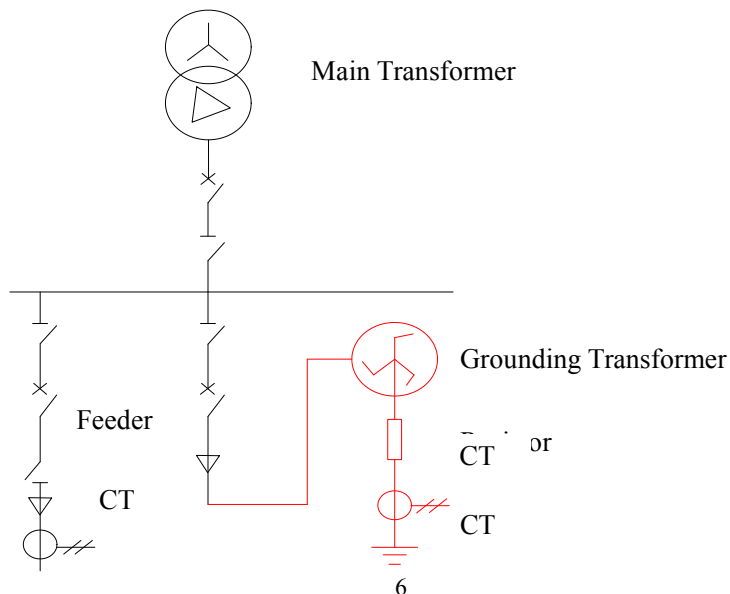
Various resistors could be designed as per customers' requirement, value ranging from $1\ \Omega$ to $2000\ \Omega$. Current allowed to flow through is from $1A\sim 2000A$ and the rated short time could be designed at 10s,15s,30s,60s and 2h.

6. Schematic Diagram for Wire Connection

6.1 The transformer adopts star connection with neutral leading-out wire ,connected as in following diagram.



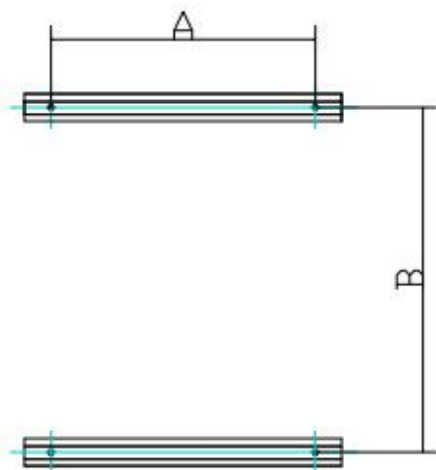
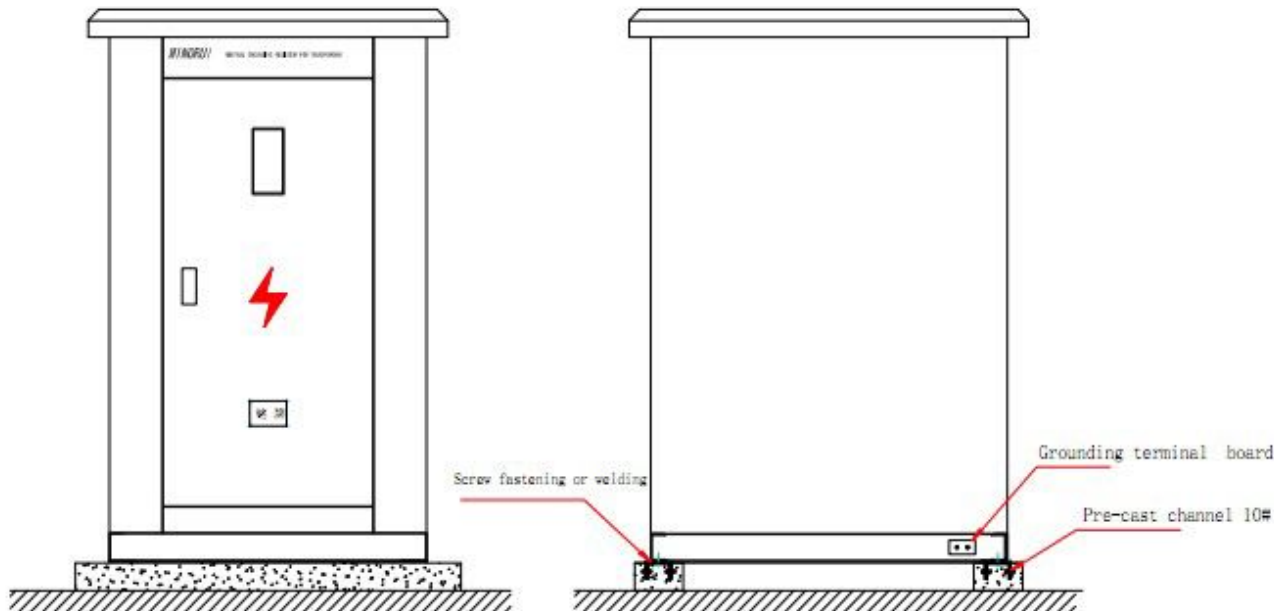
6.2 If the neutral is triangle-connected, neutral grounding resistor is grounded by grounding transformers. Connection is as following diagram





7. Outline and Installation Dimension

Resistor cubicle can be fixed in the concrete foundation stage to keep the resistor even. Equipment cabinet should ground firmly via foundation grounding bolts. Dimension of cabinet outline depends on the parameters of users. Please see following diagram for outline



Enlarge drawing of mounting hole



Note: A, B is the installation dimension of cubicle, different cubicle, different A and B

8. Service Condition

8.1 Generally applicable to outdoors, used in the system of 50 Hz and 60 Hz.

8.2 The altitude shall not exceed 3500m.

8.3 Ambient temperature : $-20^{\circ}\text{C}\sim+70^{\circ}\text{C}$, Relative humidity: $\leq 95\%$

8.4 Wind pressure is not higher than 700Mpa (equal to wind velocity 34m/s)

8.5 Earthquake intensity : < 8 degree

8.6 Thickness of coated ice: $< 10\text{mm}$

8.7 Grade of air pollution: not higher class IV

8.8 The air at the installation site shall be free from inflammable/ explosive/ corrosive gas, and conductive dust.

8.9 As NGR is heating device. The temperature will rise high when applied. Therefore, some space should be left around the the place where the resistor is installed, avoiding being influenced by external heating source. Please pay close attention to this.

9. Notice for Ordering

Please let us know the parameters below.

9.1 Rated Voltage of System: (KV)

9.2 Current Value Allowed to Flow Through in Short Time:(A)

9.3 Nominal Resistance Value:(Ω)

9.4 Whether current transformer needed or not (CT)?

Ratio and capacity and composite error of it is required.

9.5 Wire-in and wire-out modes are for choice:

- a. top-in and bottom-out, b. bottom-in and bottom-out,
c. side-in and side-out, d. side-in and bottom-out.

9.6 Allowable Time of Current Flowing Through in Short Time:(S)

9.7 Material of cubicle, protection of degree (IP), the color code and installation location.

9.8 Optional Devices: -Dis-connector

-Grounding Transformer (if delta connection)

-Recorder of Grounding Times

-Temp. & Humidity Controller

10. Cautions of Site Installation

10.1 Transport the equipment to the installation site by forklift, unscrew bolts of fixing skids, open and taking out the equipment; in unpacking, it is necessary to prevent the shell or wall bushing on the top from damaging; it is suggested that the base of packing material and box should not be dismantled in unpacking, so as to avoid damage during conveyance.

10.2 When using forklift truck, please ensure aligning it with the angle steel on the base, in case that the base is damaged.

10.3 If the space is not big enough, crane can be used to move the equipment to the site. Hoisting lever is equipped at the bottom of the cabinet. If the equipment is too big, or the door of the distribution room is too small, the cabinet body could be detachable type, but instructions must be made prior to producing or indicated in the contract.



10.4 The equipment can be installed either indoors or outdoors. It can be installed on specialized foundation, concrete platform or a supporting platform nearby the transformer.

10.5 Fix to the foundation with anchor bolts through the bolt holes at the bottom. Fixing can also be done through direct welding.

10.6 The resistor is connected to grounding grid by a single core cable. One end of cable is connected to the NGR through incoming hole from bottom to top. The end side of cable must be well done.

10.7 NGR grounding side or CT output side must ground firmly. The cable hole must be covered by rubber plug and sealed. Wire-in end of NGR must be connected firmly with grounding transformer or transformer neutral by single-core cable or copper strip.

10.8 Resistor grounds firmly to public grounding grid via copper bar or cable, the specification of which depends on actual situation.

10.9 Check and fasten all fixing and connecting bolts within the cabinet to ensure the fixing is firm and connections are secure.

11. Checking and Testing

When the device arrives, please open the cabinet door to check components and connected wires in the cabinet. Meanwhile please pay attentions to the following points:

11.1 Prior to power-on, remove all packaging materials from inside the cabinet, to prevent fire-on.

11.2 Carefully check the insulators, bushing and so on for any damage. In case any damage is found, transporter should be connected immediately.

11.3 Check all electrical connections to make sure that the connections are solid and reliable.

11.4 Whether all fastening bolts have been fastened.

11.5 Pre-operating test: Measure the resistance value of the resistor; measure the insulation resistance; and power frequency withstand voltage test shall be carried out according to standard.

11.6 Close the door tightly ready for operation.

12. Maintenance

NGR is highly reliable equipment and does not need additional maintenance. It is recommended that check and maintain it when the main transformer or busbar is during overhaul. Safety operational regulation and safety standards should be strictly followed during check and maintenance.

12.1 Disconnect the resistor cabinet from system.

12.2 Open the cabinet door and check for any abnormality in the cabinet.

12.3 Cleaning shall be carried out.

2.4 Check for any damaged insulator or bushing. Use a Megger (Testing tool for insulation) to confirm the insulation of porcelain bushing.

12.5 Check the resistor components for good condition; Measure the resistance value. The tolerance of its value should be within 10%.

12.6 Check whether the internal connection is firm.

12.7 Check the tightness of the fastening bolts.

12.8 For special occasions such as lightning, storm, earthquake or overload that may damage the resistor components, it is recommended that timely checks shall be carried out by staff.

12.9 When spare parts and/or assistance is needed, please contact our company.

13. Packaging, Transportation and Storage

13.1 When crating, the product should be placed on cross-tie at its right position, and fastened with bolts.

13.2 Place foamed plastic hood around the cabinet body to prevent dust or humidity during transit or storage.

13.3 It is recommended to use the original package for moving the equipment to the site of installation, to prevent possible damage in transit.

13.4 To prevent the resistor from loosening during transportation, special fastening belt shall be used.

13.5 Making Crate with Laths

13.6 Place of delivery, name of equipment and transport weight should be clearly indicated on the packaging box of the resistor cabinet.

13.7 The crate can be loaded into a universal container with forklift truck.

13.8 When goods arrive, a forklift truck or crane should be used for unloading.

13.9 Checks should be carried out prior to unloading, to make sure that the goods are free from damage during transportation.