

WEIFAN ELECTRICITY

NEUTRAL GROUNDING SYSTEMS

SELECTION GUIDE

Transformer • Generator • Low-Voltage Grounding • Arc-Suppression Coil Systems

威帆电气
WEIFAN ELECTRICITY

中性点接地系列产品第一品牌
Create the first brand of neutral grounding system products

本产品系列是中压配电系统的重要组成部分，广泛应用于电力系统，为电力系统的安全运行提供可靠的保障。产品系列包括：WF-BZD系列中压配电系统、WF-GBZD系列中压配电系统、WF-FZD系列中压配电系统、WF-GBZD系列中压配电系统、WF-BZJ系列中压配电系统、WF-XHZ系列中压配电系统、WF-PX系列中压配电系统。

选型手册
SELECTION GUIDE

- WF-BZD系列中压配电系统
- WF-GBZD系列中压配电系统
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- WF-BZJ系列中压配电系统
- WF-XHZ系列中压配电系统
- WF-PX系列中压配电系统

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保定 · 中国电谷
Baoding China Electricity Valley

Create the first brand of neutral grounding system products

Company Profile

Enterprise Introduction

Baoding Weifan Electricity Technology Co., Ltd. is an industrialization base associated with the North China Electric Power University R&D Center for Power Electronics and Power Systems. The company is a specialized supplier of neutral-point protection equipment for power systems, with independently developed core technologies and multiple patented solutions.

Its principal products include neutral grounding resistor (NGR) cabinets, automatic tracking arc-suppression coil compensation systems, and dynamic reactive-power compensation equipment. These products are used in electric power, petroleum, chemical, metallurgy, mining and other industries.

Weifan has accumulated extensive technical experience in medium-voltage distribution-network ground-fault diagnosis. Its grounding-fault identification technologies are incorporated into several product families. Equipment has been applied in thermal power plants, wind farms, substations, photovoltaic plants and nuclear-power projects, and has also been supplied to international markets.

Customer focus • Reliable engineering • Product quality • Responsive technical service

Main Product Families

- WF-BZD Series – Transformer Neutral Grounding Resistor Cabinet
- WF-GBZD Series – Grounding Transformer + Low-Resistance Grounding Protection Package
- WF-FZD Series – Generator Neutral Grounding Resistor Cabinet
- WF-DBZD Series – Low-Voltage Grounding Protection Resistor Cabinet
- WF-BZJ Series – Transformer Neutral Grounding Protection Assembly
- WF-XHZ Series – Tap-Changing Automatic Tracking Arc-Suppression Coil System
- WF-PXB Series – Magnetic-Bias Automatic Tracking Arc-Suppression Coil System

Selection Contents

No.	Series	Product
01	WF-BZD	Transformer Neutral Grounding Resistor Cabinet
02	WF-GBZD	Grounding Transformer + Low-Resistance Grounding Package
03	WF-FZD	Generator Neutral Grounding Resistor Cabinet
04	WF-DBZD	Low-Voltage Grounding Protection Resistor Cabinet
05	WF-BZJ	Transformer Neutral Grounding Protection Assembly
06	WF-XHZ	Tap-Changing Automatic Tracking Arc-Suppression Coil
07	WF-PXB	Magnetic-Bias Automatic Tracking Arc-Suppression Coil
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Typical Applications

- Urban and industrial medium-voltage distribution networks
- Power transformers and station grounding systems
- Generator neutral grounding
- Coal, steel, petrochemical and mining facilities
- Wind, photovoltaic, thermal and nuclear power projects
- Systems requiring resonant grounding and automatic ground-fault line selection

WF-BZD Series

Transformer Neutral Grounding Resistor Cabinet

大变化，电缆线路的比重逐年上升，出现了以电缆为主的配电网，对
身已经超过200A）。同时全封闭GIS电器和氧化锌避雷器已广泛使用，
而中性点不接地或经消弧线圈接地方式，在发生单相接地故障时会产
下能自行恢复，不及时切断故障，容易使故障扩大。对设备绝缘和氧
与电网中大量进口设备的绝缘威胁更大。而中性点经电阻接地方式在
压低（2.5倍），谐振过电压发展不起来，电网可采用绝缘水平较低
为相间短路的概率较低；此外，还改善了电器设备运行条件，提高了
B接地方式已逐步在我国城市配网中推广，实践证明该项技术降低电

有良好
国电力
过电压

存在：



As cable-based distribution networks expand, system-to-ground capacitance increases significantly. Neutral grounding through a resistor can limit single-phase ground-fault current, suppress transient and resonant overvoltage, improve relay-protection selectivity, and reduce insulation stress on equipment.

Service Conditions

- Altitude: up to 5,000 m (standard configuration; special designs available).
- Relative humidity: $\leq 95\%$, non-condensing; no conductive dust.
- Ambient temperature: approximately $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$, depending on configuration.
- Installation environment should be free of explosive gas and severe corrosive contaminants.

Model Designation

WF-BZD – [system voltage] – [rated short-time current] – [duration]

Key Features

- Suitable for transformer neutral grounding at 3 kV, 6 kV, 10 kV, 20 kV, 35 kV and 66 kV system levels.
- Resistor materials may include FeCrAl alloy, NiCr alloy, stainless steel or imported stainless-steel alloy.
- Modular grid-resistor construction provides efficient cooling and avoids localized hot spots.
- Indoor and outdoor cabinet versions; top or bottom cable entry can be arranged to project requirements.
- Optional intelligent monitoring for resistor temperature, cabinet temperature/humidity, neutral current and ground-fault current.
- Event recording, ground-fault count, alarm report storage and RS485 communication are available.

WF-BZD Technical Data

Typical Resistor Characteristics

- Permissible current range: approximately 5–2,000 A, depending on design.
- Typical short-time current durations: 10 s, 30 s, 60 s and 10 min.
- High-temperature resistant alloy; maximum material temperature can exceed 1,000 °C for short-duration duty, subject to design.
- Low resistance temperature coefficient helps maintain protection sensitivity.
- Resistor modules can be combined in series/parallel to achieve required resistance, voltage and current ratings.

Typical Standard Models

Model	System kV	Neutral kV	Current A	Time s
WF-BZD6.0-600-10	6.0	3.46	600	10
WF-BZD6.3-200-10	6.3	3.64	200	10
WF-BZD6.3-600-10	6.3	3.64	600	10
WF-BZD10.5-200-10	10.5	6.0	200	10
WF-BZD35-100-10	35	20	100	10
WF-BZD35-200-10	35	20	200	10
WF-BZD35-400-10	35	20	400	10
WF-BZD35-800-10	35	20	800	10
WF-BZD35-1200-10	35	20	1200	10
WF-BZD66-2000-10	66	38	2000	10

Note: The above values are representative selections reconstructed from the source catalog. Final ratings are engineered against the customer's system data and protection philosophy.

WF-GBZD Series

Grounding Transformer + Low-Resistance Grounding Protection Package

提供一个人为的可带负载的中性点。该中性点可以直接接地，也可以
至还可以带一个连续使用的二次绕组（低压绕组）作为变电站站用

于低阻
安全可
平，在

存在：



（AF）两种。

一般为户内式。应安装在场地清洁，通风良好的户内场所。如果安装
应有足够的通风量，一般每1kW损耗应有≥4m³/min的通风量。

A grounding transformer is used to create an artificial neutral point for a system that otherwise has no accessible neutral. The created neutral can be grounded directly or through a resistor, reactor or arc-suppression coil. The grounding transformer may also include a continuously rated secondary winding for station-service loads.

Product Advantages

- Integrated solution combining grounding transformer and neutral resistor.
- Low loss, low noise, low temperature rise, low partial discharge and low maintenance.
- Dry-type or oil-immersed grounding transformer options.
- Indoor split arrangement or outdoor integrated cabinet can be supplied.
- Air natural cooling (AN) or forced-air cooling (AF), depending on rating.

Grounding Transformer – Typical Parameters

- Applicable standards include GB 10228 / GB 6450 / GB 1094 or equivalent project standards.
- Capacity: typically up to 5,000 kVA.
- Voltage class: up to 66 kV.
- Tapping range: common options include $\pm 2 \times 2.5\%$ or $\pm 5\%$.
- Frequency: 50 Hz or 60 Hz.
- Connection options include ZN / zig-zag configurations; optional auxiliary secondary winding.

WF-GBZD Monitoring & Ordering Data

Dry-Type Transformer Temperature Controller

- Displays three-phase winding temperatures and identifies the hottest phase.
- Sensor fault alarm with phase indication.
- Automatic fan start/stop at preset temperature thresholds.
- Over-temperature alarm and trip contact output.
- Manual fan control and timed fan self-test.
- Password-protected settings and blackout/event memory functions.

Optional Cabinet Monitoring

- Resistor temperature monitoring by infrared sensor or RTD.
- Automatic fan/heater control according to cabinet temperature and humidity.
- Neutral unbalance current and ground-fault current monitoring.
- Neutral voltage monitoring and resistor open-circuit alarm.
- Fault report display; recent event storage retained after power loss.
- RS485 interface for remote supervisory systems.

Please Provide When Ordering

- System rated voltage and grounding method.
- Whether a grounding transformer is required; dry-type or oil-immersed.
- Grounding transformer capacity and whether station-service capacity is required.
- Required resistor value, short-time current and duty duration.
- Indoor/outdoor installation, cable-entry direction, enclosure material/color and IP rating.

WF-FZD Series

Generator Neutral Grounding Resistor Cabinet

发电机中性点电阻柜

必须具备对
称方式与此



■

发电机额定
容量(MW)

故障电流
允许值(A)

Generator neutral grounding is closely related to generator ground-fault protection and transient overvoltage control. High-resistance grounding is commonly used to limit stator ground-fault current to a low value while improving protection sensitivity.

Functions

- Limits ground-fault current to reduce iron-core damage.
- Limits transient overvoltage to approximately 2.5 times rated phase voltage under typical design conditions.
- Suppresses resonant overvoltage.
- Typical single-phase ground-fault current can be designed in the 5–15 A range.
- Improves the sensitivity and coordination of generator ground-fault protection.

Configuration

- Dry-type single-phase grounding transformer.
- Neutral grounding resistor.
- Disconnecting switch / isolator.
- Surge arrester.
- Current transformer for neutral-current measurement and optional analog output.

Typical Grounding Transformer Data

- Insulation class: F.
- Temperature rise: ≤ 100 K.
- Cooling: AN.
- Enclosure protection: IP00 without enclosure; IP20/IP23 with enclosure.
- Insulation level, impedance voltage, no-load loss and load loss according to applicable standards.

WF-FZD Selection Data

Typical Generator Voltage Classes

Generator Rated Voltage	Grounding Transformer Primary
10.5 kV	10.5/ $\sqrt{3}$ kV
13.8 kV	13.8/ $\sqrt{3}$ kV
15.75 kV	15.75/ $\sqrt{3}$ kV
18 kV	18/ $\sqrt{3}$ kV
20 kV	20/ $\sqrt{3}$ kV
24 kV	24/ $\sqrt{3}$ kV
27 kV	27/ $\sqrt{3}$ kV

Please Provide When Ordering

- Generator rated voltage.
- Grounding-transformer ratio and insulation type (dry or oil-immersed).
- Required resistance value and target ground-fault current.
- CT ratio.
- Short-time current duration.
- Cabinet material, IP protection, color and cable-entry arrangement.

Weifan can calculate the required resistor value and recommend the final model from the supplied generator/system data.

WF-DBZD Series

Low-Voltage Grounding Protection Resistor Cabinet

低压接地保护电阻柜



The WF-DBZD series is intended for low-voltage generator and distribution systems, including approximately 0.22 kV diesel-generator systems, 0.38 kV auxiliary systems in thermal power plants, and 0.66 kV industrial systems used in mining, steel and similar facilities. It can also be applied as starting or braking resistance equipment where appropriately engineered.

Service Conditions

- Ambient temperature: approximately -40 °C to +70 °C.
- Installation altitude: normally up to 4,000 m.
- Relative humidity: $\leq 95\%$ at 35 °C.
- No chemically corrosive gas, vapor or explosive dust.
- System frequency: 48–52 Hz for 50 Hz systems; 58–62 Hz for 60 Hz systems.

Technical Features

- High-quality NiCr alloy (e.g., Cr20Ni80) or FeCrAl alloy resistor elements.
- High temperature resistance, corrosion resistance and stable resistance value.
- Typical permissible current: 0–100 A; common duty durations 10 s, 30 s and 60 s.
- Optional taps or continuously adjustable resistance for different system requirements.
- Optional ground-fault event recorder and temperature/humidity controller.

WF-BZJ Series

Transformer Neutral Grounding Protection Assembly

中性点接地保护成套装置



The WF-BZJ series is designed for neutral grounding protection of 110 kV, 220 kV and 330 kV transformers. It supports grounded and ungrounded operating modes and helps protect the transformer neutral insulation from lightning impulses and system-fault overvoltage.

Main Components

- Neutral disconnecting switch / grounding isolator.
- Surge arrester.
- Current transformer.
- Protective discharge gap.
- Manual or motor operating mechanism.
- Support structure and outdoor connection hardware as required.

Typical Environmental Conditions

- Outdoor installation.
- Maximum wind speed: approximately 35 m/s.
- Ambient temperature: approximately -40 °C to +70 °C, with project-specific extension available.
- Seismic intensity: up to level 8, subject to project definition.
- Pollution class and creepage distance designed to site requirements.

Model Designation

WF-BZJ – [110 / 220 / 330 kV] – [M manual / D motor operated]

WF-BZJ Typical Technical Ratings

System Class	Lightning Impulse Withstand kV peak	Short-Time Current kA	Rated Voltage kV	Arrester 1 mA Ref. kV
110 kV	325	20	72	≥103
220 kV	450	20	144	≥205
330 kV	580	20	208	≥310

Ordering Information

- Transformer HV-side rated voltage.
- Neutral insulation level and protection requirements.
- Current-transformer technical data and quantity.
- Operating mechanism type and number of auxiliary contacts.
- Whether support columns / structures are to be supplied, and required quantity.

Discharge-gap spacing is adjustable; copper or 316L stainless steel may be used depending on project requirements.

WF-XHZ Series

Tap-Changing Automatic Tracking Arc-Suppression Coil System

乙系列调匝式消弧线圈 自动跟踪补偿成套装置



该法等先进算法，对高压接地线路进行选线，选线准确，迅速。

The WF-XHZ series is an automatic tracking resonant-grounding package based on an industrial computer control platform. It measures system capacitive current and adjusts the arc-suppression coil tap position so that residual ground-fault current remains within the specified range.

Key Features

- Industrial computer platform with dual-CPU architecture and reliable multilayer control boards.
- Large touch-screen HMI for parameter display, setting and fault query.
- Built-in ground-fault feeder-selection module using residual-current increment and active-power methods.
- RS232, RS485 and IEC 61850 communication interfaces.
- Audible/visual alarm for single-phase ground faults.
- Standard printer for operating and ground-fault records.
- One controller can control one or two arc-suppression coil packages.

Performance

- Voltage class: 6–66 kV.
- Capacitive-current measurement error: <2%.
- Ground residual current: <5 A under properly tuned conditions.
- Controller supply: AC 220 V, or DC 220/110 V depending on design.
- Feeder-selection channels: typically 8–42.

WF-XHZ System Configuration & Control

System Components

- Grounding transformer.
- Tap-changing arc-suppression coil.
- On-load tap changer / tap-position actuator.
- Microprocessor controller.
- Damping resistor box.
- Optional parallel neutral resistor and feeder-selection unit.

Controller Functions

- Automatic/manual tuning with independent operating modes.
- Automatic recognition of bus operating topology and parallel-operation status.
- Automatic lock during a single-phase ground fault to maintain stable compensation.
- Historical fault query and event storage after loss of control power.
- Waveform recording for voltage/current at ground-fault events; data export through USB.
- Ground-fault line selection using multiple algorithms, with coordinated selection for parallel controllers.
- Remote communications via MODBUS, CDT, IEC 61850 and other configured protocols.

Damping Resistor

To prevent series-resonance overvoltage when the system is close to resonance, a damping resistor may be inserted in the arc-suppression coil circuit. During a single-phase ground fault, the resistor can be bypassed to avoid overheating; after fault clearance, it is returned to normal service.

WF-XHZ Typical Selection Table

Model	System kV	Rated Capacity kVA	Typical Regulation Range
WF-XHZ-180-6	6	180	40–50
WF-XHZ-360-6	6	360	30–100
WF-XHZ-630-6	6	630	30–100
WF-XHZ-150-10	10	150	5–25
WF-XHZ-450-10	10	450	10–75
WF-XHZ-900-10	10	900	60–150
WF-XHZ-1100-35	35	1100	10–50

Special capacities and regulation ranges can be engineered to order.

Data Required for Selection

- System voltage class.
- Measured or calculated single-phase earth capacitive current.
- Required compensation mode and residual-current target.
- Number of feeder-selection CTs / outgoing feeders.
- Communications protocol and station automation requirements.

WF-PXB Series

Magnetic-Bias Automatic Tracking Arc-Suppression Coil System

B系列偏磁式消弧线圈 自动跟踪补偿成套装置



双CPU结构，多层电路板处理，运行稳定可靠。
，参数显示、设置及查询方便直观。
宽，可在0~100%额定电流全范围调节。
流增量法及有功功率法等，使选线快速准确。
通信接口，可实现与上位机的通讯，达到信号的远距离传送。
警功能。

The magnetic-bias arc-suppression coil changes core magnetic reluctance by applying DC excitation, allowing the coil inductance to be adjusted rapidly and continuously. During normal system operation, the system remains away from the series-resonance point; when a single-phase earth fault occurs, inductance is adjusted quickly for optimum compensation.

Main Advantages

- Fast and continuous inductance regulation without mechanical tap movement in the coil body.
- Wide regulation range, typically from near 0 to 100% of rated current depending on design.
- Static electromagnetic structure with no internal mechanical moving parts, resulting in high reliability and long service life.
- Automatic measurement of system capacitive current and rapid transition to the required compensation point after an earth fault.
- Supports over-compensation, full compensation and under-compensation settings.

Typical Performance

- Voltage class: 6–66 kV.
- Capacitive-current measurement error: <2%.
- Regulation response: typically <20 ms for the electronic regulation stage.
- Residual earth-fault current: <5 A under correctly selected system conditions.
- Controller: AC 220 V or DC 220/110 V.
- Feeder-selection channels: 8–42; communications via RS232/RS485 and optional IEC 61850.

WF-PXB Operating Principle & System Configuration

Capacitive-Current Measurement

The controller determines system capacitive reactance by comparing neutral displacement voltage and zero-sequence current under two different coil inductance conditions. From the calculated capacitive reactance, the system capacitive current is obtained and the coil is regulated to the required compensation point.

Typical System Configuration

- 6 kV / 10 kV: grounding transformer, magnetic-bias arc-suppression coil, controller, current/voltage measurement, excitation control cabinet.
- 35 kV / 66 kV: grounding transformer, magnetic-bias arc-suppression coil, microprocessor controller and excitation system.
- Zig-zag grounding transformer (e.g., ZN, yn11) may be used to create the system neutral and can also supply auxiliary secondary loads when appropriately rated.

Microprocessor Controller

- Industrial functional modules with dual-CPU architecture.
- 10-inch color HMI with Chinese/English interface possible in project design.
- Automatic/manual mode switching, parameter setting, fault query and self-test.
- Event recording, waveform recording, feeder selection and remote communication.
- Parallel operation of two or more compensation packages can be coordinated automatically.

WF-PXB Capacity Selection

Selection Principle

Arc-suppression coil capacity is primarily determined by the system single-phase earth capacitive current, with an engineering margin. For retrofit projects, the actual measured capacitive current should be used; for new projects, the value should be calculated from the design data.

Recommended engineering basis: $W \approx (1.2-1.4) \times I_c \times U_n$
W = arc-suppression coil capacity; I_c = system capacitive earth current; U_n = system phase voltage

Typical Models

Model	System kV	Rated Capacity kVA	Typical Range
WF-PXB-180-6	6	180	10-50
WF-PXB-360-6	6	360	—
WF-PXB-630-6	6	630	—
WF-PXB-900-10	10	900	—
WF-PXB-1100-35	35	1100	10-50

Model ranges vary with system capacitive current and required compensation characteristic. Final selection should be confirmed by system calculation.

General Ordering Checklist

Electrical System Data

- System nominal voltage and maximum operating voltage.
- System grounding method and accessible neutral arrangement.
- Transformer/generator rating and connection group, where applicable.
- Calculated or measured earth capacitive current.
- Required ground-fault current, resistor value or compensation range.
- Fault current duration and duty cycle.
- CT/VT ratios and accuracy requirements.

Mechanical / Environmental Data

- Indoor or outdoor installation.
- Ambient temperature, altitude, humidity and pollution level.
- Enclosure IP rating, material, color and dimensions.
- Cable entry direction and terminal arrangement.
- Seismic and wind requirements.

Control & Communication

- Local HMI and alarm requirements.
- Remote I/O and communication protocol.
- Event recording / waveform recording / feeder selection.
- IEC 61850, MODBUS, RS485 or other station-automation interfaces.

Qualifications & Test Documentation



The source catalog shows company qualification certificates and representative test reports for grounding transformers, neutral grounding resistor cabinets and arc-suppression coil equipment. Project-specific certificates and test documentation should be confirmed against the actual ordered model and applicable standards.

Documentation Typically Available

- Product drawings and wiring diagrams.
- Technical specification / datasheet.
- Routine test records.
- Type-test documentation where applicable to the selected product family.
- Quality certificates and factory inspection documents.
- Installation, operation and maintenance instructions.

WEIFAN ELECTRICITY

Neutral Grounding • Ground-Fault Protection • Arc-Suppression Systems

Baoding Weifan Electricity Technology Co., Ltd.

English Selection Guide – translated and reformatted from the supplied Chinese catalog