

AFR SERIES ARC PROTECTION RELAY

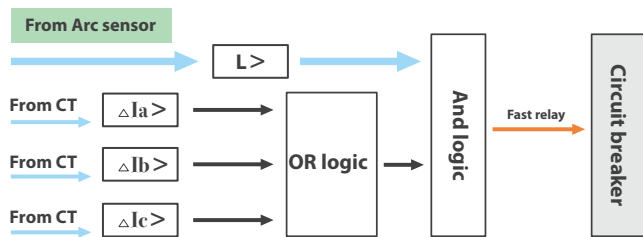
BUSBAR PROTECTION RELAY



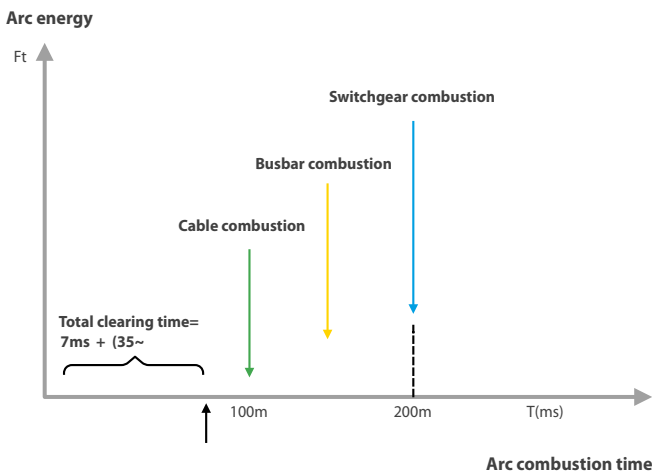
Introduction

AFR series arc protection relay detects electrical arcs in medium and low-voltage equipment, isolating power to minimize the risk of electrical fires. It works to prevent arcing faults in busbars, metal-clad switchgear, and cable boxes.

Arc flash relays can connect with remote light sensors to detect arc flashes and send a trip signal to cut off power. They can be used for stand-alone devices or embedded in complex switchgear layouts.



Arc Hazard Diagram



Main Features

- Accurate and real-time monitoring arc signals.
- High temperatures and humidity resistance.
- Fast response, relay tripping in less than 10 ms.
- Equipped with RS485 communication interface.
- Support ST visible light and ST ultraviolet sensor access.
- Complete SOE records, all information power-off retention.
- Support automatic reclosing function to improve system availability.

Application

- Capacitor cabinet.
- High voltage switchgear.
- Electric power substation.
- Large municipal engineering project.
- Medium and low voltage switchgear.
- Thermal power plant electrical section switchgear.
- Wind turbine & Wind farm and photovoltaic station switchgear.

AFR-M ARC FLASH PROTECTION RELAY

BUSBAR PROTECTION RELAY



Introduction

AFR-M busbar ARC flash protection relay represents a cost-effective and highly efficient solution designed to mitigate arc-fault damage. AFR-M detects the emitted light from an arc flash and promptly triggers tripping relay in both low-voltage (LV) and medium-voltage (MV) electrical networks.

Equipped with up to 48 ultraviolet optical sensors, the relay operates on preset programs, ensuring optimal protection for the secure operation of bus circuits.

Terminal Definition

A-Pwr board	B-DO relay board	C-Arc sensor terminal-1	D-Arc sensor terminal-2	E-Arc sensor terminal-3	F-Arc sensor terminal-4	G-DO Comm board	H-Current sensor terminal
A01 Panel/Lamp	B01 DO-1	ARC01	ARC13	ARC25	ARC37	G01 BUS-B+	H01 H01 H02 H01
A02 I/O Channel	B02 DO-2	ARC02	ARC14	ARC26	ARC38	G02 BUS-B-	H01 H03 H04 H01
A03 I/O Channel	B03 DO-3	ARC03	ARC15	ARC27	ARC39	G03 LPSA1	H1 H05 H06 I-C1
A04 I/O Channel	B04 DO-4	ARC04	ARC16	ARC28	ARC40	G06 LPSA2	H2 H07 H08 H2
A05 I/O Channel	B05 DO-5	ARC05	ARC17	ARC29	ARC41	G07 LPSB1	H2 H09 H10 H2
A06 I/O Channel	B06 DO-6	ARC06	ARC18	ARC30	ARC42	G08 LPSB2	H2 H11 H12 H2
A07 I/O Channel	B07 DO-7	ARC07	ARC19	ARC31	ARC43	EXTRA	H3 H13 H14 H3
A08 I/O Channel	B08 DO-8	ARC08	ARC20	ARC32	ARC44	ETH1	H3 H15 H16 H3
A09 I/O Channel	B09 DO-9	ARC09	ARC21	ARC33	ARC45	ETH2	H3 H17 H18 H3
A10 I/O Channel	B10 DO-10	ARC10	ARC22	ARC34	ARC46		H4 H19 H20 H4
A11 I/O Channel	B11 DO-11	ARC11	ARC23	ARC35	ARC47		H4 H21 H22 H4
A12 I/O Channel	B12 DO-12	ARC12	ARC24	ARC36	ARC48		H4 H23 H24 H4
A13 I/O Channel	B13 DO-13						H5 H25 H26
A14 I/O Channel	B14 DO-14						
A15 I/O Channel	B15 DO-15						
A16 I/O Channel	B16 DO-16						
A17 I/O Channel	B17 DO-17						
A18 I/O Channel	B18 DO-18						
A19 I/O Channel	B19 DO-19						
A20 I/O Channel	B20 DO-20						
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A27 I/O Channel	B27 DO-27						
A28 I/O Channel	B28 DO-28						
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A31 I/O Channel	B31 DO-31						
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A41 I/O Channel	B41 DO-41						
A42 I/O Channel	B42 DO-42						
A43 I/O Channel	B43 DO-43						
A44 I/O Channel	B44 DO-44						
A45 I/O Channel	B45 DO-45						
A46 I/O Channel	B46 DO-46						
A47 I/O Channel	B47 DO-47						
A48 I/O Channel	B48 DO-48						

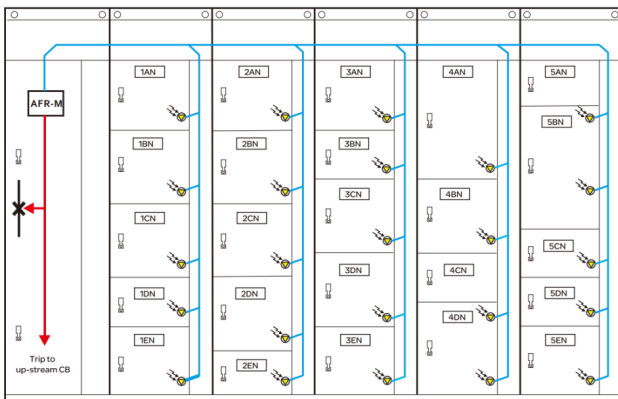
Main Features

- Arc light and current dual criterion.
- Total 4*3-phase current signal input.
- 16* passive DI point, indicates CB status.
- Single unit max 48pcs opt-sensor connected.
- HD LCD display to show integrated information.
- Independent trip act and alarm act arc flash relay.
- 9* trip contacts, free to configuration protect trip logic.
- Optional extra monitor functions by RS-485 connection.
- Panel mounting design with rugged aluminum housing.
- 1* ethernet port support IEC60870-5-103 communication.
- Less than 10 ms operation time from arc flash to arc relay trip.

Application

- Capacitor cabinet.
- High voltage switchgear.
- Electric power substation.
- Large municipal engineering project.
- Medium and low voltage switchgear.
- Thermal power plant electrical section switchgear.
- Wind turbine & wind farm and photovoltaic station switchgear.

Wiring Method



AFR-M Multiple switchgear protection

AFR-S ARC FLASH PROTECTION RELAY

BUSBAR PROTECTION RELAY

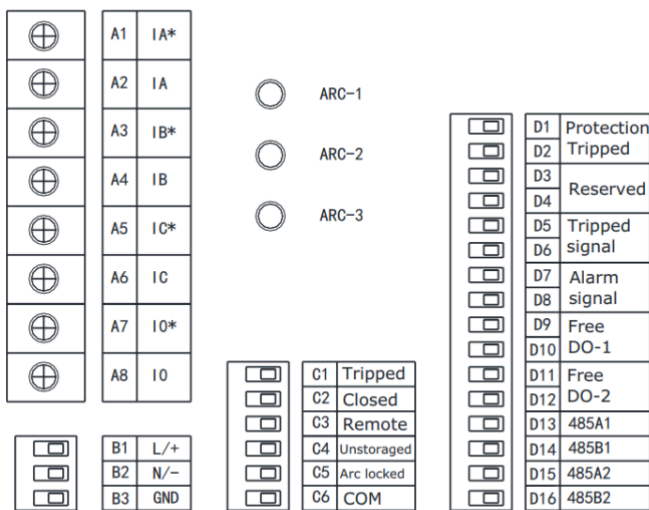


Introduction

AFR-S Arc flash protection relay is a cost-effective solution for minimizing arc-flash damage in low-voltage (LV) or medium-voltage (MV) feeder circuits, commonly recognized as a feeder protection relay. Outfitted with 3 arc sensors, can actively monitors arc faults occurring in cable connections and busbars within the cabinet.

AFR-S features a comprehensive range of functions, including three-stage phase-to-phase overcurrent protection, overload protection, zero-sequence overcurrent protection, arc flash protection, and high-temperature & over-temperature protection.

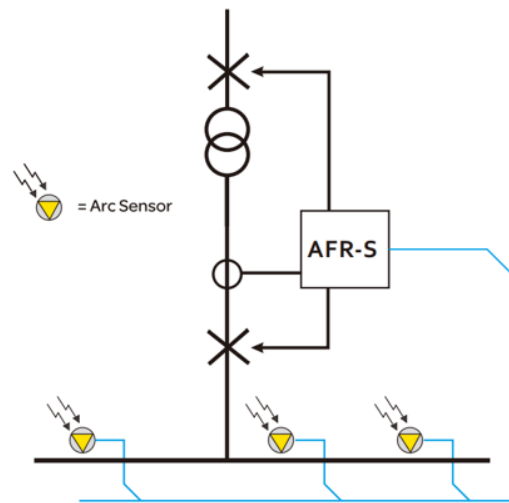
Terminal Definition



Main Features

- Programmable CB protects trip logic.
- Panel mounting design, HD LCD display.
- multiple passive DI points, indicate CB status.
- Can customized VCB control and protection logic.
- 3-phases current and earth-fault current measurement.
- Less than 10 ms operation time (including output relay).
- Multiple trip contacts, free to configure NC / NO status.
- Optional extra monitor functions by RS-485 connection.

Wiring Method



AFR-S Single switchgear protection

AFR-3S ARC FLASH PROTECTION RELAY

BUSBAR PROTECTION RELAY



Introduction

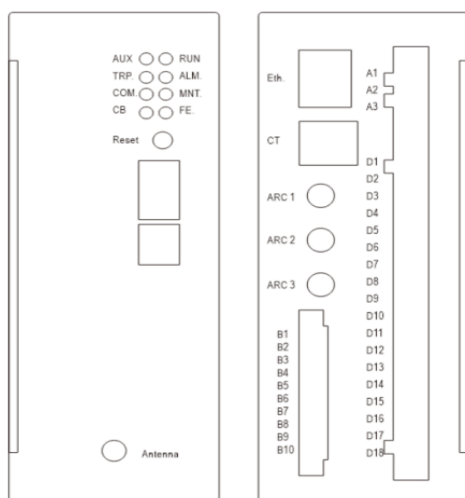
AFR-3S Arc flash protection relays serve as crucial components for detecting arc faults in electrical systems, ensuring the protection of equipment and personnel. AFR-3 adopts advanced monitoring of parameters such as current, voltage, and electric power to swiftly identify arcs.

Designed for application in medium and high-voltage power distribution systems, control cabinets, transformers, generators, motors, and various electrical equipment, the AFR-3 Arc flash relay operates based on a dual-criteria principle. Combining arc light detection with overcurrent detection, it delivers rapid protection responses and high reliability.

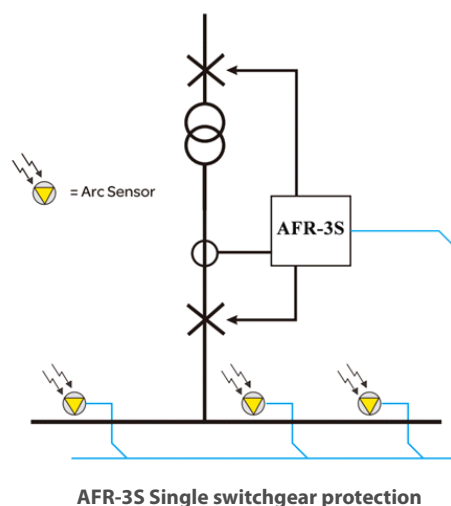
Main Features

- Advanced electrical power parameter monitoring.
- Fast response, Identify arc faults in electrical systems.
- Effectively reduce the risk of fire in electrical systems.
- Quickly cut off the power supply to protect electrical safety.
- Adopt the dual criterion of arc detection and overcurrent detection.
- Comprehensive SOE record for analysis and system optimization.

Terminal Definition



Wiring Method



AFR-4 ARC FLASH PROTECTION RELAY

BUSBAR PROTECTION RELAY



Introduction

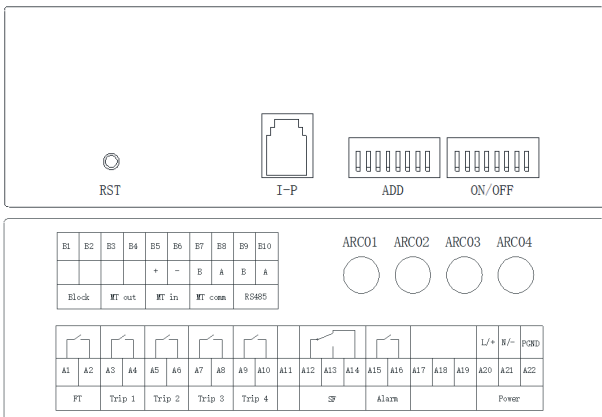
AFR-4 is a versatile and independently operating device for bay based protection. It supports 4-channels arc signal detection and can configuration multiple arc tripping modes, ensuring accurate and fast fault isolation. With a fast relay output speed up to 5ms, AFR-4 can minimize or completely eliminate arc flash damage, improving system safety and reliability. It can be used in various arc protection applications in low or medium voltage power distribution system.

AFR-4 also provides flash warning and dual criteria tripping mechanism (arc detection + current), providing a comprehensive solution for arc flash protection. Integrated RS485/Modbus communication enables seamless remote monitoring and control, which is ideal for modern power systems.

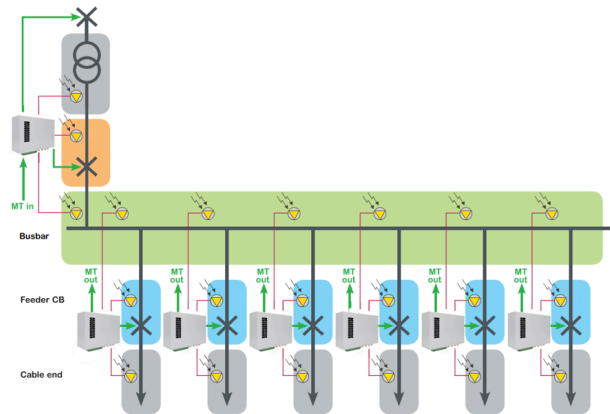
Main Features

- $\leq 5\text{ms}$ fast relay tripping;
- Regional arc light detection
- Multiple combined tripping modes;
- Circuit breaker failure protection;
- 4 channels of arc light signals detection;
- Dual criteria for arc detection and overcurrent detection;
- Integrated /RS485 MODBUS communication protocol;
- Support ST visible light and ST ultraviolet sensor access.

Terminal Definition



Wiring Method



Technical Characteristics

	AFR-S	AFR-M	AFR-3S	AFR-4
Basic parameter				
Power supply	85~265V AC/DC	85~265V AC/DC, optional 24/48V DC	85~265V AC/DC	
Consumption	Monitoring <5W DO triggered <10W	Monitoring <8W DO triggered <10W		
Protection range	0.08~10 In	0~20 In	0.06~10 In	
Rated current (In)	5A or 1A			
Burden	<0.5VA			
Protect current accuracy	<2%		<4%	
Protect frequency accuracy	0.1Hz			
Arc signal input & control				
Channels number	3	12-48	3	4
Sensor type	Optical fiber			
Detection light type	Visible light/UV light (optional)			
Trip coil contact	AC250V/8A fast relay, passive node			
Trip operation time	Pure arc protection: ≤10ms Overcurrent + arc protection: ≤20ms			Pure arc protection: ≤8ms Overcurrent + arc protection: ≤15ms
DO relay channels	6	9	4/6 (optional)	6
Safety isolation	Photoelectric isolation, isolation voltage 2500V			
RS485 Communication				
Comm port	RS485 Modbus-RTU (one standard, two optional)			
Isolation type	Photoelectric isolation, lightning protection			
Baud rate	9600bps			
Ethernet communication				
Interface	2-Way Ethernet optional		/	
Network parameters	10M/100M adaptive		/	
Default IP	192.168.12.2/192.168.13.2		/	
Others				
Working environment	-10 ~ 55°C, < 93% RH (Non-condensing)			
Storage environment	-30 ~ 70°C, < 70% RH (Non-condensing)			
Relative humidity	5%~95%			
Atmospheric pressure	60kPa~106kPa			

Related Accessories



SCM-OPUV (UV light detection)

- Detection angle: 0-240°
- Photosensitive threshold: 1-10mw/cm²
- Default trigger threshold: 5mw/ cm²



SCM-OPVL1 (Visible light detection)

- Detection angle: 0-240°
- Max.transmission distance: <30 m
- Photosensitive threshold: 5-20KLUX.



SCM-OPVL2 (Visible light detection)

- Detection angle: 0-360°.
- Photosensitive threshold: 5-20KLUX
- Trigger threshold: 8KLUX



SCM-BTM (Busbar temperature monitoring)

- Current: 5 A
- Temperature Range: -40 to 125°C
- Connectivity Type: Wireless



SCM-TEV (Partial discharge sensor)

- Bandwidth: 40 MHz - 80 MHz
- Measurement frequency range: 3M-100MHz
- Measuring range: 0~60dB
- Measurement error: ±2dB



SCM-MK (Smoke sensor)

- Smoke sensitivity: 0.15~0.3dB/m
- Alarm current: ≤45mA
- Communication method: RS485, MODBUS-RTU
- Working temperature: -40°C~+120°C, ≤97%RH(40°C±2°C)