

## AG Series



'AG' Series sensors from NK Technologies protect people, products and processes from ground faults by monitoring all current-carrying wires in grounded single or 3-phase systems.

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USA

*Operating Principal:* Under normal conditions, the current in the hot leg of a two-wire load is equal in strength but opposite in sign to the current in the neutral leg. These two currents create magnetic fields that are also equal but opposite. When the wires are next to each other, the fields cancel, producing a "Zero Sum Current". If any current leaks to ground from one wire (Ground Fault), the two currents become imbalanced and the result is a net magnetic flux or field. AG Series ground fault sensors monitor this field and alarm when leakage rises above setpoint. This concept applies to grounded 3-phase delta and wye systems.

## Ground Fault Sensors

### Applications

#### Personnel Protection (typically 5mA)

Senses low fault currents and alarms to shut power before injury occurs.

#### Equipment Protection (typically 30mA)

When personnel protection is not an issue, select a higher setpoint to protect equipment or product

#### Regulatory Approval

Meet requirements by industry groups and governments for Ground Fault Protection.

### Features

#### ■ Broad Range of Options to Match Application Needs:

- Choice of NO/NC solid-state switch and mechanical relay outputs.
- Normally energized or normally de-energized contacts.
- Latching outputs for controlling contactors; auto-reset option for control of shunt trip breakers.
- Noise-immune option for use in EMI/RFI sensitive environments.

#### ■ Setpoint Options Maximize Ease-of-Use:

- Field-selectable 5mA, 10mA or 30mA setpoints (AG3 "Tri-set" model only) makes user-adjustable setpoint fast and convenient.
- Single, factory-adjusted setpoint can be fixed from 5mA to 950mA when ordering.

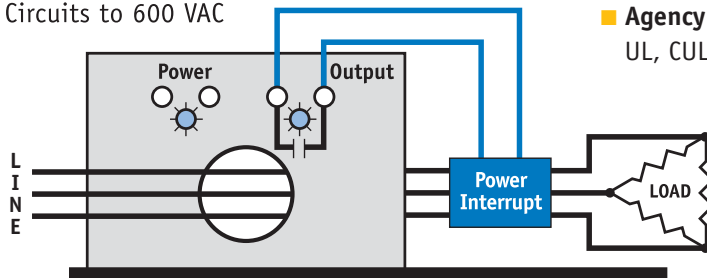
#### ■ Compatible with Standard Equipment

- Applicable on most 1Φ and 3Φ systems.
- Ideal for use with shunt trip breakers or contactors.
- Magnetically isolated from monitored circuit and control power.

#### ■ Agency Approved

UL, CUL and CE acceptance worldwide.

Easy to Apply on 1Φ or 3Φ  
Circuits to 600 VAC



## Ground Fault Sensors

# AG Series

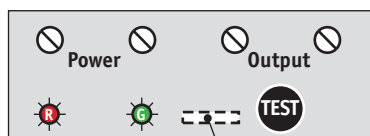
## Solid State Ground Fault Sensors

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AG Series products with solid state outputs combine the benefits of NK Technologies' ground fault sensing technology with the reliability and longevity of solid state contacts. Solid state technology provides unlimited switch operating life, superior resistance to shock and vibration, zero off-state leakage, high switching speeds and high input-output isolation, all of which make these units an ideal choice for standard and harsh environments alike.

## Connections



*Typical of  
Auto-reset  
Version*

### Notes:

- Adjustable Setpoint version has setpoint adjust but no jumper.

*Jumper Location  
for Tri-Set Models*

## Output Table

### Normally Energized Models (-FS Option)

Protection from faults and loss of control power.	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	Closed	OPEN	Closed
N.O. Normally Open	Open	CLOSED	Open

### Normally De-energized Models (-NF Option)

Protection from faults only when control power is applied.	Control Power Applied		
	No Power	No Fault	Fault
N.C. Normally Closed	Closed	CLOSED	Open
N.O. Normally Open	Open	OPEN	Closed

## Solid State Ground Fault Sensors

**AG Series**

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## Specifications

### Setpoint Range

- **"Single-Set" Models** Factory adjusted and sealed
  - AG1: 5–100mA, specify when ordering
  - AG2: 80–950mA, specify when ordering
- **"Tri-Set" Models** 5, 10 & 30mA jumper select

**Output** Isolated Dry Contact

**Output Rating**

- Solid State AC Switch: 1A @ 240VAC
- Solid State DC Switch: 0.15A @ 30VDC

**Off State Leakage** < 10µA

**Response Time**

- 200 ms @ 5% above setpoint
- 60 ms @ 50% above setpoint
- 15 ms @ 500% above setpoint

**Isolation Voltage** Up to 1,250VAC (monitored circuit)

**Frequency Range** 50–400Hz (monitored circuit)

**Sensing Aperture** 0.75" (19.1mm) dia., up to 4" (100mm) dia. available, consult factory.

**Power Supply**

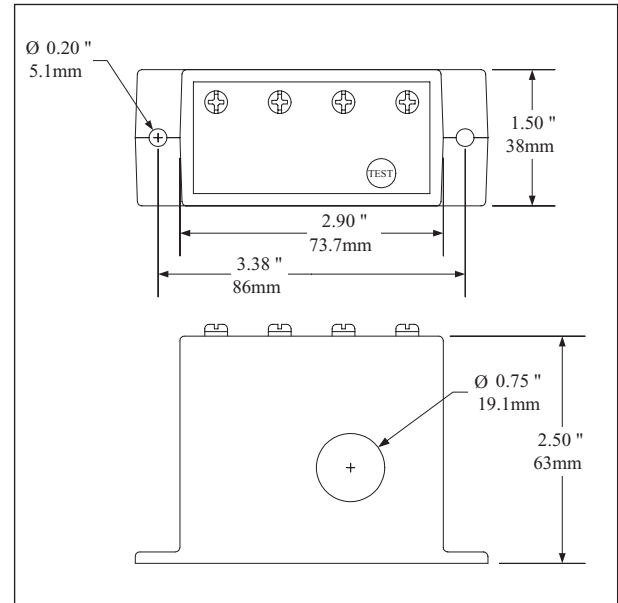
- 120VAC (55–110% of nominal voltage)
- 24VAC/DC (+/-10% of nominal voltage)
- Green LED = power (all models)

**Case** UL 94V-0 Flammability Rated

**Environmental** 5 to 158°F (-15 to 70°C),  
0–95% RH, non-condensing

**Safety** UL 1053, Class 1 Recognized, CE\*

\*Most option combinations are UL recognized.



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## Ordering Information

**Example: AG1-NOAC-120-005-FS**

Ground fault sensor with normally open solid state output, 120VAC power supply, 5mA setpoint, fail safe version.

<b>AG</b>	—		—		—	
<b>Setpoint Range</b>		<b>Output Type</b>		<b>Power Supply</b>		<b>Options</b>
1 5–100mA, Adjustable		NCAC Normally Closed 1A @ 240VAC		120 120VAC		FS Normally Energized
2** 80–950mA, Adjustable		NOAC Normally Open 1A @ 240VAC		24U** 24VAC/DC		NF Normally Deenergized
3 5, 10 & 30mA, Jumper Select		NCDC Normally Closed 0.15A @ 30VDC				
		NODC Normally Open 0.15A @ 30VDC				
						<b>Setpoint</b>
						TR3 Tri-Set Models
						005 Factory Adjusted
						Setpoint in mA
						950

\*\* Not UL recognized in any configuration

## Solid State Ground Fault Sensors

**AG Series continued**

# AG Series

## Mechanical Relay Ground Fault Sensors



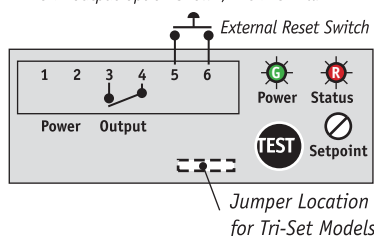
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AG Series products with mechanical outputs are available in solid-core enclosures and offer a choice between a N.O. or N.C. SPST latching relay and a SPDT Form C relay with auto-reset. All mechanical models can be ordered with a factory adjusted setpoint or with the “Tri-set” option which provides three factory-fixed, field-selectable setpoints. A noise immunity option is also available for applications within harsh EMI/RFI environments.

## Connections

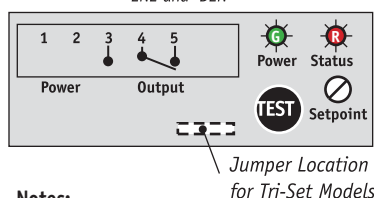
### Latching Models (-LA)

-NOR1 Output Option Shown, -NCR1 similar



### Auto Reset Models

-ENE and -DEN



#### Notes:

- Adjustable Setpoint version has setpoint adjust but no jumper.

## Output Table

### Normally Energized Models (-ENE Option)

Protection from faults and loss of control power

#### Control Power Applied

	No Power	No Fault	Fault
N.C.	Closed	OPEN	Closed
N.O.	OPEN	Closed	OPEN

### Normally Deenergized Models (-DEN Option)

Protection from faults only when control power is applied

#### Control Power Applied

	No Power	No Fault	Fault
N.C.	Closed	CLOSED	Open
N.O.	Open	OPEN	Closed

### Latching Models (-LA Option)

Latching models initially power up in the Reset (Normal) position. If there is a fault or the test button is pressed, the output switches and is latched. The output will remain latched after the fault is cleared, even if control power is removed. To reset the output, apply a momentary contact across the “Reset” terminals (5-6).

## Mechanical Relay Ground Fault Sensors

## Specifications

### Setpoint Range

- **"Single-Set" Models** Factory adjusted and sealed
  - AG1: 5–100mA, specify when ordering
  - AG2: 80–950mA, specify when ordering

- **"Tri-Set" Models**
  - 5, 10 & 30mA jumper select

### Output

- Auto Reset: SPDT Relay, 1.0A @ 125VAC, 2A @ 30VDC
- Latching: SPST Relay, 1.0A @ 125VAC, 2A @ 30VDC

### Response Time

- 200 ms @ 5% above setpoint
- 60 ms @ 50% above setpoint
- 15 ms @ 500% above setpoint

### Isolation Voltage

Up to 1,250VAC (monitored circuit)

### Frequency Range

50–400Hz (monitored circuit)

### Noise Immunity Option

- Shielded from external EMI/RFI interference.
- Power supply noise filtering.

### Sensing Aperture

0.75" (19.1mm) dia., up to 4" (100mm) dia. available, consult factory.

### Power Supply

- 120VAC, operates from 55–110% of nominal voltage
- 24VAC & 24VDC, operates +/-10%

### Case

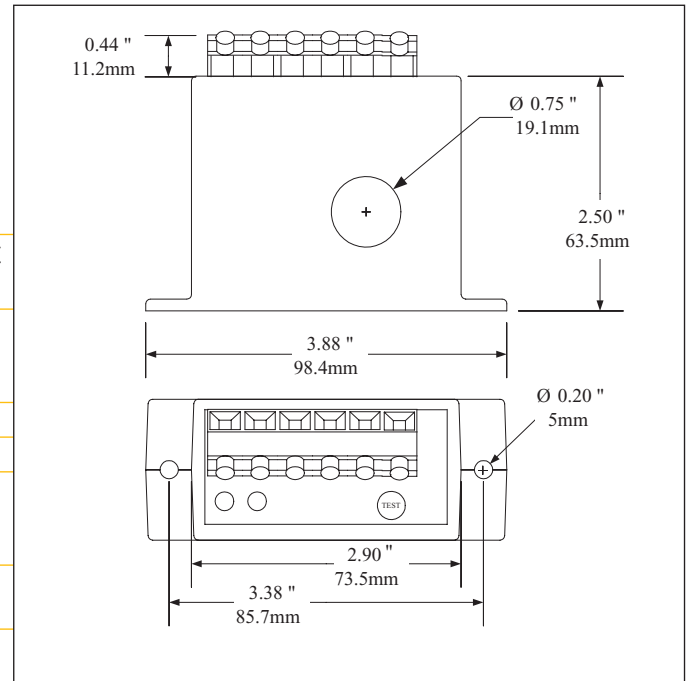
UL 94V-0 Flammability Rated

### Environmental

5 to 158°F (–15 to 70°C),  
0–95% RH, non-condensing

### Safety

UL 1053, Class 1 Recognized, CE



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## Ordering Information

### Example: AG1-NOR1-120-LA-005

Ground fault sensor with normally open SPST Relay output, latching, 120VAC power supply, 5mA setpoint, without optional noise immunity.

AG	Setpoint Range	Output Type	Power Supply	Options	Setpoint	Option
AG	1 5–100mA, Adjustable 2 80–950mA, Adjustable 3 5, 10 & 30mA, Jumper Select	NCR1 Normally Closed SPST Relay (Form B) Available ONLY with the Latching Operation (-LA) NOR1 Normally Open SPST Relay (Form A) Available ONLY with the Latching Operation (-LA) SDT1 SPDT Relay (Form C) Available ONLY with the Auto Reset Operation (-ENE and -DEN)	120 120VAC 24U 24VAC/DC	ENE Normally Energized, Reset Auto (SDT1 output ONLY) DEN Normally De-energized, Auto Reset (SDT1 output ONLY) LA Latching (NCR1 or NOR1 outputs)	TR3 Tri-Set Models 005 Factory Adjusted Setpoint in mA ↓ 950	N Noise Immunity - None (Blank)

## Mechanical Relay Ground Fault Sensors

**AG Series continued**