Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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GROUND-FAULT PROTECTION

Create safer working environments and reduce incidents of Arc Flash without affecting the uptime of critical operations. Vital in manufacturing and processing environments, sensitive ground-fault relays with advanced filtering will detect breakdown in insulation resistance without nuisance trips. Breakdown in insulation resistance can be caused by moisture, vibration, chemicals and dust.

For More Information…
and to download our White Paper on Ground-Fault Protection with VFDs, visit
Littelfuse.com/TechnicalCenter

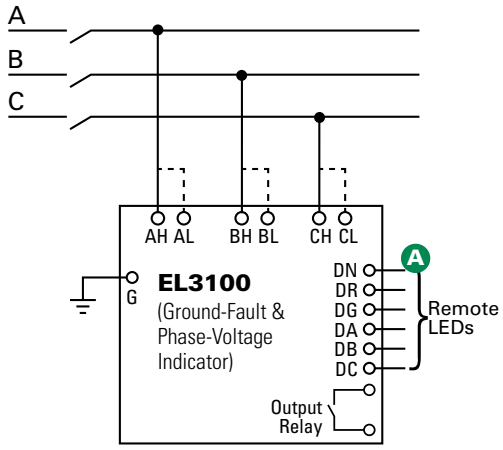
EL3100 SERIES

Ground-Fault & Phase-Voltage Indicator

Description

The EL3100 is a self-powered ground-fault and phase-voltage indication system for 3-phase systems. The EL3100 meets the National Electrical Code (NEC) and the Canadian Electrical Code (CEC) requirements for ground detectors for ungrounded alternating-current systems. Voltage connections are provided on the EL3100 for 208, 240, 480, and 600-V systems. Three green LED's on the EL3100 indicate the presence of phase-to-ground voltage and one red LED indicates a ground fault. The EL3100 can operate stand-alone or with up to five remote LED indicators. A solid-state relay output provides indication of a ground fault. The output relay is closed when the 3-phase neutral voltage shifts as the result of ground leakage.

Simplified Circuit Diagram



Features & Benefits

FEATURES	BENEFITS
NEC® and CEC Code compliant	Meets National Electrical Code (NEC®) Article 250.21 and Canadian Electrical Code Part 1, Section 10-106 (2) requirements for ungrounded systems
Low-voltage remote LEDs	System voltage is not present at the remote LED location
Phase-voltage indication	Indicates the presence of voltage on both grounded and ungrounded systems
Output relay	Allows for remote ground-fault indication

Accessories

A

Remote LEDs
High-intensity 16-mm IP67 LED lamps available in red and green colors.

Ordering Information

ORDERING NUMBER	MOUNTING
EL3100-00	DIN, Surface

ACCESSORIES	REQUIREMENT
RK-310X-0Y	Optional

Note: X=R for red LED and G for green LED
Y=0 for no label and 1 for a ground-fault label

Specifications

Input Voltage Input L: 208/240 Vac
Input H: 480/600 Vac

Dimensions **H** 87.0 mm (3.43"); **W** 112.5 mm (4.43")
D 56.0 mm (2.2")

Approvals CSA certified, UL Listed (E340889), RCM (Australia)

Conformally Coated Standard feature

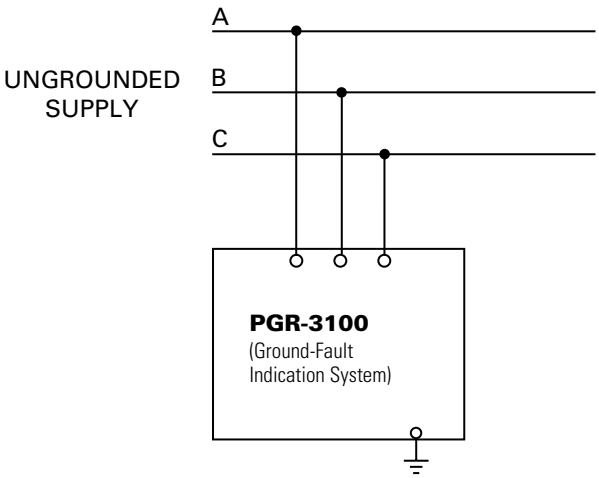
Warranty 5 years

Mounting DIN, Surface

PGR-3100 SERIES

Ground-Fault Indication System

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	MOUNTING
PGR-3100	Panel mount

ACCESSORIES					
ORDERING NUMBER		OPTIONS	POWER SUPPLY	ENCLOSURE	INDICATION
PGR-3100-PNL	-	A	B	C	D
		0 = No Options, customer supplied 120 V lamp test 1 = Transformer included for 120 V lamp test	0 = Low Voltage (120, 208, 240), c/w fusing 1 = High Voltage (480, 600), c/w fusing	0 = NEMA 4 Enclosure 1 = 316 Stainless Steel	Future Options

Description

The PGR-3100 indicates the presence of voltage on each phase of a three-phase system. The LEDs on the panel illuminate when voltage is present. When a ground-fault occurs, the voltage on the faulted phase reduces to ground potential, causing the LEDs for the faulted phase to dim and the LEDs for the unfaulted phases to become brighter. Ungrounded ac systems are required by the National Electrical Code (NEC®) Article 250.21(B) and the Canadian Electrical Code Part 1, Section 10-106 (2) to have ground detectors, such as the PGR-3100, installed on the system. External potential transformers (PTs) can be used to step down system voltage, allowing the PGR-3100 to be applied to any system voltage. PTs are not required for system voltages up to 600 Vac.

Features & Benefits

FEATURES	BENEFITS
NEC® and CEC Code compliant	Meets National Electrical Code (NEC®) Article 250.21(B) and Canadian Electrical Code Part 1, Section 10-106 (2) requirements for ungrounded systems
Phase LEDs	Indicates presence of a ground fault and the faulted phase as well as phase-to-ground voltage on an energized bus
Redundant LEDs	Redundant long-life LEDs (two per phase) to ensure reliability
Lamp test button	Verifies LEDs are operating

Accessories

PGR-3100-PNL
Panel-Mount Enclosure

PGR-3100-PNL is the PGR-3100 integrated into compact stainless steel enclosure for ease of installation and retrofits. Options include visual alarm, audible alarm with silence and reset. Dimensions are 8"W x 8"H x 4" D.

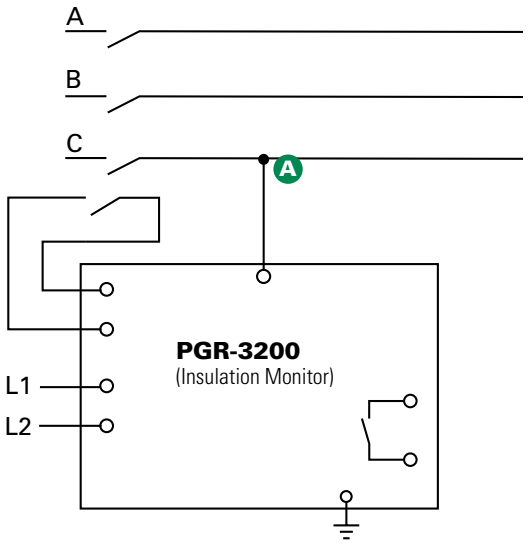
Specifications

Input Voltage	Up to 600 Vac 50/60 Hz
Indicator Off Voltage	< 30 Vac line to ground
Dimensions	**H** 88.9 mm (3.5"); **W** 108 mm (4.3"); **D** 54 mm (2.1")
Test Button	Local
Approvals	CSA certified, UL Listed
Conformally Coated	Standard feature
Warranty	5 years
Mounting	Panel

PGR-3200 SERIES

Insulation Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
PGR-3200	240 Vac(1)
PGR-3200-120	120 Vac

ACCESSORIES	REQUIREMENT
PGH Series	Required >1,300 V
PGA-0510	Optional

Note: For optional conformal coating please consult factory. To convert to a resistance grounded system, see neutral-grounding-resistors packages.

(1) UL Not Available

Description

The PGR-3200 detects ground faults by continuously monitoring the insulation integrity of ungrounded electrical systems. The relay monitors the insulation for damage and assists with predictive maintenance and troubleshooting of developing ground faults by providing two warning and an alarm level. The PGR-3200 operates on one- or three-phase ungrounded systems up to 6 kV.

The PGR-3200 can also be used on a grounded system to monitor the insulation for damage, while the power system is de-energized. The mode-of-operation terminals (27-28) are connected to the circuit breaker or contactor auxiliary contacts to toggle the relay off when the contactor or breaker is closed.

Features & Benefits

FEATURES	BENEFITS
NEC® and CEC Code compliant	Meets National Electrical Code (NEC®) Article 250.21(B) and Canadian Electrical Code Part 1, Section 10-106 (2) requirements for ungrounded systems
Output contact (50 kΩ)	Form C output contact for alarming when the insulation resistance is below 50 kΩ
Output contact (10 kΩ)	Form C output contact for tripping when the insulation resistance is below 10 kΩ
Analog output (0-1 mA)	Provides means for connecting to an optional meter (PGA-0510) or control system
DIN-rail or surface mount	Flexible options for ease of installation

Accessories

A 

PGH Series High-Tension Coupler
A PGH Series high-tension coupler is required for systems between 1,300 V and 6,000 V.

PGA-0510 Analog Ohm Meter
Optional PGA-0510 Analog Meter allows for metering of insulation resistance.

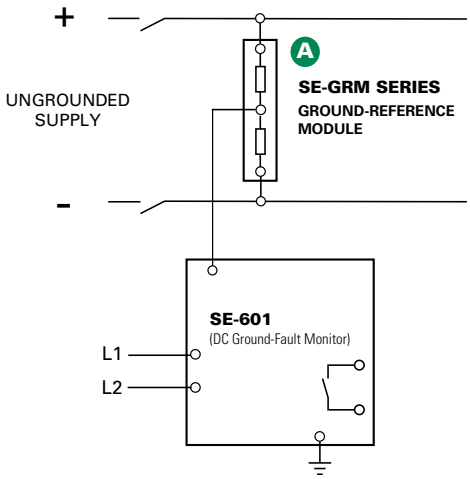
Specifications

IEEE Device Numbers	Undervoltage Relay (27) Ground Detector Relay (64)
Input Voltage	*See ordering information*
Dimensions	**H** 75 mm (3"); **W** 100 mm (3.9"); **D** 115 mm (4.5")
Resistance Ratings	Insulation warning (30 kΩ and 50 kΩ) Insulation alarm (10 kΩ)
Contact Operating Mode	Non-fail-safe
Test Button	Local
Reset Button	Local and remote
Output Contacts	Two Form C
Analog Output	0-1 mA
Conformally Coated	Consult factory
Approvals	UL Listed (E183688)
Warranty	5 years
Mounting	DIN, Surface

SE-601 SERIES (PGR-2601)

DC Ground-Fault Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-601-OU	120/240 Vac/Vdc
SE-601-OD	12/24 Vdc
SE-601-OT	48 Vdc

ACCESSORIES	REQUIREMENT
SE-GRM SERIES	Required
PGA-0500	Optional
PMA-55	Optional
PMA-60	Optional

Note: For optional conformal coating please consult factory.

Description

The SE-601 is a microprocessor-based ground-fault relay for ungrounded dc systems. It provides sensitive ground-fault protection without the problems associated with nuisance tripping. Ground-fault current is sensed using an SE-GRM Series Ground-Reference Module—a resistor network that limits ground-fault current to 25 mA. The SE-601 is used on ungrounded dc systems ranging from industrial 24-Vdc control circuits to 1000-Vdc solar and transportation systems.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (1-20 mA)	Ten settings provide a wide range of low-level protection
Adjustable time delay (50 ms-2.5 s)	Adjustable trip delay allows quick protection or delayed response
Output contacts	Form A and Form B output contacts for operation of separate annunciation and trip circuits
Analog output (0-5 V)	Provides means for connecting to a meter (PGA-0500) or a control system
Non-volatile trip Memory	Retains trip state when de-energized to simplify troubleshooting
Selectable contact operating mode	Selectable fail-safe or non-fail-safe operating modes allow connection to shunt or undervoltage breaker coil
Microprocessor based	No calibration required saves on maintenance cost

Accessories

A 

SE-GRM Series Ground-Reference Module
Required accessory, used to connect the SE-601 DC Ground-Fault Monitor to the DC bus.

PGA-0500 Analog % Current Meter
Optional panel-mounted analog meter displays ground-fault current as a percentage of 22 mA.

Specifications

IEEE Device Numbers	DC Overcurrent Relay (76G)
Input Voltage	See ordering information
Dimensions	**H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Trip Level Settings	1-20 mA
Trip Time Settings	0.05-2.5 s
Output Contacts	Isolated Form A and Form B
Contact Operating Mode	Selectable fail-safe or non-fail-safe
Test Button	Local
Reset Button	Local and remote
Analog Output	0-5 V
Conformally Coated	Consult factory
Approvals	CSA certified, UL Listed (E340889), CE (European Union), C-Tick (Australian)
Warranty	5 years
Mounting	DIN, Surface (standard) Panel (with PMA-55 or PMA-60 adapter)

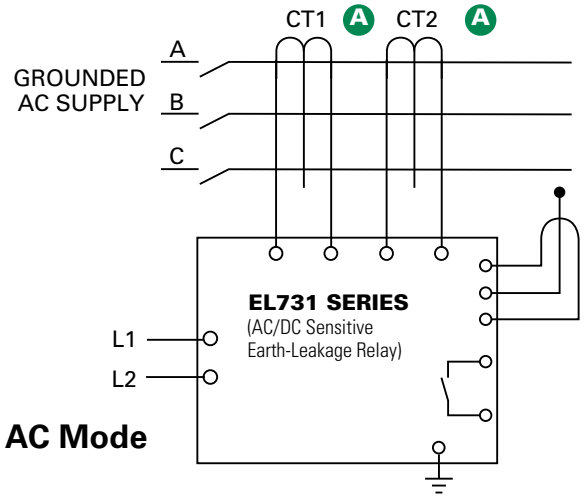
EL731 SERIES

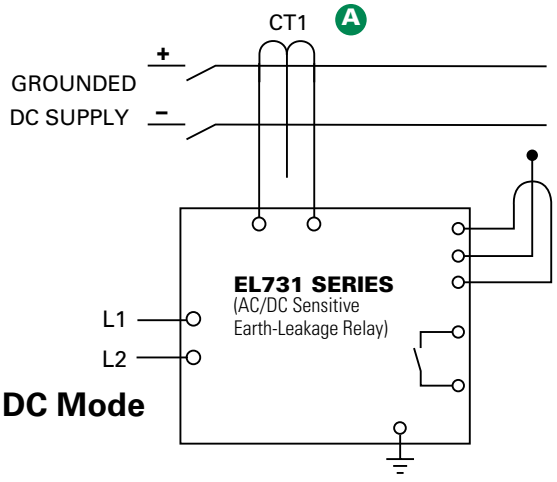
AC/DC Sensitive Earth-Leakage Relay

Description

The EL731 is a microprocessor-based AC/DC Sensitive Earth-Leakage Relay that offers complete coverage for all frequencies from 0 to 6,000 Hz. Two CTs are required for the entire frequency range, or one CT can be used for only low- or high-frequency detection. An RTD/PTC sensor input allows over-temperature protection for a motor or drive. The EL731 offers metering, password-protected alarm and trip settings and optional network communications. It is primarily used to add low-level ground-fault protection to variable-speed drives, and to dc circuits.

Simplified Circuit Diagram





For detailed wiring diagram, see adjacent page.

Ordering Information

ORDERING NUMBER	CONTROL POWER	COMMUNICATIONS
EL731-00-X0	120/240 Vac/Vdc	None
EL731-01-X0	120/240 Vac/Vdc	DeviceNet™
EL731-02-X0	120/240 Vac/Vdc	Profibus®
EL731-03-X0	120/240 Vac/Vdc	EtherNet/IP™
EL731-04-X0	120/240 Vac/Vdc	Modbus® TCP
EL731-10-X0	48 Vdc & 24 Vac	None
EL731-11-X0	48 Vdc & 24 Vac	DeviceNet™
EL731-12-X0	48 Vdc & 24 Vac	Profibus®
EL731-13-X0	48 Vdc & 24 Vac	EtherNet/IP™
EL731-14-X0	48 Vdc & 24 Vac	Modbus® TCP
EL731-20-X0	24 Vdc	None
EL731-21-X0	24 Vdc	DeviceNet™
EL731-22-X0	24 Vdc	Profibus®
EL731-23-X0	24 Vdc	EtherNet/IP™
EL731-24-X0	24 Vdc	Modbus® TCP

Accessories

A 

EFCT Series Earth-Fault Current Transformer
Required zero-sequence current transformer specifically designed for low level detection.

AC700-CUA Series Communication Adapter
Optional network-interface and firmware-upgrade communications adapters field-install in EL731.

AC700-SMK DIN-rail & Surface-mount Adapter
EL731 plugs into adapter for back-plane mounting.

ACCESSORIES	REQUIREMENT
EFCT Series CT	One Required
AC700-CUA Series Com. Unit	Optional
AC700-SMK Surface-Mount Kit	Optional
AC700-CVR-00 Watertight Cover (IP66) for Panel-Mount Applications	Optional
PGA-0520 Analog Meter	Optional

Note: When building a part number, replace the "X" with "1" for AS/NZS 2081:2011 Compliant product, "0" otherwise.

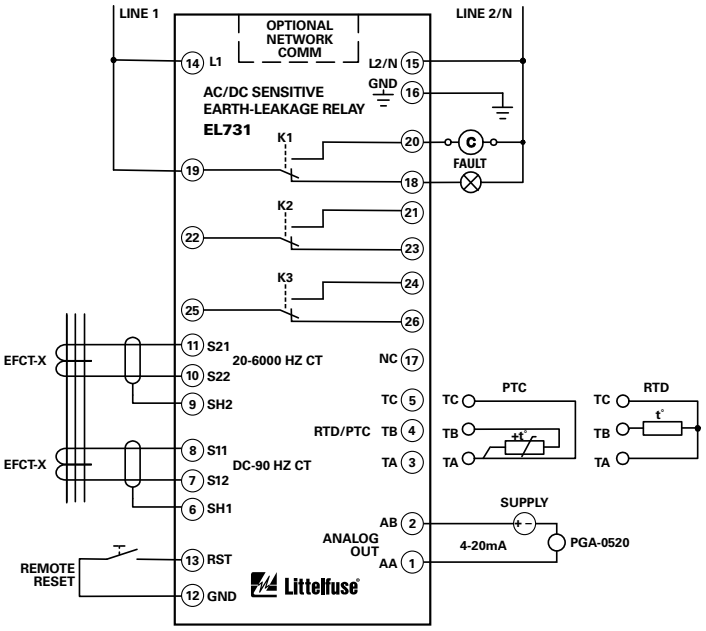
EL731 SERIES

AC/DC Sensitive Earth-Leakage Relay

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (30-5,000 mA)	Adjustable trip setting provides a wide range of low-level protection and system coordination
Frequency range (0-90 Hz, 20-6,000 Hz)	Operate in either AC or DC mode or both. Use single or combined ranges. Separate metering
32-char OLED display	Earth-leakage metering, setup and programming
Local LED indication	Visual Trip, Alarm, CT connection indication
CT-Loop monitoring	Alarms when CT is not connected
Analog output (4-20 mA)	Connect to DCS. Allows connection to an optional meter (PGA-0520) or control system
Adjustable time delay	Adjustable trip delay for quick protection and system coordination
Alarm and trip settings	Detect a deteriorating condition before damage occurs
Temperature-sensor input	Drive or motor temperature protection
Output contacts	3 programmable: Operate 2 alarm and 1 trip circuit
Network communication	Optional connection to plant network
Harmonic filtering	Eliminates nuisance tripping due to harmonic noise
Microprocessor based	No required calibration saves maintenance cost
Universal power supply	Provides flexibility for numerous applications

Wiring Diagram



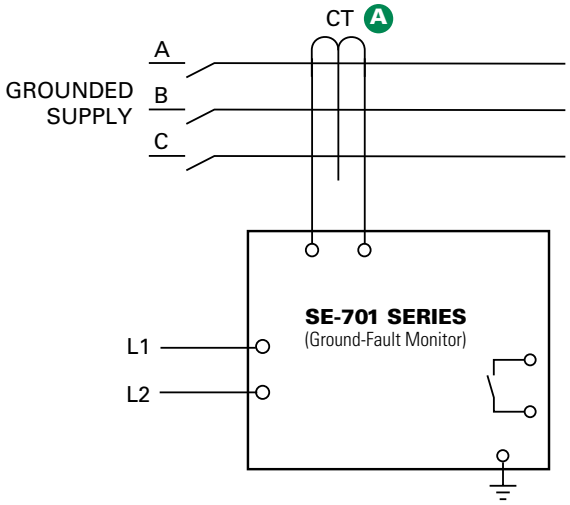
Specifications

IEEE Device Numbers	AC ground fault (50G/N, 51G/N), DC ground fault (79G), PTC overtemperature (49), RTD temperature (38, 49)
Supply Voltage	120/240 Vac/Vdc, 24 Vdc, 48 Vdc/24 Vac
Trip Level Settings	30-5,000 mA AC and DC
Alarm Level Settings	30-5,000 mA AC and DC
Trip Delay	0.05-2 s
Output Contacts	3 Form C (programmable)
Contact Operating Mode	Fail-safe & non-fail-safe
Reset	Front panel and remote
Freq. Response, CT1	0-90 Hz
Freq. Response, CT2	20-6,000, 190-6,000, 20-90, 20-3,000 Hz; selectable
Current Transformer	EFCT-x series
CT Detection	Open & short detection
Terminals	Plug-in, wire clamping, 24 to 12 AWG (0.2-2.5 mm^2)
Communications	EtherNet/IP™, DeviceNet™, Profibus®, Modbus® TCP (optional)
Analog Output	4-20 mA (selectable 0-5 A or 0-100% trip-level setting)
Conformal Coating	Standard feature
Dimensions	**H** 48 mm (1.9"); **W** 96 mm (3.8"); **D** 129 mm (5.0")
Approvals	UL Listed (E340889), CSA, RCM (Australia), CE
Warranty	5 years
Mounting	Panel; Surface and DIN (with optional AC700-SMK)

SE-701 SERIES (PGR-5701)

Ground-Fault Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-701-0U	120/240 Vac/Vdc
SE-701-0D	12/24 Vdc
SE-701-0T	48 Vdc
SE-701-03	24 Vac

ACCESSORIES	REQUIREMENT
Current Transformer	Required
PGA-0500	Optional
PMA-55, PMA-60	Optional
SE-EFVC Voltage Clamp	Optional

Note: For optional conformal coating please consult factory.

Description

The SE-701 is a microprocessor-based ground-fault relay for resistance- and solidly-grounded systems. In addition to common systems, it is uniquely suited for use on systems with significant harmonic content. The SE-701 can provide main-plant protection, feeder-level protection, or individual-load protection. Proper current transformer selection provides the desired pickup range. The output contacts can be connected for use in protective tripping circuits or in alarm indication circuits. The analog output can be used with a PLC or a meter.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (1-99%)	Trip setting based on input CT primary, allows use with any CT. Minimum 50 mA with EFCT Series.
Adjustable time delay (50 ms-2.5 s)	Adjustable trip delay allows quick protection and system coordination
Output contacts	Form A and Form B ground-fault output contacts for operation of separate annunciation and trip circuits
Analog output (0-5 V)	Allows for connecting an optional meter (PGA-0500) or a control system
CT-Loop monitoring	Alarms when CT is not connected
Selectable DFT or peak detection filtering	Compatible with variable-speed drives
Harmonic filtering	Eliminates nuisance tripping
Non-volatile trip memory	Retains trip state while de-energized to simplify troubleshooting
Microprocessor based	No calibration required, saves on maintenance cost
Universal power supply	Allows operation in application where one side of PT is faulted, provides flexibility for numerous applications

Accessories

A 

Ground-Fault Current Transformer
Required current transformer model depends on application. We offer a variety of sensitive CTs with 5- and 30-A primaries.

B 

PGA-0500 Analog % Current Meter
Optional panel-mounted analog meter displays ground-fault current as a percentage of the CT primary rating.

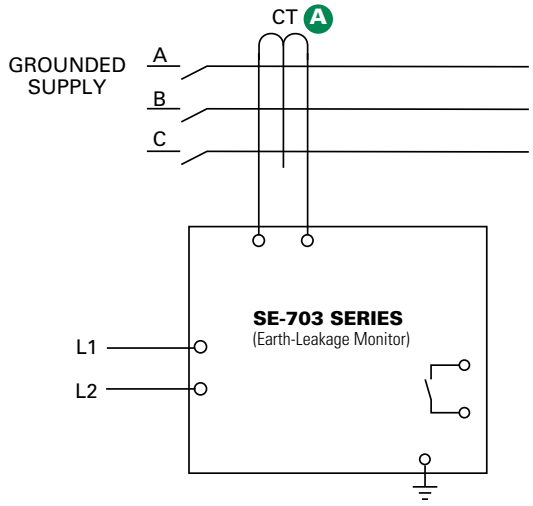
Specifications

IEEE Device Numbers Ground fault (50G/N, 51G/N)
Input Voltage See ordering information
Dimensions **H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Trip Level Settings 1-99% CT-Primary Rating
Trip Time Settings 0.05-2.5 s
Contact Operating Mode Selectable fail-safe or non-fail-safe
Harmonic Filtering Standard feature
Test Button Standard feature
Reset Button Standard feature
CT-Loop Monitoring Standard feature
Output Contacts Isolated Form A and Form B
Approvals CSA certified, UL Listed (E340889), CE (European Union), C-Tick (Australian)
Analog Output 0-5 V
Conformally coated Consult factory
Warranty 5 years
Mounting DIN, Surface (standard) Panel (with PMA-55 or PMA-60 adapter)

SE-703 SERIES

Earth-Leakage Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-703-OU	120/240 Vac/Vdc
SE-703-OD	12/24 Vdc
SE-703-OT	48 Vdc
SE-703-O3	24 Vac

ACCESSORIES	REQUIREMENT
EFCT Series	Required
PGA-0500	Optional
PMA-55	Optional
PMA-60	Optional
SE-EFVC Voltage Clamp	Optional

Description

The SE-703 is a microprocessor-based earth-fault relay for resistance- and solidly earthed systems. It offers sensitive earth-fault detection as low as 25 mA and can be used on systems with significant harmonic content. The SE-703 provides feeder-level protection or individual-load protection. The output contacts can be connected for use in protective tripping circuits or in alarm indication circuits. The analog output can be used with a PLC or a meter. The SE-703 is specifically designed to be AS/NZS 2081:2011 compliant.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (25-500 mA)	Adjustable trip setting provides a wide range of low-level protection and system coordination
Adjustable time delay (INST-500 ms)	Adjustable trip delay allows quick protection and vsystem coordination
Output contacts	Form A and Form B ground-fault output contacts for operation of separate annunciation and trip circuits
Analog output (0-5 V)	Allows for connecting an optional meter (PGA-0500) or control system
CT-Loop monitoring	Alarms when CT is not connected
Contact operating mode	Fail-safe operating mode for undervoltage applications
Harmonic filtering	Eliminates nuisance tripping
Non-volatile trip memory	Retains trip state while de-energized to simplify troubleshooting
Microprocessor based	No calibration required, saves maintenance cost
Universal power supply	Allows operation in application where one side of PT is faulted, provides flexibility for numerous applications

Accessories

A **EFCT Series Ground-Fault Current Transformer**
Required zero-sequence current transformer specifically designed for low-level detection.

B **PGA-0500 Analog % Current Meter**
Optional panel-mounted analog meter displays ground-fault current as a percentage of the set-point or 5 A.

C **PMA-60 Series – Mounting Adapter**
Required when panel mounting for AS/NZS 2081:2011 compliance

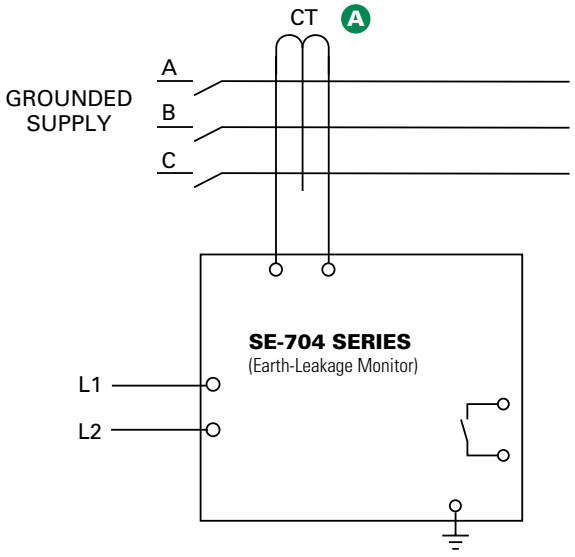
Specifications

IEEE Device Numbers	Ground fault (50G/N, 51G/N)
Input Voltage	*See ordering information*
Dimensions	**H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Trip Level Settings	25-500 mA
Trip Time Settings	INST-500 ms
Contact Operating Mode	Fail-safe
Harmonic Filtering	Standard feature
Test Button	Standard feature
Reset Button	Standard feature
CT-Loop Monitoring	Standard feature
Output Contacts	Isolated Form A and Form B
Approvals	CSA certified, UL Listed (E340889), CE (European Union), RCM (Australian)
Compliance	AS/NZS 2081:2011
Analog Output	0-5 V
Conformally Coated	Yes
Warranty	5 years
Mounting	DIN, Surface (standard), Panel (with PMA-55 or PMA-60 adapter)

SE-704 SERIES (PGR-4704)

Earth-Leakage Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-704-0U	120/240 Vac/Vdc
SE-704-0D	12/24 Vdc
SE-704-0T	48 Vdc
SE-704-03	24 Vac

ACCESSORIES	REQUIREMENT
SE-CS30 Series	Required
PGA-0500	Optional
PMA-55, PMA-60	Optional

Note: For optional conformal coating please consult factory.

Description

The SE-704 is a microprocessor-based ground-fault relay for resistance- and solidly-grounded systems. It offers very sensitive ground-fault detection as low as 10 mA and can be used on systems with significant harmonic content. The SE-704 provides feeder-level protection or individual-load protection. The output contacts can be connected for use in protective tripping circuits or in alarm indication circuits. The analog output can be used with a PLC or a meter.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (10 mA-5 A)	Adjustable trip setting provides a wide range of low-level protection and system coordination
Adjustable time delay (30 ms-2.0 s)	Adjustable trip delay allows quick protection and system coordination
Output contacts	Form A and Form B ground-fault output contacts for operation of separate annunciation and trip circuits
Analog output (0-5 V & 0-1 mA)	Allows for connecting an optional meter (PGA-0500) or control system
CT-Loop monitoring	Alarms when CT is not connected
Selectable contact operating mode	Selectable fail-safe or non-fail-safe operating modes allows connection to shunt or undervoltage breaker coil
Harmonic filtering	Eliminates nuisance tripping
Non-volatile trip memory	Retains trip state when de-energized to simplify troubleshooting
Microprocessor based	No calibration required saves maintenance cost
Universal power supply	Allows operation in application where one side of PT is faulted, provides flexibility for numerous applications

Accessories

A 

SE-CS30 Series Ground-Fault Transformer
Required zero-sequence current transformer specifically designed for low level detection. Flux conditioner is included to prevent saturation.

B 

PGA-0500 Analog % Current Meter
Optional panel-mounted analog meter displays ground-fault current as a percentage of the set-point or 5 A.

Specifications

IEEE Device Numbers	Ground fault (50G/N, 51G/N)
Input Voltage	See ordering information
Dimensions	**H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Trip Level Settings	10 mA-5.0 A
Trip Time Settings	30-2000 ms
Contact Operating Mode	Selectable fail-safe or non-fail-safe
Harmonic Filtering	Standard feature
Test Button	Standard feature
Reset Button	Standard feature
CT-Loop Monitoring	Standard feature
Output Contacts	Isolated Form A and Form B
Approvals	UL Listed (E340889), CSA, CE (European Union) C-Tick (Australian)
Analog Output	0-5 V & 0-1 mA
Conformally coated	Optional
Warranty	5 years
Mounting	DIN, Surface (standard) Panel (with PMA-55 or PMA-60 adapter)

SB6000 SERIES

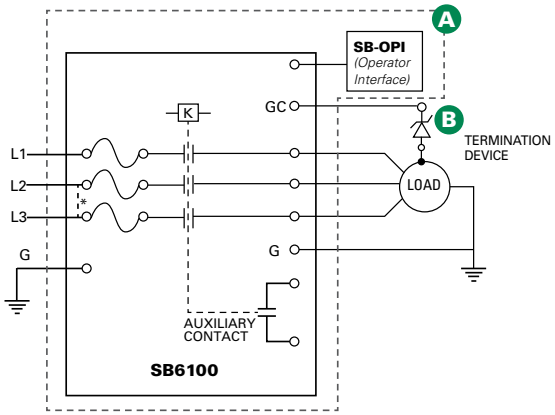
Industrial SHOCK BLOCK™ LITTELFUSE® Products

Enclosed Model* Open-Chassis Model*

Operator Interface*

*Patented

Simplified Circuit Diagram



ENCLOSED SB6100 MODELS

* For a single-phase load; Jumper L_2 & L_3 & use L_1 & L_2 as the input terminals

Ordering Information

ORDERING NUMBER	VOLTAGE (V)	TRIP LEVEL (mA)	UL CATEGORY/CLASS
SB6100-00X-0	208	20(Fixed)	UL 943C Class C special-purpose GFCI
SB6100-10X-0	240		
SB6100-20X-0	480		
SB6100-30X-0	600		UL 943C Class D special-purpose GFCI
SB6100-01X-0	208	6, 10-100 in increments of 10	UL 943/UL 1053 Equipment ground-fault protective device (EGFPD)
SB6100-11X-0	240		
SB6100-21X-0	480		
SB6100-31X-0	600		

Note: x=0 for open-chassis models and 1 for enclosed models

Description

Special-Purpose Ground-Fault Circuit Interrupter (GFCI), Class C and Class D

Industrial Shock Block (ISB) is a personnel protection device designed to meet the new requirements for special-purpose GFCIs defined by UL 943C. ISB is the first and only permanently connected Class C and Class D GFCI on the market. Class C GFCIs are intended to be used on systems where the line-to-line voltage is 480 V or less with a trip level of 20 mA, while Class D GFCIs are intended to be used on 600 V systems. These improvements to the standard Class A GFCI (6 mA trip level used on 240 V systems or less) were made to allow the use of GFCIs in industrial facilities. The ISB includes an automatic self-test feature and is compliant to the UL1998 Software in Programmable Components standard.

Equipment Ground-Fault Protective Device (EGFPD)

ISB is also available with adjustable protection settings as an EGFPD. The EGFPD models can be set to trip at 6 mA or from 10-100 mA in increments of 10 mA. This offers more flexibility since GFCI devices are not allowed to have an adjustable trip level.

Rating and Models

ISB (GFCI & EGFPD) is available for voltages from 208 to 600 V with a maximum full load current of 100 A, and a built-in overcurrent protection supplied by Littelfuse Class T fuses. The load can be 1-phase (line-to-line) or 3-phase, however, cannot have a neutral. The power system can either be solidly-grounded or high-resistance grounded.

Two options for enclosures are available: UL-recognized open-chassis models are available for installation in existing electrical enclosures and UL-listed enclosed models include a NEMA-4X enclosure for stand-alone installations.

Ground Wire (Load-Ground) Monitor

The ISB also monitors the ground wire (load-ground) connection between the ISB and load. This is a required feature for GFCI devices and is optional for EGFPD devices. If the connection is broken, the ISB will provide an alarm by changing the state of the alarm contacts. This monitoring circuit includes an extra wire (pilot wire) between the ISB and load (since the monitoring current is low, only a small wire is required). At the load, the pilot wire is connected to a termination device. The other end of the termination device is connected to the load ground (typically the enclosure).

Features & Benefits

FEATURES	BENEFITS
UL 943 inverse time trip curve	Detects and interrupts to protect people and reduce the probability of nuisance tripping
Minimum trip time < 20 msec	Reduces the risk of ventricular fibrillation for leakage current of 250 mA and above
UL 943C fixed trip level (GFCI 20 mA)	Personnel protection for systems with leakage current higher than the standard 6 mA required by UL 943 Class A
Selectable trip levels (EGFPD)	Provides extra safety when a customer is able to operate with a setting below 20 mA (GFCI) and the settings above 20 mA can reduce nuisance tripping on systems with high leakage current.
UL 943C ground monitor/ interrupt	Protects from shock by tripping if continuity of ground wire between Industrial Shock-Block and load is broken.
Undervoltage, brownout, chatter detection	Ensures proper operation and prolongs the internal contactor lifetime
3 x Class T, 600 V incoming fuses	The fuses provide overcurrent protection for a 100 A circuit and a higher short-circuit current rating (SCCR) of 50 kA.
Conformal coating	Internal circuits are conformally coated to protect against corrosion and moisture, yet still repairable
Operator Interface	Shows unit status, alarm types, percentage of leakage current, and allows for Test and Reset capabilities
Auxiliary Contact	Provides a normally-open contact for remote indication
Automatic Self-Test	All ISB options (revision 01 or higher) include an automatic self-test feature
Motor Starter	Allows the user to start and stop the motor from the interface

SB6000 SERIES

Accessories

A **Operator Interface (AC6000-OPI-00)**

B **1N5339B - Termination Device**
Axial-lead ground-check termination, included with SB6000 series

SE-TA6 - Termination Assembly
Optional termination assembly with terminals and mounting holes

SE-TA6-SM Stud-Mount Termination Assembly
Optional ground-check termination for submersible pumps

AC6000-CART-00 Two-wheeled Cart
Optional for mounting ISB to allow for moving the unit while power is off

AC6000-MNT-00 Mounting Frame
Optional for mounting ISB to a cart or other surface. Included with the AC6000-CART-00.

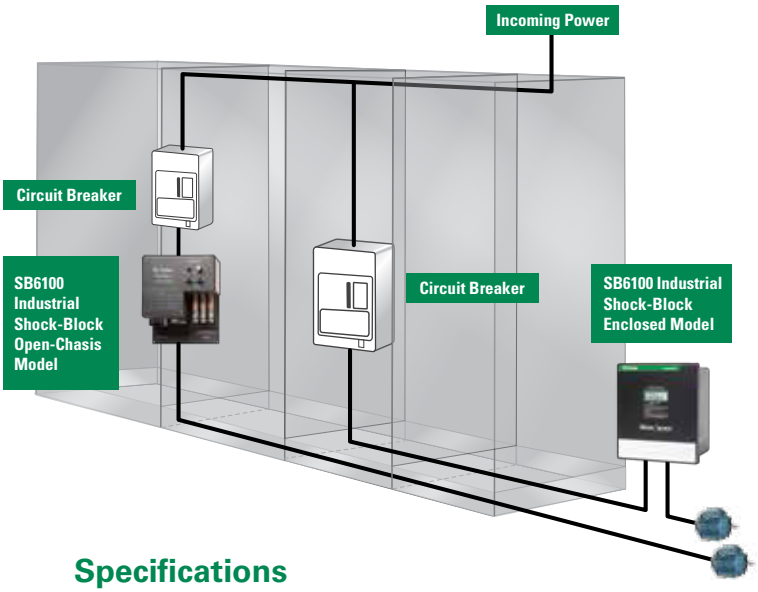
Ordering Information - Accessories

ACCESSORIES	REQUIREMENT	PAGE
AC6000-OPI-00	Included	N/A
1N5339B	Included	477
SE-TA6	Optional	477
SE-TA6-SM	Optional	477
SE-TA6ASF-WL	Optional	477
AC6000-CART-00	Optional	N/A
AC6000-MNT-00	Optional	N/A

Connection Diagram

The SB6100 is installed in-line between incoming power or existing over-current protection device and the load.

The open-chassis SB6100 can be installed in electrical equipment and the enclosed version is typically wall-mounted.



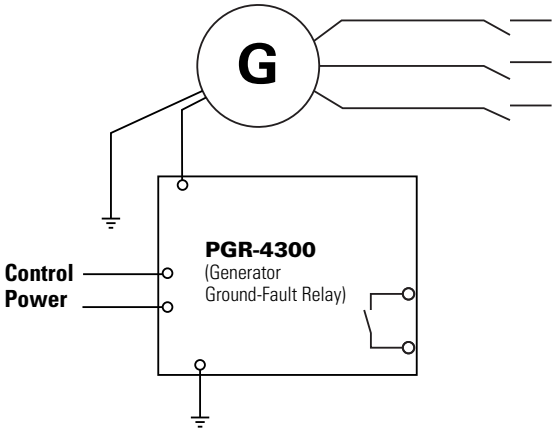
Specifications

Voltage Rating	See ordering information
Current Rating	100 A (continuous)
Load	3-phase, 3-wire (no neutral) or 1-phase (line-to-line), 60 Hz
Short-Circuit Current Rating	50,000 A
Trip Level Settings	Selectable (6, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100 mA), or fixed at 20 mA
Trip Time Setting	Inverse time trip curve
Enclosure	NEMA 4X, Polyester, Lockable
Operating Temperature	–35°C (–31°F) to +40°C(104°F), up to +66°C (151°F) with derating
Wiring Requirements	2/0 AWG (maximum)
Approval	GFCI: UL Listed (enclosed models) and UL Recognized component (open-chassis models) EGFPD: cULus Listed (enclosed models) and cURus Recognized Component (open-chassis models); UL1998 Compliant (revision 01 or higher); All models CSA Certified
Dimensions	Enclosed: **H** 453.8 mm (17.9"); **W** 406.2 mm (16.0"); **D** 223.3 mm (8.8") Open-chassis: **H** 455.0 mm (17.9"); **W** 340.7 mm (13.4"); **D** 174.9 mm (6.8")
Warranty	1 year

PGR-4300 SERIES (GFA300)

Generator Ground-Fault Relay

Simplified Circuit Diagram



Description

The PGR-4300 Generator Ground-Fault Relay provides a simple method for detecting a ground-fault condition on generators without the need for current transformers (CTs). This greatly simplifies the installation. In addition, it is compatible with both three- and four-pole transfer switches. This relay also monitors the neutral-to-ground path for continuity. The PGR-4300 is ideal for any generator or application where there is not sufficient space to install CTs.

Features & Benefits

FEATURES	BENEFITS
No CTs required	Saves space and simplifies installation
Adjustable pickup (100-1200 A)	Adjustable trip setting provides a wide range of protection and allows system coordination
Adjustable time delay (0-1.0 s)	Adjustable trip delay allows quick protection and system coordination
Output contacts	Form C ground-fault output contacts for alarming or tripping purposes
Analog output (0-1 mA)	Provides means for connecting to an optional meter (PGA-0500) or control system
N-G continuity alarm	Monitors neutral-to-ground integrity and alarms if ground path becomes open circuit
Passive filtering	Eliminates nuisance tripping

Accessories

PGA-0500 Analog % Current Meter
Optional panel-mounted analog meter displays ground-fault current as a percentage of the set-point.

Ordering Information

ORDERING NUMBER	CONTROL POWER
PGR-4300-12	12 Vdc
PGR-4300-24	24 Vdc
PGR-4300-120	120 Vac

ACCESSORIES	REQUIREMENT
PGA-0500	Optional
PMA-55	Optional
PMA-60	Optional

Note: For optional conformal coating please consult factory.

Specifications

IEEE Device Numbers	Ground Fault (50G/N, 51G/N)
Input Voltage	See ordering information
Dimensions	**H** 75 mm (3.0"); **W** 55 mm (2.2"); **D** 115 mm (4.5")
Trip Level Settings	100-1200 A
Trip Time Delay Settings	0-1.0 s
Contact Operating Mode	Non-fail-safe
Test Button	Local
Reset Button	Local and remote
Output Contacts	Form C
Analog Output	0-1 mA
Conformally Coated	Consult factory
Approvals	UL Listed (E183688)
Warranty	5 years
Mounting	DIN, Surface (standard) Panel (with PMA-55 or PMA-60 adapter)

GROUND-CONDUCTOR MONITORING

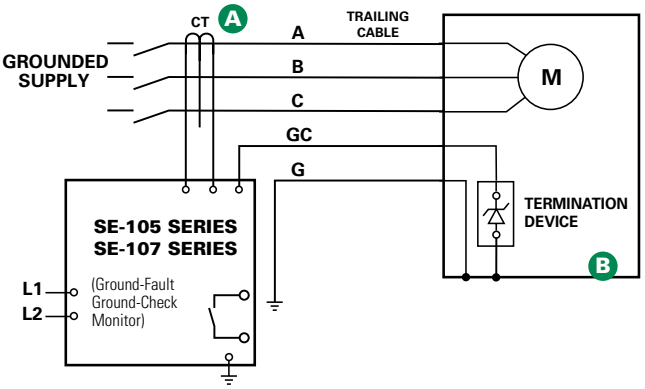
Continuously monitor the integrity of the ground conductor to protect portable equipment from hazardous voltages caused by ground faults.

For More Information…
and to download our technical note on Ground-Fault Ground-Check, visit
Littelfuse.com/Ground-faultPaper

SE-105 / SE-107 SERIES

Ground-Fault Ground-Check Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-105	120 Vac
SE-105D	120 Vac/Vdc
SE-105E	240 Vac
SE-107	120 Vac
SE-107D	120 Vac/Vdc
SE-107E	240 Vac

Consult manual online for additional ordering options.

ACCESSORIES	REQUIREMENT
CT200 Series	Required
1N5339B	Included
SE-TA6, SE-TA6-SM	Optional
SE-TA6A Series	Optional
RK-102, RK-105, RK-105I	Optional
RK-13	Optional
PPI-600V	Optional

Description

The SE-105/SE-107 is a combination ground-wire monitor and ground-fault relay for resistance-grounded systems. It continuously monitors the integrity of the ground conductor to protect portable equipment from hazardous voltages caused by ground faults. The SE-105/SE-107 is an excellent choice for trailing cables 5 kV and under in underground mining applications. For higher voltages or long-cable applications, see the SE-134C/SE-135.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (0.5, 2.0, 4.0 A)	Unit can be used on a wide variety of trailing cable applications
Adjustable time delay (0.1-2.0 s)	Adjustable trip delay for quick protection and system coordination
Harmonic filter	Prevents false operation
Zener-characteristic termination assembly	Provides reliable ground-check loop verification
Fail-safe ground-check circuit	Ensures ground-check circuit remains safe even in the event of equipment failure
Conformal coating	Additional coating protects circuit boards against harsh environment
SE-105: selectable UV- or shunt-trip mode	Provides flexibility for different applications
SE-107: UV-trip mode only	Eliminates chance of unauthorized change to trip circuit

Accessories

A 

CT200 Series Current Transformer
Required CT detects ground-fault current.

B 

1N5339B Termination Device
5 W axial-lead ground-check termination; included with SE-105/SE-107.

SE-TA6 Termination Assembly
Optional termination assembly with convenient terminals and mounting holes

SE-TA6-SM Stud-Mount Termination Assembly
Optional 50 W ground-check termination that is robust and compact for submersible pumps. Wire lead simplifies installation.

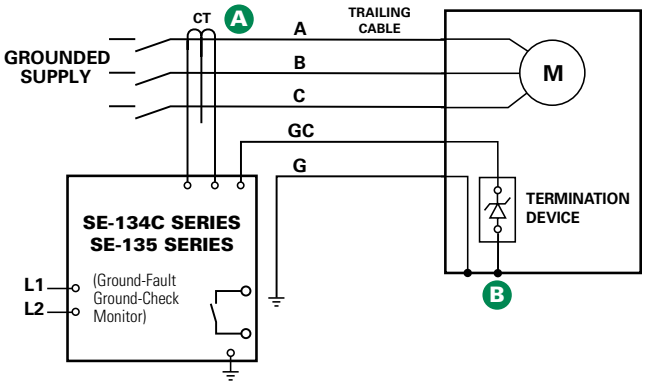
Specifications

IEEE Device Numbers Checking or Interlocking Relay (3GC), Ground Fault (50G/N, 51G/N)
Input Voltage See ordering information
Dimensions **H** 150 mm (5.9"); **W** 109 mm (4.3"); **D** 100 mm (4.0")
Trip Level Settings 0.5, 2.0, 4.0 A
Trip Time Settings 0.1-1.0 s
Contact Operating Mode Selectable fail-safe or non-fail-safe (SE-105) Fail-safe only (SE-107)
Harmonic Filtering Standard feature
Reset Button Local and remote
Output Contacts Isolated Form A
Approvals CSA certified, UL Listed (E340889), C-Tick (Australian)
Conformally Coated Standard feature
Warranty 5 years
Mounting Surface

SE-134C / SE-135 SERIES

Ground-Fault Ground-Check Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	OPTION	POWER SUPPLY	COMM
SE-134C	Blank or XGC	0=120/240 Vac/Vdc 1=24/48 Vdc (1)	0=None
SE-135	Blank or XGC	0=120/240 Vac/Vdc 1=24/48 Vdc (1)(2)	0=None 3=Ethernet (1)

ACCESSORIES	REQUIREMENT
SE-CS10 Series	Required
SE-CS40 Series (for SE-135)	Optional
SE-TA6A Series (for SE-134C)	Required
SE-TA12A/SE-TA12B Combination (for SE-134C)	Optional
SE-TA12A Series (for SE-135)	Required
SE-IP65CVR-G	Optional
RK-132	Optional
PPI-600V	Optional

(1) CE/C-Tick not available.
(2) Not available with Ethernet option 3.
(3) See ordering information.
See Current Transformer Selection Guide and Accessory Information.

Description

The SE-134C/SE-135 is a microprocessor-based, combination ground-wire monitor and ground-fault relay for resistance-grounded or solidly grounded systems. It continuously monitors the integrity of the ground conductor to protect portable equipment from hazardous voltages caused by ground faults. The SE-134C/SE-135 is field proven in monitoring trailing cables on large mobile equipment such as drag-lines, mining shovels, shore-to-ship power cables, dock-side cranes, stacker-reclaimers, submersible pumps, and portable conveyors.

Features & Benefits

FEATURES	BENEFITS
Adjustable pickup (0.5-12.5 A for SE-CS10) (2 - 50 A for SE-CS40)	Unit can be used on a wide variety of trailing cable applications
Adjustable time delay (0.1-2.5 s)	Adjustable trip delay for quick protection and system coordination
Output contacts	Separate annunciation of ground-fault and ground-check faults
Ground-check LED indication	Indication of open or short ground-check wire makes it easier to find faults
CT-loop monitoring	Alarms when CT is not connected
High-induced-ac rejection	Makes unit suitable for applications with high voltages and long cables
DFT (Harmonic) filter	Prevents false operation
Zener-characteristic termination assembly	Provides reliable ground-check loop verification
Fail-safe circuits	Ensures ground-check and ground-fault circuits remain safe even in the event of equipment failure
Conformal coating	Additional coating protects circuit boards against harsh environment
XGC option	Increases maximum cable length for ground-check monitoring (10 km typical)

Accessories

A 

SE-CS10 or SE-CS40 Series Ground-Fault Current Transformer
Required zero-sequence current transformer detects ground-fault current.

B 

SE-TA6A Series, SE-TA12A Series Termination Assembly
Required termination assembly; temperature compensated.

Specifications

IEEE Device Numbers — Checking or Interlocking Relay (3GC), Ground fault (50G/N, 51G/N)
Input Voltage — 65-265 Vac; 85-275 Vdc; 18-72 Vdc
Dimensions — **H** 213 mm (8.4"); **W** 99 mm (3.9"); **D** 132 mm (5.2")
Trip Level Settings — 0.5-12.5 A for SE-CS10, 2 - 50 A for SE-CS40
Trip Time Settings — 0.1-2.5 s
Contact Operating Mode — Selectable fail-safe or non-fail-safe
Harmonic Filtering — Standard feature
Test Button — Standard feature
Reset Button — Standard feature
Output Contacts — Isolated Form A and Form B, Two Form C
Approvals — CSA certified, UL Listed (E340889), C-Tick (Australia)(3), CE(3)
Conformally Coated — Standard feature
Warranty — 5 years
Mounting — Panel, Surface
GC Trip Resistance — 28Ω (Standard), 45Ω (XGC Option)

RESISTANCE GROUNDING/NGR MONITORING

Continuously monitor the integrity of the ground conductor to protect portable equipment from hazardous voltages caused by ground faults

Neutral-Grounding-Resistor Sizing Chart

System Voltage (Line-to-line)	NGR Let-Through Current and Resistance	Time Rating
208 V	5 A / 24 Ohms	Continuous
480 V	5 A / 55 Ohms	Continuous
600 V	5 A / 69 Ohms	Continuous
2,400 V	5 A / 277 Ohms or 10 A / 139 Ohms	Continuous or 10 sec
4,160 V	5 A / 480 Ohms or 10 A / 240 Ohms	Continuous or 10 sec
13,800 V	10 A / 798 Ohms or 200 A / 40 Ohms	10 seconds
25,000 V	200 A / 72 Ohms or 400 A / 36 Ohms	10 seconds
34,500 V	200 A / 100 Ohms or 400 A / 50 Ohms	10 seconds

Note: The values shown are for any size transformer and are typical.

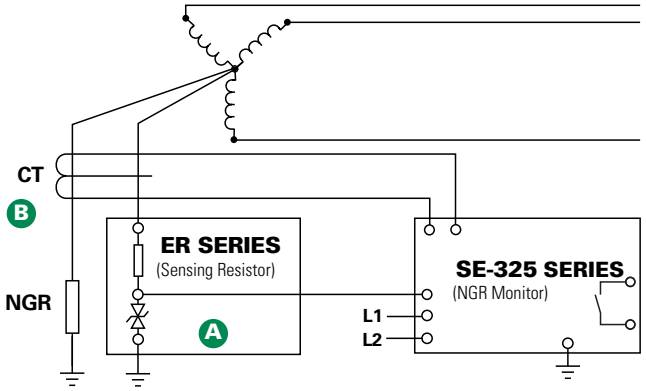
Note: The above table is for illustrative purposes only. Actual values may differ based on a variety of individual system considerations, such as capacitive charging current and co-ordination study results.

For More Information…
and to download our White Paper Why NGRs Need Contiuous Monitoring, visit
Littelfuse.com/TechnicalCenter

SE-325 SERIES (PGM-8325)

Neutral-Grounding-Resistor Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER	CONTROL POWER
SE-325	120 Vac
SE-325D	120 Vac/Vdc
SE-325E	240 Vac

Consult manual online for additional ordering options.

ACCESSORIES	REQUIREMENT
CT200 Series	Required
ER Series	Required
SE-MRE-600	Optional
RK-325, RK-325I, RK-302	Optional
RK-13	Optional
NGRM-ENC	Optional

Description

The SE-325 Neutral-Grounding-Resistor Monitor is used on resistance-grounded systems up to 25 kV to monitor the integrity of the neutral-to-ground path and to detect ground faults. It measures current and voltage in a transformer or generator neutral-to-ground connection and continuity of the neutral-grounding resistor (NGR). The SE-325 coordinates these three measurements to detect a loose connection, corrosion, ground fault, or NGR failure, and provides one alarm or trip output contact.

Features & Benefits

FEATURES	BENEFITS
Continuous NGR monitoring	Detects resistor failure within seconds, reduces transient-overvoltage risk, removes risk of ground-fault-detection failure
Ground-fault Detection	Main or backup protection to detect a ground fault anywhere on the monitored system
Adjustable pickup (0.5-4 A)	Select greatest sensitivity without false operation
Adjustable time delay (0.1-2 s)	Adjustable trip delay allows system coordination
Output contacts	Form A output contact
Selectable contact operating mode	Selectable fail-safe or non-fail-safe operating modes allows connection to shunt or undervoltage breaker coil or alarm system

Accessories

A 

ER Series Sensing Resistor
Required interface between the power system and the SE-325. Eliminates hazardous voltage levels at the monitor.

B 

CT200 Series Current Transformer
Required CT detects ground-fault current.

RK Series Remote Indication and Reset
Optional panel-mounted remote indication and reset assemblies. Available in NEMA 1 or NEMA 4 configurations.

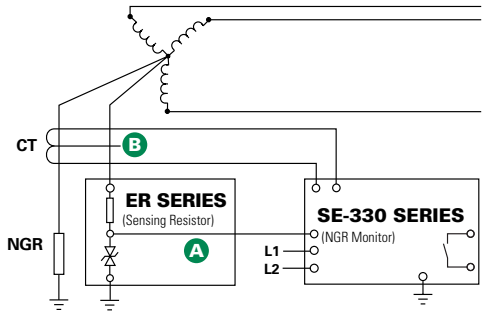
Specifications

IEEE Device Numbers	Ground Fault (50G/N, 51G/N), Overvoltage (59N), Lockout Relay (86), Checking Relay (3)
Input Voltage	See ordering information
Dimensions	**H** 150 mm (5.9"); **W** 109 mm (4.3"); **D** 100 mm (4.0")
GF Trip Level Settings	0.5-4.0 A
GF Trip Time Settings	0.1-2.0 s
RF Trip-Level Settings	20-400 Vac (≤5 kV systems) 100-2,000 Vac (>5 kV systems)
Contact Operating Mode	Selectable fail-safe or non-fail-safe
Reset Button	Standard feature
Output Contacts	Form A
Approvals	CSA certified, UL Listed (E340889), C-Tick (Australian)
Conformally coated	Standard feature
Warranty	5 years
Mounting	Surface

SE-330, SE-330HV SERIES

Neutral-Grounding-Resistor Monitor

Simplified Circuit Diagram



For detailed wiring diagram, see adjacent page.

Ordering Information

ORDERING NUMBER		POWER SUPPLY	COMM			K4 UNIT HEALTHY CONTACT
SE-330	-	X	X	-	0	X
SE-330 for all apps. 35 kV or less SE-330HV for 72 kV apps.		0=120/240 Vac/Vdc 2=48 Vdc	0=USB Only 1=DeviceNet 3=EtherNet (Dual RJ45) 4=EtherNet (SC Fiber & RJ45) 5=EtherNet (Dual SC Fiber) 6=IEC61850 Dual RJ45) 7=IEC61850 (SC Fiber & RJ45) 8=IEC61850 (Dual SC Fiber)			0=Normally Open 1=Normally Closed

NOTE: For Australian applications, see the SE-330AU.

ACCESSORIES	REQUIREMENT
ER Series Sensing Resistor	Required
Current Transformer	Required
SE-IP65CVR-G	Optional
SE-MRE-600	Optional
RK-332	Optional
NGRM-ENC	Optional
PGA-0520	Optional
SE-330-SMA	Optional

Description

The SE-330 Series is an advanced ground-fault and neutral-grounding-resistor monitoring relay. It measures neutral current, neutral-to-ground voltage, and neutral-to-ground resistance. It provides continuous monitoring of the neutral-to-ground path to verify that the neutral-grounding resistor (NGR) is intact. This is of utmost importance—an open NGR renders current-sensing ground-fault protection inoperative and could result in a false belief that the system is functioning properly. The SE-330 can be used with low- and medium-voltage transformers and generators with low- or high-resistance grounding used in processing, manufacturing, chemical, pulp and paper, petroleum, and water-treatment facilities. For high-voltage applications, use the SE-330HV Series. For applications that require conformance to Australian standard AS/NZS 2081.3:2002, see the SE-330AU Series.

Resistor Monitoring

The SE-330 combines the measured values of resistance, current, and voltage to continuously determine that an NGR is intact. It is able to detect a resistor failure with or without a ground fault present. Sensing resistors are matched to the system voltage and are used to monitor NGRs on systems up to 72 kV.

Ground-Fault Monitoring

The SE-330 uses an application-appropriate current transformer to reliably detect ground-fault currents as small as 100 mA. DFT filtering ensures that false trips due to harmonic noise from adjustable-speed drives do not occur. Should the resistor open and a ground fault subsequently occur, the SE-330 will detect the fault through voltage measurement, while other current-only sensing relays would be ineffective.

Pulsing Ground-Fault Location

The SE-330 is capable of controlling a pulsing contactor, which is used to switch the NGR resistance in a pulsing-compatible NGR package. The resulting ground-fault current is distinguishable from charging currents and noise and will only appear upstream of the ground fault, making fault location fast and easy, even without isolating feeders or interrupting loads.

Accessories

A

ER Series Sensing Resistor
Required interface between the power system and the SE-330/SE-330HV. Eliminates hazardous voltage levels at the relay.

B

EFCT Series Ground-Fault Current Transformer
Sensitive ground-fault current detection (5 A primary).

SE-CS30 Series Ground-Fault Current Transformer
Sensitive ground-fault current detection (30 A primary).

Other Current Transformer
For low-resistance NGRs choose a CT primary approximately equal to the NGR rating. Inputs are provided for 1- and 5- A- secondary CTs.

SE-IP65CVR-G Hinged Transparent Cover
Watertight cover, tamper resistant, IP65 protection.

SE-330, SE-330HV SERIES

Features & Benefits

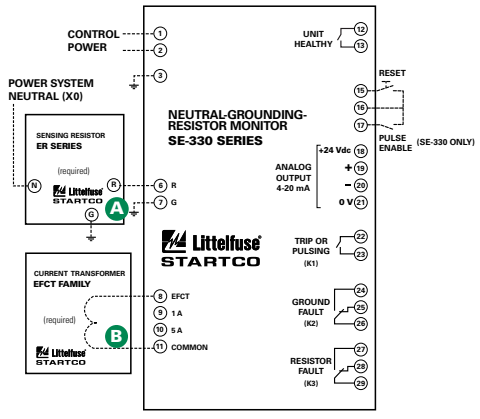
FEATURES	IEEE #	BENEFITS
Continuous NGR monitoring	3	Detects resistor failure within seconds, reduces transient-overvoltage risk, removes risk of ground-fault-detection failure
Ground-fault detection	50G/N, 51G/N, 59N	Main or backup protection to detect a ground fault anywhere on the monitored system
Adjustable pickup (2-100%)		Select greatest sensitivity without false operation, adjustable in 1% increments (MEM setting)
Adjustable time delay (0.1-10 s)		Adjustable trip delay allows quick protection and system coordination
Universal CT compatibility		Allows the use of a CT that gives required ground-fault settings
Output contacts		Two Form C (Ground Fault, Resistor Fault), Two Form A (Trip/Pulse, Healthy)
Analog output (4-20 mA)		Connect an optional PGA-0520 meter or control system
Pulsing output (SE-330 only)		Control the operation of a pulsing ground-fault-location circuit
Trip records		On-board 100-event (with date and time) recorder helps with system diagnostics
Harmonic filtering (DFT)		Eliminate false trips due to harmonic noise from ASDs
Local communications		Mini USB port to view measured values, configure settings, and check event records
Data Logging		On-board microSD card (included) can be used for long-term data logging
Network communications		Remotely view measured values and event records, reset trips, and cause a remote trip Available Protocol Options: **IEC 61850 -** with dual RJ45, SC Fiber and RJ45, or Dual SC Fiber Interface **Modbus TCP and Ethernet/IP** - with dual RJ45, SC Fiber and RJ45, or Dual SC Fiber Interface **DeviceNet -** with CAN interface
Software		PC-interface software (SE-MON330) is available at Littelfuse.com/RelaySoftware
Selectable contact operating mode		Selectable fail-safe or non-fail-safe operating modes allows connection to shunt or undervoltage breaker coil or alarm circuit (Trip, Ground Fault, Resistor Fault relays)
Selectable reset mode		Selectable latching or auto-reset operation
Calibrate push button		Ensures resistor-failure sensitivity is correct
Unit-healthy output		Verifies SE-330 is operating correctly
Conformal coating		Internal circuits are conformally coated to protect against corrosion and moisture

Typical Values

SYSTEM VOLTAGE (VOLTS)	NEUTRAL-GROUNDING RESISTOR		SENSING RESISTOR		GROUND-FAULT PICKUP LEVEL (AMPERES)	V_N PICKUP LEVEL (VOLTS)
	CURRENT (AMPERES)	RESISTANCE (OHMS)	MODEL	RESISTANCE (SWITCH S5 SETTING)		
480	5	55	ER-600VC	20 kΩ	2.5	170
600	5	69	ER-600VC	20 kΩ	2.5	200
2,400	5	277	ER-5KV	20 kΩ	2.5	800
4,160	5	480	ER-5KV	20 kΩ	3	1,700
7,200	10	416	ER-15KV	100 kΩ	2	170 x 5 = 850
14,400	15	554	ER-15KV	100 kΩ	3	340 x 5 = 1,700

DISCLAIMER: The above table is for illustrative purposes only. Actual values may differ based on a variety of individual system considerations, such as capacitive charging current and coordination study results.

Wiring Diagram



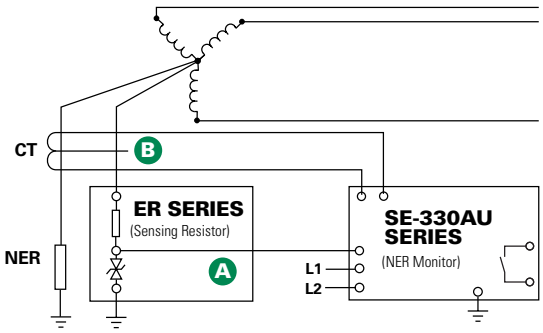
Specifications

IEEE Device Numbers	Ground Fault (50G/N, 51G/N, 59N), Checking Relay (3), Lockout Relay (86)
Input Voltage	*See ordering information*
Dimensions	**H** 213 mm (8.4"); **W** 98 mm (3.9"); **D** 132 mm (5.2")
GF Trip-Level Settings	2-100% of CT-Primary Rating in 1% increments
GF Trip-Time Settings	0.1-10 s
Vn Trip-Level Settings	20-2,000 Vac (≤5 kV systems) 100-10,000 Vac (>5 kV systems)
Contact Operating Mode	Selectable fail-safe or non-fail-safe (K1, K2, K3)
Harmonic Filtering	Standard feature
Reset Button	Standard feature
Output Contacts	Two Form A and two Form C
Pulsing Circuit	1.0-3.0 s in 0.2 s increments (SE-330 only)
Approvals	CSA certified, UL Listed (E340889), CE (European Union), C-Tick (Australian)
Communications	Mini USB (standard); DeviceNet (optional), IEC 61850 (optional), Modbus TCP and EtherNet/IP (optional)
Analog Output	4-20 mA, self or loop powered
Conformally Coated	Standard feature
Warranty	5 years
Mounting	Panel and Surface (optional)

SE-330AU SERIES

Neutral-Earthing-Resistor Monitor

Simplified Circuit Diagram



Ordering Information

ORDERING NUMBER		POWER SUPPLY	COMM			K4 UNIT HEALTHY CONTACT
SE-330AU	-	X	X	-	0	X
SE-330AU for all apps. 35 kV or less SE-330HV for 72 kV apps.		0=120/240 Vac/Vdc 2=48 Vdc	0=USB Only 1=DeviceNet 3=EtherNet (Dual RJ45) 4=EtherNet (SC Fiber & RJ45) 5=EtherNet (Dual SC Fiber) 6=IEC61850 (Dual RJ45) 7=IEC61850 (SC Fiber & RJ45) 8=IEC61850 (Dual SC Fiber)			0=Normally Open 1=Normally Closed

ACCESSORIES	REQUIREMENT
ER Series Sensing Resistor	Required
Current Transformer	Required
SE-IP65CVR-G	Optional
SE-MRE-600	Optional
RK-332	Optional

Description

The SE-330AU Series is an advanced earth-fault and earthing-resistor monitoring relay for low- and medium-voltage transformers and generators. It monitors neutral current, neutral-to-earth voltage, and neutral-to-earth resistance. It provides continuous monitoring of the neutral-to-earth path to verify that the neutral-earthing resistor (NER) is intact. This is of utmost importance—an open NER renders current-sensing earth-fault protection inoperative and could result in a false belief that the system is functioning properly. The SE-330AU earth-fault function complies with AS/NZS 2081.3:2002. Outputs include four relay outputs, and an analog output. A mini USB port is included to view measured values, configure settings, and check event records. An on-board micro SD card can be used for long-term data logging. Network communications options are available. For non-AS/NZS 2081 applications, see the SE-330 or SE-330HV Series.

Resistor Monitoring

The SE-330AU combines the measured values of resistance, current, and voltage to continuously determine that the NER is intact. It is able to detect a resistor failure with or without an earth fault present. Sensing resistors are matched to the system voltage and are used to monitor NGRs on systems up to 35 kV.

Earth-Fault Monitoring

The SE-330AU uses a 5- or 30-A-primary current transformer to provide a pickup-setting range of 0.125 to 5 A or 0.75 to 30 A to comply with AS/NZS 2081.3:2002. DFT filtering ensures that false trips due to harmonic noise from adjustable-speed drives do not occur. Open-CT detection is provided.

Accessories

A 

ER Series Sensing Resistor
Required interface between the power system and the SE-330AU. Eliminates hazardous voltage levels at the relay.

B 

EFCT Series Earth-Fault Current Transformer
Sensitive earth-fault current detection (5 A primary).

SE-CS30 Series Earth-Fault Current Transformer
Sensitive earth-fault current detection (30 A primary).

Specifications

Input Voltage	See ordering information
Dimensions	**H** 213 mm (8.4"); **W** 98 mm (3.9"); **D** 132 mm (5.2")
GF Trip-Level Settings	0.125 to 30 A
GF Trip-Time Settings	0.1 to 0.5 s
Vn Trip-Level Settings	20-2,000 Vac (≤5 kV systems) 100-10,000 Vac (>5 kV systems)
Output Contacts	Two Form A, Two Form C
Operating Mode	Fail-Safe
Harmonic Filtering	Standard feature
Reset	Front panel push button and remote input
Approvals	C-Tick (Australian), CE
Communications	Mini USB (standard); DeviceNet (optional), IEC 61850 (optional), Modbus TCP and EtherNet/IP (optional)
Analog Output	4-20 mA, self or loop powered
Conformal Coating	Standard feature
Warranty	5 years
Mounting	Panel, Surface (optional)