

General Data Sheet

GIC (Geomagnetically Induced Currents) Current Sensor

Geomagnetically induced currents (GICs) are low-frequency electric currents that flow on the Earth's surface and through man-made conductive infrastructure—such as power grids, pipelines, and railway tracks—during solar-induced magnetic storms. They are caused by rapid fluctuations in the geomagnetic field.

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Protecting the Grid from Solar-Induced Hazards

High-Precision Monitoring of Geomagnetically Induced Currents (GIC)

Overview

Space weather events, such as Coronal Mass Ejections (CMEs), trigger fluctuations in the Earth's magnetic field, inducing low-frequency DC currents (GICs) into man-made conductive infrastructure. For power grids, pipelines, and railways, these currents represent a significant operational risk.

The Powertek GIC Series is specifically engineered to detect and measure these DC components even when superimposed on high-level AC currents. With a wide dynamic range and industry-leading low residual offset, the GIC sensor provides the critical data needed to protect transformers from saturation and prevent widespread grid instability.





- **Precision Isolation:** Safely measures DC components in high-voltage AC environments without circuit interruption.
- **Resilient Design:** Rugged, split-core enclosure with an IP-rated outdoor enclosure for substation and pipeline installation.
- **High Resolution (1000:1):** Detects minute fluctuations in GIC levels to provide early warning of geomagnetic disturbances.
- **Zero-Maintenance Accuracy:** Inherently low residual effects eliminate the need for frequent degaussing, maintaining accuracy even after extreme over-range events.
- **Versatile Integration:** Bi-directional sensing with industry-standard 4-20mA, Modbus, or voltage outputs for seamless PLC and SCADA integration.

Technical Specification Table

Parameter	Specification
INPUT	
Current Range	(See Model Selection)
Over-range (w/o damage)	>8000A
Bandwidth (1.5Hz low-pass output)	dc to 1.5Hz
DIELECTRIC TEST	
Input window	2200Vac
Inst. Power to output	1kVdc
Insulation class	600Vac
INSTRUMENT POWER	
Standard	24Vac/24Vdc, ±10%
Option "-12"	12Vac/12Vdc, ±10%
Current (nominal)	80mA
Current (maximum)	100mA
OUTPUT	
Scaling (Models B, D, X5)	0 to ±FS dc in = 0 to ±FS out
Scaling (Model EM)	-FS dc/0/+FS dc in = 4/12/20mAdc out
Scaling (Model E - Unidirectional)	0-FS dc in = 4-20mAdc out
Loading (Models E and EM)	0-500Ω
Loading (Model B)	0-10kΩ
Loading (Models D and X5)	≥2kΩ
Response time (90%)	<350ms (typical)
ACCURACY	
Linearity, Offset, Setpoint, Repeatability	≤0.5% F.S.
Over-range Residual Offset (max 350mA)	0.0007A/A of input current
Linearity	≤0.1% F.S.
TEMPERATURE	
Operating range	-40°C to +85°C
Temperature effect	±0.025%/°C
Storage range	-40°C to +85°C
PHYSICAL	
Weight	2.0lbs

Application Use-Cases

- **Power Transmission:** Monitoring neutral-to-ground currents in high-voltage transformers to prevent thermal damage and saturation.
- **Pipelines:** Measuring induced currents in oil and gas pipelines to mitigate enhanced corrosion risks.
- **Railway Infrastructure:** Protecting signaling systems from low-frequency interference during solar storms.

Model Selection

MODEL NUMBER

GIC - **XXX** **Z**

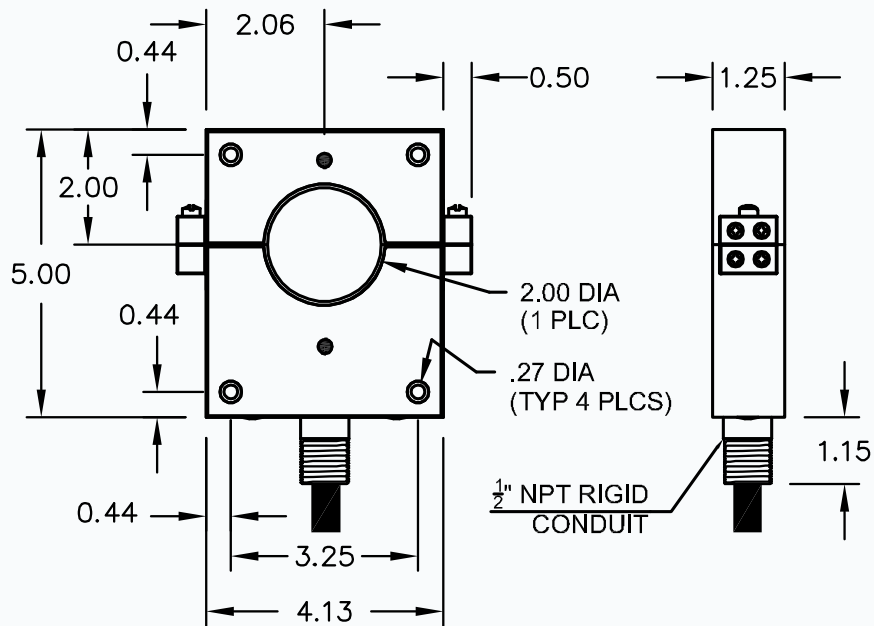
XXX	DC Range	Z	Output Type
051	±0-50Adc	B	0-±1mAdc
101	±0-100Adc	D	0-±10Vdc
151	±0-150Adc	X5	0-±5Vdc
201	±0-200Adc	E	4-20mAdc
301	±0-300Adc	EM	4/12/20mAdc
401	±0-400Adc		
501	±0-500Adc		
601	±0-600Adc		
801	±0-800Adc		
102	±0-1000Adc		
122	±0-1200Adc		
152	±0-1500Adc		

ORDERING INFORMATION

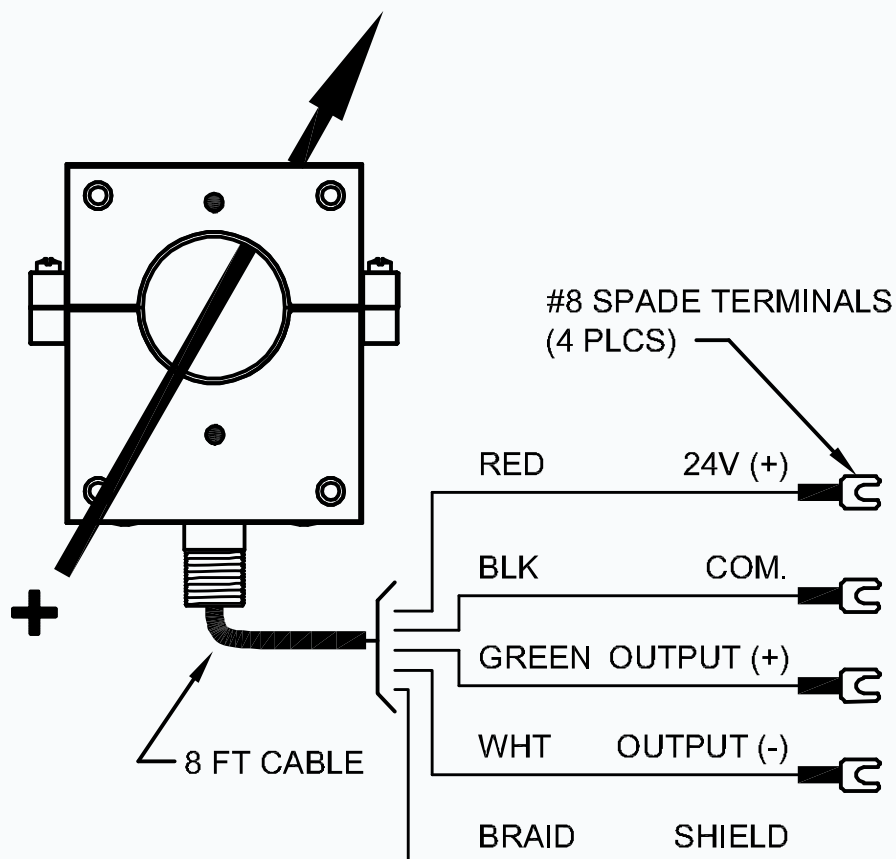
Example:
600Adc Input 0-±1mAdc Outputs
GIC-601B

Case Dimensions

Dimensions are in inches
Tolerance is ± 0.03 inches



Connection Diagram



Company Profile

Powertek has two divisions; Powertek US Inc Holbrook NY USA, Powertek UK Ltd Reading United Kingdom. These offices support a network of worldwide service centers, distributors and representatives.

Powertek specializes in the design and manufacture of electrical power, voltage and current measuring instrumentation: Measurement Transducers, Current Probes, Wattmeters, Power Analyzers, phase measuring measurement equipment along with multifunction calibration standards. The Sensor Division offers a range of ac/dc current/voltage sensors, current shunts, wideband current probes, current transformers and ac/dc power related transducers. PC based software solutions allow the Powertek measuring instruments and transducers to be controlled via Ethernet, RS232, RS485 and IEEE-488 interfaces. Various display and storage options are available to suit the customer need. An "in house" software customization service is available.

Powertek's customer base includes heavy industrial plants, avionics, positional control, military systems, power electronics & power conversion (inverters, switching power supplies, UPS, variable speed motor drives), single/three phase ac motors, ac generators, power transformers, electrical process control equipment, office and household appliance testing, electrical supply utilities and calibration.

All Powertek products are supplied CE marked with measurement uncertainties traceable to UKAS (UK) or NIST (USA) in accordance with ISO9001 2015. Our support includes application support, technical advice, servicing, repair and calibration. Flexible Current Sensing Rogowski coils with 5A output in accordance with ISO9001 2015, Z540, ISO/IEC 17025.

Powertek US Inc is a CAGE coded Military supplier, Cage code 4S5P4. Read more about our activities with US Defense on <https://www.sam.gov>

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