DC Voltage Isolation Amplifiers

The Model 6271A DC Voltage Isolation Amplifier is a linear amplifier designed to amplify dc shunted millivolt signals or dc voltages ranging from 0–50 mV through 0–1000 V, and provide complete isolation of the input signal.

The output circuit is a hybrid amplifier operating in the transconductance mode to provide true current output. Load resistance variations from 0–10,000 Ω have less than 0.1% effect on the output current.

Scientific Columbus DC Voltage Isolation Amplifiers have the same three-year warranty as the Exceltronic line.

Features

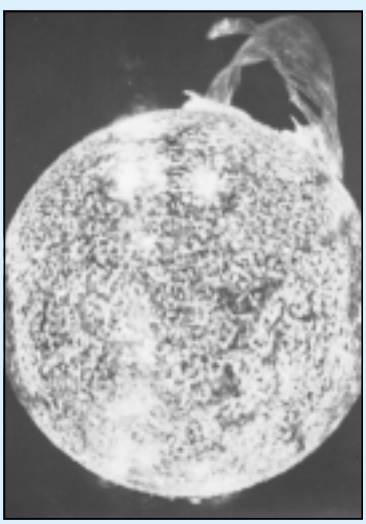
- Complete isolation
- DC shunt inputs or dc voltage from 0–50 mV thru 0–1000 V
- 4000 Vdc input isolation
- Filtered output

Applications

- Telemetering
- Recording devices
- A/D converters

Outputs

- 0 to ±1 mAdc
- 1–5 or 1–3–5 mAdc
- 4–20 or 4–12–20 mAdc
- 10–50 or 10–30–50 mAdc



Neutral-Current Sensor Warns of Magnetic Storms

Off-the-shelf electronic components are used by a large investor-owned utility to measure quasi-direct currents flowing in the neutrals of key transformers during solar-magnetic storms. The primary aim is to collect field data confirming the accuracy of recently developed models of dc current during geomagnetic activity. The geomagnetic current sensors interface with the utility's SCADA system, so dispatchers can act accordingly when magnetic activity occurs.

The neutral-current sensor consists of the Scientific Columbus Model 6271A DC Voltage Isolation Amplifier and a removable-yoke dc current sensor. The isolation amplifier filters out ac current and provides a precision 0 to ±1 mAdc bidirectional output to interface with the SCADA system.

Specifications

DC VOLTAGE ISOLATION AMPLIFIERS

Specifications		0 to ±1 mAdc (DC Voltage Isolation Amplifier)		P-Option* (DC Voltage Isolation Amplifier)	
Current Input Units Only	Nominal Range Overload Continuous Impedance	— 0 to ±1 mAdc**† ±3 mAdc < 100 Ω			
Voltage Input Units Only	Nominal Ranges Available Impedance 0–20 Vdc 21–1000 Vdc	0 to ±100 mVdc† 0 to ±50 mVdc thru 0 to ±1000 Vdc (customer specified)† 5000 Ohms/Volt 1400 Ohms/Volt			
External Auxiliary Power	Input Range Frequency Range Burden	108–132 Vac 58–62 Hz 2 VA Nominal		108–132 Vac 58–62 Hz 5 VA Nominal	
Rated Output (RO)		0 to ±1 mAdc for Standard Calibration		5, 20, or 50 mAdc for Standard Calibration, depending on selected output range*	
Accuracy		±0.5% RO at 25° C		±0.7% of Span	
Temperature Effect on Accuracy		±0.04% / ° C		±0.05% / ° C	
Operating Temperature Range		-10° C to +70° C		-10° C to +50° C	
Compliance Voltage		10 Vdc		See Table 2 on page 110.	
Load		0–10,000 Ω			
Output Ripple Peak		6271A unit contributes < 0.25% RO at steady-state dc input		6271 unit contributes < 0.25% of Span at steady-state dc input	
Response Time		< 400 ms to 99%		< 1 Second to 99%	
Standard Calibration Adjustments	Gain Zero	±15% RO (minimum) ±1% RO (minimum)		±20% of Span (minimum) ±5% of Zero Point (minimum)	
Stability (per year)		±0.25% RO, Noncumulative		±0.4% of Span, Noncumulative	
Operating Humidity		0–95% Noncondensing			
Isolation		Input to (Output/Power/Case)	Output/Power/Case	Input to (Output/Power/Case)	Output/Power/Case
Dielectric Withstand		4000 Vdc	1500 VRMS at 60 Hz	4000 Vdc	1500 VRMS at 60 Hz
Maximum Net Weight		2 lbs., 2 oz. (1 kg)		3 lbs., 8 oz. (1.6 kg)	
Approximate Dimensions (excluding mounting plate)		4.4" W x 3.9" D x 4.7" H (112 mm x 99 mm x 119 mm) Style II Case, see page 122		7.0" W x 3.7" D x 5.6" H (178 mm x 94 mm x 142 mm) Style I Case, see page 122	

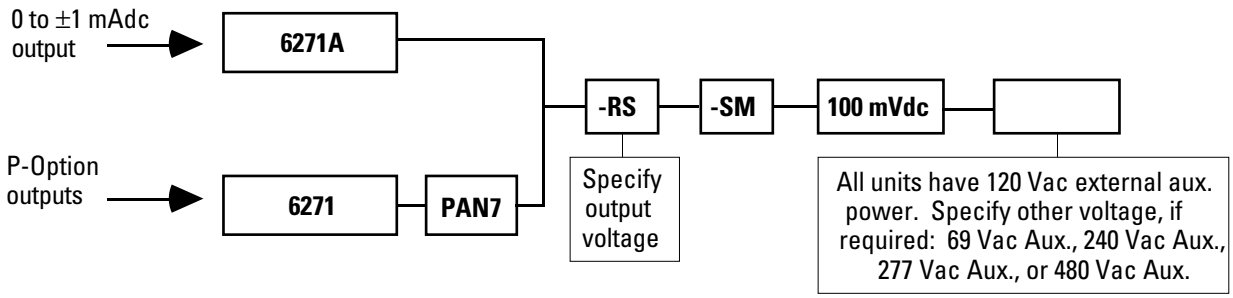
* P-Option includes 1–5/1–3–5, 4–20/4–12–20, and 10–50/10–30–50 mAdc outputs.
**Other input ranges available; consult factory.
† All inputs are zero-based spans.

Specifications subject to change without notice.

ORDERING PROCEDURE

Specify by base model number and appropriate selection or option suffixes in the order shown in the following example.

Base Model No.	Output	Scaling Resistor Option #1	Option #2	Input	External Auxiliary Power
Table 1	Table 2	Table 3	Table 4	Table 5	



EXAMPLES: 6271A-RS-SM-100 mVdc

0 to ±1 mAdc output DC Voltage Isolation Amplifier, resistor scaling (converts current output to voltage output), seismic brace, 0 to ±100 mVdc (std.) input calibration.

6271PAN7-RS-SM-100 mVdc

4-20 mAdc output DC Voltage Isolation Amplifier, resistor scaling (converts current output to voltage output), seismic brace, 0-100 mVdc (std.) input calibration.

Table 1 Base Model Number Selection

Model No.

(0 to ±1 mAdc Units)

6271A

(P-Option Units)

6271

Table 2 Output Selection

0 to ±1 mAdc output is standard, and is specified by the Base Model Numbers. For outputs other than 0 to ±1 mAdc, indicate the appropriate P-Option in the "Output" position of the complete model number.

P-Option	Output Range	Compliance Voltage/ Maximum Load	Maximum Open Circuit Voltage
PAN6	1-5 mAdc	15 Vdc/3000 Ω	30 Vdc
PAN7	**4-20 mAdc**	**15 Vdc/750 Ω**	**30 Vdc**
PAN8	10-50 mAdc	15 Vdc/300 Ω	30 Vdc
PAN6-B	1-3-5 mAdc	15 Vdc/3000 Ω	30 Vdc
PAN7-B	4-12-20 mAdc	15 Vdc/750 Ω	30 Vdc
PAN8-B	10-30-50 mAdc	15 Vdc/300 Ω	30 Vdc
PA6	1-5 mAdc	40 Vdc/8000 Ω	70 Vdc
PA7	4-20 mAdc	40 Vdc/2000 Ω	70 Vdc
PA8	10-50 mAdc	30 Vdc/600 Ω	70 Vdc
PA6-B	1-3-5 mAdc	40 Vdc/8000 Ω	70 Vdc
PA7-B	4-12-20 mAdc	40 Vdc/2000 Ω	70 Vdc
PA8-B	10-30-50 mAdc	30 Vdc/600 Ω	70 Vdc

Table 3 Scaling Resistor (-RS) Option

Option	Description
-RS*	Scaling Resistor

***You must specify the desired output voltage:**
For 0 to ±1 mAdc units, specify range from 0 to ±10 Vdc. Load impedance is 1 MΩ/Vdc (minimum).
For P-Option units, specify range from 0-15 Vdc (PAN models) or 0-40 Vdc (PA models). Load impedance is 200, 50, or 20 (kΩ/Vdc) (minimum) for units with outputs of 5, 20, or 50 mAdc, respectively.

This information is not part of the model number, but must be provided to the factory when you place your order.

Table 4 Other Options

Option	Description
-24	24 Vdc Loop-Powered (PA7 and PA7-B models only) (consult factory for specifications)
-SM	Seismic Brace (available with 0 to ±1 mAdc units) (consult factory if you desire this option with a P-Option unit)
-Z	Zero-Based Output Calibration (ex.: PA7-Z = 0-20 mAdc) (available only with P-Option units, except PAN-B models)

If you require additional options not shown here, see Special Options on page 128. When ordering any special options, or more than three options, you must first consult the factory for pricing and delivery estimates.

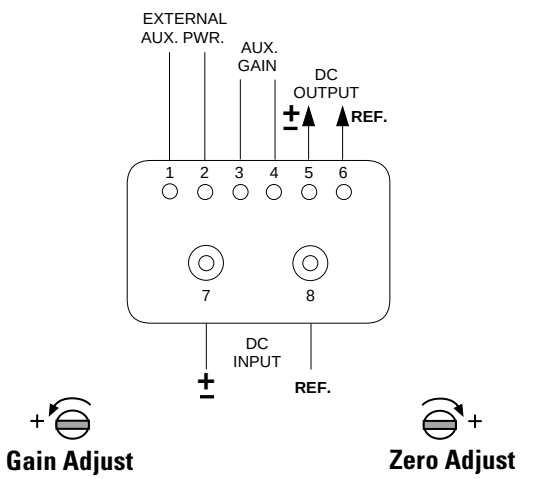
Table 5 Input Selection

Type of Input	Input Span
Current	0 to ±1 mAdc
Voltage	0 to ±50 mVdc thru 0 to ±1000 Vdc

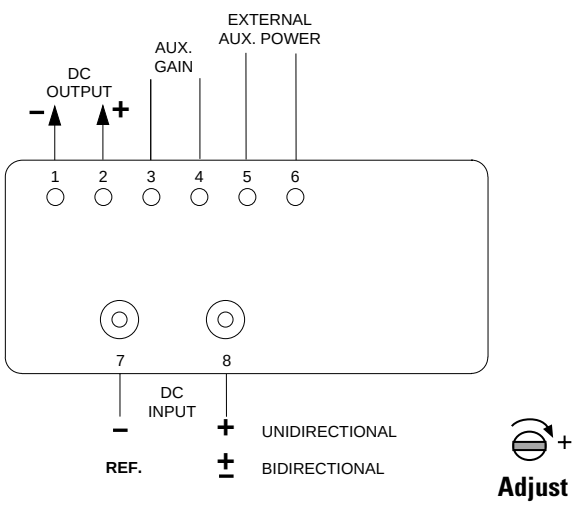
All inputs for these units are zero-based spans. The standard input span is 0 to ±100 mVdc. All 0 to ±1 mAdc output units are inherently bidirectional; P-Option units are unidirectional or bidirectional as indicated in Table 2.

WIRING DIAGRAMS FOR 0 to ±1 mAdc UNITS (Style II Case) AND P-OPTION UNITS (Style I Case)

6271A DC Voltage Isolation Amplifier 0 to ±1 mAdc Units



6271 DC Voltage Isolation Amplifier P-Option Units



Caution: **For 0 to ±1 mAdc units, external auxiliary power connects to terminals 1 & 2; for P-Option units, external auxiliary power connects to terminals 5 & 6.**

Instrumentation