

DSCA38

Strain Gage Input Signal Conditioners



Description

Each DSCA38 strain gage input module provides a single channel of strain gage input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure 1). Signal filtering is accomplished with a five-pole filter which is optimized for step response. An anti-aliasing pole is located on the field side of the isolation barrier, and the other four poles are on the system side. After the initial field-side filtering, the input signal is chopped by a proprietary chopper circuit. Isolation is provided by transformer coupling, again using a proprietary technique to suppress transmission of common mode spikes or surges.

The DSCA38 can interface to transducers with a nominal resistance of 100Ω to 10kΩ. Strain gage excitation is provided from the module by a stable 10V or 3.333V source. This source is fully isolated, allowing the amplifier inputs to operate over the full range of the excitation voltage. This feature enables the module to be interfaced to other sensors requiring excitation.

Module output is either voltage or current. For current output models a dedicated loop supply is provided at terminal 3 (+OUT) with loop return located at terminal 4 (-OUT). The system-side load may be either floating or grounded.

Special input circuits provide signal input and excitation protection against accidental connection of power-line voltages up to 240VAC and against transient events as defined by ANSI/IEEE C37.90.1. Protection circuits are also present on the signal output and power input terminals to guard against transient events and power reversal. Signal and power lines are secured to the module using screw terminals which are in pluggable terminal blocks for ease of system assembly and reconfiguration.

The modules have excellent stability over time and do not require recalibration, however, zero and span settings are adjustable up to ±5% to accommodate situations where fine-tuning is desired. The zero

Features

- Interfaces to 100Ω through 10kΩ Strain Gages
- Industry Standard Output of ±10V, 0 to 20mA, or 4 to 20mA
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protected to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 100dB CMR
- Fully Isolated Excitation Supply
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

adjustment can be used to offset bridge imbalances. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

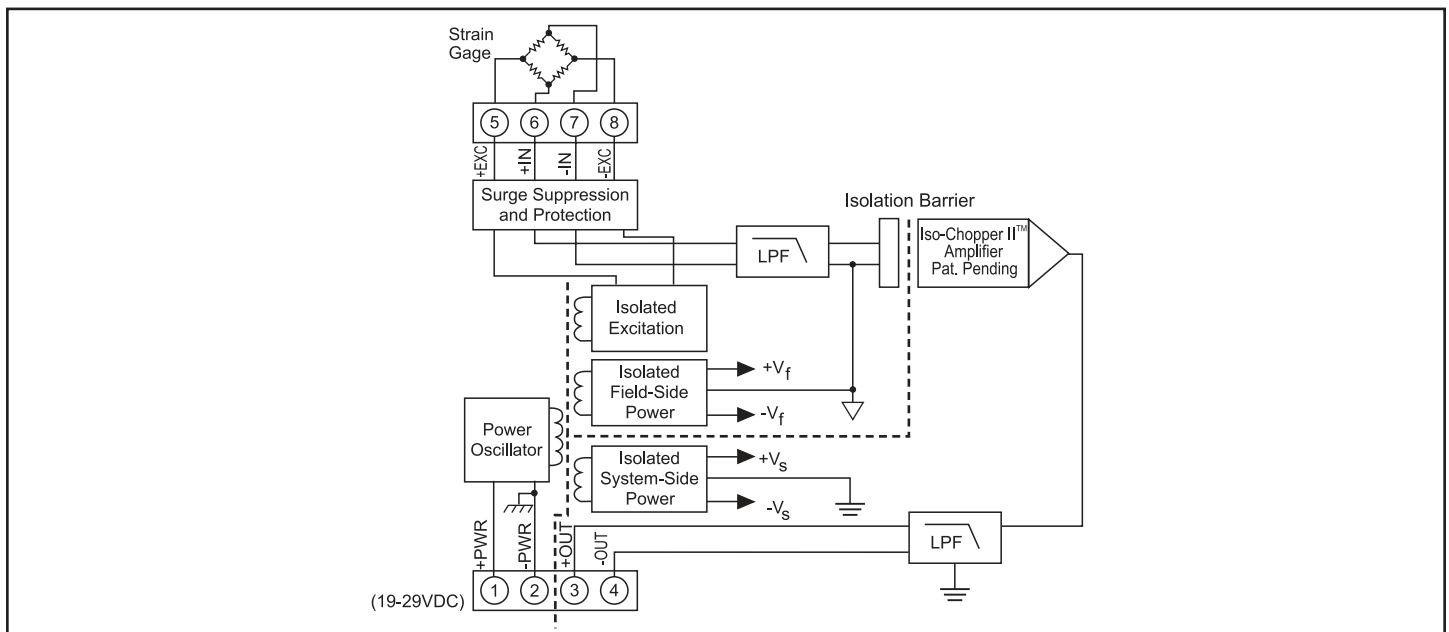


Figure 1: DSCA38 Block Diagram

Specifications Typical* at T_A = +25°C and +24VDC supply voltage

| Module | DSCA38 |
|--------------------------------------|--|
| Input Range | ±10mV to ±100mV |
| Input Bias Current | ±0.5nA |
| Input Resistance | |
| Normal | 50MΩ |
| Power Off | 65kΩ |
| Overload | 65kΩ |
| Signal Input Protection | |
| Continuous | 240Vrms max (Full Bridge) 120Vrms max (Half Bridge) ANSI/IEEE C37.90.1 |
| Transient | |
| Excitation | |
| Output | 10V ±0.03% or 3.33V ±0.03% |
| Half Bridge Output Level | Excitation Output/2 ±0.03% |
| Load Resistance (10V) | 300Ω to 10kΩ |
| Load Resistance (3.33V) | 100Ω to 10kΩ |
| Load Regulation | ±5ppm/mA |
| Stability | ±15ppm/°C |
| Protection | |
| Continuous | 240Vrms max |
| Transient | ANSI/IEEE C37.90.1 |
| Output Range | See Ordering Information |
| Load Resistance (I _{OUT}) | 600Ω max |
| Current Limit | 8mA (V _{OUT}), 30mA (I _{OUT}) |
| Output Protection | |
| Short to Ground | Continuous |
| Transient | ANSI/IEEE C37.90.1 |
| CMV, Input to Output, Input to Power | |
| Continuous | 1500Vrms max |
| Transient | ANSI/IEEE C37.90.1 |
| CMV, Output to Power | |
| Continuous | 50VDC max |
| CMR (50Hz or 60Hz) | 100dB |
| Accuracy ⁽¹⁾ | ±0.03% Span |
| Linearity | ±0.01% Span |
| Adjustability | ±5% Zero and Span |
| Stability | |
| Input Offset | ±1μV/°C |
| Output Offset | ±6ppm/°C (V _{OUT}), ±20ppm/°C (I _{OUT}) |
| Gain | ±55ppm/°C |
| Output Noise, 100kHz Bandwidth | 750μVrms (V _{OUT}), 3μArms (I _{OUT}) |
| Bandwidth, -3dB | 3kHz |
| NMR | 100dB per Decade above 3kHz |
| Response Time, 90% Span | 170μs |
| Power Supply | |
| Voltage | 19 to 29VDC |
| Current | 60mA (V _{OUT}), 80mA (I _{OUT}) |
| Sensitivity | ±0.0002% % |
| Protection | |
| Reverse Polarity | Continuous |
| Transient | ANSI/IEEE C37.90.1 |
| Mechanical Dimensions (h)(w)(d) | 2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm) |
| Mounting | DIN EN 50022 -35x7.5 or -35x15 rail |
| Environmental | |
| Operating Temperature Range | -40°C to +80°C |
| Storage Temperature Range | -40°C to +80°C |
| Relative Humidity | 0 to 95% Noncondensing |
| Emissions EN61000-6-4 | ISM, Group 1 |
| Radiated, Conducted | Class A |
| Immunity EN61000-6-2 | ISM, Group 1 |
| RF | Performance A ±0.5% Span Error |
| ESD, EFT | Performance B |

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability. (2) Strain Element.

Ordering Information

| Model | Type Bridge Input | Input Range | Excitation | Sens. | Output Range† |
|-----------|-------------------|--------------------|------------|--------|---------------|
| DSCA38-01 | Full | -10mV to +10mV | +3.333V | 3mV/V | 1 |
| DSCA38-02 | Full | -30mV to +30mV | +10.0V | 3mV/V | 1 |
| DSCA38-03 | Half | -10mV to +10mV | +3.333V | 3mV/V | 1 |
| DSCA38-04 | Half | -30mV to +30mV | +10.0V | 3mV/V | 1 |
| DSCA38-05 | Full | -20mV to +20mV | +10.0V | 2mV/V | 1 |
| DSCA38-06 | Full | -33.3mV to +33.3mV | +3.333V | 10mV/V | 1 |
| DSCA38-07 | Full | -100mV to +100mV | +10.0V | 10mV/V | 1 |
| DSCA38-08 | Full | -10mV to +10mV | +3.333V | 3mV/V | 2, 3, 4 |
| DSCA38-09 | Full | -30mV to +30mV | +10.0V | 3mV/V | 2, 3, 4 |
| DSCA38-10 | Half | -10mV to +10mV | +3.333V | 3mV/V | 2, 3, 4 |
| DSCA38-11 | Half | -30mV to +30mV | +10.0V | 3mV/V | 2, 3, 4 |
| DSCA38-12 | Full | -20mV to +20mV | +10.0V | 2mV/V | 2, 3, 4 |
| DSCA38-13 | Full | -33.3mV to +33.3mV | +3.333V | 10mV/V | 2, 3, 4 |
| DSCA38-14 | Full | -100mV to +100mV | +10.0V | 10mV/V | 2, 3, 4 |
| DSCA38-15 | Full | 0 to +10mV | +3.333V | 3mV/V | 2, 3, 4 |
| DSCA38-16 | Full | 0 to +30mV | +10.0V | 3mV/V | 2, 3, 4 |
| DSCA38-17 | Half | 0 to +10mV | +3.333V | 3mV/V | 2, 3, 4 |
| DSCA38-18 | Half | 0 to +30mV | +10.0V | 3mV/V | 2, 3, 4 |
| DSCA38-19 | Full | 0 to +20mV | +10.0V | 2mV/V | 2, 3, 4 |
| DSCA38-20 | Full | 0 to +33.3mV | +3.333V | 10mV/V | 2, 3, 4 |
| DSCA38-21 | Full | 0 to +100mV | +10.0V | 10mV/V | 2, 3, 4 |

†Output Ranges Available

| Output Range | Part No. Suffix | Example |
|-----------------|-----------------|------------|
| 1. -10V to +10V | NONE | DSCA38-01 |
| 2. 0V to +10V | NONE | DSCA38-08 |
| 3. 4 to 20mA | C | DSCA38-08C |
| 4. 0 to 20mA | E | DSCA38-08E |

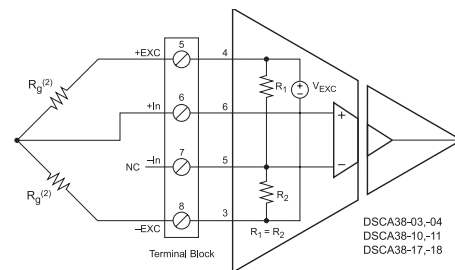


Figure 2: Half Bridge Connection

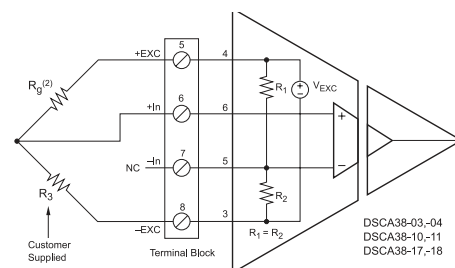


Figure 3: Quarter Bridge Connection

Installation Notes:

- 1.) This Equipment is Suitable for Use in Class I, Division 2, Groups A, B, C, D, or Non-Hazardous Locations Only.
- 2.) WARNING - Explosion Hazard - Substitution of Components May Impair Suitability for Class I, Division 2.
- 3.) WARNING - Explosion Hazard - Do Not Disconnect Equipment Unless Power Has Been Switched Off or The Area is Known to be Non-Hazardous.
- 4.) The Power to These Devices Shall Be Limited By an Over-Current Protection Device, UL Certified Fuse (JDYX/JDYX2) Rated 6A Max.

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