DSCA33

Isolated True RMS Input Signal Conditioners

Description

Each DSCA33 True RMS input module provides a single channel of AC input which is converted to its True RMS DC value, filtered, isolated, amplified, and converted to standard process voltage or current output (Figure 1).

The field voltage or current input signal is processed through an AC coupled pre-amplifier and RMS converter on the field side of the isolation barrier. The converted dc signal is then filtered and chopped by a proprietary chopper circuit and transferred across the transformer isolation barrier, suppressing transmission of common mode spikes and surges. The computer side circuitry reconstructs, filters and converts the signal to industry standard outputs.

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 protection against accidental connection of power-line voltages up to 480VAC 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 pluggable terminal blocks for ease of system assembly and reconfiguration.

DSCA33 modules have excellent stability over time and do not require recalibration, however, both zero and span settings are adjustable to accommodate situations where fine tuning is desired. The adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

Due to circuit limitations, DSCA33-04x and -05x are not ATEX compliant.

▶ Features

- Interfaces RMS Voltage (0 – 300V) or RMS Current (0 – 5A)
- Designed for Standard Operation with Frequencies of 45Hz to 1000Hz (Extended Range Operation to 20kHz)
- Compatible with Standard Current and Potential Transformers
- Industry Standard Output of 0 to 1mA, 0 to 20mA, 4 to 20mA, 0 to +5V, or 0 to +10V
- ±0.25% Factory Calibrated Accuracy (Accuracy Class 0.2)
- ±5% Adjustable Zero and Span
- 1500Vrms Transformer Isolation
- Input Overload Protected to 480V (Peak AC & DC) or 10Arms Continuous
- 100dB CMR
- ANSI/IEEE C37.90.1 Transient Protection
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed and CE Compliant
- ATEX Compliant (all models except DSCA33-04x, -05x)

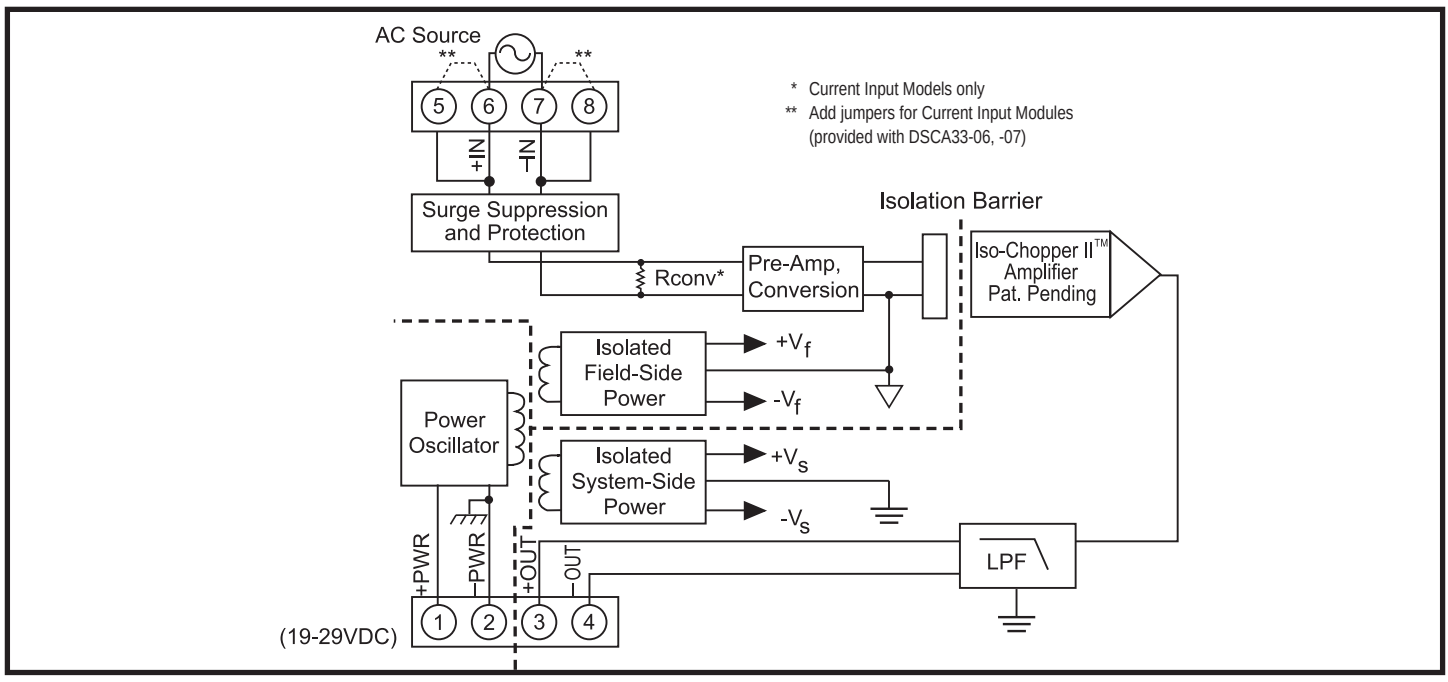

Figure 1: DSCA33 Block Diagram

Specifications

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

Module	DSCA33
Input	
Signal Range	100mV to 300Vrms, 0 to 5Arms
Standard Frequency Range	45Hz to 1000Hz
Extended Frequency Range	1kHz to 20kHz
Impedance	499KΩ // <100pF (-01 thru -05), 0.10Ω (-06), 0.025Ω (-07)
Coupling	AC
Protection	
Continuous (-01 thru -05)	350Vrms
Continuous (-06 thru -07)	5Arms (-06), 10Arms (-07) max
Transient (-01 thru -05)	ANSI/IEEE C37.90.1
Transient (-06 thru -07)	See note 1
Output	
Signal Range	See Ordering Information
Adjustability	±5% Zero & Span
Load Resistance	10kΩ max. (0-1mA models), 600Ω max. (0/4-20mA models)
Current Limit	1.4mA (0-1mA models), 30mA (0/4-20mA models), 8mA (0-5/10V models)
Protection	
Short to Ground	Continuous
Transient	ANSI/IEEE C37.90.1
Ripple and Noise	<0.025% Span rms
Accuracy (10-100% Span)(2) (3)	
Sinusoid	
50/60Hz	±0.25% Span
45Hz-1kHz	±0.25% Reading Additional Error
1kHz-20kHz	±0.75% Reading Additional Error
Non-Sinusoid	
Crest Factor = 1 to 2	±0.05% Reading Additional Error
Crest Factor = 2 to 3	±0.15% Reading Additional Error
Crest Factor = 3 to 4	±0.30% Reading Additional Error
Crest Factor = 4 to 5	±0.40% Reading Additional Error
Vs. Temperature	±100ppm/°C
Isolation (Common Mode)	
Input to Output, Input to Power	
Continuous	1500Vrms max
Transient	ANSI/IEEE C37.90.1
Output to Power	
Continuous	50VDC max
Response Time (0 to 99%)	<400ms
CMR (50 or 60Hz)	100dB
Power Supply	
Voltage	19 to 29VDC
Current	45mA (V_{OUT}), 65mA (I_{OUT})
Sensitivity	±0.0002%/%
Protection	
Reverse Polarity	Continuous
Transient	ANSI/IEEE C37.90.1
Environmental	
Operating Temperature Range	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C
Relative Humidity	0 to 95% Noncondensing
HazLoc ATEX	All models except DSCA33-04x, -05x
Emissions EN61000-6-4	ISM, Group 1
Radiated, Conducted	Class A
Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.83% Span Error
ESD, EFT	Performance B
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN50022-35x7.5 or -35x15 rail

NOTES:
* Contact factory or your local Dataforth sales office for maximum values.
(1) For 1 to 25 seconds the max allowable transient current rating is $\sqrt{2500 / (\text{event time})}$. For less than 1 second, ANSI/IEEE C37.90.1 applies with a 0.05Ω load. For greater than 25 seconds, the 10A max continuous rating applies.
(2) For 0-10% Span measurements, add 0.25% accuracy error (-02 thru -07) or 1.00% accuracy error (-01). Accuracy includes linearity, hysteresis and repeatability but not source or external shunt inaccuracy (if used).
(3) At standard 60Hz factory calibration (90Hz for -01, -06). Consult factory for calibration at other frequencies.

Ordering Information

Model	Input (rms)†	Output (dc)†
DSCA33-01	0mV to 100mV	2, 3, 4, 5, 6
DSCA33-02	0V to 1V	2, 3, 4, 5, 6
DSCA33-03	0V to 10V	2, 3, 4, 5, 6
DSCA33-04	0V to 150V	2, 3, 4, 5, 6
DSCA33-05	0V to 300V	2, 3, 4, 5, 6
DSCA33-06	0A to 1A	2, 3, 4, 5, 6
DSCA33-07	0A to 5A	2, 3, 4, 5, 6

†Modules can be ordered with other input/output ranges. Consult factory for ordering details and specifications

†Output Ranges Available

Output Range	Part No. Suffix	Example
2. 0V to +10V	NONE	DSCA33-01
3. 4 to 20mA	C	DSCA33-01C
4. 0 to 20mA	E	DSCA33-01E
5. 0V to +5V	A	DSCA33-01A
6. 0 to 1mA	B	DSCA33-01B

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.