DSCA42

2-Wire Transmitter Interface Signal Conditioners with Loop Power

Description

Each DSCA42 2-wire transmitter interface module provides a single channel of 4 to 20mA process current input which is filtered, isolated, amplified, and converted to a high-level voltage output (Figure 1). An isolated 24V power supply is provided to power the 2-wire transmitter. 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.

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 powerline 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 adjustments are made using potentiometers located under the front panel label and are non-interactive for ease of use.

Features

- Accepts Process Loop Signals
- Industry Standard Output of 0 to +10V, 2 to +10V, 0 to 20mA, or 4 to 20mA
- Provides Isolated Loop Excitation
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- Input Protection to 240VAC Continuous
- True 3-Way Isolation
- Wide Range of Supply Voltage
- 105dB CMR
- 5 Poles of Filtering
- ±0.03% Accuracy
- ±0.01% Linearity
- Easily Mounts on Standard DIN Rail
- C-UL-US Listed
- CE and ATEX Compliant

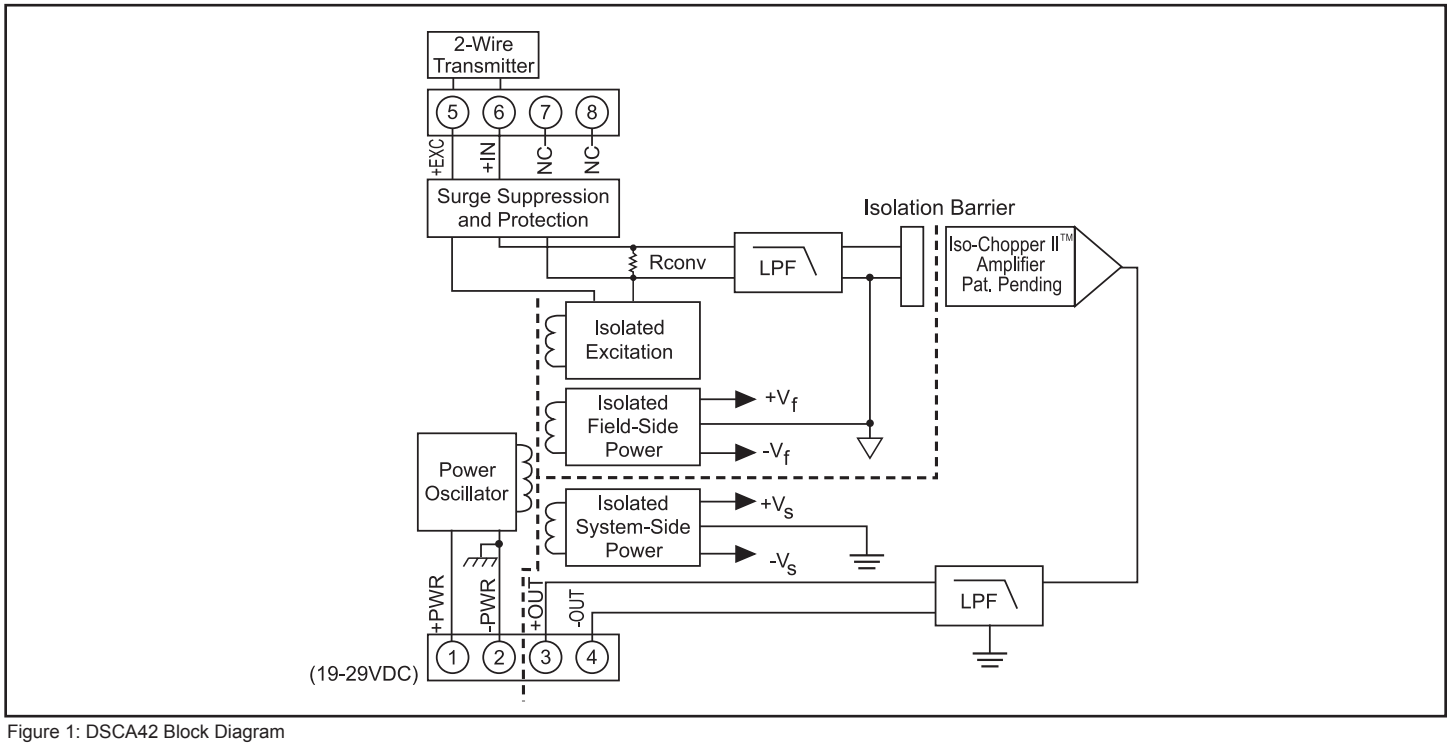

Figure 1: DSCA42 Block Diagram

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Specifications

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

Module	DSCA40	DSCA41
Input Range	+10mV to +100mV	±1V to ±40V
Input Bias Current	±0.5nA	±0.05nA
Input Resistance		
Normal	50MΩ	500kΩ min
Power Off	65kΩ	500kΩ min
Overload	65kΩ	500kΩ min
Input Protection		
Continuous	240Vrms max	240Vrms max
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Output Range	See Ordering Information	See Ordering Information
Load Resistance (I_{OUT})	600Ω max	600Ω max
Current Limit	8mA (V_{OUT}), 30mA (I_{OUT})	8mA (V_{OUT}), 30mA (I_{OUT})
Output Protection		
Short to Ground	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Input to Output, Input to Power		
Continuous	1500Vrms max	1500Vrms max
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
CMV, Output to Power		
Continuous	50VDC max	50VDC max
CMR (50Hz or 60Hz)	100dB	100dB
Accuracy(1)	±0.03% Span	±0.03% Span
Linearity	±0.01% Span	±0.01% Span
Adjustability	±5% Zero and Span	±5% Zero and Span
Stability		
Input Offset	±0.5µV/°C	±5µV/°C
Output Offset	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})	±6ppm/°C (V_{OUT}), ±20ppm/°C (I_{OUT})
Zero Suppression	±50ppm(V_z)(2)/°C	±50ppm(V_z)(2)/°C
Gain	±35ppm/°C	±55ppm/°C
Output Noise, 100kHz Bandwidth	500µVrms (V_{OUT}), 2µArms (I_{OUT})	500µVrms (V_{OUT}), 2µArms (I_{OUT})
Bandwidth, –3dB	3kHz	3kHz
NMR	100dB per Decade above 3kHz	100dB per Decade above 3kHz
Response Time, 90% Span	170µs	170µs
Power Supply		
Voltage	15 to 30VDC	15 to 30VDC
Current	25mA (V_{OUT}), 55mA (I_{OUT})	25mA (V_{OUT}), 55mA (I_{OUT})
Sensitivity	±0.0001%/%	±0.0001%/%
Protection		
Reverse Polarity	Continuous	Continuous
Transient	ANSI/IEEE C37.90.1	ANSI/IEEE C37.90.1
Mechanical Dimensions (h)(w)(d)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)	2.95" x 0.89" x 4.13" (75mm x 22.5mm x 105mm)
Mounting	DIN EN 50022 -35x7.5 or -35x15 rail	DIN EN 50022 -35x7.5 or -35x15 rail
Environmental		
Operating Temperature Range	–40°C to +80°C	–40°C to +80°C
Storage Temperature Range	–40°C to +80°C	–40°C to +80°C
Relative Humidity	0to 95% Noncondensing	0to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1	ISM, Group 1
Radiated, Conducted	Class A	Class A
Immunity EN61000-6-2	ISM, Group 1	ISM, Group 1
RF	Performance A ±0.5% Span Error	Performance A ±0.5% Span Error
ESD, EFT	Performance B	Performance B

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) Includes linearity, hysteresis and repeatability.
(2) V_z is the nominal input voltage that results in 0V or 0mA output.

Ordering Information

Model	Input Range	Output Range
DSCA40-01	–10mV to +10mV	1
DSCA40-02	–50mV to +50mV	1
DSCA40-03	–100mV to +100mV	1
DSCA40-04	–10mV to +10mV	2, 3, 4
DSCA40-05	–50mV to +50mV	2, 3, 4
DSCA40-06	–100mV to +100mV	2, 3, 4
DSCA40-07	0 to +10mV	2, 3, 4
DSCA40-08	0 to +50mV	2, 3, 4
DSCA40-09	0 to +100mV	2, 3, 4
DSCA41-01	–1V to +1V	1
DSCA41-02	–5V to +5V	1
DSCA41-03	–10V to +10V	1
DSCA41-04	–1V to +1V	2, 3, 4
DSCA41-05	–5V to +5V	2, 3, 4
DSCA41-06	–10V to +10V	2, 3, 4
DSCA41-07	–20V to +20V	1
DSCA41-08	–20V to +20V	2, 3, 4
DSCA41-09	–40V to +40V	1
DSCA41-10	–40V to +40V	2, 3, 4
DSCA41-11	0 to +1V	2, 3, 4
DSCA41-12	0 to +5V	2, 3, 4
DSCA41-13	0 to +10V	2, 3, 4
DSCA41-14	0 to +20V	2, 3, 4
DSCA41-15	0 to +40V	2, 3, 4

Output Ranges Available

Output Range	Part No. Suffix	Example
1. –10V to +10V	NONE	DSCA40-01
2. 0V to +10V	NONE	DSCA40-04
3. 4 to 20mA	C	DSCA40-04C
4. 0 to 20mA	E	DSCA40-04E

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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