DATAFORTH[®]

SCM5B42 2-Wire Transmitter Interface Modules

Description

Each SCM5B42 2-wire transmitter interface module provides a single channel which accepts a 4 to 20mA process current input and provides a standard +1 to +5V or +2 to +10V output signal (Figure 1). An isolated +20VDC regulated power supply is provided to power the current transmitter. This allows a 2-wire loop powered transmitter to be directly connected to the SCM5B42 without requiring an external power supply. The regulated supply will provide a nominal +20VDC at a loop current of 4mA to 20mA.

The SCM5B42 will provide a 1500V isolation barrier for non-isolated 2-wire field transmitters. It can also be used when additional isolation is required between an isolated 2-wire transmitter and the input stage of the control room computer.

The voltage output is logic switch controlled, which allows these modules to share a common analog bus without the requirement of external multiplexers.

The SCM5B modules are designed with a completely isolated computer side circuit which can be floated to \pm 50V from Power Common, pin 16. This complete isolation means that no connection is required between I/O Common and Power Common for proper operation of the output switch. If desired, the output switch can be turned on continuously by simply connecting pin 22, the Read-Enable pin, to I/O Common, pin 19.

A precision 20Ω current conversion resistor is supplied with the module. Sockets are provided on the SCMPB01/02/03/04/05/06/07 backpanels to allow installation of this resistor. Extra resistors are available under part number SCMXR1. All field inputs are fully protected from accidental connection of power-line voltages up to 240VAC. The module has a 3dB bandwidth of 100Hz. Signal filtering is accomplished with a six-pole filter, with two poles on the field side of the isolation barrier, and the other four on the computer side.

Features

- Isolated +20VDC Current Loop Supply
- Provides Isolation for Non-Isolated 2-Wire Transmitters
- High-Level Voltage Output +1V to +5V or +2V to +10V
- 1500Vrms Transformer Isolation
- ANSI/IEEE C37.90.1 Transient Protection
- · Input Protected to 240VAC Continuous
- 100dB CMR
- 100Hz Signal Bandwidth
- ±0.03% Accuracy
- ±0.005% Linearity
- CSA C/US Certified, CE and ATEX Compliant
- Mix and Match SCM5B Types on Backpanel

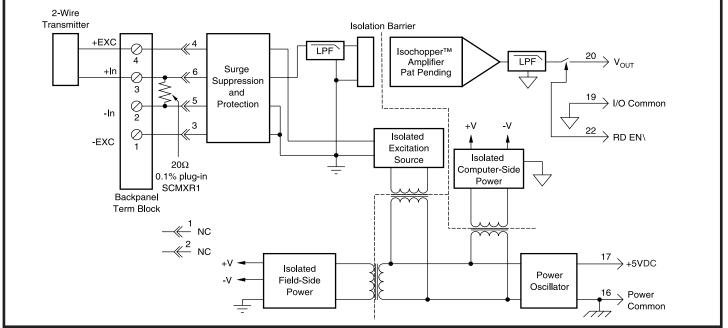


Figure 1: SCM5B42 Block Diagram

Specifications Typical at T_A=+25°C and +5V power

ModuleSCM5B42Input Range Input Resistor Value Accuracy Loop Supply Voltage4mA to 20mAIsolated Excitation Protection Continuous Transient Input Protection Continuous Transient240Vrms max ANSI/EEE C37:90.1Isolated Excitation Protection Continuous Transient Continuous Transient240Vrms max ANSI/EEE C37:90.1Input Protection Continuous Transient240Vrms max ANSI/EEE C37:90.1CMW, Input to Output Continuous Transient1500Vrms max ANSI/EEE C37:90.1CMK (50 or 60Hz) NMR (-3dB at 100Hz)100dB 120dB per Decade Above 100HzAccuracy(*) Linearity Stability Input Offset Output Offset Output IOffset Output IOffset Output 100Hz10nArms 500µVrms 3000HzOutput Offset Output Offset Input 0.1 to 10Hz Output 100Hz10nArms 500µVrms 300µVrms <br< th=""><th></th><th></th></br<>		
Input Resistor Value Accuracy Stability Loop Supply Voltage20.002 ±0.1% ±10ppm/°C Nominal 20V at 4mA to 20mAIsolated Excitation Protection Continuous Transient240Vrms max ANSI/IEEE C37.90.1Input Protection Continuous Transient240Vrms max ANSI/IEEE C37.90.1CMV, Input to Output Continuous Transient240Vrms max ANSI/IEEE C37.90.1CMK (50 or 60Hz) NMR (-3dB at 100Hz)100dB 120dB per Decade Above 100HzAccuracy® Linearity Stability Input Offset Output Offset Gain±10U/°C ±10U/°C ±400U/°C tainsNoïse Input, 0.1 to 10Hz Output Range (to ±1mV of V _{out}) Output Range Output Range (to ±1mV of V _{out})+11V to ±5V or ±2V to ±10V 50Q Continuous Short to Ground 6µs at C _{loud} = 0 to 2000pF ±2.8% tabout the stander of the standard the stander of the standard the standardOutput Enable Control Max Logic "1" Max Logic "1" Hout Current "0,1"+5VDC ±5% 180mA at Transmitter Load of 20mA 100mA at Transmitter Load of 4mA ±10µV/% RTI®Power Supply Voltage Power Supply Sensitivity-40°C to +85°C -40°C to +	Module	SCM5B42
Continuous Transient240Vrms max ANSUREE C 37.90.1Input Protection Continuous Transient240Vrms max ANSUREE C 37.90.1CMV, Input to Output Continuous Transient1500Vrms max ANSUREE C 37.90.1CMR (50 or 60Hz) NMR (-3dB at 100Hz)100dB 120dB per Decade Above 100HzAccuracy(*) Linearity Stability Input Offset Output Offset Cain Noise Input, 0.1 to 10Hz Output Range Output Range Output Range Output Selection Output Selection Output Current Limit100Hz ±0.005% Span ±10VHz ±25ppm/*C of Reading 100Hz ±25ppm/*C of ReadingOutput Eable Control Max Logic 1* Input Current 0,1*+1V to +5V or +2V to +10V 50Q Continuous Short to Ground 6µs at C _{load} = 0 to 2000pF (to ±1mV of V _{our}) Output Current LimitPower Supply Voltage Power Supply Voltage Power Supply Voltage Power Supply Sensitivity+50DC ±5% 180mA at Transmitter Load of 20mA 100Ma at Transmitter Load of 4mA ±10µV/% RTI(2)Power Supply Sensitivity Environmental Operating Temp. Range Relative Humidity Emissions EN61000-6-2-40°C to +85°C -40°C to +85°C 0 to 95% Noncondensing ISM, Group 1	Input Resistor Value Accuracy Stability	20.00Ω ±0.1% ±10ppm/°C
NMR (-3dB at 100Hz)120dB per Decade Above 100HzAccuracy(0) Linearity $\pm 0.03\%$ Span $\pm 0.005\%$ SpanStability Input Offset Output Offset Gain $\pm 1\mu V/^{\circ} C$ $\pm 40\mu V/^{\circ} C$ $\pm 25pm/^{\circ} C of ReadingNoiseInput, 0.1 to 10HzOutput, 100kHzBandwidth, -3dBResponse Time, 90% Span10nArms500\mu VrmsOutput RangeOutput ResistanceOutput VertectionOutput Selection Time(to \pm 1m V of V_{our})Output Current Limit+1V to +5V or +2V to +10V50\OmegaContinuous Short to Ground6\mu sat C_{load} = 0 to 2000pFOutput Enable ControlMax Logic '0"Min Logic "1"hmax Logic '1"Input Current "0,1"+0.8V\pm 36V180mA at Transmitter Load of 20mA100MA at Transmitter Load of 4mA\pm 10\mu V/\% RTI(2)Power Supply VoltagePower Supply Sensitivity2.28" \times 2.26" \times 0.60"(58mm x 57mm x 15mm)EnvironmentalOperating Temp. RangeRelative Humidity-40^{\circ}C to +85^{\circ}C-40^{\circ}C to +85^$	Continuous Transient Input Protection Continuous Transient CMV, Input to Output Continuous	ANSI/IEEE C37.90.1 240Vrms max ANSI/IEEE C37.90.1 1500Vrms max
Linearity $\pm 0.005\%$ SpanStabilityInput Offset $\pm 1\mu V/^{\circ}C$ Output Offset $\pm 40\mu V/^{\circ}C$ Gain $\pm 25ppm'^{\circ}C$ of ReadingNoiseInput, 0.1 to 10Hz10nArmsOutput, 100kHz500µVrmsBandwidth, -3dB100HzResponse Time, 90% Span4mSOutput Resistance500Output Resistance500Output Resistance500Output Resistance500Output Resistance500Output Resistance500Output Selection Time $\epsilon_{bast} = 0$ to 2000pF(to $\pm 1mV$ of V_{our}) $\pm 8mA$ Output Enable Control $+0.8V$ Max Logic "1" $\pm 36V$ Input Current "0,1" $0.5\muA$ Power Supply Voltage $\pm 5VDC \pm 5\%$ Power Supply Voltage $\pm 5VDC \pm 5\%$ Power Supply Sensitivity $2.28^{\circ} x 2.26^{\circ} x 0.60^{\circ}$ Mechanical Dimensions $2.28^{\circ} x 2.26^{\circ} x 0.60^{\circ}$ (h)(w)(d)(58mm x 57mm x 15mm)EnvironmentalOperating Temp. RangeOperating Temp. Range $-40^{\circ}C$ to $\pm 85^{\circ}C$ Storage Temp. Range $-40^{\circ}C$ to $\pm 85^{\circ}C$ Relative HumidityISM, Group 1Emissions EN61000-6-4ISM, Group 1Immunity EN61000-6-2ISM, Group 1		
Output Resistance 50Ω Output ProtectionContinuous Short to GroundOutput Selection Time $(to \pm 1mV \text{ of } V_{out})$ Output Current Limit $+8mA$ Output Current Limit $+0.8V$ Max Logic "0" $+0.8V$ Min Logic "1" $+36V$ Input Current "0,1" $0.5\muA$ Power Supply Voltage $+5VDC \pm 5\%$ Power Supply Voltage $+5VDC \pm 5\%$ Power Supply Sensitivity $2.28" \times 2.26" \times 0.60"$ (h)(w)(d) $(58mm \times 57mm \times 15mm)$ Environmental $Operating Temp. Range$ Operating Temp. Range $-40°C$ to $+85°C$ Storage Temp. Range $-40°C$ to $+85°C$ Relative HumidityISM, Group 1Radiated, ConductedISM, Group 1Immunity EN61000-6-2ISM, Group 1	Linearity Stability Input Offset Output Offset Gain Noise Input, 0.1 to 10Hz Output, 100kHz Bandwidth, –3dB	±0.005% Špan ±1μV/°C ±40μV/°C ±25ppm/°C of Reading 10nArms 500μVrms 100Hz
Max Logic "0" $+0.8V$ Min Logic "1" $+2.4V$ Max Logic "1" $+36V$ Input Current "0,1" $0.5\mu A$ Power Supply Voltage $+5VDC \pm 5\%$ Power Supply Current $180mA$ at Transmitter Load of 20mAPower Supply Sensitivity $100mA$ at Transmitter Load of 4mAPower Supply Sensitivity $\pm 10\mu V/\%$ RTI ⁽²⁾ Mechanical Dimensions $2.28" \times 2.26" \times 0.60"$ (h)(w)(d) $(58mm \times 57mm \times 15mm)$ Environmental $0perating Temp.$ RangeStorage Temp. Range $-40^{\circ}C$ to $+85^{\circ}C$ Relative Humidity 0 to 95% NoncondensingEmissions EN61000-6-4ISM, Group 1Radiated, Conducted $Class A$ Immunity EN61000-6-2ISM, Group 1	Output Resistance Output Protection Output Selection Time (to ±1mV of V _{out})	50Ω Continuous Short to Ground 6µs at C _{load} = 0 to 2000pF
Power Supply Current 180mA at Transmitter Load of 20mA Power Supply Sensitivity 100mA at Transmitter Load of 4mA Power Supply Sensitivity ±10µV/% RTI ⁽²⁾ Mechanical Dimensions 2.28" x 2.26" x 0.60" (h)(w)(d) (58mm x 57mm x 15mm) Environmental Operating Temp. Range Storage Temp. Range -40°C to +85°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	Max Logic "0" Min Logic "1" Max Logic "1"	+2.4V +36V
(h)(w)(d)(58mm x 57mm x 15mm)Environmental Operating Temp. Range Storage Temp. Range Relative Humidity-40°C to +85°C -40°C to +85°C 0 to 95% Noncondensing Emissions EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2	Power Supply Current	180mA at Transmitter Load of 20mA 100mA at Transmitter Load of 4mA
Operating Temp. Range-40°C to +85°CStorage Temp. Range-40°C to +85°CRelative Humidity0 to 95% NoncondensingEmissions EN61000-6-4ISM, Group 1Radiated, ConductedClass AImmunity EN61000-6-2ISM, Group 1		
RF Performance A ±0.5% Span Error ESD,EFT Performance B NOTES: Performance B	Operating Temp. Range Storage Temp. Range Relative Humidity Emissions EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD,EFT	-40°C to +85°C 0 to 95% Noncondensing ISM, Group 1 Class A ISM, Group 1 Performance A ±0.5% Span Error

Includes linearity, hysteresis and repeatability.
RTI = Referenced to input.

Ordering Information

Model	Input Range	Output Range
SCM5B42-01	4mA to 20mA	+1V to +5V
SCM5B42-02	4mA to 20mA	+2V to +10V