Analog Input Module: Strain-gauge

Interface to Full-, Half-, and Quarter-bridge Sensors

DESCRIPTION

The MAQ®20-BRDG1 strain gauge input module offers 4 input channels and can interface to full-, half-, and quarter-bridge sensors using 4-wire or 6-wire connections. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. In addition, sampling rate, resolution, bandwidth, excitation voltage, and choice of shunt calibration resistors are user-settable parameters. Input signals are sampled simultaneously and burst mode can be used to capture fast events. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Hardware low-pass filtering in each channel provides rejection of unwanted frequencies. Field I/O connections are made through spring cage terminal blocks with positions designated for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 30Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, which preserves data integrity.

Input ranges are selectable on a per-channel basis. Four ranges are available. Over-range and under-range up to 2% beyond the specified input values is allowed, and accuracy is guaranteed to full scale.

All MAQ20 modules are designed for installation in Class I, Division 2 hazardous locations and have a high level of immunity to environmental noise commonly present in heavy industrial environments.

FEATURES

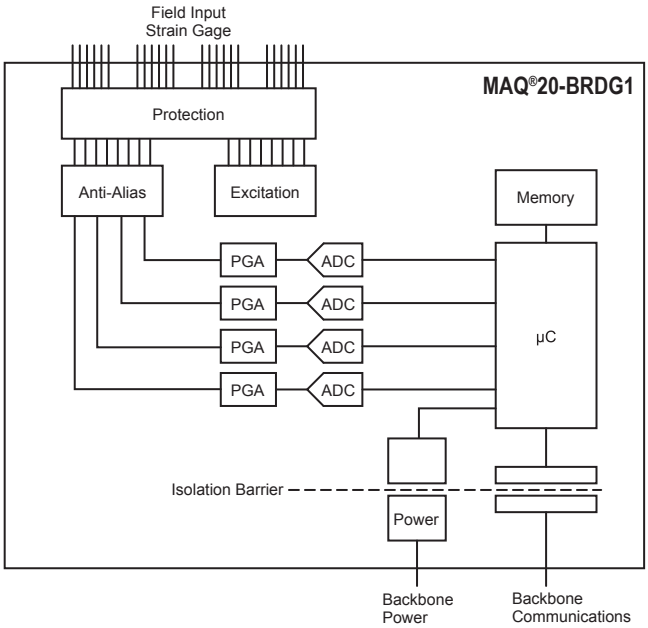
- 4 Input Channels for 4-wire or 6-wire Sensors
- Bridge Resistance 100Ω to 1kΩ
- Interface to Full, Half and Quarter (with external bridge completion) Sensors
- All Channels Individually Configurable for Range, Alarms, Averaging
- 24-bit Resolution
- Programmable Sampling Rate and Resolution
- Simultaneous Sampling of Input, Bandwidth Signals
- Burst Mode for Capturing Fast Events
- Programmable Excitation, Shunt Calibration, Remote Sense
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 30Vrms Continuous Overload
- Heavy Industrial CE Compliant
- UL/cUL (Class I, Div 2, Groups A, B, C, D) File E232858
- ATEX Compliance Pending
- Manufactured per RoHS III Directive 2015/863

BENEFITS

- Highly Compact
- Low Cost per Channel
- Modular
- On-vehicle/-mobile Use Possible (Wide Power Supply Voltage)
- Open Software Platform Options
- Easy and Fast Setup/Installation

APPLICATIONS

- Process Control
- Factory Measurement and Control
- Machine Automation
- Military and Aerospace
- Scientific Measurement and Monitoring
- Battery Management



MAQ20-BRDG1 Strain-gauge Input Module Block Diagram

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Specifications

Typical* at T_A =+25°C and +24VDC System Power

Module	Description
MAQ20-BRDG1	Full, Half, Quarter Bridge 4-wire or 6-wire Connection
Number of Channels Per Channel Setup	4 Individually Configurable for Range, Alarms, Averaging
Input Range Input Protection Continuous Transient Excitation Voltage Bridge Resistance Shunt Calibration	±100mV, 0.8mV/V to 40mV/V Sensitivity 30Vrms (max) ANSI/IEEE C37.90.1 2.5V, 3.333V, 5.0V, 10.0V 100Ω to 1kΩ 60kΩ, 100kΩ, 200kΩ, External
Excitation Protection Continuous Transient CMV Channel-to-Bus Channel-to-channel Transient CMR NMR	 30Vrms (max) ANSI/IEEE C37.90.1 1500Vrms, 1 Minute $\pm 3V_{PEAK}$ ANSI/IEEE C37.90.1 100dB at 50/60Hz 60dB/Decade
Accuracy(1) Linearity Resolution ADC Resolution Stability Zero Span	±0.03% Span ±0.01% Span 0.0005% to 0.005% Span 24-bit 50ppm/°C 75ppm/°C
Bandwidth Scales with Sample Rate Sampling Rate, Simultaneous Alarms Power Supply Current	 Programmable to 17kHz 1ks/s to 32ks/s Burst High / High-High / Low / Low-Low 400mA
Dimensions (h)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental Operating Temperature Storage Temperature Relative Humidity Emissions, EN61000-6-4 Radiated, Conducted Immunity EN61000-6-2 RF ESD, EFT	 –40°C to +85°C –40°C to +85°C 0 to 95% Noncondensing ISM Group 1 Class A ISM Group 1 Performance A ±0.5% Span Error Performance B
Certifications	Heavy Industrial CE Compliant UL/cUL (Class I, Division 2, Groups A, B, C, D) File E232858 ATEX Compliance Pending

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

For input connections and full details on module operation, refer to:
MA1046 – MAQ20 Strain-gauge Input Module Hardware User Manual

Ordering Information

Model	Description
MAQ20-BRDG1	Analog Input Module; Bridge/Strain-gauge, 4-ch

Sensor Connection	Terminal	Terminal	Sensor Connection
CH0			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH1			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH2			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL
CH3			
+EXC	1	5	+REMOTE SENSE
–EXC	2	6	–REMOTE SENSE
SHIELD	S	S	SHIELD
+IN	3	7	+SHUNT CAL
–IN	4	8	–SHUNT CAL

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