Analog Input Modules: Thermocouple

Interface to Types J, K, T, R and S Thermocouples

Description

The MAQ20 thermocouple analog input modules have 8 differential input channels. Separate models are offered for interfacing to Type J, Type K, Type T and Types R and S thermocouples. Cold Junction Compensation uses four internal sensors resulting in industry leading measurement accuracy in any system configuration and over the entire system operating temperature range. All channels are individually configurable for range, alarm limits, and averaging to match the most demanding applications. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation. Hardware low-pass filtering in each channel provides rejection of 50 and 60Hz line frequencies. Field I/O connections are made through spring cage terminal blocks with four positions provided for the termination of wiring shields.

Input-to-bus isolation is a robust 1500Vrms and each individual channel is protected up to 150Vrms continuous overload in case of inadvertent wiring errors. Overloaded channels do not adversely affect other channels in the module, thereby preserving data integrity.

Channels in a module can be selectively enabled for scanning. All channels are enabled by default; however, non-used channels can be disabled to increase the sampling rate of enabled channels.

Input ranges are selectable on a per-channel basis. The MAQ20-JTC, -KTC, -TTC and -RSTC modules have two to four user selectable input ranges, depending on the model. Over-range and under-range up to 2% beyond the specified input values is allowed. Sensor linearization is performed in the module, and accuracy is guaranteed to ±f.s.

▶ Features

- 8 Differential Input Channels
- Interface to Types J, K, T , R and S Thermocouples
- All Channels Individually Configurable for Range, Alarms, Averaging
- 1500Vrms Input-to-Bus Isolation
- Each Channel Protected up to 150Vrms Continuous Overload
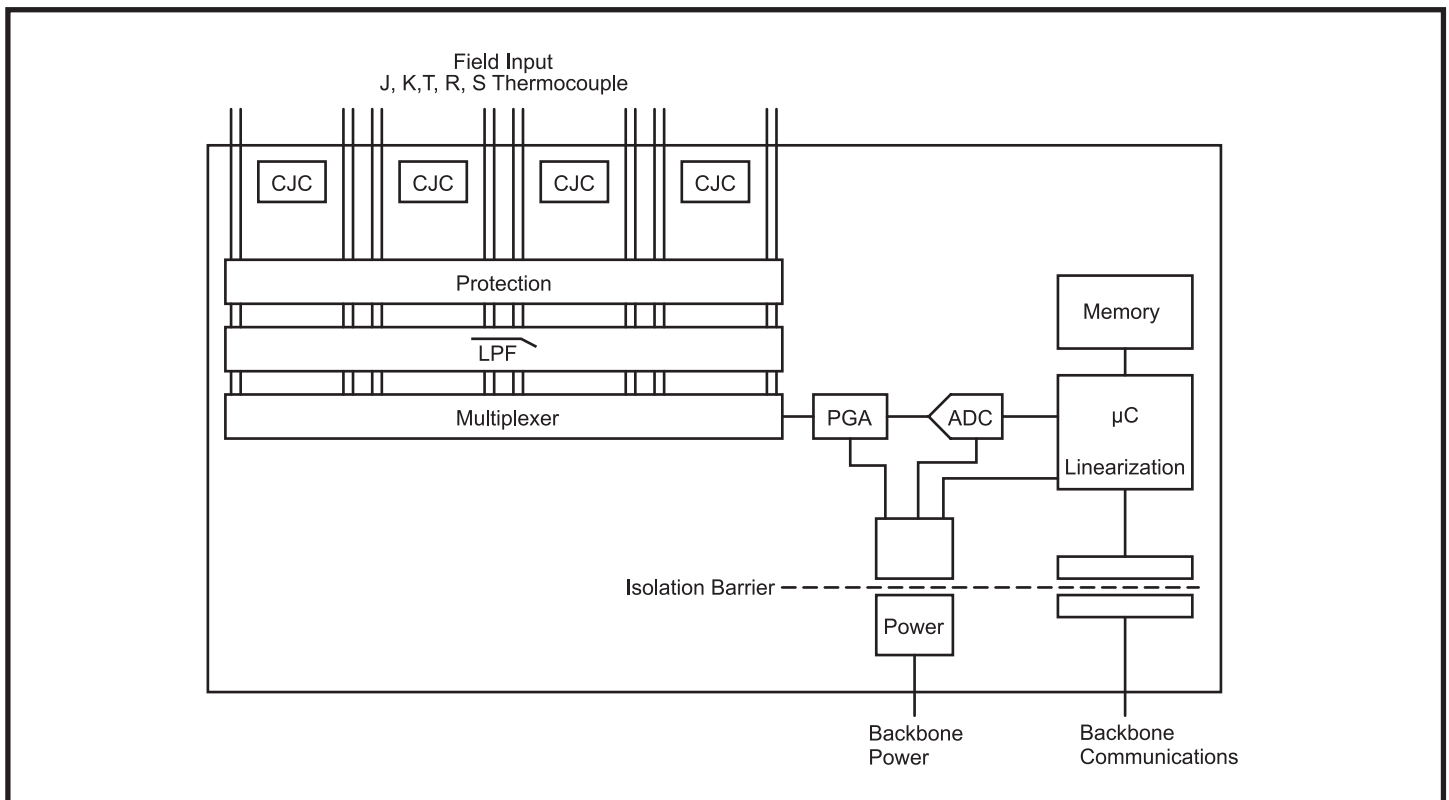- Selective Enabling of Module Channels for Scanning

Figure 1: MAQ20 Thermocouple Input Module Block Diagram

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Specifications Typical* at T_A=+25°C and +24VDC system power

Module	Description
MAQ20-JTC	8-ch., Type JTC, Differential Input –100°C to +760°C (Default) –100°C to +393°C, –100°C to +199°C
MAQ20-KTC	8-ch., Type KTC, Differential Input –100°C to +1350°C (Default) –100°C to +651°C, –100°C to +332°C
MAQ20-TTC	8-channel, Type TTC, Differential Input –100°C to +400°C (Default), –100°C to +220°C
MAQ20-RSTC	8-channel, Type RTC and Type STC, Differential Input Type R–100°C to +1750°C (Default), –100°C to +990°C Type S: –100°C to +1750°C, –100°C to +970°C
Per Channel Setup	Individually configurable for range, alarms, averaging
Input Protection	
Continuous	150Vrms max
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 min
Channel-to-Channel	±3V peak
Transient	ANSI/IEEE C37.90.1
CMR	100dB at 50/60Hz
NMR	26dB at 50/60Hz
Accuracy[1]	±0.06% span
Conformity	±0.035% span
Cold Junction Compensation	±0.25°C at +25°C, ±1.0°C at –40°C to +85°C
Resolution	0.020% span
Stability	
Zero	±15ppm/°C
Span	±35ppm/°C
Bandwidth, –3dB	3Hz
Scan Rate	200 Ch/s
Alarms	High / High-High / Low / Low-Low
Open Input Response	Downscale, <5s, Flag Set
Power Supply Current	30mA
Dimensions (h)(w)(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)
Environmental	
Operating Temperature	–40°C to +85°C
Storage Temperature	–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
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B
Certifications	Heavy Industrial CE, ATEX Pending UL/CUL Class I, Division 2, Groups A, B, C, D Pending

NOTES:
* Contact factory or your local Dataforth sales office for maximum values.
(1) Includes conformity, hysteresis and repeatability. Does not include CJC accuracy.

Ordering Information

Model	Description
MAQ20-JTC	Analog Input Module; Type J Thermocouple, 8-ch
MAQ20-KTC	Analog Input Module; Type K Thermocouple, 8-ch
MAQ20-TTC	Analog Input Module; Type T Thermocouple, 8-ch
MAQ20-RSTC	Analog Input Module; Type R and Type S Thermocouple, 8-ch

MAQ20

For input connections and full details on module operation, refer to MA1047 – MAQ20 Thermocouple Input Module Hardware User Manual, available for download at: www.dataforth.com/maq20_download.aspx