Discrete Input / Output Modules

5 Input Channels and 5 Output Channels (MAQ20-DIOL)
4 Input Channels and 4 Output Channels (MAQ20-DIOH)

Description

The MAQ20-DIOL discrete input/output module has 5 isolated discrete input channels and 5 isolated discrete output channels. Input channels accept 3-60VDC signals and output channels switch 3-60VDC signals at up to 3A load.

The MAQ20-DIOH discrete input/output module has 4 isolated discrete inputs and 4 isolated discrete outputs. Input channels accept 90-280VAC/VDC signals and output channels switch 24-280VAC signals at up to 3A AC load. **NOTE: DIOH output channels switch AC loads only.**

Discrete output channels have user configurable default output states which are set up on power up or module reset. In addition to performing standard discrete I/O, the channels can be configured to perform seven special functions: Pulse/Frequency Counter, Pulse/Frequency Counter with De-bounce, Waveform Measurement, Time Between Events, Frequency Generator, Pulse Width Modulation (PWM) Generator, and One-Shot Pulse Generator. Up to four special functions can run simultaneously. High, Low, High-High and Low-Low alarms provide essential monitoring and warning functions to ensure optimum process flow and fail-safe applications. Field I/O connections are made through a pluggable terminal block.

Input-to-bus isolation is a robust 1500Vrms and channel-to-channel isolation is 300Vrms. Each individual channel has continuous overload and reverse connection protection in case of inadvertent wiring errors.

Features

- Rugged Isolation and Protection for Industrial Control
- User-Defined Default Output and Output Waveform
- 7 High Performance Special Functions
- 1500Vrms Input-to-Bus Isolation
- 300Vrms Channel-to-Channel Isolation
- Continuous Overload and Reverse Protection

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.

IMPORTANT: The DIOH module can only switch AC loads, not DC. The output switch is AC only with zero-crossing detection.

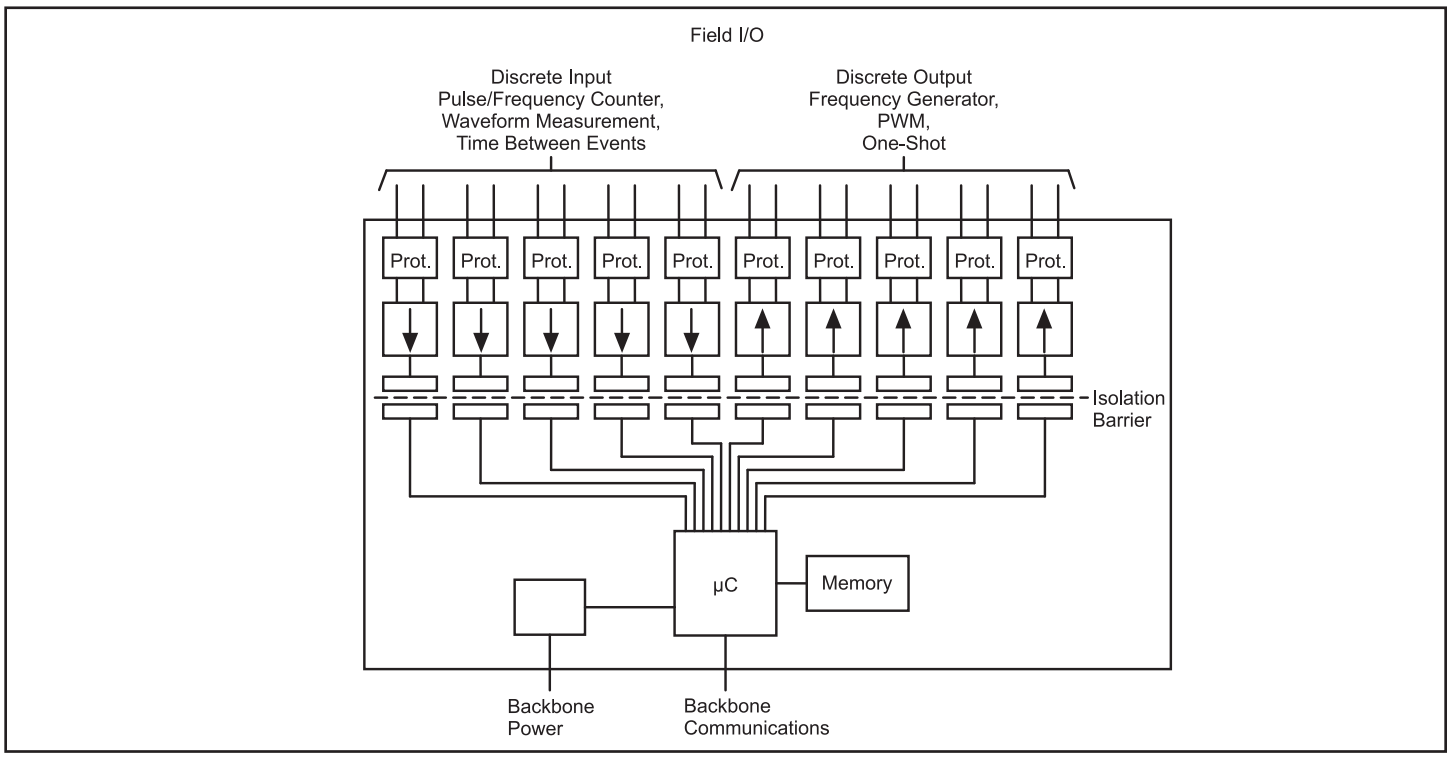

Figure 1: MAQ20-DIOL Discrete Input/Output Module Block Diagram

Specifications

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

Module	Description
MAQ20-DIOL	5 Isolated Channel Discrete Input, 3-60VDC 5 Isolated Channel Discrete Output, 3-60VDC
MAQ20-DIOH	4 Isolated Channel Discrete Input, 90-280VAC/VDC 4 Isolated Channel Discrete Output, 24-280VAC
Per Channel Setup	Individually configurable for default output, special function
Input Protection	
Continuous, -DIOL	70VDC max, Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC max
Transient	ANSI/IEEE C37.90.1
Output Protection	
Continuous, -DIOL	70VDC max, Reverse Polarity Protected
Continuous, -DIOH	350VAC/VDC max
Transient	ANSI/IEEE C37.90.1
CMV	
Channel-to-Bus	1500Vrms, 1 min
Channel-to-Channel	300Vrms, 425VDC
Transient	ANSI/IEEE C37.90.1
Output Load (Combined load, all channels)(1)	
MAQ20-DIOL	
Ta=25°C, Freq=0 to 1500Hz, Duty Cycle= 5 -100%	3A (2A if adjacent module Tcase>50°C)
Ta=85°C, Freq=0 to 500Hz, Duty Cycle= 5 -100%	2A (1A if adjacent module Tcase>50°C)
MAQ20-DIOH	
Ta=25°C, Freq=0 to 1500Hz	3Arms
Ta=85°C, Freq=0 to 500Hz	3Arms
Switching Characteristics	
MAQ20-DIOL	
Input Channel Turn-On/ Turn-Off Time	25µs / 55µs
Output Channel Turn-On/ Turn-Off Time	20µs / 40µs
MAQ20-DIOH	
Input Channel Turn-On/ Turn-Off Time	20ms / 30ms (VAC), 1ms / 1ms (VDC)
Output Channel Response Time	0.5 Cycle
I/O Special Functions (MAQ20-DIOL)	
Pulse/Frequency Counter**	Freq to 10kHz, Count to 10M**, RPM to 65k
Pulse/Frequency Counter w/De-bounce	Freq to 3kHz, Count to 10M
Waveform Measurement	Freq to 500Hz, # Periods, Pulse Width, Period, Duty Cycle
Time Between Events**	Min**, Max**, Avg**, Selectable Timebase**
Frequency Generator	Up to 700Hz
PWM Generator	200µs min Period, Selectable Timebase
One-Shot Pulse Generator	100µs min, Programmable Pre- and Post-Delay
Scan/Update Rate	3500 Ch/s
Alarms (MAQ20-DIOL)	High / High-High / Low / Low-Low
Power Supply Current	30mA
Dimensions (h)(w)(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)

Ordering Information

Model	Description
MAQ20-DIOL	Discrete Input/Output Module; 3 to 60VDC In, 3 to 60VDC Out, 5-ch In, 5-ch Out
MAQ20-DIOH	Discrete Input/Output Module; 90 to 280VAC/VDC In, 24 to 280VAC Out, 4-ch In, 4-ch Out

Terminal Block Position (top to bottom)	MAQ20-DIOL Field Connections	MAQ20-DIOH Field Connections
1	DO CH0 +OUT	DO CH0 +OUT
2	DO CH0 -OUT	DO CH0 -OUT
3	DO CH1 +OUT	DO CH1 +OUT
4	DO CH1 -OUT	DO CH1 -OUT
5	DO CH2 +OUT	DO CH2 +OUT
6	DO CH2 -OUT	DO CH2 -OUT
7	DO CH3 +OUT	DO CH3 +OUT
8	DO CH3 -OUT	DO CH3 -OUT
9	DO CH4 +OUT	NC
10	DO CH4 -OUT	NC
11	DI CH0 +IN	NC
12	DI CH0 -IN	NC
13	DI CH1 +IN	DI CH0 +IN
14	DI CH1 -IN	DI CH0 -IN
15	DI CH2 +IN	DI CH1 +IN
16	DI CH2 -IN	DI CH1 -IN
17	DI CH3 +IN	DI CH2 +IN
18	DI CH3 -IN	DI CH2 -IN
19	DI CH4 +IN	DI CH3 +IN
20	DI CH4 -IN	DI CH3 -IN

Specifications (continued)

Module	Description
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 Compliant UL/CUL Listing Pending (Class I, Division 2, Groups A, B, C, D) ATEX Compliance Pending

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) See manual for detailed calculations of load ratings based on ambient temperature, multiple channels, and adjacent modules. **Also applicable to MAQ20-DIOH

For input and output connections and full details on module operation, refer to MA1043 – MAQ20 Discrete Input-Output Module Hardware User Manual, available for download at: www.dataforth.com/maq20_download.aspx.