Discrete Input / Output Modules

5 Input Channels and 5 Output Channels (MAQ®20-DIOL)
4 Input Channels and 4 Output Channels (MAQ®20-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.

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

- 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
- 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

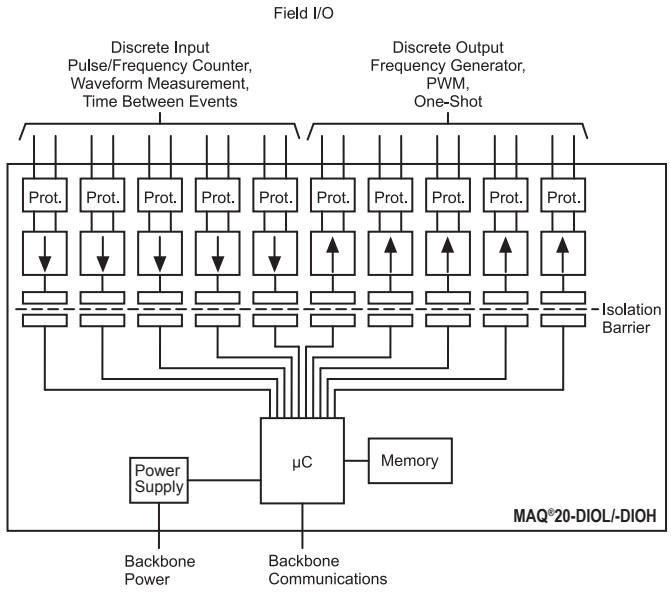
BENEFITS

- 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

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



MAQ20-DIOL/-DIOH 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 Range, Default Output, Waveform
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 Minute
Channel-to-channel	300Vrms, 425VDC
Transient	ANSI/IEEE C37.90.1
Output Load (Combined load, all channels)(1)	
MAQ20-DIOL	
T_A= +25°C, Freq = 0 to 1500Hz, Duty Cycle = 5-100%	3A (2A if Adjacent Module T_{CASE}>50°C)
T_A= +85°C, Freq = 0 to 500Hz, Duty Cycle = 5-100%	2A (1A if Adjacent Module T_{CASE}>50°C)
MAQ20-DIOH	
T_A= +25°C, Freq = 0 to 1500Hz	3Arms
T_A= +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)x(w)x(d)	4.51" x 0.60" x 3.26" (114.6mm x 15.3mm x 82.8mm)

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 (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.
**Also applicable to MAQ20-DIOH
(1) See manual for detailed calculations of load ratings based on ambient temperature, multiple channels, and adjacent modules.

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

For input connections and full details on module operation, refer to:
DIOL – MA1043 Discrete Input-Output Module Hardware User Manual

For input connections and full details on module operation, refer to:
DIOH – MA1058 Discrete Input-Output Module Hardware User Manual