

INTERCONNECTING PRODUCTS AND CABLES

M-7000

RS-485 DIGITAL DATA ACQUISITION AND CONTROL MODULES

Description

The M-7000 Series is a family of Digital Data Acquisition and Control Modules that gives the user an easy way to build a distributed Data Acquisition or Control system using the rugged Modbus RTU or DCON protocols. All modules are controlled over an RS-485 network at rates up to 115,200 baud. The modules are available various combinations of signals: up to 16 isolated digital inputs, with mixed digital inputs and outputs, with hi-current drivers and with relay contact outputs. All units are designed for industrial applications with dual watchdog timers, fail safe outputs and have 3,750 V isolation to the RS-485 network for noise free operation. Applications include providing digital inputs, driving digital loads like solenoids or relays, providing digital outputs or counting frequencies up to 100 Hz.

RS-485 Communication

The M-7000 series digital modules are controlled over an RS-485 network using the Modbus RTU or DCON protocol. RS-485 networks use differential signals and have a high degree of noise immunity due to their differential nature. Cable lengths can be up to 4,000 feet. The Modbus RTU and DCON protocols are industry standard packet protocols that guarantee a reply to every command, eliminating doubt due to missed messages. Modbus RTU packets use a checksum to validate the packet. All packets are acknowledged and erroneous packets are resent. The module device address can be 01 to 255. All module configuration parameters such as address, baud rate etc. are saved in



M-7060 Modbus Relay Module

an internal memory. All units have a LED indicator for power and communication.

M-7041

The M-7041 has 14 isolated digital input lines that handle 4 to 30V input signals. The lines have 3,750 V of isolation and share a common ground. Each line can be used as a 16-bit counter at rates up to 100 Hz. The 'D' version adds a LED per channel to display the I/O line status.

M-7045

The M-7045 has 8 isolated hi-current digital output lines that can drive up to 40 V loads. Each output can source up to 650 mA and has short circuit protection. Outputs have 3,750 volts of isolation from serial signals. The 'D' version adds a LED per channel to display the I/O line status.

Popular M-7000 Configurations

Model	Description	Available Display
M-7041	14 Isolated Digital Input Channels.	Yes
M-7045	8 Isolated Digital Outputs, 40 V at 650 mA	Yes
M-7050	7 Digital Inputs/8 Digital Outputs 30 V at 30 mA	Yes
M-7055	8 Isolated Digital Inputs/8 Isolated Digital Outputs	Yes
M-7060	4 sets of Relays Contact outputs/ 4 Isolated Digital Inputs.	Yes
M-7067	7 sets of Relays Contact outputs	Yes
M-7080	2 Frequency or Counter Channels	Yes

- Distributed Data Acquisition and Control Modules.
Data Acquisition and Analog Signals where you need it.
- Control with Modbus RTU or DCON protocols.
Industry standard protocols for control with SCADA/ HMI software and PLCs.
- RS-485 network with baud rates up to 115.2 kbaud.
High speed for quick responses.
- 3750 V Isolation for most signals.
Reduces noise and eliminates ground loops.
- Read Analog Signals, temperatures or currents
Control with analog outputs
Select the I/O Modules for your application.
- Mounts on standard DIN rails.
Easy mounting
- RoHS compatible modules.
Good for the environment.
- Includes AC Power Adapter.
Nothing more to buy.

 Approved



RoHS / WEEE Compliance
See Our policy for the RoHS / WEEE Compliance.

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M-7000 DESCRIPTION

M-7050

The M-7050 has 7 digital input lines and 8 output lines. The 7 digital input lines handle 4 to 30V signals. Each input line can also be used as a 16-bit counter at rates up to 100 Hz. The 8 output lines have open collector outputs drivers that can handle 30V loads and sink 30 mA. The 'D' version adds a LED per channel to display the I/O line status.

M-7051

The M-7051 has 16 isolated digital input lines especially designed to handle switch closure inputs or high level switching voltages. Inputs accept contact closures to ground or 0-4 to 10-50V inputs. The lines have 3,750 V of isolation from the serial signals and share a common ground. Each line can also be used as a 16-bit counter at rates up to 100 Hz. The 'D' version adds a LED per channel to display the I/O line status.

M-7052

The M-7052 has 8 isolated digital input lines for TTL or high level input signals. Six of the lines are floating and two share a common ground. Each line can also be used as a 16-bit counter at rates up to 100 Hz. Input levels are 0-1 and 4-30V. The 'D' version adds a LED per channel to display the I/O line status.

M-7053

The M-7053 has 16 isolated digital input lines especially designed to handle switch closure inputs. Inputs are contact closures to ground. Each line can also be used as a 16-bit counter at rates up to 100 Hz. The 'D' version adds a LED per channel to display the I/O line status.

M-7055

The M-7055 has 8 isolated digital input lines and 8 isolated output lines. The 8 digital input lines handle contact closures to ground to logic levels of 0-4 and 10-50V. Each input line can also be used as a 16-bit counter at rates up to 100 Hz. Each output can source up to 650 mA and has short circuit protection. I/O line isolation is 3,750 volts from the serial signals. The 'D' version adds a LED per channel to display the I/O line status.

M-7060

The M-7060 has 4 sets of relay contacts and 4 isolated digital input lines for TTL or high-level digital signals. Two of the relay contacts are SPST (form 'A') and two are SPDT (form 'C'). The 4 digital input lines handle logic levels of 0-1 V for logic '0' and 3.5-30 V for logic '1'. Isolation is 3,750 volts from the serial signals. The 'D' version adds a LED per channel to display the I/O line status.

M-7067

The M-7067 has 7 sets of relay contact outputs. The relay outputs are SPST (form 'A') contacts rated at 0.6A at 125 Vac or 2A at 30 Vdc. The 'D' version adds a LED per channel to display the I/O line status.

M-7080

The M-7080 has two 32-bit counter channels for counting events or frequency. Isolated or non-isolated inputs. Input frequency up to 100 kHz. Features programmable time base, input levels and counter alarm levels. The 'D' version adds a 5 digit display to display counter 0 or counter 1 values.



M-7067 Modbus Relay Module

M-7000 SPECIFICATIONS

M-7041 Specifications

Digital Inputs	14
Logic '0'	0-1 Vdc
Logic '1'	4-30 Vdc
Isolation	3,750 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Optional Display LED per channel	

M-7045 Specifications

Digital Outputs	8
Ext Voltage	10 to 40 Vdc
Iout	650 mA with short circuit protection
Isolation	3,750 Vrms
Optional Display LED per channel	

M-7050 Specifications

Digital Inputs	7
Logic '0'	0-1 Vdc
Logic '1'	4-30 Vdc
Isolation	3,750 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Digital Outputs	8
Type	Open Collector
Vmax	30 V
Iout	30 mA sink
Isolation	3,750 Vrms
Optional Display LED per channel	

M-7051 Specifications

Digital Inputs	16
Logic '0'	contact closure to gnd or 0-4 Vdc
Logic '1'	open or 10-50 Vdc
Isolation	3,750 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Optional Display LED per channel	

M-7052 Specifications

Digital Inputs	8
	6 floating, 2 common ground
Logic '0'	0-1 Vdc
Logic '1'	4-30 Vdc
Isolation	5,000 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W

M-7053 Specifications

Digital Inputs	16
Logic '0'	contact closure to gnd
Logic '1'	open
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Optional Display LED per channel	

M-7055 Specifications

Digital Inputs	8
Logic '0'	contact closure to gnd or 0-4 V
Logic '1'	open or 10-50 Vdc
Isolation	3,750 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Digital Outputs	8
Ext Voltage	10 to 40 Vdc
Iout	650 mA with short circuit protection
Isolation	3,750 Vrms
Optional Display LED per channel	

M-7060 Specifications

Relay Outputs	4
Type	2 form A (SPST) 4 form C (SPDT)
Contact Rating	AC: 125V @0.6A; 250V @0.3A DC: 30V @2A; 110V @0.6A
Breakdown	500 V
Relay on	3 ms
Relay off	1 ms
Switching time	10 ms total
Isolation	3,750 Vrms
Digital Inputs	4
Logic '0'	0-1 Vdc
Logic '1'	3.5-30 Vdc
Isolation	3,750 Vrms
Counters	
Frequency	100 kHz maz.
Input Z	3 Kohm, 0.5 W
Optional Display LED per channel	

M-7067 Specifications

Relay Outputs	7
Type	2 form A (SPST) 5 form C (SPDT)
Contact Rating	AC: 125V @0.6A; 250V @0.3A DC: 30V @2A; 110V @0.6A
Breakdown	500 V
Relay on	3 ms
Relay off	1 ms
Switching time	10 ms total
Isolation	3,750 Vrms

M-7080 Specifications

Input Channels	2
Type	32-bit counters
Data Rate	100 kHz
Isolated input Levels	
Logic 0	0-1 V
Logic 1	10-30V
Isolation	3,750 V
Programmable non-Isolated Input Levels	
Logic 0	0-5 V (0.8 V default)
Logic 1	0-5 V (2.4 V default)
Programmable functions per channel:	
Count Gate	0.1/1.0 second
Digital noise filter	2 us to 65 ms
Alarm	
Preset values	
Optional Display	5 digit LED readout

M-7000 SPECIFICATIONS

Operation		Physical	Power
INIT pin	Enables configuration mode	Size 123mm x 72mm x 33 mm (without mounting bracket)	10 to 30 Vdc supplied by included power adapter
Power on Values	- Set at power on or Watchdog reset occurs.		
LED Indicator	Shows	Mounting DIN rail	Power Consumption
Serial Interface			7041 0.2 W
RS-485 Interface Protocol	is half-duplex. Modbus RTU or DCON	Indicator Power and communication	7050/52 0.4 W
Signals	TX/RX pair	Connectors Serial	7045/51 0.6 W
Baud Rates	1,200 to 115.2 kbaud.	Screw terminals for 16 to 26 AWG wires, 0.15 in centers	7060 0.8 W
Format	8 data bits, no parity, and 1 stop bit	Isolation 3000 volts to serial I/O standard Channel isolation in some modules.	7055/67 1.4 W
Distance	1200 M		7080 2 W
Modbus RTU Specifications			Certifications
Supported Functions		Temperature	CE Certification
02 (0x02)	Read input status	Operating -25 °C to 75 °C	EMC Directive 89/336/EMC
04 (0x04)	Read input channels	Storage -40 °C to 85 °C	Emission EN 55022
70 (0x46)	Read/write module settings	Relative humidity 5 to 95% (not condensing)	Noise immunity EN 50082-2C
Error Responses			Included Items
00	Address, 1 to 247		Single unit DIN rail
01	Function code 0x80		Manual on CD-ROM
02	Exception code, 01		UL/CSA/VDE approved AC power
CRC mismatch	No response.		Adapters provided for:
			US - 115±10% Vac, 60 Hz (std)
			Europe - 230±10% Vac, 50/60 Hz
			UK - 230±10% Vac, 60 Hz

ORDERING INFORMATION-STANDARD VERSIONS

	Part Number
Modbus Input Module with 14 Isolated Digital Input Channels	M-7041
Modbus Input Module with 14 Isolated Digital Input Channels w/LED Display	M-7041D
Modbus Control Module with 8 Isolated Digital Outputs	M-7045
Modbus Control Module with 8 Isolated Digital Outputs w/LED Display	M-7045D
Modbus Control Module with 7 Digital Inputs and 8 Digital Outputs	M-7050
Modbus Control Module with 7 Digital Inputs and 8 Digital Outputs w/LED Display	M-7050D
Modbus Input Module with 16 Isolated Digital Input Channels	M-7051
Modbus Input Module with 16 Isolated Digital Input Channels w/LED Display	M-7051D
Modbus Input Module with 8 Isolated Digital Input Channels	M-7052
Modbus Input Module with 8 Isolated Digital Input Channels w/LED Display	M-7052D
Modbus Input Module with 16 Isolated Digital Input Channels	M-7053
Modbus Input Module with 16 Isolated Digital Input Channels w/LED Display	M-7053D
Modbus Input Module with 8 Isolated Digital Inputs and 8 Isolated Digital Outputs	M-7055
Modbus Input Module with 8 Isolated Digital Inputs and 8 Isolated Digital Outputs w/LED Display	M-7055D
Modbus Control Module with 4 Relay contacts output and 4 Isolated Digital Inputs	M-7060
Modbus Control Module with 4 Relay contacts output and 4 Isolated Digital Inputs w/LED Display	M-7060D
Modbus Control Module with 7 Relay contacts output	M-7067
Modbus Control Module with 7 Relay contacts output w/LED Display	M-7067D
Modbus Control Module with 7 Relay contacts output w/LED Display	M-7080
Modbus Control Module with 7 Relay contacts output w/LED Display	M-7080D
For 230 VAC adapter, add suffix to specify country / plug style -E(Europe), -B(UK), -A(Australia) i.e. I-7060-B	