

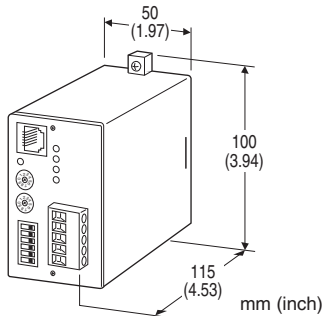
## Field Network Modules 61-UNIT Series

### ANALOG I/O MODULE

(Modbus; RS-485)

#### Functions & Features

- Interfacing analog I/O signals from/to Mini-M, Pico-M and other signal conditioner modules with Modbus
- Saving power and I/O wiring inside an instrumentation panel



### MODEL: 61M-16[1]-[2][3]

#### ORDERING INFORMATION

- Code number: 61M-16[1]-[2][3]
- Specify a code from below for each of [1] through [3].  
(e.g. 61M-161-K/Q)
- Specify the specification for option code /Q  
(e.g. /C01)

#### NO. OF CHANNELS

16: 16 points

#### [1] I/O TYPE

- 1: Input
- 2: Output

#### [2] POWER INPUT

AC Power  
**K:** 85 - 132 V AC  
 (Operational voltage range 85 - 132 V, 47 - 66 Hz)  
 DC Power  
**R:** 24 V DC  
 (Operational voltage range 24 V  $\pm$ 10 %, ripple 10 %p-p max.)  
 (Specify power suffix code R (24 V DC) when the UNIT is to be combined with the M8BS2.)

#### [3] OPTIONS

**blank:** none  
**/Q:** With options (specify the specification)

#### SPECIFICATIONS OF OPTION: Q

**COATING** (For the detail, refer to our web site.)  
**/C01:** Silicone coating  
**/C02:** Polyurethane coating  
**/C03:** Rubber coating

#### RELATED PRODUCTS

- Installation Base (model: M2BS2)
- Installation Base (model: M8BS2)

#### PACKAGE INCLUDES...

- Terminating resistor (110  $\Omega$ , 0.25 W)

#### GENERAL SPECIFICATIONS

**Construction:** Plug-in

#### Connection

**Modbus:** Euro type connector terminal (applicable wire size: 0.2 to 2.5 mm<sup>2</sup>, stripped length 7 mm)

**I/O:** Via Installation Base (model: MxBS2)

**Power input:** Via Installation Base (model: MxBS2)

**Housing material:** Flame-resistant resin (black)

**Isolation:** I/O to Modbus to power

**Power indicator:** Green LED turns on with power supplied.

#### MODBUS COMMUNICATION

**Communication:** Conforms to TIA/EIA-485-A

**Transmission setting:** DIP switch

**Data:** RTU (Binary) or ASCII

**Parity:** none, even or odd

**Baud rate:** 4800, 9600, 19.2 k, 38.4 k (bps)

**Node address setting:** Rotary switch; 01 - F7  
(factory setting: 00)

**L RUN indicator:** Red LED turns on for 10 sec. when the module receives data.

**L ERR. indicator:** Red LED turns on at errors in parity, framing, overrun, CRC or LRC.

**SD indicator:** Red LED turns on when transmitting.

**RD indicator:** Red LED turns on when receiving.

**Analog input:** Programming Unit (model: PU-2x) or via Modbus

**Moving averaging:** None, every 2 or 4 samples

**Sampling rate:** 400, 240, or 160 (msec.)

## INPUT SPECIFICATIONS

### ■ Analog Input

**Input range:** 1 - 5 V DC

**Input resistance:**  $\geq 1 \text{ M}\Omega$

(Each input must be isolated by signal conditioners. Non-isolated modules such as M2BW and M8BW are not usable.)

### ■ A/D conversion output

#### •Signed binary (2-byte data)

Signal range 0 - 100 % is proportional to hexadecimal 0000 - 2710 (0 - 10000). -15 to 0 % is a negative range represented by 2's complements.

Overall range is represented by hexadecimal FA24 - 2CEC (-1500 - +11500), for -15 - +115 %.

#### •Floating data (4-byte data)

Initial signal range 0 - 100 % is proportional to 0 - 10000, that is possible to be scaled into a specific range.

**Insulation resistance:**  $\geq 100 \text{ M}\Omega$  with 500 V DC

**Dielectric strength:** 1500 V AC @ 1 minute (I/O to Modbus to power)

## OUTPUT SPECIFICATIONS

### ■ Analog Output

**Output range:** 1 - 5 V DC

**Load resistance:** 20 k $\Omega$  minimum

(Output must be isolated with signal conditioners.

When the transmission line is open, the last value sampled before failure is held. Non-isolated modules such as M2BW and M8BW are not usable. )

### ■ D/A Conversion Input

#### •Signed binary (2-byte data)

Signal range 0 - 100 % is proportional to hexadecimal 0000 - 2710 (0 - 10000). -15 to 0 % is a negative range represented by 2's complements.

Overall range is represented by hexadecimal FA24 - 2CEC (-1500 - +11500), for -15 - +115 %.

#### •Floating data (4-byte data)

Initial signal range 0 - 100 % is proportional to 0 - 10000, that is possible to be scaled into a specific range.

## INSTALLATION

### Power consumption

•AC: Approx. 4 VA

•DC: Approx. 4 W (160 mA)

**Operating temperature:** -5 to +55°C (23 to 131°F)

**Operating humidity:** 30 to 90 %RH (non-condensing)

**Atmosphere:** No corrosive gas or heavy dust

**Mounting:** Installation Base (model: MxBS2)

**Weight:** 250 g (0.55 lb)

## PERFORMANCE in percentage of span

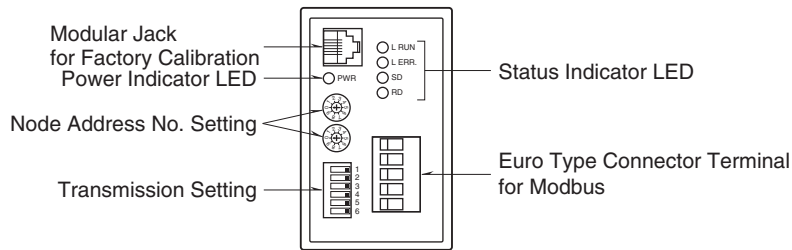
**A/D conversion:**  $\pm 0.1 \%$

**D/A conversion:**  $\pm 0.1 \%$

**Temp. coefficient:**  $\pm 0.015 \%/^{\circ}\text{C}$  ( $\pm 0.008 \%/^{\circ}\text{F}$ )

**Permissible power failure duration:**  $\leq 10 \text{ msec}$ .

## EXTERNAL VIEW



## MODBUS FUNCTION CODES & SUPPORTED CODES

### ■ Data and Control Functions

CODE	NAME		
01	Read Coil Status	X	Digital output from the slave
02	Read Input Status	X	Status of digital inputs to the slave
03	Read Holding Registers	X	General purpose register within the slave
04	Read Input Registers	X	Collected data from the field by the slave
05	Force Single Coil	X	Digital output from the slave
06	Preset Single Registers	X	General purpose register within the slave
07	Read Exception Status		
08	Diagnostics	X	
09	Program 484		
10	Poll 484		
11	Fetch Comm. Event Counter		Fetch a status word and an event counter
12	Fetch Comm. Event Log		A status word, an event counter, a message count and a field of event bytes
13	Program Controller		
14	Poll Controller		
15	Force Multiple Coils	X	Digital output from the slave
16	Preset Multiple Registers	X	General purpose register within the slave
17	Report Slave ID		Slave type / 'RUN' status
18	Program 884 / M84		
19	Reset Comm. Link		
20	Read General Reference		
21	Write General Reference		
22	Mask Write 4X Register		
23	Read/Write 4X Registers		
24	Read FIFO Queue		

### ■ Exception Codes

CODE	NAME		
01	Illegal Function	X	Function code is not allowable for the slave
02	Illegal Data Address	X	Address is not available within the slave
03	Illegal Data Value	X	Data is not valid for the function
04	Slave Device Failure		
05	Acknowledge		
06	Slave Device Busy		
07	Negative Acknowledge		
08	Memory Parity Error		

## Diagnostic Subfunctions

CODE	NAME		
00	Return Query Data	X	Loop back test
01	Restart Comm. Option	X	Reset the slave and clear all counters
02	Return Diagnostic Register	X	Contents of the diagnostic data (2 bytes)
03	Change ASCII Input Delimiter	X	Delimiter character of ASCII message
04	Force Listen Only Mode	X	Force the slave into Listen Only Mode

## MODBUS I/O ASSIGNMENT

	ADDRESS	TYPE		DATA TYPE	DATA
		1	2		
Coil (0X)	1 – 16	X			Averaging SW *
	17 – 32	X			Sampling rate SW **
Inputs (1X)	1 – 16	X	X		Analog channel status (active channel)
	17 – 32	X	X		Analog status (out of range)
Input Registers (3X)	1 – 16	X		I	Analog input
	17 – 48	X		F	Analog input
Holding Registers (4X)	1 – 16		X	I	Analog output
	17 – 48		X	F	Analog output
	49 – 80	X	X	F	Full scale
	81 – 112	X	X	F	Zero scale

### Type

- 1 : Analog input
- 2 : Analog output

### Data Type

- F : Floating
- I : Int 0 – 10000 (0 – 100%)

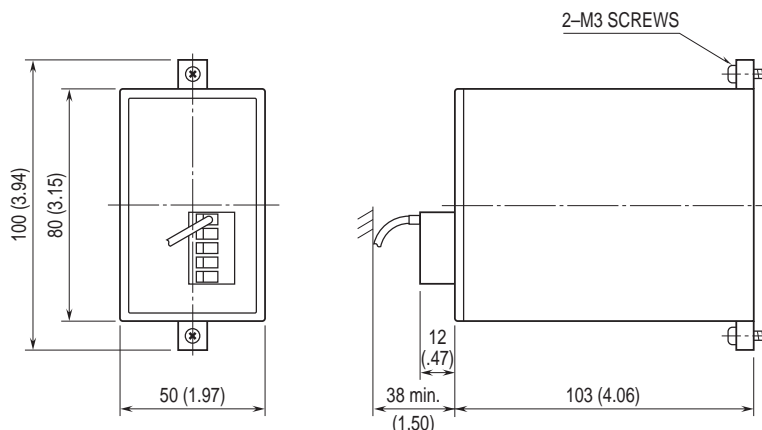
### \*Averaging SW

- 1 : 4 samples
- 2 : 2 samples
- 3 : None

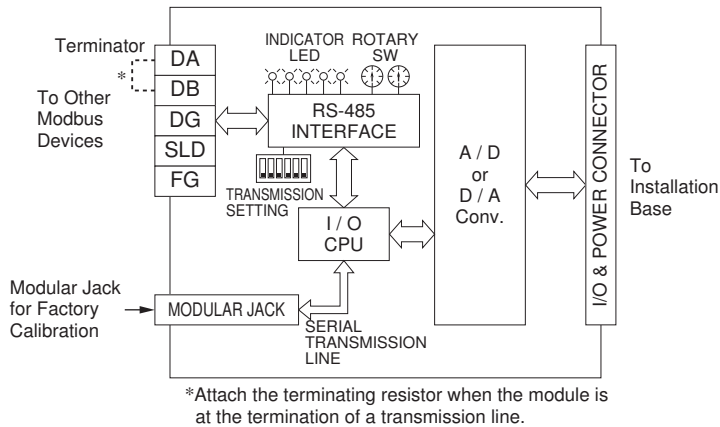
### \*\*Sampling rate SW

- 17 : 400 millisecc.
- 18 : 240 millisecc.
- 19 : 160 millisecc.

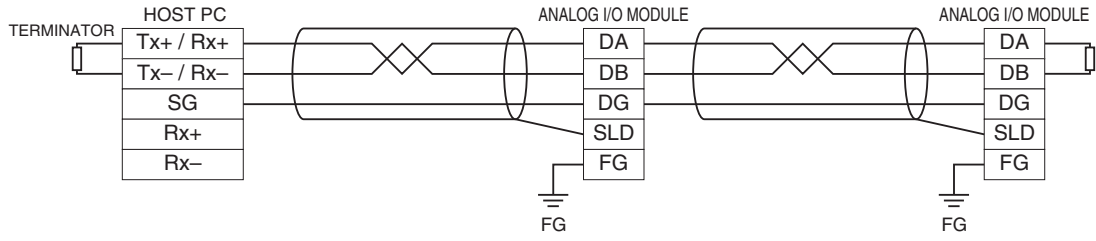
## EXTERNAL DIMENSIONS unit: mm [inch]



**SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM**



■ COMMUNICATION CABLE CONNECTIONS



 Specifications are subject to change without notice.