

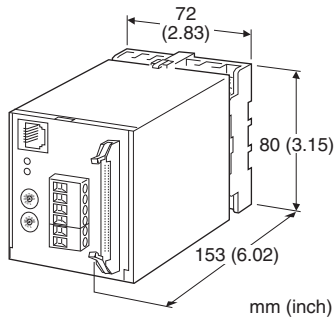
Field Network Modules 60-UNIT Series

ANALOG I/O MODULE

(Multiplex Transmission System)

Functions & Features

- Interfacing analog I/O signals from/to 10-RACK or 18-RACK modules with Multiplex Transmission System
- Saving power and I/O wiring inside an instrumentation panel



MODEL: 60S-16[1]-[2][3]

ORDERING INFORMATION

- Code number: 60S-16[1]-[2][3]
Specify a code from below for each of [1] through [3].
(e.g. 60S-161-K/Q)
- Specify the specification for option code /Q
(e.g. /C01/S01)

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.)

[3] OPTIONS

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

SPECIFICATIONS OF OPTION: Q (multiple selections)

COATING (For the detail, refer to our web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

TERMINAL SCREW MATERIAL

/S01: Stainless steel

RELATED PRODUCTS

- Special cable (model: MCN34)

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection

SIN-NET, RUN contact output: Euro type connector terminal (applicable wire size: 0.2 to 2.5 mm², stripped length 7 mm)

I/O: 34-pin connector (OMRON XG4A-3434)

Power input: M3.5 screw terminals

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: I/O to SIN-NET to RUN contact output to power to FG1

Power indicator: Red LED turns ON in normal conditions; OFF when the voltage level becomes low.

RUN indicator: Red LED turns ON when the selfdiagnosis proves normal, OFF in an abnormality.

■ **RUN Contact Output:** Contact opens at error

Rated load: 30 V DC @ 0.4 A (resistive load)

Maximum switching voltage: 125 V DC

Maximum switching power: 60 W

Minimum load: 10 mV DC @ 1 mA

Mechanical life: 5 x 10⁷ cycles

Self-diagnosis

Communication: The receiver modules detect loss of communication and wire break.

CPU: Watch-dog timer

Memory: Sum check

Power voltage: Detects when the voltage supply to the CPU drops.

COMMUNICATION

Configuration: Multi-drop
Standard: Conforms to EIA RS-422
Communication: 2-wire, half-duplex
Transmission speed: 125 kbps
Control procedure: SDLC
Data encoding: NRZ
Protocol: SIN-NET (dedicated protocol)
Error check: CRC
Transmission distance: 500 m
Transmission media: Twisted-pair cable CPEV-0.9 dia.
Station No.: Rotary switch
Terminator: Incorporated (remove jumper pin with those modules not located at the end of transmission line)

INPUT SPECIFICATIONS

■ Analog Input

Input range: 1 - 5 V DC
Input resistance: $\geq 1 \text{ M}\Omega$
 10-RACK and 18-RACK I/O modules must be isolated types. Non-isolated modules such as 10BW and 18BW are not usable.

• Input Connector Pin Assignment

PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	Input 1	2	COM
3	Input 2	4	COM
5	Input 3	6	COM
7	Input 4	8	COM
9	Input 5	10	COM
11	Input 6	12	COM
13	Input 7	14	COM
15	Input 8	16	COM
17	Input 9	18	COM
19	Input 10	20	COM
21	Input 11	22	COM
23	Input 12	24	COM
25	Input 13	26	COM
27	Input 14	28	COM
29	Input 15	30	COM
31	Input 16	32	COM
33	No connection	34	No connection

OUTPUT SPECIFICATIONS

■ Analog Output

Output must be isolated with signal conditioners. When the transmission line is open, the last value sampled before failure is held.
Output range: 1 - 5 V DC
Load resistance: 20 k Ω minimum
 10-RACK and 18-RACK I/O modules must be isolated types. Non-isolated modules such as 10BW and 18BW are not usable.

• Output Connector Pin Assignment

PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	Output 1	2	COM
3	Output 2	4	COM
5	Output 3	6	COM
7	Output 4	8	COM
9	Output 5	10	COM
11	Output 6	12	COM
13	Output 7	14	COM
15	Output 8	16	COM
17	Output 9	18	COM
19	Output 10	20	COM
21	Output 11	22	COM
23	Output 12	24	COM
25	Output 13	26	COM
27	Output 14	28	COM
29	Output 15	30	COM
31	Output 16	32	COM
33	No connection	34	No connection

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: Surface or DIN rail

Weight: 450 g (0.99 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: $\leq 10 \text{ msec.}$

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

Dielectric strength: 1500 V AC @ 1 minute (input or output to SIN-NET to RUN contact output to power)

2000 V AC @ 1 minute (input or output or SIN-NET or RUN contact output or power to FG1)

DESCRIPTIONS**■ RUN Contact Output (LED) Behaviors****• Input module**

The LED for the Input Modules turns ON when the network is on-line.

When there is an abnormality in the network, the LED turns OFF.

The network is reconfigured after an abnormality.

• Output module

The LED for the Output Modules turns ON when the network is on-line and the module receives data from the corresponding Input Module.

When there is an abnormality in the network or there is no data receiving, the LED turns OFF.

■ Station Number (Address)**A) 1 input module and X output modules:**

Match the address for input and output modules.

B) Computer interface:

Set address numbers to correspond with the computer as output module.

■ Transmission Time

Integrate all the transmission time for each process input module in the system.

• Analog input 16 points: 24.0 msec.

An analog module does not transmit all its signals in serial but does 1 point per each cycle. For example, when 1 contact input module (DLA1, 32 points) and 1 analog input module (16 points) are connected, 32 point contact signal and 1 point analog signal are transmitted in turn. One cycle time is therefore calculated as:

$$32 \text{ points} \times 1.5 \text{ msec.} + 24 \text{ msec.} = 72 \text{ msec.}$$

This method is beneficial for giving a priority to contact signals which vary rapidly.

■ Applicable models for use with 60S Input Module

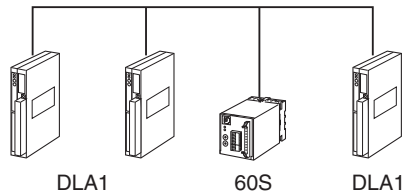
- 60S-162 (Ao 16 points)
- DLA1-xM1 (Ao 32 points; only the top 16 out of 32 are used)

■ TRANSMISSION LINE CONFIGURATION

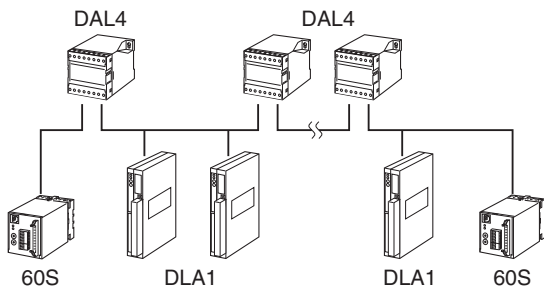
The multi-drop transmission line containing 22LA1, DLA1 and 60S modules should meet the following conditions. Contact M-System's sales office or representatives when designing.

A) 10 kilometers at maximum in total system.

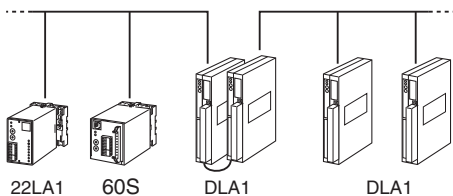
B) 60S module plus DLA1 units: One multitransmission line containing a 60S module can consist of a maximum of 16 units within the total distance of 500 m.



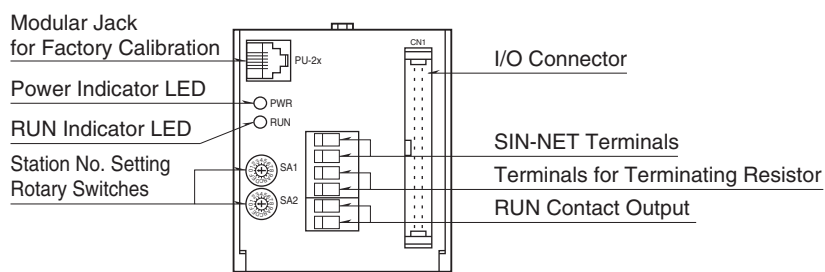
C) 60S modules, DLA1 units plus Repeater (model: DAL4): DAL4 units can expand the total distance. (6 DAL4 units max.)



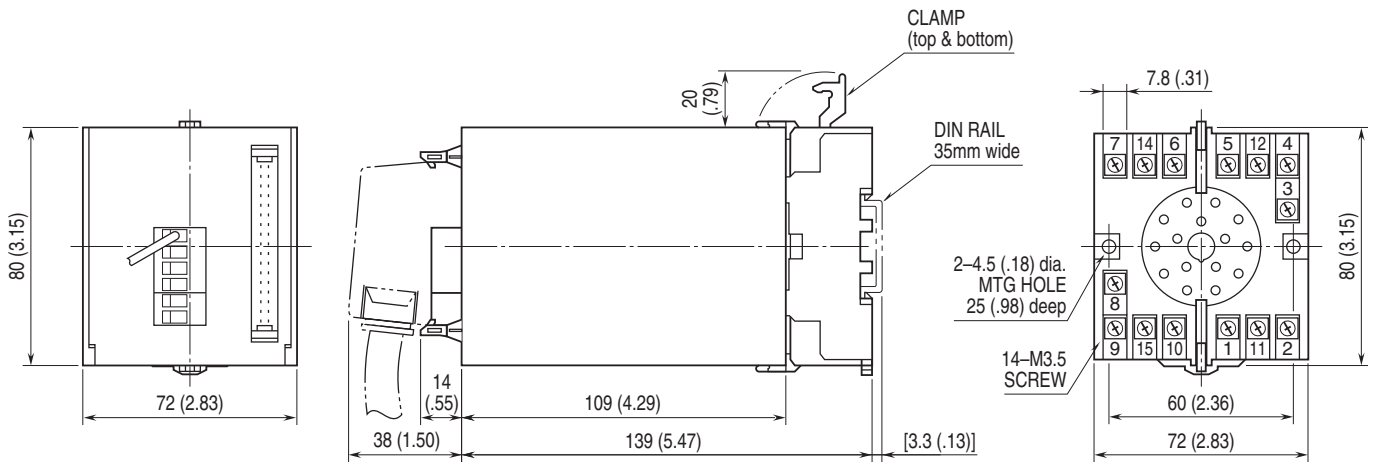
D) 60S module, 22LA1 module plus DLA1 units: The total distance of a section consisting of 60S and 22LA1 modules is less than 500 meters. They can be connected to DLA1 units via a DLA1-7 unit. (Eight DLA1-7 units max.)



EXTERNAL VIEW

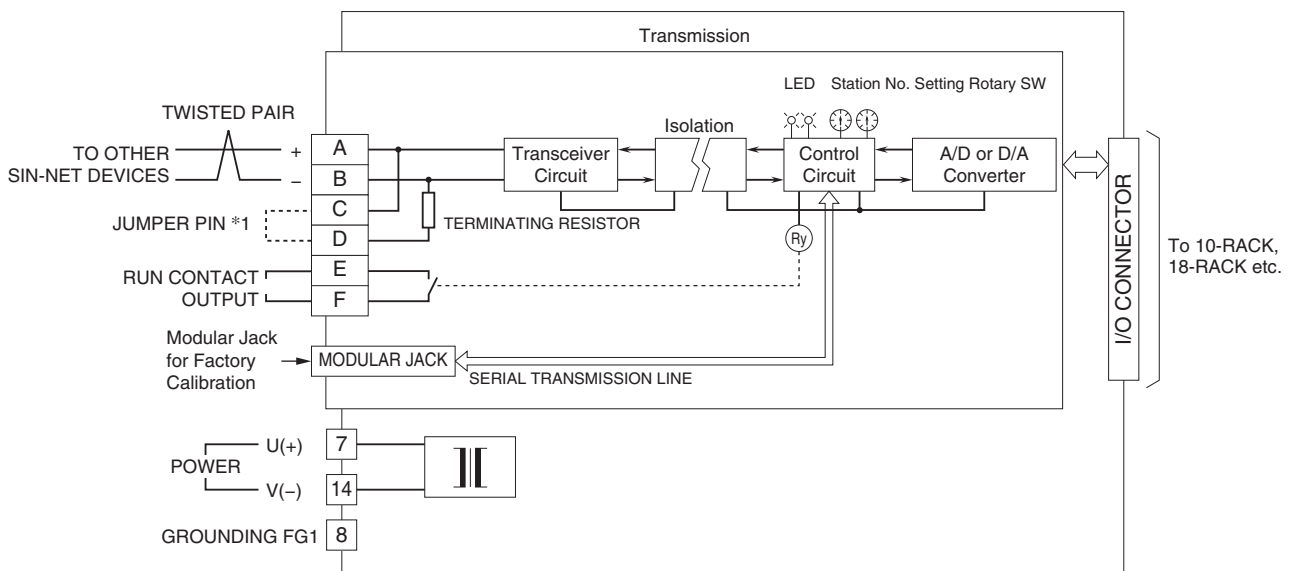


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



•When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



*1. When the unit is located at the end of transmission line via twisted-pair cable (= no cross-wiring), short across terminals C - D with the jumper pin (or wire) provided with the unit. Remove the jumper pin for the one not located at the end.



Specifications are subject to change without notice.