

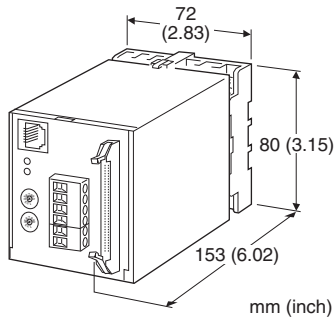
Field Network Modules 60-UNIT Series

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 [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 M-System's 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 (M-System's)
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

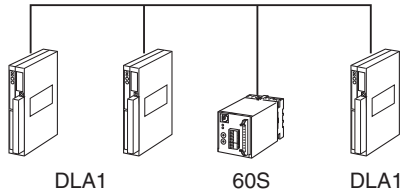
- 60S-162 (Ao 16 points)
- DLA1-xM1 (Ao 32 points; only the top 16 out of 32 are used)

■ TRANSMISSION LINE CONFIGURATION

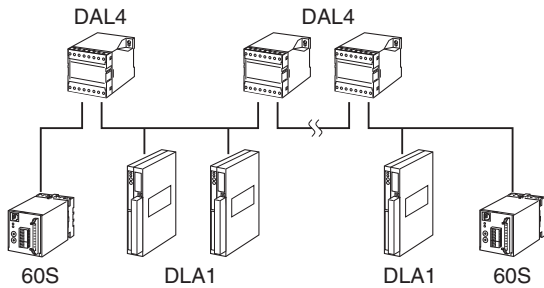
The multi-drop transmission line containing 22LA1, DLA1 and 60S modules should meet the following conditions. Contact M-System's sales office or representatives when designing.

A) 10 kilometers at maximum in total system.

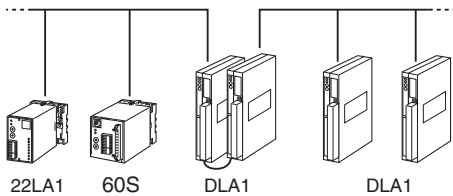
B) 60S module plus DLA1 units: One multitransmission line containing a 60S module can consist of a maximum of 16 units within the total distance of 500 m.



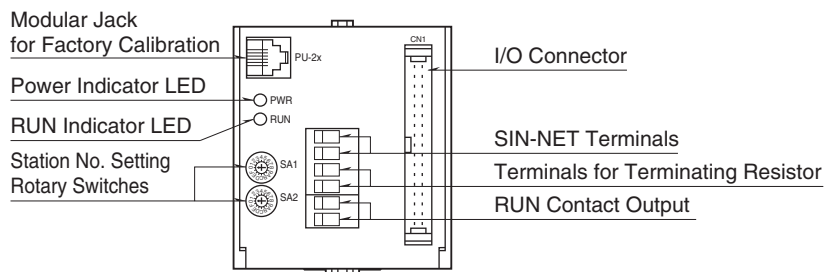
C) 60S modules, DLA1 units plus Repeater (model: DAL4): DAL4 units can expand the total distance. (6 DAL4 units max.)



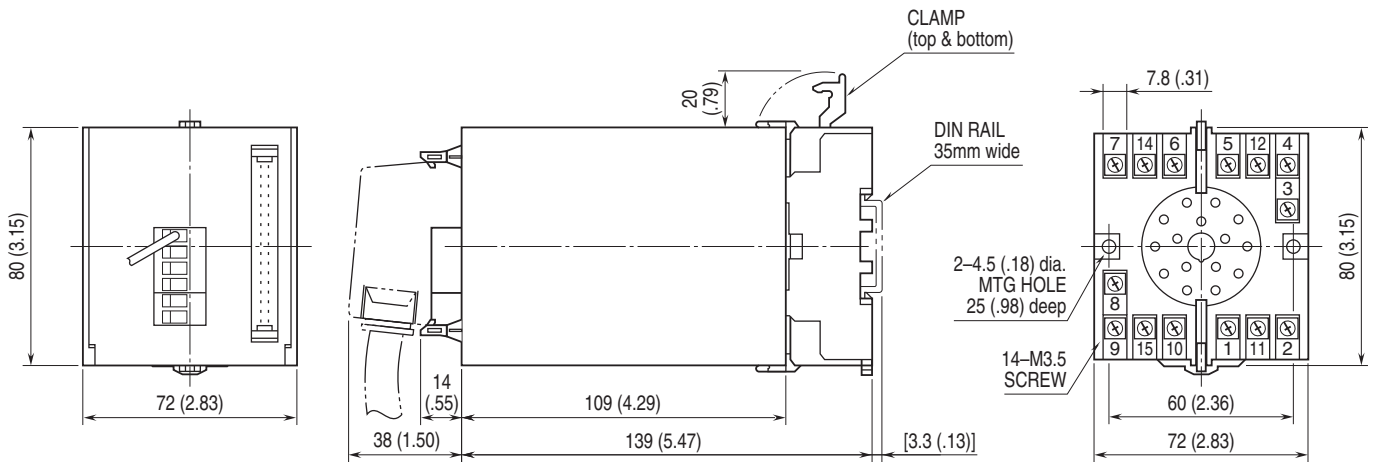
D) 60S module, 22LA1 module plus DLA1 units: The total distance of a section consisting of 60S and 22LA1 modules is less than 500 meters. They can be connected to DLA1 units via a DLA1-7 unit. (Eight DLA1-7 units max.)



EXTERNAL VIEW

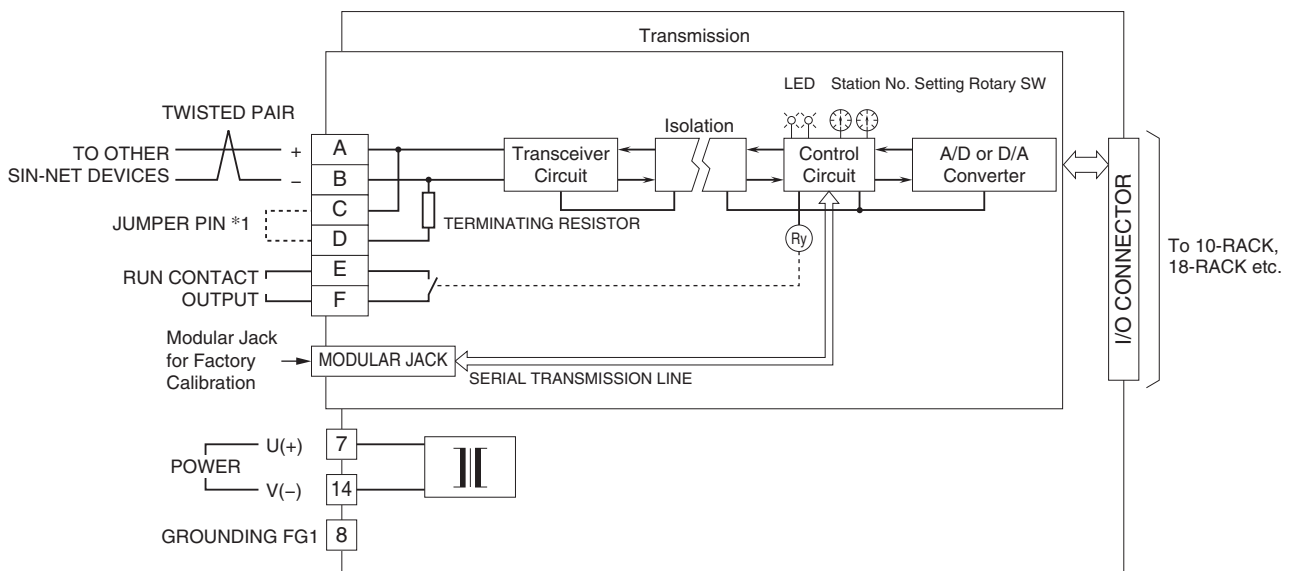


EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



•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.