

Telemetry System

MODEM INTERFACE

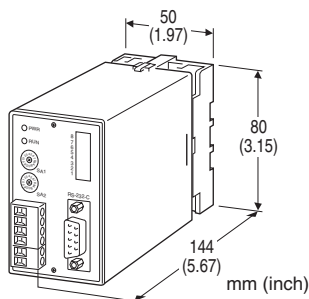
(SIN-NET use)

Functions & Features

- Interfacing between SIN-NET devices (models: 22LA1, DLA1) and a modem for leased circuit
- Simple configuration by setting Station No. for pairing units with the front rotary witches
- Combined with our modems for leased circuit

Typical Applications

- 1-to-1 transmission system
- 1-to-N transmission system



MODEL: 22LS1-3-[1]

ORDERING INFORMATION

- Code number: 22LS1-3-[1]
- Specify a code from below for [1].
(e.g. 22LS1-3-K)

TRANSMISSION MEDIA

3: Twisted-pair cable for small-scale system

[1] POWER INPUT

AC Power

K: 85 - 132 V AC

(Operational voltage range 85 - 132 V, 47 - 66 Hz)

L: 170 - 264 V AC

(Operational voltage range 170 - 264 V, 47 - 66 Hz)

DC Power

S: 12 V DC

(Operational voltage range 12 V \pm 10 %, ripple 10 %p-p max.)

R: 24 V DC

(Operational voltage range 24 V \pm 10 %, ripple 10 %p-p max.)

RELATED PRODUCTS

- Multi-transmission module
Model: 22LA1
- RS cable
Model: DCN5
- Modem
Model: MOD1, MOD2, MOD3x, MOD5, MOD6, MOD7, MOD8, MOD4 (discontinued)

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection

Power input: M3.5 screw terminals

SIN-NET, RUN contact output: Euro type connector terminal block

RS-232-C: 9-pin D-sub connector (female)
(M2.6 x 0.45 connector screw)

Housing material: Flame-resistant resin (black)

Isolation: RS-232-C to SIN-NET to RUN contact output to power

DIP switches: selecting modem type (SW1 - 4) and Master/Slave (SW8)

Terminator: Incorporated (remove jumper pin with those modules not located at the end of transmission line)

Station No. setting: 2 rotary switches; 00 - FF (256)

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 in an abnormality.

125 V AC @ 0.5A (cos ϕ = 1)

30 V DC @ 0.5A (resistive load)

Maximum switching voltage: 250 V AC or 125 V DC

Maximum switching power: 62.5 VA or 60 W

Minimum load: 10 mV DC @ 1 mA

Mechanical life: 5 \times 10⁷ cycles (rate 180/min.)

Self-diagnosis

Communication: receiving 'loss of RS-232-C communication' data; multiplex transmission error data; network error

CPU: watch-dog timer

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

MULTI-TRANSMISSION

Communication: 2-wire, half-duplex

Transmission: conform to RS-422, EIA

Transmission speed: 125 kbps

Data encoding: SDLC

Control procedure: NRZ

Protocol: SIN-NET (dedicated protocol)

Error check: CRC

Cable: CPEV-0.9 dia.

Transmission distance: 500 meters

MODEM / INTERFACE

Transmission: Conform to EIA RS-232-C

Communication: asynchronous, half-duplex, no procedure

Transmission speed: 50 – 2400 bps

RS-232C connector: 9-pin D-sub connector (female)

RS-232-C cable: Cross (provided by the user)

INSTALLATION

Power consumption

•AC: Approx. 4.5 VA

•DC: Approx. 4 W (160 mA at 24 V)

Operating temperature: -5 to + 50°C (23 to 122°F)

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

Atmosphere: No corrosive gas or heavy dust

Mounting: Surface or DIN rail

Weight: 400 g (0.88 lb)

PERFORMANCE

Permissible power failure duration: ≤ 10 msec.

Insulation resistance: ≥ 100 MΩ with 500 V DC

Dielectric strength: 500V AC @1 minute

(RS-232-C to SIN-NET to RUN contact output)

1500V AC @1 minute

(power to RS-232-C or SIN-NET or RUN contact output)

1500V AC @1 minute (FG to each section)

DESCRIPTIONS

■HOW TO SET STATION ADDRESSES

All units are connected in a series via a couple of modems. Assign to the pair of 22LS1 a number remote from those for 22LA1 units (such like FF, FE).

■DIP SWITCH SETTING

A) Modem type selecting:

Set SW1 through SW4 according to the type of modem combined with the 22LS1.

Transmission speed and format appropriate for each modem type are determined. If you change these settings, turn power supply to the unit off and on.

B) Master/Slave selecting:

Set SW8 of a 22LS1 unit to Master and one of the paired unit to Slave.

If you change these settings, turn power supply to the unit off and on.

■HOW TO CALCULATE TRANSMISSION SPEED

A) When the total number of inputs at one side of the pair of modems (one station) is at the maximum of 256 in contact and 32 in analog:

N1: number of 22LA1-3A4 units

N2: number of 22LA1-3E5/-3E6 units

N3: number of 22LA1-3G3 units

N4: number of 22LA1-3G4 units

The number of input units (N1 to N4) determines Data Volume:

•Contact Inputs

$$B1 = (N1 + N2) \times 6$$

•Analog Inputs

$$B2 = (N3 + N4) \times 3 + (N3 \times 8 + N4 \times 4) \times 2$$

•Total Data Volume

$$C0 = 5 + B1 + B2$$

Relation between the Total Data Volume and a time (Ta) required to transmit from one station (Master Station) is shown in the following equation:

$$Ta = C0 \times A$$

where A is a parameter determined by the transmission speed of modems:

$$A = 0.2933 \text{ (50 bps)}$$

$$A = 0.0333 \text{ (300 bps)}$$

$$A = 0.0083 \text{ (1200 bps)}$$

$$A = 0.0042 \text{ (2400 bps)}$$

The transmission speed (Tb) for the other station (Slave Station) can be calculated in the same way.

Actual time (TA) required for a contact (or analog) input to be transmitted from Master Station to Slave Station varies according to timings of signal status change and transmission status, if there is no transmission error.

$$Ta \leq TA \leq Ta + Ta + Tb$$

B) When the total number of inputs at one side of the pair of modems (one station) is at the maximum of 256 in contact and 64 in analog:

When the total number of analog inputs exceeds 32, the 22LS1 divides them for transmission. Therefore time required for transmitting analog and contact signals are different.

N1: number of 22LA1-3A4 units

N2: number of 22LA1-3E5/-3E6 units

N3: number of 22LA1-3G3 units

N4: number of 22LA1-3G4 units

The number of input units (N1 to N4) determines Data Volume:

•Contact Inputs

$$B1 = (N1 + N2) \times 6$$

•Analog Inputs, first group

$$B2 = 88$$

•Analog Inputs, second group

$$B3 = [(N3 + N4) \times 3 - 24] + (N3 \times 8 + N4 \times 4 - 32) \times 2$$

•Total Data Volume, first group

$$C1 = 5 + B1 + B2$$

•Total Data Volume, second group

$$C2 = 5 + B1 + B3$$

•Contact Inputs

Relation between the Total Data Volume and a time (T_a) required to transmit contact inputs from one station (Master Station) is shown in the following equation:

$$T_a = C1 \times A$$

where A is a parameter determined by the transmission speed of modems (see A).

The transmission speed (T_b) for the other station (Slave Station) can be calculated in the same way.

Actual time (TA) required for a contact input to be transmitted from Master Station to Slave Station varies according to timings of signal status change and transmission status, if there is no transmission error.

$$T_a \leq TA \leq T_a + T_a + T_b$$

•Analog Inputs

Relation between the Total Data Volume and a time (T_a) required to transmit analog inputs from one station (Master Station) is shown in the following equation:

$$T_a = (C1 + C2) \times A$$

where A is a parameter determined by the transmission speed of modems (see A).

The transmission speed (T_b) for the other station (Slave Station) can be calculated in the same way.

Actual time (TA) required for a contact input to be transmitted from Master Station to Slave Station varies according to timings of signal status change and transmission status, if there is no transmission error.

$$T_a \leq TA \leq T_a + T_a + T_b$$

■RUN CONTACT OUTPUT

RUN contact is turned off when one or more of the following three conditions occur:

•Failure of the 22LS1

Errors in power supply, memory, etc.

•SIN-NET communication errors

When there is an error occurs to 22LA1 or DLA1 units connected to the 22LS1.

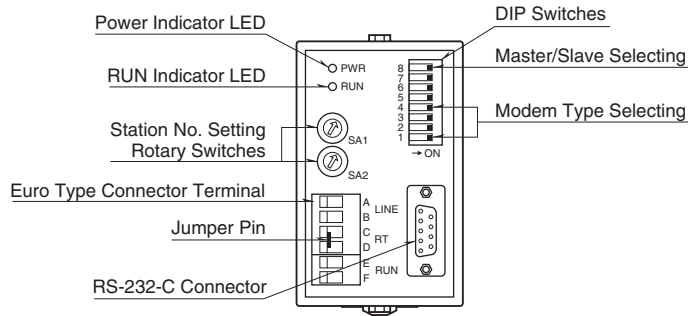
•RS-232-C communication errors

When there is an error occurs in communication with the modem connected to the 22LS1 (communicating with the paired 22LS1 via leased circuit), such like wire breakdown.

[CAUTION]

When the network is reconfigured e.g. by noise interference, the RUN LED and output for all units on the network turn briefly OFF until they are turned ON after the reconfiguration is complete.

EXTERNAL VIEW

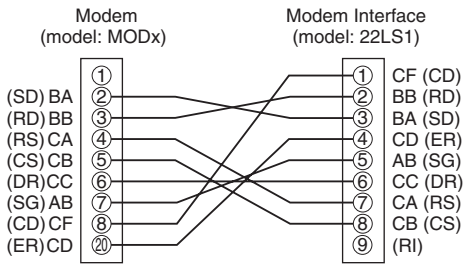


■ RS-232-C INTERFACE



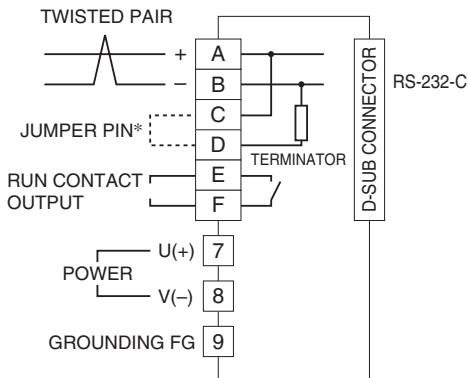
ABBR.	PIN NO.	EXPLANATION OF FUNCTION
CF (CD)	1	Received Line Signal Detector
BB (RD)	2	Received Data
BA (SD)	3	Transmitted Data
CD (ER)	4	DTE Ready
AB (SG)	5	Signal Common
CC (DR)	6	DCE Ready
CA (RS)	7	Request to Send
CB (CS)	8	Clear to Send
(RI)	9	(Not Used)

• RS-232-C Connection Example



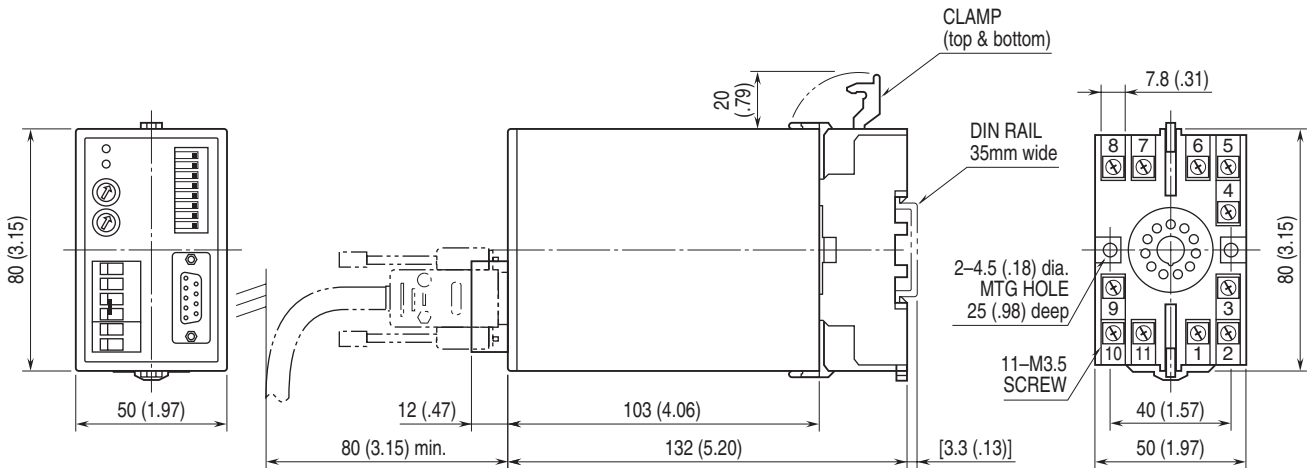
Use a cross-type cable as shown above.

CONNECTION DIAGRAM



*When the unit is located at the end of transmission line via twisted-pair cable (= no cross-wiring), short across the 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.

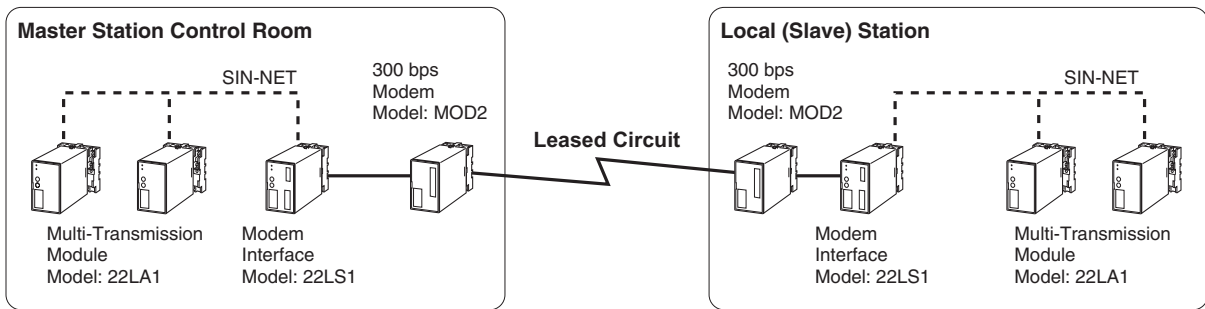
EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



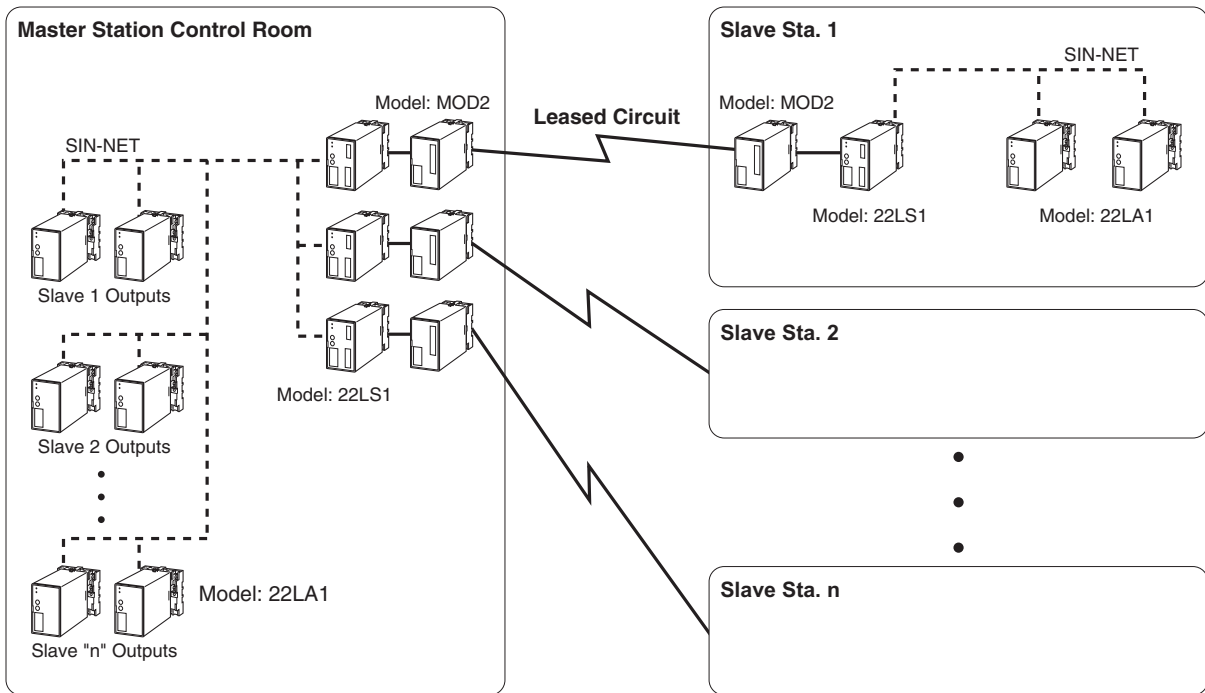
•When mounting, no extra space is needed between units.

SYSTEM CONFIGURATION EXAMPLES

■ 1 to 1 TRANSMISSION



■ 1 to N TRANSMISSION





Specifications are subject to change without notice.