

PROFIBUS Cabling Guideline

transmitter/receive A
transmitter/receive
A B
가

PROFIBUS

EN 500170 Volume 2 PROFIBUS
PTO-PROFIBUS DP Implementation
SIMATIC NET PROFIBUS networks manual
ET 200 Distributed I/O SYSTEM manual

2. segment

segment 30(31) station
가 . (repeater)

3. segment

9 segment (270)
가 . (repeater)

A. Network Rules

PROFIBUS RS-485

RS-485

PROFIBUS

Station

segment . segment

가

repeater optical link module

1. (Wiring)

PROFIBUS shielded twisted

pair cable . shield

housing

shield 가

가

B

4. master node

PROFIBUS-DP Mono master

PROFIBUS가 Token

active station(master) 가

overall controlling master

address가 1 . master

address "0"

monitoring

5. slave(I/O) device

slave device "3" address

slave device master

address가

6. Termination

PROFIBUS 가

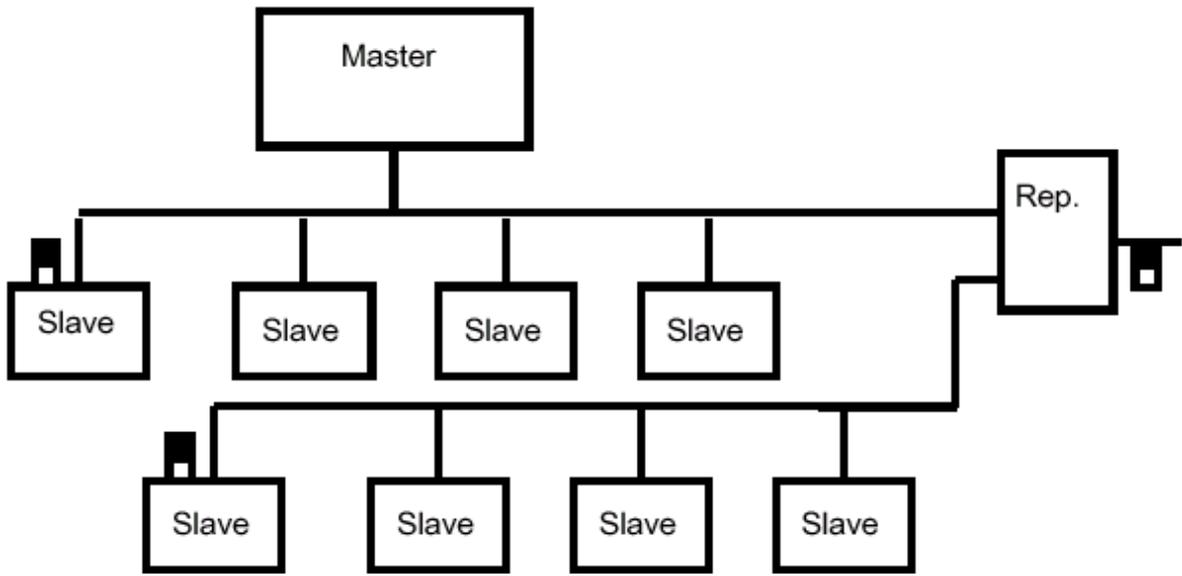
Termination

PROFIBUS segment

terminate . 가

Termination

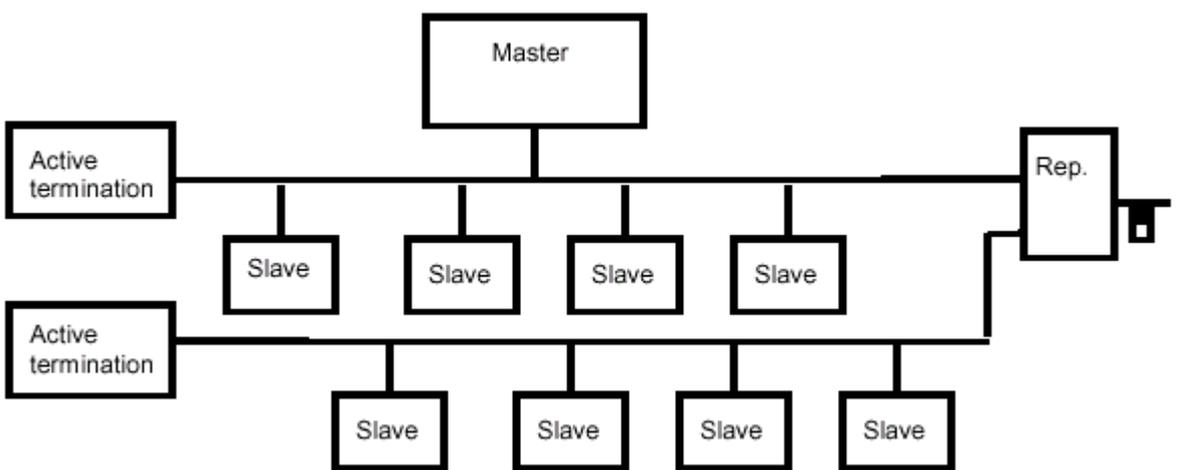
master



3 : Master Repeater termination
 termination 3
 termination master
 terminating resistor
 termination termination
 termination

가

2 master device가 active termination
 termination point . active termination



4 : Active termination

가 가 . segments : 12MBaud
 100m/327feet
B. Optical :
 300m / 981feet

segment
 가 가 station cable
 1m/3feet .

PROFIBUS monitoring device . 3M **Cabling on PROFIBUS**
 baud rate RS 485
 programmer drop line(active cable) . EN 50170 PROFIBUS
 drop line 가 . drop
 line . active cable

90mA

Parameter	Line A - PROFIBUS DP
Impedance	135 to 165 Ohm / 3 to 20 MHz
Capacity	< 30 pF / m
Resistance	<110 Ohm / km
Wire gauge	> 0.64 mm
Conductor area	> 0.34 mm ²

C. 1.5MBaud shielded twisted pair
 cable . 가
 1.5Mbaud 8.0 +/-0.5 mm가
 가
 Inductor가
 가 . 가
 spur line baud rate가 1.5MBaud PROFIBUS solid

special jacket . shield . cable shield
bar
protective

A. PROFIBUS

conductor ohm .
가

I/O BUS

가

가

- braided shield
- shield 80%
- cable shield

I/O BUS

shielding 가 가

EMC

I/O BUS

가 가

가

가

potential equalization line

가

shield

가

가

shield가

stationary operation

-

shielded cable

-

shielding/protective conduc-

-

tor bus bar

Note

-

bending

Grondig point

potential difference

가

shield

-

-

가

potential equalization

line

B. Cable Shielding

C. Standard I/O BUS cable

Shielding , ,

flexing - bending radii 가

- loop

SIEMENS PROFIBUS Cable (HF attenuation

) 가 frame

twist wire, foil shield, braid가 Trailing cable bending radius

가 500 bending cycle

가 4m/s² 가

drag chain

가

- : -40. C+ 60. C terminal

- / : -40. C+ 60. C wire-end ferrules(0.5mm ∅r 0.75mm ∅)

- : -40. C+ 60. C

bending radii :

- bending: >=75mm - : -40. C+60. C
- bending: >=150mm - : -40. C+60. C
- : -40. C+60. C

D. Trailing cable

PROFIBUS

braid shield, foil shield, fleece layer, sheath material polyurethane

bending radii

- bending: >=45mm
- bending: >=65mm

Connectors on PROFIBUS

trailing Standard I/O BUS (가 PROFIBUS

)

- 가 가 PROFIBUS
-
- 가
- 가 EMC

shield device (electrical A. 9 pin D-SUB connector가 IP 20
conductive case) device

1.

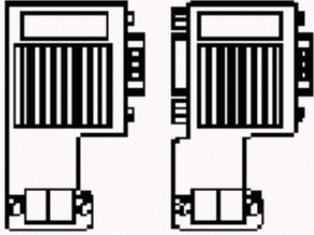
1500 kbit/s

PROFIBUS PROFIBUS
가 3-1
가 IP20 bus

PROFIBUS
fault-free operation Disconnecting a station

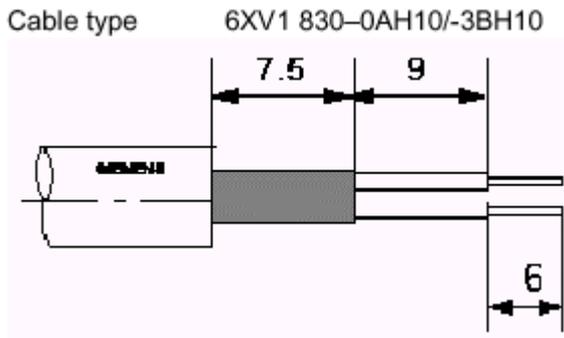
가
segment segment
segment Termination 가 가
가 pc
start up

Table 3-1 Connector Types

		
Order numbers	6ES7 972- 0BA10-0XA0 ... 0BB10-0XA0	6ES7 972- 0BA40- 0XA0 0BB40- 0XA0
Programmer socket	0BA10: no 0BB10: yes	0BA40- no, 0BB40- yes
Max. baud rate	12 Mbaud	12 MBaud
Terminating resistor	integrated on/off	yes
Outgoing cable	vertical Interfaces	45°
PROFIBUS station	9-pole sub-D socket	9-pole sub-D socket
PROFIBUS bus cable	4 terminal blocks for wires up to 1.5 mm ²	4 terminal blocks for wires up to 1.5 mm ²
Connectable PROFIBUS cable diameter	8 +/- 0.5 mm	8 +/- 0.5 mm
Dimensions (in mm)	15.8 x 54 x 34	

2. Bus connector

1.



2. housing

3.

4. A)
B)
가 the cable sheath

5.

6. housing
가 clamp

3. Module bus connector

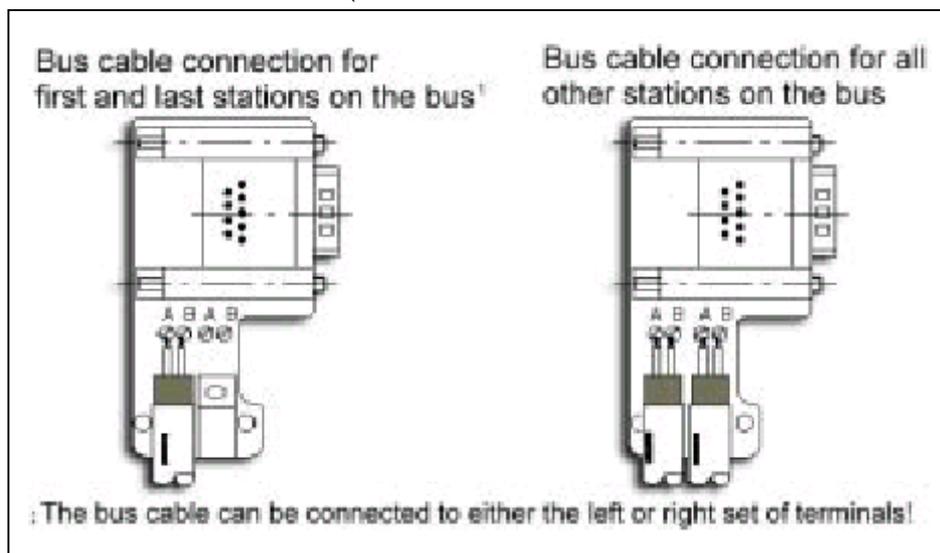
1. 가

2.

3. 가 segment
terminating resistor
(ON)

active terminating resistors 가

A B



daisy -
chained ,

PROFIBUS
-DP

가 .
 - segment
 - segment
 terminating resistor 가
 - 가 slave가 repeater
 가 () 9 RS 485
 Repeater

Terminator **2. RS 485 Repeater Mechanical Design**

resistor

terminating resistor가 가

Repeater

RS 485

Repeater

RS 485 Repeater

1. RS 485 Repeater

RS 485 Repeater

segment
 가

가 RS 485 Repeater

RS 485 Repeater

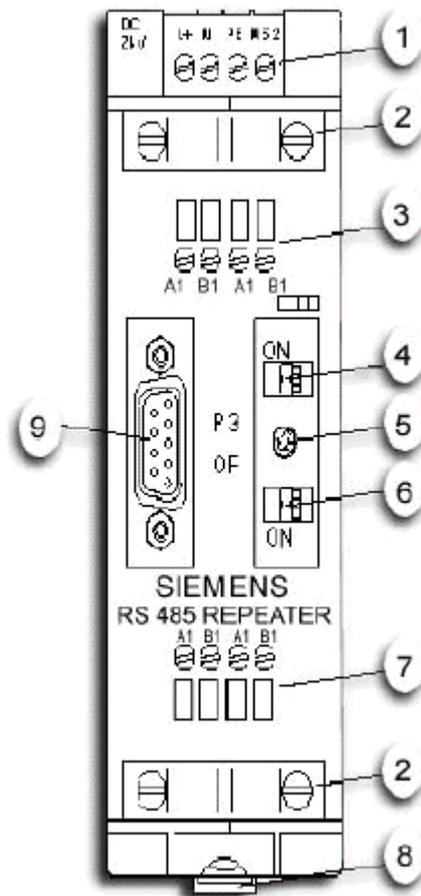
9.6KBaud 12MBaud

Repeater

- 32

가

- segment segment



1	Terminals for power supply to the RS 485 repeater (pin M5.2 is the ground reference for measuring the voltage transient between A2 and B2).
2	Shield clamp for strain relief and grounding the bus cable of bus segment 1 or bus segment 2
3	Terminals for bus cable of bus segment 1
4	Terminating resistor for bus segment 1
5	Switch for baud rate. The positions are: 0: Bus segments disconnected 1: 9.6 kbaud 6: 1.5 Mbaud 2: 19.2 kbaud 7: 3 Mbaud 3: 93.75 kbaud 8: 6 Mbaud 4: 187.5 kbaud 9: 12 Mbaud 5: 500 kbaud
6	Terminating resistor for bus segment 2
7	Terminals for bus cable of bus segment 2
8	Clamp for securing the RS 485 repeater to standard-section busbar
9	Interface for programmer/OP on bus segment 1

4. RS 485 Repeater

section bus bar RS 485 Repeater

standard-section bus bar RS 485

Repeater RS 485

Repeater clamp가

1. RS 485 Repeater standard-section bus bar
2. clamp가

3. RS 가

RS 485 Repeater가

standard-section bus bar RS 485

Repeater

1. RS 485 Repeater RS 485

Repeater clamp

2. RS 485 Repeater standard

- RS 485 Repeater segment1
segment2 terminating

- RS 485 Repeater segment 1 5.
terminating RS 485 Repeater

segment 2

24V DC

0.25mm²

- RS 485 Repeater

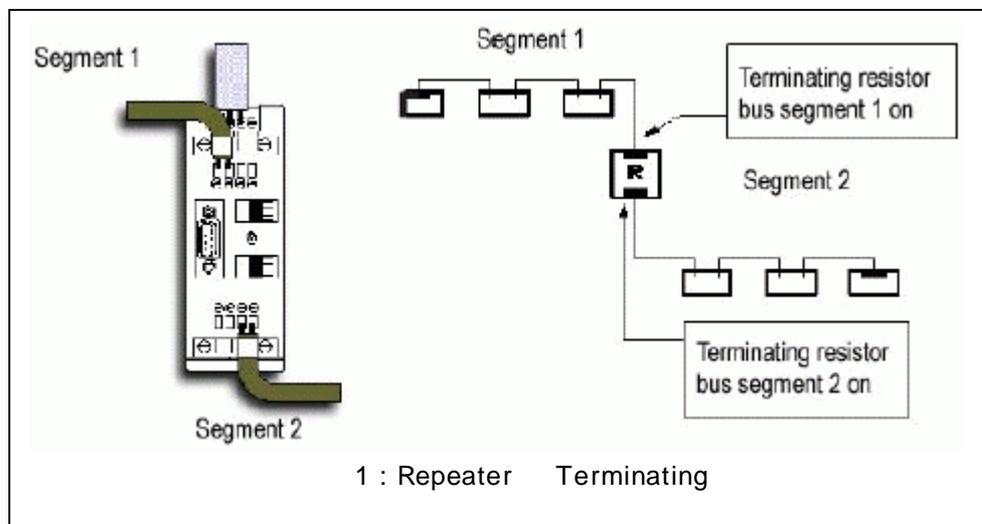
2.5mm² cross-section 가

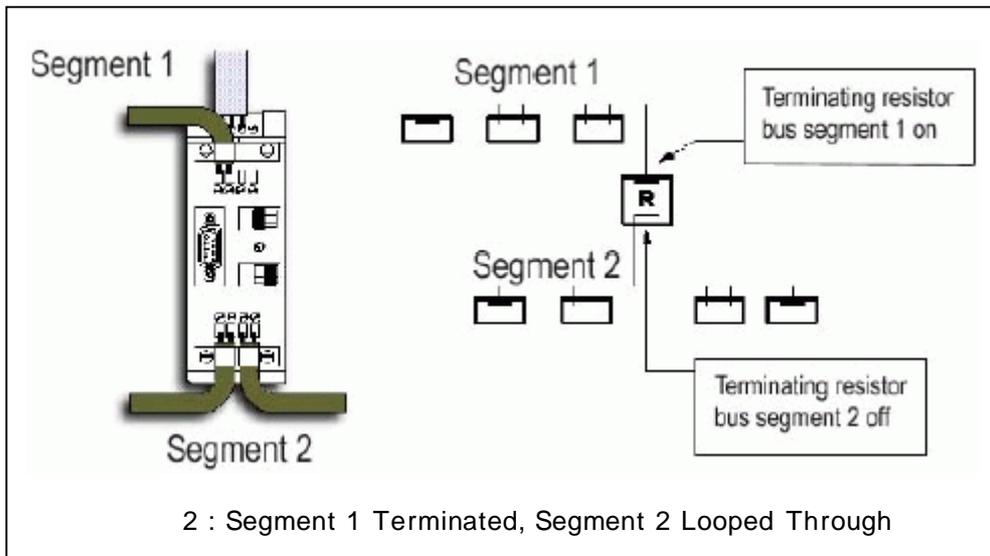
segment1

segment2

1

termination point

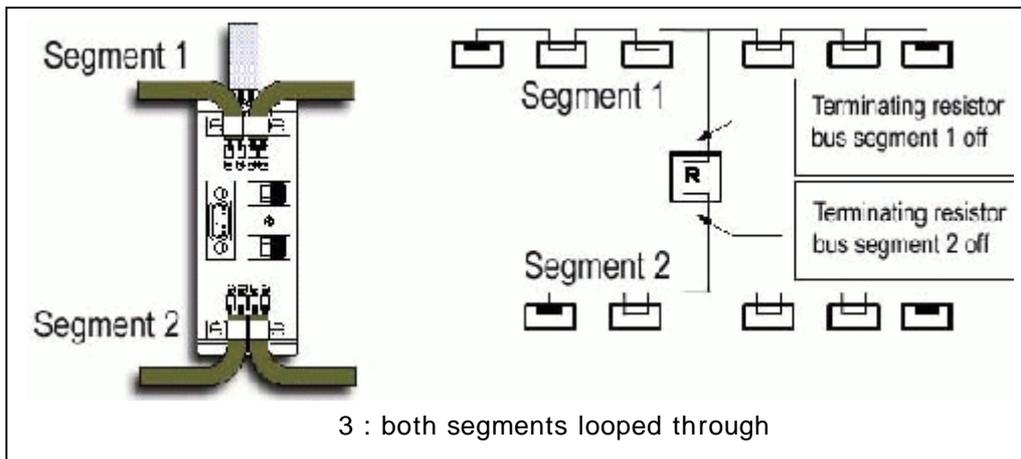




RS 485 Repeater

1. 24V DC

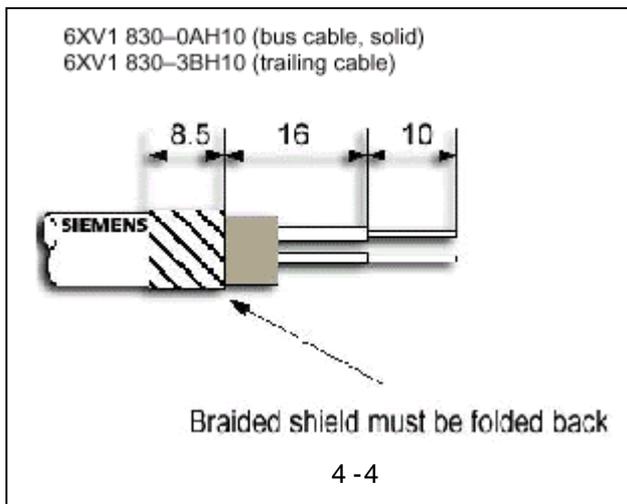
2. L+, M, PE 가



6. Connecting the bus cable

PROFIBUS section 2

flexible cable



PROFIBUS RS 485 Repeater

1.

2. 4-4

3. cable sheath shield braided clamp가 strain relief 가

4. RS 485 Repeater PROFIBUS

- 5. (PROFIBUS / 3 port . Fiber-optic cable duplex)
- 6. 가 clamp . 24V DC . LEDs shield clamp .

Fiber optic component

Fiber-optic cables

Optical fiber cable

Plastic cable 980/1000 μm	with maximum 200 dB/km path attenuation 0.1 m to 50 m
HCS cable 200/230 μm	with maximum 10 dB/km path attenuation 0.1 m to 300 m

- F0 . HCS pre-assmbled cable . optical tool
- fiber cable 가 . 가 . signalling contact(relay with floating contacts)
- optical fiber cable
- 가 control room
- 가
- galvanic isolation plant

2.

1.

- Baudrate : SIMATIC NET OLM 12M optical link module PROFIBUS . 12 Mbps(),1.5 Mbps, 500 Kbps, PROFIBUS (RS 187.5 Kbps
- Line monitoring : SIMATIC NET OLM 12M optical link module FO optical path
- 가 가 . OLM Monitoring", "Send Test Pulse", "Monitor Echo" The SIMATIC NET OLM 12M
- 3 가 . 1 optical link module FO optical path
- clip 4-wire terminal block port(RS 485) . 2 Monitoring :

SIMATIC NET OLM 12M optical link module

monitoring 가 F0

가 LED 가
single-fiber ring F0

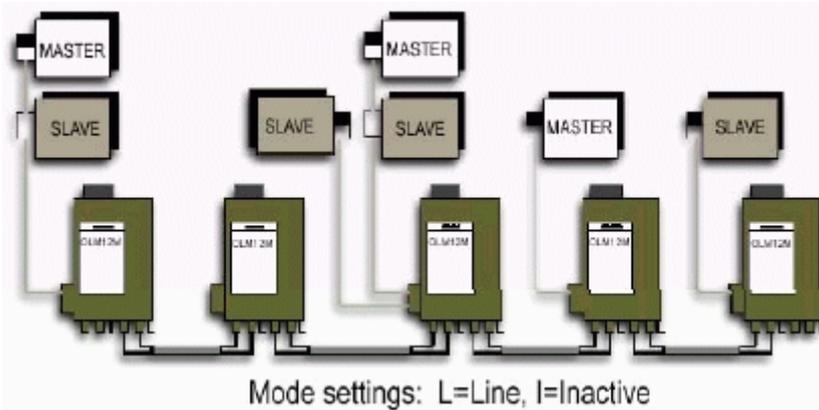
200 ms optical bus 600 ms

Line Topology :
topology

3. Starting up

active (master) DIL
passive (slaves) -
가 module

OLM12M optical link
(default setting:
12Mbaud)



topology OLM12M
optical link modules
(default
setting: Line)
- OLM12M optical
link modules RS 485
bus segment

1

terminating resistor combination
(default setting: terminating
resistor combination deactivated)

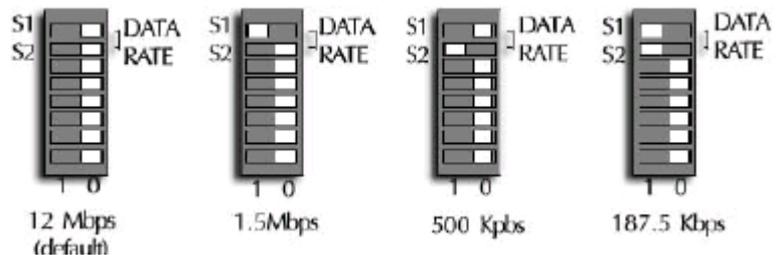
Monitoring :
SIMATIC NET OLM 12M optical link module
duplex F0

- LAN
-
- RS 485 LAN
-

“ Line ”

“ Inactive ”

25 가
DTEs
PROFIBUS segment RS 485
가



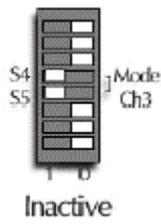
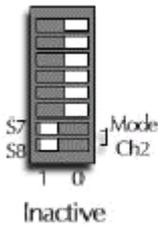
4. DIP switch

s1 s2

DIP

default

setig(line mode monitor function)



5. Channel 1 terminating resistor

terminating resistor

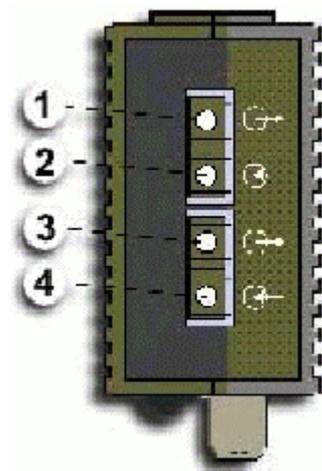
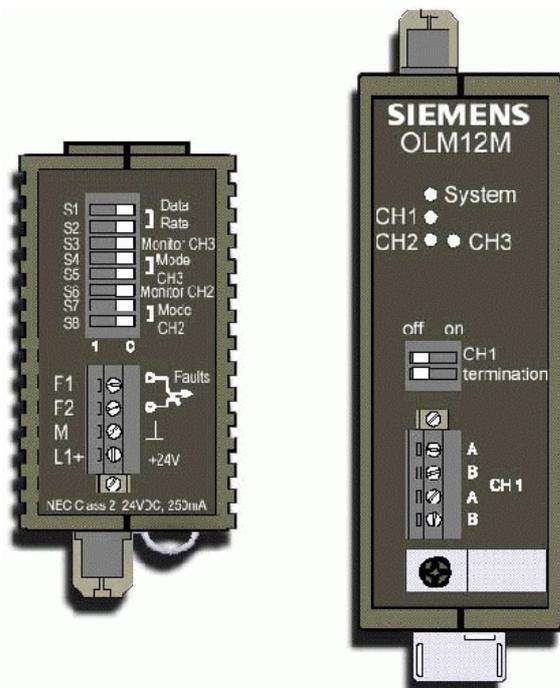
OLM12M . OLM12M RS 485

segment

ON



6. Optical cable



1 = CH3, optical transmitter
 2 = CH3, optical receiver
 3 = CH2, optical transmitter
 4 = CH2, optical receiver

duplex
 FO

duplex

.(crossover connection)

F0 strain relief가 F0
bending radius가

optic fiber-

dms Inactive

F0 가

가 가