E485GP

RS485 light-isolated repeater Manual

E485GP is compatible with Siemens repeater 6 ES7 972-0AA01-0XA0, is the high-speed isolated PROFIBUS repeaters designed for PROFIBUS bus, applicable to all RS485 network such as the PROFIBUS network, PPI network, MPI network, MODBUS network and Free Port communication network. It can realize the signal isolation and amplification. When the RS485 communication distance is over the corresponding baud rate's allowing, or nodes on the network are more than the allowed number, you should use repeaters to amplify the signal. The products have characteristics such as extending communication distance, automatically switching the flow of signals and automatically adaptation of baud rate. All their industrial-grade devices are anti-static and anti-lightning, make them work stably in the poor industrial environment.

When the number of nodes witch connected to the bus is more than 32 or of the connective cable between buses exceeds the maximum length of cable(see table below), you need to use repeaters to amplify signal.

Note 1

Baud rate	The maximum cable length of bus（m）
9.6 to 187.5Kbps	1000
500Kbps	200
1.5Mbps	100

Technical details

● isolated voltage: 1000 VDC (up to 3000 VDC, statement is required when ordering)

● communication rate: 0 ~ 1.5 Mbps automatically adaptive

● greatest distance: 2km (9.6 Kbps), 1500m(19.2 Kbps), 800m(187.5 Kbps), 200m(500 Kbps), 100m(1.5 Mbps)

● Power: 24 VDC 1W DC power supply

● protection of open-circuit, short-circuit and gap fault of bus

● 600 W built-in anti-lightning protection, ± 15KV ESD (electrostatic) protection

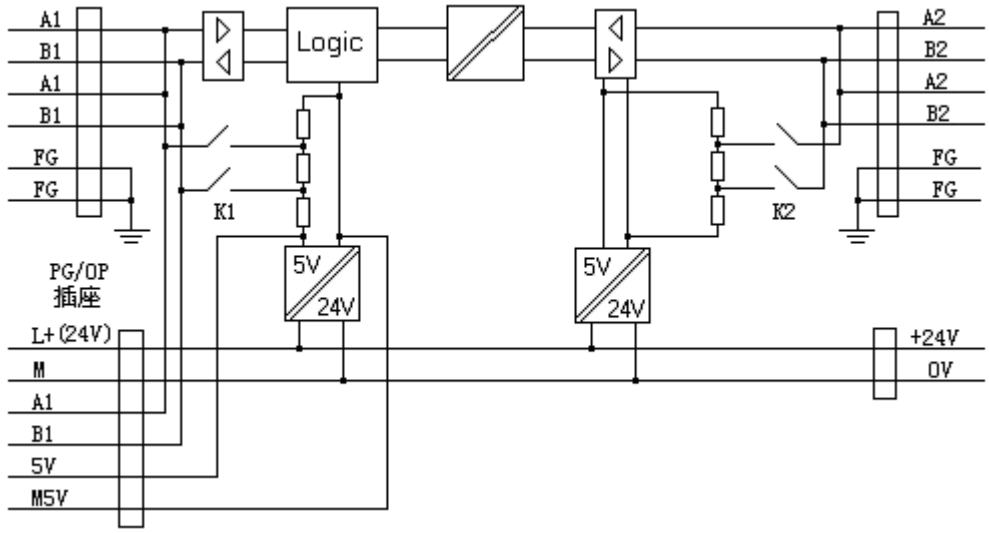
● integrated terminal and bias resistors, data sending and receiving indicator light

● temperature: -40 ~ +85 ℃

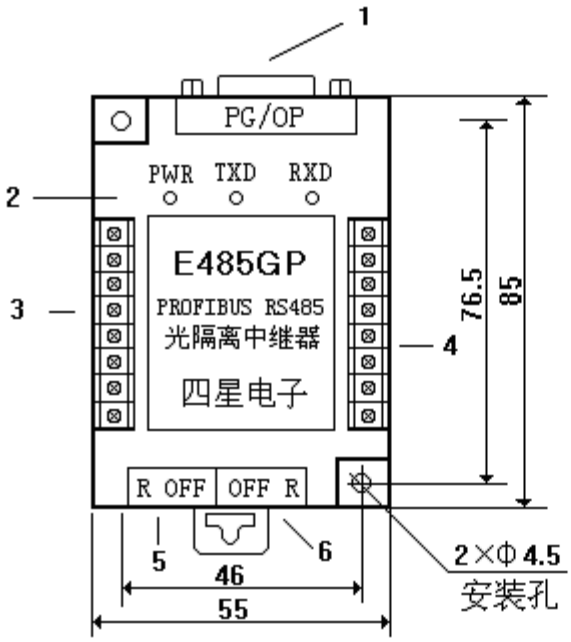
● Dimensions: 85 × 55 × 25 (L × W × H), installation of standard rail

● Weight: 100 g

Picture of working principle:



Products' shape and definition of terminal signals:



1、总线段1上的编程器/OP插座

2、电源和数据收发指示灯

3、总线段1的总线电缆接线端子和电源端子

4、总线段2的总线电缆接线端子

5、总线段1的终端电阻开关K1

6、总线段2的终端电阻开关K2

Definition of the bus paragraph 1 and 2's connection terminal signal

Bus paragraph 1 connection terminal（left）		Bus paragraph 2 connection terminal（right）	
Signal-name	description	Signal-name	description
A1	Bus paragraph 1's RS485 signal negative	A2	Bus paragraph 2's RS485 signal negative
B1	Bus paragraph 1's RS485 signal positive	B2	Bus paragraph 2's RS485 signal positive
FG	Chassis ground，connect the shielding layer of cable	FG	Chassis ground，connect the shielding layer of cable
A1	Bus paragraph 1's RS485 signal negative	A2	Bus paragraph 2's RS485 signal negative
B1	Bus paragraph 1's RS485 signal positive	B2	Bus paragraph 2's RS485 signal positive
FG	Chassis ground，connect the shielding layer of cable	FG	Chassis ground，connect the shielding layer of cable
+24V	External connect the anode of 24V DC power supply		
0V	External connect the cathode of 24V DC power supply		

Definition of programming device PG/OP socket（DB9F socket）signal

Pin number	Signal-name	description
1	-----	----
2	M24V	24Vground
3	RXD/TXD	Data wire B（RS485 signal positive）
4	----	----
5	M5V	Data reference potential（5V ground）
6	P5V	5V power anode
7	P24V	24V power anode
8	RXD/TXD	Data wire A（RS485 signal negative）
9	----	----

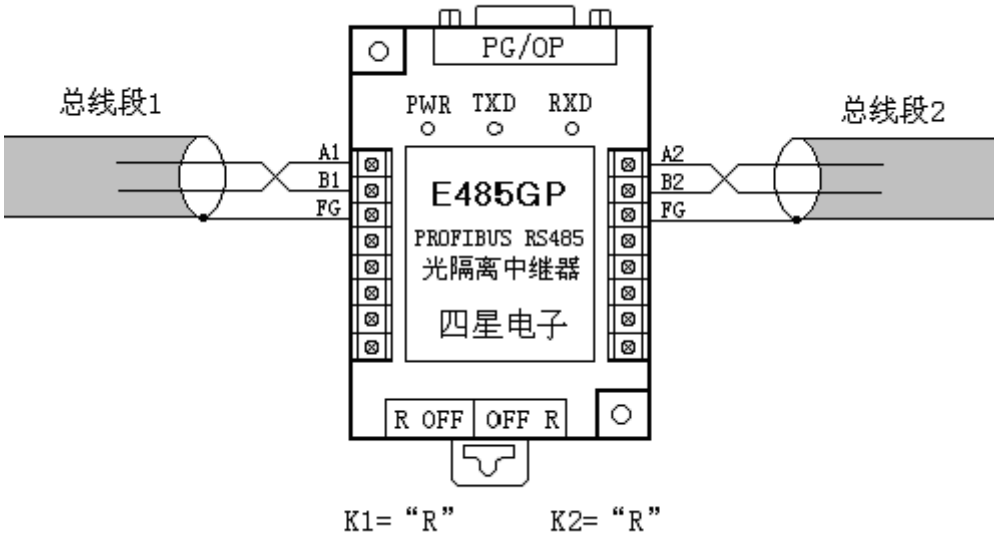
PROFIBUS network cable (Siemens products: 6 XV1 830-0EH10) is used as communication line, when baud rate is below 100 Kbps can also use general shielded twisted pair (cross-sectional area is no less than 0.35 mm2). The shield of cable should be connected to the FG terminal of repeater.

Characters	criterion
Type	shielded twisted pair
Cross-sectional area of conductor	24AWG（0.35mm^2）or more
Capacitance of cable	<60pf/m
impedance	100Ω～120Ω

E485GP used to extend the distance:

The following usage can extend respectively the communication distance of bus1 and bus2 to the set length. According to the different baud rate, the extending distance is different. See table 1.

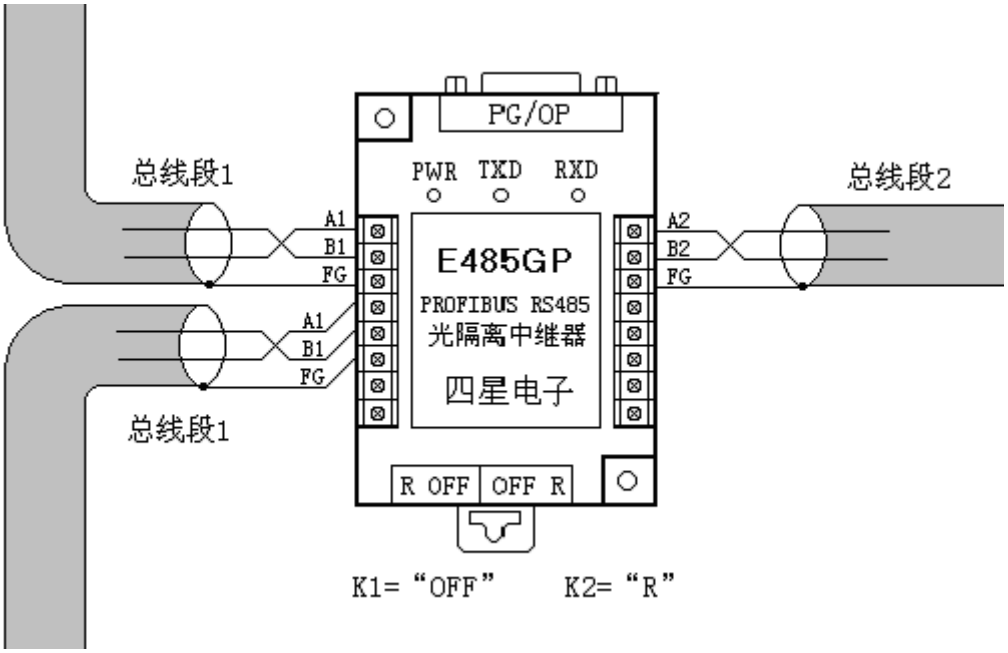
The terminal resistance setting switches K1 and K2 have already turned to "R" in the picture.



E485GP used as bus branch:

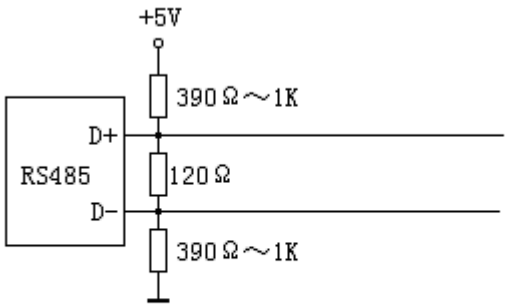
The distance from nodes to the bus is extension. According to standard RS485, the length of extension can not be more than 15 m, otherwise there will be waveform distortion caused by echo. Thus the RS485 generally use one bus to the end. When the bus needs branches, you must use repeaters in branching points. As shown below, the bus2 extend to the required length through the branching of E485GP (different lengths for different baud rate).

As E485GP’s position in bus 1 is not the end, the terminal resistance setting switch K1 should be transferred to "OFF", and K2 should be transferred to "R".



In order to ensure the line is logic "1" when the line is in leisure so that the data bits in cease - to prevent the reception error and the reflection of signal, users must connect the pull-up and pull-down resistance of terminal resistance in the line’s terminal as the map shown.

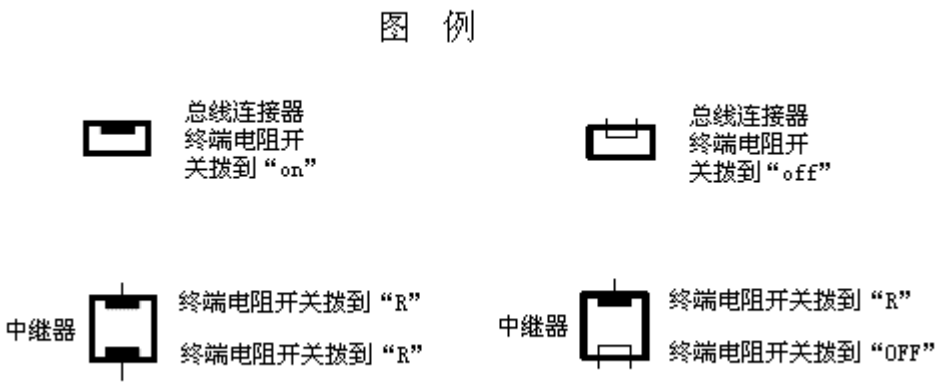
Users are advised to install Siemens bus connector (isolation) or a Fourstar bus connector (isolation) on the PLC RS485 mouth. Because the pull-up, pull-down resistors of terminal resistance have been integrated within the connector, and can be set up by switches .



仅在总线的终端接入以上电阻

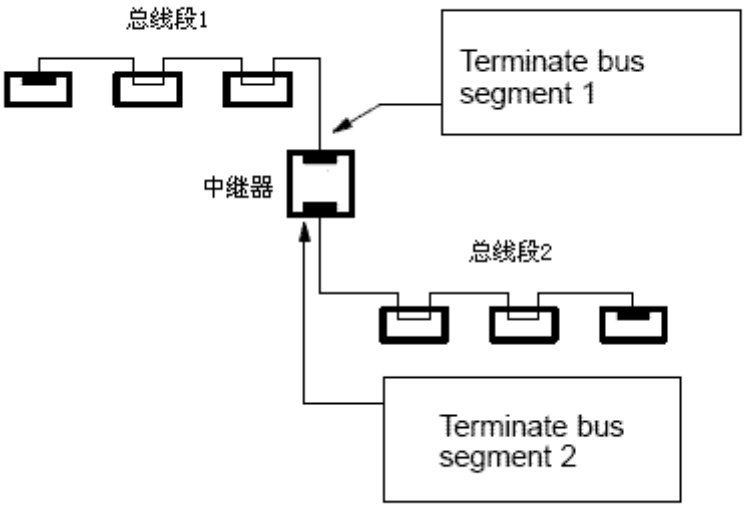
Appendix: The lay of Siemens RS485 repeater's communication cable and terminal resistance' s setting norms

The installation of RS485 repeaters and the setting of terminal resistance must be accordding to the RS485 standards, otherwise can't realize normal communication. The followings are installation norms witch are taken from the Siemens RS485 communication network. Siemens bus connector (isolation) Or Fourstar isolated bus connector PFB-G is needed for each site.



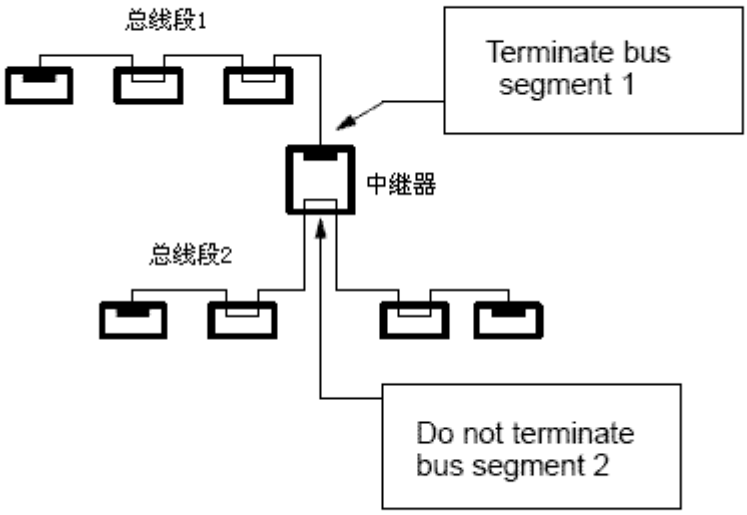
1. When the bus is longer than the required length of corresponding baud rate or the number of sites is over 32, the repeater will divide the bus into 2 parts--bus1 and bus2, each section of bus supports the required length and number of sites. Bus can 串联 no more than 9 repeaters, witch will divide the bus in to 10 sections.

The repeaters below is terminals both in bus 1 and bus 2.



2. Link the end of bus 2' branch 2 with bus 1. RS485 bus regulations use one bus to the end. Repeaters must be installed in the branch point to realize the star connection of RS485.

The repeater in the following picture is a node in bus2 and a terminal in bus1.



3, Connect bus1 and bus2 with repeater. These 2 sections can be linked in anywhere with repeater. The repeaters of the following picture are nodes both in bus 1 and bus 2.