

Solar Elf-SEG4xB

TTL/RS232/RS485/ to 4G&BLE

User Manual

V 1.0



Overview of Characteristic

- ◇ Adopting RISC architecture SOC chip, with a maximum frequency of 160MHz, 276KB RAM, 2MB Flash, based on FreeRTOS system
- ◇ Supports 4G, LTE-TDD, LTE-FDD for all network connectivity, with optional sub models supporting specific networks
- ◇ Support BLE 5.0 for diagnostic or local Bluetooth debugging and data collection functions
- ◇ Supports RS485/RS232/TTL (one out of three) to 4G data transmission, with a maximum serial port speed of 460800bps
- ◇ Support Solar Of Things photovoltaic energy management platform, web page or APP to monitor energy data
- ◇ Power supply: 5~ 36VDC@10W
- ◇ Dimensions: 68.5 x 35 x 17.8mm

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History

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1. PRODUCT OVERVIEW

1.1. General Description

Solar Elf-SEG4xB supports 4G full Netcom LTE-TDD and LTE-FDD. There are multiple sub-models that support 4G bands in different regions and the network supports a maximum downlink rate of 10Mbps and a maximum uplink rate of 5Mbps.

Solar Elf-SEG4xB built-in rich network protocol, integrated RS232/RS485/TTL standard data transmission interface, without any driver, convenient for traditional serial device networking use. It is convenient for traditional serial devices to connect and use, and is suitable for Solar of Things photovoltaic energy management. It is suitable for the photovoltaic energy industry.

Product has ultra-small size only: 68.5 x 35 x 17.8mm

1.2. Device Parameters

Table1. Solar Elf-SEG4xB Technical Specifications

Item	Parameters
System Information	
Processor/Frequency	RISC/160MHz
Flash	2MB
RAM	276KB
Operating System	FreeRTOS
4G interface (-CA submodel)	
Using Regions	China, India, Southeast Asia
Support Frequency Band	LTE-FDD: B1/B3/B5/B8 LTE-TDD: B34/B38/B39/B40/B41
Transmit power	LTE-TDD: Class3(23dBm+1/-3dB) LTE-FDD: Class3(23dBm+-2dB)
Reception sensitivity	FDD B1: -99dBm (10M) FDD B3: -99dBm (10M) FDD B5: -99dBm (10M) FDD B8: -99dBm (10M) TDD B34: -100dBm (10M) TDD B38: -100dBm (10M) TDD B39: -100dBm (10M) TDD B40: -100dBm (10M) TDD B41: -100dBm (10M)

LTE	non-CA CAT1 supported Max Support 1.4 ~ 20MHz RF broadband LTE-FDD: Max uplink speed 5Mbps, Max downlink speed 10Mbps LTE-TDD: Maximum uplink speed of 4Mbps and maximum downlink speed of 6Mbps
4G interface (-SA submodel)	
Using Regions	Hong Kong, South Korea, Australia, Asia Pacific
Support Frequency Band	LTE-FDD: B1/B3/B5/B7/B8/B28
Transmit power	LTE-FDD: Class 3(Maximum 23dBm ± 2dB)
Reception sensitivity	LTE-FDD B1: -99dBm(10M) LTE-FDD B3: -99dBm(10M) LTE-FDD B5: -99dBm(10M) LTE-FDD B7: -97.5dBm(10M) LTE-FDD B8: -98dBm(10M) LTE-FDD B28: -98dBm(10M)
LTE	Maximum Support non-CA CAT1 Supports 1.4-20MHz RF bandwidth LTE-FDD: Maximum uplink rate 5Mbps, maximum downlink rate 10Mbps
4G interface (-EA submodel)	
Using Regions	Europe, Middle East, Africa, Thailand
Support Frequency Band	LTE-FDD: B1/B3/B7/B8/B20/B28
Transmit power	LTE-FDD: Class 3(Maximum 23dBm ± 2dB)
Reception sensitivity	LTE-FDD B1: -99dBm(10M) LTE-FDD B3: -99dBm(10M) LTE-FDD B7: -97.5dBm(10M) LTE-FDD B8: -98dBm(10M) LTE-FDD B20: -98dBm(10M) LTE-FDD B28: -98dBm(10M)
LTE	Maximum Support non-CA CAT1 Supports 1.4-20MHz RF bandwidth LTE-FDD: Maximum uplink rate 5Mbps, maximum downlink rate 10Mbps
BLE parameter	
Standard	BLE 5.0
Frequency	2402GHz-2480GHz
Tx Power	Max 15dBm
Rx Sensitive	-97dBm
Serial Port	
Number of serial ports	1
Interface standards	Solar Elf-SEG40B:1 RS232 Solar Elf-SEG41B:1 RS485 Solar Elf-SEG42B:1 TTL
Data Bits	7,8
Stop Bit	1,2
Check Bit	None, Even, Odd
Baud Rate	TTL: 1200 bps to 460,800 bps

Flow Control	No flow control Half duplex (RS485)
Software	
Firmware upgrade	Serial port or OTA upgrade
Configuration	APP
Basic Parameter	
SIM card interface	Nano SIM (1.8V/3V)
Size	68.5mm x 35mm x 17.8mm
Operating Temp.	-40 ~ 85°C
Storage Temp.	-45 ~ 125°C, 5 ~ 95% RH (无凝水)
Input Voltage	5~36VDC@10W
Average current	~30mA@12V
Peak current	100mA

1.3. 4G Frequency Band Description

Table2. 4G Operating Frequency

3GPP Frequency Band	Send	Receive	Unit
LTE-FDD B1	1920~1980	2110~2170	MHz
LTE-FDD B3	1710~1785	1805~1880	MHz
LTE-FDD B5	824~849	869~894	MHz
LTE-FDD B7	2500-2570	2620-2690	MHz
LTE-FDD B8	880~915	925~960	MHz
LTE-FDD B20	832~ 861.9	791~ 820.9	MHz
LTE-FDD B28	703~ 747.9	758~ 802.9	MHz
LTE-TDD B34	2010~2025	2010~2025	MHz
LTE-TDD B38	2570~2620	2570~2620	MHz
LTE-TDD B39	1880~1920	1880~1920	MHz
LTE-TDD B40	2300~2400	2300~2400	MHz
LTE-TDD B41	2555~2655	2555~2655	MHz

1.4. Main Application Fields

Solar Plug SGB1 connects serial devices to the Internet and transmits serial data in accordance with TCP/IP protocol

- Monitoring of photovoltaic solar energy and energy storage;



Figure 1. Typical Applications

2. HARDWARE INTRODUCTION

Solar Elf-SEG4xB is a cellular network solution with the function of serial device networking.

2.1. Device appearance diagram



Figure 2. Solar Elf-SEG40B Appearance



Figure 3. Solar Elf-SEG41B Appearance



Figure 4. Solar Elf-SEG42B Appearance

We provide different antenna type for customer to use.



Figure 5. Antenna Appearance

2.2. Solar Elf-SEG4xB Pins Definition



Figure 6. Solar Elf-SEG4xB RJ45 Interface Pin

Table3. Solar Elf-SEG4xB Interface Definition

Pin	Description	Net Name	Signal Type	Comment
1		NC		Reserved
2		NC		Reserved
3		NC		Reserved
4		NC		Reserved
5	UART1_TXD	UART1_TXD	IO	Solar Elf-SEG40B: RS232 TX Solar Elf-SEG41B: RS485 A+ Solar Elf-SEG42B: 3.3V TTL TX
6	UART1_RXD	UART1_RXD	IO	Solar Elf-SEG40B: RS232 RX Solar Elf-SEG41B: RS485 B- Solar Elf-SEG42B: 3.3V TTL RX
7	Power VCC	VCC	Power	5~36VDC@10W
8	Power GND	GND	Power	

Pin	Description	Net Name	Signal Type	Comment
9	Green LED Net Status	NET	O	On: The power supply is normal. Off for 2 seconds and on for 2 seconds: The cellular network is registered and connected properly. Off for 0.1 seconds and on for 0.1 seconds: The cellular network is receiving or sending data
10	Amber LED Data Transfer	COM	O	Off: No data is being exchanged Off for 0.3 seconds and on for 0.9 seconds: The serial port outputs data Off for 0.3 seconds and on for 0.3 seconds: The serial port receives data Steady on: sends and receives data in both directions.
	actory data	nReload	I	Default high, pull down for more than 4

<Notes>

I — Input; O — Output; I/O: Digital I/O; Power—Power Supply

2.3. SIM Interface

Insert SIM card before use our product.



Figure 7. SIM slot

2.4. RS232 Interface

Device RS232 does not support hardware flow control. The physical voltage is about $\pm 7V$.

2.5. RS485 Interface

RS485 use two wire links, A(DATA+), B(DATA-). Connect A(+) to A(+), B(-) to B(-) for communication. Suggest to connect GND together when interference is very severe.

The RS485 interface support maximum 32 485 device, device. The cable maximum length is 1200 meters. Need to add 120Ohm terminal resistor for over 300 meters.

2.6. TTL Interface

The serial port of this device has no hardware flow control function, and the physical level is $\pm 3.3V$ TTL

2.7. Mechanical Size

The dimensions of Solar Elf-SEG4xB are defined as following picture (mm):

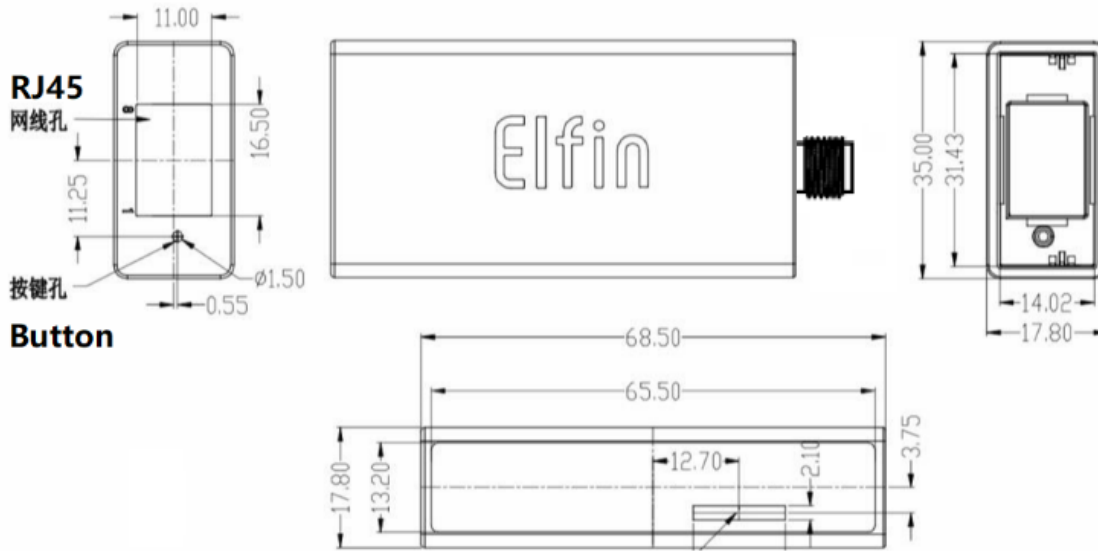


Figure 8. Solar Elf-SEG4xB Mechanical Dimension

2.8. RJ45 8PIN Connector



Figure 9. RJ45 8PIN Connector



Figure 10. Solar Elf-SEG40B +8PIN Connector



Figure 11. Solar-Elf-SEG41B+8PIN Connector



Figure 12. Solar Elf-SEG42B+8PIN Connector

2.9. RJ45 4PIN Connector



Figure 13. RJ45 4PIN Connector



Figure 14. Solar Elf-SEG40B +4PIN Connector



Figure 15. Solar Elf-SEG41B+4PIN Connector



Figure 16. Solar Elf-SEG42B+4PIN Connector

2.10. RJ45 Conversion cable



Figure 17. RJ45 Conversion cable

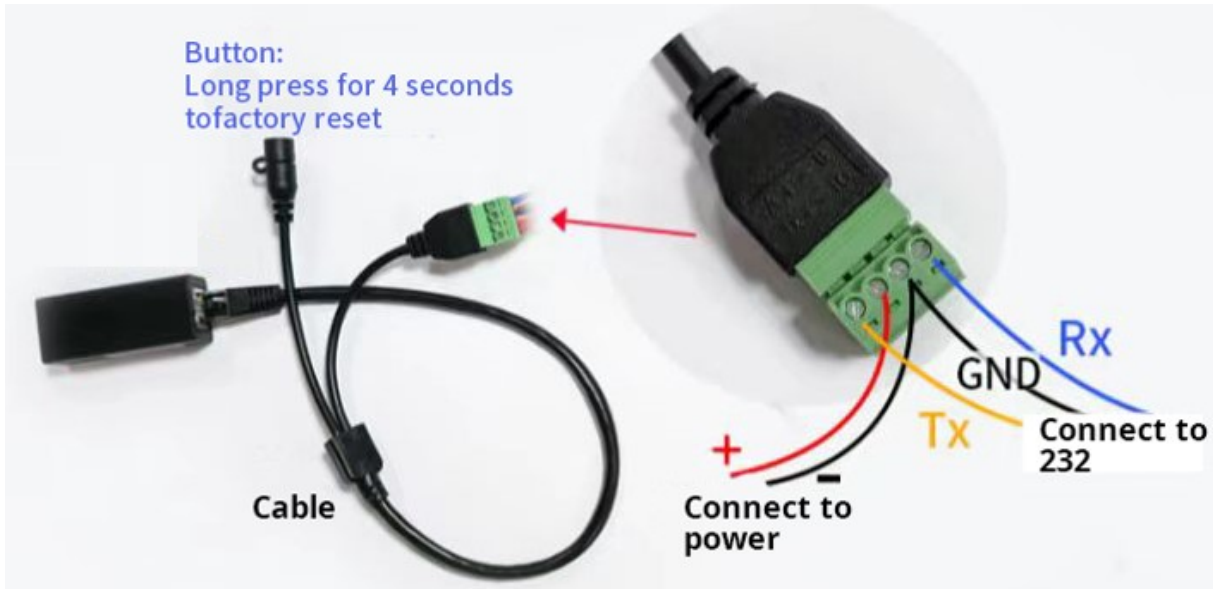


Figure 18. Solar Elf-SEG40B + RJ45 Conversion cable

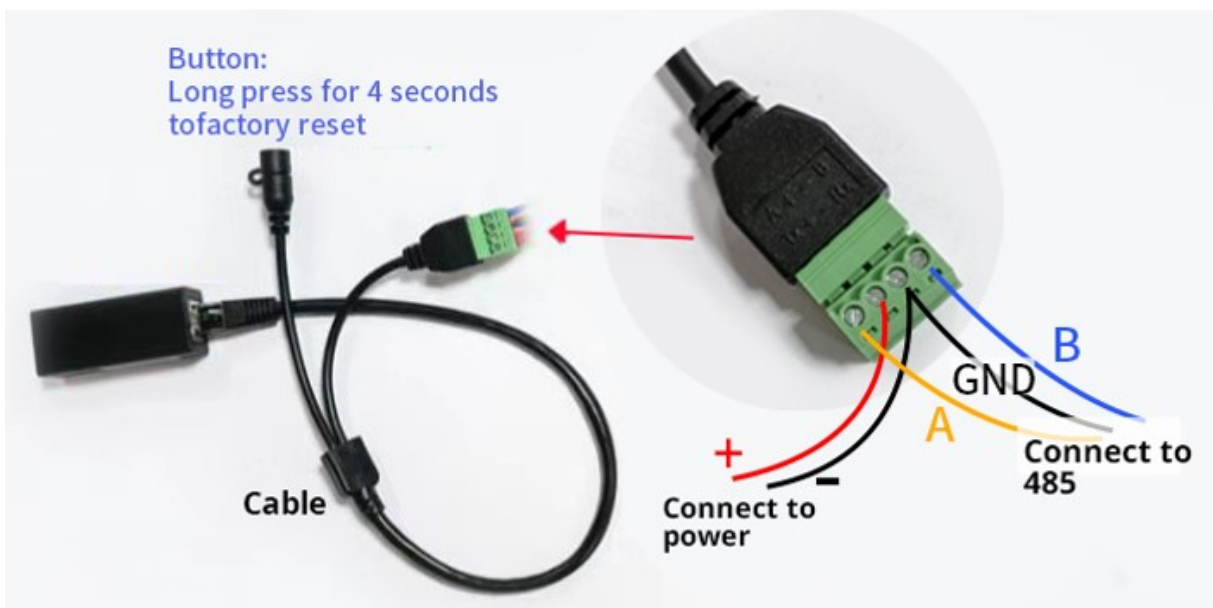


Figure 19. Solar Elf-SEG41B + RJ45 Conversion cable



Figure 20. Solar Elf-SEG42B + RJ45 Conversion cable

2.11. Homemade cable

Customers can make their own RJ45 conversion cable, add 232 DB9 interface, DC power connector, reset button and so on according to the following sequence.

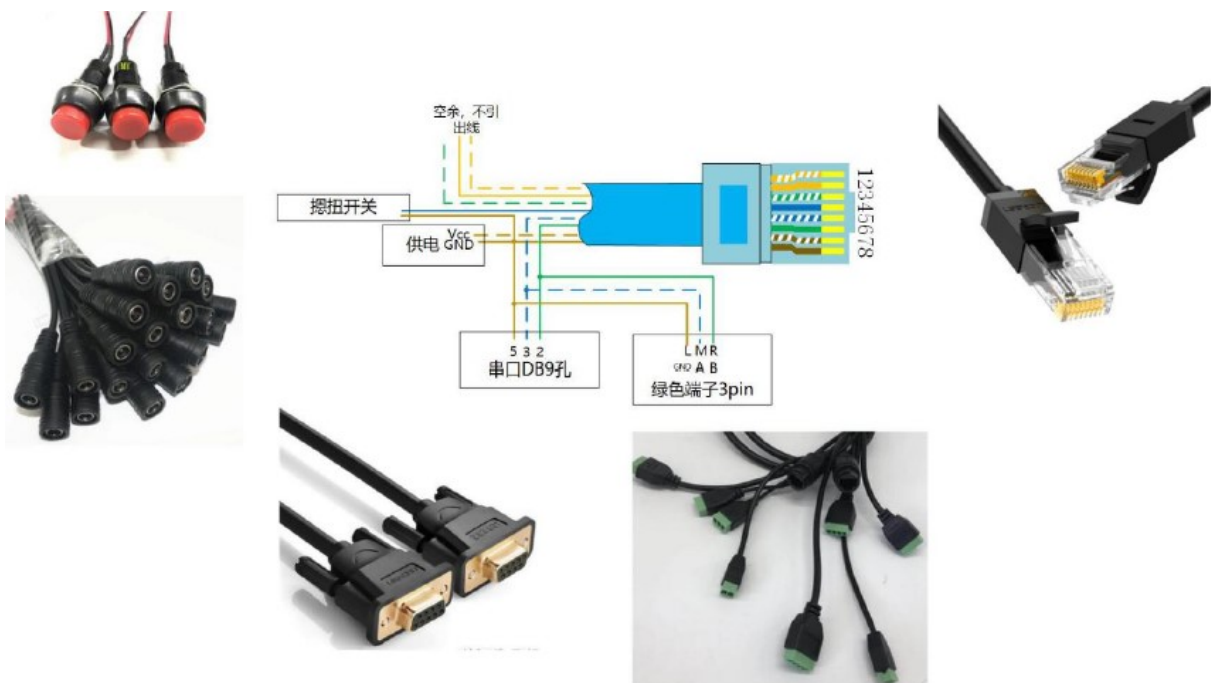


Figure 21. Cable fabrication diagram

2.12. Fixed Bracket



Figure 22. Fixed Bracket

2.13. Rail Bracket



Figure 23. Rail Bracket

2.14. Bracket

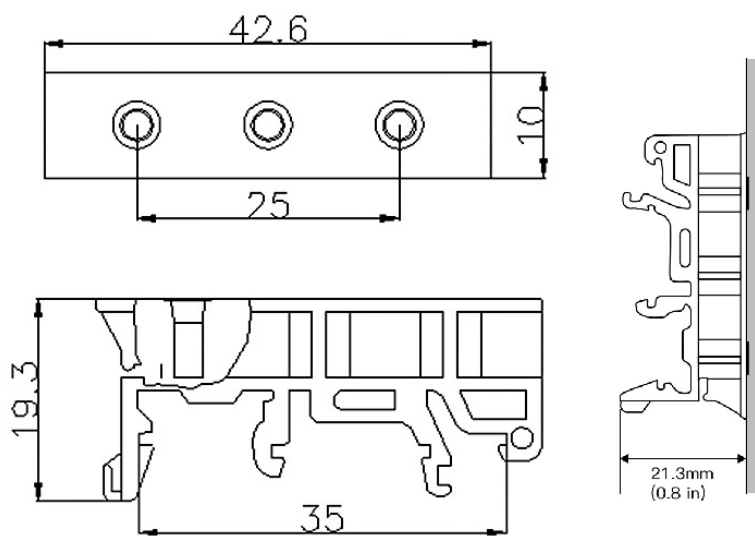


Figure 24. Bracket Size

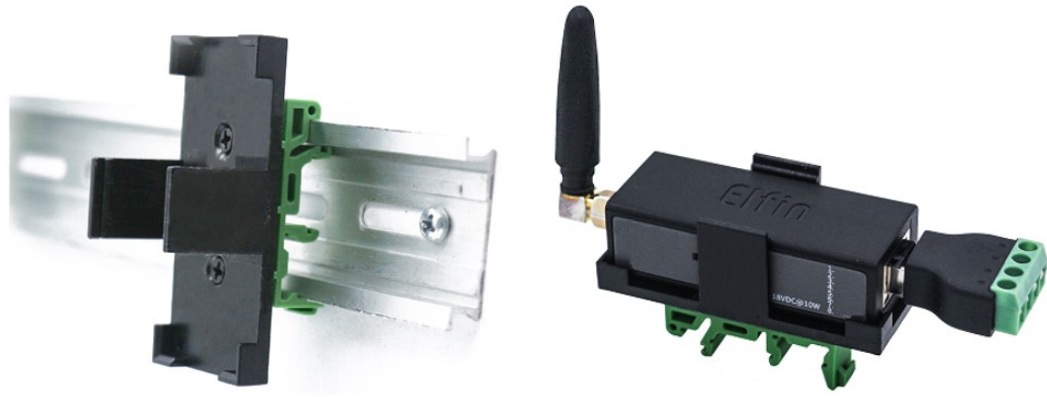


Figure 25. Bracket Install Picture

2.15. Product Installation

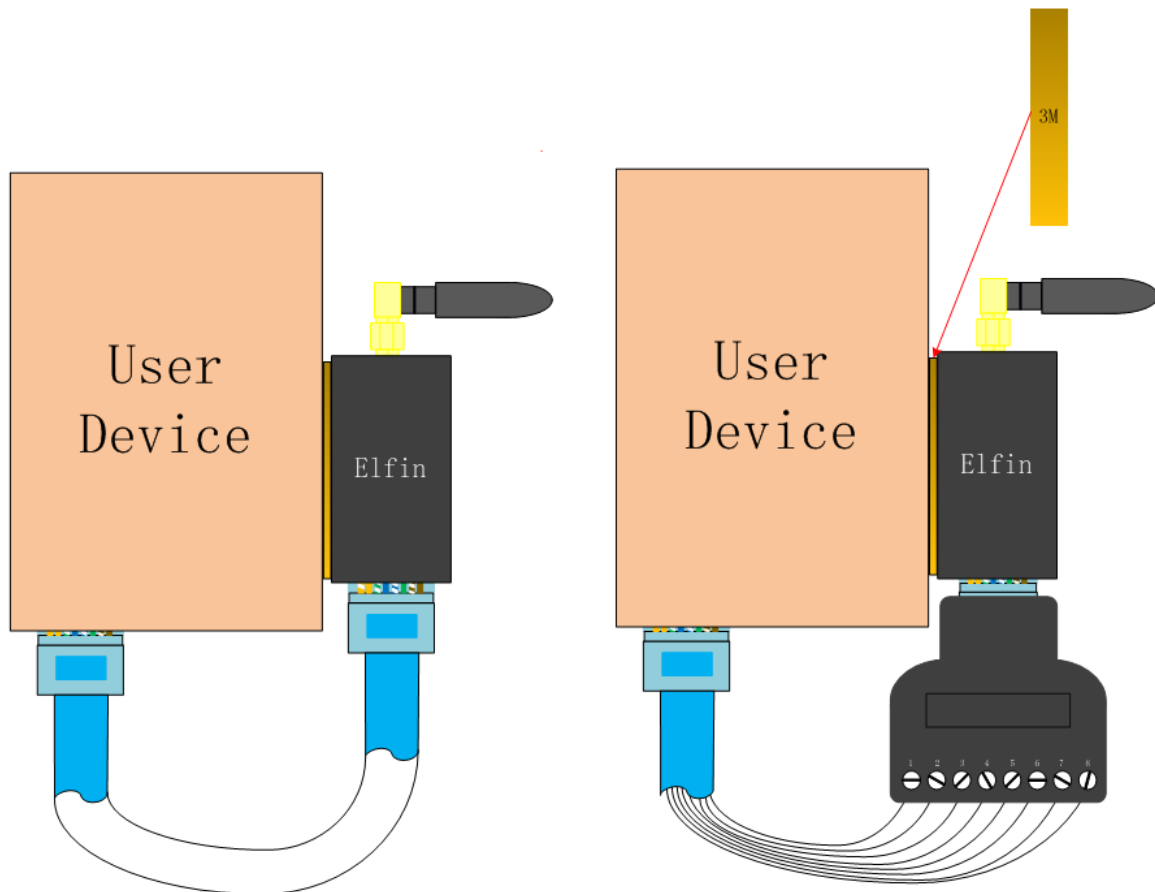


Figure 26. Product Installation

2.16. Order Information

Base on customer detailed requirement, our product provide different configuration version, Details as below:

Function Model	Power Input	Type	Antenna	UART
Solar Elf-SEG40B	5~36VDC	4G&BLE	External SMA	RS232
Solar Elf-SEG41B	5~36VDC	4G&BLE	External SMA	RS485
Solar Elf-SEG42B	5~36VDC	4G&BLE	External SMA	3.3V TTL

Figure 27. Solar Elf-SEG4xB Product Order Information

APPENDIX A: CONTACT INFORMATION

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