Elfin-EG41

RS485 to 2G/3G/4G

User Manual

V 1.2

Overview of Characteristic

✧ Support LTE-TDD, LTE-FDD, WCDMA, TD-SCDMA, cellular network, sub-type to support specific cellular network

✧ Support RS485 to 2G/3G/4G Data Transmission, UART baud rate Up to 460800bps

✧ Supports Max 3 Channel TCP/UDP connections, Each Connection Supports 1400 Bytes of Data Cache

✧ Support Multiple Working Modes: Network Transparent Transmission Mode, HTTP Mode

✧ Support IOTService Tool, Remotely and Dynamically Modify Module Parameters

✧ Support SMS AT Command Configuration

✧ Supports Registration Packet, Heartbeat Packet Function, and Packet Supports Combination of ICCID, IMEI, IMSI, Software Version, cellular network Connection Status.

✧ Support NTP

✧ Support Modbus TCP to Modbus RTU

✧ Support IOTBridge for Remote Control and Config.

✧ Support IOTBridge working time, for example only works from 10:00 to 10:30 to save the data flow charge.

✧ Support Serial Port, Network OTA Upgrade Firmware.

- Size: 68.5 x 35 x 17.8mm
- Wide Power Supply
  - Elfin-EG41: 9～18VDC@1A
  - Elfin-EG41A: 9~36VDC@1A

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V 1.0 03-29-2019. First Version

1. PRODUCT OVERVIER

1.1. General Description

The Elfin-EG41 support LTE-TDD, LTE-FDD, WCDMA, TD-SCDMA, cellular network full network. 4G network support maximum download data rate 150Mbps, upload data rate 50Mbps.

The Elfin-EG41 module support TCPIP protocol, with its /RS485 interface, it make traditional UART device easy connecting to IOT.

Elfin-EG41 is an RJ45 interface serial server with ultra-small size: 68.5 x 35 x 17.8mm

Elfin-EG41 include different sub-type, as following table.

Table1. Elfin-EG41 Series Defination

	Main Function	Interface				Band					
Function / Model	Country	Input Voltage	4G	3G	Support Serial Mode	TDD-LTE	FDD-LTE	TD-SCDMA	WCDMA	CDMA2000 1X/EVDO	GSM
Elfin-EG41	just China	9~18VDC	√	√	RS485	B38/39/40/41	B1/3/5/8	B34/39	B1/8	—	B3/8
Elfin-EG41-D	just China "China Mobile Communications Corporation"	9~18VDC	√	√	RS485	B38/39/40/41	—	B34/39	—	—	B3/8
Elfin-EG41-G	just China "4G"	9~18VDC	√	—	RS485	B38/39/40/41	B1/3/5/8	—	—	—	—
Elfin-EG41-GL	global	9~18VDC	√	√	RS485	B38/39/40/41	B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28	—	B1/2/4/5/6/8/19	—	B2/3/5/8
Elfin-EG41-CE	China	9~18VDC	√	√	RS485	B34/38/39/40/41	B1/3/5/8	B34/39	B1/8	BC0	B3/8
Elfin-EG41-EU	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~18VDC	√	√	RS485	B38/40/41	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-EC	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~18VDC	√	√	RS485	—	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-AF	Canada, USA	9~18VDC	√	√	RS485	—	B2/4/5/12/13/14/66/71	—	B2/4/5	—	—
Elfin-EG41-AU	Australia, Latin America, Taiwan(China), New Zealand, etc.	9~18VDC	√	√	RS485	B40	B1/2/3/4/5/7/8/28	—	B1/2/5/8	—	B2/3/5/8
Elfin-EG41-JP	Japan	9~18VDC	√	√	RS485	B41	B1/3/8/18/19/26	—	B1/6/8/19	—	—
Elfin-EG41-A	just China	9~36VDC	√	√	RS485	B38/39/40/41	B1/3/5/8	B34/39	B1/8	—	B3/8
Elfin-EG41-D-A	just China "China Mobile Communications Corporation"	9~36VDC	√	√	RS485	B38/39/40/41	—	B34/39	—	—	B3/8
Elfin-EG41-G-A	just China "4G"	9~36VDC	√	—	RS485	B38/39/40/41	B1/3/5/8	—	—	—	—
Elfin-EG41-GL-A	global	9~36VDC	√	√	RS485	B38/39/40/41	B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28	—	B1/2/4/5/6/8/19	—	B2/3/5/8
Elfin-EG41-CE-A	China	9~36VDC	√	√	RS485	B34/38/39/40/41	B1/3/5/8	B34/39	B1/8	BC0	B3/8
Elfin-EG41-EU-A	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~36VDC	√	√	RS485	B38/40/41	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-EC-A	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~36VDC	√	√	RS485	—	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-AF-A	Canada, USA	9~36VDC	√	√	RS485	—	B2/4/5/12/13/14/66/71	—	B2/4/5	—	—
Elfin-EG41-AU-A	Australia, Latin America, Taiwan(China), New Zealand, etc.	9~36VDC	√	√	RS485	B40	B1/2/3/4/5/7/8/28	—	B1/2/5/8	—	B2/3/5/8
Elfin-EG41-JP-A	Japan	9~36VDC	√	√	RS485	B41	B1/3/8/18/19/26	—	B1/6/8/19	—	—

1.2. Device Parameters

Table2. Elfin-EG41 Technical Specifications

Item	Parameters
System Information	
Processor/Frequency	Cortex-M3/96MHz
Operating System	FreeRTOS
2G/3G/4G Interface	
Transmit Power	LTE-TDD: Class 3(23dBm+1/-3dB) LTE-FDD: Class 3(23dBm±2dB) WCDMA: Class 3(24dBm+1/-3dB) TD-SCDMA: Class 3(24dBm+1/-3dB) GSM900: Class 4(33dBm±3dB) DCS1800: Class 1(30dBm±3dB) GSM900 8-PSK: Class E2(27dBm±3dB) DCS1800 8-PSK: Class E2(26dBm±3dB)
Receive Sensivity	FDD B1: -96dBm(10M) FDD B3: -96dBm(10M) FDD B5: -96dBm(10M) FDD B8: -96.5dBm(10M) TDD B38: -96dBm(10M) TDD B39: -97dBm(10M) TDD B40: -96.5dBm(10M) TDD B41: -96dBm(10M) WCDMA B1: -110dBm WCDMA B8: -111dBm TDSCDMA B34: -109dBm TDSCDMA B39: -109dBm GSM 900M: -109dBm GSM 1800M: -109dBm
LTE	Maximum Support non-CA CAT4 Support 1.4~20MHz RF Bandwidth Downstream Support Multiple Users MIMO FDD: Maximum Upstream Rate 50Mbpsm Maximum Downstream Rate 150Mbps TDD: Maximum Upstream Rate 35Mbpsm Maximum Downstream Rate 130Mbps
WCDMA	3GPP R8 DC-HSPA+ 16-QAM,64-QAM and QPSK Modulation Maximum Upstream 5.76Mbps Maximum Downstream 42Mbps
TD-SCDMA	CCSA Relese 3 Maximum Upstream 2.2Mbps Maximum Downstream 4.2Mbps
GSM/cellular network	R99： CSD Transmission Rate：9.6Kbps/14.4Kbps cellular network： Support cellular network multi-slot class 12 Code Method：CS-1/CS-2/CS-3/CS-4
Serial Port	
Port Number	1
Interface Standard	EG41: RS485 或 3.3V TTL UART
Data Bits	7,8

Stop Bit	1,2
Check Bit	None,Even,Odd
Baud Rate	TTL：1200 bps~460800 bps
Flow Control	No Flow Control Half-Duplex(RS485) Software Flow Contorl
Software	
Configuration	Serial AT Command IOTService Serial Port Configuration Software IOTService Network Configuration Software
Firmware Upgrade	UART or OTA Upgrade
Basic Parameter	
SIM Card	Nano SIM card(1.8V/3V)
Size	68.5mm x 35mm x 17.8mm
Operating Temp.	-40 ~ 85°C
Storage Temp.	-45 ~ 105°C, 5 ~ 95% RH（no condensation）
Input Voltage	Elfin-EG41: 9~18VDC@1A Elfin-EG41A: 9~36VDC@1A
Average Working Current	~300mA@9V
Peak Current	2A

1.3. Key Applications

The Elfin-EG41 module connects the serial device to the Internet and conforms to the TCP/IP protocol for transmitting serial data.

- Remote device monitoring
- Production asset tracking and monitoring
- Security field
- Industrial sensors and controllers
- Health medical equipment
- ATM equipment
- Data acquisition equipment
- UPS power management equipment
- Telecommunication equipment
- Data display device
- Hand-held device
- Attendance system and terminal equipment

2. HARDWARE INTRODUCTION

Elfin-EG41 is a cellular network solution for serial device networking. Data transmission via cellular network makes product integration very easy. This product meets EMC Class B security level and can pass relevant certification tests in various countries.

2.1. APPEARANCE

Figure 1. Elfin-EG41 Appearance

2.2. Elfin-EG41 Pin Definition

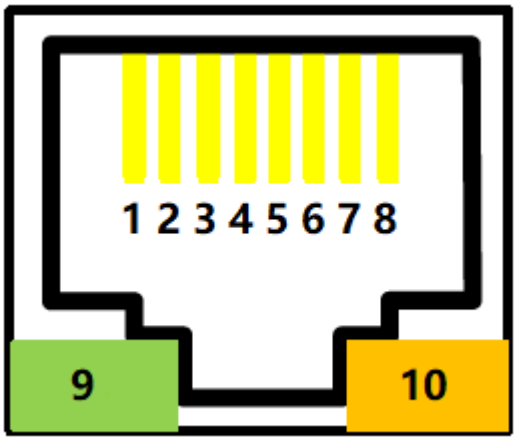

Figure 2. Elfin-EG41 RJ45 Interface Pin

Table3. Elfin-EG41 Interface Definition

Pin	Description	Net Name	Signal Type	Notes
1	UART_TX TTL Voltage	TTL_UART_ TXD	O	3.3V TTL UART Output
2	UART_RX TTL Voltage	TTL_UART_ RXD	I	3.3V TTL UART Input
3		NC		Please leave it open
4		NC		Please leave it open
5	RS485_A+	RS485_A+	IO	RS485 A+
6	RS485_B-	RS485_B-	IO	RS485 B-
7	Power VCC	VCC	Power	9～18VDC
8	Power GND	GND	Power	
9	**Green LED** Net Status	Net	O	Boot On: Power is OK. 2s Off -> 2s On: cellular network Register is OK. 0.1s Off -> 0.1s On: cellular network data is transferring.
10	**Amber LED** Data Transfer	Active	O	Off: No data transfer 0.3s Off -> 0.9s On: UART TX Output 0.3s Off -> 0.3s On: UART RX Receive On: UART bidirection.

<Notes>:

I — Input; O — Output; Power—Power Supply

Note

PIN1/2 is TTL UART, PIN5/6 is RS485 interface, it is same UART for internal MCU, just the hardware driver is different. Choose either TTL or RS485

2.3. 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.

2.4. Mechanical Size

The dimensions of Elfin-EG41 are defined as following pictures(mm):

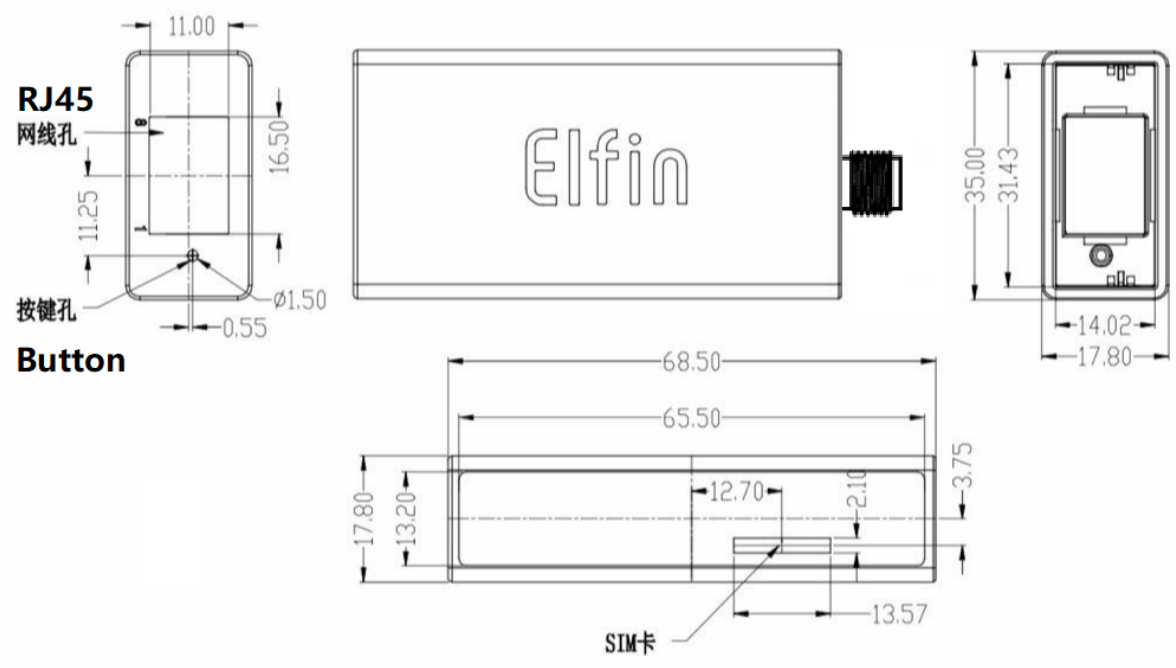

Figure 3. Elfin-EG41 Mechanical Size

2.5. RJ45 8PIN Connector

RJ45 8PIN Connector Type Order: 10810001001

Figure 4. RJ45 8PIN Connector

Figure 5. EG41+8PIN Connector

2.6. RJ45 4PIN Connector

RJ45 4PIN Connector Type Order: 10810001002

Figure 6. RJ45 4PIN Connector

Figure 7. EG41+4PIN Connector

2.7. Conversion Cable

May also make cable according to the following picture.

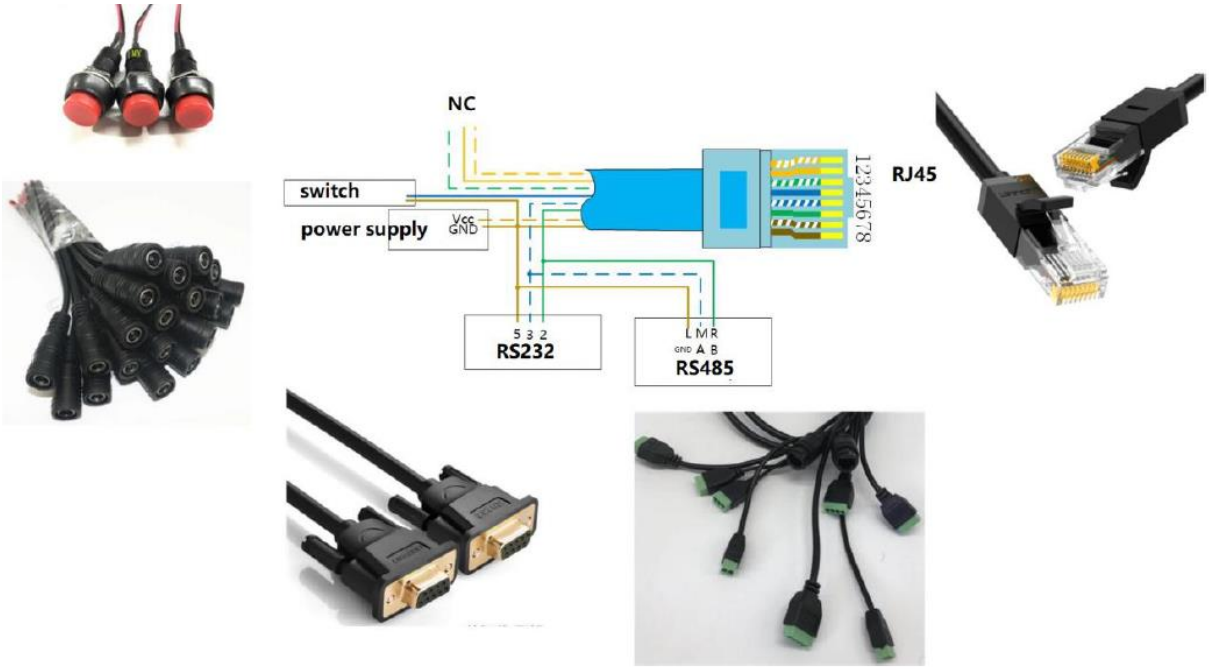

Figure 8. Cable Manufacture Guide

2.8. EG11 Interface Conversion Cable

Figure 9. Interface Conversion Cable

2.9. Fixed Bracket

Figure 10. Fixed Bracket

2.10. Rail Bracket

Figure 11. Rail Bracket

2.11. Bracket

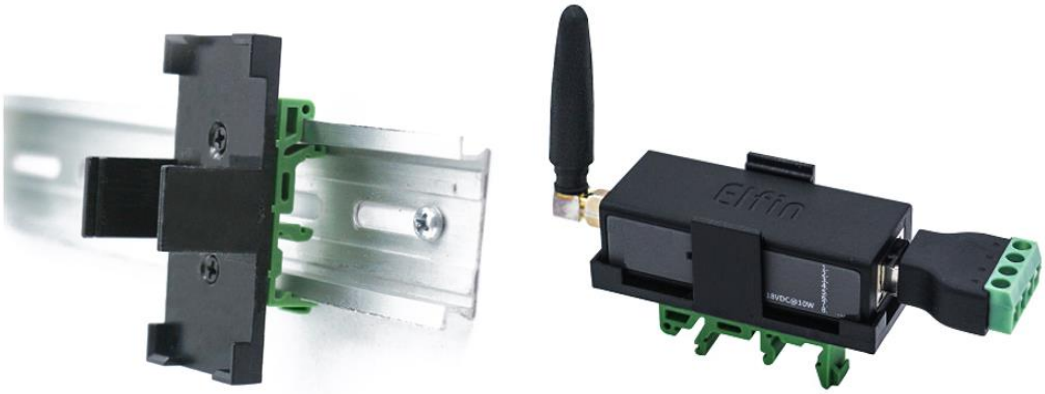

Figure 12. Bracket Install Picture

2.12. RJ45 Transform Connector

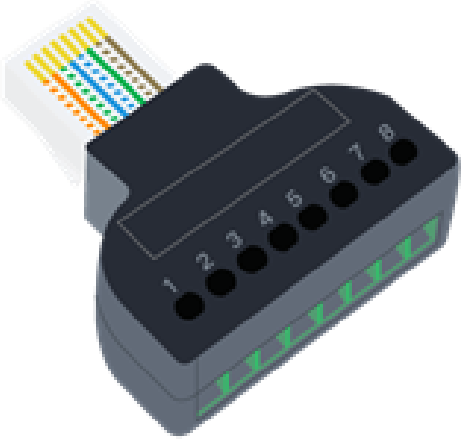

Figure 13. RJ45 Transform Connector

2.13. Product Installation

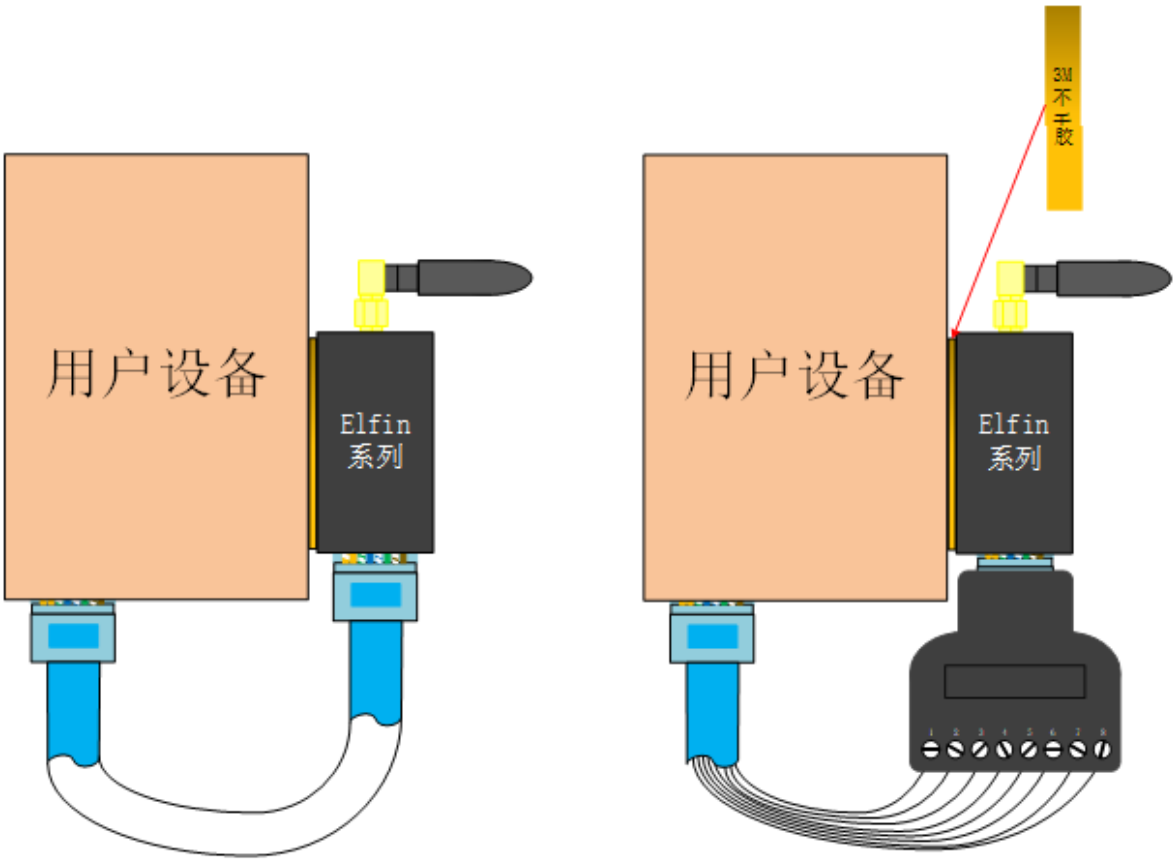

Figure 14. Product Installation

2.14. EVK

EVK indluce one Elfin device, one RJ45 Connector and one screw driver.

Figure 15. EVK Package

2.15. Product Order Information

Based on customers detailed requirements, we provide different configuration Elfin-EG41, details as below:

Model \ Function	Main Function	Interface					Band					
	Country	Input Voltage	4G	3G	2G	Serial	Support Serial Mode	TDD-LTE	FDD-LTE	TD-SCDMA	WCDMA	CDMA2000 1X/EVDO	GSM
Elfin-EG41	just China	9~18VDC	√	√	√	1	RS485	B38/39/40/41	B1/3/5/8	B34/39	B1/8	—	B3/8
Elfin-EG41-D	just China "China Mobile Communications Corporation"	9~18VDC	√	√	√	1	RS485	B38/39/40/41	—	B34/39	—	—	B3/8
Elfin-EG41-G	just China "4G"	9~18VDC	√	—	—	1	RS485	B38/39/40/41	B1/3/5/8	—	—	—	—
Elfin-EG41-GL	global	9~18VDC	√	√	√	1	RS485	B38/39/40/41	B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28	—	B1/2/4/5/6/8/19	—	B2/3/5/8
Elfin-EG41-CE	China	9~18VDC	√	√	√	1	RS485	B34/38/39/40/41	B1/3/5/8	B34/39	B1/8	BC0	B3/8
Elfin-EG41-EU	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~18VDC	√	√	√	1	RS485	B38/40/41	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-EC	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~18VDC	√	√	√	1	RS485	—	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41-AF	Canada, USA	9~18VDC	√	√	—	1	RS485	—	B2/4/5/12/13/14/66/71	—	B2/4/5	—	—
Elfin-EG41-AU	Australia, Latin America, Taiwan(China), New Zealand, etc.	9~18VDC	√	√	√	1	RS485	B40	B1/2/3/4/5/7/8/28	—	B1/2/5/8	—	B2/3/5/8
Elfin-EG41-JP	Japan	9~18VDC	√	√	—	1	RS485	B41	B1/3/8/18/19/26	—	B1/6/8/19	—	—
Elfin-EG41A	just China	9~36VDC	√	√	√	1	RS485	B38/39/40/41	B1/3/5/8	B34/39	B1/8	—	B3/8
Elfin-EG41A-D	just China "China Mobile Communications Corporation"	9~36VDC	√	√	√	1	RS485	B38/39/40/41	—	B34/39	—	—	B3/8
Elfin-EG41A-G	just China "4G"	9~36VDC	√	—	—	1	RS485	B38/39/40/41	B1/3/5/8	—	—	—	—
Elfin-EG41A-GL	global	9~36VDC	√	√	√	1	RS485	B38/39/40/41	B1/2/3/4/5/7/8/12/13/18/19/20/25/26/28	—	B1/2/4/5/6/8/19	—	B2/3/5/8
Elfin-EG41A-CE	China	9~36VDC	√	√	√	1	RS485	B34/38/39/40/41	B1/3/5/8	B34/39	B1/8	BC0	B3/8
Elfin-EG41A-EU	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~36VDC	√	√	√	1	RS485	B38/40/41	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41A-EC	Europe, Israel, South Korea, Southeast Asia India, Russia, Middle East, etc.	9~36VDC	√	√	√	1	RS485	—	B1/3/7/8/20/28A	—	B1/8	—	B3/8
Elfin-EG41A-AF	Canada, USA	9~36VDC	√	√	—	1	RS485	—	B2/4/5/12/13/14/66/71	—	B2/4/5	—	—
Elfin-EG41A-AU	Australia, Latin America, Taiwan(China), New Zealand, etc.	9~36VDC	√	√	√	1	RS485	B40	B1/2/3/4/5/7/8/28	—	B1/2/5/8	—	B2/3/5/8
Elfin-EG41A-JP	Japan	9~36VDC	√	√	—	1	RS485	B41	B1/3/8/18/19/26	—	B1/6/8/19	—	—

Figure 16. Elfin-EG41 Product Order Information

APPENDIX A: CONTACT INFORMATION

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