

Operation Manual

EC Series 4G Expansion Card



SHENZHEN INVT ELECTRIC CO., LTD.

No.	Change description	Version	Release date
1	First release.	V1.0	December 2021
2	 Added safety precautions. Added three function descriptions (antenna gain, power consumption and heat dissipation method) in section 1.2 Product specifications. Added the J3 port description in section 1.4 Port instruction. Added product weight data in section 2.3 Outline dimensions and weight. Updated all operation descriptions and interface diagrams in chapter 3 Operation quide. 	V1.1	September 2024

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Read the safety precautions to ensure safe operation before operating the IoT data transmission terminal.

- The account and password are the authentication credentials of INVT industrial Internet
 platform and can be used for device management after login. You shall keep you account
 and password properly and take sufficient precautions to prevent others from stealing
 them. If the user name and password are stolen, significant losses may be caused.
- You shall communicate with the field personnel to ensure safety before using the device for remote operation, otherwise significant losses may be caused.
- The IoT SIM card is forced to be machine-card binding, SIM card can only be used in the device which is first powered on and networked. You shall not insert the IoT SIM card into other devices, otherwise the SIM card will be locked.
- This product is an industrial IoT product, we have taken necessary technical means to
 ensure data security, but there may be hacker invasion and other network security risks
 that are not under our control or responsibility. If the harm is not caused by the quality
 defects of our products, we shall not be liable for related losses.

1 Product overview

INVT EC series 4G expansion card is an IoT 4G wireless data terminal designed for wireless monitoring with the function of data uploading to the cloud by utilizing the mobile operator network. It is applicable to GD350 and its special machine series, GD270 series VFD and used as a plug-in communication expansion card.

The product adopts a high-performance industrial-grade 32-bit communication processor and industrial-grade wireless module, with an embedded real-time operating system as the software support platform, achieving the data uploading to the cloud.

1.1 Product features

- Used as a plug-in communication expansion card in GD350 and its special machines series VFDs;
- 2. Applicable to PLC, VFD and other RS485 devices through external terminal wiring;
- 3. Supports APN, remote wireless upgrade, and remote policy configuration;
- Supports RS485 remote online upgrade of control board programs in GD350 and its special machines series VFDs;
- 5. Able to upload only the data with changes, achieving the traffic saving mechanism.
- 6. Supports 4G base station positioning;
- 7. Supports SIM cards (optional).

1.2 Product specifications

Function	Description		
	China(CN) version		
	 LTE FDD: Band 1/3/5/8 		
	 LTE TDD: Band 34/39/40/41 		
	 GSM: 900/1800MHz 		
Supported	Europe(EU) version		
network	 LTE FDD: Band 1/3/7/8/20/28 		
	 GSM: 900/1800MHz 		
	Latin America(LA) version		
	 LTE FDD: Band 1/2/3/4/5/7/8/28/66 		
	• GSM: 900/1800MHz		
	Expansion card interfaces of GD350 and its special machines series		
Supported	VFDs		
interfaces 1 RS485 interface			
	1 TTL debugging interface		

Function	Description					
	1 SMA antenna interface					
	1 spring-loaded SIM card socket (medium card)					
Indicator	Power indicator, network status indicator, running status indicator,					
Indicator	handshake indicator					
	Modbus protocol					
Communication	IoT MQTT communication protocol					
protocol	PPP dialing protocol					
	FTP transfer protocol					
Theoretical	 LTE FDD Rel.13: 10Mbps DL/5Mbps UL 					
hondwidth	LTE TDD Rel.13 : 8.2Mbps DL/3.4Mbps UL					
Danowidin	 GPRS: 85.6Kbps DL/85.6Kbps UL 					
Antenna gain	2.2dBi					
	Supports 5V power supply from the expansion card interface (14PIN					
Charging method	female header) of the GD350 and its special machines series VFDs					
	Supports DC10–25V power supply from external terminals					
Power						
consumption	Starting power: 20mA@24v, running power: 40mA@24v.					
Temperature						
range	-25-+60°C					
Shell	Without shell, protection level IP00					
Installation	Daltad					
method						
Heat dissipation	Natural heat dissipation					
method						

1.3 Model instruction

Model name illustration of INVT EC series 4G extension card:

$\underline{EC}_{1} - \underline{IC}_{2} \underbrace{5}_{3} \underbrace{02}_{4} - \underbrace{2}_{5} \underbrace{1}_{6} \underbrace{G}_{7} - \underbrace{CN}_{8}$

Symbol	Description	Content
1	Product category	EC: Expansion card
		TX: communication expansion card
2	Board card category	PG: PG card
		PC: PLC programmable card

Symbol	Description	Content	
		IO: IO expansion card	
		IC: IoT card	
3	Technology version	Indicates the generation of a technical version by using odd numbers, for example, 1, 3, 5, and 7 indicate the 1st, 2nd, 3rd and 4th generations of the technical version.	
4	Product code (IoT card)	01: GPRS card 02: 4G card 03: Reserved	
5	Antenna types for wireless communication cards	1: Built in 2: External	
6	SIM card type	0: Plug-in card (Standard, default) 1: Embedded SIM card	
7	Special function	G: With GPS This bit is omitted for standard models since special functions are not available for them.	
8	International version	CN: China version EU: Europe version LA: Latin America version	

1.4 Port instruction

Port identifier	Port description
24V	Power supply +
GND	Power supply -
485+	485A
485-	485B
4G	4G antenna
CN3	SIM card socket
J3	TTL commissioning interface

1.5 Indicator instruction

Indicator identifier Description		
	Network indicator	
NET	Flash slowly (ON: 600ms; OFF: 600ms): No SIM card/Network	
INE I	registration in progress/Registration failed.	
	Flash quickly (ON: 75ms; OFF: 75ms): Data link established	

Indicator identifier	Description
DUN	Run indicator
RUN	Plash slowly (ON: 1s; OFF: 1s): System runs properly
SPI	Handshake indicator Flash slowly (ON: 1s; OFF: 1s): Handshake between the expansion card and the VFD control board succeed ON: Handshake between the expansion card and the VFD control board failed or there is no handshake
POWER	Power supply indicator

2 Installation

2.1 Overview

EC series 4G expansion cards must be installed properly to achieve the designed function. Generally, the installation must be done under the guidance of our certified and qualified engineers.

Note: Do not conduct installation with the power on.

2.2 Unpacking inspection

Before unpacking, check whether the package is in good condition and its product information is the same as on the order. The packing materials should be well maintained during inspection for future transshipment. If any question, please contact the supplier.

Deliverables	Qty	Remark
4G expansion card	1	
4G antenna	1	Applicable to models using an external antenna
SIM card	1	Applicable to models of China(CN) version
PIN terminal	1	4PIN terminal
M3 screw	1	

Table 2-1 Product deliverables

2.3 Outline dimensions and weight

The outline dimension of the IP00 (Without shell) model is as follows (unit: mm). The net weight of the product is 32g, and the gross weight is 166.4g.



3 Operation guide

3.1 Operation description

Equipment required: Networked computer, EC series 4G expansion card, IoT SIM card.

Procedure:

- Step 1 Insert the SIM card into the corresponding card sockets.
- Step 2 Record the device ID and 6-digit key from the label and add them to the IoT monitoring system.
- Step 3 Install the expansion card into the card slot of a VFD and fasten the card with screws.
- Step 4 Connect the 4G antenna to the back end of the expansion card.
- Step 5 Power on the expansion card.
- Step 6 If the green SPI indicator flashes with an interval of 1s, the handshake between the expansion card and the VFD control board is complete. If the yellow NET indicator flashed with an interval of 75ms, the expansion card is ready and data transmission starts.
- Step 7 Go to real-time monitoring interface to review relevant information in IoT monitoring system.

3.2 Monitoring platform operation instructions

You can monitor relevant devices through the following three methods. For information on how to obtain the account and password, please refer to section 3.3 Monitoring platform account.

- 1. Host controller software: IWOstudio
- 2. Web: IWoscene industrial IoT application platform
- 3. Mobile: INVT Cloud APP

3.2.1 IWOstudio monitoring equipment

1. Download IWOstudio from the official website (www.invt.com), install, and then open it.

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IWOstudio - Log in	
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Capyright © 2024 INVT. All Bights Reserved	. 蓦ICP誓07504406号

2. Enter the account and password to log in and enter the network configuration interface.

Note: For account information, refer to section 3.3 Monitoring platform account.

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3. If it is your first time using the software, you need to add a device type. Click **New > New device type** in the lower left corner. If it is not your first time adding a device type, proceed to step 5.

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4. Enter the type name of the input device, and click **OK**. When a prompt of **Successfully created** appears, the creation of the device type is complete.

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5. Click New > New device in the lower left corner.

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6. Enter Adapter ID, Adapter key, Device name, select Device type, and click OK to complete the process.

Note: Adapter ID is the S/N code of the IoT terminal, and Adapter key is the six-digit number under the QR code next to the S/N code.

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7. After adding the device, you need to add parameters for the first time. Click the device and then click **New**.

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8. Enter **Parameter name**, select **Communication type**, select **Parameter type**, enter **Parameter address** (Modbus address of the register), fill in other information as needed, and click **OK**. When the prompt **Successfully created** appears, the process is complete.

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Communication type: Click <u>∠</u> to view, modify or create new settings. The default is 485 communication, with a slave address of 1, a baud rate of 19200, 8 data bits, 1 stop bit, and even parity. Click **Edit** to modify. If additional communication parameters are required, you can perform create operations.

Note: This parameter determines whether the terminal can successfully communicate with the device. Ensure that it corresponds to the device before sending the parameters.

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9. After creating the parameters, click Distribute.

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10. Once successfully distributed, you can proceed with online monitoring.

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3.2.2 Web monitoring device

1. Enter: iot.invt.com in the address bar of Google Browser and press Enter to visit the login page of the industrial IoT application platform. As shown in the following figure, enter the account number and password to complete the login.

Note: For account information, refer to section 3.3 Monitoring platform account.



2. After logging in successfully, the homepage appears as shown below. Enter the adapter number, secret key and device name in the Add devices quickly column on the homepage, select the device type, and select Expansion card 4G as the adapter type (default communication is SPI). Click Submit after confirming the input is correct. When a prompt of "Added successfully" appears, the device is added completely.

Note: The adapter code is the S/N code of the IoT terminal, and the adapter secret key is the six-digit number below the QR code next to the S/N code.

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3. Enter the adapter code that has been added into the search box on the homepage, click the barcode to enter the monitoring page of the device and check the monitoring state of the device.



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	Device number : 1817	device name : demo	Device type : demo081	Device model : IRE		
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	Adapter code : 0616YS00065	SIM card serial number : 80863450121081813177	invertenPLC barcode :	inseterPLC model :		
	Policy file name : INVT_Demo_0000 tac B	Adaptor software version : ICA400-02_MCU_1020	Latest data updates time : 2024-09-05 09:25:53	After-Sales Senior Tol :		
	intertype : 485	8M card Status : Normal, office	Still card Flow of this Month 1.0			

3.2.3 Monitoring the device via APP

1. Download and install the INVT Cloud APP on your mobile device.

Note: You can download it by searching for INVT IOT in Tencent MyApp Store or Google Play (for iOS system, you can search for INVT IOT in the APP Store).

 Open the INVT Cloud APP, enter the account and password to log in. On the homepage, click the + icon in the upper-right corner, enter Adapter code, Secret key and Device name, select Device type, and click Submit to complete the device addition.

Note: For account information, refer to section 3.3 Monitoring platform account.



3. In the search bar, enter the adapter code to search. Click the device to enter the monitoring page and monitor the device.



3.3 Monitoring platform account

You can register a monitoring platform account through the Web or APP, and the same account and password can be used on all three monitoring platforms.

3.3.1 Web registration

- Step 1 Enter: iot.invt.com in the address bar of Google Browser and press Enter to visit the login page of the industrial IoT application platform.
- Step 2 Click Registered.



Step 3 Fill in the Company name, User name, Password, then confirm the password again. Enter your Mobile number, click Verification code, fill in the verification code received via SMS, and enter the invitation code. Invitation code: You can obtain it through the higher-level user account. If there is no higher-level one, you can fill in dbf20a (INVT administrator invitation code). Review and check the User Privacy Agreement, click Register, and wait for review. You will receive a notification via SMS once approved.



3.3.2 APP registration

Step 1 Download and install the INVT Cloud APP on your mobile device.

✓Note: You can download it by searching for INVT IOT in Tencent MyApp Store or GooglePlay (for iOS system, you can search for INVT IOT in the APP Store). Step 2 Open the INVT Cloud APP, and click Registered.

Step 3 Fill in the Company name, User name, Password, then confirm the password again. Enter your Mobile number, click Verification code, fill in the verification code received via SMS, and enter the invitation code. Invitation code: You can obtain it through the higher-level user account. If there is no higher-level one, you can fill in dbf20a (INVT administrator invitation code), review and check the User Privacy Agreement, click Register, and wait for review. You will receive a notification via SMS once approved.

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Hello!	Registered
Welcome to INVT IOT Cloud Platform	*Company name Please enter
Account Please enter mobile phone number	*User name Please enter
Password Please enter password	*Password Please enter
Verify Code Please enter Gel g	*Confirm password Please enter
Registered	*E-mail Please enter
Sign in	*Verify Code Please enter Get code
I have read and agree User Agreement, Privacy Policy	Invite code Please enter
	Register now
	I have read and agree User Agreement, Privacy Policy

3.4 FAQs

1. After powering on, the power indicator does not flash or light up.

Answer: Check whether the expansion card is installed correctly.

After power on for three minutes, the network status indicator flashes quickly at a frequency of 75ms, but no data is displayed on the web page.

Answer:

1) The expansion card with a SIM card is not installed properly. Power off and re-install it for

ensuring good connection.

- 2) Move the 4G antenna to a place with good signal.
- 3) Ensure that the SIM card is activated and has remaining balance.
- 4) Contact the manufacturer to check whether the device ID is registered.
- 3. Data uploading doesn't match the web page display.

Answer:

- 1) Re-power on and upload all data again.
- Check whether the order and device type is matching, if not, please contact the manufacturer.
- 4. In the web system, only data content can be displayed, and commands cannot be issued.

Answer: Check the VFD function codes to ensure that the remote mode is enabled.



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The products are owned by Shenzhen INVT Electric Co., Ltd. Two companies are commissioned to manufacture: (For product code, refer to the 2nd/3rd place of S/N on the name plate.) INVT Power Electronics (Suzhou) Co., Ltd. (origin code: 06) Shenzhen INVT Electric Co., Ltd. (origin code: 01) Address: INVT Guangming Technology Building, Songbai Road, Address: No. 1 Kunlun Mountain Road, Science & Technology Matian, Guangming District, Shenzhen, China Town, Gaoxin District, Suzhou, Jiangsu, China Industrial Automation: PLC VFD Servo System Elevator Intelligent Control System Rail Transit Traction System UPS DCIM Solar Inverter SVG Energy & Power: New Energy Vehicle Powertrain System New Energy Vehicle Charging System New Energy Vehicle Motor

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