

QK-W015 WiFi Remote Controller

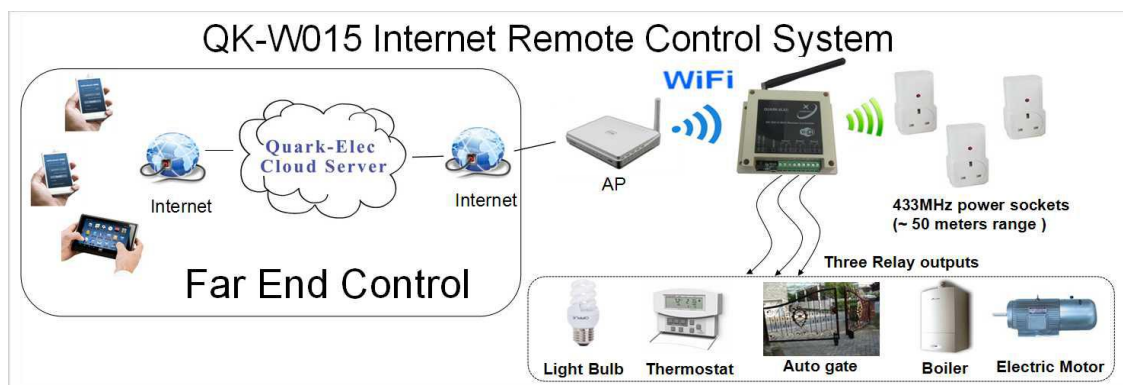
Features

- Turns electronic devices ON or OFF from any location via the Internet
- Remote control from up to 50 metres using WiFi
- Android, iOS APP and an application for Windows platforms
- Instant setup
- Up to 10 mobile phones per unit
- Switching of electronic devices through relays or 433MHz RF mains sockets
- Master ON/OFF function, allowing users to turn all devices on or off using one click
- Supports both ad hoc and station modes
- UK, Europe & US RF power sockets available



Applications

- Lighting and electrical appliance control
- Smart houses
- Automation applications
- Remote maintenance
- Irrigation systems
- Plant maintenance
- Valve control
- Pumping stations
- Security systems
- PLCs and automation systems



Document history

Issue	Date	Changes / comments
1.0	12-10-2014	Initial release
1.1	02-12-2014	New hardware release

Order information

Part No	Description
QK-W015	WiFi Remote Controller (only three relay outputs, no RF 433MHz module and RF plug sockets)
QK-W015UK	QK-W015 with three RF 433MHz UK type mains sockets
QK-W015EU	QK-W015 with three RF 433MHz Europe type mains sockets
QK-W015US	QK-W015 with three RF 433MHz US type mains sockets

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1 INTRODUCTION

The QK-W015 series remote controller is a versatile device which can be attached to many electronic devices in homes, offices, plant or wherever required. Operators can control any remote equipment, heaters, lights, machines or power sockets from anywhere in the World via the Internet. QK-W015 supports three relay outputs and a 433MHz RF transmitter. RF power sockets within 50 metres of QK-W015 can also be controlled by mobile operators.

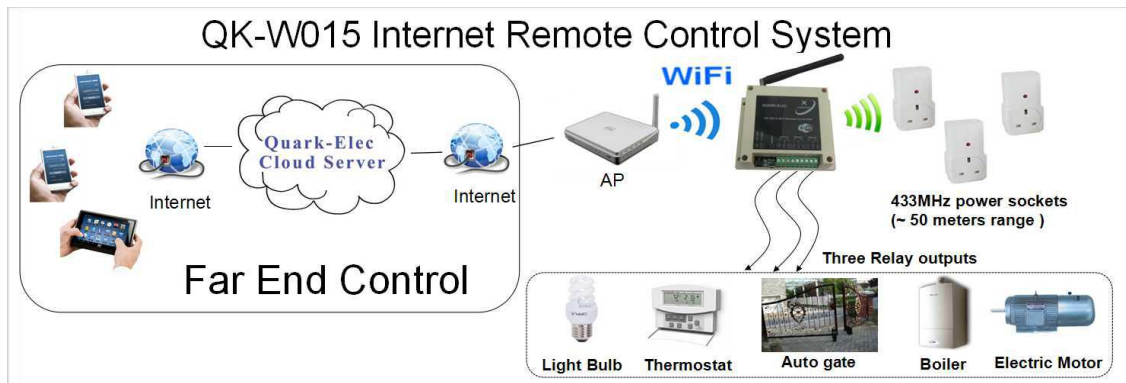


Figure 1 System diagram (Station mode)

2 SETUP

2.1 Power up

The QK-W015 remote controller needs to be powered by 12VDC voltage. Connect a 12VDC supply to the power socket and switch on the power supply. The blue LED should light up and then flash slowly. After about 10 seconds, the red LED will light up, indicating that the system has finished initialisation.

2.2 Accessing QK-W015

After QK-W015 has finished initialisation, the operator will be able to scan the SSIDs on the mobile terminals and locate the SSID called 'WiFi168'. Access the WLAN of the mobile terminal and connect with 'WiFi168', the default password is '88888888'. The blue LED will remain lit up once the SSID 'WiFi168' is connected via the operators mobile terminal. If SSID 'WiFi168' cannot be found, please go to the 'RESET' section of this application note and follow the steps to reset the module.



Figure 2 Search SSID



Figure 3 Connect to QK-W015

3 AD-HOC MODE

The IEEE 802.11 standard has two basic modes of operation, namely ad hoc mode and infrastructure mode (also called station mode). In ad hoc mode, mobile terminals transmit directly peer to peer, whilst in infrastructure mode the mobile terminals communicate through an access point (AP) that serves as a bridge to other networks (such as the Internet or a LAN). QK-W015 WiFi controller can support both ad hoc and station modes.

Setting QK-W015 to operate in ad hoc mode is quite straightforward. Once the mobile terminal is connected to the network, QK-W015 will operate in ad hoc mode automatically.



Figure 4 Working in ad-hoc mode

Operators can use the following link to download the latest version of the Android app which interworks with QK-W015:

<http://www.quark-elec.com/download/apps>

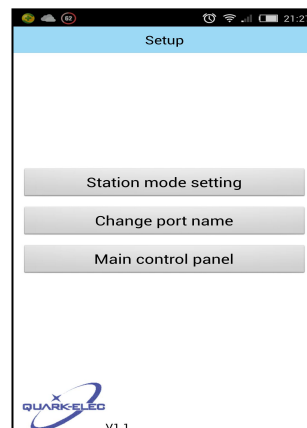


Figure 5 Main page of the APP

3.1 Connecting with mobile phones

Once 'WiFi168' is connected, operators can control electronic devices through the main control panel which, in turn, is connected to the relays and RF mains sockets. The indicator icons on the phone display (the lights next to the off button) can demonstrate each relay. Due to the one way communication between QK-W015 and 433MHz RF mains sockets, the status of the RF sockets cannot be checked and indicated.

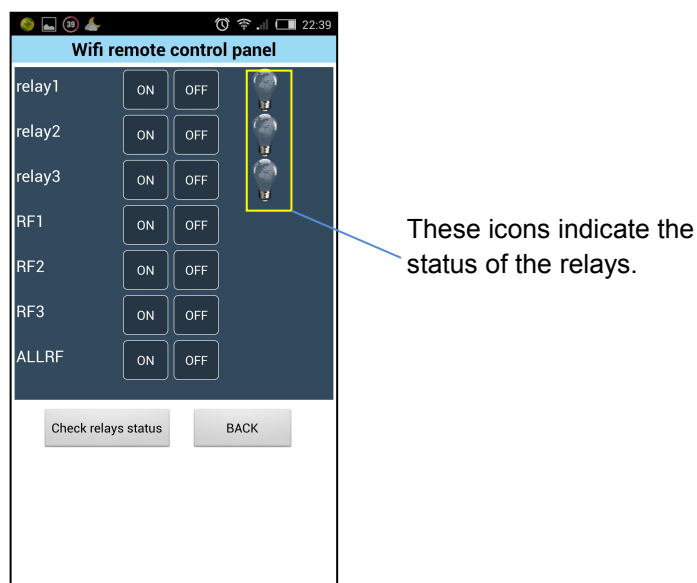


Figure 6 Setting indicators

3.2 Renaming the ports

Operators can rename the three relay outputs and the three RF mains sockets with meaningful names via the settings on APP.

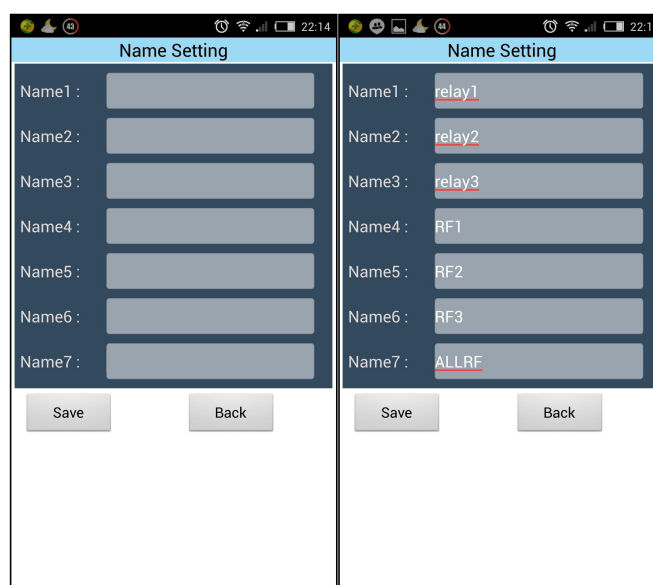


Figure 7 Renaming the ports

4 STATION (INFRASTRUCTURE) MODE

To control QK-W015 remotely, the mobile device should be set to operate in station mode and the operator needs perform the following procedure to complete the settings:

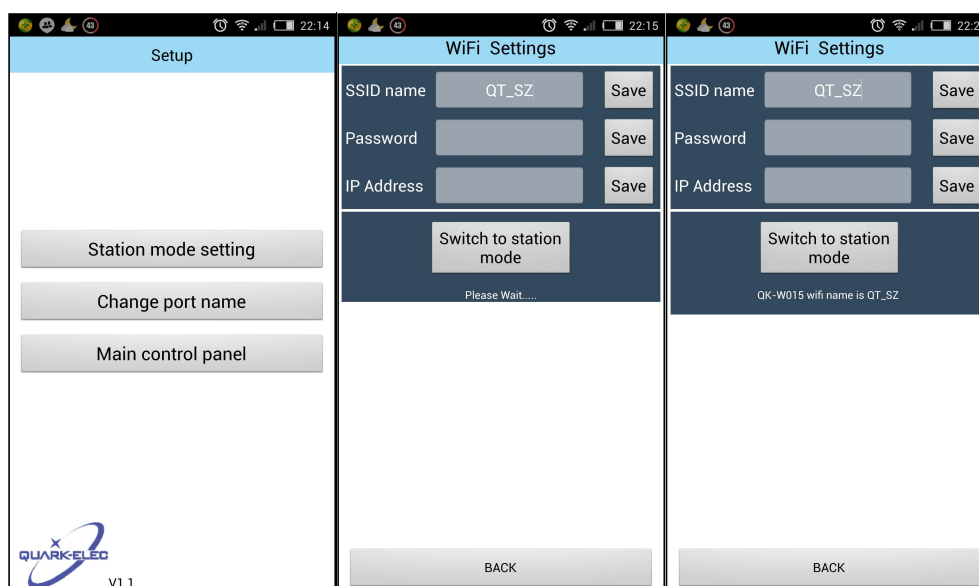
Quark-Elec application note

1. Press and hold the 'reset' button, then power up QK-W015. The blue LED will light up for a few seconds, then the red LED turns on. After the red LED has been on for 3 seconds, release the 'reset' button.
2. Wait for 60 seconds, the red LED will turn off and then turn on again. During this period, a blue LED will flash every second.
3. The operator can now use the mobile terminal to search for and connect to 'WiFi168'.
4. Once this ad hoc connection has been setup, the operator can enter the following settings via the APP:
 - SSID name – input the SSID name (also called the AP name) to which QK-W015 will connect. It is very important to ensure that there are no additional spaces added.
 - Password - input the password to access the AP. Quark-elec has noticed that for some older type access points, there may be connection problems with QK-W015 if the AP security type is set as 'WEP'. So, if operator has an access problem, please change the security type to 'WPA' or 'WPA2' and avoid 'using WEP' on the wireless router.
 - IP address – if the operator does not set up a static IP address on APP, a dynamic IP address will be assigned by QK-W015.
5. Power up QK-W015 to activate the remote control function.

4.1 Station mode setting through APP

The operator should ensure that QK-W015 has connected with the mobile terminal in ad hoc mode before making the following settings:

Run the APP, click 'station mode setting', input the SSID of the AP and then 'save'. The red LED will turn off and a message response will be received from QK-W015. The same process applies for setting the password. It is recommended that the operator uses a dynamic IP address in QK-W015 wherever possible: in this case no input is needed on 'IP Address' field.



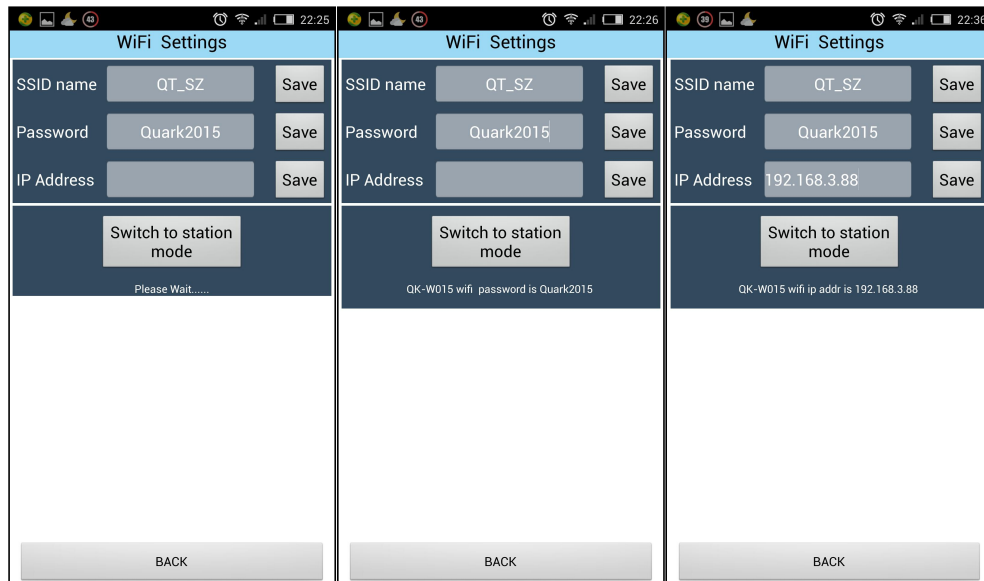


Figure 8 Station mode setting

4.2 Switching to station mode

Once the above settings are completed, the operator can click 'Switch to station mode' to set QK-W015 working in station mode.

- After clicking 'Switch to station mode', the red LED light will turn off, indicating the system is busy.
- After about 90 seconds, the blue LED will turn off. After another 30 seconds, the red LED light will turn on first, followed by the blue LED. If the SSID or password is not correct, then the blue LED will continue to flash. In this case, the operator should reset the module and repeat the setting procedure.
- Once QK-W015 has successfully connected with the AP in station mode, the operator should re-power up QK-W015 to get the full functionality (do not press the reset button during the power up process).

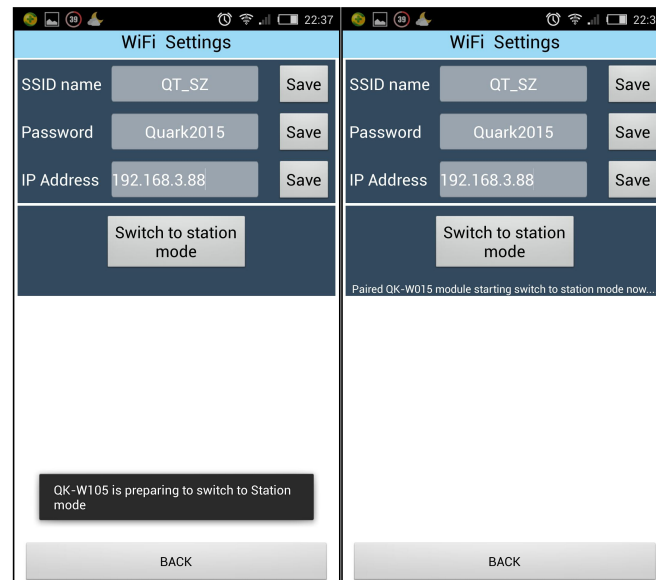


Figure 9 Switching to station mode

4.3 Reset

The user can always reset QK-W015 if the settings are incorrect or if the working mode needs to be changed. The steps below can be used to reset QK-W015 to the factory settings:

- Power off QK-W015.
- Press and hold the 'Reset' button, then power up QK-W015. The blue LED will light up for a few seconds, then the red LED will turn on. After the red LED has been on for 3 seconds, release the 'Reset' button.
- Wait for 60 seconds, the red LED will turn off and then turn on again. During this period, the blue LED will flash every second.
- The operator can now connect to 'WiFi168'.

5 PAIRING WITH RF POWER SOCKETS

QK-W015 has a built-in 433Mhz RF transmitter module which can pair with up to four RF power sockets. So operators are able to turn electrical devices ON/OFF by switching the power sockets.

The power sockets have been paired and ready to use when delivered with QK-W015. However the operator can always pair or release the pairing using the following steps:

- Insert the RF power socket into a powered mains wall socket.
- The LED light on the socket should flash at 1 second intervals indicating that it is ready to pair with the QK-W015. If the light does not flash, press and hold the ON/OFF button for 5 seconds to clear the memory (indicated by the LED flashing quickly).
- Open the WiFi remote control panel in APP and press the corresponding RF switch 'ON' button. The pairing command will be sent out via RF signals.

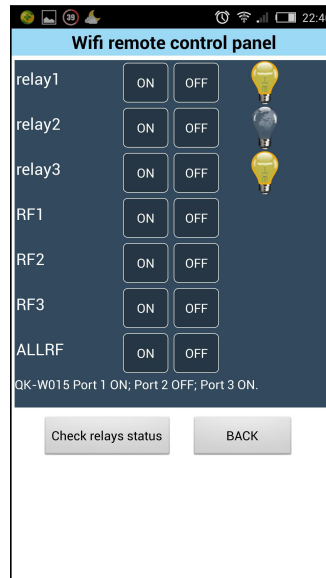


Figure 10 RF switch ON buttons

- Once the power socket has received the pairing command the LED on the socket will flash briefly more quickly and then flash at 1 second intervals. The RF mains socket will now be successfully paired.
- Repeat the above process for each different RF mains socket.

Simply plug in the appliance which you want to operate remotely into the RF socket and, using APP press the corresponding ON button that is paired to the socket. The appliance will turn on.

6 APP (ANDROID VERSION)

The latest version of the Android APP can be downloaded via the following link:

<http://www.quark-elec.com/download/apps>

Once the mobile phone has connected with QK-W015, the operator can control the electronic devices which are connected to the relays and RF mains sockets. The operator can also check the status of the relays by clicking 'Check relays status'.

7 HARDWARE

7.1 Connections

A general view of the module and details of each connection is shown below. QK-W015 uses 12VDC and 1.0A of power. The outside and inner diameters of the plug are 5.5mm and 2.1mm.

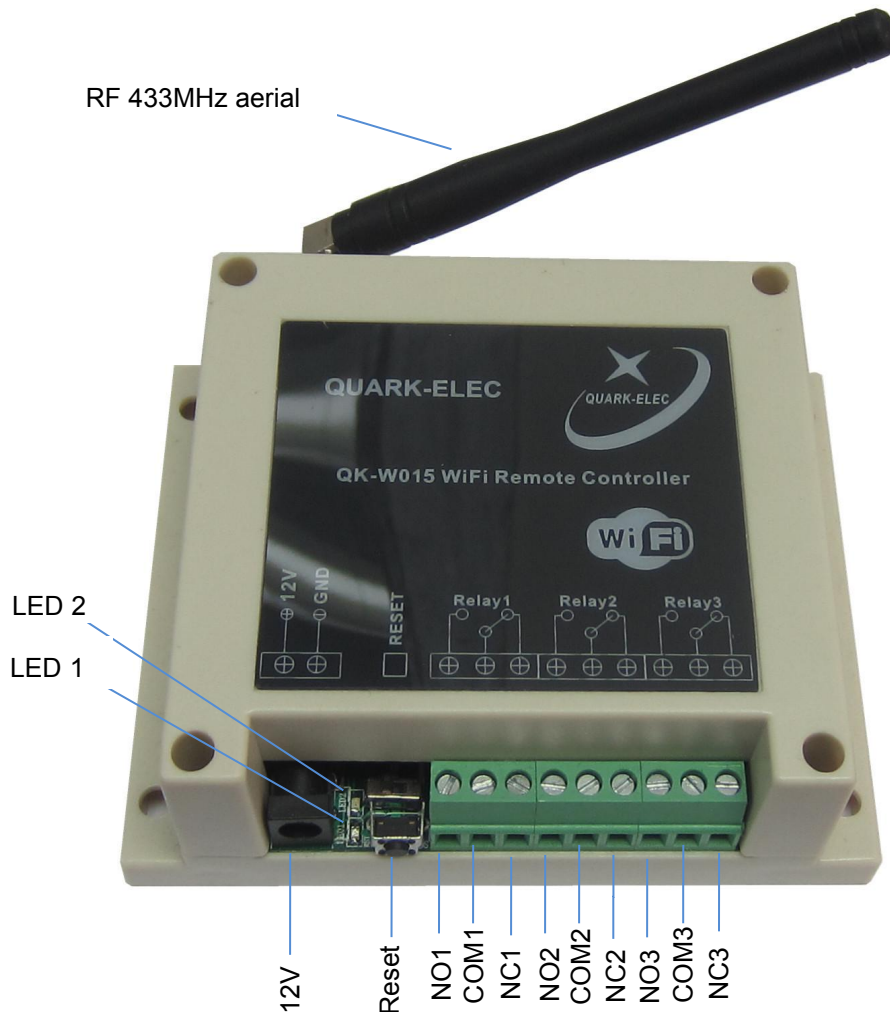


Figure 11 mechanical drawing

7.2 RF mains sockets

Customers can select US, European or UK type RF mains sockets. The Quark-elec standard RF mains sockets have a 2kW power rating.

Although QK-W015 runs specific algorithms to increase the RF transmission reliability, Quark-elec cannot guarantee a 100% correct action rate for the RF mains sockets. The RF signal could be affected by other nearby RF devices such as bell rings, car keys, cordless phones, mobile phones and RF alarm systems.

The following are real test results taken in a house environment in the UK:

Distance between QK-W015 and 433Mhz RF mains sockets	Proper action rate (RF mains sockets successfully triggered by QK-W015)
2 metres	100.0%
5 metres	100.0%
8 metres	99.2%
10 metres	98.1%
15 metres	95.4%
20 metres	93.7%

7.3 Enclosure

QK-W013 uses an IP56 Insulation Class 2 plastic enclosure with 115 x 90 x 40 mm external dimensions.

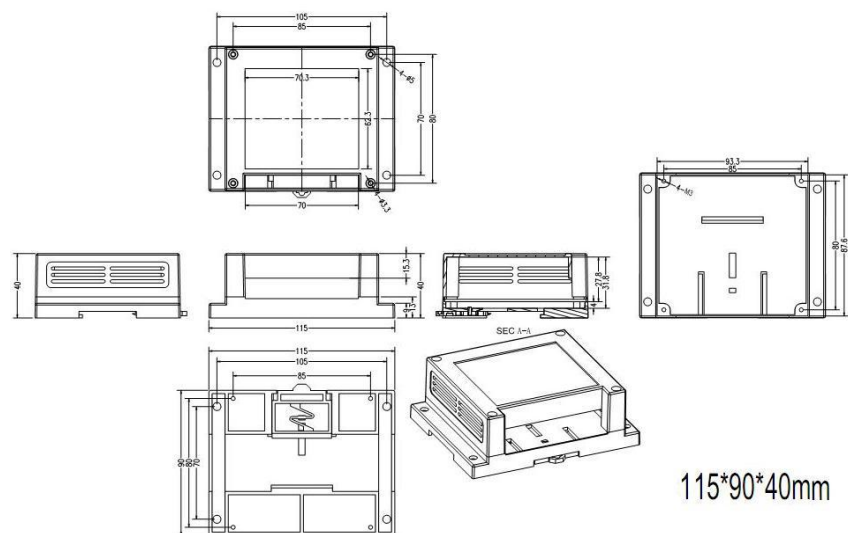


Figure 12 Enclosure drawing

8 OPERATING SPECIFICATIONS

Item	Specification
Operating temperature	-25°C to +80°C
Storage temperature	-40°C to +85°C
DC supply	12.0V (+/-10%)
Average supply current (typical quiescent)	160mA
Supply current in busy period (data transmission)	190mA
WLAN standard	IEEE 802.11b/g/n
Operating frequency	2.4000 to 2.4835GHz
Receive sensitivity	-85dBm @ 11Mbps, -70dBm @ 54Mbps
Transmit mean output power	+17dBm for 802.11b, +13dBm for 802.11g, +12dBm for 802.11n
WiFi antenna	Built in module U.FL antenna connector
Encryption	Support for WEP40/64, WEP104/128, WPA-PSK, WPA2-PSK, AES and TKIP
433 Mhz transmitting power	1W
433 Mhz modulation mode	ASK (AM)
RF transmission power	<10mW
RF emission distance	25 to 50 metres (open air conditions)
Rated current on relay	7A, 240VAC
Rated voltage on relay	90V - 245V
Power rating on RF mains sockets	< 2000W

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For sales and purchasing information, please email us at: info@quark-elec.com



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