

WiFi AirBox V2 series

AirBox/10 single radio WiFi 4 multifunction AP
AirBox/12 dual band WiFi 4/5 multifunction AP

Quick installation guide

- ✓ Access point, Router, Repeater, Bridge, Mesh
- ✓ 2 Gigabits LAN with one PoE 802.3af
- ✓ Compact metal housing
- ✓ Wall or optional DIN Rail mounting
- ✓ Dual DC power inputs 9 to 48 VDC
- ✓ 2 insulated programmable digital inputs, 2 insulated programmable digital outputs

Before starting, please check the product kit part listing below. Contact immediately your dealer if any item is missing or damaged:

- One **AirBox/10 or /12 V2** device
- 1 standard cat. 5e straight Ethernet cable
- 2 WiFi omni-directional dual-band 2.4/5 GHz antennas for AirBox/10
- 5 WiFi omni-directional dual-band 2.4/5 GHz antennas for AirBox/12
- This quick installation guide printed

Before continuing, check for the latest documentations on the www.acksys.fr web site. Read the « [WaveOS user guide](#) ».

You will need:

- a Windows PC to install WaveManager,
- a web browser, IE or compatible
- an android smartphone to install optional application WaveViewer.

PoE feature is supported from AIRBOX V2 version.

ACKSYS
COMMUNICATIONS & SYSTEMS

10, rue des Entrepreneurs
Z.A Val Joyeux
78450 VILLEPREUX - France

Phone +33 (0)1 30 56 46 46
Fax: +33 (0)1 30 56 12 95
Web: www.acksys.fr
Hotline: support@acksys.fr
Sales: sales@acksys.fr

HARDWARE INSTALLATION

1. Plug the antennas in

Connect the supplied antennas on the connectors according to the model you have. See section **WiFi Ant' antenna connectors** to get relevant information.

2. Connect the power supply

See the **Power supply** and **CONNECTORS** sections about the characteristics of the power supply.

The device has no ON/OFF switch. It turns-on automatically when power is applied. Check LEDs PWR1 and PWR2:

- **PWR1** LED is ON if power supply 1 or PoE is ON.
- **PWR2** LED is ON if power supply 2 is ON.

The Diag LED stays red for around 60 seconds, until the device is fully ready to use. Then the Diag LED turns green.

3. Connect the Ethernet cable

- If you want to use the product in PoE mode, connect the PoE source onto LAN2. Do not connect simultaneously PWR1/PWR2 power supplies.
- Plug the provided Ethernet cable to the LAN1 or LAN2 connector.
- Check that the corresponding LAN1 or LAN2 LED turns ON at that point.

SOFTWARE CONFIGURATION

4. Modifying the default IP address 192.168.1.253

From any PC on the network, run the Windows application **WaveManager** (found on the ACKSYS website: www.acksys.com)

- Go directly to step 5 if the default IP address is compatible with your network.
- Select the device in the list and click on « **Setup/Fast IP configuration** » button.
- You can configure the IP address to make it compatible with your network or activate the DHCP client.

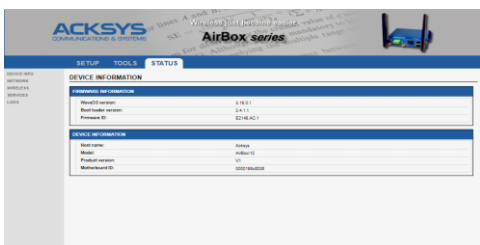


Warning: If you change the IP address of the product also think about changing the IP address of the network interface of the connected PC.

5. Configure the product

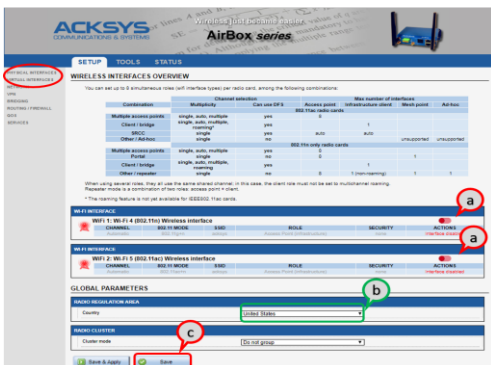
Run the WEB Interface of the product from WaveManager (via WEB server button)

- The default page (**STATUS** tab) displays the device status



Now select the “**SETUP**” tab.

- You will be asked for a username and password. You must choose the **root** user. **No password is required by default.**
- You get now access to the setup page.



In the “**wireless interfaces overview**” section, you must:

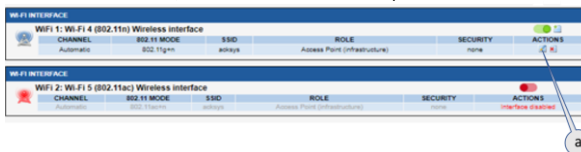
- Enable the Wi-Fi radio interface** to set up its Wi-Fi parameters (alternatively you can navigate to change network and services configuration).
- Select your country** in order to enforce applicable **regulation rules**
- Click on Save** to validate.

The default factory settings are:

- Access point mode
- SSID "acksys"
- No security
- Automatic radio channel and 11an mode

To configure the WiFi interface:

- a. click on **Edit**, to set Wireless essential parameters



Customize your Wireless interface according to

- The operating mode: Access point, client (bridge)
 - Wi-Fi parameters: 802.11 mode, radio channel, SSID
 - Wi-Fi security parameters (WEP, WPA, WPA-PSK, WPA2, WPA2-PSK, SSID broadcast or not)
- You will find a complete description of all modes in the **WaveOS** user guide.



Warning: Save your settings by clicking "**Save & Apply**". Otherwise your settings will be lost if the product has to restart

FINAL INSTALLATION

1. Install the device

- Place the device in an appropriate place.

2. Check the orientation of the antennas

- Insure that their position allows proper communication with the peer Wi-Fi devices.
- Specifically, insure that there are **no obstacles** between the device and its peers ("line of sight" concept).

QUICKLY EVALUATE AP & BRIDGE MODES

Quickly evaluate the ACKSYS device in AP role

You need a second computer (PC2) with a working Wireless connection.



Set up the PC2 Wireless network interface according to the default parameters of the ACKSYS AP device (802.11gn, SSID "acksys", no security).

Quickly evaluate the ACKSYS device in client role

You need two ACKSYS devices, and a second computer (PC2) with a wired LAN connection.



Set up the IP addresses according to the picture above and set the device connected to PC2 to Client (infrastructure) role.

From each PC, start a command prompt and run the ping command to verify the link.

From PC1: type **ping 192.168.1.2**, verify the answer returned by PC2
« Answer from 192.168.1.2... »

From PC 2: type **ping 192.168.1.1**, verify the answer returned by PC1
« Answer from 192.168.1.1... »



Notice: The State LED is flashing until the bridge connects to the AP.

TROUBLESHOOTING

None of the led indicators turns ON

- Check the power supply (voltage, cabling).

The relevant LAN1 or LAN2 led stays OFF

- Check that the remote device is turned ON.
- Check the Ethernet plugs on both sides.
- Try to connect to another device.
- Use the provided RJ45 cable to connect the device.

The Wi-Fi link does not come up (STATE led OFF or blinking)

- Make sure the WiFi interface is enabled (not by default)
- Make sure that the Wireless parameters of the Client (case sensitive SSID, 802.11 mode, radio channel and security) match those of the AP.
- Check the radio conditions: distance between devices, placement of antennas, interferences and obstacles to radio waves propagation.
- Try with all securities and encryption settings temporarily disabled.
- Try using the product with factory settings as shown in the “Quickly evaluate...” section.
- Try another radio channel.

“WaveManager” doesn’t find your device

- WaveManager only scans the local network.
- Check that your firewall does not block WaveManager.

How to restore factory settings

- If the built-in web-based interface is reachable, you can use your browser to restore factory settings.
Else, power up the unit, wait for the red “Diag” LED to turn green, then hold down the reset button (for at least 2 seconds)

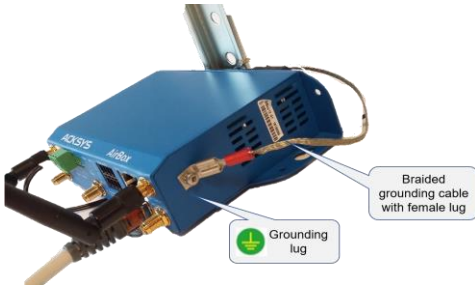
RESET

- A **RESET** button is accessible from the front panel.
- Use exclusively a 2mm diameter non-metallic object to press the button.



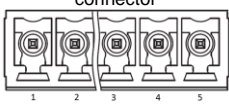
EARTH GROUNDING

- There are 2 ways to connect the product to the ground:
 - Use the power terminal block on the front panel
 - Use the grounding lug (0.81x6.35 mm) on the right side. For efficient grounding, we recommend using a braided metal wire connected to a female lug (not supplied)

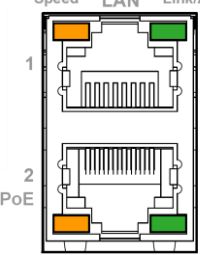


CONNECTORS

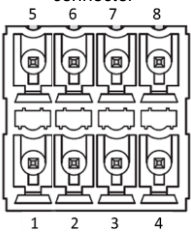
9-48VDC connector (Power supply)

<p>5-way terminal block connector</p> 	Signal name		Pin
	Power 1	VIN1-	1
		VIN1+	2
	Power 2	VIN2-	3
		VIN2+	4
EARTH		5	


LAN connectors (Ethernet)

<p>RJ45 connectors</p> <p>Speed LAN Link/Act.</p> 	<p>LAN1 and LAN2 are two Ethernet ports.</p> <p>These ports support the Auto-negotiation function.</p> <p>They can automatically select the transmission speed (10 Base-T, 100 Base-Tx or 1000 Base-T Half/Full Duplex).</p> <p>It enables to the device to coexist in the network by mitigating the risks of network disruption arising from incompatible technologies.</p> <p>LAN2 has a PoE Powered Device, built in interface, 802.3 af compliant.</p>
--	--

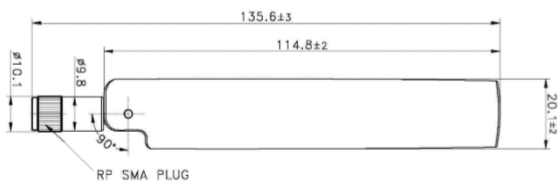
Digital I/O connector (Digital inputs/outputs)

<p>8-way terminal block connector</p> 	Signal name		Pin
	OUT1	V_{out1}	1
		GND	5
	OUT2	V_{out2}	2
		GND	6
	IN1	V_{in1}	3
		GND	7
	IN2	V_{in2}	4
GND		8	

'WiFi Ant' antenna connectors (50 ohms)

<p>RP SMA female connector</p>  <p align="center">Center pin</p>	<p>AirBox/10 AirBox/12</p>	<p>WiFi1 interface (2T/2R)</p> <ul style="list-style-type: none"> • WiFi1 Ant1: RF connector for the 1st antenna • WiFi1 Ant 2: RF connector for the 2nd antenna
	<p>AirBox/12</p>	<p>WiFi2 interface (3T/3R)</p> <ul style="list-style-type: none"> • WiFi2 Ant 1: RF connector for the 1st antenna. • WiFi2 Ant 2: RF connector for the 2nd antenna. • WiFi2 Ant 3: RF connector for the 3rd antenna.
	<p>To get the highest benefit of the MIMO technology and its high radio bit rate, you must connect all antennas (2 in 2T/2R and 3 in 3T/3R).</p> <p>Nevertheless, in degraded mode, it is possible to connect a single antenna for a 2T/2R interface (use exclusively Ant1 connector) or 1/2 antennas for a 3T/3R interface (use exclusively Ant1 connector or Ant1/Ant2 connectors).</p>	

WiFi ANTENNA

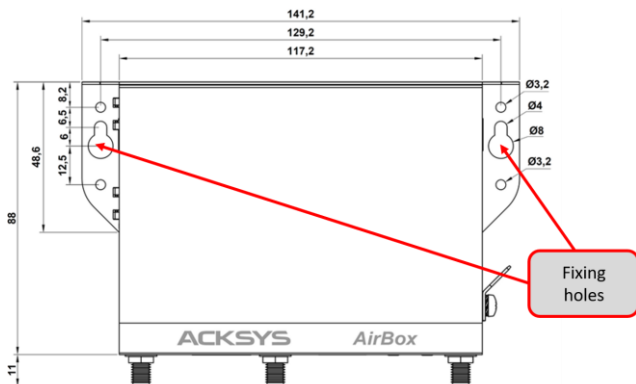


Unit: mm

Type of antennas	Dipole, dual band, omnidirectional, swivel
Dual band	2.4 / 5.8GHz
Connector	RP-SMA male
Gain	3 dBi

PANEL MOUNTING OF THE DEVICE

For fixing, use the 2 opposites holes of $\varnothing 8$ present on the case.



Moreover, it is possible to mount the product on a DIN RAIL by using the **WL-FIX-RD2** kit



LEDs definition

The product has LEDs according to the models.

The status LEDs indicate:

LED	Color	Description
PWR1	Green	On: a power supply is connected to pins VIN1 of the power connector or by a PoE source connected to LAN2
PWR2	Green	On: a power supply is connected to pins VIN2 of the power connector
Diag	Red/ Green	This led indicates the unit operational state. Off: Power supply is off Red: Initialization during 40s after power is applied then goes Green Red for more 120s: hardware failure Green: Ready to use Blinking: Firmware in flash is loading or not valid; please load new firmware with "WaveManager"
Link/Act LAN 1/2	Green	On: Link on LAN established Flashing: Tx/Rx activity Off: Link on LAN broken
SPEED LAN1/2	Yellow	On: connected in 1000 BASE T Off: connected in 100 BASE Tx or 10 BASE T
S (State) WiFi1/2	Green	Off: the radio is disabled Blinking: the product is unassociated solid "On": the product is associated
A (Activity) WiFi1/2	Blue	Flashing: Radio Tx/Rx activity

DIGITAL INPUTs

The product has 2 digital inputs. These inputs are used to signal an event in the product (See WaveOS user manual). The signal must be applied on the pins IN1 or IN2 of the digital I/O connector.

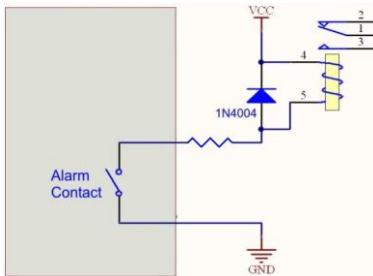
The voltage applied must not exceed 24 VDC. The product interprets any voltage between 0V and 1V as a logic level "0", and any voltage between 3V and 24V as a logic level "1". Between 1V and 3V, the state is undetermined.

DIGITAL OUTPUTs (ALARM CONTACTOR)

The product has two digital outputs in order to signal an alarm defined by the configuration of the product (See WaveOS user manual). The alarm uses the pins OUT1 or OUT2 of the digital I/O connector.

The contact is closed during normal product operation and opens when the alarm condition occurs. It opens as well when the product is powered off or not in an operational state.

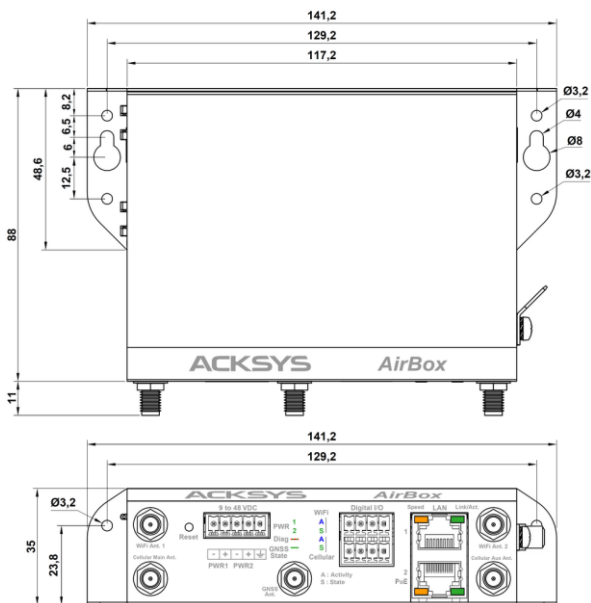
The alarm contact can switch 60V maximum voltage with a current up to 80mA, and protected against transient surges. This is a first stage alarm contactor which must not be used to drive power directly. To carry out this function, please consider the use of a power relay, as shown in the picture below:



TECHNICAL CHARACTERISTICS

General characteristics	
Dimensions (w/o antennas)	L x l x h = 141.2 x 99 x 35 mm L x l x h = 8.85 x 4.25 x 2.42 in
Weight	AirBox/10: 311 g w/o accessories, 345 g with antennas and power supply terminal block AirBox/12: 338 g w/o accessories, 412 g with antennas and power supply terminal block
Enclosure	IP 30
Operating temperatures range	-20°C to +60°C (-4°F à 140°F)
Storage temperatures range	-40°C to +85°C (-40°F à 185°F)
Relative humidity	5% to 95% non-condensing
Reset button (accessible from front panel with a sharp object < 2 mm)	Short push (< 1 sec), anytime: → Reset Long push (> 2 sec.): - while operating: → Restore factory settings - while in emergency upgrade mode: → Restore factory settings - at startup: → enter emergency upgrade

Mechanical characteristics



All dimensions are given in mm

Software	
Device configuration	Automatic discover of the product Built in web interface with login/password protection
Firmware upgrade	Via web browser or "WaveManager"
SNMP	SNMP V2C, V3
Operating mode	AP (Access Point), Router, Repeater, Bridge/Client, Mesh, WDS
AP mode only	
Network topology	Infrastructure
Security	WEP, WPA-PSK/WPA2-PSK, WPA/WPA2 with 802.1x authenticator, SSID visibility status
Client/Bridge mode only	
Network topology	Infrastructure, ad-hoc or mesh mode
Security	WEP, WPA-PSK, WPA2-PSK. 802.1x supplicant. AES/TKIP/WEP by hardware encryption
Mesh mode only (supported only with 11n WiFi interface)	
Network topology	802.11s
Security	SAE/AMPE

Power supply	
Number of power supply inputs	3, PWR1, PWR2 and PoE
PWR1/PWR2 source	9 to 48VDC protected against wire inversion 5-ways terminal block connector
PoE source	802.3af /802.3at type 1 class 3 on LAN2 Feature available from V2 version of the product
Power consumption	AirBox/10 : Average consumption between 2,1 et 6W. Recommended power supply 7W. AirBox/12 : Average consumption between 2,7 et 11W. Recommended power supply 15W.

Ethernet interface	
Number of ports	2 (LAN1, LAN2), LAN2 with PoE 802.3af
Type of ports	Auto MDI/MDI-X 10 BASE T/100 BASE Tx/1000 BASE T with automatic 802.3u negotiation (10/100/1000 Mbps)
Connectors	RJ45
Cables	Ethernet CAT5e UTP, 2x RJ45 connector (straight cable T568B)

Digital inputs	
Number of DIO	2 (IN1, IN2)
Type	Opto-isolated
Tension max	24VDC, protected against over-voltage
Isolation	1500V
Connector	8-ways terminal block connector

Digital outputs (Alarm contact)	
Number of DIO	2 (OUT1, OUT2)
Type	Solid state relay 1 form A (normally open)
Max voltage	60VDC, not polarized, protected against transient over-voltage
Max load current	80mA
ON-Resistance	25 ohms typ., 35 ohms max
Isolation	1500V
Connector	8-ways terminal block Connector

Wi-Fi interfaces	
Number of interfaces	1 for AirBox/10 ou /14 (WiFi) 2 for AirBox/12 (WiFi1, WiFi2)
WiFi or WiFi1	802.11n 2T/2R (modes a & g, 300 Mbps max.)
WiFi2	802.11ac wave 1 3T/3R (modes a & g, 1.3 Gbps max.)
Radio mode	Supports for IEEE 802.11a/h, 802.11b, 802.11g, 802.11n and 802.11ac
Modulation rates	802.11ac 3T/3R: up to 1.3 Gbps 802.11n 2T/2R: up to 300 Mbps 802.11a/h: 6 to 54 Mbps 802.11b: 1 to 11 Mbps 802.11g: 1 to 54 Mbps
Frequency range for 802.11a/n/ac	5 GHz; 5.150 to 5.850 GHz
Frequency range for 802.11b/g/n	2.4 GHz; 2.412 to 2.484 GHz
Antenna sockets	2 RP-SMA female for AirBox/10 5 RP-SMA female for AirBox/12

Wi-Fi1 / dual-band 11n 2T/2R

Output Tx power (radio card output)	Modes	1 RF chain
	802.11b/g	19 dBm @ 6M 15 dBm @ 54M
	802.11a	18 dBm @ 6M 15 dBm @ 54M
	802.11gn HT20	20.5 dBm @ 7.2 Mbps (MCS 0) 18 dBm @ 72.2 Mbps (MCS 7)
	802.11gn HT40	20.5 dBm @ 15 Mbps (MCS 0) 18 dBm @ 150 Mbps (MCS 7)
	802.11an HT20	18 dBm @ 7.2 Mbps (MCS 0) 15 dBm @ 72.2 Mbps (MCS 7)
	802.11an HT40	18 dBm @ 15 Mbps (MCS 0) 15 dBm @ 150 Mbps (MCS 7)

Values are given by the radio card manufacturer at ± 2 dB. They must be subtracted by 2dB because of RF losses between radio card connector and antenna connector. The values are given for 1 chain. Aggregate power is calculated by adding 3 dB for 2 chains and 4.8 dB for 3 chains.

Rx sensitivity (radio card input)	802.11b	NA
	802.11b/g	-94 dBm @ 6M -80 dBm @ 54M
	802.11a	-96 dBm @ 6M -84 dBm @ 54M
	802.11gn HT20	-92 dBm @ 7.2Mbps (MCS 0) -76 dBm @ 72.2 Mbps (MCS 7)
	802.11gn HT40	-90 dBm @ 15 Mbps (MCS 0) -73 dBm @ 150 Mbps (MCS 7)
	802.11an HT20	-96 dBm @ 7.2Mbps (MCS 0) -75 dBm @ 72.2 Mbps (MCS 7)
	802.11an HT40	-91 dBm @ 15 Mbps (MCS 0) -72 dBm @ 150 Mbps (MCS 7)

Values are given by the radio card manufacturer with a ± 2 dB tolerance. Add 2 dB to get the value on the antenna connector.

WiFi2 / Dual-band 11ac wave 1 3T/3R

Output Tx power (radio card output)		1 RF chain
	802.11b/g	19 dBm @ 6M 15 dBm @ 54M
	802.11a	18 dBm @ 6M 15 dBm @ 54M
	802.11gn HT20	19 dBm @ MCS 0 13 dBm @ MCS 7
	802.11gn HT40	18 dBm @ MCS 0 13 dBm @ MCS 7
	802.11an HT20	18 dBm @ MCS 0 13 dBm @ MCS 7
	802.11an HT40	18 dBm @ MCS 0 12 dBm @ MCS 7
	802.11ac HT20	18 dBm @ MCS 0 12 dBm @ MCS 9
	802.11ac HT40	18 dBm @ MCS 0 11 dBm @ MCS 9
	802.11ac HT80	18 dBm @ MCS 0 10 dBm @ MCS 9

Values are given by the radio card manufacturer at ± 2 dB.

They must be subtracted by 2dB because of RF losses between radio card connector and antenna connector. The values are given for 1 chain. Aggregate power is calculated by adding 3 dB for 2 chains and 4.8 dB for 3 chains.

Rx sensitivity (radio card input)	802.11b	Non disponible
	802.11b/g	-94 dBm @6M -80 dBm @54M
	802.11a	-96 dBm @6M -84 dBm @54M
	802.11gn HT20	-94 dBm @MCS 0 -77 dBm @MCS 7
	802.11gn HT40	-93 dBm @MCS 0 -75 dBm @MCS 7
	802.11an HT20	-95 dBm @MCS 0 -77 dBm @MCS 7
	802.11an HT40	-92 dBm @MCS 0 -77 dBm @MCS 7
	802.11ac HT20	-94 dBm @MCS 0 -70 dBm @MCS 9
	802.11ac HT40	-91 dBm @MCS 0 -65 dBm @MCS 9
	802.11ac HT80	-90 dBm @MCS 0 -61 dBm @MCS 9

Values are given by the radio card manufacturer with a ± 2 dB tolerance.

Add 2 dB to get the value on the antenna connector.

Regulatory compliance

The device conforms to the following council directive and is appropriately CE marked:

N°	Titre
2014/53/EU	Radio Equipment Directive (RED) (See the EU DECLARATION OF CONFORMITY on our website)

WiFi/WiFi1 interface conforms to:

FCC part 15	FCC modular approval (ID = Z9W-RMB)
-------------	-------------------------------------

WiFi2 interface conforms to:

FCC part 15	FCC modular approval (ID = TK4WLE900VX)
-------------	---

OPTIONAL ACCESSORIES

REFERENCE	CONTENT
PWS12-UNI-PH3	AC (110V/220V) to 12 VDC power adapter with cable terminated by 3 pin terminal block
WL-FIX-RD2	DIN rail fixing kit
All items can be ordered separately	