

INFIGATE



INSTALLATION MANUAL

Product: **AC Mobile Control (ACMC)
Communication Gateway
for LG Electronics Air Conditioning**

P/N: **SYNG1030-HA
SYNG1030-BMS**



ATTENTION

- Read whole manual before installation of the product.
- Installation of this product can be done only by a qualified personnel.
- After reading keep this manual for future use.

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DEVICE IDENTIFICATION

Please fill all fields below:

Model (P/N) _____ / _____
(model of ACMC/connected outdoor unit)

Serial number (S/N) _____
(ACMC serial number)

Required data can be found on the device.

Seller name _____

Contact _____

Purchase date _____

- Please include the purchase confirmation to this manual for verification purposes in case of warranty service.

READ THE MANUAL



There are many useful information inside this manual. Especially: how to use the product, configuration and installation.

Remember: professional installation and configuration is a key to long and stable work of the device.



Safety precautions

To prevent user injury or damage of another devices it is required to follow all safety precautions.

- In case of impropriate installation, device operation can cause serious injuries or damages, risk of those occurrences are classified by markings described below:

 WARNING	Marking indicates risk of death or serious injury.
 ATTENTION	Marking indicates risk of damaging the equipment.

- Other markings used in this manual.

	Do not do this !
	This has to be done !



WARNING

■ Installation

Do not touch the device while it's connected to the power source.

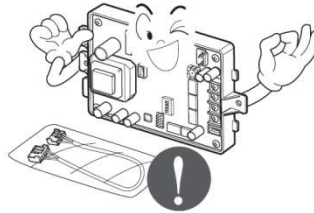
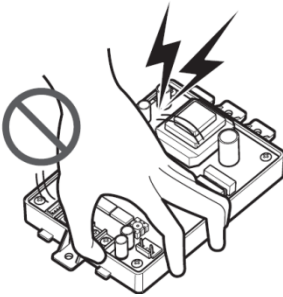
- Risk of fire or electric shock.

Use only supplied connectors and accessories.

- Do not disassemble or repair the product. There is a risk of damaging it or electric shock.

Use assistance of qualified dealer, seler, electrician or authorised service partner.

- Do not disassemble or repair the product. There is a risk of damaging it or electric shock.



Safety precautions

Use the correct fuses.

- Risk of fire or electric shock.

Customer can't install, remove, reinstall or uninstall the device by it's own.

- Risk of electric shock and injury.

For installation always use help of qualified personnel.

- Risk of electric shock and injury.



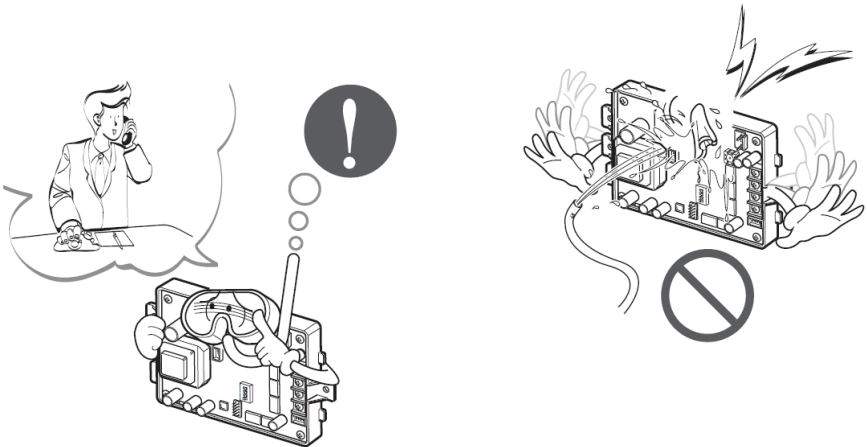
■ Operation

Contact seller is the product was soaked (flooded or submerged).

- Risk of fire or electric shock.

Product can't be in direct contact with water (also rain, snow, ice).

- Risk of fire, electric shock or product damage.



Overview



■ Functions

- Remote control of 20* (or 250**) indoor units
- changing indoor units operation modes: Cool / Fan / Dry / Heat / Auto
- changing fan speed: Auto / Low / Medium / Hi / V. Hi / Power
- setting room temperature
- reading actual room temperature
- turning on/off the Swing option
- turning on/off the Plasma option (function availability depends on indoor unit model)
- turning on/off the indoor units
- setting schedules for indoor units (up to 4 for each)*
- turning on/off the local control**
- operation with: AC Mobile Control Application*

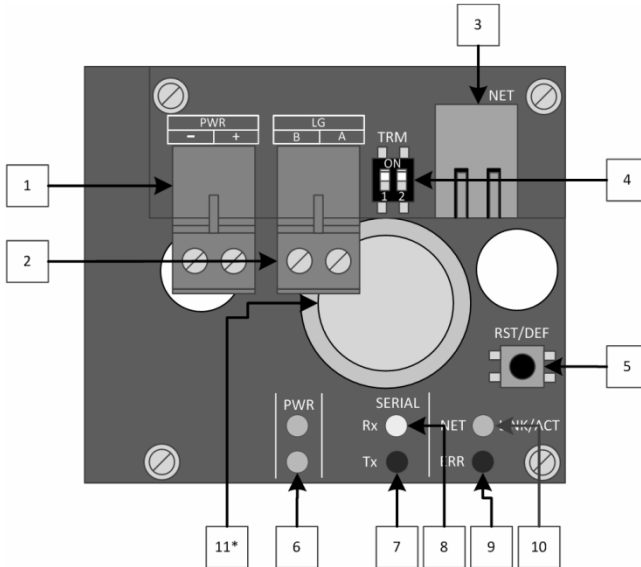
■ Technical data

- Power supply: 9 ÷ 30 V DC
- Dimensions (W x H x D): 110 x 135 x 70 [mm]
- Connected units: many systems (max. 20 junits in the system for HA version and 250 units for BMS version)
- Network interface: 10/100BaseT auto-MDIX Ethernet (Modbus TCP**)
- Installation in place without direct exposure to atmospheric agents

*for SYNG1030-HA

**for SYNG1030-BMS

■ ACMC Gateway description



1. Power input connector (9 ÷ 30 V DC)
2. Air Conditioning System connector – connect to the PI-485 extension board of LG Electronics outdoor unit (BUS-A, BUS-B)
3. RJ45 Ethernet connector
4. Termination ON/OFF dip-switch (for LG electronics communication bus)
5. Reset / factory settings button
Reset – short press; factory – press and hold over 10 sec.
6. Power LED indicator
7. PI-485 communication LED (transmission to AC)
8. PI-485 communication LED (receiving from AC)
9. Device or communication error LED indicator
10. Ethernet status LED indicator

switched off	disconnected/no signal
2 flashes, 4 sec. interval	connected/device can communicate by the network
switched on	connected/network connection established
irregular flashes	visualisation of communication (Ethernet)

11. CR2032 button battery – on board clock emergency power*

*for SYNG1030-HA

Installation

■ Installation steps

1. Turn off power supply if it's on.
2. Connect PI-485 extension board to the outdoor unit(s) (see PI-485 installation manual).
3. Configure PI-485 extension board (you will find detailed description how to do it in this manual).
4. Connect ACMC Gateway communication port to PI-485 extension board: LG-A to BUS_A(+) and LG-B to BUS_B(-).
5. Connect ACMC Gateway power input to PI-485: PWR- z GND oraz PWR+ z +10V or external power supply.
6. Connect ACMC to the Local Area Network through RJ45 Ethernet port.
7. Turn on power.
8. Configure addresses of the indoor units (you will find detailed description how to do it in this manual).
9. Configure ACMC Gateway (you will find detailed description how to do it in this manual).
10. Configure AC Mobile Control* Application (description in internal Application help) or connect Gateway to the BMS**.

■ Cooperation with controllers

AC Mobile Control Gateway, can cooperate with various controllers depending on Gate version:

- **Building Management System (BMS) or Home Automation System**

Gateway has to be connected to the Local Area Network with superior device (i.e. PLC controller, Personal Computer, touch panel etc.)

- **Simple remote, centralized Air Conditioning control**

The role of a superior device is taken by a smartphone or tablet device with AC Mobile Control Application.

The Gateway has to be connected to a home Local Area Network, in which there is a wireless router (access point) and to which a smartphone or tablet device can connect.

*for SYNG1030-HA

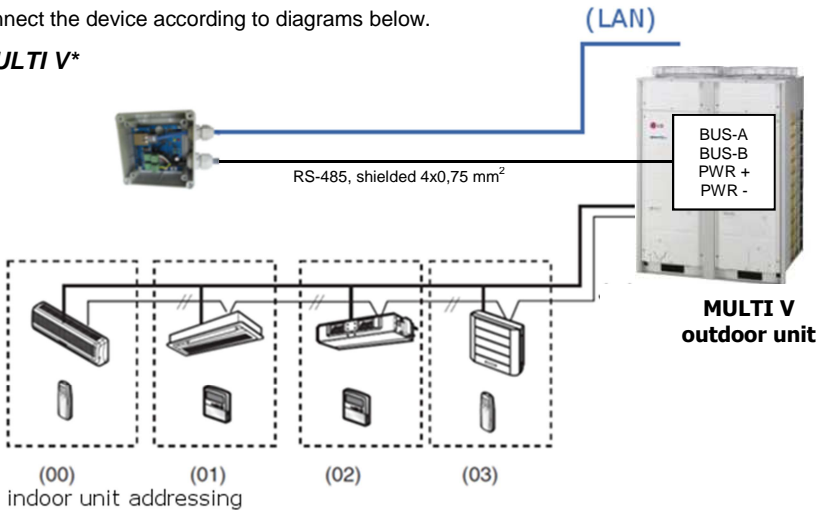
**for SYNG1030-BMS

Wiring diagram

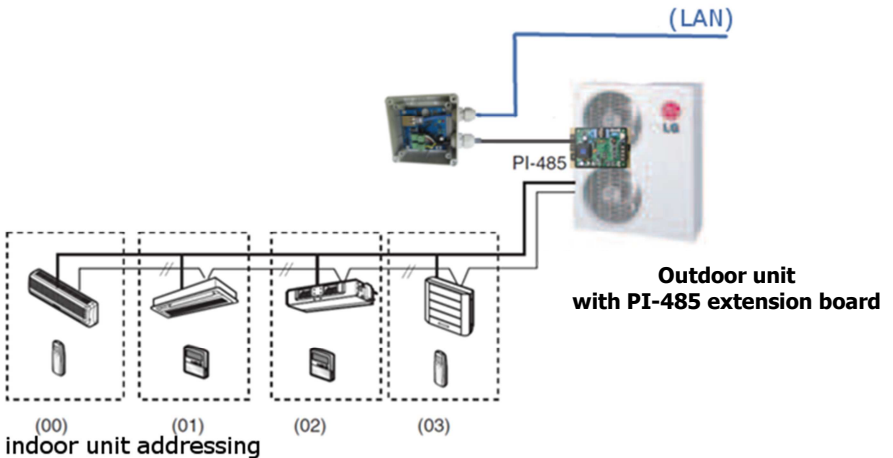
■ Independent ACOM operation

Connect the device according to diagrams below.

1. MULTI V*



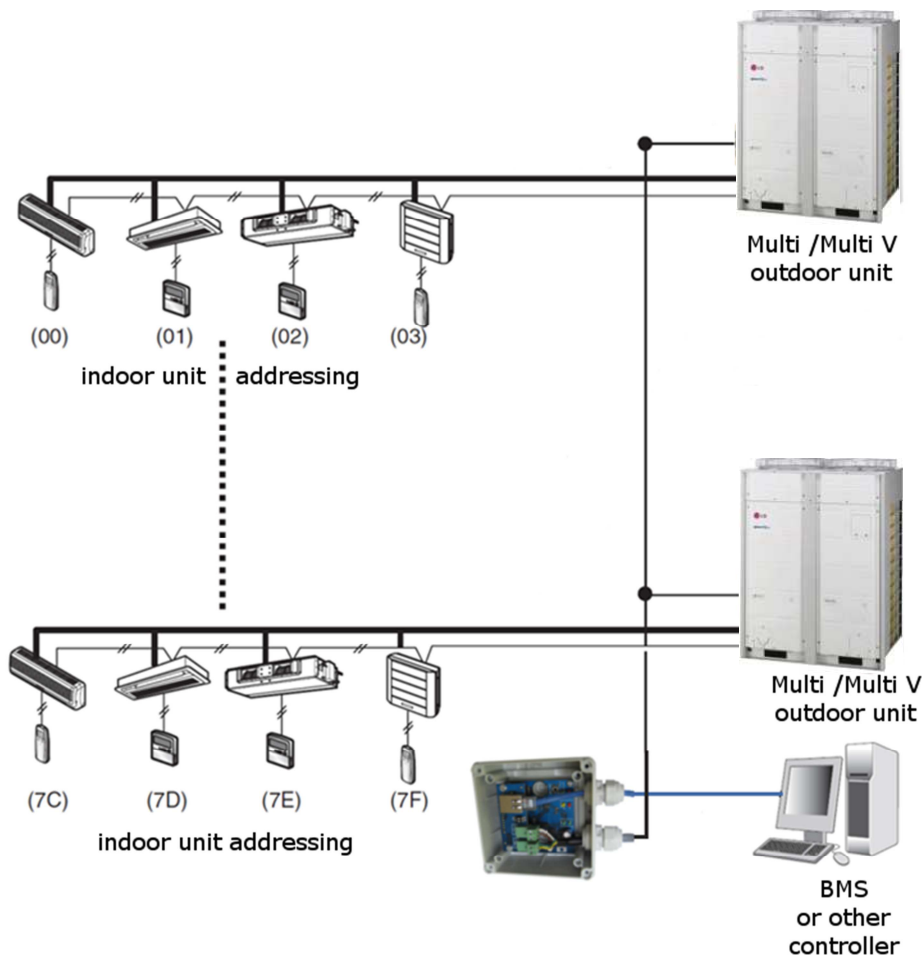
2. Residential*, commercial Split and Multi, supplied with PI-485 (PMNFP14A0)



❖ **ATTENTION:** ACOM Gateway may require PI-485 (PMNFP14A0) extension board installation, extension board is sold separately. Only MULTI V II or higher series Air Conditioners have build-in PI-485 extension board (except ARUN40GS2A, where PI-485 board has to be purchased separately).

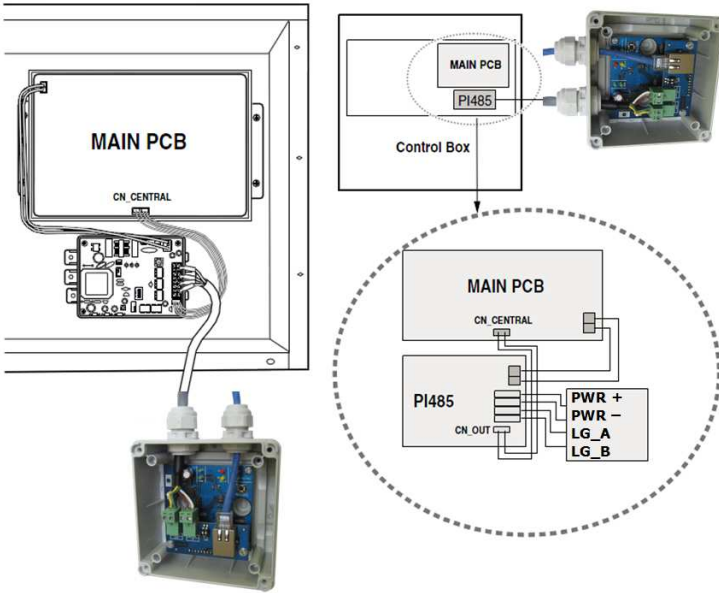
* MULTI V Series II and newer have build-in PI-485 board.

Work with central controller (AC Smart or AC Manager)



- ❖ **ATTENTION:** ACMC Gateway may require PI-485 (PMNFP14A0) extension board installation, extension board is sold separately. Only MULTI V II or higher series Air Conditioners have build-in PI-485 extension board (except ARUN40GS2A, where PI-485 board has to be purchased separately).

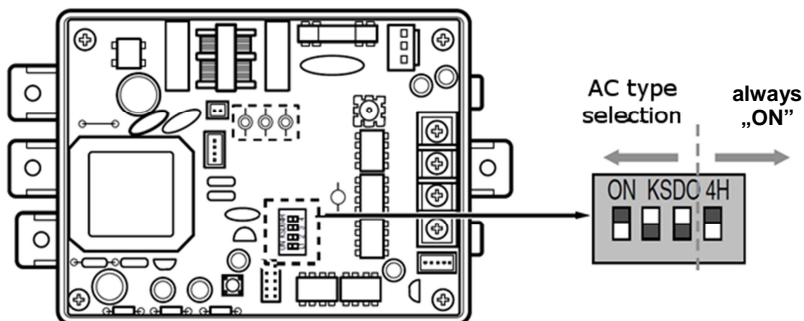
■ ACMC connection to the PI-485 extension board



❖ ATTENTION:

- LAN connection has been omitted

PI-485 configuration

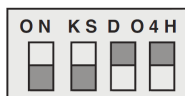


PI-485 dip switch configuration:



1 i 4 ON, rest OFF

- MULTI V Plus (without MULTI V II or newer and CRUN series)
- Multi Split Inverter



3 i 4 ON, rest OFF

- commercial Split and room air conditioners
- centrale rekuperacyjne ecoV (PHNFP14A0 board)

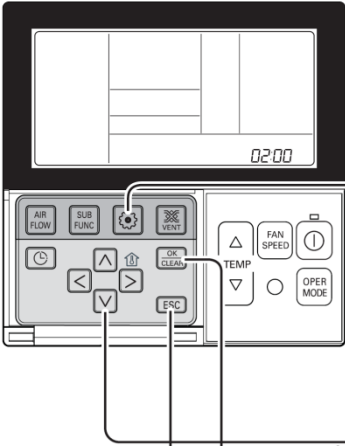
⚠ ATTENTION


Wrong dip-switch setting can cause malfunction.


* - only PI-485 extension board enabled products

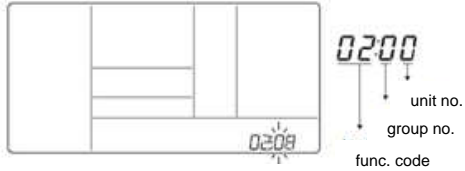
Indoor unit addressing

■ Wired controller



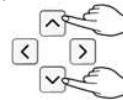
1. Press and hold the  key for more than 3 seconds.
If the key was pressed for less than 3 seconds, the controller will go into user settings mode.



1. Keep pushing the  key till you reach address setting mode – the result is visible below.



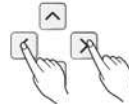
2. Set up the indoor group number using the temperature adjustment key (range: 0 ~ F).

02F0



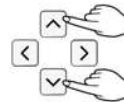
3. Use   keys to select unit number setting.


02F0




4. Set up the indoor unit number using the temperature adjustment key (range: 0 ~ F).

02F5



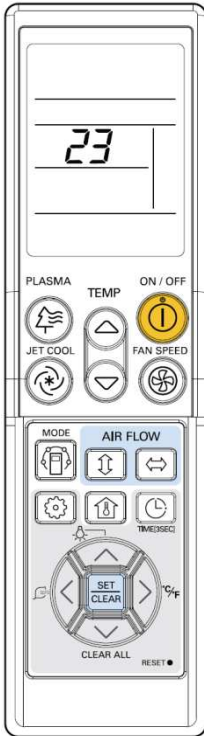
5. Press the  key to save new settings.


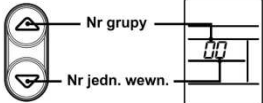



6. Press the  key to exit setup mode.

■ Wireless remote controller

❖ Address setting:



<p>1. With the MODE key pressed, press the RESET button.</p> 
<p>2. Using the temperature adjustment key, set up the indoor unit address (range: 00 ~ FF).</p> 
<p>3. After setting the address, press the On/Off key once directing the remote controller to the indoor unit.</p> 
<p>4. When indoor unit shows the setting address, the address setup is complete. (The time and method of the address display can differ depending on the indoor unit type.)</p>
<p>5. Reset the remote controller.</p>

❖ Address checking:

- 1** With the PLASMA key pressed, press the Reset button. (Press the left key for more than 3 seconds.)
- 2** Press the On/Off key once directing the remote controller to the indoor unit. The indoor unit shows the setting address and the address setup is completed. (The time and method of the address display can differ depending on the indoor unit type.)
- 3** Reset the remote controller.



■ ATTENTION:

- ACMC sorts indoor unit by address (in growing order).
i.e. If the indoor unit addresses are: "7C", "7D", "7E" i "7F", the order of indoor units discovered by the ACMC will be: 1st: "7C", 2nd: "7D", 3^d: "7E" and 4th: "7F".

ACMC configuration

Configuration has to be done after installation. Configuration is needed only once if it's done properly.

■ Default settings

IP address	192.168.1.100
www configuration port	80
communication port	502
user name	admin
password	admin

ATTENTION

factory settings can be restored at any moment by pressing and holding the reset/default button at for about 10 seconds.

Default settings restore will be confirmed by simultaneous flashing diodes Act [10] and ERR [9].

■ Device configuration

To configure the device connect it to LAN network or directly to the PC.

A. Configuration in local network.

ATTENTION

This option is available only when the network, IP address is 192.168.1.***.
In other case, you have to use the second method of configuration.

Action description:

1. turn on the power supply; diodes „PWR“ [6] should light up;
2. connect the device to local network; diode „Act“ [10] should begin indicating the connection to network;
3. start the Web Browser on the PC; at address field type in „http://192.168.1.100“ and con-firm; you should see the login screen;
4. type in login data (User Name: „admin“, Password: „admin“ – for default settings) and click the „Login“ button; after correct log-in you can see main configuration window below;



5. change the device settings

Field	Option	Description
MAC Address (uneditable)	-	physical device address
IP Address	format: ***.*.*.*.*	device address in local network
Port	format: *****	device communication port
Network Mask	format: ***.*.*.*.*	device address mask
Gateway	format: ***.*.*.*.*	network gateway for the device
Connection Timeout	0 – switched off 0,5 ÷ 32767,5 sec.	time, after which the device will automatically close active connection; counted since the last transmission



- confirm changes in general configuration – by pressing the „Save” button; save confirmation screen will be displayed;



- device reset – press the „Reboot” button; reboot confirmation screen will be displayed (graph 5); after about 15 seconds you can press the „Refresh” button, which allows you to relogin and verify settings.

ATTENTION

New settings will take effect after reboot !



- (optional – only for SYNG-1030-HA) configure actual date, time and day of week. Click „Set date and time” button. Real Time Clock setting window will appear. Input correct data and click „Save”.



9. scan air-conditioners connected to LG bus.

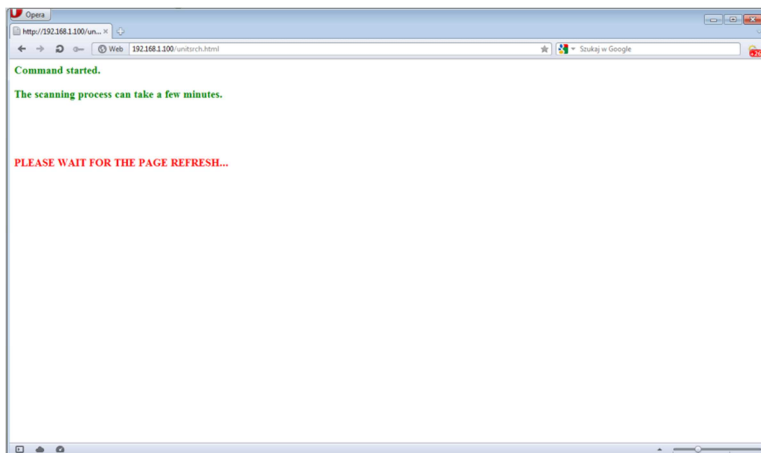
After network interface configuration, you can scan the LG bus.

Press „Scan AC Units” button. This engage LG bus scanning process. Start of the process will be confirmed by a confirmation screen.

Very important is not to close the device configuration site, until the confirmation page is displayed.

After automatic page reload (you will see main configuration screen), you can log out and close the browser window. Searching process will be uninterrupted.

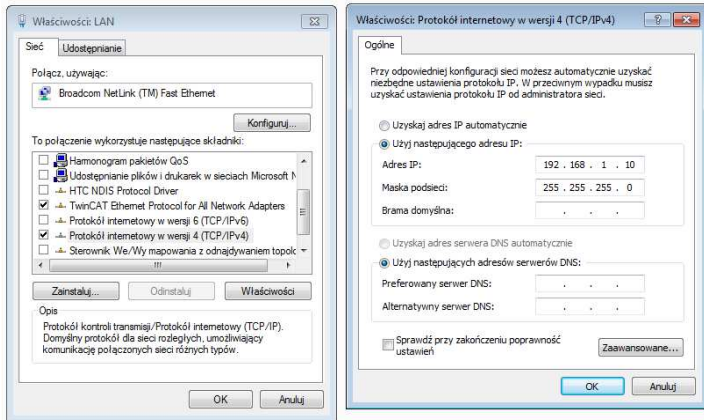
End of searching process is visible in device status register (Modbus), which is described in „Modbus Functions” chapter.



B. Configuration with direct PC connection.

Activietes description:

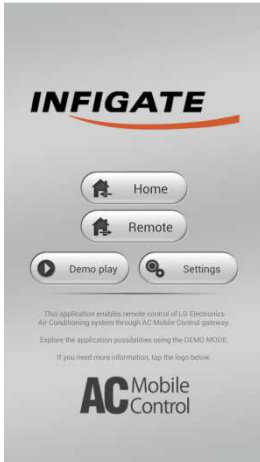
1. turn on the power supply; diodes „PWR” [6] should light up;
2. connect the device to local network; diode „Act” [10] should begin indicating the connection to network;
3. configure PC network card so that both devices are in the same network; example configuration of network card (in Microsoft Windows 7) is showed at graph 7; configuration options in Windows 7 are situated in „Control panel”: Control panel\Web and Internet\Network conection -> properties of network card, which with device is connected to;



4. proceed according to instructions included in underpoint „a”, since point 3 inclusive;

AC Mobile Control Application*

Application can be used to remotely control home air conditioning system using ACMC. It is available for free at Google Play online application store.



Main screen



AC overview



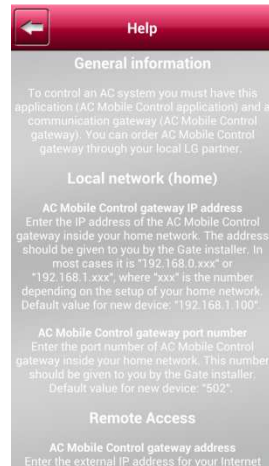
AC control screen



Main help screen



Schedule setting screen



Settings help screen

Application manual is embedded in the Application –  icon.

BMS integration**

Integration with the BMS system can be achieved using Modbus TCP.

■ Modbus functions

Because the device has a native ModbusTCP communication port, there is no need to address it. The device will respond for Modbus inquiry independently of given target address (unit address, device ID etc.). But accordingly to specification, in this case you should use „0xFF” address in address field.

Read function - Read Input Registers (0x04)

For this function device has 1751 registers accessible. They allow to read information which represents parameters of individual AC units connected to the ACMC (registers 1 – 1750) and general device status (register 0).

The structure of general device status register (address 0):

Error								Status flag							
Error code (0x00 – 0xFF)								-	SCN	-	-	BSY	-	-	RDY
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Register bits numbers															

Meaning of the status flags:

Bit	Description	Meaning when „1”	Meaning when „0”
SCN	(SCAN) LG bus scanning	scanning in progress	normal operation
BSY	(BUSY) device is busy	device is executing changes in units settings; situation occurs after writing new settings to Modbus units registers.	normal operation
RDY	(READY) device is ready to receive a command	device is ready to change unit settings (readiness to receive Modbus write)	device is not ready to write Modbus registers

Error codes:

Kod	Nazwa	Opis
0x00	NO_ERR	normal operation
0x01	CRC_ERR_LG	device has detected CRC sum error in response from LG unit
0x02	BAD_ANS_LG	unit doesn't respond
0x03	BAD_SET_TEMP	set temperature (written in Modbus) is out of permitted range
0x04	BAD_MEAS_TEMP	measured temperature (returned by unit) is out of permitted range
0x06	BAD_FAN_VAL	ventilation intensity setting is out of range

0x07	BAD_MODE_VAL	AC operation mode setting is out of range
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Every unit discovered by the gate occupies space of 7 Modbus registers. Device settings are sorted by unit address (from the smallest to the biggest) and are placed directly after one another.

Structure of unit status registers (addresses 1 ÷ 1750):

NR	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1						AC(1)	VENT(1)			GN(1)				UN(1)			
2										FS(1)							
3										MD (1)							
4										ST(1)							
5				FA(1)			PF(1)			PL(1)			AS(1)			ON(1)	
6										AT(1)							
7										ER (1)							

Those register numbers concern the first unit (registers 1 ÷ 7).

Concern AC
Concern VENT
CONCERN AC i VENT
WITHOUT MEANING

Meaning of the status flags:

Bit	Description	Option/Meaning
AC	Unit type flag (air-conditioning)	1 bit „1” – unit is an air-conditioner „0” – unit is not an air-conditioner
VENT	Unit type flag (ventilation)	1 bit „1” – unit is a ventilation „0” – unit is not a ventilation
GN	(Group Number) AC unit group addresses	older part of younger byte (4 bits) group number; determines part of unit ID (address); configured in unit; range: 0x0 ÷ 0xF
UN	(Unit Number) AC unit device address	younger part of younger byte (4 bits) unit number (in group); determines part of unit ID (address); configured in unit; range: 0x0 ÷ 0xF
FS	(Fan Speed) Ventilation intensivity	younger byte of register (8 bits) „0” – AUTO (intensivity is regulate by internal unit automation) „1” – VERY LOW (very low intensivity)* „2” – LOW (low intensivity) „3” – MIDDLE (medium intensivity) „4” – HIGH (high intensivity) „5” – VERY HIGH (very high intensivity)*
MD	(Mode) Mode	Younger bite of register (8 bits) „0” – AUTO (mode selected by unit automatically)

		„1” – COOLING (cooling) „2” – FAN (ventilation) „3” – HEAT (heating)*** „4” – DRY (drying)****
ST	(Set Temperature) set temperature	younger byte of register (8 bits) set temperature (in °C) to maintain by AC unit; range: 18 ÷ 30
FA	(Filter Alert) dirt filter flag ONLY FOR VENTILATION UNITS	1 bit „1” – filter is dirty „0” – normal operation
PF	(Plasma Function) „plasma” function	1 bit „1” – filter is dirty „0” – normal operation
PL	(Panel Lock) local controller lock	1 bit „1” – filter is dirty „0” – normal operation
AS	(Auto Swing) swing mode	1 bit „1” – additional distribution of air „0” – standard distribution of air
ON	turn on/off unit	1 bit „1” – unit is on „0” – unit is off
AT	(Actual Temperature) temperature measured by unit	younger byte of register (8 bits) room temperature (in °C) measured by AC unit; range: 10 ÷ 40
ER	(Error) unit error code	younger byte of register (8 bits) error code returned by unit

*** options available only for some AC models (information about compatibility is situated in documentation of specific unit)

Write function – Write Multiple Registers (0x10)

For this function device has 1750 registers accessible. They allow to change parameters of specific AC units connected to the gate.

Structure of unit status registers (addresses 1 ÷ 1750):

NR	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	RESERVED															
2																FS(1)

Modbus register map**

Table below describes placement of the Modbus registers of APMC.
 Meaning of particular bits were described in previous sections of this manual.

NR	ODCZYT (0x04)																ZAPIS (0x10)																status	
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
0	ERROR CODE											SCN	BSY												RDY									
1				AC(1)	VENT(1)												GN(1)	UN(1)																
2												FS(1)											FS(1)											
3												MD(1)											MD(1)											
4												ST(1)											ST(1)											
5			FA(1)												PF(1)	PL(1)	AS(1)	ON(1)												PF(1)	PL(1)	AS(1)	ON(1)	
6												AT(1)																						
7												ER(1)																						
8				AC(2)	VENT(2)												GN(2)	UN(2)																
9												FS(2)											FS(2)											
10												MD(2)											MD(2)											
11												ST(2)											ST(2)											
12			FA(2)												PF(2)	PL(2)	AS(2)	ON(2)												PF(2)	PL(2)	AS(2)	ON(2)	
13												AT(2)																						
14												ER(2)																						
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547				AC(79)	VENT(79)												GN(79)	UN(79)																
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554				AC(80)	VENT(80)												GN(80)	UN(80)																
555												FS(80)											FS(80)											
556												MD(80)											MD(80)											
557												ST(2)											ST(80)											
558			FA(80)												PF(80)	PL(80)	AS(80)	ON(80)												PF(80)	PL(80)	AS(80)	ON(80)	
559												AT(80)																						
560												ER(80)																						

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