

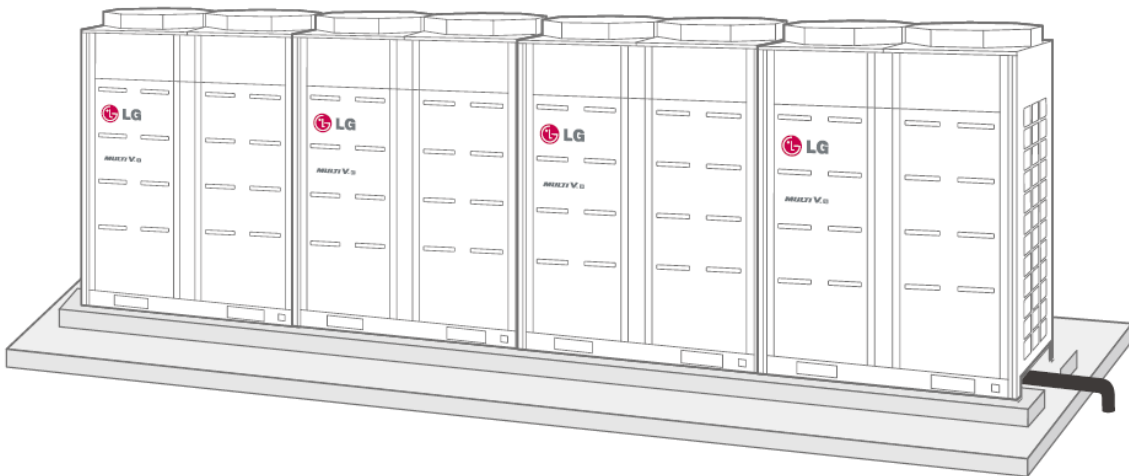
MULTI V™

INSTALLATION MANUAL

Safety regulations
Installation
Operation



2xRS485



KM113.22MV2

**A SET FOR THE APPLICATION OF AN OUTDOOR
COMPRESSOR CONDENSATION UNIT FOR A NON-
ORIGINAL EVAPORATION / HVAC UNIT**

DESIGNED FOR OUTDOOR UNITS

LG Electronics

model series „ARUM--, ARUN--, ARUB--, ARWN--, ARWB--“

Version 2020/07/23

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1. SAFETY

The equipment was designed to pose minimum risks during installation and for the operator during use. However, it is technically impossible to eliminate all risks and therefore, it is absolutely necessary to observe the below specified instructions.

MANIPULATION AND HANDLING

Upon delivery make sure that the equipment does not show any visible signs of damage and matches the parameters in the accompanying documentation.

SYMBOLS



Read the user's guide before use.

INSTALLATION



The equipment may only be installed by a professional person possessing the necessary electrical and air-condition system qualification and skills.

The equipment may only be put into operation by a professional person possessing the necessary electrical and air-condition system qualification and skills.

OPERATION

The operator uses information display, which is installed under a transparent cover. The user is not allowed to interfere with the equipment in any way.

2. TECHNICAL PARAMETERS

Technical parameters	
Lead wire terminals	Spring terminal WAGO max wire cross section 2.5 mm ²
Power supply	230 V ~ AC ±10 %/50 Hz (e.g. from the connected outdoor unit) Overvoltage category II Recommended cable CYKY-J 3x1.5
Power input	Max. 30 W
Power supply of separate module KM113.22	24 V $\overline{=}$ DC ±10 %/max. 800 mA, The source must be separated by double insulation (SELV)
Other connected devices	Must be separated by double insulation (SELV)
Communication properties with an outdoor unit	Two wires at RS485 safe voltage level
Parameters of Log. input (control)	12 VDC/5 mA voltage (passive-switch by free contact)
Analogue input parameters	10 VDC voltage with interconnected 0V potential, load 20 kohm (max. 0.5 mA)
Input temperature	DALLAS digital sensor, 3 m long (lengths 6 m and 10 m accessories to order)
Log. output parameters	Contact relay with load of 50 VAC/DC, maximum 200 mA
EEV output parameters	24 VDC, 500 mA, inductive load, designed for valves EX4, EX5, EX6
MODBUS communication	Serial line: RS485, 9.6 kbps, 8 bits, without parity, 1 stop bit
MOV-MV communication	Serial line: RS485
Using the electronic module KM113	Designed for installation with top layer overlap min. 1 mm
Mechanical parameters	
Width x Height x Depth	310 x 246 x 145 mm (vertical installation on the wall)
Protection	IP65 based on the used cable glands
Work position	vertical
Mechanical durability	IK06
Temperature	-25 °C to +55 °C

Humidity	0 to 90 % without vapour condensation
Maximum altitude	2000 m
Degree of pollution	2
<i>Storage conditions</i>	
Temperature	-25 °C to +60 °C
Humidity	0 to 90 % without vapour condensation

3. DESCRIPTION OF APPLICATION

The communication module is designed for external control of an outdoor compressor unit called LG Electronics model range "MULTI V **" in applications where the unit serves as the source of cold/heat in HVAC systems. The superior HVAC control system defines the operational mode and power requirements.

The communication module is installed in a plastic box including the necessary power supply. The delivered system includes refrigerant temperature sensors installed at the input and output of the heat exchanger in the HVAC equipment.

The module has an output for controlling a bipolar electronic expansion valve - model EX4--, EX5--, EX6-- (ALCO/Emmerson).

In an application where the compressor unit is used as a source of refrigeration, expansion valves with a one-way refrigerant flow are used, i.e. EX4-M21, EX5-U21, EX6-M21.

In applications where the compressor unit is used as a heat source or as a source for several air handling units/exchangers, it is necessary to use expansion valves with bidirectional flow, i.e. EX4-U31, EX5-U31, EX6-M31.

The KM113.27UU module has 1 analogy input, 4 digital inputs, 2 digital outputs and 2 communication ports (RS485) for controlling the compressor unit. The MODBUS input/output is intended for communication with the superior I&C system. The "POWER" output is intended for direct synchronous reduction of the compressor unit output according to the current power requirement.

3.1 GUARANTEED COMPATIBILITY OF THE KM113.22MV2 MODULE WITH COMPR. UNITS

Model range	Name of the outdoor unit
MULTI V S	ARUM**LTE5
MULTI V S	ARUN**GSS0 ARUN**LSS0
MULTI V WATER IV	ARWN**LAS4
MULTI V WATER IV HEAT RECOVERY	ARWB**LAS4
MULTI V S WATER	ARWN**GA0

3.2 PERMITTED CAPACITY OF THE HEAT EXCHANGER IN THE HVAC EQUIPMENT

Cooling performance kW		Heat exchanger capacity kW				Expansion valve
kW	kBtu/h	Cooling mode		Heat pump mode		
05	18	4.6	5.6	5.1	6.3	EX4-M21 / EX4-U31
07	24	5.7	8.2	6.4	9.2	EX4-M21 / EX4-U31
10	36	8.3	10.6	9.3	11.9	EX4-M21 / EX4-U31
12	42	10.7	12.3	12.0	13.8	EX4-M21 / EX4-U31
14	48	12.4	14.1	13.9	15.9	EX4-M21 / EX4-U31

16	54	14.2	15,8	16.0	18.0	EX5-U21 / EX5-U31
22	76	15.9	22.4	18.1	25.2	EX5-U21 / EX5-U31
28	96	22.5	28.0	25.3	31.5	EX5-U21 / EX5-U31
33	115	28.1	33.6	31.6	37.8	EX5-U21 / EX5-U31
39	134	33.7	39.2	37.9	44.1	EX5-U21 / EX5-U31
45	153	39.3	44.8	44.2	50.4	EX5-U21 / EX5-U31
50	172	44.9	50.4	50.5	56.7	EX6-M21 / EX6-M31
56	192	50.5	56.0	56.8	63.0	EX6-M21 / EX6-M31
62	215	56.1	62.0	63.1	69.4	EX6-M21 / EX6-M31
67	236	62.1	67.0	69.5	75.7	EX6-M21 / EX6-M31
73	253	67.1	73.0	75.8	82.3	EX6-M21 / EX6-M31
78-123	279-468	1:1 application, capacity of the heat exchanger corresponds to the output of the compressor unit		1:1 application, capacity of the heat exchanger corresponds to the output of the compressor unit		EX6-M21 / EX6-M31

The capacity of the heat exchanger is determined under the following conditions:

Cooling mode: air temperature in front of the exchanger 27 °C, outside air temperature 35 °C
condensing temperature 45 °C, subcooling 15 K, evaporating temperature 8 °C, superheating 3 K
length of refrigerant connecting pipe 7.5 m, elevation 0 m

Heat pump mode: air temperature in front of the exchanger 20 °C, outside air temperature 7 °C
hot steam temperature 65 °C, condensing temperature 49 °C, subcooling 5 K
length of refrigerant connecting pipe 7.5 m, elevation 0 m

3.3 SYSTEM DESIGN

The design of the compressor unit - HVAC unit – I&C system is absolutely essential for proper function. Although this manual does not address the overall design of the system, we recommend that you check, among other things, when commissioning a system with a communication module:

1. *Size (volume) of applied heat exchanger in HVAC*
2. *The amount of air passing through the heat exchanger in the HVAC*
3. *Speed of air flow through the heat exchanger in HVAC*
4. *The correct amount of refrigerant in the system with regard to the length of the piping and the size of the heat exchanger in the HVAC*
5. *Air temperature in front of the heat exchanger. Permitted operating air temperature ranges - see the documentation of the respective compressor unit (usually 18 to 35 °C in "cooling" mode and 10 to 24 °C in "heat pump" mode)*
6. *Function of the I&C system - the request for cooling or heating must not be activated if a sufficient air flow through the heat exchanger in the HVAC is not ensured*
7. *Function of the I&C system in the "DEFROST" operating mode - the system must enable reliable removal of icing from the outdoor unit and at the same time solve the low air temperature behind the heat exchanger in the HVAC*

The power request sent by the external I&C system is interpreted by the module as a temperature difference with respect to the required value. It is assumed that this requirement is in accordance with the real physical state of the heat exchanger - with decreasing power demand, the ability of the heat exchanger to transfer power decreases (smaller temperature difference, smaller amount of air, etc.).

The communication module in no way interferes with the control logic of the external condensing unit. Algorithms for controlling the speed of the invert compressor, condensing/evaporating pressure, etc. are included in the software of the specific LG compressor unit.

To directly limit the power of the compressor unit, the "power limit" module (MOV-MV accessory) must be installed.

When using MOV-UU, the algorithm of the compressor unit for changing the evaporating pressure/temperature of approx. 14 to 6 °C (approx. 11 to 8 bar) is activated according to the setting of power code C1 to C7. In the heat pump mode, according to the setting of power code H1 to H7, the algorithm of the compressor unit for activating the condensing pressure/temperature of approx. 33 to 49 °C (approx. 19 to 29 bar) is activated.

Attention, this temperature is variable according to the specific installation conditions (the above values apply to a pipe length of 7.5 m, elevation 0 m).

Fig.1 – Application overview diagram KM113.22MV2 – compressor unit AR** - HVAC – I&C system

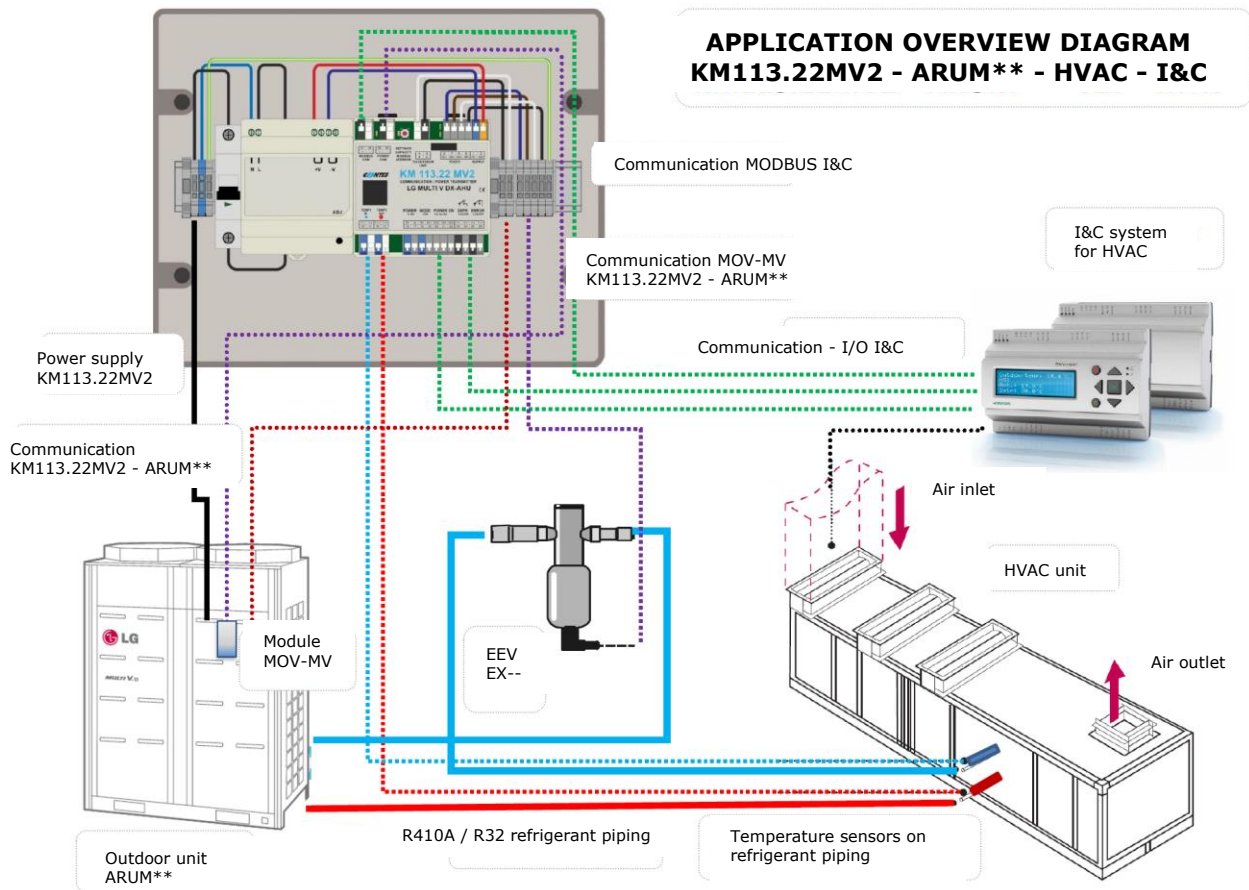
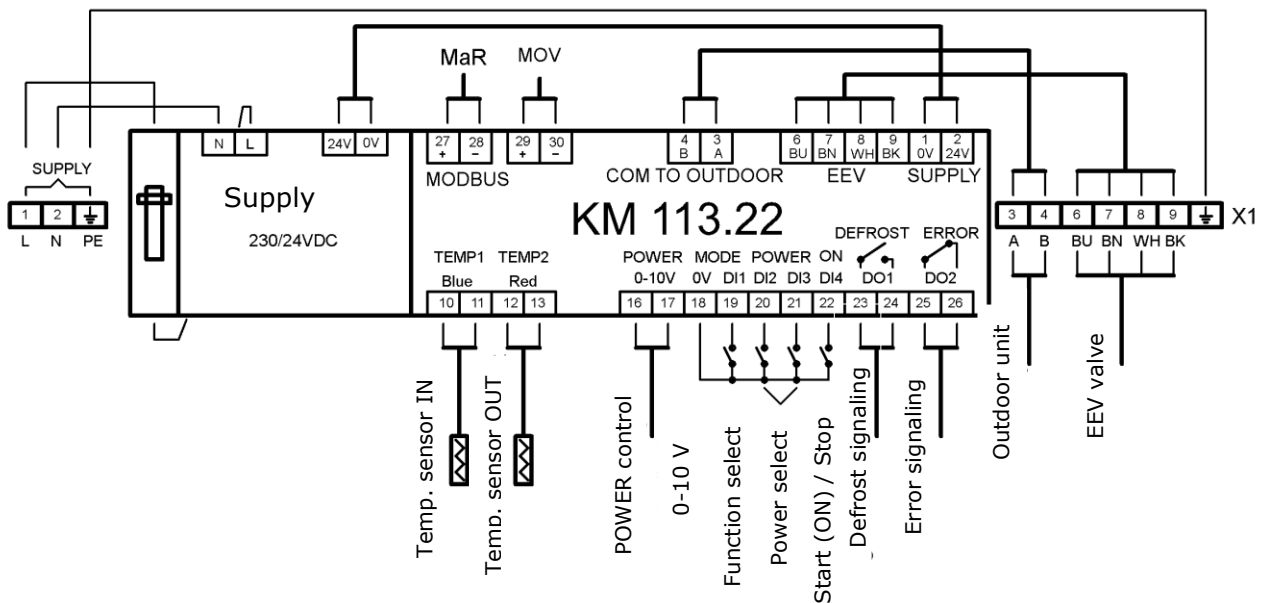


Fig.2 – Complete terminal diagram KM113.22UU



4. INSTALLATION – CONNECTION TO THE AIR-CONDITIONING SYSTEM

4.1 MECHANICAL INSTALLATION

The communication box is to be installed near to the heat exchanger in the HVAC system – refrigerant temperature sensors and EEV module at the exchanger in the HVAC system are connected to the module (standard cable length of refrigerant temperature sensors on the evaporator is 3 m, sensors with a length of 6 m - accessories on request).

The plastic box allows the module to be installed in indoor or outdoor environments providing that safety installation procedures are observed (the box integrity is not compromised, suitable cable glands are used). If the box is installed outdoor, it is necessary to protect the box from direct UV radiation (shaded area). In this case, we recommend using a box with increased UV resistance (KM113.22UU-UV).



Preparation:

Remove the front cover from the installation box – loosen the 4 threaded locks at the cover corners. Now you may access the connection terminals of the communication module and the power supply source.

Have cable glands suitable for your intended application ready.

Attach the communication box to a suitable vertical plane (use the holes and covers at the rear of the box).

4.2 CONNECTION TERMINALS OVERVIEW



Connect a suitable power cable (e.g. CYKY-J 3x1.5) to the power supply terminals of the communication box – auxiliary terminals 1, 2, 3 (terminal block X1, 230 VAC – “L, N, PE”).

Connection terminals are divided into sections:

RS485 terminals (2x) directly on the communication module KM113.22

“POWER COM” terminals for connecting the output limitation module of the outdoor compressor unit

“MODBUS COM” terminals for connecting MODBUS communication

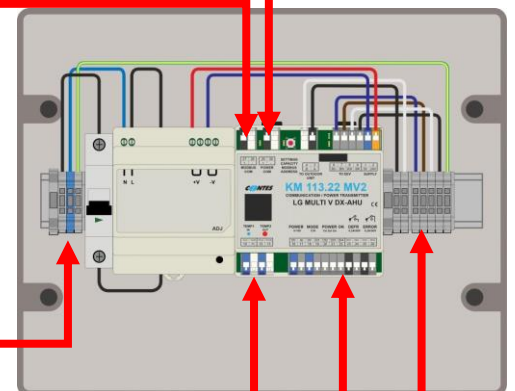
Fig. 3 – Distribution of terminals in the box

Separate external terminal block for power connection

Terminal block directly on the communication module KM113.22
Left part – for connecting refrigerant temperature sensors to the heat exchanger

Terminal block directly on the communication module KM113.22
Right part – for connecting inputs and outputs from external I&C system

Separate external terminal block X1 for connection of communication with external LG compressor unit and EEV module



4.3 EEV MODULE CONNECTION (ELECTR. EXPANSION VALVE – EX4-, EX5-, EX6-)

Mechanical installation of the EEV module – see the relevant installation manual delivered with the EEV.

Electrical connection of EEV to the communication module:

Connect a suitable connecting cable between the EEV module and the "EEV" terminals on terminal block X1 in the installation box - terminals no. 6, 7, 8, 9.

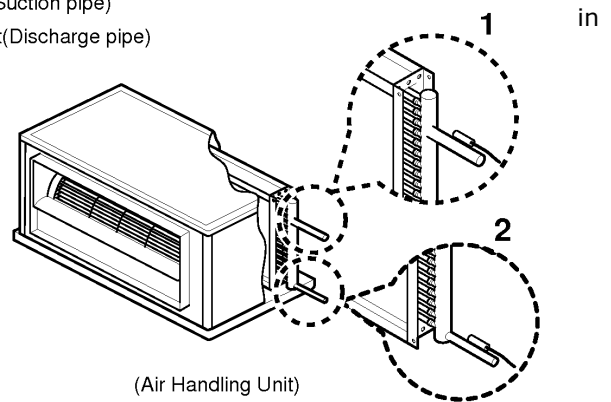
ATTENTION!

The module **MUST NOT** be under voltage, when connecting the wires!
 Follow the colour coding of the wires!
 Changing the cable positions can damage the device.

4.4 INSTALLATION, CONNECTION OF TEMPERATURE SENSORS

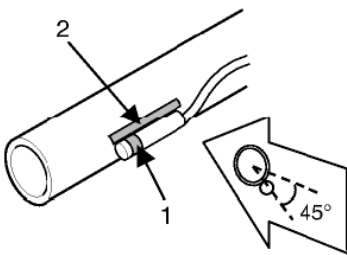
Attach thermal sensors TEMP1 (blue) and TEMP2 (red) to suitable locations on the heat exchanger the HVAC system. The blue sensor is designed for "input" of the refrigerant into the heat exchanger, that is the small diameter pipes, and the "red" sensor is designed for "output" of the refrigerant from the heat exchanger - large diameter pipes. To properly attach sensors to Cu pipes use, for example fastening clamps to ensure proper heat transfer to the sensor – see Fig. After the sensors are attached make sure to insulate them thermally from the environment.

- 1 Pipe_In(Suction pipe)
- 2 Pipe_Out(Discharge pipe)

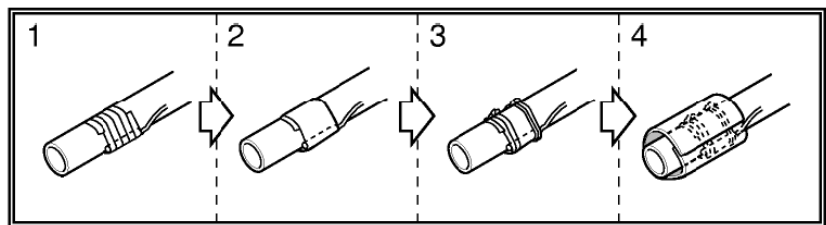


(Air Handling Unit)

Description: 1 – the most sensitive spot of the sensor
 2 – maximises the contact between the sensor and pipe



Installation description:



Create a loop on the sensor cable in order to prevent collection of water/humidity in the sensor connection.



Notice:

*Incorrect installation of temperature sensors may result in incorrect control of the cooling process.
 Incorrect installation of temperature sensors may permanently damage the refrigerant sensors.*

CONNECTION OF REFRIGERANT TEMPERATURE SENSORS TO THE MODULE

Connect the temperature sensors TEMP1 and TEMP2 to the relevant terminals on the module. Sensor IN, blue (refrigerant temperature in front of the exchanger) connect to terminals TEMP1 (terminals no.10+11). Sensor OUT, red (refrigerant temperature behind the exchanger) connect to terminals TEMP2 (terminals no. 12+13).

Follow the colour coding of the sensors and wires – white wire to white terminal! Sensors are standardly supplied with a cable length 3 m.

Notice:

When the temperature sensor is connected incorrectly or is defective the safety function of the communication module is activated and the system generates corresponding error message (see the list of error messages of the applied LG unit).

Sensors with longer cable length on request.

4.5 CONNECTION TO AN OUTDOOR COMPRESSOR UNIT

Connect a suitable power cable between the power terminals of the outdoor compressor unit (see the diagram of the given unit) and the "supply" terminals in the communication box – terminal block no. 1-L, 2-N, PE.

Connect suitable (shielded) communication cable between the outdoor compressor unit (terminals "IDU") and "OUT COMM" box terminals – terminal block X1, no. 3 (A) +4 (B).

Attention, the polarity must be followed (marked A, B).

4.6 MOV-MV POWER LIMITATION MODULE CONNECTION (ACCESSORIES)

Make sure that the compressor unit is without voltage!

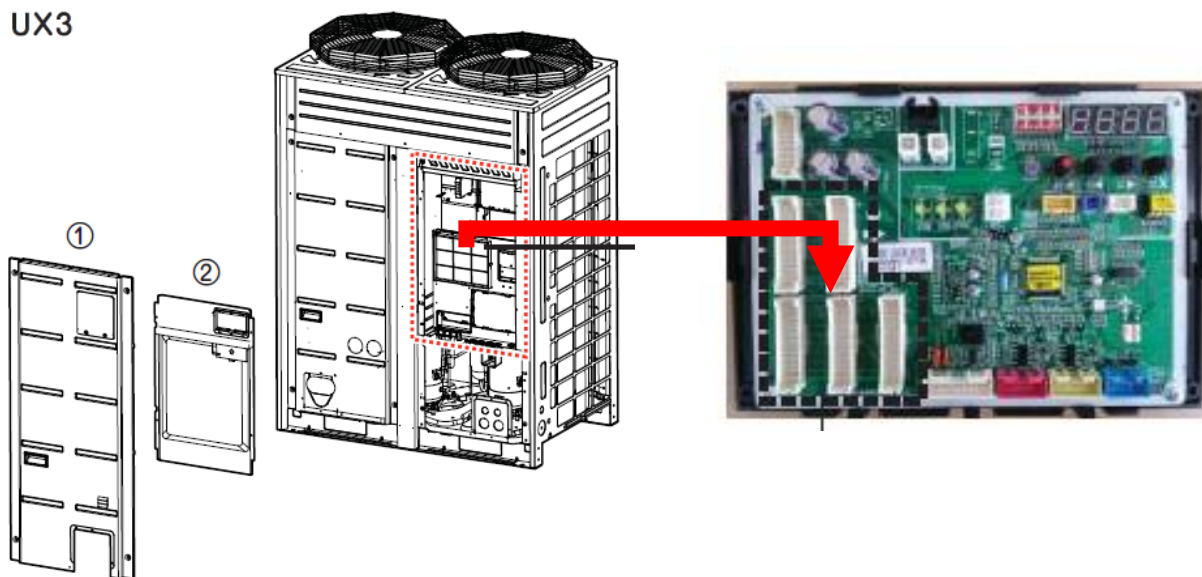
There is a risk of electric shock and damage to the device when installing the module under voltage!

Compressor unit accepts the module only when the power supply is activated. Before connecting the power limitation module, address the system first!

Connect a suitable (shielded) communication cable between the terminals of the MOV-MV power limitation module and the "POWER COM" terminals no. 29 + 30.

Attention, the polarity (colour of the terminals) must be followed.

UX3



Install the MOV-MV power limitation module in the outdoor compressor unit - the module plugs into the connector on the PCB of the outdoor unit (example for the ARUN – LTE4 series outdoor unit).

ATTENTION, the orientation of the module in relation to the connector must be observed - see the MOV-MV module manual.

5. CONNECTION TO SUPERIOR I&C HVAC SYSTEM

5.1 CONTROL – DESCRIPTIONS, PRIORITIES

As for the external control the communication module allows you to use:

- 1/ "MODBUS" communication protocol
- 2/ request on capacity through the use of 0...10V signal, operating mode via contact input
- 3/ request on capacity through the use of contact inputs (3 max), operating mode via contact input

The communication module respects priority of external signals as follows:

If the MODBUS communication sends at least one record from the recorded registries only commands from MODBUS will be respected (logic and analogue signals are ignored) until the power supply is turned off.

In the analogue signal is above the power output "1" the analogue input for the power value will be accepted as the control input.

If one of the two control inputs "MODBUS" or "analog" is not activated after switching on the power supply, the control by logic signals (contacts) is respected.

The connection is made directly at the terminals of the communication module KM113.22.

MODBUS PROTOCOL CONTROL (MONITORING) (see separate section for description)

5.2 INPUTS FOR EXTERNAL CONTROL – digital, analogue

OPERATION ACTIVATION (ON-OFF)

Input terminals "ON" – Logic input (voltage-free contact).

When the contact "0V + D4" is closed (terminals 18+22) the operation of the device is allowed, when it is opened the operation is stopped.

The current status of this input is indicated on the display by the size of the letter showing the selected operational mode.

Example:

„cO ... 24 ... 24“ = operational mode "cooling", operation is not allowed

„CO ... 24 ... 24“ = operational mode "cooling", operation is allowed

„hO ... 24 ... 24“ = operational mode "heat pump", operation is not allowed

„HO ... 24 ... 24“ = operational mode "heat pump", operation is allowed

OPERATIONAL MODE REQUEST "COOLING=C", "HEAT PUMP=H"

Input terminals "MODE C/H" - Logic input (voltage-free contact)

When the contact "0V+DI1" is closed (terminals 18+19) the communication module sends a request to switch the compressor unit from "cooling" mode to the "heat pump" mode = H".

When the contact is off/open the communication module will send a request to switch the operational mode from "heat pump" back to the "cooling mode = C".

“POWER LEVEL REQUEST”

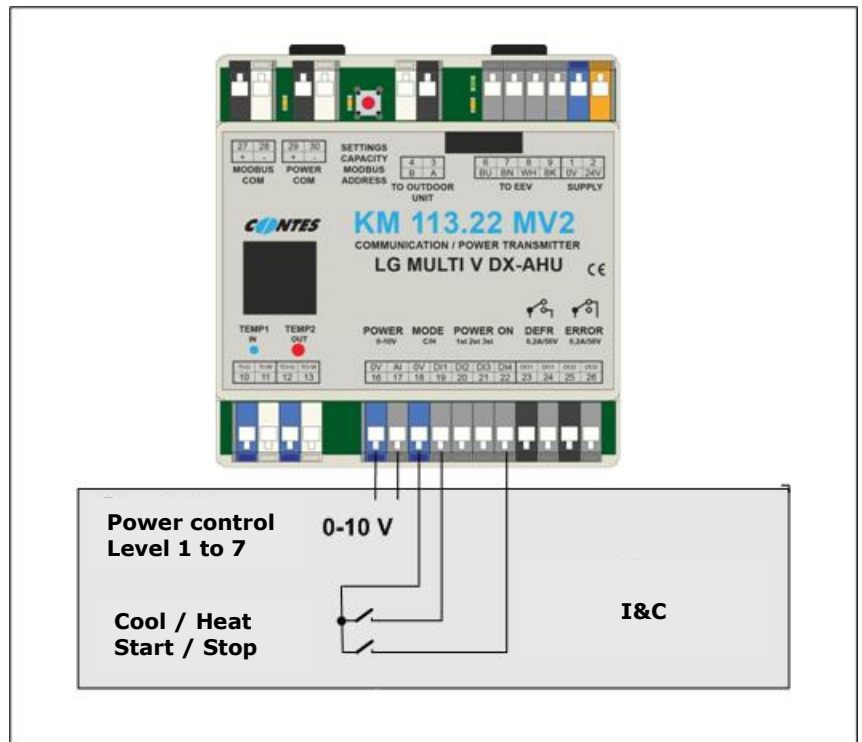
Fig.4 - Control diagram – Power request for analogue input (Operational mode through logic input)

A request for power level may be executed through an analogue signal 0...10VDC or through 3 logic inputs (voltage free contacts).

To directly influence the output (change of evaporating temperature in cooling mode/change of condensing temperature in heat pump mode) it is necessary to install a capacity limitation module at the same time.

1. Input terminals “POWER 0...10V” (terminals 16+17) – analogue signal 0...10V (0 V = no request for power level, 10 V = maximum power level request). The current power request is shown on the right side of the display module using 8 codes (“C0...C7” or rather “H0...H7”).

The power request algorithm requires at least “C1”/“H1” code (i.e. at least 1.5V) to activate the compressor unit.



The power request algorithm requires at least “C0”/“H0” code (that means maximum 1.3V) to stop the compressor unit.

2. Input terminals “POWER 1ST,2ST,3ST” – logic inputs (voltage free contacts):

no contact closed = no power request

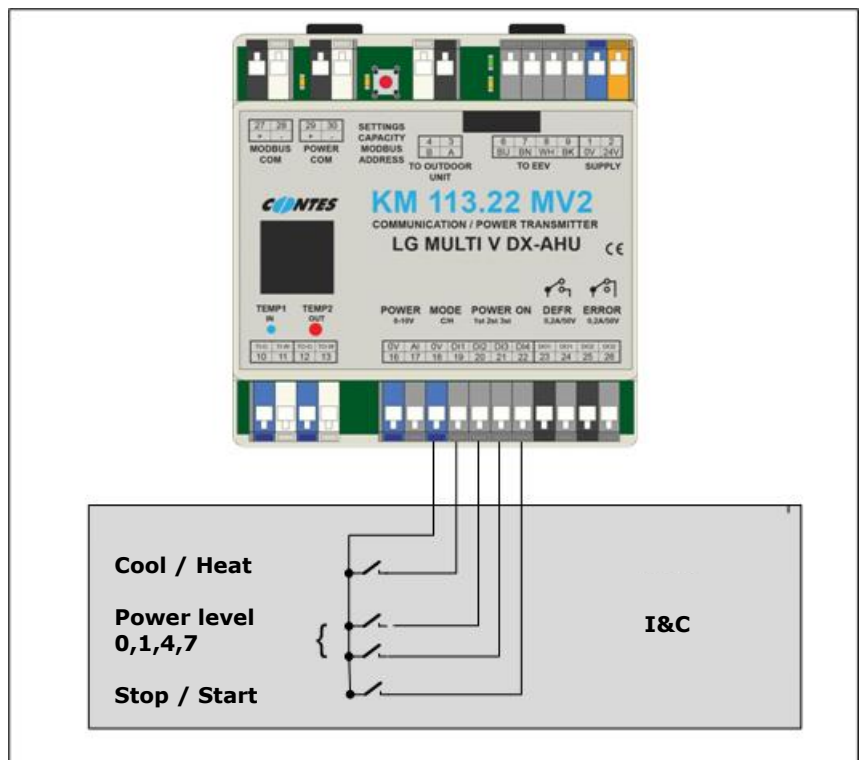
contact POWER 1st closed (terminals 18+20) = low power request

contact POWER 2st closed (terminals 18+21) = higher power request

both contacts POWER 1ST+2ST closed (terminals 18+20+21) = maximum power request

the current power demand is displayed on the right position of the module display via 4 codes (“C0, C1, C3, C7, ” or “H0, H1, H3, H7”)

Fig.5 - Logic input control diagram – free contact type



5.3 OUTPUTS – INFORMATION ABOUT THE OPERATIONAL STATUS OF THE EQUIPMENT

DEFROST

Logic output "DEFROST"(terminals 23 + 24).

The contact is closed if the equipment is in the "defrost" mode and at the same time the display module shows an information message "**d F**"

During normal operation of the device, the contact is open.

ERROR

Logic output "ERROR"(terminals 25+26).

The contact is off/open if the equipment diagnostics identified a defect or the equipment is not powered - no supply voltage.

The defect code is also shown on the module display using the variable communicated by the MODBUS.

Defects identified by the communication module:

Er .. 2	thermometer error "blue"
Er .. 6	thermometer error "red"
Er .. 99	Modbus communication error
Er .. 5	Communication error with the outdoor unit
Er .. XX	outdoor unit errors

List of error codes of the outdoor unit – see the servicing manual of the applied LG equipment.

If more than one error has occurred at the same time, only the code of the first error is shown on the display.

During regular operational status the contact is on/closed.

Notice:

To restart the device after errors occur, it is NECESSARY to perform a "RESET" of the compressor unit device, i.e. disconnect the device from the power supply.

5.4 CONTROL / COMMUNICATION MODBUS

In order to control up to 23 modules from the superior system you may use the MODBUS communication as an option to control or monitor the equipment.

Input/output "MODBUS" (terminals 23+24)

The address for MODBUS communication is set using the "SETTINGS" button. The setting procedure to be found in paragraph 6.

PARAMETRY KOMUNIKACE MODBUS

Serial line: 9.6 kbps, 8 bits, no parity, 1 stop bit
Station address: hex91 - hexA7 (default hex91)

Supported functions: - 3 (Multi_Read)
- 6 (Single_Write)
- 16 (Multi_Write)

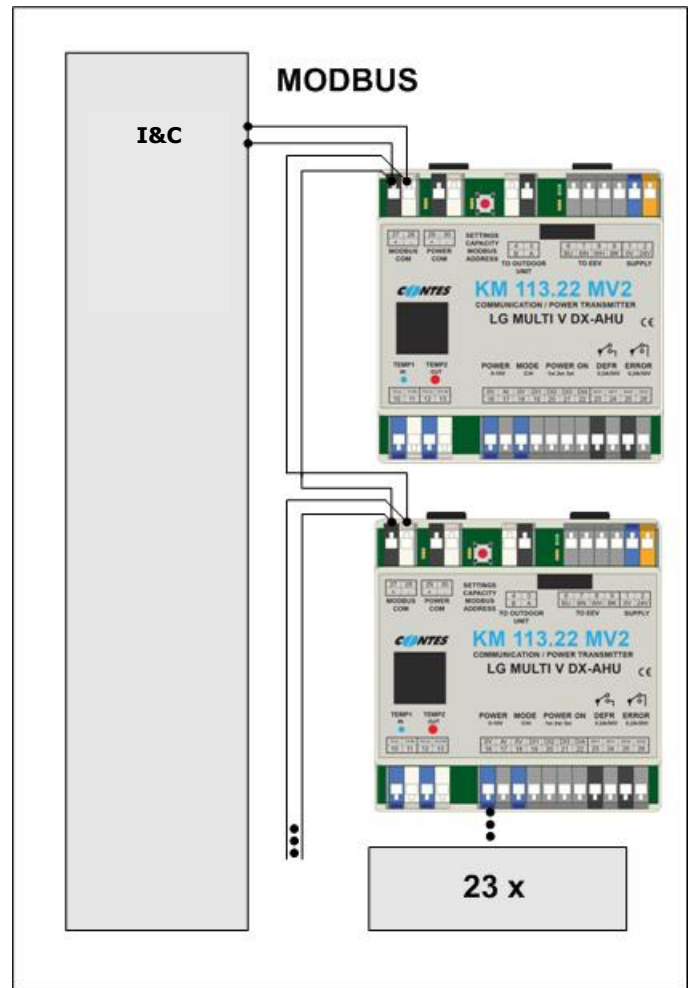


Fig.6 - MODBUS communication wiring diagram for controlling multiple modules

READING REGISTRIES

Name	Address (decadically)	Properties/description
VERSION	4096	Software version
ERROR	4097	Errors according to the device's self-diagnostics (see the service manual of the LG device), (error 99 + Modbus communication error)
TEMP1	4098	Refrigerant input temperature to the exchanger +15 °C (blue sensor, smaller diameter)
TEMP2	4099	Refrigerant output temperature to the exchanger +15 °C (red sensor, bigger diameter)
DEFROST	4100	1 = active defrost mode of the outdoor unit

RECORDING REGISTRIES

Name	Address (decadically)	Properties/description	
POWER	4101	The value of the required power 0 to 7 corresponds with analogue input	
FUNCTION	4102	Bit 0	0 = cooling; 1 = heating (heat pump)
		Bit 1+2	Power value 0,1,2,3 (this value is used to control the power only if the value in the registry POWER is = 0)
		Bit 3	0 = OFF; 1 = ON
		Bit 6	1 = RESET

POWER							
7	6	5	4	3	2	1	0
					A2	A1	A0

FUNCTION							
7	6	5	4	3	2	1	0
	RESET			OFF/ON	L1	L0	C / H

The RESET function is used for example when you need to transfer the control of hardware to signals without the need to shut down the power supply to the unit.

When the communication is activated through the first record it is necessary to communicate more often than during 50 seconds (the recommended communication frequency is once every 1 to 10 second).

If writing is not repeated, the situation will be considered as a MODBUS communication error (error Er 99).

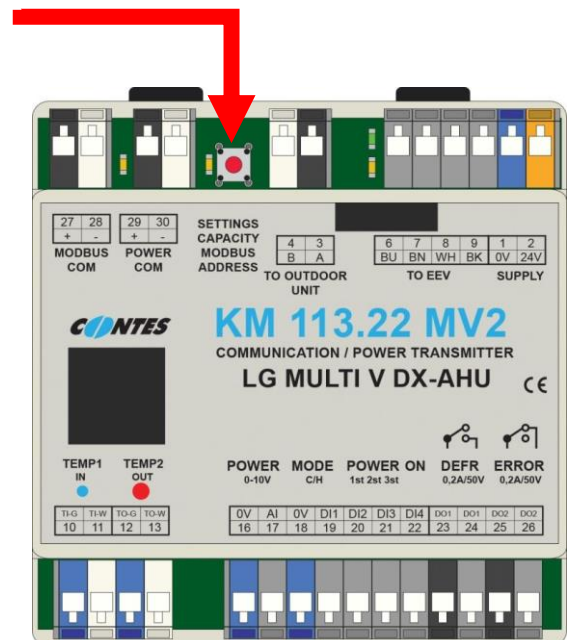
Notice: If an error is active (ER--), the registers are automatically set to "0".

Reading the values of the read registers is possible at any time without time limit and does not affect the control by HW signals.

6. CONFIGURATION AND CONNECTION CHECK

6.1 SETTING THE POWER CODE AND MODBUS COMMUNICATION ADDRESS

Power code and address for MODBUS communication are set using the button "SETTINGS / CAPACITY / MODBUS ADDRESS".



Setting procedure:

ENTERING THE "SETTINGS" MODE

1. Press the SETTINGS button while turning on the power to the module
- Entering the setting mode is indicated on the display by a character:



ENTERING THE "POWER CODE SETTING" MODE

2. Hold the SETTINGS button for 5 s.
 - The display shows the set power code in **kW**.
 - The power code can be changed by shortly pressing the SETTINGS button. It changes cyclically according to the following table

Cooling power	kW	05	07	10	12	14	16	22	28
	Btu	18	24	36	42	48	60	80	100
	kW	33	39	45	50	56	62	67	73
	Btu	120	140	160	180	200	220	240	260

ENTERING THE "MODBUS ADDRESS SETTING" MODE

3. Hold the SETTINGS button for 5 s.
 - The display shows the set address for MODBUS communication. This address is also usable for LG central control systems.
The MODBUS address can be changed by briefly pressing the SETTINGS button. It changes cyclically from 90 to A7. (90 = service communication; 91,..., A7 = MODBUS communication)

Address	90	91	92	93	94	95	96	97
	99	9A	9B	9C	9D	9E	9F	A0
	A1	A2	A3	A4	A5	A6	A7	

ENTERING THE "PROGRAM SELECTION" MODE

4. Hold the SETTINGS button for 5 s
 - The display shows the setting of the active program "0".
 - Service settings – do not change the program
5. Hold the SETTINGS button for 5 s to return to point 2.

If you do not press the SETTINGS button for 10 seconds, the last set value is automatically saved, the setting mode is exited and the initial information sequence appears on the display.

Attention! After changing the settings, it is necessary to restart the outdoor unit (restore power). If the outdoor compressor unit is not restarted, the changes are not accepted by the unit.

SETTING THE INTERNAL SYSTEM ADDRESS (AUTO-ADDRESSING PROCESS)

When starting the system for the first time, it is necessary to perform auto-addressing of the system – see the relevant installation manual for the outdoor compressor unit. During the addressing process, the "- -" symbol appears on the display. After the addressing is completed, the display shows the assigned module address in hexadecimal format (for approx. 10s).

The assigned address is displayed in the introductory information sequence:

1st cycle - basic hardware and software setting information – example:

"LG ... Ar ... 56 ... So ... 4.3 ... So ... 3"

Explanation – module designed to communicate with the compressor unit, model series ARUM/N, power code set to 56kW, software version 4.3, user software 3

2nd cycle - basic hardware and software setting information – example:

"LG ... Ar ... 56 ... So ... 4.3 ... So ... 3 ... 11"

Explanation – module designed to communicate with LG compressor unit, ARUN model series, power code set to 56kW, software version 4.3, user software 3, assigned station / address number "1" for communication with ARUM--- outdoor unit.

Notice:

If no address has been assigned to the module, the symbol "- - " will be displayed in the appropriate position for the address in the introductory sequence – i.e. the system did not auto-address successfully, the outdoor compressor unit does not communicate with the KM113.22MV2 module.

If several communication modules are connected to one outdoor compressor unit, each module must have different address.

Upon delivery, the module is delivered with the preset address "1".

After these initial sequences, the display will show current status of the operation request

Example

"cO ... -1 ... 6"

Explanation: cooling operating mode, no operation allowed, no power demand, current temperature of the input refrigerant piping to the heat exchanger in HVAC -1 °C (blue sensor), on the output +6 °C (red sensor). Refrigerant temperature display range MIN = -9, MAX= 99.

Attention:

If the power code is set incorrectly, the safety function of the external compressor unit may be activated.

When setting the power code, both the module and the device must be without voltage (changing the power code is accepted by the module when the power supply is activated).

Notice:

If several communication modules are connected to one outdoor compressor unit, each module must have a different address. The address of the communication module(s) for internal communication between the outdoor unit and the modules is assigned automatically during the auto-addressing process (the process is activated from the outdoor unit).

ADDRESS OF COMMUNICATION MODULE FOR COMMUNICATION WITH COMPRESSOR UNIT:

The address of the communication module(s) for internal communication between the outdoor unit and the modules is assigned automatically during the auto-addressing process. The process is activated from the outdoor unit (see the relevant manual for the outdoor compressor unit).

Display of the assigned address - see section "Introductory information sequence".

COMMUNICATION MODULE ADDRESS FOR CENTRAL CONTROL IN THE LG SYSTEM:

The address of the communication module(s) for central control via the LG protocol (central controller/converter) is identical to the MODBUS address.

6.2 INTRODUCTORY INFORMATION SEQUENCE

Communication module functionality test

Activate the supply voltage - the display will show the introductory sequence:

1ST cycle – basic information about hardware, settings and software - example:

"LG ... Ar ... 56 ... So ... 4.3 ... So ... 3"

2nd cycle – basic information about hardware, settings, software and assigned address - example:

"LG ... Ar ... 56 ... So ... 4.3 ... So ... 3 ... 1"

Meaning - module designed for communication with the LG compressor unit, ARUM / N model series, set power 56kW, software version 4.3, user software 3, assigned station number/address "1" (set on delivery).

After these initial sequences, the display will show the current status of the operation request - example:

"cO ... -1 ... 6"

Explanation: cooling operating mode, no operation allowed, no power demand, current temperature of the input refrigerant piping to the heat exchanger in HVAC -1 °C (blue sensor), on the output +6 °C (red sensor).
Refrigerant temperature display range MIN = -9, MAX= 99.

6.3 INSPECTION OF INPUTS / OUTPUTS – TESTS

WARNING! All the described functionality tests may ONLY be done by an authorized person. Incorrect test performance may result in equipment breakdown. Make sure that the test will not damage the equipment or endanger persons near the equipment!

INPUT TESTS – temperature sensors

1. Test for the presence of the refrigerant temperature sensor at the input to the heat exchanger (terminals TEMP1, blue) - if the sensor is defective or the connection is incorrect, "Er-2" error flashes on the LED display. Status of this input is permanently indicated by the LED below the display (blue LED is lit = module communicates with the sensor).
2. Test for the presence of the refrigerant temperature sensor at the output from the heat exchanger (terminals TEMP2, red) - if the sensor is defective or the connection is incorrect, "Er-6" error flashes on the LED display. Status of this input is permanently indicated by the LED below the display (red LED is lit = module communicates with the sensor).

INPUT TESTS – power request

The power request is processed by the module only if the operation of the compressor unit is enabled - closed contact „ON (DI4). If a power demand is active at the module input and the operation of the compressor unit is not enabled (contact ON is open), the device will not be activated.

If the operation of the compressor unit is blocked, but at the same time the power demand is active, this state can be recognized by the case of the operation request letter on the display (e.g. "C4" = cooling request, operation enabled, "c4" = cooling request, operation not allowed).

3. The analog input test is performed by applying a DC voltage of 0-10 V to the "POWER 0–10 V" terminals. The display shows the value C0, C1,..., C7. Since we need 8 positions for the range 0-10 V, the voltage for a change of one degree is about 1.4 V. (ATTENTION, at the same time "operation must be" - contact "ON" closed.)
4. Test of logic (contact) input for power switching - disconnect the analog voltage and perform a test of logic inputs, gradually connect the terminals "POWER 1st / 2st / 3st" with a suitable wire. When the "0V" terminals are connected to the "DI2" terminal, power stage 1 is activated - the display shows the value C1. When the "0V" terminals are connected to the "DI3" terminal, power stage 2 is activated - the value C3 appears on the display. When the "0V" terminals are connected to the "DI2" and "DI3" terminals at the same time, power stage 3 is activated - the value C7 appears on the display. (ATTENTION, at the same time "operation must be" - contact "ON" is closed.)
5. Logic (contact) input test for switching the operating mode - disconnect all power request and connect the "MODE C / H" terminals with a suitable wire. When the "0V" terminals are connected to the "DI1" terminal, the heat pump operating mode is activated - the "H0" character appears on the display. Now we connect the power request - the corresponding request ("H1"....) Will appear on the display.

Example of displayed requests:

„C3 ... 6 ... 8““
„H2 ... 58 ... 37““

OUTPUT TESTS

6. Error message test - if we disconnect for example the temperature sensor TEMP1, an error will occur, see the display, and output ERROR opens the contact.

Example of displayed errors: „Er-2-Er-2-Er-2... “

If the system diagnoses several errors at the same time, only the error that occurred first will be displayed. After removing it, the second error will be displayed.

7. DEFROST function test always after activating the power supply of the module, the contact closes momentarily for testing reasons (approx. 2 s).

Notice: This output is necessary for the correct function of the "HVAC compressor unit" system in "heat pump" mode. The superior HVAC control system must ensure the correct appropriate response of the HVAC system.

After performing the tests, check the tightness of the bushings and reattach the cover of the installation box and visually check its tightness.

6.3 INSPECTION OF SETTINGS DURING OPERATION

During operation, without deactivating the supply voltage, the pressure status of the system (if a pressure sensor is installed), the set power code, the address for central control (MODBUS) and the last 10 error states of the device can be verified.

1. After a short press of the SETTINGS button, the display shows the pressure (in bar). If the pressure gauge is not used, 0 is displayed.
2. Hold the SETTINGS button for approx. 5 s.
The display shows the set power code in **kw**
3. Hold the SETTINGS button for approx. 5 s.
The display shows the set address for MODBUS communication. This address is usable (same) for LG central control systems.
4. Hold the SETTINGS button for approx. 5 s.
The display shows numerical code of the selected user program for controlling the EEV.

In this mode, the values can be viewed, not changed. The "current setting information" mode ends automatically after approx. 5 s and the display shows the current status of the operating requirements and the temperature values.

Warranty card

Equipment specifications

<p><i>Product</i></p> <p>communication box to control outdoor compressor condensation unit LG Electronics. model series "ARUN**" output for bipolar expansion valve control EX5, EX6</p>	<p><i>Model</i></p> <p>KM113.22MV2</p>
<p><i>Scope of delivery – accessories</i></p> <p>communication module KM113.22MV2 power supply (24 VDC), switch, Refrigerant temperature sensor "BLUE" (TEMP1-IN = small ●) refrigerant temperature sensor "RED" (TEMP2-OUT" = large ●) installation box, auxiliary terminals, cable glands (6pcs), installation manual</p>	<p><i>Serial number</i></p>
<p><i>Date of sale</i></p>	<p><i>Seller</i></p>
<p><i>Installation date</i></p>	<p><i>Installation performed by</i></p>

The manufacturer provides a 24-month warranty covering the quality of the product starting on the day of sale. The warranty covers defects of the purchased product, which appear during the warranty period. In order to keep your warranty valid the installation must be performed by an authorized person and the "Warranty form" must be properly filled out. The client shall always claim the given warranty rights at his own seller.

Service contacts

<p><i>Manufacturer (branch)</i></p> <p>CONTES, spol. s r.o. Mikuleckého 1314 147 00, Praha 4</p>	<p><i>Telephone</i></p> <p>261 710 655</p>	<p><i>E-mail</i></p> <p>info@contes.cz</p>
<p><i>Distributor</i></p> <p>RAN klima s.r.o. Jilovištská 691 155 31, Praha 5</p>	<p><i>Telephone</i></p> <p>244 402 140</p>	<p><i>E-mail</i></p> <p>info@ran-klima.cz</p>
<p><i>Seller's service</i></p>		