ROKONET
RISCO GROUP

Industrial LuNAR

CEILING DETECTOR INSTALLATION MANUAL

Optional Remote Control Device

Optional ProSYS Upload/Download Software

General Description

The Industrial LuNAR is an intelligent ceiling detector for a mounting height of 2.7m to 8.6m (9ft - 28ft) that incorporates Rokonet's revolutionary Anti-Cloak™ Technology (ACT™). The model has an Intelligent Digital Signal Processing method that automatically adjusts the alarm threshold and pulse count verification according to actual intruder behavior and environmental factors, providing the best detection.

The industrial Lunar can operate as a stand-alone detector or as a BUS accessory when connected to Rokonet control panels, ProSYS via the RS485 BUS.

Industrial LuNAR Features

- Addressable Dual Technology detector with Anti-Cloak™ Technology
- Dual IR and MW Technologies for harsh environments.
- Digital and analog Microwave Range Adjustment manually (analog) and remotely (digital)
- Trouble Indication (by LEDs or via communication)
- Up to 8.6 m (28ft) mounting height
- 360^0 by 22m (72ft) diameter coverage pattern
- 3 independently PIR channels for customized coverage
- Range optimization by sliding the Lens
- Remote control and diagnostics from a remote control device
- 3 Triple color LEDs for easy walk testing
- Intelligent Digital Signal Processing – alarm verification and decision thresholds adjusted according to actual intruder behavior
- Ceiling and cover tampers
- Reduced Power Consumption when connected to Rokonet's ProSYS

Remote Control and Diagnostic Features*

- Remote microwave adjustment enables one-man walk test without climbing ladders.
- Diagnostic tools include detector input voltage reading and status of each PIR channel and MW channel (signal voltage and noise levels), SW version verification.
- Remote display and control of detector settings: MW adjustment, ACT on/off, LEDs on/off.
- Remote trouble indication (Pass/Fail) for the PIR, MW and power supply input
- Control of MW bypass, MW disable.

*Via the optional Bi-Directional Infrared Remote Control, or the **ProSYS** Upload/Download Software.

Detection System

The Industrial Lunar detection is based on:

- **PIR** (Passive Infra-Red) - which responds to changes in the ambient thermal radiation caused when an intruder crosses the protected area.
- **MW** (Microwave) - which transmits signals and analyzes the frequency changes of the reflected echo from an intruder using Doppler effect.

ALARM is initiated only when both technologies trigger simultaneously (except for the ACT mode-see page 4 – "How ACT™ Works"). Detection occurs only in areas where IR (Infra Red) and MW patterns overlap, thus greatly reducing the possibility of false alarms.

How ACT™ Works

ACT™ (Anti-Cloak™ Technology) identifies cases in which PIR detection is problematic, and automatically switches to microwave-only detection.
When ambient temperature is close to body temperature, the infra-red energy emitted from an intruder is similar to the IR emitted from the room background, therefore IR sensors cannot detect any signal difference. In such case the ACT™ switches to microwave-only detection as shown below:
False alarm immunity is not compromised because in MW-only mode, the MW sensitivity is reduced by increasing the threshold of the Doppler pulse required for triggering an alarm and by increasing the number of Doppler pulses required for triggering an alarm;

IR signal level of a camouflaged moving intruder is very low, but has a characteristic shape and frequency. The ACT™ concentrates only on the shape and frequency of the signal and disregards signal strength. Using complex pattern recognition algorithms ACT™ is able to identify a camouflage attempt of a moving intruder. When ACT™ identifies a camouflage attempt in the PIR channel as described above and microwave detection is present, it switches to microwave-only mode for a short window of time. False alarm immunity is not compromised because the ACT™ algorithms filter out all causes of false alarms in the PIR channel. In addition, in microwave-only mode the MW sensitivity is reduced.

Configuring the LuNAR

Once installed, the LuNAR can be configured and/or diagnosed remotely via one of the options:

	Manual operation	Remote control	ProSYS control
ACT Mode		√	√
LEDs	√	√	√
MW Sensitivity	√ (by trimmer)	√	√
Diagnostics	√		√
Status/ Trouble/Info Reports	-	√	√
MW Bypass	-	-	√
MW Disable on Disarm	-	-	√
Upload/Download Software	-	-	√

LED Display

All three Tri color LEDs in the LuNAR, operate as described in the table below:

LED	STATE	MEANING
Red	Steady	Detector alarm (simultaneous PIR and MW detection)
	Flashing	Indicates malfunctioned communication with ProSYS
Green	Steady	Microwave activation
	Flashing	Trouble in the MW channel
Yellow	Steady	PIR activation
	Flashing	Trouble in the PIR channel
All LEDs	Flashing	Upon powerup

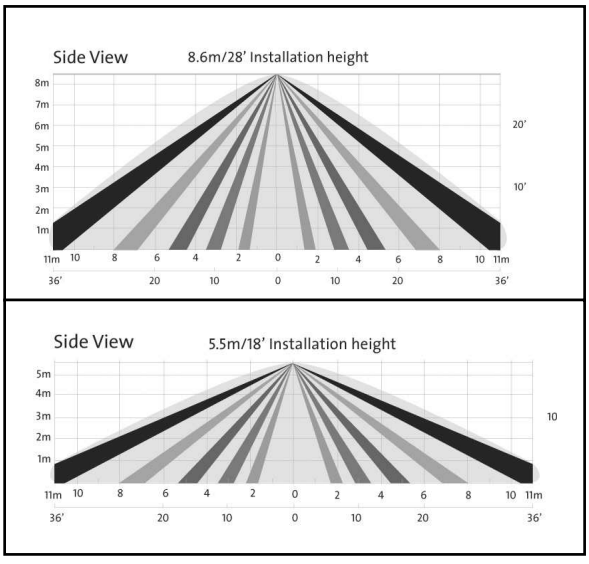
NOTE:

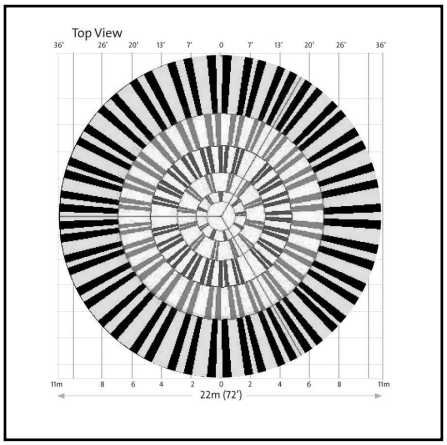
Relevant only if LED Dipswitch 2 is “ON” in Stand Alone mode.

INSTALLATION

STEP 1. PRELIMINARY CONSIDERATIONS

- Before installation, study the space to be protected carefully in order to choose the exact location of the unit and lens for the best possible coverage.
- Never install the LuNAR in an environment that causes an alarm condition in one technology.
- Avoid installations where rotating machines (e.g. fans) are normally in operation within the coverage pattern. Point the unit away from glass exposed to the outdoors and objects that may change temperature rapidly.
- Do not mount the detector in direct sunlight or near any heat sources. Detection sectors should be pointed either towards a wall, floor but not towards windows or curtains. The surface should be solid, smooth and vibration free
- Eliminate interference from nearby outside sources.
- For optimum detection, select a location likely to intercept an intruder moving across the coverage pattern.
- Recommended mounting height, that allows 20m (72ft) detection diameter, is from 3.7m to 8.6m. Typical LuNAR detection range and installation height, are demonstrated below:

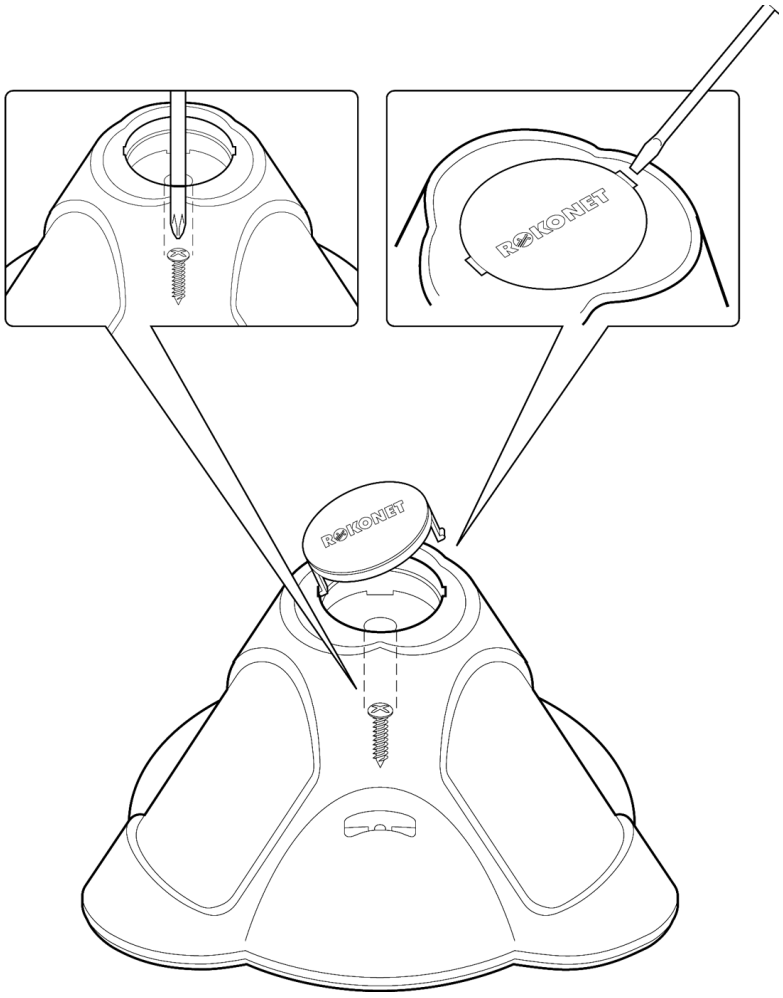




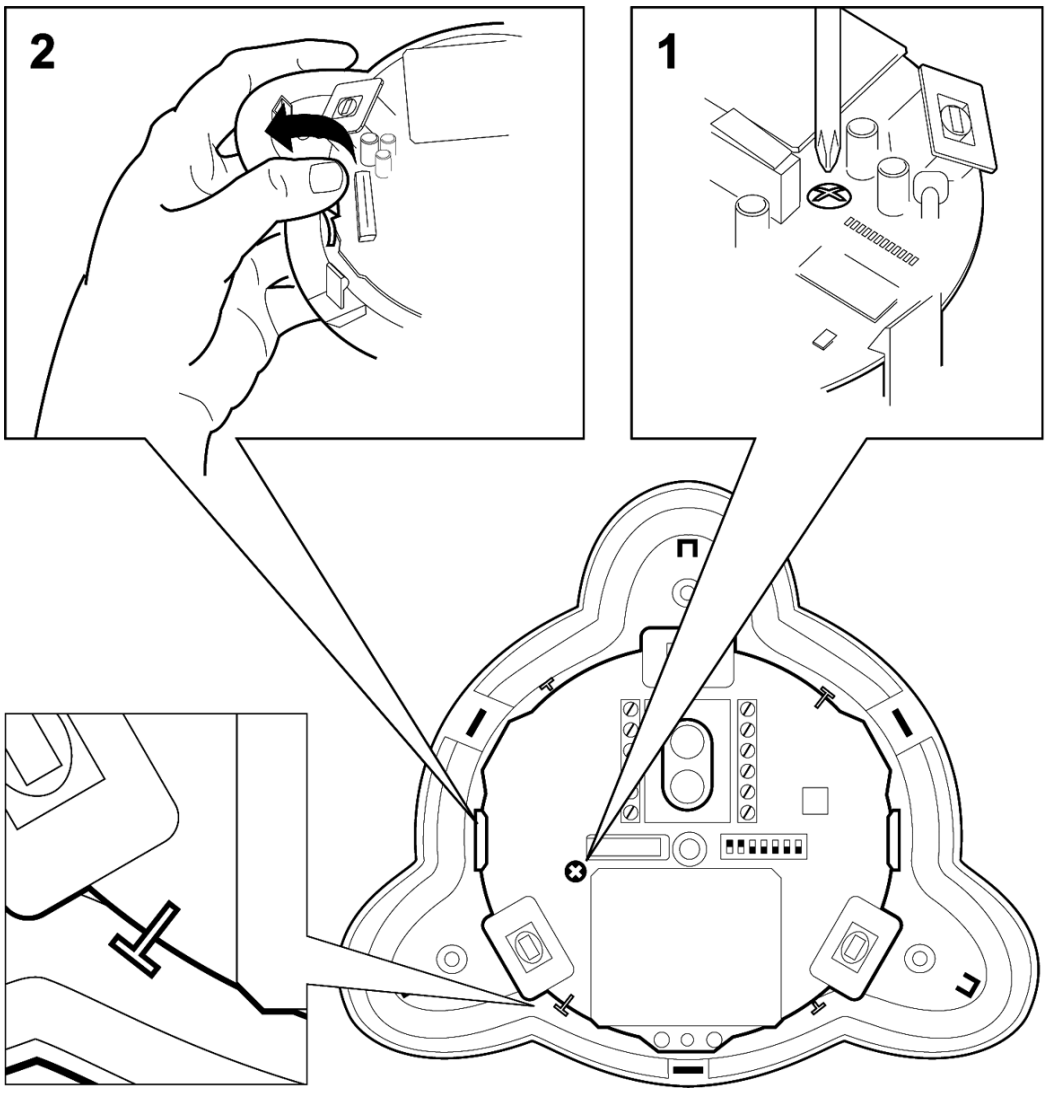
STEP 2. MOUNTING

The detector **must** be mounted on the ceiling, in the center of the room.
To open the detector, turn a screwdriver in the recess between the detector's protection cap and the cover. The cover will remain attached to the base of the detector.

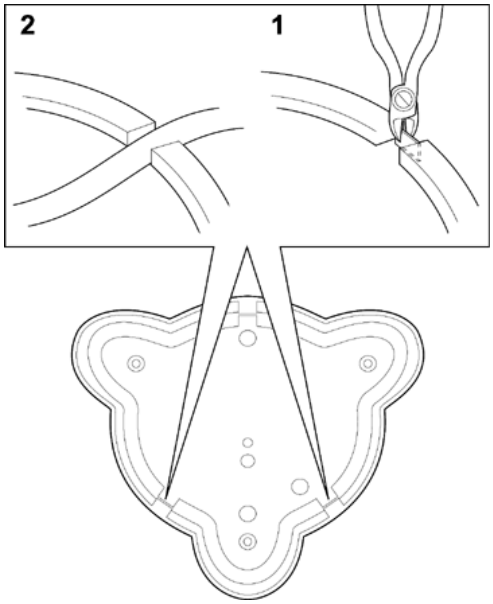
1. Using a screwdriver, release the upper cover screw and gently pull upward the detector's upper cover.

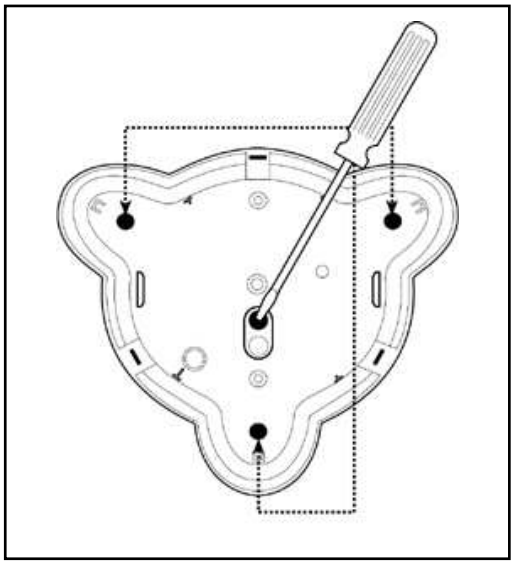


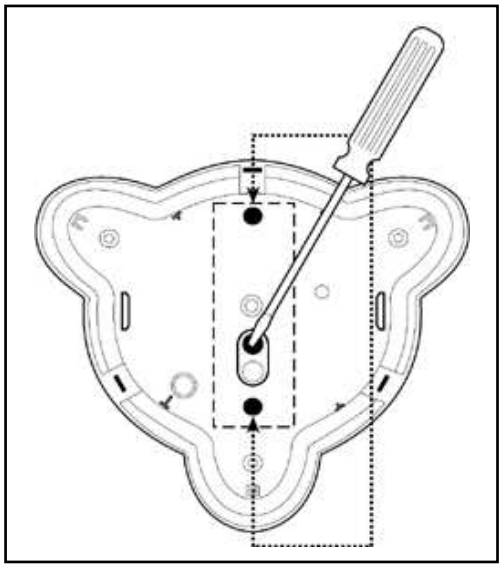
2. Release the PCB holding screw (1), located on the right hand side of the PCB, pull gently the two release clips (2) outward and pull the PCB upward.



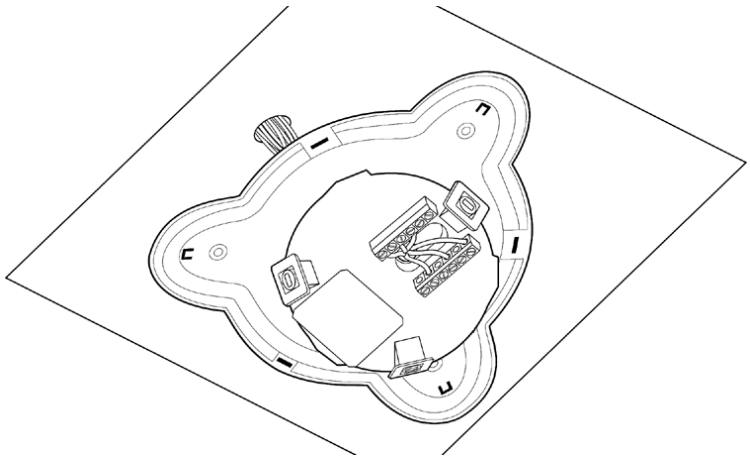
3. Open the wiring channels (1, 2) knockout using a cutter and knockout holes (3, 4) using a screwdriver located on the rear cover.





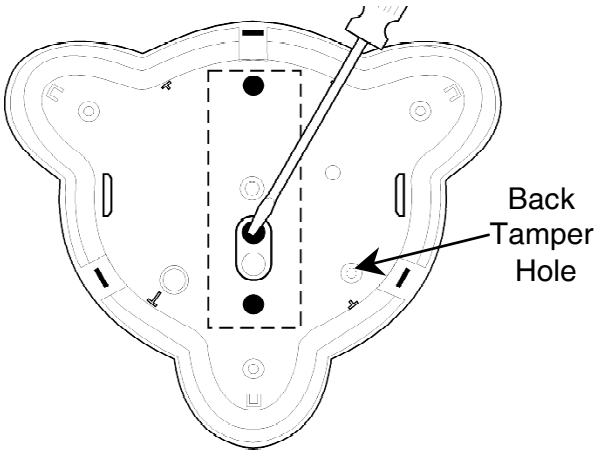


4. Insert the cable via the cable opening and wire the desired wires as shown below and also described in “Step 4- Wiring”.



5. Mount the rear cover in its final location using its 3 mounting screws and seal the remaining open holes with sealant.

NOTE:
When special single gang box is used, use 2 additional screws to mount the base to the box single gang box! The back tamper can not be used in this case!



6. Return the PCB to its previous location and verify that it is well secured by the holding clips.
7. Mount the top cover on the detector's base.
8. Tighten the top cover's central screw.
9. Return the detector's protection cap to its previous location.

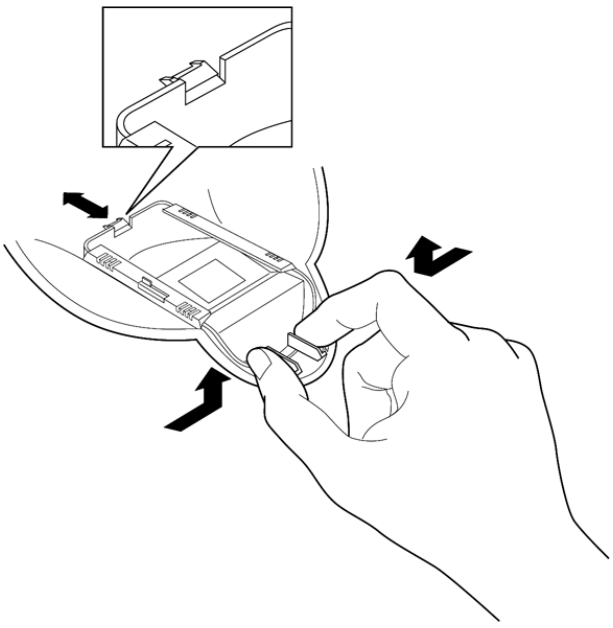
NOTE:

If ceiling tamper is desired, open the ceiling tamper hole at the detector's base!

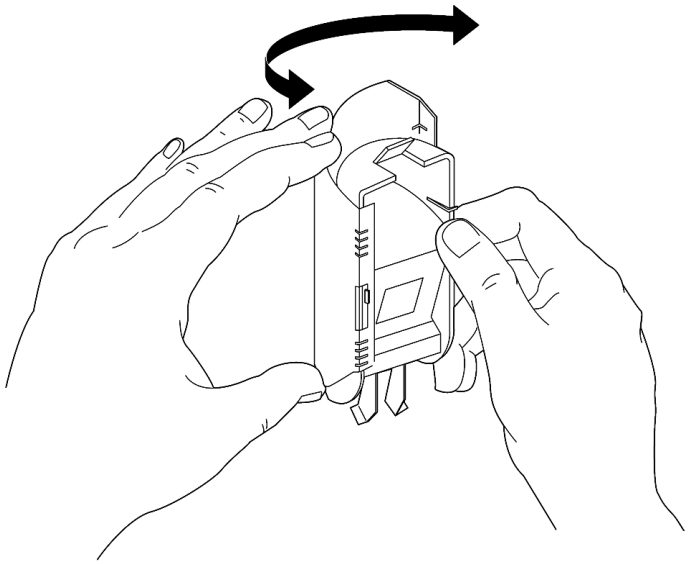
STEP 3. ADJUSTING THE LENS

The Lunar has three pigmented protective lens attached to the cover, using a sensor protective sleeves (attached to each lens). Adjust the position of the lens based on the ceiling mounting height.

1. Repeat steps 1-2 of the "STEP 2. Mounting".
2. Press inward the 2 clips attaching the sleeve to the Lunar's cover and gently pull out the sleeve.



3. Disconnect the lens from the sleeve by gently lifting it from the holding pins that secure it to the sides of the sleeve.



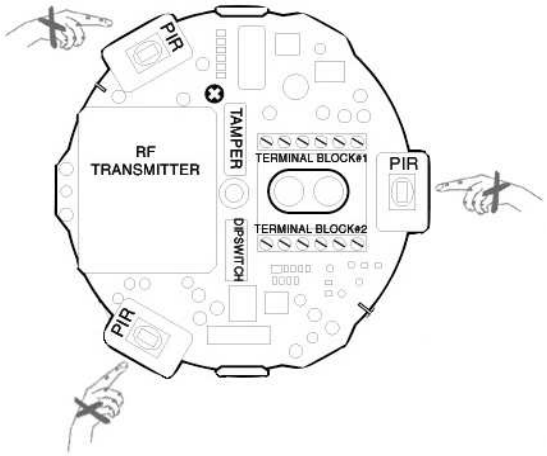
4. Place the two pins, which are located on both sides of the sleeve into the matching slots on the lens. Use the following table to select the desired lens position.

Lens Position	Mounting Height
1	2.7 - 4.9m 9 - 16ft
2 (DEFAULT)	4.9 - 6.2m 16 - 20.3ft
3	6.2 - 7.8m 20.3 - 25.6ft
4	7.8 - 8.6m 25.6 - 28ft

5. Return the protective sleeve back into place on the Lunar front cover.

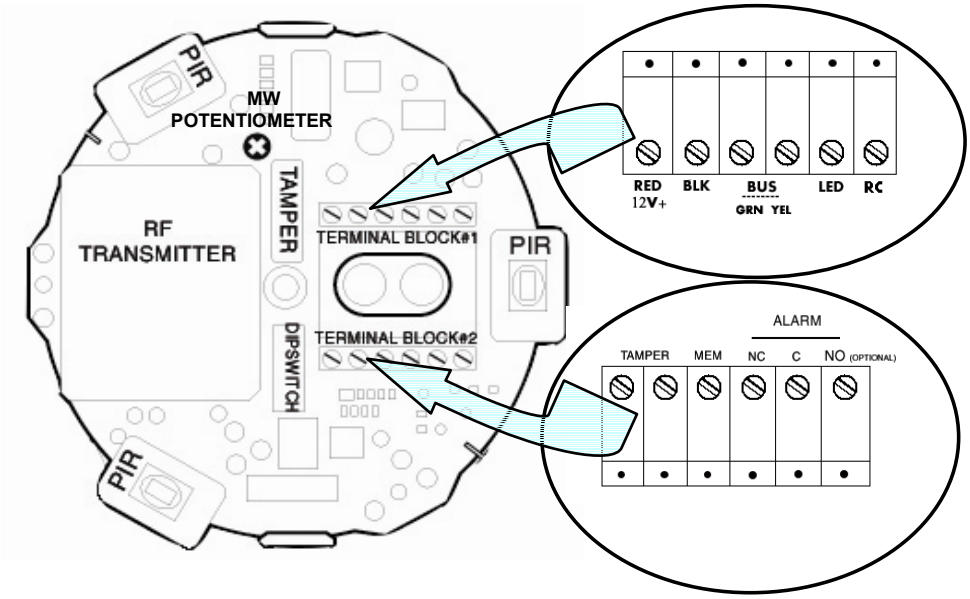
STEP 4. WIRING

The LuNAR has 2 terminal blocks. Use the table below and the wiring diagram to connect the cables to the terminal block on the PCB. Use the wiring channels if necessary to navigate the wires to the LuNAR central wiring hole.



	TERMINAL BLOCK 1	DESCRIPTION
Power	**+12V (RED)**	Power supply positive (+) input voltage
	-12V (BLK)	Power supply negative (-) input voltage
ProSYS	**BUS (GRN)**	Used for data communication with the **ProSYS**
	BUS (YEL)	Used for data communication with the **ProSYS**
Stand Alone	**LED**	Used to remotely enable/disable the LEDs. You may use a switch to operate this feature. (12VDC/Not connected=Enabled, GND=Disabled) **Important:** To enable the control of this terminal, in Stand Alone Mode, dipswitch 2 should be "ON".
	RC	Used to remotely enable/disable IR control (12VDC/not connected =disabled) **Important:** To enable the control of this terminal, in Stand Alone Mode, dipswitch 7 should be in "ON".

	TERMINAL BLOCK 2	DESCRIPTION
ProSYS	**TAMPER**	Normally closed dry tamper output
	MEM	Used to set the detector to the Alarm Memory Mode (for more details, see Alarm Memory Mode - page 18).
Stand Alone	**ALARM (NC)**	Alarm relay contacts used for normally closed circuits for DC resistive loads.
	C	Used as common terminal for either NC or NO circuits.
	ALARM (NO)	Alarm relay contacts used for normally open circuits for DC resistive loads (optional)



STEP 5. DIPSWITCH SETTINGS

The LuNAR has 7 position Dipswitches that have different programming options, when the detector operates in the **Stand Alone** mode or in **ProSYS** operation mode. Set the Dipswitch as desired according to the table below:

Stand Alone Mode (Dipswitch 6=OFF):

Dipswitch Number	Description
1	Used to determine the operation of the ACT technology **Dipswitch ON**: ACT is activated **Dipswitch OFF**: ACT is deactivated
2	Used to determine the operation of the detectors LEDs **Dipswitch ON**: LEDs are activated **Dipswitch OFF**: LEDs are deactivated
3-5	Not Applicable
	Used to determine the detectors connection
6	**Dipswitch OFF**: Stand alone mode
7	Used to determine if the detector can be programmed by remote control programmer or not.
	Dipswitch ON: Programming is Enabled
	Dipswitch OFF: Programming is Disabled

ProSYS Connection (Dipswitch 6=ON):

Dipswitch Number	Description
1 - 5	Used to set the detector ID number. (See table 1) Set the ID number in the same way as for any other ProSYS accessory.
6	Used to determine the detector's connection **Dipswitch ON**: ProSYS connection – BUS configuration
	NOTE: Upon power up or normal operation, the LuNAR waits 10 seconds for **ProSYS** communication. Malfunctioned communication may occur due to bad wiring, wrong address, or **ProSYS** not configured properly; all LEDs will continuously flash until the problem is solved (e.g. switch 6 to "OFF").
7	Not Applicable

Factory Default Settings

Table 1: ID Settings

ID	1	2	3	4	5	ID	1	2	3	4	5
01	OFF	OFF	OFF	OFF	OFF	17	OFF	OFF	OFF	OFF	ON
02	ON	OFF	OFF	OFF	OFF	18	ON	OFF	OFF	OFF	ON
03	OFF	ON	OFF	OFF	OFF	19	OFF	ON	OFF	OFF	ON
04	ON	ON	OFF	OFF	OFF	20	ON	ON	OFF	OFF	ON
05	OFF	OFF	ON	OFF	OFF	21	OFF	OFF	ON	OFF	ON
06	ON	OFF	ON	OFF	OFF	22	ON	OFF	ON	OFF	ON
07	OFF	ON	ON	OFF	OFF	23	OFF	ON	ON	OFF	ON
08	ON	ON	ON	OFF	OFF	24	ON	ON	ON	OFF	ON
09	OFF	OFF	OFF	ON	OFF	25	OFF	OFF	OFF	ON	ON
10	ON	OFF	OFF	ON	OFF	26	ON	OFF	OFF	ON	ON
11	OFF	ON	OFF	ON	OFF	27	OFF	ON	OFF	ON	ON
12	ON	ON	OFF	ON	OFF	28	ON	ON	OFF	ON	ON
13	OFF	OFF	ON	ON	OFF	29	OFF	OFF	ON	ON	ON
14	ON	OFF	ON	ON	OFF	30	ON	OFF	ON	ON	ON
15	OFF	ON	ON	ON	OFF	31	OFF	ON	ON	ON	ON
16	ON	ON	ON	ON	OFF	32	ON	ON	ON	ON	ON

STEP 6. WALK TEST

NOTE:

To perform the walk test, firstly enable the LEDs as described in step 5. If walk test is performed via the ProSYS, LEDs enable is performed automatically via the RS485 bus.

1. Two minutes after applying power (warm-up period), walk test the detector over the entire protected area to verify proper operation of the detector and observe the Tri - color LED. The edge of the microwave pattern is determined by the first red LED activation (both PIR and MW LEDs are triggered).

NOTE:

If any of the PIR/MW LEDs does not lit, it means that there is a problem with either the lens (PIR) position, or MW tuning!

2. If adequate range cannot be reached, increase the microwave sensitivity by adjusting the PCB potentiometer (using a screwdriver) or by the Remote Control device. Continue walk testing and adjust the range until the desired coverage is achieved.
3. Walk test the unit from all directions to determine all the detection pattern boundaries.

NOTE:

Set the potentiometer to the lowest possible rate, that will still provide enough coverage for the entire protected area!

4. When using the Remote Control device, it is recommended to perform LuNAR self test; For further instructions refer to the Remote Control Instructions.

FINAL SETUP

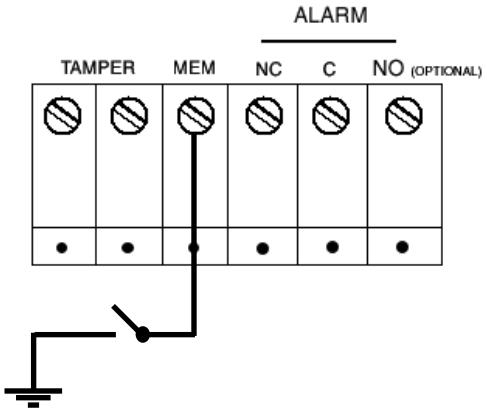
Upon completion of installation and testing stages, ensure that all switches are in their desired positions. The unit is now ready for use.

Alarm Memory Mode

The LuNAR has an alarm memory mode that enables to store an alarm for display at a later time. To set the detector to Alarm Memory Mode, apply “0” level (Ground connection) to the “MEM” terminal. You may use a switch as shown below.

To view the last Alarm detection disconnect the “0” level from the “MEM” terminal. If an alarm occurred, the RED LED will light steadily.

To reset the LED and return the detector to a stand alone operation mode, re-apply the “0” level to the “MEM” terminal, and then disconnect the “0” level again from the “MEM” terminal.



Specifications

Electrical

- Voltage Requirements: 9 to 16VDC
- Current Consumption: 20mA at 12VDC, 30mA at 16VDC, (Maximum 50mA with all LEDs on)
- Alarm Contact: NC 200mA, 24VDC (form “C” relay available)
- Tamper Contact: NC 500mA, 24VDC
- Alarm Time 2.2 seconds
- Warm-up time 2 minutes

Optical

- Pigmented Fresnel lens

Physical

- Dimensions (Height x Diameter) 99mmx194mm (3.9inx7.6in)

Environmental

- RFI immunity 40V/m from 10MHz to 1GHz
- Operating Temperature: -20^{o}C to 55^{o}C (-4^{o}F to 131^{o}F)
- Storage Temperature: -20^{o}C to 60^{o}C (-4^{o}F to 140^{o}F)

Ordering Information:

Part Number	Description
RK200DT00xxA	Industrial LuNAR DT Detector
RK200RC0000A	Industrial LuNAR Remote Control

XX select the microwave x-band frequency for your market according to the following list:
00 10.525 Ghz for most countries
UK 10.687 Ghz for UK
FR 9.9 Ghz for France and Czech Republic
DE 9.35 for Germany

FCC NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on to a different circuit from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- Changes or modifications to this equipment which are not expressly approved by the party responsible for compliance Rokonet Electronics Ltd.) could void the user's authority to operate the equipment.

Rokonet Limited Warranty

Rokonet Electronics, Ltd. and its subsidiaries and affiliates ("Seller") warrants its products to be free from defects in materials and workmanship under normal use for 24 months from the date of production. Because Seller does not install or connect the product and because the product may be used in conjunction with products not manufactured by the Seller, Seller cannot guarantee the performance of the security system which uses this product. Seller's obligation and liability under this warranty is expressly limited to repairing and replacing, at Sellers option, within a reasonable time after the date of delivery, any product not meeting the specifications. Seller makes no other warranty, expressed or implied, and makes no warranty of merchantability or of fitness for any particular purpose.

In no case shall seller be liable for any consequential or incidental damages for breach of this or any other warranty, expressed or implied, or upon any other basis of liability whatsoever.

Seller's obligation under this warranty shall not include any transportation charges or costs of installation or any liability for direct, indirect, or consequential damages or delay.

Seller does not represent that its product may not be compromised or circumvented; that the product will prevent any persona; injury or property loss by burglary, robbery, fire or otherwise; or that the product will in all cases provide adequate warning or protection. Buyer understands that a properly installed and maintained alarm may only reduce the risk of burglary, robbery or fire without warning, but is not insurance or a guaranty that such will not occur or that there will be no personal injury or property loss as a result.

Consequently seller shall have no liability for any personal injury, property damage or loss based on a claim that the product fails to give warning. However, if seller is held liable, whether directly or indirectly, for any loss or damage arising from under this limited warranty or otherwise, regardless of cause or origin, sellers maximum liability shall not exceed the purchase price of the product, which shall be complete and exclusive remedy against seller.

No employee or representative of Seller is authorized to change this warranty in any way or grant any other warranty.

Contacting Rokonet

Rokonet Electronics Ltd. is committed to customer service and product support. You can contact us through our website (www.rokonet.com) or at the following telephone and fax numbers:

USA

Tel: (305) 592-3820

Fax: (305) 592-3825

Israel

Tel: +972 (3) 9637777

Fax: +972 (3) 9616584

United Kingdom

Tel: +44 (1527) 576-765

Fax: +44 (1527) 576-816

Brazil

Tel: +55 (21) 2496-3544

Fax: +55 (21) 2496-3547

Italy

Tel: +39 (02) 392-5354

Fax: +39 (02) 392-5131

ROKONET ELECTRONICS LTD. 07/04 5IN200DT