SR-Series
User Manual

Introduction

Scope

This document aims to provide a user manual for the setup and installation of the SR-Series sensor by Magos Systems. The manual provides information on mechanical structure and interface, installation procedure and guidelines, and interface to manage the system. Please read the entire document prior to the installation and or use of the product.

About Magos Systems

Magos was established in 2008 to realize its co-founder's vision of bringing advanced radar technology to the security, perimeter protection, and detection market. We are experts in low-cost & power consumption and high-performance radars that can be easily integrated with existing VMS, PSIM, and other control software and automatic PTZ slew to cue for an end-to-end cost-effective and easily maintained solution for the customer's security requirements.

Contacting Magos Systems

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Address	Gad Feinstein 13 Office 225, Rehovot Israel 7638517
Website	www.magosys.com
Support (Available to trial version/ valid maintenance contract)	support@magosys.com

System Overview

SR-Series outdoor perimeter defense sensors are designated for outdoor installation and use only. They provide accurate location, velocity, and bearing data on moving targets within their coverage area. The SR-series sensor is a radar technology-based sensor. This means that it transmits low-power (less than 100mW) RF signal in the C-Band frequency and inspects the returned signal. Radars detect movement within the transmitted beam coverage area, based on modification in the returned signal and Doppler-induced frequency detection. The SR-series sensors contain no moving parts and rely on a multichannel antenna array and digital beam-forming technology to determine target azimuth. This fact increases scan rate capabilities and thus enhances detection probability and detection performance in general.

In addition, it contributes to MTBF increase making the entire system more reliable. Finally, as they are RF-based sensors, the SR-Series sensors exhibit superb immunity to lighting, visibility (FOG, Smog), weather (rain, snow), and other environmental conditions.

The SR-Series sensors implement all data processing, and detection algorithm intrinsically, and report the detection results via Ethernet UDP protocol to the host computer approximately twice per second.

Unlike most radars, the SR Series sensors support "zero Doppler" detection, which can detect very slow-moving targets (crawlers, etc.) and tangent-moving targets. Static objects are not reported as targets since each target must travel a certain minimum target to be considered as a target, however, a moving target that was tracked and stopped moving will still be detected and reported.

The radar coverage area is nominally 100°-120° (depending on the model) in azimuth (horizontal plane) and 30° in elevation.

A more accurate description of the radar coverage area can be found in Figure 10.

System Specifications

	SR-150	SR-250	SR-500	SR-1000	SCEPTER
Ordering P/N	MSA1356A	MSA1452A	MS700A	MSA1231A	MSA1241A
Description	5.8GHz Sensor 150m range, 1.2m resolution	5.8GHz Sensor 250m range, 1.2m resolution	5.8GHz Sensor 600m range, 1.2m resolution	5.8GHz Sensor 1000m range, 1.2m resolution	5.8GHz Sensor 600m range, 1.2m resolution
Detection Range	Human: 150m Vehicle/Boat: 150m	Human: 250m Vehicle/Boat: 250m	Human 400m Vehicle/Boat: 600m	Human: 800m Vehicle/Boat: 1000m	Human: 400m Vehicle/Boat: 600m
Frequency	C-Band				
Sensor Type	High-resolution MIMO digital beam-forming				
Azimuth Coverage (º)	120°			100°	
Elevation Coverage (º)	30°				
High-Range Accuracy	< 1m				
Azimuth Accuracy(º)	1°			0.7^o	
Scan Rate (per second)	~3		2		
Target Detection Speed (m/sec)	0.3-30				
Dimensions	25cm X 15cm X 5.9cm / 9.8" X 5.8" X 2.3"			25cm X 30cm X 8 cm /9.8" X 11.8" X 3.15"	
Power Consumption	48V, 3.5W		48V, 5W		
Operating Temperature	-40 - +85 C ^{o}				
Power Interface	PoE 802.3af (802.3at Type 1)				
Environmental Ratings	NEMA-6, IP67				
Weight (Kg/lb)	1.5Kg / 3.3lb			3Kg / 6.6lb	
Approvals/ Certifications	CE, FCC, UL, IC	FCC, UL, IC	FCC, UL, IC	FCC, UL, IC	CE/RED EN 62368-1:2014, EN 60950-22:2006 / AC:2008, EN 301 489-1, EN 301 489-3, EN 300 440

Figure 1: SR-Series Sensors – SR150/250/500 (left) and SR1000/SCEPTER (right)

Physical Installation

Personnel Authorized for Installation

Installation of the SR-Series Sensors is intended for technicians/system integrators who have only received training by Magos Ltd.
If you have not received proper training, please contact Magos Ltd or visit our website (www.magosys.com) for a list of authorized installation personnel.

Installation Restrictions and Limitations

- The product shall be installed at a location where the radiating antenna can be kept at least 2_m from nearby persons in normal operating conditions.
- For safety reasons it is restricted to install the radar in marine-type environment.

General Installation Guidelines

To properly install the SR-Series sensors and integrate it into an active, efficient protection system, it is imperative that the user will first understand some basic rules regarding radars in general and specifically regarding the SR-Series sensors. Prior to sensor installation, it is imperative that the user reads the following list of limitations and restrictions and ensures that the intended installation site is suitable for installation. When in doubt
Please consult with Magos representatives. In addition, Magos strongly recommend conducting a site survey prior to installation. For first-time installers, it is recommended to consult with Magos representatives before, during, and after the site survey.
The following limitation and restrictions should be considered prior to installation:

- Line of sight: Radar sensors are based on line-of-sight detection. Any obstacles hiding or partially hiding areas from the radar will not be properly protected. This includes obvious obstacles such as walls, buildings, hills, etc, but also includes less obvious obstacles such as light foliage, low bushes, etc., where the target is only partially obscured from the radar. In such cases, detection performance is reduced.

- Clutter: While the SR-Series sensors feature "zero-doppler" detection, maximum detection ranges for tangent moving targets (moving targets that remain at a constant or near constant distance from the radar) or for crawlers are typically reduced compared to radial moving targets. This occurs in areas that are not clear of obstacles such as bushes, trees, and other flora.

- As mentioned earlier the SR-Series sensors might exhibit disturbances and "ghost" targets as a result of largely returned signals. This occurs when a very large target (car/ truck etc.) moves in the vicinity of the radar (30m away or less, and 5m away or less for human targets) even outside the stated coverage area. Therefore, it is recommended to install the sensor in unpopulated, isolated spots (or alternatively use high poles to increase the distance between the radar and ground traffic).

- The SR-Series sensors, in similar to all radar-based technologies, rely on returned signals to interpret target location. If the coverage area contains metallic objects

(cars, large pipes, fences, etc) or non-metal surfaces (straight walls, buildings) this might result in multiple reflections (similar to looking at a mirror) from a signal target, arriving at the radar from multiple angles.

This means, for example, that if the sensor is set to protect an area containing a metallic fence, a target moving at one side of the fence might be detected by the radar as 2 targets moving from both sides of the fence.
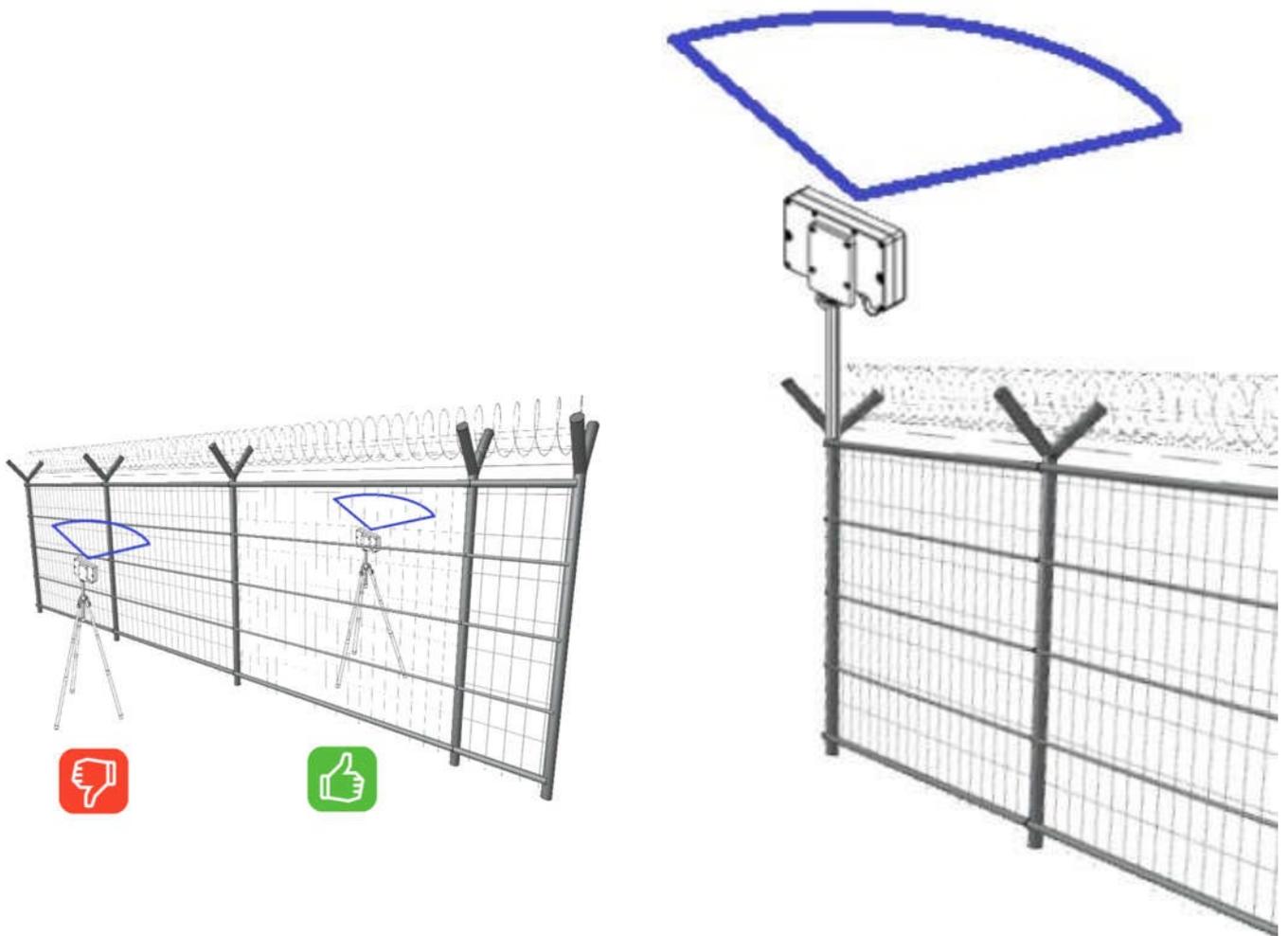

Figure 2: Avoid reflections from metallic objects

- Note that tripod user as illustrated in the figure is not recommended for permanent installations. Use tripods only for evaluating sensor performance during site surveys/demos/etc.
- In general water is non-transparent to RF signals. A consequence of this fact is that when the SR-series sensor intended to cover an area containing large bodies of

water, large waves and other disturbances in the surface of the water might be interpreted by the radar as moving targets.

- Note that in similar to all transmitting/receiving antennas and devices, the SR-Series sensors also exhibit low gain to areas outside the stated coverage area. This results in some wanted and unwanted phenomena for example:
    - **Zero range detection**: even when installed on very high (>10m) poles with zero tilt angle – the radar will probably still detect targets moving on the ground directly below it (allegedly increasing coverage in elevation to 90 degrees below the horizon).
    - **Near range disturbances**: large moving targets (or metallic objects acting as reflectors) in the near vicinity of the radar (up to 10 meters away from it for human targets) outside the area of coverage and even directly behind the radar might be detected by the radar and falsely interpreted as targets moving within the coverage area.

Mechanical Installation

SR-Series sensors have four mounting holes for attaching the unit to designated adaptors/brackets. It is strongly recommended to use Magos mounting brackets. This section includes full details for the mechanical mounting of the sensors.

Important! The warranty does not cover water damage caused to the connector. In order to avoid such damage, the cap must be attached whenever a cable is not plugged in. Whether using the cable or the cap ensure that they are securely connected by twisting them until firmly locked.

<u>Sensor Mounting</u>

Figure 3 and Figure 4 outline the mechanical dimensions of the various sensors and the locations of the mounting holes (identical in all SR-series models). Holes are compatible with ¼''-20X1/2 screws. Screws and mounting brackets can be purchased separately from Magos. These include tilt adjustable brackets, and adaptors for wall, corner, and pole installations as depicted in.

- Figure 5
- Ensure all 4 screws are used. During installation make sure all screws are properly fastened and are installed with spring washers and washers. Otherwise, Magos is not responsible for damage caused to the unit or people that might result from the detachment of the sensor unit under harsh wind conditions.
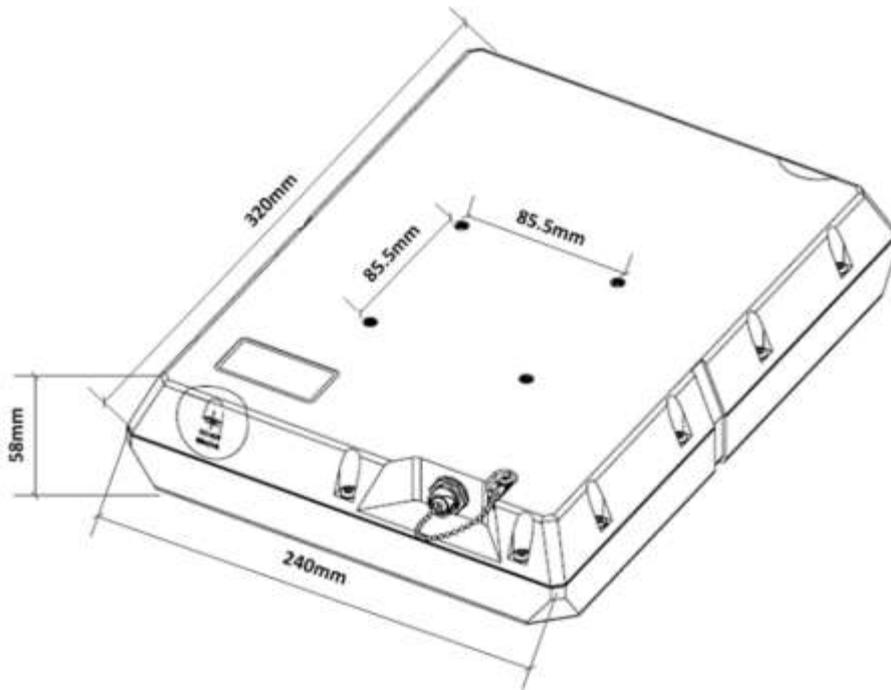
Figure 3: SR-1000F/SCEPTER Mechanical Dimensions and Mounting Holes
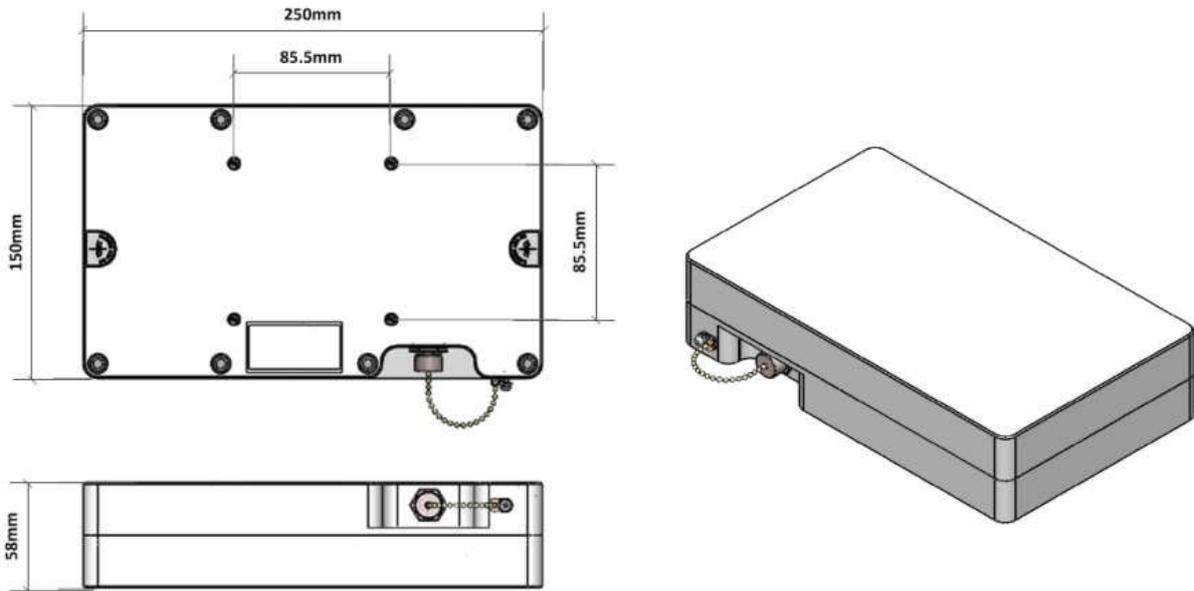

Figure 4: SR-500F/SR-500I/SR-250F/SR-150F Mechanical Dimensions and Mounting Holes
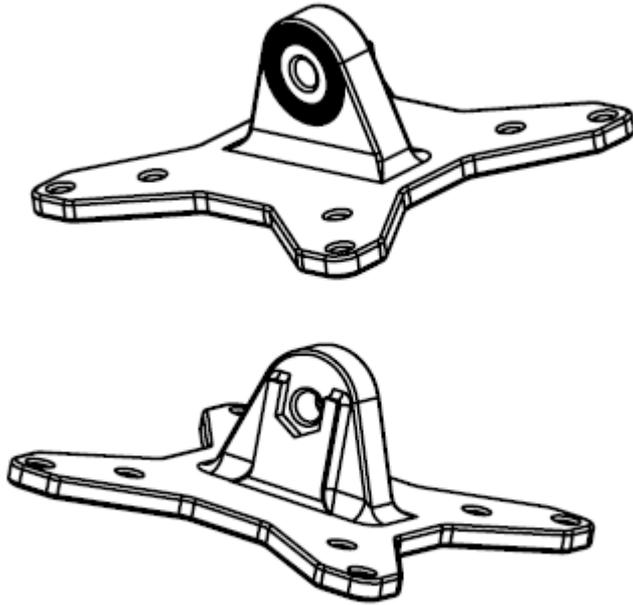
Figure 5: Universal Bracket

Installation Height

Microwave radiation does not propagate in a straight line but more as an elliptic sphere between the radar and the target: This is known as a Fresnel zone and should be kept clear of blocking objects to maximize radar performance.

The ground is the major problem but also other objects in the area like trees, buildings and large vehicles can be a problem.

Therefore, please use the following table as a minimum recommended radar installation height as a function of the maximum detection range wanted for the radar:

Range (m)	Sensor Minimum Height (m)
150	5
250	5
500	5
1000	9.5

Table 2: Recommended Installation Height

Sensor Direction

In terms of azimuth (or horizontal direction), aim the center of the sensor towards the center of the area of interest. Figure 10 demonstrates detection performance – maximum range as a function of angle of approach from the birds-eye view. Ensure that sensor is level with the ground, otherwise, sensor coverage area might be reduced depending on the sensor's elevation angle coverage and the degree of tilt relative to the ground.
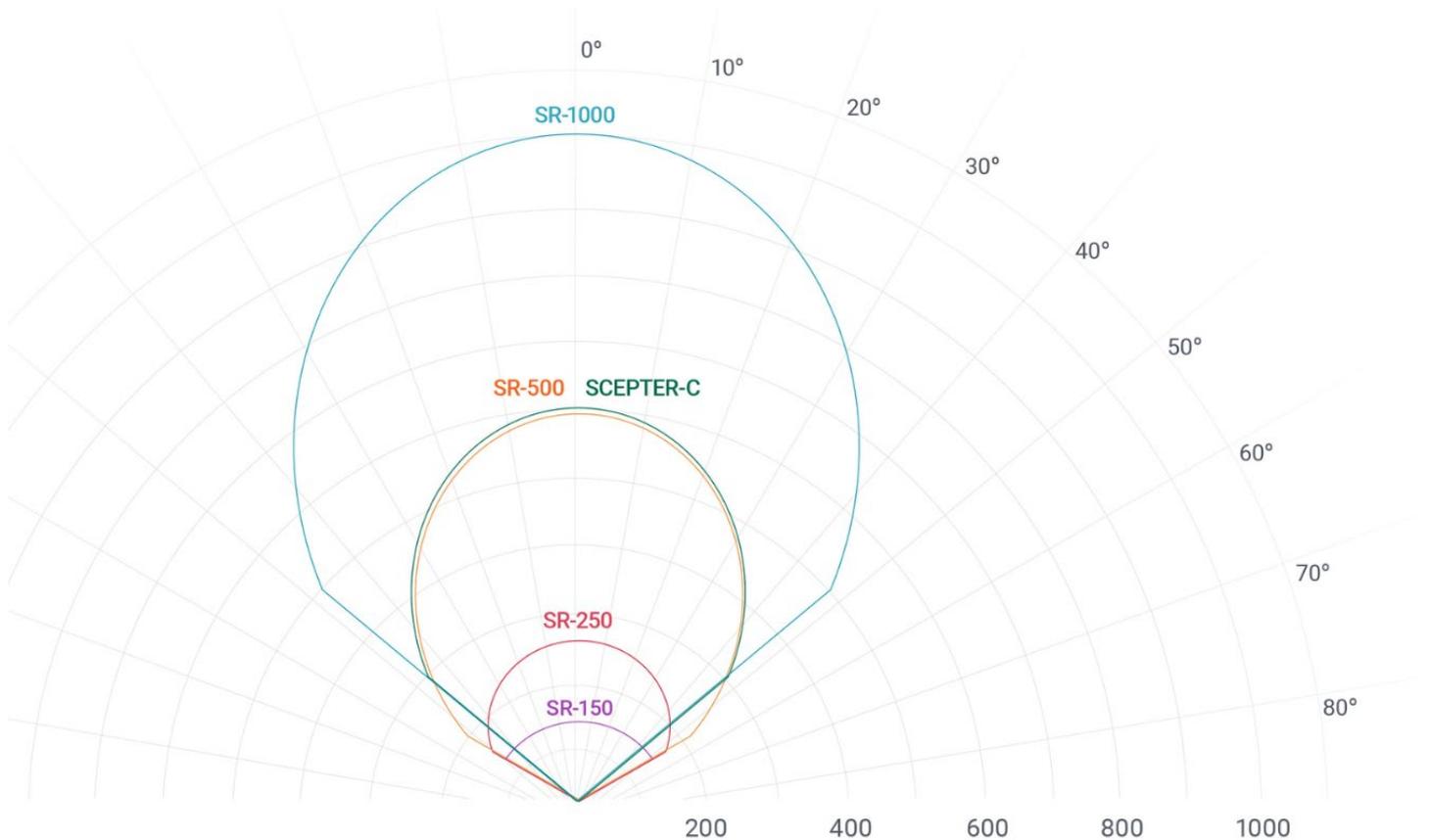

Figure 6: SR-Series Maximum Coverage Diagram (Top View)

- In terms of tilt angle, to achieve the best performance refer to Table 3 and Figure 7. The rule of thumb is to point the radar such that the maximum desired detection range is at the center of the elevation coverage range of the radar.
- Tilt recommendations relate to the height of radar compared to ground level at a maximum range of interest. When installing in extremely un-level terrains (e.g. on top of a steep hill) tilt angle might need further adjustment
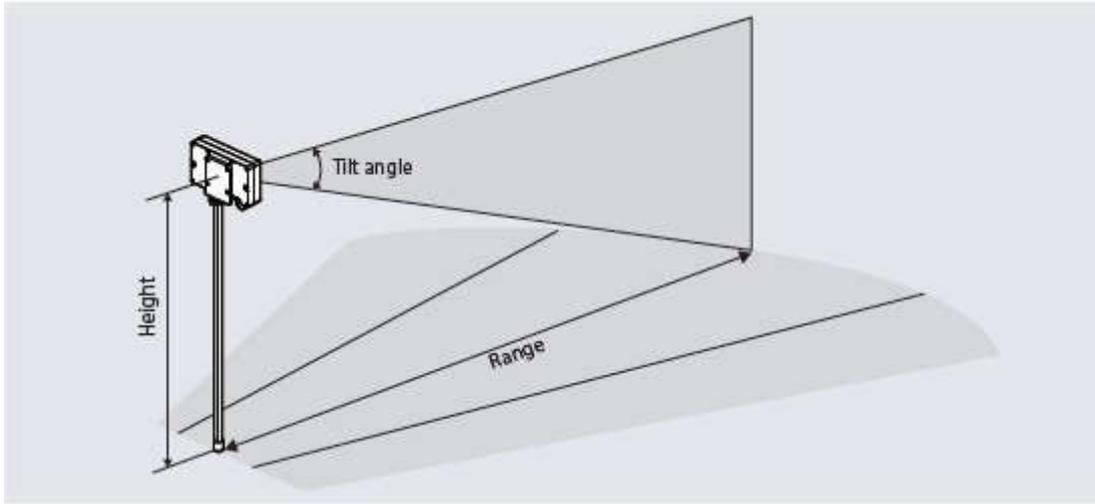
Figure 7: Tilt Angle

Height (m)	Range (m)	Tilt angle (degrees)
5	100	-3
5	200	-2
5	400	0
10	100	-6
10	200	-3
10	400	0
15	100	-8
15	200	-4
15	400	-2
20	100	-11
20	200	-6
20	400	-3

Table 3: Tilt Angle

<u>Additional Physical guidelines</u>

- Make sure the sensor is stable and secure. The mounting solution should be stiff and stationary under harsh wind conditions. As a general guideline, oscillations of more than 3cm should not be allowed, or the unit's performance might be compromised.
- If several sensors need to be installed next to each other, we recommend a distance of at least 1m between the sensors when not aimed at each other (back-to-back installation). Avoid aiming the sensors at each other when they are installed with less than 150 meters distance between them.

Important! Failure to observe the above restrictions might result in sensor performance degradation and in extreme cases might lead to irreversible damage to thesensor units.

- Connecting to the sensor: use outdoor weather immune cables. When the cable is not plugged in, use the connector cap to maintain weather immunity. The warranty does not cover weather damage (corrosion etc.) caused by the usage of improper cables/failure to the use the cap when not installed. In such cases product warranty is void. See chapter 5 for details on the sensor's electronic connection. Ensure that the electronic connecting cable is firmly secured to the pole/wall or any other contraption upon which the radar is installed in such a fashion that would not allow it to dangle within the coverage area of the sensor. In addition, make sure that the cable securing method renders it resistible to strong winds and that it does not apply excessive force on the connector.

Electrical Installation Guidelines

The electrical installation of the sensor consists of a simple cable connection on the radar side. Figure 8 contains the electrical schema of this cable.
For safety and warranty reasons users must use only cables supplied by Magos. Users must also ensure that the connector shielding on the RJ45 connector side is
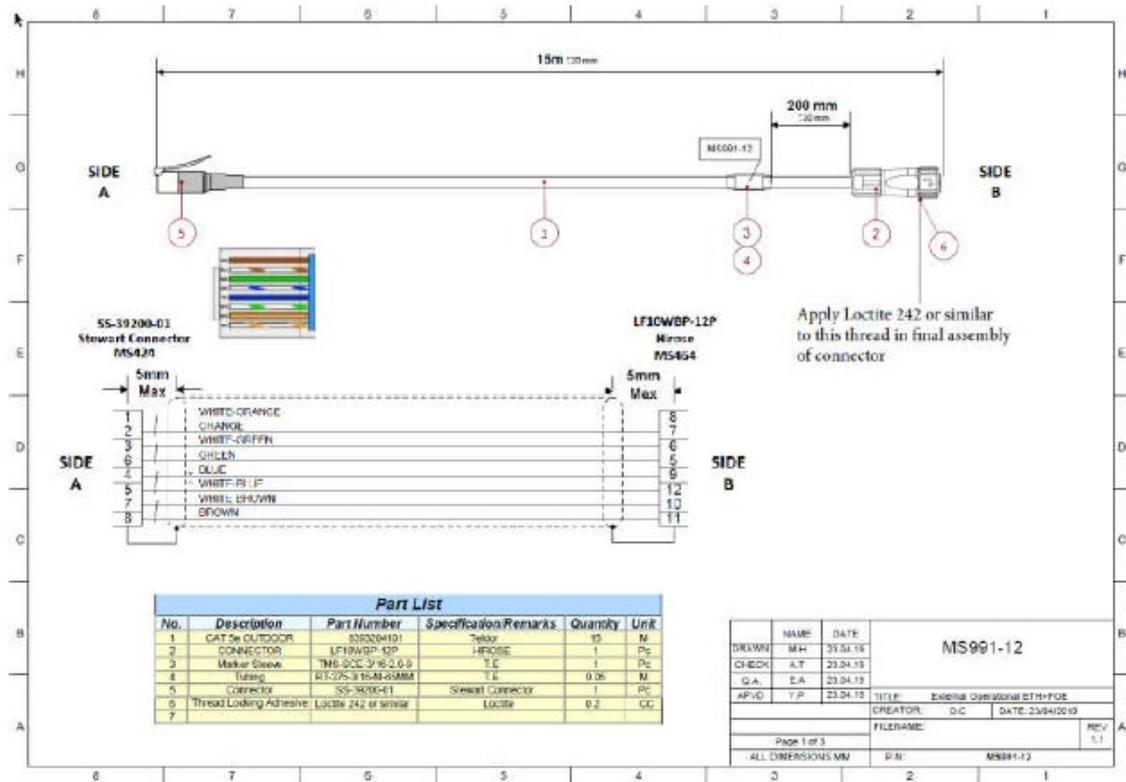properly grounded.

Figure 8: SE-Series External operation cable

Power Supply Interface

Ensure that the SR-Series radar is powered only by an IEEE 802.3at Type 1 (802.3af) and Type 2 certified POE injector/switch which is in conformance with all safety and EMC standards that are relevant and applicable in your country. If you are unfamiliar with such standards, it is recommended that you contact Magos and enquire as to the compatibility of the suggested power supply. The electrical requirements of the power supply are according to IEEE 802.3at Type 1 (802.3af) and Type 2.
Using power supplies that do not meet these requirements and/or are not properly authorized for public use in your country is the sole responsibility of the user, and might result in unexpected sensor behavior or even irreversible damage to the unit.

Important! For safety reasons, prior to handling the connector on the radar unit, disconnect the AC/DC converter or POE supply feeding the unit.

For a list of recommended POE equipment please refer to the Magos Knowledge Base page, at: https://partners.magosys.com/portal/wiki

Communication Interface

The SR-Series sensors support a standard Ethernet interface (100Mbps). The product label contains its unique MAC address. When interfacing with Magos proprietary MASS C&C software consult the MASS user manual for more details on the sensor interface and ICD. Otherwise please contact Magos at support@magosys.com for information on supported C&C software, sensor
setup etc.

Network Behavior

In terms of network discovery – the SR-Series sensors send out a broadcast message used for the identification of the sensor in any network, regardless of the subnet. These messages can be used for the initial detection and configuration of the sensor (setting a subnet-matching IP address).
In terms of outgoing operational messages (detections etc.), the SR-Series sensors are designed to send messages to a single client. Once the sensor receives a valid message from any source, it will automatically direct all outgoing communications to the source IP address. The sensor does not support broadcast/multicast topologies in which several devices listen/subscribe to outgoing messages sent from
the sensor.
Therefore, ensure that at any given time, your local network contains a single device that is attempting to communicate with the SR-Series sensors. If more than one instance of the MASS server is running on 2 different computers in the network, for example, a race condition is created in which the sensor keeps "jumping" between two destination IP addresses.

Radar Manager

The "Radar Manager" software tool is a simple configuration tool for swift and easy network configuration of the SR-Series Radar. This tool doesn't require installation and can be downloaded from (https://partners.magosys.com/portal/downloads/). If you encounter problems during the download you may contact the Magos support team (support@magosys.com) for assistance.
This section contains instructions on how to use the "Radar Manager" tool to detect radars connected to your local network and to assign them with user-defined IP addresses. This initial step is crucial for proper communications with the radars via C&C/PSIM software (either Magos MASS or any other software based on Magos SDK).
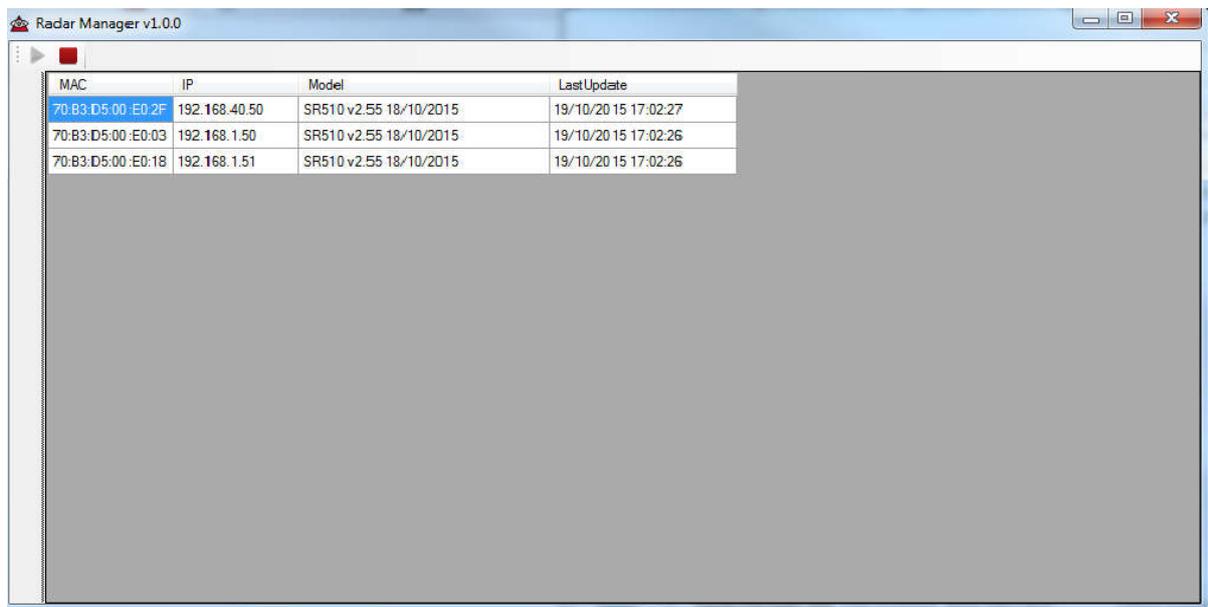Figure 9 depicts the Radar Manager main screen as it is shown when first running the tool.

The play/stop buttons on the top left of the screen can start/stop the tool from scanning network messages.

While running the tool scans for specific broadcast messages periodically sent by the SR-Series sensors.

As seen in Figure 10 the main screen lists the sensors it detected in a table. Each device occupies one row in the table with the following columns:

- MAC – device-specific and unique MAC address
- IP – current IP address assigned to the sensor
- Model – Device model and firmware version
- Last Update – the time and date of the last message broadcast by the device.

Figure 9: Radar Manager main screen

In order to assign a different IP to a sensor, right-click on the row containing the device details, and choose "Assign IP".

An "Update IP" window will be opened as shown in Figure 14. The window shows the MAC address of the selected sensor and the current IP assigned to it. The user is prompted to type in the new IP address.

When done click set.

The new IP will be updated in the device table of the main screen within a few seconds, when the next broadcast message arrives from the device. It is recommended to wait and check that IP was indeed updated successfully.

This IP will be retained in flash memory on the sensor and will not be erased upon reset. It can be re-configured using the radar manager tool whenever needed.
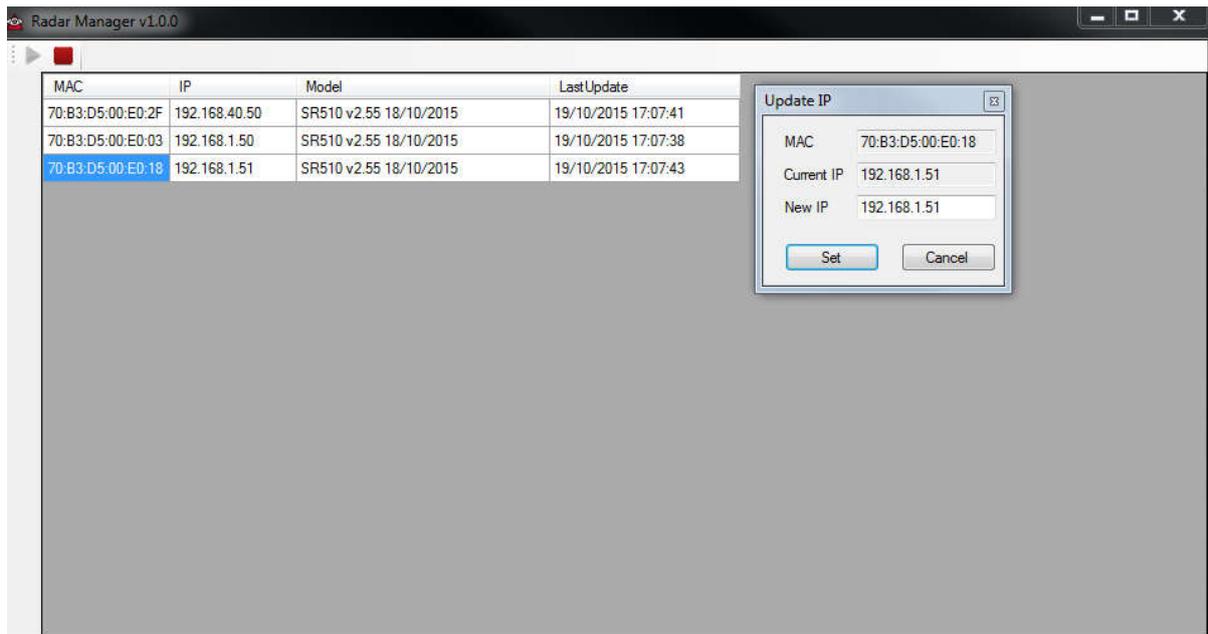
Figure 10: Radar Manger – choosing a fixed IP

BIT

The SR sensor includes a built-in test feature. This feature is designed to allow operators to identify HW or other faults that might result in reduced sensor performance or even prevent the operation of the sensor.

Note – The BIT feature is not supported in all FW versions. In order to find out whether your sensor supports BIT please contact the Magos support team.

BIT Mechanism

The built-in test contains 2 types of tests – continuous and periodic. Continuous tests are run continuously. If the test fails BIT status is immediately reported. Periodic tests run periodically (approx. once per minute).
In any event, regardless of test results, a BIT status report is sent periodically upon completion of all periodic tests.
While all tests have a "Boolean" "Pass/Fail" result, most tests also report a numeric test result if relevant.
To find out how to access the BIT status report, and depending on the control software you use, please see:

- MASS user guide – "BIT Status Report" chapter
- Technician software user guide
- SDK/ICD documentation

BIT Description

- **Jamming** – Radar SW suspects a jamming attempt / an external interference. This test is run continuously and any suspected jamming/interference is immediately

reported. The jamming test also returns the estimated direction of the jamming source and measurement standard deviation.

- **Current** – Radar current consumption is too high/low. Test result includes current measurement in mA. This test is periodic.
- **Vmain** – The internal 5V DC supply output voltage exceeds limits. Test result includes voltage measurement in mV. This test is periodic.
- **VextPOE** – The main DC voltage supply input level exceeds limits. Test result includes voltage measurement in mV. This test is periodic.
- **Temp**. – The temperature exceeds operating limits. Test result includes temperature measurement in ° Celsius. This test is periodic.
- **Vneg, Vhighh, Vpll, Vrf1, Vrf2, VpdPre, VpdCh0** - Various internal DC converter voltages levels. These tests include voltage measurement in mV. This test is periodic.
- **TxRfP –** RF power detector places on the Tx output detects a power level that exceeds limits. This test includes estimated power measurement in dBm. This test is periodic.
- **PllLck –** The Pll (in charge of generating the Tx RF signal) fails. This test does not include additional results. This test is continuous.
- **TamperSw** – Internal tamper switch has been activated. This means that the radar's front cover (Radome) has been physically removed. This test is continuous.
- **Note I** – This test is only support in specific HW models that include the Tamper Switch. Contact Magos support to find out whether your unit includes this feature.
- **Note II –** Once tamper switch is set it can only be cleared by an authorized Magos technician.

Handling Failed BIT Reports

In case of a Jamming report – try to find out if there are any radio-emitting devices in the vicinity of the radar (wireless communication equipment, nearby radars, etc.). Use the angle measurement report to narrow down the emitting source possible locations.

In case of temperature – the sensor is designed to operate in extreme temperature conditions from -40° up to +85° Celsius. If installed in a harsh environment that exceeds these limits try to control temperature by shading/adding circulation (in case of overheating) or adding an external heat source (even a lamp) in case of extremely low temperatures.

In the case of tampered SW – this indicates that radar has physically tampered. Even if tamper occurred due to an innocent mistake, once the Radome has been opened the unit must be inspected by Magos personnel or an authorized technician to ensure that no lasting damage has occurred.

In case of failure in all other tests, the unit must be inspected by Magos personnel or an authorized technician in order to locate the HW fault and repair it.

Warnings and Disclaimers

General

The SR-series sensor is an electronic radiating product. As such it is not recommended for installation in densely populated areas, or in the vicinity of such areas. Magos recommends installation at remote, un-populated, outdoor sites only. In addition, avoid prolonged unnecessary human contact with the radar and as a rule, it is recommended that the sensor is installed at a safety distance of at least 3m from any person.
All SR-Series sensors are not suitable for installation in locations where children are likely to be present.
The SR-Series sensors are not intended for direct connection to the AC power network. When using power supplies/converters with the sensor that are connected to a local or national AC power network make sure they are properly isolated and are in full compliance with your local regulations as well as with POE/POE+ standards as specified in section 4.1.
In any event, Magos will not liable for any damage caused to the product or any interference caused to the power network resulting from a faulty inappropriate power supply.
Mechanical installation of the SR-Series sensor is not within the scope of responsibility of Magos. Magos is not
liable to any damage incurred to the customer and/or to a third party due to faulty installation (loose bolting/weak brackets etc.).
SR Series sensors are intended for installation in restricted access areas and are installed and serviced only by skilled personnel qualified by Magos.

Warning! – hot parts
While handling the device, pay attention to a hot surface.

FCC Compliance Statement

IMPORTANT!
This Section relates only to SR150F (PN: MSA1356A) SR250F (PN: MSA1452A), SR500F (PN: MS700A) and SR1000F (PN: MSA1231A)

This device 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 residential installations. 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 and television reception.
However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one that supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

Warning! Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To comply with FCC Section 1.1310 for human exposure to radiofrequency electromagnetic fields, implement the following instruction:
A distance of at least 30cm. between the equipment and all persons should be maintained during the operation of the equipment.

Industry Canada Compliance
Important. This Section relates only to SR150F (PN: MSA1356A) SR250F (PN: MSA1452A), SR500F (PN: MS700A) and SR1000F (PN: MSA1231A).

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation. A distance of at least 30cm. between the equipment and all persons should be maintained during the operation of the equipment.

Le present appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de
licence. L'exploitation est autorisee aux deux conditions suivantes :(1) l'appareil ne doit pas produire de
brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioelectrique subi, meme si le brouillage
est susceptible d'en compromettre le fonctionnement.
Une distance d'au moins 20 cm. entre l'équipement et toutes les personnes devraient être maintenues pendant le
fonctionnement de l'équipement

Warranty

Unless otherwise agreed upon Magos supplies a 1-year warranty from the date of purchase.
The product warranty extends to the original purchaser only and is not transferable.
The product warranty does not apply to software programs, power supplies, cables, brackets, or other accessories supplied with the product.
Transport in case of a malfunction that requires maintenance at Magos premises is under the responsibility of the customer.
Magos Ltd does not have any liability or responsibility under the Product Warranty where any cost, loss, injury, or damage of any kind, whether direct, indirect, consequential, incidental or otherwise arises out of events beyond Magos's reasonable control. This includes but is not limited to: acts of God, war, riots, embargoes, acts of civil or
military authorities, fire, floods, electricity outages, lightning, power surges, or shortages of materials or labor.
The product warranty is automatically voided if:

- You or anyone else use the product or attempt to use it other than as specified by Magos;
- The fault/defect in your product is the result of a voltage surge subjected to the product either by the way of power supply or communication line, whether caused by thunderstorm activity or any other cause;
- The fault is the result of accidental damage in transit, including but not limited to liquid spillage;
- Your product has been used for any purposes other than that for which it is sold, or in any way other than in strict accordance with the user manual supplied;
- Your product has been repaired or modified or attempted to be repaired or modified or tampered with by anyone other than a person qualified to do so by Magos. Specifically opening the product cover or any of the cover fastening screws will be considered as tampering described in this section;
- The serial number label has been defaced or altered in any way or removed.

Limitation of Liability

Magos Ltd. accepts no liability or responsibility, for consequences arising from the use of this product. Specifically, although this is a security device, under no circumstances is Magos responsible or liable to direct/indirect damages and or costs caused/inflicted on the customer or a third party as a result of false alarms, missed detections, or inaccurate sensor readings. Though the SR-Series sensors are top-of-the-line technology, and in most scenarios the best security sensor in terms of detection performance, they are not 100% fault-proof and must not be treated as such.

Magos Ltd. reserves the right to change the specifications and operating details of this product without notice.

If any law implies a guarantee, condition or warranty in respect of goods or services supplied, and Magos' liability for breach of that condition or warranty may not be excluded but may be limited, then subject to your rights and remedies under any applicable Consumer Protection Laws which cannot be excluded, Magos' liability for any breach of that guarantee, condition or warranty is limited to (i) in the case of a supply of goods. Magos doing any one or more of the following: replacing the goods or supplying equivalent goods; repairing the goods paying the cost of replacing the goods or of acquiring equivalent goods; or paying the cost of having the goods repaired; or (ii) in the case of a supply of services, Magos doing either or both of the following: supplying the services again, or paying the cost of having the services supplied again.

To the extent Magos Ltd. is unable to limit its liability as set out above, Magos Ltd. limits its liability to the extent such liability is lawfully able to be limited.