EL.MO. SPA

TECHNICAL MANUAL

DT2000

DT detector with digital PIR sensor, antimasking and under-crawl protection

IMQ-SISTEMI DI SICUREZZA

Addressee for this information: (U) User | (I) Installer

1 DESCRIPTION

DT2000 is a dual-technology (infrared and microwave) detector.

The detector includes two sections operating in AND or OR mode.

Infrared section (IR): digital PIR sensor with temperature compensation and environmental monitoring, FRESNEL lens with white light protection.

An additional bottom lens is used for the under-crawl function.

The under-crawl function is not IMQ-certified.

Microwave section (MW): 10.525 GHz DRO planar antenna (also available as an alternative in the 9.9 GHz version). Anti-masking device.

The two green and blue LEDs show the activities of the IR and MW section respectively.
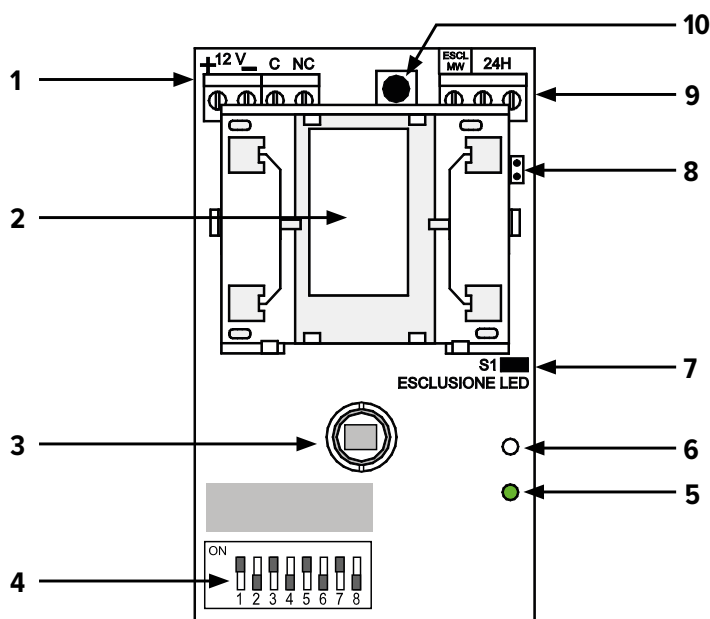
For side-by-side mounting, differentiated frequencies can be used.

DT2000 can be set with board dip switch.

An optional swivel mount may be used for wall or corner installation.

DT2000 is certified IMQ - Security Systems.

2 PCB (I)

1 Power supply and relay output terminals
2 MW antenna
3 PIR sensor
4 Dip switches
5 IR LED (green)
6 MW LED (blue)
7 LED exclusion jumper (S1)
8 Jumper for protection against removal (S2)
9 Tamper output / MW exclusion terminals
10 Tamper button

3   TECHNICAL DATA   I

Model	DT2000	
Identification		
Technology	IR + MW	
MW section		
MW max range	15	m
Number of integration pulses	2/4/6/8	
Pre-alarm time	20	s
Standard TX frequency	10,525	GHz
Differentiated TX frequency	9,900	GHz
Max power output	13 (1)	dBm
MW vertical coverage	60°	°
MW horizontal coverage	95°	°
IR section		
PIR sensors number	1	
Max range	15	m
Number of integration pulses	2/4	
Pre-alarm time	20	s
Opening	81°	°
No. of IR sensitive zones	18 zones on 4 levels. 3 creep zones on one level	
General features		
Protection class	IP3X	
Working temperature	-10 / +55	°C
Operating voltage	Power supply	12 (9 ÷ 15)	V
Consumption at power voltage	Idle mode	13	mA
	Alarm mode	13	mA
	MW excluded mode	11	mA
Permissible ripple (2)	200	mV
number of under-crawl zones	3 zones on 1 floor	
Operating times	Power-on stand-by	60	s
	Alarm	5	s
	Pre-alarm time	20	s
	Pause after alarm	1	s
Dimensions	W 64 × H 110 × D 48	mm
Weight	120	g
IMQ certified	EN50131-2-4: degree 2	
Environmental class	2	

(1) E.I.R.P.
(2) Peak to peak

Parts supplied

Screws, inserts, S4 screw and insert for microswitch against removal, technical manual.

Optional accessories

SN/D(x)99 swivel mount for tilted installation.
Optional accessories are not IMQ - Security Systems certified.

4   BEFORE INSTALLATION   I

⚠ *General warnings are at the end of this manual.*

Before installing the product, please read the following indications carefully.

4.1   General considerations

- Make sure the device operating field is free and devoid of zones darkened by obstacles.
- Adjust the range of the microwave so that it does not go through glass or plastic curtains. For distances below 4 m disable the anti-masking function.
- Avoid installation nearby oscillating or vibrating metal items (e.g. refrigerating units). If this is not possible, disable the anti-masking function.
- Avoid installation near heat sources or drafts.
- Do not touch the PIR sensor with your fingers.
- In case of installation of two sensors at a distance of less than 5 m, the second must be an offset frequency type:
  10,525 GHz (standard) model code: **RCRDTMP069#00**
 9,9 GHz (offs. freq.) model code: **RCRDTMP070#00**

⚠ *The electronic board of the detector may be damaged by electrostatic discharges. The installer must completely avoid any presence of electrostatic discharges.*

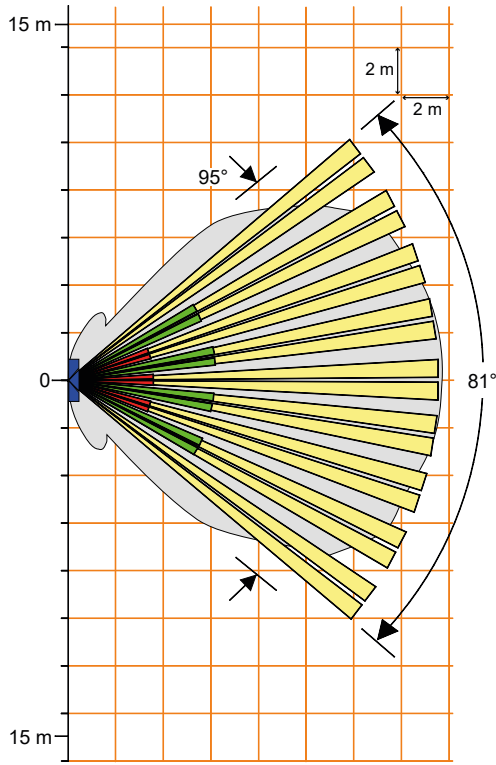### 4.2   Definition of installation position

Choose installation position taking into account the IR and MW cover ranges shown in the following diagrams.
Diagrams refer to detectors mounted at 2.1m height.
The under-crawl zones are also included: 3 zones on 1 floor.
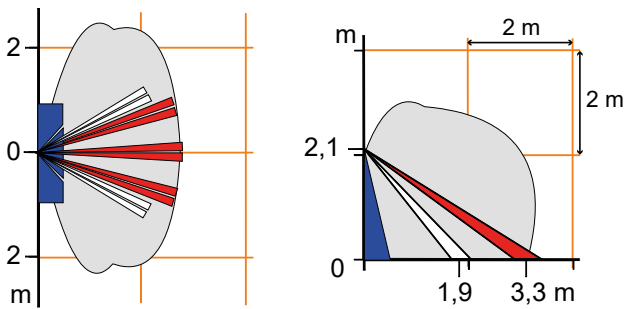
Coverage at maximum range:

Side view

Top view

15 m

2 m

2 m

95°

0

81°

15 m
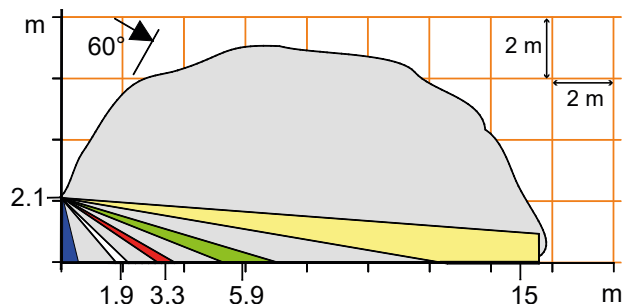
Coverage at minimum range:

2

0

2

m

m

2 m

2 m
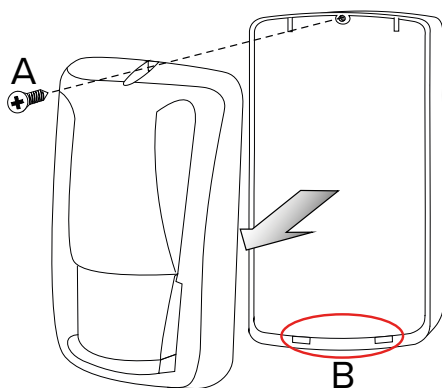
2,1

0

1,9   3,3 m

On the left: top view.
On the right: side view.

Note: the under-crawl function is not IMQ-certified.
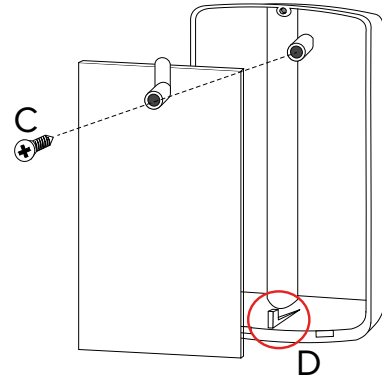
5   DEVICE MOUNTING   **I**
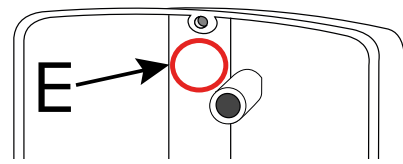
• **Opening the housing**

A

B

– unscrew the cover fixing screw (A)
– separate the front cover by pulling it away from the stops (B)

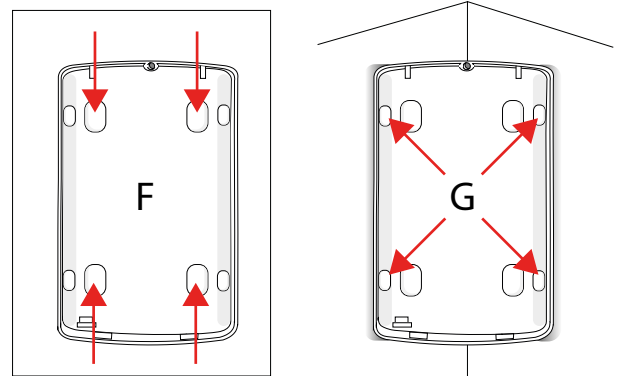• **Removing the electronic board**

C

D

– remove the screw fixing the board to the base (C)
– extract the board from the bottom hook (D)

• **Base wall mount**

E

– drill a hole on area E (pre-cut plastic on the outside) for the passage of the wires

F   G

– using a screwdriver, perforate the 4 pre-cut areas of the support for flat (F) or corner (G) installation
– In case of corner mount, move the lever against removal from wall as indicated in paragraph 5.1 *p. 4*
– insert a screw with the supplied S4 dowel where the microswitch against removal is located
– adjust the depth level of the screw so that the lever will keep the switch pressed

⚠️ *The lever is not active when the detector is installed on the optional swivel mount. Disable the function against removal by closing jumper S2.*

– fix the base to the surface using screws and dowels

⚠️ *In case of corner mount, to ensure the right value of max range, it is necessary to tilt the detector suitably by inserting a 2-3mm-thick shim under the two upper fixing holes.*
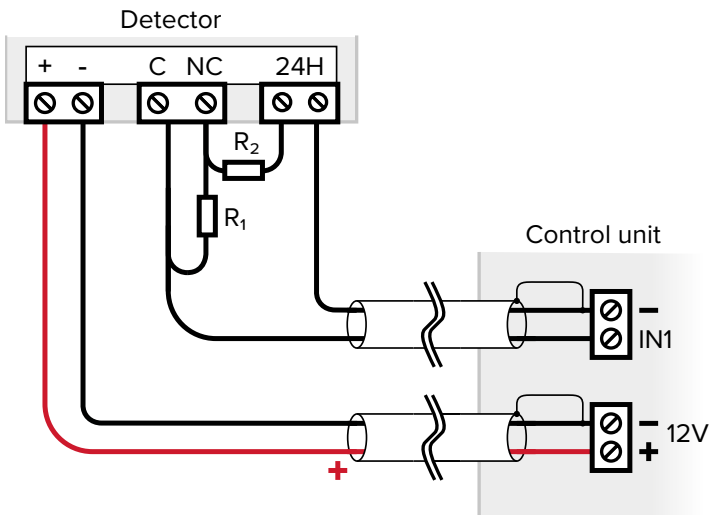
• Wirings

Detector terminal board:
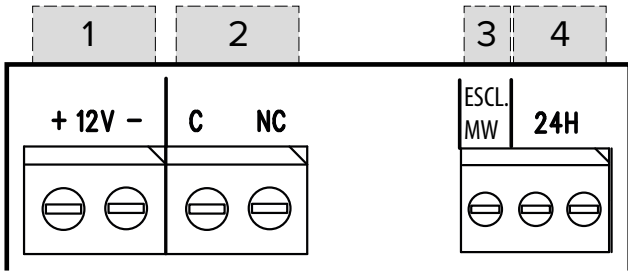
1 Power supply (+12 V)
2 Alarm relay output C-NC (with 10 Ω resistor and 100 mA voltage)
3 MW exclusion enable
4 Tamper output (NC)

– remove the sheath from the end of the cable to connect to the terminal block
– feed the cable through the channel
– extract it from the drilled hole E
– wire terminals

Dual-balancing drawing:

Resistors R1 = R2 = 1500 Ω are supplied with the control unit.
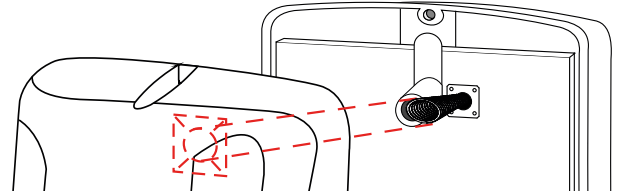
• Board positioning

Disconnect the battery following the steps above in reverse order:
– position the electronic board under the lower hook
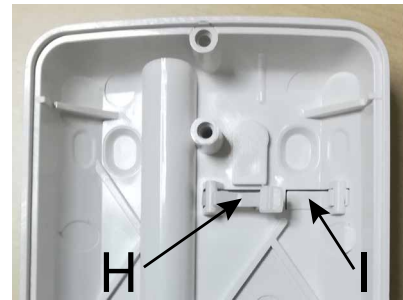– secure it in position using the screw

• Device setup

Configure the sensor functions (see next chapter).

• Closing the housing

– position the front cover on the base making sure the tamper protection spring fits correctly to its place
– hook the cover to base stops again
– fix the cover with the screw

5.1 Protection against removal for corner mount

In case of corner installation, in order to ensure protection from removal from the mounting surface, it will be necessary to move the H lever (which operates the corresponding micro-switch at the back of the board) to the position of the plastic plug I that closes the detector angle.
Proceed as follows (images show the internal view of the detector base):
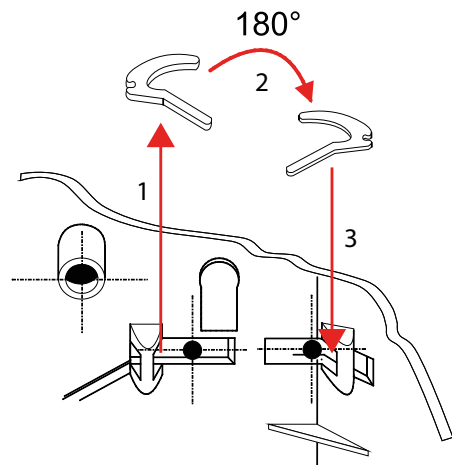
– detach the lever from the rotation pin
– detach the plastic plug that closes the detector angle
– rotate the lever by 180°
– insert the lever were the plug was, firmly attaching it to the pin
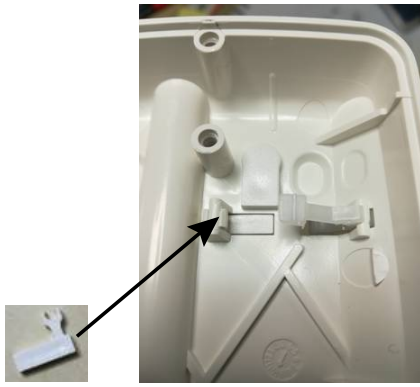
You can close the gap where the lever was before using the second plastic plug provided.

6 STARTING THE DEVICE Ⓘ

All the detector functions can be configured using dip switches and jumpers, positioned as shown in 2 *p. 1* section.
To access it, open the cover as illustrated in the mounting procedure.

6.1 DIP switch settings

dip	function
1	MW range adjustment
2	
3	IR integration
4	MW integration
5	
6	AND/OR
7	Anti-masking function
8	Not used

MW range adjustment

dip 1	dip 2	range
ON	ON	25%
ON	OFF	50% (default)
OFF	ON	75%
OFF	OFF	100%

IR integration

dip 3	number of pulses
ON	4
OFF	2 (default)

MW integration

dip 4	dip 5	number of pulses
ON	ON	8
ON	OFF	6
OFF	ON	4 (default)
OFF	OFF	2

AND/OR

dip 6	mode
ON	AND (default)
OFF	OR

Anti-masking function

dip 7	anti-masking function
ON	not active (default)
OFF	active

6.2 Use of jumpers

jumper	function	closed	open
S1	LED exclusion	LEDs enabled	LEDs disabled
S2	Protection against removal from the mounting surface	Excluded	Enabled (default)

6.3 MW section exclusion

The detector features a terminal board input (ESCL.MW) to exclude the microwave section.

Disable the MW section

– connect the ESCL.MW terminal to +12V

⚠ *The position of dip 6 is not relevant anymore.*

Enable the MW section

– connect the ESCL.MW terminal to the power supply negative wire, or leave it disconnected

⚠ *The device will operate as set via dip 6.*

7 OPERATING MODE Ⓤ

The detector detects motion inside the covered area.

7.1 AND/OR mode

The way the alarm notification is given differs depending on operating mode set:

AND mode

To activate it, move dip 6 to ON.
The alarm relay is activated only when both IR and MW technologies trigger an alarm.

One of the two technologies detects a movement and switches to pre-alarm status (IR or MW) for 20 seconds.
If within such time the other technology does not confirm the detection, the technology in pre-alarm status will reset.

OR mode

To activate it, move dip 6 to OFF.
The alarm relay is activated when either of the two technologies sends an alarm notification due to movement within the controlled area.

7.2 Environmental monitoring

Through the IR section, the detector performs a continuous control of the area and its temperature changes.
Thermal compensation adapts the sensitivity of the infrared to the ambient temperature: this ensures optimum response to the movement of the human body and a reduction of false alarms.

7.3 Anti-masking function

The detector features an anti-masking device based on pulse counting.
For anti-masking to be enabled, the detector must be in operation in AND mode and the ESCL. MW terminal must be disconnected from +12V.
To activate this function, move dip 7 to OFF.
If the device enters "masked sensor" status, it will behave as follows:
1. activation of the alarm relay during the ongoing event;
2. the front LEDs blink for 3 s;
3. the IR green LED turns on.
The standard operating mode will be restored when one of the technologies confirms the first movement.
Note: The count of masking pulses is visually notified only during the stabilisation stage when the sensor is connected to the power source, with the LEDs flashing when a person moves close to the sensor.
**Nota**: this function is not IMQ-certified.

7.4 LED indications

Condition	Green LED	Blue LED
Power on		Steady light (2 s)
Power-on stand-by	Blinking (alternate to blue LED)	Blinking (alternate to green LED)
IR pulse	Blinking	
MW pulse		Blinking
Pre-alarm IR	Steady light	
Pre-alarm MW		Steady light
Alarm	Fast blinking	Fast blinking

8 MAINTENANCE

8.1 Periodic test

Carry out a simple test regularly to verify the functionality and the coverage limits of the detector.
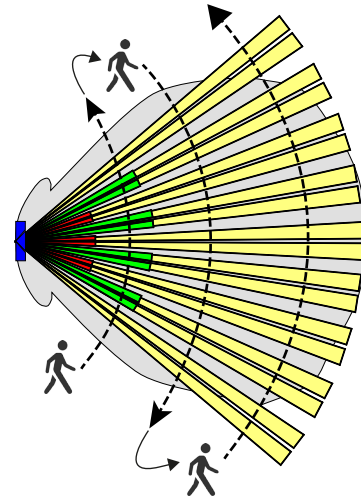
– taking detector position as the point of reference, make half-circle movements from opposite directions to check coverage from both sides

Detector LED indicators shall respond as shown in the table of 7.4 *p. 6* paragraph.

EU DECLARATION OF CONFORMITY

Hereby, EL.MO. Spa declares that the radio equipment DT2000 is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: www.elmospa.com – registration is quick and easy.

CE

GENERAL WARNINGS

This device has been designed, built and tested with the utmost care and attention, adopting test and inspection procedures in compliance with current legislation. Full compliance of the working specifications is only achieved in the event the device is used solely for its intended purpose, namely:

DT detector with digital PIR sensor, antimasking and under-crawl protection.

The device is not intended for any use other than the above and hence its correct functioning in such cases cannot be assured. Consequently, any use of the manual in your possession for any purpose other than those for which it was compiled - namely for the purpose of explaining the product's technical features and operating procedures - is strictly prohibited.

Production processes are closely monitored in order to prevent faults and malfunctions. However, the components adopted are subject to an extremely modest percentage of faults, which is nonetheless the case with any electronic or mechanical product.

Given the intended use of this item (protection of property and people), we invite you to adapt the level of protection offered by the system to suit the actual situation of risk (allowing for the possibility of impaired system operation due to faults or other problems), while reminding you that there are specific standards for the design and production of systems intended for this kind of application.

We hereby advise you (the system's operator) to see that the system receives regular routine maintenance, at least in accordance with the provisions of current legislation, and also check on as regular a basis as the risk involved requires that the system in question is operating properly, with particular reference to the control unit, sensors, sounders, dialler(s) and any other device connected. You must let the installer know how well the system seems to be operating, based on the results of periodic checks, without delay.

Work involved in the design, installation and maintenance of systems incorporating this product should be performed only by personnel with suitable skills and knowledge required to work safely so as to prevent any accidents. It is vital that systems be installed in accordance with current legislation. The internal parts of certain equipment are connected to the mains and therefore there is a risk of electrocution when maintenance work is performed inside without first disconnecting the primary and emergency power supplies. Certain products include batteries, rechargeable or otherwise, as an emergency backup power supply.

If connected incorrectly, they may cause damage to the product or property, and may endanger the operator (explosion and fire).

INSTALLER WARNINGS

Comply strictly with current standards governing the installation of electrical systems and security systems, and with the manufacturer's directions given in the manuals supplied with the products.

Provide the user with full information on using the system installed and

on its limitations, pointing out that there are different levels of security performance that will need to suit the user's requirements within the constraints of the specific applicable standards. See that the user looks through the warnings given herein.

Work involved in the design, installation and maintenance of systems incorporating this product should be performed only by personnel with suitable skills and knowledge required to work safely so as to prevent any accidents. It is vital that systems be installed in accordance with current legislation. The internal parts of certain equipment are connected to the mains and therefore there is a risk of electrocution when maintenance work is performed inside without first disconnecting the primary and emergency power supplies. Certain products include batteries, rechargeable or otherwise, as an emergency backup power supply.

If connected incorrectly, they may cause damage to the product or property, and may endanger the operator (explosion and fire).

USER WARNINGS

Check the system's operation thoroughly at regular intervals, making sure the equipment can be armed and disarmed properly.

Make sure the system receives proper routine maintenance, employing the services of specialist personnel who meet the requirements prescribed by current regulations.

Ask your installer to check that the system suits changing operating conditions (e.g. changes in the extent of the areas to be protected, change in access methods, etc...)

MAIN SAFETY RULES

The use of the device is forbidden for children and unassisted disabled individuals.

Do not touch the device when bare footed, or with wet body parts. Do not directly spray or throw water on the device.

Do not pull, remove or twist the electric cables protruding from the device even if the same is disconnected from the power source.

DISPOSAL WARNINGS
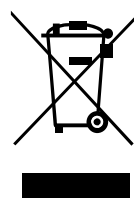
IT08020000001624

In accordance with Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), please be advised that the EEE was placed on the market after 13 August 2005 and must be disposed of separately from normal household waste.