INSTALLATION MANUAL

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MESDAVE200
IMN230 for ABSOLUTE

Digital Microwave

DAVE

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INTRODUCTION

DAVE is an active volumetric microwave barrier for internal and external protection.
Available product models are:

- MESDAVE200 **200 meter range, external, in plastic container**
- IMN230 **200 meter range, external for IMN200, in extruded aluminium**

TECHNICAL SPECIFICATIONS

Power supply voltage	12Vdc ■ 11 ÷ 14.2Vdc ■	
Maximum Current Absorbed	115mA per pair ■TX=40mA ■ RX=75mA at 12.5V=	
Maximum range	200mt	
Emission frequency	In accordance with the directives of each country	
Passage time adjustment	20 at 500mS	
Selectable channels	4	
Alarm contact relays	24V – 1Adc resistive load	
Open Collector Output	12V – 20mA dc	
Back up Battery	Powered by input voltage, not regulated	
Maximum connectable battery capacity	12V/2.3Ah	
Operating Temperature	-20℃ to +60℃	
Container	Plastic MESDAVE200	Aluminium Column IMN
Dimensions	h=390 x l=280 x p=135mm	h=1350 mm

TECHNICAL CHARACTERISTICS

SYSTEM APPARATUS

The DAVE microwave system is composed of a transmitting system and a receiving system, created with digital micro-processing technology, digital AGC regulation and with sensitivity reducing input; relay and Open Collector (O.C.) type output, and the possibility to manually set analog settings, or through installation and use of software.

APPARATUS POWER SUPPLY

Connection of the barrier to the power supply

The cards must be powered through continuous current at a nominal voltage of 13.8 V (min. 11.0 V and max. 14.2 V), or through an appropriate adaptor for a.c. voltages; this is to decrease the possibility of loss of voltage or disturbances deriving from length of the intervals and power cables. Note that the input voltage is also used to recharge the back up battery used. For this reason, set input power supply voltage and current that are appropriate for the battery utilised, in the case that you intend to install a back up battery (max amperage 2.3Ah).

The connection conductors between the power supplies and the cards must be of an appropriate dimension, thus the conductor section must be calculated on the basis of the length of the connection and the absorption of all of the installed systems.
If the connections are of a length that would render the placement of the cables difficult, a supplementary adaptor (feeder) is recommended.

Connection of the MW to the anti-intrusion centre

The TX transmitting card is provided with a contact that is normally closed, free of voltage, for anti-opening protection (tampering, PG, 24 h) in the plastic container.
On the RX receiving card, there is a contact that is normally closed, free of voltage, for anti-opening protection of the plastic container and an exchange contact, free of voltage, for the “intrusion” alarm. In addition, a failure O.C. output is provided both for the transmission system and the receiving system that allows checking of possible system anomalies (see notes regarding output operation in the section “Failure Output”).

Connection of these outputs to the alarm centre should be performed with shielded cables, with sections and typologies that are appropriate for the site characteristics, considering that long sections of cables laid in outdoor environments can be affected by strong disturbances or incorrect impedance and then travel to the alarm centre, causing generation of undesired alarms.

We recommend connections to balanced or double balanced systems be used as much as possible, in order to increase the security level of the system.
In order to increase the system's security, on the alarm and tamper contacts it is possible to have an internal balance resistance of 10Kohm as in the following illustrations for balanced inputs from our line of anti-intrusion control centres.
The use of appropriate power supply devices is recommended. These should be placed in the column or the plastic container in order to avoid loss of voltage to the associated cables and possible system malfunctioning.
Where metallic containers are used it is recommended that the cables be placed on the ground to avoid problems caused by undesired interference.

Data memory

All of the data recorded on the cards is maintained in non-volatile memory according to the typology installed; that is, in analog values through the trimmer if the calibration is performed in the traditional analog mode, while they will be digital in the case that calibration is carried out through the appropriate connector and PC software with a local connection and insertion of the associated connector (see DAVESOFT installation instruction manual).

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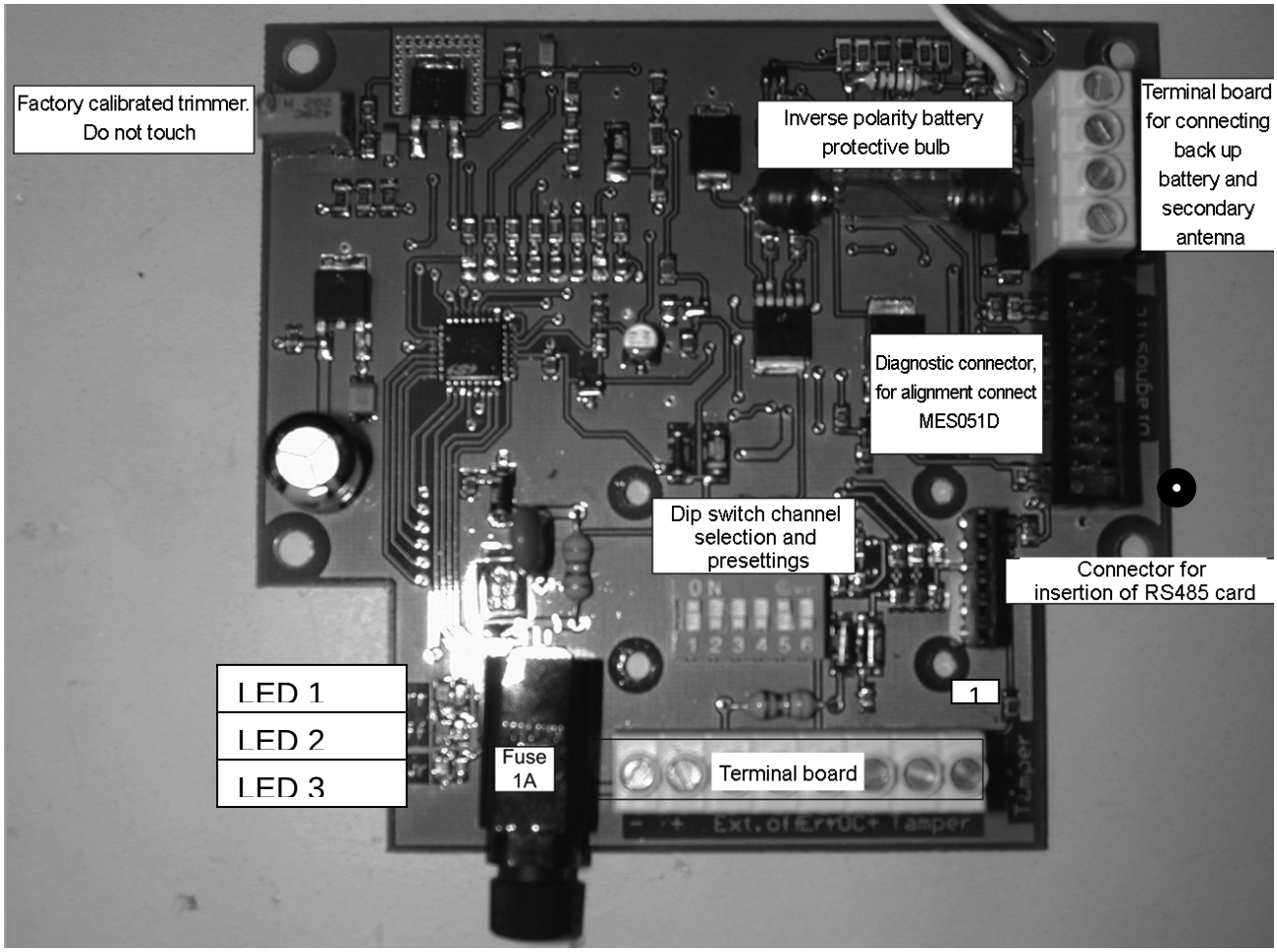
PRODUCT DESCRIPTION

TRANSMITTER CARD: TX



1: (-) Apply the negative power supply voltage to this terminal.

2: (+) Apply the positive power supply voltage to this terminal.
Do not exceed the MIN/MAX power supply limits (11.0 - 14.2 V). The nominal value is 13.8 V.

3: Ext off Reset input through resistance balancing of 3K3Ohm. Value limit +/- 25%. When it is balanced, the transmitter is inactive and does not transmit.

4: Negative reference for reset input

5: Err oc Open Collector output to indicate anomalies. It is possible to connect a relay or LED with a maximum voltage of 20mA. Normally connected to negative.

6: Positive reference for O.C. output voltage

7-8 Tamp. Anti-opening contact normally closed (for plastic container)

Jumper 1: normally closed. If a R=10Kohm is opened, it is in series with the tamper contact, for anti-intrusion systems with balanced inputs.

Dip switch functions

Transmitter

On the TX card there is a 6/position dip switch which allows the following programming options to be chosen.

DIP	**ON**	OFF
1	Channel 1 (900Hz)	
2	Channel 2 (1160Hz)	
3	Channel 3 (1500Hz)	
4	Channel 4 (2400Hz)	
5	Battery connected (control activated)	Battery not present
6	2 cavity configuration	1 cavity configuration

Only one channel must be selected, and only one dip, between 1, 2, 3, 4, must be positioned to ON.
Warning: dip 5 must be selected and positioned to ON when an internal back up battery is connected to the card. Not positioning this dip to ON means that the battery will not be recharged.

The LEDs on the card have the following functions:
Red LED (1): indicates anomalies with reference to the malfunctioning TX table.

Yellow LED (2): indicates activation of the Reset input (Ext. off: balanced 3K3Ohm).

Green LED (3): indicates the presence of the power supply and the battery condition.

Specifications:

The L3 LED (green) PWR
- Lights up when the TX system is powered with the correct voltage.
- Turns off when the input 11<V>14.5 or battery voltage is out of the tolerance limits.
- Flashes when the battery is connected but the power supply voltage is out of the tolerance limits.

LED 1 (red): ERR of anomaly found:
- flashes and the number of flashes indicates the type

TX Table Malfunctioning

Number of Flashes	***Type of error***
0 (led turned off)	No error
1 0 2	Main cavity (1) defective
3	Voltage regulated by the cavity command incorrect
4	Vp/p cavity command voltage incorrect
5	Battery low or missing (voltage)
6	Power supply voltage not within tolerance limits (<11 - >14.5Vdc)
8	Processor temperature incorrect (<-30 - >70℃)
9	Secondary cavity (2) defective
10	Secondary cavity (2) short circuiting, not connected or absorbing at high levels

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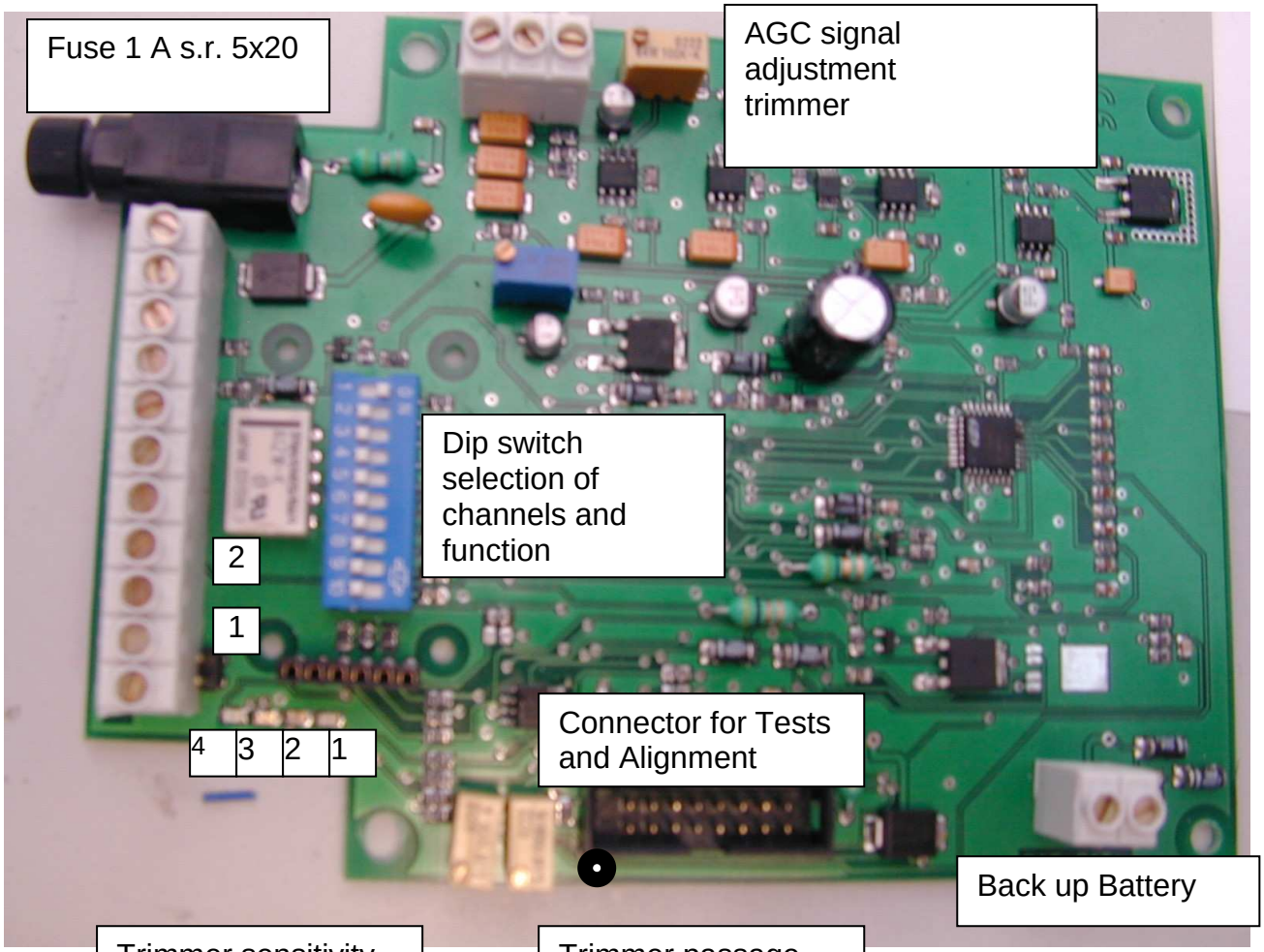
With regards to indication of cavity problems (flashing 1 or 2), check the correct set up based on the number of connected cavities, normally factory installed with only one cavity connected.
Warning: it is possible that more than one anomaly could occur at the same time. In this case, the LED that indicates the type of error would flash differently after each pause.

Tx OC output Malfunction

Indicates these types of malfunctions:
indicates one or more of the malfunctions listed in the above table (TX Malfunctions Table). Normally connected to the negative, it will open when it finds one or more anomalies (malfunctions) or when the card is in reset state (input Ext off balanced and the transmitter prevented from transmitting)

RECEIVER CARD: RX



1: (-) Apply the power supply negative voltage to this terminal.

2: (+) Apply the power supply positive voltage to this terminal, not exceeding the MIN/MAX power supply limits (11 - 14.2 V). The nominal value is 13.8 V.

3: Positive reference for output voltage O.C. (12V-20mA)

4: Open Collector output to indicate anomalies. It is possible to connect a relay or LED with a maximum voltage of 50mA. It is normally connected to the negative.

5: Output N.O. alarm relay contact

6: Alarm relay C contact output

7: Alarm relay N.C. contact output

8: Sens Disqualified input through resistance balancing of 3K3Ohm. Value limit +/- 25%.

9: Negative reference for disqualified input

10/11-Tamper Contact - N.C. tamper (for plastic container)

Jumper 1: normally closed. If a R=10Kohm is opened, it is in series with the tamper contact, for anti-intrusion systems with balanced input.

Jumper 2: normally closed. If a R=10Kohm is opened, it is in series with the alarm relay contact, for anti-intrusion control systems with balanced inputs.

Dip switch functions

On the receiving board there is a 10-position dip switch used for the following settings:

DIP	ON	OFF
1	Channel 1 (900Hz)	
2	Channel 2 (1160Hz)	
3	Channel 3 (1500Hz)	
4	Channel 4 (2400Hz)	
5	Recording analog settings	
6	Simulate idle state: idle alarm relay, LED alarm on	
7	Test mode: for alignment	
8	Unbalanced disqualified input. Activates disqualification for values less than 500-1,000Ohm	Balanced 3K3Ohm (+/- 25%) disqualified input.
9	Alarm generated for exceeding the MIN/MAX levels (indicated for critical installations, but diminishes the security level)	Alarm generated for exceeding MIN/MAX levels
10	Battery connected (control activated)	Battery not connected

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LED signals:

The LEDs on the card have the following functions:
Red LED: Indicates the type of malfunction
Yellow LED: Slow flashing indicates the wrong Channel is selected, constant illumination for a lack of channel frequency decoding or interference
Green LED: indicates the presence of a power supply.
Red LED: constant illumination indicates an alarm, flashing indicates an active disqualified input (reduced sensibility, according to the criteria indicated in the section "Disqualified Input").

LED 1 (red-malfunction) indicates the error code according to the flashes and the table below listed:

RX Malfunction Table

Flashes		
0 (led turned off)	No malfunction	
3	DC level error in the amplifier	
5	Battery low (voltage) or not connected	
6	Power supply voltage not within tolerance limits (<11 - >14.5Vdc)	
8	Processor temperature incorrect (<-30 - >70℃)	

LED L2 (green):
- Lit up when the RX system is powered at the correct voltage.
- Off when the voltage is outside of the tolerance -- 11<V>14.2
- Flashes when the battery is connected but the power supply voltage is outside of the tolerance limits.
- Warning: it is possible that the green LED is not lit up when the battery voltage is higher than that of the input and hence the battery is distributing current instead of receiving the recharging current.

LED 4 (red) indicates - Active output alarm. If flashing, it indicates that low sensitivity has been set, following activation of the Sens input. This is used in cases with critical environmental conditions where it is necessary to reduce the microwave sensibility in particular environmental situations.

Alarm relay

Normally excited when idle (positive security) with contacts free of charge in exchange C NC NO.

OC output Malfunction

Output normally connected to negative: it opens when one or more malfunctions are found from the table above (RX Malfunction Table) or when the disqualified input is active. Maximum current that can be piloted 20mAdc.

Disqualified Input

When this input is activated the sensitivity and passage time are reduced, as illustrated below.
Activation is indicated by intermittent flashing of LED 4 of the alarm (red).
Passage time
If the passage time is programmed under 80mS, the active input is set to 80mS.
Higher passage times are not changed.
Sensitivity
If the sensitivity is programmed with a value higher than 60%, the active input will be set to a sensitivity of 60%.
If the value is less than 60%, a minimum value of 30% is selected.
If this input is used, verify sensing of intrusion in the sensitive area, with active input.

ALIGNMENT DESCRIPTION

ALIGNMENT AND ANALOG CALIBRATION

All the calibration operations indicated below should be performed on terrain in optimal conditions, without depressions, accumulations of water, rain or other conditions that could invalidate or alter the alignment quality.
Alignment and calibration of the microwave must be performed using a normal digital multimetre and/or oscilloscope. Provide yourself with the appropriate instrument (analog or digital tester) and the calibration circuit **MES051D**.
To perform the calibration and verify proper circuit functioning, proceed the following way:

Transmitter testing

- **go to the transmitter**
  - select the appropriate transmission channel
  - connect the dc power supply lines to the terminal board 1(-) e 2(+).
  - verify that the green LED lights up indicating proper 12Vdc power supply

- perform the connection between the TX DIAGNOSTIC connector and the MES051D card.

Multimetre test (dc voltmeter):

- Connect the black prod (negative) of the multimetre to terminal 1 and maintain it in this position for the entire duration of the test.

➢ Connect the red prod of the multimetre to terminal 2.
The voltage read on the multimetre must be 12.5 V ± 15 %.

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If the voltage differs from above indicated values, verify the power supply voltage of the TX.

- Connect the red prod of the multimetre to terminal 3.
  The voltage read on the multimetre must be 3.3 V ± 5 %.
  If the voltage differs from above indicated values, this means that the internal voltage regulator on the TX circuit is defective.

- Connect the red prod of the multimetre to terminal 4.
  The voltage read on the multimetre must be 9.5 V ± 5 %.
  If the voltage differs from above indicated values, this means the control voltage regulated by the emitting cavity is incorrect. Disconnect the power supply to the TX circuit.

In the case that you have an oscilloscope, proceed to these additional tests:

Oscilloscope tests:

- Connect the oscilloscope reference (negative) to terminal 1 and maintain it in this position for the entire duration of the test.

- Connect the oscilloscope prod to terminal 5
  This terminal has a square waveform of approx. 3Vp/p and a frequency equal to that of the channel selected, as indicated in the associated table

- Connect the oscilloscope prod to terminal 6
  This terminal has a square waveform of approx. 9.5Vp/p and a frequency equal to that of the channel selected, as indicated in the associated table.

- Connect the oscilloscope prod to terminal 7
  This terminal has a square waveform of approx. 9Vp/p and a frequency equal to that of the channel selected, as indicated in the associated table. The control voltage of the main cavity.

- Connect the oscilloscope prod to terminal 8
  This measurement is valid only in the presence of two connected cavities.
  This terminal has a square waveform of approx. 9Vp/p and a frequency equal to that of the channel selected, as indicated in the associated table. The control voltage of the secondary cavity (when present)**.**

If all of the operations and settings are correct and the transmitter operating, only the green LED should be lit up.

4.2 - **Go to the receiving card**:

- go to the receiver
  - select the appropriate transmission channel
  - connect the dc power supply lines to the terminal board 1(-) e 2(+).
  - verify that the green LED lights up indicating proper 12Vdc power supply

- perform the connection between the RX DIAGNOSTIC connector and the MES051D card.

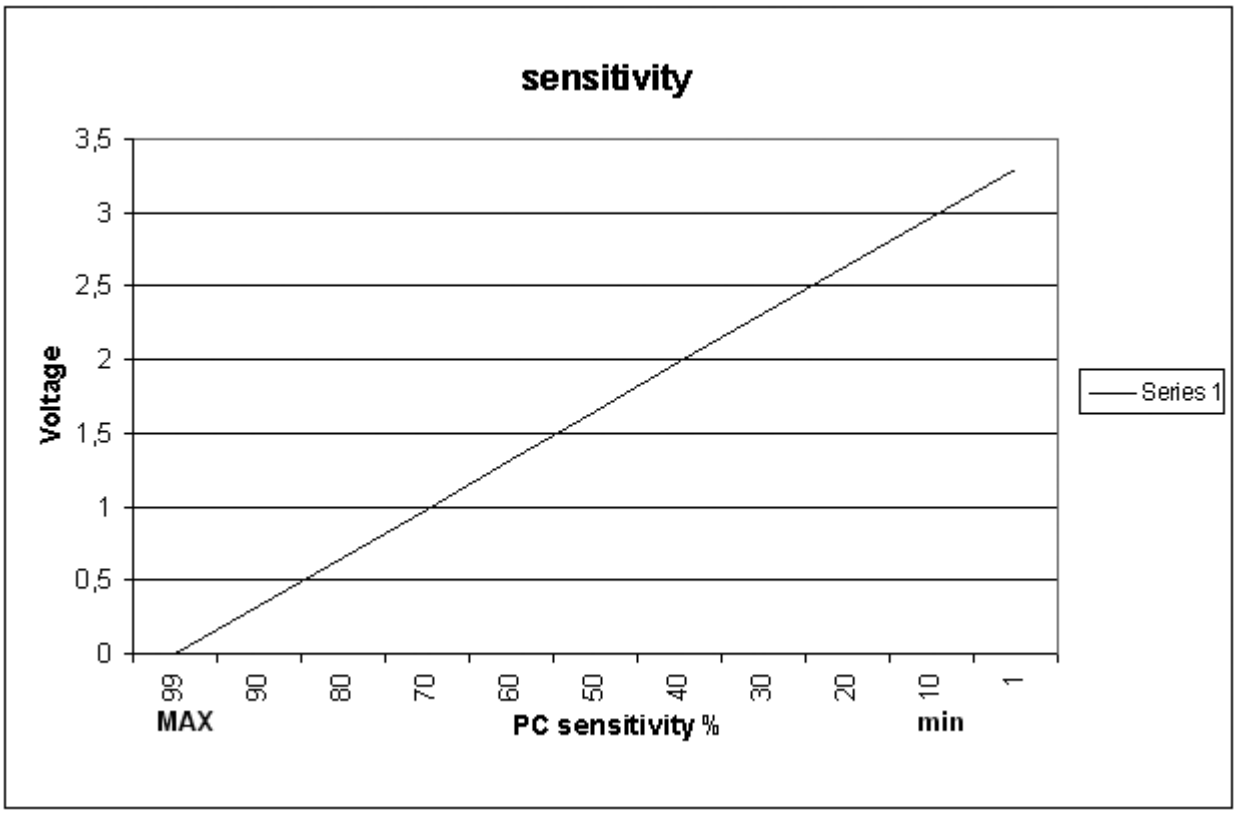
Multimetre test (dc voltmeter):

- Connect the black prod (negative) of the multimetre to terminal 1 and maintain it in this position for the entire duration of the test.

➢ Connect the red prod of the multimetre to terminal 2.
The voltage read on the multimetre must be 12.5 V ± 15 %.
If the voltage differs from that above indicated, verify the power supply voltage of the RX.

➢ Connect the red prod of the multimetre to terminal 3.
The voltage read on the multimetre must be 3.3 V ± 5 %.
If the voltage differs from that above indicated, this means that the internal voltage regulator on the RX circuit is defective.

➢ Connect the red prod of the multimetre to terminal 4.
The voltage read on the multimetre must be between 0 and 3.3 Volt.
Regulate the selection trimmer to the medium sensitivity value (circa 1.6 volts.)
The sensitivity trimmer is in the position indicated in the illustration, on the Diagnostic connector side near the fixing screw.



Remember that selecting at half the voltage value of the trimmer to obtain average sensitivity. In fact, the voltage value indicates the system's level of sensitivity. 3.3Volts indicates the minimum sensitivity. At this setting, the system will detect the intrusion of large objects.

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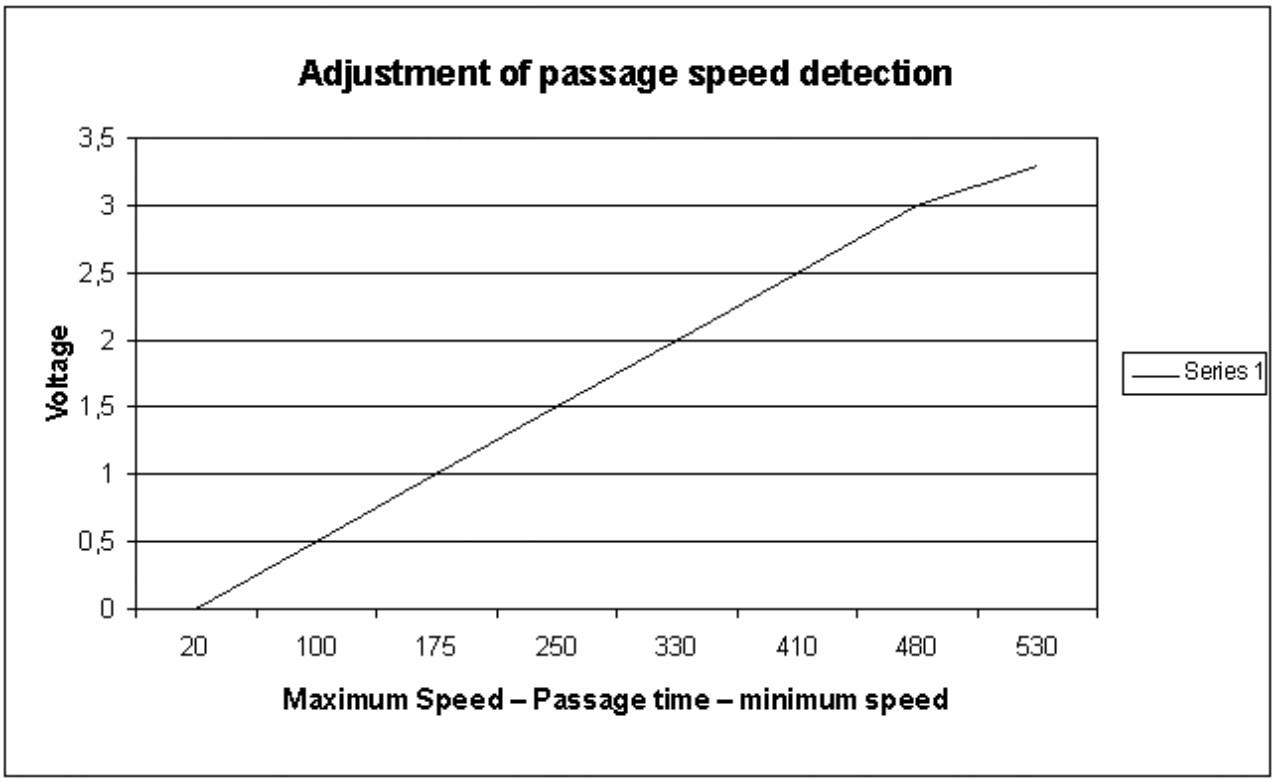
- Connect the red prod of the multimetre to terminal 5. The voltage read on the multimetre must be between 0 and 3.3 Volt.

  Adjust the detection speed selection trimmer to the average value (approx. 1.6 volt).

  The speed trimmer (delay) is in the position indicated in the illustration, on the Diagnostic connector side, near the same connector.

  Remember that the trimmer voltage is selected at one half in order to obtain a decrease in voltage for the average passage (approx. 250mS). In fact, the voltage value indicates the capacity to detect objects that quickly pass through the protected area. The value of 3.3 Volts indicates the minimum detection level (e.g. it will not detect a running man). Set this way, the system will detect the intrusion of objects that pass the protected zone very slowly.



Adjustment of the trimmer's value for sensitivity and passage speed must be regulated on the basis of the needs and installation characteristics and the security of every individual pair.

Alignment

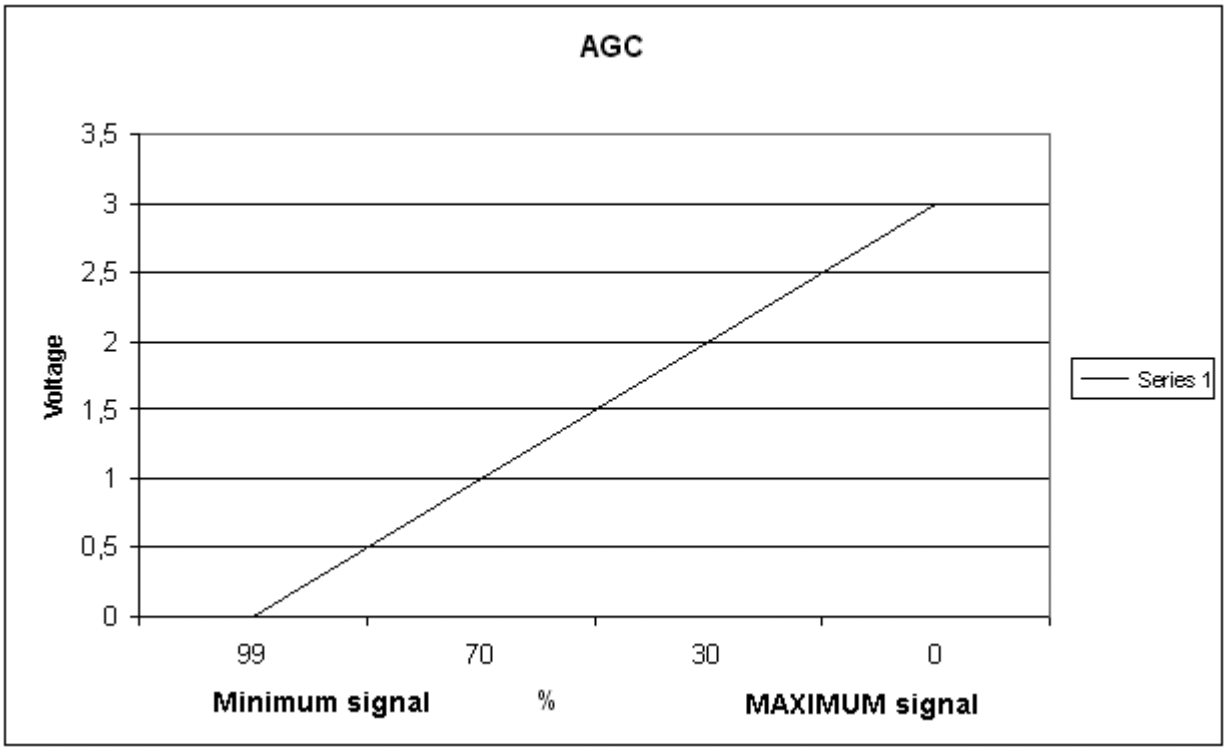
During alignment (dip7=ON) dip 6 must be positioned to OFF.

- Connect the red prod of the multimetre to terminal 7.

  The voltage read on the multimetre must be between 0 and 3.3 Volt.

Regulate the calibration trimmer AGC signal to a value of approx. 0.5 volt. Turning counter clockwise decreases the voltage value.

Wait for roughly 2 minutes for a non-alarm situation (no passing of the protected area and an AGC signal that is stable at about 0.5 volts as previously calibrated, then move dip 7 to ON and proceed to the alignment operations).



Move the parabola in slow movements, first horizontally and then vertically, positioning it behind the column or container as to not influence the detection lobe.

This voltage output indicates the quantity of signals received by the receiver, which indicates the alignment quality. The maximum value indicates the best alignment. To perform the alignment, position yourself behind the receiver and leave the area to be protected. Do not move for at least 2 minutes. After this, put the system in test (dip 7 ON) and verify that the voltage on the voltmeter is greater than 0.1 volts. Then proceed to moving the parabola horizontally in order to optimise the alignment (search for the maximum voltage). Once a value of over 2.8 volts has been reached, adjust the trimmer near the cable input cavity (AGC adjustment trimmer) until the voltage is reduced to approx. 0.2 volts and then search again both vertically and horizontally for the highest possible voltage. In the case that a value of over 2.8 volts is found again, repeat the preceding operation, adjusting the trimmer and searching again fro the maximum voltage. Researching the maximum value by horizontal and vertical repositioning of the parabola must be performed on both the TX and RX heads and repeated at the end on the RX head.

At the end of the alignment process, turn dip 7 to OFF, wait for the voltage to stabilise (about 1-2 minutes after the last passage simulation) and calibrate the trimmer near the input antenna so that the voltage read on terminal 7 has a value between 0.5 and 1 volt.

- Connect the red prod of the multimetre to terminal 6.

  The voltage read on the multimetre must be between about 0 and 12 Volt.

  This output allows monitoring of the system's alarm state. In fact, the output is usually closed at negative and becomes Open Collector weighted at 12 volt (internal pull-up resistance) when the alarm relay is in alarm conditions. Maximum output current 20mAdc

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In the case that you have an oscilloscope, proceed with these additional tests:

Oscilloscope tests:

- Connect the oscilloscope reference (negative) to terminal 1 and maintain it in this position for the entire duration of the test.

➢ Connect the oscilloscope prod to terminal 8

This terminal has a waveform that indicates the level of correction of the gain. When calibration has been completed as described above, with no obstacles or movement in the area to be protected, the waveform should consist of two half-cycles with greater spaces towards the negative.

➢ Connect the oscilloscope prod to terminal 10

This terminal has a square waveform of approx. 1.5Vp/p (trapezoidal) and a frequency equal to that of the channel selected, as indicated in the associated table. The waveform should be clean with no defects on the up and down slopes and without crests on the tops and bottoms. The cleaner and more stable this waveform is, the better the detection will be, as well as the linearity and reliability of the system.

Detection test / Maintenance

N.B.: for every adjustment of the calibration trimmer the data must be recorded through use of dip 5 (ON - OFF).

Perform passage tests in various points on the installation with objects of various dimensions and passage speed that simulate the type of intrusion to be detected. For example, if only cars should be detected, attempt to pass with a car in order to adjust sensitivity and passage speed calibrated on the dimensions and speed of the actual detection speeds and avoid setting the system with an unnecessarily elevated sensitivity. In fact, a system that is calibrated according to the actual installation needs is less likely to generated undesired alarms. Repeat these steps more than once to verify intrusion detection in various environmental situations.
Detection of intrusion is indicated by the alarm's red LED lighting up.
Verify stability of the system by leaving the detection field free and verifying that neither the red alarm LED or the yellow interference malfunction LED light up.
It is important to remember that the delay trimmer (passage speed adjustment trimmer) operates on the passage speed, while the sensitivity trimmer operates on the mass detected.

If all of the operations are correct and transmitter is operational, only the green LED should be lit up.

All data relative to measurements performed during installation should be taken note of in order to facilitate future maintenance or repair operations.
Repeat the above described operation including the intrusion alarm tests every 6 months at least. The maintenance periods depend greatly upon the security level that characterises the installed system.

MES051D

In the table below, the functions of the terminals present in the DAVE system test card are indicated.

	TRANSMITTER	RECEIVER
TERMINAL		
1	(-) reference	(-) reference
2	+12V Adjusted voltage	+12V Adjusted voltage
3	+3.3V Microprocessor voltage regulated	+3.3V Microprocessor voltage regulated
4	+9.5V	Sensitivity Calibration: 0 max -3.3Vmin
5	Selected channel waveform	Passage speed detection calibration: 0 max -3.3V min
6	**Oscilloscope: Modulated output signal** Tester: 4.75V= average	O.C. alarm output 20mA dc max
7	**Oscilloscope: Secondary antenna command signal output** Tester: 4.5V= average	Tester: AGC continuous level output: 3V signal maximum - 0V minimum At the end of the test, adjust to approx. 0.8Vdc
8	**Oscilloscope: Primary antenna command signal output** Tester: 4.5V= average If the second antenna is connected.	**Oscilloscope: AGC voltage, for alignment. Towards maximum positive signal, at the end of the test regulate the period to circa 20%.**
9	Not used	Not used
10	Not used	**Oscilloscope: Waveform output signal detected.**

All of the above described operations relate to th operation of the DAVE digital microwave with analog adjustment.
In case detection and calibration using software and computers are needed, refer to the appropriate manual indicating the alignment and verification procedures.

NOTES

SICURIT ALARMITALIA S.p.A. reserves the right to modify this manual without any notice.

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