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SINCLAIR

FOR SERVICE MANUALS
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MINDER

HOME PROTECTION SYSTEMS

INDEX

INTRODUCTION

The TS500 is a complete microwave radar intruder alarm system capable of detecting a human target at 15 metres. The system consists of a compact mains-operated control unit containing the detector and a separate electronic indoor alarm. Integral rechargeable batteries provide typically 3 hours back-up in the event of mains failure or interruption.

A major feature of the TS500 is its simplicity of installation, test and operation but with the facility to extend to a more sophisticated system if desired. The basic system offers exit and entry delay, secure key operation, and a high immunity to false alarms. Security can be further enhanced by the simple addition of the tamper-proof TS550 outdoor alarm which also acts as an excellent deterent when mounted in a prominent place. In addition two or four-wire pressure mats, door and window switches can all be connected to the TS500 control unit, as can independent panic/attack buttons. Accessory kits containing all that is required by the average home can also be provided.

In order to operate any microwave system legally, it is necessary to possess a Telapproach System licence as defined in the Wireless Telegraphy Act 1949. The TS500 circuitry has been given type approval by the Home Office (as Mullard CL8960/H) but it is still necessary to apply formally for the licence which is valid for 5 years at a time. Packaged with this instruction book you will find the necessary Home Office Application Form with the Telapproach Type No. already entered.

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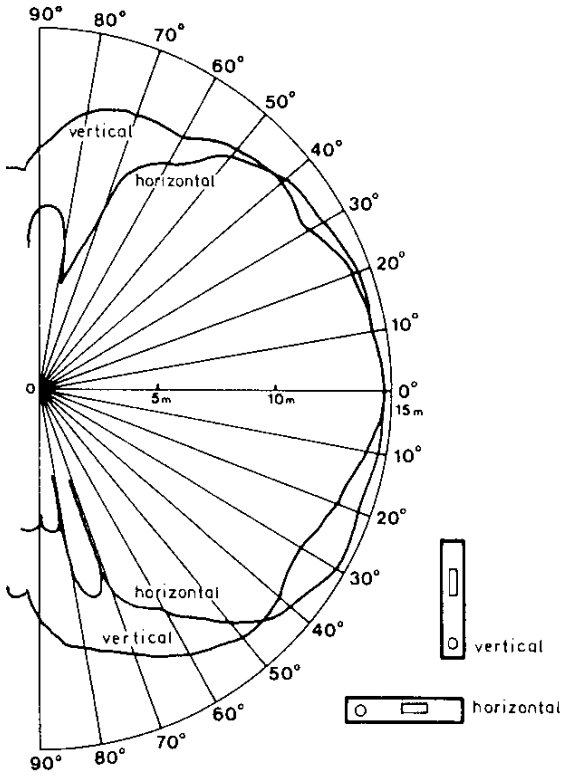
SPECIFICATION FOR TS500

DETECTOR

Type: Microwave radar unit utilising the Doppler shift principle.

Carrier Frequency: 10·687 GHz

Range: Up to 15 metres for a human target, adjustable by rear-panel sensitivity control. See diagram for field pattern.



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OPERATING MODES

Mode Selection: By 3-position key-operated facia switch. Multiple key variations; 2 keys supplied.

Off: All functions disabled but internal batteries charged if unit is connected to the mains.

Test: Two possible modes, selected by rear panel slide switch: —

WALK TEST: Indoor and outdoor alarms disabled but all sensors instantaneously active. Whilst movement is detected by the radar or whilst perimeter switches (pressure mats, door and window switches) are activated, the WALK TEST LED will remain lit. This mode is used to set sensitivity and check operation of perimeter switches.

PANIC: Indoor and outdoor alarms enabled but radar and perimeter switches disabled. Use of a panic button (if fitted) will sound the alarm(s) instantaneously.

Armed: Indoor and outdoor alarms enabled. Panic button, radar and perimeter switches enabled after EXIT DELAY. At the end of the EXIT DELAY, an alarm condition will cause the alarm to sound at the end of the ENTRY DELAY period.

EXIT DELAY: typically 30 secs. Permits householder to vacate premises after arming system.

ENTRY DELAY: typically 30 secs. Permits householder to re-enter and disable system before alarm sounds.

ALARM, PERIMETER SWITCHES AND PANIC BUTTON CONNECTIONS

Identifying letters are marked on the rear panel above the connectors.

Indoor Alarm: Connect between A and B. The indoor alarm is not tamper-proof and will stop if disconnected.

Panic Button: If required, connect a normally open push-button between C and D. Several buttons may be connected in parallel.

Normally Open Perimeter Switches: Pressure mats are usually "normally open". If required, connect between E and F.

Normally Closed Perimeter Switches: Window and door switches are usually "normally closed". If required, connect between I and J. If not required the link fitted must be left in place.

Perimeter Switch Protection Loop: If a 4-wire system is used the normally closed protection loop should be connected between G and H. If not required the link fitted must be left in place.

Outdoor Alarm (TS550): The TS550 outdoor alarm should be connected to K, L, M and N; K corresponds to K on the outdoor alarm, L to L etc. In both the TEST and ARMED modes the outdoor alarm is tamper-proof and disconnection or interruption of the cable will sound the alarm.

INDOOR AND OUTDOOR (TS550) ALARMS

Indoor: Electronic swept-frequency siren powered directly by TS500 control unit. Output level typically 104dB (A) at 1 metre.

Outdoor (TS550): Electronic swept-frequency siren controlled by TS500 but self-powered and tamper-proof; internal battery charged by TS500. Output level typically 98dB (A) at 1 metre.

Alarm Time-off: Both alarms are controlled by the TS500 and will continue to sound for typically 5 minutes after disturbance ceases but will then shut-down. If the disturbance persists (e.g. protected window left open) both alarms will sound continuously.

Fail-safe Shut Down: In the event of a prolonged, i.e. in excess of 3 hours, mains failure whilst the system is armed, the TS500 will disable both alarms before the end of its own battery life, thus avoiding possible false triggering of the alarms. When the mains supply is restored, both alarms become immediately active again.

IMMUNITY TO FALSE TRIGGERING

Radar: Single events such as a falling picture will not trigger the radar.

Perimeter Switches: Perimeter switch inputs will not respond to inputs shorter than 400ms in accordance with BS4737.

CIRCUIT PROTECTION

Rear Panel Connections: All rear panel connections are protected against wrong interconnection.

Indoor Alarm Fuse: 3 Amp fast-blow fuse inside TS500 in series with alarm output will blow if alarm terminals are short-circuited, protecting TS500.

Battery Protection Fuse: 3 Amp fast-blow fuse fitted in series with internal batteries of TS500 protects batteries from heavy discharge in the unlikely event of a circuit failure causing a high current drain.

Outdoor Alarm Fuse: 3 Amp fast-blow fuse in series with battery of TS500 protects battery from heavy discharge in the unlikely event of a circuit failure causing a high current drain.

POWER REQUIREMENTS

Mains Operating Voltage: 200-260V AC, 50/60Hz

Power Consumption: Nominally 8VA

Mains Failure Indication: LED lights when no mains supply present. Lights in all operating modes.

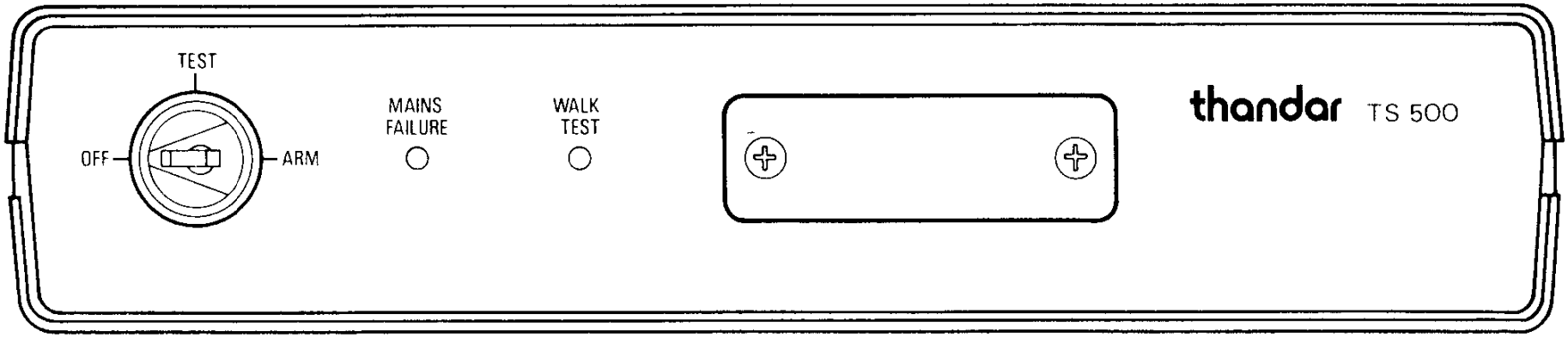
Standby Battery Life: TS500 control unit – greater than 3 hours if fully charged. TS550 outdoor alarm – typically 24 hours reducing to about 1 hour if the alarm is sounding.

GENERAL

Environmental Operating Range:
TS500: +5°C to +40°C
TS550: −20°C to +60°C

Size:
TS500: 255 × 150 × 50mm
TS550: 240 × 130 × 95mm

Weight:
TS500: 2·4kg, including indoor alarm and mains lead
TS550: 3·4kg, including connecting cable



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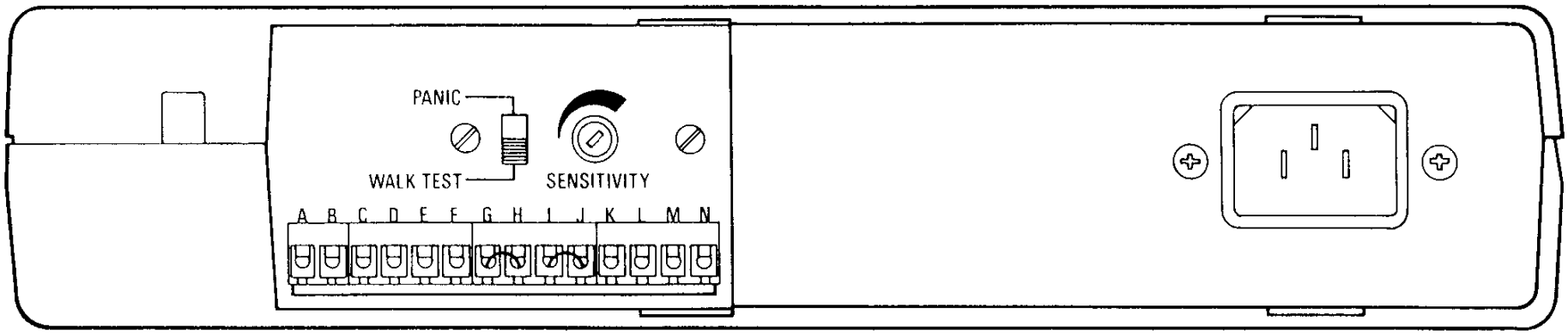


INSTALLATION

Connecting to the Mains

When a three core mains lead with bare ends is provided this should be connected as follows:—

BROWN	— MAINS LIVE
BLUE	— MAINS NEUTRAL
GREEN/YELLOW	— EARTH

Fit a 3 amp fuse.

WARNING! THIS APPARATUS MUST BE EARTHED

Any interruption of the protective conductor inside or outside the apparatus or disconnection of the protective earth terminal is likely to make the apparatus dangerous. Intentional interruption is prohibited.

Note: A thermal fuse is fitted in the primary circuit of the transformer. This will become 'open circuit' in the event of a fault occurring in the instrument which would cause excessive temperature rise of the transformer. Should such a fault occur it will be necessary to return the instrument for Service.

Siting the Control Unit

To obtain maximum benefit from the TS500 and to minimise the possibility of false alarms it is important that these installation instructions are followed carefully. The microwave radar will detect movement of any object but will not be falsely triggered by hot air currents as is the case with many ultrasonic detectors. The radar will penetrate glass and so the TS500 should not be directed towards a window if at all possible because legitimate movement outside the window (postman, etc.) may be detected. Pets must be kept out of the area protected by the radar as their movement will trigger the alarm. Flapping curtains will also be detected, but the TS500 is designed so that single events – such as a picture falling down – will not set off the alarm.

Flourescent lights in the radar range must be turned off before the alarm is armed because they may falsely trigger it. Finally, it is important that the TS500 itself is not mounted on a flimsy surface subject to vibration because its own movement will trigger the alarm. For example, thin partition walls that could be disturbed from the adjacent room, or be vibrated by passing heavy road traffic, should be avoided.

To set up the TS500, proceed as follows. Connect to the mains supply, turn the keyswitch to TEST and the rear-panel slide switch to WALK TEST. Allow 5-10 seconds for the internal circuitry to stabilise. Standing very still, the walk test light should remain off; if it comes on check the wire links between G & H and I & J or, if perimeter switches have been fitted, check that these are properly closed. If the sensitivity is set very high, it may be triggered by vibration or even very small limb movements at close range. Clockwise rotation of the rear-panel sensitivity control will increase range while anticlockwise rotation decreases range. Adjust the sensitivity such that reasonable movement at the boundary of the area to be protected still causes the WALK TEST LED to light. Sensitivity must be kept to a minimum if the TS500 is in line of sight of a window, particularly if a road goes past that window, because even if the sensitivity is low enough not to detect a person immediately outside the window it may still detect larger objects such as vans or lorries at a greater distance.

Once installed, the TS500 will require no further adjustment unless it is resited elsewhere in which case the sensitivity control may need altering following the procedure described above.

Indoor Alarm

Connect the indoor alarm between terminals A and B at the rear of the TS500; the leads are reversible. However, if the terminals are accidentally shorted together and the alarm is sounded an internal protection fuse will blow. If this happens, refer to the Service section.

Perimeter Switches

Either two or four-wire (i.e. with protection loop) perimeter switches may be connected following the scheme shown in the appropriate diagram below.

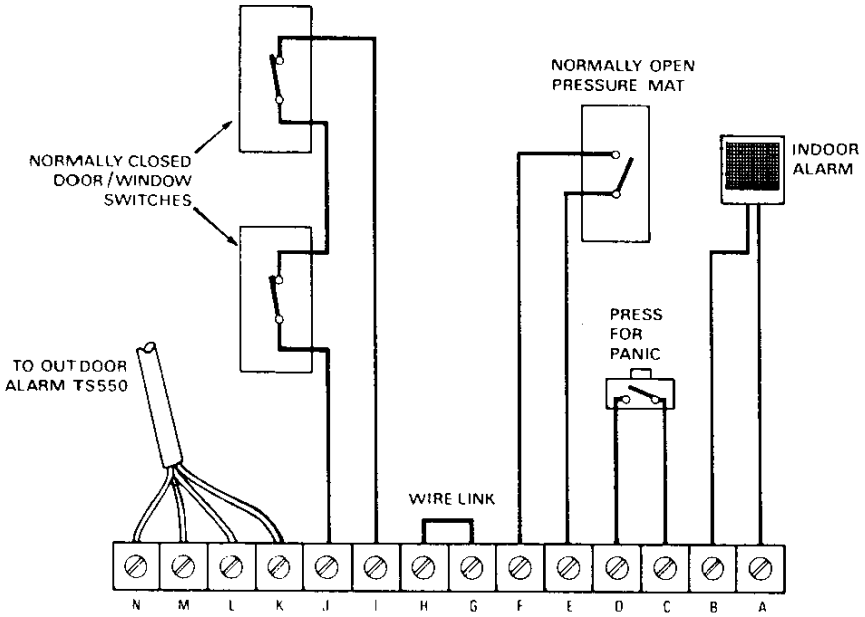
Door and window switches operated by a magnet fixed to the moving part are usually of the "normally closed" type, i.e. the switch contacts are made when the door or window is closed and the magnet is in close proximity to the switch.

Pressure mats are usually "normally open", i.e. the switch contacts inside the mat are only made when the mat is pressed.

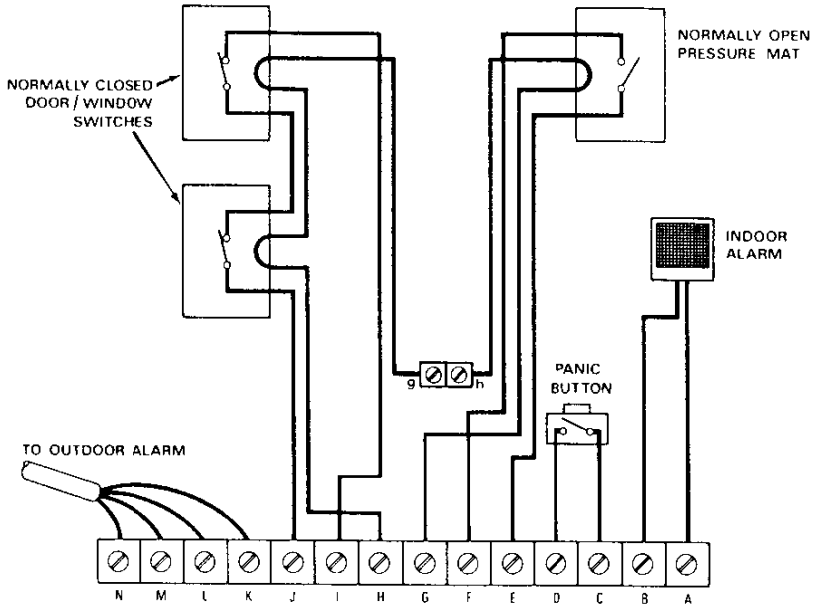
Note that if 2-wire switches are used the wire link between G and H must be retained. If 4-wire door and window switches are used but only a 2-wire pressure mat is fitted the protection loop is wired directly back from g to terminal G. Similarly if 2-wire door and window switches are used with a 4-wire pressure mat the protection loop is wired directly back from h to terminal H.

Note also that any number of "normally closed" switches can be added in series in either case and that "normally open" devices such as pressure mats must be wired back to the TS500 in parallel.

If no perimeter switches are fitted then the link between I and J must also be left in place.



TWO - WIRE PERIMETER SWITCHES



FOUR - WIRE PERIMETER SWITCHES

Panic Button

Any number of push-buttons can be connected in parallel, i.e. individually wired back to, terminals C and D. Conventional door-bell push buttons can be used.

Outdoor Alarm

The optional TS550 is a tamper-proof outdoor alarm which also acts as a significant deterent if mounted prominently. The steel enclosure itself is tamper-proof as is the 4-core signal cable which links the TS550 to the TS500 control unit. Connect terminals, K, L, M and N of the TS500 to the corresponding terminals of the outdoor alarm; the installer may choose his own inner cable colour for K-K, L-L connections etc., for greater security. Once the TS500 has been set to the TEST or ARMED position the outdoor alarm is tamper-proof and any interruption of the cable or attempted dismantling of the enclosure will cause the alarm to sound. For this reason, it is safe to run the cable down an exterior wall and to take it through to the inside at the most convenient point such as the corner of a window frame; there is no need to drill through the exterior wall directly behind the alarm as on many other systems.

Note that in the event of accidental or intentional interruption of the cable once the system is armed causing the alarm to sound, the alarm can **only** be turned off by correctly reconnecting to the control unit and switching it to the 'OFF' position.

The internal battery in the TS550 is charged from the control unit.

Keys

Two keys are supplied. Extra keys cannot be supplied, nor can they be cut at a locksmiths. If the keys are lost then the unit will have to be returned to the manufacturer to have a new keyswitch fitted. The key is removable in all three switch positions.

It is highly recommended that the spare key is left in the possession of a trustworthy neighbour who has been familiarised with the system since, in the unlikely event of a false alarm, turning the control unit OFF may be the only way to prevent the alarm sounding continuously. It is also advised that the Police are informed as to who the second keyholder is.

OPERATION

Keyswitch Off

With the keyswitch in the OFF position all sensor and alarm functions are disabled but the internal rechargeable batteries will be charged whilst the control unit remains connected to the mains. The TS500 and TS550 are fitted with maintenance-free sealed lead-acid gel batteries. However, as with car type lead-acid batteries, these must not be allowed to totally discharge as their effective capacity will be reduced. For maximum battery life (typically 3 years) it is therefore recommended that the TS500 be left connected to the mains supply; the TS550 outdoor alarm derives its charging current from the TS500. If for some reason the TS500 is seldom used, it is recommended that it is connected to the mains supply for about 12 hours once a month to keep the internal batteries in a charged state.

Walk Test Mode

With the keyswitch at TEST and the rear panel slide switch at WALK TEST the control unit is in the WALK TEST mode, i.e. all sensors active but the alarm(s) disabled. Any alarm condition (movement detected by the radar or perimeter switches activated) causes the WALK TEST LED to light instantaneously and for as long as the disturbance exists. The primary use of this mode is in setting the sensitivity of the radar in the manner already described under **Installation**. However, since **any** alarm condition causes the WALK TEST LED to light it is useful to pause at WALK TEST before ARM (see below) and to check that the LED remains off whilst standing very still near the radar unit. If the light stays on it indicates that a perimeter switch is active, e.g. a protected window has been left open. This is much better than arming the system then waiting for the EXIT DELAY + ENTRY DELAY (30 + 30 secs) to elapse and the alarm(s) to sound, to find whether all perimeter switches are closed – and alerting the neighbourhood in the process.

Panic Mode

With the keyswitch at TEST and the rear-panel slide switch at PANIC the radar and perimeter switches are disabled but the alarm(s) will sound instantaneously if a panic button is pressed. This mode is invaluable to the elderly who, with several panic buttons around the house, could signal any sort of distress (as well as attack) to the neighbours if an outdoor alarm is fitted.

The Outdoor Alarm in Walk Test and Panic Modes

In both the WALK TEST and PANIC modes the TS550 outdoor alarm is tamper-proof, i.e. accidental or deliberate damage to the cable or enclosure will cause the alarm to sound. PANIC mode is probably the most useful mode in which to leave the system when it is not actually armed, even if no panic buttons are fitted, because the outdoor alarm itself is being 'protected' by the system from tampering and the internal batteries are being charged in both units but the radar and perimeter switches are disabled, permitting free movement.

Note: Rapid switching from OFF to TEST and back again to OFF, is likely to cause the outdoor alarm to sound because of the way in which it is controlled by the TS500 to make it tamper-proof. If this happens, switch again to TEST (which will immediately stop the alarm), pause for a few seconds and switch OFF; the alarm should now be properly disarmed. Similarly, switching rapidly from TEST to OFF and back again to TEST may not leave the alarm in the desired tamper-proof state. If this is suspected, switch again to OFF, pause a few seconds and switch back to TEST; the outdoor alarm should now be properly tamper-proof.

Armed Mode

With the keyswitch at ARM, the radar, perimeter switches and panic button(s) are all active, irrespective of the rear-panel slide switch position, and the outdoor alarm is tamper-proof. In actual fact the sensors do not become active until the 30 second EXIT DELAY, initiated when the keyswitch is turned to ARM, has elapsed; this allows the user to get completely out of radar range and vacate the building if perimeter switches are used before the system is truly armed. When the EXIT DELAY has elapsed any movement in the radar range or perimeter switch left active (e.g. a protected window open) will trigger an alarm condition. The alarm(s) themselves, however, will not sound until the

30 second ENTRY DELAY has elapsed. The purpose of this delay is to give time, after a legitimate entry, to reach the TS500 control unit and switch it to TEST or OFF before the alarm sounds.

When vacating the premises after arming it is normally necessary to wait for the duration of the EXIT DELAY and ENTRY DELAY to ensure that the system is not being activated by, for example, an open window. Remember, however that it is easier to make this check in the **Walk Test Mode** before switching to ARM – see that section above.

To ensure that the system has been installed correctly and that all sensors are working properly it is recommended that the system is tested for a period of one week before being left completely unattended, to check for possible false triggering.

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DO'S AND DON'TS OF INSTALLATION AND OPERATION

Do not point the unit towards a window if at all possible.

Do not have the sensitivity control set unnecessarily high.

Do not mount the unit on a flimsy surface.

Do not switch rapidly from OFF to TEST and back again, or vice-versa, as doing so may incorrectly set the outdoor alarm (TS550). Always pause a few seconds at each position.

Do test the system for a period of one week before leaving completely unattended to check that it has been installed correctly and all sensors are working properly.

Do check all perimeter switches are closed before leaving the premises, either by pausing at WALK TEST before ARM, or by waiting outside until the exit plus entry timers have elapsed (1 minute).

Do keep the internal batteries in a charged state.

Do test the complete system periodically, by generating an alarm condition.

Do keep pets out of the area protected by the radar.

MAINTENANCE AND SERVICE

For reasons of security no service information will be made available by the manufacturer at any time.

In the unlikely event of the TS500 or TS550 developing a fault, including a suspected blown fuse, it must be returned to the manufacturer for service. The owner is reminded that the guarantee is void once the seals on the units are broken.

The rechargeable batteries should be replaced after 3 years to maintain the system's performance. Leaving the batteries in a discharged state will reduce their life and they should be replaced earlier if a problem is suspected. Impaired batteries on the TS500 will reduce the standby life below 3 hours but operation whilst connected to the mains will be normal. On the TS550, a poor battery will reduce the time for which the alarm could sound continuously and in the extreme case it may not sound at all.

Replacement batteries are available direct from the alarm manufacturer. Since the warranty will have expired by the time batteries need replacing it is recommended that the owner changes the batteries himself. To change the batteries, proceed as follows:

WARNING!
Opening the TS500 is likely to expose live parts. The instrument must be disconnected from the mains before any adjustment, replacement or maintenance and repair is effected.

Replacing the batteries in the TS500:

1. Invert the instrument and remove the 4 rubber feet.
2. Remove the 4 recessed and one surface screw (under the Warranty label).
3. Holding the case upper and lower together, turn the instrument the right way up and lift off the top.
4. Replace the batteries, ensuring that they are the right way round.
5. Reassemble in reverse order.

Replacing the battery in the TS550:

1. Ensure the TS500 is in the OFF mode and disconnected from mains supply.
2. Undo the two screws at the bottom of the outer cover. Remove the cover by swinging out the lower edge and sliding whole cover up until disengaged from the back-plate.
3. Disconnect the 4 wires to the terminal block on the side of the inner box, noting the colour code.
4. Remove the two 3mm nuts and lift off the inner box.
5. Remove the battery clamp and replace the battery ensuring it is the right way round.
6. Reassemble in reverse order, ensuring that the anti-tamper microswitch arm is undamaged and is heard to "click" as the outer cover is swung back into position. The microswitch should click before the holes in the cover are aligned with the threads in the backplate; if not, straighten the microswitch arm to restore the correct action.

GUARANTEE

For guarantee details, please see separate insert contained in packing.

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