MINDA PERSONAL PROTECTION SYSTEM

TX-500 INTELLIGENT KEY-FOB TRANSMITTER

Operating Instruction

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Tactical Technologies Inc.
1701 Second Ave
Folsom, PA 19033
610-522-0106
www.tacticaltechnologies.com

OVERVIEW
Thank you for purchasing a MINDA Intelligent Transmitter, which uses a low-power microprocessor for 'house-keeping' and offers the following programmable options:

• A Unit Identity Code (TX ID number 1,2,3,or 4) which will allow a single receiver to identify up to four different transmitters.
• A very secure Family Identity Code, enabling secure use of multiple groups of transmitters and receivers together in the same location - without receiving alarms in ALL receivers.
• Full compatibility with other MINDA equipment
• Alarm signal repeat at programmable intervals
• Automatic transmission of Confidence signals is possible
• Transmitter 'Low Battery' alert sent to receiver
• Very low power consumption

Keep this instruction manual in a safe place - it contains important information and helpful tips which will assist you to obtain the best possible performance from your new MINDA system.

OPERATING FREQUENCY
All MINDA systems for use in the United States operate on a frequency of 418MHz in the UHF band. The operating radio frequency cannot be changed to suit a specific customer's needs.

BATTERY INSTALLATION
The MINDA TX-500 transmitter requires an internal 12 volt 33mA/hour battery type GP 23A (Duracell type MN-21).

To install a new battery into a key-fob style transmitter, the two-piece case must be pried open by inserting and carefully twisting a flat-bladed screwdriver into the groove formed by the two case halves. The old battery can then be removed and replaced by a new one, taking care to ensure that it is orientated in accordance with the polarity markings on the inside of the case. The case top should then be carefully aligned with the LED and gently but firmly snapped closed just using finger pressure.

OPERATION
The TX-500 will only communicate with an appropriate MINDA receiver, such as the RX-400 pocket receiver, or the RX-500 portable/mobile/tabletop receiver.

The TX-500 is operational immediately upon inserting the battery.

The unit *is* equipped with an On/Off switch that is magnetically controlled. To turn the TX-500 OFF, place the unit firmly in its holder. To turn the TX-500 on, remove it from the holder.

The TX-500 has two buttons: RED and BLUE. The RED button sends a RED ALARM to a MINDA receiver. The BLUE button sends a GREEN alarm to a MINDA receiver. Press and hold either button for at least 1 second to transmit your alarm.

The TX-500 may be programmed to automatically transmit a GREEN or RED 'confidence alarm'. This signal may be programmed to transmit every few seconds or every few minutes. The timing of this transmission begins upon battery insertion. See the section on CONFIDENCE MODE for more details.

The TX-500 has two LED's: RED and YELLOW. The red LED illuminates during transmissions. In use, if the red LED on the transmitter fails to light, or is lit dimly, the transmitter battery probably needs to be replaced. The yellow LED depicts the programmed Unit Identity Number.

WHAT IS ACTUALLY TRANSMITTED
Whenever a 'MINDA' transmitter operates, the actual digital data message transmitted contains all of the following pieces of information, repeated a number of times:

< *I am a 'MINDA' transmitter* >
and < *My Family Identity is 'xxx'* >
and < *I am Unit I.D. 'y'*>
and < *My alarm status is 'red/green'* >
and < *My battery status is 'OK/low'* >

If the first two pieces of data in the above message exactly match the information programmed into the 'MINDA' receiver, then the rest of the information will be decoded and displayed on the LEDs. If they do not match, the entire message is ignored.

UNIT IDENTITIES
A MINDA TX-500 Intelligent Transmitter can have each of its four possible Unit Identities (1, 2, 3 or 4) configured to signal in different ways and with different timings to suit particular operational needs.

The user can easily alter the pre-programmed Unit Identity Code (shown on the label on the back of the case) whenever required.

CHANGING THE UNIT IDENTITY
To change the Unit Identity of a MINDA TX-500 transmitter, carefully open the case as if you were installing a battery, and locate the small double switch adjacent to the large 18-pin chip. Set the two switches in accordance with the table shown below in order to determine the initial 'start-up' Unit Identity of the transmitter.

Unit I.D.	***Switch 1***	***Switch 2***
1	ON	ON
2	OFF	ON
3	ON	OFF
4	OFF	OFF

The Unit Identity of the TX-500 transmitter can also be temporarily changed by simultaneously holding down both push buttons for about 2 seconds. When this is done the yellow LED will blink an appropriate number of times to show the new identity it has assumed.

Each time the two buttons are pressed together the sequence will cycle through all four possible identities (ie. 1,2,3,4,1,2,3...) but ***note that*** if the power supply is interrupted by switching off or changing the battery the transmitter will revert to its start-up Unit I.D. once power is re-applied.

Please note:
This user option can, if required, be modified in format or completely inhibited by suitably re-programming the unit.

Note*:* Check that you know the Unit Identity (1,2,3,or 4) of the transmitter that you intend to use by sending a test signal to a 'MINDA' receiver and noting which of its LEDs illuminates. If necessary, change the Unit Identity to the one you require.

The transmitter's antenna is the external small black cord. ***Never*** attempt to shorten, fold up or modify the transmitter antenna since such action will seriously degrade the range of the MINDA system. When using the key-fob transmitter, hold the case so that the short cord antenna points away from you, and then press the appropriate button for at least one second. The small red LED should illuminate.

FAMILY IDENTITY CODE
Each MINDA system, when supplied to a customer, will have already been programmed at time of manufacture with a common default 'Family Identity Code' (hexadecimal 94) enabling it to be used with any other of the standard MINDA products. The Family Identity Code for a particular family of MINDA units can easily be re-programmed by returning all of the equipment to Tactical Technologies Inc. or, if a MINDA computer interface package has been purchased, by the user.

For a MINDA system to operate with, and recognize up to four independent transmitters, the Family Identity Code of the receiver and transmitter(s) all have to match ***AND*** each of the transmitters must have a different Unit Identity (1,2,3 or 4).

A microprocessor controlled MINDA receiver will only respond to signals from those transmitters sending the same Family Identity Code that it has been pre-programmed to accept. This capability minimizes the risk of interference between similar systems that happen to be operating within radio range of one another. It is ***absolutely vital*** therefore, to ensure that all transmitter and receiver units that have to operate together are programmed with the same Family Identity Code. Signals received from any 'alien' transmitter operating within range will not be decoded and, instead, treated by the receiver as radio interference on the channel.

LOW BATTERY WARNING
When the battery voltage of a MINDA TX-500 transmitter drops to a level where battery replacement is desirable, each subsequent transmission made will be 'tagged' to indicate this fact to the receiving end. When a MINDA receiver recognizes a 'tagged' signal from a MINDA transmitter, the LED indicator appropriate to that transmitter's Unit Identity will start to 'blink out' briefly about once per second.

BATTERY LIFE
The MINDA TX-500 transmitter consumes about 400 times more power when actually transmitting compared to that required when it is dormant. If the unit is programmed to send frequent confidence transmissions, or is used manually a great deal, the battery drain will be significantly increased. The following table shows the typical life that can be expected of a transmitter in relation to the time interval between automatic transmissions made.

Time between each automatic transmission	***Typical battery life (hours)***	***Typical battery life (days)***
15 seconds	37	1.5
30 seconds	68	2.8
1 minute	120	5
2 minutes	195	8
5 minutes	309	13
15 minutes	418	17
30 minutes	458	19
1 hour	482	20

The above times have been calculated on the assumption that the MINDA TX-500 transmitter is programmed to send the default (normal duration) automatic confidence signal and that it has been fitted with a new MN-21 alkaline battery and switched on to run continuously. Switching the unit on and off frequently and manually sending a number of alarm signals longer than 1 second in length both consume additional power from the battery and will reduce its life below the estimated figures shown above.

CONFIDENCE SIGNALLING
A MINDA TX-500 intelligent transmitter can be programmed so that for any or all of the four identities it can assume a GREEN or RED transmission as an “I’m here and OK” signal.

In order for confidence to be transmitted, the transmitter must be in the MODE of the programmed signal.

The transmitter defaults to GREEN mode upon reset, or when it is turned on.

If Confidence mode is programmed for GREEN MODE -
Transmitter 'starts up' in GREEN MODE, therefore confidence is automatically enabled upon start up.
Confidence signal will be transmitted at each interval.
If a RED alarm is pressed manually - confidence mode is temporarily disabled.
To re-start confidence mode, press GREEN alarm manually.

If Confidence mode is programmed for RED MODE -
Transmitter 'starts up' in GREEN MODE, therefore confidence sequence must be STARTED by manually activating a RED alarm.
Confidence signal will then be transmitted at each interval.
If a GREEN alarm is pressed manually - confidence mode is temporarily disabled.
To re-start confidence mode, press RED alarm manually.

...Here's an idea...
If a MINDA receiver has been programmed (1) to remain silent whenever a valid ‘green’ transmission is received, and (2) to signal an alarm if nothing is heard from one or more of its associated transmitters within a pre-designated period of time, then the following scenario becomes possible:

When an initial ‘green’ transmission is received from any of its associated transmitters the receiver will remain silent and one of four pre-programmed internal time-clocks within it will start counting. Each subsequent ‘green’ transmission from that same transmitter unit will again be received silently and reset the time-clock to zero. If, however, the pre-set time period elapses before another ‘green’ signal has been received then the appropriate LED on the receiver will begin to flash and a ‘Lost Signal’ audible alarm will be signaled. Until the person using the receiver pushes the ‘RESET’ button to clear the audible and visual alarms, a warning alert tone will continue to be emitted at the pre-programmed interval(s).

If a different transmitter unit (but of the same family) is then received, another time-clock commences operation independently in the same way as described above. If a valid ‘red’ alarm signal is received from any of its associated transmitters the receiver will, of course, generate all of the normal audible and switching alarms.

In a situation where a receiver and an intelligent MINDA TX-500 transmitter are being used to protect a person close-by but out of sight, the regular confidence transmission will keep the receiver silenced all the while it is present. If the transmitter moves out of radio range, its battery fails, or it is otherwise disabled the receiver will emit an alarm signal as soon as the confidence signal has been missing for the pre-programmed period of time. This enables, for example, a VIP to be protected at night by a bodyguard in an adjoining room, or a person going into a potentially hazardous situation to be supported by a back-up team in a vehicle close-by. The intelligent MINDA transmitter will send the confidence signals entirely automatically without disturbing the user unless he or she wishes to send a ‘red’ alarm signal in the usual way.

TROUBLESHOOTING GUIDE
If signals from a TX-500 transmitter are not being received by a MINDA receiver the following tests should be undertaken:

1.) Check that the transmitter is not out of receiver range by temporarily reducing the distance between the units to 10 yards or less. Begin to increase the distance again until signals transmitted are not received reliably. This will give a good indication of the likely maximum working range that can be achieved in the particular location used for these tests.

2.) Observe the red LED on the transmitter. If it fails to light, or is lit dimly, when a button is pressed the battery probably needs to be replaced.

3.) If the units still fail to communicate, check that the MINDA receiver is operating correctly by pressing and releasing its RESET button and confirming that the eight LEDs briefly illuminate. If this does not happen, replace the battery in the receiver with a new one and try again.

4.) Confirm that interference or another signal is not jamming the receiver. If necessary, move the receiving location away from the source of the interference.
5.) Check that other transmitters (in the same family) are being received OK.

6.) Return the faulty transmitter for check-out and/or repair.

MAINTENANCE
The MINDA transmitters require minimal maintenance. Problems with the internal electronics are unlikely unless the unit has been subjected to some physical damage. The most likely sources of difficulty will be associated with the transmitter battery or its contacts, the mechanical switches, or the antenna. These items should be inspected regularly and corrective action taken, where found to be necessary.

TRANSMITTER SPECIFICATION

UNITED STATES OF AMERICA FCC COMPLIANCE:

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:
1. THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND
2. THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

U.K RADIO AUTHORITY'S COMPLIANCE:

The unit is fully compliant with the U.K. Radio Authority's Specification MPT1340 for short-range radio alarm systems.

Operating frequency:	418.00 MHz nominal
Overall freq. accuracy:	± 100 kHz
Operating range:	50 to 150 metres (depends on the local environment)
Transmitter E.R.P.:	0.5 milliwatt (-6dBm) typical
Internal power source:	12 volt alkaline battery (MN-21)
Current drain:	< 80 µA when on and in stand-by mode
	< 20 mA while actually transmitting
Operating temp. range:	-10 to +55 degrees Celsius
Battery life:	Depends on number of transmissions - see text

GUARANTEE
Tactical Technologies Inc. guarantees these MINDA products from any faults due to defective materials or workmanship for a period of 12 months from the date of purchase. Where the fault is the result of misuse, negligence or inexpert repair, Tactical Technologies Inc. reserve the right to make a charge to cover the extra costs involved.

RE-PROGRAMMING OF OPTIONS
Re-programming of any MINDA equipment - with the exception of the TX-400 key-fob 'dumb' transmitter - requires specialist electronic knowledge, a PC and peripheral equipment. For this reason, most customers will find it more convenient to return the equipment to Tactical Technologies Inc. for re-programming. Customers with a significant number of MINDA units and who also have their own electronic workshop, with access to a PC and peripherals, may wish to consider purchasing the special MINDA programming kit which comprises hardware interface, custom software on disk, and full instructions. Further details on this product can be obtained from Tactical Technologies Inc.