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1 General

The RoadSnoop Pressure Watch is a system that monitors the pressure and temperature of a car's tires. If the pressure or temperature of one or more tires changes from the reference pressure, the system alerts the driver with a flashing indicator light and warning beeps. The system allows for normal changes in tire pressure caused by fluctuating temperatures. Pressure Watch helps the driver to ensure that the correct tire pressure is maintained, thus enabling prolonged tire life and reduced fuel consumption. Data from the tire sensors located in the tires is transmitted to the receiver via radio waves.

NOTE! PLEASE READ ALL THE INSTRUCTIONS AND WARNINGS IN THIS MANUAL CAREFULLY

2 Warnings

- | | |
|---|--|
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> | 1. READ AND UNDERSTAND THIS USER'S MANUAL AND ALL WARNINGS AND INSTRUCTIONS IN IT BEFORE USING THE PRESSURE WATCH SYSTEM. OPERATION OF THE VEHICLE IN A MANNER INCONSISTENT WITH THE REQUIREMENTS OF THIS MANUAL CAN CAUSE TIRE DAMAGE, ACCIDENTS AND SERIOUS BODILY INJURY. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> | 2. THE PRESSURE WATCH SYSTEM ACTIVATES ONLY AFTER THE VEHICLE IS PUT IN MOTION AND ITS TIRES HAVE REACHED OPERATING SPEED AND TEMPERATURE. IT IS THE DRIVER'S RESPONSIBILITY TO EXAMINE THE CONDITION AND ASSURE CORRECT INFLATION OF THE TIRES BEFORE DRIVING THE VEHICLE. OPERATION OF THE VEHICLE WITH IMPROPER TIRE PRESSURE CAN CAUSE TIRE DAMAGE, ACCIDENTS AND SERIOUS BODILY INJURY. THE PRESSURE WATCH SYSTEM DOES NOT PREVENT THE VEHICLE FROM STARTING WITH DEFECTIVE TIRES OR WITH INCORRECT TIRE PRESSURES. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">DANGER</div> | 3. THE PRESSURE WATCH SYSTEM MONITORS ONLY GRADUAL TIRE PRESSURE CHANGES, WHILE THE VEHICLE IS IN OPERATION. DO NOT RELY UPON THE PRESSURE WATCH SYSTEM TO DETECT SUDDEN TIRE DAMAGE, PUNCTURES, OR SUDDEN PRESSURE LOSS DUE TO ACCIDENTAL CAUSES. THE RECEIVER RECEIVES DATA FROM THE SENSORS AT REGULAR INTERVALS. THE DEVICE WILL NOT PROVIDE ANY WARNING IN THE EVENT OF A SUDDEN LOSS OF TIRE PRESSURE. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">DANGER</div> | 4. THE PRESSURE WATCH SYSTEM MONITORS ONLY GRADUAL TIRE PRESSURE CHANGES, WHILE THE VEHICLE IS IN OPERATION. OTHER RADIO TRAFFIC IN THE FREQUENCY USED BY THE SYSTEM MAY PREVENT THE PROPER TRANSFER OF INFORMATION. DO NOT RELY UPON THE PRESSURE WATCH SYSTEM TO DETECT SUDDEN TIRE DAMAGE, PUNCTURES, OR SUDDEN PRESSURE LOSS. THE DEVICE WILL NOT PROVIDE ANY WARNING IN THE EVENT OF DISCONTINUED OR IMPROPER TRANSFER OF INFORMATION. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> | 5. ENSURE PROPER INSTALLATION BY A QUALIFIED TECHNICIAN FOR PROPER CONTACT BETWEEN SENSORS AND RECEIVER. IMPROPER INSTALLATION CAN CAUSE THE RECEIVER TO HAVE NO DATA AND THUS FAIL TO PROVIDE NECESSARY WARNINGS OF LOW OR HIGH PRESSURE. ONLY SENSORS IN RADIO CONTACT WITH THE RECEIVER WILL TRANSMIT DATA. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">DANGER</div> | 6. DO NOT LOOK AT OR ADJUST THE PRESSURE WATCH DISPLAY WHEN THE VEHICLE IS MOVING. TO EXAMINE OR ADJUST THE DISPLAY, SAFELY STOP THE VEHICLE. USE OF THE PRESSURE WATCH SYSTEM WHILE DRIVING CAN LEAD TO DISTRACTION AND ACCIDENTS. YOU CAN BECOME DISTRACTED WHILE: PAYING ATTENTION TO THE RECEIVER; OPERATING THE RECEIVER WHILE DRIVING; OR BECAUSE YOU HAVE PLACED THE RECEIVER IN AN UNSAFE OR IMPROPER LOCATION. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">DANGER</div> | 7. THE PRESSURE WATCH SYSTEM EMITS WARNING LIGHT AND SOUND. DO NOT PLACE THE RECEIVER IN A LOCATION WHERE ITS WARNING CANNOT BE SEEN OR HEARD. THE WARNING SOUND MAY NOT BE HEARD OR THE WARNING LIGHT MAY NOT BE SEEN BY YOU IF THE RECEIVER IS PLACED IMPROPERLY. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> | 8. THE PRESSURE WATCH SYSTEM MUST BE INSTALLED AND MAINTAINED BY A TRAINED PROFESSIONAL FOLLOWING THESE INSTRUCTIONS. IMPROPER INSTALLATION OF THE SYSTEM CAN CAUSE MALFUNCTIONS AND TIRE DAMAGE, ACCIDENTS, AND SERIOUS BODILY INJURY. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> | 9. THE PRESSURE WATCH SYSTEM ONLY MONITORS THE VEHICLE'S ACTUAL TIRE PRESSURE AS COMPARED TO THE REFERENCE PROGRAMMED BY THE USER. IT IS THE DRIVER'S RESPONSIBILITY TO SET THE REFERENCE PRESSURE IN ACCORDANCE WITH THE INSTRUCTIONS OF THE TIRE AND AUTOMOBILE MANUFACTURER. IMPROPER PROGRAMMING OF THE REFERENCE PRESSURE CAN CAUSE TIRE DAMAGE, ACCIDENTS AND SERIOUS INJURY. THE PRESSURE WATCH SYSTEM ONLY MONITORS CERTAIN CHANGES IN TIRE PRESSURE AND ONLY COMPARES THOSE PRESSURES TO USER CALIBRATED REFERENCE PRESSURES. THE SYSTEM DOES NOT SHOW THE ACTUAL TIRE PRESSURES. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">CAUTION</div> | 10. SET THE RECEIVER TO ITS "CONFIGURATION MODE" ONLY IN LOW TRAFFIC AREAS. ATTEMPTING TO PROGRAM THE RECEIVER WITH REFERENCE TIRE PRESSURES IN THE VICINITY OF OTHER VEHICLES OR ANOTHER PRESSURE WATCH SYSTEM MAY INTERFERE WITH ANOTHER SYSTEM'S SIGNALS AND CAUSE A PRODUCT MALFUNCTION. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> | 11. DO NOT USE THE PRESSURE WATCH SYSTEM IN RACE VEHICLES OR IN ANY SITUATION WHERE THE SPEED OF THE VEHICLE WILL EXCEED 140 MILES PER HOUR. IN SUCH A CASE THE SENSORS MAY BECOME LOOSE AND CAUSE SERIOUS DAMAGE, ACCIDENT OR BODILY INJURY. |
| <div style="border: 1px solid black; padding: 2px; display: inline-block;">WARNING</div> | 12. THE MANUFACTURER IS NOT RESPONSIBLE FOR ANY INTERFERENCE CAUSED BY UNAUTHORIZED MODIFICATIONS TO THIS EQUIPMENT. SUCH MODIFICATIONS COULD VOID THE USER'S AUTHORITY TO OPERATE THE EQUIPMENT. |

3 How to use the Pressure Watch

3.1 SYSTEM COMPONENTS

The packet, as purchased, contains the following parts:

- Receiver (**figure 1**)
- Receiver battery (**figure 3B not in 12V version**)
- Four tire sensors (**figure 2A**)
- Four tire sensor securing bands (**figure 2A**)
- Four RoadSnoop valve caps (**figure 2B**)
- Four valve rings, each numbered differently (**figure 2C**)
- Receiver flexible securing band
- Manual

3.1.1 Receiver

The receiver is equipped with a button (**figure 1C**), a bleeper, four yellow tire indicator lights (**figure 1B**) and one two-color status indicator light (**figure 1A**) that can shine green or red depending on the situation, and a configuration button (**figure 1D**). The indicator lights provide an analysis of the system and tire situation, as described below. The configuration of the indicator lights on the front panel of the receiver does not match the position of the sensors under the car. Pressing the button enables the driver to check the system status and to confirm potential alarms.

3.1.2 Tire sensors

Each tire sensor comprises a sensor enclosed in plastic casing, a battery and a radio transmitter. The tire sensors measure pressure and temperature and recognize tire rotation. Tire sensors only transmit data when the vehicle is in motion. Each tire (excluding the spare tire) has its own sensor, which is secured, by a tire fitter, onto the wheel rim using a stainless steel band. The system will only work correctly if the car is fitted with four sensor units, each with its own individual number. The identically numbered valve rings indicate which sensor is in which tire. These numbers correspond to the numbered tire indicator lights on the receiver.

⚠ WARNING TIRE SENSORS MAY ONLY BE FITTED BY A TRAINED FITTER FROM A DEALER THAT SELLS THE PRESSURE WATCH, FOLLOWING THE INSTALLATION INSTRUCTIONS IN THIS MANUAL.

3.2 START-UP

NOTE! PLEASE READ ALL THE INSTRUCTIONS AND WARNINGS IN THIS MANUAL CAREFULLY BEFORE START-UP

3.2.1 Positioning the receiver

Position the receiver, using the flexible securing band, to the upper edge of the driver's sun visor, on the center side of the car. Do not position the receiver next to the area on the sun visor where the mirror is located (on either side) as the mirror may contain metal parts.

The receiver may be fixed (e.g. with adhesive tape) elsewhere on the dashboard, provided that it can easily be checked (→ 5.1 If contact cannot be established with one or more tire sensors).

⚠ WARNING POSITIONING THE RECEIVER ON A SURFACE THAT CONDUCTS ELECTRICITY (E.G. METAL) MAY INTERFERE WITH THE FUNCTIONING OF ITS ANTENNA AND MAY IMPEDE RECEPTION OF DATA FROM THE TIRE SENSORS.

⚠ WARNING THE RECEIVER MUST BE POSITIONED WHERE IT CAN BE EASILY CHECKED. THE RECEIVER MUST NOT DISTRACT THE DRIVER'S ATTENTION FROM CONCENTRATING ON DRIVING. IF THE RECEIVER OR ITS FUNCTIONS REQUIRE THE DRIVER'S ATTENTION, THE DRIVER MUST STOP THE CAR.

⚠ WARNING AT START-UP YOU MUST ENSURE THAT THE TIRE PRESSURES ARE AT THE CAR MANUFACTURER'S RECOMMENDED VALUES.

3.2.2 Setting the recommended tire pressure following system installation

Place the battery, the right way around, into the receiver as indicated in the directions in the battery compartment (12V version is connected to the vehicle's electrical system). Following initial activation, the receiver settings are the factory settings, i.e., the pressure value for each tire is 22 PSI (1.5 bar). To indicate this, the Status indicator light (**figure 1A**) will flash red while the car is in motion. In order to set your car's recommended tire pressures into the receiver memory, put the receiver into configuration mode:

1. Check that the tires are inflated to the pressures recommended by the car manufacturer.
2. Press the configuration button (**figure 1D**) using the end of a paper clip, etc., until the device emits a short bleep. The status indicator light (**figure 1A**) will flash green rapidly to indicate that the device is in configuration mode.
3. Drive the vehicle at a sufficient speed to ensure that the tire sensors are activated (approx. 13 mph (20 km/h)) and establish contact, after a short delay, with the receiver.
4. The receiver sets the tire pressures as the reference pressures.
5. When the receiver emits a short bleep and the status indicator light stops flashing green rapidly, the receiver has successfully set the new reference pressures.

NOTE! IN ORDER FOR CONFIGURATION TO SUCCEED, THE RECEIVER MUST ESTABLISH CONTACT WITH ALL FOUR TIRES, AND THE PRESSURE IN EACH TIRE MUST BE OVER 22 PSI (1.5 BAR).

NOTE! IF, AFTER BEING IN CONFIGURATION MODE, THE STATUS INDICATOR LIGHT FLASHES RED DURING DRIVING, CONFIGURATION HAS FAILED AND THE DEVICE HAS RESET TO THE DEFAULT FACTORY SETTINGS (22 PSI (1.5 BAR)). PUT THE RECEIVER IN CONFIGURATION MODE AGAIN BY PRESSING THE CONFIGURATION BUTTON.

NOTE! PREVIOUSLY RECORDED REFERENCE PRESSURE VALUES AND SENSOR NUMBERS WILL BE RETAINED IN THE RECEIVER'S MEMORY AFTER CHANGING THE BATTERY, SO THERE IS NO NEED TO SET THE RECEIVER TO CONFIGURATION MODE FOLLOWING A BATTERY CHANGE.

3.3 USE

When the car is set in motion the tire sensors are activated and, after a short delay, they establish contact with the receiver. During this time, the lights of the tire sensors which have not yet established contact with the receiver will flash. When all of the tire indicator lights (**figure 1B**) have gone out, contact has been established and the tire pressures and temperatures are within target value parameters. If you wish to ensure that the receiver is switched on, press the button (**figure 1C**) briefly. If the receiver is in contact with all of the tire sensors and the tire pressures and temperatures are within reference values, the Status indicator light (**figure 1A**) will shine green for a moment. If contact with a tire sensor has not yet been established, the Status indicator light will shine red for a moment. If the receiver has been switched off, it will switch itself on and the status indicator light will shine red for a moment. If the receiver does not react when the button is pressed, the battery may be empty (→ 3.6 Changing receiver battery).

3.4 ALARMS

The receiver activates an alarm if the pressure values in one or more tires change from the previously set reference values. Tire sensor overheating will also activate the alarm.

⚠ WARNING WHEN THE ALARM IS ACTIVATED, ALWAYS CHECK THE PRESSURE OF EACH TIRE IMMEDIATELY. THIS IS ABSOLUTELY NECESSARY NOT ONLY TO ENSURE A SAFE JOURNEY, BUT ALSO TO ENSURE THE CONTINUING FUNCTIONING OF THE SYSTEM AND TO KEEP THE ALARM FROM BEING ACTIVATED AGAIN IN A SHORT SPACE OF TIME.

NOTE! IF THE RECOMMENDED PRESSURES FOR YOUR VEHICLE ARE HIGHER THAN THE HIGHEST PRESSURES THAT CAN BE MEASURED BY THE TIRE SENSORS (50 PSI (3.5 BAR)), THE ALARM WILL NOT BE ACTIVATED WHEN THOSE PRESSURES FALL BY 10%, BUT ONLY WHEN TIRE PRESSURE FALLS BENEATH 45 PSI (3.2 BAR).

3.4.1 Slow repetitive warning bleep and flashing indicator light

An alarm is activated for a tire if its pressure has fallen more than 10% below the reference value or its temperature is over 176°F (80°C). In this case:

- The Status indicator light (**figure 1A**) is red and flashes slowly.
- The indicator light for the tire that activated the alarm (**figure 1B**) flashes in time with the status indicator light.
- The receiver emits warning bleeps in time with the indicator lights.

The warning bleep can be switched off by pressing the receiver button briefly. The indicator lights will not stop flashing until the change of pressure/heat that caused the alarm has been rectified. If another tire activates an alarm, the indicator light for the tire will begin to flash and the warning bleeps will start again.

3.4.2 Rapid repetitive warning bleep and flashing indicator light

An alarm is activated for a tire if its pressure has fallen more than 20% below the reference value or its temperature is over 212°F (100°C). In this case:

- The status indicator light is red and flashes rapidly.
- The indicator light for the tire that activated the alarm flashes in time with the status indicator light.
- The receiver emits warning bleeps in time with the indicator lights.

The warning bleep can be switched off as described above.

3.4.3 What to do when alarm is activated

1. Stop the car as soon as it is safe to do so.
2. Check and rectify the tire pressures so that they correspond to the car manufacturer's recommended values, or allow the overheated tire to cool. If you rectify the tire pressure within 15 minutes of stopping, the alarm will stop and the receiver will return to monitoring mode.

3.5 CONFIGURATION MODE

⚠ WARNING USER PROGRAMMED REFERENCE TIRE PRESSURES MUST BE ADJUSTED ACCORDING TO THE INSTRUCTIONS PROVIDED BY THE TIRE AND AUTOMOBILE MANUFACTURER EACH TIME THE VEHICLE'S ACTUAL TIRE PRESSURE IS ADJUSTED OR CHANGED. FAILURE BY THE USER TO PROPERLY RECALIBRATE THE REFERENCE TIRE PRESSURES IN THIS CIRCUMSTANCE CAN CAUSE THE PRESSURE WATCH SYSTEM TO MALFUNCTION. CHANGING THE TIRE PRESSURES REQUIRES THE SETTING OF NEW REFERENCE PRESSURES AFTERWARDS.

⚠ WARNING FOR TRAFFIC SAFETY REASONS, THE RECEIVER MUST BE SET TO CONFIGURATION MODE WHEN THERE IS AS LITTLE TRAFFIC AS POSSIBLE IN THE IMMEDIATE VICINITY. THIS ALSO HELPS ENSURE THAT THE RECEIVER DOES NOT RECEIVE DATA FROM THE PRESSURE WATCH OF A NEIGHBORING CAR.

NOTE! THE RECEIVER IS IN CONFIGURATION MODE FOR A MAXIMUM OF 9 MINUTES. THE RECEIVER WILL NOT SET NEW REFERENCE TIRE PRESSURES IF IT DOES NOT ESTABLISH CONTACT WITH ALL FOUR TIRE SENSORS OR IF THE PRESSURE IN THE TIRES IS UNDER 22 PSI (1.5 BAR). IN THIS CASE IT WILL RESET TO THE DEFAULT FACTORY SETTINGS (22 PSI (1.5 BAR)) AND THE STATUS INDICATOR LIGHT WILL FLASH RED WHILE THE CAR IS IN MOTION.

3.5.1 Changing the recommended tire pressure

If you are driving at high speeds, with a heavy load or towing a trailer you should increase the tire pressures in accordance with the car manufacturer's recommendations. These increased tire pressures must be recorded into the receiver's memory as new reference pressures, so that the receiver alarm will be activated, sufficiently early, in case of a pressure drop. (→3.4 Alarms).

Setting the receiver to configuration mode:

1. Check that the tires are inflated to the pressures recommended by the car manufacturer.
2. Press the configuration button (**figure 1D**) using the end of a paper clip, etc., until the device emits a short bleep. The status indicator light (**figure 1A**) will flash green rapidly to indicate that the device is in configuration mode.

3. Drive the vehicle at a sufficient speed to ensure that the tire sensors are activated (approx. 13 mph (20 km/h)) and establish contact, after a short space of time, with the receiver.

4. The receiver sets the tire pressures as the reference pressures.

5. When the receiver emits a short bleep and the Status indicator light stops flashing green rapidly, the receiver has successfully set the new reference pressures.

If, after being in configuration mode, the Status indicator light flashes red during driving, configuration has failed and the device has reset to the default factory settings (22 PSI (1.5 bar)).

Put the receiver in configuration mode again by pressing the configuration button.

3.5.2 Configuring the receiver to recognize new tire sensors

It is necessary to configure new tire sensors if one or several defective sensors are replaced.

⚠ WARNING REPLACEMENT OF A MALFUNCTIONING SENSOR MAY ONLY BE CARRIED OUT BY A TRAINED TIRE FITTER FROM A DEALER THAT SELLS THE PRESSURE WATCH, FOLLOWING THE INSTALLATION INSTRUCTIONS IN THIS MANUAL.

After fitting a new tire sensor, follow the procedure above (→ 3.5.1. Changing the recommended tire pressure) i.e.:

1. The receiver will try to establish contact with the sensors it already recognizes within approximately 5 minutes but if any of them are not found it will reconfigure 1-4 new sensors (numbered 1-4).

2. When all of the tire indicator lights (**figure 1B**) have gone out the receiver emits a small bleep and the Status indicator light stops flashing green rapidly. The device has now configured and accepted the new tire sensors.

If the Status indicator light flashes red during driving, configuration has failed. Put the receiver in configuration mode again.

3.6 CHANGING RECEIVER BATTERY (not in 12V version)

When the receiver battery is almost empty, the device will indicate this by emitting three bleeps every five minutes or so.

Change the battery. Use a fresh RoadSnoop battery or a CR2 3V battery (so-called 'camera battery'). Please note that battery life of different CR2 batteries available on the market may vary.

NOTE! IN EXTREMELY COLD TEMPERATURES THE RECEIVER MAY INCORRECTLY INDICATE THAT THE BATTERY IS ALMOST EMPTY. IN ORDER TO CLARIFY HOW MUCH BATTERY LIFE IS LEFT, PUT THE RECEIVER IN ROOM TEMPERATURE SURROUNDINGS. IF THE WARNING BLEEP SOUNDS WHEN THE RECEIVER HAS WARMED UP, THE WARNING IS VALID AND THE BATTERY MUST BE CHANGED.

Changing the battery:

1. Open the battery cover (**figure 3C**) on the receiver.

2. Remove the battery carefully (**figure 3B**).

3. Place the new battery between the springs. Ensure that the battery is the right way around.

4. Close the battery cover.

When the car is set in motion the tire sensors are activated and, after a short delay, they establish contact with the receiver. Previously recorded reference pressure values and sensor numbers will be retained in the receiver's memory after changing the battery, so there is no need to set the receiver to configuration mode following a battery change.

⚠ WARNING THE RECEIVER BATTERY IS A DISPOSABLE BATTERY. IF INAPPROPRIATELY HANDLED, THE BATTERY MAY OVERHEAT OR IGNITE. DO NOT ATTEMPT TO RECHARGE OR SHORT CIRCUIT THE BATTERY. DO NOT DISASSEMBLE THE BATTERY. DO NOT HEAT OR BURN THE BATTERY. DO NOT STORE THE BATTERY IN DIRECT SUNLIGHT OR IN HIGH TEMPERATURES. USED BATTERIES MUST BE DISPOSED OF APPROPRIATELY.

NOTE! USE ONLY CR2 TYPE BATTERIES OR ROADSNOOP BATTERY (SAME AS BATTERY SUPPLIED WITH ORIGINAL EQUIPMENT).

4 How the system operates

4.1 CONCEPT

Data is transferred between the tire sensors and the receiver via the wireless radio transmitters and receiver, which operate at a frequency of 433.92 MHz. The tire sensors measure and send pressure and temperature data and their own sensor number data to the receiver at regular intervals. The receiver operates on the basis of the temperature-corrected pressure value, so a reduction in tire pressure due to an external drop in temperature will not activate the alarm unnecessarily.

NOTE! OTHER RADIO TRAFFIC OPERATING IN THE SAME FREQUENCY RANGE AS THE SYSTEM MAY SOMETIMES PREVENT DATA TRANSMISSION, AND SOME OF THE SIGNALS SENT BY THE TIRE SENSORS MAY NOT BE RECEIVED. PLEASE NOTE THAT THE SYSTEM IS INTENDED FOR LONG-TERM PRESSURE MONITORING AND CANNOT NECESSARILY PROVIDE ALERTS FOR SUDDEN CHANGES IN TIRE PRESSURE.

4.2 RECEIVER STANDBY MODE

When there is a working battery in the receiver it is always in standby mode, so it checks, at regular intervals, whether the tire sensors are sending data. When the car is parked and stationary, the sensors are deactivated. The numbers of the sensors are recorded in the memory of the receiver.

4.3 ACTIVATION WHEN STARTING JOURNEY

The motion detectors in the tire sensors activate the sensors when the car's speed exceeds approx. 13 mph (20 km/h). When the receiver registers that one of the tire sensors it recognizes is sending data it, too, activates and is ready to receive data from the other three recognized tire sensors. To indicate this, the lights for the tire sensors (**figure 1B**) which have not yet sent data to the receiver flash slowly. During the time delay, the tires for which data has been received are monitored normally.

It can take 5 minutes before the receiver's active detection period and the tire sensors' initial data transmission coincide and contact is established. The activation of the receiver can be speeded up by briefly pressing the button (**figure 1C**).

4.4 MONITORING

In monitoring mode, the receiver receives pressure and temperature data from each tire sensor every minute on average. If the receiver does not receive data from a tire sensor for 5 minutes, the tire indicator light for that tire sensor will begin to flash.

4.5 ALARMS

The reference tire pressure values are set into the receiver's memory whenever the receiver has last been set to configuration mode. If it has never been set to configuration mode, or if previous configuration has failed, the settings in the receiver will be the factory settings (→ 3.5 Configuration mode). The receiver obtains the pressure and temperature values from the tire sensors and activates an alarm if the parameters for activating the alarm are exceeded. (→ 3.4 Alarms). The accuracy of the alarm parameters depends on the measuring accuracy of the tire sensors (→ 6 technical specifications).

The pressure measured by the tire sensors is the prevailing tire pressure and the temperature measured is the air temperature near to the wheel rim. A high temperature warning does not necessarily mean that a tire has overheated, but that the temperature of a tire sensor has risen to a level that could hamper its functioning or increase its potential to be damaged. Do what every alarm situation requires, i.e., stop and check the situation. If overheating has occurred, allow the tire to cool down.

4.6 AFTER STOPPING DRIVING

After coming to a halt, the tire sensors are still active for 15 minutes. After this, the sensors deactivate and the receiver loses contact with them. Contact with the tire sensors will also be cut if the receiver is removed beyond the range of the sensor radio transmitters (approx. 30 feet (10 meters)). When contact with all four tire sensors is lost, the receiver goes into standby mode and the indicator lights go out.

NOTE! IF YOU DRIVE PARTICULARLY SLOWLY, E.G., IN A TRAFFIC JAM, THE TIRE SENSORS MAY DEACTIVATE. THE SENSORS WILL REACTIVATE AUTOMATICALLY WHEN YOUR DRIVING SPEED EXCEEDS APPROX. 13 MPH (20 KM/H).

5 Procedure during potential malfunction

⚠ WARNING WHEN MALFUNCTIONS OCCUR, PLEASE READ ALL THE INSTRUCTIONS AND WARNINGS IN THIS MANUAL CAREFULLY.

5.1 IF CONTACT CANNOT BE ESTABLISHED WITH ONE OR MORE TIRE SENSORS

The position of the receiver affects its capacity to establish contact with the tire sensors. In some vehicles the glove compartment, door storage compartments or metal-surfaced shelves are unsuitable places to keep the receiver. Generally the best places to position the receiver are the driver's sun visor or shelves and compartments visible to the driver. A good solution, both for radio contact and checking, is to attach the receiver to the dashboard with adhesive tape. If contact is not established with one or more tires, try moving the receiver somewhere else or positioning it slightly differently in the front of the car. Do not, however, position the receiver so that it obstructs driving, hinders the driver's view of the road or handling of the controls or makes it impossible to change the battery (not in 12V version).

When the car is stationary, an individual sensor may be in a position that stops it from establishing contact with the receiver. Contact will, however, be established again when the wheel starts turning. If the receiver is repeatedly unable to establish contact with a particular tire sensor, it could be because the receiver does not recognize the unit in question, or because the unit is defective or its battery is almost empty. Ensure that the tire pressures correspond to the manufacturer's recommended levels and set the receiver to configuration mode (→ 3.5 Configuration mode). If the malfunction persists, the sensor must be replaced (→ 5.5 Replacing a damaged tire sensor).

5.2 IF RECEIVER ALARM IS NOT ACTIVATED EVEN THOUGH TIRE PRESSURE HAS FALLEN

The reference tire pressure values in the receiver's memory may be too low. If the system does not activate the alarm even though tire pressures are too low, check the tire pressure, e.g., at a service station pressure meter. After this, set the checked tire pressures as the new reference values. (→ 3.5 Configuration mode).

⚠ WARNING IF THE REFERENCE VALUES RECORDED INTO THE SYSTEM ARE LOWER THAN THOSE RECOMMENDED BY THE MANUFACTURER, THE RECEIVER WILL NOT NECESSARILY ACTIVATE AN ALARM IN TIME. THE USER MUST ENSURE THAT THE RECEIVER IS NOT PUT INTO CONFIGURATION MODE UNLESS NECESSARY (→ 3.5 CONFIGURATION MODE), AND THAT THE PRESSURE GAUGE USED TO SET THE REFERENCE TIRE PRESSURES, IS SUFFICIENTLY ACCURATE.

⚠ WARNING THE SYSTEM ONLY MONITORS THOSE TIRES CONTAINING SENSORS THAT HAVE ESTABLISHED CONTACT WITH THE RECEIVER. IF THE TIRE PRESSURE HAS FALLEN WHILE THE CAR IS STATIONARY, THE SYSTEM WILL ONLY ACTIVATE AN ALARM WHEN THE TIRE SENSOR HAS ESTABLISHED CONTACT WITH THE RECEIVER. IF THE TIRE SENSOR BATTERY IS EMPTY, CONTACT WILL NOT BE ESTABLISHED.

⚠ WARNING THE TIRE PRESSURE MAY POTENTIALLY FALL SO RAPIDLY THAT THE SYSTEM DOES NOT HAVE TIME TO REACT BEFORE THE DRIVER HIMSELF BECOMES AWARE OF THE SITUATION. THIS MAY BE THE CASE, FOR EXAMPLE, IF A TIRE BURSTS.

5.3 IF RECEIVER ALARM IS ACTIVATED EVEN THOUGH TIRE PRESSURES ARE AT RECOMMENDED LEVEL

The reference tire pressure values recorded in the system may be incorrect. Rectify the situation by setting the checked tire pressures as the reference values (→ 3.5 Configuration mode). If the same situation occurs again, the tire unit that activates the alarms is probably defective and must be replaced (→ 5.5 Replacing a damaged tire sensor). If the tire temperature changes very rapidly (e.g. car wash or heavy rain fall), the receiver may give a false alarm, which ends automatically when the temperature stabilizes.

NOTE! ALWAYS CHECK TIRE PRESSURES USING A RELIABLE GAUGE.

5.4 IF RECEIVER ALARM SIGNALS PRESSURE DROP, BUT IN THE WRONG TIRE

If the tire activating the alarm and the numbered tire indicator light (**figure 1B**) on the receiver do not correspond to each other, the position of the valve rings (**figure 2C**) indicating the location of the corresponding tire sensors may have been changed. You can rectify the situation by letting air out of each tire in turn, one by one. When the receiver activates the alarm you know which tire the alarm corresponds to and you can, accordingly, put the correct valve ring on that tire. You can do this within 15 minutes after stopping the car, as the tire sensors are still active for that time. Please note, however, that the tire sensors may only transmit data approximately every 60 seconds or so, in which case it might take that amount of time before the receiver registers from which tire you have reduced pressure. When you have finished, fill the tires to manufacturer's recommended levels with a pressure gauge at a service station or equivalent.

5.5 REPLACING A DAMAGED TIRE SENSOR

If the receiver is not able, over several journeys, to establish contact with a particular tire sensor; or if a sensor has activated several unnecessary alarms, the sensor is either broken or its battery is almost empty. In these cases, the tire sensor must be replaced. The tire sensor battery cannot be changed, so the whole sensor must be replaced.

A specialist tire fitter can replace the defective tire sensor with a new unit numbered exactly the same (1-4, figure 2A) as that of the tire sensor being replaced. The same car must not contain two sensors with the same number. This would prevent the system from functioning correctly, as the receiver would not be able to differentiate one sensor from another. Once a new tire sensor has been installed, the receiver must be set to configuration mode (→ 3.5 Configuration mode).

⚠ WARNING INSTALLATION OF TIRE SENSORS MAY ONLY BE CARRIED OUT BY A TRAINED TIRE FITTER FROM A DEALER THAT SELLS THE PRESSURE WATCH, FOLLOWING THE INSTALLATION INSTRUCTIONS IN THIS MANUAL (ANNEX B: TIRE SENSOR INSTALLATION INSTRUCTIONS FOR TIRE FITTERS).

6 Technical specifications

RECEIVER

Length:	2.8" (70 mm) (+ 2.8" (70 mm) flexible part or 6.5 feet (2000 mm) electric lead in 12V version)
Width:	1.8" (46 mm)
Height:	0.8" (20 mm)
Mass:	1.4 ounces (40 g) (containing battery or voltage-reducing electronics in 12V version)
Battery type:	CR2 3V or RoadSnoop battery (same as battery supplied with original equipment)
Operating voltage:	3.0 V (CR2), 3.6 V (RoadSnoop battery)
Battery life:	6 months, depending on use
Range of operating temperature:	-4... +176°F (-20... +80°C)
Factory settings:	recommended pressure 22 PSI (1.5 bar)

TIRE SENSOR

Length:	2.5" (64 mm)
Width:	1.1" (28 mm)
Height:	0.5" (13 mm) (1.6" (42 mm) measured from tip of antenna)
Mass:	0.9 ounces (25 g)
Battery type:	CR2450N 540 mAh (not changeable)
Operating voltage:	3.0 V
Battery Life:	approx. 90,000 miles (150,000 km), depending on circumstances
Range of operating temperature:	-40... +257°F (-40... +125°C)
Pressure range:	100...450 kPa (14.5...65 PSI (1.0...4.5 bar)) absolute pressure)
Pressure measurement accuracy:	±12 kPa (±1.7 PSI (±0.12 bar) in temperature range of -40...+212°F (-40...+100°C))
Temperature measurement accuracy:	±11°F (±6 °C) (in temperature range of -40...+248°F (-40...+120°C))
Activation speed:	approx. 13 mph (20 km/h) depending on composition of wheel rim/tire
Maximum permitted driving speed:	155 mph (250 km/h)
Transmission capacity:	6 dBm
Frequency range:	433,92 MHz
Modulation:	OOK
Data transmission speed:	9600 bps
Nominal transmission interval:	14s
Operating time after vehicle has stopped:	15 min

7 Terms of Warranty

LIMITED WARRANTY: Nokian Tyres warranty to you, ("You") being the Purchaser, is that the Pressure Watch ("Unit") shall be free of defects in material and workmanship (the "Warranty"); provided, however, that Nokian Tyres Warranty hereunder shall not cover or apply to any consumables (i.e., batteries in sensors and in receiver) or product, accessory, part or attachment that is not manufactured by Nokian Tyres, except to the extent the manufacturer of any such item provides a warranty against defects in material and workmanship to Nokian Tyres that can then be passed on to You. The Warranty Period shall commence on the date of purchase of each Unit (the "Sale") and shall run for a period of one (1) year. The Warranty Period limits the duration of the Warranty including, without limitation, any implied warranties arising out of the Sale of the Unit. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to You. This warranty gives You specific legal rights, and You may also have other rights which vary from state to state.

EXCLUSIVE RECOURSE: TO THE EXTENT PERMITTED BY LAW AND EXCEPT AS MAY OTHERWISE BE EXPRESSLY PROVIDED UNDER THIS SALE, NOKIAN TYRES SOLE AND ENTIRE LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES RESULTING FROM ANY CAUSE WHATSOEVER, INCLUDING NOKIAN TYRES NEGLIGENCE, ALLEGED DAMAGED OR DEFECTIVE GOODS, IRRESPECTIVE OF WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL BE LIMITED TO, AND YOUR SOLE AND EXCLUSIVE RECOURSE SHALL BE, THE REPAIR OR REPLACEMENT, AT NOKIAN TYRES DISCRETION, AND BY NOKIAN TYRES AUTHORIZED DEALERS OR BY A DEALER SELECTED BY NOKIAN TYRES, OF ANY PART OR PARTS OF ANY UNIT (A) THAT MUST, WITHIN THE WARRANTY PERIOD, BE RETURNED TO NOKIAN TYRES WITH TRANSPORTATION CHARGES PREPAID AND (B) THAT ON EXAMINATION BY NOKIAN TYRES PROVES TO BE DEFECTIVE. If Nokian Tyres takes action to remedy the defect, such action shall be undertaken promptly and at Nokian Tyres own cost and expense and without expense to You except for the prepaid transportation charges specified herein.

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ALLOCATION OF RISK: You expressly acknowledge and agree that the limitations and exclusions contained herein represent the parties' agreement to allocate risk between the parties in connection with Nokian Tyres obligations under this Sale. The price You paid for the Unit reflects this allocation of risk and the exclusion of special, incidental, consequential, indirect or punitive, or other damage or economic loss in this Sale. NOTWITHSTANDING THE CASE WHERE ANY EXCLUSIVE RECOURSE FAILS ITS ESSENTIAL PURPOSE OR IS OTHERWISE UNAVAILABLE.

8 Limitation of Liability

LIMITATION OF LIABILITY: NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, NOKIAN TYRES ENTIRE LIABILITY TO YOU FOR DAMAGES CONCERNING PERFORMANCE OR NONPERFORMANCE BY NOKIAN TYRES OR IN ANY WAY RELATED TO THE SUBJECT MATTER OF THIS SALE AND REGARDLESS OF WHETHER THE CLAIM FOR SUCH DAMAGES IS BASED IN CONTRACT OR IN TORT OR OTHERWISE, SHALL NOT IN ANY EVENT EXCEED THE ACTUAL PRICE YOU PAID FOR THE UNIT.

Annex A Check list

	Status indicator light (1A)	Tire indicator lights (1B)	Warning bleep
After starting journey.	Off. If receiver has factory settings (failed configuration) Status light flashes red.	Lights of sensors not yet in contact with receiver flash. Lights go out as contact is established.	—
During driving (tire pressures and temperatures within permitted parameters).	Off. If receiver has factory settings (failed configuration) Status light flashes red.	Off If a tire indicator light is flashing, contact with that tire has been cut off	—
When pressing the button (1C)	Shines green for a moment if receiver has contact with all tires and pressures and temperatures are within permitted parameters. Shines red for a moment if receiver is not in contact with all tires or if receiver has factory settings.	—	—
If a tire's pressure has fallen more than 10% or if its temperature has risen above 176°F (80°C).	Flashes red slowly.	The tire indicator light of the tire that has caused the alarm flashes.	Slow, repetitive bleeping. (Can be switched off by pressing the button)
If a tire's pressure has fallen more than 20% or if its temperature has risen above 212°F (100°C).	Flashes red rapidly.	The tire indicator light of the tire that has caused the alarm flashes.	Fast, repetitive bleeping. (Can be switched off by pressing the button).
Configuration mode.	Flashes green rapidly.	Off. If a tire indicator light is flashing, contact with that tire has been cut off.	Short bleep at beginning and end of configuration mode.
If receiver battery is empty.	Off. Shines red for a moment when button (1C) is pressed.	—	Three bleeps at 5-minute intervals.

Annex B: Tire sensor and receiver installation instructions for tire fitters

GENERAL INSTALLATION INFORMATION

⚠ WARNING IF INSTALLED INCORRECTLY ON THE WHEEL RIM THE TIRE SENSOR SECURING BAND MAY BECOME LOOSE. THIS MAY UPSET THE BALANCING OF THE TIRE OR CAUSE THE SENSOR TO MALFUNCTION OR BREAK. IN THE WORST CASE, THE SENSOR AND ITS SECURING BAND MAY COME OFF AND DAMAGE THE TIRE.

⚠ WARNING INSTALLATION OF TIRE SENSORS OR REPLACEMENT OF A MALFUNCTIONING SENSOR MAY ONLY BE CARRIED OUT BY A TRAINED TIRE FITTER FROM A DEALER THAT SELLS THE PRESSURE WATCH, FOLLOWING THESE INSTALLATION INSTRUCTIONS.

⚠ WARNING PLEASE READ ALL THE INSTRUCTIONS AND WARNINGS IN THIS MANUAL CAREFULLY BEFORE STARTING INSTALLATION.

The tire sensor is attached to the well bed of the wheel rim using a steel band, and positioned close to the valve. When the tire sensors are fitted, new valve caps and rings must also be fitted. These caps and rings indicate which sensor is installed on which wheel rim. It is still possible to switch the position of the tires in order to balance out the wear of the tires, in accordance with the car's instruction manual, as the number on a valve ring does not require the tire to always be in the same fixed position under the car.

It is recommended that the receiver be positioned on the driver's sun visor so that it can establish clear contact with the tire sensors. This position is also the easiest as regards checking. The 12V version can also be positioned elsewhere (→ 5.1 If contact cannot be established with one or more tire sensors).

PARTS AND TOOLS NECESSARY FOR INSTALLATION

- 4 tire sensors, each numbered differently (1, 2, 3 and 4)
- 4 steel securing bands
- 4 valve rings, each with a number corresponding to the numbers on the tire sensors (1, 2, 3 and 4)
- 4 RoadSnoop valve caps (which are interchangeable with the original valve caps)
- Marker pen to mark cut-off point
- Tool (e.g. sheet metal scissors) to cut off excess strips of the securing band
- Screwdriver or box wrench to tighten the screw on the securing band
- Receiver, battery (no battery in 12V version) and receiver flexible securing band

STAGES OF INSTALLATION

- 1) Thread the free end of the securing band between the lugs on the base of the tire sensor (**Installation figures 2-3**). Straightening the end of the band makes it easier to thread through.
- 2) Fit the securing band holding the tire sensor around the well bed of the wheel rim in such a way that the sensor is positioned near the valve (**Installation figure 5**).

⚠ WARNING ALWAYS POSITION THE TIRE SENSOR CLOSE TO THE VALVE, SO THAT WHEN REMOVING THE TIRE FROM THE RIM, THE APPROXIMATE POSITION OF THE SENSOR IS KNOWN, THUS ENABLING YOU TO ENSURE THAT THE SENSOR REMAINS UNDAMAGED.

⚠ WARNING IF THE TIRE SENSOR AND THE BAND TIGHTENING MECHANISM ARE POSITIONED OPPOSITE EACH OTHER ON THE WHEEL RIM THEY COULD PREVENT THE TIRE BEAD FROM BEING ABLE TO LIE DEEP ENOUGH IN THE WHEEL RIM WELL BED DURING INSTALLATION. IN THIS CASE THE TIRE FITTING MACHINE COULD DAMAGE THE EDGE OF THE WHEEL RIM, OR THE TIRE BEAD COULD BREAK THE TIRE SENSOR OR THE TIGHTENING MECHANISM. FOR THIS REASON IT IS RECOMMENDED THAT THE SENSOR AND TIGHTENING MECHANISM BE POSITIONED SIDE BY SIDE (INSTALLATION FIGURE 6).

3) Thread the free end of the securing band through the tightening mechanism. Tighten the band by hand and mark the cut-off point using a marker pen. Loosen the band and cut it at the cut-off point. Then thread the cut end back through the tightening mechanism (**Installation figures 7-10**).

⚠ WARNING THE SECURING BAND MUST BE ATTACHED EXACTLY PARALLEL WITH THE WHEEL RIM WELL BED. IF A SECURING BAND IS NOT PARALLEL AND IS TIGHTENED UP CROOKEDLY IT COULD BECOME LOOSE DURING MOTION. THE WELL BED OF SOME WHEEL RIMS TAPERS CONICALLY, I.E., THE BASE SLANTS. IF THIS IS THE CASE, THE TIRE SENSOR AND SECURING BAND MUST BE INSTALLED AND TIGHTENED AT THE SMALLER TAPERED END SO THAT IT CANNOT MOVE SIDEWAYS AND BECOME LOOSE. IF IT BECOMES LOOSE, THE TIRE UNIT CAN MOVE IN THE DIRECTION OF THE PERIMETER OF THE RIM AND UPSET THE BALANCING OF THE WHEEL.

⚠ WARNING IF A CONICAL WELL BED TAPERS TOO SHARPLY, THE SECURING BAND MAY TIGHTEN UP UNEVENLY AND BREAK THE LUGS ON THE TIRE UNIT. IT IS FORBIDDEN TO INSTALL THE SYSTEM ON THIS KIND OF WHEEL RIM. ENSURE THAT THE SIDES OF THE TIRE SENSOR ARE NOT RESTING ON OR HOLDING THE SENSOR AGAINST THE RIM OF THE WELL BED. DANGER OF BREAKAGE WHEN TIGHTENING.

⚠ WARNING IF THE EXCESS STRIP OF SECURING BAND IS NOT CUT SHORT ENOUGH, THE EXCESS OVERLAPPING STRIP MAY RUB AGAINST THE INSIDE OF THE TIRE OR CUT INTO THE TIRE DURING INSTALLATION, CAUSING A PUNCTURE HAZARD.

4) Continue tightening the band by screwing the tightening mechanism screw (the recommended tightening torque is 3.3 FT lbs (4.5 Nm) (**Installation figure 11**).

5) Place the valve ring with the number matching the number on the tire sensor on the wheel rim valve (**Installation figure 12**).

6) The tire sensor has now been installed. Take note of the position of the sensor and the tightening mechanism of the securing band when fitting the tire, in order to ensure that the sensor does not get stuck and crushed between the inside bead of the tire and the wheel rim (**Installation figures 13-15**). Ensure that the flexible antenna of the tire sensor does not get trapped under the bead of the tire. Fitting the tire will be possible if, at the beginning, the sensor is exactly opposite the arm of the tire installation machine and 1/3 of the tire bead is in the well bed. The place where the sensor is located is the place where the bead of the tire must be lifted over the edge of the wheel rim last.

7) When the tires, each containing a sensor, have been replaced, fill them to car manufacturer's recommended pressure values. and replace the RoadSnoop valve caps, if desired (**Installation figure 16**).

8) Activate the receiver by installing the battery (**Installation figure 17**) Note: 12V version is connected up to the vehicle's electrical system.

9) Thread the flexible securing band through the links on the receiver. Attach the receiver to the upper edge of the driver's sun visor, on the center side of the car (**Installation figure 19**). Do not position the receiver next to a mirror on the sun visor as metal parts in the mirror could impair the functioning of the receiver's antenna. The receiver (especially the 12V version) can also be positioned elsewhere.

10) Check that the tires are all filled to the manufacturer's recommendations and only then press the configuration button on the receiver (**figure 1D**) to put it into configuration mode (fi 3.2 Start up and 3.5 Configuration).

11) When the car begins moving, the tire sensors will be activated and will transmit the pressure data at that particular moment to the receiver, which will record them as reference values..

REMOVING THE TIRE SENSOR

When removing the tire from a wheel rim fitted with a RoadSnoop tire sensor, note where the sensor and the tightening mechanism are located. (**Installation figures 21-23**). Always start lifting the first section of the tire bead over the edge of the wheel rim where the sensor is positioned.

⚠ WARNING IF YOU REMOVE A TIRE FROM A WHEEL RIM FITTED WITH A ROADSNOOP TIRE SENSOR, DO NOT POSITION THE TIRE SO THAT THE BEAD BREAKING MACHINE PRESSES THE TIRE ON EITHER SIDE OF WHERE THE TIRE SENSOR OR BAND TIGHTENING MECHANISM IS LOCATED, AS THIS CAN CAUSE THE TIRE TO BREAK THE SENSOR OR THE SECURING BAND WHEN IT COMES FREE FROM THE WHEEL RIM WELL BED. ADDITIONALLY, MAKE SURE YOU ALWAYS START LIFTING THE FIRST SECTION OF TIRE BEAD OVER THE EDGE OF THE WHEEL RIM WHERE THE SENSOR IS POSITIONED. THIS WILL ENSURE THAT THE SENSOR DOES NOT GET STUCK AND CRUSHED BETWEEN THE INSIDE BEAD AREA OF THE TIRE AND THE WHEEL RIM.