

Safety-Plus

Advance Tire Safety

Tire Pressure Monitoring System User's Manual

Model: WP101L

FCC Certification Number: RU5CARETRON



Note:

Asia Pacific Microsystems, inc. All rights reserved. No part of this documentation may be reproduced in any form or by any means or used to make any directive work (such as translation or transformation) without permission from Asia Pacific Microsystems, Inc. Asia Pacific Microsystems, Inc. reserves the right to revise this documentation and to make changes in content without obligation to Asia Pacific Microsystems, Inc. to provide notification of such revision or change.

@2004 Asia Pacific Microsystems, Inc.

Table of Contents

FCC Notices	3
System Description	3
System Component Parts	3
Let's Start	4
Installation	4
Receiver	4
Transmitters	4
Installation Procedures	4
Mounting the Tire with Transmitter on Wheel	5
De-Mounting Transmitter/s from Wheel	6
Receiver Description	9
Diagram and Display Indicator	9
The Function of Receiver Button	9
Alerts and Warnings	10
Setup Function	12
Special Setup	14
Technical Specifications	17

FCC Notices

FCC Compliance Statement

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.

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device , pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and , if not installed and used in accordance with the instructions , may cause harmful interference to radio communications.

However , there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception , which can be determined by turning the equipment off and on , the user is encouraged to try to correct the interference by one or more of the following measures :

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and the receiver.

Connect the equipment into an outlet different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

CAUTION : Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Safety Notice








The product is designed to measure and display the active operative data in tires , and provide the alert or warning when the product detects the pressure or the temperature of tires is irregularities. The drivers shall have the responsibility to react with discretion to the alerts or warnings. Irregular tire pressure should be remedied at the earliest occasion.

System Description

Safety-Plus is a wireless tire pressure system with sensor/transmitter mounted on each wheel plus a module of Receiver Display placed onto dashboard. High quality sensors collect real-time tire pressure and temperature data then transmitted by wireless radio to receiver.






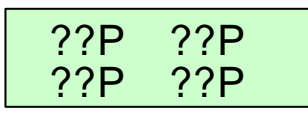
The system monitors the data of tires with digital display on LCD thus driver can be well-posted with most updating info of tire while driving. The receiver will alert with beep and yellow light while pressure and/or temperature are/is out of normal range.

System Component Parts

<p>Receiver : 1 Unit</p> 	<p>Receiver Holder Kit : 1 Unit</p> 
<p>Antenna : 1 Unit</p> 	<p>DC Cable : 1 Unit</p> 
<p>Transmitter : 4 Units</p> 	<p>Clamping Strap : 4 Units</p> 
<p>Transmitter Mounting Pad : 8 Units</p> 	

Installation

Receiver -- Installation Procedures

<p>Stick self-adhere device on the backside of receiver.</p>	
<p>Attach the Holder suction cups on windshield of car.</p>	
<p>Screw Antenna into Receiver.</p>	
<p>Lock the Receiver on the Holder.</p>	
<p>Plug DC Power Cable into Receiver Power Jack and Cigarette Lighter Socket.</p>	
<p>The LCD Display will show “??P”.</p>	

Transmitters -- Installation Procedures

The transmitter devices should be installed by qualified technician. They need to follow installation procedures. It can ensure that the transmitters are properly installed and undamaged.

The tools and instruction in this manual are used by the manufacturer's tire changer. It may not available to you.

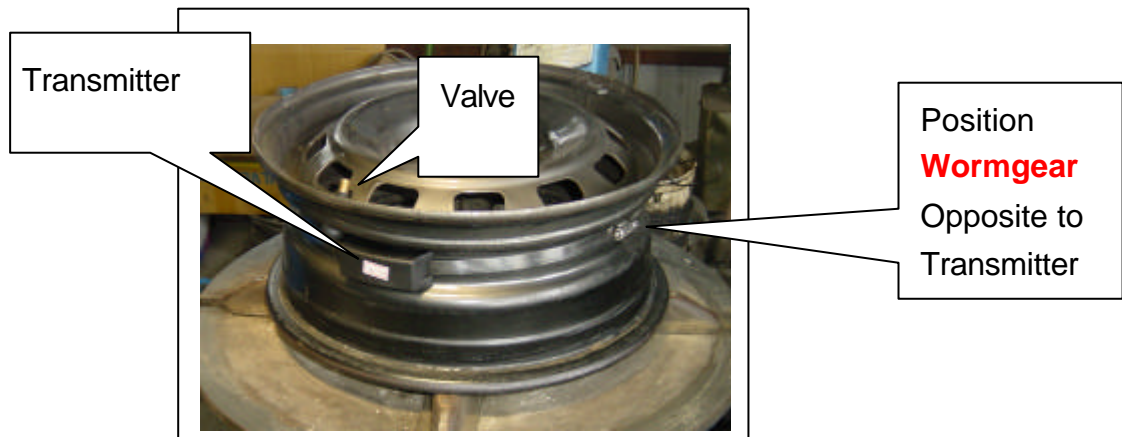
Tools Required

- Tire Changing Equipment
- Tire Balancing Equipment
- Metal Cutter
- Torque Wrench

Mounting the Tire with Transmitter on Wheel

Part I : Fasten Transmitter in the wheel

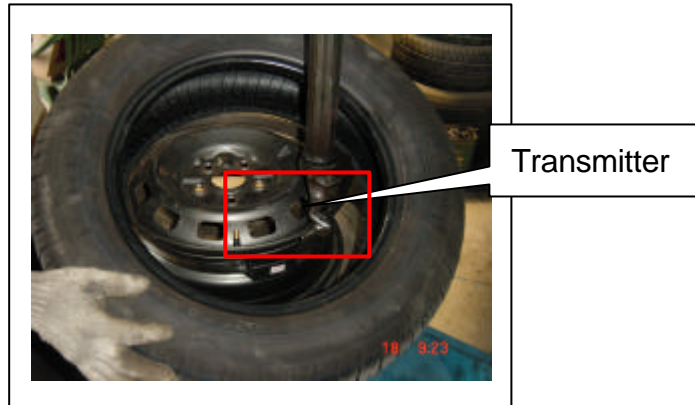
1. Pass Clamping Strap through Transmitter.
2. Place the Transmitter in the lowest area of the drop center and nearby valve.



3. Fasten the Clamping Strap ; tighten to 4N-m (30inch pound).
4. Cut excess Clamping Strap off , at approximately one inch from the wormgear.

Part II : Place Tire on Wheel

1. Place tire under Transmitter.

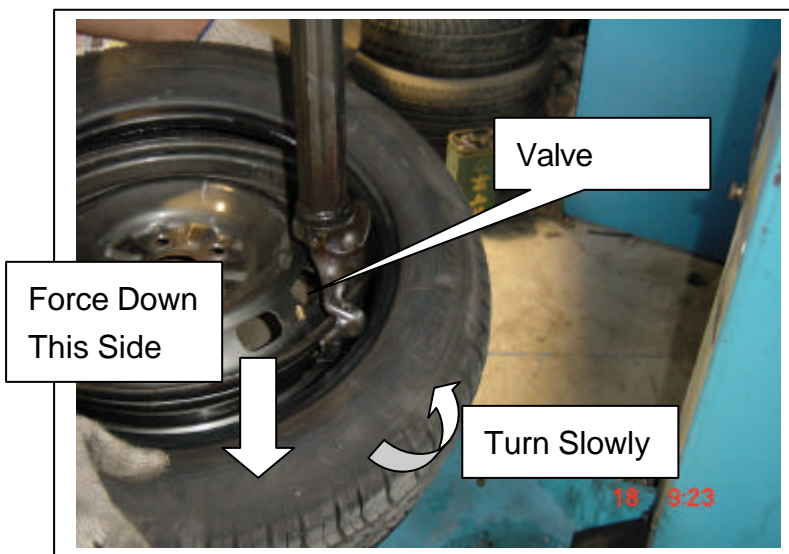


2. Use auto-install machine stalling the lower-side of tire into wheel.

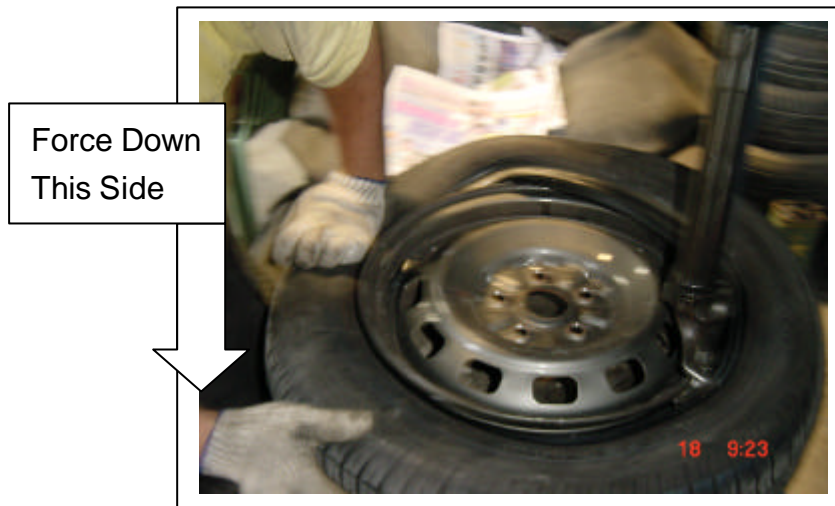


3. Place the upper-side of tire to wheel.

Notice : force down the wall of tire nearby valve and turn slowly by machine.



4. Stall whole tire to the wheel,



De-Mounting Tire with Transmitter Inside

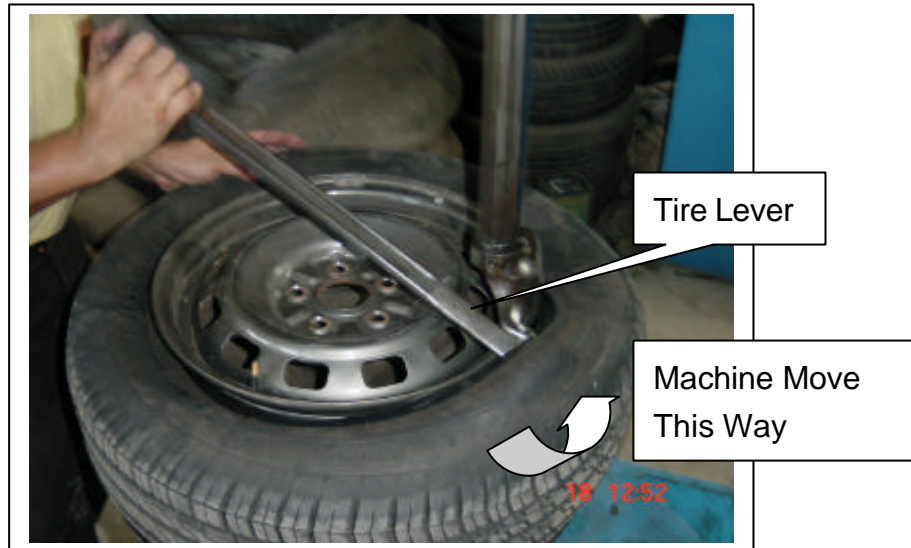
Part I : Air Discharge

Screw valve insert out of valve and let air discharge completely. Remove balancing weight/s. Press tire off the safety shoulder inside and outside.

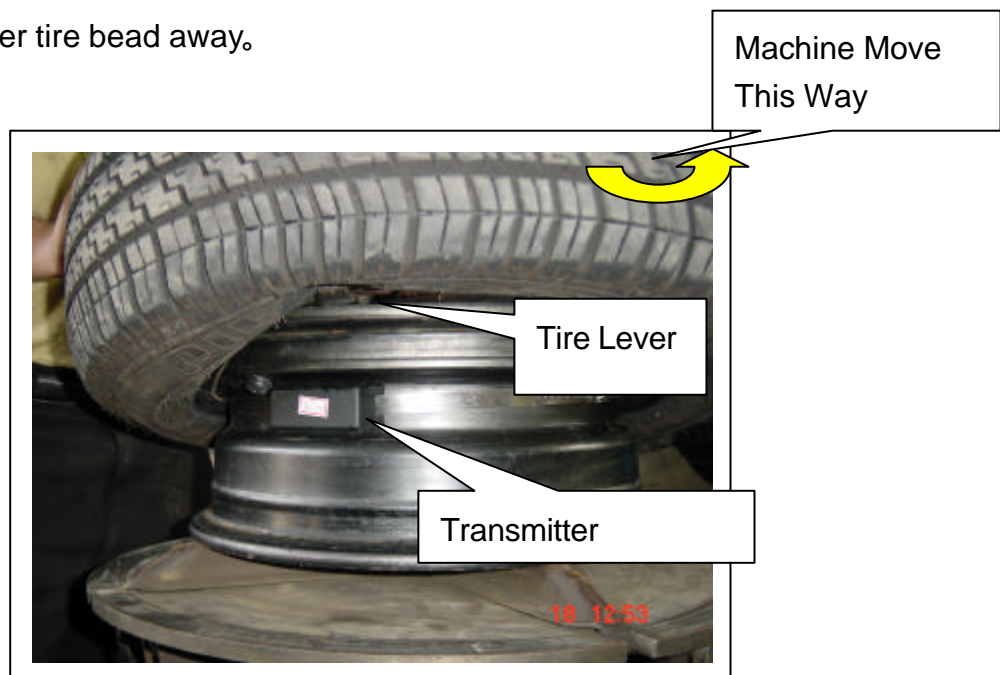


Part II : Remove Tire Away from Rim

1. Place wheel onto the installation machine. Rub soapy water onto tire bead and rim lip.
2. Place lever on the tire bead and lift tire bead with mounting tire lever over the installation head and pull tire away.

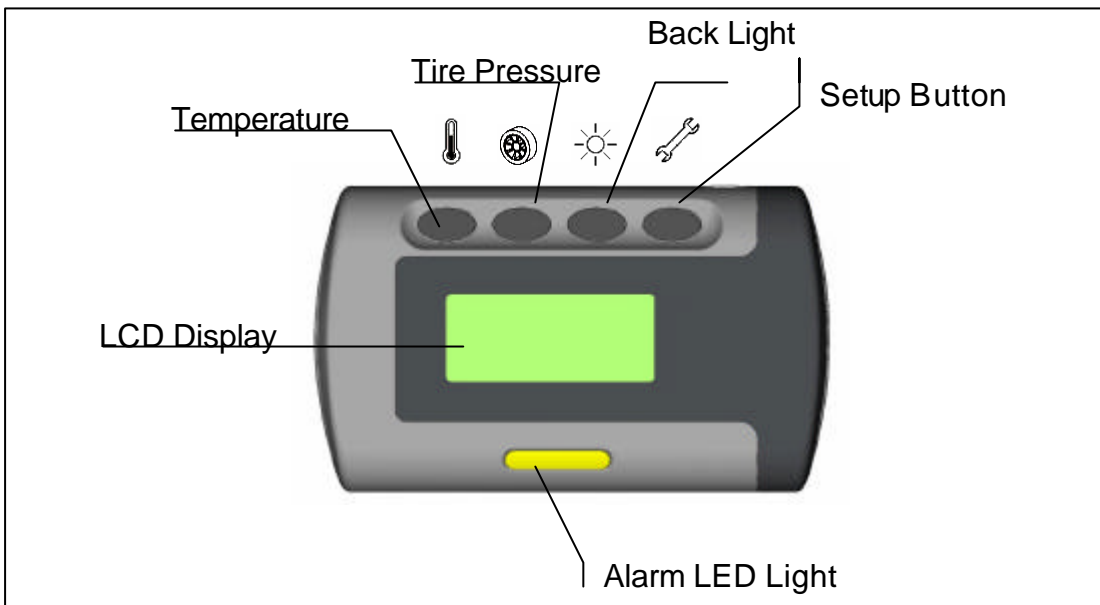


3. Pull the lower tire bead away.















4. Take the Transmitter away from rim.

Receiver Description : Diagram and Display Indicator





The Function of Receiver Button

<p> 1. Temperature Button 2.? Button</p>	<p>1. Display temperature of tires after press button .</p> <p>2. Select the function or number by press this button .</p> <div style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">36C 36C 35C 35C</p> </div>
<p> 1. Pressure Button 2.? Button</p>	<p>1. Display pressure of tires after press button .</p> <p>2. Select function or number by press this button .</p> <div style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; width: fit-content; margin: 10px auto;"> <p style="text-align: center;">31P 31P 30P 30P</p> </div>
<p> LCD Display Backlight Button</p>	<p>1. Press button  to Initiate the backlight of LCD Display.</p> <p>2. Press button  to confirm “function mode” of</p>



	<p>set-up.</p> <div style="border: 1px solid black; background-color: yellow; padding: 5px; display: inline-block;"> <p>31P 31P 30P 30P</p> </div>
 Set Up Button	<p>1. Press button  to enter into Function Setup Mode.</p> <p>2. Press button  again to exit Function Setup Mode.</p> <div style="border: 1px solid black; background-color: lightgreen; padding: 5px; display: inline-block; margin-top: 10px;"> <p>Pressure Limit</p> </div>

Alerts and Warnings

Pressure Deviation Alert

<p>Pressure Deviation Alert will be initiated when receive pressure signal , which be measured by sensor in wheel, below the value of set-up.</p> <p>Alert action includes :</p> <ol style="list-style-type: none"> 1. Show affected tire and its pressure. 2. Voice alert. 	<div style="border: 1px solid black; background-color: lightgreen; padding: 5px; display: inline-block;"> <p>31P !23P 30P 30P</p> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>
---	---

Temperature Deviation Alert

<p>Temperature Deviation Alert will be initiated when receive temperature signal , which be measured by sensor in wheel , above the value of set-up.</p> <p>Alert action include :</p> <ol style="list-style-type: none"> 1. Show affected tire and its Temperature. 2. Voice alert. 	<div style="border: 1px solid black; background-color: lightgreen; padding: 5px; display: inline-block;"> <p>!86C !80C 55C 50C</p> </div> <div style="display: flex; justify-content: space-around; margin-top: 10px;">   </div>
--	--

Alerts and No Signal Accept














<p>If the tire pressure is below 75% and the Receiver have not accepted any signal from tire more than 20~25 minutes , then LCD Display will show “???” or “!XXP” with LED light blinking.</p>	<div style="border: 1px solid black; background-color: lightgreen; padding: 5px; display: inline-block; margin-bottom: 10px;"> <p>??? ??? ??? ???</p> </div> <div style="border: 1px solid black; background-color: lightgreen; padding: 5px; display: inline-block;"> <p>31P !20P 30P 30P</p> </div>
--	---





<p>If the tire temperature is above 85 and Receiver have not accepted any signal from tire more than 20~25 minutes, then LCD Display will show “???” and “!86C” with LED alarming light blinking.</p>	<table border="1"> <tr> <td>???</td> <td>???</td> </tr> <tr> <td>???</td> <td>???</td> </tr> </table> <table border="1"> <tr> <td>50C</td> <td>55C</td> </tr> <tr> <td>!86C</td> <td>57C</td> </tr> </table>	???	???	???	???	50C	55C	!86C	57C
???	???								
???	???								
50C	55C								
!86C	57C								
<p>If tire/s temperature is/are above 85 and tire/s pressure is/are below 75% , then the receiver have not accepted any signal from tire more than 20~25 minutes , then LCD Display will show “???” and “!86C” with LED alarming light blinking.</p>	<table border="1"> <tr> <td>???</td> <td>???</td> </tr> <tr> <td>???</td> <td>???</td> </tr> </table> <table border="1"> <tr> <td>33P</td> <td>!20P</td> </tr> <tr> <td>32P</td> <td>30P</td> </tr> </table>	???	???	???	???	33P	!20P	32P	30P
???	???								
???	???								
33P	!20P								
32P	30P								

No Signal Accept

<p>If the Receiver doesn't accept any signal from tire , then LCD Display will show “???”.</p>	<table border="1"> <tr> <td>??</td> <td>??</td> </tr> <tr> <td>??</td> <td>??</td> </tr> </table>	??	??	??	??				
??	??								
??	??								
<p>If the Receiver has not accepted any signal from tire more than 20~25 minutes , then LCD Display will show “???”.</p>	<table border="1"> <tr> <td>???</td> <td>???</td> </tr> <tr> <td>???</td> <td>???</td> </tr> </table>	???	???	???	???				
???	???								
???	???								
<p>If the Receiver doesn' t accept any signal more than 20~25 minutes during driving , then LCD Display will show “???” with tire pressure.</p>	<table border="1"> <tr> <td>???</td> <td>???</td> </tr> <tr> <td>???</td> <td>???</td> </tr> </table> <table border="1"> <tr> <td>33P</td> <td>33P</td> </tr> <tr> <td>32P</td> <td>30P</td> </tr> </table>	???	???	???	???	33P	33P	32P	30P
???	???								
???	???								
33P	33P								
32P	30P								

Setup Function








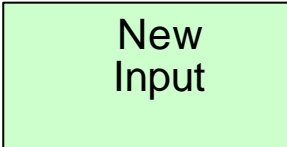


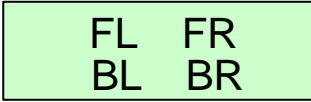



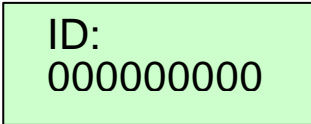

<p>Press  to setup Pressure Limit</p>	<p>1. Receiver will go into setup mode. 2. LCD Display will show :</p> <div data-bbox="608 360 922 461" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>Pressure Limit</p> </div> <p>3. Press  or  button to setup pressure limit</p> <div data-bbox="608 568 922 669" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>23</p> </div> <p>4. Press  button to conform setup value 5. Press  button again to exit setup mode</p>
<p>Press  to setup Temperature Limit</p>	<p>1. Press  button ; Receiver will go into setup mode. 2. LCD Display will show :</p> <div data-bbox="608 1039 922 1140" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>Temp Limit</p> </div> <p>3. Press  or  button to setup temperature limit,</p> <div data-bbox="608 1346 922 1447" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>85</p> </div> <p>4. Press  button to conform setup value. 5. Press  button again to exit setup mode.</p>
<p>Reset</p>	<p>1. Press  button, 2. Choose Reset and Press  button,</p> <div data-bbox="608 1861 922 1962" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>Reset</p> </div> <div data-bbox="943 1861 1257 1962" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center; margin-left: 20px;"> <p>OK</p> </div> <p>3. All the limit will be “0”.</p>

<p>Default (check the limit)</p>	<p>1. Press  button,</p> <p>2. Choose Default and Press  button,</p> <div data-bbox="608 331 922 450" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; display: inline-block; margin-right: 10px;">Default</div> <div data-bbox="943 331 1283 450" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; display: inline-block;">Pre=23 Temp=85</div> <p>3. Press  button,</p> <div data-bbox="624 555 938 651" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; display: inline-block;">OK</div>
<p>EXIT</p>	<p>1. Choose EXIT and Press  button,</p> <div data-bbox="608 797 922 893" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; display: inline-block;">EXIT</div>




Special Setup

This procedure will be implemented by qualified person,

Special Setup Function

<p>Enter special setup function</p>	<ol style="list-style-type: none"> 1. Press  and  button for more than 5 seconds. 2. The LCD Display will shall show :  3. Press  or  button to choose special function. 4. Press  button to accept the special function. 5. Press  will cancel the setup.
<p>Choose the tire for set-up new ID input</p>	<ol style="list-style-type: none"> 1. Choose "New Input".  2. Press  or  button to choose the tire for setup.  3. Press  button and use  or  button to choose number. 4. The ID number will show as the label of transmitter.  4. After input 9 ID number, Press  button to

	<p>check all the ID number. If there is no any error message , press ☀ to confirm.</p> <div data-bbox="608 338 922 439" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 5px;"> <p>00000000 0</p> </div> <div data-bbox="608 472 922 595" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px;"> <p>OK</p> </div>
<p>Choose the tire for New ID Shake setup</p>	<p>1. Choose "New Shake"</p> <div data-bbox="608 678 922 779" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 5px;"> <p>New Shake</p> </div> <p>2. Press 🌡 or 🌐 button to choose the tire for setup and press ☀ button.</p> <div data-bbox="608 954 922 1055" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 5px;"> <p>FL FR BL BR</p> </div> <p>3. LCD Display will show "Waiting".</p> <div data-bbox="608 1149 922 1249" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 5px;"> <p>Waiting</p> </div> <p>4. Shake the Transmitter ; let the Receiver accept the signal of Transmitter. LCD Display will show the Transmitter ID.</p> <div data-bbox="608 1435 922 1536" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; margin-bottom: 5px;"> <p>01234567 8 ID OK</p> </div> <p>5. If ID number is same as the one onto Transmitter label , Press ☀ button to accept this ID number.</p> <p>6. If ID number can' t be accept , the LCD Display will show :</p> <div data-bbox="608 1865 922 1966" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px;"> <p>ID ERROR</p> </div>

	<p>7. Please shake Transmitter again.</p>
<p>Choose "Running Set ID" for New ID setup</p>	<p>1. Choose "Running Set ID" and press  button,</p> <div data-bbox="608 405 922 506" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>Running Set ID</p> </div> <p>3. LCD Display will show :</p> <div data-bbox="639 598 954 698" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>FL FR BL BR</p> </div> <p>4. If the Receiver accept the signal of Transmitter , LCD Display will show the pressure of Transmitter.</p> <div data-bbox="608 884 946 985" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>33P 33P 32P 30P</p> </div> <p>5. Press  button to accept those ID numbers.</p> <p>6. If some ID numbers of tires can't be accept , then LCD will show " FL,FR,RL,RR".</p> <div data-bbox="608 1220 922 1321" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>33P FR RL 30P</p> </div> <p>7. Please wait for 5 minutes and do the operation again. .</p>
<p>EXIT</p>	<p>1. Choose EXIT and Press  button,</p> <div data-bbox="608 1556 922 1657" style="border: 1px solid black; background-color: #e0ffe0; padding: 5px; text-align: center;"> <p>EXIT</p> </div>

Technical Specifications

Transmitter

➤ Operation Condition

Description	Value	Accuracy	Units
Pressure Range	0 ~ 90	+/- 1	PSI
Operating temperature	-20 ~ +125	+/- 2	
	-4 ~ +257	+/- 3	
Operating Humidity	0 ~ 100		%

➤ Radio Frequency Transmitter

Description	Value	Units
Central Frequency	433.92	MHz
Frequency Stability	+/- 3~5	KHz
Transmission duration	0.4	Second

➤ General Specification

Description	Value	Units
Sensor sample rate	6	Second
Sampling data transfer	5~10	Minute
Alerting delay	0.4	Second
Weight	39	Gram

➤ Power Condition

Description	Type	Value	Unit
Power source	Lithium Battery	3	Vdc
Battery life		5000	Driving Hours

Digital Receiver

➤ Operation Condition

Description	Value	Units
Operating temperature	-20 ~ +60	
	-4 ~ +140	
Storage Temperature	-40 ~ +85	
	-40 ~ +185	
Operation Voltage	9 ~ 16	Vdc

➤ Radio Frequency Receiver

Description	Value	Units
Central Frequency	433.92	MHz
Frequency Stability	+/- 20	KHz

➤ Power Consumption

Description	Average	Unit
Power Consumption	25	mA