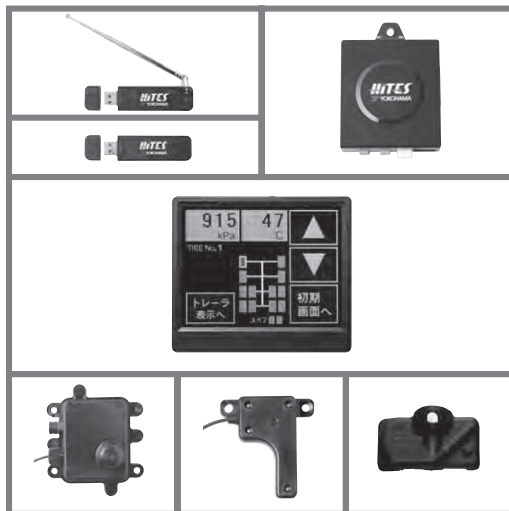




Tire pressure monitoring system for trucks and buses

Instruction manual



Introduction

Thank you very much for purchasing our Tire Pressure Monitoring System “HiTES”. HiTES is a system for indicating tire air pressure and air temperature which are indispensable for maximum exertion of tire performances. The HiTES consists of a Sensor unit, a Receiver, a Receiving antenna, and a Display *, and the data detected by the Sensor unit which is mounted on tire rim are displayed on the Display near driver's seat via the Receiving antenna and the Receiver. The Display installed near driver's seat tells the driver a state of tire air pressure by means of changes of figure, sound and color. Since tire air pressure can be confirmed in real time, labor of air pressure inspection before travel can be greatly saved, and grasp of correct data and automatic recording are made possible, which is different from conventional inspection method using man power. This book mainly describes methods of mounting, operation, failure indication and recovery to be noted when using this product.

*A logger (exclusive memory) is necessary for recording data and loading data into PC.

*Supported OS: Windows

(Windows is a registered trade mark or trade mark of Microsoft Corporation, USA in USA and other countries.)

1. Requests concerning this book

- (1) Read this book carefully before use to use this product correctly.
Use by erroneous handling may cause malfunction, failure and accident.
- (2) After finishing reading this book, store it with care at an easily accessible place.
- (3) Partial or total reproduction without permission is prohibited.
- (4) Contact our Tire Customer Service Office for inquiry concerning content of this book.

2. Precautions concerning this product

- (1) The HiTES is a system for the purpose of improving convenience in pre-start-up inspection, etc., in management of states of tire air pressure and air temperature, but does not guarantee states of tire air pressure and air temperature. Responsibility for management of states of tire air pressure and air temperature is solely ascribed to the user. Inspect tires at least once a month using other instruments.
- (2) Since this product utilizes radio data transfer, radio data may not be received depending upon tire position and environmental conditions. In such a case, tire air pressure and air temperature may not be indicated normally on the indicator.
- (3) Specifications of the HiTES are set for Japan, USA, Canada and Thailand. It cannot be used in foreign countries because frequency zones allowed to use are different in foreign countries because of difference of laws concerning electric wave.
- (4) Since the HiTES is for monitoring values of tire air pressure and air temperature, users are asked to manage safety of tires by themselves.

4. Concerning exemption from responsibility on this product

Please note that our company cannot take responsibility for damages suffered by the user or the third party due to erroneous use of the HiTES.

For safety in use (Be sure to read)

"Be sure to follow for safety in use" of HiTES

This book is for safe and correct use of this product, and for prevention in advance of harm and damages which may be suffered by users and workers of mounting this product. Meanings of indications and picture signs are shown below.

 Danger	 Warning	 Caution
Level of harm that may cause death or heavy injury of the user due to erroneous handling and has high degree of urgency is indicated.	Level of harm by which death or heavy injury of the user is estimated due to erroneous handling is indicated.	Level of harm and damage by which injury of the user or occurrence of physical harm and damage are estimated due to erroneous handling is indicated.

Meanings of picture signs	
 Caution	The signs shown by  indicate that there are items of warning or precaution. Pictures in the signs indicate concrete precautions.
 Prohibition	The signs shown by  indicate prohibited actions. Pictures in the signs indicate concrete prohibited items.
 Direction	The signs shown by  indicate contents to be necessarily followed. Pictures in the signs indicate concrete direction items.

Cautions in mounting work (for those who carry out mounting work)

 **Danger**

●Concerning handling of tires, comply with precautions of tire assembly. Handling error may cause rupture or damage of tires.

 Warning	
 Direction	●Works such as mounting of this product, wiring, installation, rim assembly, rim disassembly, valve replacement and tire air pressure filling shall necessarily be carried out by those who received training of mounting work according to procedures of the instruction manual. Negligence of them may cause failure of this product. ●Valves are different depending upon rims. Be sure to use exclusive valve of same model as specified by the maker. Use of wrong valve may cause accident and failure due to contact with vehicle such as breaks. If model of valve is unknown, ask the rim maker. ●Before mounting valve, clean seat surface well to remove dust. Use with dust adhered may cause air leakage. ●Tighten and fix valve nut with specified torque. Air leakage due to valve loosening or valve failure due to excessive tightening may occur. Refer to ETRTO standards or TR standards for details of tightening torque of valves.
 Prohibition	●This product cannot be used for tube-type tires. The tube and the sensor unit may be damaged.
 Electrification	●When installing receiver, indicator and cable, avoid places where operation may be disturbed and where there are much dust, water, humidity steam and oil smoke. Accidents, electrification, fire or failure may be caused. Mount it confirming the position with no problem when safety apparatuses such as air-bag operate. Unpredicted accident may
 Fire precaution	
 Disconnect power source	●When fixing wiring and instruments to vehicles, in connecting to power source system (battery in particular), sufficiently confirm safety conditions around instruments. Unpredicted accidents, electrification and fire may be caused.
 Electrification	
 Fire precaution	
 Disconnect power source	
 Electrification	●This product contains many fine instruments. Avoid applying impact and strong vibration to, and opening, disassembling, modifying and processing of this product. Electrification, fire and failure may be caused. Further, our company will not take responsibility for any events such as failures and accidents caused by them. Contact the sales agent from which this product is purchased for maintenance and inspection of this product.
 Fire precaution	
 No wetting	●Avoid adhesion of humidity (liquid, etc.) to this product. Water may enter in this product and cause failure, damage, etc. due to electrification or fire caused by electric leakage.
 Electrification	

 Warning	
 No wet hand	●Avoid handling this product with contaminated or wet hands. Electrification, failure or damage may be caused.
 Electrification	●Avoid applying excessive force to the instrument when fixing it to a vehicle. Application of excessive force may generate strain in the instrument to reduce water-proof capability causing fire and damage.
	●The liquid crystal panel of the indicator will be cracked by applying impact by hitting, etc. causing fire and injury. Never apply impact to

 Caution	
 No wetting	●Comply with precautions for tire assembly. Confirm there is no foreign matter nor water inside tire at the time of rim assembly. Remove them if any. Further, carry out periodical drainage of compressor to prevent water from entering inside tire surface. Use of this product with foreign matters or water inside tire surface may cause failure of this product. Damage of tire or instability of tire air pressure may also occur. ●Install receiving antenna, repeater and sensor unit at places specified by the instruction manual and by the procedure and with metal fittings that are specified by the instruction manual. Installation by erroneous handling may result in insufficient receiving sensitivity and cause failure in indication of correct data or cause damage. ●Be sure to mount this product under absence of static electricity. Work under presence of static electricity may cause damage of this product. ●Refer to JIS D4207 for handling and specifications of valve. ●Refer to JIS D4211 for handling and specifications of valve core. ●Apply appropriate amount of non-water-soluble grease on valve seat surface of rim before mounting valve. ●O-ring of valve deteriorates by using. Replace it together with valve once a year or at the time of tire replacement. ●When fixing the apparatus to vehicle, avoid applying excessive force. Applying excessive force will generate strain to the instrument, reduce water-proofing capability and cause fire or damage. ●After fixing valve, confirm that there is no leakage of air from where rim is fixed or from valve core.
 Direction	
 Disconnect power source	●At the time of removing or wiring of this product, be sure to disconnect power source by withdrawing power source connector of the receiver. Work after fully confirming safety conditions around instruments, or damage of this product and electrification may occur. ●Avoid adhesion of water or liquid on this product. Infiltration of liquid inside this product may cause electric leakage resulting in electrification, fire and damage of this product.
 Electrification	

Use precautions (for those who actually use this product)

 Warning		 Caution	
 Direction	●Do not operate or closely watch the indicator during driving. Traffic accident may be caused due to front carelessness. Be sure to stop at a safe place, and carry out operation or confirmation. When yellow or red indication appears on the indicator during travel, it is recommended to stop vehicle at a safe place and take routine measures appropriate to your travel procedure. ●When abnormal noise or vibration from tires or instruments is sensed during travel, quickly stop at a safe place, and inspect tires, vehicle, wiring of this product, etc. Even if there is no abnormality in appearance, contact the sales agent from which the vehicle was purchased.	 Disconnect power source	●Sensor unit is a consumable item. Replace sensor unit with a new one within about 3 years from start of use. Continued use will result in failure of transmission of signals from the sensor unit and of indication of tire air pressure and air temperature inside tire. Until replacing sensor unit with new one, confirm air pressure of the relevant tire with air gauge, etc.
 Fire precaution	●If abnormality such as heat, smoke, abnormal odor or abnormal sound from the instruments occurs by chance, since ignition may occur, immediately disconnect power source connector of the main body of the instrument to stop using this product, and contact the sales agent from which the vehicle was purchased.	 Electrification	●In the occasion of release or transfer of the instruments, be sure to disconnect power source connector of the receiver to turn power source off. Failure, electrification or fire may be caused. Work fully confirming safety conditions around the place.
 Disconnect power source	●This product contains many fine instruments. Avoid applying impact and strong vibration to, and opening, disassembling, modifying and processing of this product. Electrification, fire and failure may be caused. Further, our company will not take responsibility for any events such as failures and accidents caused by them. Contact the sales agent from which this product was purchased for maintenance and inspection of this product.	 Fire precaution	
 Electrification		 Prohibition	●When disconnecting cables from instruments, do not pull the cables and be sure to hold the roots to draw them out. Damaging cables may cause exposure of cores or disconnection resulting in electrification and fire. ●Do not connect other cables and instruments than those specified by the instruction manual to connectors of the receiver and the indicator.
 Fire precaution	●Do not install instruments at places of direct sunlight or high temperature. The instrument may become hot inside and cause fire and malfunction.	 Electrification	
 Caution, hot		 Fire precaution	
 Fire precaution	●Avoid adhesion of humidity (liquid, etc.) to this product. Water may enter in this product and cause failure, damage, etc. due to electrification or fire caused by electric leakage.		●When other wireless instruments are used in the same vehicle or when there are other radio instruments in the peripheral environment, data of tire air pressure and air temperature inside tire may not be indicated correctly on the indicator because of jamming or interference of signals. ●When implementing high pressure washing, pay full attention to avoid hitting receiving antenna, repeater and cables with high pressure water. Otherwise damage may be caused. ●The valve contains consumables such as rubber and resin. Replace the valve when replacing tire. ●Be sure to fix valve cap. ●Although TFT color liquid crystal panel of the Display is produced by the technology of very high precision, some of the pixels may not be lit or may always be lit. There are also cases of occurrence of unevenness of colors and brightness depending upon viewing angle. Since both of the cases are not failures influencing action of liquid crystal monitor, please acknowledge them in advance. ●Display of fixed image or still image for a long time on the indicator may cause residual image or seizure in some cases. ●Display image is difficultly seen when screen is set at minimum brightness. Adjust brightness with Display setting menu to fit use environment. ●Just in case when Display screen is damaged and liquid crystal (liquid) leaks, do not touch liquid crystal. Skin irritation may occur. When it adheres to skin or clothes, immediately wash them with clean water. ●Do not leave Display on dash board with its TFT color liquid crystal panel surface up. (Storage temperature range: -20°C to +70°C) Chemical reaction of liquid crystal panel will occur at lower or higher temperature, causing failure. ●Since TFT color liquid crystal screen of the Display is specially processed, touching screen will leave conspicuous finger print. Avoid touching with contaminated hand. ●Avoid pushing screen strongly. Liquid crystal screen may be cracked. ●Although image of Display may become dark, change slowly or become deteriorated in quality at low temperature, which does not mean failure. It turns normal when temperature rises. (Use temperature range: -10°C to +60°C)
 No wetting			
 Electrification			
 Fire precaution			
 No wet hand			
 Electrification	●Avoid handling this product with contaminated or wet hands. Electrification, failure or damage may be caused.		
 Prohibition		 Caution	
 Electrification			
 Fire precaution	●Avoid using this product with input voltage other than indicated power source voltage. Electrification, fire or damage may be caused. ●Do not hurt or process power source cable and indicator cable. Heavily loading, pulling, forcibly bending, twisting or heating will hurt cables resulting in electrification, fire and failure. ●Avoid insertion or dropping of foreign matters such as metals and flammable matters from opening. Electrification and fire may be caused.		
 Prohibition	●Avoid exposing this product to organic solvents such as alcohol and benzene, oils and chemicals. Discoloration and deformation may occur. ●Avoid putting things on or riding this product. Failure or damage may occur. ●Do not strongly push, scratch or put things on the liquid crystal screen of the Display. Unevenness of the screen and failure of liquid crystal panel may be caused. Damage of the panel may also occur causing electrification and fire.		

Precautions for storage

- Store under environment conditions within the range of specifications of this product, avoiding direct sunlight, rain, water, oils, heat source such as stove and places close to apparatuses which generate electric spark.
- Pay attention not to expose this product to organic solvents such as alcohol and benzine, oils and chemicals. Discoloration and deformation may occur. In case when contaminated, wipe contamination off carefully with dry cloth.
- Store sensor unit away from young children's hands. In case when swallowed, consult a medical doctor.
- Sensor unit utilizes battery as power source. Avoid storage more than a year after purchase. Storage for a long time will shorten use period of sensor unit.
- Prevent liquid crystal panel surface of Display from being hit by sharp or heavy materials. Panel may be damaged.
- Store valves, seals and valve cores avoiding direct sunlight, rain, water, oils, organic solvents, heat source, etc. Seal part of a valve is made of rubber and resin. They may be deteriorated by temperature and humidity. (Environment of no higher than 40°C of room temperature and no more than 30% of humidity is recommended.)

Method of disposal

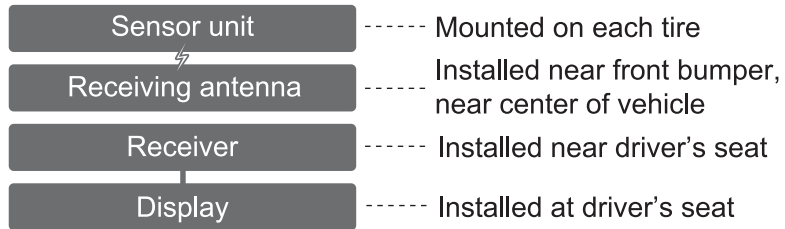
- Method of disposal of used instruments differs depending upon municipalities. Contact sales agency from which they were purchased.

C O N T E N T S

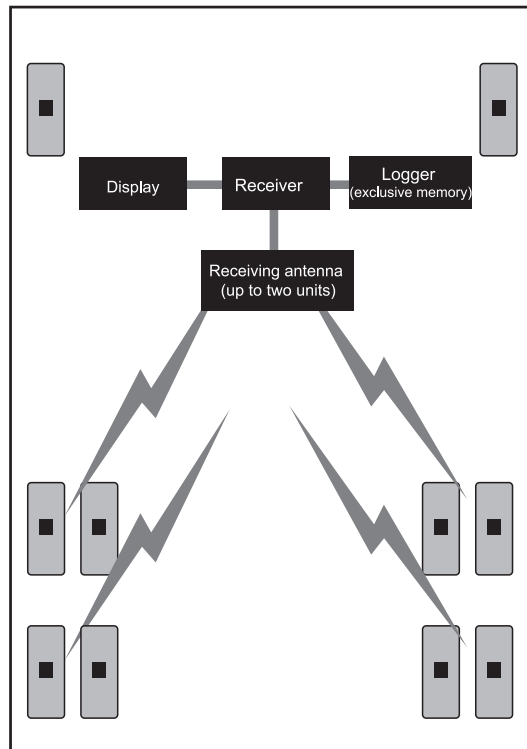


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1 **HiTES** Entire construction of HiTES



Example of construction of HiTES



Maximum 14 wheels

< **HiTES** mounting flow >

1. Mounting of receiving antenna

Receiving antenna are mounted at rear of front bumper, center of vehicle, etc. using bolts or cable tie.



2. Installation of Receiver and Display

Mount them where they do not interfere with driving and where there is no problem when safety apparatuses such as air-bag operate.

Examples of installation places

- Receiver: under assistant driver's seat
- Display: place where operation from driver's seat is possible

3. Laying and connection of receiving antenna cable

Receiving antenna cable is laid toward receiver inside cabin



Cable is pulled into cabin



4. Installation of Receiver and Display

Receiver and Display are installed in cabin where they do not interfere with vehicle operation and change of logger (exclusive memory) is possible.



5. Connection to receiver

Power source cable, Display, receiving antenna and each cable are connected to receiver.



6. Mounting of sensor unit

Record ID and position of sensor unit. Record or mark the position so that sensor ID can be found after tire assembly.



7. Rim assembly

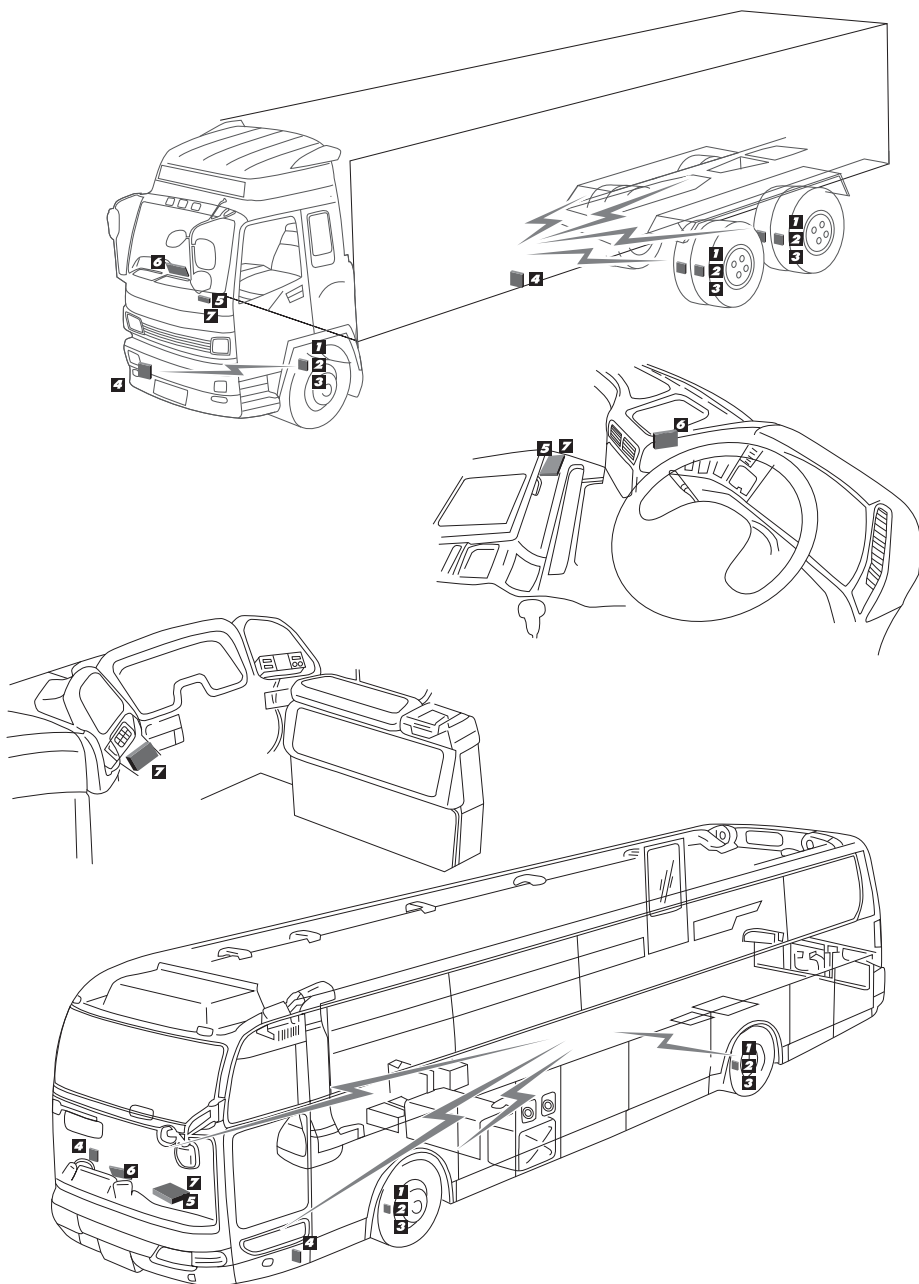
Tire is assembled to the rim on which sensor unit is mounted, and air is filled.



9. Performance confirmation

Power source is turned on and time, sensor ID, management values (in the case of single vehicle), etc. are set with Display. Whether tire air pressure and air temperature inside tire of each tire are correctly measured are confirmed.

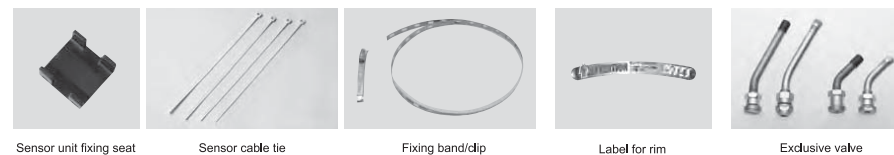




Tire air pressure monitoring system, **HITES**, consists of the following main parts.

1	 Sensor unit Sensor unit for new ISO	Sensor unit Tire pressure and air temperature inside tire are detected in real time, and the data are transmitted as wireless signals*. One sensor unit is mounted on each tire. *Within the range of domestic Radio Law (specified low power radio) Sensor unit can be fixed with attachment band in addition to method of fixing to exclusive valve. Sensor unit for new ISO is an exclusive sensor corresponding to iron rim of new ISO specification.
2		Attachment When fixing sensor unit for new ISO to iron rim of new ISO specifications, it is inserted between the sensor unit for new ISO and exclusive valve.
3		Exclusive fixing screw It is used for fixing sensor unit or sensor unit for new ISO to exclusive valve.
4		Receiving antenna (items with 5 m cable and 8 m cable) Signals from sensor unit are received. It is installed near front bumper and near center of vehicle. * Receiving antenna of 8 m has blue identification color at connector part.
5		Receiver It transmits information received from sensor unit via receiving antenna to Display. Data can also be recorded by using logger (exclusive memory).
6		Display Data of tire air pressure and air temperature inside tire of each tire collected in receiver are indicated. Data of each tire are indicated by color change and informed to driver. In the case of truck (single vehicle), setting operation of various parameters is also carried out.
7		Logger (Exclusive memory) It is inserted in receiver, and records data of tire air pressure, air temperature inside tire, tire position, time, etc. The data recorded in logger (exclusive memory) are read in by connecting it to PC. * Supported OS: Windows

* Specifications of this product may be changed without advance notice.



Sensor unit fixing seat

Sensor cable tie

Fixing band/clip

Label for rim

Exclusive valve

Confirm if following content is all set.

(Table below shows a representative list of combination of mounting. Figures in the table do not include quantity of spare tires.)

No.	Name	Quantity								Remarks	Check
		Six wired light truck	Six wheels of motor coach	Eight wheels of motor coach	Twelve wheels of motor coach	Twelve wheels of motor coach	Eight wheels of motor coach	Eight wheels of motor coach	Two wheels only of trailer		
1	Sensor unit	6	6	8	10	12	14	2		Shapes of ones for iron rim of new ISO specifications and for other rim are different.	
2	Exclusive valve	6	6	8	10	12	14	2		Shapes of ones for iron rim of new ISO specifications and for other rim are different.	
3	Exclusive fixing screw	6	6	8	10	12	14	2		Change to exclusive valve of the same model as the one normally mounted on rim is necessary. Sensor unit cannot be mounted on other valves than exclusive valve. If model of valve is not known, ask rim maker.	
4	Attachment	6	6	8	10	12	14	2		When mounting it to iron rim of new ISO specifications, mount it between sensor unit for new ISO and exclusive valve.	
5	Sensor unit fixing seat	6	6	8	10	12	14	2		For fixing sensor unit	
6	Sensor cable tie	24	24	38	40	48	56	8		For fixing sensor unit. (Spare item for changing is included.) Since this is an exclusive part, do not use ones that are commercially available. For fixing sensor unit. (Spare item for changing is included.) Since this is an exclusive part, do not use ones that are commercially available.	
7	Fixing band/clip	6	6	8	10	12	14	2		For fixing seat. Size of fixing band differs depending upon rim size. Confirm if the fixing bands included in the package fit rim size. Since this is an exclusive part, do not use ones that are commercially available.	
8	HITES check sheet	2	2	2	2	2	2	2		It is necessary for confirmation of position of tire for mounting sensor unit. Use the sheet attached at the end of this book. In the case of shortage, copy it.	
9	Label for rim	1	1	1	1	1	2	2		For indication of sensor unit mounting position	
10	Receiving antenna (5m)	1	0	1	1	1	1	0		—	
11	Receiving antenna (8m)	0	2	1	1	1	1	0		There is blue marker at connector part.	
12	Receiver(including power source cable)	1	1	1	1	1	1	0		Cigarette-socket-type power source cable is included. DC12-24V for receiver.	
13	Display	1	1	1	1	1	1	0		—	
14	Logger (exclusive memory)	1	1	1	1	1	1	1		It is connected to receiver and memorizes such data as tire air pressure and air temperature inside tire. Data in the logger is read into PC by means of included exclusive application CD-ROM. * Supported OS: Windows	

Items to be prepared by customer before mounting

	Name	Content
1	Double-sided tape for fixing vehicle-mounted instruments	For fixing receiver and indicator Prepare one for inside cabin. One utilizing hook and loop fastener is recommended.
2	Weather resistant tie lap	For fixing wiring Weather-proof type
3	Hooks for wiring	For fixing wiring
		
4	Hexagon socket head bolts, nuts, flat washers, spring washers	Hexagon socket head bolts, nuts, φ6 flat washers, spring washers (Prepare when receiving antenna and repeater are fixed with bolts and spring washers)
5	Tools	Prepare torque driver or torque wrench, nipper, pliers, driver, etc. as needed. Positions where tightening and confirmation are required: · Sensor unit is fixed with fixing band: tightening torque of fixing band/clip 2.5±0.5N·m · Sensor unit is fixed to exclusive valve: tightening torque of exclusive fixing screw 5.0N/m±1.0N/m Valve fixing Follow torque specified by each rim maker.
6	Brackets	For fixing receiving antenna and repeater Prepare them as needed when mounting receiving antenna or repeater in vehicle. (Refer to dimensional drawing on page 7 to prepare brackets that fit the vehicle.)
7	One-touch power source, etc.	For fuse box connection It is used as needed when power source is taken from fuse box. * Select flat-type fuse of same capacity as one presently used. * Replace pipe fuse (fuse of this product side) with one having capacity of 2A to use. (No need if power source is taken from cigarette socket)
		
8	Wiring connector	For power source wiring connection It relays between electric wires. It is used as needed when power source is taken from fuse box.
		
9	Corrugated tube	For wiring receiving antenna cable

5 **HiTES** Explanation of functions of HiTES Display

5.1. Functions of Display

It indicates tire air pressure and air temperature inside tire detected by sensor unit mounted on each tire and tire position. Detected data are compared with two preset management values, and when they are out of ranges of management values, the lamp at the tire position blinks, and the conditions are shown by figures and change of background color. Detected data can be stored in logger. Data in the logger can be read into PC.

Setting when new sensor is mounted and information updating when tire rotation is implemented, for example, can be carried out.

Touch panel is adopted for the indicator. Various operations can be performed by pushing buttons on the screen shown in each display.

*Be sure to operate and confirm indicator while vehicle is parked.

5.2. Concerning language selection

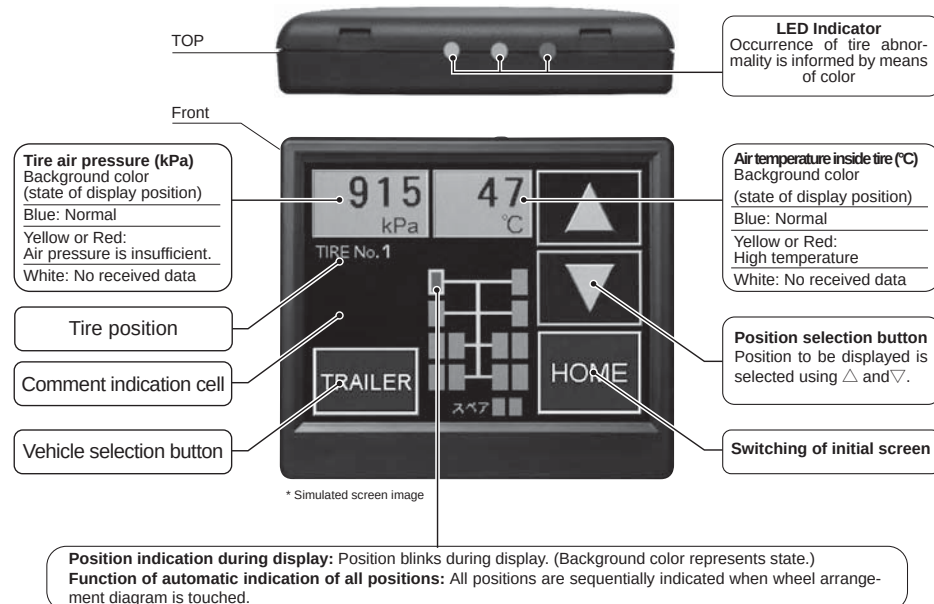


Language selection screen is displayed only at initial start. Select either Japanese or English.

* Language can be selected from setting menu.

5.3. Explanation of parts of Display

Air pressure display screen



Initial screen

