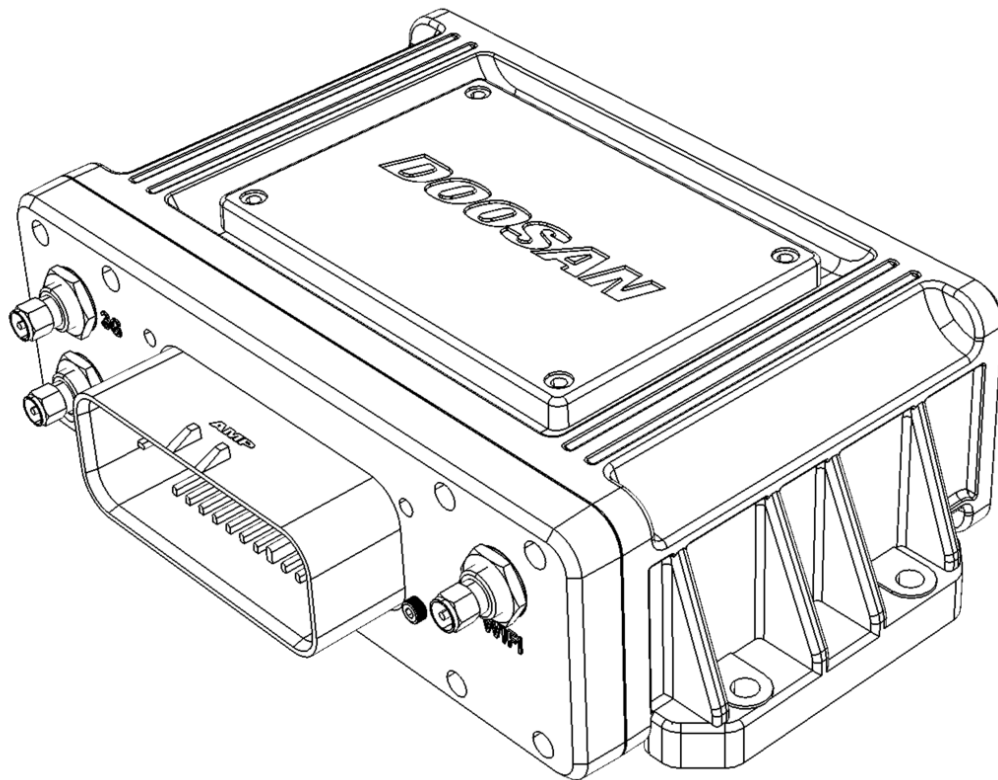


# DTM-01

## USER'S GUIDE



## Revision History

Revision	Issue Date	Author	Scope
1.0	2018/11/16	Ahn.H.W	Initial Release



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# 1 Warnings for safety operation

This is to protect your safety and property. Please read this manual carefully before using.

## ■ Operational Environment

- The operating voltage of this products is between 9Vdc and 34Vdc. Please use the specified operating volgage.
- Use within the specified temperature range.
- This product is specialized for industrial vehicles.

## ■ Insallation Precaustions

- Insallation and wiring require professional skills. Be sure to install it with the help of a propeSSIONAL. Incorrect insallation and wiring can cuase the fire or malfuncation.
- When installing the product, install it so that it does not inferfere with the operation of safety devices such as airbags and brake levers...etc.
- Insall in a location free from moisture. It may cuase damage or accidents if it is installed in places where water or rain is splashed or dusty.
- When wiring, be sure to check the position of pipes, tanks, electric wiring, etc., and pay special attention to avoid interference or contact.
- Use specified cables and components.
- Be careful not to fall down when installing in a place where the ceiling and vibration of the vehicle are severe.
- Do not block the vent or heat sink. It may cause the fire.
- Protect the wire tube by winding the insulation tape around the area where the wire is in contact with the metal part. It can cause the fire or electric shock.

## ■ Important Safety Precautions

- Do not operate the device by manually during the vehicle operation. It can cuase the accidents.
- Any modification of this product is prohibited and will void your warranty. Any use of the product or its components for purposes not expressly authorized by this document is prohibited and will void your warranty.
- Allow only authorized personnel to service the unit. Unauthorized service can invalidate the warranty.

## 2 Introduction

The DTM-01 is a product to the Doosan Lin-Q system. This product is an IoT(Internet of Things) terminal that can be used anywhere in the world by using 3G communication networks or WIFI communication networks.

User can access the Lin-Q system and this product after registration in on the Lin-Q homepage or by contacting the administrator.

Below is the Lin-Q system diagram.

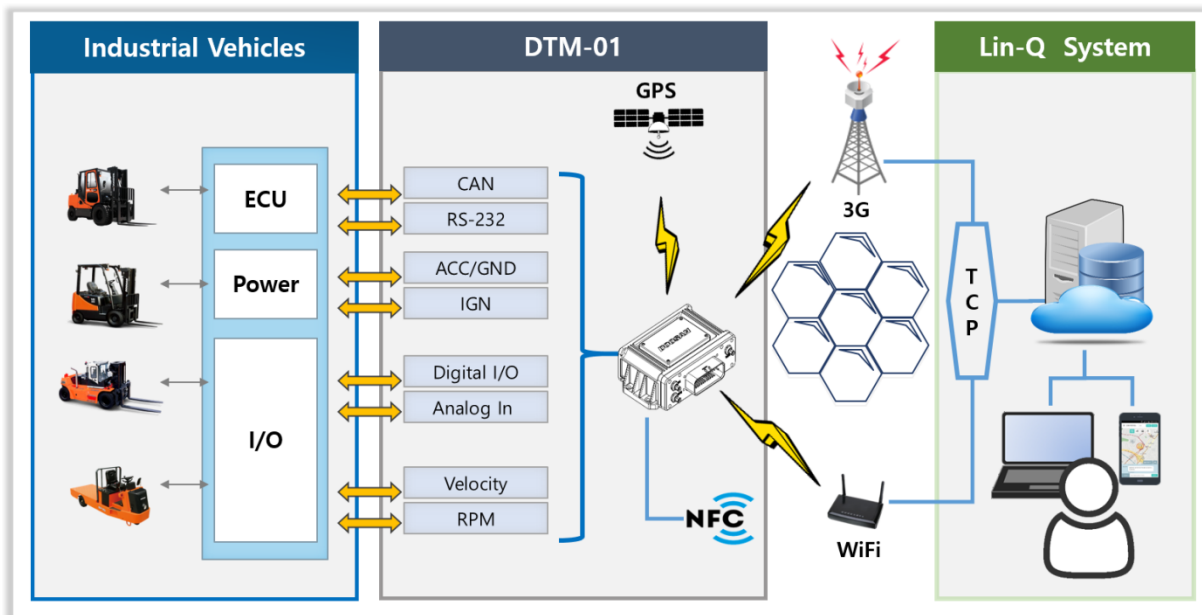
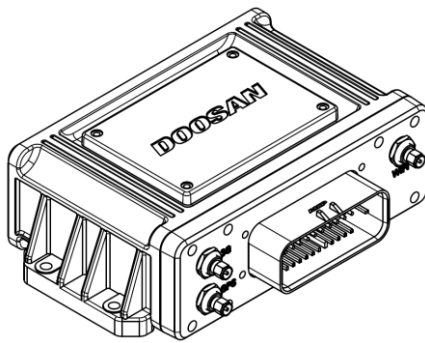


Figure 1 Lin-Q System

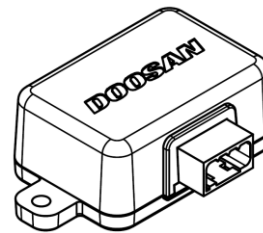
## 3 Overview

### 3.1 Components

DTM-01 is composed of the following components. It is required that separate harness cable assembly for the connection with the vehicle.



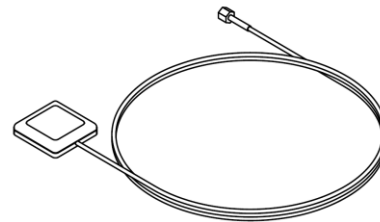
**DTM-01**



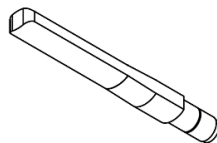
**Shock Sensor Module**



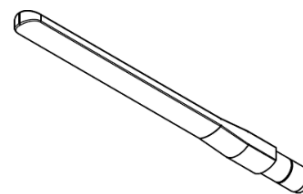
**Internal Battery**



**GPS Antenna**



**WIFI Antenna**



**3G Antenna**

**Figure 2 Package Component**

## 3.2 Connection Diagram

Below figure shows the terminal connection diagram.

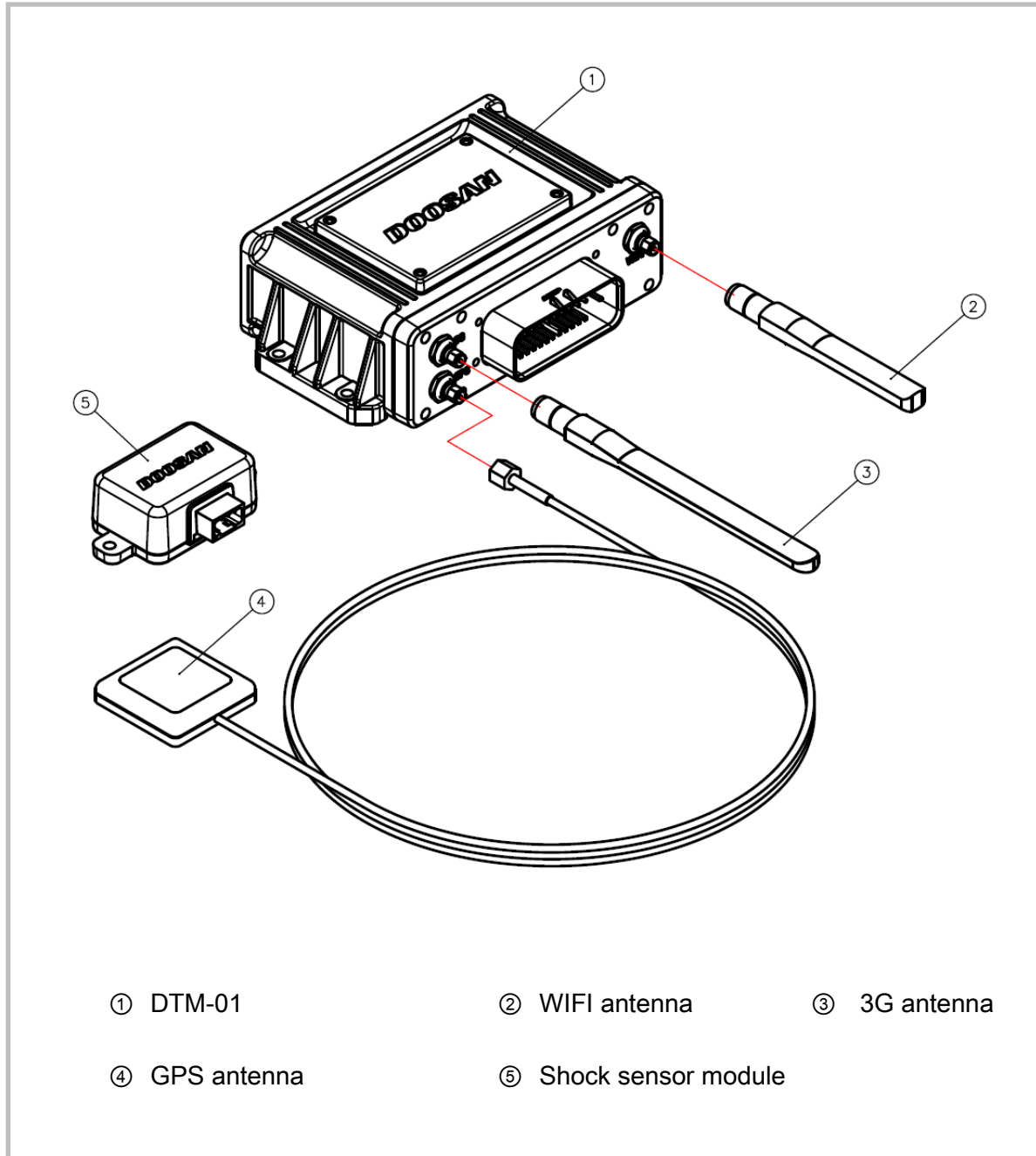


Figure 3 Connection Diagram



## 3.3 Features

- Dual communication mode
  - ✓ WIFI mode
  - ✓ 3G mode
- Optimized functions for industrial vehicles
- CAN data collection function
- Various sensor data collection function of vehicle
- Periodic transmission function for collected data
- Non periodic event data transfer function
- Driver limitation function using NFC
- Shock detection function
- Firmware over the air function.
- Remote limitation function (will be updated)
  - ✓ Speed limitation / Driver limitation / Torque limitation / RPM limitation
- Various I/O ports
  - ✓ 4 Digital Input
  - ✓ 5 Digital Output
  - ✓ 8 Analog Input
  - ✓ CAN
  - ✓ 2 UART

## 4 Hardware Descriptions

### 4.1 DTM-01

The name of each part of the terminal is as follows.

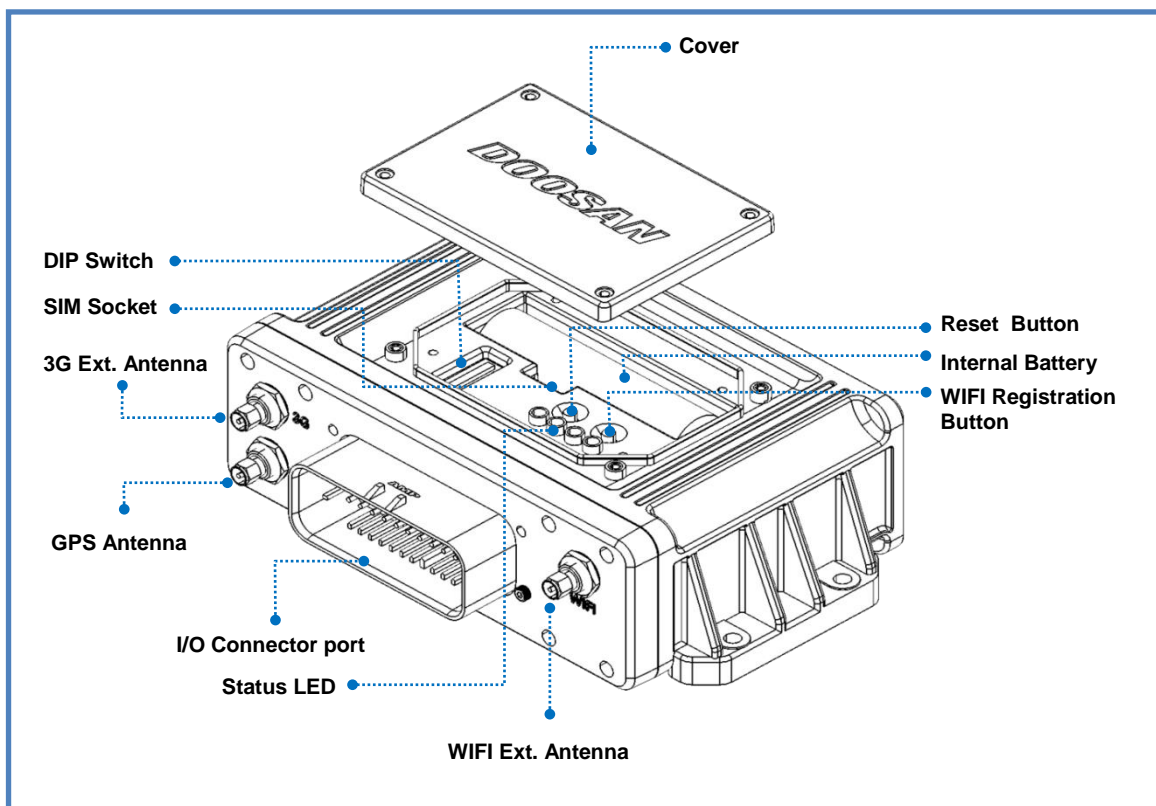


Figure 4 DTM-01 Terminal

The following table shows the specifications of each parts.

Parts	Functions	Description
I/O Connector	Connector that connect with vehicle	35 pins
WIFI Ext. Antenna	WIFI external antenna connection port	SMA-Female
3G Ext. Antenna	3G external antenna connection port	SMA-Female®
GPS Antenna	GPS antenna connection port	SMA-Female
Internal Battery	Internal Battery	Li-Ion, 3000 mAh
WIFI Registration Button	WIFI access point Registration button	
SIM Socket	3G SIM card socket	Micro SIM

Status LED	Represent the terminal status	4 LEDs
Cover	Terminal upper cover	
Reset Button	Terminal is re-booting when the button is pressed	
DIP Switch	It's for developer. No allowed to general user.	
Frequency Range	2412 MHz~2462 MHz	WIFI
	826.4 MHz ~ 846.6 MHz	WCDMA B5
	1559 MHz ~1610 MHz	GPS L1

**Table 1 Descriptions for each parts of DTM-01**

Detailed descriptions for each parts are as follows.

## 4.1.1 Status LED

DTM-01 displays the status of the terminal with LED.

The LED is composed of four, and the status of the terminal according to the color is shown in the following table.

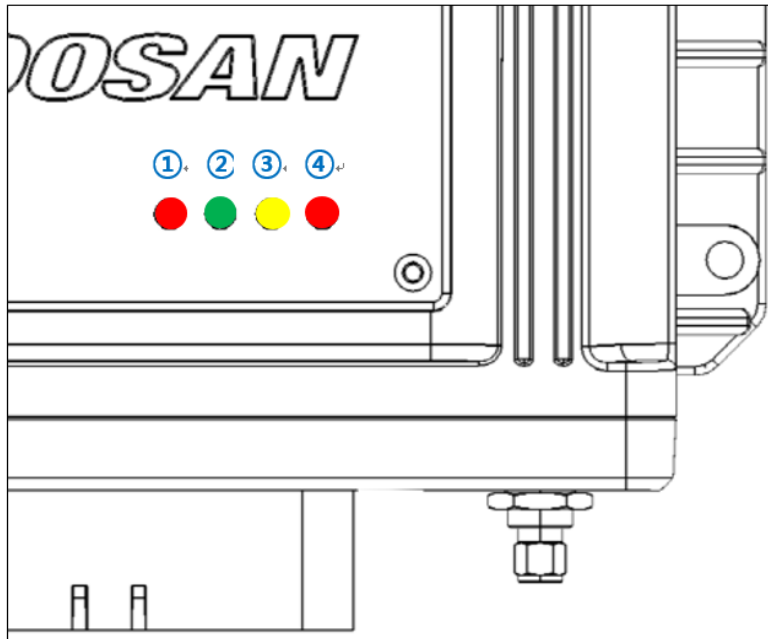


Figure 5 Status LED

No.	Item	Color	Status	Description	
①	POWER	Red	Power status	Off	• Power Off
				On	• Power On
②	3G	Green	3G communication status	Off	• Network is not connected
				On	• Network is successfully connected
				Blinking	• On transmitting the data
③	WIFI	Yellow	WIFI Communication Status	Off	• WiFi network is not connected
				On	• WiFi network is successfully connected
				Blinking	• On transmitting the data or setting
④	GPS	Red	GPS Status	Off	• GPS is not fixed
				On	• GPS is 3D fix status

Table 2 Status LED

## 4.1.2 DIP Switch

There are 6 DIP switches. All switches are in off state by default. This switch is for developer.

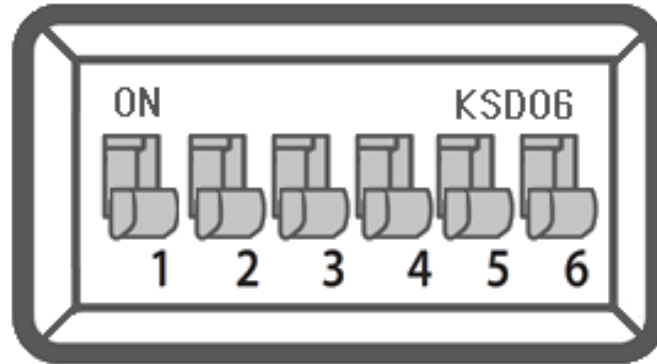


Figure 6 DIP Switch

## 4.1.3 SIM Socket

The micro SIM is adopted. When inserting the SIM card, be careful the direction of the SIM card.

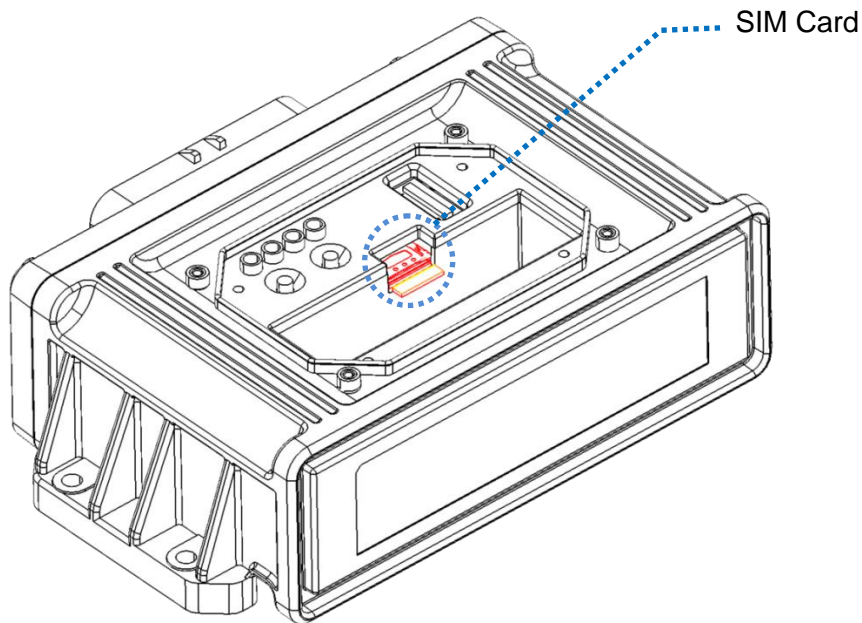


Figure 7 SIM Card Socket

## 4.1.4 WIFI Registration Button

It is a button used for registering with a wireless access point (AP) when the terminal is used in the WIFI mode.

For details on how to use it, refer to "WIFI Mode Operation" in the next chapter.

## 4.1.5 Reset Button

Terminal will be rebooted when this button is pressed.

## 4.2 WIFI Antenna

The terminal basically includes an internal antenna, but further provides an external antenna for use in a region where the signal is weak.

Below is the shape of the WIFI external antenna

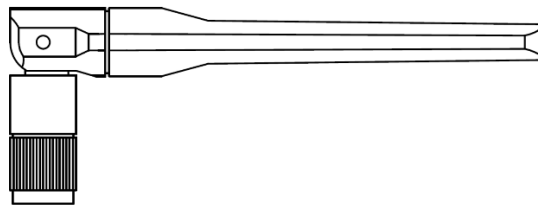


Figure 8 WIFI External Antenna

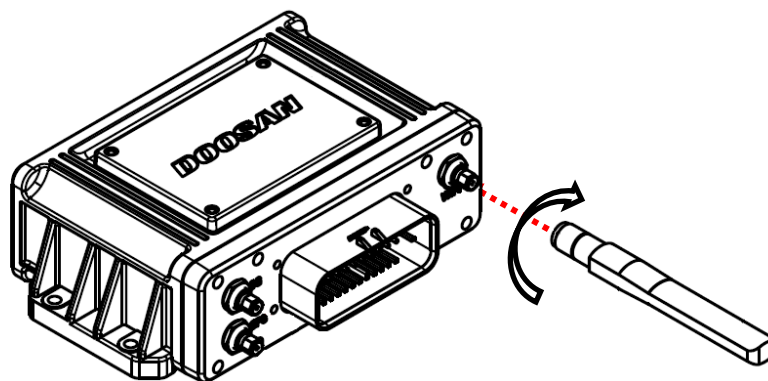


Figure 9 Connecting WIFI External Antenna

Tighten the external antenna to the WIFI port of the terminal so that it does not come loose.

The specifications of the WIFI external antenna are as follows.

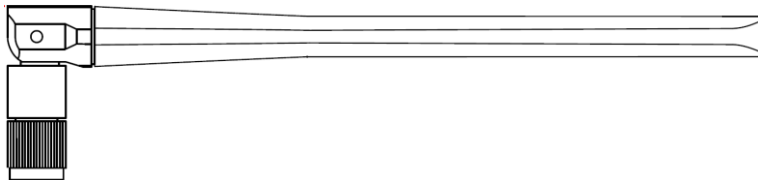
Item	Specification	Unit
Frequency	2400 ~ 2500	MHz
VSWR	< 2.0 : 1	
Gain	2	dBi
Polarization	Vertical	
Impedance	50	$\Omega$
Size	12 x 100 x 6.5	mm

**Table 3 WIFI External Antenna Specifications**

## 4.3 3G Antenna

The terminal basically includes an internal antenna, but further provides an external antenna for use in weak signal area.

Below is the shape of the 3G external antenna



**Figure 1 0 3G External Antenna**

Tighten the antenna to the 3G port of the terminal so that it does not come loose.

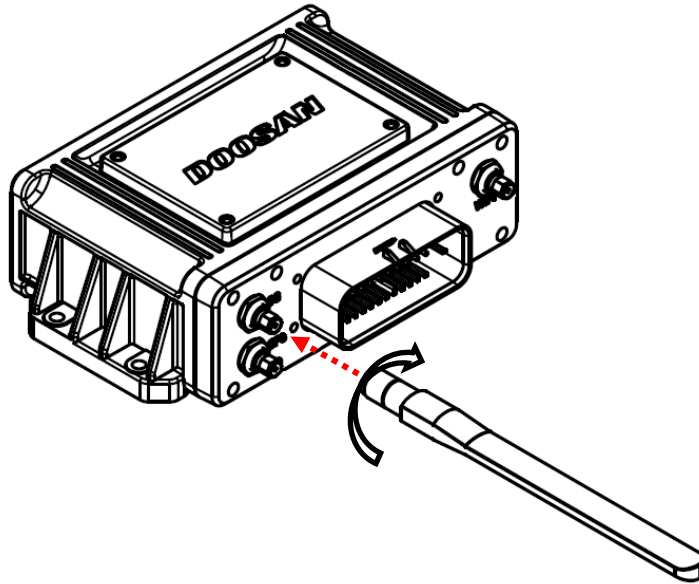


Figure 1 1 Connecting 3G External Antenna

The specifications are as follows.

Item	Specification	Unit
Frequency	824 ~ 960 1500 ~ 2170 2300 ~ 2700	MHz
VSWR	< 3.0 : 1	
Gain	0.4dBi @ 824 ~ 960 MHz 1.9dBi @ 1500 ~ 2170 MHz 2.6dBi @ 2300 ~ 2700 MHz	dBi
Polarization	Vertical	
Impedance	50	$\Omega$
Size	150 x 10 x 12.2	mm

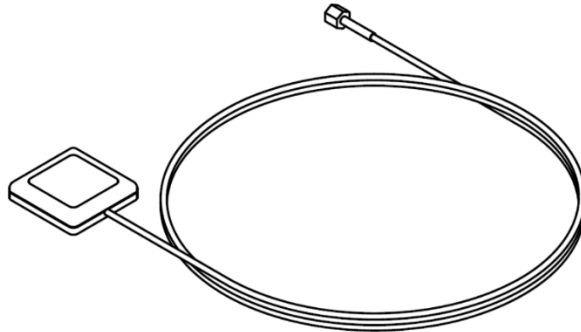
Table 4 3G External Antenna Specification



## 4.4 GPS Antenna

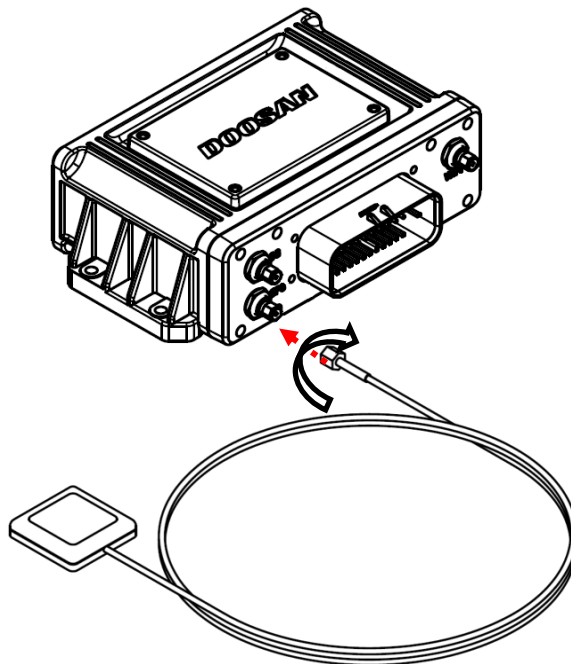
It is an antenna for GPS signal reception. The GPS antenna should be installed in a clear view of the sky.

Below is the shape of the GPS antenna.



**Figure 1 2 GPS Antenna**

Tighten the antenna to the GPS port of the terminal so that it does not come loose.



**Figure 1 3 Connecting GPS Antenna**

## 4.5 Shock Sensor Module

The shock sensor module is installed on the vehicle via harness cable ass'y from the I/O port of the DTM-01. The shock sensor module must be installed in accordance with the prescribed regulations. Do not change the installation direction of the module arbitrary.

Below picture is the shape of the shock sensor module.

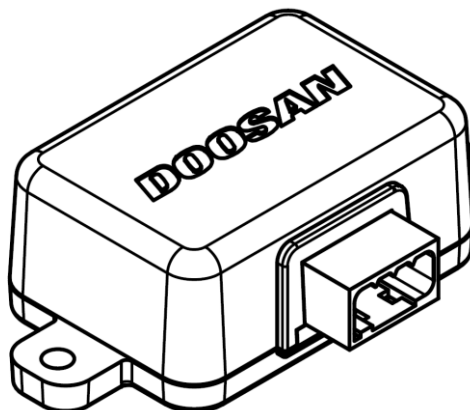


Figure 1 4 Shock Sensor Module

## 4.6 Internal Battery

The terminal has a built-in battery and the main specifications are as follows.

- Li-Ion , 3000 mAh
- 18mm(D) x 65mm(L)
- Discharging Temperature: -20°C ~ +70°C

The below figure shows how to connect the battery terminals.

Plug the battery terminal  
into the housing of DTM-  
01

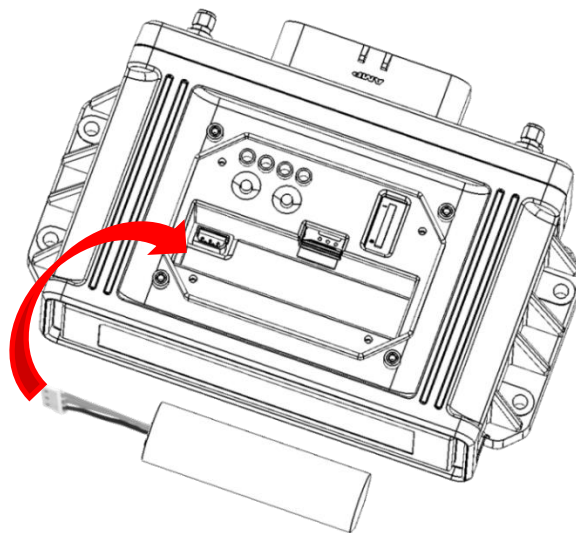


Figure 1 5 Battery Connecting



**Battery may explode, please handle with care.**

**Do not short the battery terminals.**

**Do not put the battery in the fire. There are risk of explosion.**

**Risk of explosion if battery is replaced by an incorrect type.**

**Dispose of used batteries according to the instructions.**

---

## 5 How To Use

Be sure to read the following instructions before using.

### 5.1 User Registration

User registration is required to use this product.

In order to registration, please contact to your sales office or visit the ["https:// lin-q.doosan-iv.com"](https://lin-q.doosan-iv.com).

For more detailed information, please refer to the Lin-Q user's guide.

### 5.2 3G Mode Operation

In order to operate the terminal in 3G mode, it must be subscribed to 3G communication service and have a USIM card.

In general, The SIM card is preinstalled to the DTM-01 from the factory. To activate your SIM card, please contact your dealer or customer service center.

### 5.3 WIFI Mode Operation

WIFI may not be able to transmit data in real time due to limit of communication distance. Automatically transmit collected data when the vehicle is close to the WIFI communication range.

To operate in WIFI mode, the WIFI access point must be installed and connect the terminal to the WIFI access point in the following order.

The following items are required to connect a WIFI access point.

- Things to prepare
  - ① DTM-01 terminal
  - ② Wireless WIFI access point
  - ③ Smart phone or PC

### 5.3.1 How to connect

In order to connect WIFI access point, Please follow the steps below.

- ① Remove the DTM-01 terminal top cover.
- ② Apply power to the terminal
- ③ Press the WIFI registration button for more than 3 seconds.

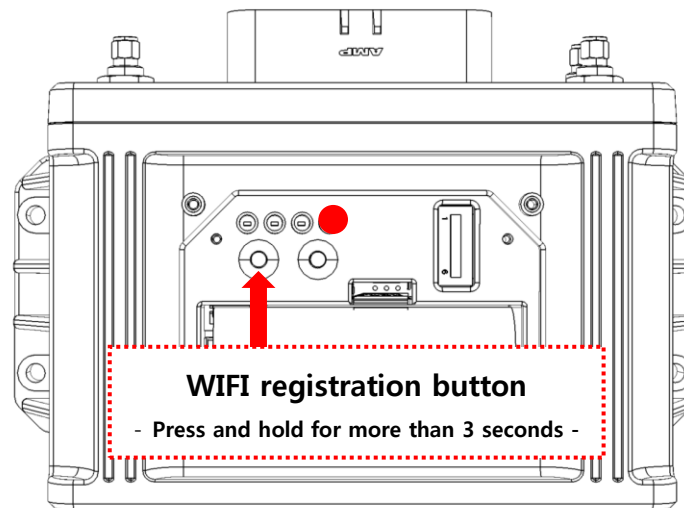
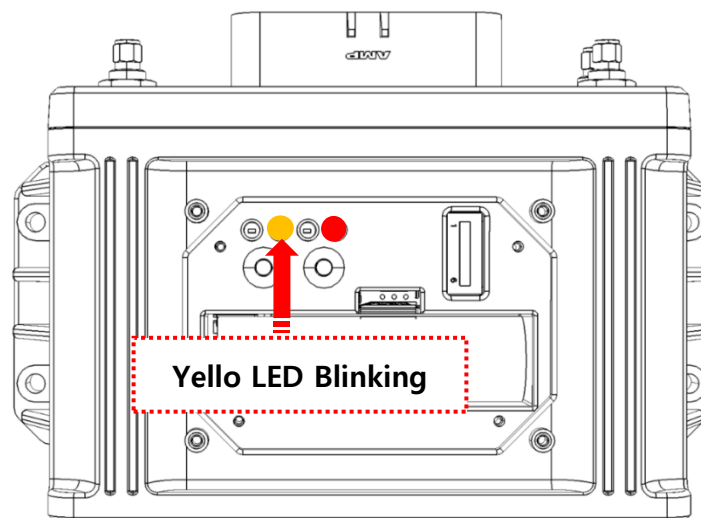


Figure 1 6 WIFI Registration 1



- ④ Yellow LED will blink when entering WIFI access point registration mode.

Figure 1 7 WIFI Registration 2

- ⑤ Search for WIFI using smartphone or PC.
- ⑥ Please check if “ZentriOS” is found in the list. .



Figure 1 8 WIFI Searching



Figure 1 9 Insert WIFI Password

- ⑦ Click on “ZentriOS” and enter your password. The password is "password"..

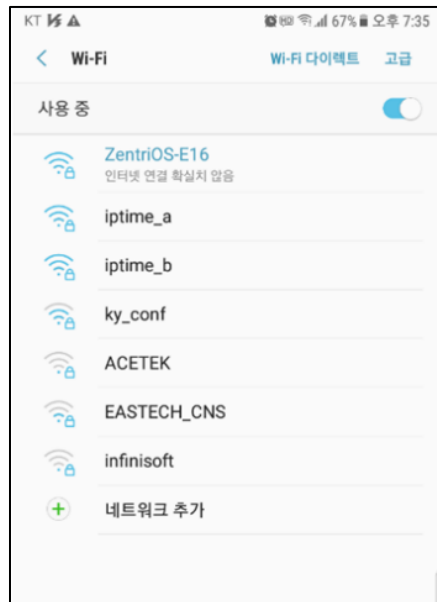


Figure 2 0 WIFI Activation

- ⑧ When the connection is completed, ZentriOS is activated as shown below.
- ⑨ Open a web browser on your smartphone or PC and enter "setup.com" in the address bar. Then, the available WIFI list is automatically searched as below

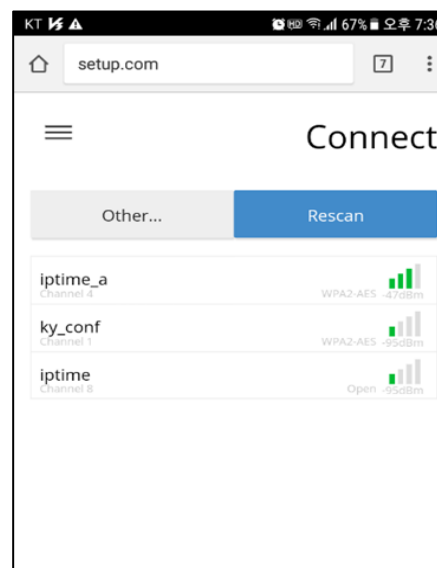


Figure 2 1 WIFI Set up



- ⑩ Click on the ID (SSID) of the WiFi you want to connect to, and type the WiFi password and then press the “Connect” button.

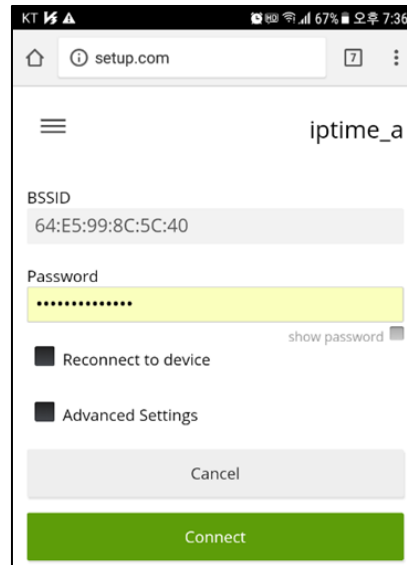


Figure 2 2 Connecting Access Point

- ⑪ If the connection is successful, "Setup is complete" message is displayed as shown below.

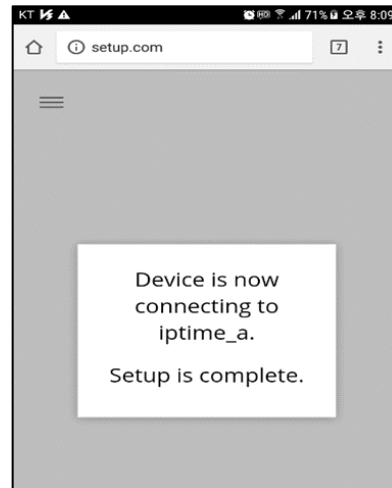


Figure 2 3 WIFI Set up Complete

- ⑫ Press the WiFi registration button again for 1 second. The blinking yellow LED will be turned off and the terminal will reboot automatically after saving the setting.

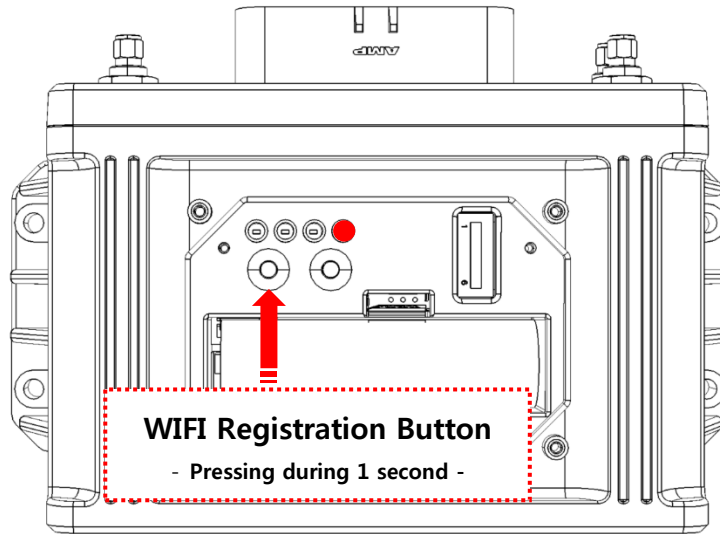


Figure 2 4 WIFI Set up Complete Button

- ⑬ The terminal is ready to transmit data in WIFI mode.

### 5.3.2 WIFI Manual Registration

- ① Open a web browser, type "setup.com" in the address bar, and press the "Other"

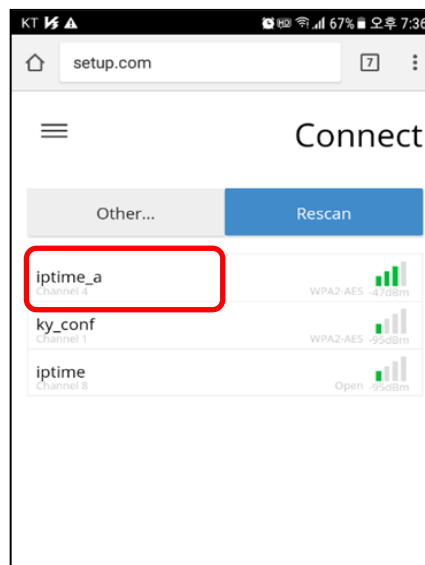
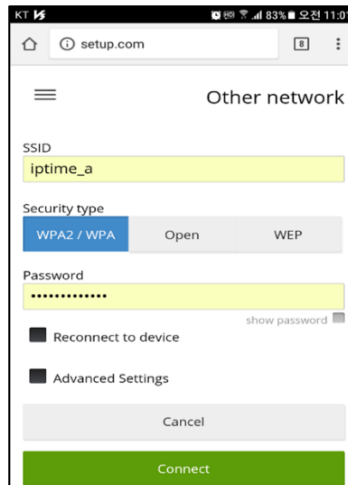


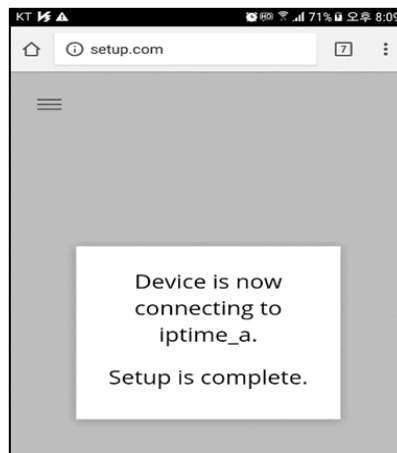
Figure 2 5 Manual Registration 1

button.



**Figure 2 6 Manual Registration 2**

- ② After pressing the “Other” button, below screen will be shown.
- ③ Select one security type among the WPA2 / WPA, Open, and WEP. Please put the SSID directly and type the password. If you select “Open”, enter only SSID and do not enter the password.
- ④ If the connection is successful, “Setup is complete” message is displayed as shown



**Figure 2 7 Manural Registration Complete**



bellows.

- ⑤ Press the WIFI registration button again for 1 second. The blinking yellow LED will be turned off and the terminal will reboot automatically after saving the setting.
- ⑥ The terminal is ready to transmit data in WIFI mode.

## 6 Limited Warranty

- This product is manufactured through strict quality control and inspection process.
- In the event of a malfunction in normal use by the customer, the Service Center will repair it free of charge during the warranty period (one year from the date of purchase).
- Even within the warranty period, the following cases will be charged for repair.
  - Fault caused by customer's negligence or carelessness
  - Failure due to fire, flood or natural disaster
  - Flaws caused by arbitrary modification and disassembly
  - If you want to purchase parts or consumables separately
  - Lost warranty card
- When repair is required, please provide a warranty card.
- Please note that the warranty will not be re-issued.

<b>Item</b>	<b>Lin-Q Terminal</b>	<b>Model</b>	<b>DTM-01</b>
<b>Serial No.</b>		<b>Date of Purchasing</b>	
<b>Where to Buy</b>			

## WARNING & SAFETY INFORMATION

### Safety Symbols



#### **Warning**

- When encountering this symbol in the manual, you must follow these recommendations to avoid irreparable damage to your car, system or connected devices or to avoid accidents with injuries or death.

### IC Information

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.

L'exploitation est autorisée aux deux conditions suivantes :

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

The antenna(s) used for this device must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet équipement doit être installé et utilisé avec un minimum de 20 cm de distance entre la source de rayonnement et votre corps.

### FCC Information

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 notification to users

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 when the equipment is operated in a commercial environment. 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, the user is encouraged to try to correct the interference by consulting with a dealer or an experienced technician for technical assistance.

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