

DC-20

USER'S GUIDE

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Revision History

Revision	Issue Date	Author	Scope
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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 Precautions

- 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 interfere 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.

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.

WARNING & SAFETY INFORMATION

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

2 Introduction

The DC-20 is a IoT(Internet of Things) terminal that can be used anywhere in the world by using LTE communication networks. DC-20 is connected to devices such as personal mobility.

Below is the DC-20 diagram.

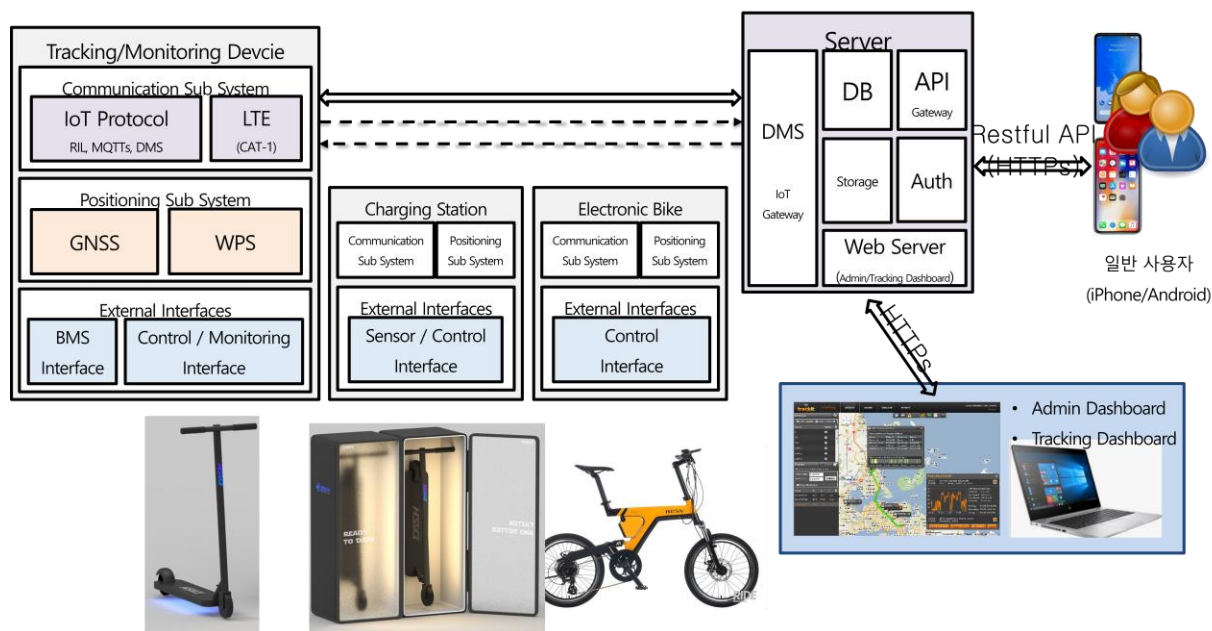


Figure 1 DC-20 System

3 Overview

3.1 Components

DC-20 is composed of the following components. It is required that separate harness cable assembly for the connection with the personal mobility.



Figure 2 DC-20 Terminal

3.3 Features

- LTE communication, support Global
- Optimized functions for personal mobility
- Various data collection function of personal mobility
- Periodic transmission function for collected data
- Non periodic event data transfer function
- Shock detection function
- Firmware over the air function.
- Remote limitation function
 - ✓ Speed limitation / Driver limitation
- Various I/O ports
 - ✓ 1 Digital Output
 - ✓ UART 2Port

4 Hardware Descriptions

4.1 DC-20

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

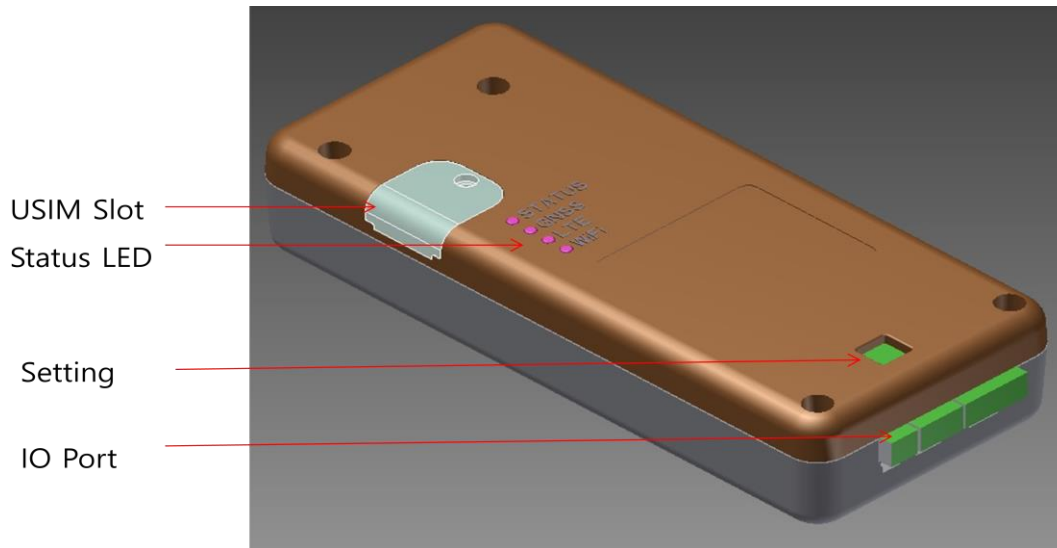


Figure 3 DC-20 Terminal

The following table shows the specifications of each parts.

Parts	Functions	Description
I/O Connector 6PIN	Connector that connect with personal mobility	6 pin
I/O Connector 4PIN	Connector that connect for devug	4 pin
I/O Connector 2PIN	Connector that connect with Buzzer	2 pin
Status LED	Represent the terminal status	4 LEDs

Table 1 Descriptions for each parts of DC-20

4.1.1 I/O Connector

4.1.2 2mm 6pin connector

PN	Pin Name	Pin Type	Comments
1	VDC	POWER	Output Volteage (4V)
2	MCU_RXD	Input	TTL Level RXD Signal(3.3V)

3	MCU_TXD	Output	TTL Level TXD Signal(3.3V)
4	KEY	Output	GPIO Output
5	GND	Power	Digital Ground
6	BAT	Power	Output Voltage(9~54V)

4.1.3 2mm 4pin connector

PN	Pin Name	Pin Type	Comments
1	DU_TXD	Output	TTL Level TXD Signal(3.3V)
2	DU_RXD	Input	TTL Level RXD Signal(3.3V)
3	GND	Power	Digital Ground
4	ID	Output	설정저항 Output

4.1.4 2mm 2pin connector

PN	Pin Name	Pin Type	Comments
1	SPK_OUTP	Output	TBD
2	SPK_OUTN	Output	TBD

4.1.5 Status LED

DC-20 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.

No.	Item	Color	Status		Description
①	POWER	Red	Power status	Off	• Power Off
				On	• Power On
②	GNSS	Green	GNSS status	Off	• GPS is not fixed
				On	• GPS is 3D fix status
③	LTE	Yellow	Communication Status	Off	• LTE network is not connected
				On	• LTE network is successfully connected
④	WiFi	Red	WiFi Status	Off	• WiFi Off
				On	• WiFi On

Table 2 Status LED

5 Specifications

5.1 DC-20

Item	Specification	
Size	55 x 127 x 24 [mm] [Unit: mm]	
Weight	118 grams	
Operating Temperature	-20°C ~ +60°C	
Storage Temperature	-30°C ~ +85°C	
Communication	LTE	LTE Data Modem(LTE Cat1)
	WIFI	WIFI Module (WPS only)
	BT	nRF52810, Bluetooth 5.0
GPS	Chipset	Ublox M8, GPS 1575.42Mhz
Operating Voltage	+9Vdc ~ +58.8Vdc	
I/O port	2mm pitch 6PIN 2mm pitch 4PIN 2mm pitch 2PIN	
SIM	MICORUSIM	
LED	4 LEDs	

Table 3 DC-20 Specifications

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.

Item	IoT terminal	Model	DC-20
Serial No.		Date of Purchasing	
Where to Buy			

FCC Regulations:

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.

This device 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 receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

RF Exposure Information

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.