VCU (Vehicle Control Unit) manual

2022 08 09

HYUNDAI KEFICO

▣ VCU

1. Overview
2. Support Functions
3. Communication Specifications
4. Control Specification
5. Installation Guide
6. Assemble Guide
7. Other Information

▣ VCU

1. Overview

- VCU (Vehicle Control Unit)

As an electric motorcycle (electric motorcycle) controller, it provides control functions such as lamp, warning it provides control functions such as lamp, warning sound, and vehicle lock, as well as general functions such as and vehicle lock, as well as general functions such as fault diagnosis and firmware update. By adding LTE/3G/BLE diagnosis and firmware update. By adding LTE/3G/BLE wireless function to the control function, it enables control function to the control function, it enables control services such as vehicle location information and theft. services such as vehicle location information and theft.

(Example: shared motorcycle control service such as delivery)

<Block Diagram>

2. Support Functions

Items			Support	Note
Housing	Design / Assembly		○	
HW	Block	Power	○	
		MCU	○	
		Gyro Sensor	○	
		Actuator Control	○	
		Analog/ Digital Input	○	
		Audio	○	
		H-bridge(Handlelock)	○	
		Seat Motor	○	
		CAN	○	
		Bluetooth	○	
		GPS	○	
		Modem	○	

항목			Support	Note
SW	Vehicle Control		○	
	Diagonosis		○	
	Calibration		○	
	EEPROM		○	
	Reprogramming		○	
	Communication	CAN	○	
		GPS	○	
		모뎀	○	
		BLE KeyFob	○	
		BLE	○	
	SW Verification		○	
Certific-ation	FCC/IC		○	

3. Communication Specifications

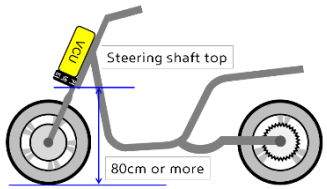
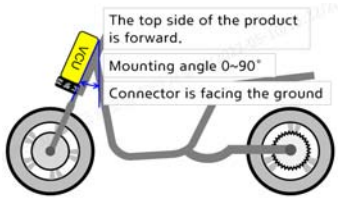
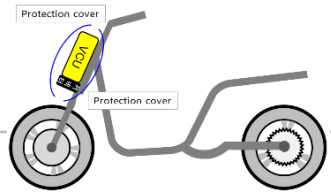
Items	Frequency	RF Functions	Note
Modem	LTE B12(B17), 26(B5), 4, 2, 7	Power : 23dBm	
	WCDMA B2, 4, 5	Power : 23dBm	
	GSM 850/1900	Power : 33dBm(GSM850) 30dBm(GSM1900)	
Bluetooth	BLE(2402~2480MHz)	LE 1M Power : 10dBm	
GPS	GPS/GNSS	Built-in Modem	

4. Control Specifications

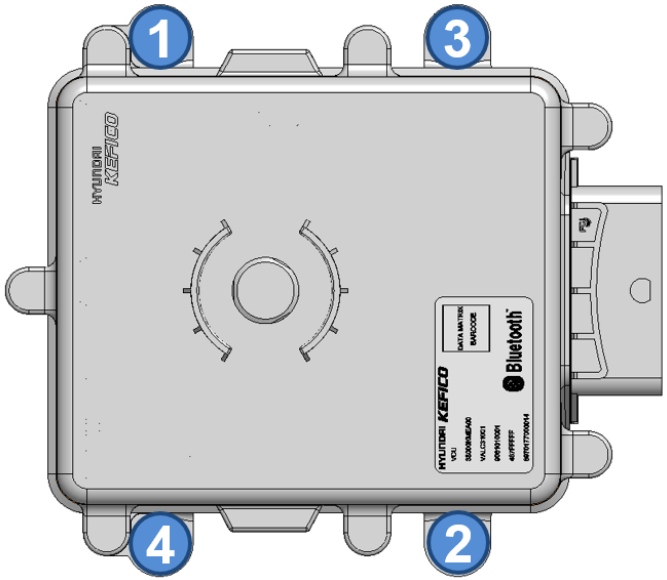
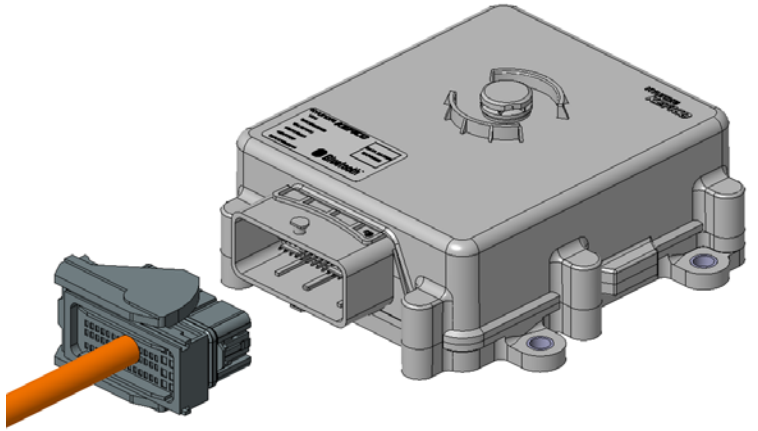
- VCU basically comprises the following groups: communication module (CAN, Bluetooth, Modem, GPS, G-communication module (CAN, Bluetooth, Modem, GPS, G-Sensor,
TPMS), and vehicle control module (I/O, Accessories, Driving information, Vehicle speed, Torque, Driving information, Vehicle speed, Torque, Regenerative
braking, etc

Item	Specifications
Vehicle Function Function Control	- BMS certification
	- Smart KeyFob user authentication through Bluetooth Low Energy (BLE) Bluetooth Low Energy (BLE)
	- Acceleration Pedal control
	- Forward/Reverse and required torque control control
	- Trip information (Trip) control : vehicle speed, mileage, driving time, energy consumption, etc. energy consumption, etc.
	- Vehicle operation control according to the status of Key ON/OFF/START status of Key ON/OFF/START
	- Regenerative braking control
	- Boost mode control
	- Function limit according to battery charging status charging status
	- Lamp module output control : Tail, Left/Right Turn Signal, Low/High Beam, Reverse, Warning Lamp m, Reverse, Warning Lamp
	- Handle lock solenoid control
	- Saddle open motor control
	- Driving sound speaker control
Communication	- Vehicle position check
	- Theft detection control

5. Installation Guide

Item	Appearance	Requirements	Effects on Non-compliance
Mounting ing Position ion		1) Product must be mounted at least 80c ted at least 80cm above the ground on the top side of the top side of the steering shaft.	1) Malfunction may occur in communication and GPS. communication and GPS.
Mounting ing Angle	 	1) Connector must face the ground. the ground. 2) Product top surface must be mounted i must be mounted in the forward direction. n. 3) Mounting angle must be in the range be in the range between 0 and 90 degrees. ees.	1) Malfunction may occur in communication and GPS. communication and GPS.
Protection ction		1) Product must be protected by applying ected by applying the proper protection cover. n cover. 2) The material of the protection cover protection cover must not interfere with the with the communication function. function.	1) Malfunction may occur in communication and GPS. communication and GPS. 2) Product may be damaged by external impact. external impact.

6. Assemble Guide

	Assemble the product in the vehicle vehicle		Assemble connector
1	 1) Assemble the product using M6 flange bolts for 4 points. flange bolts for 4 points. 2) Bolt assembly sequence must follow the image above. follow the image above.	2	 1) Insert the connector in the direction of the hook and direction of the hook and turn the locking lever until it clicks. it clicks.

※ Note 1) To prevent damage of harness, harness should not be under excessive tension. (bending minimize),
※ Note 2) Vehicle-side connectors and harnesses must ensure waterproof.

▣ Others

7. Other Information

- ✓ Provider : HYUNDAI KEFICO (102, Gosan-ro, Gunpo-si, Gyeonggi-do)
- ✓ Country of manufacture : Republic of Korea
- ✓ Manufacturer : ESSYS (55, Gaetbeol-ro, Yeonsu-gu, Incheon)
- ✓ A/S : HYUNDAI KEFICO (102, Gosan-ro, Gunpo-si, Gyeonggi-do)

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 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: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.
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.
The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.

IC Statement

This device complies with Industry Canada license-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 that may cause undesired operation of the device.
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.
This device should be installed and operated with minimum distance 20cm between the radiating element of this device and the user.
Cet appareil doit être installé et utilisé avec une distance minimale de 20 cm entre l'élément rayonnant de cet appareil et l'utilisateur.