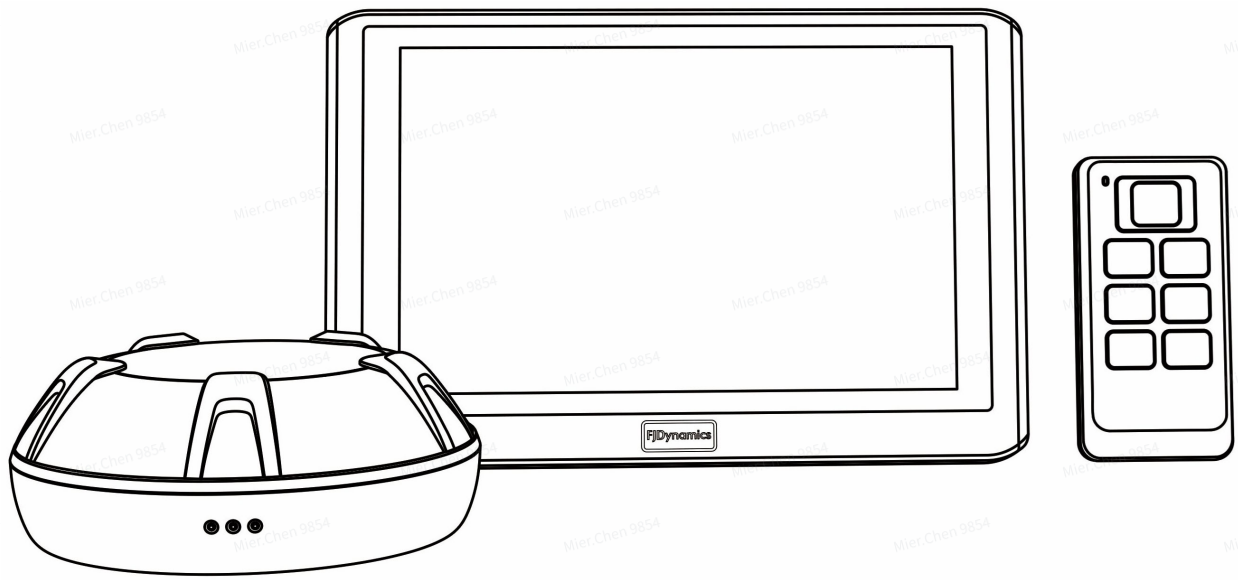
CN_AL02 Overseas Hardware Manual_FJD_V24.110.1

1. Product Introduction

The FJDynamics AL02 3D Land Leveling System features in high precision and high performance. It consists of a high-precision GNSS positioning device and a data communication device. It is widely applied to restoration of wasteland, land reclamation and leveling, conversion of slope cropland into terrace, paddy field leveling, dry land leveling, and other large-scale land leveling in precision agriculture. It can also be used for construction of water infrastructures, airports, and large stadiums.

The system consists of a control terminal, a high-precision GNSS positioning device, Easy Control, and wire harnesses. The control terminal uses the 3D land leveling system independently developed by FJDynamics.



2. Preparation Before Installation

2.1 Safety Instructions

Before installation, read this chapter carefully to avoid damage to people and equipment.

The following safety instructions cannot cover all possible dangerous situations.

2.1.1 Installation Safety

- Do not install and commission the equipment in environments with high temperature,heavy dust, harmful gases, flammables, explosives, electromagnetic interference (forexample, around large radar stations, transmitting stations, and substations), unstablevoltages, great vibration, and strong noise;
- Do not install the equipment in places where water is likely to accumulate, seep, drip, and condense; otherwise, the equipment ports could be damaged.

2.1.2 Disassembly Safety

- To avoid accidental damage, do not frequently disassemble the equipment after installation.
- Before disassembly, turn off all power supplies and disconnect the cable from the battery to prevent equipment damage.

2.1.3 Electrical Safety

- Electrical operations must be performed by qualified personnel in accordance with local laws and regulations.
- Carefully check for potential hazards in the work area (e.g., wet ground).
- Before installation, learn about the position of the emergency stop button. Use this button to cut off the power supply in case of accidents.
- Do not put the equipment in a humid place. Prevent liquids from entering the equipment.
- Stay away from radio transmitting stations, radar stations, high-frequency and largecurrent equipment, and other high-power radio equipment.
- Direct or indirect contact with high voltage or utility power may cause death.

2.1.4 Hydraulic Safety

- Check for leakage of high-pressure fluids. High-pressure fluids may penetrate the skin or eyes, causing serious injury, blindness, or even death.
- Do not use your hand to find the leak. Use a piece of cardboard or wood instead. Wear protective glasses to protect the eyes.
- If high-pressure fluids have penetrated your skin, consult a doctor immediately.
- Relieve the pressure before disassembling or assembling any hydraulic parts.
- Use proper containers to collect leaking fluids, and dispose of the wastes in accordance with local regulations. Clean the area to avoid slipping hazards.

2.2 Installation Requirements

To ensure the normal operation of the equipment, the installation site must meet the following requirements.

2.2.1 Installation Site

- Ensure that the installation position is firm enough to support the equipment and itsaccessories.
- Ensure that there is enough space to install the equipment at the installation position,without any obstruction or obstacle.

2.2.2 Temperature and Humidity

- The temperature and humidity of the working environment should be kept within a reasonable range to ensure the normal operation and service life of the equipment. Avoid high temperature and humidity. In summer, protect the control terminal from direct sunlight, and note that appropriate space must be maintained between the shelter and the control terminal.
- Do not operate the equipment for extended periods in environments that do not meet the required temperature and humidity standards, as this may lead to equipment damage.
- Operating the equipment in environments with excessively high relative humidity can cause poor insulation of insulating materials, and may even result in electrical leakage. It can also lead to mechanical property degradation and corrosion of metal components.
- Operating the equipment in environments with excessively low relative humidity may cause insulating materials to shrink and become brittle, increasing the risk of static discharge, which can damage internal circuitry.

2.2.3 Air

- Ensure that the contents of salt, acid, and sulfide in the air are within a reasonable range.Some hazardous substances will accelerate the rusting and corrosion of metals and theaging of parts. Keep the working environment free of harmful gases (for example, sulfurdioxide, hydrogen sulfide, nitrogen dioxide, and chlorine).

2.2.4 Power Supply

- Input voltage: The system supports a wide range of input voltage of 9 – 36 V DC.
- Generally, the input voltage of a tractor is 12 V DC or 24 V DC. Use a 12 V DC power supply, or use a DC-DC power cable to change the input voltage to 12 V.
- Ensure that the power line is connected properly to the positive and negative terminals of the battery. Keep wiring harnesses away from hot objects.

2.3 Installation Tools

Before installation, please prepare the following tools.

No.	tool	Specifications	Qty.	Function
1		PH0*75 small screwdriver	1	Install the SIM card and the connectors of the solenoid valve.
2	Allen key	2.5	1	Secure the radio antenna.
3		4	1	Mount the GNSS receiver to its bracket.
4	Open-end wrench	10	2	Install the radio antenna.
5		11	1	Secure the U-bolt of the vehicle display terminal.
6		12/14	2	Instal battery cables (bolt spec depends on model).
7		13/16	2	Install the solenoid valve bracket.
8		19	1	Fix the GNSS receiver and the Suckerbase.
9		27	2	Install transition and quick connectors.
10	Adjustable wrench	12”（300 ）	1	Install transition and quick connectors.
11	Tweezers	/	1	Assist with SIM card installation..
12	Ejector pin	/	1	Assist with SIM card installation..
13	Utility knife	/	1	Open the packaging box.
14	Scissors	/	1	Cut cable ties.
15	Tape measure	5 m	1	Measures certain parameters of the land leveler.

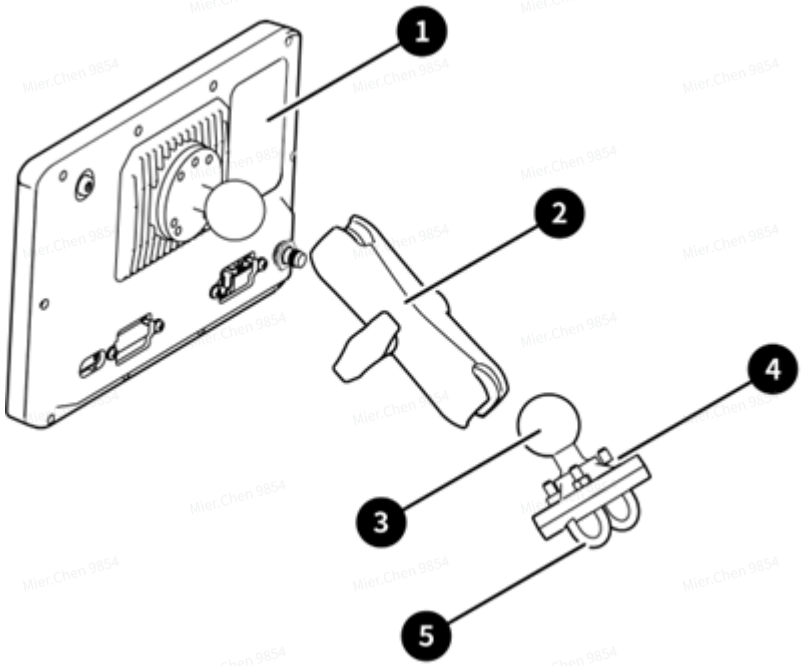
3. Installing the Land Leveler Kit

3.1 Installing the Control Terminal

3.1.1 Components

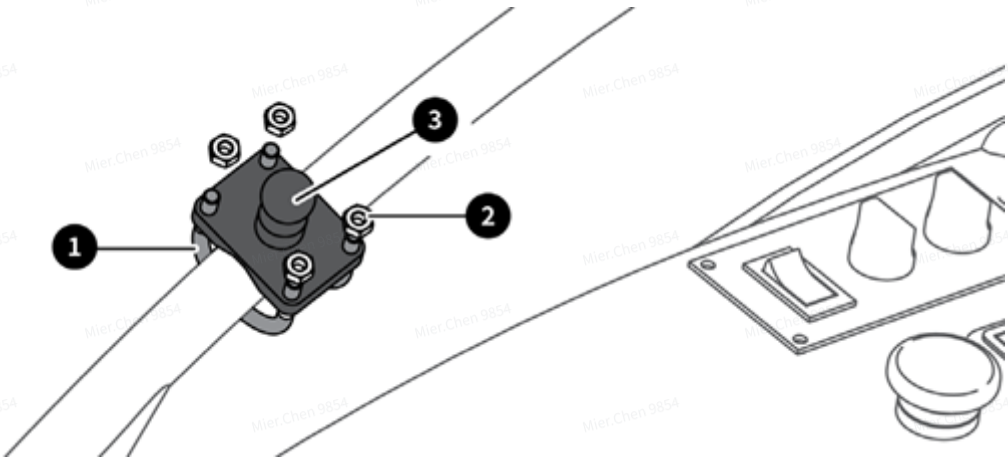
No.	Name	Qty.	Remarks
1	Control terminal	1	

2	Control terminal bracket	1	Provided together with the control terminal bracket
3	Control terminal mounting base	1	
4	Nut	4	
5	U-bolt	2	

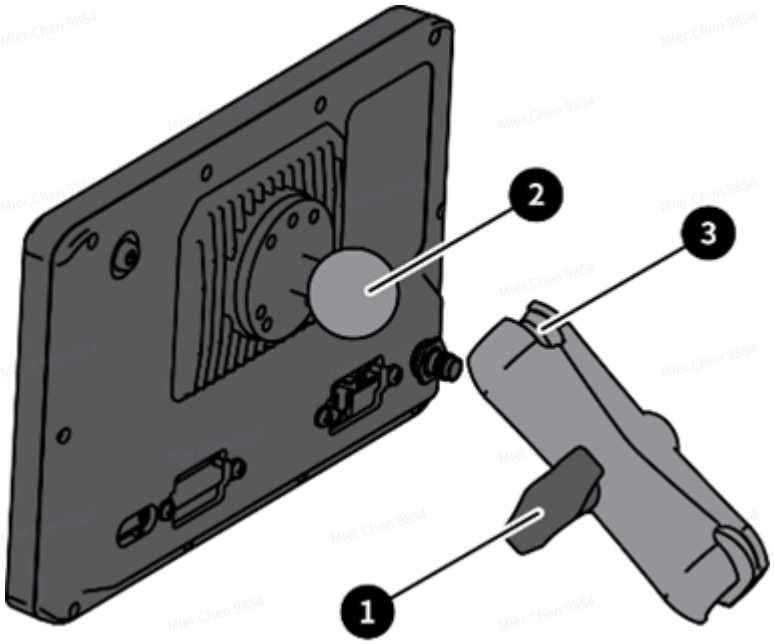


3.1.2 Installation Steps

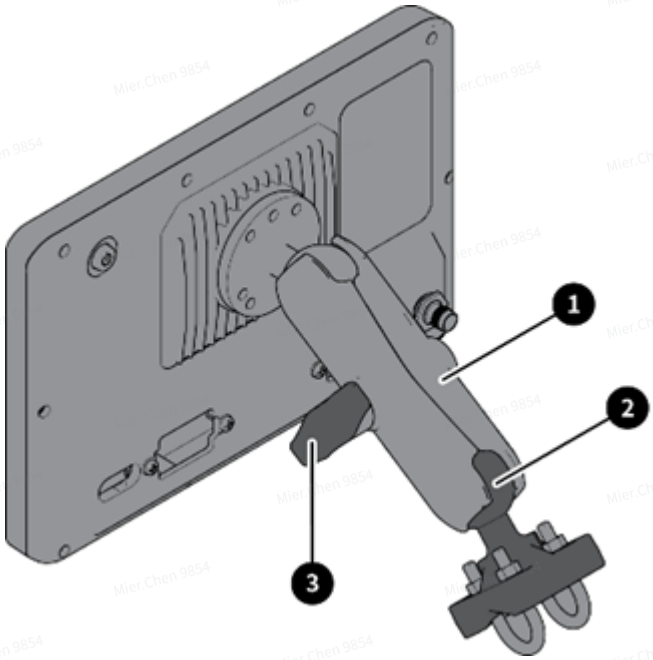
1. Fix the control terminal mounting base ③ with two U-bolts ① and four nuts ② at the appropriate position of the door armrest on the lap bar side of the cab.



2. Place the ball joint ② of the control terminal into the socket ① of the control terminal bracket.



3. Place the socket of the control terminal bracket ① on the ball joint ② of the controlterminal mounting base in the same way as in step 2, and turn the hand screw ③ clockwiseto fix the control terminal.



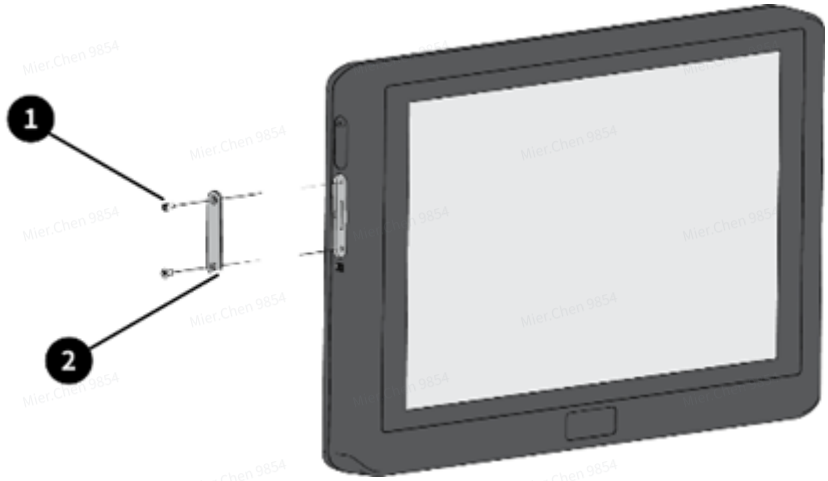
3.2 Installing SIM Card

3.2.1 Components

No.	Name	Qty.	Remarks
1	SIM Card	1	Micro-SIM

3.2.2 Installation Steps

1. Use a cross screwdriver to remove the screws ① of the SIM card cover on the left of the control terminal and remove the SIM card cover②.



2. Slowly insert the SIM card into the slot with the chip facing the screen side, and use an ejector pin and tweezers when necessary.
3. Install the SIM card cover with a cross screwdriver.

3.3 Installing GNSS Receiver

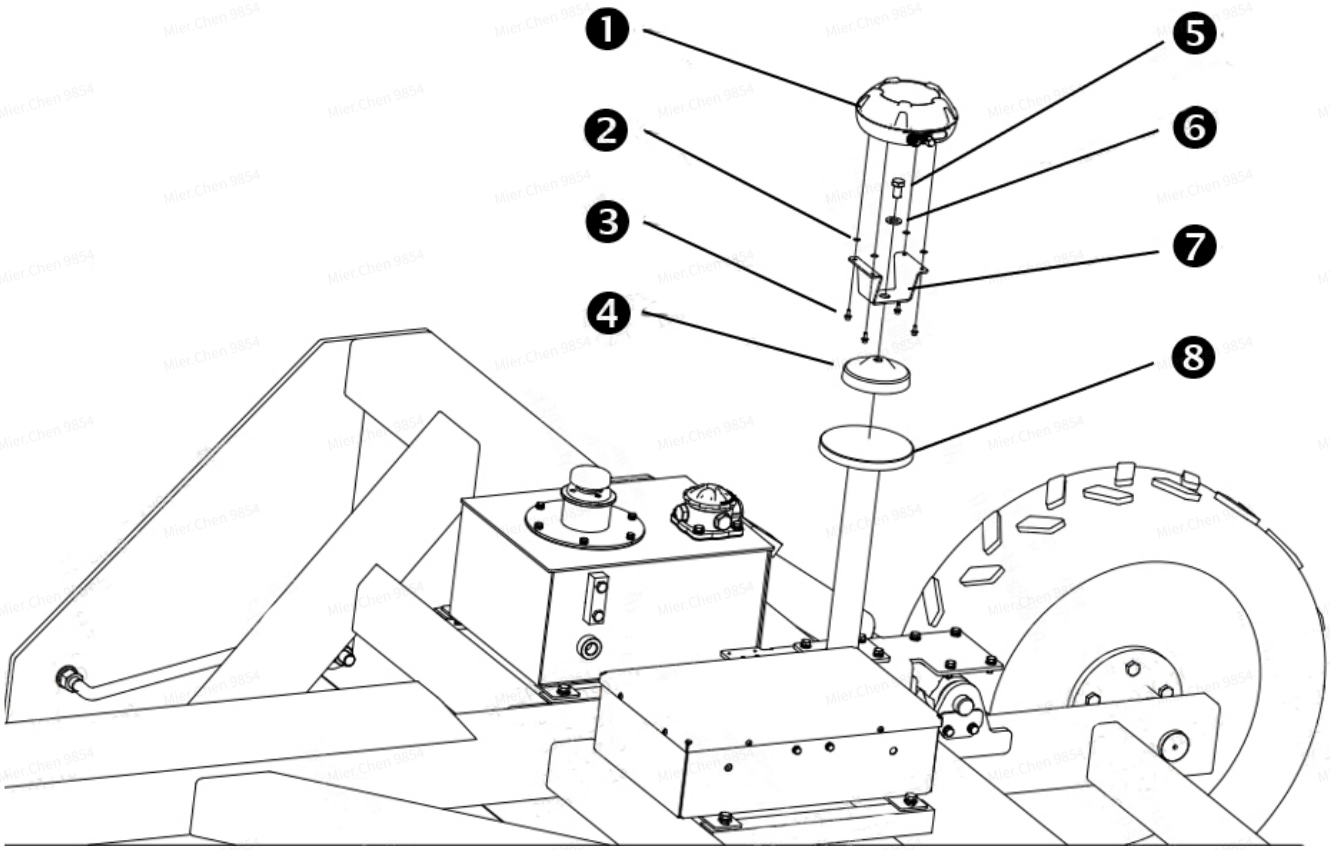
3.3.1 Components

No.	Name	Qty.	Remarks
1	GNSS receiver	1	
2	Anti-vibration pad M4	4	Pre-installed at the GNSS receiver bracket
3	Hexagon socket head cap assembly bolt M4×12	4	
4	Magnetic base for GNSS receiver	1	
5	Hexagon head bolt M12×1×20	1	
6	Plain washer M12	1	
7	GNSS receiver bracket	1	

3.3.2 Installation Steps

1. Attach the GNSS receiver bracket ⑦ to the magnetic base for GNSS receiver ④ using the Hexagon head bolt (M12×1×20) ⑤ and plain washer (M12) ⑥.

2. Fix the GNSS receiver ① to the GNSS receiver bracket ⑦ using four anti-vibration pads (M4) ② and four hexagon socket head cap assembly bolts ③. After assembly, attach the whole to the support rod ⑧.



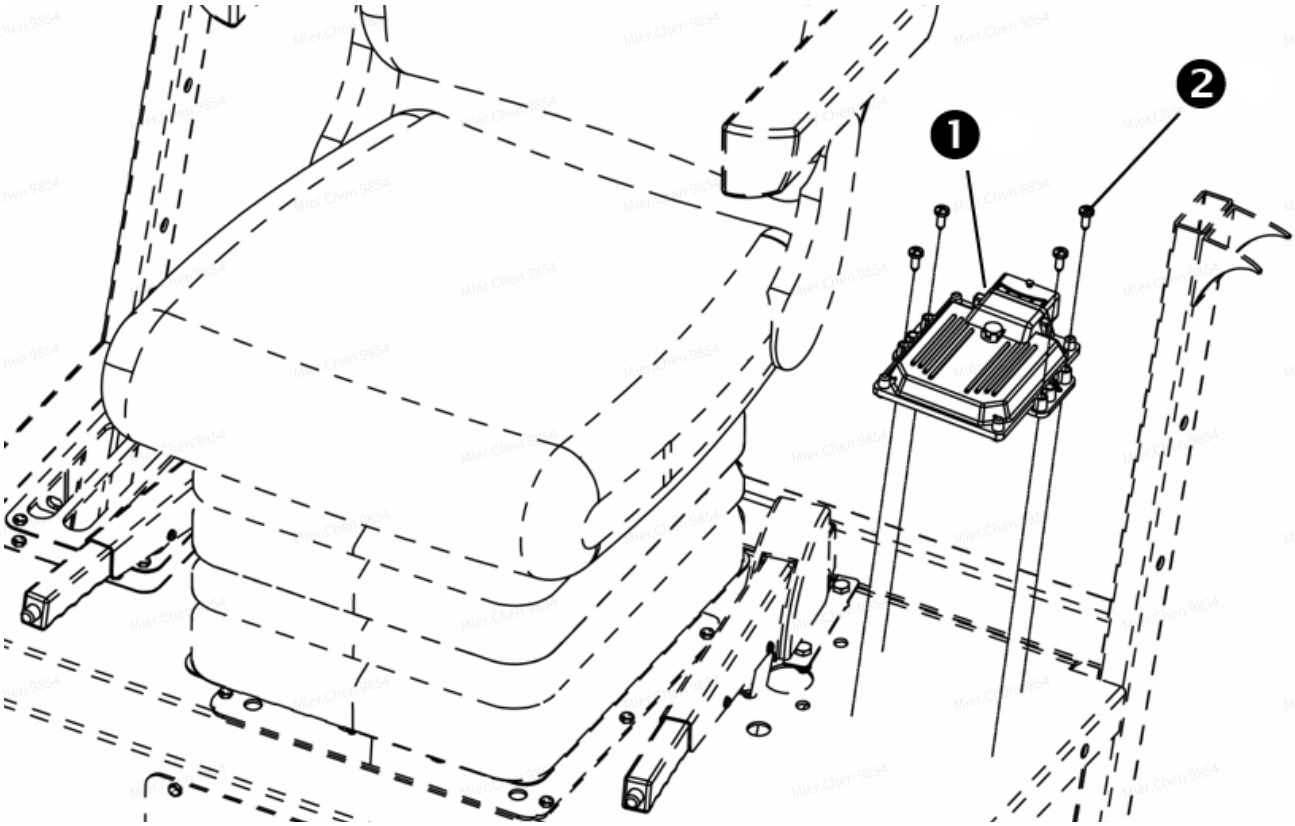
3.4 Installing the VCU

3.4.1 Components

No.	Name	Qty.	Remarks
1	VCU	1	
2.	Self-tapping Screw	4	Provided by user (Recommended: ST6.3×22)

3.4.2 Installation Steps

Install the VCU ① to a suitable position on a level surface beside the seat using self-tapping screws ②.

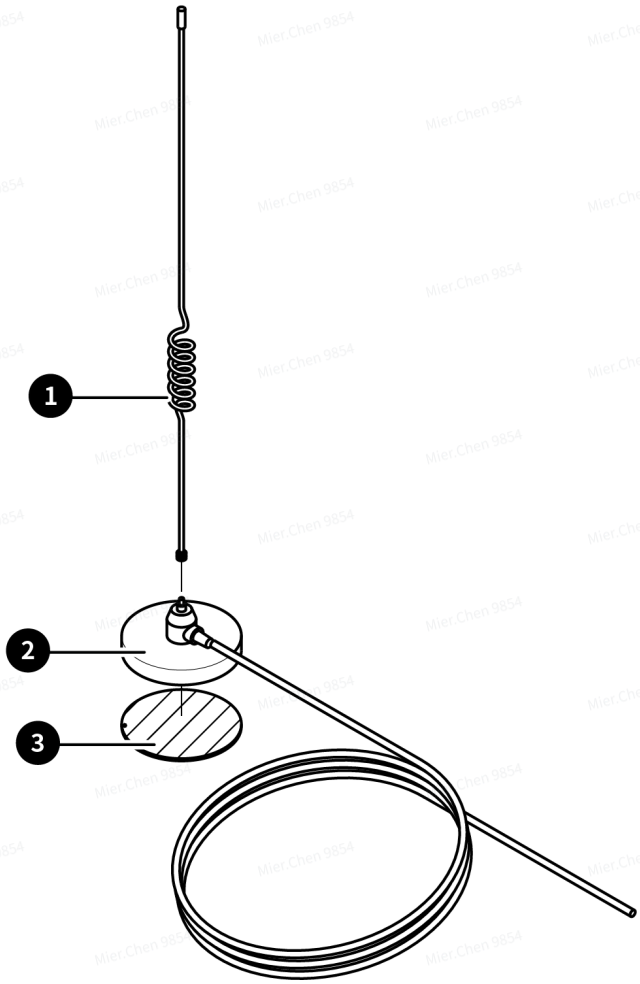


Note: The programmable controller (VCU) must be properly secured. The installation location should be away from heat sources and protected from water ingress.

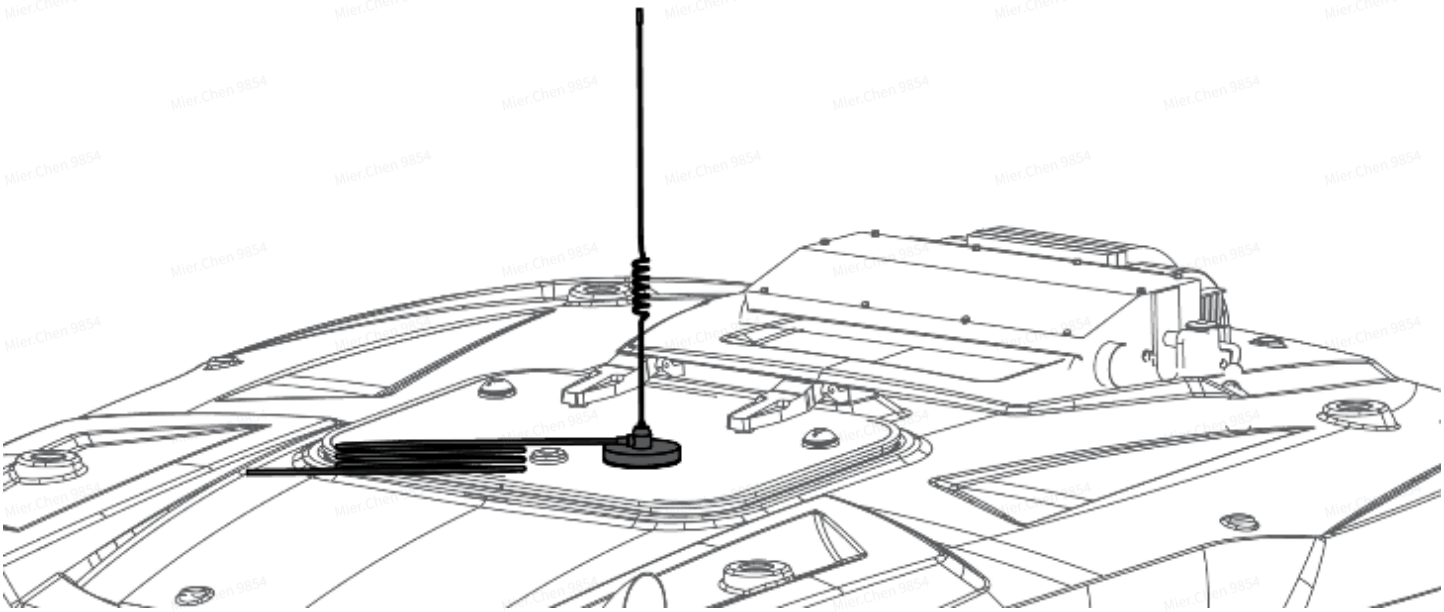
3.5 Installing the Radio Antenna (Optional)

3.5.1 Components

No.	Name	Qty.	Remarks
1	Radio Antenna	1	
2	Sucker base	1	
3	3M tape	1	



3.5.2 Installation Steps



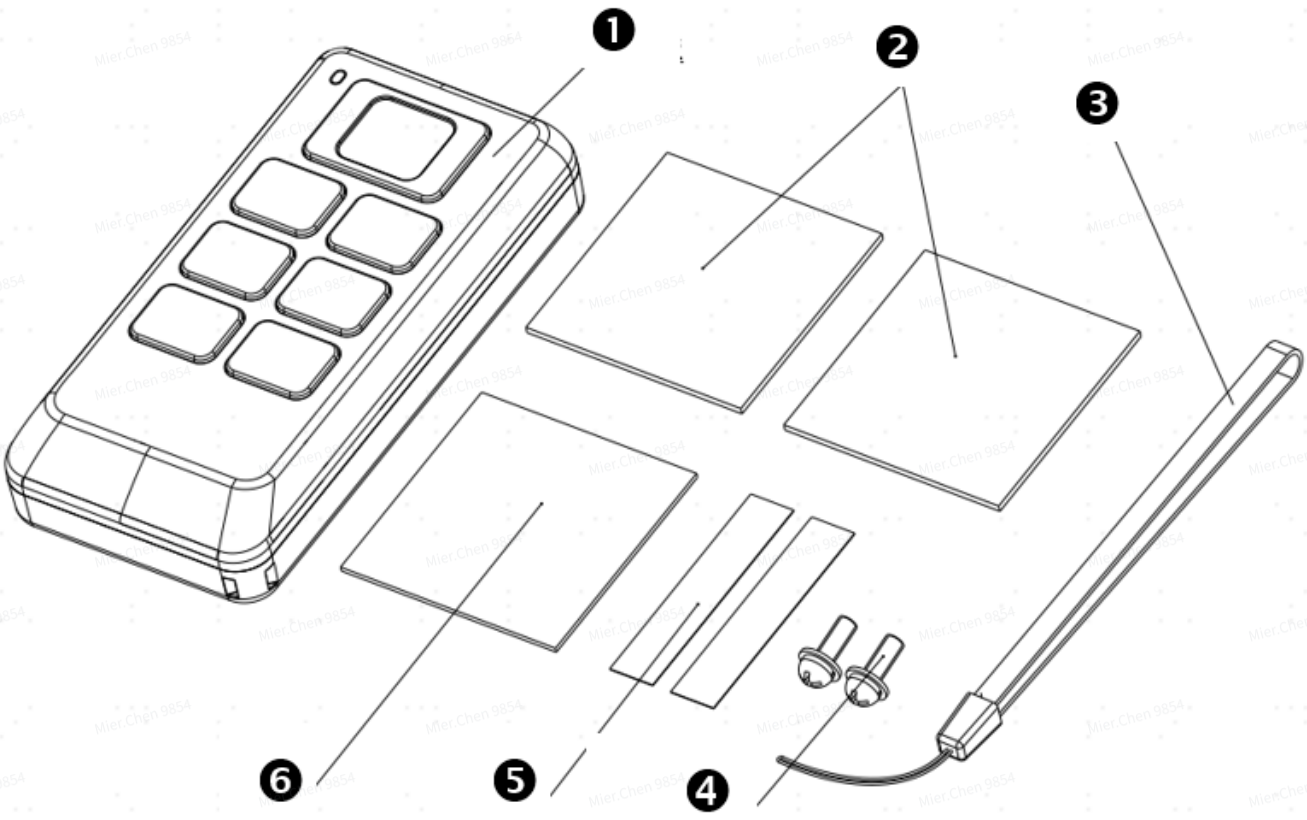
3.6 Installing the Easy Control (Optional)

3.6.1 Components

No.	Name	Qty.	Remarks
1	Easy Control	1	
2	Hook and loop Velcro	1	
3	Lanyard	1	
4	Pan head bolts with elastic flat pad	2	
5	Anti-slip tape	2	
6	3M tape	1	

3.6.2 Installation Steps

Place or fix the Easy Control in a convenient position for personnel operation in the driver's cab (using 3M tape, Velcro, Hook and loop Velcro, anti-slip tape, etc.), and remove it for handheld operation during working.



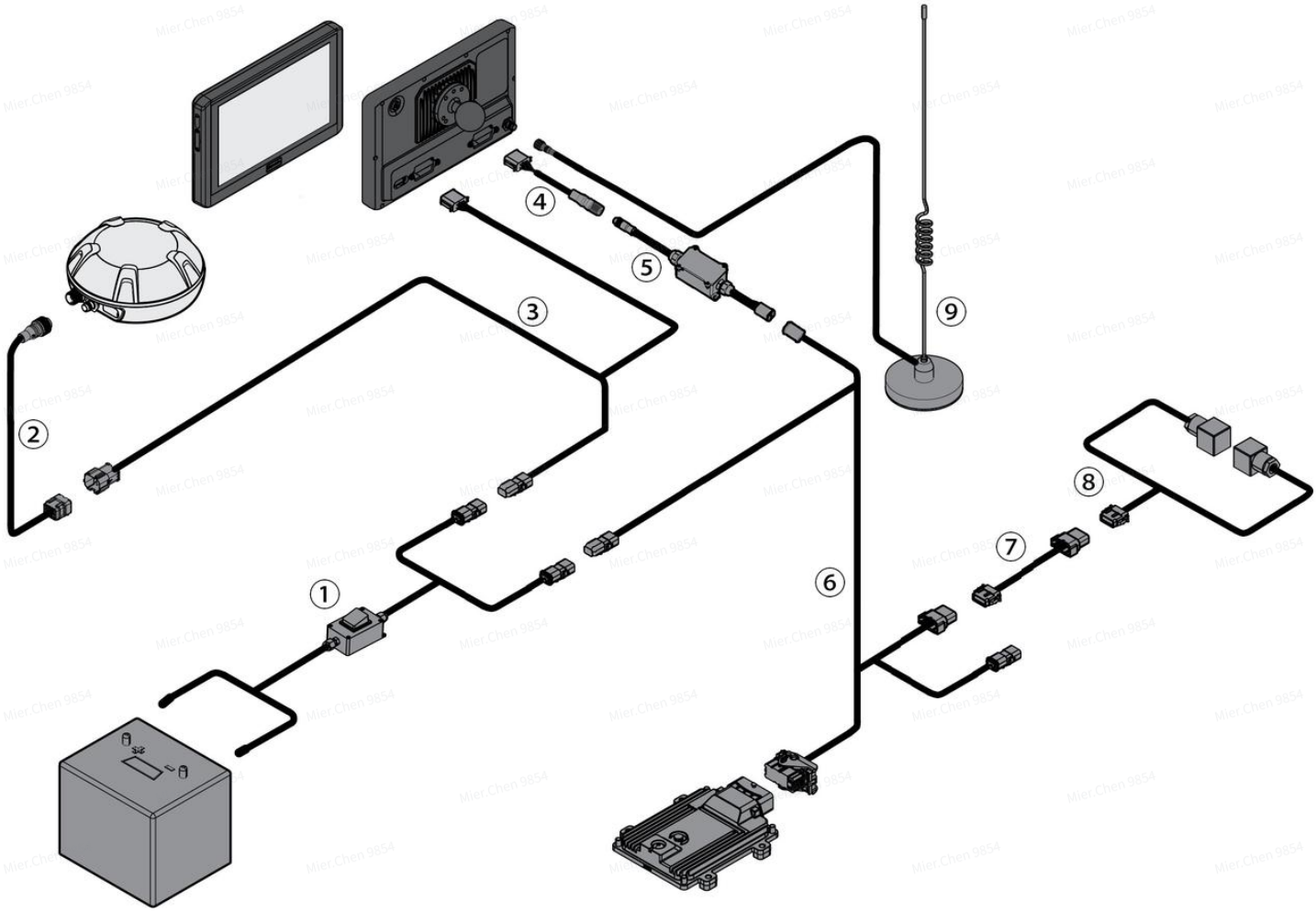
Note: Please use the Easy Control safely in the driver's cab and prohibit remote control outside the driver's cab.

3.7 Installing the Standard Kit Wiring Harness

The installation positions of each component in the standard kit are shown in the diagram below:

3.7.1 Components

No.	Name	Qty.	Remarks
1	Land Leveler Power Cable	1	QXL-XS-003311
2	IMU Wiring Harness	1	QXL-XS-003174
3	Main Wiring Harness	1	QXL-XS-003310
4	Sub Wiring Harness	1	QXL-XS-003318
5	Signal Conversion Harness	1	900262000A0040
6	VCU Wiring Harness	1	QXL-XS-003356
7	Solenoid Valve Cable	1	QXL-XS-003362
8	Adapter Harness	1	QXL-XS-003364
9	433MHz Radio Antenna	1	900300470Q0030B



3.7.2 Installing Power Cable

1. Connect the negative terminal of power cable ① to the negative terminal of the battery. Do not connect the positive terminal for now. Then, use nylon cable ties to secure the harness along the right side of the vehicle and route it into the cab from the front right side.
2. Connect power cable ① to the power interfaces of the main wiring harness ② and the VCU wiring harness ③.

3.7.3 Installing IMU Wiring Harness

1. Connect the IMU wiring harness ② connector to side A of the GNSS receiver. Make sure the anti-misplug locking tab is properly aligned for correct installation.

2. Connect the other end of the IMU wiring harness ② to the corresponding connector on the main wiring harness ③.

3.7.4 Installing Main and Sub Wiring Harness

1. Connect the connectors of the main wiring harness ③ and sub wiring harness ④ to the control terminal. Be sure to distinguish the connectors by color and ensure the anti-misplug locking tabs are properly aligned.

3.7.5 Installing Signal Conversion Harness

1. Connect the other end of the sub wiring harness ④ labeled "422" to the 12-pin connector labeled "C5" on the signal conversion harness ⑤. Make sure the anti-misplug locking tabs are properly aligned.

2. Connect the 4-pin connector labeled "C3" on the signal conversion harness ⑤ to the 4-pin connector labeled "CAN 250K" on the VCU wiring harness ⑥.

Note: The solenoid valve wiring harness ⑦ also has a 4-pin connector. Please check the labels carefully to avoid confusion!

3.7.6 Installing VCU Wiring Harness

Press the locking tab on the main connector of the VCU wiring harness ⑥ all the way down, then insert the connector into the VCU. Rotate the locking tab 90° until you hear a "click," indicating that the connector is securely locked in place. The completed installation is shown in the image on the right.

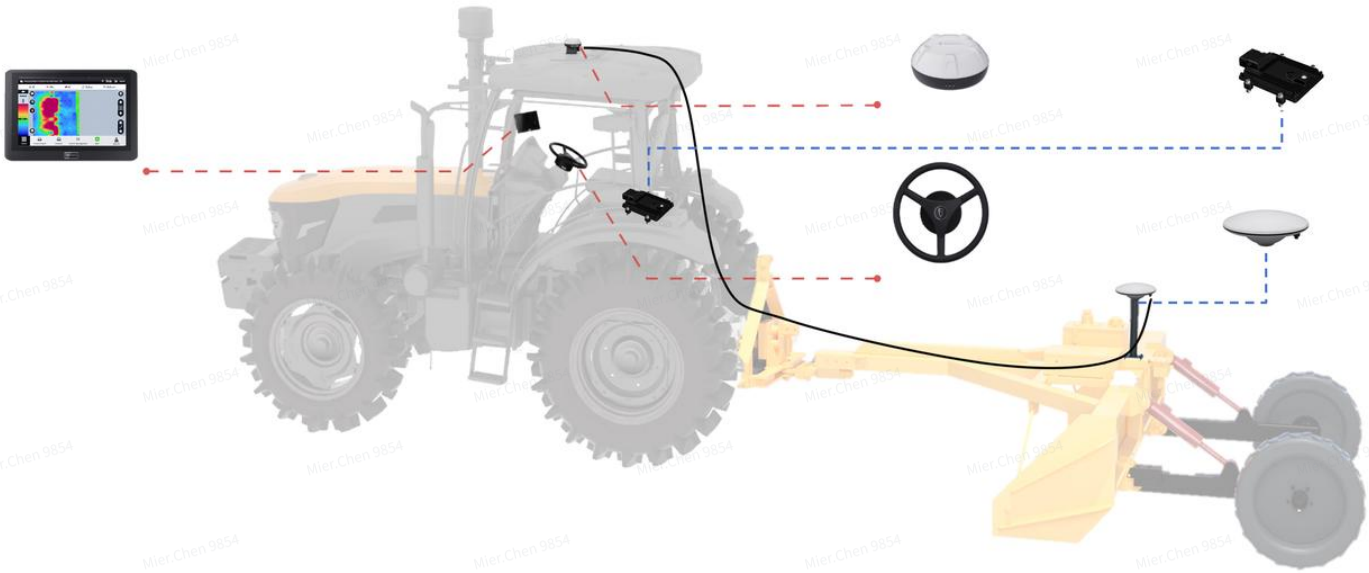
3.7.7 Installing Solenoid Valve Wiring Harness

1. Refer to the diagram for connecting the solenoid valve cable ⑦. Before connection, pull out the yellow locking tab. After inserting the connector, push it in while simultaneously pushing the yellow tab. When you hear a "click," the connection is complete.

2. Connect the solenoid valve cable ⑦ to the adapter harness ⑧. Ensure both sides are labeled "PVEO" for correct matching and connection.

3.8 Installing Integrated Kit Wiring Harness

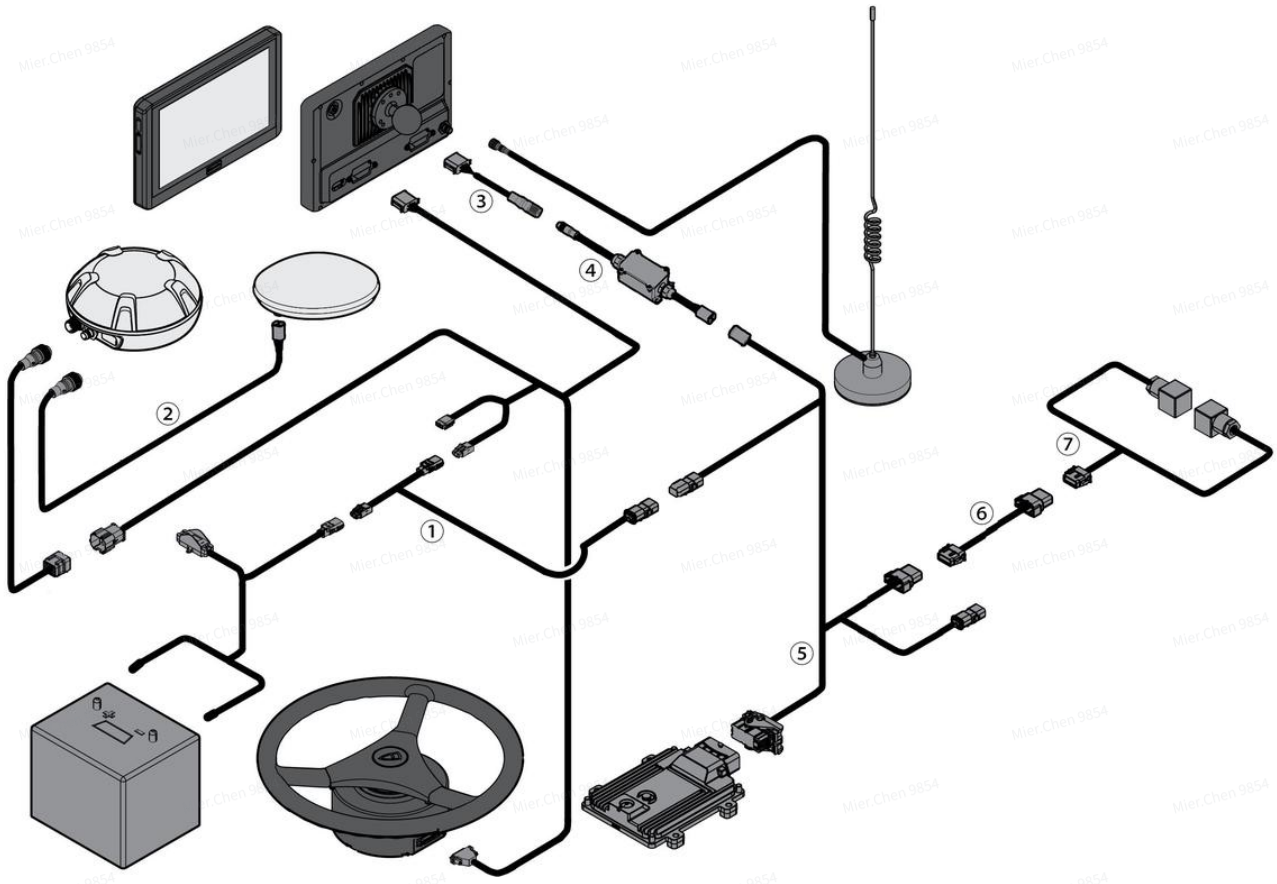
The installation positions of each component in the integrated kit are shown in the diagram below (also applicable to systems already equipped with the AT2 kit and an additional accessory package):



3.8.1 Components

No.	Item	Quantity	Remarks

1	Power Wiring Harness	1	
2	RF Cable	1	
3	Sub Wiring Harness	1	
4	Signal Conversion Harness	1	
5	VCU Wiring Harness	1	
6	Solenoid Valve Cable	1	
7	Adapter Harness	1	



3.8.2 Installing Integrated Power Cable

Disconnect the original connector of the navigation kit’ s power cable, then insert power cable ① into the system. This cable ① will supply power to the VCU and other devices.

3.8.3 Installing Second GNSS Antenna

Install the second GNSS antenna onto the land leveler implement. Use RF cable ② to connect the primary and secondary GNSS antennas.

3.8.4 Installing Remaining Harness

Refer to Section 3.7 of this document to complete the installation of the remaining wiring harnesses.

4. Appendix

4.1 Appendix 1: Main Hardware Specifications

No.	Component	Specifications
1	Control terminal	Size： 275× 180× 40 mm； Basic configuration: 10.1-inch capacitive touch screen, LED, D, speaker, 2G RAM, 8G ROM; Various communication interfaces; Power supply: 9 V – 36 V Signals received: radio, satellite, and 4G

		Relative humidity: 0% – 95%, at 40°C (noncondensing) Wi-Fi: 2.4 GHz frequency band, frequency range: 2412 MHz – 2484 MHz, output power: 2.4 GHz 11 n 14±2 dBm Operating temperature: -20°C to 70°C Storage temperature: -40°C to 85°C IP rating: IP65
2	GNSS receiver	Size: 162 mm×64.5 mm Frequency band: GPS L1C/A, L1C, L2P(W), L2C, L5; GLONASS L1, L2; BDS B1I, B2I, B3I, B1C, B2a; Galileo E1, E5a, E5b, SBAS Operating voltage: 9 V – 36 V Operating current: < 300 mA IMU accelerometer accuracy: 0.5 mg IMU gyroscope accuracy: 0.1°/s Roll/pitch: 0.2° Operating temperature: -20°C to 70°C Storage temperature: -40°C to 85°C IP rating: IP66
3	VCU	Size: 184.1×148×42.6 mm Supply voltage: 9 V –36 V Maximum total current: 30 A Connector: 64 pin(Aptiv) Operating temperature: -40°C to 85°C Storage temperature: -40°C to 105°C IP rating: P67