

Specification & Operation Manual

(Remote Control Unit, Lever Control Unit,
Pedal Control Unit, Main Controller)

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1. Specification

1.1. Remote Control Unit

Device for controlling the lever & pedal remotely using wireless communication

No.	Description	Range
1	Dimension	298 x 144 x 212 mm
2	Weight	2.3 kg
3	Power	7.4 V
4	Power Supplier	- Ni-MH(Nickel-Metal hydride) Battery - Battery 2ea (1 for operation / 1 for Spare)
5	Standard operating time	8 hours (continuous operation at 20°C)
6	Battery recharging time	2 hours
7	Operating Temperature	-20 ~ +55 °C
8	Storage Temperature	-40 ~ +77 °C
9	Operating Humidity	0 ~ 95%
10	Dustproof and Waterproof	IP65 Grade

1.2. Lever Control Unit

Device for controlling the excavator lever at operator's command using remote control unit

No.	Description	Range
1	Dimension	125 x 200 x 85 mm
2	Weight	1.5 kg
3	Power	24 V
4	Power Supplier	Cigar jack (with Battery)
5	Operating Temperature	-20 ~ +55 °C
6	Storage Temperature	-40 ~ +77 °C
7	Operating Humidity	0 ~ 95%
8	Dustproof and Waterproof	IP54 Grade

1.3. Pedal Control Unit

Device for controlling the excavator pedal at operator's command using remote control unit

No.	Description	Range
1	Dimension	135 x 140 x 110 mm
2	Weight	2.5 kg
3	Power	24 V
4	Power Supplier	Cigar jack (with Battery)
5	Operating Temperature	-20 ~ +55 °C
6	Storage Temperature	-40 ~ +77 °C
7	Operating Humidity	0 ~ 95%
8	Dustproof and Waterproof	IP54 Grade

1.4. Main Controller

Device for controlling the Lever & Pedal Control Unit at operator's command using Remote Control Unit

No.	Description	Range
1	Dimension	125 x 250 x 100 mm
2	Power	24V
3	Power Supplier	Cigar jack (with Battery)
4	Operating Temperature	-20 ~ +55 °C
5	Storage Temperature	-40 ~ +77 °C
6	Operating Humidity	0 ~ 95%
7	Dustproof and Waterproof	IP54 Grade

2. Preparation

2.1. Parts

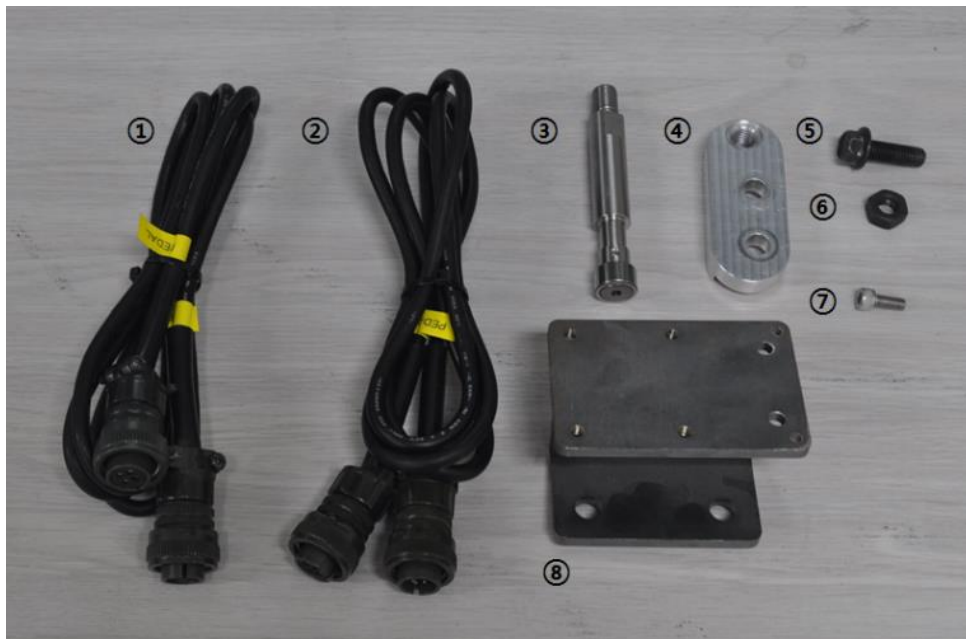
2.1.1. Lever Control Unit



No.	Name	Unit
1	Grip Fix Tilt	2EA
2	Grip Fix 1	2EA
3	Grip Fix 2	2EA
4	Grip Fix 3	2EA
5	Lever Wire Left	1EA
6	Lever Wire Right	1EA
7	Shaft Joint	23EA
8	M4 x 8mm Bolt(Wrench)	10EA
9	M3 x 12mm Bolt(Wrench)	8EA

No.	Name	Unit
10	M3 x 8mm Bolt(Wrench)	4EA
11	M2.5 x 6mm Bolt(Wrench)	4EA
12	Motor Bush	4EA
13	Spacer	4EA
14	Shaft Fixer	2EA
15	Clipper	8EA
16	Shaft	2EA
17	Lever Adapter Rubber	2EA
18	Lever Adapter	2EA

2.1.2. Pedal Control Unit



No.	Name	Unit
1	Pedal Connector(R)	1EA
2	Pedal Connector(L)	1EA
3	Roller	2EA
4	External Support	2EA
5	M10 Bolt	4EA
6	M10 Nut	4EA
7	M6 x Bolt(Wrench)	8EA

2.2. Tools



[Box tool set]



[Wrench set]

No.	Name	Unit
1	Box tool set	1SET
2	Wrench set	1SET

3. Installation

3.1. Level Control Unit

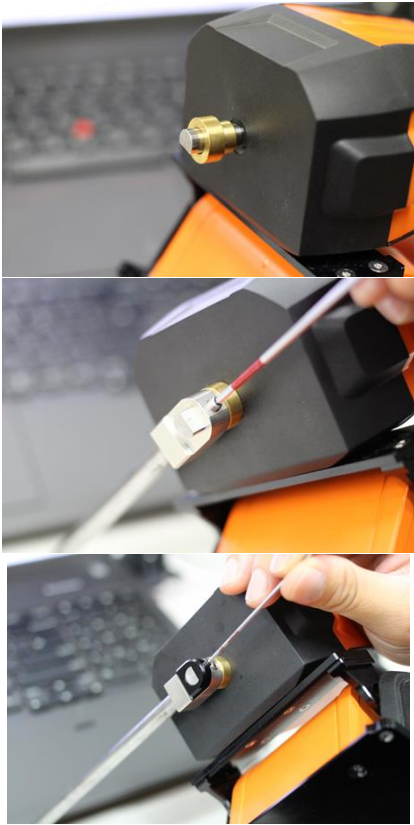
3.1.1. Lever Adapter Installation

Order	Figure	Note	Parts and Tool
1		- Put the adapter on the adapter rubber of the lever. - Do not pull powerfully to split the rubber of the lever rubber.	- Lever Adapter
2		- When the Clippers are inserted, Please check that the clippers include adapter, adapter rubber and control stand.	- Clipper - Wrench(M2.5)

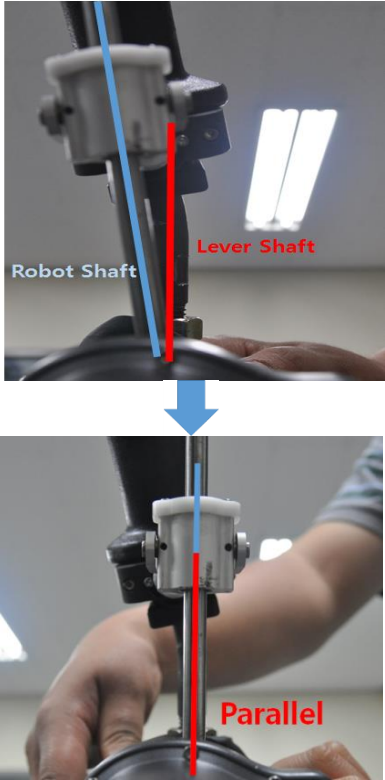
3.1.2. Lever Neck Gripper Installation

Order	Figure	Note	Parts and Tool
1		- After take off the lever flexible rubber, Insert the Grip Fix 3 under the lever.	- Grip Fix 3
2		- Bolting after Insert the Grip Fix 2 where the opposite side of the Grip Fix 3. - Please be sure that Grip fix2 and Grip fix3 contacted.	- Grip Fix 2 - Bolts(M3 x 4) - Wrench(M3)
3		- Put in the Grip Fix 1 in front of the Grip Fix 2 and Bolting	- Grip Fix 1 - Bolts(M3 x 2) - Wrench(M3)
4		- Put the Grip Fix Tilt into the hole of the Grip Fix 1. - Do not confuse the side of the Grip Fix Tilt. - Do not tighten up the screws cause you will tuning this part.	- Grip Fix Tilt - Bolts(M2.5 x 2) - Wrench(M2.5)
5		- Connect the Shaft joint to Grip Fix Tilt. - Do not tighten up the screw also this will be tuned.	- Shaft Joint - Screw(M4 x 1) - Wrench(M4)

3.1.3. Installation to Adapter

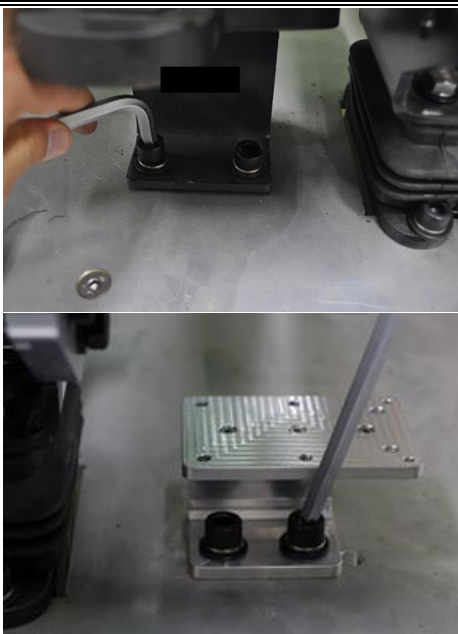
Order	Figure	Note	Parts and Tool
1		- To the rotating part of the Motor, put the Motor Bush, Spacer, Shaft and Shaft Fixer sequentially. - Fix the Shaft and Shaft Fixer using the headless screws.	- Motor Bush - Spacer - Shaft - Shaft Fixer - Screws(M4 Headless,M3 Headless) - Wrench(M2, M1.5)
2		- Attach the Lever control Unit on the Adapter. - Please sure that Shaft should be connected and pass through the Shaft Joint. - Please mate the Align pin and the align hole of the Adapter When you connect the Lever Unit and Adapter. - Tighten the screws on the 4points of the Lever control Unit.	- Shaft Joint - Lever Control Unit with Shaft - Screws(M4 x 2) - Wrench(M4)

3.1.4. Horizontal Matching

Order	Figure	Note	Parts and Tool
1		- After Installation of the Lever Control Unit, You have the one more step to operate machine well. - You need to tuning the some parts. - First of all, tune the Grip Fix Tilt until the Shaft Joint positioning the half position of the Shaft when Lever is in neutral position.	- Wrench(M2.5, M4)
2		- Second, Make Parallel between Lever shaft and Robot Shaft for the performance of the Lever Control Robot.	

3.2. Pedal Control Unit

3.2.1. Pedal Adapter Installation

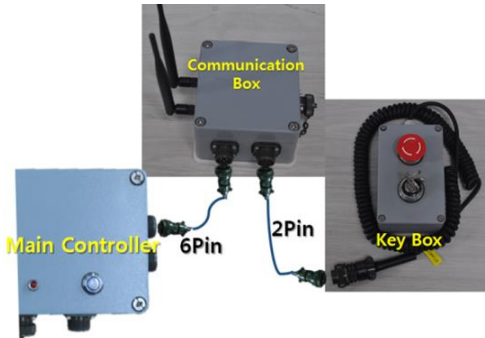
Order	Figure	Note	Parts and Tool
1		- Take the Foot Rest off the excavator. - Install the Pedal Adapter.	- Wrench(M8)

3.2.2. Pedal External Support Installation

Order	Figure	Note	Parts and Tool
1		- Assemble the Roller and Pedal external support. - Take off the Pedal Handle of the Pedal . - Install the assembled part the opposite position of the pedal handle like second photo.	- Roller - External Support - Box

Order	Figure	Note	Parts and Tool
2	  	- Match the Slide Link and Roller attached on the pedal. - After match, lay the pedal control unit on the adapter and bolting.	- Wrench(M6) - Screws(M6 x 4)

3.3. Wiring

Order	Figure	Note	Parts and Tool
1	 <Lever Cable Connecting>	- Put the Lever cable to the lever control unit. - On the other side, of the Cable, connect to the main controller.	- Lever Cable(4Pin x 2)
2	 <Pedal Cable Connecting>	- Same as the Lever unit, - Pedal unit is connected with Main Controller.	- Pedal Cable(4Pin x 2)
3	 <Key Box and Communication Box Cable Connecting>	- The communication box is connected with main controller through 6pin cable. - In case of Key box, connected with communication box Through 2pin cable.	- Communication Cable(6pin) - Key box cable(2pin)

Order	Figure	Note	Parts and Tool
4		<Power Cable Connecting> - Power cable is two type as you see the picture, first is Cigar jack and second is 2pin power cable. - Cigar jack will be connected with Excavator. - 2Pin power cable will be connected with main controller and battery.	- Cigar Jack Cable - Power Cable(2Pin)

4. Operation

After Level/Pedal Control Unit is finished the installation, excavator lever and pedal can be operated by using Remote Control Unit. Joysticks of Remote Control Unit to control excavator level/pedal are configured as follows.



4.1. Lever Control Unit

Motion	Note
Left Lever Control Unit forward direction operation	Push the left lever joystick to forward(↑). Then left lever control unit operate the excavator left lever to forward(↑).
Left Lever Control Unit backward direction operation	Push the left lever joystick to backward(↓). Then left lever control unit operate the excavator left lever to backward(↓).
Left Lever Control Unit left direction operation	Push the left lever joystick to left side(←). Then left lever control unit operate the excavator left lever to left side(←).

Left Lever Control Unit right direction operation	Push the left lever joystick to right side(→). Then left lever control unit operate the excavator left lever to right side(→).
Right Lever Control Unit forward direction operation	Push the right lever joystick to forward(↑). Then right lever control unit operate the excavator right lever to forward(↑).
Right Lever Control Unit backward direction operation	Push the right lever joystick to backward(↓). Then right lever control unit operate the excavator right lever to backward(↓).
Right Lever Control Unit left direction operation	Push the right lever joystick to left side(←). Then right lever control unit operate the excavator right lever to left side(←).
Right Lever Control Unit right direction operation	Push the right lever joystick to right side(→). Then right lever control unit operate the excavator right lever to right side(→).

4.2. Pedal Control Unit

Motion	Note
Left Pedal Control Unit forward direction operation	Push the left pedal joystick to forward(↑). Then left pedal control unit operate the excavator left pedal to forward(↑).
Left Pedal Control Unit backward direction operation	Push the left pedal joystick to backward(↓). Then left pedal control unit operate the excavator left pedal to backward(↓).
Right Pedal Control Unit forward direction operation	Push the right pedal joystick to forward(↑). Then right pedal control unit operate the excavator right pedal to forward(↑).
Right Pedal Control Unit backward direction operation	Push the right pedal joystick to backward(↓). Then right pedal control unit operate the excavator right pedal to backward(↓).

FCC Information

This device complies with part 15 of the FCC Results. Operation is subject to the following two conditions :

- (1) This Device may not cause harmful interface, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for CLASS B digital device, pursuant to Part 15 of 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 to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try correct the interference by one or more of the following measures:

- 1.1. Reorient or relocate the receiving antenna.
- 1.2. Increase the separation between the equipment and receiver.
- 1.3. Connect the equipment into an outlet on a circuit different from that to which receiver is connected.
- 1.4. Consult the dealer or experienced radio/TV technician for help.

WARNING

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

"CAUTION : Exposure to Radio Frequency Radiation.

Antenna shall be mounted in such a manner to minimize the potential for human contact during normal operation. The antenna should not be contacted during operation to avoid the possibility of exceeding the FCC radio frequency exposure limit.