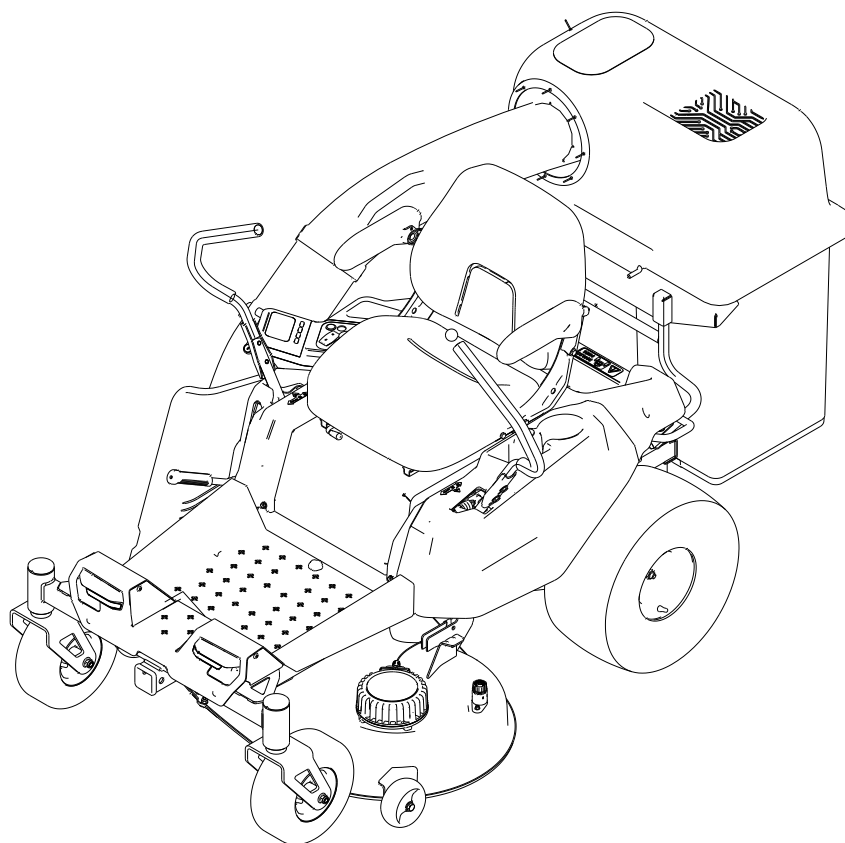


greenworks[®]

CrossoverZ Zero Turn 6-in-parallel

GC82ZT107

Service Manual

**WARNING:**

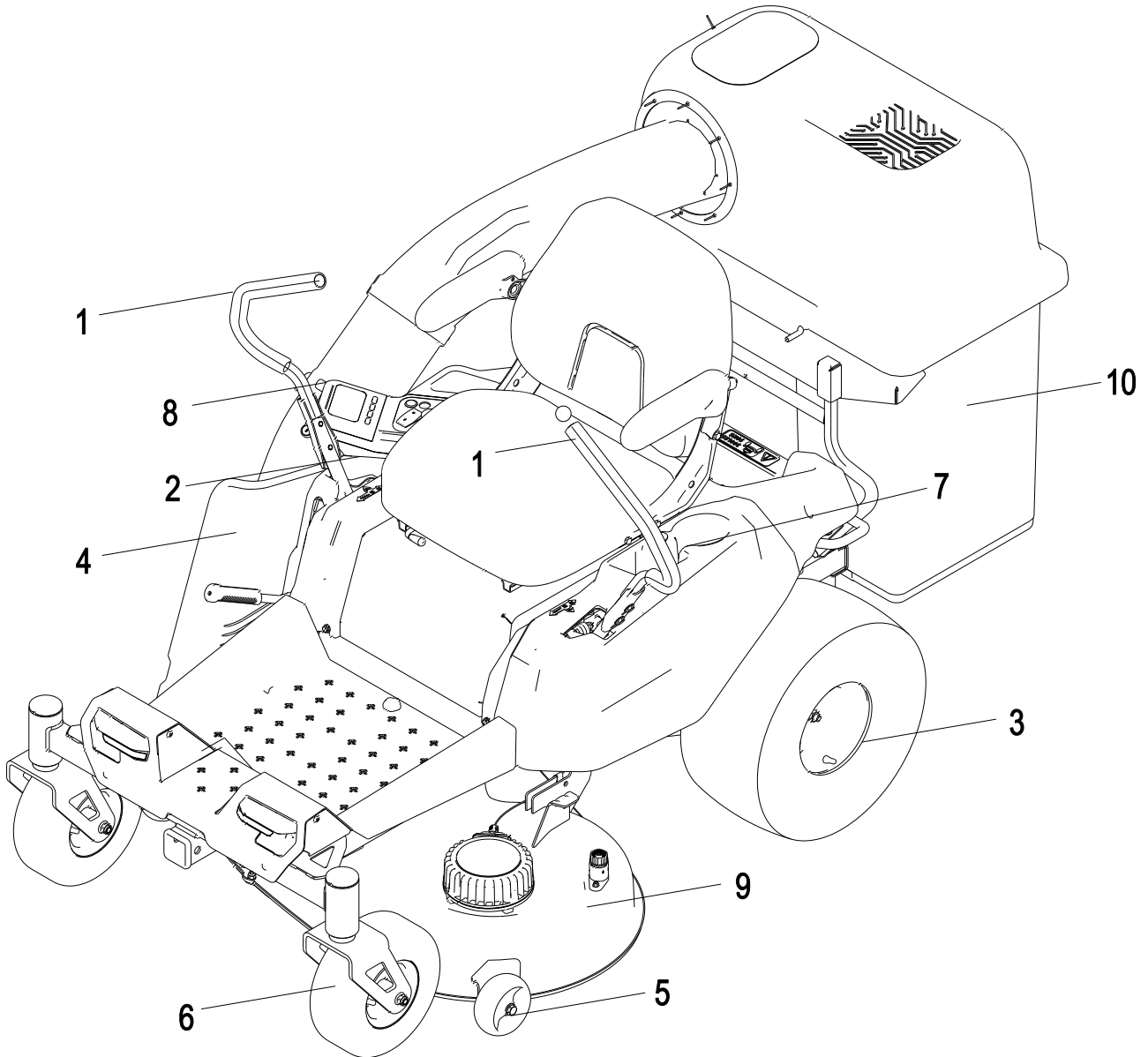
Undertaking repairs to gardening tools can be hazardous. Use correct tools and safety devices noted in the manual and obey all the instructions. Do not proceed until you are confident that you understand all steps and can complete the repair work. Some repairs must only be performed by a qualified technician.

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1. Component location



- | | |
|----------------------------|--------------------|
| 1. Steering control levers | 6. Front wheels |
| 2. Right control panel | 7. USB port |
| 3. Rear (drive) wheel | 8. Digital display |
| 4. Discharge chute | 9. Deck |
| 5. Anti-scalp wheel | 10. Grass Bagger |

1.1 Terminology

Abbr.	Full term
CAN	Controller Area Network
HW	Hardware
PC	Personal Computer
PTO	Power Take Off
SW	Software
KSI	Key Switch Ignition

2. Warnings

- 2.1. All disassembly, replacement, repair, and maintenance operations must be performed by professional operators who have read this manual.
- 2.2. For the ease of quick disassembly and maintenance, you are advised to: before disassembly, put the machine in a suitable work area; prepare the necessary disassembly tools beforehand; remove the bolts in an appropriate order; put the disassembled parts in a clean work area.
- 2.3. In addition to obeying the conventional procedures for most repairing processes, there are some other special reminders:
 - Before any maintenance work, the start switch must be turned off, and if necessary, disconnect the main power supply of the vehicle.
 - Do not put dangerous (flammable or explosive) items on the battery compartment.
 - When replacing sharp and dangerous parts such as blades, protective gloves or other protective measures must be used.
 - No operations shall be carried out before all the moving parts have come to a standstill.
 - To avoid any personal injury or death, make sure that no one other than the maintenance operators is near the vehicle under repair or touches the mechanical parts by accident.

3. Electrical system

3.1 Faults

3.1.1 Fault list

The CANBUS system takes actions to protect the user and the machine when it detects an issue. When it acts to turn off the vehicle or a component, it indicates that a fault occurs and the fault code is shown on the display. Each electrical fault has a letter code followed by a number.

The first letter describes the system that caused the fault:

Letter	System
TR	Right traction controller and motor
TL	Left traction controller and motor
PMU	Power management unit
MR	Right blade controller and motor
ML	Left blade controller and motor

Most faults can quickly be corrected by noting what caused the issue, restarting the machine or changing how the operator uses the machine.

Use the chart below to find the solution for immediate fix during operation.

3.1.2 Fault code

System	Fault code	Fault type	Solutions
Power management unit	PMU 2	Overtemperature-Level1	The vehicle is overloaded, please reduce the operating load or use it after cooling down.
	PMU 10	Battery pack open circuit in PMU	Unconnected battery pack in battery compartment, product performance may be affected.
	PMU 11	PMU minor error	A minor error in the battery compartment prevented the blade system from starting. Wait for the system to recover and then reset the blade start switch.
	PMU 12	PMU critical error	A major error in the battery compartment prevented the drive and blade systems from starting. Restart the power supply and try again.
	PMU 13	PMU no battery pack available	Check that you are using the correct battery pack, and then restart the power supply.
	PMU35	Overtemperature-Level2	The vehicle is overloaded, wait for cooling down before use.
	PMU36	Undervoltage	The voltage is too low. Charge the battery pack and try again.
	PMU37	Overvoltage	The voltage is too high. Restart the power supply.
	PMU38	Power supply output failure	1. Restart the vehicle; 2. Replace the battery pack and power on again.

System	Fault code	Fault type	Solutions
	PMU41	No battery pack available	1. Restart the vehicle; 2. Replace the battery pack and power on again.
	PMU46	Relay (MOS) error	1. Restart the vehicle; 2. Insert individual battery packs into the battery compartment one after another and power them on to determine the abnormal channels. The idle corresponding abnormal channels can be used under limited conditions in emergencies; 3. The relay (MOS) of the battery pack channel is damaged, please replace the PMU.
	PMU47	Pre-charge error	1. Check whether the B+ and B- output of the PMU are short-circuited; if short-circuited, you need to check the status of the MOS tubes of the controller one by one; 2. Remove or replace the battery pack with the highest voltage in the battery compartment and power on again; 3. PMU hardware failure, please replace the PMU
	PMU48	Pre-charge hardware error	1. Restart the vehicle; 2. PMU hardware failure, please replace the PMU
	PMU49	Negative MOSFET temperature sensor error	1. Restart the vehicle; 2. PMU hardware failure, please replace the PMU
	PMU52	Current sensor error	1. Restart the vehicle; 2. PMU hardware failure, please replace the PMU
	PMU57	KSI Pre-MOS error	1. Restart the vehicle; 2. PMU hardware failure, please replace the PMU
	PMU59	KSI MOS error	1. Restart the vehicle; 2. PMU hardware failure, please replace the PMU
	PMU61	Battery pack 1 does not match	Replace with battery pack of correct voltage platform.
	PMU62	Battery pack 2 does not match	Replace with battery pack of correct voltage platform.
	PMU63	Battery pack 3 does not match	Replace with battery pack of correct voltage platform.
	PMU64	Battery pack 4 does not match	Replace with battery pack of correct voltage platform.
	PMU65	Battery pack 5 does not match	Replace with battery pack of correct voltage platform.
	PMU66	Battery pack 6 does not match	Replace with battery pack of correct voltage platform.
	PMU67	Abnormal charging status	1. Check whether the charger input plug is plugged in properly; 2. Check whether the switch status in the charging socket is abnormal; 3. Check whether the wiring harness from the charging socket switch to the PMU is open or short-circuited.
Right traction controller and motor	TR 2	Drive motor stalled	1. Restart the power supply. 2. Check if the drive wheels are stuck. 3. Replace the traction controller.
	TR 4	Motor overspeed protection	1. Check whether the phase wire of the corresponding motor is damaged and whether the phase wire installation is misaligned; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly;

System	Fault code	Fault type	Solutions
			3. Replace the motor encoder; 4. Perform motor self-learning again.
	TR 5	Motor encoder error	1. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 2. Replace the motor encoder and perform motor self-learning again; 3. Replace the controller and perform motor self-learning again.
	TR 6	Controller phase loss	1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Replace the motor and perform motor self-learning again; 3. Replace the controller and perform motor self-learning again.
	TR 7	MOSFET error	Replace the controller and perform motor self-learning again.
	TR 8	Controller undervoltage	Replace with a fully charged battery pack.
	TR 9	Controller overvoltage	1. Replace with battery pack of correct voltage platform; 2. Replace the controller and perform motor self-learning again.
	TR 12	Motor overtemperature	1. Check whether the tires are stuck; 2. The motor temperature is too high. Please wait for cooling before use and restart the power supply.
	TR 13	Controller overtemperature	1. Check whether the tires are stuck; 2. The controller temperature is too high. Please wait for cooling before use and restart the power supply.
	TR 14	Software overcurrent	1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Restart the vehicle.
	TR 15	Hardware overcurrent	1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Check the status of the MOS tube of the controller; 4. Perform motor self-learning again; 5. Restart the vehicle.
	TR 16	Potentiometer error	1. Check the pin status of the potentiometer connector and whether the connector is connected properly; 2. Check whether the throttle voltage is within the range of $5V \pm 0.5$; 3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
	TR 19	Operating sequence error	1. Check whether the park switch status changes normally;

System	Fault code	Fault type	Solutions
			<ol style="list-style-type: none"> 2. Check whether the right throttle voltages exceed the dead zone range; 3. Check whether the seat switch status changes normally.
	TR 21	ETO relay error	<ol style="list-style-type: none"> 1. Check whether the relay coil resistance is around 30Ω. If it is abnormal, the relay needs to be replaced; 2. Check whether there is a short circuit or open circuit in the wiring between the controller and the relay coil; 3. Replace the controller and perform motor self-learning again.
	TR 22	Electromagnetic valve error	<ol style="list-style-type: none"> 1. Check whether the electromagnetic valve coil resistance is around 24Ω. If it is abnormal, the electromagnetic valve needs to be replaced; 2. Check whether there is a short circuit or open circuit in the wiring between the controller and the electromagnetic valve coil; 3. Replace the controller and perform motor self-learning again.
	TR 23	Battery compartment (PMU) communication failure	<ol style="list-style-type: none"> 1. Check the pin status of the PMU CAN connector and whether the connector is connected properly; 2. Check whether PMU CANL and CANH are short circuited or open circuited; 3. Restart the vehicle.
	TR 25	CAN timeout error - left drive	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector and whether the connector is connected properly; 2. Check whether CANL and CANH are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the controller is flashing. If the indicator light does not work, please replace the controller.
	TR 27	CAN timeout error - left blade	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector and whether the connector is connected properly; 2. Check whether CANL and CANH are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the controller is flashing. If the indicator light does not work, please replace the controller.
	TR 28	CAN timeout error - Middle blade	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector and whether the connector is connected properly; 2. Check whether CANL and CANH are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the controller is flashing. If the indicator light does not work, please replace the controller.
	TR 29	CAN timeout error – Right blade	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector and whether the connector is connected properly; 2. Check whether CANL and CANH are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the controller is flashing. If the indicator light does not work, please replace the controller.

System	Fault code	Fault type	Solutions
	TR 31	Seat switch verification error	<ol style="list-style-type: none"> 1. Check the pin status of the seat switch connector and whether the connector is connected properly; 2. Check whether there is a short circuit or open circuit in the seat switch wiring; 3. Check whether water has entered the seat switch and whether the status of the switch changes normally; 4. Replace the seat switch; 5. Replace the controller and perform motor self-learning again.
	TR 32	Software authentication error	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TR60	Controller undertemperature	The temperature of the controller is too low. Please wait until the temperature rises to above -22.0°F and then restart the power supply.
	TR61	5V internal power supply failure	<ol style="list-style-type: none"> 1. Check whether there is any short circuit abnormality in the 5V power supply; 2. Check whether the load is abnormal and whether there is a short circuit in the encoder or throttle circuit; 3. Replace the controller and perform motor self-learning again.
	TR62	12V internal power supply failure	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TR63	Motor temperature sensor error	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Measure the resistance value of the motor's temperature sense, compare the resistance value of the temperature sensor with the temperature relationship table, and determine whether the temperature sense is abnormal; 3. Replace the motor and perform motor self-learning again.
	TR64	Data storage error	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TR65	Motor encoder data error	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Replace the controller and Perform motor self-learning again.
	TR66	Controller internal communication error	<ol style="list-style-type: none"> 1. Restart the vehicle; 2. Replace the controller and Perform motor self-learning again.
	TR67	Motor overtemperature warning	The motor temperature is too high. Wait for the motor to cool down, and then restart the power supply.
	TR68	Controller overtemperature warning	The controller temperature is too high. Wait for the controller to cool down, and then restart the power supply.
	TR69	Right electromagnetic valve has released warning	Enable the locking device of the electromagnetic valve;
	TR70	Pedal potentiometer error	<ol style="list-style-type: none"> 1. Check the pin status of the potentiometer connector and whether the connector is connected properly; 2. Check whether the throttle voltage is within the range of 5V±0.5;

System	Fault code	Fault type	Solutions
			3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
	TR71	Steering wheel potentiometer error	1. Check the pin status of the potentiometer connector and whether the connector is connected properly; 2. Check whether the throttle voltage is within the range of $5V \pm 0.5$; 3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
Left traction controller and motor	TL 2	Drive motor stalled	1. Check whether the tires are stuck; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Check whether the phase wire of the corresponding motor is damaged and whether the phase wire installation is misaligned; 4. Check the parameter version and perform motor self-learning again.
	TL 4	Motor overspeed protection	1. Check whether the phase wire of the corresponding motor is damaged and whether the phase wire installation is misaligned; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Replace the motor encoder; 4. Perform motor self-learning again.
	TL 5	Motor encoder error	1. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 2. Replace the motor encoder and perform motor self-learning again; 3. Replace the controller and perform motor self-learning again;
	TL 6	Controller phase loss	1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Replace the motor and perform motor self-learning again; 3. Replace the controller and perform motor self-learning again.
	TL 7	MOSFET error	Replace the controller and perform motor self-learning again.
	TL 8	Controller undervoltage	Replace with fully charged battery pack;
	TL 9	Controller overvoltage	1. Replace with battery pack of correct voltage platform; 2. Replace the controller and perform motor self-learning again.
	TL 12	Motor overtemperature	1. Check whether the tires are stuck. 2. The motor temperature is too high. Wait for the motor to cool down before use and restart the power supply.
	TL 13	Controller overtemperature	1. Check whether the tires are stuck; 2. The controller temperature is too high. Please wait for cooling before use and restart the power supply.

System	Fault code	Fault type	Solutions
	TL 14	Software overcurrent	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Restart the vehicle.
	TL 15	Hardware overcurrent	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the pin status of the encoder connector corresponding to the motor and whether the connector is connected properly; 3. Check the status of the MOS tube of the controller; 4. Perform motor self-learning again; 5. Restart the vehicle.
	TL 16	Potentiometer error	<ol style="list-style-type: none"> 1. Check the pin status of the potentiometer connector and whether the connector is connected properly; 2. Check whether the throttle voltage is within the range of $5V \pm 0.5$; 3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
	TL 19	Operating sequence error	<ol style="list-style-type: none"> 1. Check whether the park switch status changes normally; 2. Check whether the left throttle voltages exceed the dead zone range; 3. Check whether the seat switch status changes normally.
	TL 22	Electromagnetic valve error	<ol style="list-style-type: none"> 1. Check whether the electromagnetic valve coil resistance is around 24Ω. If it is abnormal, the electromagnetic valve needs to be replaced; 2. Check whether there is a short circuit or open circuit in the wiring between the controller and the electromagnetic valve coil; 3. Replace the controller and perform motor self-learning again.
	TL 23	Battery compartment (PMU) communication failure	<ol style="list-style-type: none"> 1. Check the pin status of the PMU CAN connector and whether the connector is connected properly; 2. Check whether PMU CANL and CANH are short circuited or open circuited; 3. Restart the vehicle.
	TL 26	CAN timeout error - right drive	<ol style="list-style-type: none"> 1. Check the pin status of CAN connector and whether the connector is connected properly; 2. Check whether CANL and CANH are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the controller is flashing. If the indicator light does not work, please replace the controller.
	TL 31	Seat switch verification error	<ol style="list-style-type: none"> 1. Check the pin status of the seat switch connector and whether the connector is connected properly; 2. Check whether there is a short circuit or open circuit in the seat switch wiring;

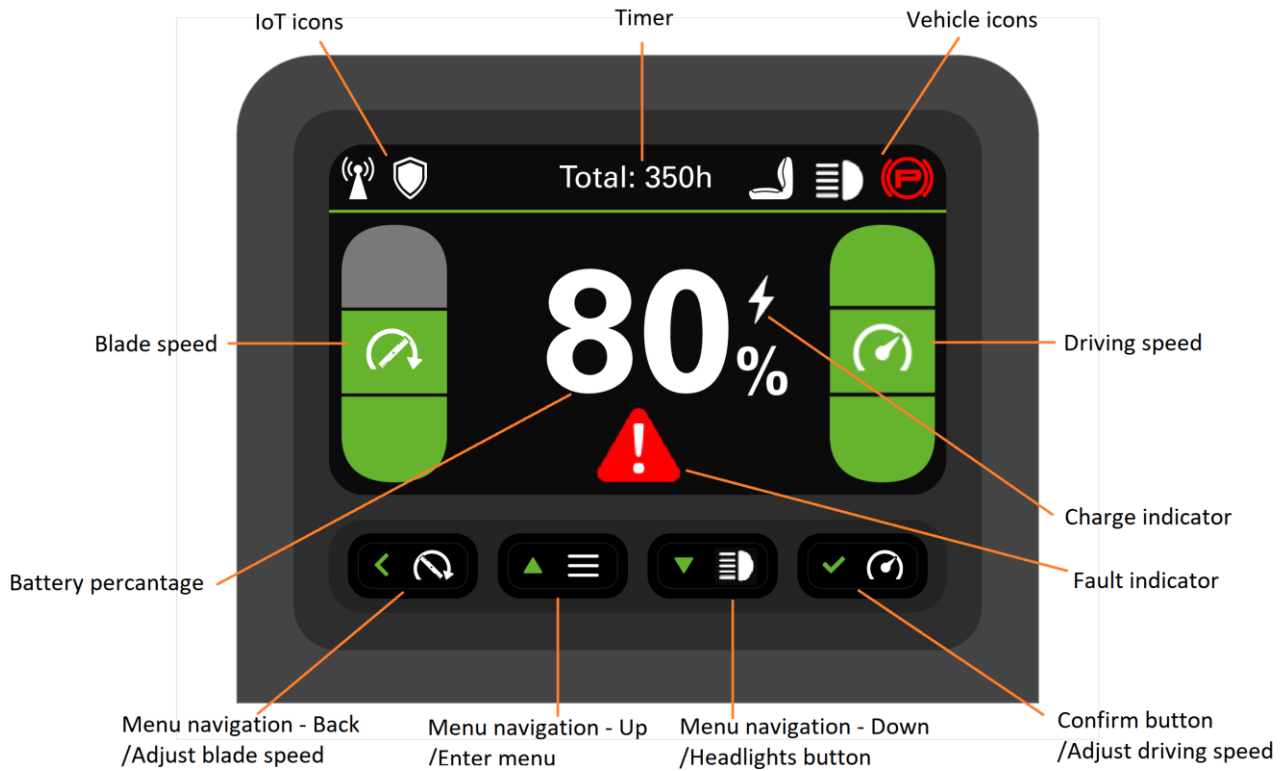
System	Fault code	Fault type	Solutions
			3. Check whether water has entered the seat switch and whether the status of the switch changes normally; 4. Replace the seat switch; 5. Replace the controller and perform motor self-learning again.
	TL 32	Software authentication error	1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TL60	Controller undertemperature	The temperature of the controller is too low. Please wait until the temperature rises to above -22.0°F and then restart the power supply.
	TL61	5V internal power supply failure	1. Check whether there is any short circuit abnormality in the 5V power supply; 2. Check whether the load is abnormal and whether there is a short circuit in the encoder or throttle circuit; 3. Replace the controller and perform motor self-learning again.
	TL62	12V internal power supply failure	1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TL63	Motor temperature sensor error	1. Restart the vehicle; 2. Measure the resistance value of the motor's temperature sense, compare the resistance value of the temperature sensor with the temperature relationship table, and determine whether the temperature sense is abnormal; 3. Replace the motor and perform motor self-learning again.
	TL64	Data storage error	1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TL65	Motor encoder data error	1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TL66	Controller internal communication error	1. Restart the vehicle; 2. Replace the controller and perform motor self-learning again.
	TL67	Motor overtemperature warning	The motor temperature is too high. Wait for the motor to cool down, and then restart the power supply.
	TL68	Controller overtemperature warning	The controller temperature is too high. Wait for the controller to cool down, and then restart the power supply.
	TL69	Left electromagnetic valve has released	Enable the locking device of the electromagnetic valve;
	TL70	Pedal potentiometer error	1. Check the pin status of the potentiometer connector and whether the connector is connected properly; 2. Check whether the throttle voltage is within the range of $5V \pm 0.5$; 3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
	TL71	Steering wheel potentiometer error	1. Check the pin status of the potentiometer connector and whether the connector is connected properly;

System	Fault code	Fault type	Solutions
			<ol style="list-style-type: none"> 2. Check whether the throttle voltage is within the range of $5V \pm 0.5$; 3. Detect the throttle voltage change range to see if there is any abnormal voltage jump; 4. Replace the potentiometer.
Left blade controller and motor	ML 2	Blade motor stalled	<ol style="list-style-type: none"> 1. Check whether the blades are stuck; 2. Check whether the phase wire of the corresponding motor is damaged and whether the phase wire installation is misaligned; 3. Check parameter version; 4. Reset the PTO switch.
	ML 6	Controller phase loss	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Replace the motor; 3. Replace the controller.
	ML 7	MOSFET error	<ol style="list-style-type: none"> 1. Check the status of the MOS tube of the controller; 2. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 3. Replace the controller.
	ML 8	Controller undervoltage	Replace with a fully charged battery pack;
	ML 9	Controller overvoltage	<ol style="list-style-type: none"> 1. Replace with battery pack of correct voltage platform; 2. Replace the controller.
	ML 13	Controller overtemperature	<ol style="list-style-type: none"> 1. Check whether the blades are stuck; 2. The controller temperature is too high. Please wait for cooling before use and restart the power supply.
	ML 14	Software overcurrent	<ol style="list-style-type: none"> 1. Check whether the blades are stuck; 2. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 3. Reset the PTO switch.
	ML 15	Hardware overcurrent	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the status of the MOS tube of the controller; 3. Check the insulation resistance value of the motor phase wire and motor shell; 4. Restart the vehicle;
	ML 19	Operating sequence error	<ol style="list-style-type: none"> 1. Check whether the cutter switch is pulled up; 2. Check whether the grass gathering switch is connected well. 3. Check whether the seat switch status changes normally.
	ML 26	CAN timeout error - right drive	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector of the blade controller and whether the connector is connected properly; 2. Check whether CANL and CANH of the blade controller are short circuited or open circuited; 3. Restart the vehicle; 4. Check whether the indicator light of the blade controller is flashing. If the indicator light does not work, please replace the blade controller.

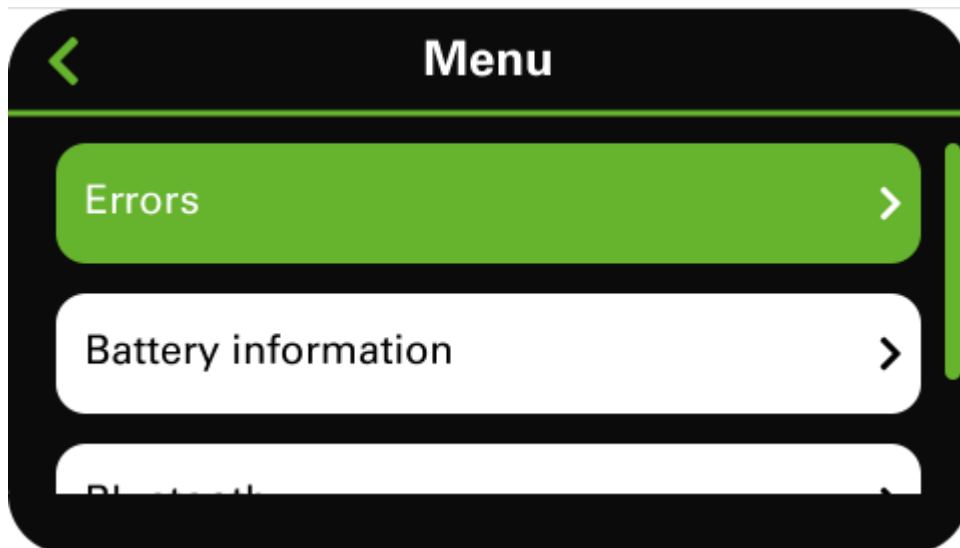
System	Fault code	Fault type	Solutions
	ML 31	Blade switch verification error	<ol style="list-style-type: none"> 1. Check the pin status of the PTO switch connector and whether the connector is connected properly; 2. Check whether there is a short circuit or open circuit in the PTO switch wiring; 3. Check whether water has entered the PTO switch and whether the status of the switch changes normally; 4. Replace the seat switch; 5. Replace the controller.
Right blade controller and motor	MR 2	Blade motor stalled	<ol style="list-style-type: none"> 1. Check whether the blade are stuck; 2. Check whether the phase wire of the corresponding motor is damaged and whether the phase wire installation is misaligned; 3. Check parameter version; 4. Reset the PTO switch.
	MR 6	Controller phase loss	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Replace the motor; 3. Replace the controller.
	MR 7	MOSFET error	<ol style="list-style-type: none"> 1. Check the status of the MOS tube of the controller; 2. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 3. Replace the controller.
	MR 8	Controller undervoltage	Replace with a fully charged battery pack;
	MR 9	Controller overvoltage	<ol style="list-style-type: none"> 1. Replace with battery pack of correct voltage platform; 2. Replace the controller.
	MR 13	Controller overtemperature	<ol style="list-style-type: none"> 1. Check whether the blades are stuck; 2. The controller temperature is too high. Please wait for cooling before use and restart the power supply.
	MR 14	Software overcurrent	<ol style="list-style-type: none"> 1. Check whether the blades are stuck; 2. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 3. Reset the PTO switch.
	MR 15	Hardware overcurrent	<ol style="list-style-type: none"> 1. Check whether the phase wire of the corresponding motor is damaged and whether the mounting screws are tight; 2. Check the status of the MOS tube of the controller; 3. Check the insulation resistance value of the motor phase wire and motor shell; 4. Restart the vehicle;
	MR 19	Operating sequence error	<ol style="list-style-type: none"> 1. Check whether the cutter switch is pulled up; 2. Check whether the seat switch status changes normally.
	MR 26	CAN timeout error - right drive	<ol style="list-style-type: none"> 1. Check the pin status of the CAN connector of the blade controller and whether the connector is connected properly; 2. Check whether CANL and CANH of the blade controller are short circuited or open circuited; 3. Restart the vehicle;

System	Fault code	Fault type	Solutions
			4. Check whether the indicator light of the blade controller is flashing. If the indicator light does not work, please replace the blade controller.
	MR 31	Failed to verify blade signal	<ol style="list-style-type: none"> 1. Check the pin status of the PTO switch connector and whether the connector is connected properly; 2. Check whether there is a short circuit or open circuit in the PTO switch wiring; 3. Check whether water has entered the PTO switch and whether the status of the switch changes normally; 4. Replace the seat switch; 5. Replace the controller.
Display	D1	CAN Timeout with PMU	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and PMU are connected properly; 2. Replace the display. 3. Replace the PMU.
	D2	CAN Timeout with left traction controller	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and left traction controller are connected properly; 2. Replace the display. 3. Replace the PMU.
	D3	CAN Timeout with right traction controller	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and right traction controller are connected properly; 2. Replace the display. 3. Replace the PMU.
	D4	CAN Timeout with left blade controller	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and blade controller are connected properly; 2. Replace the display. 3. Replace the blade controller.
	D5	CAN Timeout with right blade controller	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and blade controller are connected properly; 2. Replace the display. 3. Replace the blade controller.
	D6	CAN Timeout with right blade controller	<ol style="list-style-type: none"> 1. Check whether the connectors of the display and blade controller are connected properly; 2. Replace the display. 3. Replace the blade controller.

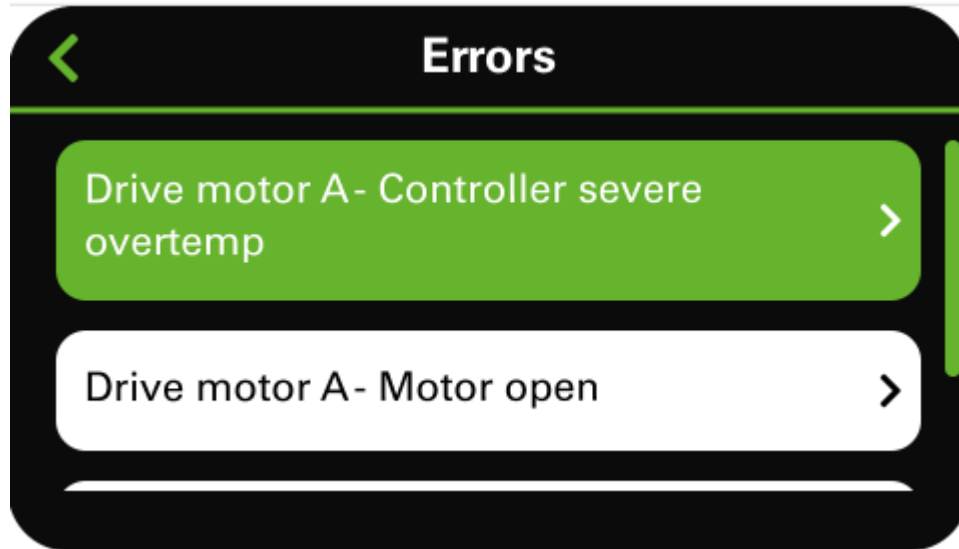
3.1.3 Reading the fault code (on the digital display)



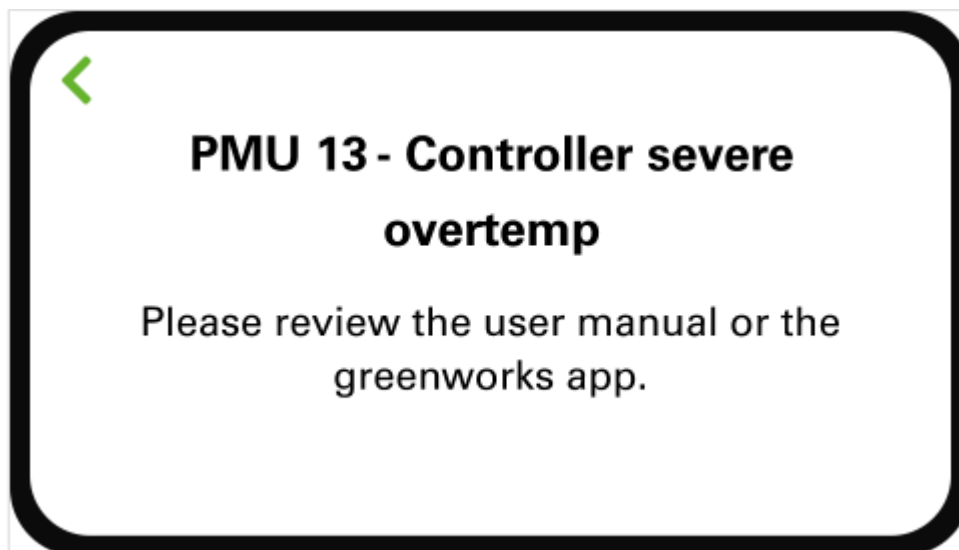
When a fault occurs, the fault indicator will be displayed on the screen. Please press the "Menu navigation - Up/Enter menu" button to enter the menu page.



Use "Menu navigation - Up/Down" button to select "Errors", then press "Confirm button/Adjust driving speed" button to enter the fault list.



Use “Menu navigation - Up/Down” button to select which item you want to check (if there are multiple faults), then press “Confirm button/Adjust driving speed” button to enter the details.



This page provides quick troubleshooting, for more detailed methods, please refer to the manual.

3.2 Electrical components

3.2.1 Switches

Switches either open a circuit to stop current flow or close and allow current to flow through.

- A normally open (NO) switch prevents current flow until the switch is actuated, completing the circuit, and allowing current to flow through it. An example is a light switch - the lights are off until the switch is actuated, and the lights go on.
- A normally closed (NC) switch allows current to flow until the switch is actuated, breaking the circuit, and stopping current flow through it. An example is an ignition switch that grounds the magneto when

in the OFF position (completing the circuit) but opens the circuit when in the ON position allowing the engine to operate.

The switches are selected with reference to their nominal current (the contacts must be of sufficient size to carry the required current), rated voltage and type of actuation (pressure switches, traction, rotation, momentary contact or microswitches).

NOTE:

Before doing an electrical test, make sure that the connections to the switches are stable and that the switch is actuated correctly (Safety switches may need adjustment in order to be actuated correctly).

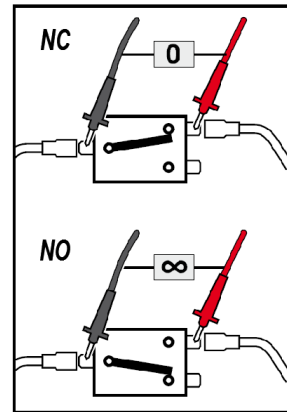
IMPORTANT:

During the checking process, remove the switches from their respective circuits, unplugging the connectors. If the cables are left in place, the machine components or the meters can be damaged.

Normally Open Switch Test

To test a normally closed switch

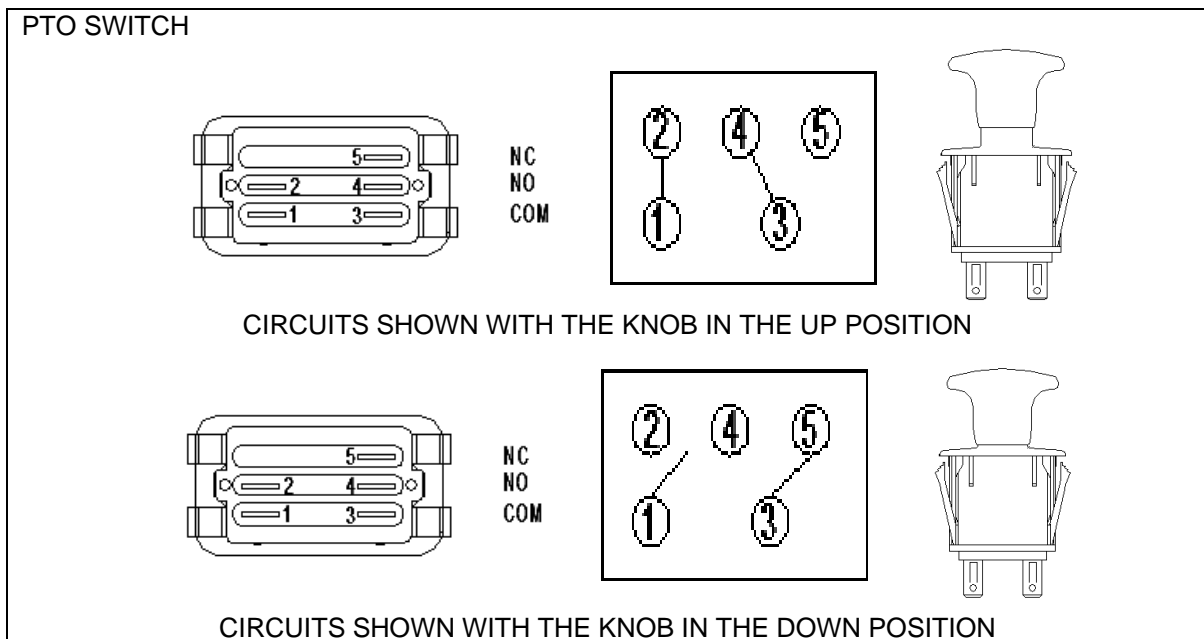
1. Connect the Multimeter between the switch terminals.
 - The meter should indicate an open circuit (infinite resistance).
2. Activate the switch.
 - The Multimeter should indicate a closed circuit (zero resistance). This indicates the switch is operating properly.
 - Variation from test results described indicates a defective switch.

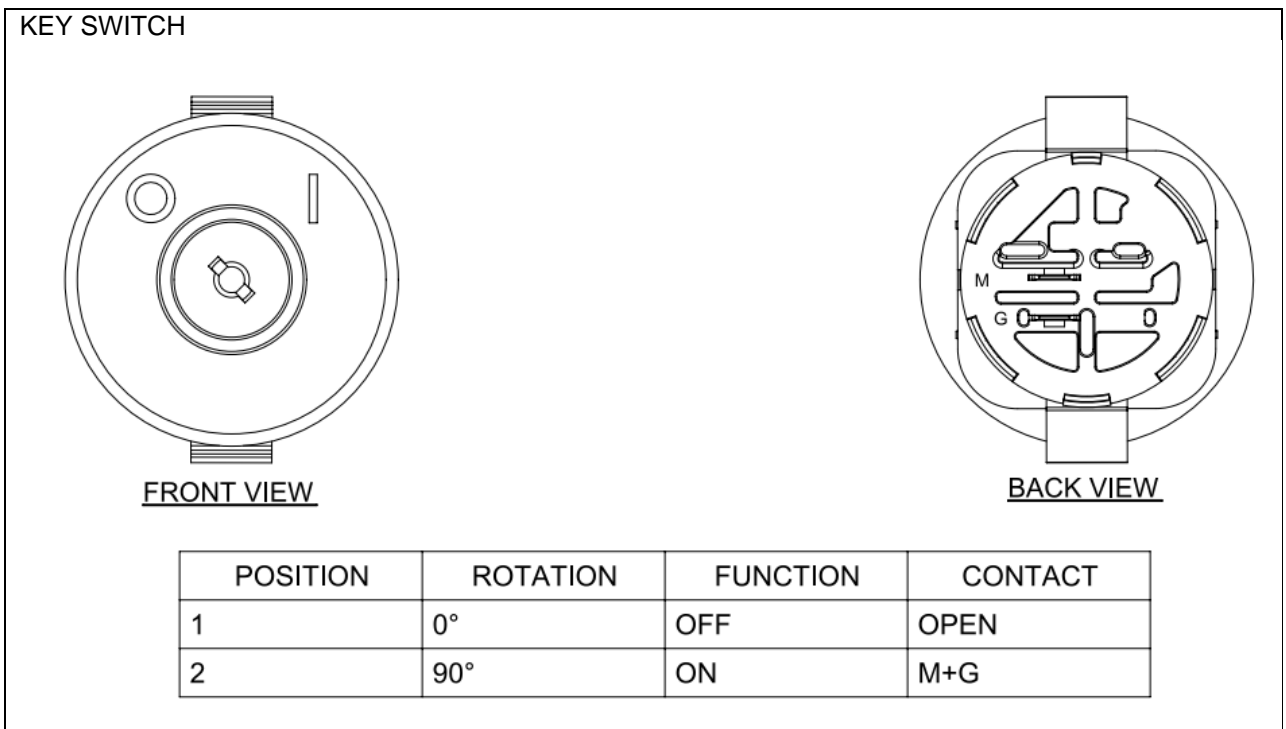
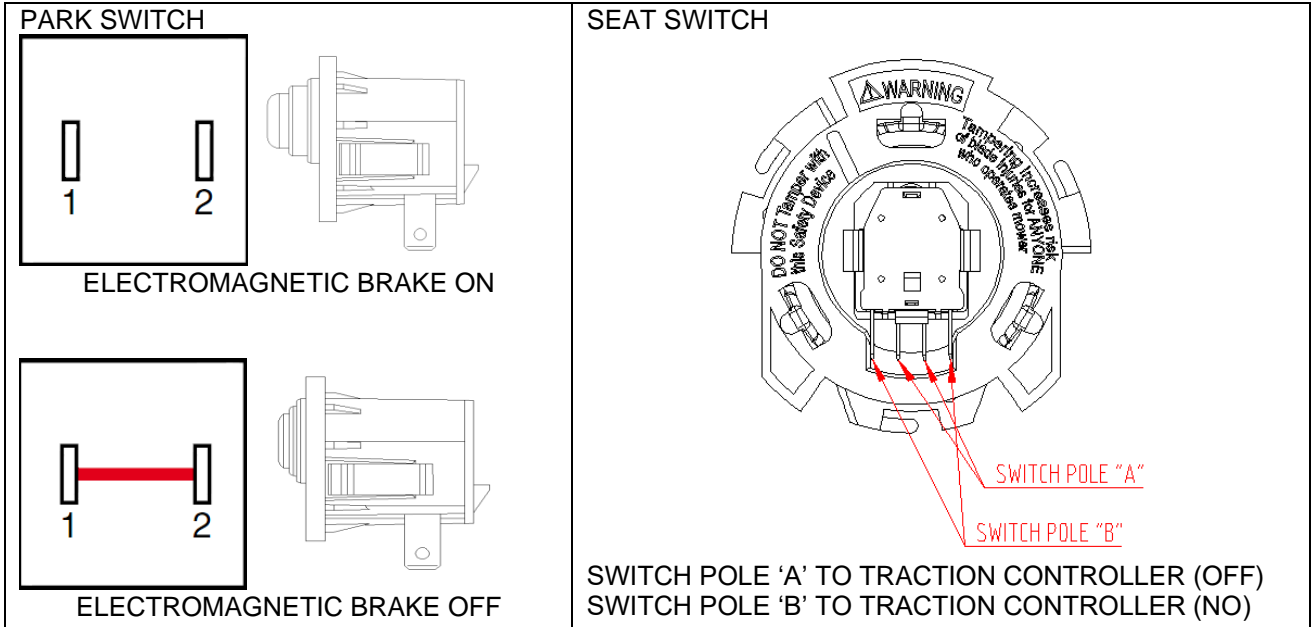


The diagrams show the connections of the electrical components in different situations.

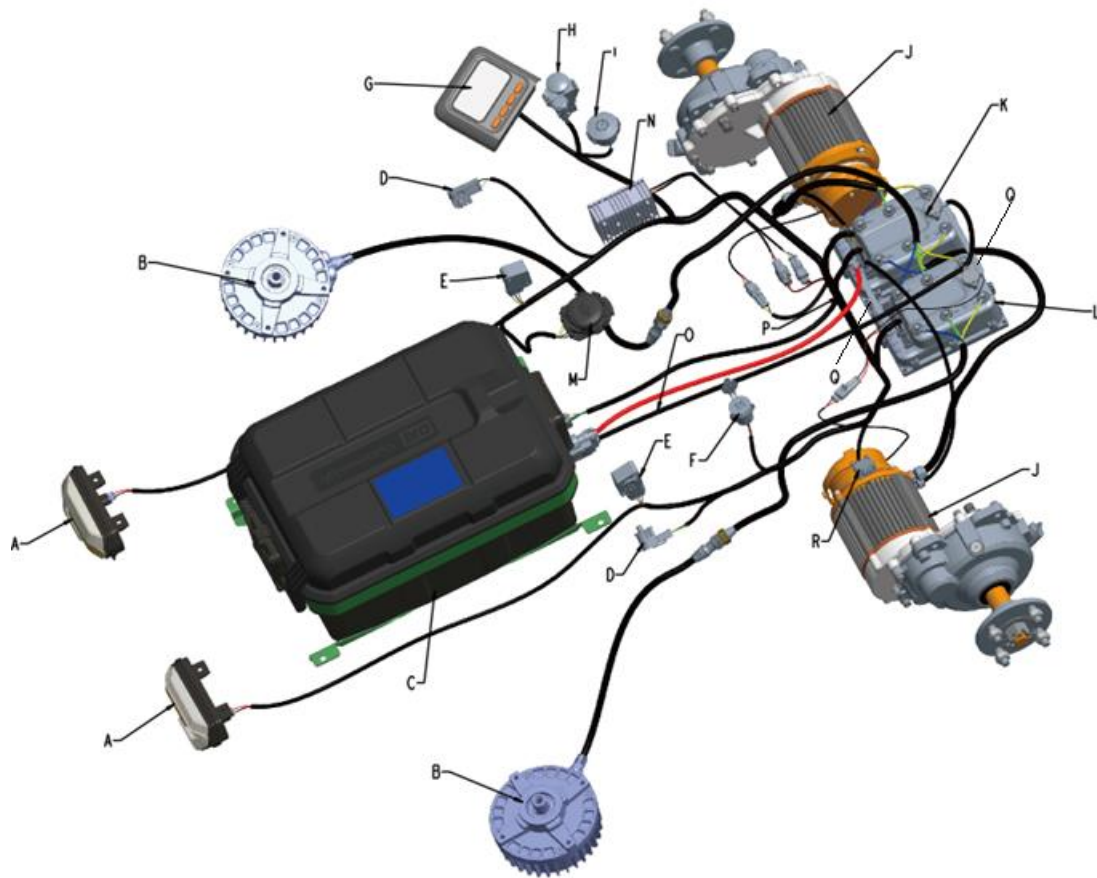
NOTE:

The continuous line indicates the electrical continuity of the circuit. All switches are shown from the rear.





3.2.2 Electrical wiring diagram



- | | |
|--------------------------|-------------------------------|
| A. Led Light | J. Motor and Gearbox Assembly |
| B. Blade Motor | K. Drive Motor Controller |
| C. Battery Pack Assembly | L. Blade Motor Controller |
| D. Parking Switch | M. Seat Switch |
| E. Accelerator | N. DC-DC |
| F. USB Charge Port | O. Harness_Power |
| G. Instrument | P. Harness_Control & Signal |
| H. Blade PTO | Q. Bus Bar |
| I. Key Switch | |

4. Deck

The deck is the part of the vehicle that carries out mowing work, which comprises the blade, the blade motor and the welded body of the deck. When removing the blade and the blade motor, simply lift the front section of the machine.

IMPORTANT:

Before removal and installation of the following parts specific to the deck, make sure the key switch of the vehicle is turned off, and, if necessary, cut off the main power supply.

4.1 Blade

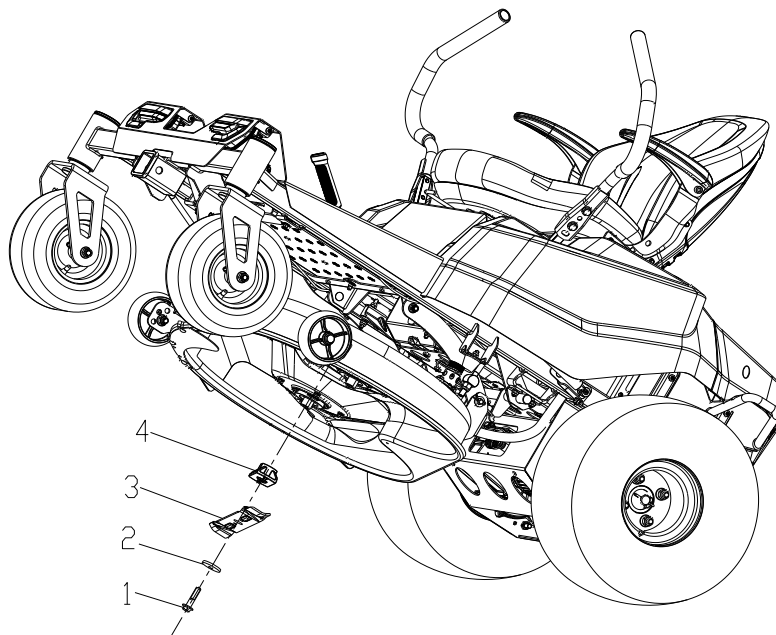
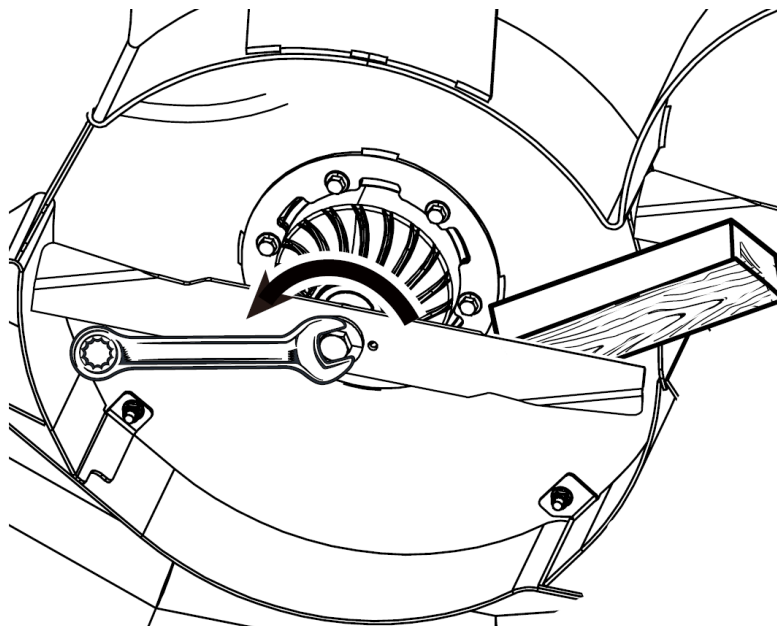


Fig. 1

- | | |
|--------------------|--------------------|
| 1. Bolt 7/16-14UNC | 3. Discharge blade |
| 2. Washer | 4. Blade holder |

Removal:

1. Using a lifting tool, lift the front end of the deck for easier access to the blades. Ensure the mower is secure before working underneath it.
2. Place a block of wood between the blade and the deck to prevent it from spinning while you work.



3. Loosen the bolt (1) with a 16 mm socket by rotating counterclockwise.
4. Remove the bolt (1), the washer (2), the blade (3), and the blade holder (4) in order.

Installation:

1. Put the washer (2), the blade (3), and the blade holder (4) on the bolt (1) in the order as shown in the Fig. 1 and screw the bolt (1) into the threaded hole of the motor shaft.
2. Tighten the bolt (1) with a 16 mm socket by rotating clockwise, with a fastening torque of 90-100 N•m (66~74 Ft-lbs).
3. Gently rotate the blade, make sure there is no conflict between the two blades, no conflict between the blades and the deck housing, such that the blades can rotate freely and smoothly.

NOTE:

- Frequently inspect the wear of the blades. Replace in time if a blade is overworn, otherwise it will affect the dynamic balance of the working motor and lead to earlier damage of the blade motor.
- Make sure the mower is secured when it is lifted and while working on it.
- The removal and the installation steps for the two blades are the same.

4.2 Blade motor

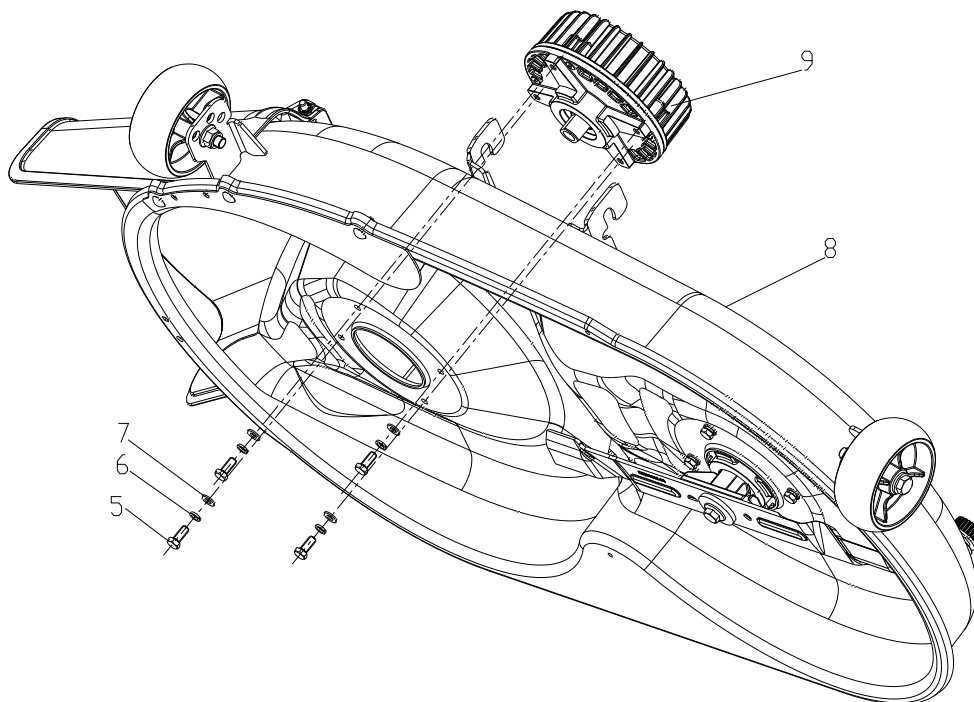


Fig. 2

- | | |
|---------------------------|------------------|
| 5. Bolt 5/16-18UNC | 8. Deck weldment |
| 6. Spring washer $\phi 7$ | 9. Blade motor |
| 7. Flat washer $\phi 8$ | |

Removal:

1. Using a lifting tool, lift the front end of the deck to a certain angle.
2. Make sure that the start switch of the vehicle is in OFF state. Cut off the main power of the vehicle, if necessary.
3. Use 5mm socket to loosen harness clip bolt and disassemble the motor connector as shown in Fig.3.



Fig. 3

10. Cable harness clip bolts

4. Remove the blade (see 4.1 for detailed steps).
5. Use a 13 mm socket to loosen the bolt (5) by rotating counterclockwise.
6. Remove the bolt (5), the flat washer (7), and the spring washer (6) altogether. Each motor is fixed by 4 sets of bolts.
7. Remove the blade motor (9) from the deck.

Installation:

1. Put the blade motor (9) into the mounting hole of the deck housing. Rotate the motor until the motor mounting hole is aligned with the deck mounting hole. Connect motor connector and tighten harness clip.
2. Slip the flat washer (7) and the spring washer (6) onto the bolt (5) in order. Apply thread locker on the end of the thread and manually screw it clockwise into the threaded installation hole of the motor. Each motor is fixed by 4 sets of bolts.
3. Tighten the bolt (5) with a 13 mm socket with a tightening torque of 10-15 N•m (7~11 Ft-lbs). Motor installation is complete.

- Refer to the reverse operation steps of motor removal, install the blade, tighten the wiring harness fixing bolts, and install the three-phase wire and the hall sensor harness of the blade controller.

NOTE:

- The main power supply of the vehicle must be cut off when removing the wire harness of the blade controller.
- When installing the wire harness of the blade motor, the motor (left and right) in each position must correspond to the specific blade controller (left and right), and must not be reversed.

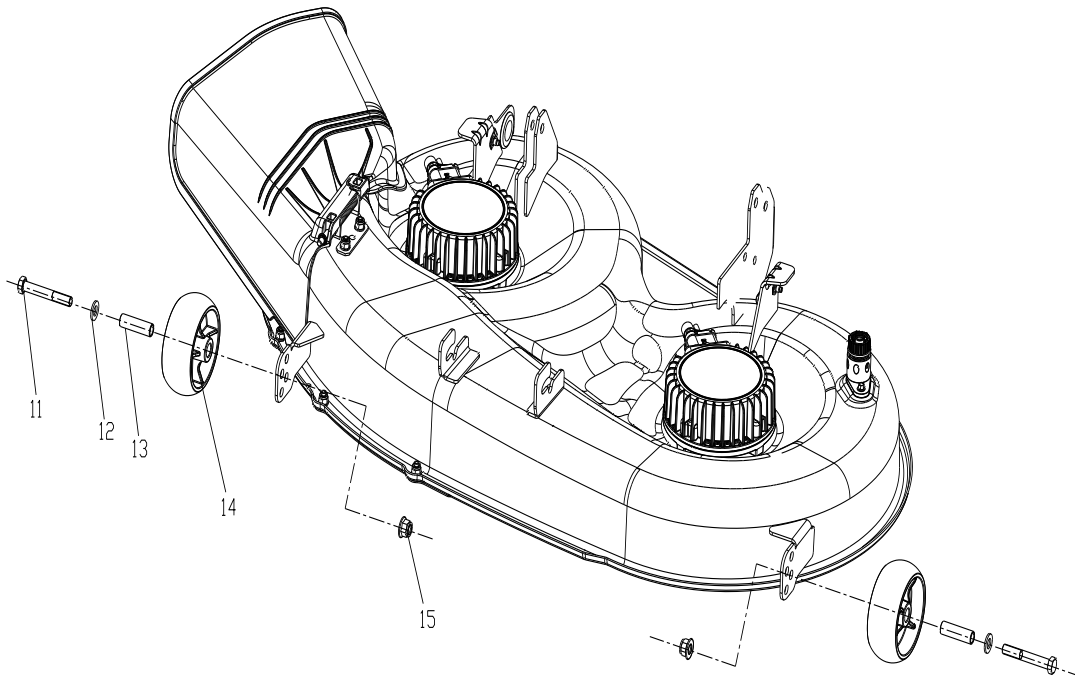
4.3 Anti-scalp wheel

Fig. 4

- | | |
|---------------------------|----------------------|
| 11. Bolt M12×80 | 14. Anti-scalp wheel |
| 12. Flat washer $\phi 12$ | 15. Nut M12 |
| 13. Sleeve | |

Removal:

- Use two 18 mm sockets or 18 mm wrenches to loosen the bolts (11) and nuts (15).
- Pull out the bolt (11).
- Remove the roller (14), the sleeve (13), and the flat washer (12) from the deck.

Installation:

- Install the sleeve (13) into the inner hole of the roller (14).
- Pass the bolts (11), the flat washer (12) through the inner hole of the roller sleeve and the deck (8) in order, then screw on the nut (15).

3. Use two 18 mm sockets or 18 mm wrenches to tighten the bolts (11) and nuts (15), with a tightening torque of 45-50 N•m (33~37 Ft-lbs). The roller (14) can now rotate freely, while the sleeve (13) cannot.
4. The installation is complete.

NOTE:

- The removal and installation steps for the two anti-scalp wheels are the same.
- The installation direction for the bolts of the two rollers is shown in the figure. The roller nuts (15) on both sides are located on the inside of the deck.
- Inspect the anti-scalp wheel after installation. It should be spinning freely without a jam.

4.4 Cutting height adjustment

Before adjusting the height of the blade, make sure that the tire pressure meets the standards below.

Rear wheels	Front wheels
8-10 PSI	40-42 PSI

4.4.1 Deck levelling

1. Drive the machine to a level ground, put the deck height adjustment lever in the lowest position, which is 1.5-inch position hole (as shown in Fig.5 below).
2. Use an 18 mm open-end wrench to loosen the two adjusting nuts at the upper end of the height adjustment rod.
3. Loosen the nut (17), adjust the nut (16) and the nut (18): tighten the nuts to increase the blade height and loosen the nuts to decrease the blade height.
4. Use a tape measure to measure the clearance above the ground at the four corners of the deck (A, B, C, D in Fig.5)
5. Use two 18 mm open-end wrenches to roughly adjust the two nuts (16) and (18) to lift A, B, C, and D off the ground at roughly the same height.
6. The rear two positions (A, C) are allowed to be slightly higher than the front two positions (B, D), with a height difference no more than 5 mm. The height difference between the left and right positions A, B and C, D shall be less than 2 mm. The deck can be regarded as levelled within such standard.

NOTE:

After the deck is preliminarily levelled, do not immediately tighten the adjusting nut (17).

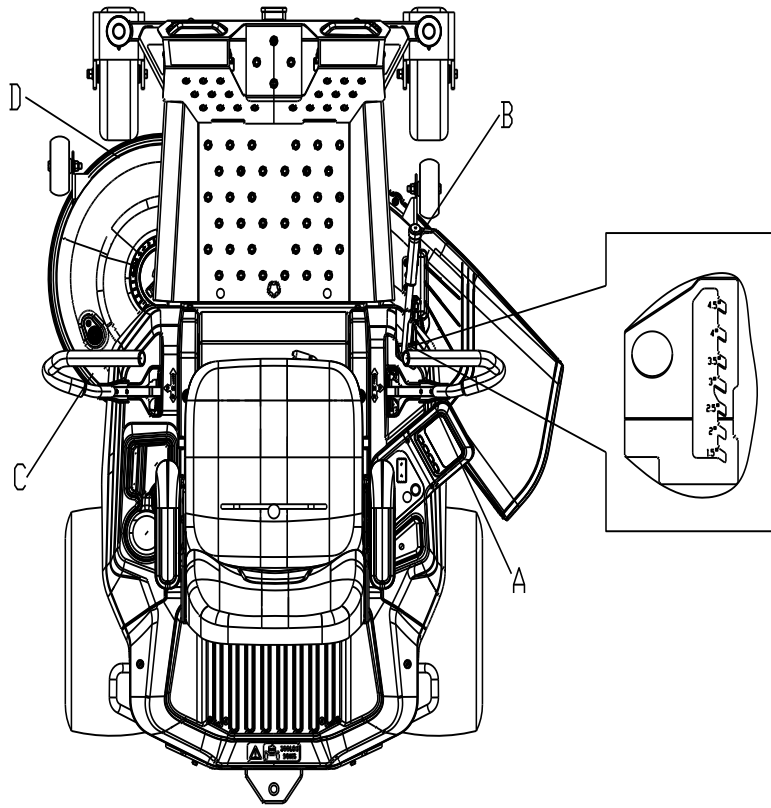


Fig. 5

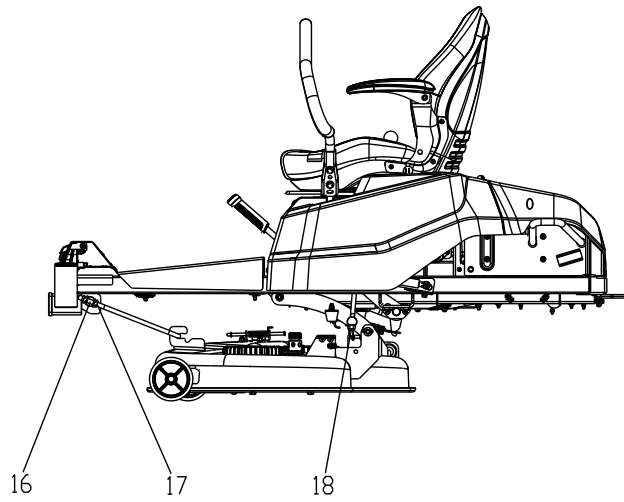


Fig. 6

- 16. Hex flange locking nut M12
- 17. Hex flange locking nut M12

- 18. Hex flange locking nut M12

4.4.2 Deck height adjustment

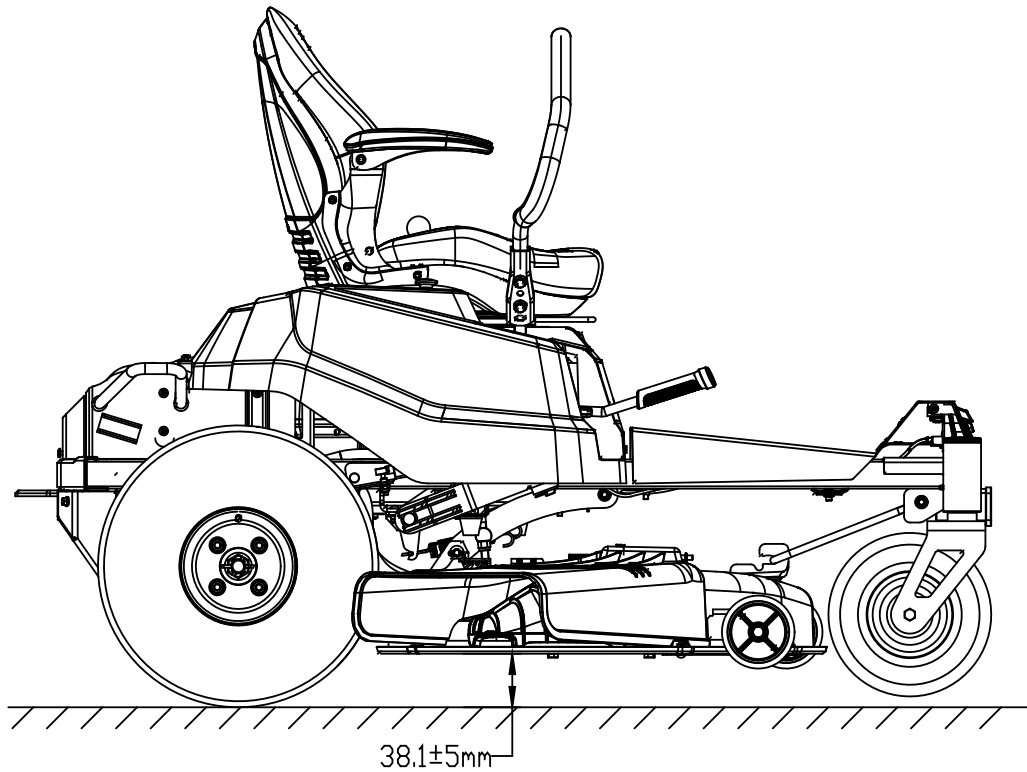


Fig.7

After the preliminary levelling of the deck is completed, adjust the height of the blade.

At this point, the blade needs to have a theoretical clearance of 1.5 inches (38.1±5 mm) above the ground (as shown in Fig.7).

Use a tape measure to measure the clearance of the right blade tip above the ground on the right side around the grass discharge chute. A clearance within the range of 38.1±5 mm is appropriate. If not, use the steps below to adjust the height of the blade.

1. Loosen the nut (17), then adjust the nuts (16) and (18): loosen the nuts to increase the height of the blade, and tighten the nuts to decrease. For each adjustment, ensure the direction and rotation of nuts (16) and (18) on four height adjustment rods are exactly the same. The height of the blade rises or falls by 1.75 mm per rotation.
2. Measure and adjust multiple times using the above method until the height of the blade is within the range of 38.1±5 mm.
3. Use two 18 mm open-ended wrenches to tighten the nut (17). When tightening the nut (17), the nut (16) must be kept in place.

NOTE:

- The deck needs to be preliminarily levelled and then raised to ensure the deck is level and the two blades are basically at the same height.
- If the deck is installed with a discharge chute, install the baffle at last. If the deck has no discharge chute, skip this step.

4.4.3 Discharge chute

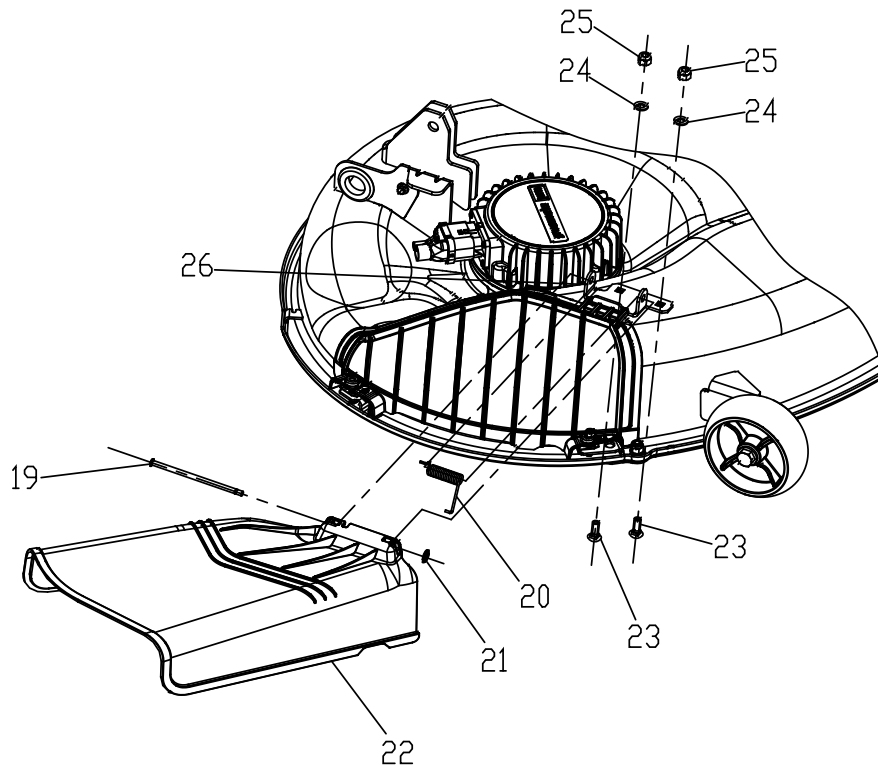


Fig.8

- | | |
|---------------------|-----------------------------|
| 19. Fixing pin | 23. Square neck bolt M8×20 |
| 20. Torsion spring | 24. Flat washer φ8 |
| 21. Bearing clip | 25. Nut M8 |
| 22. Discharge chute | 26. Discharge chute support |

Removal:

1. Hold bolt (23) with hand, use a 13 mm socket to loosen the nut (25), then remove bolt (23) and washer (24).
2. Remove the discharge chute (22) and the discharge chute support (26) altogether.
3. Remove the bearing clip (21) and pull out the fixing pin (19).
4. Remove the torsion spring (20), the discharge chute support (26) and the discharge chute (22).

Installation:

1. Put the torsion spring (20) in the middle of the discharge chute support (26).
2. Put the discharge chute (22) on the support (26) and align the holes.
3. Pass the fixing pin (19) through the aligned holes and insert the bearing clip (21).
4. Use the bot (23)), the flat washer (24), and the nut (25) to fasten the support (26), with a fastening torque of 15-20 N•m (11~15 Ft-lbs).

NOTE:

If no discharge chute is installed, skip this step.

4.4.4 Mulching

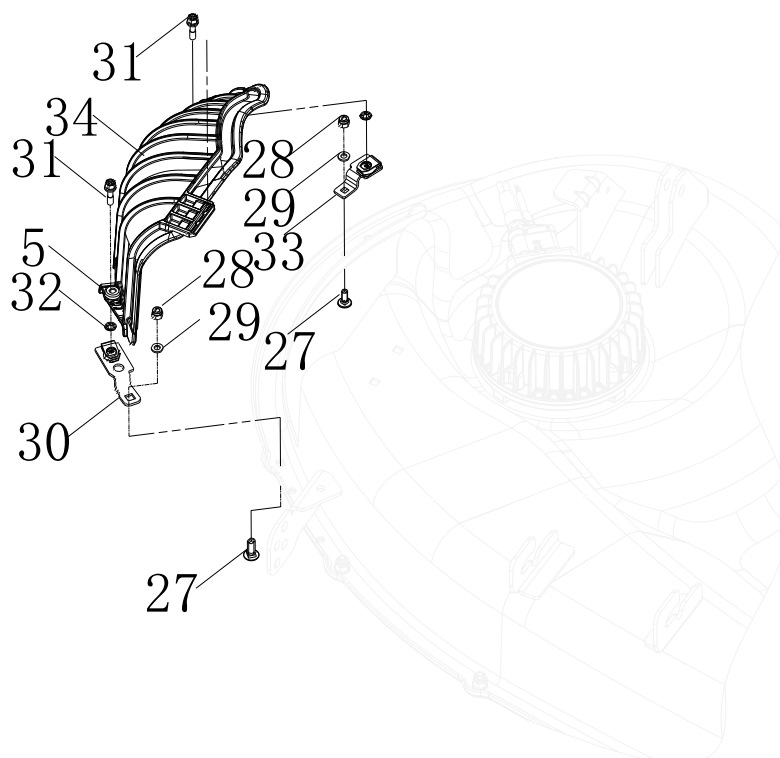


Fig.9

27. Square neck bolt M8x20	31. Custom bolt
28. Nut M8	32. Bearing clip
29. Flat washer φ8	33. Holder B
30. Holder A	34. Mulching

Removal:

1. Use a Phillips screwdriver to loosen the custom bolts (31) and remove the bearing clips (32).
2. Use a 13 mm socket or wrench to loosen the nuts (28).
3. Remove the flat washers (29), the bolts (27), the holder A (30), the holder B (33), and the mulching (34).

Installation:

1. Use the bolts (27), the flat washers (29), and the nuts (28) to fasten the holder A (30) and the holder B (33).
2. Use the custom bolts (31) and the bearing clips (32) to fasten the mulching (34).

NOTE:

If no mulching is installed, skip this step.

5. Operation components

5.1 Steering control lever

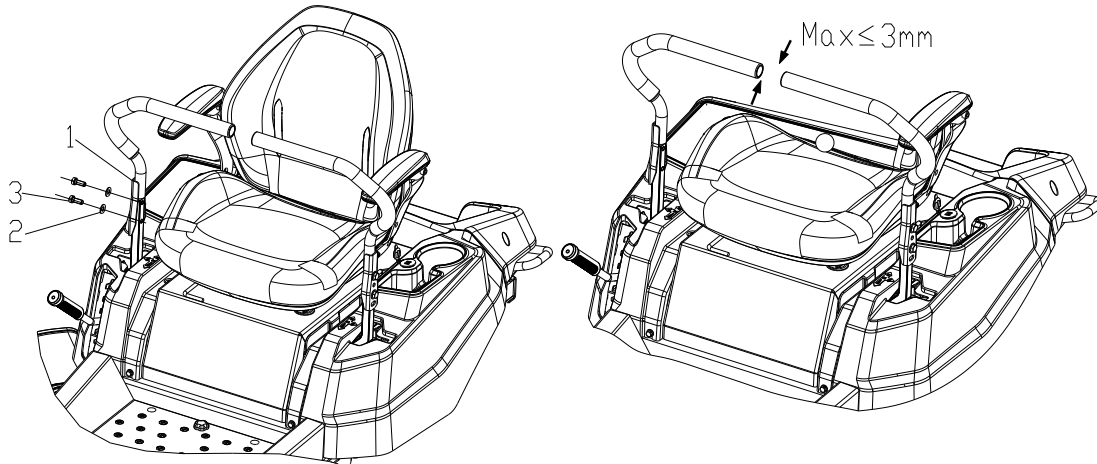


Fig. 1

1. Steering control lever
2. Disc spring 22.5-2

3. Bolt M10x25

Removal:

1. Use a 16 mm socket or a 16 mm wrench to loosen the bolt (3).
2. Remove the bolt (3) and the disc spring (2).
3. The control lever (1) is ready to be removed.

Installation:

1. Put the control lever (1) on the control rod and align it with the two holes on the mounting plate. The control lever has two sets of mounting holes (upper and lower) to ensure the control lever has two positions (high and low) available. Installation shall be carried out according to the actual situation faced by the operator.
2. Insert the bolt (3) through mounting holes on the disc spring (2) and the control lever (1). Tighten the control lever using the internal thread on the control rod, with a tightening torque of 20-30 N•m (15~22 Ft-lbs).

NOTE:

- The removal and installation steps for the two control levers are the same.
- After installation, the levers on two sides should be aligned with one another at both the head and the tail, with no obvious misalignment. The maximum longitudinal distance between the centers of the two control levers should not exceed 3 mm (as shown in Fig.1 above).

5.2 Operation enclosure, switch and digital display

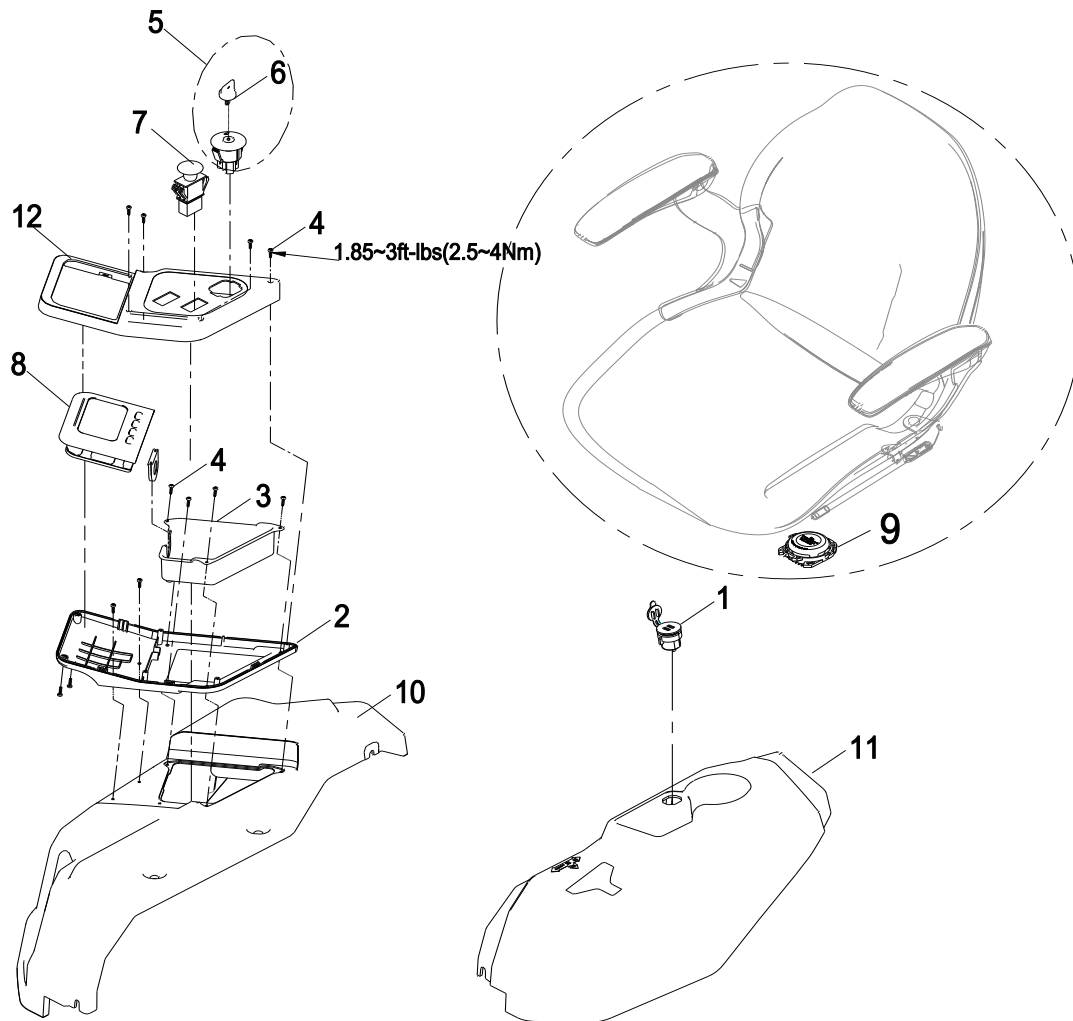


Fig. 2

- | | |
|---------------------------|-----------------------|
| 1. USB | 8. LCD Dashboard |
| 2. Lower Shell | 9. Switch, Seat |
| 3. Guard | 10. Right Cover Piece |
| 4. Screw, Torx T20 ST4*16 | 11. Left Cover Piece |
| 5. Ignition Assembly | 12. Upper Housing |
| 6. Key | |
| 7. PTO Switch | |

Removal: panel&wires

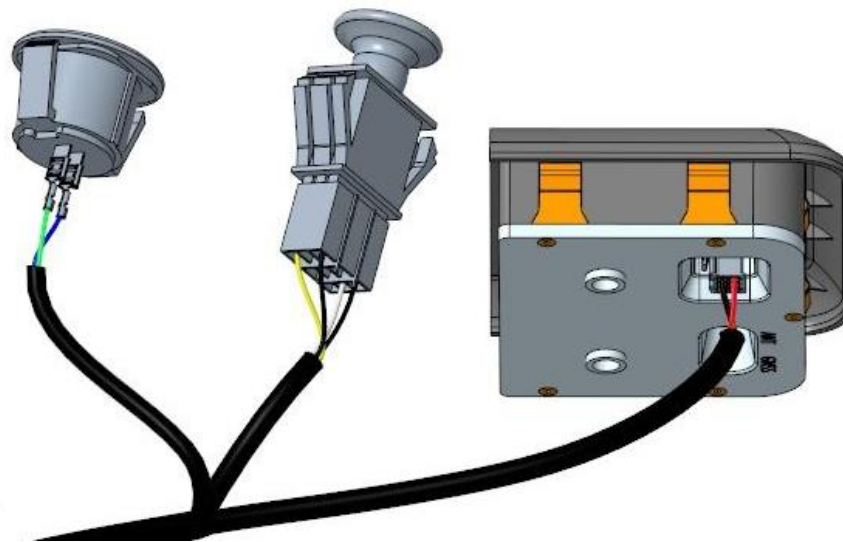
The display screen and other parts are installed on the right enclosure, while the USB connector is on the left enclosure.

1. Use a T20 wrench to remove screws (4) from upper housing (12) and lower shell (2).
2. Take guard (3) out, unplug all connectors, separate the entire switch panel, then you can remove right cover piece (10).

CAUTION:

To prevent damage to the switch and the panel, do not drag the wire harness.

3. Use a 13 mm socket to loosen and remove the four assemblies on the corners of enclosure.
4. Open left enclosure (12).
5. Disassemble left enclosure.
6. Disconnect the red positive and black power cords of USB. Remove the USB (1) by rotating the USB nut counterclockwise.



Connectors of the right operation enclosure



Connectors of the left operation enclosure

Fig.3

Installation:

1. Align ignition assembly (5), PTO switch (7), and LCD dashboard (8) to three holes on the upper housing (12).
2. Push them into the upper housing (12) with a slightly stronger force until the snaps clip with the back of the panel to complete the installation.
3. Connect the component connectors at the back, as shown in the figures above.
4. Use ST4*16 screws to install left cover piece (11) and right cover piece (10), with a fastening torque of 1.85~3 Ft-lbs (2.5~4N•m).

NOTE:

- The removal and installation steps for the left and right cover piece are the same.
- Connection of connectors inside cover piece is shown as Fig.3 above.

5.3 Potentiometer

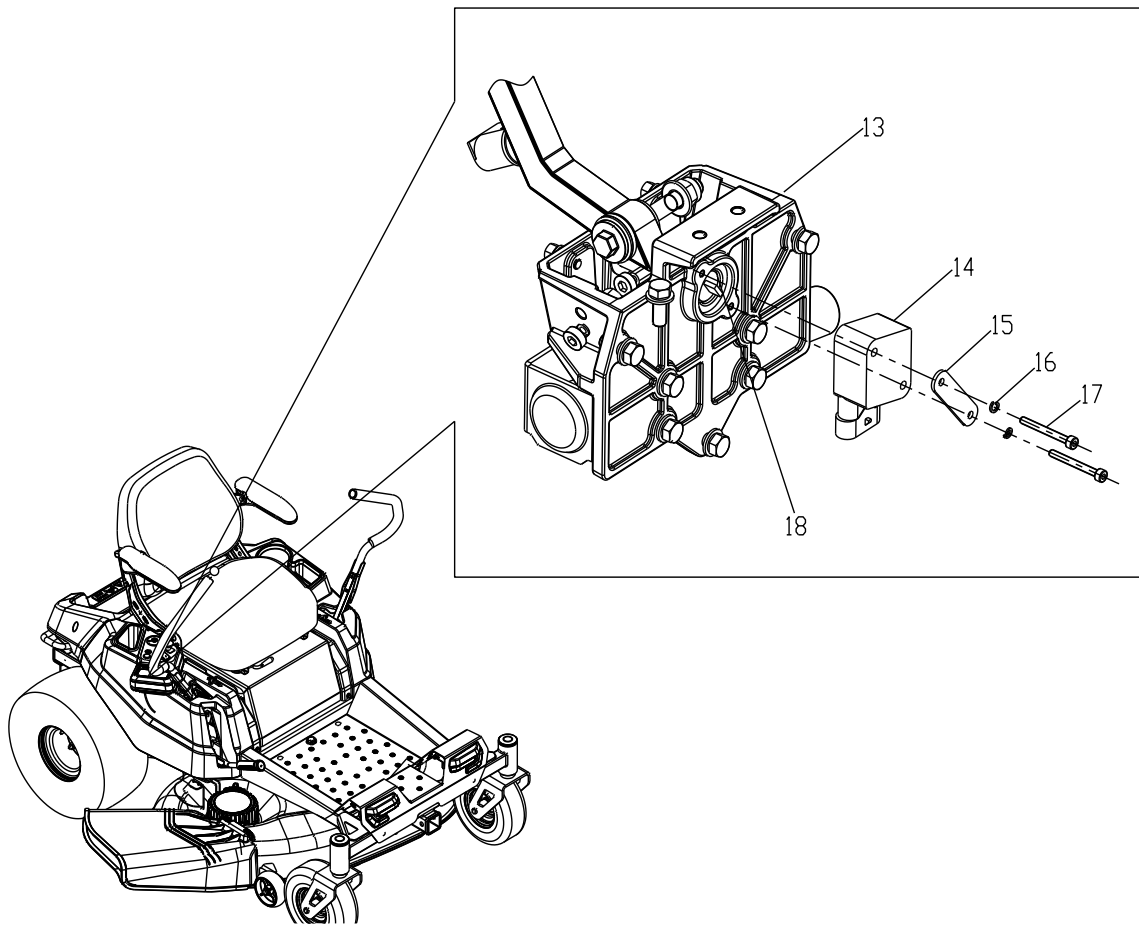


Fig. 4

13.Potentiometer mount
 14. Potentiometer
 15.Potentiometer pad

16.Spring washer ϕ 4
 17.Screw M4 \times 35
 18.Shaft

Removal:

1. Use a 3 mm Allen wrench to remove the screw (17), the spring washer (16), and the potentiometer pad (15) by rotating counterclockwise (the screw comes with thread locker when released. If you have difficulty in removal, slightly heat the screw with an electric heat gun first).
2. Disconnect the potentiometer wire harness connector (see Fig. 5 and 6 below).
3. Remove the potentiometer (14) from the mount (13) and the shaft (18).

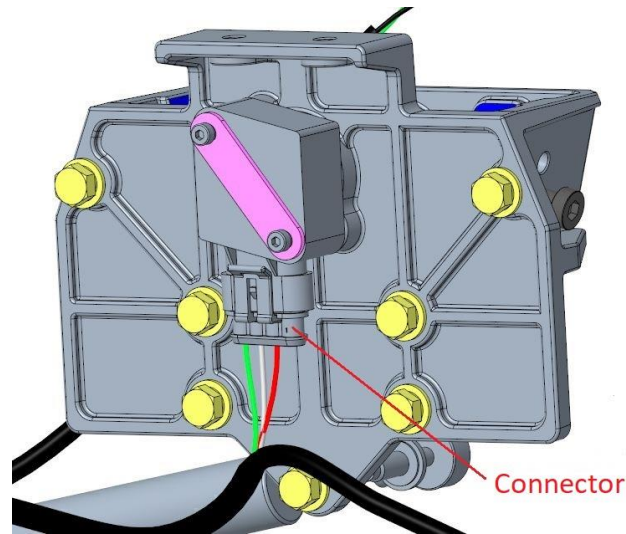


Fig. 5

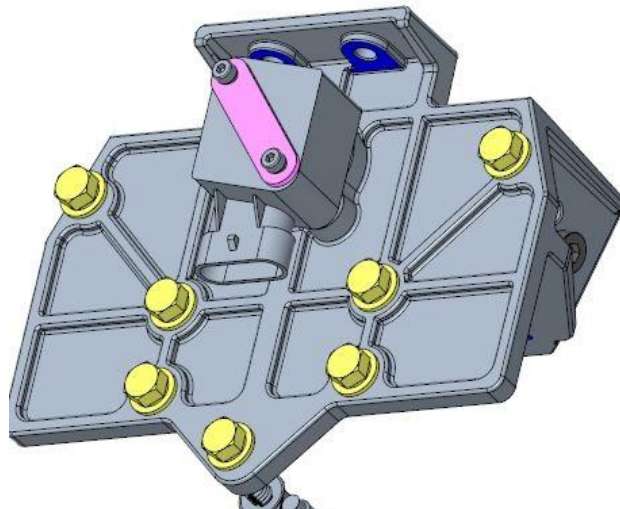


Fig. 6

Installation:

1. Align the flat wire end of the potentiometer (14) to the wire of the shaft (18).
2. Pass the screw (17), the spring washer (16), and the potentiometer pad (15) through the potentiometer (14) and fasten them to the mount (13) by using a 3 mm Allen wrench to tighten torque of 3 N•m (2 Ft-lbs). (Apply a small amount of thread glue on the screw).
3. Connect the potentiometer wire harness connector (as shown in the figure above).
4. Adjust the voltage values of the neutral and front and rear positions of the potentiometer (see 5.4.2 for detailed steps).

NOTE:

- The removal and installation steps for the potentiometers on both sides are the same.
- After mounting the potentiometers on the shaft, synchronize the potential value of the potentiometers before fully tightening them.

5.4 Potentiometer voltage adjustment

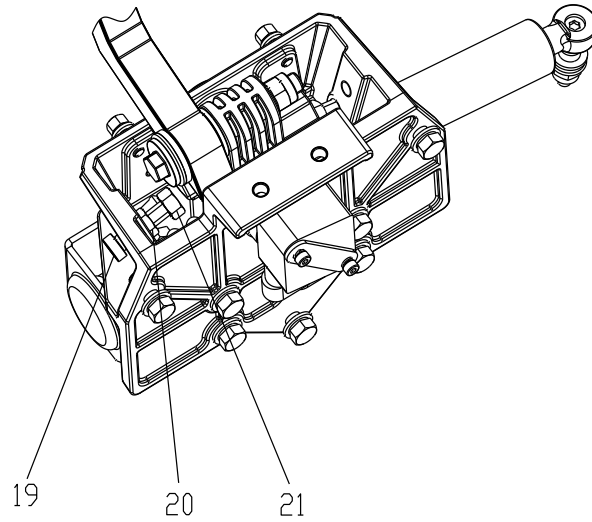


Fig. 7

19. Stop rod
20. Anchor nut

21. Spacing nut

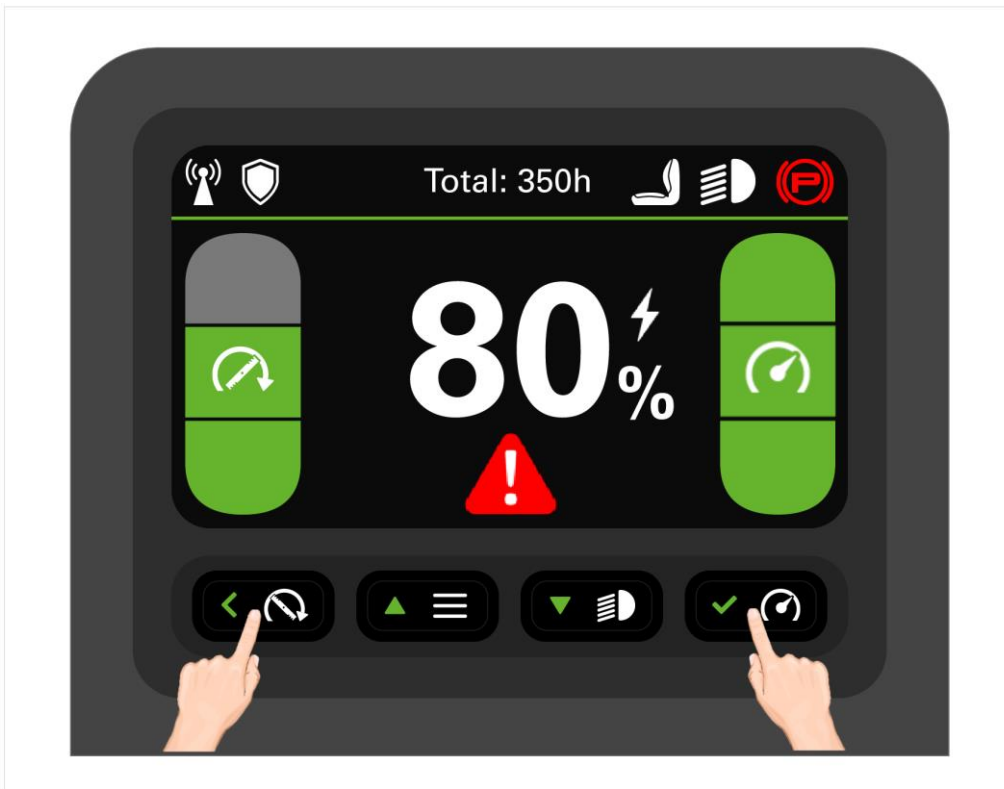


Fig. 8

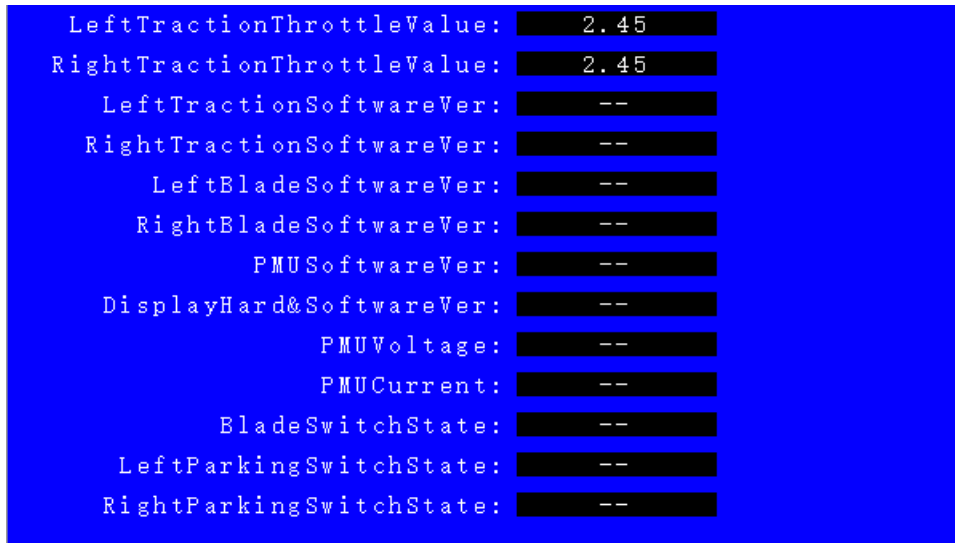




Fig. 9

5.4.1 Potentiometer voltage measurement:

1. Turn on the vehicle main power and make sure that the control levers are in the middle position and open status.



2. Press and hold the buttons ( and ) for more than 3 seconds, as shown in Fig.8. Then will enter the system management interface.
3. The voltage value displayed in the screen, as shown in Fig.9. The values in the first and second rows represent the voltage of left and right potentiometers. Please refer to the data in the following table for adjustment.
 - The correspondence between the controllers and standard interval of voltage ranges are given in the table below:

Controller position	Middle	Foremost	Rearmost
Standard range of the left voltage	2.3-2.5 V	0.3-0.4 V	3.15-3.25 V
Standard range of the right voltage	2.3-2.5 V	4.4-4.5 V	1.55-1.65 V

- If the detected voltage value deviates from the set value, take following steps to adjust.

5.4.2 Potentiometer voltage adjustment

Neutral position adjustment:

After installing the potentiometer, monitor the natural position voltage via the voltage monitoring software. Adjust it, if it falls out of the standard range:

1. Loosen the two screws (17) with a 10 mm socket wrench.
2. Slightly rotate the potentiometer mounting plate (15) clockwise or counterclockwise until the natural position voltage of the potentiometer is within the standard range.
3. Fasten the two screws (17).

Forward adjustment:

1. Make sure the end face of the spacing nut (21) in front of the operation mount is aligned with that of the stop rod (19) (if not, adjustment is needed, and the stop rod (19) should be applied with thread locker).
2. Loosen the anchor nut (20) with a 13 mm open-ended wrench and rotate the stop rod (19) clockwise or counterclockwise with a 6 mm Allen key to adjust the end face position of the spacing nut (21).
3. Push the control lever forward until the end face of the spacing nut (21) is reached and cannot be pushed further.
4. Read current voltage with a handheld encoder and see if it falls within the standard range of the foremost position. If the value is too small (too big), continue to rotate the stop rod (19) so the end face of the spacing nut (21) moves forward (backward), until the voltage is within the standard range.

Reversing adjustment:

1. Make sure the end face of the spacing nut (21) at the rear end of the operation mount is aligned with that of the stop rod (19) (if not, adjustment is needed, and the spacing nut (21) should be applied with thread locker).
2. Loosen the anchor nut (20) with a 13 mm open-ended wrench and rotate the stop rod (19) clockwise or counterclockwise with a 6 mm Allen key to adjust the end face position of the spacing nut (21).
3. Push the control lever backwards until the end face of the spacing nut (21) is reached and cannot be pushed further.
4. Read current voltage with a software in the computer and see if it falls within the standard range of the rearmost position. If it is too small (too big), continue to rotate the stop rod (19) so the end face of the stop nut (21) moves forward (or backward), until the voltage is within the standard range.
5. A set of the stop rod (17), the anchor nut (20), and the spacing nut (21) are installed at both front and rear end of the operation mount, forming a stop mechanism for the foremost position and the rearmost position of the control lever.

NOTE:

- OBD port connector must be connected properly for the voltage adjustment.
- The adjustment methods for the potentiometers on both sides are exactly same.
- The potentiometer value of the control enclosures on both sides must be adjusted independently, because the power must be on during adjusting potentiometer value. Therefore, when adjusting the potentiometer value on one side, you must ensure that the control lever on the other side is in the neutral open position (to ensure that the lever touches the station switch). For safety purpose, the rear wheels (drive wheels) of the vehicle can be lifted off the ground, if necessary.

5.5 Damper

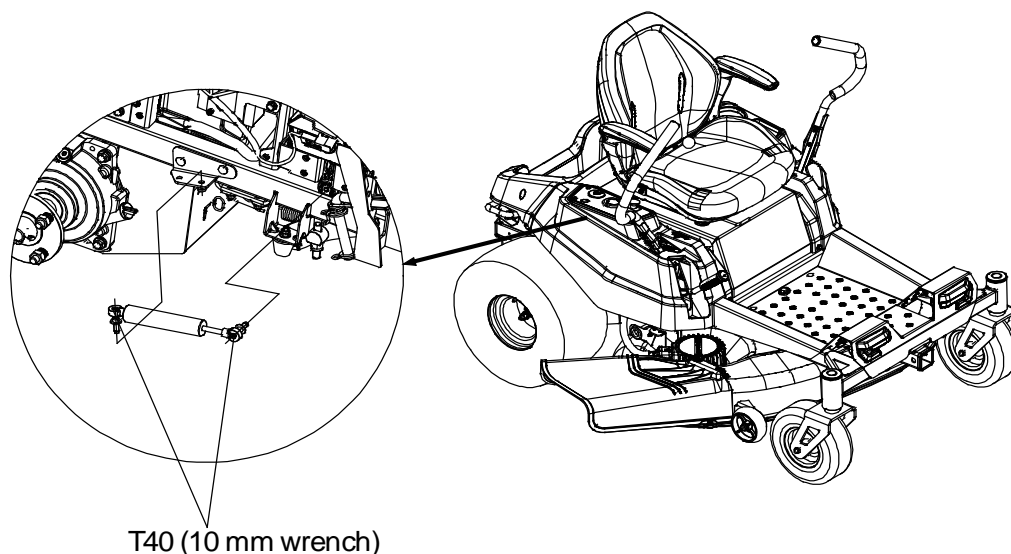


Fig. 8

Removal:

1. Remove the operation enclosure on the side where the damper is located (see 5.2 for detailed steps).
2. Use a T40 socket or a 10 mm wrench to completely loosen the fixing rods at the front and rear ends of the damper.
3. Remove the damper.

Installation:

1. Install the front and the rear fixing rods of the damper in place as illustrated and tighten them with a T40 socket wrench to a torque of 10~15 N•m (7~11 Ft-lbs).
2. Install the operation enclosure (see 5.2 for detailed steps).

NOTE:

- The steps for removal and installation of the dampers on two sides are the same.
- After installing the damper, move the control lever back and forth to feel whether the damping force is abnormal. Install the control cover. if there is no abnormality.

6. Seat

6.1 Seat

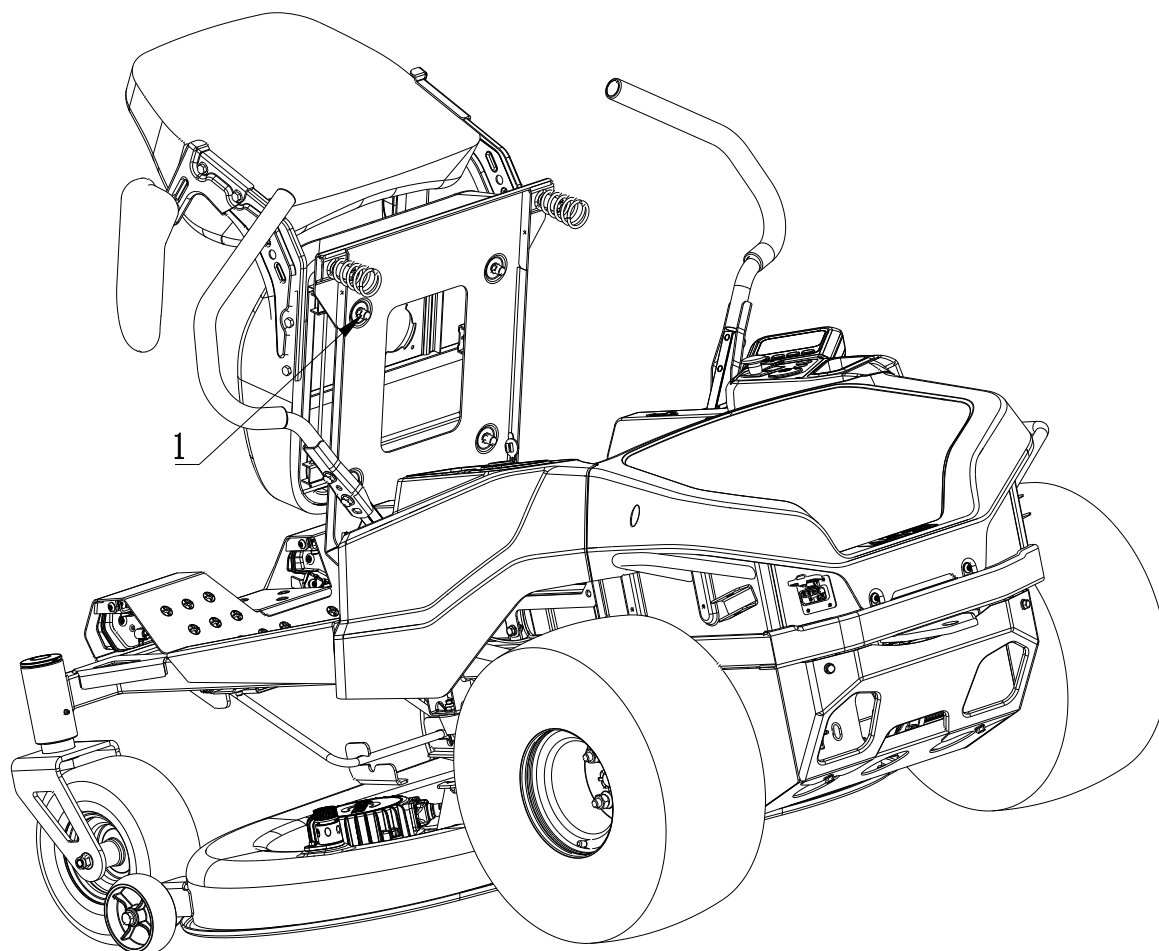


Fig.1

1. Seat nut

Removal:

1. Put the left and right control levers in the OPEN position.
2. Hold the upper part of the backrest, roll it forward.
3. Disconnect the switch connector beneath the seat (as shown in Fig.2 below).
4. Use a 13 mm socket wrench to disassemble the four installation nuts (1) under the seat pan.
5. Remove the seat from the seat pan.

Installation:

1. Put the seat on the seat pan and roll it forward together with the seat pan.
2. Install the four seat nuts (1) and tighten them with a 13 mm socket wrench to a torque of 15-20 N•m (11~15 Ft-lbs).

3. Connect the switch connector beneath the seat (as shown in Fig.2 below).
4. Roll the seat backwards and put it in the normal position to complete the seat installation.

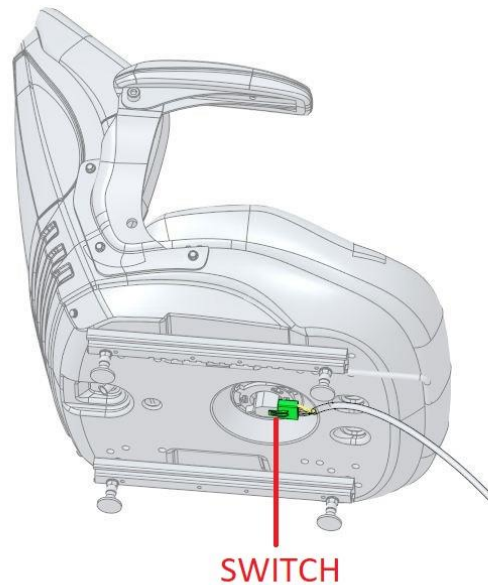


Fig. 2

6.2 Seat pan

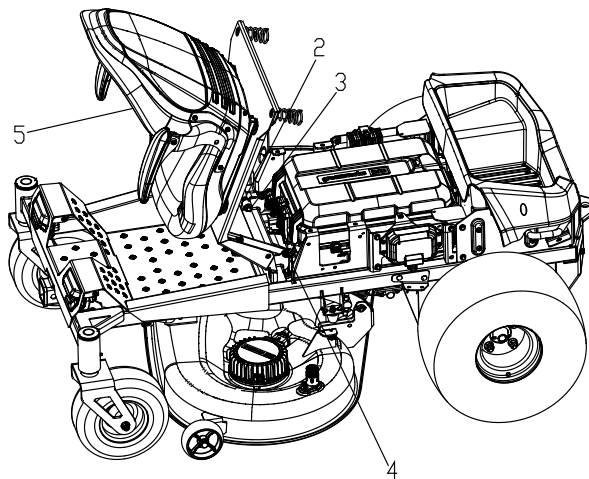


Fig. 3

- | | |
|---------------------|-----------|
| 2. Nut M10 | 4. Nut M8 |
| 3. Sems bolt M10x50 | 5. Seat |

Removal:

1. Use a 13 mm socket wrench to loosen the nuts (4) in the stop plates of the seat pan.
2. Use a 13 mm socket wrench to hold bolt (3), then remove nut (2) with a 15 mm wrench.
3. Disconnect the presense switch of the seat (see 6.1 for detailed steps).

4. Remove the two bolts (3), two nuts (1), and two nuts (4).
5. Remove the seat (5) with the seat pan from the frame.

Installation:

1. Use a 13 mm socket wrench to fasten the two nuts (4) in the stop plates of the seat pan to a torque of 15~20 N•m (11~15 Ft-lbs).
2. Based on the actual situation, use a 13 mm wrench hold bolt (3), then tighten nut (2) with 15mm wrench with a torque of 15~20 N•m (11~15 Ft-lbs).
3. Connect the connector under the seat and put the seat back in horizontal position.

CAUTION:

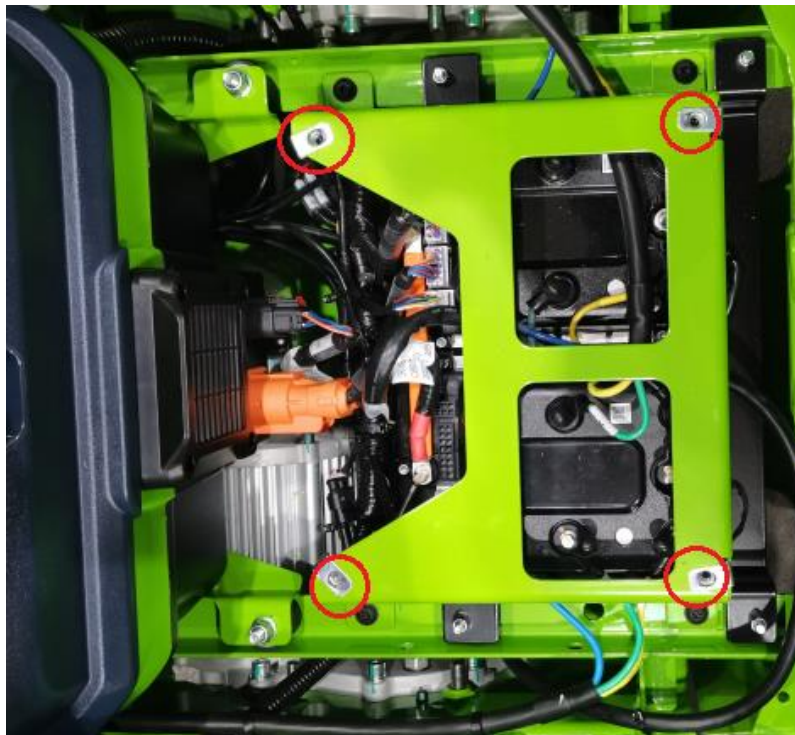
To disassemble the seat alone or together with the seat pan from the vehicle, make sure you disconnect the presence switch of the seat to prevent damage to the wire or the switch.

7. Controllers and other components

7.1 Drive and blade controller

Removal:

1. Turn off the vehicle power.
2. Roll over the seat, remove battery compartment and cargo bed (see 6.1 and 9 for detailed steps).
3. Use T30 wench to remove four bolts from cargo bed fixed plate with a tightening torque of 8~10 N•m (6~7.4 Ft-lbs).



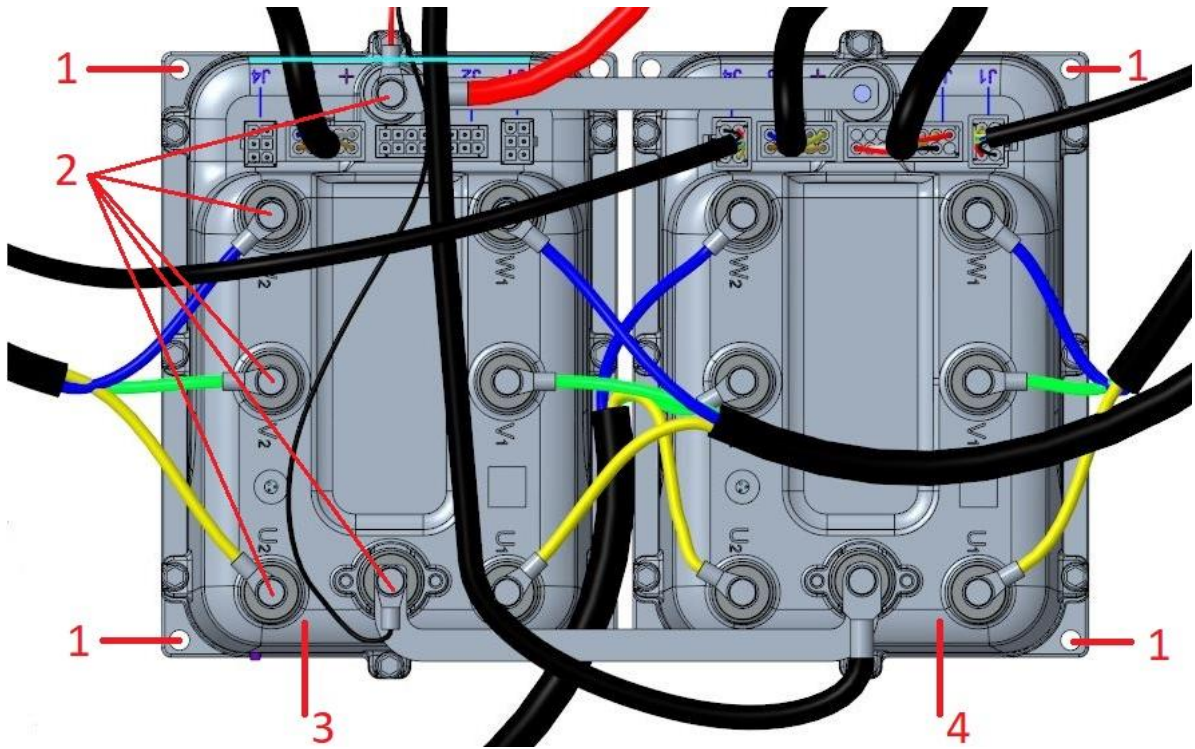


Fig.1

- | | |
|--------------------|---------------------|
| 1. Sems bolt M6x40 | 3. Blade controller |
| 2. Bolt M5x40 | 4. Drive controller |

4. Use a 5 mm Allen wrench to loosen the four bolts (1) that mount the controller.
5. Disconnect the all the connector of controllers. (One for balde controller and four for drive controller.)
6. Use an 8 mm Allen wrench to loosen the sixteen bolts (2) that mount the controller.
7. Remove the blade controller (3) and drive controller (4) from the control panel (3).

Installation:

1. Use a 5 mm Allen wrench to install the controller (2) onto the control panel (3) with the bolt (1), with a tightening torque of 6~8 N•m (4~6 Ft-lbs).
2. Connect the controller connectors as shown in Fig.2.
3. Switch on the power source and start the machine to see if the vehicle can operate properly.

NOTE:

Before removal of controllers, make sure the mower is powered off, and the battery compartment is removed.

7.2 DC-DC

Removal:

1. Disassemble the right cover piece (see 5.2 for detailed steps).
2. Turn off the vehicle main power.
3. Cut zip tie and disconnect the two connectors of DC-DC.
4. Use an 8 mm socket to loosen the nut (5) by rotating counterclockwise and remove the locking rod (8).
5. Remove the DC power source (7).

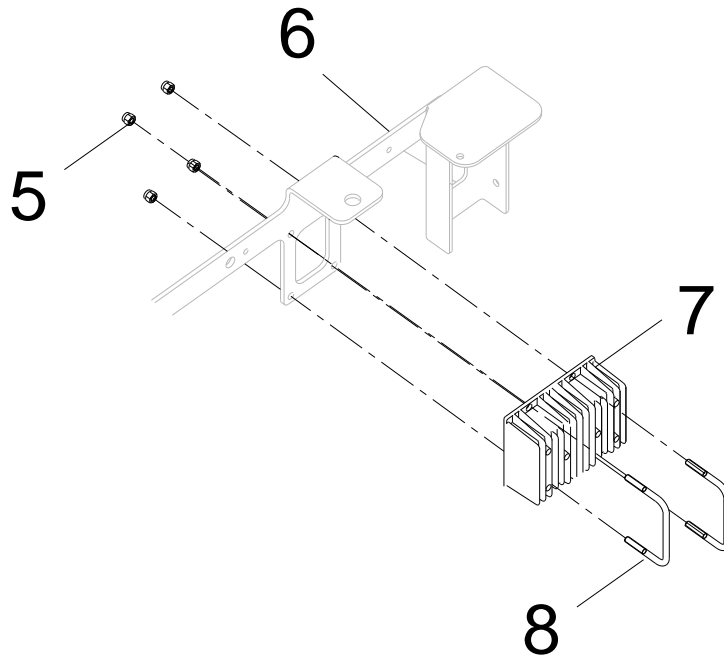


Fig.4

- | | |
|-------------------|--------------------|
| 5. Nut M5 | 7. DC power source |
| 6. Mounting plate | 8. Locking rod |

Installation:

1. Use the locking rod (8) to install the DC-DC (7) on the mounting plate (6) and align the holes on them.
2. Use an 8 mm socket to fasten the nut (5) to the locking rod (8) with a tightening torque of 5-6 N•m (3.7~4.4 Ft-lbs).
3. Connect all the connectors properly.
4. Install the right enclosure in place.

8. Front and rear wheels, drive motors

8.1 Front wheel

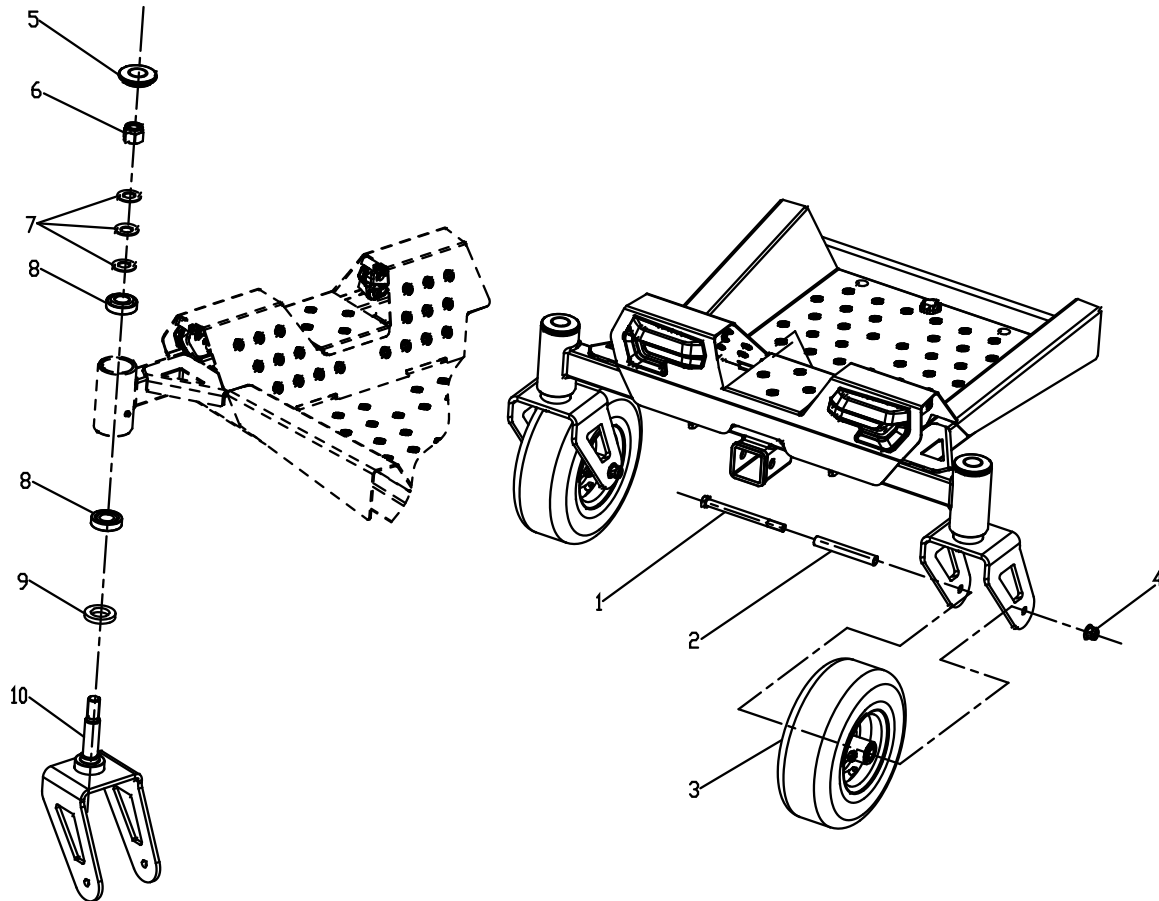


Fig. 1

- | | |
|-------------------------|-------------------------|
| 1. Bolt M12×150 | 6. Nut M20 |
| 2. Shaft sleeve | 7. Disc spring |
| 3. Front wheel assembly | 8. Cone roller bearing |
| 4. Nut M12 | 9. Oil seal |
| 5. Dust cover | 10. Front fork weldment |

Removal: the front wheel

- Using a hoisting tool, lift the front end of the chassis to a certain angle.
- Use two 18 mm sockets wrenches to loosen the bolt (1), nut (4) and remove them.
- Remove the front wheel assembly (3) and the shaft sleeve (2).

Removal: the front fork

- Use a slotted screwdriver to pry open the dust cover (5).
- Use a 30 mm socket to loosen the nut (6) by rotating counterclockwise, remove the nut (6), three-disc springs (7), and the inner ring of the upper bearing (8).
- Remove the front fork (10), the oil seal (9), and the inner ring of the lower bearing (8) altogether.

Installation: the front fork

1. Case the front fork (10) at the bottom with the oil seal (9) and the inner ring of the lower bearing (8) shaft in order.
2. Thread the front fork, which is mounted with the oil seal (9) and the inner ring of the lower bearing (8), through the shaft sleeve at the front end of the rack from bottom to top.

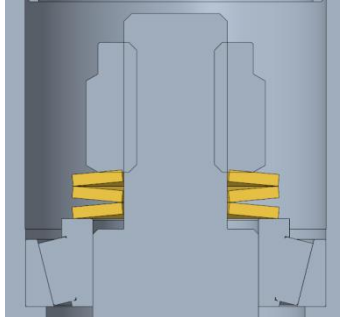


Fig.2

3. Install the inner ring of the upper bearing (8) and the three-disc springs (7) in order from the top of the rack sleeve (as shown in Fig.2).
4. Install the nut (6) and tighten it to a torque of 70~80 N•m (52~59 Ft-lbs).

Installation: the front wheels

5. Put the front wheel assembly (3) in the middle of the front fork, then align the center of the tires with the two mounting holes of the front fork on the chassis.
6. Thread the bolt (1) through the front fork mounting hole, the sleeve and the tire center, and install the nut (4) and tighten with a torque of 30-35 N•m (22~26 Ft-lbs).
7. Use two 18 mm sockets or 18 mm wrenches to tighten the bolts (1) and nuts (4) until the front wheels come to a full contact with the inner sides of the front fork along the axial direction.

NOTE:

- The removal and installation steps for the two front wheels and the front forks are the same.
- After the installation of the front wheels, make sure there is no gap between the front wheel shaft and the front fork interior along the axial direction.
- The pressures of the two front tires must be the same within the range (40-42 Psi).

8.2 Rear wheel

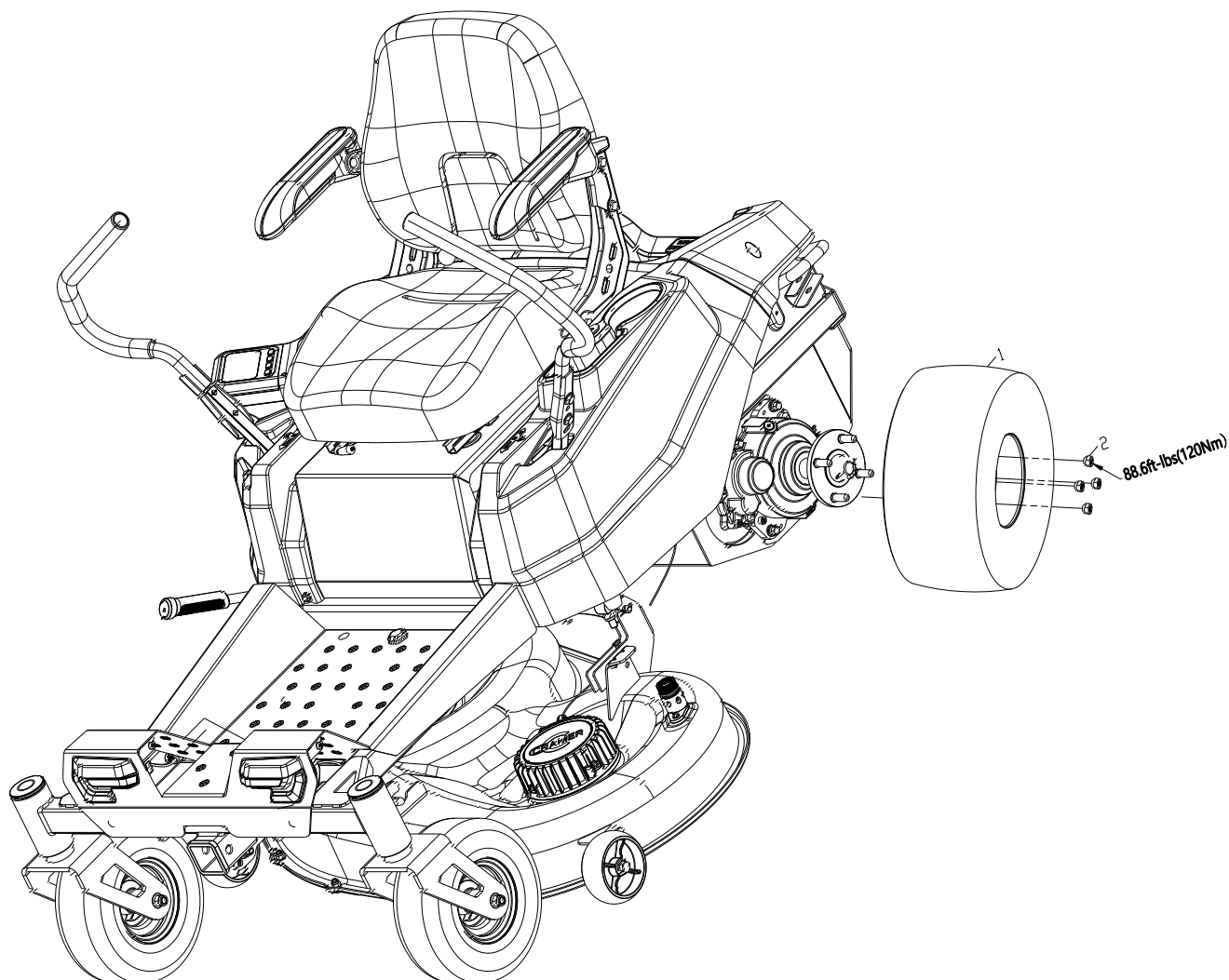


Fig.3

11. Rear wheel

12. Clamp nut

Removal:

1. Lift the rear end of the machine with a hoisting tool, so that the rear wheels are suspended above the ground.
2. Remove the four nuts (12) of the rear wheels with a 21 mm socket wrench.
3. Remove the tire (11).

Installation:

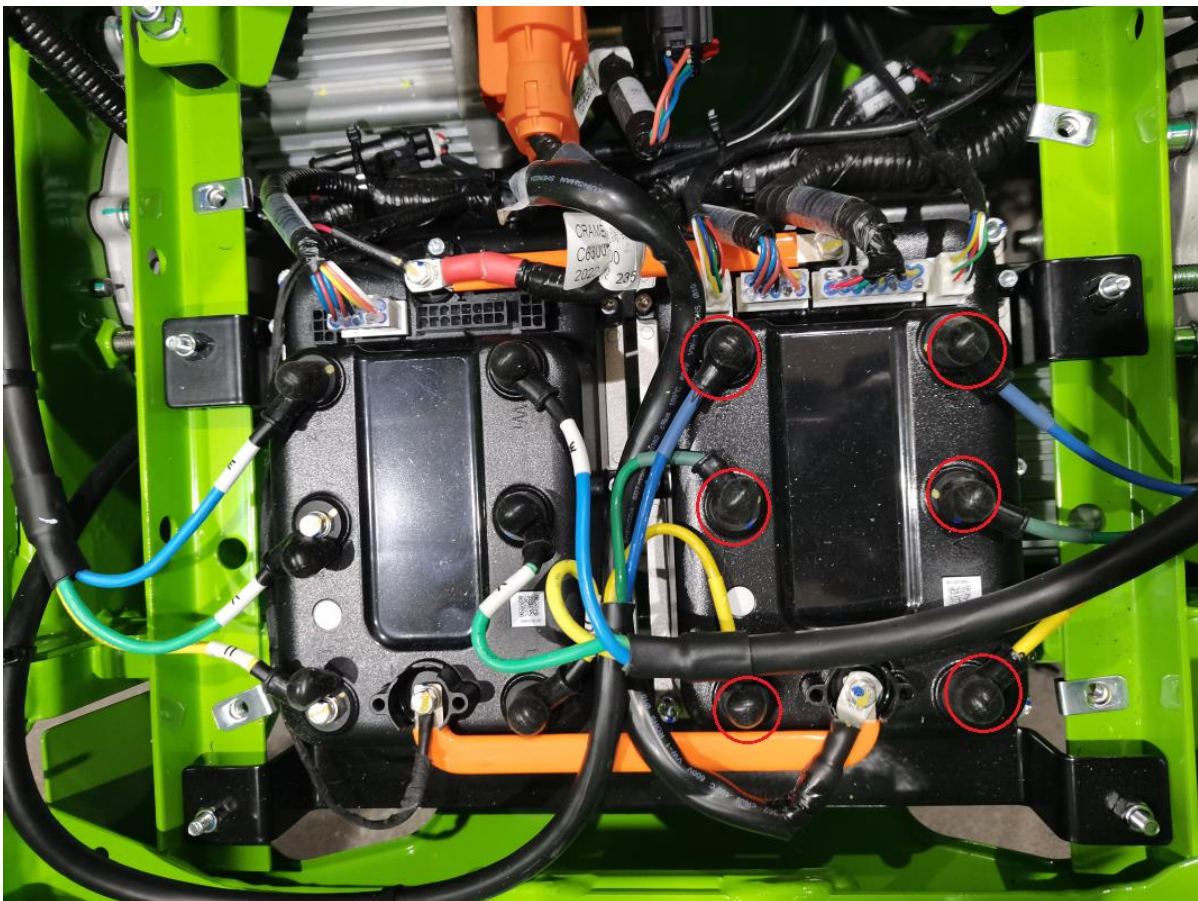
1. Align and install the tire (11) to the four mounting bolts on the driver motor.
2. Install the nuts (12) on the four mounting bolts respectively and tighten them with a torque of 120-130 N•m (89~96 Ft-lbs).

NOTE:

- The removal and installation steps for the two rear tires are the same.
- The pressures of the two rear tires must be the same within the same range (8-10 Psi).

8.3 Drive motor**IMPORTANT:**

- Before removing the drive motor, always disconnect the battery pack power connector.
- Only after removing the rear tires, remove the drive motor.

Removal:

1. Remove the connector of the three-phase wire of the drive motor (inside the motor controller).
2. Disconnect the hall sensor connector (7) of the drive motor and the electromagnetic brake connector (5) (as shown in Fig.5 below).
3. Remove the electromagnetic brake by repeating removal steps in chapter 8.5.

4. Use a 13 mm socket to remove the four bolts (1) that mount the drive motor to the side wall of the chassis.
5. Pull out the drive motor (4) from the side wall of the frame (as shown in Fig.4 below).

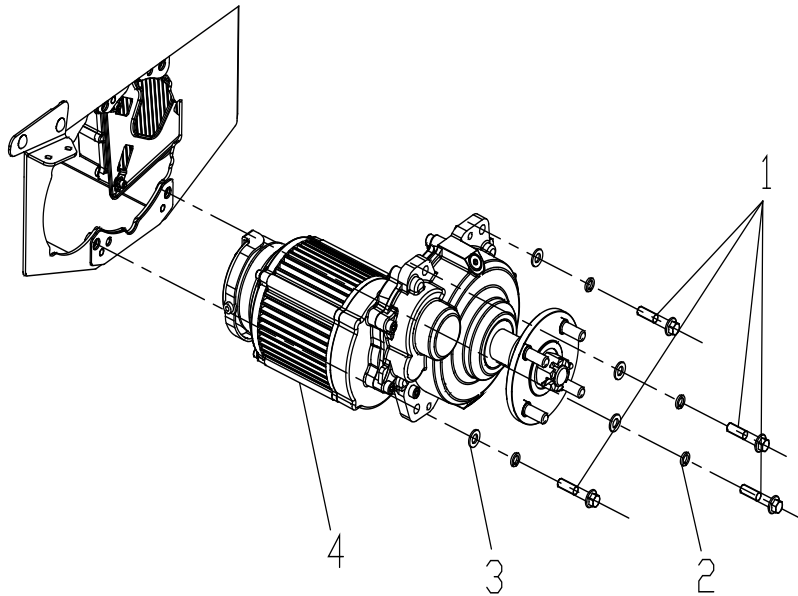


Fig.4

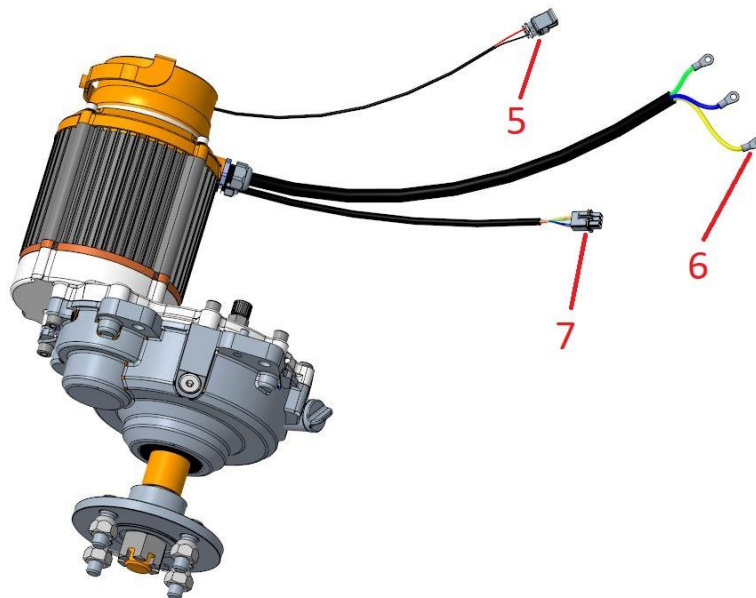


Fig.5

- | | |
|----------------------------|------------------------------------|
| 1. Sems bolt M10×50 | 5. Electromagnetic brake connector |
| 2. Spring washer ϕ 10 | 6. Phase wire terminal |
| 3. Flat washer ϕ 10 | 7. Hall sensor connector |
| 4. Drive motor | |

Installation:

1. Install the drive motor (4) into the rack via the mounting hole on the wall, as shown in Fig.4.
2. Install the electromagnetic brake by repeating steps in 8.5 Installation.
3. Tighten the four bolts (1), the spring washers (2), the flat washers (3) of the drive motor (4) with a 13mm socket by rotating clockwise, with a tightening torque of 45~50 N•m (33~37 Ft-lbs).
4. Connect the Hall sensor connector (7), the electromagnetic brake connector (5) and the three-phase wire connector (6) to the drive motor (4) (as shown in Fig.5). (See 7.1 for detailed steps for connecting to the controller.)

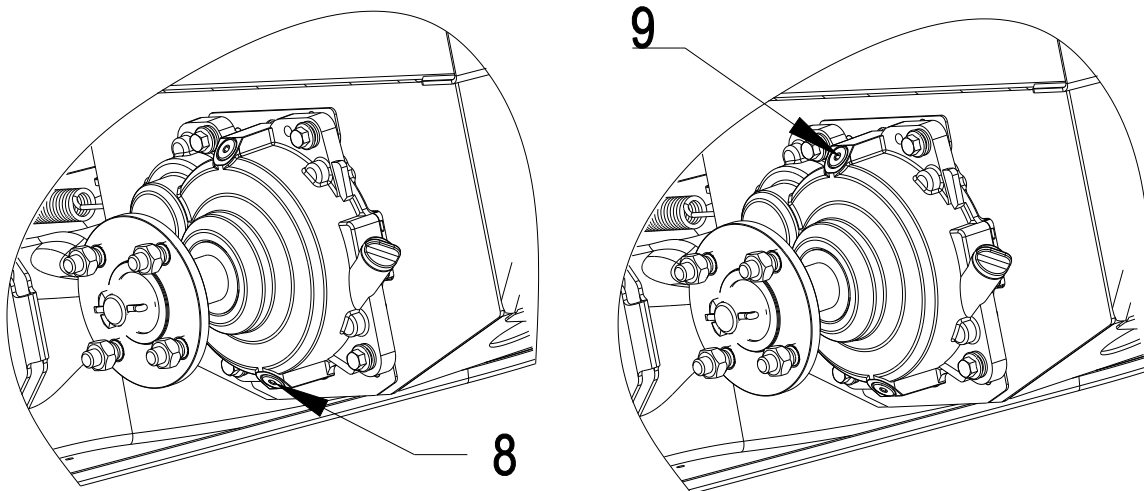
NOTE:

- The removal and installation steps for the two drive motors are the same.
- The three-phase wires of the left drive motor are connected to the left drive controller, and those of the right drive motor are connected to the right drive controller.

8.4 Gearbox oil change

The lubricating oil in the gearbox needs to be renewed after a period of time.

First oil change interval	50 h
Subsequent oil change interval	200 h
Oil specification	GL-5 85W-140
Oil consumption per gearbox	180 ml



8. Oil plug

9. Oil plug

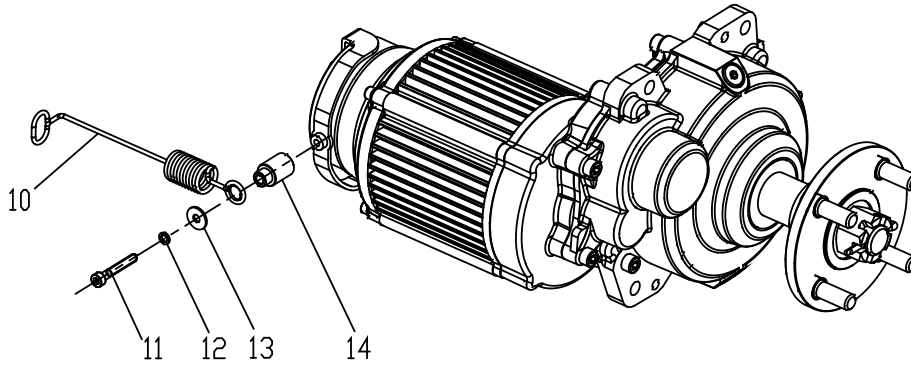
1. Put the machine on a level ground.
2. Lift the rear wheels off the ground and remove the rear wheel on the side where the oil is to be drained (see 8.2 for detailed steps).
3. Use a 5 mm Allen key to loosen the oil plug (8) at the oil discharge outlet shown in the Fig.6.
4. Put an oil box under the oil plug (8) of the oil discharge outlet to collect the old gear oil to be drained.

5. Use a 5 mm Allen key to loosen the oil plug (9) at the oil discharge outlet shown in the Fig.7, and the gear oil in the gearbox can be drained from the outlet.
6. After draining the gear oil, tighten the oil plug (8) on the oil discharge outlet shown in Fig.6.
7. Fill new gear oil (oil specification: GL-5 85W-140, oil volume: 180 ml).
8. Tighten the oil plug (9) at the oil discharge outlet shown in Fig.7.
9. The operation of gearbox oil change is complete.
10. Install the rear wheel.

NOTE:

The methods of the two drive motors gear box oil change are same.

8.5 Electromagnetic brake



- 10. Tension spring
- 11. Screw M6×40
- 12. Spring washer φ6

- 13. Large flat washer φ6
- 14. Spacer

Removal:

1. Use a 5 mm Allen wrench to loosen the screw (11).
2. Remove the spring washer (12), the large flat washer (13), the spacer (14), and the tension spring (10) from the motor.

Installation:

1. Thread the screw (11), with the spring washer (12), and the large flat washer (13) through the tension spring (10) and the spacer (14).
2. Fasten it to the motor release rod to a tightening torque of 6-8 N•m (4-6 Ft-lbs).

NOTE:

The removal and installation steps for the left and right motors are the same.

8.6 Electromagnetic brake release

When the power of the vehicle is turned off (or cannot be turned on), the motor gearbox is under braking state and the brake cannot be released by turning on the power. If the vehicle needs to be moved or towed, the brake needs to be disconnected. Therefore, you need to manually release the disc for a mechanical brake release.

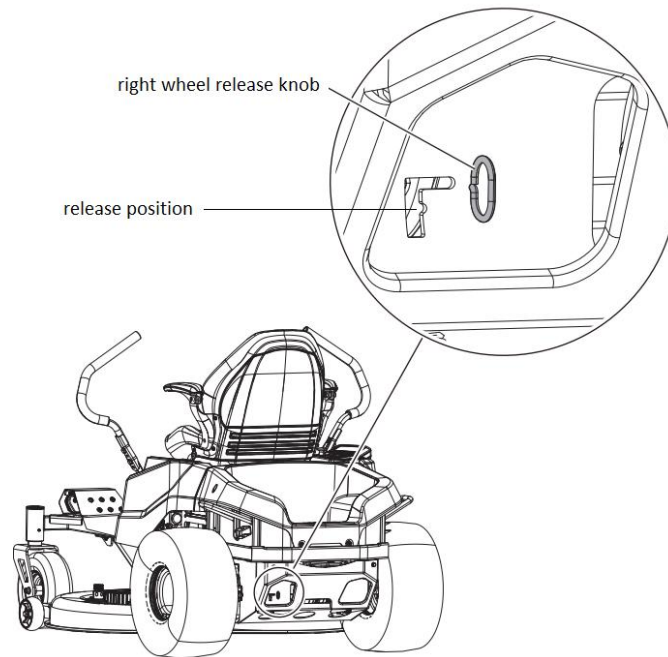


Fig.1

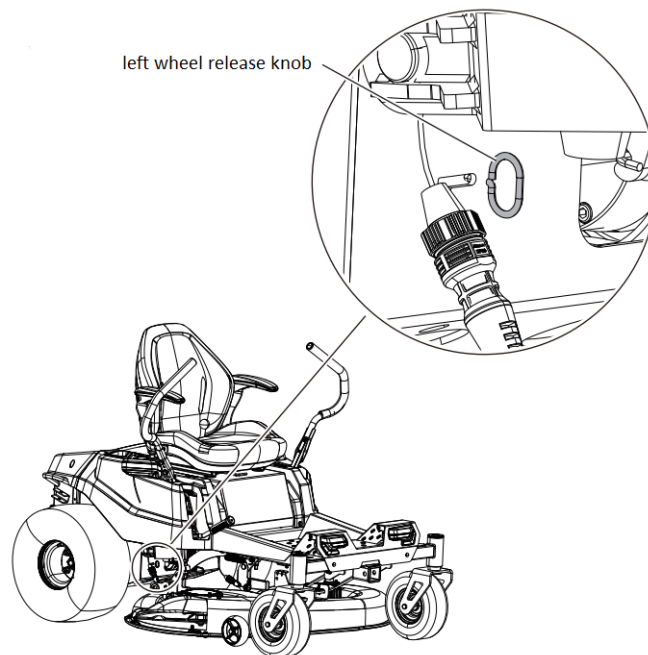


Fig.2

1. Pull the tension spring outward and hook the end into the vehicle frame aligning holes (as shown in Fig.1). Now, the motor brake on this side can be released and the rear wheel can rotate freely.
2. Reset the tension spring (as shown in Fig.2), then the motor brake on this side is re-engaged and locking the rear wheel.
3. Repeat the step above, and you can release the motor brake on the other side.
4. After releasing the brakes of the driving motors on both sides, the vehicle can be pushed manually or towed by external force without power supply.

9. Battery compartment

Before removal and installation of the battery compartment, you need to remove the cargo bed of the vehicle first.

Removal: cargo bed & battery compartment & battery pack

1. Turn off the vehicle main power.
2. Use a T30 screwdriver to remove the eight binding bolts (see in Fig.1).
3. Remove the cargo bed of the vehicle.

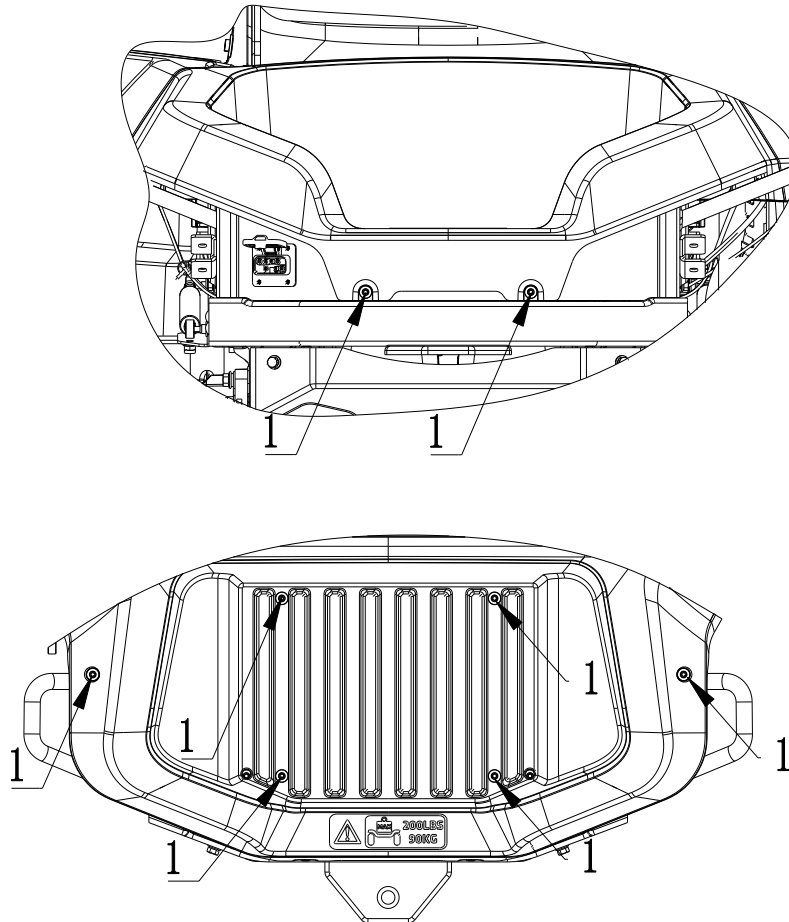


Fig.1

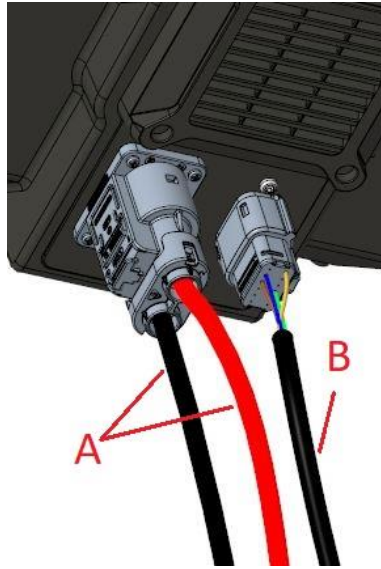


Fig.2

A. Harness - Power

B. Harness - Control & Signal

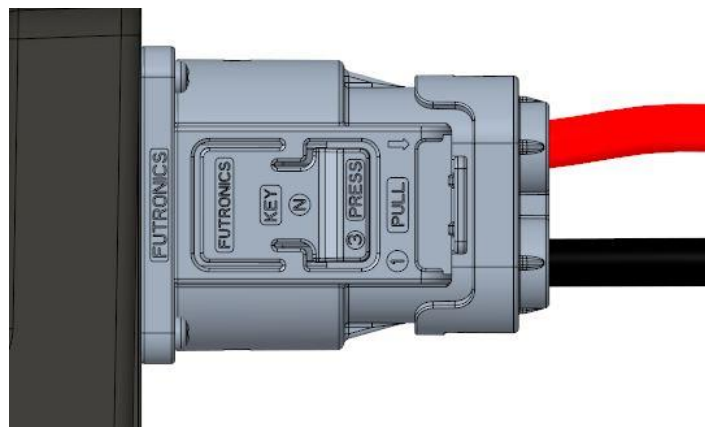
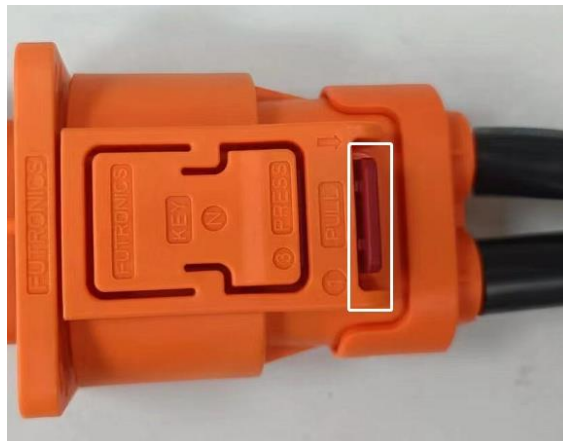


Fig.3-1



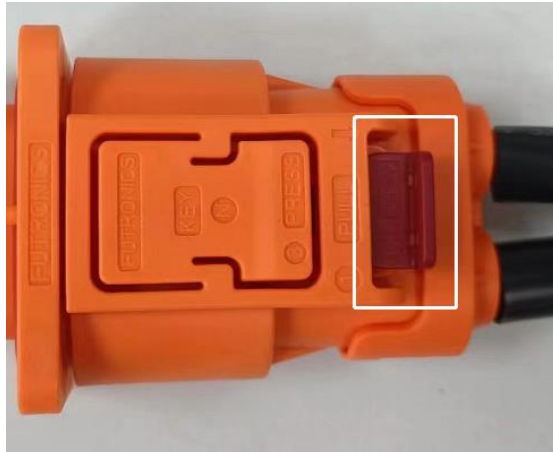


Fig.3-2 Pull back the plug CPA

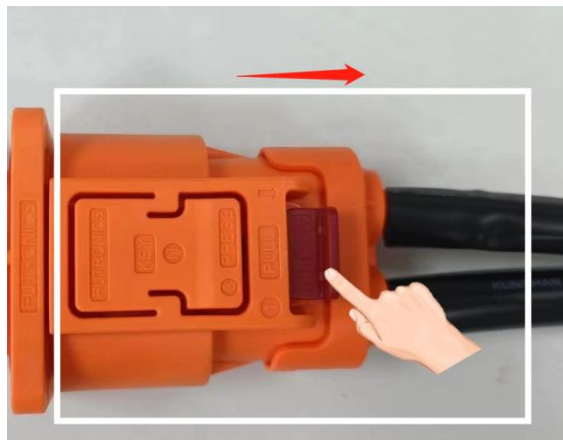


Fig.3-3 Push the CPA down and pull the plug back

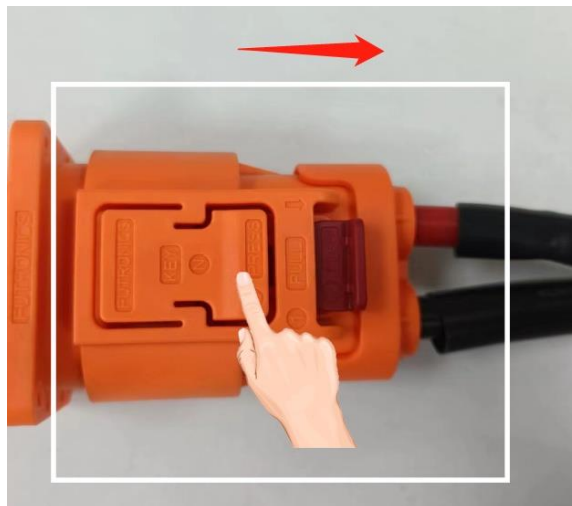


Fig.3-4 Press down the key position and pull out the plug backwards. The plug socket is separated.

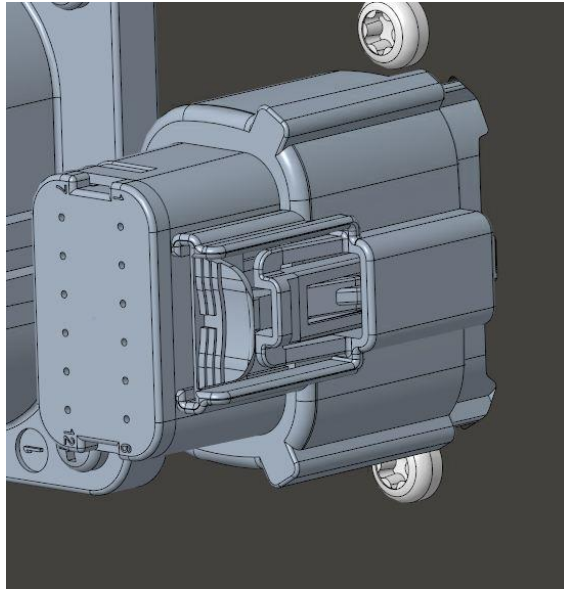
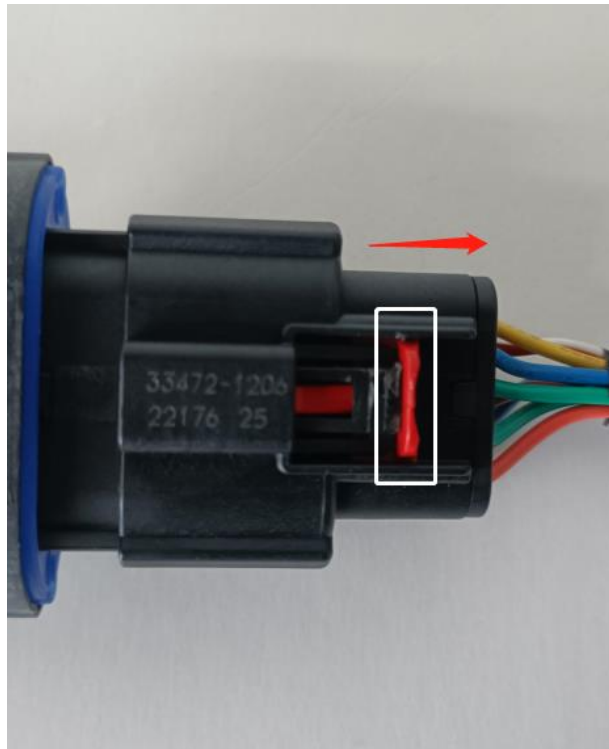


Fig.4-1



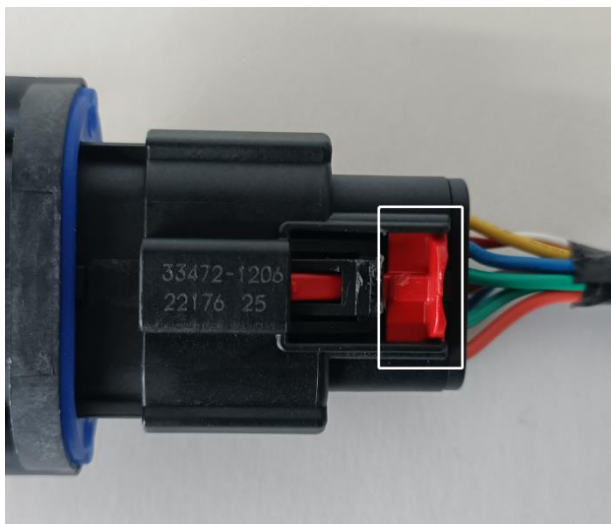


Fig.4-2 Pull back the plug CPA

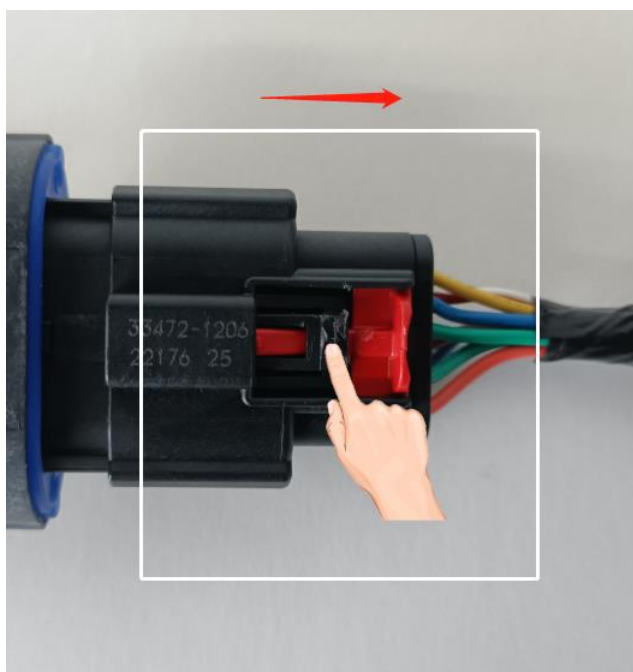


Fig.4-3 Press down the key position and pull out the plug backwards. The plug socket is separated.

4. Remove all the battery packs (3) from the battery compartment.
5. Loosen the connector of the harness (A) as shown in Fig.2 and Fig.3).
6. Loosen the connector of the harness (B) as shown in Fig.2 and Fig.4).
7. Use a 13 mm socket to loosen the four nuts (1) in Fig.5 by rotating counterclockwise and remove them.
8. Remove the battery compartment from the vehicle.

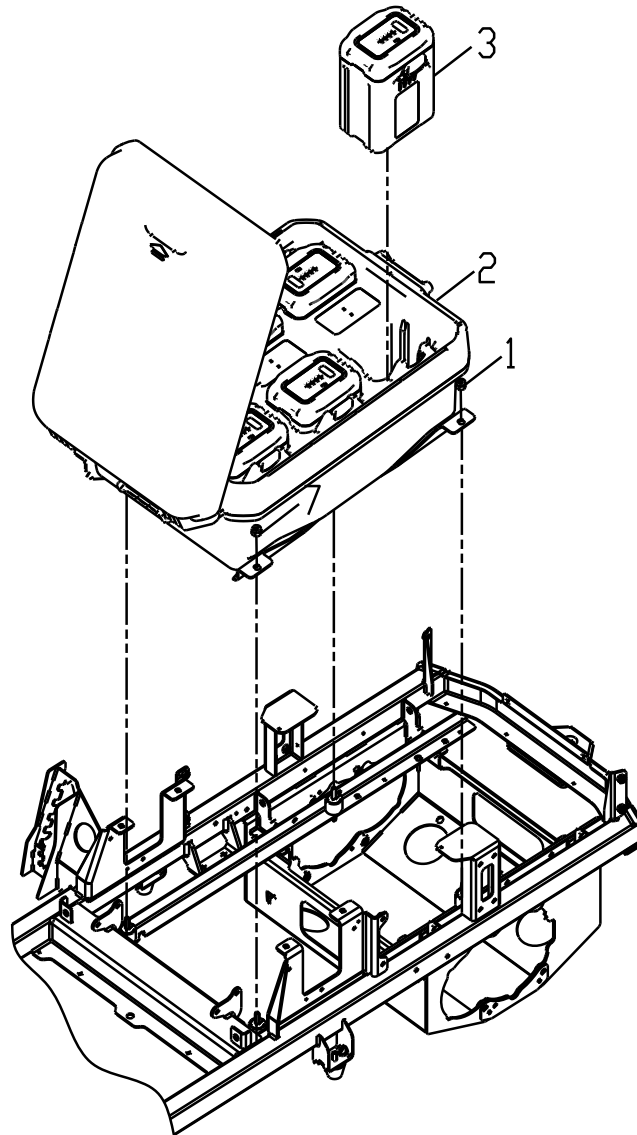


Fig.5

- | | |
|------------------------|-----------------|
| 1. Nut M8 | 3. Battery pack |
| 2. Battery compartment | |

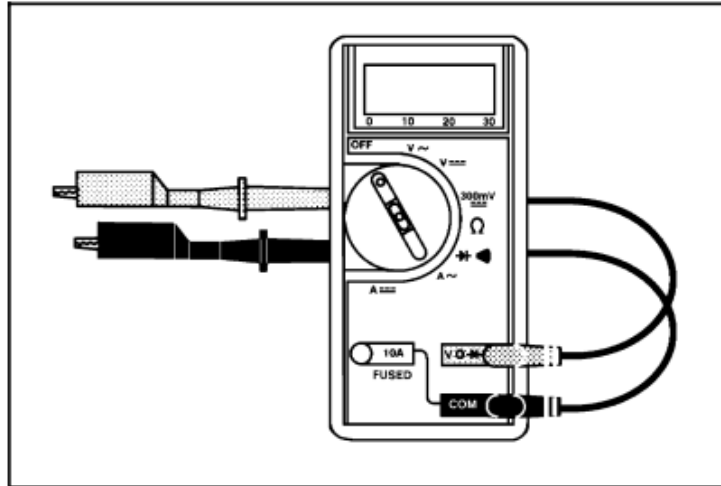
Installation:

1. Align the four mounting holes of the support under the battery compartment (2) with the four studs on the vehicle rubber pad.
2. Using a 13 mm socket wrench, tighten the nuts (1) to the rubber pad by rotating clockwise.
3. Install A, B and C connectors in Fig.2 to the battery compartment (2).
4. Put the battery pack (3) into the battery compartment.
5. Close the cover of the battery compartment (2) and turn the seat over to its original position.
6. Mount the cargo bed onto the frame with a T30 screwdriver and eight M6 hexagon socket fancy pan head screws at eight positions as marked in red circles in Fig.1.

10. Special tools

Order special tools from your Distributor. Some tools may also be available from a local supplier.

10.1 Multimeter




The multimeter can test electrical components and circuits for current, resistance or voltage.

NOTE:

Greenworks recommends the use of a DIGITAL Volt-Ohm-Amp multimeter when testing electrical circuits. The high impedance (internal resistance) of a digital meter in the voltage mode will make sure that excess current is not allowed through the meter. This excess current can cause damage to circuits not designed to carry it.

10.2 Special tools

Tools	Cable to Flash Program	Host Computer Program	Remarks
CAN Interface		According to the purpose of each model	ERP: R0203845-00 UPC: 195526020639

11. Specifications

11.1 GC82ZT107 specifications

ERP	7404107RU
Model NO.	GC82ZT107
Brand	Greenworks
Voltage Platform(v)	82
Weight (kg)	256
Dimension (cm)	170*135*122
Cut Width (cm)	107
Power Type	Lithium-ion
Battery Type	BAB743 and other BAB series
Charger Type	CAB80012 and other CAB series
Charge Time (hrs)	5 h (with 600 W charger)
Deck Lift System	Manual
Cutting Range (inch)	1.5"-4.5"
Cut Height Adjustment	7
Cutting System Motor (kw)	1.2
Number of Blades	2
Blade Speed (rpm)	2400 / 3000 / 3200
Blade Tip Speed (m/s)	91/86/69
Blade Type	2-in-1 Multi-puropose Blade
Deck Construction	Stamp
Mowing Type	Side-discharge, Mulching, Bagging
Drive Motor System (kw)	1.0
Cutting Motor System (kw)	1.2
Front Wheel Size	11*4-5
Rear Wheel Size	20*10-8
Turning Radius (inch)	0
Max Forward Speed (km/h)	8
Max Reverse Speed (km/h)	3

Noise decibel(dB)	< 100 dB
Slope degree (°)	15.0
Cutting Area (acres)	Up to 2
Life Time (hrs)	200
IP Level	X4
Ambient temperature (°C)	-10~40
Brake system	Electromagnetic
Cargo bed	√
Phone Holder	√
Cup Holder	√
LED Light	√
USB	√
Display	√
Accessories port	Mechanical Only
Bagger	√
Bagging Blades	√
Mulching Blades	√
4G/GPS	×
APP	√

11.2 Torque specifications

Torque Specification Chart (General Standard Parts)							
Diameter of Thread (mm)	Pitch value of Thread (mm)	Tighten Torque Spec (Mechanical Property of Grade 8.8 for Fasteners components)					
		Standard Value		Max Value		Min Value	
		N•m	Ft-lbs	N•m	N•m	N•m	Ft-lbs
6	1	9.0	6.6	12.0	8.9	6.0	4.4
8	1.25	23.0	17.0	26.0	19.2	16.0	11.8
8	1	25.0	18.5	28.0	20.7	17.0	12.5
10	1.5	59.0	43.5	75.0	55.4	37.0	27.3
10	1.25	63.0	46.5	79.0	58.3	45.0	33.2
10	1	64.0	47.2	80.0	59.0	46.0	33.9
12	1.75	95.0	70.1	111.0	81.9	73.0	53.9
12	1.5	97.0	71.6	113.0	83.4	75.0	55.4
12	1.25	99.0	73.1	115.0	84.9	78.0	57.6
14	2	160.0	118.1	185.0	136.5	122.0	90.0
14	1.5	180.0	132.8	205.0	151.3	146.0	107.7
16	2	215.0	158.7	245.0	180.8	182.0	134.3
16	1.5	240.0	177.1	270.0	199.3	199.0	146.9
18	2.5	268.0	197.8	298.0	219.9	229.0	169.0
18	1.5	316.0	233.2	346.0	255.4	287.0	211.8
20	2.5	430.0	317.3	470.0	346.9	389.0	287.1
20	1.5	440.0	324.7	480.0	354.2	396.0	292.3
10	1.5	74.0	54.6	90.0	66.4	52.0	38.4
10	1.25	78.0	57.6	93.0	68.6	63.0	46.5
10	1	80.0	59.0	95.0	70.1	65.0	48.0
12	1.75	140.0	103.3	156.0	115.1	105.0	77.5
12	1.5	142.0	104.8	158.0	116.6	106.0	78.2
12	1.25	145.0	107.0	161.0	118.8	108.0	79.7
14	2	175.0	129.2	200.0	147.6	141.0	104.1

Torque Specification Chart (General Standard Parts)							
Diameter of Thread (mm)	Pitch value of Thread (mm)	Tighten Torque Spec (Mechanical Property of Grade 10.9 for Fasteners components)					
		Standard Value		Max Value		Min Value	
		N•m	Ft-lbs	N•m	N•m	N•m	Ft-lbs
14	1.5	210.0	155.0	235.0	173.4	178.0	131.4
16	2	280.0	206.6	310.0	228.8	200.0	147.6
16	1.5	305.0	225.1	335.0	247.2	240.0	177.1
18	2.5	437.0	322.5	467.0	344.6	380.0	280.4
18	1.5	467.0	344.6	507.0	374.2	397.0	293.0
20	2.5	528.0	389.7	568.0	419.2	450.0	332.1
20	1.5	558.0	411.8	598.0	441.3	475.0	350.6
6	1	4.0	3.0	5.5	4.1	2.5	1.8
8	1.25	8.0	5.9	11.0	8.1	5.0	3.7
8	1	8.5	6.3	11.5	8.5	5.5	4.1
10	1.5	19.7	14.5	29.7	21.9	14.3	10.6
10	1.25	20.8	15.4	25.8	19.0	16.7	12.3
10	1	21.8	16.1	26.5	19.6	17.0	12.5
12	1.75	37.3	27.5	43.3	32.0	28.0	20.7
12	1.5	38.5	28.4	45.0	33.2	29.0	21.4
12	1.25	39.6	29.2	48.0	35.4	30.0	22.1
14	2	61.2	45.2	75.0	55.4	46.8	34.5
14	1.5	74.6	55.1	92.0	67.9	56.0	41.3
16	2	95.0	70.1	115.0	84.9	73.0	53.9
16	1.5	105.0	77.5	133.0	98.2	76.0	56.1
18	2.5	142.9	105.5	178.0	131.4	107.4	79.3
18	1.5	157.6	116.3	190.0	140.2	124.5	91.9
20	2.5	188.0	138.7	230.0	169.7	135.0	99.6
20	1.5	203.7	150.3	243.0	179.3	149.0	110.0
6	1	4.5	3.3	6.0	4.4	3.0	2.2
8	1.25	10.6	7.8	14.0	10.3	7.0	5.2

Torque Specification Chart (General Standard Parts)							
Diameter of Thread (mm)	Pitch value of Thread (mm)	Tighten Torque Spec (Mechanical Property of Grade 5.6 for Fasteners components)					
		Standard Value		Max Value		Min Value	
		N•m	Ft-lbs	N•m	N•m	N•m	Ft-lbs
8	1	11.0	8.1	15.0	11.1	8.0	5.9
10	1.5	26.0	19.2	33.0	24.4	19.0	14.0
10	1.25	28.0	20.7	34.0	25.1	22.0	16.2
10	1	29.0	21.4	35.0	25.8	23.0	17.0
12	1.75	45.0	33.2	53.0	39.1	37.0	27.3
12	1.5	47.0	34.7	56.0	41.3	38.0	28.0
12	1.25	50.0	36.9	60.0	44.3	40.0	29.5
14	2	81.0	59.8	95.0	70.1	62.0	45.8
14	1.5	90.0	66.4	105.0	77.5	68.0	50.2
16	2	124.0	91.5	150.0	110.7	98.0	72.3
16	1.5	132.0	97.4	160.0	118.1	101.0	74.5
18	2.5	190.0	140.2	220.0	162.4	161.0	118.8
18	1.5	200.0	147.6	230.0	169.7	165.0	121.8
20	2.5	231.6	170.9	272.0	200.7	190.0	140.2
20	1.5	236.6	174.6	285.0	210.3	197.0	145.4