KODIAK SNOW BLOWER

User Manual

Warning:
Read and observe the safety precautions and instructions in this manual and carefully observe the safety labels on the machine.
Failure to do so may cause serious injury, death or property loss. Keep this manual accessible at all times.

Disclaimer

The snow blower is designed to provide timely and effective snow removal and rescue operations in extremely cold environments. Kodiak assumes no responsibility for any adverse consequences caused by the following circumstances:

- Failure to use the snow blower correctly as instructed in this manual.
- Unauthorized modifications or alterations to the snow blower.
- Use of non-genuine Kodiak parts, untested or unauthorized accessories, or tools that result in equipment damage or accidents.
- Machine malfunctions or damage caused by natural disasters (earthquakes, typhoons, etc.), wars, or other force majeure events.

Kodiak cannot foresee all potential hazards in a work environment. Therefore, operators and customers must prioritize safety at all times.

Additionally, different regions and local government authorities may have stricter operating regulations, which should be followed over any conflicting safety instructions in this manual.

Responsibilities of the Manufacturer

- Ensure the quality of the supplied snow blower and provide accurate documentation.
- Fulfill after-sales service commitments and document all maintenance and repairs performed by service personnel.
- Provide training for equipment operators and maintenance personnel as needed.

Responsibilities of Customers and Authorized Personnel

- Only personnel who have received systematic training and fully understood the user manual and maintenance guide may operate and maintain the snow blower.
- Ensure that operators and maintenance personnel are qualified and aware of their responsibilities.
- Regularly inspect personnel’s adherence to safety protocols.
- Stop the snow blower operation immediately if any safety-related issues occur.
- Kodiak service personnel have the right to conduct safety inspections on the snow blower when necessary.
- In addition to Kodiak's prescribed inspections, conduct checks according to the regulations of the country or region where the snow blower is used.
- Ensure timely maintenance and repairs of the snow blower.
- Carefully plan the usage of the snow blower.

Responsibilities of All Operators

- Report any abnormal conditions that may cause improper operation or potential hazards to supervisors and correct them if possible.
- Follow all warning signals and stay alert to personal and others' safety when working near the snow blower.
- Understand the project scope and procedures.
- Identify hazards such as high-voltage lines, unauthorized personnel, and poor ground conditions, and report them to operators and signal personnel.

Responsibilities of Management Personnel

- Ensure that operators are trained, understand the Kodiak operation and maintenance manual, and are physically fit and certified to operate the snow blower.
- Ensure operators have good judgment, teamwork, and psychological stability before allowing them to operate or maintain the snow blower.
- Assign specific safety responsibilities to project members and report safety risks to upper management promptly.

Table of Contents

(I) Main Technical Specifications of the Equipment

1.1 Main Electrical System Parameters

Wiring method	Single wire system, negative terminal grounded
System voltage	DC24V
Heater	125V (AC) heater
Minimum engine starting ambient temperature	-18℃
Battery	SAIL 680 25D

1.2 Break-in Period for New Equipment

Note: The snow blower delivered by Kodiak has been thoroughly tested and adjusted according to technical specifications. The snow blower should not be operated under full load when the engine is cold, as this can significantly affect performance and reduce the lifespan of the machine.

It is essential to ensure that snow blower operators fully understand the contents of this manual and pay attention to the following key points:

- After starting the engine, let it idle for 3-5 minutes to warm up until the coolant temperature reaches 30°C. During the warm-up period, do not load the engine or accelerate suddenly with no load.
- Avoid running the engine under heavy load until the engine is fully warm, as well as sudden acceleration or emergency stops with a load.
- Running the engine at no load or light load (less than 15% load) for extended periods may cause oil to accumulate in the exhaust manifold or turbocharger. This oil accumulation is normal during no-load or light-load operation. To clear the oil from the exhaust manifold, run the engine under a load greater than 30% for 10 minutes. To minimize oil accumulation, avoid prolonged operation under no load or light load.

1.3 Equipment Serial Number Plate

When the equipment requires maintenance or replacement parts, please provide the details from the nameplate or send a picture of the nameplate to Kodiak or your local distributor.

The nameplate is located on the lower right side of the operator’s cabin, on the side of the stair tread.

(II) Safety Precautions

2.1 **Safety Labels**

The equipment uses the following warning signs and safety labels:

- Be sure to fully understand the correct location and content of the labels.
- When cleaning labels, do not use organic solvents or gasoline, as these will cause the label paint to peel off.
- If a label is damaged, lost, or unreadable, it must be replaced with a new one.

2.2 **General Precautions**

- Only trained or designated personnel are allowed to operate and maintain the machine.
- When operating or maintaining the machine, follow all safety rules, precautions, and operating instructions.
- Alcohol or medication significantly impairs the ability to safely operate or repair the machine, putting both the operator and others at risk.
- Signal device check: Turn on the main power switch ➞ the ignition key should be in the "ON" position (engine off) and check if the engine warning indicator light is on (the light should turn on for five seconds after turning the key on, then automatically go off).
- Fuel check: Check the fuel gauge and refill the fuel to ensure it meets the required operating needs.
- Coolant check: Check the sight window at the top of the radiator. The coolant level should be above the halfway mark of the sight window. When adding coolant, the engine must be off, or the coolant temperature must be below 40°C. For safety, do not open the radiator cap when the engine is hot to avoid burns.

2.3 **Pre-Start Engine Checks**

Before starting the engine for daily operation, perform the following checks:

- Visually inspect the entire equipment for any oil or fluid leaks.
- Clean the work lights, warning lights, and fault lights, and ensure the lights are functioning properly.
- Check if the auger drive shaft bolts are loose; the drive shaft bolts should be tightened regularly.
- Check coolant, fuel, engine oil, and hydraulic fluid levels.
- Check if the air filter is clogged and check for any damaged wires.
- Check if the display screen is working properly.
- Check the area around the machine for any people or obstacles. If present, issue a warning to ensure they move to a safe area.
- Ensure the snow blower parking switch is in the PARKING position.
- Never attempt to start the engine by short-circuiting the starter motor circuit, as this is both unsafe and may damage the equipment.
- Ensure the blower head shift lever is in the neutral position to prevent the engine from starting under load.

2.4 Winter Engine Start

If the ambient temperature is below -18°C, preheating the engine is required, and the machine's built-in parking heating system can be used for preheating.

Note: Do not adjust the engine speed control during startup. The electronic control module (ECM) will control the engine speed during startup.

- Disconnect any driven equipment.
- Turn the key switch to the "START" position; keep the key in the start position for 20 seconds.
- Let the engine idle for 3-5 minutes or until the coolant temperature begins to rise. Let the engine idle until the speed gradually increases to high idle. Allow the white smoke to dissipate before normal operation.
- Run the engine at low idle until all systems reach operating temperature. During warm-up, check that all gauges are functioning correctly.

2.5 Jump-Starting with Booster Cables

Note:

- Use a battery with the same voltage as the starter motor. Cross-connecting with a higher voltage will damage the electrical system.
- Never reverse the battery cable connections, as this will damage the alternator and batteries.
- Always connect and disconnect the negative cable last.

2.6 Engine Operation

2.6.1 Engine Idling Warm-Up

Proper operation and maintenance are key factors in achieving maximum engine lifespan and efficiency. Following the instructions in the operation and maintenance manual will minimize operating costs and extend the engine's service life. Running the engine at low speed and power helps it reach operating temperature more quickly. Once the operating temperature is reached, the engine can continue running at low idle.

Running the engine at no load or light load (less than 15% load) for extended periods may cause oil to accumulate in the exhaust manifold or turbocharger. This is a normal phenomenon when running under low load or no load. To clear the oil from the exhaust manifold, run the engine with a load greater than 40% for 10 minutes. To minimize this oil accumulation, reduce long periods of no-load or light-load operation.

2.6.2 Engaging Driven Equipment

Check the engine gauges while the engine is running. Before engaging any driven equipment, ensure the engine gauges are within the normal range.
Engage the driven equipment and begin running the engine under low load. Continuously monitor the gauges and check that the equipment is working properly. If the load changes or

cycles, the governor will adjust the engine speed as needed. Running the engine at low idle or reduced load for long periods can cause increased oil consumption and carbon buildup in the cylinders. Carbon buildup can lead to power loss or reduced performance. When running under reduced load, the engine should run at full load every 4 hours to burn off excess carbon in the cylinders.

2.6.3 Fuel Consumption Guidelines

Engine efficiency directly impacts fuel economy. The engine design and manufacturing technologies provide maximum fuel efficiency for all applications. Follow the recommended steps to ensure optimal performance throughout the engine's lifespan.

- Avoid fuel spillage, as fuel expands when heated and may overflow from the fuel tank. Check the fuel lines for leaks and perform any necessary repairs.
- Be aware of the characteristics of different fuels. Always use the recommended fuel.
- Avoid unnecessary no-load running. If the engine doesn't need to run, shut it down instead of letting it idle for long periods.
- Regularly check the air filter maintenance indicator, if equipped, and keep the air filter clean.
- Only remove the air filter cover if the maintenance indicator shows the filter needs cleaning.
- Keep the electrical system in good condition. A faulty battery cell can cause the alternator to overwork, consuming additional power and fuel.
- Ensure proper belt tension and condition.
- Ensure all hose connections are tight and leak-free.
- Keep the driven equipment in good condition. A cold engine consumes more fuel. Keep cooling system components clean and well-maintained. Never run the engine without an installed thermostat.
- These actions will help maintain the proper operating temperature.
- The engine's fuel system settings and operational altitude limits are engraved on the engine information nameplate.

2.7 **Shutting Down the Engine**

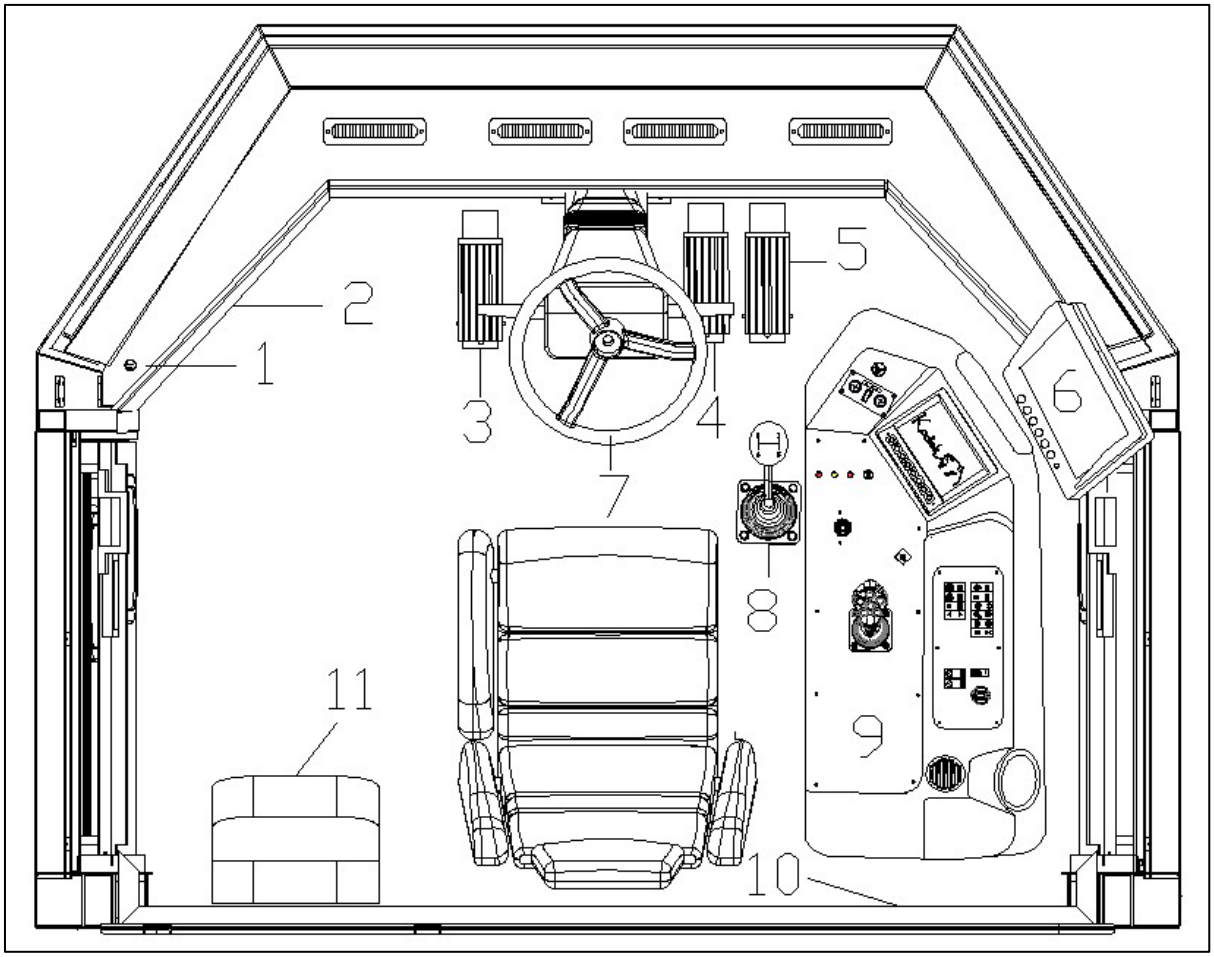
- Ensure the snow blower parking switch is in the "PARKING" position.
- After running the engine at idle for 3-5 minutes, turn the key switch to the "LOCK" position to shut down the engine.
- Turn off the main power switch.

2.8 **Post-Shutdown Inspection**

- Perform a visual inspection of the equipment and check for any loose ribbon, auger or drive shaft bolts.
- Check for oil or water leaks.
- Check fuel levels and refill as necessary.
- Check for any paper or debris near the engine and remove it to prevent fire hazards.
- Check the engine oil level 10 minutes after the engine stops.
- Record the operating time and perform maintenance as described in the maintenance manual.

(III) System Functions

3.1 Cabin Interior Functions



Interior Overhead View of the Operator's Cabin

1. Cigarette Lighter or Power point	2. Windshield Washer Reservoir Filling Port
3. Deceleration Pedal	4. Brake Pedal
5. Accelerator Pedal	6. Reverse Display Screen
7. Steering Assembly	8. Blower head Shift Lever
9. Armrest Control Console	10. Electrical Components Mounting Panel
11. Front Passenger Seat	

3.1.1 Cigarette Lighter

Press the cigarette lighter, and after a few seconds, it will pop back to its original position. Remove the cigarette lighter to ignite the cigarette. The cigarette lighter socket can also be used as a power source for electrical devices, providing DC24V, 240W output.

3.1.2 Windshield Washer Reservoir

The windshield washer reservoir is located at the left front of the operator's cabin. The filling port is beneath the left side of the front windshield. Open the decorative cover to add antifreeze windshield washer fluid.

Note: Since the equipment is used in cold environments, to prevent the washer fluid lines from freezing, use windshield washer fluid that is suitable for the ambient temperature.

3.1.3 Deceleration Pedal

The deceleration pedal is located to the left of the steering assembly. When driving, pressing the brake pedal disconnects the power between the drive gear box and engine. The further the pedal is pressed, the greater the deceleration. When the deceleration pedal reaches the bottom, the vehicle speed will gradually come to a stop. After the pedal is released, the engine will resume powering the drive gear box.

3.1.4 Brake Pedal

The brake pedal is located to the right of the steering assembly. The vehicle decelerates by conventional braking. When driving at high speeds, press the deceleration pedal first, then the brake pedal, to prevent mechanical friction between the snow blower head and the ground during abrupt braking.

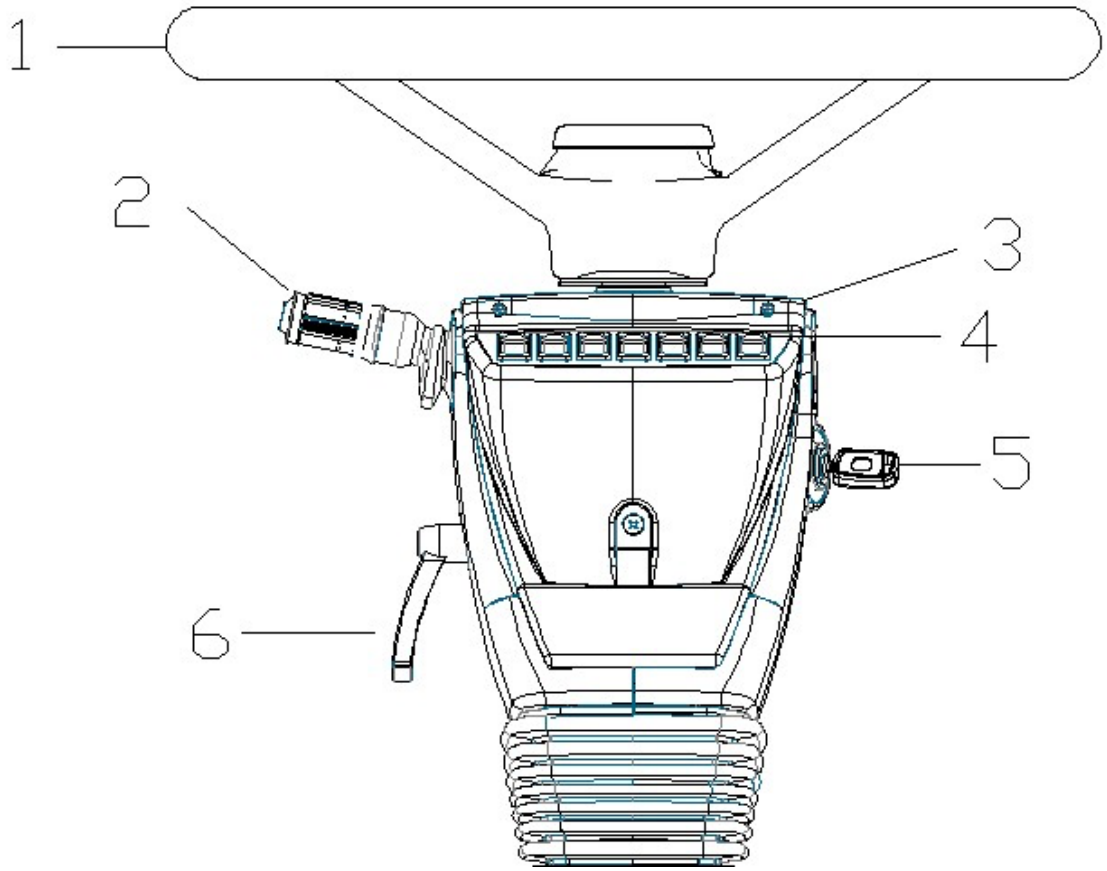
3.1.5 Accelerator Pedal

The accelerator pedal is located to the right of the steering assembly. When transitioning the vehicle, turn the rpm knob down and use the accelerator pedal to control engine speed, which improves vehicle handling. During snow blowing operations, the blower head requires stable power output, and the engine needs to operate at a constant speed. The rpm knob takes priority over the accelerator pedal, so when the rpm knob is active, the accelerator pedal will be paused.

3.1.6 Rearview System

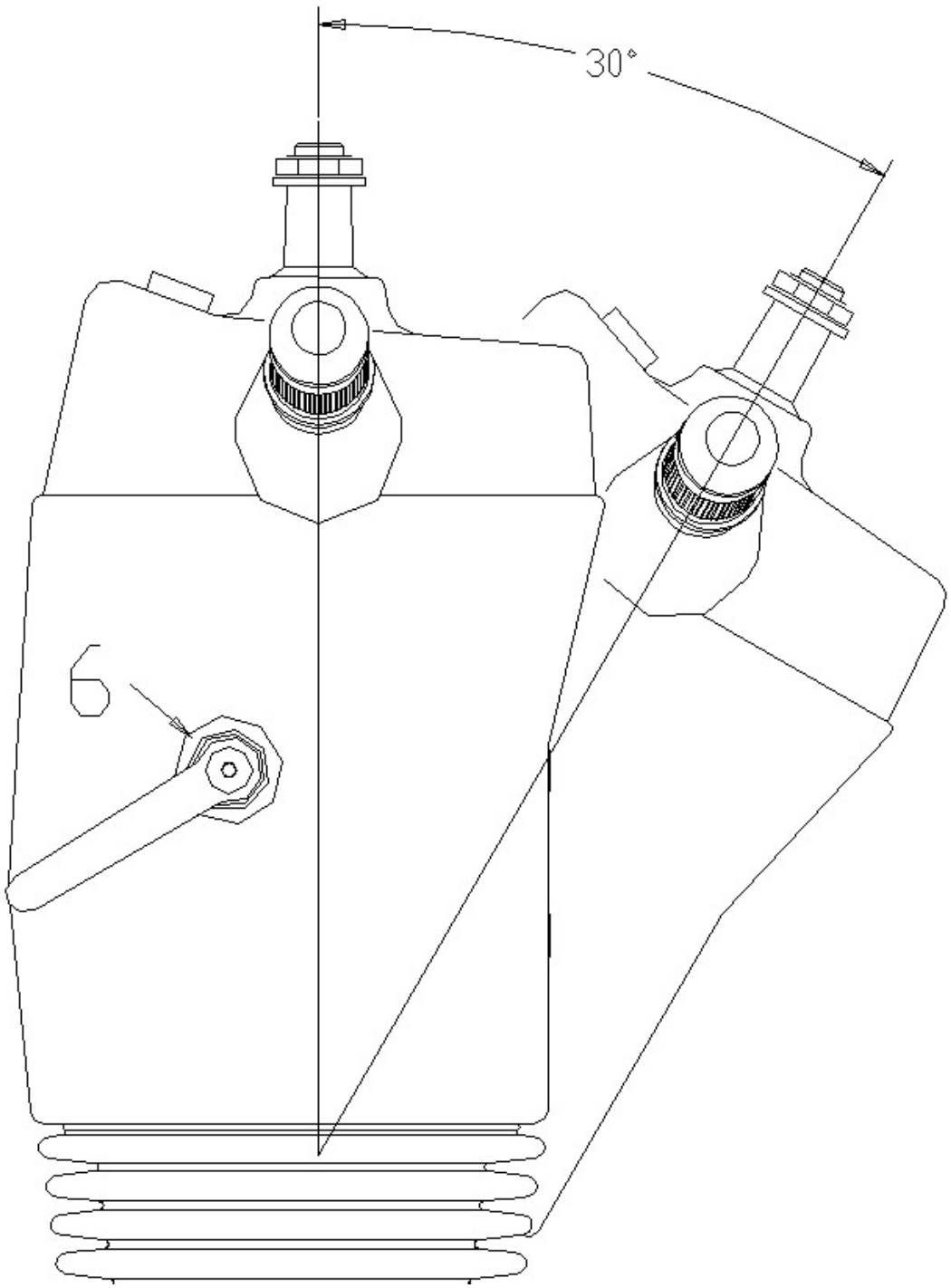
A wide-angle camera is installed at the rear of the vehicle to assist the operator in observing some blind spots behind the vehicle in real time. The monitoring display is located at the right front of the operator's cabin.

3.1.7 Steering Assembly



1. Steering Wheel
2. Left Combination Lever (Steering Column)
3. Indicator Lights
4. Steering Column Toggle Switch
5. Ignition Key
6. Steering Column Adjustable Handle

Steering Assembly Top-Down View



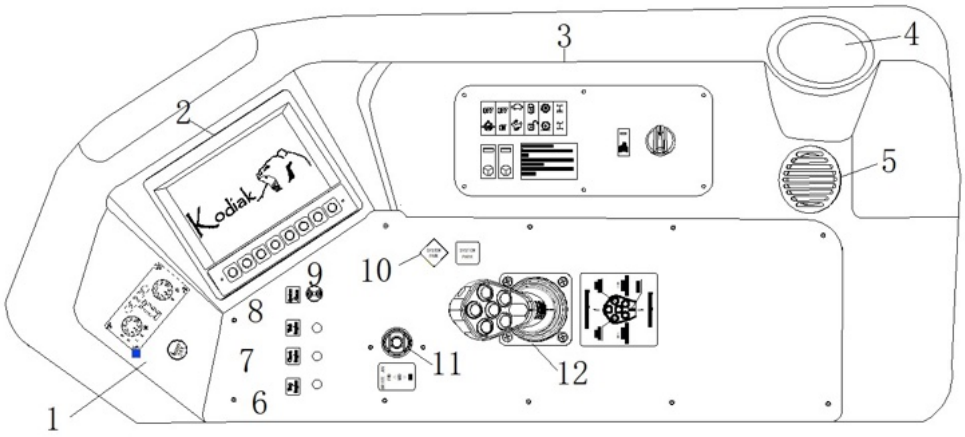
By loosening the steering gear adjustment handle-6 counterclockwise, the front and rear angles of the steering gear can be flexibly adjusted to suit the driver's operating posture.

3.1.8 Snow Blower Gear Shifter

The operator manually shifts gears to control the engagement and disengagement of power between the engine and transmission, as well as to adjust the snow casting distance of the equipment.

3.1.9 Armrest Console

The operator's cabin is equipped with a professional, integrated independent control console. According to the sequence in which the operator drives the vehicle, the system display screen and control levers are positioned for convenience, with clear Simplified Chinese text labels. There is appropriate lighting for nighttime use.
All snow blowing operations can be controlled from the cabin, and all tasks can be completed independently by the operator.



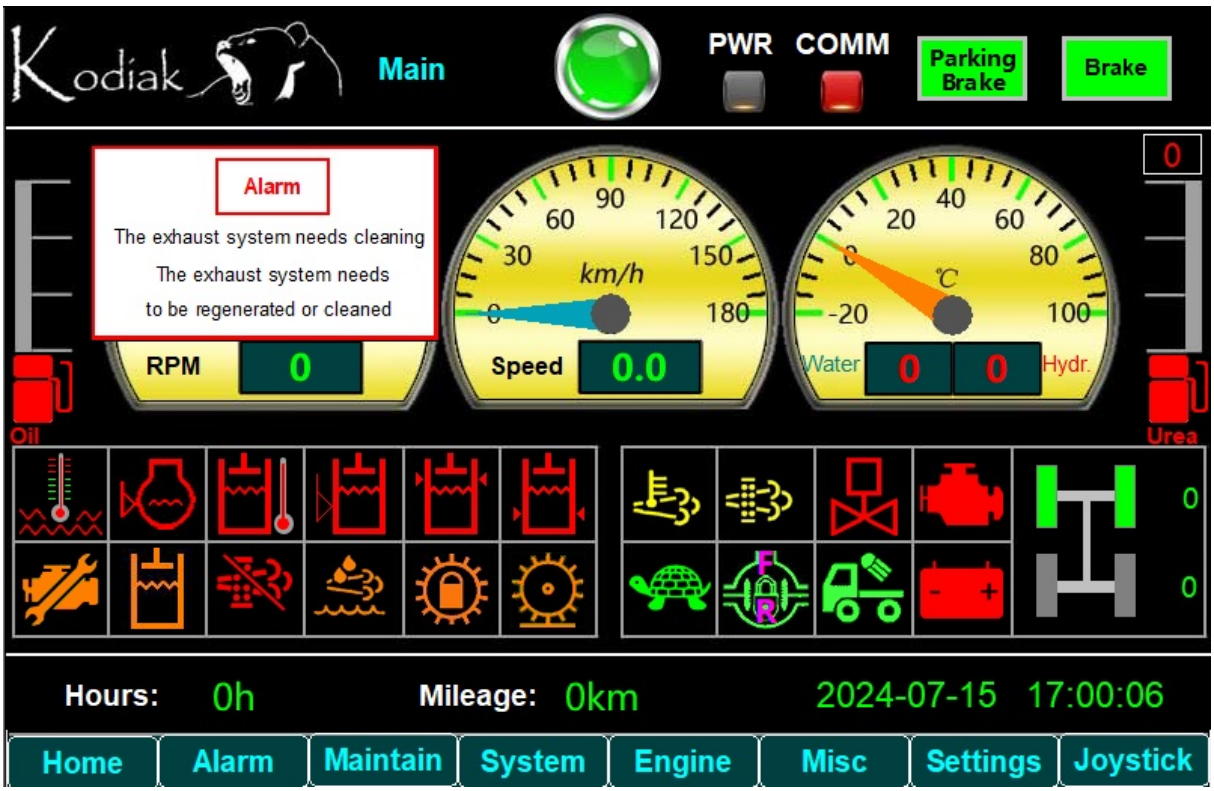
3.1.9.1 Cigarette Lighter, Air-Conditioning Control Panel

Press the cigarette lighter, and after a few seconds, it will pop back to its initial position. Remove the cigarette lighter to ignite the cigarette. The cigarette lighter socket can also be used as a power source for electrical devices, providing DC24V, 240W output.

The air conditioning control panel can control the fan speed, adjust the airflow temperature, and switch between hot and cold air functions. When using air conditioning for cooling in the summer, manually close the water valve on the engine.

3.1.9.2 Display Screen

The display screen is a 7-inch TFT color display with a resolution of 800×480 pixels, capable of showing the engine status and monitoring system operation. Upon powering on, the default display is the main interface, which shows the following information in real-time: speedometer, engine RPM, engine coolant temperature, engine oil pressure, odometer, operating hours, fuel tank level, fault warning indicators, and other necessary information.

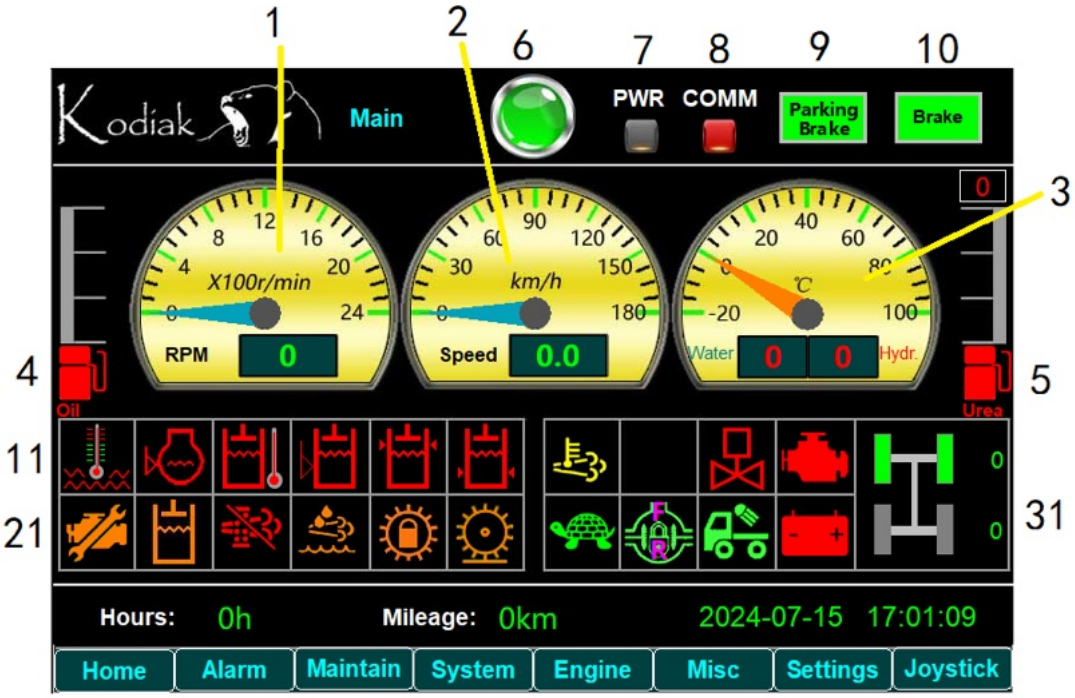


Main Interface

The display screen is divided into eight interfaces: main interface, alarm interface, maintenance interface, controller interface, engine interface, other interface, system settings interface, and joystick interface.

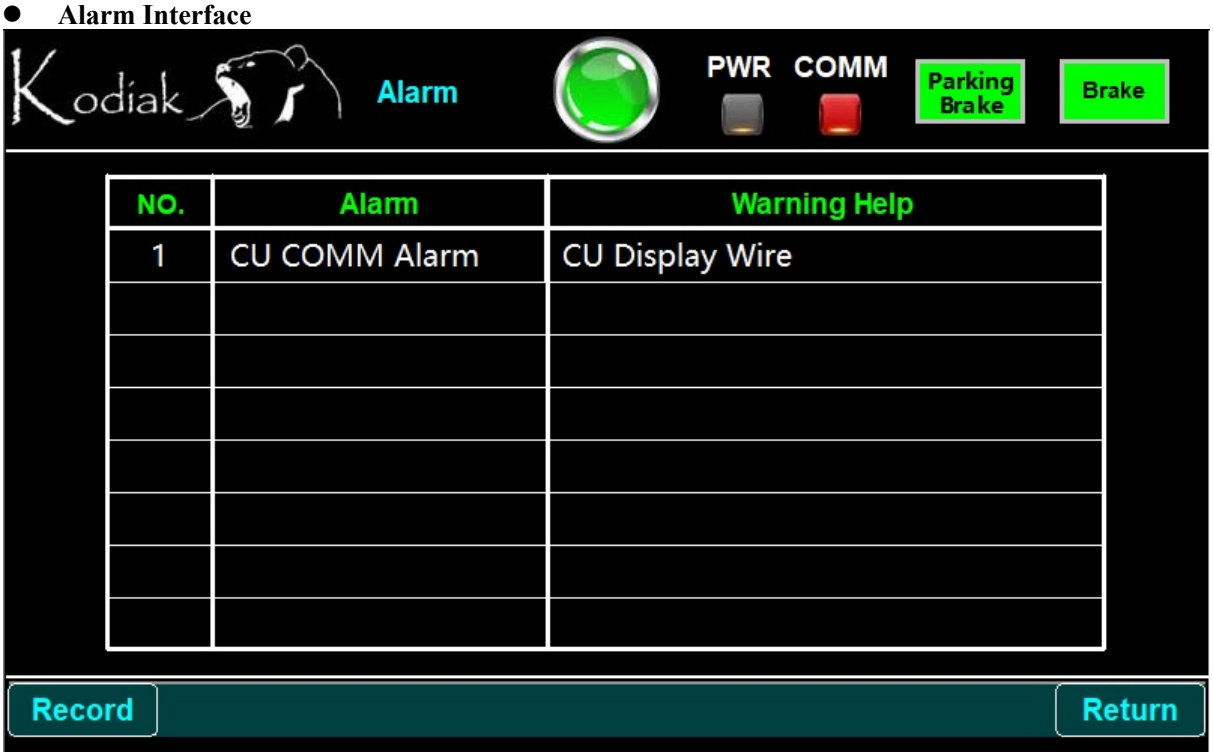
In the main interface, you can access the corresponding function interface through the eight buttons at the bottom of the display screen.

- **Main Interface**



1. Engine RPM Gauge	2. Speedometer
3. Engine Coolant Temperature, Hydraulic Oil Temperature	4. Fuel Level Gauge
5. Urea Level Gauge	6. Emergency Stop Switch Indicator Light
7. CAN Communication Indicator Light	8. System Communication Indicator Light
9. Parking Brake Indicator Light	10. Foot Brake Signal Indicator Light
11. Engine Coolant Temperature High Alarm Indicator Light	12. Engine Coolant Low Level Indicator Light
13. Hydraulic Temperature Alarm Indicator Light	14. Hydraulic Oil Low Level Alarm Indicator Light
15. Hydraulic Oil High Pressure Alarm Indicator Light	16. Hydraulic Oil Low Pressure Alarm Indicator Light
17. Seat Belt Not Fastened Indicator Light	18. Filter Clogged Indicator Light
19. Solenoid Valve Fault Indicator Light	20. Engine Fault Indicator Light
21. Engine Maintenance Indicator Light	22. Driver Indicator Light
23. Aftertreatment Regeneration Indicator Light	24. Aftertreatment Regeneration Disabled Indicator Light
25. Travel Lock Working Indicator Light	26. Floating Function Indicator Light
27. Transfer Case Gear Position Indicator Light	28. Drive Axle Differential Working Indicator Light
29. Reverse Light Indicator Light	30. Battery Charging Status Indicator Light
31. Drive Axle Steering Angle Display Area	

- **Alarm Interface**



Alarm Record Interface

In the main interface, press F2 to enter the alarm record interface, where you can view the system alarm content in real time. Press F1 to continue viewing the device's fault records.

Alarm Record Interface

By using the alarm record interface, the fault points of the equipment can be quickly and

accurately identified. When the red fault indicator lights up during operation, please immediately move the equipment to a safe location for further inspection. The equipment can only continue operation after the fault has been resolved.

- **Maintenance Interface**

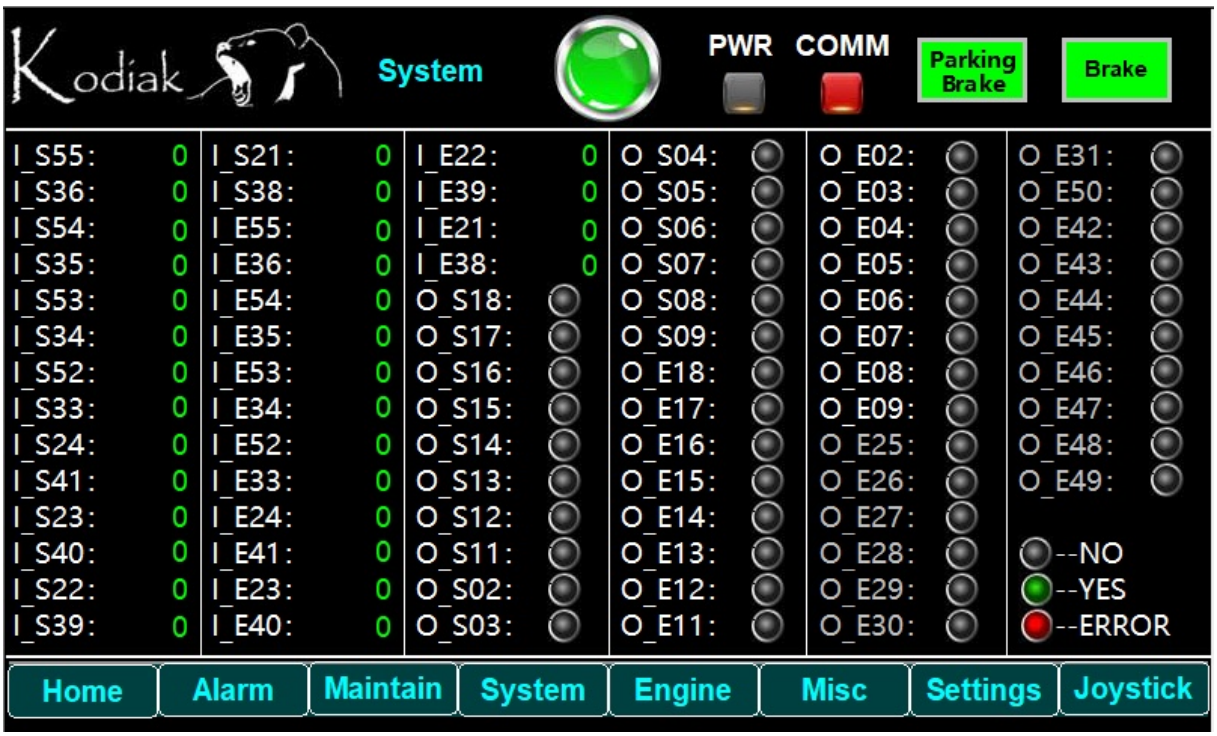
Press F3 from the main interface to enter the equipment maintenance interface. After each maintenance, use F2 and F3 to toggle between the maintenance items, and press F5 to update. The system will save the maintenance information and automatically generate the next maintenance time. When the next maintenance time arrives, the display screen's main interface will automatically prompt for maintenance.

Maintenance Interface

- **Controller Interface**

Press F4 from the main interface to switch to the controller interface. This page allows you to determine the status of the controller's input and output signals.

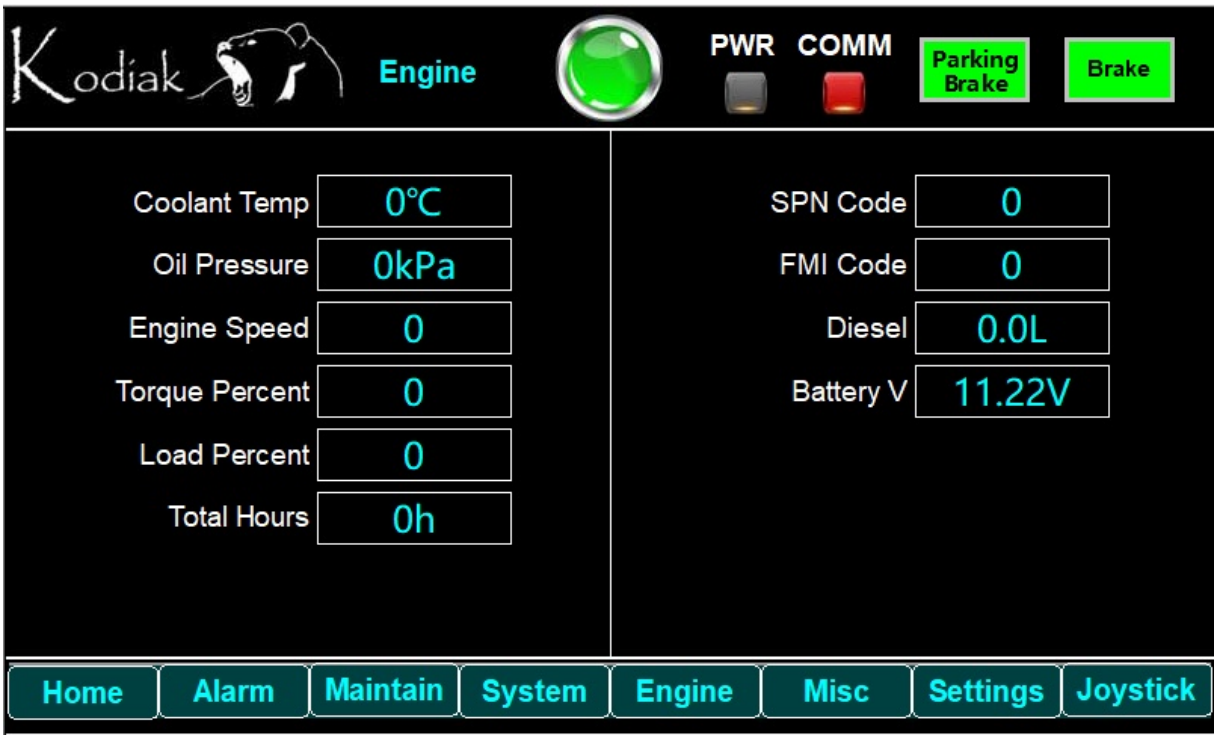
The controller output page can accurately determine whether the controller has signal output. When the electrical components are functioning normally and the wiring connections are correct, the controller output points will display in green. If the electrical components fail, or if there is a wiring short circuit or disconnection, the output points will display in red. In case of wiring faults, please contact after-sales service promptly to resolve the issue.



Controller Interface

- **Engine Interface**

Press F5 from the main interface to directly enter the engine interface, where the real-time status of the engine can be monitored. When a fault occurs in the engine, the SPN code and FMI code will display values. These fault codes can be referenced through local engine after-sales service points or the engine operation and maintenance manual to determine the engine's fault.



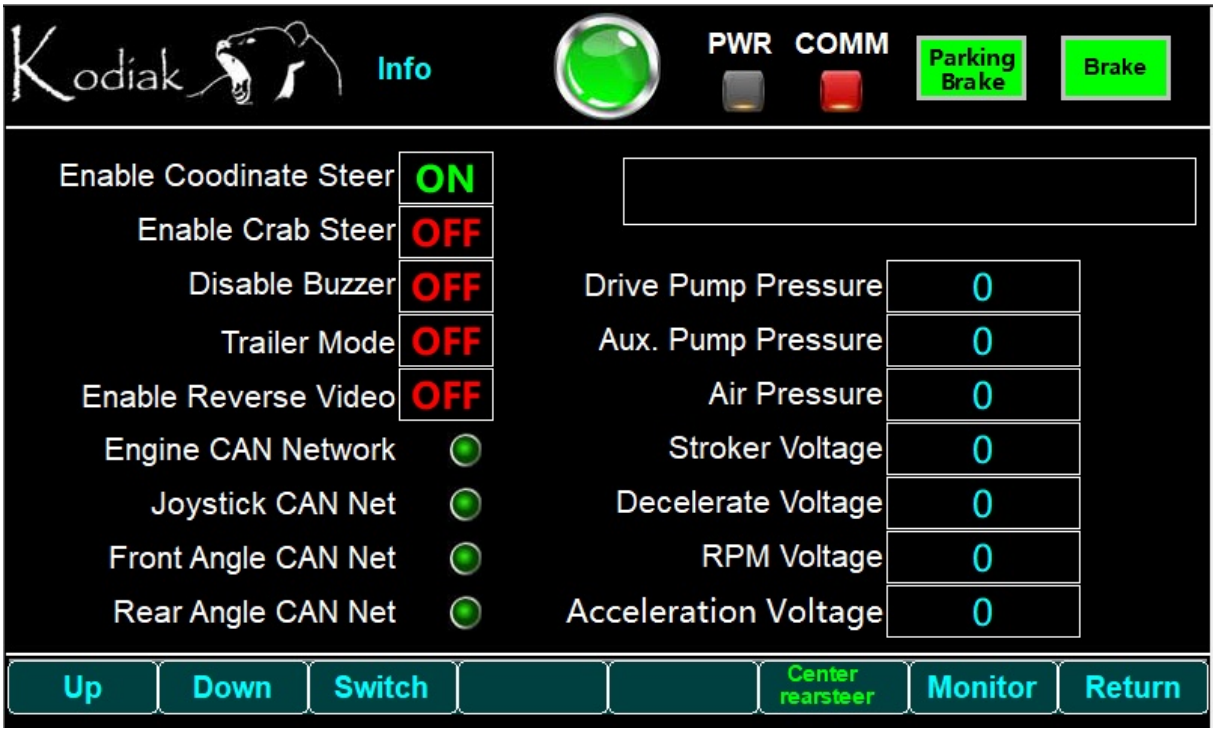
Engine Interface

- **Other Interface**

Press F6 from the main interface to directly enter the information interface. In the information interface, you can set the switching function between coordinated steering and crab steering. The rear-wheel steering function is limited to being used when the transfer case is in low-range mode.

When the rear-wheel steering function is enabled, the crab steering function will be turned off. After the rear-wheel steering switch is turned on, the rear-wheel steering indicator in the lower right corner of the display screen's main interface will light up. The default rear-wheel steering mode is coordinated steering.

To switch to crab steering mode, first turn off the coordinated steering function before enabling the crab steering. Once crab steering is enabled, the rear-wheel steering angle on the display screen's main interface, located at the lower right corner, will follow the front-wheel angle and turn in the same direction.



Information Interface

- **Settings Interface**

Press F7 from the main interface to enter the settings interface, where you can configure the rpm knob, deceleration pedal, accelerator pedal, initial angle of the front and rear wheels, or restore the factory settings. The calibration interface allows you to set the engine speed based on the actual working load:

1）Engine speed range: 700 RPM - 2100 RPM

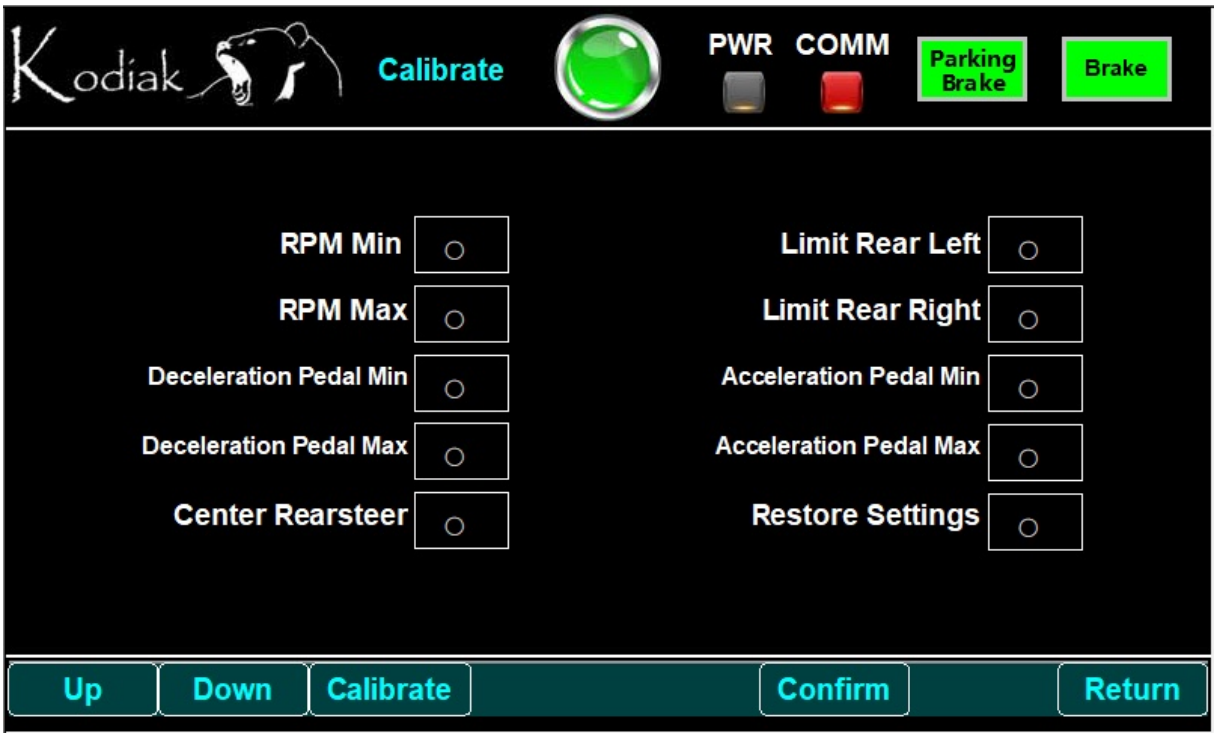
2）If the front and rear wheels are not at the center position, they need to be adjusted to the center before re-calibration.

3）When calibrating the left turn limit of the rear wheels, enable the rear-wheel steering manual mode, use the work handle to turn the rear wheels to the far left, and then proceed with calibration.

4）When calibrating the right turn limit of the rear wheels, enable the rear-wheel steering manual mode, use the work handle to turn the rear wheels to the far right, and then proceed with calibration.

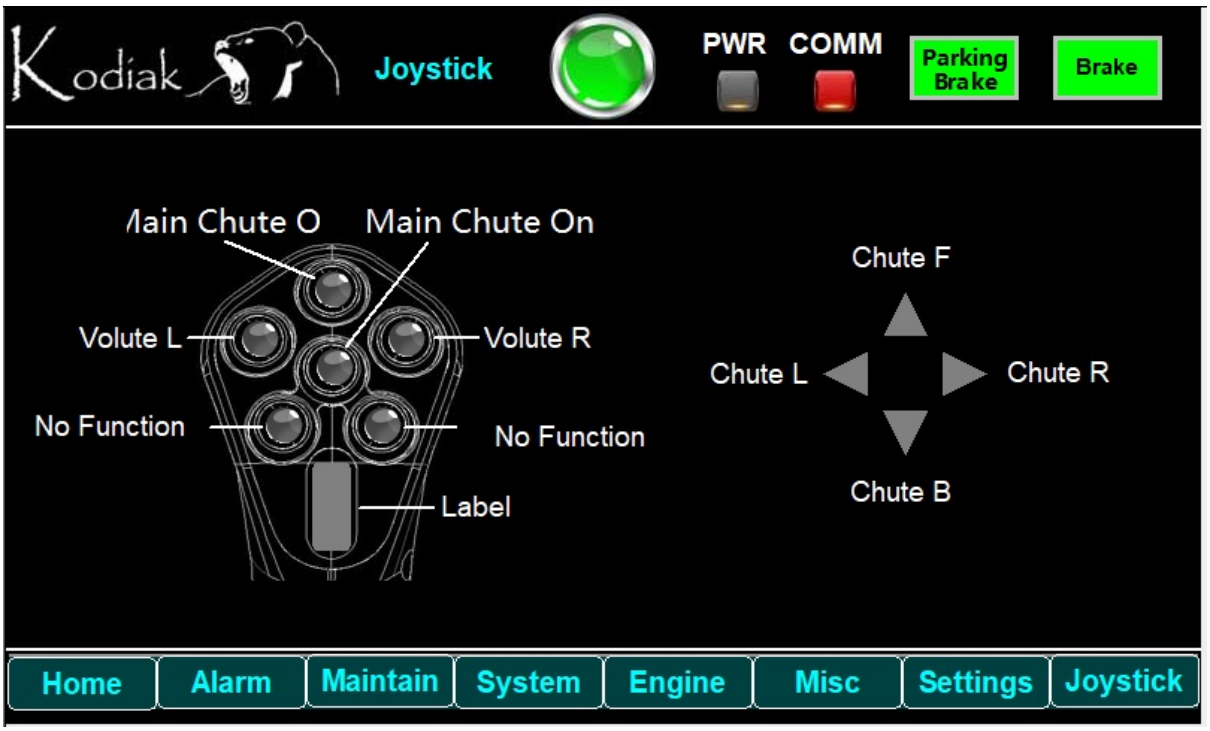
5）All parameters are set to optimal conditions before the equipment leaves the factory. If factory settings are restored during use, only the front and rear wheel center positions, left turn limit, and right turn limit of the rear wheels need to be re-calibrated.

6）If you have any questions during the calibration process, please contact the manufacturer immediately.



- **Joystick Information Interface**

From the main interface, press F8 to enter the joystick interface. In the joystick interface, when the work joystick is moved, the corresponding button in the joystick interface will light up simultaneously. If the display screen does not show the corresponding working status, it indicates a fault in the equipment's electrical system, and the fault should be resolved promptly.



3.1.9.3 Switch Panel

1. Differential Lock Switch

   If the tires slip and the vehicle cannot free itself while driving or operating, the differential lock switch must be activated when the vehicle is stationary. Both front and rear axle differential locks will work simultaneously. Once the differential lock engages, the

differential lock icon will light up on the display screen.

2. Spare Switch
3. Transfer Case High/Low Gear Switch

   Note: The vehicle must be stopped before switching the transfer case between high and low gears. Switching while the vehicle is moving may cause gear grinding in the transfer case, potentially damaging it.
4. Snow Blower Head Lock Switch

   When the switch is off, the snow blower head lock icon will appear on the display screen. When switched on, the icon will disappear. When transitioning, make sure to raise the snow blower head to its highest point and lock it. After confirming it's locked, move the vehicle to prevent the snow blower head from dropping suddenly while driving, which could damage the road surface.
5. Snow Blower Head Floating Switch

   To enable the floating function, the travel lock must first be turned on before the snow blower head floating function can be activated.
6. Rear Wheel Steering Switch

   The rear wheel steering function can only be used when the transfer case is in low gear. When the rear wheel steering switch is on, the rear wheel steering icon will light up in the bottom right corner of the display. To confirm the rear wheel steering mode, press F6 to enter the information screen on the display.
7. Parking Heater Switch

   When the ambient temperature is low and engine start is difficult, use this switch to preheat the engine.
8. Engine Rpm knob

   The rpm knob controls different engine speeds at different settings. When the rpm knob is turned on, the system defaults to snow removal mode, and the accelerator pedal will be disabled.
9. Regeneration Disable Switch

   1) The priority of the Diesel Particulate Filter (DPF) regeneration disable switch is higher than the forced DPF regeneration switch.

   2) The DPF regeneration disable switch is typically an open switch with an indicator light and a "Regeneration Disable" label. If the driver toggles the switch, the light will turn on and disable the DPF regeneration.
10. Regeneration Switch

    When the display screen indicates that the after-treatment system requires regeneration, move the vehicle to a safe area before starting regeneration. The signal for this switch is controlled by a pull-up input with two possible states:

    1) On (not grounded) or closed (grounded).

2) When the engine is running at idle speed and the following conditions are met, the regeneration will be forced to initiate: The engine is running.
3) The throttle pedal must be at idle.
4) The clutch switch must indicate that the clutch is engaged or the pedal is released (if applicable).
5) The parking brake switch must indicate that the parking brake is released or the pedal is released.
6) The vehicle speed must be 0 mph, and the transmission must be in park/neutral.

11. Emergency Steering Switch
In case of engine shutdown without power, the emergency steering function can be used by turning on the emergency pump switch.
12. Emergency Pump Switch
When turned on, the emergency pump switch allows the snow blower to be raised using the switch on the engine compartment, as well as control the opening and closing of the engine compartment.

3.1.9.4 Cup Holder

To provide convenience for the driver to place a water cup, a cup holder is installed at the top rear of the right side of the control console.

3.1.9.5 Air Conditioning Vent

Due to the special working conditions of the snow blower, the cabin is equipped with a heating and cooling air conditioning system. There is a heating and cooling air vent on the armrest console.

3.1.9.6 Engine Air Filter Clogging Indicator

When the indicator light turns on, it means the engine air filter is clogged. Please replace the filter or clean it using compressed air.

3.3.9.7 Hydraulic Oil Filter Clogging Indicator

When the indicator light turns on, it indicates that the hydraulic oil filter is clogged. Please replace the filter promptly.

3.1.9.8 System Fault Alarm Indicator

If there is a malfunction in the hydraulic system, power system, or electronic control system, fault information will be displayed on both the main interface and the alarm interface of the display screen, accompanied by an audible buzzer alarm.

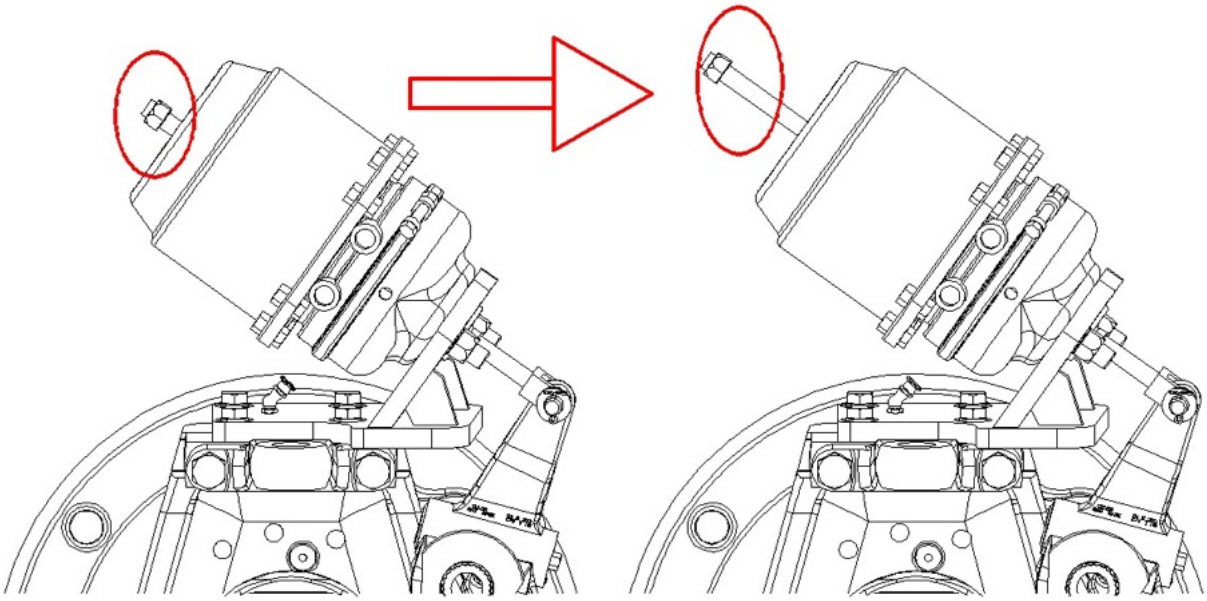

Cab lift
Do Not
Drive
Cab lift
Air filter
clogged
Hyd filter
clogged
System
Alarm

3.1.9.9 Parking Brake Valve

When the vehicle is stationary, the parking brake must be engaged to prevent unintended movement and potential collisions. Pulling up the parking brake switch activates the parking brake.

Manual Release of the Parking Brake: If the vehicle experiences a malfunction preventing engine startup or if the braking system fails, making it impossible to release the parking brake pneumatically, manual release is required for towing. Manual Release Procedure: Using an M14 wrench, turn the brake chamber release bolt on all wheels counterclockwise to the limit position to disengage the parking brake.

Caution: After manually releasing the parking brake, the vehicle will have no braking force. Before doing so, wheel chocks must be placed on the front and rear axles to prevent unintended movement and ensure safety.

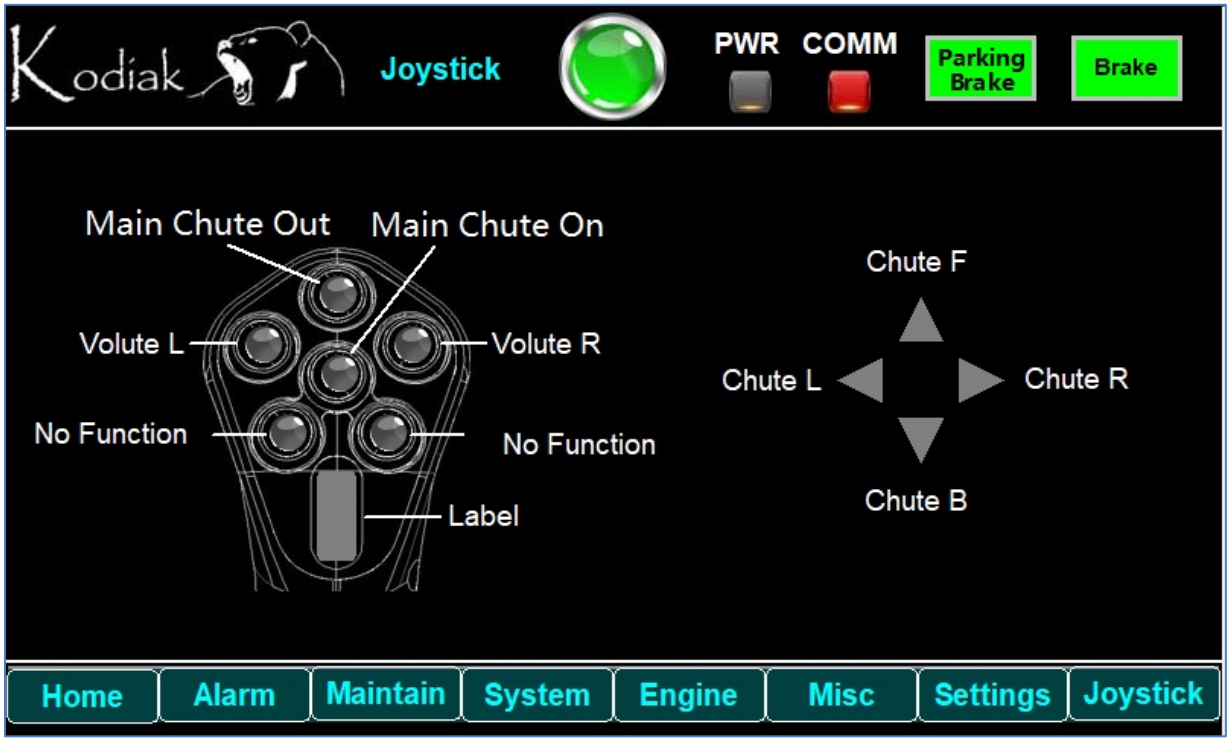


3.1.9.10 Travel Handle

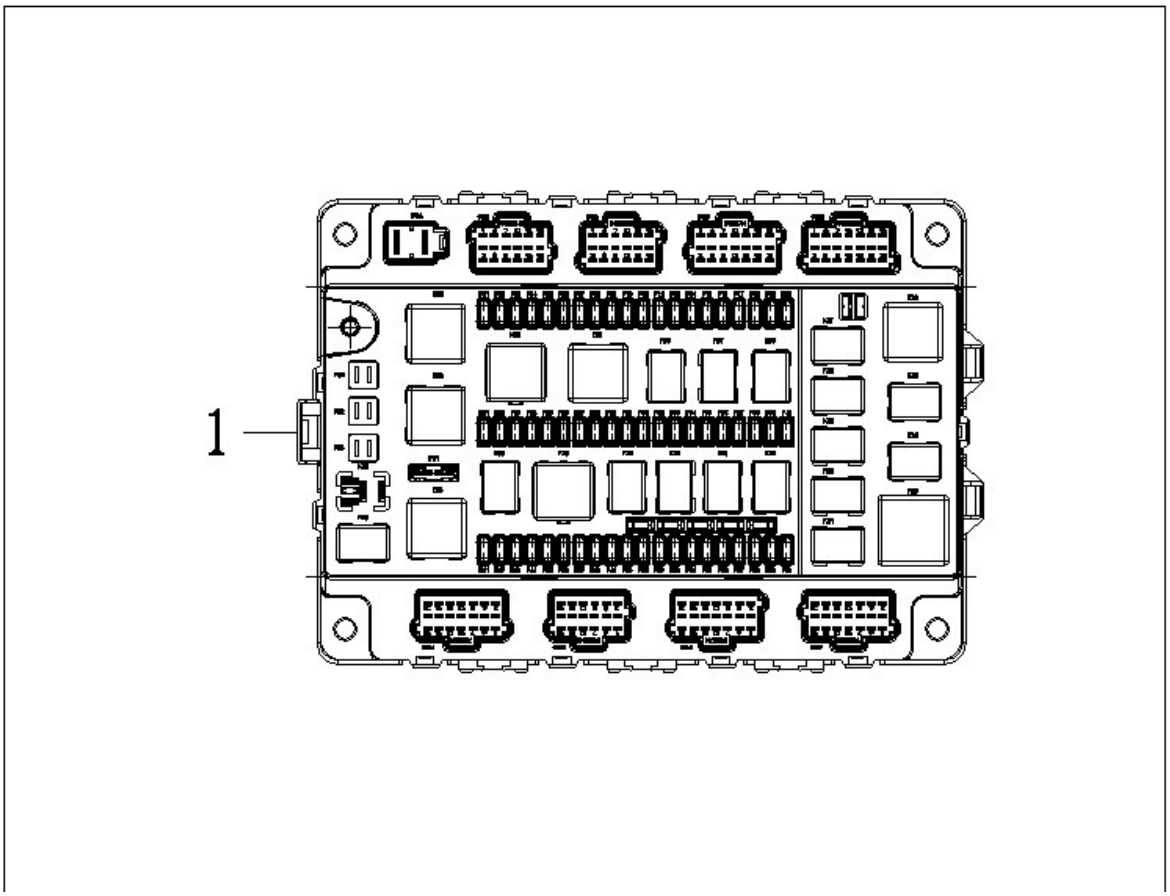
When the travel handle is in the neutral position, the vehicle remains stationary. Pushing the handle forward or backward increases the vehicle speed proportionally to the handle's displacement. Before starting or when the vehicle is stationary, the travel handle must be in the neutral position. If the travel handle is not in the neutral position, the vehicle will not start.

3.1.9.11 Work Handle

The work handle controls the snow blower head attachment movements and the rear-wheel steering function. The handle's actions can be monitored in real-time through the handle interface on the display screen. When the handle is operated, the corresponding position on the screen will light up (green).

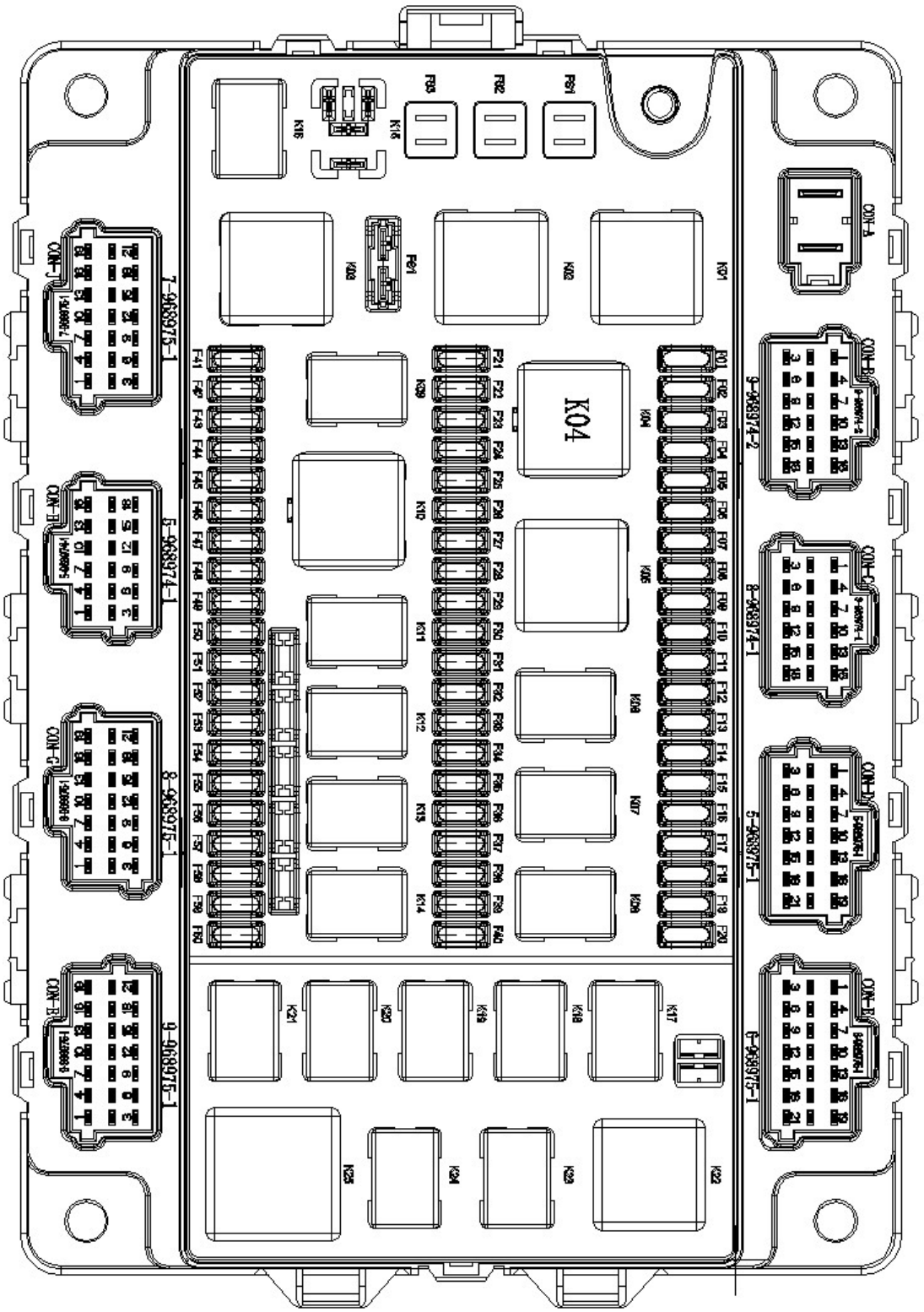


3.1.10 Electrical Component Mounting Board

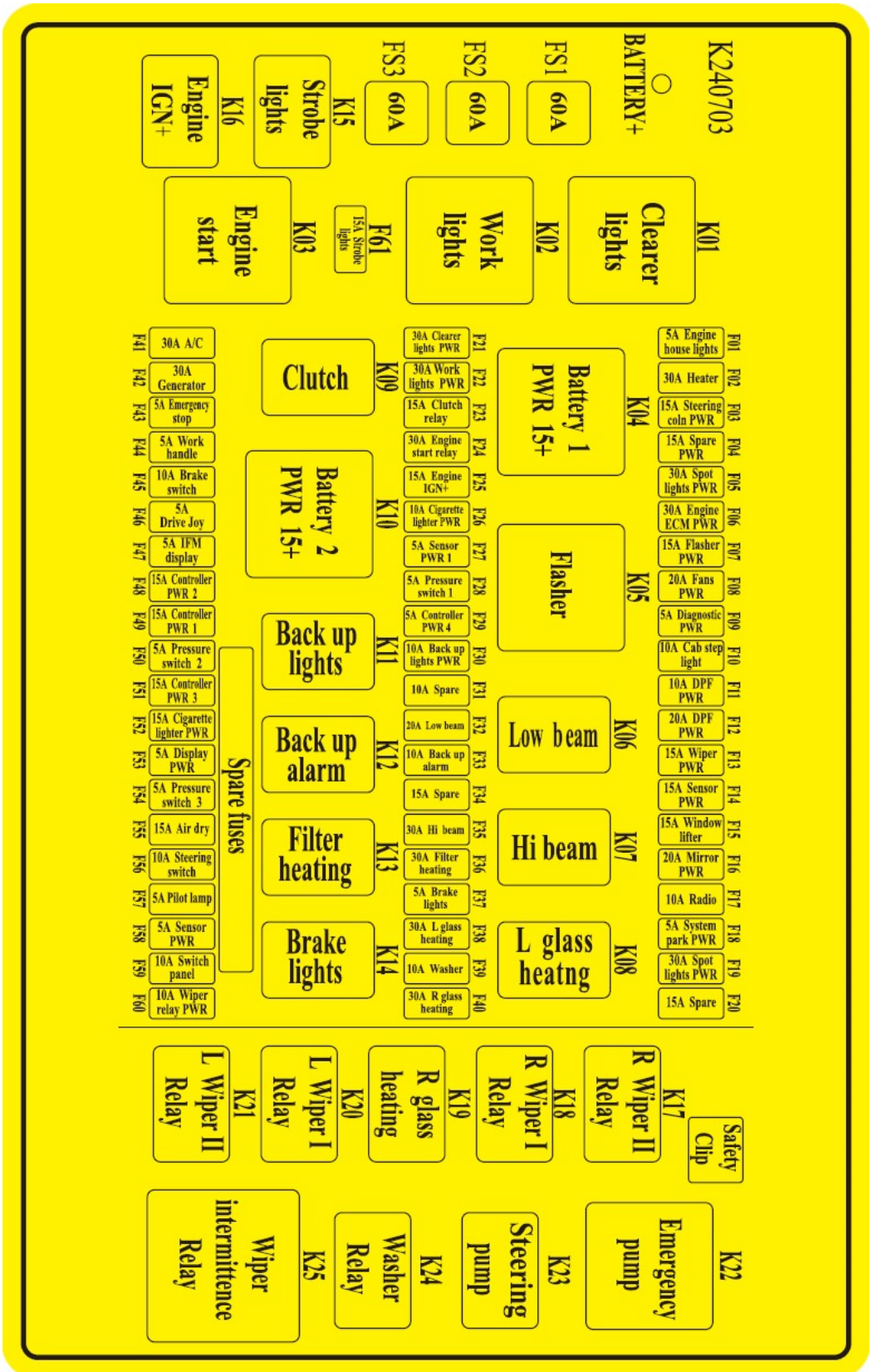


3.1.10.1 Electrical Junction Box

The primary function of the electrical junction box is to protect electrical equipment and prevent wire burnout. If a fuse is corroded, it will appear black inside the fuse casing, indicating the need for replacement with a fuse of the same model.



Electrical Junction Box Top View



Electrical Junction Box Definition

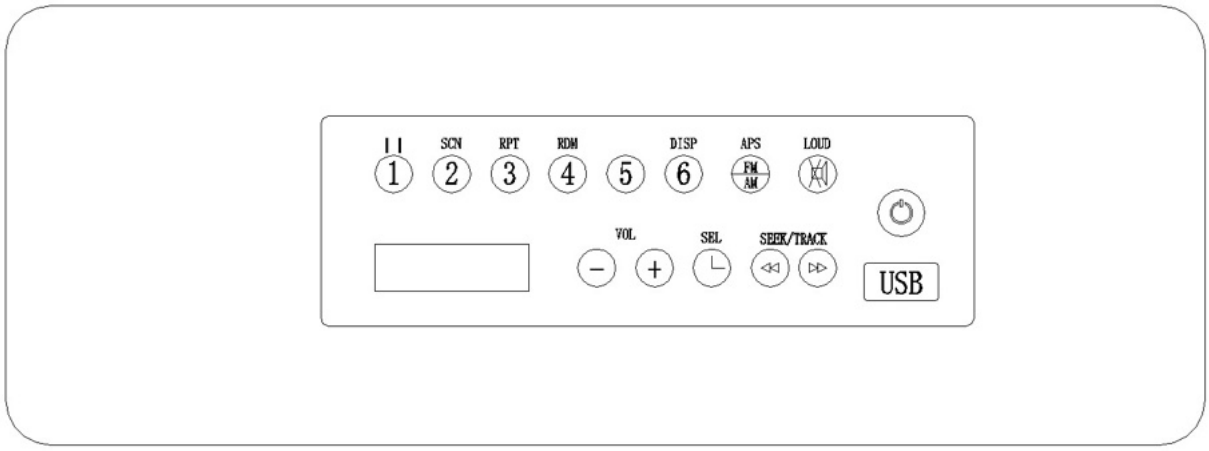
3.1.11 Jump Seat

The jump seat is a foldable seat. Please fasten your seatbelt when seated.

3.1.12 Work Light Mounting Board

1. Left Work Light Control Switch – The switch has buttons for turning the work light on/off and adjusting it up, down, left, and right.
2. Rearview Mirror Adjustment Switch – Allows adjustment of the rearview mirror position.
3. Rearview Mirror Heating Switch – Turns on the heating function for the rearview mirrors.
4. Fan Rocker Switch – A two-position switch that controls the speed of the cabin fan.
5. Right Work Light Control Switch – The switch has buttons for turning the work light on/off and adjusting it up, down, left, and right.

3.1.13 Radio



The radio can receive broadcast programs from radio stations and supports audio playback from USB devices.

1.Pause Button

2.SCN (Scan) – Searches for radio stations.

3. RPT (Repeat) – Plays a single track in a loop.

4. RDM (Random) – Plays tracks in random order.

5. Empty (Unused Button)

6. DISP (Display) – Shows time information.

APS (Automatic Programming System) – Adjusts radio frequency bands.

SEL (Select) – Selects functions.

(IV) Equipment Operation

4.1 Precautions for Low-Temperature Operation

To maintain optimal vehicle performance, extend its service life, reduce fuel consumption, and protect the environment, please use the following grades of hydraulic oil based on the ambient temperature:

Recommended Hydraulic Oil Viscosity Range

Hydraulic Oil Operating Temperature Range	℃	-20 to +90
Operating Viscosity Range	cSt	10 to 80
Optimal Operating Viscosity	cSt	15 to 30
Maximum Viscosity (Short-Term Cold Start)	cSt	1000

Recommended Hydraulic Oil Viscosity Grades

Operating Temperature（℃）	Recommended Viscosity Grade
Around 30-40	VG22
Around 40-60	VG32
Around 60-80	VG46 or VG68

Note: Maintaining a hydraulic fluid viscosity of 15-30 cSt helps extend the lifespan of the hydraulic system. If the operating viscosity is too low (below 10 cSt), it may lead to poor lubrication of system components, increased internal leakage, and accelerated wear of system components.

The following fluids have been pre-filled in this equipment for use in specific regions:

- Hydraulic Oil: 32# high-pressure anti-wear hydraulic oil; suitable for regions with ambient temperatures above -45°C.
- Coolant: Mobil Antifreeze -45°C; suitable for regions with ambient temperatures above -45°C.
- Engine Lubricating Oil: 10W-40 CK-4.
- Transfer Case Oil: 80W-90 GL-5.

4.2 Battery

Precautions:

- The battery generates flammable gases; therefore, do not bring sparks or flames near the battery.
- The battery's electrolyte is dangerous. If it gets into your eyes or splashes onto your skin, immediately rinse with plenty of water and seek medical attention.
- The electrolyte can dissolve paint; if it splashes onto the equipment, immediately wash it off with water.
- If the battery's electrolyte freezes, do not charge the battery or attempt to start the engine with a different power source. There is a risk of explosion.
- Do not leave the battery in a low-temperature environment for extended periods to avoid difficulty starting the equipment. The battery's capacity decreases in low temperatures, so cover the battery or remove it from the equipment and store it in a warmer location. When using the equipment again, reinstall the battery.

As the ambient temperature drops, the battery's capacity also decreases. If the battery is undercharged, its electrolyte may freeze. Try to keep the charging rate near 100% and insulate the battery from the cold, so the equipment can start easily the next day. Measure the electrolyte's specific gravity and use the conversion table below to determine the charging rate.

Electrolyte Temperature / State of Charge (SOC)	20℃	0℃	-10℃	-20℃
100	1.28	1.29	1.30	1.31
90	1.26	1.27	1.28	1.29
80	1.24	1.25	1.26	1.27
75	1.23	1.24	1.25	1.26

4.3 Equipment Commissioning Operations

Before starting work, perform idle checks on the operation of various attachments and check engine coolant temperature, oil pressure, and equipment communication status on the display screen.

- The hydraulic system’s pressure, flow, and flow control have been adjusted to appropriate values before leaving the factory. Unless authorized, the user should not adjust the system's overall pressure and flow control valves.

4.4 Equipment Operation Precautions

- While operating the equipment, promptly remove snow accumulation around the air pre-filter to ensure sufficient air intake, or it may affect engine power.

- During snow removal operations, avoid excessive swinging or long-term tilting of the equipment, as it may cause low engine oil pressure, severe wear of engine components, and affect the engine's service life.
- If the engine fault light or system alarm appears, immediately stop the engine and evacuate the work area. Please contact Kodiak's after-sales service.

4.5 Long-Term Operation Considerations

If the equipment is operated for long periods, the following points should be noted to ensure efficient operation:

- When the fuel level is below 15%, the controller will trigger an alarm. Please add fuel promptly to avoid the fuel filter being emptied, which may cause unnecessary trouble.
- Always monitor engine oil pressure and coolant temperature to ensure the engine operates normally and efficiently.
- Always monitor the display screen for any alarm messages or notifications.

4.6 Post-Operation Inspection

After completing the operation, to prevent mud, water, or ice from freezing and affecting the next use, always follow these precautions:

- Thoroughly remove any mud, water, or ice from the body of the equipment. This prevents dirt or mud from entering the sealing surfaces with the frozen water droplets, which could damage seals.
- Park the equipment on a firm, dry surface.
- Drain any water accumulated in the oil-water separator to prevent freezing, which could cause difficulty or failure to start the engine.

4.7 Long-Term Storage

When storing the equipment for an extended period (more than one month), follow these steps:

- Clean the equipment and store it in a dry building. If stored outdoors, park the equipment on a level surface and cover it with a protective cloth.
- Before storage, fill the fuel tank to prevent moisture buildup.
- Change and refill the lubricating oil.
- Apply a thin layer of grease to the hydraulic cylinder piston rods.
- Disconnect the negative terminal of the battery and lock the engine compartment door.
- Perform an idle check to ensure there are no oil leaks.

4.8 During Storage Period

- Start the engine once a month and let the blower head run for five minutes. This will cover the moving parts with a fresh oil film and recharge the battery.
- Before operating the work devices, wipe off the grease from the hydraulic cylinder piston rods.

4.9 After Storage

Note: If the equipment was not rust-proofed monthly during storage, please contact Kodiak or an authorized dealer.

After long-term storage, before using the equipment, follow these steps:

- Wipe off the grease from the hydraulic cylinder piston rods.
- Add grease to all moving parts.
- When equipment is stored for a long time, moisture in the air may mix with the oil. Before starting the engine, check the quality of the lubricating oil and hydraulic oil. If water is found in the oil, replace the oil with the same type of lubricating oil or hydraulic oil.

4.10 Precautions Before Operating the Equipment After Storage

OFF (Closed): This is the position for turning off the main power of the equipment during normal parking. The vehicle key can only be removed in this position.

ON (On): In this position, all electrical circuits of the vehicle are connected.

START (Start): When the key is turned to this position, the starter motor works, and the engine begins to run. Once the engine starts, release the key. It will automatically return to the "ON" position, cutting off the starter motor power.

The vehicle must meet the following three conditions before starting: The stroker must be in the neutral position. The emergency stop switch must be in the open position. The blower head transmission must be in neutral.

Note:

1. Do not turn or remove the key while the vehicle is in motion, as this will result in a complete power failure, engine stall, loss of hydraulic power steering, and loss of steering control.
2. Do not exceed 15 seconds for each engine start attempt. If starting fails, wait 120 seconds before attempting again.
3. The key has an anti-restart function to prevent the engine from restarting while running. If a restart is needed, turn the key to the "OFF" position before turning it back on.
4. When the engine is off, the key should be in the "OFF" position. (If the key remains in the "ON" position for an extended period, it will continuously discharge the battery, which may affect the engine's ability to start.)

Precautions

- Before operation, walk around the vehicle to check for any oil or fluid leaks. If any leaks are found, resolve the issue before starting the equipment.
- Before operation, check the fastening condition of the U-bolt bolts on the front and rear axles, the drive shaft bolts of the transfer case, the auger drive shaft bolts, the pump drive shaft bolts, and the radiator fan drive shaft bolts.
- If the ambient temperature is below -18°C, preheat the engine coolant for 30 minutes in advance. Use a 220V AC power supply to heat the engine cylinder liner or use the parking heater to heat the entire vehicle coolant, ensuring the engine can start quickly and normally in low temperatures.
- If the battery is undercharged and the battery voltage is below 24V, promptly use a 220V AC power supply to charge the battery.
- After starting the equipment each day, check the charging status of the engine alternator. After running the engine at >1000 rpm for 3 minutes, check whether the battery voltage displayed on the monitor is ≥27V.
- The optimal engine speed for snow removal operation is between 1200 rpm and 1600 rpm.
- If the vehicle is not used frequently (unused for more than 7 days), regularly use a 220V power supply to charge the battery for at least 8 hours and up to 16 hours.
- When the vehicle is operating normally, always turn off the differential lock. Failure to do so may cause severe wear on the coaxial drive tires during turns or damage the drive axle's main reducer and differential.
- When the rear-wheel steering rocker switch is activated, the vehicle's speed will be limited to below 20 km/h. Before disabling the rear-wheel steering function, ensure the rear wheels are returned to the neutral position.
- When shifting between high and low gear in the transfer case, the vehicle must be stationary. Shifting gears while the vehicle is moving may cause gear misalignment in the transfer case, leading to damage.
- During transportation, when the snow blower head is raised to the highest position, ensure the travel lock is engaged. Confirm the travel lock is engaged before moving the vehicle to prevent the snow blower head from suddenly dropping during travel, which could damage the road surface.
- If the windshield wipers are frozen, do not force them to operate. First, remove the ice and snow before using the wipers. Forcing them to operate may burn out the wiper motor or strip the wiper arm gears.
- If the vehicle experiences a failure where the engine cannot start or the braking system malfunctions, preventing the pneumatic release of the parking brake, and towing is necessary, the parking brake must be manually released. (Refer to Section 3.1.9.11 of the operation manual for manual parking brake release.)

- During high-speed travel between job sites, avoid hard braking to prevent mechanical friction between the snowplow blade and the road surface, which may cause road damage.
- After completing the operation, promptly grease the equipment. (Refer to Section 3 of the maintenance manual for lubrication procedures.)

Due to continuous technological and product updates, materials and technical specifications are subject to change without prior notice.