WARNING
Operators and maintenance persons should read this manual carefully and understand these instructions before use to avoid serious accident. For the convenience of relevant people using this manual, it should be easily accessible and kept in readable condition.

G9200 Grader
Operation & Maintenance Manual
(New Cab)

4th edition in 2019.10 1st print

SHANDONG LINGONG CONSTRUCTION MACHINERY CO., LTD.

PREFACE

Thank you for purchasing G9200 Grader produced by SDLG.

This manual is a guideline for users to operate and maintain this machine properly. Keep this manual within easy access and have all relevant people read it before use. If this manual is lost, damaged or cannot be read, contact our company or our dealers.

If you sell the machine, be sure to give this manual to the new owners.

Parameters, figures and information of G9200 Grader included in this manual is very useful for you to repair, use and administer technically. For those derivative products, please consult us or refer to the relative manuals.

G9200 Grader is improved continuously, so the contents of the manual may be different from the products. Please note that the changed part will not be noticed, and be careful when using.

We are continually striving to improve the quality of our products, to produce more advanced and a safer engineering machine. We reserve the right to change or modify our design, but we do not promise to apply the changes to products that are sold. We also reserve the right to change the data and machine, and the right to maintain it. The design, operation and user information in this document is subject to change without notice. Customer feedback is very welcomed. If you would like to comment on any aspect of this manual or our products in general, please feel free to contact us.

Please give us feed back about the shortcomings immediately upon using our products, so that we can continue to improve our products to satisfy your requirements.

WARNING

The wrong operation, maintenance and repair could result in injury or death.

An operator should read this manual carefully before operation or maintenance. Never attempt to operate, maintain or repair the machine before reading and understanding this manual.

The operation specifications and precautions given in the manual only apply to intended uses of the machine. If the machine is used for any unintended purpose that is not specifically prohibited, ensure the safety of yourself and others before using.

Any operation and actions which are in conflict with the description in this manual are prohibited.

CONTENT

SAFETY INFORMATION

Operators should know and obey the safety criteria described in national and local laws. If there is no such national or local criteria, please follow the rules described in this manual.

Most accidents are caused by the failure to follow fundamental safety regulations for the operation and maintenance of machines. To avoid accidents, please read, understand and follow all precautions and warnings in this manual about the machine before performing any operation or maintenance.

Safety precautions are specified in SAFETY of Chapter I.

Safety information described in this manual cannot include safety precautions for every circumstance that might involve a potential hazard in operation and maintenance. Therefore, if procedures or actions which are not recommended in this manual are used, the safety of the operator and machine must be confirmed. Otherwise, consult us or the dealers.

The safety precautions for operation and maintenance in this manual only apply to those conditions specified by the machine. If the uses of the machine are not specified in the manual, users should assume full responsibility for their actions. We will not bear any safety responsibility for the operators or machine.

In any case, you should not engage in prohibited operations as described in this manual.

The following signs are used for identification of safety information in this manual:

DANGER——Failing to avoid this hazard may result in serious injury or death. This word is also used to indicate that the machine will be damaged seriously if the hazard is not avoided.

WARNING——If the danger is failed to be avoided, potential consequence may result in serious injury or death. It also means that it may also result in serious damage to the machine if failing to avoid this hazard.

NOTICE—If the danger is failed to be avoided, it may result in slight or medium injury or death. It also means that it may also result in serious damage to the machine if failing to avoid the hazard.

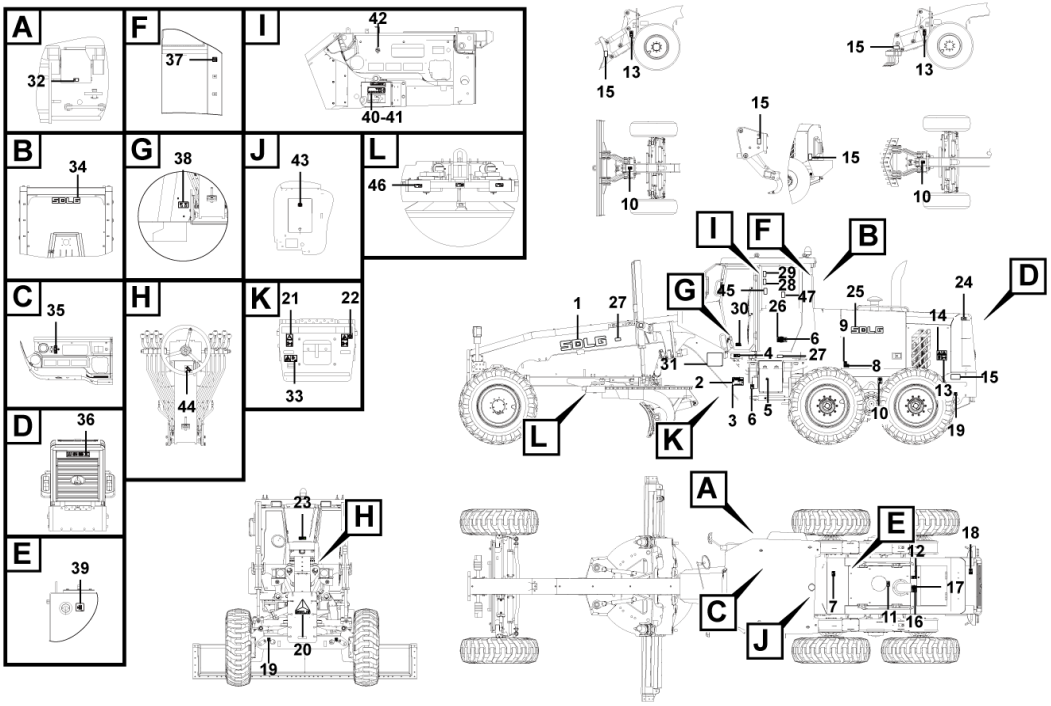
SAFETY

WARNING
Read and follow all safety precautions. Failure to do so may result in serious injury or death.

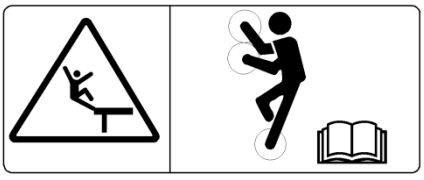
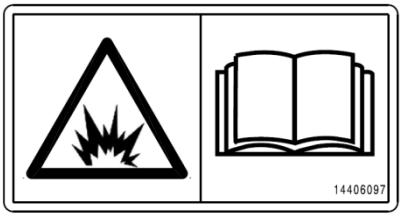
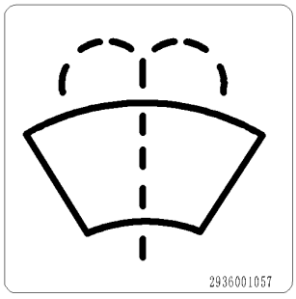
SAFETY LABEL POSITIONS AND THE CONTENTS

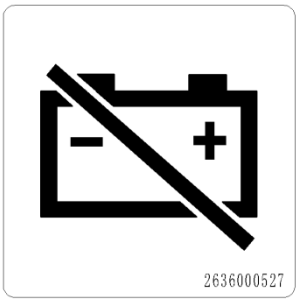
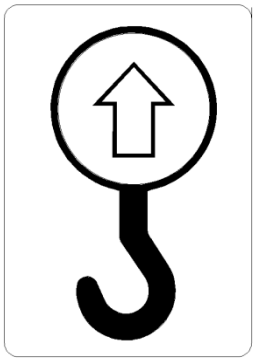
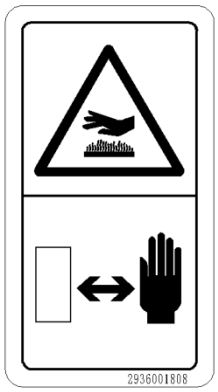
The positions of safety labels of this machine are shown in the figure. Please read carefully and follow the contents of all the safety labels. Please maintain the labels; when a label becomes lost, broken or unclear, immediately repair or replace the label. If any component attached with safety labels is replaced, please make sure the new component has the same safety label.

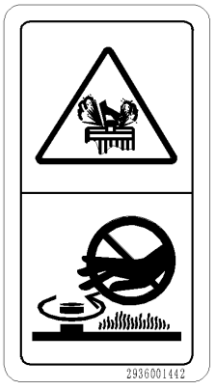
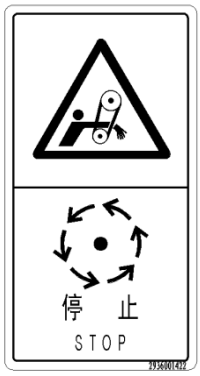
When cleaning the safety labels, please use cloth, soap and water. Do not use chemical and gas cleansers.

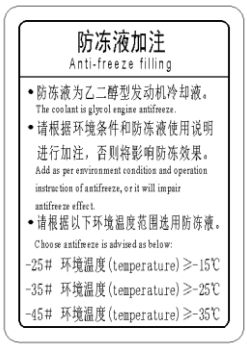
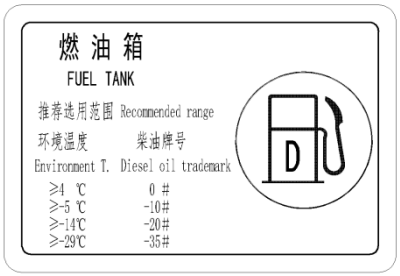
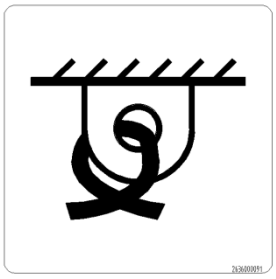


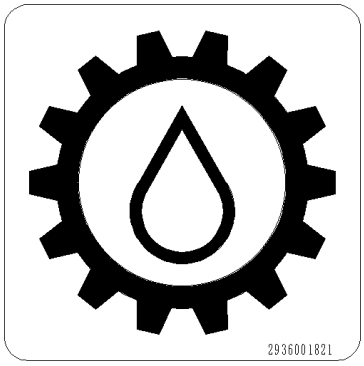
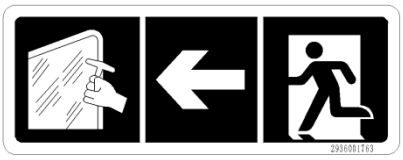
The Contents of Safety Label

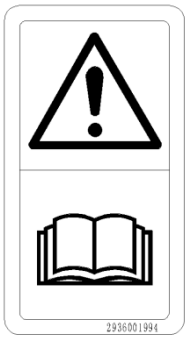
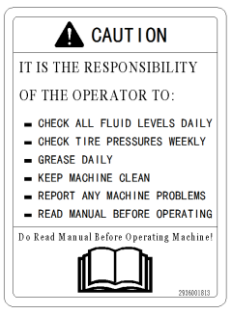
SDLG	1 **SDLG logo** Label is located on both sides of front frame
	4 **Maintain 3-point contact when using steps and platforms of the machine** Label is located on the right and left side ladders.
	5 **WARNING! Explosion** Label is located on side of front frame below the cab
	6 **Windshield washer** Label is located on side of front frame below the cab

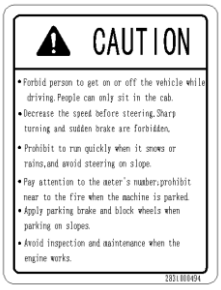
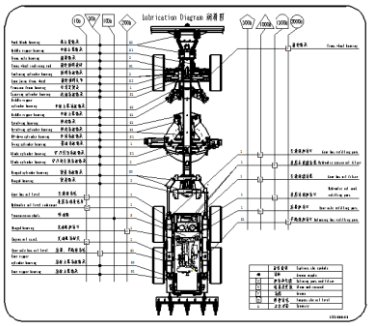
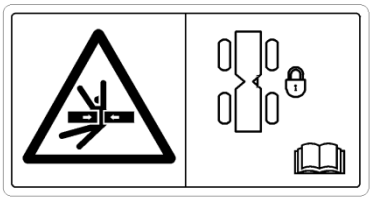
	7 **Hydraulic oil tank** Located on the hydraulic tank
	8 **Warning for banning fire** Located on the battery box
	9 **Master electrical switch** Label is located on the side of hood
	10 **Attachment point for machine hoisting** Label is located on top of front working equipment.
	11 **WARNING! Extremely hot surfaces, do not touch** Label is located on top of the engine hood by the exhaust pipe.

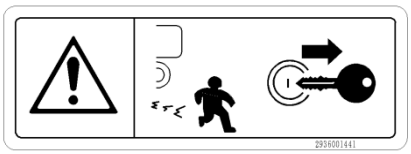
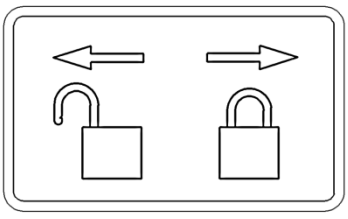
	12 **Hot coolant in a pressurized system - do not open system when engine is hot** Label is located on top of the engine hood
	13 **WARNING! Keep safety distance** Label is located on the side of hood
	14 **WARNING! Engine belt hazard** Label is located on the side of hood
	15 **Reverberator** Label is located on side of rear frame

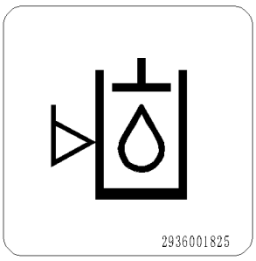
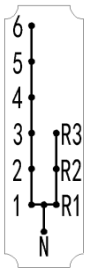
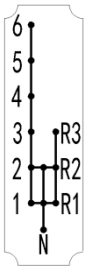
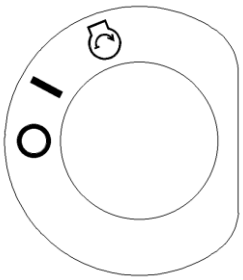
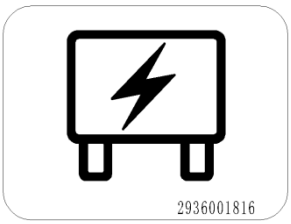
	16 **Must use proper coolant mixture** Label is located on top of the engine hood in the area of the coolant fill cap.
	17 **Antifreeze fluid** Label is located on top of the engine hood
	18 **Fuel tank** Located on fuel tank
	19 **Sign for hug** Located on the side of rear frame.

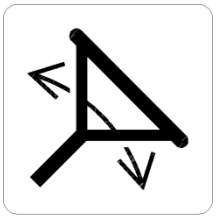
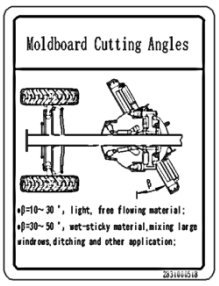
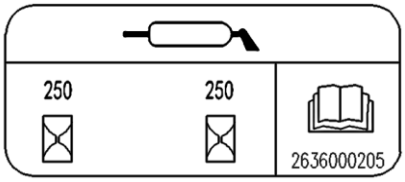
	20 **SDLG logo** Label is located on front of front frame.
	21 **WARNING! In the hinge joint area when machine is being steered** Label is located on the rear side of rear frame
	22 **Transmission oil check and fill point** Label is located on the rear side of rear frame
	23 **Emergency exit** Label is located on cab rear window

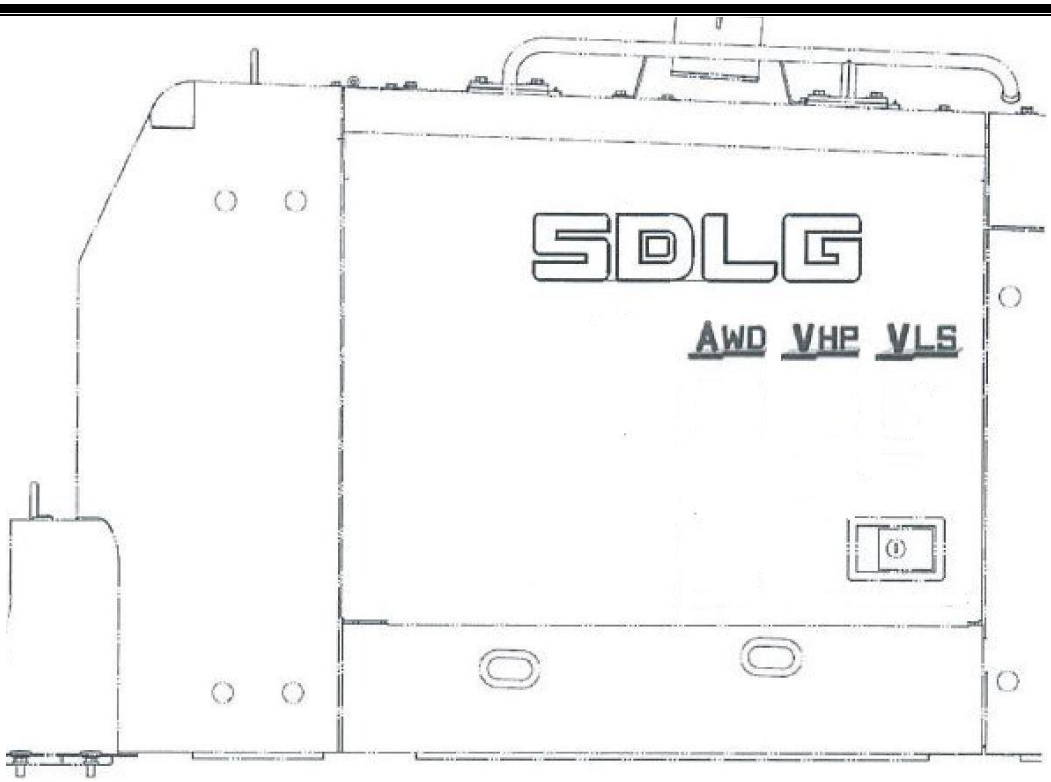
	24 **Logo** Label is locater on the side of engine hood
SDLG	25 **SDLG logo** Label is locater on the side of engine hood
	26 **Read manual** Label is located on the window in the cab
	27 **Reverberator** Label is located on the side of front frame.
	28 **Operator responsibilities** Label is located on the window in the cab

	29 **Notice for driving** Label is located on the window in the cab
	30 **Notice for the door of operator cab** Located on the left operator cab door
	30 **Lubrication logo** Label is located on the side of cab
	32 **Sign for condenser cleaning** Label is located on side of front frame
	33 **Steering hinge lock** Label is located on side of front frame

	34 **SDLG-450** Label is on the front of cab
	35 **WARNING! Starting switch** Label is located on top of the starting switch
	36 **SDLG-350** Label is on the rear side of engine hood
	37 **Fire extinguisher location** Label is located on the window in the cab
	38 **Sign for locking the operation handle** Located on the bottom of console inside the cab

	39 **Hydraulic oil level** Located on the side of front working equipment
	40 **Sign for gear box(hangchi)** Located in the cab
	41 **Sign for gear box(zf)** Located in the cab
	42 **Sign for electric lock** Located on the operation panel in the cab
	43 **Fuse block/box** Label is located on fuse block/box

	44 **Sign for steering wheel angle adjustment** Located on platform in the cab
	45 **Sign for blade** Label is in the cab
	46 **Sign for grease** Label is on the gear.
	47 **Warning for engine using** Label is in the cab



AWD	All wheel drive
V8	8 speed automatic shift
VHP	Automatic variable power control
MHP	Manual variable power control
EHC	Electronic control pilot
VLS	Variable hydraulic system

SAFETY RULES

Driver bears an important responsibility for normal driving and the operation safety. Therefore, before the driving and operating, you should be familiar with the performance, structure, methods of operation and technical maintenance of the grader. Only by obeying the safety regulations strictly can the safe production be guaranteed and the machine performance will also be used fully, which prolongs the life of the machine

1. Only trained and authorized people can be permitted to operate and maintain the machine.
2. Follow all safety rules, precautions and instructions in the Operation & Maintenance Manual when the machine is in operation or being maintained.
3. Operator should have a good rest to keep good spirit. **Don't** operate machine if you feel sick, or feel sleepy after taking drugs or drinking alcohol.
4. Understand all the regulations during the work and all hand signals that are to be used.
5. Before operating the grader, be familiar with the functions and positions of all the operation devices, gages and indicating lights. Keep a rabbit of observing the gauges to find the abnormal conditions.
6. Operators should grasp the condition of the operation sites. Anybody is forbidden passing by or standing near the machine, which is necessary to

avoid the loss of lives and property, or potential deaths

7. Anybody is prohibited to enter or stay in the dangerous areas 7m near the machine. Operator should be careful. And the machine could be operated only when the positions of the people is identified.
8. If there is grease adhered to the operation positions, clean it in case of slipping.
9. If the abnormal condition (Noise, vibration, display errors, gas, oil leaking or abnormal display on the warning devices or monitors) is found, report to the administration departments immediately to take some measures. Do not operate the machine before the problems is solved.
10. Wear protective items, such as a hard hat, safety glasses, boots, face shield, protective vest, earplugs and thick gloves when the machine is in operation or being maintained. Make sure to wear a hard hat, safety glasses and heavy gloves if there are scattered metal chips or other tiny particles in the process of operation, particularly when cleaning the filter elements with compressed air. Be sure that there is no one near the machine.
11. Never wear loose clothes and jewelry. Keep your hair up and away from moving machine pieces. These items may get caught by control

levers, control handles, or other moving parts which may cause serious injury and even death.

12. Avoid wearing oily clothes because they are flammable.
13. When operate the machine, the cab door should be closed!

SAFETY OPERATION

BE FAMILIAR WITH MACHINE

1. Study the operation manual for the machine. Learn the structure of the machine, operation and maintenance. Be familiar with the positions and functions of the buttons, operation handles, meters and warning devices.
2. Check all the safety items, for example, the safety protective devices should be at the safe status. Make sure the tires are not worn and the tire pressure is normal. Routinely check for oil leaks, water leaks, air leaks, deformation, loose fittings and abnormal sounds or accidents may occur. Check the safety devices routinely.

WHEN LEAVING OPERATOR'S SEAT

1. Always keep brake valve manual control lever (or the parking brake switch) in the lock position.
2. Level the working equipment completely to the ground and put the gear control lever and working equipment control handle in the neutral position,

then stop the engine and turn off the starting switch. Set the stop block on the front and rear wheels if necessary.

3. Make sure the grader is locked and put the key in a safe place.

MOUNTING AND DISMOUNTING

1. Check the handrails and pedals, and if there is oil, lubricant or dirt clean them first to prevent slippage. Repair the broken items and fasten the loose nuts.
2. Never jump on or off the machine. Never get on or off a moving machine.

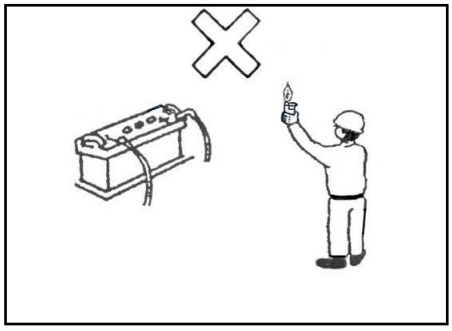
3. When getting on or off the machine, face the machine and use the handrails and pedals to ensure that you can support yourself. Keep at least three-point contact (two hands/one foot or two feet/one hand) with the handrails and pedals to ensure body stability.
4. Never hold any control levers when getting on or off the machine.
5. Never hold any tools or other items when climbing up and down the grader; lift the tools needed to the operation flat roof by rope.

FIRE PREVENTION

The following fluids are flammable and must be kept away from high heat and fire engine: lubricant for grader engine, hydraulic oil for hydraulic system, hydraulic pressure shafting oil and gear oil for transmission system,

brake fluid and antifreeze fluid for heat elimination system.

1. Keep fire away from flammable fluids.
2. Add refueling and lubricating oil in well-ventilated areas. Stop the engine and no smoking while refueling.
3. Tighten all fuel and oil tank caps firmly.
4. Put the above flammable liquids in containers with relevant tags and put in a separate, proper place for storage. Do not allow unauthorized people to use.
5. Electric welding and flame cutting is not allowed for the tubes containing flammable fluid. Clean the tubes with nonflammable fluid before electric welding and flame cutting.
6. Clean thoroughly the flammable materials such as sawdust, leaves and paper which collect in the engine and brake clip, and clean the flammable oil, lubricating oil and other substances on the machine.

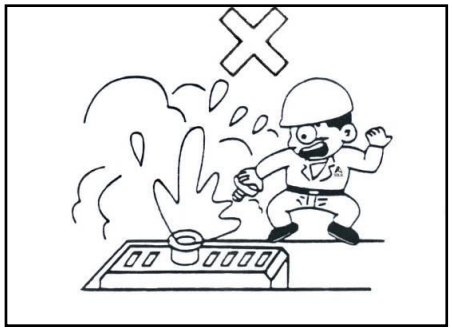


7. While operating, pay attention when the outlet of the muffler is close to flammable materials such as withered grass and old papers.
8. When parking the grader, carefully select the environment; especially select the places where there are no flammable materials near the parts with a high temperature such as the muffler.
9. Check whether there is the leakage of fuel,

lubricating oil, or hydraulic oil. If so, repair or replace the broken items. Clean the repaired items before use.

10. If there is explosive air generated near the storage battery, be sure there is no flame or fire nearby. Repair, maintain and use the storage battery as referenced in users manual.
11. Do not use flame or fire (match or lighter) to check in a dark place.
12. The fire extinguisher should be ready for use at all times and the user must be knowledgeable about its use and function. Check and maintain it as referenced in users manual.
13. Never operate machine near flame or fire.
14. Do not short circuit

PRECAUTIONS WHEN OPERATING AT HIGH TEMPERATURE



Just after turning off the engine, the coolant, engine oil and hydraulic oil are at high temperature and still under high pressure. The attempt to remove the cap, drain the oil or water, or replace filters may lead to serious burns. **Always** wait for the temperature to go down, and follow the specified procedures when performing these operations.

1. Stop the engine, wait for the water to become cool, and then loosen the cap slowly to relieve the inner pressure before removing the cap of radiator.

PREVENTIONS FOR OPERATION IN POLLUTED AREA

1. Choose different air filter according to the operation condition.
2. Inspect and maintain the machine more frequently.

PREVENTIONS FOR OPERATION IN AREA WITH FALLING OBJECTS

1. Choose suitable ROPS/FOPS cab.
2. Do not operate under big, heavy falling objects.

NOTES FOR USING FOPS&ROPS (IF HAVE)

FOPS&ROPS is used to prevent the operators from hurting by the falling objects when the grader is working or tilting. ROPS is not only to bear the tilt load when the grader tilts, but also it can absorb the impact energy. Please refer to the following items:

1. FOPS&ROPS is deformed due to the falling objects or tilting and its strength should not meet the normal requirements. If this happens, please connect with SDLG or its dealers for the repair method and you should not deal with it at will.
2. Even if ROPS is installed, the operators should tie the safety belt for effective protection. The safety belt should be replaced every 3 years even if it is normal.
3. Don’t drill or weld on the FOPS or this will impair the strength of FOPS.

STARTING SAFELY

BEFORE STARTING ENGINE

SAFETY OPERATION AT WORKING AREA

1. Before starting operations, thoroughly inspect the area for any unusual conditions that could be dangerous.
2. Examine the condition of the ground and the quality of the soil in the work area, and determine the proper method of operation. Before starting work, the ground should be planed and pressed firmly. If there is a lot of sand and dust, sprinkle with water first.
3. When working on public roads, there should be a trained person managing the traffic. Erect the barricades and use the sign of **DON'T ENTER** to ensure safety of passing traffic and pedestrians.
4. In the places where objects are buried such as water pipes, gas pipes, or high-voltage cables, contact the responsible companies to confirm the position of the buried objects and take care not to damage them during operations.
5. Be sure there are good ventilation conditions when working in a closed environment.

CHECK BEFORE STARTING THE ENGINE

1. Check the machine carefully before starting a job. Report any abnormal machine condition to your manager before starting a job. Operate the machine

only after the abnormal conditions are resolved.

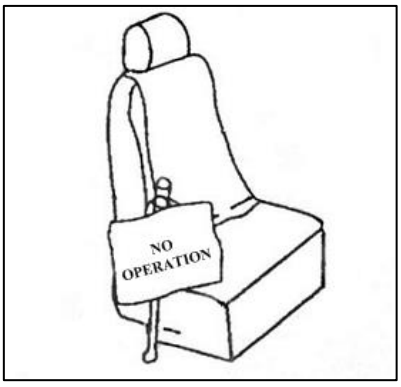
2. To avoid fire, check whether there are any flammable materials such as wood chips, leaves, and paper which have piled on the engine and battery.
3. Check whether there is leakage of oil or water, loose nuts, abnormal sounds, broken or lost parts.
4. Check if there is oil, grease, snow, or dirt on the cab floor, rear view mirror, control lever, foot step and handrails.
5. Make sure the level of coolant, lubricant, fuel and engine oil in the pan is normal. Check the air filter for blockage.
6. Adjust the operator's seat to the proper position for operation. Check whether the safety belt is broken. The safety belt must be replaced with a new one every three years.

7. Check the gauges for damage, and make sure the control lever is in the neutral position. Clean the dirt on the cab window and all the lights to ensure better visibility.
8. Adjust the rear-view mirrors and keep the surface clean to ensure the best view from the operator's seat. Replace the mirror if it has been damaged.
9. Remaining parts are not allowed in the cab. They may move around the cab area which could damage the control lever or switch, or move the control lever

which could engage the working equipment and cause an accident.

10. Check whether the headlight and turn signal lights work normally. Repair them if they are not working properly.
11. Check whether the hinge lock is engaged. Remove articulation lock.
12. Clean oil from the handrail and the foot step and remove the silt and sand from the shoes to avoid slipping, which may affect the operations.
13. Check whether the tires are worn or broken, and whether the bolts and nuts are loose. Pay attention to a loose wheel nut and repair or replace them if there is any abnormal situation.

WHEN STARTING THE ENGINE



1. Before boarding the machine, check the machine again to see whether there are people or blockages on, under, or near the machine. If there is somebody else in the working area, ask them to leave. Do not begin to work until they leave.
2. Don’t start the machine if there is the tag of “NO OPERATION” on the control handle or any of the operating controls.
3. Always sit in the operator's seat and secure the safety belts (if assembled).
4. Be sure the parking brake control handle is at the braking position and all the control equipment is set

in the neutral position.

5. Sound the horn for warning.
6. Start the engine.
7. Start the engine only in the cab. Never use short circuit of the starting motor to start the engine. This method not only has personal injury potential, but also can result in the damage of the electrical system.

CHECKING AFTER STARTING THE ENGINE

Check to make sure there is no potential danger after the engine is started.

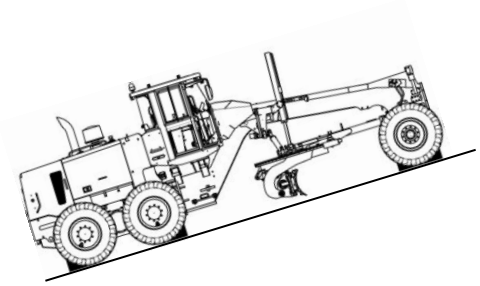
1. When examining the machine, park the machine in a spacious place, and do not let somebody else to get close.
2. Check whether the engine runs with an abnormal sound or vibration. If so, there may be some malfunctions; report this to the manager immediately. Operate the machine after the malfunctions are eliminated.
3. Test the control of the engine speed in the neutral gear.
4. Examine the gauges, meters, and warning light; be sure they are in the normal working range.
5. Operate the control mechanism for the gears. Make sure all the control levers are easy to use.
6. Examine the foot brake valve and throttle operation valve, according to the user manual, to make sure

that they are normal. Check whether the left turning and right turning is smooth at low speed.

7. Be sure the parking brake control handle is relieved before moving forward.

PARKING SAFETY

PAY ATTENTION TO THE SAFETY OF YOURSELF AND OTHERS



⚠ WARNING
NEVER get on or off the machine while it is moving.

1. Park the machine on level ground.
2. Never park on a ramp. If parking on a ramp is necessary, the ramp angle should be less than a 20% grade, and put the wedge under the wheels to prevent movement. Then put the bucket down to the ground.
3. If the machine breaks down or must park in a high traffic area, lay bars, signals, flags, and warning lights. Make sure the other cars can see it clearly. Do not block traffic.
4. When parking the machine, stop the engine, set the machine in parking station,, and put it in the braking position. Lock the cab and put away the keys. Climb down with face to the machine slowly, according to the “3-points” method. Never jump down to the ground.

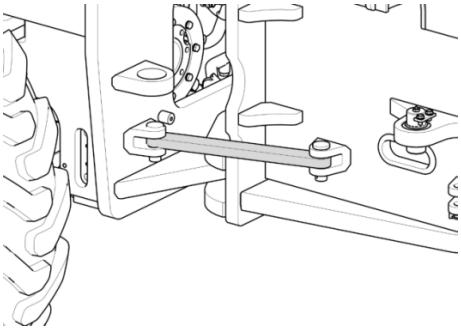
NOTES FOR COLD AREAS

1. Clear the water, snow, or dust attached to wires, switches, power insert, or sensor, and the covers of these parts. Otherwise, the water in these parts may be frozen and an unpredictable accident may be

caused.

2. Do not charge the storage battery with frozen electrolytes, and do not use other power to start the engine. It is dangerous and can cause fires.

TRANSPORTATION AND STORAGE



SAFETY REQUIREMENTS FOR TRANSPORTATION AND STORAGE OF MACHINE

1. Straighten out the articulated frame, lock the front and rear frame with frame lock lever, lower the blade for driving.
2. Wedge the tires and bind the grader tightly.

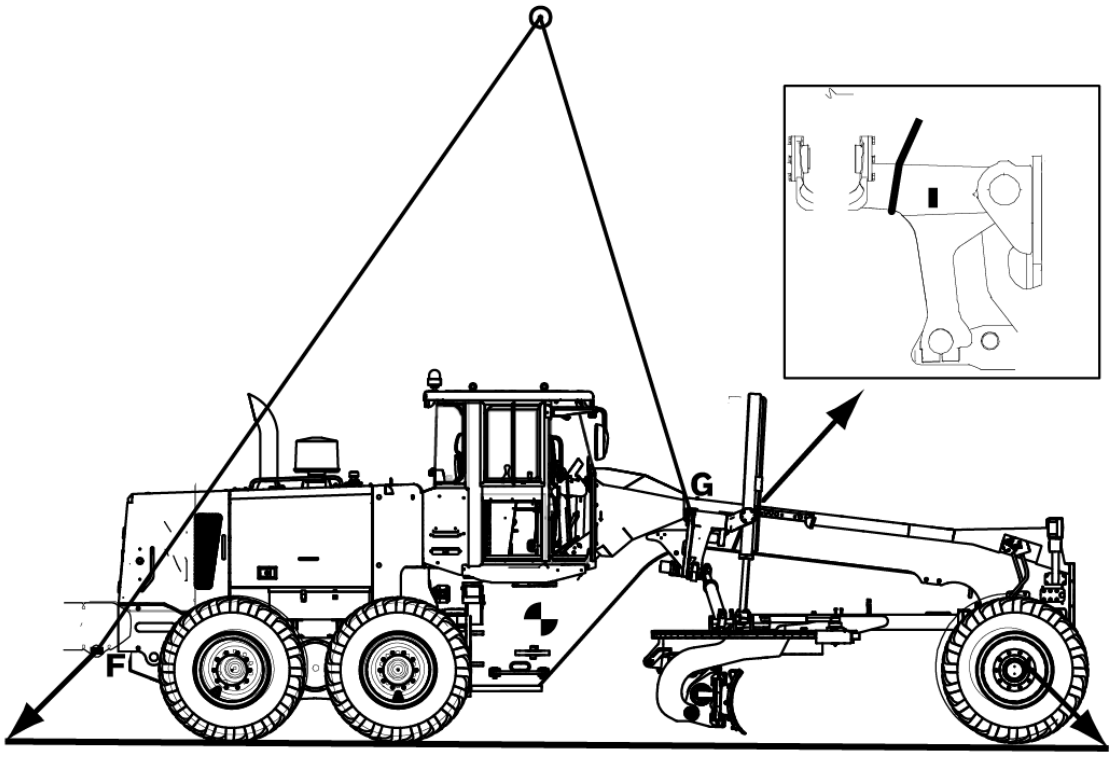
LOADING AND UNLOADING THE MACHINE

1. Caution should always be used when loading and unloading the machine. Keep engine running at low speed while loading and unloading the machine.
2. Load and unload the machine on level ground and remain a safe distance away from the road.
3. Fix the tires of the carrier vehicle well during loading and unloading and make sure it will not move. Put a cushion under the springboard.
4. Ramps should be strong enough with sufficient length and width to form a safe loading/unloading area. The angle between the ground and the ramp should not be larger than 15°. Distance between the boards of the ramp should be adapted to the wheel base of the machine.
5. Make sure the ramp is fixed firmly and the height of the two sides of the board should be consistent.
6. Keep the ramp surface clean, free from lubricant, oil, ice, and loose materials. Remove any dirt from the tires.

7. Never turn the machine on the ramp. If it is necessary, drive away the ramp to adjust and then drive back.
8. Install the articulation lock after the machine is on the transport device. Block the tires. Tie down the machine at the defined points.

ROAD TRANSPORTATION

1. Rotate the blade to prevent it from exceeding the width of grader.
2. Obey the rules about weight, height, width, and length as prescribed by Federal and local laws for transporting the machine using a truck. Obey the traffic rules.
3. Ensure the weight, height, width, and length of machine is within regulation before deciding the transport route.
4. Ensure you are under the allowed limit of weight when passing bridges or private buildings. Obey the relative rules when driving on the public roads.
5. When the transportation distance is no more than 20 kilometers, the grader can be drive freely by the driver rather than using a truck. Long time high-speed driving is strictly forbidden.



LIFTING

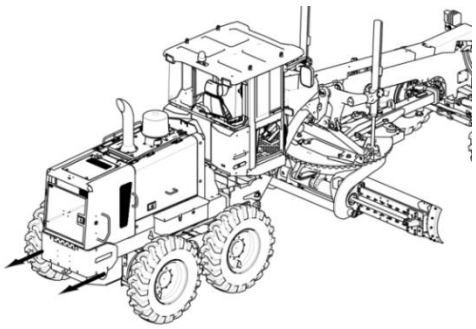
Use the hook of the front and rear frame to transport the machine to ship or train. Select proper lifting equipment according to the weight of the grader, otherwise it is dangerous to surpass the weight limit.

Notes for lifting:

1. Make sure the grader is in the transporting state. The front and rear frame should be in the straight position. Lock the machine using the articulation lock bar to prevent rotation of the front and rear frame during lifting.
2. All the control levers should be in the neutral position.
3. Stop the engine, lock all the equipment with keys and then remove the keys.

4. No one is allowed to stay in the operator cab.
5. Keep the machine horizontal during lifting.
6. No person or vehicle is allowed to pass under the machine during lifting.
7. Remove the articulation lock bar to turn the machine after lifting.

Install the articulation lock bar after parking, block the tire and bind the machine tightly to prevent movement during transportation.



TOWAGE

The grader shouldn't be dragged or towed unless in case of emergency, Please notice when towing and dragging:

1. If possible, the engine of the towed machine should be kept running to ensure braking and turning is possible.
2. Never tow a grader with turning or brake system failure.
3. The speed for towing the grader should be under 2km/h, and the towing distance should be no more than 1500m; if the transmission shaft is removed, the towing distance can be more than 1500m, but the speed should be under 10km/h.

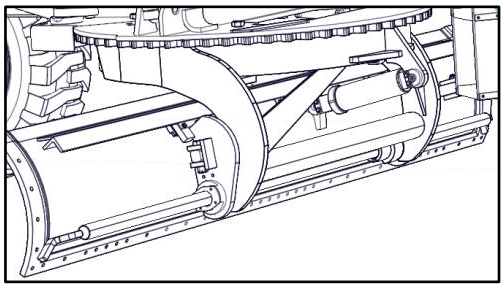
STORAGE

1. Clean the dirt and impurities on the machine after the operation.
2. The grader should be put in the storeroom or construction camp to prevent strong sunlight

exposure and rain if the grader is not needed for a period of time. If it has to be parked outside, be sure to cover the grader with shelter, and park it on the dry and flat ground.

3. Park the machine on place without danger of falling stones, collapsing or drowning.
4. Pay attention to the weather and take proper measures. Avoid the machine from freezing onto the ground, collapsing or other bad consequence.
5. When stop the engine and leaving the machine, be sure to set the machine in parking station..
6. Close the window, lock the cab and all the covers, remove the key and put it specified place.
7. Turn off the main power switch.

   IMPORTANT ! If the engine is stopped without cooling, the service life may be shortened. So don't stop the engine immediately unless in case of emergency. If the engine is too hot, cool it at low speed, and then stop the engine.



8. If the grader has been stored for long time, you must clean it thoroughly, and inject grease to all related points, and coat the paint-free metal surface (such as the slide rail) with anti-rust oil. Be sure to start the grader every other week and run the engine at low speed for 10~15min.

   ATTENTION : If the grader has been stored for a long time (over 100 days), be sure to do the

following first:

1. Clean the anti-rust oil on the surfaces.
2. Install the full-charged battery. Adjust the fan belt.
3. Fill the fuel, hydraulic oil and water according to the specifications, check the lubricant capacity and quality in the bottom of engine, transmission and driving axle.
4. Implement as the regulations about the trial running and the preparation before running the machine.
5. All the oil should be replaced if the machine is not used for more than 1 year.

RULE OF REPLACING HOSE

Before repairing or replacing the hydraulic system, lock cylinders, and other hydraulic devices, safely allow the system to cool down and carefully release the pressure in the pressure pipeline/container, parts, and systems in case of danger. Such pipes, systems, and parts with pressure should be dissembled by trained professionals. Put machine in the service position.

Never bend or hammer on high pressure hydraulic pipes. Never use a hard pipe or hose if they are bent abnormally or broken.

Routinely repair any loose or broken fuel pipes, lubricant pipes, hard pipes, and hoses of hydraulic system. Leakage can cause fire, so repair or replace

them.

To prevent oil leakage and personal injury caused by ejected high-pressure liquid, withhold-type rubber hose should not be reused once damaged, be sure to replace the whole assembly with a new one.

Inspect the pipe system carefully (hard pipes and hoses), tighten the connectors according to the proper torque. Do not examine the leak with your hands. Use a piece of cardboard. The leaking hydraulic liquid may penetrate your skin and cause death. If the liquid splashes onto your skin, refer to a physician trained for this kind of “burn” immediately.

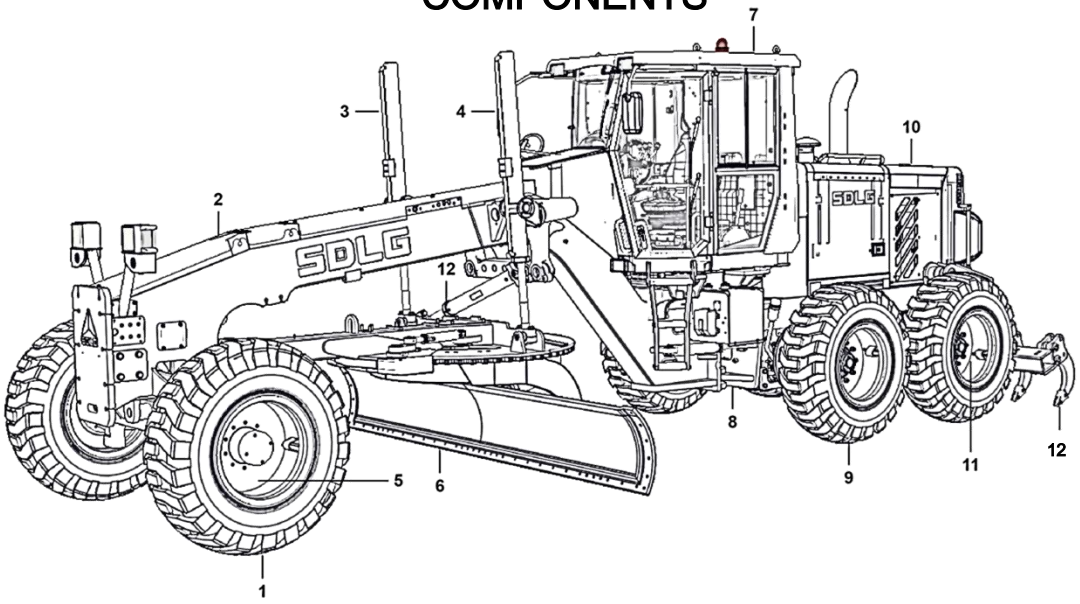
Make sure all the pipe clamps, protective board, and anti-heat cover are installed properly to prevent vibration and overheating due to friction with other parts.

Choose proper container to hold liquid when replacing the hydraulic oil of the hydraulic system and when cleaning the parts

When replacing the hoses, the exploding pressure of hoses should be more than 4 times of working pressure .Take attention to check the screw thread of hoses joints ,the joins can be reused if it is good.

GRADER INTRODUCTION(Basic model)

GENERAL VIEW OF THE MACHINE AND COMPONENTS



1 Front wheel

2 Front frames

3 Right lift cylinders

4 Left lift cylinders

5 Front axles

6 Blades

7 Cab

8 Rear frame

9 Rear wheel

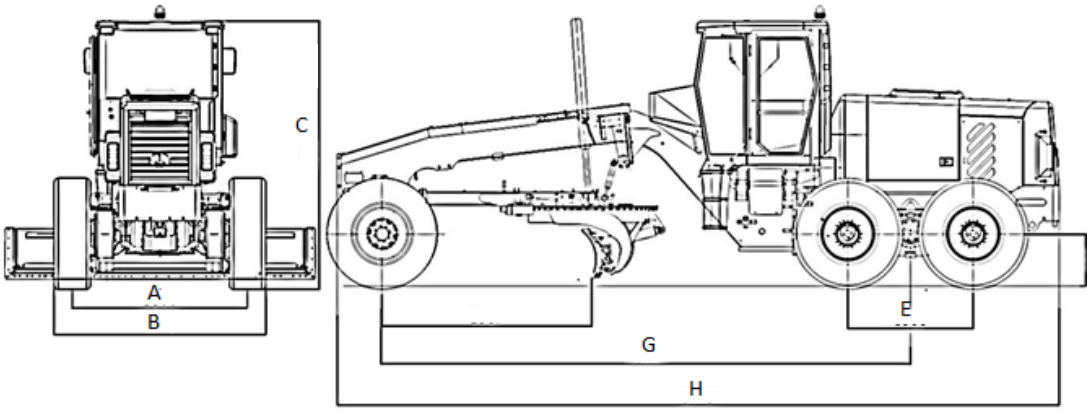
10 Engine hood

11 Rear axles

12 Rear scarificator

OUTLINE DIMENSIONAL DRAWING

NOTE! All parameters are base on basic model,!



Wheel distance A	2260	Rear axle wheelbase E	1538
width B	2710	length H	8975
height C	3240	wheelbase G	6480

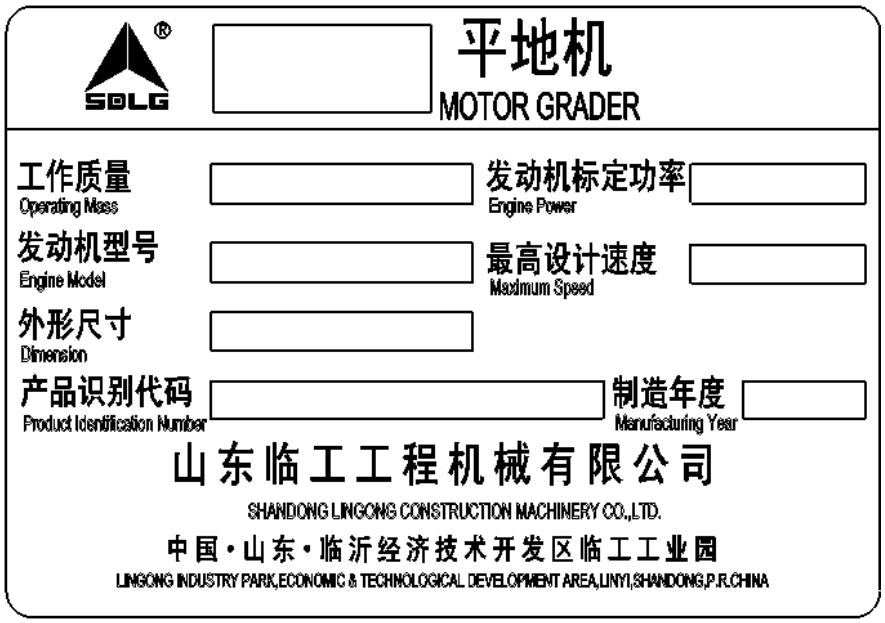
PRODUCT MODEL COMPOSITION AND SIGNIFICANCE

G9200

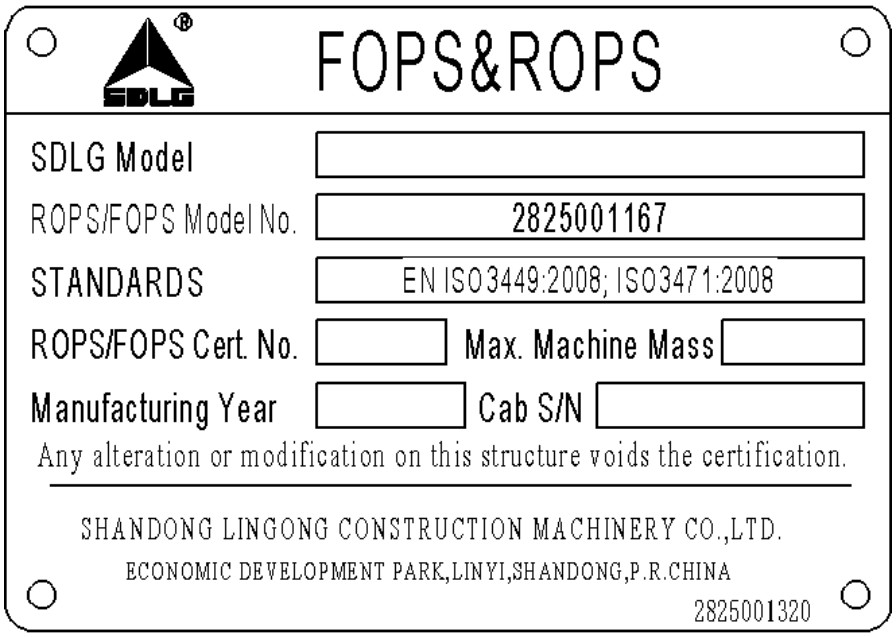
G	Grader
9	Hydro mechanical drive
190	Engine rated power: 190 horsepower

PRODUCT NAMEPLATES

The label of this machine is nailed rear-end left-side of front frame, which indicates the vehicle type, product number (That is, PIN, also engraved on the front frame, near the sign), date of manufacturing and manufacturer and so on.



G9200 label



G9200 FOPS&ROPS label

Engine sign

It is located on the top or sides of engine.

Show the model and component of the engine.

Transmission sign

It is located on the top or sides of transmission.

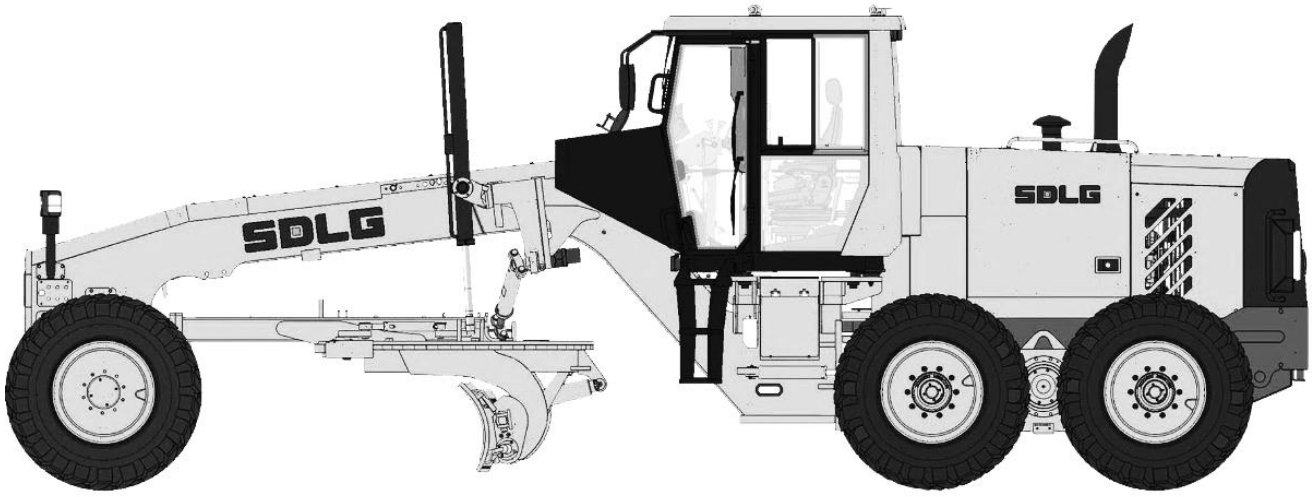
Show the model and component of the transmission

Axle sign

It is located on the axle

Show the material code and the factory number.

USE



SDLG series grader is mainly used for leveling and excavation of large-area ground, such as road, airport and farmland, it can transport soil and stone mixture; dig side ditch, scrape side slope, remove snow and clean the street. It is one of the necessary machinery in the national defense industry, mine construction, urban and rural road construction and water conservancy construction, farmland improvement and so on.

REQUIREMENT FOR WORKING ENVIRONMENT

The grader is applicable to the following environment:

1. Altitude: ≤2000m ;
2. Ambient temperature: -15℃-+40℃ ;
3. Fording depth: ≤735mm。

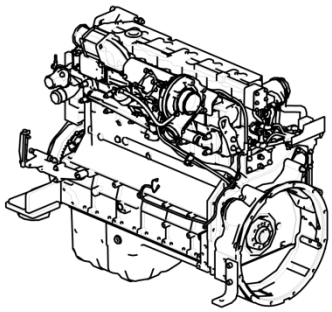
The grader is common construction machinery, which is used in various applications mentioned in

the manual under normal conditions. If it is used for other purposes or in environment with potential hazard, such as flammable and explosive air or area containing asbestos dust. At this moment, special safety provisions must be abided by. What's more, this machine must be equipped with corresponding device with corresponding functions.

TECHNICAL FEATURES

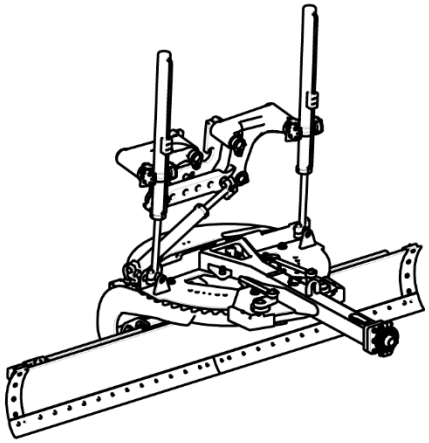
G9200 grader is mainly composed of engine system, working device system, frame system, torque converter-transmission box system, rear drive axle system, front drive axle system, control system, A/C system, electrical system and covering parts system.

The main features are as follows:

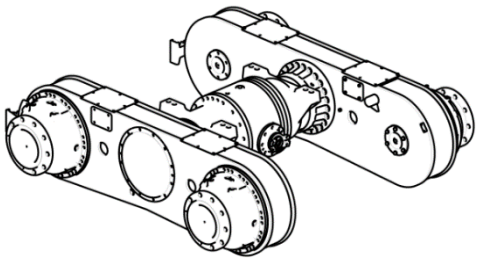


1. Grader is equipped with in-line, water-cooling, 4-stroke diesel engine, emission meets the requirements of Stage II EC & Tier II EPA. The engine has advantages of large torque, low fuel consumption and low noise.(DDE 1013EC Phase II engine)
2. Grader is equipped with in-line, water-cooling, 4-stroke DDE Phase III engineer, emission meets the requirements of Stage III EC & Tier III EPA(DDE 1013FC Phase III engineer)
3. Optimized overall layout, which fully takes

advantage of the overall weight to make the load distribution more reasonable, big traction and optimized blade insertion of the blade.



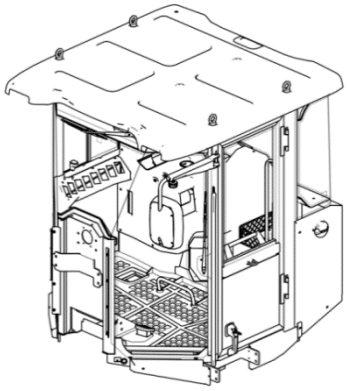
4. Double oil cylinder drive tray type working device, can bring the rotation, high reliability, accurate positioning.
5. Blade is designed with single cylinder to avoid that the blade will bend due to over positioning when the blade pulls out the cylinder.
6. High pressure gear pump + multi valve of the hydraulic system, the hydraulic system pressure 21Mpa, the vehicle brake system using the full hydraulic brake system, brake smooth, safe and reliable.
7. Equipped with variable pump, the hydraulic system pressure 20Mpa(Variable system)



8. Tripartite grader drive axle, rear axle is installed with no-spin differential mechanism , front axle is designed with heavy load, with high ground clearance, less parts, which will ensure the requirements of long working life and low maintenance, and realize sharp turning angle under small turning radius.
9. Double cylinder- drive pallet working device, which can rotate with load, with high reliability and accurate positioning.
10. Multi valve front, optimize the design of the

operating mechanism, the manipulation of light and flexible.

11. Front and rear frame that is proper to use in bad condition is designed with rapid assembly parts, working bearings is designed without lubrication to realize high reliability and free of maintenance.
12. FOPS/ROPS cab is designed according to Ergonomics with broad view.
13. Electric-hydraulic swing pin cylinder and 7-hole linkage will get enough positioning of blades.
14. Optimized blade radian can ensure good traffic ability and mobility to improve productivity.
15. Many attachments, which can meet the different need of guests.



MAIN TECHNICAL PARAMETERS

ENGINE PARAMETERS

Item	Parameter	Item	Parameter
Model	BF6M1013EC	Number of cylinders	6
Type	In-line, water-cooling, 4-stroke, direct injection	Cylinder diameter/Storke (mm)	108/130
Rated power (kW)	165	Min. fuel consumption (g/kw.h)	210
Rated speed (r/min)	2100	Max. torque (Nm)/Rotating speed (r/min)	710/1550
Displacement (ml)	7146	Emission standard	EC Stage II & EPA Tier II

OVERALL PARAMETERS

Item	Parameter	Item	Parameter
Machine weight (kg)	15800	Min. turning radius (m)	7.6
Distribution weight of front axle (kg)	4700	Ground clearance of blade (mm)	445
Distribution weight of rear axle (kg)	11100	Cutting depth of blade	787
Max. tilt angle of the front wheel (°)	±18	Tilt angle of blade (Forward (°)	47°
Max. swing angle of the front axle (°)	±16	Tilt angle of blade (Backward (°)	5°
Max. turning angle of the front wheel (°)	±50	Tilt angle of blade (°)	90°
Turning angle of frame hinge (°)	±23	Slide range of blade (mm)	左 673/右 673
Diameter of blade disc (mm)	1626	Max tractive force (KN) (f=0.75)	82
Specification blade (mm)	3962×565×25	Rotation angle of blade (°)	360

Speed	Forward (km/h)	4.8	8.4	11	18.6	23	38
	Backward (km/h)	4.8	11	23			

Item	Parameter	Item	Parameter
Vehicle length (mm)	8975	Wheel base (mm)	2260
Vehicle height (mm)	3240	Shaft base (Front/rear) (mm)	6480
Vehicle width (mm)	2710	Shaft base of rear axle (mm)	1538
Ground clearance of front axle (mm)	610	Tire parameter	17.5-25-16PR
Ground clearance of rear axle (mm)	430		

ELECTRICAL SYSTEM

1.	System voltage(V)	DC-24
2.	Storage battery	6-QW-70, two in series

PRODUCT STANDARD

GB/T 14782-2010

OPERATION AND APPLICATION

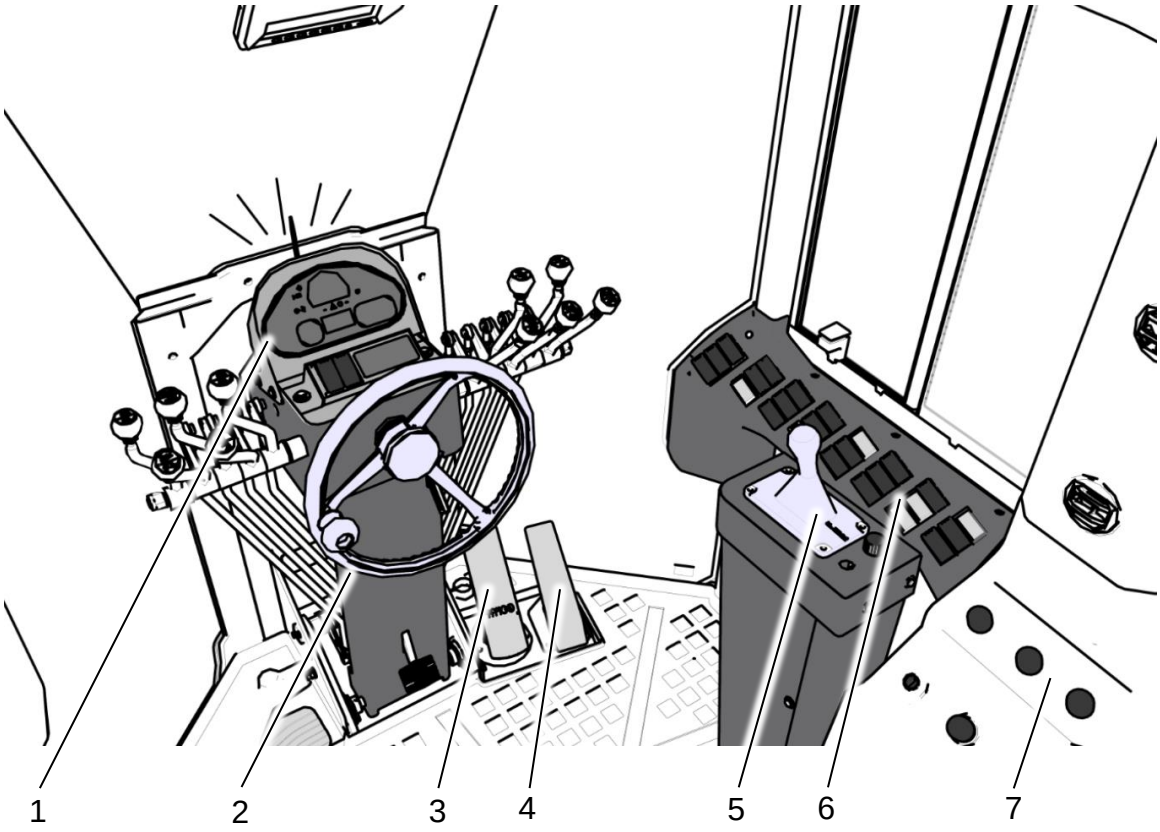
SAFETY RULES FOR OPERATING THE GRADER

1. If the grader needs to be towed, please set gear shift control handle to neutral (N). If possible, you should keep the engine running, so that the steering and brake device can still be available. If the grader is towed by steel rope, please make sure that there is no people stay between the towing vehicle and the grader.
2. Because the transmission system is designed with torque converter, there is no way that the grader can be drag-started, drag-start the grader will damage the transmission box.
3. To avoid discontinuity of engine lubricating oil and result in poor lubrication, the operation gradient should not exceed the specified values listed below, because poor lubrication may result in engine hazard.

	Cross slope	Longitudinal slope	
	Left or right	Forward	Backward
Allowed gradient	20°	25°	25°

If the machine requires long-term ramp work, please consult the agent to adjust the oil filling amount.

BE FAMILIAR WITH MACHINE



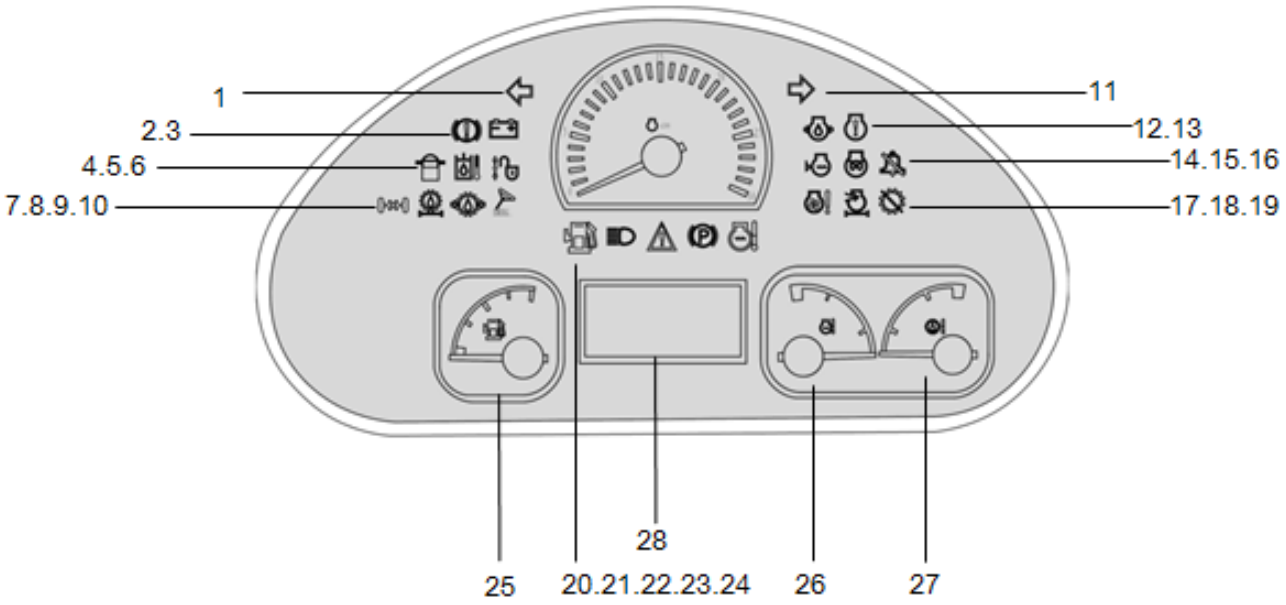
1 Instrument panel 2 Steering wheel 3 Brake pedal

4 Throttle 5 Shift control box 6 Rocker switch panel

7 Right control panel

INTRODUCTION OF GAUGES & CONTROLS

Operators should be familiar with and understand the positions and functions of various control devices, instruments and indicator lamps before operating the grader, and form a habit of observing instruments frequently during work so as to discover any abnormality in time.



1. Steering indicator lamp	2. Low brake pressure alarm lamp	3. Charging indicator lamp
4. Oil-water separation alarm indicator lamp	5. Hydraulic oil temperature alarm indicator lamp	6. Safe locking indicator lamp
7. Differential lock indicator	8. Transmission oil coarse filter indicator lamp	9. Transmission oil pressure low alarm lamp
10. Emergency steering indicator lamp	11. Steering indicator lamp	12. Low engine oil pressure alarm lamp
13. Engine failure indicator lamp	14. Low coolant level alarm lamp	15. Preheating indicator lamp
16. Mute indicator lamp	17. Cooling failure indicator lamp	18. Air filter blocking indicator lamp
19. Power shutoff indicator lamp	20. Low fuel level indicator lamp	21. High beam indicator lamp
22. Central alarm indicator lamp	23. Manual brake indicator lamp	24. High coolant temperature alarm lamp
25. Fuel oil level gauge	26. Engine cooling thermometer	27. Torque converter oil temperature gauge
28. Display screen		

Torque converter oil temperature gauge

The measuring range is 40°C~140°C. Under normal circumstances, the temperature should be 80°C~110°C.

Engine cooling thermometer

The measuring range is 40°C~120°C. Under normal circumstances, the temperature should be 80°C~96°C.

Engine tachometer

The gauge shows the engine speed with a range of 0-3,000n/min.

Fuel oil level gauge

The gauge indicates the capacity of fuel in the fuel tank.

Steering indicator lamp

After turning on the steering lamp rocker switch, when this indicator lamp flashes and the steering lamp flashes meanwhile, it indicates a steering signal has been given. When turning left, the left indicator lamp flashes; similarly, when turning right, the right indicator lamp flashes.

Low brake pressure alarm lamp

When the brake pressure is low, the symbol

flashes and a buzzer alarm occurs.

Charging indicator lamp

When the engine starts to generate electricity normally, the work light goes out.

Low engine oil pressure alarm lamp

When the start switch is turned on, the indicator lamp lights up immediately; while immediately after the engine starts, it goes out. Otherwise, it means that the lubricating oil level is too low or the lubricating system is out-of-order, and the engine should be immediately shut down and checked.

Engine failure indicator lamp

When the lamp is on, it indicates that the engine is out-of-order. It’s necessary to stop the machine to find out the cause and eliminate the fault.

Oil-water separation alarm indicator lamp

When the key is turned ON and there is too much water in the oil-water separator, after the switch is closed, the indicator lamp will light up. When the lamp is on, pay attention to the drainage of the oil-water separator.

Hydraulic oil temperature alarm indicator

When the oil temperature of hydraulic oil is too high, the lamp will light up. It's necessary to stop the machine, find out the cause and eliminate the fault.

Safety unlock indicator lamp

The solenoid valve locks the hydraulic circuit of the working device, the indicator symbol is normally on and the buzzer sounds.

Low coolant level alarm lamp

When the coolant level is low, the alarm symbol will light up.

Preheating indicator lamp

When a cold start device is installed and the start switch is turned to the preheating position, the lamp lights up; while when it is turned to the non-preheating position, the lamp goes out.

Mute indicator lamp

When some faults occur, there will be sound alarm; while after turning on the mute switch, the sound alarm will stop and the indicator lamp will light up.

Differential lock indicator

When the differential lock button is closed after power is applied, the indicator symbol will light

up.

Transmission oil coarse filter indicator lamp

When the water content of transmission oil is higher than the set value of the switch, after the switch is closed, the alarm symbol will light up.

Transmission oil pressure low alarm lamp

If this happens, please turn off the engine immediately and find out the cause.

Emergency steering indicator lamp

When emergency steering is turned on, the indicator lamp lights up and the buzzer sounds.

Cooling failure indicator lamp

In case of a failure of the cooling system, the indicator lamp lights up.

Air filter blocking indicator lamp

If the indicator lamp lights up when the engine is running, it indicates that the air filter is blocked which needs to be cleaned or replaced.

Power shutoff indicator lamp

When the lamp is on, it indicates that the power is cut off; while when the lamp is off, it indicates the power is not cut off.

Low fuel level indicator lamp

If the fuel level is too low, the lamp will light up and the buzzer will sound.

High beam indicator lamp

When the front headlight adopts a high beam, the indicator lamp lights up; while when it adopts a low beam or it is turned off, the indicator lamp does not light up.

Central alarm indicator lamp

Before starting, when the oil pressure and charging indicator lamps are on, this lamp does not alarm. When other faults occur, the lamp flashes.

Manual brake indicator lamp

The lamp flashes when the machine be set in parking station.

High coolant temperature alarm lamp

If the engine coolant temperature is equal to or higher than 105°C, the lamp will light up, the central warning lamp will flash and the buzzer will sound.

If this happens, please turn off the engine immediately and find out the cause.

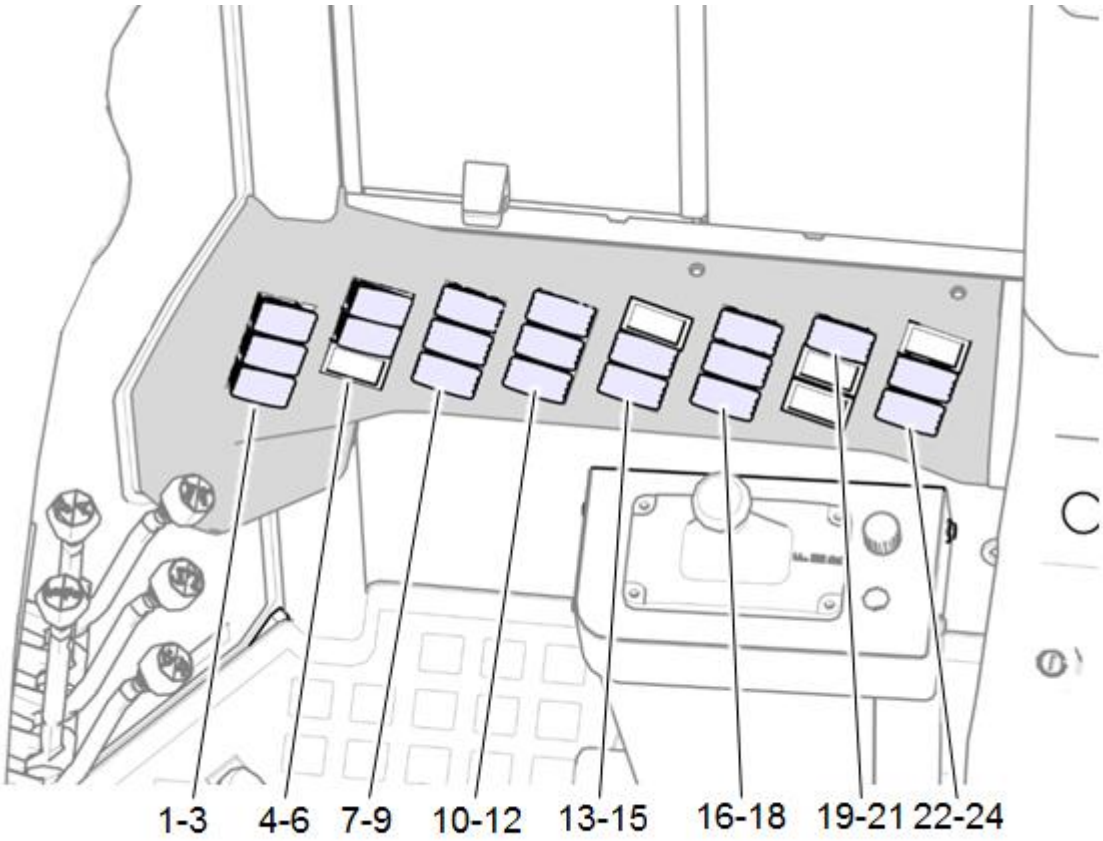
Display screen

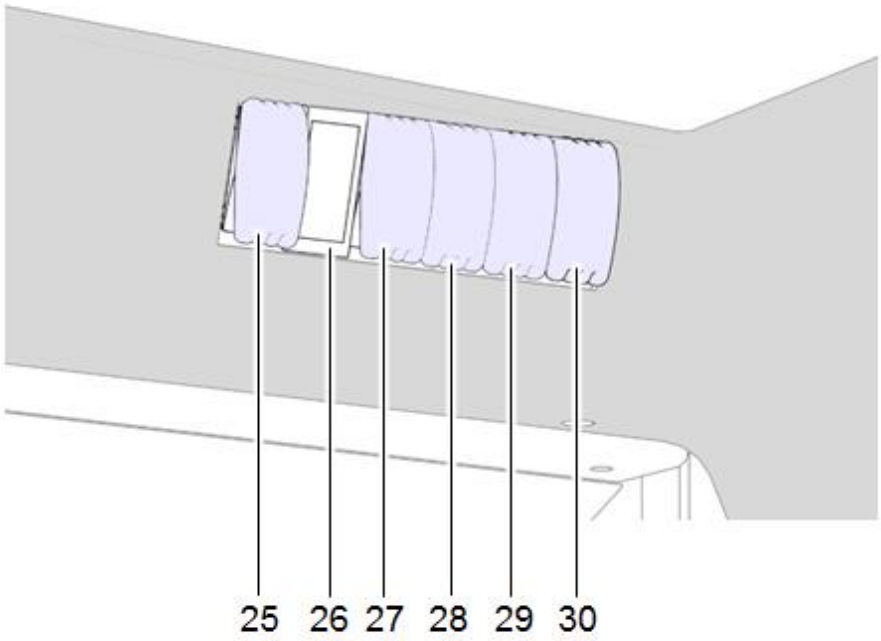
The display screen has four basic interfaces,

namely, POST, Normal Mode, Fault Mode and Fault Description. The switching mode is automatic cyclic switching.

NOTE! When the user operates the machine, finds an abnormal alarm, stops working, and contacts the SDLG service provider.

ROCKER SWITCH





1	-	17	High and low speed switch (reserve)
2	Power mode switch（Automatic Transmission）	18	Front Differential lock switch (reserve)
3	Transmission mode switch	19	Blade lift overload protection switch (reserve)
4	Warning light switch	20	Blade side overload protection switch (reserve)
5	Power automatic control switch	21	-
6	PTO S+/R-switch	22	Emergency steering switch (reserve)
7	Working light switch	23	Engine fan reversing switch
8	Blade lamp switch	24	Rear axle differential lock switch
9	Rear working lamp Switch	25	Ceiling alarming lamp switch
10	Backlight switch	26	Rear wiper switch (reserve)
11	Mute	27	Spraying bottle switch
12	Lock cylinder switch	28	Wiper switch
13	The blade left float switch (reserve)	29	Wiper switch
14	The blade right float switch (reserve)	30	Wiper switch
15	Middle/rear scarifier select switch (reserve)	31	Steering light switch
16	Front wheel auxiliary drive switch (reserve)	32	Headlight switch

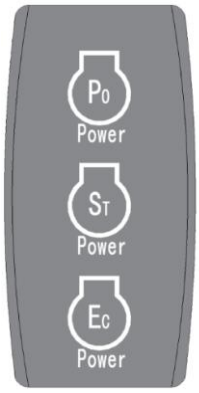
1. --

2. **Power mode switch（Automatic Transmission）**

This is a two-position switch. When the upper part is pressed down, the manual mode is entered, and the engine power depends on the power selection button; and when the lower part is pressed down, the automatic mode is entered, and the engine power mode will be automatically switched according to the transmission gear.

Transmission gear	Engine power mode
1, 2	Ec
3, 4	St
5, 6	Po

3. **Polymorphic switch**



Through this switch, the engine can be selected to work under different power curves to effectively utilize the power of the engine and achieve the best performance and fuel efficiency.

Po Converting field, long distance driving

St Standard

Ec Normal condition

4. **Warning light switch**

When the lower end of the switch is pressed down, the left and right warning lights flash.

5. **PTO switch**

This is a self-locking rocker switch. By pushing up the lock lug and pressing down the switch, the engine can operate at a set speed higher than idle speed. When the grader cruises automatically, the automatic cruising can be released when the brake is applied.

When the brake is stepped down, it will automatically return to the idle state; when the accelerator is stepped down again and the engine speed is increased, after pressing down any one of the PTO speed increase/decrease switches, the whole machine will enter the automatic cruise state again.

6. **PTO S+/R-switch(Auto cruise rotatory speed adjustment switch)**

This switch can reset automatically and it can adjust this switch to set the speed. Press S+ to add the rotary speed of engine for cruise, loosen it when the speed gets to the set value, then engine can keep this speed; Press R- end and you can reduce the speed of engine for cruise.

7. **Working light switch**

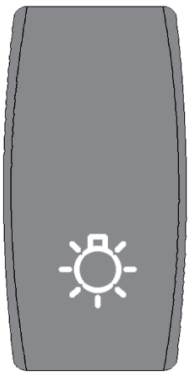
Press top end, only front working lamp in front of the cab will be on; Press bottom end, both the front and the rear working lamp will not be on.; When the switch is in middle position, the lamps will be off.

8. **Blade lamp switch**

Press bottom end, the blade lamp on the front frame will not be on; Press top end, it will be off.

9. **Rear working lamp Switch**

Press the bottom end, the light on the engine hood will be on.

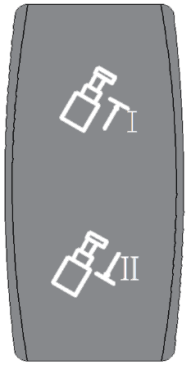


10. **Backlight switch**

Press the bottom end and backlight is on; Press the top end, it is off.

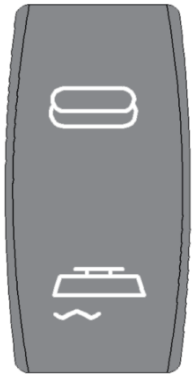
11. **Mute**

Press the bottom end of the switch, the alarming sound on the gauge panel will stop.



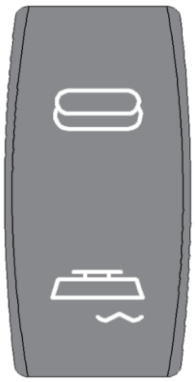
12. **Lock cylinder switch**

This switch can reset automatically. Press the bottom end of switch, the lock cylinder will withdraw, and then loosen it and the lock cylinder will be fixed on the current position. Press the top end of switch, the lock cylinder will extend, and then loosen it and the lock cylinder will be fixed on the current position.



13. **The blade left float switch (reserve)**

This is a self locking switch. After pushing the lock up, press the button to open the floating function of left blade lift cylinder.



14. **The blade right float switch (reserve)**

This is a self locking switch. After pushing the lock up, press the button to open the floating function of right blade lift cylinder.

15. **Middle/rear scarifier select switch (reserve)**

The switch has two positions, if the grader install the middle scarifier and rear scarifier at the same time, the operator can select scarifier buy this switch.

16. **Front wheel auxiliary drive switch (reserve)**

The switch is the front auxiliary drive switch, when the switch is pressed, and the gear selector in the non reverse position, the front wheel drive function to open.

NOTE! In order to improve the safety, the grade can only be started when the switch is not pressed.

17. **High and low speed switch (reserve)**

The switch is high and low speed switch, when the switch is switched to the rabbit gear, it is high speed. When the switch is switched to the tortoise stall, it is low gear.in general, the tortoise gear position is used when the gear shift is in 1 gear. The transmission gear is 2 or 3 gears, using rabbit gears.

18. **Front drive differential lock switch (reserve)**

The switch is a differential lock switch. When the lower end is pressed, the front wheel differential function is closed, and the side wheel skidding phenomenon is eliminated, so that the grader can get out of trouble.

19. **Blade lift overload protection switch (reserve)**

    Under the condition that the mining area or the road condition is not clear enough. Open the switch, when the blade is subject to greater impact force, the hydraulic system does not hurt.

20. **Blade side pendulum overload protection switch (reserve)**

    Under the condition that the mining area or the road condition is not clear enough. Open the switch, when the blade is subject to greater impact force, the hydraulic system does not hurt.

21. --

22. **Emergency steering switch (reserve)**

23. **Engine fan reversing switch(reserve)**

    Press down this switch to rotate the fan anticlockwise for dedusting. It is a normally locked self-lock switch, push away the lock catch on the switch to unlock and use this switch

ATTENTION: Make sure the engine is in flameout state when using this switch, and duration of not more than 1~3 minutes.

24. **Rear axle differential lock switch(reserve)**

Press the switch to lock the rear axle differential for the whole machine to get out of trouble.

25. **Ceiling alarming lamp switch**

Press the bottom end, ceiling alarming lamp on the top of cab will flash; Press the top end of switch, this lamp will be on.

26. **Rear wiper switch (reserve)**

Press the bottom end and the rear wiper begins to work; Press the top end, the rear wiper stops. High and low speed will be got due to the different pressuring positions.

27. **Spraying bottle switch**

Press the bottom end and the spray bottle begins to work and the water is sprayed from the port to clean the cab; Loosen and the switch will be turned to the original position.

28. **Wiper switch**

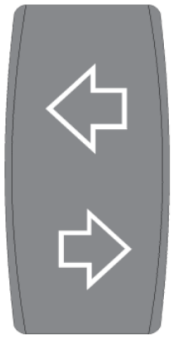
Press the bottom end and the wiper begins to work; Press the top end, the wiper stops. High and low speed will be got due to the different pressuring positions.

29. **Wiper switch**

Press the bottom end and the wiper begins to work; Press the top end, the wiper stops. High and low speed will be got due to the different pressuring positions.

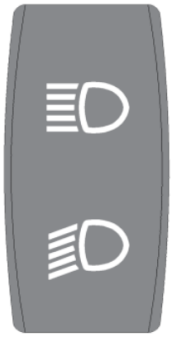
30. **Wiper switch**

Press the bottom end and the wiper begins to work; Press the top end, the wiper stops. High and low speed will be got due to the different pressuring positions.



31. **Steering light switch**

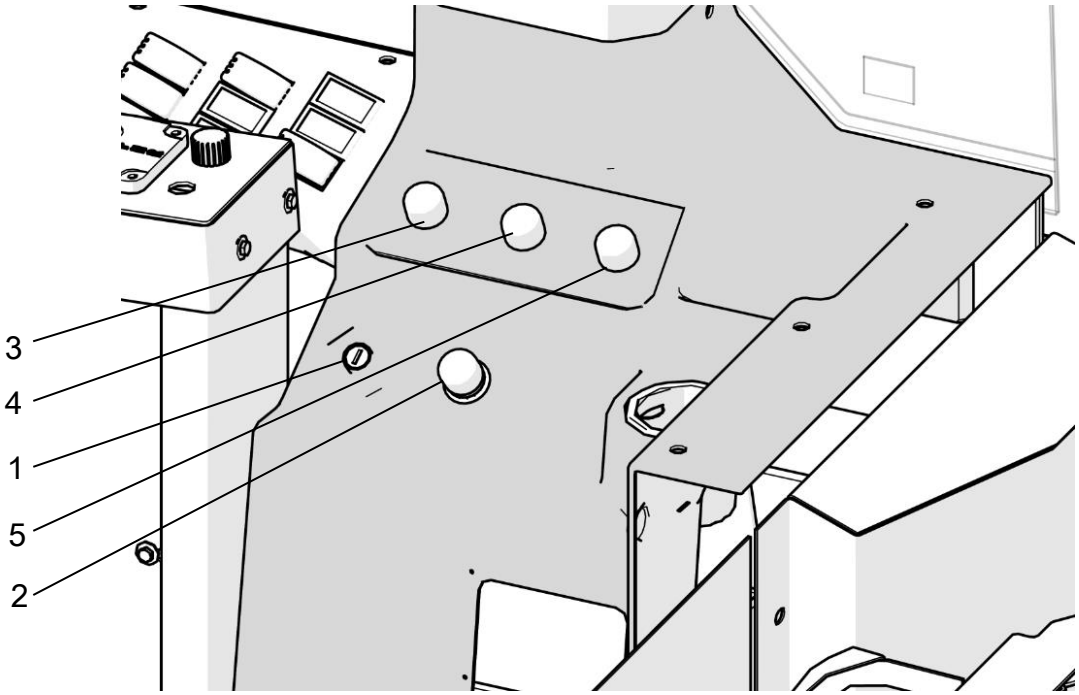
Press left or right, turn on left and right turn light.

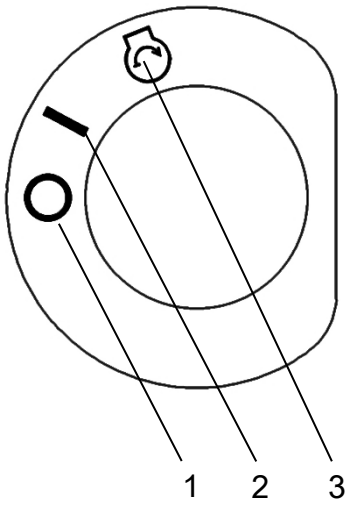


32. **Headlight switch**

Left or right button, open the headlight, corresponding to the high beam light, dipped headlight.

RIGHT CONTROL PANEL





1.Ignition switch

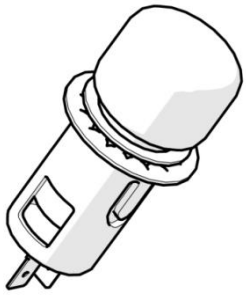
Used for start/stop the engine.

"1" (OFF): The key can be inserted and pulled out at this position. When the key is rotated to this position, the controlled circuit is closed.

"2" (ON): When rotating clockwise to this position, the charging line and the power line are connected. Check whether the parameters and display of the monitor panel are within the normal working range. In case of any abnormality, the next operation can only be carried out after it is handled in time to restore it to normal. When all parameters are normal, observe the preheating indication on the monitor panel. When the indicator lamp is on, it indicates that the machine is preheating, and then when it

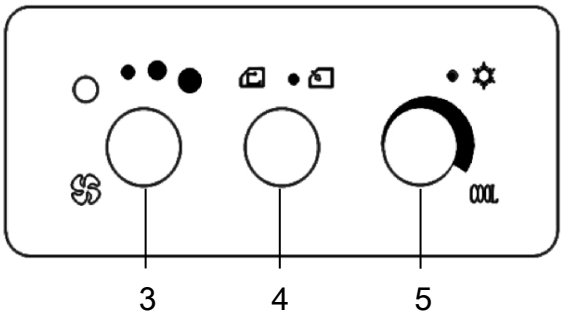
goes off, it indicates that the machine can be started.

"3" (Start): When rotating further to this position, the starting motor works to drive the engine to start. Once the engine is started, the switch should be released immediately, and the key will automatically turn back to the "2" position.



2. Cigarette lighter

The cigarette lighter is located on the right-side panel of the cab. After pressing down the cigarette lighter when the power is applied, when it returns to its original position within a few seconds, it can be used at this time.



3.Air volume switch of air conditioner

Air volume switch of air conditioner

The system switch and the speed control of the evaporation fan are divided into high, medium and low gear and power switch so as to select the appropriate air volume and turn on/off the air conditioning system.

4.Internal/external circulation switch

Fresh air change-over switch: Controlling the operation of fresh air actuator and the internal/external circulating air intake.

5.Temperature switch of air conditioner

Refrigeration start change-over switch: Turn clockwise to turn on the refrigeration system and

adjust the refrigerating capacity.

Refrigeration

Start the engine.

Turn on the air volume switch, it can be felt that the system is already in the air supply state, and then turn on the refrigeration change-over switch to the refrigeration gear. At this time, the refrigeration indicator lamp lights up, and the system is in the refrigeration state.

Rotate the air volume switch and select different gears to obtain high, medium and low air volume.

Heating

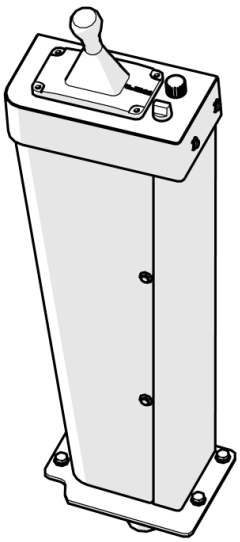
Before use, turn the refrigeration start change-over switch to the off state.

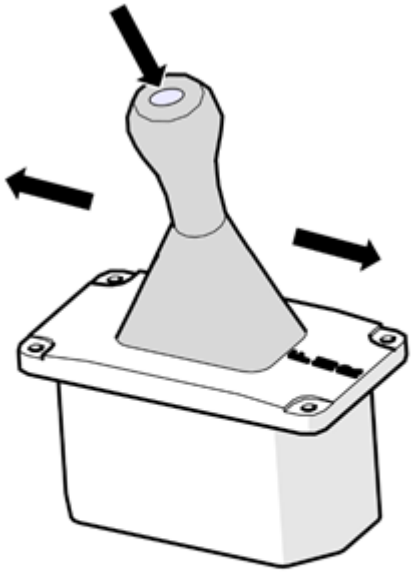
Start the engine and open the hot water valve.

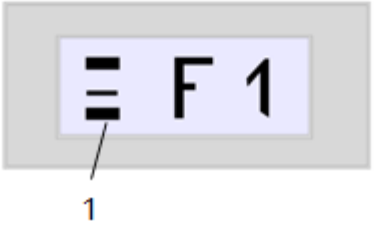
Turn on the fan air volume switch and select the gear to adjust to the required air volume.

NOTE: Close the hot water valve when cooling.

VARIABLE SPEED CONTROL BOX







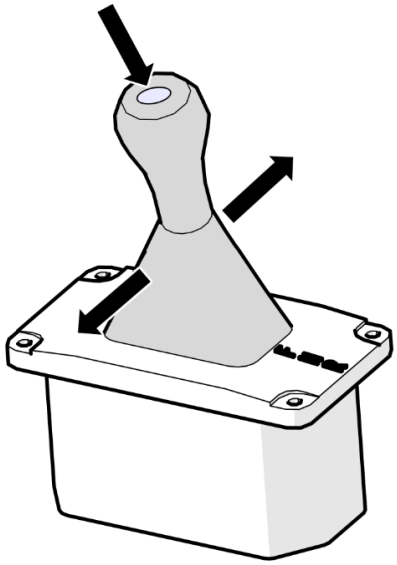
This model is equipped with two transmission, one is: automatic transmission.

Please select automatic/manual mode as required

The control lever is shown in the figure.

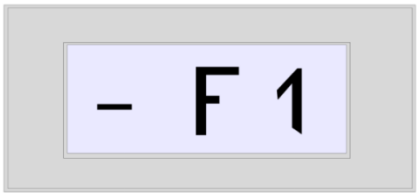
The transmission has neutral gear protection function, press and hold the above round button when shifting, otherwise it will still be neutral gear; press and hold the round button and enter the forward or reverse gear; when entering the **automatic mode**, the transmission will automatically change gear according to the engine speed and vehicle speed.

At this time, the small display screen will show the current gear and transmission operation mode.



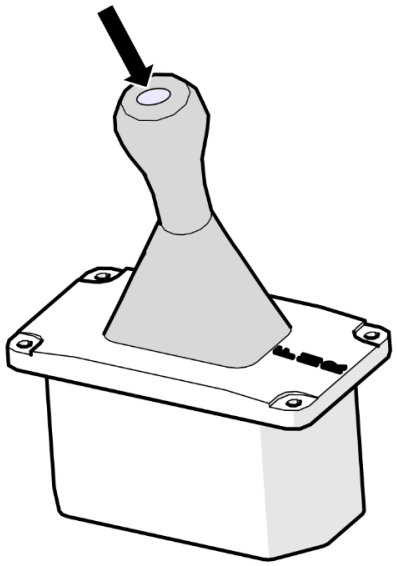
When the round button is pressed again or the handle is operated to the right and left for manual upshift and downshift, the manual mode is entered; right swing for transmission upshift and left swing for transmission downshift.

At the same time, the automatic transmission sign on the display screen will disappear.



When the round button is pressed again, the automatic mode is entered once more.

At the same time, the display screen will display the sign of automatic shift mode.



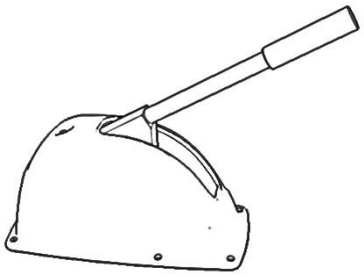
The second is

Manual shift transmission

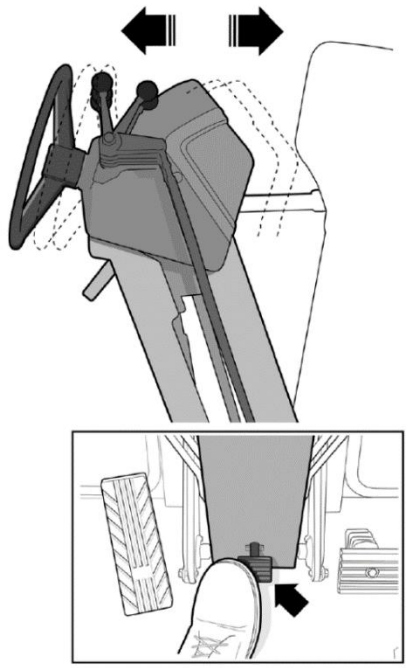
Gear shift mechanism is electro-hydraulically controlled, 6 forward gears on the left side and 3 backward gears on the right side. Besides, negative control is available only when transmission box is in gear I. When traveling downhill, you should select a suitable gear to keep the engine speed bigger than 1200r/min, to guarantee lubrication of the machine.

ATTENTION :The gears should be selected successively, do not skip any gears when shifting. Do not pull or push the handle rashly and fiercely.

PARKING BRAKE CONTROL HANDLE



This handle is located at side of operator’s seat. Pull it up to engage parking brake and put it down to release the brake.

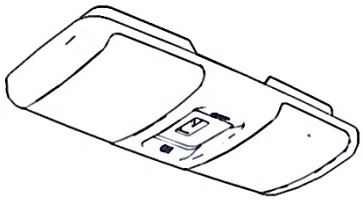


CONTROL PANEL ANGLE ADJUSTMENT

When stepping down the pedal on the lower part of the control box, the overall angle of the control panel can be adjusted, making the driver's operation more convenient.

STEERING WHEEL ANGLE ADJUSTMENT

When lifting the handle under the steering wheel upward, the steering wheel angle can be adjusted to suit the driver's operation.

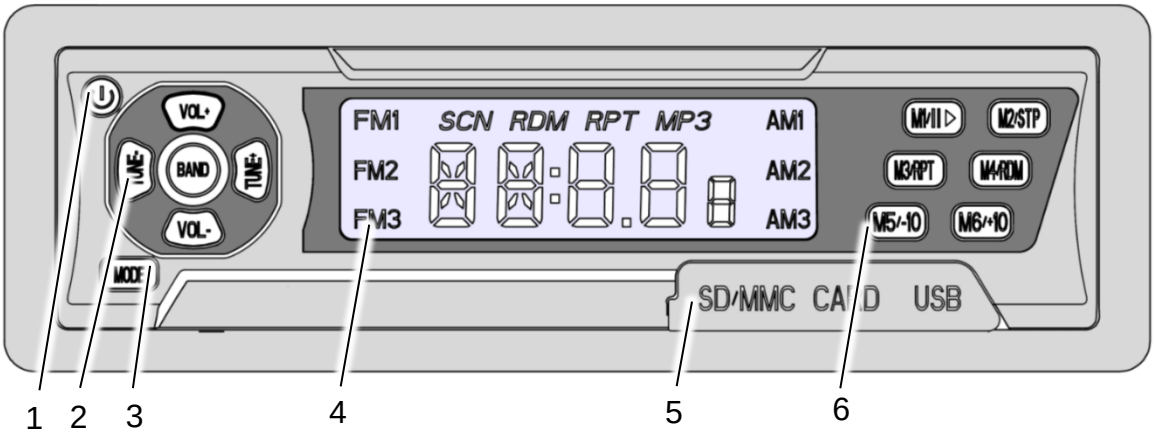


CEILING LIGHT IN THE CAB

The light is located in the top of cab.

Press down the switch to turn on the light.

RADIO/MP3/WMA PLAYER



The radio of the grader is located on the upper left of the driver.

1. Power switch

2. Radio operation area

TUNE is used for channel switching

VOL is used for volume increase/decrease

BAND is used for band selection

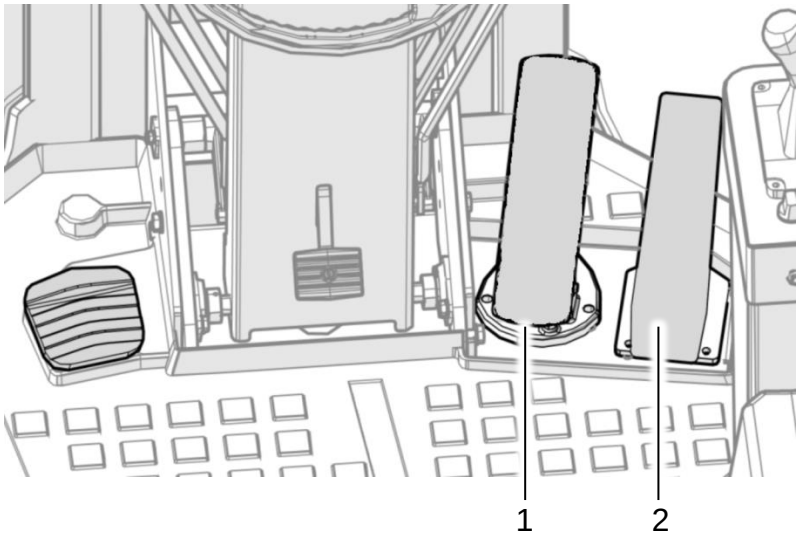
3. Switching between radio and music playing modes

4. LCD screen

5. The radio is equipped with memory card, U disk and other storage media for reading internal MP3 files. Among them, USB interface can be used for mobile phone charging

6. Music playing operation area

BRAKE AND ACCELERATOR PEDAL



1． Brake pedal

Used for vehicle braking. Step down to start braking, and the braking force increases as the stepping angle increases.

2． Accelerator pedal

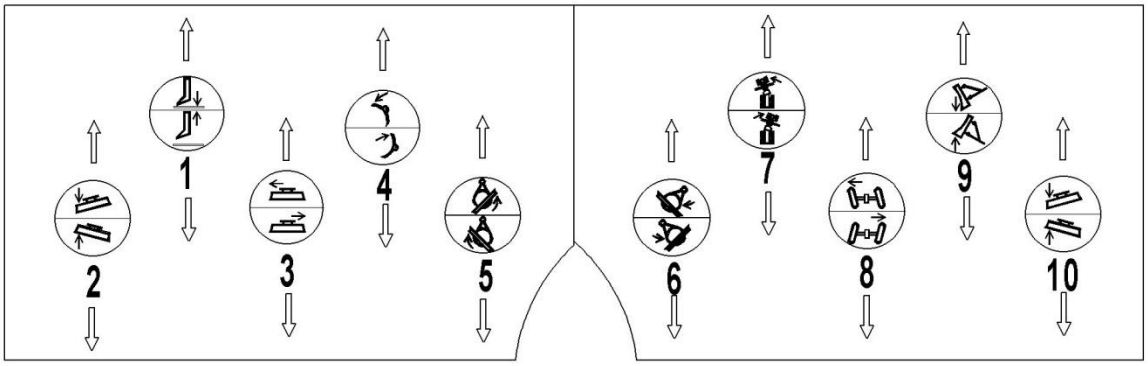
Used to change the engine speed to adapt to different working conditions.

WORKING DEVICE CONTROL HANDLES

This model has two forms of control handles.

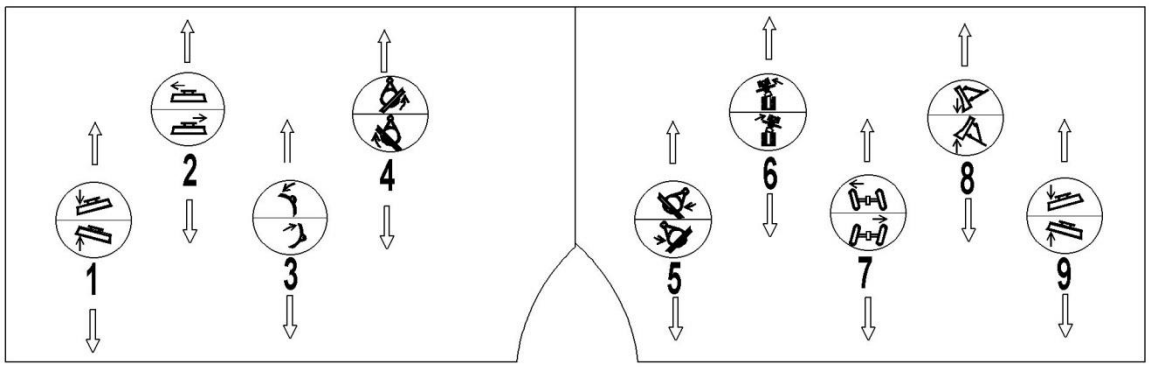
One has ten handles:

As shown in the left figures, there are five control handles on both sides of steel wheel, which are used to control the two multitandem valves on front of cab respectively, to perform the following actions:



1	Control lever for mid-mounted scarifier or ripper	6	Side-swing of blade
2	Up/down of blade	7	Articulation lever
3	Sidesway of blade	8	Front wheel lean
4	Adjusting of cutting angle	9	Front-mounted attachments lever
5	Blade rotating	10	Up/down of blade

Another is nine handles:



1	Up/down of blade	6	Articulation lever
2	Sidesway of blade	7	Front wheel lean
3	Adjusting of cutting angle	8	Front-mounted attachments lever
4	Blade rotating	9	Up/down of blade
5	Side-swing of blade		

NOTE: when the grader equipped the Front-mounted attachments, middle scarifier and rear scarifier.

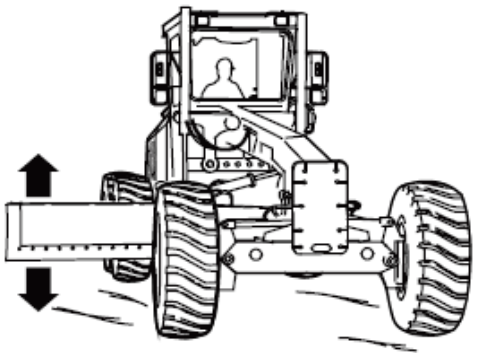
1. If the grader was equipped the Front-mounted attachments and middle scarifier or rear scarifier,

The front-mounted attachments control handles can control front-mounted attachments, and the scarifier control handles can control scarifier.

2. If the grader was equipped the middle scarifier and rear scarifier, the front-mounted attachments control handles can control the middle scarifier, and the scarifier control handles can control rear scarifier

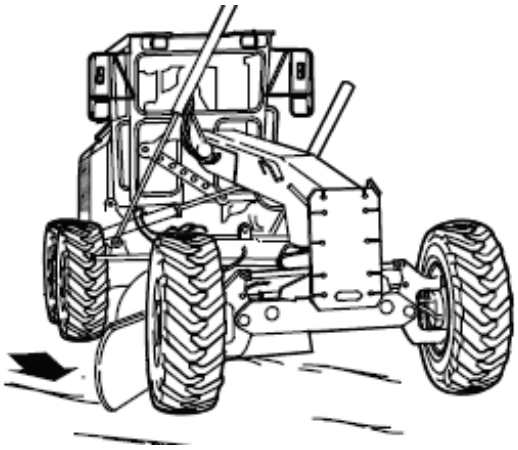
3. If the grader was equipped three attachments, The front-mounted attachments control handles can control Front-mounted attachments, and the scarifier

control handles can control middle scarifier or rear scarifier, it depend on the transfer of the middle scarifier and rear scarifier



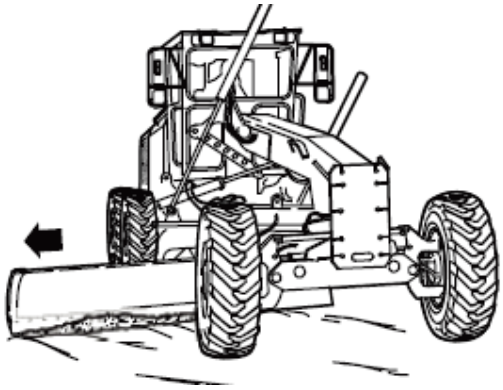
Up/down of blade

Right and left lifting cylinder act on the ball head on left and right side of connecting rack respectively, by extending or retracting the cylinder piston, the left and right side of connecting rack can be lifted or lowered, thereby height of the left and right end of blade can be adjusted, which can make the height and inclination of the ground meet the requirements.



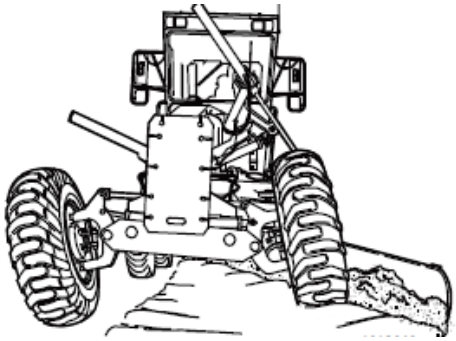
Blade rotating

The rotary frame together with the blade body can achieve 360° rotation in the horizontal plane. A certain deflection angle exists between blade and grader travel direction, so that the scraped soil can be discharged from the two sides and the grader can work continuously.



Sidesway of blade

Blades can extend to both sides along the length of the blade under the action of the sidesway cylinder so as to increase the operation width of grader.



Side-swing of blade

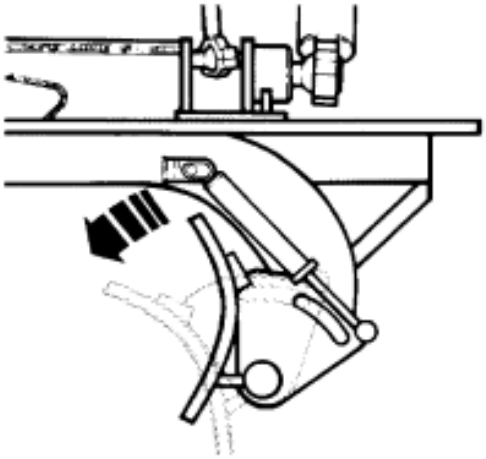
When the blades are fully extended to both sides and the operation width is still not enough, you can side-swing the connecting rack, rotary frame and the blades together left and right to increase the operation range.

NOTE:

The purpose of adjusting the position of swing frame position is to keep angle between the bases of lifting cylinder and swing frame center as 90°.

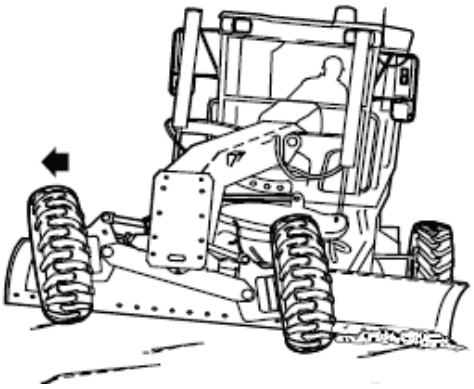
When the blade are placed towards left and right, lock the swing frame in positions 7 and 1 respectively.

When the blade rolls around 90 °, the blade lifting cylinder must cooperate with swing cylinder the blade. Do not avoid rough operation. It is prohibited that one or two cylinder has got to the stroke position, when another one has not begun to move, which may cause the interference between cylinders and damage the cylinder.



Adjusting of cutting angle

Under the action of blade tilt cylinder, the blade body can tilt between forward 47° and backward 5°, so as to get different cutting angle of blade and to be used for different working condition.



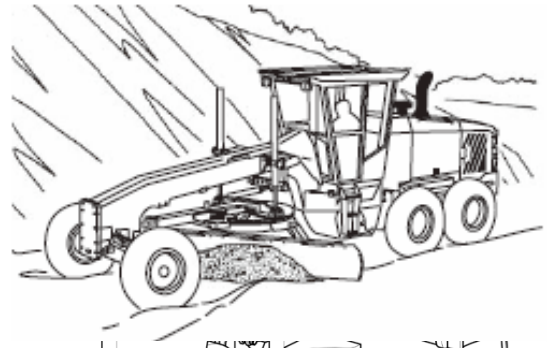
Front wheel lean

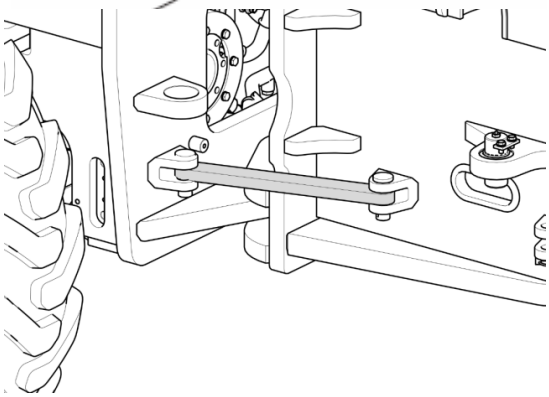
This lever is the third lever in from the extreme right. It controls the lean of the front wheels to the left or right for a reduced turning radius and improved machine stability while grading.

Push forward on the wheel lean lever to lean the front wheels to the left.

Pull back on the wheel lean lever to lean the front wheels to the right.

IMPORTANT! The function of the wheel lean is to offset the side forces caused by the moldboard while grading.

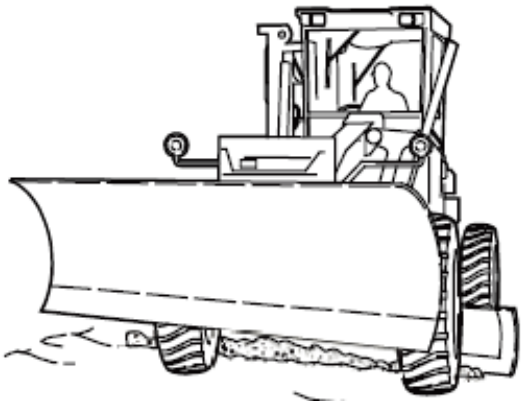




Articulation lever

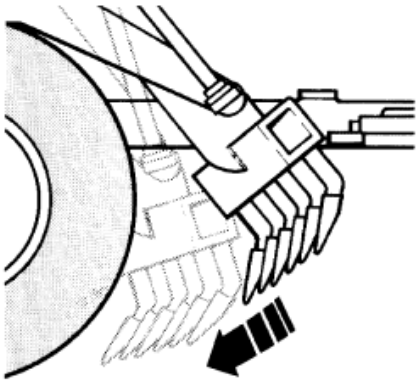
This lever is located fourth from the extreme right. The articulation lever controls the direction of the articulation function.

Remove the articulation lock pin before attempting to articulate the machine.



Front-mounted attachments lever

This lever is the second lever in from the extreme left. It controls the raising and lowering action of the front-mounted dozer blade/scarifier or other attachment.



Control lever for mid-mounted scarifier or ripper

This lever is the second lever in from the extreme right. The attachments lever normally controls the mid-mounted scarifier function. The lever also controls the ripper if the machine is not equipped with a mid-mounted scarifier.

SEAT ADJUSTMENT

WARNING

Stop the machine to a safe place and stop the engine, when adjusting the seat.

Adjust the seat and get the most comfortable seat position, before changing the driver or starting the machine.

Do not adjust the seat, when operating the machine.

Bearing adjustment

The bearing adjustment knob is located in the center of the lower front side of the seat. The operator can turn the knob counterclockwise to reduce the shock absorbing rigidity and turn the knob clockwise to increase the rigidity. According to his/her own weight, the operator can turn the shock absorbing rigidity adjusting knob by hand to continuously adjust in the range of 50 ~ 130kg until he/she feels comfortable.

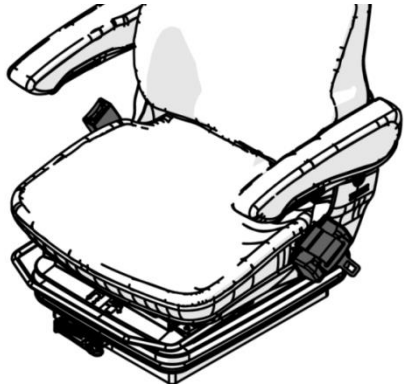
Backrest angle adjustment

Pull up the backrest angle adjusting handle and push the backrest until the backrest angle is appropriate. Release the handle to lock the backrest angle.

Forward/backward adjustment

The forward/backward adjusting handle is at the front of the seat. Lift the forward/backward adjusting handle by hand and adjust it along the forward/backward direction of the seat to reach the desired position, and then lower the handle and lock it automatically.

SAFETY BELT



Before use, the length of the safety belt should be adjusted to ensure that the safety belt can play a role of safety protection and has certain comfort. The position of the locking bolt on the safety belt can be moved to adjust the length of the safety belt. The locker of the safety belt is on the right side of the seat. Insert the locking bolt of the safety belt into the opening of the locker and then the locking bolt will be locked by the locker. There is a red button beside the opening of the locker. Press the red button and then the locking bolt will jump out of the locker. Before using the safety belt, please check whether the safety belt locker can be properly locked and unlocked

REAR VIEW MIRROR

Rear view mirror is outside the cab. Do adjust the rear view mirror before operation , rotate rear view mirror to adjust the angle of elevation of it so that the operator will have a good field of vision.

EXTINGUISHER

The extinguisher frame has been installed on the left rear of cab seat. Please install the extinguisher that meets the requirements of local regulations(Our dealers offer the spare extinguisher for option).

Use points of fire extinguishers:

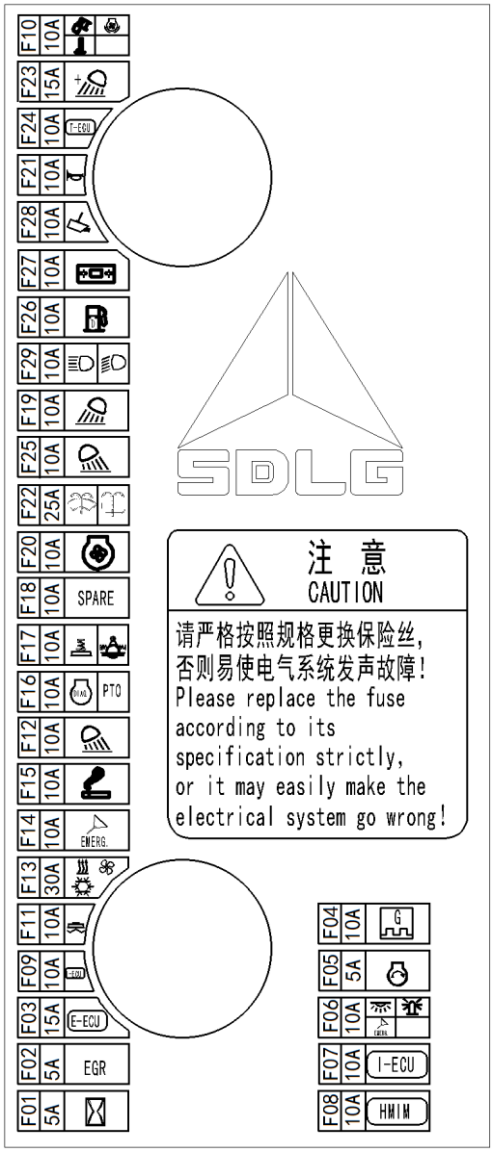
1. Stand upwind side, keep an appropriate distance (2-3 meters).
2. Unplug insurance sales.
3. Hold nozzle by one hand and hold the handle by the other hand.
4. Spray towards the foot part of fire resource.
5. Routine inspections, fire extinguishers and precautions
6. Check the pressure of a fire extinguisher every six months. If the pressure is in the red range, please add the fire extinguishing agent, or replace the extinguisher.
7. Carry out the hydrostatic test every five years or when replace the filling extinguishing agents again. Ensure it is qualified and then use it
8. Fire extinguisher mainly used for initial-stage fire

CLOTHES HOOK

Clothes hook is located on the right rear of cab seat.

NOTE: Prevent the hanged clothes from affecting the operation of operator.

FUSE



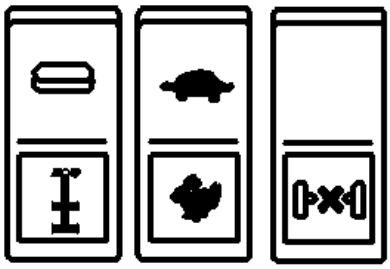
NOTE

Be sure to turn off the start switch before replacing the fuse. The fuse is used to protect electrical equipment and cables from burning out. If the fuse is corroded, oxidized or loosened, it should be replaced in time.

When replacing, the fuse specifications should be kept the same.

The fuse box is located in the left rear of the cab. Turn the rotary switch and then the fuse box can be opened to check the fuse.

FRONT WHEEL AUXILIARY DRIVE OPERATION INSTRUCTIONS (If equipped)



If equipped with front wheel auxiliary drive module

From left to right

Front wheel auxiliary drive switch

High and low speed switch

Differential lock switch

Front wheel auxiliary drive switch

The switch is the front auxiliary drive switch, when the switch is pressed, and the gear selector in the non reverse position, the front wheel drive function to open.

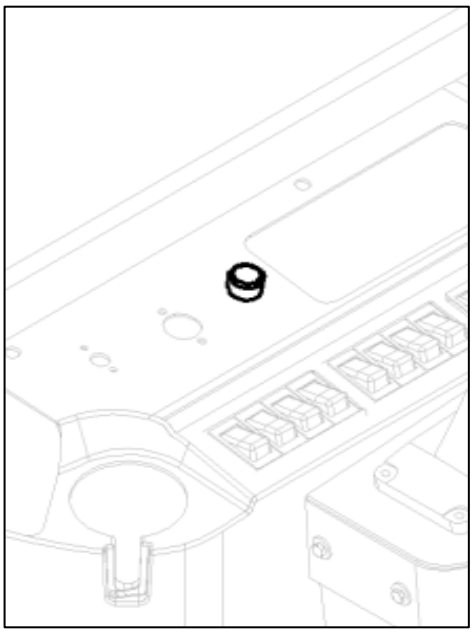
NOTE! In order to improve the safety, the grade can only be started when the switch is not pressed.

High and low speed switch

The switch is high and low speed switch, when the switch is switched to the rabbit gear, it is high speed. When the switch is switched to the tortoise stall, it is low gear.in general, the tortoise gear position is used when the gear shift is in 1 gear. The transmission gear is 2 or 3 gears, using rabbit gears.

Differential lock switch

The switch is a differential lock switch. When the lower end is pressed, the front wheel differential function is closed, and the side wheel skidding phenomenon is eliminated, so that the grader can get out of trouble.



Torque adjusting knob

The knob is a torque adjusting knob. By rotating the knob, the traction force of the front wheel auxiliary drive can be adjusted. Clockwise rotation, torque increase.

RUNNING-IN PERIOD OF NEW MACHINE

A new machine must have a running-in period first 50h. In the running-in period, choose flat road. When starting the engine, avoid accelerating suddenly; start the engine when the water temperature gets to 50℃. When driving, do not accelerate to climb the slope; avoid emergency brake and using the brake for a long time. Carry out the maintenance before, during and after run-in period.

Grader can not use full power in the first 50h. Grader can use full power in the first 50h in second 50h-100h, but not for a long time.

IMPORTANT! Check the oil level often.

PREPARATION BEFORE RUNNING-IN

1. Clean the external part of grader.
2. Check whether the exposed part of the fastener is loose, intact, and free of damage.
3. Check whether the control handles (joysticks) and pedals are loose and damaged.
4. Check the quantity and quality of lubricant, brake fluid, fuel and coolant, if necessary, add or replace them.
5. Check the discharging condition of battery. Check whether the terminals of battery are connected firmly.
6. Check the tire pressure; be sure to inflate the tire if

the pressure is lower than the specified value.

7. Check whether the tension of engine fan belt is appropriate, and whether the generator is working properly.
8. Check the oil pipes, air pipes and pipe joints for damage, looseness and leakage.
9. For the new machine or machine with newly replaced parts, you must pay attention to the "initial" maintenance of the oil filters in the first 20h or 50h operation. These oil filters are as follows:

Transmission oil filter (First 20h maintenance);

Hydraulic oil filter (First 50h maintenance)

PREPARATION BEFORE OPERATION

START THE DIESEL ENGINE

1. Set the machine in parking station.
2. Set the transmission control handle to the neutral position.
3. Check the multitude valve control handles, which should be in the neutral position.
4. Turn on main power switch; insert the ignition key and turn it to “ON” position, at this point the following red lights will be on: Service brake warning light and charging system warning light.
5. Check around for obstacles and other potential safety hazards. Ring the horn to warn people nearby.
6. Turn the ignition key clockwise to ST to start the

engine, if the diesel engine fails to be started in 10s, start it again 1min later. If the engine cannot be started after three consecutive trials, you must check and troubleshoot the engine.

7. In cold season and areas, you must preheat the engine before starting; an air preheater is generally used.

CHECKING AFTER STARTING

1. The two red lights should be off.
2. Check whether the turn signals, headlights, brake lights and other lamps, wipers, horn and other electrical components can work normally.
3. Check whether the torque converter oil temperature gauge, engine water temperature gauge, fuel level gauge, working hour meter and other instruments can work normally.
4. Check the lubricant level of transmission box and the oil level of hydraulic oil tank, which should meet related requirements.
5. Operate all the cylinders, their actions should be normal.
6. Run the engine idly and pivot steer the front wheels to check the function of hydraulic system.
7. Set the blades to transporting state, namely put the blades within the wheels, and lift them up as far as possible. Pay attention to check whether there is adequate distance between the blade side and the

middle tire surface.

8. Raise the bulldozing plate to highest position.
9. Run the engine idly at medium speed to keep the temperature of engine oil, transmission box lubrication, and hydraulic oil no lower than 60oC.
10. After releasing the parking brake handle, run the machine at medium speed to test the service brake function, the brake should be reliable.

ATTENTION: You must contact with the person in charge before operating the machine.

DRIVING

1. Use low gear to start the machine and shift to high gears gradually.
2. Deceleration must be performed step by step and stay for a certain time at the current gear before shifting to the lower one. Do not shift from high gear to low gear directly to avoid damaging the parts.
3. When shift between forward and backward gears, please do stay at the neutral gear for a certain period of time, to avoid unnecessary peak loading and impact to the transmission system.
4. When going down a long slope, choose the appropriate gear to make the speed of the torque converter turbine faster than the speed of the pump wheel, so that the torque converter can produce continuous braking force.
5. When go down on a relatively flat or medium slope,

Forward II is more appropriate.

6. If the slope is steep, apply Forward I with appropriate speed by using the engine throttle pedal to minimize the use times of the brake. In the process of driving, the driver should pay attention to check the torque converter oil temperature gauge, the oil temperature should be within 80°C ~110°C, short term 120°C, but under no circumstance should the temperature exceed 120°C. Otherwise, you should immediately reduce the throttle and shift a low gear, slow down and wait until the temperature drops to normal range.
7. During the long-distance driving, the driver should pay attention to check whether the blades and other working devices are automatically sinking and adjust them if necessary.

ATTENTION : Tilt of front wheels is locked during transportation.

ATTENTION: All the moving parts from the transmission box to the hydraulic circuit require running-in period. During this period, the grader cannot work at full load.

ATTENTION: The main switch must be turned on when the engine is running.

ATTENTION: Before maintaining or welding on the machine, you must turn off main power switch of the electrical system, cut off connection to ECU!

ENGINE WEAR

1. The new engine must be carried out in advance, so as to improve the coordination of various friction parts and improve the working ability, which is essential to ensure the reliability and service life of the engine.
2. Running in time for the 40 to 60 hours, running in period of the power and speed should be low to high, but the maximum power should not exceed 80% of the rated power.
3. After running in period should change the oil ,oil filter.
4. NO long idle running.

OPERATION AND USE OF GRADER

CHECKING BEFORE DRIVING

CHECK BEFORE STARTING

1. Check the fuel level of engine, the level should be between two lines of oil dipstick. And pay attention to the quality of the oil.
2. The radiator should be filled with antifreeze.
3. Check the capacity of the fuel tank.
4. Check the hydraulic oil level of hydraulic tank and keep the oil level above the half of the tank.
5. Check the oil level of rear axle and balance tank. Fill the oil to specified position if not enough.
6. Check whether the connectors are loose.

CHECKING BEFORE DRIVING AND AFTER STARTING

1. Whether the gauges are normal and the engine is normal.
2. Whether the sound is normal when running at the neutral speed.
3. Whether the lights, steering indicating lamp, horn, scraper and brake lamp are normal.
4. Steering system of steering wheel is normal.
5. Whether the parking brake is normal

DRIVING OF THE GRADER

STARTING OF GRADER

1. The grader should be started after the checking above before starting. Specially, lock the gear control handle in the neutral position.
2. Put down the parking brake control handle to release the parking brake.
3. Turn the ignition key switch to ST position.

   NOTE: After the engine is started, immediately release the starting key to avoid damaging the gear and burning the starting engine!

   In order to prevent the start engine from being damaged, the engagement time of starting engine should be not more than 10 seconds each time, the internal between two starting should be at least 2 minutes.
4. Idle at 850r/min for 3-5 minutes and then increase

the load gradually. It is prohibited to accelerate immediately after starting.

BEGINNING OF THE GRADER

1. After the engine is started, heat the engine water temperature to 50℃ at idle. The grader starts to move only after the instrument is working properly

   DANGER: Don't begin to move when the low pressure alarm light is on.
2. Look around the vehicle and observe the rotary direction of the vibration wheel.
3. Release the parking brake, and observe the front, left/right, top of the machine and rear mirror to see whether there is something to hamper the beginning.
4. Select the direction of travel, set the manipulation handle to shift I. And after accelerating slowly, hold the parking brake control handle by one handy, hold the steering wheel by the other hand and slowly release the parking brake control handle so that the grader can move smoothly. Turn to shift II after starting.
5. Hold the steering wheel tightly.

NOTE: It is not allowed with shift II!

BEGINNING OF THE GRADER ON THE SLOPE

Grader is best not to park or start on the slope. If needed, please operate as the following methods:

Beginning on the uphill.

After starting the engine, set the shift control handle to shift I. And after accelerating slowly, hold the parking brake control handle by one handy, hold the steering wheel by the other hand and slowly release the parking brake control handle so that the grader can move smoothly. When the grader begins to slip backwards, set the machine in parking station. Start again.

Beginning on the downhill.

Release the parking brake handle and accelerate slowly.

DANGEROUS: No neutral glide!

STEERING

Grader in this series applies the hydraulic steering gear, which is similar to the general mechanical steering. It should be noted that the oil supply of steering pump will reduce when the speed of the engine reduces, and the steering speed will be also affected. In particular, when the engine is shut off, steering pump will not supply the oil and steering operation will malfunction. In a sharp turning on the road, use low-speed, while the engine speed should be not excessively reduced, particularly to prevent the flameout.

DANGEROUS: The grader should not slide with flameout of the engine when going downhill, otherwise the steering will be out of control.

Please note the following items when steering:

1. Reduce the speed, and avoid sudden turing. Avoid braking when turning, especially in emergency braking. Be careful to be in the muddy road and the snow and ice on the road, in order to avoid the sideslip to cause the vehicle out of control.
2. Do not rotate the steering wheel too fast, otherwise it will damage the steering.
3. Turning of articulated frame: Articulated frame is controlled by a steering control lever. When the articulated frame turns, unplug the safety lever under the hinged fuel tank.

STOPPING AND TURNING OFF

1. Slow down before and remind of other people with turn signal or gesture. Stop the machine slowly toward the road on the right or stopping places.
2. Avoid parking in the narrow roads, steep slope, soft road and other unsafe places.
3. When parking in night next to the road, place some safety signs to prevent collision.
4. Choose a safe location if the machine has to be parked on the slope. Set the machine in parking station, and set to shift I. Insert the blocks or stone under the front and rear wheel to prevent slippery.
5. The engine needs to be turned off, reduce the load gradually, and then gradually decrease the speed to 850r/min. Turn the key switch to 0FF position to stop

the engine.

NOTE: The engine should not be shut off with full loading.

6. After the engine is stopped, remove the ignition key
7. After the engine flameout, all attachments shall be on the ground

ENGINE

ENGINE PRECAUTIONS

BEFORE USING FOR THE FIRST TIME

1. Please operate and maintain the engine , in strict accordance with the requirements of this manual.
2. Engine never works under overload, and idle running time is no more than 10 minutes.
3. The antifreezing solution used to cooling system must be qualified; otherwise my company is not responsible for the resulting failure.
4. Different manufacturers and different type of oil never mix, so as not to lower the quality of the engine oil.
5. After the end of the engine running-in, clean oil sump with cleaning kerosene or diesel, replace engine oil filter element, and replace all the engine oil.
6. It is strictly prohibited that engine runs without air filter, because the air without filtration into the engine will cause early wear of the engine and

abnormal work.

7. Electric circuit wiring must be correct and strong; during the work of generator, it is forbidden to remove any connection, so as to avoid accidents.
8. In order to prevent accidents, all exposed rotating parts have protective device, and installed firmly.
9. Wipe off the overflowing lubricating oil, fuel, coolant, or other liquid.
10. Clean the spilled lubricating oil, fuel, coolant, etc.
11. Adopt the appropriate, safe and reliable method of waste oil processing.
12. Put the oil dishcloth in fireproof container, and never throw dishcloth on the engine.
13. No flammable liquids will be near engine.
14. To prevent accidental start, before maintenance for the engine, disconnect and pack battery ground wire with insulation tape.
15. When disconnecting governor connecting rod, never start the engine.

WHEN USING

1. Every time start the engine, keep idle running 3~5minutes, after instruments work normally, the machine may start running. Don't allow suddenly accelerate the cold car, otherwise it will damage all kinds of instruments and its corresponding parts, accelerate the wear of engine moving parts and damage the supercharger, thus shortening the

service life of engine.

2. After the engine starts, the engine should first run for 3~ 5min under no-load, and then can be allowed to speed up and upload step by step.
3. When replace engine oil filter in the process of maintenance, the new engine oil filter should be filled with engine oil, and then installed, and after the installation is complete, the engine must start, and keeps idle running for 2~3minutes, then keeps medium speed running for 1~3 minutes, after that, drivers get down from the machine, and carefully observe whether filters have leakage phenomenon, if have, the phenomenon must be ruled out in time, otherwise it will lead to burn deputy moving parts such as crankshaft, bearing bush due to lack of oil.
4. During the work of engine, the temperature of the supercharger, exhaust pipe, muffler, radiator and so on, is higher, you should pay special attention that your body should keep a certain distance with the engine, in order to avoid high temperature burns.
5. During the work of engine, the internal of the radiator has high pressure, so adding coolant should meet the requirement for stopping machine, when cooling liquid is cooled adequately, add coolant, in order to avoid burns caused by the spilled high temperature liquid.
6. When engine oil pressure is too low, or without oil

pressure, cooling water temperature is too high, and the internal of the engine has abnormal sound, user should timely stop the machine to check and troubleshooting.

7. Should pay attention to fire prevention for engine, and open fire shall not be close to the engine. At the same time, the exhaust temperature of engine is very high, if your machine works under the occasion where there is combustible thing. The exit tube or muffler should be equipped with spark elimination device, according to the requirements.
8. In accordance with the provisions, put water in the fuel pre-filter, clean or replace the fuel filter element assembly, replace fuel fine filter element assembly.
9. Should always check whether air inlet line has leakage, the air filter is blocked, if it has the above phenomenon, maintenance must be timely conducted, otherwise it will damage the supercharger or result in failure of cylinder and so on, engine power would fall at the same time, the vehicle can only run at a lower speed, maintenance be timely conducted.
10. Before adjust or repair the engine and the actuating device, user must stop the engine.
11. In the process of operating the blade lift cylinder and the blade swing cylinder so the blade lift and sway, pay attention to the coordination of the oil

cylinder to avoid the mechanical interference between the swing frame and the working device.

END OF USE

1. It is forbidden to stop the machine by flameout under the high speed and heavy load, after 3~5 minutes for idle running, then stop the machine. Otherwise it will damage the supercharger and other moving parts, thus shortening the service life of engine.
2. When the engine parks or is in maintenance for a long time, so as to prevent accidental starting engine, users should dismantle wires between the engine and the battery.
3. After parking, if environmental temperature may be lower than 0 ℃ and the engine is without antifreezing solution, user should drain all the water inside the radiator and engine.

WHEN IN FAILURE

1. Never use corrosive detergent to clean radiator and inlet inter-cooler, or it will cause severe damage to the engine cooling system.
2. On the seal parts of the fuel injection pump, we're not allowed to dismount and adjustment. When in failure, please contact with my company dealers.
3. When the engine major accident occurs without the permission of the manufacturer repair station, users are strictly prohibited to overhaul and maintain.

4. If we found the engine without oil pressure, low oil pressure, cooling water temperature is too high, air intake system has a leak or there is some sound in the engine, we should contact with the local customer service department. It is strictly prohibited to run engine in spite of illness.

COMPREHENSIVE EXAMINATION BEFORE STARTING

Check the bottom of the vehicle and the periphery, to find if there are loose bolts, dirt, oil leakage and coolant leaks or damaged parts, etc., and check the attachment and hydraulic parts status.

Check before starting :

1. Check the fuel mass in the fuel tank, discharge the air in the fuel pipeline:
2. Check whether engine intake and exhaust pipeline connection is sealed and strong.
3. Check whether the water pump belt tightness is appropriate:
4. Apply 4-5kg force downward on the middle of two pulleys between water pump and charger, and belt sinking 10-15mm is advisable.
5. Check whether engine electrical wiring connection is firm, whether there is a touch line and breakage.
6. Check whether the engine has three leakage phenomenons (oil, water and air leakage).
7. Check if there is defect on the instruments, sensing

elements.

8. Whether battery charging is enough.

ENGINE START

NOTE FOR STARTING THE ENGINE：

Having completed the preparation work before starting and found them in order, start the engine (when the weather is cold in winter, need preheating engine before starting).

1. When you start the engine, the last starting time can't be more than 10seconds, two starting interval time should not be less than 1minute, if three consecutive starts are unable to start the engine, you should find out the reason, confirm the troubleshooting and start again.
2. For the engine under cold starting, you should increase the speed slowly, not suddenly making it under high-speed operation, or in idling running for a long time.
3. Poor lubrication, low oil pressure, will make the kinematic pairs wear.
4. Check whether water pump working is in good condition, and check for the "three leakage", abnormal sound.
5. Check the condition of the whole vehicle instrument. If there is abnormal phenomenon, user must immediately stop the engine to check out, or need delivery repairing when necessary.

6. It is forbidden to idle for a long time: idling for 3~5 minutes after starting, generally no more than 10 minutes, otherwise it is easy to cause failures such as burning nozzle, cylinder liner piston ring wear and so on.

AFTER STARTING ENGINE

1. After cold starting engine, ban running engine under large throttle, high speed and high load; increasing engine speed little by little, the temperature rising to more than 60℃, the engine can normally work after sufficient lubrication, heating evenly.
2. Running under the large load, don't stop it immediately, but stop it after 5-10 minutes for no-load running at low speed.
3. When driving grader, the driver should always observe all kinds of instruments, all times knowing the running situation of the engine; once finding the abnormal situation, must stop immediately to check out, or need delivery repairing when necessary.
4. the engine running at low speed, if the engine oil pressure indicator can't reach the normal range in 10seconds, you should find out the reason, and then start again, otherwise it will lead to engine failure.
5. When oil pressure does not reach the specified value, high engine speed will damage the turbocharger.
6. To rapidly warm the hydraulic components,

circularly use working device control handle, making the preheated hydraulic oil circularly flow in the hydraulic cylinder and hydraulic line.

7. After starting the engine, make the engine under idle running for a few minutes, gradually increasing the speed to 1000~1200r/min, and then make the part-load operation. In the process of running, must pay attention to the change of the instrument reading at any time.
8. Can't keep the engine under neutral position in high speed or last running in low speed for more than 20minutes.
9. If it is necessary to let the engine run under neutral position, the engine should be applied load from time to time or runs at a moderate speed.

ATTENTION: After every stop, user must immediately rule out the fault found during operation**, and often do necessary check, to ensure the normal engine technical status.**

NOTE FOR LONG STORED ENGINE

Long-term storage for engine needs antirust processing; the long-term storage here refers to the storage for about six months; when restart the engine, in addition to replace the engine oil and diesel oil, user also eliminate protective layer.

1. Clean the engine, the clean water tank.
2. Heat engine, then stop.

3. Drain off all the engine oil, and inject rust-proof oil.
4. Drain off all cooling fluid.
5. Inject anti-rust oil.
6. If necessary, clean the oil-bath type air filter, and add anti-rust oil.
7. Empty diesel tank。
8. After mixing 90% diesel and 10% rust-proof oil，and then fill fuel tank with the mixture.
9. Run for 10 minutes.
10. Stop the machine.
11. Turn laps by hand, and put the parking lever in the STOP position.
12. Remove and wrap all belts.
13. Spray anti-rust agent to the pulley groove.
14. Block the inlet and outlet.
15. Block the supercharger inlet and outlet.
16. Drain off all the rust-proof.

Remove the engine protective cover:

1. Remove the corrosion inhibitor in pulley groove.
2. Install the belt (after short running, tension again (when necessary)).
3. Remove the blocking of the inlet and outlet.
4. Refill coolant.
5. Start the engine.

OPERATION

The grader can do as follows: clean up the foundation;

level off the roads, dig ditches; scrape slope; loosen old road and hard land, transfer the materials, remove the snow and other work.

Operate in strict accordance with the construction process. Clean up the site before work to prevent crushing or crashing things. Identify the actual situation of the site to prevent the grader from sinking. The following is a brief description of some requirements:

1. It is recommended that the driver of grader should accept the guidance of our operating and technical personnel in order to operate the grader better. Be careful when manipulating the blade, scarifier and other operating devices to prevent it from interfering with the parts of the machine. Such as, blade and cab ladder, front and rear tires, and so on.
2. Operate the hinge device at high speed will cause the overturning of the machine. Make sure the speed is no more than 10km/h (6.21mph) during the operation.
3. Operation slope gradient: Max. cross slope is 20 °, max. Longitudinal slope is 25 ° (Only applicable to downhill operation).
4. During the operation of a cylinder to make the blade achieve sway, should pay attention to coordination, to prevent interference with the working device of shovel.

REAR RIPPER

Rear ripper is mainly used to destroy the earth road, in order to help the blade to transfer the soil and material

NOTE: Before starting the machine, raise the ripper at first.

NOTE: Remove the ripper if the ripper doesn't work and store teeth of ripper correctly.

NOTE: You should check whether the teeth of the ripper are damaged, for example, cracks or bending. Do not use a damaged tooth.。

ADJUSTMENT OF TEETH

The teeth can have two locations, as shown here: Remove the spring pin, and pull the pin out. Each tooth can be placed in the reservated location, and then push the pin inside, and insert the spring pin.

ADJUSTMENT OF REAR RIPPER

Operating position: Retract the teeth inside to raise the ripper completely;

The position of loosening soil: stretch the teeth out and put it on the ground;

Ripper: Use the cylinder to press the ripper completely.

LOOSENING SOIL

The hardness of the land determines the number of teeth of the ripper, the inserting depth and travelling speed.

Put the teeth of the ripper on the ground;

Drive the grader forward, lower the ripper and insert it into the earth.

NOTE: Before the turnning and backing of the grade, raise the ripper.

BLADE PLATE

Blade plate is mainly used for material paving operations and trimming of road corners that blade can not be accessible.

NOTE: The position of blade and bulldozer should not be too lower and raise them according to the requirements.

In the process of operating the blade lift cylinder and the blade swing cylinder so the blade lift and sway, pay attention to the coordination of the oil cylinder to avoid the mechanical interference between the swing frame and the working device.

During driving, the blade and the bulldozing plate position must not be too low, should be based on the need to improve.

When doing scarification operation, all middle ripper shall not be carried out in large scale operation of the whole machine to avoid damage to the attached; if the vehicle needs to turn, please put away the small and loose and then carry on the operation.

When the small ripper in folded state and operation state, prohibit the large amplitude of the left and right swing connection frame and settlement shovel operation. Operation report of articles and blade in the process, should instantly through in ripper observation mirror to

observe the ripper tooth frame and the working device connecting frame, to ensure that the gap between them, in order to avoid the bump damage.

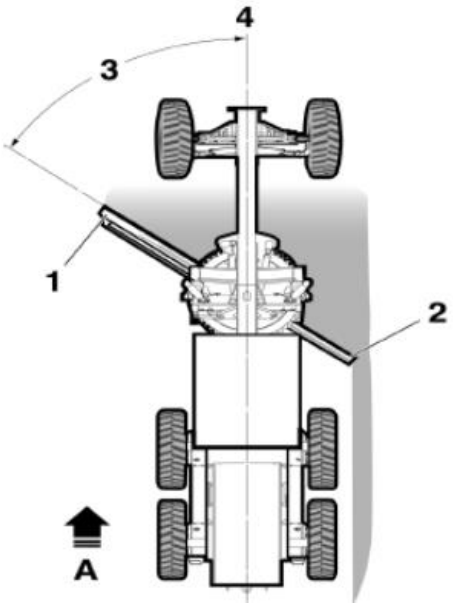
OPERATING TECHNIQUES

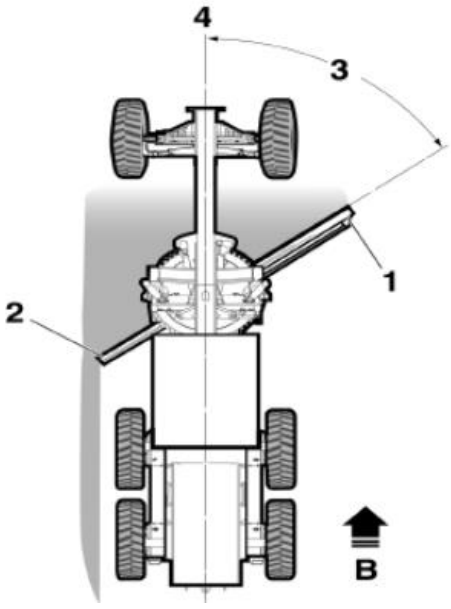
Study these illustrations to familiarise yourself with the terms used in this manual.

Moldboard toe – The point of the moldboard closest to the front wheels.

Moldboard heel – The point of the moldboard farthest away from the front wheels.

Moldboard angle – The angle of the moldboard as measured from the moldboard toe to the centre line of the front frame of the machine.





1 Moldboard toe

2 Moldboard heel

3 Moldboard angle

4 Centreline of frame

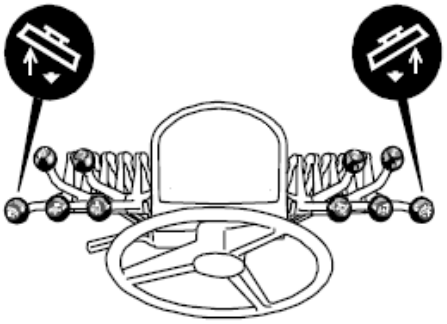
A Left-hand grading 1 Moldboard toe

B Right-hand grading 2 Moldboard heel

BLADE LIFT SYSTEM

MOLDBOARD BLADE LIFT PROCEDURE – RIGHT-HAND SIDE

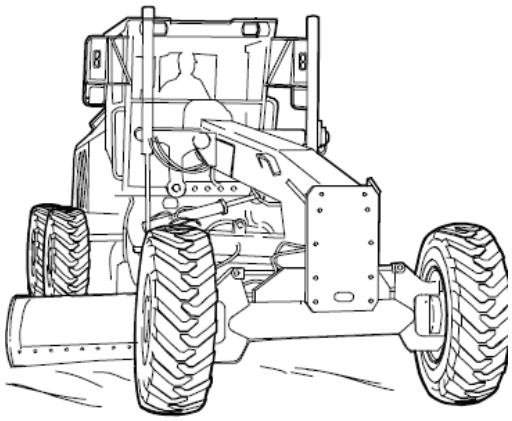
This procedure describes how to manoeuvre the moldboard into the right-hand side high bank sloping position. The blade lift system provides a total blade position range.



Observe all moving parts to prevent structure fouling when using the blade lift system.

Park the machine.

Place the transmission shifter in the Park (P) position.



Position the moldboard at 90 degrees to the frame.

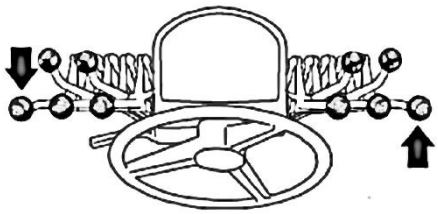
Centralise the circle, drawbar and moldboard with the frame.

Fully lower the moldboard and all attachments. Do not apply down-pressure.

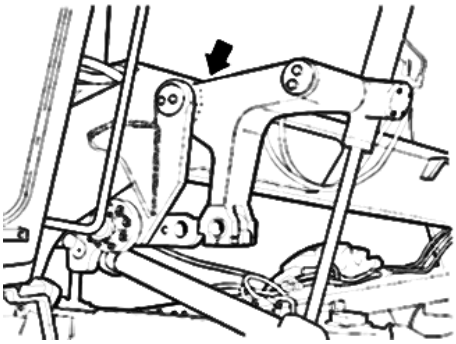
Ensure that there are no persons or vehicles near the machine.

Operate the blade lift lock pin switch (A) on the pedestal instrument panel to release the blade lift lock pin.

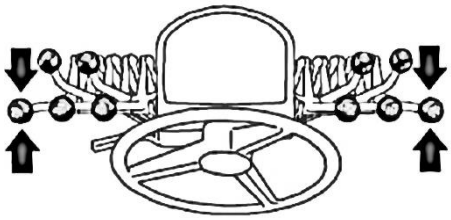
Upper end of switch pushed up and pressed in = Blade lift lock pin is disengaged.



The amber blade lift lock status lamp (B) in the centre instrument panel will light up when the blade lift lock pin is disengaged. If the status lamp does not light up, slowly operate both the right-hand and left-hand blade lift cylinder hydraulic control levers until the blade lift lock pin fully retracts and the lamp lights up.

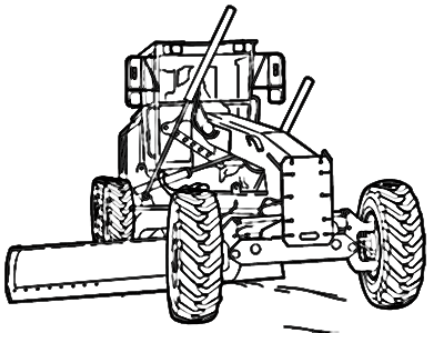


Observe the pointer on the bracket and “dimples” on the right hand arm. Retract the left-hand blade lift cylinder and extend the right-hand blade lift cylinder to move the blade lift lock bar to the right. This action pivots the blade lift arms around their pins. Pivot the blade lift arms until the final “dimple” on the right-hand arm aligns with the pointer.

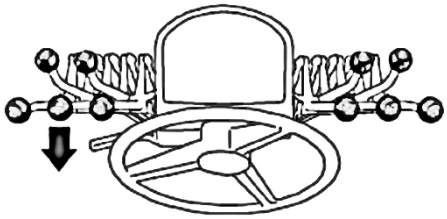


Operate the blade lift lock switch on the pedestal instrument panel to engage the blade lift lock pin.

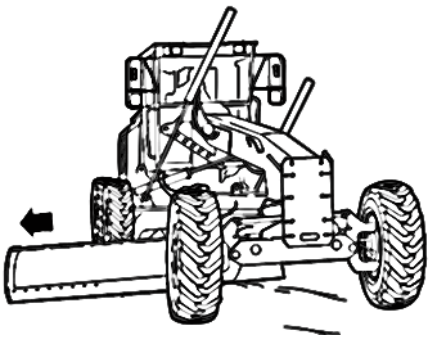
Lower end of switch pressed in = Blade lift lock pin is engaged.

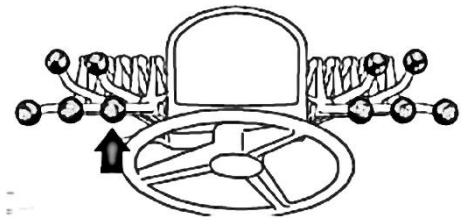


The blade lift lock status lamp will go out to indicate that the lock pin has engaged. If the status lamp does not go out, slowly operate both the right-hand and left-hand blade lift cylinder hydraulic control levers until the blade lift lock pin fully engages and the lamp goes out.

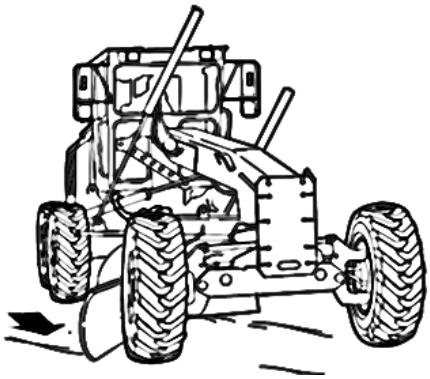


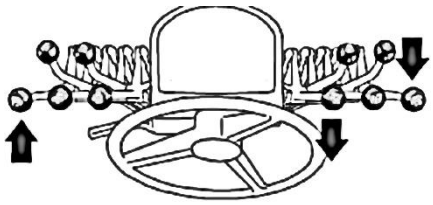
Operate the moldboard slide shift hydraulic control lever to slide the moldboard as far to the right as possible.



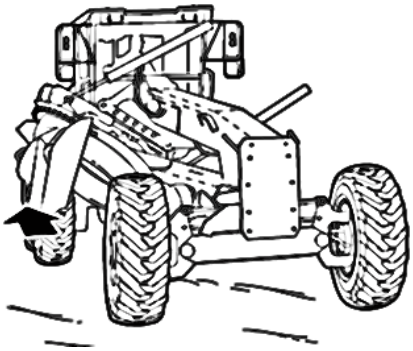


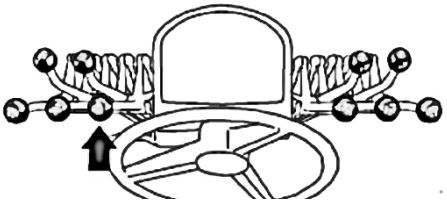
Using the circle turn hydraulic control lever, rotate the circle so that the end of the moldboard is close to the front tire.

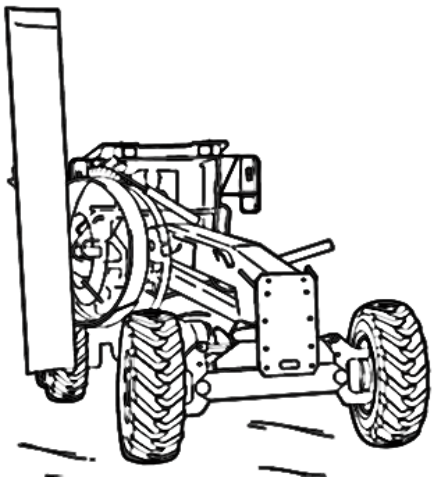




Retract the right-hand blade lift cylinder approximately 60 cm (2 feet). Fully extend the left-hand blade lift cylinder and the circle shift cylinder. Retract the right-hand blade lift cylinder until the moldboard reaches the desired position. Observe all moving parts to prevent structure fouling when using the blade lift system.

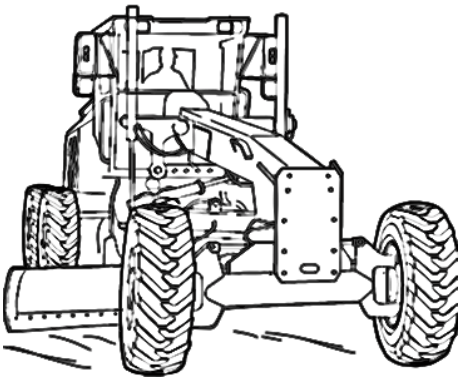






Using the circle turn hydraulic control lever, rotate the circle to allow the end of the moldboard to clear the ground.

Reverse this procedure to return the moldboard to the normal grading position.



MOLDBOARD BLADE LIFT PROCEDURE – LEFT-HAND SIDE

This procedure describes how to manoeuvre the moldboard into the left-hand side high bank sloping position. The blade lift system provides a total blade position range.

Observe all moving parts to prevent structure fouling when using the blade lift system.

Remove the right-hand moldboard extension if installed.

Park the machine.

Place the transmission shifter in the Park (P) position.

Position the moldboard at 90 degrees to the frame.

Centralise the circle, drawbar and moldboard with the frame.

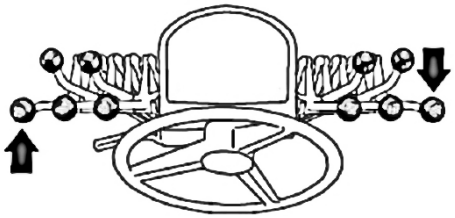
Fully lower the moldboard and all attachments. Do not apply down-pressure.

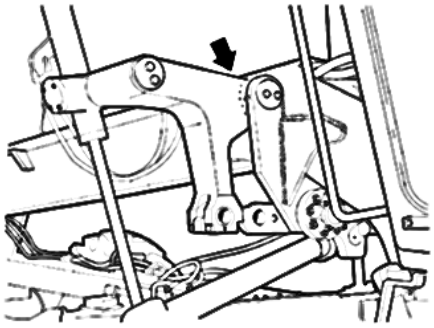
Ensure that there are no persons or vehicles near the machine.

Operate the blade lift lock pin switch (A) on the pedestal instrument panel to release the blade lift lock pin.

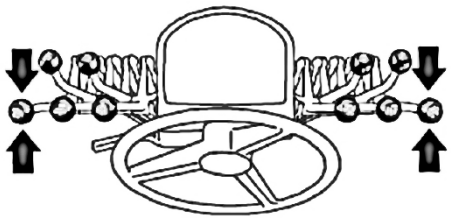
Upper end of switch pushed up and pressed in = Blade lift lock pin is disengaged.

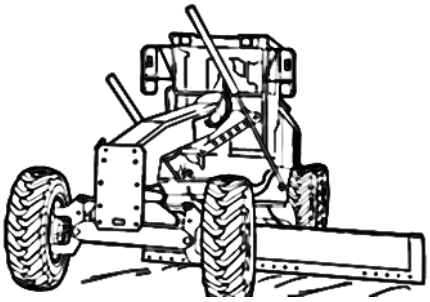
The amber blade lift lock status lamp (B) in the centre instrument panel will light up when the blade lift lock pin is disengaged. If the status lamp does not light up, slowly operate both the right-hand and left-hand blade lift cylinder hydraulic control levers until the blade lift lock pin fully retracts and the lamp lights up.





Observe the pointer on the bracket and “dimples” on the left hand arm. Retract the right-hand blade lift cylinder and extend the left-hand blade lift cylinder to move the blade lift lock bar to the left. This action pivots the blade lift arms around their pins. Pivot the blade lift arms until the final “dimple” on the left-hand arm aligns with the pointer.

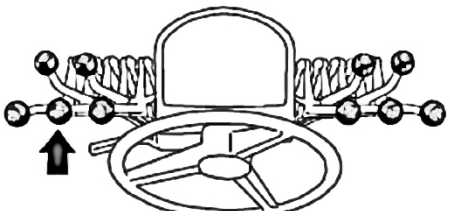


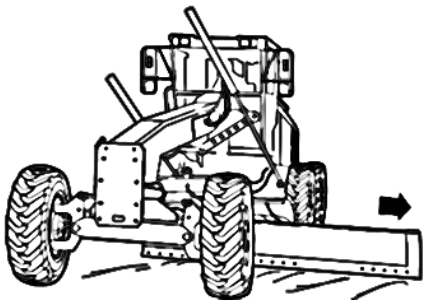


Operate the blade lift lock switch on the pedestal instrument panel to engage the blade lift lock pin.

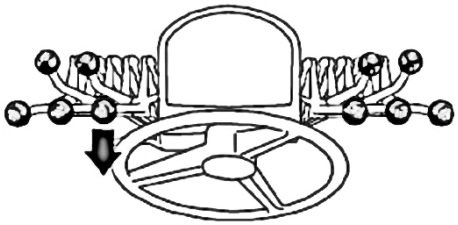
Lower end of switch pressed in = Blade lift lock pin is engaged.

The blade lift lock status lamp will go out to indicate that the lock pin has engaged. If the status lamp does not go out, slowly operate both the right-hand and left-hand blade lift cylinder hydraulic control levers until the blade lift lock pin fully engages and the lamp goes out.

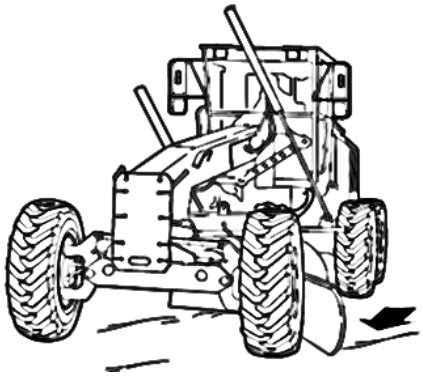


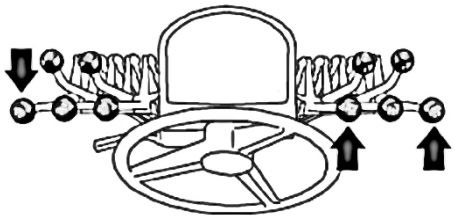


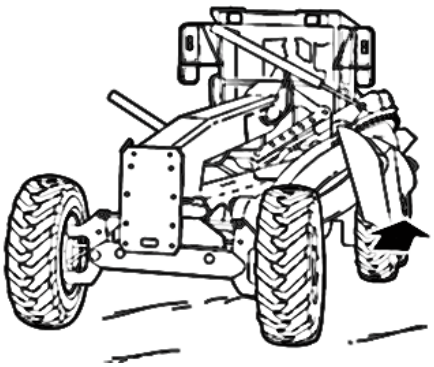
Use the moldboard slide shift hydraulic control lever to slide the moldboard as far to the left as possible.



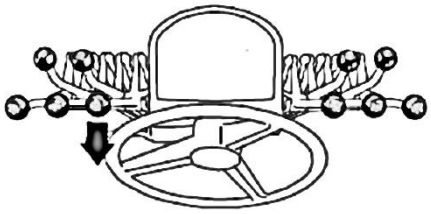
Using the circle turn hydraulic control lever, rotate the circle so that the end of the moldboard is close to the front tire.



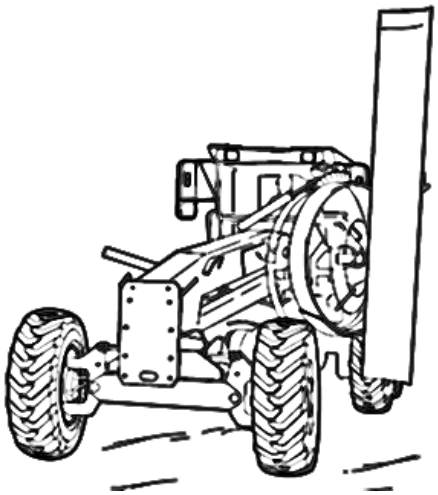




Retract the left-hand blade lift cylinder approximately 60 cm (2 feet). Fully extend the right-hand blade lift cylinder and retract the circle shift cylinder. Retract the left-hand blade lift cylinder until the moldboard reaches the desired position. Observe all moving parts to prevent structure fouling when using the blade lift system.



Using the circle turn hydraulic control lever, rotate the circle to allow the end of the moldboard to clear the ground.

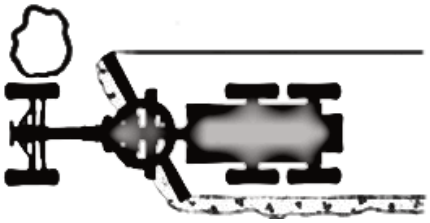


Reverse this procedure to return the moldboard to the normal grading position.

GRADING AROUND AN OBJECT

Note and avoid all hazards and obstructions such as overhangs, ledges, slide areas, power lines, underground cables, water mains, gas lines, etc.

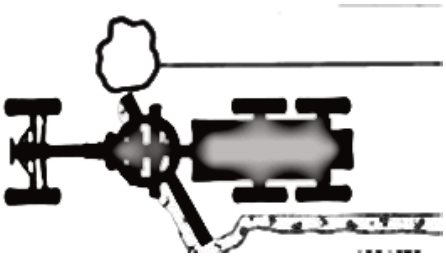
When operating close to power lines, underground cables, water mains or gas lines, contact the responsible authority and request assistance.



Manoeuvre 1

Reduce your speed.

Use the accelerator to slowly manoeuvre the machine around the object.



Drive as close as possible to the object to reduce the amount of hand shoveling required.

Manoeuvre 2:

Use the moldboard slide shift hydraulic control lever and move the moldboard to follow the shape of the object.

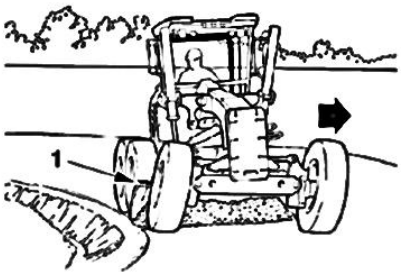
Manoeuvre 3:

Slide the moldboard back to its original position after you have passed the object and continue grading.

GRADING ON AN 'S' CURVE SHOULDER

Slowly approach the first right-hand curve.

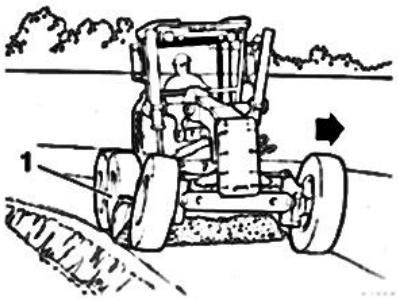
Lean the front wheels slightly to the left to counteract side thrust.



Turn right and follow the edge of the shoulder nearest the ditch.

Position the toe of the moldboard behind and outside the front right-hand wheel. Always have the toe of the moldboard positioned on the edge of the shoulder nearest the ditch while grading.

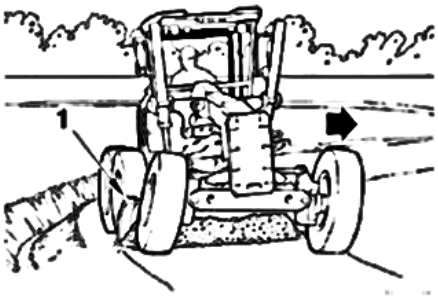
When finishing the right-hand curve, turn straight.



As you approach the second curve, follow the edge of the shoulder nearest the ditch and turn left.

Complete the curve and continue grading.

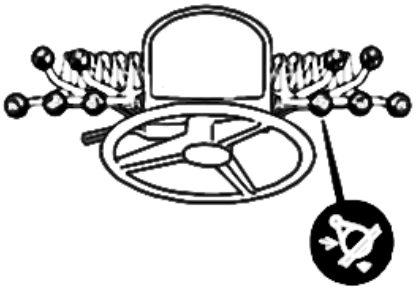
If a windrow has been created, make a clean-up pass to remove the windrow and reshape the shoulder.



Articulate the machine in the direction of the curve and follow the edge of the shoulder nearest the ditch. Slide and position the moldboard as required. Do not allow the moldboard to contact

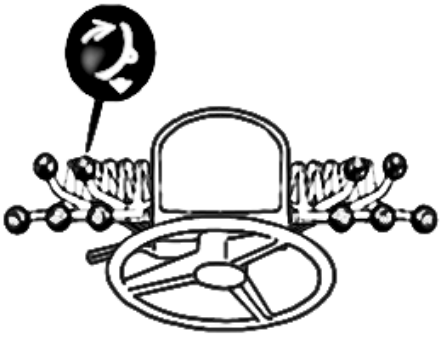
the front tandem tyres when articulating as severe damage can occur.

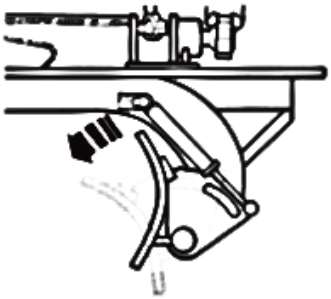
RIGHT-HAND LEVELLING

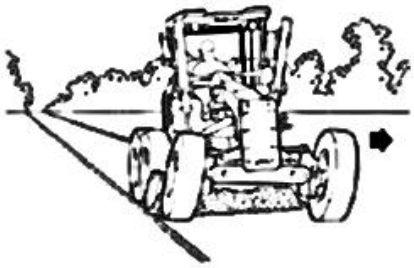


Use the circle shift hydraulic control lever to offset the circle and drawbar slightly to the left of the frame.

Rotate the circle and tilt the moldboard depending on the amount of material to be moved.

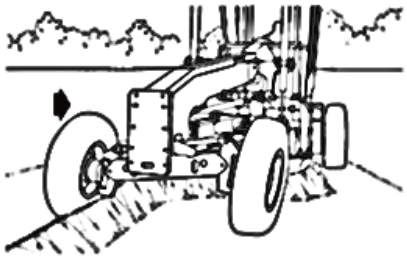






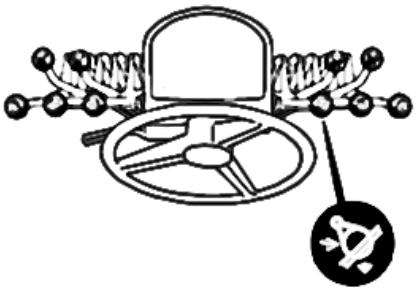
Position the moldboard angle according to the desired depth of the cut. Deposit the windrow outside the left-hand tandem wheels.

Lean the front wheels to the left to overcome the side thrust.



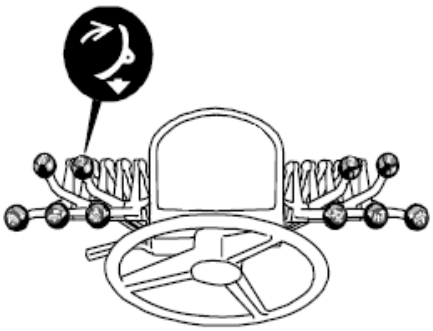
Articulate the frame to the right. If the drive wheels lose traction, reduce the articulation angle. This will decrease the cutting angle and side thrust allowing the drive wheels to regain traction. Deposit the windrow between the tandem wheels. Spread the windrow over the new surface until it is smooth.

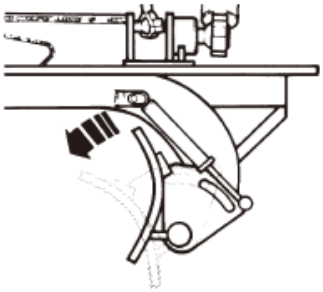
LEFT-HAND LEVELLING

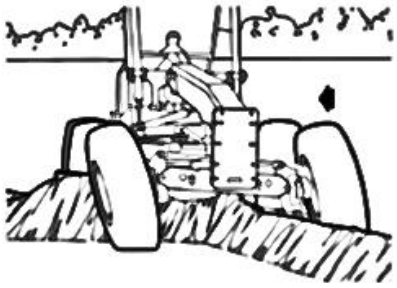


Use the circle shift hydraulic control lever to offset the circle and drawbar slightly to the right of the frame.

Rotate the circle and tilt the moldboard depending on the amount of material to be moved.

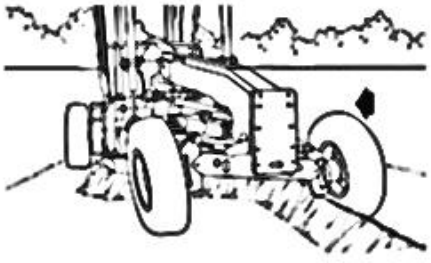






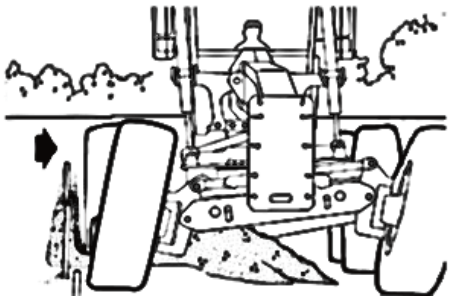
Position the moldboard angle according to the desired depth of the cut. Deposit the windrow outside the right-hand tandem wheels.

Lean the front wheels to the right to overcome the side thrust.



Articulate the frame to the left. If the drive wheels lose traction, reduce the articulation angle. This will decrease the cutting angle and side thrust allowing the drive wheels to regain traction. Deposit the windrow between the tandem wheels. Spread the windrow over the new surface until it is smooth.

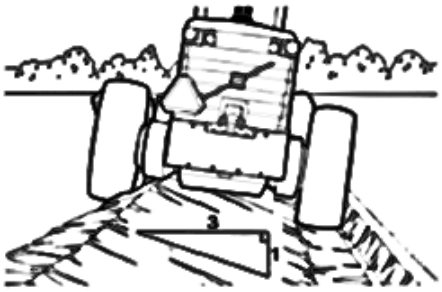
ROAD CONSTRUCTION RIGHT-HAND ‘V’ DITCHING



Place a line of stakes to define where the ditch will be constructed.

Position the moldboard with the toe just outside the front right-hand wheel and the moldboard heel just ahead of the left-hand tandem wheels.

Tilt the moldboard back and raise the heel to carry the material inside the left-hand tandem wheels.



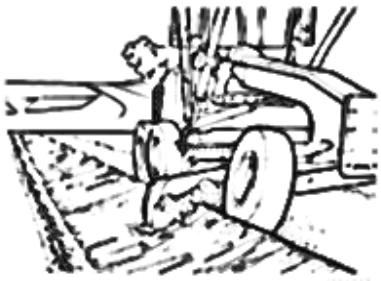
Lean the front wheels left to counteract side thrust.

Make the marking pass slowly.

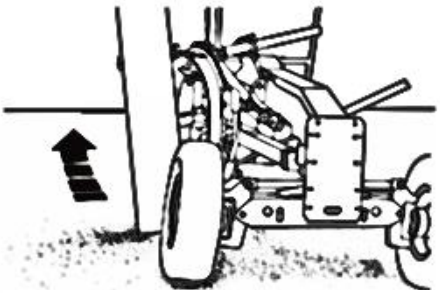
On a firm surface, keep the frame straight.

If the surface is loose, articulate the frame to keep the drive wheels on firm ground.

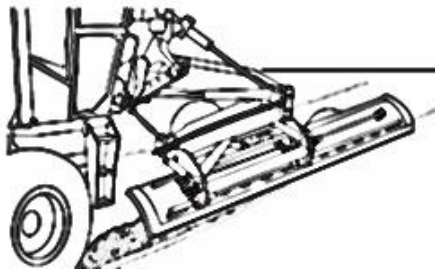
Make the second pass with the front right-hand wheel on the bottom of the first cut. Cut a 3 to 1 slope.



A clean-up pass may be required as the windrow builds up on the roadside. Side shift the circle towards the ditch. Carry the material well inside the toe of the moldboard to prevent spillage back into the ditch.



Cut the ditch back slope by using the blade lift system to move the moldboard to the right-hand side of the machine. Rotate the circle counter clockwise and lower the left blade lift cylinder while the circle is rotating.



Centre the moldboard heel in front of the right-hand tandem wheels. Drive the machine with the tandem wheels in the ditch. Deposit the material in the ditch.

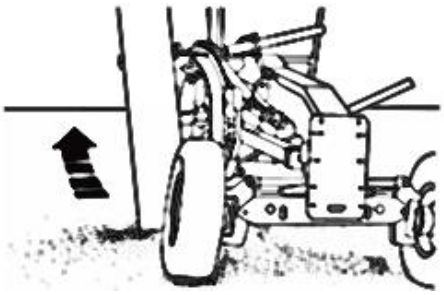
When you have completed the back slope procedure, position the moldboard to complete the clean-up pass. This spreads the windrow created by the back slope and builds up the road surface.

Repeat these procedures to cut the ditch on the other side of the road.

HIGH BANK CUTTING

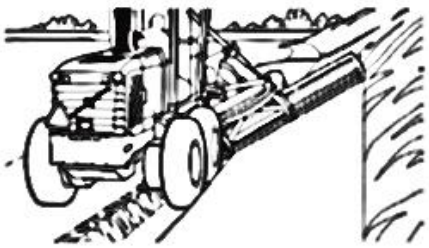
Establish a level platform surface for machine operation.

If the platform surface is hard, make a pass cutting into the platform. This pass should slope slightly towards the bank to stop the machine from sliding away while cutting into the bank slope.



Prepare the machine for cutting the bank slope by side shifting the circle and moldboard as far as possible to the side of the machine where you will be working.

Rotate the circle and moldboard counter clockwise and lower the left blade lift cylinder at the same time.



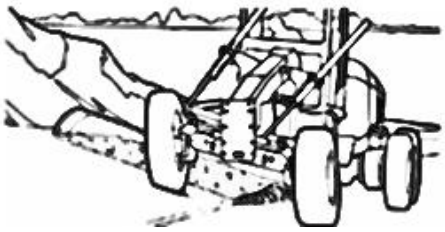
Lower or raise the circle shift cylinder to position the heel of the moldboard at the bottom of the bank slope and aligned with the inner edge of the tandem wheels.

Move the machine slowly towards the bank. Check to see if the moldboard is angled correctly before actually cutting into the bank.

While cutting the slope, ensure the tandem wheels are near the base of the bank slope.

The depth of cut or degree of slope required can be accomplished easily by raising or lowering the moldboard, tilting the moldboard, or leaning the front wheels.

Keep the platform surface clean by moving the windrow after each pass on the bank slope.



On the level platform surface, articulate the front frame towards the bank slope and allow the front wheels to ride the bank slope and position the moldboard as required. The tandem wheels must be kept on the level platform surface.

FLAT BOTTOM DITCHING – GRAVEL ROADS

If no ‘V’ ditch exists, and cut a ditch to the desired depth.

The first step is to cut the ditch fore-slope.

With the frame straight, operate the machine with the right-hand wheels riding at the bottom of the ‘V’ ditch.

Position the moldboard toe behind the front right-hand wheel, and the heel outside and in front of the left-hand tandem wheels.

Tilt the moldboard forward.

Lower the moldboard toe to the bottom of the ditch.

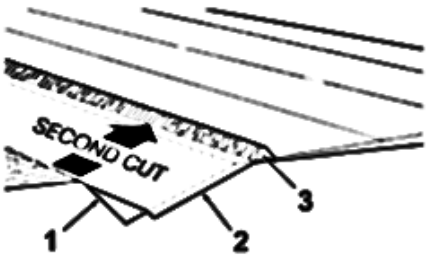
Raise or lower the heel to the required ditch fore slope and lean the front wheels to the left.

Deposit the material onto the shoulder.

1 Backslope 2 Foreslope

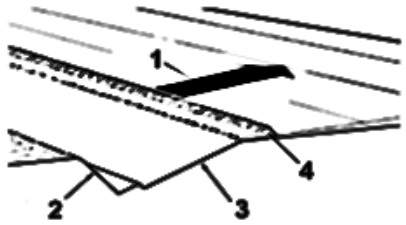
3 Windrow

Reposition the moldboard to cut a second ‘V’ ditch closer to the road and not as deep as the first ‘V’ ditch cut. Deposit the material onto the shoulder.



1 Backslope 2 Foreslope

3 Windrow

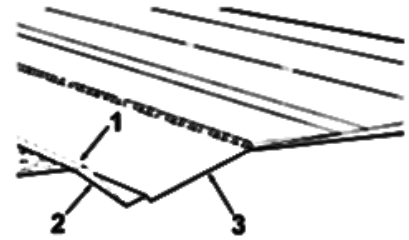


Reposition the moldboard to make a clean-up pass for the material built up on the road shoulder. Side shift the circle towards the ditch. Carry the material well inside the toe of the moldboard to prevent spillage back into the ditch.

Spread the material to the centre of the road to create a crown.

1 Spread out material 2 Backslope

3 Foreslope 4 Windrow



If the back-slope is insufficient or if you are building a new road, make a pass to cut the back-slope.

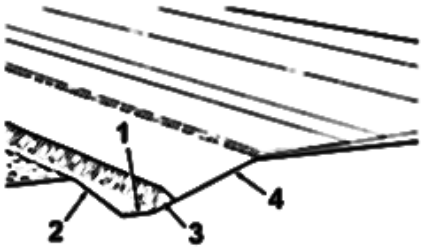
1

To begin a flat bottom cut, operate the machine with its right-hand side wheels riding in the first 'V' ditch cut.

Position the moldboard toe at the bottom of the ditch back-slope and the heel at the bottom of the ditch fore-slope.

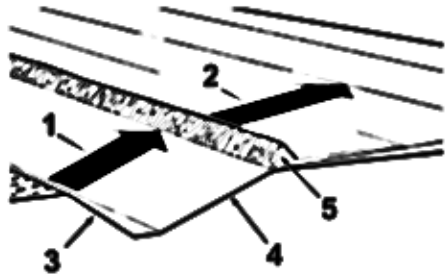
Tilt and lower the moldboard for the required depth.

Make a horizontal cut and lean the front wheels to the left.



1 Flat bottom cut 2 Backslope

3 Windrow



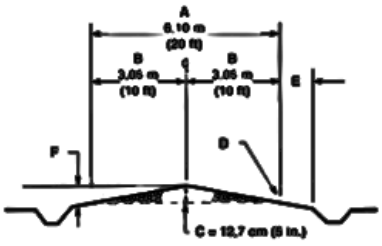
Reposition the moldboard to make a cleanup pass to spread the windrow created by the flat bottom cut up onto the shoulder.

Spread this material and finish the final grade.

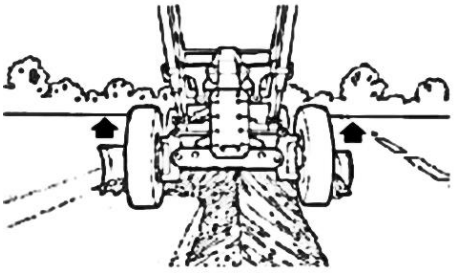
1 Clean-up pass 2 Spread out material

3 Backslope 4 Foreslope 5 Windrow

CROWNING A ROAD



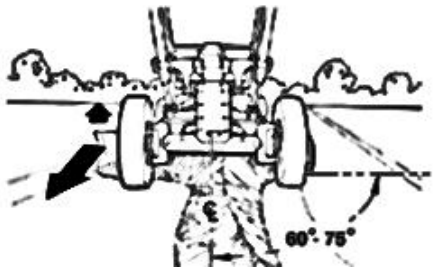
Crowning a road is simply constructing a road surface so that the centre of the road is higher than the road edge. This allows water to drain into the ditches as quickly as possible. If the crown is not built properly, water is trapped and breaks up the road crust to produce potholes and washboards. The amount of crown is the amount of slope on the road. For good drainage, a road should have a crown of 8–13 mm for every 305 mm (1/3–1/2 in. for every 12 in.) of width measured from the centre of the road to the outside edge where the road meets the shoulder.



After the ditches have been constructed, grade the excess material to the centre of the road, creating a windrow.

Position the moldboard parallel to the front axle.

Drive the machine straight down the centre of the windrow, keeping the moldboard high on the windrow to feather the material to both sides of the machine.

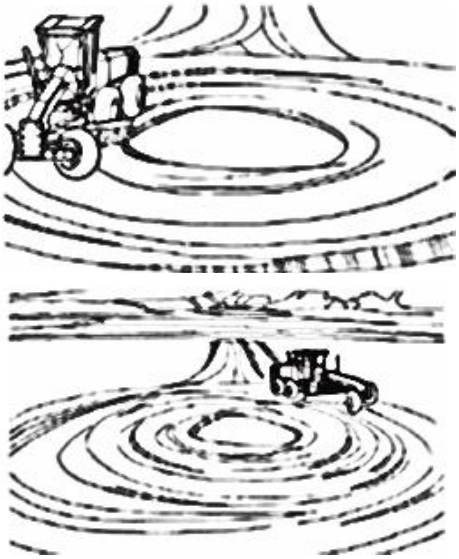


Construct the crown slope by tilting the moldboard forward and position it between a 60 and 75 degree angle. Place the transmission in a higher gear to increase your speed. Raise the heel of the moldboard slightly to allow the material to be feathered. Work both sides of the road constructing the slope at the same time.

When you reach the shoulders, align the heel of the moldboard with the tandem wheels to compact the excess material.

CUL-DE-SAC USING ARTICULATION

Start grading at the perimeter of the cul-de-sac in a circular pattern and work the material towards the centre. Angle the moldboard to deposit the material outside the tandem wheels.

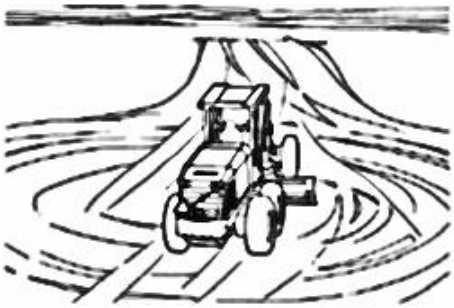


Articulate the frame and lean the wheels in the direction you are turning to increase steering control as you approach the centre of the cul-de-sac.

To begin the finished grade of the cul-de-sac, drive the machine opposite to the direction you were previously operating at the outside edge and form a windrow towards the centre.

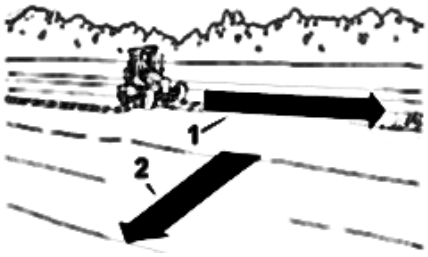
Tilt the moldboard forward and move the windrow towards the centre of the cul-de-sac.

Check the slope as you grade the windrow towards the centre, making the centre the highest point.



When you have completed circling, grade the excess material out the cul-de-sac entrance.

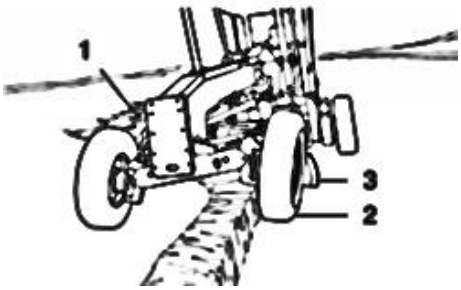
FINISHING A GRADUAL SLOPE USING ARTICULATION



Do not articulate the machine when operating on slopes or when roading the machine as this may cause the machine to roll over. Always articulate the machine before moving onto the slope.

1 Work across slope

2 Start from the top and finish at the bottom



If possible, it is best to start from the top of the slope and finish your grading at the bottom.

Work back and forth across the slope.

Always extend the moldboard down slope.

Articulate the machine.

1 Windrow deposited outside tandem wheels

2 Uphill front wheel

3 Moldboard toe

Lean the front wheels vertically and position the uphill front wheel on the edge of the windrow created from the previous pass. This provides stability and allows you to create an even grade.

Position the toe of the moldboard outside and behind the uphill wheel so that the heel of the moldboard deposits the material outside the downhill tandem wheels.

When you have completed grading the slope, spread the remaining material to make a smooth finished grade.

ROAD MAINTENANCE – GRAVEL ROADS

Check the road surface material. If it is dry, use water to dampen it. This results in a better finished surface.

Washboard road surface or potholes need reshaping because of the effects of weather and traffic. Reshaping involves cutting and re-mixing aggregates and fines.

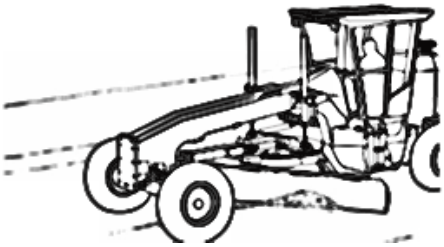
Start at the edge of the shoulder and cut the material into a windrow. Deposit the material towards the centre of the road and outside the tandem wheels.

Ensure that the circle is centred and the moldboard is angled at 30 degrees to the frame centre line.

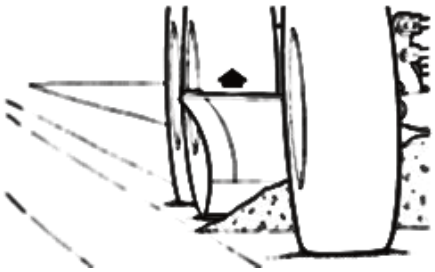
Tilt the moldboard back for maximum cutting to remove the ridges and potholes.

Lean the front wheels towards the heel side of the moldboard as you work towards the centre of the road.

Repeat these procedures for the other side of the road surface. – In general, tilt the moldboard forward for spreading material and back for ditching.



Build the road surface by moving half the windrow towards the shoulder. Feather the material over the road surface as you check the crown and work towards the shoulder with each pass.



As you make a final pass at the edge of the shoulder, raise the heel of the moldboard to feather the material and use the tandem wheels to compact any remaining material.

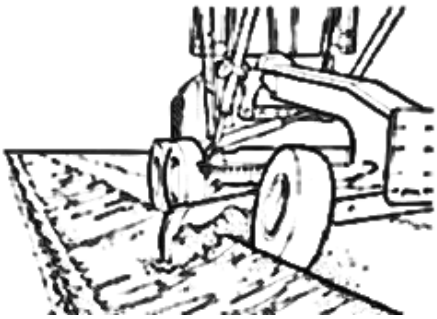
RIGHT-HAND DITCH CLEAN-UP

Position the moldboard toe behind the front right-hand wheel.

Lower the right-hand blade lift cylinder to position the moldboard to the depth of the ditch.

Move the left-hand blade lift cylinder to position the heel of the moldboard. This delivers the material onto the fore-slope between the tandem wheels without cutting the fore-slope.

Lean the front wheels slightly left to counteract side thrust.



For the next pass, reposition the moldboard as required to move the material up the fore-slope and onto the shoulder.

On the next pass spread the material to finish the shoulder grade.

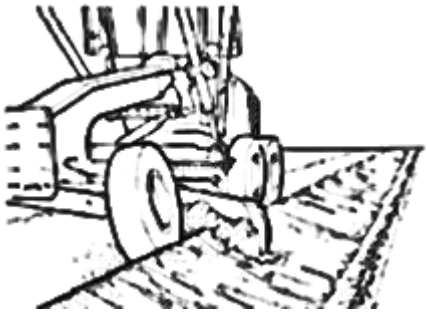
LEFT-HAND DITCH CLEAN-UP

Position the moldboard toe behind the front left-hand wheel.

Lower the left-hand blade lift cylinder to position the moldboard to the depth of the ditch.

Move the right-hand blade lift cylinder to position the heel of the moldboard. This delivers the material onto the fore-slope between the tandem wheels without cutting the fore-slope.

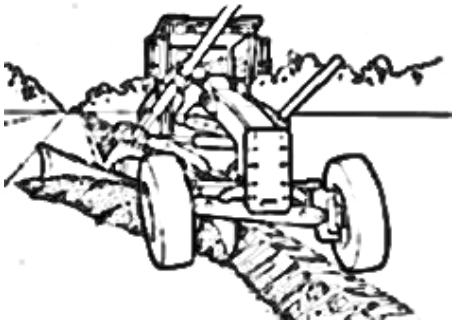
Lean the front wheels slightly right to counteract side thrust.



For the next pass, reposition the moldboard as required to move the material up the fore-slope and onto the shoulder.

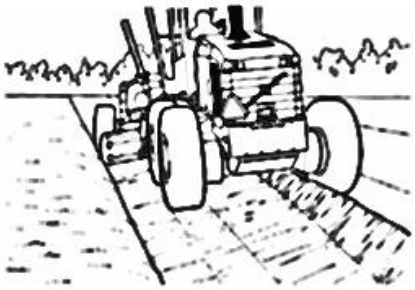
– On the next pass spread the material to finish the shoulder grade.

CLEANING A WET DITCH



Remove the articulation lock pin before attempting to articulate the machine. Install the articulation lock pin when not using the articulation function.

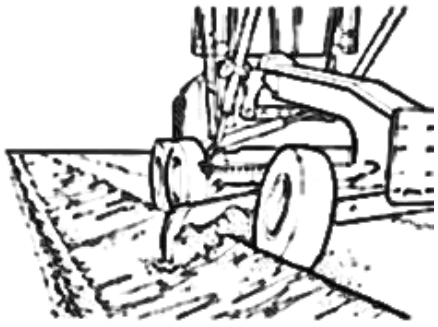
Articulate the machine so that the front wheels are in the ditch.



Keep the tandem wheels on the shoulder to prevent wheel slippage in the wet or soft material of the ditch.

Side shift the circle and drawbar assembly towards the ditch.

Tilt and angle the moldboard as required to move the material out of the ditch and to deposit it between the tandem wheels.



For the next pass, straighten the frame, side shift the circle and drawbar assembly and centre it under the frame. Position and angle the moldboard as required to spread the wet material over the shoulder.

DRAGGING A SHOULDER (RIGHT-HAND SIDE)

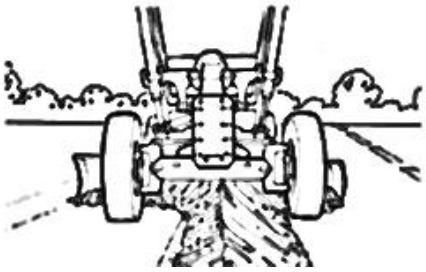
Check the material you will be grading. If it is dry, use water to dampen it. This results in a better finished surface.

Position the right toe of the moldboard in line with the outer edge of the front right-hand wheel.

Angle the moldboard 30 to 45 degrees from the centre line of the frame. Tilt the moldboard forward to drag the material, not to cut it.

Lean the front wheels to the left to counteract side trust.

Deposit the material outside the left-hand tandem wheels onto the edge of the road.



On the next pass, collect the windrow from the edge of the road and feather the material back onto the shoulder surface. Remember to adjust the moldboard to create a gentle slope towards the ditch.

Ensure that you clean up the road surface before allowing traffic to use the roadway.

Procedures and illustrations shown are for right-hand side grading. For left-hand side grading, lean the front wheels and position the moldboard opposite to the description and illustrations shown.

COMMON FAULT AND TROUBLESHOOTING

FAULT ANALYSIS AND TROUBLESHOOTING OF WORKING DEVICE

Problems	Possible causes	Remedy
Blade rotary frame rotates automatically when loaded.	Damage of seals of rotary cylinder, which results in bypass of hydraulic oil circuit	Replace the seals
	Wear of rotary valve group of multiple valve	Replace rotary valve group of multiple valve
	Abnormal wear of rotary valve spool	Replace rotary valve
	Leakage of pipeline	Replace the corresponding pipe
Blade rotary frame can't rotate or rotate unsmooth.	Stuck of rotary mechanism	Clear away the dirt in the rotary mechanism; Adjust the clearance of rotary frame
	Drive shaft of rotary valve is damaged. Gear of rotary valve is damaged. Drive shaft of rotary valve slides with gear of rotary valve	Replace drive shaft of rotary valve. Replace gear of rotary valve
	Rotary drive gear is damaged	Replace rotary drive gear
	Rotary drive arm and spline of rotary gear are damaged	Replace rotary drive arm or rotary gear
	Pipeline between rotary and rotary cylinder is connected wrongly	Readjust
	Oil level in hydraulic tank is too low.	Fill oil to required level.
	Seals of left and right rotary cylinder are damaged	Replace the seals
	Setting pressure of multiple valve is not correct	Reset it
	Safety valve of multiple valve cannot maintain the required pressure	Replace the multiple valve and put the spring in to the valve
	Guide nylon is worn or with small clearance.	Replace the guide nylon or adjust the clearance

The direction of blade rotary frame is not in accordance with the direction on the operation handle.	Position of spool of rotary valve is wrong.	Adjust the spool of rotary valve and turn it 180°
Blade rotary frame can only rotate along one direction.	Spool of rotary valve is adjusted wrong.	Readjust the he corresponding position between rotary and cylinder
Shaking when blade is working.	The clearance between drive gear and gear ring of rotary frame is too big.	Adjust the clearance
	The clearance between the axial direction and radial direction of rotary frame is too big.	Adjust the clearance between the axial direction and radial direction of rotary frame
	Guide sleeve and bushing of blade tilt frame is damage.	Replace guide sleeve and bushing of blade tilt frame
	Pouring nylon board on the blade is abnormal or broken.	Replace the wear-resisting plate
	Blade tilt cylinder leaks internally or O function of multiple valve is stuck or fails.	Replace seals or cylinder or the multiple valve group
Working device falls down.	Balancing valve of blade lifting cylinder is damaged or stuck so as it fails.	Replace balancing valve

TRANSMISSION SYSTEM

Problems	Possible causes	Remedy
Shifting pressure of every gear is low.	Safety valve gets stuck or spring is broken	Check and repair the transmission control valve
	Pipes leaks oil	Tighten the pipe joint
	Pump is damaged or has internal leakage failure	Replace pump
	Oil level is low	Fill the oil to required
	Filter is clogged	Replace the seal, and clean the filter
	Control pressure valve gets stuck	Replace filter, and clean the filter
	Oil seals of clutch leak	Replace with new seals and seal bases
Shifting pressure of a certain gear is low.	Shifting valve gets stuck	Clean the hydraulic control valve
	Seal rings of fixed shaft lose efficacy	Replace the seals
	Internal leakage of clutch	Disassemble and check the clutch
Unable to engage a gear.	Oil supply is insufficient or leaked	Fill oil
	Transmission oil pressure is too low	Measure the pressure or replace pump
	Brake is adjusted incorrectly or brake is not relieved fully	Readjust brake
	Short circuit of brake pressure sensor	Replace the sensor and the wires
	Wire of solenoid valve is disconnected or damaged	Replace the solenoid valve
Gear mixing of transmission box.	Signals of electric handle are not right	Examine the shifting signals according to station table of shifting solenoid valve
	Short circuit or burn of solenoid valve	Measure and replace solenoid valve
	Shifting spool of hydraulic control valve gets stuck	Disassemble, check and clean solenoid valve
	Shifting clutch is burnt out	Disassemble and check clutch according to station table of shifting

		solenoid valve
Overheating of torque converter of transmission box.	Water tank and oil radiator are blocked or damaged	Clean the water tank and oil radiator
	Oil is too dirty or deteriorated	Replace oil and filter
	Pressure of converter valve is abnormal	Test the outlet pressure of converter
	Sliding of clutch	Examine the gear shifting pressure
	Transmission oil supply are not enough or too much	Check oil level at idle engine speed

HYDRAULIC SYSTEM

Problems	Possible causes	Remedy
Control lever can reset automatically.	Reset spring is too soft or broken	Replace the reset spring
Flow is too small or pressure is abnormal.	Hydraulic oil level is too low	Fill the hydraulic oil to required level
	Oil filter is blocked	Clean and replace
	Pipeline is blocked	Clean and replace
	Pressure of multiple valve is not correct	Test the pressure of multiple valve and adjust
	Spring of safety valve is broken	Replace
	Internal leakage of working pump	Replace
Swing of front wheel	Hydraulic lock of tilt cylinder of front wheel is damaged	Replace hydraulic lock

BRAKE SYSTEM

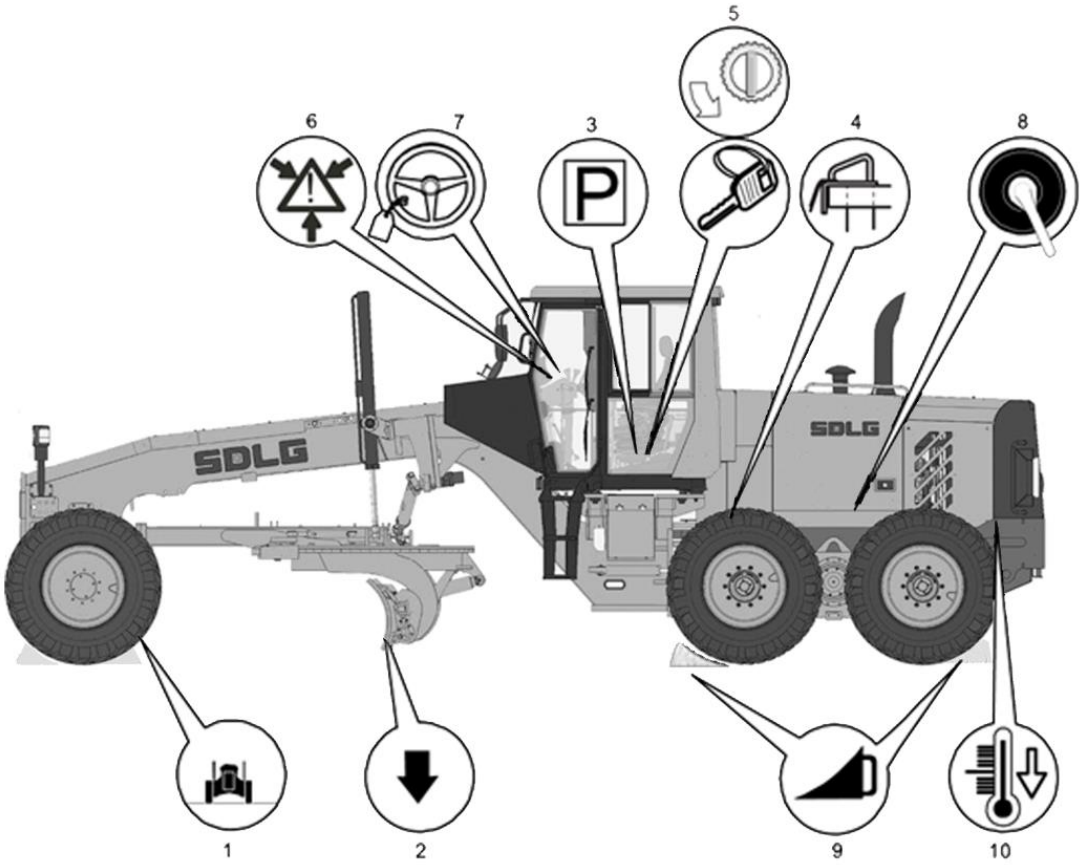
Problems	Possible causes	Remedy
Brake is powerless or malfunctioned.	Brake cylinder is stuck or leaks internally	Clean brake cylinder or replace it
	High pressure spool is blocked	Clean and replace the filter spool.
	Brake pipeline is blocked	Clean the brake pipeline
	Accumulator leaks and the pressure is not enough	Replace the accumulator
	Abnormal wear of brake friction plates	Replace the brake shoe assembly
	Brake valve is stuck	Clean brake valve
	Prefill valve is stuck	Clean and replace oil prefill valve
	Brake system is infiltrated with air	Bleed the air out
	Pipe joints of brake system leak	Tighten the joints and replace the seals
	Seals of brake pump leak	Replace the seals
	Internal leakage of brake pump	Replace brake pump
Brake can’t be relieved	Oil returning pipeline is blocked, which causes high oil returning back pressure, the brake cylinder cannot work normally in this case	Clean oil returning pipeline or replace it
	Brake reset spring is broken	Replace the reset spring.
	Spool of brake valve is stuck	Clean and replace the spool of brake valve

MAINTENANCE

SAFETY RULES FOR MAINTENANCE AND REPAIR

1. Perform the maintenance on hard and level ground.
2. Lower the work device on the ground.
3. Engage the parking brake control to set the grader in the parking brake condition.
4. Lock the hinged steering mechanism with frame locking bar.
5. Shut down the engine, unless the maintenance or repair requires running engine.
6. If the working device has to be suspended in the air, then fix it firmly.
7. Fix the hanging objects above the grader.
8. If the pressure of hydraulic system is not released, do not tighten any hydraulic pipe joint.
9. Keep the mud guard clean to prevent slipping and hurting people.
10. After the maintenance or repair, recover all fasteners (cotter pin, spring washer, etc.).
11. It is not recommended to perform any maintenance or repair with engine running. If the engine has to be running under special circumstance, never get close to high-speed rotating and high-temperature components.

MAINTENANCE POSITION



1	Align the front wheels	2	Place all working devices on the ground.
3	Set the machine in parking station	4	Lock the front and rear frames
5	Shut down the engine and remove the key	6	Release the pressure of hydraulic system and pay attention to safety
7	Hang a warning sign on the steering wheel	8	Disconnect the vehicle power supply
9	Lock the wheels in a suitable way (For example, use wedges to block grader tyres)	10	Machine cooling

MAINTENANCE GUIDELINES

Read following information carefully before carrying out maintenance and inspection.

PRECAUTIONS BEFORE MAINTENANCE

1. Perform the maintenance on hard and level ground.
2. Set all control levers/handles to the Neutral position.
3. Set the machine in parking station.
4. Wedge the tires with blocks.
5. Lock the front and rear frames with frame locking bars.

USE WARNING TAGS

Hang a do-not-start-engine tag near the ignition switch before performing maintenance or repairs to prevent inadvertent engine or machine movements.

USE GENUINE PARTS

It is highly recommended to use only genuine parts specified by the manufacturer.

USE HIGH QUALITY AND PREMIUM SPECIFICATION OILS AND FUELS

Use oils and fuels specified in this manual and according to local ambient temperatures and machine use conditions.

USE CLEAN FLUID CONTAINERS FOR OILS AND FUELS

Keep containers of oils and fuels clean and make

certain to use specified oils and fuels.

KEEP THE MACHINE CLEAN

Always keep the machine clean. Keep grease fittings, pipe joints, oil level gauges, and fluid fill caps/openings clean to prevent foreign materials from entering these systems.

PAY ATTENTION TO HIGH-TEMPERATURE OIL AND COOLANT

It is very dangerous to drain hot oils or engine coolant, or to remove the filters immediately after the engine stops. Make sure the engine is cooled down to ambient temperature. Always drain oils when they are at temperatures of approximately 68~104°F (20~40°C), as this will ensure complete system drainage. If the oil temperatures are lower than this temperature, it is recommended to warm it up to this temperature before draining it.

INSPECT THE OIL AND FILTERS

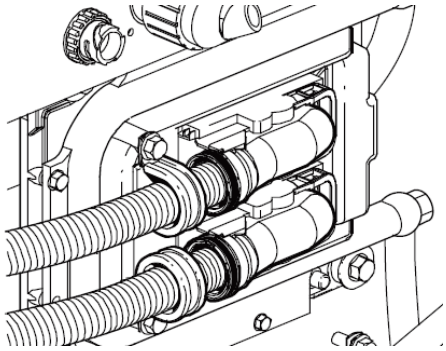
After any systems oils are changed or filters are replaced, inspect the oil and filters. If large amounts of metallic particles or impurities are found, investigate and repair.

RETAIN THE FUEL FILL STRAINER

Do not remove the fuel strainer while fueling.

PRACTICE CLEAN OIL CHANGING

Change oil in a dust-free place to keep impurities and contaminants out of the oil.



WELDING GUIDE

Turn off the starting switch of the engine, and the main battery switch, and remove the battery cables from their terminals.

Keep the distance between the grounding cable line and welding area no more than 39in (1m).

Avoid welding near seal rings and bearings.

Never weld any pipe or take that has fuel or oil in them.

Cut off the ECU with machine electronic system.

FIRE PREVENTION

When cleaning any parts or components, use non-flammable cleaners or light oil. Keep sparks and cigarette lighters away from them.

SEALS

When replacing O-rings or gaskets, clean the sealing faces first, and make sure the O-rings and gaskets are in the correct assembly position.

INSPECT THE FRONT AND REAR FRAMES, AND THE CENTER JOINT

After a long period of operation in rocky conditions, check for damage of the undercarriage, frames, center joint, and for loose or damaged bolts and nuts.

PRECAUTIONS TO USE WHILE WASHING THE MACHINE

Do not wash the machine with a hot or warm engine. Let it cool down.

Do not allow water to spray on any electrical components.

MACHINE CLEANING AFTER INCLEMENT WEATHER OPERATIONS

Clean the machine immediately after working in rain and snow. Lubricate and coat anti-rust oil to components

ENVIRONMENTS WITH AIRBORNE CONTAMINANTS

Do the following when the machine works in conditions with airborne dust or chemicals:

Inspect and clean air filter frequently to avoid restricted inlet air.

Clean the radiator frequently to avoid blockages and overheating.

Clean and replace fuel filter frequently.

Clean the electric components, especially the starting motor and alternator to avoid accumulation of dust affecting dissipation of heat.

AVOID USING MIXED OIL

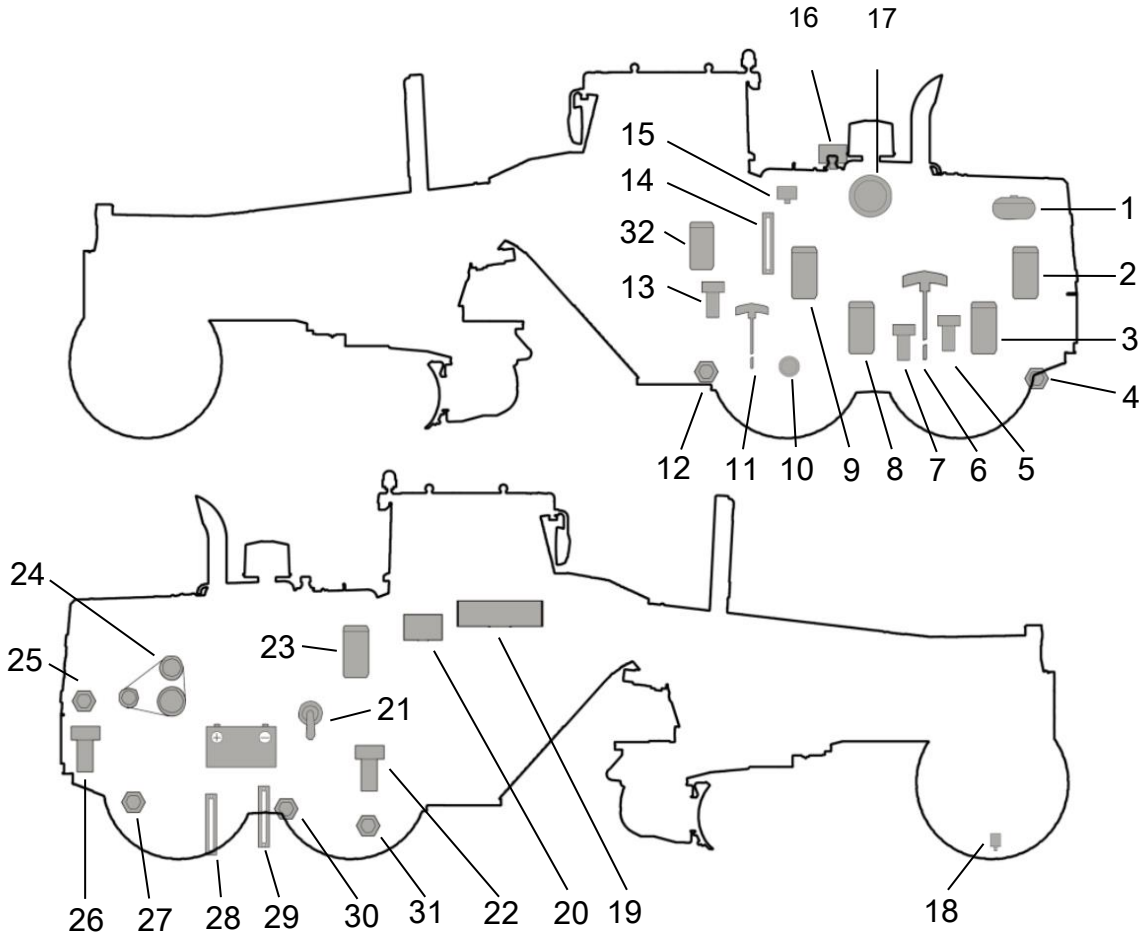
Never use oil mixed from different brands. If using a different kind of oil from the one previously used, drain the oil from the machine, and fill with the new brand oil completely.

PROTECT THE ENVIRONMENT AND SAVE ENERGY

In the process of maintenance, the waste oil and scrap

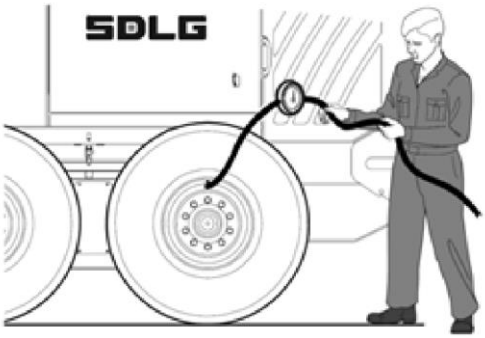
parts should be recovered and concentrated, and the mark should be made for the two times.

SERVICING POINTS OF THE WHOLE MACHINE



1	Coolant level, fill	12	Transmission oil drain	23	Hydraulic oil suction filter element
2	Coarse fuel filter	13	Transmission oil filler	24	Engine belt
3	Oil filter	14	Hydraulic oil level	25	Coolant water drain
4	Fuel drain	15	Replacement of hydraulic oil tank breather	26	Fuel filler
5	Engine oil filler	16	Drive axle, transmission breather	27	Engine oil drain
6	Engine oil stick	17	Air filter	28	Balancing box oil level of drive axle
7	Rear axle final drive filler	18	Tyre pressure	29	Final drive oil level
8	Fine fuel filter	19	Cab return air filter element	30	Final drive oil drain
9	Brake high-pressure filter element	20	Cab fresh air filter element	31	Drive axle balancing box oil drain
10	Rear wheel rim nut	21	Master power switch	32	
11	Transmission oil stick	22	Drive axle balancing box filler	33	

TYRE



Tyre inflation

Inflating the tyre may cause tyre explosion. Therefore, it is necessary to use a long enough hose with a self-locking pneumatic chuck when inflating tyres. During inflation, ensure that there is no one or no one passes in front of the rim.

Tyre maintenance

Repairing or welding a rim equipped with a pneumatic tyre may cause rim rupture or tyre explosion. Therefore, the repair of tyres and rims must be carried out by trained maintenance technicians.

Some requirements for tyre inflation are as follows

1 When checking the air pressure, the machine is unloaded and the wheels are cold

2 All irrelevant personnel should stay away from dangerous areas (in front of rim)

3 It is necessary to use a long enough hose with a self-locking pneumatic chuck

4 The spare tyre should be flat and fully inflated.

5 Do not inflate if the machine has been operated under the condition that the tyre pressure is less than 80% of the specified pressure, or the tyre and rim are obviously damaged.

ENGINE

WARNING

In the replacement of oil and oil filter should pay attention to the safety, engine oil may be at a higher temperature, so as to avoid damage to the body.

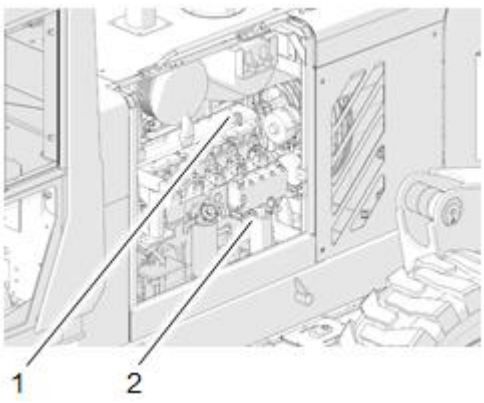
Don't exhaust the engine oil in cold state. Because in the cold state, the impurity particles suspended in the oil have been deposited to the bottom of the oil pan and attached to the internal surface of the oil pan, cannot be discharged with the oil temperature, oil temperature, is conducive to the suspended particles in the oil in the oil discharge.

Properly handle the old oil and protect the environment!

CHECK THE OIL LEVEL

WARNING

Check the oil amount must be in operation before or after the engine is closed for 15 minutes.



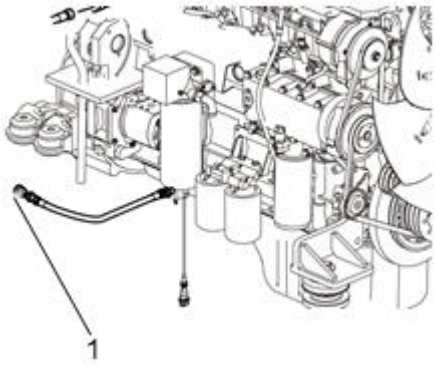
1. Engine oil filler
2. Engine oil stick

1. Grader will be parked in a flat place, the gear lever is placed in neutral position, set the machine in parking station, the front and rear tire placed block.
2. Open the door on the right side of the engine hood cover.
3. Pull out the dipstick, wipe the plug back in place after the net (end), and then pull it out to check (at least 2 times).

4. If the oil level is lower than the dipstick limit (the "Min" or "add") scale line, need to add oil; if oil is higher than that of the oil dipstick limit ("Max" or "full") scale line, should identify the reasons and exclude; if oil between the oil dipstick limit ("Max" or "full") and lower (the "Min" or "add"), for the amount of oil, put it back on the oil dipstick, shut off the engine side cover.

REPLACEMENT OIL

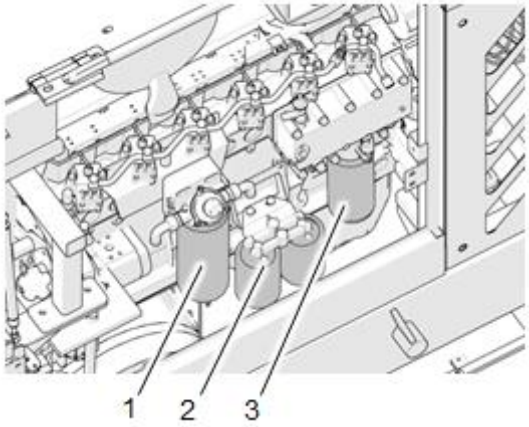
1. Grader will be parked on the flat ground, gear lever is placed in neutral position and the parking brake switch is pressed, the front and rear tires placed block, start the engine, idle running, until the oil temperature up to 20℃ to 40℃, the engine flameout.
2. Unscrew the oil drain plug in the back of the rear frame bottom, release the oil and fill it with the container.
3. Discharge old oil, oil drain plug screw



1. Oil drain plug

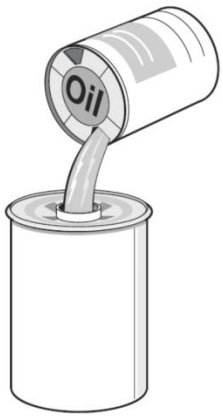
Warning : After discharge oil should check on the oil drain plug of the magnet is adsorbed run in iron, if is to remove iron, refitted with new oil. If the magnet adsorption abnormal iron, contact the maintenance personnel to analyze whether moving engine parts abnormal wear off and clear analysis of causes and take appropriate countermeasures to add new oil normal use.

4. From the mouth of the engine oil filler added provisions of oil, running in the idle the engine, check the oil filter and oil drain plug leaks.
5. The engine turn off about 15 minutes, let oil fully back into the oil pan, check the engine oil level again.



1. Fuel filter 2.Fuel fine filter

3. Engine oil filter



REPLACE OIL FILTER ELEMENT

Warning : After the replacement of the filter element, the engine must be run at least 1 minute at low idle speed to make sure that the engine has been lubricated before the operation.

Excessive mechanical seal screw may damage the thread or damage the oil filter element.

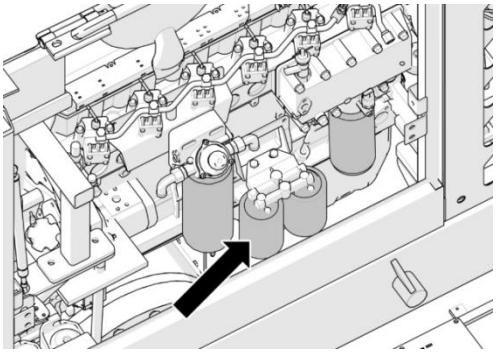
Properly handle the old oil and protect the environment!

1. Clean the oil filter in the vicinity of the installation seat area, use the filter to remove the filter cartridge.
2. Remove filter element.
3. Fill the container with oil.
4. Clean the sealing surface of the filter installation seat to make sure that all the old sealing pads have been cleaned; otherwise it will cause a bad seal.
5. The filter is filled with oil, rubber oil seal ring on dab.
6. Screw on the new filter element with the hand until it engages the washer.
7. Until the sealing ring is exposed to the base and then tighten the "1/2" or "3/4 to 1".
8. Check the oil level, oil pressure.
9. Start the engine and check the sealing pad has been sealed, if not, remove the filter element and

check the sealing surface.

ATTENTION: More oil filter replacement method for reference only, the actual filter on the instructions for the.

THE REPLACEMENT OF FUEL FINE FILTER ELEMENT



1. Clean the fuel filter in the vicinity of the installation seat area, use the filter to remove the filter cartridge.
2. Remove filter element.
3. Fuel tank.

ATTENTION: No fireworks.

4. Clean the sealing surface of the filter installation seat to make sure that all the old sealing pads have been cleaned, otherwise it will cause a bad seal.
5. Fill the fuel filter, a rubber sealing ring with a fuel.
6. Screw on the new filter element with the hand until it engages the washer.。

ATTENTION The new fuel filter replacement, pay attention to do not add no fuel filter through to the new fuel filter, to prevent clogging dirt inside the fuel injector.

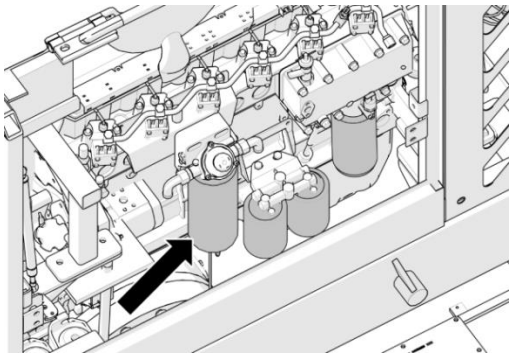
7. Until the sealing ring is exposed to the base and then tighten the "1/2 circle" or "1/2 ~ 3/4".
8. Check for leaks.
9. Start the engine and check the sealing pad has

been sealed, if not, remove the filter element and check the sealing surface.

ATTENTION: Above fuel filter replacement method for reference only, the actual filter on the instructions for the.

ATTENTION: Fuel system without bleed.

THE SINGLE STAGE FUEL FILTER CLEANING AND REPLACEMENT



1. Clip in the fuel line;
2. Coarse filter pan down;
3. Screw down the oil bolt, release fuel;
4. Screw down fixed bolt, remove filter housing and filter element;
5. Clean filter block of sealing surface and filter housing;
6. Into the new sealing ring and the filter element (when needed);
7. Filter the filter element into the filter housing and filter out the 3cm of the filter housing;
8. Filter housing, filter and sealing ring into the filter seat, with the bolt fixed (tightening torque 25Nm);

ATTENTION sealing pad must be positioned on the! Tighten the bolt;

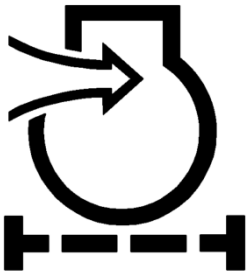
9. Open circuit;
10. Check leaks after starting engine.

THE SINGLE STAGE FUEL FILTER / WATER GAS TO DISCHARGE WATER：

1. Coarse filter pan down;
2. Unscrew the bolt, pay attention to the flow of liquid, from the water into fuel, tighten the bolts ;
3. Check leaks after starting engine.
4. Bleeding:
5. Open oil circuit;
6. Start engine, run for about 2 minutes;
7. Coarse filter pan down;
8. Loosen the bleed screw, bleed until the bubble disappears, the fuel flow out;
9. Tighten the bleed bolt (tightening torque 15Nm);
10. Check leaks after starting engine.

ATTENTION. When working on the fuel plant, open fire, prohibit smoking, and properly dispose of waste fuel!

AIR INTAKE SYSTEM



The intake air quality has a great relationship with the working environment and the size of the air filter. If there is too much dust, the coarse filter should be added. Therefore, the cleaning interval cannot be generalized and should depend on the conditions.

If it is a dry air filter, cleaning is necessary only when the service indicator viewing window on the air filter shows red or the air filter blocking indicator on the instrument panel is on.

The air filter shall be cleaned under the following conditions:

Red indication can be seen in the service indicator

The air filter blocking indicator on the instrument panel is on (when the engine is running)

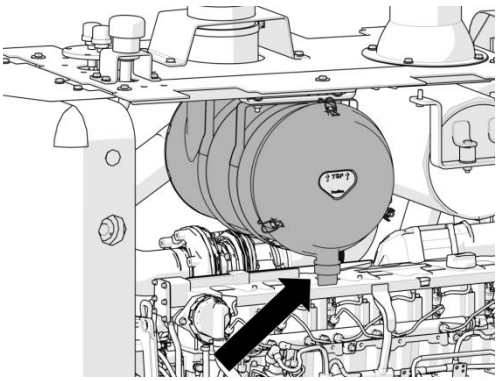
CLEAN OIL BATH AIR FILTER (IF OIL BATH AIR FILTER IS OPTIONAL)

1. Stop the vehicle for 10 minutes to let the oil flow down;
2. Loosen the snap ring, take off the oil cup and filter, be careful not to damage the washer;
3. Pour out the dirty oil and sludge and clean the oil cup;
4. Immerse the filter element in diesel oil to clean and dry it to remove the oil;
5. Clean up the air filter housing;
6. Check the rubber ring and replace it if necessary;

7. Fill the oil cup with oil to the scale indicated by the arrow;

8. Install the oil cup and filter element back into the housing and tighten the bolts

NOTE: The filter element cannot be washed with gasoline, and the used engine oil should be properly disposed of!

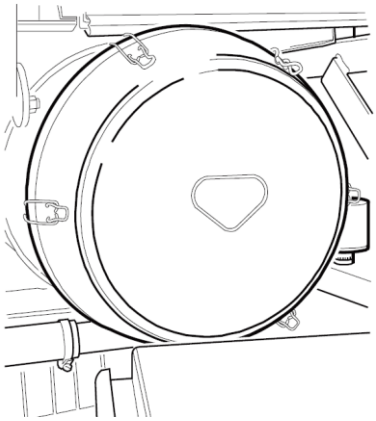


CLEAN THE DUST DISCHARGE NOZZLE OF DRY AIR FILTER

1. Press the dust discharge nozzle as shown by the arrow to discharge dust.

2. Clean the dust discharge nozzle regularly.

3. Press the upper parts of the dust removal opening together to remove caked dust.



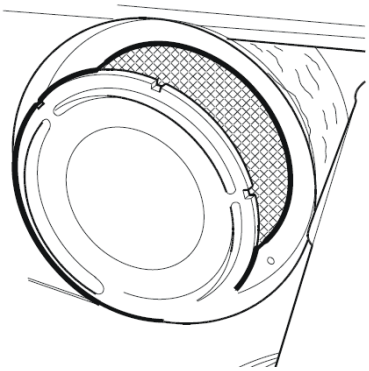
CLEAN AND REPLACE FILTER ELEMENT

1. Loosen the snap ring;

2. Remove the filter cartridge cover and take out the filter element;

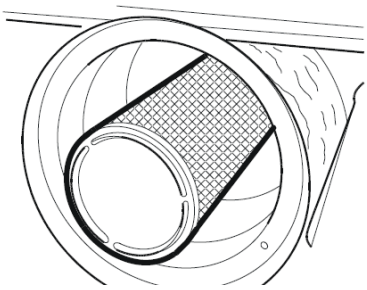
3. Clean the filter element and replace it at least once a year;

4. Clean the filter element:



Compressed air is blown from inside to outside (with the maximum pressure of 5bar), or tapped lightly (only when it's necessary), taking care not to damage the filter element, and the filter element can be cleaned according to the manufacturer’s instructions.

Check the filter paper of the filter element and replace



it in time if it is damaged (transparent).

Check the sealing performance of the sealing ring, and replace it in time if it is damaged.

5. After cleaning for 5 times or up to 2 years, the safety filter element must be replaced (which cannot be cleaned).

6. The following steps should be followed during the replacement:

Take out the used filter element;

Install a new filter element and tighten it;

Install the filter element, put it back into the cover and clamp the cover tightly.

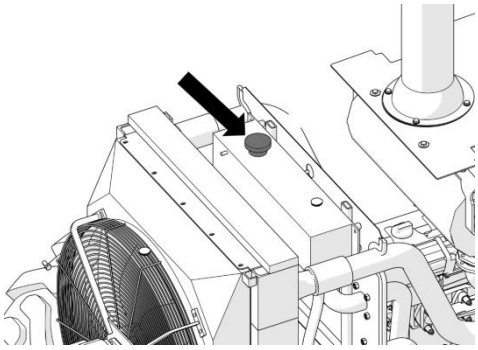
NOTE: Do not clean the filter element with gasoline or hot water!

COOLING SYSTEM

CLEAN THE COOLING SYSTEM

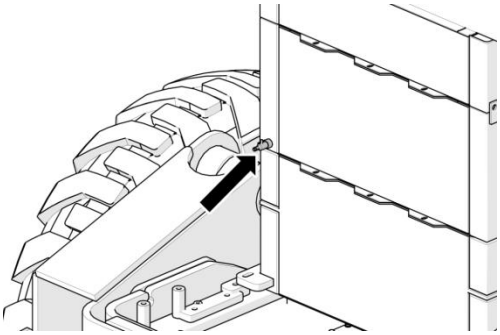
DANGER

At the operating temperature, the engine coolant is hot and under pressure. Steam can cause personal injury. The coolant level can only be checked after the engine stops working and the radiator cap is not hot to be touched. Slowly unscrew the radiator cap to relieve the pressure. Avoid contact of coolant with skin and eyes to prevent personal injury.



Coolant filler

1. Slowly loosen the radiator cap to relieve the pressure, and then remove the cap.
2. Unscrew the water drain valve on the radiator.
3. If there is a water drain valve on the engine body, unscrew the water drain valve on the engine body. Drain all coolant from the cooling system.



Coolant drain

4. Tighten the water drain valve
5. Fill the cooling system with commercial cleaning solution, or cleaning solution prepared by mixing 1kg of sodium bisulfate (NaHSO4) with 40 L of water. Start and run the engine for 30 minutes, and then stop the engine and drain the cleaning solution. Flush the cooling system with clean water until the drained water is clean.

NOTE! Do not run the engine during flushing.

7. Tighten all water drain valves Fill the system with neutral solution or the solution prepared by mixing

250g of crystalline sodium carbonate (Na2CO3+10H2O) with 40L of water.

8. Start and run the engine for 10 minutes, and then stop the engine and drain the neutral solution.

9. Flush the cooling system with clean water until the drained water is clean.

NOTE! Do not run the engine during flushing.

10. Tighten all water drain valves

11. Fill the engine with clean water. Run the engine for 10 minutes, and then drain the water. Repeat the above procedure until the drained water is clean.

12. Fill the engine with coolant. During filling, in order to prevent air resistance, it can be carried out at a speed not higher than 19L per minute.

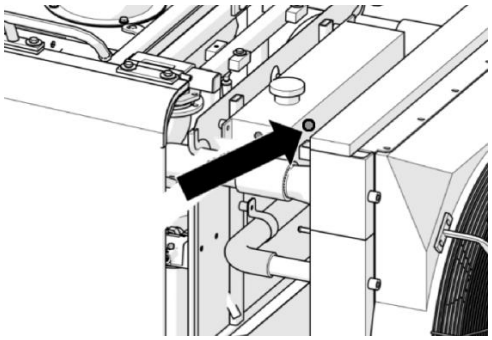
REPLACEMENT OF COOLANT

ATTENTION：

In the working temperature, engine coolant is hot and has pressure. Steam can cause personal injury. Only after the engine stops working, and don't feel hot, touching the radiator cover, can you check the coolant level. Slowly unscrew the radiator cover to release pressure. Coolant should avoid contact with skin and eyes, in case of personal injury

Replace the coolant once every 2000 working hours or a year, the first time shall prevail.

1. Slowly unscrew the radiator cover to release the pressure, and then remove cover.



Coolant level hole

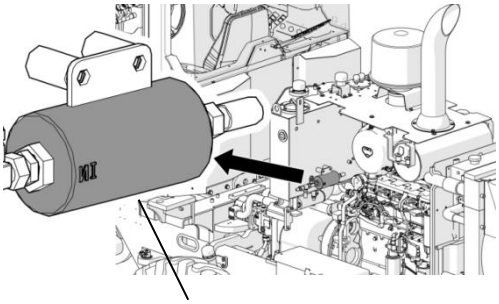
2. Unscrew the water drain valve on the radiator.
3. Unscrew water drain valve on the engine body.

   If the engine is equipped with gearing oil cooler, air compressor pump (water cooling), you should also unscrew the oil cooler and the water drain valve of air compressor pump. Drain out all cooling fluid in the cooling system
4. According to the requirements of the above, clean the cooling system.
5. Refill coolant from radiator cover.
6. Coolant level is 10~15mm away from the bottom of the radiator cover.
7. Before the radiator cover is not covered, start the engine; after liquid surface is stable, according to the need, fill the cooling fluid.
8. Stop engine, and tighten the radiator cover. Check and tighten all water drain valves again.

MAINTENANCE OF SUPERCHARGER

Turbochargers and turbo engine have a close relationship in performance; the change of the performance of the supercharger, will directly affect the engine performance; in order to make the supercharged engine keep good comprehensive performance, as the engine, supercharger must be used in a right way and has a good maintenance in the process of using. Because the leakage of joints in the inlet and outlet system will affect the work of the supercharger, the user must often check the fastening of the external joints.

BRAKE SYSTEM

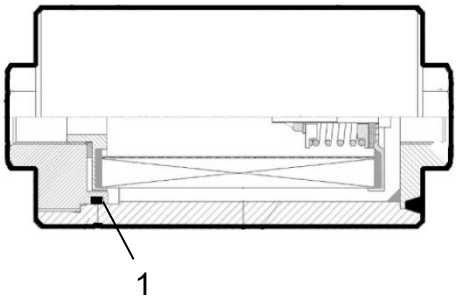


1 Brake high-pressure filter

REPLACEMENT OF HIGH-PRESSURE FILTER

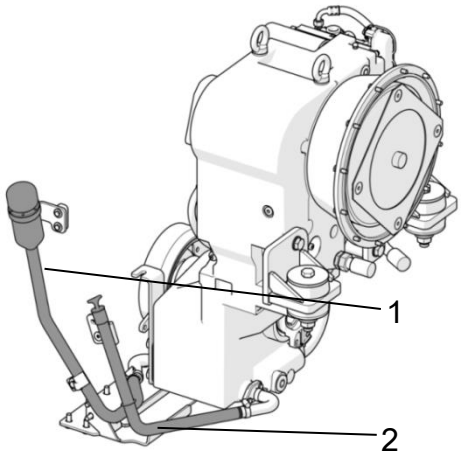
1. Remove the filter housing.
2. Replace internal filter element.

NOTE! Replace the O-ring while replacing the filter element.



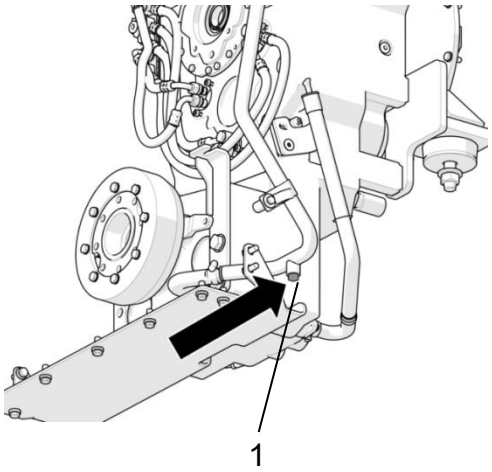
1 O-ring

TRANSMISSION



1 Transmission gear oil filler

2 Transmission oil stick



1 Transmission oil drain plug

Oil level inspection of transmission oil

1. Park the vehicle on flat ground, place the gear control lever in the neutral (“N”) position, pull up the parking brake handle, and place stops in front of and behind the tyres.

2. Start the engine, run at idle speed (about 800r/min), loosen the oil stick at the oil filler of the left transmission, take it out and wipe it clean.

3. Insert the oil stick into the oil level pipe and tighten it. Take it out after it is in place (at least twice).

4. When the oil temperature is about 40°C, the oil level should be between the lower scale and the middle scale.

5. When the oil temperature is about 80°C, the oil level should be between the upper scale and the middle scale.

6. If the oil level is not within the specified scale range, please add the specified hydraulic transmission oil or drain the excess oil.

NOTE: If the used oil is found to be dirty, the oil should not be added directly. The coarse filter on the side should be taken out and cleaned. If a large amount of metal powder or fragments is found, please contact the maintenance personnel.

Install the disassembled parts in turn, add a small amount of hydraulic transmission oil, start the engine,

run at idle speed for 3～5 minutes, drain the oil from the oil pan, and add the specified oil again.

REPLACEMENT OF TRANSMISSION OIL

DANGER

As hydraulic transmission oil is at a high temperature, it's necessary to wear protective equipment and operate carefully to avoid personal injury.

1. Park the vehicle on flat ground, place the gear control lever in the neutral ("N") position, shut down the engine, pull up the parking brake handle, and place stops in front of and behind the tyres.

2. At the working temperature of the transmission, unscrew the oil drain plug at the bottom of the front of the transmission to drain the oil, and use a container to hold it.

NOTE: When draining oil, not only should the oil in the transmission be drained, but also the oil in the converter oil radiator should be drained.

3. Drain the used oil, clean up the oil stain on the oil drain plug, the housing sealing surface and the transmission body, and install it together with the new sealing ring.

4. Remove the cover plate on the left side of the rear frame, unscrew the oil filler cap on the left side of the transmission, inject the specified hydraulic transmission oil, and screw the oil filler cap.

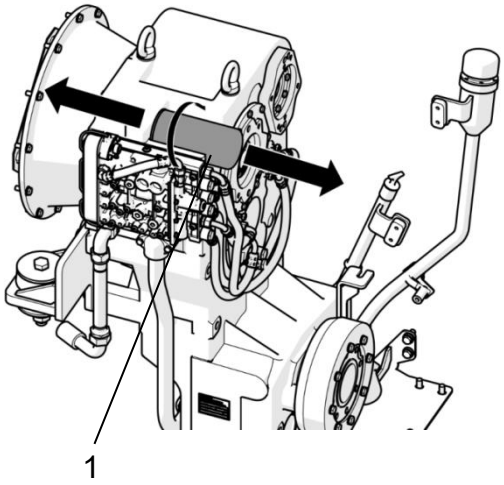
5. Start the engine and run it at idle speed. Add oil to

the range between the lower scale and the middle scale.

6. All gears are selected once.

7. Check the oil level again and refill if necessary.

REPLACEMENT OF HYDRAULIC TRANSMISSION OIL FILTER



1. Transmission filter element

1. Place a container under the transmission oil filter. Use a filter wrench to remove this filter.

2. Install a new filter. Apply new oil to the filter seal. Tighten the filter according to the instructions on the filter.

Dispose of the filter and oil in an environmentally friendly manner.

Cleaning transmission oil suction strainer

Clean the oil suction strainer every 1,000 hours.

The oil suction strainer is located at the bottom of the transmission case.

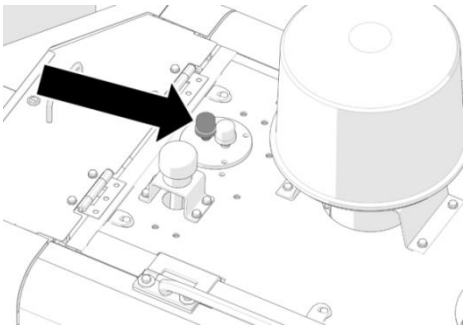
1. Remove the cover and the oil suction strainer. Clean the components. Check and confirm that there are no components indicating bearing failure or similar conditions.

2. Install the oil suction strainer and a new gasket between the cover and the transmission.

3. Reinstall the cover.

REPLACEMENT OF TRANSMISSION BREATHER

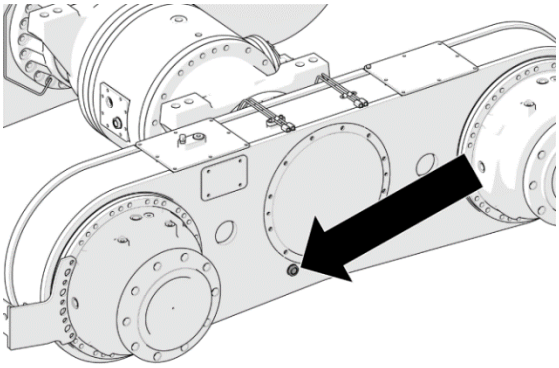
At the same time of replacing the gear oil of the transmission, it is required to replace the transmission



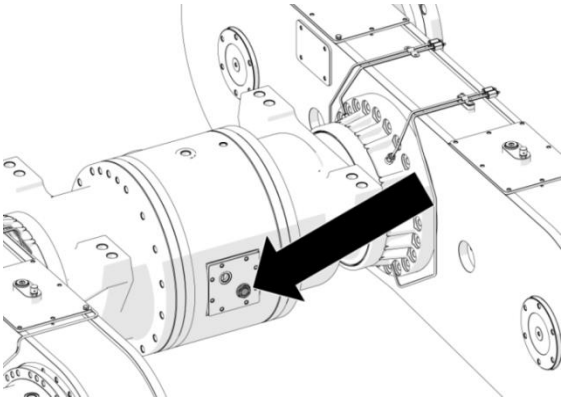
breather.

At the same time of replacing the gear oil of the transmission, it is required to replace the transmission breather.

DRIVE AXLE



Balancing box oil level observer hole

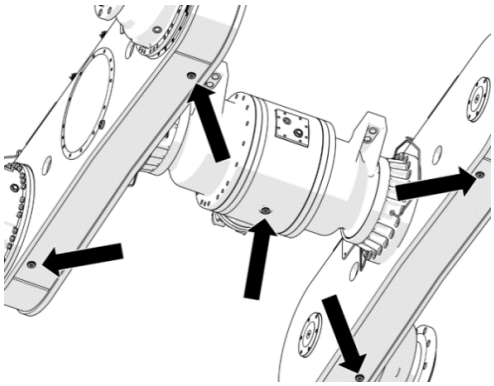


Final drive oil level observer hole

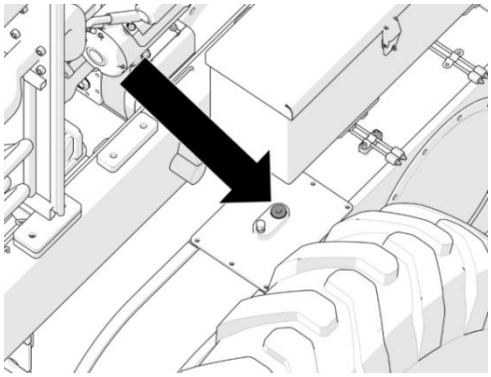
The oil level inspection of the rear drive axle of the grader is realized through the oil level observation mirrors at the balancing box and the final drive.

1. Park the grader on the horizontal ground, shut down the engine, pull up the parking brake, and put stops in front of and behind the tyres.

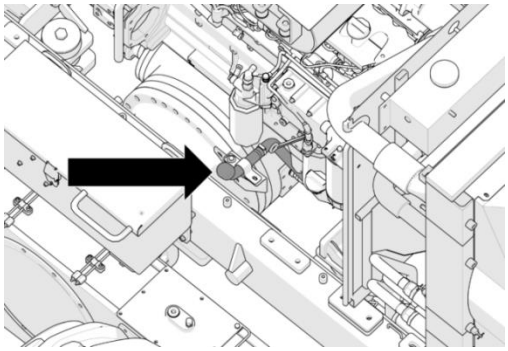
2. Check the oil level of the rear drive axle. The oil level should be in the middle of the observer hole.



Oil drain plug at final drive and balancing box



Balancing box oil filler



Final drive oil filler

REPLACEMENT OF OIL

NOTE: During the inspection, service, test and adjustment of the machine, when disassembling any hydraulic oil circuit or decomposing any components containing liquid, a suitable container must be prepared to collect the liquid. And all liquids need to be disposed of according to local regulations. Oil drain shall be performed after the vehicle has been running for a period of time. It's required that the impurities precipitated in the axle housing are fully suspended.

DANGER

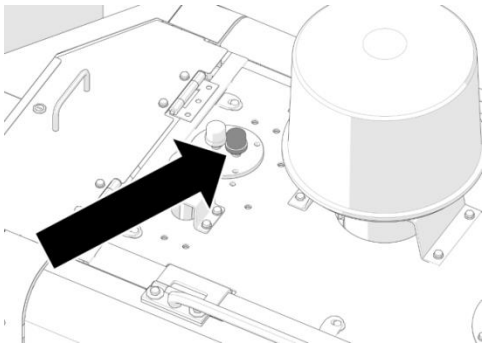
As the gear oil is probably at a high temperature, it's necessary to wear protective equipment and operate carefully to avoid personal injury.

1. Park the grader on the horizontal ground, shut down the engine, pull up the parking brake, and put stops in front of and behind the tyres.

2. Unscrew the oil drain plug of the drive axle balancing box and the oil drain plug at the bottom of the center of the axle housing, drain the oil, and hold it with a container.

3. Drain the used oil and screw the oil drain plug at the bottom of the center of the axle housing.

4. Add appropriate amount of gear oil from the oil filler of the balancing box and the final drive respectively to check the oil level.



Drive axle breather

REPLACEMENT OF DRIVE AXLE BREATHER

At the same time of replacing the gear oil of the drive axle, it is required to replace the filter element of the drive axle breather.

CHECK THE NUT AT REAR AXLE WHEEL

Tightening torque of nut > 700Nm

Use tool 6410007391 Socket 392804

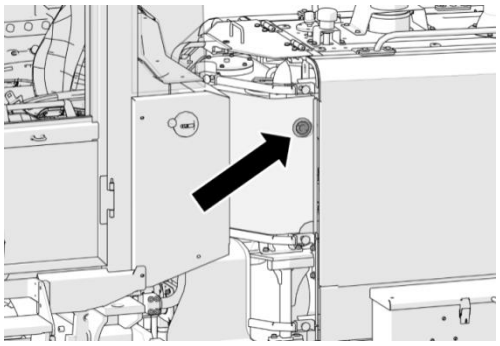
HYDRAULIC SYSTEM

The working hydraulic system, brake system and steering system use the same hydraulic oil tank.

Any operation on the system requires absolute cleanliness. Even tiny particles can cause system damage or blockage. Therefore, the relevant areas should be wiped up before performing any work.

The pressure limiting valve of the hydraulic system has been set to the correct value at the factory. If the valve setting is changed by someone other than a qualified maintenance technician, the warranty provided by the manufacturer will become invalid.

INSPECTION OF HYDRAULIC OIL LEVEL



Hydraulic oil stick

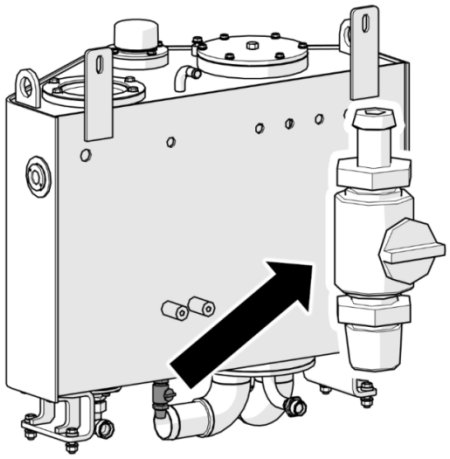
1. Park the grader on flat ground with the working device flat on the ground and the front and rear frames facing straight without any included angle.
2. Check the oil stick on the left side of the hydraulic oil tank. The oil level is considered moderate in the middle.

REPLACEMENT OF HYDRAULIC OIL

DANGER

In the process of oil change, the machine shall carry out various operations. It's necessary to operate in accordance with relevant safety regulations and be aware of safety.

As the hydraulic oil is probably at a high temperature, it's necessary to wear protective equipment and operate carefully to avoid personal injury.



Hydraulic oil drain valve

1. Park the grader on flat ground, set the machine in parking station, start the engine running for 10 minutes, and repeatedly operate each control handle.

2. Place all machine tools on the ground and turn off the engine.

3. Open the oil drain valve at the lower part of the hydraulic oil tank, drain the hydraulic oil and hold it with a container. At the same time, unscrew the oil filler cap to speed up the oil drain process.

4. Remove the flange cover at the bottom of the oil tank and clean the inside of the oil tank and filter elements at oil filler and each suction and return oil port. The filter elements need to be replaced if they are damaged.

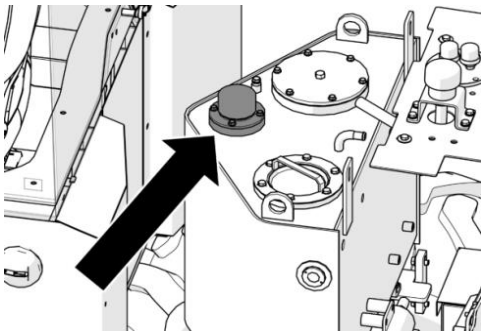
5. Tighten the flange cover and oil drain ball valve again.

6. Add the specified hydraulic oil from the oil filler at the top of the hydraulic oil tank to the middle of the

observer hole, and screw the oil filler cap. It is not allowed to remove the filter element of the oil filler and directly fill the oil tank.

7. Start the engine, adjust the working device for 2 to 3 times, fill the oil cylinder with oil, run at idle speed for 5 minutes, and release the pressure in the system.

8. Shut down the engine, check the oil level, add oil if it's insufficient.



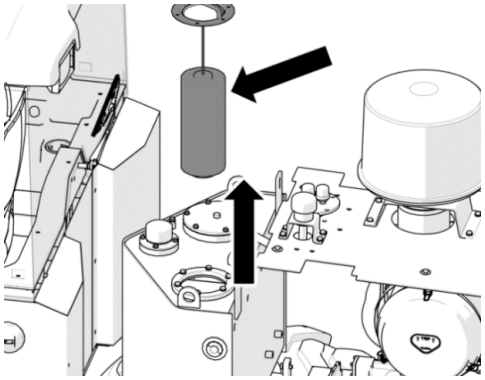
Hydraulic oil filler

REPLACEMENT OF HYDRAULIC OIL RETURN FILTER ELEMENT

When replacing hydraulic oil, it is required to replace the hydraulic oil return filter element.

Loosen the fixing bolt of the oil return filter element and take out the hydraulic oil return filter element.

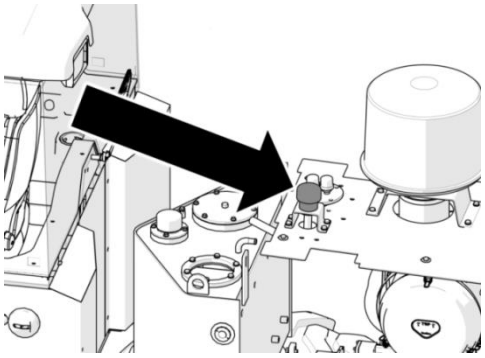
ATTENTION should be paid to check the seal assembly.



Hydraulic oil return filter element

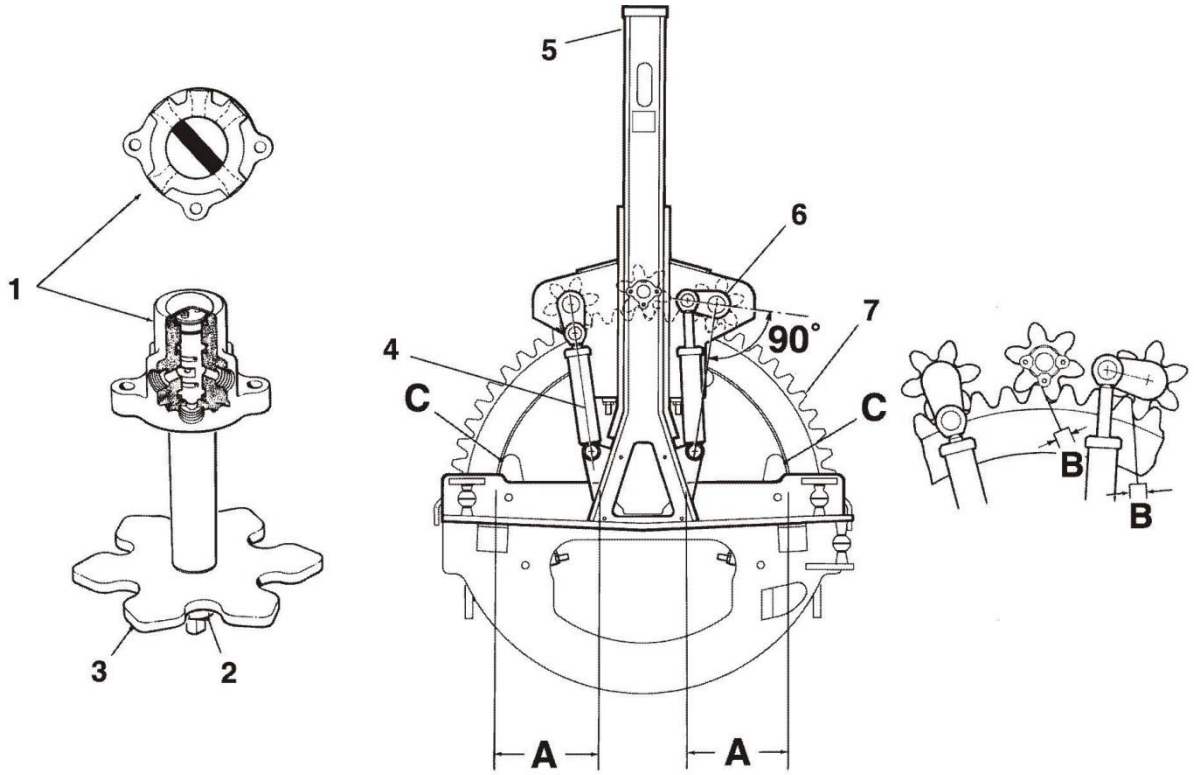
REPLACEMENT OF HYDRAULIC OIL TANK BREATHER

When replacing hydraulic oil, it is required to replace the filter element of the hydraulic oil tank breather.



Replacement of hydraulic oil tank breather

WORKING DEVICE



1 Circle timing valve 2 Timing shaft lock nut 3 Timing valve pinion

4 Left hand circle turn cylinder 5 Drawbar 6 Right hand circle turn crank

7 Circle

A Centering dimension

B Tooth backlash

C Guide plate to circle clearance

CIRCLE, SETUP AND TIMING

The machine uses two hydraulic cylinders in conjunction with a timing valve to turn the circle. The circle must be kept properly adjusted through regular maintenance for smooth operation and long life. If the circle fails to turn smoothly, one of the corrective measures is re-timing. Timing the circle is a six step procedure. Follow this procedure whenever the timing

is checked or whenever the circle is adjusted. For more detailed information, refer to the Service Manual.

1. Preparing the circle for adjustment:

Loosen all jam nuts securing the guide plate setscrews. Loosen the front guide plate setscrews approximately 6 mm (0.25 in.) to allow the circle to move freely. Use a safe method to move the circle teeth away from the drive pinions. Measure the distance from the inside edge of the circle to the side of the drawbar on both sides of the machine (see Figure, “A” dimension). Tighten the front setscrews on the rear guide plates to adjust the circle from side to side until the distance is approximately equal on both sides.

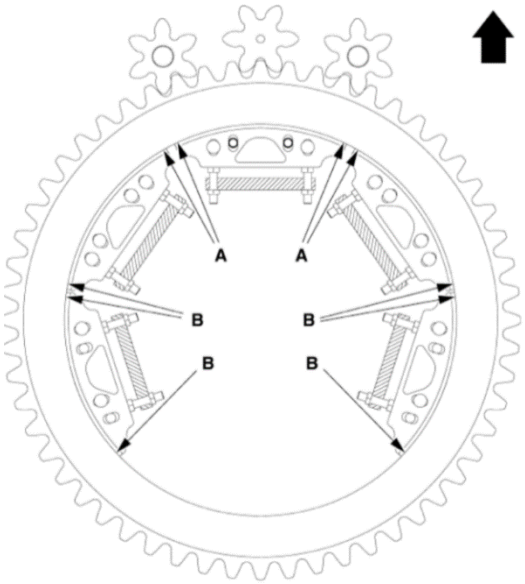
2. Centering circle to pinions:

Measure the backlash between each drive pinion and the circle teeth. If the backlash for each pinion is not the same, tighten the front setscrews of the rear guide plates to adjust the circle until the backlash measurement is equal.

3. Setting pinion backlash:

The front guide plate should always be in contact with the circle at both ends. Tighten the setscrews of the front guide plate to pull the circle closer to the drive pinions. The backlash to the face of each pinion is set at 2.0 +0.5/-0.25mm (0.090 +0.020/-0.010 in.). Note that you may have to further loosen the rear guide

plate setscrews to allow the circle to move freely. The timing valve pinion should have the same backlash as the circle teeth. When you have obtained the correct backlash at both pinions, fully tighten the jam nuts securing the front guide plate setscrews.



Measure clearance between guide plates and circle. Viewed from bottom of circle; arrow indicates front of machine.

A 0,0 mm (0.00 in.)

B 1,0 +1.0/-0.0 mm (0.040 +0.040/-0.0 in)

4. Setting guide plate clearance:

Measure the clearance between the rear guide plates and the circle inside edge. Adjust each rear plate to have a clearance of 1,0 +1.0/-0.0 mm (0.040 +0.040/-0.0 in).

ADJUSTING THE CIRCLE TURN VALVE

1. Setting crank position:

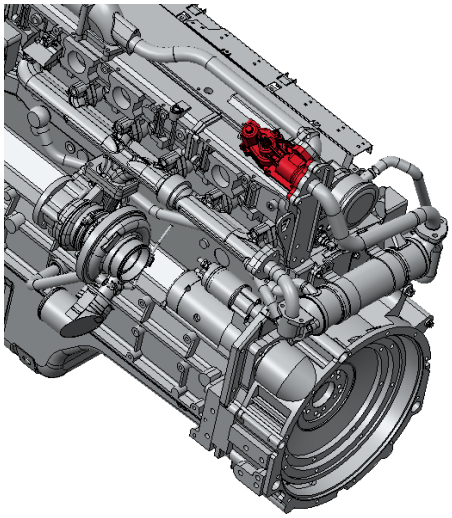
Fully retract the left-hand cylinder so that a straight line passes through all three pivot points. Ensure that the righthand cylinder and crank is towards the drawbar (5). Position the cylinder so that a straight line drawn between the center of the cylinder anchor and the center of the crank shaft will form an approximate 90o angle with a line drawn through the centers of both the crank shaft and pivot.

2. Set timing valve:

After relieving all hydraulic pressures, locate and remove a hose and fitting from one of the ports on the timing valve connected to the left-hand cylinder. The valve spool must completely block the port. If adjustment is required, loosen the timing pinion shaft lock nut (2) and rotate the shaft until the spool is centered, completely blocking the port. A hole on the spool must be visible in the center of the port. Check for wear between the timing valve drive shaft and timing valve spool. If excessive, timing performance will suffer. Secure the lock nut and ensure that the spool did not move. Replace all fittings and hoses. The circle should turn in a counter clockwise direction when pushing the circle turn control lever forward. If the circle turns in a clockwise direction, the spool is 180 ° out of position. Turn the valve spool 180 ° and

repeat this step.

EGR VALVE CLEANING



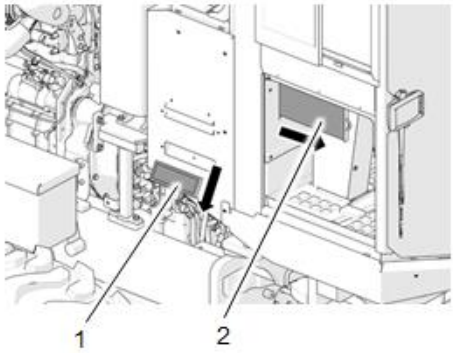
WARNING: when the engine is stopped, there is still exhaust gas with high temperature beside EGR valve, so care not to be burned when disassembling EGR valve or just disassemble after cooling down.

EGR valve needs to be cleaned every 3000 running hours; when the exhaust gas recirculated through EGR valve, the soot in the exhaust gas will be deposited on EGR valve surface and make the performance worse. Use compressed air (0.1Mpa(2kg/cm3)or lower) to clean the carbon deposition inside the EGR valve. If carbon deposition is too much, use cleaning agent, kerosene or other liquid and soft brush to clean EGR valve. Pay attention not to damage other elements.

Don’t make water, solvent, cleaning agent and other liquid flow into EGR valve motor and plug-in parts, or it will make EGR valve can’t work normally.

Wear eye patch while cleaning EGR valve. Prevent compressed air, cleaning agent, soot, small flying debris entering into operator’s eye. If it’s not followed, it will lead to serious personal injury.

CAB



1 Air conditioning fresh air filter element 2 Air conditioning return air filter element

If the environment is poor, gently pat the filter element with hand or clean the filter element with dry compressed air, and replace the filter element in advance if the air volume is still obviously insufficient.

Let qualified maintenance technicians check the air conditioner once a year.

SERVICE DETAILS

ATTENTION

Because of bad operating conditions (high temperature and high load) and dusty ambient circumstances, oil may deteriorate easily. Change oil as soon as the oil deteriorates or it is mixed with many impurities.

Add the specified volume of oil. Either too much or too little oil may cause problems.

Clean or replace the relevant filters when changing oil.

RULES OF USING OILS, FUEL AND COOLANT

FUEL

1. The fuel pump is a precision instrument. If the fuel mixes with water or dirt, the fuel pump will not work normally.
2. Never let impurities or contaminants enter the system when changing fuel filters or adding fuel.
3. Strictly choose the fuel type according to recommendations in this manual.
4. The fuel may be frozen at low temperatures (particularly temperatures lower than 5°F (-15°C)). So it may be necessary to change the kind or blend of fuel according to the ambient temperatures.
5. Always fill the fuel tank after operating to prevent water, which is condensed by the moisture in the air, from entering the fuel tank.

6. If the engine fails to prime with fuel or the filters have been just replaced, purge the air in the fuel inlet system.

ENGINE OIL

1. Different brands of oil due to different formulations, mixed use may have adverse effects on the engine.
2. It is strictly prohibited to use inferior oil, otherwise it will cause serious damage to the engine, resulting in the failure will not be guaranteed.
3. When the oil becomes thin, thick, black, loss of viscosity, the oil must be replaced in time, the proposed replacement cycle 250 hours.
4. When changing the oil, the oil filter must be replaced at the same time; the user can use the good quality of the oil filter

COOLANT

1. In order to keep sediment from blocking the radiator and affecting the thermal performance, use high quality glycol type antifreeze mixed at the proper proportion with distilled water; do not use straight water as coolant.
2. If the engine is overheating, the engine should be cooled down first, then topped off with coolant
3. Coolant should be added to the specified level, if the coolant level is too low, it will result in engine overheating and corrosion problems of cooling

system.

4. Antifreeze is combustible, stay away from open flame when filling it.
5. Never use 100% antifreeze as coolant.

LUBRICANT

1. Lubricant can help to prevent the wear of fitting surface and noise.
2. The connectors (pipe joint, connecting set) that are not involved in this manual are only for overhauling and not need to add lubricant. But be sure to fill the lubricant if some parts are difficult to operate after a long time using.
3. Clean the spilled lubricant after filling.

STORAGE OF OIL AND FUEL

1. Prevent water, dirt, or other impurities from mixing with the oil.
2. Follow the rule, first in - first out, to maintain oil quality during long-term storage.

FILTERS

1. Filters are extremely important safety components. They can prevent impurities in the fuel from entering important equipment and causing problems. Replace filters at shorter intervals when the machine works in a severe environment.
2. Never try to clean paper filter elements and use them again. Always replace them with a new one.
3. When replacing the oil filters, check whether there

are some metallic particles adhering to the old filter. If some metal particles are found, investigate and repair.

4. Never open the packaging of new filters until they are ready to be used.
5. Always use authorized filters from SDLG.

OILS, FUEL, COOLANT AND LUBRICANT SPECIFICATIONS

OIL APPLICATION

1. Use the oil in strict accordance with the rules about specified brand and quantity. .
2. Clean the oiler or container before filling the fuel, hydraulic oil, grease and clean the filling ports to prevent water, sludge and debris entering into the oil.
3. Except for the grease, use a filter for filling.
4. Fill grease until there is grease squeezing out of the filling point. And wipe the spilled grease.
5. When replacing oil, drain the contaminated oil out after operation. Fill cleaning oil and keep the engine running idly for several minutes to clean all the parts. And then fill the new oil and keep the engine running at low speed. Finally, fill the oil to the specified level. The fuel tank should be cleaned regularly.
6. In different seasons, replace the oil or grease according to the actual situation.

7. When filling oil or checking the oil level, put the grader in a horizontal position.
8. Apart from the oil dipsticks and other pointers, the oil level should be in the middle part of the oil window, such as the drive axle, balance tank, turbine box.

OIL SELECTION TABLE

Kinds of Fluids		Oil Recommended Types And Standards	Application point	Qty. (L)
Fuel		Ambient temperature≥4oC 0# common diesel oil GB252 Ambient temperature≥-5oC -10# common diesel oil GB252 Ambient temperature≥-14oC -20# common diesel oil GB252 Ambient temperature≥-29oC -35# common diesel oil GB252	Fuel tank	270
Engine oil		CH-4 15W-40	Engine	26
Hydraulic oil	Full year	L-HM46 VG46 (variable pump system)	Hydraulic oil tank	132
Gear oil	Full year	(GL-5) 85W/90 GB 13895	Rear axle and balancing box	28+23×2
			Rear axle and balancing box (SDLG)	25+21×2
Transmission oil	Full year	CH-4 15W-40	Transmission box	28
Grease	Full year	EP2 GB 7324 EP3 GB 7324	Grease cup	
Antifreeze	Full year	NB/SH/T 0521	Water tank	30

NOTE: The filling quantity listed in this table is for reference only, while specifically oil gauge standard shall prevail.

NOTE FOR OIL APPLICATION

1. Diesel oil in the fuel tank must be added timely to prevent cavitation. Check whether the fuel tank is contaminated, whether there is sediment, and clean the oil filter every mouth. The engine oil must be changed regularly because the mechanical impurities in the oil will increase over time, main causes are: oxidation after wear, residual ballast in the cylinder after combustion, and the dust from outside. When the impurity content reaches 0.4~0.5%, oil begins to become black, physical and chemical index will deteriorate. Replace the oil in hot state.

2. Check the cleanliness of hydraulic oil regularly. Method: Take a few drops of oil from the tank and drops the oil on the filter paper (240mesh). If the paper presents a light yellow circle, it proves that the oil can continue to use; If the yellow circle on paper is obvious, and the center is black, it proves the oil is polluted and need to be replaced. Fill the new oil through the oil filter, and do not fill the oil directly into the fuel tank. Never allow several brands of hydraulic oil mixed to use. The crude oil must be cleaned when replacing the oil.

LUBRICATING OF GRADER

Engine maintenance project	10h	50h	100h	250h	500h	1000h	2000h
Check the oil level, fuel level, coolant level	●						
Check the engine drive belt is loose, cracks, safety shield is fastened in place	●						
Check engine and radiator on the accumulation of debris, keep the engine clean, tidy	●						
Check engine has no three leakage phenomenon	●						
Check engine electrical line connector is loose, the lead is intact	●						
Check air filter and clean or replace if necessary.	●						
Check the maintenance indicator on the air filter	●						
To check whether the instrument is normal or not, otherwise it should be repaired or replaced in time.	●						
Check or fasten cooling line, pipe clip, inlet line, hose and flange connection parts.	●						
Clean fuel system		▲					●
Clean cooling system				●			
Clean air filter set dust cup		●					
Clean crankcase breathing apparatus				●			
Check parking control device					●		

Proper lubrication can greatly reduce the frictional resistance of machine parts and wear of parts, to ensure a good machine performance and prolong the service life. Regular refueling and replacing the oil has special significance for the normal use of the grader.

Only use low pressure to inject grease into the

transmission to avoid filling too much due to strong injecting force;。

In the dusty circumstance, clean water tank and remove all the leaves on the oil cooler regularly, the cleaning times should be more than the specified number of times in the lubrication diagram.

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Only use low pressure to inject grease into the transmission to avoid filling too much due to strong injecting force;。

In the dusty circumstance, clean water tank and remove all the leaves on the oil cooler regularly, the cleaning times should be more than the specified number of times in the lubrication diagram.

GUIDELINES FOR ELECTRICAL SYSTEM MAINTENANCE

1. If wiring insulation is damaged, there is a high potential for the electrical system shorting to ground, which may be a serious fire hazard.
2. Important electrical system maintenance items are:
3. Check the tension and damage condition of the fan belt.
4. Integrated and/or sealed electrical components or

parts should not be disassembled or attempted to be repaired.

5. Never install any electrical parts or components other than those specified by the manufacturer.
6. Be sure to keep the major electrical system parts and components dry when washing the machine or working in rain and snow.
7. Pay particular attention to avoiding excessive corrosion of the electrical parts and components system when located in an environment with highly corrosive elements (including air humidity in coastal regions).

MAINTENANCE TOOLS

Refer to the production containerization list for details of maintenance tools.

PERIODIC MAINTENANCE TASKS AND INTERVALS

Maintenance site	Maintain contents	Replacement cycle	Remark
Engine	Engine Oil	Frist 50h cycle 250h	Frist 100h cycle 500h(Weichai stage 3)
	Oil filter	Frist 50h cycle 250h	Frist 100h cycle 500h(Weichai stage 3)
Fuel system	Fuel fine filter element	cycle 250h	Cycle 500h (Weichai stage 3)
	Oil - water separator filter element	cycle 500h	
Air filter	Air filter	cycle 500h	
Cooling system	Coolant	cycle 2000h	
Transmission & Axle	Transmission oil	Frist 100h , cycle 1000h	Frist 100h cycle 500h(Hangchi transmission)
	Transmission filter element	Frist 100h , cycle 1000h	Frist 100h cycle 500h(Hangchi transmission)
	Transmission breather	cycle 1000h	
	Axle breather	cycle 1000h	
	Gear oil of Axle	Frist 100h , cycle 1000h	
Hydraulic system	Hydraulic oil	cycle 1000h	
	Hydraulic tank breather	cycle 2000h	
	Hydraulic oil filter	Frist 500h , cycle 1000h	
Braking System	Filter	cycle 500h	
A/C	A/C air filter	cycle 1000h	

In order to extend the service life of the machine, the machine can play a better performance, we suggest that the maintenance cycle and the contents of the maintenance cycle and the contents of the maintenance cycle and the content of the maintenance manual shall prevail. Periodic

maintenance is divided into every 10 hour maintenance, every 50 hour maintenance, every 100 hour maintenance, every 250 hour maintenance, every 500 hour maintenance(season), every 1000 hour maintenance(half year), every 2000 hour maintenance(year), and every 3000 hour maintenance. Whatever occurs first.

EVERY 10 HOUR MAINTENANCE

1. Clean the grader: Clean the dust and ash on the surface of grader; Clean the dust and oil on the surface of parts and hydraulic components. Do not let dirt enter oil filling port and air filter.
2. Check the connection and fixing of the parts of grader. Check whether the connecting bolts between frame and rear axle and hub are loose or broken. Fix or replace the loose or broken parts.
3. Check the grader for leaking phenomenon and eliminate the problem.
4. Check the sealing performance of working hydraulic system, steering system and brake system.
5. Check reliability and flexibility of the service and parking brakes.
6. Check the electrical system for damage and for having a proper charge.
7. Check all fluid systems for proper fluid levels (engine, transmission, axles, brakes, and air conditioning).

8. Grease any components or parts per the machine lubrication chart. (except the oil port on rear drive axle)
9. Do a walk around of the machine observing for damage and abnormalities

EVERY 50 HOUR MAINTENANCE

ATTENTION : Before putting a new grader into operation, a running-in period of 50 hour is required. Follow the instructions in Operation and Maintenance Manual of Diesel Engine to perform the running-in. After the running-in period, maintain the machine as per the instruction s below

COMPLETE THE TASKS OF THE 10 HOUR PERIODIC MAINTENANCE INDICATED ABOVE

1. Check the tire pressure; check the wheel nuts (with 450Nm torque wrench).
2. Check hydraulic oil level and fill hydraulic oil to specified level.
3. Check if there is leakage in the hydraulic system, remove the problem if so, and fill hydraulic oil to specified level.
4. Grease the oil port on front drive axle bearing.

EVERY 100 HOUR MAINTENANCE

COMPLETE THE TASKS OF THE 10 HOUR AND 50 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Check the intake system and exhaust system, and

ensure the connectors are connected firmly. Clean the intake and exhaust pipes if necessary.

2. Check the parking brake system and adjust it if necessary.
3. Check whether the connection of steering mechanism is loose, including nuts of steering linkage, tighten them.
4. Tighten wheel nuts.

IN ADDITION, DO THE EXTRA MAINTENANCE IN THE FIRST 100 HOUR AS FOLLOWS:

5. Check the tension of chain of balancing box. If it is loose, tighten it.

NOTE: The rear axle manufactured by SDLG do not need!

EVERY 250 HOUR MAINTENANCE

COMPLETE THE TASKS OF THE 10 HOUR, 50 HOUR AND 100 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Check the oil level of main drive and balancing box, add if necessary.
2. Remove the dust inside the generator with compressed air and check whether the parts are normal, and eliminate the problem if not.
3. Check the guide clearance of rotary frame and adjust it if necessary.
4. Check air filter pressure difference indicator, replace the filter if necessary.

5. Grease the oil port on the brake of rear drive axle, but not too much. （Every 3 months, ordinarily rear axle）
6. Grease the oil port on the connecter of main drive and balance box. （Every 3 months, ordinarily rear axle, ordinarily axle）

EVERY 500 HOUR MAINTENANCE

COMPLETE THE TASKS OF THE 10 HOUR, 50 HOUR 100 HOUR AND 250 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Check the nut at rear axle wheel
2. Check whether the circuits of switches and control monitoring device are normal. Repair if damaged.
3. Check the tension of chain of balancing box. If it is loose, tighten it .

NOTE: The rear axle manufactured by SDLG do not need!

4. Grease the oil port on the connecter of main drive and balance box. （Rotate bearing axle）
5. Check whether the clearance of transmission box to rear axle transmission shaft, engine to working pump transmission shaft and the cardan shaft are oversized.

EVERY 1000 HOUR MAINTENANCE

(ALSO CARRY OUT THE MAINTENANCE BEFORE WINTER COMING)

COMPLETE THE TASKS OF THE 10 HOUR, 50

HOUR 100 HOUR, 250 HOUR AND 500 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Check engine belt.
2. Engine should be maintained specially if the ambient temperature is lower than 5°C.

Choose fuel that applicable to winter and pay attention the water content in the fuel in case of blockage of fuel circuit.

Be sure to use antifreeze (coolant) specified by SDLG all year round. Use water as coolant is strictly forbidden.

EVERY 2000 HOUR MAINTENANCE

COMPLETE THE TASKS OF THE 10 HOUR, 50 HOUR 100 HOUR, 250 HOUR, 500 HOUR AND 1000 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Set circle setup and timing

EVERY 3000 HOUR MAINTENANCE

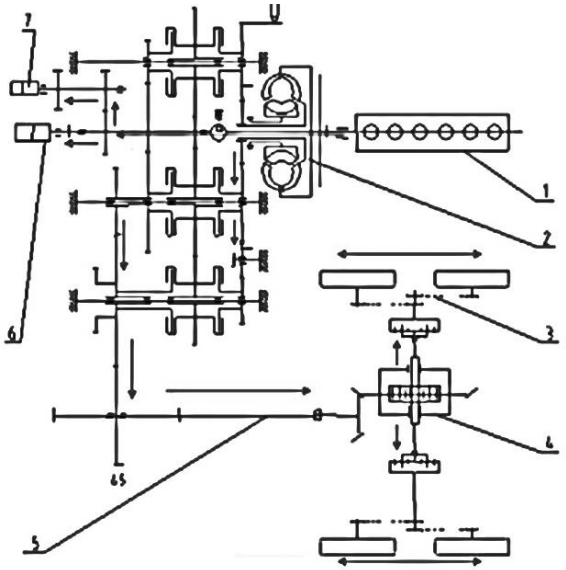
COMPLETE THE TASKS OF THE 10 HOUR, 50 HOUR 100 HOUR, 250 HOUR, 500 HOUR, 1000 HOUR AND 2000 HOUR PERIODIC MAINTENANCE INDICATED ABOVE.

1. Clean the radiator
2. Check the water seal in water pump.

SYSTEM PRICIPLE AND PRECAUTIONS

POWER AND TRANMISSION SYSTEM

Engine and transmission box are installed on the rear frame. Working device is installed on the front frame. The power generated by engine transfers from hydraulic converter, transmission box, transmission shaft to rear axle, and then to balancing box transmission chain to drive the four wheels.



G9200 grader power transmission diagram

1 Engine 2 Hydraulic converter + transmission box 3 Balancing box 4 Drive axle 5 Transmission shaft 6.Left working pump 7 Right working pump

HYDRAULIC SYSTEM

Hydraulic system of G9200 grader consists of service brake hydraulic system, steering hydraulic system and working hydraulic system.

ELECTRIC SYSTEM

Electrical system includes battery, starter motor, AC generator, stepping gauge penal, switches, lights, A/C circuit, electrical control box, operation box, wiring harnesses, sensors and other electrical equipment.

Machine system voltage is 24V DC, select the power curves of engine to achieve the purpose of fuel economy by using the power selecting switch. In addition, the electrical system can also monitor the torque converter, hydraulic systems, brake system, battery charging and discharging, and all kinds of filters.

Electrical diagrams