

**Operating Manual
of Laser Land Leveling System AG308**



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Chapter 1 Introduction

1. Operating Principle of Land Leveling

As shown, the two height reference A and B, A is the height of the laser plane, B is the height of a point on the ground, the height difference between A and B is the height between the center of the laser receiver and the scraper edge. We call it as “L”; so when the laser is at a fixed height, “L” is fixed, then B is fixed, the land was leveled.

Before land leveling, you need to measure and confirm the average height of the land, then the land will be leveled to this average height, and make scraping and filling roughly equal.

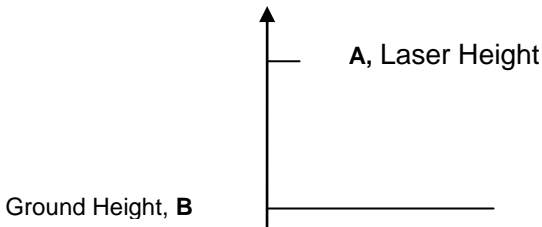


Chart No.1. Principle of Land Leveling

2. Operating principle and characteristics of Laser Leveling

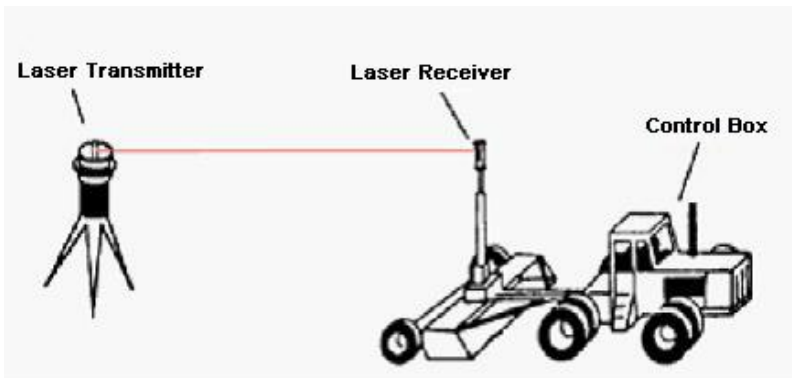


Chart No.2. Parts of Laser Land Leveling System

AG308 Laser land leveling system includes three parts: laser transmitter and receiver, control system and scraper. It is actually like a scraper with rear wheels, which could automatically up and down according to the height of ground. The scraper goes up and down through the telescopic oil cylinder. The cylinder is installed between the rear axle and scraper. In the process of moving forward, when ground is higher, the oil cylinder will be shortened to make the scraper down., then scraper blade cut soil there and goes forward with the soil. When the ground is lower, the oil cylinder will be extended to make scraper up, then the soil in the scraper will be filled here. During the land leveling, soil in the higher places will be scraped to flatten the lower places to complete the land leveling.

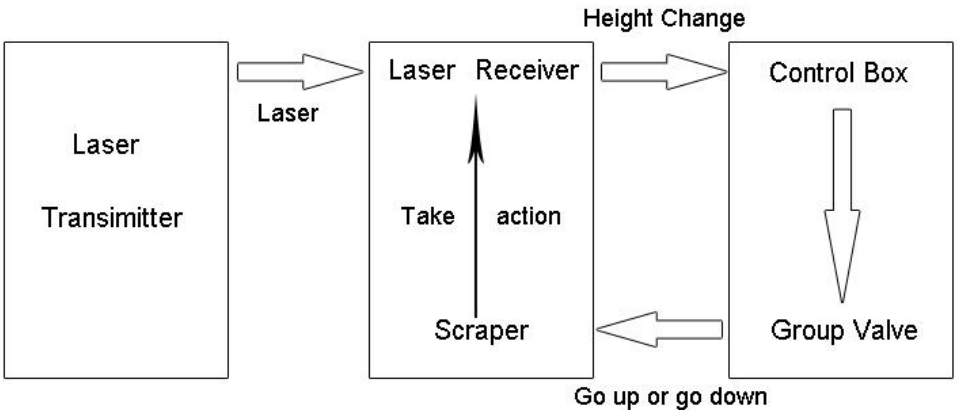


Chart No.3. System Configuration

Description:

1. Laser Receiver connected with scraper through the mast, they will go up and down together at the same time.
2. The system is made up of optical path, electrical path, hydraulic path and mechanical part. The optical path includes laser transmitter and laser receiver, it measures height difference. The electrical path includes laser receiver, controller box and solenoid valve. It sends control signals to reduce the height

difference. The hydraulic path includes oil pump, group valve, oil tank, oil cylinders and oil tubes. It leads the machine to complete the land leveling.

3.The control signal from controller box tends to decrease the height difference between the laser transmitter and center of laser receiver. When the height difference of every point in the ground tends to be zero, the land will be leveled to a flat plane.

Item	Action of scraper
= standard height	None
< standard height (at low)	Up and fill soil
> standard height (at high)	Down and cut soil

Laser Receiver is fixed on the mast of the scraper, it will measure the height difference between the laser transmitter and the center of laser receiver via the laser signals. This height difference is the deviation between the current height and the target height of the land. The control box always tend to reduce this deviation, it will control the scraper to go up and down to make the current height of the land to be close to the target height. Land leveling is a process, which will measure the height difference between every point and reference point of the land, then reduce this height difference to make all the points in a plane.

If the laser signal reaches at the upper part of the receiver, indicating that the current height is lower than the target height, then lift valve to make the scraper up; if the laser signal reaches at the lower half of the receiver, indicating that the current height is higher than the target height, then drop valve to make the scraper down.

Working characteristics

- (1) High accuracy, after the land leveling, the height difference will be $\pm 2\text{cm}$.
- (2) High efficiency, when rough grading, it can level 3 to 5 acres per hour, when fine grading, it can level 4 to 6 acres per hour.
- (3) Suitable for land in good condition. When land in poor condition, you can

level your land roughly with the traditional method first, then do precision leveling with this laser land leveling system.

3.Components of Laser land leveling System

1: Laser Transmitter KF-308 :

Laser transmitter is installed on the tripod, the rotating laser beams can form a light plane. One unit of laser transmitter can control many sets of levelers to work at the same time.

2: Control Box KB-508 :

Control box is installed in the cab. It has two modes: automatic control and manual control, it is very easy to be operated by the user. It will show the height of the blade with a set of Light-Emitting Diode (LED).



Power Switch :

Press the power switch to open the system. All the lights on the controller box flashed, and the green power light “P” is bright. When the power of control box, is opened, the power of laser receiver will also be opened at the same time. Press the power switch again, then power off.

LED of height indication :

There are five kinds of status when the laser receiver receives the laser signal: Very high, high, flat, low, very low.

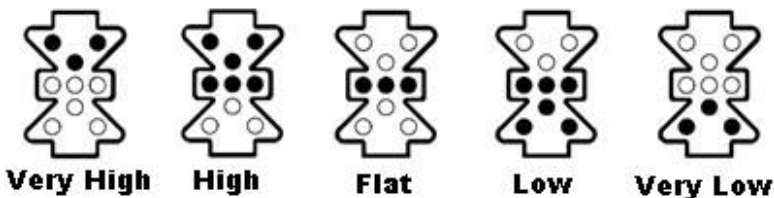


Chart No.5. LED of height indication

Status	Meaning	Action of scraper
Very High	Receiver center very higher than standard	Down and cut soil
High	Receiver center higher than standard	Down and cut soil
Flat	Receiver center equal to standard	None
Low	Receiver center lower than standard	Up and fill soil
Very Low	Receiver center very lower than standard	Up and fill soil

1.If the laser signal in the target height is beyond the reception range of the receiver, the LED will continuous flashing 2 minutes.

2. If the laser signal in the target height is below the bottom of the receiver, the “down arrow” flashing, indicating the blade of scraper is far higher than the target height. Then you need to manually control the scraper to go down.

3. If the laser signal in the target height is above the top of the receiver, the “upward arrow” flashing, indicating the blade of scraper is far lower than the target height. Then you need to manually control the scraper to be raised.

Attention: The LED indicator on the laser receiver is in accord with the LED indicator on the control box.

Automatic/manual mode switch :

Automatic mode: Press the yellow button, when the yellow light “A” is bright, it means the system is in automatic mode.

1: If the laser receiver LS-508 can receive the laser beam, then the control box KB-508 will adjust the blade to the target height automatically.

2: If the laser receiver LS-508 can't receive the laser beam, then the control box KB-508 will not do any adjustment.

Manual mode: Press the yellow button, when the yellow light “M” is bright, it means the system is in manual mode.

When the laser receiver LS-508 can receive the laser beam, the LED indicator on the control box KB-508 will be bright, but it will not send any control signals.

In manual mode, the user needs to control the scraper manually according to the LED indication.


Lift Switch :

This switch is used to lift the scraper in manual mode. Upwards pull this switch to raise the scraper, downward pull this switch to down the scraper. Release your hands, this switch will back to the middle position.

In automatic mode, this switch is also workable for scraper and when this switch is released, the system will back to automatic mode.

3: Laser Receiver LS-508 :

The laser beams acceptable angle of this laser receiver is 360 degrees, and it can match with almost all types of laser transmitter. With advanced technology, it can guarantee the highest accuracy when be used.

Item	Description	
1	Reception window of Laser	
2	Indicator Lamp	
3	Connector	

4: Land Leveler

Land Leveler includes mechanical parts and hydraulic parts, the hydraulic parts are installed on the mechanical parts to control the mechanical parts. The mechanical parts include: Scraper, wheel carrier (Axle), triangle draw bar, lead screw and mast. The hydraulic parts include: oil tank, oil tube, oil pump, group valve and oil cylinder.

Scraper includes blade and the guard plate on both sides. The blade is able to cut soil and scroll the soil into scraper body, then goes ahead. When the oil cylinder is shortened, the blade will be dropped down to the land, cut the soil and it will be dragged forward together. When the oil cylinder is extended, the blade will be raised, the soil in the scraper body will be backfilled to flat the land. Land leveler will cut soil then carry and backfill to the land via the scraper., so it can complete the land leveling.

