Machine Control Overview

- Laser Controlled -

Introduction

Using a laser-based machine control system to guide your grader is the simplest and most cost-effective way to achieve a high-quality finish on any earthmoving project.

Below is a brief outline of how the system works and what steps need to be taken to ensure that your system is working accurately and effectively.

Setup the Laser Transmitter

The first step when it comes to using your laser system is to setup your laser tower or tripod and to ensure that the transmitter is set to the required grade.

- Simply position the laser tower or tripod on the edge of the work area where it will be out of the way of where the tractor and grader will be operating. If possible, place the tower just outside the work area to completely avoid any risk of collision.
- Fit the transmitter to the tower, aligning the sights with the desired grade direction.
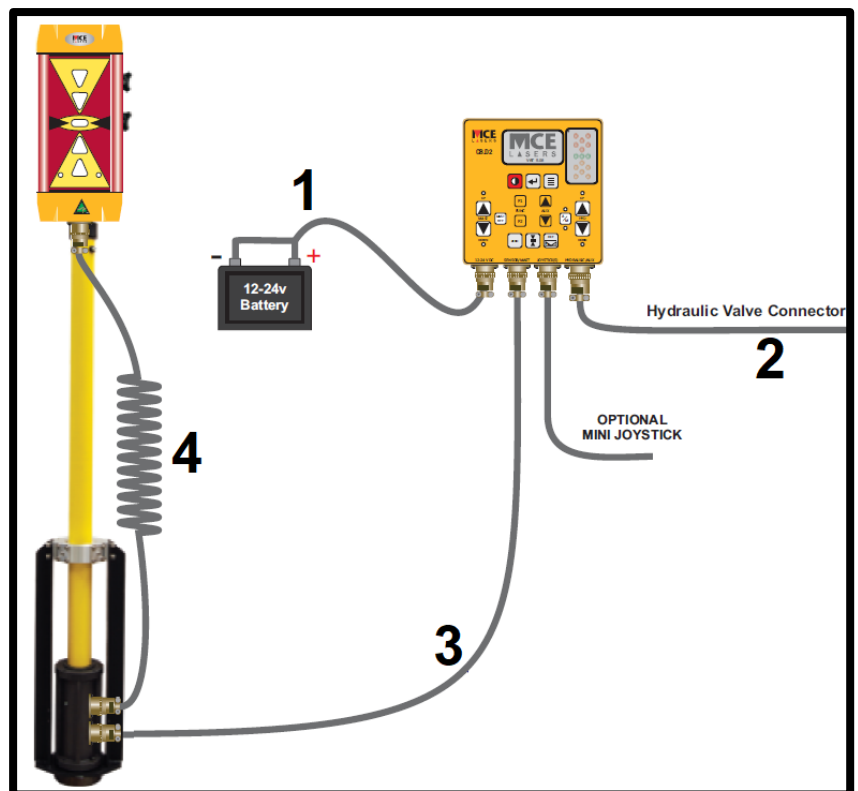- Dial in the required grade – to determine the grade see below.

Fit Control Panel to Tractor

Your control panel will be supplied with either a RAM mount or a suction cup mount. Simply fit these to your tractor in a position that is comfortable for the operator and will not obstruct their view of the implement. Depending on what other tasks your tractor is used for, the mounting hardware can either remain in place permanently or be stored safely between use.

Your system will come with the following cables, as seen on the diagram below.

- (1) Power Cable
  - Provides 12v power from tractor to control panel.
- (2) Valve Cable
  - Connects panel to hydraulic valve mounted on the grader.
- (3) Receiver Cable
  - Connects panel to base of mast.
- (4) Coil Cable
  - Runs between the base of the receiver and base of mast, allows for mast travel.

Once these cables are connected, your receiver is ready to be switched on.

Determining a Grade

There are several ways to determine the grade required for your job depending on the type and size of the job.

- Read grade from site plan.
    - Study the site plan to obtain the grade prescribed by the hydrological engineer.
    - If grade is provided as a ratio, use the attached grade sheet to convert to a percentage grade.
      Or click HERE to use our online calculator.

- Match an existing grade – ideal for large scale leveling where no site plan is available. For example, renovating a paddock which has been levelled in the past.
    - Set laser to 0.00%, this provides a flat plane to being with.
    - Park grader at the top of the work area with blade resting on the ground.
    - Adjust mast until receiver detects the laser signal and shows the On Grade light.
    - Travel to bottom of work area and again lower the grader until the cutting edge is resting on the ground.
    - Begin to raise mast until the receiver again shows the On Grade light.
    - Determine the height difference between the two points measured. This is found on the digital read out of the control panel.
    - Calculate the grade ratio by using the formula shown below. Or click HERE to use our online calculator. All measurements are based on the two points at which the 0.00% grade was obtained.

$$1\ IN\ \left(\left(\frac{1\ meter}{vertical\ distance\ (m)} \right) \times horizontal\ distance\ (m) \right)$$

   Example: The paddock is 750m long and the distance the mast was adjusted was 320mm.

$$1\ IN\ \left(\left(\frac{1}{0.32} \right) \times 750 \right)$$
$$1\ IN\ (3.125\ \times 750)$$
$$1\ IN\ 2343.75$$
   Rounded to the nearest significant figure.
$$= 1\ IN\ 2350$$
    - Convert the ratio to a grade percentage via the attached grade sheet below. Round up to three decimal places. In the case of our example above, our grade is 0.043%

- Choose your own grade – ideal for small scale leveling with relatively heavy drainage requirements. For example, preparing a concrete slab for a truck wash-bay.
    - Determine the fall required across the area being levelled.
    - Determine the distance between the highest and lowest points.
    - Calculate the grade ratio by using the following formula. Or click HERE to use our online calculator.

$$1\ IN\ \left(\left(\frac{1\ meter}{vertical\ distance\ (m)} \right) \times horizontal\ distance\ (m) \right)$$

    - Refer to grade table for the grade percentage.
    - Finally adjust the laser transmitter to suit the newly calculated grade.

Lawless Lasers - Grade Sheet

Ratio	%	Ratio	%	Ratio	%	Ratio	%	Ratio	%	Ratio	%
1 IN 1	100.000%	1 IN 30	3.333%	1 IN 300	0.333%	1 IN 800	0.125%	1 IN 1050	0.095%	1 IN 1700	0.059%
1 IN 2	50.000%	1 IN 40	2.500%	1 IN 320	0.313%	1 IN 810	0.123%	1 IN 1075	0.093%	1 IN 1800	0.056%
1 IN 3	33.333%	1 IN 50	2.000%	1 IN 340	0.294%	1 IN 820	0.122%	1 IN 1100	0.091%	1 IN 1900	0.053%
1 IN 4	25.000%	1 IN 60	1.667%	1 IN 360	0.278%	1 IN 830	0.120%	1 IN 1125	0.089%	1 IN 2000	0.050%
1 IN 5	20.000%	1 IN 70	1.429%	1 IN 380	0.263%	1 IN 840	0.119%	1 IN 1150	0.087%	1 IN 2100	0.048%
1 IN 6	16.667%	1 IN 80	1.250%	1 IN 400	0.250%	1 IN 850	0.118%	1 IN 1175	0.085%	1 IN 2200	0.045%
1 IN 7	14.286%	1 IN 90	1.111%	1 IN 420	0.238%	1 IN 860	0.116%	1 IN 1200	0.083%	1 IN 2300	0.043%
1 IN 8	12.500%	1 IN 100	1.000%	1 IN 440	0.227%	1 IN 870	0.115%	1 IN 1225	0.082%	1 IN 2400	0.042%
1 IN 9	11.111%	1 IN 110	0.909%	1 IN 460	0.217%	1 IN 880	0.114%	1 IN 1250	0.080%	1 IN 2500	0.040%
1 IN 10	10.000%	1 IN 120	0.833%	1 IN 480	0.208%	1 IN 890	0.112%	1 IN 1275	0.078%	1 IN 2600	0.038%
1 IN 11	9.091%	1 IN 130	0.769%	1 IN 500	0.200%	1 IN 900	0.111%	1 IN 1300	0.077%	1 IN 2700	0.037%
1 IN 12	8.333%	1 IN 140	0.714%	1 IN 520	0.192%	1 IN 910	0.110%	1 IN 1325	0.075%	1 IN 2800	0.036%
1 IN 13	7.692%	1 IN 150	0.667%	1 IN 540	0.185%	1 IN 920	0.109%	1 IN 1350	0.074%	1 IN 2900	0.034%
1 IN 14	7.143%	1 IN 160	0.625%	1 IN 560	0.179%	1 IN 930	0.108%	1 IN 1375	0.073%	1 IN 3000	0.033%
1 IN 15	6.667%	1 IN 170	0.588%	1 IN 580	0.172%	1 IN 940	0.106%	1 IN 1400	0.071%	1 IN 4000	0.025%
1 IN 16	6.250%	1 IN 180	0.556%	1 IN 600	0.167%	1 IN 950	0.105%	1 IN 1425	0.070%	1 IN 5000	0.020%
1 IN 17	5.882%	1 IN 190	0.526%	1 IN 620	0.161%	1 IN 960	0.104%	1 IN 1450	0.069%	1 IN 6000	0.017%
1 IN 18	5.556%	1 IN 200	0.500%	1 IN 640	0.156%	1 IN 970	0.103%	1 IN 1475	0.068%	1 IN 7000	0.014%
1 IN 19	5.263%	1 IN 210	0.476%	1 IN 660	0.152%	1 IN 980	0.102%	1 IN 1500	0.067%	1 IN 8000	0.013%
1 IN 20	5.000%	1 IN 220	0.455%	1 IN 680	0.147%	1 IN 990	0.101%	1 IN 1525	0.066%	1 IN 9000	0.011%
1 IN 21	4.762%	1 IN 230	0.435%	1 IN 700	0.143%	1 IN 1000	0.100%	1 IN 1550	0.065%	1 IN 10000	0.010%
1 IN 22	4.545%	1 IN 240	0.417%	1 IN 720	0.139%	1 IN 1010	0.099%	1 IN 1575	0.063%	1 IN 11000	0.009%
1 IN 23	4.348%	1 IN 250	0.400%	1 IN 740	0.135%	1 IN 1020	0.098%	1 IN 1600	0.063%	1 IN 12000	0.008%
1 IN 24	4.167%	1 IN 260	0.385%	1 IN 760	0.132%	1 IN 1030	0.097%	1 IN 1625	0.062%	1 IN 13000	0.008%
1 IN 25	4.000%	1 IN 270	0.370%	1 IN 780	0.128%	1 IN 1040	0.096%	1 IN 1650	0.061%	1 IN 14000	0.007%

THINK LEVEL
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