

Auto Steer Settings Farmlap2

Introduction

This document attempts to explain some of the auto steer settings used in Farmlap2 and how it affects the steering of the tractor under Farmlap2 steering control.

It must be read in conjunction with the *Farmlap2 Operation Manual* and *5500, RT4000 and 3500 Flexi Steer Hardware Installation Manual* .

Prerequisite

- It is assumed that all the components required, both electrical and hydraulic, have already been installed and tested for correct operation.
- It is assumed that the GPS receiver is receiving corrections, differential or RTK.
- It is assumed that the steering POD has the correct firmware version already loaded. *207.hex*
- It is assumed that the correct disables have been set correctly and tested.
- It is assumed that the wheel angle sensor has been mounted to achieve the maximum range possible as allowed by the tractor's steering geometry. Centre value of the wheel angle sensor must be as close to 512 as possible. The full lock left range should be similar to full lock right.

E.g. Center = 512,

Full lock left = 312,

Full lock right = 712,

The difference between the center and left lock = 200

The difference between the center and right lock = 200

Ensure that the difference between the left and right figure is **absolutely** no more than 40.

This can be corrected by adjusting how the wheel angle sensor is mounted.

Settings

WHEEL CENTER

- This is the sensor value when the vehicles wheels are dead straight which correlates to the sensor value.
- This number should not need to be adjusted after the auto cal

COUNTS/DEGREE

- Similar to the SLOPE value in Farmlap 1.
- This is a physical figure and should avoid altering this figure during calibration once it has been correctly determined.
- This figure is a real world figure and can be determined manually; this figure represents the total sensor range from right lock to left lock divided by the total angle range of the wheels.

E.g. Left lock sensor value = 312, Right lock sensor value = 712, therefore Sensor range = Right lock minus left lock = $712 - 312 = 400$. Measured Left lock real angle = 40° from dead center, measured right lock from dead center = 40° . Total angular range = 80° . Counts per degree = sensor range divided by angular range = $400/80 = 5$

- Sensor range is dependant on how the wheel angle sensor has been mounted. A high sensor range is very desirable, this means that the steering angle sensor needs to rotate as much as is possible from left lock to right lock.

MIN VALVE

- The steering valve is fully opened at a value of 1000, and fully closed at 0. The amount it is opened determines how fast the wheels turn.
- The MIN VALVE represents how fast the wheels turn when making small re-adjustments. E.g. when in parallel and within .1 of the line the MIN VALVE will be used. If this value is too high too much correction will occur causing very rapid left-right wheel movements. If this value is too low then not enough correction will cause slow oscillations and wandering off the line.
- The MIN VALVE should be set as high as possible without getting the fast left right wheel movements.
- There is no typical value as this is dependant on tractor hydraulics, counts/degree, etc.

MAX VALVE

- The steering valve is fully opened at a value of 1000, and fully closed at 0. The amount it is opened determines how fast the wheels turn.
- The MAX VALVE represents how fast the wheels turn when making large re-adjustments. E.g. when approaching a target runline from a large distance, from 2m or greater, the MAX VALVE will be used. If this value is too high too much correction will occur causing very rapid left-right wheel movements when approaching the line. If this value is too low then not enough correction will cause large overshoot as the wheels will not turn quickly enough.
- There is no typical value as this is dependant on tractor hydraulics, counts/degree, etc.

STEERING MAX

- The lower the value, more aggressive the steering.
- This value determines how much dampening is applied, having a high figure will result in slowing down the steering
- Typical values will range from 0.5 to 20.

MIN VALVE SHOT

- This is a very fine adjustment, the auto setup will determine this value correctly, no need to change this figure.

SENSOR VALUE

- The live time read out from the wheel angle sensor, this is only a display, not adjustable.

VALVE VALUE

- The live time read out of how open the steering valve is currently, this is only a display, not adjustable.

DEFAULT VALVE

- The starting value for doing the AUTO CAL procedure.
- Decrease the number if the Auto Cal procedure is too aggressive.

AXLE WIDTH

- Physical distance between the front or rear steering wheels.
- On multiple wheeled tractors, measure the distance between the centre wheels or the centre of the wheels.

STEERING AXLE TO ANTENNA

- Distance between the steering axle and the GPS antenna.
- On articulated tractors the FRONT axle is the steering axle.
- If steering axle is in front of the antenna (front wheel assist), the value is NEGATIVE, a harvester will have a positive value.

DRIVE AXLE TO ANTENNA

- Distance between the drive axle and the GPS antenna.
- On articulated tractors the REAR axle is the drive axle.
- If drive axle is in front of the antenna, the value is NEGATIVE, and vice versa.

LOOKAHEAD MIN/MAX

- The time in seconds that the auto steer looks ahead to determine the amount of correction required to keep the wheels on track.
- The Max value is used when significantly off the line.
- The Min value is used when close to the runline.
- If the max lookahead is too high acquiring the line will take longer. If too low steering will become extremely aggressive.
- In contour mode if overshooting corners the max lookahead is too high. If undershooting the corner then max lookahead is too low.
- Lower values will make the steering more aggressive.

TILT CORRECT

- Determines if the tilt correction is used or not.
- Always have it at YES.
- Select NO if using 3rd party tilt correction eg JD's terrain compensating module.

CENTRE CORRECT

- Allows Farmlap to check the center value while operating and adjust it if necessary.
- Always have it at YES.

In Conclusion

The art of getting tractors to steer correctly, either in parallel or contour, is to get the correct balance between all the settings suitable for the tractor hydraulics, ground conditions and the dynamics of the implement attached.

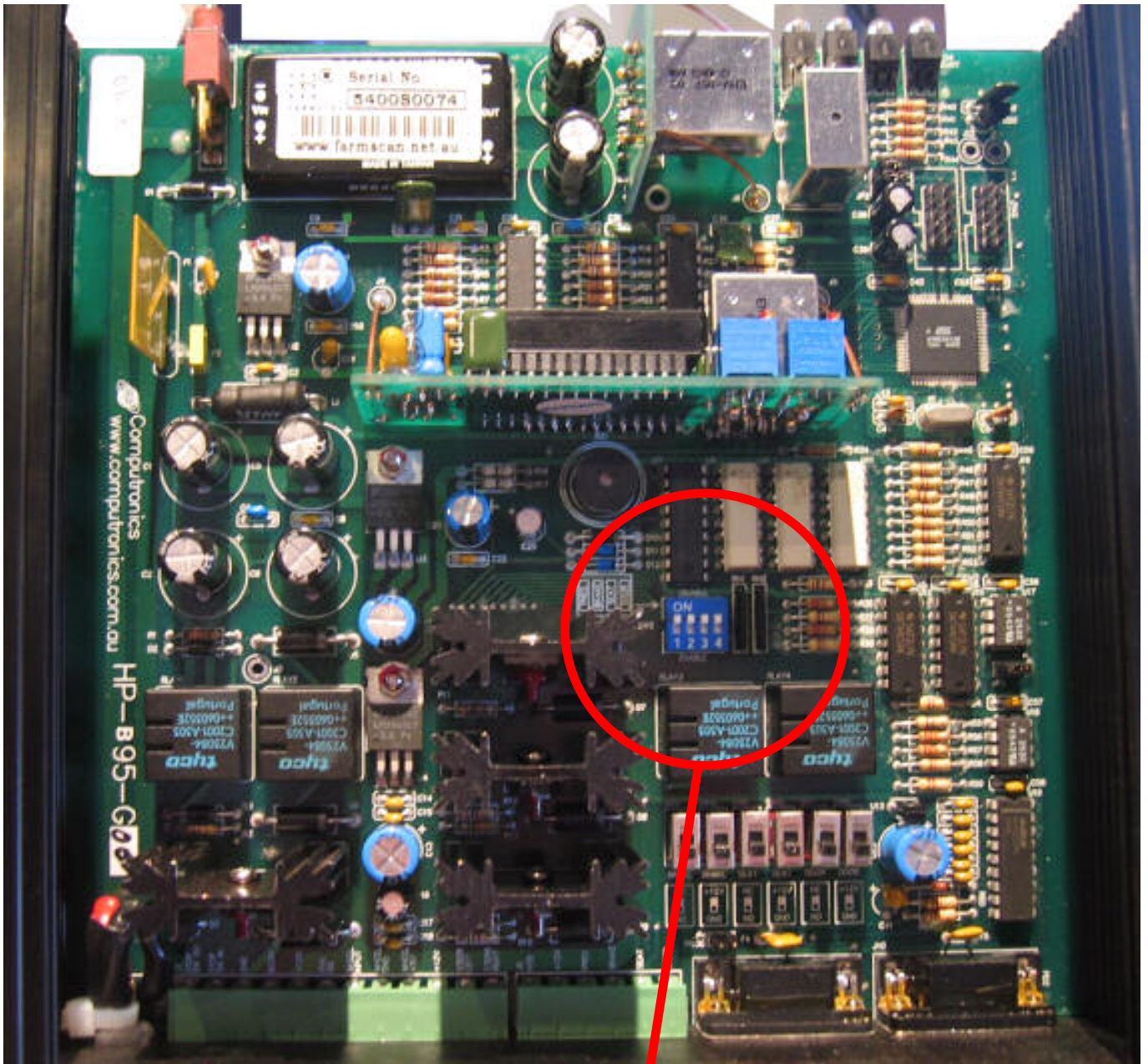
Quite often this may be achieved only by trial and error and spending some time on the tractor.

It is strongly advised to copy all settings once satisfactory control is achieved. These settings can then be used as a starting point on the next similarly sized tractor if the auto cal procedure does not produce a satisfactory result.

If you have any questions contact Farmscan Service on (08) 9470 1177

NOTES

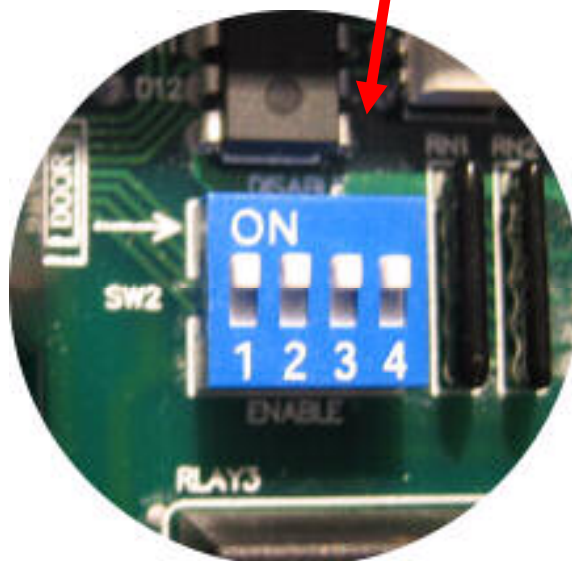
STEERING POD DISABLES



**** Current picture shows all DISABLES are OFF ****

When switches are in ON MODE DISABLES are OFF

When switches are down towards the numbers 1-4 Disables are ON



1 = Pressure Switch

2 = Brake

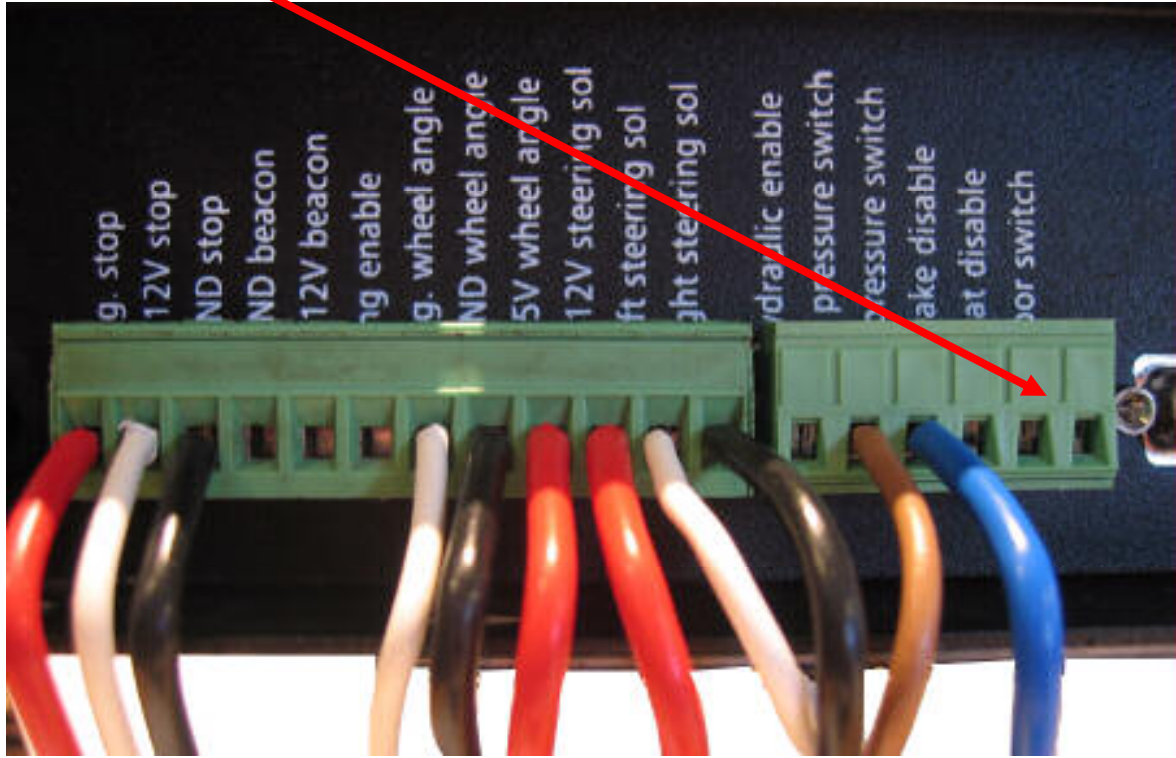
3 = Seat

4 = Door

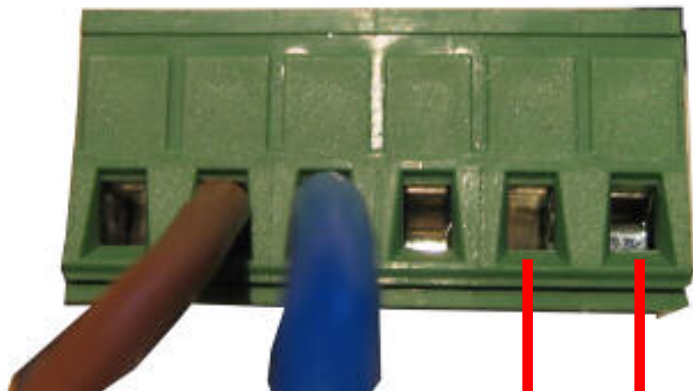
STEERING POD WIRING

Below is correct wiring & Colours for standard setup.

The picture below has no disables installed. They are normally installed at the right side of the 6 pin phoenix plug



PHOENIX PLUG



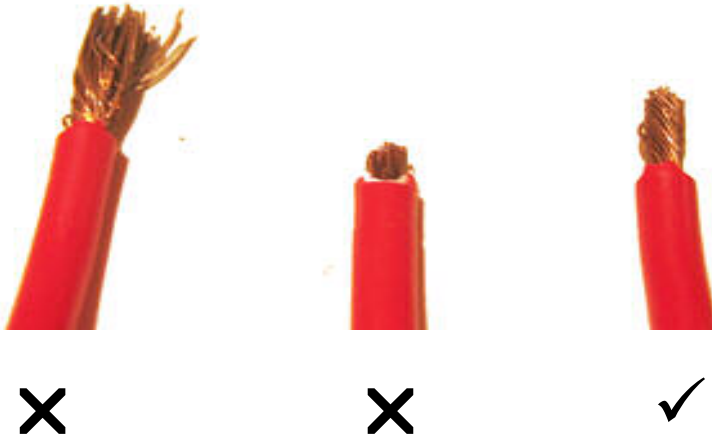
** Make sure these are fully Open before installing wires **

Full
OPEN
✓

Half
OPEN
✗

Always ensure that wires are stripped correctly. Too much or too little wire can give a poor connection when screwed down in phoenix plug.

Never solder ends of the wires. Always twist



** Back to basics **

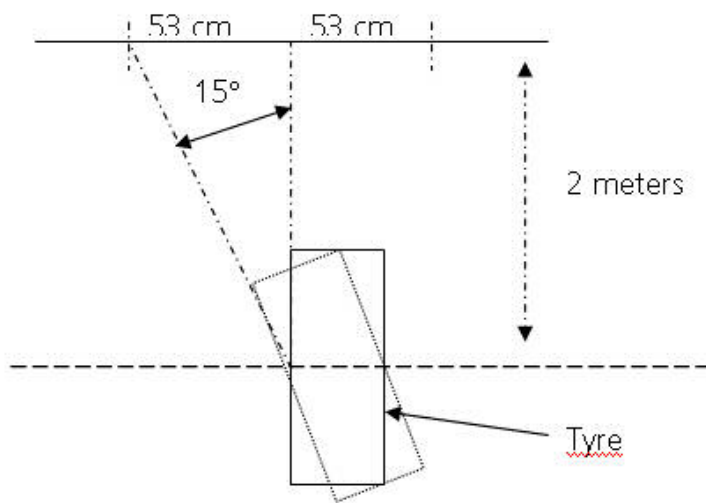


Figure 25 – Front Steering

1. With the wheels straight measure a straight-line 2 metres out the front of the tyre. A straight piece of angle iron is a good tool for this.
2. Measure 53 cm either side of the intersection.
3. Move the wheel to the left until it lines up with the point 53 cm to the left. Read the wheel angle sensor feed back in the INS screen. See "Setting up the wheel angle sensor"
4. Move the wheel to the Right until it lines up with the point 53 cm to the right. Read the wheel angle sensor feed back in the INS screen. See "Setting up the wheel angle sensor"
5. Use the following formulae to calculate the slope.

$$\frac{\text{Left wheel angle sensor value} - \text{Right wheel angle sensor value}}{30} = \text{Slope Value}$$

**** Write the settings down ****

AUTOSTEER SETUP 1		DEFAULT
ANTENNA HEIGHT []	STEER AXLE From Antenna m	AUTO SETUP []
POD POSITION []	DRIVE AXLE From Antenna m	DIAGNOSTICS Firmware Version
VERTICAL TILT [] m	MIN LOOKAHEAD [] sec	TILT CORRECT []
AXLE WIDTH Steering Axle m	MAX LOOKAHEAD [] sec	CENTER CORRECT []

AUTOSTEER SETUP 2		DEFAULT
WHEEL CENTER []	STEERING MAX []	AUTO SETUP []
COUNTS/DEGREE []	MIN VALVE SHOT []	POD STATUS DISABLED
MIN VALVE []	SENSOR VALUE []	STEERING ENABLED
MAX VALVE []	VALVE VALUE []	DEFAULT VALVE []