

Shepherd Steering Configuration with IVN and SharedLink

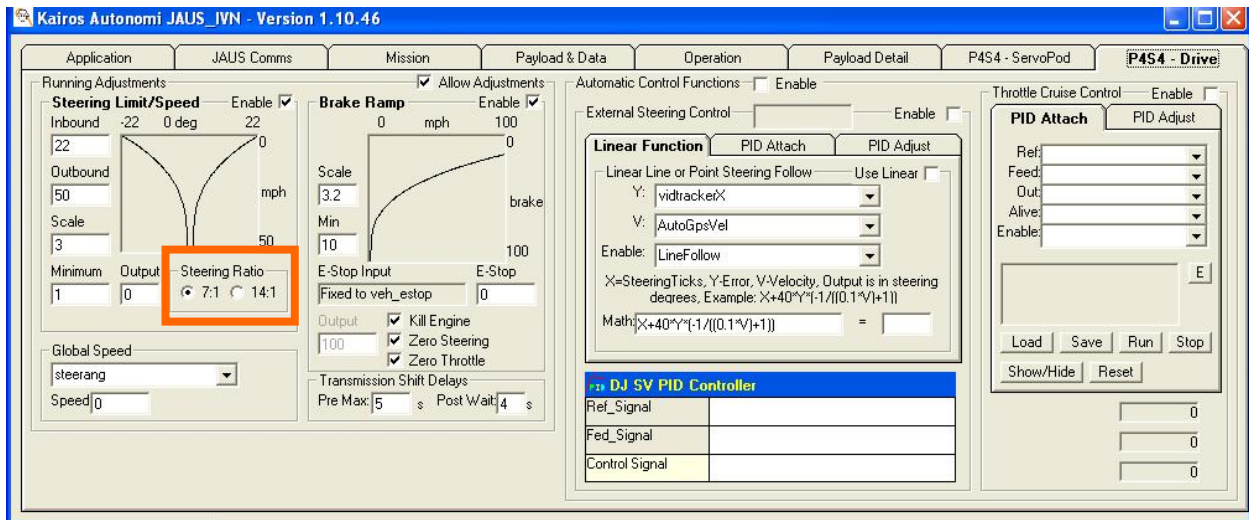
Introduction

The following steering configurations are available to Pronto4 systems that are running the standard Shepherd OCU software with IVN and SharedLink protocols.

Steering Ratio (aka Steps Per Degree)

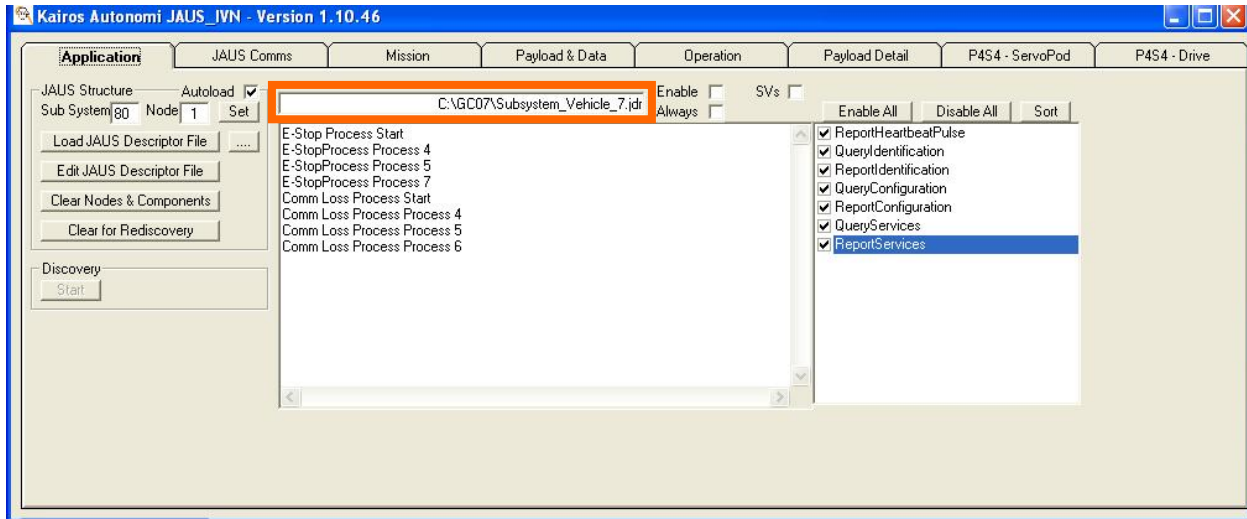
The steps per degree in IVN are fixed by the type of steering ring that is used. Kairos only sells steering rings with 7:1 or 14:1 ratios.

The software setting for steering ratio is in the JAUS_IVN application, on the “P4S4 – Drive” tab.



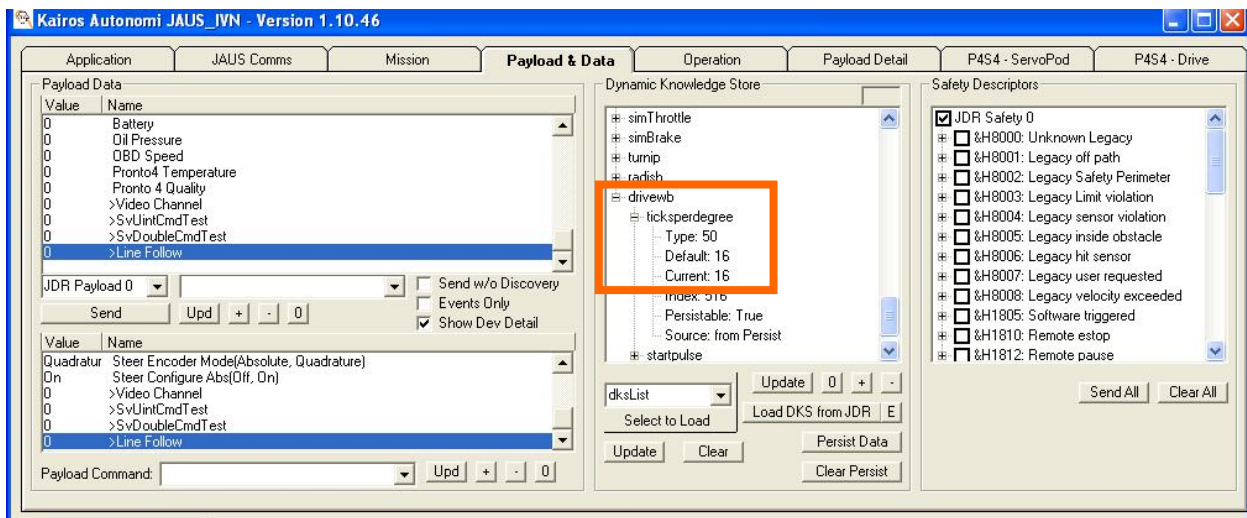
Ticks Per Degree

Each Pronto4 system has a database, the Dynamic Knowledge Store (DKS), of robot specific settings. This database is loaded from a “jdr” file. In JAUS_IVN, on the “Application” tab, the currently loaded jdr filename is displayed. The filename field is editable, and may be used to load an alternative jdr file.



The recommended method to modify the ticks per degree is in the JAUS_IVN application, on the “Payload & Data” tab.

1. In the “Dynamic Knowledge Store” area there is a tree. Clicking on a symbol next to a branch will expand that branch. Expand “drivewb” and “ticksperdegree”.
2. Double-click the “Current:” value, change the value to the desired ticks per degree, then press the enter key.
3. Click the “Persist Data” button to save the edited DKS.



Steering and Braking Profile

A steering profile can be set in IVN that progressively limits the maximum steering angles..

This is done through the JAUS_IVN application, on the “P4S4 – Drive” tab.

1. On the “P4S4 – Drive” tab, ensure:
 - a. “Allow Adjustments” is checked
 - b. Steering Limit per Speed's “Enable” is checked
 - c. E-Stop Brake Ramp's “Enable” is checked
 - d. “Global Speed” drop-down is set to “AutoGpsVel”
 - e. “Steering Ration” is set to according to the steering ring's steps per degree ratio.
2. Set variables as follows (i.e. manually restore default values):
 - a. Steering Limit per Speed
 - i. Inbound = 450
 - ii. Outbound = 50
 - iii. Scale = 3
 - iv. Minimum = 10
 - b. E-Stop Brake Ramp
 - i. Scale = 3
 - ii. Minimum = 10
 - iii. Zero Steering = checked
 - iv. Zero Throttle = checked
 - v. Kill Engine = checked
3. Check the “Enable” checkbox for:
 - a. Steering Limit per Speed
 - b. E-Stop Brake Ramp
4. Drive the vehicle noting turning and e-stop responsiveness at various speeds.
5. Based on performance in step 4 and desired range responsiveness, adjust the following variables as follows:
 - a. Steering Limit per Speed
 - i. Minimum = Vehicle's minimum steering angle for the purpose of steering responsiveness
 - ii. Outbound = Vehicle's maximum speed (mph) for the purpose of steering responsiveness

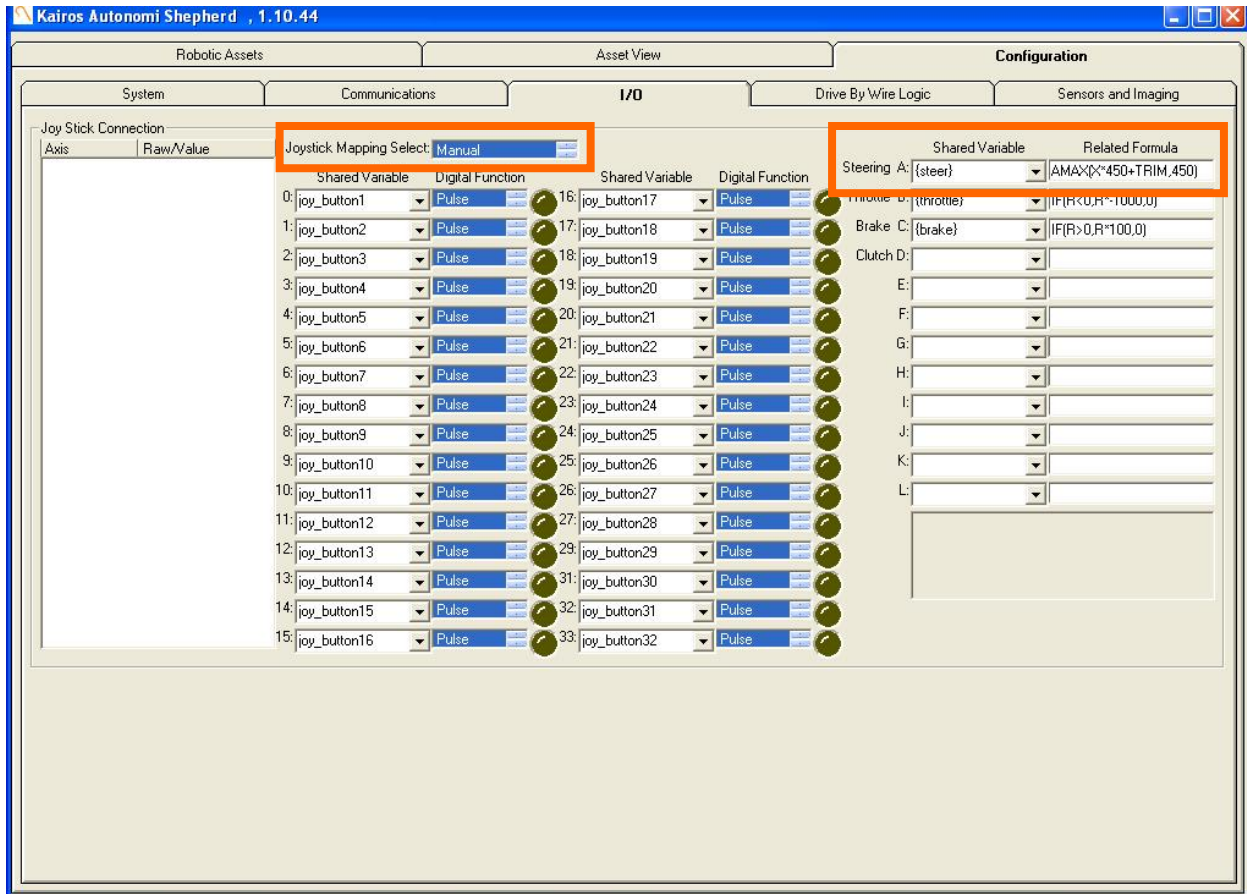
- iii. Inbound = Maximum vehicle steering angle in degrees
- iv. Scale = Logarithmic value determining the steering responsiveness curve (displayed in the Steering Limit per Speed graph area)
- v. Output = NOT set by users (actual output steering angle based on curve)
- b. E-Stop Brake Ramp
 - i. Minimum = Vehicle's minimum brake application, in percentage of available brake pedal travel
 - ii. Scale = Logarithmic value determining the E-Stop responsiveness curve (displayed in the E-Stop Brake Ramp graph area)
 - iii. E-Stop = NOT set by users (current E-Stop state)
 - iv. Zero Steering = binary value; when an E-Stop is engaged, if checked the Steering Ring will return to the Center position. Should be set based on range conditions.
 - v. Zero Throttle = binary value; when an E-Stop is engaged, if checked Throttle servo will return to 0% position. Kairos Autonomi strongly recommends having Zero Throttle checked.
 - vi. Kill Engine = binary value; when an E-Stop is engaged, if checked vehicle engine will be stopped. Kairos Autonomi strongly recommends having Kill Engine checked.
- 6. Click the red X button in the upper-right corner of the "JAUS_IVN" window.
- 7. When asked whether to save INI changes, select "Yes".
- 8. Repeat steps 3 - 5 until step 4 yields acceptable vehicle responsiveness for the range.

Joystick Steering Range

Joystick steering range is calculated in Shepherd.

In Shepherd, navigate to the “Configuration” tab and “I/O” sub-tab.

1. Click the “Joystick Mapping Select” options, then click the “Manual” option. This selects the Manual option, and allows the “Related Formula” entries to be edited.
2. Edit the numerical values in the “Steering A:” related formula (i.e. the body of the formula should remain “AMAX(X*____+TRIM,____)”).
3. When Shepherd is closed, the parameters will be saved.



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