

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.

🕅 Kairos Autonomi JAUS_IVN - Versior	1.10.46					
Application JAUS Comms	Mission	Payload & Data	Operation	Payload Detail	P4S4 - ServoPod	P4S4 - Drive
Running Adjustments Steering Limit/Speed Inbound -22 0 deg 0 Outbound 50 Scale 3 0 1 0 Steering Ratio 1 0 \$teering Ratio \$teering Ratio \$teerang \$steerang \$speed	Image: State of the state o	Adjustments Automatic Enable 100 brake 100 E-Stop 2 /att]4 s Automatic External	Control Functions — En Steering Control PID Atta r Line or Point Steering Fol vidtracketX AutoGpsVel LineFolow sering Ticks, Y-Error, V-Vele degrees, Example: X+40 X+40°Y"(-1/((0.1°V)+1)) SV PID Controller hal hal ignal	able Enable	Throttle Cruise Co PID Attach Ref Feed Out Alive Enable Load Sav Show/Hide	PID Adjust



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.

🔍 Kairos Autonomi JAUS_IVN - Vers	sion 1.10.46					
Application JAUS Comm	s Mission	Payload & Data	Operation	Payload Detail	P4S4 · ServoPod	P4S4 - Drive
JAUS Structure Autoload V Sub System(80 Node 1 Set Load JAUS Descriptor File Clear Nodes & Components Clear for Rediscovery Discovery Start	C:\GC(Stop Process Stat StopProcess Process 4 StopProcess Process 5 StopProcess Process 5 Comm Loss Process Stat Comm Loss Process Process 4 Comm Loss Process Process 5 Comm Loss Process Process 6 (/7\Subsystem_Vehicle_7.j	dr Always F SVs	Enable All II Providentification Preport/HeartbeatF Query/dentification Preport/Onfiguration QueryConfiguration QueryServices PreportServices	Disable All Sort	

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.

Application	JAUS Comms 1	Mission	Payload & Data	Operation	Payload Detail	P4S4 - ServoPod	P4S4 · Drive
Payload Data Value Name 0 Battery 0 OIP resure 0 OBD Speec 0 Pronto 4 Tei 0 Pronto 4 Tei 0 Pronto 4 Tei 0 SvUnitCme 0 SvUnitCme 0 SvUnitCme 0 Send Value Name Quadratur Steer Config 0 Ster Config	Inperature ality anel Test imdTest der Mode(Absolute, Quadrature) unel unel Test imdTest	▼ Send w/ Events 0 ▼ Show De	D Discovery Inly v Detail Upd	nic Knowledge Store mThrottle mBrake mip dish ticksperdegree Type: 50 Default: 16 Current: 16 Persistable: True Source: from Persist statpulse text to Load ate Clear	ate D + DKS from JDR E Persist Data Clear Persist	Safety Descriptors JDR Safety 0 * \$48000: Legacy off * \$48000: Legacy off * \$48000: Legacy sa * \$48003: Legacy ins * \$48005: Legacy ins * \$48005: Legacy ins * \$48005: Legacy uns * \$480008: Legacy uns * \$48008: Legacy uns * \$4808: Legacy uns * \$4	Legacy path fely Perimeter nit violation ide obstacle sensor er requested locity exceeded iggered top use Send All Clear Al



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.

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- 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^{1}
 - 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

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- 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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Joy Stick Connection						
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	Shared Variable Dig	gital Function 5	hared Variable Digi	se	Thiotte D. (throttle)	
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	2: joy_button3 V	ilse 📫 🙆 18: joy	button19 👻 Pul	se 📰 🖌	Clutch D:	
	3: joy_button4	ilse 19: joy_	button20 🗸 Pul:	se 📰 🏹	E:	
	4: joy_button5	ilse20: joy_	button21 📃 🔽	se 📃 🏹	F:	
	5: joy_button6	ilse 🔁 🧖 21: joy_	button22 🚽 Pul	se 🖃 🏹	G:	_
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Contact Information

Kairos Autonomi 498 West 8360 South Sandy, Utah 84070 801-255-2950 (office) 801-907-7870 (fax) www.kairosautonomi.com