

## **IVN DKS Settings Calibration**

This procedure documents the Calibration process for the Dynamic Knowledge Store (DKS) transmission settings in the Intelligent Vehicle Navigation (IVN) Software.

- 1. Complete the "Inspections and Preparation" of the robot and OCU following normal operational procedures.
- 2. Ensure the safety operator is in the driver's seat, with seat belt secured, clear of all controls, including the steering wheel, and in a position to activate controls, including the brake pedal.
- 3. Ensure:
  - vehicle engine is running
  - transmission is in Park, if the vehicle does not have a Park gear ensure it is in Neutral
  - transmission cable is connected
- 4. In Shepherd, on the "Assets" Tab, select the robot asset, and click the VNC button.
- 5. Identify the vehicle's transmission shifting values, as follows:
  - a. In the VNC window, restore JAUS\_IVN, on the "P4S4 ServoPod" tab, type '0' into the "Trans" text area. Press the 'Enter' key. This will fully extend the transmission cable.

Kairos Autonomi JAUS_IVN - Version 1	1.00.23		
Application JAUS Comms	Mission Payload & Data	Operation Payload Detail	P4S4 - ServoPod P4S4 - Drive
Com Port 1           F: ABpeck READ           F: ABpeck READ           UEH I CLEI (09)           F: ABpeck READ           F: ABpeck READ           UEH I CLEI (09)           F: ABpeck READ           UEH I CLEI (199)           F: ABpeck READ           UEH I CLEI (199)           Servopod Access           Steering           Calbrate           Forth           Clear Buffer           Packet Actv           SVP Init	$\begin{array}{c c c c c c c c c c c c c c c c c c c $	832     21704     2800     0     0     1     0     30       832     21704     2800     0     0     1     0     30       736     21576     2760     0     0     1     0     30       824     21576     2726     0     0     1     0     30       824     21576     2726     0     0     1     0     30       824     2168     2756     0     0     1     0     30       824     2168     2756     0     0     1     0     30       824     2168     2756     0     0     1     0     30       824     2168     2566     0     0     1     0       972     21736     2566     0     0     1     0       972     21736     2566     0     0     0     1     0       8     7     1712     256     0     0     1     0       70     775     50     50     50     50       50     50     50     50     50       9     9     1     10     10       9     1     0	9 (98) 10         000 1         0 (000 1

b. Increment the value in the "Trans" text area, and press the 'Enter' key, until the vehicle solidly shifts to the next gear (e.g., from 0:Park enter 2, then 4, then 6, and so on until the gear shifts solidly into Reverse). Note the value and the gear changed (e.g., "25" - reverse from park, "32" - neutral from reverse, etc.).

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- c. Repeat step 5.b. until you have a value for each gear listed below that consistently and solidly shifts between the specified gears:
  - i. to Reverse from Park, if the vehicle does not have a Park gear use to Reverse from Neutral for this setting
  - ii. to Neutral from Reverse
  - iii. to Forward (i.e., Drive)
  - iv. to Neutral from Forward
  - v. to Reverse from Neutral
  - vi. to Reverse from both Park and Reverse
  - vii. to Neutral from both Reverse and Forward
- 6. Enter and persist the identified transmission shifting values, as follows:
  - a. In the VNC window, in JAUS\_IVN, on the "Payload & Data" tab, in the "Dynamic Knowledge Store" area, scroll to and then expand the "Transmission" section.
  - b. In the expanded "Transmission" section, expand the "calReverseFromPark" section.
  - c. Click & hold the "Current" value until it highlights.
  - d. Type in the value identified in step 5.
  - e. Press the 'Enter' key.
  - f. Click the Persist Data button.

Application JAUS Comms	Mission	Payload & Data	Operation	Payload Detail	P4S4 · ServoPod	P4S4 · Drive
Payload Data Value Name UP Di Pressure UP Prontod Temperature Prontod Temperature Prontod Quality Send Send UP Contod Quality Send UDR Payload 0 ▼ Value Name Undatur Steer Encoder Mode(Absolute, Qua Send Upd t + 0 Value Name Send Upd t + 0 Value Name Value Name Value Channel Send Upd t + 0 Value Name Value Channel Send Configure Absolute, Qua Steer Encoder Mode(Absolute, Qua Steer Encoder Mod	✓ Send w/o [ Events Only ✓ Show Devi drature)	Detail	ic Knowledge Store smission calPark calPark calPark calPark calParesefromPark Type: 10 Defealt: 35 Current: 30 Index: 201 Persistable: True Source: from Persist calNeutralFromPervare calNeutralFromPervare calNeutralFromPervare to Load Load I te Clear	ate 0 + · · DKS from JDR E Persist Data Clear Persist	Safety Descriptors  JDR Safety 0  + 348000: Unknown Li  + 348000: Legacy Safe + 348000: Legacy Safe + 348000: Legacy climi + 348000: Legacy unit + 348000: Legacy unit + 348000: Legacy unit + 348000: Software tit + 348000: Softwar	egacy hath sty Perimeter tviolation se obstacle ensor requested city exceeded gered op end All Clear A

- g. Repeat steps 6.b.-6.f. for:
  - i. calPark = 0, if the vehicle does not have a Park gear use the Neutral from Reverse value for this setting
  - ii. calNeutralFromReverse, if the vehicle does not have a Park gear use the Reverse from Neutral value for this setting
  - iii. calForward
  - iv. calNeutralFromForward

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- v. calReverseFromNeutral
- vi. calReverse
- vii. calNeutral
- 7. Verify DKS settings were retained, as follows:
  - a. Still in the VNC window, in JAUS\_IVN, on the "Payload & Data" tab, in the "Dynamic Knowledge Store" area, scroll to then expand the "Transmission" section.
  - b. Click the Load DKS from JDR button. This will refresh the DKS area's values.
  - c. Expand the Transmission's sections listed (and highlighted in Figure E-3) and verify the values listed were properly retained:
    - i. calPark = 0, if the vehicle does not have a Park gear use the Neutral from Reverse value for this setting
    - ii. calReverseFromPark
    - iii. calNeutralFromReverse
    - iv. calForward
    - v. calNeutralFromForward
    - vi. calReverseFromNeutral
    - vii. calReverse
    - viii. calNeutral

Application	JAUS Comms	Mission	Payload & Data	Operation	Payload Detail	P4S4 - ServoPod	P4S4 · Drive
Payload Data Value Name			Dyna	mic Knowledge Store		Safety Descriptors	
Batteny Oil Pressure OBD Speed Pronto4 Tem Pronto4 Tem Pronto4 Qua Svideo Chann SvUntCmdT SvDoubleCn Send Uadatur Steer Encode Uadatur Steer Encode Uadatur Steer Encode Send Value Name Judatur Steer Encode Svideo Chann SvUntCmdT SvDoubleCn SvDoubleCn SvDoubleCn SvDoubleCn SvDoubleCn SvDoubleCn SvDoubleCn	berature lity el est dTest Jpd + 0 r Mode(Absolute, Quadrature e Abs(DIr, Dn) el est dTest	▼ Send Even ⊽ Show	w/o Discovery ts Only Dev Detail + - 0	c callaverseFromPark c calleverseFromPark c calleverseFromPark c calleverseFromNeutral c calleverseFromNeutral c calleverseFromReverse c callorumerra c callerverse c calleverse c calleve	tec 0 + . → XCS from JDR E Persist Data Clear Persist	JDP Safety 0           +         #140000; Unknown L           +         #14000; Unknown L           +         #14000; Legacy off ;           +         #14000; Legacy off ;           +         #14000; Legacy off ;           +         #14000; Legacy insi           +         #14000; Legacy insi           +         #14000; Legacy use           +         #14000; Legacy use           +         #14005; Software tit           +         #14005; Software tit           +         #14005; Software tit           +         #14105; Software tit           +         #11810; Remote est           +         #11812; Remote pau	egacy path ty Perimeter k violation sor violation de obstacle ensor r requested pocity exceeded ggered op use isend All Clear A

- 8. Close the VNC window.
- 9. The vehicle's transmission is now calibrated.

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## **Bidirectional Shifting**

Mechanical push/pull cables inherently have some directional slack. Depending on various factors this slack can impact shifting transmission gears. One way to compensate for directional slack is to have two values for the same desired goal, one for each possible direction (e.g., Reverse from Park and Reverse from Neutral). Bidirectional is more accurate. The Kairos software suite supports both bidirectional and non-directional shifting at the vehicle level.

The option is located on the Pronto4 unit, in JAUS\_IVN, under the "Operation" tab, in the "Operational Options" section, as "Bidirectional Shifting".

If "Bidirectional Shifting" is checked then bidirectional shifting is used (e.g., calReverseFromPark and calReverseFromNeutral). If "Bidirectional Shifting" is unchecked then non-directional shifting is used (e.g., Reverse).

🗟 Kairos Autonomi JAUS_IVN - Version 1.08.32							
Application JAUS Comms	Mission	Payload & Data	Operation	Payload Detail	P4S4 - ServoPod	P4S4 · Drive	
Primative Driver - Platform Operational Data Load Engine Temperature: 200 Update Clear Engine RPM: 2000 Payload E-Stop Primative Driver	15:10:56 Battery Voltage (0:100% Fuel Level (0:100% Oil Pressure (0:100% A/M Primative (	30, 1, 33, 1 50 45 75 Paylo Paylo Paylo Paylo Paylo Paylo	ad Scanner ayList Dad Not yet Disco Vehicle Status	PD - Platform Discr Load Propulsion Main On/Off	rete Devices — 15:10:56 — Fresh Safety Gear Farking Brake	30, 1, 33, 1 Update Transfer	
Emergency Stop	Manual 30, 1, 42, 1-		<ul> <li>Heartbeat</li> <li>Ready</li> <li>Enable</li> <li>Start</li> </ul>	Main Energy Aux Energy Aux Energy Aux Energy Aux Devices Starter Cold Start Auto Start Auto Start Kairos Cc	Hom "Run Lights "Low Beams "High Beams "Strobe Light "Right Blinker "Left Blinker VGC07-VJAUSPlatformSpecif	ications. Ixt	
Velocity X: 0 Velocity Y: 0 Velocity Z: 0 Velocity AMS: 0 Load Update Clear	0 0 0 15:10:56 0 15:10:56	Load Upd	Operational Option     ✓ Park on Deadr     ✓ Park on Deadr     ✓ Enable Vehicle     ✓ Calibrate Steer     ✓ Park on Pause	ns nan Loss on Auto Mode ing Before Pathing	Bidirectional Shifting     Ignore Park on Estop		

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