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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.
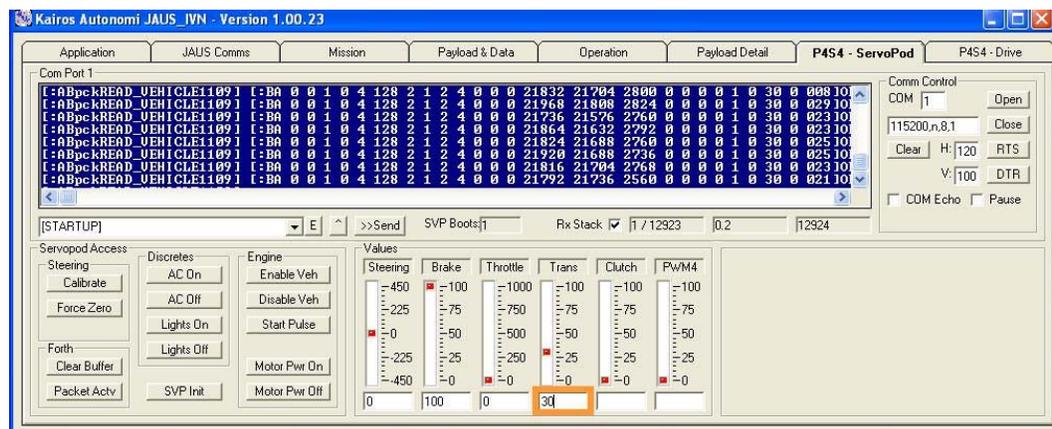
   b. Increment the value in the "Trans" text area, and press the 'Enter' key, until the vehicle solidly shifts to the next gear (e.g., from 0:Park enter 2, then 4, then 6, and so on until the gear shifts solidly into Reverse). Note the value and the gear changed (e.g., "25" - reverse from park, "32" - 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.
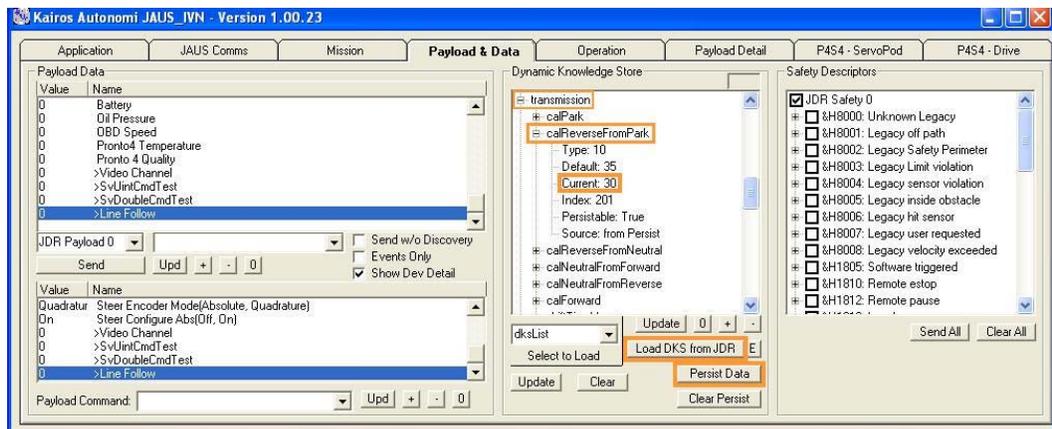
    g. Repeat steps 6.b.-6.f. for:
- i. calPark = 0, if the vehicle does not have a Park gear use the Neutral from Reverse value for this setting
- ii. calNeutralFromReverse, if the vehicle does not have a Park gear use the Reverse from Neutral value for this setting
- iii. calForward
- iv. calNeutralFromForward

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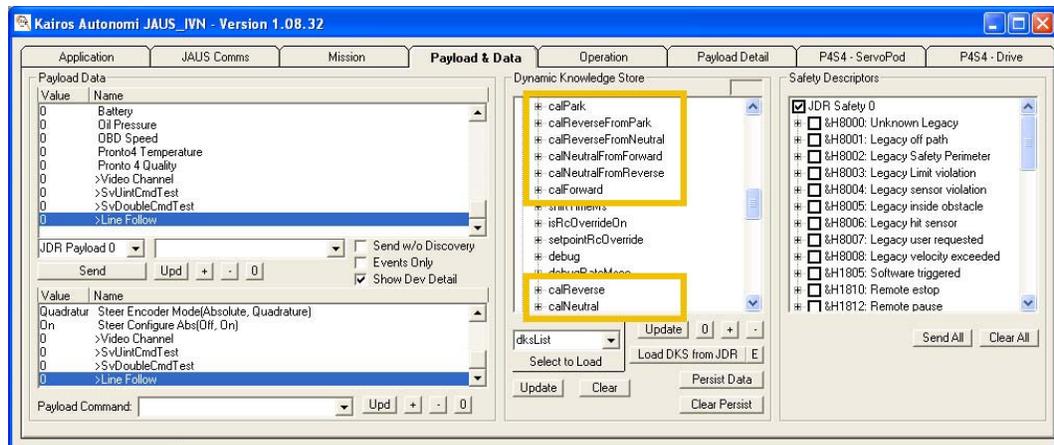
8. Close the VNC window.
9. The vehicle's transmission is now calibrated.

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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).