



## Shift By Wire (SBW & SBW II)

### Troubleshooting Guide

**AES-125-C**

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## ARENS CONTROLS COMPANY

### SHIFT-BY-WIRE TROUBLESHOOTING GUIDE

**WARNING!** - Park the vehicle on level ground. Set the emergency brake and chock/block the tires to prevent the vehicle from moving unexpectedly. Failure to do so may result in property damage, personal injury, or death.

1. If the vehicle is equipped with a WHEELCHAIR LIFT, make sure that it is properly stowed. The Shift-by-Wire System will not shift into range with the WHEELCHAIR LIFT deployed.
2. Turn ignition switch to ON, but do not start vehicle. The Shift Selector Display should turn on and display P or NN (P only appears on the right character of the display). P will appear for Park equipped vehicles, and NN will appear for all other vehicles. Press P on Park equipped Transmissions or N on non-Park equipped Transmissions and see if it shifts. If it does shift, proceed to Step 3. If it does not Display P or NN, or does not shift, then proceed to the Electrical Troubleshooting Section.
3. Start engine. If the engine starts, the transmission is in NEUTRAL or PARK. Be sure the display indicates NN or P. If it does, go to Step 4. If it doesn't, go to the Electrical Troubleshooting Section.
4. Press the R button for REVERSE. See if RR is displayed. Listen for backup warning beeper if equipped. If warning beeper sounds, the Transmission Shifter has shifted the transmission to Reverse. If it does, go to Step 5. If it doesn't, go to the Electrical Troubleshooting Section.
5. **On 5 Speed Transmissions**, press the D button for DRIVE. Check that D1 is displayed.
  - a. If D1 is displayed, proceed to Step 7.
  - b. If DD is displayed the J1939 CAN is not working or the connector is not making contact – proceed to the Loss of J1939 Section for more details. The CAN connector is usually behind the instrument panel to the left of the steering column.
  - c. If D3 is displayed, the Transmission TCM is in the Limp Home Mode. Proceed with Transmission Diagnosis per Allison Troubleshooting Procedures. **If the vehicle is in Limp Home Mode do not turn off the engine.** Once the engine is turned off the vehicle will not start again, and will likely need to be towed. Consult Allison for further details.
6. **On 6 Speed Transmissions**, press the D button for DRIVE. Check that 61 is displayed.
  - d. If 61 is displayed, proceed to Step 7.
  - e. If D\* is displayed the J1939 CAN is not working or the connector is not making contact – proceed to the Loss of J1939 Section for more details. The CAN connector is usually behind the instrument panel to the left of the steering column.

f. If 63 is displayed, the Transmission TCM is in the Limp Home Mode. Proceed with Transmission Diagnosis per Allison Troubleshooting Procedures.

7. With the Transmission in DRIVE perform the following checks:

<u>Step</u>	<u>Action</u>	<u>5-Speed Display</u>	<u>6-Speed Display</u>
1	D	D1	61
1a	↓	(Skip for 5-Speed)	51
2	↓	41	41
3	↓	31	31
4	↓	21	21
5	↓	11	11
6	↑	21	21
7	↑	31	31
8	↑	41	41
8a	↑	(Skip for 5-Speed)	51
9	↑	D1	61

If all ranges show up correctly, the Shift-by-Wire System is functioning normally. Proceed with Transmission Diagnosis per Allison Troubleshooting Procedures. If not, contact Arens Controls at (847) 844-4700 for further assistance.

### Electrical Troubleshooting Section

1. If there is no display or power to Shift-by-Wire System when the ignition is on, check the following fuses and connections at the body fuse panel:
  - a. **Main Power** – Locate the Main Power 10 amp fuses (V-Bat). There are 2 fuses (requiring 2 grounds & 2 main power lines). These 2 main power lines must NOT go through the ignition switch. They must supply constant power to the system at all times, even when the ignition is OFF.
  - b. **Ignition** – Insure that the ignition line is connected to the ignition circuitry. This is different from the 2 main power lines.
  - c. **Grounds** – Insure that the 2 ground lines are securely fasten to a good, clean ground.
2. Remove the Shift Selector from the Console (2 U-Brackets from underneath) and check to see if the connector in the back is firmly plugged in. If it is, then run a continuity check of each of the wires listed in No. 1 above.
3. If the display still does not illuminate replace the Shift Selector.
4. If the Shift Selector display illuminates, but the transmission still will not shift into the various ranges, check the two connectors on the Actuator Assembly on the left side of the transmission. One is on a pigtail to the motor portion of the actuator, and the other is plugged directly into the position sensor. Make sure both connectors are in good condition (no pushed out pins or damage) and properly connected.

On Wheelchair lift equipped vehicles, also check that the wheelchair lift is properly stowed. If the Wheelchair lift is not stowed or functioning properly this may prevent the operation of the PBSS (Push Button Shift Selector).

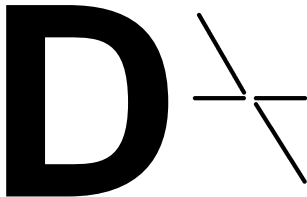
If the connectors check out OK, and it still will not shift, check continuity of each of the wires to the sensor and motor from the connectors at the Actuator to the connector at the Pushbutton Shifter. If the wiring is OK and trouble is still being experienced, then call Arens Controls for further instructions at (847) 844-4700.

#### **Loss of J1939 Section – 5 Speed**

The 5-speed version of the SBW and SBW II does not require the CAN J1939 signal for shifting, so loss of the signal will not result in any changes to the Shifter or its functionality.

#### **Loss of J1939 Section – 6 Speed**

Loss of the J1939 to/from the shifter results in a catseye (shown below) being displayed on the MONITOR display. The SELECT display works as normal except that Drive will only display **DD** on 5-Speed Transmissions, and **D** with a catseye on 6-Speed Transmissions. Upshift and Downshift commands are sent on the J1939 link and will not function in this mode. The vehicle transmission will not be able to hold any of the forward gears unless the loss of J1939 occurred while a lower range was currently selected – in this case the selected range will be the max range. Press **D** during this condition to enable shifting to all gears



#### **6 Button Shift Selector – Shifting to Park or D1 when Key is turned off.**

If the controller shifts to PARK or D1 when the Key is turned off, this can be quickly remedied. This is most likely due to a loose or dirty Power and/or Ground Connections. Consult an Authorized Allison Service Center for assistance.

#### **6 Button Shift Selector – Monitor Display shows P (where Park is not an available option).**

If the Monitor Display shows P (which it should not, since the 6 Button system does not include a Park Setting) then safely stop the vehicle and set the Emergency Brake. This is most likely caused by a loose or dirty Power or Ground Cable. Consult an Authorized Allison Service Center for assistance.