



**Shift By Wire (SBW & SBW II)**

**Operators Guide  
5 Speed and 6 Speed  
Allison Transmission  
1000, 2000, 2400 Series**

**AES-205**

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## WARNINGS, CAUTIONS, AND NOTES

IT IS YOUR RESPONSIBILITY to be completely familiar with the warnings and cautions described in this operator's guide. It is, however, important to understand that these warnings and cautions are not exhaustive. Arens Controls could not possibly know all the possible ways the Shift By Wire system may be utilized in each manufacturer's vehicle. The vehicle manufacturer is responsible for providing information related to the operation of the vehicle systems. Additionally, the Arens Controls Shift By Wire system is designed to automate the gear selection of the Allison Transmission 1000/2000/2400 transmissions. The Arens Controls Shift By Wire system in no way defeats or compromises the Allison Transmission system. Therefore, it is imperative that the Allison Transmission operator's manual be read and understood for the safe operation of the transmission.



**WARNING:** A warning is used when an operating procedure or practice, if not correctly followed, could result in personal injury or loss of life.



**CAUTION:** A caution is used when an operating procedure or practice, if not correctly followed, could result in personal injury or damage to property.

**NOTE:** A note is a brief statement meant to help guide you in the use of the product, or to alert you to a specific function or feature.

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## **A BRIEF DESCRIPTION OF THE ARENS SHIFT BY WIRE SYSTEM**

The Arens Controls Shift By Wire System (SBW & SBW II) is a state of the art control developed for use with Allison 1000/2000/2400 Series Transmissions. This shift selector simplifies driver operation, and features:

- Push-button operation
- Integrated safety features
- Solid state construction for extended life and reliable operation

The system consists of two major components:

1. The Push Button Shift Selector is mounted in a convenient location near the vehicle operator. It is a self-contained electronic control that contains the push button system, Interface Control Module, and the Actuator Control Module. The push button pad provides quick and easy operator on the system functions. The Interface Module communicates electronically with the Allison TCM and NSBU switch. The Actuator Control communicates with the Arens actuator and the integrated Position Sensor.
2. The Shift By Wire Actuator is mounted directly on the Allison Transmission. The actuator shifts the transmission as directed by commands from the shift selector and within the operating guidelines of the Allison transmission. The Arens SBW system works in conjunction with the Allison “adaptive shifting” electronic control system to provide optimized shift quality. The SBW & SBW II also have a unique redundant electronic system which prevents single point electrical failures in the system and ensures long life & trouble free operation of the SBW & SBW II system and the Allison transmission.

Please read and study this manual to become familiar with all the SBW & SBW II features. For applications using other transmissions please contact Arens Controls Company at (847) 844-4700.

## PUSH BUTTON SHIFT SELECTORS



**Park Equipped**



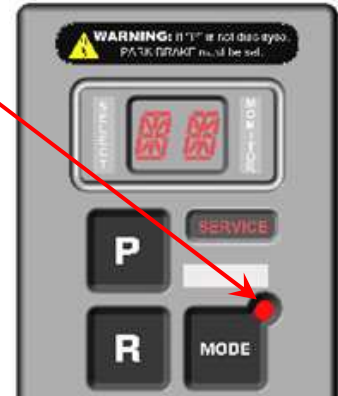
**Non-Park Equipped**

The Shift Selector allows the operator to quickly and easily shift the transmission and engage any vehicle-specific MODE functions. To help the operator quickly recognize which function is active, there are four important displays:

1. **SELECT DISPLAY:** This LED Character shows which gear has been selected by the operator. It will display D, R, or N on the 5-Speed versions, or a number reflecting the specific gear on the 6-Speed versions. P is typically not displayed for Park – the P only appears on the MONITOR DISPLAY side.
2. **MONITOR DISPLAY:** This LED character shows which transmission gear is currently engaged. This includes P, R, N, and numerical values for forward gears. This side typically does not display D for Drive – it allows the operator to glance down and see the specific gear they are currently using.



3. **MODE** The MODE button activates the function identified by the label above it and may vary from vehicle to vehicle. A light will illuminate in the corner of the button when the MODE is on. This function is optional, based on the vehicle.



4. **SERVICE** If the SERVICE display illuminates there is a fault in the SBW system. A qualified technician should inspect the system as soon as possible.



**WARNING:** Operation with the SERVICE light illuminated may indicate a loss of safety back up systems, and the operator should use extra caution when shifting to ensure that the transmission is performing properly.



## SHIFT SELECTOR DISPLAY

The operator can select P, R, N, D, MODE, ↓, and ↑ on Allison 1000 & 2400 Series Transmissions, and can select R, N, D, MODE, ↓, and ↑ on Allison 2000 Series Transmissions.

### P

This button shifts the transmission into Neutral and engages the Park Pawl on 1000 and 2400 Series Transmissions. The “P” will only appear on the Monitor side of the display, and the Select side will remain blank. Typically the transmission needs to be in Park or Neutral to start the vehicle.



**WARNING:** If Park is selected and **P** does not display on the MONITOR side, the Parking brake must be set to prevent the vehicle from moving unexpectedly. The system should be checked and serviced by a qualified technician.



**WARNING:** On Park equipped transmission, if the ignition is turned off without shifting to Park a buzzer will sound and the display panel will illuminate and show the gear currently engaged. Shifting to **P** will engage Park and turn off the display and buzzer.

**NOTE:** On Park equipped transmissions like the 1000 & 2400 series, if the vehicle is off, the ignition on, and the Park Pawl is not engaged (see Allison Transmission’s Operator Manual for Park Pawl Information) the MONITOR side will display “N” and a buzzer will sound regardless of the operator’s selection. Shifting to P will engage Park and turn off the display and buzzer.

### R

This button shifts the transmission into Reverse.



### N

This button shifts the transmission into Neutral. Neutral can be used to start the vehicle.

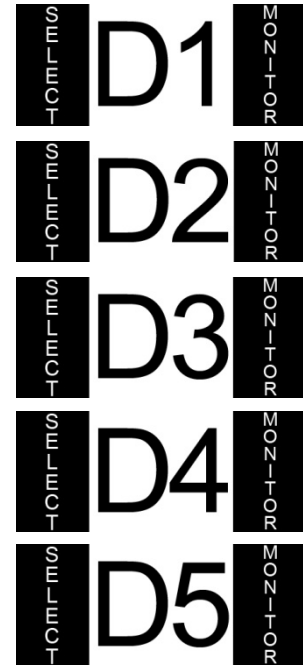


**WARNING:** If the transmission is in **N** and the operator leaves the driver’s station, the vehicle Parking Brake must be set to prevent the vehicle from rolling.

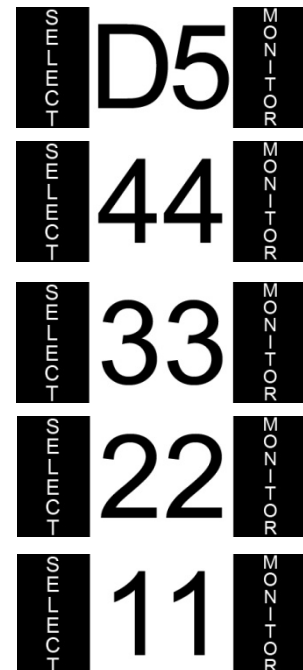
# 5-Speed Transmission

## D

This button shifts the transmission into Drive and allows the transmission to automatically shift through the full range of 1<sup>st</sup> through 5<sup>th</sup> gears. When Drive is initially selected, the SELECT and MONITOR displays will show **D1** indicating that Drive has been selected and the transmission is in 1<sup>st</sup> gear. As the transmission automatically upshifts or downshifts, the SELECT & MONITOR displays will show which gear the transmission is actually in – **D1, D2, D3, D4, or D5**.



This button is the Manual Gear Selector – Down. When the Transmission is in Drive, the ↓-button allows the operator to manually downshift one gear at a time – 5<sup>th</sup> through 1<sup>st</sup>. The SELECT Display will show which gear range has been selected, and this will limit the transmission from shifting into a gear above this value. The MONITOR Display will show which transmission gear is currently engaged.



**NOTE:** The transmission will not shift above the gear range selected. When Drive is selected the full range automatic shift capability is restored.

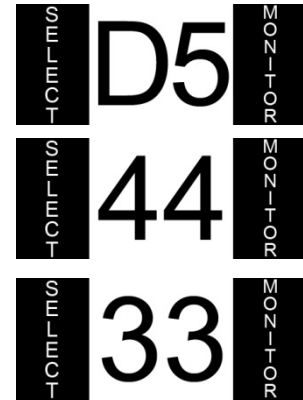
**NOTE:** Selecting Drive, by pressing D, at anytime during the upshift sequence cancels the manual shifting function and allows the transmission to shift automatically.

**NOTE:** A downshift may be inhibited by the TCM depending on current vehicle conditions and speed.



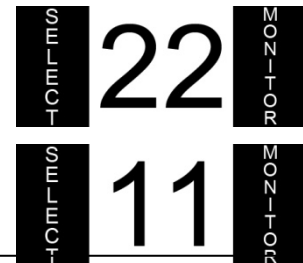


This button is the Manual Gear Selector – Up. When the Transmission is in 11, 22, 33, or 44, depressing the ↑-button manually upshifts the transmission one gear at a time (i.e. increases the gear the transmission will be limited to) until D is selected. The SELECT Display will show which gear range has been selected, and this will limit the transmission from shifting into a gear above this value. The MONITOR Display will show which transmission gear is currently engaged.



**NOTE:** The transmission will not shift above the gear range selected. When Drive is selected the full range automatic shift capability is restored.

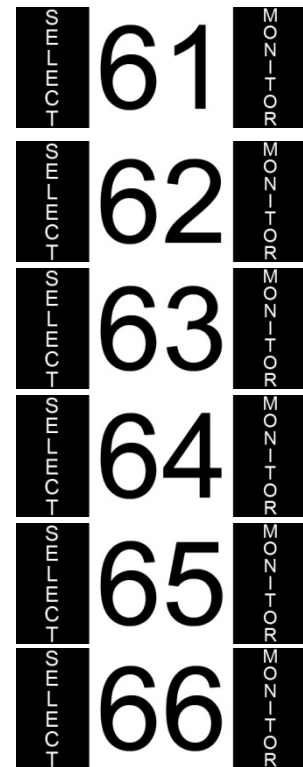
**NOTE:** Selecting Drive, by pressing D, at anytime during the upshift sequence cancels the manual shifting function and allows the transmission to shift automatically.



## 6-Speed Transmission

### D

This button shifts the transmission into Drive and allows the transmission to automatically shift through the full range of 1<sup>st</sup> through 5<sup>th</sup> gears. When Drive is initially selected, the SELECT and MONITOR displays will show **6 1** indicating that the 6 range has been selected and the transmission is in 1<sup>st</sup> gear. As the transmission automatically upshifts or downshifts, the SELECT & MONITOR displays will show which gear the transmission is actually in – **6 1, 6 2, 6 3, 6 4, 6 5, or 6 6.**



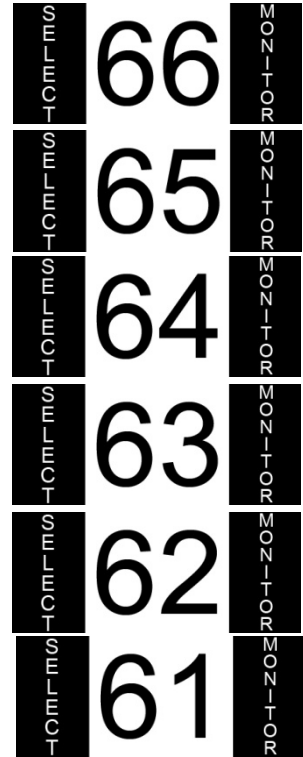


This button is the Manual Gear Selector – Down. When the Transmission is in Drive, the ↓-button allows the operator to manually downshift one gear at a time – 6<sup>th</sup> through 1<sup>st</sup>. The SELECT Display will show which gear range has been selected, and this will limit the transmission from shifting into a gear above this value. The MONITOR Display will show which transmission gear is currently engaged.

**NOTE:** The transmission will not shift above the gear range selected. When Drive is selected the full range automatic shift capability is restored.

**NOTE:** Selecting Drive, by pressing **D**, at anytime during this shift sequence cancels the manual shifting function and allows the transmission to shift automatically.

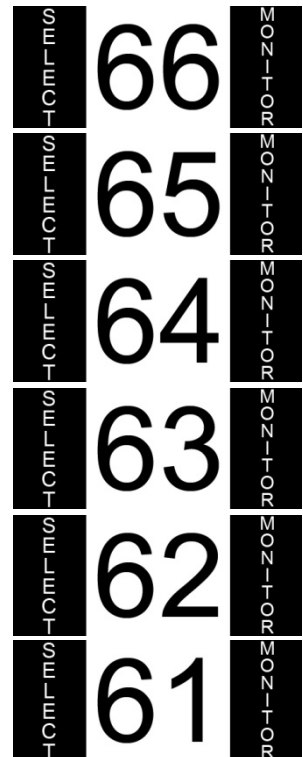
**NOTE:** A downshift may be inhibited by the TCM depending on current vehicle conditions and speed.



This button is the Manual Gear Selector – Up. When the Transmission is in 11, 22, 33, 44, or 55, depressing the ↑-button manually shifts the transmission one gear at a time (i.e. increases the gear the transmission will be limited to) until 6 is selected. The SELECT Display will show which gear range has been selected, and the MONITOR Display will show which transmission gear is currently engaged.

**NOTE:** The transmission will not shift above the gear range selected. When Drive is selected the full range automatic shift capability is restored.

**NOTE:** Selecting Drive, by pressing **D**, at anytime during this shift sequence cancels the manual shifting function and allows the transmission to shift automatically.



## LOSS OF J1939

Loss of the J1939 to/from the shifter is indicated on the Display as follows:

- a. 5-Speed Transmission Displays will show **DD**;
- b. 6 Speed Transmission Displays will show **D**↘.

The SELECT display works as normal except that Drive will only display a **DD or D**↘. 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 6 gears, and consult a qualified technician.

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## ADDITIONAL SYSTEM FEATURES

### Range Inhibit Indicator

Certain conditions may cause the Allison Transmission Control Module to restrict shifting. The Range Inhibit Indicator alerts the operator that such a condition exists when the SELECT display (the left digit) begins flashing, and the MONITOR Display (the right digit) remains constant.

### Park Warning Buzzer (on Park Equipped Transmissions only)

A warning buzzer sound indicates that the engine was shut off before the transmission was shifted into Park. The display will stay illuminated and show the transmission gear. Selecting Park will engage Park, indicate **P** on the display, and turn off the panel. The ignition key can remain in the OFF position when selecting **P** for Park.

## EMERGENCY REMOVAL FROM PARK

In the event that a vehicle must be towed, and the SBW system can not be electronically activated to move the transmission out of Park, follow this short list:

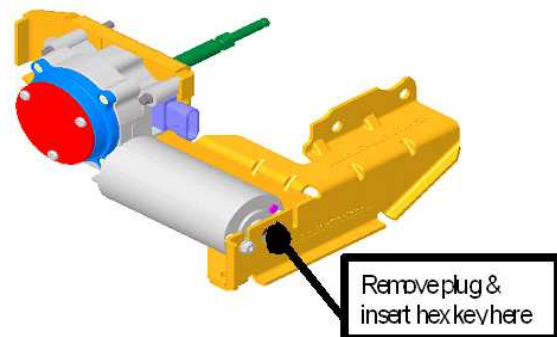
- Connect the tow vehicle to disabled vehicle in such a manner that the disabled vehicle can not move in either direction when it is removed from Park.
- Set the tow vehicle's brakes.
- Chock the tow vehicle's wheels.
- Set the disabled vehicle's brakes.
- Chock the disabled vehicles wheels.
- Make sure the vehicle can not move. Bn
- Remove the plug from the rear of the SBW Actuator.
- Insert a standard 3/16" hex key into the rear of the SBW actuator and turn in a clockwise direction until the transmission comes out of Park.
- Be sure to replace the moisture protection plug.

**NOTE:** The disabled vehicle's transmission can also be returned to Park with this feature.



**WARNING:** When performing this operation all of the above steps must be done in proper order to prevent possible injury from unexpected movement of the tow or disabled vehicle.

**NOTE:** See the vehicle's operating guide and the Allison Transmission Operator's Manual for instructions on preparing the vehicle for towing.



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