Advanced Electronic Vehicle Interface Technology

SMART-SHIFT INSTALLATION MANUAL

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1. OVERVIEW

The EMC Smart-Shift answers all of the "shifting" needs of the individual, the installing dealer, and the driver rehabilitation professional. This system can be installed in almost any vehicle equipped with a cable actuated automatic transmission to remotely operate the vehicle's shifting functions. The Smart-Shift is operated by the four illuminated tactile buttons on the front of a small (5.5" x 3.25" x 1") touchpad. Each button is positioned below the icon representing the corresponding gear which it operates. Each icon has an LED to signal when the actuator has reached the programmed position.

The Smart-Shift incorporates positional feedback so that the actuator can be automatically positioned in up to seven selector choices; Park, Reverse, Neutral, Drive, Drive3, Drive2, and Drive1 (Drive3, 2, & 1 are not available for all vehicles). When the vehicle is in Park and any other key is depressed, the actuator will move the shifter cable to the selected gear, stop automatically and illuminate the LED indicator. No more missed gears or waiting in traffic for the actuator to slowly move. In addition, the multifunctional "D" button can be programmed for up to four different Drive positions (Drive, Drive3, Drive2 & Drive1).

Operation of the system is quite simple. While the vehicle's ignition is ON and the brakes are applied, press any of the four buttons to move the vehicle's transmission to the selected gear. To activate Drive 3, 2 & 1 simply press the Drive key while in Drive. Each time the key is depressed it will cycle through each position. The "D" LED will continually flash while you are in Drives 3, 2 & 1, with each one flashing at a different rate. To exit any of the low Drives, just depress any key, and the vehicle's transmission will be switched to that position. The Smart Shift requires two inputs for the system to operate; 1) the ignition of the vehicle must be "On" and 2) the brakes must be applied.

The Smart-Shift includes a Touchpad, Actuator (and mounting bracket), Controller Module, Vehicle Interface cord, a telco cord, and an Universal installation kit. The actuator will need to be mounted in such a way that it will interface with the vehicle's transmission shift cable. This can be done by mounting the actuator and bracket to the vehicle to provide solid connection that the transmission cable will reach. The Universal installation kit includes additional, smaller mounting brackets for mounting the actuator to the vehicle along with hardware and a cable bracket to secure the tranmission shift cable to the actuator.

2. INSTALLATION

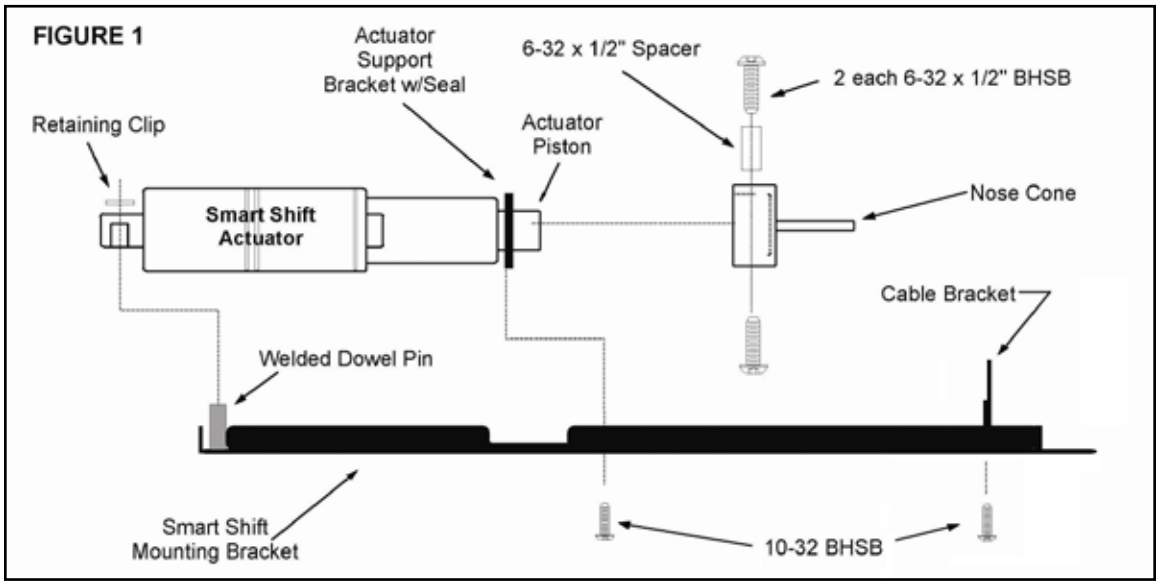
2.1 SHIFT CABLE INSTALLATION

Mounting the actuator to the vehicle's shift cable and than to the vehicle are the most important parts of the entire installation process. The actuator can position itself accurately to within 1/32" of travel. If the shift cable is not positioned mechanically correct relative to the actuator, the shift positions will vary with each application due to freeplay in your mechanical installation. For this reason, EMC supplies the Smart-Shift mounting bracket preassembled to the actuator. Determine the method for attaching the shift cable first, followed by securing the actuator mounting the bracket to the vehicle.

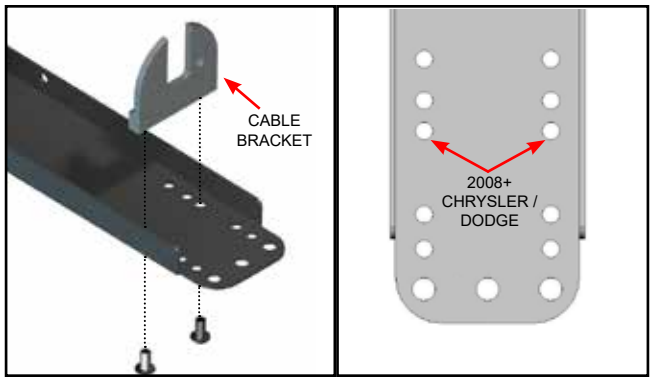
THE ACTUATOR MOUNTED TO THE SMART-SHIFT ACTUATOR BRACKET

Refer to FIGURE 1 below to understand how the actuator is attached to the actuator mounting bracket. This method is the same for all vehicles. The only changes that occur from one vehicle to another is the design of the Cable Bracket and the hardware for attaching the shift cable to the Nose Cone. Refer to the remainder of this section for the Nose Cone and Cable Brackets instructions for some common EMC vehicles.

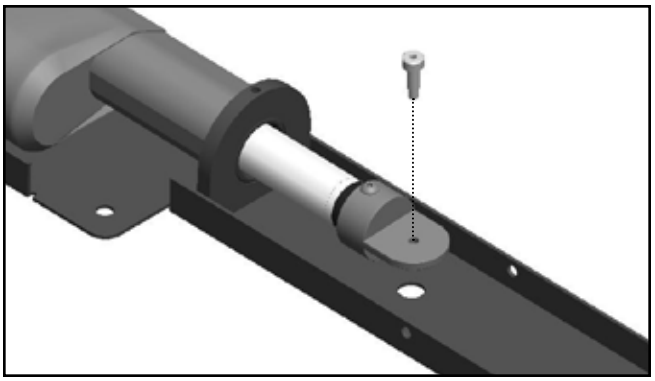
FIGURE 1



CHRYSLER TOWN & COUNTRY / DODGE GRAND CARAVAN (2008+)

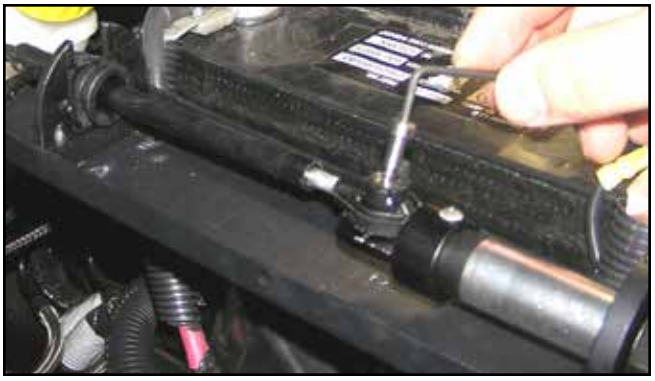


Attach the Cable Bracket (included in KIT-SS-ASSY-08C) to the end of the Smart Shift bracket in the location shown in the figures above. The flat side of the bracket should be facing away from the actuator. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.



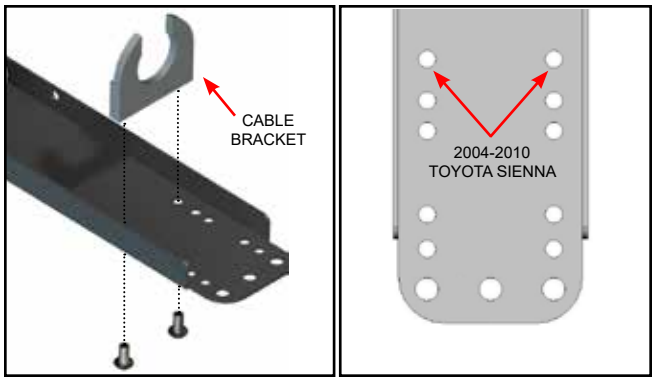
Carefully tap the hole in the Nose Cone to #8-32. Verify the #8-32 x 3/8" shoulder screw (included in KIT-SS-ASSY-08C) will thread properly into the Nose Cone. Do not install the shoulder screw at this time.

Carefully insert the OEM shifter cable sleeve into the Cable Bracket until the plastic ear snaps into the hole in the Cable Bracket.

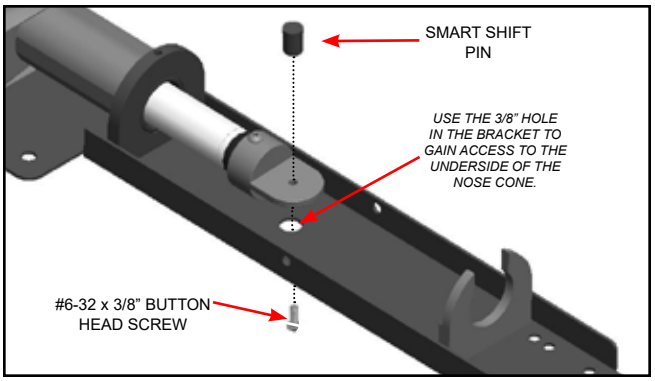


After calibration (see Section 3), verify the cable is in Park. Insert the shoulder screw through the OEM cable end and into the Nose Cone as shown, using a small amount of Blue Loctite®.

TOYOTA SIENNA (2004-2010)



Attach the cable bracket (included in KIT-SS-ASSY-04T) to the end of the Smart Shift bracket in the location shown in the figures above. The flat side of the bracket should be facing away from the actuator. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.

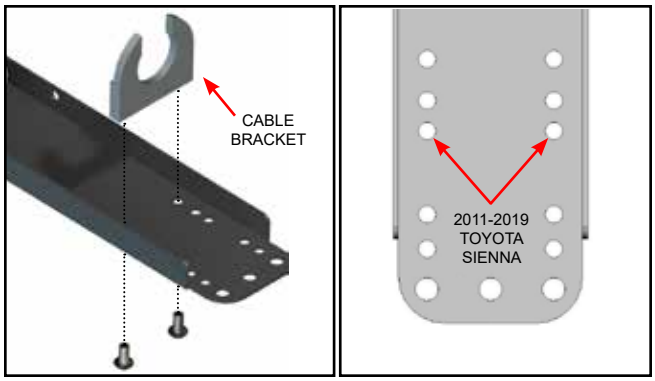


Attach the Smart-Shift pin (included in KIT-SS-ASSY-04T) to the Nose Cone using the supplied #6-32 x 3/8" button head screw and Blue Loctite®. Hint: Use the 3/8" hole directly beneath the nose cone to gain access to the underside of the nose cone in order to insert and tighten the screw as shown.

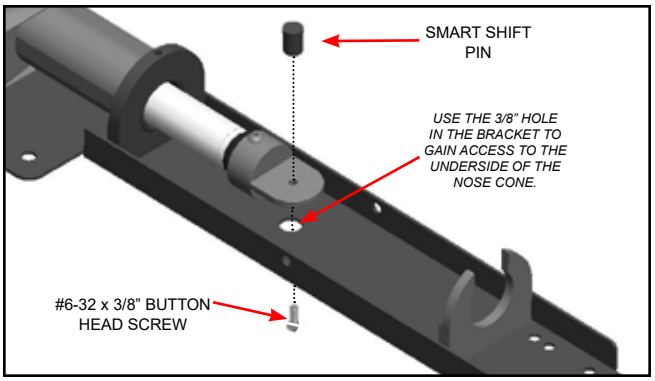
Secure the shift cable to the Smart Shift by sliding the end of the OEM cable onto the Cable Bracket.

After calibration (see Section 3), verify that the cable is in Park. Snap the shift cable over the pin on the Nose Cone.

TOYOTA SIENNA (2011-2019)



Attach the cable bracket (included in KIT-SS-ASSY-04T) to the end of the Smart Shift bracket in the location shown in the figures above. The flat side of the bracket should be facing away from the actuator. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.

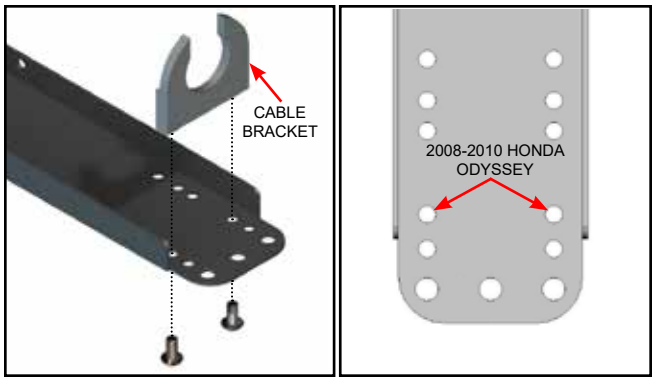


Attach the Smart-Shift pin (included in KIT-SS-ASSY-04T) to the Nose Cone using the supplied #6-32 x 3/8" button head screw and Blue Loctite®. Hint: Use the 3/8" hole directly beneath the nose cone to gain access to the underside of the nose cone in order to insert and tighten the screw as shown.

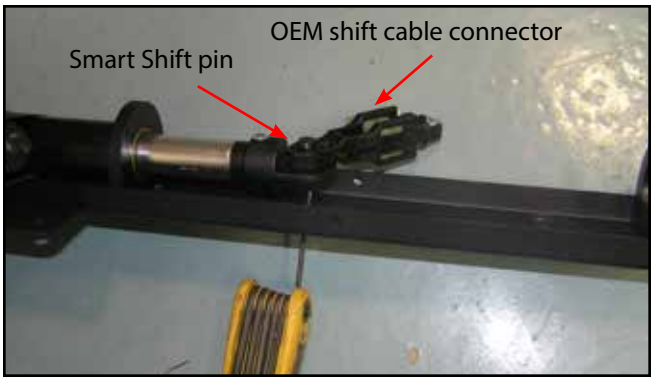
Secure the shift cable to the Smart Shift by sliding the end of the OEM cable onto the Cable Bracket.

After calibration (see Section 3), verify that the vehicle is in Park. Snap the shift cable over the pin on the Nose Cone.

HONDA ODYSSEY (2008-2010)

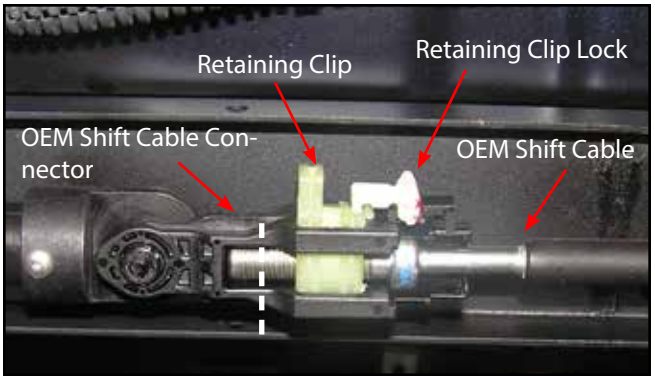


Attach the Cable Bracket (included in KIT-SS-ASSY-04T) to the end of the Smart Shift bracket in the location shown in the figures above. The flat side of the bracket should be facing away from the actuator. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.



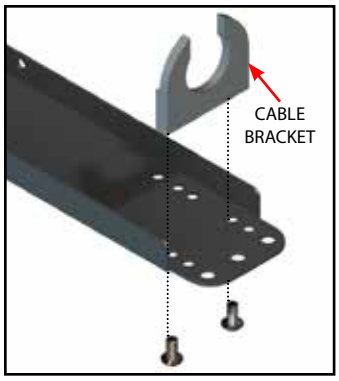
Insert the Smart-Shift pin (included in KIT-SS-ASSY-04T) through the OEM shift cable connector. Using the provided #6-32 x 3/8" button head screw, attach the pin to the actuator Nose Cone as shown using a small amount of Blue Loctite®.

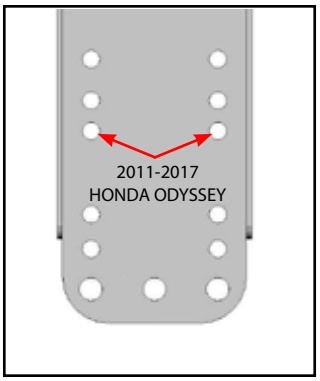
Secure the shift cable to the Smart Shift by sliding the end of the OEM cable onto the Cable Bracket and rotating.



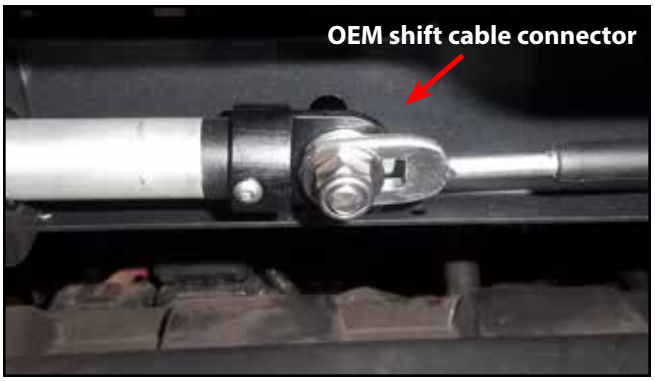
After calibration (see Section 3), verify that the vehicle is in Park. The shift cable should fit into the OEM cable connector that is already mounted on the Smart Shift Nose Cone. Once in place, secure the cable to the connector by sliding the retaining clip over the OEM cable and sliding the lock over the retaining clip.

HONDA ODYSSEY (2011-2017)





Attach the Cable Bracket (included in KIT-SS-ASSY-04T) to the end of the Smart Shift bracket in the location shown in the figures above. The flat side of the bracket should be facing away from the actuator. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.

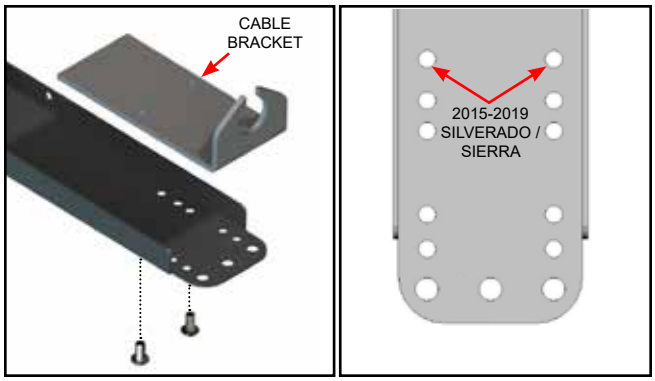


Drill out the nose cone hole to 5/16". Using a 5/16" x 3/4" long button head bolt and 5/16" lock nut, test fit the OEM shifter cable to the to the actuator Nose Cone as shown. Hint: Use the 3/8" hole directly beneath the Nose Cone to gain access to the underside of the Nose Cone in order to insert and tighten the screw as shown.

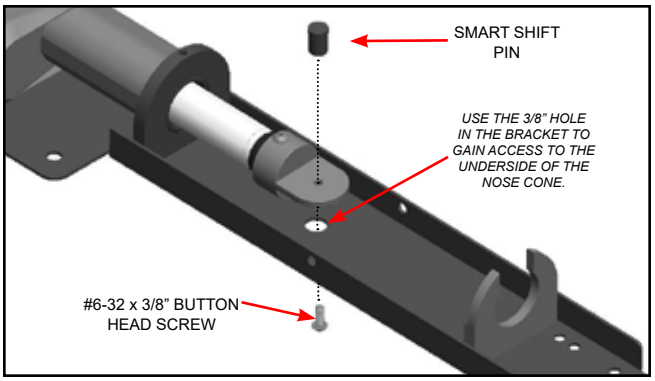
Secure the shift cable to the Smart Shift by sliding the end of the OEM cable onto the Cable Bracket and rotating.

After calibration (see Section 3), verify that the vehicle is in Park. The shift cable should be secured to the Nose Cone using the 5/16" x 3/4" long button head bolt and 5/16" lock nut.

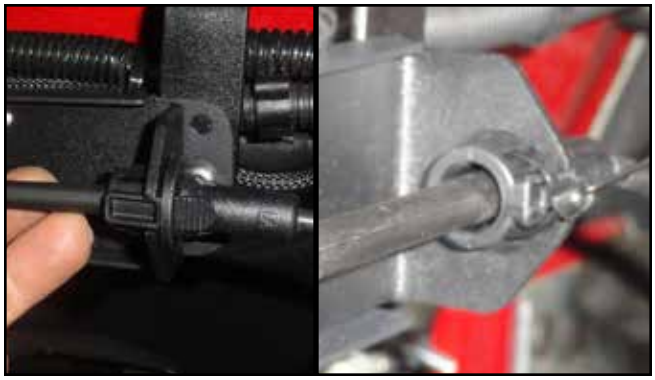
GM SILVERADO / SIERRA (2015-2018 & 2019 (2500 only))



Attach the Cable Bracket (included in KIT-SS-ASSY-05M) to the end of the Smart Shift bracket in the location shown in the figures above. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.



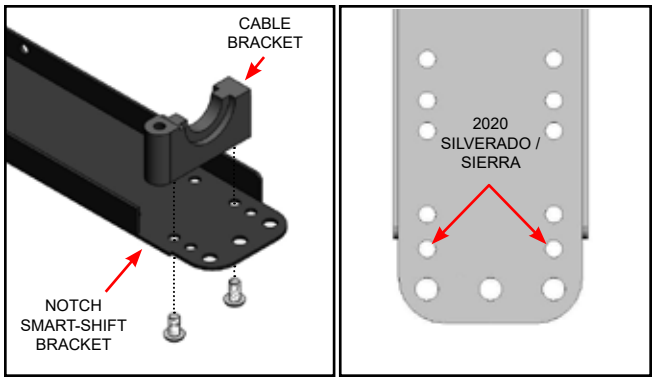
Attach the Smart-Shift pin (included in KIT-SS-ASSY-05M) to the nose cone using the supplied #6-32 x 3/8" button head screw and Blue Loctite®. Hint: Use the 3/8" hole directly beneath the Nose Cone to gain access to the underside of the Nose Cone in order to insert and tighten the screw as shown.



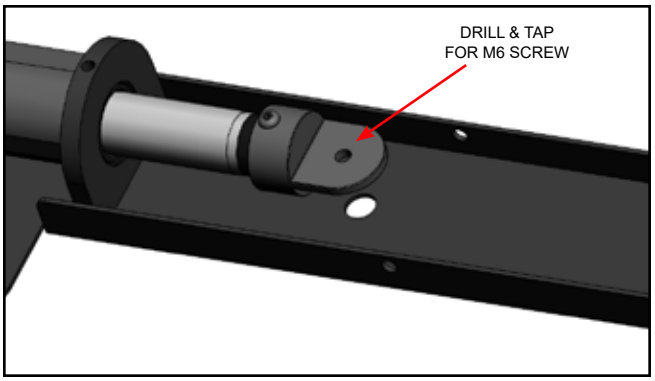
Slide the OEM shift cable through the Smart Shift cable bracket. It will snap in place. Secure the OEM shift cable to the Smart Shift Cable Bracket by sliding a zip tie around the clip, underneath the tabs, so they cannot be compressed or slid out of the Cable Bracket.

After calibration (see Section 3), verify that the vehicle is in Park. Press the shift cable over the pin on the Nose Cone.

GM SILVERADO / SIERRA (2019 (1500 only)-2020)



Attach the Cable Bracket (included in KIT-SS-ASSY-19S) to the end of the Smart Shift bracket in the location shown in the figures above. Notch the side of the Smart Shift bracket. Secure this bracket using the (2) provided #10-32 x 3/8" button head screws and a small amount of Blue Loctite®.



The OEM shift cable has an M6 screw preassembled to it. This means the Smart Shift Nose Cone must be drilled and tapped to M6 to accept it.

Slide the OEM shift cable over the Smart Shift cable bracket. Secure the OEM shift cable to the Smart Shift Cable Bracket with the preassembled OEM hardware and a small amount of Blue Loctite®.

After calibration (see Section 3), verify that the vehicle is in Park. Secure the shift cable to the Nose Cone using the OEM preassembled hardware and a small amount of Blue Loctite®.

2.2 MOUNTING THE SMART-SHIFT ACTUATOR BRACKET

Each vehicle is different, depending on the vehicle type, amount of body lift and length of the shift cable.

Start by pulling the shift cable into the engine bay and seeing where it will reach without contacting anything hot or needing sharp bends.

More often than not, the best location to mount the actuator bracket is above the engine on the wiper tray or lower cowl panel. Both ends of the bracket must be attached to something rigid, not something connected to the motor where there is flex. Some vehicles have threaded studs for hoses or wire looms that the actuator bracket can be hung from. EMC includes small steel brackets that can be bent or drilled to hold either end of the actuator bracket. Rivnuts or thru-bolts are also options.

Below are pictures of installed actuator brackets showing possible attachment methods.

Once securely attached, loop the shift cable around and over parts as needed to avoid kinks and hot surfaces. P-clamp it periodically to hold it in place. Route the actuator harness back into the cabin through an open grommet or the through the hole used for the shift cable. Seal around the harness to prevent water and fumes from entering back into the cabin.






OTHER APPLICATIONS
If your particular vehicle uses a cable operated shift mechanism, or a mechanical "rod style", one of the bracket kits can likely be modified to fit your application, or you can fabricate your own. The actuator has a total stroke of 2-1/4". You must weld or bolt a bracket to the shift arm on the transmission such that the arc of travel from Park to Low gear is approximately 2-1/4". This will be the connection point of the actuator. Other optional mounting techniques could involve purchasing a Ford or Chrysler shift cable and adapting it to your particular vehicle. You could also mount the actuator inside the vehicle with this sort of cable control. Feel free to contact EMC Service with your particular applications should you encounter installation problems.

2.3 MOUNTING THE CONTROLLER AND TOUCHPAD

The remaining modules - Controller Module and Touchpad - will be located inside the cabin of the vehicle.

The Controller Module can be attached under the dash in a convenient location, provided it is within reach of the actuator harness and the electrical connections described in the next section. Avoid locating the module next to a heat source.

The Touchpad will be mounted according to the users range of motion, needs or preference. On back of the Touchpad you will find (2) 1/4-20 threaded studs to help facilitate attaching the Touchpad to something suitable.

2.4 ELECTRICAL CONNECTIONS

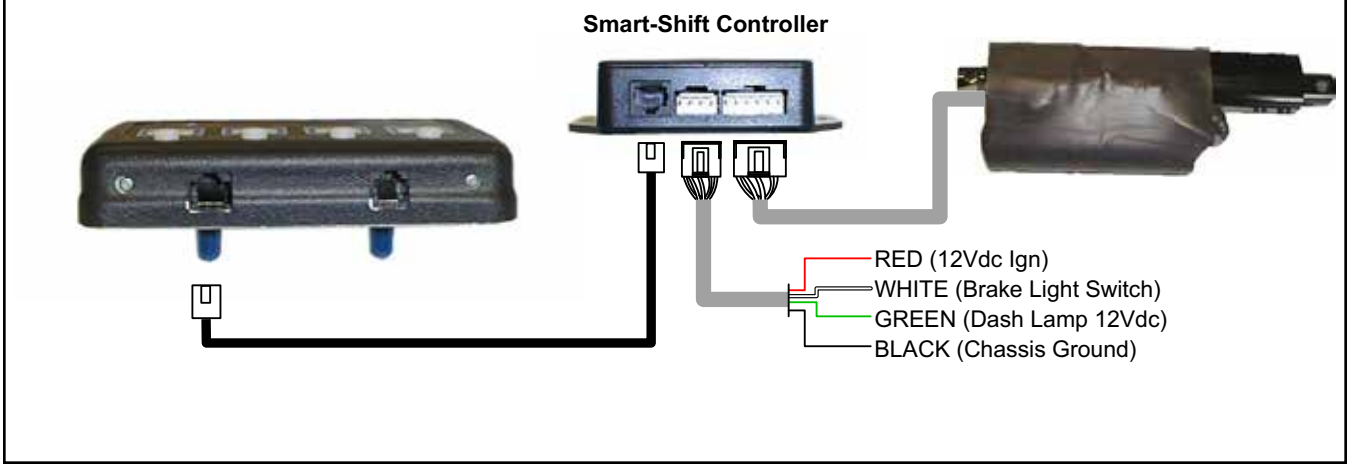
IMPORTANT NOTE: DO NOT CUT THE CONNECTOR END OFF OF THE ACTUATOR TO ROUTE YOUR CABLE AS IT IS A SPECIAL SHIELDED,TWISTED PAIR CABLE WITH THREE BLACK WIRES.

There is only (1) harness that will interface with the vehicle. The other connections are the telco cord from the touchpad to the controller and the actuator connector to the controller. If you are routing the actuator cable through the floorboard of the vehicle, DO NOT cut the connector off of the harness. This connector contains shielded twisted pairs with three black wires. If this cable is cut and wired back incorrectly, damage to the actuator will result which is not covered under warranty. Make sure you drill a large enough hole to accommodate the connector.

Locate the power cable which plugs into the Smart-Shift Harness port and connect the four wires as depicted and explained in FIGURE 2.

RED - Connect to 12V dc source, through a 15 AMP circuit breaker that is hot only with the ignition of the vehicle On.
BLACK - Connect to Chassis Ground.
WHITE - Connect to the brake light switch wire that has 12V dc only when the brake lights are "On". The Smart-Shift will not work if this wire is not connected to a brake light feed.
GREEN - Connect to a wire that supplies the dash lamp with 12V dc when the dash lights are "On". This wire provides backlight illumination to the touchpad.

FIGURE 2


Smart-Shift Controller
RED (12Vdc Ign)
WHITE (Brake Light Switch)
GREEN (Dash Lamp 12Vdc)
BLACK (Chassis Ground)

3. CALIBRATION

To calibrate the Smart Shift for your vehicle you will use the four gear selector keys and the two actuator control buttons. The actuator control buttons are located on the front side of the controller on the left and right edges as shown below. These two buttons are used to move the actuator in either direction when they are depressed, as long as the ignition is "ON" and the brakes are applied. Once one of the actuator control buttons is depressed, the actuator will move in one direction and all four of the indicator lights on the touchpad will illuminate to signify that you are in calibration mode. Use both buttons to move the actuator to the desired position. Once the actuator is positioned correctly, depress the corresponding button on the touchpad.

Actuator Control Buttons

IMPORTANT NOTE: If your vehicle is unable to reach all four of the Drive positions, program the un-used Drives for the same setting as Drive. This way if the "D" key is pressed in error the actuator will still travel to the Drive position.

CALIBRATION PROCEDURE

Step 1: As discussed in the Actuator Installation section, in most installations the actuator will not meet the OEM shift cable when the actuator is installed. For those cases you must first adjust the actuator to meet the OEM shift cable. Confirm that the Electronic Connections section has been completed, and the vehicle's transmission is in Park. Turn on the ignition, start the vehicle, and apply and hold the brakes. (Remember the Smart-Shift must receive a brake light input in order for the actuator to move.) Using the actuator control buttons, position the actuator so that the OEM shift cable can attach to the actuator. Now, with the brake pedal depressed, have someone attach the cable to the actuator according to the Installation section for your vehicle type.

Step 2: With the engine still running and the brake depressed, use the Actuator Control Buttons to confirm that the actuator can travel to the four main gears of the transmission (Park, Reverse, Neutral, & Drive). If not, some adjustments to the placement of the OEM cable in relation to the bracket, or the OEM cable to the transmission will need to be made. If you are unable get the actuator to travel to these four positions, contact EMC Service for assistance.

Step 3: After you have attached the cable and confirmed that the cable can travel to the required gear positions, your ready to program the positions into memory. Remember, while in calibration mode all four LED's will illuminate. Using the Actuator Control Buttons, place the vehicle in Park and press the "P" key to set the position. The Park LED should now be the only LED illuminated. Park has now be set. Each time the "P" key is depressed, the actuator will track to Park.

Step 4: Using the Actuator Control Buttons, place the vehicle in Reverse and press the "R" key. Again the LED above the Reverse icon will illuminate. Repeat this same step for Neutral and Drive.

Step 5: For Drive2 follow the same procedure to set the position, except you will need to press and hold the "D" key to set Drive2. Once Drive2 is set the "D" LED indicator will flash continuously. Press the "D" key or any other key to change out of Drive2 and to move to the selected position.

Step 6: Once all gear positions have been adjusted, you will need to check the operation from both directions, that is, from Park to Drive (or Drive1) and Drive to Park. The reason for this is that each shift position has an area or "window" in which it will operate or "drop into" a gear. When you set the positions from Park to Drive you positioned it on the high side of this area or "window". You must check to make sure that your high side adjustments are low enough to be activated from the low direction. If you are unable to "drop into" a gear from the low side direction, use the actuator control buttons to reset the gears position slightly further to the low side.

When delivering the vehicle, be sure to go over the OEM operation of the transmission. Some vehicle's utilizes a lockout feature for Lower gears to prevent the transmission from entering if the vehicle is above a certain speed. An example of this situation is if the operator of the vehicle is traveling at 30 mph and decides that the grade is extremely long and steep or that the road conditions require a lower gear to save on wear and tear of the vehicle, the operator only needs to depress the Drive key and the transmission linkage will move to the low Drive position. The transmission, however, will only shift into low gear if the vehicle slows down below the maximum speed allowable to access that gear. Therefore, no matter what the driver selects below the Drive (D) position, the vehicle's transmission will dictate when and if these lower gears can be accessed.

CAUTION: THE EMC SMART-SHIFT ACTUATOR MUST BE EITHER PLACED IN NEUTRAL OR THE OEM SHIFT CABLE DISCONNECTED FROM THE ACTUATOR BEFORE ATTEMPTING TO TOW THE VEHICLE.