MOON Equipped

SMART SHIFT

U.S. Patent Pending

Instruction Manual

LIMITED WARRANTY

Mooneyes USA, Inc. warrants to the original Purchaser of its SMART SHIFT that the product shall be free from defects in material and workmanship (normal wear and tear excluded) for a period of 12 months from the date of purchase.

If within the period of the foregoing waranty Mooneyes finds, after inspection, that the product or any component thereof is defective, Mooneyes will at its option, repair such products or components or replace them with identical or similar parts PROVIDED that within such period Purchaser:

1. Promptly notifies Mooneyes, in writing, of such defects.
2. Delivers the defective product or component to Mooneyes (Attn: Warranty) with proof of purchase date; and
3. Has installed and used the product in a normal and proper manner, consistent with Mooneyes printed instructions

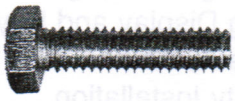
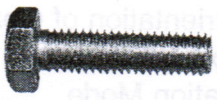
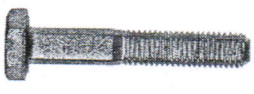
THE FOREGOING LIMITED WARRANTY IS EXCLUSIVE AND IN LEIU OF ALL OTHER WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THE FURNISHINGS OF A REPAIR OR REPLACEMENT COMPONENT OR COMPONENTS SHALL CONSTITUTE THE SOLE REMEDY OF PURCHASER AND THE SOLE LIABILITY OF MOONEYES USA, INC. WHETHER ON WARRANTY, CONTRACT OR FOR NEGLIGENCE, AND IN NO EVENT WILL MOONEYES BE LIABLE FOR MONEY DAMAGES WHETHER DIRECT OR CONSEQUENTIAL.

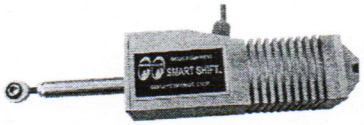
MOONEYES USA, Inc. 10820 S. Norwalk Blvd. Santa Fe Springs, CA 90670 562-946-2692 Fax 562-946-2961

Contents

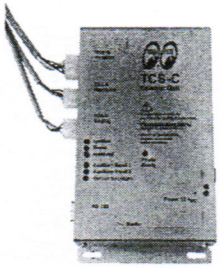
PARTS LIST

Part#	Description	Mfg Number	Pcs Per Kit	
1	ROD END 1/4 X 28 Male	CM4	1 Pc	
2	JAM NUT 1/4" X 28	94846A505	1 Pc	
3	BOLT 5/16" x 1-1/4"	91309A585	2 Pcs	
4	BOLT 8mm x 1-1/4"	91280A538	2 Pcs	
5	WASHER 5/16 ID	90108A415	2Pcs	
6	FLANGE NUT 3/8 Flange	94831A031	1 Pc	
7	FLANGE NUT 10 mm	94920A600	1 Pc	
8	SPACER 5/16 ID x 3/8 Long	6432K13	2 Pcs	
9	BOLT 1/4" Fine x 1"	92865A008	1 Pc	
10	BOLT 1/4" Fine x 1-1/2"	912474012	1 Pc	
11	NUT 1/4" Fine	94895A805	2 Pcs	
12	NUT 1/4" Fine Lock	90640A140	1 Pc	
13	STUD COLLAR 5/16	6432K13	2 Pcs	
14	FLANGE NUT 5/16	94831A030	2 Pcs	
15	STUD 5/16 x 4"	92198A699	1 Pc	

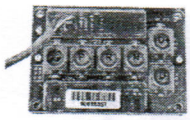
PARTS LIST



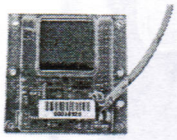
16. ACTUATOR



17. CONTROL BOX



18. KEYBOARD



19. LED DISPLAY

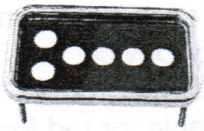
20. TRANS PAN RAIL BRACKET

21. GM SHIFT ARM

22. FORD SHIFT ARM

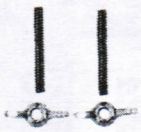
23. CHRYSLER SHIFT ARM

24. POWER GLIDE SHIFT ARM

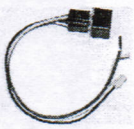


25. BILLET BUTTON BEZEL

26. BILLET LED BEZEL

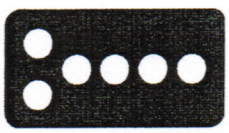


27. BEZEL HARDWARE



28. NEUTRAL SAFETY RELAY

29. AOD ADAPTER BUSHINGS



30. STICKER BUTTON DISPLAY

31. STICKER LED DISPLAY

ALLEN KEY 1 Pc 3/32

1 Smart Shift

"Shift into the future with Smart Shift" – that means:

- Electronically controlled automatic transmission shifter
- Compact control can be mounted anywhere vertically or horizontally
- LED display for positive gear identification
- Backlit Keyboard for easy operation
- Built-in Neutral Safety Device
- Built-in Reverse Light Relay
- Eliminates linkage, cable, or rod for a smooth operation

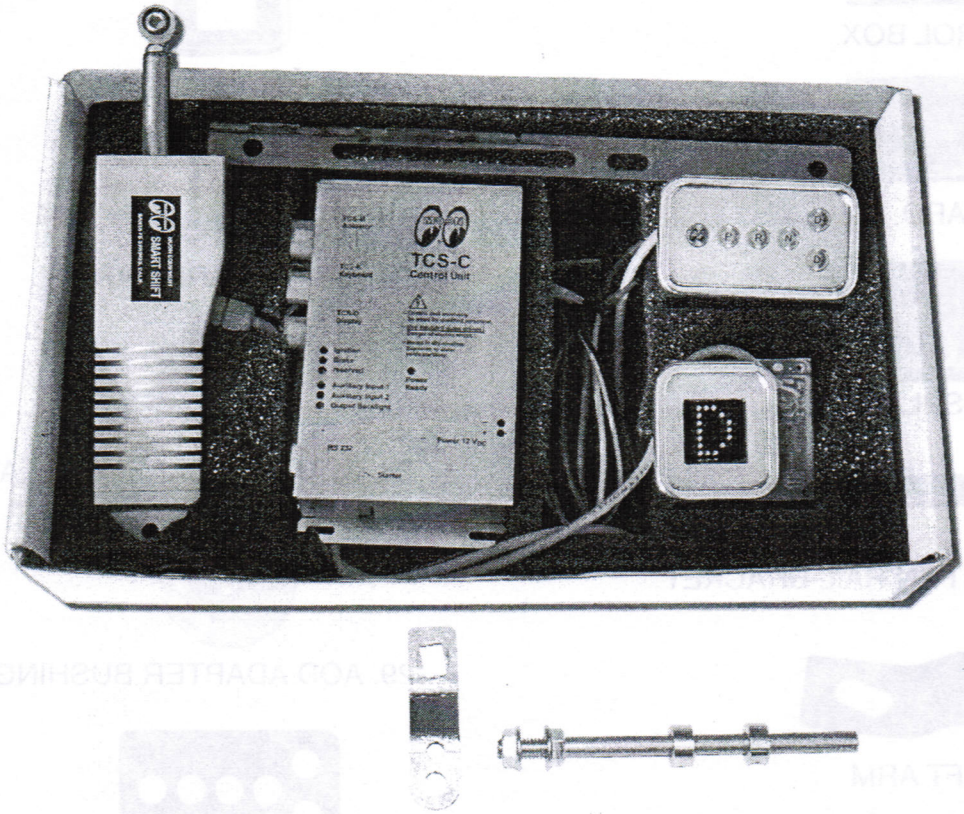


Fig. 1: SMART SHIFT package

Smart Shift is the winner fo SEMA's "Best Engineered Product 2004". The system consists of the following parts:

- TCS-M Actuator to be mounted at the car's transmission
- TCS-C Compact Control Unit
- TCS-D Display Unit
- TCS-K Keyboard

2 Mounting

2.1 Cables

Please check the required cable lengths, before mounting each part of the system. With the SMART SHIFT three standard cables are delivered:

Actuator cable 1.6 m (62.5 inch)
Display cable 1 m (39.4 inch)
Keyboard cable 1 m (39.4 inch)
Extensions can be ordered (length: 3ft). maximum, 1 Extension maybe used, Per Cable.

2.2 Mounting Plan

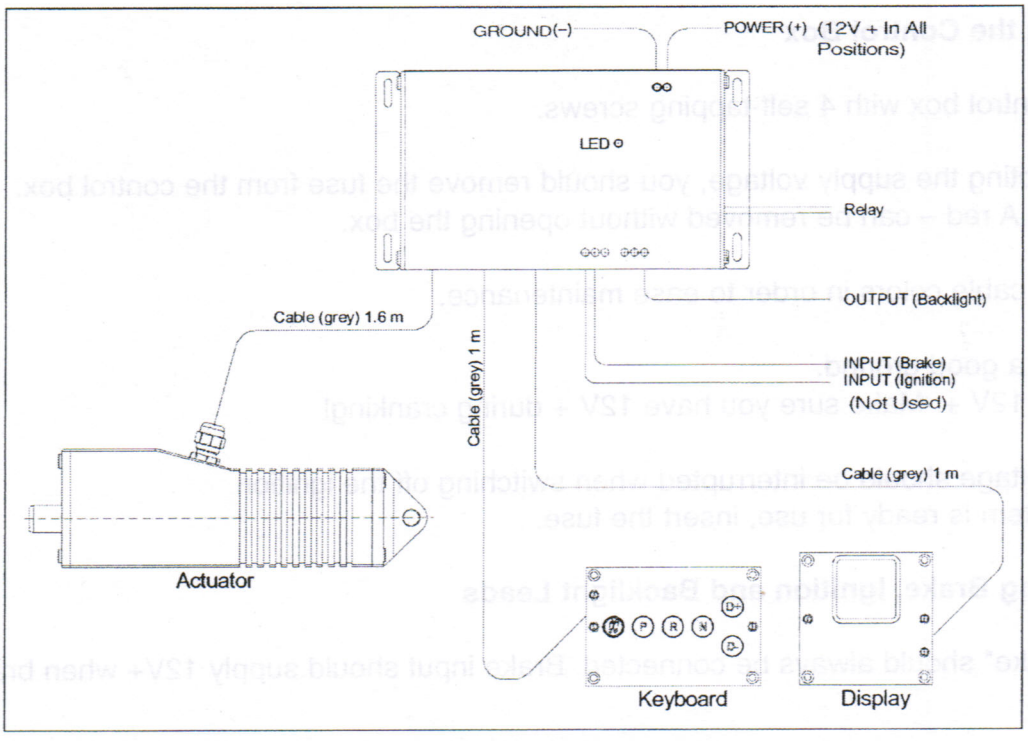


Fig. 2: System Wiring Diagram

The control unit has to be connected to the vehicles electrical system. Actuator, keyboard and display are powered from the control unit.

2.3 Safety Instructions

Installation of the Smart Shift must only be performed by qualified and trained personnel. These persons should be able to recognize and handle risks emerging for electrical, and or mechanical system parts.

Installation by persons without the proper training and qualification may result in damages to persons and devices.

The devices are carefully checked by the manufacturer. Proper function is guaranteed.

The driver of the car, however, is responsible for any risks emerging from using the system.

When replacing the fuse the same type must be used.

Do not cut the cables! Cutting cables voids warranty.

2.4 Mounting the Control Box

Fasten the control box with 4 self-tapping screws.

Before connecting the supply voltage, you should remove the fuse from the control box. The fuse – 10 A red – can be removed without opening the box.

Use standard cable colors in order to ease maintenance.

1. Connect to a good ground.
2. Connect to 12V +. Make sure you have 12V + during cranking!

The supply voltage should be interrupted when switching off the ignition.
When the system is ready for use, insert the fuse.

2.5 Connecting Brake, Ignition and Backlight Leads

The input "brake" should always be connected. Brake input should supply 12V+ when brake is applied.

The Reverse relay – if existing – should be connected to the backlight output.

Only Reverse light bulbs up to 24 W / 12 V may be connected. Maximum current: 3 A.
For higher currents you should wire a relay. Reverse light output circuit is a ground and should not recieve 12V+.

2.6 Mounting Display and Keyboard

Display and keyboard can be mounted anywhere in the car, horizontally or vertically.

The display orientation can be changed by software (see 5.1).

The keys of the keyboard can be turned if necessary. In this case you can carefully remove the cover and turn the keys.

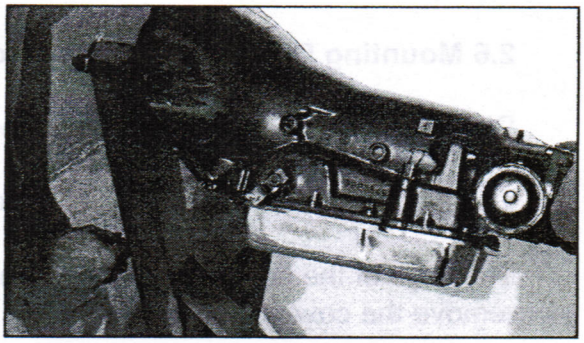
Use supplied studs & nuts to fasten keyboard and display.
The screws should be tightened very carefully to avoid cracks in the material

Press down the connector's latch before inserting or removing the connectors.

Connect display and keyboard to the control unit.

3 Mounting The Actuator

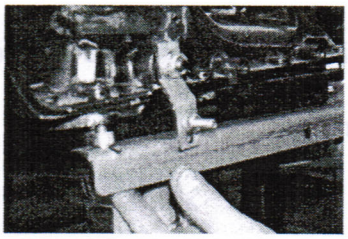
Install bolt & nut on shift arm, then mount shift arm on transmission as shown using flange nut either part #6 or #7 depending on transmission. Don't tighten flange nut yet.

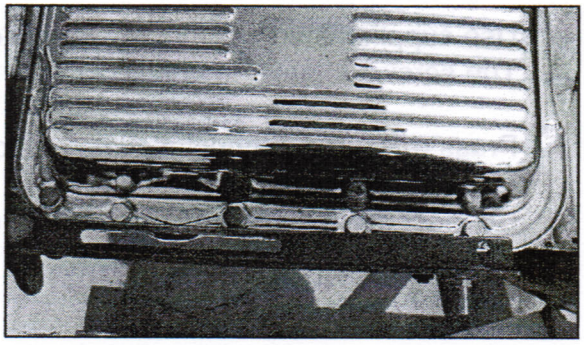


On Ford and Chrysler transmissions, snug bolt and nut on shift arm. Ford requires additional spacer.

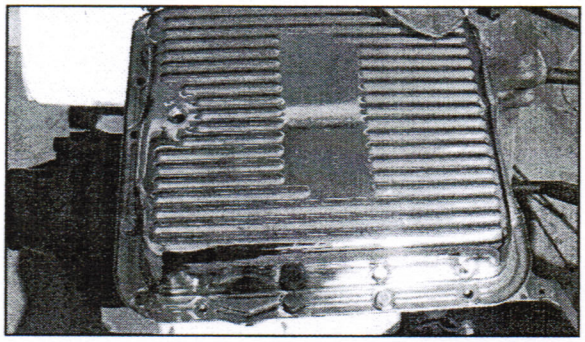
(See special installation instruction section for your specific application notes!)

Align pan rail bracket(#20) on transmission with hole (A) at front bolt on pan. Observe which bolt lines up with furthest rear slot(B) in bracket.



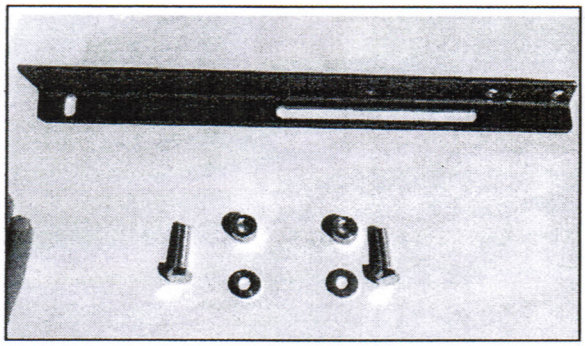


Remove and discard 2 bolts to be used to mount pan rail bracket



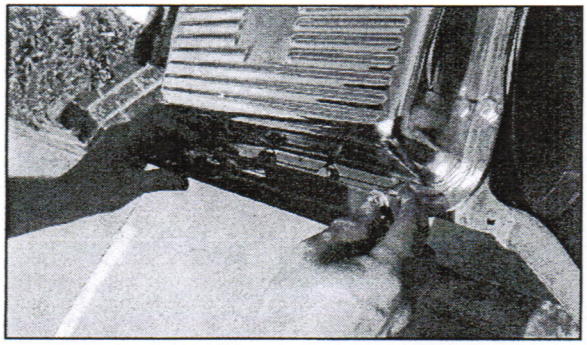
Locate bolts (Part# 3or 4) washers (Part#5) spacers (Part# 8) and rail bracket (Part# 20) from hardware package. *Make sure to use correct thread for your application. IE. 5/16 coarse or 8 mm metric.

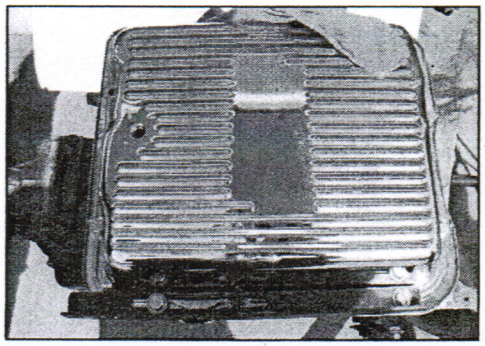
Use spacers supplied between pan and pan rail bracket.



Install rail bracket (Part# 20) to trans as shown in Fig (1).

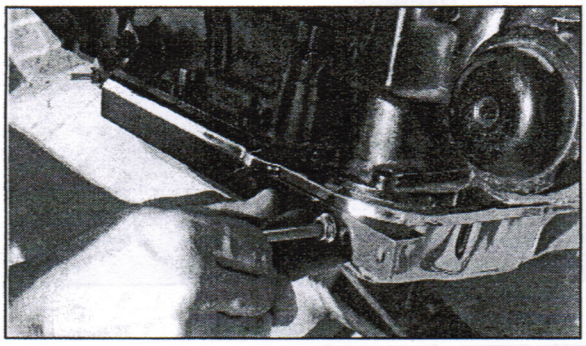
Mount stud on pan rail bracket.

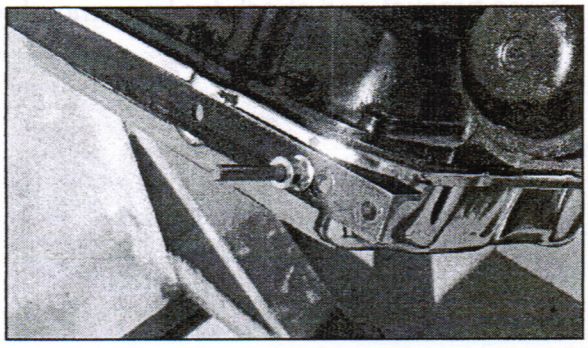


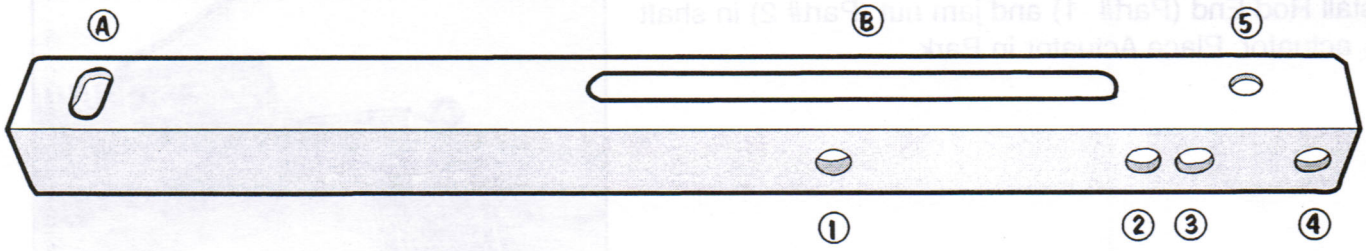


(Fig 1)

6) Refer to chart Bracket Location Section(Section 7) for your trans and mount SS stud in proper loca tion on bracket.

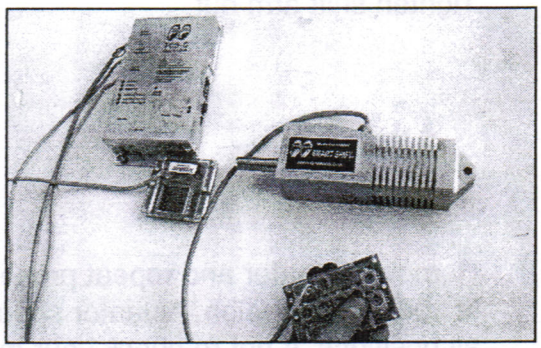






See Bracket Location Section (Section 7) for correct slot and hole locations for your transmission.

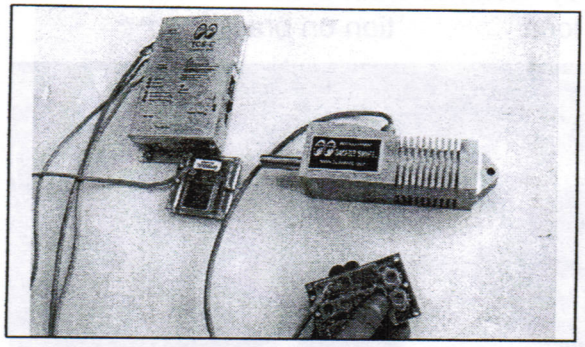
Tighten stud (Part# 15) to bracket using flange nuts (Part# 14) and install one collar lock (Part#13) loose on stud.



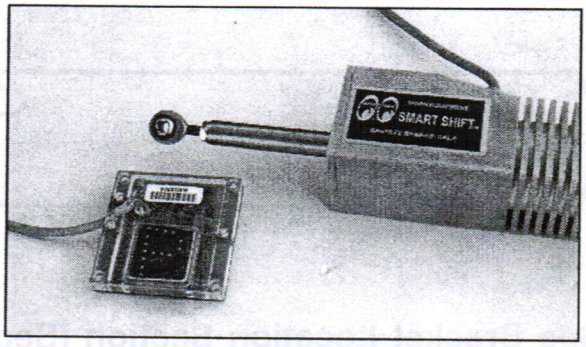
7) Place Transmission in park and power up actuator (refer to 2.2) Actuator should move freely to park position.

*Actuator should not be mounted as of yet

8) Run Actuator through its positions before mounting on trans bracket and check for free smooth operation.

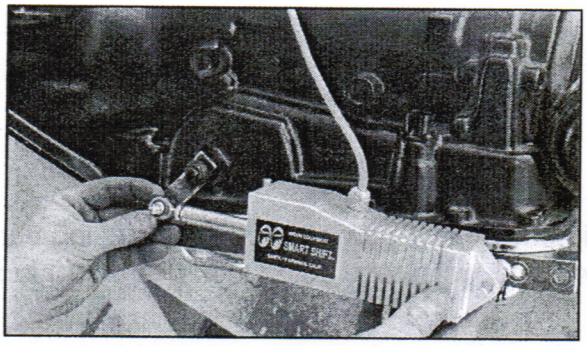


9) Install Rod End (Part# 1) and jam nut (Part# 2) in shaft on actuator. Place Actuator in Park.

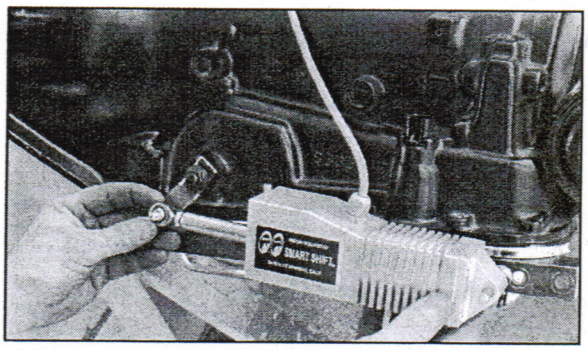


10) Adjust Rod End so actuator installs freely on stud and trans shift arm bracket when both trans and actuator are inPark. Lock jam nut after verifying position.

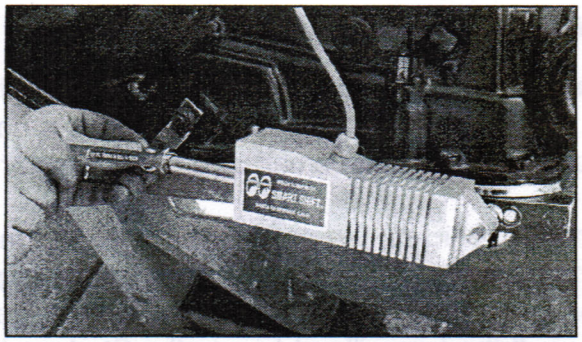
Tighten shift arm nut.



11)) Remove actuator and repeat process for all positions in your transmission. Actuator should install freely in all positions. If not re-check your mounting locations and Part# for correct positions and application.



12) If positions are correct tighten all bolts on shift arm (Part# 6) and shift arm stud (Part# 4) Install 2nd collar lock (Part# 13) on stud and lock set screw with supplied allen key making sure actuator is parallel to rail bracket. (See Fig 4)



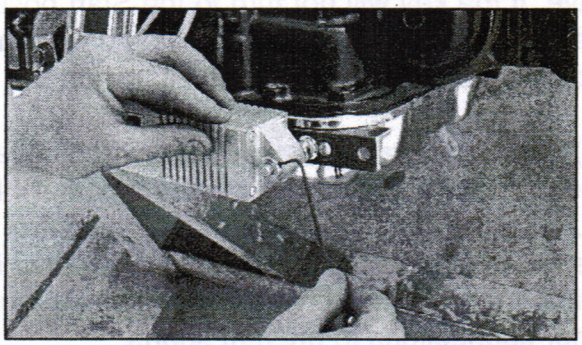
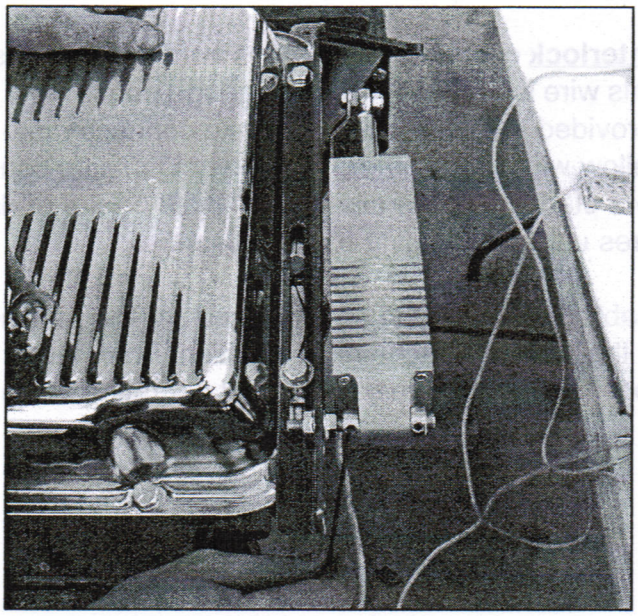
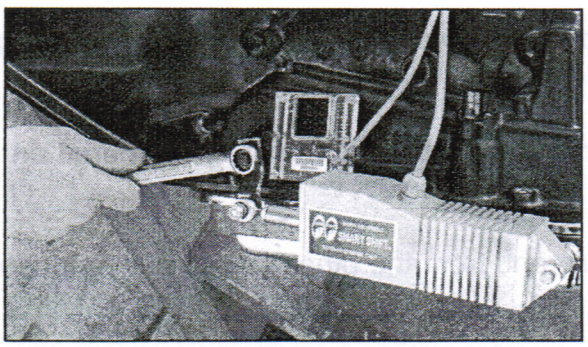


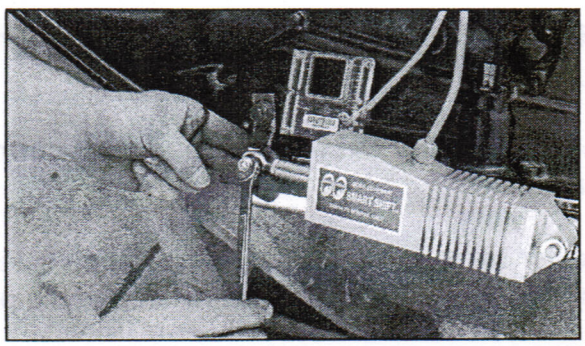
Fig 4



Picture from bottom of actuator w. Collar locks in place

13) Re-Check all nuts & bolts and wire locations making sure wire is not in harms way and is secure. Re-run shifter through all positions. If all is well you have completed bracket and actuator installation and can proceed to mounting buttons and display in vehicle.





4 Neutral Safety Installation

Since the neutral safety switch is a breaker that keeps the starter from engaging until the switch is closed in Neutral or Park, the color of the wires is not critical. It is only being used to break the 12V wire from the starter switch to the small wire on the starter solenoid .

On GM vehicles, the neutral safety switch may be located on the shifter(steering column or console), or it may be mechanical interlock in the steering column that prevents the key from turning to the Start position unless the shifter is in the Park or theNeutral position. Identify the type of neutral safety system you have. If the key will not turn to the Start position unles the stock shifter is in Park or Neutral, you have a mechanical interlock, otherwise you have a neutral safety switch. With either type, disconnect the battery ground cable to prevent accidental shorts.

(A) **If you have a neutral safety switch**, locate and identify the neutral safety wires (engine will not crank unless these wires are connected together). Extend the wires from the switch to the relay provided in the kit. Plug the white connector into the control box, splice the blue wire to one side and the yellow wire to the other. The solenoid makes contact only in neutral or park and completes the circuit for your starter. Crimp the terminals onto the wires using a crimping tool or pliers. Tape the terminal connections and all other connections to prevent shorts.

(B) **If you have a mechanical interlock** cut the wire that goes from the start position on the ignition switch to the solenoid on the starter. This wire is usually a 10 or 12 gauge purple wire. Run wires from both ends of the cut wire to the Solenoid provided in the kit. Plug the white connector into the control box, splice the blue wire to one side and the yellow wire to the other. The solenoid makes contact only in neutral or park and completes the circuit for your starter. Put the slip-on terminals on the ends of the lengthened wires. Crimp the terminals onto the wires using a crimping tool or pliers.

Reconnect the battery ground cable, disconnct the coil wire and set the parking brake. Check the switch operation by attempting to start the motor in each shifter position. The starter must crank only when the shifter is in the Park or Neutral position. Check the backup light operation when the shifter is shifted to the reverse position.

Relay Pinout:

85 White to TCS-C
86 Black to TCS-C
87 Yellow to starter (or battery) (outer contact, closing switch)
30 Blue to battery (or starter, common switch)

Reverse Light Installation

WARNING! The back up output on the control box completes the reverse circuit. It does not provide power!

Do not Under any circumstance, do not connect power to the output back up light terminal on the control box.

To Power back up lights run power to one side of your bulb and from the other side to the control box. Circuit is completed when shifter is in reverse position.

5 Changing Orientation of Gear Indicator

When the TCS-C unit has been calibrated it will start in the normal operation mode by default.
To start the setup mode again, it takes the following steps:

- Power off
- Press R, N, D+ and power on while keeping the keys pressed.
- Release the keys after approx. 5 secs.
- The setup mode is activated, the display shows: #

5.1 Orientation of Display
Press D+ and select O for orientation
Press MOON key and question mark will display.

- Change the orientation mode with D+ or D–, Once orientation is selected, press MOON key for 3 seconds to store or abort with the N key.
  The display shows: S - T - O - R - E - D or A - B - O - R - T - E - D. The selected orientation is permanently stored. When S-T-O-R-E-D displays.
- Press MOON Key Twice to go to the normal operation mode.

6 Normal Operation Mode

Security Instructions
! Only the driver of the car must operate the keyboard.

! The driver has to prevent, that children, animals or objects from accidentally pressing keys.

! The driver is responsible for sensible operation of the Smart Shift. The Smart Shift controller has no information about motor speed, direction or velocity of the car.

! False shifting while the car is moving may destroy the gear or cause injury

- After switching on, the display shows the actual shift position: for ex. P.
- Now you can shift by pressing a key.
- Some shifts are protected. They can be enabled.
  – by operating the brake, pressing MOON and then the desired key.
- The table shows how to shift from one position to another. When you press the MOON key, the display will blink. Now you can select desired gear position within 3 sec.

to / from	P	R	N	D
P	–	Brake + MOON + R	Brake + MOON + N	Brake + MOON + D
R	Brake + MOON + P	–	N	Brake + D
N	Brake + MOON + P	Brake + MOON + R	–	Brake + MOON + D
D	Brake + MOON + P	Brake + R	N	–

Downshift or upshift in forward gear can be performed br pressing D+ or D-

6.1 Diagnosis Checklist

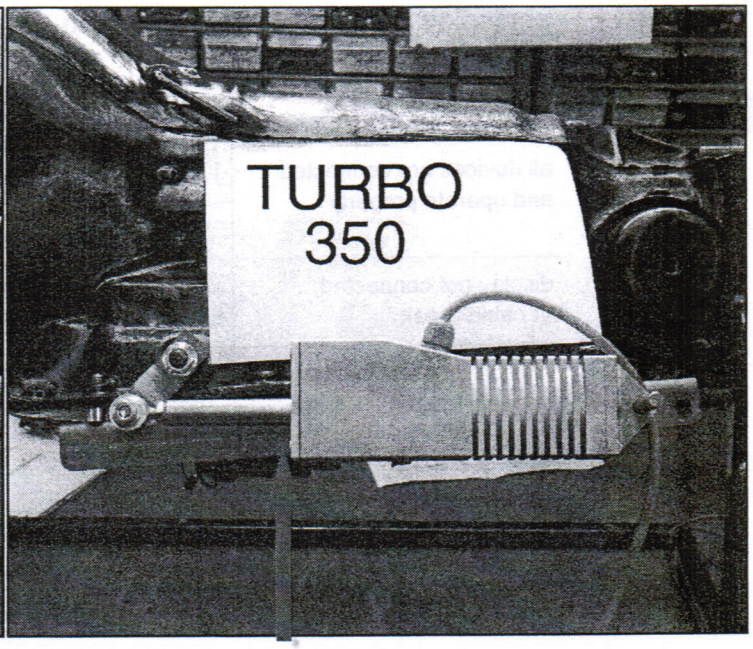
- After switching on, the control unit performs a self test. The actual shift position is recognized by evaluating the position feedback sensor. The shifter is moved to the nearest position.
- The LED of display and keyboard enable you to recognize if something is wrong.

	Keyboard	Display
all devices are connected and operate properly	1. orange LED blink short time	1. growing square (twice)
	2. all LED shine	2. actual position (for ex.P)
display not connected or cable break	after about 1 sec: orange LED blink	
keyboard not connected or cable break		after about 1 sec: **K - E - Y - B - O - A - R - D E - R - R - O - R**
sensor not connected or cable break		after about 1 sec: **S - E - N - S - O - R E - R - R - O - R**

7 Bracket Location Section

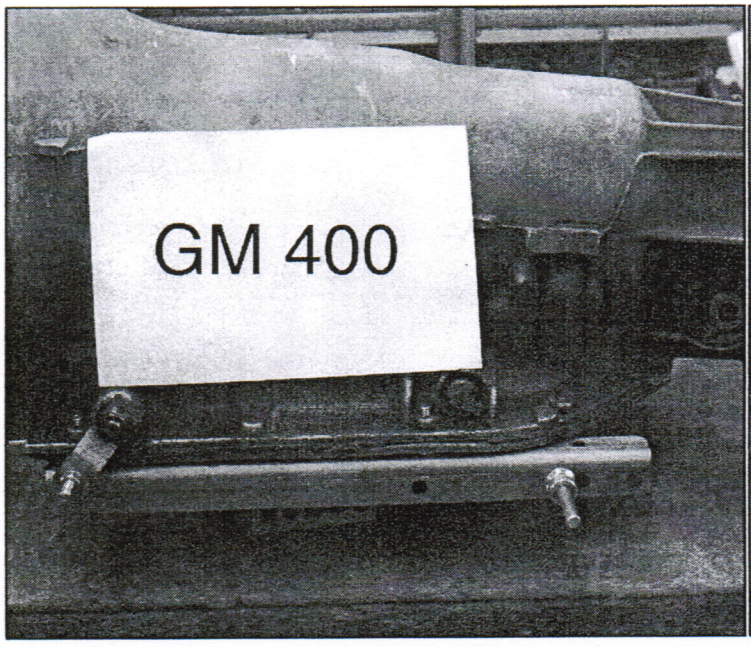
GM TURBO 350

*Stud installs in position #3 on trans rail bracket.

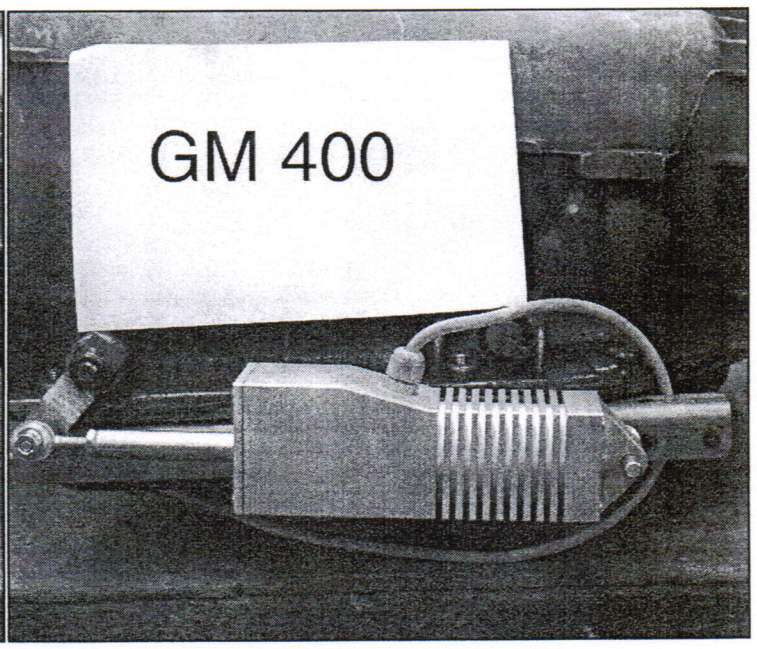


*Slot "A" Aligns with 1st bolt from front of trans.

GM TURBO 400



*Stud installs in position #3 on trans rail bracket.



*Slot "A" Aligns with 1st bolt from front of trans.

GM 200 R4

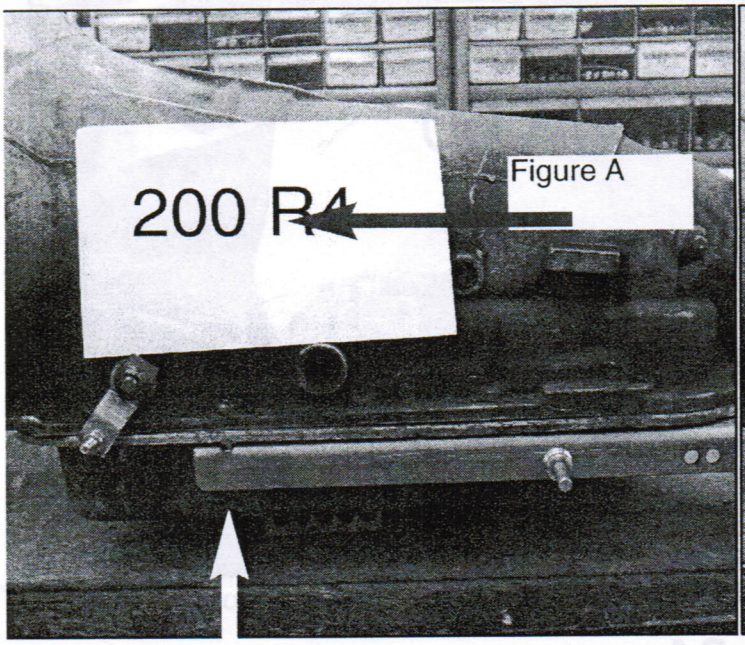
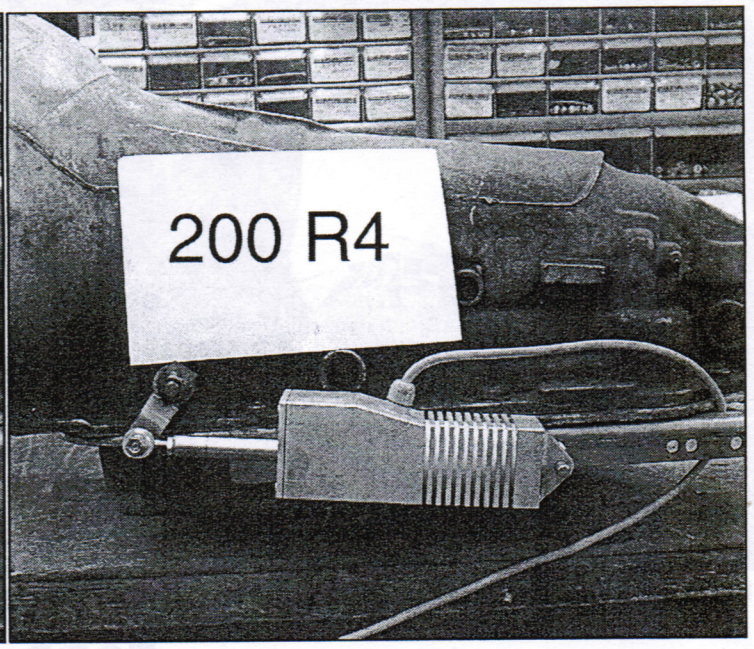


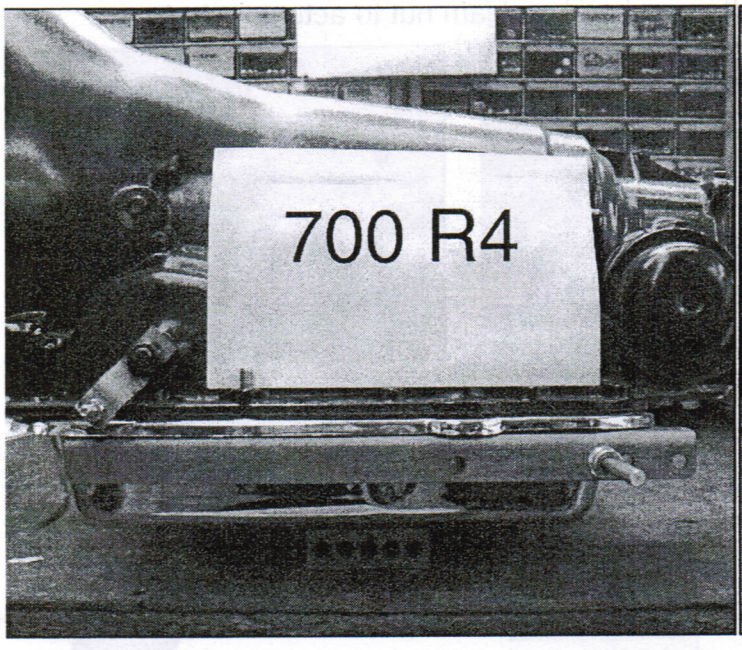
Figure A

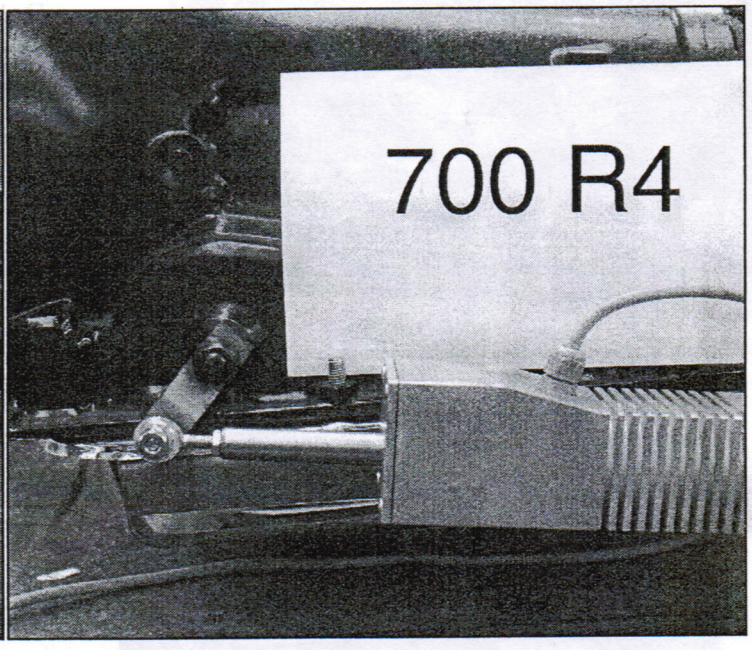


*Slot A aligns with 2nd bolt from front of trans pan

*Stud installs in position 1 on rail bracket.

GM 700 R4

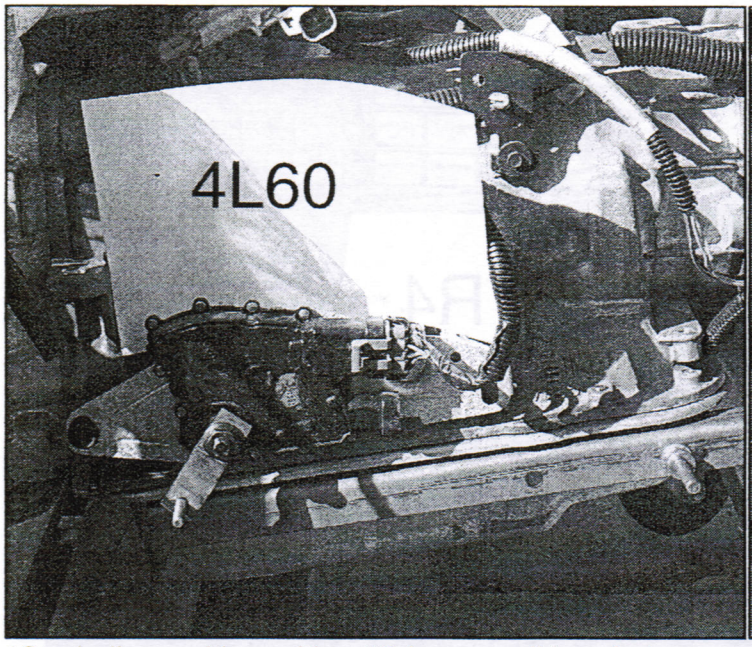




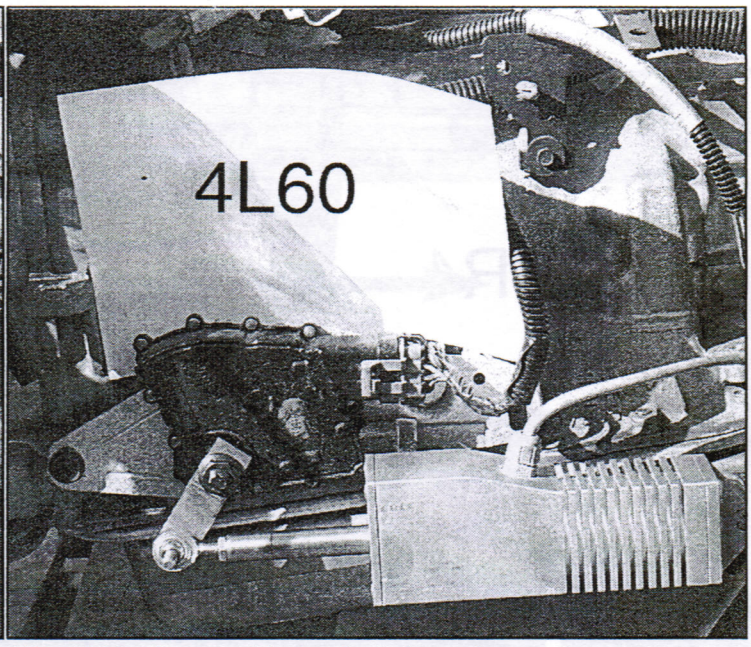
*Stud install in position #2 on rail bracket.

*Slot "A" Aligns with 1st bolt from front of trans.

GM 4L60

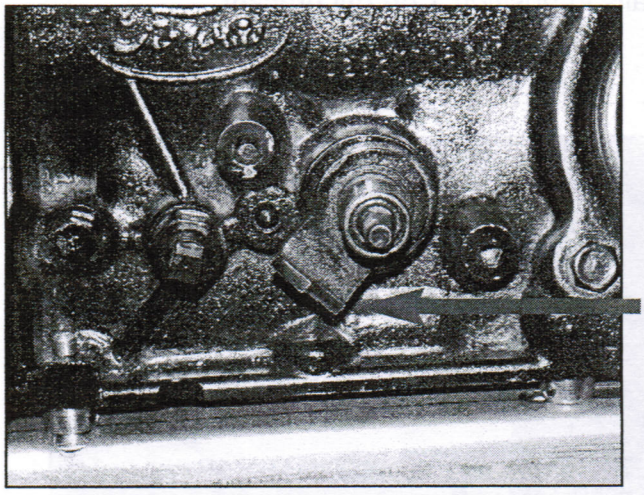


*Stud aligns with position #2 in pan rail bracket.



*Slot "A" Aligns with 1st bolt from front of trans.

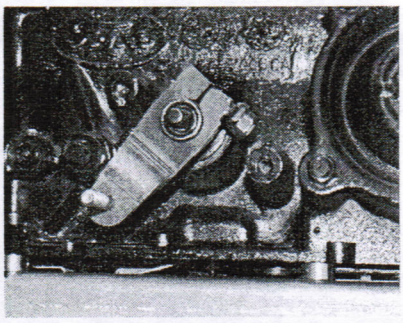
FORD C4

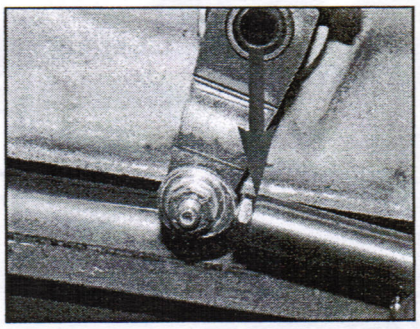


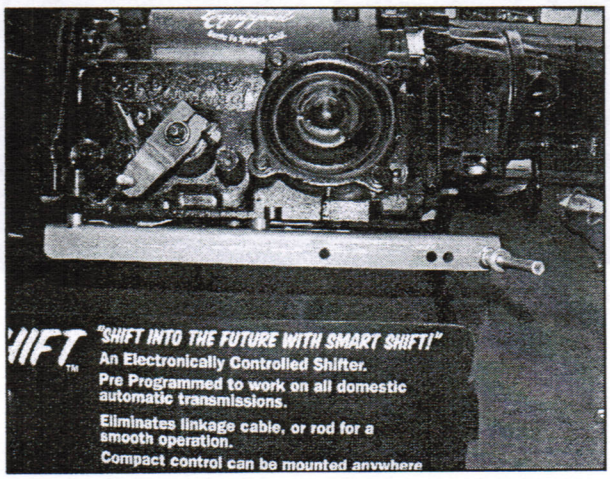
Remove exsisting shift arm as shown in photo. Install new shift arm part#22 over remaining portion of shift arm.

IMPORTANT

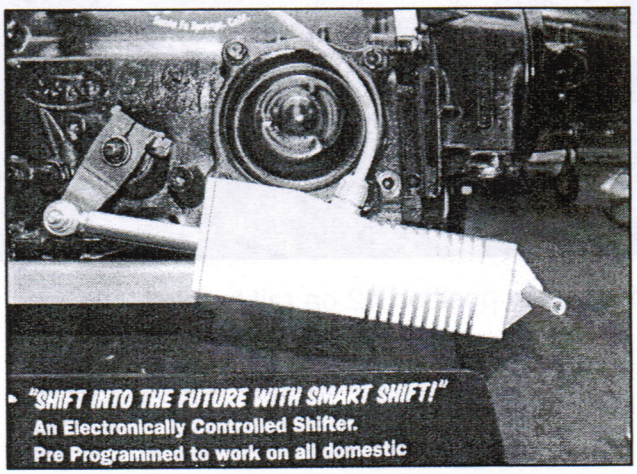
Bottom rod end and jam nut to actuator shaft.



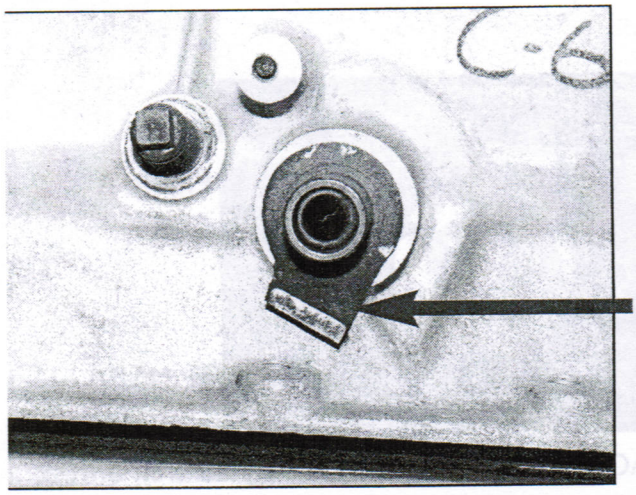




*Install stud in position #4 on rail bracket.



FORD C6

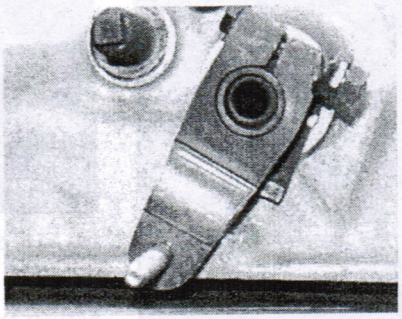


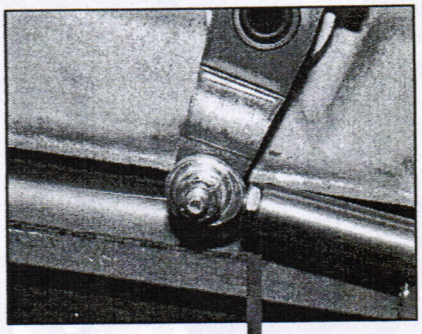
*Slot A aligns with 2nd bolt from front of trans pan

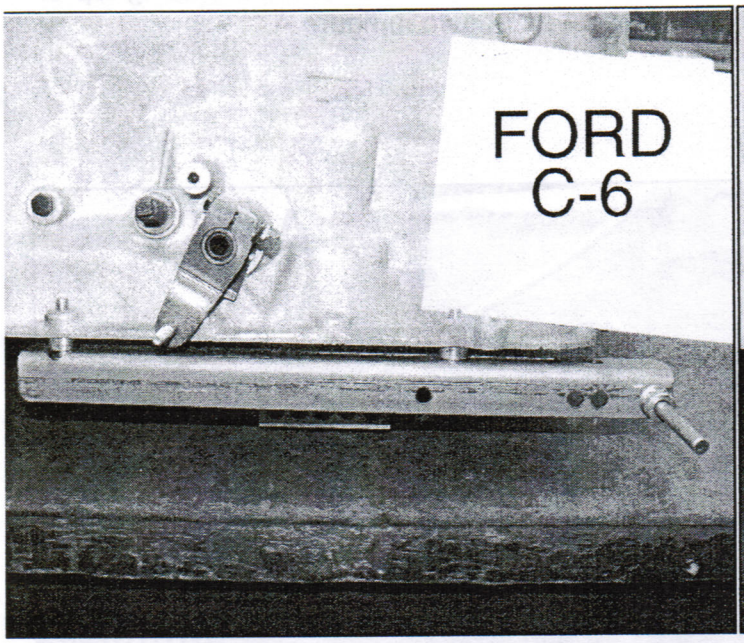
Remove exsisting shift arm as shown in photo. Install new shift arm part#22 over remaining portion of shift arm.

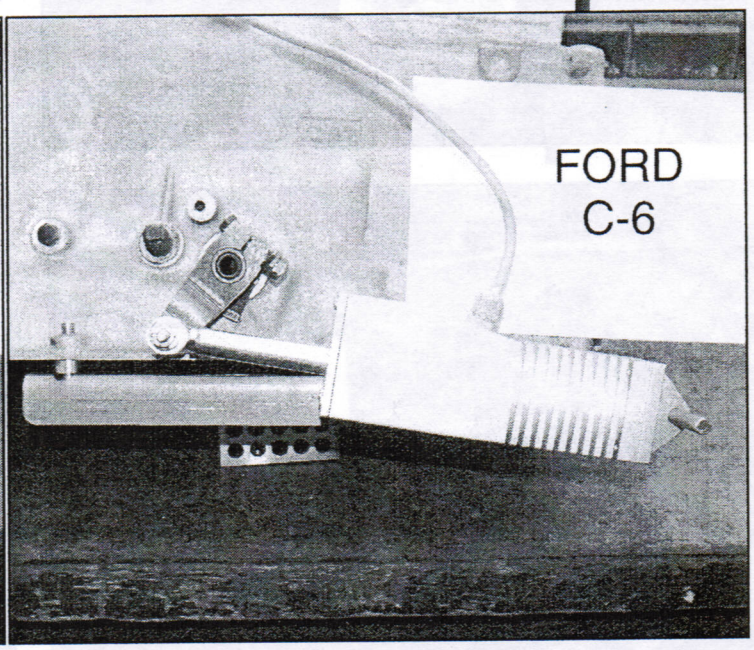
IMPORTANT

Bottom rod end and jam nut to actuator shaft.



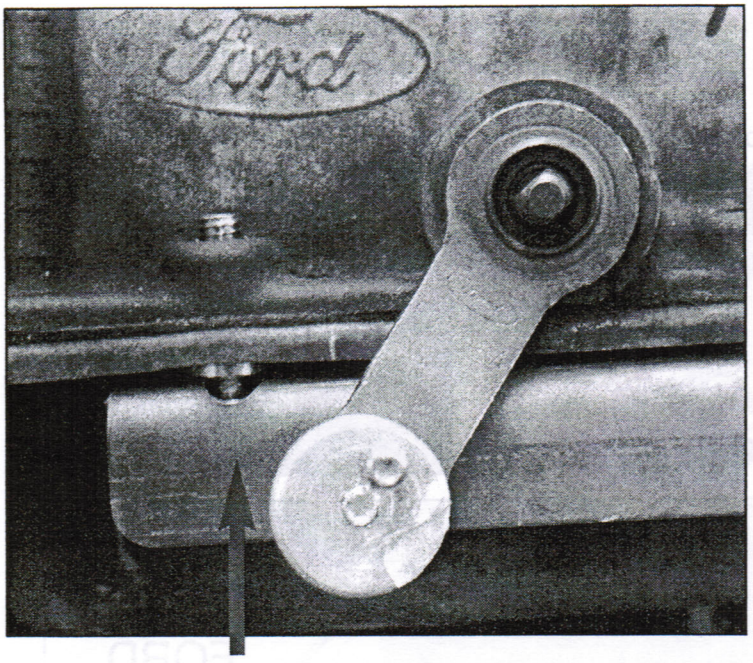






*Install stud in position #4 on pan rail bracket.

FORD AOD



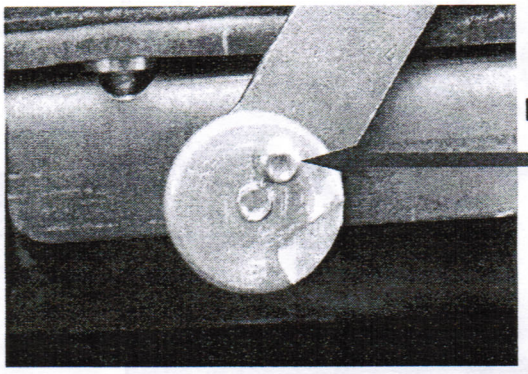
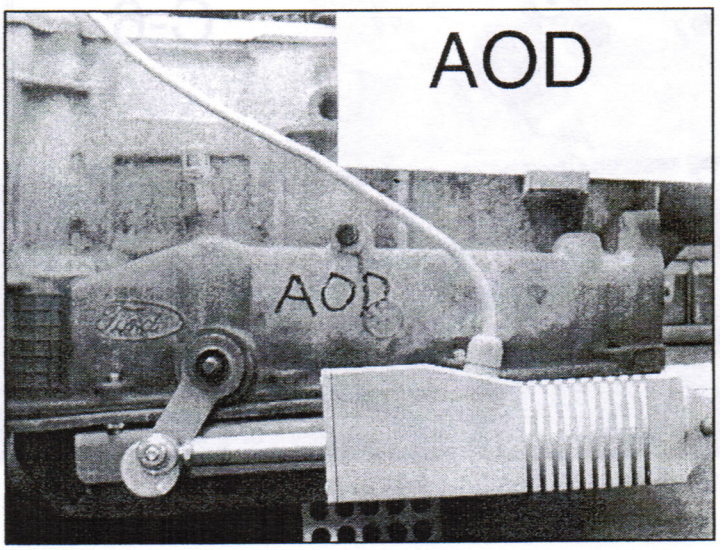


Figure A

Install AOD adapter bushing on original shift arm.

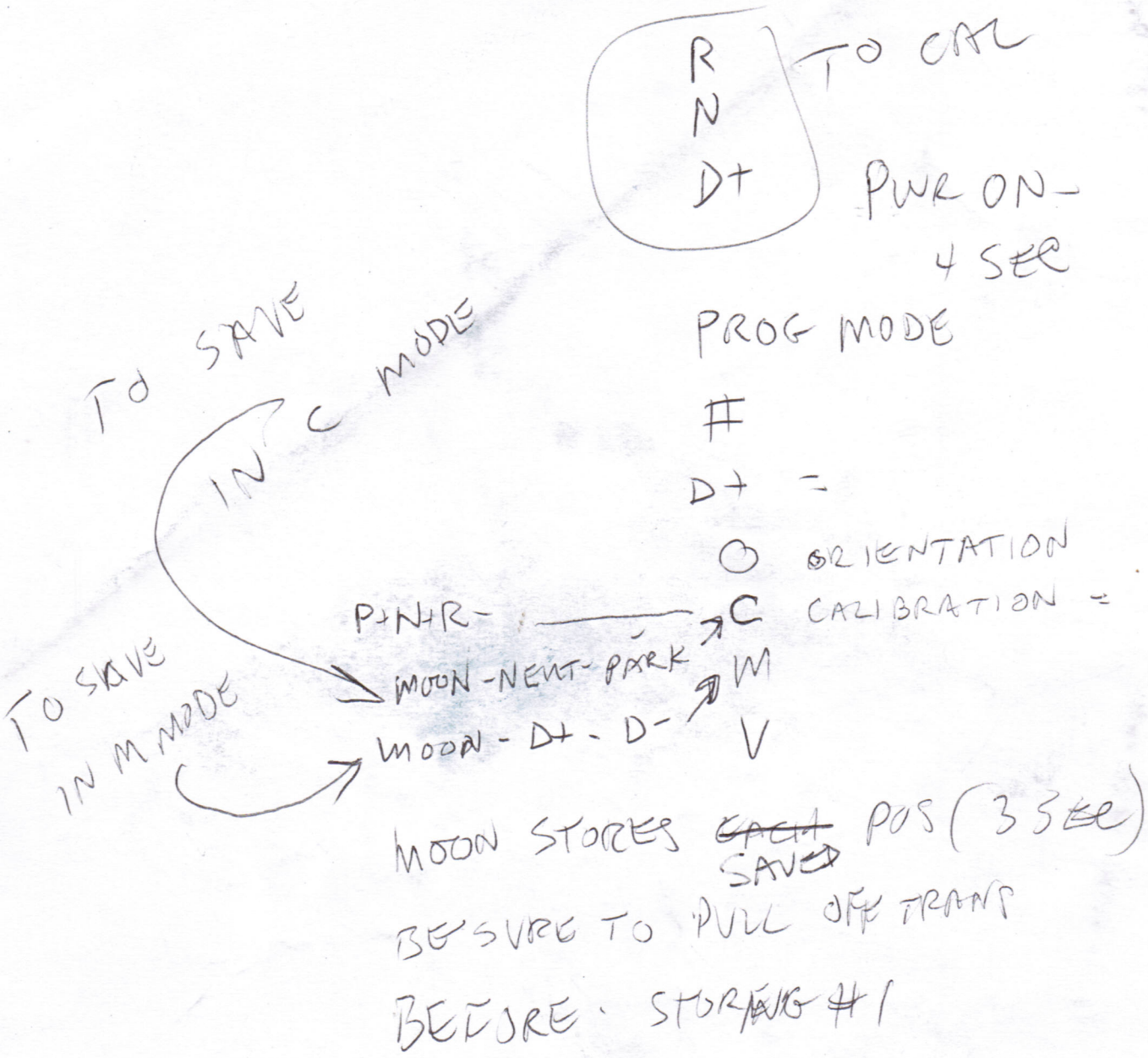
Make note to install with stud location facing top of transmission as shown in figure A.



Install stud in position #3 on trans rail bracket.

IMPORTANT

Be sure to install aluminum adapter bushing with stud location towards top of transmission.



For Tech Support Please Call 562-946-2692
Monday through Friday 9 Am to 4 Pm Pacific Standard Time

Fax 562-946-2961

For Product Support Online go to:

http://www.mooneyes.com/support

Programming the Smart Shift

Power off
Hold down R N D+ and turn power on, hold for 4 sec.

 # sign will appear

Use D+ or D- to scroll thru the following:

O for orientation

C for Calibration

M for manual position setting

V for Version number

To save in C mode, MOON N P

To save in M mode, MOON D+ D-

To store M positions, hold MOON for 3 seconds. Counts down 3,2,1, stored

When setting manual positions, use D+ to pull shaft into solenoid for setting position.

Be SURE the shaft is not attached when storing the M positions.