TITAN PN: 01 0000 0122

Important: Please read these instructions carefully and completely *before* starting the installation.

For TITAN Tanks:
7010101 (S)
7010201 (S)
7010301

TITAN™ Fuel Tanks

INSTALLATION INSTRUCTIONS
G e n e r a t i o n V

Extended Capacity Replacement Tank for Diesel Chevrolet / GMC Trucks—

For Chevrolet / GMC models 2500 & 3500, model years 2001-2010, with Duramax diesel engines: Extended Cab Short and Long Bed: also Crew Cab Short and Long Bed

Required Tools:

1 ea. Ratcheting socket driver
1 ea. ½" socket
1 ea. 8 mm socket
1 ea. 13 mm socket
1 ea. Torque wrench handle to fit ½" socket
1 ea. ½" end wrench
1 ea. 11 mm end wrench
1 ea. Large flat blade screwdriver
1 ea. Medium flat blade screwdriver
1 ea. Diesel fuel line release tool
1 ea. Razor blade or sharp box cutting knife
1 ea. Small mallet or hammer.

Optional Recommended Tools:

1 ea. Hydraulic transmission jack
1 ea. Vehicle hoist

Parts List:

1 ea. Extra heavy-duty cross-linked polyethylene (XLHDPE) fuel tank for one of the following General Motors diesel trucks:

Extended Cab, Short Bed	Tank Identification: "GM EXSB"
Crew Cab, Short Bed "Super Series"	Tank Identification: "GM CCSB"
Crew Cab & Extended Cab, Long Bed	Tank Identification: "GM CCLB"
Crew Cab Long Bed "Super Series"	Tank Identification: "GM CCLB" Also, low fuel trap baffle is visible in bottom of tank—visible from the outside on "Super Series".

Note: *Each tank has the above identification designation on its top. Please check to be sure the tank is properly identified as the one to fit your truck.*

The following parts (Sending Unit Mounting Assy) should already be installed on the tank (top flange and 5/16" nylon locking nuts should be loosely installed).

1 ea. Sending Unit Mounting Assembly, made of:
- 2 ea. ½ flanges with 5/16 welded studs (mounted inside tank)
- 1 ea. Flat flange gasket (mounted inside tank)
- 8 ea. 5/16" flat retainers
- 1 ea. "O" Ring sending unit gasket (primary "O" ring gasket)
- 1 ea. Top sending unit flange
- 8 ea. 5/16" nylon locking nuts

2 ea. Roll-over vent valves (installed in top of tank)
2 ea. Roll-over vent valve gaskets (under roll-over vent valves)
2 ea. ½" X 36" vent hoses
6 ea. ½" hose clamps
2 ea. ½" "Y" connectors

1 ea. Rear cradle bracket
4 ea. 99 0000 0113 Universal Strap Shims (for straps marked "A" following the part no.) Two each required per inboard strap bolt.
2 ea. 99 0000 0103 Extruded Rubber Bushings (IF optional Titan Shield was ordered, only one [1] rubber bushing will be included)

1 ea. Front Cross Member assembly, including:
- 1 ea. tapered right-hand side bracket
- 5 ea. 5/16" X 1" plated bolts
- 5 ea. 3/8" plated flat washers
- 3 ea. 5/16" nylon locking nuts

Note: *The General Motors straps are identified by designations stamped into them. These designations are:*

SUPER SERIES
Crew Cab Short Bed

Cradle (front and rear straps tied together)	*Front Strap = "RGCSF"* *Rear Strap = "RGSB"*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0106 0000*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0106 0000 A* *(straps require universal shims)*

Crew Cab Long Bed

Cradle (front and rear straps tied together)	*Front Strap = "RGCLR"* *Rear Strap = "GCLR"*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0107 0000*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0107 0000 A* *(straps require universal shims)*

STANDARD, Generation V
Extended Cab Short Bed (43 Gallon)

Cradle (front and rear straps tied together)	*Front Strap = *"QGCSF"*

** Some Extended Cab Short Bed straps have no markings*

Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0102 0000*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0102 0000 A* *(straps require universal shims)*

Crew & Extended Cab Long Bed (55 Gallon)

Cradle (front and rear straps tied together)	*Front Strap = "QGCLF"*
Cradle (front and rear straps tied together) *Same as above only marked differently:*	*Front or Rear Strap = "08"*
Cradle (front and rear straps tied together)	*Front &/or Rear = 01 0103 0000*

Cradle (front and rear straps tied together) *Front &/or Rear = 01 0103 0000 A*
(straps require universal shims)

Please check to be sure the straps are identified as the proper parts for your truck.

<u>Optional</u> Parts List:

1 ea. "LB7 Kit", including:
- 1 ea. 12 ga. Intermediate Top Flange (3 ¾" inside diameter)
- 1 ea. 12 ga. LB7 Top Flange (3 3/8" inside diameter)
- 1 ea. 2" x 2" x ½" Fill Line Adapting Tee
- 2 ea. 2" hose clamps
- 1 ea. ½" hose clamp
- 1 ea. "O" Ring for LB7 sending unit (smaller than primary "O" ring gasket)

1 ea. Titan Shield, XLHDPE Plastic

For trucks equipped with LB7, LLY, LBZ and LMM engines:

IMPORTANT NOTICE: *Before installation, be sure to thoroughly inspect inside of the tank for ANY foreign debris!*

Step	Description
1	Place the vehicle on a hoist that leaves the entire underside of the frame *unobstructed.* It is recommend that installer remove the driveline for better access to the tank and accessories. *IMPORTANT:* The new aluminum drivelines can be easily damaged if care is not taken in handling. Be very careful, they are very expensive to replace.
2	Drain all the fuel from the original equipment tank using a pump or siphon.
3	Disconnect fuel tank fill hose from original equipment tank.
4	Remove bolts and drop fuel cooler, located at the front of tank, down to gain access to lines on top of tank.
5	Disconnect fuel gauge electrical connection, feed line and return line from sending unit. *Note:* Use fuel line release tool to remove fuel lines from sending unit.
6	Support original equipment tank.
7	Loosen and remove the two (2) 15 mm bolts on outside of straps.
8	Remove original equipment tank with its straps from vehicle.
9	Tuck the wiring harness, differential breather hose, and brake line up on top of the frame as the new tank will need to be positioned against the frame for its entire length.

Note: *Some truck models may be equipped with a wiring harness for gooseneck and 5th wheel trailers. This will need to be moved to a new location and secured once the new tank is installed—generally behind the tank is best.*

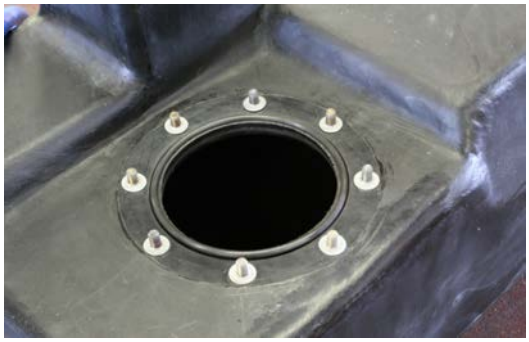
10 Remove feed and return lines from sending unit and reinstall in factory position on truck.
11 Reinstall fuel cooler.
12 Cut the primary vent line just after the *second* elbow from the tank end of the line. This is approximately 8 to 10 inches from the sending unit end of the line.

Note: *Older trucks equipped with LB7 engines (2001 to early 2004) require an optional "LB7 Kit." If you are installing on an LB7 and the kit wasn't ordered, contact your Titan dealer to obtain one. The kit includes a special 2" X 2" X ½" "Fill Line Adapting Tee." If installing on an LB7, disregard instructions concerning the "primary vent line hose" as LB7 vehicles do not have one. On an LB7, the tank vents will be attached to the ½" "barb" on the Fill Line Adapting Tee. This will be covered in more depth below.*

13 Insert the supplied "Y" fitting into the end of the primary vent line that is still connected to the vehicle. Fasten tightly using one of the hose clamps supplied. *Note: The primary vent line hose will fit the "Y" fitting loosely, however, the hose clamp will tighten it and hold securely.* The loose piece of primary vent line will be reattached to the sending unit in another step.
14 Remove sending unit from original equipment tank using hammer and screw driver to rotate factory sending unit flange counter-clockwise until it releases the sending unit. Leave original equipment factory "O" ring gasket behind, do not use on new tank (See Fig. 1).
15 The new Titan fuel tank comes with the sending unit mounting hardware assembled. Remove the 5/16" nylon locking nuts from the studs holding the top flange. Remove the top flange. You will see the "O" ring gasket in place under the flange. Leave the "O" ring gasket, studs, and retainers assembled as they are (See Fig. 2).

Note: *Check the two ½ flanges mounted inside the tank to be sure the flat gasket is in place between the flanges and the inside top of the tank. Also, be sure to check the ½ flanges to be sure they are seated properly and do not overlap.*

(Fig. 1) Remove sending unit from original equipment tank using mallet or hammer and large screwdriver.

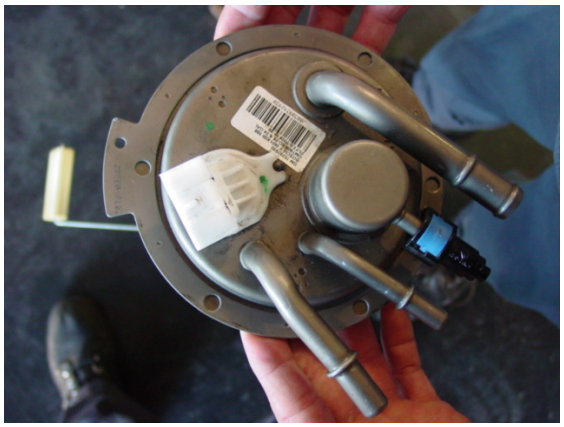


(Fig. 2) Sending unit mounting hardware before sending unit, top flange, and 5/16" nylon locking nuts are installed.

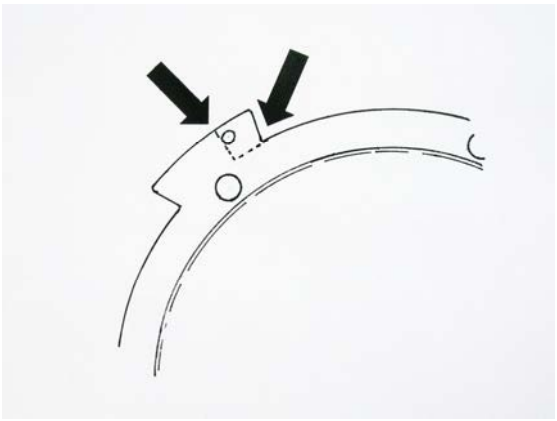
Note: *On trucks equipped with LB7 engines (2001 to early 2004) please refer to "Special LB7 Sending Unit Installation Instructions" located after the main instructions. They replace steps 16 – 21 shown here.*

16 Check the tab(s) on the sending unit for clearance in the mounting opening of the new fuel tank.

Note: *On <u>some</u> new GM trucks the sending unit tab is situated such that the flange studs on the TITAN Tank will not allow it to be set at the same angle as in the original equipment tank (See Step 18 below). In this case, part of the tab will have to be removed so that the sending unit will align properly (See Figs 3&4).*



(Fig. 3) New GM sending unit showing tab which, in some cases, interferes with mounting studs in the TITAN Tank. If the tab interferes, it will need to be trimmed.



(Fig. 4) Diagram showing where to trim sending unit tab. Cut the tab along the dotted line as shown above using a pair of diagonal cutters, a hack saw or a grinder.

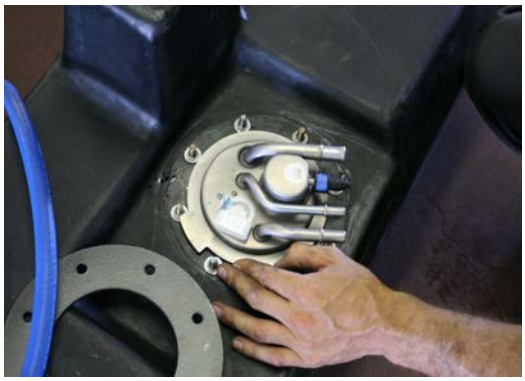
17 Carefully place the sending unit into the new tank. Make sure that the "O" ring gasket is placed properly under the sending unit to seal correctly.

18 After placing the sending unit in the tank on top of the "O" ring gasket, rotate it so the fuel line fittings are positioned at the *same* angle as in the original equipment tank. If the fittings point too far either direction they will not hook up correctly or the float will press against the side of the tank resulting in improper operation of the fuel gauge (See Fig. 5).

19 Replace the top flange on the studs, on top of the sending unit, so as to hold it down securely.

20 Use the 5/16" nylon locking nuts to tighten down the top flange. **Tighten to 20 foot pounds (ft. lbs) of torque using torque wrench.** Be sure to tighten in a "star" pattern, starting with the four studs adjacent to where the ½ flanges meet so as to prevent the flanges from overlapping, and to ensure all nuts are equally tightened and the "O" ring gasket is properly seated. Carefully "snug" the nuts equally before tightening to specification (See Fig. 6).

21 Attach the short portion of the primary vent line which was cut off in a previous step to the vent line fitting of the sending unit (See Fig. 7).



(Fig. 5) Make sure fuel line fittings point at the same angle as in original equipment tank.

(Fig. 6) Tighten using torque wrench and a "star" pattern to ensure all nuts are equally tightened and the "O" ring gasket is properly seated.

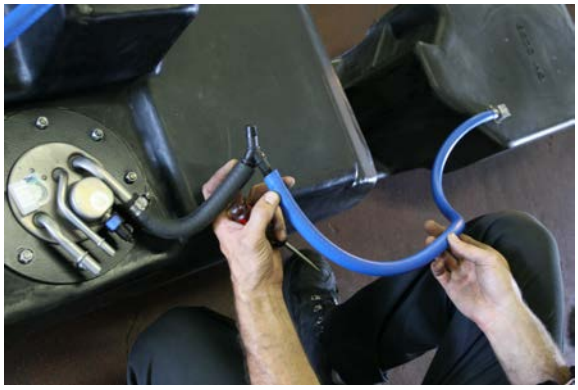
22 If the optional Titan Shield *was not* ordered with the tank, install one of the two rubber bushings supplied (*If the Titan Shield was ordered with the tank only one bushing was supplied).* Place the rubber bushing, channel side down, on the bottom of the front strap, of the rear mounting cradle. The front strap is the one that is flat, not curved. Align the rubber bushing so that the center of the bushing is lined up with the center of the bottom of the inside of the strap and press it securely into place. *Note: If the Titan Shield WAS ordered with the tank, skip this step and DO NOT place the rubber bushing on the front strap of the rear mounting cradle. The rubber bushing is not installed in the rear mounting cradle when the Titan Shield is used.*

23 If the Titan Shield was ordered with the tank, place it under the tank.

24 Place tank (and shield if included) on a hydraulic transmission jack. Lift the tank high enough to reconnect the sending unit electrical connection, as well as both the return, feed line hoses, and primary vent line.

25 Attach the free end of the piece of primary vent line that is now attached to the sending unit fitting to the "Y" fitting you installed in the primary vent line, on the vehicle, earlier (See Fig. 8).

26 Attach the front vent line (1/2" hose on the end of the Titan fuel tank farthest away from the sending unit) to the remaining empty "barb" on the "Y" fitting described in the preceding step (See Fig. 8). You will need to route the vent lines around and through the frame rails; experiment to find the best route. *Note: The primary vent line hose will fit the "Y" fitting loosely, however, the hose clamp will tighten it and hold securely.*



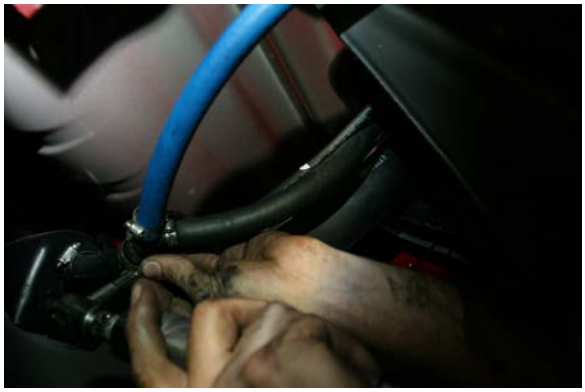
(Fig. 7) Replace cut-off portion of primary vent line onto sending unit. This figure illustrates how this part of the primary vent line, the "Y" and the tank's front vent hose line will be connected when mounted in vehicle. The empty barb of the "Y" shown would be connected to primary vent line already attached to vehicle.

(Fig. 8) Attach "Y" to short primary vent line on sending unit and to tank's front vent hose line. Hold with small gear clamps provided; make sure they are tight.

27 Now go up to where the main vent line attaches to the fill spout. Measure down approximately 8 or 10 inches from the fill spout and cut main vent line. Install the other "Y" fitting supplied, splicing the two lines together (See Fig. 9). *Note: The primary vent line hose will fit the "Y" fitting loosely, however, the hose clamp will tighten it and hold securely.*

28 Attach the rear vent line (1/2" hose on the end of the Titan fuel tank closest to the sending unit) to the remaining empty "barb" on the "Y" fitting described in the preceding step. You will need to route the vent lines around and through the frame rails; experiment to find the best route.

29 Make sure that all vent hose attachments are secured and tightened with the small hose clamps supplied.



(Fig. 9) Cut primary vent line hose down approximately 8 inches from fill spout. Using second "Y" fitting provided, splice the two ends back together. Attach tank's rear vent line to the remaining, third barb of the "Y". Hold fast with small hose clamps provided; make sure they are tight.

(Fig. 10) Tighten cross member against frame using 5/16" plated bolts, washers and nylon locking nuts provided. Note exhaust particulate filter above cross member.

(Fig. 11) If included, thread two shims onto each strap bolt. In the case of GM, thread bolt up through strap and shims.

(Fig. 12) Tighten the bolt and bracket against the shims. If the strap does not hold the tank tightly enough, remove one shim at a time until it is tight.

Note: *The shims, if included, make it easier for the installer to adjust the straps so they are good and tight. This is to compensate for slight differences from vehicle to vehicle and year to year. With two shims in place on each strap, tighten the mounting bolts. If the straps are not sufficiently tight, remove one shim at a time until the straps hold the tank tightly.*

(Fig. 13) Shown: Right Hand Bracket for GM Cross Bar. The Cross Bar is held fast by tightening the 5/16" cap screw seen here at the upper left hand corner of the bracket. In severe applications it is recommended that the installer position the Cross Bar, mark the center of this cap screw hole, drill a hole in the front lip of the frame and then tighten the cap screw into the hole. It is advisable to apply Loctite Threadlocker or equivalent to the bolt. By early 2009, TITAN will be shipping a "Super Series" bracket with each tank as shown above. In a severe application, using this bracket, the installer may position the bracket, tighten down the cap screw as shown, and then drill a hole in the frame lip through the hole seen in the right hand corner of the bracket. An extra 5/16" cap screw and nylon locking nut are provided for fastening this extra hole.

Note: *Summary as to vent hose line routing and attachment (LLY, LBZ and LMM): Basically the two vent hose lines supplied on the tank are attached to the existing main vent hose line by cutting the line and installing the "Y" fittings—the front is attached down by the sending unit (8-10" away from sending unit)—the rear is attached up by the fill spout (8-10" away from fill spout). When the tank is installed, it is vitally important the vent lines are not kinked, crushed, or sagging or the tank will not fill properly.*

LB7 *Summary as to vent hose line routing and attachment: The two vent hose lines supplied on the tank are attached to the ½" barb on the 2" x 2" x ½" Fill Line Adapting Tee. Procedure: Cut the front line (the one attached farthest away from the sending unit) in its center. Install one of then ½" "Y" fittings supplied using it to splice the hose line back together. Install the rear (the one closest to the sending unit) line on the empty barb of the "Y" fitting. Secure all with the small hose clamps provided. Finally, slide the end of the front vent hose line onto the ½" barb of the 2" x 2" x ½" Fill Line Adapting Tee after it is installed in the fill hose. When the tank is installed, it is vitally important the vent lines are not kinked, crushed, or sagging or the tank will not fill properly.*

30 Once all connections are securely attached, lift the tank the rest of the way into place with the transmission jack.

31 The rear mounting cradle has two hangers that hang in the inboard original equipment mounting points. There are bolt holes in the frame rail side that attach directly into the original equipment bolt holes. Hang the inboard side of the cradle first.

32 On the rear outboard section of the strap cradle, start the stock 15 mm bolt into the retaining clip until approximately half of the thread is through. Sometime in 2010, zinc plated shims will be integrated into the strap design. In those cases, zinc plated shims are included with the straps. If applicable, be sure to thread the shims onto the strap bolt before starting (See Fig.11). Now, move to the forward strap and start the 15 mm bolt and tighten to the same depth. It is important to check the straps all the way around before tightening to ensure proper alignment and seating of the brackets. Once again, if applicable, be sure to thread the shims onto the strap bolt before starting (See Fig.11). After checking alignment, tighten stock mounting bolts to original equipment specifications (See Fig. 12).

33 A front cross-member support is included with the tank. It will require no drilling of the truck's frame rails to install. However, in cases where severe conditions might be expected, a small optional "locking hole" might be desirable (See Fig. 13).

34 Locate the second rubber bushing supplied *(If the Titan Shield was ordered with the tank, this is the only bushing that was supplied)*. Place the rubber bushing, channel side down, on the bottom of the cross-member tank cradle. Align the rubber bushing so that the center of the bushing is lined up with the center of the bottom of the inside of the cradle, and press it securely into place.

35 Place the cross-member on the frame at the very front of the tank. Hang it on the in-board side of the driver's side frame rail first. Lift cross-member to opposite frame rail (passenger's side). Set the separate tapered passenger side bracket on the frame and then bolt the cross member to it using two of the 5/16" plated bolts, with washers, and nylon locking nuts supplied.
36 Slide the cross-member along the frame rail towards the rear of the truck until it is under the tank, and in contact with it enough to substantially support it.

Note: *If the truck is equipped with an exhaust particulate filter canister (it looks like a small muffler located in-line before the truck's main muffler), move the end of the cross-member support on the passenger's side of the frame one direction or the other (forward or rear) until you obtain 1/4" of clearance or more under the canister.*

37 Using the other two 5/16" plated bolts provided; thread a 5/16" bolt into the nut welded on the tapered bracket on each end of the cross member and tighten against the frame (See Fig. 10). Be sure the cross-member is secured well (See Fig. 11).
38 Connect the fill hose and vent hose (where applicable) and securely tighten with clamps. Make sure neither hose is kinked and both have a consistent downward slope.

Note: *On trucks equipped with LB7 engines: Cut fill hose as near as possible to fill spout assembly (fuel tank cap), being sure to leave enough hose for the 2" x 2" x ½" Fill Line Adapting Tee to slide into. LB7 trucks may have an interior fill tube inside the fill hose. Do not cut this at the same time the outer fill hose is cut. This will have to be threaded through the adapting tee. Twelve inches (12") of the interior fill tube should be cut off the tank end of the tube. Install the adapting tee so the ½" barb is pointing up. Slide the tank ½" vent hose line onto it as described earlier.*

39 Make sure that ALL mounting hardware, clamps, bolts, etc. are tight.
40 Replace drive line assembly on the truck.
41 Lower truck, fill with diesel fuel and check for leaks.

Special LB7 Sending Unit Installation Instructions

These Instructions Replace Steps 16-21 Above

These Steps Require an "LB7 Kit"

16 Put the top flange you have removed aside, it will not be needed again. Place the thinner flange, from the LB7 Kit (the Intermediate Top Flange), with the larger inside diameter, onto the studs; making sure the primary "O" ring gasket (the one shipped in-place on the tank) is placed properly under the flange to seal correctly.

17 From the bottom of the sending unit thread the provided smaller “O” ring gasket over the unit until it is at the base of the unit’s top. Carefully place the sending unit into the new tank on top of the flange you installed above. Make sure the “O” ring gasket is placed properly under the sending unit to seal correctly.

18 After placing the sending unit in the tank on top of the “O” ring gasket, rotate it so the fuel line fittings are positioned at the *same* angle as in the original equipment tank. If the fittings point too far either direction they will not hook up correctly or the float will press against the side of the tank resulting in improper operation of the fuel gauge.

19 Place the remaining thin flange (with the smaller inside diameter; the LB7 Top Flange) from the LB7 Kit onto the studs, on top of the sending unit, so as to hold it down securely.

20 Use the 5/16” nylon locking nuts to tighten down the top flange. **Tighten to 20 foot pounds (ft. lbs) of torque using torque wrench.** Be sure to tighten in a “star” pattern to ensure all nuts are equally tightened and the “O” ring gasket is properly sealed.

NOW GO TO STEP 22 ABOVE AND FOLLOW THROUGH TO STEP 41

How do you know if you need an LB7 Kit?

Answer: LB7 engines were used on all 2001 to 2003 General Motors diesel trucks. On 2004 models it is required if the eighth character in the VIN is a “1”. Contact your TITAN™ dealer if you have any questions.

Important: *Be sure that all vent lines are free of any sagging areas. Sags can fill with and trap fuel and prevent the vent lines from venting the tank. Slow filling, “spitting” and surging can result. Shorten vent lines and/or tie them to the body and chassis as needed to be sure they drain and do not trap liquid fuel.*