SECTION VI - INSTALLATION

The information found in this section covers installation of the **Series 10 Gen II** on Ford, Chevrolet & International truck chassis. Should you require information or assistance concerning installation on another make chassis, contact:

MILLER INDUSTRIES
CHEVRON
Mercer, PA 16137
Phone (724) 981-7500

MILLER INDUSTRIES
CENTURY/VULCAN
Hermitage, PA 16148
Phone (724) 981-3328
FAX (724) 981-0277

Before attempting installation, thoroughly read your Owner's Manual & Warranty. Become familiar with the different parts, their function and general location. **BE SAFE!** Exercise caution when handling the larger components of the unit. **MAKE CERTAIN** your handling equipment has the load capabilities for lifting and transporting the carrier assembly to the truck chassis for installation.

THE CAR CARRIER WEIGHS APPROXIMATELY 4,500 LBS. (ALUMINUM), 6,000 LBS. (STEEL). THEREFORE, DURING INSTALLATION ON THE CHASSIS, ONLY AN OVERHEAD CRANE OR MOBILE LIFTING DEVICE OF SUFFICIENT LOAD CAPACITY RATING SHOULD BE USED.

Section VI - INSTALLATION

TRUCK FRAME PREPARATION

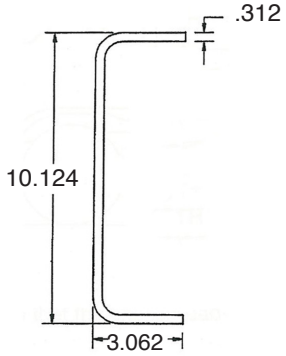
Make sure the frame height at the burn-off does not exceed 37 inches. Also make sure that the strength of the truck frame meets or exceeds Century's guide lines for resistive bending moment (RBM) for each frame rail. On Series 10 carriers the guide lines are as follows:

CARRIER LENGTH	FRAME RBM
19	500,000 in. • lbs.
19.5	500,000 in. • lbs.
21	600,000 in. • lbs.
21.5	600,000 in. • lbs.
22	600,000 in. • lbs.

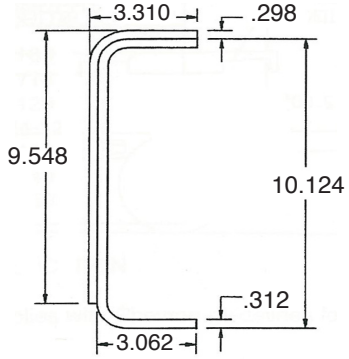
If you do not know the RBM for the truck you are installing, call your chassis dealer and find out what it is. If the dealer does not know the RBM, then find out the section modulus and yield strength rating. Once the section modulus and yield strength are known, the RBM can be found by multiplying these two numbers together.

The RBM quantitatively describes how strong the frame is. The section modulus quantitatively describes how strong the shape of the frame is. And the yield strength quantitatively describes how strong the steel in the frame is. Therefore, the frame RBM is found by taking the strength of the frame's shape and multiplying it by the strength of the frame's steel.

Shown below are two International frame rails. The first frame is a single 5/16 rail. The second frame is a 5/16 rail reinforced with 1/4 inverted L.



Section Modulus = 12.48 in.^{3}
Yield Strength = 50,000 PSI
RBM = 12.48 x 50,000 = 624,000 in. • lbs.



Section Modulus = 17.05 in.^{3}
Yield Strength = 50,000 PSI
RBM = 17.05 x 50,000 = 852,500 in. • lbs.

Notice that the reinforced frame has a higher RBM than the single frame because the section modulus is greater when the frame is reinforced.

Section VI - INSTALLATION
TRUCK FRAME PREPARATION

From the chart the minimum frame strength specification for Series 10 carriers is 500,000 in-lbs. Japanese truck frames on cab-over trucks are typically less than this and they rely on fixed bodies like van boxes and stake beds fastened along their entire length to reinforce the truck frame. Carriers are moveable bodies that do not reinforce the truck frame and they can be operated in a way that can over stress and break the truck frame. Make sure to reinforce truck frames with an RBM strength rating that is less than 500,000 in-lbs. for each frame rail.

Do not weld truck frame anywhere forward of the frame cut off. Do not drill holes in the truck frame flanges or in the web any closer than 2-1/4 inches from the frame flanges.

Section VI - INSTALLATION
POWER TAKE-OFF
(MANUAL TRANSMISSION)

CAUTION

DISCONNECT BATTERY BEFORE PERFORMING ANY WELDING ON CHASSIS TO PREVENT DAMAGE TO ELECTRONIC COMPONENTS!

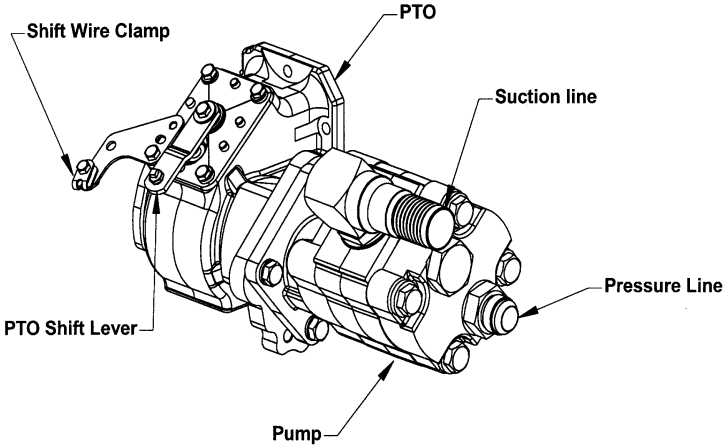
Drain the transmission fluid into a large clean container to be re-used later.

Install the PTO to the transmission. Refer to the instructions included with the PTO. Make sure that the mounting studs and bolts are fastened with Loctite and properly torqued according to the PTO manufacturer's specifications.

Determine the desired hose routing from the pump. The bi-directional pump provides 1-1/4 inch SAE side ports and 1 inch SAE rear ports. Insert the pressure and return line fittings into the pump.

Pack the female pilot of the PTO pump shaft with grease before installing the pump on the PTO (reference Chelsea grease pack 379688).

Install the pump onto the PTO as shown.



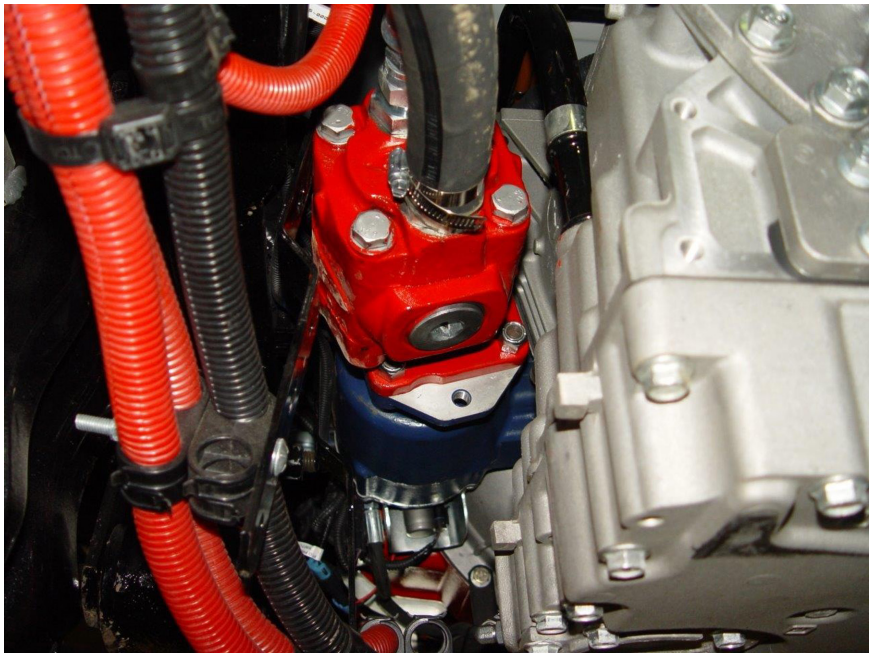
Attach the PTO cable mounting bracket or optional switch panel to the dash of the chassis or other desired location inside the cab.

Connect the PTO control cable to the cab mounted bracket or switch panel and the PTO. Disengage the PTO.

Refill the transmission with the previously drained transmission fluid.

Section VI - INSTALLATION
POWER TAKE-OFF
(AUTOMATIC TRANSMISSIONS)

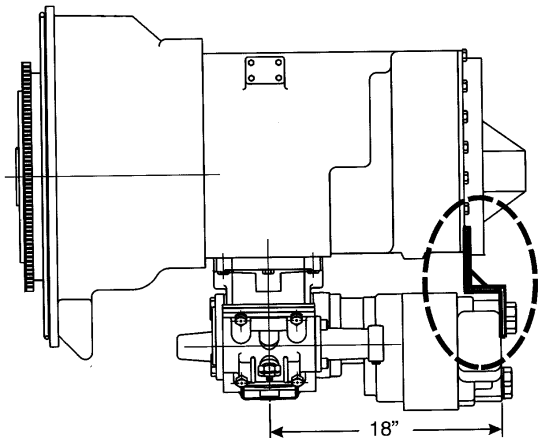
Follow the PTO instructions supplied by the PTO manufacturer that are included with the PTO. Hot shift PTO's on automatic transmissions are torque converter driven. The torque converter must be instructed to lock up when the PTO is activated. The on board computer must be programmed to lock up the torque converter when the PTO is engaged. On some trucks the PTO must be wired to pin 43 of the TCM. On some trucks the PTO must be wired to pin 42 of the TCM. The individual installing the PTO must be aware that the PTO is being wired and activated in a way that locks up the torque converter. The carrier without a load or with a light load may operate fine if the torque converter is not slipping while also not instructed to lock up. The carrier hydraulics may also operate sluggishly or with insufficient power with a light load or a heavy load when the torque converter is not locked up. A torque converter that slips will cause the pump to intermittently turn or stop turning. A pump that stops turning may give the false appearance of a control valve pressure problem. If the carrier hydraulics perform sluggishly, it may be necessary to have a chassis dealer perform diagnostic testing to determine if the torque converter is programmed to lock up on PTO engagement.



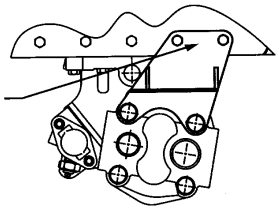
Section VI - INSTALLATION
REAR PUMP SUPPORT

Direct mounted pumps exceeding 40 lbs. or 18 inches in length must have an additional support bracket hung from the transmission to the back of the pump. The 24 GPM pump supplied by Century exceeds 40 lbs. It is assembled with extended rear studs for mounting a support bracket.

Direct Mount Pump Support Recommendations



Note: For proper bracketing attach at 2 or more transmission bolt locations and 2 or more pump locations.



CAUTION

Use caution to ensure that bracket does not pre-load pump/PTO mounting.

The PTO warranty will be void if a pump bracket is not used when:

1. The combined weight of pump, fittings and hose exceed **40 pounds.**
2. The combined length of the PTO and pump is **18 inches** or more from the PTO centerline to the end of the pump.

SECTION VI - INSTALLATION

CHASSIS PREPARATION

The following diagrams show recommended chassis installation layout configurations for cab-to-axle (CA) dimensions 120, 138, 144, 150, and 156 inches for Series 10 GEN II carriers. These diagrams are color coded and should be used as a general guide for properly locating the carrier on the chassis. There are up to 4 possible layout configurations for each different CA. These configurations are:

1. Cab protector mounted to front of bed (YELLOW).
2. Narrow 5-inch base pylon mounted to the truck frame behind the cab (GREEN).
3. Wide 8-inch base pylon mounted to the truck frame behind the cab (BLUE).
4. SP-8000 side puller mounted to the truck frame behind the cab (MAGENTA).

The Series 10 GEN II beds are made in incremental lengths of 6 inches. Configurations 2 and 3 use a bed length 6 inches shorter than configuration 1. Configuration 4 uses a bed length 12 inches shorter than configuration 1 for the same CA.

There can be certain chassis configurations that may require some dimensional adjustment from what is shown in the diagrams. Be aware of the following considerations when planning the installation layout. These situations will affect the air gap behind the cab, and the frame cut-off. Mark the subframe crossmember locations on the truck frame before cutting the truck frame to verify inboard oil tank and frame mounted pylons fit as intended.

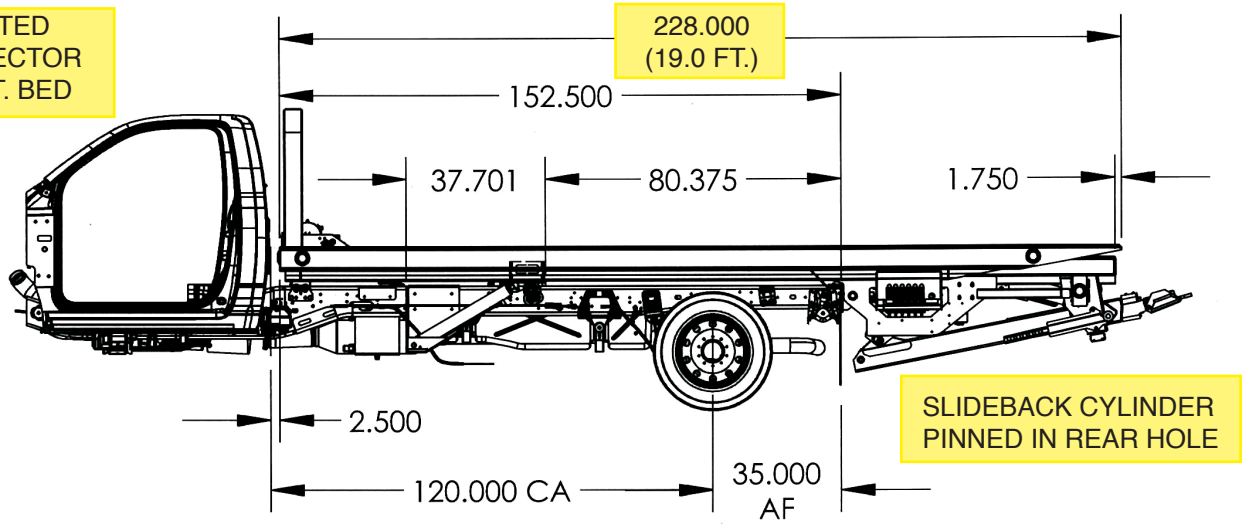
1. Some chassis may require extra room behind the cab to allow for cab air bag deflation, protruding rear windows, and vertical exhausts. Frame mounted pylons and side pullers may also require extra space to fit with chassis components such as battery boxes, air dryers, crossmember bolts, and some fuel tank brackets.

2. Some chassis may have slight interference between the crossmember that carries the drive shaft and the inboard tilt cylinder saddle. This circumstance may happen on Ford F650 and International 4300 chassis. A 33-1/2 or 34 inch frame cut off will alleviate this interference.

3. Some Ford F650 and International 4300 chassis have the carrier bearing hanger bracket located 66 inches forward of the rear axle center. On these chassis with this situation, plan the frame cut off so that the carrier hanger bracket will remount to front of the inboard saddle after its crossmember is remounted 8 to 12 inches forward of the saddle.

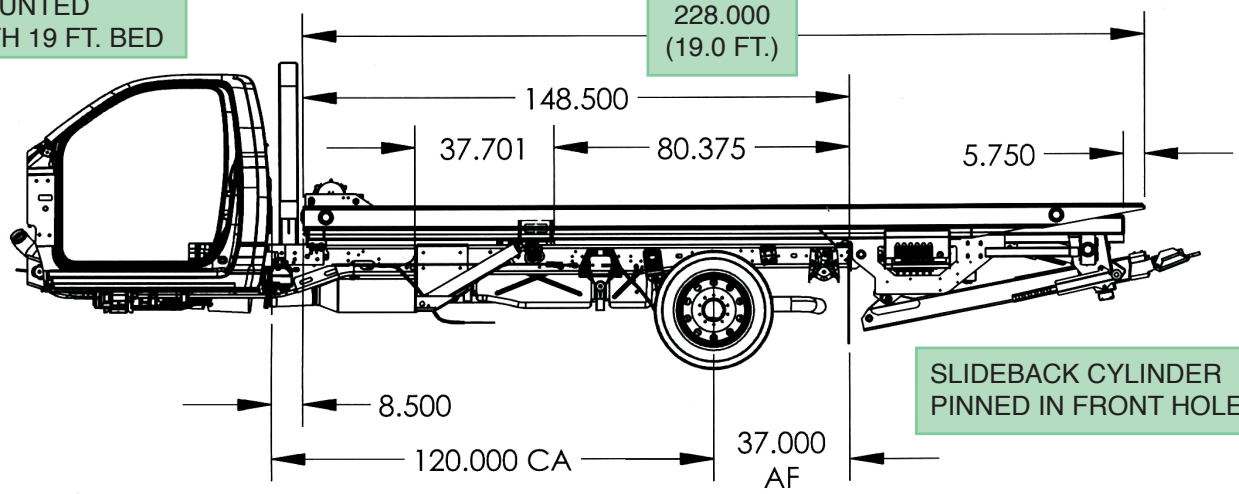
LAYOUT CONFIGURATION FOR FORD F550/DODGE 5500 WITH 120CA

BED MOUNTED
CAB PROTECTOR
WITH 19 FT. BED



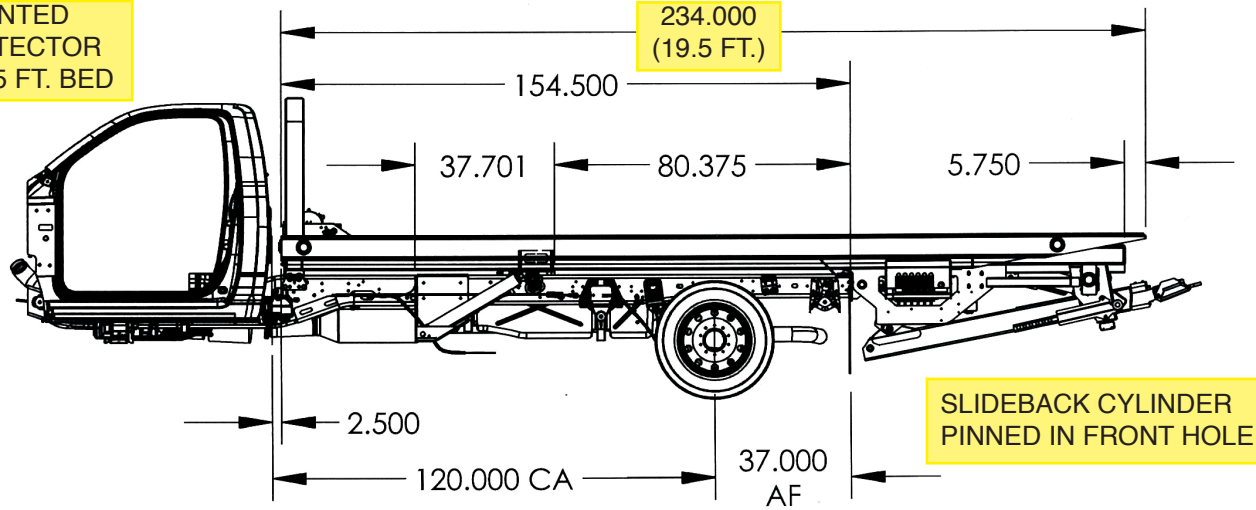
SLIDEBACK CYLINDER
PINNED IN REAR HOLE

5 INCH BASE
FRAME MOUNTED
PYLON WITH 19 FT. BED



SLIDEBACK CYLINDER
PINNED IN FRONT HOLE

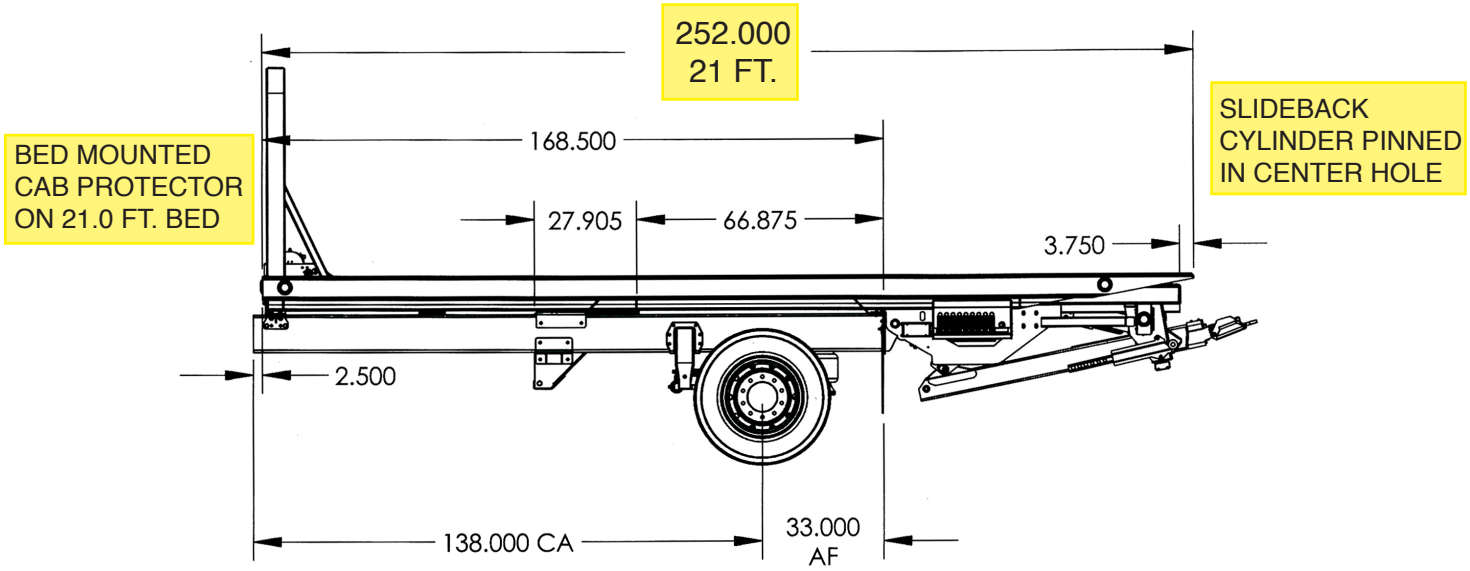
BED MOUNTED
CAB PROTECTOR
WITH 19.5 FT. BED



SLIDEBACK CYLINDER
PINNED IN FRONT HOLE

CA = CAB TO AXLE AF = AFTER FRAME

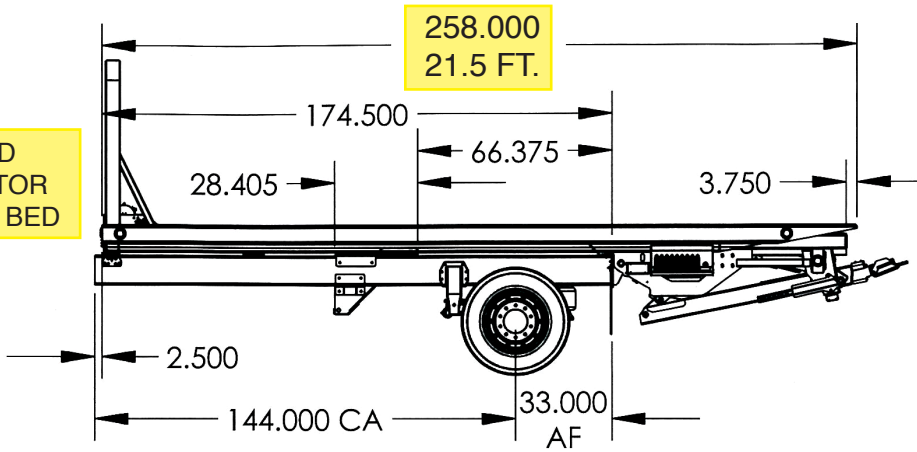
LAYOUT CONFIGURATION FOR SERIES 10 GEN II CARRIER - 138 CA



CA = CAB TO AXLE **AF = AFTER FRAME**

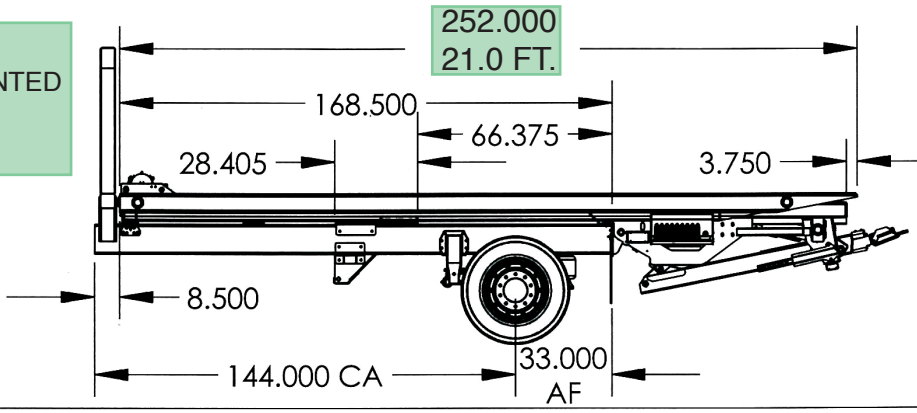
LAYOUT CONFIGURATION FOR SERIES 10 GEN II CARRIER - 144 CA

BED MOUNTED
CAB PROTECTOR
WITH 21.5 FT. BED



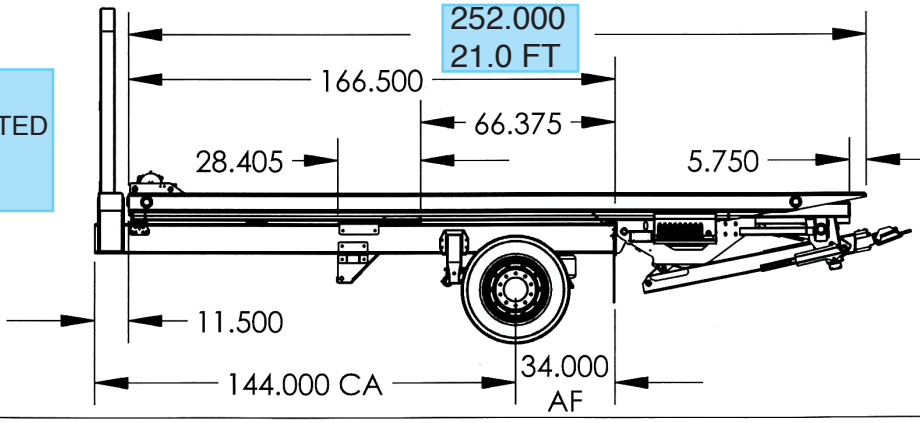
SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

5 INCH BASE
FRAME MOUNTED
PYLON WITH
21.0 FT. BED



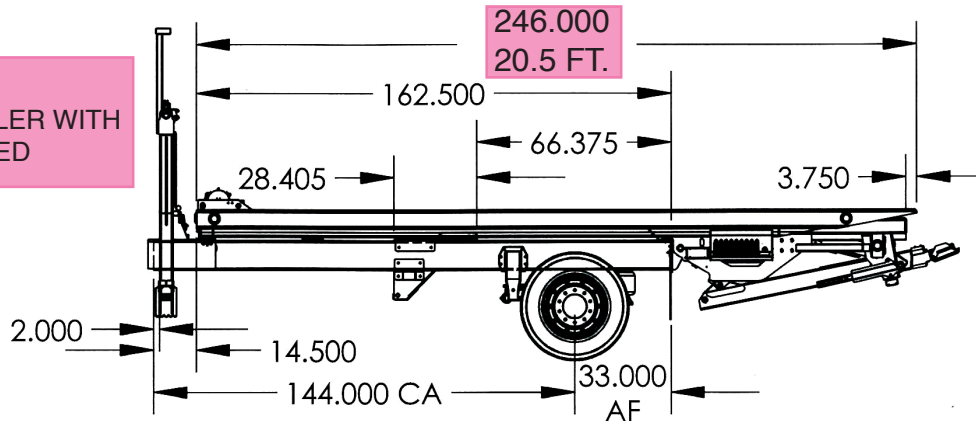
SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

8 INCH BASE
FRAME MOUNTED
PYLON WITH
21.0 FT. BED



SLIDEBACK
CYLINDER PINNED
IN FRONT HOLE

SP8000
SIDE PULLER WITH
20.5 FT. BED

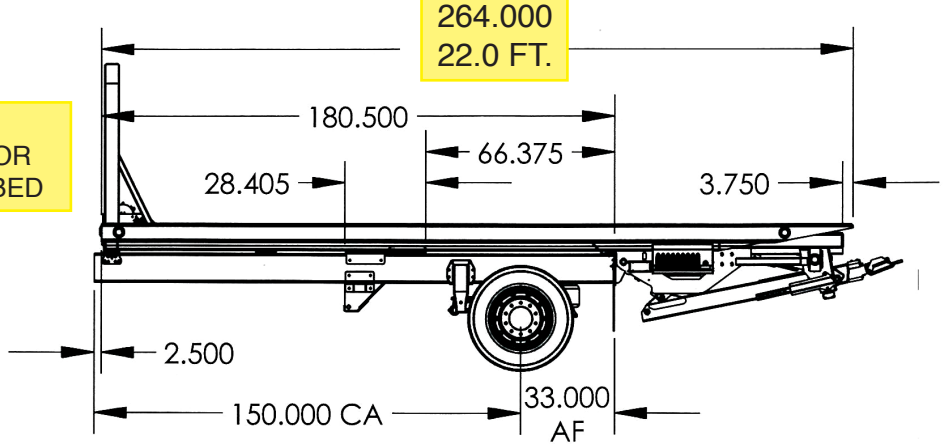


SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

CA = CAB TO AXLE **AF = AFTER FRAME**

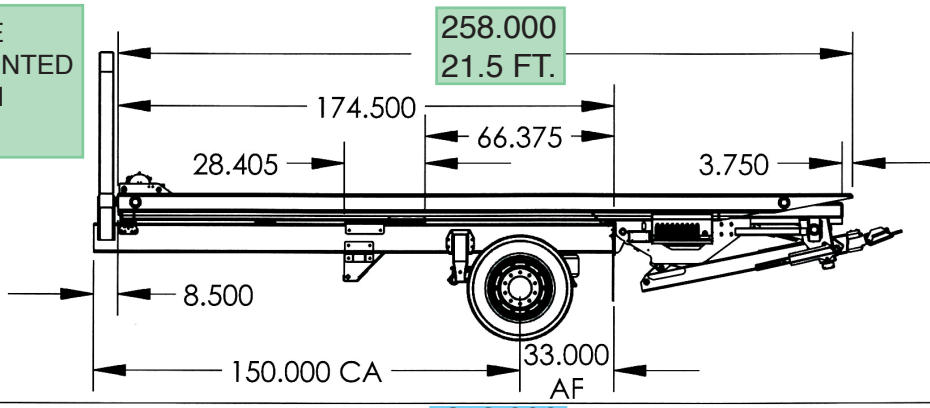
LAYOUT CONFIGURATION FOR SERIES 10 GEN II CARRIER - 150 CA

BED MOUNTED
CAB PROTECTOR
WITH 22.0 FT. BED



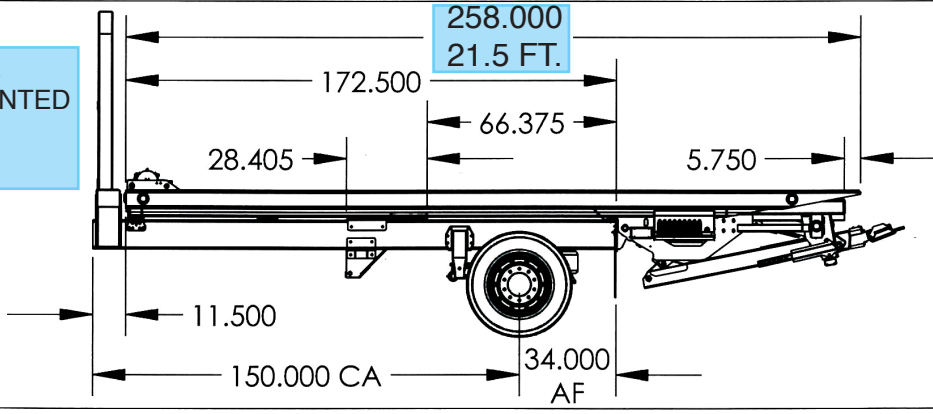
SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

5 INCH BASE
FRAME MOUNTED
PYLON WITH
21.5 FT. BED



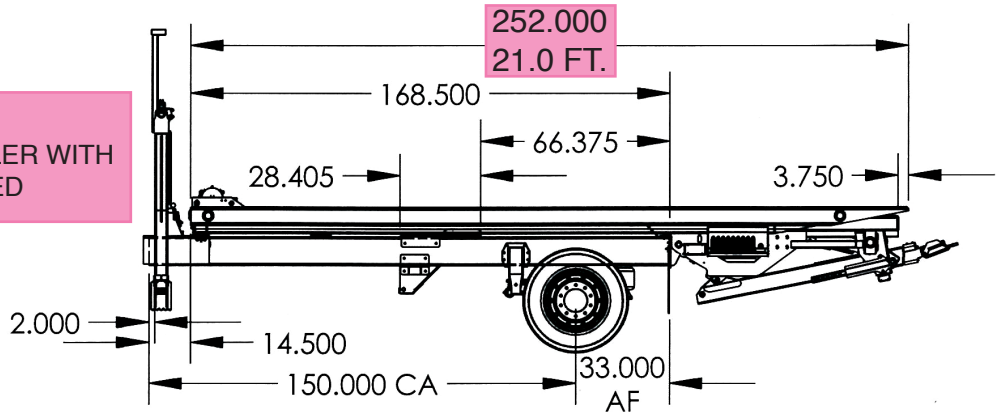
SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

8 INCH BASE
FRAME MOUNTED
PYLON WITH
21.5 FT. BED



SLIDEBACK
CYLINDER PINNED
IN FRONT HOLE

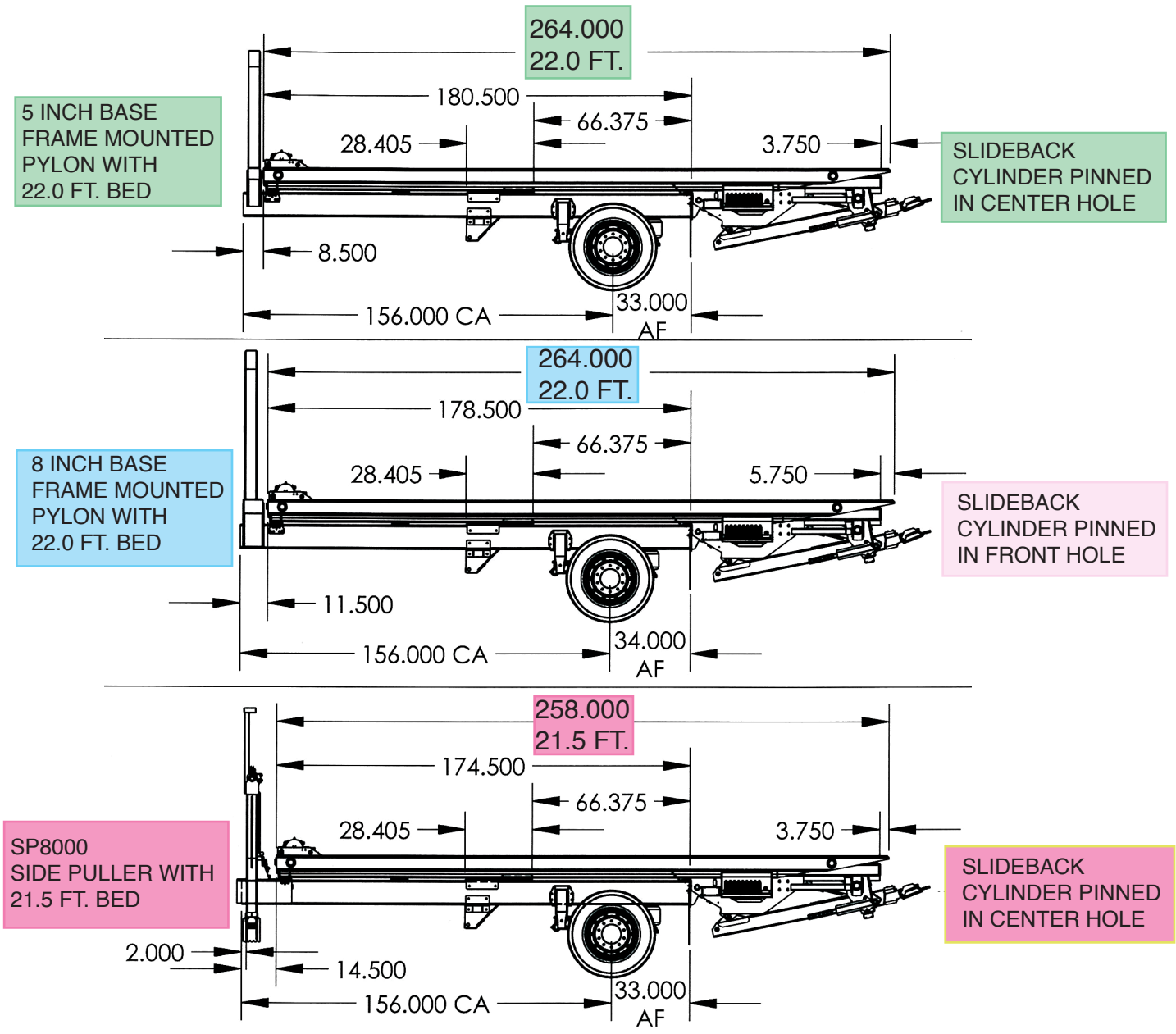
SP8000
SIDE PULLER WITH
21.0 FT. BED



SLIDEBACK
CYLINDER PINNED
IN CENTER HOLE

CA = CAB TO AXLE **AF = AFTER FRAME**

LAYOUT CONFIGURATION FOR SERIES 10 GEN II CARRIER - 156 CA



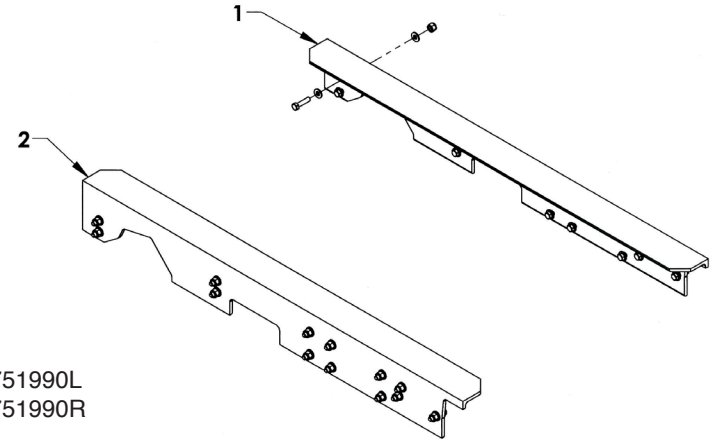
CA = CAB TO AXLE **AF = AFTER FRAME**

Section VI - INSTALLATION

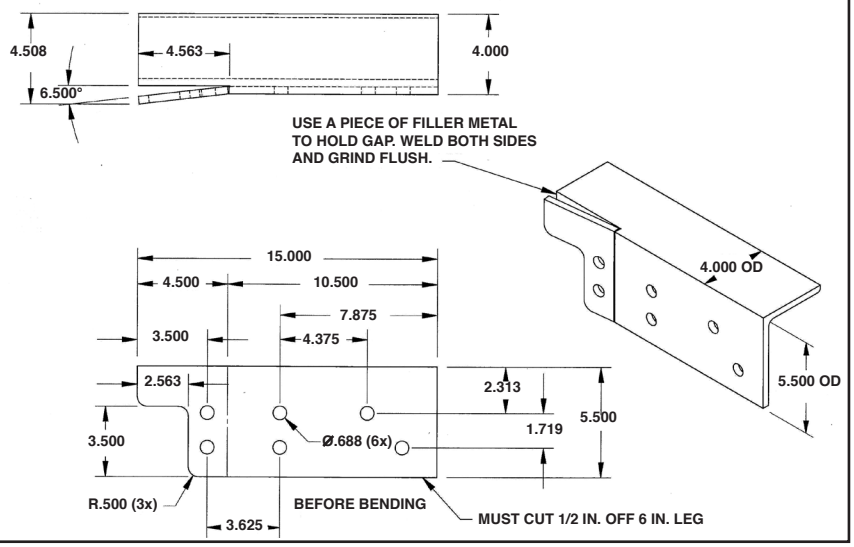
DODGE REINFORCEMENT ANGLE WELDMENT-LEFT

The 2015 Dodge chassis have a redesigned frame. Accordingly, the frame reinforcements are changing as well. These reinforcement angle weldments-left are made from 6 x 4 x 3/8 angles.

2015 DODGE REINFORCEMENT ANGLE - LEFT



PN 0751990L
PN 0751990R

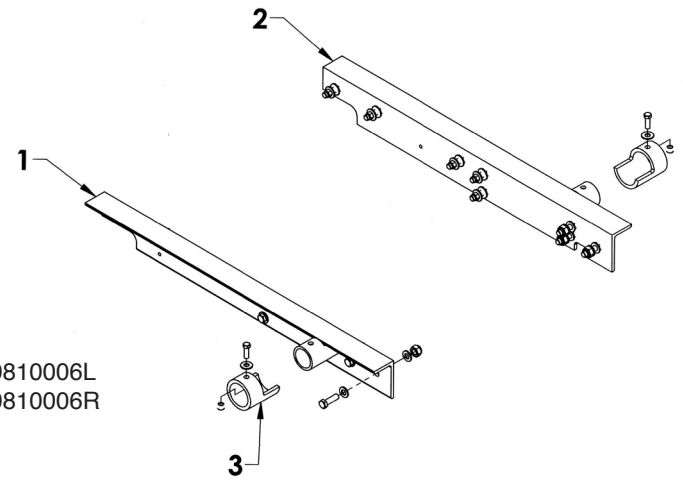


Section VI - INSTALLATION

FORD REINFORCEMENT ANGLE WELDMENT-LEFT

The 2015 Ford chassis have a redesigned frame. Accordingly, the frame reinforcements are changing as well. These reinforcement angle weldments-left are made from 5 x 3 x 3/8 angles.

2015 FORD REINFORCEMENT ANGLE



PN 0810006L
PN 0810006R

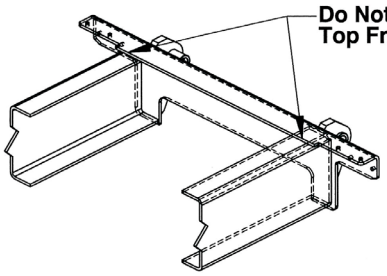
Section VI - INSTALLATION
HINGE ANGLE

Make sure that the chassis frame rails are parallel on flat level pavement. If the frame rails are not parallel, the suspension may need corrected or shimmed.

CAUTION

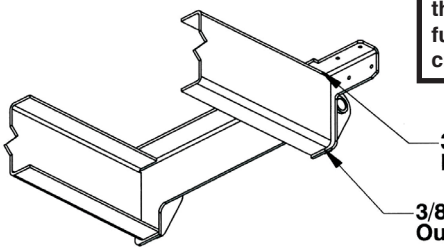
If the frame rails are not parallel when the carrier is installed, the carrier will tilt unevenly and twisted. The left front frame height must equal the right front frame height. The left rear frame height must equal the right rear frame height.

Burn off the excess after-frame and grind the frame end straight and smooth.



WARNING

The rear chassis crossmember at the frame cut-off may need to be relocated forward. Do not remove this chassis crossmember. Do not rely on the hinge angle by itself to function as the rear chassis crossmember.



Pin the hinge angle to the subframe if it is not already mounted. Position the subframe on the truck frame. Make sure the subframe is centered side to side on the chassis front and back. Also make sure that the subframe is horizontally parallel with the truck frame. If the truck frame is equipped with a partial frame reinforcement, shim the hinge angle up 3/8 inch to match the frame elevations at the partial frame reninforcement.

Clamp the subframe vertically to the truck frame near the hinge and front cross member. Weld the hinge angle to the end of the truck frame. The weld bead should travel horizontally along the frame radius vertically down the frame cut-off and across the lower frame flange. Do not weld across the top frame flange as this can cause a stress crack. Do not weld anywhere else on the truck frame.

Clean and repaint the heat affected areas of the truck frame and the hinge angle.

Section VI - INSTALLATION

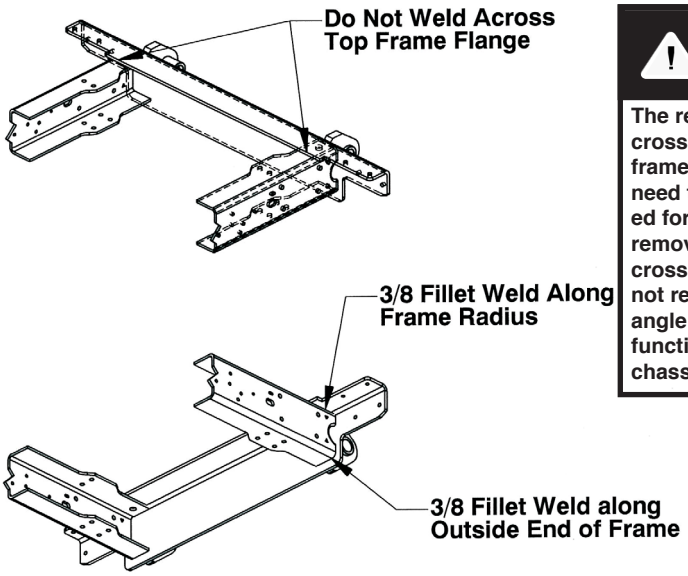
HINGE ANGLE - FORD F550/DODGE 5500

Make sure that the chassis frame rails are parallel on flat level pavement. If the frame rails are not parallel, the suspension may need corrected or shimmed.

CAUTION

If the frame rails are not parallel when the carrier is installed, the carrier will tilt unevenly and twisted. The left front frame height must equal the right front frame height. The left rear frame height must equal the right rear frame height.

Burn off the excess after-frame and grind the frame end straight and smooth.



WARNING

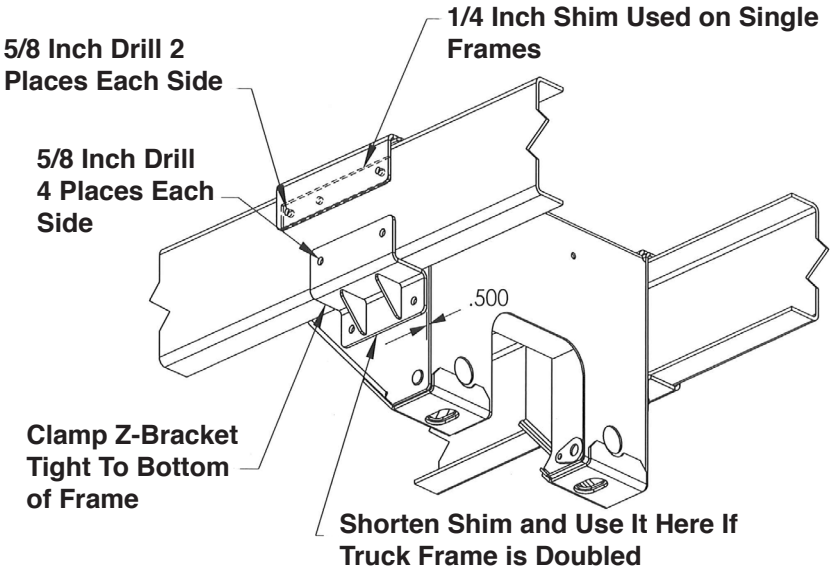
The rear chassis crossmember at the frame cut-off may need to be relocated forward. Do not remove this chassis crossmember. Do not rely on the hinge angle by itself to function as the rear chassis crossmember.

Pin the hinge angle to the subframe if it is not already mounted. Position the subframe on the truck frame. Make sure the subframe is centered side to side on the chassis front and back. Also make sure that the subframe is horizontally parallel with the truck frame. If the truck frame is equipped with a partial frame reinforcement, shim the hinge angle up 3/8 inch to match the frame elevations at the partial frame reninforcement.

Clamp the subframe vertically to the truck frame near the hinge and front cross member. Weld the hinge angle to the end of the truck frame. The weld bead should travel horizontally along the frame radius vertically down the frame cut-off and across the lower frame flange. Do not weld across the top frame flange as this can cause a stress crack. Do not weld anywhere else on the truck frame.

Clean and repaint the heat affected areas of the truck frame and the hinge angle.

Section VI - INSTALLATION
INBOARD SADDLE

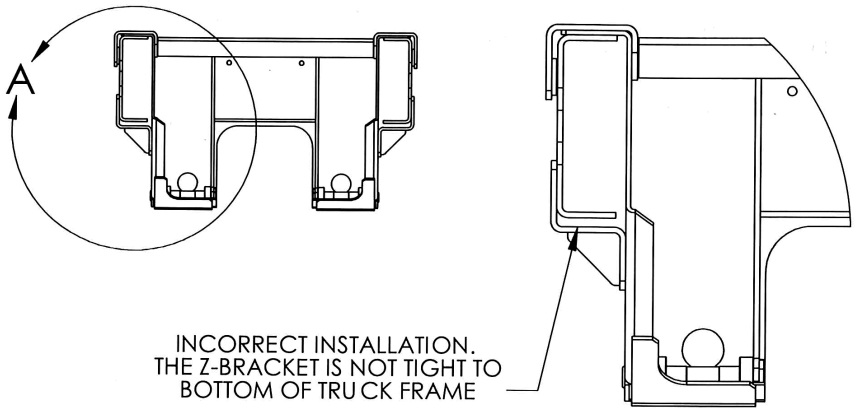


Make sure that the tilt cylinders are completely retracted. Scribe a line on the truck frame along the back of the saddle. Reposition the saddle forward 1/8 inch. This saddle repositioning will cause the tilt cylinders to extend 1/8 inch so that the cylinders can be hydraulically pre-loaded to remove excess pin clearance that can cause the subframe to rattle against the truck frame.

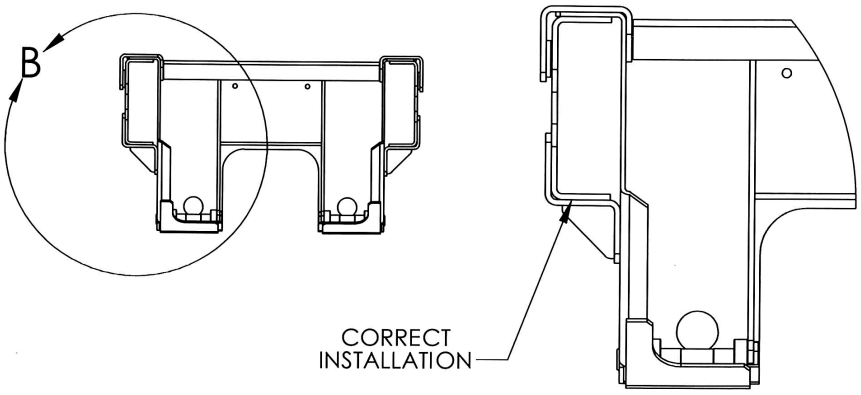
Clamp the saddles and drill 2 saddle holes into the truck frame on each side 5/8 inch diameter. Insert 1/4 inch shim if the truck frame is not doubled. Fasten the saddles with 5/8 x 2 grade 5 bolts and nylon lock nuts.

Clamp the lower saddle Z-Gusset **tight** to the underside of the truck frame with 1/2 inch setback as shown. Drill 2 top holes each side 5/8 inch diameter through the truck frame and fasten gusset to frame with 5/8 x 1-3/4 grade 5 bolts and nylon lock nuts. Drill 2 bottom holes each side 1/2 inch diameter through saddle and fasten gusset to saddle with 5/8 x 1-3/4 grade 5 bolts and nylon lock nuts. **CAUTION**: The Z-Gusset must be tight against the bottom frame flange to prevent cracking of the saddle in its horizontal bends.

Section VI - INSTALLATION
SADDLE Z-BRACKET



DETAIL A

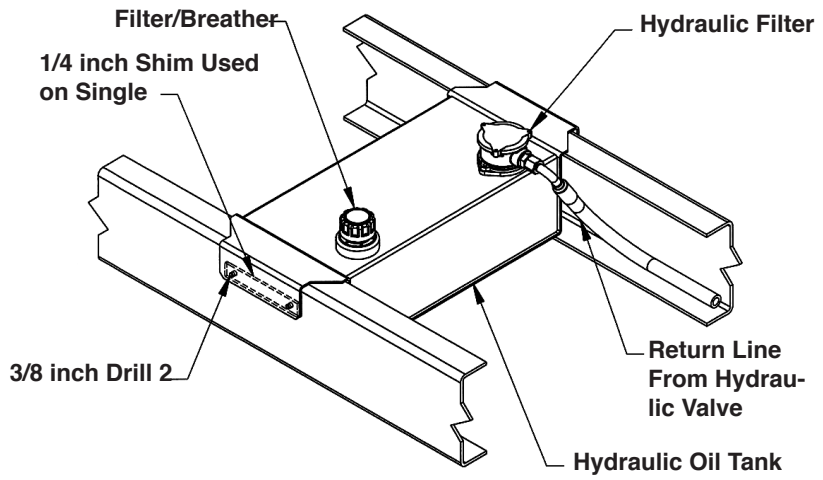


DETAIL B

WARNING

The Z-bracket must be tight to the bottom of the truck frame to prevent the inboard saddles from flexing. If the saddle is allowed to flex, fatigure cracks may develope along the bends of the saddle and the Z-brackets.

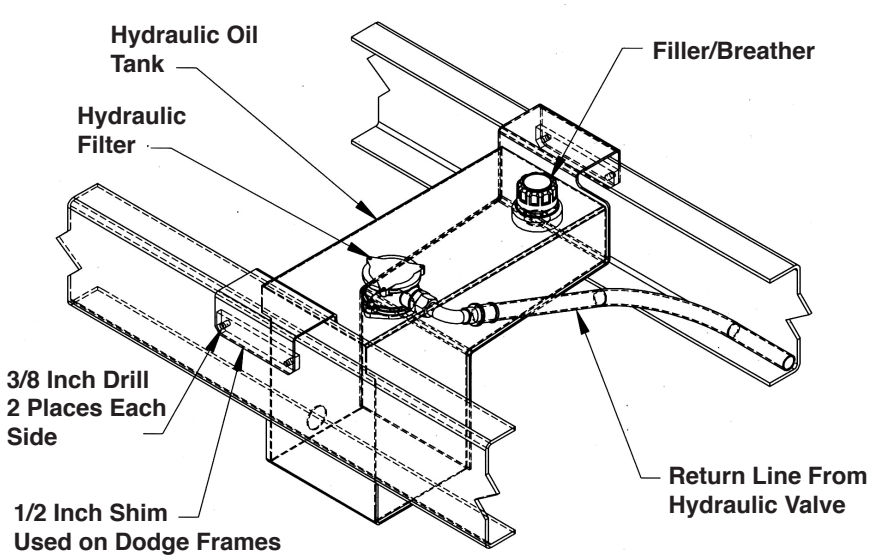
Section VI - INSTALLATION
INBOARD OIL RESERVOIR



Chassis that have clear space between the frame rails use the inboard hydraulic oil tank. The inboard oil tank allows the suction and return lines to remain inside the truck frame along with the pump and control valve. Position the tank so that the return line does not interfere with a chassis crossmember. The bottom of the tank is equipped with two suction line ports to accommodate left or right side PTO installations. The unused port is closed off with an O-ring plug. Drill four 3/8 holes through the side of the frame rails and fasten the tank to the frame with 3/8 bolts and lock nuts. Chassis that do not have doubled frames require an aluminum shim as shown above.

The filter is submerged inside the tank. It is a 25 micron filter with a 25 GPM flow capacity and it is compatible with both 18 and 24 GPM pumps. The filter element can be changed by removing the top filter cover.

Section VI - INSTALLATION
INBOARD OIL RESERVOIR
FORD 550/DODGE 5500

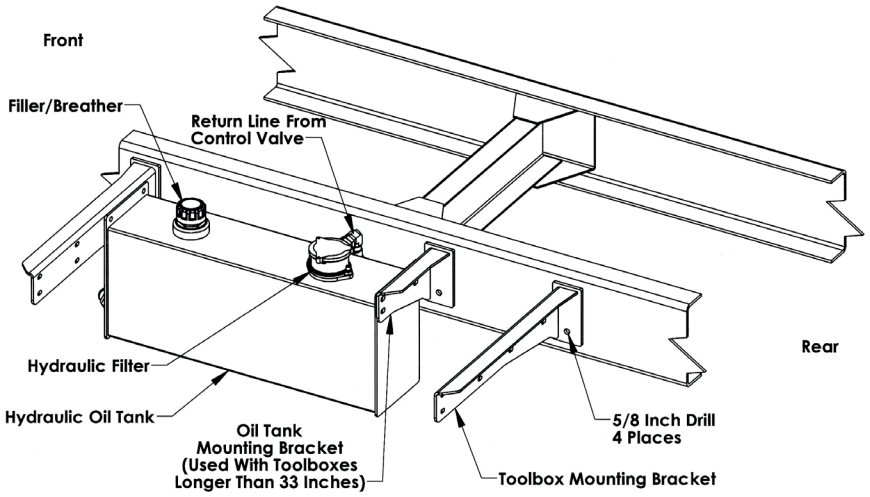


Chassis that have clear space between the frame rails use the inboard hydraulic oil tank. Ford F550 and Dodge 5500 chassis need an offset oil tank as shown to fit around the drive shaft and exhaust system.The inboard oil tank allows the suction and return lines to remain inside the truck frame along with the pump and control valve. Position the tank so that the return line does not interfere with a chassis crossmember. Drill four 3/8 holes through the side of the frame rails and fasten the tank to the frame with 3/8 bolts and lock nuts. Dodge chassis require a plastic shim as shown above.

The filter is submerged inside the tank. It is a 25 micron filter with a 25 GPM flow capacity and it is compatible with both 18 and 24 GPM pumps. The filter element can be changed by removing the top filter cover.

Section VI - INSTALLATION
OUTBOARD OIL RESERVOIR

Chassis that do not have sufficient space between crossmembers for the inboard hydraulic oil tank use the outboard hydraulic oil tank. The top of the toolbox mounting bracket should be mounted 1.25 inches down from the top of the truck frame. Be sure never to drill any holes less than 2.5 inches from the top of bottom of the truck frame. A hole too close to the frame flange will reduce the strength of the frame and could result in fame failure. Drill four 5/8 inch holes through the side of the frame rail and fasten the tank brackets to the frame with 5/8 inch bolts and nuts.



SECTION VI - INSTALLATION

SUBFRAMES WITH OUTBOARD TILT CYLINDERS

Subframes with outboard tilt cylinders are for installations on chassis with inboard fuel tanks such as Ford F550 and Dodge 5500. Install frame reinforcements above the axle as shown here.

Dodge

Ford

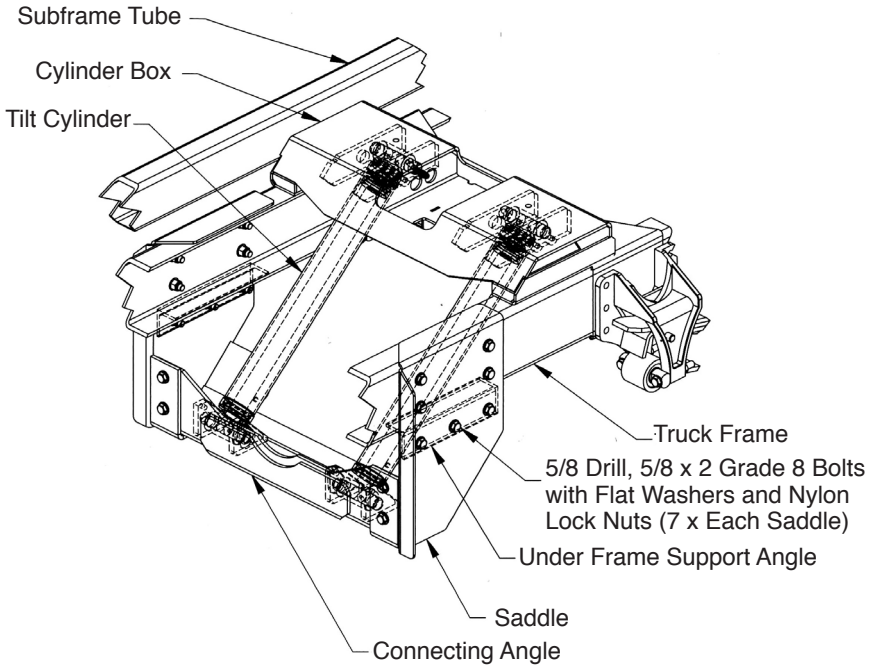
SECTION VI - INSTALLATION

OUTBOARD TILT CYLINDER HOSE ROUTING

Attach and route the tilt cylinder hoses as shown. The hoses should travel in a gradual curve parallel to each other. Use rubberized clamps to fasten the hoses on the bottom of the mounting plate.

SECTION VI - INSTALLATION

INBOARD TILT CYLINDERS OUTBOARD SADDLES



Pin the base of the tilt cylinder in the cylinder box as shown.

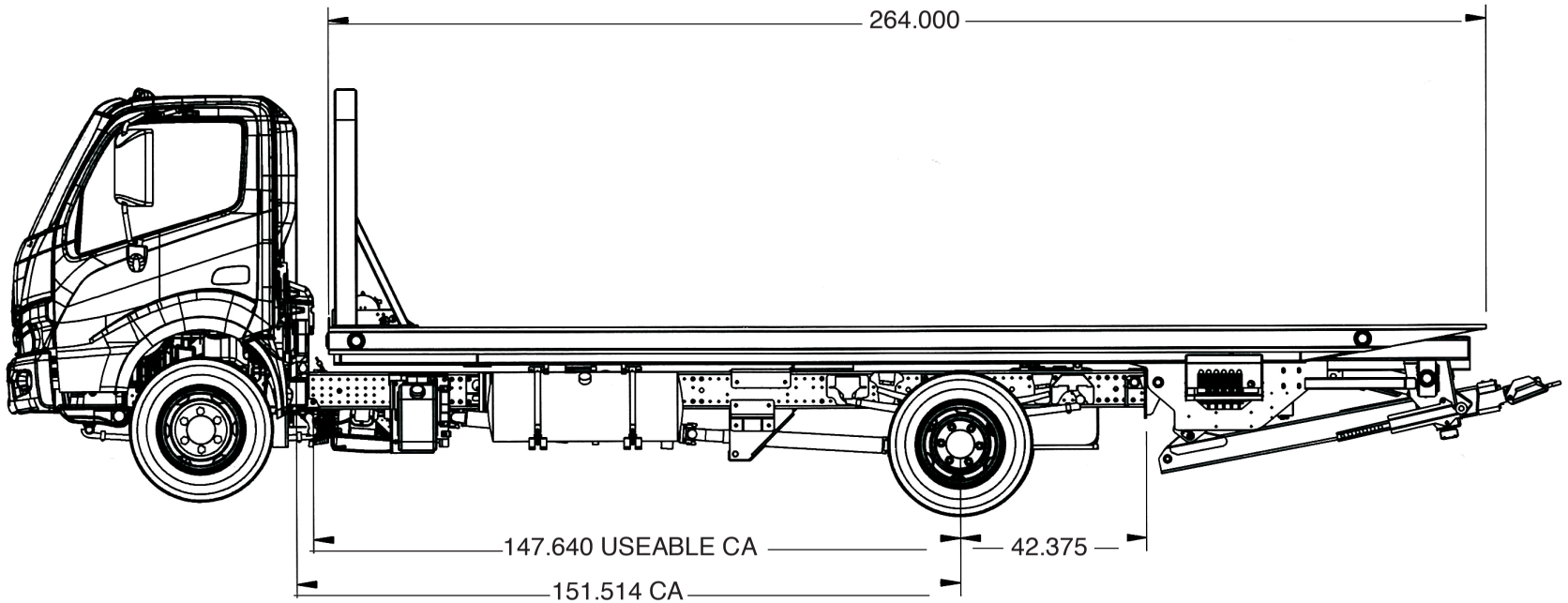
Temporarily clamp the saddles to the truck frame and bolt the connecting angle to the saddles with 5/8 x 2 bolts, flat washers and lock nuts six places.

Unclamp the saddles and pin the rod end of the tilt cylinders into the connecting angle. Use 1.230 x 5-3/4 grooved keeper pins and 3/8 x 1-1/2 bolts with nylon lock nuts.

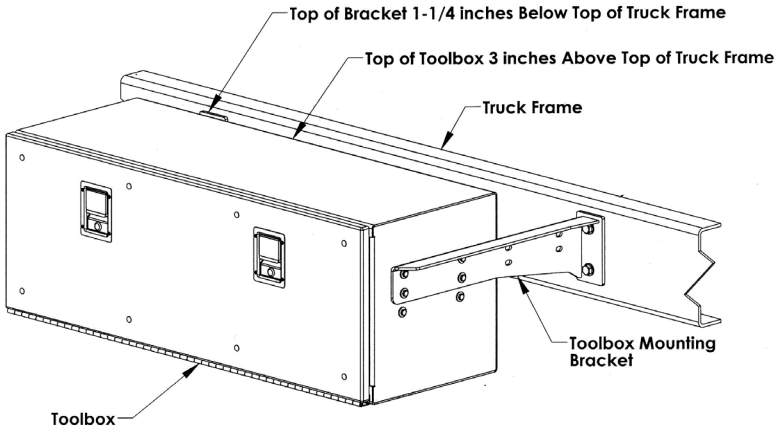
Completely retract the tilt cylinders and clamp the saddles tight to the top frame flange. Scribe a line onto the truck frame along the back of the saddles. Unclamp the saddles and reposition them forward 1/8 inch from the scribed line. This saddle repositioning will cause the tilt cylinders to extend 1/8 inch so that the cylinders can be hydraulically pre-loaded to remove excess pin clearance that can cause the subframe to rattle against the truck frame. Reclamp the saddles and drill four 5/8 saddle holes through each frame rail. On Japanese frames that use a series of close proximity holes, back drill the saddles using the existing holes in the truck frame. Bolt the saddles to the frame with 5/8 x 2 bolts with flat washers and nylon lock nuts.

Clamp the under-frame support angle tight to the bottom frame flange and saddle as shown. Drill three bottom row 5/8 holes in the saddles through the support angle. Fasten the support angles to the saddles with 5/8 x 2 bolts and nylon lock nuts.

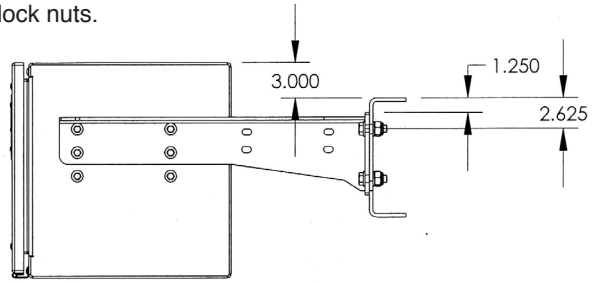
HINO 195 With Rear Fuel Tank



Section VI - INSTALLATION
ALUMINUM TOOLBOX



Fasten the toolbox mounting brackets to the toolbox with 3/8 x 1-1/2 grade 5 bolts, flat washers, and nylon lock nuts through the top and middle holes as shown.. Make sure that the mounting brackets are parallel with the top of the toolbox. washers, and nylon lock nuts.



Position the toolbox mounting brackets 1 to 1-1/4 inches below the top of the truck frame and scribe the mounting holes onto the truck frame. The center of the holes should be at least 2-1/4 inches away from the frame flanges. Remove the box and drill 21/32 holes through the truck frame.

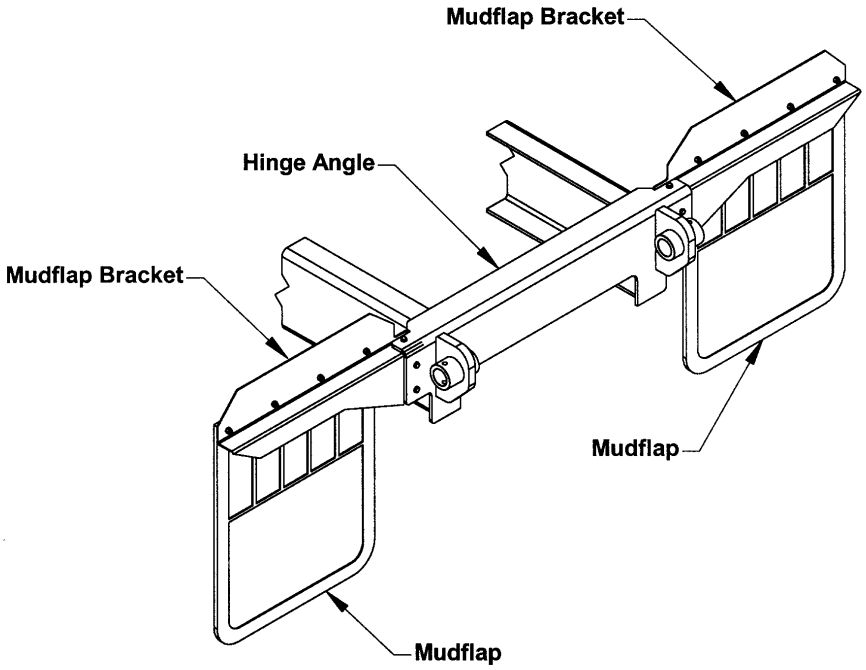
Bolt the toolbox to the truck frame with 5/8 x 2 grade 5 bolts and nylon lock nuts.

For tandem toolbox installations, use optional spacer channel PN 37760 between the boxes on the same mounting bracket. Use four 3/8 x 3-1/2 grade 5 bolts, flat washers, and nylon lock nuts.

WARNING

If toolboxes or toolbox mounting brackets are being used other than what is specifically shown here, make sure the mounting bracket holes drilled into the frame are no closer than 2-1/4 inches away from the frame flanges. Holes that are drilled too close to the frame flanges pose a potential risk for frame damage over time.

Section VI - INSTALLATION
MUDFLAPS



Install mudflap brackets to the ends of the hinge angle with 3/8 x 1-1/2 grade 5 bolts, flat washers, and nylon lock nuts as shown.

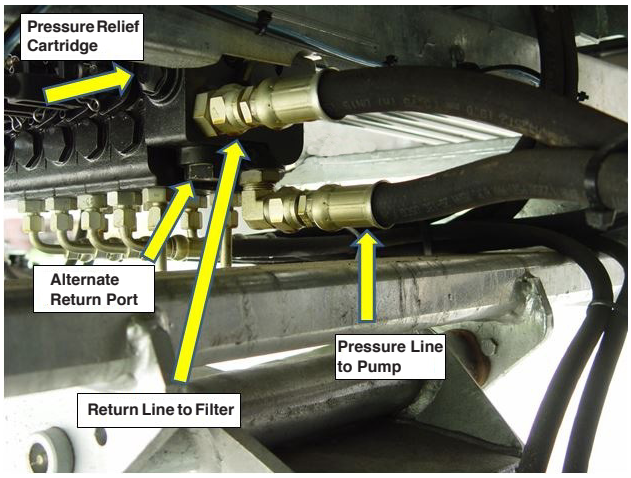
Fasten the mudflaps to the mudflap brackets with 5/16 x 1-1/4 grade 5 bolts, flat washers and nylon lock nuts. The mudflaps should be 1/2 inch rubber measuring 24 x 30.

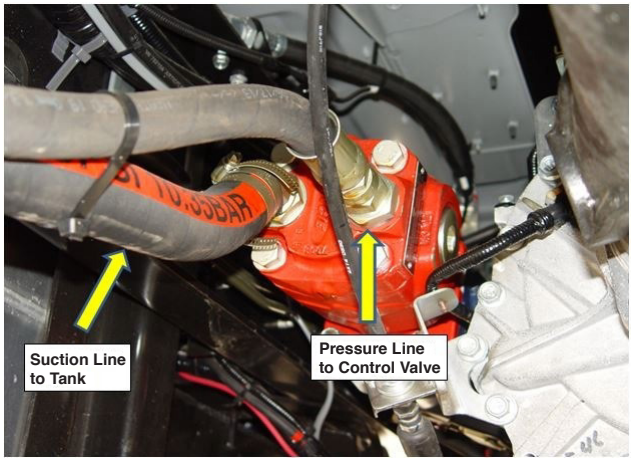
Section VI - INSTALLATION
HYDRAULIC HOOK-UP

The filter is submerged inside the tank. It is a 25 micron filter with a 25 GPM flow capacity and it is compatible with both 18 and 24 GPM pumps. The filter element can be changed by removing the top filter cover.

	HOSE DIAMETERS		
PUMP	**INLET/SUCTION HOSE**	**RETURN HOSE**	**PRESSURE HOSE**
15 GPM	1-1/4	3/4	3/4
18 GPM	1-1/4	3/4	3/4
23-24 GPM	1-1/2	1.00	3/4

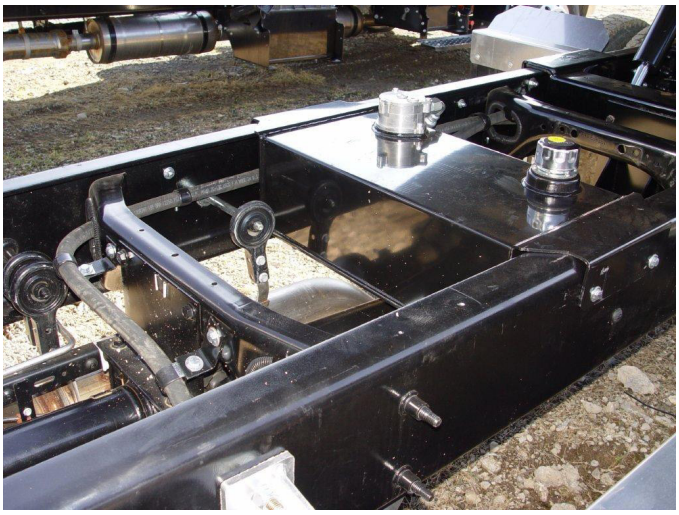
Route and attach the pressure line from the inlet port of the control valve along the truck frame to one of the pressure ports on the pump. Route and attach the return line from the outlet port of the control valve along the truck frame to the inlet port of the filter. These hoses should cross over along a chassis crossmember to the passenger side truck frame rail.



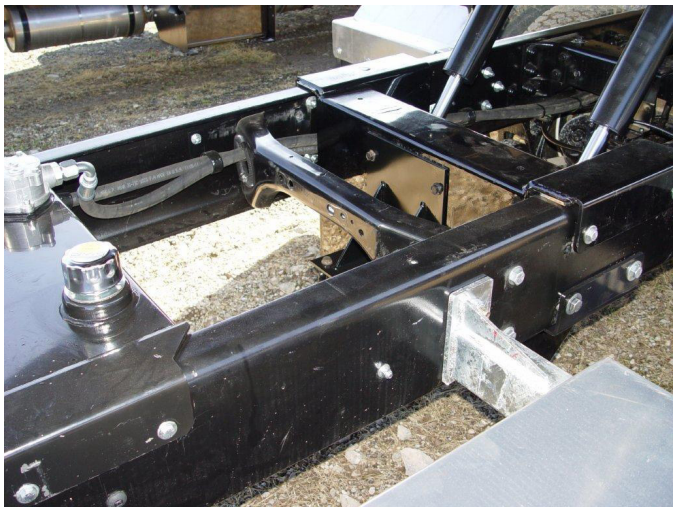


Section VI - INSTALLATION

PRESSURE AND RETURN LINE HOSE ROUTING



The driver's side frame rail is typically conjested with the chassis builder's hoses and wires. Therefore, the pressure and return line hoses should be routed along the passenger side frame rail. Fasten the hoses as shown with rubberized hose clamps. Take care to prevent the hoses from contacting metal edges.



Section VI - INSTALLATION
HYDRAULIC HOOK-UP

Route and attach the pressure line from the inlet port of the control valve along the truck frame to one of the pressure ports on the pump.

Route and attach the return line from the outlet port of the control valve along the truck frame to the inlet port of the filter.

Secure the hoses to the truck frame with bolt-on rubber covered metal hose clamps.

Fill the hydraulic reservoir up to the bottom of the filler neck screen with a high multi-purpose Automatic Transmission Fluid.

Check to make sure all hose connections are properly tightened. Plug the unconnected end of the winch hoses with suitable fittings. Reconnect the battery ground cable to the battery ground terminal.

Start the truck engine and engage the PTO. Completely cycle all cylinders to pressure by-pass in both directions at least 3 times to remove all air from the hydraulic system.

CAUTION

The slideback cylinder shaft must be vertically supported by hand while it is being extended and retracted. Failure to support the slideback cylinder shaft while it is being cycled will put excessive force on the internal seals from the extended weight of the shaft. This excessive force can damage the cylinder seals. If the seals become damaged, the cylinder may leak or drift during normal operation.

Check the oil level in the reservoir with all cylinders retracted. Refill as necessary until the oil level reaches the bottom of the filler neck screen.

Section VI - INSTALLATION
BODY

Using a paint brush, apply grease to the full length of the subframe rails on the top and sides.

Make sure the lower front wear pads (1/2 x 1-1/2 x 5 nylatron) are properly seated in their cages located on top of the inside bottom flange of the C-channel on steel beds.

Lift the body and slide it onto the subframe to within 8 feet of the front of the subframe. Extend the slideback cylinder and pin it to the body at the cylinder mount.

Fully extend the body with the slideback cylinder and attach the winch hoses from the subframe to the winch pipes in the body. Be careful not to tighten the hoses in a twist so that the hoses will track properly in the hose tray. Use three wrenches on each connection; one wrench on the pipe, one wrench on the hose crimp collar and one wrench on the hose swivel nut. Hold the pipe and hose crimp collar stationary while tightening the hose swivel nut. Make sure that the nylon hose covering is fastened at both ends of the hoses with heavy duty nylon cable ties. The nylon hose covering must **not** be allowed to slide along the hoses because it may "bunch up" and cause the hoses to track improperly in the hose tray.

The 7 conductor body wire is routed through a 7/8 inch flexible hydraulic hose beside the winch hoses in the subframe hose tray. Fasten the wire hose to the body adjacent to the winch pipe connections and route the wire through the tube along the body beside the winch pipes. Attach the 7 conductor body wires to the junction box located at the front of the body. **Note**: Steel bodies are equipped with two junction boxes, one box is for marker lights (wired at the factory) and the other box is for all other lighting wired by the installer. Aluminum bodies are equipped with one junction box for all lighting.

Attach the cable to the winch drum. If the winch is an upright design, under-wind the cable so that the cable is tangent to the bottom of the drum barrel near the bed surface. Never over-wind a cable on an upright winch unless the winch is properly supported against its rear face. The additional torque applied to an upright winch with an over-wound cable can cause the winch to break loose from the bed.

SECTION VI - INSTALLATION
BED INSTALLATION

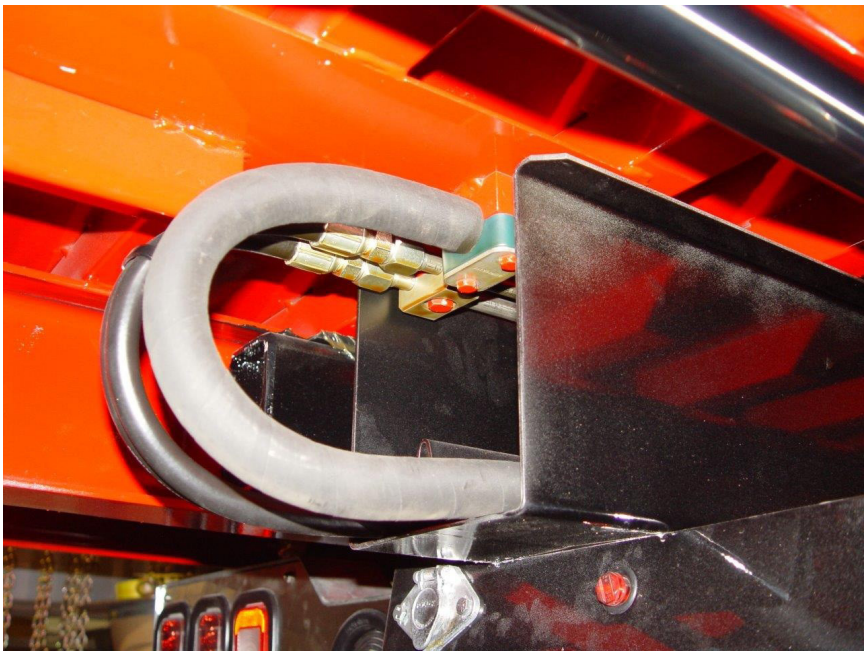
Apply grease to the subframe rails along the top, sides and bottom. Smear the grease evenly with a paint brush.

Wipe away grit and debris along the full length of the bed rails to prevent gouging between the bed subframe and wear pads. Make sure there are no sharp edges to cause gouging at each end of the bed rails. Apply grease to the bed rails along the top, sides and bottom. Smear the grease evenly with a paint brush.

Slide the bed onto the subframe to within 7 ft. of the cab. Pin the slideback cylinder to the mounting bracket on the bed. Refer to the layout configurations for the proper pin hole.

Slide the bed forward, but watch to make sure the bed does not travel too far forward. Beds are made in different lengths in 6 inch increments. If the wrong length bed is accidentally slid onto the subframe, cab damage could occur.

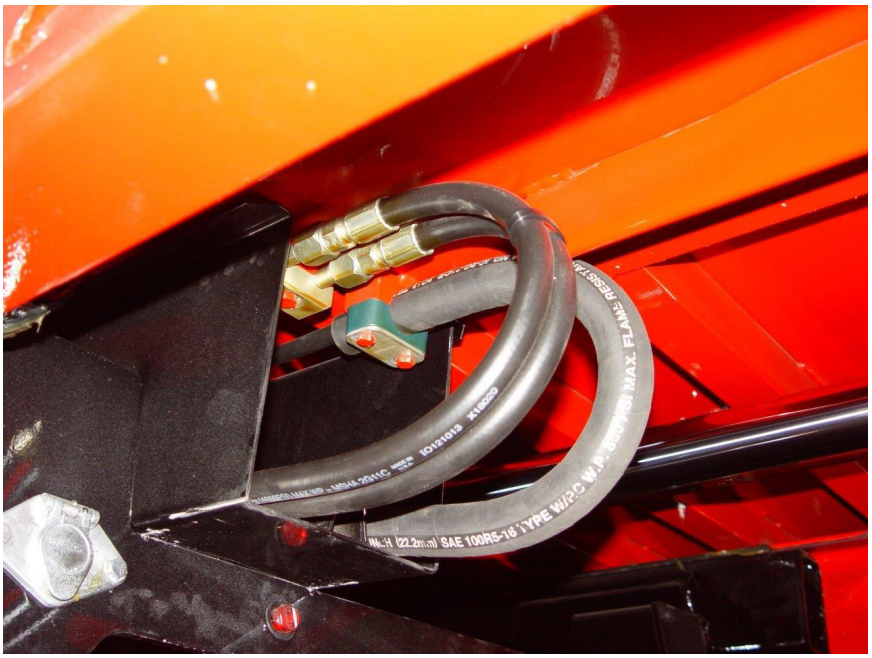
SECTION VI - INSTALLATION
LOOP HARNESS



The loop harness electrically joins the junction box in the subframe to the junction box in the bed. The loop harness is routed through a 7/8 rubber hose shown above. The rubber hose provides the right amount of stiffness and flexibility to promote proper tracking in the subframe hose tray. The rubber hose is fastened with 30 millimeter boltable clamps to the front end of the subframe tray and to the bottom of the bed as shown when the bed is fully extended. Notice that the hose clamp is located at the end of the subframe tray. The rubber hose should protrude through the 30 millimeter clamps 3/8 inch and follow the same loop shape as the winch hoses.

If there are any special installation circumstances that require the slideback cylinder to be pinned in the rear mounting hole, the subframe hose tray can be rebolted to the subframe 2 inches forward from its normal location. Holes are provided in the subframe tray to allow repositioning.

SECTION VI - INSTALLATION
WINCH HOSES



The winch hoses are bonded together as a twin pair to promote straight tracking. The winch hoses are joined to the subframe at their lower end with bulkhead fittings. The winch hoses are joined at their upper end to the under-body stainless steel fluid tubes. When the bed is pinned to the slideback cylinder in the center mounting hole, the under-body fluid tube connnections should be located exactly at the end of the subframe hose tray when the bed is fully extended. The arc length of the winch hose loop should be 17 inches. Before making the winch hose connection to the under-body fluid tubes, make sure the rear end of the subframe hose tray is evenly aligned with the end of the subframe slide rail tubes and that the winch hoses when laid flat reach 17 inches past the subframe hose tray. Proper tightening of the winch hoses needs 3 wrenches to prevent hose twist. Apply one wrench on the under-body fluid tube nut, one wrench on the hose swivel nut, and one wrench on the hose fitting crimp collar. Make sure the hoses do not twist when tightening. Make sure that a heavy duty nylon zip tie is fastened to the hoses approximately 4 inches behind the crimp to prevent the bonded seam from splitting over time. The zip tie head should be positioned to the inside of the winch hose arc.

If there are any special installation circumstances that require the slideback cylinder to be pinned in the rear mounting hole, the subframe hose tray can be rebolted to the subframe 2 inches forward from its normal location. Holes are provided in the subframe tray to allow repositioning.

Section VI - INSTALLATION
BODY

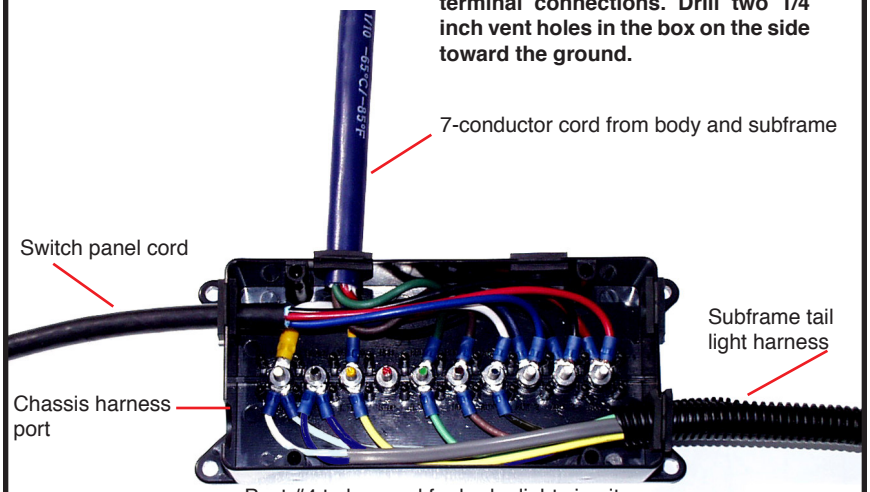
ELECTRICAL CONNECTIONS

Refer to the wire chart when making electrical connections in the junction boxes.

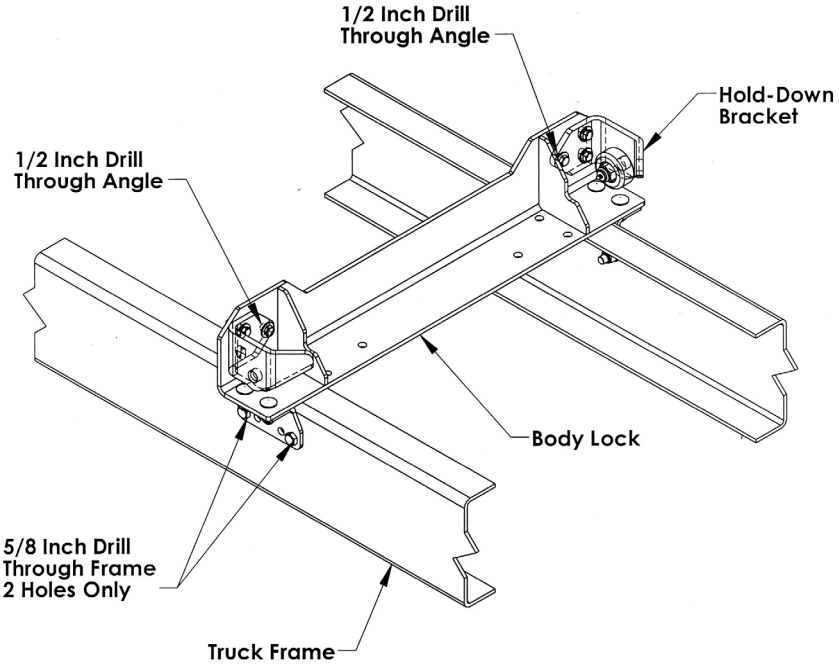
	POST#	FUNCTION	SUBFRAME HARNESS WIRE COLOR/GAUGE	BAR LIGHT CORD WIRE COLOR/GAUGE
CHASSIS CIRCUITS	1	Ground	White 12	White 10
	2	Back-Up	Blue 12	N/A
	3	Left Turn/Brake	Yellow + (Yellow Stripe) 12	Yellow 12
	4	Reserved	N/A	N/A
	5	Right Turn/Brake	Green + (Green Stripe) 12	Green 12
	6	Marker/Clearance	Brown 12	Brown 12
AUXILIARY CIRCUITS	7	Lower Work Lights	Black 12	N/A
	8	Upper Work Lights	N/A	Blue 12
	9	Rotate Lights	N/A	Black 12
	10	Flashing Lights	N/A	Red 12

Subframe Junction Box

NOTE: Use electrical grease on all terminal connections. Drill two 1/4 inch vent holes in the box on the side toward the ground.



Section VI - INSTALLATION
BODY LOCK

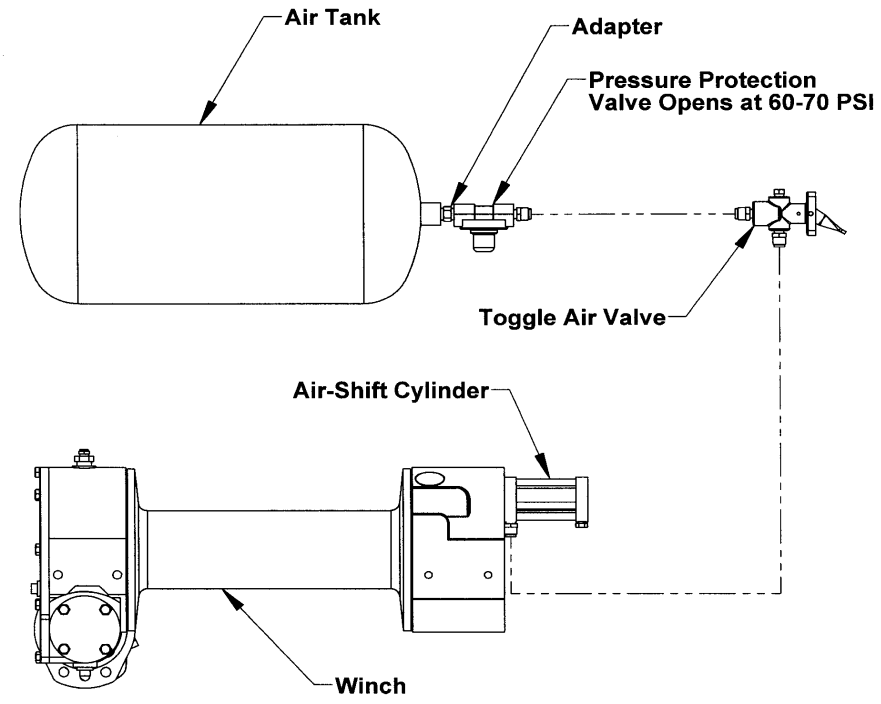


Position the body lock on the truck frame near the back of the cab. Slide the body fully forward and re-adjust the body lock so that there is 1/2 inch gap between the vertical faces of the body lock and the body sill channels. The body lock should also be centered on the truck frame and between the sill channels.

Clamp the body lock to the top flange of the truck frame. Bolt the body lock mounting brackets to the body lock angle with 5/8 carriage bolts. Drill two 5/8 holes for each bracket into the truck frame. Use one hole on each side of center of the mounting bracket. Fasten the body lock to the truck frame with 5/8 x 2 grade 5 bolts and nylon lock nuts.

Adjust the height of the hold-down brackets so that the wheels pull the body down 1/8 inch. The hold-down brackets have 2 slotted holes to allow vertical adjustment. Tighten the bolts in the slotted holes. Drill the third hole in each hold-down bracket 1/2 inch diameter and fasten with 1/2 x 2 grade 5 bolts and nylon lock nuts. This third drilled hole will lock each hold-down bracket from moving along the slotted holes.

Section VI - INSTALLATION
AIR-SHIFT WINCH AIR LINE

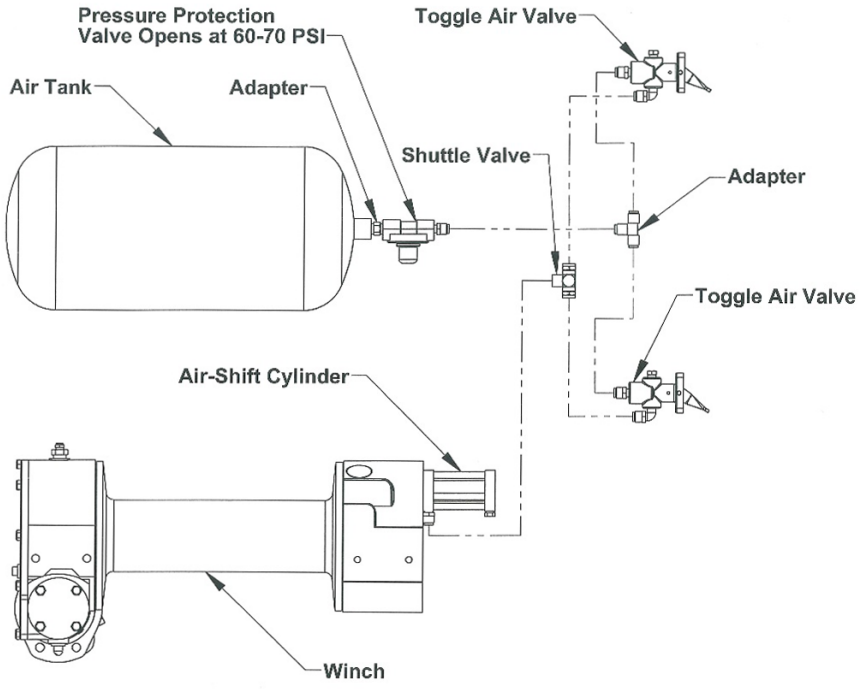


Make sure the chassis is equipped with an air dryer for better air system performance.

Install an air pressure protection valve directly to the air tank with an adapter. Do not use a hose or steel tubing between the tank and the pressure protection valve. The air pressure protection valve opens when the air tank pressure exceeds 60 PSI. This valve preserves pressure of at least 60 PSI in the tank in the event of an air leak between the tank and the air-shift cylinder. Make sure the air-flow directional arrows on the air pressure protection valve point out of the tank.

When installing nylon tubing between the valves and air cylinder, avoid sharp angle bends and sharp edges.

Section VI - INSTALLATION
DUAL AIR-SHIFT WINCH AIR LINE



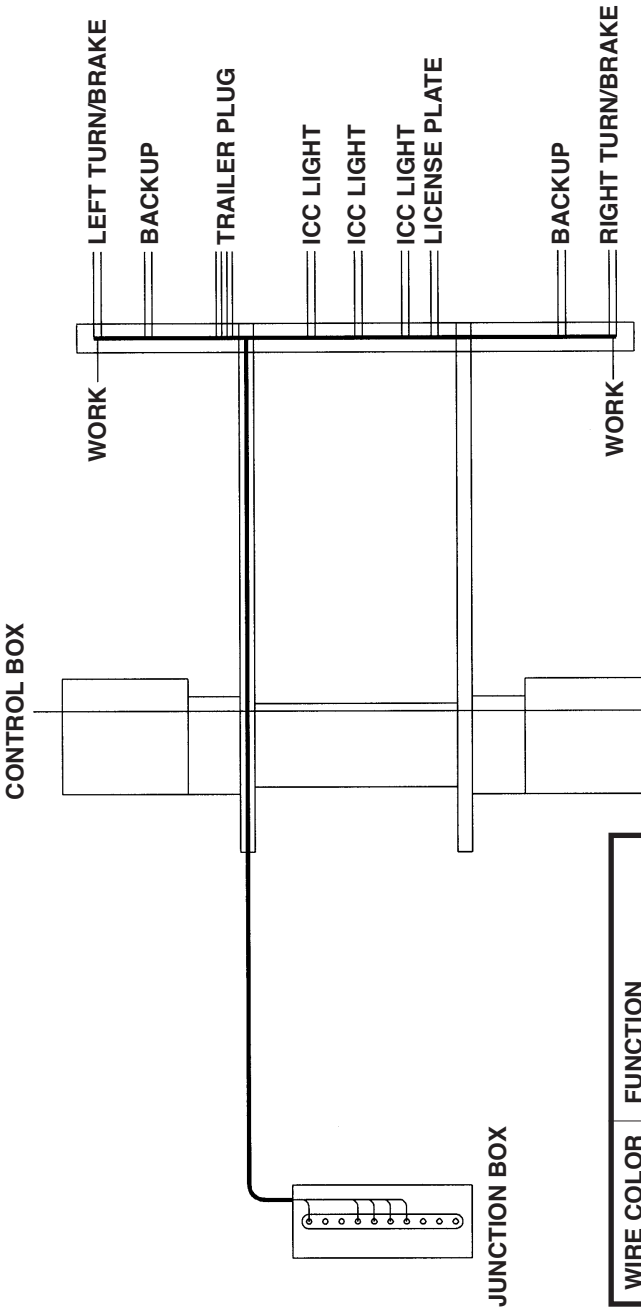
Make sure the chassis is equipped with an air dryer for better air system performance.

Install an air pressure protection valve directly to the air tank with an adapter. Do not use a hose or steel tubing between the tank and the pressure protection valve. The air pressure protection valve opens when the air tank pressure exceeds 60 PSI. This valve preserves pressure of at least 60 PSI in the tank in the event of an air leak between the tank and the air-shift cylinder. Make sure the air-flow directional arrows on the air pressure protection valve point out of the tank.

When installing nylon tubing between the valves and air cylinder, avoid sharp angle bends and sharp edges.

Section VII - SCHEMATICS

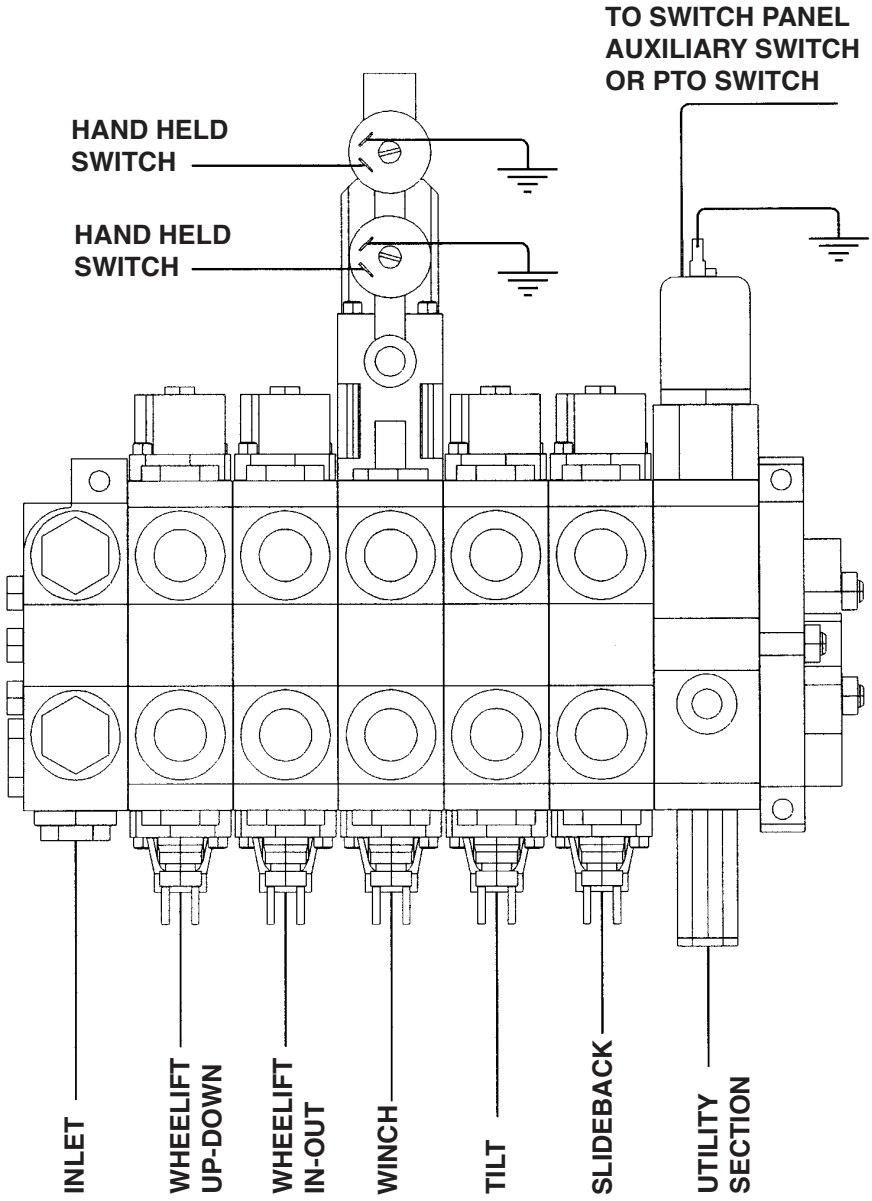
SUBFRAME WIRING



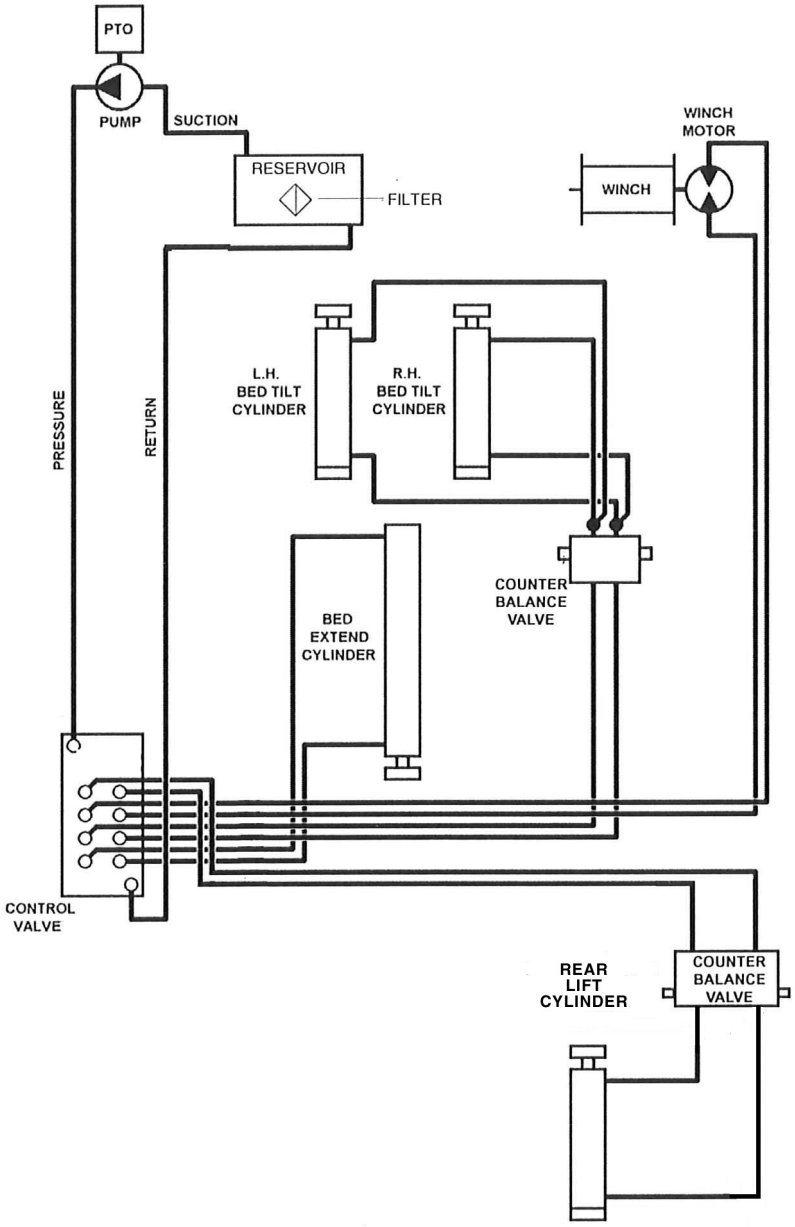
WIRE COLOR	FUNCTION
GREEN	RIGHT TURN/BRAKE
YELLOW	LEFT TURN/BRAKE
BROWN	MARKER/CLEARANCE
WHITE	GROUND
BLACK	WORK LIGHTS
BLUE	BACKUP LIGHTS

Section VII - SCHEMATICS

CONTROL VALVE
REMOTE CONTROL WINCH
WIRE DIAGRAM

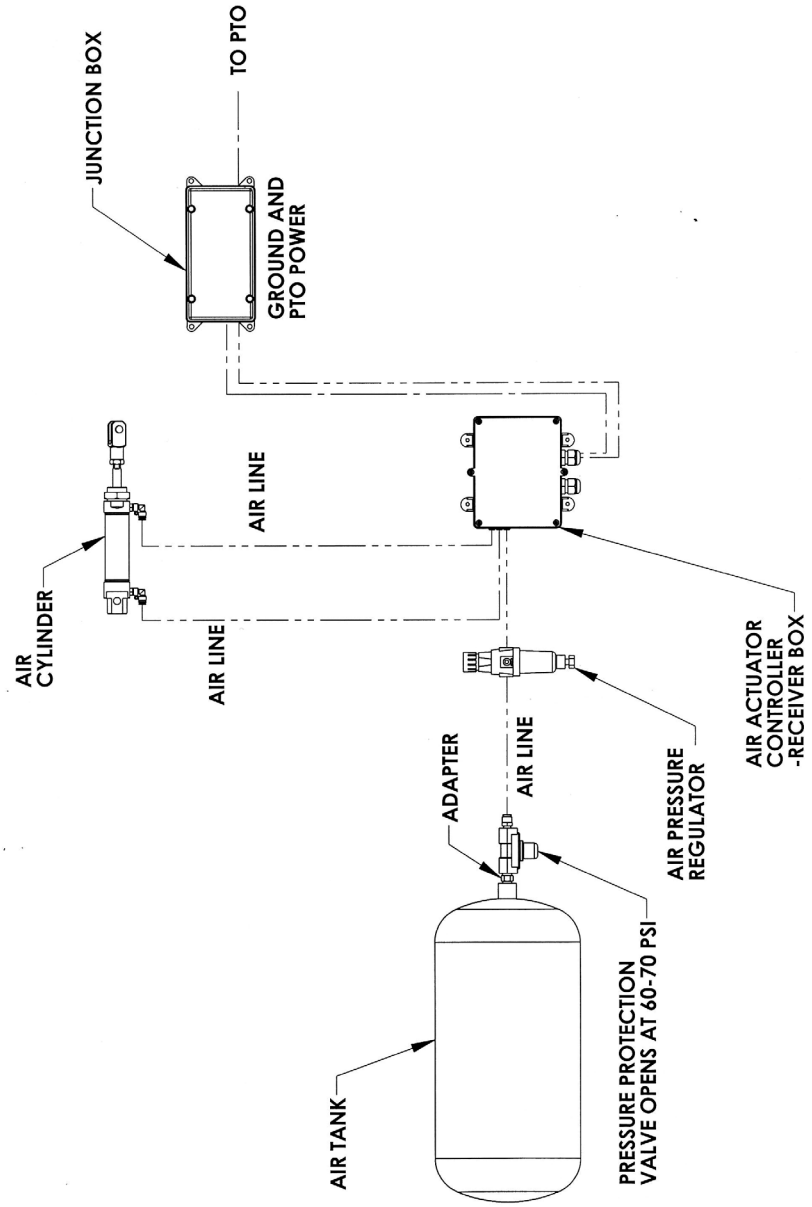


Section VII - SCHEMATICS
HYDRAULICS



Section VII - SCHEMATIC

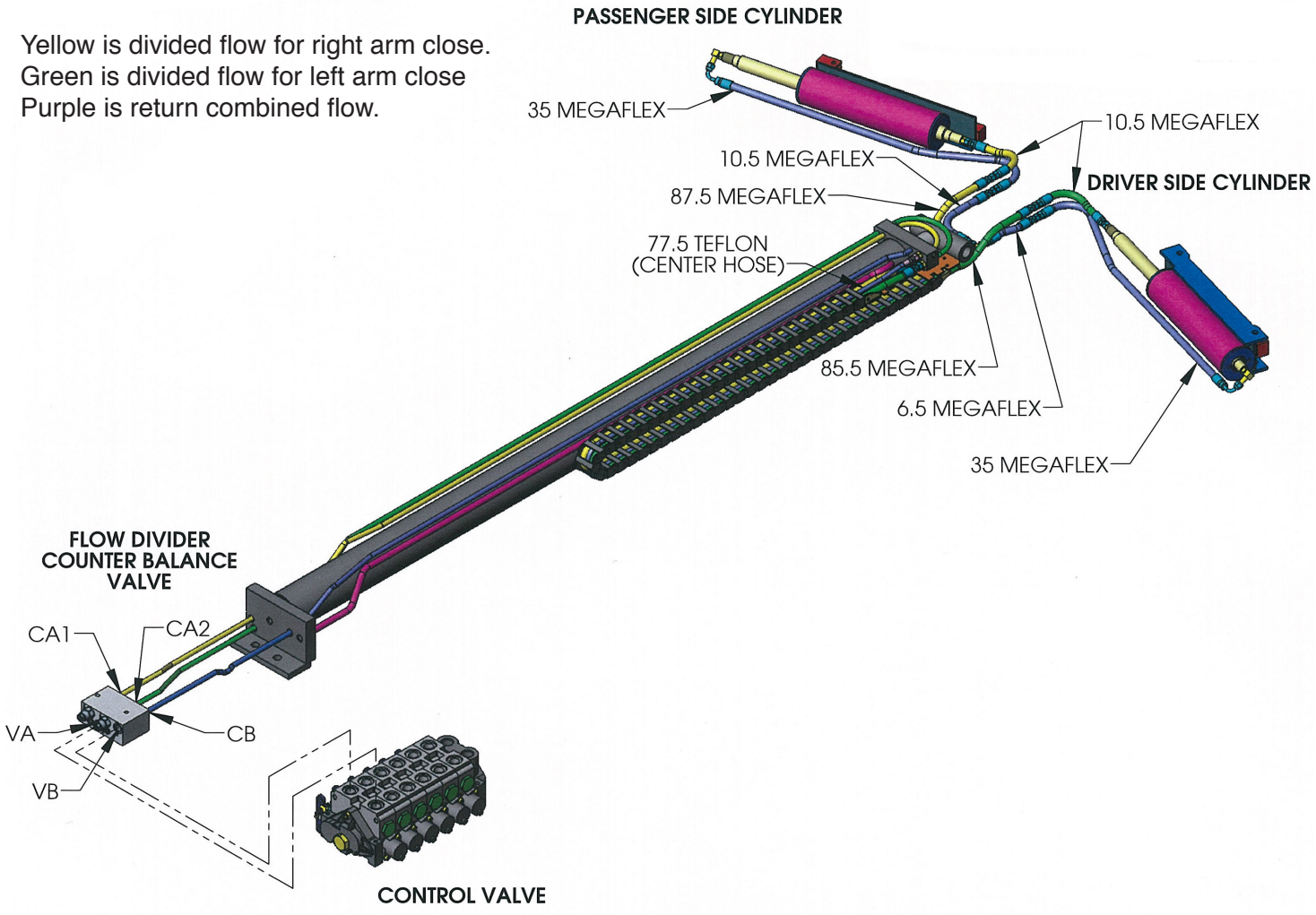
WIRELESS AIR ACTUATED REMOTE CONTROLS



Section VII - SCHEMATICS

CAR CARRIER
L-ARM CYLINDER HOSE ROUTING
AUTOGRIP II

Yellow is divided flow for right arm close.
Green is divided flow for left arm close
Purple is return combined flow.

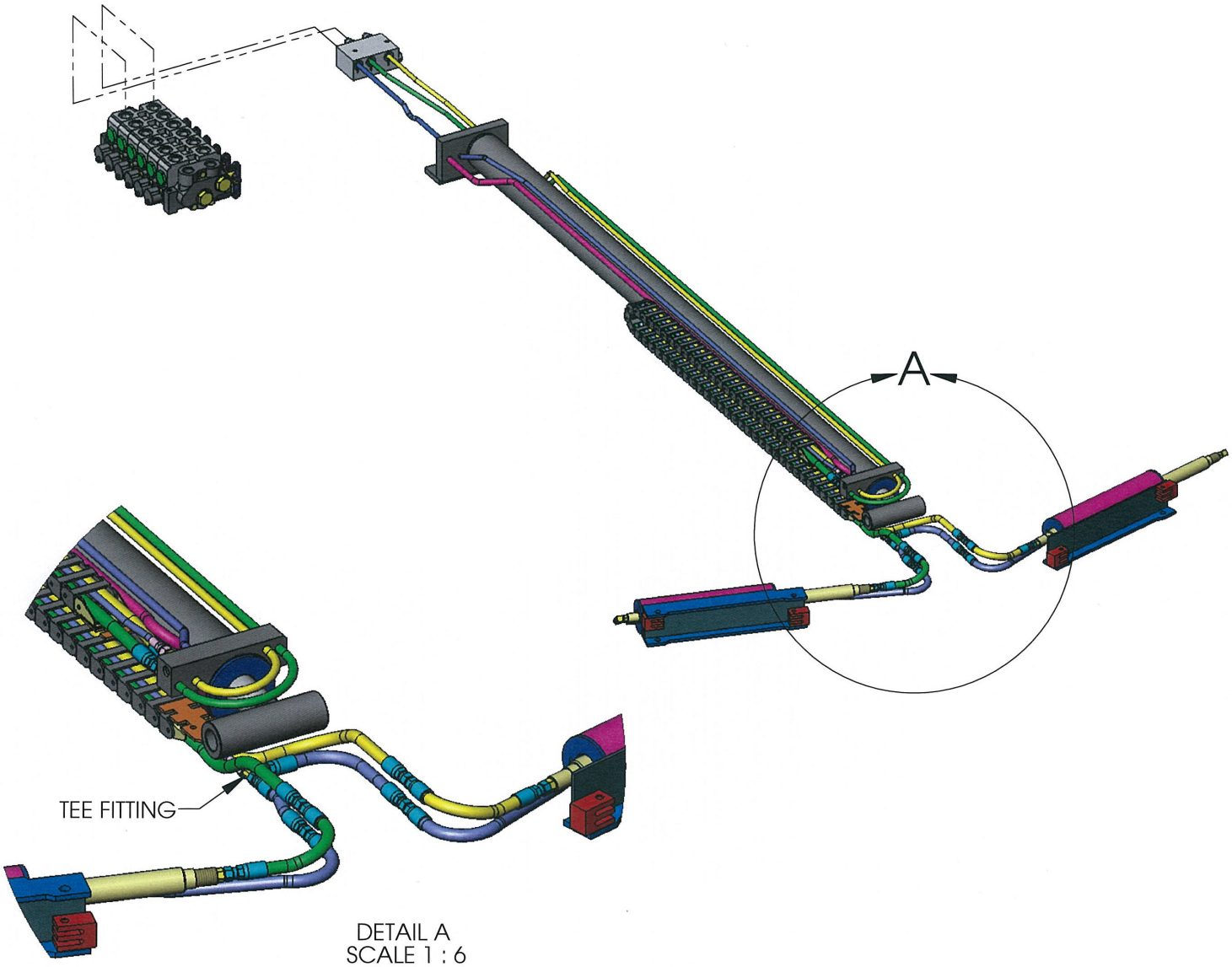


Section VII - SCHEMATICS

CAR CARRIER

L-ARM CYLINDER HOSE ROUTING

AUTOGRIP II



DETAIL A
SCALE 1 : 6