

CHIEF G SERIES

For: G16, G18 Machines

USERS MANUAL



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Chief Automotive Systems, Inc.
Attn: Returned Goods Dept.
1924 E. Fourth St. or Your Authorized
P.O. Box 1368 Chief Automotive Systems, Inc.
Grand Island, NE 68802-1368 Representative

INTRODUCTION


This manual is designed as an owners manual and as a training tool for the Chief Automotive Systems, Inc. G Series frame alignment machines. It provides information on system components, assembly, basic setup, safe operation, maintenance, and general safety tips.

The G Series systems feature unibody and full frame repair capabilities with 360 degree pulling access available around the vehicle. Two pulling towers are included as standard equipment with a third tower available as an optional accessory. Towers are available with either 5-ton or 10-ton pulling capability. Each tower is equipped with one hydraulic ram operated by an air over hydraulic foot pump.

The system features a 25 inch (63.5cm) working height and ability to be lowered on one end allowing a vehicle to be driven or winched onto the mainframe. The G16 machine is 16 feet (4.9m) in length, and the G18 is 18 feet (5.5m) in length.

IMPORTANT: Lifting capacity for the G Series machines is 6,500 lbs. (2,950 kg.).

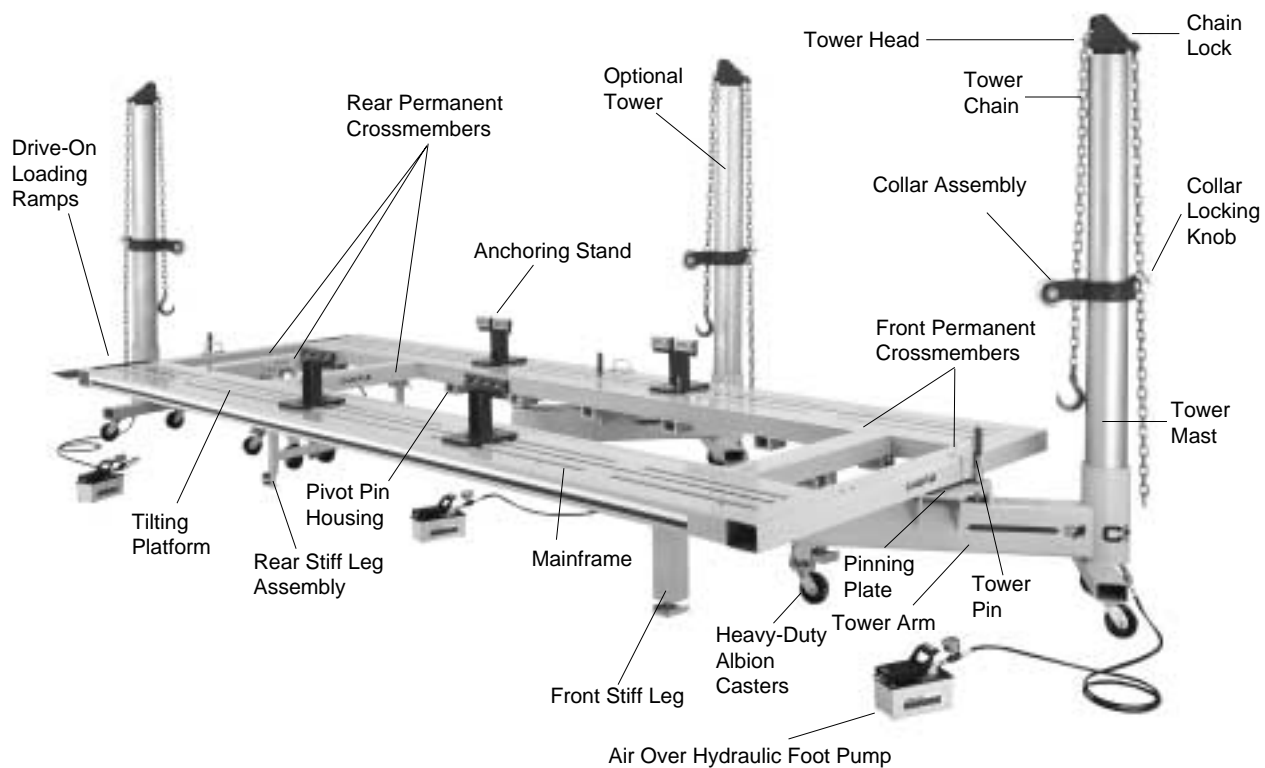
DO NOT attempt to operate a G Series machine without first viewing the training video and completely reading the users manual.

Complete safety information is highlighted throughout this manual and is identified using this safety alert symbol . Operator injury may result if these caution notes are not followed.

 **CAUTION:**


1. Qualified service personnel must check operational capacity of G Series systems prior to initial use and at intervals of no more than one year. Contact authorized Chief Automotive Systems, Inc. representative.
 2. Maintain a free space of 20 inches (50cm) minimum around all moving parts of machine.
 3. Persons operating G Series systems must be at least 18 years of age, must be trained in operation of G Series systems, and must have demonstrated their qualifications to the employer. They must also be specifically assigned to operate the G Series systems by the employer and this assignment must be made in writing. The employer controls usage of machine through the issuance of the system's air/hydraulic foot pumps.
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G SERIES COMPONENT TERMINOLOGY



GENERAL SAFETY TIPS

 **WARNING!** To avoid severe personal injury to yourself and others, DO NOT position yourself close to, or in line with chains, clamps, or other accessories while pressure is applied to this system.

 **CAUTION:** Failure to follow these procedures may result in personal injury or damage to property!

1. Before raising or lowering machine:
 - a) Remove towers from the machine.
 - b) Clear area of obstacles.
 - c) Install loading ramps.
2. When driving vehicle on or off machine, use a helper.
3. When raising or lowering machine with a vehicle on it:
 - a) Block vehicle's wheels and set parking brake.
 - b) DO NOT walk behind machine.

 Always pin stiff leg when machine is in the raised position.


 DO NOT run over air hoses or hydraulic lines when loading or unloading vehicles.


 To avoid tower tipping over, always push tower in direction of arrow.

 Remove twist in chain before applying pressure to the chain.

 Always wear safety glasses with the G Series machines or any of the accessories.

 DO NOT move machine if a vehicle is on it.

 DO NOT exceed 6500 psi (448 bar) hydraulic pressure when collar assembly is positioned 18 inches (457 mm) or less from top of tower pipe.

 Maintain a free space of 20 inches (50cm) minimum around all moving parts of machine.

The procedures outlined in this booklet are provided as a guide to the safe operation of the machine. Chief Automotive Systems, Inc. **does not assume responsibility for any injury resulting from the operator's misuse of this product or attachments.**

Chief Automotive Systems, Inc. reserves the right to alter product specifications, accessories and/or package components without notice. Availability of items shown in this manual may vary depending upon the distributor and/or region and country in which you reside.

Chief Automotive Systems, Inc. offers a variety of training courses. For more information on Chief Training, contact Chief Automotive Systems, Inc., P.O. Box 1368, Grand Island, Nebraska or call 800-445-9262, ext. 424. If located outside the U.S., contact your authorized Chief Automotive Systems, Inc. representative.

Basic Assembly

Installation and assembly of a few basic components is required following the delivery of a G Series machine.

Tools and materials required:

Roll teflon tape.

9/16 inch (14mm) end wrench.

3/4 inch (19mm) end wrench.

Tower Roller Assembly Installation

Slide collar onto tower pipe and position it as low as possible on tower. Then install collar locking knob. Figure 1.



Figure 1

Tower Chain Installation

Run tail end of chain through roller assembly as shown in Figure 2. Run chain through tower head and engage chain in tower head lock. Figure 3. When completed, check chain for twists and if found, remove.



Figure 2

Mainframe Lowering/Stop Installation

The lowering stops attach to the inside of the middle rear permanent crossmember, one to each side of lift jack assembly.

Install the stops hole end up, lining up the holes in the stops with the holes in the plate on the crossmember. Then thread the bolts with lock washers into the holes and tighten. Figure 4.



Figure 3



Figure 4

Foot Pump Assembly

1. Remove foot pump components from box.
2. Apply teflon tape to threads on air coupler. Remove rubber plug at rear of foot pump and install air coupler using 9/16 inch (14mm) end wrench. Figure 5.
3. Apply teflon tape to threads on male end of hydraulic hose. Thread hose into female fitting at front of foot pump and tighten with a 3/4 inch (19mm) end wrench. Figure 6.
NOTE: This connection does not have a swivel fitting.
4. Attach air hose to coupler at the rear of foot pump.

IMPORTANT:

The 'red' circles on one of the foot pumps indicates the foot pump is designated for raising and lowering the machine. Figure 7. Use of a designated foot pump prevents displacement of hydraulic fluid (one foot pump to the other) when pumps are alternately used to raise and lower the machine. Use of a designated foot pump prevents the possibility of one pump overflowing while the other pump goes empty.

NOTE: The designated foot pump is not limited to just lowering and raising the machine, but can also be used for tower or auxiliary ram operation.

Air/Hydraulic System

To operate tower ram, attach foot pump's hydraulic hose to the pressure gauge assembly, Figure 8, and attach pressure gauge assembly to tower ram, Figure 9. Also mount pressure gauge to rear of tower. Figure 10. Then attach foot pump's air hose to the shop's air supply. Press 'rearward' on foot pump to exert pressure (hydraulic ram



Figure 5

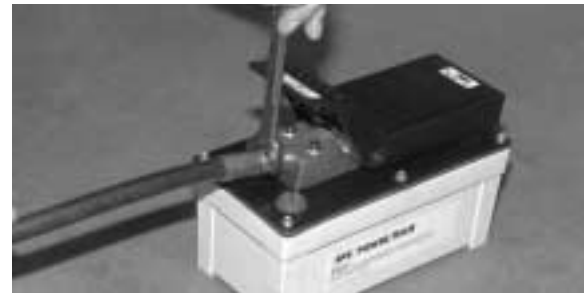


Figure 6



Figure 7



Figure 8



Figure 9



Figure 10

will lift tower head) and press 'forward' to release pressure (hydraulic ram retracts and lowers tower head).

NOTE: Always bleed air from the system before operating for the first time. See Parts Manual - Maintenance.

To operate lift ram, follow same procedure; however, attach foot pump's hydraulic hose to lift ram's hydraulic hose.

IMPORTANT: If hydraulic connections are not seated correctly, couplings may leak fluid or may not allow fluid to pass through. Male and female connectors must be fully seated and then tightly threaded together. Figures 11 and 12 show a coupling that is not 'fully seated' and a coupling that is 'fully seated'.

⚠ CAUTION: To avoid personal injury or damage to property: When disconnecting connectors, some fluid spillage may occur. Always clean up any hydraulic fluid spillage from the floor or work area.

Towers

The G Series tower assemblies are attached to the machine's mainframe by inserting the pivot pin (located at the end of the tower arm) into housings located at various points under the mainframe. Figure 13. Once inserted, the towers are secured using a safety pin and safety clip. Figure 14. The towers may then be pivoted into the desired location to perform a pull.

Prior to making a pull, secure tower mast to tower arm. On 10 ton towers, install and tighten 3/4-10NC x 5 inch bolt at bottom of tower arm. Bolt extends upward and threads into tower mast bracket. Figure 15. On 5 ton towers, install 1/2-13NC x 1 1/4 inch bolt and lock nut to tower mast bracket. Figure 16.

NOTE: The bolts and lock washer identified in the preceding paragraph may have been installed prior to delivery.

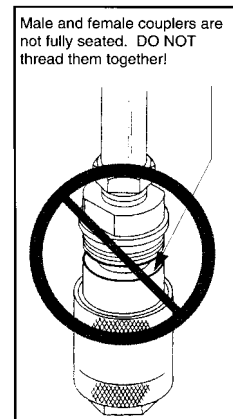


Figure 11

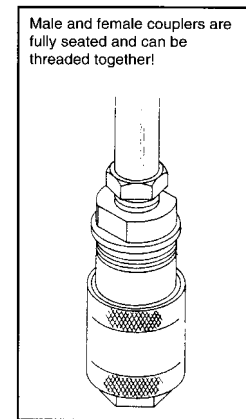


Figure 12

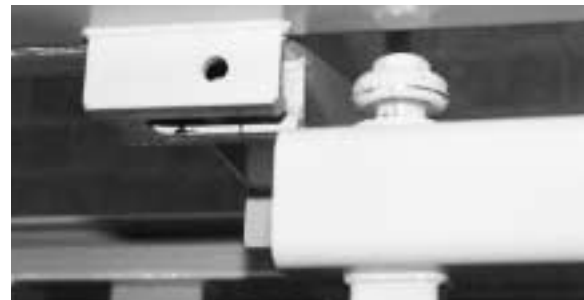


Figure 13



Figure 14

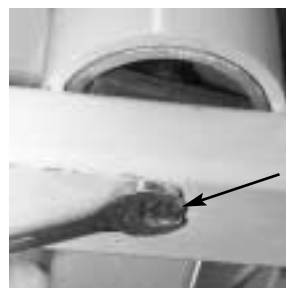


Figure 15

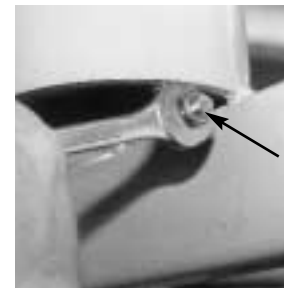


Figure 16

SAFE OPERATION

HOW TO OPERATE G SERIES MACHINES

⚠ CAUTION: To avoid personal injury, always wear safety glasses and safety shoes while using the machine.

Leveling The Machine

1. Place the entire weight of the machine on the front and rear stiff leg assemblies. Figure 17.
2. Level the machine side-to-side first by reading the sight bubble on a carpenter's level placed across the front permanent crossmember. Figure 18. Adjust leveling bolts at base of front stiff leg assemblies if necessary. Figure 19. Next, check for level at the rear permanent crossmember. Adjust the leveling bolts on the rear stiff leg so that both contact the floor. Figure 20.
3. To level front-to-rear, place a carpenter's level across the top of one side of the mainframe. Figure 21. Check the sight bubble and, if necessary, adjust the leveling bolts at the base of the front or rear stiff leg assemblies. Once completed, check for level on the other side of the mainframe and, if necessary, repeat these same procedures.
4. After leveling the machine, position the tower assemblies around the mainframe to ensure adequate clearance between the top of the pinning plate and the bottom of the mainframe. If adequate clearance does not exist, raise the entire machine evenly.



Figure 17



Figure 18

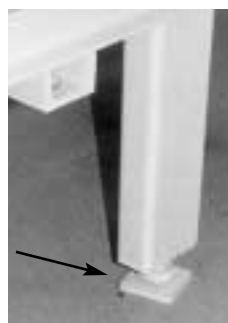


Figure 19

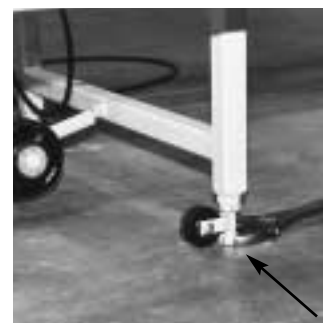


Figure 20



Figure 21

Lowering The Machine

⚠ CAUTION: To avoid personal injury or damage to property:

1. Before raising or lowering machine:
 - a) Remove the towers from the mainframe.
 - b) Clear area of obstacles.
 - c) Install loading ramps.
 - d) **DO NOT** allow anyone or anything to ride on machine or be under machine during lowering or raising procedures.
2. When driving vehicle on or off of machine, use a helper to guide you.
3. When raising or lowering machine with vehicle on it:
 - a) Always put vehicle in park. Block vehicle's wheels and set parking brake.
 - b) **DO NOT** walk behind machine.

⚠ CAUTION: To avoid personal injury by tower tipping over, always push tower in direction of arrow.

1. Install loading ramps, lining up the tabs on the underside of the ramp with the slots in the mainframe. Figure 22.
2. Attach foot pump's air and hydraulic lines. **IMPORTANT:** When raising and lowering machine, use foot pump with red identification circle. Figure 23. Use of a designated foot pump prevents displacement of hydraulic fluid (one foot pump to the other) when pumps are alternately used to raise and lower machine.
3. Remove safety clip and pin from rear stiff leg assembly. Figure 24.
4. Raise machine until stiff leg is off floor, Figure 25, and swing stiff leg assembly out of the way, Figure 26.
5. Lower machine by pressing on the front of the foot pump.



Figure 22



Figure 23



Figure 24



Figure 25



Figure 26

Loading A Vehicle On The Machine

NOTE: Lifting capacity for G Series machines is 6,500 lbs. (2,950 kg).

1. With towers removed, clear all obstacles, install loading ramps and lower machine.
2. Using a helper, center vehicle and drive up mainframe, clearing loading ramps. Figure 27.
3. Set parking brake and put gear selector in park (automatic transmission) or in gear (manual transmission).
4. Continue to depress brake pedal, raise machine, and secure.

⚠ CAUTION: To avoid personal injury or damage to property, block the vehicle's wheels and set parking brake.



Figure 27

Raising The Machine

1. Attach foot pump's air and hydraulics.
IMPORTANT: When raising and lowering machine, use foot pump with red identification circle. Figure 23 — Page 8. Use of a designated foot pump prevents displacement of hydraulic fluid (one foot pump to the other) when pumps are alternately used to raise and lower machine.
2. Raise machine until stiff leg assembly swings into upright position.
3. Lower machine until stiff leg assembly is securely on the floor.
4. Install stiff leg pin and clip.

⚠ CAUTION: To avoid personal injury or damage to property, always pin stiff leg when machine is in the raised position.

Installing Anchoring System

NOTE: If the anchoring system is to be used with the Chief Universal Measuring System, consult UMS data sheets for installation procedures.

1. Inspect the area on the inside of rocker panel pinchweld flange for fuel lines, brake lines, or any other items which may interfere with the anchoring stand's clamps. If the vehicle is undercoated, check for and remove any undercoating from the pinchweld that would interfere with the pinchweld clamps. Figure 28.
2. Position lifting device under subrail (or other structurally sound component). Lift entire side of vehicle high enough to install anchoring stands at both front and rear of center section.
3. Position anchoring stand below attachment points on pinchweld making certain anchoring stand base spans treadway slot. Figure 29. Adjust front and rear anchoring stand height so clamp jaws engage (or are just below) rocker panel pinchweld and insert height adjusting pin.
4. Lower vehicle until the rocker panel seats firmly against top surface of pinchweld clamps, and the pinchweld fits completely into the clamps. Figure 30.
5. On underside of mainframe, position mounting plate and insert bolt upward through the plate and the treadway slot. Thread the bolt into the fastener bar inside the anchoring stand base. Figure 31.
6. Secure assembly starting with clamp jaw bolts and then mounting bolts, tightening each to 80 ft. lbs. (108Nm) torque.



Figure 28

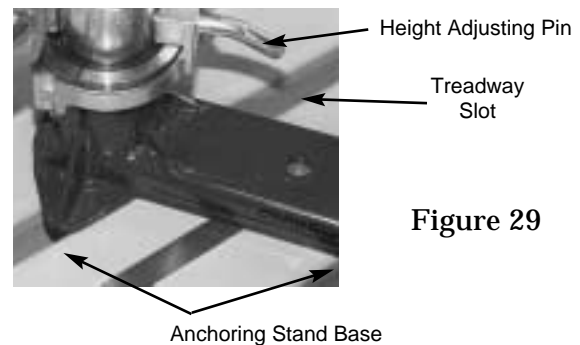


Figure 29

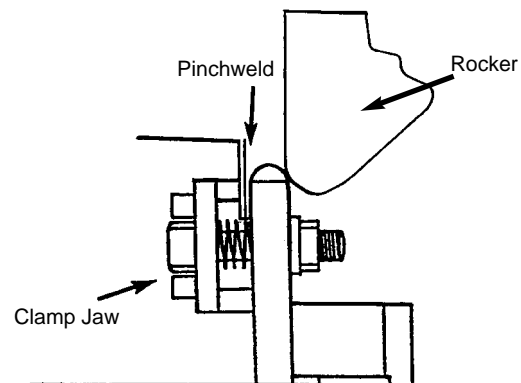


Figure 30

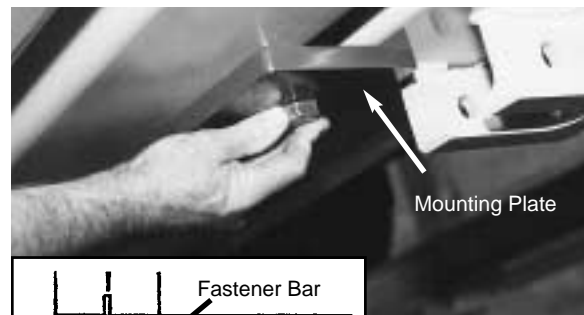
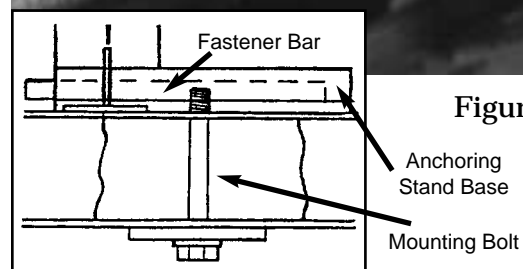


Figure 31



Mainframe Tie Downs (Optional)

Holding & Blocking

This section is shown only as a guide to holding and blocking. Specific angles of the hold and attachments will vary depending upon the vehicle's damage.

Pickup

1. Secure the optional chain attachment accessory and a bumper puller accessory to the mainframe just behind the vehicle's center section.
2. Loop a chain over the frame rail at the rear of the center section.
3. Bring both ends of the chain through the loop until snug. Figure 32.
4. Position one end of the chain perpendicular to the vehicle angling it down through a mainframe opening at a 45 degree angle. Secure the chain to the mainframe using a slotted chain anchor.
5. Position the other end of the chain back and down at a 45 degree angle securing it to the mainframe using a chain anchor attachment. A bumper puller or other auxiliary chain assembly may be required to complete the setup. Figure 33 and inset.
6. Raise the vehicle and place wood blocks under the frame rail below the point of hold. Figure 34.
7. Lower the vehicle.
8. At the front of the center section, attach a chain to the inside of the frame rail angling it down at a 45 degree angle. Secure it to the mainframe using a slotted chain anchor.



Figure 32

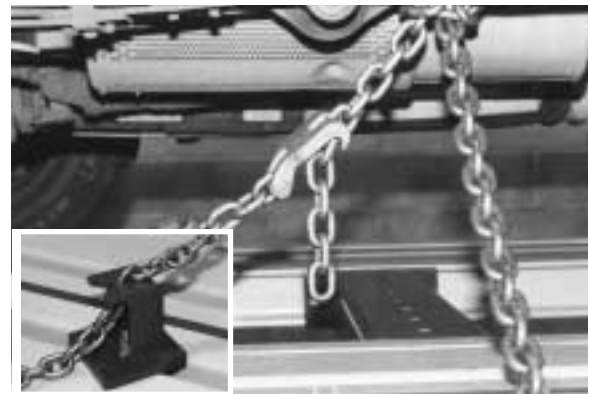


Figure 33



Figure 34

9. Raise the vehicle, position wood blocks under the hold and lower the vehicle. Figure 35.
10. Attach holds as needed to the other side of the vehicle.

Perimeter Frame

1. At the rear of the center section, position a hole hugger (with chain) in a hole in the vehicle's frame. Position the chain down and out at a 45 degree angle from the frame.
2. Secure chain to the mainframe. Figure 36.
3. Raise the vehicle until you have tension on the chain and position wood blocks under the hole hugger. Figure 37.
4. Lower the vehicle.
5. At the front of the center section, use the same procedures as outlined for holding the pickup frame.
6. Attach holds and blocks as needed on the other side of the vehicle.



Figure 35



Figure 36



Figure 37

Alignment, Pinning & Bolting

The pinning plate on each tower has 16 pinning and bolting holes which allow flexibility when aligning towers for pulls.

Under normal pulling conditions, the use of pins to secure the towers is sufficient. Figure 38.

IMPORTANT:

1. Always use mainframe guard at edge of machine when making a normal pull.
2. Use tower bolt and clamp when making pulls at excessive angles. (See page 13.)

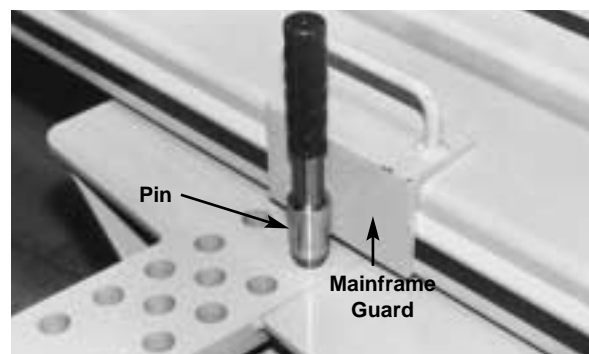


Figure 38

Tower Bolt And Clamp Installation Procedures

There are two pulling situations in which you must use the tower bolt and clamp to secure the towers.

One is when making an upward pull at a 30 degree angle or more. Figure 39. During this pull, the tower is forced downward when pressure is applied.

The other situation is when pulling from the side of the tower at an angle of 30 degrees or more, the tower is subject to twisting when pressure is applied. Figure 40.

1. Position tower clamp in line with the edge of the mainframe and over the appropriate hole in the pinning plate.
2. Use the shims provided to remove the gap between the lip of the clamp and the top of the mainframe.
3. Install bolt, nut and washer, tightening to 120 ft. lbs. (163Nm) torque. Figure 41.

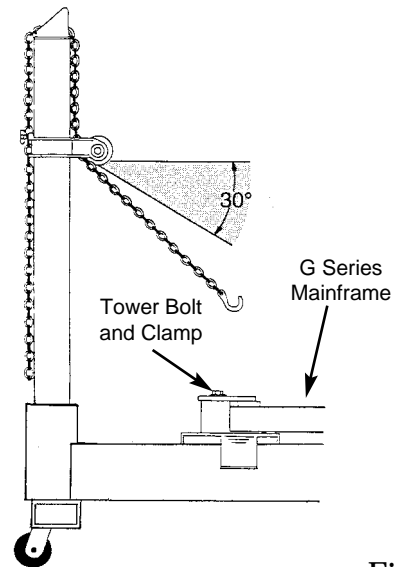


Figure 39

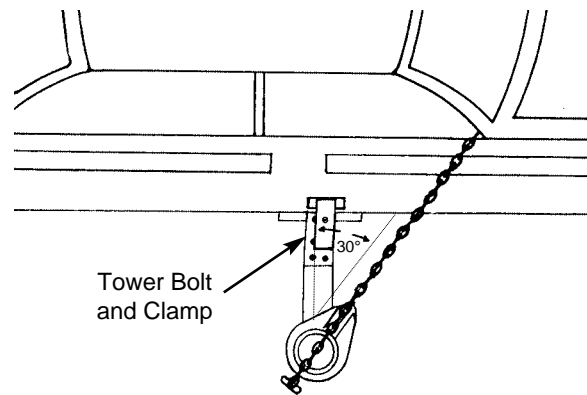


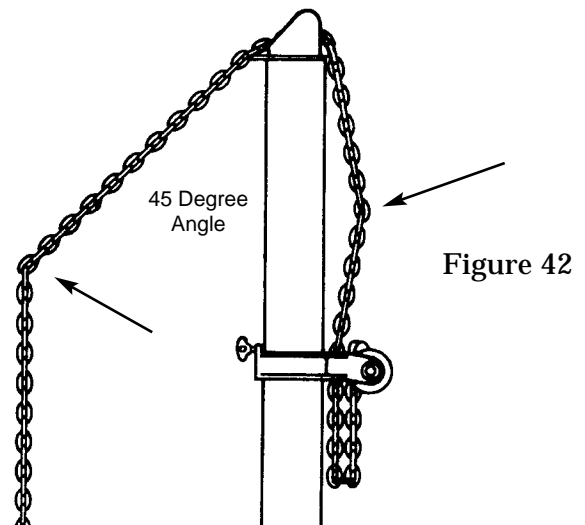
Figure 40



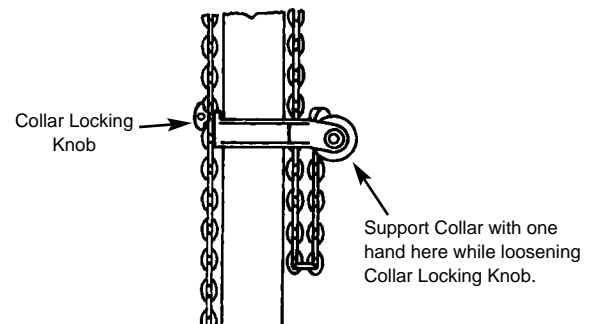
Figure 41

Adjusting Chains & Roller Assembly

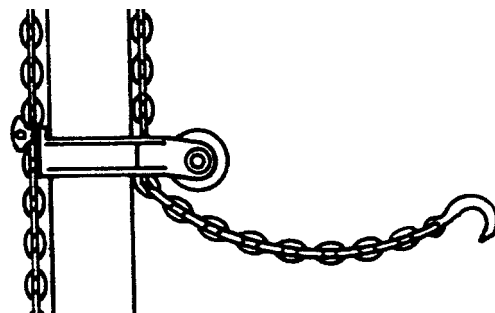
1. Grip chain at positions indicated by arrows in Figure 42. Pull chain out at a 45 degree angle, disengage chain from tower head lock and adjust to desired length.



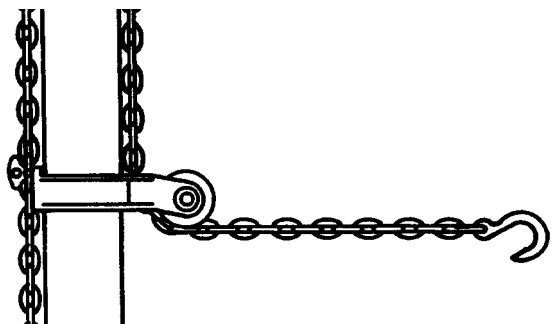
2. Support collar assembly with one hand and loosen collar locking knob. See Figure 43. Position collar at desired position for pull and tighten collar locking knob.



3. Remove twist from chain. Attach hook to vehicle. Figure 44.



4. Pull on tail of chain to remove slack and engage chain in tower head lock. Figure 45 shows slack has been removed.



5. Check collar and tower head to make sure they are rotated to be in line with direction of pull.

6. Apply pressure.

Setting Up The Pull

⚠ WARNING: To avoid severe personal injury to yourself and others, DO NOT position yourself close to or in line with chains, clamps or other accessories while pressure is applied to the system.

⚠ CAUTION: To avoid personal injury or damage to property, DO NOT exceed 6500 psi (448 bar) hydraulic pressure when collar assembly is positioned 18 inches (457 mm) or less from top of tower pipe.

IMPORTANT: Prior to pulling make certain tower mast is secured to tower arm. See Page 6

NOTE: Measure, analyze and plan the repair prior to making any pulls.

For all pulls, the anchoring system must be installed, and unless otherwise specified, all fasteners tightened.

Front Corner Pull

1. Position clamps on vehicle at points to be pulled. Figure 46.
2. Position towers for pulls, secure and set up for pull. Figure 47.

Front End Sway

Using the previously outlined techniques, position towers as shown and set up for the pull. Figure 48.



Figure 46

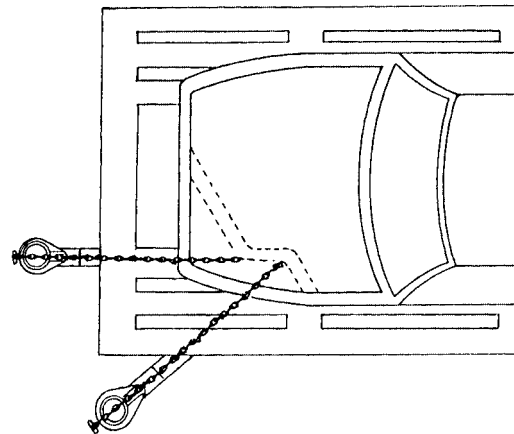


Figure 47

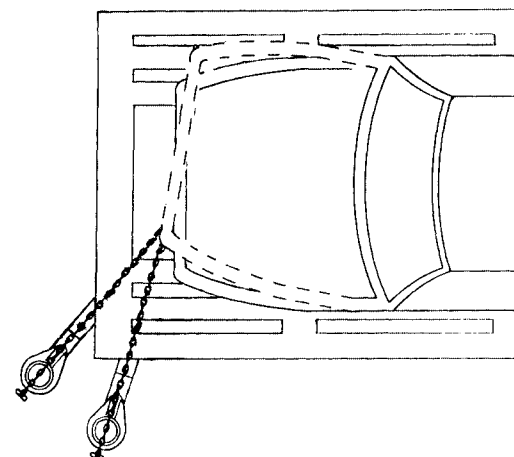


Figure 48

Side Pull

It may be necessary to loosen the anchoring system on the damaged side of the vehicle to perform certain side pulls.

1. Use normal setup procedures for the two towers.
2. To provide an additional pulling point, use (optional) auxiliary ram.

⚠ CAUTION:

1. Auxiliary ram can only be used for direct side pulls. All angular pulls must be made by system's pulling towers.
2. DO NOT exceed 6,000 psi (420 bar) of hydraulic pressure when using auxiliary ram to make a direct side pull from G Series systems.
 - a. Position auxiliary ram assembly at desired location and brace v-base against corner of inner treadway slot. Figure 49.

⚠ **CAUTION:** Wedged portion of v-base must be squarely against corner of treadway slot. Figure 50. If it is not, it will kick out when hydraulic pressure is applied.

- b. Attach chain to body clamp (at point of pull) and run chain through auxiliary ram pulling head and secure with safety pin. Figure 51.
- c. Wrap tail end of pulling chain around outer edge of machine. Insert it upward through outer treadway slot and secure it with slotted chain anchor. Angle between chain and ram must be identical one side of ram to the other. Figure 52.

IMPORTANT: Tail end of pulling chain and its point of attachment to mainframe must be in line with auxiliary ram assembly.

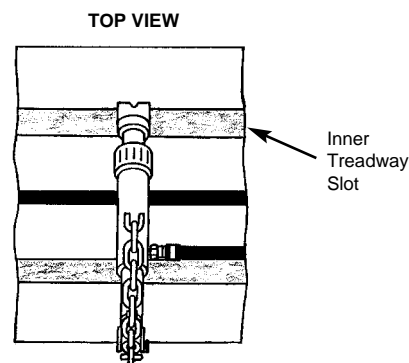


Figure 49



Figure 50



Figure 51



Figure 52

Rear Pull

1. Remove the rear drive on ramps.
2. Position the towers at the rear of the vehicle.
3. Proceed with normal setup procedures. Figure 53.

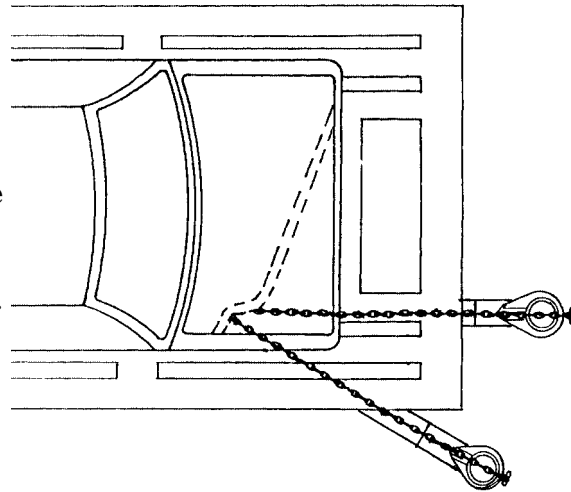


Figure 53

Supporting Pull

1. Align towers directly across from each other and in line with engine. Position the collar rollers near top of the towers and install tower bolts and clamps.
2. Adjust chains and hook together, attaching engine support chain. Figure 54.
3. Apply pressure evenly lifting engine. Figure 55.



CAUTION:

To avoid personal injury or damage to property: The item being supported may lower rapidly when pressure is released from the system on this type of pull.



Figure 54

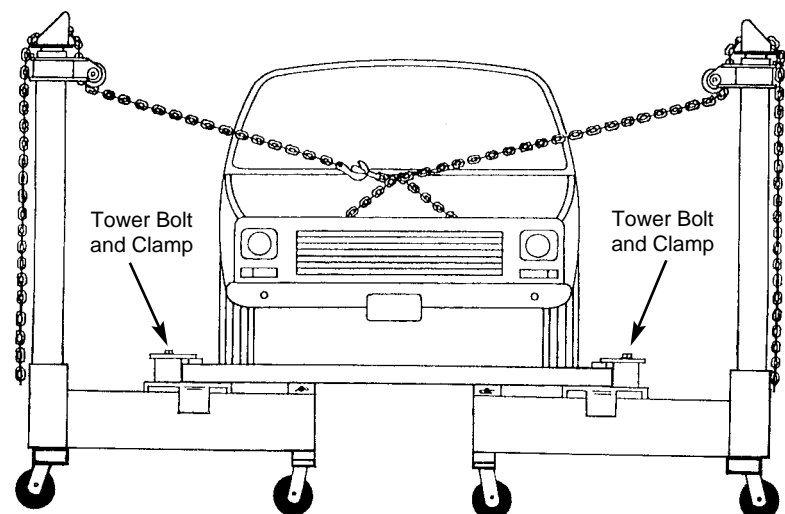


Figure 55



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