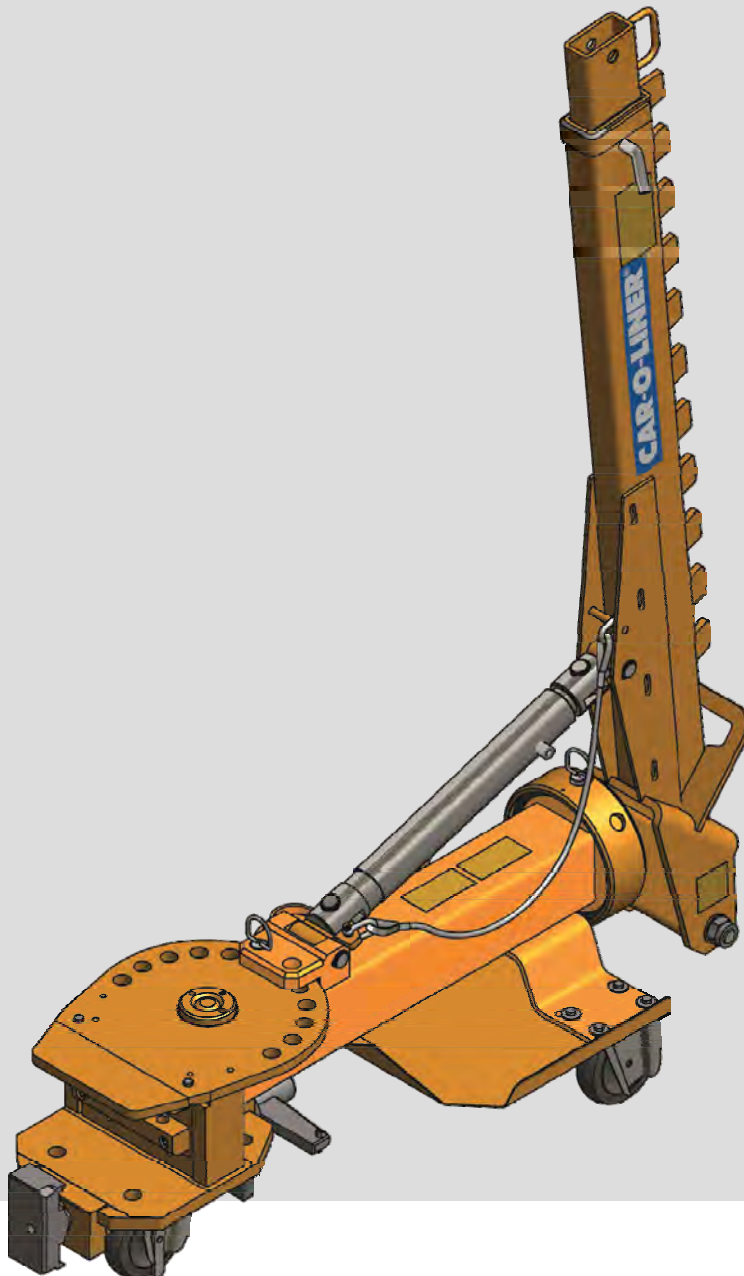


# Draw Aligner D16

## Instruction manual



(30308, rev 1) 2012-02, ENG

**CAR-O-LINER®**



The Draw Aligner D16 is designed to perform alignment work on Mark- and Bench Rack- series of alignment benches. D16 can easily be locked to the bench frame. Its adjustment possibilities give it a large range of movement, making alignment work fast and effective.

## Conformity with directives and standards

The Draw Aligner D16 is designed and manufactured by Car-O-Liner, which is an EN-ISO 9001 and 14001 accredited development and manufacturing organisation.

It is required that only Car-O-Liner approved spare parts and accessoires are used with the Draw Aligner D16.

This manual gives tips and directions for installation, operation and maintenance.

*IMPORTANT! Read these instructions carefully to become familiar with proper operation of the draw aligner. Do not neglect this, since improper operation can result in personal injury and damage to the equipment.*

## Warranty

Car-O-Liner AB offers a one-year guarantee from the date of delivery. This guarantee covers material defects and assumes normal care and maintenance.

The guarantee assumes that:

- The equipment is correctly installed and inspected in accordance with current local regulations.
- The equipment has not been altered or rebuilt without approval from Car-O-Liner AB.
- Genuine Car-O-Liner AB spare parts are used in any repairs.
- Operation and maintenance have been carried out according to the instructions in this manual.

All claims on warranty must verify that the fault has occurred within the guarantee period, plus that the unit has been used within its operating range as stated in the specifications. All claims must include the product type and article number.

This data is stamped on the name plate, refer to page A.3.

The photographs and drawings in this manual are merely illustrative and do not necessarily represent the actual appearance of equipment available. The equipment is designed to be used in accordance with established practices and in observation of applicable safety regulations. The design of the equipment presented in this manual may be changed without prior notice.

## 1 APPLICATIONS

The draw aligner is solely intended for the performance of alignment work on the coachwork of a vehicle that is properly mounted on Mark- and Bench Rack- series of alignment benches.

During alignment work the draw aligner shall be secured to the bench frame according to instructions.

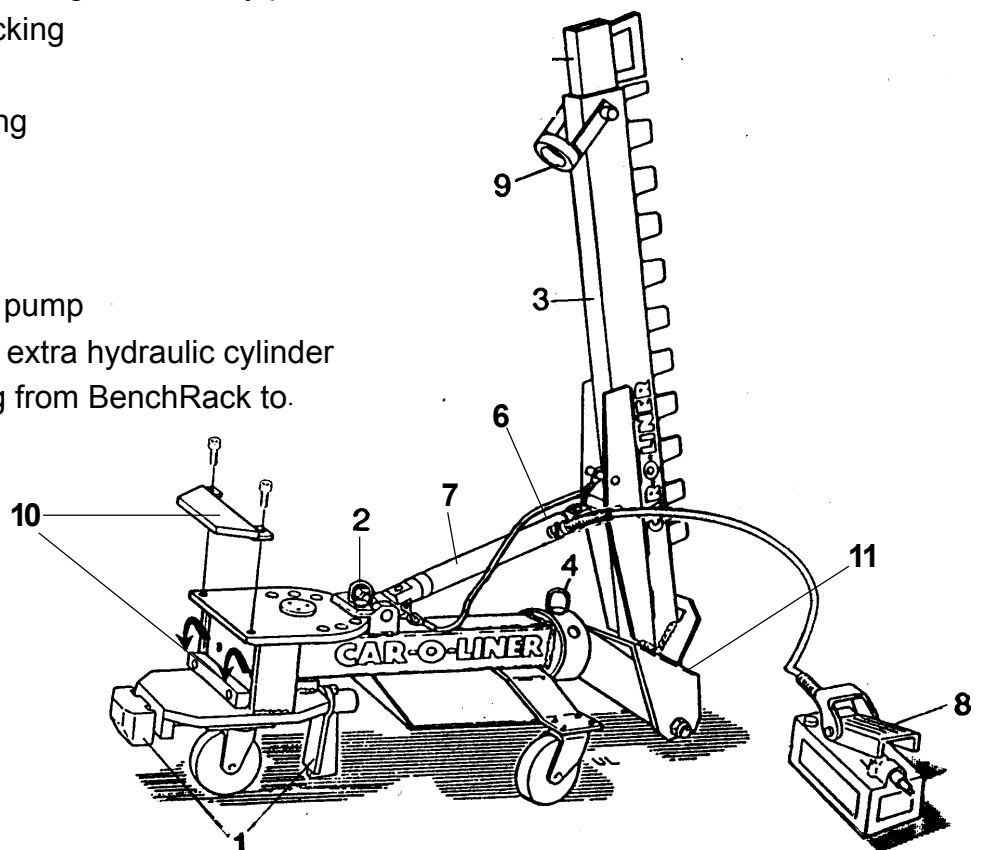
The draw aligner shall only be used with a hydraulic cylinder with a maximum capacity of 10 tons.

## 2 DRAW ALIGNER

The draw aligner can be placed at any position along the four sides of the base frame. It is secured to the base frame with the locking wedge (1). The draw aligner rotates sideways and is locked in the desired position with a peg (2). The arm (3) can be inclined sideways to obtain the optimum pulling angle. It is locked in position with a peg (4). The arm is fitted with an extension (5). A stop wire (6) limiting the outward movement of the arm is connected between the arm and the hydraulic cylinder mounting.

The hydraulic cylinder (7) has a capacity of 10 tons and is operated with the help of a pneumatic pump (8). The mounting bracket (9) at the end of the arm is for an extra hydraulic cylinder.

1. Drawbar with locking wedge and safety plate
2. Peg for horizontal locking
3. Draw aligner arm
4. Peg for vertical locking
5. Arm extension
6. Stop wire
7. Hydraulic cylinder
8. Pneumatic hydraulic pump
9. Mounting bracket for extra hydraulic cylinder
10. Device for converting from BenchRack to Mark and vice versa.
11. Nameplate



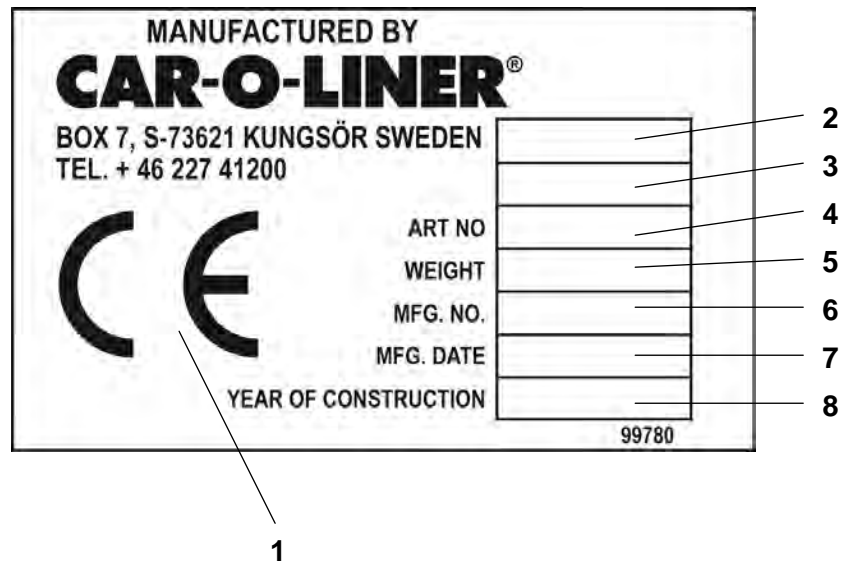
# General

D16

CAR-O-LINER

## 3 NAMEPLATE

The manufacturer's nameplate is placed at the lower mounting point of the draw aligner arm



1. CE label
2. Product type
3. Product name
4. Article number
5. Weight
6. Manufacturers serial number
7. Date of manufacture
8. Year of construction

## 1 GENERAL

Alongside the illustrations and important descriptive texts in this manual are various warnings and notices. Safety signs shall also be in place on the equipment. These are meant to warn for hazardous situations or to draw attention to incorrect use of the equipment.

By observing these safety precautions, the user of the draw aligner will ensure safer working conditions both for himself and his fellow workers.

## 2 WARNINGS, IMPORTANT NOTICES AND INFORMATION

"WARNING" (in italic type) means that you can injure yourself or others if you do not follow the instructions. When you see the warning symbol shown in part B3 of this section, follow the safety instructions to prevent personal injury.

"IMPORTANT" (in italic type) indicates practical information or that the equipment may be damaged if the instructions in the notice are ignored.

In addition to the safety signs illustrated in part 3, the following warnings and important notices appear in the manual.  
*See next page.*

## 2 WARNINGS, IMPORTANT NOTICES AND INFORMATION (cont'd.)

**WARNING!** The draw aligner is meant to be equipped with a hydraulic cylinder with a maximum capacity of 10 tons.

**WARNING!** Make sure that the safety wire is correctly fitted and undamaged.

**WARNING!** Never release the locking wedge if the bench is not at draw aligner height. Risk for injury.

**WARNING!** Make sure that the draw aligner is correctly secured to the bench frame.

**WARNING!** The locking pegs must be pressed in completely.

**WARNING!** Always use safety glasses when hammering the locking wedge in or out. Risk for splinters.

**WARNING!** Watch out for flying objects during aligning work. Do not stand behind or near the draw aligner during a pull.

**WARNING!** Before moving the draw aligner, always lock the arm in an upright position. Risk for tipping

**WARNING!** To avoid damage to the draw aligner ,chain must run as parallel as possible to hydraulic cylinder.

**IMPORTANT!** When using the draw aligner, remember to move the measuring studs away from the damaged area to avoid damage to the measuring system.

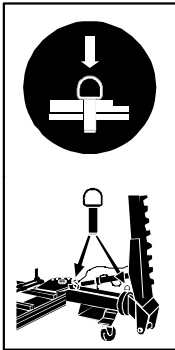


## 3 SAFETY SIGNS



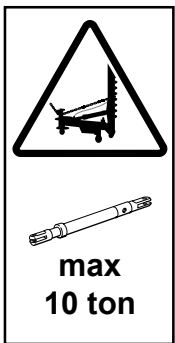
**Command.** Safety glasses must be used when hammering in the locking wedge.

Art. no. 31897



**Command.** The locking pegs must always be pressed in completely.

Art. no. 31898



**Warning.** The draw aligner is to be equipped with a hydraulic cylinder with a maximum capacity of 10 tons.

Art. no. 31901



**Warning.** Watch out for flying objects during aligning work. Do not stand behind or near the draw aligner during a pull.

Art. no. 31895



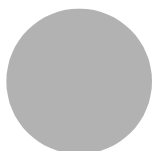
**Warning.** Risk for tripping; loose hoses, etc.

Art. no. 31892

## 3 SAFETY SIGNS (cont'd.)



Red with white background, black symbol.  
Prohibition - Prohibits behaviour that can cause injury.



Blue with white symbol.  
Command - Prescribes a specific responsibility.



Yellow with black symbol.  
Warning - Warns for safety risk.

Undamaged safety signs shall always be affixed at the indicated places. See page B.5.  
If any signs are damaged or missing the user is responsible for their immediate replacement. Safety signs are available as spare parts.

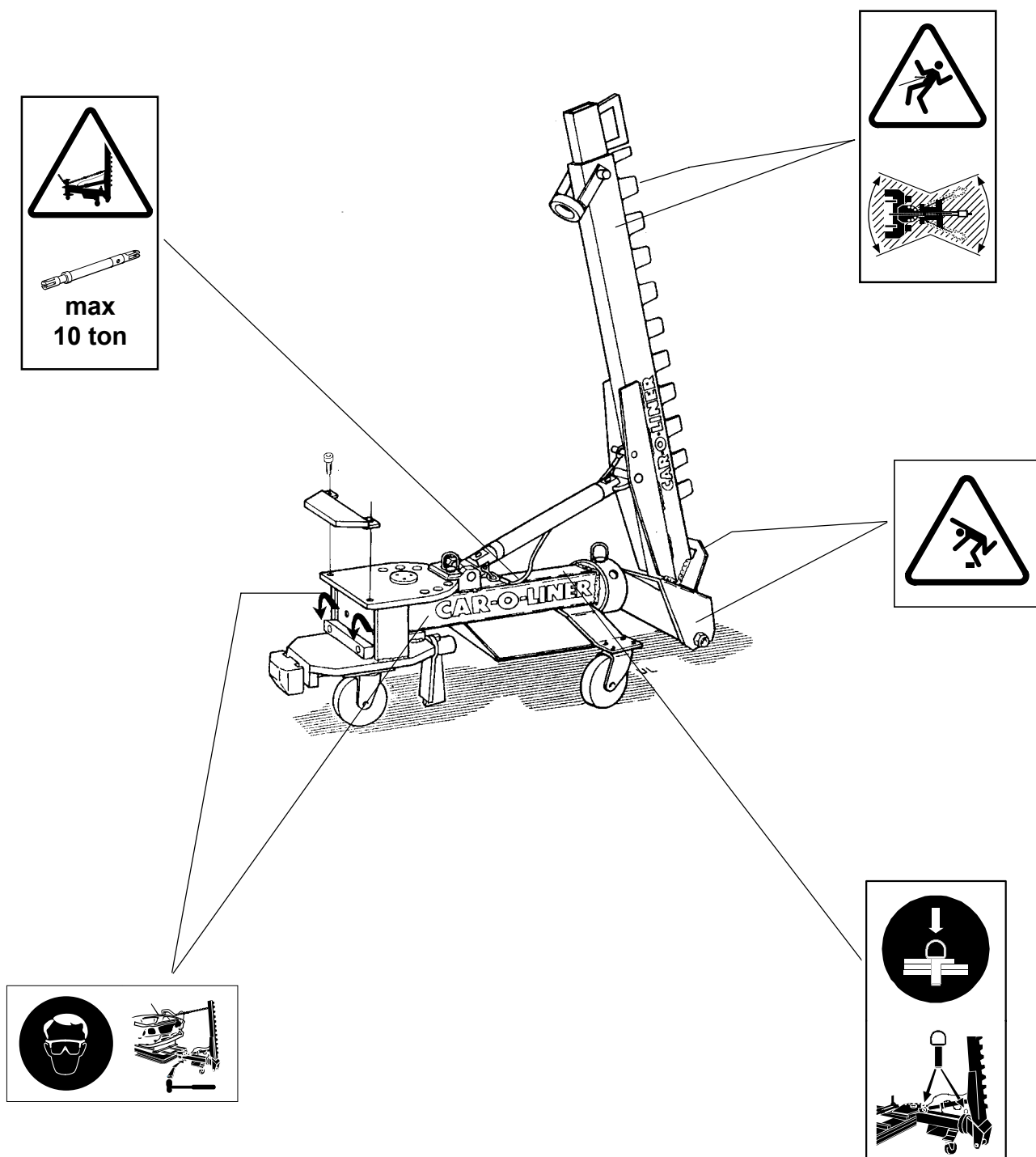
# Safety

D16

CAR-O-LINER

## 4 PLACEMENT OF SAFETY SIGNS

### DRAW ALIGNER D16



# Installation

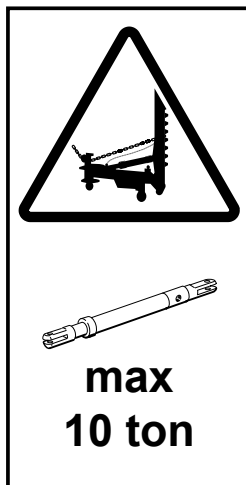
D16

CAR-O-LINER

## 1 FITTING

- 1.1 D16 can be used with BenchRack- and Mark-series. Adaptation to the respective bench frames is accomplished by transposition of parts A and B. The draw aligner is delivered set up for use with Mark series. By loosening and removing A and loosening B, rotating it 90° and bolting it to the lower pair of holes, D16 can be used with BenchRack series. See page C.2.

If D24 (see page C.2) is inserted in the track in the head of the drawbar, D16 can also be used with earlier models MKIII and MKIV.



- 1.2 Fit the hydraulic cylinder in the mounting points on the arm and the body of the draw aligner. Ensure that the spring washers that hold the locking pins are locked and undamaged.

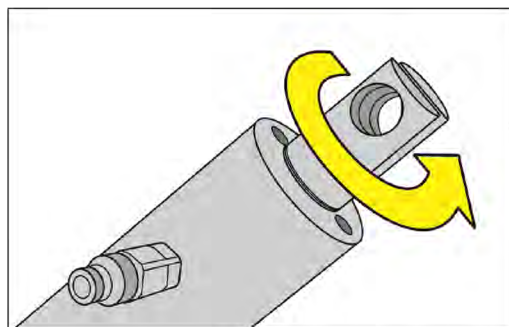
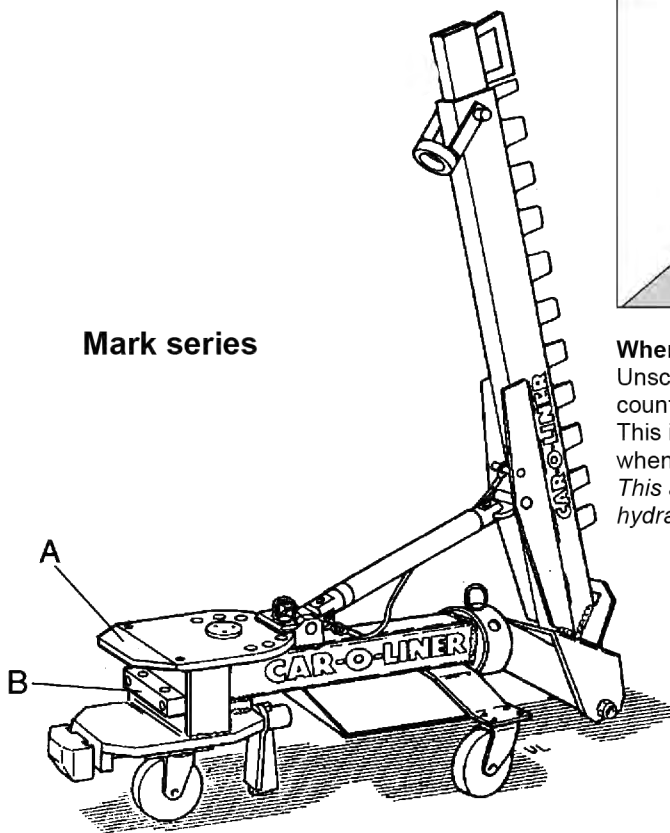
**WARNING!** The draw aligner is meant to be equipped with a hydraulic cylinder with a maximum capacity of 10 tons.



- 1.3 Fit the safety wire (6). See page A.2.

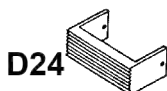
**WARNING!** Make sure that the safety wire is correctly fitted and undamaged.

## Mark series

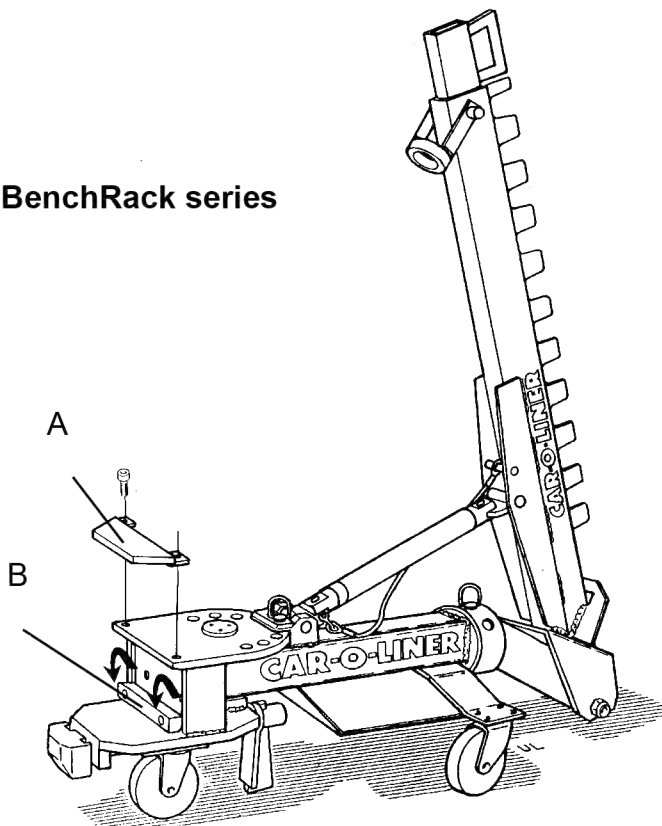


**When installing the hydraulic cylinder to the D16.** Unscrew the cylinder attachment 1 revolution counter clockwise according to the picture above. This is done to allow swiveling of the cylinder when pivoting the draw aligner arm. *This applies only to Enerpac hydraulic cylinders.*

## BenchRack series



D24



# Installation

D16

CAR-O-LINER

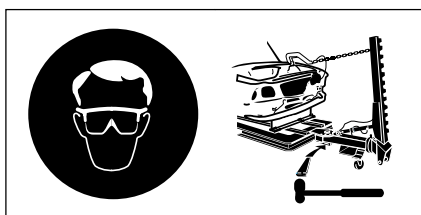
## 2 CONNECTION TO THE BENCH FRAME

See the figures on pages C.4 and C.5

- 2.1 The head of the drawbar must be horizontal. The wedge and safety plate should hang straight down with the drawbar pushed against the safety plate. The supports of the bench frame must be adjusted so that the head of the draw aligner is free when the draw aligner is pushed in toward the bench frame.

**WARNING!** Before moving the draw aligner, always lock the arm in an upright position. Risk for tipping.

- 2.2 Rotate the drawbar 90° by lifting the locking wedge and safety plate. Turn the safety plate back again while holding the wedge in its horizontal position. The drawbar and its head are thus pressed against the inner side of the bench frame and the head of the drawbar engages the steel strip on the inside of the bench.



- 2.3 The draw aligner is secured to the bench frame by driving in the locking wedge with a copper hammer.

**WARNING!** Always use safety glasses when hammering the locking wedge in or out. Risk for splinters.

- 2.4 The draw aligner is detached by performing the preceding steps in reverse order.

**WARNING!** Never release the locking wedge if the bench is not at draw aligner height. Risk for injury.

# Installation

D16

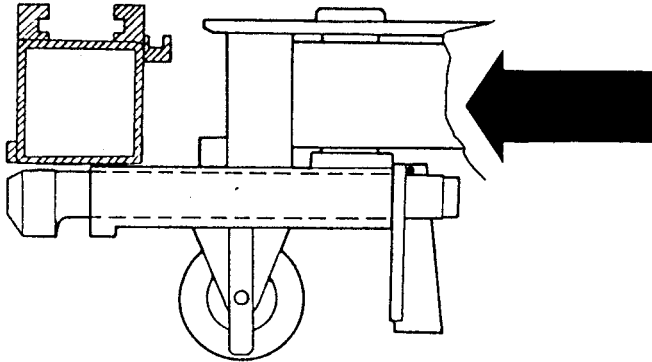
CAR-O-LINER

## 2 CONNECTION TO THE BENCH FRAME (cont'd.)

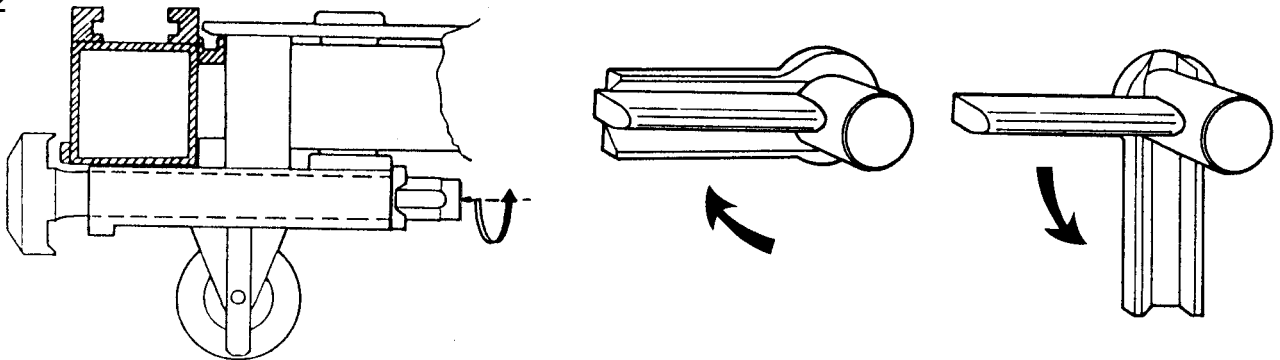
### BenchRack series

**IMPORTANT!** Make sure that the draw aligner is correctly secured to the bench frame.

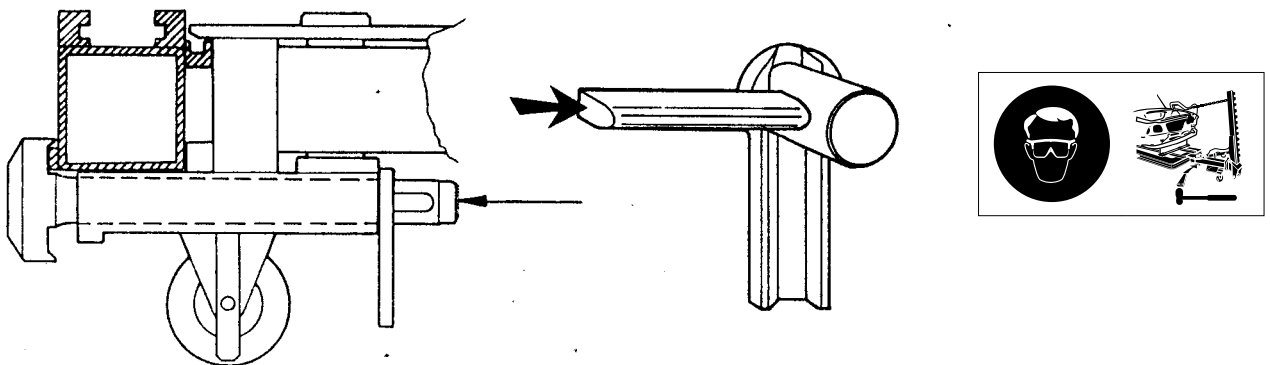
2.1



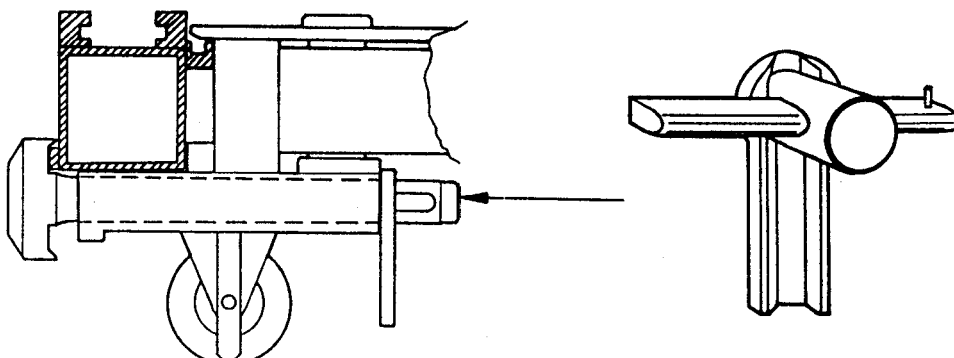
2.2



2.3



2.4



# Installation

D16

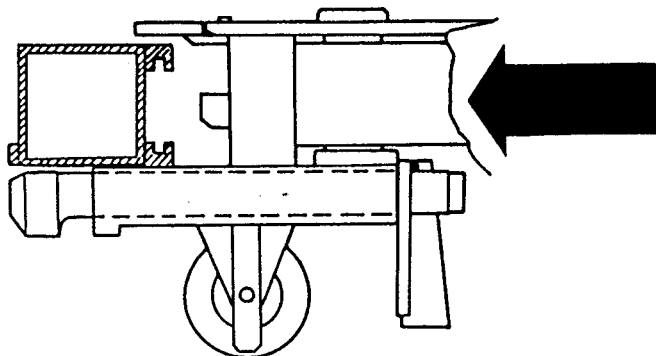
CAR-O-LINER

## 2 CONNECTION TO THE BENCH FRAME (cont'd.)

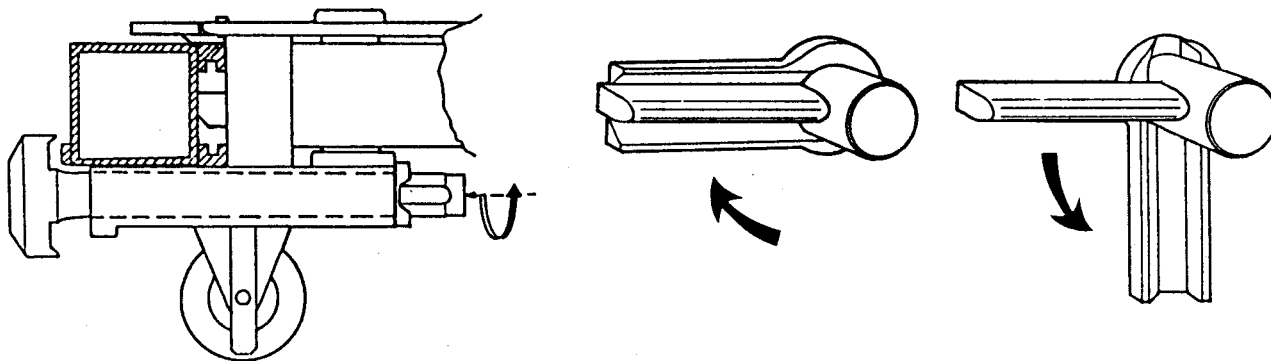
Mark series

**IMPORTANT!** Make sure that the draw aligner is correctly secured to the bench frame.

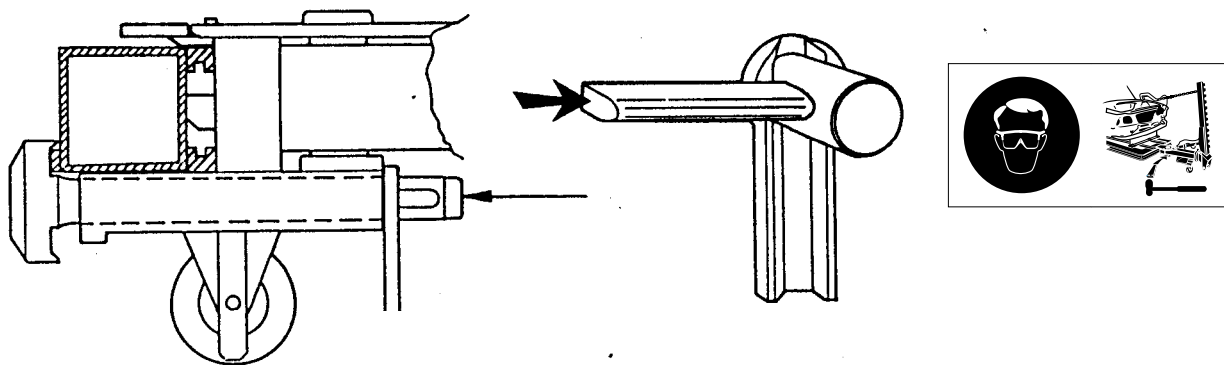
2.1



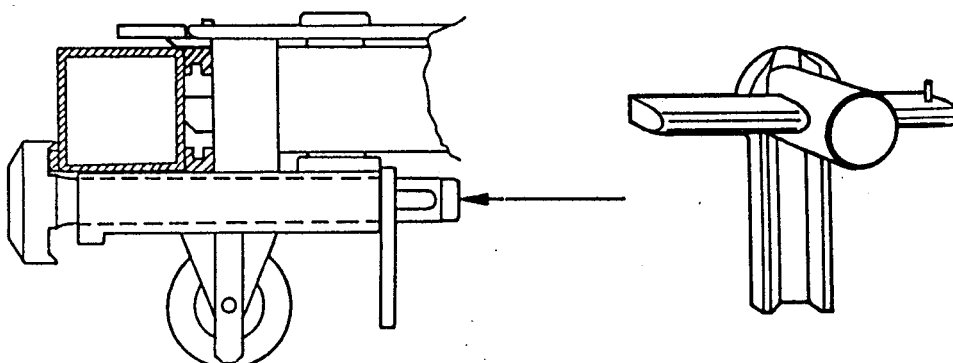
2.2



2.3



2.4





# Safety Devices

D16

CAR-O-LINER

The safety plate under the locking wedge on the drawbar (1) prevents the head of the drawbar from losing its purchase on the steel strip on the inner side of the bench frame when the wedge is hammered out.

**WARNING!** *Never release the locking wedge if the bench is not at draw aligner height. Risk for injury.*

The safety wire between the draw aligner arm and the body prevents the arm from falling too far backwards during movement or if the pull should come loose.

**WARNING!** *Make sure that the safety wire is correctly fitted and undamaged.*

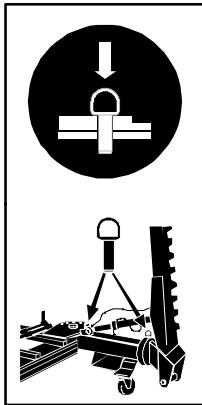
When a pulling chain is delivered from CAR-O-LINER together with the D16, a safety wire is included which is to be fastened between the vehicle and the draw clamp. This prevents accidents if the clamp should lose its grip.

**WARNING!** *Make sure that the safety wire is correctly fitted and undamaged.*

**WARNING!** *Watch out for flying objects during aligning work. Do not stand behind or near the draw aligner during a pull.*



## 1 POSITIONING AND LINKING THE DRAW ALIGNER



**WARNING!** Before moving the draw aligner, always lock the arm in an upright position. Risk for tipping.

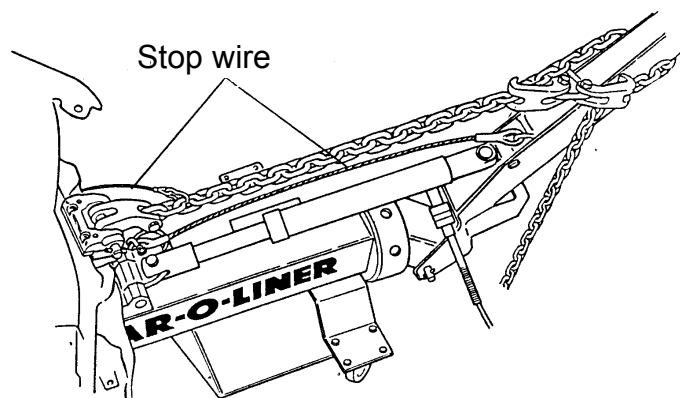
Position the draw aligner based on the impact angle of the damage.

The bench frame must be at a height that is suited to the draw aligner. If, for instance, the floor is uneven, the height of the draw aligner can be adjusted with the support screws on the legs or supports of the aligning bench.

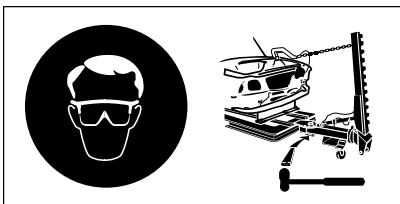
**WARNING!** The locking pegs must be pressed in completely.

Correct positioning of the draw aligner minimizes the number of times it must be moved during the course of the work.

**IMPORTANT!** To avoid damage to the draw aligner, the chain must run as parallel as possible to the hydraulic cylinder.



When a suitable anchoring angle has been determined, secure the draw aligner to the bench frame with the locking wedge (see figures on pages C.4 and C.5).



**WARNING!** Always use safety glasses when hammering the locking wedge in or out. Risk for splinters.

**WARNING!** Never release the locking wedge if the bench is not at draw aligner height. Risk for injury.



## WARNING

**TO AVOID INJURIES, OBSERVE THE FOLLOWING:**

- Make sure that the safety wire between the arm and the body is undamaged and correctly fitted.
- Make sure that the safety wire between the vehicle and the draw clamp is undamaged and correctly fitted.
- Make sure that the draw aligner cylinder is rated at a maximum of 10 tons.
- Make sure that the draw aligner is correctly secured to the bench frame.
- Make sure that the pegs locking vertical and lateral movement are pressed in completely.
- Always use safety glasses when hammering the locking wedge in or out.
- Watch out for flying objects and do not stand behind or near the draw aligner during a pull.
- Never release the locking wedge if the bench is not at draw aligner height.

## 2 PREPARATIONS BEFORE COMMENCING ALIGNMENT

Before using the draw aligner, observe the following:

Clean the area on the vehicle to which the clamp is to be fastened in order to ensure a good grip.

Always use an approved pull chain such as CAR-O-LINER T33 and see that the clamp, hook or plate are in good shape.

Make sure that the hydraulic hose is undamaged. The working pressure is approximately 600 bar. If the hose springs a leak, the oil under high pressure can cause damage.

Make sure that there is no air in the hydraulic system. Bleed the system as follows:

1. Connect the pump hose to the cylinder.
2. Extend the cylinder fully.
3. Hold the pump 1.5 to 2 metres above floor level and release pressure. The built-in spring will force the cylinder back and expel any air from the system.
4. Repeat this procedure once more.

**Never leave the draw aligner unattended when it is under pressure.**

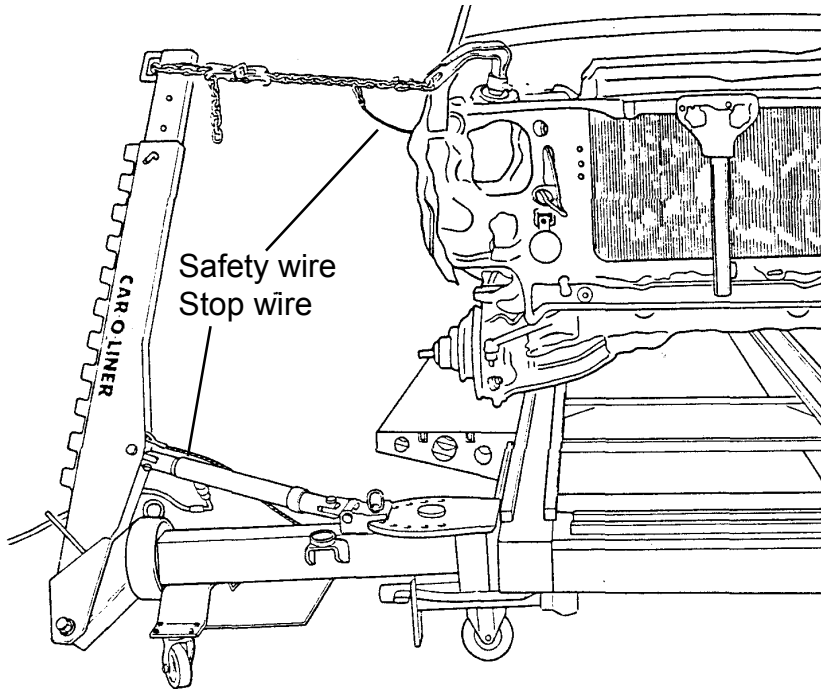
***IMPORTANT!*** When using the draw aligner, remember to move the measuring studs away from the damaged area to avoid damage to the measuring system.

# Operation

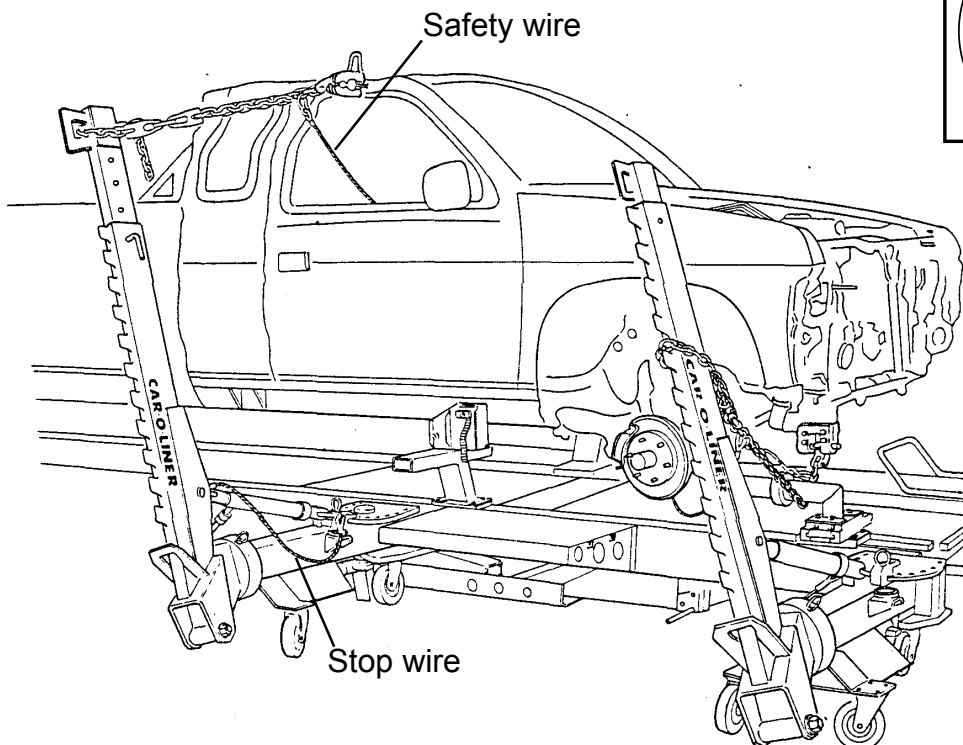
D16

CAR-O-LINER

## 3 EXAMPLES OF TYPICAL PULLS



Pull on the McPherson strut turret



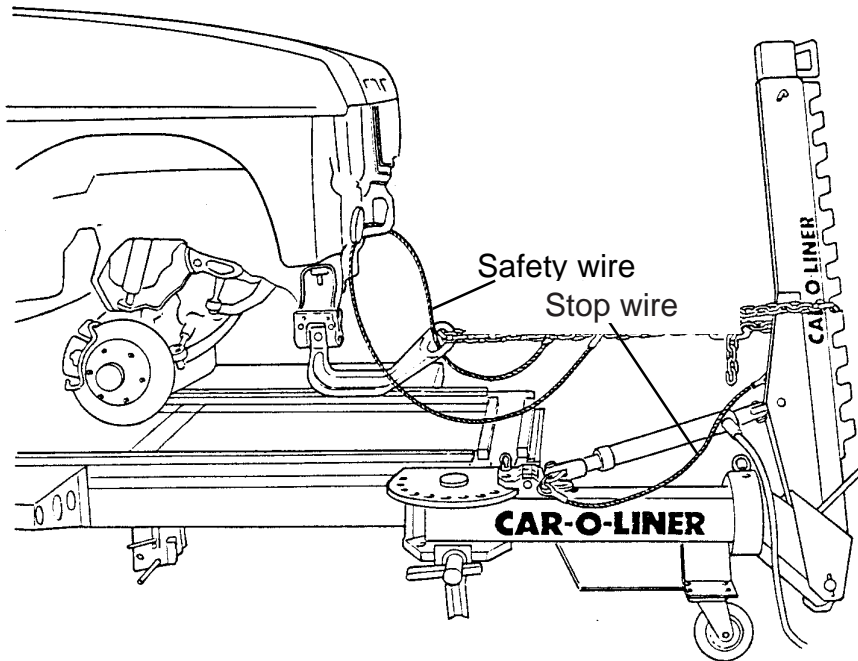
Side pull at roof edge and downward pull on front of car

# Operation

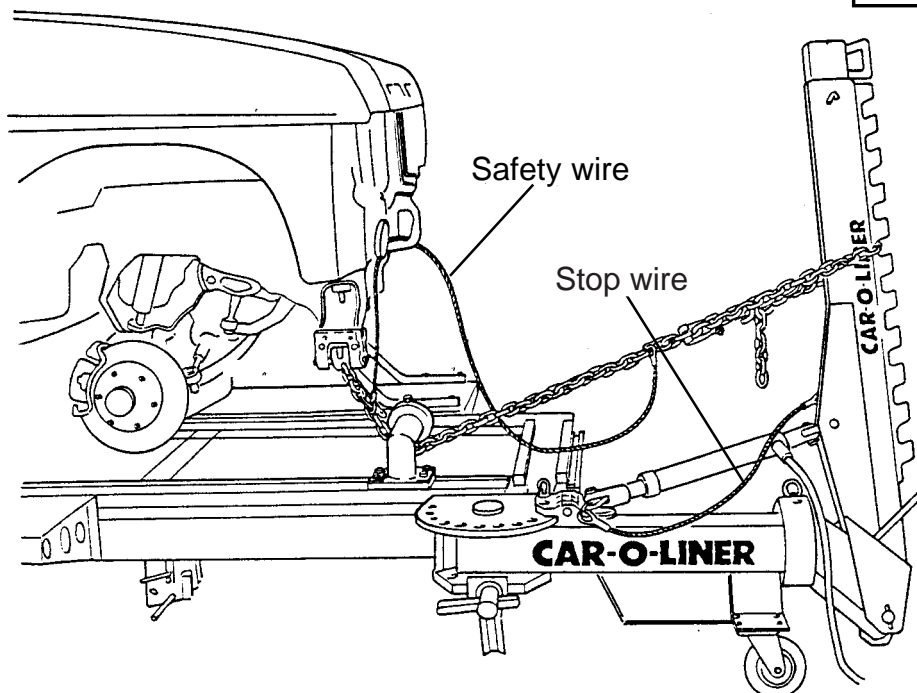
D16

CAR-O-LINER

## 3 EXAMPLES OF TYPICAL PULLS (cont'd.)



Forward pull on a frame member



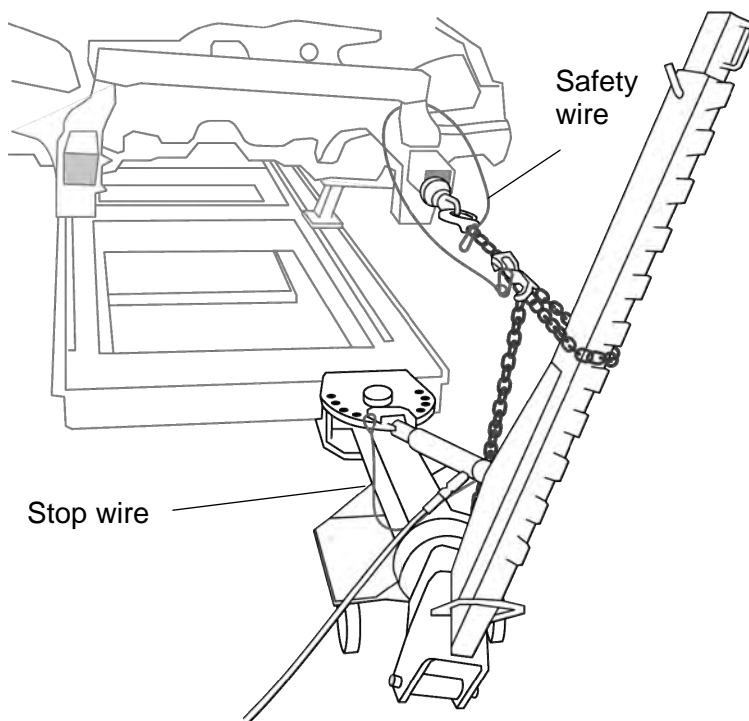
Downward pull on a frame member

# Operation

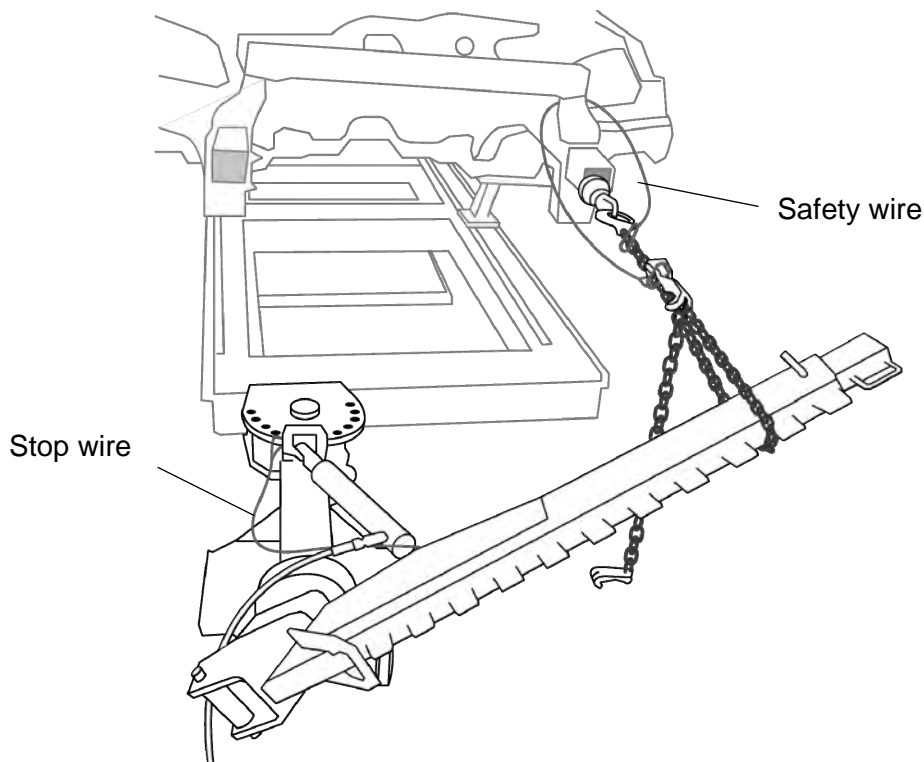
D16

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## 3 EXAMPLES OF TYPICAL PULLS (cont'd.)



Forward pull on a frame member - **recommended**  
See safety, page B.2



Forward pull on a frame member - **NOT recommended**

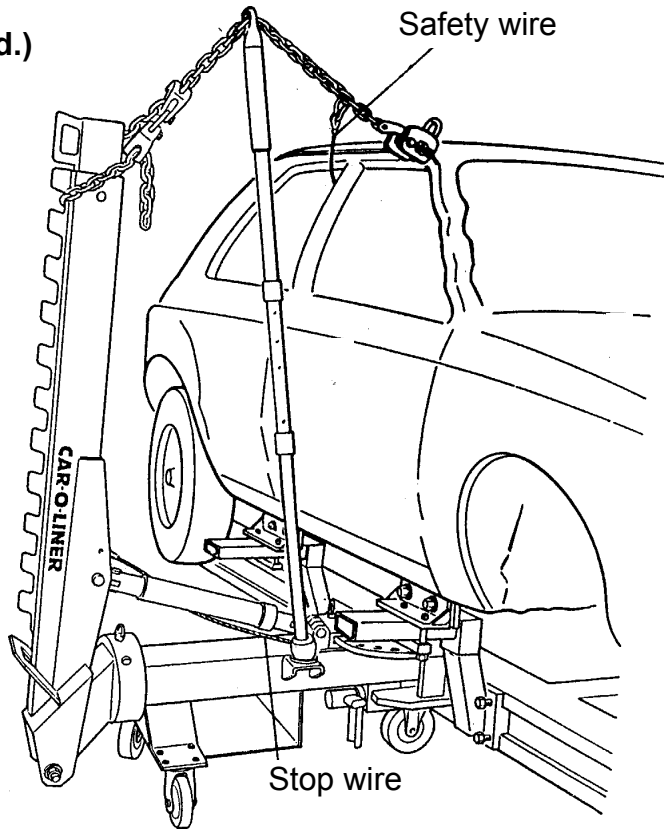
# Operation

D16

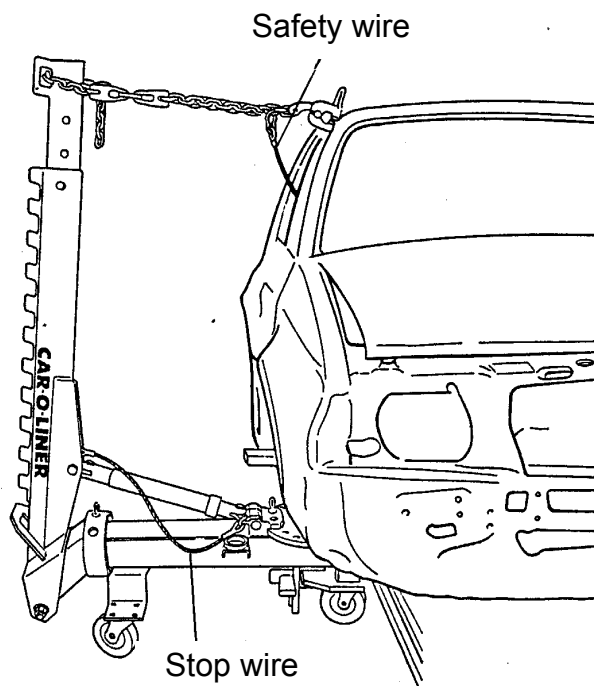
CAR-O-LINER

## 3 EXAMPLES OF TYPICAL PULLS (cont'd.)

Upward pull at the  
roof edge



Side pull at roof edge  
with extended draw  
aligner arm.



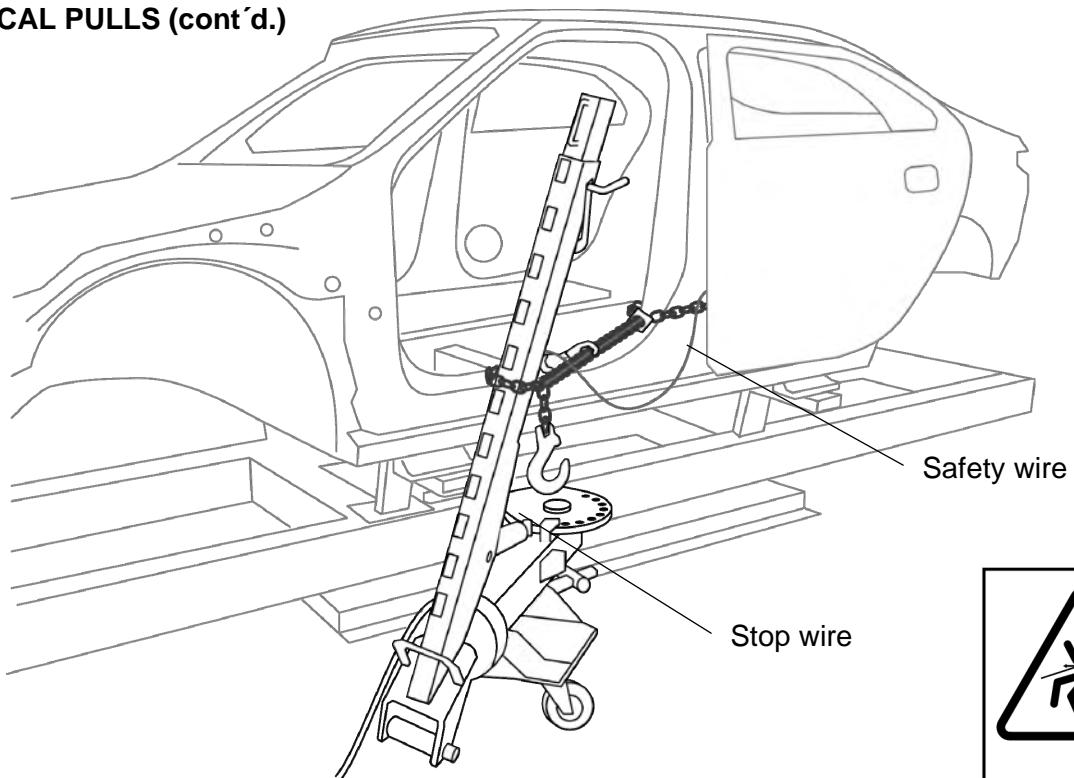


# Operation

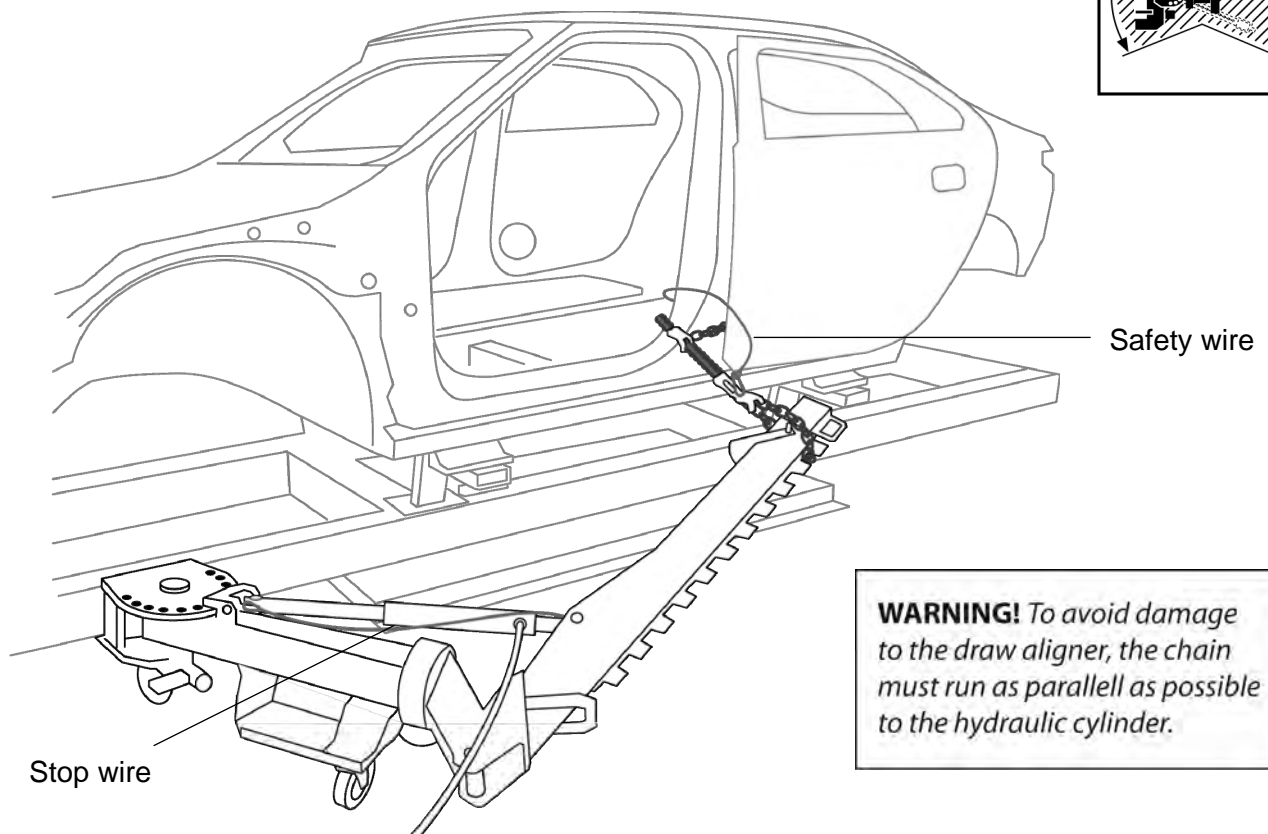
D16

CAR-O-LINER

## 3 EXAMPLES OF TYPICAL PULLS (cont'd.)



B post pull - **recommended**. See safety, page B.2



B post pull - **NOT allowed** (risk for personal injuries and damages to equipment)

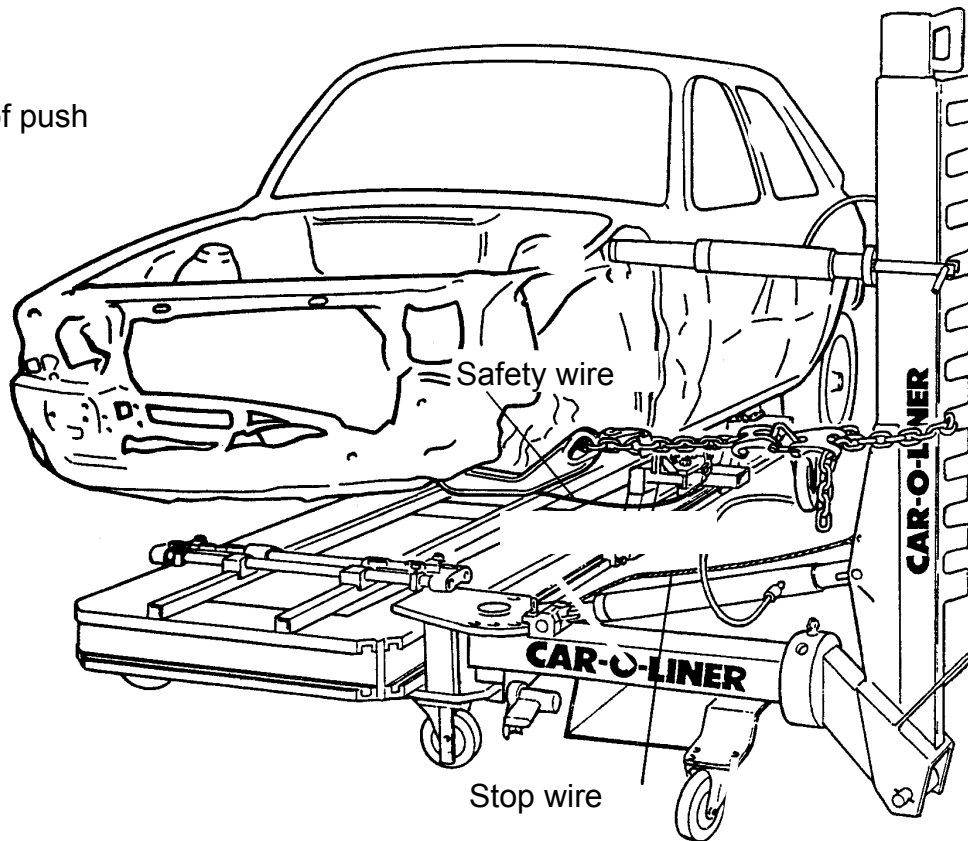
# Operation

D16

CAR-O-LINER

## 3 EXAMPLES OF TYPICAL PULLS (cont'd.)

A combination of push  
and pull



## **4 ADDITIONAL ANCHORING AND HOLDING**

The EVO anchoring and holding system includes attachment clamps and universal mountings which can be used together in a variety of combinations. For further information regarding the EVO system, please see the EVO system manuals.

Measuring points which have been re-aligned, for example the mounting point for the front end to the frame side member, can be fixed in position by the use of the EVO system.

Alignment can then be carried out on other parts of the body without disturbing the position of this point.

Parts of the EVO system can also be used in conjunction with the standard chassis clamps to provide extra anchoring of the vehicle to the bench.

When a vehicle with a chassis frame is to be set up on the bench and chassis clamp B248 is used, always use parts from the EVO system to provide extra anchoring.

The EVO system should be stored on WSS Tool Board which is fitted with hooks specially arranged for this equipment.

## 1 GENERAL

The draw aligner and its component parts are subject to large amounts of loading and strain and therefore need regular inspection and replacement of any worn parts. Inspection shall take place each time the draw aligner is put to use.

For the hydraulic components, please see the manufacturer's instructions.

## 2 HYDRAULICS

Check that the piston rod is undamaged and that there is no leakage.

Check that the locking pins at the cylinder attachment points are undamaged and that the locking washers are in place and undamaged. Replace where necessary.

Check that the hose couplings are undamaged and do not leak. Replace where necessary.

## 3 MECHANICAL

Check that all bolts and screws are tight.

Check that the locking pegs are undamaged and that it is possible to press them completely into the holes. Replace the pegs and/or clean out the holes where necessary.

Check the locking wedge for damage, a "beard" or the like. Grind off any "beard".

# Dismantling / salvage

D16

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CAR-O-LINER

## **MECHANICAL COMPONENTS**

If the components in the draw aligner are to be dismantled or scrapped, the oil in the cylinder, hose and pump is to be drained off.

The used oil shall be sent for destruction or recovery.

Electrical components, plastic hoses, steel and aluminum shall be separated for material recovery.

Net weight \_\_\_\_\_ 150 Kg

Maximum cylinder pressure \_\_\_\_ 10 ton



Car-O-Liner® is together with Josam part of the Alignment Systems Group. Car-O-Liner developed collision repairs systems for cars and light trucks, while Josam is focusing on heavy-duty vehicles. The Alignment Systems Head Quarter and Car-O-Liner Head Quarter are located in Gothenburg, Sweden. Our main factory is based Kungsör, Sweden. Car-O-Liner runs operations of its own in Sweden, Norway, USA, UK, France, Germany and China and sells through local distributors in more than 70 countries.

Car-O-Liner products are well known for their high quality, advanced technology and ergonomic design. According to our customers, Car-O-Liner's collision repair equipment is the best made, the easiest to learn, the simplest to use and the most productive. With Car-O-Liner equipment in your shop, your customers - the vehicle owners and insurance companies - will experience safety and complete satisfaction from your work. Car-O-Liner has everything you need to reduce cycle times and increase profits.

**CAR-O-LINER®**