



SP 3400 SERIES

Four-Point

MAINTENANCE MANUAL



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Notes:



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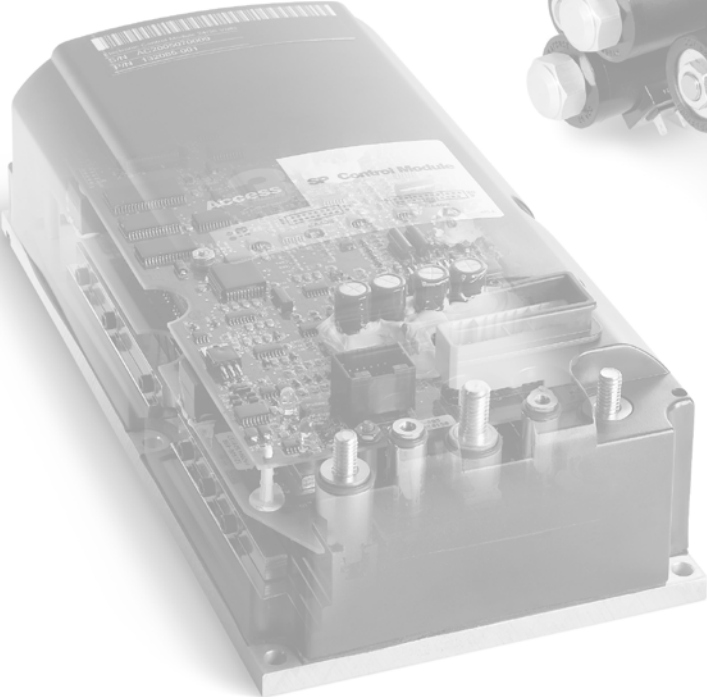
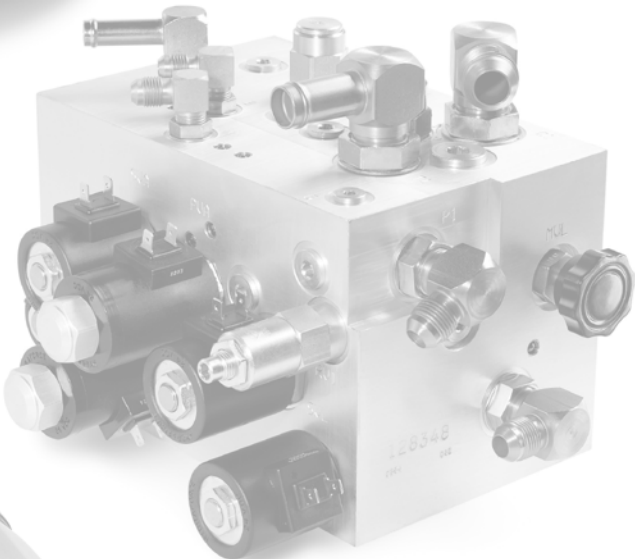
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SAFETY



Notes:

Symbols Used in the Manual

Safety Symbols

To provide guidance and clearly identify potential hazard points, we have used graphic illustrations in the manual:



DANGER

This symbol indicates a danger to life.

You or other people could be seriously or fatally injured if you fail to comply with this safety instruction.



WARNING

This symbol represents risk of injury and/or potentially significant material damage.

You or other people could be seriously injured and/or significant material damage could occur if you fail to comply with this safety instruction.



CAUTION

This symbol represents potential minor injuries and/or potential minor material damage.

You or other people could be slightly injured and/or minor material damage could occur if you fail to comply with this safety instruction.

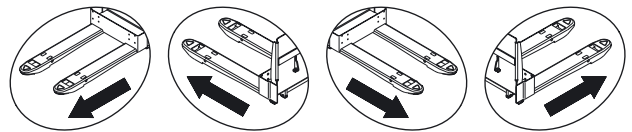
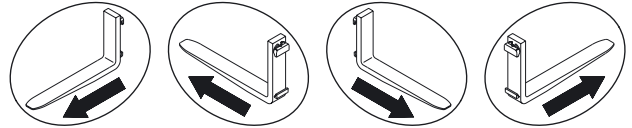
NOTE

This symbol is used with additional information and instructions.

General Symbols

Fork direction

This symbols are used to show the direction of view in a figure. The direction of the forks is used as reference:



General Safety Instructions

Maintenance and Repair Instructions



DANGER

Observe the safety instructions in the maintenance manual and the truck operator manual.

Failure to do so could result in serious or even fatal injuries to maintenance and other personnel.

Motorised trucks can become hazardous if maintenance and servicing work are neglected. For this reason maintenance and inspections must be performed at sufficiently short intervals. There must be suitably trained personnel and proper guidelines at your place of work.

Maintenance and Repair

- Always carry out work in accordance with the test and maintenance schedule enclosed in these maintenance instructions and any applicable service bulletins.
- Only qualified and authorized personnel may carry out work on the truck.
- Keep fire protection equipment at hand and do not use a naked flame to check fluid levels or to test for leaks.
- Use groundwater neutral, non-flammable solvents for cleaning. Always perform cleaning work over an oil separator. Protect the electrical system against damp.
- Keep the work place and battery charging station clean, dry and well ventilated.
- Do not allow oils to penetrate the ground or the drain system. Used oil must be recycled correctly. Oil filters and dehumidifying inserts must be treated as special waste. Observe the local authority regulations.
- Immediately neutralize and thoroughly rinse any spilled battery fluid.
- Keep the truck clean. This will facilitate tracing loose or faulty components.

- Maintain the legibility of the data capacity plate and data plate, warning and instruction decals.
- Truck modifications and additions may only be performed with Crown's prior written approval.
- The reliability, safety and suitability of Crown trucks can only be ensured by using original Crown parts.

Before Parking the Truck

- Brake until the truck comes to rest.
- Lower the fork carriage fully.
- Apply the parking brake.
- Switch off the truck and remove the key.
- When parking on a slope or incline always chock all wheels.

Before Working on the Truck

- Jack up the truck so that the drive wheel is clear of the ground. Apply the Emergency Disconnect and disconnect the battery.
- Prevent the truck from rolling away and lowering.
- When working on the mast, fork carriage or lifting mast always apply a chock to prevent accidental lowering.
- Allow sufficient room for manoeuvre when testing the truck, to avoid endangering yourself and other people.

Before Starting the Truck

- Test the safety mechanisms.
- Get into the travel position.
- Test the lifting mechanism, travel direction switch, speed control, steering, warning mechanism and brakes.

Warning and Instruction Decals on the Truck

In the course of periodic maintenance work, check that the warning and instruction decals on the truck are complete and legible.

- Clean any dirty decals.
- Replace any faulty or missing decals.

A description and the location of the warning and instruction decals used on the truck are given in chapter 10.9 of the parts manual.

Control of Hazardous Energy

In the interest of safety Crown has developed guidelines for proper energy control when performing service and maintenance on this truck.

Before performing any service or maintenance, review the appropriate sections in this service manual for additional procedures to be followed.

In addition, Crown recommends that all mechanics wear appropriate protective items, such as safety glasses, work gloves, and steel toed shoes, whenever performing service or maintenance work on Crown equipment.

Battery



WARNING

Only qualified and experienced personnel should perform maintenance and repair on batteries.

Follow the battery's and charger manufacturer's instructions concerning practices and procedures for charging, maintenance and repair.



DANGER

Make sure that the battery used meets the weight, size and voltage requirements of the truck (refer to data plate). Never operate the truck with an undersized battery.

- Do not lay metallic or conductive objects on the battery. Arcing will result.
- Do not allow dirt, cleaning solution or other foreign materials to enter cells. Impurities in electrolyte have a neutralising effect, reducing the available charge.
- Make certain the charger being used matches the voltage and amperage of the truck battery. This voltage is listed on the truck data plate.
- Before disconnecting or connecting batteries to a charger, make sure the charger is "OFF". If an attempt is made to do this while the charger is "ON", serious injury to you and damage to the battery and charger could result.

Safety Rules

- Wear protective clothing such as a rubber apron, gloves, boots and a full-face shield when performing any maintenance on batteries.
- Do not allow electrolyte to come in contact with eyes, skin, clothing or floor. If electrolyte comes in contact with eyes, flush immediately and thoroughly with clean water. Obtain medical attention immediately.
- Should electrolyte be spilled on skin, rinse promptly with clean water and wash with soap. A baking soda solution (120 g to 1 L of water) will neutralise acid spilled on clothing, the floor or any other surface. Apply solution until bubbling stops and rinse with clean water.
- Keep vent plugs firmly in place at all times except when adding water or taking hydrometer readings.
- Do not bring any type of flame, spark, etc., near the battery. Gas formed while the battery is charging is highly explosive. This gas remains in the cells long after charging has stopped.

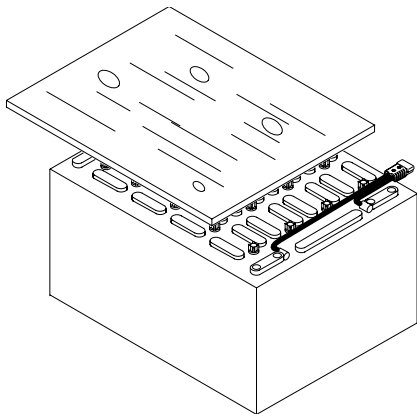
Battery Removal



WARNING

Never move battery partially from truck without roller stand in place.

- When removing the battery, move truck to area intended for battery care. Floor must be level.
- Turn key switch or toggle switch to “off” position and remove key.
- Disconnect battery and lockout or tagout truck as described in Battery - Lockout/Tagout in this section.
- Lower load engaging means completely. If battery is removed with load engaging means raised, use hoist attached to mast to provide tipover protection.
- Do not allow any metallic object to come into contact with the top of the battery cells. This may cause a short circuit when removing and transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal.



8251

Battery Installation



WARNING

Make sure that the battery used meets the weight, size and voltage requirements of the truck (refer to data plate). NEVER operate truck with an undersized battery.

- When installing the battery, move truck to area intended for battery care. Floor must be level.
- Turn key switch or toggle switch to “off” position and remove key.
- Lockout or tagout truck as described in Battery - Lockout/Tagout in this section.
- If battery was removed with load engaging means raised, use hoist attached to mast to provide tipover protection.
- Do not allow any metallic object to come in contact with the top of the battery cells. This may cause a short circuit when transporting or installing the battery. Use an insulator (such as plywood) to cover the top of the battery before and during installation.

SAFETY

Control of Hazardous Energy



Lockout - Tagout

Always turn key switch to "off", remove key and apply tag to steering wheel or twist grip with cable tie, warning others that the truck is being serviced (see Fig. 8262).



8262

When maintenance is to be performed and the battery will be left in the truck:

1. Disconnect battery.
2. Remove the main power fuses.
3. Install a commercially available lockout device on the battery connector.

When maintenance is to be performed and the battery is removed from the truck:

1. Disconnect battery.
2. Remove the main power fuses.
3. Install a lockout device on the truck's battery connector if possible. If a lockout device is not applicable, then install a tag with a cable tie on the trucks battery connector warning that the truck is not available for operation.

Brake

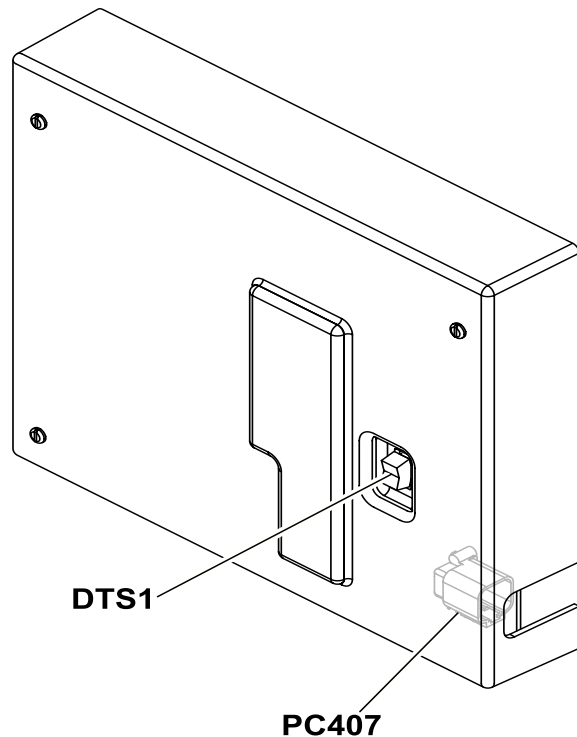


WARNING

Extreme care must be taken when using the Drive/Tow switch to release the brakes!

- The truck will not have brakes available for stopping.
- The truck will have no traction control.
- The power steering system will not work.

Brakes will only be applied when DTS1 is moved from the Tow to the Drive position.



12367-01

The brakes can be released through the use of the Drive/Tow switch (DTS1) during a maintenance situation:

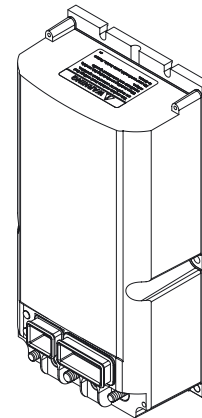
- Tagout the truck (see Lockout - Tagout).
- Chock wheels or make sure truck is secured by some means to keep it from rolling away.
- When towing the truck make sure all operators are informed of the truck's lack of braking.
- Move switch DTS1 from the Drive position to the Tow position.

- Insert brake harness, PC407, to distribution panel.
- Move truck to area intended for maintenance.
- Move DTS1 from the Tow to the Drive position. Disconnect battery.
- Disconnect brake harness from distribution panel and connect to original connection, CA407.

Capacitance

Whenever performing maintenance which may permit contact with the bus bars and associated power cables, discharge the capacitors in the Access 3 module.

- Move truck to a secure non traffic maintenance area with a level floor.
- Lockout or tagout truck (see page 8).
- Battery must be disconnected: turn and hold the key switch to the "start" position for 30 seconds.
- Turn key switch to "off", remove key.



Access 3

12368-01

SAFETY

Control of Hazardous Energy



Hydraulic System



WARNING

High pressure hydraulic system!

Risk of injury from escaping hydraulic oil.

To avoid accidents:

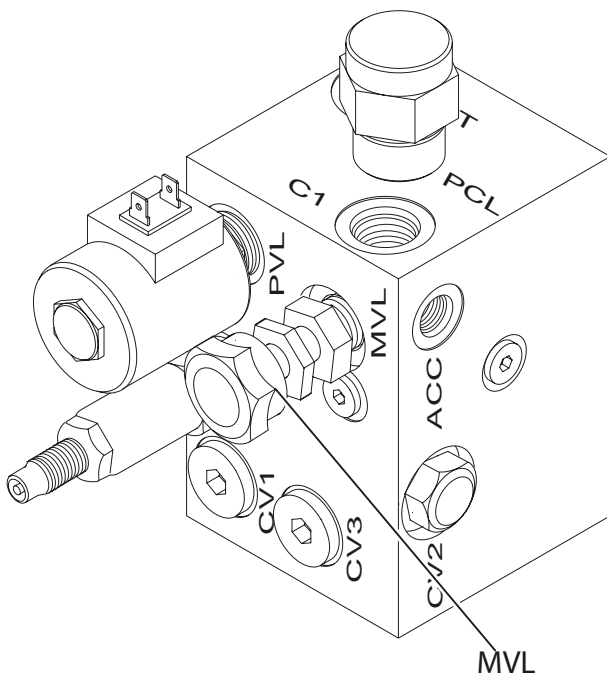
- *Depressurise the hydraulic system before opening any sections of it.*
- *Tighten all connections before pressurising the system.*
- *Keep hands and body away from pressurized fluid.*
- *Whenever a high pressure fluid enters the skin it must be treated as a medical emergency.*

Seek medical assistance even if the skin appears normal at first.

appropriate height as described in Mast of this section.

- Lockout or tagout truck as described in Battery - Lockout/Tagout in this section.
- Open power unit doors and locate the lift manifold.
- Open the manual lower valve to remove hydraulic pressure.

Depressurising the hydraulic system



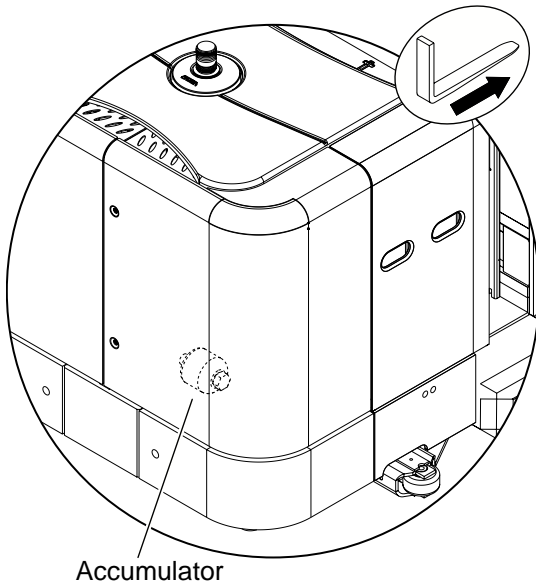
12369-EU

Move truck to a secure non traffic maintenance area with a level floor.

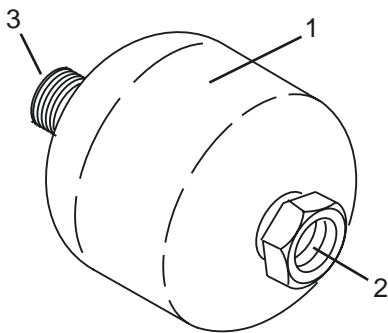
- Remove load from forks if present.
- Completely lower load engaging means (mast) or, if required for maintenance, block mast sections at

Accumulator

The accumulator (hydraulic system shock absorber) contains a charge of nitrogen. Do not tamper with the gas valve (3, Abb. 8266-EU) on the accumulator (1) in an attempt to reduce the amount of this charge. Use accumulator charging equipment and procedures as described in chapter *Hydraulic System* of this manual.



14976



8266-EU

- 1 Accumulator
- 2 Hydraulic Line Connection
- 3 Gas Valve

Lifting and Blocking

Required tools

- Hydraulic Jack (Crown part number: 12259)
 - Capacity 3 620 kg
 - Minimum collapsed height: 60 mm
 - Maximum raised height: 400 mm
- Jack Stand
 - Capacity 4 500 kg. Commercially available.
- Appropriately sized hard wood blocks and wedges.

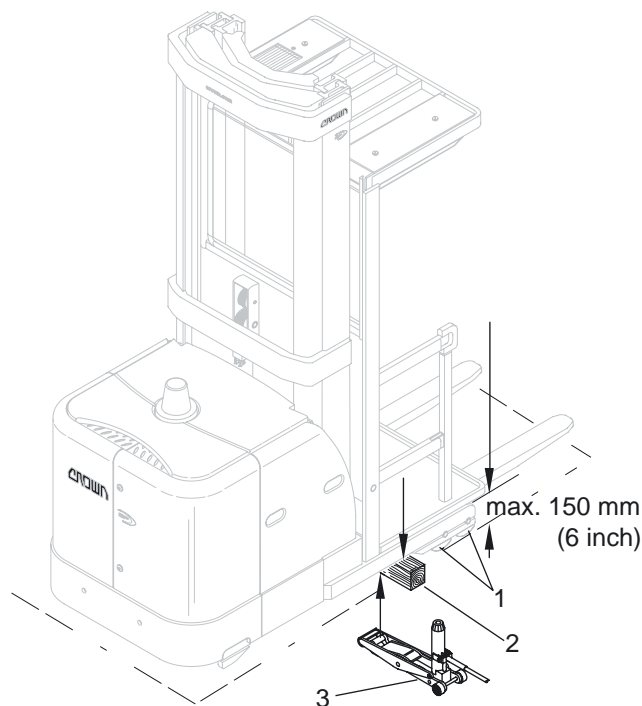
Raising the Side



DANGER

Risk of tipover!

Truck stability decreases dramatically if load wheels are raised more than 13 mm.



10576-EU

- No load on forks.
- Raise the platform to max. 150 mm from floor (see Fig. 10576-EU).
- Lockout or tagout truck as described in Battery - Lockout/Tagout in this section (see page 8).
- Attach a sling and an overhead lifting device to all cross members of the mast to prevent the truck from accidental tipping over.
- Place a wedge in front of the load wheel remaining on the floor.
- Place a jack (3, Abb. 10576-EU) under the truck and raise the truck. Do not exceed 13 mm (distance from floor to load wheels (1)).
- Place hard wood block(s) under the frame and relieve the jack.

- Move truck to a secure, traffic-free maintenance area with a level floor.

Raising the Drive Wheel



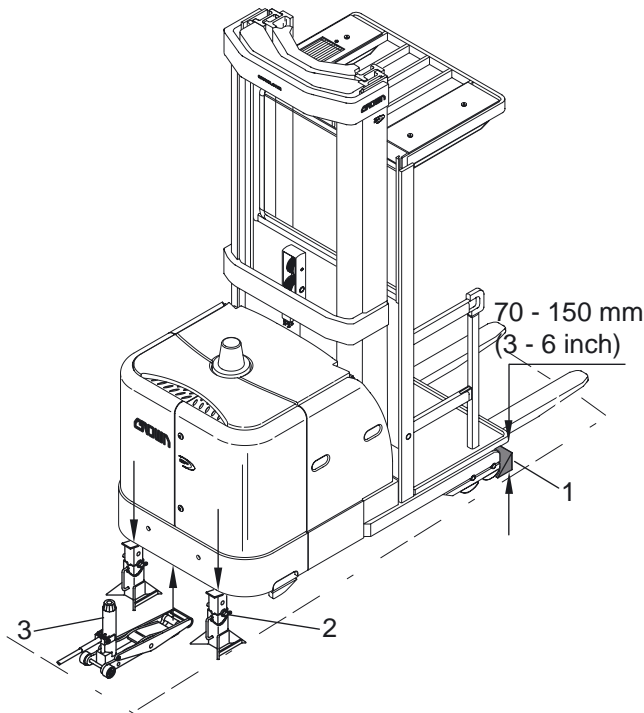
Risk of tipover!

Attach sling and overhead lifting device to all cross members of the mast to prevent truck from tipping over when raising the side of the truck.



Before raising the truck verify that the jack does not interfere with the wire guidance sensors!

- Place a jack (3, Fig. 10577-EU) under the truck skirt and raise the truck until the jack stands fit under the skirt.
- Relieve the jack.



10577-EU

- Move truck to a secure, traffic-free maintenance area with a level floor.
- No load on forks.
- Lockout or tagout truck as described in Battery - Lockout/Tagout in this section (see page 8).
- Attach a sling and an overhead lifting device to all cross members of the mast to prevent the truck from accidental tipping over.
- Place wedges in front of the load wheels to prevent truck from moving.
- Raise the platform to min. 70 mm and max.150 mm from floor (see Fig. 10577-EU).
- Set height of the two jack stands (2, Fig. 10577-EU) as required but do not exceed 400 mm

SAFETY

Control of Hazardous Energy



Blocking Mast Stages

7. Lockout or tagout truck (see page 8).

NOTE

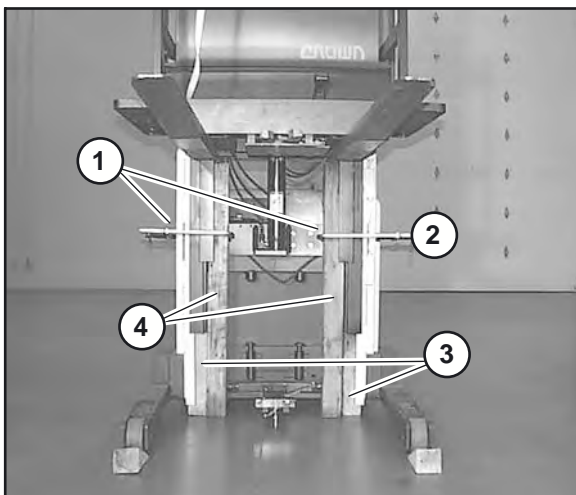
Use 100 mm x 100 mm or larger, suitably long hardwood blocks to support mast channels. Block both mast rails of each stage to maintain truck stability. Remove any carriage mounted accessory (e.g. roll loader, etc.) before blocking masts. These accessories add significant weight to the mast.

1. Move truck to a secure traffic-free maintenance area with a level floor.
2. Chock truck wheels (see page 12).

NOTE

Do not block the first stage mast if work is to be carried out at the main frame base. In this case position blocks under the platform only as described in step 4.

3. Raise forks. Position suitably long blocks (3, Fig. 8357-1-EU) under first stage mast. Using clamps (1, Figure 8357-1-EU), secure blocks to mast channel.



8357-01-EU

4. Using the manual lowering valve (MVL), lower platform and position suitably long blocks (4, Figure 8357-1-EU) under platform frame in mast channels.
5. Using clamps (1, Figure 8357-1-EU), secure blocks to mast channel or first stage block.
6. Continue to lower platform until platform frame rests on blocks.

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