SC 5300 SERIES
MAINTENANCE MANUAL

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INTRODUCTION

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Important Information

This maintenance manual applies to the following models of the SC 5300 Series trucks:

SC 5310-1.3
SC 5320-1.3
SC 5320-1.6
SC 5340-1.4
SC 5340-1.8
SC 5360-1.8
SC 5360-2.0

Ordering spare parts

To order spare parts, use the parts manual supplied separately. Always quote the following numbers when ordering spare parts:

- Truck data number
- Serial number

These numbers can be found on the truck data plate. For details of the truck's technical specifications refer to the *Technical Specifications* chapter in the operator manual.

Note: Always use original Crown spare parts.

Ordering documentation

Parts manuals, operator manuals, specification sheets etc. can be obtained from:

Crown Gabelstapler GmbH & Co. KG
Moosacher Str. 52
80809 Munich
Germany

Tel.: +49 (0)89 / 93 002 -0
Fax: +49 (0)89 / 93 002 -175 or 133
www.crown.com

Manual structure

The manual is divided into the following sections:

Section
Index
Safety
Inspection and Lubrication
Componentry
Hydraulic
Drive Unit
Electrical
Brake
Steering
Lifting Mechanism
Cylinders
Glossary
Wiring Diagrams
Hydraulic Schematic

Truck modifications and additions

WARNING

Fatal accidents can be caused by modifying the original condition of the truck.
Changes to the original condition of the truck when delivered can lead to fatal accidents.

➢ *Any necessary changes to the original condition of the truck must be checked and approved in writing by Crown Gabelstapler GmbH & Co. KG prior to being made.*

- Modifications or additions to the truck may only be performed with Crown's prior written approval. In such cases the data plate must be changed if necessary.
- If at a later time Crown is no longer in business or is not operating in your country and there is no successor in the interest to the business, modifications and alterations may only be performed if the following conditions are met:

- Design, test(s) and implementation to be carried out only by an expert in industrial trucks and their safety
- Permanent records of the design, test(s) and implementation to be maintained
- Modifications must be incorporated into the truck labelling and documentation (operator, service and parts manuals)
- A permanent and readily visible label to be affixed to the truck stating the manner in which the truck has been modified or altered, the date and name and address of the organisation responsible

Service personnel qualification

To maintain the safety and functionality of the truck, maintenance and repair work must only be performed by service engineers who have been authorised by Crown.

Contact Crown if you wish to have your engineers trained.

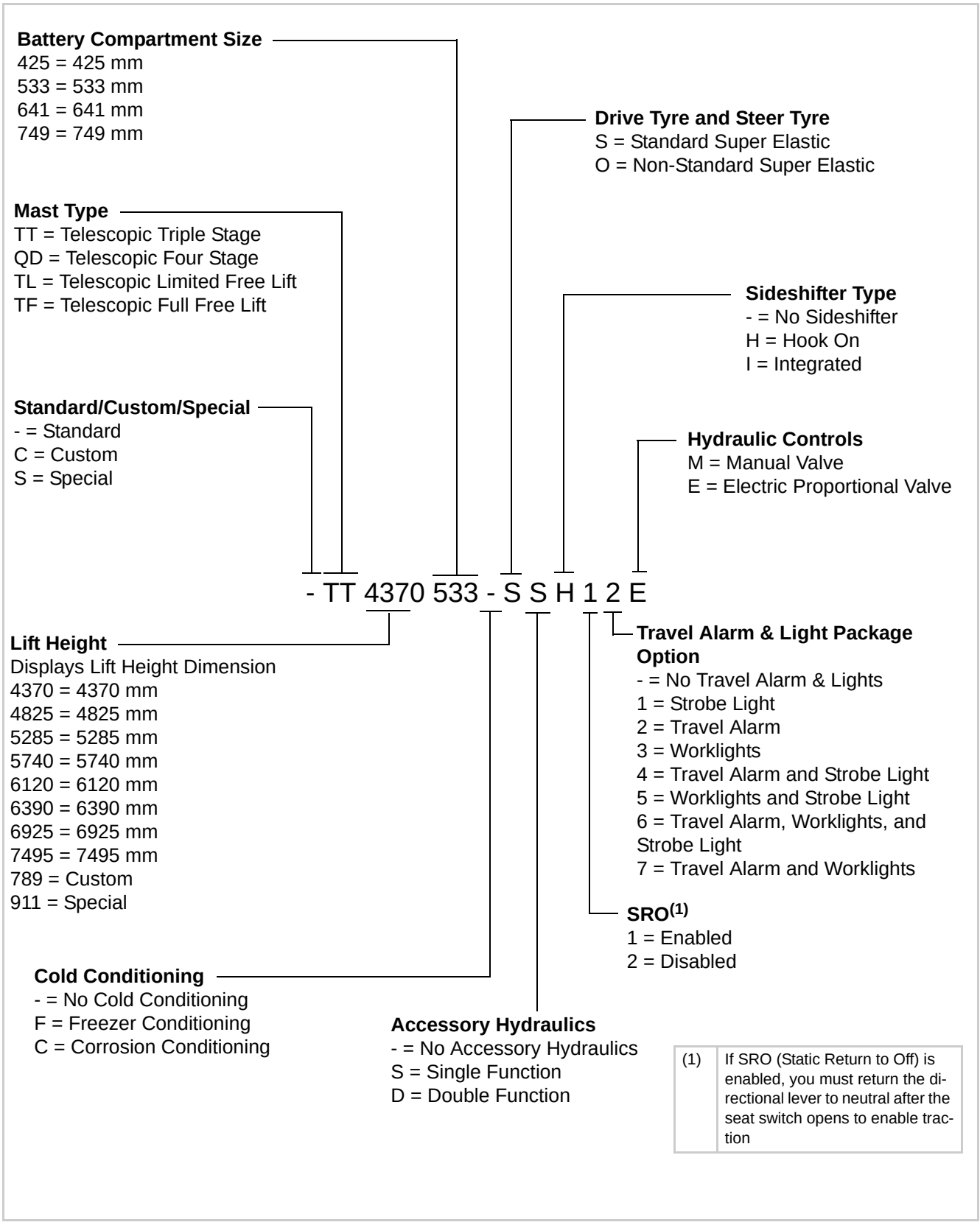
Details of routine inspection and maintenance work to be performed by the customer can be found in the *Maintenance and Safety Inspection* chapter of the operator manual.

Truck Data Number

The truck data number is located on the data plate.

It contains important information concerning the truck's features at the time of delivery.

The truck data number given in the example on the next page. shows a standard truck with a TT mast and 4370 mm of lift height. The battery compartment size is 533 mm, cold conditioning is not an option and the drive tyre is standard super elastic. The truck has a single hydraulic accessory that is a hook on type sideshifter. SRO is enabled. The truck has a travel alarm and an electric proportional valve (fingertip controls).



(1)	If SRO (Static Return to Off) is enabled, you must return the directional lever to neutral after the seat switch opens to enable traction

Notes:

SAFETY

Notes:

General Maintenance Instructions

WARNING

To prevent serious risk of injury to yourself and others observe the following safety instructions.

Powered industrial trucks may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, trained personnel and procedures should be provided.

Maintenance and inspection shall be performed in conformance with the following practices:

1. A scheduled planned maintenance, lubrication, and inspection system should be followed.
2. Only qualified and authorised personnel shall be permitted to maintain, repair, adjust and inspect truck.
3. Before leaving the truck—
   - Stop truck.
   - Fully lower the load handler.
   - Place control handle in neutral.
   - Apply the parking brake.
   - Turn off power (power disconnect).
   - Remove key.
   - Block the wheels if truck is on an incline.
4. Before working on truck—
   - Raise drive wheel free of floor or disconnect power sources.
   - Use chocks or other positive positioning devices.
   - Block load handler, inter masts, or chassis before working under them.
   - Operation to check performance of truck or attachments shall be conducted in an authorised safe clearance area.
5. Before starting to operate truck—
   - Be in operating position.
   - Apply brake.
   - Place control handle in neutral.
   - Before operating truck, check functions of lift systems, control handle, speed control, steering, warning devices, brakes and any attachments if any used.
6. Avoid fire hazards and have fire protection equipment present. Do not use an open flame to check level, or for leakage of electrolyte and fluids or oil. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
7. Keep shop well ventilated, clean and dry.
8. Brakes, steering mechanisms, control mechanisms, lift overload devices, guards, and safety devices shall be inspected regularly and maintained in a safe operating condition.
9. Capacity, operation and maintenance instruction plates or decals shall be maintained in legible condition.
10. All parts of lift mechanisms shall be inspected to maintain them in safe operating condition.
11. All hydraulic systems shall be regularly inspected and maintained in conformance with good practice. Cylinders, valves, and other similar parts shall be checked to assure that “drift” has not developed to the extent that it would create a hazard.
12. Batteries, motors, controllers, limit switches, protective devices, electrical conductors, and connections shall be maintained in conformance with good practice. Special attention shall be paid to the condition of electrical insulation.
13. Trucks shall be kept in a clean condition to minimise fire hazards and facilitate detection of loose or defective parts.
14. Modifications and additions which affect capacity and safe truck operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance plates or decals shall be changed accordingly.
15. Care shall be taken to assure that all replacement parts are interchangeable with the original parts and of equal quality to that provided in the original equipment.
16. Be sure that any equipment added to the truck (terminal, fan, clipboard, etc.) is positioned so that it does not block your vision or interfere with safe and efficient operation of the truck.

Note: For further information pertaining to operating and maintenance procedures, refer to F.E.M. safety code - Power Industrial Truck (section 4).

For copies send to:

F.E.M.
10 Avenue Hoche
75382 Paris Cedex 08 France

Cleaning of Material Handling Equipment

Cleaning Methods

The preferred method of cleaning built up dirt and dust from electric material handling equipment is dry pressured air. For localised degreasing, use of an appropriate solvent is recommended.

If these methods are not effective and power washing is the only alternative, extreme care must be exercised. Electrical components including connectors, terminal boards and wiring can be permanently damaged from water or cleaning solvents. Mineral and chemical residue left on or in components (i.e., circuit boards, contactors, encoders, switches, potentiometers, etc.) after washing is a proponent of oxidation and corrosion.

Functional integrity of contaminated components may be questionable. Nuisance fault logging, intermittent operation or immediate failure could be the resultant of power washing. For these reasons all electronic components including motors must be protected. Component removal is the best method to eliminate the risk of damage.

Power washing will also remove or destroy lubricants in or on the surface of shafts, unsealed bearings, hinges, exposed gears, bushings, chains, linkages, etc. These items must also be protected or properly lubricated after cleaning.

Consideration must also be given to metal surfaces. The cleaning process can strip away paint and protective coatings applied to components (i.e., hydraulic lines, terminal strips, linkages) for freezer/condition environment. Paint or protective coating must be reapplied to these areas to reduce the chance of oxidation and corrosion.

Before installing removed components, lubricating or returning the equipment to service it must be free of solvent residue and thoroughly dry.

Crown Cleaning Products Chart

Cleaner Type	Part Number	Package Quantity
Degreaser & Cleaner	363105-001 363105-012	20 oz Can (12) 20 oz Cans
All Purpose Cleaner	363114-001 363114-012	20 oz Can (12) 20 oz Cans
Glass Cleaner	363101-001 363101-012	20 oz Can (12) 20 oz Cans
Waterless Hand Cleaner	363111-001 363111-012	15 oz Tube (12) 15 oz Tubes
Pumiced & Smooth Hand Cleaner	363112-001 363112-004	1 Gallon Jug (4) 1 Gallon Jugs
Wall Mounted Deluxe Soap Dispenser	363122	Used with 363112-001
Tough On Grease	063009-005	1 Gallon Jug
Citrus Degreaser Spray	363134-001 363134-012	32 oz spray bottle (12) 32 oz spray bottles
Citrus Degreaser Spray	36135-001 363140-101	1 Gallon refill used with 363134-001 1 Gallon concentrated used with 363134-001
Citra-Sol Degreaser	363146-001 363146-012	19 oz Can (12) 19 oz Cans
Battery Cleaner	363124-001 363124-012	18 oz Can (12) 18 oz Cans

Control of Hazardous Energy

Lockout/Tagout

In the interest of safety and to ensure compliance with EU Machinery Directives, Crown has developed guidelines for proper energy control when performing service and maintenance on the truck. Before performing any service or maintenance on the truck, 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

Safety Rules

- Wear protective clothing, such as, rubber apron, gloves, boots and 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. If battery acid is spilled on the floor or any other surface, use Battery Spill Kit, part no 300035 to neutralise and clean-up the battery acid. Follow the manufacture directions for use.
- 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.
- Do not lay metallic or conductive objects on battery. Arcing will result.
- Do not allow dirt, cleaning solution or other foreign material to enter cells. Impurities in electrolyte has a neutralizing effect reducing available charge.
- If battery repair is planned, follow the battery manufacturer's instructions concerning repair practices and procedures.

Battery Care

CAUTION

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

- ➢ *Make certain the charger being used matches the voltage and amperage of the truck battery. This voltage is listed on the truck serial plate.*
- ➢ *Before disconnecting or connecting batteries to a charger, make sure charger is OFF. If an attempt is made to do this while charger is ON, serious injury to you, the battery and charger could result.*
- ➢ *Never use a match or lighter. Battery fumes are explosive.*
- ➢ *Make certain battery used meets weight, size, amperage and voltage requirements of truck (refer to serial plate). NEVER operate truck with an undersized battery.*

Charging

CAUTION

Gas formed during charging is highly explosive and can cause serious injury.

- ➢ *Never smoke or bring flame near the battery.*

Consult the charger manufacturer's manual covering your charger for hints on operation and maintenance.

Battery Removal

CAUTION

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 Lockout - Tagout in this section. Never move battery partially from truck without roller stand in place.*
- *Lower load handler completely.*
- *If battery is removed with load handler raised, use hoist attached to mast to provide tip over 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 removing, transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal.*

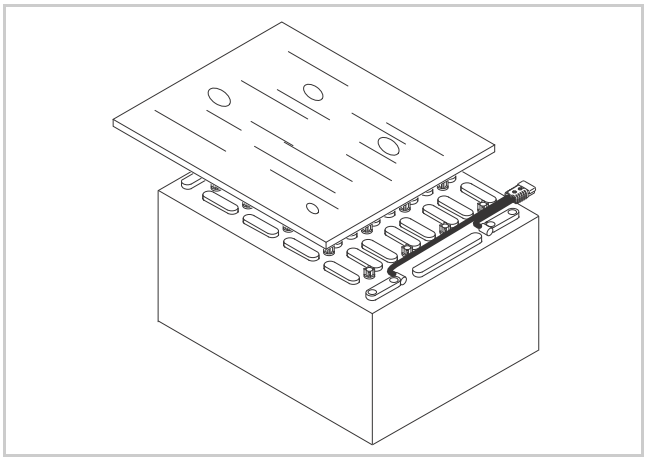


Figure 8251

Battery Installation

CAUTION

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 Lockout - Tagout in this section.*
- *If battery was removed with load handler raised, use hoist attached to mast to provide tip over 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.*

CAUTION

Make certain battery used meets weight, size, amperage and voltage requirements of truck (refer to serial plate). NEVER operate truck with an undersized battery.

Lockout - Tagout

Always turn key switch to OFF, remove key and apply tag to steering wheel with cable tie warning others truck is being serviced.

CAUTION

A Lockout - Tagout Kit (part number 300037) is available. Refer to the One Source Catalog.

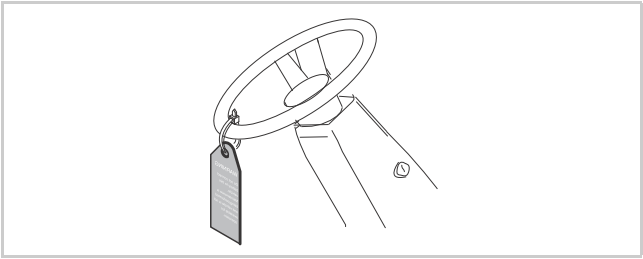


Figure 8346

When maintenance is to be performed and the battery will be left in the truck, disconnect battery, remove the

main power fuses and install a lockout device on the battery connector. Refer to Figure 24312.

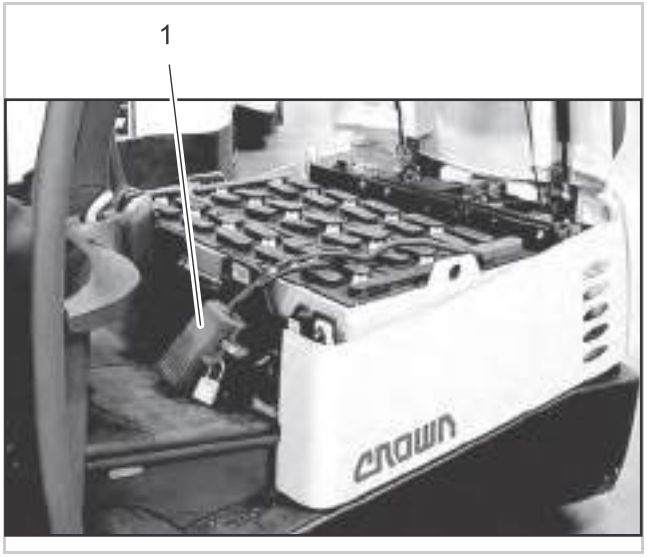


Figure 24312

1	Lockout device on battery connector (Lockout Tagout Kit, part no. 300037)

When maintenance is performed and the battery is removed from the truck, remove main power fuses, install a lockout device on the trucks battery connector if possible, or if possible install a tag with a cable tie on the trucks battery connector so it cannot be removed easily warning that the truck is not available for operation.

Capacitance

Due to capacitance voltage present in the ACCESS 2 and ACCESS 3 modules, whenever performing maintenance which may permit contact with the bus bars and associated power cables, discharge the capacitors.

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Chock truck wheels. Refer to Lifting and Blocking in this chapter.
3. Disconnect battery. Lockout/Tagout truck as described in Lockout/Tagout in this chapter.
4. Turn and hold the key switch to the start position a minimum of 10 seconds.
5. To verify the capacitors have discharged, place a volt meter across the B+ and B- terminals of ACCESS 2 and ACCESS 3 module.
6. Turn key switch to OFF and remove key.

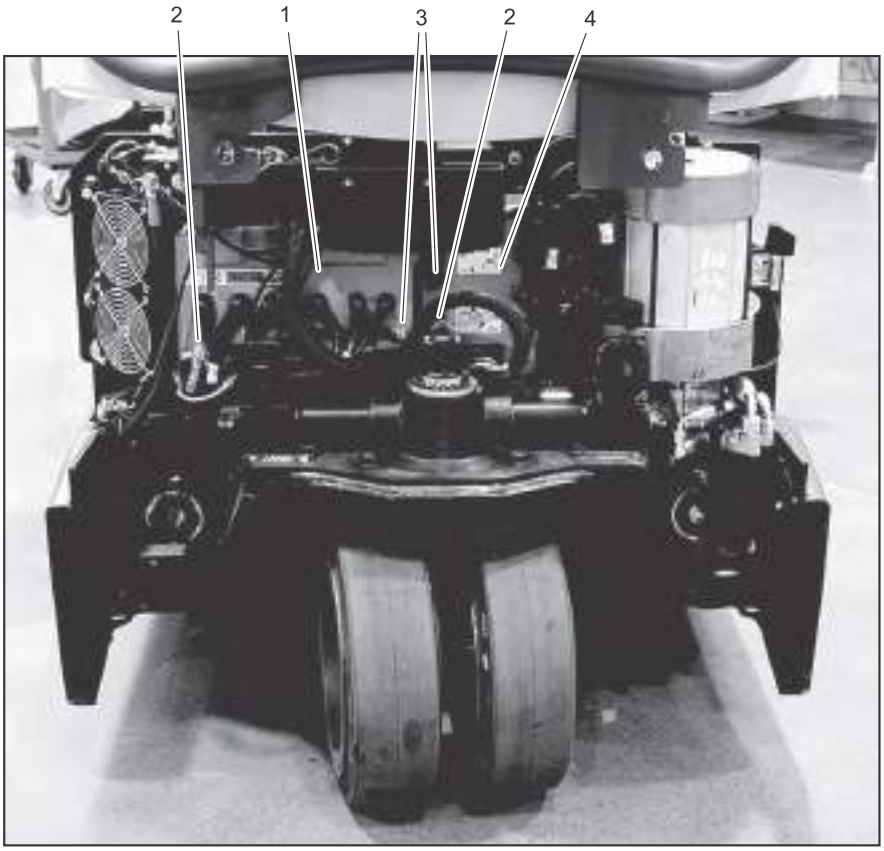


Figure 25879

1	ACCESS 3
2	Negative (B-) Terminal
3	Positive (B+) Terminal
4	ACCESS 2

Brake

It is necessary to release the electric brakes before towing the truck

WARNING

Extreme care must be taken when using any of the following procedures to release the truck brakes. The brake pedal in the operator compartment and the truck brakes will not function when using any of the following procedures. The brakes can only be applied when the truck is returned to its original configuration.

- *During any procedure, lockout and tagout the truck as described in Lockout - Tagout in this section.*
- *Remove load from truck before releasing the brakes and towing.*
- *Always perform brake release procedure on a level surface to prevent the truck from rolling. Chock drive wheels or make sure truck is secure before releasing brakes.*
- *When towing the truck, make sure all operators know that truck does not have braking capability.*
- *Move truck to a maintenance area and secure on a level surface.*
- *If the truck is not returned to normal braking configuration after towing, it must remain in a Lockout - Tagout condition.*

Releasing Brakes

When releasing the truck brakes, use extreme caution and follow one of the following procedures. Choose the procedure that best fits the situation.

Releasing Brakes by Switching Connectors and Using an External Power Source

1. Turn key switch to OFF position, disconnect the battery (if present), and remove left side operator floorboard.
2. Refer to Figure 24313. Disconnect plug JC605 from PC605 (labeled Drive). Connect plug JC605 and PC606 (labeled Tow). Install floorboard.

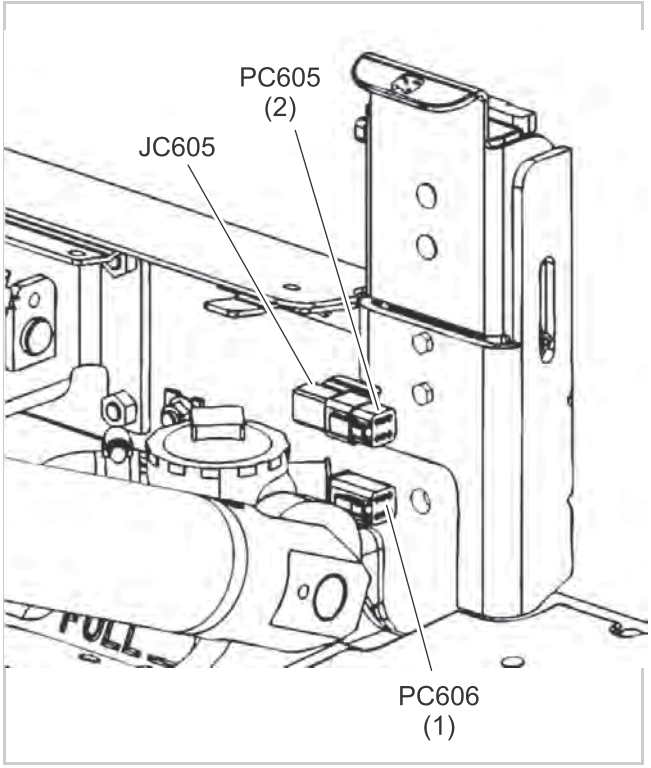


Figure 24313

1	Tow
2	Drive

3. Raise seat deck, locate and disconnect JC405 from PC405. They are the *Drive/Tow connectors* and are located near the ACCESS 3 module. Route the female end of the plug between the seat deck and rear counterweight, so it can be accessed from the rear of the truck. Be careful not to pinch the wires.
4. Using brake release harness (139956-002), connect an auxiliary power source to the plug. This will release the brakes.
5. Tow truck to maintenance area, secure truck in position, disconnect power supply, and return the connectors to original configuration.

CAUTION

Leaving a power source ON and connected to the truck brake coils could over heat and damage the brakes. If the truck is not returned to normal braking configuration then it must remain in Lockout - Tagout condition.

Releasing Brakes by Switching Connectors & Using On Board Truck Battery

1. With truck key switch turned OFF, disconnect battery and remove left side operator floor plate.
2. Refer to Figure 24313. Disconnect plug JC605 from PC605 (labeled Drive). Connect plug JC605 and PC606 (labeled Tow). Install floor plate.
3. If brakes do not release, locate *Drive/Tow connectors* JC405 and PC405 in the rear of the truck near the traction control module and make sure that they are connected.
4. Tow truck to maintenance area, secure truck in position, and return connectors to original configuration.

CAUTION

Leaving this power source connected to the truck brake coils could overheat and damage the brakes. If the truck is not returned to normal braking configuration, then it must remain in the Lockout - Tagout condition.

Releasing Brakes by Using the Crown Operator Display and Truck Battery is Present

1. Turn key switch ON.

WARNING

After enabling tow mode, the truck will be difficult to steer because the truck will not have power steering.

2. Navigate to Access 1 2 3 Service Level 2 (password is required) menu, then to Utilities menu, then to U2 tow mode. Enable tow mode. For more information concerning Access 1 2 3 menus, refer to Access 1 2 3 section of this service manual.
3. When in tow mode, there is a five minute window that the brakes are in the released state. If additional time is required the release can be reactivated for additional five minute periods.
4. If the brakes are released in tow mode, and need to be applied, disable tow mode.
5. When in tow mode, if operator is not present (out of seat) and either drive wheel moves, an audible alarm will sound.
6. When in tow mode, if operator is present (in the seat) and either drive wheel moves, there is no audible alarm.
7. Tow the truck to maintenance area, disable tow mode and turn truck OFF. If truck is not returned to normal braking configuration then it must remain in the Lockout - Tagout condition.

Hydraulic

WARNING

Avoid high pressure fluids.
Escaping fluid under pressure can penetrate the skin causing serious injury.

- *Relieve pressure before disconnecting hydraulic lines.*
- *Tighten all connections before applying pressure.*
- *Keep hands and body away from pinholes which eject fluids under high-pressure.*
- *Use a piece of cardboard or paper to search for leaks. Do not use your hand.*

Consider any fluid injected into the skin under high-pressure as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Seek medical attention immediately by a specialist who has experience with this type of injury.

Before performing maintenance on the hydraulic system, relieve the hydraulic pressure. To relieve pressure, refer to the following:

Lift and Lower Circuit

1. Move the truck to a secure, no traffic maintenance area with a level floor.
2. Tilt forks level.
3. With no load on the forks, lower the forks or block the mast sections at a suitable height. Refer to Mast in this manual section.
4. Turn the truck OFF.
5. Lockout or tagout the truck described in this manual section.
6. Remove the floorboards.
7. Slowly open the manual lower valve to remove hydraulic pressure from the lift and lower circuit.

Tilt Circuit

1. Move the truck to a secure, no traffic maintenance area with a level floor. If truck has an attachment, remove attachment.
2. With no load on the forks, raise the forks high enough so you can tilt the mast completely forward (about 0.3 meter).
3. Tilt the mast completely forward. As soon as the mast reaches full forward tilt, release the tilt lever so the pressure doesn't increase in the tilt circuit.
4. Lower the forks to floor.
5. Turn the truck OFF.
6. Lockout or tagout the truck described in this manual section.
7. On a SC 5300 with a manual valve operate the tilt control lever to release hydraulic pressure in the tilt circuit.
   On a SC 5300 with EPV place a catch pan or oil absorbent pad below the cylinder fittings.
8. Place a shop rag over the fittings to lessen the chance of spray and slowly loosen both hydraulic fittings in one of the tilt cylinders to relieve pressure in the tilt circuit.

Steering Circuit

1. Move the truck to a secure, no traffic maintenance area with a level floor.
2. Lockout or tagout the truck described in this manual section.
3. Turn the steering wheel to the left or right all the way and hold for 10-20 seconds.

Sideshift Circuit

1. Move the truck to a secure, no traffic maintenance area with a level floor.
2. Lockout or tagout the truck described in this manual section.
3. Check to be sure nothing is pushing against the sideshift carriage or cylinder ram.
4. On a SC 5300 with a manual valve operate the sideshift control lever to release hydraulic pressure in the tilt circuit.
   On a SC 5300 with EPV wait 10-20 seconds after sideshifting to relieve the hydraulic pressure in the sideshift circuit.

Towing Truck

Refer to the following guidelines when towing the truck:

Towing by Pulling in Power Unit First Direction

WARNING

- *Towed truck must always maintain three contact points with floor and/or towing device.*
- *Maximum travel speed while towing truck is 3.2 km/h (2 mph).*
- *Do not make sharp turns when towing this truck.*
- *Towed vehicle forks should be empty and no more than 305 mm off floor. If possible, tilt forks back and center sideshifter.*
- *Provide a safe distance for truck to coast to stop.*

Preparing Truck For Towing

1. Refer to the data plate for the gross vehicle weight. Include the battery weight if it is in the vehicle during towing.

WARNING

Truck will be difficult to steer. Use extreme care.

2. Ensure truck can be steered safely during towing.
3. Reference the service manuals SAFETY Control of Hazardous Energy BRAKE section for information on releasing the electric brakes before towing.
4. Ensure operator compartment has not been damaged in such a way as to inhibit operator safety during towing. If operator needs to exit vehicle quickly during towing, can it be done safely? If not, use another method to move vehicle.
5. Ensure floor is level and flat without trash or debris in towing path.

Towing Device Requirements

6. The pull force required to tow the vehicle on a flat level surface can be found by multiplying the gross vehicle weight of the truck by 0.20 (i.e., GVW x 0.20).The gross vehicle weight of the towed truck can be found on the data tag. Include the battery weight if it is in the vehicle during towing.
7. Towing device/vehicle must have pulling/braking capacity greater than the pulling force found in the previous step.

Note: Excessive acceleration by the towing vehicle, or drag caused by the towed vehicle (i.e., brake drag, drive unit drag, wheel drag, etc.), will greatly increase the requirements to pull or push a vehicle.

Attaching Towing Device To Lift Truck To Be Towed

8. Pull vehicle by overhead guard.

Note: Use pull force requirements listed under Towing Device Requirements (see previous column) to determine specifications of tow strap.

9. Attach towing strap around both rear overhead guard uprights. Refer to Figure 26733.

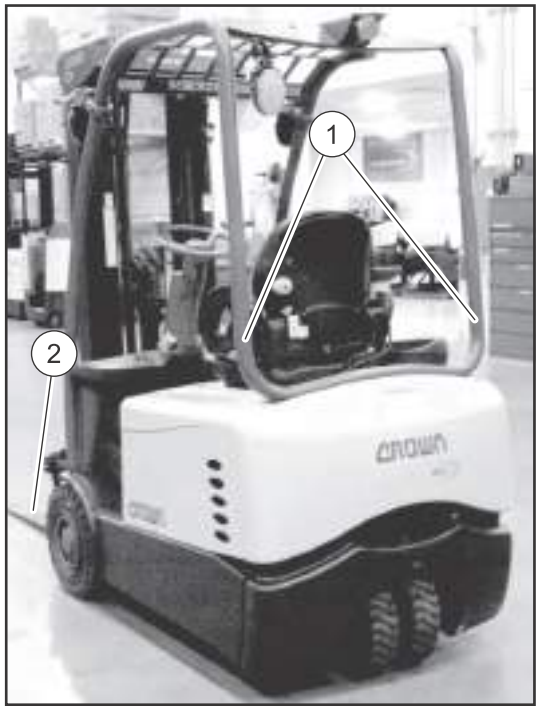


Figure 26733

1	Route tow strap around both rear overhead guard uprights
2	Lower forks completely, no load on forks

10. Use a tow strap that is long enough to allow the operator time to stop safely if he or she needs to do so quickly. Towing at 1.6 km/h (1 mph) will require a 2438 mm minimum distance between towed and towing vehicle; choose a tow strap accordingly.

Towing Vehicle Minimum Requirements:

11. Use pull force requirements calculated in Towing Device Requirements to determine traction force.

This traction force must be within towing specifications of towing vehicle.

12. Both towed and towing vehicle must be able to stop under their own power if they need to while towing.
13. Attach tow strap as low as possible on towing vehicle. Consult manufacturer for more information.

Towing Guidelines

- Maximum travel speed while towing truck is 3.2 km/h (2 mph).
- Both the towing vehicle operator and towed vehicle operator must be able to communicate clearly while towing. For example: if braking is required during towing, operators of towed and towing vehicles must clearly and quickly verbally communicate their intentions. Clear communication is also required during acceleration, turning, etc.

Towing by Lifting Truck and Pulling in Power Unit First Direction

WARNING

- *Towed truck must always maintain three contact points with floor and/or towing device.*
- *Maximum travel speed while towing truck is 3.2 km/h.*
- *Do not make sharp turns when towing this truck.*
- *Towed vehicle forks should be empty and no more than 305 mm off floor. If possible, tilt forks back and center sideshifter.*
- *Provide a safe distance for truck to coast to stop.*
- *Excessive acceleration by towing vehicle, or drag caused by towed vehicle (i.e., brake drag, drive unit drag, wheel drag, etc.) will greatly increase requirements to pull or push a vehicle.*

Preparing Truck For Towing

CAUTION

- *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 Lockout - Tagout in this section.*
- *Never move battery partially from truck without roller stand in place. Lower load handler completely. If battery is removed with load handler raised, use hoist attached to mast to provide tip over protection.*
- *Do not allow any metallic object to come in contact with the top of battery cells. This may cause a short circuit when removing, transporting the battery. Use an insulator (such as plywood) to cover top of battery before and during removal.*

1. Remove battery from vehicle.
2. Release parking brake. Refer to *Brake* in this section for proper procedure.

3. Lift and tow from power unit end of vehicle. Refer to Figure 26734.

Figure 26734

1	Lift from this location
2	Lower forks completely, no load on forks

4. Ensure towed vehicle does not uncouple from towing vehicle during towing.
5. Towing device must not damage underside of towed vehicle.

Lifting Vehicle Requirement

6. Make sure all lifting vehicle capacities are not exceeded while lifting, travelling, accelerating, or braking. Refer to manufacturer if there is any doubt this vehicle can carry disabled vehicle.
7. Use pull force requirements calculated in Towing Device Requirements to determine traction force. This traction force must be within towing specifications of towing vehicle.
8. Both towed and towing vehicle must be able to stop under their own power if they need to while towing.

Lifting and Towing Guidelines

- Lift and tow from power unit end of vehicle.
- Ensure towed vehicle does not uncouple from towing vehicle during towing. Secure with straps or clamps.
- Towing device must not damage underside of towed vehicle or steer wheels.

Lifting and Blocking

Side View

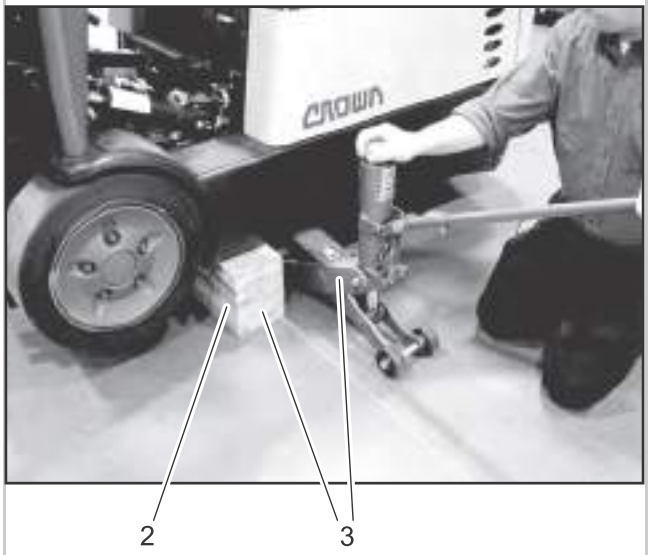


Figure 24318

1	Lower forks (not shown)
2	Hardwood block
3	Height not to exceed 400 mm (16 in)

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. No load on forks.
3. Lockout or tagout truck as described in Lockout - Tagout in this section.

Note:

- Hydraulic Jack Capacity: 3991 kg
  - Crown Part Number: 300083
  - Collapsed Height Minimum: 60 mm
  - Raised Height Maximum: 400 mm
- Jack Stand Capacity: 6350 kg
  - Crown Part Number: 300081

CAUTION

When raising rear of truck, raise one side 25-40 mm and block. Raise opposite side 25-40 mm and block. Continue alternating sides until reaching required height (not to exceed 400 mm).

WARNING

Truck stability decreases dramatically if truck skirt is raised more than 140 mm.

- *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.*

Steer Wheel

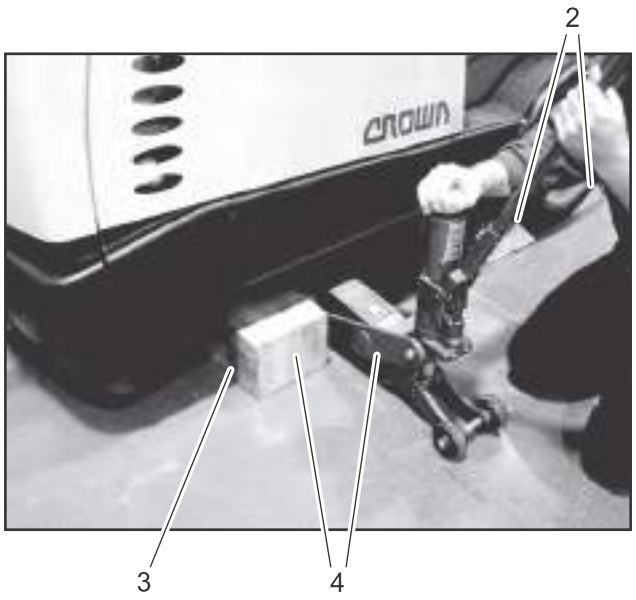


Figure 24317

1	Raise forks 75 - 150 mm from floor (not shown)
2	Chock both drive wheels
3	Hardwood block
4	Height not to exceed 400 mm - refer to note

Mast

Blocking Masts

Use 100 x 100 mm or larger hardwood blocks of appropriate length for supporting mast channels. Block both mast rails of each stage to maintain stability.

Remove any carriage mounted accessory (i.e., carton clamp, etc.) except sideshifters before blocking masts. These accessories add significant weight to the mast.

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Chock wheels of truck (refer to Lifting and Blocking in this section).
3. Connect battery.
4. Raise forks and position blocks under second stage mast as shown.
5. Using a clamp or ratchet tie down, secure blocks to mast channel as shown.
6. Lower mast and position appropriate length blocks under third stage mast as shown.
7. Lower mast and position appropriate length blocks under fourth stage mast (or inner) on quad mast trucks as shown.
8. Using a clamp or ratchet tie down, secure blocks to mast channel or second stage block as shown.
9. Lower fork carriage until carriage rests on stops or place blocks under carriage and lower until weight rests on blocks.
10. Lockout or tagout truck as described in Lockout - Tagout in this section.

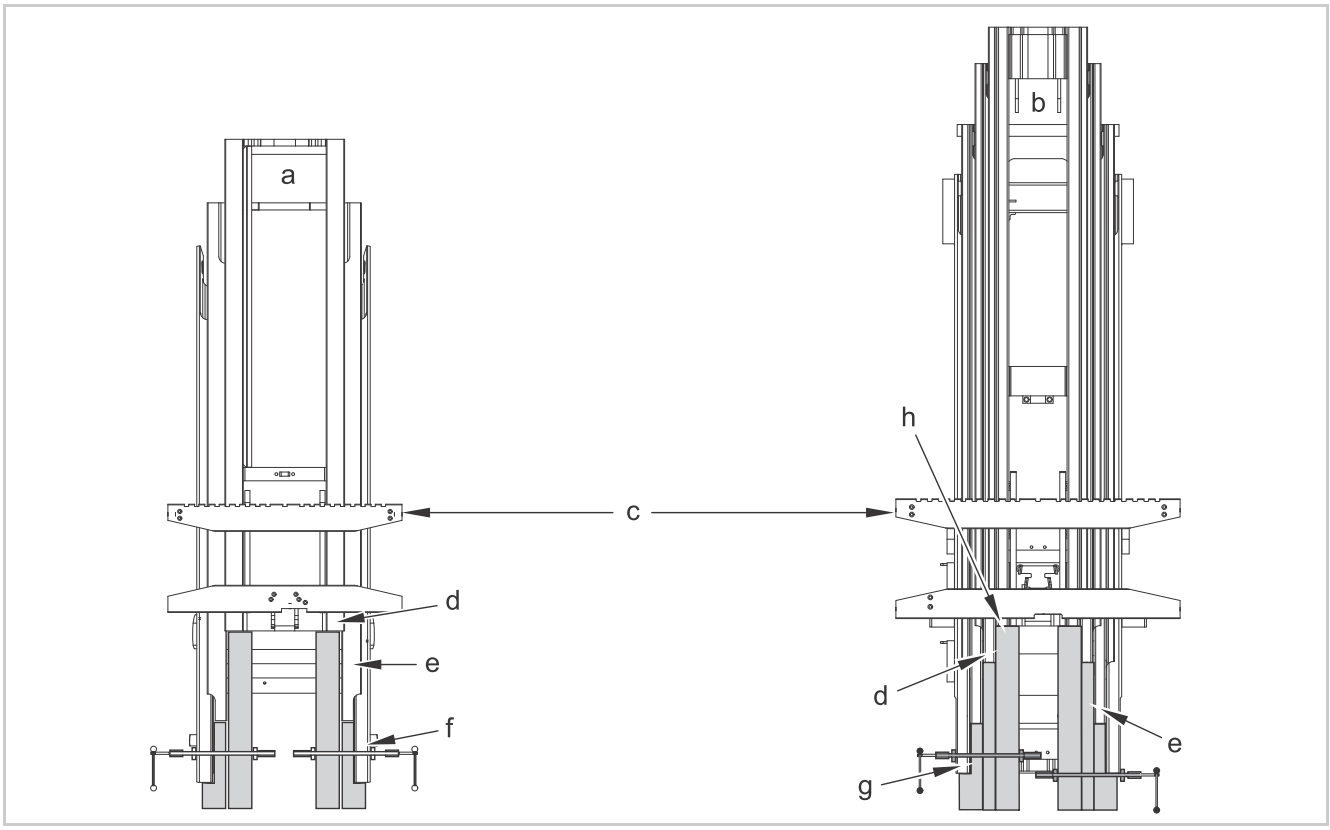


Figure 16959-01

a	TT Mast	e	Second Stage Mast
b	Quad Mast	f	First Stage Mast (or Mainframe)
c	Fork Carriage (Shown Slightly Raised for Clarity)	g	First Stage Mast (or Outer Mast)
d	Third Stage Mast	h	Fourth Stage Mast (or Inner)

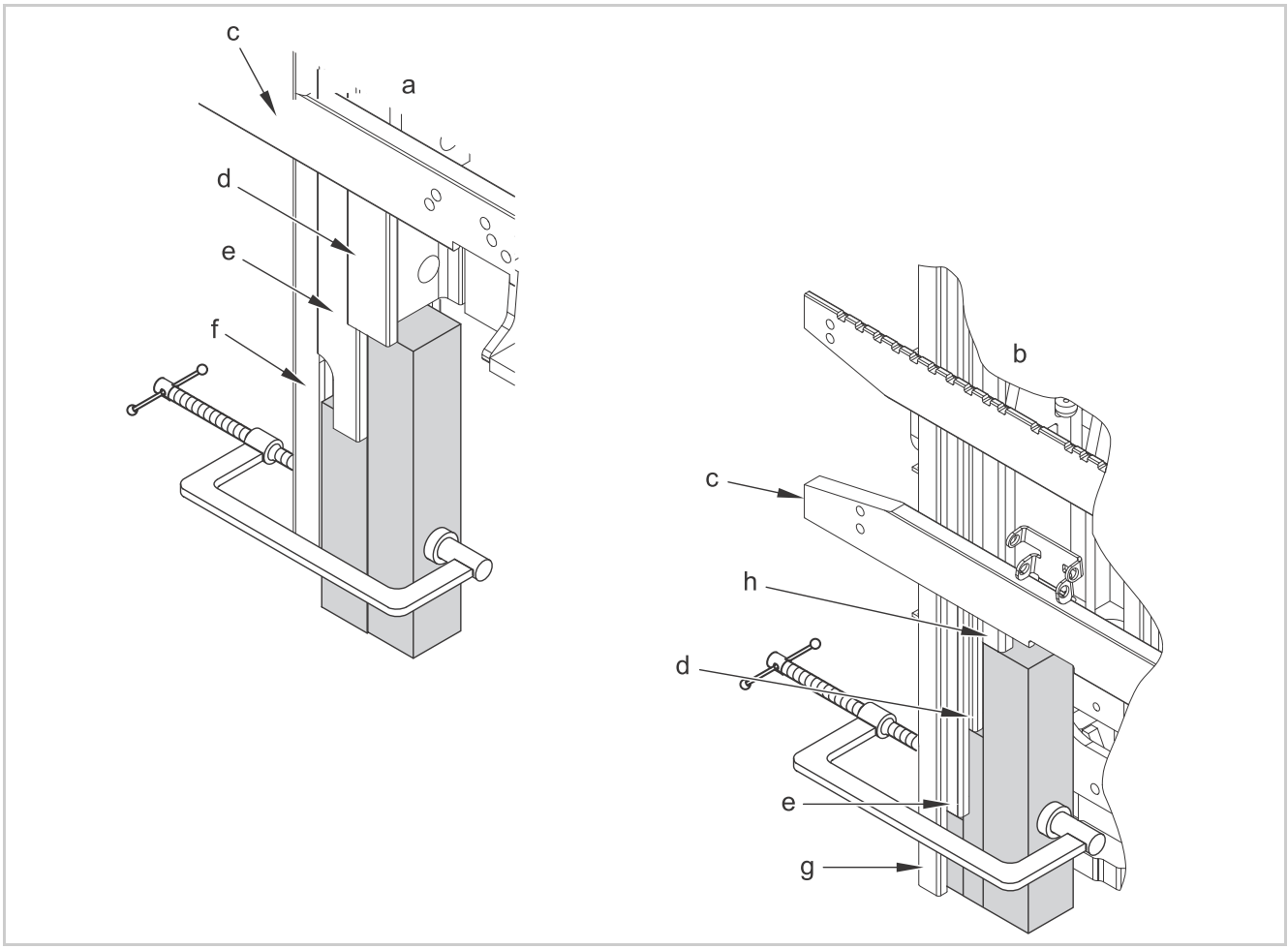


Figure 16960-01

a	TT Mast
b	Quad Mast
c	Fork Carriage
d	Third Stage
e	Second Stage
f	First Stage (or Mainframe)
g	First Stage (or Outer Mast)
h	Fourth Stage (or Inner Mast)

Disconnecting Tilt Cylinder

When the tilt cylinders are disconnected from the hydraulic system or from the mounting brackets, the mast must be secured to keep the mast from pivoting toward, or away from the truck.

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Lower forks and mast (load handler) completely. No load on forks.
3. Lockout or tagout truck as described in Lockout - Tagout in this section.
4. Chock wheels (refer to Lifting and Blocking in this section).
5. Attach a sling and lifting device to all mast top cross braces so movement will be minimal when tilt cylinders are disconnected.

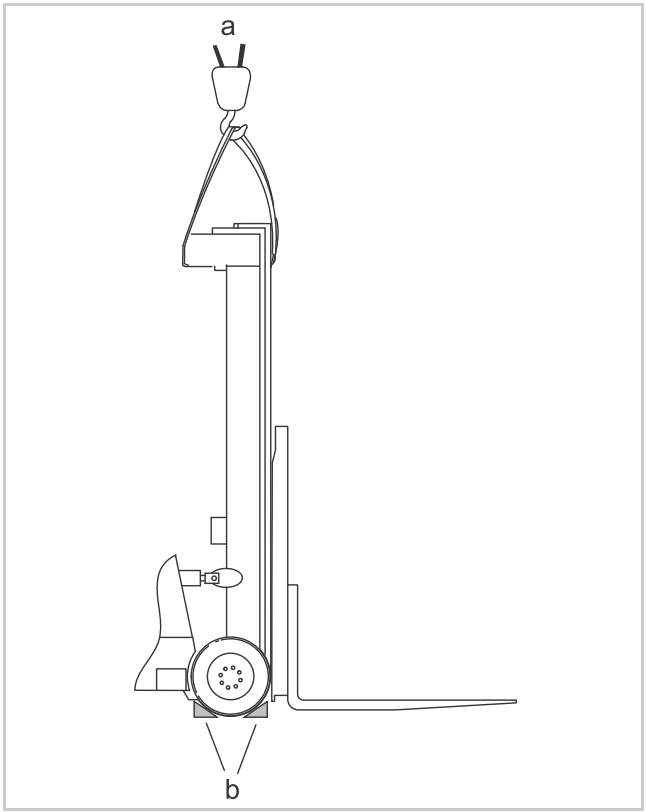


Figure 16961-01

a	Attach Lifting Device to All Top Cross Braces and Center to Maintain Balance
b	Wheel Chocks

Mast Removal

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Lockout or tagout truck as described in Lockout - Tagout in this section.
3. Remove battery.
4. Remove forks.
5. Remove hydraulic pressure from the lift, tilt and sideshift (accessory) circuits. Refer to “Hydraulic” in this manual section.
6. Disconnect lift cylinder hydraulic lines, accessory cables and accessory hydraulic lines between power unit and mast if present. Use catch pan or oil absorbent pads to catch hydraulic oil.
7. Disconnect wiring between mast and power unit.
8. Support mast as described in Disconnecting Tilt Cylinders in this section.
9. Chain mast sections together at the upper cross-braces. Chain fork carriage to lower mast cross-brace. This will keep carriage and mast sections from moving when the mast is laid down.
10. Remove pins connecting tilt cylinders to the mast.

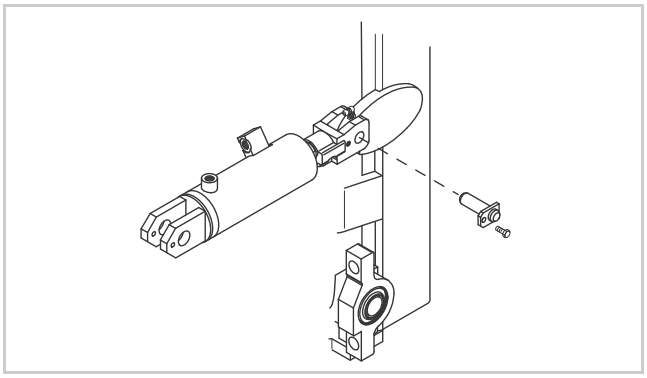


Figure 8351

11. Remove pivot block mounting bolts. If pivot blocks are to be removed, note number and location of shims between pivot blocks and mast.
12. Move mast away from truck and lay mast on level floor with the truck side of the mast on the floor.

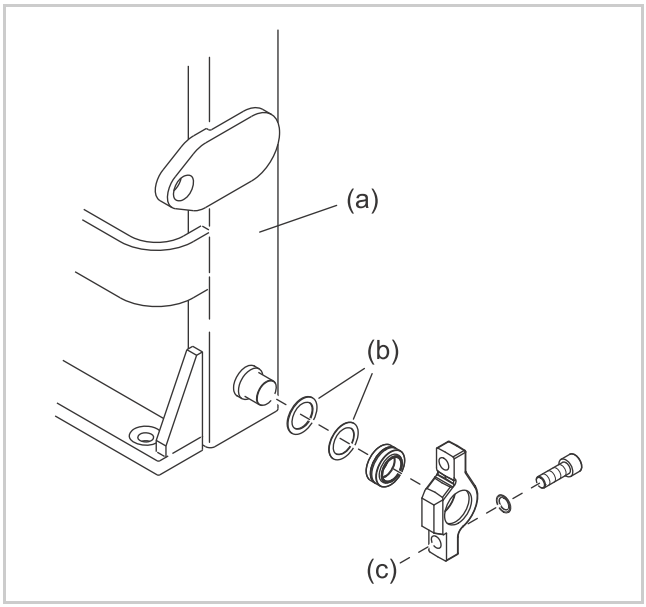


Figure 26735

a	Part of Mast
b	Shim
c	To Power Unit

Counterweight Removal

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Lockout or tagout truck described in Lockout - Tagout in this section.
3. Remove battery.
4. Attach a sling and lifting device to all top cross braces of the mast, to prevent tipover.
5. Attach a sling and lifting device to the rear of the overhead guard to support the guard when the guard mounting bolts are removed.

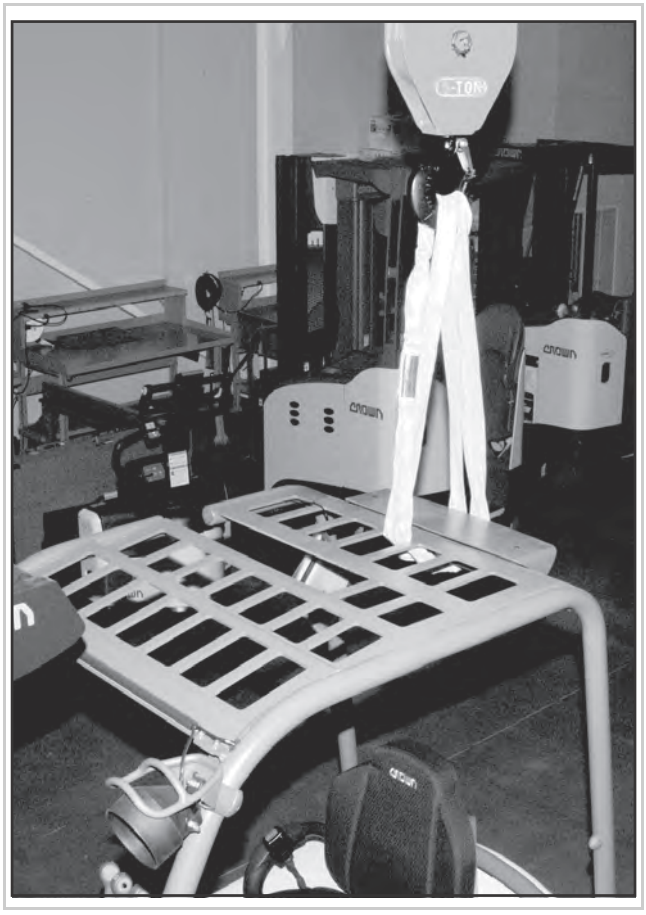


Figure 25379

6. Position a pallet truck or other similar lifting device under the counterweight from the rear of the truck and raise to support the weight of the counterweight when the mounting bolts are removed.

Figure 25380

WARNING

After mounting bolts holding the counterweight to the truck are removed, the counterweight will be balanced on the pallet truck forks. Use extreme care when moving counterweight to maintain balance.

7. Remove counterweight mounting bolts.
8. Carefully move the counterweight away from truck.

Hose Reel

Hose reels have a minimum of 3 revolutions of prewind and up to 16 revolutions maximum. When performing maintenance to these units, use the following steps to remove the spring prewind.

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Position the forks to provide the shortest distance between the carriage mounted junction block and the hose reel. Block the carriage at this height as described in Mast of this section.
3. Lockout or tagout truck as described in Lockout - Tagout in this section.
4. Remove battery.
5. Remove any hydraulic pressure that may be present. Refer to the Hydraulic section in this chapter of the manual.
6. Clean oil and residue from hose(s) exterior.
7. Disconnect the hose(s) from the carriage mounted junction block while maintaining a tight grip on the hose(s).
8. Slowly allow hose(s) to coil up on the reel and carefully remove prewind by grasping reel and slowly allowing the reel to rotate.

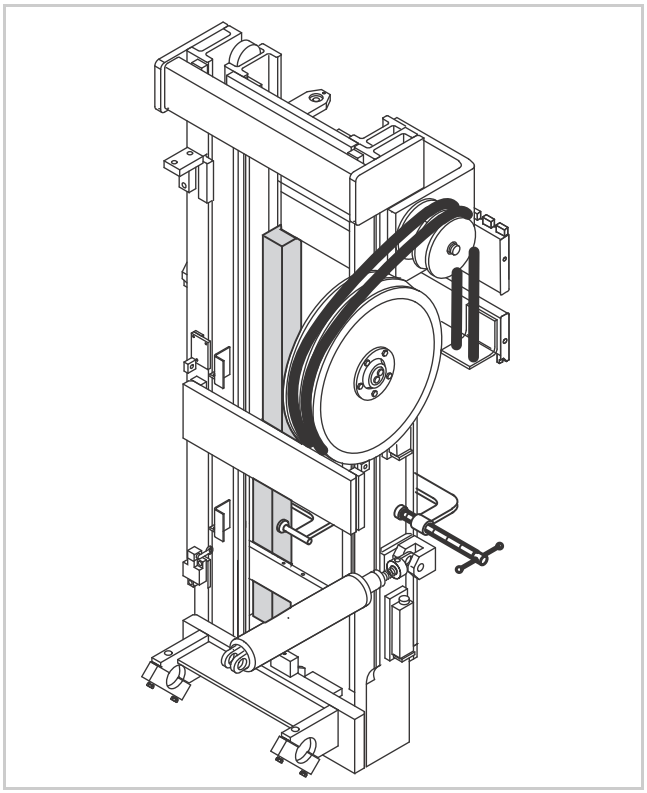


Figure 8320

Notes:

LUBRICATION & ADJUSTMENT

Notes:

Operators Daily Checklist

To obtain maximum life of any industrial equipment, a well planned maintenance program (PM), performed by qualified technical personnel should be followed. In conjunction with, and an integral part of, any planned maintenance program should be daily operator input. Operator involvement can greatly reduce truck down time, assist in determining planned maintenance (PM) schedules and ultimately save money. For these reasons, Crown recommends a checklist similar to the Operators Daily Checklist shown below.

Before performing maintenance to any unit, it should be taken to an area set aside for maintenance or a section where there is adequate space to perform required work. This is a must to insure the safety of others and to insure that proper maintenance is performed to the unit.

If desired, padded packs of this checklist (OF3772) are available through your Crown dealer.

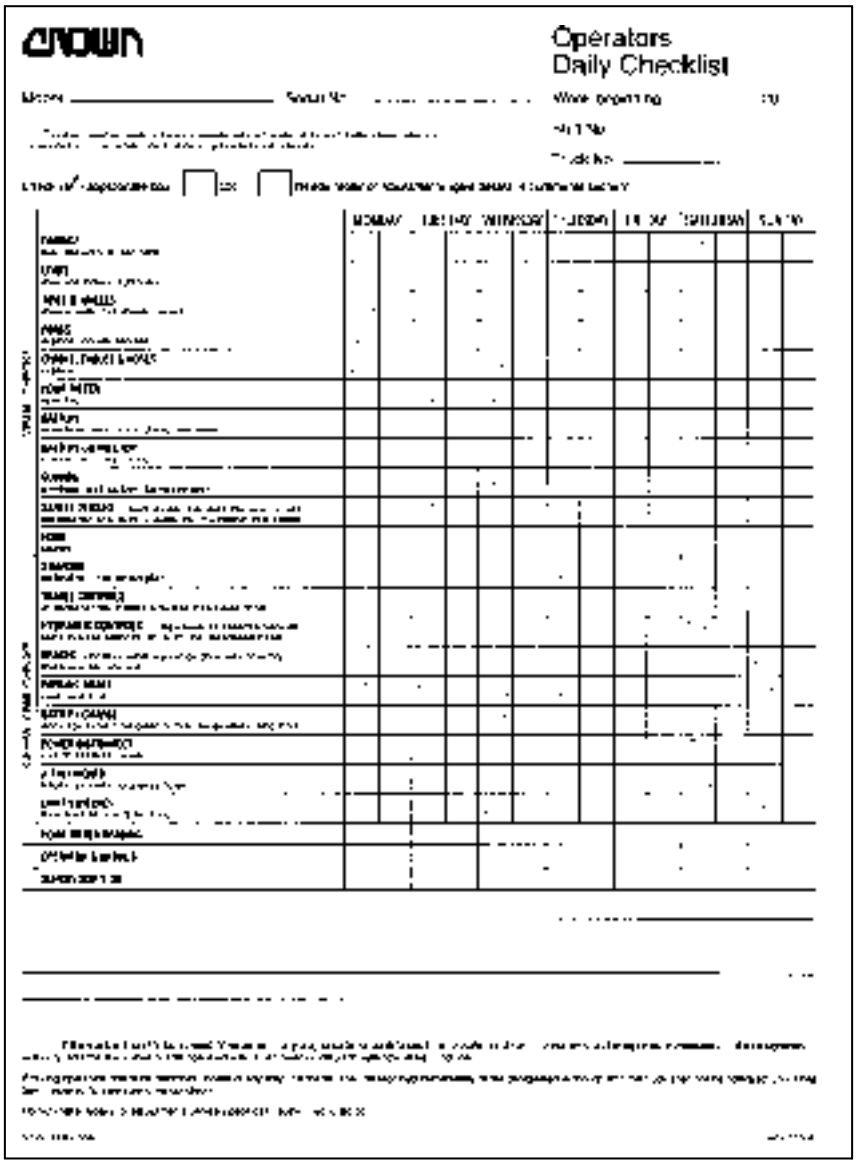


Figure 14990

Lubricants, Aerosols & Service Supplies

The following is a list of lubricants and maintenance products recommended when doing Planned Maintenance on Crown Lift Trucks.

Lubrication Identification Chart			
Type of Lubricant		**Part Number**	**Package Quantity**
A	Gear Lube 80W-90 (Typical)	363506-001 363506-012	1 Quart (12) 1 Quart Cans
AA	Automatic Transmission Fluid (Multi-Purpose)	363503-001 363503-012	1 Quart (12) 1 Quart
AAA	Universal Hydraulic & Transmission Fluid	363513-001 363513-012	1 Quart (12) 1 Quart
AAAA	Synthetic Gear Oil 75W-90	363514-001 363514-012	1 Quart (12) 1 Quart
B	Grease (Multi-Purpose)	063002-034 063002-045	14.5 oz Cartridge (40) 14.5 oz Cartridges
BB(1)	Grease (Low Temperature)	063002-017 063002-046	14.5 oz Cartridge (40) 14.5 oz Cartridges
BBB	Food Grade Grease (Multi-Purpose)	363002-001 363002-030	14 oz Cartridge (30) 14 oz Cartridges
BBBB	Grease (Multi-Purpose) Premium	063002-025 063002-026	14.5 oz Cartridge 5 Gallon
C	Oil (SAE 40)		
CC	Engine Oil (10W30)	363500-001 363500-012	1 Quart (12) 1 Quart
	JD Turf Guard (10W30)	063041-001 063041-012	1 Quart (12) 1 Quart Cans
D	Hydraulic Oil	363504-101 363504-106	1 Gallon (6) 1 Gallon
DD(1)	Hydraulic Oil (Low Temp)	363505-101 363505-106	1 Gallon (6) 1 Gallon
DDD	Hydraulic Oil - DTE24	063001-021	1 Gallon
E	Channel Grease	063002-024 063002-022	14.5 oz Cartridge 35 lb Pail
F	Gear Grease	063002-024 063002-022	14.5 oz Cartridge 35 lb Pail
(1) Trucks operated in below freezing temperatures must use Low Temp Hydraulic Oil & Grease.			

Lubrication Identification Chart			
Type of Lubricant		**Part Number**	**Package Quantity**
G	Chain & Cable Lube	363107-001 363107-012	15 oz Can (12) 15 oz Cans
	Premium Chain & Cable Lube	363115-001 363115-012	12 oz Can (12) 12 oz Cans
H	Final Finish - Rubber & Vinyl Dressing	363129-001 363129-012	11 oz Can (12) 11 oz Cans
I	Grease (Lift Pump Coupling)	063002-039 127801S	1 lb 1 oz
J	Brake Fluid - Dot 5	063004-002 063004-003	12 oz 1 Gallon
K	Grease (Wheel Bearing)	063002-034 063002-045	14.5 oz Cartridge (40) 14.5 oz Cartridges
L	Metal Assembly Spray	063002-021	11 oz Spray
M	Silicone Grease (Clear)	063002-020	5.3 oz Tube
N	Brake & Parts Cleaner	363102-001 363102-012	14 oz Can (12) 14 oz Cans
	Low VOC Brake & Parts Cleaner	363103-001 363103-012	14 oz Can (12) 14 oz Cans
	Non-Flammable Brake & Parts Cleaner	363116-001 363116-012	19 oz Can (12) 19 oz Cans
O	Penetrating Lubricant	363104-001 363104-012	20 oz Can (12) 20 oz Cans
P	Premium Formula Multi-Purpose Grease	363108-001 363108-012	11 oz Can (12) 11 oz Cans
Q	White Lithium Grease	363110-001 363110-012	11 oz Can (12) 11 oz Cans
R	Choke & Carburetor Cleaner	363109-001 363109-012	15 oz Can (12) 16 oz Cans
S	Contact Cleaner - Non-Flammable	363106-001 363106-012	10 oz Can (12) 10 oz Cans
	Contact Cleaner	363128-001 363128-012	11 oz Can (12) 11 oz Cans
T	Electrical Connector Oxidation & Corrosion Inhibitor	127189-001	30 cc
U	Battery Cleaner	363124-001 363124-012	18 oz Can (12) 18 oz Cans
V	Battery Protector	363125-001 363125-012	15 oz Can (12) 15 oz Cans
W	Food Grade Machine Lubricant	363127-001 363127-012	12 oz Can (12) 12 oz Cans

Lubrication Identification Chart			
Type of Lubricant		Part Number	Package Quantity
X	Food Grade Silicone Spray	363126-001 363126-012	11 oz Can (12) 11 oz Cans
Y	Coolant	363509-101 363509-106	1 Gallon (6) 1 Gallon
	Extended Life Coolant	363511-101 363511-106	1 Gallon (6) 1 Gallon

Alternate Lubricants & Fluids Chart			
Type of Lubricant		**Product Name**	**Manufacturer/ Distributor**
A	Gear Lube 80W-90 (Typical)	Crown	Crown
AA	Automatic Transmission Fluid (Multi-Purpose)	Crown	Crown
AAA	Universal Hydraulic & Transmission Fluid	Crown	Crown
AAAA	Synthetic Gear Oil 75W-90	Crown	Crown
B	Grease (Multi-Purpose)	Mobilgrease XHP 222 Special Union Unoba EP No 2 Retinax A(1) LM Grease Unirex EP-2	Mobil Union 76 Co. Shell Burmah Castrol Exxon
BB	Grease (Low Temp) (2)	Lubriplate Alvania RA(1) Helveum O(1)	Fiske Bros Refining Co. Shell Burmah Castrol
BBB	Food Grade Grease (Multi-Purpose)	Petro Canada Purity FG	Petro Canada
BBBB	Grease (Multi-Purpose) Premium	Mobilux EP2 64127-4 Retinax AM 71119 Chevron RPM Heavy Duty LC Grease EP	Mobil Shell Chevron
C	Oil (SAE 40)		
D	Hydraulic Oil	Crown	Crown
DD	Hydraulic Oil (Low Temp) (2)	Crown	Crown
DDD	Hydraulic Oil - DTE24 (3)	Mobil DTE 24	Mobil
E	Channel Grease	Factran #2	Standard Oil Co.
F	Gear, Channel & Shaft Grease	Molykote BR-2 Plus	Dow Corning
G	Chain & Cable Lube	Crown	Crown
	Premium Chain & Cable Lube	Crown	Crown
H	Final Finish - Rubber & Vinyl Dressing	Crown	Crown
I	Grease (Lift Pump Coupling)	Nyogel 774F-MS	NYE Lubricants
J	Brake Fluid - Dot 5	Q2-1141 Silicon Brake Fluid	Dow Corning
K	Grease (Wheel Bearing)	Mobilgrease XHP 222 Special Unirex EP-2 Lubriplate No. 1242(1)	Mobil Exxon Fiske Bros. Refining Co.

(1) Denotes allowable substitutes, contact factory if unavailable.
(2) Trucks operated in below freezing temperatures must use Low Temp Hydraulic Oil & Grease.
(3) Premium antiwear hydraulic oil used in blending with low temp oil.

Alternate Lubricants & Fluids Chart			
Type of Lubricant		**Product Name**	**Manufacturer/ Distributor**
L	Metal Assembly Spray	Dow Corning	Dow Corning
M	Silicon Grease (Clear)	Dow Corning 111 Compound	Dow Corning
N	Brake & Parts Cleaner	Crown	Crown
	Low VOC Brake & Parts Cleaner	Crown	Crown
	Non-Flammable Brake & Parts Cleaner	Crown	Crown
O	Penetrating Lubricant	Crown	Crown
P	Premium Formula Multi-Purpose Grease	Crown	Crown
Q	White Lithium Grease	Crown	Crown
R	Choke & Carburetor Cleaner	Crown	Crown
S	Contact Cleaner	Crown	Crown
T	Electrical Connector Oxidation & Corrosion Inhibitor	Nye Grease	NYE Lubricants
U	Battery Cleaner	Crown	Crown
V	Battery Protector	Crown	Crown
W	Food Grade Machinery Lubricant	Crown	Crown
X	Food Grade Silicone Spray	Crown	Crown
Y	Extended Life Coolant		

Planned Maintenance

Overview

Lift trucks are designed to move products safely, efficiently and economically. In order to perform this function day after day, lift trucks must be properly maintained. The planned maintenance (PM) section of this manual is designed to assist you in keeping your lift truck operating as it was designed. Proper planned maintenance will reduce downtime and operating cost.

A good PM starts with an operational and visual inspection of the truck. Begin by performing all the inspections on the Operators Daily Checklist (shown previously in this section of the service manual). Next:

1. Move the truck to a secure, non-traffic maintenance area with a level floor.
2. Lockout and tagout the truck, chock the drive tyres and discharge the capacitance voltage in ACCESS 2 and ACCESS 3. Refer to the Control of Hazardous Energy section for proper procedures.
3. Blow off the truck with low pressure air, including motors, electrical panels, fans, mast, etc.
4. Look for debris such as shrink wrap, banding or other debris that may be lodged in or around moving or rotating components.
5. Look for damaged components.
6. Look for loose or missing fasteners.
7. Look for damaged electrical wiring or connectors.

Next, based upon the truck's accumulated hours, perform planned maintenance as indicated in the proper interval chart located in this chapter.

- 60 Day/250 Hour
- 12 Month/2000 Hour

CAUTION

- *If the truck is found in need of repair or is, in any way, unsafe or contributes to an unsafe condition, the matter shall be reported immediately to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.*
- *If, during operation, the truck becomes unsafe in any way, the matter shall be reported to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.*
- *Do no make repairs or adjustments unless specifically authorised to do so.*

CAUTION

Lubrication and inspection intervals must be changed to a frequency that will minimise corrosion and wear on moving parts for trucks operated in extremely dusty or corrosive environments.

Component Access

The following is a list of covers, panels, etc. that must be opened/removed to allow access when performing maintenance to components identified in this section.

CAUTION

Lockout and tagout the truck, chock the drive tyres and discharge the capacitance voltage in ACCESS 2 and ACCESS 3. Refer to the Control of Hazardous Energy section for proper procedures.

Figure 26902

1	Seat Deck
2	Right Side Cover
3	Floorboards
4	Dash Cover
5	Steering Column Covers
6	Lowering Flow Control Manifold Cover

Seat Deck

Provides access to:

- Seat deck latch, gas struts and hinges
- Tow Connector
- Rear electrical panels
- Steer axle and potentiometer

To open the seat deck, tilt the steering wheel up and pull the seat deck handle (located below and in front of the seat).

Left Side Cover

Provides access to:

- ACCESS 3 and ACCESS 2 Fan

With the seat deck open, remove the left side cover by loosening the nut on the upper left corner and lifting the cover up.

Right Side Cover

Provides access to:

- Hydraulic motor and pump
- Battery restraint switch

The right side cover lifts out and is also a battery retainer.

Floorboards

The floorboards are in two pieces. Sliding the left and right floorboard out provides access to:

- Traction motors and brakes
- Brake pedal, switch and potentiometer
- Accelerator pedal, switch and potentiometer
- Hydraulic directional control valve (trucks with manual valve only)
- Hydraulic function switches and lift potentiometer (trucks with manual valve)
- Tilt cylinders and switches
- Tilt manifold
- Horn
- Tow connectors
- Optional traction motor fan
- Hydraulic reservoir, filter, breather hoses, etc.
- Impact sensor and travel alarm
- EPV manifold (trucks with EPV only)
- Two accessories manifold (trucks with EPV only)
- ACCESS 7 (trucks with EPV and two accessories only)
- Operator presence manifold (manual valve only)

Cover Below Dash

Provides access to:

- Steer unit
- ACCESS 1 connections
- Optional fan and work light switches

Dash Cover

Provides access to:

- Steer command encoder

Steering Column Covers

Provides access to:

- Key switch
- Travel directional switches

Control Lever Cover (Trucks with Manual Valve only)

Provides access to:

- Control lever linkage

Lowering Flow Control Manifold Cover

Provides access to:

- Pressure transducer

Armrest Pad and Cover (Trucks with EPV only)

- Potentiometers, directional control switches

Lubrication

The following information is intended to provide guidelines for proper lubrication intervals as called out in the lubrication chart. However, some operating conditions will require more frequent checks and lubrication than listed. For example, applications with much dust or moisture will require modification of the schedule to fit that particular application. Use high grade lubricants and fluids. Sources of these lubricants may be from almost any of the oil companies. Recommended lubricants are listed in the Lubrication Identification Chart and the Alternate Lubricants & Fluids Chart in Lubrication & Adjustment Chapter. Crown trucks may require a mixture of low temperature hydraulic oil, Crown P/N363505-101 (gal), blended with standard hydraulic oil, Crown P/N 063001-021 (gal) when used in a freezer or cooler. 100% low temperature oil is too thin for most cold storage operations and therefore could shorten the life of cylinder packings and pumps if used in higher ambient temperatures.

CAUTION

Trucks equipped with velocity fuses may experience staging issues if an insufficient mix of low temperature oil has been used.

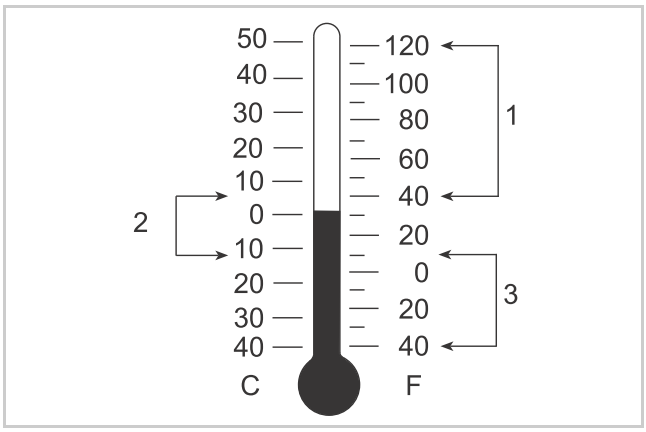


Figure 17478-01

1	Hydraulic Oil 063001-001 (100%)
2	50/50 Blend of Low-Temp 063001-006 (50%) and Hydraulic Oil 063001-021 (50%)
3	80/20 Blend of Low-Temp 063001-006 (80%) and Hydraulic OIl 063001-021 (20%)

For truck applications operating continually in temperatures at or above 4° C (40° F), use 100% standard hydraulic oil (063001-001).

For truck applications primarily operating in a cooler environment with intermittent freezer entry, use a 50/50 blend of low temperature (063001-006) and standard hydraulic oil (063001-021). For trucks running continuously at temperatures of -12° C (10° F) or below, use an 80% low temperature (063001-006) and 20% standard hydraulic oil (063001-021). The proper mixture of freezer hydraulic oil will ensure the best and most efficient operation of your Crown equipment. All screws, washers, nuts, roll pins, retaining rings, etc. need to be coated with a rust preventive (078882) to protect against corrosion. Lubrication intervals must be changed to a frequency that will minimise corrosion and wear on moving shafts and parts.

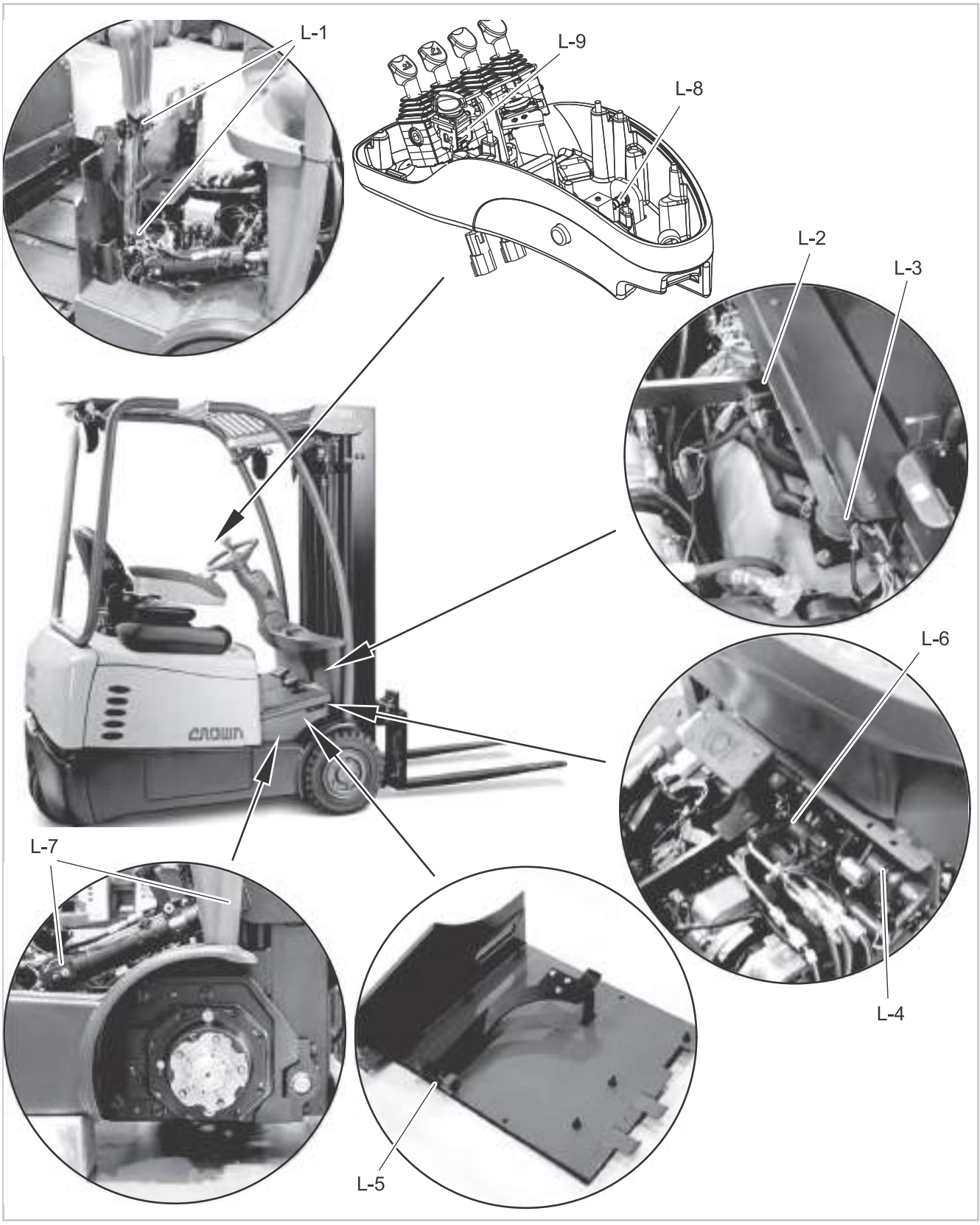
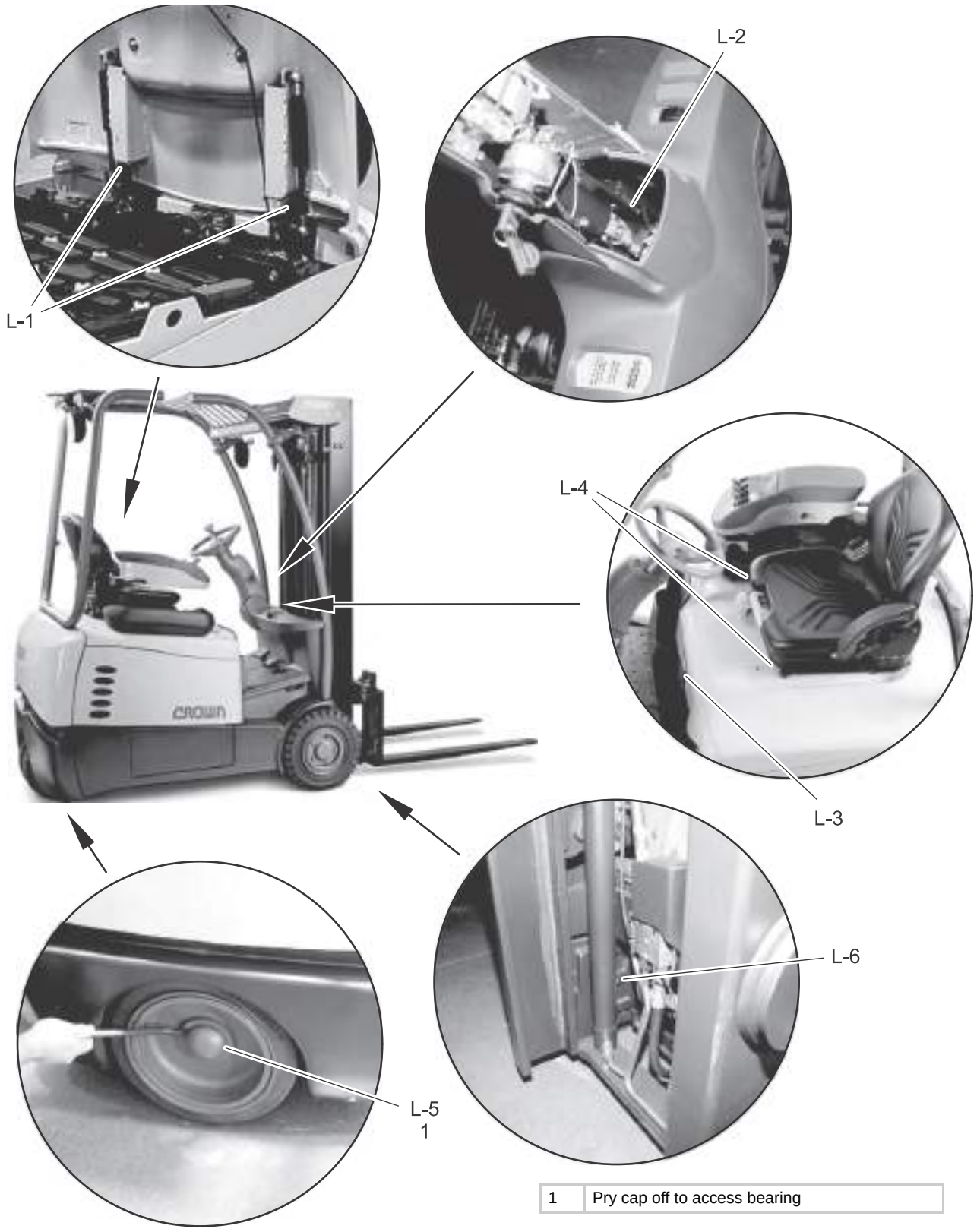


Figure 26903

Chart 1 - Planned Maintenance Lubrication					
Index	**Component**	**Lube Type**	**Quantity**	**60 Days 250 Hrs**	**12 Months 2000 Hrs**
L-1	Lift, Tilt and Accessory Lever Linkage and Pivots (Trucks with Manual Valve only)	O	As Required	Check	
L-2	Brake Pedal Pivot	B	As Required	Check	
L-3	Hydraulic Reservoir Oil 10 micron Filter Element Suction Strainer Breather Cap	D	 16.6 Liter (4.4 gal) 1 1 1	 Check 1st Change 1st Change	 Change Change Clean Change
L-4	Accelerator Potentiometer Pivot	O	As Required	Check	
L-5	Accelerator Pedal Pivot	O	As Required	Check	
L-6	Brake Potentiometer Pivot	O	As Required	Check	
L-7	Tilt Cylinder Pivot	B	As Required	Check	
L-8	Armrest Adjustment Pin and Spring (trucks with EPV only)	B	As Required	Check	
L-9	Directional Control Rollers (Trucks with EPV only)	B	As Required	Check	
See Lubrication Identification Chart and Alternate Lubricants & Fluids Chart for lube type designation explanation. Lubrication intervals must be changed to a frequency that will minimise wear on moving shafts and parts on vehicles used in less desirable operation conditions.					
Lubrication intervals for freezer/corrosion trucks must be changed to a frequency that will minimise corrosion and wear on moving parts.					



1	Pry cap off to access bearing

Figure 269041

Chart 2 - Planned Maintenance Lubrication					
Index	**Component**	**Lube Type**	**Quantity**	**60 Days 250 Hrs**	**12 Months 2000 Hrs**
L-1	Seat Deck Hinges	Q	As Required	Check	
L-2	Adjustment Latch	Q	As Required	Check	
L-3	Seat Deck Latch	Q	As Required	Check	
L-4	Seat Slides	Q	As Required	Check	
L-5	Steer Wheel Bearing	B	As Required	Check	
L-6	Drive Unit Oil	AAAA	775 mL (0.8 quart)	Check	Change
See Lubrication Identification Chart and Alternate Lubricants & Fluids Chart for lube type designation explanation. Lubrication intervals must be changed to a frequency that will minimise wear on moving shafts and parts on vehicles used in less desirable operation conditions.					
Lubrication intervals for freezer/corrosion trucks must be changed to a frequency that will minimise corrosion and wear on moving parts.					

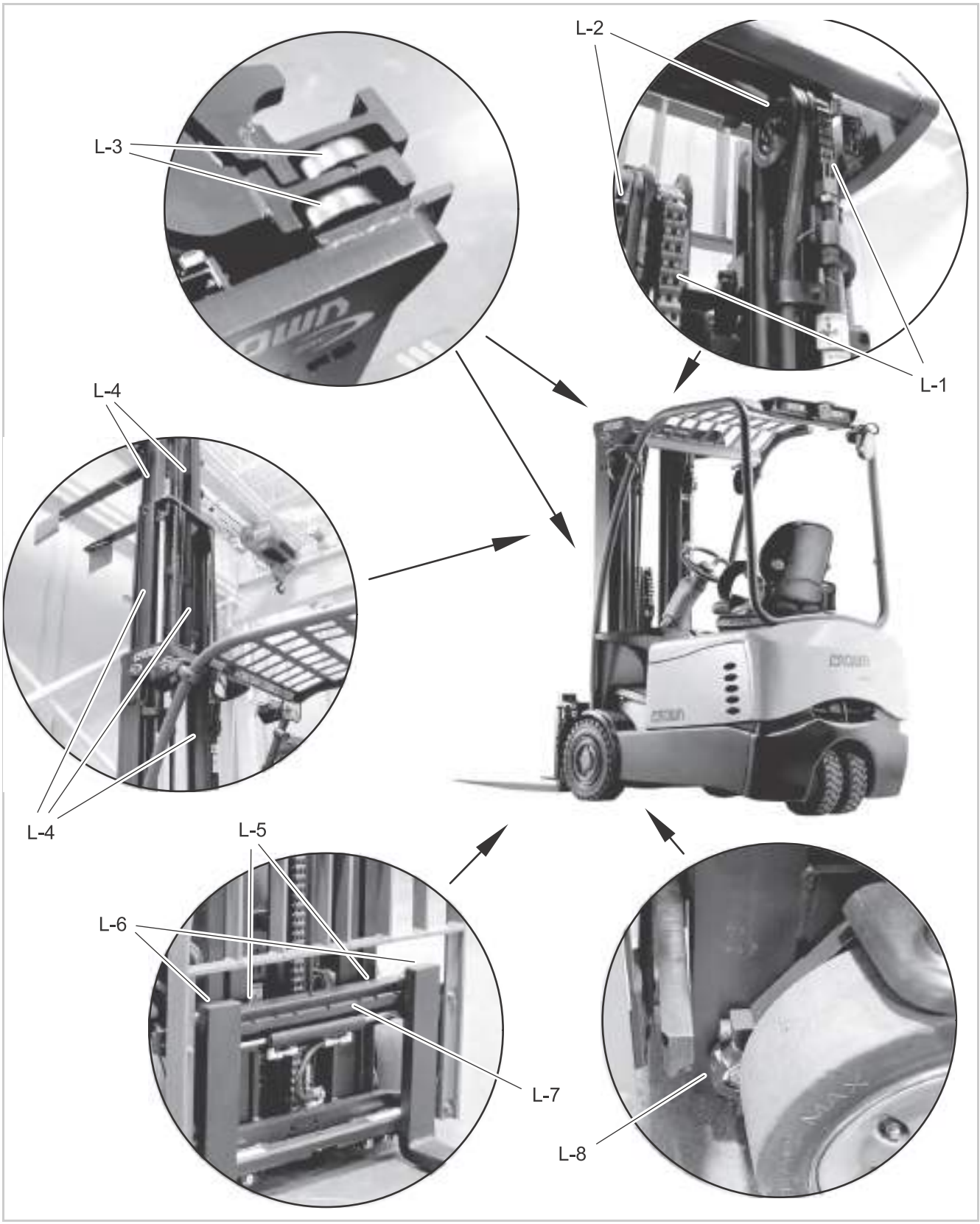


Figure 26905

Chart 3 - Planned Maintenance Lubrication					
Index	Component	Lube Type	Quantity	60 Days 250 Hrs	12 Months 2000 Hrs
L-1	Lift Chains	G	As Required	Check	
L-2	Mast Pulleys	H	As Required	Check	
L-3	Mast and Carriage Column Rollers	B/E	As Required	Check	
L-4	Mast Channels	E	As Required	Check	
L-5	Sideshifter Slide Rail	B/E	As Required	Check	
L-6	Fork Locking Pins	P	As Required	Check	
L-7	Fork Slide	P	As Required	Check	
L-8	Mast Pivots	B	As Required	Check	
See Lubrication Identification Chart and Alternate Lubricants & Fluids Chart for lube type designation explanation. Lubrication intervals must be changed to a frequency that will minimise wear on moving shafts and parts on vehicles used in less desirable operation conditions.					
Lubrication intervals for freezer/corrosion trucks must be changed to a frequency that will minimise corrosion and wear on moving parts.					

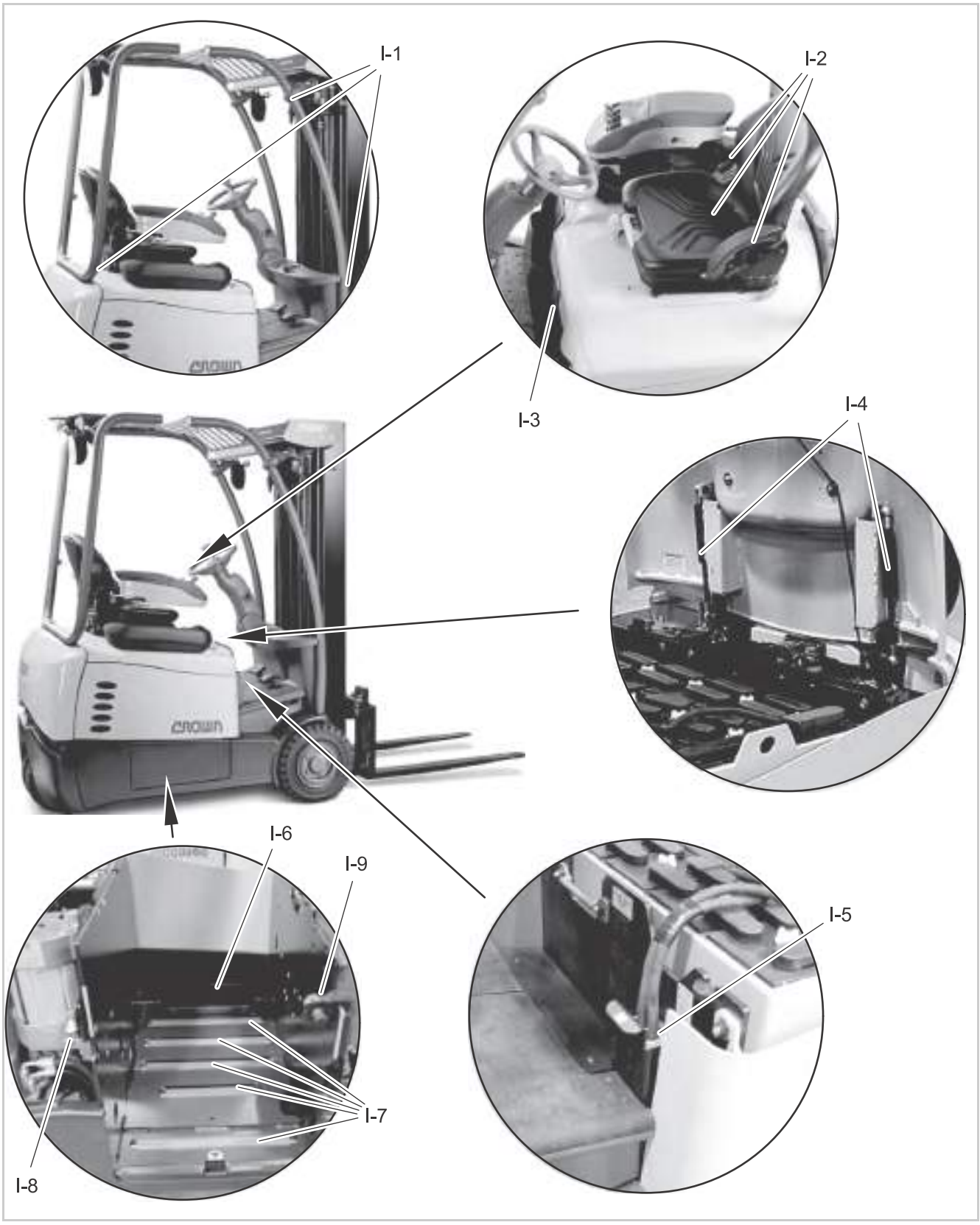


Figure 25013

Chart 4 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Overhead Guard, Secure and No Cracks	Check
I-2	Seat Belt, Retainer and Switch	Check
I-3	Seat Deck Latch	Check
I-4	Gas Struts, Hinges and Mounting Hardware	Check
I-5	Battery Connector and Contacts	Check
I-6	Battery Retainer Condition	Check
I-7	Battery Rollers and Spacers	Check
I-8	Battery Restraint Switch (BRES)	Check
I-9	Battery Stop Adjustment	Check
Refer to the appropriate chapter of service manual for additional information concerning inspection or adjustment.		

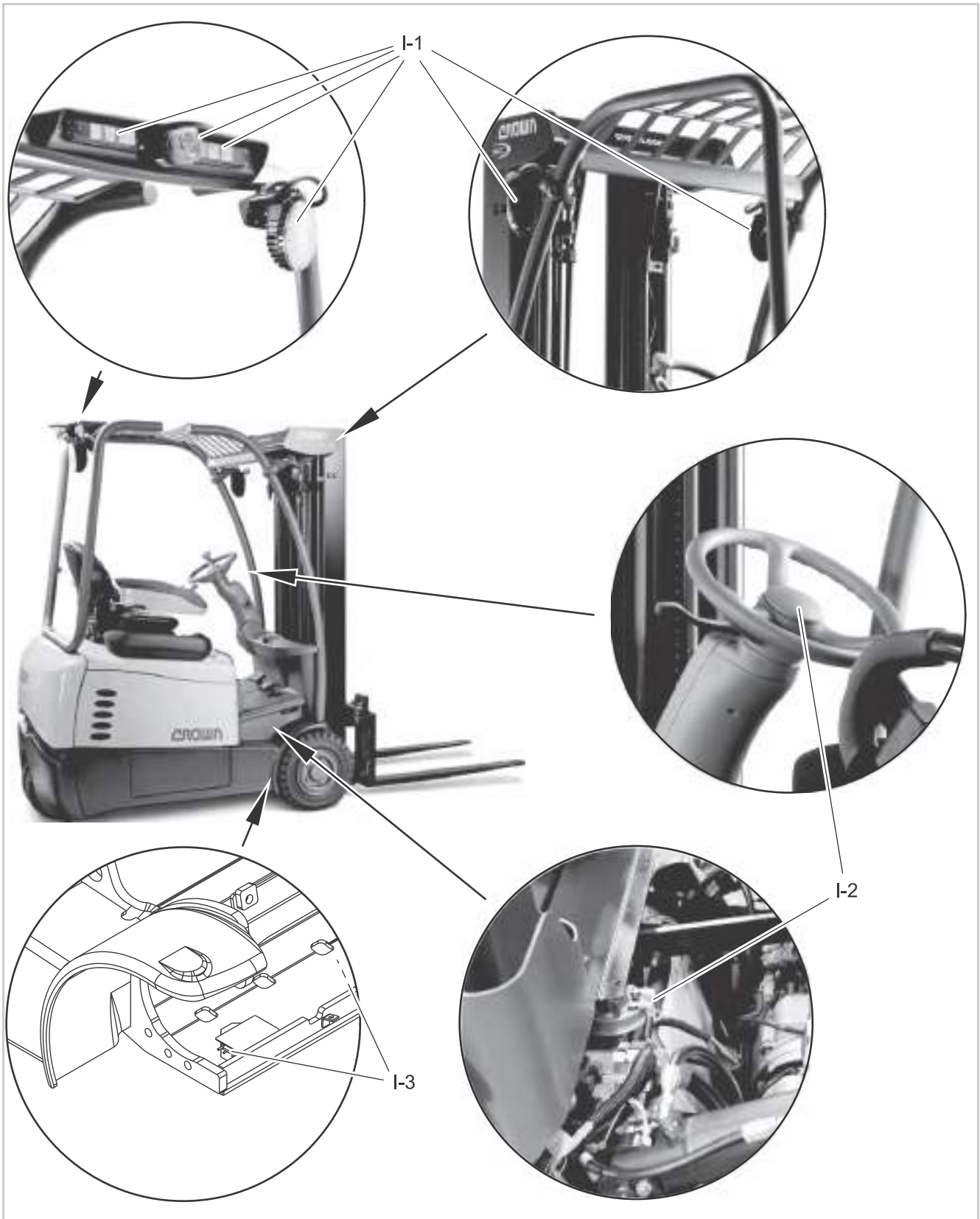


Figure 26907

Chart 5 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Strobe, Tail and Work Lights	Check
I-2	Horn Switch, Horn and Operation	Check
I-3	Travel Alarm and Impact Sensor	Check
Refer to the appropriate chapter of service manual for additional information concerning inspection or adjustment.		

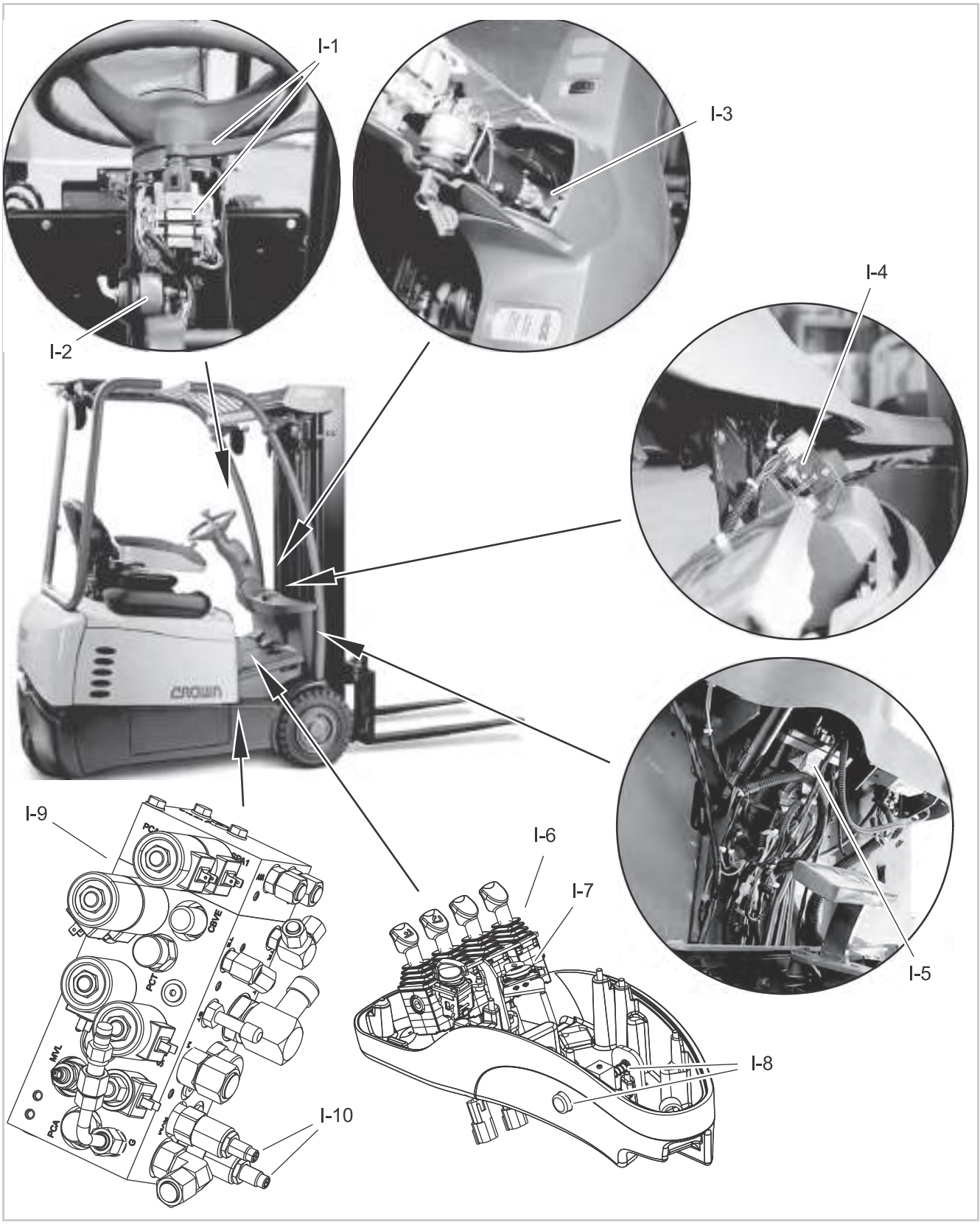


Figure 26908

Chart 6 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Control Handle and Switches	Check
I-2	Key Switch	Check
I-3	Steer Column Pivot, Universal and Adjustment Latch	Check
I-4	Steer Command Encoder and Gears	Check
I-5	Steer Unit	Check
I-6	Armrest Potentiometers, Directional Control, Connections and Wiring (Trucks with EPV only)	Check
I-7	Armrest Horn Switch, Horn and Operation (Trucks with EPV only)	Check
1-8	Armrest Adjustment, Pin and Spring (Trucks with EPV only)	Check
1-9	EPV Manifold Valves (Trucks with EPV only)	Check
1-10	Main and Accessories Relief Valves (RVM and RVA) Operation (Trucks with EPV only)	Check
Refer to the appropriate section of service manual for additional information concerning inspection or adjustment.		

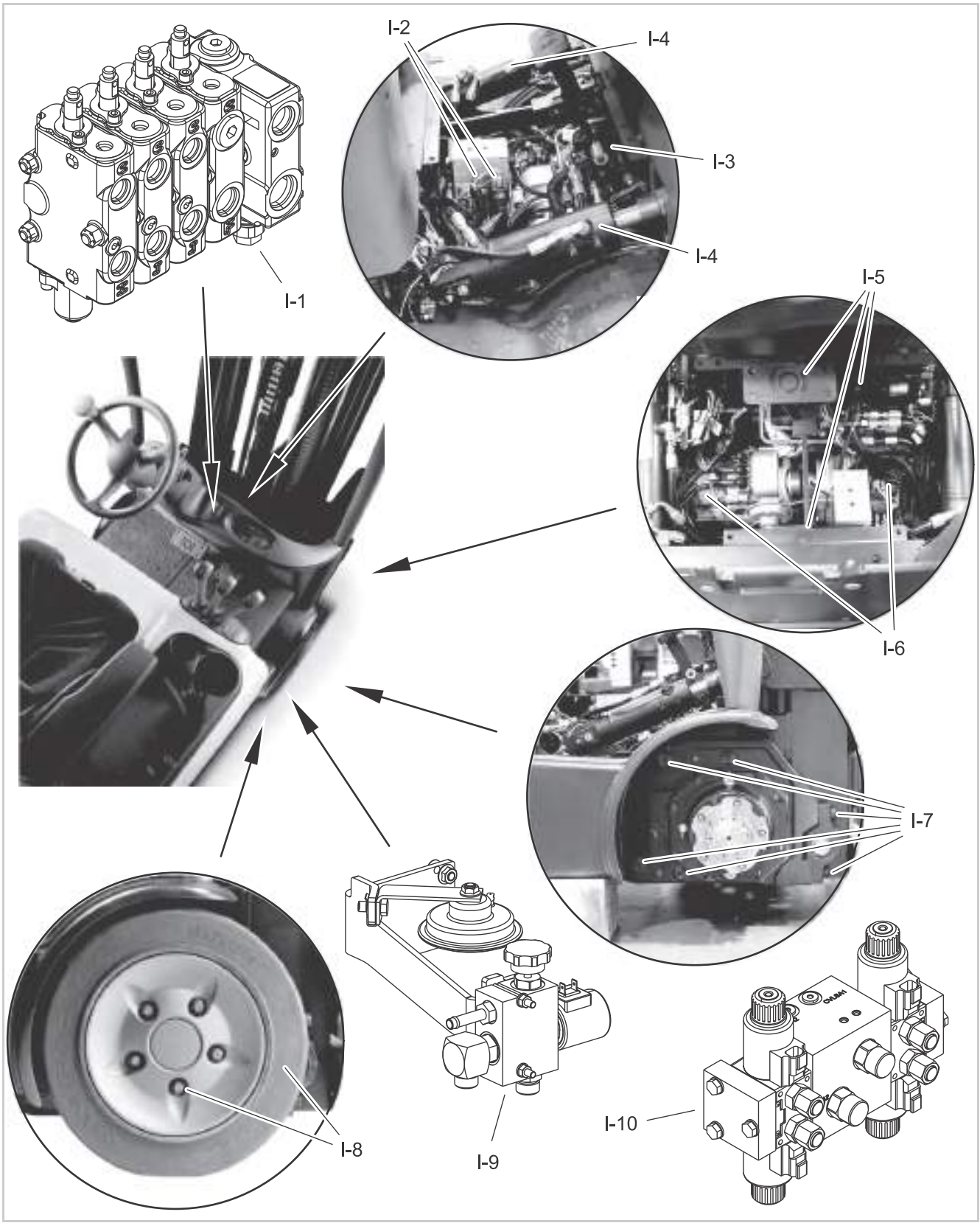
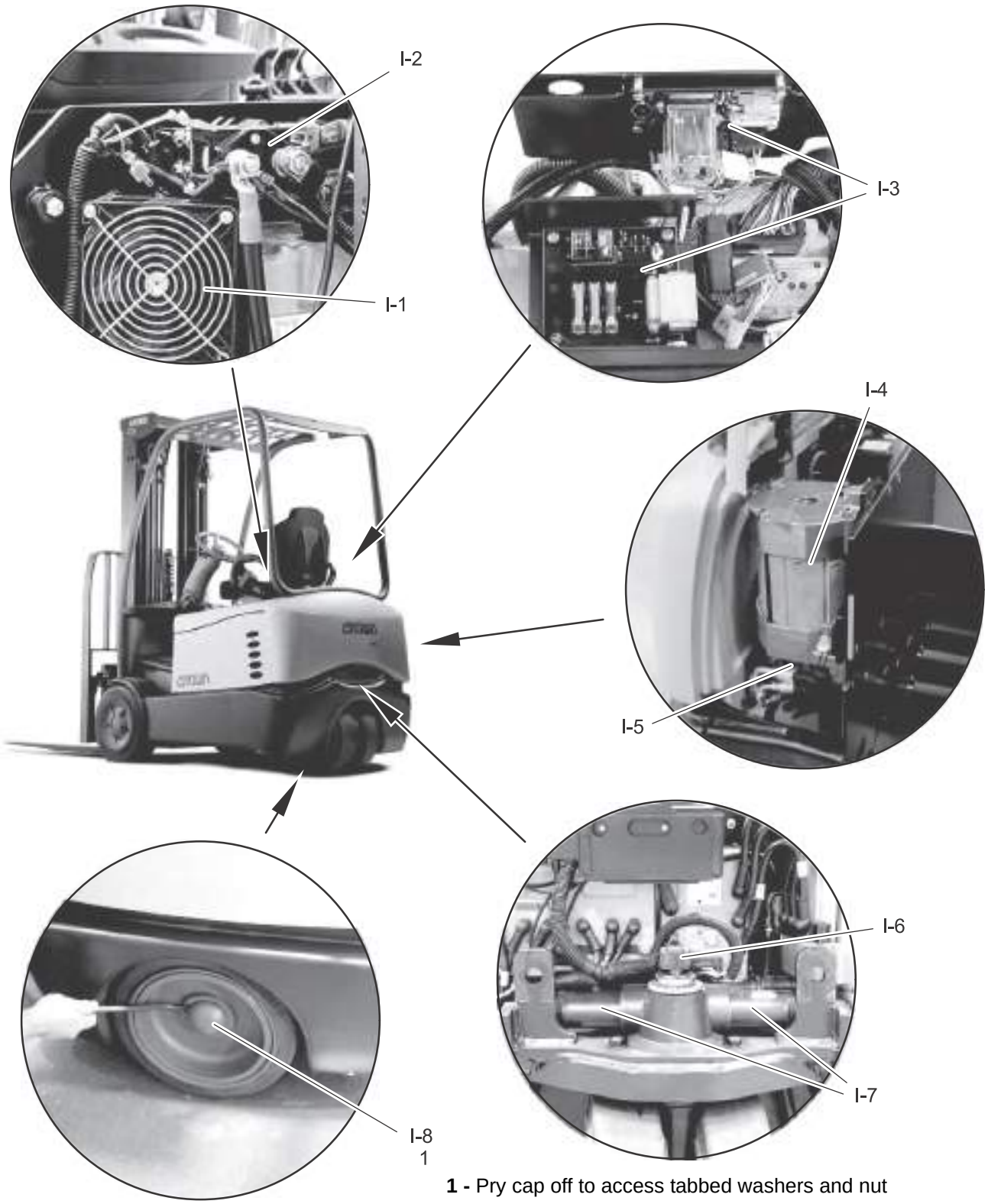


Figure 26909

Chart 7 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Lift and Accessory Relief Valves (RV1 and RV2) Operation (Trucks with Manual Valve only)	Check
I-2	Tilt Restriction Solenoid Valve (SV1) and Tilt Position Assist Solenoid Valve [(SV3) Trucks with Manual Valve only]	Check
I-3	Accelerator Linkage, Switch Adjustment & Potentiometer	Check
I-4	Tilt Cylinders, Mounting & Mounting Hardware	Check
I-5	Brake Linkage, Mounting, Potentiometer and Operation	Check
I-6	Traction Motors, Mounting Secure	Check
I-7	Drive Units Mounting Secure	Check
I-8	Drive Tires and Lug Nuts	Check
I-9	Operator Presence Manifold Valves (Trucks with Manual Valve Only)	Check
1-10	Two Accessories Manifold Valve (Trucks with EPV and Two Accessories only)	Check
I-11	Traction Motor Compartment and Steer Column Electrical Connections Cables and Wiring (not shown)	Check
I-12	Traction Motor Compartment Hydraulic Hoses, Tubes and Fittings (not shown)	Check
Refer to the appropriate section of service manual for additional information concerning inspection or adjustment.		



1 - Pry cap off to access tabbed washers and nut

Figure 26910

Chart 8 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Fan	Check
I-2	Contactor Tips	Check
I-3	Distribution/Relay Panels	Check
I-4	Hydraulic Motor, Mounting Secure	Check
I-5	Hydraulic Pump	Check
I-6	Steer Angle Potentiometer	Check
I-7	Steer Axle/Cylinder	Check
I-8	Steer Tire, Mounting Secure	Check
I-9	Rear Compartment Electrical Connections, Cables and Wiring (not shown)	Check
I-10	Rear Compartment Hydraulic Hoses, Tubes and Fittings (not shown)	Check
Refer to the appropriate chapter of service manual for additional information concerning inspection or adjustment.		

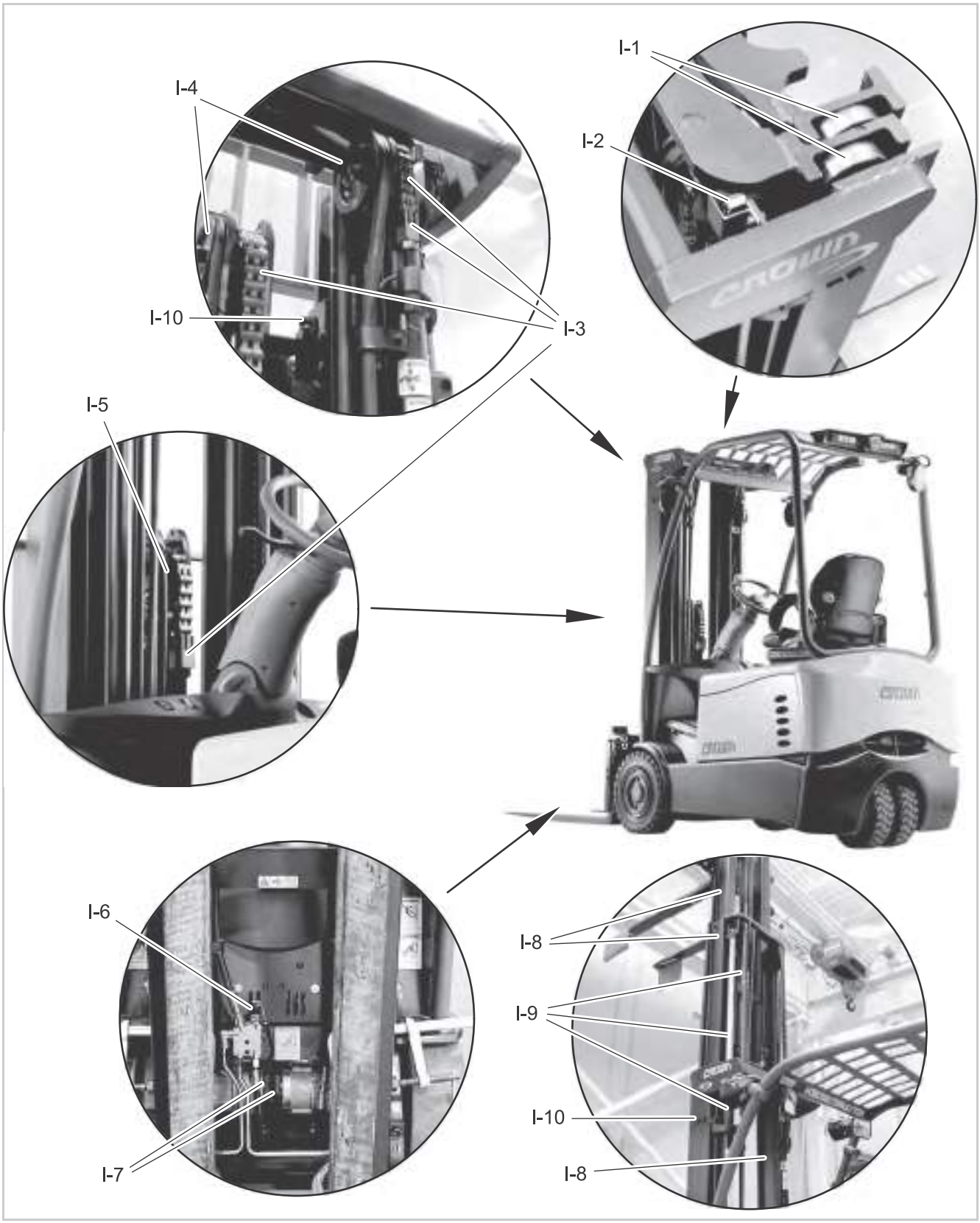


Figure 26911

Chart 9 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Mast and Carriage Column Rollers	Check
I-2	Mast Limit Switch (HGST1)	Check
I-3	Lift Chains and Anchors	Check
I-4	Mast Pulleys Rollers and Bearings	Check
I-5	Yoke	Check
I-6	Pressure Transducer (PT1)	Check
I-7	Brake Air Gap	Check
I-8	Mast Channels	Check
I-9	Lift Cylinders and Mounting	Check
I-10	Mast Stops and Carriage Bumpers	Check
Refer to the appropriate chapter of service manual for additional information concerning inspection or adjustment.		

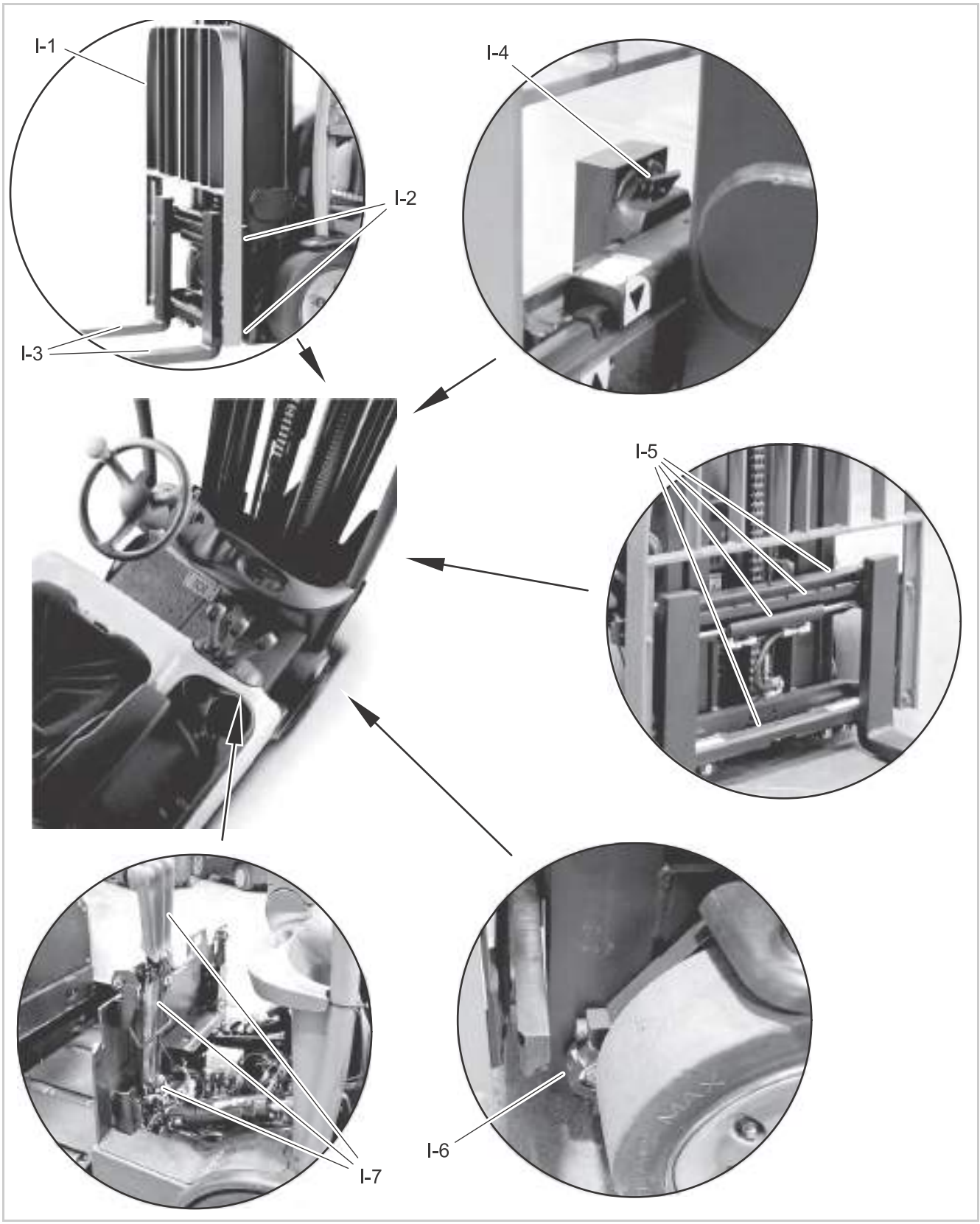


Figure 26912

Chart 10 - Planned Maintenance Inspection		
Index	**Component**	**60 Days 250 Hrs**
I-1	Load Backrest	Check
I-2	Carriage	Check
I-3	Forks	Check
I-4	Fork Latches	Check
I-5	Sideshifter (Slide, Cylinder, Mounting Hardware, etc)	Check
I-6	Mast Pivot Bearings and Mounting Bolts	Check
I-7	Control Levers Linkage, Switches and Lift Potentiometer (trucks with Manual Valve only)	
I-8	Mast Hydraulic Lines, Hoses and Fittings (not shown)	Check
I-9	Mast Cable and Wiring (not shown)	Check
Refer to the appropriate chapter of service manual for additional information concerning inspection or adjustment.		

Metric Torque Values

All Crown trucks are manufactured with class 8.8 or better screws and bolts. The information contained in this section will aid you when replacing any screws and bolts that are necessary when performing maintenance on your lift truck.

Grade

Grade Marking (on Head)	Specification	Material	Bolt and Screw Size (mm)
	Class 5.8	Low Carbon Steel	M5 through M36
	Class 8.8	Medium Carbon Steel Quenched and Tempered	M5 through M36
	Class 10.9	Medium Carbon Alloy Steel Quenched and Tempered	M5 through M36
Note: Even though a bolt head is unmarked, Crown uses nothing less than class 8.8 in all of its bolted assemblies. Instances do occur when class 8.8 bolts are manufactured unmarked. When a fastener is replaced that is unmarked, replace the fastener with a class 8.8.			

Figure 15048

Torque Chart - Metric Hex Head Cap Screws and Nuts			
Thread Diameter & Pitch	Tightening Torque Nm		
	Class 8.8	Class 10.9	Class 12.9
M5 x 0.80	5 - 8	7 - 8	8 - 10
M6 x 1.00	8 - 10	12 - 14	15 - 16
M8 x 1.25	20 - 25	28 - 31	34 - 37
M10 x 1.50	39 - 43	56 - 61	68 - 75
M12 x 1.75	71 - 76	100 - 107	119 - 127
M14 x 2.00	113 - 122	159 - 171	190 - 205
M16 x 2.00	175 - 190	247 - 267	296 - 320
M20 x 2.50	340 357	479 - 518	574 - 621
M24 x 3.00	587 - 635	824 - 892	990 - 1071
M30 x 3.50	1175 - 1274	1654 - 1792	1985 - 2150
Note: Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page.			

Torque Chart - Metric Hex Socket Countersink Head Screws			
Thread Diameter & Pitch	Tightening Torque Nm (ft lb)		
	Class 8.8	Class 10.9	Class 12.9
M5 x 0.80	4 - 7	5 - 8	7 - 10
M6 x 1.00	7 - 10	9 - 12	11 - 14
M8 x 1.25	16 - 19	23 - 26	27 - 30
M10 x 1.50	31 - 34	45 - 49	54 - 58
M12 x 1.75	56 - 60	79 - 84	94 - 102
M14 x 2.00			
M16 x 2.00	124 - 146	190 - 206	228 - 247
M20 x 2.50	259 - 281	363 - 395	437 - 473
M24 x 3.00	416 - 451	586 - 635	702 - 762
M30 x 3.50			
Note: Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page.			

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Torque Chart - Metric Socket Head Cap Screws			
Thread Diameter & Pitch	Tightening Torque Nm		
	Class 8.8	Class 10.9	Class 12.9
M5 x 0.80	5 - 8	7 - 9	8 - 11
M6 x 1.00	9 - 12	12 - 15	15 - 18
M8 x 1.25	22 - 24	30 - 33	35 - 38
M10 x 1.50	42 - 45	58 - 64	71 - 76
M12 x 1.75	72 - 77	102 - 110	122 - 132
M14 x 2.00	115 - 125	161 - 175	194 - 210
M16 x 2.00	179 - 194	251 - 273	301 - 327
M20 x 2.50	348 - 377	489 - 530	588 - 637
M24 x 3.00	601 - 651	846 - 915	1014 - 1098
M30 x 3.50	1196 - 1296	1681 - 1822	2017 - 2187
Note: Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page.			

Torque Chart - Metric Flanged Hex Head Cap Screws and Nuts			
Thread Diameter & Pitch	Tightening Torque Nm		
	Class 8.8	Class 10.9	Class 12.9
M5 x 0.80	5 - 8	8 - 11	9 - 12
M6 x 1.00	9 - 12	14 - 16	16 - 19
M8 x 1.25	22 - 24	31 - 34	38 - 41
M10 x 1.50	44 - 48	62 - 68	75 - 81
M12 x 1.75	77 - 83	108 - 117	130 - 141
M14 x 2.00	123 - 134	174 - 187	209 - 225
M16 x 2.00	193 - 210	273 - 294	327 - 354
Note: Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page.			

Torque Values

All Crown Trucks are manufactured with Grade 5 or better screws and bolts. The information contained in this section will aid you when replacing any screws and bolts that are necessary when performing maintenance on your lift truck.

Grade

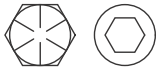
Grade Marking (on Head)	Specification	Material	Bolt and Screw Size (Inches)
	SAE - Grade 2	Low Carbon Steel	1/4 thru 1-1/2
	SAE - Grade 5	Medium Carbon Steel, Quenched and Tempered	1/4 thru 1-1/2
	SAE - Grade 8	Medium Carbon Alloy Steel, Quenched and Tempered	1/4 thru 1-1/2
Note: Even though a bolt head is unmarked, Crown uses nothing less than Grade 5 in all of its bolted assemblies. Instances do occur when Grade 5 bolts are manufactured unmarked. When a fastener is replaced that is unmarked, replace the fastener with a Grade 5.			

Figure 14916

Torque Chart						
Bolt Diameter	Grade 5			Grade 8		
	Dry Torque Requirement			Dry Torque Requirement		
in	ft lb	kgm	Nm	ft lb	kgm	Nm
1/4	9 ± 3	1.2 ± 4	12 ± 4	13 ± 4	1.8 ± 5	17.5 ± 5.5
5/16	18 ± 5	2.5 ± 7	24.5 ± 7	25 ± 5	3.5 ± 7	34 ± 7
3/8	32 ± 5	4.4 ± 7	43.5 ± 7	48 ± 10	6.6 ± 1.3	65 ± 13.5
7/16	50 ± 10	6.9 ± 1.4	67.5 ± 13.5	75 ± 10	10.4 ± 1.4	102 ± 13.5
1/2	75 ± 10	10.4 ± 1.4	101.5 ± 13.5	112 ± 15	15.5 ± 2.0	152 ± 20.5
9/16	110 ± 15	15.2 ± 2.0	149 ± 20.5	163 ± 20	22.5 ± 3.0	221 ± 27
5/8	150 ± 20	20.7 ± 2.8	203.5 ± 27	225 ± 30	31.1 ± 4.1	305 ± 41
3/4	265 ± 35	36.6 ± 4.8	359 ± 47.5	400 ± 50	55.2 ± 6.9	542 ± 68
7/8	420 ± 60	58.1 ± 8.3	569 ± 81	640 ± 80	88.3 ± 11.0	868 ± 108
1	640 ± 80	88.5 ± 11.1	868 ± 109	960 ± 115	132.5 ± 15.9	1300 ± 156
1 1/8	800 ± 100	110.6 ± 13.8	1085 ± 136			
1 1/4	1000 ± 120	138 ± 16.6	1356 ± 163			
1 3/8	1200 ± 150	166 ± 20.7	1630 ± 203			
1 1/2	1500 ± 200	207 ± 27.7	2034 ± 271			
	Mounting bolt torque requirements involving hydraulic valves.					
5/16	13 ± 2	1.8 ± 3	17.5 ± 2.5			
3/8	24 ± 2	3.3 ± 3	32.5 ± 2.5			
7/16	39 ± 2	5.4 ± 3	53 ± 2.5			
Note: Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page.						

Notes:

COMPONENTRY

Notes:

Componentry

The electrical and hydraulic components in this section are listed alphabetically and include the information below:

- Component designator (i.e., ALM2) that is on the wiring diagram, hydraulic schematic, Access 1 2 3® menu and parts pages.
- Description
- Location of the component on the truck
- Purpose of the component
- Technical data
- Adjustments, if applicable
- Wiring diagram or hydraulic schematic page(s) the component appears.
- Parts page that the component appears. One additional number immediately follows the parts page number. This number (in parenthesis) is the index number of the (i.e., 04.0-1153-050 (9)).

Audible Indicators

ALM1

Status Alarm

Location: internal to ACCESS 1

Purpose: alerts the operator of improper operator sequence or when the display logs an Event. The alarm will sound briefly when the truck is turned ON.

Data: controlled by ACCESS 1. View ALM1 status from ANALYZER, A3.1.1 menu. Test ALM1 from ANALYZER, A4.1.2 menu.

Adjustment: N/A

EPV Diagrams: DIA-1153-003
DIA-1153-008

Manual Valve Diagrams: DIA-1153-020
DIA-1153-025

Parts Breakdown: not available

ALM2 (optional)

Travel Alarm

Location: traction motor compartment, mounted on the right side of power unit below the traction motor

Purpose: alerts pedestrians of truck movement

Data: controlled by ACCESS 3. ACCESS 3 provides +BV and negative to ALM2. View ACCESS 3 output to ALM2 from ANALYZER, A3.3.3 menu. Test ACCESS 3 output to ALM2 from ANALYZER, A4.3.3 menu.

Adjustment: can be set from FEATURES, F20.2 menu to sound during forward travel, reverse travel or all travel. Alarm can also be disabled in F20.2.

EPV Diagrams: DIA-1153-010

Manual Valve Diagrams: DIA-1153-026

Parts Breakdown: 04.0-1153-050 (9)
04.0-1153-100 (9)

HN1

Horn

Location: traction motor compartment. The horn mounts near where the brake pedal pivots.

Purpose: provide operator controlled audible warning

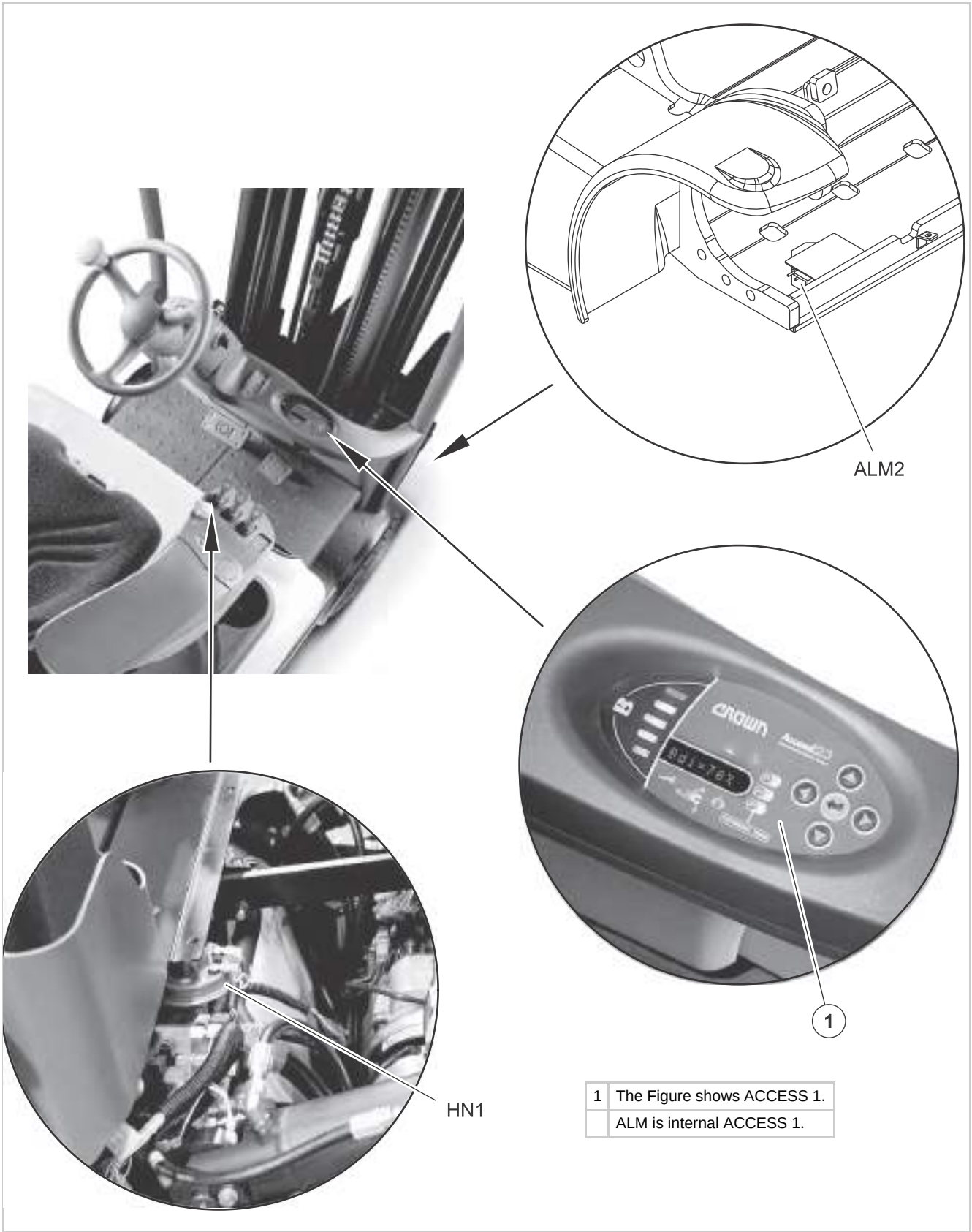
Data: receives +BV from battery when horn switch HNS is closed. BNEG is supplied to horn when the battery is connected.

Adjustment: N/A

EPV Diagrams: DIA-1153-003
DIA-1153-012

Manual Valve Diagrams: DIA-1153-009
DIA-1153-026

Parts Breakdown: 04.0-1153-050 (13)
04.0-1153-100 (13)



1	The Figure shows ACCESS 1.
	ALM is internal ACCESS 1.

FIgure 26829

Brakes

BRK1

Right Brake

Location: right traction motor

Purpose: provide braking force to right traction motor to stop the truck during a hard brake application. The brake prevents movement when the truck is parked.

Data: coil resistance is 7 to 10 Ω at 22 °C. Electrically released and spring applied. ACCESS 1 controls the brake. ACCESS 1 supplies positive and negative to BRK1. View ACCESS 1 outputs to BRK1 from ANALYZER, A3.1.2. Test ACCESS 1 output to BRK1 from ANALYZER, A4.1.3 menu.

Adjustment: refer to Brake section of service manual

EPV Diagrams: DIA-1153-003
DIA-1153-008

Manual Valve Diagrams: DIA-019
DIA-1153-025

Parts Breakdown: 05.3-1152-001

BRK2

Left Brake

Location: left traction motor

Purpose: provide braking force to left traction motor to stop the truck during a hard brake application. The brake prevents movement when the truck is parked.

Data: coil resistance is 7 to 10 Ω at 22 °C.Electrically released and spring applied. ACCESS 1 controls the brake. ACCESS 1 supplies positive and negative to BRK2. View ACCESS 1 outputs to BRK2 from ANALYZER, A3.1.3. Test ACCESS 1 output to BRK2 from ANALYZER, A4.1.4 menu.

EPV Diagrams: DIA-1153-003
DIA-1153-008

Manual Valve Diagrams: DIA-1153-020
DIA-1153-025

Parts Breakdown: 05.3-1152-001(661)

Contactors

L

Line Contactor

Location: rear truck compartment, controller panel

Purpose: line contactor tips provide +BV to ACCESS 3 and ACCESS 2 power circuit

Data: controlled by ACCESS 3. ACCESS 3 provides 24 V and negative to L contactor coil. Coil is suppressed internally to absorb voltage from collapsing magnetic field when de-energizing and is polarity sensitive. Coil resistance is approximately 55 Ω. View ACCESS 3 output to L contactor coil from ANALYZER, A3.3.1 menu. Test ACCESS 3 output to L coil from ANALYZER, A4.3.1 menu.

Adjustment: N/A

EPV Diagrams:

Coil: DIA-1153-003
DIA-1153-004

Contacts: DIA-1153-003
DIA-1153-017

Manual Valve Diagrams:

Coil: DIA-1153-020
DIA-1153-021

Contacts: DIA-1153-020
DIA-1153-033

Parts Breakdown: 04.1-1153-050 (19)
04.4-2045-001

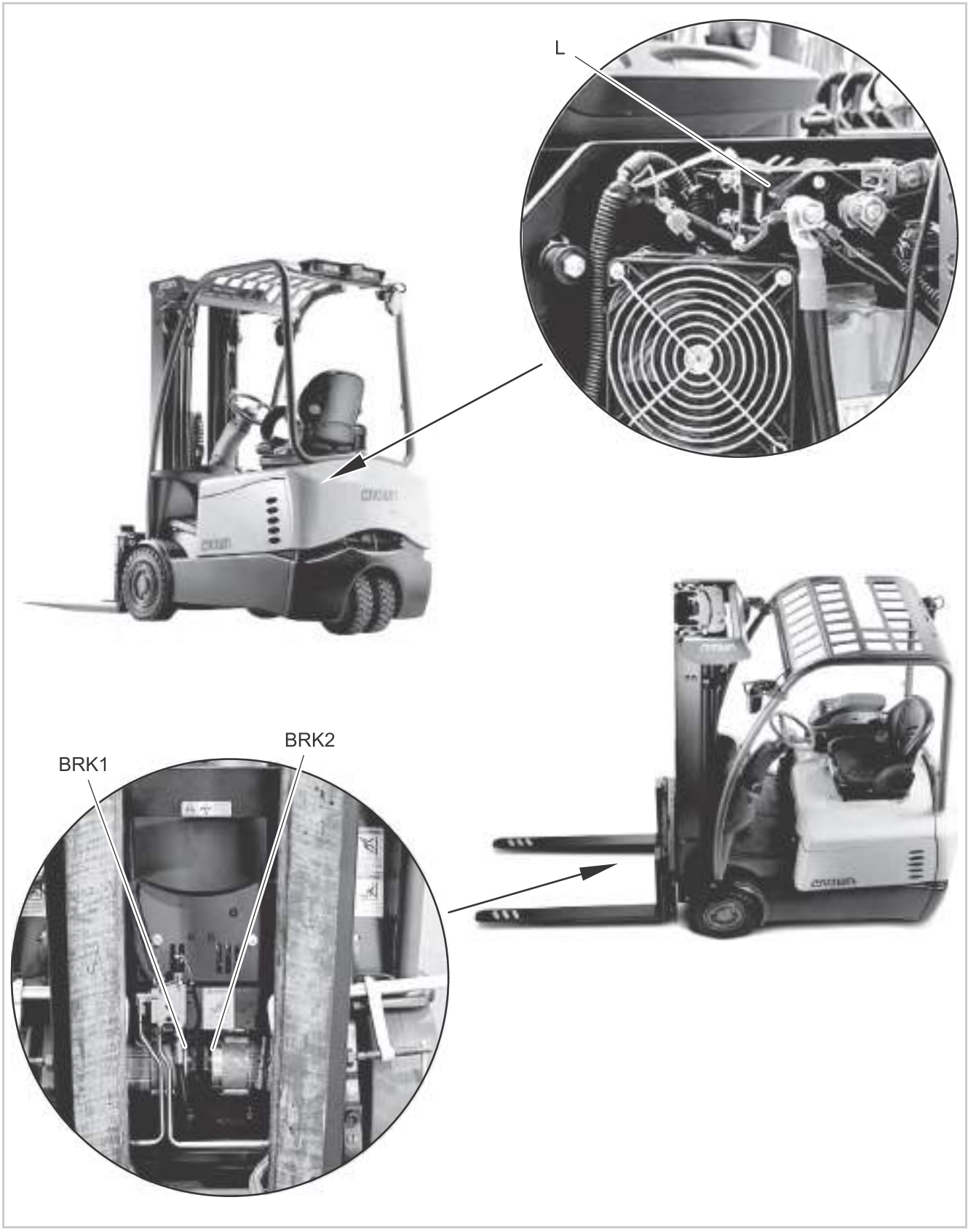


Figure 26830

Control Modules

ACCESS 1

Display Control Module

Location: truck dash

Purpose: display pertinent truck information to operator or service technician, allows technician to modify truck settings, calibrate components and troubleshoot. During truck operation ACCESS 1 energises the brake coils, floorboard fan, pressure transducer, steer command encoder, solenoid valve lower (EPV only) and solenoid valve bypass (EPV only).

Data: N/A

Adjustment: if module is replaced, complete truck calibration is recommended to prevent nuisance codes. Also if replacement module includes updated software, the software in the remaining modules must be updated so all software is compatible.

EPV Diagrams: DIA-1153-003
DIA-1153-008

Manual Valve Diagrams: DIA-1153-020
DIA-1153-025

Parts Breakdown: 04.0-1153-001 (7)

ACCESS 2

Hydraulic Control Module

Location: rear truck compartment, controller panel

Purpose: controls the hydraulic system operation except the 2nd accessory solenoid proportional valves (EPV only) and solenoid valve load sense dump (EPV only)

Data: N/A

Adjustment: if module is replaced, complete truck calibration is recommended to prevent nuisance codes. Also if replacement module includes updated software, the software in the remaining modules must be updated so all software is compatible.

EPV Diagrams: DIA-1153-003
DIA-1153-007
DIA-1153-0017

Manual Valve Diagrams: DIA-1153-020
DIA-1153-024
DIA-1153-033

Parts Breakdown: 04.1-1153-050 (2)

ACCESS 3

Traction Control Module

Location: rear truck compartment, controller panel

Purpose: controls the traction system, line contactor, ACCESS 3 cooling fan and travel alarm (option) operation

Data: N/A

Adjustment: if module is replaced, complete truck calibration is recommended to prevent nuisance codes. Also if replacement module includes updated software, the software in the remaining modules must be updated so all software is compatible.

EPV Diagrams: DIA-1153-003
DIA-1153-006
DIA-1153-017

Manual Valve Diagrams: DIA-1153-020
DIA-1153-023
DIA-1153-033

Parts Breakdown: 04.1-1153-050 (26)

ACCESS 7 (EPV Only)

Accessory Control Module

Location: traction motor compartment, mounts above the double accessory manifold

Purpose: during truck operation, ACCESS 7 energises the 2nd accessory solenoid proportional valves and solenoid valve load sense dump

Data: N/A

Adjustment: if module is replaced, complete truck calibration is recommended to prevent nuisance codes. Also if replacement module includes updated software, the software in the remaining modules must be updated so all software is compatible.

Diagrams: DIA-1153-003
DIA-1153-009

Parts Breakdown: 04.0-1153-100 (26)

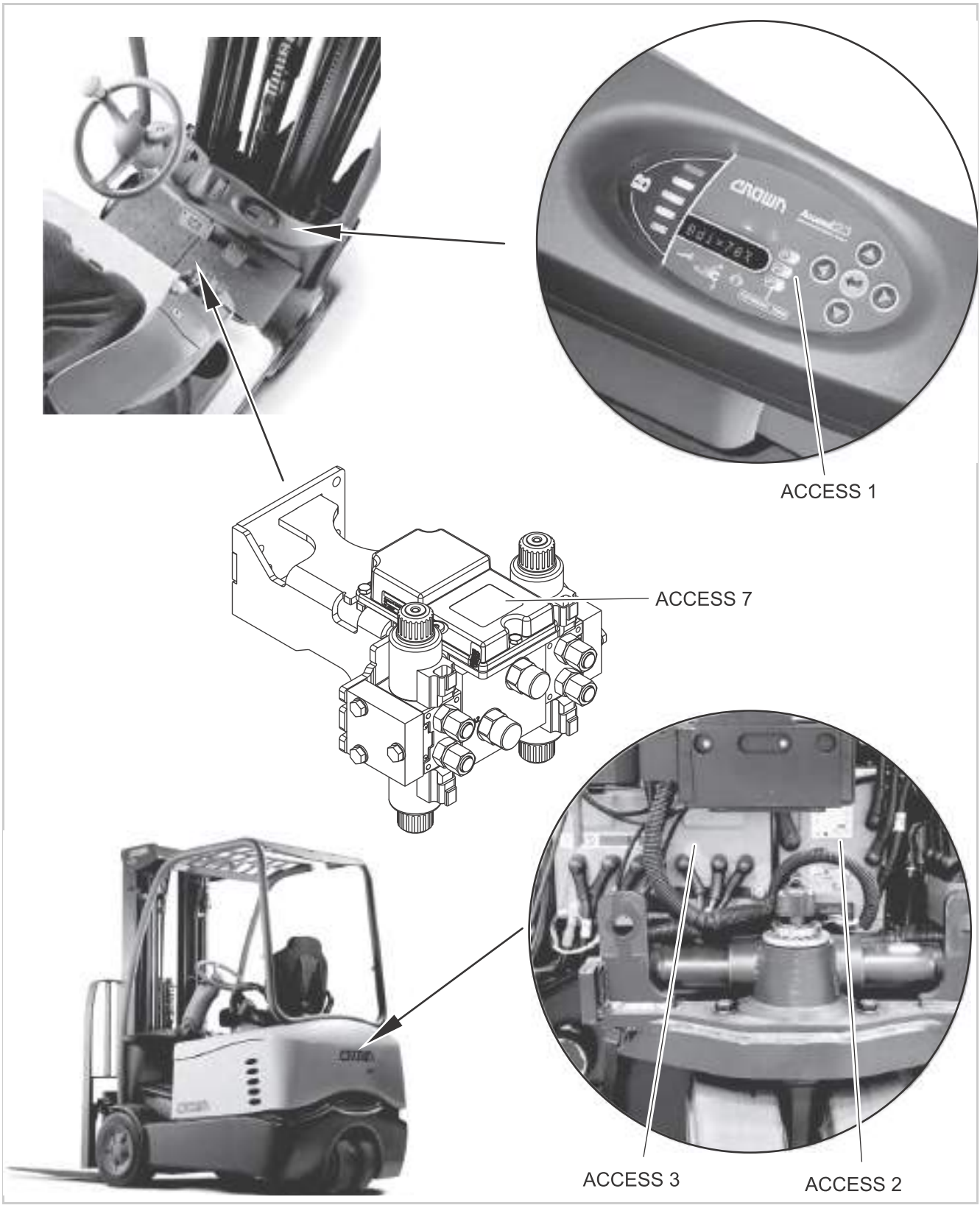


FIgure 26831

DR1

Rear Light Driver

Location: tie strapped to the wire harness located above the left traction motor

Purpose: rear light and switch interface, provides power to rear light

Data: +BV is provided from the battery when the rear light switch LGS2 is closed. BNEG is supplied when the battery is connected.

Adjustment: N/A

EPV Diagrams: DIA-1153-013
DIA-1153-014

Manual Valve Diagrams: DIA-1153-029
DIA-1153-030

Parts Breakdown: 04.0-1153-050 (see end of parts list)

DR2 (EPV Only - Not Shown)

Floorboard Fan Driver

Location: tie strapped to the floorboard fan (FAN3) wire harness

Purpose: floorboard fan and switch interface, provides power to fan

Data: controlled by ACCESS 1. ACCESS 1 provides positive to DR2 when traction motor(s) temperature is greater than 100 °C, positive is removed when traction motor(s) temperature is less than 80 °C. BNEG is provided to DR2 when the battery is connected.

Adjustment: N/A

EPV Diagrams: DIA-1153-001

Parts Breakdown: 04.0-1152-050 (see end of parts list)

INFOLINK DISPLAY MODULE (Option)

Location: overhead guard

Purpose: monitors truck functions and impacts, requires pre-operational truck check; if equipped with proximity reader requires operator login authorization

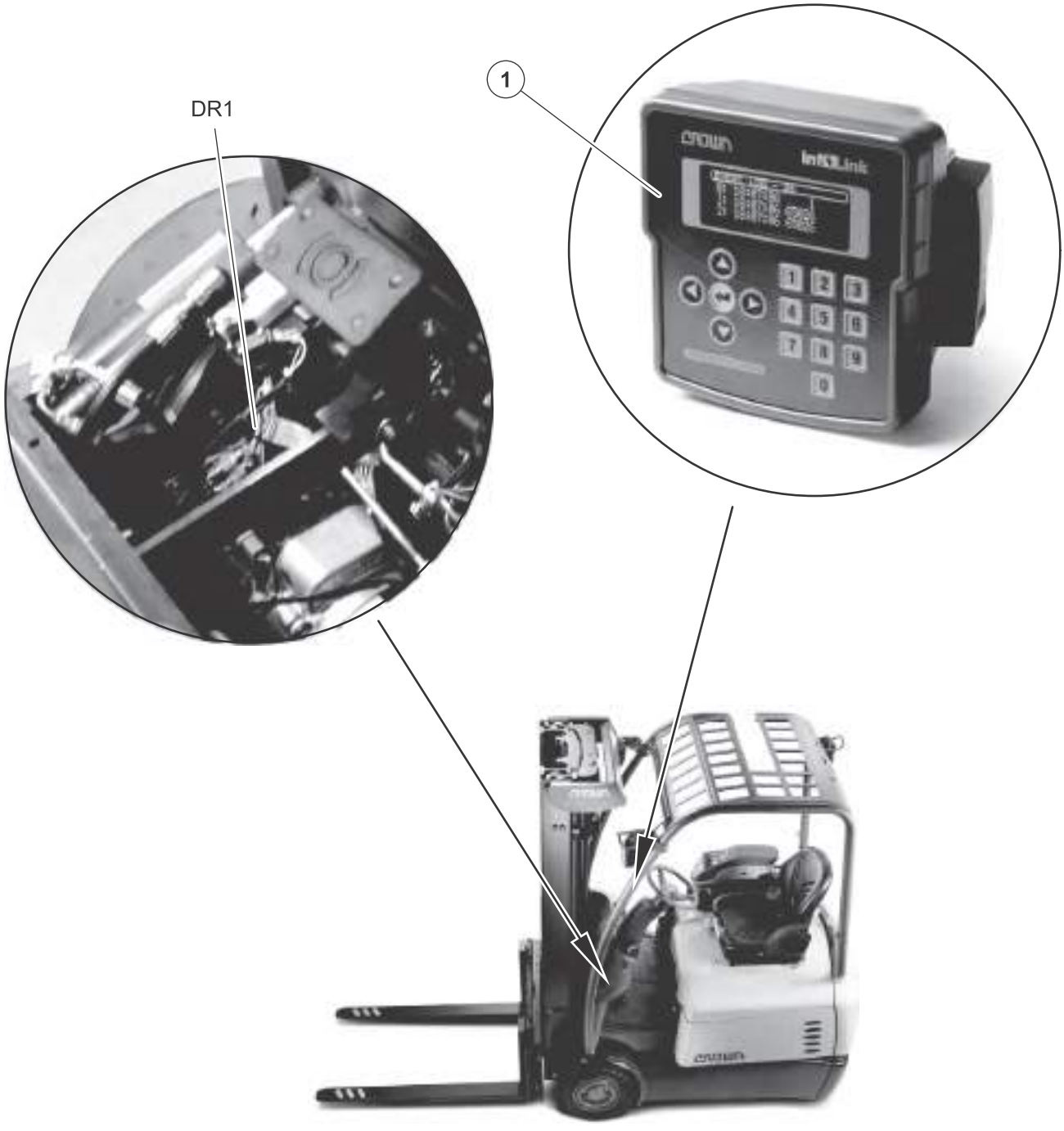
Data: N/A

Adjustment: N/A

EPV Diagrams: DIA-1153-016

Manual Valve Diagrams: DIA-1153-032

Parts Breakdown: 10.0-1152-050 (1)



1	InfoLink display module

Figure 26832

Cylinders

Carriage Cylinder

Location: inner TT, TF and Quad mast

Purpose: raise fork carriage

Data: N/A

Adjustment: N/A

EPV Diagrams: HYD-1153-002 (15)
HYD-1153-003 (15)

Manual Valve Diagrams: HYD-1153-001 (16)

Parts Breakdown: 08.3-1153-050
08.34-1030-052

Mast Cylinder

Location: outer (1st stage) mast

Purpose: raise inner mast stages

Data: N/A

Adjustment: N/A

EPV Diagrams: HYD-1153-002 (13, 14)
HYD-1153-003 (13, 14)

Manual Valve Diagrams: HYD-1153-001 (14, 15)

Parts Breakdown: 08.3-1153-001
08.3-1153-100
08.34-1030-001

Sideshift Cylinder

Location: sideshift carriage

Purpose: sideshift forks (carriage)

Data: N/A

Adjustment: N/A

EPV Diagrams: HYD-1153-002 (12)

Manual Valve Diagrams: HYD-1153-001 (11)

Parts Breakdown: 08.7-1030-001

Steer Actuator

Location: steer axle

Purpose: rotate steer axle

Data: N/A

Adjustment: N/A

EPV Diagrams: HYD-1153-002 (8)
HYD-1153-003 (8)

Manual Valve Diagrams: HYD-1153-001 (8)

Parts Breakdown: 06.0-1140-052 (7 through 12, 22, 23)

Tilt Cylinder

Location: traction motor compartment

Purpose: tilt mast and forks

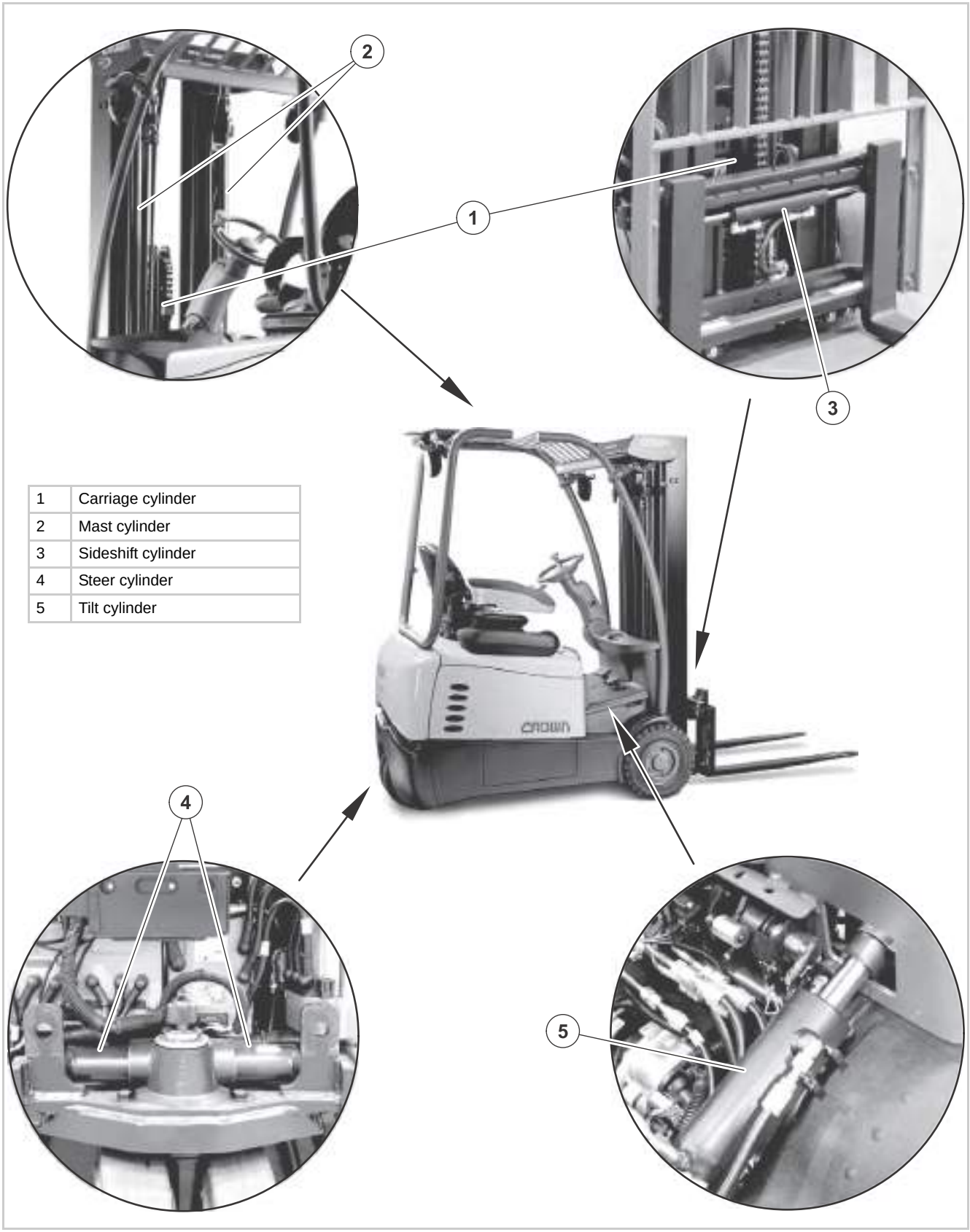
Data: N/A

Adjustment: N/A

EPV Diagrams: HYD-1153-002 (10, 11)
HYD-1153-003 (10, 11)

Manual Valve Diagrams: HYD-1153-001 (9, 10)

Parts Breakdown: 08.6-1152-001



1	Carriage cylinder
2	Mast cylinder
3	Sideshift cylinder
4	Steer cylinder
5	Tilt cylinder

Figure 26833