General Maintenance Instructions

WARNING

TO PREVENT SERIOUS RISK OF INJURY TO YOURSELF AND OTHERS OBSERVE THE FOLLOWING SAFETY INSTRUCTIONS

Power 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 authorized personnel shall be permitted to maintain, repair, adjust and inspect truck.
3. Before leaving the truck—
   - Stop truck.
   - Fully lower the load engaging means.
   - Place directional controls 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 engaging means, inter masts, or chassis before working under them.
   - Operation to check performance of truck or attachments shall be conducted in an authorized safe clearance area.
5. Before starting to operate truck—
   - Be in operating position.
   - Apply brake.
   - Place directional control in neutral.
   - Before operating truck, check functions of lift systems, directional control, 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.
   - All guards must be installed to factory configuration and condition before operating truck. Do not operate truck if any guards or fasteners are damaged, improperly installed or missing.
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 minimize fire hazards and facilitate detection of loose or defective parts.

Capacitance

Due to capacitance voltage present in the traction motor controller and lift motor controller, whenever performing maintenance which may permit contact with the bus bars and associated power cables, discharge the capacitors.

- Move truck to a secure non-traffic maintenance area with a level floor.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Disconnecting the battery will discharge the capacitors. Once the dash display flashes, the capacitors are discharged. Two alternative methods of discharging these capacitors are to disconnect the battery and hold the key switch in the "start" position for 10 seconds or disconnect the battery and connect a 200 ohm, 2 watt resistor between the positive and negative terminals on the controller.
- Turn key switch to "OFF", remove key.

Truck Modules

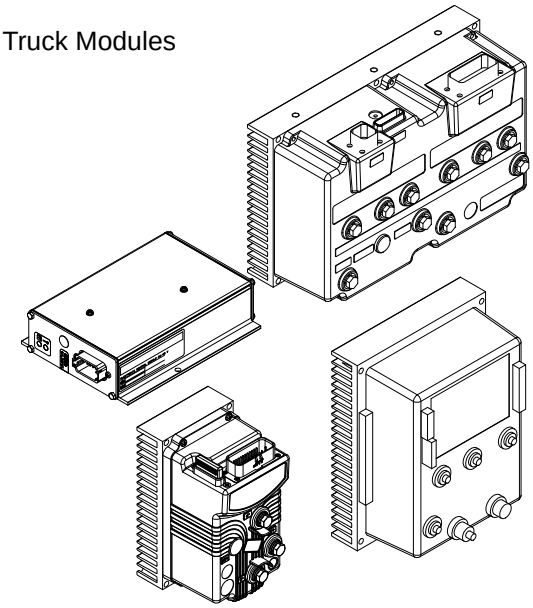


Figure 16927

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 pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.
Any fluid injected into the skin under high pressure should be considered 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. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.

When maintenance is to be performed on the hydraulic system, make certain the hydraulic system is not under pressure by:

- Move truck to a secure non-traffic maintenance area with a level floor.
- No load on forks.
- Completely lower load engaging means (mast) or, if required for maintenance, block mast sections at the appropriate height as described in Mast of this section.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Depressurize hydraulic reservoir by momentarily opening cap on reservoir before disconnecting any hydraulic lines or components.
- Operate hydraulic levers to remove any hydraulic pressure that may be present.

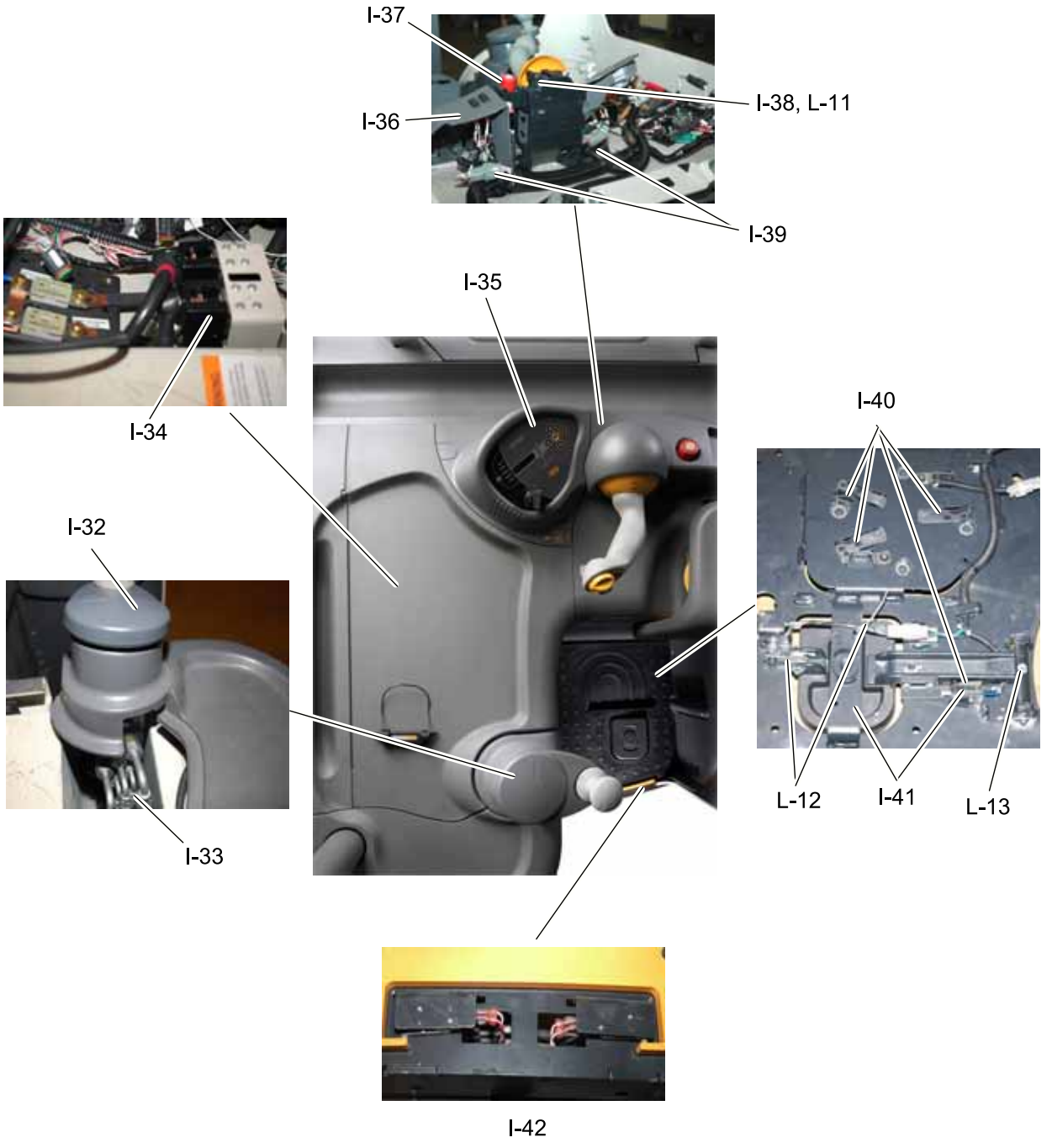
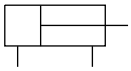
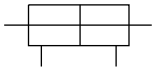


Figure 15980

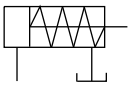
PRESSURE SWITCH



CYLINDER
double acting unequal area



CYLINDER
double acting equal area
(steer) (double end)

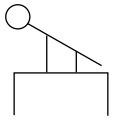


CYLINDER
single acting spring returned
(rod end vented)

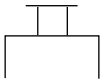
CYLINDER
single acting ram type

CYLINDER
single acting with cushion

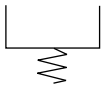
COMPONENT ENCLOSURE
manifold block



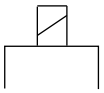
ACTUATOR MANUAL LEVER



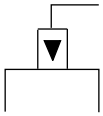
ACTUATOR MANUAL



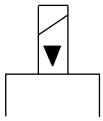
SPRING
(bias to normal
de-energized position)



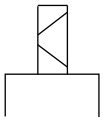
SOLENOID
single coil or winding



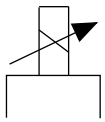
HYDRAULIC PILOT
OPERATED



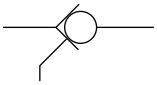
SOLENOID
pilot operated



SOLENOID DUAL

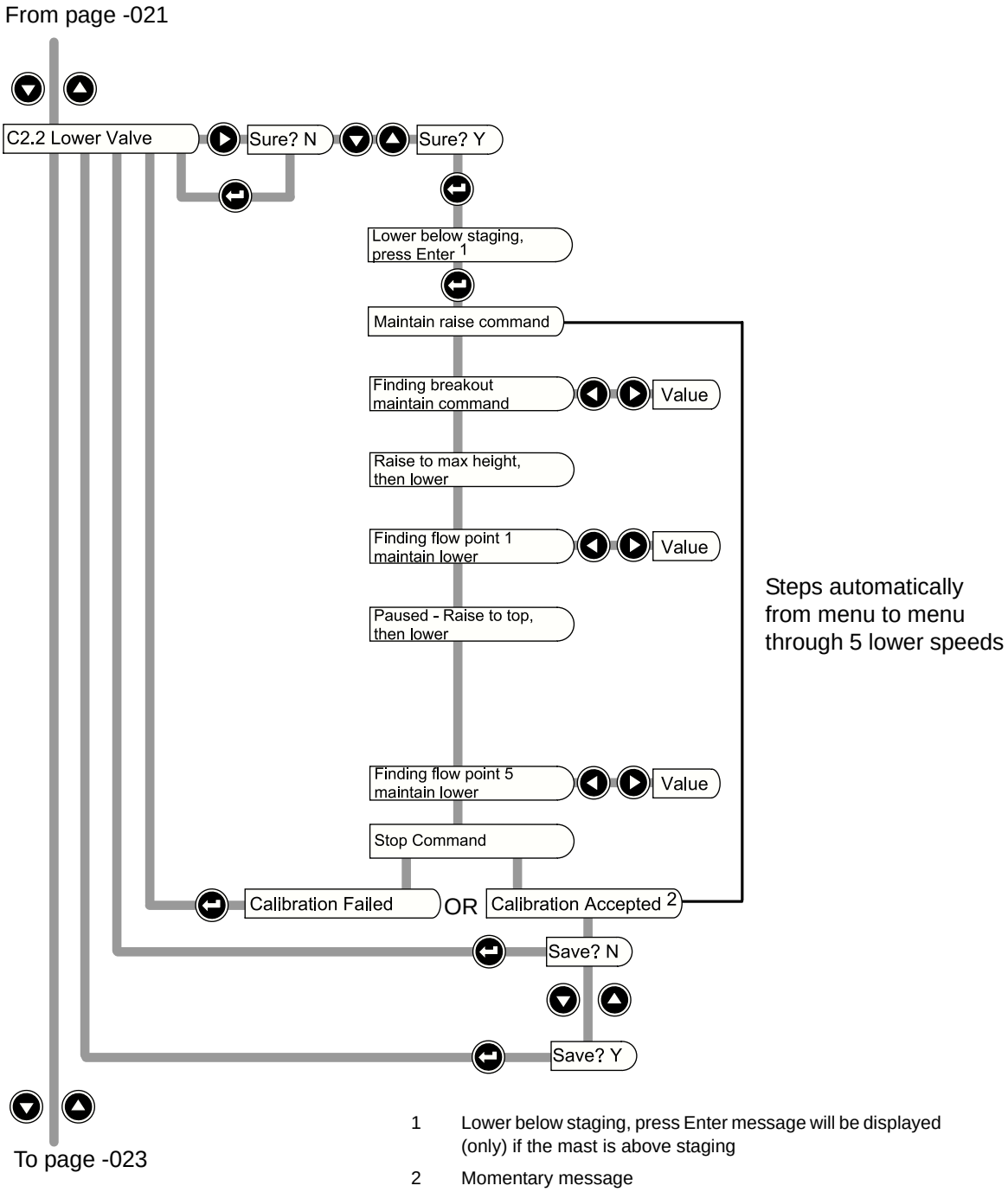


SOLENOID PROPORTIONAL



VALVE PILOT CHECK
(pilot to open)

Figure 3560-03



1 Lower below staging, press Enter message will be displayed (only) if the mast is above staging

2 Momentary message

Figure 15442-01

Battery Care

Your Crown truck is powered by an electrical storage battery. Here are a few suggestions which will help you give the battery proper care.

- The battery on your Stand-up Rider is located in front of the operator's compartment.
- Charge the battery only in areas designated for that use.
- 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 the charger is "OFF". If an attempt is made to do this while the charger is "ON", serious injury to you, the battery and the charger could result.
- Before charging, make sure the battery cells contain the correct amount of water. Charging batteries with a low water level might result in damage to the cells. When checking water levels, never use any type of open flame, battery fumes are explosive.
- Before connecting the battery cable to the trucks receptacle, make sure the key switch is off and controls are in the off position. The battery cable must be fully connected before the truck is used. If the plug is not making good contact, heat will weld the two parts of the battery connector together, making it difficult to remove and necessary to replace.
- Battery terminals should be checked and cleaned of corrosion regularly. Good battery terminal contact is essential not only for operation, but also for proper charging of the battery.
- The charging requirements will vary depending on the use of the truck. The battery should be given an equalizing charge on a weekly basis. This charge should normally be an additional three hours at the finish rate.
- Refer to charger manufacturer's manual for specific charging procedures.
- Make certain battery used meets weight and size requirements of truck (refer to serial plate). NEVER operate truck with an undersized battery.

Charging

Charging requirements will vary depending on use of truck. A battery with a specific gravity of 1.160 should be recharged. In some applications more than one battery is required to provide ample power to the unit during the service period.

CAUTION

Never smoke or bring open flame near the battery. Gas formed during charging is highly explosive and can cause serious injury.

Consult the charger manufacturer's manual covering your charger for hints on operation and maintenance. Some of the basic rules are as follows:

Placing battery on charge:

- Park truck at charging station with forks lowered and key removed.
- Make certain charger control is in off position.
- Connect battery to charger and make certain connectors are mated completely.
- Set timer for specified time. Set for normal (Daily Charge, except one night a week when the equalize [Weekend] Charge should be used).
- Check ammeter to make certain it shows charge.

Removing battery from charge:

- Make certain charger is turned off.
- Unplug the connector, using both hands with a straight pulling motion.
- Hang up the charger cable to prevent damage to the cable. (Broken connectors can cause poor connections and connector failures.)
- Make daily battery checks, add distilled water as needed.
- Connect battery to truck. Make certain connections are mated completely.

Event Code 110

ACCESS 1 Communication issue.

Step 1: Check voltage at ACCESS 1 CA215-17 (+) and CA215-4 (-) and at CA403-3 (+) and BNEG.

- If: 35 to 38 Vdc.
  - Then follow Event 300 procedures.
- If: Less than 35 Vdc.
  - Then follow Event 303 procedures.

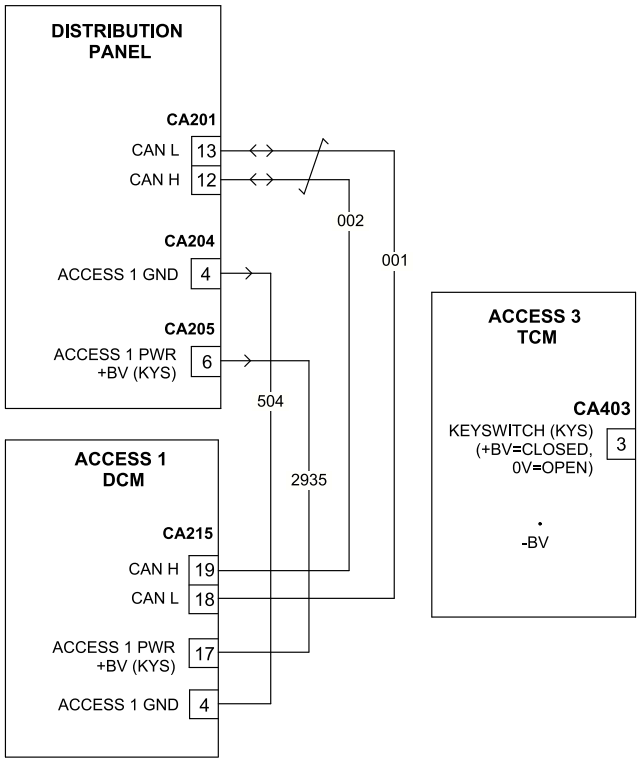


Figure 15783-01

Event Code 713

Excessive Current SPL Solenoid Coil Circuit.

Event logged if excessive current flows through driver CA230-1.

Step 1: Remove wire from CA230-1. Key on truck and attempt to lower, monitor event code.

- If: Event 713 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 29 ohms. Reinstall wire and proceed to Step 2.
- If: Event 713 is still the last event.
  - Then replace ACCESS 7.

Step 2: Remove positive wire from solenoid. Key-on truck and attempt to lower, monitor event code.

- If: Event 713 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 713 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 29 ohms.

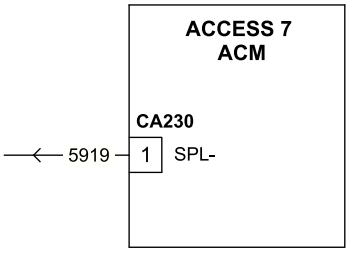


Figure 16065

Event Code 714

Excessive Current SPA Solenoid Coil Circuit.

Event logged if excessive current flows through driver CA230-2.

Step 1: Remove wire from CA230-2. Key on truck and attempt to tilt, monitor event code.

- If: Event 714 is not the last event.
  - Then short is in the solenoid or wiring. Coil resistance should be approximately 29 ohms. Reinstall wire and proceed to Step 2.
- If: Event 714 is still the last event.
  - Then replace ACCESS 7.

Step 2: Remove positive wire from solenoid. Key on truck and attempt to tilt, monitor event code.

- If: Event 714 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 714 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 29 ohms.

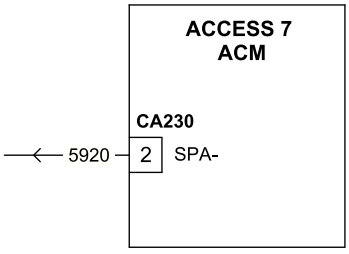


Figure 16066

Mast

WARNING

Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.
In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.
It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.

Your truck has been built with either a TT or Quad mast, depending on your particular application.

Torque Requirements

The four M20 screws that secure the mast pivot block to the power unit must be torqued 550 to 600 Nm (405 to 440 ft lb).

Fork Adjustments

- With the forks completely lowered and level, adjust so that the top surface of the fork tip is a maximum of 12.7 mm (0.5 in) from the floor.
- Maximum fork height is to be within ± 12.7 mm (±0.5 in) of the fork height specified on the truck data plate.

Mast Flaking

It is not uncommon for a new mast to appear as if it is flaking or peeling. This appearance is an indication that the rollers are seating to the mast channel and is considered normal. Eventually, this condition will disappear. The grease applied to the channel will retain these particles.

TT (Triple Telescopic Full Free Lift) Mast

The TT is a three stage mast assembly providing a high lift height while maintaining a low collapsed height. The TT incorporates two mast cylinders and a carriage cylinder. The fork carriage assembly ascends completely to the top of the mast as the single center cylinder is completely extended. As the carriage reaches the top of the mast, it contacts a pair of stops. At this time the two mast cylinders begins to extended and the Intermediate and inner stage masts begin to ascend. A pair of lift chains are attached to the bottom of the inner mast and to the top of the main frame. These lift chains are routed through pulley assemblies mounted in the top of the intermediate mast.

The carriage cylinder is mounted to the inner mast with mounting hardware at the base and to the center crossbrace. Lift chains are routed from the back of the cylinder through a yoke assembly to the back of the carriage assembly.

Mast Cylinder Inspection

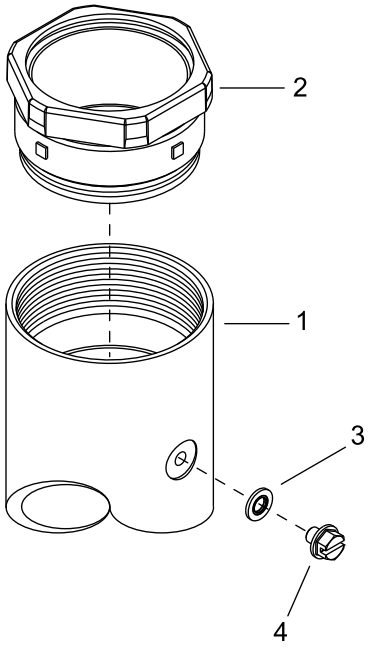
(Refer to Figure 15293)

1. Before disconnecting battery and initial cylinder repair, a careful inspection should be made of the cylinder assembly throughout a complete lift and lower sequence.
2. Check ram (12) for any signs of nicks, scratches, surface imperfections, etc. that allow abnormal leakage, improper cylinder operation, or create seal damage.
3. Check wiper ring (14) and complete cap area for component wear and/or leakage that is abnormal.

As the cylinder assembly is repaired be aware of component part condition and not only replace a worn or damaged part, but correct or replace a part that may be causing other premature wear.

Mast Cylinder Disassembly

1. Turn the cap counterclockwise and unscrew it from the cylinder tube. Refer to Figure 15962.



1 Cylinder Tube
2 Cap
3 O-Ring
4 Bleed Screw

Figure 15962

2. Remove the cap and carefully extract the ram assembly from the cylinder bore, never allowing the ram to come in contact with any sharp edges.

Mast Cylinder Repair

WARNING

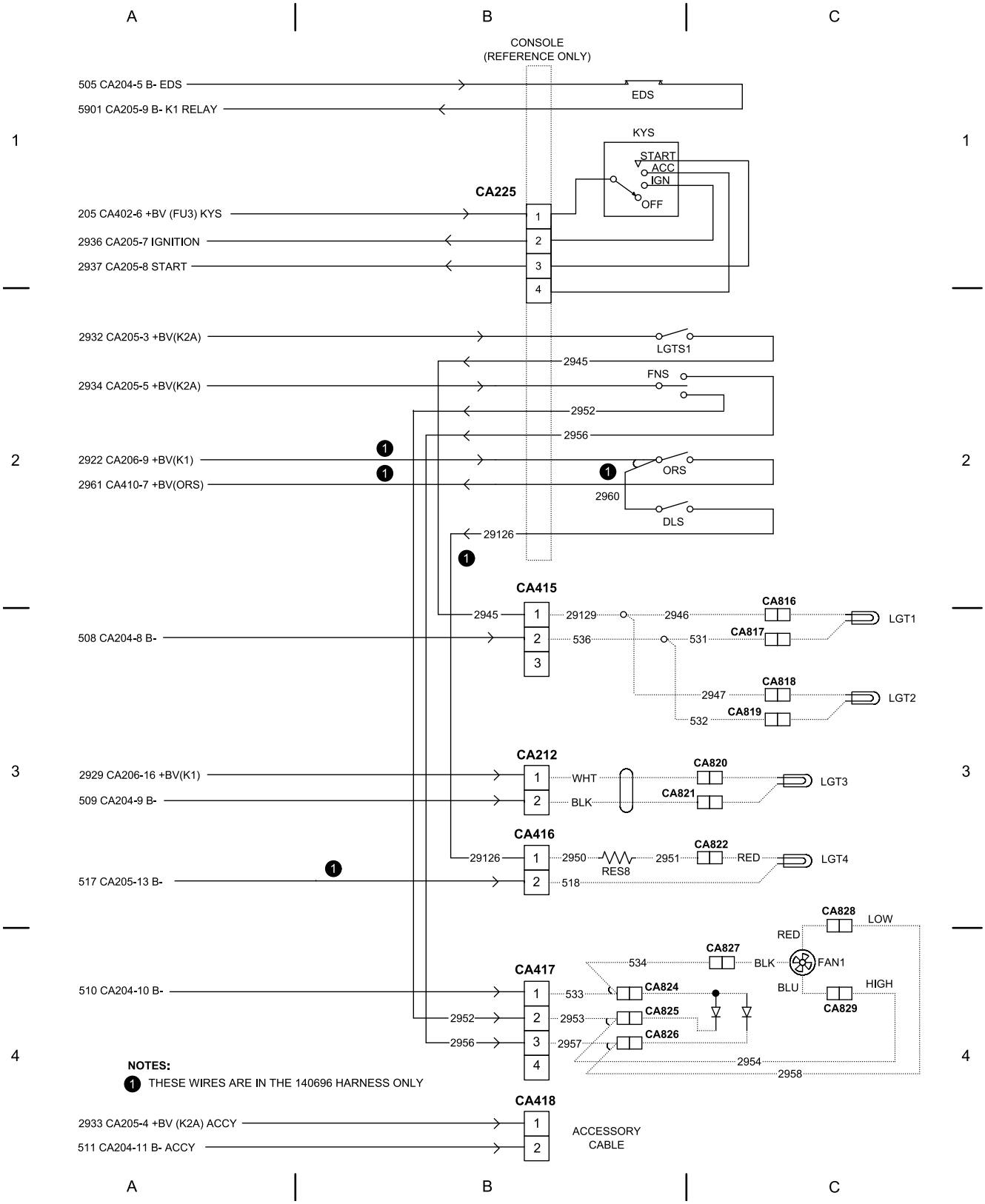
Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered 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. Medical attention should be sought immediately from a specialist who has experience with this type of injury.

When an excessive amount of hydraulic oil is evident on the top of the cylinder where the ram exits from the cap, the rod packing is probably bad and should be replaced. The replacement of the packing can be accomplished without removing the ram assembly from the cylinder tube or truck.

1. Make sure all hydraulic pressure has been removed from the mast cylinders.
2. Carefully remove hydraulic fittings from lift cylinder rams. Attempt to absorb any hydraulic oil draining from lines during this procedure.
3. Remove cylinder cap by turning it in a counterclockwise direction.

NOTE

Seals used in the cylinders are made of an extremely durable, hard polyurethane material which can be deformed temporarily to allow for installation without permanent damage.


A
B
C
CONSOLE
(REFERENCE ONLY)
505 CA204-5 B- EDS
5901 CA205-9 B- K1 RELAY
EDS
KYS
START
ACC
IGN
OFF
CA225
205 CA402-6 +BV (FU3) KYS
2936 CA205-7 IGNITION
2937 CA205-8 START
1
2
3
4
2932 CA205-3 +BV(K2A)
LGTS1
2945
2934 CA205-5 +BV(K2A)
FNS
2952
2956
2922 CA206-9 +BV(K1)
2961 CA410-7 +BV(ORS)
ORS
2960
DLS
29126
CA415
2945
29129
2946
CA816
LGT1
508 CA204-8 B-
536
531
CA817
CA818
2947
LGT2
532
CA819
CA212
2929 CA206-16 +BV(K1)
509 CA204-9 B-
WHT
BLK
CA820
CA821
LGT3
CA416
29126
2950
RES8
2951
CA822
RED
LGT4
517 CA205-13 B-
518
CA828
LOW
RED
CA827
534
BLK
FAN1
CA417
510 CA204-10 B-
533
CA824
BLU
HIGH
CA825
CA829
2952
2953
CA826
2956
2957
2954
2958
NOTES:
1 THESE WIRES ARE IN THE 140696 HARNESS ONLY
CA418
2933 CA205-4 +BV (K2A) ACCY
511 CA204-11 B- ACCY
ACCESSORY
CABLE

138553 C

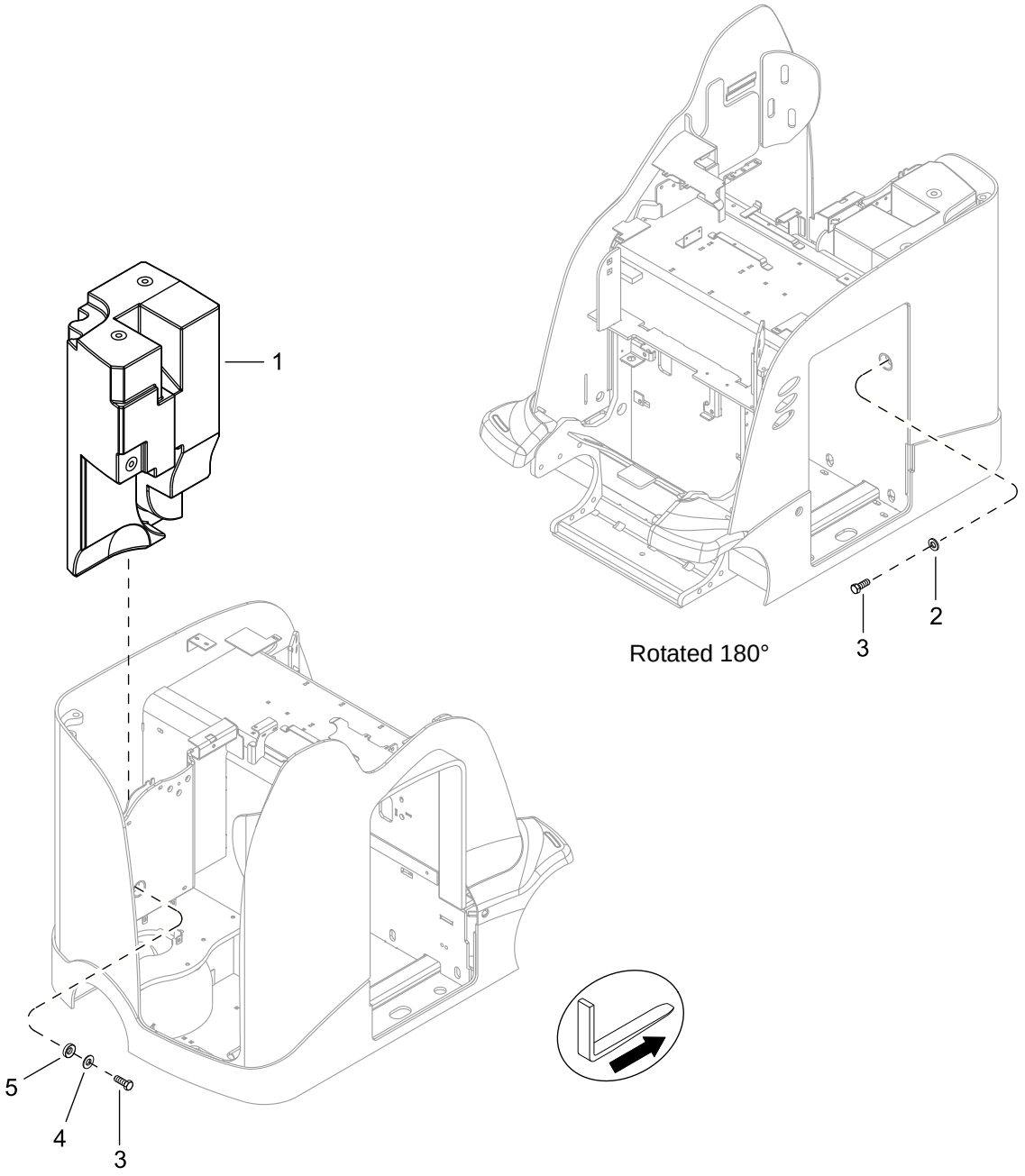
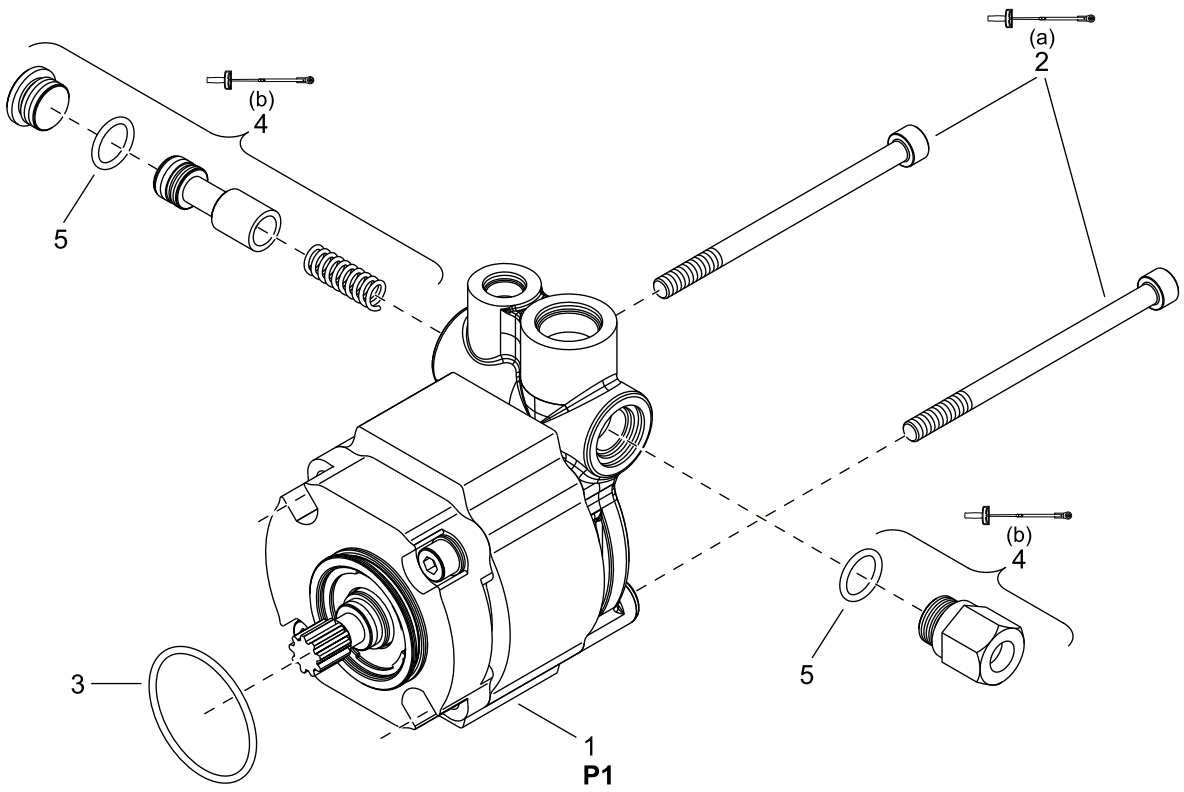
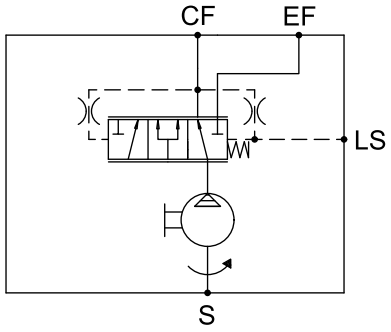


Figure 15326





(a) Torque 27 Nm (37 ft lb)

(b) Torque 50-60 Nm (36.9-44.3 ft lb)

Figure 14354-02

INDEX	PART NUMBER	PART NAME	NUMBER REQUIRED
0	141436	LH Drive Unit Sub-Assembly Kit	1
	141396	RH Drive Unit Sub-Assembly Kit	1
1	132320	Wheel Hub Assembly	1
2	140705	Locking Nut	1
3	060062-025	Screw	4
	061004-002	Thread Locking Adhesive Primer	AR
	061004-006	Thread Locking Adhesive Blue	AR
4	146857	Housing (1)	1
5	064020-010	Pipe Plug	1
	061004-016	Thread Locking Adhesive Primer	AR
	061004-005	Thread Locking Adhesive Thread Sealant	AR
6	138930	Ring Gear (2)	1
7	061011-014	Dowel Pin	2
8	060030-365	Flatwasher	8
9	060063-078	Screw	8
	061004-002	Thread Locking Adhesive	AR
	061004-006	Thread Locking Adhesive	AR
10	064138-019	Oil Seal	1
11	077014	Bearing Cup	1
12	077015	Bearing Cone	1
13	147105	Carrier Shaft	1
14	138929	Planet Idler	3
15	065180	Needle Bearing	3
16	147345	Planetary Shaft	3
17	132447	Shim	6
18	065081-012	Ball Bearing	1
19	065019	Bearing Cone	1
20	065018	Bearing Cup	1
21	146727-002	Holder Bearing LH (1)	1
	146727-001	Holder Bearing RH (1)	1
22	064091-001	Hex Plug with O-Ring	2
23	064091-006	Hex Plug with O-Ring	1
24	144486	Adjusting Plate	1
25	147068	Gear Assembly	1
26	060009-180	Retaining Ring	1
27	065081-078	Ball Bearing	1
28	060009-085	Retaining Ring	1
29	140080	Dowel Pin	2
30	147070	Mount Plate LH (1)	1
	147069	Mount Plate RH (1)	1
	147072	Mount Plate LH EE (1)	1
	147071	Mount Plate RH EE (1)	1
31	060115-022	Screw	9
	061004-002	Thread Locking Adhesive Primer	AR
	061004-006	Thread Locking Adhesive Blue	AR
32	064138-022	Oil Seal	1
33	146686	Guard String	1

(1) Refer to Drive Unit Maintenance to apply primer 061004-016 and gasket eliminator 061004-030.

(2) Refer to Drive Unit Maintenance to apply primer 061004-016 and gasket eliminator 061004-015.

Always Specify Model, Data & Serial Number

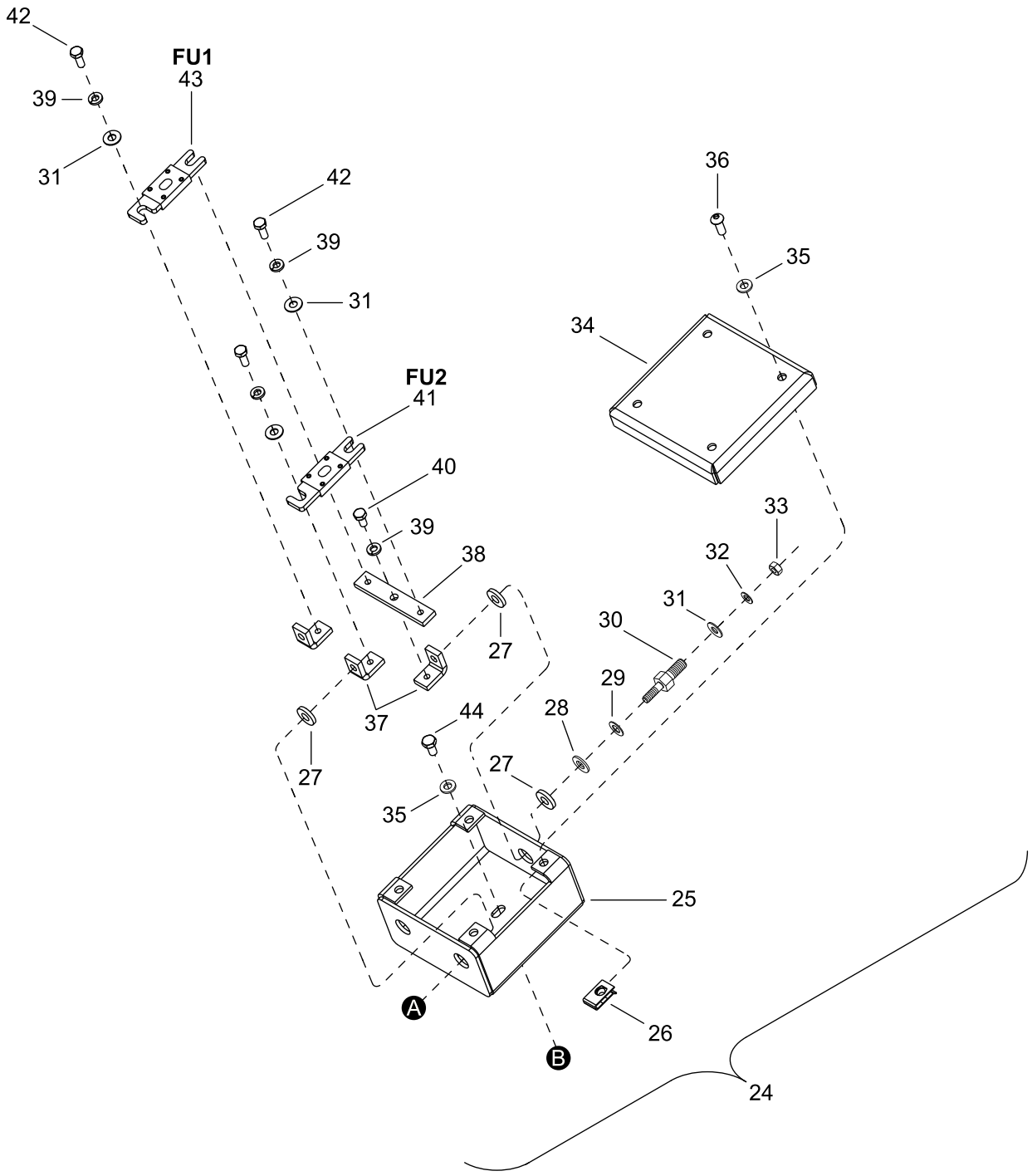


Figure 15466