

Introduction

This manual is for service technicians who are approved and correctly trained to do troubleshooting and maintenance procedures on the lift truck. The manual contains information about maintenance, troubleshooting, and replacement parts.

Operator Instructions

This manual does not have operator instructions. There are operator instructions in tag or booklet form with each lift truck. If it is necessary, more copies can be ordered. The operator instructions are to make sure that you and your personnel know how to operate your Crown lift truck safely. For operator instructions, refer to "Operator Manual TSP 6000 Series".

Operator Training

Crown has operator training programs that are available through your Crown dealer. For more information on operator training, consult your Crown dealer or go to "Training" on

Service Training

Service training is available for:

- All Crown lift trucks
- Module systems
- Wire guidance

- Hydraulic systems
- Electrical systems.

For more information on service training, consult your Crown dealer or go to "Training" on www.crown.com.

Replacement Parts

For correct and fast service, when you consult Crown for replacement parts, always give this information:

- The part number
- The lift truck model number
- The lift truck serial number
- The lift truck data number.

Consult your Crown dealer or go to

- The newest service manuals
- The newest operator manuals
- Training
- Lift truck capacities
- Lift truck specifications.

Manual Structure

This manual contains sections that have maintenance and replacement parts. The section descriptions are as follows:

MAINTENANCE		REPLACEMENT PARTS	
SECTION	DESCRIPTION	SECTION	DESCRIPTION
MA	Safety	1	Power Unit Parts
M1	Inspection & Lubrication	2	Hydraulic Parts
M1.91	Componentry	3	Drive Unit Parts
M2	Hydraulic	4	Electrical Parts
M3	Drive Unit	5	Brake Parts
M4	Electrical	6	Steering Parts
M5	Brake	7	Lifting Mechanism Parts
M6	Steering	8	Cylinder Parts
M7	Lifting Mechanism	9	Platform Parts
M8	Cylinders	10	Accessories
M9	Platform	12	Labels and Decals
M10	Glossary		

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Brake

The brakes can be released through the use of the Drive/Tow switch (DTS) during a maintenance situation. When using this method to release the brakes, the truck will not have brakes available for stopping. The truck will not have traction control and the power steering system may not work.



WARNING

Extreme care must be taken when using Drive/Tow switch to release brakes. The truck will be free-wheeling and the brake pedal in the operator compartment will have no effect on braking. Brakes will only be applied when DTS is moved from Tow to Drive position.

- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Chock wheels or make sure truck is secured by some means to keep it from free-wheeling.
- When towing the truck make sure all operators are informed of the trucks lack of braking.
- Insert brake harness, PC407, to distribution panel.
- Connect battery. Move switch DTS from the Drive position to the Tow position.
- Move truck to level area intended for maintenance.
- Move DTS from the Tow to the Drive position. Disconnect battery.
- Disconnect brake harness from distribution panel and connect to original connection, CA407.

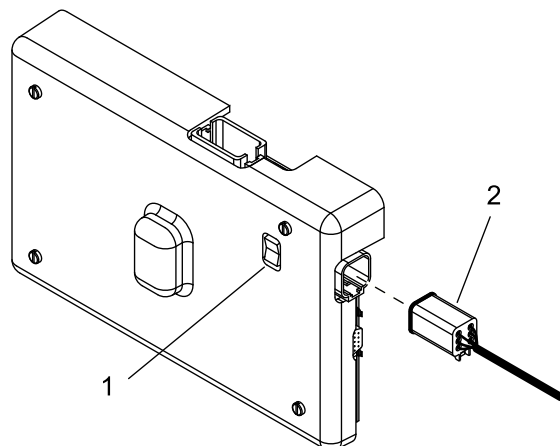


Figure 17675

- 1 Drive/Tow Switch DTS
- 2 Brake Harness PC407

Auxiliary Mast and Platform Lifting

Auxiliary Mast

The platform weighs approximately 1360 kg (3000 lb) and the load handler weighs approximately 1000 kg (2200 lb). Be sure equipment used to lift and support the load handler and platform is of sufficient capacity to safely handle this load.

- Move truck to a secure non-traffic maintenance area with a level floor.
- Completely lower main and auxiliary masts. No load on forks.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Chock wheels of truck (refer to Lifting and Blocking in this section).
- Prepare the auxiliary mast to be removed. Refer to Mast Maintenance section in this manual.
- Connect hoist to auxiliary mast and raise load handler just enough to transfer the load handler weight from the platform to the hoist.
- Slowly slide the load handler out of the left side of the platform being careful not to damage the gang hose and cable.
- Carefully move load handler away from truck.

Platform

- Move truck to a secure non-traffic maintenance area with a level floor.
- Completely lower main and auxiliary masts. No load on forks.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Chock wheels as described in lifting and blocking in this section.
- Remove the load handler. Refer to Platform Maintenance section in this manual.

- Place a 100 x 100 mm (4 x 4 in) hardwood block under the overhead guard, tight against the back of the platform. Be sure the block is at least 305 mm (12.0 in) longer than the overhead guard and is centered. If the truck is equipped with spotlights and overhead fan, disassemble these first from the overhead guard.
- Using a 3-point hook-up, attach sling, chain, etc. to block and back of overhead guard. Raise platform to the desired height.
- Block the platform as described in Mast and Platform of this section or remove platform as described in Platform section in this manual.

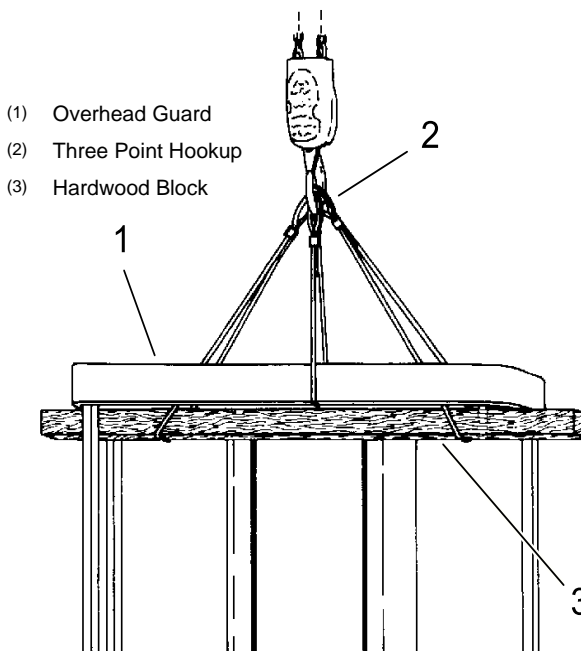


Figure 17670

- 1 Overhead Guard
- 2 Three Point Hookup
- 3 Hardwood Block

INSPECTION AND LUBRICATION

Lubricants, Aerosols, and Service Supplies



Lubricant Identification			
Lubricant Identifier	Description	Part Number	Package Quantity
F	Gear grease	063002-024	14.5 oz cartridge
		063002-022	35 lb pail
G	Lubricant - chain and cable	363107-001	15 oz can
	Lubricant, premium - chain and cable	363115-001	12 oz can
H	Protectant - rubber and vinyl	363129-001	11 oz can
I	Grease, synthetic - motor spline connection	063002-039	1 lb
		127801S	1 oz
J	Fluid, brake, DOT 5	063004-002	12 oz
		063004-003	1 gal
K	Grease - wheel bearing	063002-034	14 oz cartridge
		063002-045	40 - 14 oz cartridges
L	Lubricant, metal spray, break-in	063002-021	16 oz spray
LL	Lubricant, S00727 - freezer condition	063002-059	9 oz can
M	Grease, clear - O-rings	063002-020	5.3 oz tube
N	Cleaner, low VOC - brakes and parts	363119-001	15 oz can
	Cleaner, nonflammable - brake and parts	363116-001	18 oz can
O	Lubricant, penetrating	363104-001	15 oz can
P	Grease, premium, multi-purpose	363108-001	13 oz can
Q	Grease, white, lithium	363110-001	14 oz can
R	Cleaner - carburetor and choke	363109-001	14 oz can
S	Cleaner, contact, nonflammable	363106-001	10 oz can
	Cleaner, contact	363128-001	13.5 oz can
T	Contact lubricant	127189-001	55 cc
		127189-002	2 oz. tube
U	Cleaner - battery	363124-001	18 oz can
V	Protector - battery	363125-001	14 oz can
W	Lubricant, food grade, machine	363127-001	12 oz can
X	Lubricant, food grade, silicone spray	363126-001	11 oz can
Y	Coolant, extended life - C-5 LP series	363535-101	1 gal
		363535-005	6 - 1 gal bottles
Z	Fluid, windshield washer, protects to -29 °C (-20 °F)	300100-101	1 gal

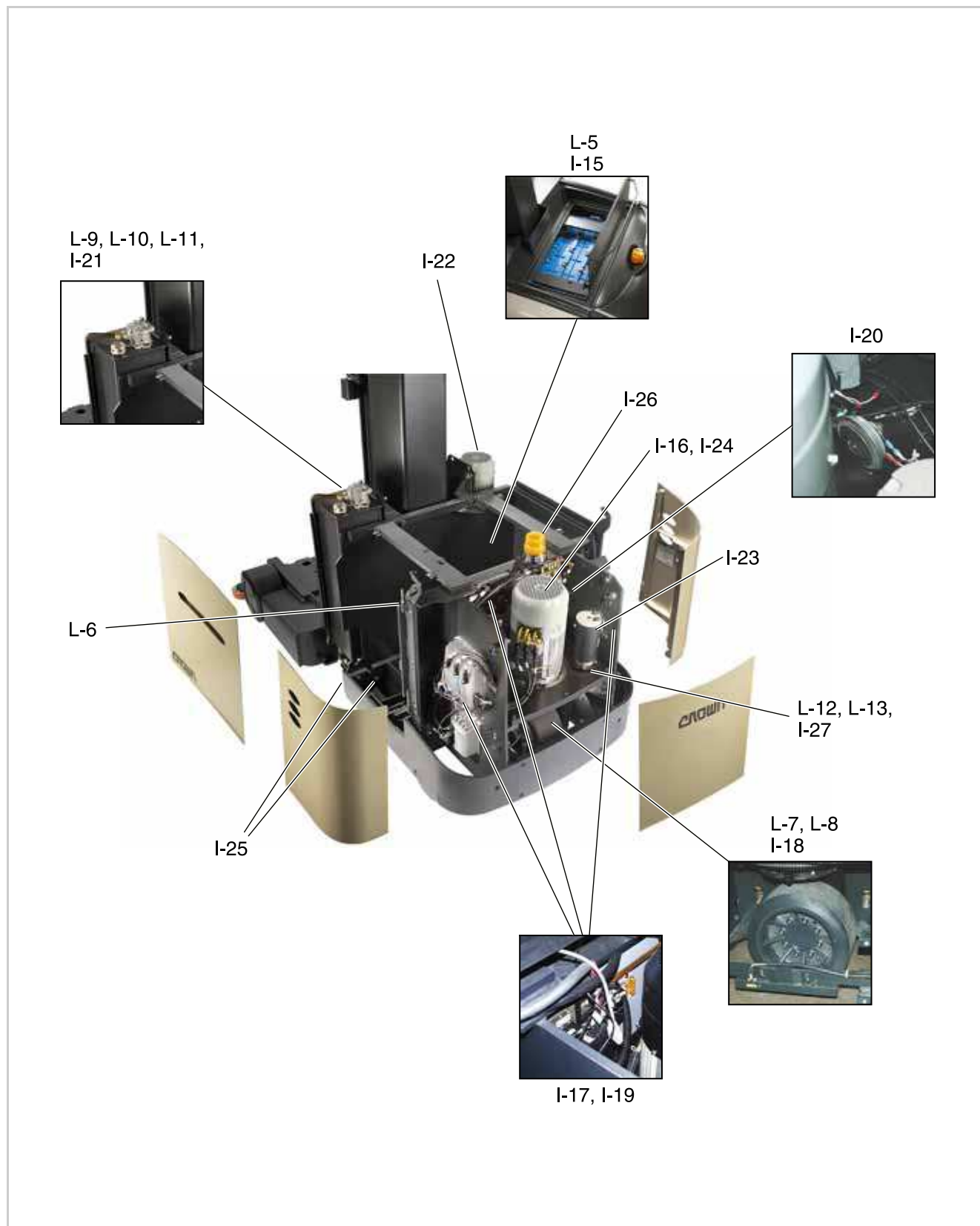


Fig. 3 (12737-01)

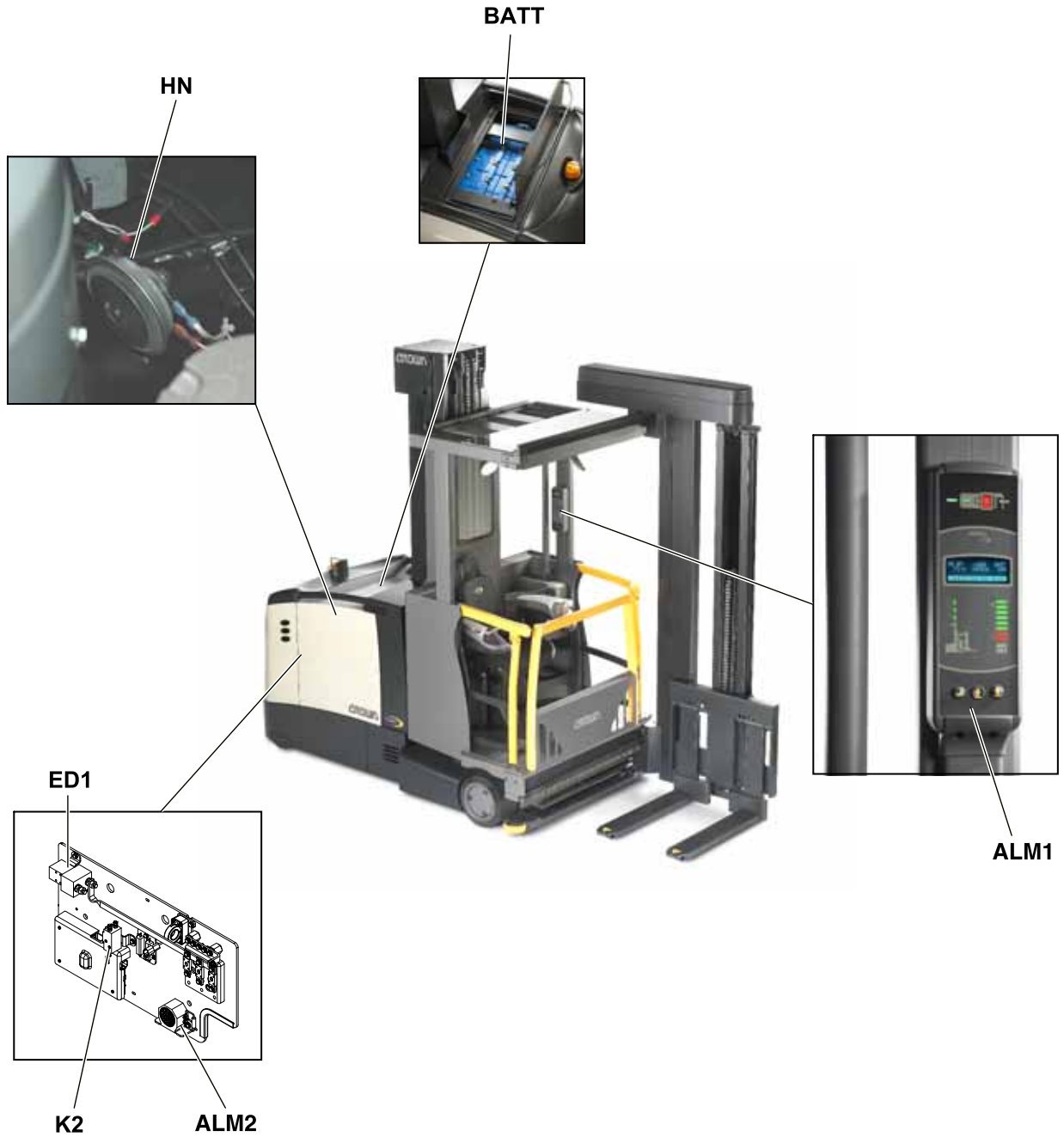


Figure 21377

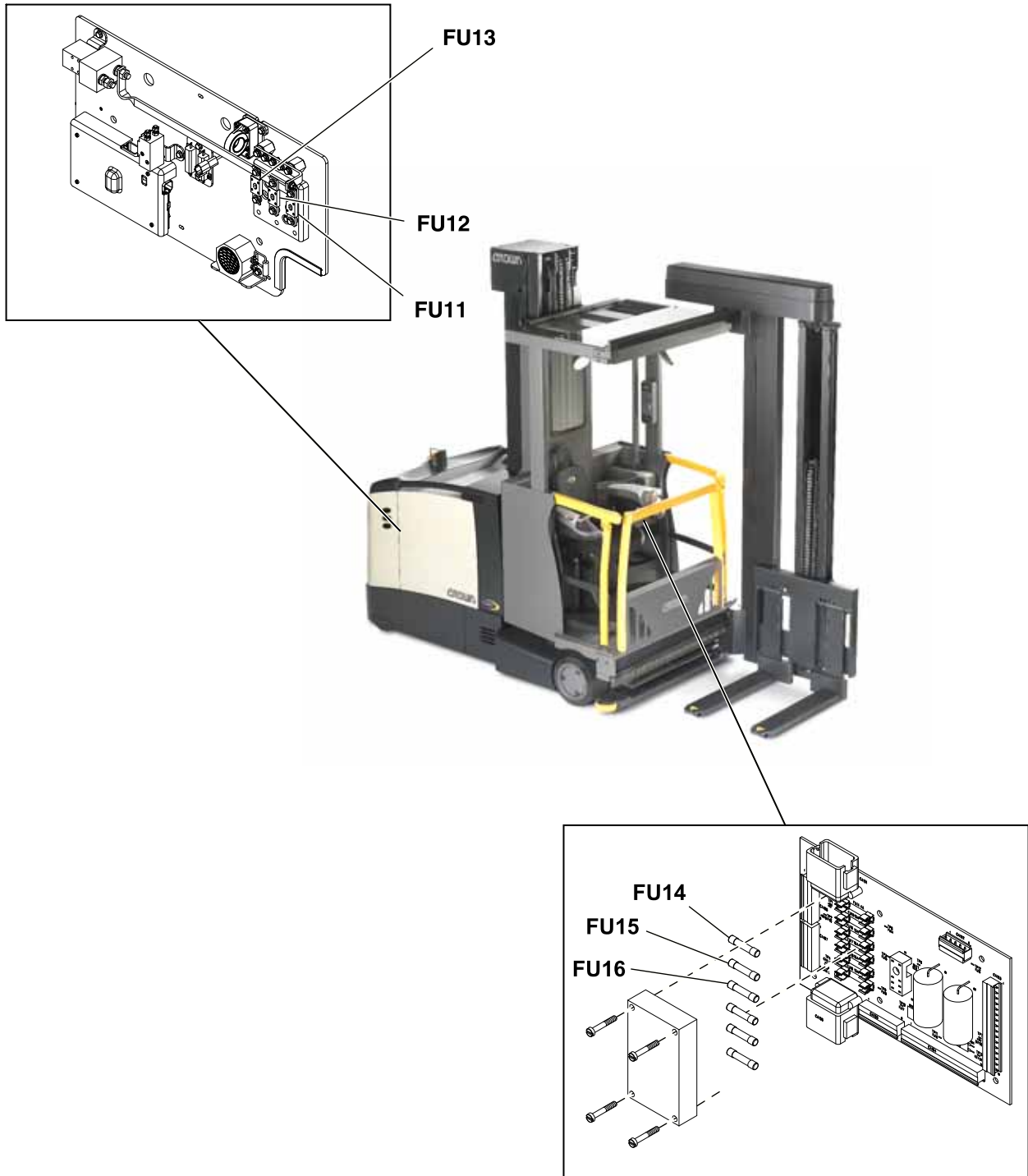


Figure 21382

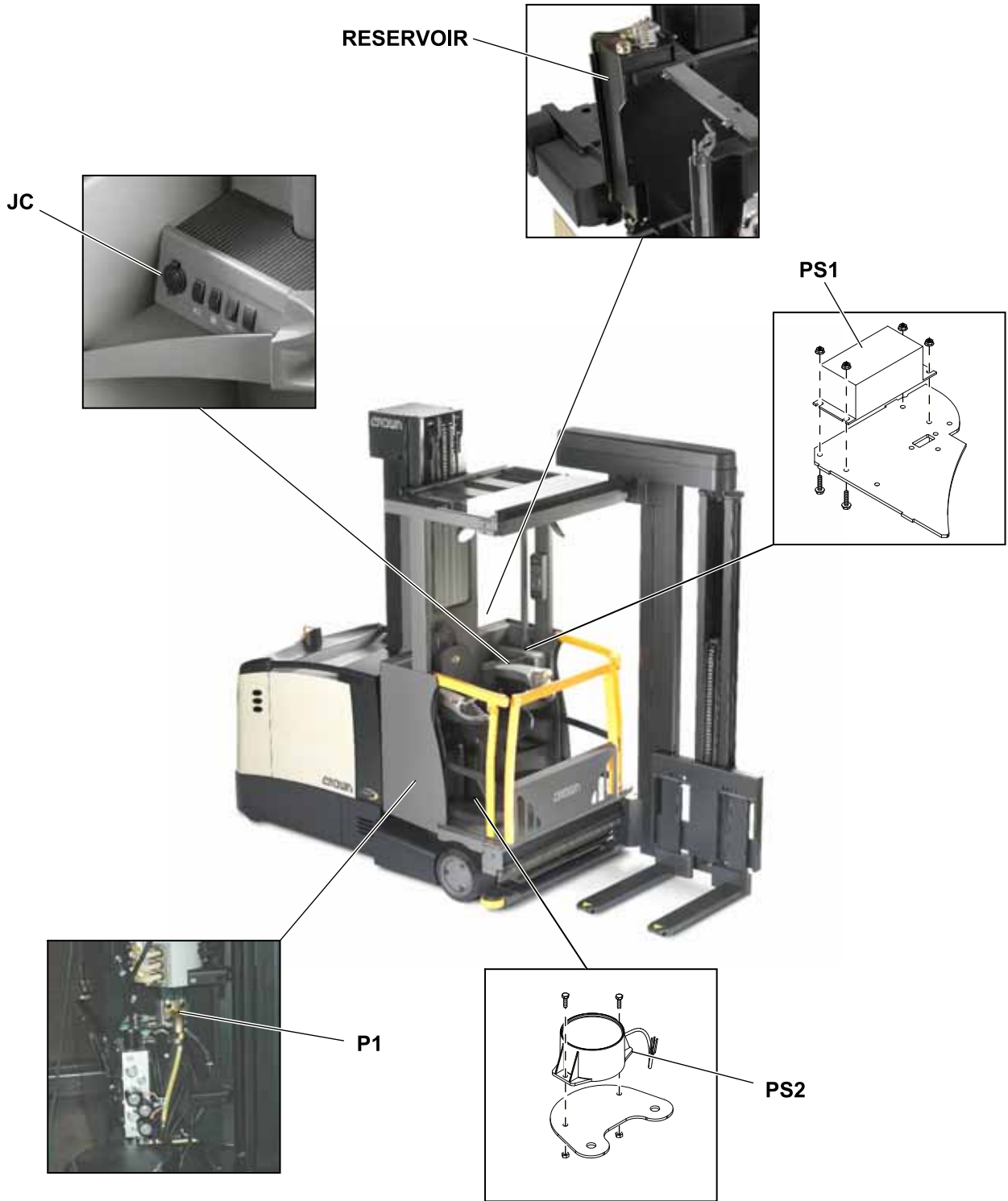


Figure 21387

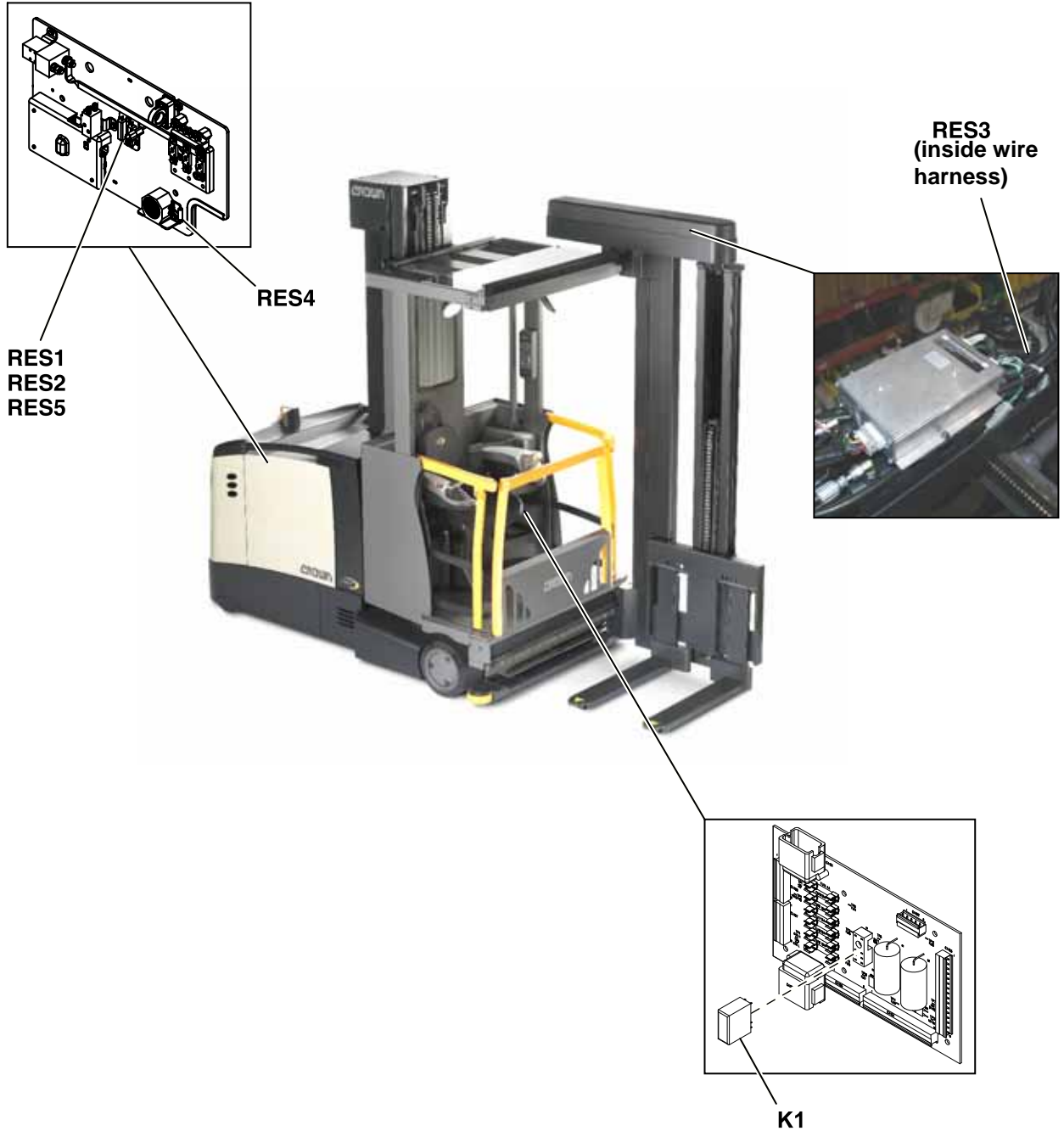


Figure 21392

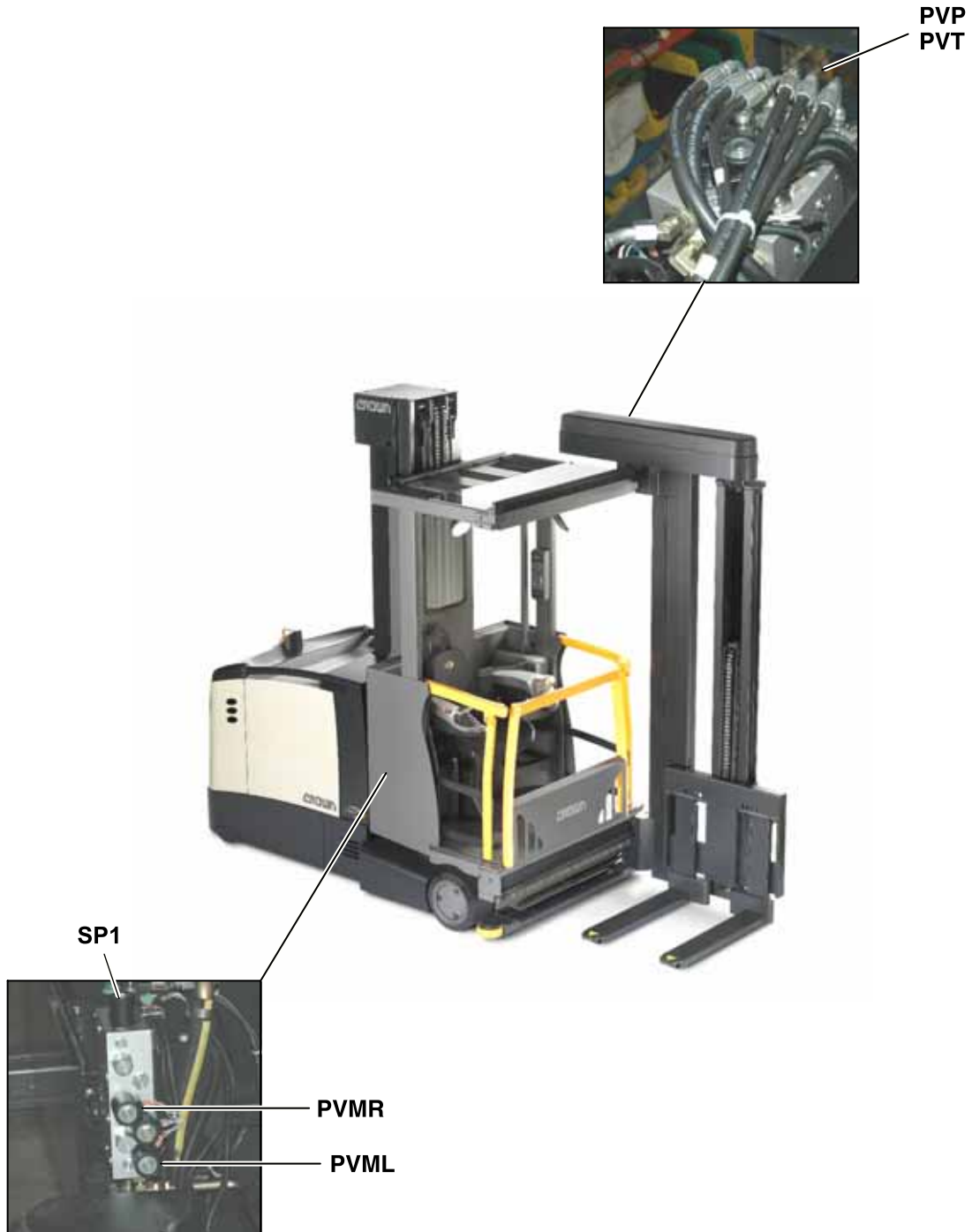


Figure 21397

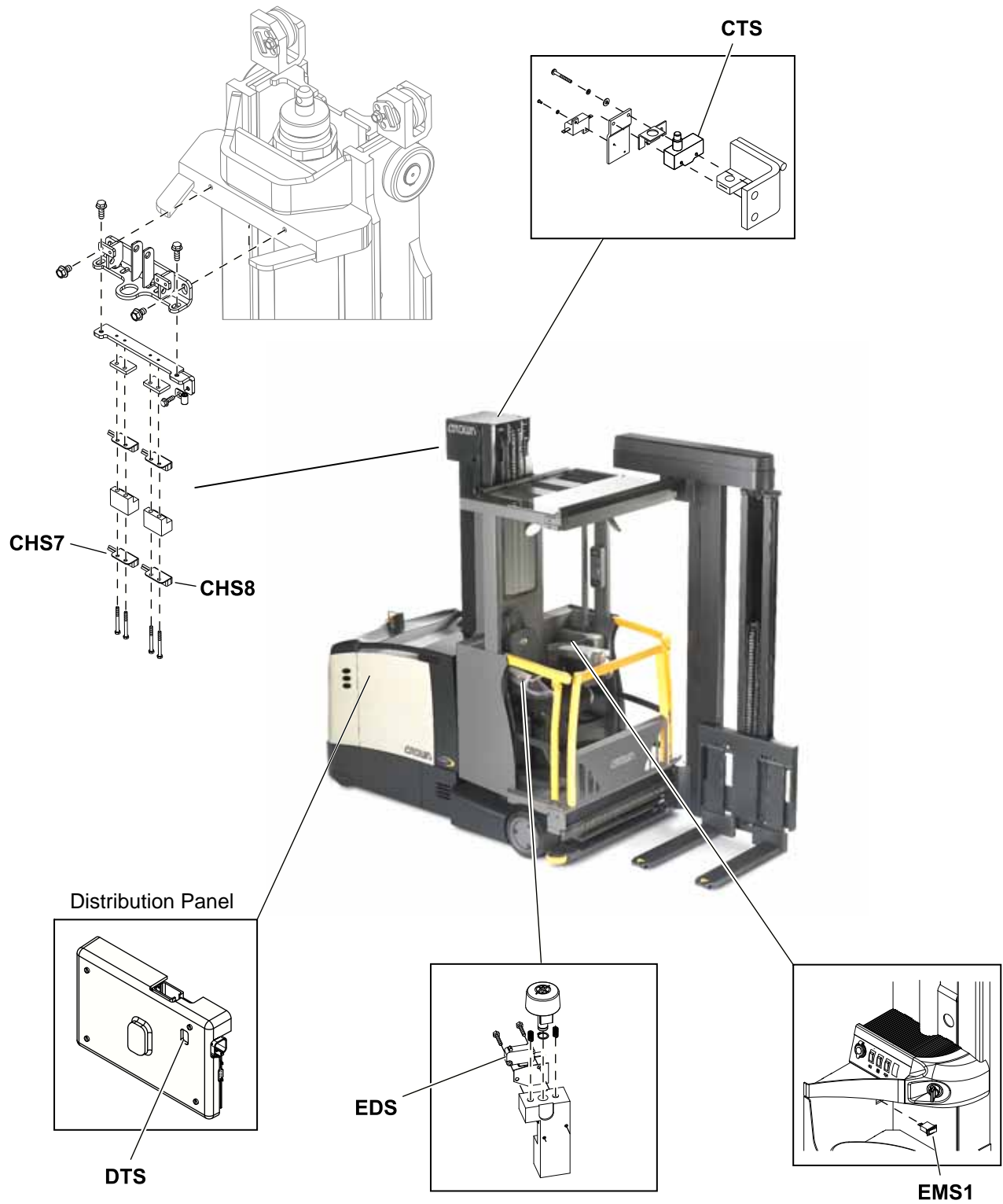


Figure 21401

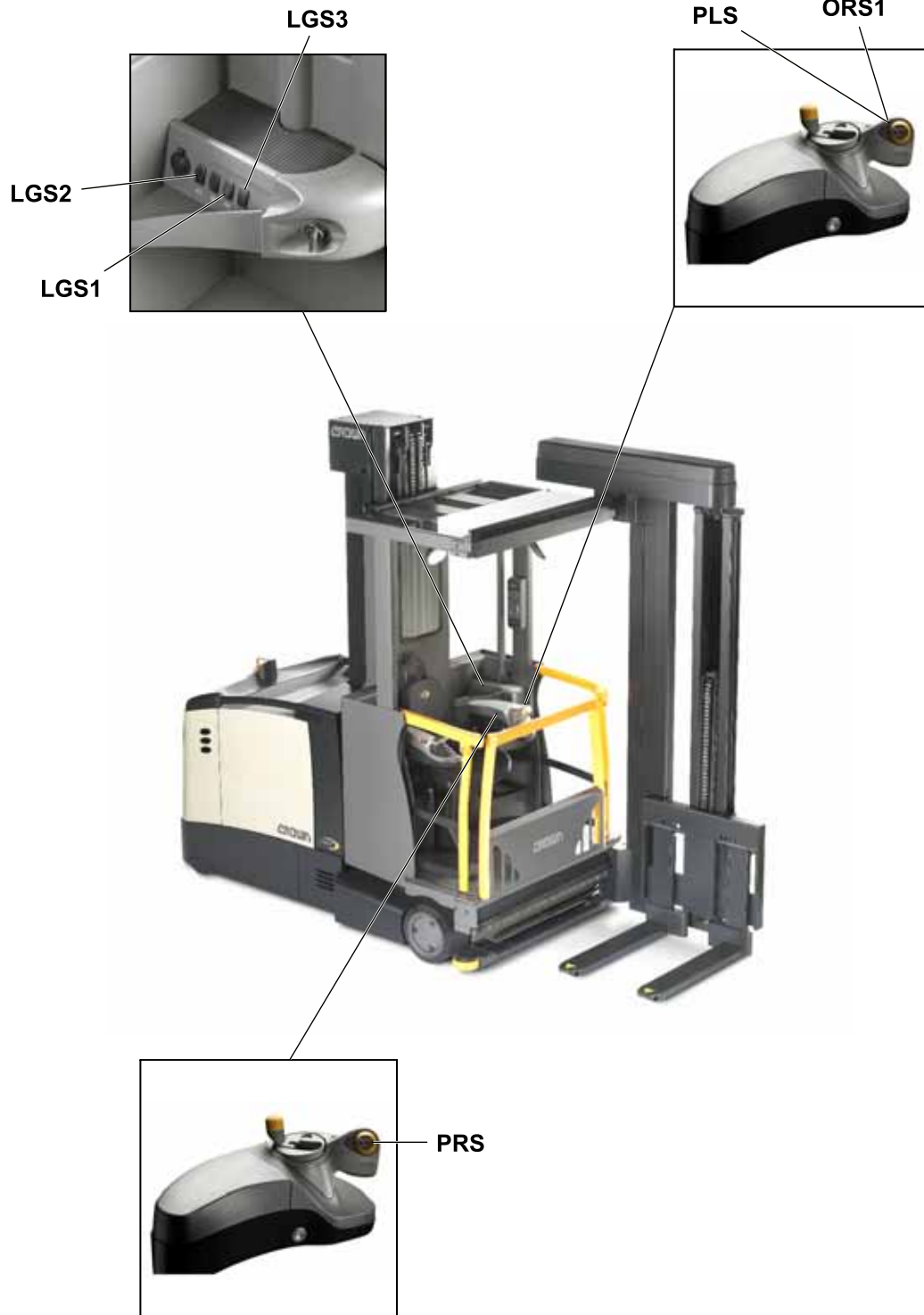


Figure 21406

Skid Inspection

On trucks equipped without rail guidance, skid bars (1) and shims (2) are located in the lower left and right corners of the power unit skirt (3).

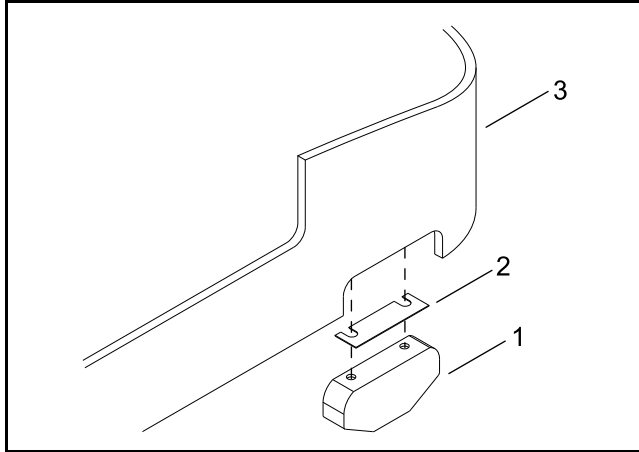


Fig. 1 (19643)

On trucks equipped with rail guidance; skid bars (1) and shims (2) are mounted on the bottom of the front (power unit end) rail guidance wheel supports (3).

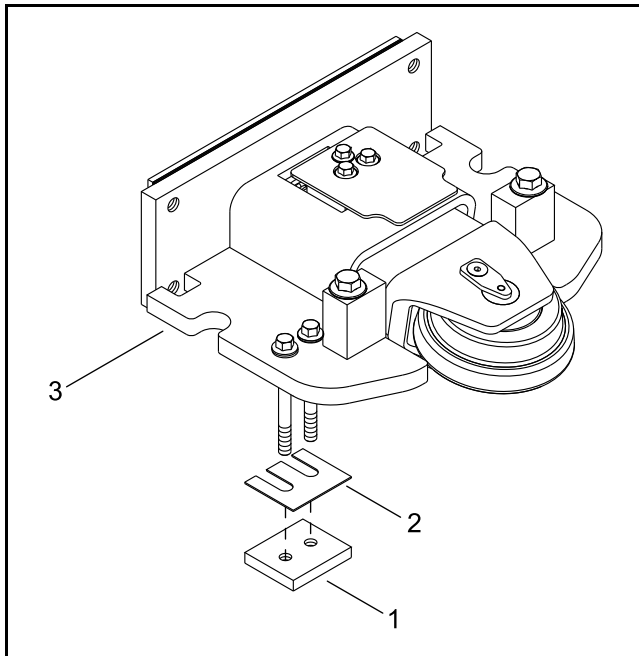


Fig. 2 (19644)



CAUTION

These skid bars are used to maintain truck stability and should be periodically inspected.

Skid Bar Torque Requirements

Check to be sure skid bar mounting screws are secure. On trucks without rail guidance, torque mounting screws to 305 Nm (225 ft lb). On trucks equipped with rail guidance, torque mounting screws to 70 Nm (52 ft lb).

Skid Bar Height

Position the truck on a level surface. Without a load, center the load handler with the forks pointing forward. Measure the distance from the bottom of skid bar to the level floor. The skid bar must be between 13 - 16 mm (0.50 - 0.63 in) from the level floor.

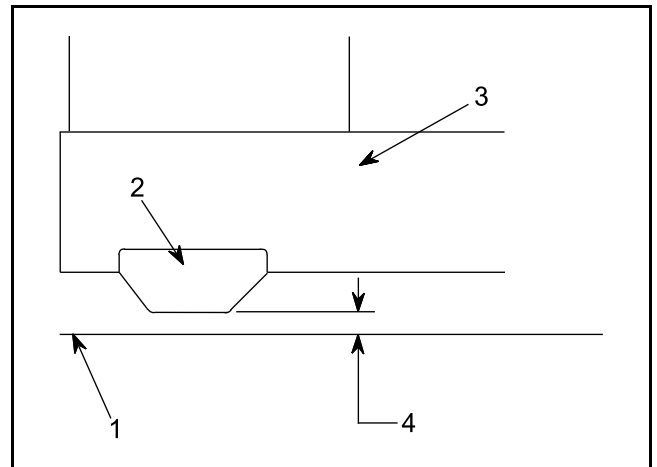


Fig. 3 (19645)

1	Level Floor
2	Skid Bar
3	Power Unit Skirt
4	Skid Bar Clearance Range 13 - 16 mm (0.50 - 0.63 in)

If measurement exceeds 16 mm (0.63 in) add shims to meet the acceptable floor to skid bar clearance range. Trucks with rail guidance already have one shim. Trucks without rail guidance do not have any shims, start by adding two thin shims. Add thick and thin shims as required to meet the acceptable floor to skid bar clearance range.

Encoders

ECR1

Steering Command Encoder

Location: left armrest

Purpose: provide steering command input to steering module

Data: 32 pulses per revolution

Adjustments: N/A

Diagrams: DIA-1960-002 (B-1)
DIA-1960-020 (C-2)

Parts Breakdown: 04.5-1960-001 (13)

ECR2

Steering Command Encoder

Location: left armrest

Purpose: provide steering command input to steering module

Data: 32 pulses per revolution

Adjustment: N/A

Diagrams: DIA-1960-002 (B-1)
DIA-1960-020 (C-3)

Parts Breakdown: 04.5-1960-001 (13)

ECR3

Auxiliary Mast Height Encoder

Location: auxiliary mast

Purpose: provide measured height and speed of forks

Data: 6.5 counts per mm (166 counts per in)

Adjustment: N/A

Diagrams: DIA-1960-002 (C-3)
DIA-1960-022 (A-3)

Parts Breakdown: 07.7-1960-001 (46)

ECR4

Traverse Position Encoder

Location: load handler top

Purpose: provide position and speed of traverse drive

Data: 64 pulses per revolution

Adjustment: N/A

Diagrams: DIA-1960-002 (B-3)
DIA-1960-022 (A-4)

Parts Breakdown: 09.1-1960-100 (39)

FU17

Battery Negative ACCESS 7 (ACM) Fuse

Location: platform distribution panel

Purpose: protect battery negative ACCESS 7 and associated wiring from over current

Data: 15 A

Adjustment: N/A

Diagrams: DIA-1960-002 (C-4)

DIA-1960-004 (B-2)

DIA-1960-005 (B-2)

Parts Breakdown: 04.3-1960-050 (6)

FU18

Battery Negative ACCESS 1 (DCM) ACCESS 8 (OCM) Fuse

Location: platform distribution panel

Purpose: protect battery negative ACCESS 1, ACCESS 8 and associated wiring from over current

Data: 15 A

Adjustment: N/A

Diagrams: DIA-1960-002 (C-4)

DIA-1960-004 (B-2)

DIA-1960-005 (B-2)

Parts Breakdown: 04.3-1960-050 (6)

FU19

Battery Negative ACCESS 4 (VCM) Fuse

Location: platform distribution panel

Purpose: protect battery negative ACCESS 4 and associated wiring from over current

Data: 15 A

Adjustment: N/A

Diagrams: DIA-1960-002 (C-4)

DIA-1960-004 (B-2)

Parts Breakdown: 04.3-1960-050 (6)

FU20

Work and Dome Lights Fuse

Location: platform 12 V supply in

Purpose: protect work and dome lights and associated wiring from over current

Data: 15 A

Adjustment: N/A

Diagrams: DIA-1960-002 (B-4)

DIA-1960-008 (C-2)

Parts Breakdown: 04.5-1960-100 (20)

FU21

Work and Dome Lights Fuse

Location: platform 12 V supply out

Purpose: protect work and dome lights and associated wiring from over current

Data: 15 A

Adjustment: N/A

Diagrams: DIA-1960-002 (B-4)

DIA-1960-008 (C-3)

Parts Breakdown: 04.5-1960-100 (20)

Modules

ACCESS 1

Display Module

Location: left post of platform

Purpose: display for operator information (including direction, speed and position), service mode messages and indicators

Data: 22 V to 55 V input

Adjustment: N/A

Diagrams: DIA-1960-002 (B-3)
DIA-1960-008 (C-1)

Parts Breakdown: 04.8-1960-252 (2)

ACCESS 2

Hydraulic Control Module

Location: power unit right rear

Purpose: controls hydraulic motor, hydraulic solenoids and reads CTS and HCS

Data: 48 VDC to 80 VDC input

Adjustment: N/A

Diagrams: DIA-1960-003 (B-3)
DIA-1960-017 (C-1)
DIA-1960-023 (B-2)

Parts Breakdown: 04.0-1960-007 (70)

ACCESS 3

Traction Control Module

Location: power unit left rear

Purpose: control traction operation

Data: 48 VDC to 80 VDC input

Adjustment: N/A

Diagrams: DIA-1960-003 (B-1)
DIA-1960-013 (C-1)
DIA-1960-023 (A-2)

Parts Breakdown: 04.0-1960-007 (36)

ACCESS 4

Vehicle Control Module

Location: platform

Purpose: control vehicle operation

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-002 (B-2)
DIA-1960-010 (C-2)

Parts Breakdown: 04.8-1960-252 (7)

Sensors

CS1

Current Monitor

Location: contactor panel

Purpose: monitor current through BDI to determine battery status

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-003 (B-2)
DIA-1960-015 (C-1)

Parts Breakdown: 04.1-1960-003 (36)
04.1-1960-052 (10)
04.1-1961-001 (37)

EACA1

End Aisle Control A1

Location: mainframe bumper

Purpose: to signal operator of approaching end or intersection of aisle

Data: 12 V

Adjustment: N/A

Diagrams: DIA-1960-003 (C-4)
DIA-1960-021 (A-1)

Parts Breakdown: 10.4-1960-150 (21)
10.4-1960-250 (21)

EACA2

End Aisle Control A2

Location: mainframe bumper

Purpose: to signal operator of approaching end or intersection of aisle

Data: 12 V

Adjustment: N/A

Diagrams: DIA-1960-003 (C-4)
DIA-1960-021 (A-3)

Parts Breakdown: 10.4-1960-150 (21)
10.4-1960-250 (21)

EACB1

End Aisle Control B1

Location: mainframe bumper

Purpose: to signal operator of approaching end or intersection of aisle

Data: 12 V

Adjustment: N/A

Diagrams: DIA-1960-003 (C-3)
DIA-1960-021 (A-1)

Parts Breakdown: 10.4-1960-150 (21)
10.4-1960-250 (21)

EACB2

End Aisle Control B2

Location: mainframe bumper

Purpose: to signal operator of approaching end or intersection of aisle

Data: 12 V

Adjustment: N/A

Diagrams: DIA-1960-003 (C-4)
DIA-1960-021 (A-3)

Parts Breakdown: 10.4-1960-150 (21)
10.4-1960-250 (21)

SVAL

Velocity Fuse

Location: auxiliary cylinder base

Purpose: to stop lift cylinder from lowering if speed exceeds 36.5 m/min (120 ft/min)

Data: fits C10-2 cavity

Adjustment: N/A

Diagrams: HYD-1960-001

DIA-1960-002 (B-3)

DIA-1960-018 (C-3)

DIA-1960-022 (A-2)

Parts Breakdown: 02.0-1960-200 (33)

SVML

Main Lower Solenoid Valve

Location: mainframe manifold

Purpose: prevents drift

Data: fits C12-2 cavity

Adjustment: N/A

Diagrams: HYD-1960-001

DIA-1960-003 (B-3)

DIA-1960-018 (C-3)

Parts Breakdown: 02.4-1960-001 (27)

EMS2

Traverse Override

Location: power unit right side

Purpose: during an electrical malfunction allows operation of traverse functions

Data: normally open

Adjustment: N/A

Diagrams: DIA-1960-003 (C-3)
DIA-1960-017 (C-4)

Parts Breakdown: 04.0-1960-001 (5)

FHSL

Fork Home Switch

Location: fork assembly

Purpose: lock out pivot function when forks are out of home position

Data: normally closed

Adjustment: N/A

Diagrams: DIA-1960-002 (B-3)
DIA-1960-022 (A-2)

Parts Breakdown: 07.9-1960-003 (7)

FHSR

Fork Home Switch

Location: fork assembly

Purpose: lock out pivot function when forks are out of home position

Data: normally closed

Adjustment: N/A

Diagrams: DIA-1960-002 (B-3)
DIA-1960-022 (A-2)

Parts Breakdown: 07.9-1960-001 (7)

FNS

Operator Fan Switch

Location: platform console

Purpose: allows operator to turn fan ON or OFF

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-008 (B-2)

Parts Breakdown: 04.5-1960-100 (14)

FPS1

Foot Presence Switch

Location: platform floorboard

Purpose: sense operator presence to enable traction and hydraulic functions and to apply brake when foot is removed while in stand up mode

Data: normally open

Adjustment: N/A

Diagrams: DIA-1960-002 (B-2)
DIA-1960-012 (C-2)

Parts Breakdown: 09.2-1960-050 (3)

FPS2

Foot Presence Switch

Location: platform floorboard

Purpose: sense operator presence to enable traction and hydraulic functions and to apply brake when foot is removed while in stand up mode

Data: normally open

Adjustment: N/A

Diagrams: DIA-1960-002 (B-2)
DIA-1960-012 (B-2)

Parts Breakdown: 09.2-1960-050 (3)

RGSL

Rail Guide Switch (Optional)

Location: aisle guide wheel bracket mounted under power unit

Purpose: provide ability to turn ON automatic steering

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-003 (C-2)
DIA-1960-014 (C-4)

Parts Breakdown: 10.4-1960-001 (17)
10.4-1960-050 (16)

RGSR

Rail Guide Switch (Optional)

Location: aisle guide wheel bracket mounted under power unit

Purpose: provide ability to turn ON automatic steering

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-003 (B-2)
DIA-1960-014 (B-4)

Parts Breakdown: 10.4-1960-001 (17)
10.4-1960-050 (16)

RS

Reverse Switch

Location: right armrest

Purpose: informs traction controller reverse travel direction is being requested

Data: N/A

Adjustment: N/A

Diagrams: DIA-1960-002 (C-2)
DIA-1960-019 (A-2)

Parts Breakdown: 04.6-1960-001 (17)

RSS

Release Seat Switch

Location: right armrest

Purpose: release seat lock

Data: normally open

Adjustment: N/A

Diagrams: DIA-1960-002 (C-1)
DIA-1960-019 (B-2)

Parts Breakdown: 04.6-1960-001 (1)

SES

Seat Sense Switch

Location: seat

Purpose: sense operator presence on seat

Data: normally open

Adjustment: N/A

Diagrams: DIA-1960-002 (B-2)
DIA-1960-011 (C-4)

Parts Breakdown: 09.0-1960-150 (9)

SLS

Seat Sense Switch

Location: seat

Purpose: sense when seat is locked in place

Data: normally closed

Adjustment: N/A

Diagrams: DIA-1960-002 (B-2)
DIA-1960-011 (C-2)

Parts Breakdown: 09.0-1960-150 (112)

Load Handler Circuit through Main Frame Manifold (Except Auxiliary Lower)

SP1 is a proportional control valve that directs oil for all auxiliary (load handler) functions. Access 2 controls SP1 by varying the applied voltage to the SP1 coil. The more voltage applied to SP1 coil, the more SP1 spool moves which permits more oil to flow to the auxiliary functions.

Actuating SP1 for any load handler function causes PCA to adjust to provide priority flow to the load handler manifold. Any unused oil is passed out to the secondary port to PCBy and PVMR. The requested flow out SP1 is directed to the load handler through PCA, and excess flow is directed to PCBy and PVMR.

When an operator requests an auxiliary function(s), Access 2 energizes SP1 coil opening the valve in proportion to the operator's request and turns on the variable speed pump motor causing P1 to draw oil from the reservoir. Oil flows through manifold port P to RV1. Oil is directed through SP1, PCA and CV1 and out the main frame manifold through port A to the load handler manifold.

SP1 and PCA control the amount of oil flow to the load handler manifold. Oil flow before SP1 and after SP1 is applied through pilot passages to both sides of PCA. If SP1 is opened a small amount, more oil will flow through pilot passages to PCA's right side. When that oil flow creates enough pressure to overcome the spring force on PCA's left, PCA will shift left allowing some oil to be directed to PCBy and PVMR and may be used for main lift (if requested) or directed back to the reservoir by PCBy. If SP1 is opened fully, just the opposite will happen. More oil will flow into the pilot passages on PCA's left and assist the spring in moving PCA to the right, sending more oil to the load handler manifold.

When the accessory function is no longer requested, pressure before CV1 is bled through ORF1.

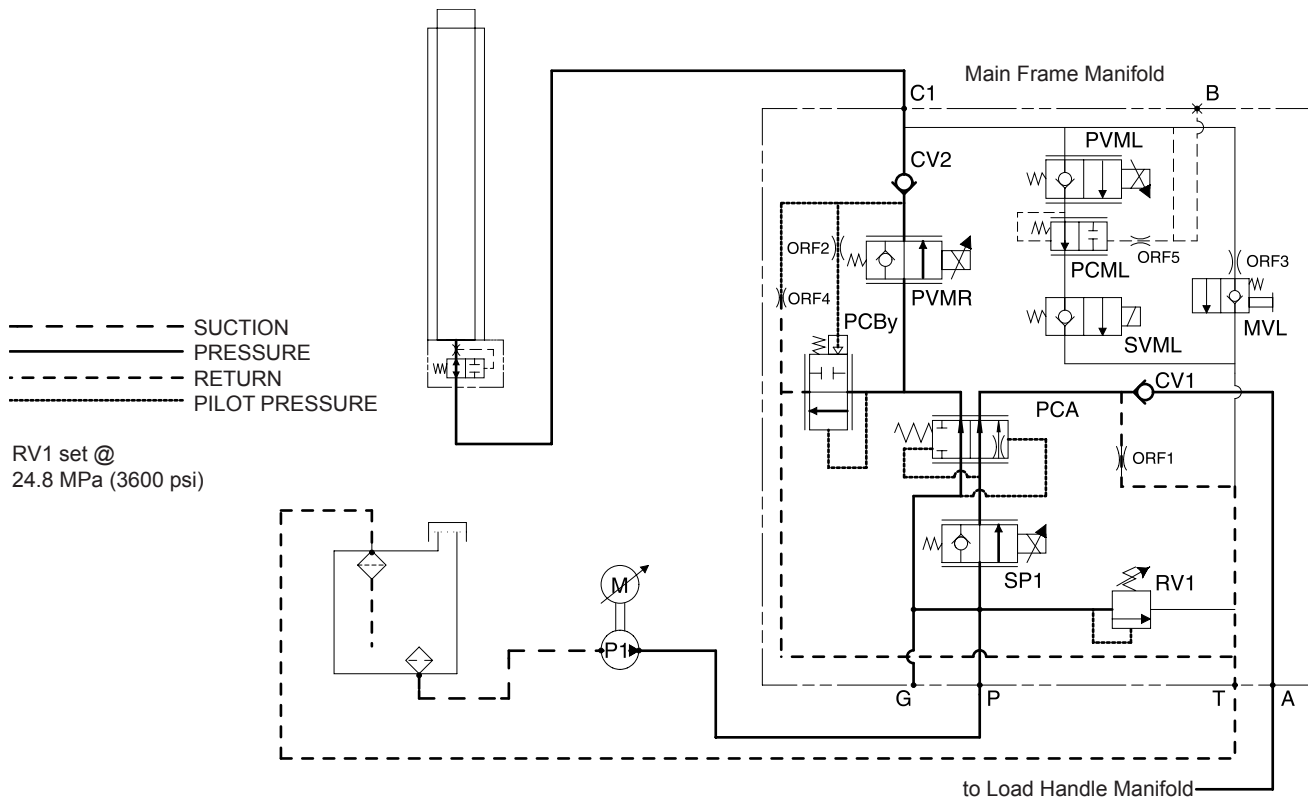


Figure 12877

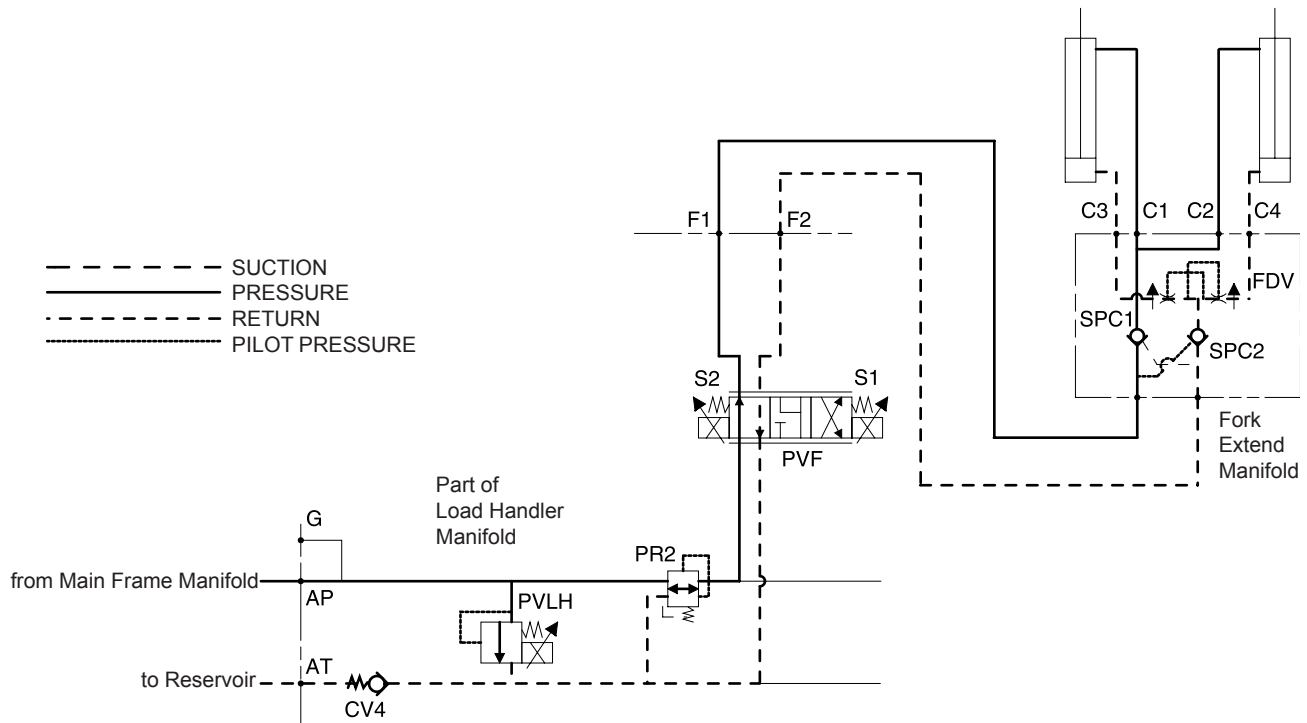


Figure 12883

Hydraulic Motor

Preparation Before Disassembly

Before you disassemble the hydraulic motor or any of its components, read this entire maintenance section. It provides important information on parts and procedures you will need to know to service the hydraulic motor. Refer to the tool list for tools and other items required to service the hydraulic motor and have them available.

- Thoroughly clean off all outside dirt, especially from around fittings and hose connections, before disconnecting and removing the hydraulic motor.
- Remove rust or corrosion from coupling shaft.
- Remove coupling shaft connections and hose fittings and immediately plug port holes and fluid lines.
- Remove the hydraulic motor from truck, drain it of fluid and take to a clean work surface.
- Clean and dry the unit before you start to disassemble the unit.
- As you disassemble the unit, clean all parts, except seals, in clean petroleum-based solvent and blow them dry.



WARNING

Be extremely careful when using any solvent. Even a small explosion or fire could cause injury or death. Always wear eye protection and be sure to comply with OSHA or other maximum air pressure requirements.



CAUTION

Never steam or high pressure wash hydraulic components. Do not force or abuse closely fitted parts.

Keep parts separate to avoid nicks and burrs. Discard all seals and seal rings as they are removed from the unit. Replace all seals, seal rings and any damaged parts with approved service parts.

Tools and Materials Required for Servicing

- Clean, petroleum-based solvent
- Emery paper
- Vise with soft jaws
- Air pressure source
- Arbor press
- Screwdriver
- Masking tape
- Breaker bar
- Torque wrench - Nm (ft lb)
- Sockets: 1/2 or 9/16 inch thin wall, 1 inch
- Allen sockets: 3/16, 3/8 inch
- Adjustable crescent wrench or hose fitting wrenches
- SAE 10W40 SE or SF oil
- Special bearing mandrel (refer to Figure 21256)
- Feeler gage 0.13 mm (0.005 in)
- Blind hole bearing puller for 26.9 mm (1.06 in) and 41.1 mm (1.62 in) diameter bearing/bushing
- Clean corrosion resistant grease. Recommended grease is E/M Lubricant #K-70M, Crown #107334

NOTE

The available service seal kits include the recommended grease as a grease pack.



CAUTION

Mixing greases that have different bases can be detrimental to bearing life.

⚠ CAUTION

If the bearing mandrel specified is not available and alternate methods are used to press in bearing and bushing (12) and (19), the bearing and bushing depths specified must be achieved to insure adequate bearing support and correct relationship to adjacent components when assembled. Refer to Figure 12949.



Figure 12949

⚠ CAUTION

Because the bearing and bushings (12) and (19) have a press fit into housing they must be discarded when removed. They must not be reused.

24. The hydraulic motor inner housing bearing/bushing (12) can now be pressed into its counterbore in housing (18) flush to 0.76 mm (0.03 in) below the housing wear plate contact face. Use the opposite end of the bearing mandrel that was used to press in the outer bearing/bushing (19). Refer to Figure 12950.

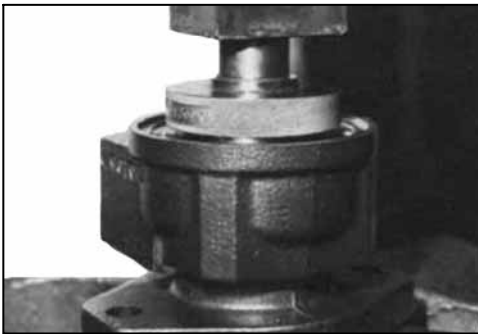


Figure 12950

25. Apply a small amount of clean grease to a new dirt and water seal (20) and press it into the housing (18) outer bearing counterbore. It must be pressed in until its flange is flush against the housing. Refer to Figure 12952.

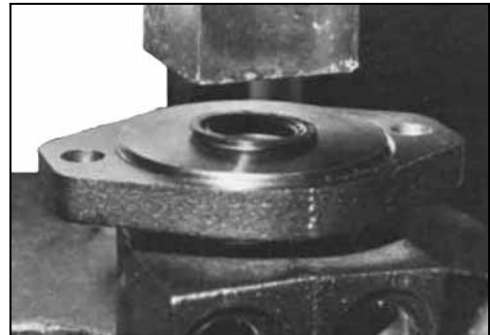


Figure 12952

26. Place housing (18) assembly into a soft jawed vise with the coupling shaft bore down, clamping against the mounting flange. Refer to Figure 12953.



Figure 12953

Drive Unit Lubrication

Drive unit capacity is 6.2 liters (6.55 quarts) of Mobilube1 SHC 75W-90 synthetic gear oil or equivalent. This gear oil can be used in all applications including freezer operations. Substitute gear oil must meet service grade rating of API GL-4 to preserve the drive unit's warranty.

On new trucks the initial oil change should be at 250 hours of operation and then every 2500 hours of operation or 1 year which ever occurs first.

To gain access to the drive unit, open power unit doors and remove rear skirt. It may be necessary to turn the steer wheel to gain access to the fill plug (1) and drain plug (2) and to remove the steer wheel wire guidance bracket if the truck has optional wire guidance.

The drain plug (2) is located on the bottom of drive unit. Refer to Figure 20789.

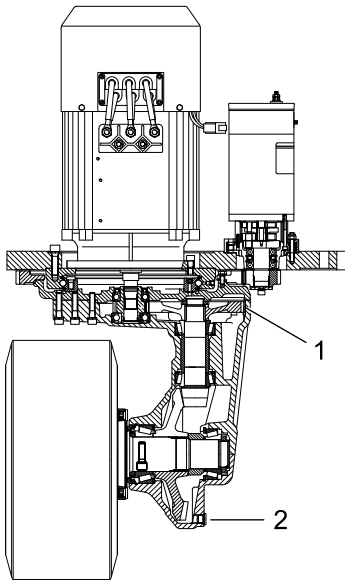


Figure 20789

1. Turn steer wheel to gain access to the fill plug (1) and drain plug (2).
2. Disconnect battery and chock load wheels.
3. Remove drain plug (2). Collect oil and dispose of properly.
4. Once drive unit oil has been drained, inspect drain plug seal before reinstalling and replace seal as needed.

5. Clean area around fill plug and remove fill plug (1) which is located at top of the drive unit. Refer to Figure 20789.
6. Fill with oil until it starts running out of fill hole (6.2 liters [6.55 qt]).
7. Inspect fill plug seal and replace as needed. Install fill plug (1). Check for leaks.
8. Close drive unit doors and run operational check on truck.
9. Verify wire guidance calibration if truck is equipped with optional wire guidance.

Drive Unit Removal



If truck is equipped with wire guidance make sure when raising rear of the power unit the jack does not damage the steer wheel wire guidance bracket.

1. Raise rear of power unit so drive tire just clears the floor. Place hardwood blocks under each corner of power unit. After blocks are in place and truck is secure remove jack. Refer to Control of Hazardous Energy Lockout/Tagout section for lifting and blocking instructions.
2. Open and remove power unit doors to gain access to the drive unit.
3. Remove rear skirt from truck.
4. Remove steer wheel guidance bracket if truck is equipped with wire guidance.
5. Attach a lifting sling around the drive unit and apply some pressure on sling with lifting device.

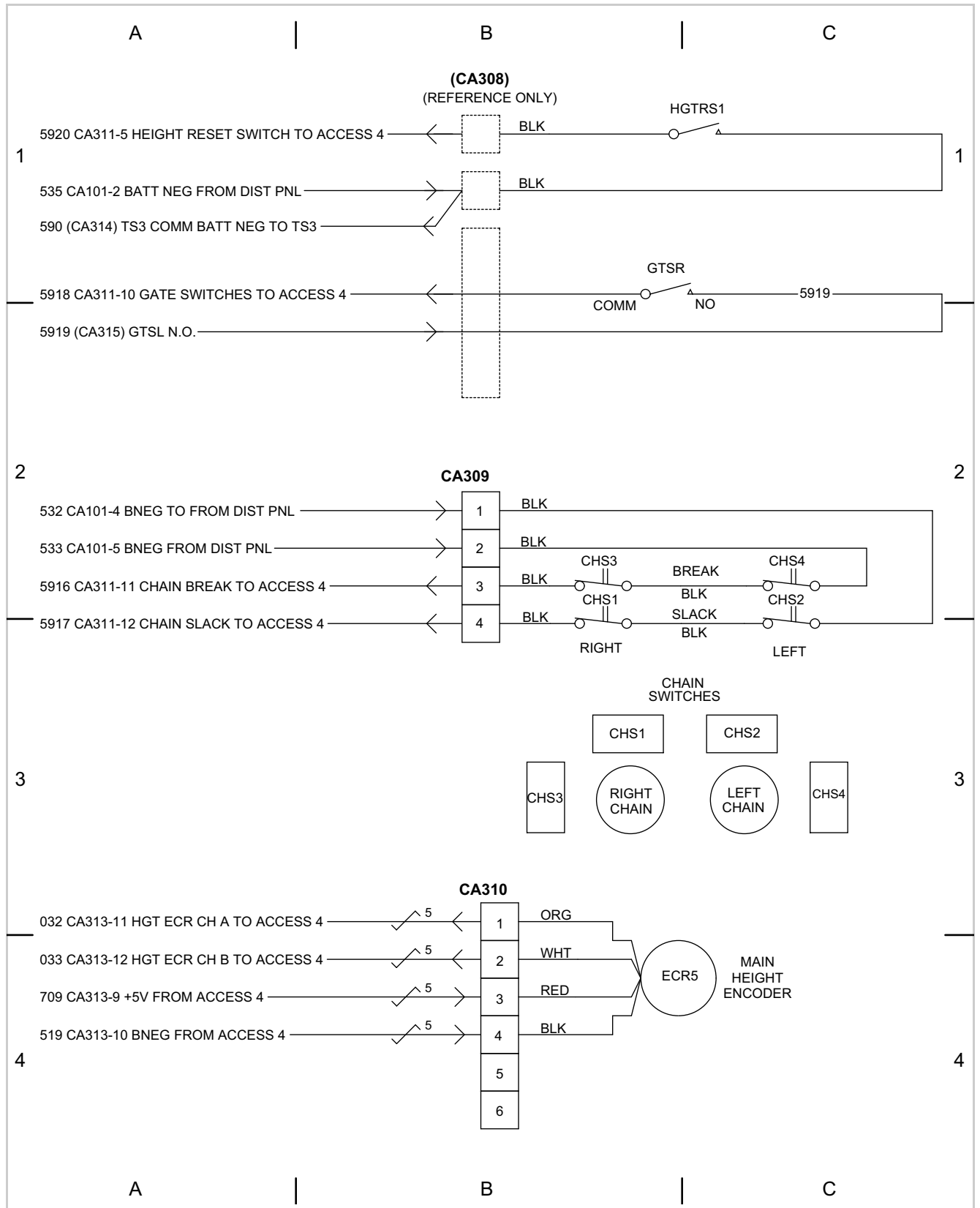


Figure 134495 C

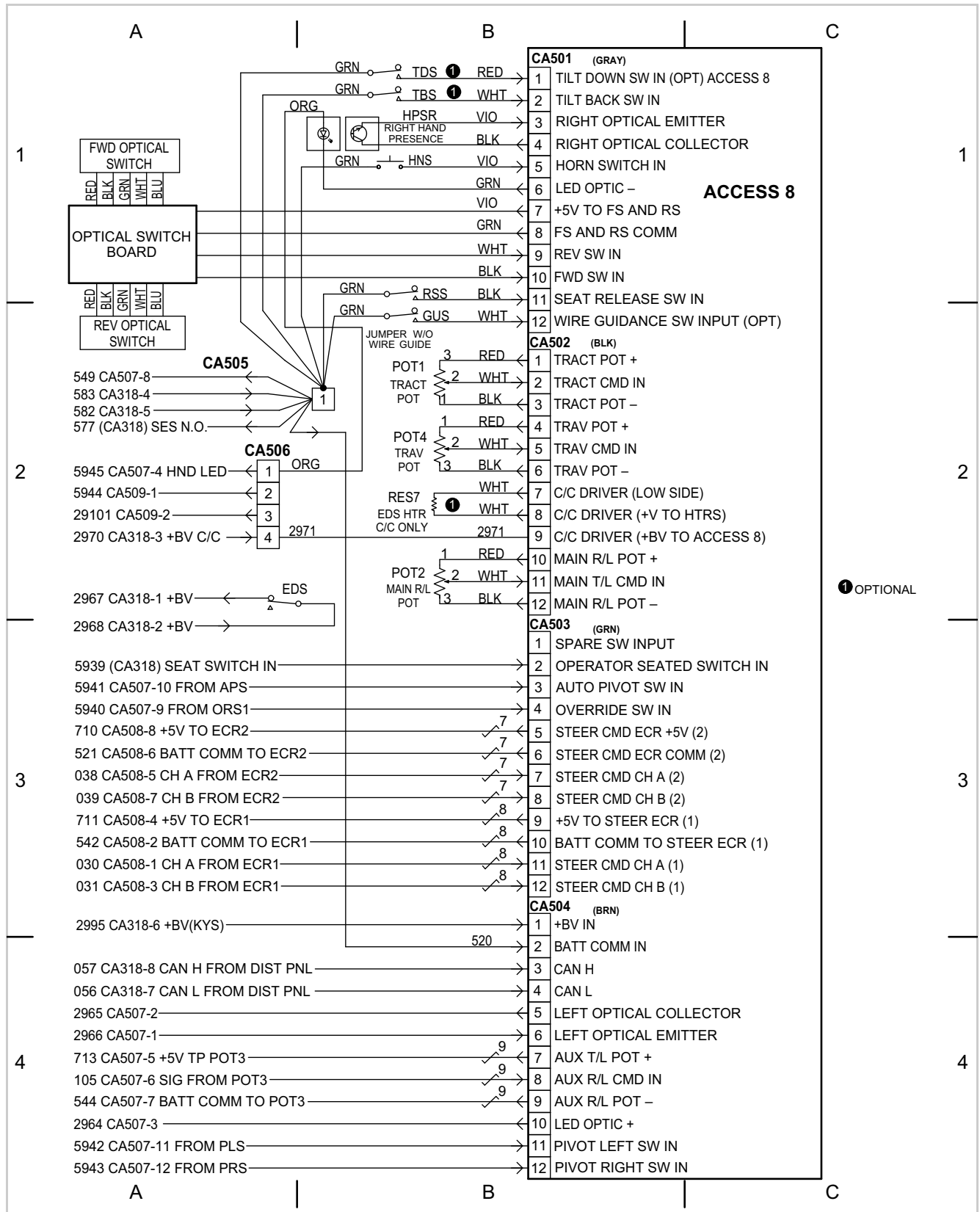


Figure 134499 F

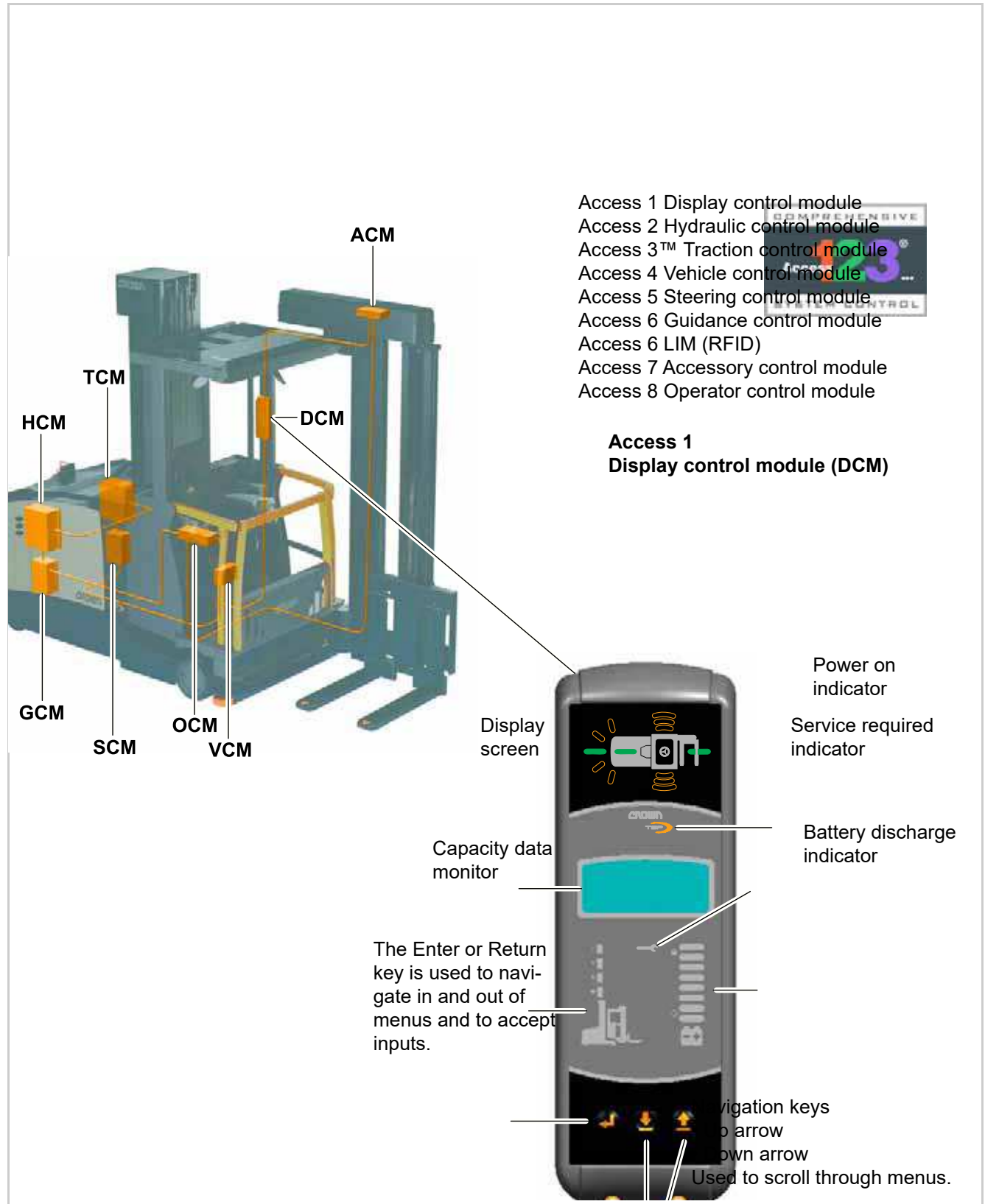


Fig. 2 (12575-02)

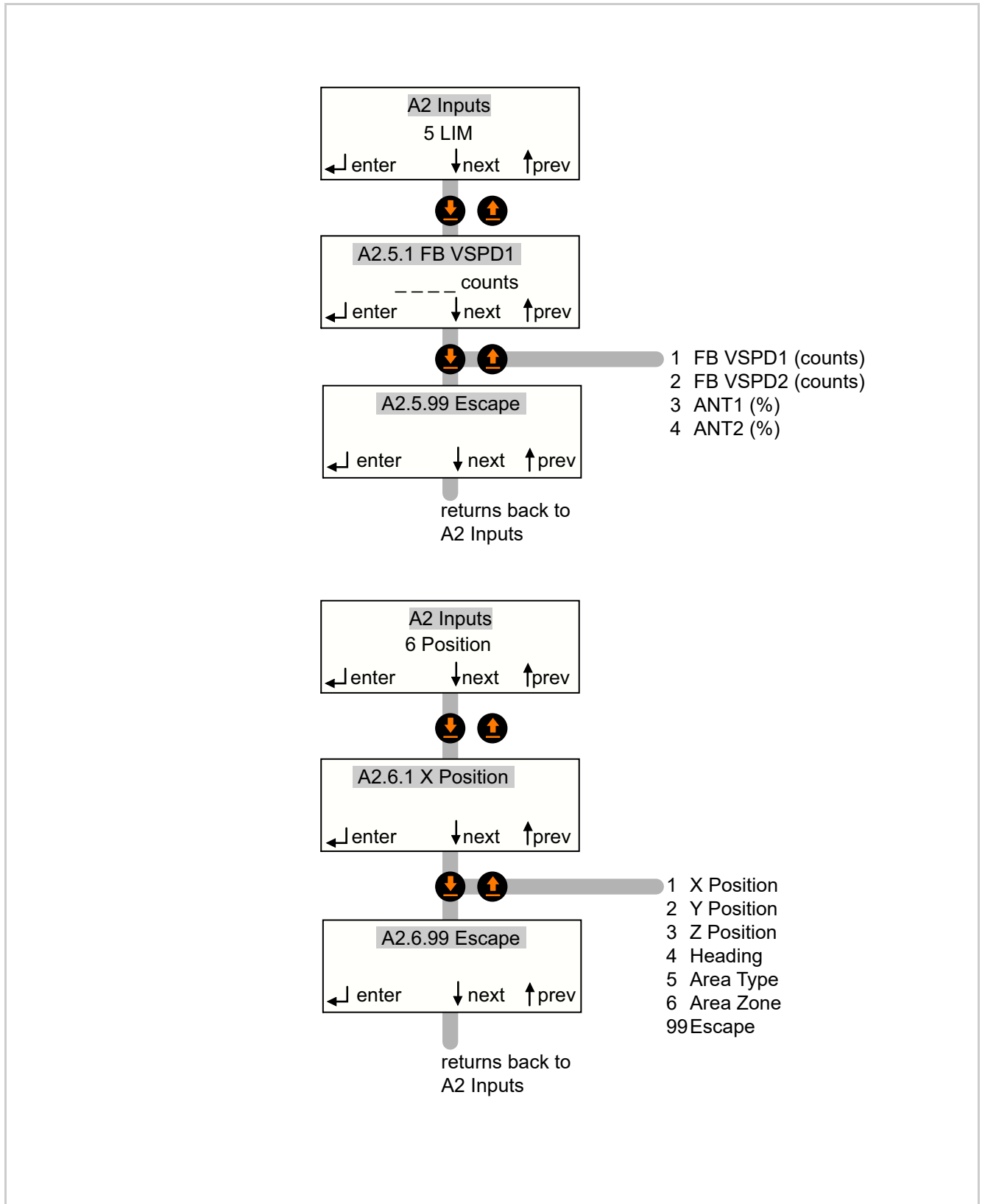


Fig. 12 (31173)

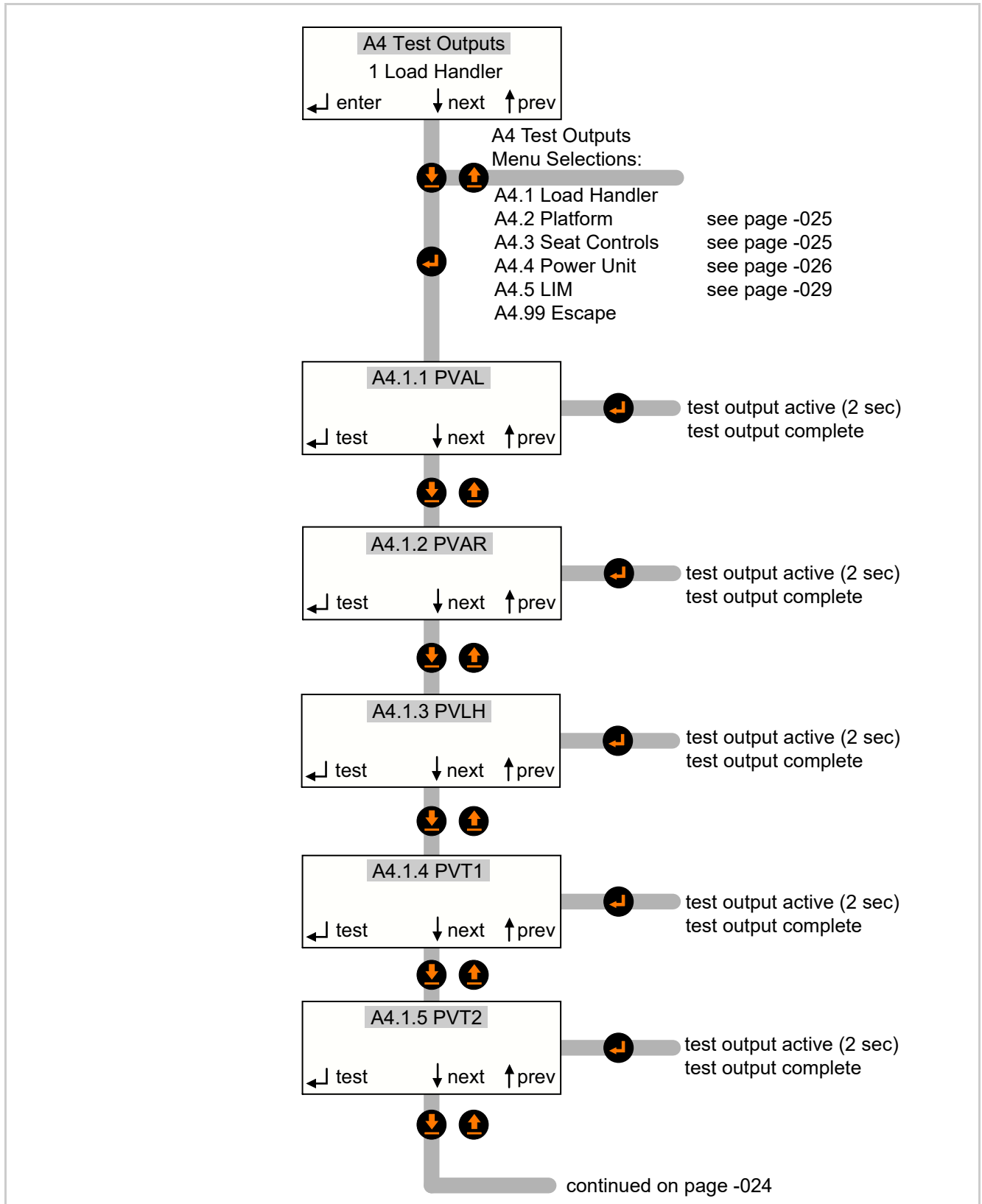


Fig. 22 (13938-02)

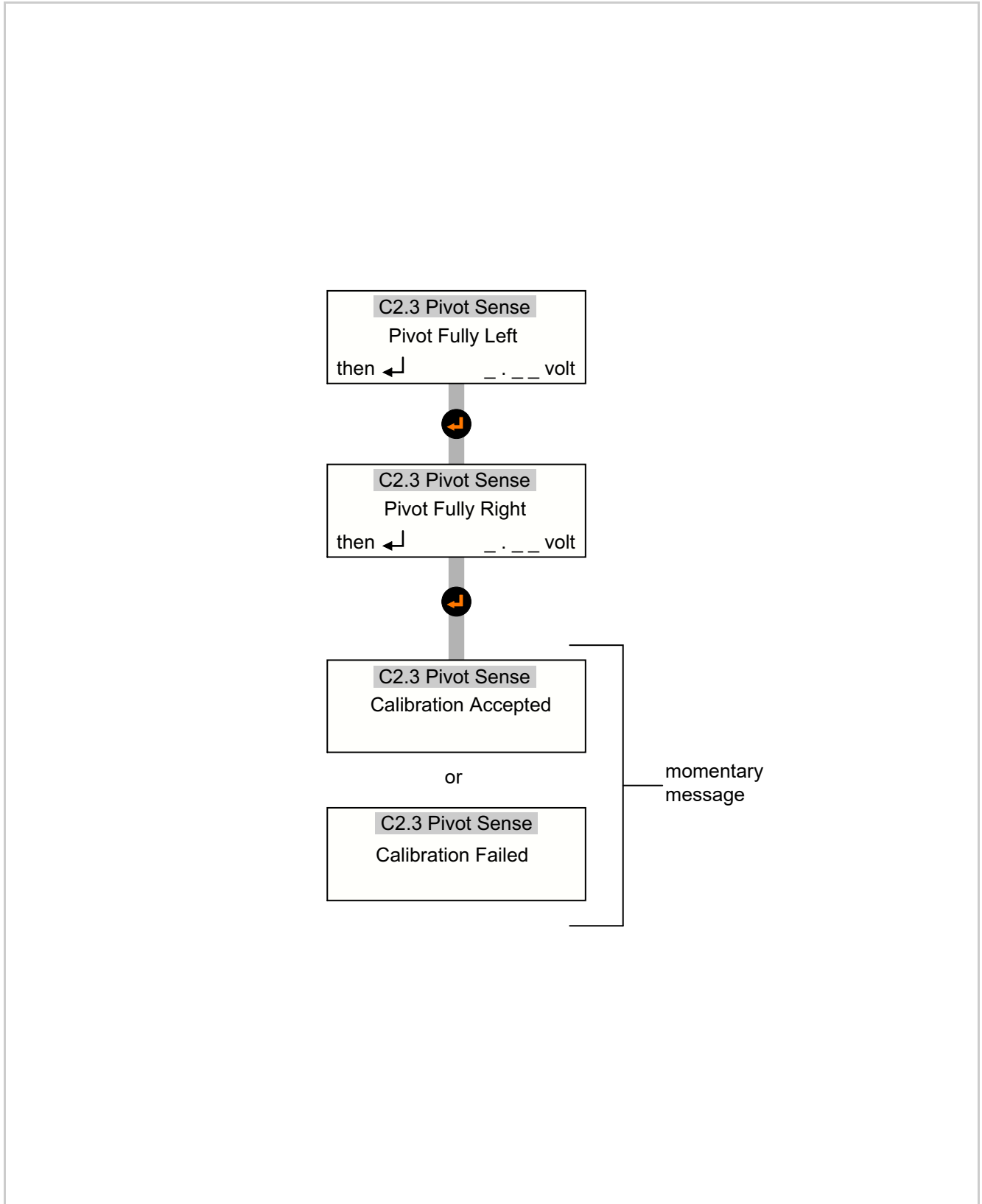


Fig. 32 (13947-02)

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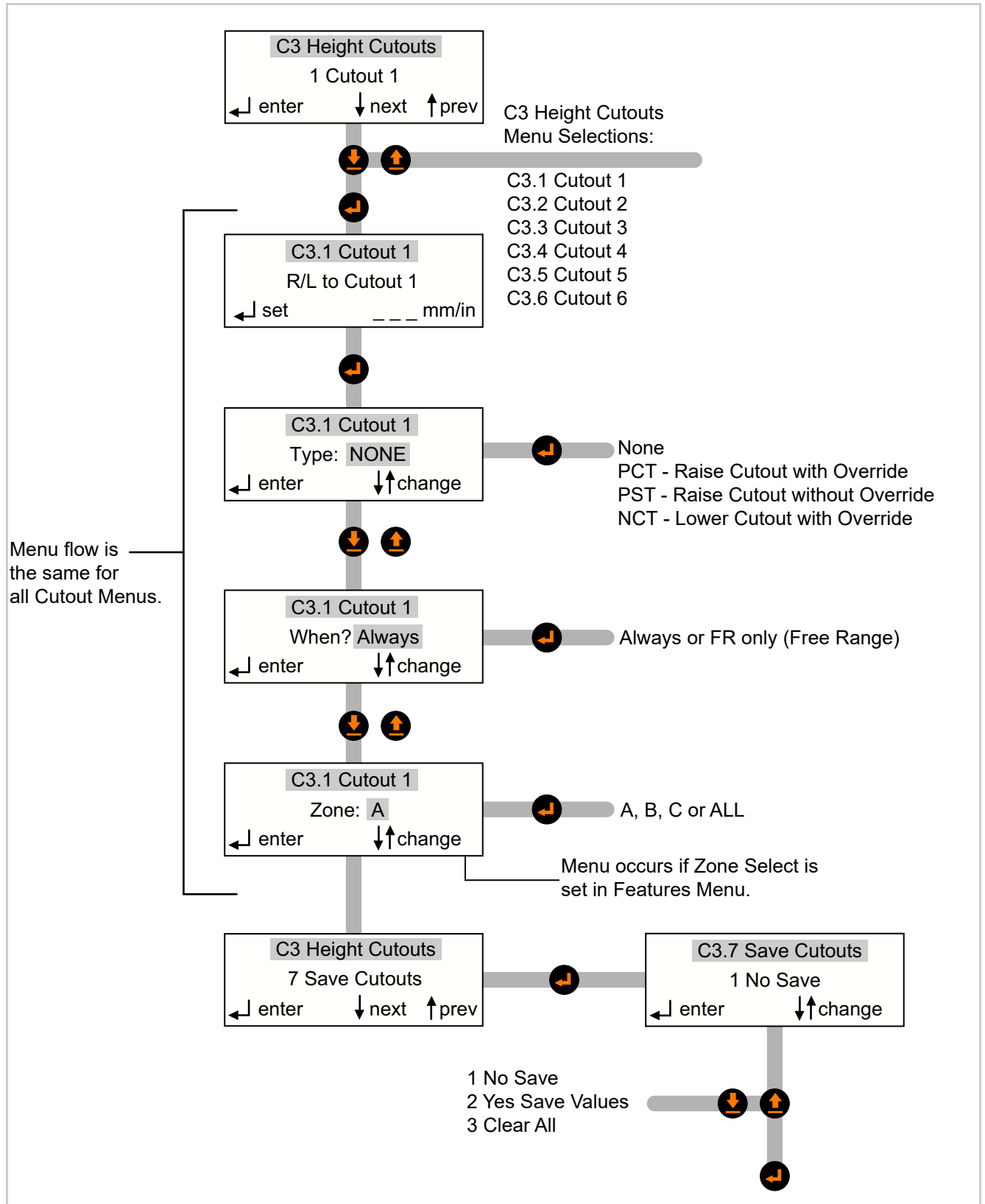


Fig. 42 (13959-03)

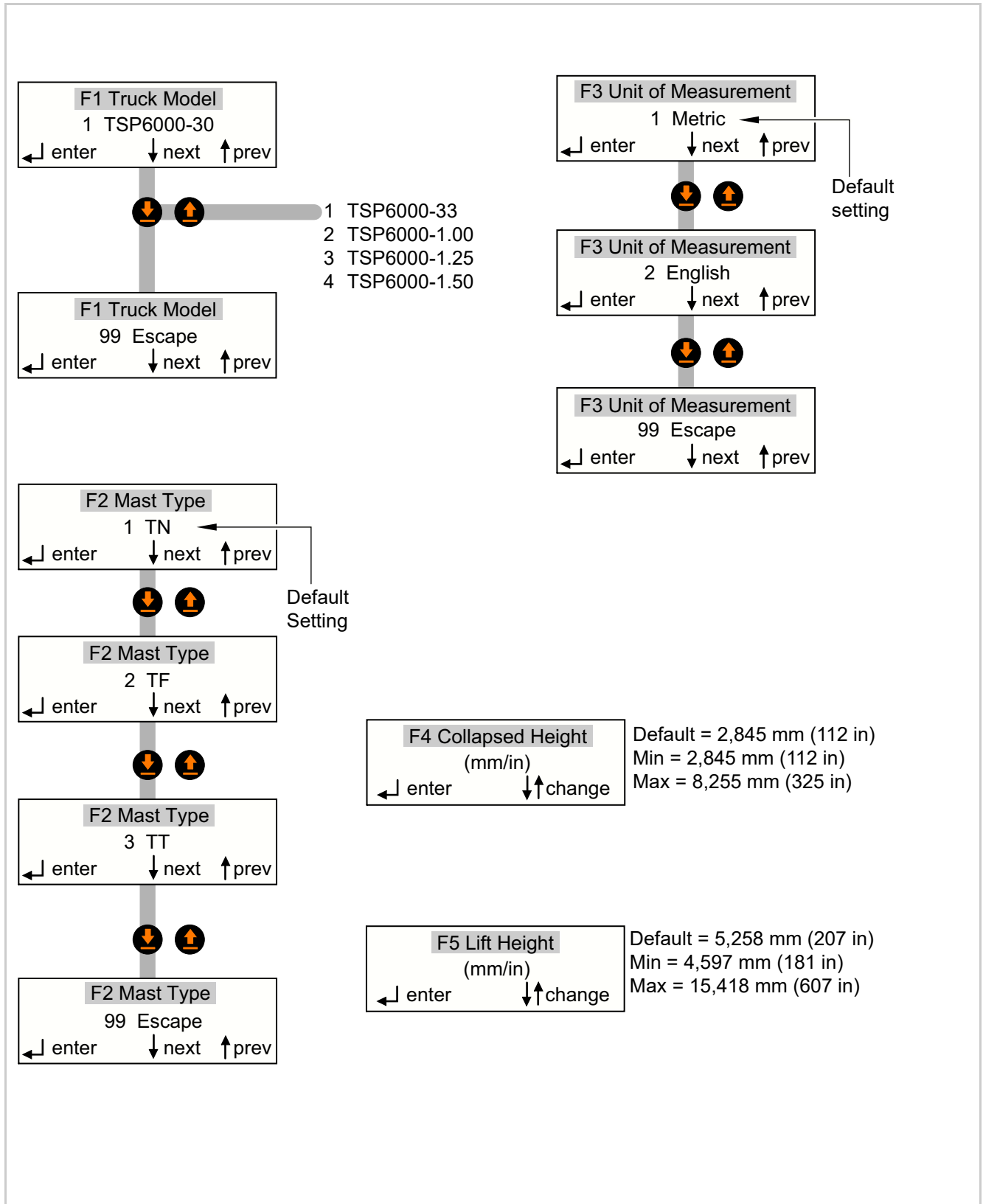


Fig. 52 (13967-02)

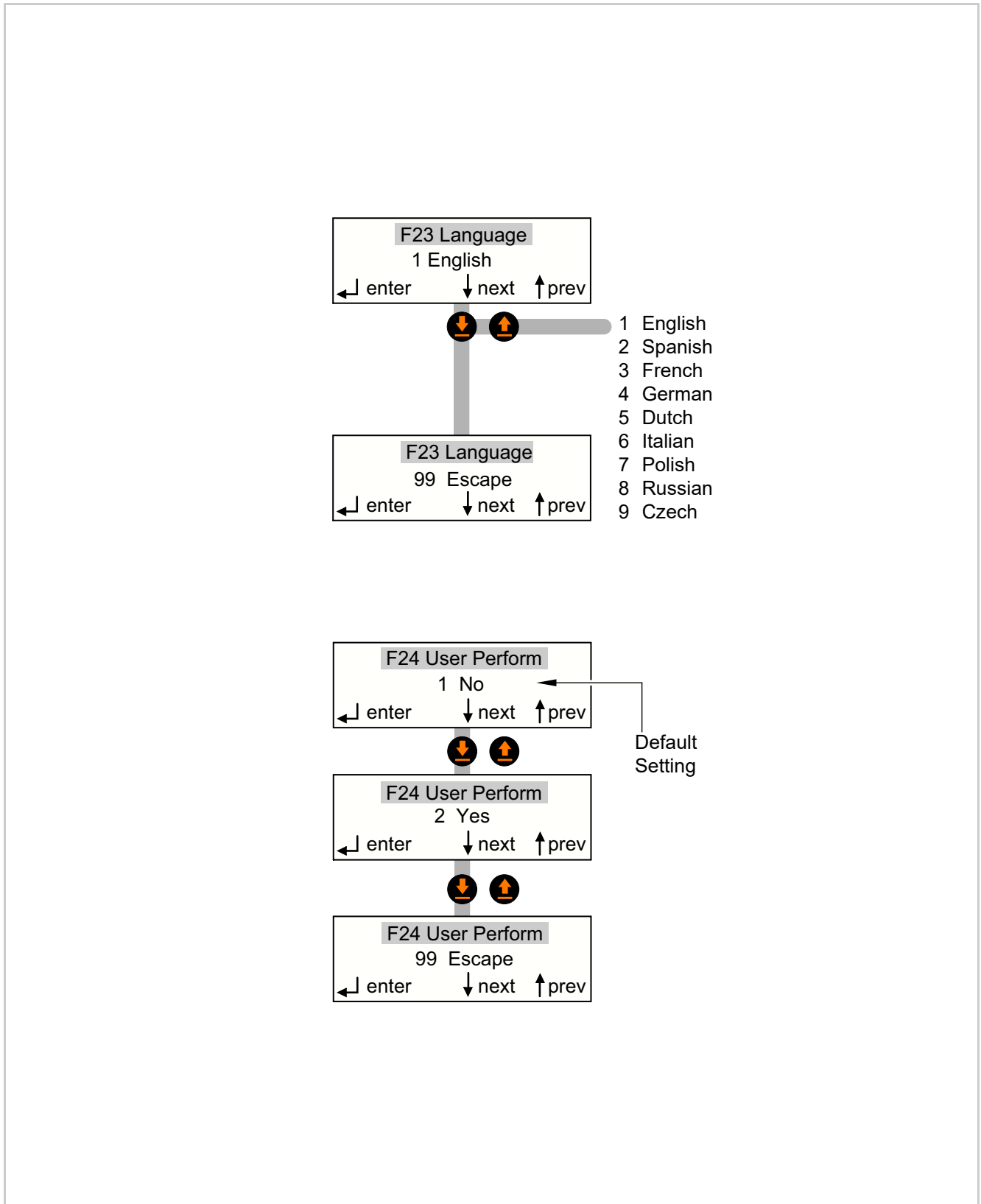


Fig. 62 (31178)

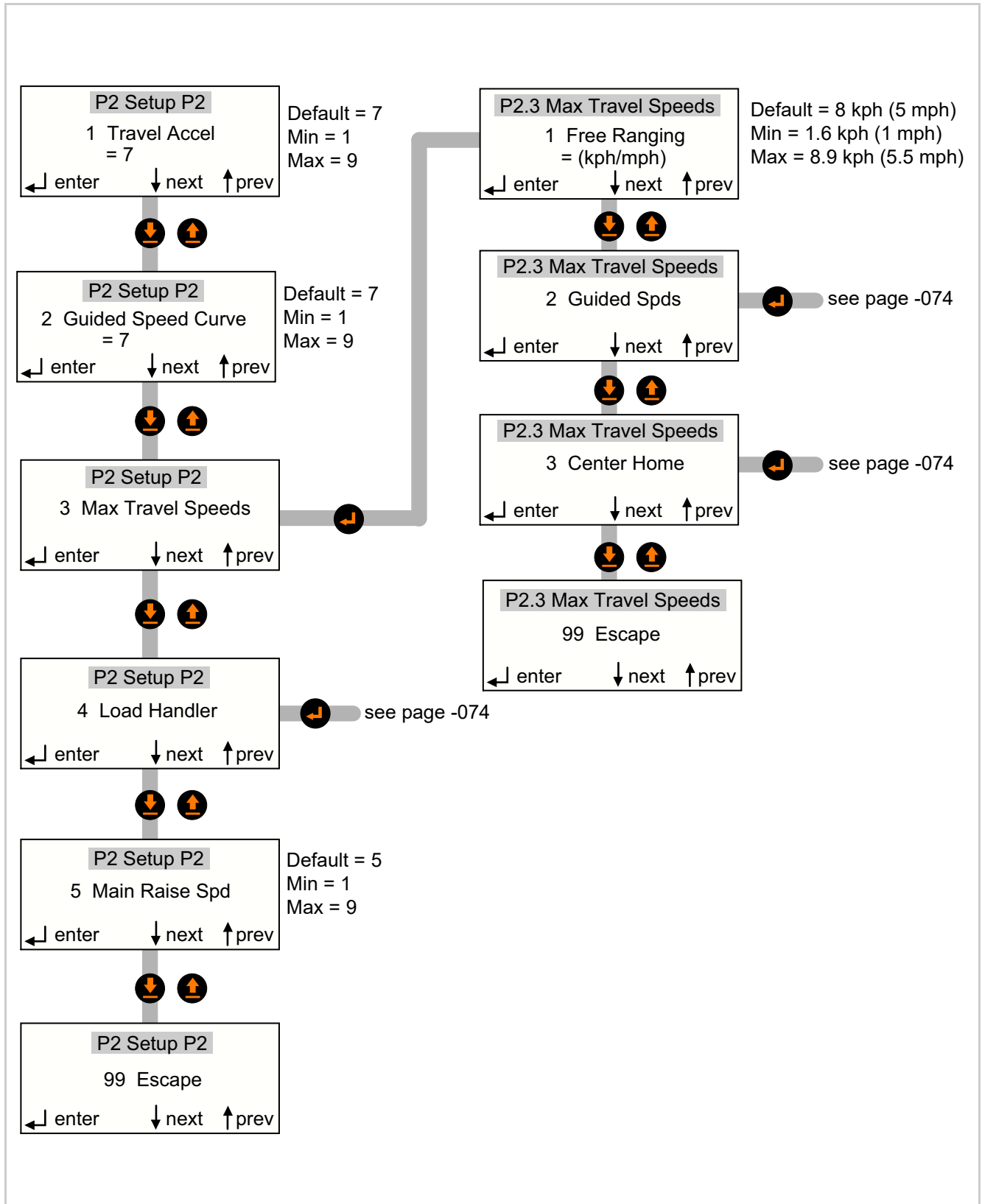


Fig. 72 (14004-02)

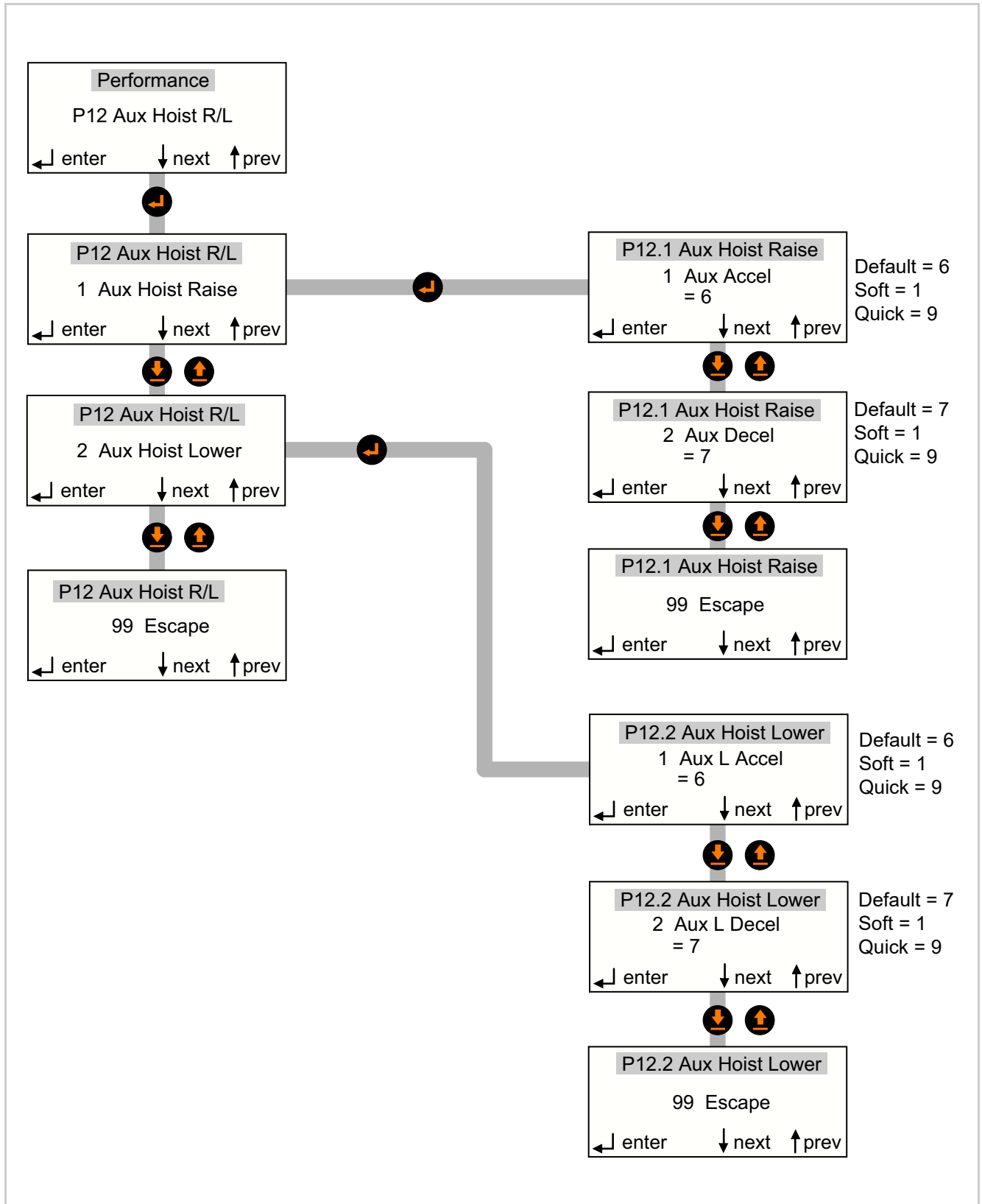


Fig. 82 (14013-02)

Three variations to normal operation are encountered during the Auto Tracking mode: 1) Auto Field Strength; 2) Auto Track Deviation; 3) Auto Wire Lost.

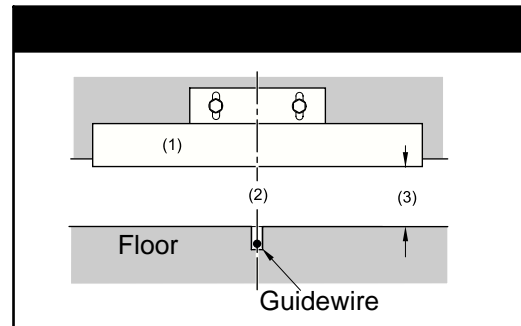
Auto Field Strength variation is encountered when the guidance signal received by the sensors decreases to near the minimum required to continue Auto Tracking Mode. When entering Auto Field Strength, the alarm is pulsating, field strength indicator is turned on and traction speed is limited to 2.4 KPH (1.5 MPH). When the guidance signal received returns to above minimum levels, the alarm stops pulsating, the field strength indicator turned off and the speed limit removed.

Auto Track Deviation is encountered if the center of the truck leaves the guidance signal by 19 - 38 mm (.75 - 1.50 in), a truck angle of 1 - 1.8° or the steer wheel angle is 6 - 12° from center. When this happens, the alarm is sounded (pulsates), and traction speed is limited to 2.4 KPH (1.5 MPH). When truck returns to acceptable tracking characteristics, the alarm stops pulsating and is sounded for 2 seconds to indicate auto tracking mode, and traction speed limit is removed.

Auto Wire Lost will occur if one or more of four situations are present; 1) guidance signal lost; 2) centerline of truck leaves signal path by more than 38 mm (1.50 in); 3) angle of truck to guidance signal is more than 1.8°; 4) steer wheel angle is more than 12° during Auto Tracking. The truck is allowed to deviate more immediately following a travel direction change. When in Auto Wire Lost, the alarm is operated continuously and the brake is applied. Guidance selector switch (GUS) must be placed in the "manual" position to release the brakes after this situation occurs.

Sensors

Sensor bars are fastened to adjustable brackets which permit adjusting the distance between the sensor bars and the floor. When the line driver current output is set to 220 ma., the sensor bar should be level and 82 to 86 mm (3.25 to 3.38 in) from the floor. Refer to Figure 12912. Voltage required by the sensor bar to operate is 5 volts, between terminals 5 (positive) and 3 (negative).



- (1) Sensor Bar
- (2) Truck Centerline
- (3) 82 to 86 mm
(3.25 to 3.38 in)

Figure 12912-01

Battery

CAUTION

Only approved personnel must do maintenance and repair on batteries.

- *The truck, tools, and mechanisms could be damaged.*
- *Do not do maintenance on the truck if you do not know it.*

Safety Procedures

- Wear protective items when you clean or repair the batteries.
- Do not let the battery acid touch the eyes, skin, clothing, or floor. If the battery acid touches the eyes, you must flush them immediately with distilled water and get medical aid immediately.
- If the battery acid touches the skin, you must clean it immediately with distilled water and soap.
- If you spill the battery acid on the floor or on a different surface, use a Battery Spill Kit (300035) to make the battery acid neutral and clean it up. Follow the manufacturer directions to use the kit.
- Keep the vent plugs tightly in position at all times, but not when you add distilled water or use a hydrometer.
- Do not let flames or sparks near the battery. Gas made while the battery charges is very explosive. This gas stays in the cells after you charge the battery.
- Do not put metal or conductive objects on the battery because they can cause a short circuit.
- Do not let contamination, solution, or other unwanted material into the cells. The contamination makes the battery acid neutral and lowers the available battery charge.
- If you must repair the battery, follow the battery manufacturer instructions for the applicable repair procedures.

Battery Inspection

- Monitor the level of battery acid before you charge the battery.
- Keep the level of battery acid at 13 mm (0.5 in) above the element protector. If the level of battery acid is low, add some distilled water or an approved local supply (consult the battery manufacturer) at after you fully charge the battery. Do not add too much water.

- For maximum battery life, monitor and record the specific gravity daily on a cell.
- Monitor a different cell monthly and record the specific gravity on all cells one or two times a year. Do not record the specific gravity immediately after you add the distilled water.
- Charge the battery to fully mix the distilled water and battery acid before you record the specific gravity. The specific gravity (at full charge) must be between 1.280 and 1.320.

Battery Charging

Before you charge the battery, follow these procedures:

- Charge the battery only in areas for that use.
- Make sure that the battery charger you use agrees with the voltage and amperage of the truck battery. This voltage is on the truck data plate.
- Before you connect or disconnect a battery to a battery charger, make sure that the battery charger is OFF. If you do this and the battery charger is ON, an injury could occur to you, the battery, and the battery charger.
- Before you charge the battery, make sure that the cells contain the correct quantity of distilled water. A low level of water could do damage to the cells. When you examine the water levels, do not use explosive materials (for example, a lighter). The battery fumes are explosive.
- Before you connect the battery cable to the connector, turn the truck OFF, apply the brake, and make sure that all controls are in the OFF position. You must fully connect the battery cable before you operate the truck. If the connection is not tight, heat welds the two parts of the battery connector together, which makes it hard to remove and necessary to replace.
- You must examine and clean the corrosion from the battery terminals regularly. A good battery terminal connection is necessary not only for operation, but also to charge the battery. Clean the battery terminals with the Battery Terminal Cleaner (363124). Seal the battery terminals with the Battery Terminal Protector (363125).
- You must keep the battery cover closed, but not when you charge the battery.
- How you use the truck changes the battery charge requirements. You must give the battery an equalizing charge weekly (if applicable, set the battery charger to the equalizing charge mode).

- **If:** The voltage is 0 V
 - Then examine the wire from Access 5 CA403-1 to CA406, the wire from Access 5 CA403-10 to the power unit distribution panel CA206-9, and the power unit distribution panel FU8. Make the necessary repairs or replacements.
- **If:** The voltage is 48 V
 - Then replace Access 5.

Step 4: Turn off the lift truck. Disconnect Access 5 CA402 from Access 5. Measure the resistance between Access 5 CA402-4 and Access 5 CA402-5.

- **If:** The resistance is greater than 120 Ω
 - Then replace Access 5.
- **If:** The resistance is 120 Ω
 - Then continue to step 5.

Step 5: Make sure that the lift truck is turned off. Measure RES3 in the wiring harness between CA703-1 and CA703-12.

- **If:** RES3 is bad
 - Then replace RES3 or the wiring harness.

Step 6: Turn off the lift truck and disconnect the battery. Measure for a CAN line short circuit to B-NEG, +BV, or the lift truck frame. Measure the resistance at the power unit from CAN_L to the B-NEG bus bar, CAN_L to TP8 and TP9 on the distribution panel of the power unit, and CAN_L to the lift truck frame. The resistance must be greater than 10K Ω .

- **If:** The resistance is less than 10K Ω
 - Then make the necessary repairs or replacements.

Event Code 106

Access 1 and Access 6 CAN Event

All lift truck functions do not operate.

This event is logged when Access 1 CAN transmission with Access 6 has not occurred in a specified time.

Step 1: Turn on the lift truck and look at the status of the Access 6 indicator lights.

- **If:** The Access 6 indicator lights are on and the event code continues
 - Then continue to step 2.
- **If:** The Access 6 indicator lights are off
 - Then continue to step 3.

Step 2: Turn off the lift truck. Do a CAN transmission line test. Measure the resistance between CAN_H and CAN_L. The resistance must be 60 Ω .

- **If:** The resistance is 0 Ω
 - Then there could be a short circuit between CAN_H and CAN_L. Examine all related wires, connections, and fuses. Make the necessary repairs or replacements.
- **If:** The resistance is greater than 60 Ω
 - Then a CAN resistor could be open. Continue to step 4.

Step 3: Turn on the lift truck. Measure for +BV between Access 6 CA601-1 and Access 6 CA601-2.

- **If:** The voltage is 48 V
 - Then replace Access 6.
- **If:** The voltage is 0 V
 - Then examine the wire between Access 6 CA601-2 and Access 6 CA406, the wire between Access 6 CA601-1 and Access 6 CA206-11, and the power unit distribution panel FU8.

Step 4: Turn off the lift truck. Disconnect Access 5 CA402 from Access 5 and measure the resistance between Access 5 CA402-4 and Access 5 CA402-5.

- **If:** The resistance is greater than 120 Ω
 - Then replace Access 5.
- **If:** The resistance is 120 Ω
 - Then continue to step 5.

Step 5: Make sure that the lift truck is turned off. Measure RES3 in the wiring harness between Access 7 CA703-1 and Access 7 CA703-12.

- **If:** RES3 is bad
 - Then replace RES3 or the wiring harness.

Step 6: Turn off the lift truck and disconnect the battery. Measure for a CAN line short circuit to B-NEG, +BV, or the lift truck frame. Measure the resistance at the power unit from CAN_L to the B-NEG bus bar, CAN_L to TP8 and TP9 on the distribution panel of the power unit, and CAN_L to the lift truck frame. Resistance must be greater than 10K Ω .

- **If:** The resistance is less than 10K Ω
 - Then make the necessary repairs or replacements.

Event Code 233

Access 2 Module SVML Driver Short Circuit or Open Circuit

If the driver has a short circuit, the primary raise and lower and the auxiliary raise are decreased (in limp mode).

If the driver has an open circuit, the primary lower does not operate.

This event code is logged with the following conditions:

Open in the SVML solenoid coil or wires, which prevents current flow when the SVML driver is requested

A short circuit to +BV, which could be because of a short circuit in the SVML solenoid coil or the wires between the SVML and Access 2

A short circuit to B-NEG (supplies voltage to SVML when the lift truck is turned on), which could be because of a short circuit in the wires to Access 2

Step 1: Turn on the lift truck.

- **If:** The service indicator illuminates and Event Code 233 is logged
 - Then there is a short circuit to B-NEG or a short circuit to the lift truck frame. Continue to step 2.
- **If:** The service indicator does not illuminate and Event Code 233 is not logged
 - Then raise the primary mast 305 mm (12 in), and try to lower it. Look for an event code.
- **If:** A primary lower is performed and the service indicator illuminates and records Event Code 233, and when the primary lower is stopped, the service indicator goes off
 - Then there is a short circuit to +BV. Turn off the lift truck and remove the wire CA414-2 from the terminal on SVML. Turn on the lift truck.
- **If:** The service indicator illuminates and stays on and Event Code 233 is recorded
 - Then replace the SVML.
- **If:** The service indicator does not illuminate but Event Code 233 is recorded when you try a primary lower
 - Then there is a short circuit in the lift truck wires or Access 2. Turn off the lift truck and measure the resistance of the wires between SVML and Access 2. If no problems are found in the wires, then replace Access 2.

Step 2: Turn off the lift truck and disconnect all the wires from the SVML. Measure the resistance of the SVML solenoid coil.

- **If:** The resistance is not 20–40 Ω
 - Then replace the SVML.
- **If:** The resistance is 20–40 Ω
 - Then continue to step 3.

Step 3: Make sure that the lift truck is turned off. Connect the wires to the SVML. Turn on the lift truck and measure the voltage across the SVML terminals.

- **If:** The voltage is 0 V
 - Then Access 2 has a short circuit. Replace Access 2
- **If:** The voltage is greater than 1 V
 - Then there is a short circuit to B-NEG. Continue to step 4.

Step 4: Turn off the lift truck and remove the wire from Access 2 CA411-4. Turn on the lift truck and measure the voltage across the SVML terminals.

- **If:** The voltage is greater than 1 V
 - Then there is a short circuit in the wires. Examine the wires.
- **If:** The wires are good and the event code continues
 - Then continue to step 5.

Step 5: Keep the lift truck turned on. Measure the voltage between B-NEG and the positive terminal on SVML with the GRN/WHT wire, and keep the wires connected. Go to SVML A4.4.4 in the Analyzer Menu. Press and hold the ENTER key (drives the SVML).

- **If:** The voltage is 0 V
 - Then a positive voltage is missing. Examine the wire from CA414-1 to SVML, the wire from CA414-1 to CA406 (+), and the wire from Access 2 CA411-13 to CA406 (+).
- **If:** The voltage is +BV
 - Then the negative voltage is missing. Continue to step 6.

Step 6: Keep the lift truck turned on. Measure the negative output between the SVML terminal with the GRN/WHT wire and Access 2 CA411-2. Turn off the lift truck. Turn on the lift truck while pushing the up and down arrow keys. Go to SVML A4.4.4 in the Analyzer Menu. Press and hold the ENTER key to drive SVML.

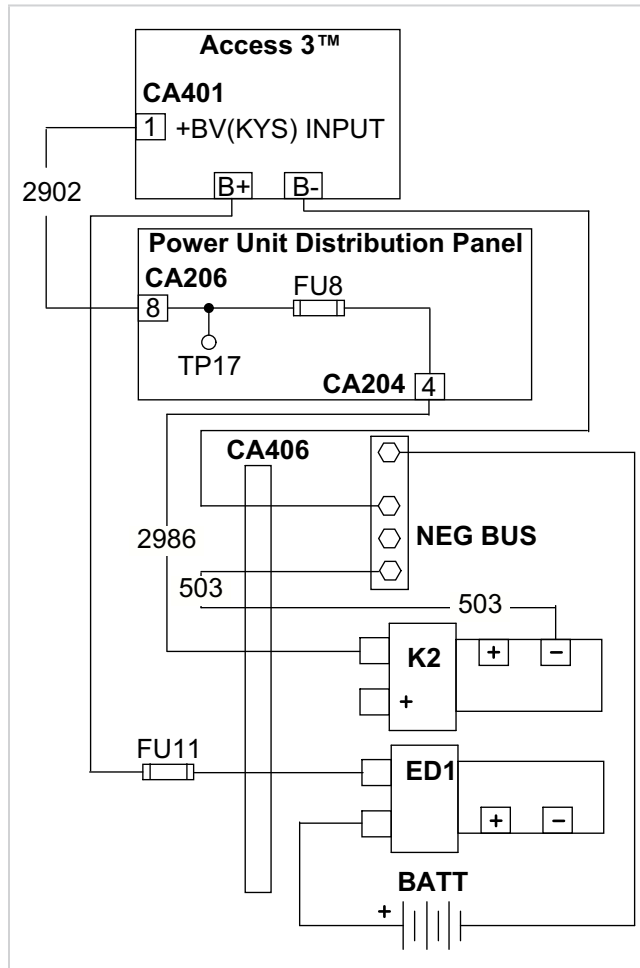


Fig. 26 (13082-02)

Event Code 325

Access 3™ Module 5 V for ECR7 Out of Range

The traction does not operate.

Step 1: Turn on the lift truck and measure for 5 V between Access 3™ CA401-26 and B-NEG.

- **If:** The voltage is not 5 V
 - Then turn off the lift truck and remove the wire from Access 3™ CA401-26. Turn on the lift truck and measure for 5 V between Access 3™ CA401-26 and B-NEG.
- **If:** The voltage is 5 V
 - Then turn off the lift truck and connect the wire to Access 3™ CA401-26. Continue to step 2.

Step 2: Turn off the lift truck and disconnect the traction feedback module (FSB) CA409 from FSB. Turn on the lift truck and measure for 5 V between Access 3™ CA401-26 and B-NEG.

- **If:** The voltage is 5 V
 - Then replace ECR7.
- **If:** The voltage is not 5 V
 - Then continue to step 3.

Step 3: Turn off the lift truck. Disconnect FSB CA408 from FSB. Turn on the lift truck and measure for 5 V between Access 3™ CA401-26 and B-NEG.

- **If:** The voltage is not 5 V
 - Then examine the wires between Access 3™ CA401-26 and FSB. Make the necessary repairs or replacements.
- **If:** The voltage is 5 V
 - Then replace FSB.
- **If:** The voltage is 4.9–5.1 V and the event code continues
 - Then replace Access 3™.

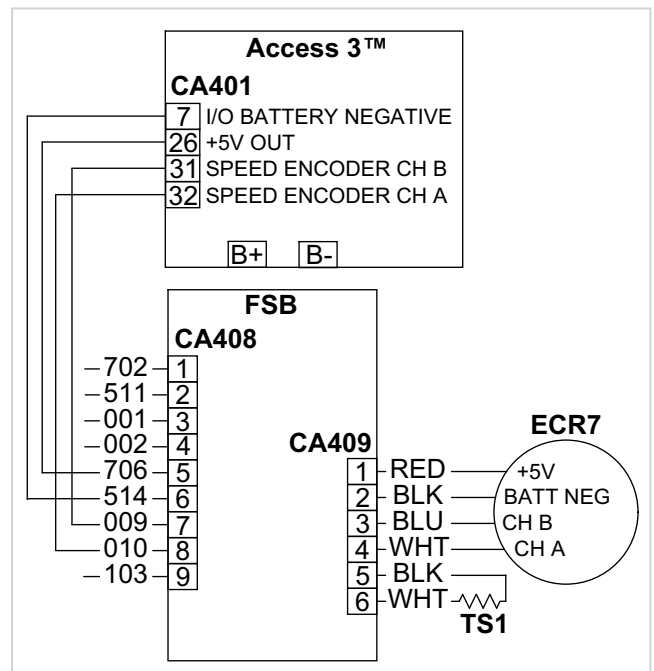


Fig. 27 (13083-02)

Event Code 326

Access 3™ Module Pedestrian Detection System (PDS) Platform Down Driver Access 3™ CA401-19 Overcurrent

Full traction does not operate.

This event code is logged with the following conditions:

- The driver is pulling too much current.
- The PDS is damaged (EMEA option).

Event Code 403

Access 4 or Access 7 Module CAN Event

All hydraulic functions do not operate and the primary lower function is decreased (limp mode).

Access 4 CAN transmission with Access 7 has not occurred in a specified time.

Step 1: Turn on the lift truck and check the status of the Access 7 indicator lights.

- **If:** The Access 7 indicator lights are on
 - Then look at the wires between Access 7 CA703-1 and CA703-12 and the platform distribution panel CA106-6 and CA106-7. Examine the condition of the wires and connections. Make the necessary repairs or replacements.
- **If:** The Access 7 indicator lights are off
 - Then continue to step 2.

Step 2: Keep the lift truck turned on. Measure for +BV between Access 7 CA703-8 and Access 7 CA703-10

- **If:** The voltage is 0 V
 - Then examine the wire from CA703-10 to CA701-3, the wire from CA701-3 to CA105-3, the wire from CA703-8 to CA701-1, and the wire from CA701-1 to CA105-1. Make the necessary repairs or replacements.
- **If:** The event code continues
 - Then examine the Access 4 wires. Examine the wire from CA314-3 to CA106-9 and the wire from CA314-4 to CA106-1. Make the necessary repairs or replacements.
- **If:** The voltage is 48 V
 - Then replace Access 7.

CAN Transmission Line Test: Turn off the lift truck. Measure the resistance between Access 7 CA703-1 CAN_H and Access 7 CA703-12 CAN_L. The resistance must be 60 Ω .

- **If:** The resistance is 0 Ω
 - Then there is a short circuit between CAN_H and CAN_L. Examine the wires and access modules for short circuits. Make the necessary repairs or replacements.
- **If:** The resistance is greater than 60 Ω
 - Then the CAN terminating resistors could be open. Remove CA402 from Access 5, and measure the resistance between Access 5 CA402-4 and Access 5 CA402-5.

- **If:** The resistance is 120 Ω
 - Then examine RES3 in the wiring harness between Access 7 CA703-1 and Access 7 CA703-12. Replace RES3 or the wiring harness.
- **If:** The resistance is 120 Ω and the event code continues
 - Then replace Access 7.
- **If:** The resistance is greater than 120 Ω
 - Then replace Access 5.

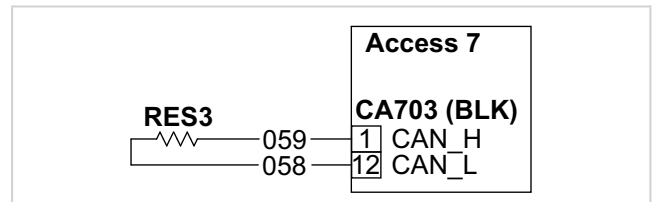


Fig. 40 (30968)

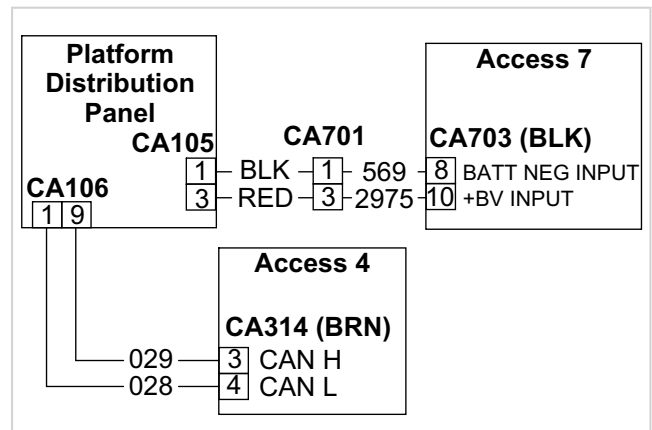


Fig. 41 (13549-02)

Event Code 407

Access 2 or Access 4 Module CAN Event

All hydraulic functions do not operate.

Access 2 CAN transmission with Access 4 has not occurred in a specified time.

Step 1: Turn on the lift truck and look at the status of the Access 2 indicator lights.

- **If:** The Access 2 indicator lights are on
 - Then look at the wires between Access 2 CA411-23 and CA411-35 and the power unit distribution panel CA201-4 and CA201-10. Examine the condition of the wires and connections. Make the necessary repairs or replacements.
- **If:** The Access 2 indicator lights are off
 - Then continue to step 2.

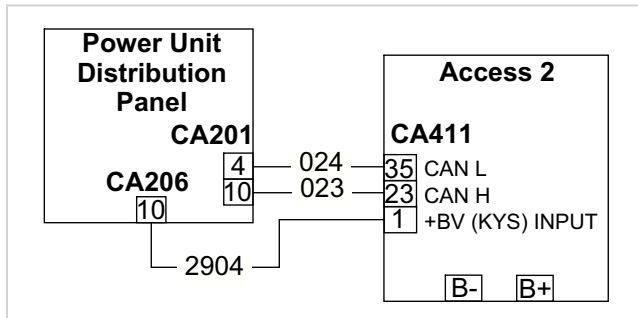


Fig. 60 (13550-02)

Event Code 503

Access 3™ Module CAN Time out

The traction, steering, hydraulics, and ED do not operate.

Step 1: Examine for power to Access 3™.

- **If:** The Access 3™ indicator lights are on
 - Then look at the wires between the power unit distribution panel and Access 3™. Examine the wire and connections between the power unit distribution panel CA206-8 and Access 3™ CA401-1, the wire and connections between the power unit distribution panel 201-7 and Access 3™ CA401-23, and the wire and connections between the power unit distribution panel CA201-1 and Access 3™ CA401-35.
- **If:** The wires and connections are good
 - Then clean the wire connections and connectors.
- **If:** The Access 3™ indicator lights are off
 - Then look at the wires between the power unit distribution panel and Access 3™. Measure for +BV between Access 3™ CA401-1 and B-NEG.
- **If:** The voltage is 48 V
 - Then replace Access 3™.
- **If:** The voltage is 0 V
 - Then look at the wires or connections between the power unit distribution panel and Access 3™. Examine the wire between the power unit distribution panel CA206-8 and Access 3™ CA401-1.

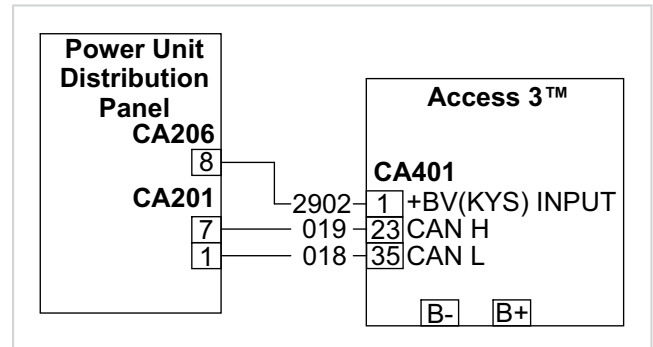


Fig. 61 (13113-02)

Event Code 504

Access 4 Module CAN Time out

All traction, steering, lift hydraulics, and ED do not operate.

Step 1: Examine for power to Access 4.

- **If:** The Access 4 indicator lights are on.
 - Then look at the wires between the platform distribution panel and Access 4. Examine the wires and connections between Access 4 CA314-2 and the platform distribution panel CA101-1, between Access 4 CA314-4 and the platform distribution panel CA106-1, between Access 4 CA314-3 and the platform distribution panel CA106-9, and between Access 4 CA314-1 and the platform distribution panel CA103-13.
- **If:** The wires are good
 - Then clean the wire connections and connectors.
- **If:** The Access 4 indicator lights are off
 - Then look at the wires between the platform distribution panel and Access 4. Measure for +BV between Access 4 CA314-1 and B-NEG.
- **If:** The voltage is 48 V
 - Then replace Access 4.
- **If:** The voltage is 0 V
 - Then look at the wires between the platform distribution panel and Access 4. Examine the wire between Access 4 CA314-1 and the platform distribution panel CA103-13 and the wire between Access 4 CA314-2 and the platform distribution panel CA101-1.

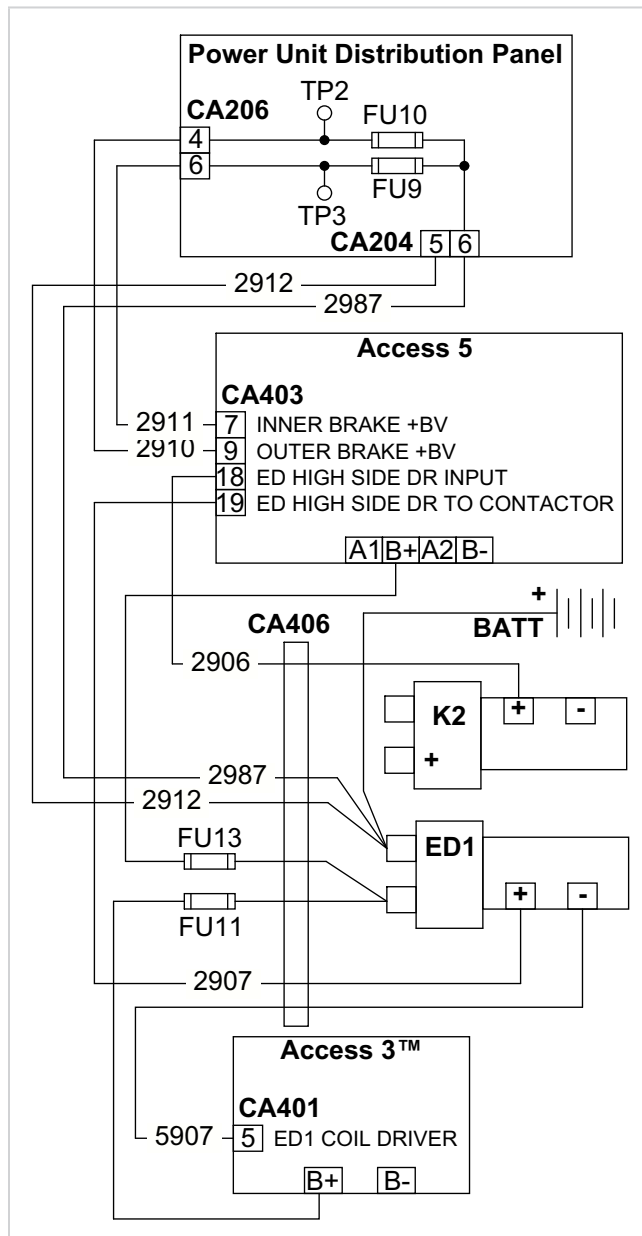


Fig. 74 (13122-02)

Event Code 542

Open Fuse

The steering, traction, and hydraulics do not operate.

Step 1: Turn off the lift truck and examine FU9, FU10, and FU13.

- **If:** The fuses are open
 - Then replace the open fuses.
- **If:** The fuses are good
 - Then continue to step 2.

Step 2: Examine the wire between the power unit distribution panel CA206-6 and Access 5 CA403-7, the wire between the power unit distribution panel CA206-4 and Access 5 CA403-9, and the cable from FU13 to Access 5 +BV terminal.

- **If:** The connections are bad
 - Then repair or replace the connections.

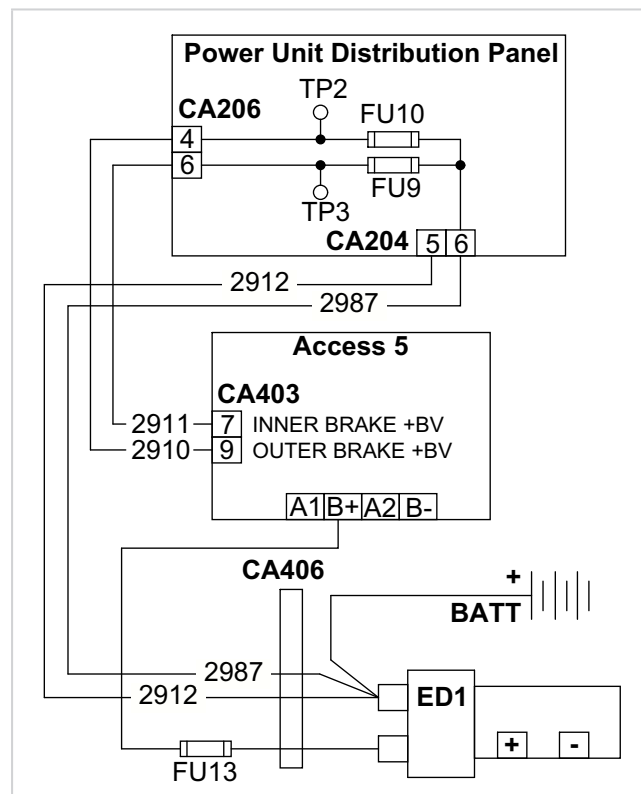


Fig. 75 (13123-02)

Event Code 543

Access 5 Module ED1 Tips Welded

The traction, steering, and hydraulics do not operate.

Step 1: Examine ED1 for welded tips.

- **If:** The ED1 tips are welded
 - Then repair or replace the tips.
- **If:** The ED1 tips are not welded
 - Then turn off the lift truck and measure the resistance between the ED1 load bus and +BV.
- **If:** The circuit is not open
 - Then the problem is a connection between the +BV terminal of ED1 and the load side ED1. Examine the wire connections.

Event Code 589: Outer brake voltage event

Step 1: Identify Event Code 588 or 589

- **If:** Event Code 588 occurred
 - Then examine FU9.
- **If:** FU9 is open
 - Then replace FU9.
- **If:** FU9 is good
 - Then measure the voltage between Access 5 CA403-7 and B-NEG.
- **If:** The voltage is not 48 V
 - Then examine the wire from the power unit distribution panel CA204-5 to the ED contactor, the wire from the power unit distribution panel CA204-6 to the ED contactor, and the wire from the power unit distribution panel CA206-6 to Access 5 CA403-7.
- **If:** Event Code 589 has occurred
 - Then examine FU10.
- **If:** FU10 is open
 - Then replace FU10.
- **If:** FU10 is good
 - Then measure the voltage between Access 5 CA403-9 and B-NEG.
- **If:** The voltage is not 48 V
 - Then examine the wire from the power unit distribution panel CA204-5 to the ED contactor, the wire from the power unit distribution panel CA204-6 to the ED contactor, and the wire from the power unit distribution panel CA206-4 to Access 5 CA403-9.

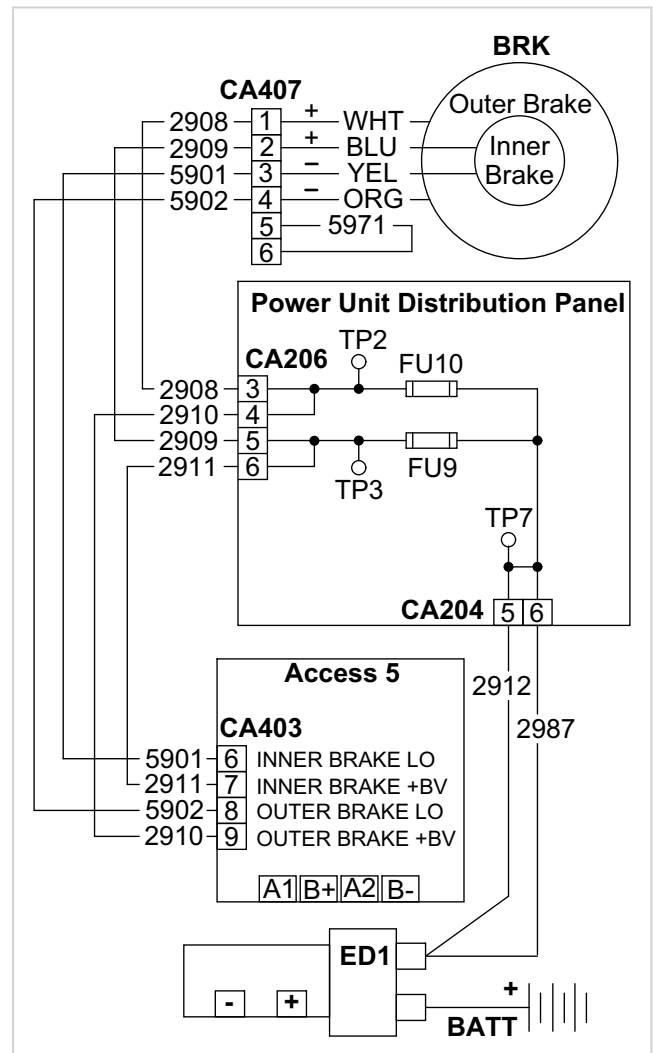


Fig. 84 (13128-02)

Event Code 590

Access 5 Module Brake Driver Event

Event Code 590 and 591

The following procedures apply to Event Codes 590 and 591.

Traction does not operate.

Event Code 590: Inner brake driver event

Event Code 591: Outer brake driver event

Step 1: See the procedure for Event Codes 588 and 589. Use the event code that is related to a specified driver (inner or outer brake solenoid coil).

Note: If the VNA Auto Fence feature is enabled, Event Code 682 is recorded, and the full traction and full hydraulics do not operate.

Step 1: Go to the Analyzer Menu A2.5.1, and look at the VSPD1 values. While slowly traveling, the counts must be increasing if the lift truck is moving forward. If the lift truck is moving backward, the counts must be decreasing.

- **If:** The counts are changing in the wrong direction
 - Then the wires for Channel A and Channel B are reversed.
 - The wiring for Channel A starts at PC640 pin 2, then to CA645 pin 8, and then to CA632 pin 3.
 - The wiring for Channel B starts at PC640 pin 3, then to CA645 pin 9, and then to CA632 pin 4.
- **If:** The counts are not changing
 - Then inspect the wires and connector. Make the necessary repairs or replacements if there is damage.
- **If:** The wires are good
 - Then examine the sensor.
- **If:** The wires are bad
 - Then replace the sensor.
- **If:** The sensor is good
 - Then check the load wheel for excessive wear or damage.
- **If:** The load wheel is bad
 - Then replace the load wheel.
- **If:** The load wheel is good
 - Then replace Access 6.4.

Event Code 689

Access 6.4 Module Left Antenna Event

The full traction and full hydraulics do not operate. The Auto Positioning System feature is not available.

Step 1: Examine the condition of the coax cable connecting the left antenna to Access 6.4.

- **If:** There are no issues with the coax cable
 - Then check the connections at the left antenna and Access 6.4. Tighten the coax cable connectors if they are loose. Use a torque wrench to prevent over tightening.
- **If:** The coax cable is damaged or appears to be malfunctioning
 - Then replace the coax cable.

- **If:** The event code continues
 - Then replace the left antenna.
- **If:** The event code continues
 - Then replace Access 6.4.

Event Code 690

Access 6.4 Module Right Antenna Event

The full traction and full hydraulics do not operate. The Auto Positioning System feature is not available.

Step 1: Examine the condition of the coax cable connecting the right antenna to Access 6.4.

- **If:** There are no issues with the coax cable
 - Then check the connections at the right antenna and Access 6.4. Tighten the coax cable connectors if they are loose. Use a torque wrench to prevent over tightening.
- **If:** The coax cable is damaged or appears to be malfunctioning
 - Then replace the coax cable.
- **If:** The event code continues
 - Then replace the right antenna.
- **If:** The event code continues
 - Then replace Access 6.4.

Event Code 691

Access 6.4 Module Missed RFID Tag

If the lift truck misses an expected tag based on the tag map, the lift truck comes to a stop. Items that can cause a missed tag include:

- A defective RFID floor tag
- A metal feature in the floor that interferes with the tag

If the tag map predicts the missed tags: Return the throttle to neutral. This action allows the lift truck to continue normal operation.

If the tag map does not predict the missed tags: Press the override button to continue operation at reduced performance.

To restore the system to proper functionality, one of the floor tags in the facility must be replaced or relocated. Replacing or relocating the tag can also require reconfiguring of the tag map which is stored within Access 6.4.

Step 1: Turn off the lift truck and remove the wire from the connector Access 7 CA702-4. Turn on the lift truck and try a traverse right. Look at the event code.

- **If:** Event Code 738 is the last event code recorded
 - Then replace Access 7.
- **If:** Event Code 738 is not the last event code recorded
 - Then there is a short circuit in the wires or solenoid. Turn off the lift truck and connect the wire to Access 7 CA702-4. Continue to step 2.

Step 2: Remove the wires Access 7 CA702-12 and 2984 from PVT1. Turn on the lift truck and try a traverse right. Look at the event code.

- **If:** Event Code 738 is the last event code recorded
 - Then measure for short circuits between the wire Access 7 CA702-4 and the wires Access 7 CA702-12 and 2984.
- **If:** Event Code 738 is not the last event code recorded
 - Then there is a short circuit in the PVT1 valve. Replace the PVT1.

Event Code 739

Access 7 Module Proportional Flow Valve Traverse Motor (PVT2) Above Current

Traverse left does not operate.

Note: This event code is logged if too much current flows through the module driver at Access 7 CA702-3.

Step 1: Turn off the lift truck and remove the wire from the connector Access 7 CA702-3. Turn on the lift truck and try a traverse left. Look at the event code.

- **If:** Event Code 739 is the last event code recorded
 - Then replace Access 7.
- **If:** Event Code 739 is not the last event code recorded
 - Then there is a short circuit problem in the wires or solenoid. Turn off the lift truck and connect the wire to CA702-3. Continue to step 2.

Step 2: Remove the wires 2983 and 2984 from PVT2. Turn on the lift truck and try a traverse left. Look at the event code.

- **If:** Event Code 739 is the last event code recorded
 - Then measure for short circuit problems between the wire 5960 and the wires 2984 and 2983.

- **If:** Event code 739 is not the last event code logged
 - Then there is a short circuit in the PVT2 valve. Replace the PVT2.

Event Code 740

Access 7 Module Proportional Flow Valve Pivot (PVP1) Above Current

The pivot clockwise does not operate.

Note: This event code is recorded if too much current flows through the module driver at Access 7 CA702-8.

Step 1: Turn off the lift truck and remove the wire from the connector Access 7 CA702-8. Turn on the lift truck and try a pivot clockwise. Look at the event code.

- **If:** Event Code 740 is the last event code logged
 - Then replace Access 7.
- **If:** Event Code 740 is not the last event code logged
 - Then there is a short circuit in the wires or solenoid. Turn off the lift truck and connect the wire to Access 7 CA702-8. Continue to step 2.

Step 2: Remove the wires 2980 and 2981 from PVP1. Turn on the lift truck and try a pivot clockwise. Look at the event code.

- **If:** Event Code 740 is the last event code logged
 - Then measure for short circuits between the wire 5964 and the wires 2980 and 2981.
- **If:** Event Code 740 is not the last event code logged
 - Then there is a short circuit in the PVP1 valve. Replace PVP1.

- **If:** The voltage is +BV
 - Then the wires are open between Access 7 and PVP1. Make the necessary repairs or replacements to the wires.
- **If:** The voltage is 0 V
 - Then there is an open internal to Access 7. Replace Access 7.

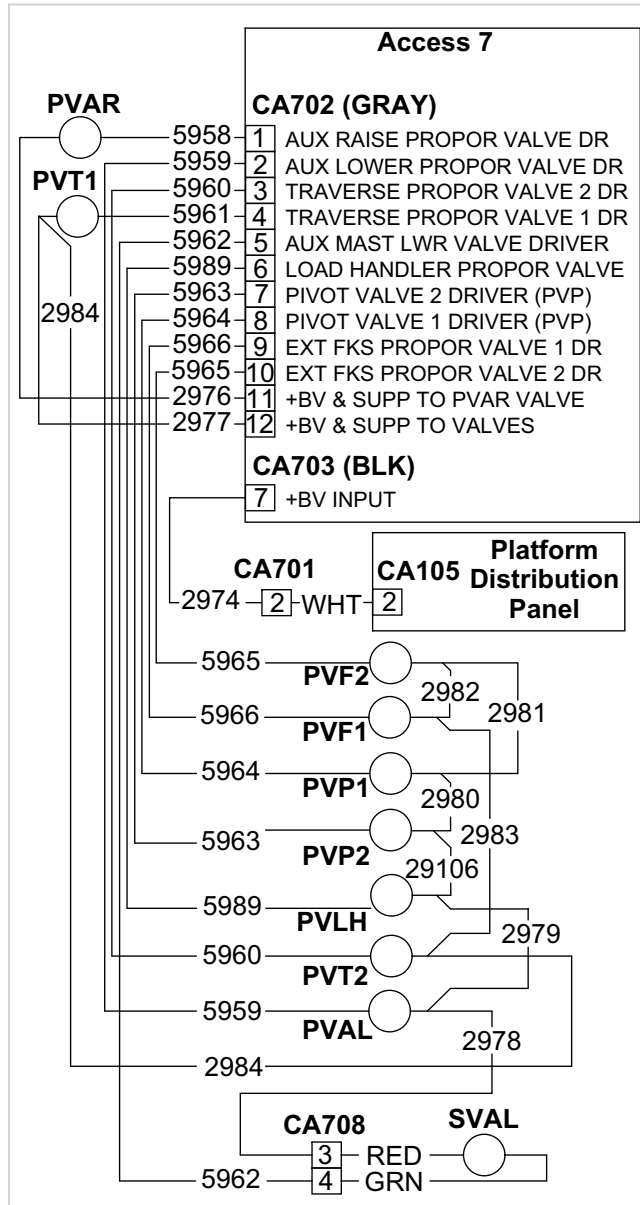


Fig. 108 (13601-02)

Event Code 757

Access 7 Module Auxiliary Cylinder Lower Solenoid Valve (SVAL) Open Driver

The auxiliary lower does not operate.

Note: This event code is logged if an open is not allowing the current flow through the driver at Access 7 CA702-5.

Step 1: Replace Access 7.

Event Code 758

Access 7 Module Proportional Flow Auxiliary Relief (PVLH) Driver Open

The auxiliary raise, pivot, extend, retract, and traverse do not operate.

Note: This event code is logged if an open is not allowing the current flow through the driver at Access 7 CA702-5.

Step 1: Replace Access 7.

Event Code 759

Access 7 Module Proportional Flow Valve Pivot (PVP2) Driver or Load Open

The pivot counterclockwise does not operate.

Note: This event code is logged if an open is not allowing current flow through the driver at Access 7 CA702-7.

Step 1: Measure the voltage across the PVP2 solenoid coil terminals (wires connected). Go to the Analyzer Menu to A4.1.9 on the display. Push and hold the ENTER button to drive the component, and look at the indication.

- **If:** The voltage is +BV
 - Then the PVP2 is open. Replace the PVP2.
- **If:** The voltage is 0 V
 - Then a positive or negative signal is missing. Continue to step 2.

Step 2: Measure the voltage between B-NEG and the PVP2 wire Access 7 CA702-7. Go to the Analyzer Menu to A4.1.9 on the display. Push and hold the ENTER button to drive the component, and look at the indication.

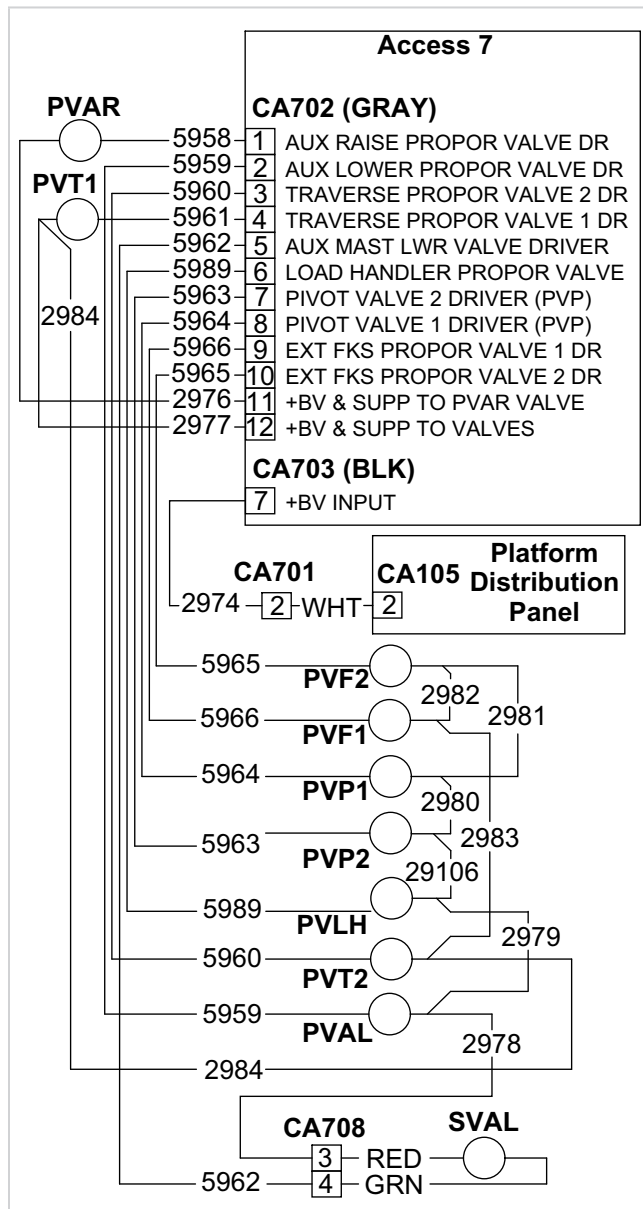


Fig. 121 (13601-02)

Event Code 778

Access 7 Module Traverse Encoder (ECR4) Reset Switch (TVRS) Did Not Change Condition

Step 1: Calibrate the ECR4.

- **If:** The event code does not continue
 - Then the lift truck can be operated.

- **If:** The event code continues
 - Then examine the wire from TVRS to Access 7 CA704-5 and the wire from TVRS to Access 7 CA704-6.
- **If:** The wires are good and the event code continues
 - Then replace TVRS.

Step 2: Examine the wire from ECR4 to CA705-1, the wire from CA705-1 to Access 7 CA704-4, the wire from ECR4 to CA705-2, the wire from CA705-2 to Access 7 CA704-10, the wire from ECR4 to CA705-3, the wire from CA705-3 to Access 7 CA704-11, the wire from ECR4 to CA705-4, and the wire from CA705-4 to Access 7 CA704-12.

- **If:** The event code continues
 - Then replace Access 7.

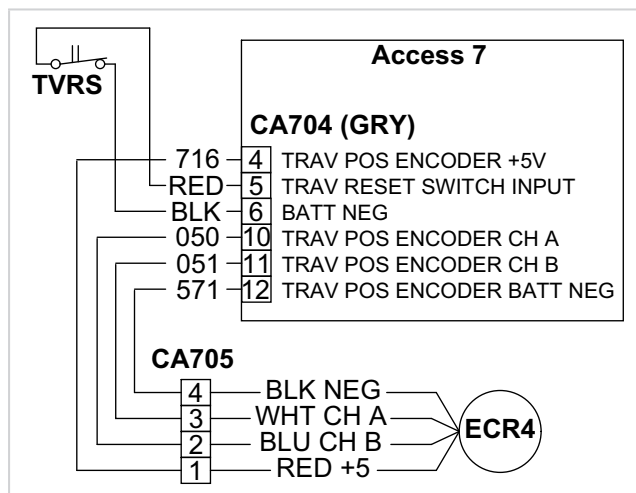


Fig. 122 (13610-02)

Event Code 779

Access 7 Module Traverse Encoder (ECR4) Pulse Speed Out of Range

The traction is decreased (in limp mode), and the traverse does not operate.

Step 1: Examine the wire from PVT2 to Access 7 CA702-3 and the wire from PVT1 to Access 7 CA702-4

- **If:** The wires are good
 - Then replace ECR4.
- **If:** The event code continues
 - Then replace Access 7.

Event Code 805

Access 1 and Access 8 Module CAN Time out

Step 1: Turn on the lift truck and look at the status of the Access 1 indicator lights.

- **If:** The Access 1 indicator lights are on
 - Then continue to step 2.
- **If:** The Access 1 indicator lights are off
 - Then continue to step 5.

Step 2: If the event code continues, turn off the lift truck. Measure the resistance between CAN_H CA304-4 and CAN_L CA304-5. The resistance must be 60 Ω .

- **If:** The resistance is 0 Ω
 - Then continue to step 3.

Step 3: Make sure that the lift truck is turned off. There is a short circuit between CAN_H and CAN_L. Disconnect Access 1 CA304 from Access 1. Measure the resistance between module pins Access 1 CA304-4 and CA304-5. The resistance must be 60 Ω .

- **If:** The resistance is 0 Ω
 - Then there is a short circuit between CAN_H and CAN_L. Disconnect Access 1 CA304 from Access 1. Measure the resistance between module pins Access 1 CA304-4 and CA304-5.
- **If:** The resistance is 0 Ω
 - Then replace Access 1.
- **If:** The resistance is greater than 10K Ω or is an open circuit (OL)
 - Then continue to step 4.

Step 4: Make sure that the lift truck is turned off. There are two 60 Ω resistors that connect CAN_H and CAN_L together. One is in the wiring harness near Access 7 CA703, and one is internal to Access 5. Measure the resistance between connector Access 7 CA703-1 and CA703-12 on Access 7.

- **If:** The resistance is 0 Ω
 - Then disconnect Access 5 CA402 from Access 5. Measure the resistance between Access 5 CA402-4 and CA402-5. The resistance must be 120 Ω .
- **If:** The resistance is 120 Ω
 - Then the resistor in the wiring harness is bad. Replace the resistor or the wiring harness.
- **If:** The resistance is 0 Ω
 - Then replace Access 5.

Step 5: Turn on the lift truck. Measure for +BV between Access 1 CA304-1 and CA304-2.

- **If:** The voltage is 0 V
 - Then examine the wire from Access 1 CA304-1 to the platform distribution panel CA103-12, the wire from Access 1 CA304-2 to the platform distribution panel CA104-6, FU7, and FU18. Make the necessary repairs or replacements to the fuses and wires.
- **If:** The wires, connections, and fuses are good
 - Then examine the wires between Access 8 CA504-3 and CA504-4 and the platform distribution panel CA106-3 and CA106-10. Make the necessary repairs or replacements.
- **If:** The voltage is +BV
 - Then replace Access 1.

Event Code 846

Access 8 Module Right Hand Presence Switch (HPSR) Open Receiver

The traction function is decreased (in limp mode). The primary raise, auxiliary raise, and lower, and pivot functions do not operate.

Step 1: Examine the wires from the HPSRL receiver to Access 8, the wire from HPSR to Access 8 CA501-3, and the wire from HPSR to Access 8 CA501-4.

- **If:** The wires are good
 - Then turn off the lift truck and disconnect Access 8 CA501 from Access 8. Measure the resistance between the wire Access 8 CA501-3 and the wire Access 8 CA501-4.
- **If:** The resistance is 220K Ω or less
 - Then the HPSR receiver is good.
- **If:** The resistance is greater than 220K Ω
 - Then replace HPSR.
- **If:** The event code continues
 - Then replace Access 8.

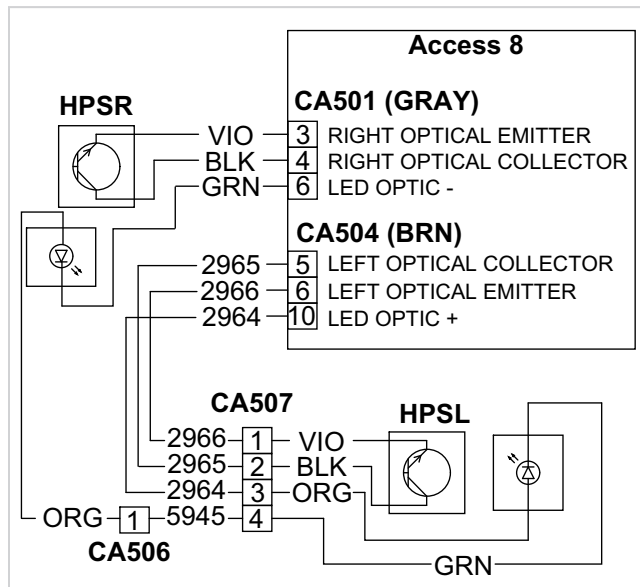


Fig. 150 (13697-02)

Event Code 847

Access 8 Module Steer Tiller Encoders (ECR1 and ECR2) Turn Rate Event

Full traction does not operate.

The lift truck brakes to a stop, and the ED opens.

The event code is recorded if the turn rate between ECR1 and ECR2 is not equal. This problem could be because of a loss of power to channel A or B or to two of the encoders.

Step 1: Turn on the lift truck while pushing the up arrow key. Go to ECR1 A2.3.1 in the Analyzer Menu. Look at the indication on the display.

- **If:** The ECR1 pulse is correct
 - Then continue to step 2.
- **If:** The ECR1 does not pulse or has an irregular pulse
 - Then continue to step 3.

Step 2: Go to ECR2 A2.3.1 in the Analyzer Menu. Look at the indication on the display.

- **If:** The ECR2 pulse is correct
 - Then examine the wire from ECR2 to CA508-5, the wire from CA508-5 to Access 8 CA503-7, the wire from CA508-6 to Access 8 CA503-6, the wire from ECR2 to CA508-7, the wire from CA508-7 to Access 8 CA503-8, the wire from ECR2 to CA508-8, and the wire from CA508-8 to Access 8 CA503-5.

- **If:** The ECR2 pulse is not correct
 - Then continue to step 3.

Step 3: Turn off the lift truck and examine the tiller knob. Check whether it has moved between ECR1 or ECR2 and the tiller knob. Also examine the tiller knob for damaged or broken wires from ECR1 to ECR2 to the seat tube wiring harness CA508.

- **If:** The wires, ECR1, or ECR2 have moved or the tiller knob is damaged
 - Then make the necessary repairs or replacements.
- **If:** ECR1 or ECR2 have not moved and do not have damaged wires
 - Then examine all the wires from CA508-1 to CA508-8 and from Access 8 CA503-5 to Access 8 CA503-12.

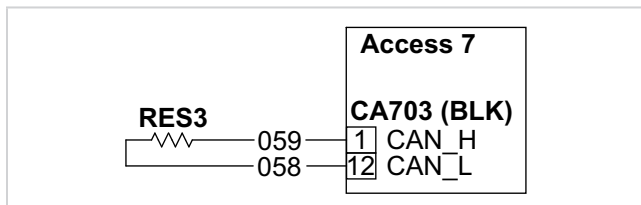


Fig. 162 (30968)

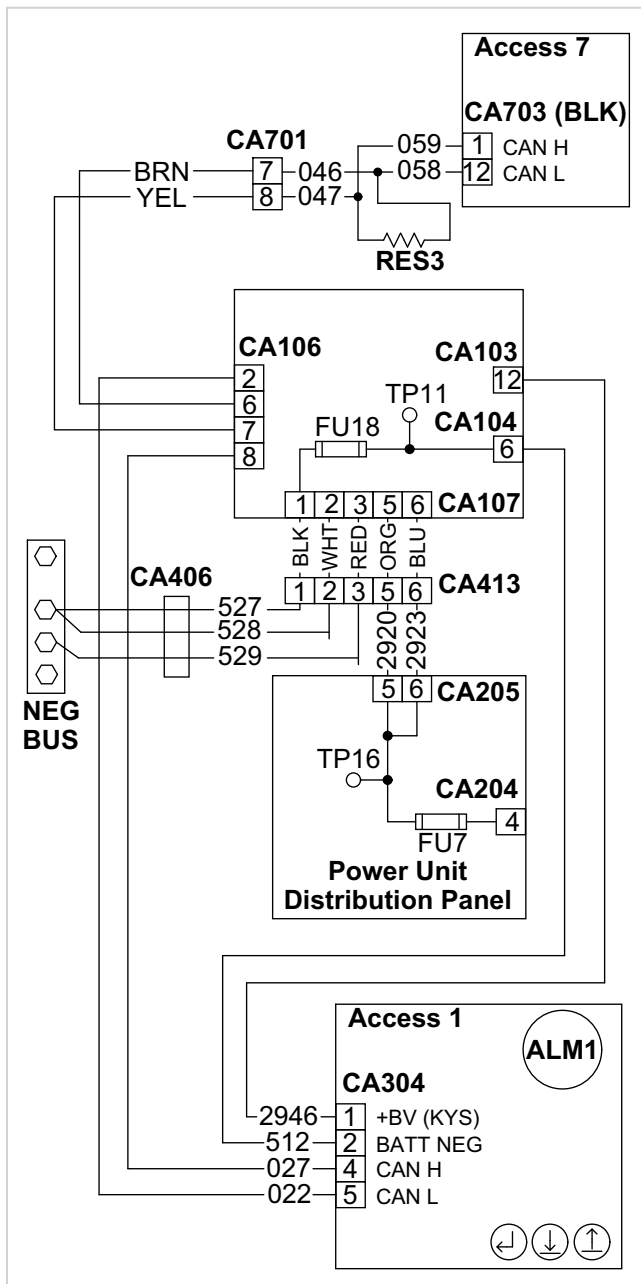


Fig. 163 (13691-02)

Event Code 875

Access 4 and Access 8 Module CAN Event

Event Code 875 through 877

The following procedures apply to Event Codes 875-877.

Event Code 875: Access 4 passive event

Event Code 876: Access 4 event control event

Event Code 877: Access 4 CAN off line

Step 1: Turn on the lift truck and measure for +BV at Access 4 CA314-2 (B-NEG) and CA314-1 (+BV).

- **If:** The voltage is 0 V
 - Then examine the wire Access 4 CA314-1 and CA314-2 to the platform distribution panel and FU7. Make the necessary repairs or replacements.
- **If:** The voltage is +BV and the event code continues
 - Then replace Access 4.

Step 2: If the event code continues, turn off the lift truck. Measure the resistance between CAN_H Access 8 CA504-3 and CAN_L Access 8 CA504-4 on Access 8. The resistance must be 60 Ω.

- **If:** The resistance is 0 Ω
 - Then there is a short circuit between CAN_H and CAN_L. Disconnect Access 8 CA504 from Access 8. Measure the resistance between Access 8 CA504-3 and CA504-4.
- **If:** The resistance is 0 Ω
 - Then replace Access 8.
- **If:** The resistance is greater than 10K Ω or is an open circuit (OL)
 - Then continue to step 3.

Step 3: Make sure that the lift truck is turned off. Connect Access 8 CA504, and disconnect Access 4 CA314 from Access 4. Measure the resistance between the module pins Access 4 CA314-3 and CA314-4.

- **If:** The resistance is 0 Ω
 - Then replace Access 4.
- **If:** The resistance is greater than 10K Ω or is an open circuit (OL)
 - Then continue to step 4.

Steering Feedback

Replacing Steering Feedback Assembly Encoder

Refer to Figure 21246.

1. Lower forks completely, chock load wheels, and disconnect the battery.
2. Remove rear door on power unit to obtain access to steering feedback assembly.
3. Remove steering feedback assembly cover (1).
4. Disconnect encoder (3).
5. Loosen set screw (18) in gear assembly (17) shaft. Then remove screws (6) and cleats (5) that secure encoder to retainer (4) and remove encoder (3).
6. Install new encoder and secure to retainer (4) using screws (6) and cleats (5) previously removed.
7. Tighten set screw (18) to secure encoder shaft to gear assembly (17) shaft. Make certain set screw is tightened on flat part of encoder shaft.
8. Connect encoder.
9. Connect battery and remove load wheel chocks.
10. At this time, the steering encoder alignment must be set. Follow the procedure outlined under *Steering Encoder Alignment*.

CAUTION

The steering indicator will not represent the proper steer angle. The steering feedback encoder must be set to ensure the steered wheel is set to straight ahead position.

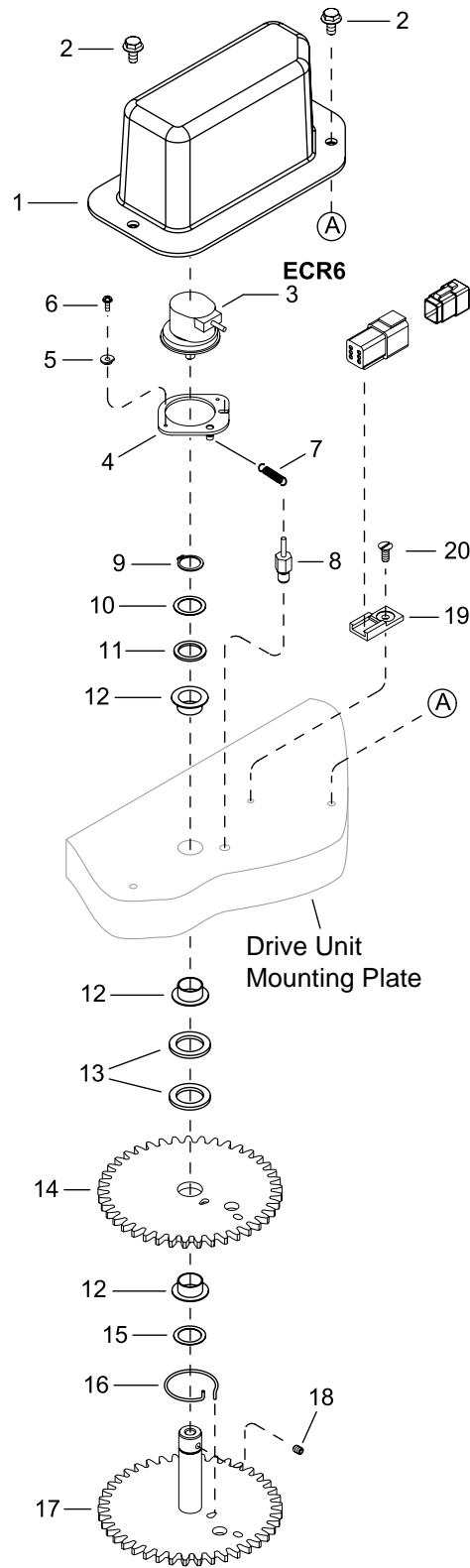
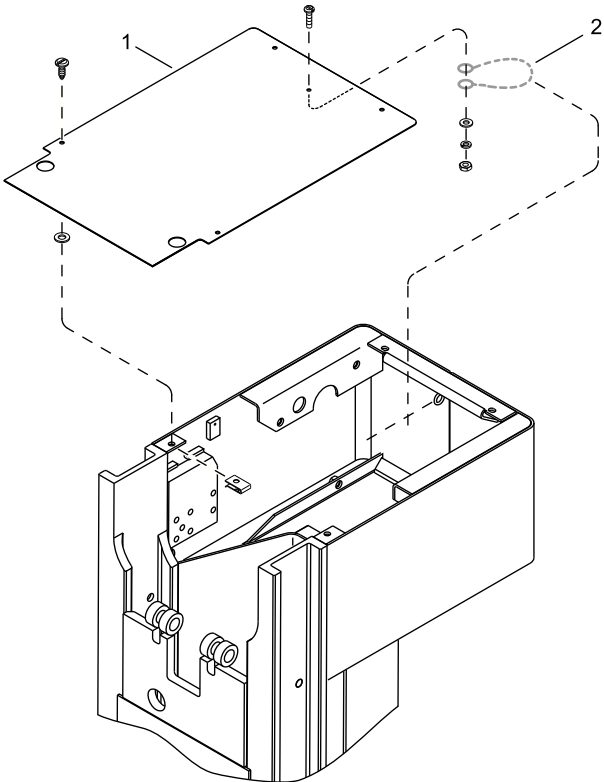


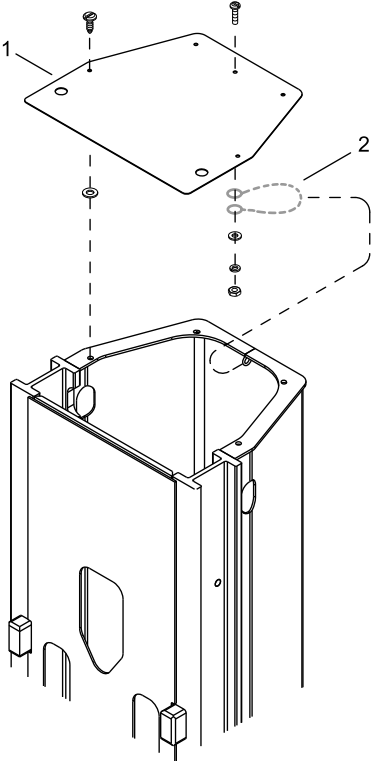
Figure 21246

LIFTING MECHANISM

Mast



TF & TN



TT

Figure 13038-01

LIFTING MECHANISM

Mast



29. Remove springs on control cables from bracket through access at top of the third stage mast shown in Figure 20992. Then remove springs from cable clamps

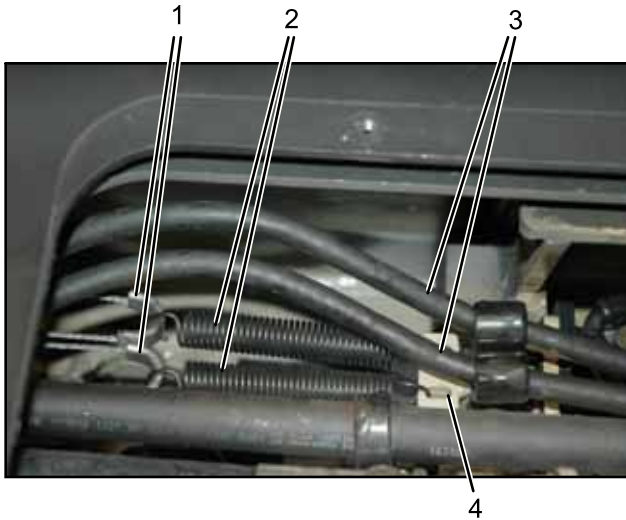


Figure 20992

- 1 Cable Clamps
- 2 Springs
- 3 Control Cables
- 4 Bracket

30. Mark position of large center hydraulic hose as shown. This mark will be used to line up hydraulic hose at reassembly to prevent twisting the hose. Refer to Figure 20993.



Figure 20993

31. Disconnect and plug the large hydraulic hose through access opening at top section of third stage mast. Also plug hydraulic hard line to prevent leakage and contamination from getting into hydraulic cylinder.

32. Number the hydraulic hoses and control cables at top of mast. Refer to Figure 20994.



Figure 20994

33. Remove hose retainer shafts at both ends of the hose pulley assembly on top of the second stage mast. Refer to Figure 20995.



Figure 20995

LIFTING MECHANISM

Mast



41. Install mounting bolts, two at top 060099-007, six at bottom 060099-008, and shims 060131-005, through power unit with bolt heads pointing towards power unit. Install shims, 060131-006 through -008, between the power unit and mainframe. Make certain that the shims are the same ones that were previously removed and that they are put in the same position. Then install flat washers 060131-005, and hex nuts 060059-035, on the mounting bolts in position shown. Refer to Figure 20932.

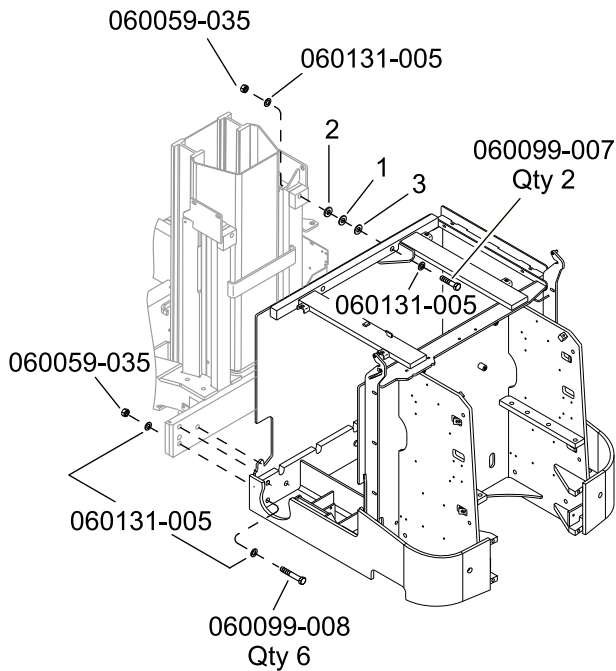


Figure 20932

- 1 060131-007, 3 mm (0.12 in) Thick
- 2 060131-006, 6 mm (0.25 in) Thick
- 3 060131-008, 1.8 mm (0.07 in) Thick

42. Using a torque wrench, first tighten the mounting bolts to 305 Nm (225 ft lb) in the sequence shown. Next tighten all 8 bolts to 435 Nm (320 ft lb) in the same sequence, then verify the 435 Nm (320 ft lb) torque on each bolt. Refer to Figure 20933.

Torque Value and Sequence

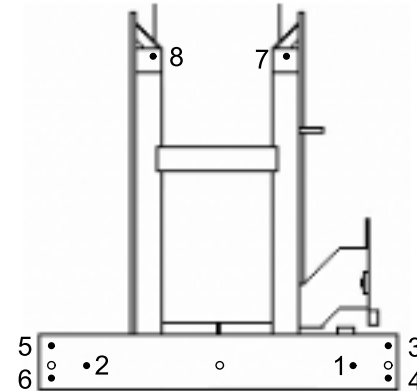


Figure 20933

Torque bolts in the sequence shown in the following steps:

- Step 1: 305 Nm (225 ft lb)
- Step 2: 435 Nm (320 ft lb)
- Step 3: Verify torque of 435 Nm (320 ft lb)

- 43. Install primary lift cylinders on mainframe, refer to Cylinder maintenance section for installation procedure.
- 44. Make certain that all electrical cables, hydraulic hoses, lift chains, mast cables, wire guidance, etc. are properly connected.
- 45. Install cover on top of third stage mast. Make sure that chain is attached to cover and to mast.
- 46. Install platform on mast assembly, refer to Platform maintenance section installation procedure.
- 47. Install load handler assembly onto platform, refer to Platform maintenance section for installation procedure.
- 48. Raise platform a sufficient amount that the chain anchors at the bottom of the third stage mast can be accessed, do not raise platform above free lift stage. Block platform as described in the Control of Hazardous Energy section of this manual.

LIFTING MECHANISM

Fork Inspection



To set the outside jaws, measure the thickness of the middle of the shank as this point receives almost no wear. Set the calipers to the feel of the shank by lightly tapping on them with a metal object.

Care should be taken when using the calipers to hold them square across the shank or an incorrect reading will result.

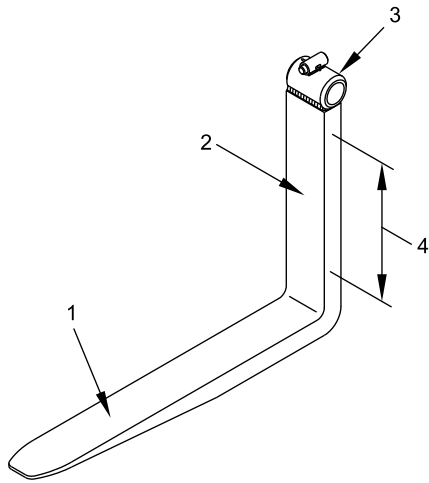


Figure 21294

- 1 Fork Blade
- 2 Fork Shank
- 3 Hanger
- 4 Measure here to set outside jaws

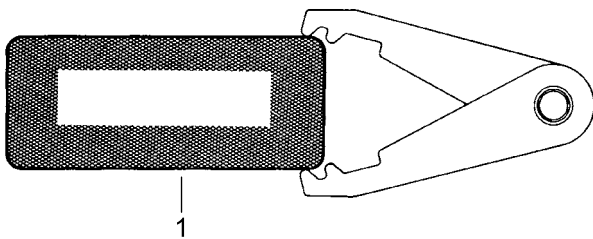


Figure 16856-01

- 1 Fork Shank cross section

When the outside jaws are set, check to see if the inside jaws of the calipers pass over the flanks of the fork blade at any point between the end of the taper and the heel of the fork blade. After checking the blade, re-check the caliper setting by measuring the shank again making sure the setting was not inadvertently changed.

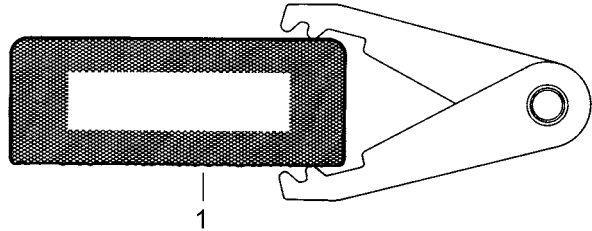


Figure 16857-01

- 1 Fork Blade cross section

Hanger Bore Measurement

To check for elongation and wear of the hanger bore, the outside jaws of the fork wear calipers are used by rotating the legs of the calipers so that the jaws are on the outside.

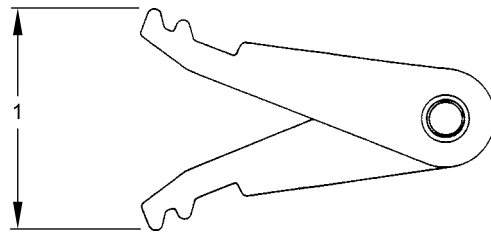


Figure 21295

- 1 Use outside jaws for bore measurement

Primary (Free) Lift Cylinder Repair

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 lift cylinders.



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 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 from a specialist who has had experience with this type of injury.

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 counter-clockwise direction.

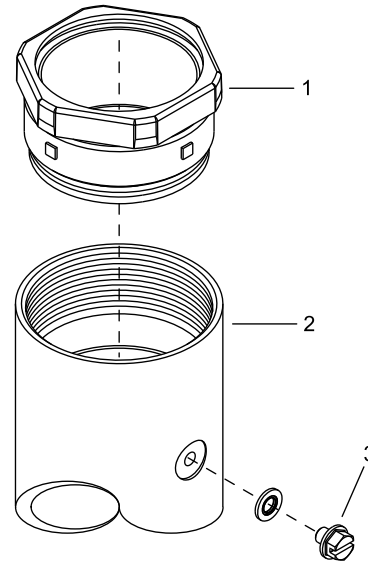


Figure 21282

- 1 Cap
- 2 Cylinder Tube
- 3 Bleed Screw

NOTE

The 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.

Lift Cylinder Repair

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 lift cylinder.



WARNING

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NOTE

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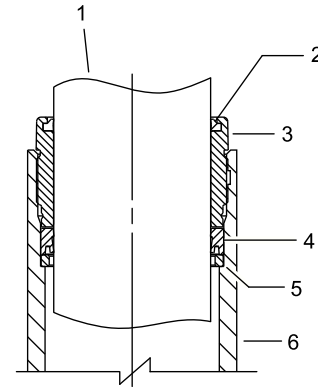


Figure 21283

- | | | | |
|---|--------------|---|---------------|
| 1 | Ram | 4 | Packing |
| 2 | Wiper Ring | 5 | Collar |
| 3 | Cylinder Cap | 6 | Cylinder Tube |

4. The packing is located below the cap and remains in the cylinder bore after the cap is removed. A pair of special tools can be utilized to facilitate packing removal. Refer to Figure 21284.

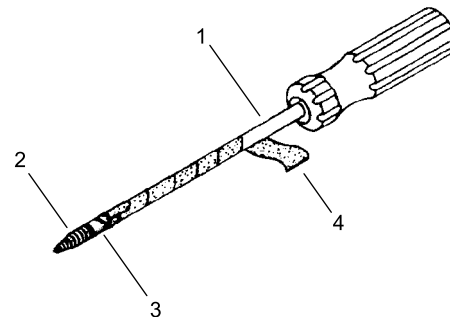


Figure 21284

- 1 Screwdriver
 152 mm (6 in) Shaft Length (Minimum)
 4 mm (0.156 in) Shaft Diameter (Maximum)
- 2 No. 8 Metal Screw - Headless (4 mm Self-Tapping)
- 3 Weld (grind off excess) to a maximum diameter of 4 mm (0.156 in)
- 4 Tape

Fork Cylinders

The fork cylinders on your truck are double-acting, piston-type, cylinders. Extreme care should be taken when any adjustments or repairs are made to the cylinders. It is important to maintain the relationship of ports and hydraulic lines to prevent problems in reassembly or replacement of parts.

When an excessive amount of hydraulic oil is evident at the rod end of the fork cylinder, the rod packing or wiper ring is probably bad and should be replaced. If the area around the outside of the cylinder has oil present, the o-ring or back-up ring is probably bad and should be replaced. The inability to extend and retract the load indicates the piston seals are bad and the cylinder will have to be disassembled.

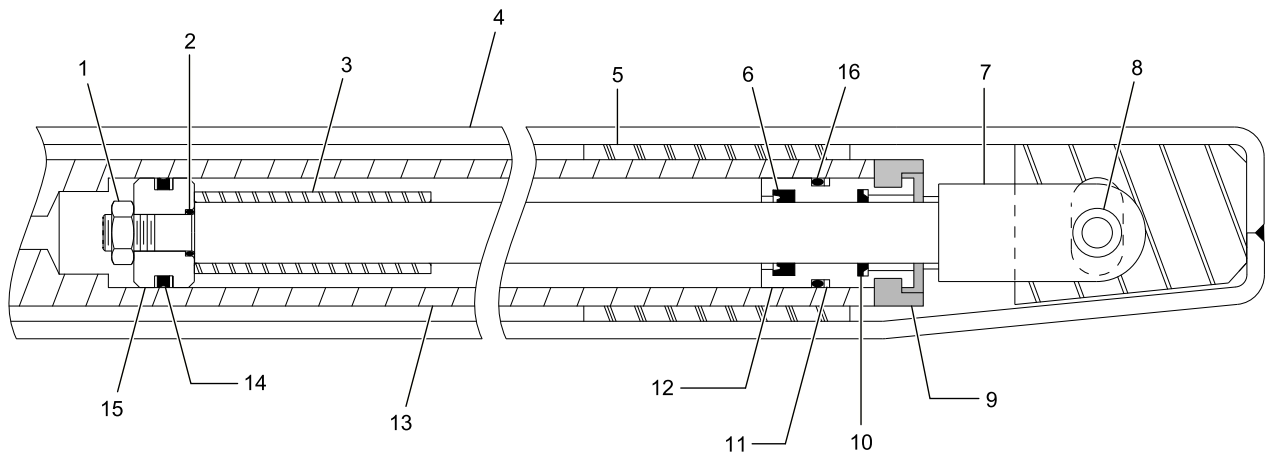


Figure 21328

- | | | | |
|------------------|-----------------------|---------------|-----------|
| 1 Nut | 5 Bearing Slide | 9 Clamp Block | 13 Fork |
| 2 O-Ring | 6 Rod Packing | 10 Wiper Ring | 14 Seal |
| 3 Spacer | 7 Piston Rod | 11 Back-Up | 15 Piston |
| 4 Fork Extension | 8 .250 Shoulder Screw | 12 End Cap | 16 O-Ring |

Height Sensor Assembly Installation

To install height sensor assembly into truck:

- Position height sensor in platform and secure in place with mounting screws. Feed cable through opening in bottom of platform.
- Connect connector CA310 which exits the height sensor.
- Remove locking bolt from height sensor housing and install cover.
- Working under the platform, pull the height encoder cable down to main frame base and thread cable through tube to the switch assembly.
- Adjust cable so distance between ferrule (crimped on cable) and point cable enters tube measures 89 mm (3.5 in). Wrap cable around cable clamp and tighten screw. Refer to Figure 21340.
- Position cover switch assembly and secure in place.
- Remove blocking from under platform, remove wheel chocks and connect battery.
- Lower platform completely.

Height Cable Broken Switch (HCS)

Refer to Figure 21342.

Replacement of components:

- Raise and block platform to allow room to work at cable anchor assembly on main frame base.
- Chock wheels and disconnect battery.
- Remove screw (1) and lift cover (2) from switch assembly.
- Remove switch mounting screws (3) and lift switch (4) from assembly.
- Disconnect wires from switch being replaced and connect to replacement switch.
- Make certain insulator (5) is in position. Place switch in assembly and secure in place.

- The switch arm (6) should not be touching the switch housing, however, the switch should be actuated. If adjustment is required pull switch arm back and turn screw (7) to achieve proper adjustment. When switch arm is pulled back against the roll pin (8), the switch should reset.
- When proper adjustment has been achieved, tighten locknut (9) on set screw (7).
- Remove blocking from under platform, remove wheel chocks and connect battery.
- Lower platform completely.

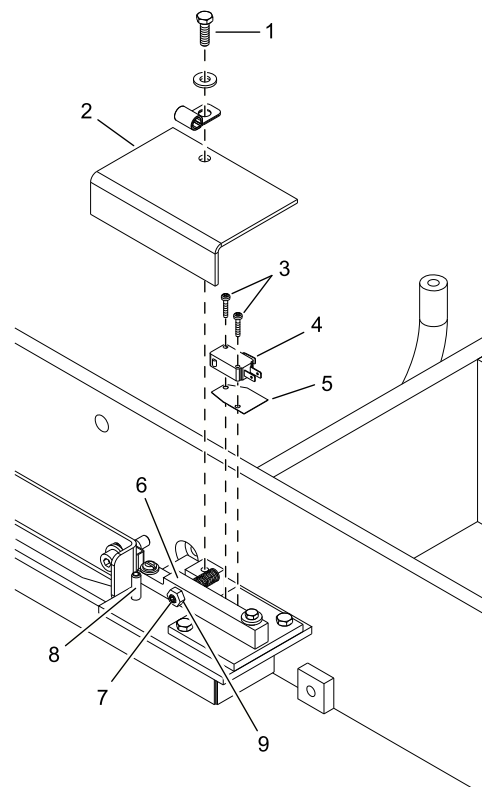


Figure 21342

PLATFORM

Platform



Platform Removal

The weight of the platform, without the load handler, is approximately 900 kg (2000 lb) and with the load handler is approximately 1450 kg (3200 lb). Be sure equipment used to lift and support the platform is of sufficient capacity to safely handle this load and overhead clearance is sufficient to remove platform. When removing the platform from 2nd stage mast refer to the following:

1. Raise platform high enough so the thrust roller covers can be removed. Disconnect battery, chock load wheels and securely block platform.
2. Remove the four thrust roller covers from back of the platform and rotate the cam shafts so the thrust rollers will not contact the mast when removing the platform.

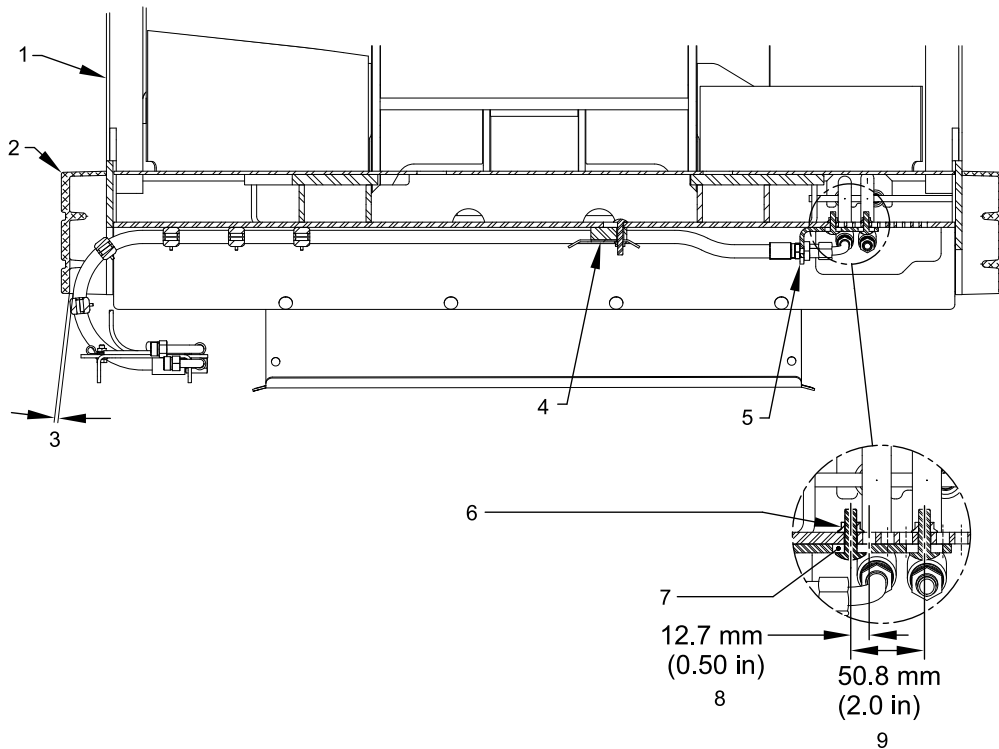


Figure 21308

- 1 Platform
- 2 Right Side Lower Extension
- 3 Adjust to maintain a 6 - 16 mm (0.25 - 0.625 in) gap between hose and extension with traverse fully to truck right
- 4 Hose support weldment in keyhole slot
- 5 Bulkhead Bracket
- 6 Assemble this bolt to hole nearest to the truck center when traverse frame width is 127 mm (5.0 in) greater than platform width. Assemble one hole 12.7 mm (0.50 in) outward for each 25.4 mm (1.0 in) outward for each 25.4 mm (1.0 in) reduction in traverse frame width. If gap cannot be achieved, moving bolts one hole outward is acceptable.
- 7 Slots for final gap adjustment
- 8 Hole spacing
- 9 Bolt spacing

Mirror Adjustment

Refer to Figure 21323.

1. Sit in seat at operator operating height and lock the seat in the 60 degree rotated position.
2. While looking in the mirror, adjust side A of the mirror until it is in line and parallel to the edge of side B of the platform wall.
3. Side C of the mirror should be adjusted and tilted down far enough to see the rear top power unit cover.

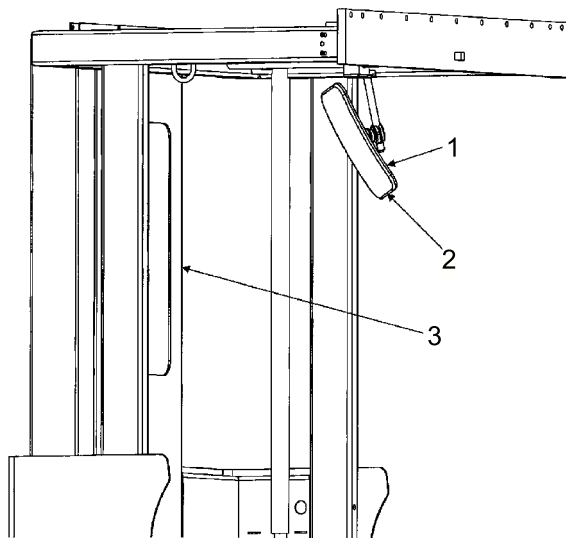


Figure 21323

- 1 Side A
 - 2 Side C
 - 3 Side B
4. Have the mirror adjustment checked by the operator in all other operating positions.

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