

Introduction

This manual is for the service technician who is seeking information about maintenance and service replacement parts. It contains a section on event codes which will enable a qualified technician to find and solve problems which may occur.

Operator Instructions

This manual does not contain operator instructions. Trucks are shipped with operator instructions in tag or booklet form. You can order more copies if you need them. Use these booklets to insure years of safe, trouble free operation of your Crown Lift Truck. For operator instructions, refer to Crown publications, "Operator Manual SC 5200 Series".

Operator Training

Crown produces a series of operator training programs available through your local Crown dealer. A listing of these and other available programs is under "Training" on www.crown.com.

Service Training

Complete Service Training is available for the lift truck technician covering all Crown Lift Trucks, Planned Maintenance, Access 1 2 3®, Wiring Diagrams, etc. For more information about service training, contact your Crown Dealer or under "Training" on www.crown.com.

Replacement Parts

When ordering replacement parts from this manual, always specify, with the part number, the model and serial number of the truck. This information will further enable us to give correct, fast and efficient service.

For current part number of service manuals, operator manuals, operator training programs, truck capacities and technical specifications, contact your local Crown dealer or at www.crown.com.

This manual covers maintenance and replacement parts. Listed below are the major section descriptions.

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	Reach & Attachment Parts
M8	Cylinder	10	Accessories
M9	Reach & Attachments	12	Labels and Decals
M10	Glossary		

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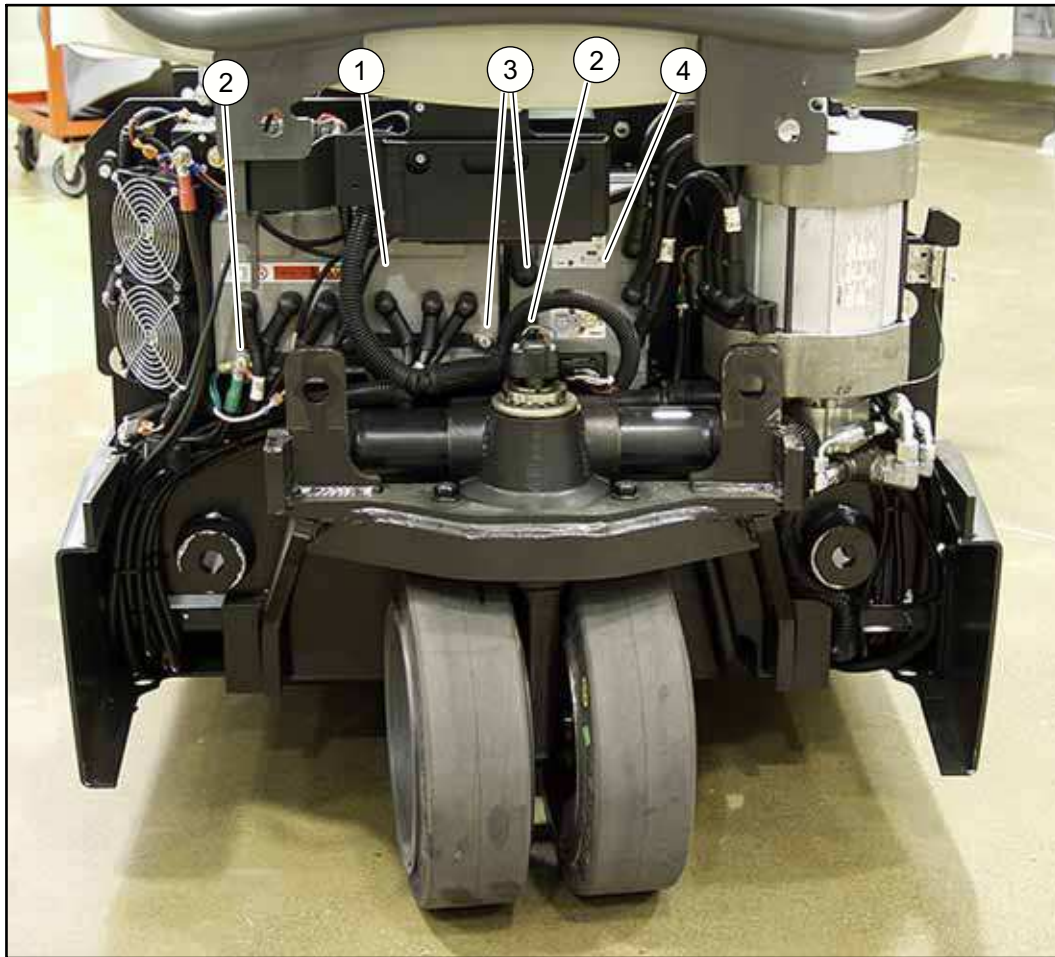


Fig. 4 (24309-01)

1	ACCESS 3
2	Negative (B-) terminal
3	Positive (B+) terminal
4	ACCESS 2 (trucks with AC hydraulics only)

Control of Hazardous Energy

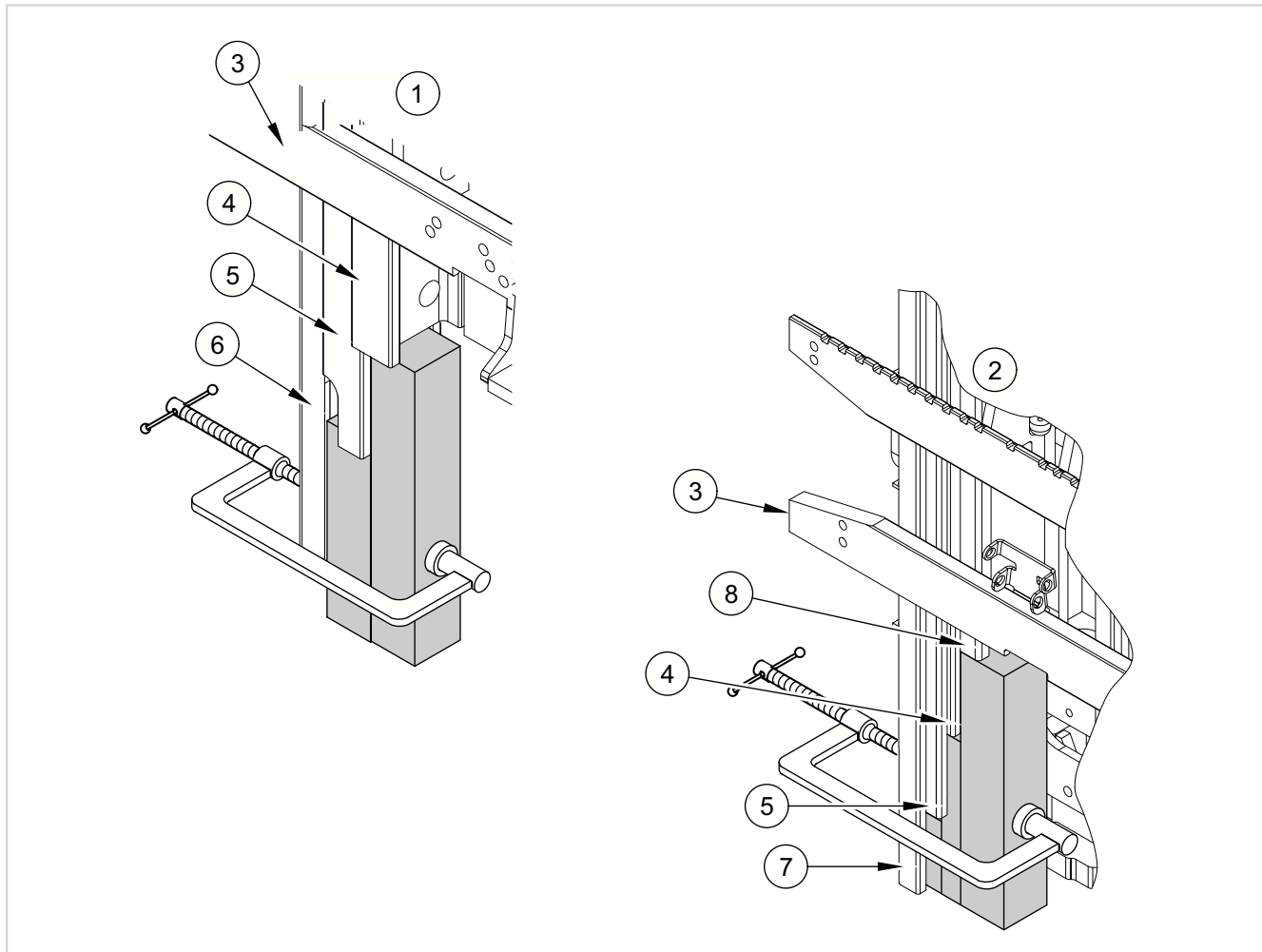


Fig. 12 (16960-02)

1	TT mast
2	Quad mast
3	Fork carriage
4	Third stage
5	Second stage
6	First stage (or mainframe)
7	First stage (or outer mast)
8	Fourth stage (or inner mast)

Mast



WARNING

A truck or mast that falls can cause injury or death.
 If the capacity of the lift device, straps or chains, or hardwood blocks cannot support the truck weight, the truck could fall.

- Always use hardwood blocks to support both mast rails of each mast stage to keep the mast stable.
- Remove accessories installed on the carriage (i.e., carton clamp, slip sheet, roll loader, etc.) except sidershifters before you block the masts. These accessories add weight to the mast.

Operator's Daily Checklist

To get the maximum life out of your equipment, approved personnel must follow a planned maintenance (PM) schedule. Operator input is an important part of a planned maintenance schedule. Operator input can decrease the time that the truck is not available, help to schedule planned maintenances, and save money. Because of this, Crown recommends an operator's daily checklist.

Before you do maintenance on the truck, you must move it to an area where there is sufficient space. This is to make sure that others are safe and that you do the correct maintenance on the truck.

This checklist (OF3772) is available through your Crown dealer.

CROWN

Model _____ Serial No. _____

**Operators
Daily Checklist**

Week beginning _____ 20____

Shift No. _____

Truck No. _____

This check must be made by the truck operator daily at the start of the shift. Certain items listed are not included on some models. Check all items applicable to unit noted above.

Check (✓) appropriate box OK Needs repair or adjustments (give details in comments section)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
VISUAL CHECKS	DAMAGE <small>dent, dented or broken parts</small>						
	LEAKS <small>drive unit, brakes, hydraulics</small>						
	TIRES & WHEELS <small>drive wheels, load wheels, casters</small>						
	FORKS <small>in place, properly secured</small>						
	CHAINS, CABLES & HOSES <small>in place</small>						
	HOOR METER <small>operating</small>						
	BATTERY <small>water level, vent caps in place, cleanliness</small>						
	BATTERY CONNECTOR <small>cracked, burnt, tight fitting</small>						
	GUARDS <small>overhead, load backrest, battery retainer</small>						
	SAFETY DEVICES <small>flashing lights, indicator lights, safety shield, operator harness, warning labels, etc. in condition as equipped</small>						
OPERATIONAL CHECKS	HORN <small>sounds</small>						
	STEERING <small>no binding, no excessive play</small>						
	TRAVEL CONTROLS <small>all speed ranges, forward & reverse, no unusual noise</small>						
	HYDRAULIC CONTROLS <small>raise & lower, tilt forward & rearward, reach in & out, sideshift right & left, etc., no unusual noise</small>						
	BRAKES <small>stop truck within required distance, work smoothly, brake override functions</small>						
	PARKING BRAKE <small>seal, hand, foot</small>						
	BATTERY CHARGE <small>discharge meter in full green or 75% charge after raising forks</small>						
	POWER DISCONNECT <small>cuts off all electric power</small>						
	ATTACHMENTS <small>function properly, no unusual noise</small>						
	LIMIT SWITCHES <small>travel limit, tilt limit, lift limit, etc.</small>						
HOOR METER READING							
OPERATOR'S INITIALS							
SUPERVISOR'S OK							

- If the truck is found to be in need of repair or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

If during operation, the truck becomes unsafe in any way, the matter shall be reported immediately to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

Do not make repairs or adjustments unless specifically authorized to do so.

OF3772 Rev. 5/00
Printed in U.S.A.

Fig. 1 (14990)

Right Side Cover

Provides access to:

- Hydraulic motor(s) and pump(s)
- Battery restraint switch

The right side cover lifts out and is also a battery re-tainer.

Floorboards

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

- Traction motors and brakes
- Brake pedal, switch and potentiometer
- Accelerator pedal, switch and potentiometer
- Hydraulic directional control valve
- Hydraulic function switches and lift potentiometer (AC hydraulic system only)
- Tilt cylinders and switches
- Tilt manifold
- Horn
- Tow connectors
- Optional traction motor fan
- Hydraulic reservoir, filter, breather hoses, etc.
- Impact sensor and travel alarm

Cover Below Dash

Provides access to:

- Steer unit
- ACCESS 1 connections
- Optional fan and work light switches
- Optional rear work light driver (AC hydraulic system only) and floorboard fan driver (DC hydraulic system only)

Dash Cover

Provides access to:

- Steer command encoder (AC hydraulic system only)

Steering Column Covers

Provides access to:

- Key switch
- Travel directional switches

Control Lever Cover

Provides access to:

- Control lever linkage

Lowering Flow Control Manifold Cover

Provides access to:

- Pressure transducer

Chart 4 - Planned Maintenance Inspection		
Index	Component	180 Days 500 Hours
I-1	Overhead Guard, Secure and No Cracks	Check
I-2	Seat Belt, Retainer and Switch	Check
I-3	Seat Deck Latch	Check
I-4	Gas Struts, Hinges and Mounting Hardware	Check
I-5	Battery Connector and Contacts	Check
I-6	Battery Retainer Condition and Adjustment	Check
I-7	Battery Rollers and Spacers	Check
I-8	Battery Restraint Switch (BRES)	Check
Refer to the appropriate section of service manual for additional information concerning inspection or adjustment.		

Chart 9 - Planned Maintenance Inspection		
Index	Component	180 Days 500 Hours
I-1	Mast and Carriage Column Rollers	Check
I-2	Mast Limit Switch (HGST1)	Check
I-3	Lift Chains and Anchors	Check
I-4	Mast Pulleys Rollers and Bearings	Check
I-5	Yoke	Check
I-6	Pressure Transducer (PT1)	Check
I-7	Brake Air Gap	Check
I-8	Mast Channels	Check
I-9	Lift Cylinders and Mounting	Check
I-10	Mast Stops and Carriage Bumpers	Check
Refer to the appropriate section of service manual for additional information concerning inspection or adjustment.		

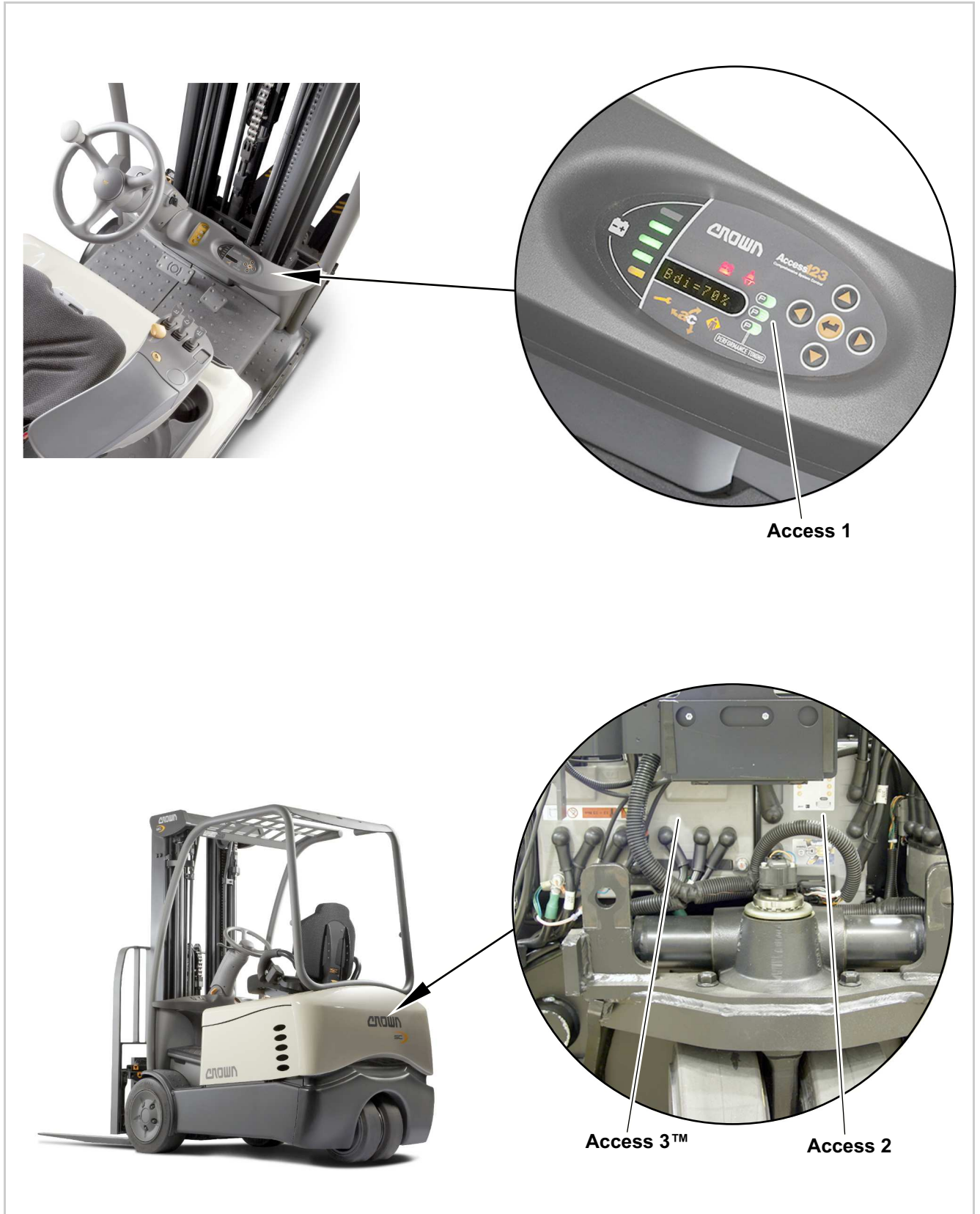
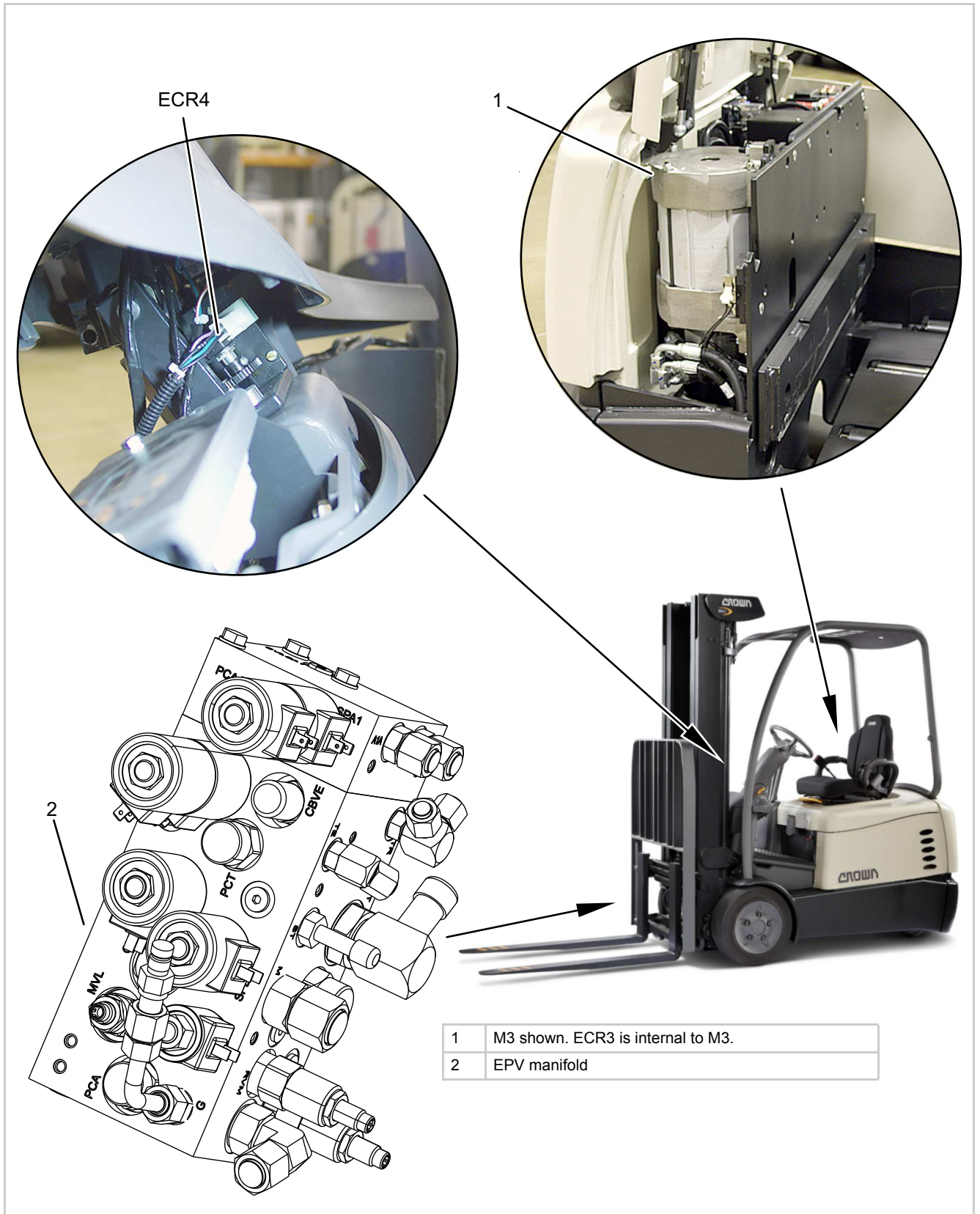


Fig. 1 (28051-01)



Fig. 6 (28056)



1	M3 shown. ECR3 is internal to M3.
2	EPV manifold

Fig. 11 (28061)

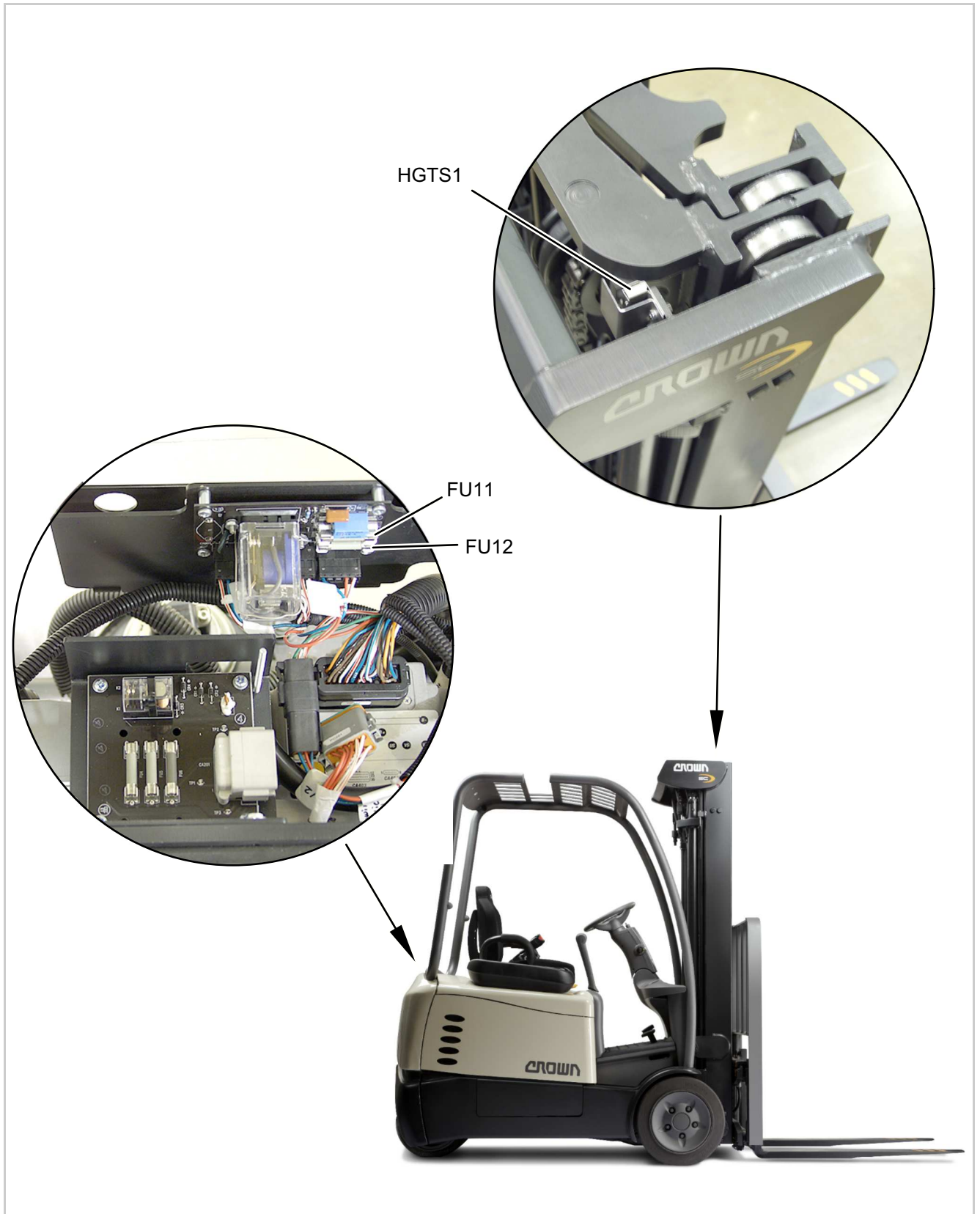


Fig. 16 (28066)

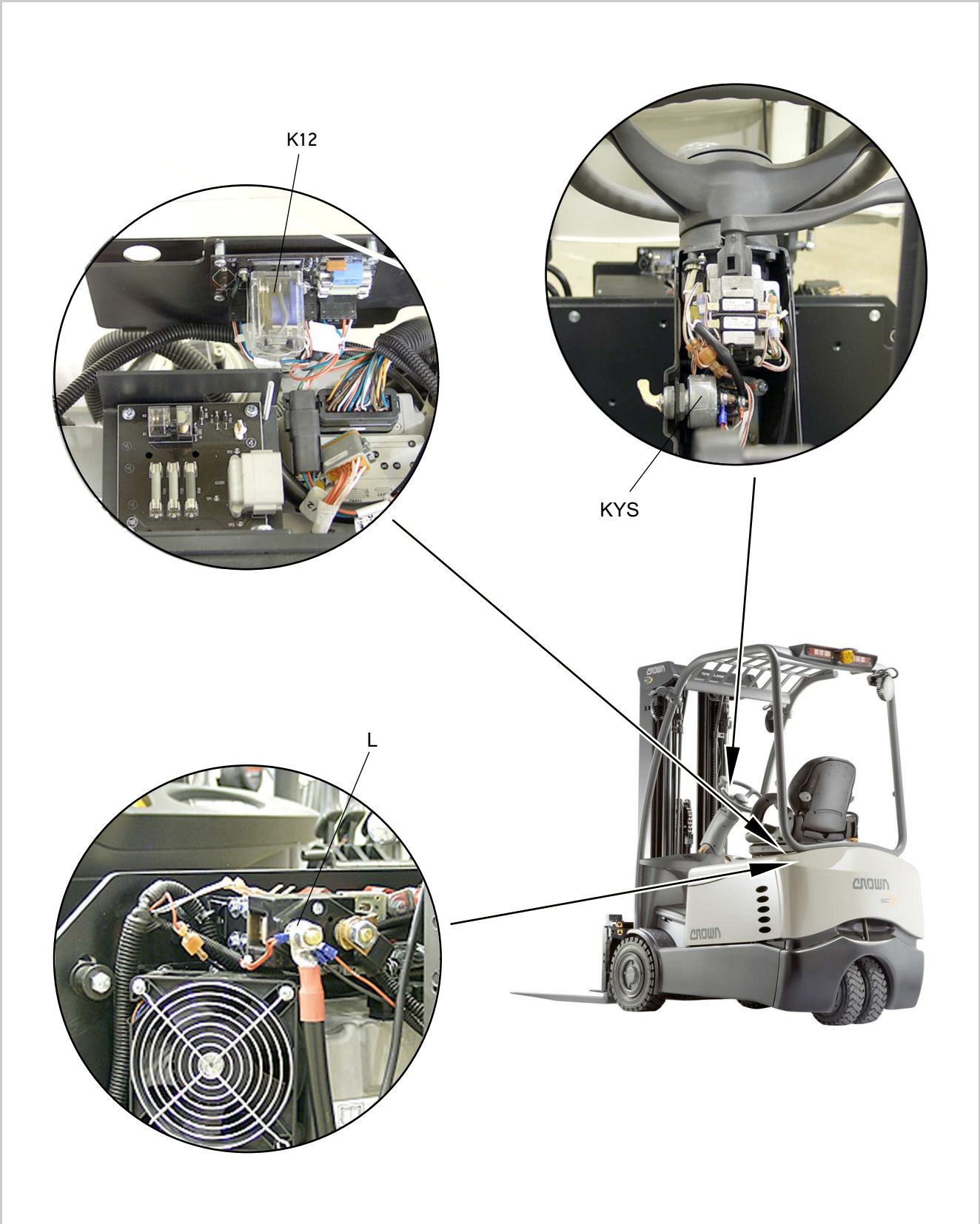


Fig. 21 (28071)

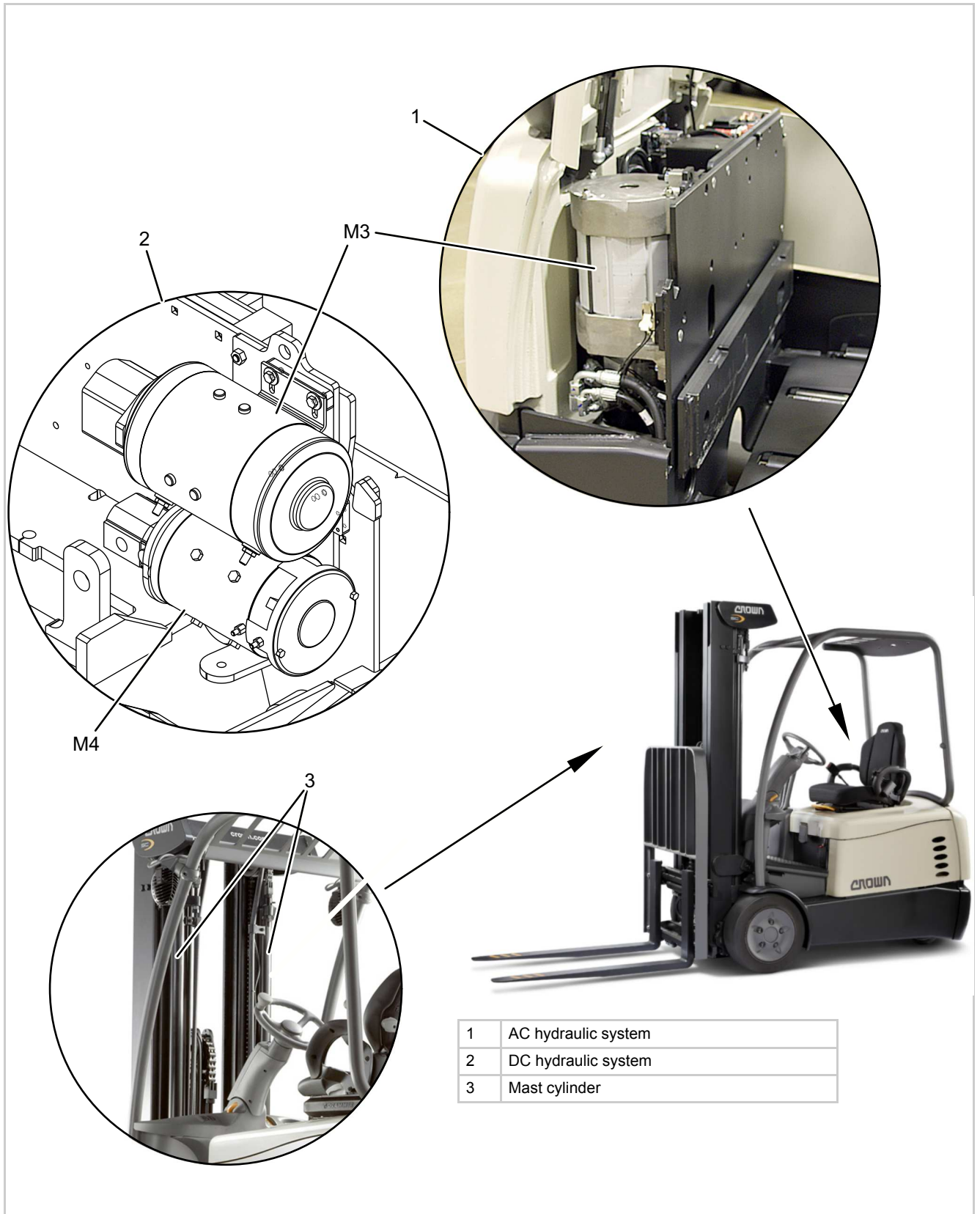


Fig. 26 (28076)

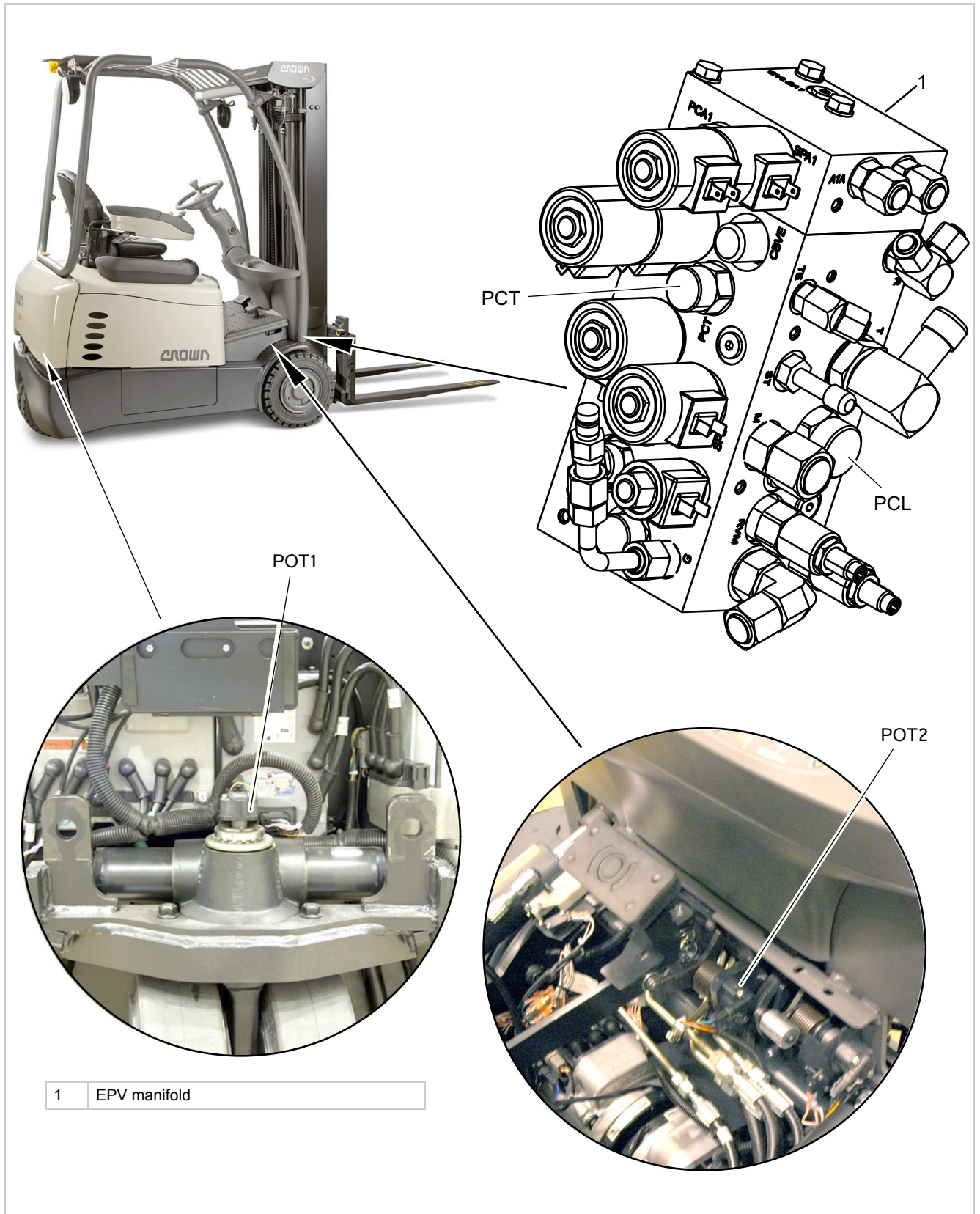


Fig. 31 (28081)

COMPONENTRY

S (DC Hydraulic System Only)

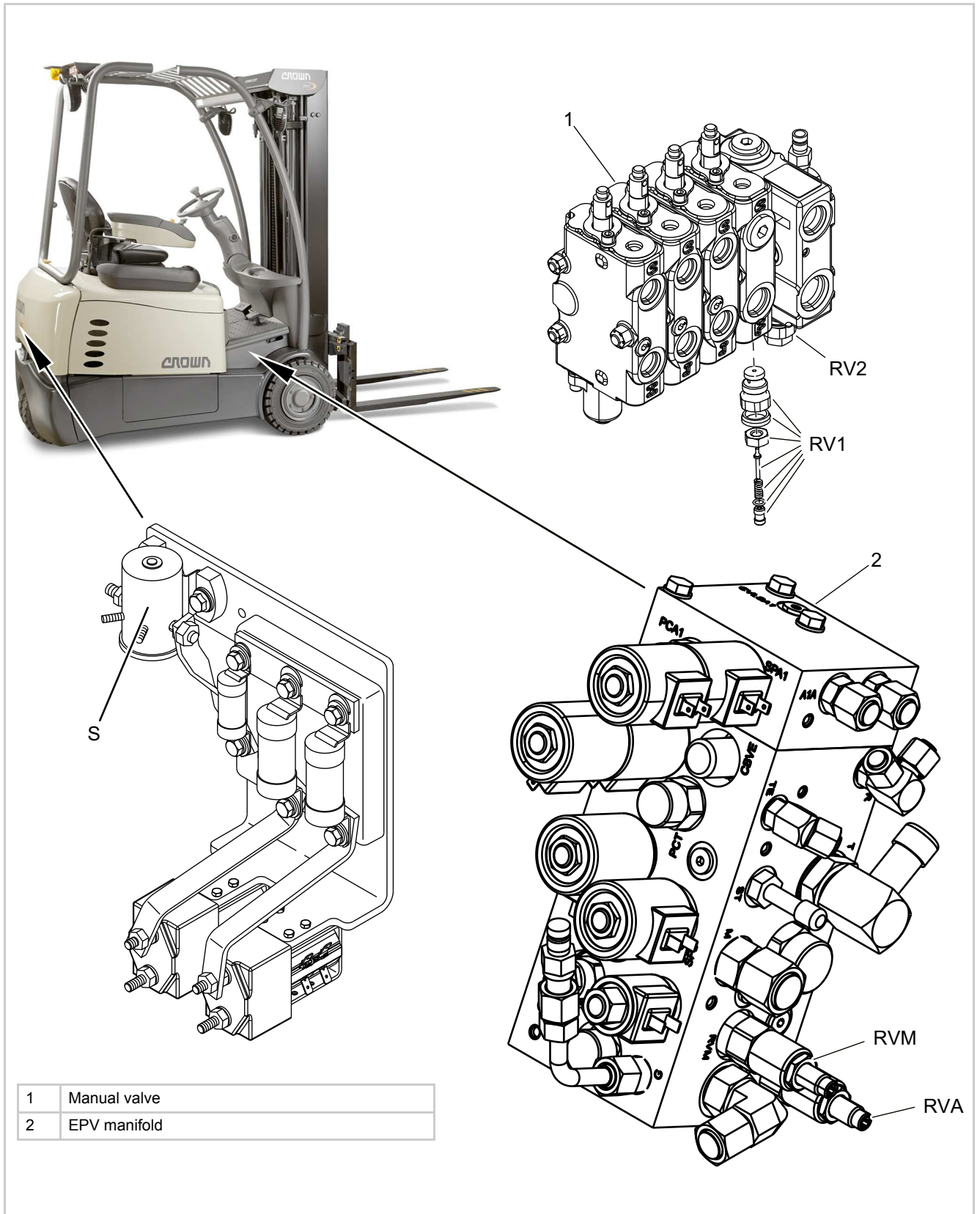


Fig. 36 (28086)

COMPONENTRY

SVX (Manual Valve Only, Optional - Not Shown)

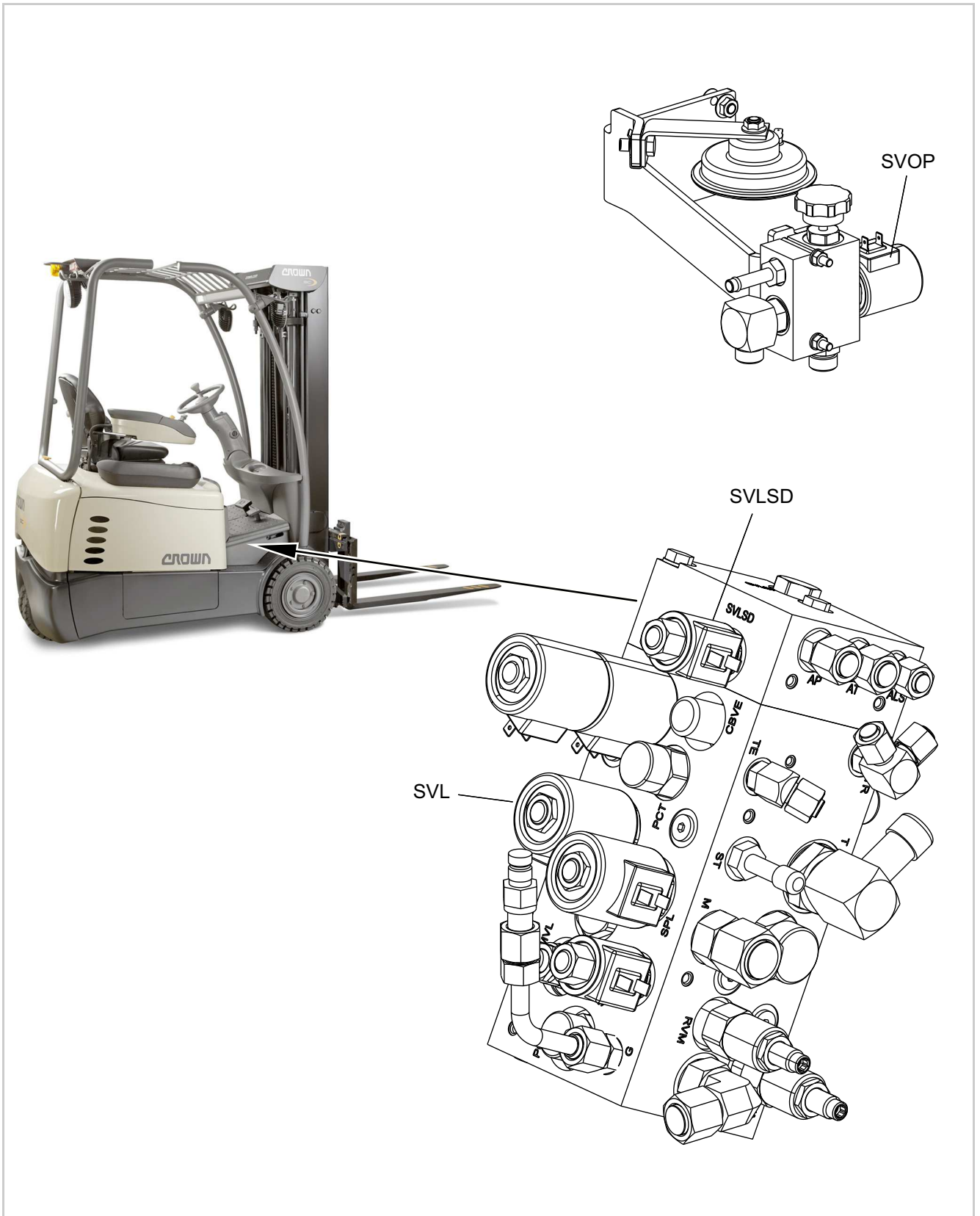


Fig. 41 (28091)

SAE Torque Values

It is important to tighten fasteners to the correct torque value. This section shows the standard torque values for the screws and bolts used in Crown lift trucks and vehicles. Special torque values in the maintenance and parts sections of this manual override the standard torque values in this section.

Grade



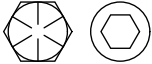
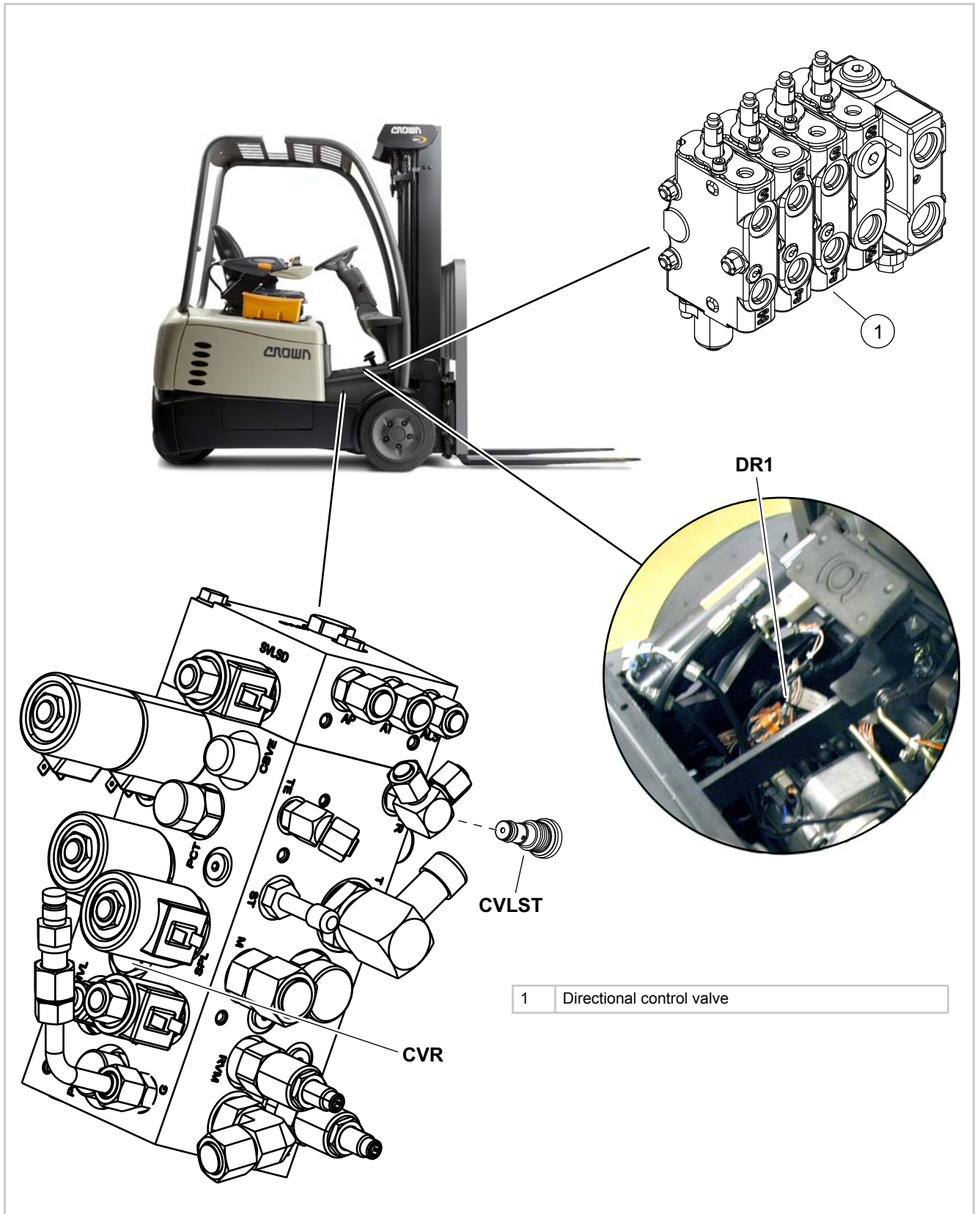
Grade Identification (on Head)	Specification	Bolt and Screw Size (in)
	SAE - Grade 2	1/4 through 1-1/2
	SAE - Grade 5	1/4 through 1-1/2
	SAE - Grade 8	1/4 through 1-1/2
<p>NOTE: Even though a bolt head is unmarked, Crown uses nothing less than Grade 5 in all its bolted assemblies. Instances do occur when Grade 5 bolts are manufactured unmarked. When a fastener is replaced that is unmarked, replace the fastener with a Grade 5.</p>		

Fig. 1 (14916-02)



Fig. 4 (33886)



1	Directional control valve
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Fig. 9 (33891)

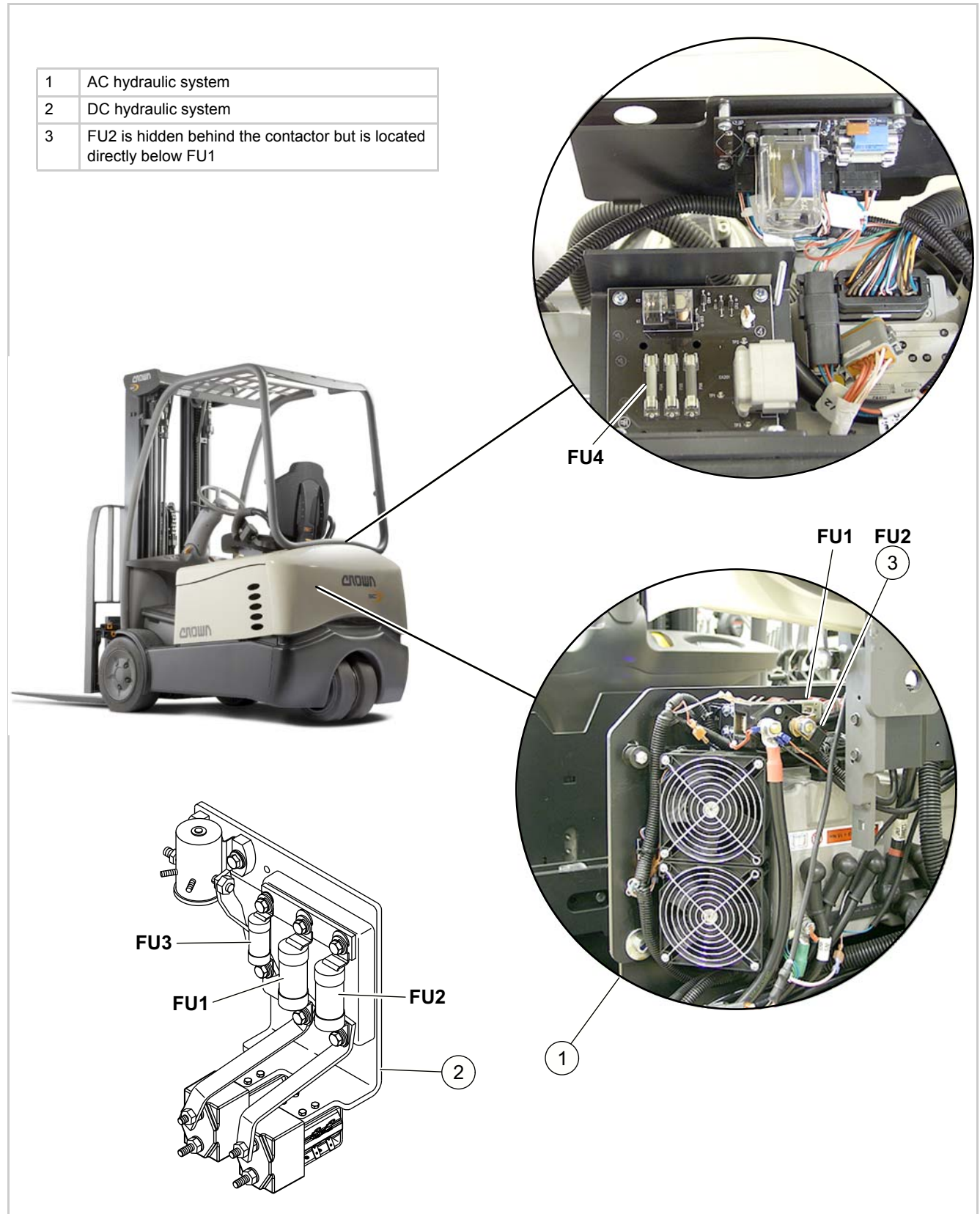


Fig. 14 (33896)

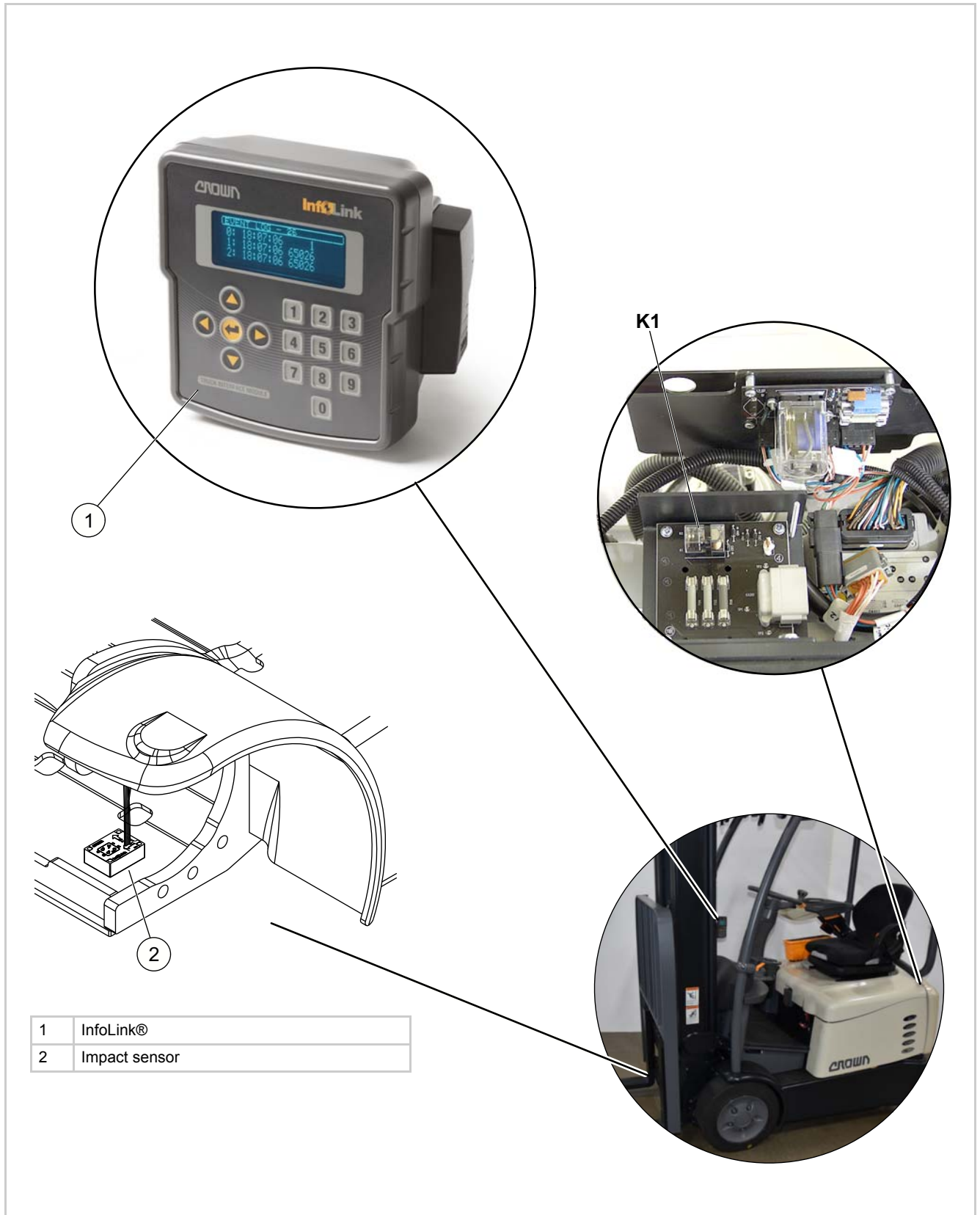


Fig. 19 (33901)

Lowering Flow Control Manifold (Manual Valve Only)

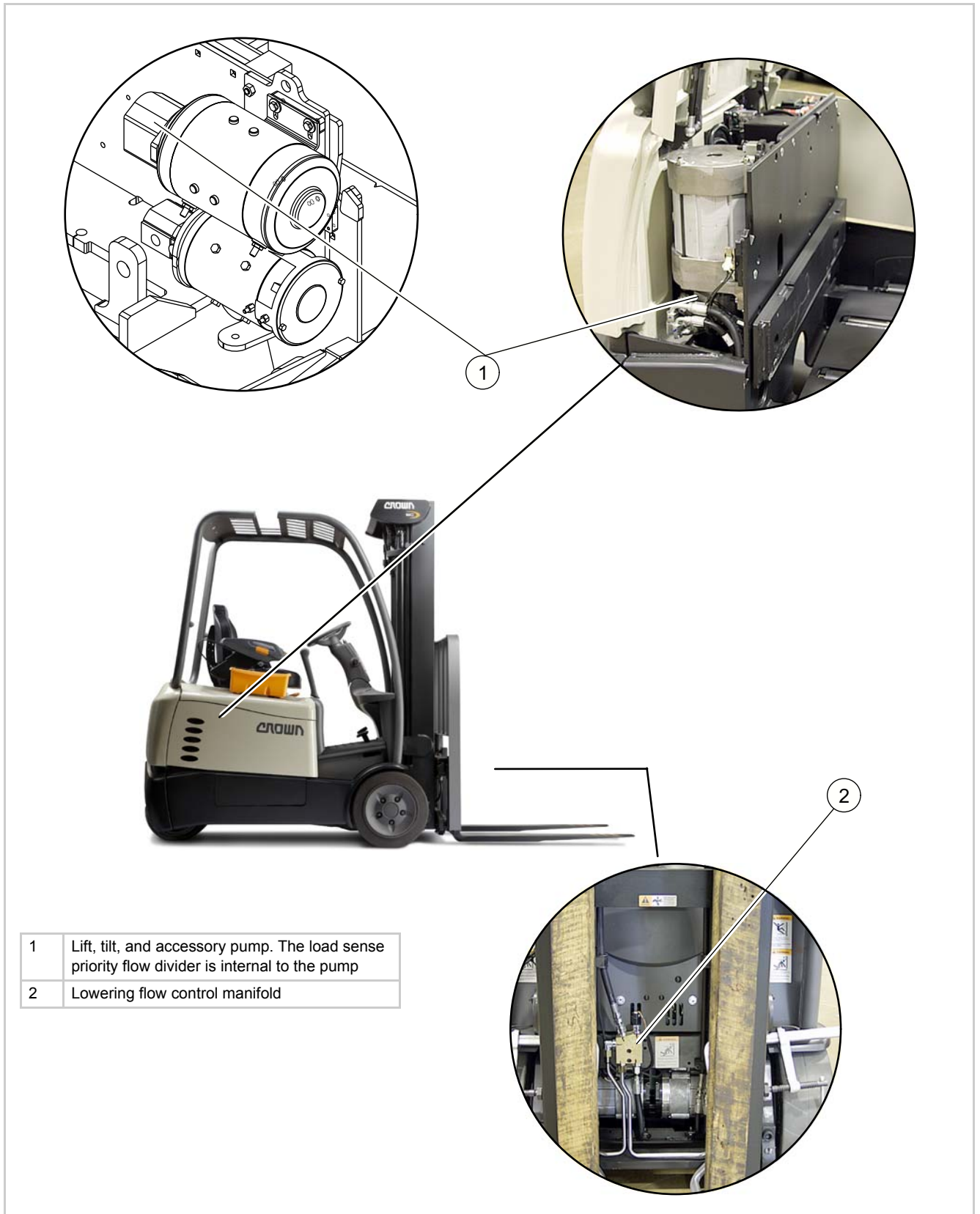


Fig. 24 (33906)

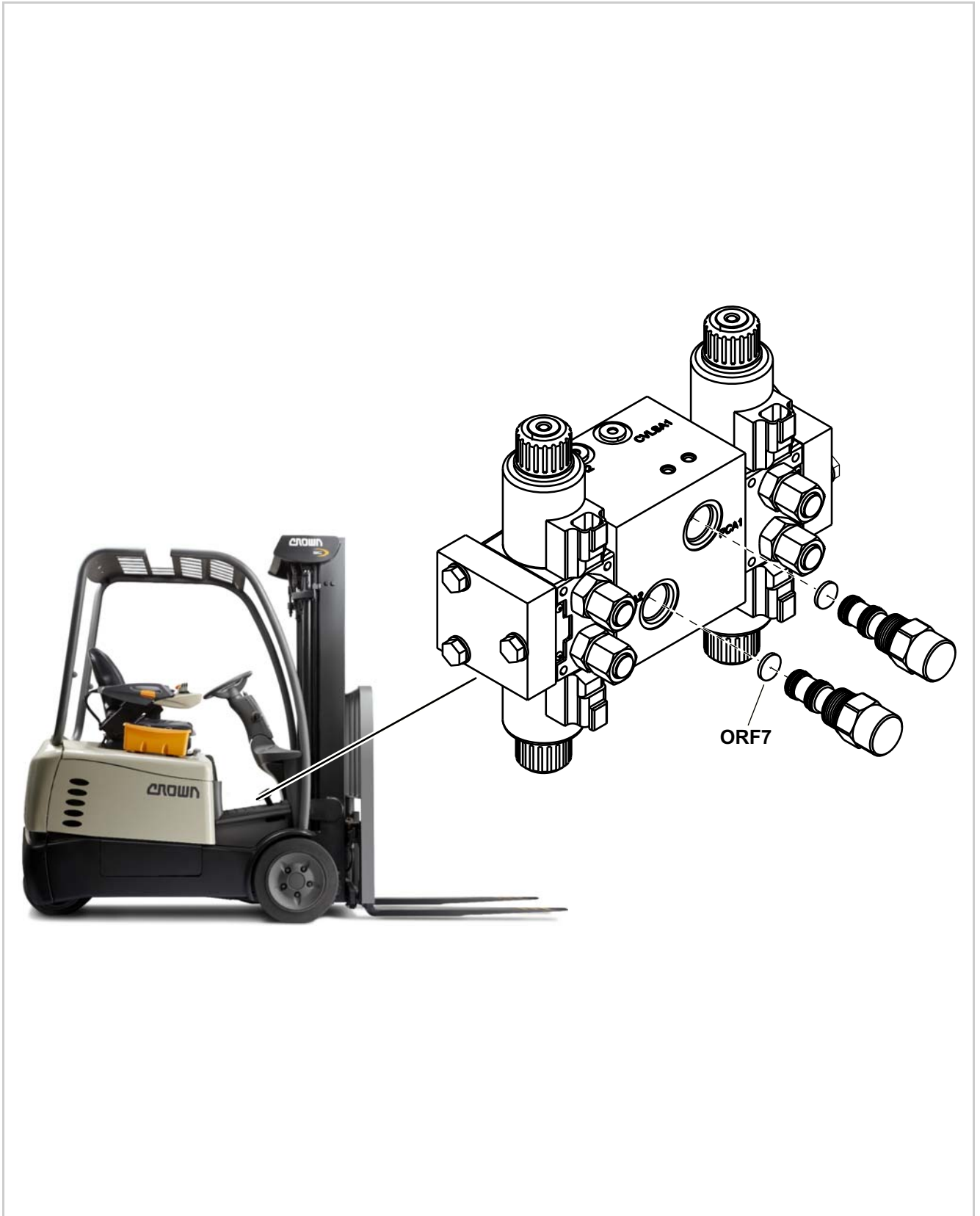


Fig. 29 (33911)

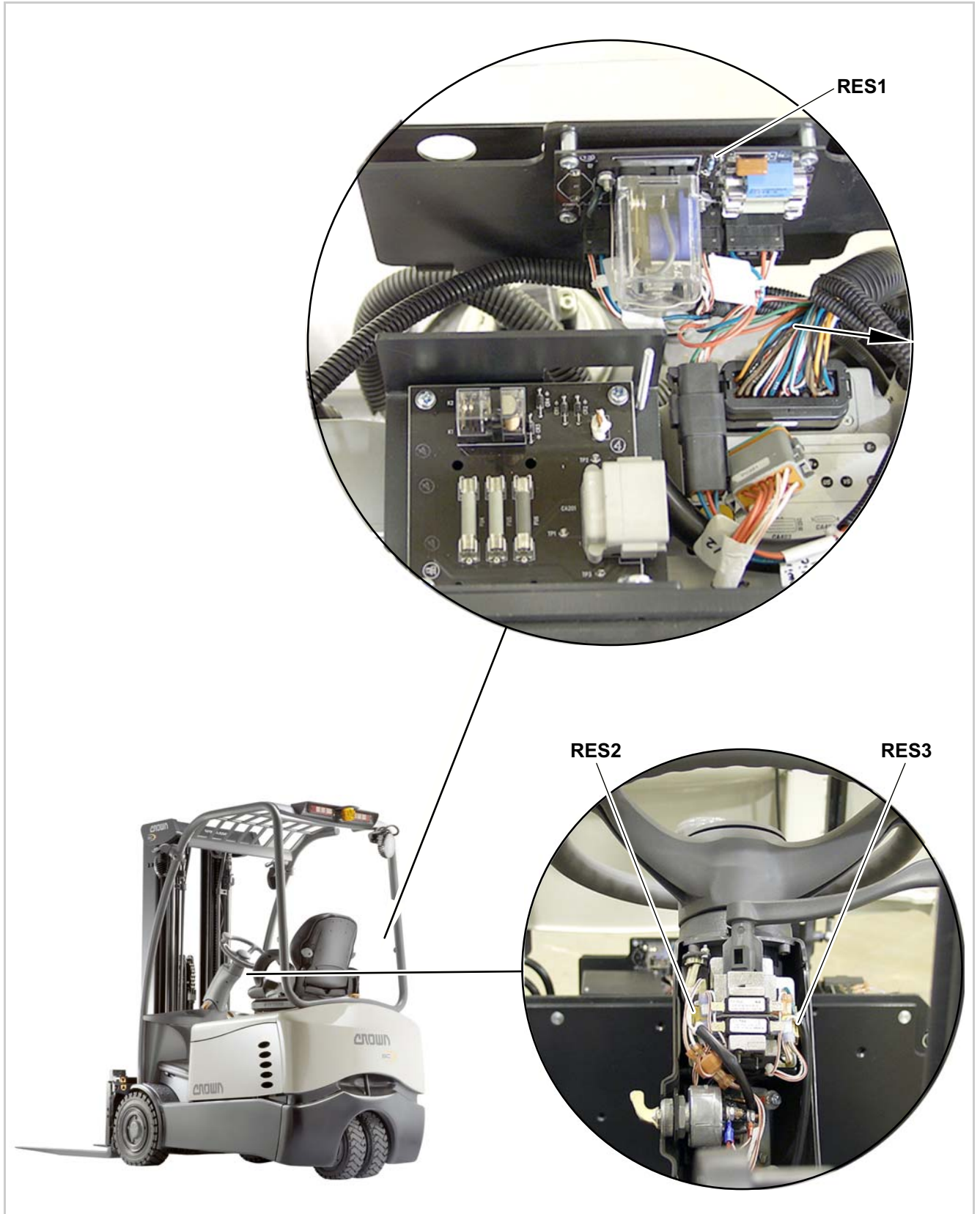


Fig. 34 (33916)

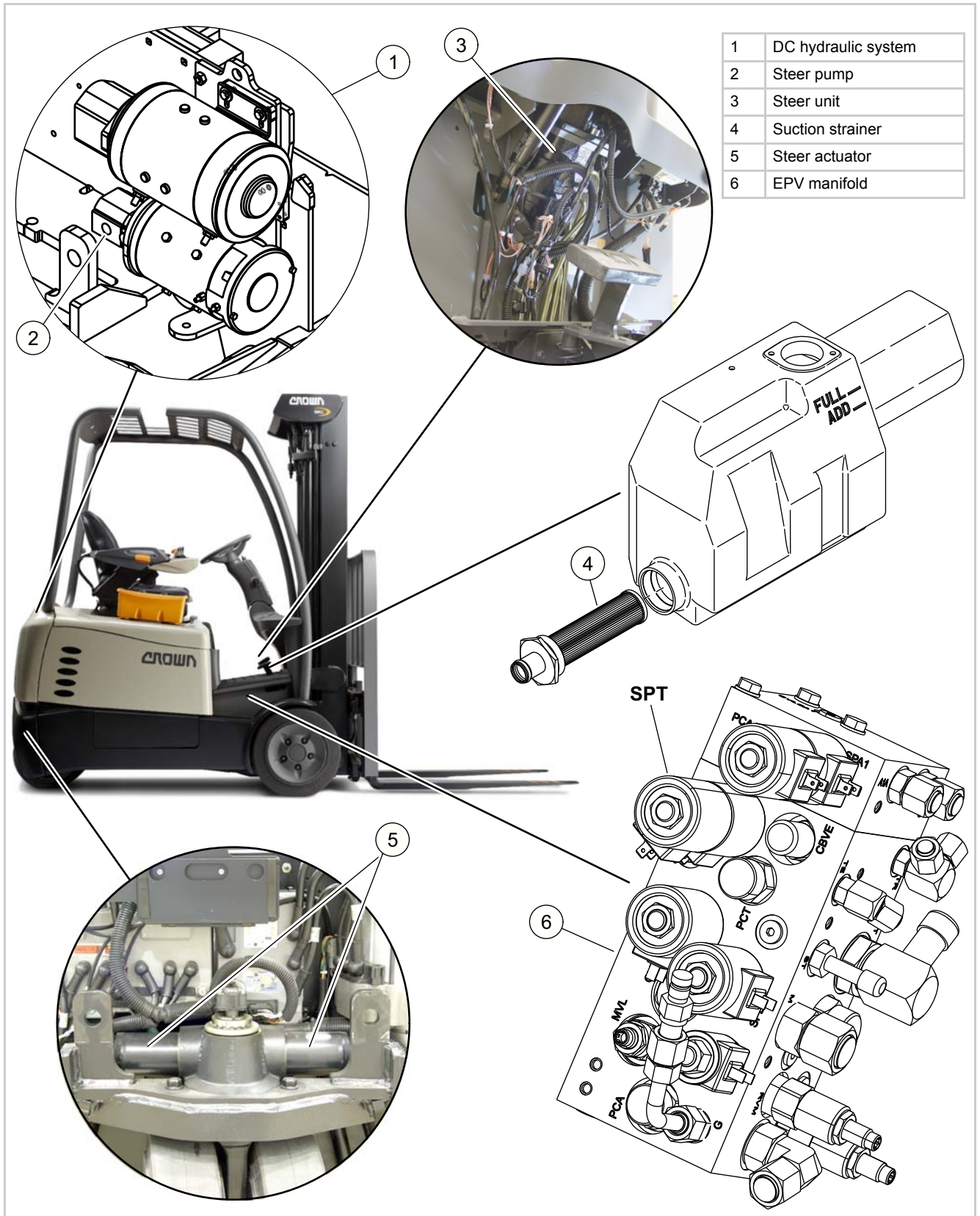


Fig. 39 (33921)

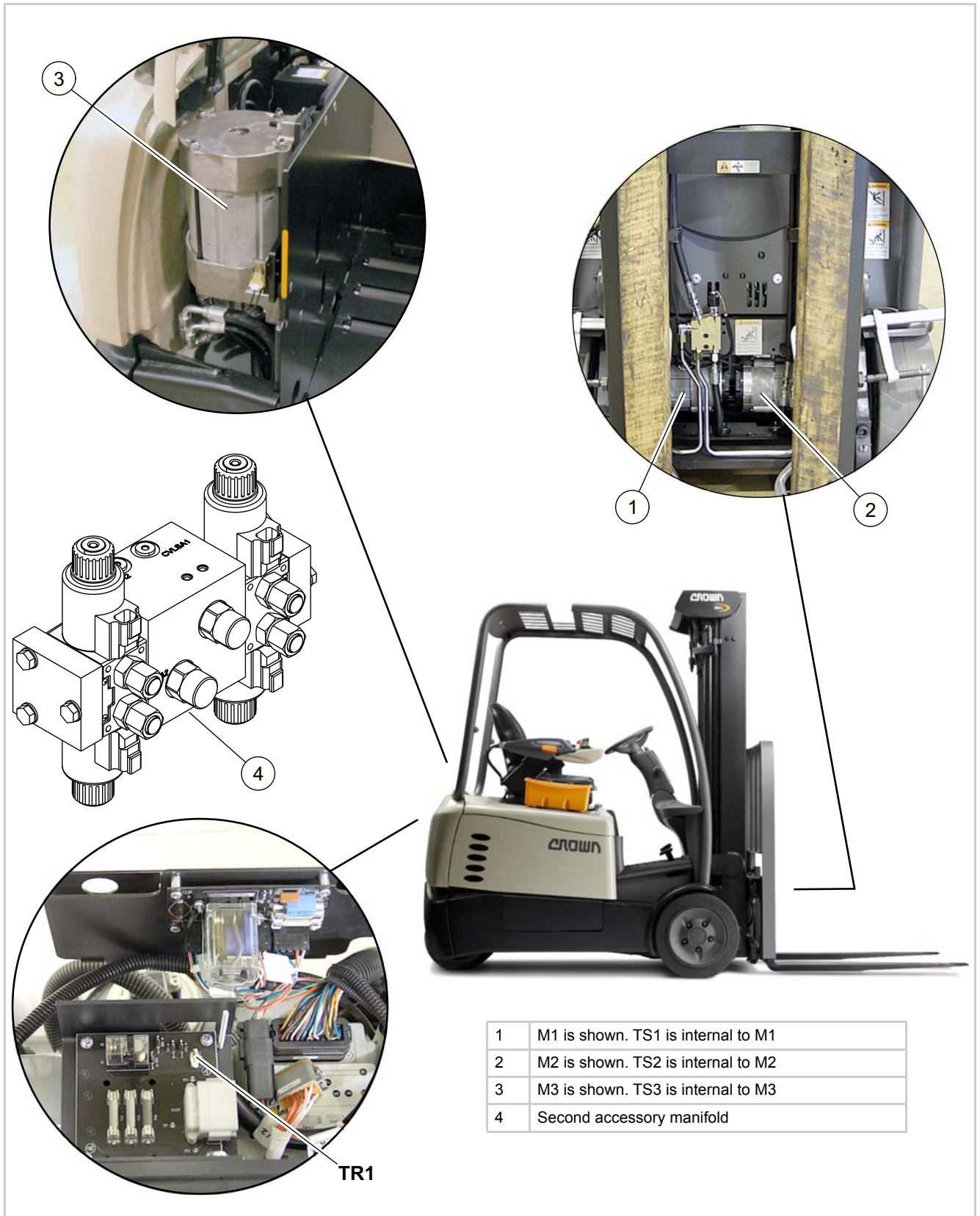


Fig. 44 (33926)

Removal

1. Move truck to a service area with a level floor.
2. Rotate the steering wheel fully left. Refer to Figure 25573.



Fig. 35 (25573)

1	Left
2	Right

3. Disconnect the battery. Chock the drive tires. Lock-out and tagout the truck. Refer to the Control of Hazardous Energy chapter.
4. Remove the right side cover.
5. Insert a block of hardwood between the battery and power unit to keep the battery in place. Refer to Figure 25574.

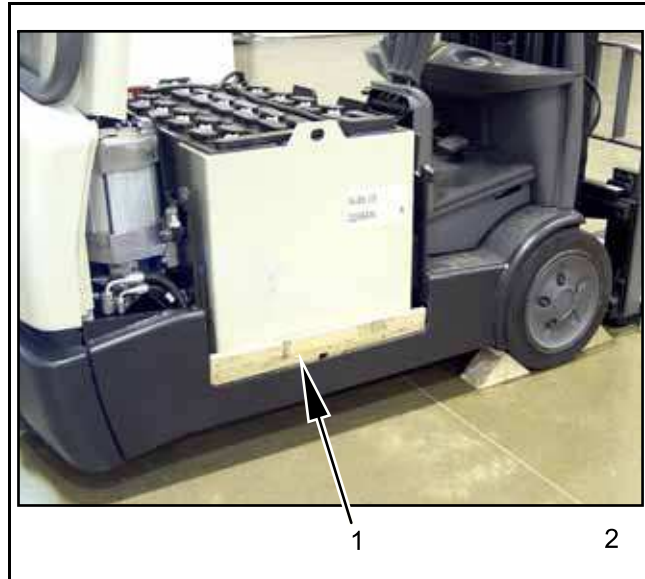


Fig. 36 (25574)

1	Block of hardwood between the battery and power unit
2	Chocks

6. Block the truck so the steer wheels are off the floor.
7. Using a 1412A Blue Point pry bar, remove the grease cap. Refer to Figure 25575.

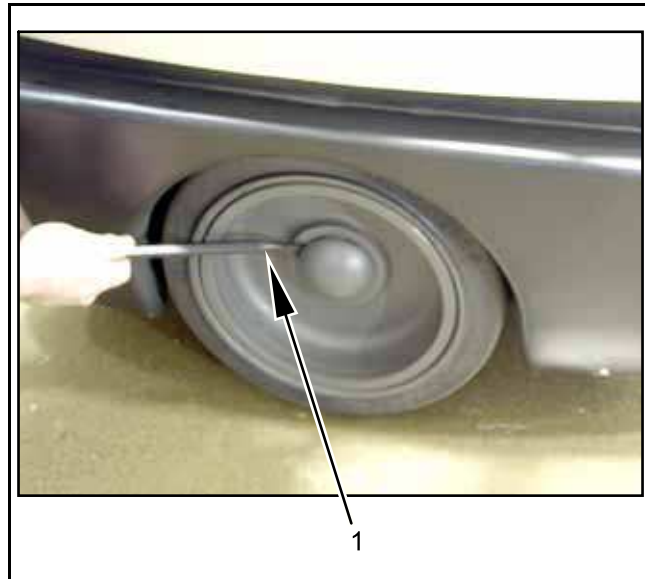
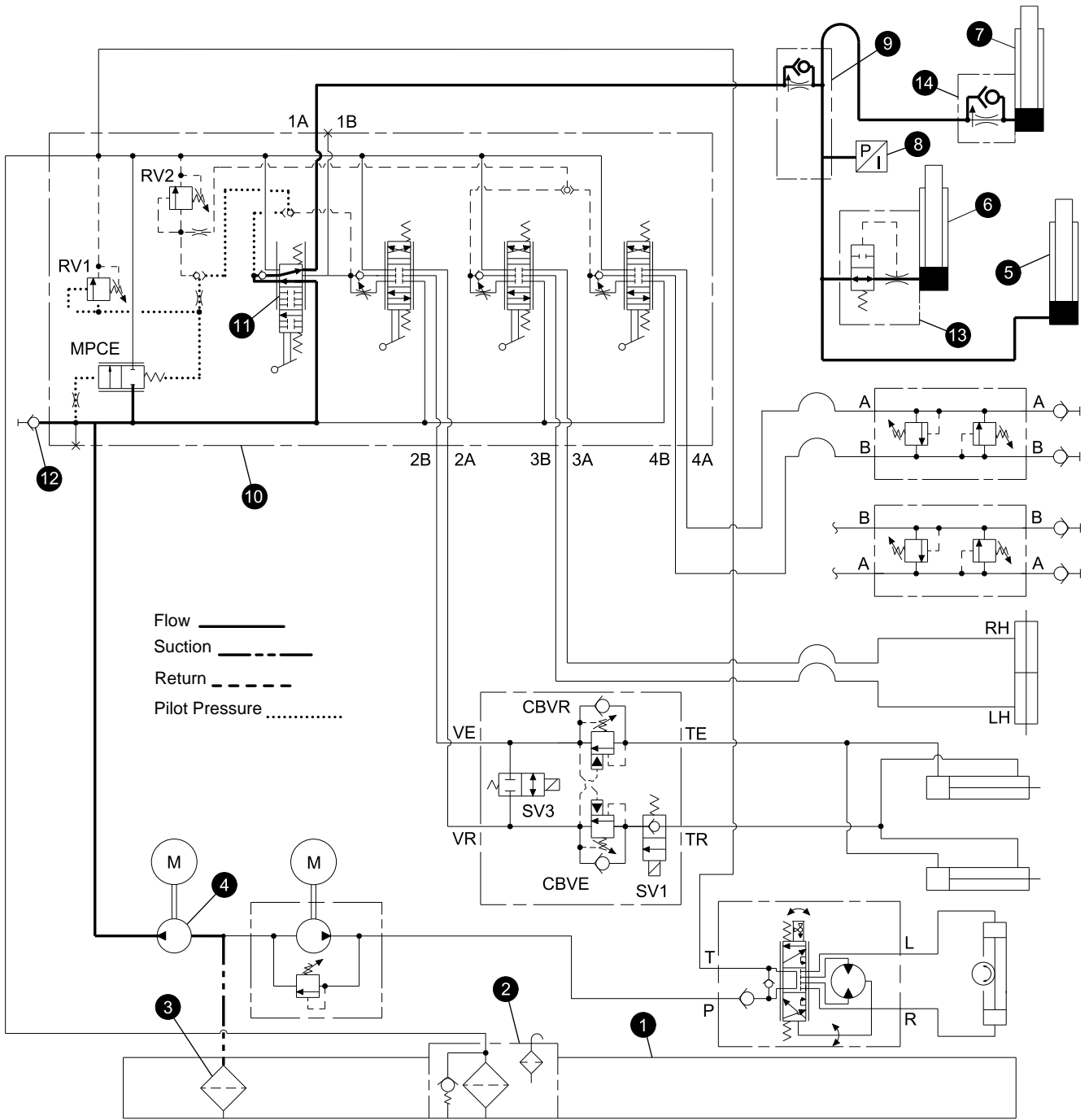


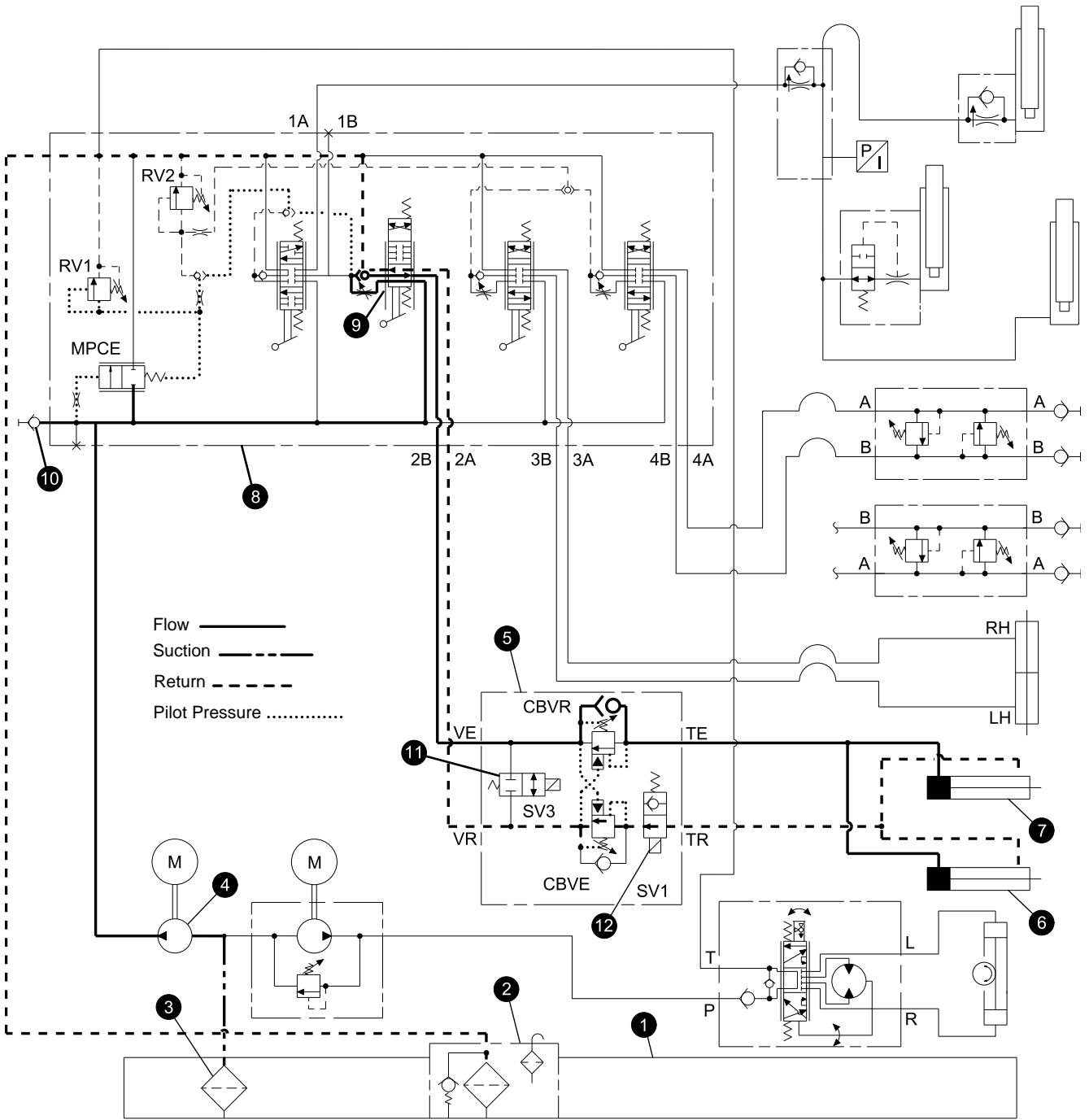
Fig. 37 (25575)

1	1412A Blue Point Pry Bar
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- | | | |
|----------------------------|----------------------------------|--|
| 1 Reservoir | 6 Right Mast Cylinder | 11 Lift/Lower Valve |
| 2 Return Filter & Breather | 7 Carriage Cylinder | 12 Quick Disconnect (for Pressure Gauge) |
| 3 Suction Strainer | 8 Pressure Transducer (PT1) | 13 Velocity Fuse |
| 4 Lift Pump | 9 Lowering Flow Control Manifold | 14 Flow Regulator |
| 5 Left Mast Cylinder | 10 Directional Control Valve | |

Figure 25506



- | | | |
|----------------------------|-----------------------------|--|
| 1 Reservoir | 5 Tilt Manifold | 9 Tilt Valve |
| 2 Return Filter & Breather | 6 Right Tilt Cylinder | 10 Quick Disconnect (for Pressure Gauge) |
| 3 Suction Strainer | 7 Left Tilt Cylinder | 11 Tilt Position Assist Valve |
| 4 Lift Pump | 8 Directional Control Valve | 12 Tilt Interlock Valve |

Figure 25511

Steer Pump

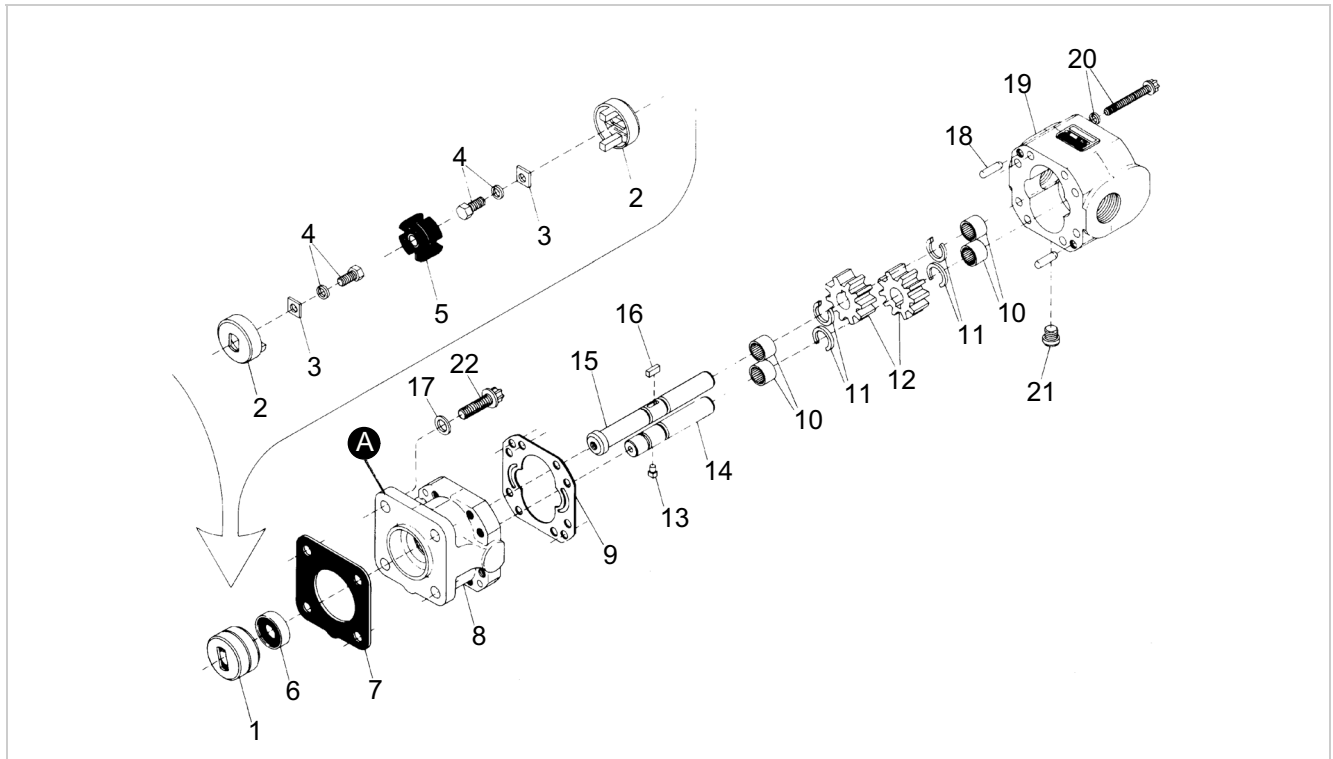


Fig. 1 (11075-02)

Preparing for disassembly

Pump repair must be performed in a clean, dust-free location, using clean tools and equipment. Dirt or grit damages the highly machined surfaces and results in leakage or premature failure of the pump.

Before disassembling the pump, scribe match marks on the stator (8) and the gear housing (19) to make sure that the pump is assembled in the same manner as it was shipped from the factory. If the stator or gear housing is replaced during repair, scribe a match mark on the new part in the same location as on the part it replaces.

Disassembling the pump

See Figure 1.

1. Clean the outside of the pump with a high grade solvent and thoroughly dry.
2. Secure the pump in a vice (using light clamping pressure) at the area of the mounting flange (A).
3. Remove the eight screws (20) from the stator (8).
4. Separate the gear housing (19) from the stator (8). It may be necessary to lightly tap the sides of the housing to facilitate the separation.

**CAUTION**

Never insert a screwdriver or other similar instrument between the housing and the stator for the purpose of prying the two halves apart as permanent damage may result.

5. Remove the dowel pins (18) from the gear housing (19).
6. Remove the idler gear and drive gear assemblies including the retaining rings (11), gears (12), keys, idler shaft (14) and drive shaft (15).

Technician Tips: When removing the plastic shim (9), note the color of the shim. These shims are supplied in different colors corresponding to different thicknesses. When replacing the shim, the same color shim must be installed.

7. Disassemble the shaft assemblies.

General part inspection

1. Thoroughly wash all pump components in a good grade solvent and blow dry.
2. Lay the cleaned components on a dirt-free bench or shop-cloth and individually inspect each part.

Adjusting the Relief Valve (RV1)

Refer to Figure 2

Special tools and equipment:

- 0-35000 kPa (0-5000 psi) pressure gauge (part number 104812)
1. Connect a pressure gauge to the test port (1) on the control valve.
 2. Operate the hydraulic system until the oil temperature is 20-30° C (70-90° F).
 3. Loosen the jam nut on RV1.
 4. Raise the fork carriage or tilt the mast forward until it stops.
 5. Hold the control lever in position while you check the pressure gauge as the relief valve opens.
 6. Turn the adjustment screw, on the bottom of the relief valve to set it to the applicable pressure. Refer to the RV1 Pressure Chart.

Note: Tighten the screw to increase the pressure. Loosen the screw to decrease the pressure.

7. Tighten the jam nut.
8. Check the pressure setting.
 - ⇒ If the pressure setting is correct, the procedure is complete.
 - ⇒ If the pressure setting is incorrect, then go back to step 4.

Adjusting the Relief Valve (RV2)

Refer to Figure 2

Special tools and equipment:

- 0-35000 kPa (0-5000 psi) pressure gauge (part number 104812)
1. Connect a pressure gauge to the test port (1) on the control valve.
 2. Operate the hydraulic system until the oil temperature is 20-30° C (70-90° F).
 3. Loosen the jam nut on RV2.
 4. Operate an accessory until it stops.
 5. Hold the control lever in position while you check the pressure gauge as the relief valve opens.
 6. Turn the adjustment screw, on the bottom of the relief valve to set it to 17235 ± 345 kPa (2500 ± 50 psi)

Note: Tighten the screw to increase the pressure. Loosen the screw to decrease the pressure.

7. Tighten the jam nut.

8. Check the pressure setting.
 - ⇒ If the pressure setting is correct, the procedure is complete.
 - ⇒ If the pressure setting is incorrect, then go back to step 4.

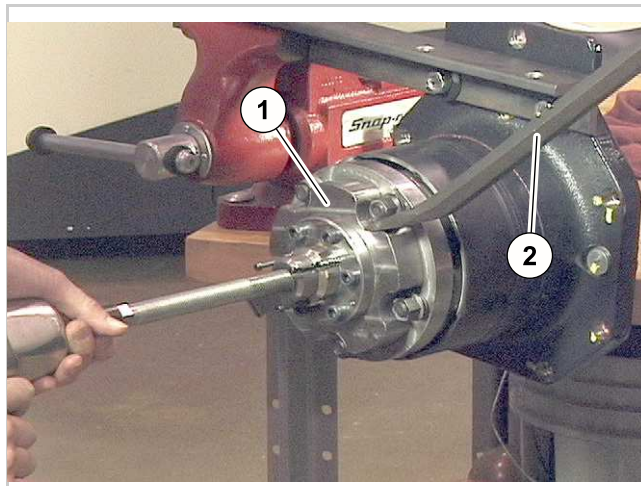


Fig. 14 (26469)

11. To prevent the hub and drive unit from turning, put a pry bar (2) between one of the lugnuts and the drive unit tool (1).
12. Turn the rod on the drive unit tool (1) and hold the pry bar (2), and remove the hub.
13. After you remove the hub, remove the drive unit tool from the studs.
14. See Figure 15. Use a 3 mm (0.125 in) drill bit (1). Make two holes 180° apart through the outer surface of the oil seal (2).

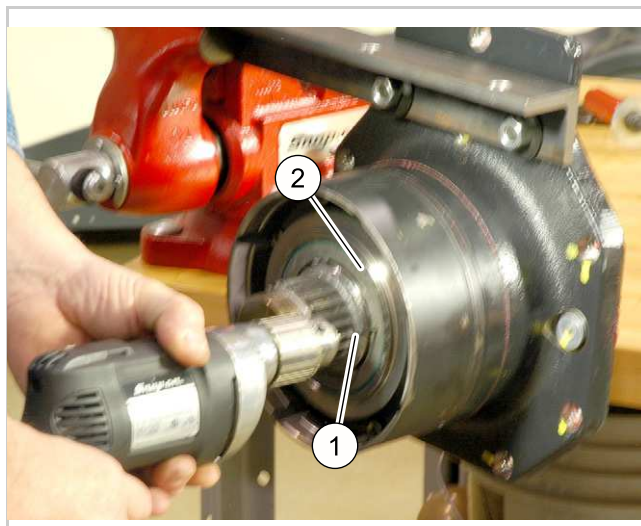


Fig. 15 (26422)

CAUTION

Improper removal of the seal causes an oil leak.
Do not use a screwdriver or small pry bar to remove the oil seal. You can damage the seal surface of the housing and cause an oil leak.

- Remove the oil seal properly.

15. Use a slide-hammer (1, Figure 16) and remove the oil seal (2).

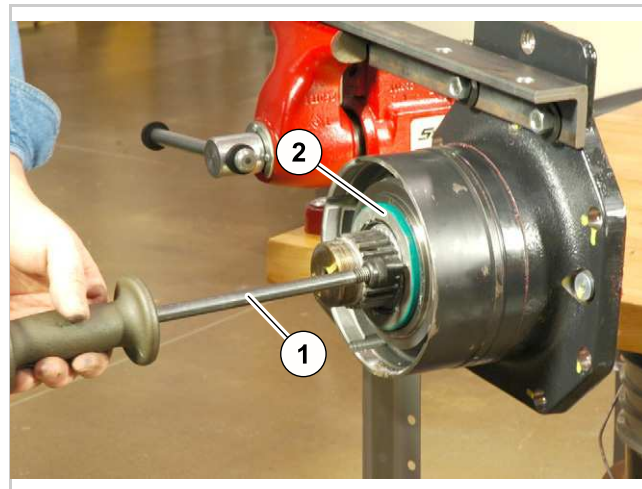


Fig. 16 (26415)

Drive axle seal installation

1. Examine the oil seal housing and make sure that it is free of rough edges and gouges.
2. Lightly lubricate the housing seal bore.

CAUTION

An incorrect installation procedure can damage the components.

If you tap directly on the seal with a hammer, you can make a dent in the seal. You can also incorrectly align the seal in the housing. A damaged or misaligned seal causes an oil leak.

- Make sure that you install the seal with a bearing and seal driver or wood block and a rubber mallet.

3. To install the seal (1, Figure 17) in the housing, use a bearing and seal driver or a wood block and a rubber mallet.

1. See Figure 39. Assemble the traction motor to the drive unit. Torque the screws to 33–36 Nm (24–27 ft lb).



Fig. 39 (25428-01)

2. Install the O-ring in the brake hub groove.
3. Lubricate the spring groove (1, Figure 40) in the brake hub with grease (2).

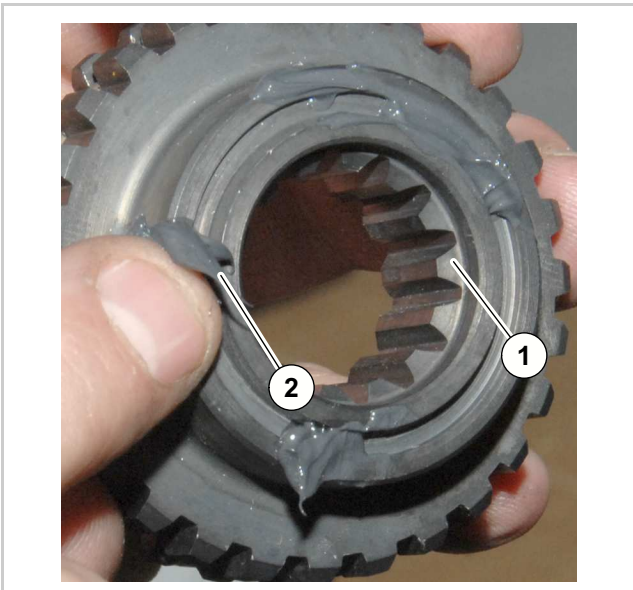


Fig. 40 (26531-01)

4. Install the spring in the brake hub groove.
5. Install the brake hub on the traction motor shaft.

6. Install the washer on the traction motor shaft.
7. Install the retaining ring on the traction motor shaft.
8. Push the retaining ring (1, Figure 41) into the groove in the traction motor shaft with a punch.

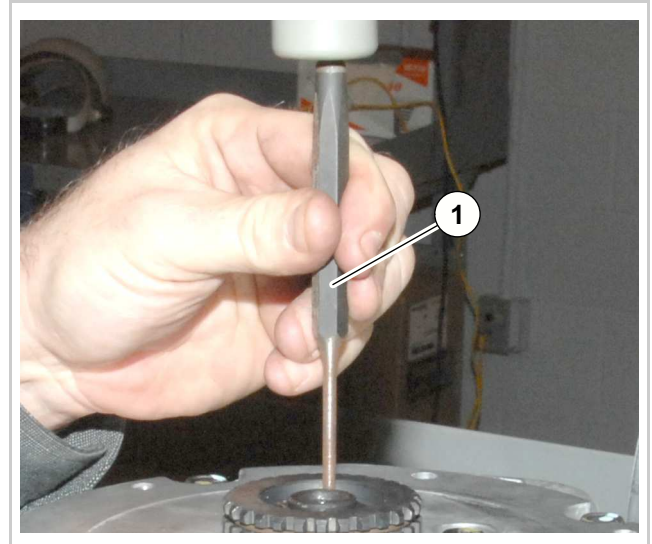


Fig. 41 (26533-01)

9. Install the brake.
10. Use screws to assemble the brake to the motor.
11. Torque the screws to 10–12 Nm (7–9 ft lb).

2. Lightly lubricate the dowel pins in the mounting plate.
3. Apply primer (061004-0016) to the mounting surface of the drive unit sub-assembly. Let the primer fully dry (approximately 2 min).
4. See Figure 26. Apply the flange sealant (061004-030) in a continuous flow around the bolt holes on the mounting surface of the drive unit sub-assembly.

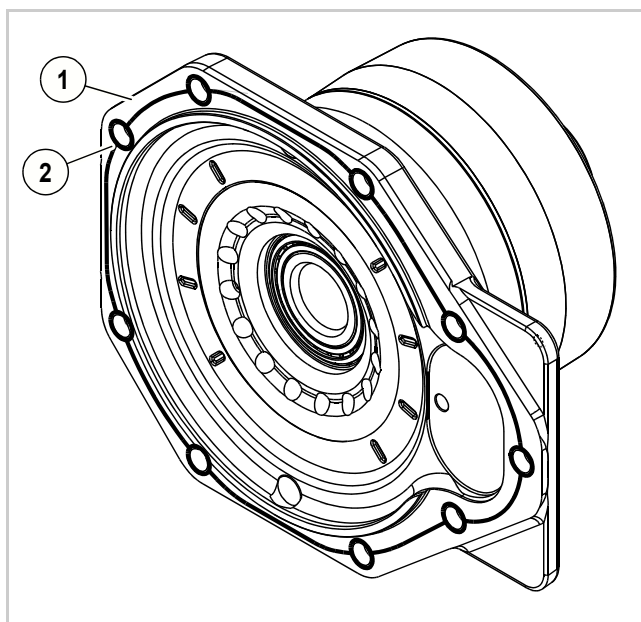


Fig. 26 (26497)

5. Apply primer (061004-002) to the nine screws (1, Figure 27) that assemble the drive unit sub-assembly (2) to the mounting plate (3). Let the primer fully dry for 2 min.

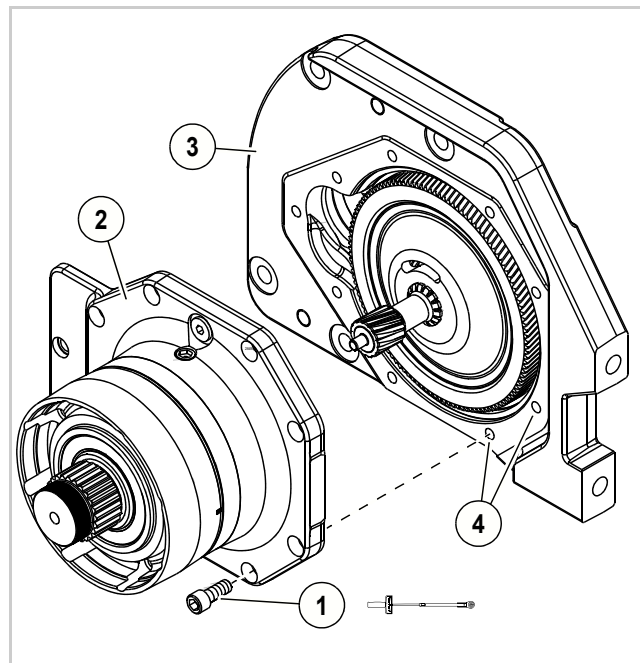


Fig. 27 (26498)

6. Apply primer (061004-002) to the holes (4) in the mounting plate (3). Let the primer fully dry for 2 min.
7. Apply thread-locking adhesive (061004-012) to the nine screws (1) that assemble the drive unit sub-assembly (2) to the mounting plate (3).
8. Assemble the drive unit sub-assembly (2) to the mounting plate (3) with the nine screws (1). As you tighten the screws, torque one screw on one side of the drive unit and then torque one on the other side. Torque the screws to 75 Nm (55 ft lb).
9. Apply anti-seize compound to the carrier shaft spline (1, Figure 28) to prevent corrosion.

ACS

Accelerator Switch

1. Place a 1.7 mm (0.067 in) thick shim between accelerator mount and buffer.
2. Loosen the two #6 screws. Slide switch roller against cam. Refer to Figure 12. The switch should actuate.
3. Tighten screws to secure switch.
4. Remove shim from between accelerator mount and buffer.
5. Rotate accelerator lever several times to confirm switch doesn't actuate when accelerator lever is in neutral position (lever arm against buffer.) If not, repeat previous adjustment steps.

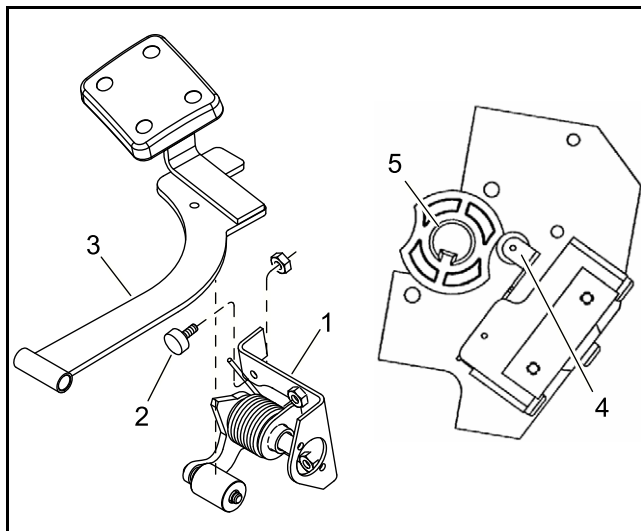


Fig. 12 (25334)

1	Accelerator Mount
2	Buffer
3	Accelerator Lever
4	Switch Actuated
5	Cam

BRKS1, BRKS2 (Optional)

Brake Switches

1. Enter Analyzer menu A2.3.3.
2. Loosen switch mounting screws.
3. Adjust BRKS1 so it changes state (0 to 1) when POT2 percentage is between 5 and 50% (18% ideal).
4. Adjust BRKS2 so it actuates with 2 to 3 mm (0.078 to 0.11 in) of pedal stroke.
5. Tighten mounting screws to secure switch.

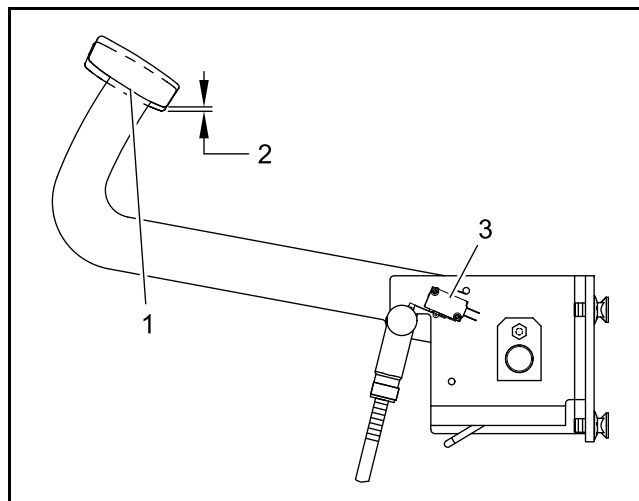


Fig. 13 (16992-01)

1	Service Brake Pedal
2	2 to 3 mm (0.078 to 0.11 in)
3	BRKS1, BRKS2

Power cables

To identify the power cables, see the Power Cables Abbreviations table for all lift trucks except the WP 3000 Series. For example: PC #1/0-10 is P/N 084572-010.

Power Cables Abbreviations	
Abbreviation	Part Numbers
PC#1	084571
PC#2	084570
PC#4	084569
PC#6	084568
PC#8	124474
PC#10	090963
PC#1/0	084572
PC#2/0	084573
PC#3/0	086749
PC#4/0	137636

Switches

The switch symbols show:

- The switch type
- The number of terminals
- If the switch is a momentary contact switch or maintained contact switch
- How the switch is connected
- How the switch operates
- How the switch functions

Switch type

- See Figures 1 and 2 for switches with a common terminal.



Fig. 1 (8115-01)

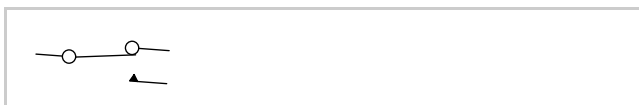


Fig. 2 (8116-01)

- See Figures 3 and 4 for switches without a common terminal.



Fig. 3 (8117-01)



Fig. 4 (8118-01)

Number of terminals

- All terminals are shown even if not connected.

Momentary contact switch or maintained contact switch

- See Figures 5 and 6 for switches with a momentary contact. A momentary contact is shown as a shaded triangle.



Fig. 5 (8119-01)



Fig. 6 (8120-01)

- See Figures 7 and 8 for switches with a maintained contact. A maintained contact is shown as an open circle (an open circle also shows the common terminal).

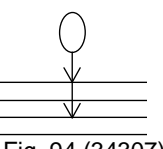



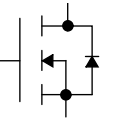
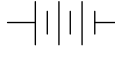
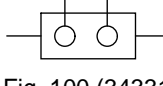
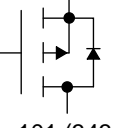




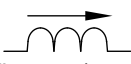


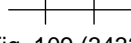
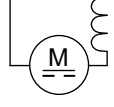


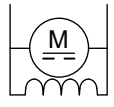
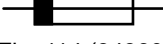

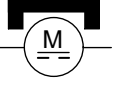
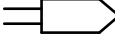

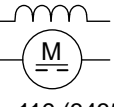


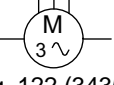



Fig. 7 (8115-01)



Fig. 8 (8117-01)

Notes:

Other Electrical Symbols					
Symbol	Name	Symbol	Name	Symbol	Name
 Fig. 94 (34307)	Cable Multi-Conductor	 Fig. 95 (34318)	Socket and Pin	 Fig. 96 (34329)	Capacitor Nonpolarized
 Fig. 97 (34330)	Capacitor Polarized	 Fig. 98 (34344)	N-FET With Diode Clamp	 Fig. 99 (34355)	Battery
 Fig. 100 (34331)	Current Shunt	 Fig. 101 (34345)	P-FET With Diode Clamp	 Fig. 102 (34356)	Contactor Normally Open
 Fig. 103 (34332)	Inductor	 Fig. 104 (34346)	Motor Field, Series	 Fig. 105 (34357)	Contactor Normally Closed
 Fig. 106 (34333)	LVDT	 Fig. 107 (34347)	Motor Field, Shunt	 Fig. 108 (34358)	Coil
 Fig. 109 (34334)	Ferrite Bead	 Fig. 110 (34348)	Series Motor, DC	 Fig. 111 (34359)	Coil Suppression
 Fig. 112 (34335)	Diode	 Fig. 113 (34349)	Shunt Motor, DC	 Fig. 114 (34360)	Fuse-Band Shows Positive Feed
 Fig. 115 (34336)	LED	 Fig. 116 (34350)	Permanent Magnet Motor	 Fig. 117 (34361)	Tach Sensor
 Fig. 118 (34337)	Zener Diode	 Fig. 119 (34351)	Separately Excited Motor, DC	 Fig. 120 (34362)	Hour Meter
 Fig. 121 (34338)	SCR	 Fig. 122 (34352)	Motor, AC	 Fig. 123 (34363)	Lamp

continued from the previous page

	A2.2.12	M3 Temperature=	__	C	
	A2.2.13	Access 2 Temperature=	__	C	
	A2.2.14	Battery Voltage=	__	V	
	A2.2.15	POT5=	__	V	
	A2.2.16	POT6=	__	V	
	A2.2.17	HGTS2=	__	0/1	
	A2.2.18	HGTS3=	__	0/1	
	A2.2.19	MDLK=	__	0/1	
	A2.2.20	MSTK=	__	0/1	
A2.3	Access 3	A2.3.1	FS=	__	0/1
		A2.3.2	RS=	__	0/1
		A2.3.3	BRKS1=	__	0/1 : __ %
		A2.3.4	SES=	__	0/1
		A2.3.5	HGTS1=	__	0/1
		A2.3.6	ACS=	__	0/1
		A2.3.7	POT1=	__	Deg
		A2.3.9	POT3=	__	V
		A2.3.10	M1 Speed=	__	RPM
		A2.3.11	M2 Speed=	__	RPM
		A2.3.12	Truck Speed=	__	kph (__ mph)
		A2.3.13	M1 Temperature=	__	C
		A2.3.14	M2 Temperature=	__	C
		A2.3.15	Access 3 Temperature=	__	C
		A2.3.16	Battery Voltage=	__	V
		A2.3.17	Dynamic Brake=	__	Cnt
A2.7	Access 7	A2.7.1	POT7=	__	V
		A2.7.2	AXS3=	__	0/1
		A2.7.3	CLS=	__	0/1

continued on the next page

Fig. 5 (35129)

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CALIBRATION menus

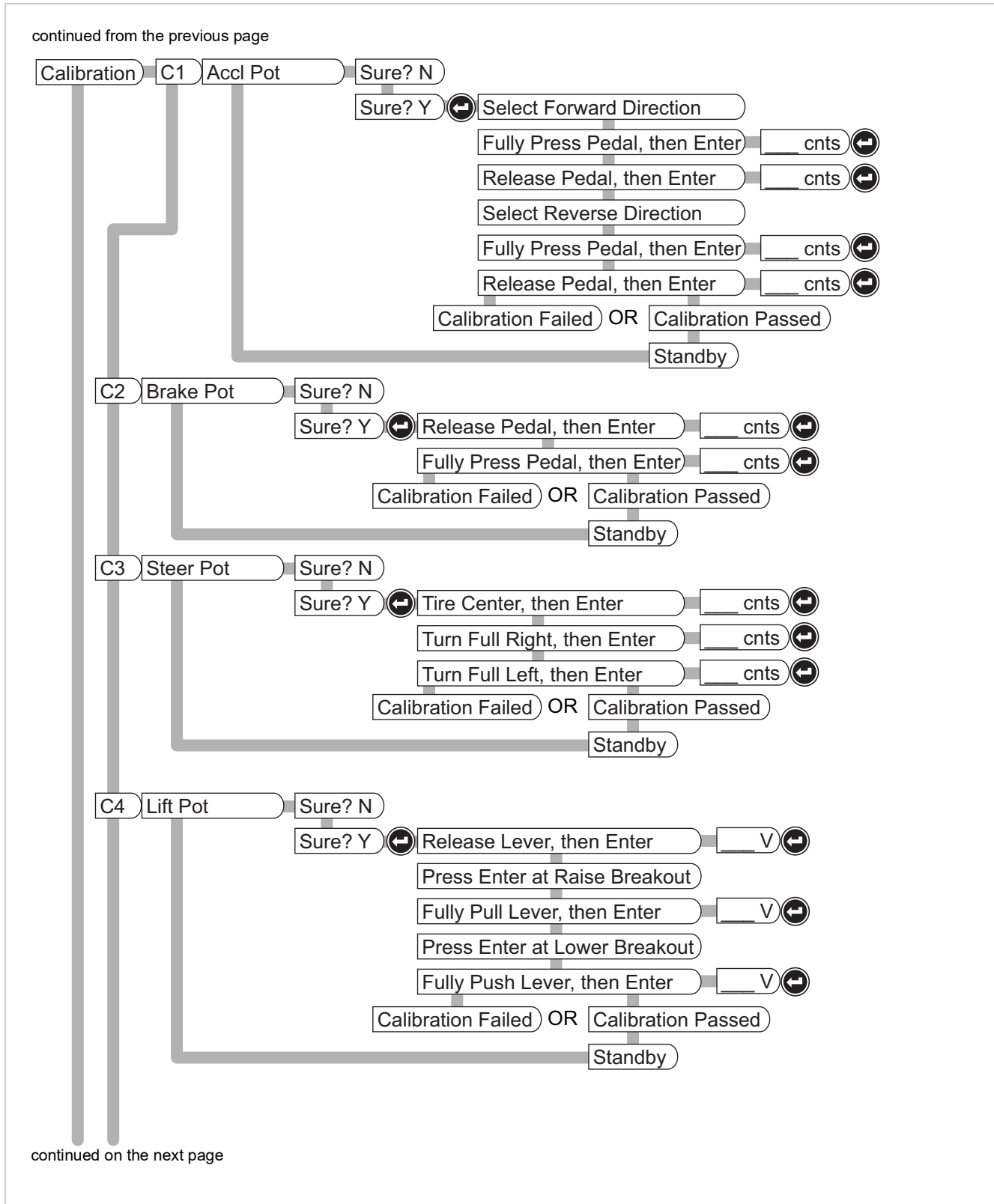


Fig. 15 (35133)

A2 INPUTS		
A2.1	Access 1 Inputs Menu	Menu Description
A2.1.5 ^{b)}	SBS = ____	0 = The seat belt is not latched (the switch is open).
		1 = The seat belt is latched (the switch is closed).
A2.1.6	PT = ____	This menu shows the weight on the forks.
		0 kg (0 lb) = 250 ±100 counts
		455 kg (1,000 lb) = 380 ±100 counts
		910 kg (2,000 lb) = 500 ±100 counts
		1,360 kg (3000 lb) = 630 ±100 counts
		1,815 kg (4000 lb) = 750 ±100 counts
A2.1.7 ^{c)}	LOS = ____	0 = The operator is not pushing the lift lever (the switch is open).
		1 = The operator is pushing the lift lever (the switch is closed).
A2.1.8 ^{c)}	LPR = ____	LPR is an input to the InfoLink® module.
		0 = The operator is not moving a hydraulic lever.
		1 = The operator is moving a hydraulic lever.
A2.1.9 ^{d)}	ZSS = ____	0 = Access 1 2 3® does not decrease the lift truck performance for the zone (the switch is open).
		1 = Access 1 2 3® decreases the lift truck performance for the zone (the switch is closed).
A2.1.10 ^{e)}	ECR4 = ____	The counts increase when the lift truck steers in the right direction.
		The counts decrease when the lift truck steers in the left direction.
A2.1.12 ^{c)}	THMS = ____	0 = M3 is hot.
		1 = M3 is cool.

- c). AC - Access 1 shows this menu only if the F4 HYDRAULIC VALVE TYPE menu is set to EPV and the F7.2 FLOORBOARD FAN is not set to OFF.
DC - Access 1 shows this menu only if the F7.2 FLOORBOARD menu is not set to OFF.
- d). AC only. Access 1 shows this menu only if the F4 HYDRAULIC VALVE TYPE menu is set to EPV.
- e). AC only. Access 1 shows this menu only if the F4 HYDRAULIC VALVE TYPE menu is set to MANUAL and the F20.8 DIRECTION SELECTOR menu is set to LIFT LEVER.

A3.2 ACCESS 2 OUTPUTS menu

This menu shows the Access 2 outputs to the components.

A3 OUTPUTS ^{a)}		
A3.2 ^{b)}	Access 2 Outputs Menu	Menu Descriptions
A3.2.1 ^{c)}	SV1 = ____	ON = The SV1 coil is energized, HGTS1 is open, and TLMS is closed.
		OFF = The SV1 coil is not energized, HGTS1 is open or closed, and TLMS is open.
A3.2.2 ^{c)}	SVOP = ____	On lift trucks manufactured 2/1/12 and after, SVOP is included. SVOP does not let the operator lower the mast when SES is open. SVOP also does not let the operator raise the mast if HGTS1 is open and TLMS is open.
		ON = The SVOP coil is energized, SES is closed, and HGTS1 or TLMS is closed.
		OFF = The SVOP coil is not energized, SES is open, and HGTS1 or TLMS is open.
A3.2.3 ^{c)}	SV3 = ____	ON = The SV3 coil is energized and TPAS, TLT, and VTS are closed.
		OFF = The SV3 coil is not energized and TPAS, TLT, or VTS is open.
A3.2.4	M3 CURRENT = ____	This menu shows the current in the M3 circuit.
A3.2.5 ^{d)}	FAN3 = ____	ON = The FAN3 coil is energized.
		OFF = The FAN3 coil is not energized.
A3.2.6 ^{e)}	SPL = ____	This menu shows the current in the SPL circuit.
A3.2.7 ^{e)}	SPTR = ____	This menu shows the current in the SPTR circuit.
A3.2.8 ^{e)}	SPTE = ____	This menu shows the current in the SPTE circuit.

F4 HYDRAULIC VALVE TYPE menu descriptions

FEATURES (F4)		
Submenus	Display	Menu Description
N/A	F4 HYDRAULIC VALVE TYPE = _____	Use this menu to set the type of hydraulic valve. EPV = electric proportional valve MANUAL = manual valve

F5 ELECTRICAL POWER SOURCE menu descriptions

FEATURES (F5) ^{a)}		
Submenus	Display	Menu Description
N/A	F5 ELECTRICAL POWER SOURCE= _____	Use this menu to set the lift truck electrical power source.
F5.1	TYPE	Use this menu to select the type of power source of the lift truck.
F5.2	LEVEL	Use this menu to select the integration level of the electrical power source.

a). AC only

F7 FANS menu descriptions

FEATURES (F7)		
Submenus	Display	Menu Description
N/A	F7 FANS	Use this menu to set the operation parameters for FAN1, FAN2, and FAN3.
F7.1	MODULE FAN	FAN1 and FAN2 help to cool Access 2 and Access 3. Use this menu to set the operation and the voltage parameters for FAN1 and FAN2.

**PX.2 MAX TRAVEL SPEEDS menu de-
 scriptions**

PERFORMANCE (PX.2)		
Submenus	Display	Menu Description
N/A	PX.2 MAX TRAVEL SPEEDS	Use this menu to set the operation parameters for the maximum travel speeds.
PX.2.1	EMPTY FORWARD = ____	Use this menu to set the maximum travel speed in the forward direction with empty forks.
		The speed is set in km/h if the F2 UNITS OF MEASURE menu is set to METRIC.
		The speed is set in mph if the F2 UNITS OF MEASURE menu is set to ENGLISH.
		The range is 0–13.7 km/h (0–8.5 mph) for 36 V lift trucks.
		The range is 0–15.3 km/h (0–9.5 mph) for 48 V lift trucks.
		The default setting is 13.7 km/h (8.5 mph) for 36 V lift trucks for P1.
		The default setting is 15.3 km/h (9.5 mph) for 48 V lift trucks for P1.
		The default setting is 12.2 km/h (7.6 mph) for 36 V and 48 V lift trucks for P2.
The default setting is 8 km/h (5 mph) for 36 V and 48 V lift trucks for P3.		

PX.15 LOWER DECEL menu descriptions

PERFORMANCE (PX.15) ^{a)}		
Submenus	Display	Menu Description
N/A	PX.15 LOWER DECEL = ____	Use this menu to set the lower deceleration rate. 1 = The slowest lower deceleration rate. 9 = The fastest lower deceleration rate. The default setting is 9.

a). AC only. Access 1 shows this menu only if the F4 HYDRAULIC VALVE TYPE menu is set to EPV.

PX.16 TILT DECEL menu descriptions

PERFORMANCE (PX.16) ^{a)}		
Submenus	Display	Menu Description
N/A	PX.16 TILT DECEL = ____	Use this menu to set the tilt deceleration rate. 1 = The slowest tilt deceleration rate. 9 = The fastest tilt deceleration rate. The default setting is 6.

a). AC only. Access 1 shows this menu only if the F4 HYDRAULIC VALVE TYPE menu is set to EPV.

PX.17 ACCY1 DECEL menu descriptions

PERFORMANCE (PX.17) ^{a)}		
Submenus	Display	Menu Description
N/A	PX.17 ACCY1 DECEL = ____	Use this menu to set the deceleration rate for the first accessory. 1 = The slowest deceleration rate for the first accessory. 9 = The fastest deceleration rate for the first accessory. The default setting is 9.

a). AC only. Access 1 shows this menu only if the F20.3 ACCY1 menu is set to LOW FLOW or HIGH FLOW and the F4 HYDRAULIC VALVE TYPE menu is set to EPV.

PERFORMANCE (P10) a)		
Submenus	Display	Menu Description
P10.2	WEIGHT TRIGGER = ____	Use this menu to set the maximum weight on the forks when HGTS2 or HGTS3 opens.
		ALWAYS
		EMPTY
		0.5 TON (1,100 LB)
		0.75 TON (1,650 LB)
		1.0 TON (2,200 LB)
		1.25 TON (2,760 LB)
		1.5 TON (3,310 LB)
		1.75 TON (3,860 LB)
		2.0 TON (4,410 LB)
		The default setting is ALWAYS.

a). Access 1 shows this menu only if the F20.13 SPEED LIMIT menu is set to HGTS2 or HGTS3.

P11 ZONE DECEL menu descriptions

PERFORMANCE (P11) a)		
Submenus	Display	Menu Description
N/A	P11 ZONE DECEL = ____	Use this menu to set the deceleration rate for the zone select.
		1 = The slowest deceleration rate for the zone select.
		9 = The fastest deceleration rate for the zone select.
		The default setting is 1.

a). Access 1 shows this menu only if the F20.7 ZONE SELECT menu is set to ENABLE.

HOUR		
Menu Level	Display	Menu Description
H10.2	INTERVAL = ____	Use this menu to set the interval between PM alerts.
		Set this interval from 1–65,535 h.

- a). Access 1 shows this menu in the operator level only if the F9 HOUR METER MODE menu is set to H1.
- b). Access 1 shows this menu in the operator level only if the F9 HOUR METER MODE menu is set to H2.
- c). Access 1 shows this menu only if the F3.1 MODEL menu is set to SC52x5 (lift trucks with an AC hydraulic system).
- d). Access 1 shows this menu only if the F3.1 MODEL menu is set to SC52x5 (lift trucks with an AC hydraulic system) and the F20.4 ACCY2 menu is set to ENABLE or CLAMP ATTACHMENT.
- e). Access 1 shows this menu only in SERVICE LEVEL 3.

Electrical System

The following is an explanation of terms and symbols which are standard on Crown wiring diagrams.

Wiring Color Codes

Wires are limited to the colors shown in the chart below. The color of the wire is based on the function of the

circuit in which it is used. Each wire is assigned a three or four digit number. The first one or two numbers identify the color of the lead. The last two numerals number the lead from one thru ninety-nine. Exceptions to this can be component leads supplied by vendors. Each wire is identified by a number on a wiring pictorial (refer to section DIA).

Wiring Color Codes Chart		
Number	Color	Function
0**	Black	Traction Inputs/Outputs
1**	Brown	Analog Inputs
2**	Red	Battery Positive
3**	Orange	Non-Battery Positive
4**	Yellow	Status Inputs/Outputs
5**	Green	Battery Negative
6**	Blue	Isolated Negative
7**	Violet	Load Position Inputs/Outputs
8**	Gray	Indicators and Warning Devices
9**	White	Miscellaneous
29**	Red Stripe/White	Positive that has gone thru a switch
59**	Green Stripe/White	Negative that has gone thru a switch or resistor

Power Cables

Except WP trucks, power cables are designated using one of the following abbreviations, followed by a dash number.

Power Cables Abbreviations Chart	
Abbreviation	Part Numbers
PC#1	084571
PC#2	084570
PC#4	084569
PC#6	084568
PC#10	090963
PC#1/0	084572
PC#2/0	084573
PC#3/0	086749

An example of such a cable is PC # 1/0 - 10. The part number for this cable is 084572-010.

Other Electrical Symbols


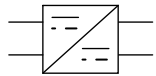
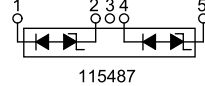


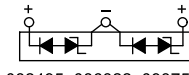


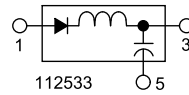
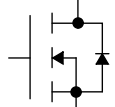


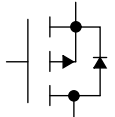






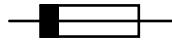
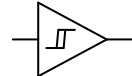
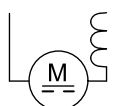
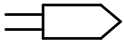
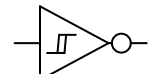
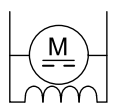

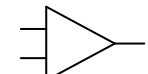
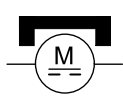

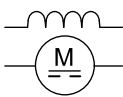


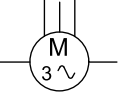
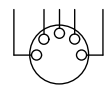




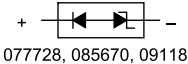
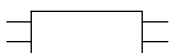
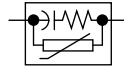
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	Darlington NPN		Battery		Dual Suppressor
	Darlington PNP		Contactor Normally Open		Filter Block
	N-FET With Diode Clamp		Contactor Normally Closed		OR Gate
	P-FET With Diode Clamp		Coil		NOR Gate
	Motor Field, Series		Coil Suppression		Schmitt NAND
	Motor Field, Shunt		Fuse - Band Shows Positive Feed		Schmitt Buffer
	Series Motor, DC		Tach Sensor		Schmitt Inverter
	Shunt Motor, DC		Hour Meter		Amp/Comp
	Permanent Magnet Motor		Lamp		AND Gate
	Separately Excited Motor, DC		Horn		NAND Gate
	Motor, AC		Encoder		X-OR Gate
	Transformer		Suppressor 077732		X-NOR Gate
			Suppressor 077728, 085670, 091181		Integrated Circuit
			Suppressor 085484, 086755		

Figure 8133-02

Event Codes

- Then replace Access 1.
- **If:** 33–38 V DC (36 V lift truck) or 45–51 V DC (48 V lift truck) and A2.1.2 shows off.
 - Then replace Access 1.

Step 5: Connect a DVOM to CA403-10 (+) and the battery negative terminal on Access 3™.

Step 6: Turn on the lift truck and go to the Analyzer Menu A2.3.5.

- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.3.5 shows off.
 - Then examine the circuit between CA614 and CA403-10.
- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.3.5 shows on.
 - Then replace Access 3™.
- **If:** 33–38 V DC (36 V lift truck) or 45–51 V DC (48 V lift truck) and A2.3.5 shows off.
 - Then replace Access 3™.

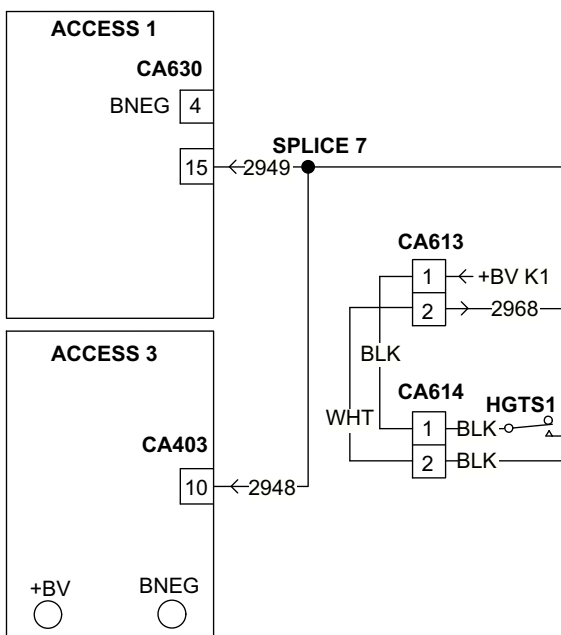


Fig. 13 (25208)

Event Code 123

The brake switch (BRKS1) input to Access 1 and Access 3™ is not the same

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.

Step 2: Compare A2.1.3 and A2.3.3 with BRKS1 open and closed.

Technician Tips: A2.3.3 shows a 1 (switch open) or 0 (switch closed) and POT2 percentage. For this event code only, the switch is used.

- **If:** A2.1.3 does not change from on to off as BRKS1 opens and closes while A2.3.3 does.
 - Then continue to Step 3.
- **If:** A2.3.3 does not change from on to off as BRKS1 opens and closes while A2.1.3 does.
 - Then continue to Step 4.
- **If:** A2.1.3 and A2.3.3 do not change from on to off as BRKS1 opens and closes.
 - Then examine the brake switch, wires, and connections.

Step 3: Connect a DVOM to CA630-14 (+) and CA630-4 (-).

Step 4: Turn on the lift truck and go to the Analyzer Menu A2.1.3.

- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.1.3 shows off.
 - Then examine the wires and connections between BRKS1 and CA630-14.
- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.1.3 shows on.
 - Then replace Access 1.
- **If:** 33–38 V DC (36 V lift truck) or 45–51 V DC (48 V lift truck) and A2.1.3 shows off.
 - Then replace Access 1.

Step 5: Connect a DVOM to CA40-9 (+) and the battery negative terminal on Access 3™.

Step 6: Turn on the lift truck and go to the Analyzer Menu A2.3.3.

- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.3.3 shows off.
 - Then examine the wires and connections between BRKS1 and CA403-9.
- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck) and A2.3.3 shows on.
 - Then replace Access 3™.
- **If:** 33–38 V DC (36 V lift truck) or 45–51 V DC (48 V lift truck) and A2.3.3 shows off.
 - Then replace Access 3™.

Event Codes

Event Code 223

Access 2 senses high battery voltage in the power circuit

Technician Tips: This event can occur if the lift truck has an incorrect or under charged battery. This event can also occur if the Features Menu F3.4 is set incorrectly.

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.2.14.

- **If:** > 39 V DC (36 V lift truck) or 52 V DC (48 V lift truck).
 - Then make sure that the correct battery is installed in the lift truck and perform the C5 Calibration.
- **If:** 35–39 V DC (36 V lift truck) or 45–52 V DC (48 V lift truck).
 - Then replace Access 2.

Event Code 224

The temperature of Access 2 is < -25 °C (-13 °F)

Technician Tips: This event can occur if the lift truck is not used for long periods of time in temperatures below -25 °C (-13 °F).

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.2.13.

- **If:** < -25 °C (-13 °F).
 - Then examine the environment. Move the lift truck to an area where the temperature is above -25 °C (-13 °F).
 - Then turn off the lift truck and then turn on the lift truck.
- **If:** > -25 °C (-13 °F).
 - Then replace Access 2.

Event Code 225

The temperature of Access 2 is < -45 °C (-49 °F)

Technician Tips: This event can occur if the lift truck is not used for long periods of time in temperatures below -45 °C (-49 °F). The event code is cleared when the Access 2 temperature is -43 °C (-46 °F).

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.2.13.

- **If:** < -43 °C (-46 °F).
 - Then examine the environment. Move the lift truck to an area where the temperature is above -43 °C (-46 °F).

- Then turn off the lift truck and then turn on the lift truck.
- **If:** > -43 °C (-46 °F).
 - Then replace Access 2.

Event Code 226

The temperature of Access 2 is > 85 °C (185 °F)

Technician Tips: FAN2 is only on EE lift trucks with an AC hydraulic system.

Technician Tips: The lift truck continues to operate but the performance, at times, decreases to keep Access 2 below the temperature limits. Slow air flow in the FAN1 and FAN2 duct can cause this event. Examine the duct for restrictions.

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.2.13. Close the seat switch.

- **If:** ≥ 85 °C (185 °F).
 - Then follow Event Code 321 procedures.
- **If:** < 85 °C (185 °F).
 - Then turn off the lift truck and then turn on the lift truck. Replace Access 2 if the event code does not clear.

Technician Tips: If FAN1 and FAN2 operate during the troubleshooting procedure and the event continues to occur, make the fans operate continuously. Set the Features menu F7.1 to Always On.

Event Code 227

The temperature of Access 2 is > 105 °C (221 °F)

Technician Tips: FAN2 is only on EE lift trucks with an AC hydraulic system.

Technician Tips: The lift truck continues to operate but sometimes the performance decreases to keep Access 2 below the temperature limits. Slow air flow in the FAN1 and FAN2 duct can cause this event. Examine the duct for restrictions. The event code is cleared when the Access 2 temperature is 103 °C (218 °F).

Step 1: Turn on the lift truck and go to the Analyzer Menu A2.2.13. The seat switch must be closed.

- **If:** ≥ 103 °C (218 °F).
 - Then follow Event Code 321 procedures.
- **If:** < 103 °C (218 °F).
 - Then turn off the lift truck and then turn on the lift truck. Replace Access 2 if the event code does not clear.

Event Codes

- **If:** 33–38 V DC (36 V lift truck) or 45–52 V DC (48 V lift truck).
 - Then continue to Step 2.
- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck).
 - Then examine the wires and connections between CA201-9 and SVOP (+).

Step 2: Connect a DVOM to the wires 29103 (+) and 5918 (-) at SVOP.

Step 3: Turn on the lift truck and go to the Analyzer Menu A4.2.2. Push ENTER to energize SVOP.

- **If:** 22–26 V DC.
 - Then replace the SVOP coil.
- **If:** < 22 V DC.
 - Then continue to Step 4.

Step 4: Connect a DVOM to CA201-9 (+) at the distribution / relay board and CA404-18 (-) at Access 2.

Step 5: Turn on the lift truck and go to the Analyzer Menu A4.2.2. Push ENTER to energize SVOP.

- **If:** 22–26 V DC.
 - Then examine the wires and connections between SVOP, CA201 and CA404.
- **If:** < 22 V DC.
 - Then replace Access 2.

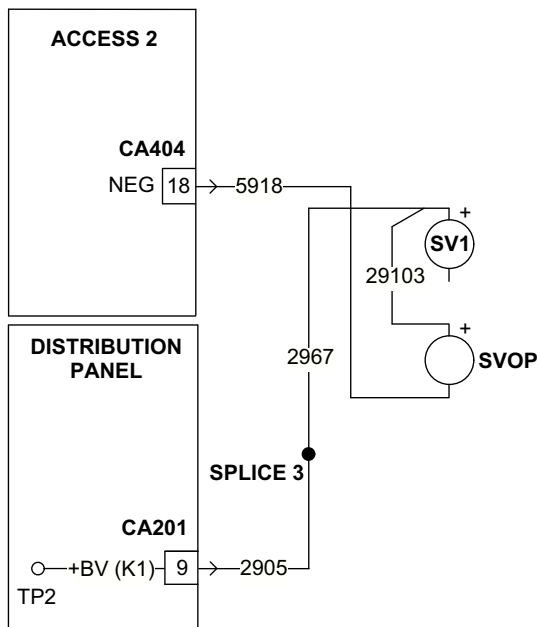


Fig. 37 (27533)

Event Code 246

EPV - Access 2 senses the circuit for the tilt forward solenoid (SPTE) is an open circuit

Technician Tips: Examine the event code history. If there are many event codes for lift truck coils with open circuits, then first examine the positive circuit for the coils.

Step 1: Connect a DVOM to the wire 29251 (+) at SPTE and battery negative. Turn on the lift truck.

- **If:** 33–38 V DC (36 V lift truck) or 45–52 V DC (48 V lift truck).
 - Then continue to Step 2.
- **If:** < 33 V DC (36 V lift truck) or 45 V DC (48 V lift truck).
 - Then examine the wires and connections between CA201-9 and SPTE (+).

Step 2: Connect a DVOM to the wires 29251 (+) and 5954 (-) at SPTE.

Step 3: Turn on the lift truck and go to the Analyzer Menu A4.2.10. Push ENTER to energize SPTE.

- **If:** 22–26 V DC.
 - Then replace the SPTE coil.
- **If:** < 22 V DC.
 - Then continue to Step 4.

Step 4: Connect a DVOM to CA201-9 (+) at the distribution / relay board and CA404-21 (-) at Access 2.

Step 5: Turn on the lift truck and go to the Analyzer Menu A4.2.10. Push ENTER to energize SPTE.

- **If:** 22–26 V DC.
 - Then examine the wires and connections between SPTE, CA201 and CA404.
- **If:** < 22 V DC.
 - Then replace Access 2.

Event Codes

- Then examine for issues internal to the traction motors, drive units, or brakes.
- **If:** The motors turns freely.
 - Then continue to Step 3.

Step 4: Examine the motor and Access 3™ power cables and connections.

- **If:** The cables and connections are good.
 - Then replace Access 3™.

Event Code 302

Access 3™ senses the voltage in the feedback circuit for the traction motors is out of range

Technician Tips: A bad line contactor (L) can cause this event. Access 1 2 3® can record this event after the lift truck temperature increases to the usual temperature of operation. The symptoms can be intermittent. Event Code 306 can follow this event.

Step 1: Make sure that the power cables connect to the correct terminals of traction motors and to Access 3™.

- **If:** The cable connections are correct.
 - Then continue to Step 2.

Step 2: Examine for a short circuit between the traction motors and frame.

Step 3: Remove the power cables from the WM, VM, and UM terminals on M1 and the WS, VS, and US terminals on M2.

Step 4: Examine the resistance from each motor terminal to the lift truck frame.

- **If:** There is a short circuit.
 - Then replace the motor.
- **If:** There is an open circuit.
 - Then replace Access 3™.

Event Code 303

Access 3™ senses that there is not sufficient voltage or too much voltage at the key switch input

Technician Tips: The voltage range is 15 V DC to 65 V DC.

- **If:** This event code occurs:
 - When the lift truck turns on
 - When the lift truck is at idle, or
 - When the operator moves the direction lever to the forward or reverse position.
 - Then event is likely the cause of not sufficient voltage.

- **If:** This event occurs:
 - During plugging.
 - Then the event is likely the cause of too much voltage. Examine the battery condition and charge.

Step 1: Connect a DVOM to CA403-3 (+BV) and the battery negative terminal on Access 3™. Turn on the lift truck and close the seat switch.

- **If:** < 15 or > 65 V DC.
 - Then continue to Step 2.
- **If:** 15–65 V DC.
 - Then replace Access 3™.

Step 2: Connect a DVOM to CA201-6 (+BV) and TP3 (battery negative) on the distribution / relay board.

- **If:** < 15 or > 65 V DC.
 - Then examine FU6, the wires, and connections between battery +BV and CA201-5.
- **If:** 15–65 V DC.
 - Then examine the wires and connections between CA201-6 and CA403-3.

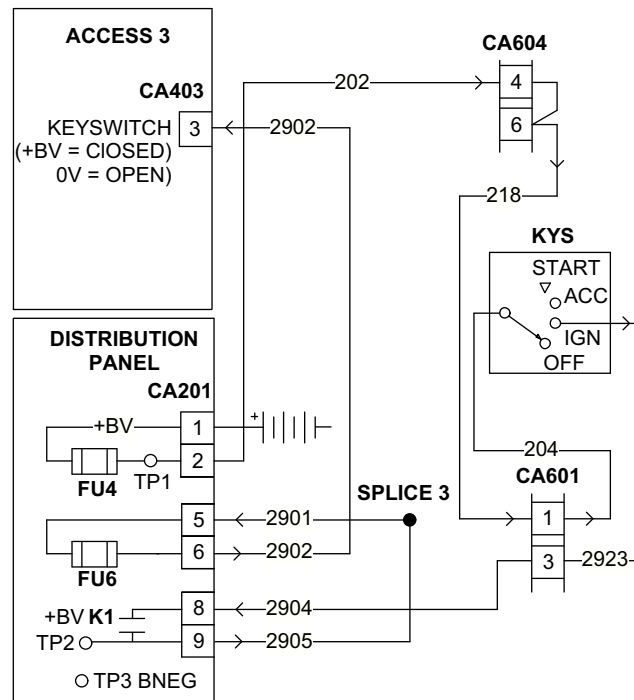


Fig. 52 (26769)

Event Code 304

Low output voltage to the right traction motor (M1)

Technician Tips: This event can occur if the line contactor tips open during lift truck operation.

Event Codes

- **If:** The temperature > 180 °C (356 °F).
 - Then continue to Step 2.
- **If:** The temperature < 180 °C (356 °F).
 - Then turn off the lift truck and then turn on the lift truck. Monitor the event frequency.
- **If:** The temperature is not shown on the menu.
 - Examine the wires and connections between Access 3™ and the motor temperature sensor (TS2).

Step 2: Does the lift truck have heavy duty cycles or operate in high temperatures?

- **If:** Heavy duty cycles or high temperatures.
 - Then let the lift truck cool and then continue to operate the lift truck.

Technician Tips: If the lift truck has heavy duty cycles or operates in high temperatures, install a Floorboard Cooling Kit. See PF26187.

- **If:** the lift truck does not become hot because of the above conditions.
 - Then continue to Step 3.

Technician Tips: Incorrect encoder feedback can be the cause of the high motor temperature.

Step 3: Turn on the lift truck, go to the Analyzer Menu A2.3.11 M2 Speed. Move the direction lever to the forward or reverse position. Monitor the motor encoder counts.

- **If:** The encoder counts do not change smoothly with constant mast movement.
 - Then replace ECR2.
- **If:** The encoder counts correctly.
 - Then examine the wires and connections between Access 3™ and ECR2. Replace Access 3™ if the wires and connections are good.

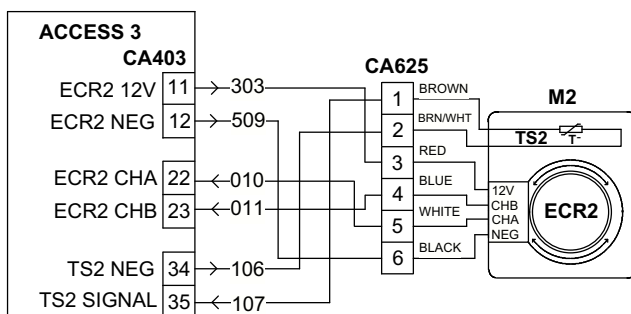


Fig. 66 (25297)

Event Code 339

Internal forward or reverse switch input event

Step 1: Follow Event Code 318 procedures.

Event Code 399

Step 1: Turn off the lift truck and then turn on the lift truck.

- **If:** The event code continues.
 - Then replace Access 3™.

Event Code 700

Access 7 cannot write to memory (EPV only)

Step 1: Turn off the lift truck and then turn on the lift truck.

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

Event Code 701

Access 7 cannot find the event history (EPV only)

Step 1: Turn off the lift truck and then turn on the lift truck.

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

Event Code 702

Hour meter memory in Access 7 (EPV only)

Step 1: Turn off the lift truck and then turn on the lift truck.

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

Event Code 703

Access 7 cannot find the Calibrations (EPV only)

Step 1: Turn on the lift truck, go to the Calibration Menu, and calibrate the lift truck. Turn off the lift truck and then turn on the lift truck.

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

Notes:

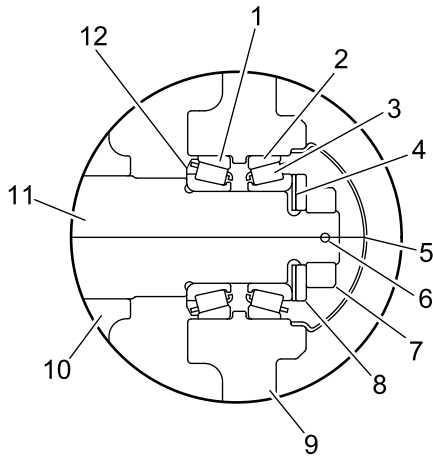


Figure 15165-01

- 1 1st Bearing Cup
- 2 2nd Bearing Cup
- 3 Bearing Cone
- 4 Flatwasher
- 5 Grease Cap
- 6 Cotter Pin
- 7 Nut
- 8 Tabbed Washer
- 9 Steer Wheel Assembly
- 10 Yoke Shaft
- 11 Axle
- 12 Metallic Grease AC Outer Ring Seal

Hub

1. Refer to Figure 15164-01 and 15165-01. The steer wheel hub is sealed by two types of metallic grease seals; an outer ring metallic grease seal and grease cap.
2. Prior to assembly, pack tapered roller bearings and fill hub bearing bore cavities with wheel bearing grease. Refer to "Lubrication & Adjustment" chapter for lubricant information.
3. Apply a light coating of lubricant to steer axle bearing diameters and install outer ring metallic grease seal and bearing cone on steer axle (1st bearing cup area).
4. Install both bearing cups into steer wheel hub and install steer wheel hub over steer axle. Pack wheel bearing grease into bearing/steer wheel hub cavity.
5. Install bearing cone into 2nd bearing cup. Add flatwasher, tabbed washer and nut. Torque nut to 170 Nm (125 ft lb). Rotate the hub a minimum of three turns in each direction while torquing. Then loosen nut until free. The wheel bearing setting as adjusted must not be disturbed. Retighten nuts to 34 Nm (25 ft lb) of torque. Further tighten the nuts until next slot in nut and hole in end of the steer axle are aligned.
6. Insert new cotter pin and bend. Do not reuse old cotter pin.
7. After installing the special nuts and applying the torque requirements listed in step 5, pack wheel bearing grease into bearing/cap cavity. Also fill the grease cap half way with grease.
8. Install grease caps. Repeat steps 1 thru 8 for other wheel assembly.

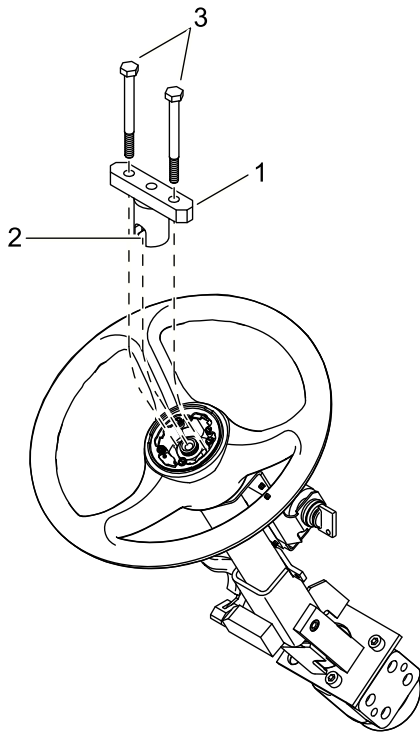


Figure 15161-01

Steering Wheel

- The two notches (1) on the upper horn switch contact (2), which are directly opposite of each other, must be aligned with the two brass inserts (3) in the steering wheel (4).

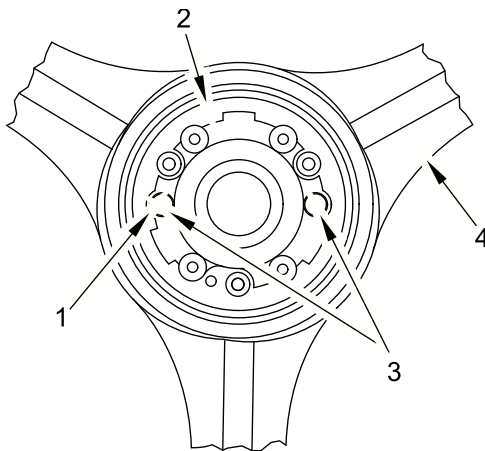


Figure 20104

Final Assembly

1. Apply a small amount of anti-seize compound (065005-003) on tapered area of steering shaft prior to installing steering wheel. Do Not get any on the threaded portion of the shaft. This will make wheel removal easier.
2. When installing steering wheel on shaft, align splines and push down until taper in steering wheel seats with taper on shaft. Secure with jam nut. Do Not over tighten - torque to 36 Nm (27 ft lbs).
3. Apply a small amount of grease (063002-007) on the O.D. of tilt pin and install release head (with gas cylinder included). Secure with retaining ring. Release head (with gas cylinder) must rotate freely on the tilt pin, without excessive free movement; 0.025 mm (0.001 in) maximum movement.
4. Apply a small amount of grease (063002-007) to gas cylinder lower end mounting pin (included with power unit frame) and position gas cylinder and column assembly onto frame. The fit of the gas cylinder to its mounting pin must be held and must not have excessive free movement more than 0.050 mm (0.002 in) maximum.
5. After steering column assembly is mounted to frame, check tilting and locking functions for proper operation. Check the "full up" and "full back" positions. The "full up" (forward) position should be $16^{\circ} \pm 2^{\circ}$ and the "full back" should be $40^{\circ} \pm 2^{\circ}$ from vertical.

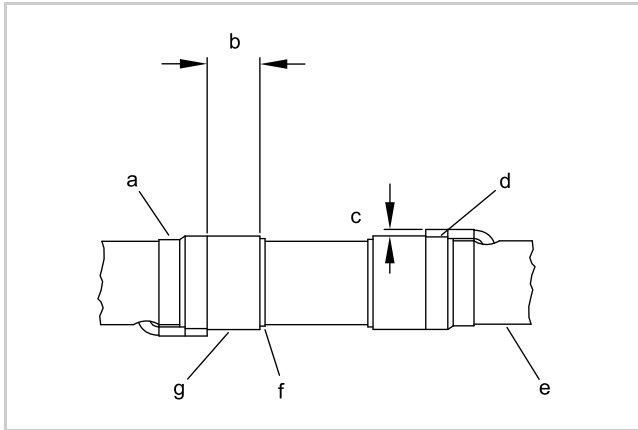


Fig. 4 (18690)

a	Electrical tape
b	17 mm (0.67 in)
c	2 mm (0.08 in) maximum
d	Solder area
e	Upper shaft
f	Insulator
g	Contact ring

Apply a small amount of oil (063001-002) to outside of o-ring at bottom of lower shaft. Refer to 4.

Gas Cylinder

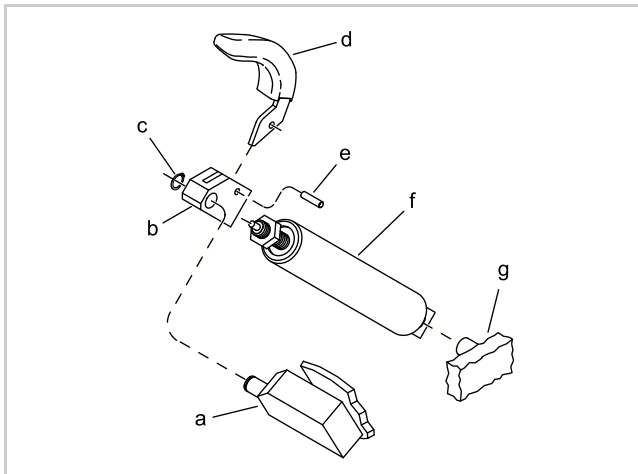


Fig. 5 (18691)

a	Part of lower machining on steering column
b	Release head
c	Retaining ring
d	Release lever
e	Roll pin
f	Gas cylinder
g	Part of power unit

Screw gas cylinder threaded shaft into threaded hole in release head until plunger pin on gas cylinder contacts bottom edge of release lever. Refer to Figure 6.

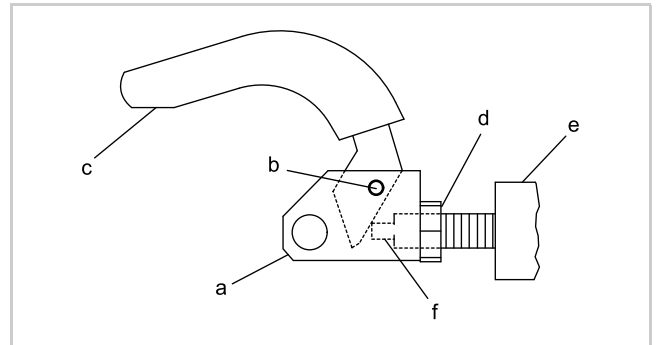


Fig. 6 (18692)

a	Release head
b	Roll pin
c	Release lever
d	Jam nut
e	Gas Cylinder
f	Pin contacts release lever

Continue to screw the gas cylinder into head until release lever moves to its maximum position and lever is not "loose" within head. Screw gas cylinder another 1/4 rotation and lock in position by tightening jam nut.

Rotate gas cylinder body until lower mounting tab is parallel with release head.

Circuit Bleeding

Air can be introduced into the steering system when removing the steering unit, disconnecting hoses, etc. and must be bled from the system before the truck is returned to operation. To bleed circuit:



CAUTION

Do not attempt to bleed a line by cracking an o-ring face seal fitting. This will result in damaging the o-ring which then must be replaced to prevent hydraulic fluid leakage.

- Power up truck and rotate steering wheel 10 revolutions or more to the right (clockwise) at 60 rpm or higher.
- Rotate steering wheel 10 revolutions or more to the left (counter clockwise) at 60 rpm or higher.
- Check steering for an equal number of revolutions lock to lock in both directions. There should be approximately 3.86 revolutions, but not more than four revolutions.
- If there are more than four revolutions lock to lock in either direction, repeat the procedure.

To Examine steering drift

- Turn the truck ON, turn the steering wheel until it stops. Hold the wheel there. The steering wheel drift is not to be less than 60 seconds for one revolution in the left and right directions.

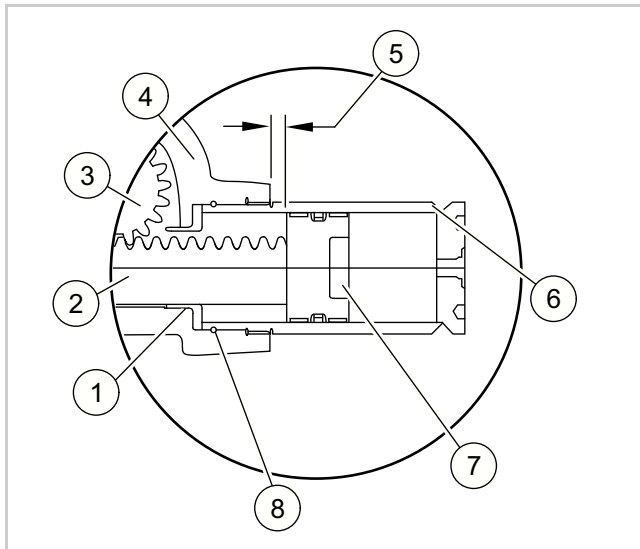


Fig. 19 (30024)

1	Flanged bushing
2	Rack
3	Yoke shaft
4	Housing
5	9.46 mm (0.37 in) both sides
6	Cylinder
7	Piston assembly
8	O-ring

Steer Cylinders Seal Replacement

1. Lower the forks completely.
2. Turn the lift truck OFF.
3. Chock the wheels.
4. Disconnect the battery.
5. Tilt the steering wheel up and raise the battery cover.
6. See Figure 20. Remove the hydraulic line from the cylinder (2).
7. Cap the hydraulic line.
8. Using a spanner wrench, remove the cylinder (2) from the housing (1).

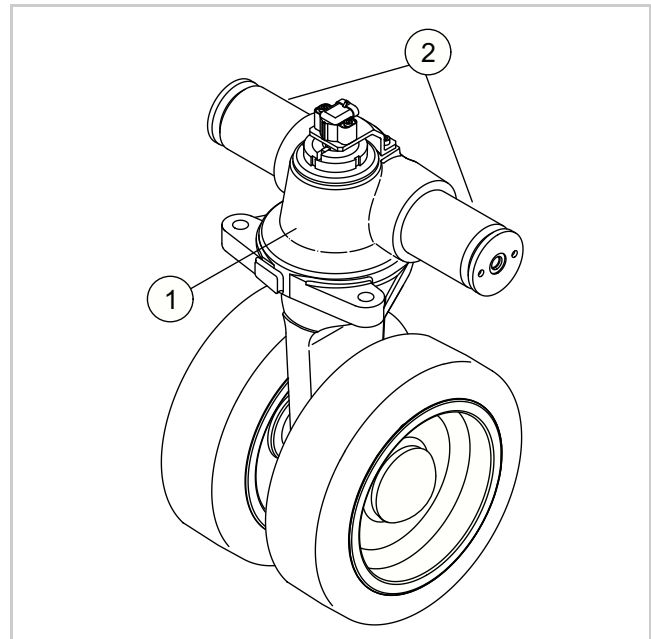


Fig. 20 (30025)

1	Housing
2	Cylinder

9. See Figure 21. Remove the bushing (5) from the housing (2).
10. Remove the O-ring (4) from the housing (2).
11. Remove the piston assembly (7) from the cylinder (3).
12. Remove the slide rings (6) and the O-ring (4) from the piston (7).
13. Put a thin coating of lubricant on the new slide rings (6).
14. Install the slide rings (6) on the outer grooves of the piston (7).
15. Put a thin coating of lubricant on the new seal (8).
16. See Figure 21. Using the piston seal loading tool (127521) (5, Figure 23), install the seal (8) into the middle groove of the piston (7).
17. Before you install the piston (7), clean the interior of the steer cylinder (3).
18. Put a thin coating of lubricant to the piston (7) and insert the piston (7) into the piston loading tool (127522) (6, Figure 23).
19. Evenly press the piston (7) into the cylinder (3).

STEERING

STEER UNIT



18. With seal groove side of gerotor facing up (opposite spacer plate), align star valleys (ref. A) on drive (ref. B). Note the parallel relationship of reference lines A, B, C, and D, as shown in Figure 50. Align the bolt holes without disengaging the gerotor from the drive.

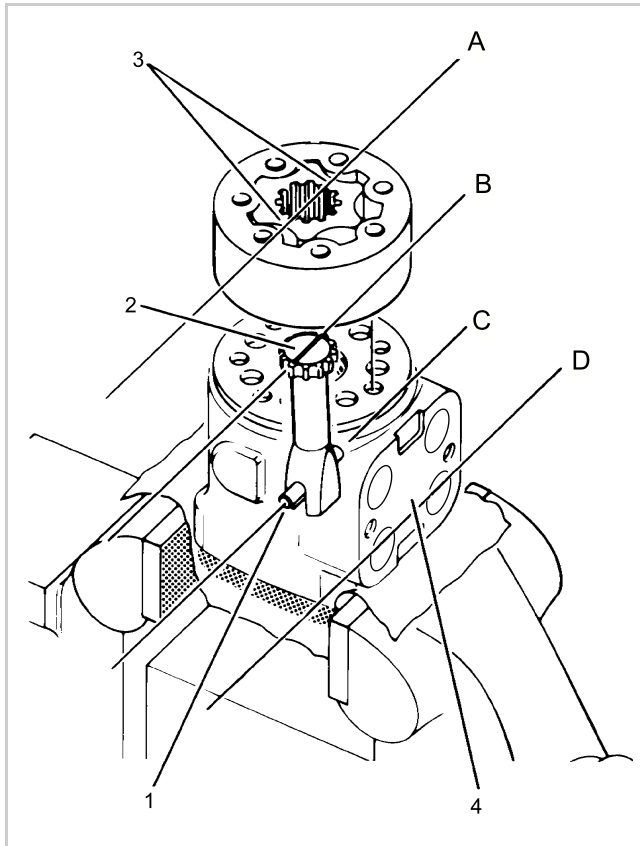


Fig. 52 (22666)

1	Pin
2	Drive (marked)
3	Star valley
4	Port face

19. Install the seal in gerotor.

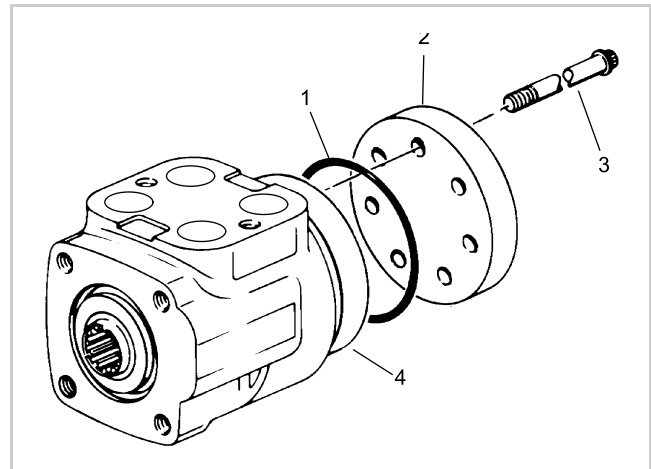


Fig. 53 (22644)

1	Seal
2	End cap
3	Cap screw
4	Gerotor

20. Install the end cap on gerotor, align holes.

21. Install the 7 dry cap screws in the end cap. Torque all screws to 11 to 17 Nm (100 to 150 in lb) evenly, then torque to 26 Nm (235 in lb) in sequence shown in Figure 54.

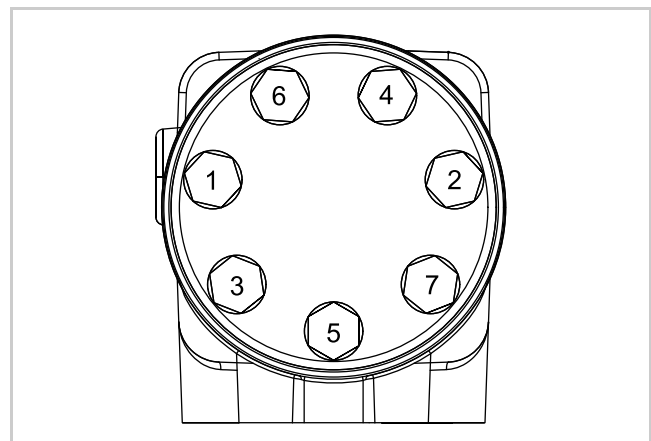


Fig. 54 (22667)

Mast

14. Disconnect and cap the lift and the lower hose. See Figure 11.

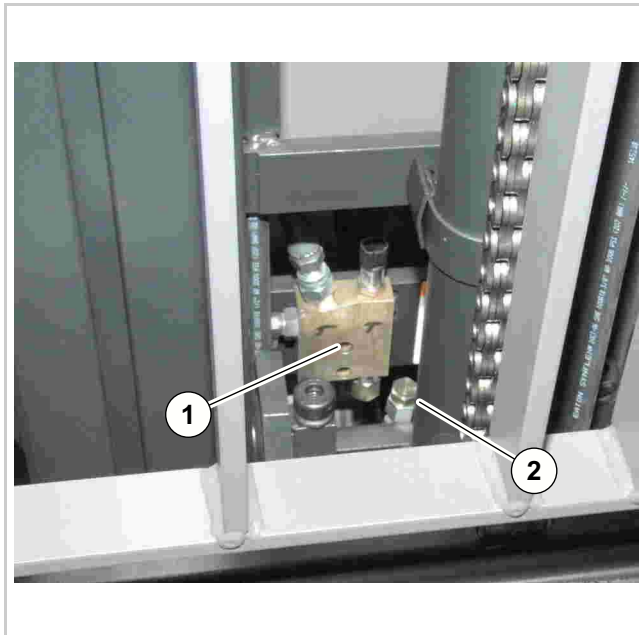


Fig. 11 (25415-01)

1	Lowering flow control manifold
2	Lift and lower hoses disconnected and capped

15. Disconnect height switch connector, CA613.

16. Connect a strap or chain to the upper cross brace. Using another lift truck or an overhead hoist, support the mast. See Figure 12.



Fig. 12 (25416-01)

17. Remove both the tilt cylinder clevis pins from the mast. See Figure 13.

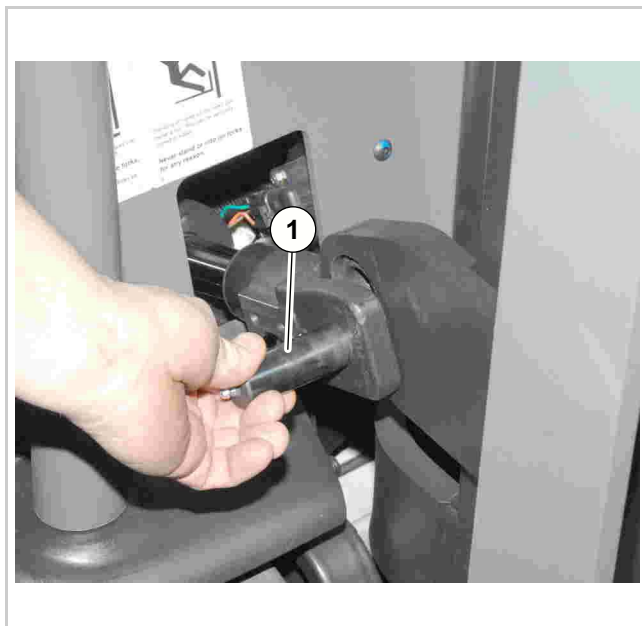


Fig. 13 (25417-01)

1	Tilt cylinder pin
---	-------------------

18. Loosen (only) the pivot bearing mounting bolts of the upper mast.

Mast

15. Brush grease PN 063002-024 (063002-017 for freezer condition applications) on the mast rails.
16. Install the yoke in the top of the carriage cylinder.
17. Attach the carriage chain (1, Figure 25) to the chain anchor (2) on the carriage cylinder.
18. Route through the yoke (8) and attach to the carriage.
19. To secure, use the chain pin (3) and the roll pin (4).

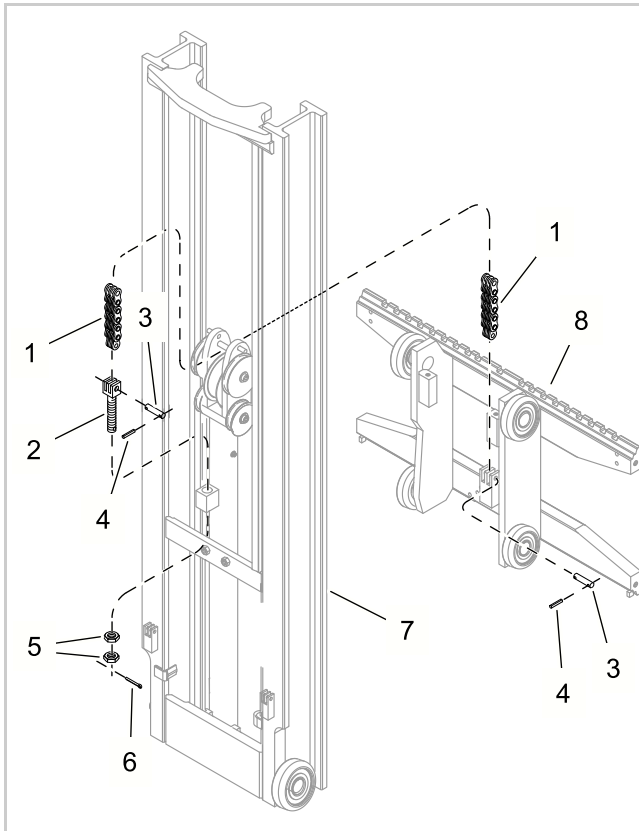


Fig. 25 (25470)

7	Inner mast
8	Fork carriage

20. Route the hydraulic hose over the pulley then install the pulley (5 through 9, Figure 21) to the right side of the intermediate mast.

Measuring the lift chains for wear with a steel tape measure

1. Raise the forks 152 mm (6 in).
2. Select a section of the lift chain that moves over a pulley during operation.
3. See Figure 3. Measure the lift chain pitch (1) from the center of the center of two chain pins of an outer plate.

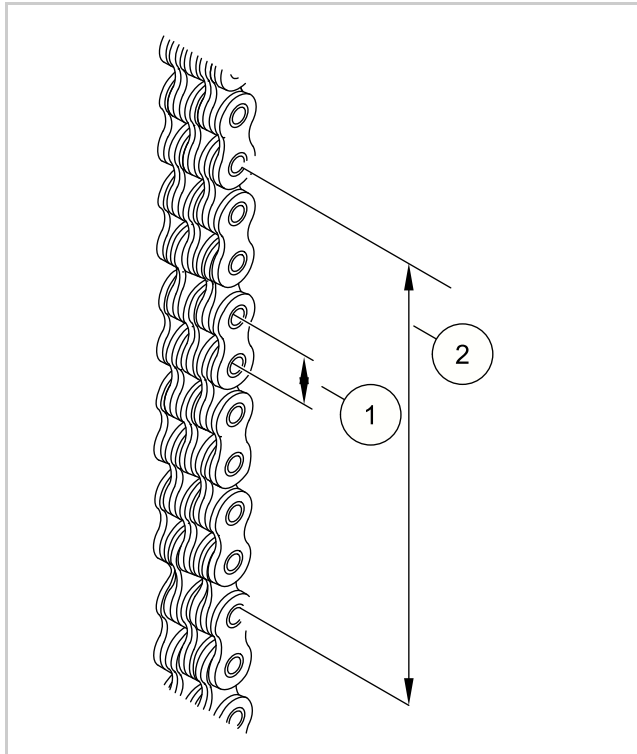


Fig. 3 (33492)

4. See the pitch value in the Lift Chain Wear table to find the number of chain links that are necessary for the measurement.

Lift Chain Wear						
Pitch		Chain Links	New Length		Wear Limit	
mm	in		mm	in	mm	in
25.4	1.0	12	305	12.0	314	12.375
19.05	0.75	16	305	12.0	314	12.375
15.88	0.625	20	318	12.5	327	12.875

Checking the lift chain elongation

1. Using the chain link number found in the Lift Chain Wear table, count the chain links on the lift truck.
2. See Figure 3. Measure the length (2) from the center of the first chain pin to the center of the last chain pin.

Note: The pitch is the distance between the pins.

3. Calculate the percent of lift chain elongation (x).
Percent of the lift chain elongation = [measured length / (new length/100)]-100

Example: The lift chain pitch is 25 mm (1.0 in). The Lift Chain Wear table shows that the new length for this lift chain pitch is 305 mm (12.0 in). The measured length with the steel tape measure is 309 mm (12.2 in).

$$x = [309 / (305 / 100)] - 100$$

$$x = 309 / 3.05 - 100$$

$$x = 101.3 - 100$$

$$x = 1.3$$

In this example, the lift chain elongation is 1.3%.

4. Replace the lift chain if the elongation is more than 3% or if it will be more than 3% before the next maintenance interval. See the Lift Chain Wear table.
 - Do not repair lift chains by removing a worn section of a lift chain and installing a new piece.
 - If the lift truck has two lift chains, replace both lift chains at the same time.
 - If a part of the lift chain is worn, replace both lift chains.

Cylinders

Great care and cleanliness should be exercised in disassembly and assembly of any hydraulic cylinders. Wipe all surfaces clean of dirt and oil before attempting disassembly. Care should be taken when removing the ram from the cylinder to prevent damage to the packing on the piston end. After ram and wipers are removed, thoroughly wash all metallic parts in solvent and blow dry with compressed air. Carefully inspect the ram assembly and cylinder bore. Replace if scored, grooved, pitted, or worn. Minor damage to the cylinder bore can be removed with the use of a cylindrical honing tool. Place washed components in a clean container until assembly. Whenever new packing's are required, new wiper rings should also be installed.

Lift Cylinder

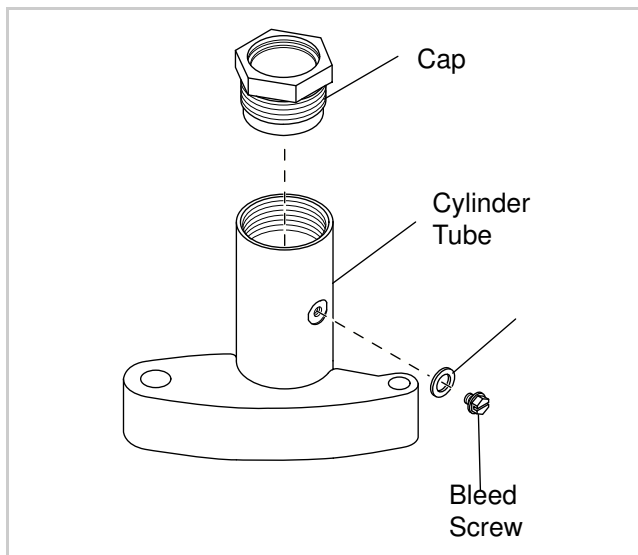


Fig. 1 (14795)

Disassembly

Turn the cap counterclockwise and unscrew it from the cylinder tube. Remove the cap and carefully remove the ram assembly from the cylinder bore, never allowing the ram to come in contact with any sharp edges.

Seals

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.

Seal Removal

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

Remove the cap as explained in "Disassembly". If the packing is seated in the cap itself, a hooked tool should be used to remove the packing. If 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 used to facilitate packing removal (Refer to Figure 2). To make these tools, weld or braze a headless 4.0 mm self-tapping (No. 8 metal) screw to the end of a screwdriver. The screwdriver must have at least 150 mm (6.0 in) of shank length with no larger than 4.0 mm (0.156 in) shank diameter. After attaching the screw to the screwdriver, grind off excess weld to a diameter of 4.0 mm (0.156 in). Wrap the shank with electrical tape from the tip of the screw to the screwdriver handle. This will prevent scratching of the cylinder bore or the ram.

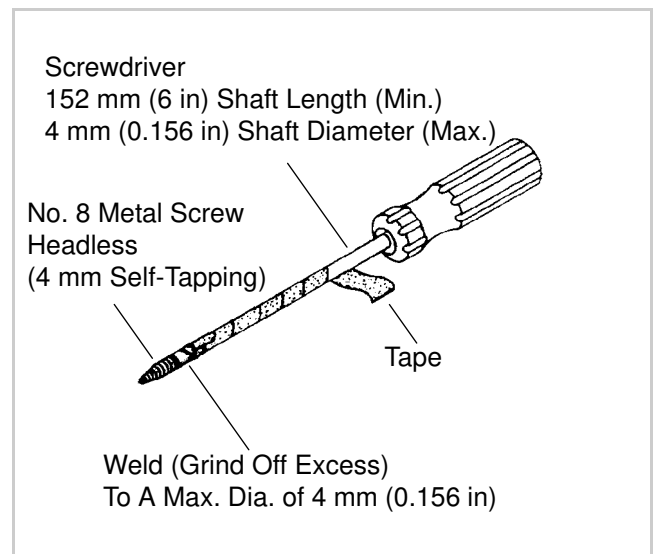


Fig. 2 (12850)

Insert the tools between the ram and the cylinder walls, 180 degrees apart, and screw into the face of the packing (Refer to Figure 3). After the threads are sufficiently secured into the packing, evenly pull on the screwdriver handles until the packing is removed.

Note: Extreme care should be taken to prevent damage to cylinder wall and ram assembly.

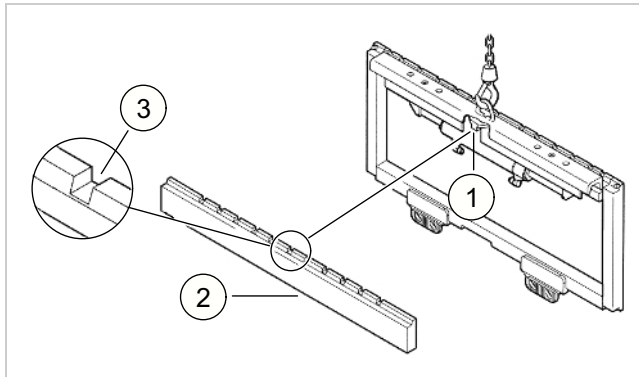


Fig. 6 (16211-01)

1	Locating tab
2	Upper fork carriage bar
3	Center notch

4. See Figure 7. Install and adjust the lower hooks (3). Torque the nuts (5) to 165 N m (122 ft lb).

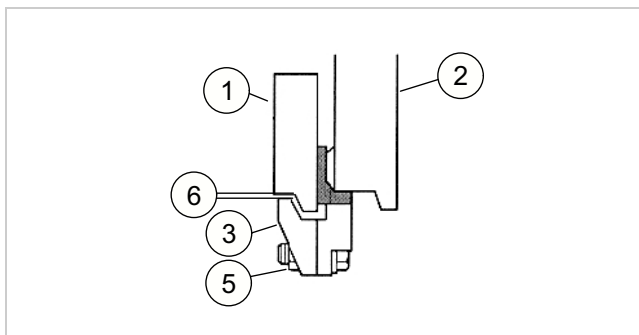


Fig. 7 (16965-02)

1	Lower fork carriage bar
2	Sideshifter
3	Lower hook
4	Cap screws
5	Nut
6	Clearance: 0.8 mm (0.03 in) minimum 1.6 mm (0.06 in) maximum

5. Flush the supply hoses thoroughly and install them.

6. See Figure 8. Install the forks.

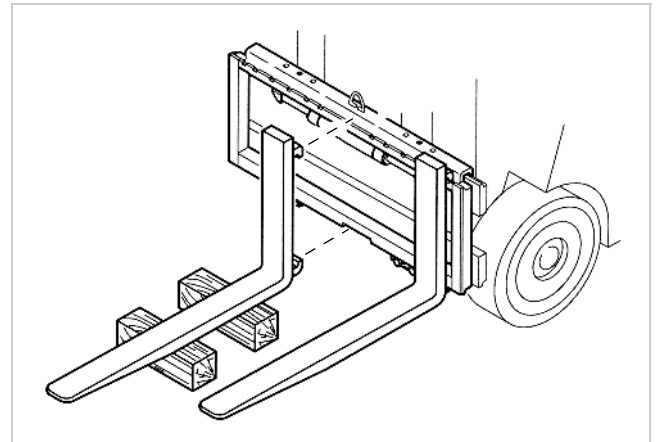


Fig. 8 (16213-01)

7. See Figure 9. Put the load backrest (1) on the fork carriage and secure with the screws (2). Torque the screws (2) to 196 N m (145 ft lb).

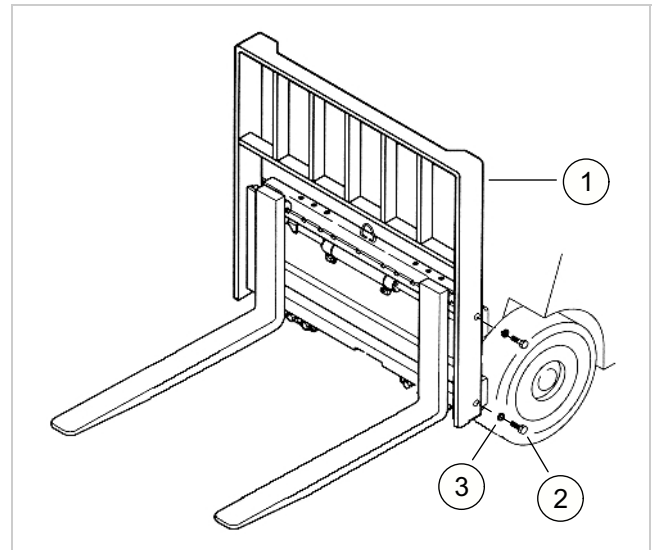


Fig. 9 (16214-01)

1	Load backrest
2	Cap screw
3	Lock washer

8. See Figure 10. Lubricate the lower bearing grease areas (2) with a general-purpose, lithium-based chassis grease.

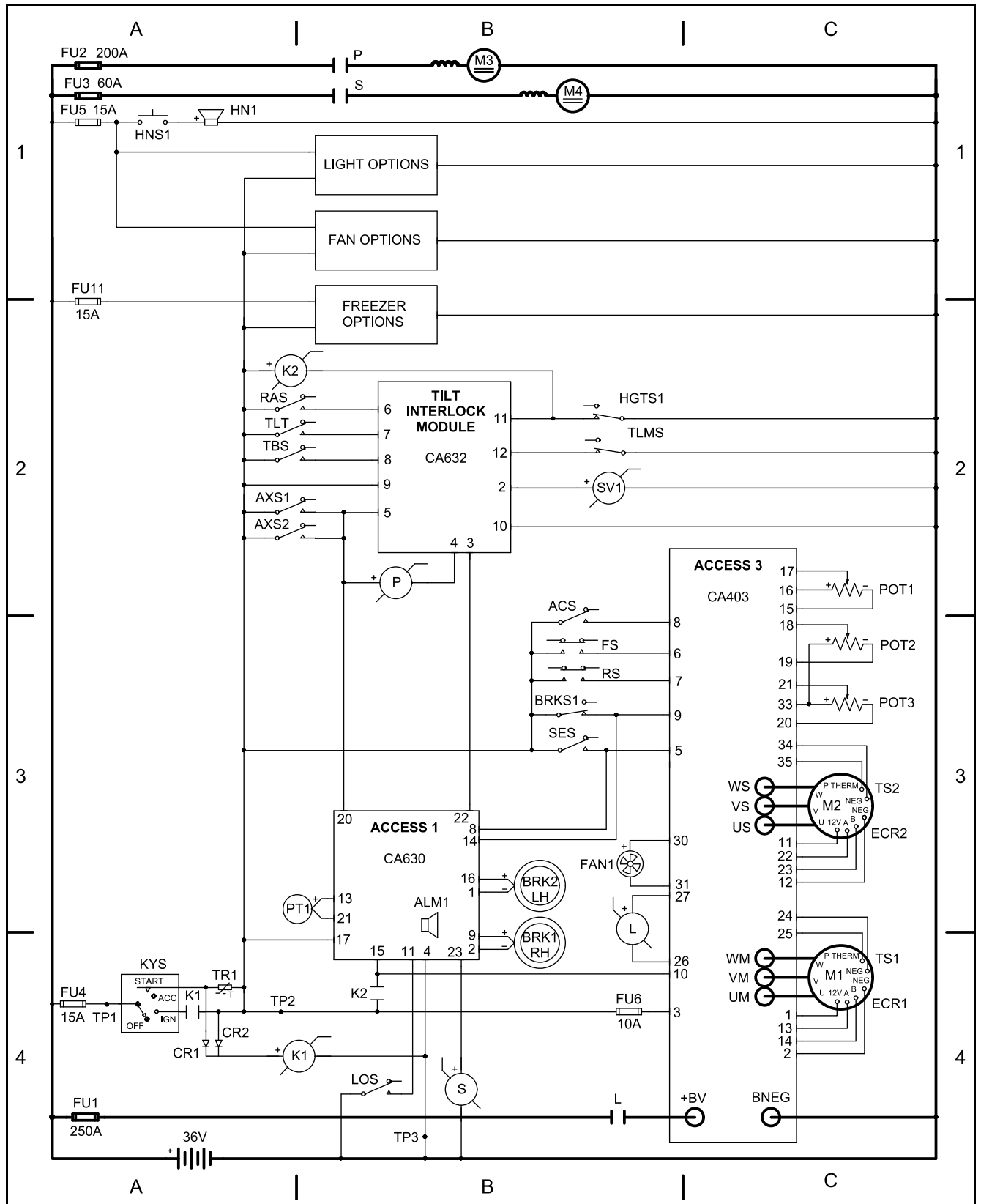


Fig. 1 (148181 C)

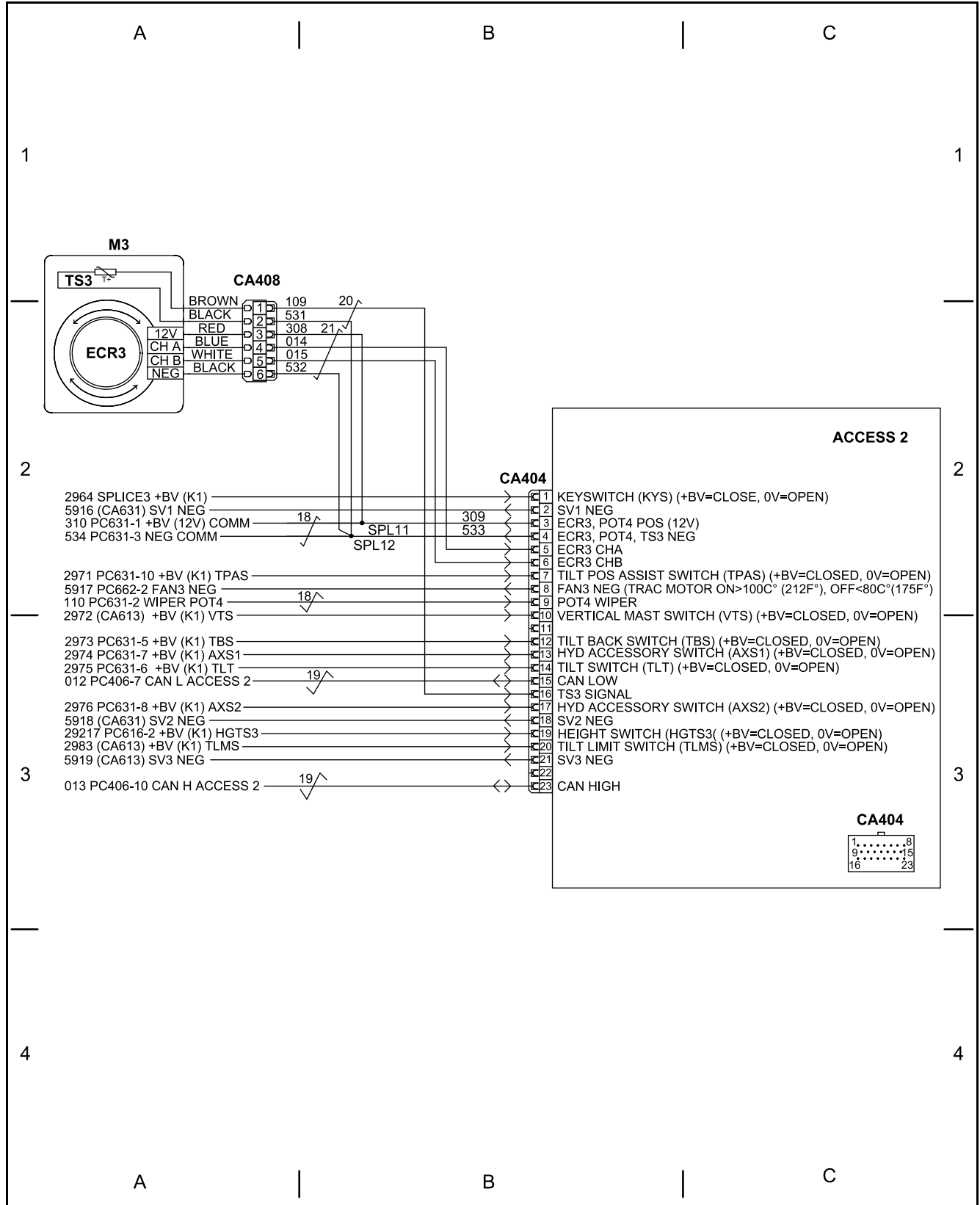


Fig. 19 (148186 E 4 of 8)

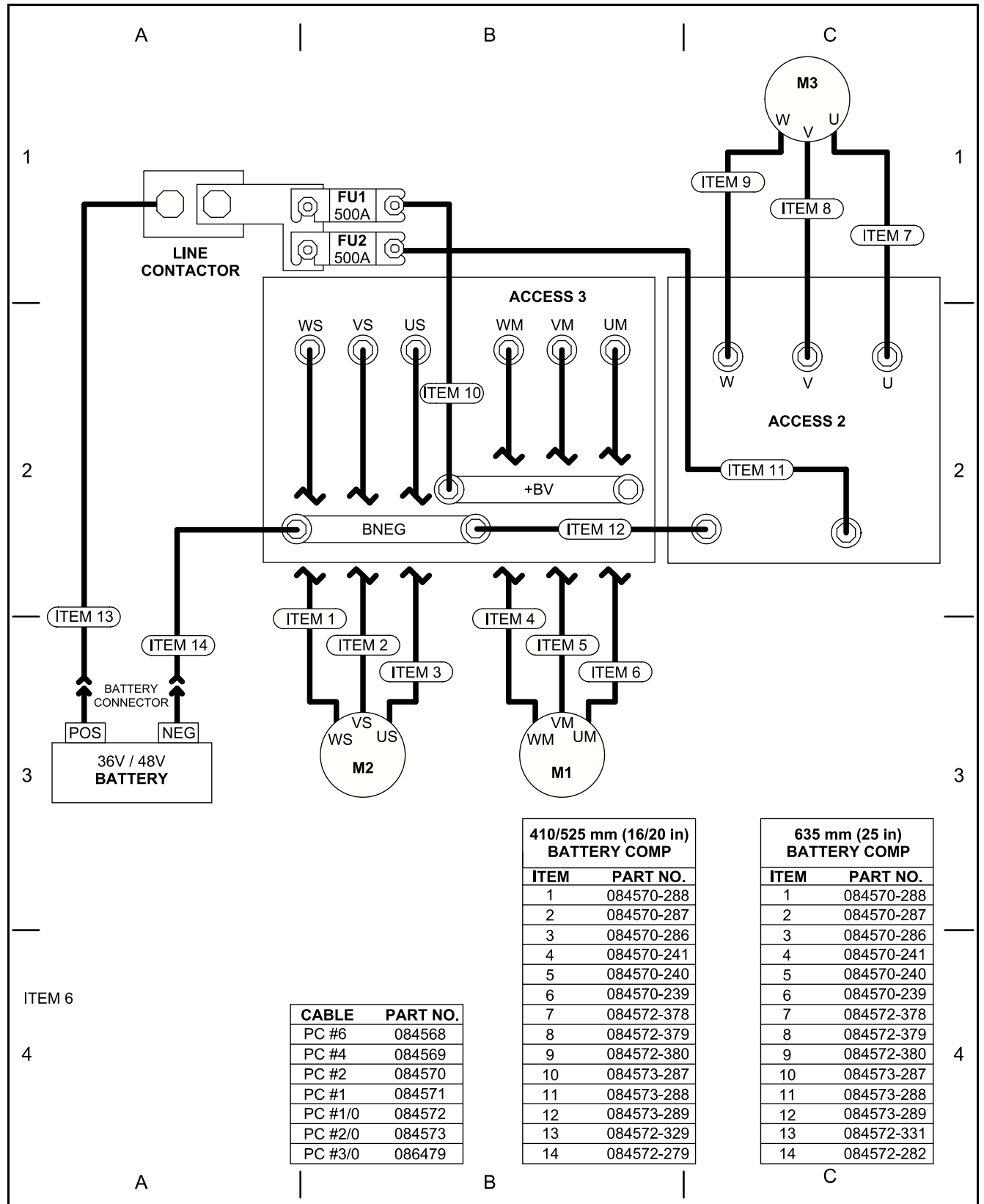


Fig. 29 (148184 A)

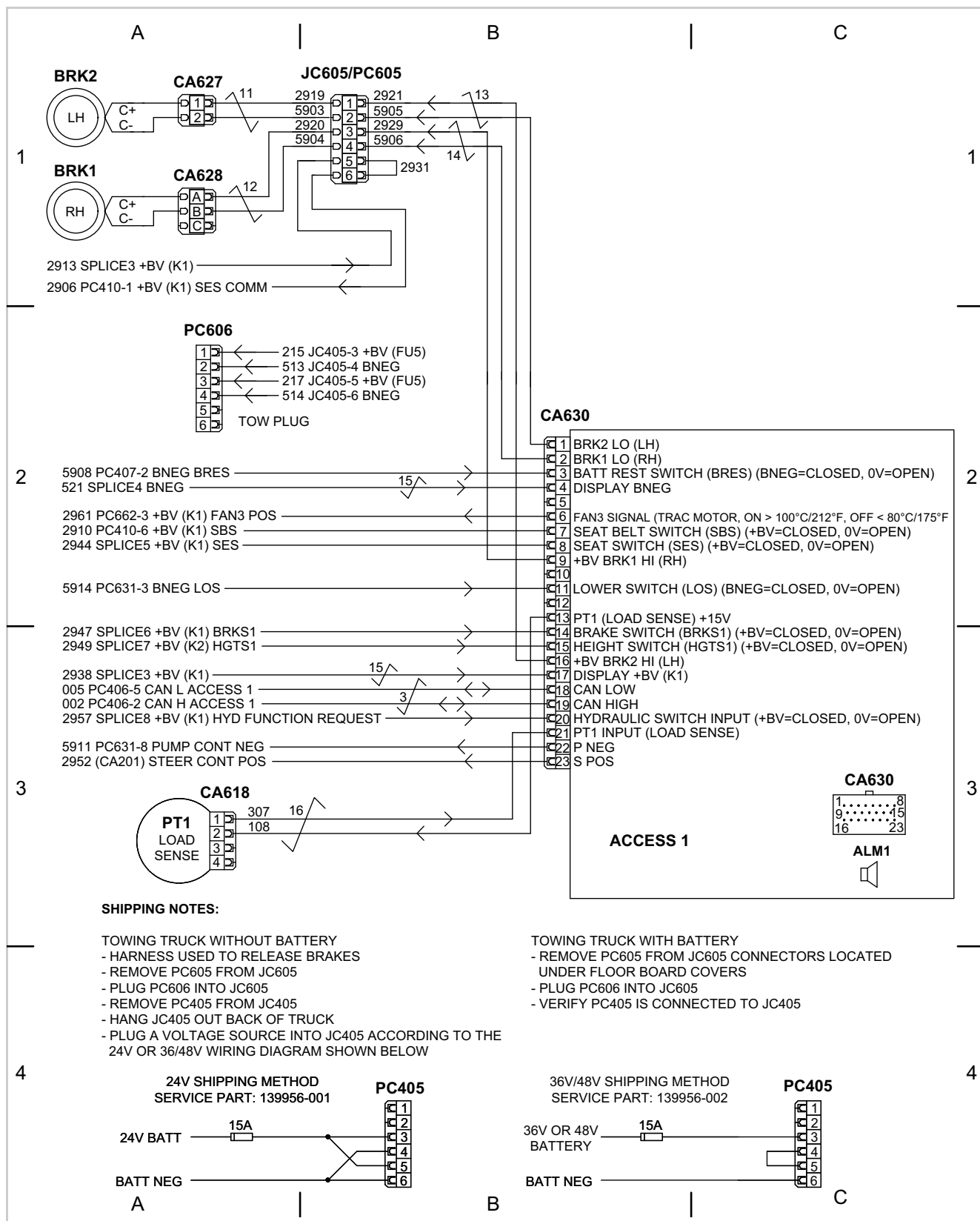


Figure 148185 G 4 of 7

Below are the wiring harness numbers for the SC 5200. The list also includes the components connected by each wire harness.

Wiring Harness Table - DC Hydraulics	
Part Number	Wiring Harness Connections
127272-002 thru -006	Height switch harness: HGTS1 ⁽¹⁾
127342	+BV accessory cable
127511	5th function switch harness: AXS3, PC615
127515-XXX	5th function: accessory, JC615 ⁽¹⁾
128720	Freezer condition front harness: THS1, THS2, RES2, RES3, JC813
130117-001	Foot Operated Directional Control (FODC) harness: includes 1 resistor
130583	Foot Operated Directional Control (FODC) freezer condition harness: RES4, RES5, JC813, PC813, PC814
133559	Tilt position assist upper harness: TPAS, RES50
133868	Tilt position assist lower harness: TLT, TBS, SV3, VTS
139943	FlexSeat™ harness: SES, JC410
140290-001	InfoLink®: MODULE, CURRENT, LOAD, ALARM, CAN, PROG, SHOCK, RS232
141045	Steer column harness: HNS, KYS, RS, FS, JC601
141601	Foot Operated Directional Control (FODC) harness: FS, RS, JC601, PC601
141624	Foot Operated Directional Control (FODC) with freezer condition harness: FS, RS, HR1, HR2, JC601, PC601, JC814
144485	InfoLink®: impact sensor
145605	Overhead guard work lights harness: LGT1, LGT2, LGT3, JC651, PC806
145606	Overhead guard rear lights harness: LGT5, LGT6, strobe light, JC806, PC806, PC809, PC810
145898-002 thru -006	Mast mounted work lights with turn signals harness: LGT1, LGT2 ⁽¹⁾
146012-002 thru -006	Mast mounted work lights harness: LGT1, LGT2 ⁽¹⁾
146087-003	Travel alarm harness: ALM2, JC603
146966	Suspension seat harness: PC411, JC410
148208	+BV accessory fuse assembly
⁽¹⁾ Choice of dash number depends on lift height. To determine lift height, see the data number and the Introduction chapter in this service manual. To determine dash number, see the following chart.	

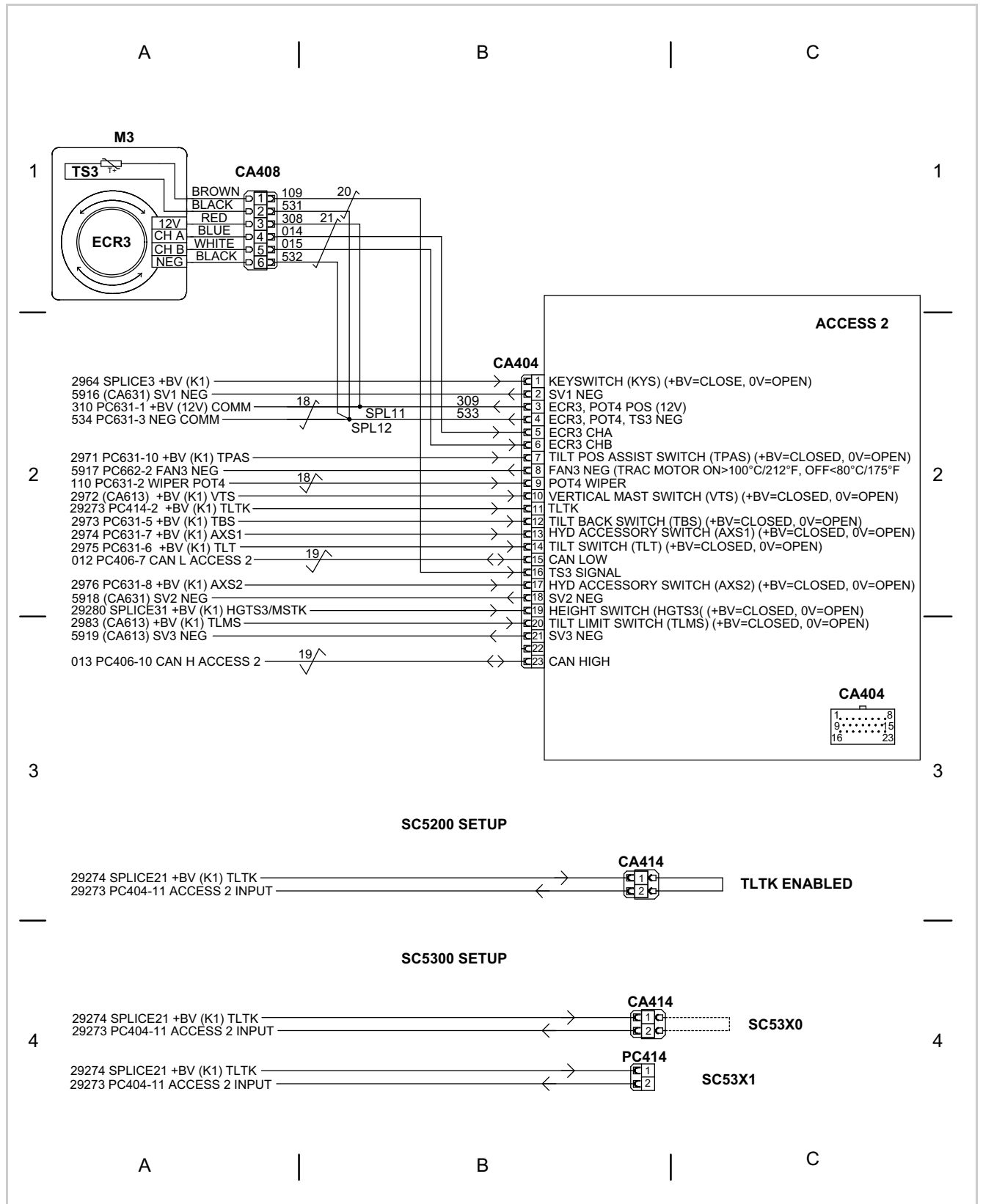


Figure 148186 I 4 of 8

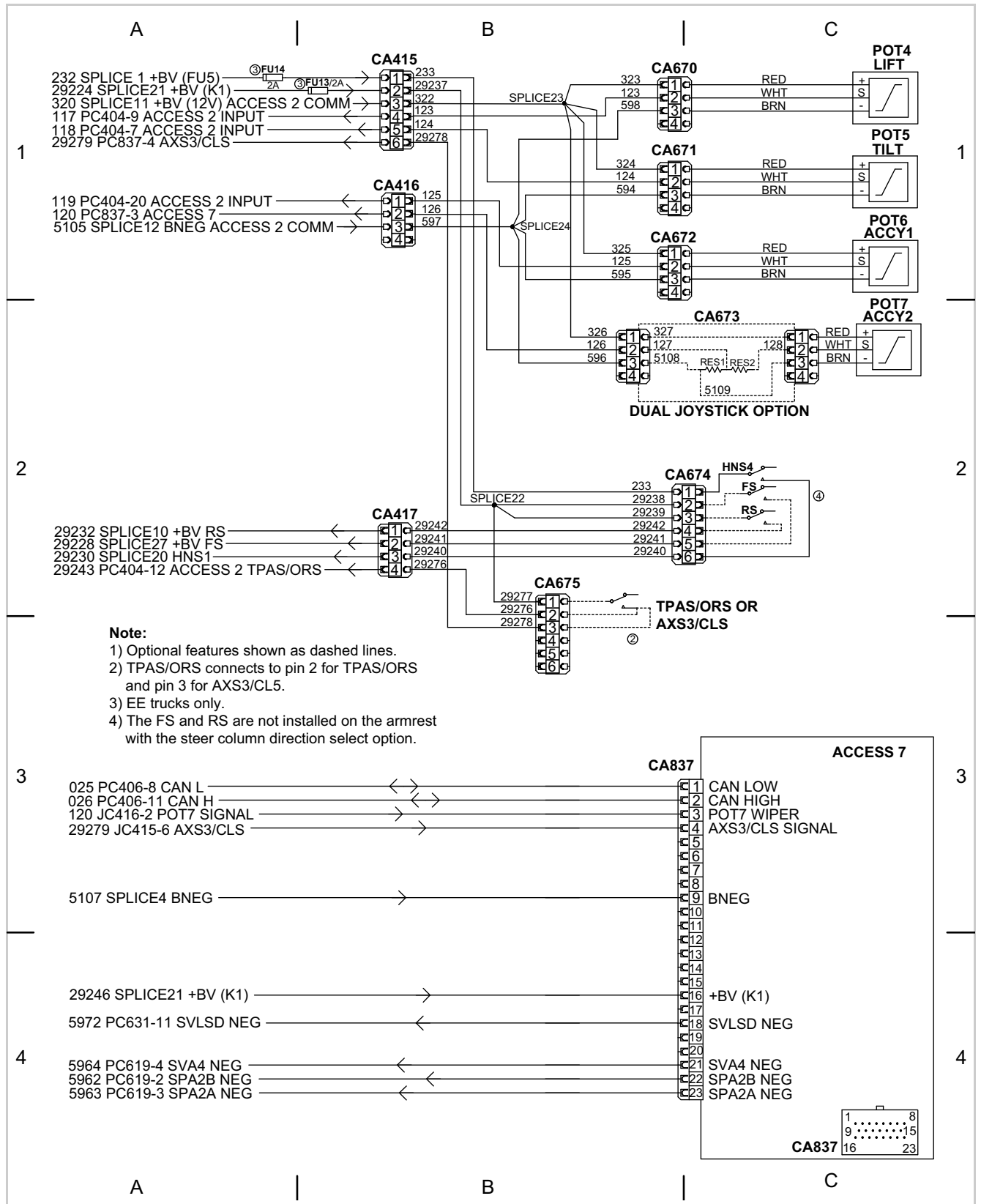


Figure 150872 D 6 of 9

(2) Harness for 5th function Lift Height

mm	in	Part Number
4365	172	127515-002
4825	190	127515-003
5285	208	127515-004
5740	226	127515-005
6120	241	127515-006
6400	252	127515-007
6930	273	127515-008
7490	295	127515-009

(3) Harness for Height Switch Lift Height

mm	in	Part Number
4365	172	150962-002
4825	190	150962-003
5285	208	150962-004
5740	226	150962-005
6120	241	150962-006
6400	252	150962-007
6930	273	150962-008
7490	295	150962-009

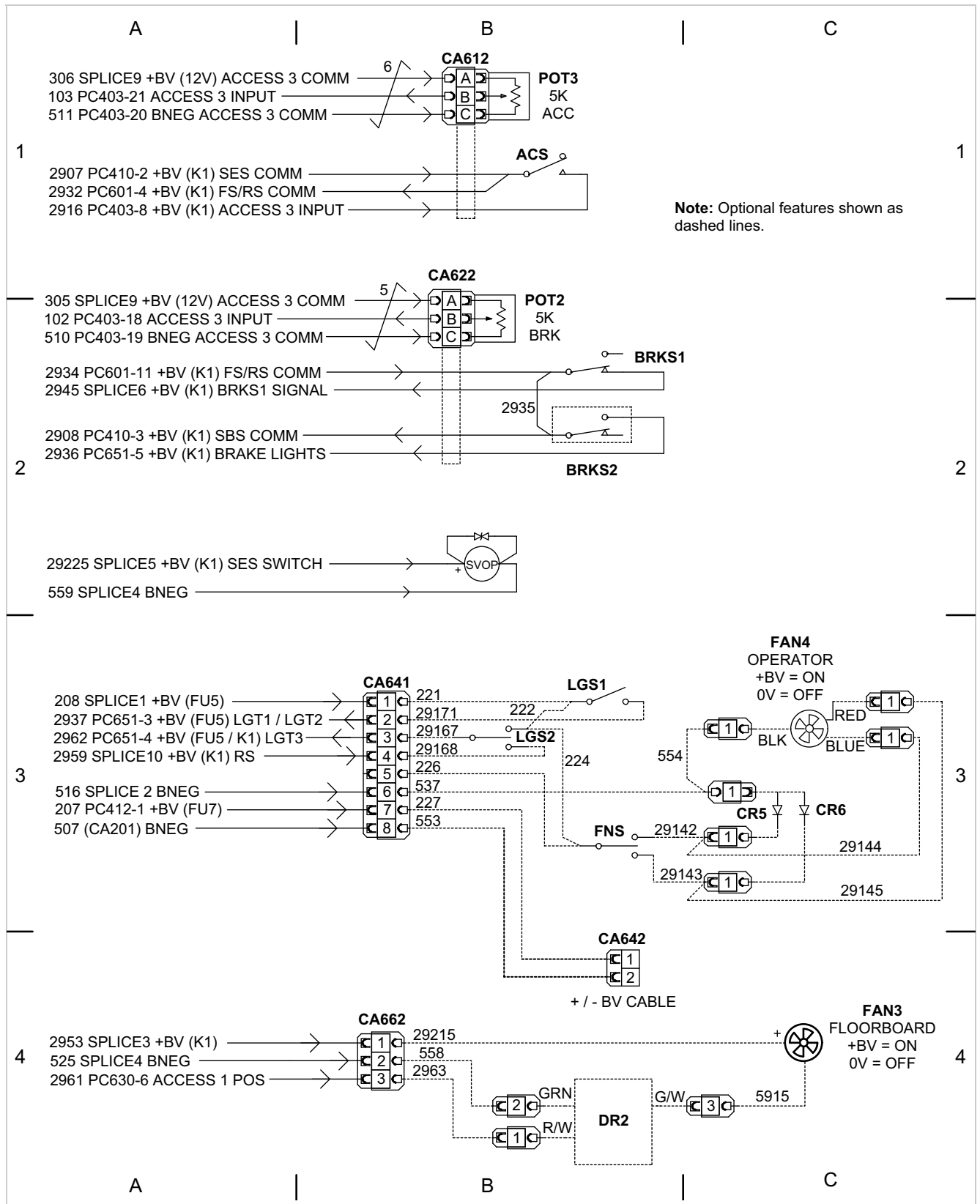


Figure 148185 G 6 of 7

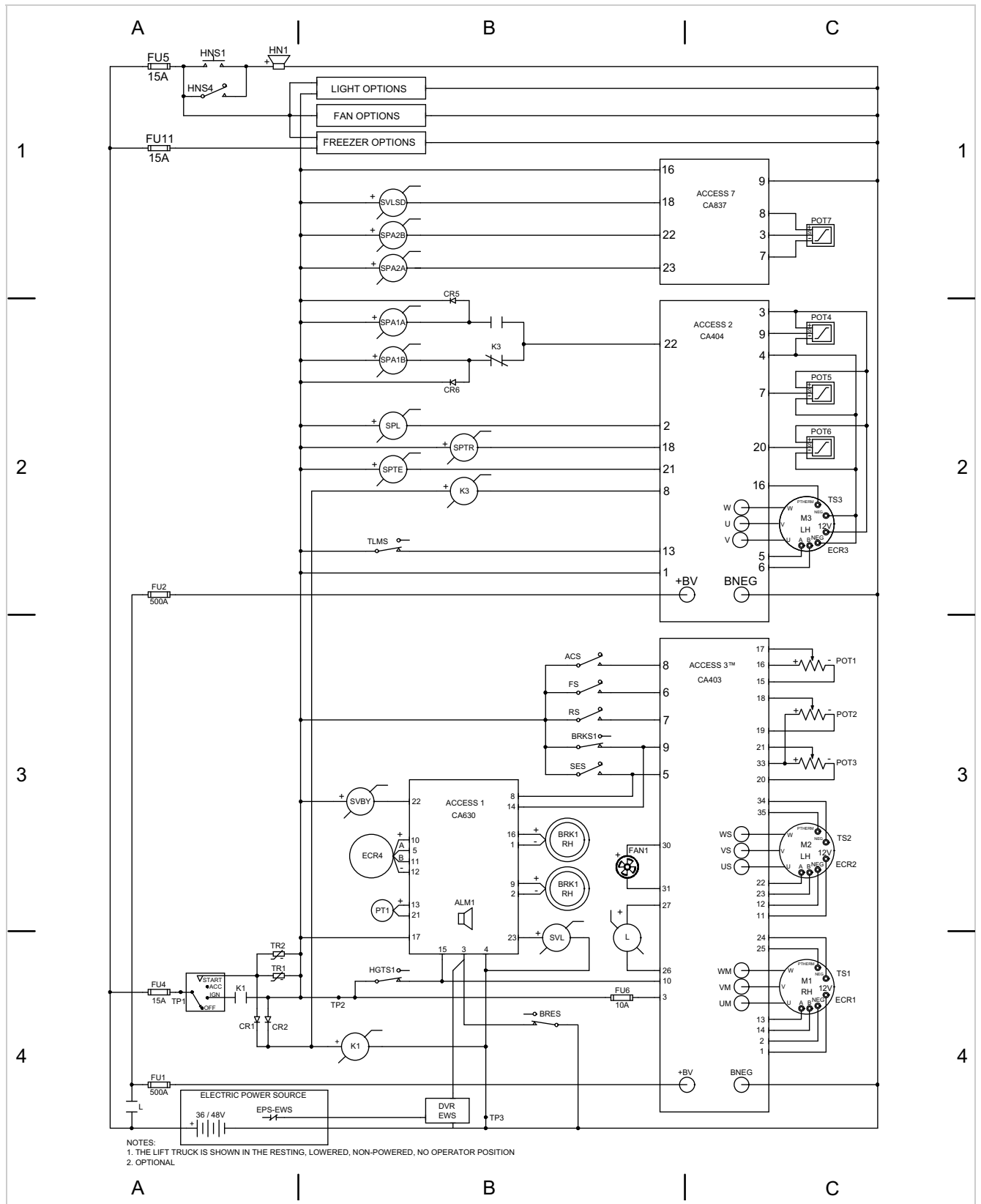


Figure 155521 B

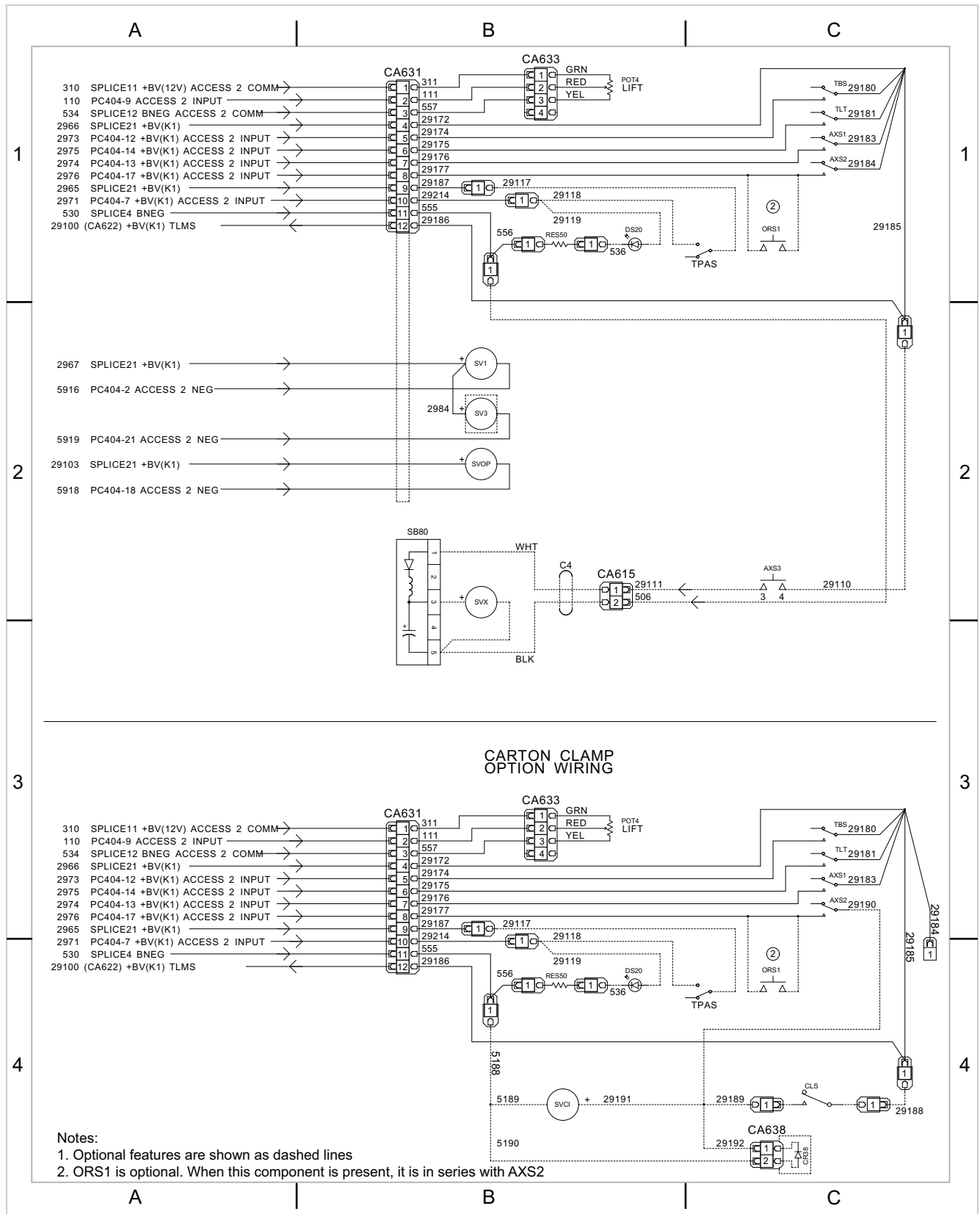


Figure 159948 C 9 of 10

Harness - TT Mast		
Lift Height		Wiring Harness
mm	in	Dash Number
4,370	172	-002
4,825	190	-003
5,285	208	-004
5,740	226	-005
6,120	241	-006

Harness - Quad Mast		
Lift Height		Wiring Harness
mm	in	Dash Number
6,096	240	-003
6,248	246	-004
6,553	258	-004
6,706	264	-005
7,010	276	-005

Harness - Lift Tek TF Mast		
Lift Height		Wiring Harness
mm	in	Dash Number
2,896	114	-002
3,200	126	-003

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