

Introduction

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

Operator Instructions

This manual does not contain operator instructions. Operator instructions in tag or booklet form are sent with each truck. Additional copies can be ordered if required. These booklets are for you and your personnel to insure years of safe, trouble free operation of your Crown Lift Truck. For operator instructions, refer to Crown publications, "Operator Manual RM/RMD 6000 Series", "Operator Manual RM/RMD 6000S Series".

Operator Training

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

Service Training

Complete Service Training is available for the lift truck technician covering all Crown Lift Trucks, module systems, wire guidance, hydraulic and electrical systems. To obtain more information concerning service training, contact your Crown Dealer or under "Training" on www.crown.com.

Replacement Parts

When ordering replacement parts from this manual, always specify, along 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 is arranged according to major sections which cover maintenance and replacement parts. The sectional 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	Reach & Attachment Parts
M8	Cylinder	10	Accessories
M9	Reach & Attachments	12	Labels and Decals
M10	Glossary		

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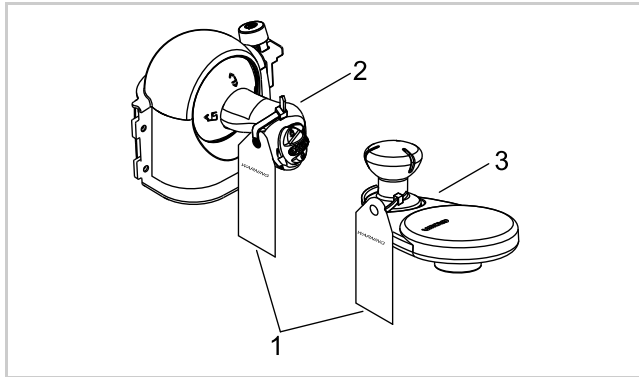


Fig. 2 (20916)

To do maintenance on the truck (with the battery in the truck)

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

To do maintenance on the truck (with the battery out of the truck)

1. Remove the primary power fuses.
2. If it is possible, install a lockout device on the truck battery connector. Or, install a tag with a cable tie on the truck battery connector to warn others that the truck is being serviced.

Capacitance



WARNING

A charged capacitor could be dangerous.
Uncontrolled discharge of stored electrical energy in some control modules can cause injury or damage the truck.

- When you do truck maintenance around the bus bars and related power cables, first discharge the capacitors.

Discharge the capacitors

1. Move the truck to a maintenance area that has a flat and level floor.
2. Chock the wheels. Refer to **SAFETY** ► *Control of Hazardous Energy* ► *Lifting and Blocking*.
3. Lockout/tagout the truck. Refer to **SAFETY** ► *Control of Hazardous Energy* ► *Lockout/Tagout*.

4. Turn and hold the key switch to the start position a minimum of 10 seconds.
5. Turn the key switch to OFF and remove the key.
6. To verify that the capacitors have discharged, place a volt meter across the B+ and B- terminals of ACCESS 2. The voltage should be less than 1 V. Repeat the procedure on ACCESS 3 and ACCESS 8. Refer to Figure 3 for RM/RMD 6000S trucks. Refer to Figure 4 for RM/RMD 6000 trucks.



Fig. 3 (24218)

1	ACCESS 3 B+ and B- Terminals
2	ACCESS 2 B+ and B- Terminals
3	ACCESS 8 B+ and B- Terminals



LUBRICATION & ADJUSTMENT

Lubrication and Adjustment

Lubrication and Adjustment

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

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

If desired, padded packs of this checklist (OF-3772) are available through your Crown dealer.

CROWN		Operators Daily Checklist						
Model _____ Serial No. _____		Week beginning _____ 20 _____						
<small>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.</small>		Shift No. _____						
Check <input checked="" type="checkbox"/> appropriate box <input type="checkbox"/> OK <input type="checkbox"/> Needs repair or adjustments (give details in comments section)		Truck No. _____						
		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
VISUAL CHECKS	DAMAGE bent, dented or broken parts	OK	OK	OK	OK	OK	OK	OK
	LEAKS drive unit, brakes, hydraulics	OK	OK	OK	OK	OK	OK	OK
	TIRES & WHEELS drive wheels, load wheels, casters	OK	OK	OK	OK	OK	OK	OK
	FORKS in place, properly secured	OK	OK	OK	OK	OK	OK	OK
	CHAINS, CABLES & HOSES in place	OK	OK	OK	OK	OK	OK	OK
	HOUR METER operating	OK	OK	OK	OK	OK	OK	OK
	BATTERY water level, vent caps in place, cleanliness	OK	OK	OK	OK	OK	OK	OK
	BATTERY CONNECTOR cracked, burnt, tight fitting	OK	OK	OK	OK	OK	OK	OK
	GUARDS overhead, load backrest, battery retainer	OK	OK	OK	OK	OK	OK	OK
	SAFETY DEVICES flashing lights, indicator lights, safety shield, operator harness, warning labels, etc. in condition as equipped	OK	OK	OK	OK	OK	OK	OK
OPERATIONAL CHECKS	HORN sounds	OK	OK	OK	OK	OK	OK	OK
	STEERING no binding, no excessive play	OK	OK	OK	OK	OK	OK	OK
	TRAVEL CONTROLS all speed ranges, forward & reverse, no unusual noise	OK	OK	OK	OK	OK	OK	OK
	HYDRAULIC CONTROLS raise & lower, tilt forward & rearward, reach in & out, sideshift right & left, etc., no unusual noise	OK	OK	OK	OK	OK	OK	OK
	BRAKES stop truck within required distance, work smoothly, brake override functions	OK	OK	OK	OK	OK	OK	OK
	PARKING BRAKE seat, hand, foot	OK	OK	OK	OK	OK	OK	OK
	BATTERY CHARGE discharge meter in full green or 75% charge after raising forks	OK	OK	OK	OK	OK	OK	OK
	POWER DISCONNECT cuts off all electric power	OK	OK	OK	OK	OK	OK	OK
	ATTACHMENTS function properly, no unusual noise	OK	OK	OK	OK	OK	OK	OK
	LIMIT SWITCHES travel limit, lift limit, tilt limit, etc.	OK	OK	OK	OK	OK	OK	OK
HOUR 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. 500 Printed in U.S.A.

Figure 14990

Lubricant Identification			
Lubricant Identifier	Description	Part Number	Package Quantity
<p>Technician Tips: Lift trucks operated in below freezing temperatures must use low temperature hydraulic oil and grease.</p> <ul style="list-style-type: none">(1) Usual operation (temperatures of 0.6 °C [33 °F] and above)(2) Used on TSP lift trucks. Standard temperature freezers (-18 to 4 °C [0 to 39 °F]). Do not mix with different oil.(3) Used on TSP lift trucks. Low temperature freezers (-40 to -12 °C [-40 to 10 °F]). Do not mix with different oil.(4) Premium antiwear hydraulic oil used in mixing with low temperature oil			

Table 1 – Planned Maintenance Lubrication

Index	Component	Lube Type	Quantity	180 d 500 hr	12 m 2,000 hr
L-1	Multi-task control handle (ramps and plunger)	M	As Required	Lubricate	
L-2	Steering gears	B	As Required	Lubricate	
L-3	Lower floorboard and entry bar pivot points	B	As Required	Lubricate	
L-4	Caster axle and pivot	B (1)	As Required	Lubricate	
L-5	Drive unit lubricant level	A (2)	0.7 l (1.5 pt)	Check 1st Change	Change
L-6	Drive unit pivot	B	As Required	Lubricate	
L-7	Load wheel axles (left and right side)	B	As Required	Check	
L-8	Door hinge pins	C	As Required	Check	
See the Lubrication Identification table and Alternate Lubricants and Fluids table for lubricant type designation explanation.					
Lubrication intervals for freezer condition lift trucks must be changed to a frequency that minimizes wear on moving shafts and parts on vehicles unless desirable operating conditions.					
(1) In below freezing temperatures, use low temperature, multi-purpose grease, P/N 063002-017.					
(2) In below freezing temperatures, use Dextron II, P/N 063001-010.					

Table 6 – Planned Maintenance Inspection

Index	Component	180 d 500 hr	12 m 2,000 hr
I-1	Column and thrust rollers (mast and reach)	Check	
I-2	Reach staging bumpers (back side of reach carriage)	Check	
I-3	Mast staging bumpers (bottom of second stage mast)	Check	
I-4	Height sensor (ECR2)	Check	
I-5	All lift chains and anchors	Check	
I-6	Mast installation screws for tightness	Check	
I-7	Lower fork carriage retainer	Check	
I-8	Sideshift cylinder mounting	Check	
I-9	Forks	Check	
I-10	Sideshift cylinder and hydraulic connections	Check	

See the appropriate section of service manual for additional information concerning inspection or adjustment.

Componentry

Components listed in this section have been categorized to assist the service technician with the following information for each component:

- Reference designator (for example, ALM1) found on the wiring diagram and parts pages
- Description of the component
- Location of the component on the lift truck
- Purpose of the component
- Technical data of the component
- Adjustments required, if applicable
- Wiring diagram or hydraulic schematic pages which the component appears. The number in parenthesis is the grid coordinate of the component on the diagram [for example, DIA-1460-033 (A-1)]
- Parts page which the component appears (for example, 04.3-1460-001)

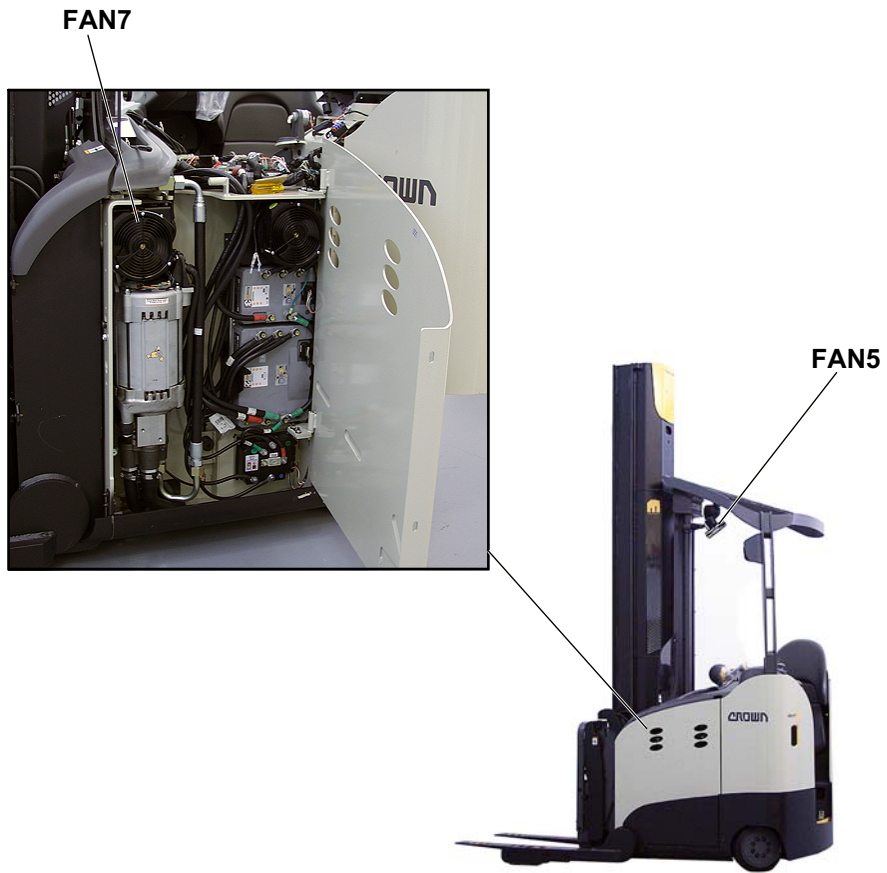


Fig. 5 (24902-01)

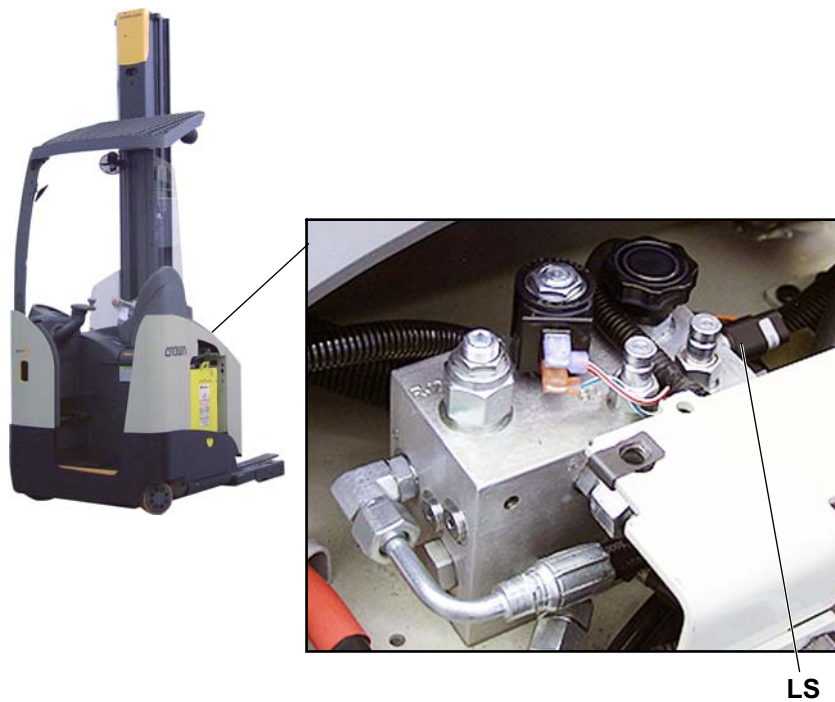


Fig. 10 (24903-01)

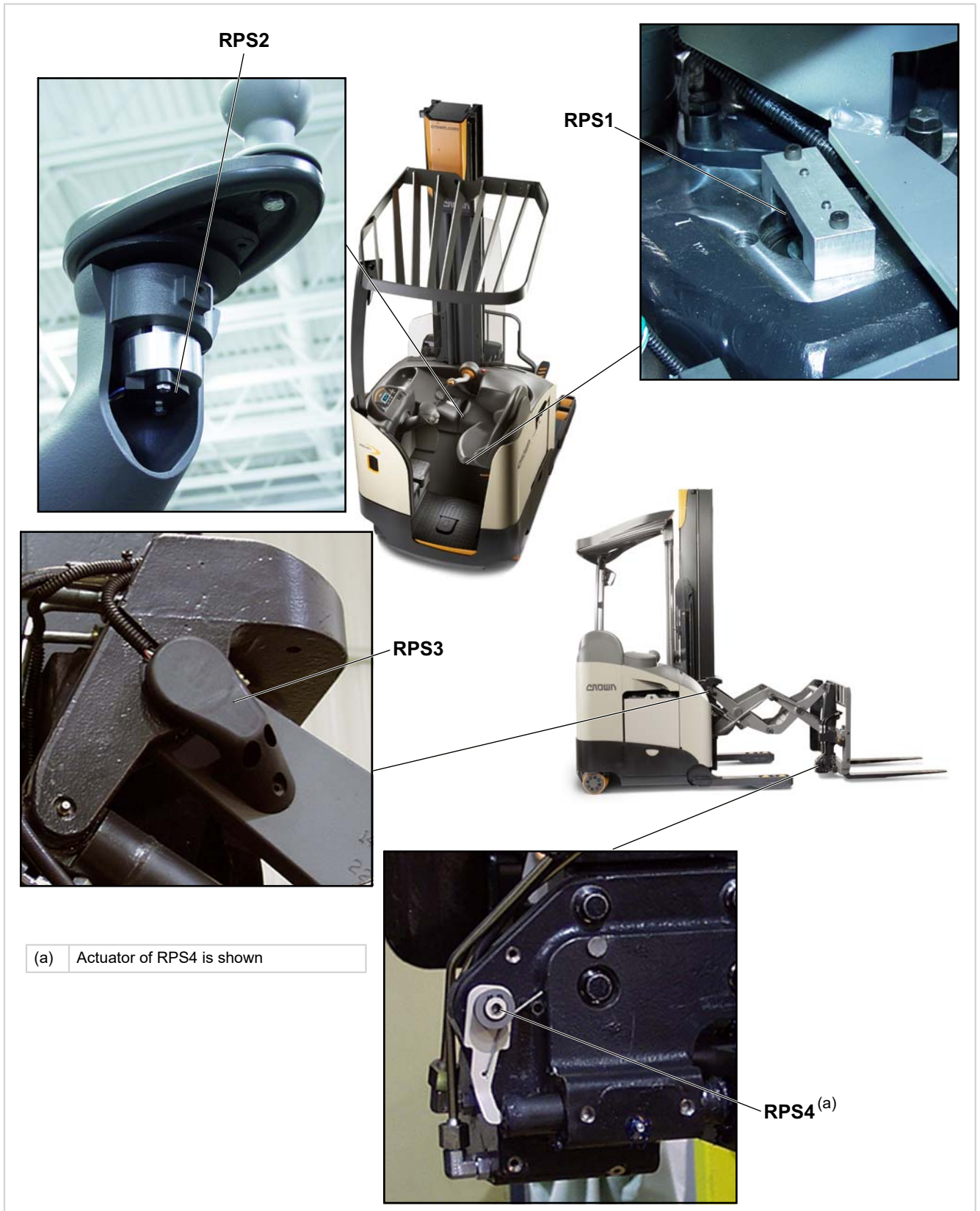


Fig. 15 (24748-01)

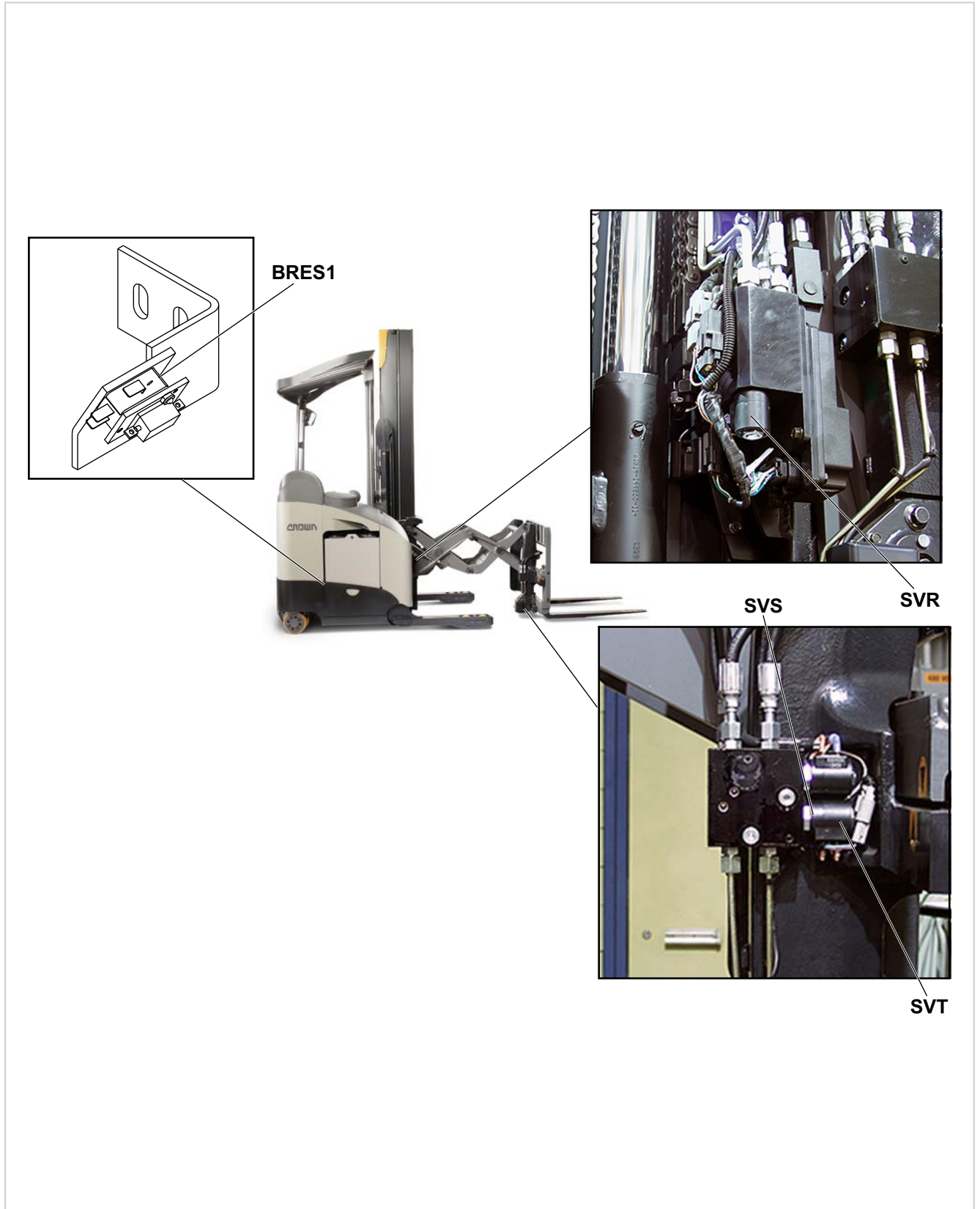


Fig. 20 (24753-01)

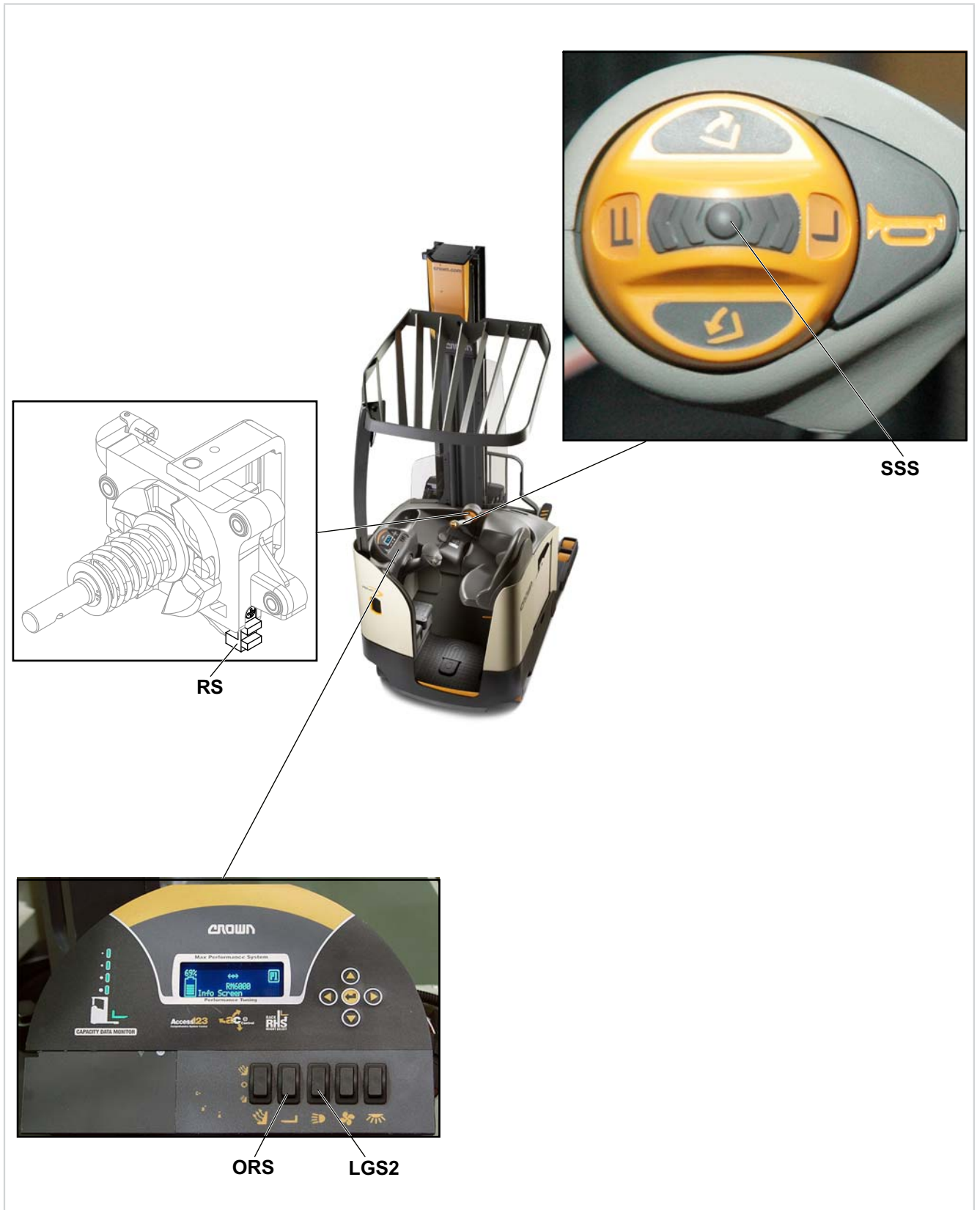


Fig. 25 (24796-01)

When SVA energizes and shifts, the reach retract, side-shift right and tilt down circuits function.

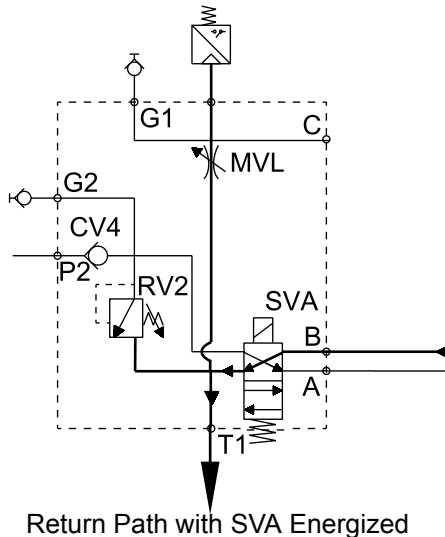
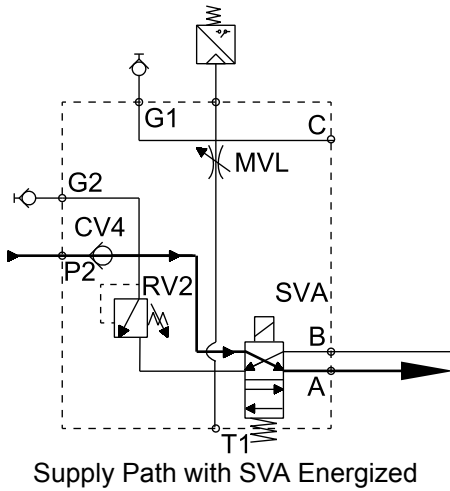


Figure 24650

Reach Extend Circuit

Refer to Figure 24648.

1. When the operator requests the reach extend function via the multi-task control handle, ACCESS 8 powers M5 to rotate P2. Hydraulic oil is drawn from the reservoir and supplied to the accessory manifold block on the power unit at port P2.
2. The accessory manifold block directs oil flow from port P2 across CV4 and SVA (not presently energized by ACCESS 4) and out Port B to the reach manifold assembly.

3. Oil enters the reach manifold assembly through port B. The supply oil flows through the check valve portion of the lower CBV with some of the oil piloted to the relief portion of the upper CBV.
4. ACCESS 4 or ACCESS 7 (depending upon truck configuration) causes SVR to shift to allow oil to flow to and from the two reach cylinders and allowing oil to flow out port RB on the reach manifold.
5. The oil continues to another small manifold block located on the top of the rear reach carriage where it flows into port RB and out ports R1 to the backs of the reach cylinders.
6. As the piston in each cylinder moves, the rod extends and the oil in the cylinder housings on the rod side of the pistons is pushed out of the housings and into the R2 ports on the small manifold block. The oil exits the manifold block through RA and enters the reach manifold through RA.
7. This oil flows across SVR to the relief portion of the upper CBV. Pilot flow to this CBV assists the pilot flow from the supply side in opening this valve to allow the return oil to flow across. The spring on the other side of the valve opposes the two pilot oil pressures controlling the amount of oil that can escape the reach manifold out port A. This control prevents overrun, a situation where the forks move too quickly for the command given.
8. The oil flow from port A of the reach manifold flows into port A of the main manifold, across SVA and out port T1 back to the reservoir.

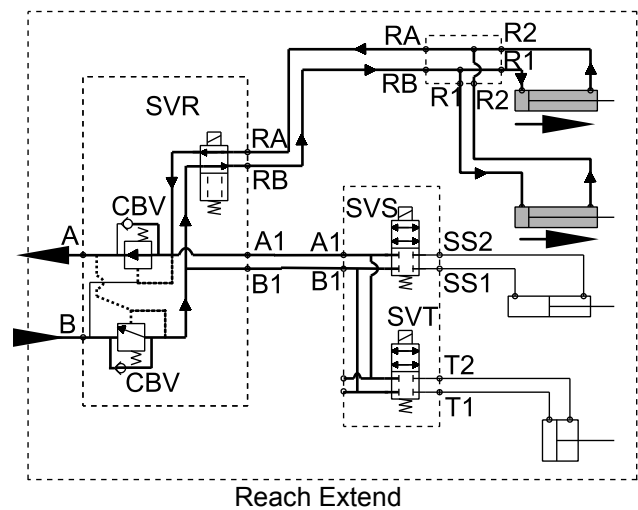


Figure 24648

Hydraulic Reservoir Contamination and Flushing

If contamination has reached the hydraulic reservoir, Crown recommends draining it completely. Do not reuse the contaminated oil.

1. Check the condition of the hydraulic filter element and breather element, and change as required. Refer to Hydraulic Reservoir in this section for instructions.
2. Remove the hydraulic lines or tubes to the reservoir and flush the tank with water based degreaser, Crown part number 063009-005. Blow all degreaser and moisture from the hydraulic reservoir.
3. Blow air through each of the hoses and lines to remove loose particles. Catch any hydraulic oil that may be spilled and do not reuse.
4. Reconnect all lines and tubes to the hydraulic reservoir.
5. Clean the outside of the manifold block with the same water based degreaser to remove surface dirt.

Accessory System Contamination and Flushing

1. If the steps in Hydraulic System Flushing have already been completed, skip to step 5. Move the truck to a secure non-traffic maintenance area with a level floor. Chock the wheels.
2. Raise the mast and block the 2nd stage approximately 915 mm (36.0 in) from the floor. Fully retract the reach assembly.
3. Key the truck OFF and disconnect the battery. Lockout/Tagout the truck as described in the Control of Hazardous Energy section.
4. Open the manual lowering valve (MVL) and slowly lower the carriage to relieve hydraulic pressure.
5. Disconnect each of the tube assemblies and hoses from the manifolds and cylinders taking care to note where each one belongs.
6. Blow air through each of the hoses and lines to remove loose particles. Catch any hydraulic oil that may be spilled and do not reuse.

7. Remove and flush each manifold block as needed according to the instructions in Manifold Blocks - Manifold Block Removal and Flushing. Reinstall the manifolds.
8. Taking care to follow necessary lifting and blocking procedures as outlined in Control of Hazardous Energy, remove and de-contaminate the reach, sideshift and tilt cylinders as needed. Reinstall the cylinders. Refer to the applicable cylinder service section for information regarding disassembling the cylinders.
9. Assemble the hoses and tube assemblies back to the cylinders and manifolds.
10. Continue on to the Hydraulic System Reassembly section.

Hydraulic System Bleeding

Refer to the Lift Cylinders section of this manual for instructions on bleeding air from the hydraulic system.

Notes:

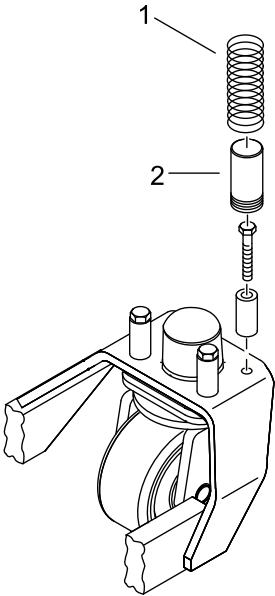
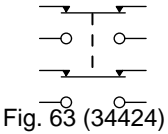


Figure 16871-01

- 1 Spring
- 2 Spacer

Notes:

Switch Symbols						
Actuation	Description	No. of Terminals	Momentary		Fully Maintained	
	DPDT	8		 <p>Fig. 63 (34424)</p>		

Standby Mode

NOTE

The blue wire should not be connected to +BV during this procedure. Otherwise, it will not be possible to engage standby. This can be accomplished by raising the mast above staging.

The monitor should already come in standby mode. If it is not, perform the following procedures to put the monitor in standby mode.

1. When the monitor is switched ON, press the enter button (8) on the keypad. This will bring up a menu where standby is already highlighted. Refer to Figure 22803.

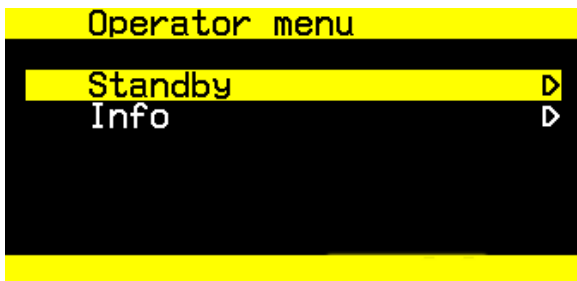


Figure 22803

NOTE

If the standby menu cannot be toggled, ensure the forks are above staging. If the standby menu still cannot be toggled, go into the keyboard menu and ensure it is not locked out (represented by a large dot instead of a small one).

2. Press the enter button (8) a second time and the monitor will go into standby. A black screen will now be shown. When the blue wire is connected to BNEG (above staging), the monitor will be activated and the camera picture will be shown on the screen. When the blue wire is either disconnected (open) or connected to +BV (below staging), the monitor will go back to standby and show a black screen again.

Horizontal Bars

The horizontal bars should be turned on and should be adjusted, which can be accomplished by performing the following procedures.

1. Open the service menu. To open the service menu, press the minus (6), plus (7) and camera selection buttons (1) at the same time. Refer to Figure 22804.

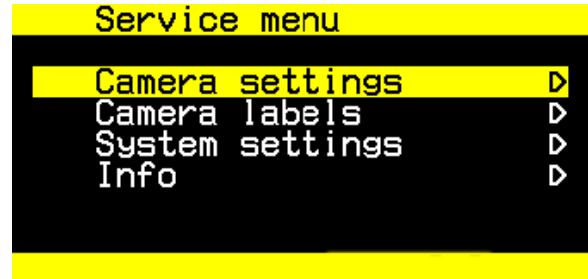


Figure 22804

2. Use the option (5), minus (6), plus (7) and enter (8) buttons to scroll through the service menu.
3. Press the enter button (8) to activate the camera settings menu. When entering the menu, use the minus (6) and plus (7) buttons to select the camera (C1) to configure and press the enter (8) button. The yellow cursor will jump to the list of items. Use the minus and plus buttons to select the item to adjust, and press the enter button. If the selection option is ON/OFF, it will toggle between on (represented by a large dot) and off (represented by a small dot). If the option is a numeric value, it is possible to change the value with the minus and plus buttons. Press the enter button to store the new setting. Refer to Figure 22805.

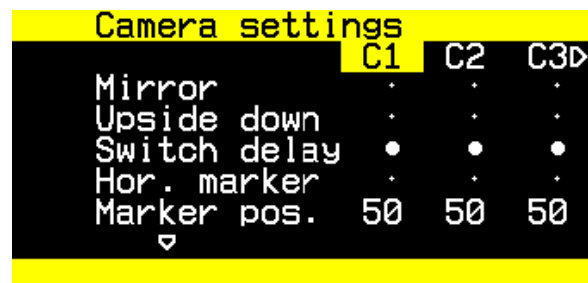


Figure 22805

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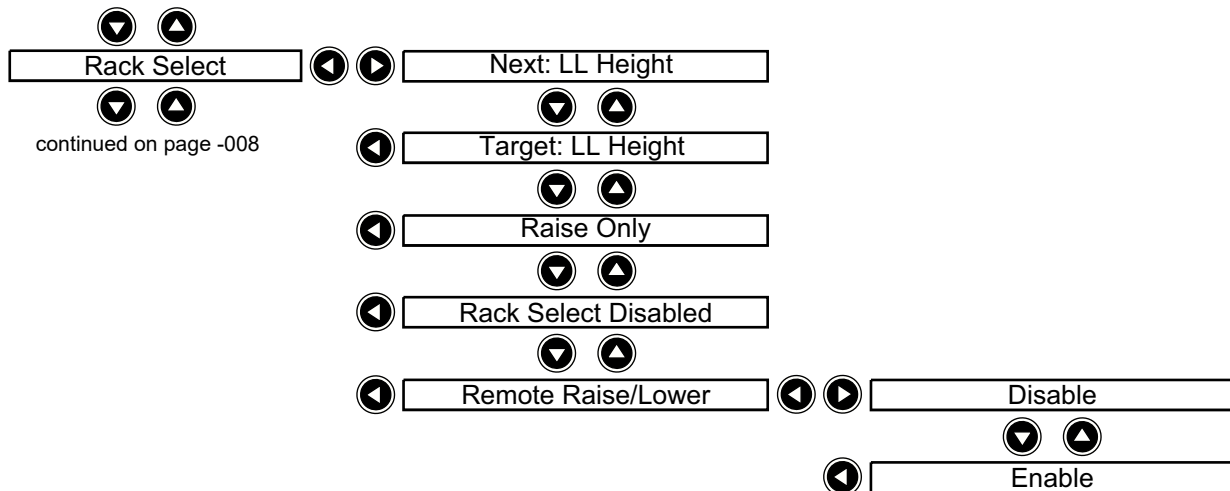


Fig. 4 (24097-02)

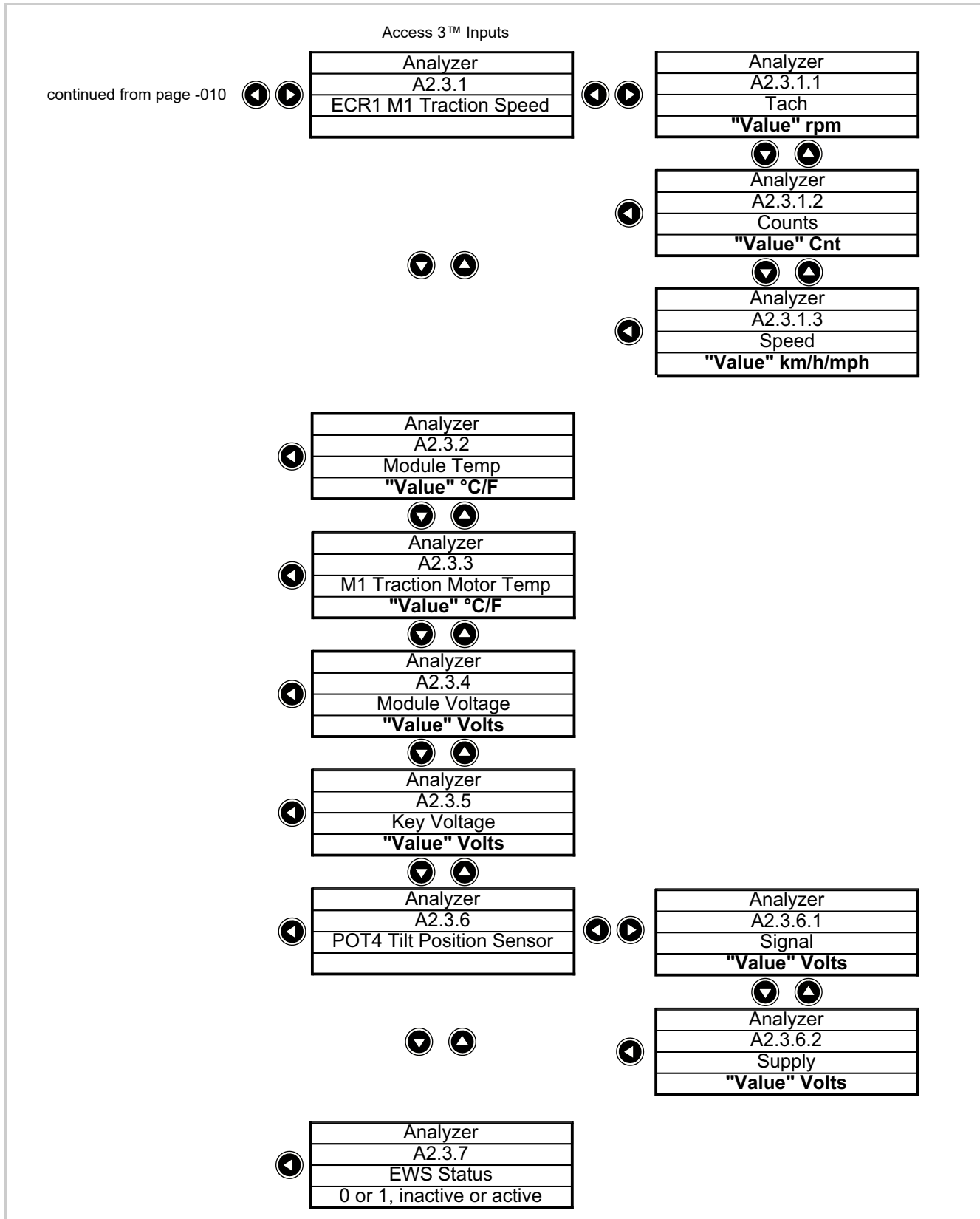


Fig. 14 (24107-02)

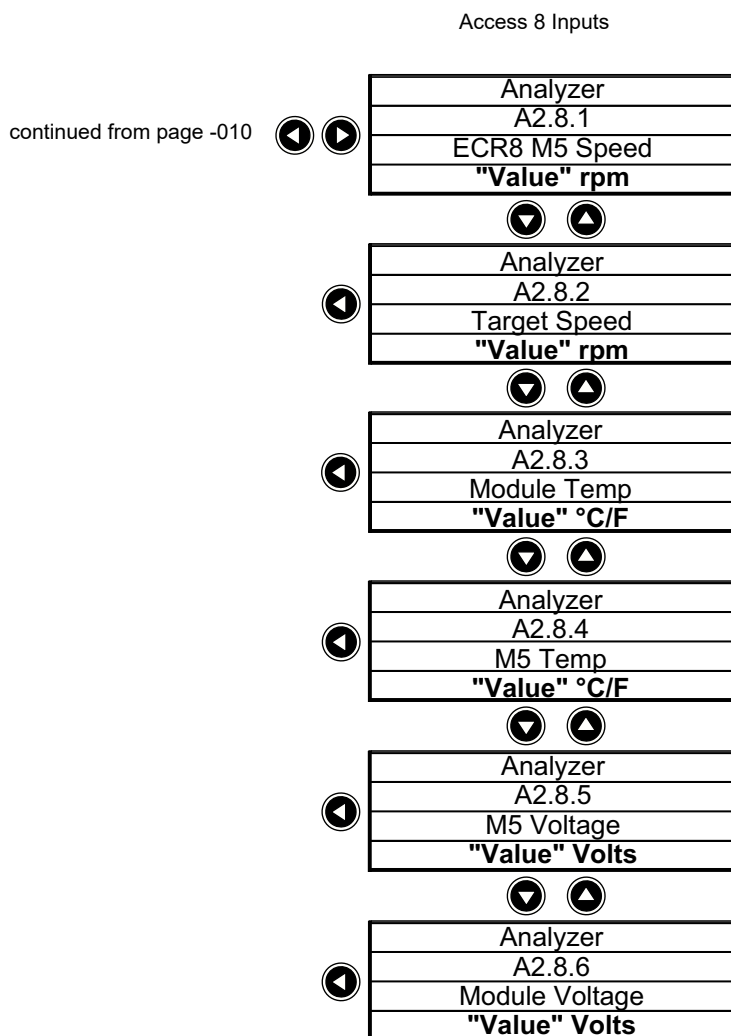


Fig. 24 (24117-02)

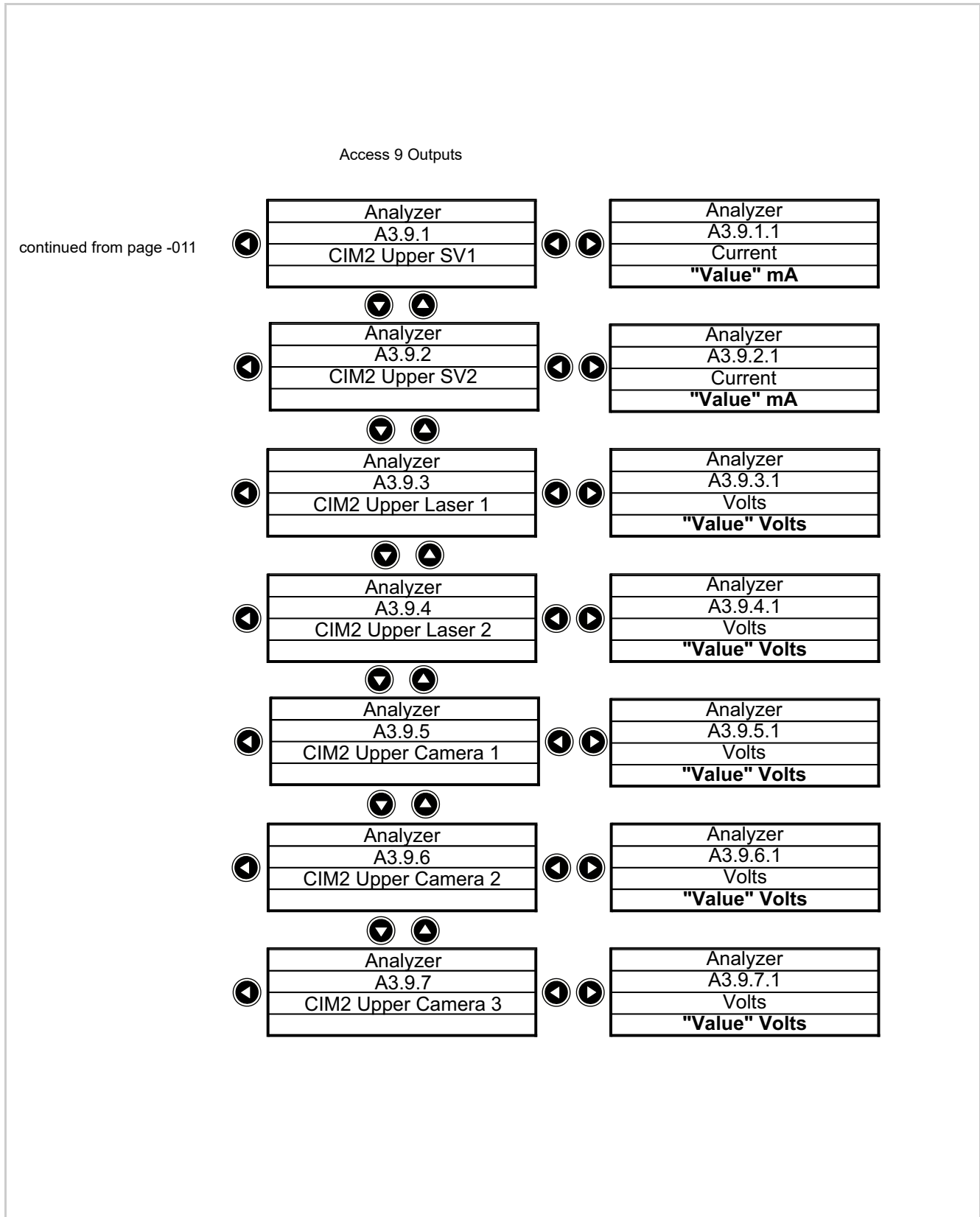


Fig. 34 (24640-02)

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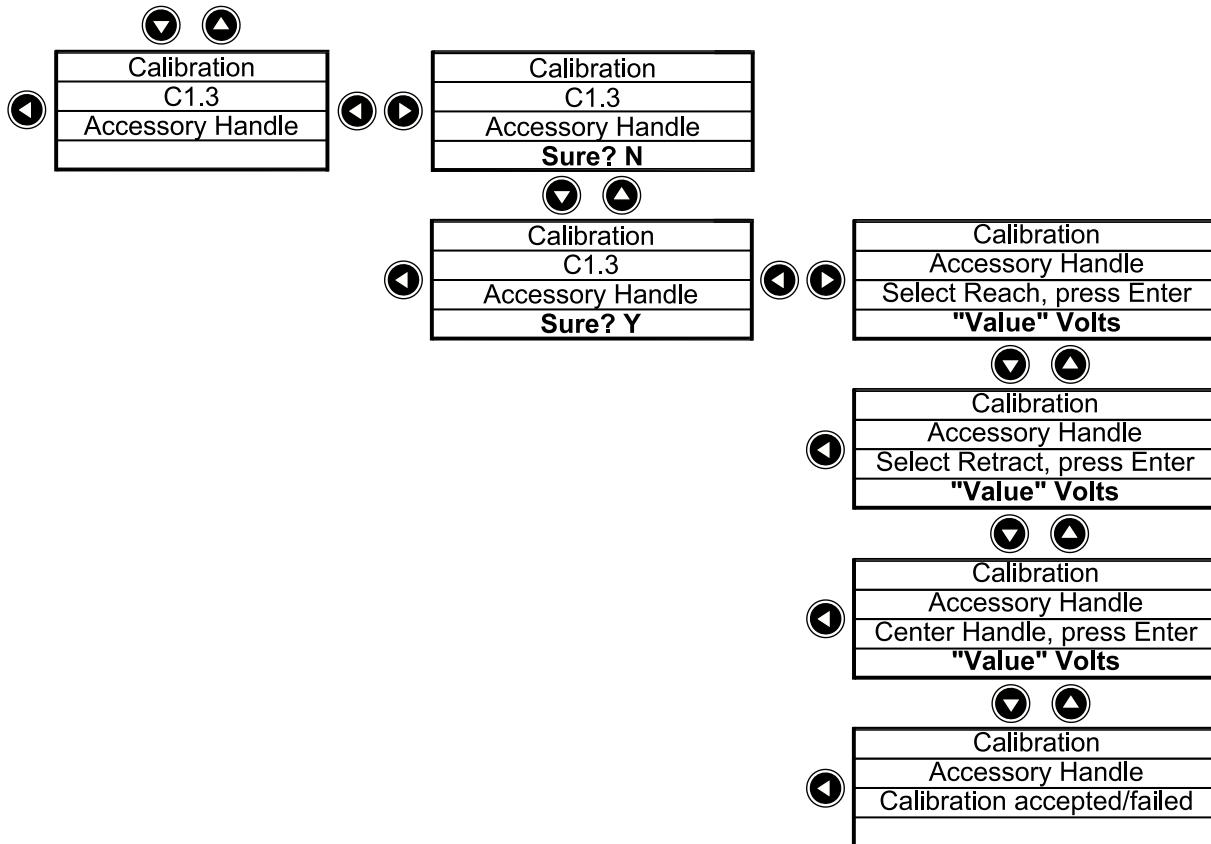


Fig. 44 (24134)

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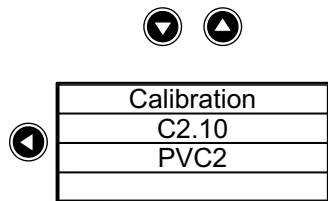
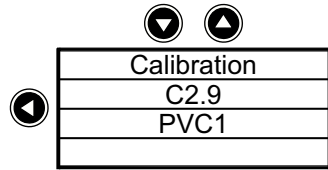


Fig. 54 (34169)

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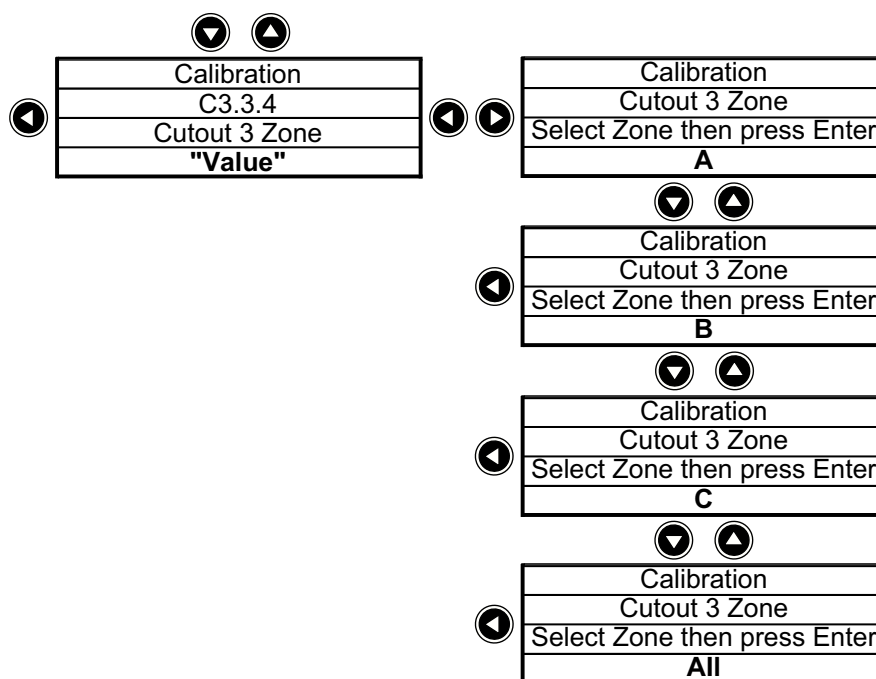


Fig. 64 (34194)

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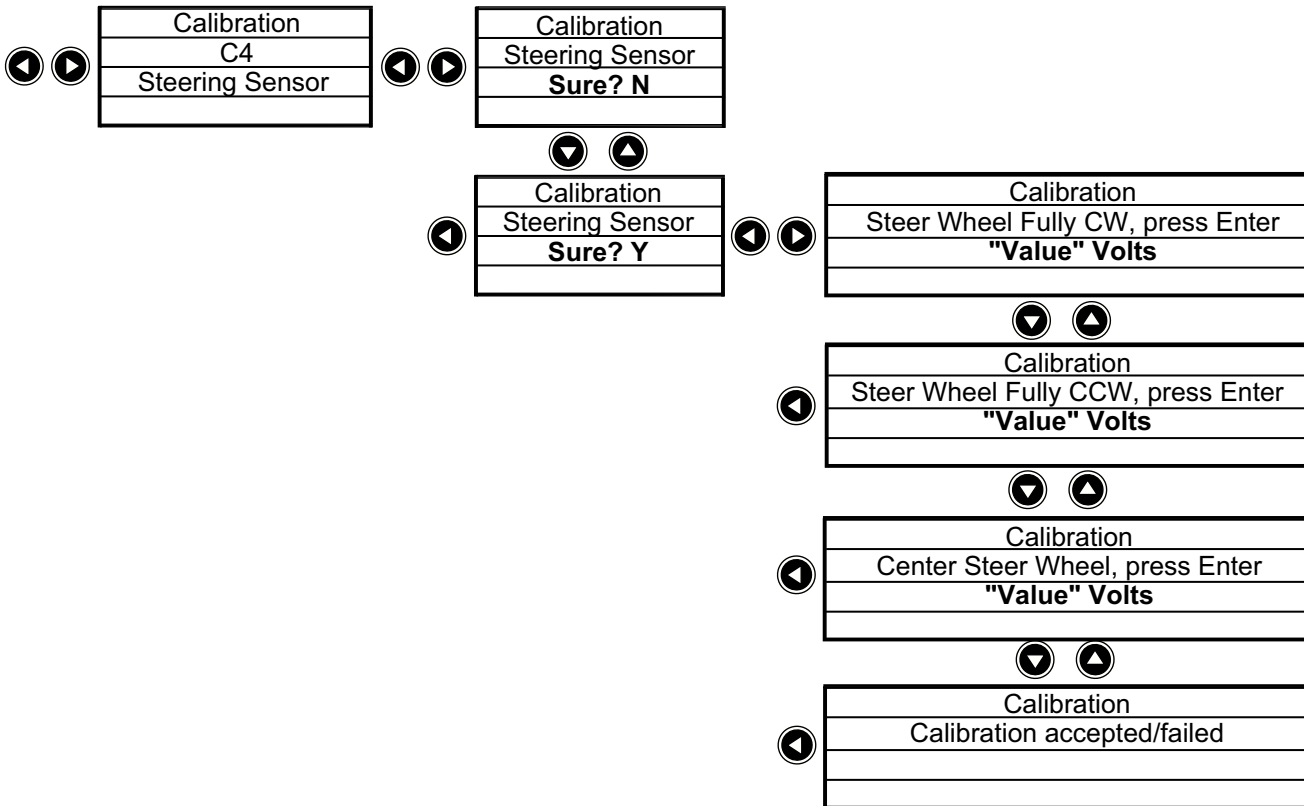
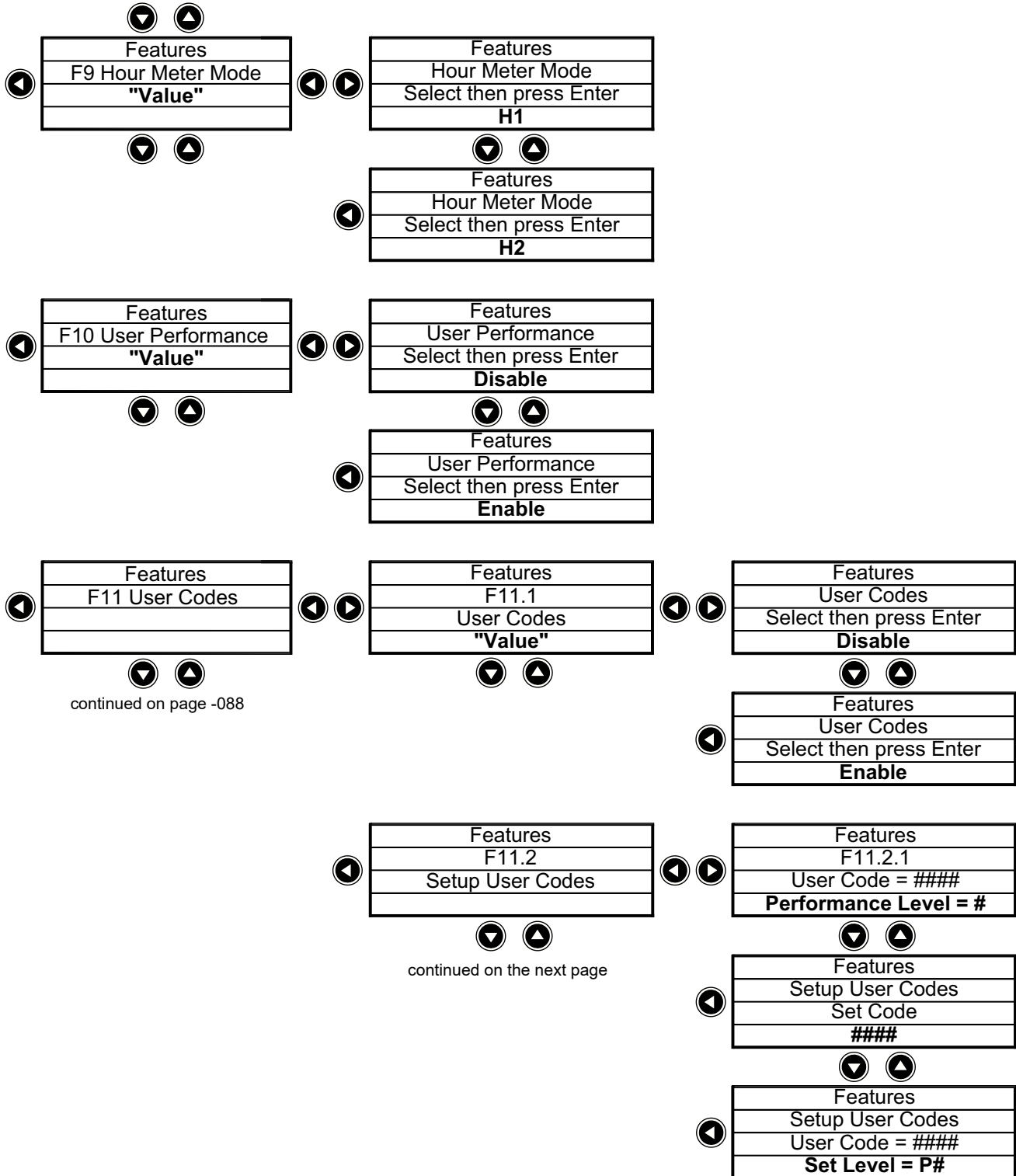


Fig. 74 (24148-02)

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Fig. 84 (24158-02)

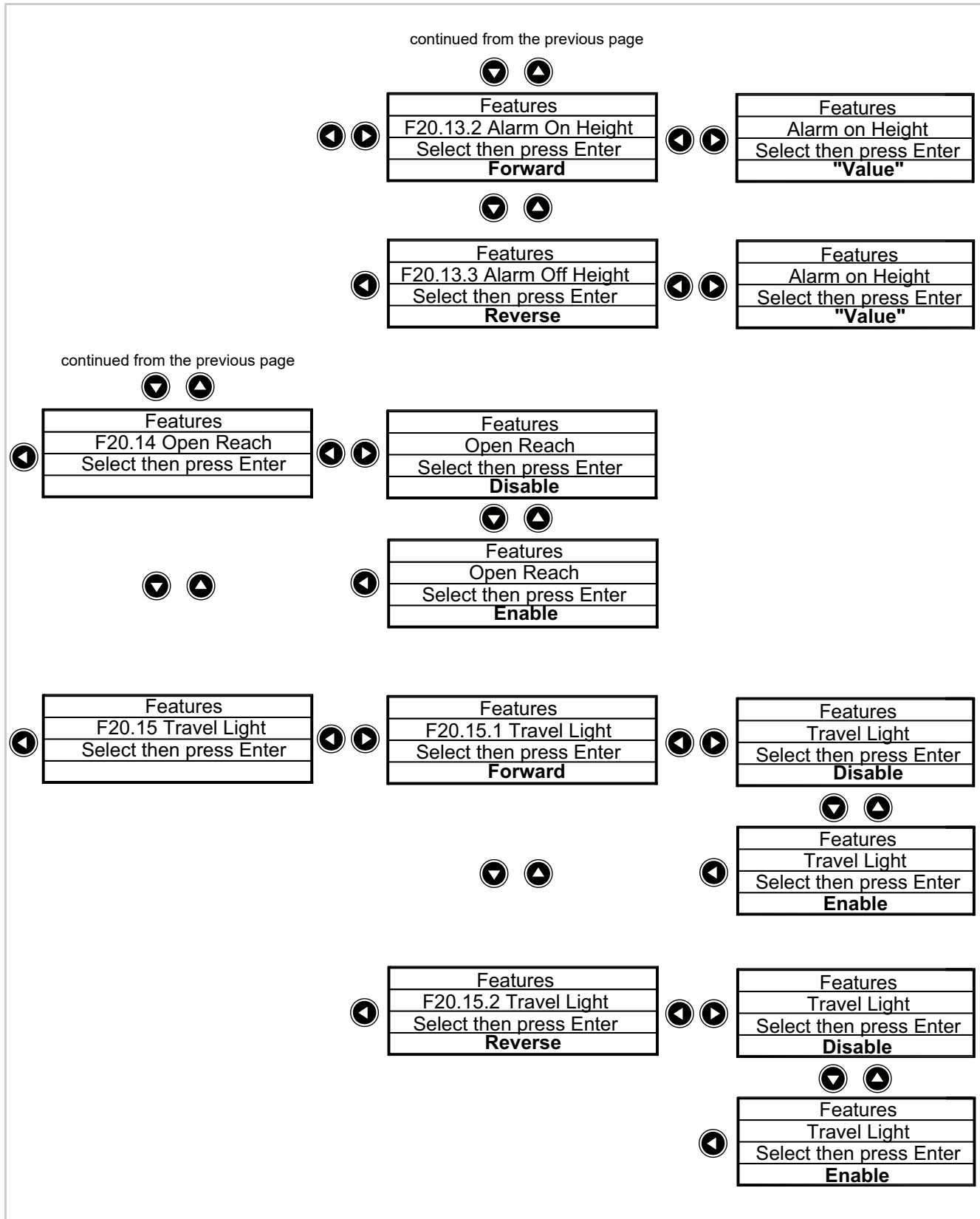


Fig. 94 (34216)

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Fig. 104 (24173-02)

Utilities Menu

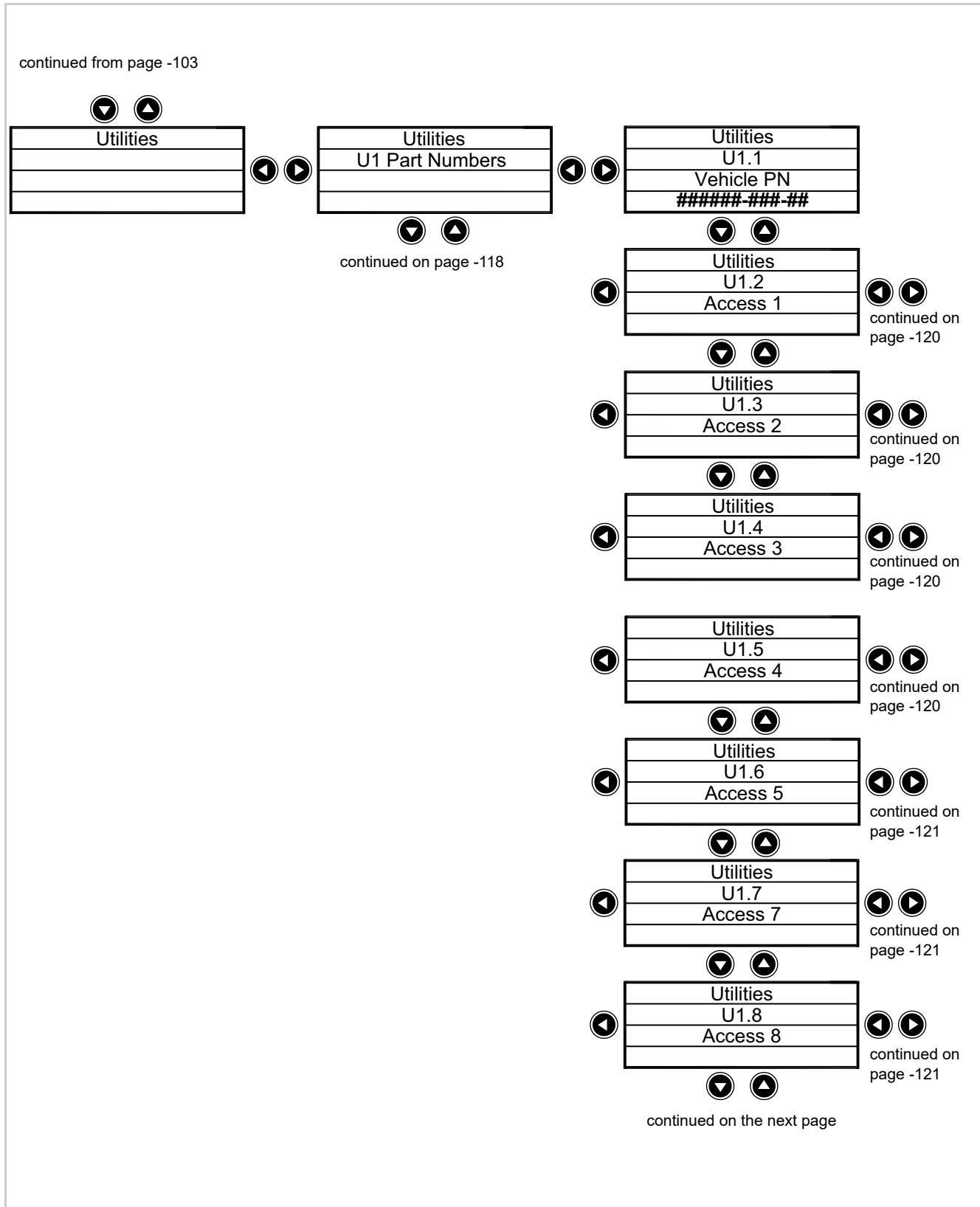


Fig. 114 (24182-02)

A2.2 Access 2 Input Menus

This menu shows the Access 2 inputs for DC hydraulic lift trucks.

A2 INPUTS		
A2.2 a)	Access 2 Input Menus	Menu Descriptions
A2.2.1 b)	ECR3 M2 Speed = ____ rpm (M2 speed feedback encoder)	This menu shows the hydraulic pump motor M2 speed in rpms. Access 1 shows Event Code 609 if the input is zero.
A2.2.2 c)	Target Speed = ____ rpm	This menu shows the speed command from Access 2 to the hydraulic pump motor (M2).
A2.2.3	Module Temp = ____ °C	This menu shows the temperature of Access 2.
		The lift truck performance decreases if the temperature is 75–105 °C (167–221 °F).
A2.2.4	M2 Voltage = ____ Volts	This menu shows the voltage between the +BV and P- terminals on Access 2.
		Access 1 shows Event Code 602 if M2 voltage is too low for the command.
		Access 1 shows and Event Code 603 if the voltage is too high for the command.
A2.2.5	Module Voltage = ____ Volts	This menu shows the battery voltage between the +BV and BNEG terminals on Access 2.
		Access 1 shows Event Code 224 or 226 if the voltage is incorrect.

a). Access 1 shows these menus only if the FEATURES Menu F3.9 LIFT SYSTEMS is set to DC

b). A2.2.1.1 and A2.2.2 must be approximately the same rpm. If the difference is large, the system does not operate correctly

c). A2.2.1.1 and A2.2.2 must be approximately the same rpm. If the difference is large, the system does not operate correctly

A2.3 Access 3™ Input Menus

This menu shows the Access 3™ inputs.

A2 INPUTS		
A2.3	Access 3™ Input Menus	Menu Descriptions
A2.3.1	ECR1 M1 Traction Speed (M1 speed feedback encoder)	Push the right arrow for the speed of the traction motor M1.
A2.3.1.1	Tach = ____ rpm (M1 speed feedback encoder)	This menu shows the speed of the traction motor M1 in rpms.
		Access 1 shows Event Code 332 if the speed is more than 4,000 rpm.

A3.2 Access 2 HCM/HDM Output Menus

This menu shows the Access 2 outputs.

A3 OUTPUTS		
A3.2	Access 2 HCM/HDM Output Menus	Menu Descriptions
A3.2.1 a)	M2 rms Current = ____ Amps	(AC) This menu shows the current output to the hydraulic pump motor (M2) in amps.
A3.2.1 b)	M2 Current = ____ Amps	(DC) This menu shows the current output to the hydraulic pump motor (M2) in amps.
A3.2.2 b)	P2 = ____	On = The contactor coil is energized.
		Off = The contactor coil is not energized.

a). Access 1 shows this menu only if the FEATURES Menu F3.9 LIFT SYSTEM is set to AC, AC WITH REGEN, or AC WITH XL AND REGEN

b). Access 1 shows this menu only if the FEATURES Menu F3.9 LIFT SYSTEM is set to DC

A3.3 Access 3™

This menu shows the Access 3™ outputs.

A3 OUTPUTS		
A3.3	Access 3™ Output Menus	Menu Description
A3.3.1	ED = ____	Push the right arrow for the outputs to the ED coil.
A3.3.1.1	Duty Cycle = ____ %	This menu shows the percentage of voltage on time (duty cycle).
		0% = The coil is not energized
		50% = The coil is energized.
		Multiply the duty cycle (A3.3.1.1) by the battery voltage (A2.4.26) and then divide by 100%. This is the voltage applied across the coil.
A3.3.1.2	Current = ____ mA	This menu shows the ED current in milliamps.
		0 mA = The coil is not energized.
		700 mA = The coil is energized.
A3.3.2 a)	ALM2 Travel Alarm = ____ %	This menu shows the percentage of voltage applied to the travel alarm.
		0% = The travel alarm does not operate.
		100% = The travel alarm operates.
A3.3.3	M1 rms Current = ____ Amps	This menu shows the Traction Motor (M1) rms phase current in amps.

A4 TEST OUTPUTS		
A4.4	Access 4 Test Output Menus	Menu Descriptions
A4.4.12 b)	SVR Reach	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		The correct voltage = 18–20 V.
A4.4.13 b)	SVS Sideshift	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		The correct voltage = 18–20 V.
A4.4.14 b)	SVT Tilt	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		The correct voltage = 18–20 V.
A4.4.15	FAN1 and FAN2	FAN1 is the fan for the traction motor compartment.
		Push ENTER. ⇒ The fan must operate.
A4.4.16	HN	Push ENTER. ⇒ The horn must operate.
A4.4.18	Brake (outer)	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		Push ENTER. ⇒ The outer brake must release.
A4.4.19	Brake (inner)	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		Push ENTER. ⇒ The inner brake must release.
A4.4.20 c)	Brake (caster)	To do the test, see the steps in the A4 TEST OUTPUTS introduction.
		Push ENTER. ⇒ The caster brake must operate.

- a). Access 1 does not show this menu if the FEATURES Menu F3.9 LIFT SYSTEM is set to AC WITH REGEN
- b). Access 1 shows this menu only if the FEATURES Menu F14 Access 7 is set to Disable
- c). Access 1 shows this menu only if the FEATURES Menu F3.2 NUMBER OF PEDALS is set to 5 PEDALS

C3.X.2 CUTOUT TYPE	
Cutout Type	Description
NONE	No cutout.
RAISE CUTOUT	This type of cutout operates during raise only.
	The operator can raise the forks above the cutout. 1. The operator must move the multi-task handle to the center position. 2. The operator must push and hold the override switch, and then use the multi-task control handle to raise the forks.
LATCHED RAISE CUTOUT	This type of cutout operates during raise only.
	This type of cutout is the same as the raise cutout, but when the operator raises the forks, the operator can release the override switch.
RAISE STOP	This type of cutout cause the raise to stop when the forks are at the cutout.
	The operator cannot raise the forks above a RAISE STOP.
LOWER CUTOUT	This type of cutout operates during lower only.
	The operator can lower the forks below the cutout. 1. The operator must move the multi-task handle to the center position. 2. The operator must push and hold the override switch, and then use the multi-task control handle to lower the forks.
LATCHED LOWER CUT-OUT	This type of cutout is the same as the lower cutout, but when the operator lowers the forks, the operator can release the override switch.

C3.X.3 Cutout X Speed

The cutout speed can be set from 0–6.4 km/h (0–4.0 mph). For example:

- If C3.X.3 is set to 1.61 km/h (1 mph), the cutout occurs only if the lift truck travels at or more than 1.61 km/h (1 mph).
 - If C3.X.3 is set to 0 km/h (0 mph), the cutout occurs at all travel speeds.
1. Push the right arrow to set the travel speed at which the cutout occurs.
 2. Push the up and down arrows to set the speed in km/h if FEATURES Menu F2 = Enable or mph if F2 = Disable.

C3.X.4 Cutout X Zone

1. Push the right arrow to set the zone that triggers the cutout.
2. Push the up and down arrows to scroll to the applicable menu (A, B, C, or ALL).
3. Push ENTER to set the zone.

C3.99 Clear All Cutouts

1. Push the right arrow.
2. Push the up and down arrows to scroll to SURE? N (to cancel clearing all cutouts) or SURE? Y (to clear all cutouts).
3. Push ENTER.

C4 Electronic Power Steering Sensor Calibration

Use these menus to calibrate the electronic power steering sensor.

Navigating in the C4 Electronic Power Steering Sensor Calibration Menus

1. Push the right arrow to go to the Steering Sensor calibrations.
2. Push the up and down arrows to scroll through the menus.

Features Menu

F10–F15 Features Menu Descriptions

FEATURES (F10–F15)			
Menu Levels	Sub-Menu	Display	Menu Description
F10 ^{a)}	N/A	USER PERFORMANCE	ENABLE = The operator can set the performance level of the lift truck (P1, P2, or P3).
			DISABLE = The operator cannot set the performance level of the lift truck.
F11 ^{b)}	N/A	USER CODES	This menu lets the operator make a maximum of 25 four digit user codes.
			Each user code can apply to one of the three performance levels (P1, P2, or P3).
	F11.1	USER CODES = ____	ENABLE = The operator must enter a user code to operate the lift truck.
			DISABLE = User codes are off.
F11.2 ^{c)}	SETUP USER CODES	<p>This menu lets the operator add or change a maximum of 25 user codes that have four digits.</p> <ol style="list-style-type: none"> 1. Enter or change the user code 2. Push ENTER. 3. Push the down arrow to scroll to the performance level menu for the user code. 4. Push ENTER. ⇒ The performance level is set. 	
F11.3 ^{c)}	TIMEOUT = ____	Use this menu to set the number of minutes the lift truck is not operating (key switch turned on with no pedals pressed) before the operator must start the lift truck again.	
		<p>NEVER = The timeout feature is disabled.</p> <p>Use the up and down arrows to set the timeout in minutes.</p>	
F12 ^{d)}	N/A	RACK SELECT = ____	ENABLE = Lets the operator use the RACK SELECT heights that are set in the OPERATOR LEVEL USER RACK.
			DISABLE = Does not let the operator use RACK SELECT in the OPERATOR LEVEL.

Performance Menu

Performance Menu

Performance Menu Overview

The Performance Menu has multiple levels of access and authorization:

OPERATOR:

- If the FEATURES Menu F10 is set to Enable, the operator can set or change the performance level (P1, P2, or P3).
- If the FEATURES Menu F10 is set to Disable, the operator cannot set or change the performance level.
- If a performance level is set to the operator user code, the operator cannot set or change the performance level.

SERVICE LEVEL:

These menus allow the service technician to view and modify the performance settings.

- P1 SETUP P1
- P2 SETUP P2
 - Access 1 shows this menu only if the FEATURES Menu F10 USER PERFORMANCE or F11 USER CODE is set to Enable.
- P3 SETUP P3

- Access 1 shows this menu only if the FEATURES Menu F10 USER PERFORMANCE or F11 USER CODE is set to Enable.

Performance Menu Access

Note: To scroll through the Performance Menu, see the tables in this section of the service manual.

1. Turn on the lift truck.
2. Scroll to the SERVICE Menu, LEVEL 2 Menu.
3. Push the right arrow.
4. Use the up or down arrows to put in the first digit of the password.
5. Push the right arrow to move to the next digit.
6. Continue steps 4 and 5 until the last digit is entered.
7. Push ENTER.
8. Press the down arrow to scroll to the PERFORMANCE Menu.
9. Press the right arrow.
 - ⇒ Access 1 shows P1 SETUP P1.
10. Push the up or down arrows to view or change the applicable performance menu.

Performance Menu Descriptions

The setup structures are the same for each of the Performance Levels. The X in the menu below represents the applicable performance menu (P1, P2, or P3).

PERFORMANCE			
Menu Level	Sub-Menu	Display	Menu Description
PX.1	N/A	TRAVEL ACCELERATION	This setting controls the time it takes the lift truck to go from stopped to full-speed.
			1 = The slowest acceleration time.
			9 = The fastest acceleration time.
			The default setting is 9.

Utilities Menu

UTILITIES		
U1 Menu Level	Display	Menu Description
U1.10	UPPER CAMERA MODULE	U1.10.1 = Shows the part number for the upper camera module.
		U1.10.2 = Shows the part number for the upper camera module software.

- a). Access 1 shows this menu only if the FEATURES Menu F3.9 LIFT SYSTEM is set to AC, AC WITH REGEN, or AC WITH XL AND REGEN
- b). Access 1 shows this menu only if the FEATURES Menu F14 Access 7 is set to Enable
- c). Access 1 shows this menu only if the FEATURES Menu F3.9 LIFT SYSTEM is set to AC WITH REGEN, or AC WITH XL AND REGEN

U2–U5 Menu Descriptions

UTILITIES		
Menu Levels	Display	Menu Description
U2 a)	TOW MODE	ACTIVATE TOW MODE? N = Keeps the lift truck in the usual operation mode.
		ACTIVATE TOW MODE? Y = Sets the lift truck to the tow mode.
U3	LIFT TRUCK LOCKOUT	ENABLE = Sets the lift truck to an electronic lockout mode.
		DISABLE = Sets the lift truck to the usual operation mode.
U4 b)	ENERGY USAGE	U4.1 CLEAR CYLCE RECORDS ONLY = This selection lets the service technician clear the 16 cycle records.
		U4.2 CLEAR ALL = This selection lets the service technician clear the 16 cycle records and the cumulative record.
U5	STATISTICS	This menu lets the service technician see statistics for the Express Lower command.
		LOWER COMMAND MINUTES
		AVERAGE LOWER START HEIGHT
		XPRESS LOWER MINUTES
		XPRESS LOWER 120–200 FT/MIN
		XPRESS LOWER 200 FT/MIN OR MORE
RESET LOWER COMMAND MONITOR		
U6 c)	LIFT TRUCK SERIAL NUMBER	U6.1 SERIAL NUMBER

- a). See the SAFETY / Control of Hazardous Energy section for more information
- b). InfoLink® and a computer connection to the lift truck are necessary to see the Energy Usage records
- c.) The U6 menu is only available in Service Level 3

Battery Removal & Installation (S Series Truck Shown)

Battery Removal



CAUTION

Do not allow any metallic object to come in contact with the top of the battery cells. This may cause a short circuit when removing, installing or transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal and installation.

1. 1. Turn key switch OFF.
2. 2. Disconnect the battery.

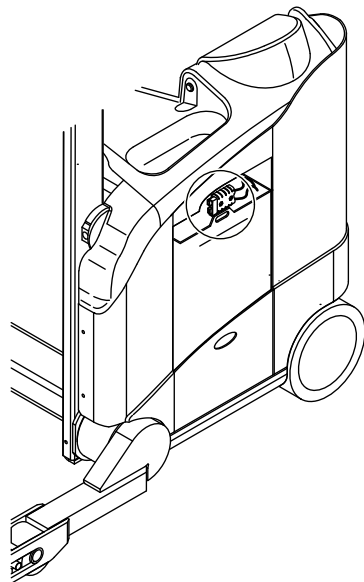


Figure 16817-01

3. 3. Lift and remove the battery retainer (one side only).

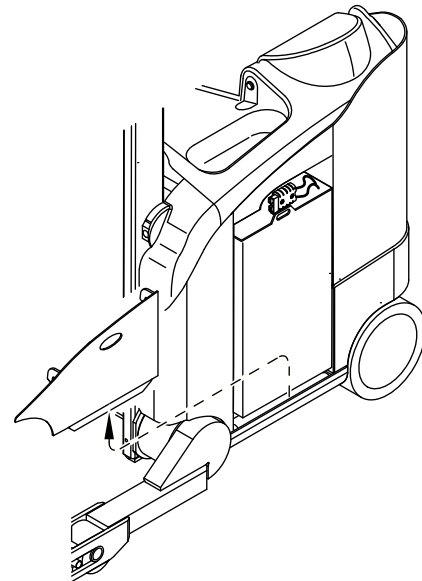


Figure 16818-01

4. 4. Position the battery roller stand next to the truck. Align the stand with the battery. Battery roller stand should be the same height as the truck's battery compartment rollers and as long as or longer than the battery.

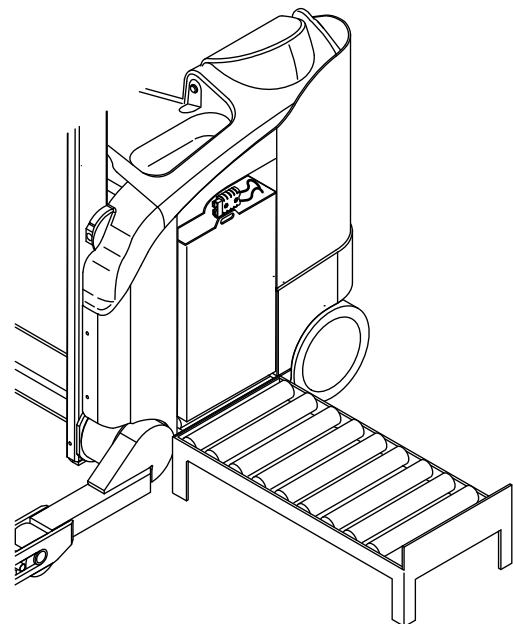


Figure 16819-01

Static Return to Off (SRO) Messages

During lift truck operation, messages can occur to tell the operator of the lift truck condition. After you correct the condition that causes the message, the condition will be removed. A list of the messages as seen on ACCESS 1 with a description of the message function follows:

1. Message Display
2. Enter Key
3. Navigation Arrows - Up, Down, Left and Right
4. Capacity Data Monitor (CDM) (Optional)

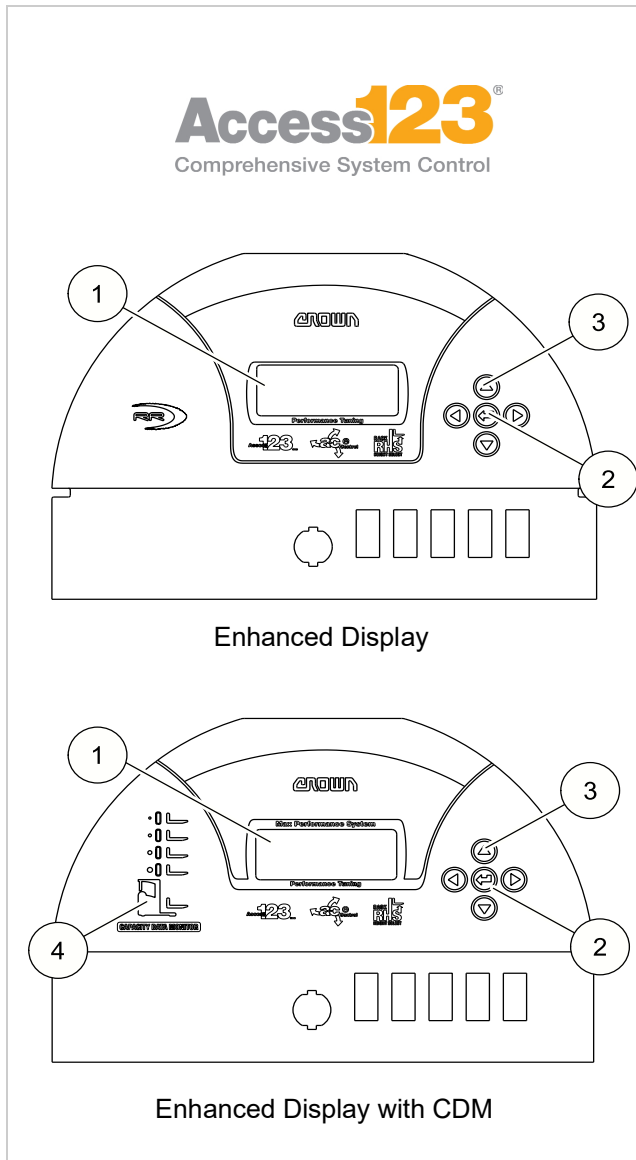


Fig. 2 (21865-01)

Symbols

Symbol	Definition
=	is equal to
≠	is not equal to
<	less than
≤	is equal to or less than
>	more than
≥	is equal to or more than
≈	is approximately

Event Code 113

ACCESS 3™ SOFTWARE INCOMPATIBLE

All lift truck functions are disabled.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 3™ does not let you install the new software.
 - Then replace ACCESS 3™.

Event Code 114

ACCESS 4 SOFTWARE INCOMPATIBLE

All lift truck functions are disabled.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 4 does not let you install the new software.
 - Then replace ACCESS 4.

Event Code 115

ACCESS 5 SOFTWARE INCOMPATIBLE

All lift truck functions are disabled.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 5 does not let you install the new software.
 - Then replace ACCESS 5.

Event Code 116

ACCESS 1 SOFTWARE INCOMPATIBLE WITH ACCESS 7

All lift truck functions are disabled.

ACCESS 1 checks for the correct software at ACCESS 7 during start-up.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 7 does not let you install the new software.
 - Then replace ACCESS 7. Turn off the lift truck. Then turn on the lift truck again. Monitor the event.

Event Code 117

ACCESS 1 SOFTWARE INCOMPATIBLE WITH ACCESS 2

All lift truck functions are disabled.

ACCESS 1 checks for the correct software at ACCESS 2 during the lift truck start.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 2 does not let you install the new software.
 - Then replace ACCESS 2. Turn off the lift truck. Then turn on the lift truck again. Monitor the event.

Event Code 118

ACCESS 1 SOFTWARE INCOMPATIBLE WITH ACCESS 8

All lift truck functions are disabled.

ACCESS 1 checks for the correct software at ACCESS 8 during the lift truck start.

Step 1: Install the newest software into all lift truck modules.

- If: ACCESS 8 does not let you install the new software.
 - Then replace ACCESS 8. Turn off the lift truck. Then turn on the lift truck again. Monitor the event.

Event Code 119

ACCESS 1 SOFTWARE INCOMPATIBLE WITH UPPER CAMERA INTERFACE MODULE1 (MAST)

All lift truck functions are enabled.

ACCESS 1 checks for the correct software at CIM1 during the lift truck start.

Step 1: Install the newest software into all lift truck modules.

- If: CIM1 does not let you install the new software.
 - Then replace CIM1. Turn off the lift truck. Then turn on the lift truck again. Monitor the event.

Event Code 226

ACCESS 2 INTERNAL TEMPERATURE EXCEEDS 85 °C (185 °F)

All lift truck functions are enabled.

Step 1: Check the condition of ACCESS 2.

- If: The ACCESS 2 heatsink is dirty.
 - Then use air to clean the heatsink.
- If: The ACCESS 2 heatsink is clean.
 - Then continue to Step 2.

Step 2: Check the installation of ACCESS 2.

- If: ACCESS 2 is loose.
 - Then tighten the installation hardware.
- If: ACCESS 2 is not loose.
 - Then continue to Step 3.

Step 3: Check the operation of FAN3. See the outputs to FAN3 in ANALYZER MENU ► A3.3.4. Do a test of FAN3 in A4.3.3.

- If: FAN3 does not operate correctly.
 - Then correct the FAN3 operation problem.
- If: FAN3 does operate correctly and ACCESS 2 is extremely hot.
 - Then check the power cable connections.

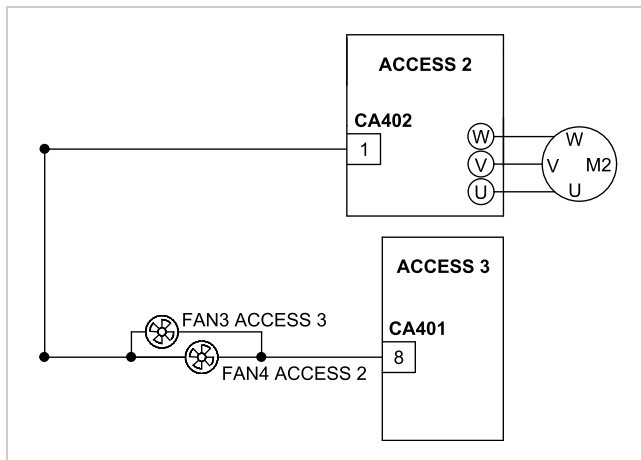


Fig. 22 (21798)

Event Code 227

ACCESS 2 INTERNAL TEMPERATURE EXCEEDS 105 °C (221 °F)

All lift truck functions are enabled.

Refer to Event Code 226.

Event Code 228

ACCESS 2 AC LIFT PUMP MOTOR (M2) TEMPERATURE SENSOR (TS2) ABOVE RANGE 165 °C (329 °F)

The hydraulic system is disabled.

Possible cause:

- A very heavy hydraulic duty cycle
- High temperatures in the operation environment.

Step 1: Check the M2 performance settings.

- If: The settings are incorrect.
 - Then make corrections to the M2 settings.
- If: The settings are correct.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Check the wires to TS2 and the M2 power cable connections. Blow off any dirt buildup from M2.

- If: The wires and connections are correct and M2 is clean, but the event code continues.
 - Then check the battery condition. Refer to Event Code 222.

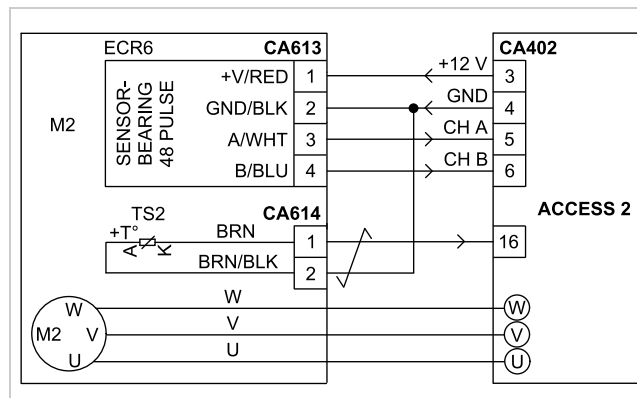


Fig. 23 (21799)

Event Code 278

ACCESS 2 OVER CURRENT CONDITION

All hydraulic functions are disabled.

Step 1: Turn off the lift truck. Disconnect the M2 power cables from ACCESS 2. Turn on the lift truck.

- If: The event code continues.
 - Then replace ACCESS 2.
- If: The event code does not continue.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Check the M2 power cables for phase to phase or phase to lift truck frame short circuits.

- If: There is a short circuit between the U, V, or W power cables or to the lift truck frame (with the power cables connected to M2).
 - Then continue to Step 3.

Step 3: Keep the lift truck OFF. Disconnect the power cables from M2. Check for a short circuit from the M2 windings to the lift truck frame.

- If: There is a short circuit in the windings.
 - Then replace M2.
- If: There is no short circuit in the windings.
 - Then repair or replace the M2 power cables.

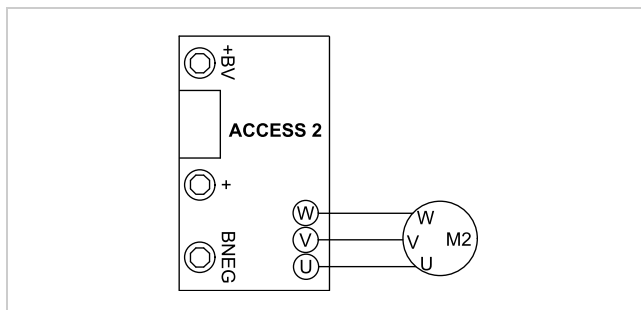


Fig. 35 (21804)

Event Code 279 Event Code 280

ACCESS 2 INTERNAL SHORT

All hydraulic functions are disabled.

Step 1: Turn off the lift truck. Then turn on the lift truck again.

- If: The event code continues.
 - Then replace ACCESS 2.

Event Code 281 Event Code 282

ACCESS 2 SHORT

All hydraulic functions are disabled.

Event Code 281: ACCESS 2 Short Between +BV and Terminal U

Event Code 282: ACCESS 2 Short Between BNEG and Terminal U

Refer to Event Code 278.

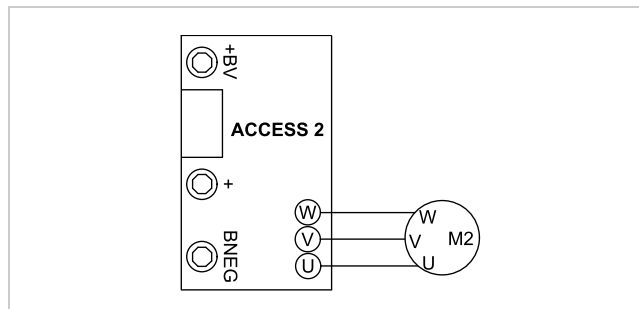


Fig. 36 (21804)

Event Code 337

ACCESS 3™ BATTERY VOLTAGE (+BV) FLUCTUATING

The hydraulic system is disabled.

The battery voltage decreases too much when it is under load.

Step 1: Turn on the lift truck. Measure the voltage at the ACCESS 3™ BNEG terminal and the ACCESS 3™ +BV terminal.

⇒ The correct voltage = +BV.

- If: The voltage < +BV.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Check the power cables and power cable connections.

- If: The power cables and connections are correct.
 - Then continue to Step 3.
- If: The power cables or connections are not correct.
 - Then make repairs or replacements as necessary.

Step 3: Check the battery charge and the individual cell conditions.

- If: The battery condition is not satisfactory.
 - Then make repairs or replacements as necessary.
- If: The battery is correctly charged and has the correct specifications.
 - Then continue to Step 4.

Step 4: Install a battery that you know is good. Monitor for Event Code 337.

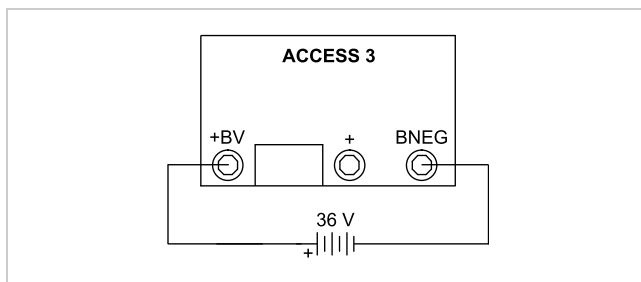


Fig. 48 (21807)

Event Code 366 Event Code 367

ACCESS 3 12 V POWER SUPPLY FOR ECR1 OUT OF RANGE

All lift truck functions are disabled.

Event Code 366: ACCESS 3 12 V Power Supply for ECR1 Out of Range (High)

Event Code 367: ACCESS 3 12 V Power Supply for ECR1 Out of Range (Low)

Step 1: Turn on the lift truck. Measure the voltage at ACCESS 3™ CA401-3 and the distribution panel TP1 (BNEG).

- If: The voltage = 0 V.
 - Then replace ACCESS 3™.
- If: The voltage ≈ 12 V and the event code continues.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Disconnect the wire from CA401-3. Turn on the lift truck. Measure the voltage at ACCESS 3™ CA401-3 and the distribution panel TP1 (BNEG).

- If: The voltage = 12 V.
 - Then replace ECR1.
- If: The voltage is not ≈ 12 V and the event code continues.
 - Then replace ACCESS 3™.

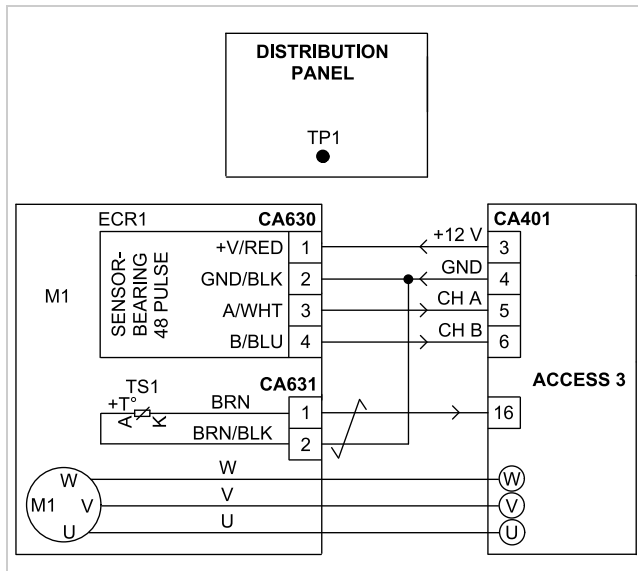


Fig. 58 (21808)

Event Code 368 Event Code 369

ACCESS 3™ INTERNAL 15 V POWER SUPPLY OUT OF RANGE

All lift truck functions are disabled.

Event Code 368: ACCESS 3™ Internal 15 V Power Supply Out of Range (High)

Event Code 369: ACCESS 3™ Internal 15 V Power Supply Out of Range (Low)

Step 1: Turn off the lift truck. Then turn on the lift truck again.

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

Event Code 370 Event Code 371

ACCESS 3™ INTERNAL 5 V POWER SUPPLY OUT OF RANGE

All lift truck functions are disabled.

Event Code 370: ACCESS 3™ Internal 5 V Power Supply Out of Range (High)

Event Code 371: ACCESS 3™ Internal 5 V Power Supply Out of Range (Low)

Step 1: Turn off the lift truck. Then turn on the lift truck again.

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

Event Code 420

ACCESS 4 LOWER SOLENOID (SVL) DRIVER OVER CURRENT

The raise and lower functions are disabled.

The SVL driver output has a short circuit to +BV.

Step 1: Turn off the lift truck. Disconnect the negative wire from SVL. Turn on the lift truck.

- If: The event code changes to open circuit (Event Code 803).
 - Then there is a short circuit in SVL or the positive circuit. Continue to Step 2.
- If: The event code continues.
 - Then there is a short circuit internal to ACCESS 4 or in the negative circuit. Continue to Step 3.

Step 2: Turn off the lift truck. Measure the resistance across SVL from the positive terminal to the negative terminal.

- ⇒ The correct resistance $\approx 30 \Omega$.
- If: The resistance is not $\approx 30 \Omega$.
 - Then there is a short circuit in SVL. Replace SVL.
- If: The resistance $\approx 30 \Omega$.
 - Then there is a short circuit in the positive circuit. Repair or replace the wire from ACCESS 4 CA410-4 to SVL.

Step 3: Keep the lift truck OFF. Disconnect the negative wire from ACCESS 4 CA411-26. Turn on the lift truck.

- If: The event code changes to open circuit (Event Code 803).
 - Then there is a short circuit in the negative circuit. Repair or replace the wire from ACCESS 4 CA411-26 to SVL.
- If: The event code continues.
 - Then continue to Step 4.

Step 4: Check the CA411 connector for damage.

- If: There is no damage or short circuit in the connector.
 - Then replace ACCESS 4.

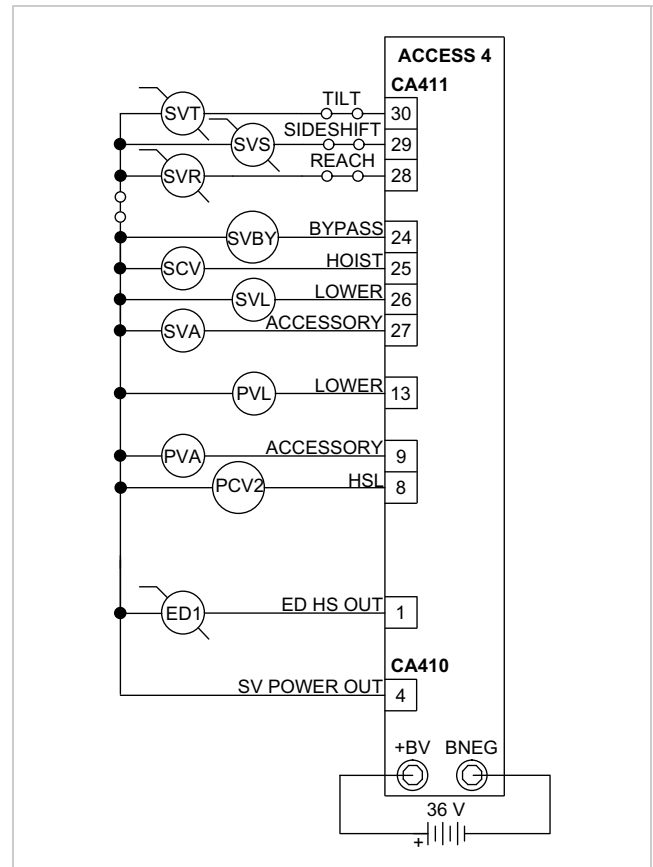


Fig. 68 (21818-03)

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Event Code 443

ACCESS 4 INNER BRAKE (BRK1) COIL RESISTANCE HOT (BRAKE IS DRAGGING)

The traction function is disabled.

The BRK1 coil resistance is higher than the operation range. Use ANALYZER MENU ► A3.4.19 to check the current and resistance.

Possible causes:

- The BRK1 temperature could be too hot
- There could be a connection problem.



CAUTION

BRK1 could be very hot. It can burn your skin.

Step 1: Let BRK1 become cool. Make sure that the BRK1 air gap and torque gap are correct and that the bolts are tight.

- If: The air gap or torque gap is incorrect.
 - Then correct the air gap or the torque gap.
- If: The air gap and torque gap are correct.
 - Then continue to Step 2.

Step 2: Use ANALYZER MENU ► A4.4.19 to do a test of the BRK1 inner brake operation.

- If: BRK1 releases correctly.
 - Then continue to Step 3.
- If: BRK1 does not release.
 - Then continue to Step 4.

Step 3: Turn off the lift truck. Disconnect ACCESS 4 CA410. Check the wire continuity from CA410-6 to the inner coil. Then check the wire continuity from CA410-7 to the inner coil.

- If: There is damage to the wires or connectors.
 - Then make the necessary repairs or replacements.
- If: The wires and connectors are satisfactory.
 - Then continue to Step 4.

Step 4: Use ANALYZER MENU ► A3.4.19 to check the BRK1 current.

⇒ The correct current \approx 2 A.

- If: The current \approx 2 A.
 - Then BRK1 has a mechanical problem. Repair or replace BRK1.

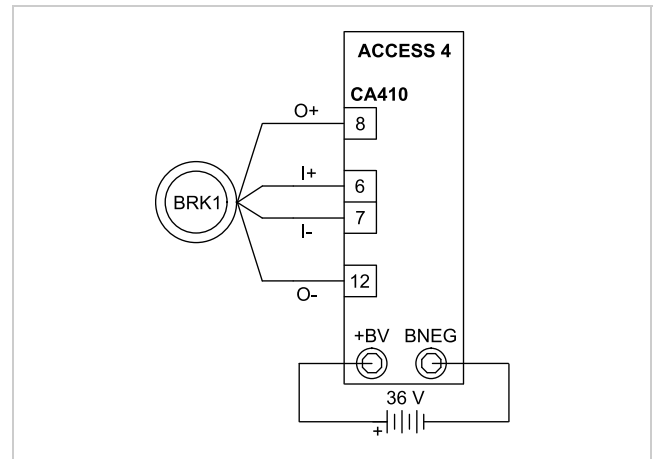


Fig. 78 (21821)

Event Code 444

ACCESS 4 INNER BRAKE (BRK1) RESISTANCE HIGH

Decreased traction speed, usually $<$ 1.61 km/h [1 mph].

The BRK1 coil resistance is higher than a typical hot brake, but there is no open circuit. Use ANALYZER MENU ► A3.4.19 to check the current and resistance.

Possible causes:

- The BRK1 temperature could be too hot
- There could be a connection problem.



CAUTION

BRK1 could be very hot. It can burn your skin.

Refer to Event Code 443.

Event Code 467

ACCESS 4 HEIGHT RESET SWITCH (HGTRS2) INPUT ISSUE

The raise function is disabled.

Step 1: Turn on the lift truck. Use ANALYZER MENU ► A2.4.2 monitor the HGTRS2 input.

- ⇒ HGTRS2 is closed (0 V) below mast staging
- ⇒ HGTRS2 is open (12 V) above mast staging.
- If: The HGTRS2 status changes correctly.
- If: The HGTRS2 status does not change correctly.
 - Then continue to Step 2.

Step 2: Keep the lift truck ON. Measure the voltage at ACCESS 4 CA411-33 (COMM) and CA411-4. Measure the voltage with the switch open and closed.

- If: The input voltages are not correct.
 - Then check HGTRS2 and the related wires.
 - Make the necessary repairs or replacements.
- If: The input voltages are correct.
 - Then continue to Step 3.

Step 3: Check the mechanical operation of HGTRS2. Make sure that the wheel operates correctly for the full length of the rail. Make sure that the shims have the correct distance.

- If: The HGTRS2 mechanical operation and shims are satisfactory.
 - Then replace ACCESS 4.

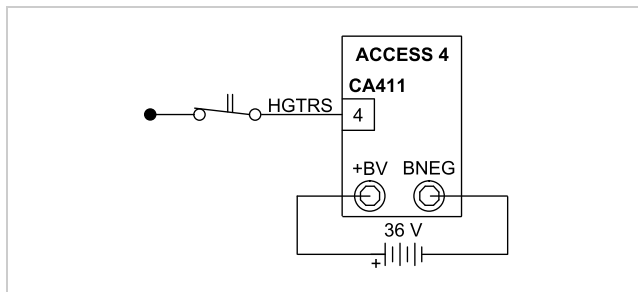


Fig. 92 (21824)

Event Code 468

ACCESS 4 STEER TILLER SENSOR (ECR7) SUPPLY VOLTAGE ISSUE

The traction function is disabled.

The ECR7 supply voltage is out of the correct range (5 V) (hydraulic steer lift trucks only).

Step 1: Turn on the lift truck. Measure the ECR7 supply voltage at CA408-1 and CA408-4.

⇒ The correct supply voltage = 5 V.

- If: The voltage = 5 V.
 - Then replace ECR7.
- If: The voltage is > 5 V.
 - Then continue to Step 2.

Step 2: Check the wires from ECR7 to ACCESS 4 CA412-20 and CA412-23 for an open circuit.

- If: The wires and connections are satisfactory.
 - Then replace ACCESS 4.

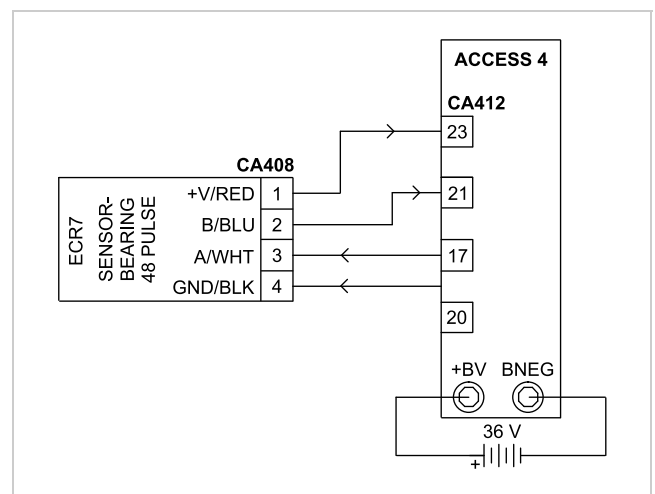


Fig. 93 (21825)

Event Code 491

ACCESS 4 REVERSE (RS) AND FORWARD (FS) SWITCH MISMATCH

The traction function is disabled.

Step 1: Use ANALYZER MENU ► A2.4.16 and A2.4.17 to check the RS and FS inputs.

- If: The two inputs show CLOSED.
 - Then continue to Step 2.

Step 2: Measure the input voltage at ACCESS 4 CA412-14 and CA412-15.

- If: The two voltages = 5 V.
 - Then repair or replace RS and FS, or the related wires.
- If: The two voltages \neq 5 V.
 - Then replace ACCESS 4.

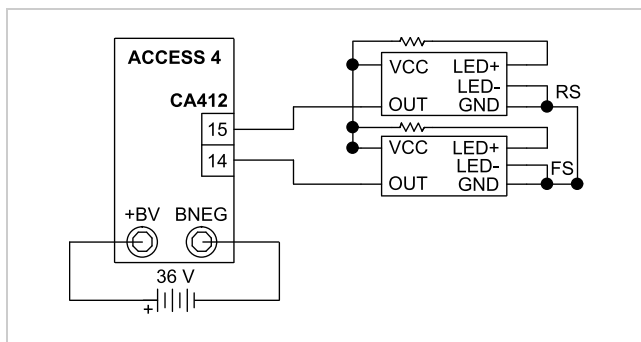


Fig. 106 (21829)

Event Code 492

ACCESS 4 FORWARD SWITCH (FS) CLOSED IN REVERSE DIRECTION

The traction function is disabled.

Possible cause: a short circuit in the FS circuit.

Step 1: Use ANALYZER MENU ► A2.4.17 to check the FS input.

- If: The input shows CLOSED.
 - Then continue to Step 2.

Step 2: Measure the input voltage at ACCESS 4 CA412-14.

- If: The voltage = 5 V.
 - Then repair or replace FS or the related wire.
- If: The voltage \neq 5 V.
 - Then replace ACCESS 4.

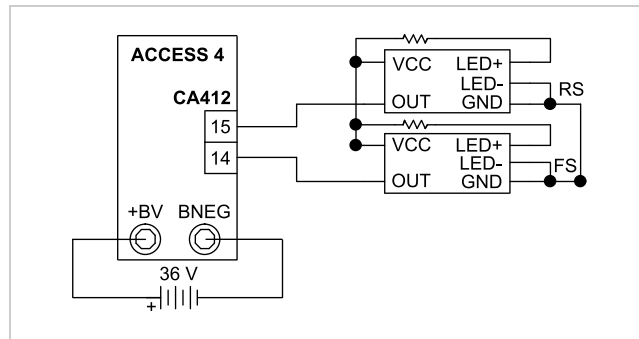


Fig. 107 (21829)

Event Code 493

ACCESS 4 REVERSE SWITCH (RS) CLOSED IN FORWARD DIRECTION

The traction function is disabled.

Possible cause: a short circuit in the RS circuit.

Step 1: Use ANALYZER MENU ► A2.4.16 to check the RS input.

- If: The input shows CLOSED.
 - Then continue to Step 2.

Step 2: Measure the input voltage at ACCESS 4 CA412-15.

- If: The voltage = 5 V.
 - Then repair or replace RS or the related wire.
- If: The voltage \neq 5 V.
 - Then replace ACCESS 4.

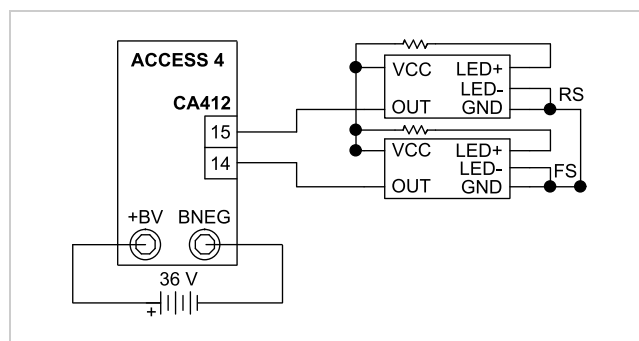


Fig. 108 (21829)

Event Code 513

TILLER SENSOR (RPS2) OUT OF RANGE HIGH

The traction function is disabled.

One or both of the RPS2 channels have a short circuit or is near 5 V.

Step 1: Turn on the lift truck. Use ANALYZER MENUS ► A2.5.6.2 and A2.5.6.3, to monitor the RPS1 and RPS2 output signals while you turn the steer tiller.

- If: Both of the Channel A and Channel B outputs \geq 1020 counts.
 - Then continue to Step 2.
- If: Only the Channel A output \geq 1020 counts.
 - Then continue to Step 3.
- If: Only the Channel B output \geq 1020 counts.
 - Then continue to Step 4.

Step 2: Check the RPS2 BNEG connections. Check the wire, crimp, contact, and connector at ACCESS 5 CA651-4 and splice 17. Turn on the lift truck. Measure the voltage at BNEG.

- If: The wire and connector are good and RPS2 BNEG is 0 V.
 - Then continue to Steps 3 and 4.
- If: The RPS2 supply voltage is not \approx BNEG.
 - Then replace ACCESS 5.

Step 3: Check the condition of the RPS2 Channel A wire (blue) for open circuits, short circuits, and problems with the contacts or connectors (CA652-1 and CA651-11).

- If: The wire, contact, or connector has damage or wear.
 - Then make the necessary repairs or replacements.
- If: There is no damage or wear.
 - Then replace RPS2.

Step 4: Check the condition of the RPS2 Channel B wire (brown) for open circuits, short circuits, and problems with the contacts or connectors (CA652-6 and CA651-10).

- If: The wire, contact, or connector has damage or wear.
 - Then make the necessary repairs or replacements.
- If: There is no damage or wear.
 - Then replace RPS2.

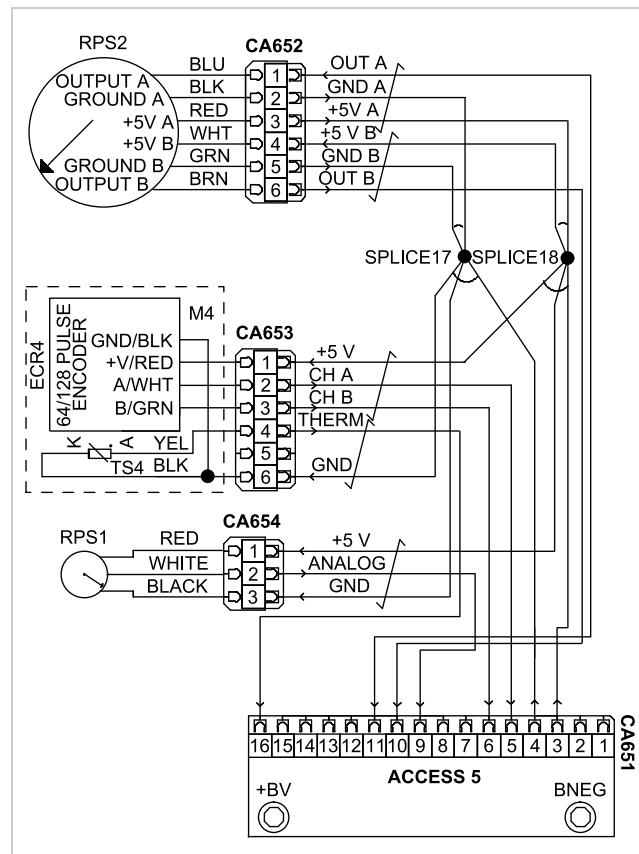


Fig. 118 (21833)

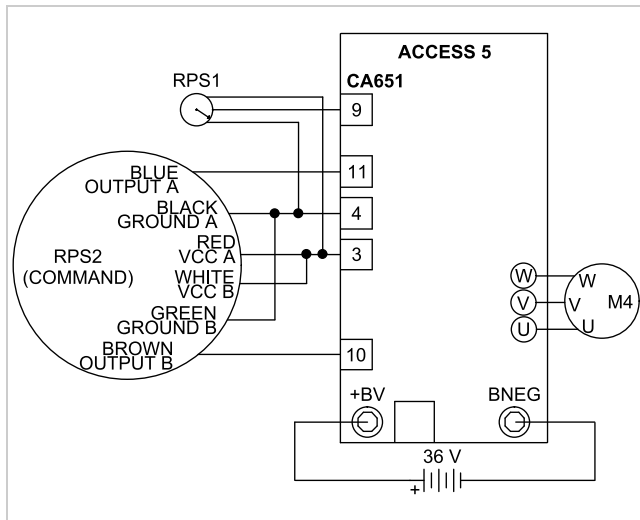


Fig. 128 (21830)

Event Code 552

ACCESS 5 STEERING FEEDBACK (RPS1) SIGNAL OUT OF RANGE (LOW)

The traction function is disabled.

The RPS1 feedback voltage is less than the permitted range (0.35–4.65 V).

Possible causes are:

- No power to RPS1
- A short circuit in the signal circuit
- A problem with RPS1 or ACCESS 5
- An incorrectly aligned steer gears.

Step 1: Use ANALYZER MENU ► A2.5.5.1 to monitor the RPS1 counts with the tire away from the hard stops.

⇒ The correct RPS1 output range ≈ 66–874 counts.

- If: The RPS1 signal is < 66 counts.
 - Then continue to Step 2.
- If: The RPS1 signal is in the permitted range.
 - Then continue to Step 3.

Step 2: Examine the RPS1 harness. Look for short circuits or damaged wires, correct wire crimps at the contacts, and the correct connector installation.

- If: There is a problem in the wires.
 - Then make the necessary repairs or replacements.
- If: The wires are satisfactory.

- Then replace RPS1. Use CALIBRATION MENU ► C4.1 to calibrate RPS1.

- If: The event code continues after you replace RPS1.

- Then replace ACCESS 5. Use CALIBRATION MENU ► C4.1 to calibrate RPS1.

Step 3: Use ANALYZER MENU ► A2.5.5.1 to monitor the RPS1 counts with the tire near the hard stops.

- If: The RPS1 signal is very near or < 66 counts.

- Then continue to Step 4.

- If: The RPS1 signal stays sufficiently above 66 counts.

- Then replace ACCESS 5. Use CALIBRATION MENU ► C4.1 to calibrate RPS1.

Step 4: Make sure that the RPS1 gear aligns correctly. Refer to Event Code 523.

- If: The gear is not aligned correctly.

- Then align RPS1 gear. Use CALIBRATION MENU ► C4.1 to calibrate RPS1.

- If: The gear is correctly aligned.

- Then replace RPS1. Use CALIBRATION MENU ► C4.1 to calibrate RPS1.

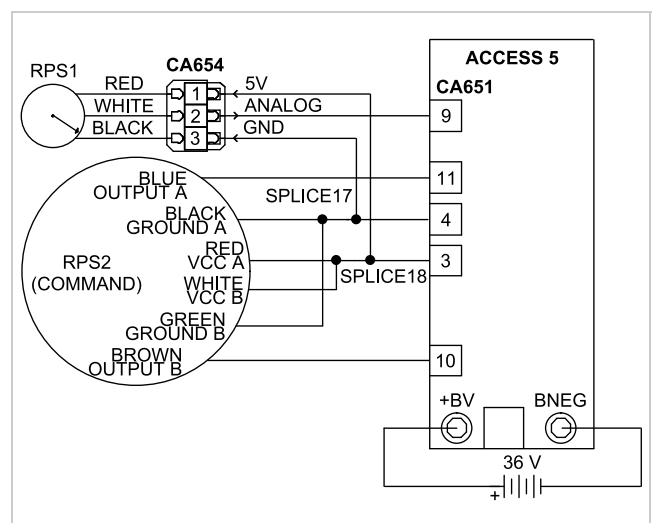


Fig. 129 (21837)

Event Code 657

UPPER CAMERA INTERFACE MODULE1 - OPTIONAL GENERAL PURPOSE DRIVER2 HIGH CURRENT

All lift truck functions are enabled.

GPD2 circuit is drawing too much current (more than 2 amps).

Step 1: Turn off the lift truck. Disconnect the green/white wire from GPD2 at the load. Turn on the lift truck. Monitor the event code.

- If: The event code changes to open circuit (Event Code 655).
 - Then there is a short circuit in the load or the positive circuit to the load. Continue to Step 2.
- If: The event code continues.
 - Then there is a short circuit internal to CIM1 or the green/white wire from CIM1 to the load. Continue to Step 3.

Step 2: Turn off the lift truck. Check the resistance across the load from the positive terminal to the negative terminal.

⇒ The correct resistance $\geq 18 \Omega$.

- If: There is a short circuit.
 - Then replace the driven component.
- If: The resistance $> 18 \Omega$.
 - Then check for a short circuit in the red/white wire from the load to CA842-13. Make the necessary repairs or replacements.

Step 3: Keep the lift truck OFF. Disconnect the green/white wire from CIM1 CA842-2. Turn on the lift truck. Monitor the event code.

- If: The event code changes to open circuit (Event Code 655).
 - Then there is a short circuit in the green/white wire. Make the necessary repairs or replacements.
- If: The event code continues.
 - Then examine CA842 for damage or a short circuit.
- If: There is no short circuit or damage to CA842.
 - Then replace CIM1.

Event Code 658

UPPER CAMERA INTERFACE MODULE1 - INVALID EVENT REPORTED

All lift truck functions are enabled.

The event code is not specified in the lift truck code. Consult the factory.

Event Code 707

ACCESS 7 CAN COMMUNICATION ERROR WITH ACCESS 4

All lift truck functions are disabled.

ACCESS 7 CAN bus communication with ACCESS 4 stopped.

Step 1: Turn on the lift truck. Check the status of the ACCESS 7 indicator light.

- If: The ACCESS 7 indicator light is ON.
 - Then continue to Step 3.
- If: The ACCESS 7 indicator light is OFF.
 - Then continue to Step 2.

Step 2: Then measure the power input voltage to ACCESS 7 at CA895-13 and CA895-24.

- If: The voltage = +BV.
 - Then replace ACCESS 7.
- If: The voltage \neq BV.
 - Then continue to Step 3.

Step 3: Turn off the lift truck. Measure the resistance from CA837-2 to CA837-1.

⇒ The correct resistance $\approx 60 \Omega$.

- If: The resistance is not $\approx 60 \Omega$.
 - Then continue to Step 4.
- If: The resistance $\approx 60 \Omega$.
 - Then replace ACCESS 7.

Step 4: Keep the lift truck OFF. Check the wire continuity.

CAN HIGH: Check the continuity from CA837-2 through the mast cables to CA204-5. Then check from CA205-4 to CA412-2.

CAN LOW: Check the continuity from CA837-1 through the mast cables to CA204-8. Then check from CA205-9 to CA412-1.

- If: There is damage to the wires or connectors.
 - Then make the necessary repairs or replacements.

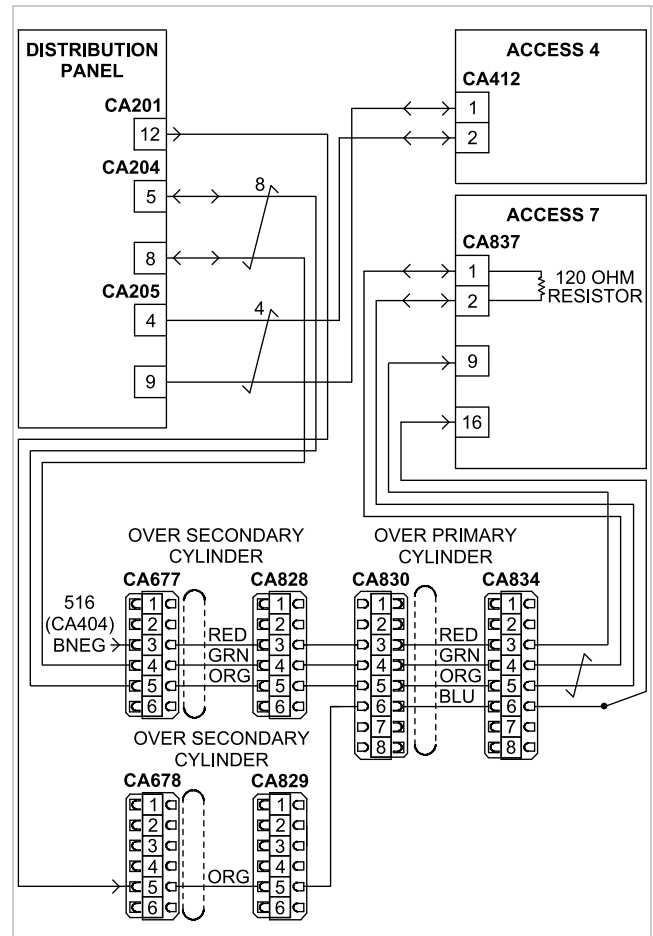


Fig. 145 (24972)

Event Code 723

ACCESS 7 SIDESHIFT SOLENOID (SVS) DRIVER OPEN CIRCUIT

The raise and lower functions are disabled.

There is an open circuit in the SVS coil or the related wires.

ACCESS 7 supplies a constant positive voltage to the coil and supplies negative voltage in relation to the command.

Step 1: Turn on the lift truck. Measure the voltage from BNEG to each side of SVS.

- ⇒ The correct voltage = +BV on each side of the coil.
- If: The voltage \neq +BV at SVS.
 - Then continue to Step 2.
- If: The the voltage = +BV on only one side of SVS.
 - Then the open circuit is in SVS. Replace SVS.
- If: The voltage = +BV on both sides of SVS.
 - Then continue to Step 3.

Step 2: Keep the lift truck ON. Measure the voltage at ACCESS 7 CA837-16.

- If: The voltage \neq +BV.
 - Then check the +BV key input through the mast cables to CA201-12. Make the necessary repairs or replacements.
- If: The voltage = +BV.
 - Then repair or replace the wire from CA837-16 to SVS.

Step 3: Keep the lift truck ON. Measure the voltage at CA837-22.

- ⇒ The correct voltage = +BV.
- If: The voltage = +BV.
 - Then continue to Step 4.
- If: The voltage \neq +BV.
 - Then repair or replace the wire from CA837-22 to SVS.

Step 4: Turn off the lift truck. Then turn on the lift truck again. Measure the voltage at CA837-22 while you use ANALYZER MENU ► A3.7.2 to check the output.

- ⇒ The voltage should decrease to 18–20 V.
- If: The voltage stays at +BV.
 - Then replace ACCESS 7.

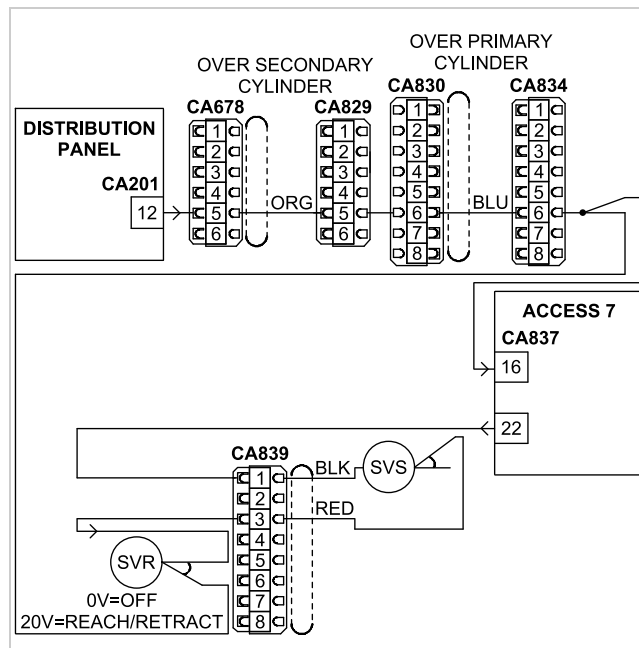


Fig. 155 (24978)

Event Code 804

ACCESS 4 ACCESSORY SOLENOID (SVA) COIL OPEN CIRCUIT

The reach, tilt, and sideshift functions are disabled.

There is an open circuit in the coil or the related wires.

ACCESS 4 supplies a constant positive voltage to the coil and supplies negative voltage in relation to the command.

Step 1: Turn on the lift truck. Measure the voltage from BNEG to each side of SVA.

⇒ The correct voltage = +BV on each side of the coil.

- If: The voltage \neq +BV at SVA.
 - Then continue to Step 2.
- If: The the voltage = +BV on only one side of SVA.
 - Then the open circuit is in SVA. Replace SVA.
- If: The voltage = +BV on both sides of SVA.
 - Then continue to Step 3.

Step 2: Keep the lift truck ON. Measure the voltage at ACCESS 4 CA410-4.

- If: The voltage \neq +BV.
 - Then replace ACCESS 4.
- If: The voltage = +BV.
 - Then repair or replace the wire from CA410-4 to SVA.

Step 3: Keep the lift truck ON. Measure the voltage at CA411-27.

⇒ The correct voltage = +BV.

- If: The voltage = +BV.
 - Then continue to Step 4.
- If: The voltage \neq +BV.
 - Then repair or replace the wire from CA411-27 to SVA.

Step 4: Turn off the lift truck. Then turn on the lift truck again. Measure the voltage at CA411-27 while you use ANALYZER MENU ► A4.4.11 to check the output.

⇒ The voltage should decrease to 18–20 V.

- If: The voltage stays at +BV.
 - Then replace ACCESS 4.

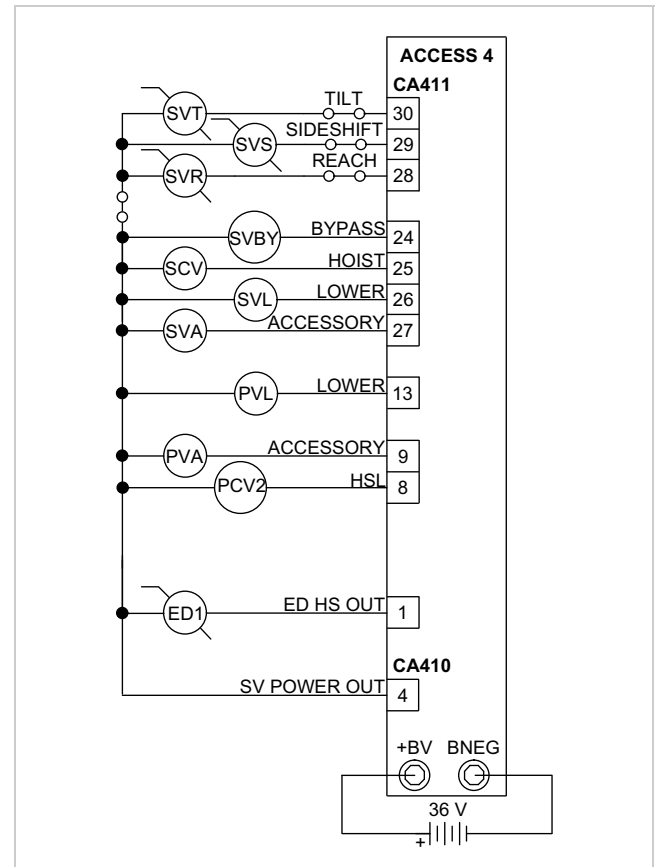


Fig. 163 (21818-03)

Event Code 818

ACCESS 4 ACCERLEROMETER INTERNAL TIME-OUT ERROR

Full-speed traction is disabled.

Step 1: Make sure that ACCESS 4 is installed correctly and tightly.

Step 2: Move the lift truck to a level floor. The top of the battery compartment must be level within 2 degrees. Use CALIBRATION MENU ► C2.5 to calibrate the accelerometer. Turn off the lift truck. Then turn on the lift truck again. Monitor the event code.

- If: The event code continues.
 - Then replace ACCESS 4.

Event Code 819

ACCESS 4 ACCERLEROMETER INCLINE ERROR

Full-speed traction is disabled.

Make sure that the lift truck is on a level surface.

Refer to Event Code 818.

Event Code 820

ACCESS 4 ACCERLEROMETER INCLINE ERROR

Full-speed traction is disabled.

Make sure that the lift truck is on a level surface.

Refer to Event Code 818.

Event Code 821

ACCESS 4 LOAD SENSE (LS) NO CALIBRATION

All lift truck functions are disabled.

Note: You must calibrate the load sense transducer (LS) if you install new software.

Step 1: Use CALIBRATION MENU ► C2.2 to calibrate LS.

- If: You calibrated LS and the event code continues.
 - Then replace LS. Calibrate LS again.
- If: The event continues after you replace LS.
 - Then replace ACCESS 4.

Event Code 822

ACCESS 4 MODULE - LOWER OVER-SPEED

Express Lower™ is disabled. Raise the mast to remove the event code.

The fork carriage speed is above the normal range. PVC1 & PVC2 prevent the lower function.

Step 1: Check the condition of the primary lift hose.

- If: The hose has a leak.
 - Then make the necessary repairs or replacements.
- If: There is no leak.
 - Then continue to Step 2.

Step 2: Use ANALYZER MENU ► A2.4.23 to monitor the operation of ECR2 while you raise and lower the mast.

- ⇒ ECR2 should change only in relation to the movement of the mast.
- If: ECR2 changes correctly in relation to the mast movement.
 - Then continue to Step 3.
- If: ECR2 does not change correctly in relation to the mast movement.
 - Then check the operation of ECR2. Make the necessary repairs or replacements. Use CALIBRATION MENU ► C2.2 to calibrate ECR2.

Step 3: Measure the lift speed with a load on the forks.

- If: The lift speed is more than 10% below normal operation.
 - Then replace the lift pump.
- If: The lift speed is satisfactory.
 - Then monitor the event code.

Event Code 869

ACCESS 8 START-UP ERROR

All lift truck functions are enabled.

ACCESS 8 is commanded to operate at lift truck start-up.

Step 1: Turn on the lift truck. Use ANALYZER MENU - A2.4.20.1 to monitor POT3 operation.

- ⇒ The voltage should change in relation to the thumb wheel movement.
- If: The voltage does not change in relation to the thumb wheel movement.
 - Then replace POT3. Use CALIBRATION MENU ► C1.3 to calibrate POT3.
- If: The voltage does change in relation to the thumb wheel movement.
 - Then replace ACCESS 8.

Event Code 870

ACCESS 8 DETECTS M5 MOTOR STALLED

The reach, tilt, and sideshift functions are disabled.

The M5 rotor is stuck or ACCESS 8 did not receive ECR8 feedback.

Step 1: Turn on the lift truck. Use the multi-task control handle to operate the accessory function (via POT3). Use ANALYZER MENU ► A2.8.1 to compare the ECR8 feedback to the target speed in ANALYZER MENU ► A2.8.2.

- If: The target speed increases in relation to the POT3 input, but the ECR8 speed (monitored by ECR8) does not increase.
 - Then replace M5.
- If: The target speed does not increase in relation to the POT3 input.
 - Then continue to Step 2.

Step 2: Use ANALYZER MENU ► A2.4.20 to monitor the POT3 input.

- If: The POT3 input is correct.
 - Then replace ACCESS 8.
- If: The POT3 input is not correct.
 - Then check POT3 and the related wires. Make the necessary repairs or replacements.

Event Code 871

ACCESS 8 VOLTAGE OUT OF RANGE

All lift truck functions are enabled.

ACCESS 8 checks the battery voltage at start-up.

Step 1: Check the battery condition.

- If: The battery is correctly charged and has the correct specifications.
 - Then continue to Step 2.
- If: Battery does not have the correct voltage or is not correctly charged.
 - Then correct the battery problem.

Step 2: Check the power cable connections to ACCESS 8 at +BV and BNEG.

- If: The power cables are incorrect or have poor connections.
 - Then correct the power cable issue.
- If: The power cables are satisfactory.
 - Then continue to Step 3.

Step 3: Make sure that the system voltage is correct in FEATURES MENU ► F3.1.

- ⇒ The correct system voltage = 36 V.
- If: The F3.1 setting is not correct.
 - Then change F3.1 to 36 V.
- If: The F3.1 setting is correct.
 - Then replace ACCESS 8.

CAN HIGH: Check the wire continuity from Access 1 CA405-8 to the distribution panel CA205-1. Then check the continuity from the distribution panel CA205-3 to Access 3™ CA401-23.

CAN LOW: Check the wire continuity from Access 1 CA405-9 to the distribution panel CA205-12. Then check the wire continuity from the distribution panel from CA205-10 to Access 3™ CA401-15.

- **If:** There is damage to the wires, pins, or connectors.
 - Then make the necessary repairs or replacements.
- **If:** There is no damage to the wires, pins, or connectors.
 - Then continue to Step 3.

Step 3: Keep the lift truck turned off. Measure the resistance on the distribution panel between CAN HIGH (TP7) and CAN LOW (TP8).

⇒ The correct resistance = 60 Ω.

- **If:** The resistance = 0 Ω.
 - Then there is a short circuit between CAN HIGH and CAN LOW. Examine the related wires, connectors, and fuses. Make the necessary repairs or replacements.
- **If:** The resistance > 60 Ω.
 - Then continue to Step 4.

Step 4: The terminating resistors on the CAN bus are open. Keep the lift truck turned off. Disconnect CA204 and CA205 from the distribution panel. Measure the resistance between TP7 and TP8.

- **If:** The resistance > 120 Ω.
 - Then replace the distribution panel.
- **If:** The resistance = 120 Ω.
 - Then replace Access 1.

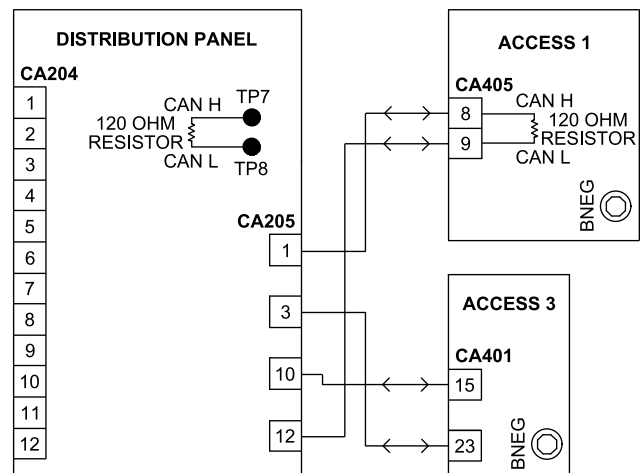


Fig. 5 (21786)

Event Code 104

ACCESS 1 CAN INITIALIZATION ISSUE WITH ACCESS 4

All the lift truck functions are disabled.

Access 1 CAN bus communication with Access 4 stopped.

Step 1: Turn on the lift truck. Check the status of the Access 1 and Access 4 indicator lights.

- **If:** The indicator lights are off.
 - Then there is no battery negative to the modules. This makes a load on the CAN bus and slows communications. Correct the battery negative problem.
- **If:** The indicator lights are on.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Examine the CAN wires and connections.

CAN HIGH: Check the wire continuity from Access 1 CA405-8 to the distribution panel CA205-1. Then check the continuity from the distribution panel CA205-4 to Access 4 CA412-2.

CAN LOW: Check the wire continuity from Access 1 CA405-9 to the distribution panel CA205-12. Then check the wire continuity from the distribution panel from CA205-9 to Access 4 CA412-1.

- **If:** There is damage to the wires, pins, or connectors.
 - Then make the necessary repairs or replacements.
- **If:** There is no damage to the wires, pins, or connectors.

- **If:** The settings or software are incorrect.
 - Then correct settings or install correct software.
- **If:** Settings or software are correct.
 - Then replace Access 1.

Event Code 141

ACCESS 1 ZONE SELECT SWITCH (ZSS-A) OPEN

The raise function is disabled.

Step 1: Turn on the lift truck. Check for battery negative input at Access 1 CA405-1.

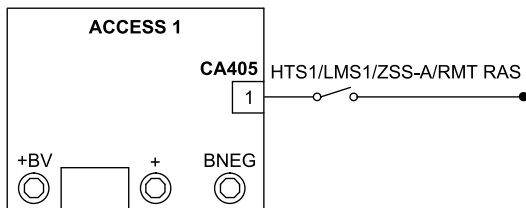


Fig. 17 (21794)

Event Code 142

ACCESS 1 ZONE SWITCH SELECT (ZSS-A) ISSUE

The raise function is disabled.

Step 1: Check the wires to ZSS-A for a short circuit to battery positive.

- **If:** There is no short circuit.
 - Then replace Access 1.

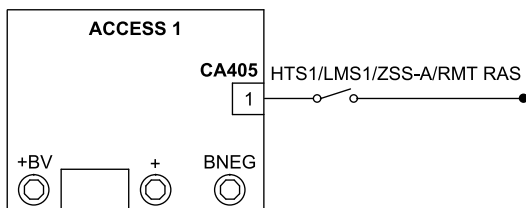


Fig. 18 (21794)

Event Code 161

ACCESS 4 CAN ERROR WITH EPS

Step 1: Turn off the lift truck. Check the resistance between CA646-1 and CA646-2.

- **If:** The resistance = 60 Ω. If CA646 is open, the lift truck side resistance should be 60 Ω and the battery side should read O/L.
 - Then continue to step 2.
- **If:** The resistance ≠ 60 Ω or O/L.

- Then follow the instructions in the V Force® battery manufacturer manual or Event Code 104.

Step 2: Check the wires between CA646-1 and CA646-2. Make sure that the wires are connected properly.

- **If:** The wires are damaged or not connected properly.
 - Then repair or replace the wires or connect CA646.
- **If:** The wires and connections are good.
 - Then continue to step 3.

Step 3: Turn on the lift truck. Make sure that the FEATURES MENUS are set correctly.

- **If:** The menu settings are not correct.
 - Then change the menus to the correct settings.
- **If:** The menu settings are correct.
 - Then continue to step 4.

Step 4: Turn off the battery then turn on the battery. Turn on the lift truck.

- **If:** The event code clears.
 - Then return the lift truck to service.
- **If:** The event code does not clear.
 - Then troubleshoot the battery by following the instructions in the V Force® battery manufacturer manual.

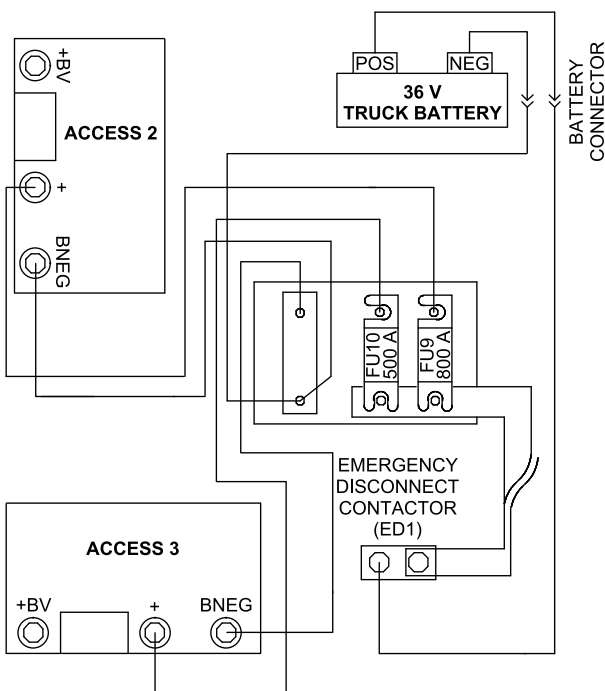


Fig. 30 (21796)

Event Code 235

ACCESS 2 BATTERY VOLTAGE ABOVE RANGE

The hydraulic system is disabled.

Note: If the lift truck logs Event Code 235 with Event Code 223 or 356, then see Event Code 356 first.

See Event Code 223.

Event Code 236

ACCESS 2 BATTERY VOLTAGE (BATTERY POSITIVE) VERY HIGH

The hydraulic system is disabled.

Note: If the lift truck logs Event Code 236 with Event Code 236 or 356, then see Event Code 356 first.

See Event Code 223.

Event Code 237

ACCESS 2 BATTERY VOLTAGE (BATTERY POSITIVE) FLUCTUATING

The hydraulic system is disabled.

The battery voltage decreases too much when it is under load.

Step 1: Turn on the lift truck. Measure the voltage at the Access 2 battery negative terminal and the Access 2 battery positive terminal.

Step 2: The correct voltage = battery positive.

- **If:** The voltage < battery positive.
 - Then continue to Step 2.

Step 3: Turn off the lift truck. Check the power cables, power cable connections, FU9, and ED1.

- **If:** The power cables, connections, FU9, and ED1 are correct.
 - Then continue to Step 3.
- **If:** The power cables, FU9, or ED1 are not correct.
 - Then make repairs or replacements as necessary.

Step 4: Check the battery charge and the individual cell conditions.

- **If:** The battery condition is not satisfactory.
 - Then make repairs or replacements as necessary.
- **If:** The battery is correctly charged and has the correct specifications.
 - Then continue to Step 4.

Step 5: Install a battery that is good. Monitor for Event Code 237.

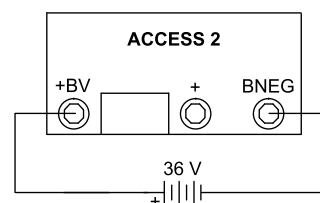


Fig. 31 (21797)

Event Code 238

ACCESS 2 BATTERY VOLTAGE (BATTERY POSITIVE) UNDER VOLTAGE

The hydraulic system is disabled.

Step 1: Check to make sure that the battery has the correct specifications for the lift truck and duty cycle.

- **If:** The battery is correct.
 - Then continue to Step 2.
- **If:** The battery is not correct.
 - Then replace the battery as necessary.

Step 2: Check the battery charge and the individual cell conditions.

- **If:** The battery condition is not satisfactory.

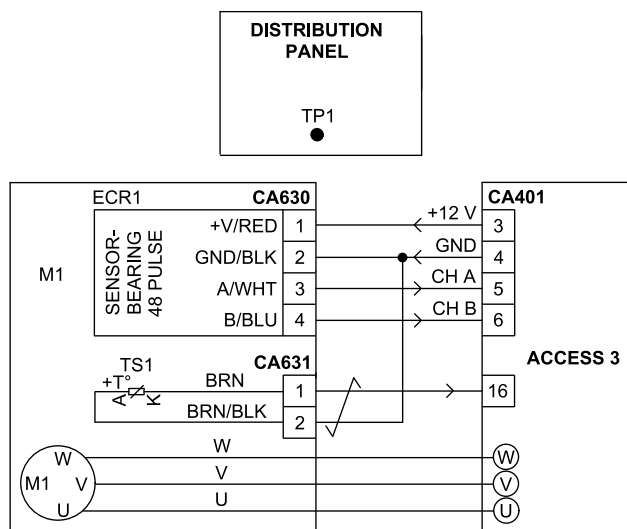


Fig. 43 (21808)

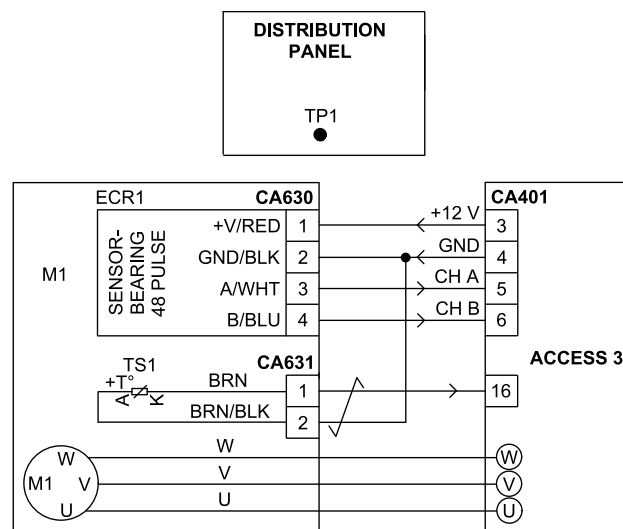


Fig. 44 (21808)

Event Code 329

Access 3™ TRACTION MOTOR TEMPERATURE SENSOR (TS1) OUT OF RANGE

The traction function is disabled.

Step 1: Turn off the lift truck. Check the wires to TS1 for a short circuit to the lift truck frame.

Measure the resistance from CA631-1 and CA631-2 to the lift truck frame. Then check the wire from ECR1 CA630-2 to Access 3™ CA401-4.

⇒ The correct resistance > 10 kΩ.

- **If:** There is a short circuit.
 - Then make the necessary repairs or replacements.
- **If:** There is no short circuit.
 - Then proceed to Step 2.

Step 2: Keep the lift truck turned off. Check the wires to TS1 for an open.

Measure the continuity of TS1 CA631-1 to Access 3™ CA401-16 and from TS1 CA631-2 to Access 3™ CA401-4.

- **If:** The resistance > 0 Ω.
 - Then make the necessary repairs or replacements.

Event Code 330

Access 3™ TRACTION MOTOR ENCODER (ECR1) COUNT ISSUE

The traction function is disabled.

Note: If the lift truck logs Event Code 330 with Event Code 366, 367, or 377, then see Event Code 366, 367, or 377 first.

Step 1: Turn off the lift truck. Then turn on the lift truck.

- **If:** The lift truck logs Event Code 330 again.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Check the continuity of the wires from Access 3™ CA401-5 to ECR1 CA630-3 (Channel A) and from CA401-6 to ECR1 CA630-4 (Channel B). Look for short circuits or broken wires.

- **If:** There is damage to the wires or connectors.
 - Then make the necessary repairs or replacements.
- **If:** There is no damage to the wires or connectors.
 - Then continue to Step 3.

Step 3: Turn on the lift truck. Measure the voltage to ECR1 at CA630-1 and CA630-2.

⇒ The correct voltage = 12 V.

- **If:** The voltage = 12 V.
 - Then replace ECR1. If the event code continues, then replace M1.
- **If:** The voltage ≠ 12 V.
 - Then replace the wires or connections to ECR1.

Event Code 372 and 373

Access 3™ INTERNAL 227 mV REFERENCE VOLTAGE OUT OF RANGE

All the lift truck functions are disabled.

Event Code 372: Access 3™ Internal 227 mV Reference Voltage Out of Range (High)

Event Code 373: Access 3™ Internal 227 mV Reference Voltage Out of Range (Low)

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 374 and 375

Access 3™ INTERNAL 2.5 V REFERENCE VOLTAGE OUT OF RANGE

All the lift truck functions are disabled.

Event Code 374: Access 3™ Internal 2.5 V Reference Voltage Out of Range (High)

Event Code 375: Access 3™ Internal 2.5 V Reference Voltage Out of Range (Low)

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 376 and 377

Access 3™ INTERNAL ANALOG GROUND VOLTAGE OUT OF RANGE

All the lift truck functions are disabled.

Event Code 376: Access 3™ Internal Analog Ground Voltage Out of Range (High)

Event Code 377: Access 3™ Internal Analog Ground Voltage Out of Range (Low)

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 378

Access 3™ OVERCURRENT CONDITION

The traction function is disabled.

Step 1: Turn off the lift truck. Disconnect the M1 power cables from Access 3™. Turn on the lift truck.

- **If:**The event code continues.
 - Then replace Access 3™.
- **If:**The event code stops.
 - Then continue to Step 2.

Step 2: Turn off the lift truck. Check the M1 power cables for phase to phase or phase to lift truck frame short circuits.

- **If:**There is a short circuit between the U, V, or W power cables or to the lift truck frame (with the power cables connected to M1).
 - Then continue to Step 3.

Step 3: Keep the lift truck turned off. Disconnect the power cables from M1. Check for a short circuit from the M1 windings to the lift truck frame.

- **If:**There is a short circuit in the windings.
 - Then replace M1.
- **If:**There is no short circuit in the windings.
 - Then repair or replace the M1 power cable.

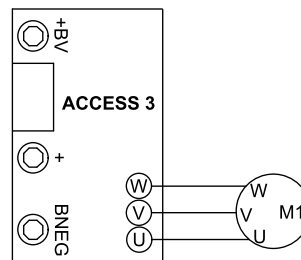


Fig. 60 (21815)

Event Code 379 and 380

Access 3™ INTERNAL SHORT

The traction function is disabled.

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 381 and 382

Access 3™ SHORT

The traction function is disabled.

Event Code 381: Access 3™ Short Between battery positive and Terminal U

Event Code 382: Access 3™ Short Between battery negative and Terminal U

Step 1: Turn off the lift truck. Check the condition of the M1 power cables.

Event Code 423

ACCESS 4 SIDESHIFT SOLENOID (SVS) DRIVER OVERCURRENT

The sideshift function is disabled.

The SVS driver output has a short circuit to battery positive.

Step 1: Turn off the lift truck. Disconnect the negative wire from SVS. Turn on the lift truck.

- **If:**The event code changes to open circuit (Event Code 805).
 - Then there is a short circuit in the SVS circuit. Continue to Step 2.
- **If:**The event code continues.
 - Then there is a short circuit internal to Access 4 or in the negative circuit. Continue to Step 3.

Step 2: Turn off the lift truck. Measure the resistance across SVS from the positive terminal to the negative terminal.

⇒ The correct resistance $\approx 30 \Omega$.

- **If:**The resistance is not $\approx 30 \Omega$.
 - Then there is a short circuit in SVS. Replace SVS.
- **If:**The resistance $\approx 30 \Omega$.
 - Then there is a short circuit in the positive circuit. Repair or replace the wire from Access 4 CA410-4 to SVS.

Step 3: Keep the lift truck turned off. Disconnect the negative wire from Access 4 CA411-28. Turn on the lift truck.

- **If:**The event code changes to open circuit (Event Code 806).
 - Then there is a short circuit in the negative circuit. Repair or replace the wire from Access 4 CA411-29 to SVS.
- **If:**The event code continues.
 - Then continue to Step 4.

Step 4: Check the CA411 connector for damage.

- **If:**There is no damage or short circuit in the connector.
 - Then replace Access 4.

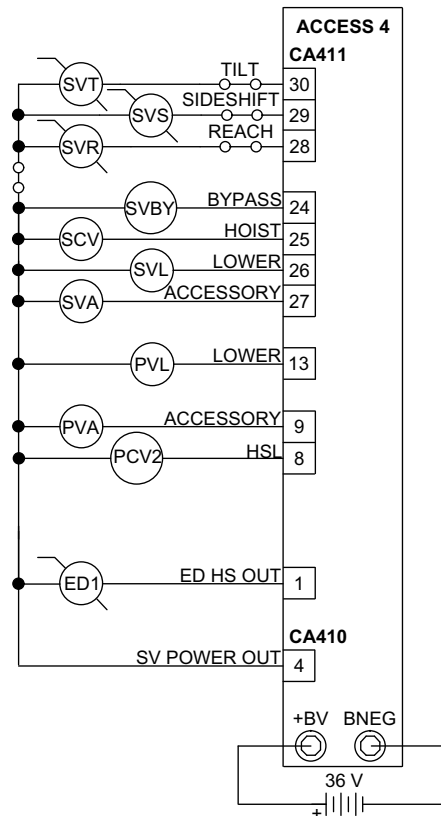


Fig. 74 (21818-01)

Event Code 424

ACCESS 4 TILT SOLENOID (SVT) DRIVER OVERCURRENT

The tilt function is disabled.

The SVT driver output has a short circuit to battery positive.

Step 1: Turn off the lift truck. Disconnect the negative wire from SVT. Turn on the lift truck.

- **If:**The event code changes to open circuit (Event Code 807).
 - Then there is a short circuit in the SVT circuit. Continue to Step 2.
- **If:**The event code continues.
 - Then there is a short circuit internal to Access 4 or in the negative circuit. Continue to Step 3.

Step 2: Turn off the lift truck. Measure the resistance across SVT from the positive terminal to the negative terminal.

⇒ The correct resistance $\approx 30 \Omega$.

- **If:**The resistance is not $\approx 30 \Omega$.
 - Then there is a short circuit in SVT. Replace SVT.

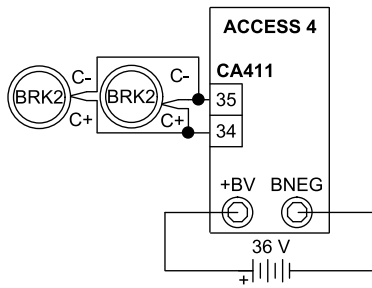


Fig. 87 (21822)

Event Code 450

ACCESS 4 CASTER BRAKE (BRK2) RESISTANCE HIGH

Decreased travel speed, usually < 1.61 km/h (1 mph).

The BRK2 coil resistance is higher than a typical hot brake, but it is not an open circuit. Use ANALYZER MENU / A3.4.20 to check the current and resistance.

Possible causes:

- The BRK2 temperature could be too hot
- There could be a connection problem.



CAUTION

BRK1 could be very hot. It can burn your skin.

See Event Code 449.

Event Code 451

ACCESS 4 INNER BRAKE (BRK1) COIL RESISTANCE LOW

Decreased travel speed, usually < 1.61 km/h (1 mph).

The BRK1 inner brake coil resistance is a minimum of 30% lower than nominal, but it does not have a short circuit.

Step 1: Use ANALYZER MENU / A3.4.19.3 to check the coil for low resistance. Do an inspection of the coil for turn-to-turn short circuits.

- **If:**The coil resistance is low.
 - Then replace the BRK1 coil.

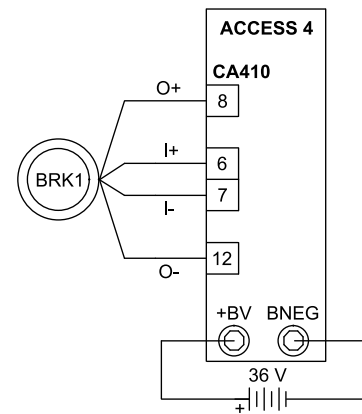


Fig. 88 (21821)

Event Code 452

ACCESS 4 OUTER BRAKE (BRK1) COIL RESISTANCE LOW

Decreased travel speed, usually < 1.61 km/h (1 mph).

The BRK1 outer brake coil resistance is a minimum of 30% lower than nominal, but it does not have a short circuit.

Step 1: Use ANALYZER MENU / A3.4.18.3 to check the coil for low resistance. Do an inspection of the coil for turn-to-turn short circuits.

- **If:**The coil resistance is low.
 - Then replace the BRK1 coil.

- **If:** The voltage = 12 V.
 - Then repair the wires from CA412-25 and CA412-26 to CA612-1 and CA612-2.
- **If:** The voltage \neq 12 V.
 - Then replace Access 4.

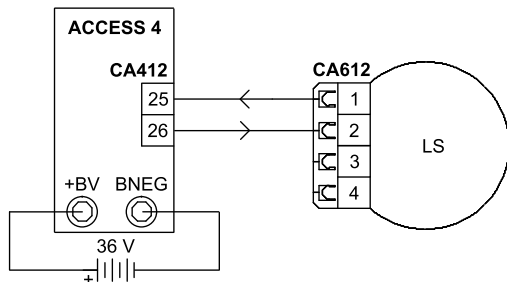


Fig. 106 (21827)

Event Code 477

ACCESS 4 HYDRAULIC STEER SENSOR (RPS1) NOT CALIBRATED

Full-speed traction is disabled.

Step 1: Use CALIBRATION MENU / C2.8 to calibrate RPS1.

- **If:** The event code continues.
 - Then replace RPS1. Use CALIBRATION MENU / C4.1 to calibrate RPS1 again.

Event Code 478

ACCESS 4 ACCELEROMETER NOT CALIBRATED

Full-speed traction is disabled.

Step 1: Park the lift truck on a level surface. Do the calibration in CALIBRATION MENU / C2.5.

- **If:** The event code continues.
 - Then replace Access 4.

Event Code 479

ACCESS 4 INCORRECT BATTERY VOLTAGE

Traction and lift functions are disabled.

Probable Causes: A bad battery or battery connections. A short in the overhead guard, strobe, aftermarket accessory harnesses, or components. A blown FU6 due to part failure or a short in the circuit. A loose connection at the ED1, fuse block, or ACCESS 4.

Step 1: Make sure that a proper battery is installed and is in good health. Verify the water levels, specific gravity, and good voltage output.

- **If:** The battery is correct and in good working order.
 - Then continue to Step 2.
- **If:** The battery is incorrect or in poor working condition.
 - Then make the necessary repairs, adjustments, or replace the battery

Step 2: With the battery connected, the lift truck turned off, LGS2 and FNS in the off position, and wire 2955 disconnected from the strobe diode block, measure voltage at CA412-3.

- **If:** The voltage \neq battery volts.
 - Then check FU6, connections at the fuse block, and the wire 206 connection at ED1. Make the necessary repairs.
- **If:** The voltage = battery volts but drops by > 0.5 V when the lift truck is turned on.
 - Then remove and inspect the aftermarket accessories wired anywhere in the FU6 circuit.
- **If:** The voltage = battery volts and maintains voltage when the lift truck is turned on.
 - Continue to Step 3.

Step 3: With the battery connected, the lift truck turned on, LGS2 and FNS in the off position, and wire 2955 disconnected from the strobe diode block, measure voltage at CA412-3 while toggling the FNS to high, low and back to neutral.

- **If:** The voltage maintains in all of the switch positions.
 - Continue to Step 4.
- **If:** The voltage drops in any of the switch positions.
 - Inspect the wiring harness and FAN5 for shorts or damaged wiring. Make all necessary repairs

Step 4: With the battery connected, the lift truck turned on, FNS in the off position, and wire 2955 disconnected from the strobe diode block, measure voltage at CA412-3 while turning the LGS2 to the on position.

- **If:** The voltage maintains.
 - Continue to Step 5.
- **If:** The voltage drops.
 - Inspect the wiring harness and LGT2 for shorts or damaged wiring. Make all necessary repairs.

Step 5: With the battery connected, the lift truck turned off, LGS2 and FNS in the off position, and wire 2955 connected to the strobe diode block, measure voltage at CA412-3 while turning the truck on.

- **If:** The voltage maintains.

- Then make the necessary repairs or replacements.
 - **If:** There are no mechanical problems.
 - Then Continue to Step 6.
- Step 6:** Replace Access 5 and recalibrate RPS1 in Calibration Menu C4.1.
- **If:** The event code continues.
 - Then replace M4.

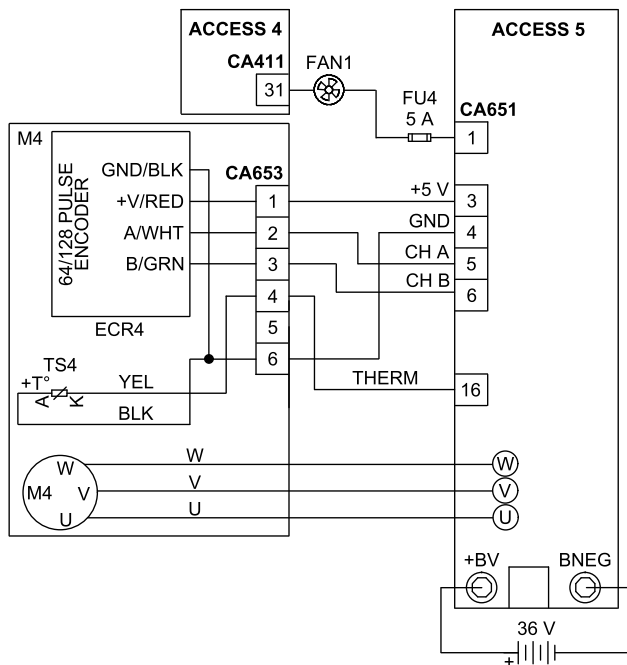


Fig. 122 (21832)

Event Code 508

ACCESS 5 15 V SUPPLY VOLTAGE LOW

The traction function is disabled.

Replace Access 5.

Event Code 509

ACCESS 5 5 V SUPPLY VOLTAGE OUT OF RANGE

The traction function is disabled.

Replace Access 5.

Event Code 510

ACCESS 5 CALIBRATION ISSUE

The traction function is disabled.

Replace Access 5.

Event Code 511

ACCESS 5 OPEN DRAIN OUTPUTS FROM HIGH CURRENT

The traction function is disabled.

Replace Access 5.

Event Code 512

TILLER SENSOR (RPS2) OUT OF RANGE LOW

The traction function is disabled.

One or both of the RPS2 channels have a short circuit or is near battery negative.

Step 1: Turn on the lift truck. Use ANALYZER MENUS / A2.5.6.2 and A2.5.6.3, to monitor the RPS1 and RPS2 output signals while turning the tiller knob.

- **If:** Both of the Channel A and Channel B outputs are < 75 counts.
 - Then continue to Step 2.
- **If:** Only the Channel A output < 75 counts.
 - Then continue to Step 4.
- **If:** Only the Channel B output < 75 counts.
 - Then continue to Step 5.

Step 2: Keep the lift truck turned on. Measure the voltage for RPS2 power at Access 5 CA651-3 and splice 18.

- **If:** The voltage = 5 V.
 - Then continue to Steps 3 and 4.
- **If:** The voltage is much < 5 V.
 - Then continue to Step 3.

Step 3: Disconnect the wire from CA651-3. Measure the voltage at CA651-3.

- **If:** The voltage < 5 V.
 - Then replace Access 5.
- **If:** The voltage = 5 V.
 - Then check each sensor (RPS1, RPS2, or ECR4) by connecting them one at a time. Make repairs or replacements as necessary.

Step 4: Check the condition of the RPS2 Channel A wire (blue) for open circuits, short circuits, and problems with the contacts or connectors (CA652-1 and CA651-11).

- **If:** The wire, contact, or connector has damage or wear.
 - Then make the necessary repairs or replacements.
- **If:** There is no damage or wear.

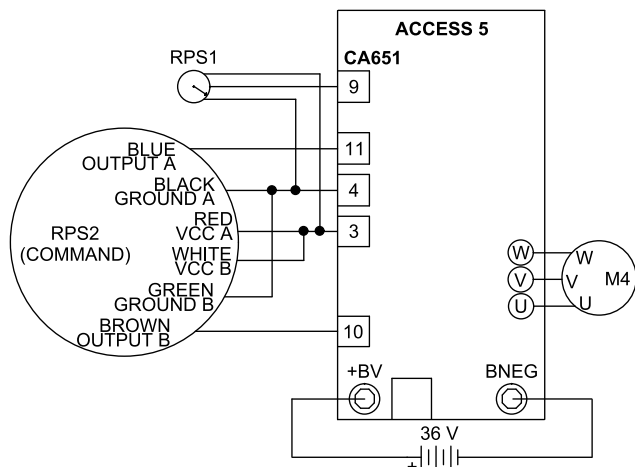


Fig. 134 (21830)

Event Code 552

ACCESS 5 STEERING FEEDBACK (RPS1) SIGNAL OUT OF RANGE (LOW).

The traction function is disabled.

The RPS1 feedback voltage is less than the permitted range (0.35–4.65 V).

Possible causes:

- No power to RPS1
- A short circuit in the signal circuit
- A problem with RPS1 or Access 5
- An incorrectly aligned steer gears.

Step 1: Use ANALYZER MENU / A2.5.5.1 to monitor the RPS1 counts with the tire away from the hard stops.

⇒ The correct RPS1 output range ≈ 66–874 counts.

- **If:**The RPS1 signal is < 66 counts.
 - Then continue to Step 2.
- **If:**The RPS1 signal is in the permitted range.
 - Then continue to Step 3.

Step 2: Examine the RPS1 harness. Look for short circuits or damaged wires, correct wire crimps at the contacts, and the correct connector installation.

- **If:**There is a problem in the wires.
 - Then make the necessary repairs or replacements.

- **If:**The wires are satisfactory.
 - Then replace RPS1. Use CALIBRATION MENU / C4.1 to calibrate RPS1.
- **If:**The event code continues after replacing RPS1.
 - Then replace Access 5. Use CALIBRATION MENU / C4.1 to calibrate RPS1.

Step 3: Use ANALYZER MENU / A2.5.5.1 to monitor the RPS1 counts with the tire near the hard stops.

- **If:**The RPS1 signal is near or < 66 counts.
 - Then continue to Step 4.
- **If:**The RPS1 signal stays sufficiently above 66 counts.
 - Then replace Access 5. Use CALIBRATION MENU / C4.1 to calibrate RPS1.

Step 4: Make sure that the RPS1 gear aligns correctly. See Event Code 523.

- **If:**The gear is not aligned correctly.
 - Then align RPS1 gear. Use CALIBRATION MENU / C4.1 to calibrate RPS1.
- **If:**The gear is correctly aligned.
 - Then replace RPS1. Use CALIBRATION MENU / C4.1 to calibrate RPS1.

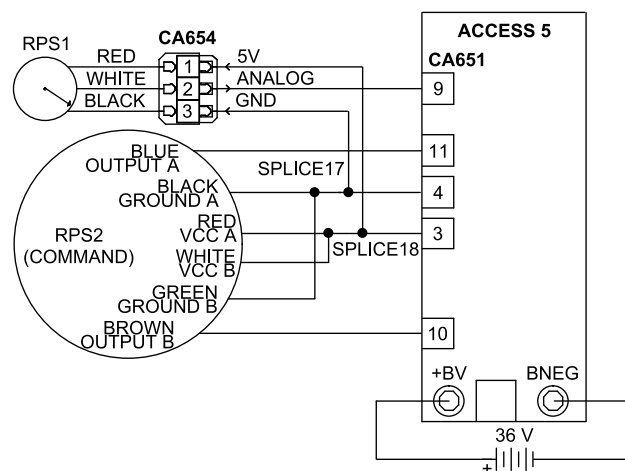


Fig. 135 (21837)

Event Code 553

ACCESS 5 STEERING FEEDBACK (RPS1) SIGNAL OUT OF RANGE (HIGH)

The traction function is disabled.

The RPS1 signal voltage is above the permitted range (0.35–4.65 V).

Possible causes:

- No power to RPS1

- Then find and correct the problem in the wires and connections from the distribution panel CA201-12 to CIM1 CA842-13 and from CA404 to CIM1 CA842-24.
- **If:**The voltage \neq battery positive at TP4.
 - Then find and correct the power problem at the distribution panel or replace the distribution panel.

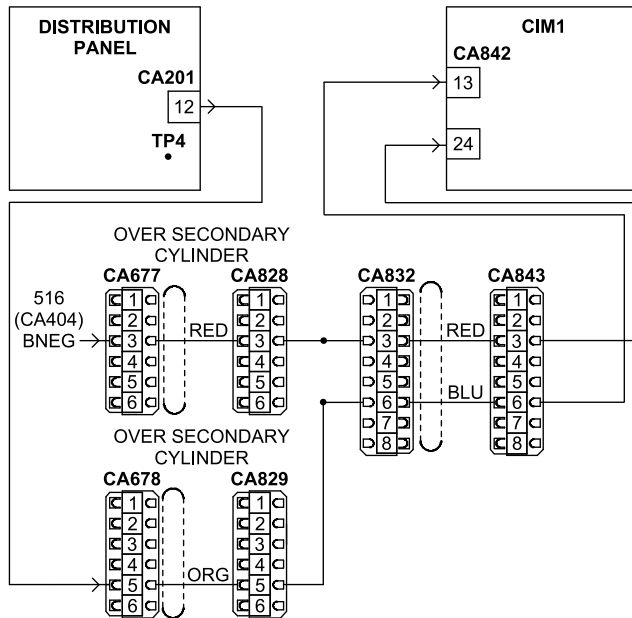


Fig. 150 (24964)

Event Code 647

UPPER CAMERA INTERFACE MODULE1 - HIGH INPUT VOLTAGE

All the lift truck functions are enabled.

CIM1 received the incorrect battery voltage (high).

Step 1: Check the battery charge and the individual cell conditions.

- **If:**The battery condition is not satisfactory.
 - Then make repairs or replacements as necessary.
- **If:**The battery is correctly charged and has the correct specifications.
 - Then continue to Step 2.

Step 2: Turn on the lift truck. Measure the voltage at CIM1 CA842-13 and CA842-24.

- **If:**The voltage \neq battery positive.
 - Then continue to Step 3.

- **If:**The voltage = battery positive.
 - Then replace CIM1.
- Step 3:** Keep the lift truck turned on. Measure the voltage at the distribution panel TP4 and known battery negative.
- **If:**The voltage = battery positive.
 - Then find and correct the problem in the wires and connections from the distribution panel CA201-12 to CIM1 CA842-13 and from CA404 to CIM1 CA842-24.
- **If:**The voltage \neq battery positive at TP4.
 - Then find and correct the power problem at the distribution panel or replace the distribution panel.

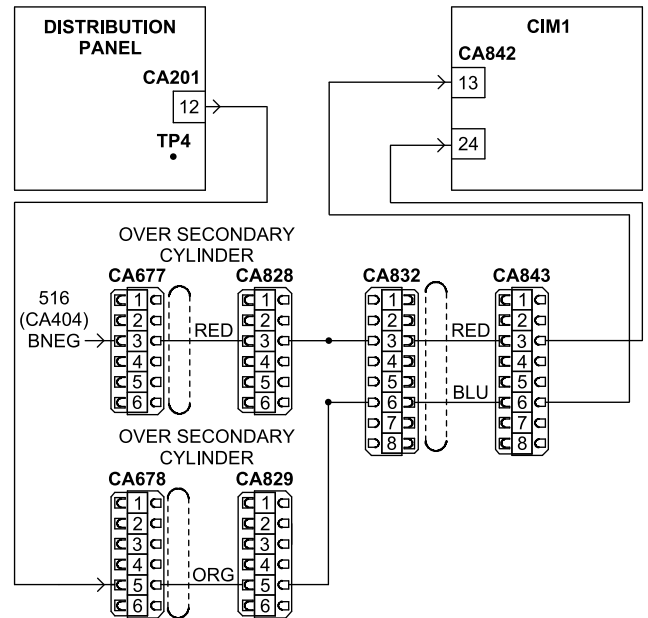


Fig. 151 (24964)

Event Code 648

UPPER CAMERA INTERFACE MODULE1 - INTERNAL 5 V SUPPLY OUT OF RANGE

All the lift truck functions are enabled.

CIM1 has an internal 5 V supply signal that is out of range.

Step 1: Turn off the lift truck. Then turn on the lift truck.

- **If:**The event code continues.
 - Then replace CIM1.

Event Code 701

ACCESS 7 MODULE FRAM EVENT HISTORY ERROR

All the lift truck functions are enabled.
The event code history was not found.

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 702

ACCESS 7 MODULE HOUR METER MEMORY CORRUPT

All the lift truck functions are enabled.
There is an hour meter memory error.

Step 1: Turn off the lift truck. Then turn on the lift truck.

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

Event Code 703

ACCESS 7 MODULE INVALID CALIBRATION

All the lift truck functions are enabled.
Access 7 lost calibration.

Step 1: Turn off the lift truck. Then turn on the lift truck.

- **If:** The event code continues.
 - Then use the CALIBRATION MENU to calibrate the lift truck.
- **If:** The event code continues.
 - Then replace Access 7.

Event Code 704

ACCESS 7 MODULE LOW INPUT VOLTAGE

The reach, tilt, and sideshift functions are disabled.
Access 7 received the incorrect battery voltage (low).

Step 1: Check for the correct battery voltage. Check the condition of the battery.

- **If:** The voltage is incorrect or repairs are necessary.
 - Then correct, repair, or replace the battery.
- **If:** The battery is satisfactory and the event code continues.
 - Then replace Access 7.

Event Code 705

ACCESS 7 MODULE HIGH INPUT VOLTAGE

All the lift truck functions are disabled.
Access 7 received the incorrect battery voltage (high).

Step 1: Check for the correct battery voltage. Check the condition of the battery.

- **If:** The voltage is incorrect or repairs are necessary.
 - Then correct, repair, or replace the battery.
- **If:** The battery is satisfactory and the event code continues.
 - Then replace Access 7.

Event Code 706

ACCESS 7 CAN COMMUNICATION ERROR WITH ACCESS 1

All the lift truck functions are disabled. ED1 is energized.

Access 7 CAN bus communication with Access 1 stopped.

Step 1: Turn on the lift truck. Check the status of the Access 7 indicator light.

- **If:** The Access 7 indicator light is on.
 - Then continue to Step 3.
- **If:** The Access 7 indicator light is off.
 - Then continue to Step 2.

Step 2: Measure the power input voltage at Access 7 CA837-16 and CA837-9.

- **If:** The voltage = battery positive.
 - Then replace Access 7.
- **If:** The voltage = battery positive.
 - Then continue to Step 3.

Step 3: Turn off the lift truck. Measure the resistance from CA837-2 to CA837-1.

⇒ The correct resistance $\approx 60 \Omega$.

- **If:** The resistance is not $\approx 60 \Omega$.
 - Then continue to Step 4.
- **If:** The resistance $\approx 60 \Omega$.
 - Then replace Access 7.

Step 4: Keep the lift truck turned off. Check the wire continuity.

CAN HIGH: Check the continuity from CA837-2 through the mast cables to CA204-5. Then check from CA205-1 to CA405-8.

Step 1: Turn on the lift truck. Measure the voltage from battery negative to each side of PVC1.

⇒ The correct voltage = battery positive on each side of the coil.

- **If:** The voltage ≠ battery positive at PVC1.
 - Then continue to Step 2.
- **If:** The voltage = battery positive on only one side of PVC1.
 - Then the open circuit is in PVC1. Replace PVC1.
- **If:** The voltage = battery positive on both sides of PVC1.
 - Then continue to Step 3.

Step 2: Keep the lift truck turned on. Measure the voltage at Access 7 CA837-16.

- **If:** The voltage ≠ battery positive.
 - Then check the battery positive key input through the mast cables to CA201-12. Make the necessary repairs or replacements.
- **If:** The voltage = battery positive.
 - Then repair or replace the wire from CA837-16 to PVC1.

Step 3: Keep the lift truck turned on. Measure the voltage at CA837-20.

⇒ The correct voltage = battery positive.

- **If:** The voltage = battery positive.
 - Then continue to Step 4.
- **If:** The voltage ≠ battery positive.
 - Then repair or replace the wire from CA837-20 to PVC1.

Step 4: Turn off the lift truck. Then turn on the lift truck. Measure the voltage at CA837-20 while using ANALYZER MENU / A3.7.4 to check the output.

⇒ The voltage decreases to 18-20 V.

- **If:** The voltage stays at battery positive.
 - Then replace Access 7.

Event Code 726

ACCESS 7 RES19 (FREEZER CONDITION LIFT TRUCKS ONLY) DRIVER OPEN CIRCUIT

RES19 is disabled.

There is an open circuit in RES19 or the related wires.

Access 7 supplies a constant positive voltage to RES19 and supplies negative voltage in relation to the command.

Step 1: Turn on the lift truck. Measure the voltage from battery negative to each side of RES19.

⇒ The correct voltage = battery positive on each side of the resistor.

- **If:** The voltage ≠ battery positive at RES19.
 - Then continue to Step 2.
- **If:** The voltage = battery positive on only one side of RES19.
 - Then the open circuit is in RES19. Replace RES19.
- **If:** The voltage = battery positive on both sides of RES19.
 - Then continue to Step 3.

Step 2: Keep the lift truck turned on. Measure the voltage at Access 7 CA837-16.

- **If:** The voltage ≠ battery positive.
 - Then check the battery positive key input through the mast cables to CA201-12. Make the necessary repairs or replacements.
- **If:** The voltage = battery positive.
 - Then repair or replace the wire from CA837-16 to RES19.

Step 3: Keep the lift truck turned on. Measure the voltage at CA837-19.

⇒ The correct voltage = battery positive.

- **If:** The voltage = battery positive.
 - Then continue to Step 4.
- **If:** The voltage ≠ battery positive.
 - Then repair or replace the wire from CA837-19 to RES19.

Step 4: Turn off the lift truck. Then turn on the lift truck. Measure the voltage at CA837-19 while using ANALYZER MENU / A3.7.5 to check the output.

⇒ The voltage decreases to 18-20 V.

- **If:** The voltage stays at battery positive.
 - Then replace Access 7.

Step 2: Keep the lift truck turned on. Measure the voltage at Access 4 CA410-4.

- **If:** The voltage \neq battery positive.
 - Then replace Access 4.
- **If:** The voltage = battery positive.
 - Then repair or replace the wire from CA410-4 to SVT.

Step 3: Keep the lift truck turned on. Measure the voltage at CA411-30.

⇒ The correct voltage = battery positive.

- **If:** The voltage = battery positive.
 - Then continue to Step 4.
- **If:** The voltage \neq battery positive.
 - Then repair or replace the wire from CA411-30 to SVT.

Step 4: Turn off the lift truck. Then turn on the lift truck. Measure the voltage at CA411-30 while using ANALYZER MENU / A4.4.14 to check the output.

⇒ The voltage decreases to 18-20 V.

- **If:** The voltage stays at battery positive.
 - Then replace Access 4.

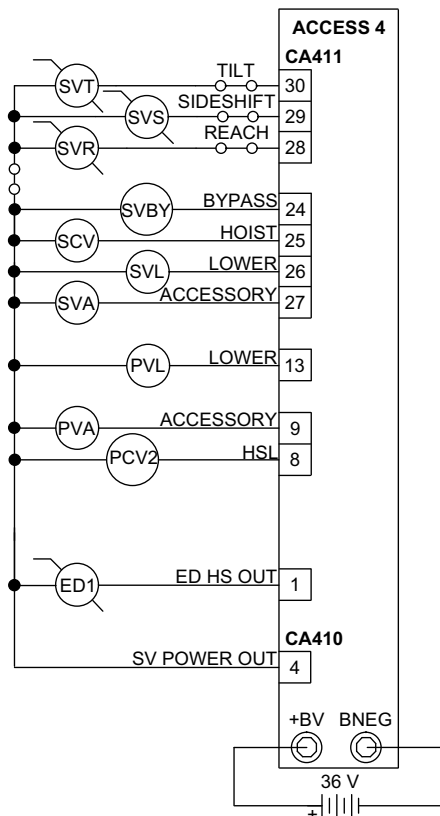


Fig. 182 (21818-01)

Event Code 808

ACCESS 4 FAN (FAN1) OPEN CIRCUIT

FAN1 is disabled.

There is an open circuit in the coil or the related wires.

Access 4 supplies a constant positive voltage to the coil and supplies negative voltage in relation to the command.

Step 1: Turn on the lift truck. Measure the voltage from battery negative to each side of coil.

⇒ The correct voltage = battery positive on each side of the coil.

- **If:** The voltage \neq battery positive at FAN1.
 - Then continue to Step 2.
- **If:** The voltage = battery positive on only one side of FAN1.
 - Then the open circuit is in FAN1. Replace FAN1.
- **If:** The voltage = battery positive on both sides of FAN1.
 - Then continue to Step 3.

Step 2: Keep the lift truck turned on. Measure the voltage at Access 4 CA410-4.

- **If:** The voltage \neq battery positive.
 - Then replace Access 4.
- **If:** The voltage = battery positive.
 - Then repair or replace the wire from CA410-4 to FAN1.

Step 3: Keep the lift truck turned on. Measure the voltage at CA411-31.

⇒ The correct voltage = battery positive.

- **If:** The voltage = battery positive.
 - Then continue to Step 4.
- **If:** The voltage \neq battery positive.
 - Then repair or replace the wire from CA411-31 to FAN1.

Step 4: Turn off the lift truck. Then turn on the lift truck. Measure the voltage at CA411-31 while using ANALYZER MENU / A4.4.15 to check the output.

⇒ The voltage decreases to 18-20 V.

- **If:** The voltage stays at battery positive.
 - Then replace Access 4.

- a problem with the M5 connections or the M5 power circuit in Access 8.

If this event code occurs during start-up, start at Step 1. If this event code occurs after ED1 closes, then start at Step 3.

Step 1: Turn off the lift truck. Check the continuity of the M5 power cables and connections.

- **If:** The M5 power cables and connections are satisfactory.
 - Then continue to Step 2.

Step 2: Check the M5 windings for a high resistance short circuit (leak) or a short circuit to the frame (10,000 Ω minimum).

- **If:** The M5 windings are satisfactory.
 - Then check the power cable connections to Access 8 battery negative and battery positive.
- **If:** The connections are satisfactory.
 - Then replace Access 8.

Step 3: Check ED1 for good contact through the tips.

- **If:** The contact is satisfactory.
 - Then replace Access 8.

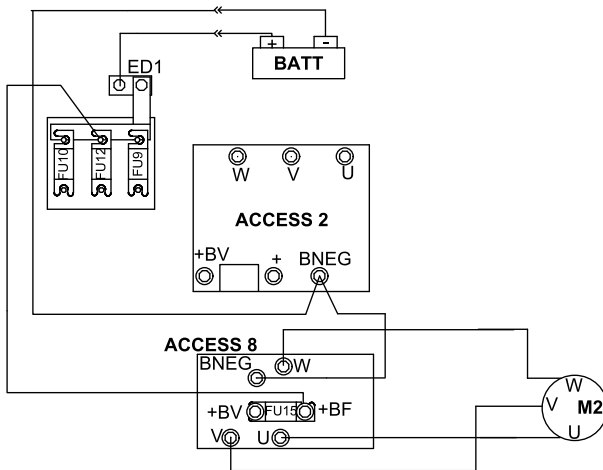


Fig. 196 (24987)

Event Code 855

ACCESS 8 (ADM) PRE-CHARGE VOLTAGE NOT COMPLETED

The reach, tilt, and sideshift functions are disabled. Access 8 did not receive the pre-charge voltage within the necessary time limit.

Step 1: Turn on the lift truck. Measure the voltage at CA422-1 and battery negative to check FU8 and the key switch circuit.

- **If:** The voltage is more than 1.5 V below battery positive.
 - Then find and repair the cause of the voltage drop.
- **If:** The voltage is within 1.5 V of battery positive.
 - Then replace Access 8.

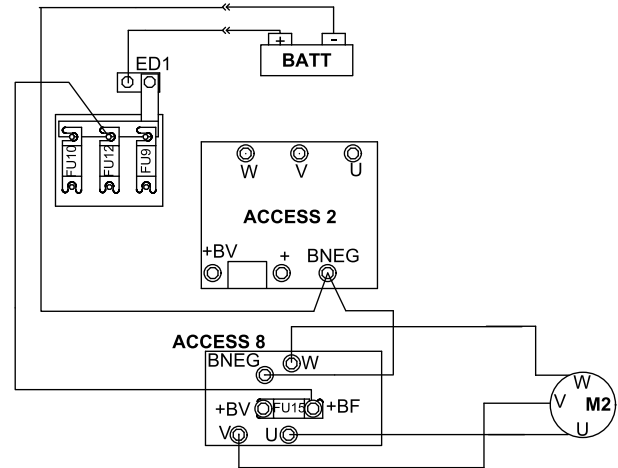


Fig. 197 (24987)

Event Code 856

ACCESS 8 (ADM) POWER MOSFET SHORTED

The reach, tilt, and sideshift functions are disabled. Access 8 has an internal error.

Step 1: Turn off the lift truck. Then turn on the lift truck.

- **If:** The event code continues.
 - Then replace Access 8.

Event Code 857

ACCESS 8 (ADM) OUTPUT DRIVER CIRCUIT SHORTED (OPTIONAL)

The reach, tilt, and sideshift functions are disabled.

The Access 8 output driver has a short circuit to positive at CA420-1.

Step 1: Check the wires from CA420-1 through the related component to positive.

- **If:** The wires or component have a short circuit.
 - Then make the necessary repairs or replacements.
- **If:** There is no short circuit.
 - Then replace Access 8.

Brake System

Chart 1 - Stopping Distance				
Model	Forks First Maximum Speed		Maximum Stopping Distance	
	km/h (+0.0/-0.1)	mph (+0.0/-0.1)	meters	feet
RR5715-35	10.14	6.3	2.59	8.5
RR5715-40	10.14	6.3	2.59	8.5
RR5725/RM6025	10.94	6.8	2.90	9.5
RR5795/RM6095	11.10	6.9	2.90	9.5
RD5725/RMD6025	10.94	6.8	2.90	9.5
RD5795/RMD6095	11.10	6.9	2.90	9.5

Brake System

6. Place the axle spacer (1) onto the axle. Refer to Figure 10.
7. Install the retaining ring (2) to secure the assembly in position.
8. Place the spacers with C-bore (3) in the brake counterbored holes with the counterbored side of the spacers facing up.

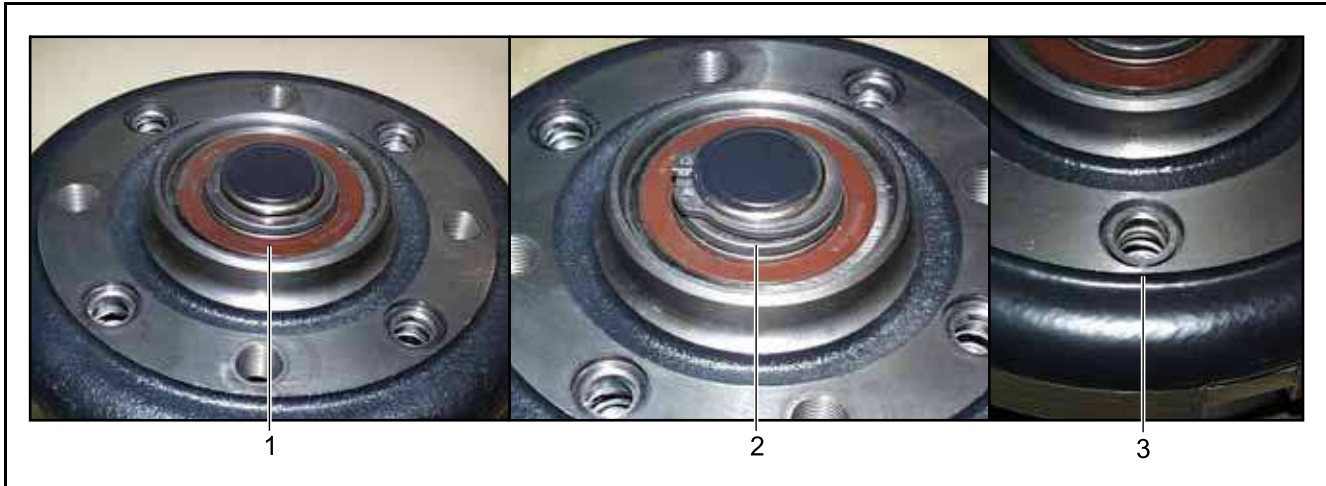


Fig. 10 (24060)

Mast**WARNING**

Wear appropriate items, such as safety glasses, whenever performing maintenance work. Do not place fingers, hands or arms through the mast or position them at pinch points.

**WARNING**

In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to the truck Data Plate for truck weight information.

NOTE

It will be necessary to disconnect and remove the battery from the truck, disconnect cylinders from the mast and reach, disconnect electrical connections and hydraulic lines. The Control of Hazardous Energy section provides information for performing the above procedures along with additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.

**WARNING**

AVOID HIGH PRESSURE FLUIDS - Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of paper to search for leaks. Do not use your hand.

Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.

NOTE

In this section there are circumstances which require the collection of hydraulic oil that may leak from components. Be prepared to catch hydraulic oil with a catch pan or absorbent material. Do not reuse hydraulic oil. Follow applicable laws and environmental standards when disposing of used hydraulic oil. Many hazardous waste facilities have oil recycling capabilities.

NOTE

It may be necessary to slightly raise the mast to access the fitting. If so, ensure the T-Fitting disconnected in Step 8 is capped. Reconnect the battery, turn the truck ON, raise and block the mast as needed to access the fitting. To prevent excessive slack in the hoses and electrical cable, do not raise the third stage mast more than 127 mm (5 in).

13. Connect the primary lift hose to the base of the primary cylinder from inside the battery compartment. Tighten the fitting. Refer back to Figure 24685.
14. Connect the replacement hose to the tube as removed in Step 10. Tighten the fitting. Refer back to Figure 24686.
15. Lower the mast completely, turn the truck OFF and disconnect the battery before continuing. Open MVL.
16. Uncap the tube and unplug T-fitting next to the accessory manifold and connect the tube to the fitting as removed in Step 8. Refer back to Figure 24605.
17. Close MVL. Refer to Figure 24604.
18. Wipe up any spilled oil and check the oil level in the hydraulic reservoir.
19. Install and connect the battery.
20. Turn the truck ON. Raise and lower the primary cylinder while checking for correct hose routing and oil leaks.
21. Install the rear mast cover as removed in Step 6. Refer back to Figure 24603.

Accessory Mast Hose Replacement**CAUTION**

Always block the mast when working near, on or under it in an elevated position, even though connected to a hoist.

The following procedures detail the steps required to replace the accessory mast hoses on the truck. These are the two hoses that follow a similar path to the primary lift hose on the mast. They are the smaller diameter hoses mounted on the back of the second stage column. Determine whether to replace the hose(s) with the mast extended or retracted. It may be easier to route the new hose(s) with the mast extended if overhead clearance and applicable safety procedures can be followed. As always, review the Control of Hazardous Energy chapter of this manual and follow all safety procedures as outlined.

NOTE

An alternative to replacing the hoses with the mast extended is to "fish" the hoses through the mast.

1. Move the truck to a service area on a level floor, preferably under a lifting device.
2. Raise and block the mast to allow access to the accessory hose pulley from the cutout area on the back of the third stage mast column. Refer to Figure 24687.
3. Chock the wheels and turn the truck OFF.

**WARNING**

Make sure the truck is correctly supported to prevent tipover since the battery will be removed.

4. Disconnect and remove the battery. Keep the battery close enough to the truck that it can be connected to reposition the mast if necessary.
5. Lockout/Tagout the truck as described in the Control of Hazardous Energy.

49. Remove the retaining ring that secures the two control cable pulleys. Remove the flatwasher, both pulleys and the control cables (2) from the second stage column. Refer to Figure 24698.
50. Remove the retaining ring that secures the accessory hose pulley. Remove the flatwasher, pulley and the accessory hoses (3) from the second stage column. Refer to Figure 24698.
51. Attach a lifting device and sling to the second stage column. Slide the second stage column up until the stop blocks on the main frame are visible through the holes on the second stage column. Remove the stop blocks. Disconnect and remove any additional hose connections or hydraulic tubes as necessary for your application.
52. Slide the second stage column off the main frame column.

Thrust Roller Installation and Shimming

Refer to Figure 24699.

The mast contains four sets of thrust rollers (1). One set is at the base of the third stage column. One set is at the top of the main frame. The second stage column contains a set of thrust rollers at the top and a second set of thrust rollers at the bottom. These rollers are shimmed to the appropriate dimensions at the factory as a matched set. Each truck has differing numbers and sizes of shims. If it is necessary to replace the rollers or shims, contact the factory to determine the correct shimming for your specific truck. You will need to have the truck's serial number on hand when calling. If any mast column is replaced, it is necessary to recalculate the correct shimming for the mast, contact the factory. Please note the following when installing shims on the thrust rollers (left-hand and right-hand are determined as viewed from the operator's perspective):

- When installing the shim sets, if more than one shim is used on a roller, it is important for the thinnest shim to be closest to the mast column and the thickest shim to be closest to the thrust roller.
- When different quantities and sizes of shims are called out for the left and right sides on the bottom of the third stage or bottom of the second stage columns, the thicker shim sets should be used on the right-hand side.
- When different quantities and sizes of shims are called out for the left and right sides of the top of the main frame or on the top of the second stage column, the thicker shim sets should be used on the left-hand side.
- When installing the thrust rollers, ensure the wheel stud is pressed into the mast column so that the head is flush or below the surface of the I-beam.
- While taking care that the shims and thrust rollers remain square, torque the nuts that secure the wheel studs to 31 - 34 Nm (23 - 25 ft lb).

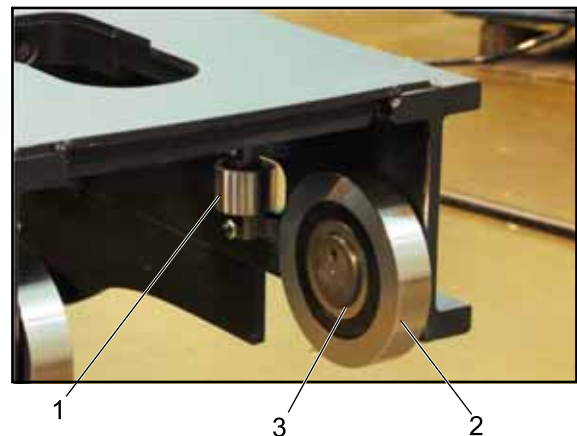


Figure 24699

81. Use a lifting device and sling to install the extended and blocked reach assembly onto the mast.
82. Route the chains over the primary cylinder and through the primary yoke (the chain pulley may need to be removed and installed with the chains in place).
83. Use a suitable lifting device to slightly raise the reach carriage.
84. Assemble the chain anchors to the back of the base of the primary cylinder with two nuts and a cotter pin in each anchor. Adjust the chain anchors as described in Chain Anchor Adjustments in this section. Refer to Figure 24602.

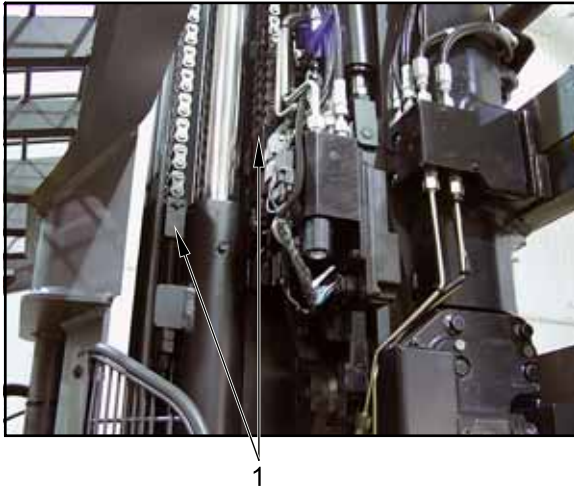


Figure 24602

90. Connect the control cable that goes over the primary cylinder to the appropriate connector that is clipped to the bottom of the primary cylinder. Refer to Figure 24706.
 91. Being careful not to cross them, route the hoses through the yoke and then the hose guide.
 92. Assemble the accessory hoses to the top side of the straight fittings on the side of the primary cylinder. Refer back to Figure 24596.
 93. Uncap the tube and unplug the T-fitting next to the accessory manifold and connect the hose to the fitting as previously removed.
 94. Close the MVL.
 95. Connect the battery and key the truck ON.
 96. Raise the mast enough to remove the blocks.
 97. Check for hydraulic leaks.
 98. Bleed the primary cylinder as described in Primary Cylinder Bleeding in the Lift Cylinders chapter of this manual.
 99. Verify all truck operations.
 100. Remove the wheel chocks.
 101. Adjust the fork height. Refer to Fork Height Adjustment at the beginning of this section.
85. Assemble the hose pulleys and control cable pulley into the yoke with the hoses and control cable properly routed over them. Secure the pulleys with a shaft and retaining rings.
 86. Route the control cable through the yoke and then the hose. Affix the extension spring to the hole on the back side of the upper hose guide. Refer to Control Cable in the Electrical chapter of this manual for further details on proper control cable tensioning.
 87. Close MVL. Remove the lifting device from the mast. Connect the battery.
 88. Turn the truck ON. Raise and block the mast to gain access to attach the hoses and cables to the primary cylinder.
 89. Turn the truck OFF. Disconnect the battery. Open MVL.

Lift Chain

Lift Chain Inspection			
Damage Example	Damage and Symptom	Cause	Solution
	<p>Broken plates</p> <ul style="list-style-type: none"> The head section of the plate is missing or the crack is protruding. 	<ul style="list-style-type: none"> Fatigue crack because of overload Corrosion 	<ol style="list-style-type: none"> Find and correct the cause of the overload. Replace the lift chain.
	<p>Broken pins</p> <ul style="list-style-type: none"> The outer plate (9) is lifted out a small distance <p>Note: These defects are not easy to see in the initial stages of inspection.</p>	<ul style="list-style-type: none"> Pitting on the pins because of corrosion. Pitting permanently damages the pin. 	<ol style="list-style-type: none"> Replace the lift chain. Increase the frequency of the planned maintenance intervals.
	<p>Contamination</p> <ul style="list-style-type: none"> A thick layer of dirt mixed with oil or grease (10) is on the lift chain. 	<ul style="list-style-type: none"> Incorrect lubricant used. The lift chain was not cleaned before lubrication. 	<ol style="list-style-type: none"> Clean the lift chain and check for damage. <ul style="list-style-type: none"> If the lift chain is not damaged, lubricate it with the correct lubricant. Replace the lift chain if it is damaged. Increase the frequency of the planned maintenance intervals.
	<p>Hydrogen absorption</p> <ul style="list-style-type: none"> Non-distorting brittle fracture (11), only on the outer plate 	<ul style="list-style-type: none"> The lift chain came into contact with hydrogen. <p>Note: Electrolysis always makes hydrogen. Solvents made with chlorine also emit hydrogen.</p>	<ol style="list-style-type: none"> Replace the lift chain. Check the operating conditions for sources of hydrogen. See the cleaning the lift chains for instructions.
	<p>Lift chain elongation</p> <ul style="list-style-type: none"> The lift chain elongation check found the lift chain to be out of the tolerance level. 	<ul style="list-style-type: none"> Wear caused by movement in the joints. <p>Note: This type of wear is typical.</p>	<ol style="list-style-type: none"> Replace the lift chain. <p>Note: Check if increasing the frequency of the planned maintenance intervals can increase the life of the lift chain.</p>

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 Figures 28009, 28010, 28011, 28012, 28013, 28014, 28015, 28016, 28017, 28018, 28019, and 28020 are used in this table.

CYLINDERS

Lift Cylinders



- Using blue thread locking adhesive, secure the secondary cylinder to the mast with a screw and spacer installed through the hole in the bottom-front of the mast. Torque the screw to 75 Nm (55 ft lb). Refer to Figure 24696.



Figure 24696

- Thread the remaining lift chain anchors through the yoke and then draw the yoke along the chains until it can be moved into position on the cylinder. Refer to Figures 24695 and 24694.

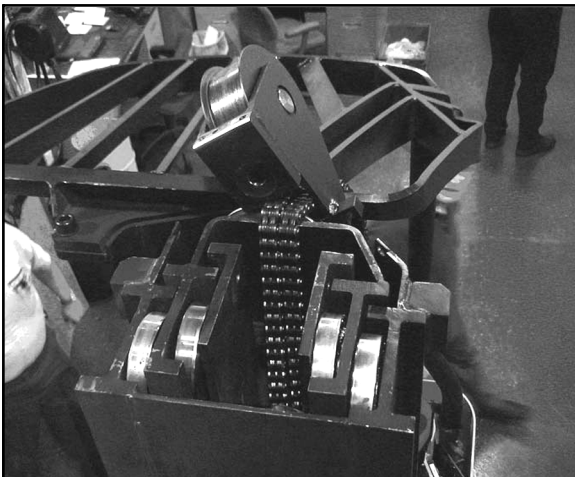


Figure 24695



Figure 24694

- Secure the secondary yoke to the mast using three screws in the front. Install the longest of the three screws in the lower left corner of the triangle-shaped pattern of holes on the mast so that it holds the secondary cylinder ram in the secondary yoke assembly. Torque the screws to 101 Nm (75 ft lb). Refer to Figure 24692.



Figure 24692

CYLINDERS

Lift Cylinders



NOTE

Take extreme care to prevent scratching of the cylinder (7) walls or the ram.

17. Remove the rod packing using a pair of specially made tools. Refer to Figure 15963-01.
 - To make the tools, weld or braze a headless 4 mm self-tapping (No. 8 metal) screw to the end of a screwdriver. The screwdriver must have at least 152 mm (6 in) of shank length with no larger than 4 mm (0.156 in) shank diameter.
 - After attaching the screw to the screwdriver, grind off the excess weld to a diameter of 4 mm (0.156 in).
 - To prevent scratching of the cylinder bore or the ram, wrap the shank with electrical tape from the tip of the screw to the screwdriver handle.

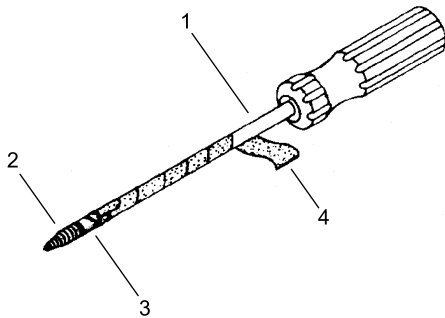


Figure 15963-01

- 1 Screwdriver
152 mm (6 in) shaft length (min.)
4 mm (0.156 in) shaft diameter (max.)
- 2 No. 8 Metal Screw
Headless (4 mm Self-Tapping)
- 3 Weld (grind off excess) to a max. dia. of 4 mm (0.156 in)
- 4 Tape

18. Insert the tools between the ram and the cylinder walls, 180° apart. Push on the handles while turning them in a clockwise direction to bore the screws into the rod packing. When the screws are firmly seated in the rod packing, gently pull on the tools to work the rod packing out of the cylinder bore. Refer to Figure 24882 (different cylinder shown).



Figure 24882

19. Since the wiper ring and rod packing should always be replaced at the same time, remove the wiper ring (1) from the cap. Refer to Figure 24883.
20. Thoroughly clean the areas where the wiper ring and rod packing seat. All burrs, sharp edges, dirt and debris must be removed before reinstalling new seals.
21. Inspect the existing collar (4). Ensure it is properly seated in the cylinder bore. Replace if necessary. Refer to Figure 24883.

CYLINDERS

Tilt Cylinder

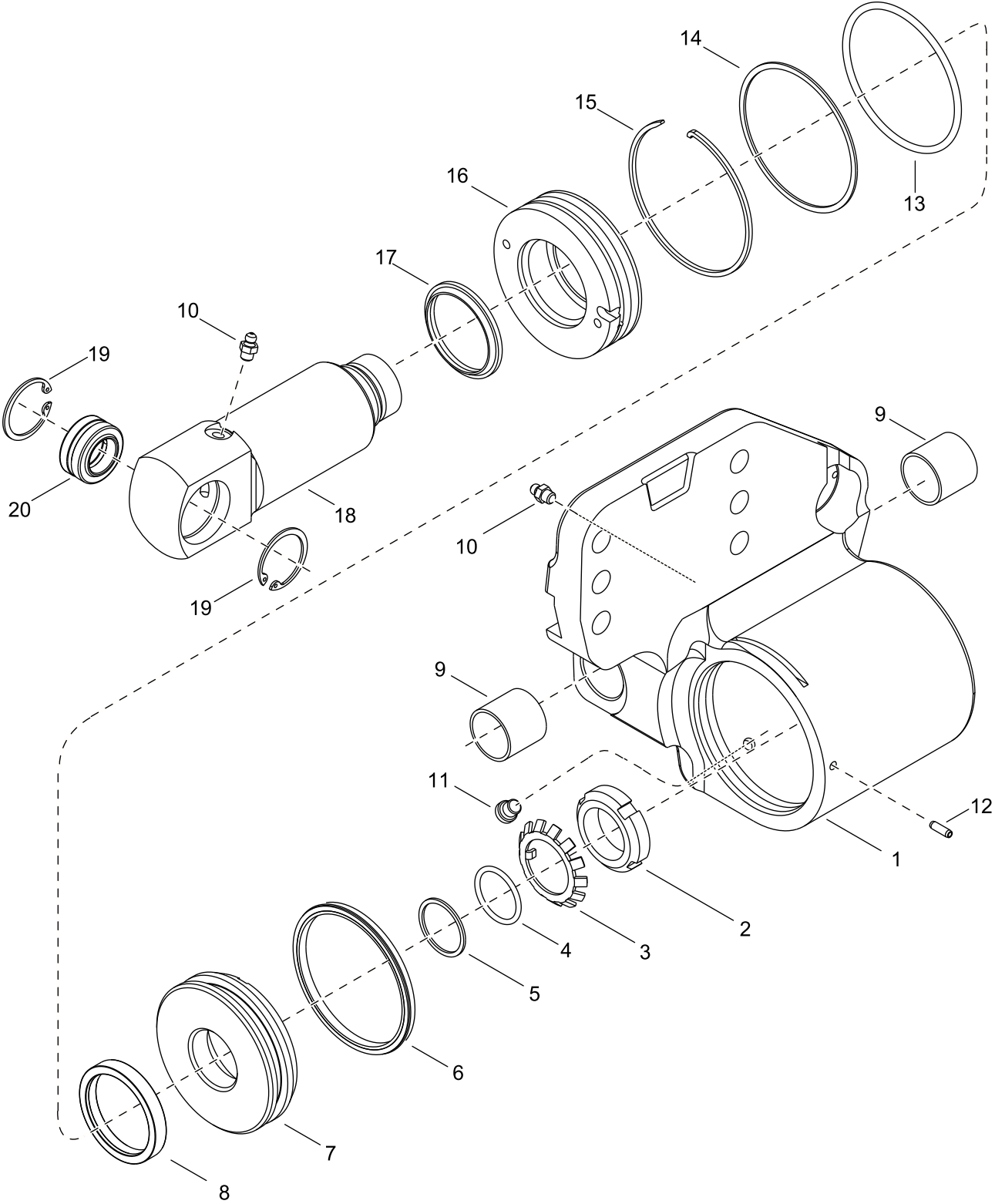


Figure 23058

REACH & ATTACHMENTS

Reach Mechanism



18. Lift the load backrest and reach carriage off the rollers and away from the truck. Set in a secure area until reassembly.
19. Use the lifting device and sling to support the inner arm as it is still attached to the truck. Refer to Figure 24402.



Figure 24402

20. Remove the roll pin (1) from the cylinder pivot shaft (2) at the rod end of each reach cylinder (3). Remove the cylinder pivot shafts. Retain the hardware for reassembly. Refer to Figure 24403.

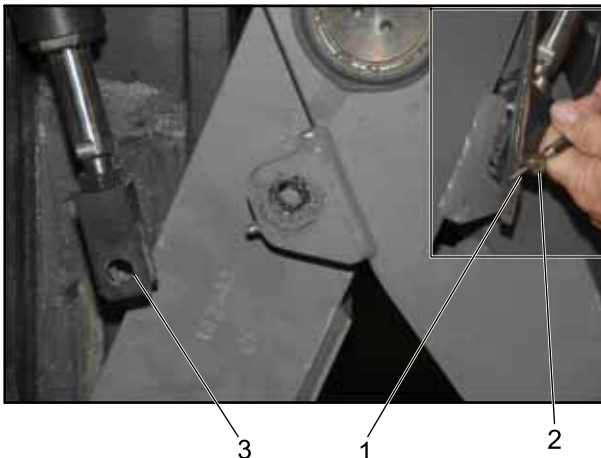


Figure 24403

21. Remove the cover from the top of the rear reach carriage.
22. Remove the screw (1) that secures the manifold assembly (2) on the top of the reach carriage. It is not necessary to disconnect the hoses from the manifold block. Move the manifold block to access the roll pin (3). Retain the hardware for reassembly. Refer to Figure 24404.
23. Remove the screw (4) that secures the clamp body (6) and cover plate (5) to the top of the rear reach carriage. Move the hoses aside to access the roll pin underneath. Retain the hardware for reassembly.

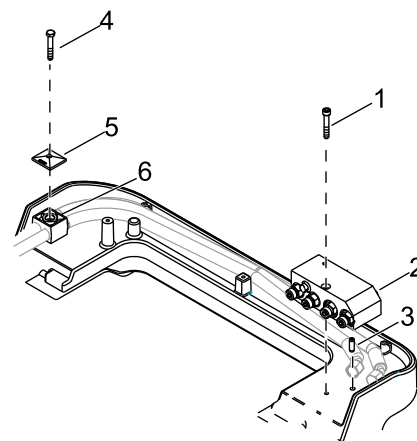


Figure 24404

REACH & ATTACHMENTS

Reach Mechanism



10. Ensure the reach mechanism is properly blocked on the mast. Remove the lifting device and sling from the inner arm assembly.
11. Use the lifting device and sling to slide the front reach carriage onto the rollers of the outer arms.
12. Align the bushings (16) in the tops of the inner arm (2) with the holes on the front reach carriage.
13. Insert the pivot shafts (17) through the front reach carriage and the bushings in each side of the inner arm. Take care to line up the holes to install the roll pins (18) that secure the pivot shafts. Install the roll pins.
14. If the fork carriage and load backrest were removed from the front reach carriage, use a lifting device and sling to install the fork carriage on the reach carriage and then install the load backrest on the fork carriage using four screws as previously removed.
15. On the top of the rear reach carriage, reposition and secure the manifold block with the screw previously removed. On the opposite side, reassemble the clamp body and cover plate with a screw as previously removed.
16. Install the rear reach top cover. Torque the screws to 6 Nm (60 in lb).
17. Install the reach sensor (RPS3) and applicable spacer(s) using two screws. The sensor must be installed with the potted side toward the rear reach weldment.
18. Use three screws to install the magnet carrier. The gap between the reach sensor and the magnet carrier should be 4 mm \pm 0.5 mm (0.16 in \pm 0.02 in). Install spacer(s), as necessary, between the reach sensor and the carriage. Refer to Figure 24405.



Figure 24405

GLOSSARY

Glossary

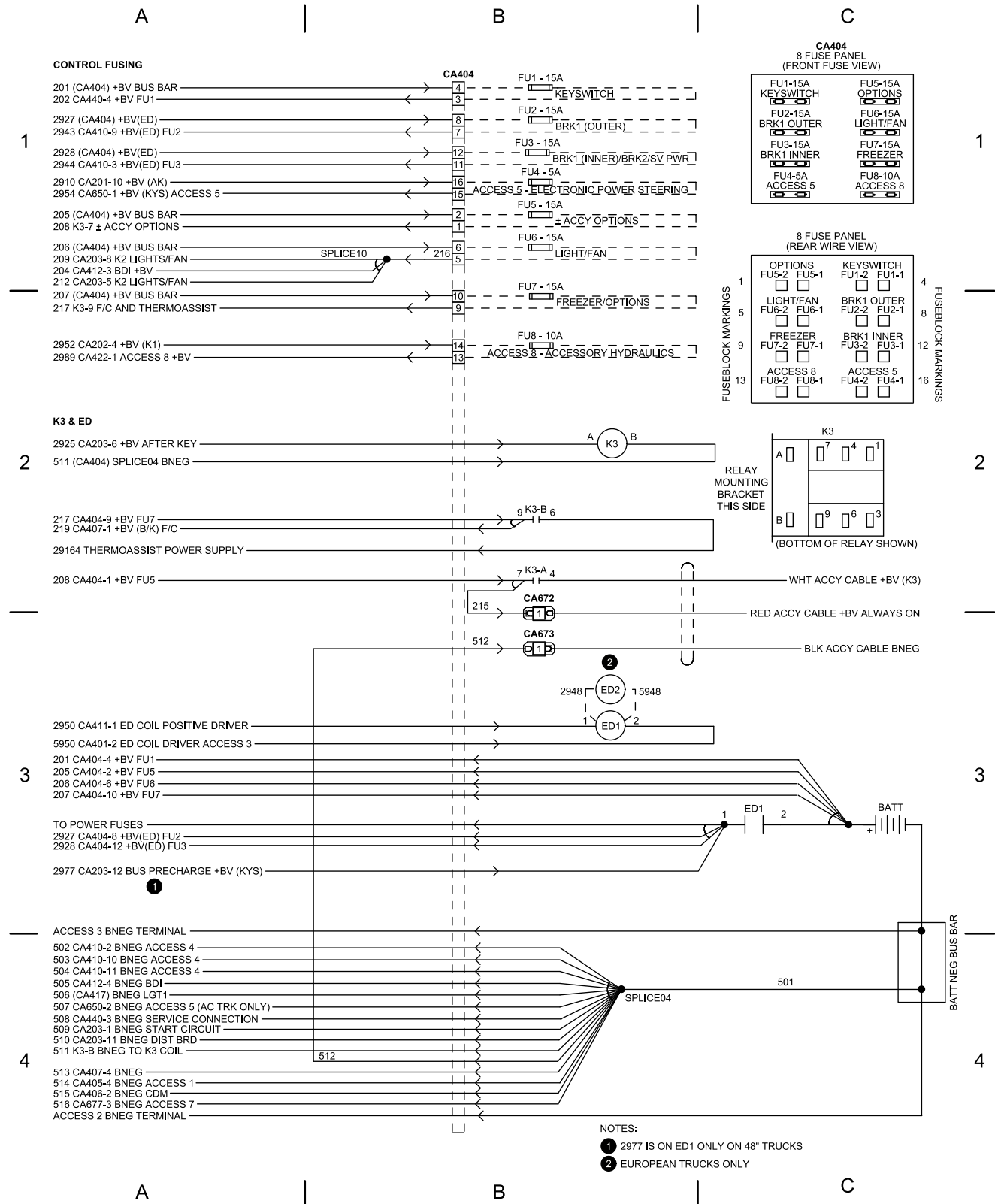


CONNECTIONS (Continued)

	Location	Function	Diagram	Parts Breakdown
CA652	Steer Tiller	RPS2	DIA-1460-051 (A-1) DIA-1460-052 (A-1)	04.8-1460-302
CA653	M4	ECR4, TS4	DIA-1460-034(B-1) DIA-1460-051 (A-1) DIA-1460-052 (A-1)	04.8-1460-302
CA654	Undercarriage	RPS1	DIA-1460-051 (A-2) DIA-1460-052 (A-2)	04.8-1460-302
CA665	Near Battery Compartment	BRES1 BNEG	DIA-1460-050 (B-2) DIA-1460-050 (B-3)	
CA667	Near Battery Compartment	BRES1 Input	DIA-1460-050 (B-3)	
CA672	K3	Positive Accessory, +BV	DIA-1460-040 (B-3) DIA-1460-041 (B-3)	
CA673	K3	Negative Accessory, BNEG	DIA-1460-040 (B-3) DIA-1460-041 (B-3)	
CA676	Mast	Mast Cable	DIA-1460-053 (B-1)	04.8-1460-302
CA677	Mast	Mast Cable	DIA-1460-054 (A-2) DIA-1460-055 (A-3) DIA-1460-056 (A-2)	04.8-1460-302
CA678	Mast	Mast Cable	DIA-1460-054 (A-3) DIA-1460-055 (A-3) DIA-1460-056 (A-3)	04.8-1460-302
CA679	Mast	Mast Cable	DIA-1460-055 (B-2)	04.8-1460-302
CA803	Near Battery Compartment	RES4 (BRES2)	DIA-1460-058 (C-1)	04.8-1460-303
CA804	Near Battery Compartment	RES4 (BRES2)	DIA-1460-058 (C-1)	04.8-1460-303
CA805	Power Unit	RES5 (BRES1), RES4 (BRES2), +BV	DIA-1460-057 (B-1) DIA-1460-058 (C-1)	04.8-1460-303
CA806	Multi-Task Control Handle	RES10 (POT3), RES11 (POT1), RES22 (POT2), RES23, RES24, RES9	DIA-1460-057 (C-2) DIA-1460-058 (C-2)	04.8-1460-303
CA807	Distribution Panel	RES5, RES4, RES18, RES16, RES17, RES23, RES24, RES9, RES11, RES22, RES10, THS4	DIA-1460-057 (B-2) DIA-1460-058 (B-2)	04.8-1460-303
CA810	Power Unit	RES5, BNEG	DIA-1460-057 (B-1) DIA-1460-058 (C-1)	04.8-1460-303
CA816	Floorboard	RES13 (BRS1), RES14 (DMS1) & RES15 (ENS), THS5	DIA-1460-057 (B-3) DIA-1460-058 (B-3)	04.8-1460-303

WIRING DIAGRAMS

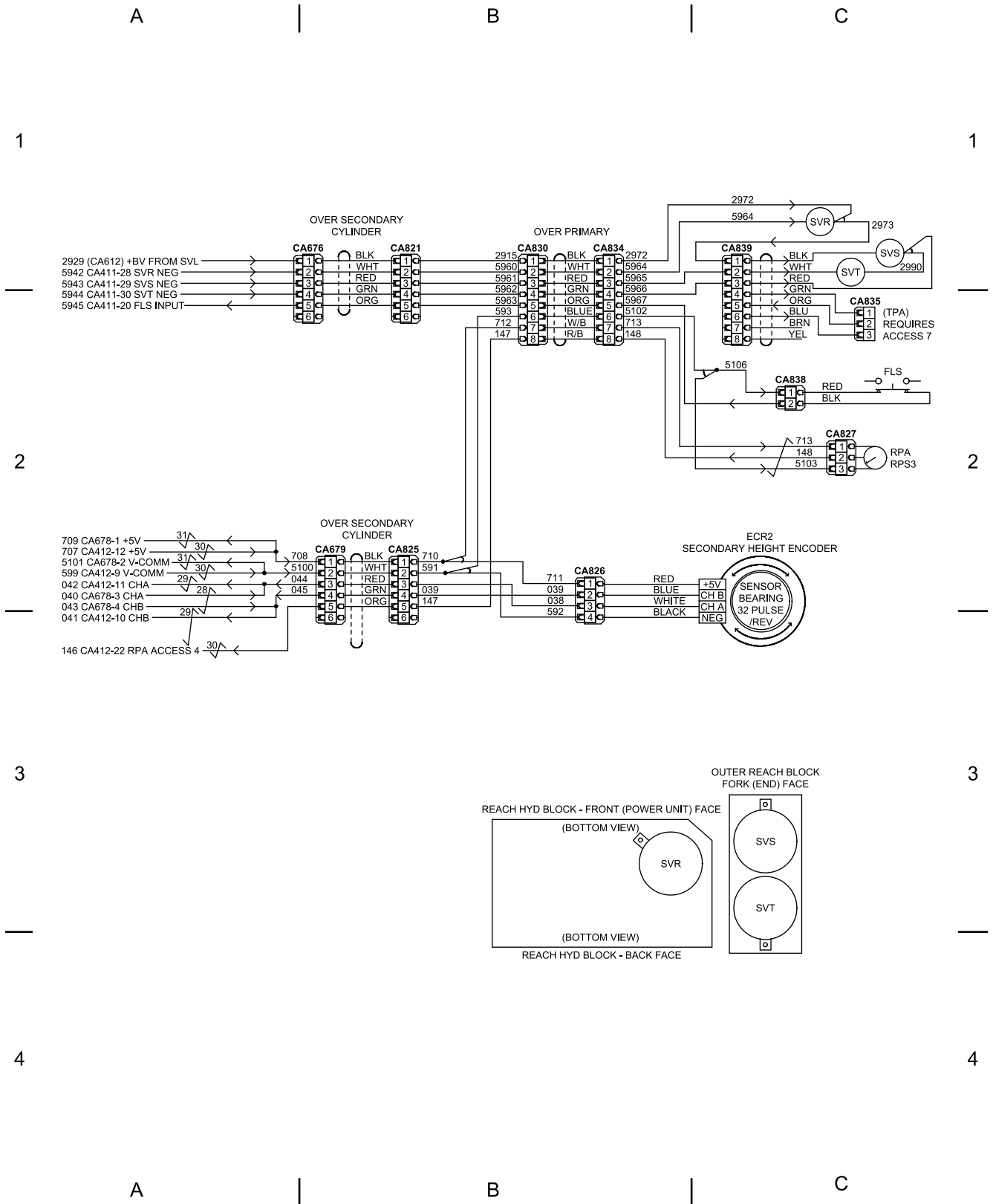
Fuse Panel



149230 B

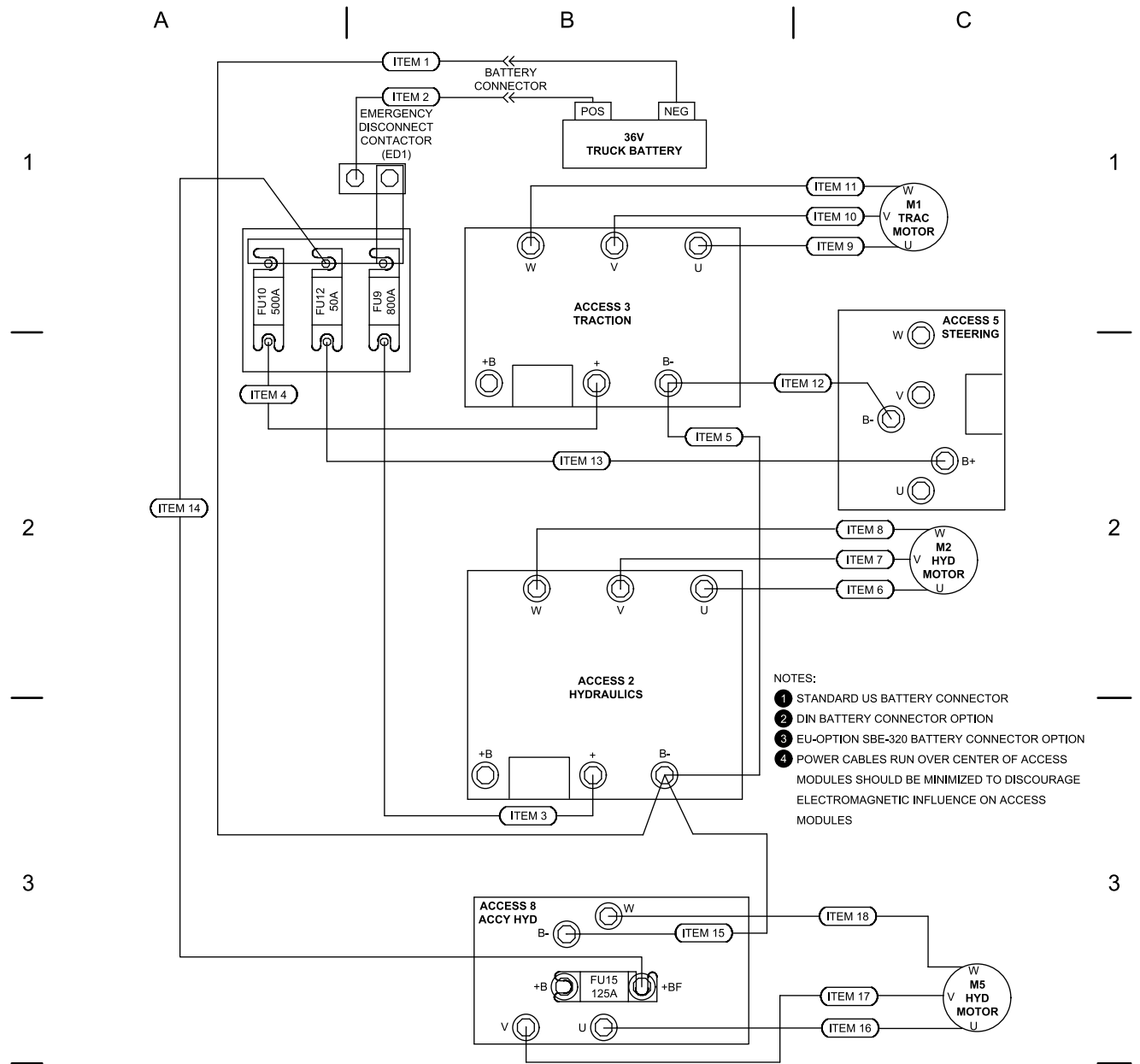
WIRING DIAGRAMS

Standard Mast Components



WIRING DIAGRAMS

48 inch Power Cables



- NOTES:
- ① STANDARD US BATTERY CONNECTOR
 - ② DIN BATTERY CONNECTOR OPTION
 - ③ EU-OPTION SBE-320 BATTERY CONNECTOR OPTION
 - ④ POWER CABLES RUN OVER CENTER OF ACCESS MODULES SHOULD BE MINIMIZED TO DISCOURAGE ELECTROMAGNETIC INFLUENCE ON ACCESS MODULES

CABLE SIZE	PART NO.
PC #10	090963
PC #8	124474
PC #6	084568
PC #4	084569
PC #2	084570
PC #1	084571
PC 1/0	084572
PC 2/0	084573
PC 3/0	086749
PC 4/0	137636

ITEM	E-BOX	F-BOX
1.	137636-039	137636-042
1.	137636-044	137636-046
1.	137636-048	137636-050
2.	137636-040	137636-043
2.	137636-045	137636-047
2.	137636-049	137636-051
3.	137636-041	137636-041
4.	084573-280	084573-280
5.	084573-284	084573-284
6.	084573-281	084573-281
7.	084573-282	084573-382

ITEM	E-BOX	F-BOX
8.	084573-283	084573-283
9.	084572-273	084572-273
10.	084572-274	084572-274
11.	084572-275	084572-275
12.	090963-063	090963-063
13.	090963-057	090963-057
14.	084569-287	084569-287
15.	084569-288	084569-288
16.	084569-289	084569-289
17.	084569-290	084569-290
18.	084569-291	084569-291

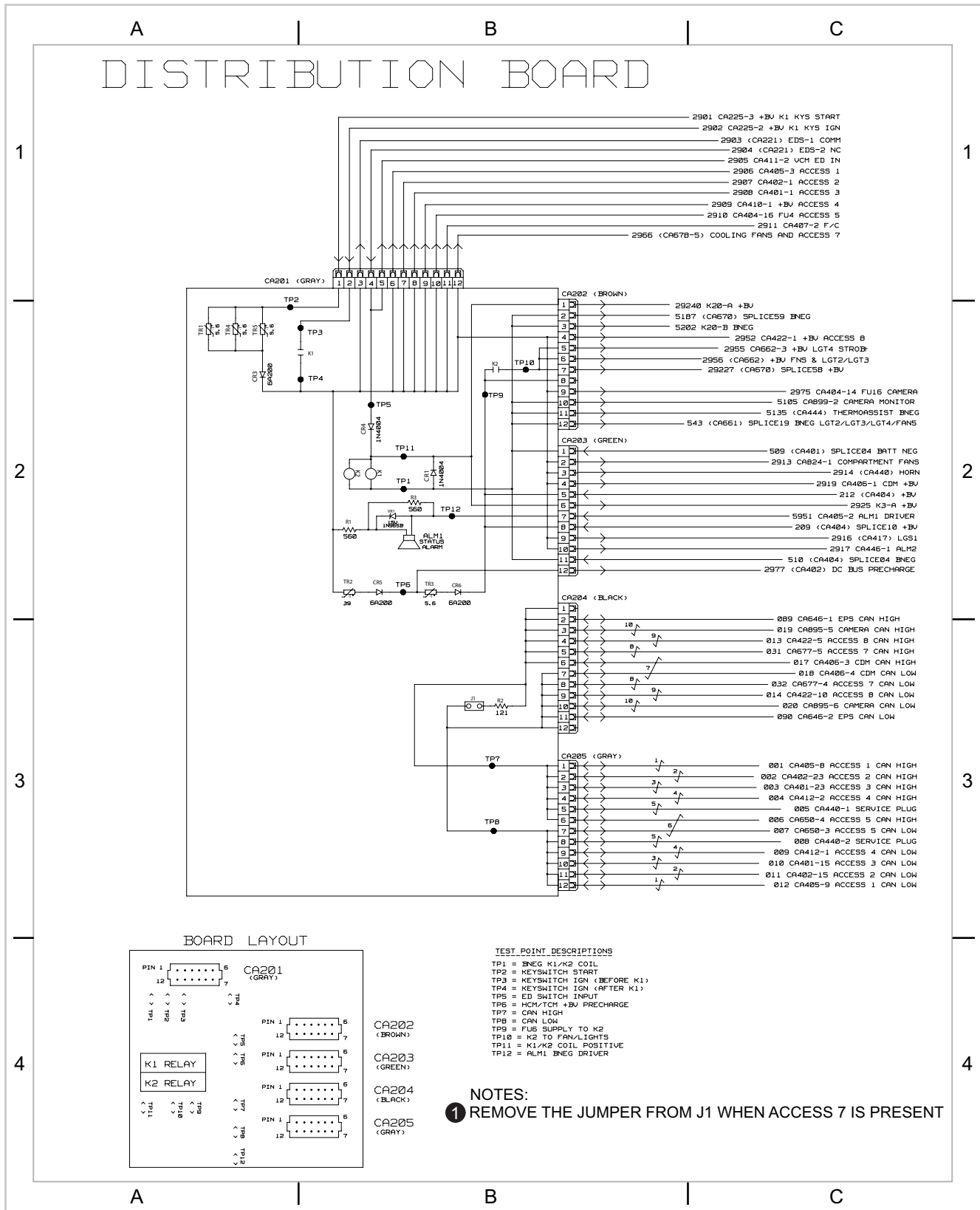
A

B

C

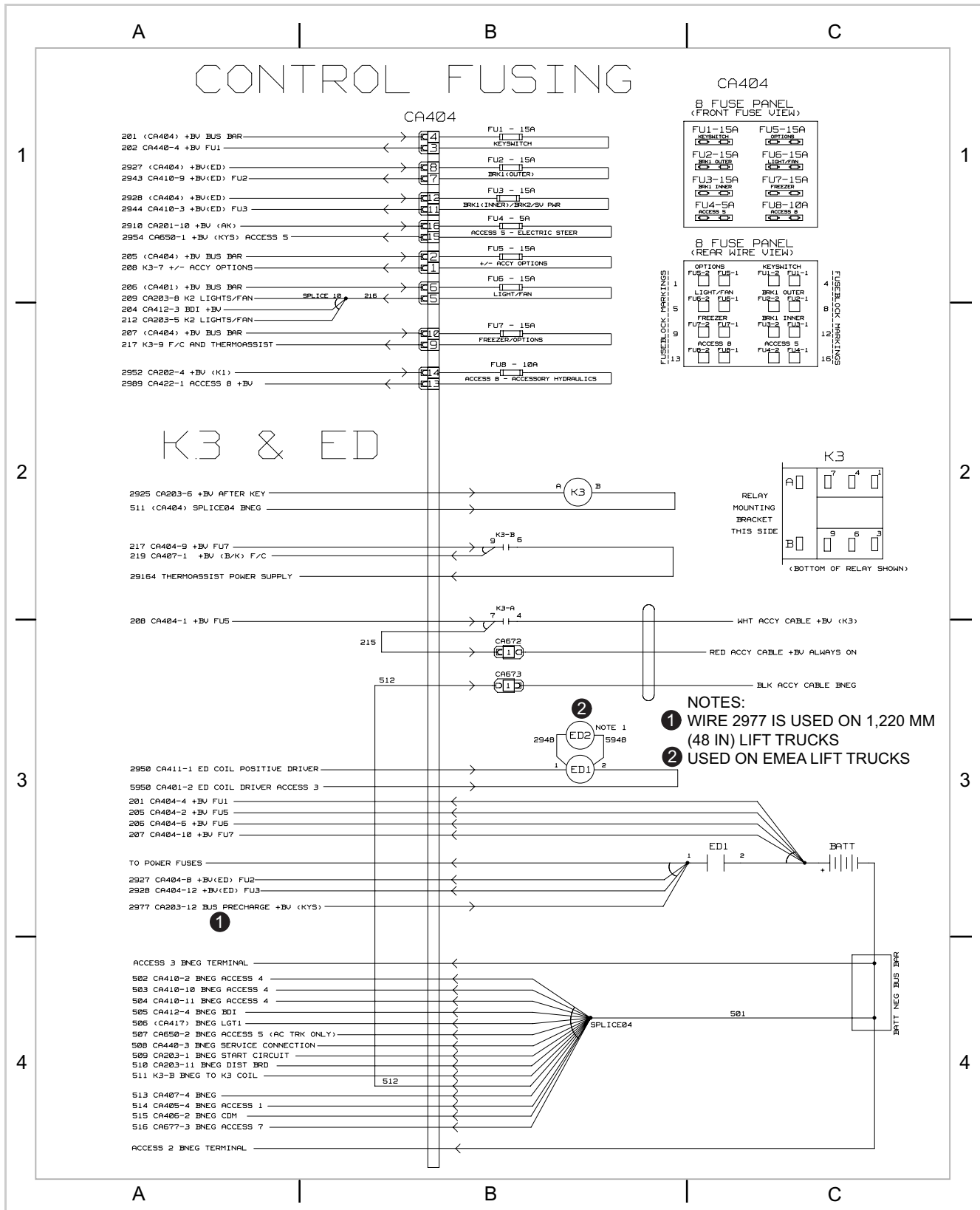
149226 B

Distribution Panel - 1,065 mm (42 in) with EWS Level 2



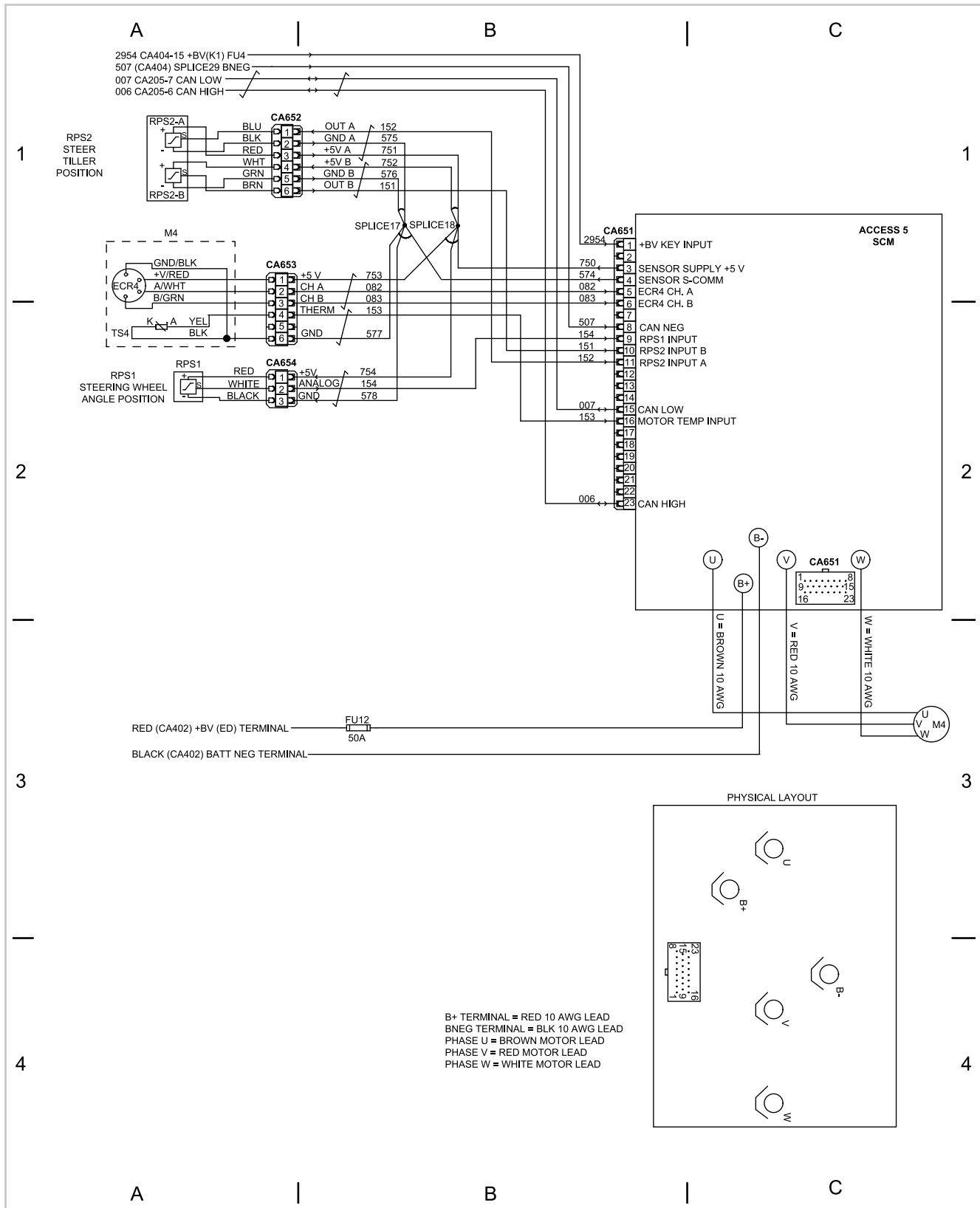
SCHEMATIC DIAGRAMS

Fuse Panel - 1,220 mm (48 in)



149230 B SH 1 of 1

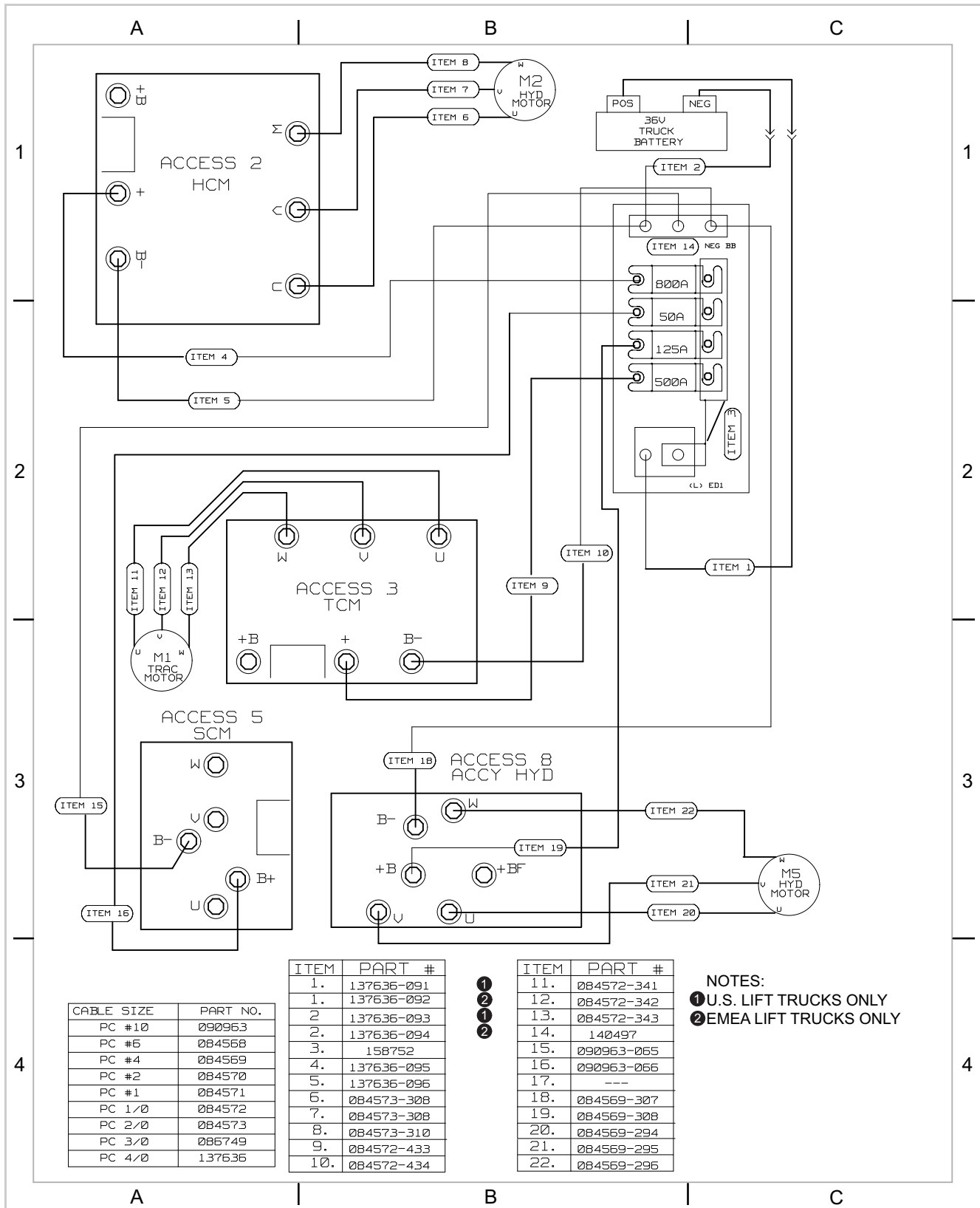
Access 5 - Electronic Power Steering - 1,065 mm (42 in)



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SCHEMATIC DIAGRAMS

Power Unit - 1,065 mm (42 in)



CABLE SIZE	PART NO.
PC #10	090963
PC #6	084568
PC #4	084569
PC #2	084570
PC #1	084571
PC 1/0	084572
PC 2/0	084573
PC 3/0	086749
PC 4/0	137636

ITEM	PART #
1.	137636-091
1.	137636-092
2.	137636-093
2.	137636-094
3.	158752
4.	137636-095
5.	137636-096
6.	084573-308
7.	084573-308
8.	084573-310
9.	084572-433
10.	084572-434

- ①
- ②
- ③
- ④

ITEM	PART #
11.	084572-341
12.	084572-342
13.	084572-343
14.	140497
15.	090963-065
16.	090963-066
17.	---
18.	084569-307
19.	084569-308
20.	084569-294
21.	084569-295
22.	084569-296

NOTES:
 ① U.S. LIFT TRUCKS ONLY
 ② EMEA LIFT TRUCKS ONLY

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