RR 5200S DC

Service & Parts Manual

Crown PF13001-00M

16. Be sure that any equipment added to the truck (terminal, fan, clipboard, etc.) is positioned so that it does not block your vision or interfere with safe and efficient operation of the truck.

For further information pertaining to operating and maintenance procedures:

- All trucks except Series B and Tow Tractors, refer to current ASME B56.1.
- Series B trucks, refer to current ASME B56.10.
- Tow Tractors, refer to current ASME B56.9.

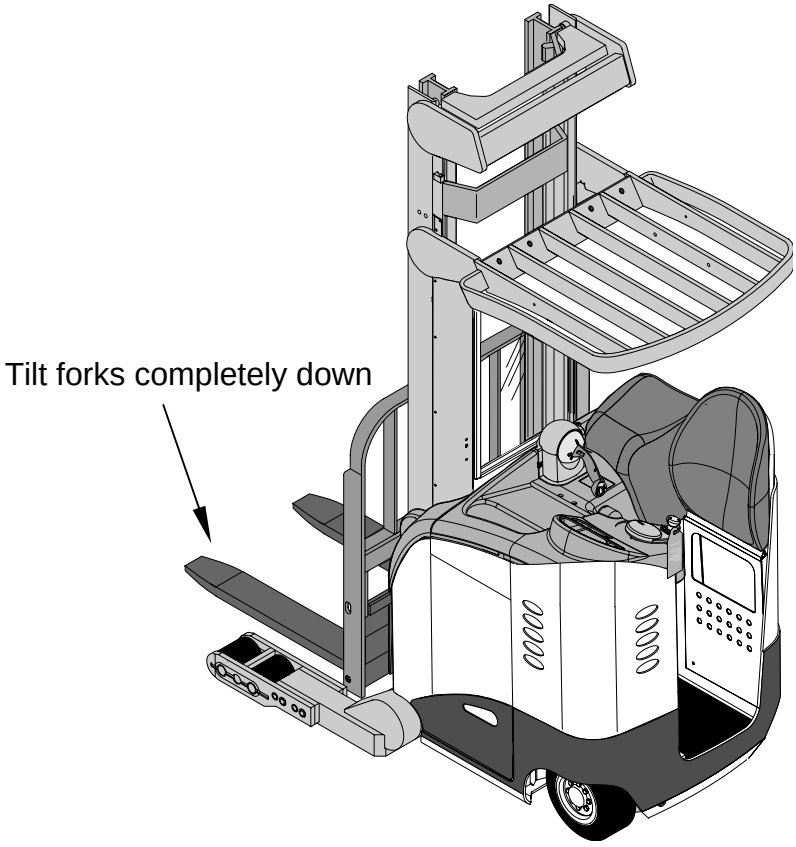
TILT

1. Move truck to a secure non traffic maintenance area with a level floor.

2. Chock wheels of truck. Refer to Lifting and Blocking in this section.

3. Tilt forks down so weight of carriage is not on the tilt cylinder.

4. Lockout or tagout truck as described in Battery - Lockout/Tagout in this section.



8841

Reach Mechanism

- Move truck to a secure non-traffic maintenance area with a level floor.
- Chock wheels of truck (refer to Lifting and Blocking in this section).
- Extend reach assembly.
- Clamp a 50 x 100 mm (2 x 4 in) hardwood block in either left or right channel of reach support assembly below the roller.
- Relieve hydraulic pressure from reach circuit by retracting carriage until roller rests on block.
- If mast is staged refer to Mast in this section for blocking instructions.
- Lockout or tagout truck as described in Lockout - Tagout in this section.

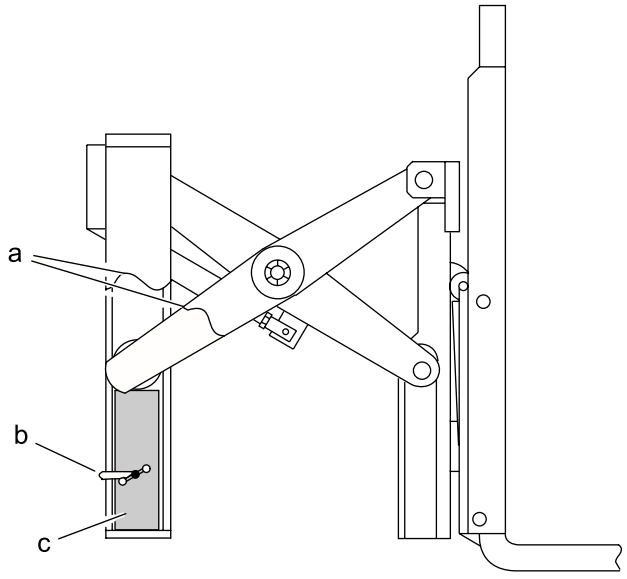


Figure 15991-01

a Cut Away for Clarity
b Clamp
c Hardwood Block

Tilt

- Move truck to a secure non-traffic maintenance area with a level floor.
- Chock wheels of truck (refer to Lifting and Blocking in this section).
- Tilt forks down so weight of carriage is not on the tilt cylinder.
- Lockout or tagout truck as described in Lockout - Tagout in this section.

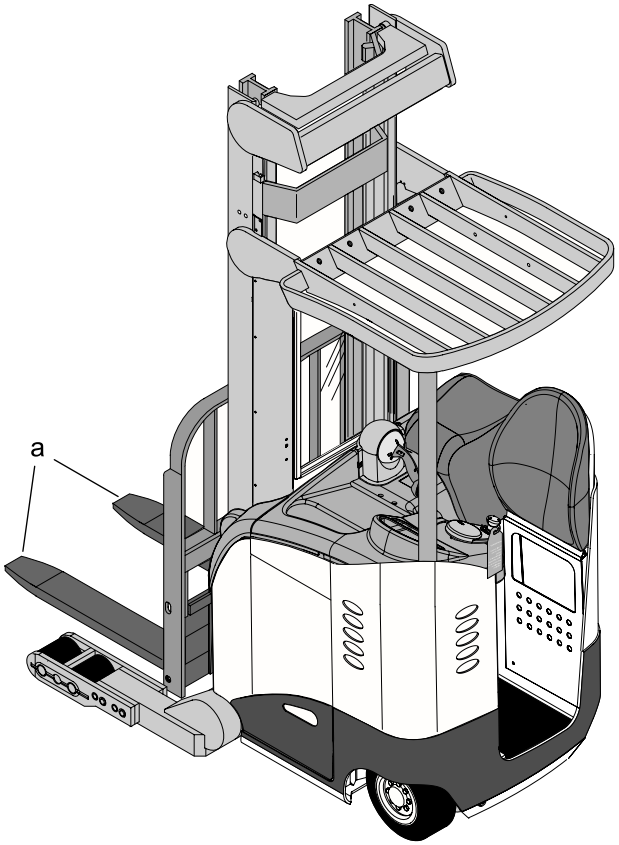


Figure 15992-01

a Tilt Forks Completely Down

RR/RD 5200S/5200S(AC)

Component Accessibility

For regular maintenance, access to various truck components is accomplished by removing covers, panels or opening the power unit door. The following is a general explanation of which cover, panel, etc. that must be removed to allow for the most efficient access when performing service and/or maintenance to components. Refer to the illustrations in this section as an aid in locating parts that require attention.

NOTE

Be sure battery connectors are disconnected.

The power unit console is secured to the top of the power unit with five clip springs. Lift and remove the console to perform maintenance to Display (Access 1), Access 2, multi-task control assembly, distribution panel (ALM1, K1, K2, FU10 & FU11), key switch, key switch suppressor (SB20), SB21, RDB1 and Access 3-VCM RR/RD 5200S(AC).

Remove screws and covers on front left corner to gain access to contactor (ED), fuse panel (FU7, FU8 & FU9), CS1, TDM, FN2 and Access 3 (RR/RD 5200S).

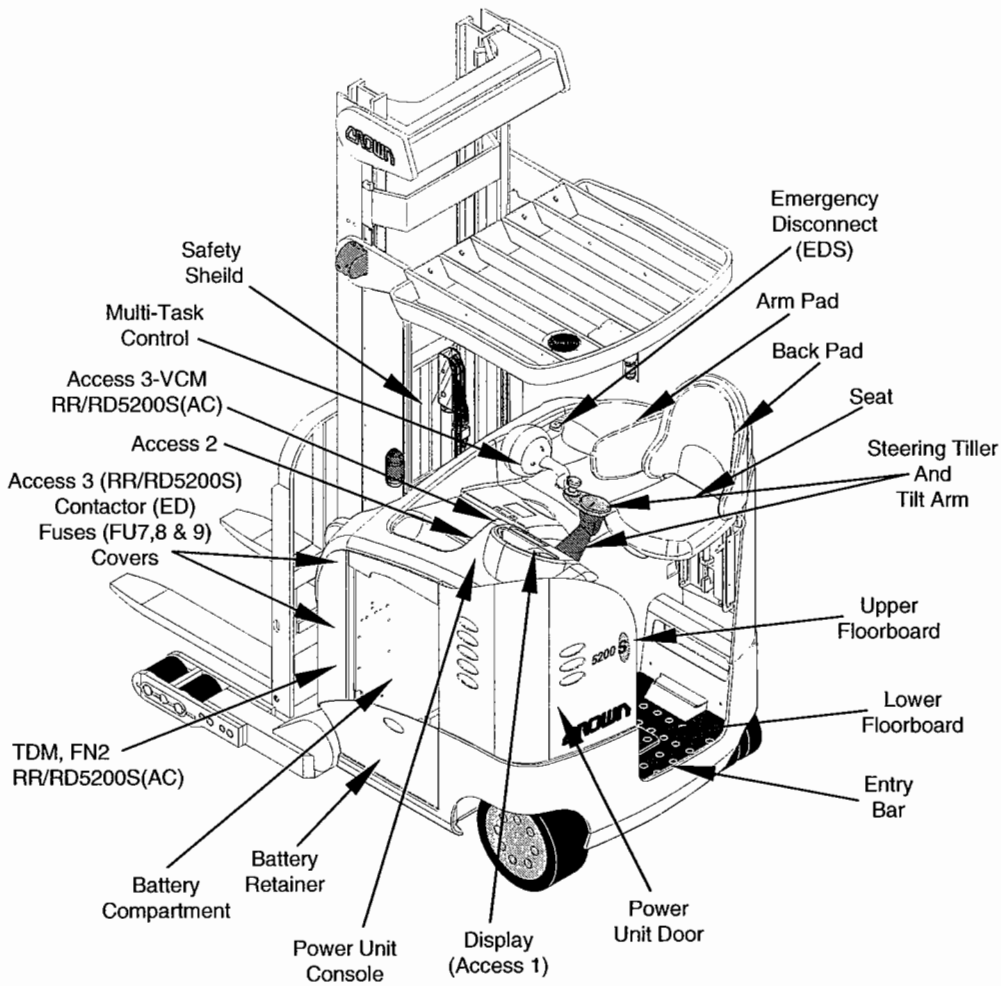
Remove screws and covers on front right corner to gain access to hydraulic reservoir and filter assembly.

Open service door on right side to gain access to lift pumps (P1 & P2), pump motors (M2 & M3), manifold block assembly and P2 contactor RR/RD 5200S(AC).

Remove floorboard to service pedals, switches ENS,BRS1 and DMS1 and connector JC607.

Lift pedals on upper floorboard to gain access to switches BRS2, BRS3 and DMS2.

Unlatching and swinging open the power unit door allows access to the steering control unit (SCU), steer motor, traction motor (M1), traction encoder (ECR1), electric brake (BRK1), hydraulic steer motor linkage, tilt steer arm linkage, horn (HN) and travel alarm (ALM2).



8833-01
010328

ILLUSTRATION 1

4168

M1.0–1452–500

RR/RD 5200S

ALM1
Status Alarm

Location: distribution panel.

Purpose: draws operator attention to changing truck status.

Data: controlled by Access 3.

Adjustment: none required.

ALM2
Travel Alarm

Location: on drive carriage in traction motor compartment.

Purpose: audible warning when travelling forward and/or reverse direction.

Data: controlled by Access 2.

Adjustment: features menu F14.

BRES1
Battery Retainer Switch

Location: below Access 3.

Purpose: monitor switch for control system. Informs control system when battery restraints are in place.

Data: wired normally open held closed.

Adjustment: slight adjustment through elongated mounting holes in mounting bracket.

BRK1
Drive Brake

Location: traction motor (M1).

Purpose: provide braking force to drive motor to stop truck and prevent movement of parked vehicle.

Data: Access 3 release via operator or control system request, spring applied.

Adjustment: Performance menu P6.

BRK2
Caster Brake

Location: on caster wheels.

Purpose: provide braking force to caster wheels to assist BRK1 in stopping truck.

Data: Access 3 apply via operator or control system request, spring released.

Adjustment: Performance menu P7.

BRS1
Stand up Floor Brake Pedal Switch

Location: under floorboard left foot pedal.

Purpose: allows operator to operate the brakes operation through the control system.

Data: momentary contact wired normally closed held open. Switch actuated when operator not on pedal.

Adjustment: none required.

RDB1
Horn Relay Driver Block

Location: near Access 2.

Purpose: provides ground path to horn relay K2.

Data: 36 volt MOSFET driver actuated upon switch closure.

Adjustment: none required.

RS
Reverse Switch

Location: pivot point of multi-task control handle.

Purpose: informs control system reverse travel direction being requested by operator.

Data: optic switch output 0 volt when reverse travel direction selected. Output 5 volt when in neutral or forward travel selected.

Adjustment: none required.

RV1
Relief Valve #1

Location: hydraulic manifold.

Purpose: limit maximum lift pressure for raise.

Data: not applicable.

Adjustment: adjusted to 21,375 kPa (3100 psi) & sealed at inspection.

RV2
Relief Valve #2

Location: hydraulic manifold.

Purpose: limit maximum accessory pressure (independent of lift).

Data: preset to 10,340 kPa (1500 psi).

Adjustment: none required.

RV3
Relief Valve #3

Location: steering control unit.

Purpose: limit maximum inlet steering pressure.

Data: preset to 8275 kPa (1200 psi).

Adjustment: none recommended.

SB20
Suppressor Block

Location: below key switch.

Purpose: key switch inrush current protection.

Data: not applicable.

Adjustment: none required.

SB21
Suppressor Block

Location: near Access 2.

Purpose: suppress electrical noise from operation of horn.

Data: not applicable.

Adjustment: none required.

SB42
Suppressor Block

Location: fan wire harness

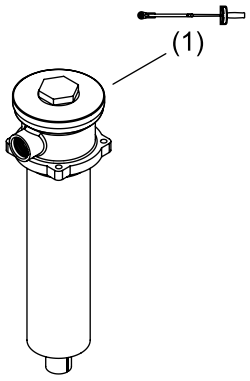
Purpose: suppress electrical noise from operation of compartment fan.

Data: not applicable.

Adjustment: none required.

Filter

The internal filter is contained within the reservoir filter/ fill assembly.



(1) 22 - 27 Nm
(16 - 20 ft lb)

Figure 16838

To access filter, rotate filter cap CCW and remove. Grasp inner support tube and remove the filter element. The filter element can be removed from the support tube and replaced. Insert filter element and support tube and replace filter cap. Torque cap to 22-27 Nm (16-20 ft lb) Dispose of filter and used oil in accordance laws and regulations concerning the disposal of hazardous waste.

Reservoir

Check reservoir fluid level when oil is warm, if not, operate lift for fifteen minutes first before checking fluid level.

With all cylinders in the retracted position and after all air has been bled from the hydraulic system, fill reservoir so that the oil level is at the "add" marks. Excess oil above the "add" mark should be removed. The total capacity of the hydraulic system at this level should be approximately:

- Trucks with dual reservoirs:24.6 liters (6.5 gal)
- Trucks with single reservoirs:27.4 liters (7.25 gal)

CAUTION

Never stand or work under a suspended load.

Drift Test

All drift tests should be conducted with a capacity load (refer to capacity plate for the rated capacity of your truck). The material used for the test load must be evenly stacked within the limits of a four foot square pallet and must be secured to the fork carriage with the forks spread to their maximum width.

Tilt Drift Test

Cycle tilt forward and back several times before testing drift. Elevate test load 600 mm (24.0 in) off floor. Measure drift at the load center with forks tilted up. Forks may not drift more than 15 mm (0.50 in) over a five minute period.

Lift Drift Test

Elevate the test load above staging height and tilt carriage to the full back position. After five minutes, measure the distance the carriage has drifted. Drifting in excess of 50 mm (2.0 in) over a five minute period is considered unacceptable.

NOTE

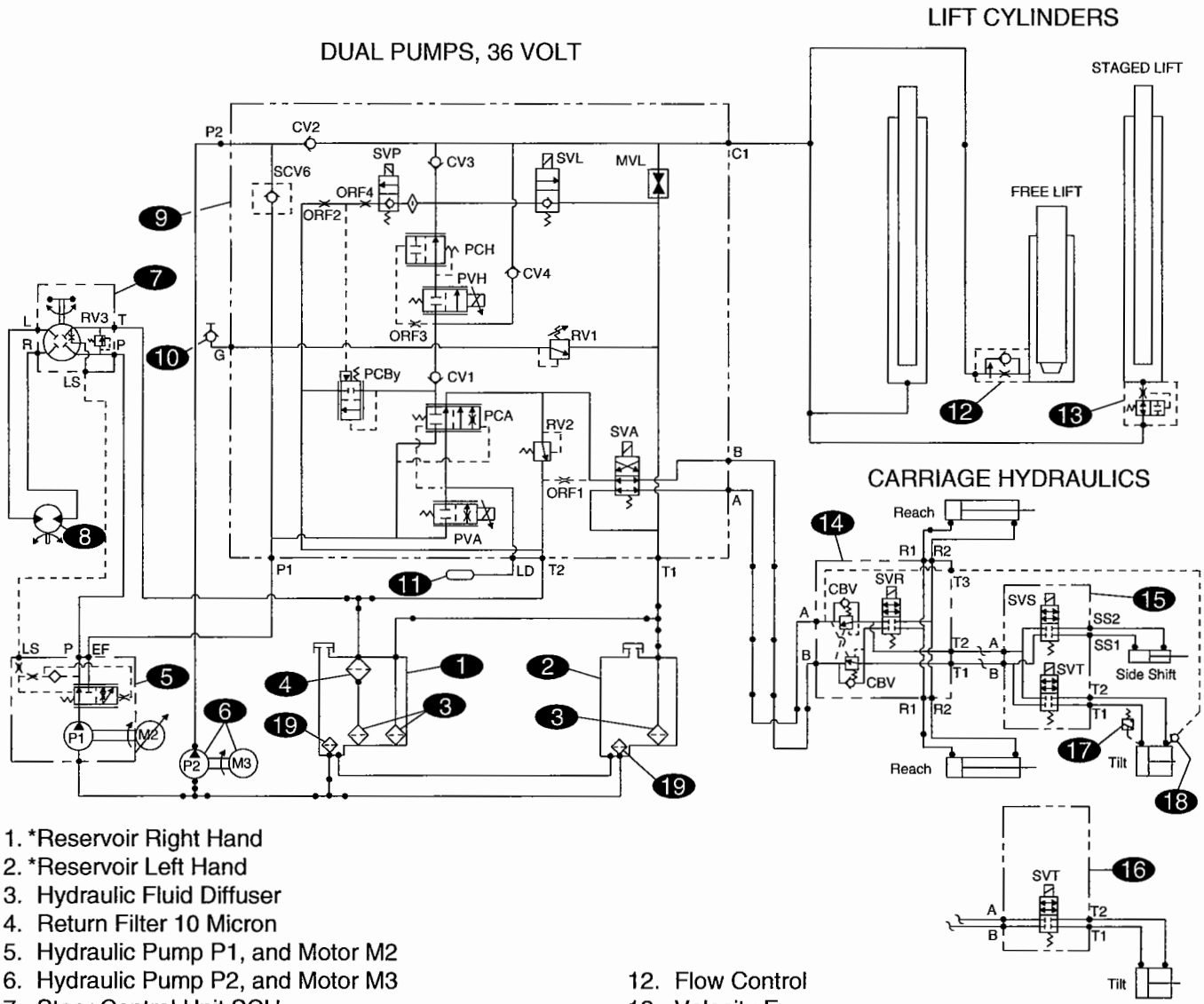
The lift measurement is to be taken from the tip of the fork to the floor.

Occasionally, a slight creep of the fork assembly may occur due to internal leakage in the piston pak, but it can also be caused by leakage in a check or control valve. To seat these valves properly when this occurs, raise and lower the forks to flush out any foreign material from the valve seat.

A thorough check for leaks in the system should be conducted if abnormal oil losses occur. The hydraulic system is designed to eliminate mechanical damage even if fittings become loose.

RR/RD 5200/5200S
RR/RD 5200 (AC)/5200S (AC)
HYDRAULIC CIRCUITS
AS A FUNCTION OF THE MULTI-TASK HANDLE

The following information contains brief descriptions of the hydraulic circuits for the various hydraulic functions. Illustration 1 is a reference schematic for these descriptions and may vary for that which is applicable to your truck. Refer to the hydraulic schematic in the HYD section of this manual for the schematic of your unit.



1. *Reservoir Right Hand
2. *Reservoir Left Hand
3. Hydraulic Fluid Diffuser
4. Return Filter 10 Micron
5. Hydraulic Pump P1, and Motor M2
6. Hydraulic Pump P2, and Motor M3
7. Steer Control Unit SCU
8. Steering Hydraulic Motor
9. Manifold Assembly Contains - CV1, CV2, CV3, CV4, MVL, PCA, PCby, PCH, PVA, PVH, RV1, RV2, SCV6, SVA, SVL, & SVP
10. Quick Disconnect Test Point
11. Hydraulic Expansion Chamber
12. Flow Control
13. Velocity Fuse
14. Reach Manifold - Contains CBV & SVR
15. Tilt/Sideshift Manifold - Contains SVS & SVT
16. Tilt Manifold - Contains SVT
17. Pressure Switch HSS/Pressure Transducer LS
18. Check Valve CV
19. Strainer

*Only one (1) Reservoir on RR/RD 5200S trucks

6198-04

ILLUSTRATION 1

010328

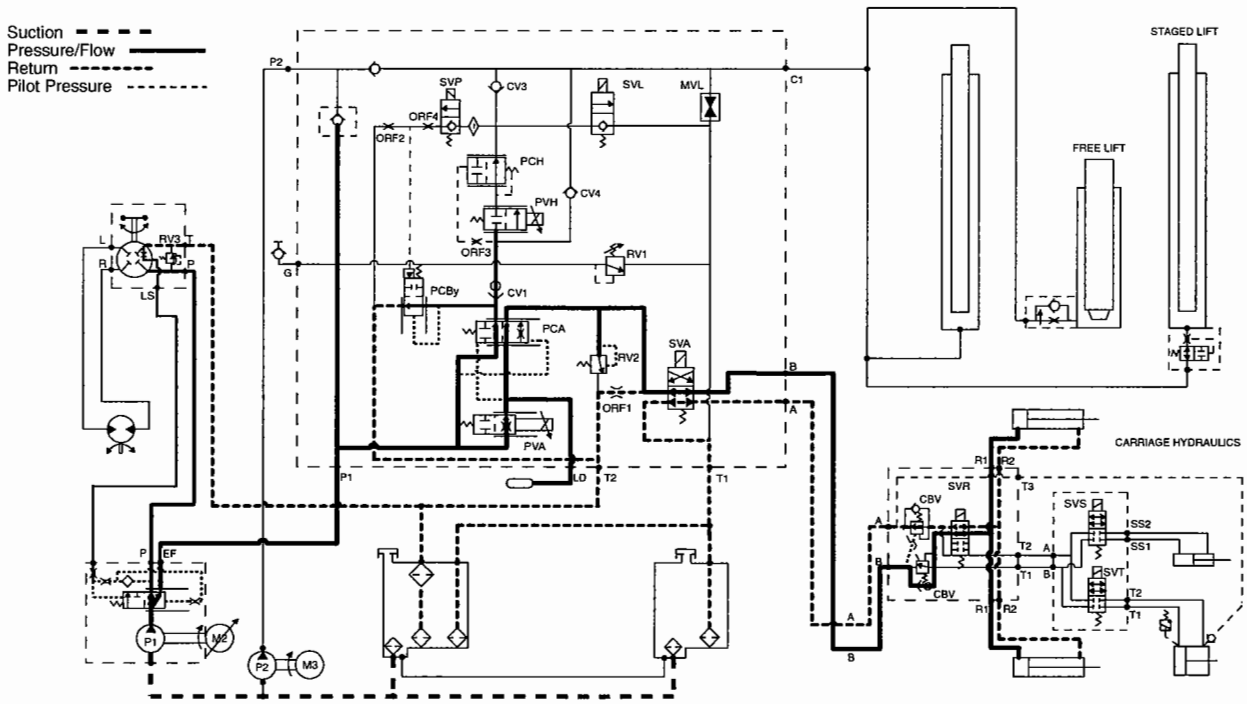
4225

Oil will flow from Pump1's EF port into port P1 of the hydraulics manifold. Flow then passes to PVA and also to bypass port of PCA. PVA is the proportional valve that determines the amount of oil flow delivered to accessory circuits. How far PVA will shift open is in direct proportion to how far the operator moves POT 3. During accessory idle, when PVA is closed, a pilot line delivers oil pressure to right side of PCA causing PCA to shift left when pressure overcomes the bias spring force. With PCA shifted left, oil is permitted to flow through PCA. After PCA the flow is split between PCBy and CV1/PVH. With PVH closed, pilot passage at PCBy pressurizes the bottom of PCBy and overcomes the bias spring, allowing all oil to be bypassed to tank port T2 at a low pressure. When PVA is shifted open, oil flows through PVA to priority port into PCA. A pilot line directs pressure to the left side of PCA and acts with the bias spring to spool PCA right. A pressure differential is now sensed by PCA, with inlet pressure to PVA sensed by a pilot line to the right of the spool, and downstream pressure, after PCA, acting with the bias spring to provide pressure compensation of accessory flow. If PVA is shifted open with a high inlet pressure, PCA is shifted more to the left, decreasing accessory circuit flow, allowing more inlet flow to be bypassed to tank port T2. If PVA is shifted open with a low inlet pressure, PCA is shifted more to the right, allowing more inlet flow to be passed to accessory circuit, and less inlet flow to be bypassed to tank port T2.

Reach is requested by the operator through movement of POT 3 in multi-task handle. PVA is energized, opening to deliver the desired flow out of the priority port of PCA, with excess flow being bypassed over PCA to CV1 and PCBy. From PCA's priority port, oil flows to solenoid selector valve SVA. SVA is not energized for reach and oil passes through lower portion of SVA, out port B of hydraulics manifold, and into port B of reach manifold. With reach selected, solenoid selector valve SVR will be energized. Oil will flow through lower counterbalance valve of double counterbalance valve assembly, through SVR, and exit reach manifold at ports R1, it is routed into rear of reach cylinders causing them to extend.

Oil in front of reach cylinders will be pushed out of the cylinders and into ports R2 on the manifold, through SVR, the other side of dual counterbalance valve, out port A of reach manifold block, into port A of hydraulics manifold block, through SVA, exit hydraulics manifold block at port T1 and return to reservoir(s).

When reach is stopped, PVA and SVR are de-energized, oil in carriage circuit is trapped by counterbalance valves and SVR in carriage manifold block to prevent carriage drifting. Pressurized oil in the mast hose, connected between hydraulic manifold port B and carriage manifold port B, is depressurized through ORF1.



Maximum Reach Extend Pressure is Limited to 103.4 bar / 1500 psi by Manifold Relief Valve RV2.

8709-02

ILLUSTRATION 11

- Remove gears, key and plate (9, 10, 11 and 13) from the driveshaft and driven gear journals, note the position of plate (11) to ensure reassembly in the same position.

- Remove the two remaining bushes from the body bores.

Parts Inspection

Each component should be thoroughly cleaned. Inspected in the order disassembled, for wear and damage and assessed for suitability of reuse.

Inspect the body bore cutin where gears wipe into the body.

The body can only be reused if the cutin is bright and polished in appearance and the depth does not exceed 0.08mm (0.003 in.).

The body is unserviceable if the surface is scored, has a matte appearance or shows signs that the tip of the gears have dug in and torn away the surface metal.

The body should be inspected to ensure that there is no superficial damage which may adversely effect performance or sealing. Pay particular attention to the port threads and body O-ring seal recesses.

Mounting Flange And End Cover

The inner surfaces should be inspected to ensure that there is no unusual wear or scoring in the regions where the body O-rings and bush seals contact, which could result in external leakage.

Check shaft seal recesses for scoring or damage that could result in oil leakage around the outer diameter of the shaft seal. Replacement shaft seal can be refitted with hydraulic sealant (061004-023) to overcome slight damage in this area.

Bushes and Balance Plate

The side faces which abut the gears should be perfectly flat showing no sign of scoring. Characteristically there are bright polished areas on this surface caused by loading against the gear faces, which is often more pronounced on the low pressure side. These should not be used if there is any general scoring or fine scoring with a matte appearance or tearing of the surface material. There must be no noticeable wear step as it is critical that the bush side face and balance plate are completely flat to the gear side face.

Bush bearing liners are acceptable providing that they are not scored or show other damage. The general outside area of the bush should not show any prominent signs of wear.

Gears

Gear side faces should be examined for bruising or scoring. Often operation on contaminated fluid shows scoring between the root of the gear and the journal which leaves a wear step. If a wear step can be felt, coincidental with the root diameter, by drawing a sharp pointed tool across the surface from the journal outwards towards the tip of the gear, then the gear is unserviceable.

Gear teeth should be carefully examined to ensure that there are no signs of bruising or pitting.

Journal bearing surfaces should be completely free from scoring or bruising. The surface should appear highly polished and smooth to touch.

Examine the area where the shaft seal lips run on the driveshaft, this shows up as a polished ring or rings. If a noticeable groove can be felt or there is scoring the shaft is unserviceable.

Examine drive keyway in driveshaft journal extension to ensure it is not damaged or chipped.

If the driveshaft and gears are not damaged then they can be reused. If, however, the gears are damaged they are unserviceable.

Pump Assembly

All parts should be perfectly clean and lubricate bushes and gears with clean hydraulic oil. Make sure O-ring recess and end faces of body remain dry. This will assist assembly of components into body bores.

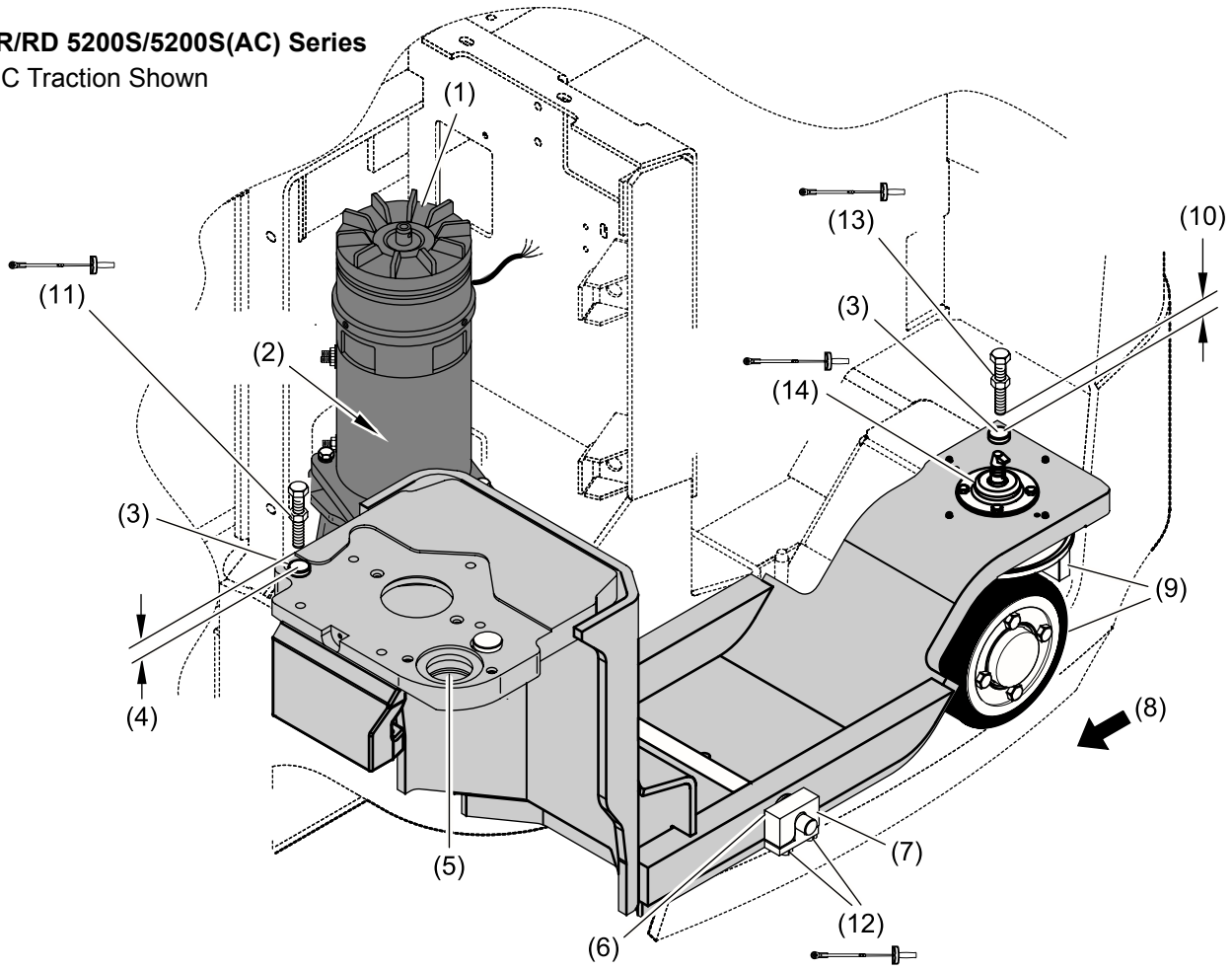
- Install end cover (2) bushes (6 & 7) into undoweled end of the body from where they were removed. The "C" shape cutout in the bushes must be to the side of the body with the cusp removal flat. Refer to Illustration 2.

- Place end cover (2) against the undowelled end of the body (8) and stand assembly on the cover so the dowels are uppermost and to the lefthand side.

Troubleshooting

Problem	Probable Cause	Remedy
Excessive lowering function (Lowers too fast)	Debris in flow control valve	Cycle through lift/lower to free possible debris.
	SVL sticking	Test SVL using analzer A3.5 menu. Replace SVL.
	External oil leak	Check hydraulic plumbing for leak(s).
	Contamination of PCH (stuck open)	Check PCH.
	Blockage of ORF3	Inspect and clean manifold orfice.
	Incorrect calibration of PVH	Check and reset.
Sudden movement or jerking	Broken spring/dirty CV4 (stuck open)	Check CV4.
	PCBY stuck in closed position	Check PCBY.
Lift pump & motor overheating *	Relief valve malfunction	Reset or replace relief valve.
	Exceeding capacity load	Check load weight.
	Low fluid level	Inspect fluid level and fill.
	Worn or damaged pump	Inspect pump & motor for damage repair or replace as needed.
	Oil too thin *	Change to proper viscosity oil.
Abnormal hydraulic oil usage	External leak	Inspect hydraulic plumbing.
Carriage drifts down (in excess of drift test)	Worn lift cylinder packings	See section M8.0 for replacement.
	Broken spring/dirty CV1 (stuck open)	Check CV1.
	Broken spring/dirty CV2 (stuck open)	Check CV2.
	Broken spring or dirt in SVP	Check SVP.
	Broken spring/dirty SVL (stuck open)	Check SVL.
	MVL open or damaged	Check MVL.
Carriage drifts up slightly	PCBY stuck in closed position	Check PCBY.
	Restriction in ORF2	Check ORF2.
Forks drift down (in excess of drift test)	Worn tilt cylinder packings	See section M8.0 for replacement.
	Broken spring/dirty CBV (stuck open)	Check CBV.
Loss of accessory functions (no functions when requested)	Binding or jammed spool in PVA	Check PVA.
	Binding or jammed spool in SVR	Check SVR.
	Binding or jammed spool in SVS	Check SVS.
	Binding or jammed spool in SVT	Check SVT.
Reduced accessory functions (low flow rate)	Contaminated/dirty PCA	Check PCA.
	Dirt or broken spring in RV2	Inspect RV2.
	RV1 set incorrectly	Reset relief valve.
	Broken spring/dirty SCV6 (stuck open)	Check SCV6.
	Oil too thick *	Change to proper viscosity oil.
	Incorrect calibration of PVH	Check and reset
Accessories function with no command or input	Broken spring/dirty SVR (stuck open)	Check SVR.
	Broken spring/dirty SVS (stuck open)	Check SVS.
	Broken spring/dirty SVT (stuck open)	Check SVT.

RR/RD 5200S/5200S(AC) Series
DC Traction Shown



(1)	Brake	(8)	Trailing Edge of Caster Must be in Direction of Arrow for Articulation Adjustment
(2)	Drive Motor	(9)	Inspect Caster and Wheel
(3)	Inspect Wear Plug	(10)	Adjust Articulation to 6.4 mm +0.0/-1.0 mm (0.25 in +0.0/-0.04 in)
(4)	Adjust Articulation to 6.4 mm +0.0/-1.0 mm (0.25 in +0.0/-0.04 in) for Mast Heights 8155 mm (321 in) and Below. For Mast Heights 8180 mm (322 in) and Above, Adjust to 3.0 mm +0.0/-1.0 mm (0.12 in +0.0/-0.04 in)	(11)	375 - 405 Nm (275 - 300 ft lb)
(5)	Hydraulic Steering Motor	(12)	305 - 340 Nm (225 - 250 ft lb)
(6)	Note Number and Location of Flatwashers	(13)	375 - 405 Nm (275 - 300 ft lb)
(7)	Part of Power Unit	(14)	30 - 43 Nm (22 - 32 ft lb)

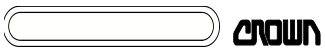
Figure 16872

Component Abbreviations and Designators	
LGS	Light Switch
LMS	Limit Switch
LOS	Lower Switch
LTS	Loadtray Switch
MFS	Multi-funciton Switch
MVS	Multi-voltage Switch
NUS	Null Switch
ORS	Override Switch
PLS	Pivot Left Switch
PORS	Presence Overide Switch
PRS	Pivot Right Switch
PS	Pressure Switch
PTS	Pivot Switch
PUS	Pump Switch
QPS	Quick Pick Switch
RAS	Raise Switch
RES	Reach Extended Switch
RGS	Rail Guide Switch
RGSL	Rail Guidance Switch Left
RGSR	Rail Guidance Switch Right
RIS	Reach In Switch
RLMCS	Rear Left Motor Cover Switch
ROS	Reach Out Switch
RRMCS	Rear Right Motor Cover Switch
RS	Reverse Switch
RSS	Sheet Retainer Switch
SAS	Safety Switch
SCS	Sideshift Center Switch
SES	Seat Switch
SLS	Sideshift Left Switch
SQS	Sequence Switch
SRS	Sideshift Right Switch
SSS	Sideshift Switch
STS	Power Steer Switch

Component Abbreviations and Designators	
SWH	Operator Activated Switch
TBS	Tilt Back Switch
TDS	Tilt Down Switch
TES	Test Switch
THS	Thermal Switch
TLS	Traverse Left Switch
TLT	Tilt Switch
TRS	Traverse Right Switch
TUS	Tilt Up Switch
TVS	Traverse Switch
ZSS	Zone Select Switch
Terms	
ASM	Assembly
CTRL	Control
CTRLR	Controller
DESIG LIST	Designation List
DIST PNL	Distribution Panel
DSPL	Display
F / C	Freezer Conditioning
HCM	Hydraulic Control Module
HDL	Handle
HYD	Hydraulic
OHG	Overhead Guard
PCB	Printed Circuit Board
PICT	Pictorial
PKT	Packet
PL	Platform
PWR	Power
PWR SPLY	Power Supply
SCHEM	Schematic
TCM	Traction Control Module
TMM	Truck Management Module
TRAC	Traction

Performance Menu
Hour Meter Menu
Log Events Menu

6221



6225

These indicators on enhanced displays only:

Quick Reference Keys
- during truck operation, keys can be used to go directly to indicated operator menu.
- pressing key while in menu returns display to normal operation.

Extended Message Display (in place of 4 character display on standard)
- 16 character alpha numeric display.
- presents more comprehensive information to operator as necessary.
- visual interface with truck electronic system.

This indicator on enhanced display with CDM

6223

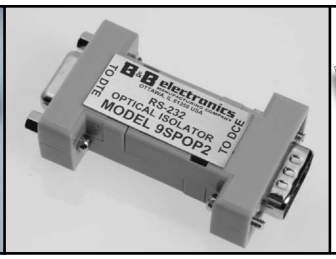
Capacity Data Monitor
- fork icon indicates approximate lift height of forks.
- bar left of fork icon indicates maximum recommended lift height for load on forks.
- circle to the left of the bar corresponds to data plate circles.
- for more information on the capacity data monitor, refer to the M4.3 Capacity Data Monitor section of the service manual.

TRUCK SOFTWARE TOOLS RR/RD5000/5000S, RR/RD5200/5200S, RR/RD5200(AC)/5200S(AC)

PF12937-PRO is a CD-ROM based software utility program created to assist the service technician in configuring truck setups. A PC, with requirements specified below, Down Load Cable (126456), and Isolator Connector (062785-001) are also required. With this software utility the technician can:
- Configure, save or print truck setups.
- View or modify service password.
- View or erase fault code history.
- View or modify hour meters.
- Save or print hour meter and log history (via Data Dump).

Truck System Requirements:
- DC traction models with version 12 through 14 Software.
- AC traction models with version 01 through 04 Software (Data Dump feature not available on version 01 and 02 Software).

Computer System Requirements:
Before using the Crown Programming Tool, PF12937-PRO, the following minimum requirements for the personal computer being used are needed:
- Minimum 1.5 mb of available hard drive disk space.
- Operating system Windows 95, 98, 2000, ME, XP or NT.
- An available COM (communications) port.
- CD-ROM drive

PC Down Load Cable 126456	Frame Isolator Connector 062785-001	Crown Programming Tool PF12937-PRO
		

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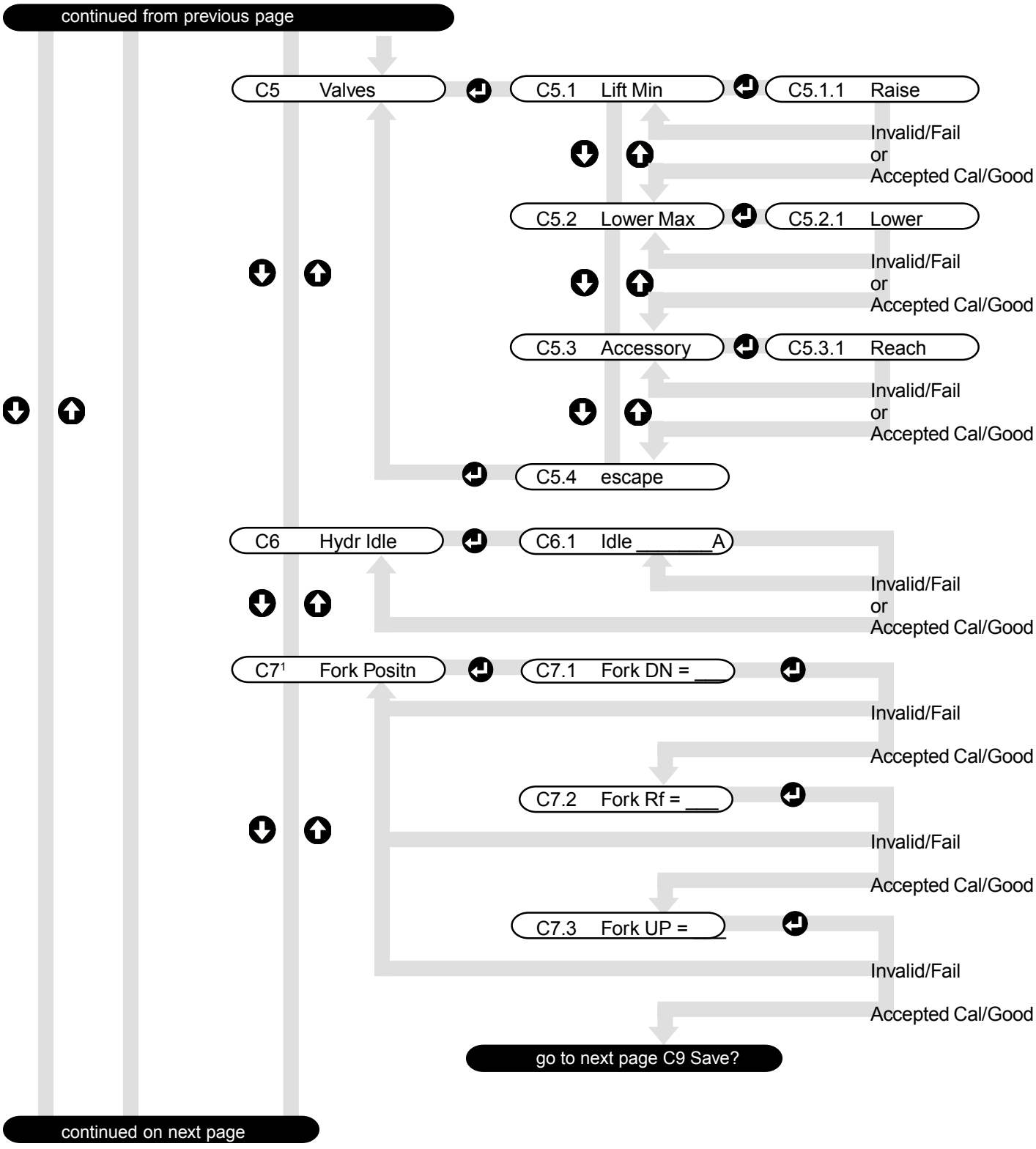
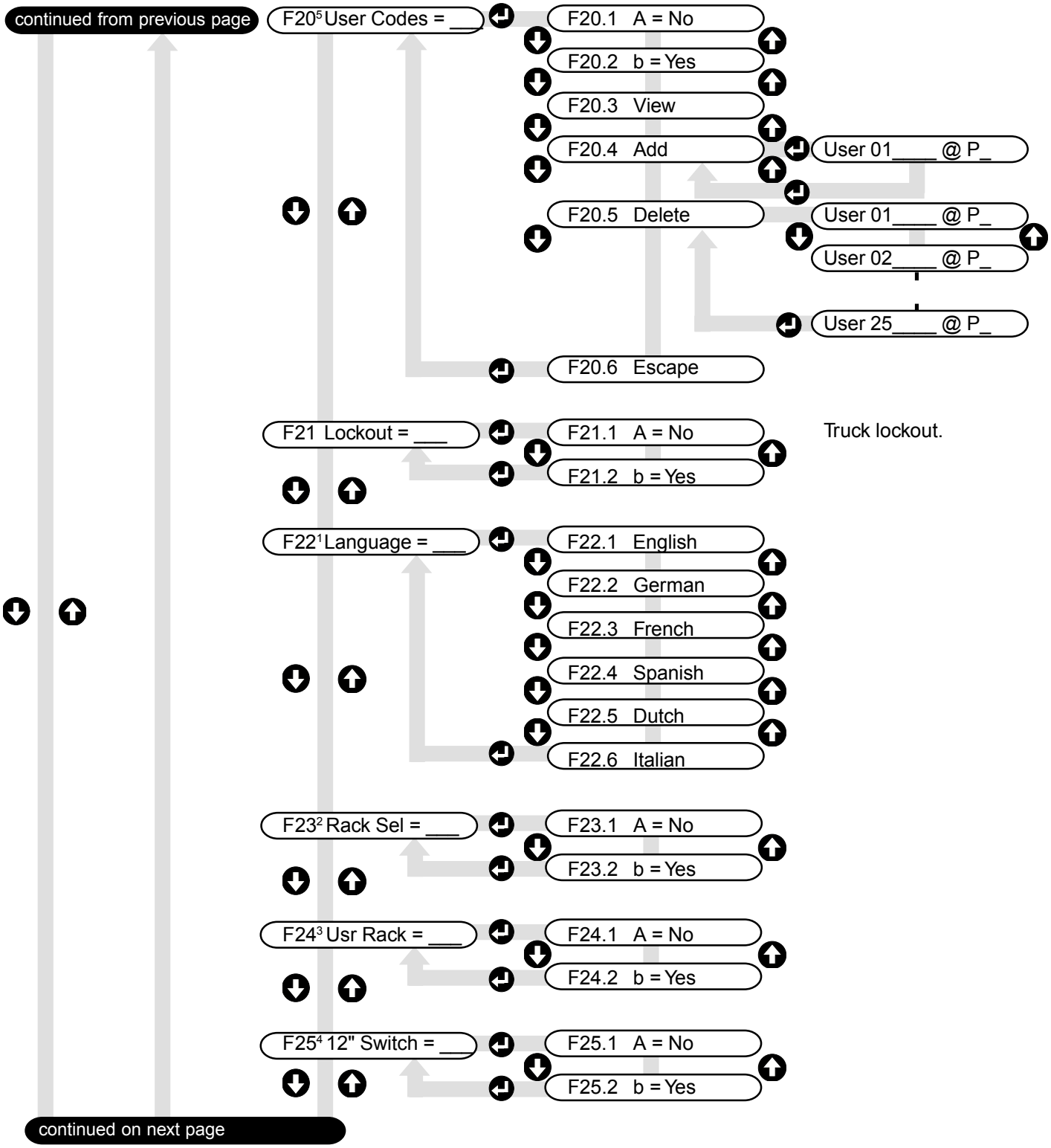
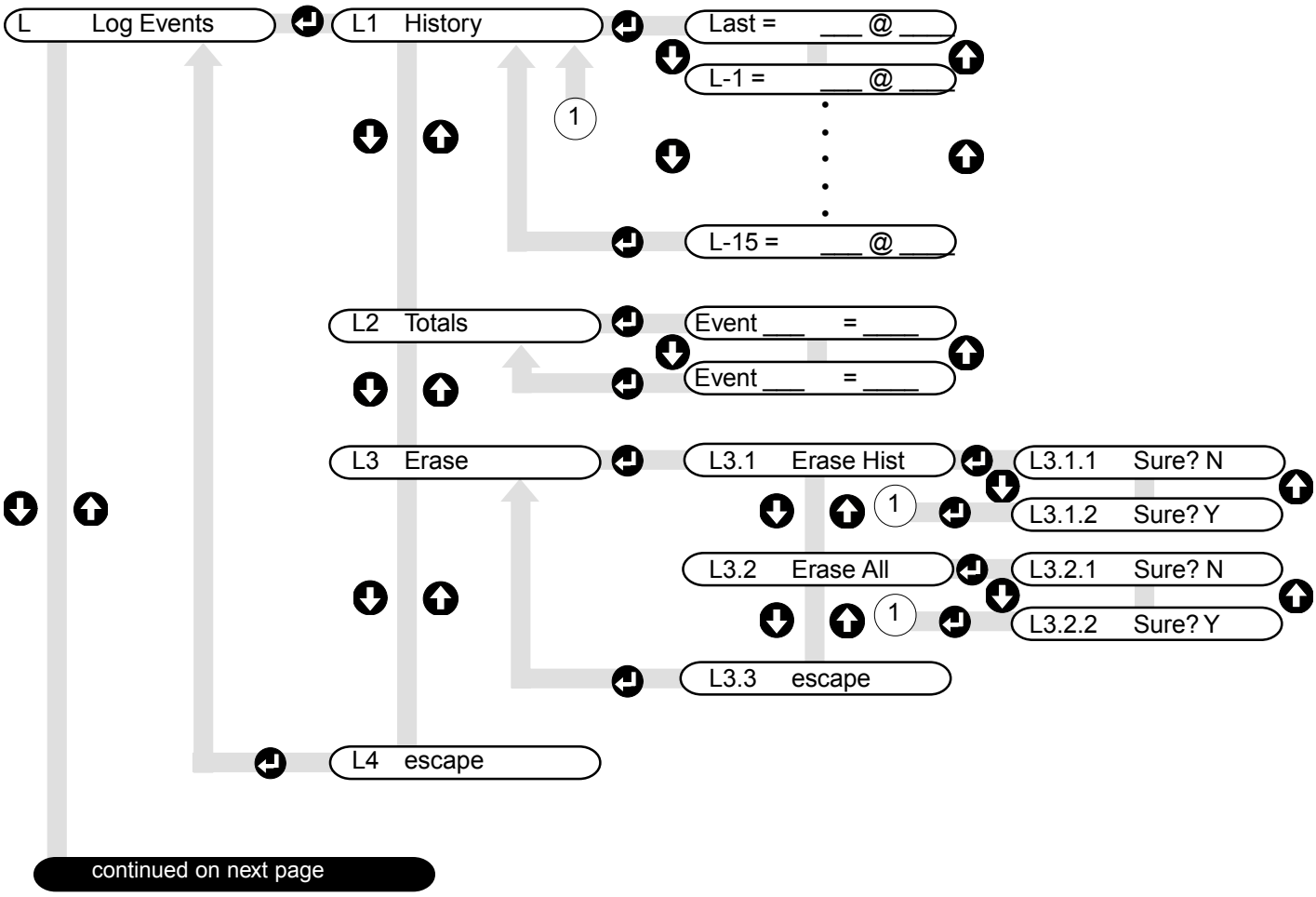


[1] = TPA (Tilt Position Assist)



[1] = Menu available with enhanced display only.
[2] = Menu available with height encoder and enhanced display only. F9 CDM must be Yes.
[3] = F23 must be Yes.
[4] = Menu available only if F3 is No.
[5] = If F20 is "yes", then at least one Personal Identification Number (PIN) is required. If F19 is "yes", any user can select any performance level. The vehicle PIN timeout feature is adjustable from 2 to 20 minutes, in 1 minute increments, through F31 menu.

Press the ↵ key to move right and left in the menu and allow system to accept changes to the log events menu. Press the ↑ and ↓ to move up and down.

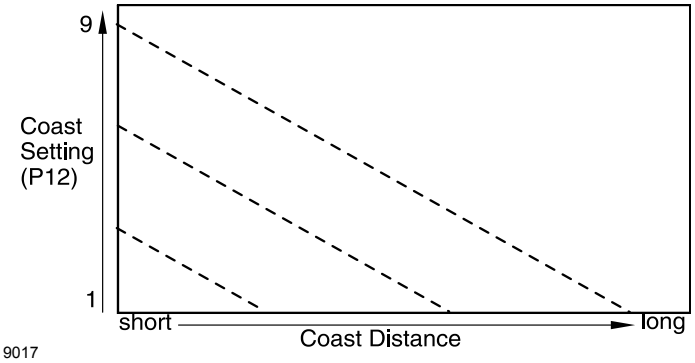


- **P11 Trav>270 = _____**
  This affects traction speed when the forks are above 6.9 m/270 inches. The current setting will be displayed. Adjustment range is between 0.1 to 2.4 Kph (0.1 to 1.5 MPH). To change/modify travel speed above 6.9 m/270 inches press ↵. Press ↓ to go to P12 Coast.

  P11.1 Std = _____
  The value displayed is a setting that is acceptable for optimum truck and installation conditions. If this setting is the desired setting and is the value displayed in P11, press ↵ to return to P11. If a value different than this is desired, press ↓ to access P11.2.

  P11.2 Cust = _____
  Press ↵. Then use ↑ and ↓ to obtain the desired setting. When set, press ↵ to return to P11.

- **P12 Coast = _____**
  The current setting will be displayed. Adjustment range is 1 to 9.



9017

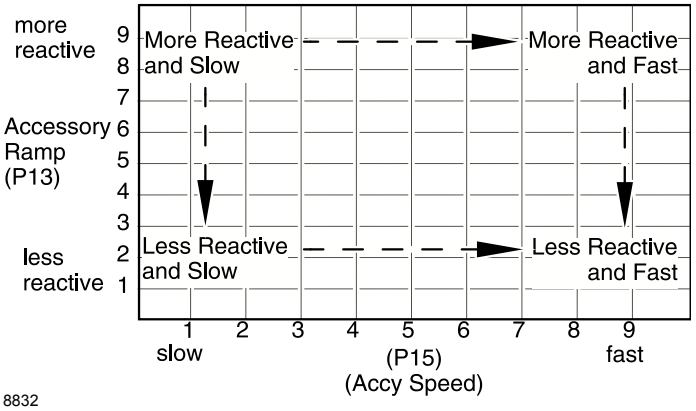
This feature controls the amount of regenerative braking current applied to the drive motor when the operator returns the multi-task handle to neutral while the truck is in motion. The higher the setting, the lower the amount of regenerative braking current applied to the drive motor, resulting in the longest coasting distance. The lower the setting, the higher the amount of regenerative braking current applied to the drive motor, the shorter the coasting distance. To change/modify coasting effort press ↵. Press ↓ to go to P13 Accy Rmp.

P12.1 Std = _____
The value displayed is a setting that is acceptable for optimum truck and installation conditions. If this setting is the desired setting and is the value displayed in P12, press ↵ to return to P12. If a value different than this is desired, press ↓ to access P12.2.

P12.2 Cust = _____
Press ↵. Then use ↑ and ↓ to obtain the desired setting. When set, press ↓ to return to P12.

- **P13 Accy Rmp**
  This adjustment affects the ramp time of the accessory valve. Increasing this setting numerically makes the accessory hydraulic functions more reactive. A setting of 1 will provide smoother reaction, while a setting of 9 will be more reactive.

Accessory (Reach & Sideshift) Response



8832

To change/modify Accy Rmp, press ↵ to access menu P13.1

P13.1 Std = ___
The value displayed is a setting that is acceptable for optimum truck and installation conditions. If this setting is the desired setting and is the value displayed in P13, press ↵ to return to P13. If a value different than this is desired, press ↓ to access P13.2.

P13.2 Cust = ___
Press ↵. Use the ↑ and ↓ keys to obtain the desired setting. When set, press ↵ to return to P13.

NOTE: Unsatisfactory accessory hydraulic performance could be the result of air trapped in the accessory circuit. Refer to section M2 for more information.

2. Place the wheel on the opposite side of the arm and tap it into position in the encoder using a cylindrical bar, approximately 19 mm (.75 in.) diameter, and a small hammer.

3. Install washer and screw, index 6 & 7, into back of wheel and torque screw to 2.8 ±.6 Nm (25 ±5 in. lb).

4. If freezer condition truck, put strip heater, index 8, on outer race on bottom side of the encoder with the leads exiting at the same location as the encoder leads. Place retainer, index 9, over heater to keep in position.

5. If replacing gasket, index 10, put adhesive side against retainer, index 11.

6. Clip retainer, index 11, over arm and encoder and secure in position using screw, index 6.

7. Use clip, index 12, to secure wire to arm.

8. Apply light film of grease, 063002-017, to both ends of arm shaft.

9. Position spring as shown in Illustration 2, slide over end of arm shaft and insert spring end into arm.

10. Slide arm shaft into slotted hole in bracket, index 1.

11. Insert long end of arm shaft into hole at other end of bracket.

12. Rotate arm down into groove in bracket and secure with cotter pin 060038-003.

13. Using same screws as removed remount height sensor to top section of main frame, in the same position and orientation as removed. Use blue thread lock adhesive, 061004-026, and torque screws to 4.1 ±.6 Nm (36 ± 5 in. lb.) Remove cotter pin 060038-003.

14. If freezer condition truck, plug heater wires into strip heater.

15. Route encoder harness down mast in same manner as removed and secure with cable ties in same positions.

16. Plug encoder harness into harness below console.

17. Re-calibrate height sensor as described in Calibration section M4.3 of this manual.

18. Put console back on truck, remove wheel chocks, connect battery and check truck operation.

ALM2 (TRAVEL ALARM) Open external circuit. EVENT CODE 217

Step 1: Attach meter across ALM2 terminals.

Leave wires connected.

Step 2: Turn key "ON" while pressing the ▲ and ▼ buttons.

Select ALM2 (A4.2) on display menu.

Press and hold ↵. (drives component)

Check meter reading.

If: **Battery volts** ALM2 open circuit.

Then replace ALM2.

If: **0 volts** positive or negative missing.

Then "power up" truck, move one test lead to B- on Access 2.

0 volts after standing on operator pedals, positive missing. Use missing positive test.

Battery volts, negative missing. Use missing negative test.

If: **20 volts** correct functional reading.

Then problem likely an intermittent loose connection.

Check wiring. Wiring checks okay, replace Access 2. See note.

Note: *If truck operates, check connectors at module for corrosion and verify good electrical connections are being made. If connectors are okay this could be a random nuisance code. Monitor code frequency. If frequency gradually increases for no apparent reason, replace Access 2.*

Missing Positive and Negative Test

Missing Positive Test

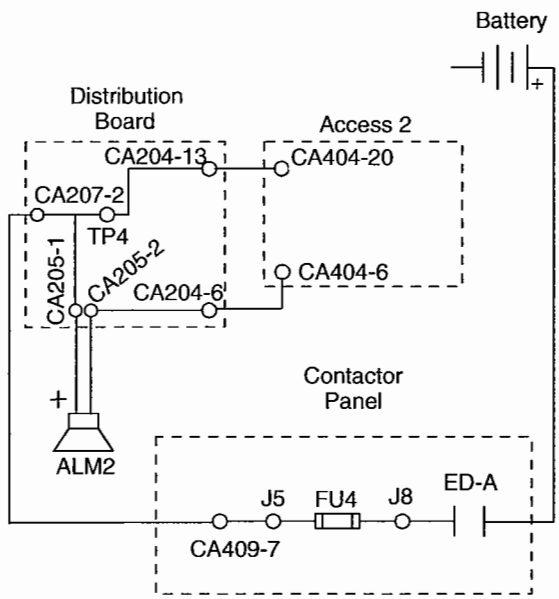
1. Trace positive wiring by referring to illustration.

Missing Negative Test

1. Check negative output of Access 2 by attaching meter leads to ALM2 and CA404-6 of Access 2.
2. Turn key "ON" while pressing the ▲ and ▼ buttons.
3. Select ALM2 (A4.2) on display menu.
4. Press and hold ↵. (drives component)

   Battery volts, open wiring between Access 2 and ALM2.

   0 volts, replace Access 2. See note.



6289

POT3 (ACCESSORY) Above electrical limit. EVENT CODE 243

Step 1: Turn key "ON" while pressing the ◆ button.

Select POT3 (A2.5) on display menu.

Move accessory thumb knob to confirm following readings.

If: **Approximately 5 volts**. Open between potentiometer and Access 2.

Then check connections to CA405-7 and CA405-6.

Okay, replace potentiometer

If: **Approximately 2.5 volts** thumb wheel in center position. Correct reading

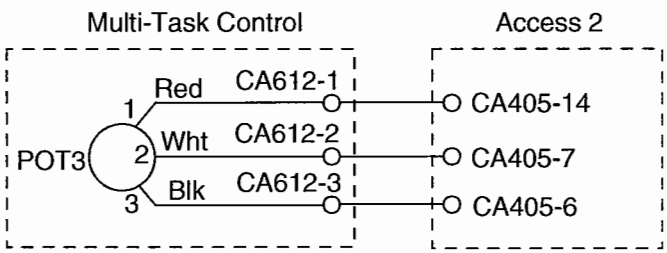
If: **Approximately 1.2 volts** thumb wheel at full left position. Correct reading

If: **Approximately 3.8 volts** thumb wheel in full right position. Correct reading

Correct readings are confirmed, intermittent connection likely in potentiometer circuit.

Check connections and potentiometer.

Note: *(calibrate potentiometer after repair)*



6296

POT3 (ACCESSORY) Below electrical limit. EVENT CODE 244

Step 1: Turn key "ON" while pressing the ◆ button.

Select POT3 (A2.5) on display menu.

Move accessory thumb knob to confirm following readings.

If: **Approximately 0 volts**. Open between potentiometer circuit and Access 2.

Then check connection at CA405-14. Refer to above illustration.

Okay, replace potentiometer

If: **Approximately 2.5 volts** thumb wheel in center position. Correct reading

If: **Approximately 1.2 volts** thumb wheel at full left position. Correct reading

If: **Approximately 3.8 volts** thumb wheel in full right position. Correct reading

Correct readings confirmed, intermittent connection likely in potentiometer circuit.

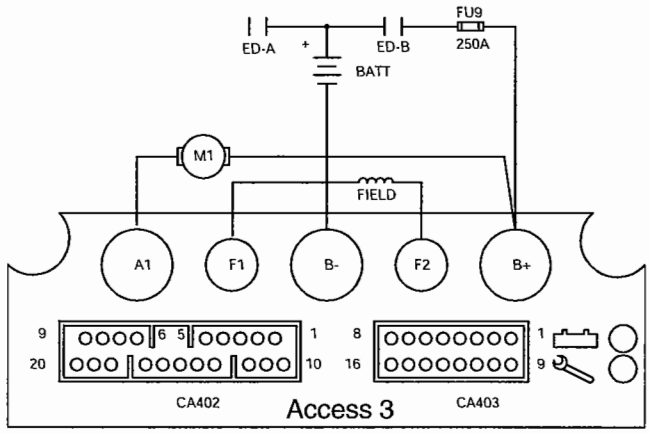
Check connections and potentiometer.

Note: *(calibrate potentiometer after repair)*

OVER VOLTAGE OCCURRED IN TRACTION MOTOR CIRCUIT DURING REGENERATIVE BRAKING. EVENT CODE 316

Step 1: This is caused by an open circuit in the traction motor circuit. Components to check include: ED contactor tips, FU9, cables and connections in path of battery to traction motor.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases, replace Access 3.*



6301

OVER CURRENT CONDITION OCCURRED IN TRACTION MOTOR ARMATURE CIRCUIT. EVENT CODE 317

Step 1: Raise truck so drive tire is clear of floor and place hardwood blocks under truck frame.

Step 2: Check traction motor A1 power cable wiring to A1 terminal on Access 3. Refer to above illustration.

Step 3: Disconnect and isolate A1 terminal at drive motor and "power up" truck. Depress operator pedals. "Power down" truck and turn key "ON" while pressing the ▲ and ▼ buttons. Check last log event (L1).

If: Code changes to 374. Check wiring between M1 motor and Access 3.

If wiring is correct, check or replace drive motor armature or drive motor.

If: Code 317 remains: Disconnect cable on A1 terminal of Access 3 and "power up" truck. Depress operator pedals. "Power down" truck and turn key "ON" while pressing the ▲ and ▼ buttons. Check last log event (L1).

If the symptom and code 317 remains, replace Access 3.

POSITIVE VOLTAGE AT CA402-6 WHEN NOT REQUIRED. EVENT CODE 329

Step 1: Disconnect CA206-1.

If: Alarm remains on, replace distribution board.

If: Alarm turns off, check output from CA402-6.

If 12 or battery volts, proceed with step 2.

Step 2: Disconnect wire at CA402-6 on Access 3.

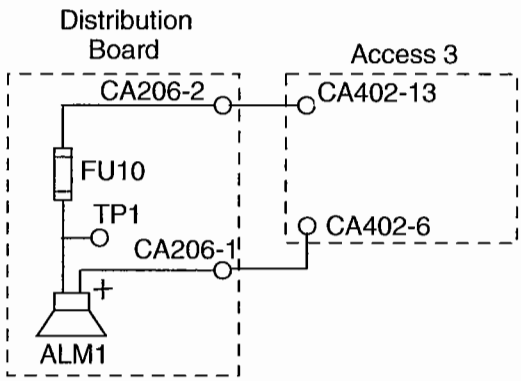
Check voltage at output pin (CA402-6) on Access 3.

If: 12 volts or battery voltage remains, replace Access 3.

If: 0 volts, check for 12 or battery volts on disconnected wire (CA402-6).

If voltage present, then short circuit exists between CA402-6, CA206-1, and ALM1.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases, replace Access 3.*



6303

OUTER BRAKE RESISTANCE TOO HIGH. EVENT CODE 347

Step 1: Check FU 5 for open circuit.

Step 2: Attach meter leads across CA609-1 and CA609-4 near brake coil.

Step 3: Turn key "ON" while pressing the ▲ and ▼ buttons.

Select BRK1o (A4.12) on display menu.

Press and hold ↵. (drives component)

View reading on display and meter.

If: Battery volts on meter/ 0 amps on display: Open circuit in brake coil. Repair/replace.

If: 0 volts on meter and 0 amps on display: Re-select BRK1o on display. Check for battery positive at CA402-18 while pressing and holding ↵.

If: 0 volts, double check FU5 and associated wiring.

If: Battery positive, Re-select BRK1o on display and measure voltage between CA402-18 and CA402-8 while pressing and holding ↵.

Battery volts, open circuit in wiring between Access 3 and brake coil. Repair/replace.

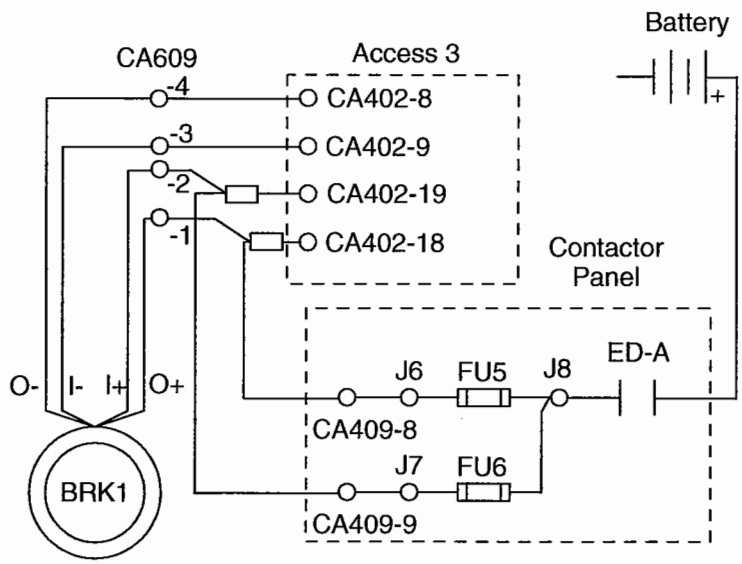
0 volts, replace Access 3.

If: Less than 10 volts on meter and 3 to 6 amps on display. This could be an indication that brake assembly is getting too hot during operation. Check for dragging brakes or improper adjustment.

If: Okay, check resistance of brake coil. Correct reading should be between 0.95 and 2.1 ohms at 20° C (68° F).

If: Neither of these two conditions exists, verify that condition is not intermittent or occurs during extended use.

Note: *If problem can not be found and truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*



6306

ACCESS 3 INTERNAL FAULT. EVENT CODE 365

Step 1: If truck does not operate, check wiring and check for proper software (AC or DC traction).

If: Wiring and software OK, replace Access 3. See note.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*

ACCESS 3 INTERNAL FAULT. EVENT CODE 366

Step 1: If truck does not operate, check wiring.

Wiring okay, replace Access 3. See note.

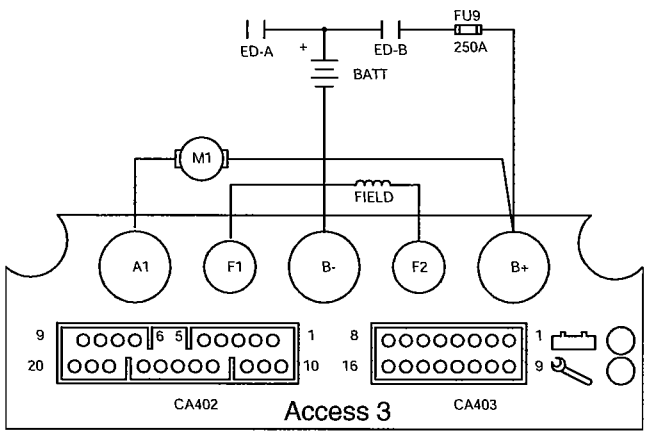
Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*

FU9 OPEN CIRCUIT OR M1 (TRACTION MOTOR) CIRCUIT OPEN. EVENT CODE 367

Step 1: Check condition of fuse FU9 and ED contactor tips. Repair/replace.

Step 2: Check for open circuit between battery positive, ED tips, FU9 and Access 3.

Note: *Due to stored capacitance voltage in Access 3, a voltage check of FU9 may be misleading. Replace with known good fuse and retest.*



6301

RAISE COMMAND GIVEN AND ENCODER COUNTS NOT DECREASING. EVENT CODE 814

Step 1: If HGTRS is open when forks are in free lift zone and raising forks, this code will be registered. Monitor HGTRS condition by following event code description for code 822.

Step 2: Turn key ON while pressing the ⏏ button.

Select ECR2 (A2.19) on the display menu.

View reading on display while raising and lowering forks.

If: **No counts** then wiring open circuit between encoder and Access 3 or encoder faulty. Repair or replace.

Make sure height sensor is operating correctly. Reference M4.3 section of service manual.

ENCODER COUNTS Above maximum calibrated height. EVENT CODE 816

Step 1: Check condition of height sensor. Encoder wheel worn, replace.

Check for proper maximum height calibration.

LOWER COMMAND GIVEN AND ENCODER COUNTS NOT DECREASING. EVENT CODE 818

Step 1: If this is an intermittent condition, an operator induced error may be present (e.g. forks resting on rack). This code will also occur when velocity fuse activates due to excessive hydraulic fluid flow.

Step 2: If the HGTRS switch is open when mast is in freelift zone while lowering, this code will be registered. Monitor HGTRS condition, following the event code description for code 822.

Step 3: Turn key on while pressing the ⏏ button.

Select ECR2 (A2.19) on display menu.

View reading on display while raising and lowering forks.

If: **No counts** then wiring open circuit between encoder and Access 3 or encoder faulty. Repair or replace.

Make sure height sensor is operating correctly. Reference M4.3 section of service manual.

SVA (ACCESSORY SOLENOID) Open external circuit. EVENT CODE 211

Step 1: Attach meter across coil terminals.

Leave wires connected.

Step 2: Turn key "ON" while pressing the ↑ and ↓ buttons.

Select SVA (A4.4) on display menu.

Press and hold ↵. (drives component)

Step 3: Check meter reading

If : Battery volts coil open circuit.

Then replace solenoid coil.

If: 0 volts positive or negative missing.

Then "power up" truck, move one test lead to B- on Access 2.

0 volts after standing on the operator pedals. Then positive missing. Use missing positive test**.**

Battery volts negative missing, Use missing negative test.

If : 20 volts correct functional reading.

Then problem is likely an intermittent loose connection.

Check wiring. Wiring checks okay, replace Access 2**.** See note.

Note: *If truck operates, check connectors at module for corrosion and verify good electrical connections are being made. If connectors are okay this could be a nuisance code. Monitor code frequency. If frequency gradually increases for no apparent reason, replace Access 2.*

Note: *Fault codes 211, 226 or 228 may occur if horn suppressor block is faulty or if it has not been installed on truck. See TSB428.*

Missing Positive and Negative Test

Missing Positive Test

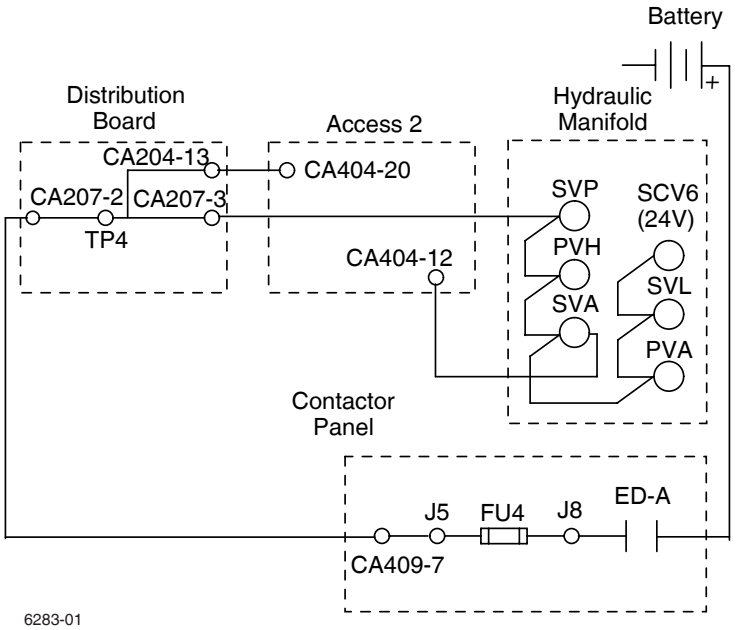
1. Check FU4.
2. FU4 is okay, "power up" truck without Access 1 service mode. Measuring from CA404-20 to B- on Access 2, reading should be battery volts when standing on operator pedals.
3. If not, check wiring from CA404-20 back to battery positive. Refer to illustration.

Missing Negative Test

1. Attach meter leads to SVA and CA404-12 of Access 2.
2. Turn key "ON" while pressing the ↑ and ↓ buttons.
3. Select SVA (A4.4) on display menu.
4. Press and hold ↵. (drives component)

   Battery volts, wiring open circuit between Access 2 and SVA.

   0 volts, replace Access 2. See note.



HYDRAULIC MOTOR (M2) Short circuited. EVENT CODE 223

Step 1: (Refer to capacitor Caution earlier in this guide) Disconnect and isolate one power cable at pump motor M2. "Power up" truck and observe last log event.

If: **Code 222** is last log event then there may be a short circuit in motor. See code 222.

If: **Code 223** is last log event then reconnect power cable to pump motor and go to step 2.

Step 2: Disconnect cable A1 at Access 2 and "power up" truck.

If: **Code 222** registered, check for a shorted power cable.

If: **Code 223** still remains.

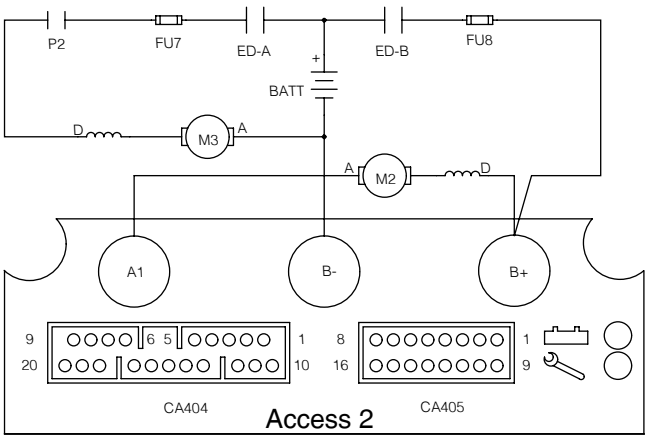
Then check ED contactor tips

If OK, check wiring to ED contactor.

If OK, check cabling to ED contactor and M2 motor.

If OK, replace ED contactor.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If frequency gradually increases for no apparent reason, replace Access 2.*



6292-02

ACCESS 2 Temperature outside of normal range. EVENT CODE 261

Step 1: Verify duty cycle of truck.

Step 2: If truck duty cycle does not seem to be excessive, clean Access 2 module. Make certain adequate air flow is possible and that module is clean.

Check Access 2 mounting. Make sure sufficient heat transfer grease is between module and mounting surface and that module is tight against mounting surface. Check mounting screw tightness.

Make sure ambient temperature is within operating range of control -40 to +85° C (-40 to +185° F).

Check all termination's and make sure they are secure. Check pump motor for overheating. Make sure correct fuse size is used for FU8 (250 amp). See note.

***Note**: If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 2.*

ACCESS 2 Temperature too cold. EVENT CODE 268

Step 1: Make sure ambient temperature is within operating range of control -40° to + 85° C (-40° to 185° F).

Make certain adequate air flow is possible and that module is clean.

If: Ambient temperature is correct and module is clean, go to step 2.

Step 2: Refer to PIB03-04-01, Radio Frequency Compliance. If that does not apply, and truck application is correct, replace Access 2. See note.

***Note:** If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 2.*

ACCESS 2 Temperature too hot. EVENT CODE 269

Step 1: Verify duty cycle of truck.

Truck duty cycle okay.

Step 2: Clean Access 2 module and make certain adequate air flow is possible.

Check mounting. Make sure sufficient heat transfer grease is between module and mounting surface and that module is tight against mounting surface. Check mounting screw tightness. Make sure correct fuse size is used for FU8 (250 amp).

Check all termination's and make sure they are secure. Replace module. See note.

***Note:** If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 2.*

CHECKS THAT CA402-17 NOT AT BATTERY POSITIVE BEFORE ED CONTACTS CLOSE. EVENT CODE 322

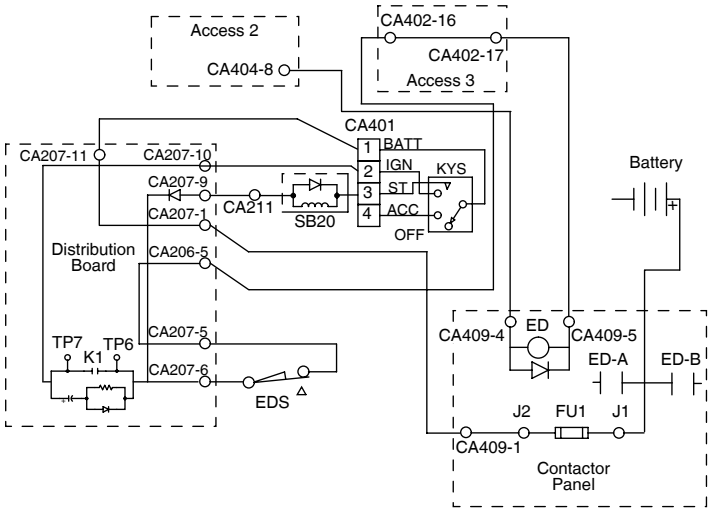
Step 1: Short circuit exists between battery positive and CA402-17. Battery voltage should only be present at CA402-17 after depressing operator pedals when truck is "powered up".

No short circuit. Go to Step 2.

Step 2: Verify ED coil is not open circuit between CA402-17 and CA404-8.

Wiring okay, replace Access 3. See note

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases, replace Access 3.*



6299-04

AC TRACTION SYSTEM BATTERY CURRENT SENSOR POWER INTERRUPTION. EVENT CODE 335

Step 1: Disconnect CA412. Measure the voltage from Access 3 between pins C and A of CA412. (CA412 is located in wire harness between CA413 on Access 3 and BDI Current Sensor.) Should measure between 4.5 and 5.5 volts DC.

If: Voltage okay.

Then power supply voltage is okay. Proceed to Step 2.

If: Voltage is out of range or missing.

Measure voltage between pins 10 and 11 of CA413. Should measure between 4.5 and 5.5 volts DC.

If: Voltage okay.

Then power supply voltage is okay. Locate and repair broken wire(s) between CA413 pins 10 and 11 and CA412 pins C and A.

If: Voltage is out of range or missing.

Check condition of pins 10 and 11 in JC 413 (on Access 3)

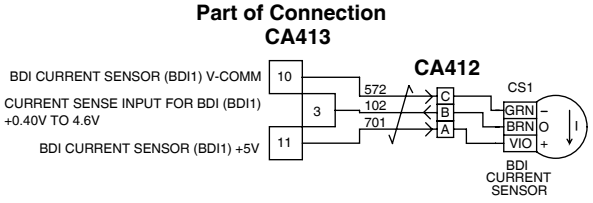
If: Pins are not bent, broken, or corroded;

Then replace Access 3 module.

Step 2: Check wiring between JC412 and the BDI Current Sensor. The BDI Current sensor is located beneath fuse panel just above the Traction Drive Module.

If: Wiring checks okay.

Then replace the BDI current sensor.



AC TRACTION SYSTEM AUXILIARY 1 POWER SUPPLY INTERRUPTION. AUXILIARY 1 POWER SUPPLY IS LOCATED IN THE ACCESS 3 MODULE. EVENT CODE 336

The auxiliary power supply voltage is monitored. If it is detected that voltage is out of range, code 336 is logged.

Note: *As of 12/14/01 this output is not used.*

Step 1: Measure voltage between CA413-12 and battery negative. Should measure between 4.5 to 5.5 volts DC.

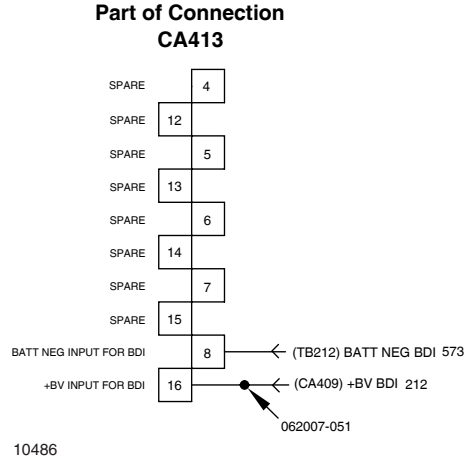
If: Voltage okay.

Then power supply is okay. This power supply interruption may be intermittent. See Note.

If: Voltage out of range.

Then replace Access 3.

Note: *If truck operates, this could be a random nuisance code. Monitor the code frequency. If it gradually increases, replace the Access 3 module.*



CASTER BRAKE RESISTANCE TOO HIGH. EVENT CODE 349

Step 1: Check FU6 for open circuit.

Step 2: Raise truck so drive tire and caster are clear of floor and place hardwood blocks under truck frame.

Step 3: Attach meter leads across CA643 and CA644 near brake coil.

Step 4: Turn key "ON" while pressing the ↑ and ↓ buttons.

Select BRK2 (A4.14) on display menu.

Press and hold ↵. (drives component)

View reading on display and meter.

If: Battery volts on meter/ 0 amps on display: Open circuit in brake coil. Proceed with step 6.

If: 0 volts on meter and 0 amps on display: Check for battery positive at CA402-19.

If: 0 volts, double check FU6 and associated wiring.

If: Battery positive, select BRK2 (A4.14) on display, press and hold ↵ and measure voltage between CA402-19 and CA402-20.

Battery volts, open circuit in wiring between Access 3 and brake coil. Proceed with step 5.

0 volts, replace Access 3.

If: Less than 10 volts on meter and 3 to 6 amps on display. This could be an indication the brake assembly is getting too hot during operation. Check for dragging brakes or improper adjustment.

If: Okay, check brake coil resistance, it should be between 3.35 and 7.43 ohms at 20° C (68° F).

If: Neither of these two conditions exists, verify this condition is not intermittent or occurs during extended use.

Step 5: Disconnect CA610. Check brake coil resistance between connectors with caster in static condition and while rotating caster slowly for one full rotation to check for open spots in slip ring.

Resistance for acceptable temperature range is between 3.35 and 7.43 ohms. At 20° C (68° F) resistance should measure approximately 4.79 ohms.

Cold temperatures decrease resistance of coil.

If in a cold environment, warm coil and recheck resistance.

If: Resistance is outside range listed, go to step 6.

If: Coil checks okay or truck is not used in a cold environment, reconnect CA610, recheck resistance at Access 3 CA402-19 and CA402-20.

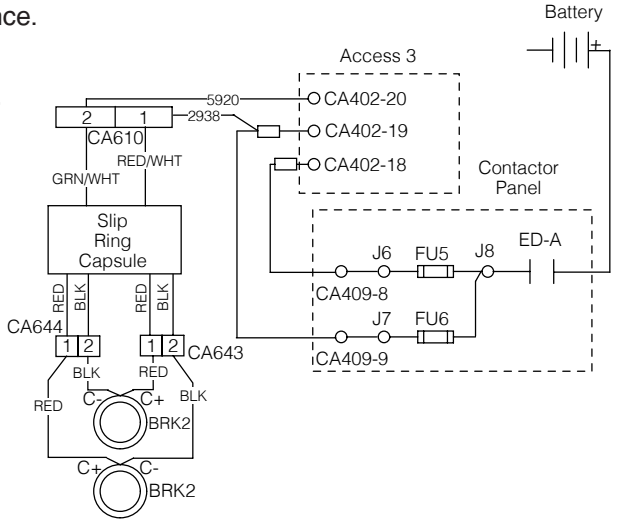
Resistance out of range, check wiring between Access 3 and connectors CA610.

Step 6: Disconnect CA643 and CA644, leave both brake wires of brake side connector attached. Check brake coil resistance between CA643 and CA644.

If: Resistance is still outside range listed, replace caster brakes.

If: Coil checks okay, replace slip ring capsule.

Note: *If problem can not be found and truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*



10535

M1 (TRACTION MOTOR) field current too high or too low. EVENT CODE 373

Step 1: Raise truck so drive tire is clear of floor and place hardwood blocks under truck frame.

Step 2: Turn key "ON" while pressing the ↑ and ↓ buttons.

Select M1-F (A4.16) for forward direction or M1-R (A4.17) for reverse direction on display menu.

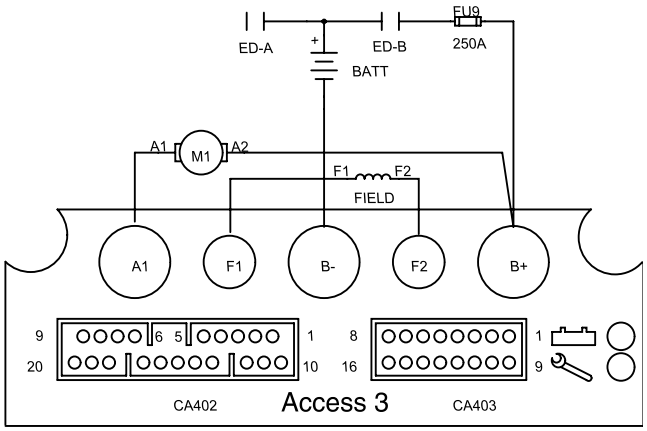
Press and hold ↵. (drives motor field)

Observe display current reading.

If: Field current above 50 amps, check for short circuit in motor field circuit. Repair/replace.

If: Field current below 30 amps, check for open circuit in motor field circuit. Repair/replace.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*



6301

M1 (TRACTION MOTOR) Armature open circuit. EVENT CODE 374

Step 1: Raise truck so drive tire is clear of floor and place hardwood blocks under truck frame.

Step 2: Attach meter across A1 and A2 terminals.

Turn key "ON" while pressing the ↑ and ↓ buttons.

Select M1-A (A4.15) on display menu.

Press and hold ↵. (drives armature)

Observe meter voltage reading and display current reading.

If: Battery volts on meter and less than 50 amps on display: Open drive motor circuit.

Then check power cable connections, motor brushes and holder, and condition to M1. Repair/replace.

If: 0 volts on meter and less than 50 amps on display: Then check output of Access 3. Move meter leads to the A1 and A2 terminals of Access 3 and repeat test.

If battery volts, open circuit in power cables between the drive motor and Access 3.

If 0 volts on meter and less the 50 amps on display, replace Access 3. See note.

Note: *If truck operates, this could be a random nuisance code. Monitor code frequency. If it gradually increases for no apparent reason, replace Access 3.*

TRACTION MOTOR OVER TEMPERATURE. EVENT CODE 412

Monitors temperature of traction motor through thermal sensor (TS1) and disables traction to protect motor. Prior to logging this code, display will show message Over Temp, and an event code 433 will occur, which is an alert that motor temperature is nearing its limit. When event code 433 occurs, traction performance is decreased to 60%. If operation continues and temperature continues to rise, traction performance will continue to decrease to 0%, at which time event code 412 occurs and traction is disabled until truck is "powered down" and back up.

Step 1: Did event code 433 occur and traction performance decrease to 60% prior to this event?

If: Yes.

Follow procedure for event code 433.

If: No.

Proceed to Step 2.

Step 2: Allow traction system of truck to cool down, then "power up" truck.

If: Traction operates at normal performance level;

Return to service and monitor for re-occurrence of event codes 433 and 412.

If: Code 412 re-occurs immediately;

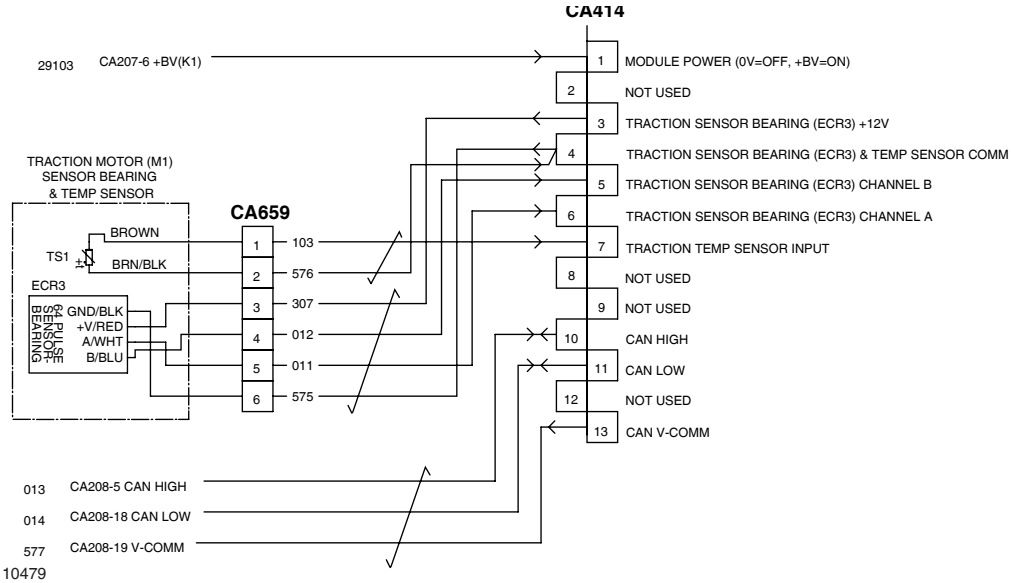
"Power down" truck and check continuity of wire harness between TDM and Traction Motor. (CA414 to CA659)

If: Continuity is good.

Replace Stator or Traction Motor, whichever is most economical.

If: Continuity is missing/bad.

Repair/replace wire harness.



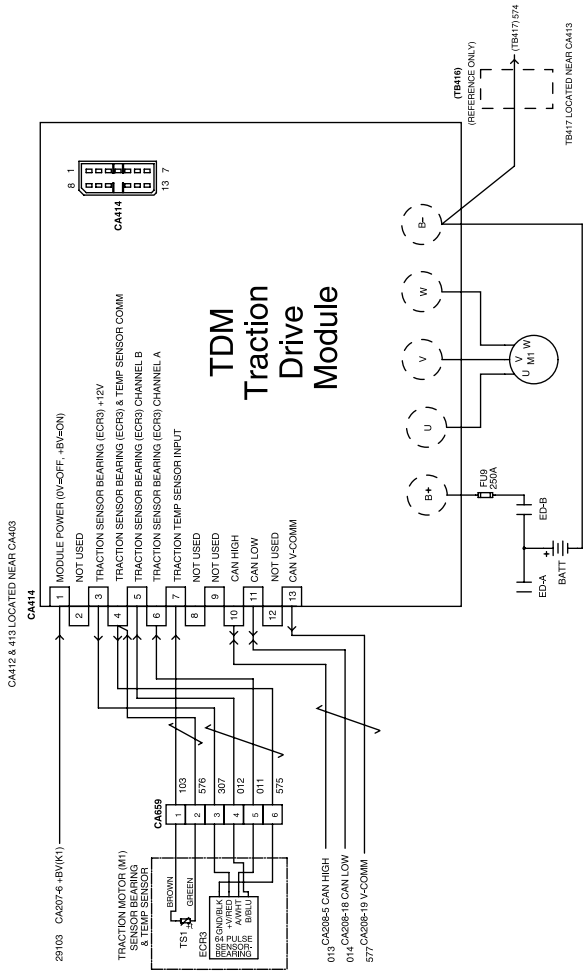
TDM PARAMETER CHECKSUM FAILURE. EVENT CODE 432

After "power up", Access 3 verifies calibration parameters. If verification fails, TDM restores calibration to default values and this event code is logged. If TDM cannot restore calibration to default values, event code 435 will be logged.

Step 1: Power truck down and back up.

If: **Code 432** returned immediately.

Then replace TDM.



11032-01

INTERNAL FAULT. EVENT CODE 842

This event code is logged after power up self test if Access 3 detects an internal error.

Step 1: "Power down" truck then back up.

If: **Code 842** is returned immediately.

Then replace Access 3.

AC TRACTION SYSTEM BDI VOLTAGE TO ACCESS 3 NOT PRESENT. EVENT CODE 843

This event code is logged if Access 3 does not detect Battery Voltage at CA413 pins 8 and 16.

Step 1: Measure voltage between CA413-16 and CA413-8. Should be battery volts.

If: **Battery volts** present.

Check condition of pins 8 and 16 on PC413 (at Access 3).

If: **Pins** are not bent, broken, or corroded.

Then replace Access 3.

If: **Voltage** out of range or missing.

Measure voltage across battery (battery disconnected)

If: **Battery voltage** normal.

Proceed to Step 2

If: **Battery voltage** low or 0.

Replace battery with a known good one and retest.

Step 2: Check condition of FU3.

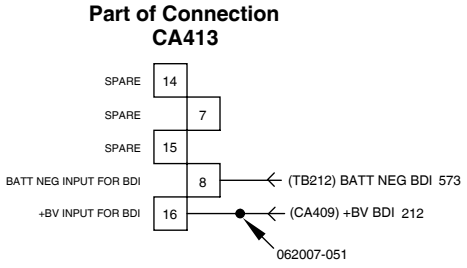
If: **FU3** open circuit.

Then replace.

If: **FU3** okay.

Locate and repair open circuit between Access 3 (CA413-16) and B+, (Wire 210 to J1).

Or, locate and repair open circuit between Access 3 (CA413-8) and B-, (Wire 573 to NB213).



RR/RD 5200S

The care and maintenance of the battery is very important to obtain efficient truck operation and maximum battery life.

CAUTION

Gases produced by a battery can be explosive. Do not smoke, use an open flame, create an arc or sparks in the vicinity of the battery. Ventilate an enclosed area well when charging.

Batteries contain sulfuric acid which may cause severe burns. Avoid contact with eyes, skin or clothing. In case of contact, flush immediately and thoroughly with clean water. Obtain medical attention when eyes are affected. A baking soda solution (one pound to one gallon of water) applied to spilled acid until bubbling stops, neutralizes the acid for safe handling and disposal.

Leakage voltage from battery terminals to battery case can cause misleading trouble symptoms with the truck electrical system. Since components of the truck electrical system are insulated from truck frame, leakage voltage will not normally affect truck operation unless a short circuit or breakdown of circuit wire insulation to truck frame occurs.

A voltage check from battery connector terminal to battery case should indicate near zero volts. Typically, however, the sum of the voltages at both terminals will equal battery volts. This leakage voltage will discharge the battery. As battery cleanliness deteriorates, the usable charge of the battery decreases due to this self discharge.

Although a leakage voltage reading of zero volts may not be possible, a cleaner battery will have more usable charge for truck operation and not affect operation of electronic devices on the unit.

Safety Rules

- Wear protective clothing, such as, rubber apron, gloves, boots and goggles when performing any maintenance on batteries. Do not allow electrolyte to come in contact with eyes, skin, clothing or floor. If electrolyte comes in contact with eyes, flush immediately and thoroughly with clean water. Obtain medical attention immediately. Should electrolyte be spilled on skin, rinse promptly with clean water and wash with soap. A baking soda solution (one pound to one gallon of water) will neutralize acid spilled on clothing, floor or any other surface. Apply solution until bubbling stops and rinse with clean water.
- Keep vent plugs firmly in place at all times except when adding water or taking hydrometer readings.
- Do not bring any type of flame, spark, etc., near the battery. Gas formed while the battery is charging, is highly explosive. This gas remains in the cells long after charging has stopped.
- Do not lay metallic or conductive objects on battery. Arcing will result.
- Do not allow dirt, cleaning solution or other foreign material to enter cells. Impurities in electrolyte has a neutralizing effect reducing available charge.
- If battery repair is planned, follow the battery manufacturer's instructions concerning repair practices and procedures.

Checking

Battery electrolyte level should be checked before each charge of the battery. The level should be maintained at one-half inch above plates or just below the lower lip of the filler hole at all times. If low, add distilled water or approved local supply (consult battery manufacturer) at the end of a charge cycle. Do not overfill. For maximum battery life, specific gravity readings should be taken daily on a pilot cell and recorded. A different pilot cell should be selected on a monthly basis with readings taken on all cells at semi annual or annual intervals. Do not take specific gravity readings immediately after adding water. Water and electrolyte must be thoroughly mixed by charging before a reliable reading can be taken. Normal full charged specific gravity should be between 1.265 and 1.285.

HYDRAULIC
020603 (24 V.)
020893 (24 V.)
with sensors

Brushes:	**4**
No. of Brush Holders	1
No. of Brush Assemblies	4
No. of Brush Springs	4
Brush Length - New	33 mm (1.30 inches)
Spring Tension on New Brushes	1360 grams (48 ounces)
Min. Brush Length - Replace	16 mm (0.62 inches)
Spring Tension Before Replacement	907 grams (32 ounces)
Commutator:	
Max. Diameter - New	74 mm (2.92 inches)
Min. Diameter - Reslotting	72 mm (2.85 inches)
Min. Diameter - Replace	70 mm (2.75 inches)
Bearings:	
Lubricant	Hi Temp 25-30% fill Chevron SRI-2 or equivalent
Cond. of Performance:	
(No Load)	
Volts	12
Max. Amperes	52
RPM	4500
Field Resistance:	
(each at 75° F [24° C])	
Series Ohms	0.0016
Armature Resistance:	
(each at 77° F [25° C])	
Ohms	0.0044
Measured Between Bars	1 and 9
Frame Diameter:	171 mm (6.75 inches)
Wound in:	
Direction of Rotation:	CWDE

M4.7–1452–006

This page available for **NOTES.**

Assembly

NOTE

Before assembly, refer to torque requirements, fork adjustment and mast staging procedures located in the first part of this section.

CAUTION

Always block masts when working on masts in an elevated position, even though connected to a hoist.

1. Refer to Figure 17059. Use cylinder clamp or braided strap around right lift cylinder just below anchor block and connect to lifting device.
2. Lift and position right lift cylinder in main frame. Secure to main frame with clevis pin and cotter pin, items 43 & 44.
3. Using lifting device, lift and position left lift cylinder in main frame. Secure to main frame with clevis pin and cotter pin, items 43 & 44.
4. Connect right hydraulic tube to right lift cylinder.
5. Install left cross tube to left lift cylinder and right tube.
6. Clean column roller studs at the top of the main frame and bottom of second stage mast. If any paint or rust is evident on the studs, remove with emery cloth and lubricate with grease, Crown No. 063002-024 for standard or 063002-017 for freezer/corrosion application.
7. Install two shims on each of the four studs, two at the top of the main frame and two at the bottom of the second stage mast. Use shim 060030-085 on RR 1585 kg (3500 lb) capacity mast, or shim 060030-130 on RR 2040 kg (4500 lb) and RD 1360 kg (3000 lb) capacity masts. Place one roller on each stud.
8. Attach lifting device to top cross member of second stage mast, lift and assemble second stage into main frame.
9. Once the mast has been reassembled, the column rollers ride and clearance should be checked.
10. Use lifting device to raise second stage mast so the rollers are about 150 to 200 mm (6 to 8 in) below the mounting holes for the stop block, item 8, in the main frame.
11. Use a pry bar to shift the mast channels to one side. Pry on the opposite side to shift it against the other side, then go back and pry on the original side to shift it back again. This will seat the rollers and force the opposite side tight against the mast channel. This is necessary to allow for accurate roller to channel clearance measurement. Once the mast has shifted, retain light pressure to hold the mast from slipping back.

WARNING

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

12. Measure the distance between the channel and the roller, about 10 mm (0.375 in) from channel face. Always measure from the side the rollers are canted toward. If the dimension is greater than 0.79 mm (0.031 in) add another shim behind the roller. If the dimension is less than 0.76 mm (0.030 in) and it does not appear to be tight, proceed in checking the remaining channel rollers. Lower the second stage and check running clearance. If shims need to be added, remove second stage mast, add shims as required, and install second stage mast back into main frame.
13. Accurate measurements can only be checked from one side. Once the previously described dimensions are obtained, the mast channel rollers for the second stage to main frame will be within tolerance. When shims are installed it is always ideal to have an equal number of shims on each column roller stud. If an unequal number of shims are required, it is very important that an equal distribution of shims per side be followed. Refer to Figure 16950.

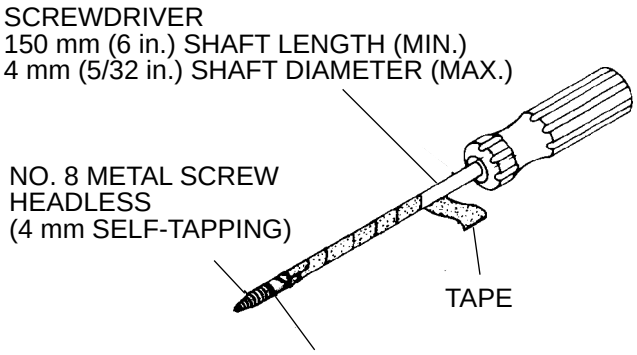
This page available for **NOTES.**

Seals

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

Seal Removal

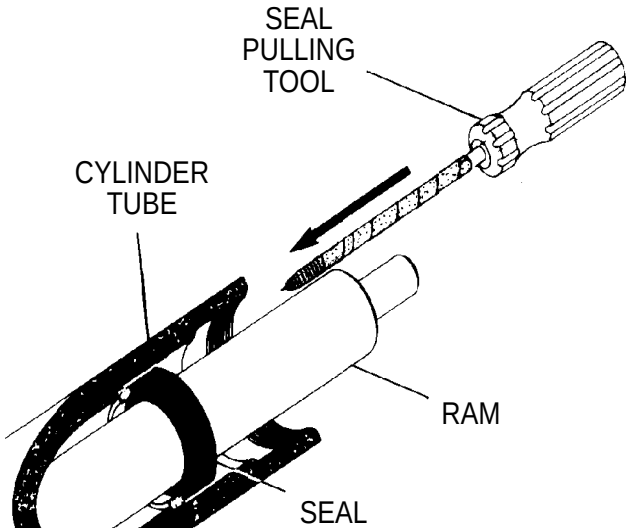
When an excessive amount of hydraulic oil is evident on the cylinder, where the ram exits from the cap, the rod packing is probably bad and should be replaced. The replacement of the packing can be accomplished without removing the ram assembly from the cylinder tube or truck.



0389S-01 ILLUSTRATION 11

Unfasten and remove the cap as explained in “Disassembly”. If the packing is seated in the cap itself, a hooked tool should be used to remove the packing. If the packing is located below the cap and remains in the cylinder bore after the cap is removed, a pair of special tools can be used to facilitate packing removal (See Illustration 11). To make these 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 150 mm (6 in.) of shank length with no larger than 4 mm (5/32 in.) shank diameter. After attaching the screw to the screwdriver, grind off excess weld to a diameter of 4 mm (5/32 in.) Wrap the shank with electrical tape from the tip of the screw to the screwdriver handle. This will prevent scratching of the cylinder bore or the ram.

Insert the tools between the ram and the cylinder walls, 180 degrees apart, and screw into the face of the packing (See Illustration 12). After the threads are sufficiently secured into the packing, evenly pull on the screwdriver handles until the packing is removed.



0390S ILLUSTRATION 12

NOTE

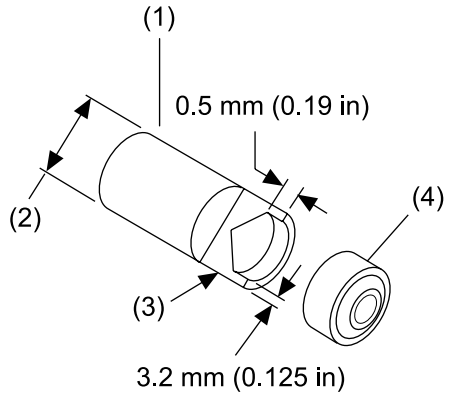
Extreme care should be taken to prevent damage to cylinder wall and ram assembly.

At this time, the wiper ring should also be removed since packings and wiper rings should always be replaced in pairs. Thoroughly clean the area where the seals seat. Any burrs, dirt or seal debris must be removed before reinstalling new seals.

NOTE

Close inspection of all new bushings after installation is necessary to be sure wear surfaces are intact.

Ball bushings are removed and installed with greater ease when using an installation tool similar to the one shown in Figure 17056.



(1) Ball Bushing Installation Tool

(2) 0.13 mm (0.005 in) Smaller than the Bushing Outside Diameter

(3) Cut-away View of the Counterbore

(4) Ball Bushing

Figure 17056

Center Pivot Repair and Adjustment

NOTE

Be sure all areas of contact are thoroughly cleaned and free of any burrs or debris that could damage new thrust washers.

When replacing thrust washers (23, 30) on both sides of outer arm assembly, apply a light coat of grease to all surfaces.

To properly adjust, tighten nut on center pivot assembly snug to eliminate any abnormal drag. Loosen nut and retighten to 73 Nm (65 in lb), then continue to tighten to next nearest groove pin location.

Reassembly

NOTE

Before proceeding with reassembly, all parts should be clean and free of any burrs or rough edges which could damage new bushings or other parts during assembly. Apply a thin coat of grease to all bushings, thrust washers and pivot shafts.

1. Install inner arm assembly (22) into support assembly (1).
2. Install pivot shafts (7) simultaneously, rather than one at a time. Pivot shafts are slotted on the end to obtain proper alignment for installation of roll pin (8).

NOTE

Refer to Center Pivot Repair and Adjustment (located in this section) for proper adjustment information of center pivot.

3. Install thrust washer (23) at center pivot. Slide outer arms (34) onto center pivot stud. Install thrust washer (30), locknut (31), roll pin (33) and retaining ring (32).
4. Use an inside caliper to measure area of support assembly where column roller (28) on outer arm will travel, record measurement.
5. Install column rollers to outer arms. Measure distance between column rollers with an outside caliper. Subtract this dimension from dimension obtained in step 4 to determine the amount of shims required. Balance out the number of shims (Example: 2 shims right, 2 shims left). If an uneven number of shims are required, note to which side the extra shim was added and install all other odd shims to that side.

NOTE

Failure of outer arms to fit into carriage assembly properly indicates inner arm assembly, carriage assembly, or outer arm assembly is bent or deformed in some way.

6. Measure distance between outer arms at top. (TT is 335 mm [13.25 in]). Measure distance between pivot blocks welded on fork carriage assembly (47). These dimensions should indicate that outer arms will fit properly in fork carriage assembly.
7. Attach carriage rollers (24) to inner arm assembly studs.

NOTE

Failure of the outer arms to fit into carriage assembly properly indicates inner arm assembly, carriage assembly, or outer arm assembly is bent or deformed in some way.

14. Attach carriage rollers (40) to inner arm assembly studs.
15. Guide fork carriage assembly onto inner arm carriage rollers.
16. Install pivot shafts (54) and roll pins (55).
17. Install reach cylinders.
    – Install pivot shafts (7) and roll pins (6).
    – Extend cylinder manually and install pivot shafts (21) and roll pins (20).
    – Connect hydraulic lines from reach cylinders to bulkheads near top of reach cylinders.
18. Place bushings (63) on tilt cylinder (62) pivot studs and install tilt cylinder assembly in carriage assembly. (Check serial number plate to obtain capacity of truck to obtain proper tilt cylinder assembly. This information is also needed to obtain proper fork plate assembly (70) and tilt cylinder shaft (67).
19. Connect all hydraulic lines from tilt cylinder to manifold block at top of support assembly.
20. Position fork plate assembly (70) with a lifting device and install pivot shafts (69) and pins (68).
21. Extend tilt cylinder piston rod and install tilt cylinder shaft (67) and pin (66). Remove hardwood block from reach support channel and two hardwood blocks from mast second stage. Remove lifting device from primary inner arm (23) cross brace.
22. Run an operational check on reach assembly. Refer to "Reach Cylinder Adjustment" for adjustment procedure.
23. Install forks and load backrest. Install bolt (5).

WARNING

AVOID HIGH PRESSURE FLUIDS - Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.
Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.

Carriage hydraulic circuits need to be flushed after repair of reach cylinders and bled of all air. Before flushing and bleeding of system inspect all hydraulic connections and verify that all filters are installed and hydraulic fluid levels are adequate for test. Hydraulic system must be pressurized during the flushing and bleeding procedures.

Flushing

1. Remove hoses from side-shift cylinder and connect them together using a male connector.
2. Energize SVS side-shift solenoid selector valve, actuate manual valve at full speed in order to pump hydraulic oil through carriage hydraulics and then back through the filter.
3. Flush carriage hydraulics for at least 2 minutes, reversing flow frequently.
4. Reconnect hoses to side-shift cylinder.

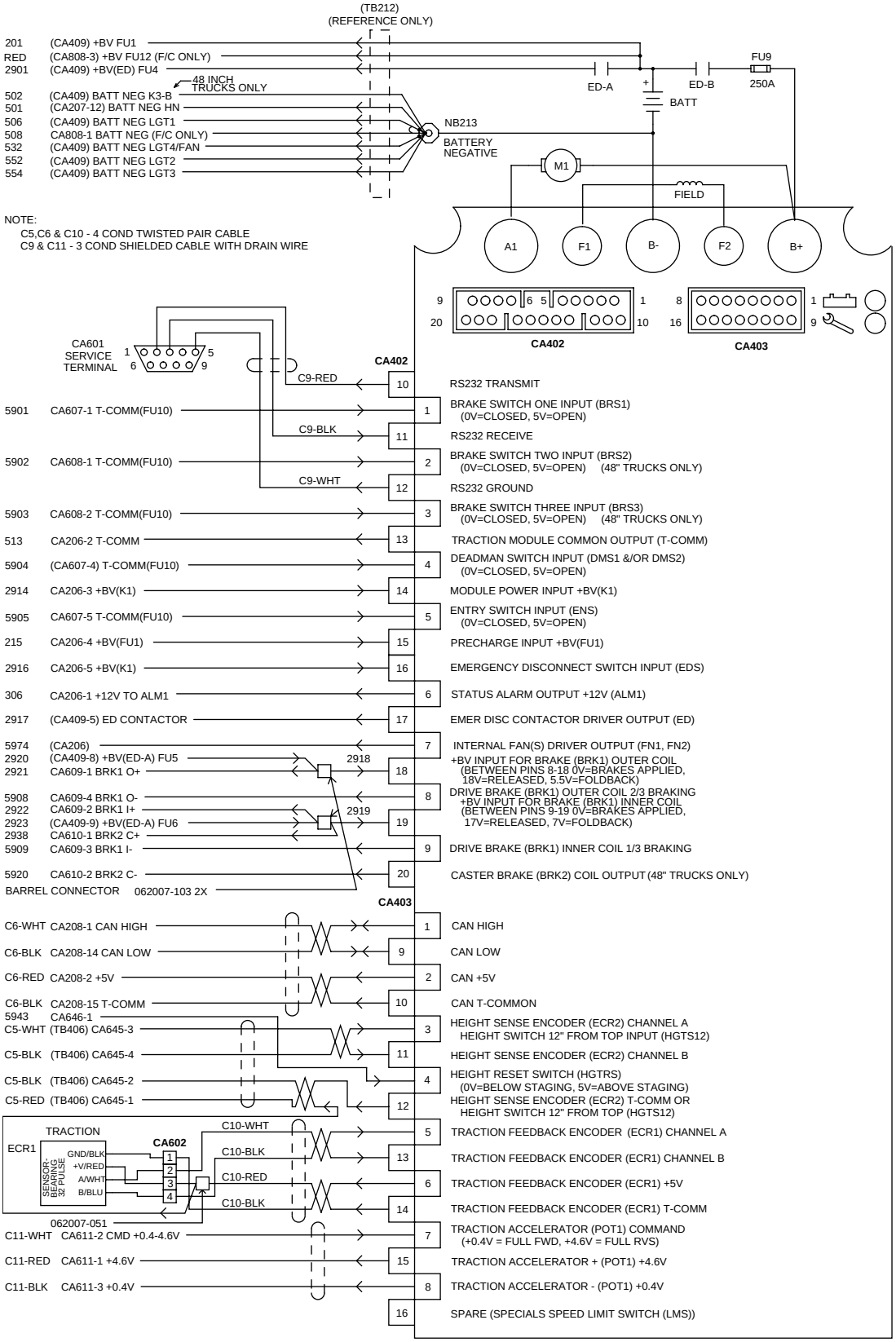
SUPPRESSOR BLOCKS

	Location	Function	Diagram	Parts Page
SB20	Below Keyswitch	Key Sw Inrush Current Prot	DIA–1452–004 (A-4) DIA–1452–005 (A-4) DIA–1452–006 (C-2)	04.0–1452–500 (6)
SB21	Near Access 2	Electrical Noise Suppressor, Horn	DIA–1452–004 (B-4) DIA–1452–005 (B-4) DIA–1452–006 (C-2)	04.0–1452–503 (46)
SB40	ED Contactor Coil	Coil Suppressor	DIA–1452–014 (B-1)	04.1–1452–200 (38)
SB42	FN2	Supressor	DIA–1452–006 (C-3)	01.0–1452–500
SB80	Overhead Guard	Fan Suppressor	DIA–1452–014 (C-3)	04.9–1452–050 (5)
SB81	Overhead Guard	Strobe Light Suppressor	DIA–1452–014 (C-3)	04.9–1452–050 (22)

SWITCHES

	Location	Function	Diagram	Parts Page
BRES1	Power Unit Front Wall	Battery Restraint	DIA–1452–004 (B-2) DIA–1452–005 (B-2) DIA–1452–006 (A-3)	01.2–1452–150 (5)
BRS1	Floorboard Left Pedal	Braking	DIA–1452–004 (B-3) DIA–1452–005 (B-3) DIA–1452–016 (C-1)	01.0–1452–051 (23)
BRS2	Upper Floorboard Left Pedal	Braking	DIA–1452–004 (B-3) DIA–1452–005 (B-3) DIA–1452–016 (C-2)	01.0–1452–075 (31)
BRS3	Upper Floorboard Center Pedal	Braking	DIA–1452–004 (B-3) DIA–1452–005 (B-3) DIA–1452–016 (C-2)	01.0–1452–075 (21)
BWS1	M1	Brush Wear	DIA–1452–005 (C-3) DIA–1452–012 (B-3)	
BWS2	M2	Brush Wear	DIA–1452–005 (C-3) DIA–1452–012 (B-3)	
BWS3	M3	Brush Wear	DIA–1452–005 (C-3) DIA–1452–012 (A-2)	
DMS1	Floorboard Right Pedal	Power On	DIA–1452–004 (B-3) DIA–1452–005 (B-3) DIA–1452–016 (C-2)	01.0–1452–051 (23)
DMS2	Upper Floorboard Right Pedal	Power On	DIA–1452–004 (B-3) DIA–1452–005 (B-3) DIA–1452–016 (B-2)	01.0–1452–075 (40)
DPS1	Access 1	Up Arrow	DIA–1452–004 (C-4) DIA–1452–005 (C-4) DIA–1452–011 (B-2) DIA–1452–012 (A-1)	04.8–1452–001 (9)
DPS2	Access 1	Down Arrow	DIA–1452–004 (C-4) DIA–1452–005 (C-4) DIA–1452–011 (B-2) DIA–1452–012 (A-1)	04.8–1452–001 (9)
DPS3	Access 1	Enter	DIA–1452–004 (C-4) DIA–1452–005 (C-4) DIA–1452–011 (B-2) DIA–1452–012 (A-1)	04.8–1452–001 (9)
DPS4	Access 1	Performance	DIA–1452–005 (C-4) DIA–1452–012 (A-2)	04.8–1452–001 (9)

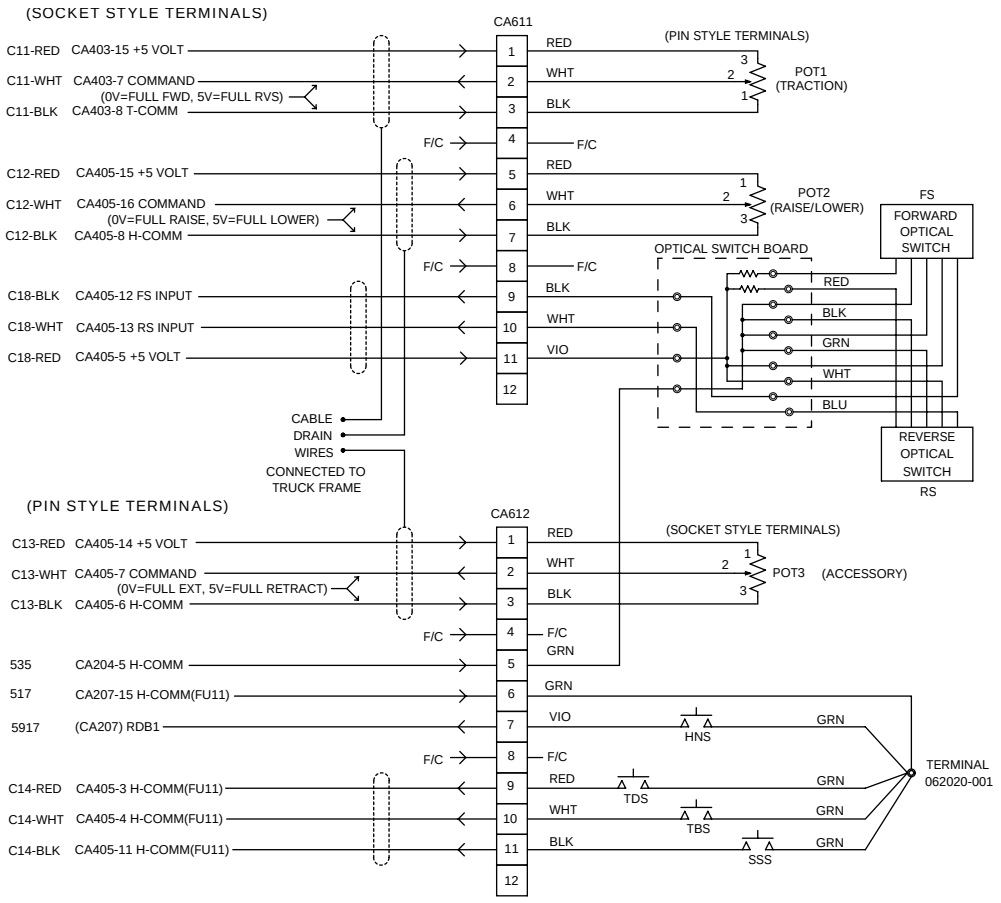
RR/RD 5200/5200S SERIES



A | B | C

RR/RD 5200/5200S SERIES

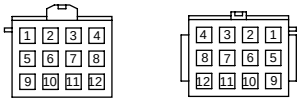
1 2 3 4



NOTES:

C11, C12, C13, C14 & C18 - 3 CONDUCTOR SHIELDED CABLES WITH DRAIN WIRES

CONNECTOR PIN NUMBERING
"MATING SIDE"

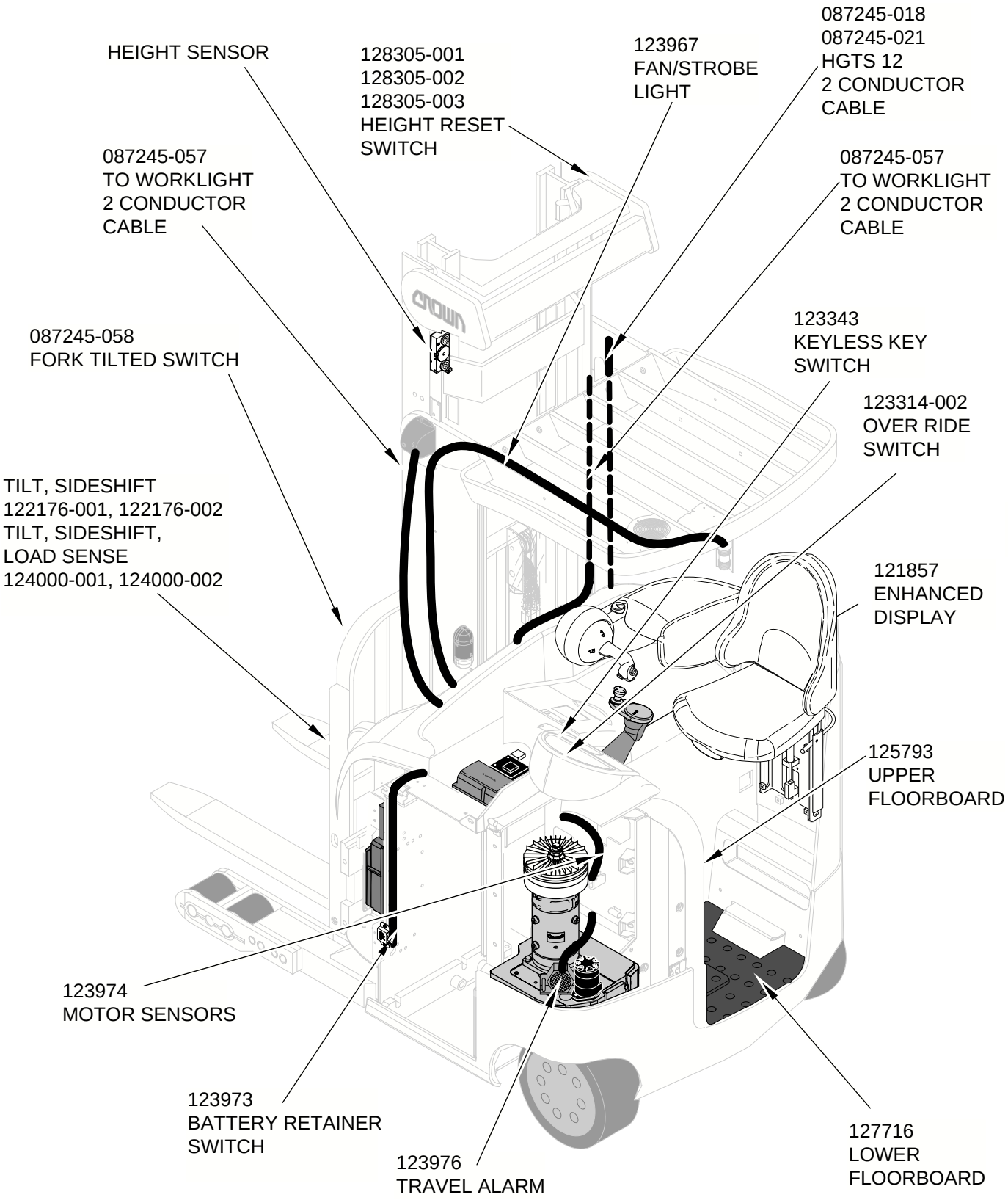


PC611 & PC612 JC611 & JC612

A | B | C

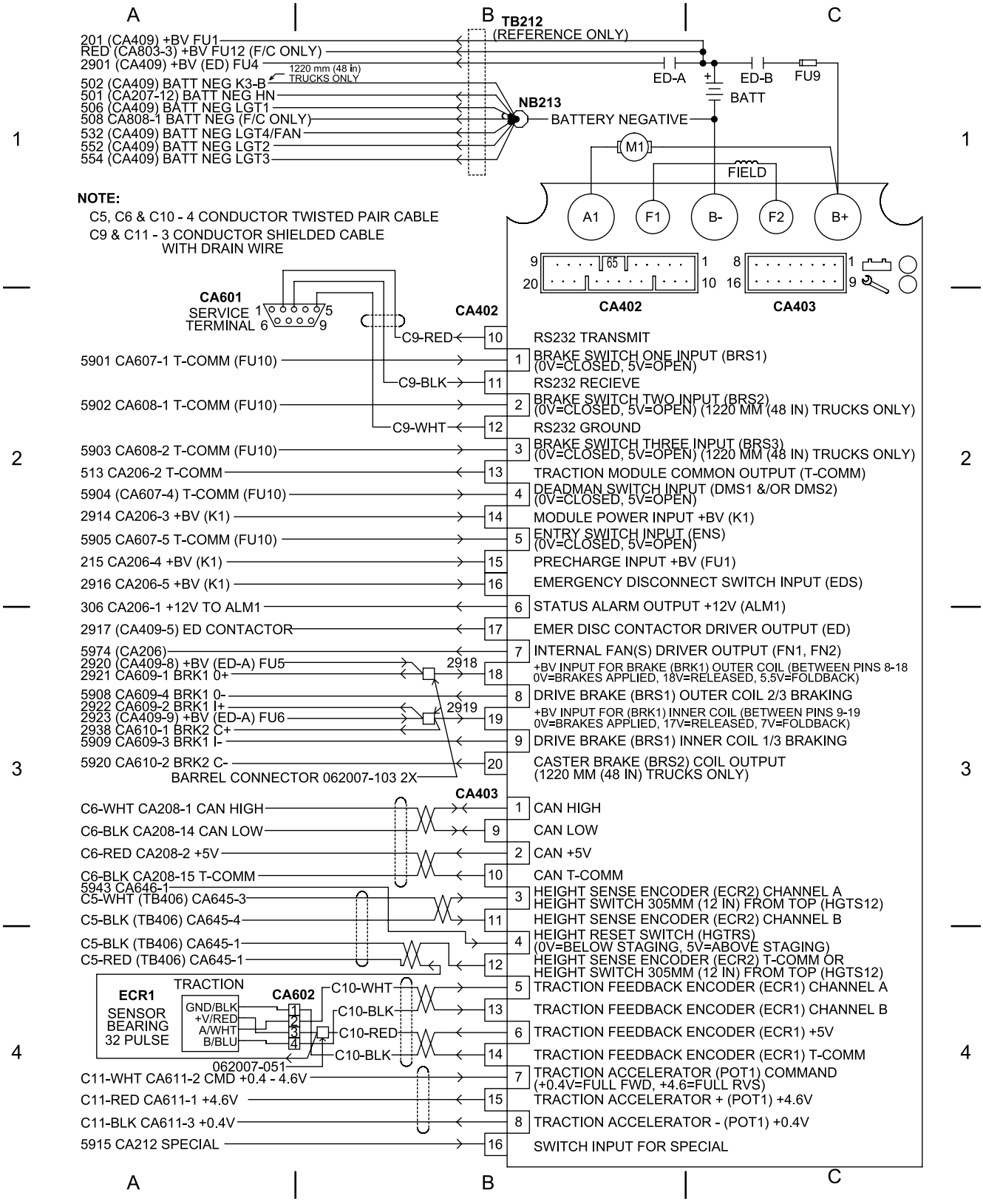
8819

RR/RD 5200S

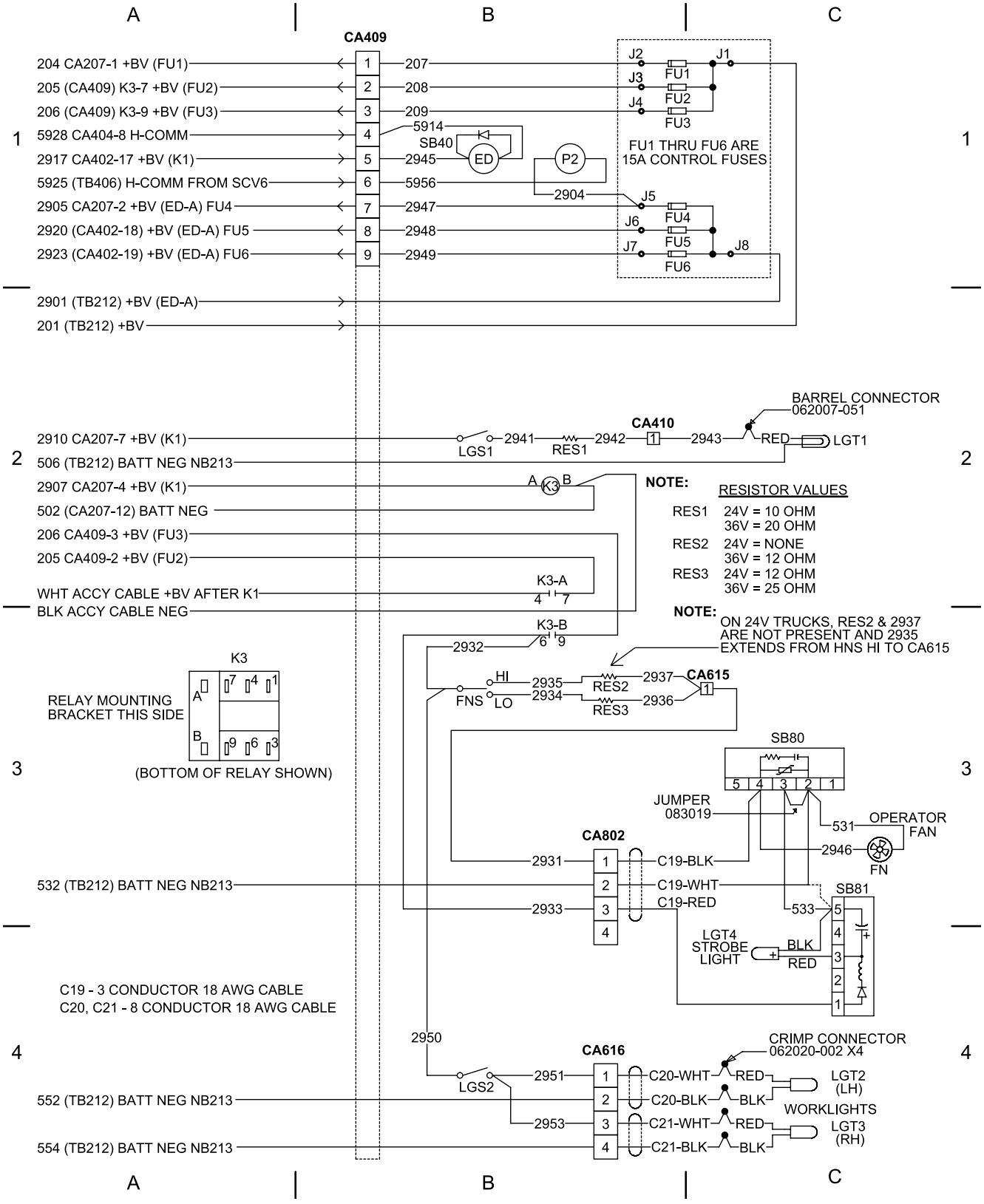


7019

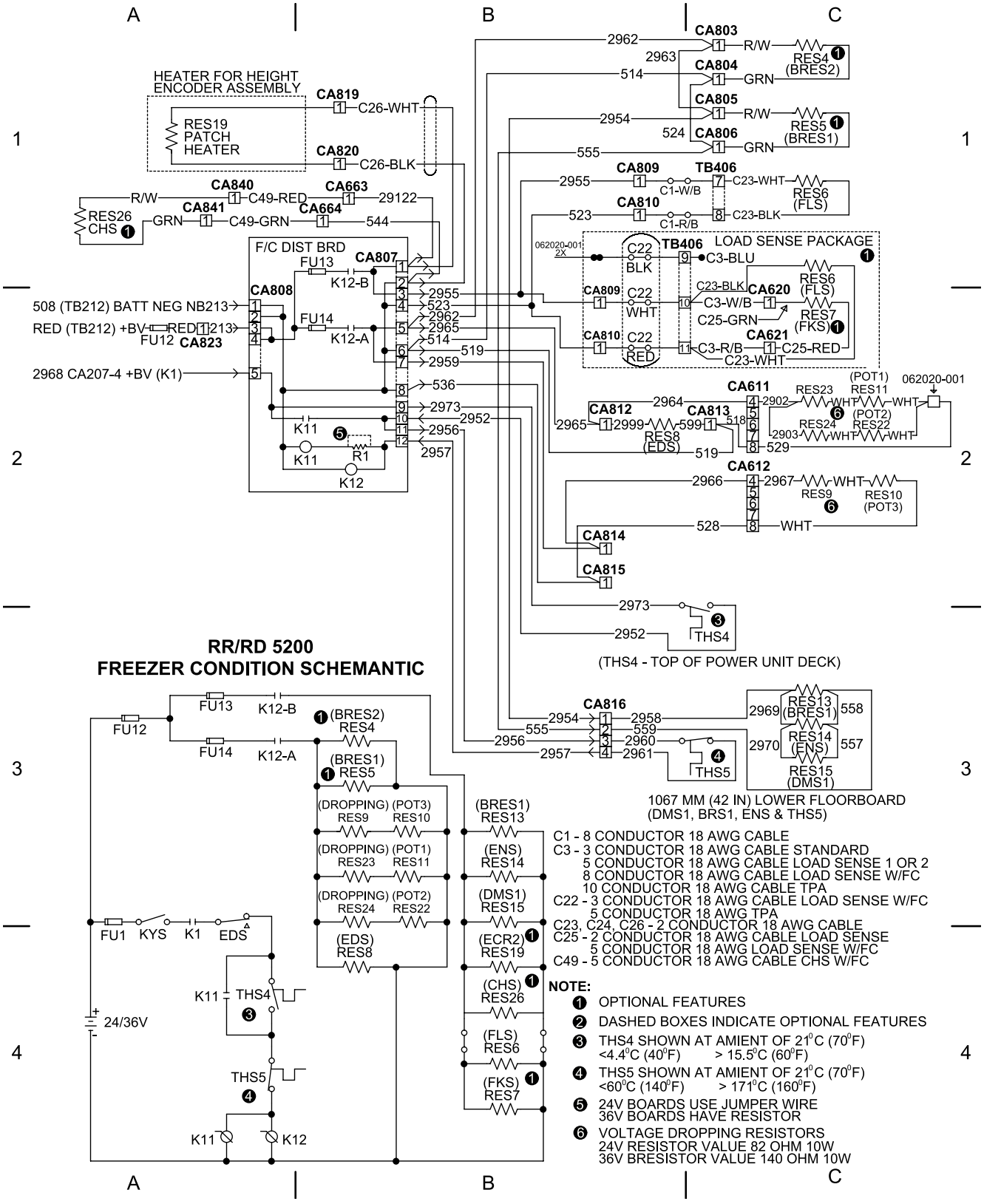
DIA–1452–022-SUP-5


A
B
C
TB212
(REFERENCE ONLY)
201 (CA409) +BV FU1
RED (CA803-3) +BV FU12 (F/C ONLY)
2901 (CA409) +BV (ED) FU4
1220 mm (48 in)
TRUCKS ONLY
502 (CA409) BATT NEG K3-B
501 (CA207-12) BATT NEG HN
506 (CA409) BATT NEG LGT1
508 CA808-1 BATT NEG (F/C ONLY)
532 (CA409) BATT NEG LGT4/FAN
552 (CA409) BATT NEG LGT2
554 (CA409) BATT NEG LGT3
NB213
BATTERY NEGATIVE
ED-A
ED-B
FU9
BATT
M1
FIELD
A1
F1
B-
F2
B+
NOTE:
C5, C6 & C10 - 4 CONDUCTOR TWISTED PAIR CABLE
C9 & C11 - 3 CONDUCTOR SHIELDED CABLE
WITH DRAIN WIRE
CA601
SERVICE TERMINAL
CA402
CA403
C9-RED
C9-BLK
C9-WHT
5901 CA607-1 T-COMM (FU10)
5902 CA608-1 T-COMM (FU10)
5903 CA608-2 T-COMM (FU10)
513 CA206-2 T-COMM
5904 (CA607-4) T-COMM (FU10)
2914 CA206-3 +BV (K1)
5905 CA607-5 T-COMM (FU10)
215 CA206-4 +BV (K1)
2916 CA206-5 +BV (K1)
306 CA206-1 +12V TO ALM1
2917 (CA409-5) ED CONTACTOR
5974 (CA206)
2920 (CA409-8) +BV (ED-A) FU5
2921 CA609-1 BRK1 0+
5908 CA609-4 BRK1 0-
2922 CA609-2 BRK1 I+
2923 (CA409-9) +BV (ED-A) FU6
2938 CA610-1 BRK2 C+
5909 CA609-3 BRK1 I-
5920 CA610-2 BRK2 C-
2918
2919
BARREL CONNECTOR 062007-103 2X
C6-WHT CA208-1 CAN HIGH
C6-BLK CA208-14 CAN LOW
C6-RED CA208-2 +5V
C6-BLK CA208-15 T-COMM
5943 CA646-1
C5-WHT (TB406) CA645-3
C5-BLK (TB406) CA645-4
C5-BLK (TB406) CA645-1
C5-RED (TB406) CA645-1
ECR1
SENSOR BEARING 32 PULSE
TRACTION
GND/BLK
+V/RED
A/WHT
B/BLU
CA602
C10-WHT
C10-BLK
C10-RED
C10-BLK
062007-051
C11-WHT CA611-2 CMD +0.4 - 4.6V
C11-RED CA611-1 +4.6V
C11-BLK CA611-3 +0.4V
5915 CA212 SPECIAL
RS232 TRANSMIT
BRAKE SWITCH ONE INPUT (BRS1)
(0V=CLOSED, 5V=OPEN)
RS232 RECIEVE
BRAKE SWITCH TWO INPUT (BRS2)
(0V=CLOSED, 5V=OPEN) (1220 MM (48 IN) TRUCKS ONLY)
RS232 GROUND
BRAKE SWITCH THREE INPUT (BRS3)
(0V=CLOSED, 5V=OPEN) (1220 MM (48 IN) TRUCKS ONLY)
TRACTION MODULE COMMON OUTPUT (T-COMM)
DEADMAN SWITCH INPUT (DMS1 &/OR DMS2)
(0V=CLOSED, 5V=OPEN)
MODULE POWER INPUT +BV (K1)
ENTRY SWITCH INPUT (ENS)
(0V=CLOSED, 5V=OPEN)
PRECHARGE INPUT +BV (FU1)
EMERGENCY DISCONNECT SWITCH INPUT (EDS)
STATUS ALARM OUTPUT +12V (ALM1)
EMER DISC CONTACTOR DRIVER OUTPUT (ED)
INTERNAL FAN(S) DRIVER OUTPUT (FN1, FN2)
+BV INPUT FOR BRAKE (BRK1) OUTER COIL (BETWEEN PINS 8-18
0V=BRAKES APPLIED, 18V=RELEASED, 5.5V=FOLDBACK)
DRIVE BRAKE (BRS1) OUTER COIL 2/3 BRAKING
+BV INPUT FOR (BRK1) INNER COIL (BETWEEN PINS 9-19
0V=BRAKES APPLIED, 17V=RELEASED, 7V=FOLDBACK)
DRIVE BRAKE (BRS1) INNER COIL 1/3 BRAKING
CASTER BRAKE (BRS2) COIL OUTPUT
(1220 MM (48 IN) TRUCKS ONLY)
CAN HIGH
CAN LOW
CAN +5V
CAN T-COMM
HEIGHT SENSE ENCODER (ECR2) CHANNEL A
HEIGHT SWITCH 305MM (12 IN) FROM TOP (HGTS12)
HEIGHT SENSE ENCODER (ECR2) CHANNEL B
HEIGHT RESET SWITCH (HGTRS)
(0V=BELOW STAGING, 5V=ABOVE STAGING)
HEIGHT SENSE ENCODER (ECR2) T-COMM OR
HEIGHT SWITCH 305MM (12 IN) FROM TOP (HGTS12)
TRACTION FEEDBACK ENCODER (ECR1) CHANNEL A
TRACTION FEEDBACK ENCODER (ECR1) CHANNEL B
TRACTION FEEDBACK ENCODER (ECR1) +5V
TRACTION FEEDBACK ENCODER (ECR1) T-COMM
TRACTION ACCELERATOR (POT1) COMMAND
(+0.4V=FULL FWD, +4.6=FULL RVS)
TRACTION ACCELERATOR + (POT1) +4.6V
TRACTION ACCELERATOR - (POT1) +0.4V
SWITCH INPUT FOR SPECIAL

129335 D sh 1


A
B
C
CA409
204 CA207-1 +BV (FU1)
205 (CA409) K3-7 +BV (FU2)
206 (CA409) K3-9 +BV (FU3)
5928 CA404-8 H-COMM
2917 CA402-17 +BV (K1)
5925 (TB406) H-COMM FROM SCV6
2905 CA207-2 +BV (ED-A) FU4
2920 (CA402-18) +BV (ED-A) FU5
2923 (CA402-19) +BV (ED-A) FU6
2901 (TB212) +BV (ED-A)
201 (TB212) +BV
207
208
209
5914
SB40
ED
2945
P2
5956
2904
2947
2948
2949
J2
J1
J3
J4
FU1
FU2
FU3
FU4
FU5
FU6
J5
J6
J7
J8
FU1 THRU FU6 ARE
15A CONTROL FUSES
BARREL CONNECTOR
062007-051
CA410
2910 CA207-7 +BV (K1)
506 (TB212) BATT NEG NB213
LGS1
2941
RES1
2942
2943
RED
LGT1
2907 CA207-4 +BV (K1)
502 (CA207-12) BATT NEG
206 CA409-3 +BV (FU3)
205 CA409-2 +BV (FU2)
WHT ACCY CABLE +BV AFTER K1
BLK ACCY CABLE NEG
K3-A
K3-B
NOTE:
RESISTOR VALUES
RES1 24V = 10 OHM
36V = 20 OHM
RES2 24V = NONE
36V = 12 OHM
RES3 24V = 12 OHM
36V = 25 OHM
NOTE:
ON 24V TRUCKS, RES2 & 2937
ARE NOT PRESENT AND 2935
EXTENDS FROM HNS HI TO CA615
2932
HI
FNS
LO
2935
2934
RES2
RES3
2937
2936
CA615
K3
RELAY MOUNTING
BRACKET THIS SIDE
(BOTTOM OF RELAY SHOWN)
SB80
JUMPER
083019
OPERATOR
FAN
531
2946
FN
CA802
2931
C19-BLK
C19-WHT
C19-RED
2933
532 (TB212) BATT NEG NB213
SB81
533
LGT4
STROKE
LIGHT
BLK
RED
C19 - 3 CONDUCTOR 18 AWG CABLE
C20, C21 - 8 CONDUCTOR 18 AWG CABLE
2950
CA616
CRIMP CONNECTOR
062020-002 X4
LGS2
2951
2953
C20-WHT
C20-BLK
C21-WHT
C21-BLK
LGT2
(LH)
WORKLIGHTS
LGT3
(RH)
552 (TB212) BATT NEG NB213
554 (TB212) BATT NEG NB213

129341 A sh 1


A
B
C
1
2
3
4
HEATER FOR HEIGHT ENCODER ASSEMBLY
RES19 PATCH HEATER
CA819
CA820
C26-WHT
C26-BLK
CA840
CA841
CA663
CA664
C49-RED
C49-GRN
29122
544
RES26 CHS
R/W
GRN
F/C DIST BRD
FU13
FU14
FU12
K12-B
K12-A
CA807
CA808
CA823
508 (TB212) BATT NEG NB213
RED (TB212) +BV
2968 CA207-4 +BV (K1)
K11
K12
R1
CA803
CA804
CA805
CA806
CA809
CA810
TB406
C1-W/B
C1-R/B
C23-WHT
C23-BLK
RES4 (BRES2)
RES5 (BRES1)
RES6 (FLS)
LOAD SENSE PACKAGE
062020-001
2X
C22
BLK
WHT
RED
C3-BLU
C3-W/B
C3-R/B
C25-GRN
C25-RED
CA620
CA621
RES7 (FKS)
CA611
CA612
CA812
CA813
CA814
CA815
RES23
RES24
RES22
RES8 (EDS)
RES9
RES10 (POT3)
(POT1)
RES11
(POT2)
THS4
(THS4 - TOP OF POWER UNIT DECK)
RR/RD 5200
FREEZER CONDITION SCHEMANTIC
CA816
RES13 (BRES1)
RES14 (ENS)
RES15 (DMS1)
THS5
1067 MM (42 IN) LOWER FLOORBOARD
(DMS1, BRS1, ENS & THS5)
(BRES2) RES4
(BRES1) RES5
(DROPPING) (POT3) RES9 RES10
(DROPPING) (POT1) RES23 RES11
(DROPPING) (POT2) RES24 RES22
(EDS) RES8
(BRES1) RES13
(ENS) RES14
(DMS1) RES15
(ECR2) RES19
(CHS) RES26
(FLS) RES6
(FKS) RES7
FU1
KYS
K1
EDS
24/36V
C1 - 8 CONDUCTOR 18 AWG CABLE
C3 - 3 CONDUCTOR 18 AWG CABLE STANDARD
5 CONDUCTOR 18 AWG CABLE LOAD SENSE 1 OR 2
8 CONDUCTOR 18 AWG CABLE LOAD SENSE W/FC
10 CONDUCTOR 18 AWG CABLE TPA
C22 - 3 CONDUCTOR 18 AWG CABLE LOAD SENSE W/FC
5 CONDUCTOR 18 AWG TPA
C23, C24, C26 - 2 CONDUCTOR 18 AWG CABLE
C25 - 2 CONDUCTOR 18 AWG CABLE LOAD SENSE
5 CONDUCTOR 18 AWG LOAD SENSE W/FC
C49 - 5 CONDUCTOR 18 AWG CABLE CHS W/FC
NOTE:
1 OPTIONAL FEATURES
2 DASHED BOXES INDICATE OPTIONAL FEATURES
3 THS4 SHOWN AT AMIENT OF 21°C (70°F)
<4.4°C (40°F) > 15.5°C (60°F)
4 THS5 SHOWN AT AMIENT OF 21°C (70°F)
<60°C (140°F) > 171°C (160°F)
5 24V BOARDS USE JUMPER WIRE
36V BOARDS HAVE RESISTOR
6 VOLTAGE DROPPING RESISTORS
24V RESISTOR VALUE 82 OHM 10W
36V BRESISTOR VALUE 140 OHM 10W

129343 C sh1

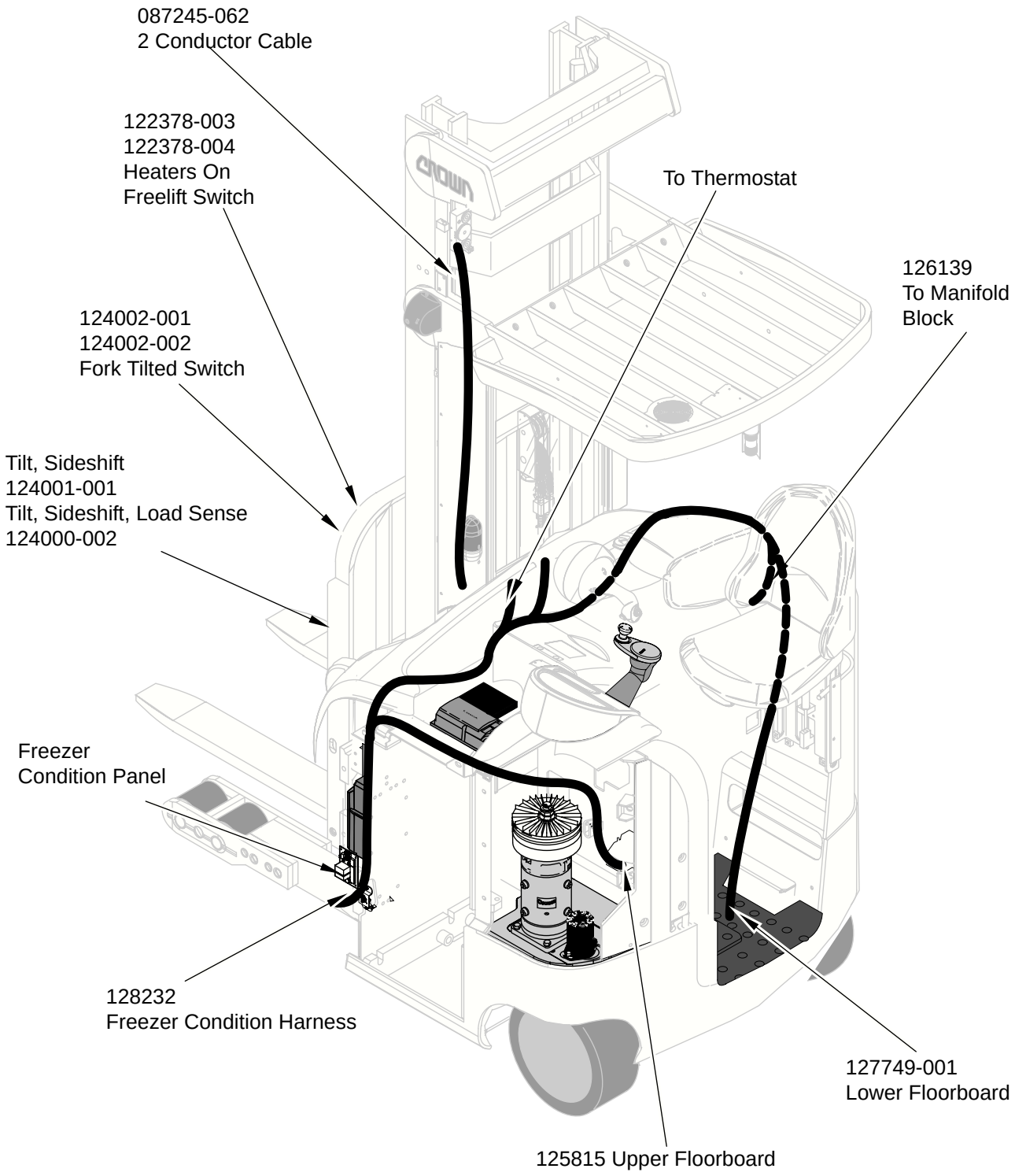
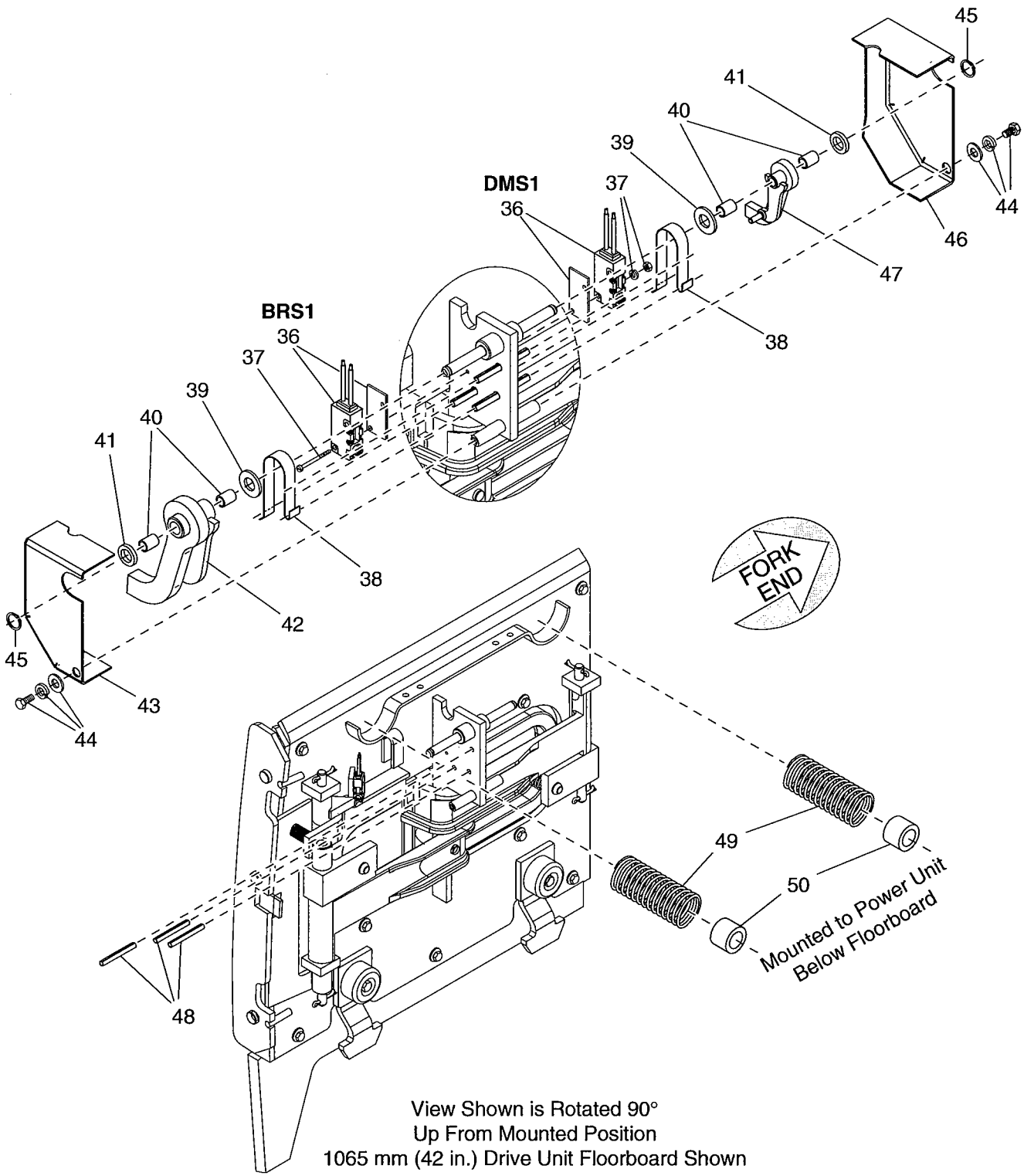


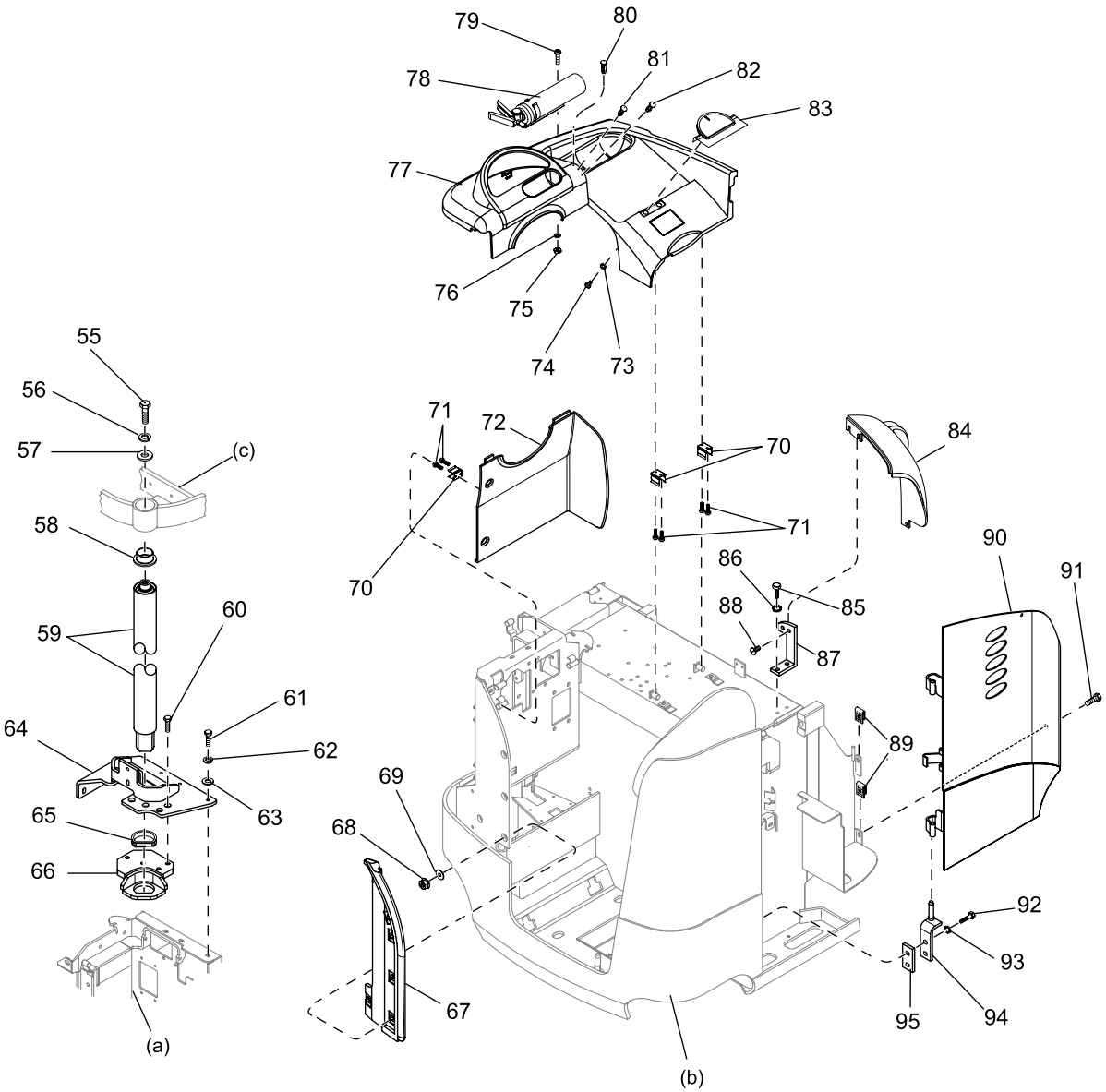
Figure 8820-01

12154



View Shown is Rotated 90°
Up From Mounted Position
1065 mm (42 in.) Drive Unit Floorboard Shown

See Page -053 for Additional Parts.



(a) Part of Power Unit

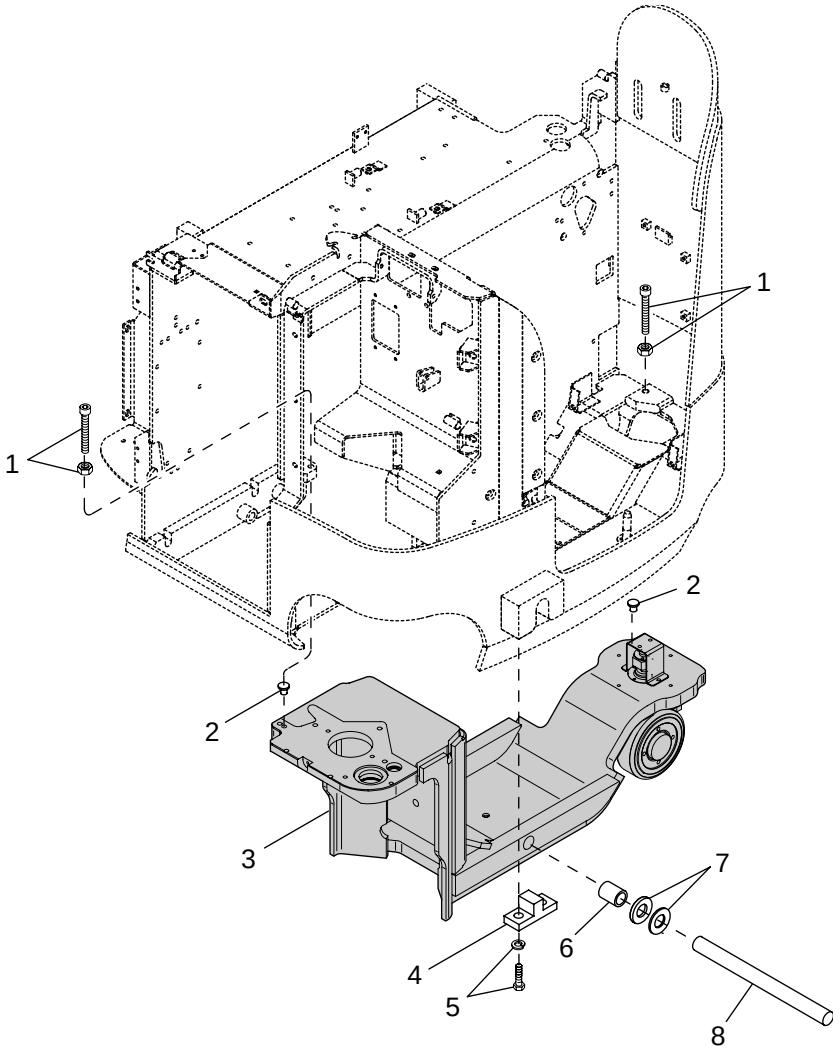
(b) Power Unit, contact factory

(c) Part of Overhead Guard

Figure 19294

8506

RR/RD5200S



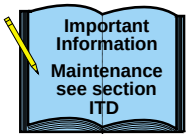
Index	Part No.	Part Name	No. Req.
1	060041-002	Screw	2
	060021-034	Nut	2
2	127792	Wear Plug	2
3	128210	Carriage Drive	1
4	125679	Block Mounting	2
5	060023-028	Screw	4
	060005-046	Lockwasher	4
6	065007-092	Bushing	2
7	060030-311	Flatwasher 1.63 mm (0.064 in.) Thick	8
	060030-324	Flatwasher 0.792 mm (0.0312 in.) Thick	AR
8	* 121709	Shaft	1
	* 121764	Shaft Freezer/Corrosion	1

* Choice of part number depends on if truck is equipped with freezer condition option. Freezer condition information is included in the truck data number (located on truck data plate).

Truck Data Number Example

Freezer Condition Option

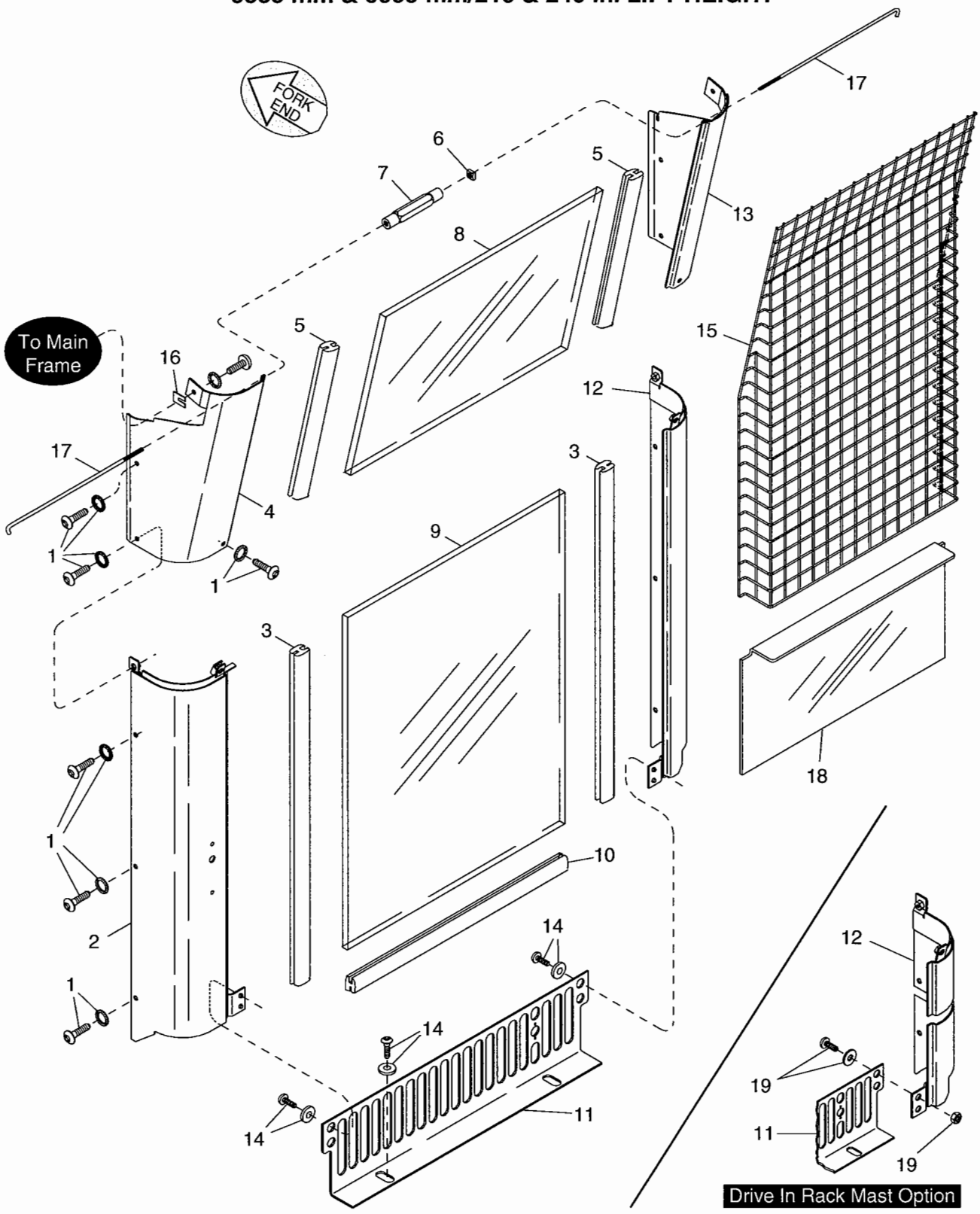
-TT270C36F2PSF-BS-Q--



Always Specify Model, Data & Serial Numbers

8737-02

RR/RD 5200/5200S
RR/RD 5200 (AC)/5200S (AC)
2415 mm & 2720 mm/95 & 107 in. COLLAPSED HEIGHT
5335 mm & 6095 mm/210 & 240 in. LIFT HEIGHT



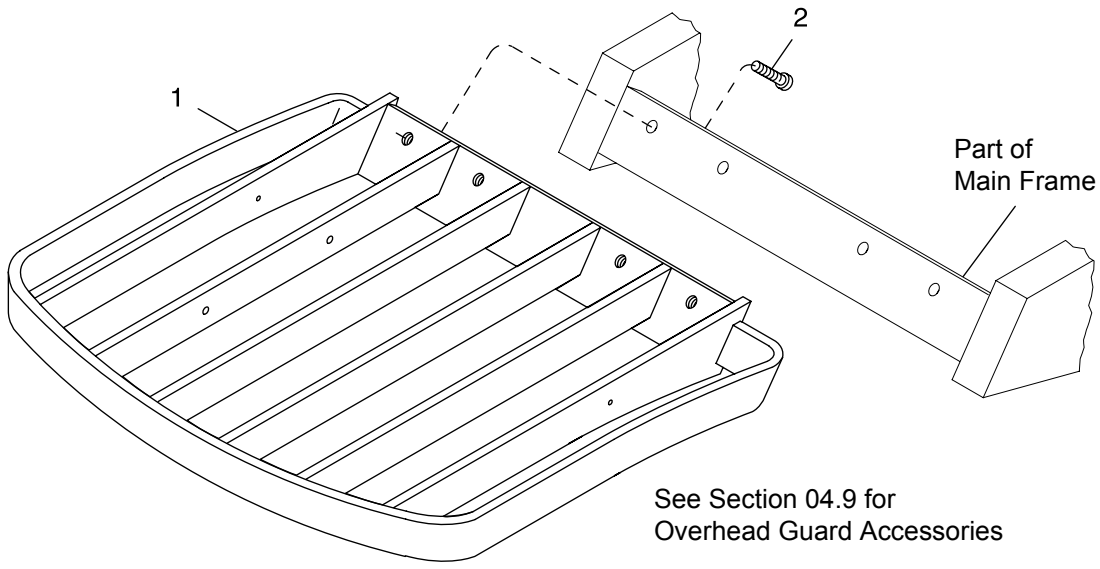


Figure 15630

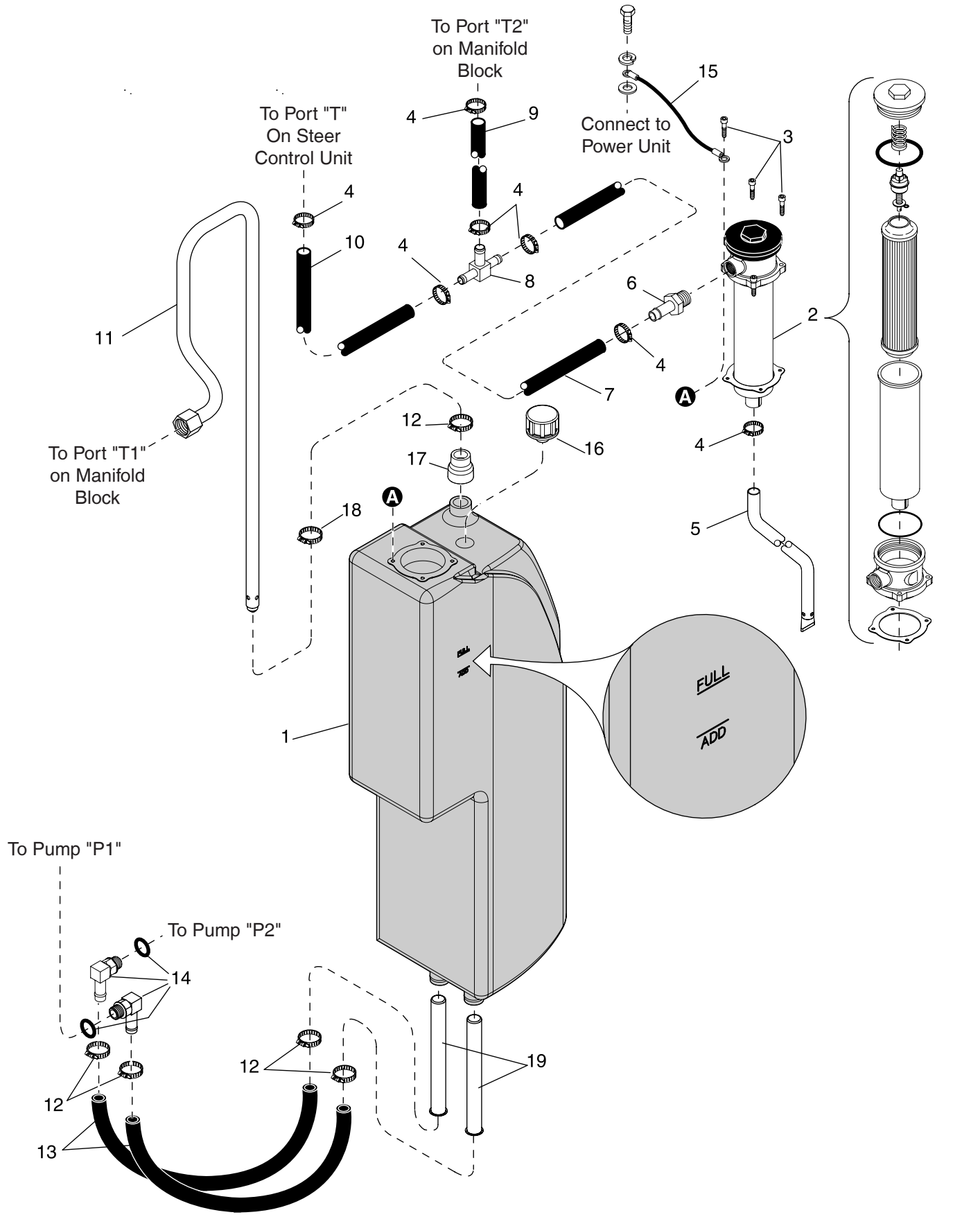
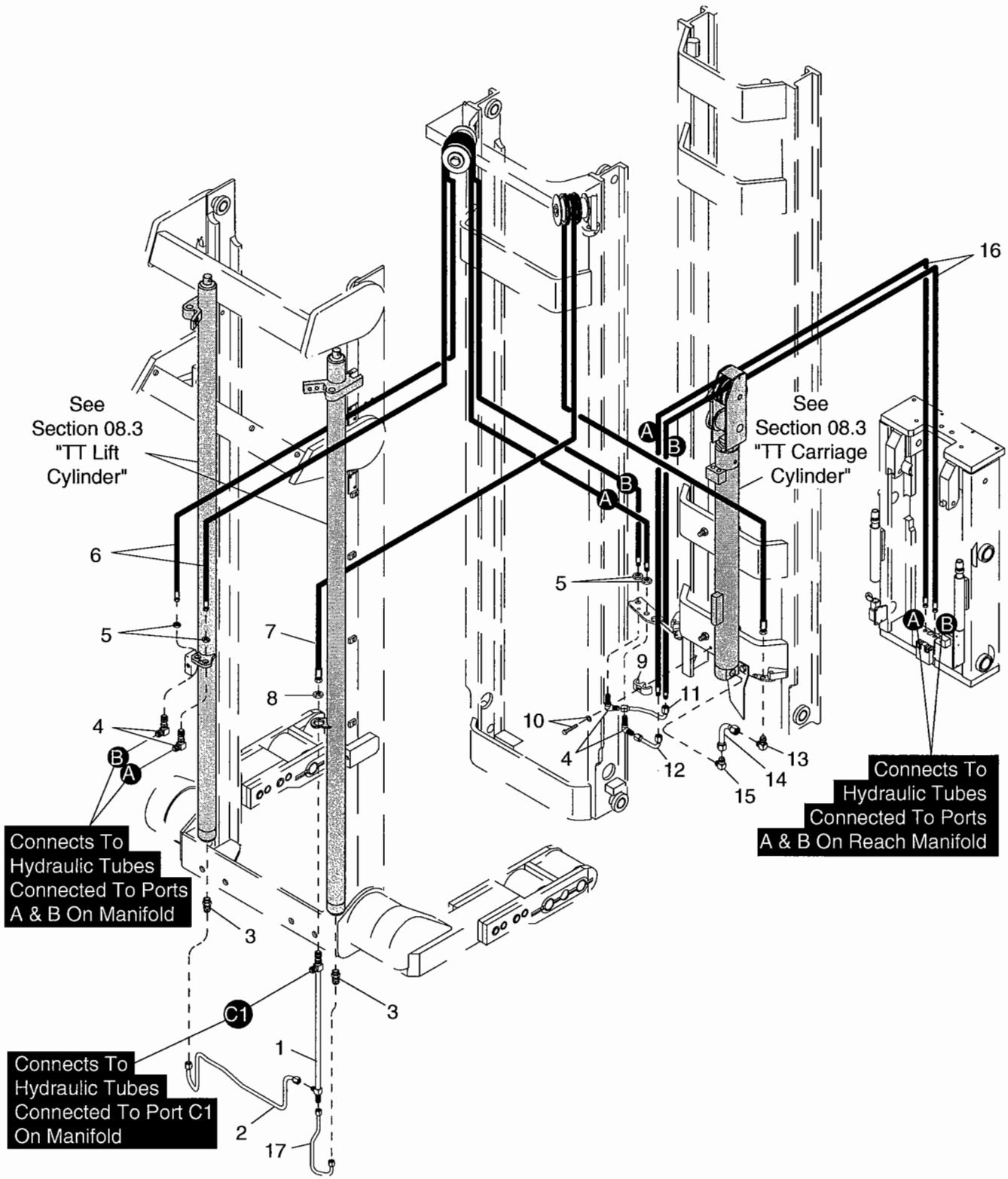
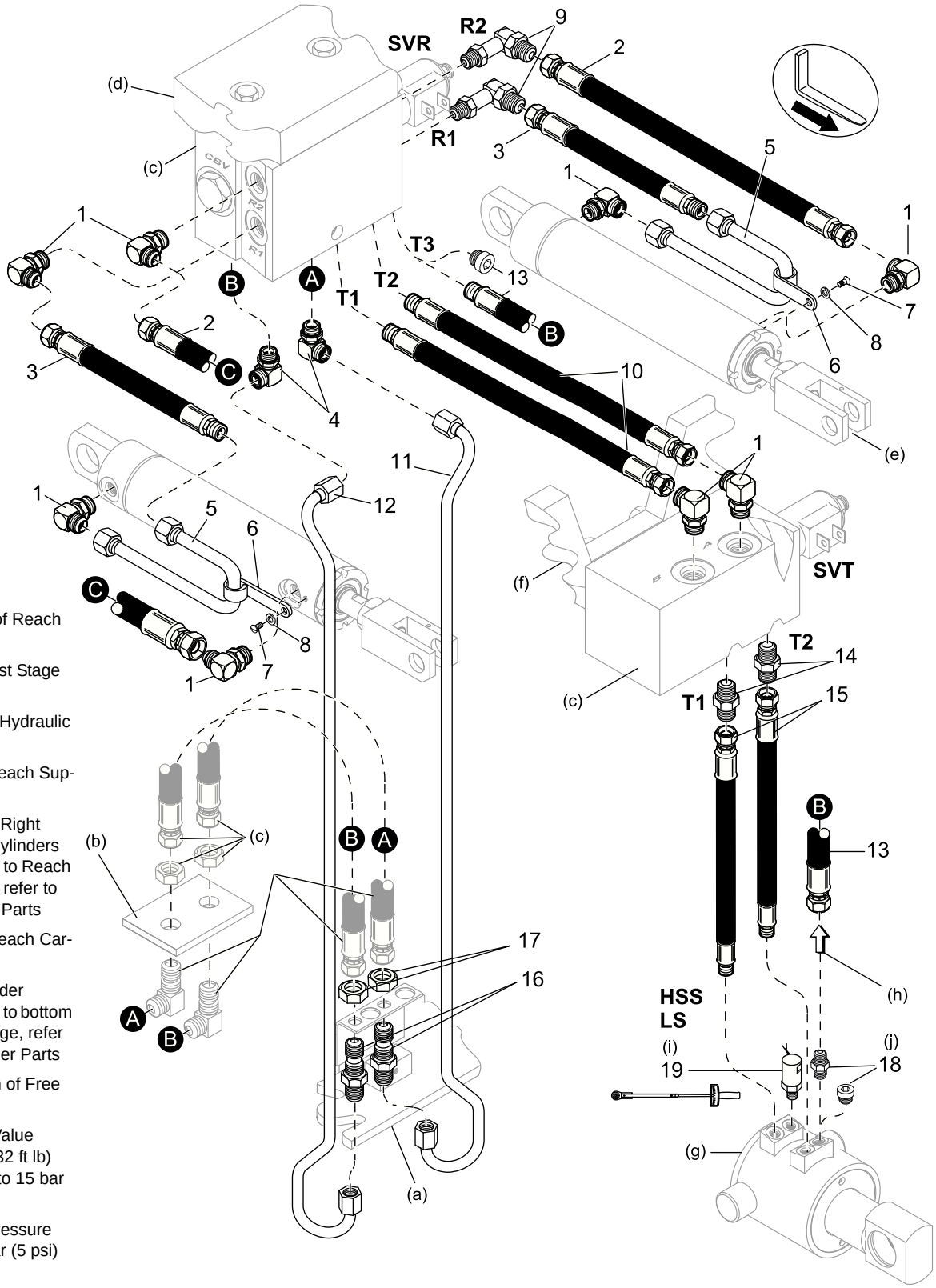


Figure 6456-10

10659

RR/RD 5200/5200S
RR/RD 5200 (AC)/5200S (AC)





(a) Bottom of Reach Support

(b) Part of 1st Stage Mast

(c) Refer to Hydraulic Parts

(d) Top of Reach Support

(e) Left and Right Reach Cylinders attached to Reach Support, refer to Cylinder Parts

(f) Top of Reach Carriage

(g) Tilt Cylinder mounted to bottom of Carriage, refer to Cylinder Parts

(h) Direction of Free Flow

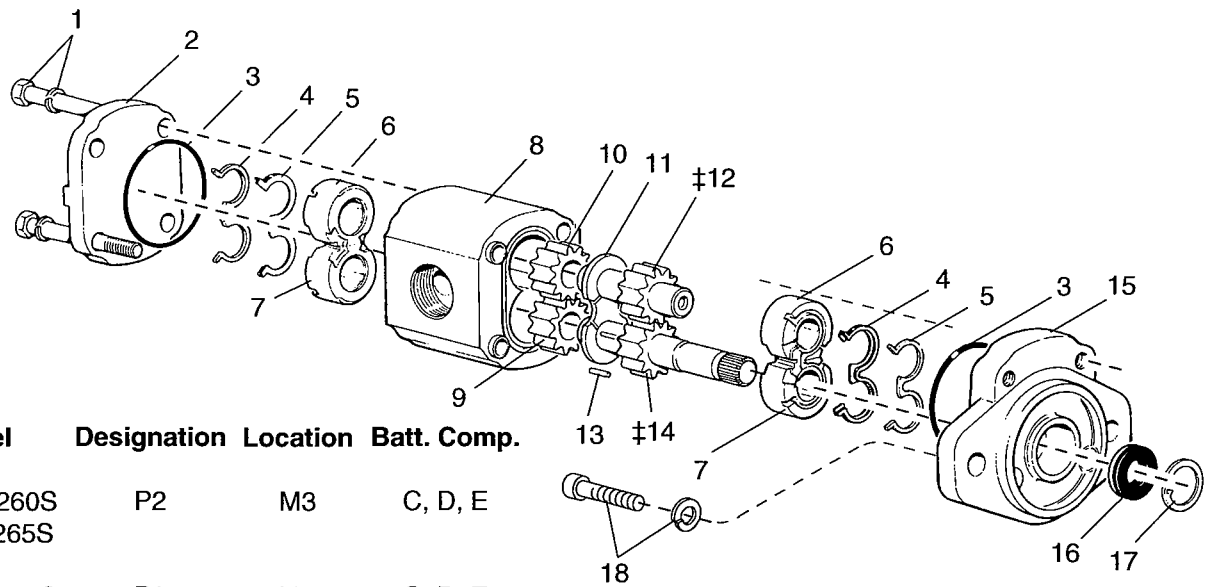
(i) Torque Value 44 Nm (32 ft lb) Pre-Set to 15 bar (225 psi)

(j) Crack Pressure 0.345 bar (5 psi)

Figure 19504-01

6758-02

RR/RD 5200S
RR/RD 5200S (AC)
36V NO LOAD SENSING
(10cc DISPLACEMENT)

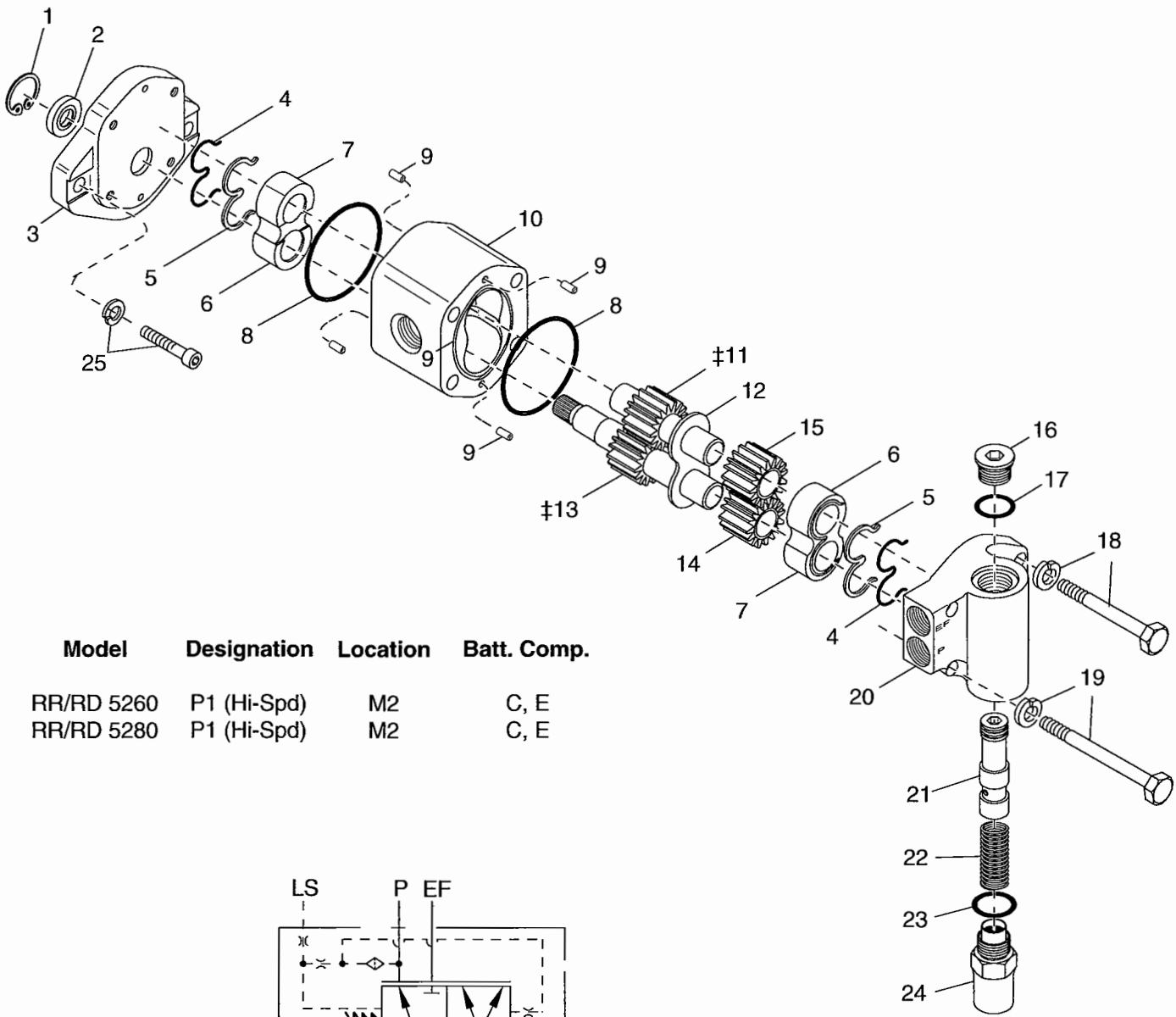


Model	Designation	Location	Batt. Comp.
RR/RD 5260S RR/RD5265S	P2	M3	C, D, E
RR/RD 5280S RR/RD5285S	P2	M3	C, D, E

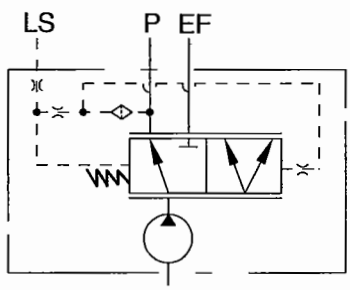
‡ Position of Gears Shown With Counterclockwise Rotation.

6761S-01

RR/RD 5200S 36V TRUCKS
LOAD SENSING PRIORITY FLOW DIVIDER
(14cc DISPLACEMENT)



Model	Designation	Location	Batt. Comp.
RR/RD 5260	P1 (Hi-Spd)	M2	C, E
RR/RD 5280	P1 (Hi-Spd)	M2	C, E

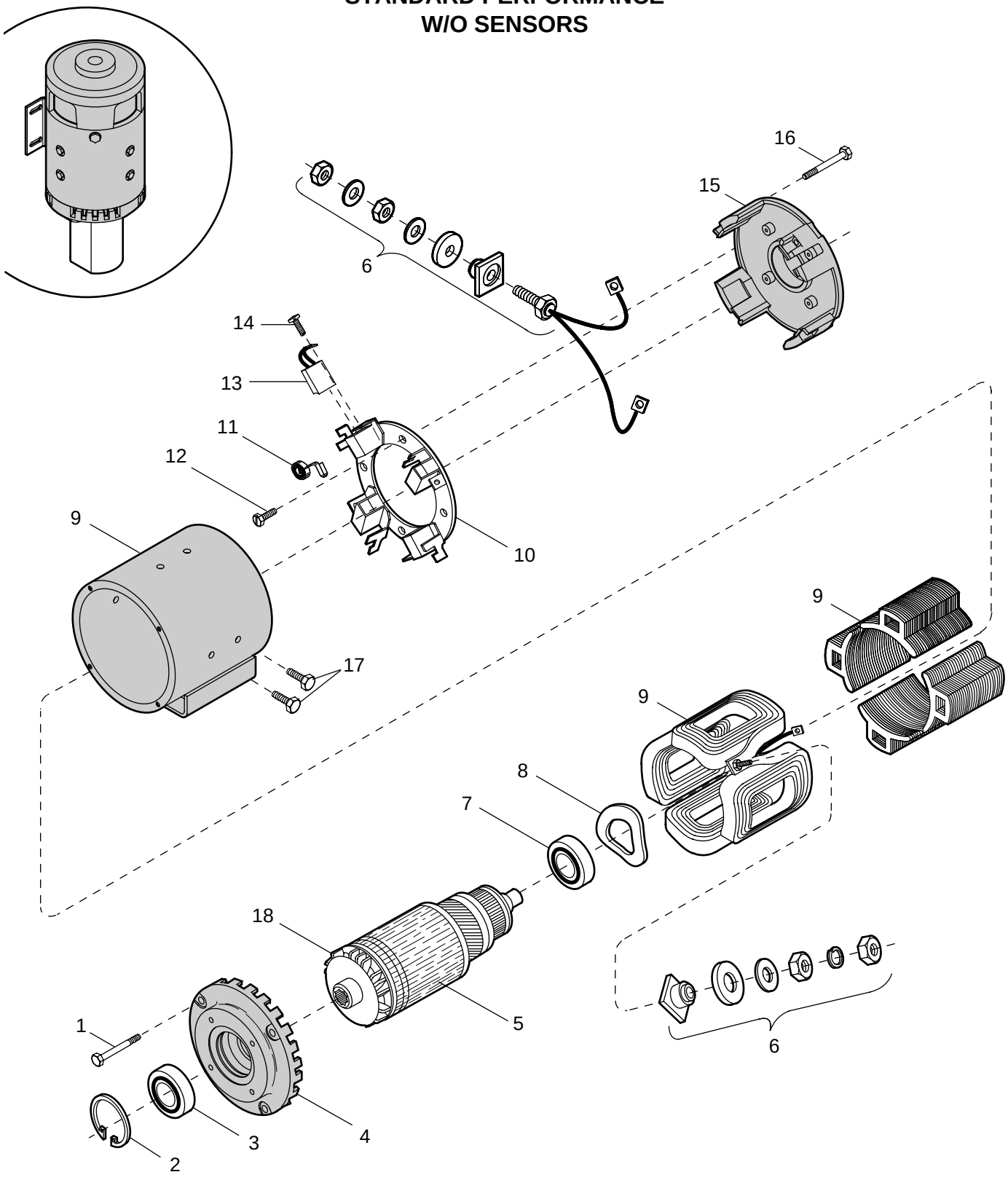


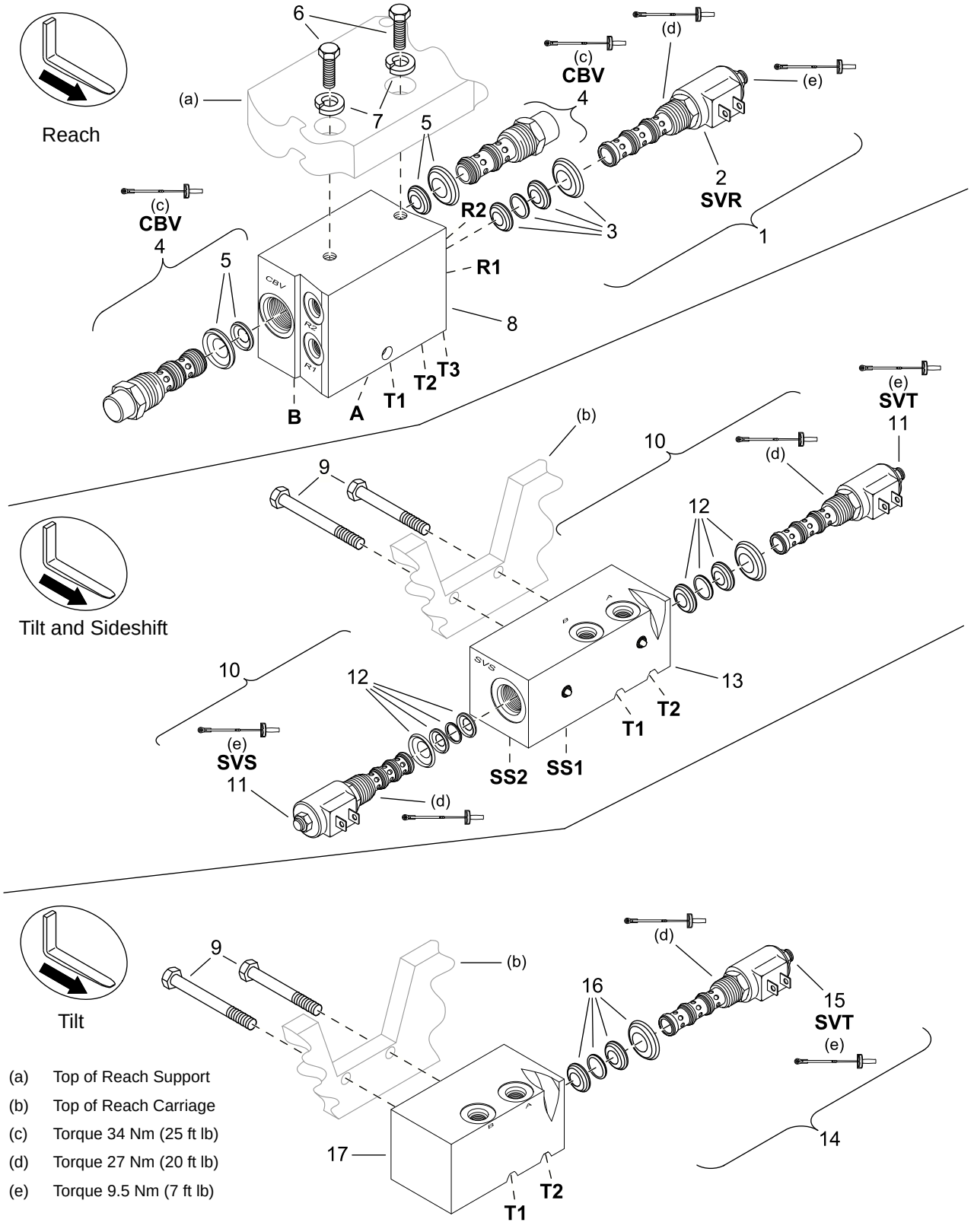
Control Pressure – 5.5 bar (80 psi)
Maximum Pressure At Port "EF" 240 bar (3500 psi)

‡ Position of Gears Shown With Counterclockwise Rotation.

8695

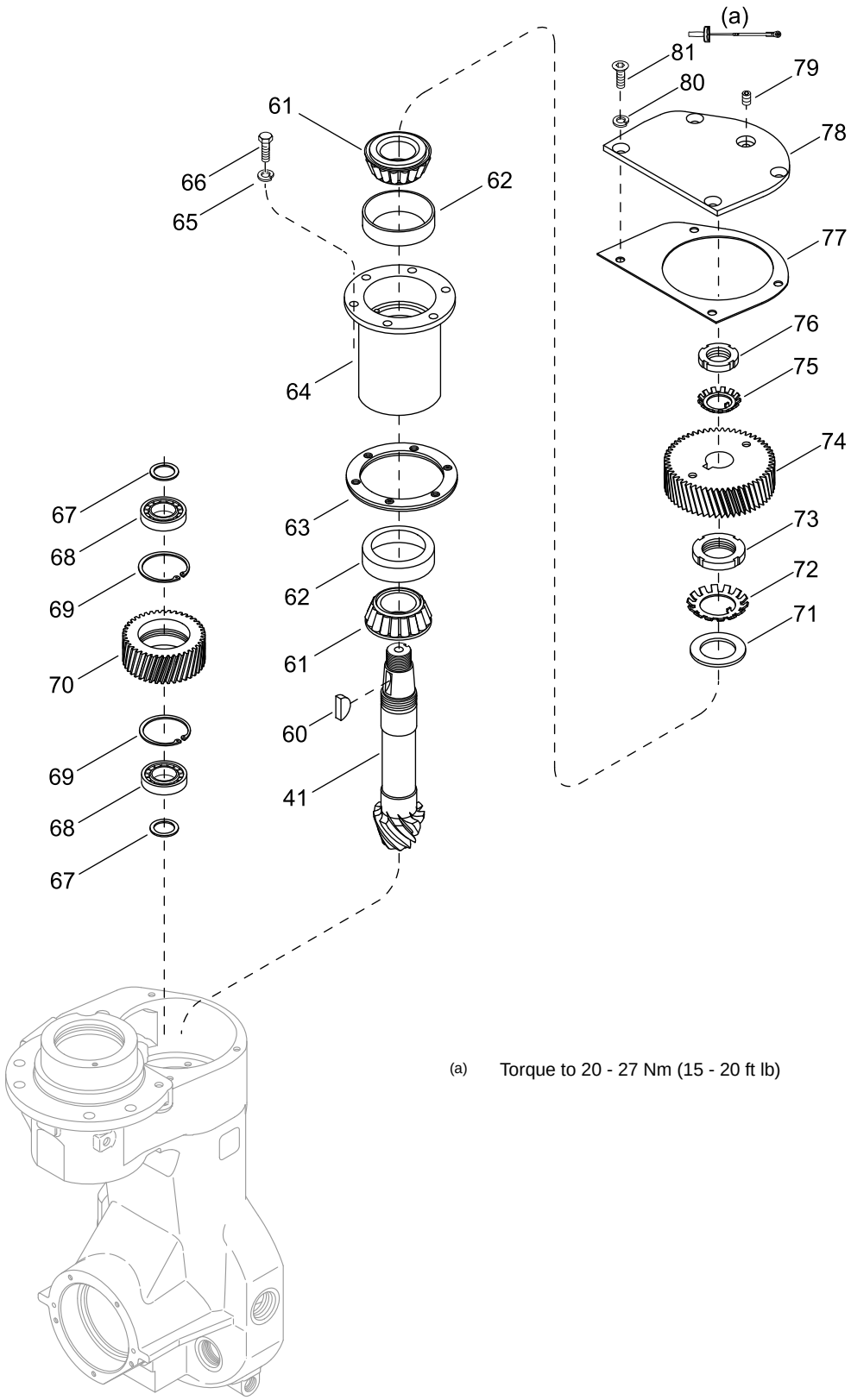
RR/RD 5200/5200S
RR/RD 5200 (AC)/5200S (AC)
36V - 170 mm (6.6 in.) DIA.
STANDARD PERFORMANCE
W/O SENSORS





(a) Top of Reach Support
(b) Top of Reach Carriage
(c) Torque 34 Nm (25 ft lb)
(d) Torque 27 Nm (20 ft lb)
(e) Torque 9.5 Nm (7 ft lb)

Figure 19503-02



(a) Torque to 20 - 27 Nm (15 - 20 ft lb)

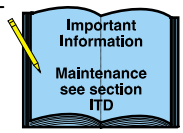
Figure 18440

Index	Part No.	Part Name	No. Req.
51	060018-005	Screw	4
	060005-043	Lockwasher	4
52	060018-010	Screw	4
	060030-131	Flatwasher	4
	061004-026	Thread Lock Adhesive	1
53	061074-001	Cable Tie Mount	6
	060078-024	Screw	6
	061003-005	Cable Tie Not Shown	6
54	129567	Suppressor Horn	1

Always Specify Model, Data & Serial Numbers

***** When installing ACCESS module, apply a thin coating of thermal grease to the bottom of the module to permit better heat dissipation. Grease should be uniformly applied then a straight edge should be used to scrape excess grease off. The grease is only useful to fill microscopic gaps in the mounting surfaces. Too much grease can be worse than none at all. Limit torque of the fasteners to 3.4 Nm (30 in. lbs.).

* To select part number, refer to truck data number. The data number consists of letters and numbers that represent truck features. Refer to section ITD.



Index	Part No.	Part Name	No. Req.
25	079566-051	Label	1
26	079566-065	Label	1
27	079566-064	Label	1
28	113729-018	Label AOK/ALS-250	2
29	076924-009	Fuse (AOK/ALS-250) 250A All 36V Trucks	1
	076924-010	Fuse (AOK/ALS-300) 300A All 24V Trucks	1
30	060015-089	Screw	5
	060005-026	Lockwasher	5
31	076924-020	Fuse (ACK/ECK-250) 250A	1
32	060015-066	Screw	1
	060005-026	Lockwasher	1
33	060059-003	Nut M8	6
34	121533	Bus Bar	1
35	123083	Bar Bus	1
36	121532	Bus Bar	1
37	076924-009	Fuse (AOK/ALS-250) 250A	1
38	114285	Suppressor Diode	1
39	131304	Contactor See Section 04.4	1
40	060078-024	Screw	2
	060030-010	Flatwasher	2
41	119960	Bracket Mounting	1
42	060061-007	Screw M5	2
	060005-005	Lockwasher	2
43	062033-050	Resistor Voltage Drop, Dome Light	1
44	062033-032	Resistor Voltage Drop, Fan	1
45	062033-034	Resistor Voltage Drop, Fan	1
46	060011-012	Screw	6
	060005-036	Lockwasher	6
47	† 126175-001	Contactor See Section 04.4	1
48	† 114285	Suppressor Diode	1
49	† 123084	Bracket Mounting	1
50	† 060015-107	Screw	2
	† 060005-007	Lockwasher	2
	† 060021-006	Nut	2
51	† 060061-007	Screw M5	2
	† 060005-005	Lockwasher	2
52	† 062627-001	Thermistor	1
53	† 060059-003	Nut M8	4

Always Specify Model, Data & Serial Numbers

†Only Used on EEC Trucks

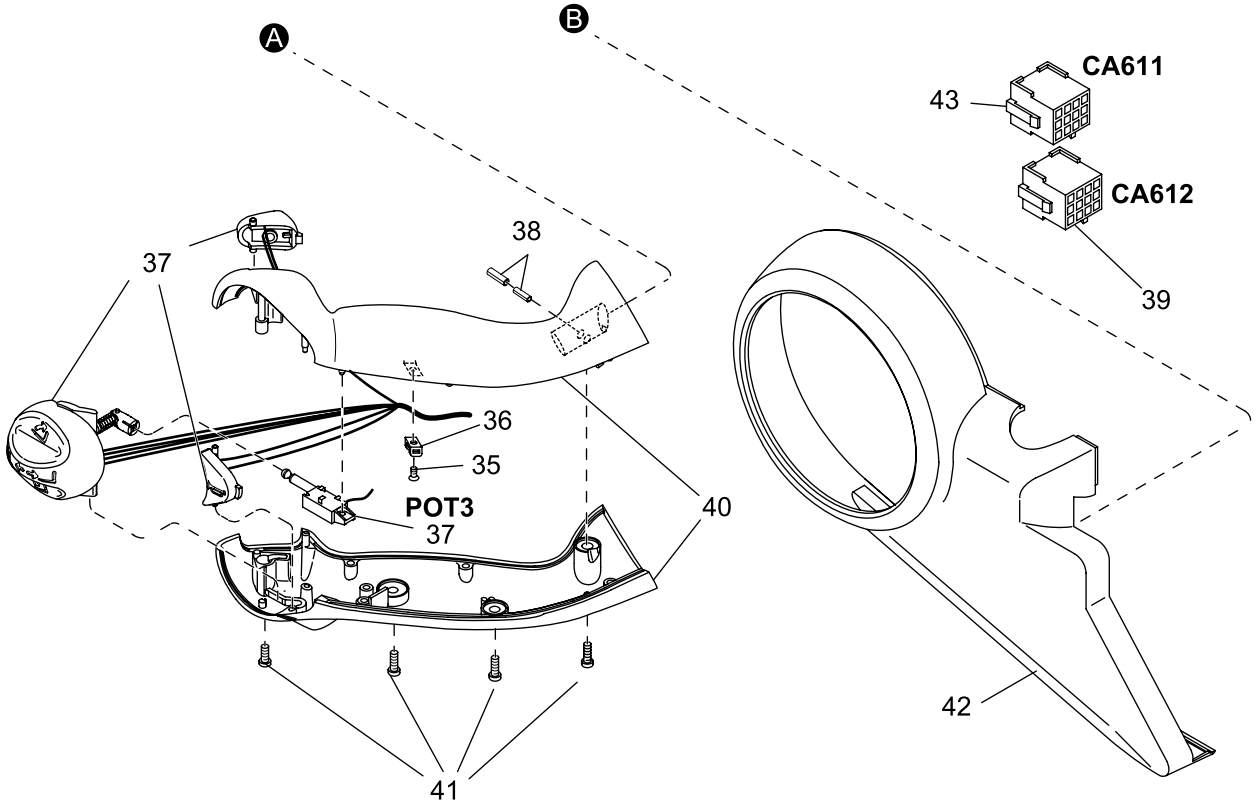


Figure 19512

Chart 1 - Connectors							
Designation	Index	Connector	Number of Terminals	Terminal	Insert (Index 10)	Extraction Tool	Crimping Tool
JC815		N/R	1	062007-063		N/R	090118
PC816	7	062701-003	4	062704-006	062703-006	062706	062737-002
JC816	9	062702-003	4	062704-003	062703-005	062706	062737-002
PC817	6	062535-006	4	062536-001		118993	N/R
JC817	6	062535-007	4	062536-002		118993	N/R
PC818	6	062535-008	2	062536-001		118993	N/R
JC818	6	062535-009	2	062536-002		118993	N/R
PC824	7	062701-001	2	062704-004	062703-002	062706	062737-002
JC824	9	062702-001	2	062704-003	062703-001	062706	062737-002
PC825		N/R	1	062007-063		N/R	090118

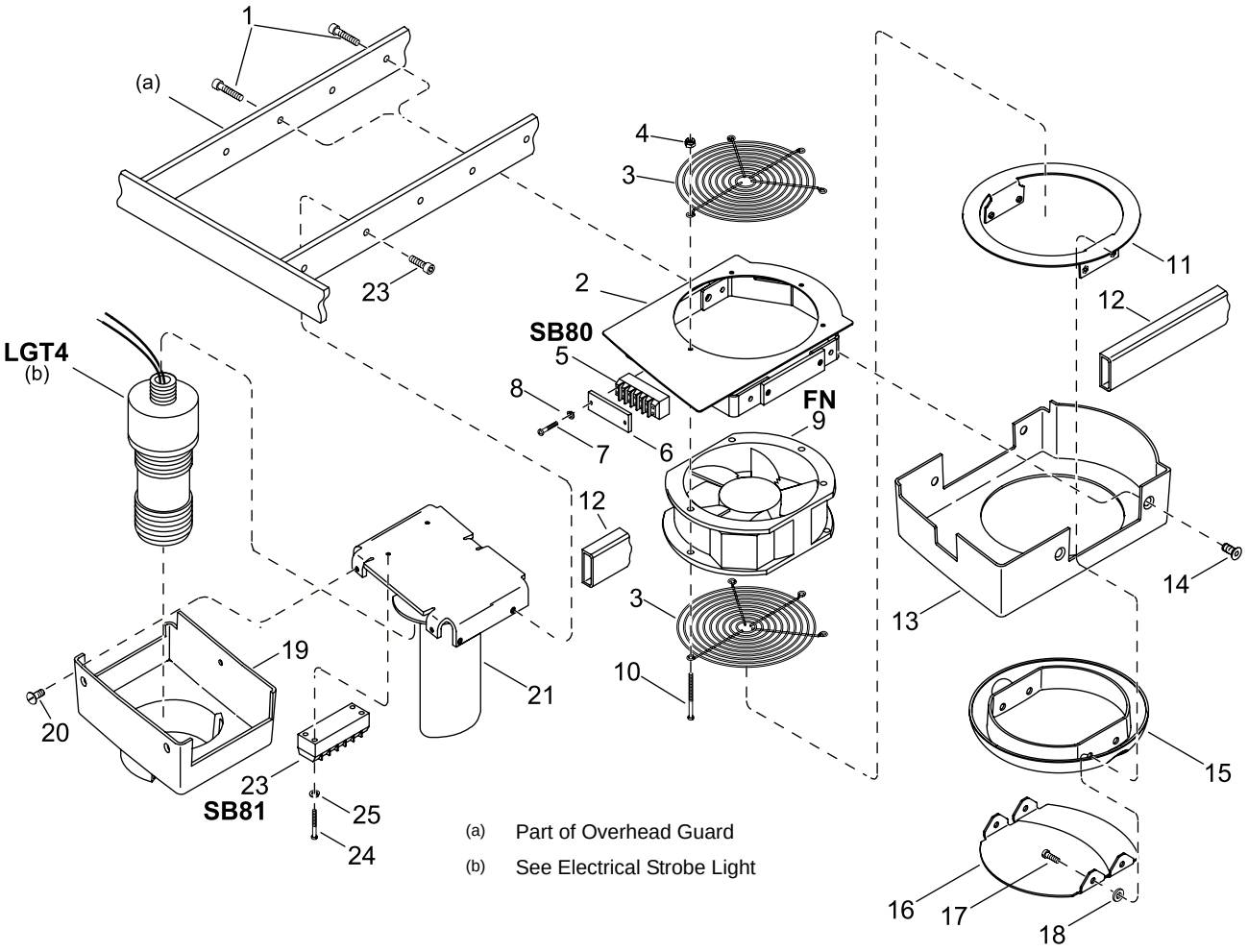
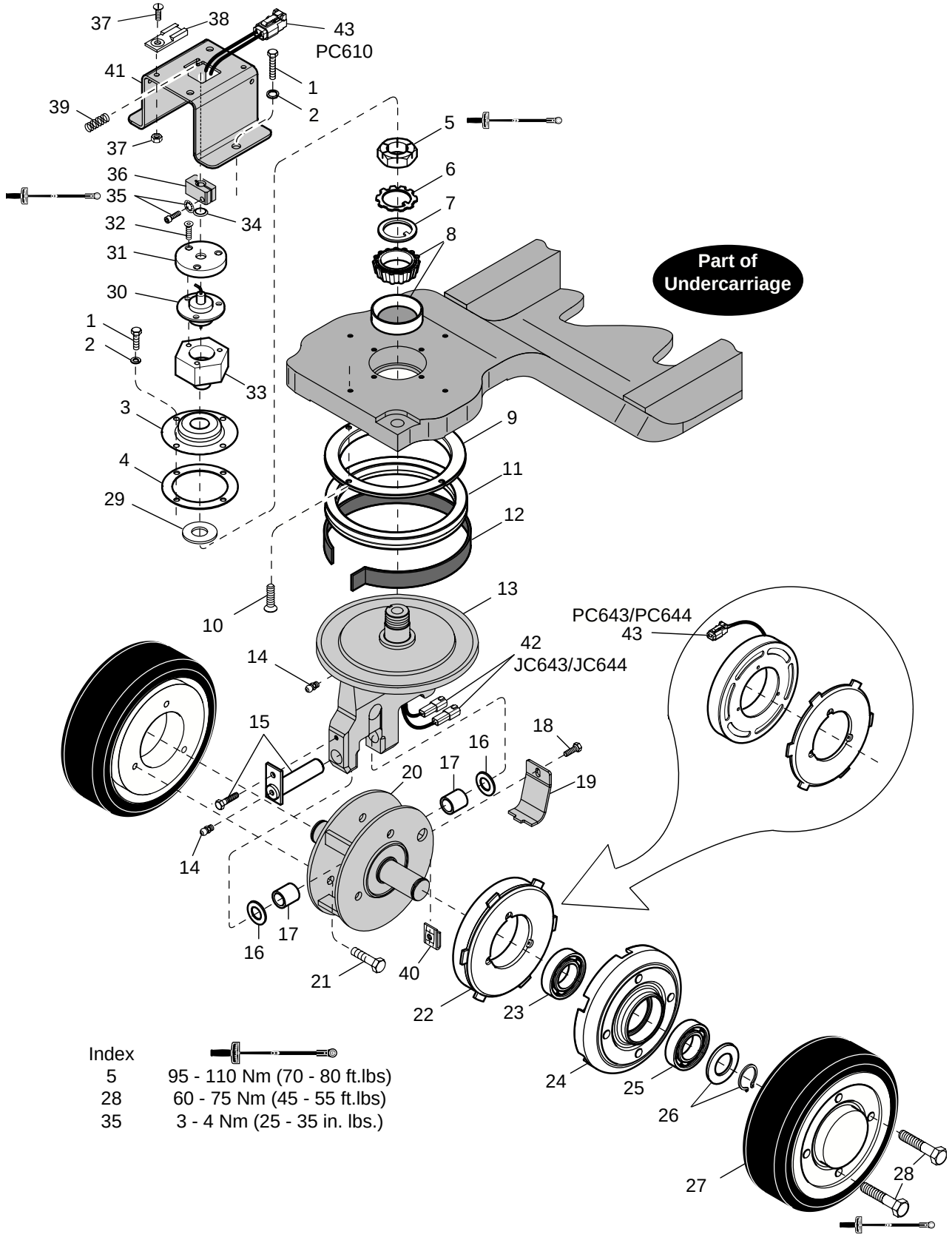


Figure 18478

8788-03

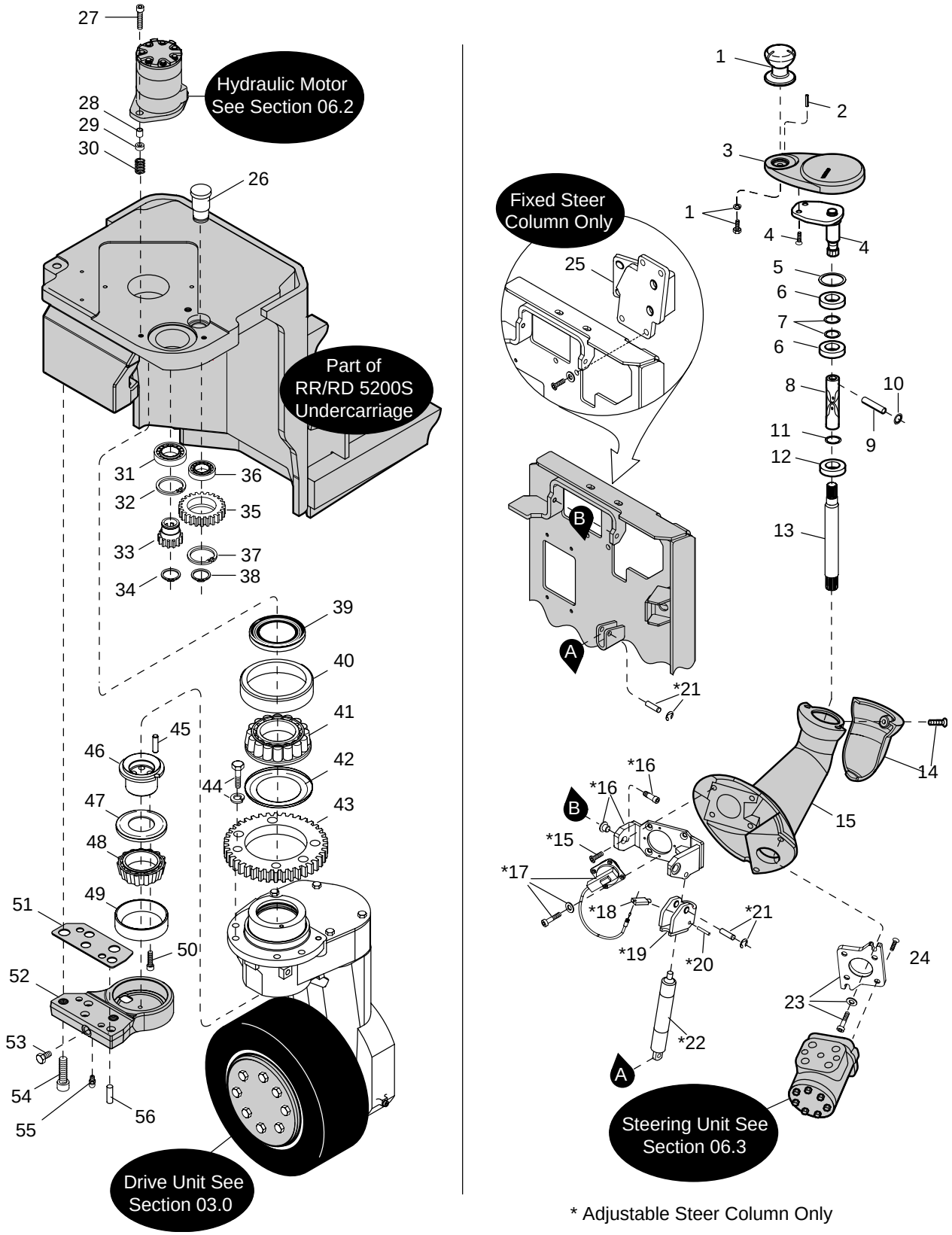
RR/RD 5200S
RR/RD 5200S(AC)



Index	
5	95 - 110 Nm (70 - 80 ft.lbs)
28	60 - 75 Nm (45 - 55 ft.lbs)
35	3 - 4 Nm (25 - 35 in. lbs.)

7846-02

RR/RD 5200S
RR/RD 5200S(AC)



* Adjustable Steer Column Only

INDEX 8 - Mainframe (Non-removable Outrigger Ends) (RR5200/5200S (AC) 2040 kg (4500 lb) Capacity)																
	Load Wheel Size						1st Dash Number Collapsed Height/Lift Height									
Part Number	100 X 105 mm (4.0 x 4.12 in)	125 X 70 mm (5.0 X 2.88 in)	125 X 105 mm (5.0 X 4.12 in)	150 X 70 mm (6.0 X 2.88 in)	150 X 105 mm (6.0 X 4.12 in)	265 X 115 mm (10.5 X 4.5 in)	2260/5025 mm (89/198 in)	2415/5535 mm (95/198 in)	2720/6100 mm (107/240 in)	3025/6860 mm (119/270 in)	3325/7620 mm (131/300 in)	3555/8155 mm (140/321 in)	3785/8660 mm (149/341 in)	4065/9300 mm (160/366 in)	4370/10160 mm (172/400 in)	4520/10695 mm (178/421 in)
128899-	X						304	305	306	307	308	309				
128899-		X					204	205	206	207	208	209	220	221	222	223
128899-			X				404	405	406	407	408	409	420	421	422	423
128899-						X	504	505	506	507	508	509				
129030-				X								109	120	121	122	123
129030-					X							209	220	221	222	223
Note: The second dash number is the same as the truck's inside straddle dimension 863 thru 1550 mm (34 thru 61 in).																

INDEX 8 - Mainframe (Non-removable Outrigger Ends) (Tapered with side shift only) (RR5200/5200S (AC) 2040 kg (4500 lb) Capacity)																
	Load Wheel Size					1st Dash Number Collapsed Height/Lift Height										
Part Number	100 X 105 mm (4.0 x 4.12 in)	125 X 70 mm (5.0 X 2.88 in)	125 X 105 mm (5.0 X 4.12 in)	150 X 70 mm (6.0 X 2.88 in)	150 X 105 mm (6.0 X 4.12 in)	2260/5025 mm (89/198 in)	2415/5535 mm (95/198 in)	2720/6100 mm (107/240 in)	3025/6860 mm (119/270 in)	3325/7620 mm (131/300 in)	3555/8155 mm (140/321 in)	3785/8660 mm (149/341 in)	4065/9300 mm (160/366 in)	4370/10160 mm (172/400 in)	4520/10695 mm (178/421 in)
128899-	X					804	805	806	807	808	809				
128899-		X				704	705	706	707	708	709	720	721	722	723
128899-			X			904	905	906	907	908	909	920	921	922	923
129030-				X								320	321	322	323
129030-					X							420	421	422	423
Note: The second dash number is the same as the truck's inside straddle dimension 863 thru 1550 mm (34 thru 61 in).															

INDEX 72 and 90 - 2nd and 3rd Stage Mast (RR5200/5200S (AC) 2040 kg (4500 lb) Capacity)											
		1st Dash Number Collapsed Height/Lift Height									
Index Number	Part Number	2260/5025 mm (89/198 in)	2415/5535 mm (95/198 in)	2720/6100 mm (107/240 in)	3025/6860 mm (119/270 in)	3325/7620 mm (131/300 in)	3555/8155 mm (140/321 in)	3785/8660 mm (149/341 in)	4065/9300 mm (160/366 in)	4370/10160 mm (172/400 in)	520/10695 mm (178/421 in)
72	123233-	004	005	006	007	008	009	010	011	012	013
90	127877-	004	005	006	007	008	009	010	011	012	013
Note: The second dash number is the same as the truck's inside straddle dimension 863 thru 1550 mm (34 thru 61 in).											

INDEX 72 and 90 - 2nd and 3rd Stage Mast (RR5200/5200S (AC) 2040 kg (4500 lb) Capacity)										
		1st Dash Number Collapsed Height/Lift Height								
Index Number	Part Number	2260/5025 mm (89/198 in)	2415/5535 mm (95/198 in)	2720/6100 mm (107/240 in)	3025/6860 mm (119/270 in)	3325/7620 mm (131/300 in)	3555/8155 mm (140/321 in)	3785/8660 mm (149/341 in)	4065/9300 mm (160/366 in)	4370/10160 mm (172/400 in)
72	123233-	004	005	006	007	008	009	010	011	012
90	127762-	004	005	006	007	008	009	010	011	012
Note: The second dash number is the same as the truck's inside straddle dimension 863 thru 1550 mm (34 thru 61 in).										

RR5200S/5200S(AC) 2040kg (4500 lb.) CAPACITY

Index	Part No.	Load Wheel Size: 100 x 105mm/4.0 x 4.12 in.	125 x 70mm/5.0 x 2.88 in.	125 x 105mm/5.0 x 4.12 in.	150 x 70mm/6.0 x 2.88 in.	150 x 105mm/6.0 x 4.12 in.	265 x 115mm/10.5 x 4.5 in.	1st Dash No. Collapsed Height/Lift Height: 2260/5025mm 89/198 in.	2415/5335mm 95/210 in.	2720/6100mm 107/240 in.	3025/6860mm 119/270 in.	3325/7620mm 131/300 in.	3555/8155mm 140/321 in.	3785/8660mm 149/341 in.	4065/9300mm 160/366 in.	4370/10160mm 172/400 in.	*2nd Dash No.
4	Non-removable Outrigger Ends																34 thru 61
	129309-	X						**304**	**305**	**306**	**307**	**308**	**309**				
	129309-		X					**204**	**205**	**206**	**207**	**208**	**209**	**210**	**211**	**212**	
	129309-			X				**404**	**405**	**406**	**407**	**408**	**409**	**410**	**411**	**412**	
	129309-						X	**504**	**505**	**506**	**507**	**508**	**509**				
	129310-				X								**109**	**110**	**111**	**112**	
	129310-					X							**209**	**210**	**211**	**212**	
	Non-removable Outrigger Ends (Tapered w/side shift only)																
	129309-	X						**804**	**805**	**806**	**807**	**808**	**809**				
	129309-		X					**704**	**705**	**706**	**707**	**708**	**709**	**710**	**711**	**712**	
	129309-			X				**904**	**905**	**906**	**907**	**908**	**909**	**910**	**911**	**912**	
	129310-				X									**310**	**311**	**312**	
	129310-					X								**410**	**411**	**412**	
	Removable Outrigger Ends																
	129291-	X						**304**	**305**	**306**	**307**	**308**	**309**				
	129291-		X					**204**	**205**	**206**	**207**	**208**	**209**	**210**	**211**	**212**	
	129291-			X				**404**	**405**	**406**	**407**	**408**	**409**	**410**	**411**	**412**	
	129310-				X									**610**	**611**	**612**	
	129310-					X								**710**	**711**	**712**	
	Removable Outrigger Ends (Tapered w/side shift only)																
	129291-	X						**804**	**805**	**806**	**807**	**808**	**809**				
	129291-		X					**704**	**705**	**706**	**707**	**708**	**709**	**710**	**711**	**712**	
	129291-			X				**904**	**905**	**906**	**907**	**908**	**909**	**910**	**911**	**912**	
	129310-				X									**810**	**811**	**812**	
	129310-					X								**910**	**911**	**912**	
45	**129068-**							**004**	**005**	**006**	**007**	**008**	**009**	**010**	**011**	**012**	
55	**129059-**							**004**	**005**	**006**	**007**	**008**	**009**	**010**	**011**	**012**	

*** The 2nd dash number is the same as the truck's inside straddle dimension in inches.**

125 mm (5 in) O.D. Tandem Load Wheels

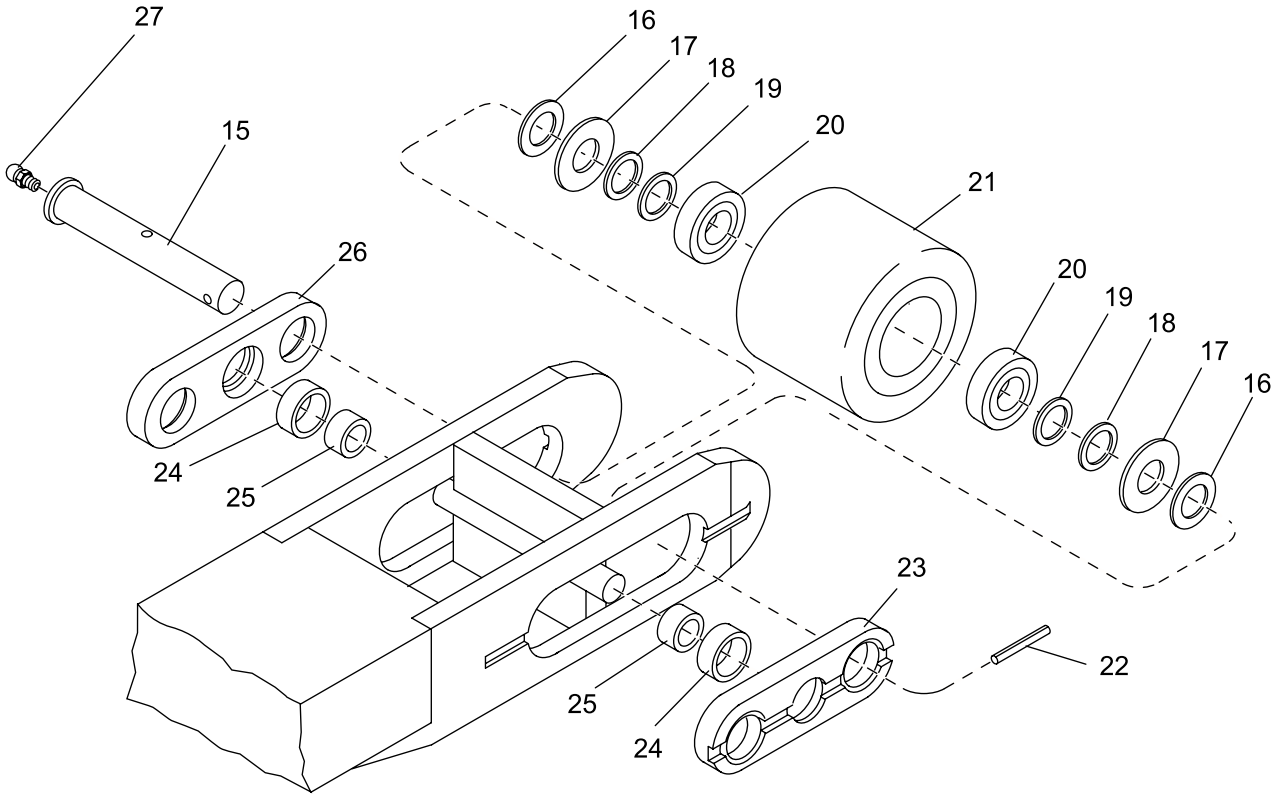
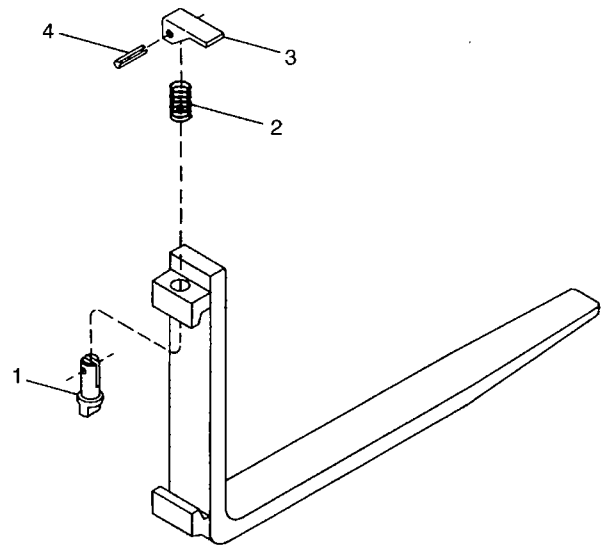


Figure 13102-02

Index	Part No.	Part Name	No. Req.
1	103443	Pin	1
	103442	Pin Bundle Includes Index 1 thru 4	1
2	104329	Spring	1
3	075248	Handle	1
4	060000-061	Pin Roll	1

Always Specify Model, Data & Serial Numbers



The Fork Assemblies Below Include Index 1 Thru 4

Series	Capacity	Fork Assembly Part Number		
		075324-	094182-	*088228-
W 4.0	3000 lbs. (1360 kg)	X		
	4000 lbs. (1815 kg)		X	
WB 5.0	1000 - 3000 lbs. (455 - 1360 kg)	X		
	4000 lbs. (1815 kg)		X	
WR 8.0	2000 - 3000 lbs. (910 - 1360 kg)	X		
RC 10.0, RC 3000	3000 lbs. (1360 kg)	X		X
	3500 - 4000 lbs. (1585 - 1815 kg)		X	X
SC 11.0, SC 4000	3000 lbs. (1360 kg)	X		X
	3500 - 4000 lbs. (1585 - 1815 kg)		X	X
RR 14.0, 3000, RR 3500, 5000 5200	3500 - 4500 lbs. (1585 - 2040 kg)		X	X
RS 15.0, 3000, RS 3500	4000 lbs. (1815 kg)		X	X
RD 16.0, 3000, RD 3500, 5000, 5200	3000 lbs. (1360 kg)	X	X	X

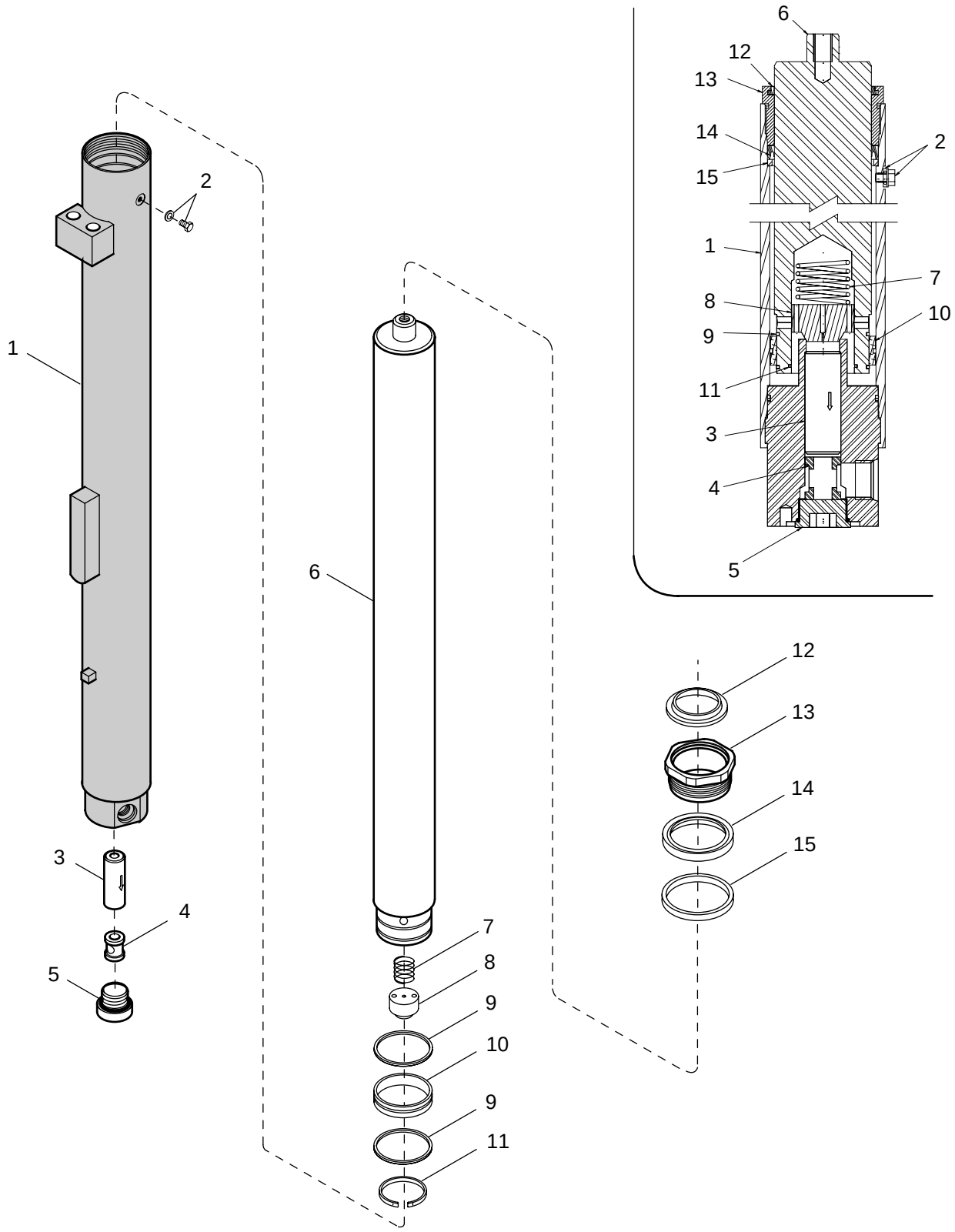
*** Polished Fork (Full Taper)**

Fork Length	Fork Assembly Part Number		
	075324-	094182-	*088228-
760 mm (30 in.)	1	1	1
915 mm (36 in.)	2	2	2
990 mm (39 in.)	6	6	6
1065 mm (42 in.)	3	3	3
1145 mm (45 in.)	5	5	5
1220 mm (48 in.)	4	4	4
1370 mm (54 in.)	†7	†7	†7
1525 mm (60 in.)	†8	†8	†8

† Not Used On RR, RS, RD

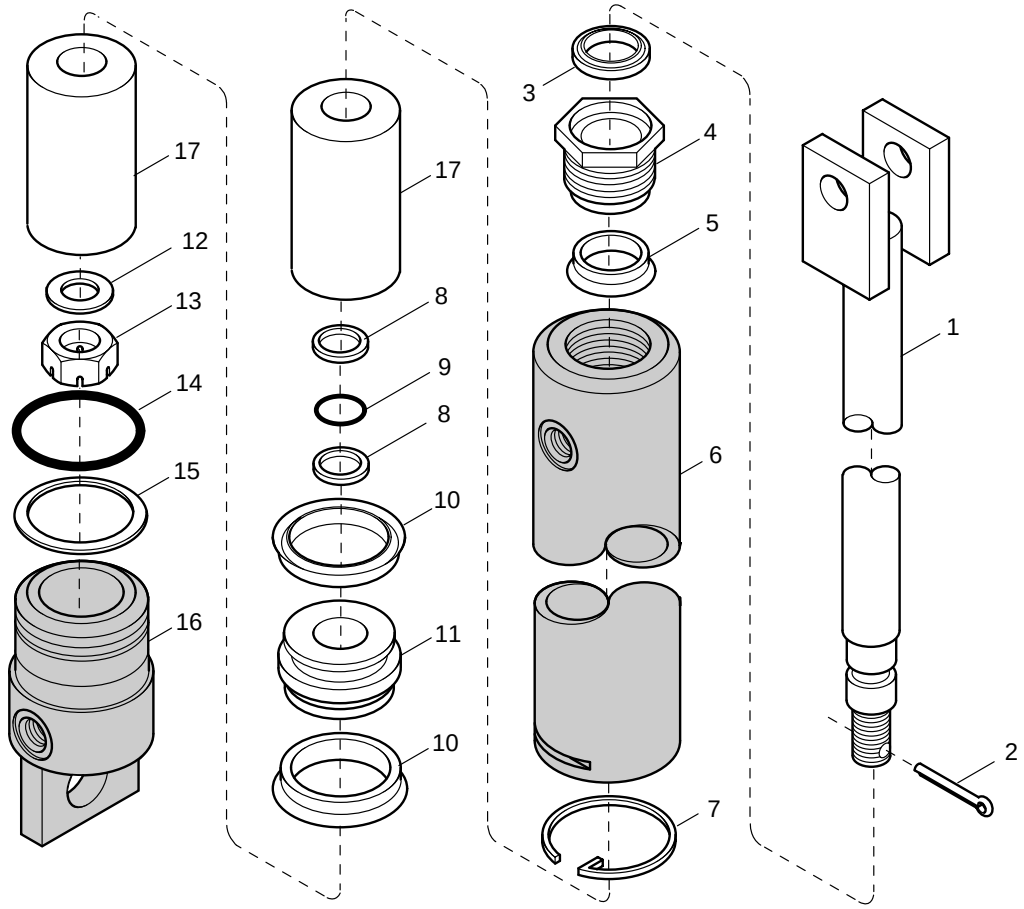
5829

RR/RD 5200/5200S



5835

RR/RD 5200/5200S

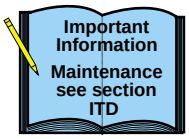


093559-002 CYLINDER - 100 mm (4.0 in.) SIDESHIFT (TT)
093559-004 CYLINDER - 50 mm (2.0 in.) SIDESHIFT (TT)

Index	Part No.	Part Name	No. Req.
1	085130-002	Rod 100 mm (4.0 in.) Sideshift	1
	085130-004	Rod 50 mm (2.0 in.) Sideshift	1
2	060038-005	Pin Cotter	1
3	064069-007	Ring Wiper	1
4	083397	Adjustor Seal	1
	061004-023	Adhesive Thread Lock	1
5	064132-011	Packing Rod	1
6	085262	Tube Cylinder	1
7	073981-009	Ring Retaining	1
8	064074-004	Ring Back-Up	2
9	064019-025	O-Ring	1
10	064133-005	U-Cup Piston	2
11	085132	Piston	1
12	060030-041	Flatwasher	1
13	060021-044	Nut Slotted Hex	1
14	064019-006	O-Ring	1
15	064074-018	Ring Back-Up	1
16	093558	Chamber Cushion	1
17	088587	Spacer 50 mm (2.0 in.) Sideshift Only	2
101343		Kit Seal (Includes Index 2, 3, 5, 7, 8, 9, 10, 14, & 15)	1

Always Specify Model, Data & Serial Numbers

* Choice of part number depends on mast type. Mast type information is included in the truck data number (located on truck data plate).



Truck Data Number Example

Mast Type

-TT270C36-2PSF-BS-Q--

010328

7020 - E0-4469

08.7–1452–050

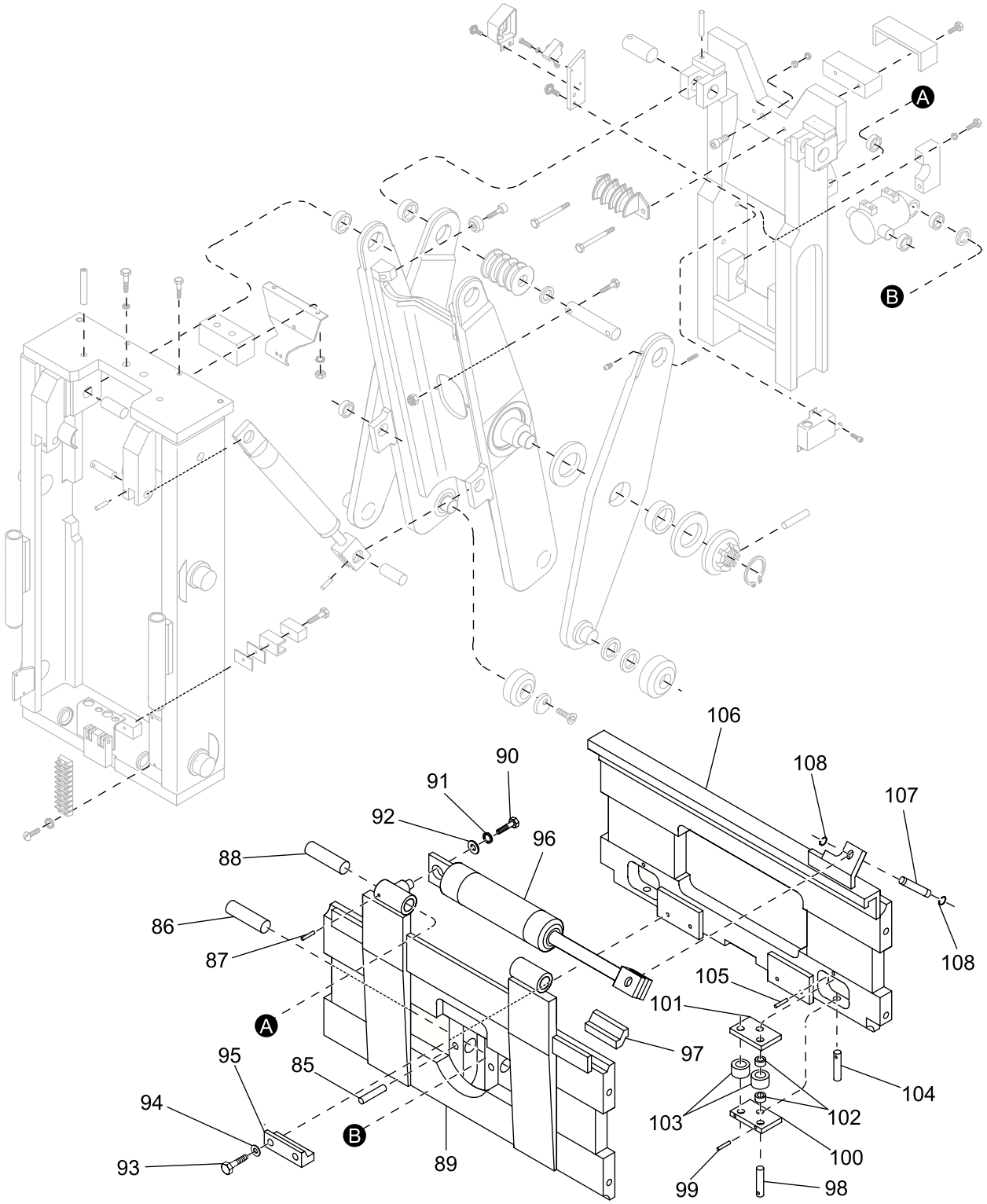


Figure 19541

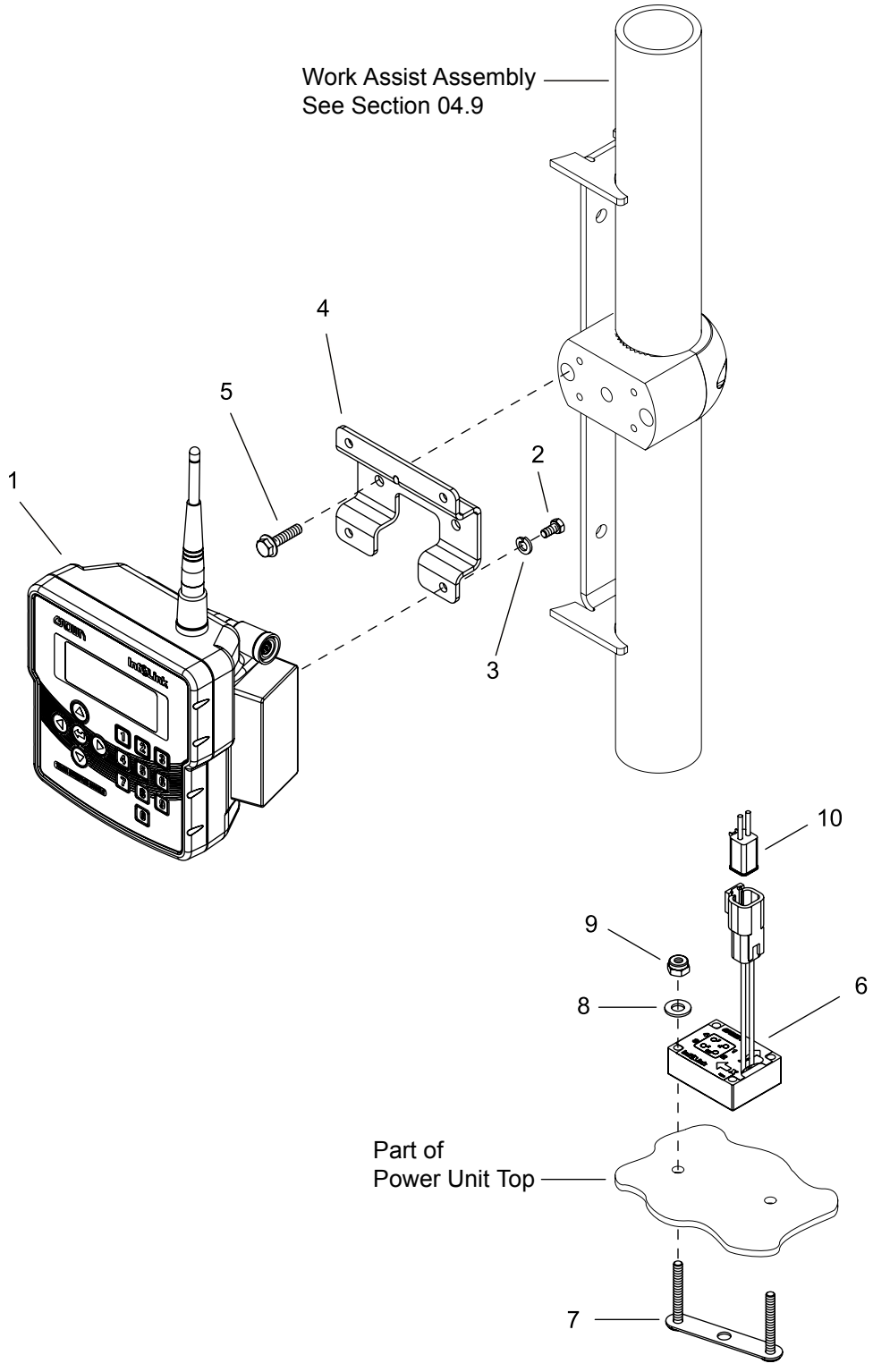
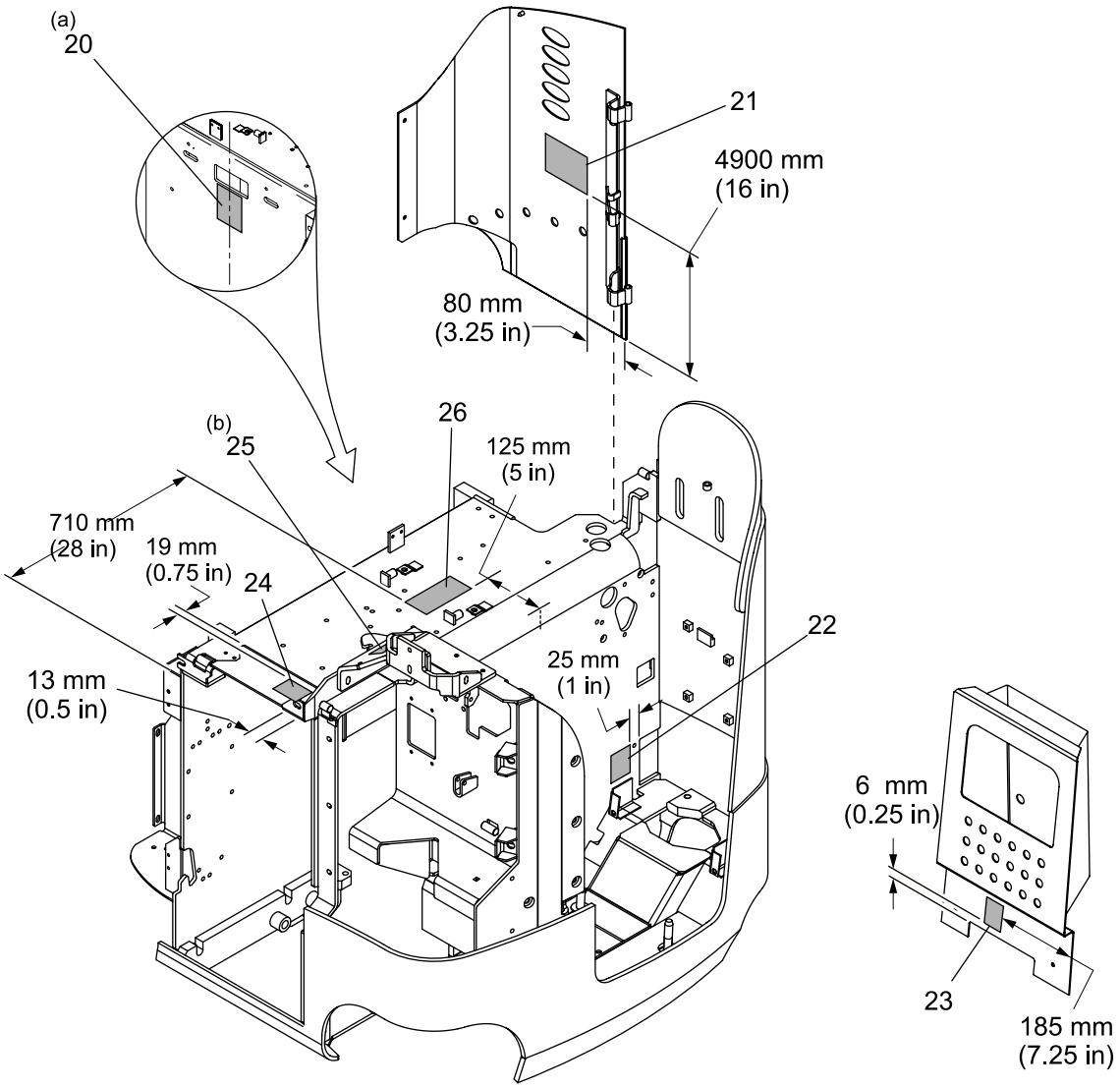


Figure 16023



(a) Decal is centered on power unit front just below slot

(b) Centered on angled side

Figure 20282