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

OPERATOR INSTRUCTIONS

This manual does not contain operation instructions. Operator Instructions in tag or booklet form are sent with each truck. Additional copies can be ordered if required. These booklets are for you and your personnel to insure years of safe, trouble-free operation of your Crown Lift Truck. For PE 4000 Series operator instructions, refer to Crown publication, "You and Your Crown Rider Pallet Truck" (PF14182).

DRIVER TRAINING

Crown has available a complete series of Driver Training programs, in two parts concerning basic safety rules and operating characteristics of your truck. To obtain this information, ask your Crown Dealer about "Its up to You" and "You and Your Crown Rider Pallet Truck".

SERVICE TRAINING

Complete Service Training is available to the lift truck mechanic covering all Crown Lift Trucks, wire guidance, hydraulic and electrical systems. To obtain more information concerning service training, contact your Crown Dealer.

REPLACEMENT PARTS

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

For PE 4000 Series capacities, technical information and dimensional specifications, please refer to the following sales literature:

PE 4000 Literature	SF
PE 4000 Specifications	SF14291

Copies of publications can be obtained from your Crown dealer or by writing to:

Crown Equipment Corporation
44 S. Washington Street
New Bremen, OH 45869

This manual is arranged according to major sections. The first part of the page number, found at the bottom of each page, denotes the section in which a particular form will be located. The first portion of the manual covers the written maintenance. The later portion covers replacement parts. The sectional descriptions are as follows:

MAINTENANCE

SECTION	DESCRIPTION
M1	Lubrication and Adjustments
M2	Hydraulics
M3	Drive Unit
M4	Electrical
M5	Brake
M7	Fork
M8	Cylinder
M10	Glossary

REPLACEMENT PARTS

SECTION	DESCRIPTION
1	Power Unit
2	Hydraulic System and Components
3	Drive Unit and Components
4	Electrical Components
5	Brake Assemblies and Brake Systems
7	Lift Structure
8	Cylinders
10	Accessories
11	Specifications

HYDRAULIC

WARNING

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

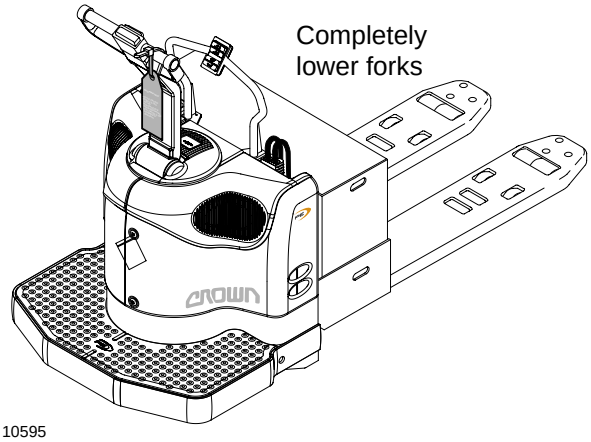
Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had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

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

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

2. Completely lower load engaging means or, if required for maintenance, block truck at appropriate height as described in Lifting and Blocking of this section.

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



10595

Notes:

LUBRICATION CHART

INDEX	COMPONENT	LUBE TYPE	QTY.	30 days 100 hr.	60 days 250 hr.	90 days 500 hr.	6 months 1000 hr.	12 months 2000 hr.
* L-1	Caster Wheels (4 points) Quick Adjustment Caster (12 points), Quick Adjustment Caster w/Torsion Bar (14 points)	F	AR		L			
* L-2	Lower Linkage Pivot Pins (4 points)	F	AR		L			
* L-3	Power Unit Pivot (2 points)	F	AR		L			
* L-4	Drive Unit Level	A	1.65 ltr. (3.5 pt.)		†	†	†	Chg.
* L-4	Drive Unit Drain Plug							
L-5	Drive Unit Rollers (4 points)	F	AR		L			
* L-6	Brake Linkage	C	AR		†			
L-7	Drive Unit Pivot (1point)	F	AR		L			
L-8	Handle Torsion Springs	BB	AR		L			
L-9	Upper Lift Linkage (4 points)	F	AR		L			
L-10	Manual coast selector linkage, Yoke Roller Bearing and Double Springs	BB	AR		L			

† - Check Chg. - Change L - Lubricate AR - As Required

See Lube Type Chart for explanation. Lubrication intervals for Freezer/Corrosion trucks must be changed to a frequency that will minimize corrosion and wear on moving shafts and parts.

* Freezer/Corrosion Trucks – use low temperature (BB) grease on load wheels and caster wheels. Use type F grease on all other lift linkage and caster pivot points.

M1.0–6540–004

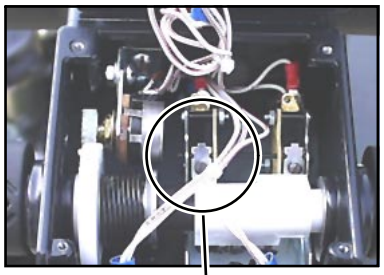
FS
Forward Travel Switch

Location: handle control pod.

Purpose: signals MRC1 for selection of forward travel.

Data: momentary contact wired normally open, actuated when operator moves twist grip to forward travel position.

Adjustment: none required.



10737P

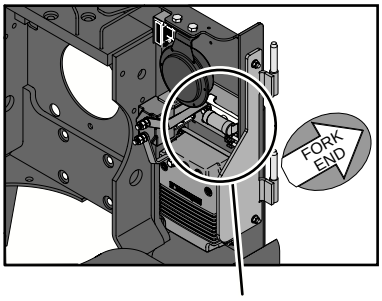
FU1
Traction Motor Power Fuse

Location: R.H. side of power unit.

Purpose: protect traction motor and associated wiring from overcurrent.

Data: ACK - 175.

Adjustment: none required.



10739

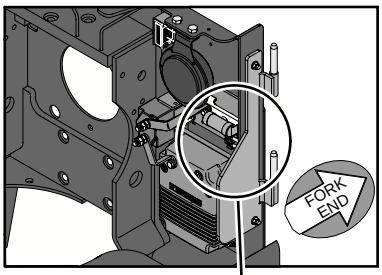
FU2
Control Circuitry Fuse

Location: R.H. side of power unit.

Purpose: protect control circuitry from overcurrent.

Data: ABC - 15.

Adjustment: none required.



10740

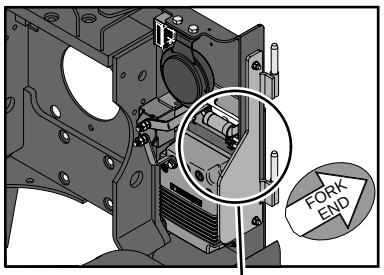
FU3
Accessories

Location: R.H. side of power unit.

Purpose: protect optional accessories and associated wiring from overcurrent.

Data: ABC - 15.

Adjustment: none required.



10741

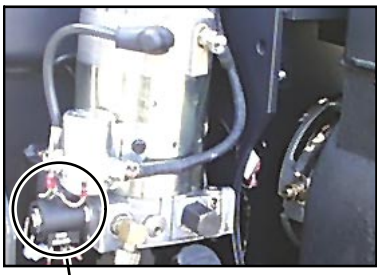
SV1
Lower Solenoid

Location: lift pump and motor assembly L.H. side.

Purpose: lower forks by providing path for hydraulic fluid to reservoir.

Data: 24 volt coil. Coil contains internal suppression diode and is polarity sensitive.

Adjustment: none required.



10795P

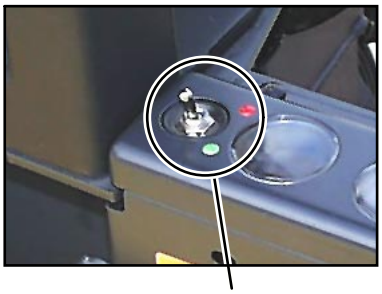
On/Off Toggle Switch

Location: meter console.

Purpose: allows operator to power truck up and shut truck down.

Data: 2 position, maintained contact.

Adjustment: none required.



10796P

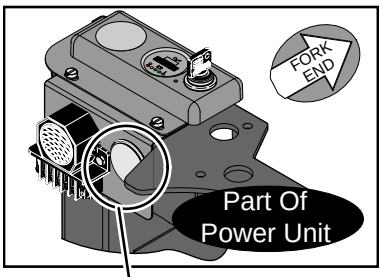
TT2
Internal Operating Time Hour Meter

Location: meter console.

Purpose: record operating time of truck.

Data: not applicable.

Adjustment: none required.



10797

Rod U-Cup Installation

1. Installation Tool
   An installation tool made of any soft metal or hard plastic machined smooth and free of burrs with a fixed steel pin (PIN 1) and two movable pins (PINS 2 & 3) is required for this installation method.

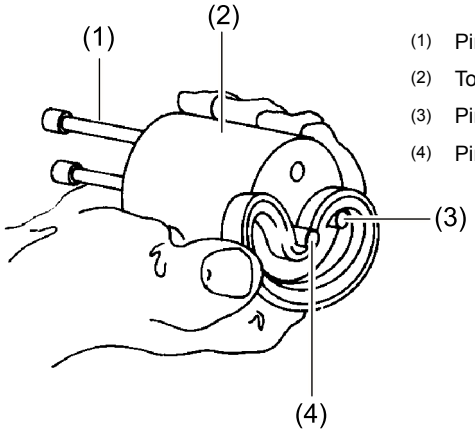


Figure 16890

2. Installation Procedure

   – Slip U-cup over the fixed pin see Figure 16890, pin 1 and bend it over pin 2 as shown.

   – Continue bending U-cup until pin 3 can be pushed through the U-cup loop which locks U-cup in position.

   – Insert installation tool with mounted U-cup into cylinder bore until aligned with U-cup installation groove. See Figure 16891.

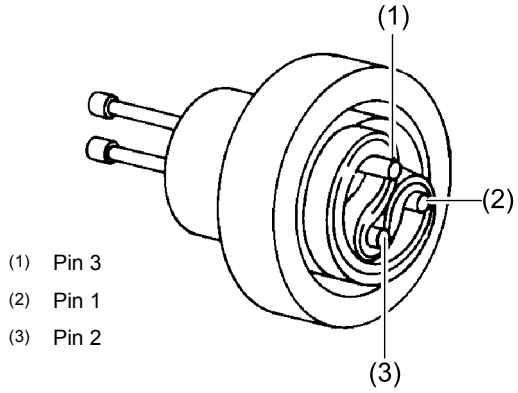


Figure 16891

– Withdraw pin 3 so that U-cup loop snaps into installation groove see Figure 16892.

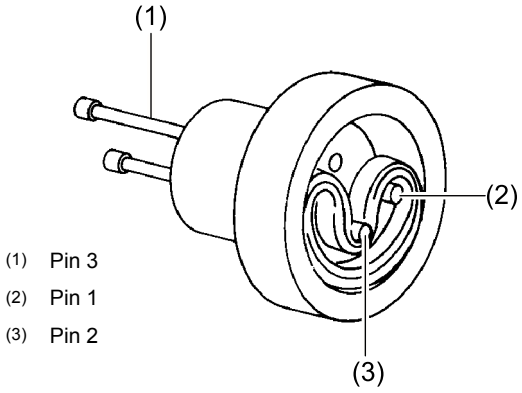


Figure 16892

– Withdraw pin 2 and U-cup will completely snap into installation groove see Figure 16893.

– Withdraw installation tool.

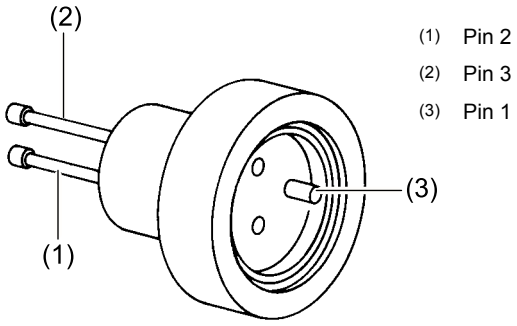
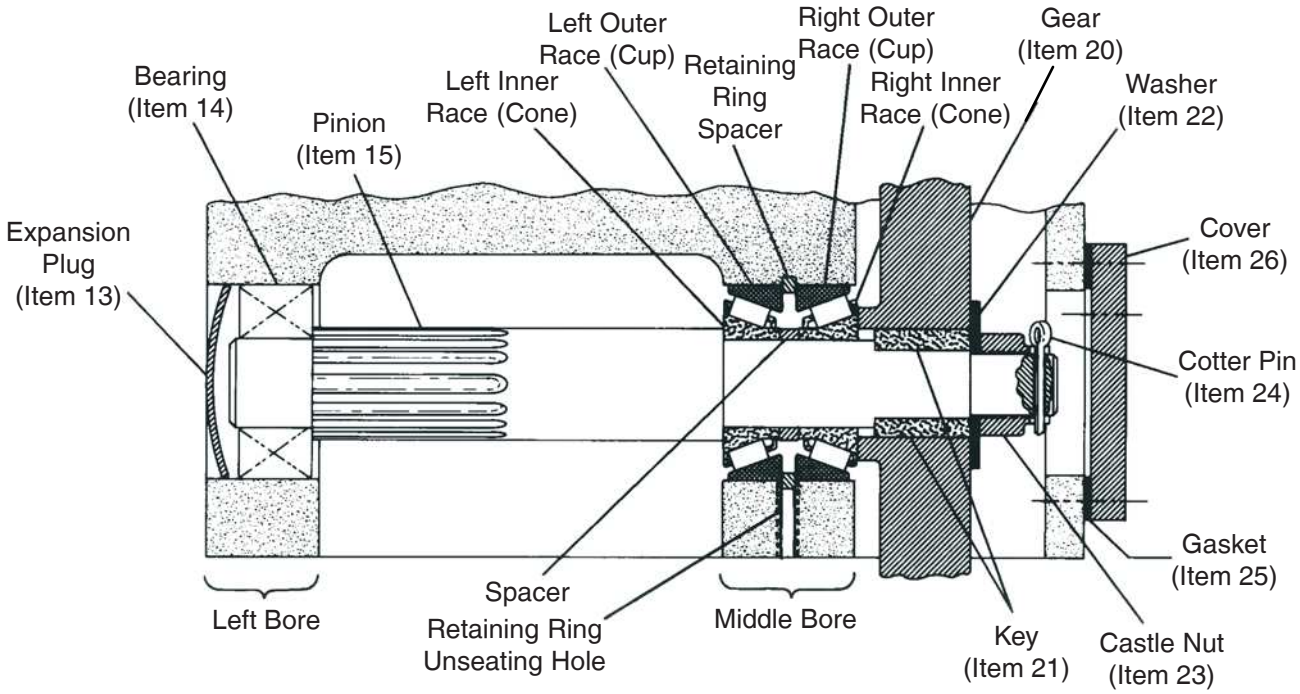


Figure 16893



Drive Unit Assembly

Figure 3395

NOTE

If the upper or lower housings were replaced, before proceeding with assembly, check the housings for burrs or casting slag. Also, the area where the lower part of the motor mounting plate rests in the upper drive unit housing should be checked, and ground if necessary, to assure a proper fit. After inspection and grinding, thoroughly clean the housings in solvent and blow dry.

UPPER HOUSING

With the upper housing (item 16) in the same relative position as the housing in Figure 0060S-01, install the lower grommet (item 9) into the neck of the housing.

Preassemble the key (item 31) and the gear (item 30) onto the motor (item 11). After the components are in position, insert the retaining ring (item 29) into its groove on the end of the motor shaft.

Apply a light film of multi-purpose grease (063002-025) to the face of the motor and place the gasket (item 10) onto the greased mounting face. Insert the complete motor assembly into the housing and secure the fasteners.

NOTE

Two bolts fasten from the inside of the housing and two bolts fasten from the outside. When tightening these bolts, follow a diagonal tightening procedure to insure proper motor seating.

Grease the motor shaft and its bore and install the oil seal (item 32). Refer to Drive Motor Shaft Seal Replacement.

With the use of an arbor press, force the left outer cup of the bearing (item 19) into the middle pinion bore (See Figure 0060S-01). This bearing includes two inner bearing cones, two outer bearing cups, a spacer and a retaining ring spacer.

After the left outer race has been pressed slightly past the groove, install the retaining ring spacer.

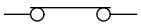
Slide the pinion shaft (item 15) through the left bore. Install the left inner race and spacer onto the right side of the pinion shaft prior to the shaft entering the middle bore.

Move the shaft through the middle bore to a position where the right inner race, right outer race and the gear (item 20) can be installed.

Once installed, force the pinion completely in and insert the two keys (item 21) into the gear.

Slide the bearing (item 14) and the expansion plug (item 13) in place on the left bore before installing the washer (item 22) and the castle nut (item 23) on the opposite end of the pinion shaft (item 15).

Tighten the castle nut (item 23) to 203 - 271 Nm (150 to 200 ft/lbs), then insert the cotter pin (item 24). Bolt the cover (item 26) and the gasket (item 25) to the right side of the upper housing and insert the filler plug (item 28) into the cover.

Examples (All Momentary)		
	With Common (Transfer)	Without Common (Double Break)
Wired normally open, held open	 Figure 8119-01	 Figure 8120-01
Wired normally open, held closed	 Figure 8122	Figure 8123
Wired normally closed, held open	 Figure 8115-01	 Figure 8117-01
Wired normally closed, held closed	 Figure 8124	 Figure 8125

How the Switch is Activated

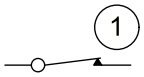
If it is necesary to include how the switch is mechanically actuated, a note will be added to the drawing (example: operator, lever or truck actuated, etc.)

Application

Switch application is conveyed through the abbreviation (example: HTS = Height Switch 120 in., DTS = Drive/Tow Switch).

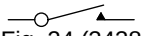
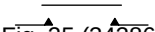
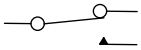
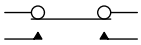
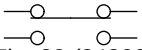
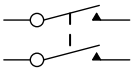
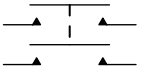
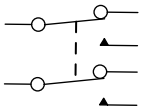
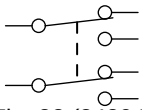
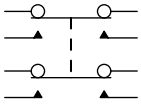
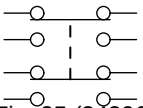
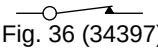
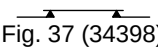
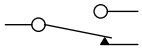
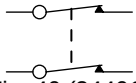
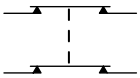
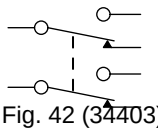
Notes:

- In a schematic, the condition of a circuit is defined using a note (example: vehicle shown fully lowered with no operator on vehicle).
- Positive action switches are marked with the following symbol:



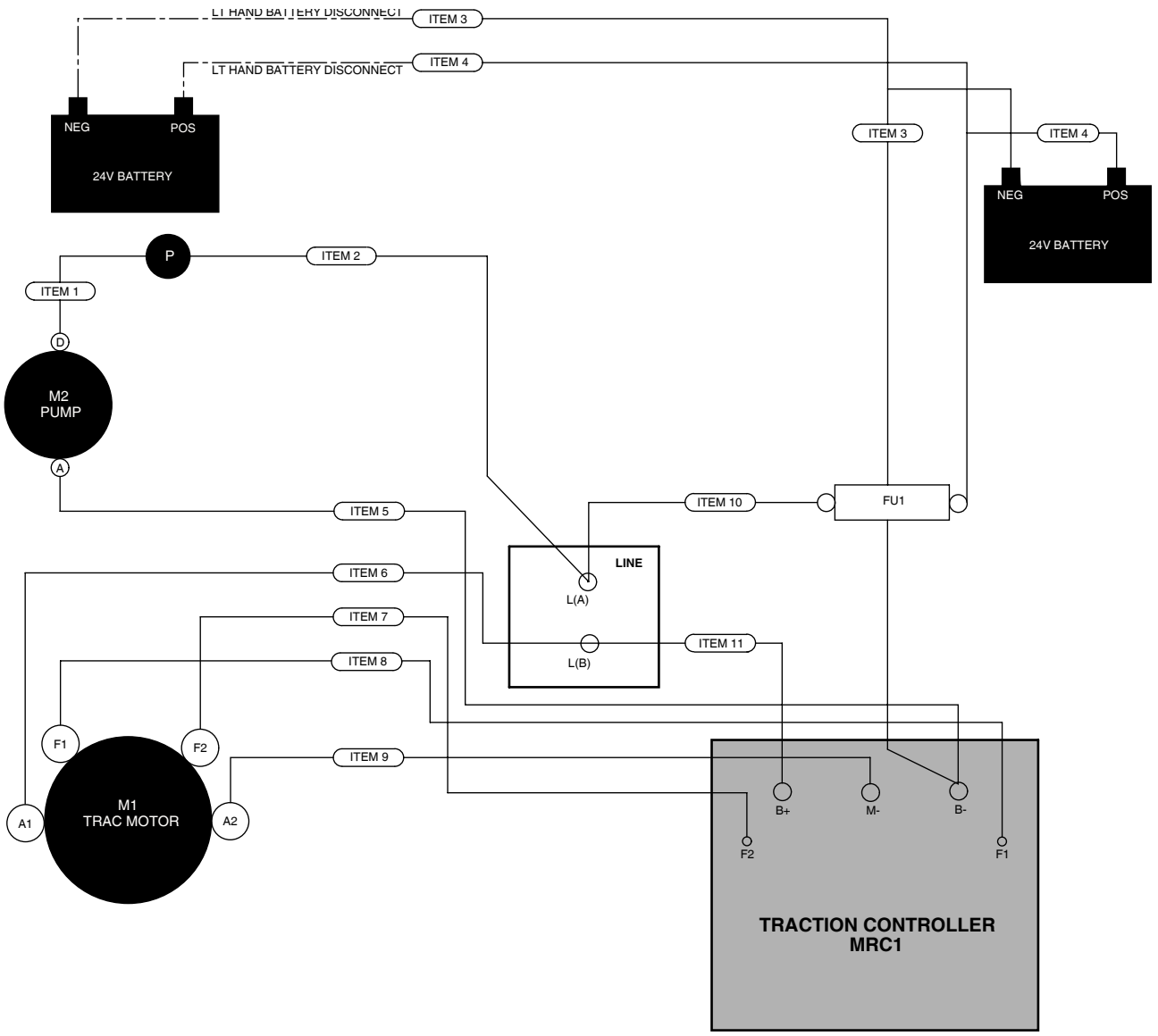
8126-02

Switch symbols (Switches that operate mechanically)

Switch Symbols						
Actuation	Description	Number of Terminals	Momentary		Fully Maintained	
			with common	without common	with common	without common
NO	SPST	2	 Fig. 24 (34385)	 Fig. 25 (34386)		
	SPDT	3	 Fig. 26 (34387)		 Fig. 27 (34388)	
	SPDT	4		 Fig. 28 (34389)		 Fig. 29 (34390)
	DPDT	4	 Fig. 30 (34391)	 Fig. 31 (34392)		
	DPDT	6	 Fig. 32 (34393)		 Fig. 33 (34394)	
	DPDT	8		 Fig. 34 (34395)		 Fig. 35 (34396)
NOHC	SPST	2	 Fig. 36 (34397)	 Fig. 37 (34398)		
	SPDT	3	 Fig. 38 (34399)			
	SPDT	4		 Fig. 39 (34400)		
	DPDT	4	 Fig. 40 (34401)	 Fig. 41 (34402)		
	DPDT	6	 Fig. 42 (34403)			

ELECTRICAL DIAGRAMS INDEX

This electrical diagram index for the PE4000 Transistor Control, lists the diagrams with portion of truck covered by each diagram.

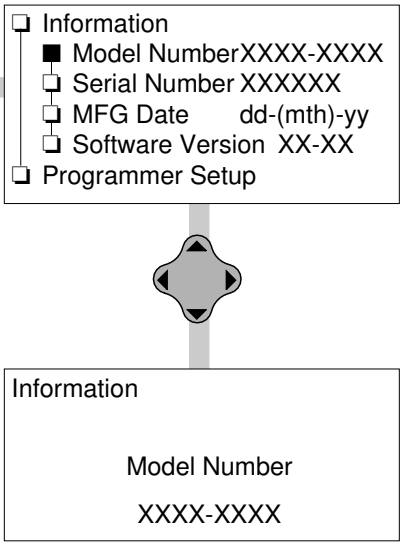


ABBREVIATION	PART
PC #4	084569
PC #2	084570
PC #1	084571
PC #1/0	084572

ITEM	PART NO. RIGHT HAND BATTERY DISCONNECT SB175	PART NO. LEFT HAND BATTERY DISCONNECT SB175	PART NO. RIGHT HAND BATTERY DISCONNECT SB350	PART NO. LEFT HAND BATTERY DISCONNECT SB350
1	094297	094297	094297	094297
2	084569-242	084569-242	084569-242	084569-242
3	084571-270	084571-272	084572-269	084572-271
4	084571-269	084571-271	084572-268	084572-270
4	EE ONLY 084571-252	EE ONLY 084571-275	---	---
5	084569-243	084569-243	084569-243	084569-243
6	084570-228	084570-228	084570-228	084570-228
7	090963-041	090963-041	090963-041	090963-041
8	090963-040	090963-040	090963-040	090963-040
9	084570-227	084570-227	084570-227	084570-227
10	130616	130616	130616	130616
11	130615	130615	130615	130615

Information Menu

From page M4.2-6540-402



Event 23 is an HPD High throttle disable. This event code is shown only by the 1404C Control Module status light blinking a 23 or the wrench light on the Spyglass blinking. The HPD event looks and acts like a SRO.

Event Code 23

Step 1: Determine if operator is operating truck out of the proper sequence such as turning the throttle before handle is in operating position.

If: HPD event.
Instruct operator in proper sequence of the truck.

If: The truck is going into an improper HPD.
Then proceed with step 2.

Step 2: With the battery connected and key switch on, check voltage at pin 16 of CA404 (controller) using B- on the controller for the negative reference. (Caution: leave handle in full upright brake position to prevent truck movement).

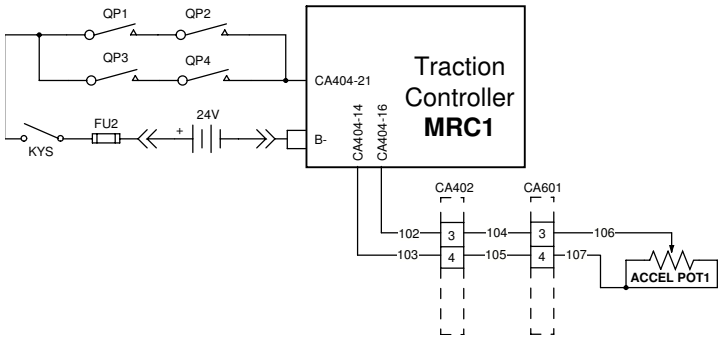
If: The voltage is less than 2.2 volts.
Then the pot is out of adjustment and needs to be adjusted.

If: The voltage is between 2.2 and 4.4 volts.
Then proceed with step 3.

Step 3: Ensure the quickpick switches are not stuck closed or the operator is not engaging quickpick before the handle is in operating position.

If: Quickpick switches are stuck and voltage is between 2.2 and 4.4 volts.
Then replace or readjust switches.

If: Switches are not stuck.
Then check harnesses for pinched wires in the potentiometer and quickpick circuit.



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Event 46 is Forward (FS) and Reverse (RS) switches simultaneously closed. **Event Code 46**

Step 1: Determine if FS and RS are misadjusted so both are closed simultaneously.

If: Switches are misadjusted.
Then readjust switch. See section M4.5 of the service manual for direction switch adjustment.

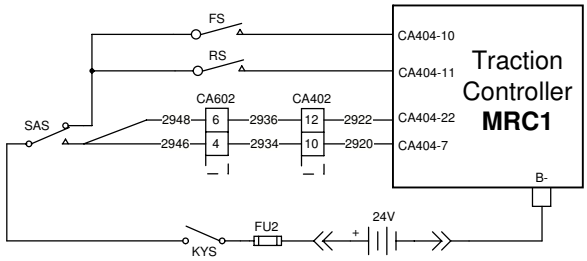
If: Switches are not misadjusted.
Then ensure that the switches are in good working order.

If: Switches are worn or damaged
Then replace switches.

If: Switches are OK.
Then proceed with step 2.

Step 2: Determine if FS or RS wires are shorted.

If: Wires are shorted to one switch.
Then fix or replace harness.



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Component Replacement

Refer to Figure 12402S and Parts Section of manual when replacing components.

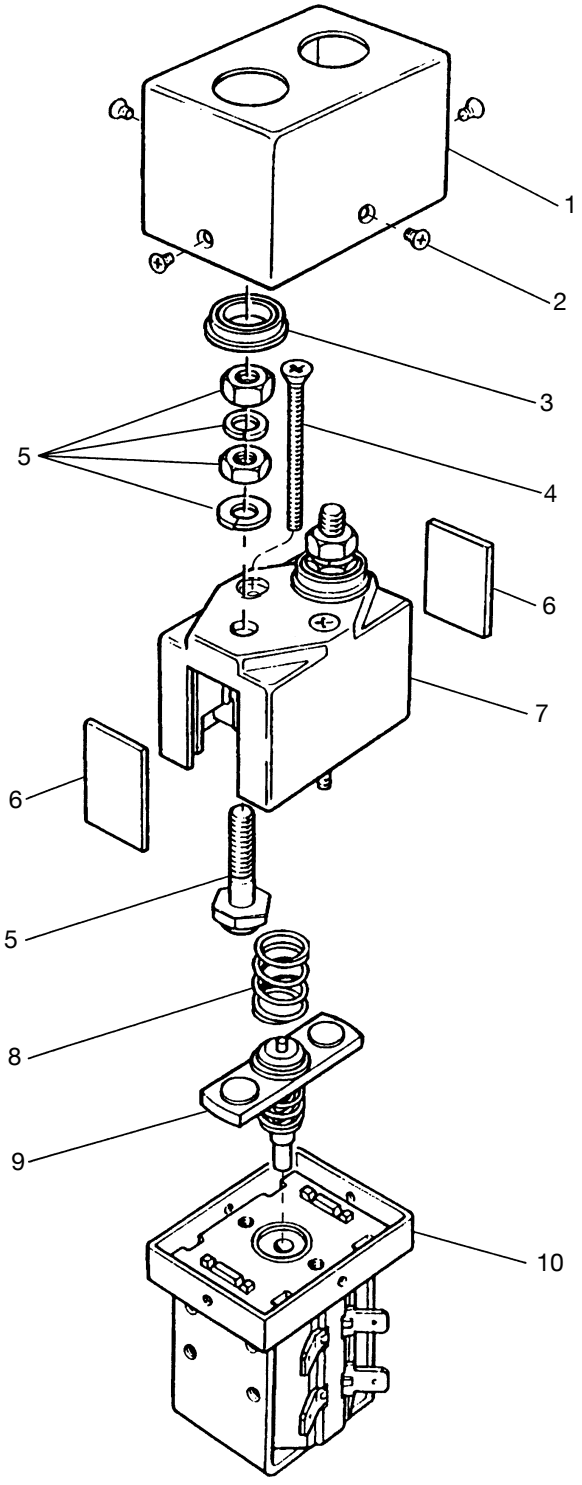

Figure 12402S

Contact Replacement

Disconnect electrical wiring to contactor. Remove two mounting bolts from bracket and remove contactor from truck. Remove shroud (Index 1) by removing four screws (Index 2). Remove two screws (Index 4) from top of contactor and remove contact assembly from coil assembly. Disassemble and replace contacts as necessary.

Reassemble contacts. Place contact assembly on coils and fasten securely with two screws (Index 4), replace shroud & screws (Index 1 & 2). Install contactor in truck and connect wiring.

Coil Replacement

Disconnect all electrical wiring from contactor. Remove two mounting bolts from mounting bracket and remove contactor from truck. Remove shroud (Index 1) by removing four screws (Index 2). Remove two screws (Index 4) and separate contact assembly from coil assembly. Remove mounting bracket from coil.

Reconnect mounting bracket to replacement coil. Transfer plunger (Index 9) from coil being replaced to replacement coil. Reassemble contact assembly to coil assembly and secure with two screws (Index 4), replace shroud & screws (Index 1 & 2). Mount contactor on truck and reconnect all electrical wiring.

Cams, Torsion Spring, Stop (Refer To Illustrations 7 & 8)

Drive roll pins from each end of right hand twist grip. Slide grip in hole of yoke to access extension on end of twist grip. Remove extension from grip and remove grip from yoke. Slowly slide the square shaft from assembly. Make note of physical arrangement of components on the shaft with respect to each other and the finger lobe on the left hand grip.

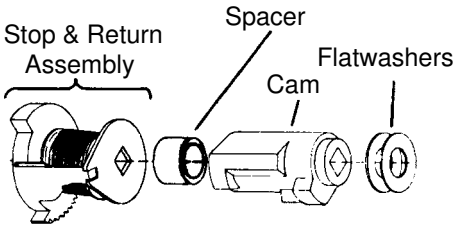

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ILLUSTRATION 7

Replace component in question. When assembling, make certain the arrows on the twist grip will be toward the top of the control pod when control handle is in operating position.

Apply grease (Crown no. 063002-025) to the inside of the torsion spring and assemble the stop, spring, collars and plate. Make certain the torsion spring is assembled on spring arm of the stop as shown in Illustration 8.

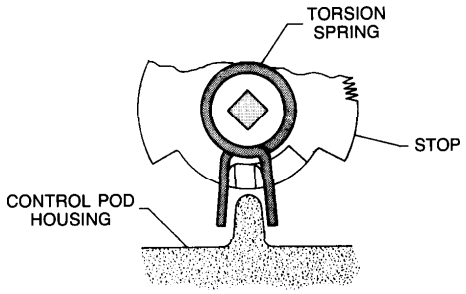

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ILLUSTRATION 8

Assemble components on shaft in control pod as noted at disassembly. Make certain torsion spring is over tab in control pod housing as shown in Illustration 8. Insert washers between cam and control pod as required to remove any lateral movement of components on the shaft.

Depending on operator preference, position right hand grip with lobe toward yoke or away from yoke (trucks are manufactured with lobe toward yoke), with arrows up and install grip in yoke. Align key on extension with slot in grip and assemble extension to grip. Align square hole in grip with square shaft and slide together. Assemble roll pins in each end of grip. Perform switch and potentiometer adjustment procedures as necessary.

Apply grease (Crown no. 063002-025) to entire torsion spring.

Install covers.

Quickpick® Controls (PE Trucks Only) (Refer To Illustration 9)

When replacing components, refer to illustration below. Switches require no adjustment. Tighten switch electrical connection screws 390-460 Nmm (55-65 inch ounces).

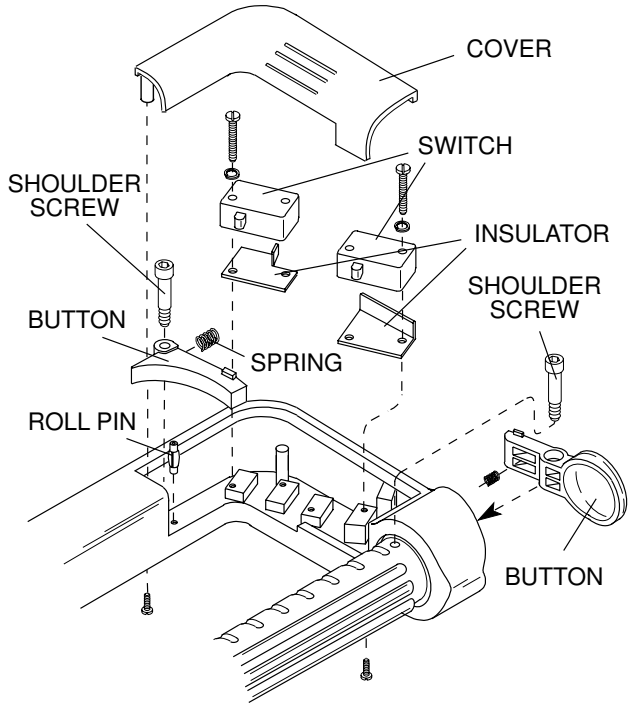

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ILLUSTRATION 9

BRAKE SWITCH ADJUSTMENT

Adjust the screw which actuates the brake switch to a length that will actuate the switch at a point when the horizontal center line of the twist grips is approximately at the following dimension from the floor.

SWITCH ADJUSTMENT CHART

SERIES	APPROXIMATE TWIST GRIP HEIGHT mm	in.
PE	1000	39.4
PW	828	32.6

Tighten jam nut to lock position of the switch actuator.

STOPPING DISTANCE ADJUSTMENT

General Notes

The brake and caster systems are adjusted at the factory to provide nominal brake and stability performance for level, smooth, dry, concrete floors and standard tire and load conditions. Upon installation, the trucks brake and stability performance should be checked to ensure acceptability. It may be necessary to modify the factory settings to properly accommodate the particular operating conditions. When a vehicle is operating over a variety of floor and load conditions, it may be impractical to adjust the brakes and casters to perform optimally for all of the different conditions.

WARNING

- *Increasing caster loading reduces load on the drive tire and therefore reduces braking effectiveness and traction.*
- *Reducing caster loading reduces stability.*

Drive tire wear or replacement as well as floor conditions will effect operating characteristics of the truck, mainly:

- *Braking/Traction*
- *Stability/Handling*
- *Steer Effort*

Floor conditions in set up area shall be consistent generally with floor conditions in the overall facility. Periodic caster adjustments may be required to maintain proper balance of these characteristics and proper operation.

Brake Spring Adjustment

Due to normal brake wear and after verifying proper shoe adjustment, it may be necessary to adjust the brake spring periodically. Using the stopping distance procedure that follows, adjust the brake spring on the drive unit to produce the desired stopping distance. Making the spring length shorter will shorten the stopping distance. If the drive tire is sliding, the stopping distance can be shortened by adjusting the casters (see section M1.5). If the stop is too abrupt, the spring length should be increased.

Stopping Distance Procedure

Check stopping distance with the truck empty on a level surface typical for the application. Travel at maximum acceleration from 0 to 15 m (50 feet) in the power unit first direction. Apply the brakes and measure the stopping distance.

TYPICAL STOPPING DISTANCE

SERIES	METERS	FEET
PE	1.2	4
PW	0.3	1

TORSION SPRING REPLACEMENT

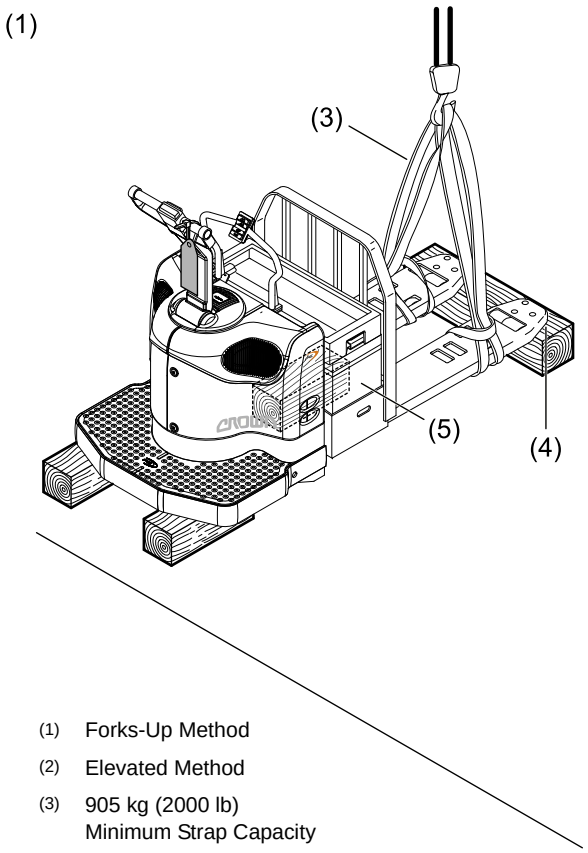
Three torsion springs located at the pivot point of the control handle keep the control handle in the vertical position when not in use. A brake cam and spacer are also located in this area that allow for proper brake operation and the routing of necessary electrical wires.

The following procedure should be used when replacing a broken spring:

Remove either end cap. Release spring tension and remove the other end cap. The pivot shaft can now be removed. Use a brass rod and mallet to remove shaft. Note spacer, spring and cam position for assembly purposes. The spacer is used to allow a path for electrical wiring to be routed from control pod to contactor panel. The cam, located to the side of the handle above the brake switch area must be secured properly to the control handle with roll pins. Any parts not properly installed will not effectively keep the handle in the vertical position when not in use.

Forks-up Method

Remove battery and place hardwood blocks under the outboard ends of the power unit skirt as shown in Figure 16936. Using an overhead lifting device equipped with a strap having a capacity of 905 kg (2000 lb), raise fork tips until they are elevated approximately 405 mm (16 in) above the floor. Securely block fork tips while leaving the lifting device attached. If lifting device must be removed, additional blocks should be placed beneath the battery compartment. Refer to Figure 16937 and remove the riser pivot shaft (index 2) after extracting roll pin (index 1). Support riser assembly by hand before completely removing the shaft, then lower the riser assembly.



(1) Forks-Up Method

(2) Elevated Method

(3) 905 kg (2000 lb) Minimum Strap Capacity

(4) Maximum Height of 405 mm (16 in)

(5) Remove Battery

(6) 4535 kg (10,000 lb) Jack Stand Capacity

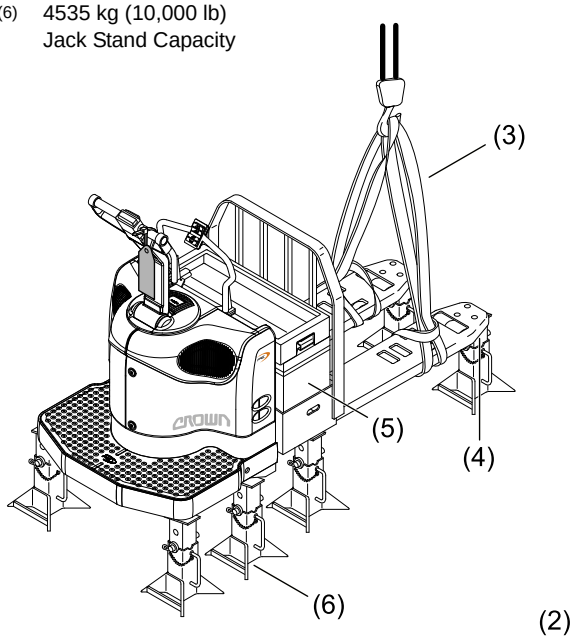


Figure 16936

FUSES	Location	Function	Diagram	Parts Breakdown
FU1	Power Unit R.H. Side	Traction	DIA–6540–002 (A-4) DIA–6540–003 (A-4) DIA–6540–007 (B-3) DIA–6540–008 (B-3) DIA–6540–011 (C-2)	04.0–6540–001 (9)
FU2	Power Unit R.H. Side	Control	DIA–6540–002 (A-4) DIA–6540–003 (A-4) DIA–6540–007 (B-3) DIA–6540–008 (B-3) DIA–6540–009 (B-4)	04.0–6540–001 (27)
FU3	Power Unit R.H. Side	Options	DIA–6540–002 (A-4) DIA–6540–003 (A-4) DIA–6540–007 (B-3) DIA–6540–008 (B-3) DIA–6540–009 (B-4)	04.0–6540–001 (16)

METERS	Location	Function	Diagram	Parts Breakdown
DISP	Meter Console	Display (BDI)	DIA–6540–002 (C-2) DIA–6540–004 (C-1)	04.8–6540–001 (8)
TT1	Meter Console	Register Operating Time	DIA–6540–003 (C-2) DIA–6540–005 (C-1)	04.8–6540–001 (8)
TT2	Meter Console	Register Operating Time (Internal)	DIA–6540–002 (C-2) DIA–6540–003 (C-2) DIA–6540–004 (C-1) DIA–6540–005 (C-1)	04.8–6540–001 (11)

MOTORS	Location	Function	Diagram	Parts Breakdown
M1	Drive Unit	Traction	DIA–6540–002 (B-4) DIA–6540–003 (B-4) DIA–6540–007 (C-3) DIA–6540–008 (C-3) DIA–6540–011 (A-3)	03.0–6540–001 (14) 03.1–6540–001
M2	Power Unit L.H. Side	Lift	DIA–6540–002 (B-4) DIA–6540–003 (B-4) DIA–6540–007 (C-3) DIA–6540–008 (C-3) DIA–6540–011 (A-2)	02.0-6435-001 (3) 02.1–6540–001

MOTOR CONTROLLERS	Location	Function	Diagram	Parts Breakdown
MRC1	Power Unit R.H. Side	Traction Controls, Quick Coast & Display	DIA–6540–002 (B-2) DIA–6540–003 (B-2) DIA–6540–007 (B-1) DIA–6540–008 (B-1) DIA–6540–011 (C-3)	04.0–6540–001 (1)

M10–6540–003