RICON®

INNOVATION IN MOBILITY™

PF4000 Series™
Low-Floor Vehicle Access Ramp for Custom Installation

PRINT

Service Manual

02/29/02

32DPF402.A

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Japanese Patent No. 2,931,842; UK Patent No. GB 2,313,589 B;
Other U.S. and Foreign Patent(s) Pending

Printed in the
United States of America

This RICON product must be installed and serviced by authorized RICON service technicians.

The authorized RICON service technician must refer to this manual for installation instructions.

The owner must refer to this manual for operating instructions, then retain it for future reference by authorized RICON service technicians who perform service and repairs.

Customer Name:_____
Installing Dealer:_____
Date Installed:_____
Serial Number:_____

REVISION RECORD

REV	PAGES	DESCRIPTION OF CHANGE	ECR / ECO
32DPF402.A	All	New release, in two-book format	3842/4829
END OF LIST			

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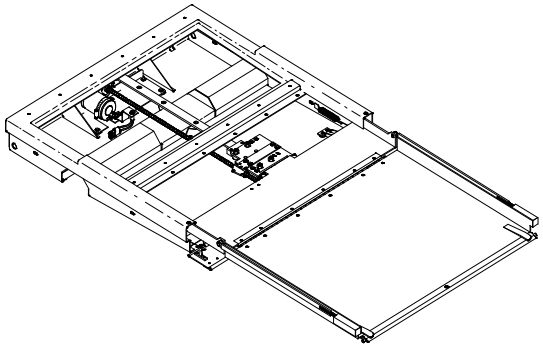
I. INTRODUCTION

The RICON PF4000 Series Low-Floor Vehicle Access Ramp is an electrically operated ramp that allows easy access to vehicles for people using mobility equipment; wheelchairs, scooters, etc. The ramp has been designed for custom installations and is operated by the vehicle driver using a dashboard mounted control switch.



When the vehicle is safely parked with the door(s) open and driver holds the control switch in the DEPLOY position, the ramp extends from the vehicle and stops when it contacts the ground. As a safety function, if the ramp encounters an obstruction, movement will automatically stop. After the ramp is used, the driver holds the switch in the STOW position and the ramp retracts into the vehicle. The rated load capacity is 800 pounds (364 kilograms).

This manual contains installation and maintenance instructions for the ramp. For operating instructions, please refer to the Operator Manual. It is important to user safety that the vehicle operator(s) be completely familiar with the operating instructions. Once the ramp is installed, it is very important that it be properly maintained by following the Ricon recommended cleaning, lubrication, and inspection instructions.

If there are questions about this manual, or additional copies are needed, please contact the Ricon Product Support Department at one of the following locations:

Ricon Corporation
7900 Nelson Road
Panorama City, CA 91402 ..... (818) 267-3000
Outside (818) Area Code ..... (800) 322-2884
World Wide Website ..... www.riconcorp.com

Ricon U.K. Ltd.
Littlemoss Business Park, Littlemoss Road
Droylsden, Manchester
United Kingdom, M43 7EF ..... (+44) 161 301 6000

A. RICON ONE-YEAR LIMITED WARRANTY (refer to following page)

RICON CORPORATION
ONE-YEAR LIMITED WARRANTY

Ricon Corporation (Ricon) warrants to original purchaser of this product that Ricon will repair or replace, at its option, any part that fails by reason of defective material or workmanship as follows:

- Repair or replace parts for a period of one year from date of purchase. A complete list of parts covered by this warranty can be obtained from Ricon Product Support.
- Labor costs for specified parts replace under this warranty for a period of one year from date of purchase. A Ricon rate schedule determines the parts covered and labor allowed.

If You Need to Return a Product: Return this product to Ricon. Please give as much advance notice as possible, and allow a reasonable amount of time for repairs.

This Warranty does not Cover:

- Malfunction or damage to product parts caused by accident, misuse, lack of proper maintenance, neglect, improper adjustment, modification, alteration, the mechanical condition of the vehicle, road hazards, overloading, failure to follow operating instructions, or acts of Nature (i.e., weather, lightning, flood).

Note: Ricon recommends that this product be inspected by an authorized Ricon service technician at least once every six months or sooner if necessary. Any required maintenance or repair should be performed at that time.

⚠ WARNING!

THIS PRODUCT HAS BEEN DESIGNED AND MANUFACTURED TO EXACT SPECIFICATIONS. MODIFICATION OF THIS PRODUCT IN ANY RESPECT CAN BE DANGEROUS.

This Warranty is Void if:

- The product has been installed or maintained by someone other than an authorized Ricon service technician.
- The product has been modified or altered in any respect from its original design without written authorization by Ricon.

Ricon disclaims liability for any personal injury or property damage that results from operation of a Ricon product that has been modified from the original Ricon design. No person or company is authorized to change the design of this Ricon product without written authorization by Ricon.

Ricon's obligation under this warranty is exclusively limited to the repair or exchange of parts that fail within the applicable warranty period.

Ricon assumes no responsibility for expenses or damages, including incidental or consequential damages. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply.

Important: The warranty registration card must be completed and returned to Ricon within 20 days after installation of this Ricon product for the warranty to be valid. The warranty is not transferable.

The warranty gives specific legal rights, and there may be other rights that vary from state to state.

B. SHIPMENT INFORMATION

Ricon does not sell directly to the user, because of the specialized nature of the product. Instead, the product is distributed through the worldwide network of authorized Ricon service technicians, who perform the actual sale and installation.

When the product is received, unpack the product and check for freight damage. Claims for any damage should be made to the carrier immediately.

Be sure the installation kit contains all items listed on the kit packing list. Please report any missing items immediately to Ricon Product Support. The warranty and owner's registration cards must be completed and returned to Ricon within 20 days for the warranty to be valid.

NOTE: The Sales/Product Support Personnel must review the Warranty and this Service Manual with the user to be certain that they understand the safe operation of the product. Instruct the user to follow the operating instructions without exception.

C. GENERAL SAFETY PRECAUTIONS

The following general safety precautions must be followed during installation, operation, service and maintenance:

- Under no circumstances should installation, maintenance, repair, and adjustments be attempted without the immediate presence of a person capable of rendering aid.
- An injury, no matter how slight, should always be attended. Always administer first aid or seek medical attention immediately.
- Protective eye shields and appropriate clothing should be worn at all times.
- To avoid injury, always exercise caution when operating and be certain that hands, feet, legs, and clothing are not in the path of product movement.
- Batteries contain acid that can burn. If acid comes in contact with skin, flush affected area with water and wash with soap immediately.
- Always work in a properly ventilated area. Do not smoke or use an open flame near a battery.
- Do not lay anything on top of a battery.
- Check under vehicle before drilling so as not to drill into frame, subframe members, wiring, hydraulic lines, fuel lines, fuel tank, etc.
- Read and thoroughly understand the operating instructions before attempting to operate.
- Inspect the product before each use. If an unsafe condition, unusual noises or movements exists, do not use it until the problem is corrected.
- Keep others clear during operation.
- The product requires regular periodic maintenance. A thorough inspection is recommended at least once every six months. The product must always be maintained at the highest level of performance.

D. PRODUCT TERMINOLOGY

The references used throughout this manual are illustrated in **Figure 1-1** and defined in **Table 1-1**. Refer to Chapter IV for more details.

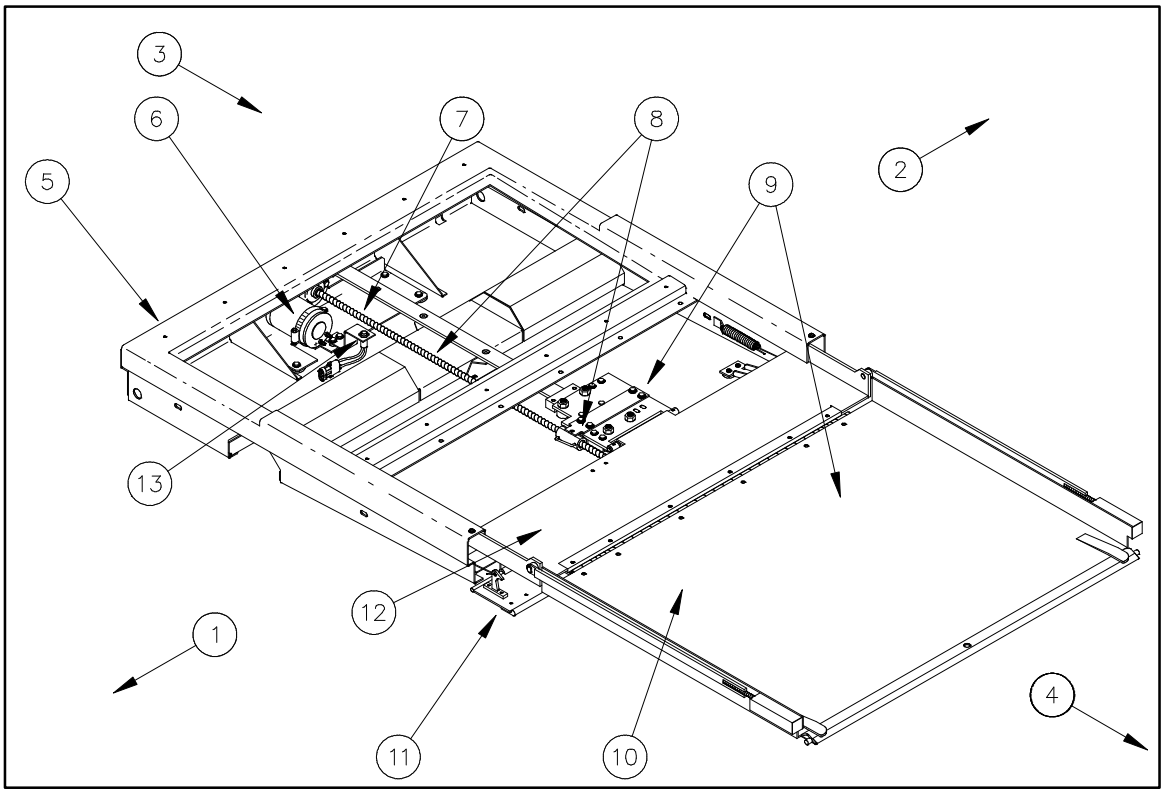


FIGURE 1-1: RAMP REFERENCE

TABLE 1-1: PF4000 RAMP TERMINOLOGY		
REF	**NAME**	**DESCRIPTION**
1	Left	Reference point from outside the vehicle looking inward.
2	Right	
3	Back	
4	Front	
5	Ramp Enclosure	Cassette type enclosure, rigidly attached to the vehicle, that contains the ramp.
6	Drive System Motor	Electric motor used to operate the ramp.
7	Drive System	Components used to extend/DEPLOY and retract/ STOW the ramp.
8	Ball Nut/Screw Assembly	Mechanical component of the drive system used to operate the ramp.
9	Traveling Frame	Mechanical assemblies that operate the ramp and maintain ramp-assembly alignment.
10	Ramp Assembly	Assembly that extends from the vehicle during ramp operation.
11	Enclosure Door	Mechanical door that protects the ramp internal components from road debris, etc.
12	Carriage Assembly	Mechanical assembly that operates the ramp assembly.
13	Sensor Assembly	Magnetic device used to signal the ramp controller when the ramp is in the fully stowed position.
END OF TABLE		

II. INSTALLATION

The RICON PF4000 Series Low-Floor Vehicle Access Ramp has been engineered and designed for custom installations. Installation consists of the mounting of the ramp and control switch and the installation of the electrical supply and control wiring. This chapter provides installation guidelines and instructions. If a question arises that is not covered in this chapter, contact Ricon Product Support for assistance.

A. MECHANICAL

1. RAMP LOCATION

The location of the ramp depends on its path of motion. The ramp must be located so it can move unobstructed through its required range of travel.

2. RAMP MOUNTING

Since ramp mounting varies from one model to another, the vehicle mounting brackets for attachment of the ramp are not supplied. When fabricated, the mounting brackets must meet the criteria listed in **Table 2-1**.

TABLE 2-1: RAMP MOUNTING BRACKET LOAD CAPACITIES		
Loading Direction	**Front Supports** (total capacity for both left and right support points)	**Rear Supports** (total capacity for both left and right support points)
Vertical	470 lbs (214 kg)	230 lbs (105 kg)
Longitudinal (perpendicular to vehicle drive axles)	470 lbs (214 kg)	230 lbs (105 kg)
Lateral (parallel to vehicle drive axles)	350 lbs (159 kg)	350 lbs (159 kg)
END OF TABLE		

Hardware for mounting the ramp must be a minimum of 5/16" diameter, with a grade of 5 or better.

Refer to **Figure 2-1**. Mechanical support of the ramp must be provided at four (two on each side) attachment points.

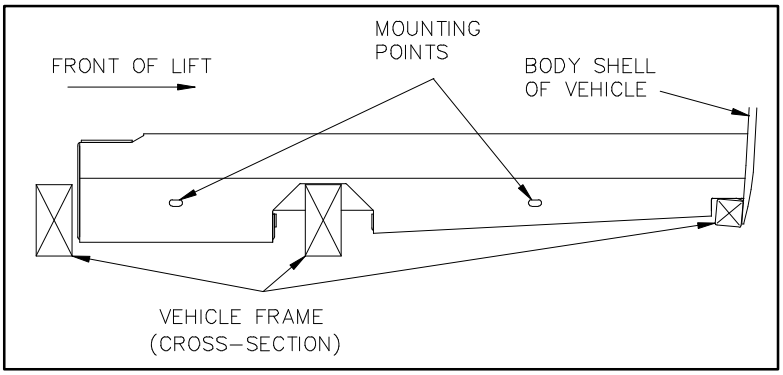


FIGURE 2-1: RAMP MOUNTING POINTS

B. ELECTRICAL INSTALLATION

⚠ CAUTION!

- Check vehicle before drilling. Do not drill into factory wiring, hydraulic lines, fuel lines, fuel tank, etc.
- If wire is routed through sheet metal holes or around sharp edges, protect points of contact with a suitable grommet or plastic conduit. Ensure that wires are properly secured and protected to prevent damage in any way.

1. Mount the ramp controller in the location specified by vehicle manufacturer.
2. Connect the 9-pin electrical harness connector to the ramp controller.
3. At the ramp controller, connect the 10-pin electrical harness connector.
4. Route and connect the other end of the 10-pin electrical harness to the ramp.
5. At vehicle engine/battery compartment, mount supplied Main Circuit Breaker within 10 - 12 inches (25 - 30 cm) of battery.
6. From beneath vehicle, run the electrical harness along vehicle frame from the ramp controller to circuit breaker. Make sure harness does not interfere with moving or hot parts and secure with cable ties every 18-inches (45 cm).
7. At engine/battery compartment, cut and retain 12-inch (30 cm) section from end of RED harness.
8. Measure RED wire to reach circuit breaker and cut and remove any excess wire from harness.
9. Using wire crimpers, crimp supplied terminal to end of RED harness wire and connect to circuit breaker AUX terminal.
10. Crimp supplied terminals to both ends of previously cut 12-inch (30 cm) section of RED wire.
11. Connect end of 12-inch (30 cm) section of RED wire to circuit breaker BAT terminal.

⚠ WARNING!

- WEAR PROTECTIVE CLOTHING AND EYE PROTECTION AT ALL TIMES. BATTERIES CONTAIN ACID THAT CAN BURN. IF ACID COMES INTO CONTACT WITH SKIN, IMMEDIATELY FLUSH AFFECTED AREA WITH WATER AND WASH WITH SOAP.
- DO NOT SMOKE OR USE OPEN FLAME IN THE VICINITY OF BATTERY. ALWAYS WORK IN PROPERLY VENTILATED AREA.
- DO NOT LAY ANYTHING ON TOP OF A BATTERY.

12. Connect other end of 12-inch (30 cm) section of RED wire to POSITIVE terminal of vehicle battery.
13. Connect BLACK wire to an appropriate chassis ground as specified by vehicle manufacturer.

C. RAMP CONTROLLER ADJUSTMENT

The purpose of the ramp controller adjustment is to ensure ramp mechanism reliability in all operating conditions while maintaining a margin of safety in the event of blockage of the ramp. Therefore, the ramp should be set to the highest possible current setting that will not cause personal injury in the event of a blockage. For the ramp controller adjustment procedure, refer to **Figure 2-2** and the following sections:

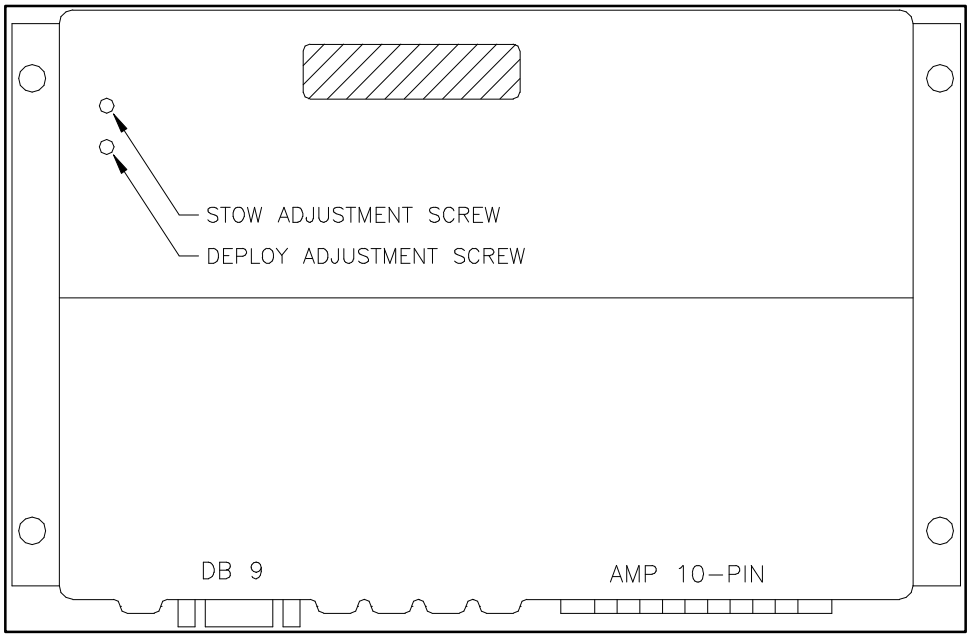


FIGURE 2-2: CONTROLLER WITH WHITE PLASTIC ADJUSTMENT SCREWS

1. DEPLOY ADJUSTMENT

For the deploy direction, the maximum force attained by the ramp against a force-gage before the current limit shuts the system down, is higher than 80 lb. (33 kg) for reliability and not to exceed 100 lb. (45 kg) for safety. Any force measuring instrument can be used as long as it contains a follower needle to record the maximum force attained. The set-up must also contain a spring in series with the force measuring instrument to absorb the ramp momentum (elongation: 2-inches/5 cm = 80 lb./33 kg). To perform the controller deploy force adjustment, follow this procedure:

⚠ CAUTION!

- Never turn the adjustment screw more than 1/8 turn between tests.
- Never operate the ramp continuously more than 5-cycles without allowing at least a 1-minute cool-down period.

a. Using a force-gauge, test the ramp deploy force. If it falls within 80-100 lb. (33-45 kg), do not adjust. If adjustment is necessary, locate DEPLOY ADJUSTMENT SCREW.

b. With a small flathead or Phillips screwdriver, turn adjustment screw **1/8 turn counter-clockwise (CCW)** to INCREASE force or **1/8 turn clockwise (CW)** to DECREASE force.

c. Repeat the above two steps. If reliable operation cannot be attained within the 80-100 lb. (33-45 kg) range, discontinue this procedure and immediately check ramp for mechanical binding.

2. STOW ADJUSTMENT

The adjustment procedure for the stow direction is not adjusted with a force-gauge. The current limiting system in the stow direction is only that it is triggered when the ramp has reached end-of-travel. The setting should be as high as possible and still accomplish current limit at the end of travel.

⚠ CAUTION!

Never operate the ramp continuously more than 5-cycles without allowing at least a 1-minute cool-down period.

a. Locate STOW ADJUSTMENT SCREW.
b. Using a screwdriver, turn potentiometer CCW until it stops (do not force). Ramp is now set for highest current limit, causing motor to stall instead of unit shutting down.
c. Stow ramp. Keep function selected after ramp has reached end-of-travel.
d. While holding stow function, turn adjustment screw **CW** until an audible **CLICK** is heard. This indicates current limit has been triggered.
e. Adjust screw an additional **1/16 turn CW.**
f. Deploy ramp approximately 6-inches (15-16 cm).
g. Fully stow ramp and observe ramp pull against enclosure back-stop then visibly “relax” as current limit shuts off power to motor.

D. INSTALLATION VERIFICATION

1. Be certain there is no interference with operation of the ramp by interior or exterior components.
2. The ramp is designed to carry the weight of a wheelchair and its passenger. The vehicle structure must be adequate to support all loads produced during ramp operation, as well as forces incurred by the motion of the vehicle during driving.

⚠ CAUTION!

Do not operate the ramp electrically or manually during the load test. The load test is designed to test the installation mounting of the ramp. Remove the test weight immediately after the test.

3. The ramp must be test loaded to 125% of its rated 750 lbs (341 kg) load capacity to verify the integrity of the installation. Deploy the ramp, place 938 lbs (426 kg) in the center of the platform, and inspect the ramp mounting points. REMOVE THE TEST WEIGHT.
4. Refer to Service Manual, Chapter II and run the ramp through several cycles of both functions (DEPLOY and STOW).
5. Verify operation of ramp control panel indicators.
6. Verify operation of manual operation panel switch.

E. CUSTOMER ORIENTATION

IMPORTANT
- Customer Orientation -
Ricon Sales/Product Support Personnel must review the Warranty and Service/Owner Manual with the customer to be certain he/she understands the safe operation of the ramp. Instruct the customer to always follow the operating instructions without exception.

Refer to **Figure 2-3** and verify that all decals are properly located and affixed as shown.

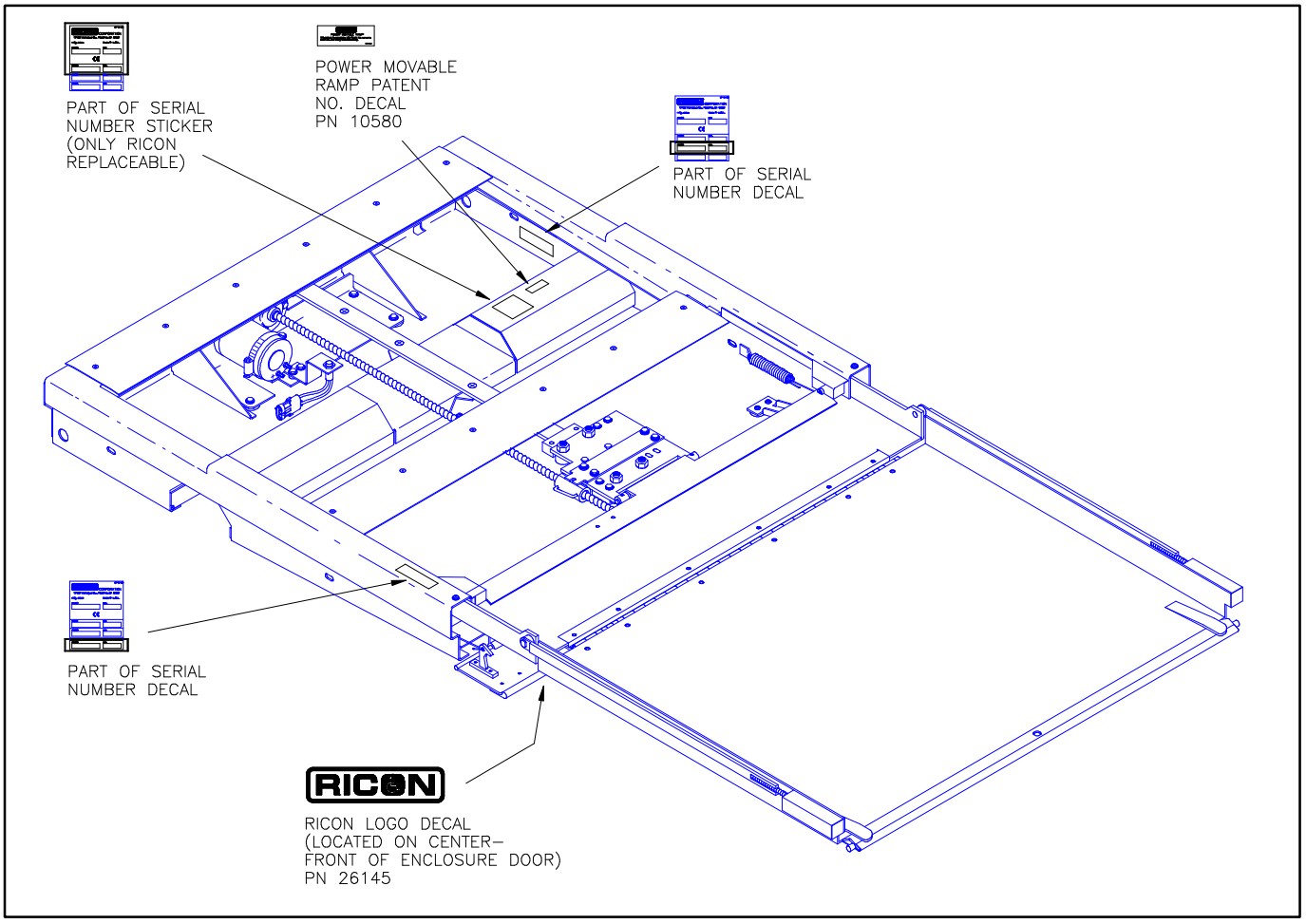


FIGURE 2-3: DECAL LOCATIONS AND PART NUMBERS

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III. MAINTENANCE

Maintenance for the RICON PF4000 Series Low-Floor Vehicle Access Ramp consists of routine safety checks and reference descriptions of the electrical wiring. Routine maintenance and any repairs should be performed by selected, authorized Ricon service personnel only.

A. MAINTENANCE SCHEDULE

For the maintenance schedule of the ramp, refer to **Table 3-1**. Under conditions of heavy use (in excess of 20 cycles per day), maintenance should be performed more frequently. Modifying or failing to properly maintain the ramp will void the warranty and may result in unsafe operating conditions for the users. Safety checks/inspections should be performed according to the following intervals:

TABLE 3-1: MAINTENANCE SCHEDULE

SERVICE POINT	DESCRIPTION
DAILY SAFETY CHECK	
Operate and Inspect	Inspect underside of vehicle and check for loose nuts and bolts. If any unsafe condition exists or unusual noises or movements are noticed, **DO NOT** use the ramp. Return the vehicle to an authorized Ricon service technician for repair.
MONTHLY OR EVERY 5,000 KILOMETERS SAFETY CHECK	
Clean Flutter Valve	If so equipped, clean the flutter (drain) valve.
3-MONTH OR EVERY 15,000 KILOMETERS SAFETY CHECK	
Clean and Lubricate	Follow these steps: 1. Remove the top wooden panel. 2. Using a water hose, clean the tracks where the side cam followers travel. 3. Vacuum the inside of the ramp thoroughly. 4. With a shop towel, clean the ball screw. 5. Grease all six Cam Followers using low-temperature grease such as Aeroshell Grease #22, Starfak EP or equivalent. Grease fittings should be wiped clean prior to grease injection. 6. Using a brush, apply a light coat of low-temperature grease to the ball screw, the metal parts of the ball nut wiper, the cam follower screws and nuts, and the rear of the motor.
Main Pivot Points	Verify carriage/ramp pivot pins are installed properly, free from damage and locked in position with proper fasteners.
ANNUAL SAFETY CHECK	
WITH RAMP IN STOWED POSITION	
Ramp Mounting and Support Points	Verify that all ramp support points under vehicle are in proper working order and free from damage. Verify that all mounting bolts are properly tight.
DEPLOY RAMP TO FULL EXTENSION	
General Operation Stow/Deploy	Listen for any abnormal noises as the ramp deploys (i.e., grinding or scraping noises). Carriage stops are in place and stop ramp squarely.
Ramp Points	Verify ramp operates properly during deploy and stow modes without obstruction.
END OF TABLE	

B. RAMP CONTROLLER ADJUSTMENTS

For ramp controller adjustments, refer to the Service Manual, Chapter II.

C. RAMP CONTROLLER ELECTRICAL WIRING

1. DIAGRAM LEGEND

a. Wire Color Codes

TABLE 3-2: COLOR CODE DEFINITIONS			
LETTER	**COLOR**	**LETTER**	**COLOR**
BK	Black	R	Red
BL	Blue	VI	Violet
BR	Brown	VI/BK	Violet w/ Black
GN	Green	W	White
GN/BK	Green w/ Black	W/O	White w/ Orange
O	Orange	Y	Yellow
O/BK	Orange w/ Black	Y/BK	Yellow w/ Black
END OF TABLE			

b. Schematic Labels

24V–SPLY	24V POWER SUPPLY
GND	GROUND
MOT–	MOTOR NEGATIVE
MOT+	MOTOR POSITIVE
SNSR IN	SENSOR INPUT
24V–RGLTD	24V–REGULATED
ST OUT	STOW SIGNAL OUTPUT
CL/OV C	CLOSED OR OVER CURRENT
SPARE	SPARE
RMP IN SIG	RAMP IN SIGNAL
RMP OUT SIG	RAMP OUT SIGNAL
O/OV C	OPEN OR OVER CURRENT
PWR	POWER

2. ELECTRICAL SIGNAL DESCRIPTIONS

a. Indication of Stowed Output (ST OUT)

The Indication of Stowed Output is located at the DB 9 connector, pin 1. The pin goes to +24 volts direct current (VDC) when the ramp is completely stowed. Because the tolerance of the sensor is within approximately ½" of the fully stowed position, this signal can only be used as an indication that the ramp is at within ½" from being completely stowed. The signal is buffered and capable of driving a 250 milliampere (mA) inductive load, such as an automotive relay.

b. Close Overcurrent Output (CL/OV C)

The close overcurrent output provided at pin 2 of the DB 9 connector is used to indicate when the system has reached an overcurrent condition in the STOW/retract direction. Overcurrent occurs either when the system encounters a resistance greater than the normal forces generated in travel or when the system comes to the end-of-travel within the enclosure. The signal is a 24-volt pulse approximately 500 milliseconds (ms) in duration.

c. Control Inputs (RMP IN SIG and RMP OUT SIG)

Ricon provides to the user two control inputs at the DB 9 connector. 'Close' input (pin 5) is used to stow the ramp and 'Open' input (pin 6) is used to deploy the ramp. Both inputs accept signals ranging from +12VDC to +24VDC, referenced to the module's ground. The module is provided with pull-down resistors, so the input signal is allowed to float when not being used.

d. Open Overcurrent Output (0/0V C)

The open overcurrent output provided at DB 9 connector pin 9, is used to indicate when the system has reached an overcurrent condition in the DEPLOY/extend direction. Overcurrent occurs either when the system encounters a resistance greater than the normal forces generated in travel or when the system comes to the end of travel at the fully deployed position. The signal is a 24-volt pulse approximately 500ms in duration.

e. Power Connections (24V-SPLY and GND)

Power is connected through the AMP 10-Pin connector, pins 1 thru 4. To facilitate better current carrying capabilities, two pins are used for each polarity (four pins total). Pins 1 and 2 are used for the positive supply of the module. Pins 3 and 4 are used for the negative supply. All four pins should be used in the connection of the power to the module.

f. Motor Connections (MOT- and MOT+)

The motor is connected to the module through the AMP 10-Pin connector, pins 5 thru 8. The connector uses two pins for each pole (four pins total). During the ramp STOW function, pins 5 and/or 6 receive positive voltage and pins 7 and/or 8 receive negative voltage. During the DEPLOY function, pins 5 and/or 6 receive negative voltage and pins 7 and/or 8 receive positive voltage.

g. Sensor Connections (SNSR IN and 24V-RGLTD)

The sensor connections are located on the AMP 10-pin Connector, pins 9 and 10. Pin 9 is used as an input for the unconditioned signal from the stow indicator sensor. Pin 10 is a +24VDC regulated supply for the sensor only, and should not be used for any other purpose.

3. WIRING DIAGRAM

Refer to **Figure 3-1** on the following page for the ramp electrical wiring diagram.

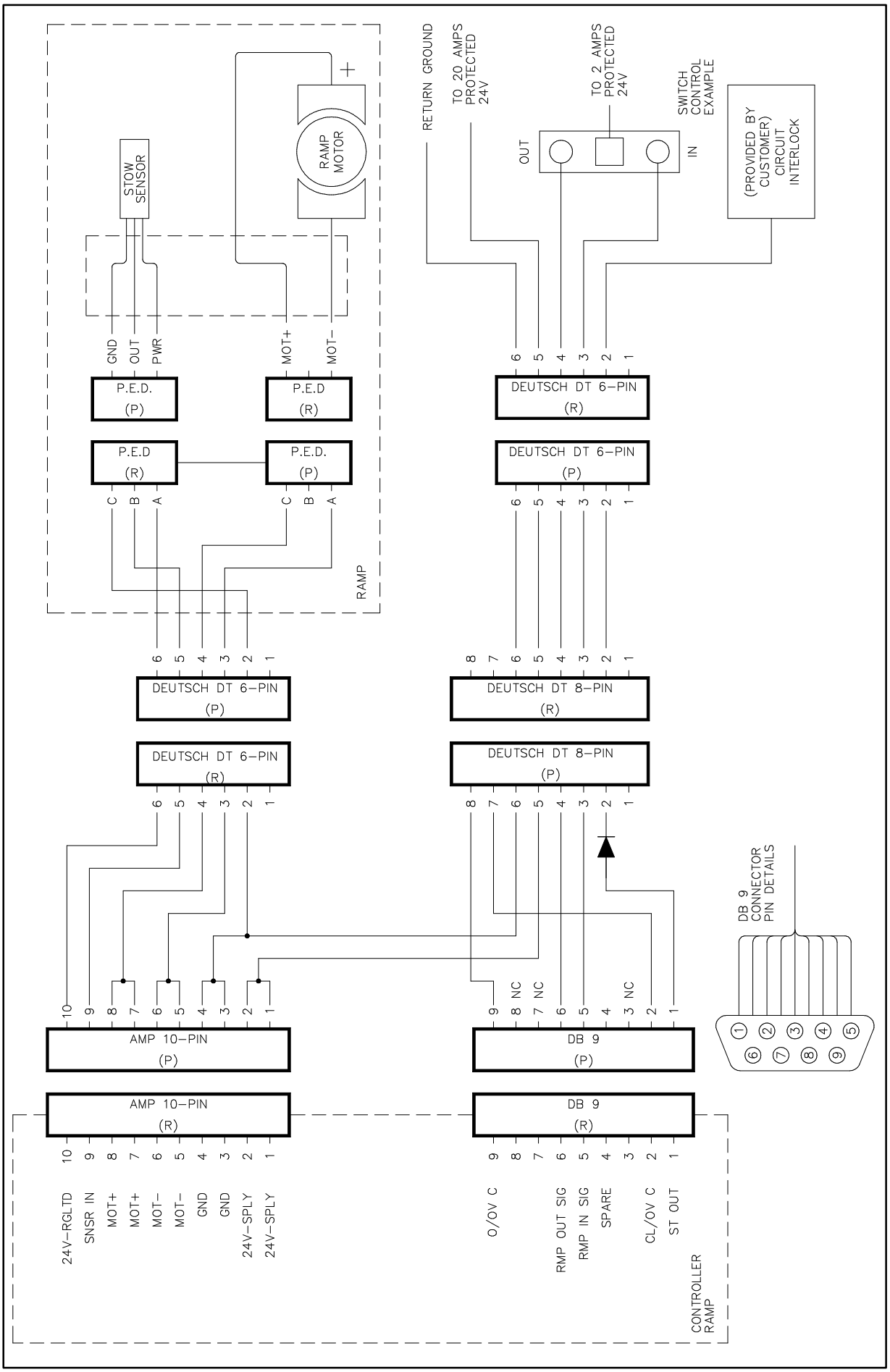
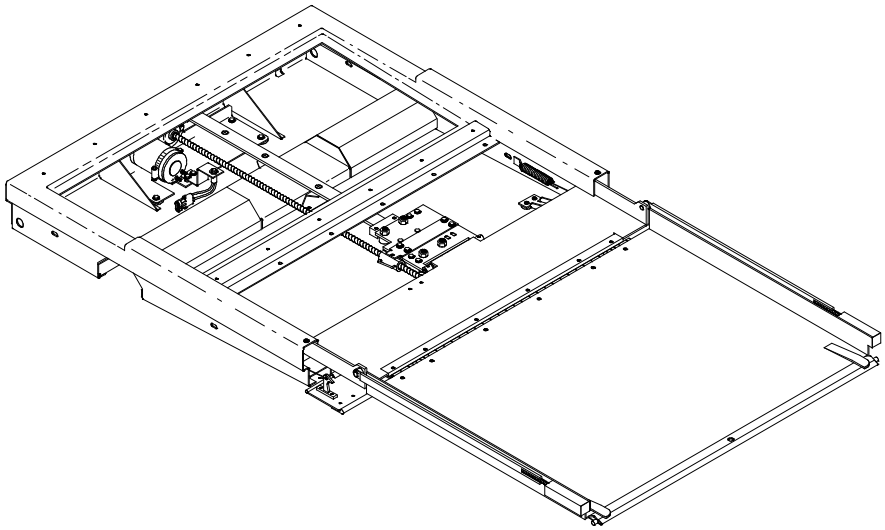


FIGURE 3-1: PF4000 RAMP ELECTRICAL WIRING SYSTEM

IV. PARTS DIAGRAMS AND LISTS

This chapter contains parts diagrams and lists for the RICON PF4000 Series Low-Floor Vehicle Access Ramp. The parts diagrams are exploded views of the ramp components with the individual components referenced by numbers. The accompanying parts list contains the part reference number, a description, quantity used, and the Ricon stock number. For parts identification, locate the part on the appropriate drawing and note the reference number. The parts list that accompanies each drawing will list the stock number of the desired part.



LIFT MODEL AND KIT NUMBERS	
PRODUCT NUMBER	PF4000
DOCUMENTATION KIT NUMBER	01328
SPARE DECAL KIT NUMBER	26010

PARTS DIAGRAM **PAGE**

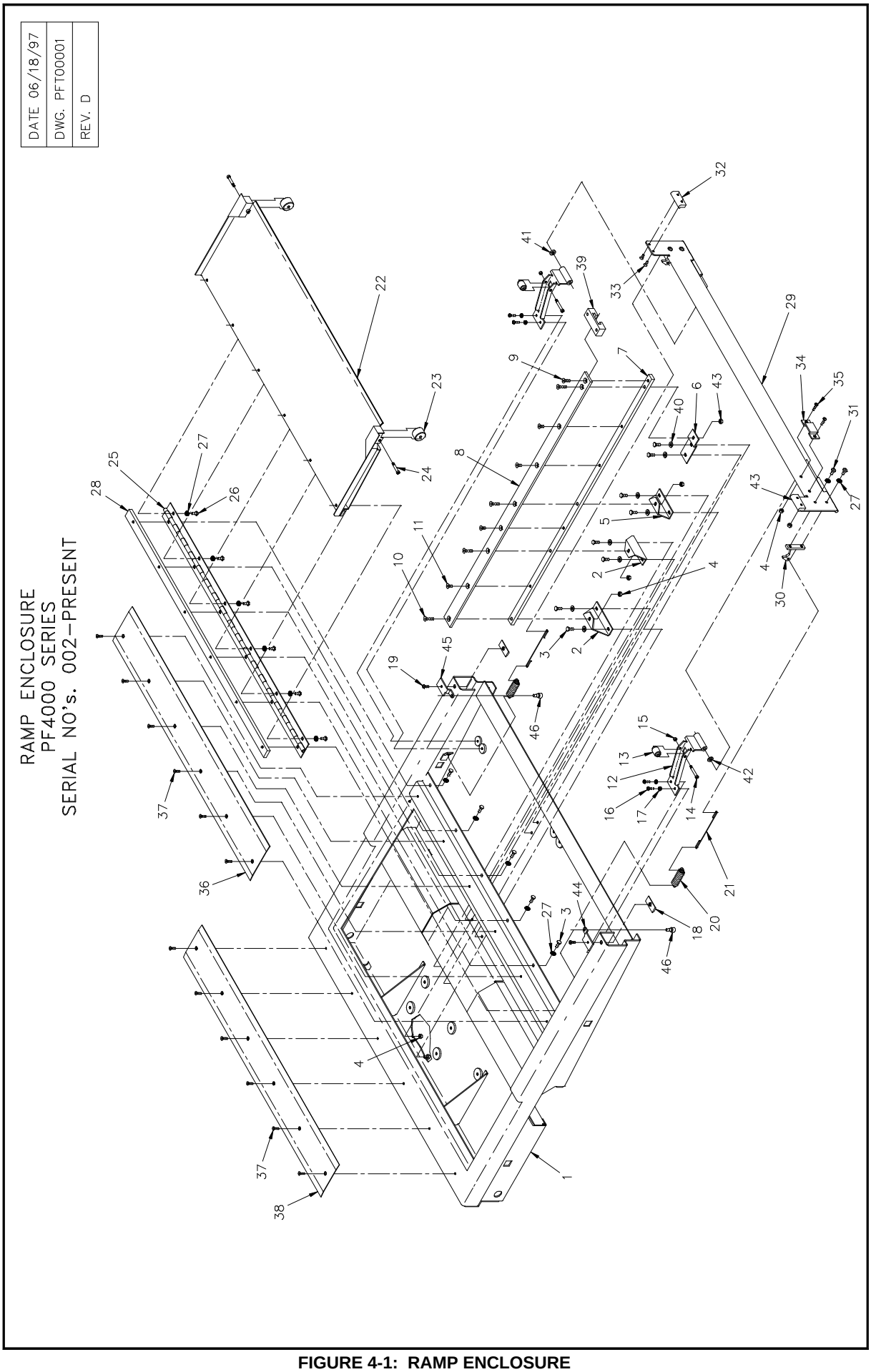


FIGURE 4-1: RAMP ENCLOSURE

FIGURE 4-1: RAMP ENCLOSURE
PF4000 SERIES
SERIAL NO's. 002–PRESENT

REF.	DESCRIPTION	QTY.	PART NO.
1	ENCLOSURE, RAMP-WASSY	1	PF4-0090
2	BRACKET, ALIGNMENT RAIL-WASSY, CARRIAGE	2	PF4-0127
3	BOLT-HEX 1/4-20 X 5/8, SST (BAG OF 10)	2	13306
4	NUT-HEX 1/4-20, NYLON INSERT, SST (BAG OF 10)	2	14414
5	BRACKET, ALIGNMENT RAIL-WASSY, CENTER	1	PF4-0128
6	BRACKET, ALIGNMENT RAIL-WASSY, FRONT	1	PF4-0129
7	RAIL, ALIGNMENT-SUPPORT	1	PF4-0028
8	RAIL, ALIGNMENT	1	PF4-0013
9	SOCKET FLAT 1/4-20 X 3/4, S.S. (BAG OF 10)	1	13310
10	MS, SOCKET, FLAT, 1/4-20 X 1", SST (BAG OF 10)	1	15948
11	MS, SOCKET, FLAT, 1/4-20 X 1/2, SST (BAG OF 10)	1	15964
12	BRACKET, DOOR	2	PF4-0102
13	ROLLER, ENCLOSURE	2	PF4-0041
14	BOLT-SHOULDER, 1/4 X 1-1/4. 10-24 SST (BAG OF 10)	1	19749
15	NUT-HEX 10-24, NYLON INSERT, SST (BAG OF 10)	1	14416
16	MS - 10-24 X 5/8, PHIL PAN, SST (BAG OF 10)	1	14445
17	WASHER #10 SPLIT LOCK, SST (BAG OF 10)	1	14432
18	BLOCK, HINGE-ENCLOSURE	2	PF4-0141
19	SCS 10-24X0.375 SST (BAG OF 10)	1	14425
20	SPRING, EXT. 0.50 X 3-1/2 X 0.054, SST	2	254531
21	WIRE, EXTENSION-SPRING, DOOR	2	PF4-0099
22	HINGED FLOOR, WASSY	1	PF4-0018P
23	ROLLER, FLOOR	2	PF4-0040
24	BOLT-SHOULDER 1/4 X 1.00, SST (BAG OF 10)	1	19750
25	HINGE, FLOOR	1	PF4-0019
26	SCREW-HEX 1/4-20 X 5/8, SST (BAG OF 10)	1	13306
27	WASHER 1/4 SPLIT LOCK, SST (BAG OF 10)	2	13399
28	BAR, HINGED FLOOR	1	PF4-0026
29	DOOR, ENCLOSURE	1	PF4-0054
30	HOOK, DOOR LATCH	2	PF4-0055
31	SOCKET BUTTON, 1/4-20 X 1/2, SST (BAG OF 10)	1	13311
32	BLOCK, DOOR-ENCLOSURE	2	PF4-0139
33	SOCKET FLAT 10-24 X 1/2, SST (BAG OF 10)	1	14426
34	STRAP, DOOR-MANUAL DEPLOY	1	PF4-0093
35	SOCKET BUTTON, 1/4-20 X 5/8 SST (BAG OF 10)	1	14423
36	COVER, STRIP, CENTER	1	PF4-0045
37	MS 10-24 X 5/8 PHIL FLAT (BAG OF 10)	2	19757
38	COVER STRIP, REAR	1	PF4-0044
39	BLOCK-ALIGNMENT GUIDE	1	WS-0013
40	WASHER-1/4 FLAT SST (BAG OF 10)	2	13398
41	SPACER-0.312ID X 0.62OD X 0.120 THICK	1	PF4-0091
42	SPACER-0.312ID X 0.62OD X 0.062 THICK	1	PF4-0098
43	NUT-1/4-20 JAM NYLON SST (BAG OF 10)	1	13339
44	BRACKET, HINGED FLOOR, LHS	1	10052
45	BRACKET, HINGED FLOOR, RHS	1	10576
46	BUMPER, BUTTON, IRS CAM (BAG OF 10)	1	19783

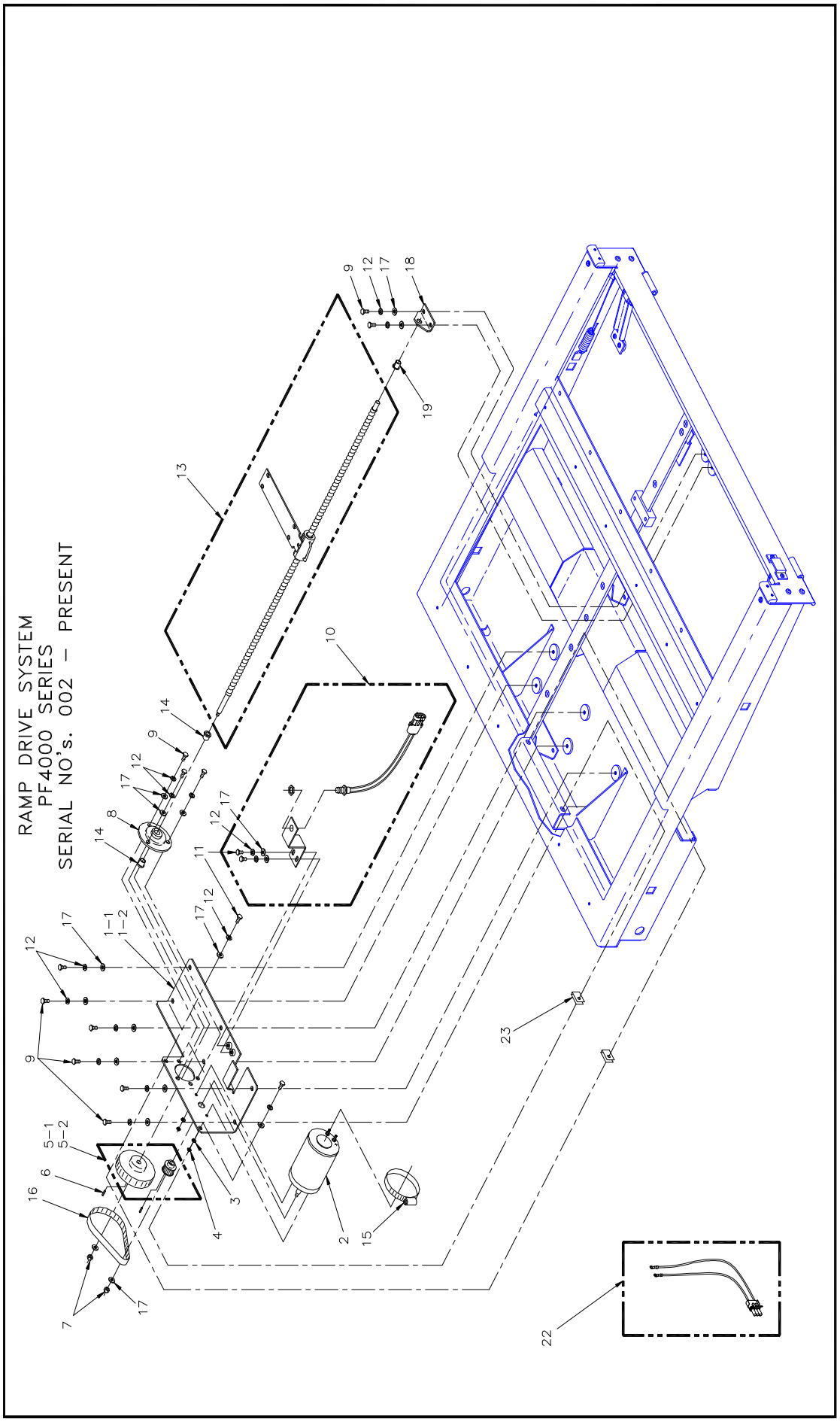


FIGURE 4-2: RAMP DRIVE SYSTEM

FIGURE 4-2: RAMP DRIVE SYSTEM
PF4000 SERIES
SERIAL NO. 002–PRESENT

REF	DESCRIPTION	QTY	PART NO
1-1	BRACKET-WASSY, MOTOR MOUNT, OFFSET HOLES (FROM SERIAL #002 TO SERIAL #031)	1	PF4-0144
1-2	BRACKET-WASSY, MOTOR MOUNT (FROM SERIAL # 032 TO PRESENT)	1	PF4-0091
2	MOTOR-DRIVE SYSTEM	1	PF4-0105
3	WASHER-#10 SPLIT LOCK SST (BAG OF 10)	1	14432
4	NUT-10-32 HEX SST	2	283061
5-1	KIT-PULLEY, 0.958 OD AND 3.464 OD, SHRT (FROM SERIAL # 002 TO SERIAL # 031)	1	PF4-0145
5-2	KIT-PULLEY, 0.958 OD AND 3.464 OD (FROM SERIAL #032 TO PRESENT)	1	PF4-0120
6	KEY-3/32 X 0.5 L	2	PF4-0095
7	NUT-1/4-20 JAM NYLON SST (BAG OF 10)	1	13339
8	BEARING, BALL-3 HOLE MOUNT, MODIFIED	1	PF4-0121
9	CS-1/4-20 X 0.625 HEX SST (BAG OF 10)	2	13306
10	BRACKET, SENSOR-ASSY	1	18725
11	CS-1/4-20 X 0.50 HEX SST (BAG OF 10)	1	13307
12	WASHER-1/4 SPLIT LOCK SST (BAG OF 10)	2	13399
13	BALL NUT-2 CICUITS, 1/2" LEAD, RH	1	25466
14	BUSHING, FLANGED-0.38 ID X 0.49 OD X 0.5 L	2	25297
15	CLAMP HOSE HS 44	1	22-10-044
16	BELT-0.591 W X 14.764 P. LG, 75 TEETH	1	25128
17	WASHER-1/4 FLAT SST (BAG OF 10)	2	13398
18	BRACKET-BALL SCREW	1	PF4-0068
19	BUSHING-FLANGE, 0.38 ID X 0.25L	1	253845
22	HARNESS-MOTOR	1	PF4-0201
23	SPRING NUT-1/4-20 MULTI THD	2	283106

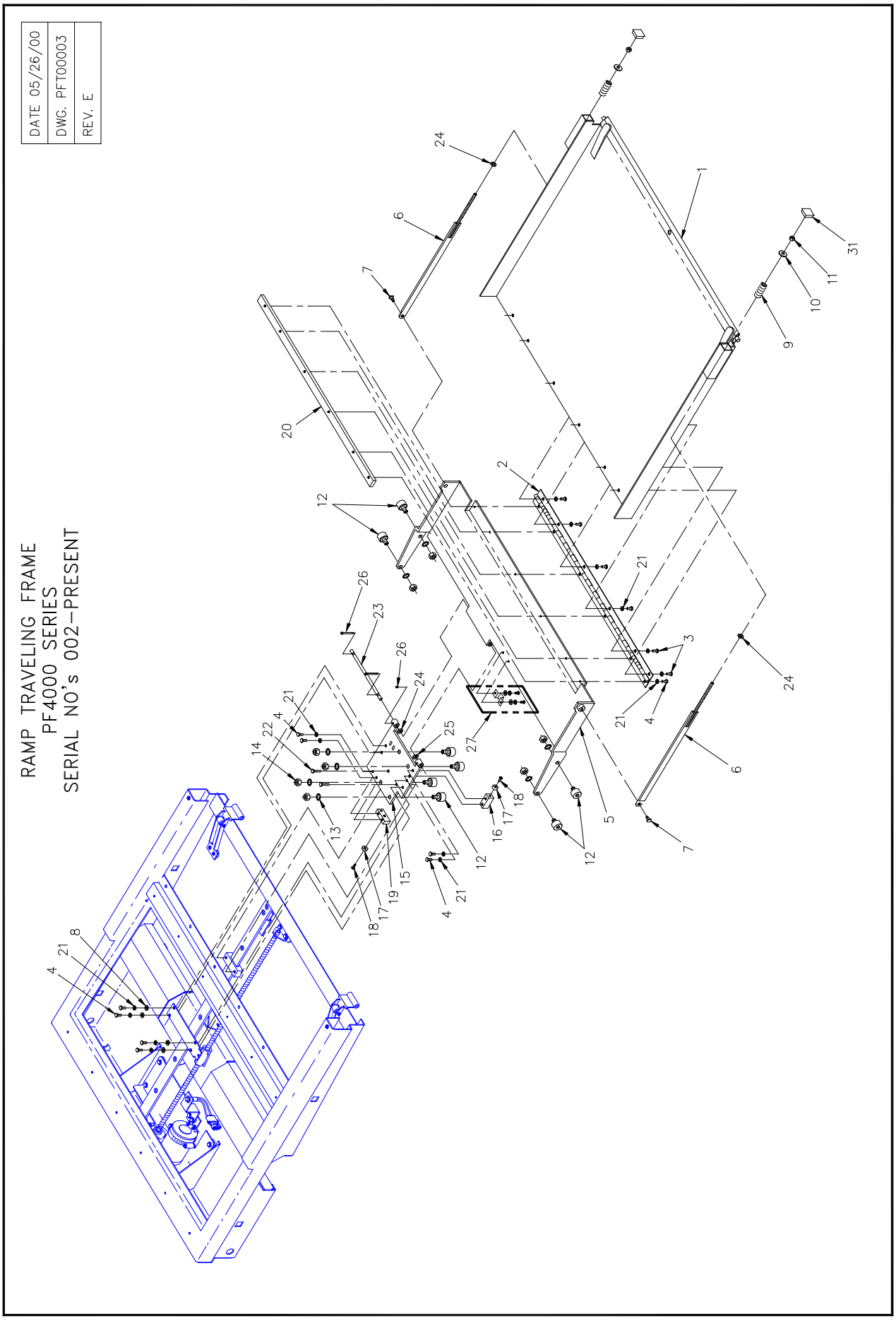


FIGURE 4-3: RAMP TRAVELING FRAME

FIGURE 4-3: RAMP TRAVELING FRAME
PF4000 SERIES
SERIAL NO. 002–PRESENT

REF.	DESCRIPTION	QTY.	PART NO.
1	RAMP-WASSY	1	PF4-0081
2	HINGE-RAMP	1	PF4-0033
3	CS-1/4-20 X 0.50 HEX SST (BAG OF 10)	1	13307
4	CS-1/4-20 X 0.625 HEX SST (BAG OF 10)	2	13306
5	CARRIAGE-WASSY, RAMP	1	PF4-0082
6	STRAP, BOLT-WASSY, RAMP	2	PF4-0056
7	BOLT, SHOULDER, 0.250 X 0.313 OD, PRS	2	UV-PF-899
8	WASHER-1/4 FLAT SST (BAG OF 10)	1	13398
9	SPRING, COMPRESSION-0.927 OD, 0.573 ID, 4.0 L	2	254525
10	BUSHING, SPRING-RAMP	2	PF4-0063
11	NUT-5/16-18 SST (BAG OF 10)	1	19703
12	CAM FOLLOWER, 1.00 OD X 5/8, 7/16-20	8	40-20-007
13	WASHER-7/16 EXTERNAL STAR SST (BAG OF 10)	1	13344
14	NUT-HEX 7/16-20 SST (BAG OF 10)	1	19738
15	PLATE, ALIGNMENT-WASSY, CARRIAGE	1	PF4-0092
16	BLOCK, BUMPER-DRIVE SYSTEM	1	PF4-0066
17	BUMPER RUBBER 315-009	2	VS-PL-02
18	SCS-10-24 X 0.50 BTN SKT SST (BAG OF 10)	2	14424
19	BLOCK-GAS SHOCK	1	PF4-0087
20	BAR-CARRIAGE	1	PF4-0035
21	WASHER-1/4 SPLIT LOCK SST (BAG OF 10)	1	13399
22	CS-1/4-20 X 1.00 HEX SST (BAG OF 10)	1	15960
23	PIN-CARRIAGE	1	PF4-0038
24	SPACER-0.312 ID X 0.62 OD X 0.120 THK	3	PF4-0097
25	SPAVER-0.312 ID X 0.62 OD X 0.062 THK	1	PF4-0098
26	PIN, COTTER, 3/32 X .50 (BAG OF 10)	1	15930
27	BRACKET, STOW INDICATOR	1	18725
31	CAP, VINYL YLW .375-2.5 IL HVY BLK LETTER	2	01653

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