Falcon® 4400 Series
Powered Vehicle Dock

Installation Guide

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Disclaimer

Reasonable measures have been taken to ensure that the information included in this manual is complete and accurate. However, PSC reserves the right to change any specification at any time without prior notice.

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PSC Falcon® 4400 Series Powered Vehicle Dock Warranty

Warranty

Falcon products are guaranteed against defects in materials and workmanship for the period specified at the time of sale. This warranty shall apply to Falcon Portable Data Terminals (PDT's), Base Stations for the Falcon and Chargers for the Falcon. Cables, mounts and other accessory items are specifically warranted for a period of 90-days from product purchase. Customer must notify PSC of the claimed defect before the expiration of the Warranty period and obtain from PSC a return authorization number for return of the product to designated PSC service center. If PSC determines Customer's claim is valid, PSC will repair or replace product without additional charge for parts and labor. Customer shall be responsible for packaging and shipping the product to the designated PSC service center, with shipping charges prepaid. PSC shall pay for the return of the product to Customer if the shipment is to a location within the country in which the PSC service center is located. Customer shall be responsible for paying all shipping charges, duties, taxes, and any other charges for products returned to any other locations.

Warranty is subject to the limitations and exclusions set forth in the paragraphs that follow.

WARRANTY SET FORTH ABOVE IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS.

Exclusions

Warranty coverage shall not apply to any claimed defect, failure or damage which PSC determines was caused by: abuse, neglect, improper use of product; failure to provide product maintenance, including but not limited to cleaning of the display in accordance with product reference guide; installation or service of product by other than PSC representatives; use of product with any other instrument, equipment or apparatus; modification or alteration of product or units with Warranty Void labels that have been tampered with. External cables and replacement of upper window/cartridge due to scratching, stains or other degradation will not be covered under the Warranty. External power supplies returned for service must be accompanied by the original product for performance of service.

Returned products that PSC inc. has determined are not covered by Warranty, will be charged PSC Inc. standard repair rates then in effect for repair of product. Replacement of display due to scratching, stains or other degradation will not be covered under Warranty. If a product is determined to be not repairable customer will be notified and product may be returned to customer at their request. A minimum repair fee may be charged.

Limitation of Liability

PSC's REPAIR OR REPLACEMENT OF DEFECTIVE PRODUCT AS SET FORTH ABOVE IS THE CUSTOMER'S SOLE AND EXCLUSIVE REMEDY ON ACCOUNT OF CLAIMS OF BREACH OF WARRANTY OR PRODUCT DEFECT. UNDER NO CIRCUMSTANCES WILL PSC BE LIABLE TO CUSTOMER OR ANY THIRD PARTY FOR ANY LOST PROFITS, OR ANY INCIDENTAL, CONSEQUENTIAL IN-DIRECT, SPECIAL OR CONTINGENT DAMAGES REGARDLESS OF WHETHER PSC HAD ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES.

Assignment

Customer may not assign or otherwise transfer its rights or obligations under Warranty except to a purchaser or transferee of product. No attempted assignment or transfer in violation of this provision shall be valid or binding upon PSC.

Risk of Loss

Customer shall bear risk of loss or damage for product in transit to PSC. PSC shall assume risk of loss or damage for product in PSC's possession or product being returned to Customer by PSC, except such loss or damage as may be caused by the negligence of Customer, its agents or employees. In the absence of specific written instructions for the return of product to Customer, PSC will select the carrier, but PSC shall not thereby assume any liability in connection with the return shipment.

Electrical Warnings, Safety Precautions & Regulatory Statements

Electrical Warnings

WARNING

To ensure safe operation when using the standard 110/220 VAC Power supply, the three prong electrical plug must be inserted into a standard three prong electrical power plug. The power plug should be grounded through the normal wiring.

During installation, make sure that the main outlet socket is easily accessible; this allows users to remove the dock from the power supply by unplugging the unit.

Only three-prong, grounded extension cords should be used. Improperly wired extension cords are a major cause of fatalities!

Only use PSC approved accessories and peripherals.

Safety Precautions

The PSC Falcon 4400 Series is a powerful, compact, rugged data terminal, ready for installation in mobile environments using the Powered Vehicle Dock. However, there are some safety precautions you should take to protect the terminal from unnecessary damage.

CAUTION

Do not place the terminal near a television or radio receiver.

Keep the terminal away from magnets and from magnetic fields.

Chapter 1
Introduction

Manual Overview

- Chapter 1 provides an introduction to the features of the Powered Vehicle Dock.
- Chapter 2 specifies important electrical considerations to observe when installing the unit.
- Chapter 3 describes the various peripheral connections made to the Dock, and their functions.
- Chapter 4 contains instructions for mounting.

Document Conventions

Formatting conventions are used throughout this guide to provide a consistent method for representing the user interface and vehicle mount dock. This guide also provides special conventions for information of high interest, in the form of notes, cautions, and warnings.

Notes contain information that is helpful and recommended. They provide information that is critical to operations and/or procedures described in this manual.

CAUTION

Cautions inform you that proper handling (adherence to the procedures described) is required to avoid damage to equipment and/or property.

WARNING

Warnings alert you to potential physical harm or injury. These statements do not include potentially fatal hazards, which would be designated as 'DANGER' blocks. Use of this product does not warrant the need for a DANGER block.

About the Powered Vehicle Dock

The Powered Vehicle Dock (PVD) is a rugged cradle for Falcon 4400 Series Win CE .NET data terminals, for use on mobile vehicle applications. This guide is intended to address some of the factors to consider when installing the PVD on gas, diesel, propane or electric powered forklifts.

To ensure you have the latest version of manuals and instructions for this product, download them from the PSC website listed on the back cover of this manual.

The procedures describe installation for most standard mounting applications; however, if your target installation does not generally match any of the mounting options detailed, contact PSC for technical support regarding a custom installation.

Features of the Powered Vehicle Dock

- Power On Indicator
- Rugged holder for the Falcon terminal
- Battery charging for the Falcon terminal
- Versatile mounting options
- Two serial port connections for peripherals (with power available)
- Additional styluses included

Figure 1. Features of the F4400 Powered Vehicle Dock

Electrical Specifications:

- Input voltage range: +12 to +18V
- Power consumption: <50 MA with no load
- +12v available on COM A and COM B ports

Unpacking

Unpack the unit carefully and ensure you received everything you ordered. Refer to your packing slip for an exact list of items delivered, which may include some or all of the following items:

- Powered Vehicle Dock
- Power Charging Cable
- Installation Guide

- Ram Ball Mount Kit
  - Ram Ball Assembly
  - Assorted Screws
  - Any additional accessories required for your installation

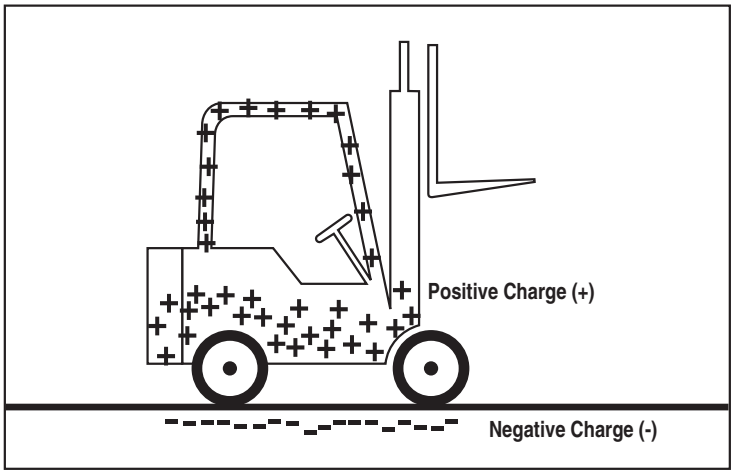
If any parts are missing, please contact your dealer or refer to “Troubleshooting” on page 23 for PSC Technical Support contact information.

Chapter 2
Electrical Considerations

Electrostatic Build-up

One common characteristic of forklifts is the possibility of producing high levels of electrostatic voltage. Static is created by the wheels as they move about the floor and can also be generated when an operator slides on or off of a vehicle's cloth-covered seat. Static buildup on the forklift frame can be as high as several thousand volts (see Figure 2). At these levels of high voltage, a discharge can cause severe damage to electronic devices.

Figure 2. Static Build-up on a Forklift Frame



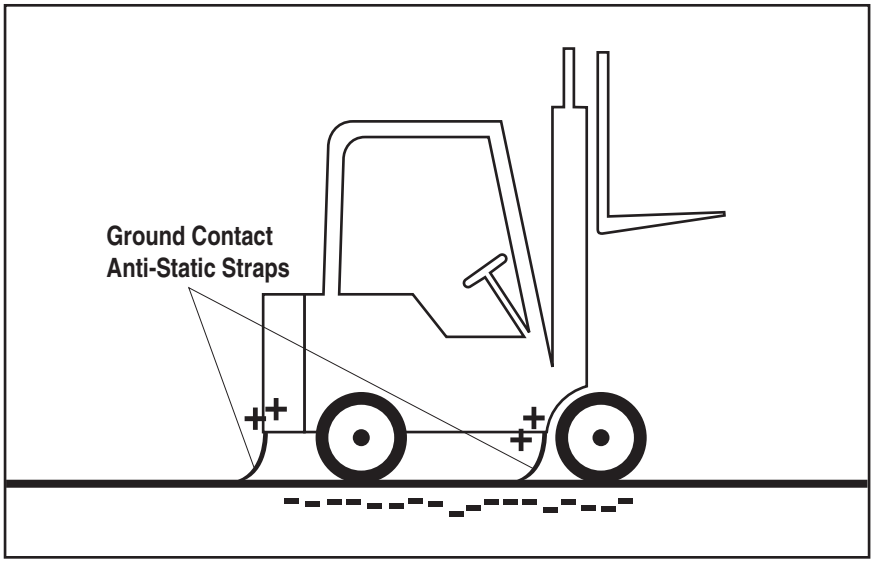
There are several factors which affect the levels of static buildup on a forklift. For instance, the type of materials used to make the wheels can help to reduce static, as well the conductive properties of the flooring and the relative humidity in the air. Static buildup will remain on the vehicle until it can be dissipated. Lowering the front forks to make contact to the floor surface can typically do this. However, eliminating the potential for static buildup is the best means of protection for both operator and equipment.

Ground Contact Anti-Static Straps

The recommended method of reducing static buildup is to install ground contacting anti-static straps or conductors to the frame of the forklift (refer to Figure 3).

Contact your forklift parts provider for availability.

Figure 3. Installing Ground Contact Anti-Static Straps



It is recommended that more than one strap be installed on each vehicle to help eliminate or reduce the potential for static buildup while the vehicle is in motion. This will provide an adequate level of redundancy, should one of the straps become dislodged from the lift.

Ground Contact Anti-Static Straps should be checked at regular intervals to ensure proper installation or identify need for replacement.

Electrical Accessories

Installation of the PVD may require accessory electronic equipment for proper and safe operation. Some of this equipment may not be available through PSC, but could be available through your dealer, forklift parts provider, or other suppliers. See Appendix A, “Accessories and Peripherals” on page 25.

DC/DC Converter. Voltage step down device used to power the terminal from +24, +36 and +48 volt battery systems.

DC Conditioner/UPS. Used to provide backup DC power during sags or interruptions in battery voltage due to peak loads or disconnect.

Delay Timer. Provides automatic shut-off of power to a terminal or other equipment, to reduce battery drain.

Noise Spike/RF Filter. Used to suppress high voltage and RF voltage spikes on the power system.

Electrical Accessory Matrix

Table 1 summarizes the accessory recommendations and options available depending on the forklift voltage application. This matrix should be used only as a reference and may not include accessories for all applications.

Table 1. Electrical Accessories

Accessory	Forklift System Voltage			
	12 volt	24 volt	36 volt	48 volt
DC/DC Converter	Not Required	Required	Required	Required
DC Conditioner/UPS	Optional*	Not Required	Not Required	Not Required
Delay Timer	Optional*	Optional*	N/A	N/A
Noise Spike/RF Filter	Recommended	Recommended	Recommended	Recommended
5-Amp Dock In-Line Fuse	Required	Required	Required	Required

*Ensure that the device being installed is properly rated for use on your vehicle.

Electrical System Connections

This section covers electrical connection to +12V, +24V, +36V and +48V systems.

CAUTION

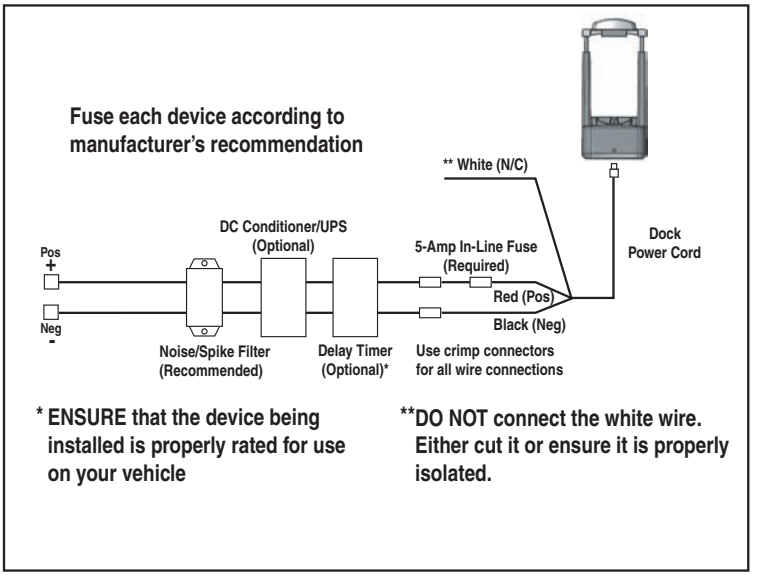
Proper installation requires that source power connections be made directly to the vehicle's positive and negative battery terminals. It is important to maintain electrical isolation when installing the powered vehicle dock and any accessory equipment, to ensure safe and proper operation. Do not make any electrical connections directly to the chassis of the forklift.

Connection to +12V

Figure 4 illustrates a typical wiring connection for a +12 volt system. The input voltage operating range of the dock will allow direct connection to the battery terminals. However, the use of a 5-Amp fuse is required, and a Noise Spike/RF filter is highly recommended.

Accessory equipment may also be required depending on your application, Refer to Table 1 on page 2-7. Read and follow all manufacturer's installation instructions carefully.

Figure 4. Wiring Diagram for +12V Systems



Connection to +24V, +36V and +48V Systems

Figure 5 illustrates a wiring diagram for +24, +36 and +48 volt systems. The use of a DC/DC converter is required to step down the battery voltage for use by the terminal.

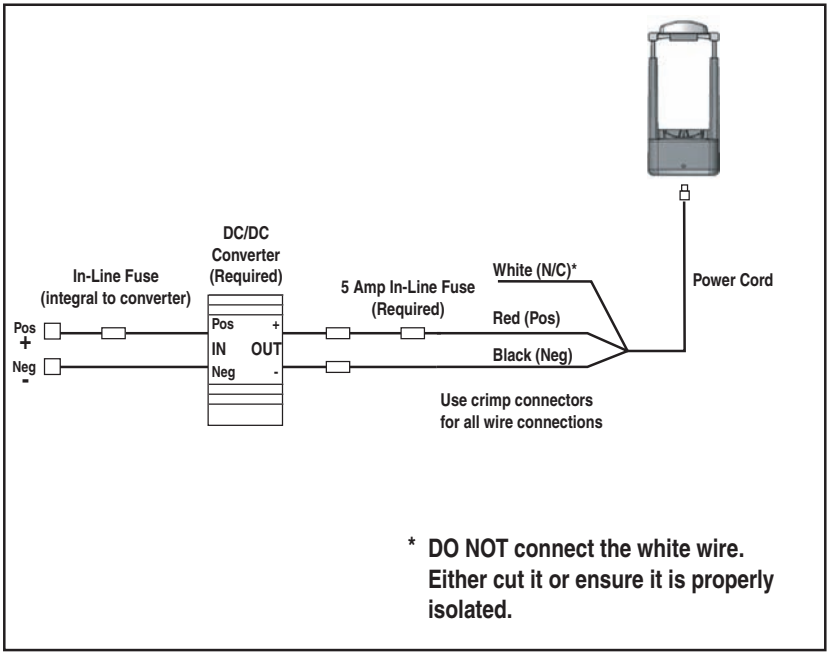
CAUTION

Proper installation requires that source power connections be made directly to the vehicle's positive and negative battery terminals. It is important to maintain electrical isolation when installing the PVD and any accessory equipment, to ensure safe and proper operation. Do not make any electrical connections directly to the chassis of the forklift.

When using any optional equipment caution must be taken to ensure that +24, +36 or +48VDC does not exceed any voltage rating for these devices. Follow all manufacturer's installation instructions carefully.

Some DC/DC converters provide internal Noise Spike/RF filtering. The use of an additional filter is optional.

Figure 5. Wiring Diagram for +24V, +36V and +48V Systems



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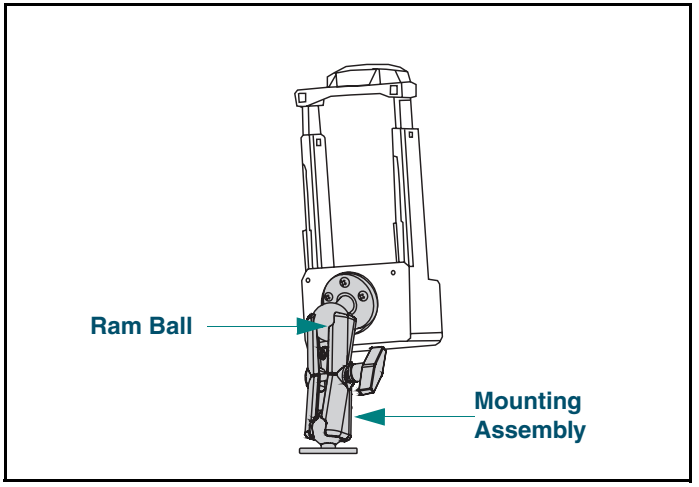
Chapter 3
Mounting Options

Ram Ball Mounting Assembly

This chapter outlines the steps needed to assemble and mount the Powered Vehicle Dock using the Ram Ball mount accessory. The Ram Ball and mounting assembly, shown in Figure 6, combine to form an extremely a flexible mounting assembly. This assembly allows wide range of rotation for the Vehicle Dock. It can be mounted on any flat horizontal or vertical surface.

Figure 6. The Ram Ball Mount



CAUTION

Install only on properly grounded vehicles. If this Dock is used on an electric vehicle, ensure that no part of the PVD and PDA can come into contact with the vehicle chassis. Electrical discharges can develop on these vehicles, which can damage the PVD and/or PDA. Refer to "Electrical Considerations" starting on page 5 for important information.

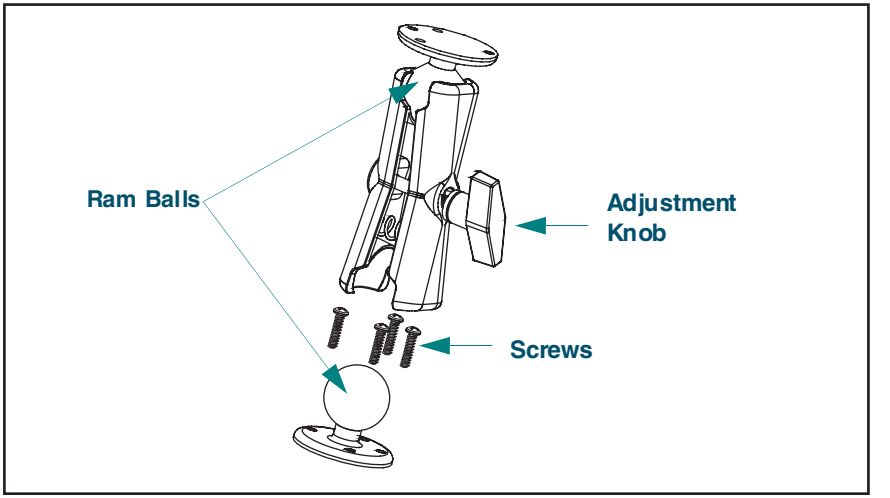
Components, Materials and Tools

- Ram Ball Assembly (sold separately)
- 8 screws and nuts for mounting Ram Ball (supplied)
- Phillips head screwdriver

Ram Ball Assembly (sold separately)

1. Loosen the large adjustment knob handle on the Ram Ball assembly.
2. Remove both Ram Balls from the mount as demonstrated in Figure 7.

Figure 7. Ram Ball Assembly

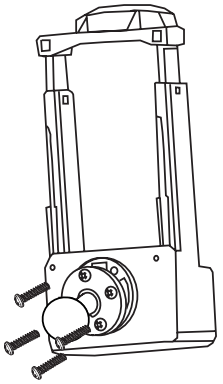


3. Use four screws (customer supplied) to secure one of the Ram balls to the desired mounting surface. Set the other Ram ball aside to use later in the assembly process.
4. Re-attach the Ram Ball Assembly to the Ram Ball you just affixed to the mounting surface.

Attaching the Ram Ball to the Vehicle Dock

1. Align the second Ram Ball with the four screw holes on the rear of the Vehicle Dock as shown in Figure 8.

Figure 8. Installing the Ram Ball on the Vehicle Dock

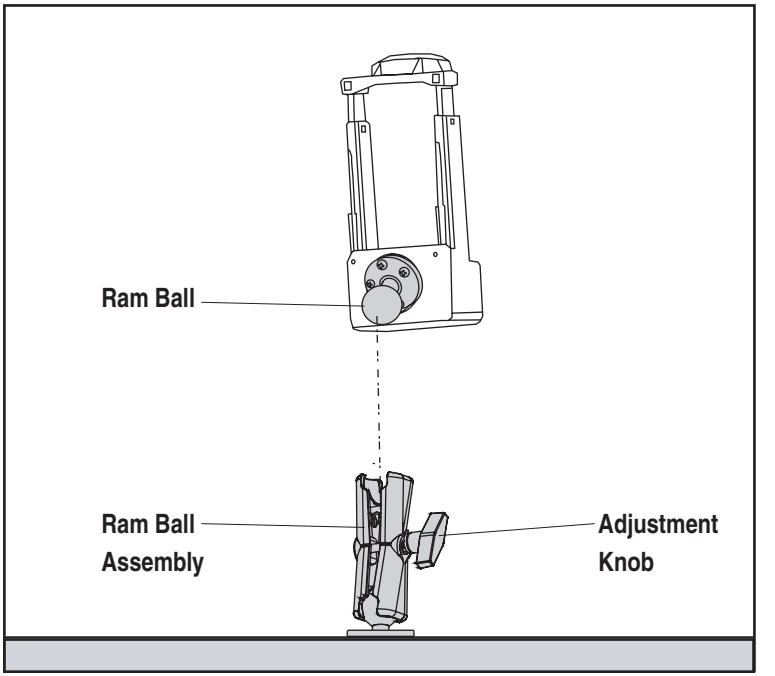


Secure the Ram Ball to the mounting area using the four supplied 10-24 x 5/8” Phillips head screws and four supplied 10-24 hex nuts.

Final Assembly

1. Insert the Ram Ball, mounted to the rear of the Vehicle Dock assembly, into the Ram Ball assembly you earlier affixed to the mounting surface (see Figure 9). Tighten the adjustment knob to secure the Ram Ball in place.

Figure 9. Installing the Vehicle Dock Assembly on the Mount



2. Loosen the Adjustment Knob slightly to tilt the Vehicle Dock to the desired mounting angle. Re-tighten the Adjustment Knob securely.
3. Route and connect all cables (see "Power and Peripheral Device Connections" starting on page 19 for more on connections). If you haven't already prepared the power connection, reference "Electrical Considerations" starting on page 5 for wiring information.

Inserting/Removing the 4400

Inserting the 4400 in the Dock

To insert a 4400 terminal into the Powered Vehicle Dock, perform the following steps:

1. Slide the Falcon up under the top of the Powered Vehicle Dock.
2. Push upwards to lift the spring-loaded top to allow insertion of the Falcon as shown in Figure 10 on page 15.

Figure 10. Inserting a Falcon 4400 in the Vehicle Dock

3. Keeping the top of the Terminal in contact with the Dock, push the bottom of the terminal upward.

Figure 11. Pushing the 4400 upward

4. Seat the bottom of the Terminal into the cradle on the Dock.

Figure 12. Seating the Falcon into the Dock

Insertion of the 4400 in the Dock is complete.

Removing the 4400 from the Dock

To remove the Falcon 4400 from the Dock:

1. Grasp the Falcon terminal.
2. Lift upwards while pulling the bottom of the terminal forward.

Figure 13. Removing the 4400 from the Dock

3. Slide the top of the Falcon out from under the top of the Dock.

Removal of the Falcon from the Dock is complete.

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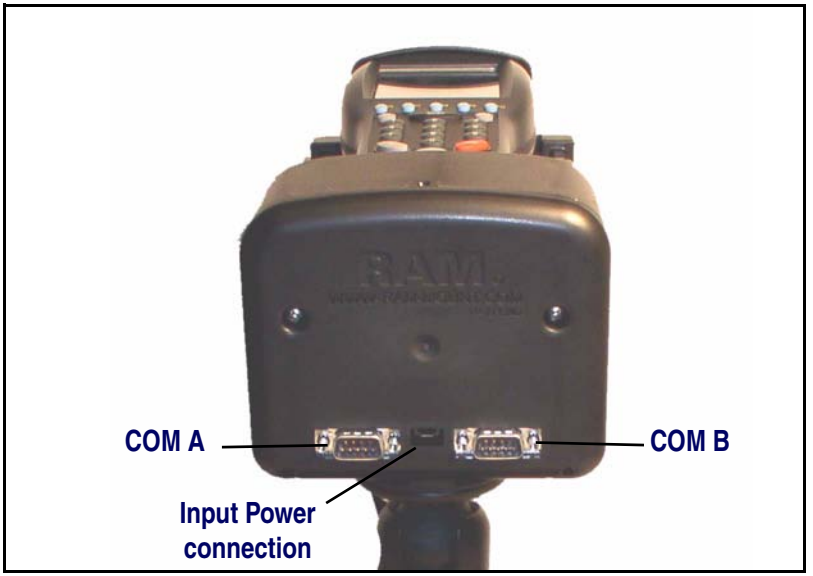
Chapter 4
Power and Peripheral Device Connections

This chapter describes connection of peripheral devices that are provided with or available for the Falcon® 4400 Series PVD system. For more on power connections, see “Electrical Considerations” starting on page 5.

Connections on the Dock

Figure 14 shows the connection located on the bottom of the dock. See the following pages for more information about these connections.

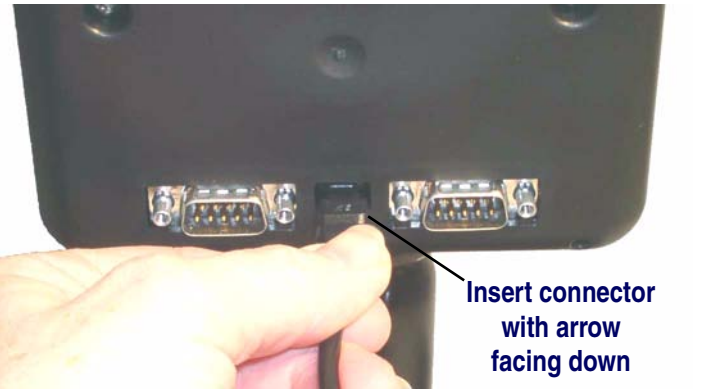
Figure 14. Cable Connections



Power Connection

Insert the DC power cord at the power port with the arrow on the connector facing down, toward the rear of the dock. When power is applied to the dock, the Power-On LED will light.

Also refer to "Electrical Considerations" starting on page 5 for complete information and wiring diagrams detailing power connection. When powered, the dock power-on LED will light.



For non-mobile applications, an AC power supply adapter is available to power the PVD. Contact your local distributor or PSC sales for additional information.

Battery Charging

The PVD provides battery charging for the Falcon terminal when powered.

The Falcon terminal must be powered on when inserted in the dock in order to charge the batteries.

COM Port Connections

The PVD includes two powered DTE serial port connections to allow the Falcon terminal to communicate with peripherals, such as a PowerScan® handheld scanner or a portable printer. +12v is available on pin 9 of each port connector for power to a peripheral. However, since the Falcon terminal can only communicate with one peripheral at a time, the dock includes circuity to

minimize data contention between any two peripherals connected to the dock. This feature is enabled only if hardware flow control is enabled.

Some peripherals may not follow all of the specifications for RS-232 hardware flow control. These will require additional or special considerations when used with the dock. See Table 2 for COM port pinouts.

Table 2. COM port DB9M Pinouts

Pin No.	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	+12 @ 200Ma

Refer to the PowerScan User's Guide for more information on the handheld scanner.

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Appendix A
Troubleshooting

Hardware Troubleshooting

Issues with Power to the Dock

- Ensure that the Hirose connector is pushed securely into the power plug.
- When power to the unit is turned on, a light will appear on the Dock.

Refer to the *Falcon 4400 Series Quick Reference Guide* (QRG) for information about powering on the Falcon and a description of its LED functions.

PSC Technical Support

PSC Website Support

PSC's website at www.psc.com is the complete source for technical support and information for PSC products. The site offers PSC's new TekForum, product support, product registration, warranty information, product FAQs (frequently asked questions), product manuals, product tech notes, software updates, patches, demos, and instructions for returning products for repair.

PSC WebsiteTekForum

Search for information on the TekForum by clicking on the **Support** link at the top of PSC's home page then click on TekForum. Browse the TekForum at PSC's website to find answers to your questions about common technical issues. Register with TekForum to submit a question to the PSC Technical Support Staff.

Reseller Technical Support

An excellent source for technical assistance and information is an authorized PSC reseller. A reseller is acquainted with specific types of businesses, application software, and computer systems and can provide individualized assistance.

Telephone Technical Support

If you don't have internet or email access, please contact PSC technical support by telephone at (541) 349-8281.

Appendix B
Accessories and Peripherals

Overview

Installation of the PVD may require accessory electronic equipment for proper and safe operation. Contact your reseller or PSC sales for information about availability.

Table 3. F4400 Vehicle Dock Accessories

Item	Description
	4400 Powered Vehicle Dock (Mounting hard-ware not included)
	Mount, RAM Base w/ 1.5" Ball
	Mount, RAM 5.5" 2x Socket, 1.5" Ball

Item	Description
	Mount, RAM 2.5" Wide Clamp Base w/1.5" Ball (Accommodates up to 2.5" wide posts)
	Mount, RAM 3.5" 2x Socket, 1.5" Ball
	Mount, RAM 6" Base Plate
	Mount, RAM 7.35" Assy w/ 2x 1.5" BALLs
	Kit, RAM Mount, Base w/ 1.5" ball, 5.5" socket, 2.5" wide clamp w/1.5" ball. (Includes one each)

Item	Description
	Mount, RAM 5.25" Assy w/ 2x1.5" BALLs
	110/220 AC/DC Power Supply
	Power Cord, Bare lead, 8',
	DC Converter, 18-55VDC IN / 13.8V 10Amp Out
	DC Noise Spike Filter, 4-60VDC, 8Amp

Item	Description
	Kit, Inline Fuse **5** Amp

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