Falcon® 4220
Powered Vehicle Dock



Installation Guide



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PSC Falcon® 4220 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



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.

WARNING **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 Falcon® 4220 is PSC's latest generation PDA device, combining a compact, ruggedized form factor with the flexibility of Microsoft's CE .NET operating system. The 4220 is ready for installation in mobile environments using the Powered Vehicle Dock. However, there are some safety precautions you should take to protect the PDA from unnecessary damage.



CAUTION

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

Keep the PDA away from magnets and from magnetic fields.

Compliance Statement

This device complies with Part 15 rules. Operation is subject to the following conditions:

1. This device may not cause harmful interference; and

2. This device must accept any interference received, including interference that may cause undesired operation.

This Class A digital apparatus complies with Canadian ICES -003.
Cet appareil numérique de la classe A est confrome à la norme NMB-003 du Canada.

This device complies with Automotive Directive 95/54/EEC.

NOTES

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 4220 Powered Vehicle Dock (PVD) is a rugged cradle for Falcon® 4220 Win CE .NET ruggedized PDAs, 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
- Provides power for battery charging of the Falcon terminal
- Versatile mounting options
- Two serial port connections for peripherals (with power available)

Figure 1. Features of the Powered Vehicle Dock



Electrical Specifications:

- Input voltage range: +9 to +28vdc
- Power consumption: Less than 100ma without 4220 installed, max 3.5 amps with 4220 PDA charging and both COM ports supplying power

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 Cable
- Installation Guide

- Ram Ball Mount Kit (ordered separately)
  - Ram Ball Assembly
  - Assorted Screws
  - Any additional accessories required for your installation

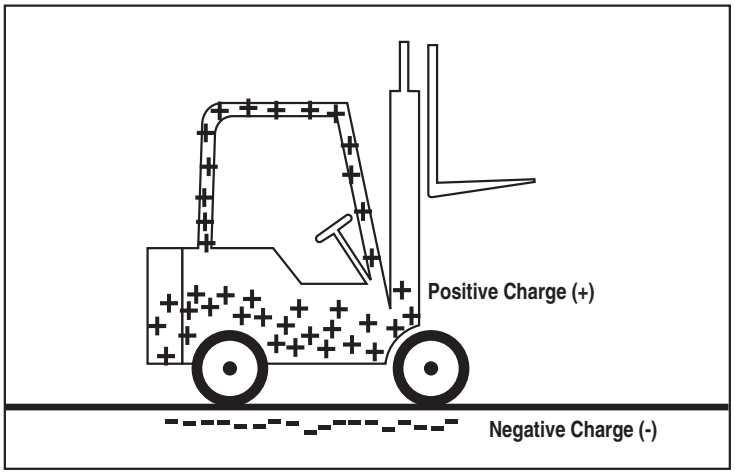
If any parts are missing, please contact your dealer or refer to “Troubleshooting” on page 21 for PSC contact information.

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



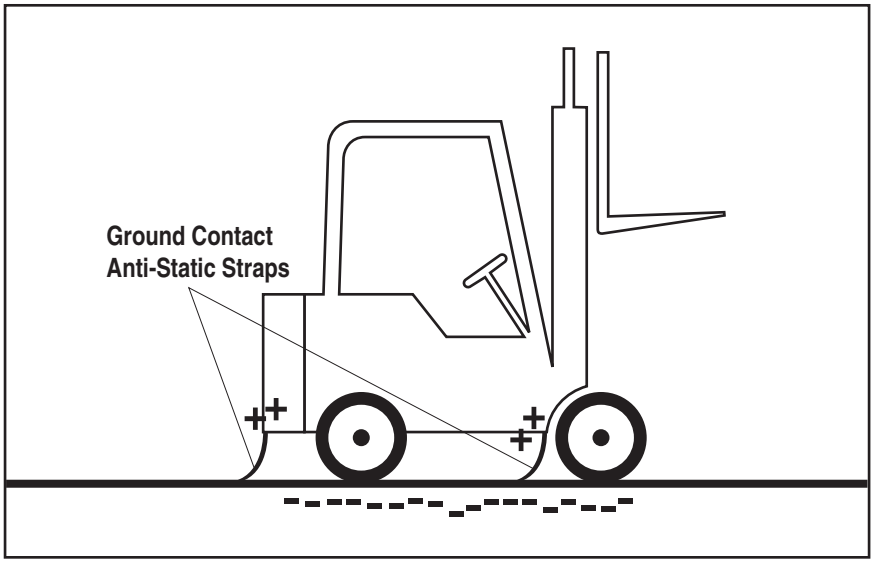
There are several factors which affect the levels of static buildup on a forklift. For instance, the type of materials used to make the wheels can help to reduce static, as well the conductive properties of the flooring and the relative humidity in the air. Static buildup will remain on the vehicle until 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.

DC/DC Converter. Voltage step down device used to power the PDA from +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	Optional*	Required	Required
DC Conditioner/UPS	Optional*	Not Required	Not Required	Not Required
Delay Timer	Optional*	Optional*	N/A	N/A
Noise Spike/RF Filter	Required	Required	Required	Required
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

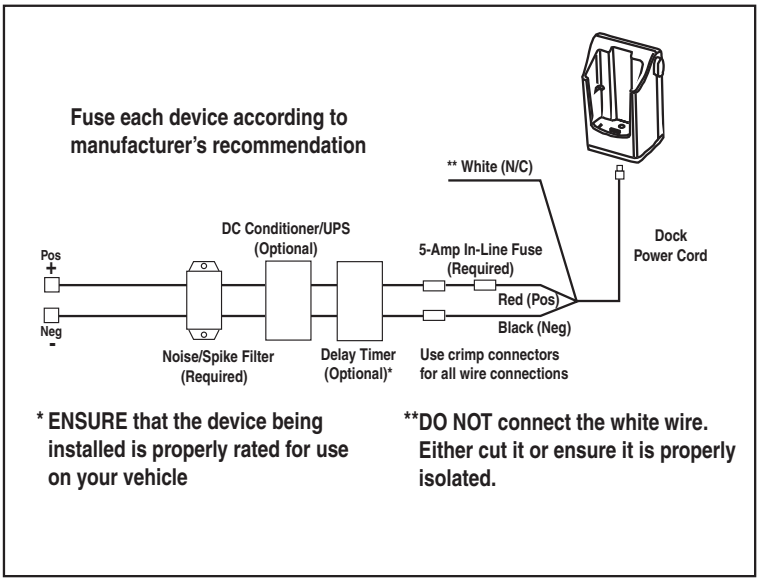
Proper installation requires that source power connections be made directly to the vehicle's positive and negative battery terminals. It is important to maintain electrical isolation when installing the powered vehicle dock and any accessory equipment, to ensure safe and proper operation. Do not make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

Connection to +12V and +24V Systems

Figure 4 illustrates a typical wiring connection for a +12 volt and +24 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 (as shown in Figure 4), and use of a Noise Spike/RF filter is required.

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

Figure 4. Wiring Diagram for +12V and +24V Systems



Connection to +36V and +48V Systems

CAUTION

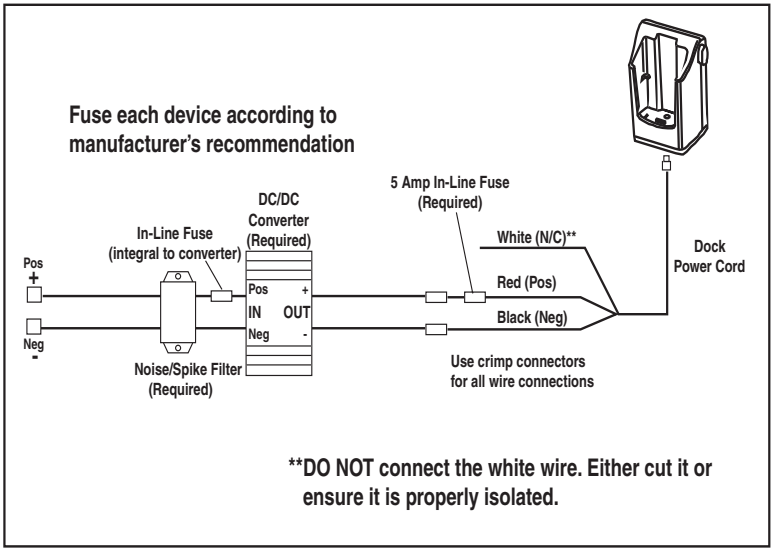
Proper installation requires that source power connections be made directly to the vehicle's positive and negative battery terminals. It is important to maintain electrical isolation when installing the PVD and any accessory equipment, to ensure safe and proper operation. Do not make any electrical connections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

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

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

Some DC/DC converters provide internal Noise Spike/RF filtering. However, the use of an additional filter is required.

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



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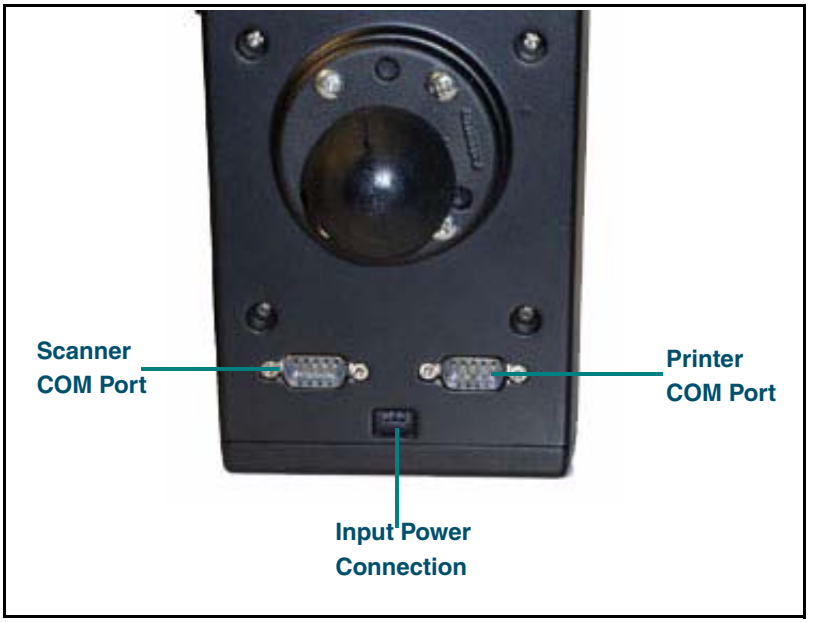
Chapter 3
Power and Peripheral Device Connections

This chapter describes connection of peripheral devices that are provided with or available for the Falcon® 4220 Powered Vehicle Dock system. For more on power connections, see “Electrical Considerations” starting on page 5.

Connections on the Dock

Figure 6 shows the connection located on the back side of the dock. See the following pages for more information about these connections.

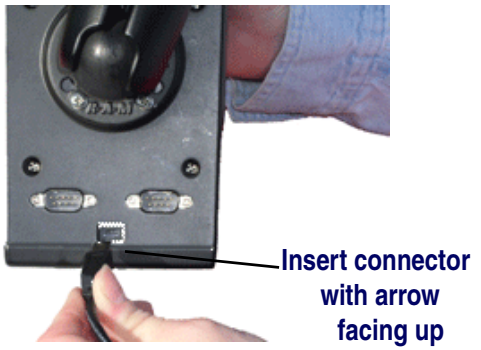
Figure 6. Cable Connections



Power Connection

Insert the DC power cord at the power port with the arrow on the connector facing up, toward the rear of the dock. When power is applied to the dock, the Power-On LED will light. When the PDA is inserted into a powered dock, the Power On/Charging LED on the PDA will also be lit.

Also refer to "Electrical Considerations" starting on page 5 for complete information and wiring diagrams detailing power connection.



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.

COM Port Connections

You must have the Falcon 4220 PDA attached to the Vehicle Dock and powered on in order for the COM ports to function.

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 on all devices connected to the Dock.

Using the COM ports

Serial peripherals connecting to the serial ports on the dock are available to the Falcon terminal as COM2. Some peripherals are considered as input devices (scanner) or an output device (printer) and are configured to communicate using serial protocol. However, PSC has available a serial wedge program (WedgeCE) which allows incoming serial data to be received into the keyboard buffer, for applications requiring keyboard data entry. Go to the PSC website (www.psc.com) to download the latest version of the WedgeCE program.

Two input devices (for example, a handheld scanner and a mag stripe reader) connected to the serial ports on the dock may communicate to the terminal in a half duplex mode, if these use the same application. If the dock has one input device (scanner) and one output device (printer) connected, then the application must be able to handle both input data, from a scanner, and output data, to a printer, over the same open COM2 port. Both serial ports on the dock are connected to the same logical port (COM2) on the terminal and in most instances, the ability for more than one application to share a logical COM port may not be possible.



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. Reference 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 @ 250mA

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Chapter 4
Mounting the Dock

Mounting Assembly

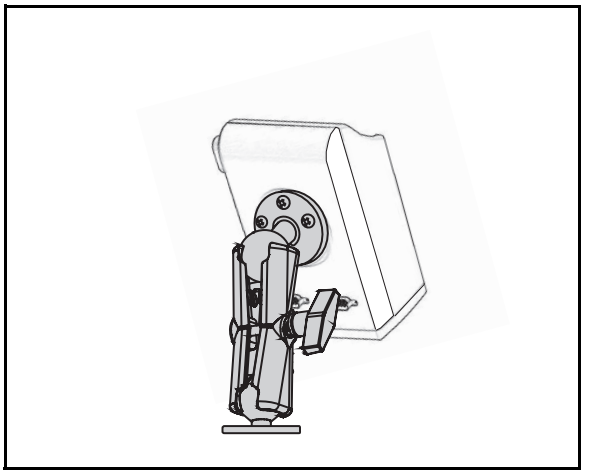


CAUTION

Install only on properly grounded vehicles. If this Dock is used on an electric vehicle, ensure that any part of the PVD and PDA do not come into contact with the vehicle. 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.

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 7, combine to form an extremely flexible mounting assembly. This assembly allows free rotation of the Vehicle Dock. It can be mounted on any sufficiently sturdy flat surface: horizontal, vertical, or even overhead.

Figure 7. The Ram Ball Mount



Mounting Options

The RAM Ball mount allows for mounting to flat surfaces or the vehicle frames using a RAM Ball joint and arm for maximum adjustment options.

Figure 8. Mounting on Powered Vehicle Dock



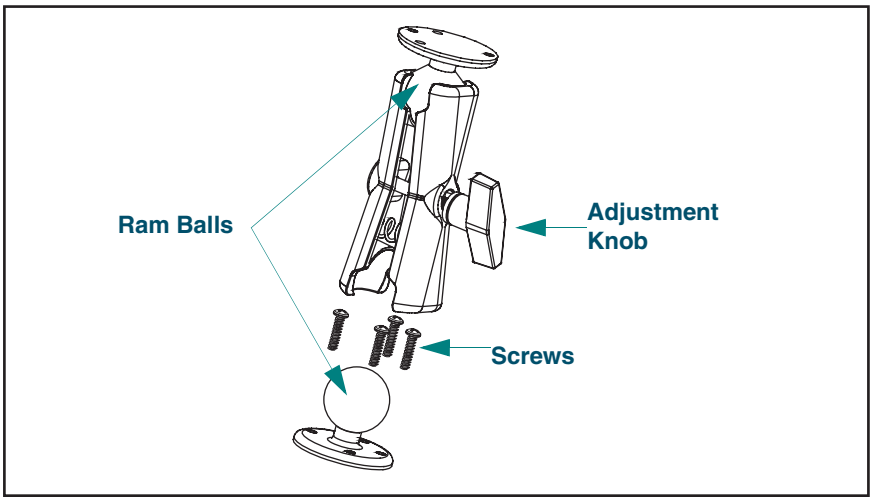
Components, Materials and Tools

- Ram/Ball Assembly (ordered separately)
- Four 5/8” screws (supplied) and four surface mounting screws (customer supplied)
- Philips head screwdriver

Ram Ball Assembly

1. Loosen the large adjustment knob handle on the Ram Ball assembly.
2. Remove both Ram Balls from the mount as demonstrated in Figure 9.

Figure 9. Ram Ball Assembly

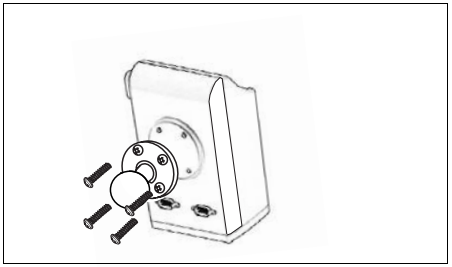


3. Use four screws (customer supplied) to secure one of the Ram Balls to the desired mounting surface. Set the other Ram ball aside to use later in the assembly process.
4. Re-attach the Ram Ball Assembly to the Ram Ball you just affixed to the mounting surface.

Attaching the Ram Ball to the Vehicle Dock

1. Align the second Ram Ball with the four screw holes on the back of the Vehicle Dock as shown in Figure 10.

Figure 10. Installing the Ram Ball on the Vehicle Dock

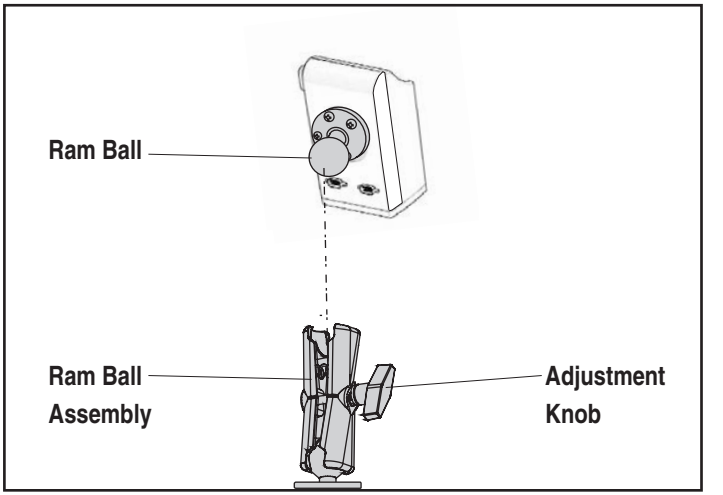


2. Secure the Ram ball to the mounting area using four supplied 8-32 x 5/8” Philips head screws.

Final Assembly

1. Insert the Ram Ball projecting from the back of the Vehicle Dock assembly into the Ram Ball assembly you earlier affixed to the mounting surface (see Figure 11). Tighten the adjustment knob to secure the Ram Ball in place.

Figure 11. Installing the Vehicle Dock Assembly on the Mount



2. Loosen the Adjustment Knob slightly to tilt the Vehicle Dock to the desired viewing angle. Re-tighten the Adjustment Knob securely.
3. Route and connect all cables (see "Power and Peripheral Device Connections" starting on page 11 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 4220

Inserting the 4220 into the Dock

To insert the 4220 PDA into the Powered Vehicle Dock, perform the following steps:

1. Align the PDA with the Dock.
2. Slide the PDA into the Dock until it locks firmly into place. See Figure 13.

Figure 12. 4220 Vehicle Dock

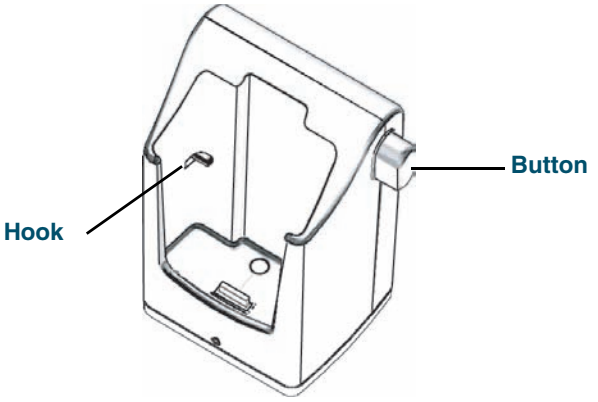


Figure 13. Inserting the 4220 into the Vehicle Dock



Insertion of the 4220 to the Dock is complete.

Removing the 4220 from the Dock

To remove the 4220 from the Dock:

1. Push the button on the side of the dock (see Figure 14).
2. Grasp the PDA and slide it out of the Dock.

Figure 14. Removing the 4220 from the Dock



Removal of the 4220 from the Dock is complete.

Appendix A
Troubleshooting

Hardware Troubleshooting

Issues with Power to the Dock

- Ensure that the power connector is pushed securely into the power port.
- When power to the Dock is turned on, the power-on LED will be lit.

Refer to the *Falcon 4220 Quick Reference Guide* (QRG) for information about powering the Falcon and a description of its LED functions.

Technical Support

PSC Website Support

The PSC website (www.psc.com) is the complete source for technical support and information for PSC products. The site offers the PSC TekForum, product support, product registration, warranty information, product manuals, product tech notes, software updates, demos, and instructions for returning products for repair.

PSC Website TekForum

Search for information on the TekForum by clicking on the Support link on the PSC home page. Browse the TekForum 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 do not have internet or email access, you may contact PSC technical support at (541) 349-8281.

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R44-2524 (Rev A) 6/05