

# Installing Door Hardware » SIMPLIFIED

Step x Step Installation Guide for commercial door hardware; including, mortise and heavy duty cylindrical locks, rim and surface mounted vertical rod exit devices and door closers.



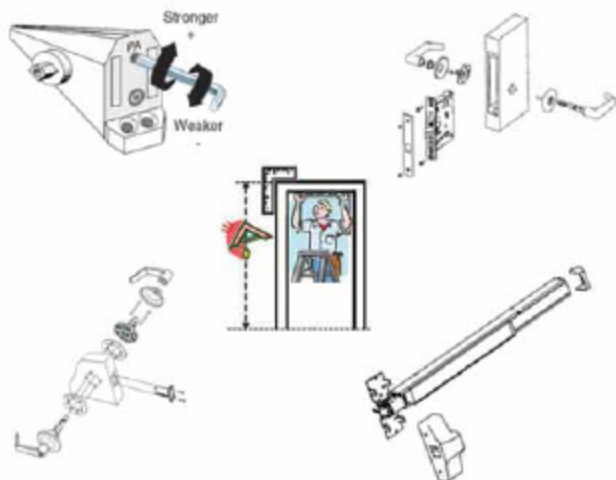
**LEE A. GARVER, DAHC, FDHI**  
Distinguished Architectural Hardware Consultant, Fellow Door and Hardware Institute

## INSTALLING DOOR HARDWARE >> SIMPLIFIED

### What's included

- Door and frame components relating to the installation of a commercial mortise lock, heavy duty grade-1 cylindrical lock, a surface mounted rim, vertical rod exit device and heavy duty surface mounted door closer.
- Important installation techniques with Step by Step instructions with detailed illustrations.
- Important servicing and troubleshooting techniques that will yield cost savings along with trouble-free operation for the entire door assembly.

Installing door hardware has not been written to replace the original lock, exit device or door closers installation instructions or information as to how to install or maintain their products, rather it's written to provide a guide to the critical steps necessary to install and maintain this type of commercial hardware.



All rights are reserved: no part of this book may be reproduced, transmitted, transcribed or translated into any language in any form or by any means whether mechanical, electronic, optical, magnetic or otherwise, unless it is specifically stated within this book or unless prior written permission is granted by the author.

The contents of this book are deemed accurate to the best knowledge of the author. This book will be sold to the consumer without warranty of any kind, either expressed or implied. The book has been checked for accuracy; however, the author assumes no responsibility for errors and/or omissions. The views, recommendations, and hardware groupings are that of the authors and acknowledges that there could be many different variations from that shown and compliances with all local/national codes, standards, and acts must be met.

Images and graphics: It is the intent of the images shown within this book to illustrate or expand on the description of the product(s) and in no way have they been chosen to represent or promote any one manufacturer. Original line drawings were taken with permission from selected manufacturers knowing that the author would modify them to illustrate an application, condition or explanation to further describe its use and/or function. Few clip art images have been taken from Microsoft XP clip art files to enhance a description or further illustrate a condition. Only a few photos, images or line-drawings were taken from various manufacturers websites to illustrate certain product and in no way does their use indicate or authenticate the product as being current or complete, as modifications were made to only show portions of the products photo. Care has been taken to not show any companies logo or branding, the intent of each image is to only give the reader a better visual of the description being described.

The intent of this book is to further expand the knowledge of the installation, servicing and troubleshooting of surface mounted door hardware; its applications, and care. Please see "From the Author" for a more detailed explanation as to the intent of the writing of this book.

### Author:

Lee A. Garver, DAHC, FDHI (Distinguished Architectural Hardware Consultant, Fellow Door and Hardware Institute) is an independent subject matter expert, consultant, instructor, and lecturer with over 40 years of Door and Hardware experience.

## OTHER AUTHORED PUBLICATIONS & WORKS

### Publication:

*Door Hardware Simplified*

Available at [www.doorhardwaresimplified.com](http://www.doorhardwaresimplified.com)

A book designed for the individual who would like to understand more about commercial door hardware.

Targeted for but not limited to all tradesmen, architects, locksmiths, hardware installers, maintenance personnel, building owners, building officials, fire door inspectors. It contains:

- ✓ Door hardware information:
  - Handing, finishes, abbreviations
- ✓ Product:
  - Hinges, locks, cylinders, master keying, exit devices, closers, miscellaneous hardware
- ✓ Care and preventative maintenance:
  - Hinges, locks, cylinders, master keying systems, exit devices, door closers
- ✓ Applications:
  - Exterior doors: both single and pair of doors
  - Interior doors: both single and pair of doors
  - Labeled single and pair of interior doors
- ✓ Appendix:
  - Quick Tips Matrix for preventative maintenance
  - Glossary
  - References

### Works:

Website: [www.doorhardwaresimplified.com](http://www.doorhardwaresimplified.com)

Created to be the go-to site for those individuals who would like to learn more about commercial door hardware, and the place to purchase the book *Door Hardware Simplified* along with *Installing Door Hardware* with links to C.E. Courses by Elite-CEU.

### Current Blogs:

- ✓ Commercial Door Hardware
- ✓ Commercial Door Hardware Training
- ✓ Door Hardware Technician Guide

### Current Videos:

- ✓ Cylindrical Locks
- ✓ Mortise Locks
- ✓ Door Closers

## INSTALLING DOOR HARDWARE >> SIMPLIFIED INDEX

1. Heavy Duty Commercial Mortise Lock.....	7
<i>Door &amp; Frame Components, Handing, Cylinders, Functions, Trim &amp; Strike Plates</i>	
A. Installation of a Mortise Lock .....	18
<ul style="list-style-type: none"> <li>• Step 1 – Marking Door &amp; Jamb</li> <li>• Step 2 – Drilling Trim &amp; Function Holes</li> <li>• Step 3 – Handing the Lock</li> <li>• Step 4 – Installing Lock Case</li> <li>• Step 5 – Installing Trim Mounting Plates</li> <li>• Step 6 – Spindle Types</li> <li>• Step 7 – Installing Trim Handles</li> <li>• Step 8 – Installing Cylinders</li> <li>• Step 9 – Re-tighten Mounting Screws</li> <li>• Step 10 – Install Front Plate</li> <li>• Step 11 – Install Strike Plate</li> <li>• Step 12 – Confirm Locks Operation</li> </ul>	
B. Fasteners .....	23
C. Troubleshooting .....	23
D. Servicing .....	23
2. Cylindrical Lock (Heavy Duty Grade 1 Series) .....	24
<i>Cylindrical Lock Components, Backsets, Latchbolts., Handing, Strike Plates, Functions</i>	
A. Installation of a Cylindrical Lock.....	29
<ul style="list-style-type: none"> <li>• Step 1 – Adjust for Doors Thickness</li> <li>• Step 2 – Install Latchbolt</li> <li>• Step 3 – Install Locks Chassis</li> <li>• Step 4 – Install Mounting Plates</li> <li>• Step 5 – Install Cylinder (single cylinder function)</li> <li>• Step 6 – Install Outside Assembly.</li> <li>• Step 7 – Connecting Latchbolt to Chassis</li> <li>• Step 8 – Install Inside Mounting Plate</li> <li>• Step 9 – Install Inside Rose Assembly</li> <li>• Step 10 – Install Inside Rose</li> <li>• Step 11 – Install Inside Lever</li> <li>• Step 12 – Tighten Latchbolt Fasteners..</li> <li>• Step 13 – Install Strike Plate</li> <li>• Step 14 – Confirm Locks Operation</li> </ul>	
B. Fasteners .....	34
C. Troubleshooting .....	34
D. Servicing.....	35
3. Heavy Duty Commercial Exit Devices .....	36
<i>Types and Models, Stile Widths, Different Categories, Panic and Fire Exit Hardware Labels, Door and Frame Components, Handing, Functions, Dogging</i>	
4. Rim Exit Device .....	45
<i>Rim Exit Devices and Components</i>	
A. Installation of a Rim Exit Device .....	45
<ul style="list-style-type: none"> <li>• Step 1 – Cutting Device to Length</li> <li>• Step 2 – Marking Frame and Door</li> <li>• Step 3 – Install Device</li> <li>• Step 4 – Install End-cap Mounting Plate</li> </ul>	



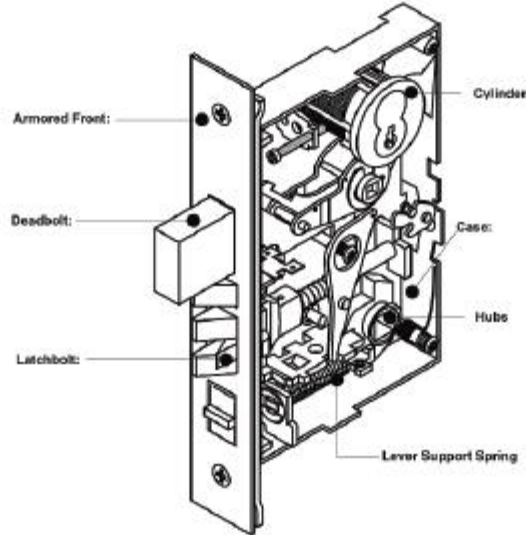
• Step 5 – Install End-cap	
• Step 6 – Install the Strike	
• Step 7 – Install Cover	
• Step 8 – Confirm Exit Device Operation	
B. Fasteners .....	47
C. Troubleshooting .....	48
D. Servicing Rim Exit Devices.....	48
5. Surface Mounted Vertical Rod Exit Device.....	49
<i>Surface Mounted Vertical Rod Exit Device and Components</i>	
A. Installation of a Surface Mounted Vertical Rod Exit Device.....	51
• Step 1 – Cutting Device to Length	
• Step 2 – Marking Door	
• Step 3 – Install Device	
• Step 4 – Install End-cap Mounting Bracket & End Cap	
• Step 5 – Install Bottom Mounting Bracket	
• Step 6 – Install Bottom Latch Assembly	
• Step 7 – Install Bottom Strike	
• Step 8 – Install Bottom Rod	
• Step 8a – Omitting Bottom Rod	
• Step 9 – Mark for Top Mounting Bracket & Strike	
• Step 10 – Install Top Mounting Bracket and Latch Assembly	
• Step 11 – Install Top Strike	
• Step 12 – Install Top Rod	
• Step 13 – Install Covers	
• Step 14 – Install Rod Guide	
B. Final Adjustments .....	58
• Problem with Bottom Latch	
• Problem with Top Latch	
• Device Not Operating Smoothly	
• Latches Not Staying Retracted	
C. Fasteners.....	59
D. Troubleshooting .....	60
E. Servicing Surface Mounted Exit Devices .....	61
6. Cylinder Types for Exit Device Trims.....	62
<i>Outside Operating Trims</i>	
7. Surface Mounted Heavy Duty Door Closer .....	64
A. Door Closer Main Components.....	64
• Mounting Options	
– Regular Arm Mounting	
– Top Jamb Mounting	
– Parallel Arm Mounting	
– Optional Arms & Brackets	
B. Sizing Door Closers .....	68
C. Installing A Regular Arm Mounted Door Closer .....	69
• Step 1RA – Determine Degree of Swing	
• Step 2RA – Marking for Drill Points – Closer Body	
• Step 3RA – Marking for Drill Points – Foot Bracket	
• Step 4RA – Sizing the Closer	
• Step 5RA – Install Closer Body	
• Step 6RA – Connecting Arms	
• Step 7RA – Final Adjustments	
• Step 8RA – Install Cover	

D. Installing Top Jamb Mounted Door Closers.....	74
• Step 1TJ – Determine Degree of Swing	
• Step 2TJ – Marking for Drill Points – Closer Body	
• Step 3TJ – Marking for Drill Points – Foot Bracket	
• Step 4TJ – Sizing the Closer	
• Step 5TJ – Install Closer Body	
• Step 6TJ – Connecting Arms	
• Step 7TJ – Final Adjustments	
• Step 8TJ – Install Cover	
E. Installing Parallel Arm Mounted Door Closers .....	77
• Step 1PA – Determine Degree of Swing	
• Step 2PA – Marking for Drill Points – Closer Body	
• Step 3PA – Marking for Drill Points – Parallel Arm Bracket	
• Step 4PA – Sizing the Closer	
• Step 5PA – Install Closer Body	
• Step 6PA – Connecting Arms	
• Step 7PA – Final Adjustments.	
• Step 8PA – Install Cover	
F. Final Adjustments .....	81
• Sweeping Speed	
• Latching Speed	
• Back Check	
• Delayed Action	
G. Servicing Surface Mounted Door Closers.....	84
• Troubleshooting	
– Correcting Closers Performance	
– Going out of Adjustment	
• Preventative Maintenance	
8. Troubleshooting Quick Tip Matrix .....	85

## 1. HEAVY DUTY COMMERCIAL MORTISE LOCKS

### Mortise Lock

Mortise locks basic terms are: Armored front, deadbolt, latchbolt, cylinder, case, hubs, and lever support springs.



### Components of a mortise lock

Several different components are required to complete a mortise lock.

