

101B, 210X, ELM, 101X Frame Installation & Service Manual

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Each customer is responsible for final site approval.

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1. PRELIMINARY CONSIDERATIONS FOR DOOR AND FRAME SERVICING PROCEDURES

1.1. Safety

Proper safety equipment includes:



Safety Glasses



Work Gloves



Work Shoes



NOTE: Turn off all electrical power prior to beginning work on the door or on any electrical equipment. Use extra caution when working with or around the door glass package.

NOTE: Do Not use power tools for the following procedures.

1.2. Tools

Tools required for this procedure include:

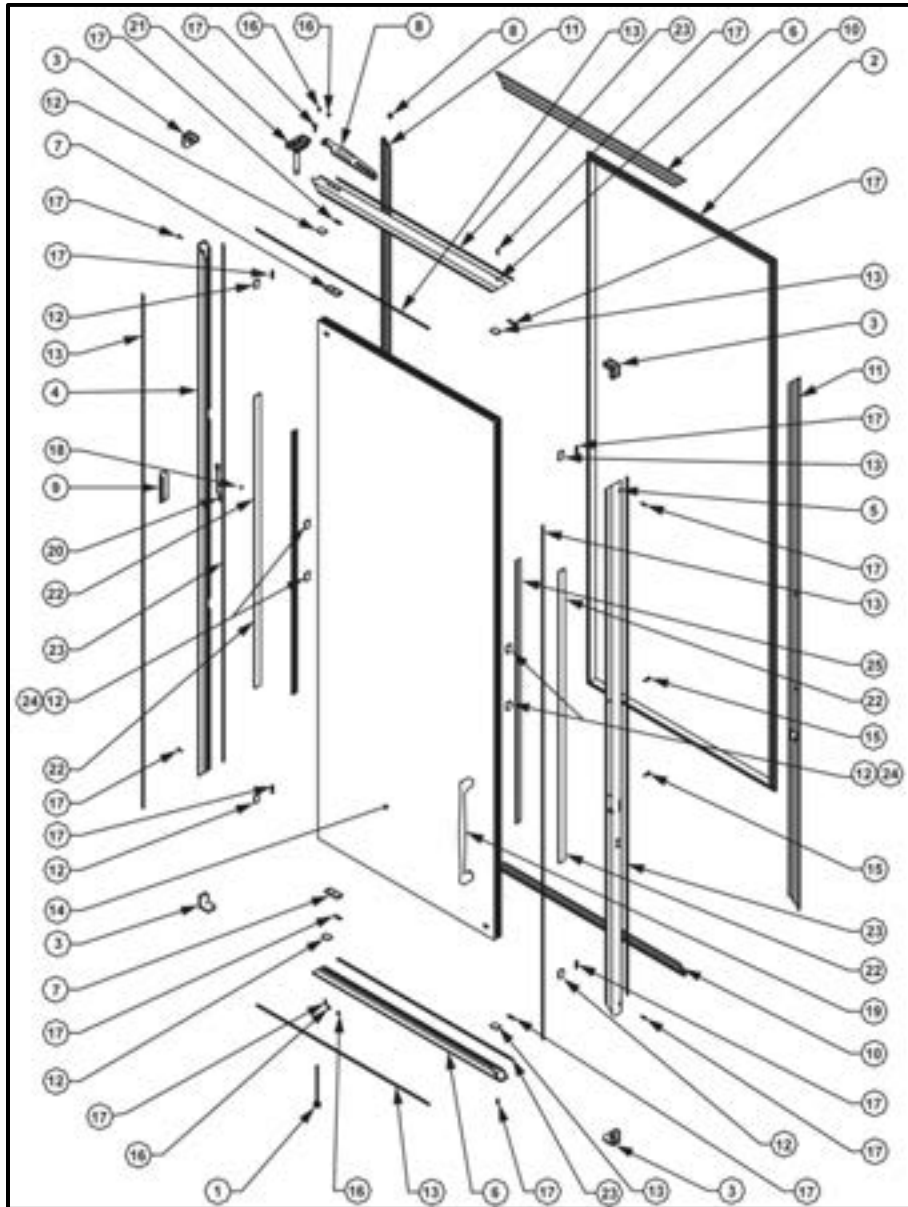
- #2 Phillips-head screwdriver
- Needle-nose pliers
- 7/16" and 1/2" Hand Wrench
- Wire stripper and cutter
- Heat Gun
- Flat-head screwdriver
- Rubber or plastic mallet
- 5/32" Hex Key
- Soldering iron
- Razor Knife

1.3. Tips

- Complete replacement of wire assemblies is recommended whenever required. Splice wires only if necessary, using proper materials: such as electrical tape, wire nuts, flux core solder and heat shrink.
- Apply liquid soap to rail plastic covers and gaskets upon installation to facilitate insertion into mounting grooves.
- Keep doors and frames clean for product efficiency. This can also help reduce energy consumption and potential health hazards.
- Whenever binding gasket or plastic parts, use food grade silicone.
- Whenever replacing fluorescent lamps, always replace lamp covers as well.
- Always use the correct tool for the job to be performed. This ensures proper installation and minimizes safety risks.
- If there is any doubt about the work to be performed, consult with a certified technician or Anthony representative.
- Preventative maintenance is recommended to ensure product longevity.

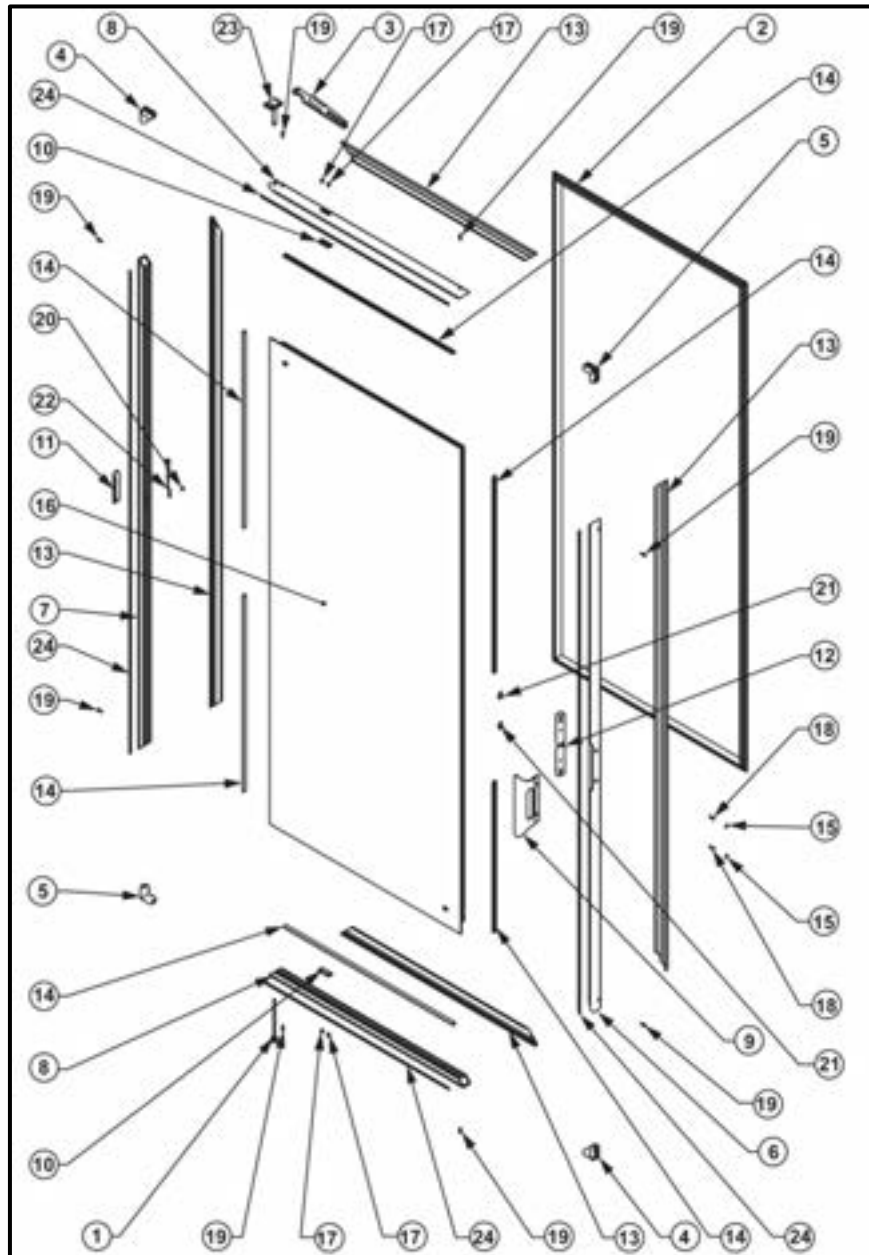
2. PARTS REPLACEMENT

2.1. Model 101B & ELM Door Parts Placement



Description	Description	Description
1. Torque Rod Assembly	10. Top & Bottom Rail Cover	19. Slimline Handle
2. Gasket with Magnet	11. Side Rail Covers	20. Ground Wire Assembly
3. Corner Pieces	12. Wedge Spacer	21. Hinge Pin
4. Door rail (Hinge Side)	13. Vinyl Glazing	22. Sealant
5. Door Rail (Handle Side)	14. Glass Pack Assembly	23. Foam Mounting Tape
6. Top & Bottom Rail	15. 10-28 x 5/8" Screws	24. 3M Hot Melt Sealant
7. Hold Open Backing Plate	16. 3/16" x 3/8" x 3/8" Rivets	25. Door Handle Rail Insert
8. Hold Open Fork & Spacer	17. 8-32 x 5/8" Screws	
9. Access Hole Cover	18. #42 Steel Rivets	

2.2. Model 210X Door Parts Placement



Description	Description	Description
1. Torque Rod Assembly	10. Plate Backing	19. 8-32 x 5/8" Black Screw
2. Gasket with Magnet	11. Access Hole Cover	20. 6-32 x 3/16" Screw
3. Hold Open Fork	12. Handle Mounting Block	21. Weld Nut
4. Left Hand Corner Piece	13. Plastic Cover	22. Heater Wire Plug Assembly
5. Right Hand Corner Piece	14. Door Rail Filler	23. Hinge Pin
6. Handle Rail	15. Cap	24. Foam Tape
7. Hinge Rail	16. Door Glass Package	
8. Top Rail	17. 3/16" x 3/8" Steel Rivet	
9. Door Handle	18. 8-32 x 5/8" Zinc Screw	

2.3. Frame Width Data

2.3.1. Model 101X, 210X, ELM

Catalog Size	Actual Door Size	Number of Doors Per Frame Section				
		1-Door	2-Door	3-Door	4-Door	5-Door
24"	23-3/16"	24-7/8"	48-5/8"	72-3/8"	96-1/8"	119-7/8"
26"	26-3/8"	28-1/16"	55"	81-15/16"	108-7/8"	135-13/16"
28"	28-3/8"	30-1/16"	59"	87-15/16"	116-7/8"	145-13/16"
30"	29-7/8"	31-9/16"	62"	92-7/16"	122-7/8"	153-5/16"

Finished Frame Net Opening Width – Endless Mullion

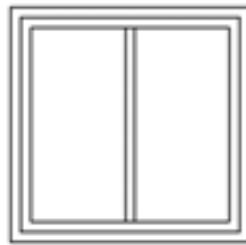
Catalog Size	Actual Door Size	Number of Doors Per Frame Section				
		1-Door	2-Door	3-Door	4-Door	5-Door
24"	23-3/16"	25-1/8"	48-7/8"	72-5/8"	96-3/8"	120-1/8"
26"	26-3/8"	28-5/16"	55-1/4"	82-3/16"	109-1/8"	136-1/16"
28"	28-3/8"	30-5/16"	59-1/4"	88-3/16"	117-1/8"	146-1/16"
30"	29-7/8"	31-13/16"	62-1/4"	92-11/16"	123-1/8"	153-9/16"

Finished Frame Net Opening Width – Full Flange

2.3.2. Single-Door thru Five-Door Full Flanged Frames



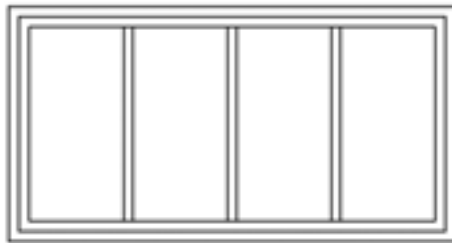
ONE-DOOR FRAME



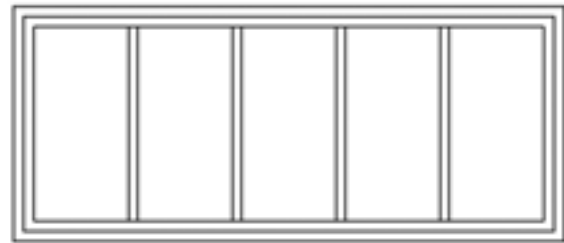
TWO-DOOR FRAME



THREE-DOOR FRAME

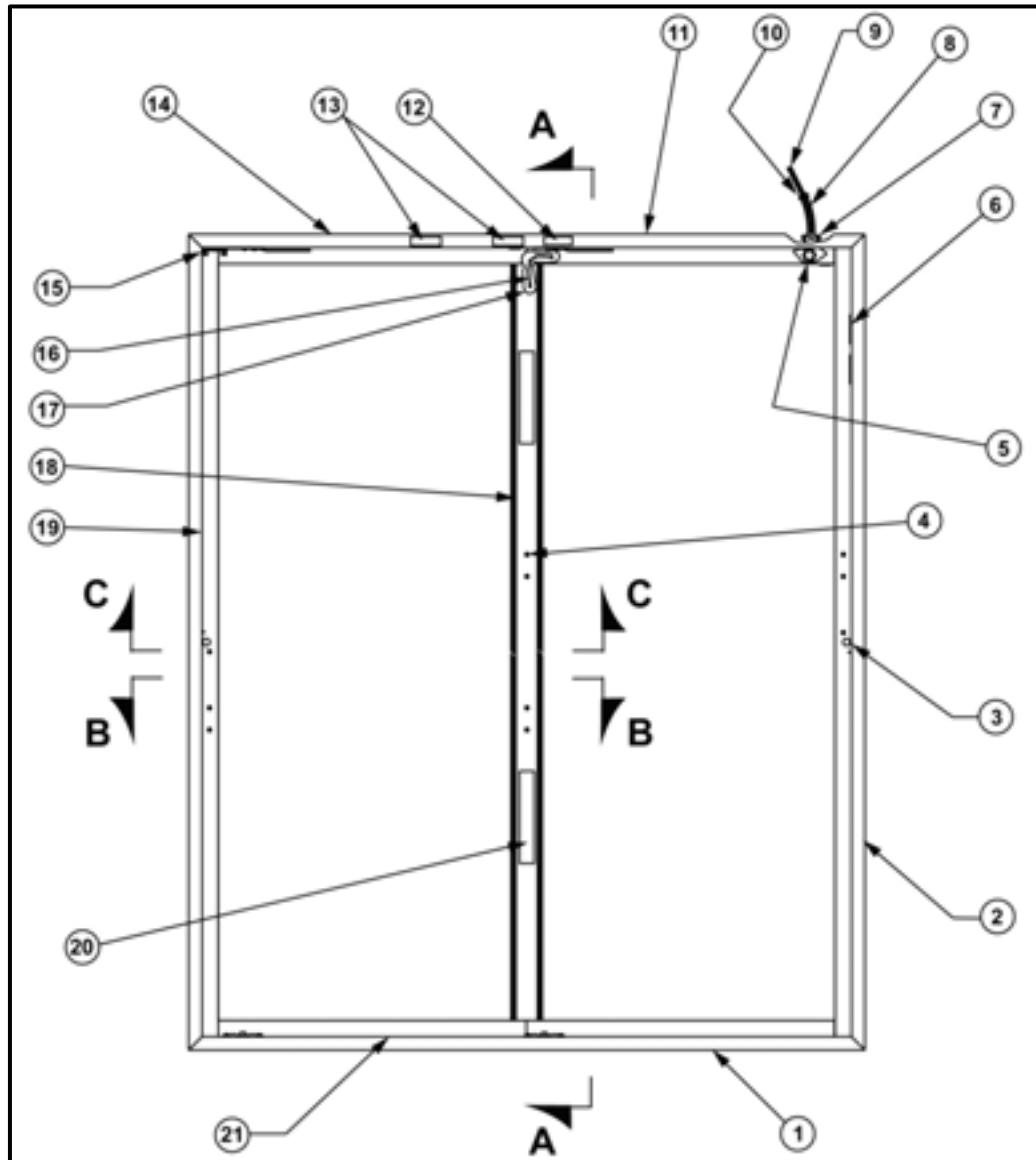


FOUR-DOOR FRAME



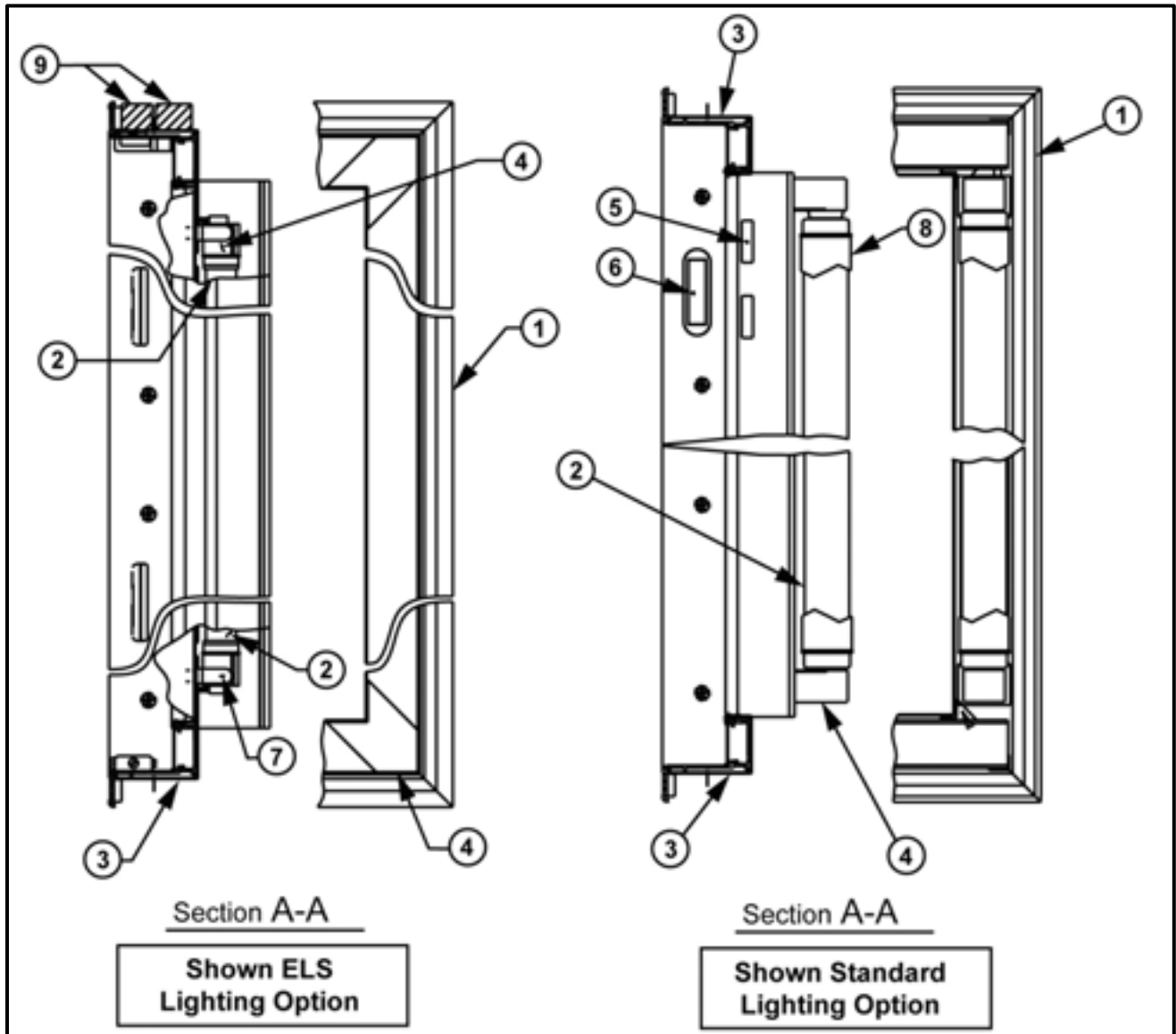
FIVE-DOOR FRAME

2.4. Model 101X Frame Parts Placement



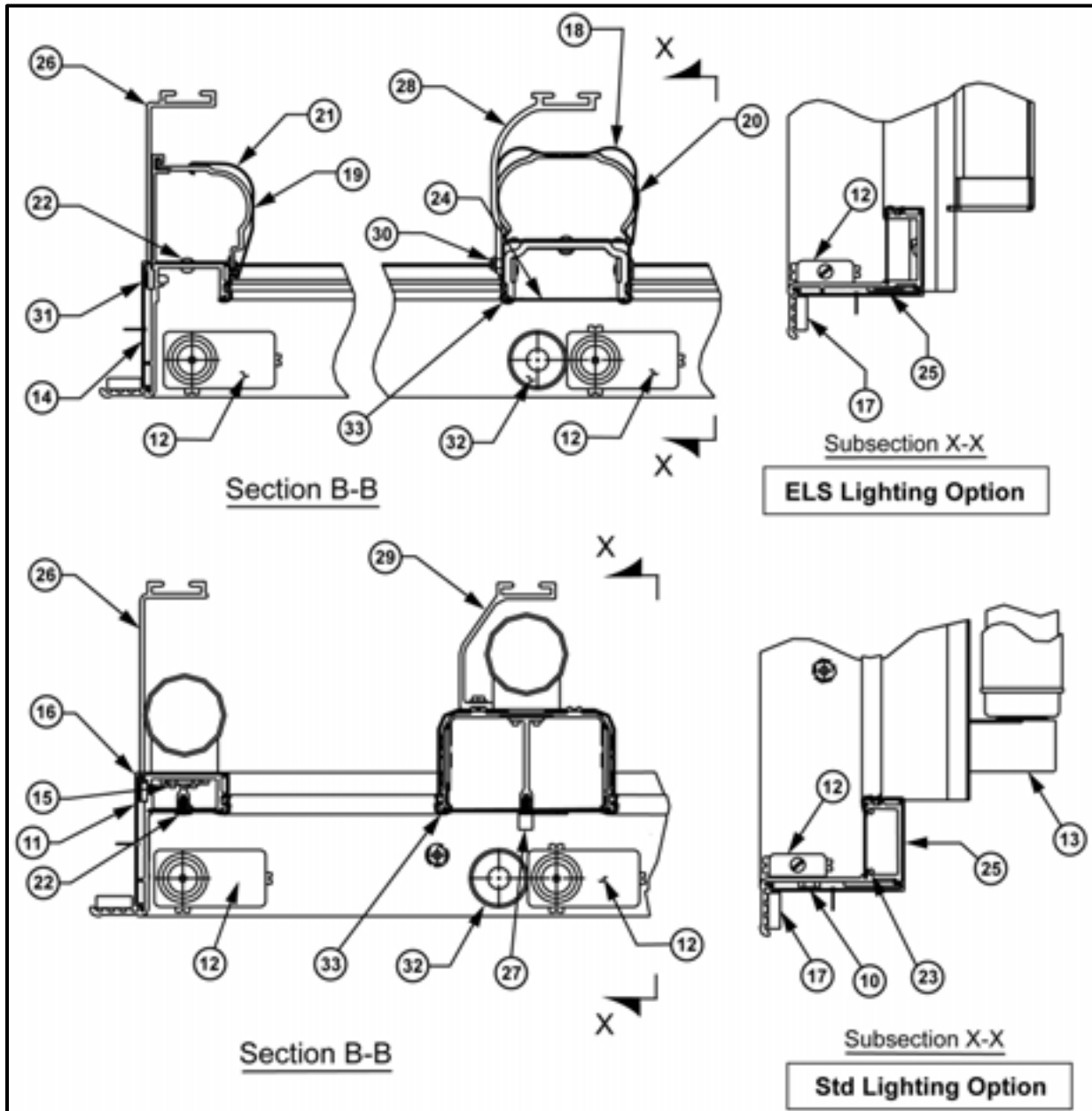
Description	Description	Description
1. Sill Frame	8. Flexible Aluminum Conduit	15. Hinge Pin Gib
2. End Frame	9. Heater & Lighting Wiring	16. Ground Jumper Assembly
3. Black Female Cap Plug	10. Screw-In Flexible Connector	17. 6-32 x 3/16" Screw
4. 8-18 x 0.219 SMS Screw	11. Flanged Frame Header	18. Center Mullion Contact Plate
5. Steel Lock Nut	12. Connection Diagram Label	19. End Frame Contact Plate
6. Warning & ID Labels	13. Brand Labels	20. Ballast
7. 90° Flex Connector	14. Warning Label	21. Bottom Contact Plate

2.4.1. Model 101X Frame Parts Placement Detail Diagram (Section A-A)



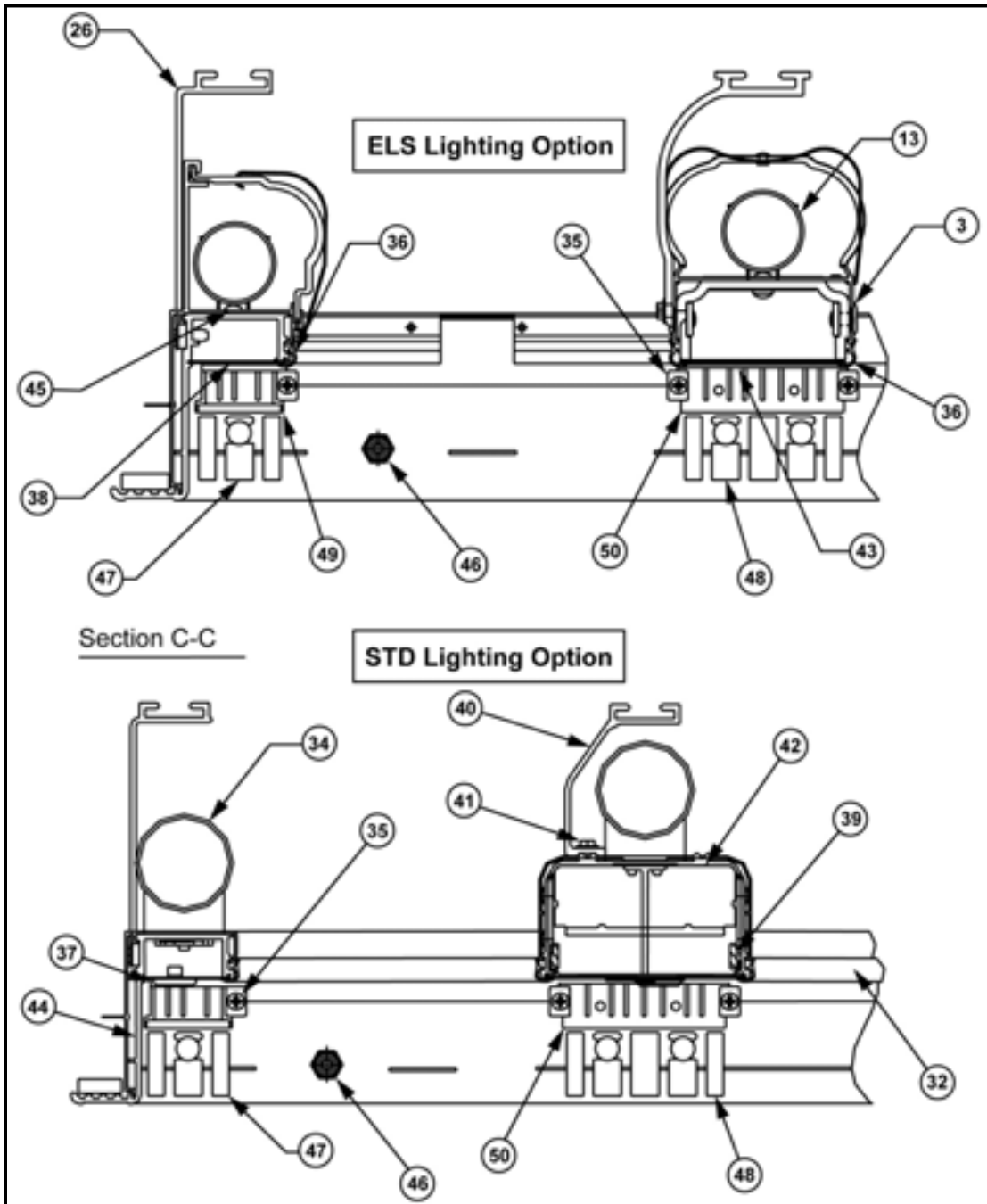
Description	Description	Description
1. Frame	4. Lamp Socket	7. Lamp Mounting Clip
2. Fluorescent Lamp	5. Rocker Switch (ELS Only)	8. Standard Lamp Cover
3. Center Mullion	6. On/Off Label (ELS Only)	9. Black Cloth Mounting Tape

2.4.2. Model 101X Frame Parts Placement Detail Diagram (Section B-B)



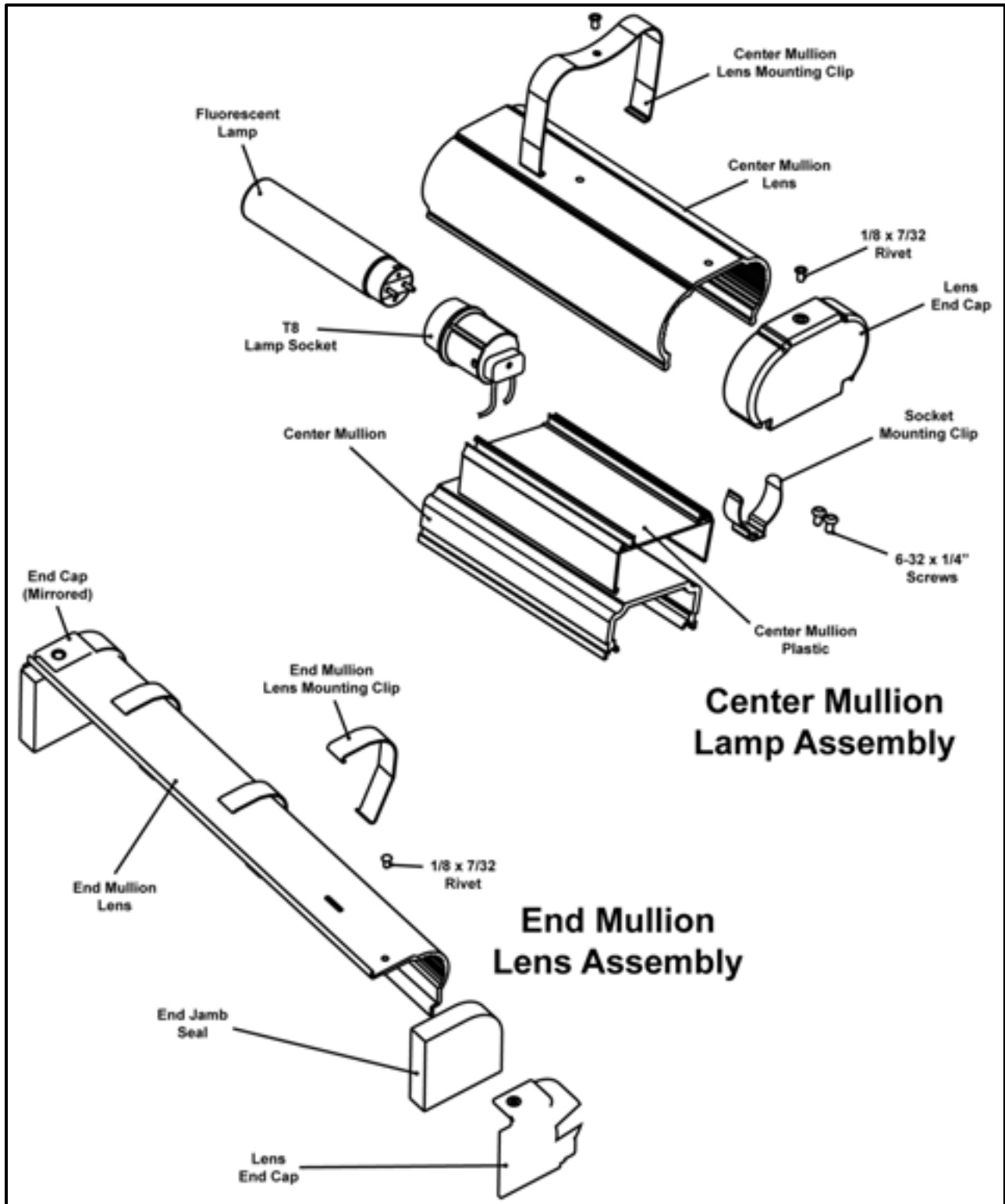
Description	Description	Description
10. 1/4-20 Cinch Nut	18. Mullion Lens Retainer Clip	26. ELS Frame Shelf Post Bracket
11. Frame End Lockstrike Support	19. Lens Assembly (End Jamb)	27. Swing Doors Lockstrike Plate
12. Torquemaster	20. Center Mullion Lens	28. Black Cloth Mounting Tape
13. Lamp Socket	21. End Frame Lens Retainer Clip	29. ELS Mullion Shelf Post Bracket
14. Perimeter End Cover	22. 18 x .219 Lampholder Screw	30. Std Mullion Shelf Post Bracket
15. Socket Clip Mounting Screws	23. Heater Wire	31. 8-32 x 3/8 Taptite Screw
16. Bottom Backup Plate	24. ELS Exterior Contact Plate	32. 10-24 x 5/16 Tap 1 Screw
17. 3/16 x 11/16 Foam Tape	25. Sill Cover	33. Zipper Strip

2.4.3. Model 101X Frame Parts Placement Detail Diagram (Section C-C)

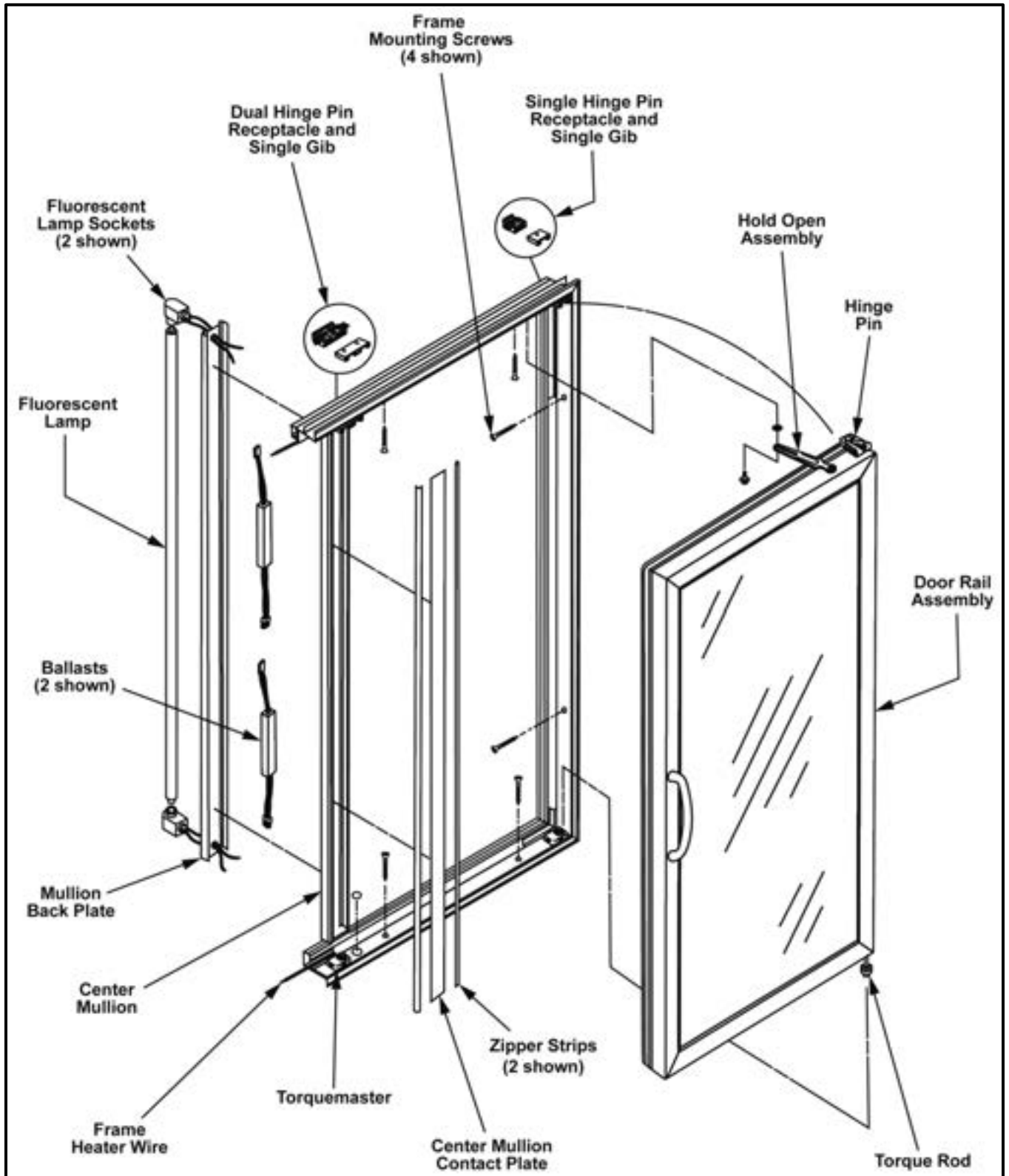


Description	Description	Description
34. Standard Lamp Socket	40. Mullion Shelf Bracket	46. Hold Open Stand-Off
35. Receptacle Mounting Screw	41. Shelf Bracket Mounting Screw	47. Single Station Gib
36. Zipper Strip	42. Ballast	48. Dual Station Gib
37. 1/4 x 7/16 x .03 Flat Washer	43. Mullion Raceway Cover Plate	49. Single Hinge Pin Receptacle
38. Frame Raceway Cover Plate	44. Frame Extrusion	50. Dual Hinge Pin Receptacle
39. 1/4-20 x .375 Black Screw	45. 6-32 x 1 Socket Mount Screw	

2.5. Model 101X ELS Fluorescent Lamp Assemblies



2.6. Door and Frame Assembly Diagram



3. DOOR REMOVAL AND REVERSAL

3.1. Removing the Door Assembly from the 101X Frame

1. Using a flat-head screwdriver, loosen the tension on the door by turning the adjustment screw, located on the front of the torquemaster, to the right or clockwise.



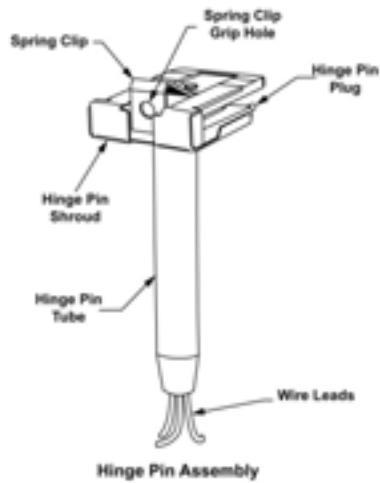
2. Test the door by opening it, and confirm that the torque tension does not retract the door from open position.
3. If tension remains, continue adjusting the torquemaster until all tension has been removed from the door.
4. Open the door to access the hold open device. Loosen and remove the hold-open bolt, using a phillips-head screwdriver.



5. Remove the hold open stud using a 7/16" hand wrench.
6. Retract the door to a near-closed position.
7. Insert the top half of the needle-nose pliers into the grip-hole, located in the hinge pin spring-clip, and the bottom half of the pliers beneath the hinge pin shroud.



8. Squeeze the pliers to clamp down on the hinge pin spring clip, allowing the clip to release the hinge pin from the receptacle gib of the frame, while simultaneously pulling the top of the door away from the frame. This will release and pull the hinge pin out of the hinge pin receptacle and gib.



9. Continue pulling the top of the door assembly away from the frame until the top door rail clears the frame.
10. Lift and remove the door from the torquemaster and carefully set the door aside.

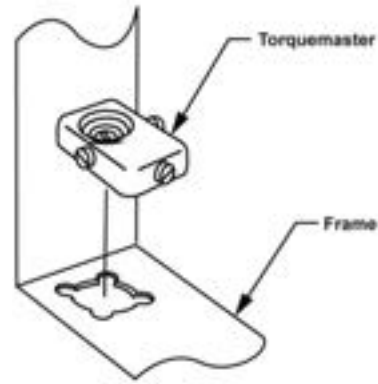
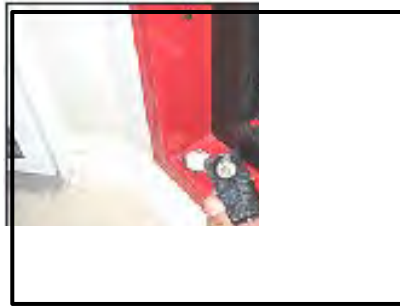


3.2. Reversing the Door Swing

1. Using a flat-head screwdriver, loosen the torquemaster from its mount by turning the center mounting screw counter-clockwise less than one-half (1/2) of a turn.



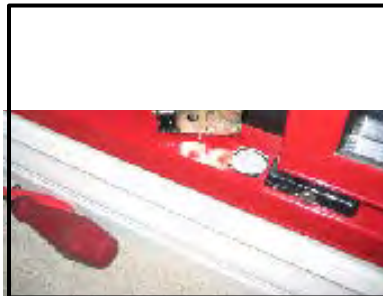
Remove the Torquemaster, exposing the mounting hole in the bottom frame rail.



2. Locate the mounting hole at the opposite side of the door opening.
3. Using the flat-head screwdriver, carefully pry underneath the plug cap and remove it.



4. Place the Torquemaster on the newly opened mounting hole, aligning the flanged corners of the mounting tabs.



5. Insert the Torquemaster mounting tabs onto the mounting hole with the hollow end of the Torquemaster against the door frame.
6. Confirm that the mounting flanges on the bottom of the torquemaster align with the corner mounting slots of the mounting hole in the frame.
7. Using a flat-head screwdriver, turn the Torquemaster mounting set-screw clockwise, for 1/2 a turn, to tighten the mount and lock it in place. Confirm that the torquemaster mounting is flush with the door frame.

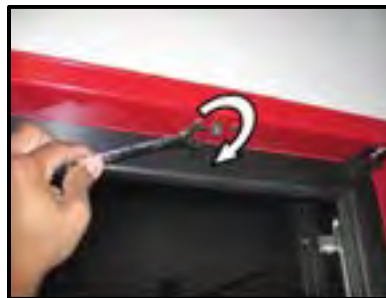
- Using a 7/16" open-ended hand wrench, loosen and remove the hold-open detent bolt from the top frame rail.



- Relocate and install the hold-open shoulder bolts into the opposite hold-open mount of the same door frame.



- If installing in Reverse Geometry, insert the hold-open stand-off into the frame header and install the detent bolt into the top of the door. Tighten each with a 7/16" open-ended hand wrench.



- Open the access portal to the hinge pin wire connections in the rail on the hinge side of the door assembly.
- Disconnect the Hot, Neutral and Ground wires of the hinge pin from the heater wire circuit and the ground terminal.



13. Loosen and completely remove the hinge pin assembly from the top door rail.

NOTE: Refer to “Removing and Replacing the Hinge Pin” for complete replacement procedures.

14. Using a plastic mallet and a flat-head screwdriver, remove the torque rod from the bottom of the door assembly.



NOTE: Refer to “Removing and Replacing the Torque Rod” for complete Torque Rod replacement instructions.

15. Swap placement of the Hinge Pin and Torque Rod to the other’s original mounting hole in the door assembly hinge side rail.
16. Reinstall the hinge pin and the torque rod completely into the ends of the door assembly hinge rail.
17. If necessary, lightly tap on the hinge pin and torque rod with a plastic or rubber mallet until each is fully seated into the top and bottom of the door.
18. Reconnect the hinge in wires and confirm that all connections are secure.
19. Check and confirm torque rod and hinge pin are correctly and completely installed.
20. Reinstall the door into the frame.

NOTE: Refer to “REPLACEMENT DOOR INSTALLATION” for complete door installation instructions.

4. DOOR MAINTENANCE AND PARTS REPLACEMENT

4.1. Removing and Replacing the Door Gasket

1. Begin removing the door gasket by lifting one corner of the gasket out of the groove.

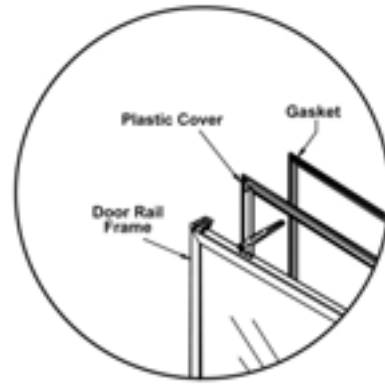


2. Carefully pull the gasket out of the groove in the plastic rail covers.



NOTE: The gasket is composed of soft materials with welded miter joints. Use extra care when manually extracting the gasket from the rail grooves to prevent damaging it as well as the plastic rail.

3. Align the two corners of the replacement gasket onto the top mitered corners of the plastic cover, with the gasket arrow facing the door rail and cover.
4. Press the gasket arrow into the groove in the center of the plastic cover corners until the edges of the gasket arrow catch and the arrow is initially inserted into the groove of the plastic cover.
5. Align the bottom two gasket corners with the bottom mitered corners of the plastic covers, aligning the gasket arrow with the groove in the plastic cover and press the corners into the groove until the arrow is fully inserted.
6. Press the gasket firmly against the top plastic cover, sliding from side to side and applying full pressure against the gasket, forcing the gasket arrow into the groove in the plastic top cover.



7. Continue pressing the gasket arrow into the grooves of the remaining plastic cover, around the entire door rail perimeter (if necessary, a plastic or rubber mallet can be used to facilitate the arrow into the groove by applying a swift stroke onto the gasket- DO NOT damage the gasket or the glass).
8. Confirm that the entire gasket arrow has been completely inserted into the groove of all four plastic rail covers.

4.2. Removing and Replacing the Door Rail Plastic Cover

1. Insert the end of a slot head screwdriver in between two plastic cover ends at the corner miter.



2. Carefully twist the screwdriver to loosen the corner of the plastic cover lip from the door rail.
3. Continue to pry the plastic cover from the door rail until the entire end of the plastic rail is disengaged.



4. Pull the plastic cover up and out of door rail grooves until the entire plastic cover is removed from the door rail.



5. Repeat step 2 through step 4 to loosen and remove the three remaining plastic covers.
6. To install the new, replacement plastic covers, begin by aligning the replacement plastic cover evenly onto the door rail.
7. Insert the outer edge of the plastic cover into the outside groove of one of the door rails.

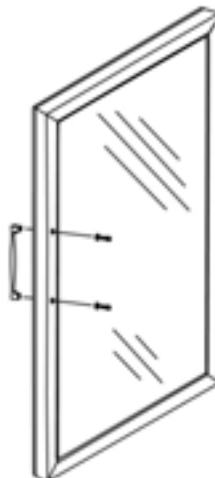


8. Push the plastic cover down and inward, toward the center of the door.
9. Slide along the entire length of the plastic cover while firmly applying pressure against it. Continue applying pressure along the length of the entire door rail, inserting both the outside lip and the inside lip into the door rail grooves simultaneously.

NOTE: Carefully tap the plastic cover with deliberate strokes, using a plastic or rubber mallet outward and away from the glass. This may help seat the lips of the plastic cover into the grooves of the door rails.

10. Check the entire plastic cover and confirm that both the inside and outside lips are fully inserted into the door rail grooves.
11. Repeat this procedure, aligning each mitered corner, with the remaining plastic covers until all four plastic covers are properly installed onto door rails.
12. Confirm that each plastic cover is fully installed and the mitered corners properly aligned.

4.3. Replacing the Door Handle



1. Carefully remove the door gasket installed into the plastic cover over the door rail in which the door handle is installed (leaving the gasket on the remaining door rail assembly for easy reassembly is recommended).
2. Insert the end of a slot head screwdriver in between two plastic cover ends at the corner miter of the plastic cover over the door rail with the handle.
3. Twist the screwdriver to loosen the corner of the plastic cover lip from the door rail grooves.
4. Pry the plastic cover from the handle side of the door rail until the entire end of the plastic rail is disengaged and remove the entire plastic cover from the door rail with the handle.
5. Insert a 5/32" hex key or Allen Wrench into the door rail openings and into the screw head securing the door handle.
6. Turn the screw counter-clockwise to loosen and remove it.



NOTE: In the event that the screw heads are obstructed, refer to product notification for instructions detailing the removal of the obstruction. Refer to "Appendix B-1: DOC IN-0002 SUPPLEMENTAL HANDLE REPLACEMENT INSTRUCTIONS" instructions for more information.

7. Repeat step 1 thru step 6 with the second mounting screw and remove the handle assembly from the door.
8. Insert mounting screws into mounting holes until the ends of the screw protrude through the mounting holes.

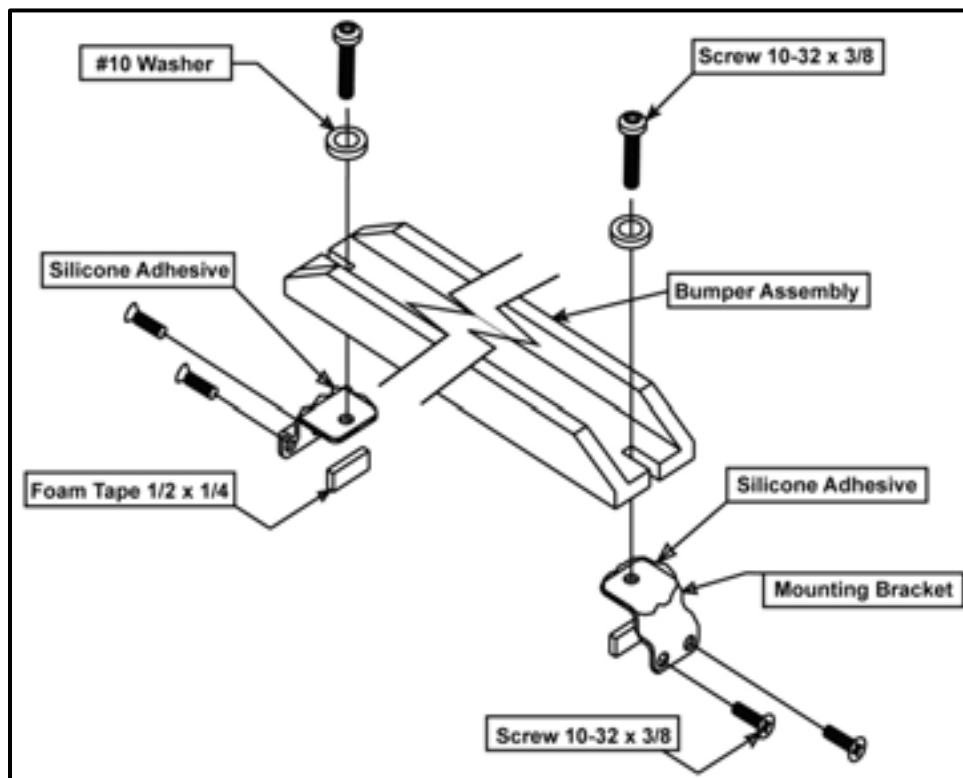


9. Insert the hex key or Allen Wrench into screw head.
 10. Hold the Handle mounting holes against the protruding screw ends.
- NOTE:** Make sure the handle is configured with the screws mated with the correct mounting holes in the handle.
11. Turn the first screw clockwise until the threads catch.
 12. Repeat the last step to connect the remaining screw and handle mount.
 13. Tighten each mounting screw.



14. Confirm the handle is secure and flush-mounted to the surface of the door rail and reassemble the door.

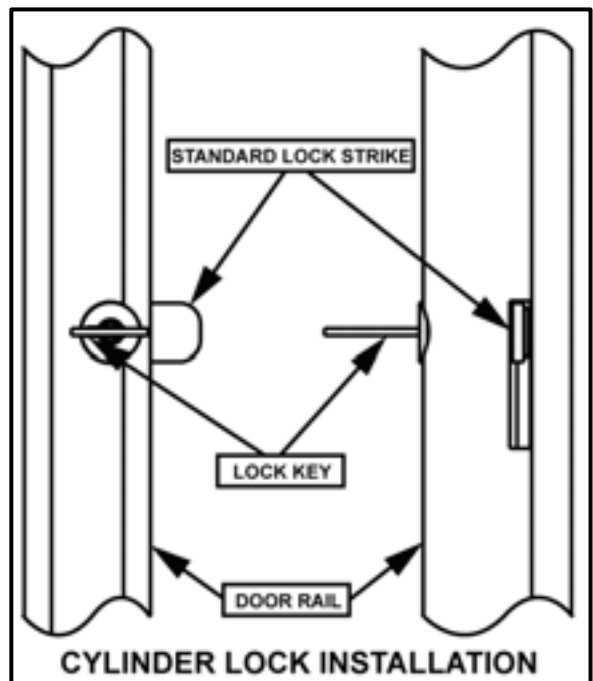
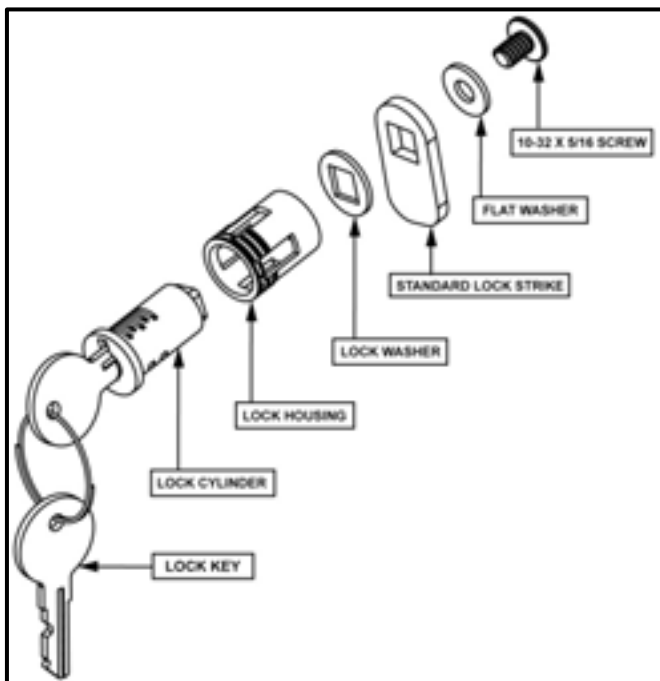
4.4. Door Bumper Removal and Replacement



1. Using a phillips-head screwdriver, loosen and remove both self-threading screws and washers at each end of the bumper assembly. Remove the bumper (leaving the gasket on the remaining door rail assembly for easy reassembly).
2. If necessary, remove bumper mounting brackets.
 - Remove plastic covers from the longer, side door rails.
 - Using a razor knife, carefully cut the silicone adhesive.
 - Loosen and remove bracket mounting screws.
 - Carefully remove mounting brackets.
3. Replace door bumper assembly mounting brackets.
 - Completely clean each bracket of silicone adhesive residue.
 - Apply a generous amount of fresh silicone adhesive to the outside of each mounting bracket.
 - Insert new self-threading 10-32 X 3/8" screws into the bracket mounting holes and into the door rail mounting
 - holes.
 - Using a phillips-head screwdriver, turn the screws clockwise until all four screws are tightened and both mounting brackets are securely fastened.
 - Apply silicone adhesive along the seams of each bracket to ensure a proper seal.
 - Allow for silicone adhesive to fully cure.

4. Replace the plastic covers to the door rails (refer to plastic cover replacement procedures).
5. Replace bumper assembly to the door.
6. Align the mounting holes in the bumper assembly with the holes in the mounting brackets.
7. Insert new self threading 10-32 x 3/8" screws into the bumper assembly mounting holes.
8. Using a phillips-head screwdriver, turn the screws clockwise until each screw is tight and the bumper assembly is securely mounted.
9. Confirm that the bumper assembly is securely mounted to the door.

4.5. Cylinder Lock Repair and Replacement



1. Remove gasket from door rail containing the lock (leaving the gasket on the remaining door rail assembly for easy reassembly).
2. Remove plastic cover from the door rail containing the lock assembly to expose access to the lock mount.



3. Insert a large phillips-head screwdriver into the lock access in the back of the door rail.

NOTE: Once the lock screw has been removed, the screw washers and lock latch will come loose. Be certain that these components are secure prior to the removal of the lock screw, or they may become lost if dropped inside of the door rail.



4. Turn the lock screw counter-clockwise to loosen the screw.
5. Carefully remove the screw, lock washers and lock strike from the back of the lock assembly.



6. If necessary, replace the strike.



7. Remove the lock assembly, out from the lock housing and through the front of the door rail.
8. Replace lock assembly into housing inside rail.
9. Replace the strike washer, strike, lock washer and screw to the rear of the lock assembly and assemble in the correct order. Be certain that the strike is fully and correctly seated onto the end of the cylinder.

10. Turn lock screw clockwise to catch the threads and tighten the screw completely. **DO NOT OVER-TIGHTEN.**



11. Test lock and confirm that it works properly.
12. Replace the plastic cover and gasket (refer to plastic cover and gasket replacement instructions).

4.6. Removing and Replacing the Torque Rod

1. Carefully place a flathead screwdriver between the door rail and the washer beneath the torque rod.



2. Dislodge the torque rod from its mount by pushing on the torque rod or tap it loose using a plastic or rubber mallet. **DO NOT** use a steel-headed hammer.



NOTE: Use caution when striking any tool with another tool. **DO NOT** use excess force when striking the screwdriver and potentially damaging the door.

3. Continue to carefully tap the torque rod, if necessary, until the torque rod and rod end disengage.
4. Carefully pull the torque rod assembly completely out the door rail.

5. Reverse the process to re-install the torque rod assembly into the door rail.
 - Insert torque rod into the bottom of the door until it is fully seated.
 - If required, tap the torque rod assembly into the door rail using a plastic or rubber mallet, until the torque rod is fully seated into the door rail socket.



4.7. Removing the Hold-Open Assembly

1. Remove screws from the hold-open standoffs, which are located on the door rail and frame.

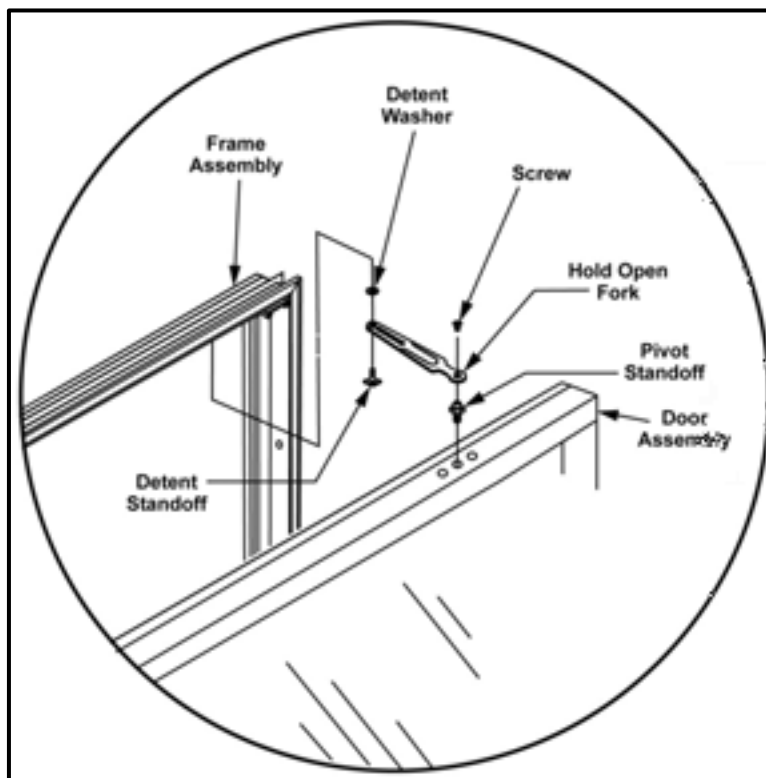


2. Remove the hold open, standoffs and discard them.
3. When replacing the hold-open arm, reverse step 1 by inserting the screw through the mounting hole in the arm and tightening it into the frame mounting hole using the #2 phillips head screwdriver.



*** Picture for orientation & reference only. Actual Hold-open assembly may differ from item shown.**

4.8. Replacing the Hold-Open Assembly



1. Insert the pivot standoff into door. Add Loctite #271 to threads. Torque to 100 in/lb.
2. Place the pivot hole of the new hold open over the pivot standoff that is closest to the hinge pin.
3. Retain with a new truss head screw and torque to 16 in/lb (approximately #2 clutch setting on a professional screw gun).
4. Remove the vinyl cap from the detent bolt.
5. Insert the bolt up thru the hold open slot and thru the detent spacer (flat side against frame).
6. Add loctite #271 to threads. Use a 7/16 hex wrench and torque into frame to 100 in/lb.
7. Add small amount of grease to detent surface.
8. Insure the truss head screw is seated on the end of the standoff and not the hold open.

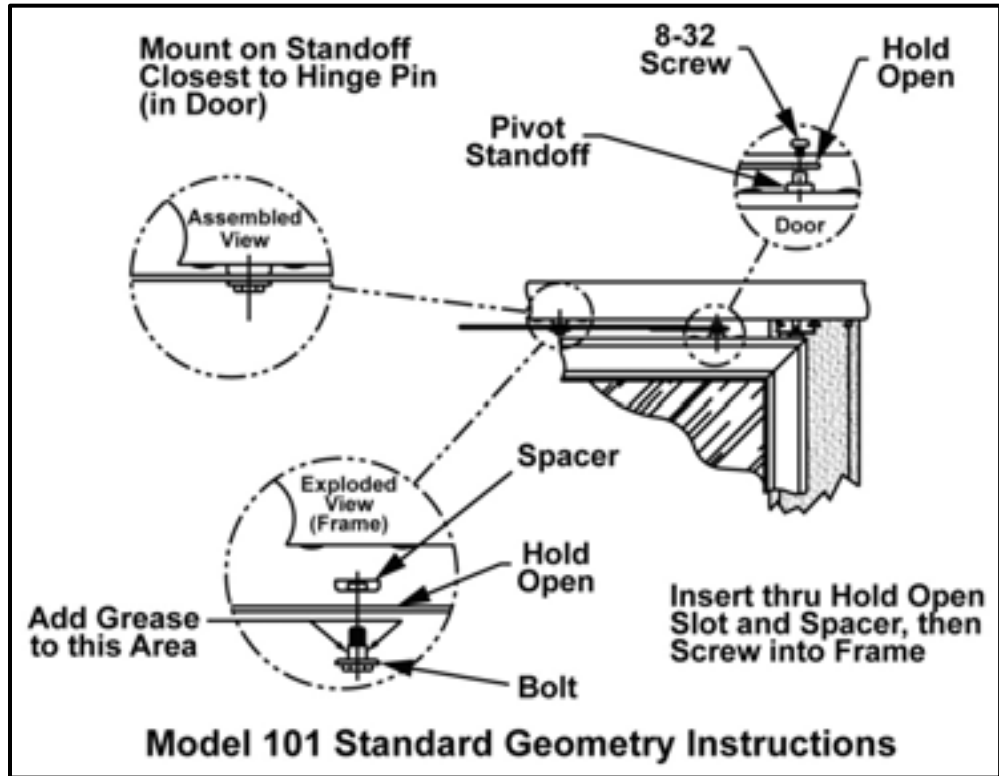
4.9. Hold-Open Assembly Standard and Reverse Geometry

The 101B, 210X and the ELM models utilize reverse geometry for the Hold-Open assembly mounting configuration.

Reverse geometry of the Hold-Open mount has the same assembly configuration as the standard geometry. The difference with reverse geometry is that the hold open fork and the mounting hardware are reversed.

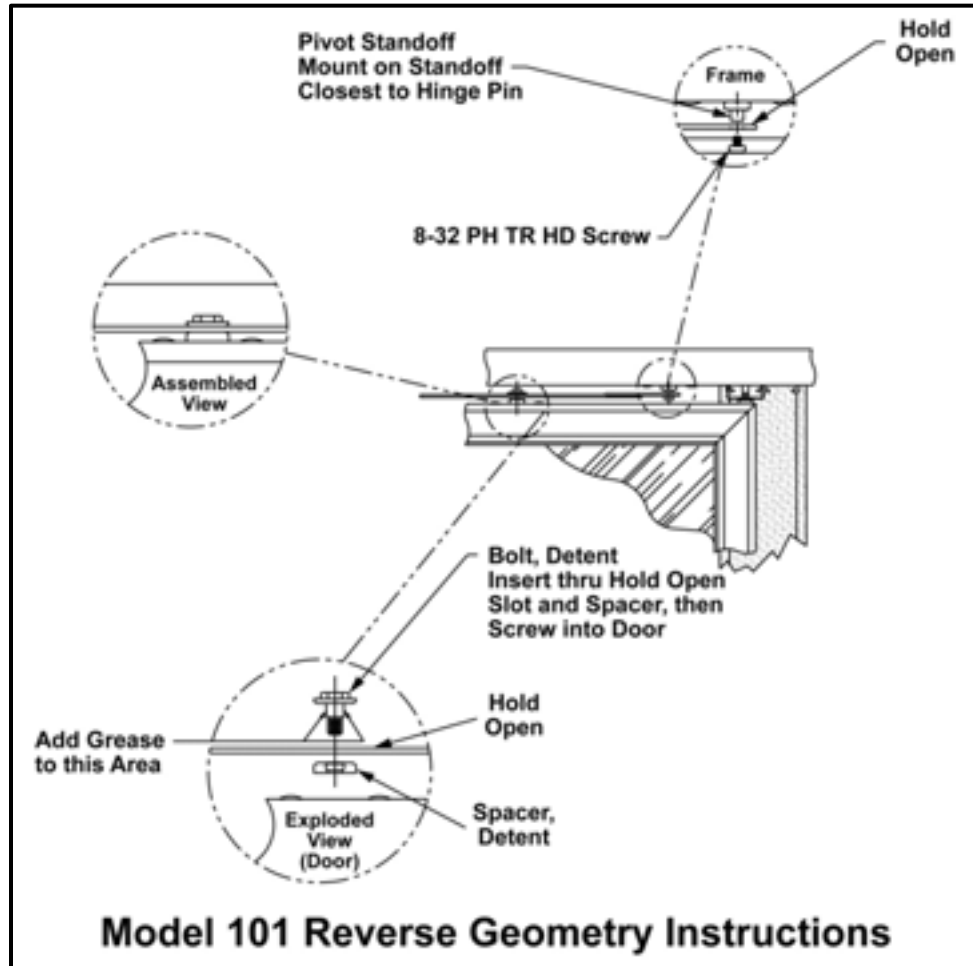
4.9.1. Standard Geometry

The Hold-Open fork slot, the Detent Standoff and the Detent Washer are mounted up, into the frame header rail. The fork pivot hole, along with the pivot standoff and pivot screw are mounted down into the top rail of the door frame.



4.9.2. Reverse Geometry

The fork pivot hole, along with the pivot standoff and the pivot screw are mounted up, into the frame header rail. Conversely, the Hold-Open fork slot, the Detent Standoff and the Detent Washer are mounted down into the top rail of the door frame.



4.10. Door Heater Wire Replacement

1. Remove door assembly from the frame (refer to door removal instructions).
2. Remove door gasket (refer to door gasket removal section for gasket removal procedure).
3. Remove plastic cover from all door rails (refer to plastic cover removal section for the removal procedure).

- Using a small, flat-head screwdriver, remove the access cover from the frame to access the wiring (as with the plastic frame cover).



NOTE: Use caution when using a metal or edged tool to remove the heater wire, to avoid damaging the wire or wire shielding.

NOTE: The wiring configuration differs per model and individual facility requirements. Make the necessary adjustments that may be required to complete this procedure.

- Locate the mounting plate (if applicable) and two mounting screws, for the cord and wire harness mounts, on the outside of the adjacent door rail.
- Using a phillips-head screwdriver, loosen and remove each screw.
- Carefully pull out and remove strain relief harness, as well as the loop terminal for the ground (green) wire.



- Remove the wire terminals from the door rails.

NOTE: Two terminals adjoin the ends of the heater wire with the hot and neutral wires from the power cord. Two different methods can be used to disconnect the heater wire from the power cord.

- Open the wire terminals and remove the terminated wire ends.



10. Locate the heater wire in the grooves of all four door rails. The heater wire is usually shielded with a woven fiberglass sleeve.
11. Using a flathead screwdriver, pull the heater wire out from door rails.



12. Manually pull out and remove the remaining heater wire.



13. Install the terminated wire ends from the replacement heater wire, then close the wire terminals.

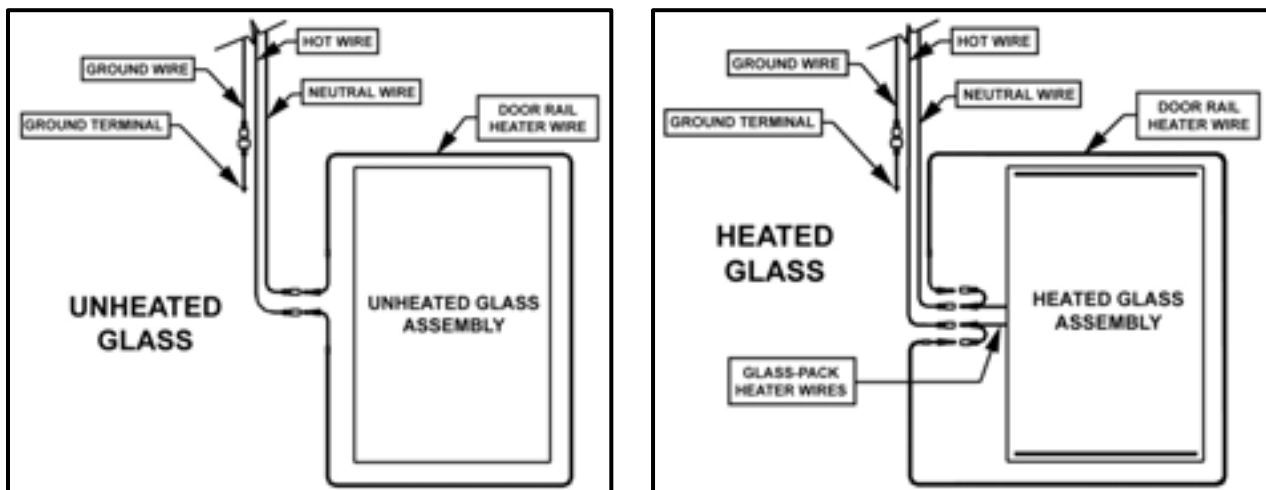


NOTE: If the replacement heater wire does not have terminated ends, then splice the wires together using wire nuts or solder and heat shrink.

4.10.1. Splicing wire ends with solder and shrink tubing

1. Cut the (black and white) power wires, after the terminals.
2. Strip a minimum of 1/2" of insulation from each wire, exposing the end of the each cut wire.
3. Strip a minimum of 1/2" of insulation from each end of the heater wire.
4. Insert one, two inch heat-shrink tube (not supplied) over each end of heater wire.
5. Slide each tube down, away from the wire ends.

6. Join the exposed end of each stripped wire, from the power cord, with each end of the stripped heater wire.
7. Twist the wire ends together and solder the adjoined wire ends using a soldering iron, flux and solder.
8. Slide each heat-shrink tube back up the heater wire and over the soldered wire joints.
9. Using a heat gun, apply a steady flow of heated air onto each shrink tube, covering the soldered wire joints, to shrink the tubing and insulate the joints.
10. Insert the entire replacement heater wire into the groove inside the door rails and arrange the wire assembly to the same configuration that it had prior to disassembly.
11. Carefully re-install the wire assembly into the door rail and the power cord into strain relief by inserting the wire into the groove located along all four door rails by using a blunt tool or instrument, such as a screwdriver handle, in order to facilitate the insertion. Be certain to match the original wire installation configuration.
12. Replace plastic covers and gasket to the door.



4.11. Removing and Replacing the Hinge Pin

1. With the access cover removed, pull the hinge pin wires out and separate all three wires (Hot, Neutral and Ground) from the door wire harness by carefully pulling the terminations apart.
2. Using a flat-head screwdriver, pry the hinge pin loose from the mount in the top door frame rail.

3. Pull the hinge pin out of the door frame until the pin and the wires are completely removed.



4. Upon replacing the hinge pin, insert all three wires into the hinge pin hole in the door rail.

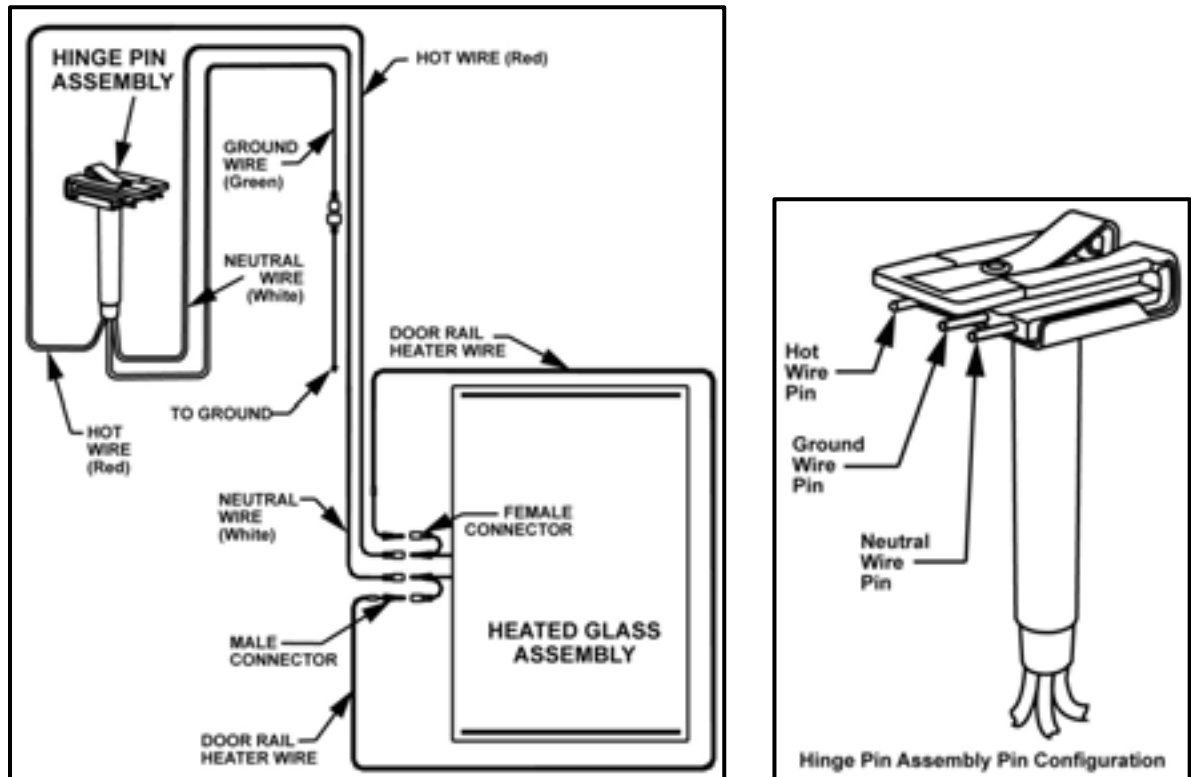


5. Thread the wires through the rail to the access opening.



6. Connect the hinge pin wires to the terminated door wires.
7. Insert the remainder of the hinge pin into the frame mounting hole
8. Insert the remainder of the hinge pin into the frame mounting hole until the hinge pin is fully seated.
9. Harness wires together using a tie-wrap and insert the harness into the door rail and install the access cover.

10. Reassemble door by following the aforementioned reassembly instructions per section.



4.12. Glass Pack Replacement Procedures

1. Remove the door assembly from the hinge mounts.
2. Carefully place the door assembly on a flat, clean and elevated surface or table.
3. Remove the door gasket (refer to the gasket removal section for removal procedures).
4. Remove the plastic covers from the door rails (refer to the plastic cover removal section for proper removal procedures).
5. Remove the screws securing the access cover to the electrical wires and remove cover.
6. Carefully pull power wires from the door rail and locate the glass-pack heater wires.



7. Open each terminal housing, exposing the wire connections.
8. Remove the terminated wires from the terminals.

NOTE: The terminated wire ends of the glass pack wire may not be accessible. If so, skip step 7 and step 8 and proceed to step 9.

9. Carefully cut the glass-pack wires at least 1/2" inch from the glass pack assembly.
10. Using a sharp razor knife, carefully insert the knife blade in-between the glass-pack edge and the door rail.
11. Cut into the adhesive adjoining the glass pack to the door rail, and slice along the seam between the glass-pack edge and the rail.



12. Continue cutting the glass-pack away from all four door rails.

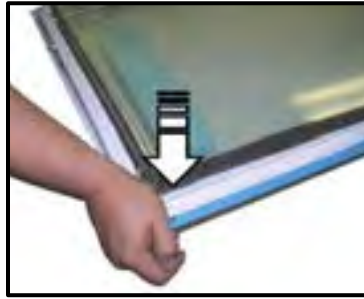


13. Confirm that the adhesive has been cut completely through, as well as all around the glass-pack.



14. Place a piece of thick foam block underneath the glass-pack, at each end of the door assembly.

15. Press down firmly on each corner of the door rail frame assembly to initiate the separation of the glass-pack from the door rail frame assembly.

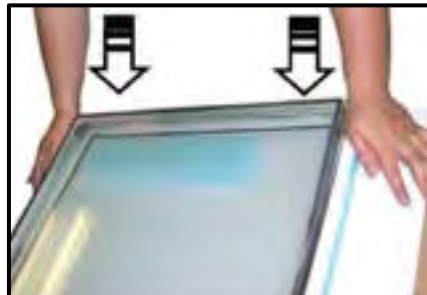


*** Procedure shown without gloves for clarity**

16. Once all four corners of the glass-pack have been loosened, go to one end of the door assembly and place one hand on each corner of the door rail frame assembly.

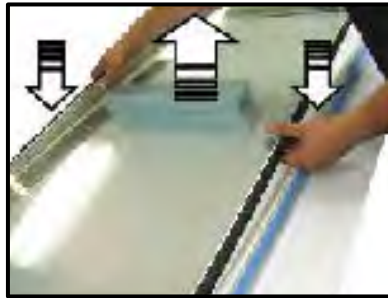


17. Press down firmly on both corners of the door rail frame assembly, forcing it down and separating the frame assembly from one end of the glass pack.



18. Go to the other end of the door assembly and repeat step 16 and step 17 to separate the other end of the glass-pack from the door rail assembly.
19. If necessary, stack two foam blocks atop one-another and work the door rail frame downward to facilitate a complete separation of the glass-pack from the door rail frame.

20. Carefully lift and remove the glass pack from the door rail assembly.



21. Remove foam blocks from the tabletop.
22. Install foam mounting tape along the interior of the frame assembly inside each rail.
23. Apply a thin strip of silicone adhesive to the interior of the door rail frame, alongside the foam tape.
24. Using extreme care, check and confirm that glass-pack heater wires are aligned with the power cord assembly in the door rail frame assembly. Be certain that the heater wires are away from the insertion point to avoid entangling the wires in the adhesive during installation.
25. Insert one side of the replacement glass package assembly into the corresponding side of the frame assembly.



26. Gently insert the remaining side of the glass-pack into the inside of the rail frame assembly until the glass pack is completely inserted into the rail frame. If necessary, use a plastic or rubber mallet and gently tap the edges of the glass-pack into the rail frame assembly.



27. Replace any loosened spacers and confirm that all four sides of the glass-pack are fully inserted into the rail assembly and evenly distributed within the frame.

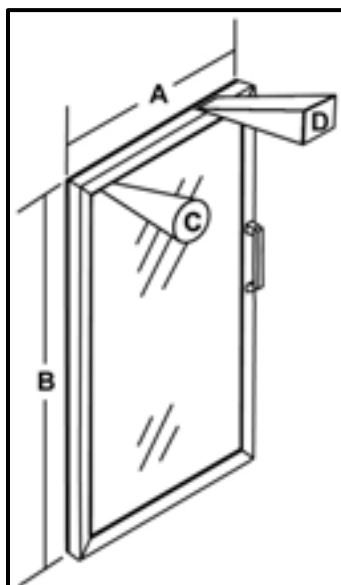
28. If glass-pack wires are terminated, insert the terminated wire ends into the terminals.
29. If the glass wire ends are stripped, then strip the cut wires from the power cord and join the wires using wire nuts.
30. If wire nuts are not an option, insert a two inch heat shrink tube over each stripped wire and slide the tubes away from the stripped wire ends.
31. Join the stripped wire ends from the power cord to the stripped heater wire ends and lightly twist.
32. Using a soldering iron or gun, solder the wire ends together.
33. Slide the heat shrink tubing over the solder joints of the adjoined wire ends and, using a heat gun, apply a steady flow of heated air onto each shrink tube to insulate the soldered wire joints.
34. Inject additional silicone adhesive into the seams between the glass-pack edges and the door rails.
35. Allow the silicone adhesive to cure.
36. Replace the plastic covers to the door rails (refer to plastic cover replacement procedures).
37. Replace the gasket to the door assembly (refer to gasket replacement procedures).
38. Install door assembly to the torquemaster (refer to door installation procedures).
39. Install door in frame gib and power receptacle (refer to door installation procedures).
40. Plug power cord into socket to restore power to the re-installed door assembly.

4.13. Ordering Replacement Doors

When ordering replacement doors, call Anthony International customer service at 800.772.0900 and specify to the representative the need to order a replacement door. Be sure to provide all of the information and specifications that are required for ordering replacement doors (refer to diagram for the complete door ordering configuration):

- Measure and specify the width (**A**) of the door to the nearest 1/16”.
- Measure and specify the height (**B**) of the door to the nearest 1/16”.
- Furnish the date of the original order or the Anthony invoice number. (The original manufacturing date will be stamped on the spacer bar, between panes of glass (**C**)).
- Specify whether or not the replacement door will require a heated glass-package.

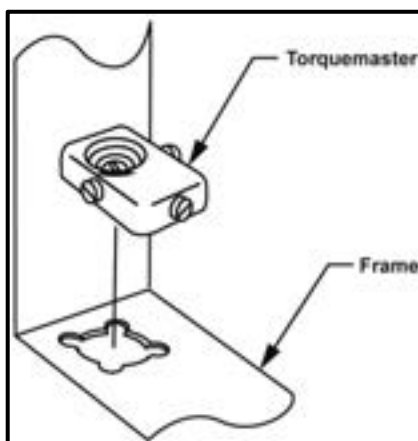
- Which way does the door hinge (left or right), as well as the type of hinge, will need to be specified.
- The Anthony representative will also need to know if the replacement door is for a cooler or a freezer.
- The need for door locks and installation hardware must be specified.
- The correct electrical voltage is required for the order.
- Are there any custom items with the original order? If so, please specify them as well as the details of those items.
- Work Order Number from Data Tag (if present **(D)**).



5. REPLACEMENT DOOR INSTALLATION

5.1. Installing the Door Assembly into the 101X Frame.

1. If replacing the Torquemaster, insert it with the hollowed end towards the frame corner. Align the mounting flanges on the bottom of the torquemaster with the divots in the corners of the mounting hole



- Using a flat-head screwdriver, turn the Torquemaster mounting screw clockwise to tighten the mount. Confirm that the torquemaster mounting is flush with the door frame.



- Handling the door carefully, install it into the frame by inserting the torque rod-end into the cavity of the Torquemaster.



- Tilt the top of the door up and toward the frame, inserting the hinge pin into the Gib, located in the top of the door frame.

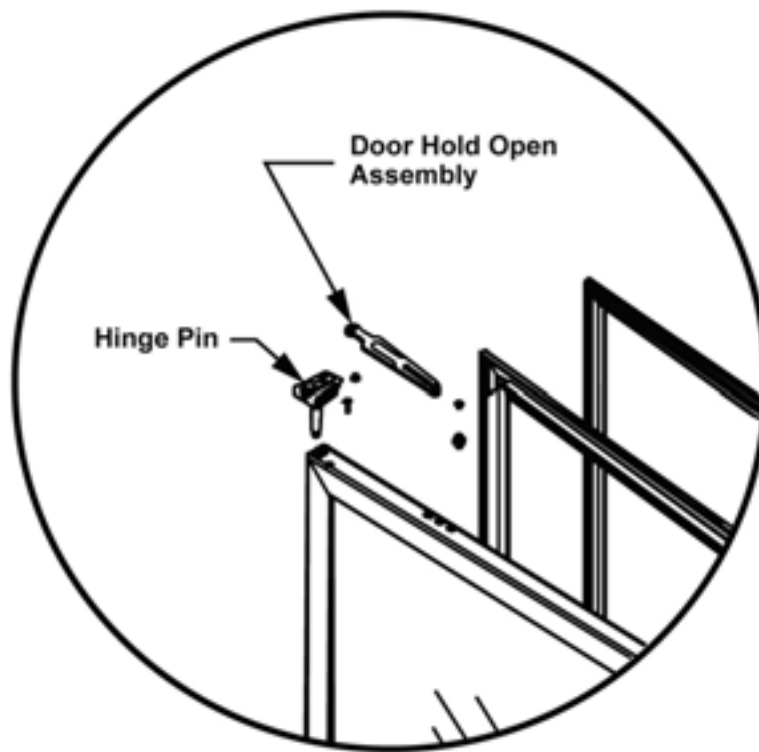


- Extend the hold-open device towards the mounting hole in the top frame rail.
- Insert the hold-open bolt through the elongated hold-open slot.

7. Install the washer and the hold-open bolt into the frame mounting hole and tighten the bolt.



NOTE: Do not over-tighten the hold-open bolt. Be certain the hold-open does not bind while sliding along the hold-open bolt. Adjust as necessary.



5.2. Torque and SAG Adjustment



The Torquemaster is the component into which the door is hinged, at the bottom torque rod. The Torquemaster regulates the speed and tension of the door swing, as well as the angle at which the door is mounted.

1. Using a flat-head screwdriver, turn the outside screw to adjust the torque rod tension on the Torquemaster.
 - Turn the screw counter-clockwise to increase the tension.
 - Turn the tension screw clock-wise to decrease the tension.

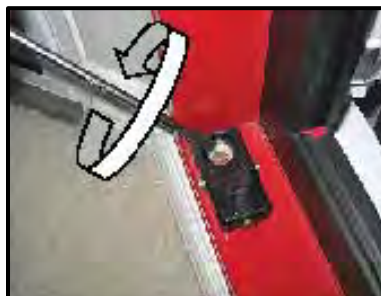


2. To adjust the door sag, or square it in the frame, use the flathead screwdriver to change the setting on the screw that is marked SAG ADJ. (Sag Adjustment), located on the end of the Torquemaster.
 - Turn the screw clockwise to lower the handle side of the door.
 - Turn the screw counter-clockwise to raise the handle side of the door.

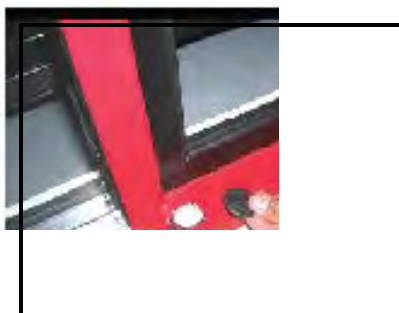
6. FRAME MAINTENANCE & PARTS PLACEMENT

6.1. Torque Replacement

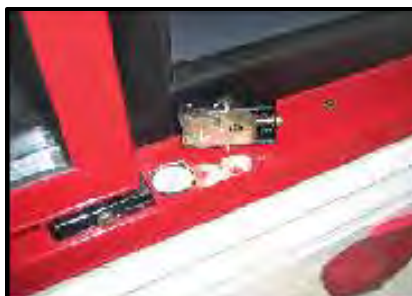
1. Using a large slot-head or flat-head screwdriver, loosen the installation mounting screw located in the center of the torque rod mounting socket of the Torquemaster.



2. Remove the Torquemaster from the frame mount.
3. Replace the Torquemaster to the mount located on the frame.
 - If necessary, reposition the Torquemaster on the lower frame near the corner. Be certain to reposition the Torquemaster so that the hollowed end of the Torquemaster correlates with the side of the frame in which the door is mounted.

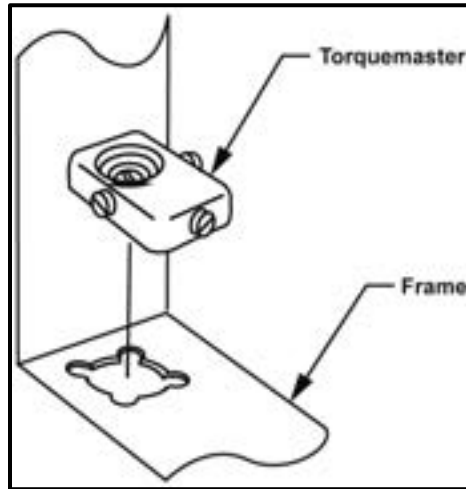


4. Place the Torquemaster on the newly opened mounting pocket in the frame, with the hollowed end of the Torquemaster towards the frame.
5. Align the mounting flanges on the bottom of the Torquemaster with the divots or slots in the corners of the mounting hole. Be certain the Torquemaster is fully seated onto the frame.



6. Turn the mounting set-screw clockwise to engage the mounting mechanism underneath the frame lining, and confirm that the Torquemaster is securely mounted.

NOTE: To adjust the Torquemaster settings, refer to the Torquemaster and Door Sag adjustment procedures.



6.2. Fluorescent Lamp Replacement

6.2.1. ELS Lighting System



WARNING: Use extreme caution when handling fluorescent tube lamps

1. Verify that power to the lamp fixtures is shut off at the power switch or facility power source.
2. To remove the ELS lens, insert a flat-head screwdriver between the lens and the retainer clip. Pry the clip, easing it from the lens, freeing the clip from its mount.



3. Grip the lens firmly, and pull it out of the vinyl channeling and away from the door frame, exposing the lamp.



4. Grip the fluorescent lamp and pull toward the inside of the box to dislodge the lamp from the socket mounting clip and then pull the upper socket off of the lamp.

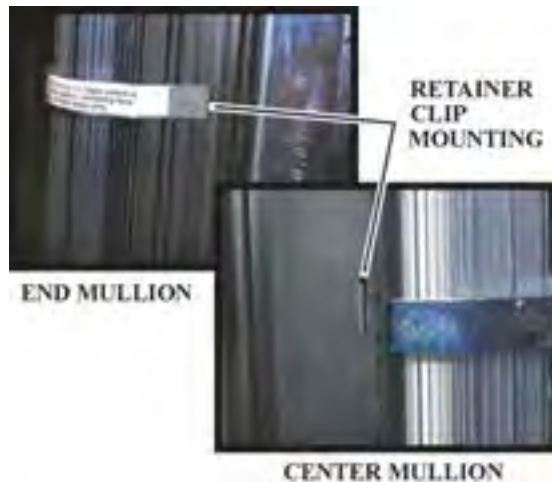


5. Pull the lamp upward and out of the lower lamp socket and remove it from the lamp fixture.



6. Align the two (2) lamp pins with the pin receptacles of the replacement lamp, to the pin holes inside the lower socket.
7. Insert the lamp into the lower socket until it is fully seated.
8. Tilt the top of the lamp upward to the upper socket.

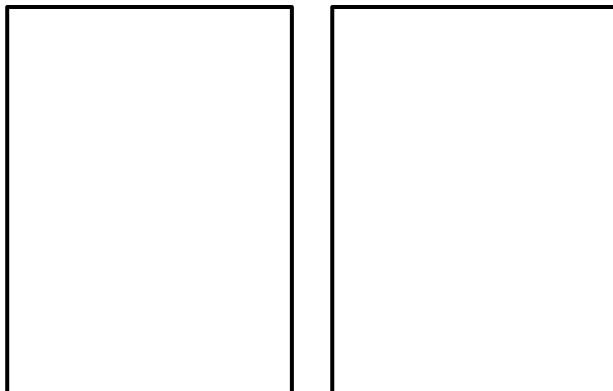
9. Align the two (2) top lamp pins with the pin holes in the top lamp socket.
10. Push the lamp up and insert it into the top socket until it is securely installed. If necessary, replace the uppersocket into the socket clip and secure the lamp and socket.
11. Replace the ELS lens onto fluorescent lamp fixture.
12. Replace lens retainer clip.
 - Place the end of the retainer clip over the mullion plastic cover until it snaps into place securely.
 - On the center mullion, insert the end of the retainer clip into the slot on the side of the mullion cover.
 - Align the bottom of the lamp assembly with the bottom socket, and insert the lamp into the socket until securely mounted



6.2.2. Standard Lighting System

WARNING: Use extreme caution when handling fluorescent tube lamps

1. Lift the lamp upward, retracting the top socket mount, then swing the bottom of the lamp aside, clearing the bottom socket and remove the lamp.



2. To remove the lens cover, grip the end cap and pull using a slight twisting motion and remove the lamp.
3. Insert the replacement lamp into the empty lamp cover, with the lamp contacts through the bottom end cap slot.
4. Place the removed end cap over the top of the cover, align the slot with the lamp contacts and install the end cap into the lamp cover completely.
5. Retracting the top socket, Insert the lamp into the top socket until securely installed.



6.3. Fluorescent Lamp Socket Replacement

6.3.1. ELS Lighting System

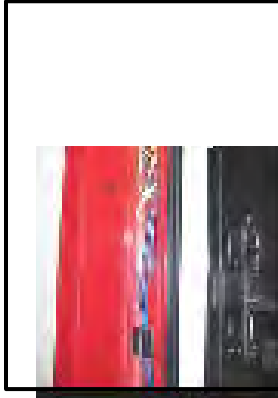
1. Insert a flat-head screwdriver between the zipper strip and the contact plate to dislodge the top end of the zipper strip.



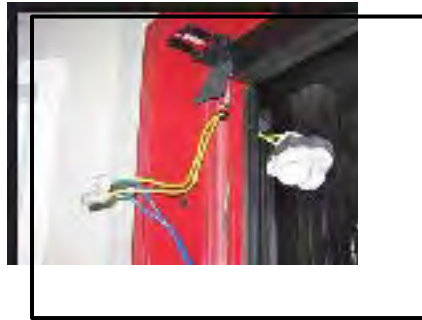
2. From the top, loosen and remove the zipper strip from the inner contact plate.



3. Remove the contact plate and expose the inner raceway, as well as the electric wiring assemblies for the lamp and the heater wire.



4. Retain the removed components for reassembly.
5. Isolate the two wire conductors supplying power to the socket to be replaced.



6. Remove the socket by slowly pulling the socket and un-threading the wires through the frame until its wire connections are exposed.
7. Using wire cutters, cut the wires at the connection to the lamp socket.
8. Remove the socket from the frame and discard it.
9. Trim the insulation from the ends of the remaining wire conductors, exposing approximately one-half inch ($1/2$ ") of conductor wire.
10. Thread the wire conductors of the replacement socket into the frame.
11. Mate each socket conductor lead with the newly stripped leads to the frame wiring.



12. Join one socket lead with one frame wire lead and slightly twist the wire leads. Then join the other wire leads together in a likewise manner.
13. Insert the joined eighteen gauge (18 AWG) leads into compatible wire nuts and twist the wire nuts until the leads are securely joined.
14. Carefully place the wire assembly back into the frame and reassemble the frame.

6.3.2. Standard Lighting System

1. Insert a flat-head screwdriver between the zipper strip and the contact plate to dislodge the top end of the zipper strip.
2. From the top, loosen and remove the zipper strip from the inner contact plate.
3. Remove the contact plate and expose the inner raceway, as well as the electric wiring assemblies for the lamp and the heater wire.

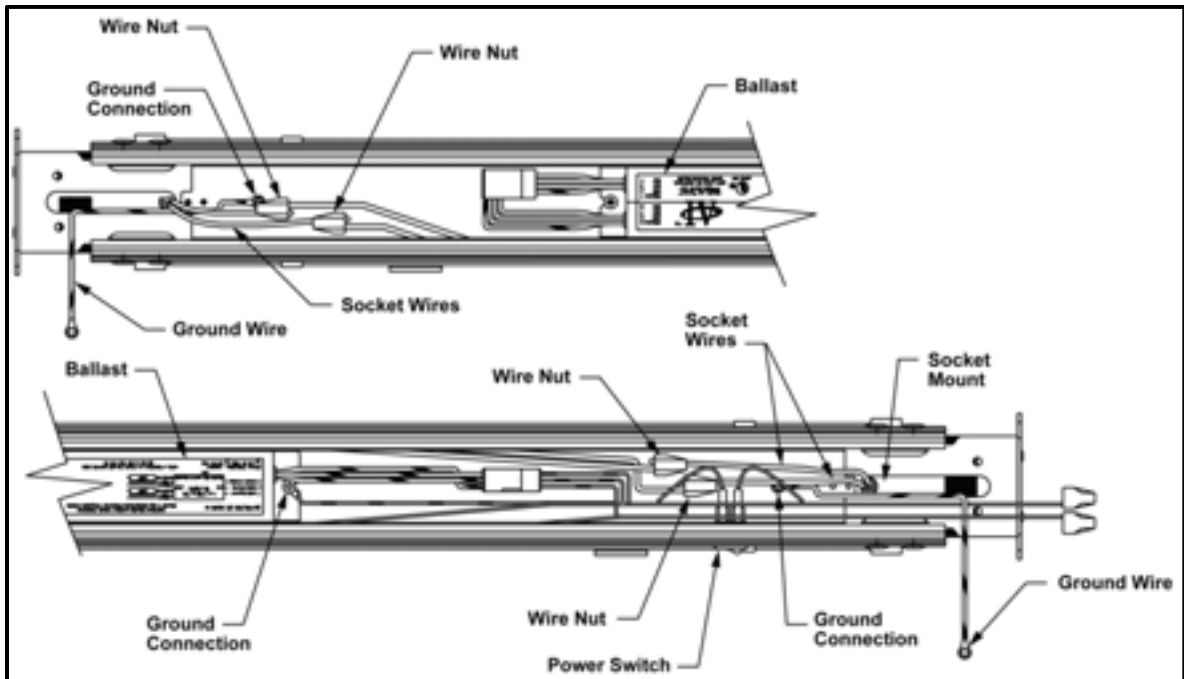


4. Retain the removed components for reassembly.
5. Isolate the two wire conductors supplying power to the socket to be replaced.



6. Remove the wire nuts or connectors securing the socket wires to the ballast wires.
7. Using a #2 Phillips screwdriver, remove the socket mounting screws.
8. Carefully remove the socket from the mullion.
9. Thread the wires for the replacement socket through the mullion hole.

10. Align the mounting holes of both the replacement socket and the mullion.
11. Mount the socket onto the mullion with the mounting screws and confirm that the socket is secure.
12. Connect the wires of the replacement socket to the ballast wires using the connectors or compatible wires nuts.
13. Check wire connections.
14. Reassemble the contact plate and zipper strips.



6.4. Power Receptacle Replacement

1. Carefully peel and remove the foam tape securing the wire leads to the power receptacle.

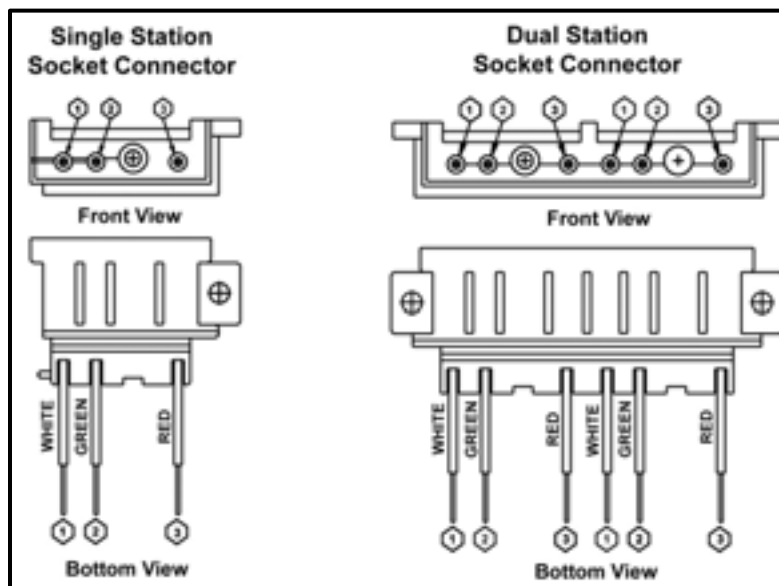


2. Using a #2 phillips-head screwdriver, remove the screws securing the receptacle to the top frame.

3. Remove the receptacle and slowly pull the connected wires out, away from the frame.



4. Disconnect the receptacle wires from the frame wires by separating the quick-connectors or, using wire cutters, cut the wire connections between the receptacle and the frame, leaving ample slack with the spared end of the wires.
 - Single Receptacles are composed of three wires:
 - ① WHITE is the neutral wire
 - ② GREEN is the Ground wire
 - ③ Red is the hot wire
 - Double Receptacles utilize two sets of the same three wires. These receptacles are located by the center mullions and are.
5. Thread the wires for the replacement receptacle into the frame.
6. Mate each socket conductor lead with the newly stripped leads to the frame wiring.



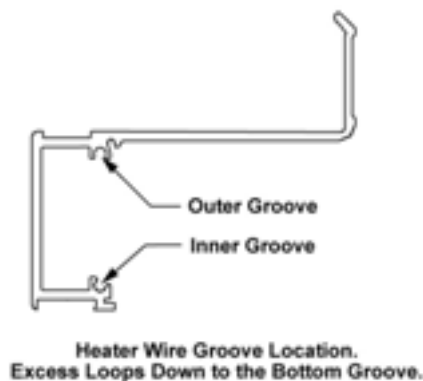
7. Join the replacement wires with the frame power wires by plugging the quick-connectors together, or by mating each stripped socket lead wire with the correlating frame wire lead and slightly twist the wire leads together.
8. Insert the joined eighteen gauge (18 AWG) leads into compatible wire nuts and twist the wire nuts until the leads are securely joined.

9. A Butt Splice can also be used as another method of adjoining the wires.
 - Insert each stripped wire end into the butt splice tube.
 - Crimp tube firmly until both wires are securely joined.
10. Carefully place the wire assembly back into the frame and reassemble the contact plates and zipper strips.

6.5. Frame Heater Wire Replacement

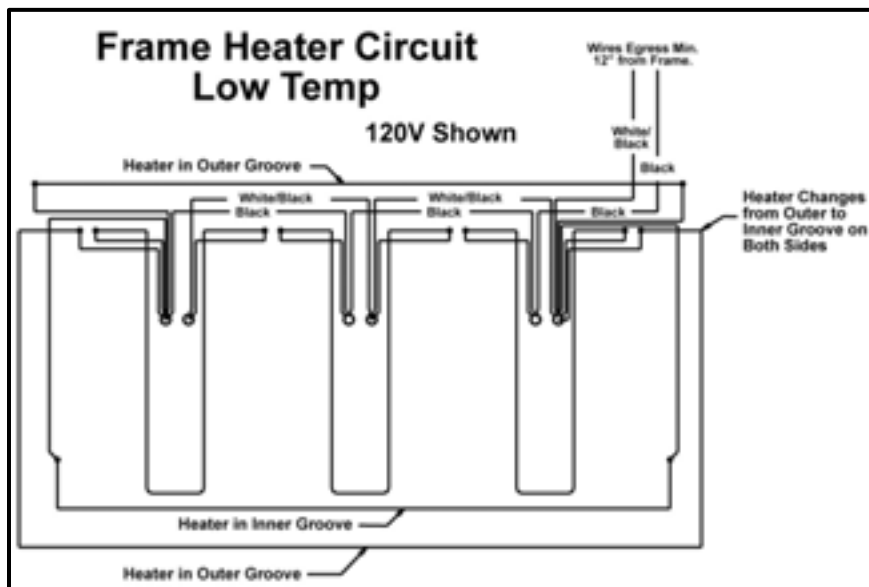
If the heater wire requires servicing or replacement, perform the following tasks.

1. With the contact plates removed from the frame mullion and frame rails, locate the heater wire in the frame.



2. Disconnect the wires at the connectors or cut the wires using wire cutters.
3. Carefully dislodge the heater wire from the groove mounts along the frame rails and remove the wire. The heater wire is usually shielded with a woven fiberglass sleeve.
4. Carefully pull out and remove the strain relief harness as well as the loop terminal for the ground (green) wire.

NOTE: Two terminals adjoin the ends of the heater wire with the hot and neutral wires from the power cord. If the heater wire must be cut in order to be disconnected, refer to the 'Splicing Wire Ends' of the door heater wire section for replacement instructions.

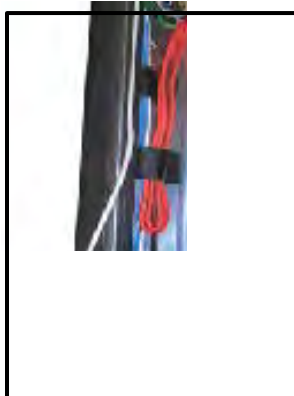


5. Open the wire terminals and remove the terminated heater wire ends.
6. Install the terminated wire ends from the replacement heater wire, then close the wire terminals.



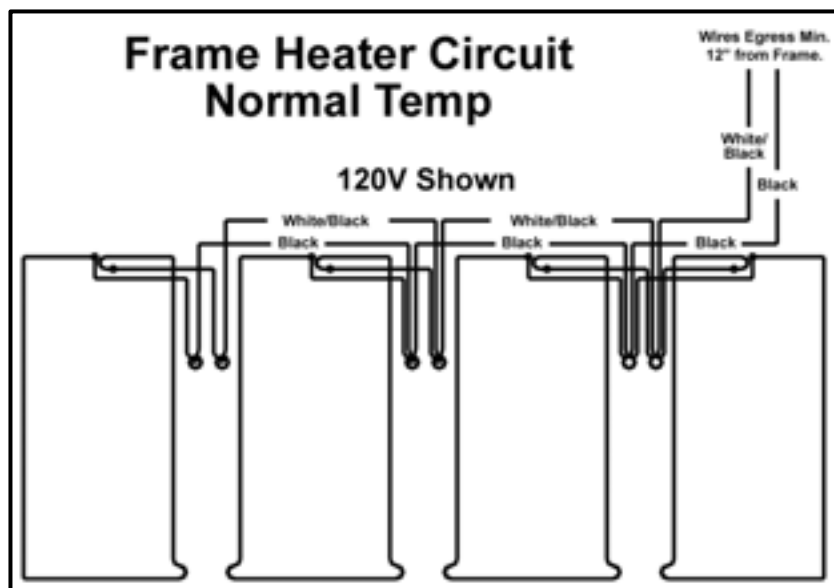
7. Lay the replacement wire out in a fashion that will avoid knots and tangling during re-installation into the frame.

8. Using a screwdriver handle or a putty knife, insert the entire replacement heater wire into the groove inside the frame and arrange the wire assembly to the same configuration that it had prior to disassembly.



9. Replace contact plates and reassemble frame as required.

NOTE: If the replacement heater wire does not have terminated ends, splice the wires together.



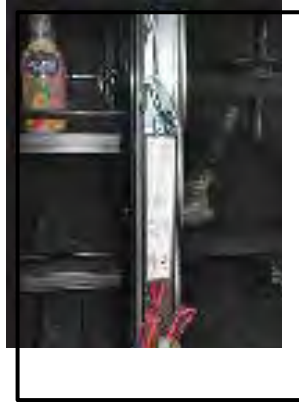
Typical 3-Door Section Shown

6.6. Ballast Replacement

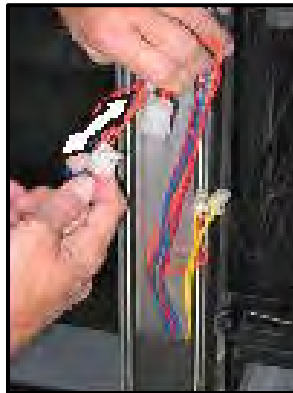
The ballasts are located in the center mullions and top frame rails. In the event of ballast failure or upgrade, perform the following procedures to replace the ballasts.

- 1 Turn the frame light switch OFF or disconnect power to the frame.
- 2 Remove the zipper strips and the contacts plates covering the frame or mullion raceway, as outlined in the frame disassembly section.

- 3 Each mullion or frame section contains more than one ballast. Locate the ballast in need of replacement.



4. Unplug the lower, eight (8) pin connector by pressing down on the connector latch and gently pulling the two connectors apart.



5. Unplug the upper three (3) pin connector by pulling the pin and receptacle plugs apart.
6. Using a phillips-head screwdriver, loosen the screw securing the lower portion of the ballast to the raceway.



- 7 Hold the ballast in place then loosen and remove the screw securing the top of the ballast and remove the ballast from the frame. Set the screws aside for reuse.

- 8 Place the replacement ballast in the raceway in the same configuration that the removed ballast was in, prior to its removal, with the bottom ballast flange inserted beneath the lower screw.
- 9 Align the ballast top mounting hole with the mounting hole in the raceway and tighten the lower screw.
- 10 Insert the top mounting screw and tighten using a phillips-head screwdriver, until the top of the ballast is nearly (but not completely) secure.
- 11 Tighten the lower mounting screw to secure the bottom of the ballast.
- 12 Using a phillips-head screwdriver, tighten the top screw, securing the upper portion of the ballast until the ballast is totally secure.
- 13 Re-acquire the three (3) pin conductor push-wire connector and mate it with the three (3) pin plug connector from the replacement ballast.



- 14 Insert all three pins from the male plug into the three female connector receptacles until the male plug snaps into place.
- 15 Re-acquire the female eight (8) pin frame connector and mate it with the eight (8) pin male connector from the replacement ballast.



16. Insert all of the pins from the male plug into the eight female connector receptacles until the male plug snaps into place or is secure.

NOTE: Some replacement ballasts differ in size to the original. Refer to the Product Update Bulletins in “Appendix A-1 thru A-3; Alternate Ballast Mounting”.

NOTE: Some replacement ballasts require adapters for the pin connectors.

6.7. Frame Reassembly

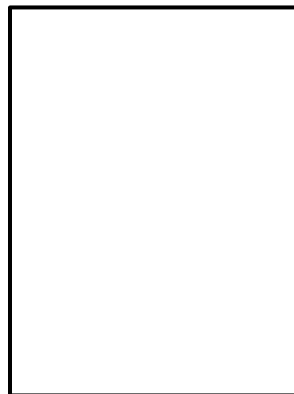
1. Place the contact plate over the frame or mullion raceway.



2. Align the contact plate in the center of the raceway.



3. Place one end of the zipper strip in the corner of the frame and press it in until it snaps into place.



4. Pressing the contact plate firmly against the frame raceway cover, slide along the frame corner, inserting the remaining zipper strip into the groove adjoining the contact plate to the frame rail or mullion.
5. Confirm that the entire zipper strip is completely inserted over the frame corner.

6. If necessary, use a plastic or rubber mallet to facilitate the zipper strip installation by tapping the zipper strip into place.



7. TROUBLESHOOTING

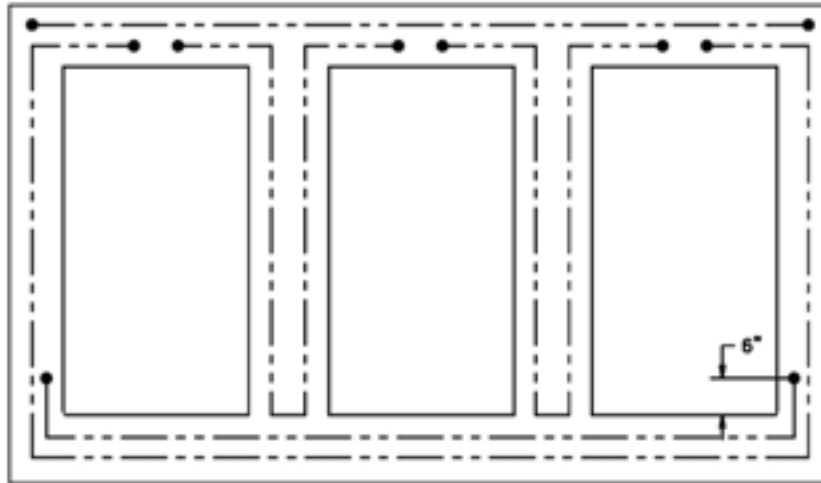
Door & Frame

I. Glass condensation	a. No power	<ol style="list-style-type: none"> 1. Check power supply 2. Check humidity controller 3. Check hinge pin connections 4. Check glass wire connections 5. Check hinge pin wiring
	b. Low voltage	<ol style="list-style-type: none"> 1. Check main voltage 2. Check humidity controller
II. Door/Frame rail condensation	a. No power	<ol style="list-style-type: none"> 1. Check power supply 2. Check humidity controller 3. Check hinge pin connections 4. Check door wire connections 5. Check frame wire connections 6. Check
	b. Low voltage	<ol style="list-style-type: none"> 1. Check main voltage 2. Check humidity controller hinge pin
	c. Door seal malfunction Refer to Door not closing or sealing"	<ol style="list-style-type: none"> 1. Check gasket 2. Check door mount wiring
III. Door not closing or sealing	a. Gasket malfunction	<ol style="list-style-type: none"> 1. Check gasket installation 2. Check gasket for damage 3. Replace gasket
	b. Door not closing properly	<ol style="list-style-type: none"> 1. Check hold-open 2. Check TorqueMaster torque 3. Check TorqueMaster mount 4. Adjust TorqueMaster sag 5. Check frame/door square 6. Check plastic covers on rails

IV. Door saw-toothed	a. Door or frame not square	<ol style="list-style-type: none"> 1. Square door to 1/16" 2. Adjust TorqueMaster sag 3. Replace worn hinge pin socket 4. Facility or case not level 5. Frame not properly shimmed 6. Hold-open binding/damaged
V. Lamp inoperative	a. Power switch OFF	Turn power switch ON
	b. Lamp burned-out	Replace lamp
	c. Lamp socket failure	<ol style="list-style-type: none"> 1. Check socket mounting 2. Check socket/lamp connection 3. Check ground wire connection
	d. Incorrect lamp	Replace with correct lamp
	e. Ballast failure	<ol style="list-style-type: none"> 1. Check wire connections 2. Replace ballast
	f. Incorrect ballast	Replace ballast
	g. Incorrect wiring	<ol style="list-style-type: none"> 1. Check ground wire connection 2. Reconfigure wiring 3. Replace wiring
VI. Lamp intermittent or dim	a. Incorrect voltage	<ol style="list-style-type: none"> 1. Match lamp voltage to circuit 2. Match ballast to circuit voltage
	b. Socket failure	<ol style="list-style-type: none"> 1. Check lamp-socket connection 2. Check socket wiring
	c. Lamp cover failure	<ol style="list-style-type: none"> 1. Check cover installation 2. Check mullion lens installation 3. Replace lamp cover
	d. Defective wiring	Check & replace wiring
	e. Defective lamp	Replace lamp
	f. Defective ballast	Replace ballast
VII. Lamp start-up too slow	a. Defective lamp	Replace lamp
	b. Lamp cover failure	<ol style="list-style-type: none"> 1. Check cover installation 2. Check mullion lens installation 3. Replace lamp cover
	c. Incorrect voltage	Match lamp voltage to circuit
	d. Defective ballast	Replace ballast
VIII. Lamp life too short	a. Incorrect wiring	Check & replace wiring
	b. Incorrect voltage	Match lamp voltage to circuit
IX. Ballast noise	a. Defective ballast	Replace ballast
	b. Loose ballast cover	Repair or replace ballast
	c. Ballast mount incorrect	Remount ballast correctly

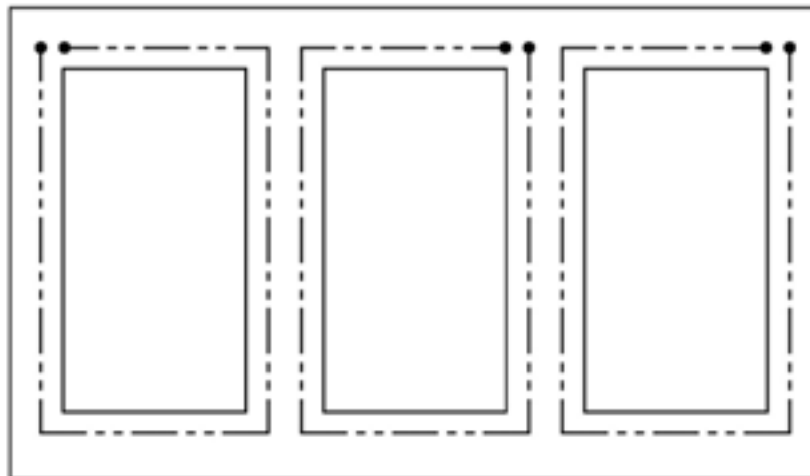
8. DOOR & FRAME ELECTRICAL SPECIFICATIONS

8.1. Typical Heater Wire and Lighting Wiring Diagrams



**3-Door Shown
 (Typ. for 2 thru 6-Door)**

**Layout, Heater Wire, Top
 2 Bottom, Center, Ends**

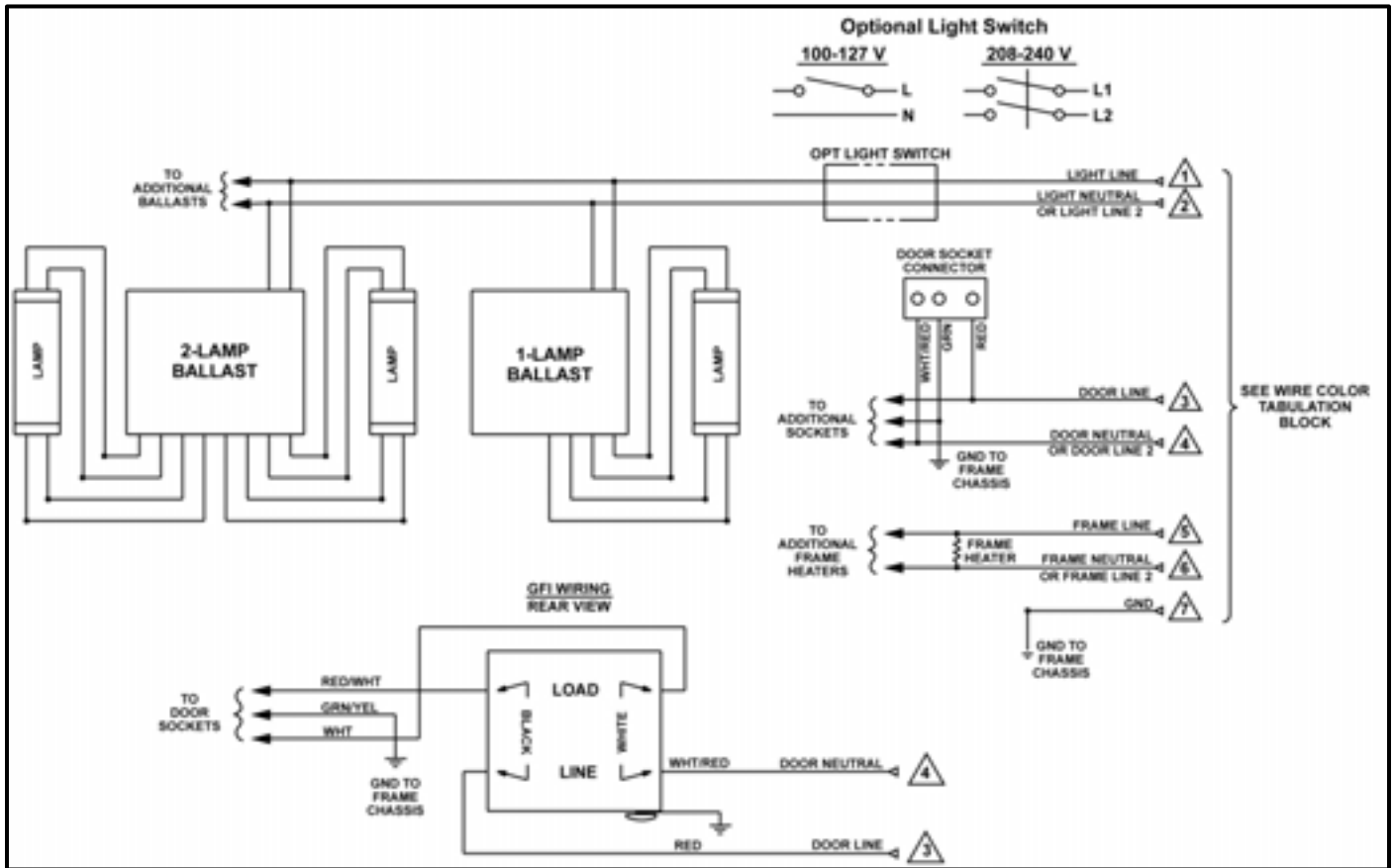


**3-Door Shown
 (Typ. for 2 thru 6-Door)**

Layout, Heater Wire, 2 Top, Bottom

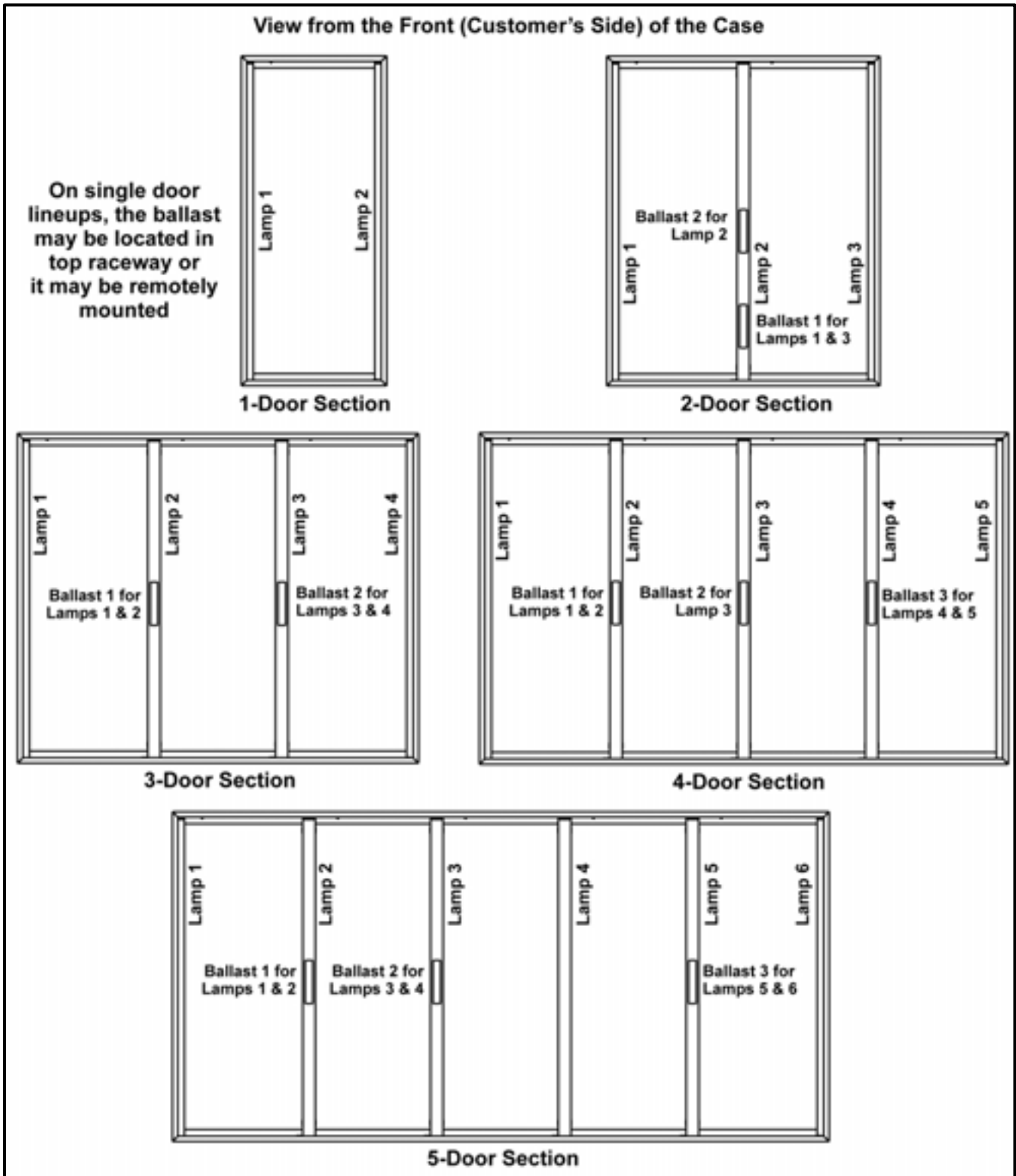
Application: 101 Low Temp Standard

8.2. Typical Frame Wiring Diagram with Wire Lead Chart



Wire Colors for Power Leads									
Voltage	HZ	Light Leads		Door Leads		Frame Leads		GND	Connection Diagram Label
		Line or L1	Neutral or L2	Line or L1	Neutral or L2	Line or L1	Neutral or L2		
100-127	50/60	BLU/WHT	WHT/BLU	RED	WHT/RED	BLK	WHT/BLK	GRN/YEL	09-13090-0001
208-240	50/60	BRN/YEL	BLU/YEL	BRN/RED	BLU/RED	BRN/ORG	BLU/ORG	GRN/YEL	09-13095-0001

8.3. Frame Power-Typical Frame Multi-Ballast Configurations



8.4. Dew Point Chart

Model 101 NT & LT (1" Glass pack)

Dew Point Chart

Normal Temperature Applications

Glass Type	Room Temp (F)	Case Temperature (F)				
		40	35	30	25	20
TWO PANE NHG*	70	69	65	61	58	55
	75	66	62	59	55	52
	80	63	59	56	53	50
	85	60	57	54	51	48
	90	57	55	52	49	47
THREE PANE NHG*	70	74	71	68	65	62
	75	71	68	65	63	60
	80	69	66	63	61	58
	85	66	64	61	59	57
	90	64	62	60	57	55
TWO PANE REFLECTIVE NHG*	70	77	74	71	68	65
	75	75	72	69	66	63
	80	72	70	67	64	61
	85	70	67	65	62	59
	90	68	65	63	60	58
TWO PANE HEATED GLASS	70	98	94	89	84	80
	75	93	89	84	80	76
	80	89	85	80	76	73
	85	85	81	77	73	70
	90	81	77	74	70	67
*NHG = Non-Heated Glass		% Rel Humidity @ which Condensation Forms on Glass				

Low Temperature Applications

Glass Type	Room Temp (F)	Case Temperature (F)						
		+5	0	-5	-10	-15	-20	-25
3-PANE HEATED REFLECTIVE NHG*	70	85	82	80	77	75	73	70
	75	82	80	77	75	73	71	69
	80	80	78	75	73	71	69	67
	85	78	75	73	71	69	67	66
	90	76	74	72	70	68	66	64
		% Rel Humidity @ which Condensation Forms on Glass						

Calculations make no allowance for air leaks or unusual air flow patterns within cases and are intended to be used only as a guideline.

8.5. Lighting Amperage Chart

Lamp Length	T12/T10 Conventional Lighting	ELS, PowerLens or 401 T* Lighting	
	120V	120V	220V
72"	0.50	0.62	0.32
60"	0.50	0.48	0.25
48"	0.50	0.30	0.16
36"	0.50	0.30	0.16
24"	0.50	0.30	0.09

8.6. Table of AMP and BTU Charts

Use the table below to identify the exact door and frame models to locate the required information.

8.6.1. ABBREVIATIONS

Glass

- 2P 2-Pane Glass Assembly
- 3P 3-Pane Glass Assembly
- HG Heated Glass Assembly
- NHG Non-Heated Glass Assembly
- CP Clear Pane Heated Glass
- HR or R Heated Reflective Glass

Electrical

- LT Low Temperature Application
- NT Normal Temperature Application
- ELS Electronic Lighting System
- SLS Standard Lighting System

Measurements

- AMP Unit of Measurement for Electrical Current
- BTU Unit of Measurement for Heat

8.6.2. AMP & BTU Chart Reference

Model	Chart	Table Number	Description
101B	AMP	6	2P, HR, NHG, NT, EF
		7	3P, HR, HG, LT
		8	2P, NHG, NT
		9	2P or 3P, HR, NHG, NT
		10	2P, HG, NT
	BTU	17	CP, 3P, HR, HG, LT, SLS, ELS
		18	2P or 3P, CP, HG, HR, LT, NHG, NT, SLS
		19	2P or 3P, CP, HG, HR, LT, NHG, NT, ELS
20		2P, HG, NT, SLS, ELS	
210X	AMP	11	2P or 3P, HR, NHG, NT, SLS
	BTU	21	CP, 3P, HR, HG, LT, SLS, ELS
		22	CP, 3P, HR, HG, NT, SLS, ELS
E2	AMP	12	3P, HR, NHG, AR, LT
		13	3P, HR, HG, LT
		14	3P, HR, NHG, NT
	BTU	23	3P, HR, HG, NHG, LT, AR,
		24	3P, HR, HG, NHG, LT, AR, ELS
		25	3P, HR, NHG, NT, SLS, ELS
ELM	AMP	15	3P, HR, NHG, AR, LT
		16	3P, HR, NHG, AR, NT
	BTU	26	3P, HR, NHG, AR, LT, ELS
		27	3P, HR, NHG, AR, NT, ELS

8.7. Model 101B Heater Amperages

8.7.1. Model 101B Energy Free Heater Amps @ 120V - No Door Heat, Frame Heat

Style: Energy Free Normal Temp Doors w/2-Pane Non-Heated Reflective Glass

Application: Case Temperature 38°F, Humidity 73% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	0.17	0.35	0.52	0.69	0.87	1.04	1.21	1.38	1.56	1.74
24 x 67	0.27	0.53	0.80	1.06	1.33	1.60	1.86	2.12	2.39	2.66
24 x 75	0.29	0.59	0.88	1.17	1.47	1.76	2.05	2.34	2.64	2.94
26 x 67	0.28	0.55	0.83	1.10	1.38	1.66	1.93	2.20	2.48	2.76
26 x 75	0.28	0.57	0.85	1.14	1.42	1.70	1.99	2.28	2.56	2.84
28 x 75	0.32	0.63	0.95	1.27	1.58	1.90	2.22	2.54	2.85	3.16
28 x 79	0.30	0.61	0.91	1.22	1.52	1.82	2.13	2.44	2.74	3.04
30 x 36	0.20	0.40	0.60	0.79	0.99	1.20	1.39	1.58	1.78	1.98
30 x 67	0.30	0.59	0.89	1.19	1.49	1.78	2.08	2.38	2.68	2.98
30 x 75	0.31	0.62	0.94	1.25	1.56	1.88	2.19	2.50	2.81	3.12
30 x 79	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	1.90	2.07	2.25	2.43	2.61	2.76	2.94	3.13	3.30	3.48
24 x 67	2.92	3.18	3.45	3.72	3.99	4.24	4.51	4.79	5.05	5.32
24 x 75	3.22	3.51	3.81	4.11	4.41	4.68	4.98	5.29	5.58	5.88
26 x 67	3.03	3.30	3.58	3.86	4.14	4.40	4.68	4.97	5.24	5.52
26 x 75	3.13	3.42	3.70	3.98	4.26	4.56	4.84	5.11	5.40	5.68
28 x 75	3.49	3.81	4.12	4.43	4.74	5.08	5.39	5.69	6.01	6.32
28 x 79	3.35	3.66	3.96	4.26	4.56	4.88	5.18	5.47	5.78	6.08
30 x 36	2.18	2.37	2.57	2.77	2.97	3.16	3.36	3.57	3.76	3.96
30 x 67	3.27	3.57	3.87	4.17	4.47	4.76	5.06	5.36	5.66	5.96
30 x 75	3.44	3.75	4.06	4.37	4.68	5.00	5.31	5.62	5.93	6.24
30 x 79	3.63	3.96	4.29	4.62	4.95	5.28	5.61	5.94	6.27	6.60

8.7.2. Model 101B Low Temp Heater Amps @ 120V - Door and Frame Heat

Style: Low Temp w/Heaters, 3-Pane Heated Reflective Glass (5.75W/Ft²)

Application: Case Temperature -10°F, Humidity 75% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	1.11	2.18	3.23	4.21	5.27	6.46	7.44	8.42	9.48	10.54
24 x 67	1.83	3.35	4.91	6.49	8.09	9.82	11.40	12.98	14.58	16.18
24 x 75	1.97	3.62	5.33	7.12	8.88	10.66	12.45	14.24	16.00	17.76
26 x 67	1.93	3.63	5.28	7.01	8.67	10.56	12.29	14.02	15.68	17.34
26 x 75	2.12	3.98	5.77	7.57	9.48	11.54	13.34	15.14	17.05	18.96
28 x 75	2.14	4.08	6.10	8.02	9.97	12.20	14.12	16.04	17.99	19.94
28 x 79	2.33	4.23	6.28	8.27	10.30	12.56	14.55	16.54	18.57	20.60
30 x 36	1.30	2.59	3.82	5.14	6.27	7.64	8.96	10.28	11.41	12.54
30 x 67	2.07	3.92	5.71	7.66	9.42	11.42	13.37	15.32	17.08	18.84
30 x 75	2.23	4.24	6.24	8.25	10.21	12.48	14.49	16.50	18.46	20.42
30 x 79	2.35	4.42	6.45	8.62	10.65	12.90	15.07	17.24	19.27	21.30

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	11.65	12.63	13.69	14.75	15.81	16.84	17.90	19.04	20.02	21.08
24 x 67	17.89	19.47	21.07	22.67	24.27	25.96	27.56	29.18	30.76	32.36
24 x 75	19.57	21.36	23.12	24.88	26.64	28.48	30.24	31.97	33.76	35.52
26 x 67	19.30	21.03	22.69	24.35	26.01	28.04	29.70	31.29	33.02	34.68
26 x 75	20.91	22.71	24.62	26.53	28.44	30.28	32.19	34.21	36.01	37.92
28 x 75	22.14	24.06	26.01	27.96	29.91	32.08	34.03	36.01	37.93	39.88
28 x 79	22.82	24.81	26.84	28.87	30.90	33.08	35.11	37.18	39.17	41.20
30 x 36	14.10	15.42	16.55	17.68	18.81	20.56	21.69	22.63	23.95	25.08
30 x 67	21.03	22.98	24.74	26.50	28.26	30.64	32.40	33.97	35.92	37.68
30 x 75	22.74	24.75	26.71	28.67	30.63	33.00	34.96	36.87	38.88	40.84
30 x 79	23.69	25.86	27.89	29.92	31.95	34.48	36.51	38.40	40.57	42.60

8.7.3. Model 101B Normal Temp Heater Amps @ 120V – 2-Pane Non-Heated

Style: Normal Temp Doors w/Heaters, 2-Pane Non-Heated Glass

Application: Case Temperature 38°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	0.25	0.51	0.76	1.01	1.27	1.52	1.77	2.02	2.28	2.54
24 x 67	0.40	0.79	1.19	1.58	1.98	2.38	2.77	3.16	3.56	3.96
24 x 75	0.43	0.87	1.30	1.73	2.17	2.60	3.03	3.46	3.90	4.34
26 x 67	0.41	0.81	1.22	1.62	2.03	2.44	2.84	3.24	3.65	4.06
26 x 75	0.43	0.87	1.30	1.74	2.17	2.60	3.04	3.48	3.91	4.34
28 x 75	0.46	0.91	1.37	1.83	2.28	2.74	3.20	3.66	4.11	4.56
28 x 79	0.45	0.91	1.36	1.82	2.27	2.72	3.18	3.64	4.09	4.54
30 x 36	0.29	0.58	0.87	1.15	1.44	1.74	2.02	2.30	2.59	2.88
30 x 67	0.44	0.87	1.31	1.75	2.19	2.62	3.06	3.50	3.94	4.38
30 x 75	0.47	0.94	1.42	1.89	2.36	2.84	3.31	3.78	4.25	4.72
30 x 79	0.48	0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.32	4.80

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	2.78	3.03	3.29	3.55	3.81	4.04	4.30	4.57	4.82	5.08
24 x 67	4.35	4.74	5.14	5.54	5.94	6.32	6.72	7.13	7.52	7.92
24 x 75	4.76	5.19	5.63	6.07	6.51	6.92	7.36	7.81	8.24	8.68
26 x 67	4.46	4.86	5.27	5.68	6.09	6.48	6.89	7.31	7.71	8.12
26 x 75	4.78	5.22	5.65	6.08	6.51	6.96	7.39	7.81	8.25	8.68
28 x 75	5.03	5.49	5.94	6.39	6.84	7.32	7.77	8.21	8.67	9.12
28 x 79	5.00	5.46	5.91	6.36	6.81	7.28	7.73	8.17	8.63	9.08
30 x 36	3.17	3.45	3.74	4.03	4.32	4.60	4.89	5.19	5.47	5.76
30 x 67	4.81	5.25	5.69	6.13	6.57	7.00	7.44	7.88	8.32	8.76
30 x 75	5.20	5.67	6.14	6.61	7.08	7.56	8.03	8.50	8.97	9.44
30 x 79	5.28	5.76	6.24	6.72	7.20	7.68	8.16	8.64	9.12	9.60

8.7.4. Model 101B Normal Temp Heater Amps @ 120V – 3-Pane Heated

Style: Normal Temp Doors w/Heaters, 3-Pane or 2-Pane Reflective NHG

Application: Case Temperature 33°F, Humidity 68% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	0.35	0.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50
24 x 67	0.55	1.10	1.65	2.20	2.75	3.30	3.85	4.40	4.95	5.50
24 x 75	0.60	1.20	1.79	2.39	2.99	3.58	4.18	4.78	5.38	5.98
26 x 67	0.56	1.12	1.67	2.23	2.79	3.34	3.90	4.46	5.02	5.58
26 x 75	0.62	1.25	1.87	2.49	3.12	3.74	4.36	4.98	5.61	6.24
28 x 75	0.64	1.27	1.91	2.55	3.19	3.82	4.46	5.10	5.74	6.38
28 x 79	0.67	1.33	2.00	2.66	3.33	4.00	4.66	5.32	5.99	6.66
30 x 36	0.40	0.80	1.21	1.61	2.01	2.42	2.82	3.22	3.62	4.02
30 x 67	0.60	1.21	1.81	2.42	3.02	3.62	4.23	4.84	5.44	6.04
30 x 75	0.65	1.30	1.95	2.60	3.25	3.90	4.55	5.20	5.85	6.50
30 x 79	0.66	1.32	1.98	2.63	3.29	3.96	4.61	5.26	5.92	6.58

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	3.85	4.20	4.55	4.90	5.25	5.60	5.95	6.30	6.65	7.00
24 x 67	6.05	6.60	7.15	7.70	8.25	8.80	9.35	9.90	10.45	11.00
24 x 75	6.57	7.17	7.77	8.37	8.97	9.56	10.16	10.76	11.36	11.96
26 x 67	6.13	6.69	7.25	7.81	8.37	8.92	9.48	10.04	10.60	11.16
26 x 75	6.85	7.47	8.10	8.73	9.36	9.96	10.59	11.23	11.85	12.48
28 x 75	7.01	7.65	8.29	8.93	9.57	10.20	10.84	11.48	12.12	12.76
28 x 79	7.32	7.98	8.65	9.32	9.99	10.64	11.31	11.99	12.65	13.32
30 x 36	4.43	4.83	5.23	5.63	6.03	6.44	6.84	7.24	7.64	8.04
30 x 67	6.65	7.26	7.86	8.46	9.06	9.68	10.28	10.87	11.48	12.08
30 x 75	7.15	7.80	8.45	9.10	9.75	10.40	11.05	11.70	12.35	13.00
30 x 79	7.24	7.89	8.55	9.21	9.87	10.52	11.18	11.85	12.50	13.16

8.7.5. Model 101B Normal Temp Heater Amps @ 120V – 2-Pane Heated

Style: Normal Temp Doors w/Heaters, 2-Pane Heated Glass
(5.75W/Ft²)

Application: Case Temperature 31°F, Humidity 80% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	0.81	1.62	2.43	3.24	4.05	4.86	5.67	6.48	7.29	8.10
24 x 67	1.30	2.61	3.91	5.22	6.52	7.82	9.13	10.44	11.74	13.04
24 x 75	1.51	3.01	4.52	6.02	7.53	9.04	10.54	12.04	13.55	15.06
26 x 67	1.42	2.85	4.27	5.69	7.11	8.54	9.96	11.38	12.80	14.22
26 x 75	1.59	3.17	4.76	6.34	7.93	9.52	11.10	12.68	14.27	15.86
28 x 75	1.64	3.29	4.93	6.57	8.21	9.86	11.50	13.14	14.78	16.42
28 x 79	1.75	3.49	5.24	6.98	8.73	10.48	12.22	13.96	15.71	17.46
30 x 36	0.96	1.91	2.87	3.83	4.78	5.74	6.70	7.66	8.61	9.56
30 x 67	1.55	3.10	4.65	6.20	7.74	9.30	10.85	12.40	13.94	15.48
30 x 75	1.72	3.42	5.15	6.86	8.58	10.30	12.01	13.72	15.44	17.16
30 x 79	1.78	3.55	5.33	7.10	8.88	10.66	12.43	14.20	15.98	17.76

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	8.91	9.72	10.53	11.34	12.15	12.96	13.77	14.58	15.39	16.20
24 x 67	14.35	15.66	16.96	18.26	19.56	20.88	22.18	23.47	24.78	26.08
24 x 75	16.56	18.06	19.57	21.08	22.59	24.08	25.59	27.11	28.61	30.12
26 x 67	15.65	17.07	18.49	19.91	21.33	22.76	24.18	25.60	27.02	28.44
26 x 75	17.44	19.02	20.61	22.20	23.79	25.36	26.95	28.55	30.13	31.72
28 x 75	18.07	19.71	21.35	22.99	24.63	26.28	27.92	29.56	31.20	32.84
28 x 79	19.20	20.94	22.69	24.44	26.19	27.92	29.67	31.43	33.17	34.92
30 x 36	10.53	11.49	12.44	13.39	14.34	15.32	16.27	17.21	18.17	19.12
30 x 67	17.05	18.60	20.14	21.68	23.22	24.80	26.34	27.87	29.42	30.96
30 x 75	18.87	20.58	22.30	24.02	25.74	27.44	29.16	30.89	32.60	34.32
30 x 79	19.53	21.30	23.08	24.86	26.64	28.40	30.18	31.97	33.74	35.52

8.8. Model 210X Heater Amperages

8.8.1. Model 210X Normal Temp Heater Amps @ 120V – 3-Pane Non-Heated

Style: Normal Temp Doors w/Heaters, 3-Pane Non-Heated Glass

Application: Case Temperature 33°F, Humidity 68% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
24 x 36	0.17	0.35	0.52	0.69	0.87	1.04	1.21	1.38	1.56	1.74
24 x 67	0.27	0.53	0.80	1.06	1.33	1.60	1.86	2.12	2.39	2.66
24 x 75	0.29	0.59	0.88	1.17	1.47	1.76	2.05	2.34	2.64	2.94
26 x 67	0.28	0.55	0.83	1.10	1.38	1.66	1.93	2.20	2.48	2.76
26 x 75	0.28	0.57	0.85	1.14	1.42	1.70	1.99	2.28	2.56	2.84
28 x 75	0.32	0.63	0.95	1.27	1.58	1.90	2.22	2.54	2.85	3.16
28 x 79	0.30	0.61	0.91	1.22	1.52	1.82	2.13	2.44	2.74	3.04
30 x 36	0.20	0.40	0.60	0.79	0.99	1.20	1.39	1.58	1.78	1.98
30 x 67	0.30	0.59	0.89	1.19	1.49	1.78	2.08	2.38	2.68	2.98
30 x 75	0.31	0.62	0.94	1.25	1.56	1.88	2.19	2.50	2.81	3.12
30 x 79	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30

8.8.2. Model 210X Normal Temp Heater Amps @ 120V – 3-Pane or 2-Pane

Style: Normal Temp Doors w/Heaters, 3-Pane or 2-Pane Reflective NHG

Application: Case Temperature 33°F, Humidity 68% or less @ 75°F Ambient

Number of Doors	11	12	13	14	15	16	17	18	19	20
24 x 36	1.90	2.07	2.25	2.43	2.61	2.76	2.94	3.13	3.30	3.48
24 x 67	2.92	3.18	3.45	3.72	3.99	4.24	4.51	4.79	5.05	5.32
24 x 75	3.22	3.51	3.81	4.11	4.41	4.68	4.98	5.29	5.58	5.88
26 x 67	3.03	3.30	3.58	3.86	4.14	4.40	4.68	4.97	5.24	5.52
26 x 75	3.13	3.42	3.70	3.98	4.26	4.56	4.84	5.11	5.40	5.68
28 x 75	3.49	3.81	4.12	4.43	4.74	5.08	5.39	5.69	6.01	6.32
28 x 79	3.35	3.66	3.96	4.26	4.56	4.88	5.18	5.47	5.78	6.08
30 x 36	21.8	2.37	2.57	2.77	2.97	3.16	3.36	3.57	3.76	3.96
30 x 67	3.27	3.57	3.87	4.17	4.47	4.76	5.06	5.36	5.66	5.96
30 x 75	3.44	3.75	4.06	4.37	4.68	5.00	5.31	5.62	5.93	6.24
30 x 79	3.63	3.96	4.29	4.62	4.95	5.28	5.61	5.94	6.27	6.60

8.9. Model E2 Heater Amperages

8.9.1. Model E2 Low Temp Heater Amps @ 120V – 3-Pane Non-Heated

Style: Low Temp Doors w/Heaters, 3-Pane Non-Heated Reflective, Argon-Filled Glass

Application: Case Temperature -10°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
30 x 67	1.14	2.06	2.92	3.94	4.77	5.84	6.86	7.88	8.71	9.54
30 x 75	1.20	2.18	3.15	4.13	5.06	6.30	7.28	8.26	9.19	10.12
30 x 79	1.25	2.26	3.21	4.30	5.25	6.42	7.51	8.60	9.55	10.50

Number of Doors	11	12	13	14	15	16	17	18	19	20
30 x 67	10.80	11.82	12.65	13.48	14.31	15.76	16.59	17.23	18.25	19.08
30 x 75	11.41	12.39	13.32	14.25	15.18	16.52	17.45	18.33	19.31	20.24
30 x 79	11.81	12.90	13.85	14.80	15.75	17.20	18.15	18.96	20.05	21.00

8.9.2. Model E2 Low Temp Heater Amps @ 120V – 3-Pane Heated

Style: Low Temp Doors w/Heaters, 3-Pane Heated Reflective Glass (5.75W/Ft²)

Application: Case Temperature -10°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
30 x 67	1.14	2.06	2.92	3.94	4.77	5.84	6.86	7.88	8.71	9.54
30 x 75	1.20	2.18	3.15	4.13	5.06	6.30	7.28	8.26	9.19	10.12
30 x 79	1.25	2.26	3.21	4.30	5.25	6.42	7.51	8.60	9.55	10.50

Number of Doors	11	12	13	14	15	16	17	18	19	20
30 x 67	10.80	11.82	12.65	13.48	14.31	15.76	16.59	17.23	18.25	19.08
30 x 75	11.41	12.39	13.32	14.25	15.18	16.52	17.45	18.33	19.31	20.24
30 x 79	11.81	12.90	13.85	14.80	15.75	17.20	18.15	18.96	20.05	21.00

8.9.3. Model E2 Normal Temp Heater Amps @ 120V – 3-Pane Non-Heated

Style: Normal Temp Doors w/Heaters, 3-Pane Non-Heated Glass

Application: Case Temperature 38°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
30 x 67	0.30	0.59	0.89	1.19	1.49	1.78	2.08	2.38	2.68	2.98
30 x 75	0.31	0.62	0.94	1.25	1.56	1.88	2.19	2.50	2.81	3.12
30 x 79	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30

Number of Doors	11	12	13	14	15	16	17	18	19	20
30 x 67	3.27	3.57	3.87	4.17	4.47	4.76	5.06	5.36	5.66	5.96
30 x 75	3.44	3.75	4.06	4.37	4.68	5.00	5.31	5.62	5.93	6.24
30 x 79	3.63	3.96	4.29	4.62	4.95	5.28	5.61	5.94	6.27	6.60

8.10. Model ELM Heater Amperages

8.10.1. Model ELM Low Temp Heater Amps @ 120V – 3-Pane Non-Heated

Style: Low Temp Doors w/Heaters, 3-Pane Non-Heated Reflective, Argon-Filled Glass

Application: Case Temperature -10°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
30 x 67	1.41	2.60	3.73	5.02	6.12	7.46	8.75	10.04	11.14	12.24
30 x 75	1.48	2.74	3.99	5.25	6.46	7.98	9.24	10.50	11.71	12.92
30 x 79	1.58	2.88	4.14	5.54	6.80	8.28	9.68	11.08	12.34	13.60

Number of Doors	11	12	13	14	15	16	17	18	19	20
30 x 67	13.77	15.06	16.16	17.26	18.36	20.08	21.18	22.09	23.38	24.48
30 x 75	14.49	15.75	16.96	18.17	19.38	21.00	22.21	23.37	24.63	25.84
30 x 79	15.22	16.62	17.88	19.14	20.40	22.16	23.42	24.54	25.94	27.20

8.10.2. Model E2 Normal Temp Heater Amps @ 120V – 3-Pane Non-Heated

Style: Normal Temp Doors w/Heaters, 3-Pane Non-Heated Glass

Application: Case Temperature 38°F, Humidity 65% or less @ 75°F Ambient

Number of Doors	1	2	3	4	5	6	7	8	9	10
30 x 67	0.30	0.59	0.89	1.19	1.49	1.78	2.08	2.38	2.68	2.98
30 x 75	0.31	0.62	0.94	1.25	1.56	1.88	2.19	2.50	2.81	3.12
30 x 79	0.33	0.66	0.99	1.32	1.65	1.98	2.31	2.64	2.97	3.30

Number of Doors	11	12	13	14	15	16	17	18	19	20
30 x 67	3.27	3.57	3.87	4.17	4.47	4.76	5.06	5.36	5.66	5.96
30 x 75	3.44	3.75	4.06	4.37	4.68	5.00	5.31	5.62	5.93	6.24
30 x 79	3.63	3.96	4.29	4.62	4.95	5.28	5.61	5.94	6.27	6.60

8.11. BTU Charts

8.11.1. Model 101B Energy-Free BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

Model 101B Energy Free
2-Pane Reflective NHG – Case Temp = 38°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	543	861	1179	1497	1814
24 x 67	616	1007	1398	1789	2179
24 x 75	635	1044	1454	1864	2274
26 x 67	635	1045	1455	1865	2275
26 x 75	656	1087	1518	1949	2380
28 x 75	669	1114	1558	2003	2447
28 x 79	681	1136	1592	2048	2503
30 x 36	566	906	1247	1587	1928
30 x 67	656	1087	1519	1950	2381
30 x 75	680	1134	1589	2043	2498
30 x 79	691	1157	1624	2090	2556

Model 101B ELS Energy Free
2-Pane Reflective NHG – Case Temp = 38°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	307	505	707	905	1107
24 x 67	476	795	1117	1437	1759
24 x 75	584	970	1353	1739	2122
26 x 67	495	833	1175	1513	1855
26 x 75	605	1013	1417	1824	2228
28 x 75	619	1040	1457	1878	2295
28 x 79	630	1062	1491	1923	2351
30 x 36	330	551	775	996	1220
30 x 67	516	876	1238	1598	1960
30 x 75	629	1060	1487	1918	2346
30 x 79	641	1083	1522	1965	2404

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.2. Model 101B Low Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters. (Per door with doors closed @ 75°F store ambient temperature with lights).

Model 101B Low Temp – Heated Glass
Clear Pane 3 Heat Reflective – Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	664	1128	1591	2055	2519
24 x 67	1044	1787	2531	3275	4019
24 x 75	1093	1887	2680	3473	4266
26 x 67	1092	1883	2675	3466	4258
26 x 75	1143	1986	2829	3671	4514
28 x 75	1179	2058	2938	3817	4696
28 x 79	1204	2108	3011	3915	4819
30 x 36	725	1251	1776	2302	2827
30 x 67	1145	1989	2834	3678	4523
30 x 75	1201	2102	3003	3904	4805
30 x 79	1230	2160	3090	4020	4949

Model 101B ELS Low Temp – Heated Glass
Clear Pane 3 Heat Reflective – Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	478	847	1219	1589	1961
24 x 67	754	1351	1951	2548	3148
24 x 75	893	1587	2278	2973	3664
26 x 67	801	1446	2094	2739	3387
26 x 75	942	1686	2427	3171	3912
28 x 75	979	1759	2536	3317	4094
28 x 79	1003	1808	2610	3415	4217
30 x 36	539	970	1404	1835	2269
30 x 67	854	1552	2253	2951	3652
30 x 75	1000	1803	2602	3404	4203
30 x 79	1029	1860	2688	3519	4347

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.3. Model 101B Normal Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

Model 101B Normal Temp
2-Pane Non-Heated Glass – Case Temp = 38°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	582	938	1295	1652	2008
24 x 67	685	1144	1604	2063	2523
24 x 75	711	1197	1683	2169	2655
26 x 67	711	1198	1684	2171	2657
26 x 75	741	1257	1773	2289	2805
28 x 75	760	1294	1829	2364	2899
28 x 79	775	1326	1876	2427	2977
30 x 36	614	1002	1391	1779	2168
30 x 67	741	1257	1773	2289	2805
30 x 75	774	1323	1871	2420	2969
30 x 79	790	1355	1921	2486	3051

Model 101B Normal Temp
3-Pane or 2-Pane Reflective Non-Heated Glass –
Case Temp = 33°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	583	941	1299	1657	2016
24 x 67	683	1141	1599	2057	2514
24 x 75	709	1192	1676	2160	2643
26 x 67	708	1190	1673	2156	2638
26 x 75	736	1247	1758	2269	2780
28 x 75	753	1282	1810	2338	2866
28 x 79	768	1312	1855	2398	2942
30 x 36	613	1001	1390	1778	2166
30 x 67	735	1245	1754	2264	2774
30 x 75	766	1307	1848	2390	2931
30 x 79	782	1339	1896	2452	3009

**Model 101B Normal Temp
CP2NT Heated Glass – Case Temp = 31°F**

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	650	1074	1499	1924	2349
24 x 67	802	1378	1955	2531	3108
24 x 75	841	1457	2072	2688	3304
26 x 67	840	1455	2070	2685	3300
26 x 75	883	1542	2200	2859	3517
28 x 75	910	1595	2280	2965	3650
28 x 79	933	1641	2349	3057	3766
30 x 36	696	1167	1638	2109	2580
30 x 67	882	1539	2196	2853	3510
30 x 75	930	1635	2340	3045	3751
30 x 79	954	1683	2412	3142	3871

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.4. Model 101B Normal Temp ELS BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

**Model 101B ELS Normal Temp
2-Pane Non-Heated Glass – Case Temp = 38°F**

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	346	583	823	1060	1300
24 x 67	544	932	1323	1711	2102
24 x 75	660	1123	1582	2044	2503
26 x 67	571	986	1404	1819	2237
26 x 75	690	1183	1672	2164	2653
28 x 75	709	1220	1728	2239	2747
28 x 79	725	1251	1775	2302	2825
30 x 36	378	647	919	1188	1460
30 x 67	601	1045	1493	1937	2384
30 x 75	723	1248	1770	2295	2817
30 x 79	740	1281	1819	2361	2899

**Model 101B ELS Normal Temp
3-Pane or 2-Pane Reflective Non-Heated Glass –
Case Temp = 33°F**

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	347	586	827	1066	1308
24 x 67	543	929	1318	1705	2094
24 x 75	658	1118	1575	2035	2491
26 x 67	568	978	1393	1804	2218
26 x 75	685	1173	1657	2144	2628
28 x 75	703	1207	1708	2213	2714
28 x 79	718	1237	1754	2273	2790
30 x 36	377	646	918	1186	1458
30 x 67	595	1033	1474	1912	2354
30 x 75	715	1233	1747	2265	2779
30 x 79	731	1264	1794	2327	2857

**Model 101B ELS Normal Temp
CP2NT Heated Glass – Case Temp = 31°F**

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	426	744	1065	1383	1704
24 x 67	681	1205	1733	2257	2784
24 x 75	811	1424	2034	2647	3257
26 x 67	720	1283	1850	2413	2980
26 x 75	854	1511	2164	2820	3474
28 x 75	882	1565	2245	2929	3609
28 x 79	905	1613	2317	3024	3729
30 x 36	474	840	1209	1574	1943
30 x 67	763	1369	1978	2585	3194
30 x 75	902	1606	2306	3010	3711
30 x 79	927	1656	2381	3110	3835

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.5. Model 210X Low Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters. (Per door with doors closed @ 75°F store ambient temperature with lights).

Model 210X Low Temp
Clear Pane 3 Heat Reflective – Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	679	1158	1637	2116	2595
24 x 67	1072	1844	2616	3388	4160
24 x 75	1125	1950	2774	3599	4424
26 x 67	1124	1947	2771	3594	4418
26 x 75	1179	2057	2936	3815	4693
28 x 75	1218	2135	3053	3971	4888
28 x 79	1244	2189	3133	4077	5021
30 x 36	745	1290	1834	2379	2924
30 x 67	1181	2061	2942	3823	4703
30 x 75	1242	2183	3125	4066	5008
30 x 79	1272	2245	3217	4190	5162

Model 210X ELS Low Temp
Clear Pane 3 Heat Reflective – Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	498	888	1280	1670	2062
24 x 67	790	1423	2059	2692	3328
24 x 75	933	1667	2398	3133	3864
26 x 67	841	1526	2214	2899	3587
26 x 75	987	1775	2561	3349	4135
28 x 75	1026	1854	2678	3506	4330
28 x 79	1053	1908	2759	3614	4465
30 x 36	565	1020	1480	1935	2395
30 x 67	899	1641	2387	3129	3874
30 x 75	1050	1902	2750	3602	4451
30 x 79	1081	1964	2844	3727	4607

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.6. Model 210X Normal Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

Model 210X Normal Temp
3-Pane NHG - Case Temp = 38°F - 2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	543	861	1179	1497	1814
24 x 67	616	1007	1398	1789	2179
24 x 75	635	1044	1454	1864	2274
26 x 67	635	1045	1455	1865	2275
26 x 75	656	1087	1518	1949	2380
28 x 75	669	1114	1558	2003	2447
28 x 79	681	1136	1592	2048	2503
30 x 36	566	906	1247	1587	1928
30 x 67	656	1087	1519	1950	2381
30 x 75	680	1134	1589	2043	2498
30 x 79	691	1157	1624	2090	2556

Model 210X ELS Normal Temp
3-Pane NHG - Case Temp = 38°F - 2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
24 x 36	307	505	707	905	1107
24 x 67	476	795	1117	1437	1759
24 x 75	584	970	1353	1739	2122
26 x 67	495	833	1175	1513	1855
26 x 75	605	1013	1417	1824	2228
28 x 75	619	1040	1457	1878	2295
28 x 79	630	1062	1491	1923	2351
30 x 36	330	551	775	996	1220
30 x 67	516	876	1238	1598	1960
30 x 75	629	1060	1487	1918	2346
30 x 79	641	1083	1522	1965	2404

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.7. Model E2 Low Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters. (Per door with doors closed @ 75°F store ambient temperature with lights).

Model E2 Low Temp
3-Pane Non-Heated, Reflective, Argon-Filled -
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	920	1539	2159	2778	3398
30 x 75	951	1602	2252	2903	3554
30 x 79	967	1634	2301	2968	3635

Model E2 Low Temp
3-Pane Heated, Reflective (5.75W/Ft²) -
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	1049	1798	2547	3297	4046
30 x 75	951	1602	2252	2903	3554
30 x 79	967	1634	2301	2968	3635

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.8. Model E2 Low Temp ELS BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

Model E2 Low Temp ELS
3-Pane Non-Heated, Reflective, Argon-Filled -
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	629	1102	1578	2051	2527
30 x 75	750	1302	1851	2403	2952
30 x 79	766	1335	1900	2468	3033

Model E2 Low Temp ELS
3-Pane Heated, Reflective (5.75W/Ft²) -
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	759	1361	1967	2570	3175
30 x 75	895	1592	2286	2983	3677
30 x 79	919	1640	2358	3079	3797

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.9. Model E2 Normal Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights. (Per door with doors closed @ 75°F store ambient temperature).

Model E2 Normal Temp
3-Pane NHG - Case Temp = 38°F
2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	657	1088	1520	1952	2384
30 x 75	680	1135	1591	2046	2501
30 x 79	692	1159	1626	2093	2560

Model E2 Normal Temp ELS
3-Pane NHG - Case Temp = 38°F
2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	517	877	1240	1600	1963
30 x 75	630	1061	1489	1921	2349
30 x 79	641	1084	1524	1968	2407

Note: Add 10-20% to above values depending upon door opening frequency.

8.11.10. Model ELM Low Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters. (Per door with doors closed @ 75°F store ambient temperature with lights).

Model ELM Low Temp
3-Pane Non-Heated, Reflective, Argon-Filled
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	953	1606	2258	2911	3564
30 x 75	987	1674	2360	3047	3734
30 x 79	1004	1709	2413	3117	3822

Model ELM Low Temp ELS
3-Pane Non-Heated, Reflective, Argon-Filled
Case Temp = -10°F

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	663	1169	1678	2184	2694
30 x 75	786	1374	1959	2547	3132
30 x 79	804	1409	2012	2617	3220

8.11.11. Model ELM Normal Temp BTU Chart

Heat Load in BTU/hr for glass, door rail and frame heaters and lights.
(Per door with doors closed @ 75°F store ambient temperature).

Model ELM Normal Temp
3-Pane NHG - Case Temp = 38°F
2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	657	1088	1520	1952	2384
30 x 75	680	1135	1591	2046	2501
30 x 79	692	1159	1626	2093	2560

Model ELM Normal Temp ELS
3-Pane NHG - Case Temp = 38°F
2W/Ft on Frame

Size	1-Door	2-Door	3-Door	4-Door	5-Door
30 x 67	517	877	1240	1600	1963
30 x 75	630	1061	1489	1921	2349
30 x 79	641	1084	1524	1968	2407

Note: Add 10-20% to above values depending upon door opening frequency.

9. ALTERNATE BALLAST MOUNTING

9.1. T8 Lighting for 101X, 101A, Cool, Frez, 401 & 1001 Models

The new ballast with Molex connectors (part number 60-14693-XXXX) has been approved as an alternate supplier for both 1- and 2-lamp applications (Ref. ECN 6157). Refer to the following chart:

Primary P/N	Description	Alternate
60-13076-0001	2 x 48	60-14693-0001
60-13076-0003	2 x 72	60-14693-0005
60-13076-0004	2 x 60 (58W)	60-14693-0005
60-13078-0001	2 x 48 600V MOLEX	60-14693-0001
60-13078-0003	2 x 72 600V MOLEX	60-14693-0005
60-13078-0004	2 x 60 (58W) 600V MOLEX	60-14693-0005
60-13158-0001	1 x 48	60-14693-0001
60-13158-0003	1 x 72	60-14693-0005
60-13158-0004	1 x 60 (58W)	60-14693-0005
60-13159-0001	1 x 48 600V MOLEX	60-14693-0001
60-13159-0003	1 x 72 600V MOLEX	60-14693-0005
60-13159-0004	1 x 60 (58W) 600V MOLEX	60-14693-0005

Note: If no 600V connector is required, it may be removed.

9.1.1. Specifications

Ballasts 60-13076-XXXX, 60-13078-XXXX, 60-13158-XXXX and 60-13159-XXXX have specifications that differ from the newer replacement ballast 60-14693-XXXX. These specifications include:

- Exclusive power capabilities, energizing either one lamp or two lamps.
- An outer casing with a finished size of a total of 10.06 inches in length.

Specifications of the replacement ballast are as follows:

- The capability of providing power for both single and double lamp applications, effectively replacing the need for all original ballasts.
- The casing has a finished size of 12.00 inches in length.

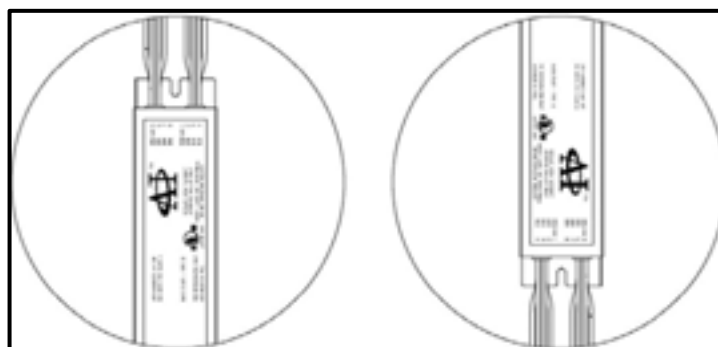
9.2. Ballast Differences

See the following illustration for a visual reference showing the differences between the ballasts.



- The top ballast is replacement ballast 60-14693-XXXX
- The center ballast is original ballast 60-13158-XXXX
- The bottom ballast is original ballast 60-13076-XXXX

When mounting replacement ballast 60-14693-XXXX vertically, fastening it at both ends is recommended, although it can also be mounted at one end. Whenever mounting the ballast vertically, it is recommended that the ballast be fastened at the lower end first, using the following illustrated configuration. Planning to replace the ballast using this method ensures that the electrical connections will be compatible



INCORRECT

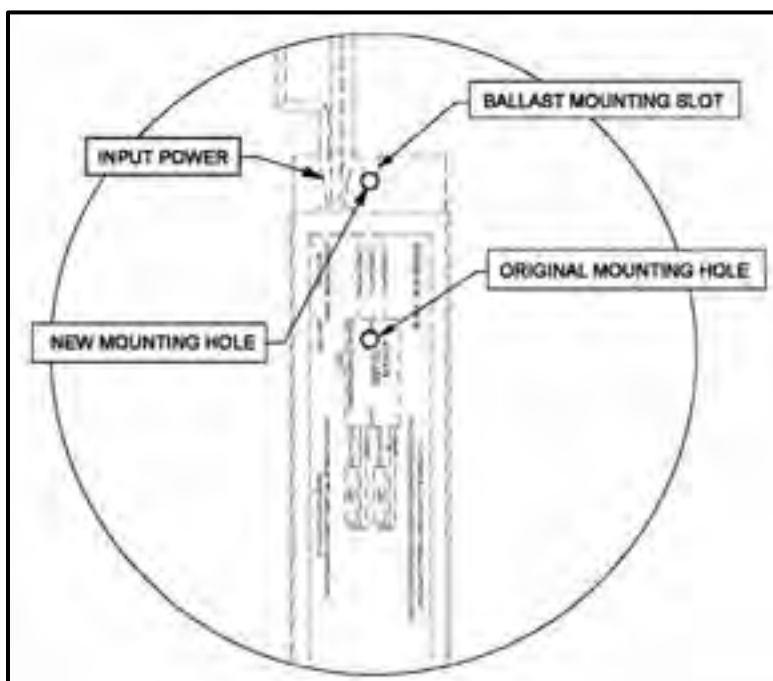
CORRECT

9.3. Mounting the Replacement Ballast

To mount replacement ballast 60-14693-XXXX, the field technician should remove the old ballast, leaving the lower mounting screw in place after loosening it. The new ballast is then mounted in the same position as the old ballast.

Insert the mounting slot at one end of the new ballast around the loosened fastener and tighten the fastener onto the new ballast. The new ballast is 1-3/4" longer than the original ballast and will cover the original ballast's mounting hole, requiring the creation of a new mounting hole. Align the ballast and hold it firmly in place.

Using a drill with a 3/16" drill bit, use the empty mounting slot of the new ballast as a guide or pilot for drilling a new mounting hole. Holding the ballast firmly in place, drill the hole.



New Ballast Mounting Configuration

When drilling the additional mounting hole into the mullion, the following items should be observed:

- Be certain the placement of the new ballast is linear and in correct alignment with the previous ballast's mounting configuration.
- The new mounting hole should be the same size as the previous mounting hole.
- Do not drill beyond the inner wall of the mullion.
- Exercise extreme caution when using power tools near power lines.

10. SUPPLEMENTAL HANDLE REPLACEMENT INSTRUCTIONS

When accessing the internally mounted door fasteners, interference with the fastener's socket heads may be encountered. When attempting to loosen or remove the fasteners, located inside the door rail, the obstruction should be circumvented or removed from the path of access.

10.1. Preliminary Considerations

The tools and materials required to perform this procedure are:

- Power Drill
- 5/16" Drill Bit
- 5/32" Hex Key or Allen Wrench
- Soapy water or mild lubricant
- Flathead Screwdriver
- Plastic or Rubber Mallet

Safety practices must be observed. Always exercise caution when working with both sharp edged and powered tools.

10.2. Perform the following steps to remove the door handle mounting fasteners.

1. Remove Gasket:

- a. Starting at one corner of the door, carefully lift the corner of the magnetic gasket.
- b. Gently pull up the gasket along the rail and plastic cover.



- c. Pull out gasket completely and set gasket aside.

Note: Be sure to handle the gasket carefully to prevent damaging it.

2. If the plastic is not pre-drilled with access holes, remove plastic rail cover on the handle side of the door only.

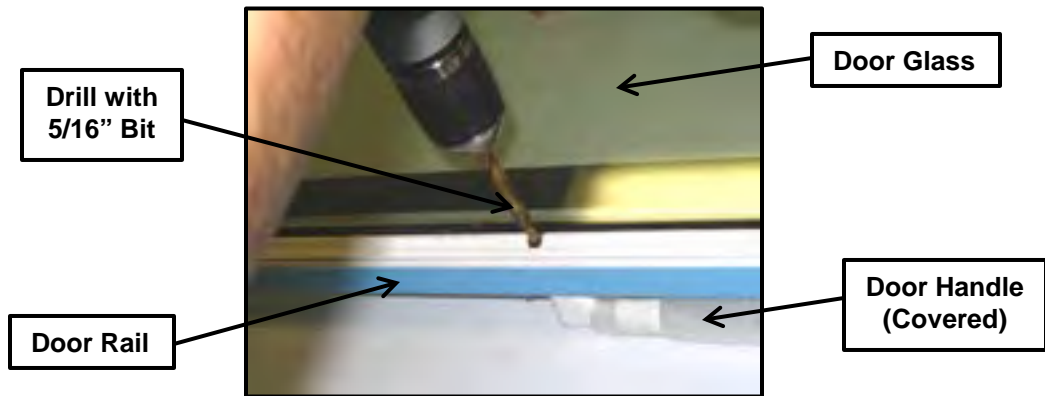
- a. Insert flathead screwdriver in between plastic cover, corner miter and carefully pry it upwards.
- b. Lift and remove plastic cover (once again- on door rail of handle side only).



3. Clear obstructive matter from the fastener heads.

Note: Perform the following tasks with extreme caution to avoid damaging the fastener socket-head, as well as the door glass.

- a. Using a power drill with 5/16" drill bit, carefully insert the bit into the access hole of the door rail.
- b. Confirm that the drill aim is perpendicular to the rail and door.
- c. Gently apply power to the drill, spinning the bit at a low speed, while applying pressure to the obstruction, until the obstruction is cleared from the socket-head.



- d. The obstruction is composed of a reasonably soft material and should clear away relatively easy. **DO NOT** drill into the socket head.

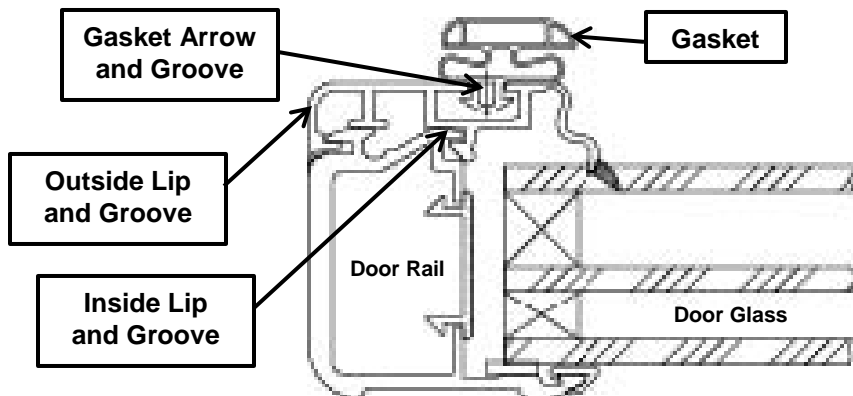
Note: In the event that adhesive has settled inside the socket-head, use a 3/16" drill bit to carefully route the adhesive out of the socket head. **DO NOT** strip the hex pattern within the socket head.

4. Remove and replace the handle fasteners from the rail.

- a. Once the obstructing matter has been cleared, insert a 5/32" hex key or allen wrench into the socket head of the handle fastener, and twist it counter-clockwise to loosen the fastener and remove it.



- b. Once the fasteners have been removed, replace with **NEW** socket-head fasteners. Using the same fasteners to secure the door handle is **NOT** recommended.
 5. Reassemble the door rail gasket.
 - a. Replace plastic cover to the door rail.
 - b. Insert the inside edge of the plastic cover into the inside groove of the rail.
 - c. Push the plastic cover outward, away from the center of the door, in order to insert the outer lip into the outside groove of the rail.



- d. Replace the gasket to the plastic cover.



- e. Insert the gasket arrow into the groove in the center of the plastic cover until the edges of the arrow catch and are fully inserted into the groove.
 - f. Press the gasket firmly against the plastic cover and (pressing hard) slide along the gasket, inserting the remainder of the gasket arrow into the plastic cover groove.
 - g. Using the blunt side of a plastic or rubber mallet, strike the gasket onto the cover and rail to facilitate the gasket arrow into the groove of the plastic cover.

Note: If the gasket arrow is exhibiting difficulty when being reinstalled into the plastic cover groove, apply soapy water or a mild silicone based lubricant to the gasket in order to assist in inserting the gasket arrow into the groove of the plastic cover.

11. REVISION HISTORY PAGE

REV	ORIGINATOR	DESCRIPTION OF CHANGE	EFFECTIVE DATE
A	SWatstein	Update format, logo & fonts	28 September 2010
B	SWatstein	Update format	01 February 2011
C	S. Fisher	Reformat from Framemaker to Word	12/26/2012