

2008

REV-201106



LTI SWITCHABLE TECHNICAL MANUAL

INSTALLATION GUIDE

READ THIS BEFORE
INSTALLATION!

CAUTION NOTICES



LTI SWITCHABLE TECHNICAL MANUAL

Switchable Glass Window \ Door System

Section 1.....	Caution Notices & Warnings
Section 2.....	LTI Power Module PM1210
Section 3.....	Installation Instructions
Section 4.....	About LTI & The AIT Group
Section 5.....	Project Photos
Section 6.....	Limited Warranty
Section 7.....	Notes

CAUTION NOTICES & WARNINGS

Switchable Glass Window \ Door System - The LTI Group - 2008

General Cautions

Silicone Reactivity Warning



STOP!



USE ONLY DOW 995 OR DOW 1199* NEUTRAL CURE SILICONE. USE OF ANY OTHER SEALANT COULD CAUSE PERMANENT DAMAGE TO THE LTI SWITCHABLE GLASS PANEL.

CRITICAL!

*The DOW 1199 is intended for use in a glass wall installation where a “Wet” butt joint is required. DO NOT use DOW 1199 as a back fill in a frame, such as a U-channel, window sash, or where the glass edge is bedded in the DOW 1199 and a frame caps the glass and silicone. This type of installation requires the use of DOW 995.

WARNING

Disconnect line power via fuses or circuit breakers BEFORE installation.

Carefully read installation instructions completely before installation.



DO NOT ATTEMPT INSTALLATION ON A “LIVE” CIRCUIT!



**FAILURE TO COMPLY WITH INSTALLATION STANDARDS
WILL NULLIFY MANUFACTURER’S WARRANTY**



LTI POWER MODULE PM1210

Switchable Glass Window \ Door System

PM1210 Overview

Typical Wiring Scenario

POWER MODULE OVERVIEW

- ✎ Installing an LTI Switchable Glass panel without following these instructions can lead to unsafe conditions and/or cause permanent damage to the panel.
- ✎ This product may be installed in either a residential or commercial environment.

Install only on a GROUNDED 120 VAC circuit protected by 15A fuse or breaker. The circuit must also be protected by a ground fault circuit interrupter (GFCI).

All wiring connected to a PM1210 power module is at 120 VAC primary line levels and must be installed to conform to NEC requirements and any local building codes.

The PM1210 Power Module circuitry is rated for a maximum continuous output of 4.0 amps. If the installation requires the operation of more than 140 square feet of glass surface from a single switch, the switch or relay lines from multiple power modules may be ganged together.

Installing a single pole switch on the switch wires is considered standard, however relays or remotes can be used. Consult LTI technical support for proper installation configuration.

Using the switch wires, “three way” type switch arrangements are permissible. (See Installation Section)

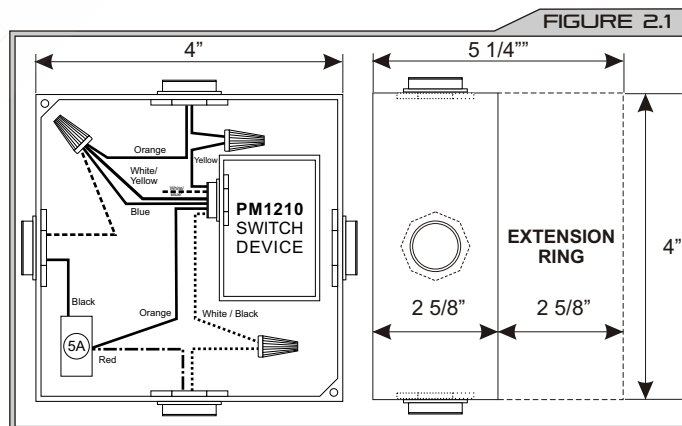
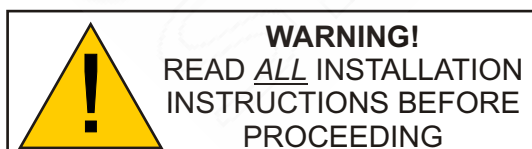
Do not connect any other devices or products to the output of the PM1210 Power Module.

The PM1210 Power Module built into a standard 4" x 4" junction box and is designed to be used in conjunction with additional J-Boxes with an added extension ring. (See Fig. 2.1)

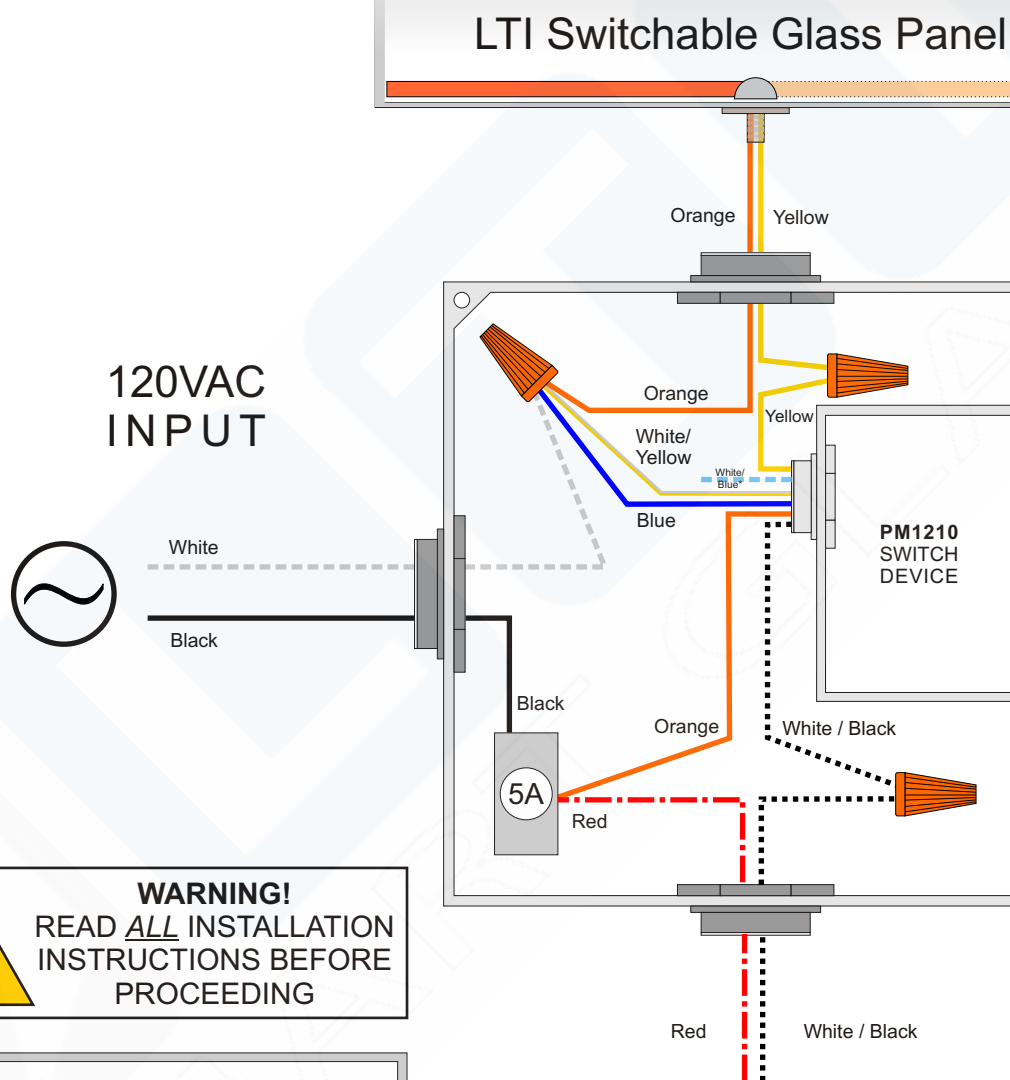
Check NEC and local building codes to determine junction box size requirements relative to the number of conductors and connections.

Each separately switched LTI Switchable Glass panel must use a separate power module.

There are no serviceable parts or replaceable parts within the PM1210 Power Module.



TYPICAL WIRING SCENARIO



WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side Of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- * ——— White/Blue OPTIONAL Low Voltage Switching

LC INSTALLATION INSTRUCTIONS

Switchable Glass Window \ Door System

Installation Overview

Glass Panel Detail

Wiring Diagrams

- Single Switch
- Three-Way Switch
- Relay Switching
- Switch + Relay

Switchable Glass Door System Installation

- Switchable Glass Door Overview
- Upper Pivot Detail
- Lower Pivot Detail
- Available Options

Butt Joint Installations

- Wet & Dry Joint Procedures

INSTALLATION OVERVIEW

LTI Switchable Glass panels are supplied with a standard 6' of 3/8" flexible metal or 3/8" flexible non-metallic conduit* containing the 2 conductor 18 ga. wire leads.

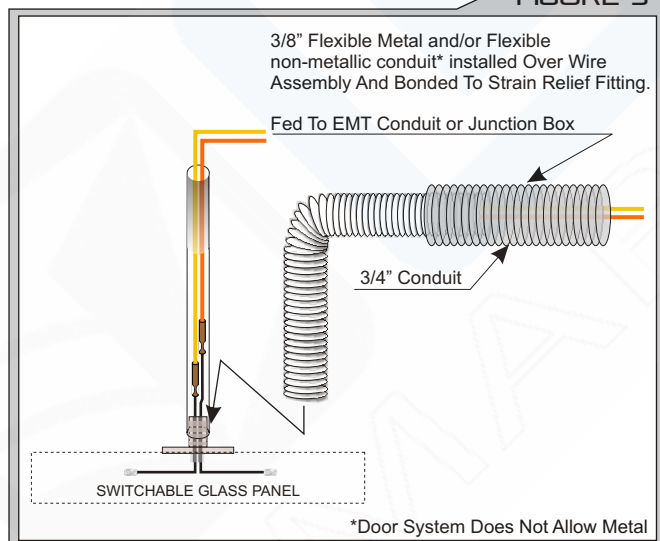
The 6' flexible pigtail is permanently attached to the glass to provide strain relief for wires. To be able to re-glaze, the glass and pigtail must be removable as a unit (do not apply inaccessible clamps to the pigtail). The flexible pigtail is designed to be slip fed through the 3/4" EMT or flexible conduit, raceway from the rough opening to an accessible junction box in order to facilitate glazing replacement (**Fig 3**).

Any bends in the conduit should be of a sufficient radius to facilitate fishing of the flexible conduit pigtail.

When the LTI switchable panel is installed into a suitable frame the switchable glass system is UL listed. The switchable glass panel alone is UL recognized. If the pigtail needs to be cut to fit, the conduit must be carefully measured and cut to length to prevent damage to the 18 ga. leads. The pigtail is permanently attached to the glass and cannot be replaced.

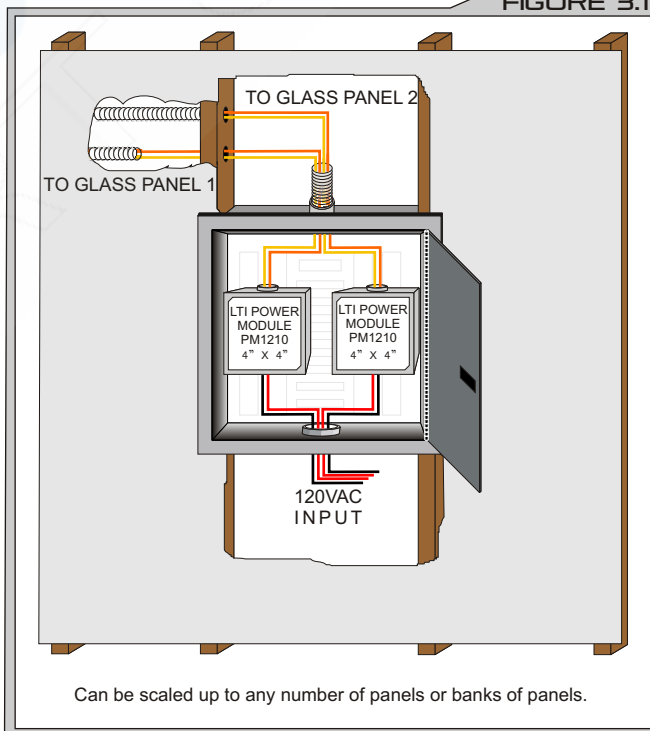
In an installation where multiple PM1210 power modules are necessary, a Hoffman or Wiegmann type box may be utilized in an adjoining closet, laundry, basement or utility room to facilitate accessible installation (**Fig 3.1**).

FIGURE 3



WARNING!
 READ ALL INSTALLATION
 INSTRUCTIONS BEFORE
 PROCEEDING

FIGURE 3.1



GLASS PANEL DETAIL

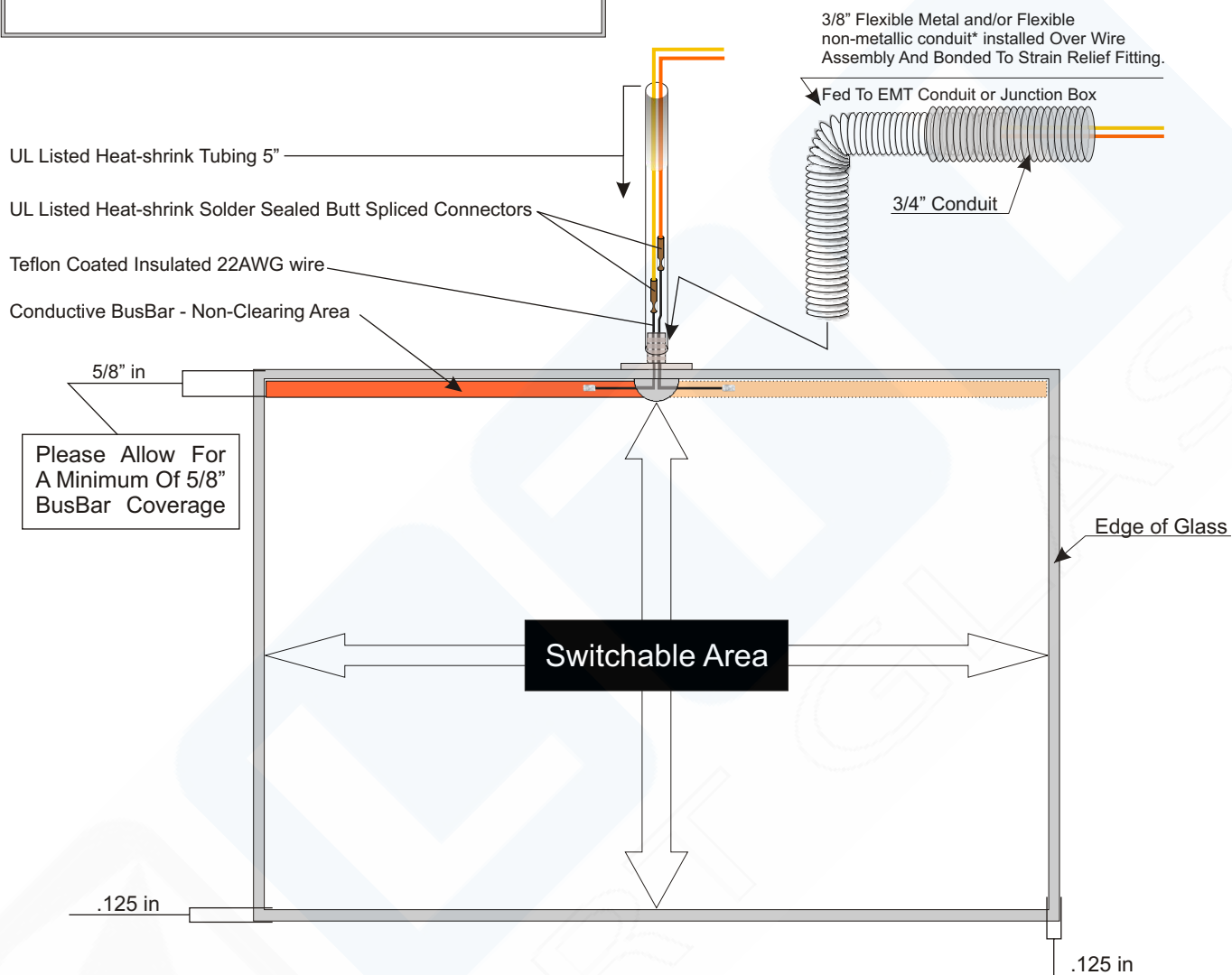
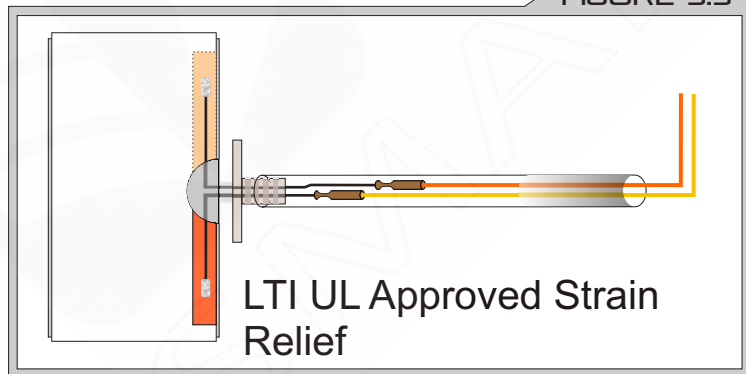


FIGURE 3.3



WARNING!
READ *ALL* INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

Note: All wiring, Conduit and Connections
Must Conform To Local Electrical Codes

SINGLE SWITCH INSTALL



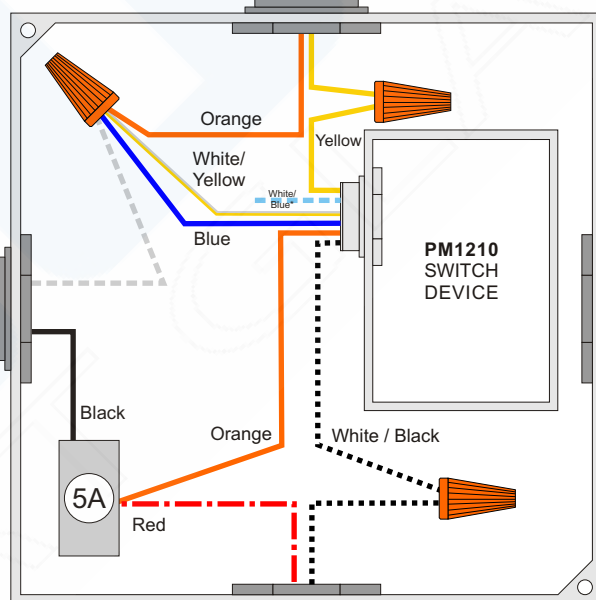
WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

LTI Switchable Glass Panel

120VAC
INPUT



White
Black



COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- . - . - . Red 5A Circuit Breaker To Line Side Of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- * - - - - White/Blue OPTIONAL Low Voltage Switching

Switch

3-WAY SWITCH INSTALL



WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

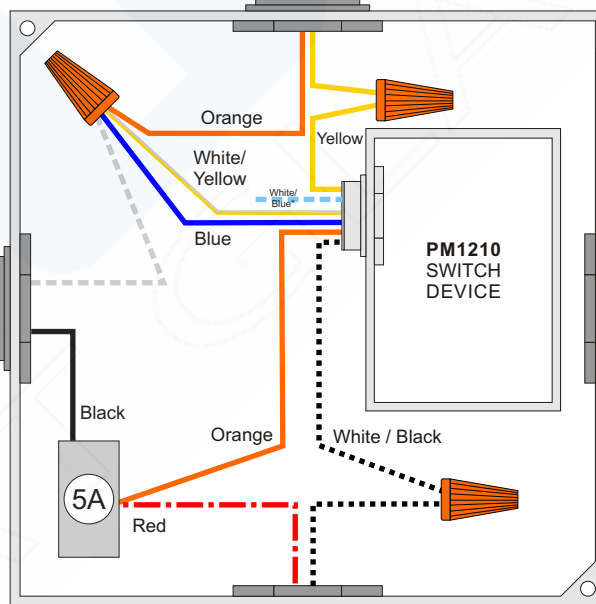
LTI Switchable Glass Panel

120VAC
INPUT



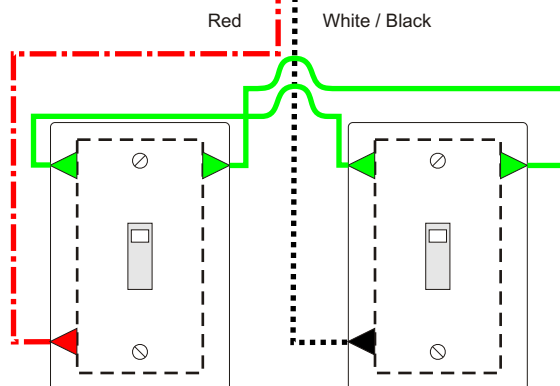
White

Black



COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side Of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- Green Switch Traveler
- * - - - - - White/Blue OPTIONAL Low Voltage Switching



MULTI PANEL & RELAY INSTALLATION

GLASS PANEL 1

GLASS PANEL 2

GLASS PANEL 3

GLASS PANEL 4...

Orange Yellow

Orange Yellow

120VAC
INPUT



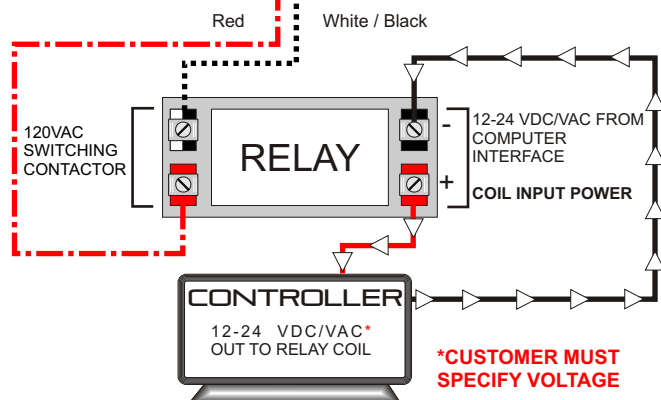
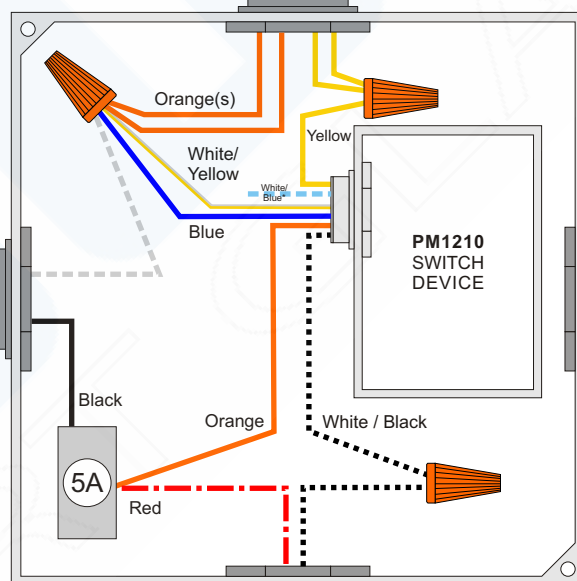
White
Black



WARNING!
READ *ALL* INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

COLOR & SYMBOL CODES

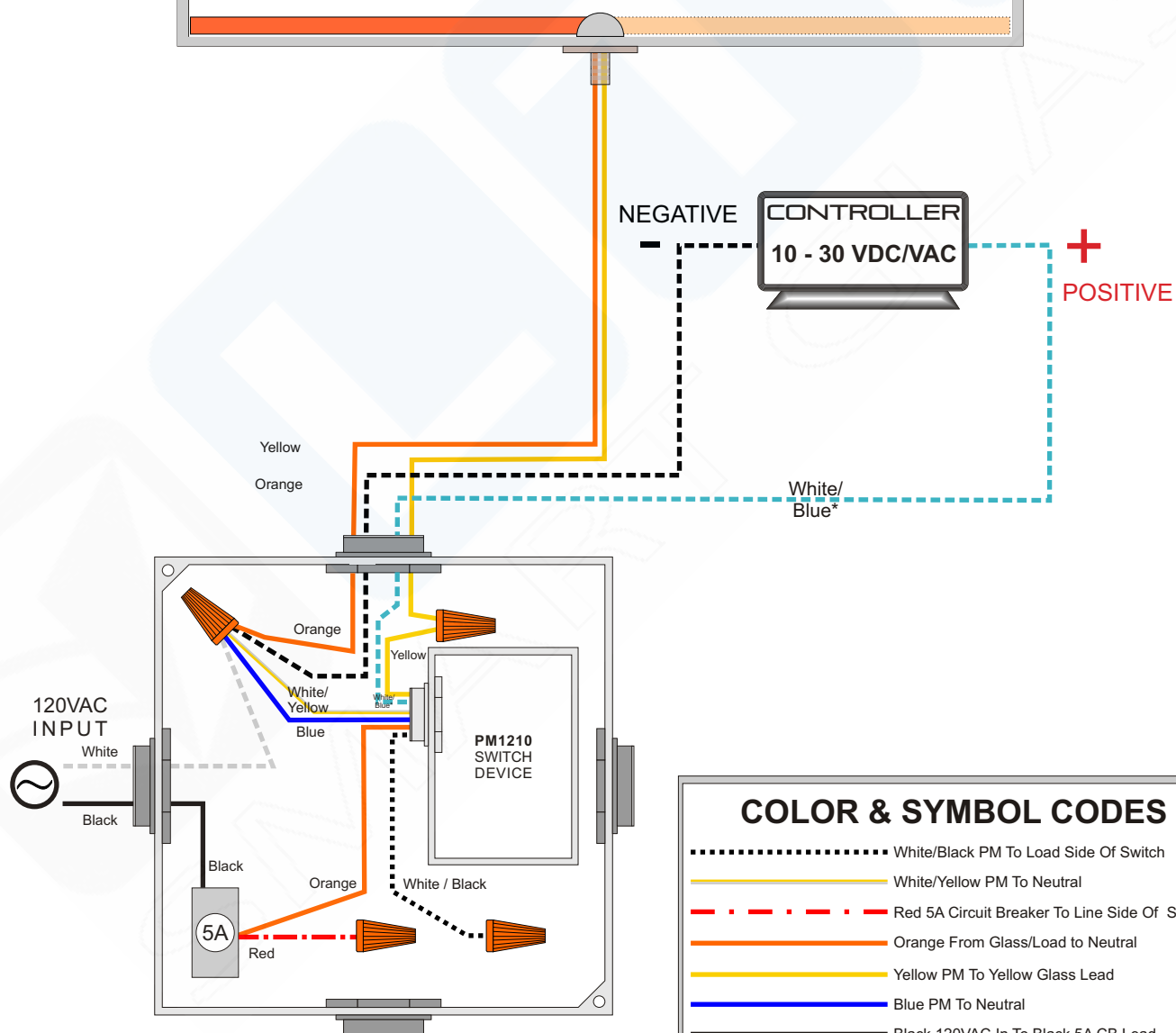
- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- Green Switch Traveler
- ◀◀◀◀◀ (+POS) Red Low Voltage To Controller
- ▶▶▶▶▶ (-NEG) Black Low Voltage To Controller
- * — White/Blue OPTIONAL Low Voltage Switching



***CUSTOMER MUST
SPECIFY VOLTAGE**

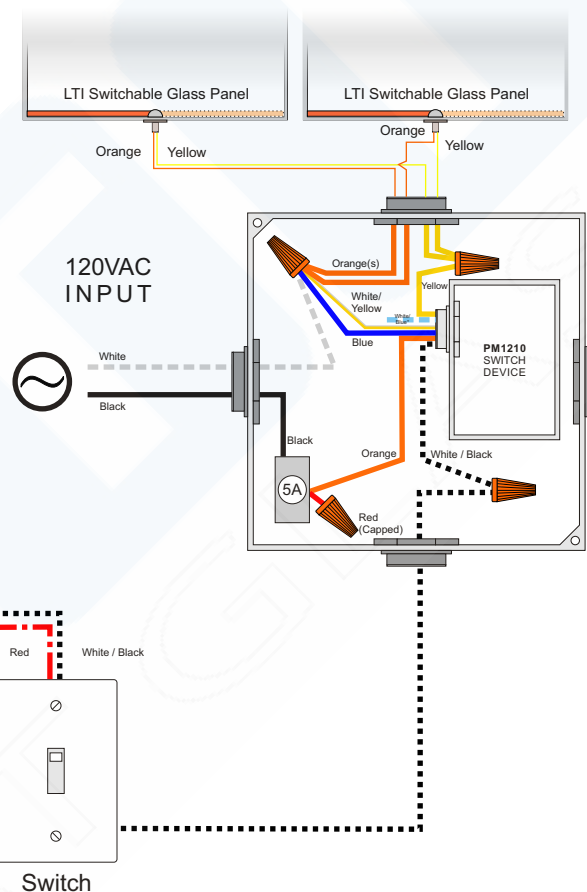
LTI SWITCHABLE PRIVACY
- LOW VOLTAGE SWITCHING -

GLASS PANEL



COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- _____ White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side Of Switch
- _____ Orange From Glass/Load to Neutral
- _____ Yellow PM To Yellow Glass Lead
- _____ Blue PM To Neutral
- _____ Black 120VAC In To Black 5A CB Lead
- * - - - - - White/Blue OPTIONAL Low Voltage Switching



----- White/Black PM To Load Side Of Switch
 ----- White/Yellow PM To Neutral
 - - - - - Red 5A Circuit Breaker To Line Side of Switch
 ----- Orange From Glass/Load to Neutral
 ----- Yellow PM To Yellow Glass Lead
 ----- Blue PM To Neutral
 ----- Black 120VAC In To Black 5A CB Lead
 ----- Green Switch Traveler
 < < < < (+POS) Red Low Voltage To Controller
 < < < < (-NEG) Black Low Voltage To Controller
 * ----- White/Blue OPTIONAL Low Voltage Switching

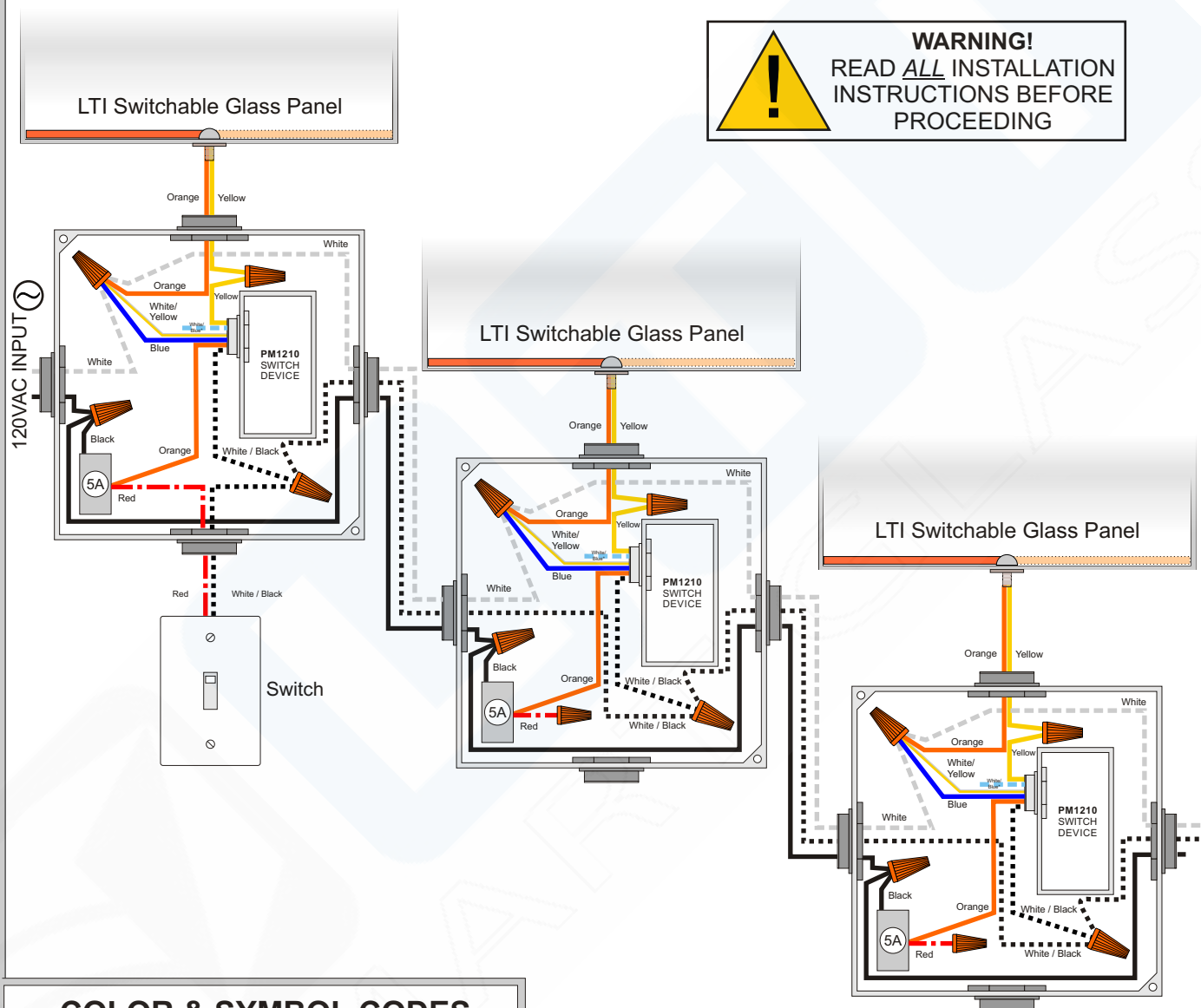


WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

MULTIPLE POWER MODULES



WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING



COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side Of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- * ——— White/Blue OPTIONAL Low Voltage Switching

SWITCH + RELAY INSTALLATION

GLASS PANEL 1

GLASS PANEL 2

GLASS PANEL 3

GLASS PANEL 4...

Orange Yellow

Orange Yellow

120VAC
INPUT



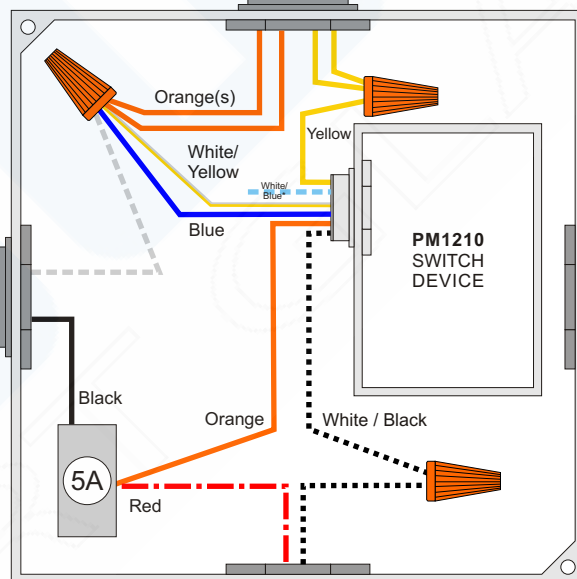
White
Black



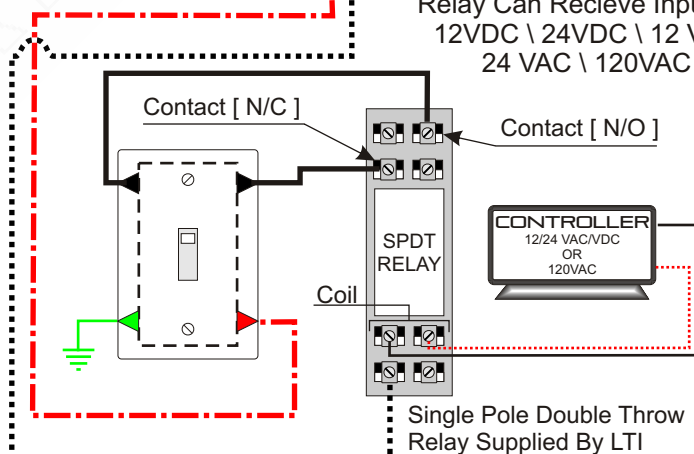
WARNING!
READ *ALL* INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

COLOR & SYMBOL CODES

- White/Black PM To Load Side Of Switch
- White/Yellow PM To Neutral
- - - - - Red 5A Circuit Breaker To Line Side Of Switch
- Orange From Glass/Load to Neutral
- Yellow PM To Yellow Glass Lead
- Blue PM To Neutral
- Black 120VAC In To Black 5A CB Lead
- Green Ground
- Red Low Voltage To Controller
- Black Low Voltage To Controller
- * White/Blue OPTIONAL Low Voltage Switching



Relay Can Recieve Input Of:
12VDC \ 24VDC \ 12 VAC
24 VAC \ 120VAC



CONTROLLER
12/24 VAC/VDC
OR
120VAC

Single Pole Double Throw
Relay Supplied By LTI

LTI SWITCHABLE GLASS DOOR SYSTEM INSTALLATION OVERVIEW

The LTI Switchable Glass Door System arrives on site fully assembled and ready to install. The installation site should be prepared by installing the appropriate receiving equipment to allow for proper door function.

The site preparation should include the following (See also fig. 4):

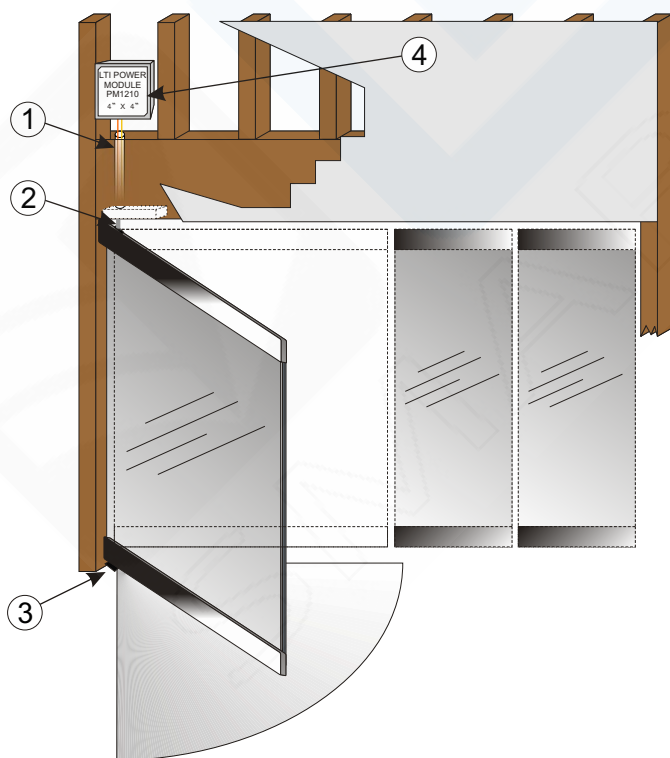
- Holes bored and conduit put in place for the routing of door's power leads through the install door header.
- Installation of "Upper Pivot" hardware included in the shipment of your Switchable Glass Door Panel. (Part 2 of this section)
- Installation of "Lower Pivot" hardware included in the shipment of your Switchable Door Panel. (Part 3 of this section)
- Installation of LTI Power Module PM1210 (covered in Section 2)

Following the installation instructions in this guide is paramount to the proper performance of your new Switchable Glass Door System. Please read ALL instructions before beginning the installation process of your door system as well as any and all other Switchable Glass Panels.

If you encounter any questions or anomalies not covered in this manual you must contact LTI Smart Glass, Inc. before proceeding in order to acquire accurate assistance as well as to protect your investment. LTI is dedicated to providing superior quality state-of-the-art products and technical support.

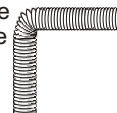
MAJOR COMPONENTS

FIGURE 4



Wire Leads From Glass. Leads will exit pivot system of door and will need to be routed through the header framing member via approved flexible conduit to engage LTI Power Module.

①



Upper Pivot Receiver. This piece of hardware will accompany your Switchable Glass Door System. You must mortise the door header to accommodate this part.

②



Lower Door Pivot Receiver. This piece of hardware will accompany your Switchable Glass Door System. This will either be a stationary lower pivot or door closer based on your order. Either case requires the floor to be prepared. The closer unit installs below floor level.

③



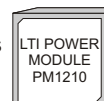
Door Closer

Lower Door Pivot

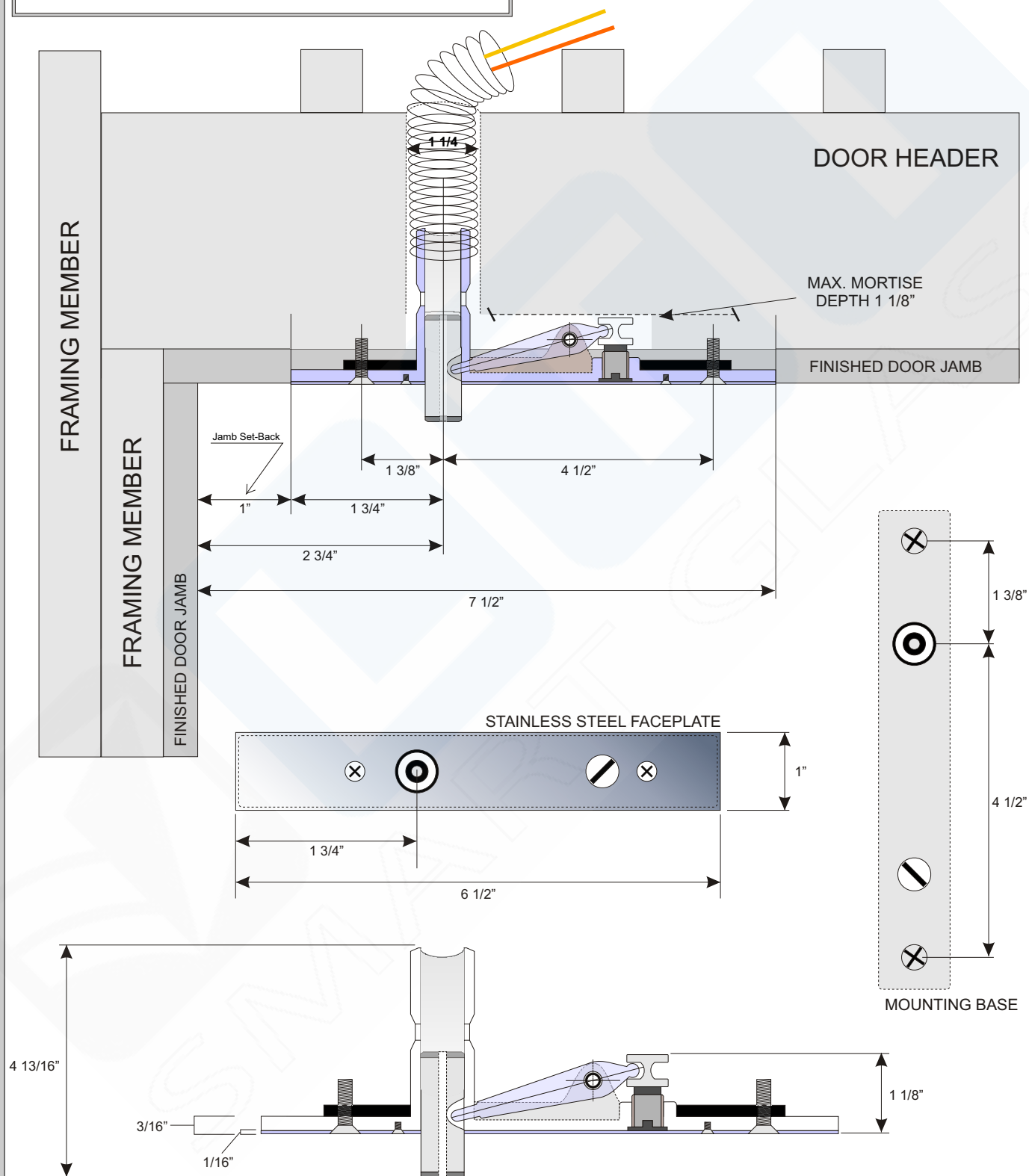


Power Module PM1210. Installation of this part is covered in Section 2 of this manual

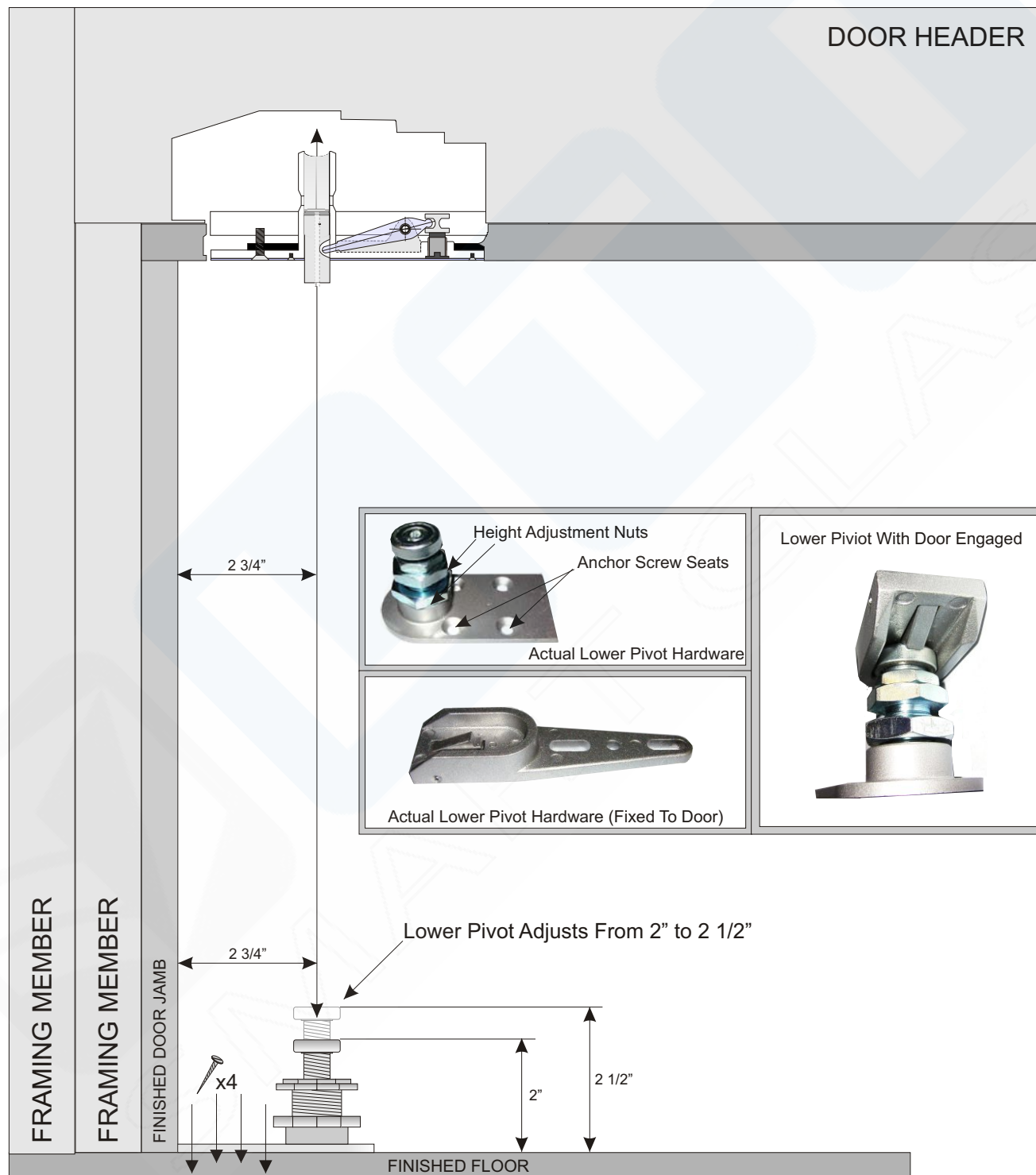
④



LTI SWITCHABLE DOOR SYSTEM
UPPER PIVOT INSTALLATION



**LTI SWITCHABLE DOOR SYSTEM
LOWER PIVOT INSTALLATION**



LTI SWITCHABLE DOOR SYSTEM
AVAILABLE OPTIONS

Holes
&
Custom Milling

IN-FLOOR DOOR CLOSER

CRL Automatic Door Closer sets flush into the floor and is finished in stainless steel.

Closer can be adjusted to customize the close speed.



There are hundreds of various types of glass door panel hardware. LTI provides several ready solutions, however we can accommodate most types of custom or specialty hardware including:

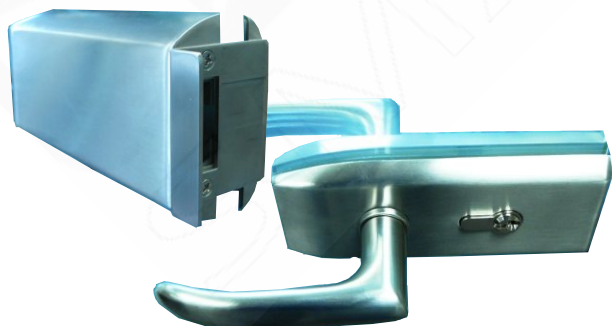
Handle & Strike Sets - With or without locks

Pulls & Knobs

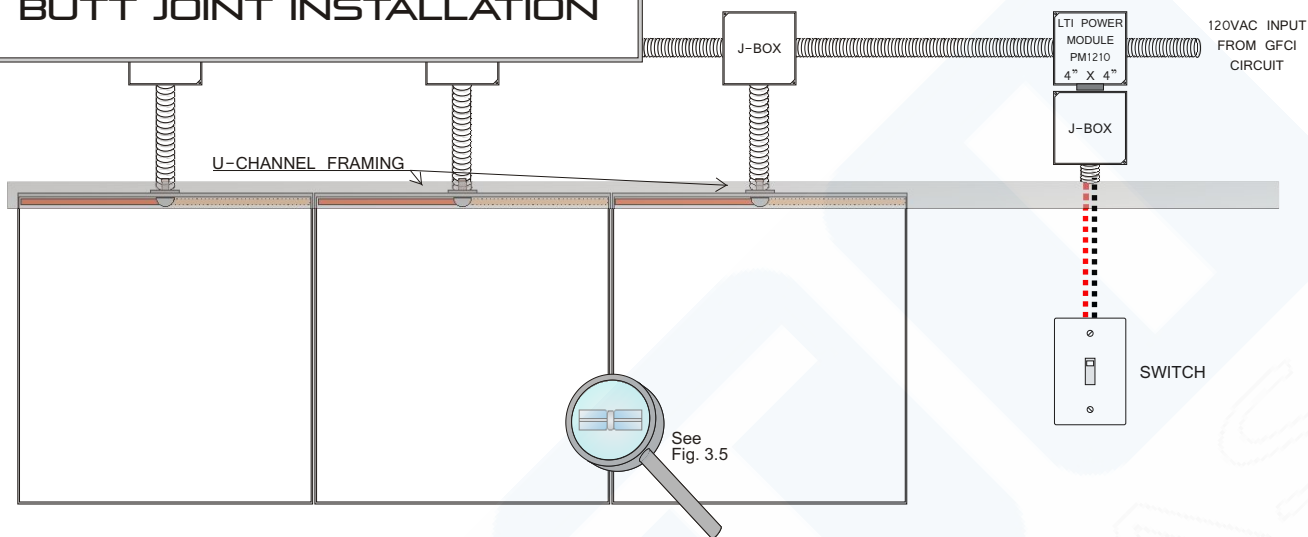
Patch Fittings

Specialty Fixtures Requiring Milling of Glass

Sliding Door Systems



BUTT JOINT INSTALLATION



WARNING!
READ ALL INSTALLATION
INSTRUCTIONS BEFORE
PROCEEDING

FIGURE 3.5



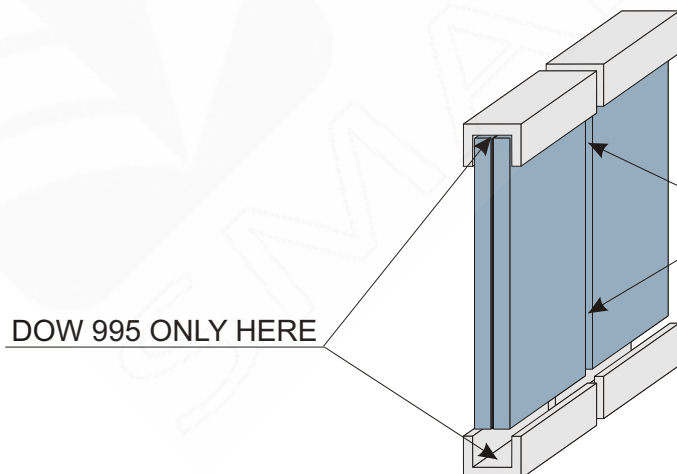
VERIFY DOW 1199 SILICONE HAS NOT
PASSED SHELF LIFE CODE. DO NOT USE
SILICONE THAT IS OLD OR DISCOLORED.
DOW 1199 SHOULD BE CLEAR WHEN CURED.

GAP-1/8\"
SEAL

DOW 1199 MUST OUT GAS TO THE
ATMOSPHERE DURING CURE. FRAMES
WILL PREVENT PROPER CURING.

Butt Joint Detail

SILICONE SEAL USE: ONLY DOW 995 OR DOW 1199



DOW 1199 ONLY IN THIS AREA
FOR WET BUTT JOINT APPLICATION

DOW 1199 MUST OUT GAS TO THE
ATMOSPHERE DURING CURE, FRAMES
WILL PREVENT PROPER CURING

ABOUT LTI SMARTGLASS

Switchable Glass Window \ Door System

Company Profile

ABOUT LTI

OUR PROFILE AND HISTORY

A division of The AIT Group, Laminated Technologies, Inc. and LTI Smart Glass, Inc. are recognized as world leaders in producing innovative laminated glass and polymer solutions to a broad range of industries including the architectural, defense, marine, airline, retail and automotive industries.

We are proud to be regularly sought out by leading glass, polycarbonate and acrylic companies to manufacture complex laminations and are specifically known for our premium OEM quality, responsiveness, and sensitivity to individual custom project requirements.

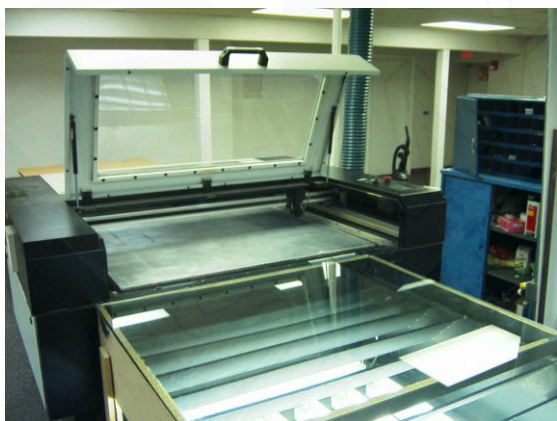
We are proud to have produced tens of thousands of laminated sheets used in detention and correctional centers around the world. This experience has been key to The AIT Group's position as a global leader in laminating thermoplastic sheets with glass (glass clad polycarbonate products).

With more than a decade of experience we are proud to have mastered (and patented) the processes used in the manufacturing of our switchable (electrified) glazing product line. The vast success of this complex laminate for LTI further evidences the company's technical leadership position.

With an aggressive goal for continued exponential growth and increased client support and production capabilities, The AIT Group is positioned with a plant in Pittsfield, Massachusetts and Largo, Florida. This capacity combined is approx. 250,000 sq/ft of manufacturing space uniquely positioning us to best serve an extremely high-demand and quality-critical market.

ADDITIONAL PRODUCTION DETAILS:

Our laminates are permanently bonded together using one of our multiple autoclaves. We also feature other specialized glass manufacturing equipment such as a glass robot lamination line, Bottero cutting & CNC and edge polishing equipment, multiple sand blasting and laser etching capabilities, along with other proprietary fabricating equipment and methodologies. Selected raw materials determine maximum sizes however our largest autoclave is capable of handling laminates up to 8' wide and 16' long.



PLANT LOCATIONS: 2 - Pittsfield, MA and Largo, FL

TOTAL PRODUCTION AREA: >250,000 Ft²

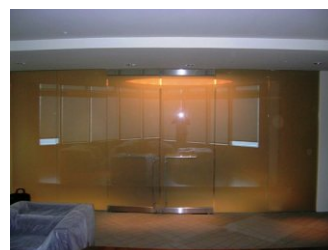
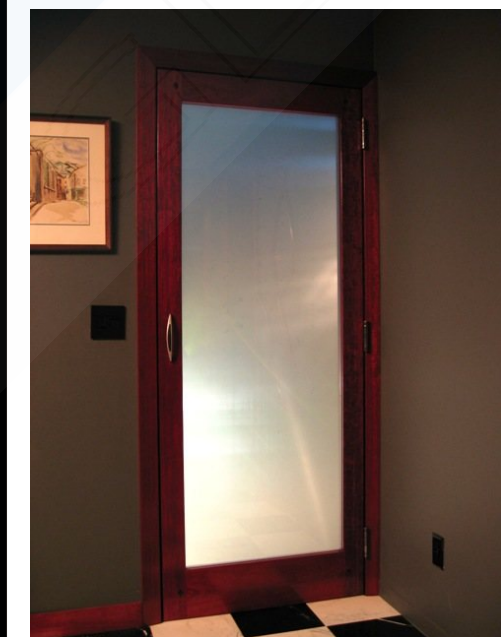
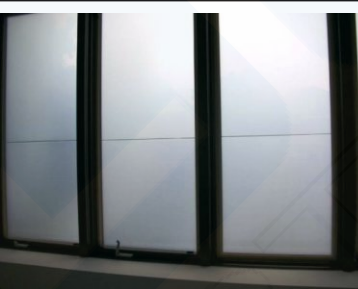
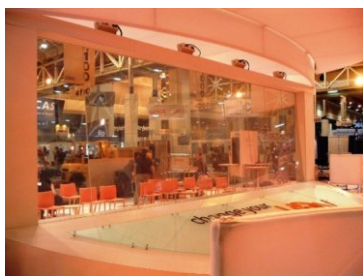
MAJOR EQUIPMENT: Autoclaves: (5), CNC machining, laser fabrication, edging, etc.

MAJOR PRODUCT LINES: Security, switchable(smart), and specialty glass.

PROJECT PHOTOS

Switchable Glass Window \ Door System

PROJECT PHOTOS



LTI LIMITED WARRANTY

Switchable Glass Window \ Door System -

Warranty Details

WARRANTY INFORMATION***LTI SMART GLASS, INC. LIMITED WARRANTY DETAILS***

LTI Smart Glass, Inc. (SELLER) and/or (COMPANY) warrants to the original consumer purchaser only that it will, at its exclusive option, repair or replace any glass or polycarbonate laminate products found by it to be defective via delamination while under normal use and maintenance for a (2) two year period from date of shipment to purchaser.

Additionally, SELLER warrants to the original consumer purchaser only that it will, at its exclusive option, repair or replace any glass or polycarbonate Liquid Crystal Privacy Glass laminate product found by it to be defective via electrical failure causing the laminate to become inoperable as a result of a manufacturing defect for a (1) one year period from date of shipment to purchaser.

This limited warranty DOES NOT COVER the following:

1. Defects or damage arising from shipping, improper installation, alterations, accidents, abuse, misuse, lack of proper maintenance and use of other than genuine LTI Smart Glass replacement parts and components, in all cases whether caused by a contractor, service company, the owner or any other person or entity.
2. IN NO EVENT WILL LTI SMART GLASS, INC. BE LIABLE FOR THE COST OF REPAIR OR REPLACEMENT OF ANY INSTALLATION MATERIALS, INCLUDING BUT NOT LIMITED TO, TILES, SHEETROCK, FRAMING, ETC.
3. Postage or shipping costs for returning products for repairs or replacement under this limited warranty and labor or other costs incurred in connection with product removal or installation under this limited warranty.
4. ANY LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, ALL OF WHICH ARE HEREBY EXPRESSLY DISCLAIMED, OR THE EXTENSION BEYOND THE DURATION OF THIS LIMITED WARRANTY OF ANY IMPLIED LIMITED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY OR FITNESS FOR AN INTENDED PURPOSE. Some jurisdictions do not allow limitations on how long an implied limited warranty lasts, or the exclusion or limitation of incidental or consequential damages, so these limitations and exclusions may not apply to you.
5. Responsibility for compliance with local code requirement. (Since code requirements vary greatly, distributors, dealers, installation contractors and users of glazing products should determine whether there are any code restrictions on the installation or use of a specific product.)

NOTES

Switchable Glass Window \ Door System -

Blank Pages For Notes



NOTES

Blank lined paper with a large, faint, light blue watermark in the center. The watermark consists of a stylized diamond shape containing the word "SMART" in a bold, sans-serif font, with the word "CL" positioned to its right. The background is white with horizontal ruling lines.