Automated Openings™

DOOR AUTOMATION
INSTALLATION INSTRUCTIONS
AO-SERVO SYSTEM
FOR ONE WAY & BI-PART DOORS

REV 3.019

TABLE OF CONTENTS

Experienced and Certified Installers only, should be installing this product. Please be aware of your surroundings during installation and use the tools the safe and proper way.

ELECTRICAL SAFETY

When working with power tools or electrical circuits, there is a risk of electrical hazard or shock. Please pay special attention to electrical hazards when installing this system. Coming in contact with electrical voltage can cause electrical current to flow through the body, resulting in electrical shock and burns. Serious injury or even death can occur.

NOTE: Incorrect installation of this product can result in serious injury. Read and follow the instructions in this manual carefully.

SAFETY TIPS

- Do not wear rings, watches or any loose clothing when installing or servicing the automation system.
- Safety glasses must be worn at all times.
- Door system must be installed correctly before any of the automation system is installed.
- Watch for nails/screws, sharp edges/corners, splintered wood, and un-even surfaces.

RECOMMENDED SAFETY EQUIPMENT

- Safety Glasses

- Work Gloves

- Hard Toed Shoes

- Knee Pads

- First Aid Kit

PRE-INSTALLATION CHECKLIST

BEFORE INSTALLATION OF THE AUTOMATION VERIFY THE FOLLOWING:

- ✓ Does the door open and close smoothly and easily?
  Make sure the door moves freely over the entire length of travel in both directions.

- ✓ Is the sill track in good condition and allows smooth door travel?
  Make sure the track is clear of debris and the stainless steel cap is secured along the whole length.

- ✓ Is the door level?
  Make sure the door does not sink or rise excessively over the travel.

- ✓ Is the head track level?
  Make sure the head track does not sag in the middle of the track.

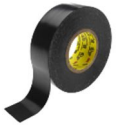
- ✓ Is the door plumb?
  Ensure the door is square “panel to panel” AND “panel to jambs”.

- ✓ Do you have the required ¾” clearance above the head track for the belt and hardware?
  Measure and record the distance between the top of the door and the head track in several locations over the length of the doors travel.

- ✓ Is there 110Vac, 60Hz, 15-20A, NON-GFI circuit available where the automation control panel is located?
  A dedicated circuit is required.

IF ANY OF THE ABOVE ARE NOT CORRECT, HAVE THE INSTALLATION CORRECTED

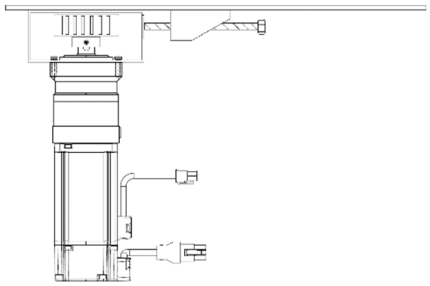
REQUIRED TOOLS

- Power Drill 
- Drill Bits 
- 1/8” Shim Spacers 
- Tape Measure 
- 6-foot level 
- Alan wrenches 
- Small Screwdrivers 
- Ladder(s) 
- Screwdrivers 
- Hammer 
- Wire Cutter/Strippers 
- Electrical Tape 

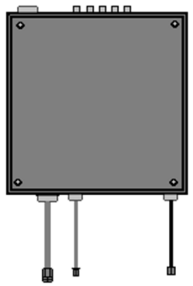
- Black Marker 
- Hole Saws 
- Paddle/Spade Bit kit 
- Wood Screws: #12 x 3”, and #8 x 1” 
- 8-24 x 1” Self Tapping screws 

AUTOMATION COMPONENTS

MOTOR MOUNT ASSEMBLY



CONTROL BOX



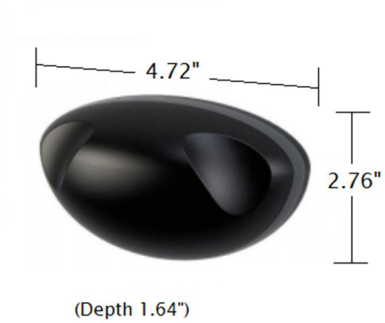
TIMING BELT

RETURN PULLEY

BELT CLAMP

CLOSE SENSOR & MAGNET

MOTION SENSORS (2)



TOUCH SCREEN

QUICK CABLING

THRU-BEAM SENSOR (Optional)

EXTERIOR KEYPAD (Optional)

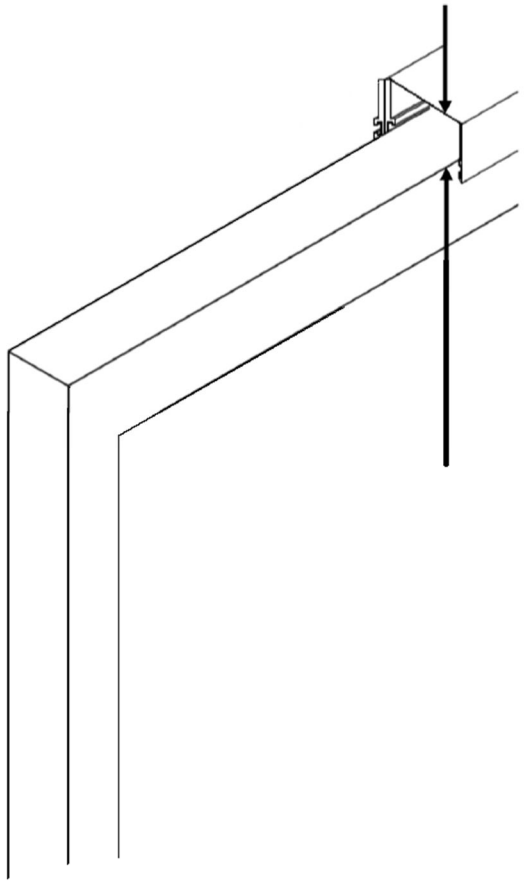
REMOTE SYSTEM (Optional)

PRE-INSTALLATION CHECKLIST

Before you start installing the automation system make sure the following are true:

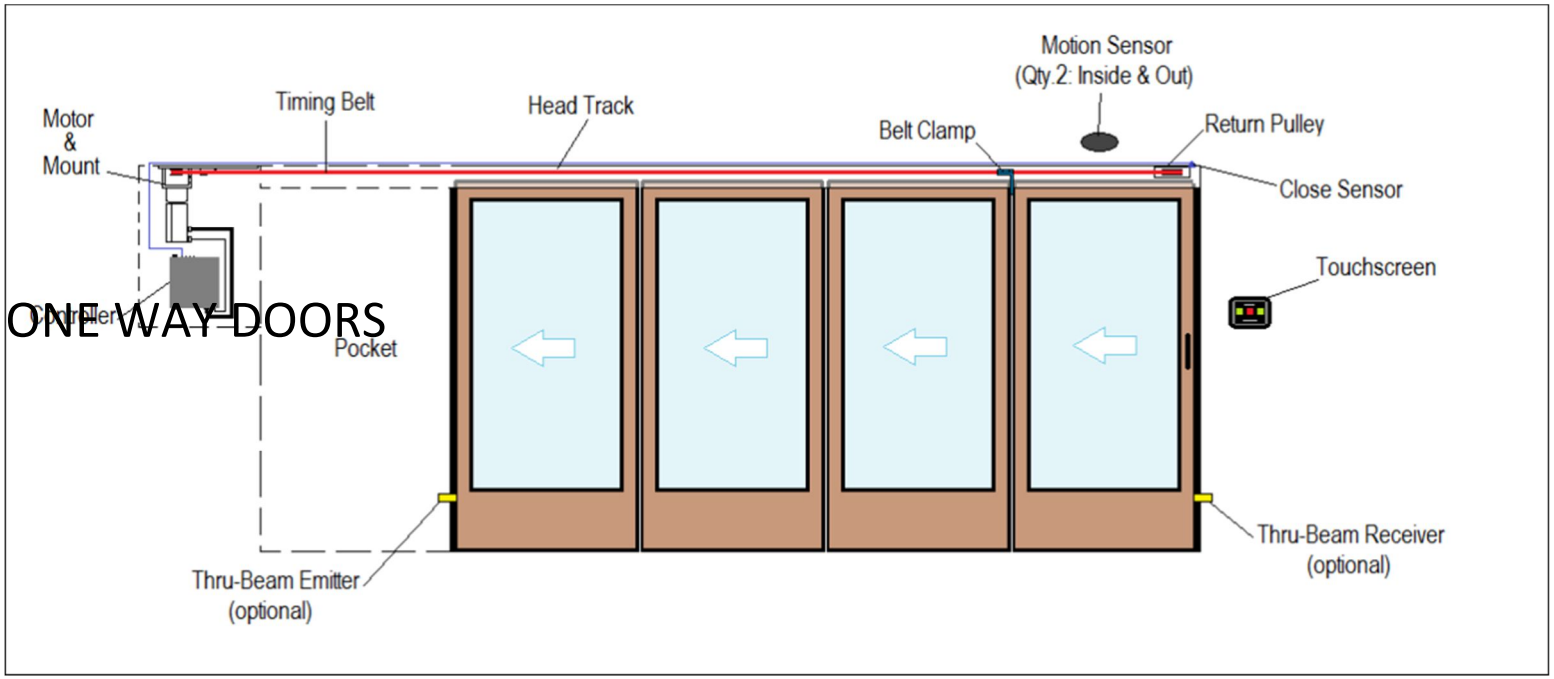
- ✓ Available at the control box location is an 110Vac, 60Hz, 15-20A, NON-GFI outlet.
- ✓ The door manually moves smoothly over the entire length of travel. The doors are square "panel to panel" and "panel to jambs". If problems are found notify the door installer AND the superintendent of the job to correct them.
- ✓ Proper substrate and space available for mounting the motor assembly and return pulley properly and securely.
- ✓ Is there enough room over the top of the door panels for the belt to pass? Measure and record the distance between the top of the door and the head track in multiple locations over the length of the door travel.

¾" Clearance between top of door panel and head track for belt to travel.

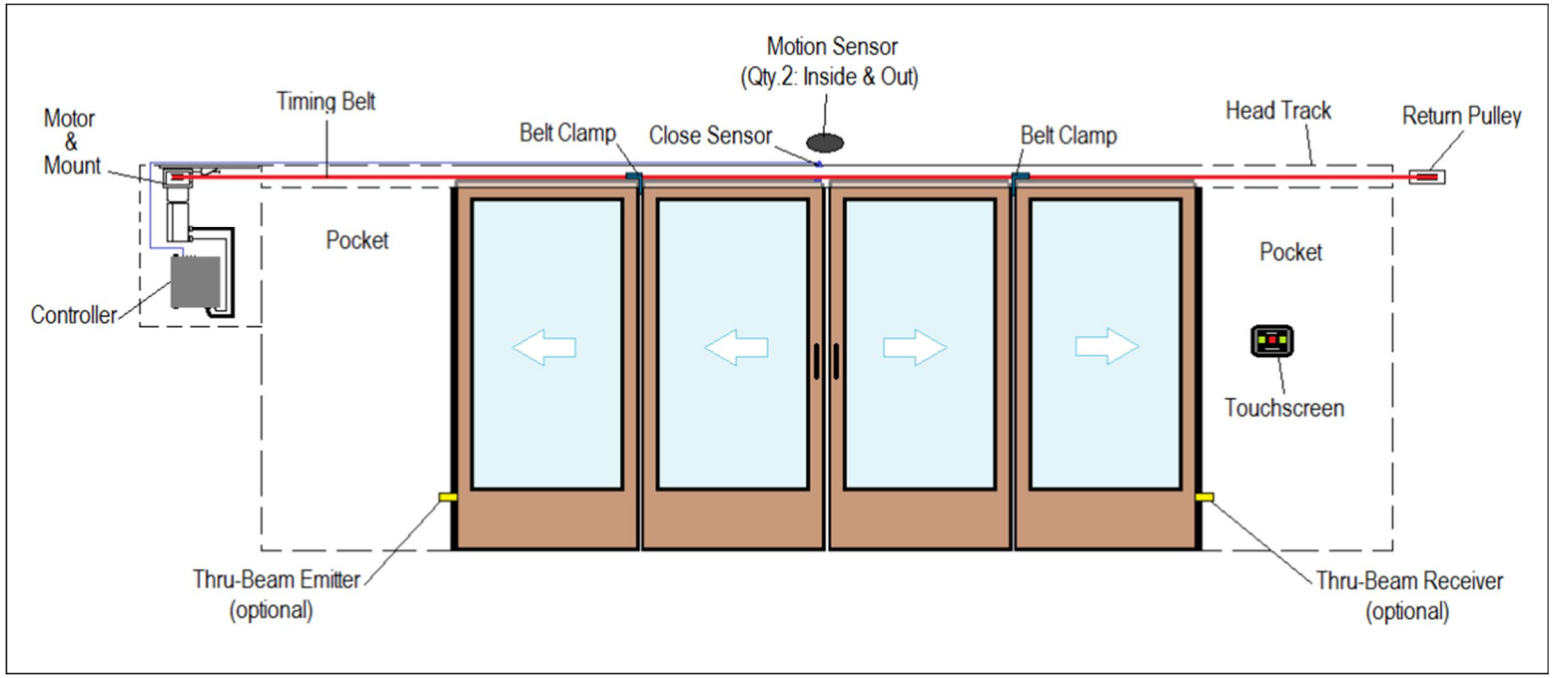


SYSTEM COMPONENT PLACEMENT

ONE WAY DOORS

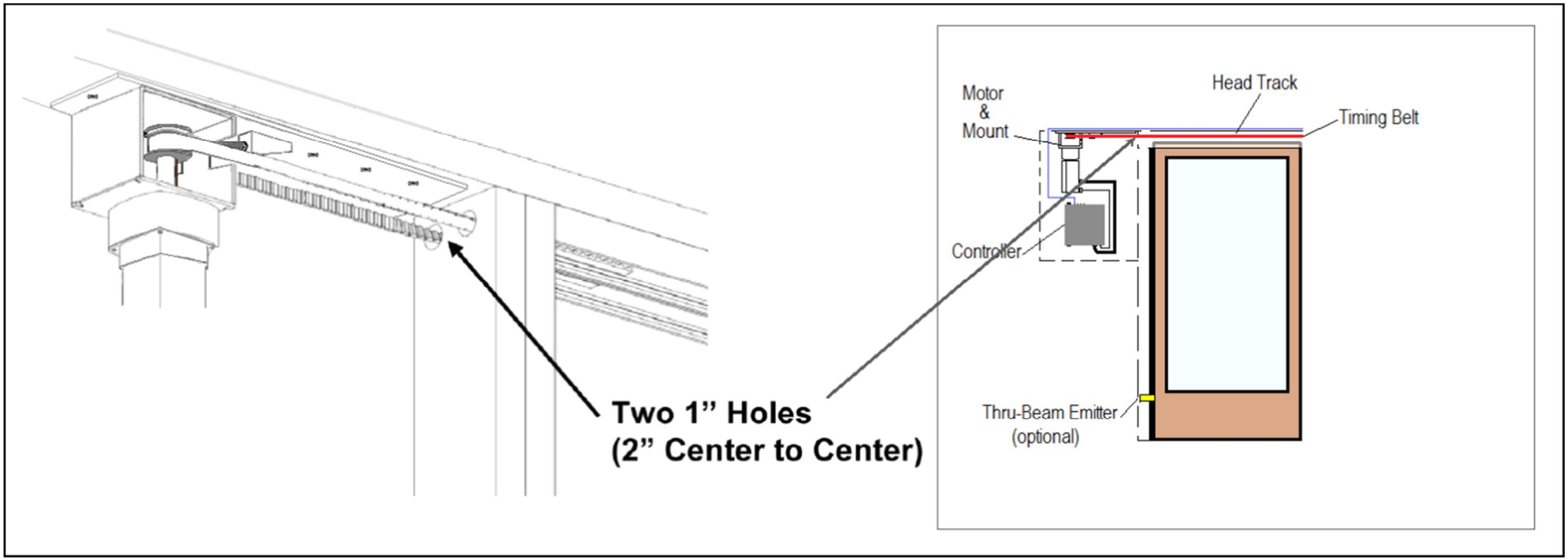


BI-PART DOORS



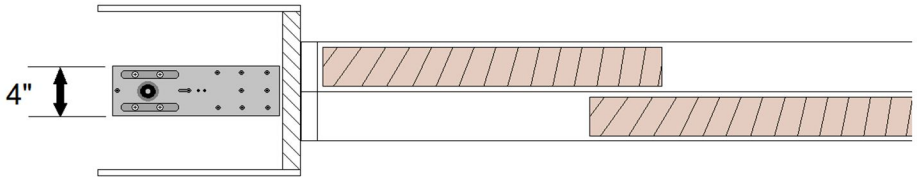
BELT CLEARANCE FOR NON-POCKETING ONE WAY DOOR SYSTEMS

The motor assembly is ALWAYS outside the door frame. In the case of a stacking door system (non-pocketing) the motor must be mounted outside the jamb. Two 1" holes (2" center to center) must be drilled for the belt to pass through the jamb. **Drilling the holes must be done prior to the motor assembly being mounted.**

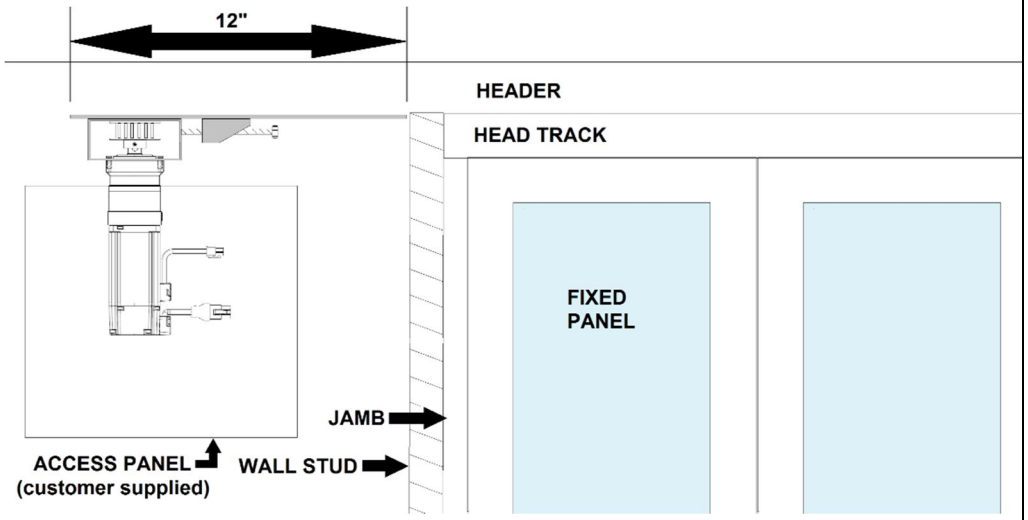


ONE WAY DOOR MOTOR ASSEMBLY POSITITIONING

When installing the motor assembly, a minimum of 4-inches of clearance must be allowed within the wall outside of the door frame. TOP VIEW example shown below.

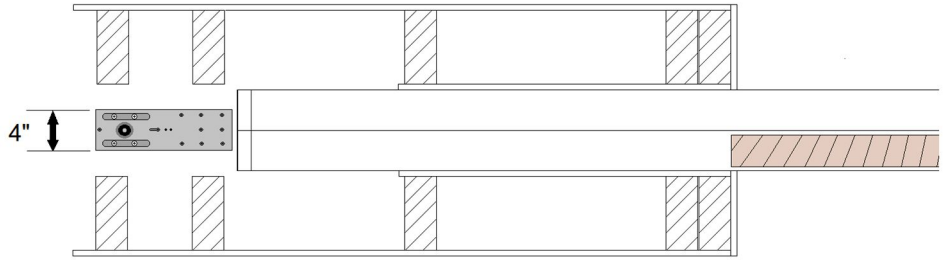


A minimum of 12 inches clearance must be allowed from the wall stud. SIDE VIEW example shown below.

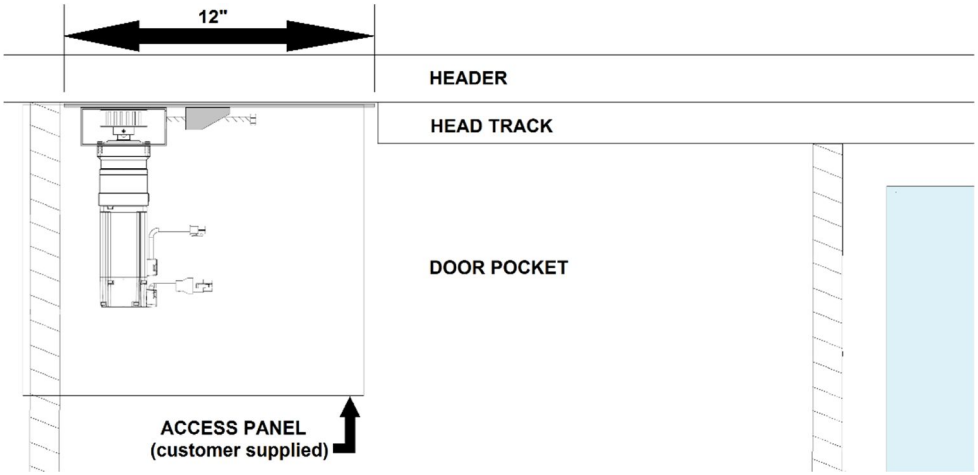


BI-PART DOOR MOTOR ASSEMBLY POSITIONING

When installing the motor assembly, a minimum of 4-inches of clearance must be allowed within the system. TOP VIEW of clearance of the motor assembly **inside the door pocket** shown below.



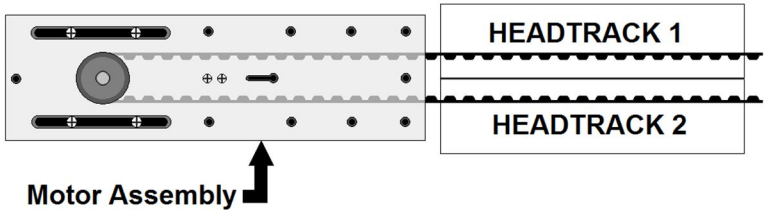
A minimum of 12 inches clearance must be allowed from the end of the head track to the wall stud. SIDE VIEW of clearance of motor assembly installation **inside the door pocket** shown below.



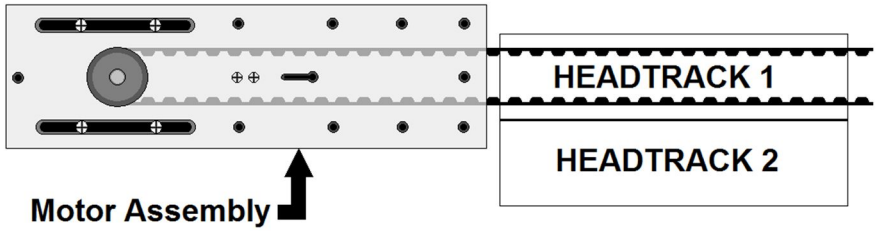
MOTOR PLACEMENT

Installation of motor assembly: Center the motor assembly between the two head tracks for a single door (one way) or centered on door track 1 for Bi-part doors.

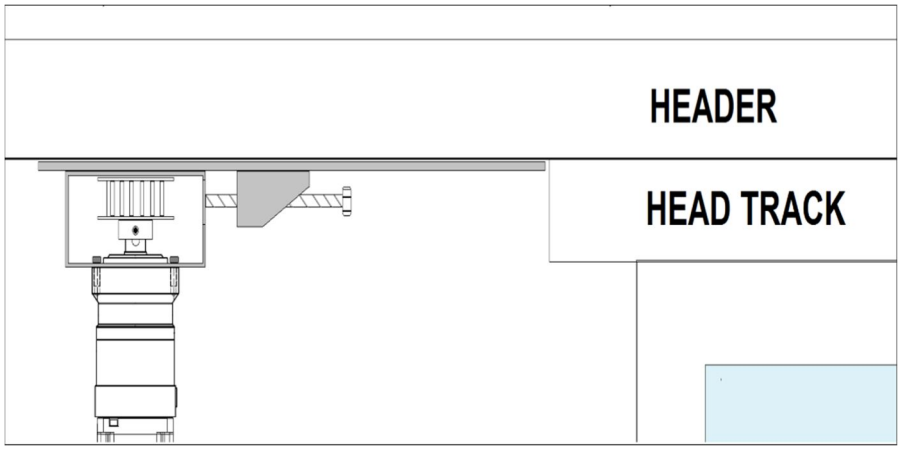
SINGLE DOOR (ONE-WAY) BELT PLACEMENT

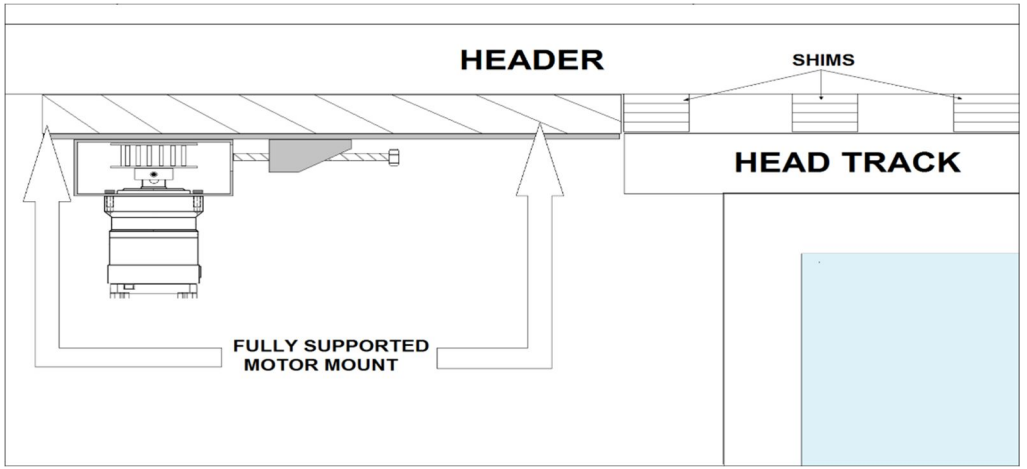


BI-PART DOOR BELT PLACEMENT



ALIGNMENT: For proper drive belt operation, it is critical that the motor assembly is aligned on the same plane has the head track and that it is level. Under typical conditions flush mounting the motor to the header will achieve proper alignment; however if the head track has been shimmed, the motor must be built down to match. **The 12" motor mounting plate must be fully supported along its entire length.**



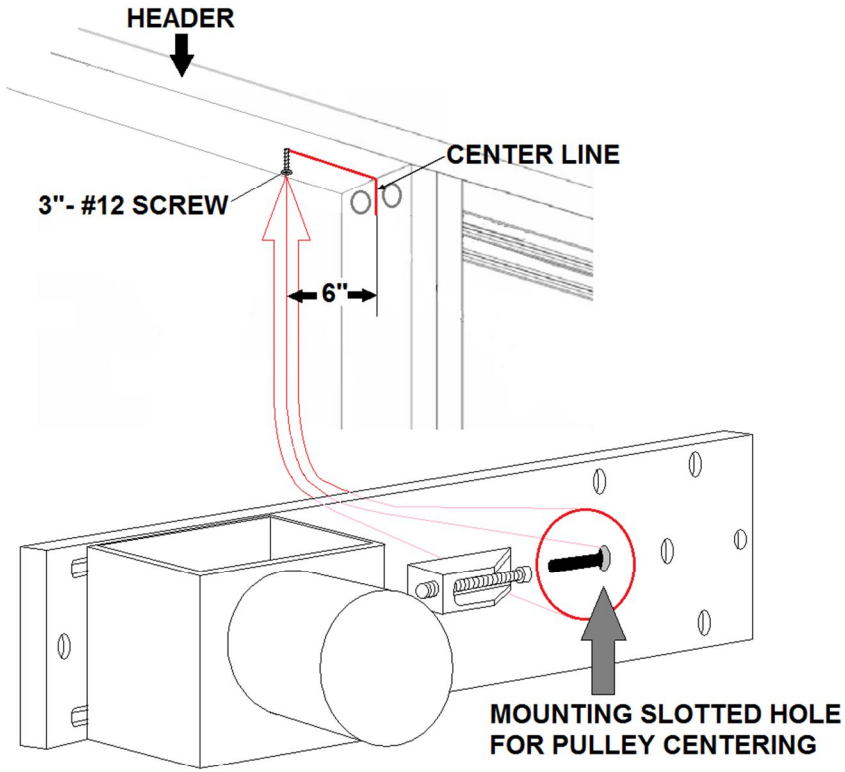


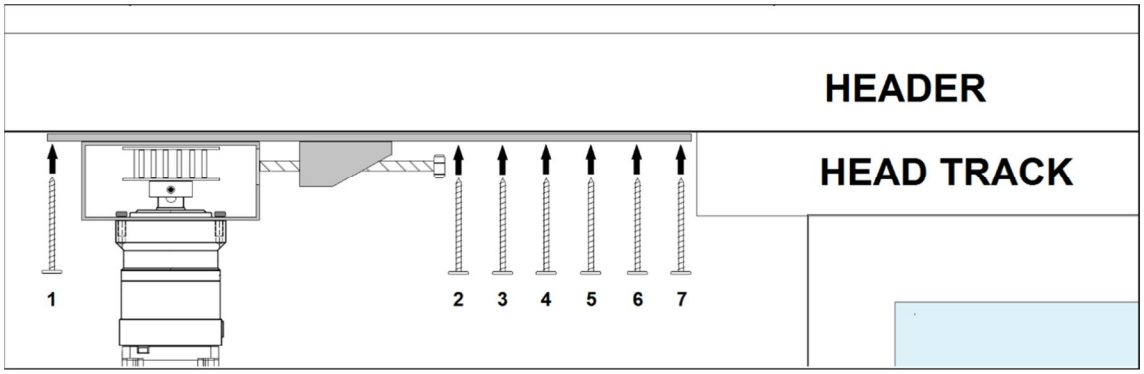
MOUNTING THE MOTOR ASSEMBLY

The motor assembly must be installed beyond the final door panel or door jamb.

THE MOTOR ASSEMBLY MUST BE MOUNTED TO A SOLID SUPPORT MEMBER SUCH AS A 2”x 8” HEADER

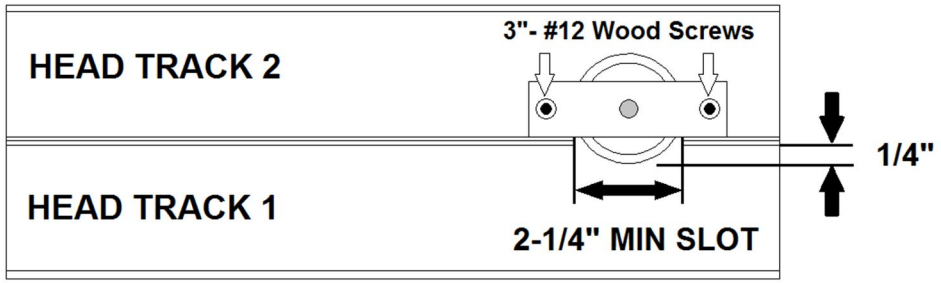
To ensure the pulley is aligned properly, so that the desired belt path is true, using a marker, draw a center line between the two 1-inch holes vertically to the top of the header. Then measure out 6-inches from the center line along the header and mark it with and “X”. Using a 3”- #12 wood screw, drill it into the “X” halfway (1-1/2”), so that an 1-1/2” of the screw is still exposed. The motor mounting plate has a slotted hole for you to center the pulley properly. Insert the screw through the slotted hole and slide the motor mount forward toward the door panels, allowing the screw to temporarily hold the mount up. **Make sure the screw is installed deep enough to hold up the whole motor assembly before letting go!** Install seven more 3”- #12 wood screws into the mounting holes that are on the motor assembly mounting plate. **Once all seven 3”- #12 wood screws have been installed, remove the screw that is in the centering slot.**





ONE WAY RETURN PULLEY INSTALLATION

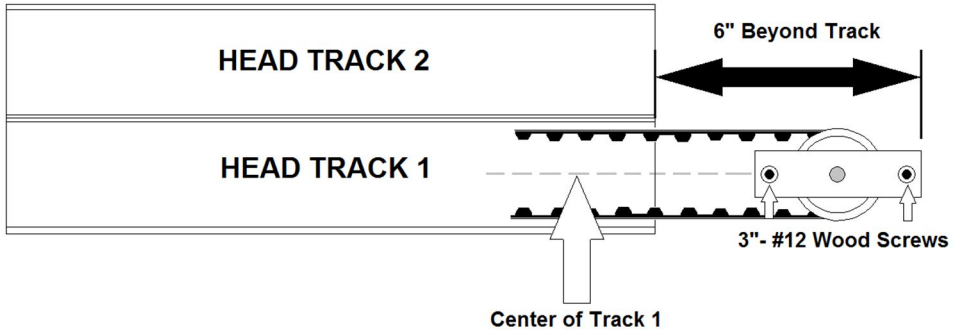
A slot which is a minimum of 2-1/4” in length must be cut into the head tracks. This allows the drive belt to pass through from Head Track 1 into Head Track 2. The return pulley should only protrude beyond the wall of the head track approximately ¼”. Attach the pulley to the head track and header using two 3”-#12 wood screws.
(Note: the pulley can be mounted outside the door frame. See bottom of pg. 14 for instructions)



(View looking up into the head track opposite end of motor)

BI-PART RETURN PULLEY INSTALLATION

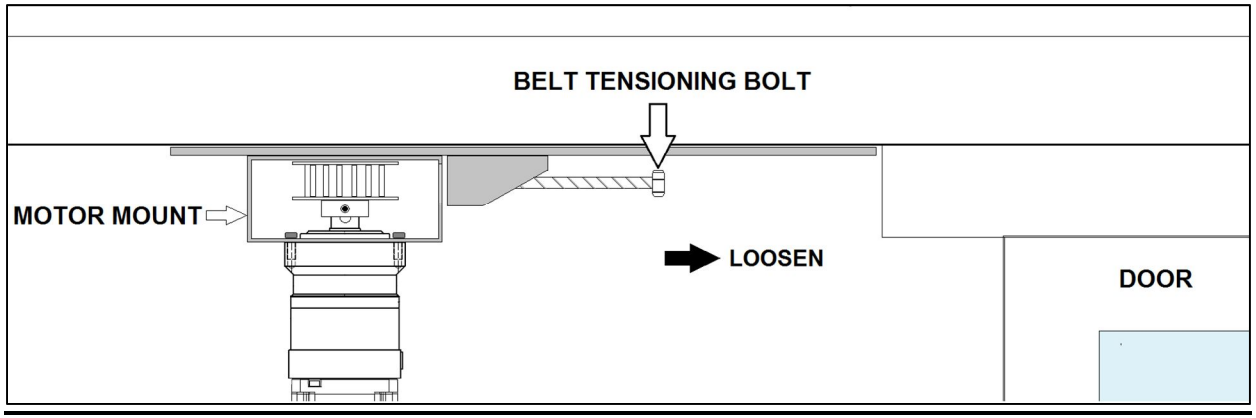
The Bi-part return pulley must be mounted outside of Head Track 1 at least 6-inches beyond the end of the Head Track. Mount the pulley, using two 3”-#12 wood screws, centered with Head Track 1 so that both sides of the belt will travel within Head Track 1.



(View looking up into the head track opposite end of motor)

INSTALLING THE BELT

Before installing the belt, loosen the belt tensioning bolt, turning it counter clock-wise on the motor mount assembly and slide the motor mount ALL the way forward toward the door.

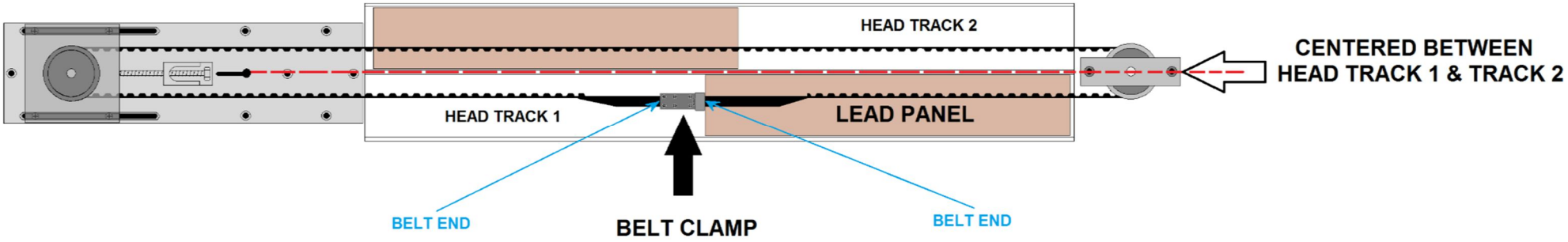


THREADING THE BELT: First make sure there aren't any twists in the belt. Thread the belt through both the Motor's Pulley and the Return Pulley, with both ends of the belt opening ending at where the belt clamp will be placed. **The open ends of the belt will ALWAYS end in Track 1.**

BELT PATH FOR ONE WAY (SINGLE) DOORS:

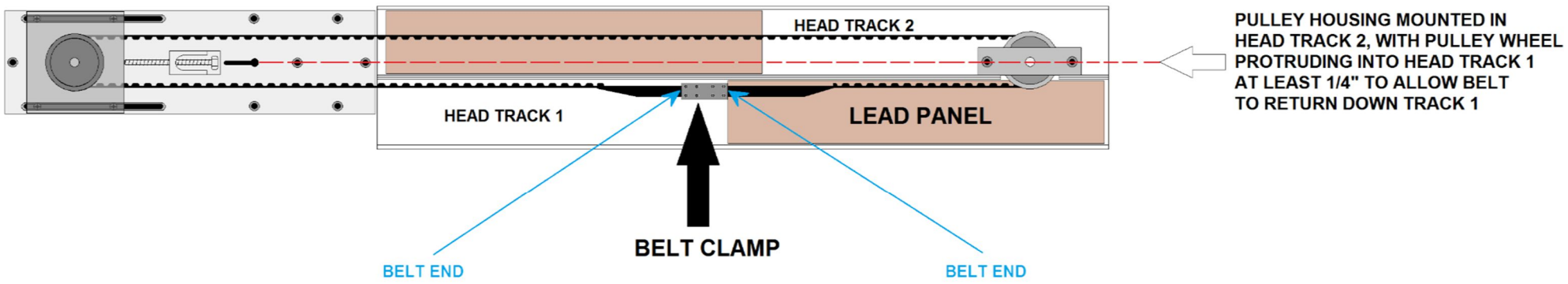
Each direction of the belt rides in a separate Head Track.

(One Way door with Return Pulley mounted outside of door frame example below)



INSTALLING THE BELT CONTINUED

(One Way (Single Panel) door with Return Pulley mounted inside door frame example below)

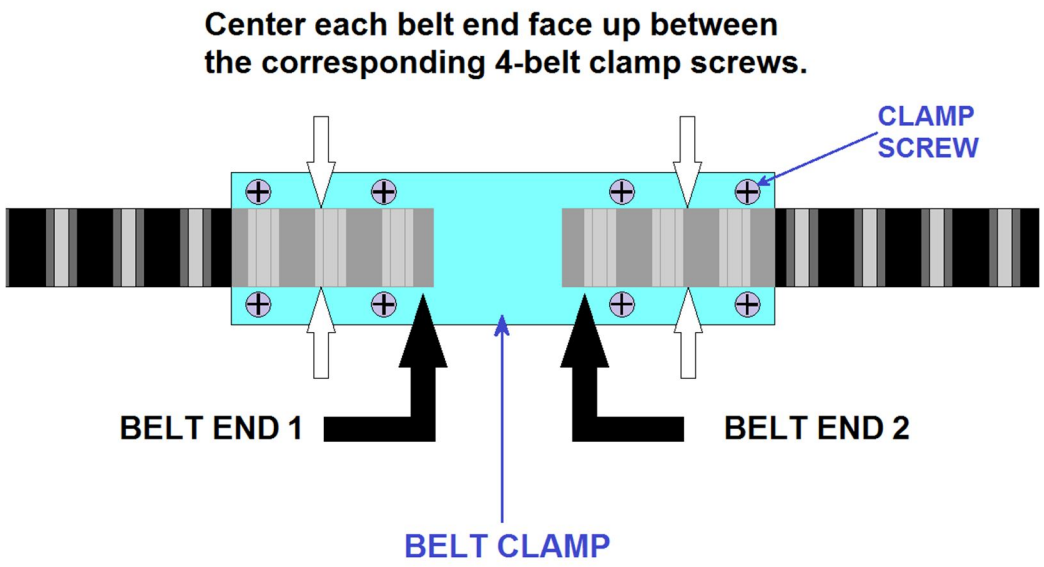


INSTALLING THE BELT TO THE BELT CLAMP

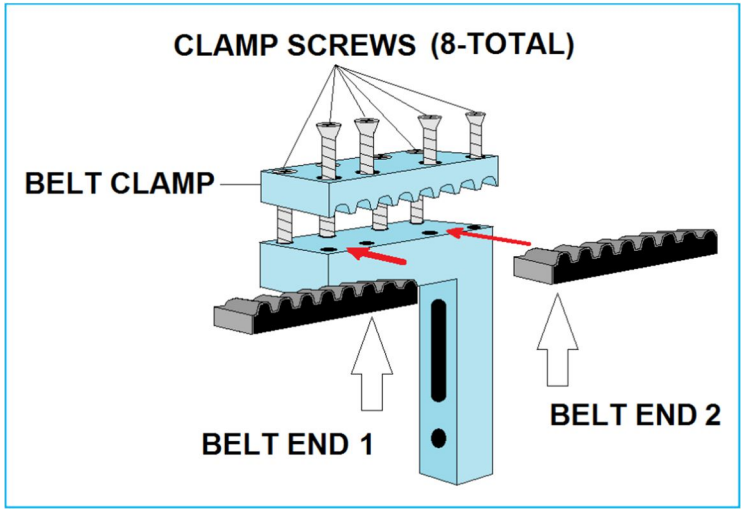
1. Cut the belt close to one of the teeth. Make sure both ends of the belt are facing up AND are cut squarely.

2. Insert Belt End 1 (teeth facing up as shown) into one end of the belt clamp, and tighten down the four 4-40 screws on the corresponding side.

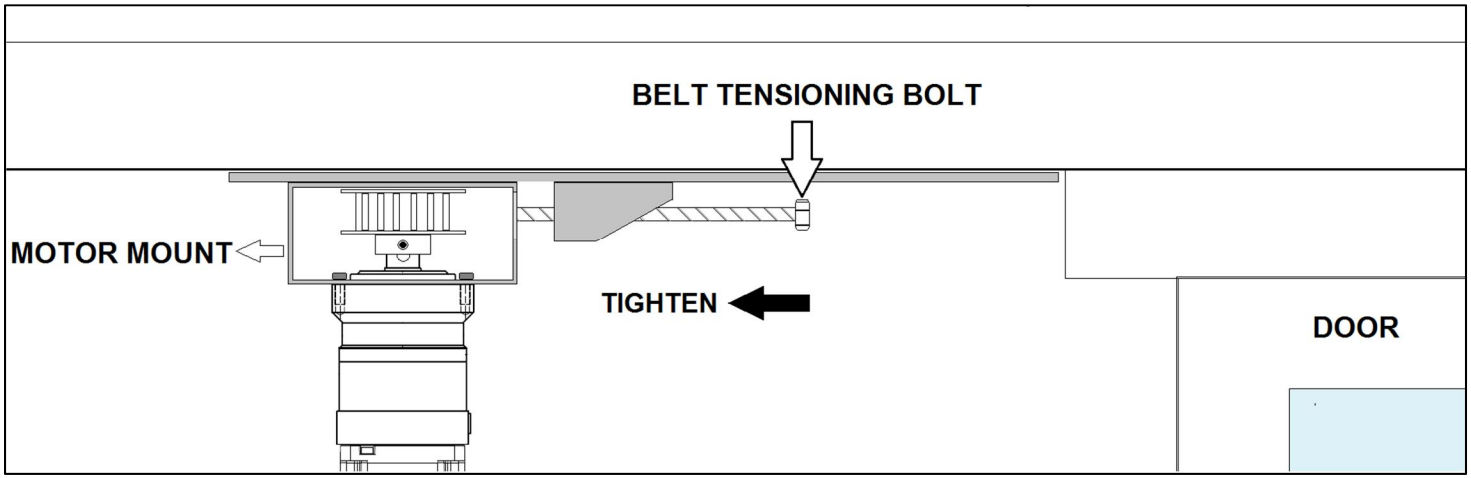
3. Pull the belt tight-take as much slack out of the belt as possible-without leaving the belt too short and also ensuring full engagement of the belt with the belt clamp. (Minimum 3-teeth engaged for ½" wide belt, and minimum 4-teeth engaged for 3/8" wide belt). Cut the Belt End 2 close to one of the teeth. Insert Belt End 2 into the other end of the belt clamp (teeth facing up) and tighten down the four 4-40 screws on the corresponding side.



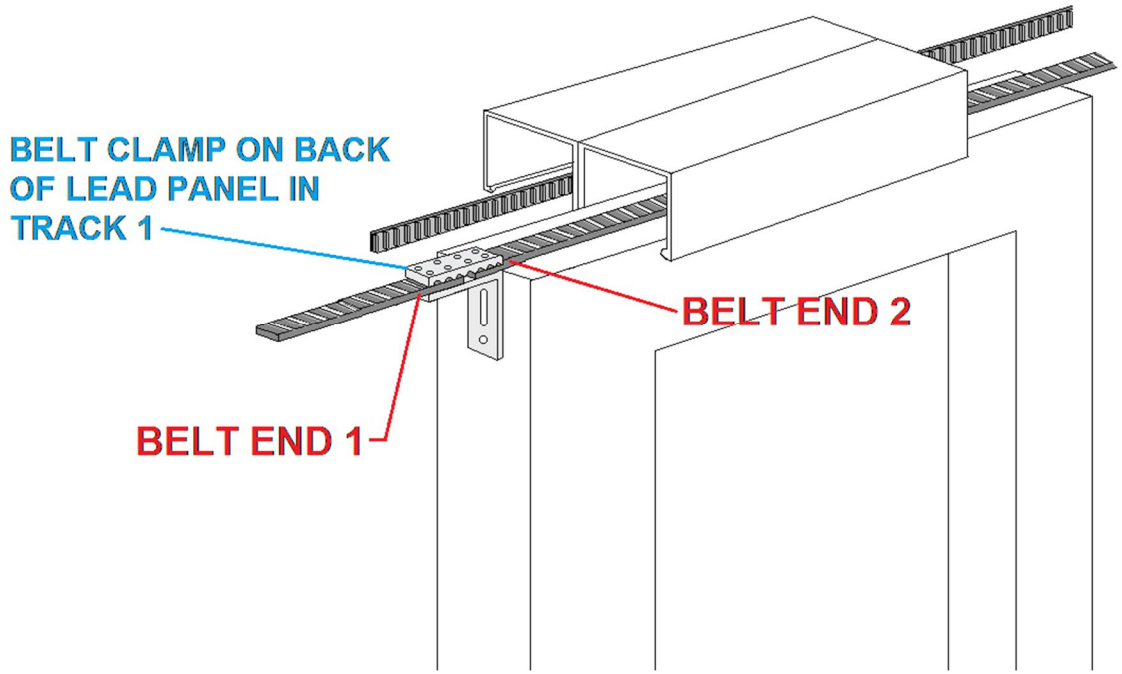
TIP: Insert 4-screws (two on belt end 1, two on belt end 2) on same side of the belt clamp a few threads just enough so that it connects the top of the belt clamp to the bottom portion of the belt clamp. This allows both belt ends to be inserted into the belt from the side of the clamp. Once both belt ends are inserted, tighten down the four 4-40 screws to secure the belt completely.



4. Tighten the belt by turning the belt tensioning bolt on the motor mount assembly clock-wise. (Tension the belt tight enough so that the belt does not skip teeth when the motor shaft turns. The belt should be tight)

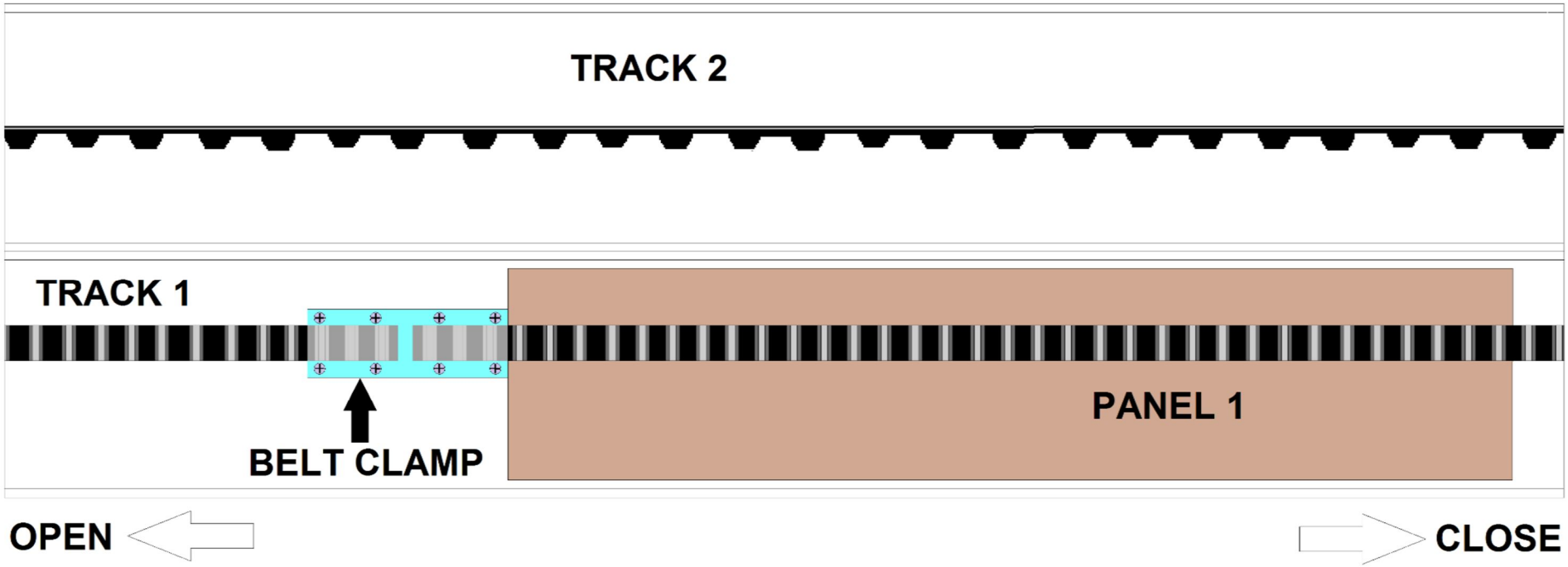


5. Slide the Lead Panel to the belt clamp to the back of the lead panel in Track 1 & attach using two 1-1/4" wood screws or metal screws.



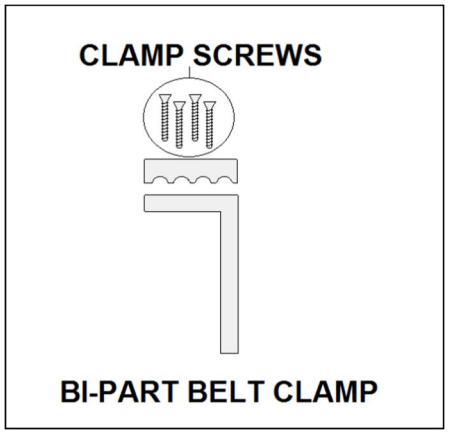
INSTALLING THE BELT CLAMP CONTINUED

BELT CLAMP LOCATION FOR ONE WAY (SINGLE) DOORS: Mount the belt clamp on the back of panel 1 in Track 1 a ½" off center of door toward Head Track 2. Secure it using two 1-1/4" wood screws or metal screws. Make sure the belt does not rub against any portion of both Head Tracks. One side of the belt will travel down Head Track 1 and the other side of the belt will travel down Head Track 2. (See example below)



Installation of Bi-part Belt Clamp on Door Panel 2:

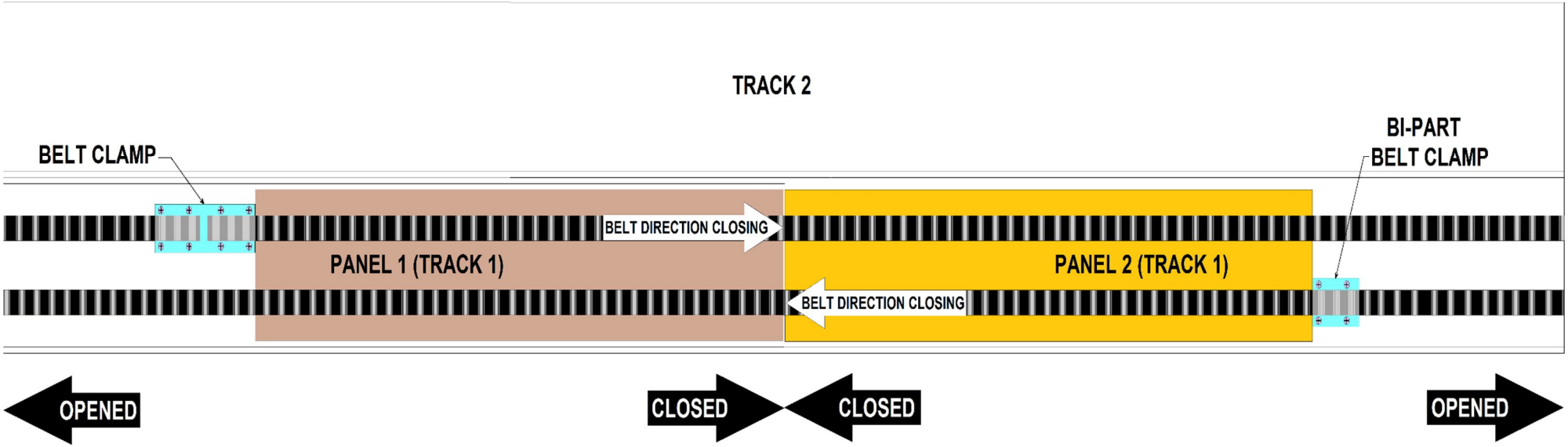
BOTH SIDES OF THE BELT TRAVELS IN HEAD TRACK 1 IN ALL BI-PART CONFIGURATIONS.



The Bi-Part belt clamp attaches to the return side of the belt to the back of Panel 2 in Head Track 1.

1. **The belt should be attached to the belt clamp & fully tensioned to Panel 1 before proceeding.**
2. Manually position all the door panels in their normally closed position. Bi-part doors close at the center.
3. Attach the belt (teeth facing up) to the Bi-part clamp using the four 4-40 screws on top of the belt clamp.
4. Off-set the Bi-part clamp on the back of Panel 2 using two 1-1/4" long wood or metal screws.

(See example below)

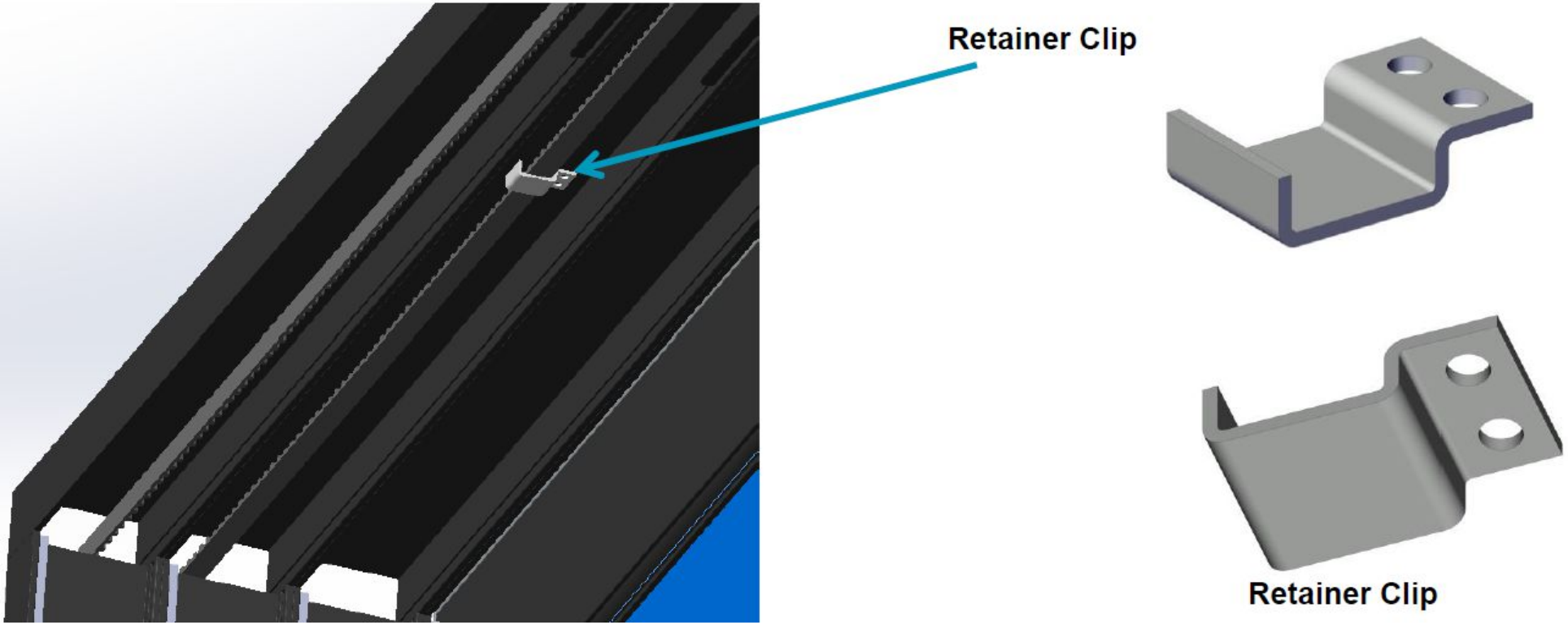


INSTALLATION OF BELT RETAINING CLIP(S)

Belt Retaining Clips prevent the belt from sagging/drooping, flapping, and rubbing. They also help keep the belt teeth in the “up” position. ONLY USED WITH ONE WAY (SINGLE) DOOR CONFIGURATIONS.

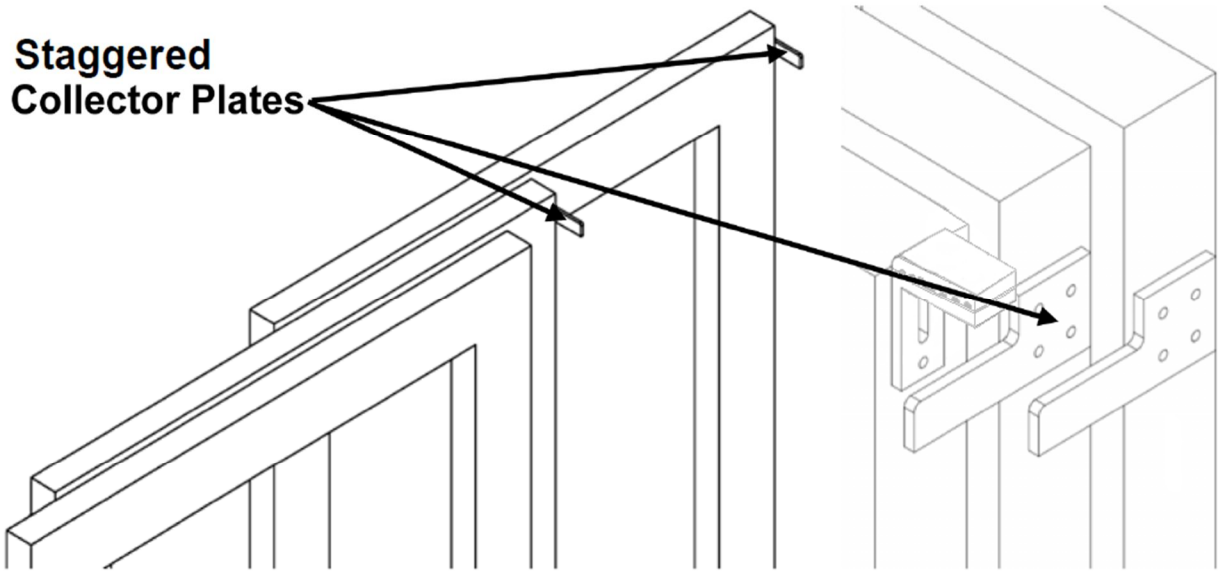
Belt Retaining Clips are always mounted in Head Track 2, NEVER in Head Track 1. Ensure the belt teeth are “up” when installing.

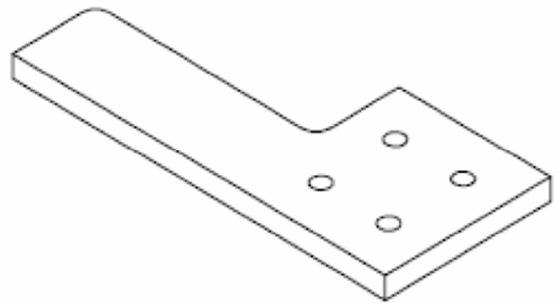
Install the belt clip in Track 2, in the middle of the day-light opening. Use two 8-24 x 1” self-tapping metal screws. Multiple clips can be used throughout the door opening, as needed.



DOOR COLLECTOR PLATES

- **INSTALLATION OF DOOR COLLECTOR PLATES:** When a multi-panel sliding door is closing, factory interlockers "collect" the next door panel. For doors that do not have opening interlockers, collector plates need to be installed at the top of each door **(except the lead panel).**
- Install the door collector plates using four (4) #8 x 1" screws. Make sure the door collector plates are installed on the back-side of the door panels. Stagger them so that they do not come in contact with each other when the doors are in the "open" position.





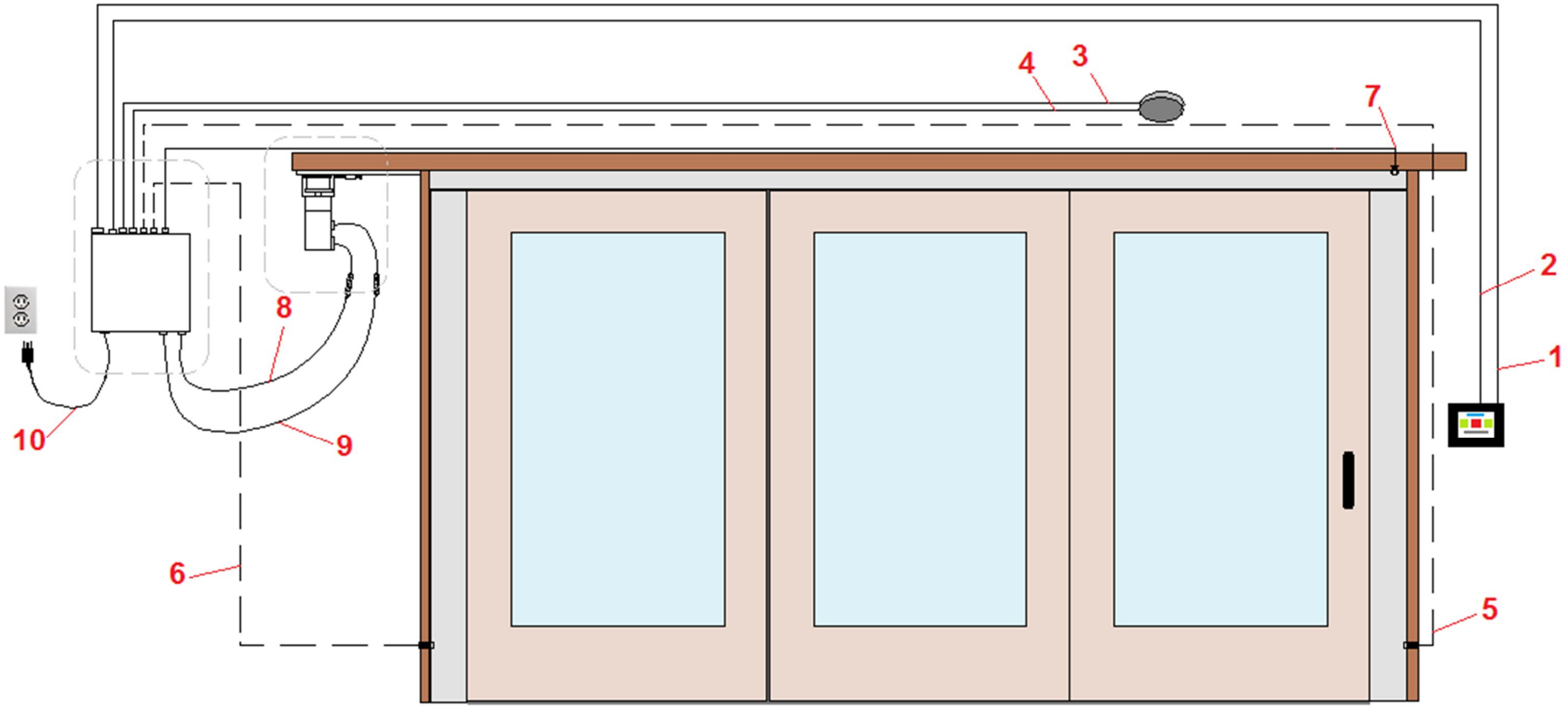
WIRING AUTOMATION SYSTEM

- **Mechanical Installation Complete:**
  - Before beginning the electrical installation, check for rubbing and interferences by manually moving the door over the entire length of its travel. Make sure the door moves freely over its entire length of travel, and that it is square "panel to panel" and "panel to jambs". If any problems are found contact the door installer and job-site superintendent to have them corrected. Everything must be working properly mechanically before beginning the electrical installation.

- **Electrical Installation:**
  - **Electrical installation is a two stage process:**
    - **1st Stage is installation of cabling prior to dry-wall (done same time as mechanical installation).**
    - **2nd Stage is installation of the Motion Sensors, Thru-Beam Sensors (optional), Auto-Tie In, & Touch screen, after the floor & walls surrounding the door have been completely finished and there is NO MORE CONSTRUCTION being done around the door. DO NOT INSTALL THESE DEVICES DURING 1ST STAGE, AS THESE DEVICES CAN BE DAMAGED BY AIRBORNE CONSTRUCTION DEBRIS!**
  - To prevent damage to the automation system components, all cables must be carefully connected to their proper locations. Cable connections are labelled accordingly on top and bottom of the control box.
  - For easy installation and to avoid damaging the connectors, wrap electrical tape around the connectors to protect the internal pins when routing them through the studs and insulation.
  - **DO NOT CONNECT THE CONTROLLER TO THE AC POWER OR BOTH THE MOTOR POWER AND MOTOR ENCODER TO THE CONTROLLER UNTIL INSTRUCTED**

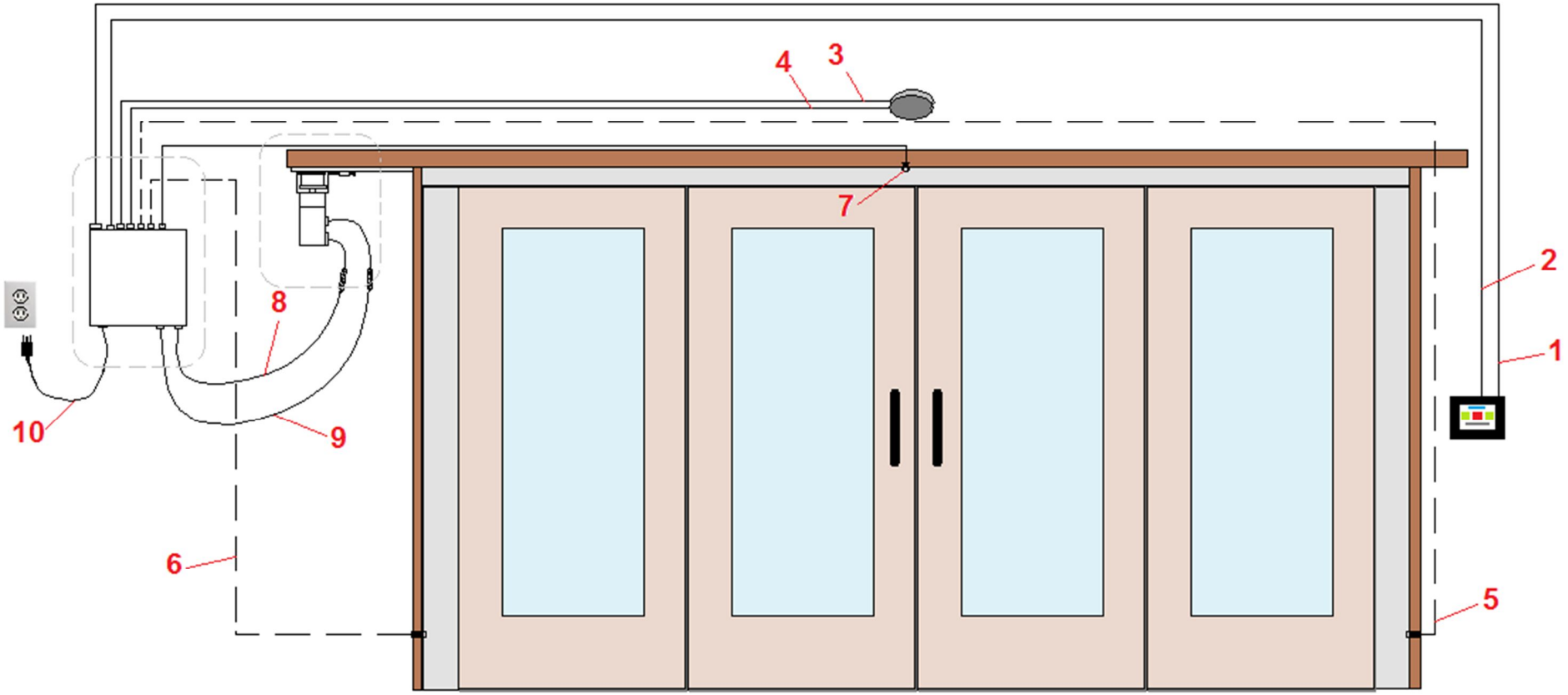
Automation System Wiring Layout for One Way (Single) Doors

1. Touch Screen Communication Cable
2. Touch Screen Power Cable
3. Motion Sensor Exterior Cable
4. Motion Sensor Interior Cable
5. Thru-Beam Sensor Emitter Cable
6. Thru-Beam Sensor Receiver Cable
7. Close Sensor Cable
8. Motor Encoder Cable
9. Motor Power Cable
10. AC Power



Automation System Wiring Layout for Bi-Part Doors

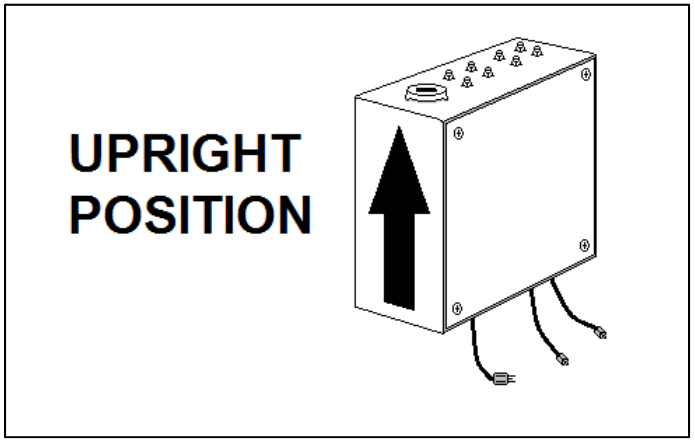
1. Touch Screen Communication Cable
2. Touch Screen Power Cable
3. Motion Sensor Exterior Cable
4. Motion Sensor Interior Cable
5. Thru-Beam Sensor Emitter Cable
6. Thru-Beam Sensor Receiver Cable
7. Close Sensor Cable
8. Motor Encoder Cable
9. Motor Power Cable
10. AC Power Cable

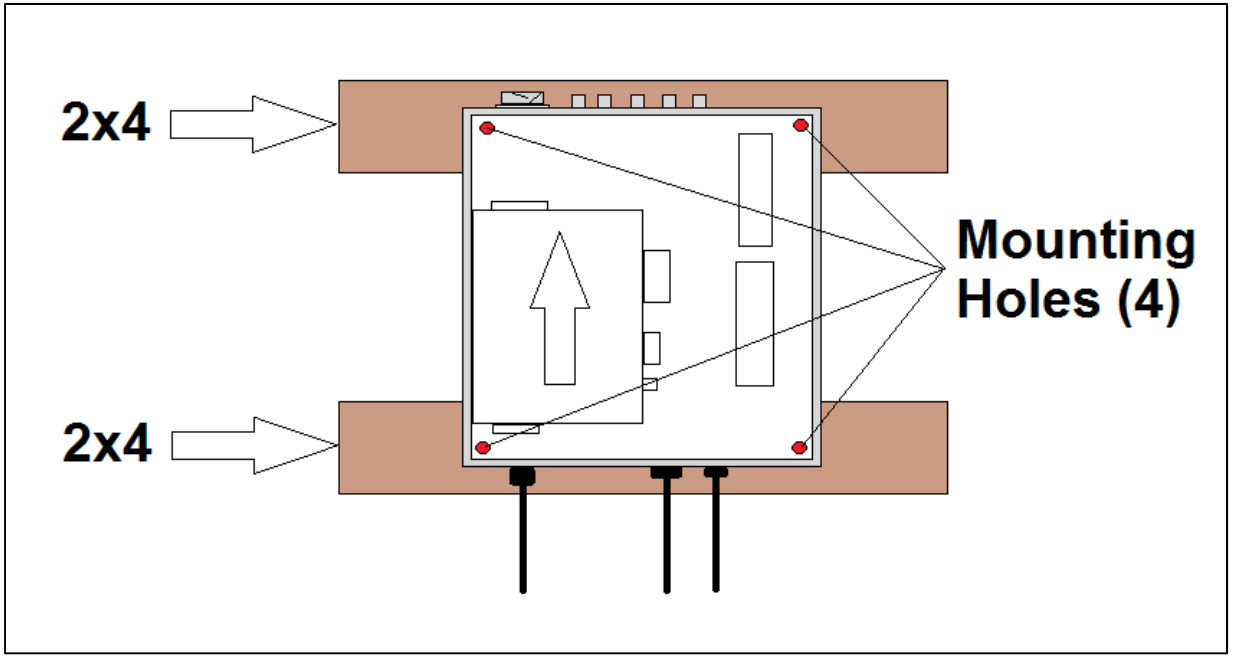


INSTALLING THE CONTROL BOX

The automation control box must be installed in the upright position. **DO NOT INSTALL IT LAYING DOWN OR ON ITS SIDE.**

1. Remove the front cover from the control box by loosening the 4-screws on the enclosure, slide the cover plate up and lift off. (The 4-loosened screws remain on the enclosure)
2. Mount the enclosure securely to two 2x4 cross sections or a 3/8" thick plywood backing, using four 2"-#12 wood screws.
    a. The control box needs to be within 14-feet of the motor. (Longer cables available to mount up to 50-feet away)
3. Once the control box is mounted put the cover back on to the enclosure and tighten down the 4-screws on the face of the enclosure.
    a. TIP: Tape a piece of plastic, temporarily, over the top of the enclosure where the cable inputs are located to protect them from falling debris, which can become damaged when you try and insert the cabling into them.





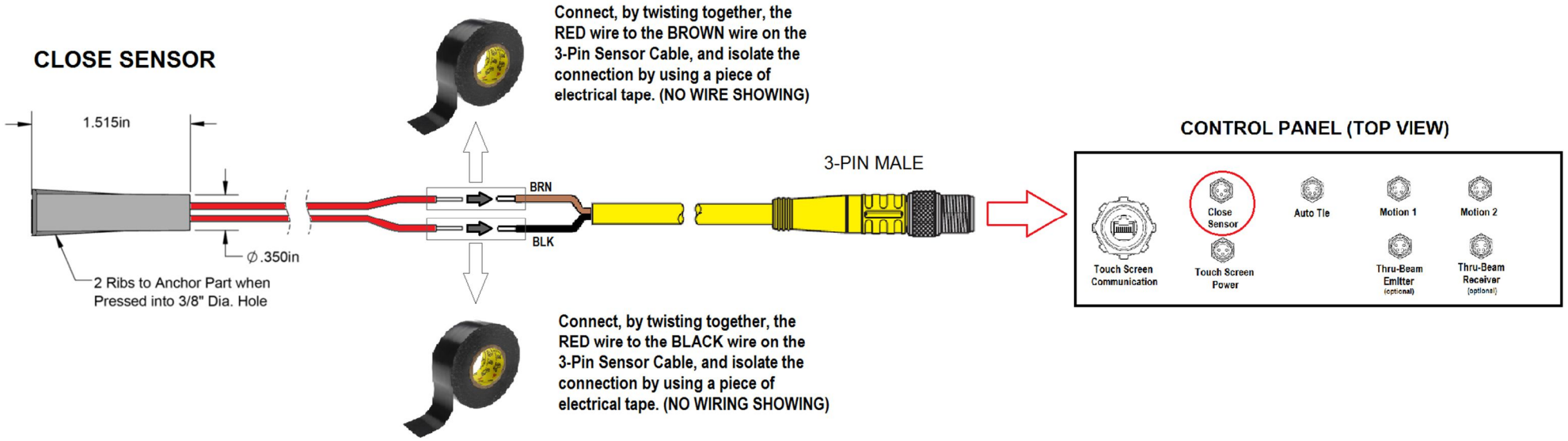
DO NOT PLUG THE POWER CORD IN

INSTALLING THE CLOSE SENSOR & MANGET BRACKET

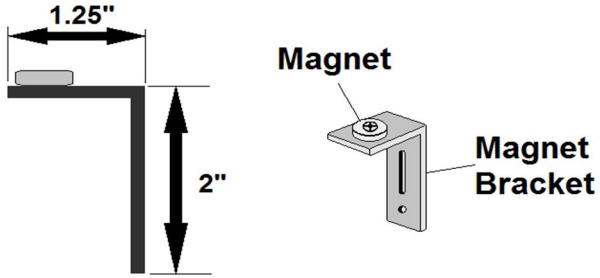
The Close Sensor <u>ALWAYS</u> mounts in Head Track 1 and the Magnet Bracket <u>ALWAYS</u> mounts on the Lead Panel (Panel 1).

<u>MAKE SURE THE BELT IS NOT RIDING DIRECTLY UNDERNEATH THE CLOSE SENSOR. (YOU MAY NEED TO SHIFT THE CLOSE SENSOR & MAGNET BRACKET)</u>

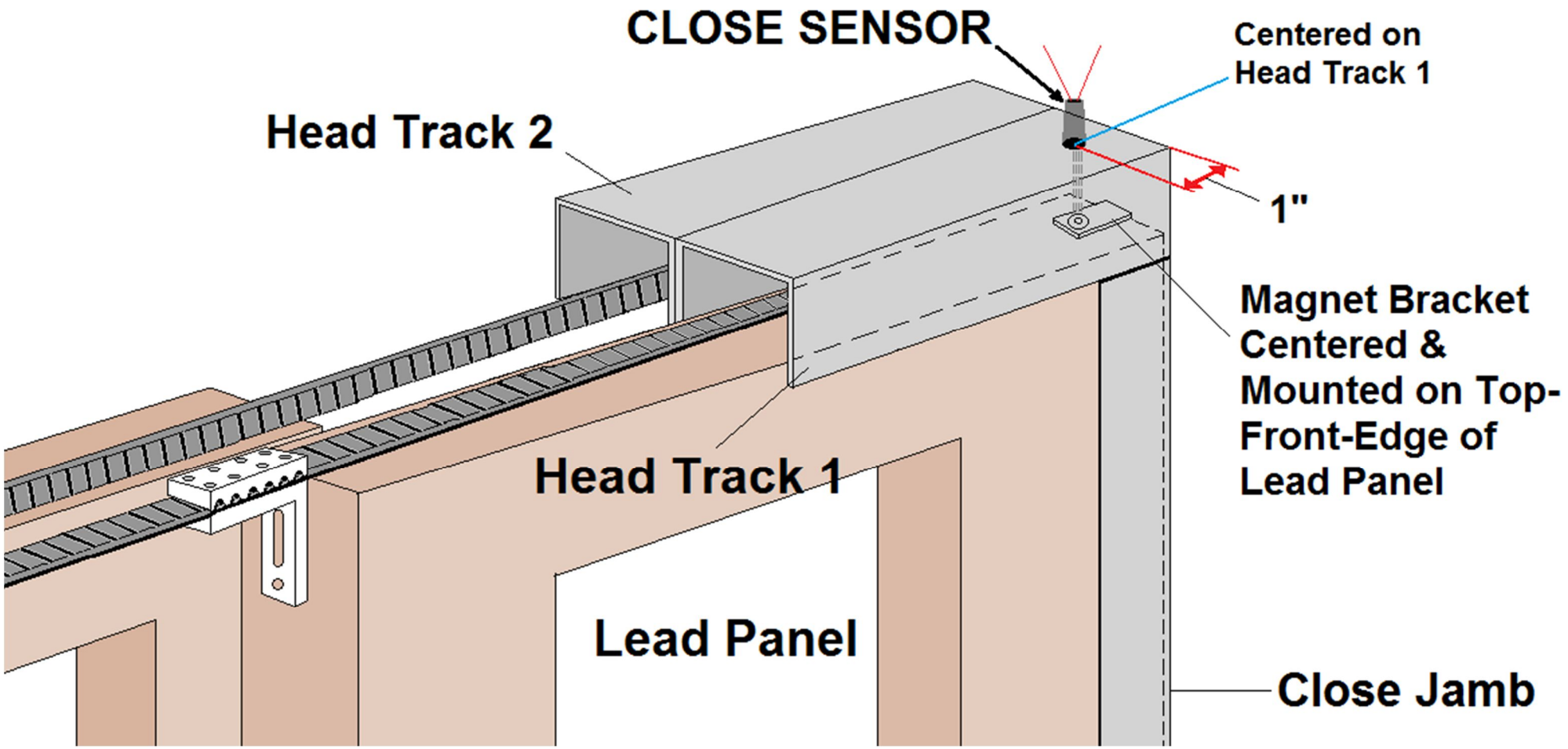
To mount the Close Sensor you will need to drill a 3/8" diameter hole at least 3-inch depth. Then "fish" the Close Sensor Cable (end with flying leads) through the hole. Connect the BLACK wire (on the cable) by twisting it to one of the red wires on the sensor, and use a piece of electrical tape to isolate the wire connection (<u>MAKE SURE NO PART OF THE WIRE CONNECTION IS EXPOSED</u>). Connect the BROWN wire (on the cable) by twisting it to the other red wire on the sensor, and use a piece of electrical tape to isolate the wire connection (<u>MAKE SURE NO PART OF THE WIRE CONNECTION IS EXPOSED).</u> The Brown-RED connection **<u>CANNOT</u>** touch the Black-RED connection! Feed the cables up into the hole and insert and press the Close Sensor into the hole. The fins on the side of the sensor will compress into the hole. (Tip: If the sensor is too loose and tends to "fall out" of the hole, use piece of electrical tape and wrap around the body of the sensor, increasing the thickness). Plug in and screw down the 3-pin male connector to the CLOSE SENSOR input on top of the control panel.



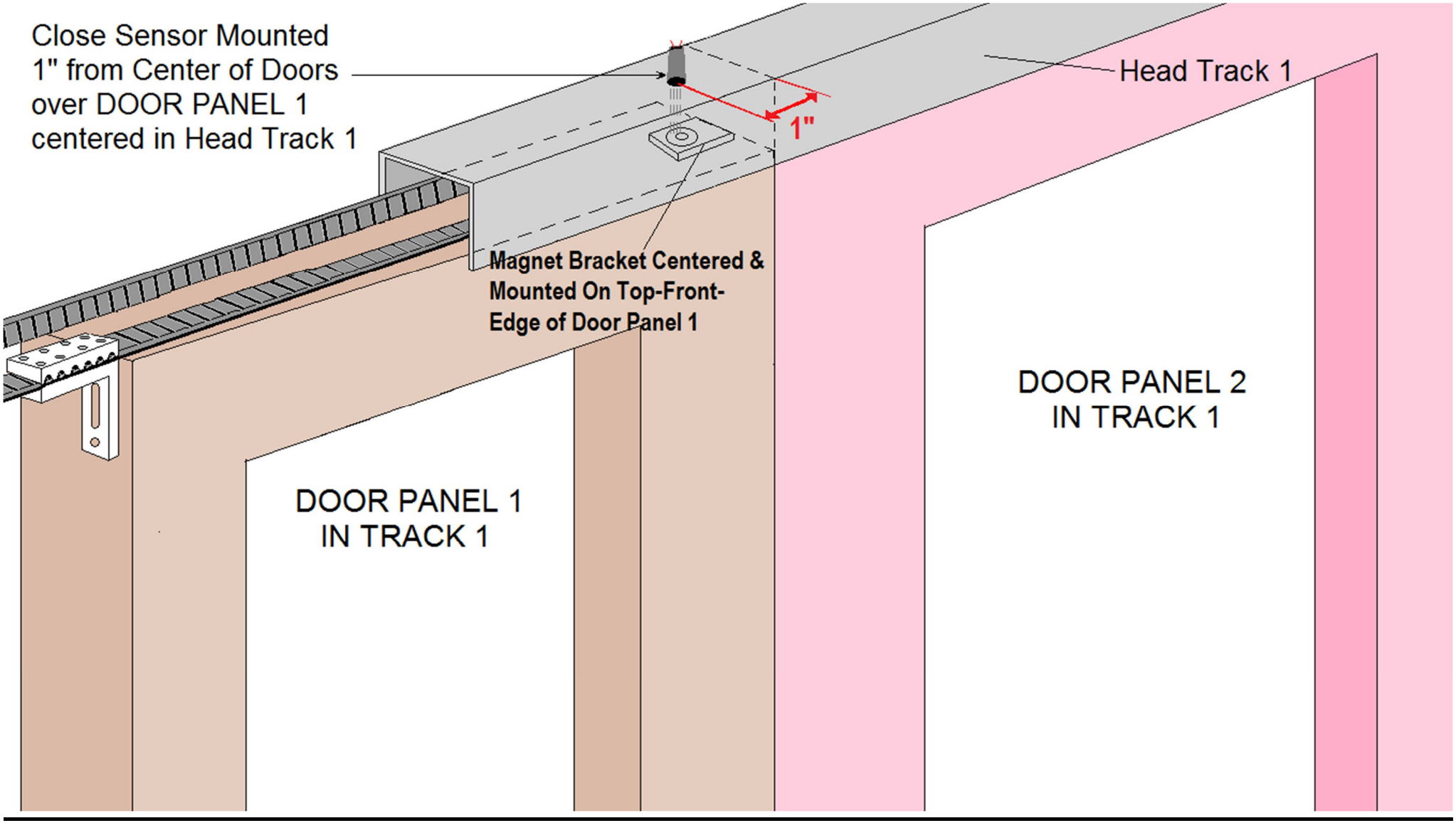
To mount the **Magnet Bracket** to the Lead Panel (Panel 1) you will need to use two #8-¾" wood or self-tapping metal screws and mount it so that the magnet is directly under the Close Sensor when the door is closed.



ONE WAY (SINGLE) DOORS

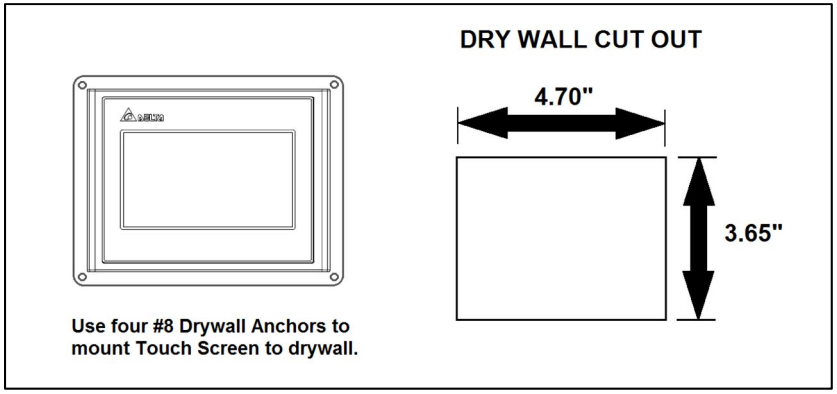


BI-PART DOORS



INSTALLATION OF TOUCHSCREEN

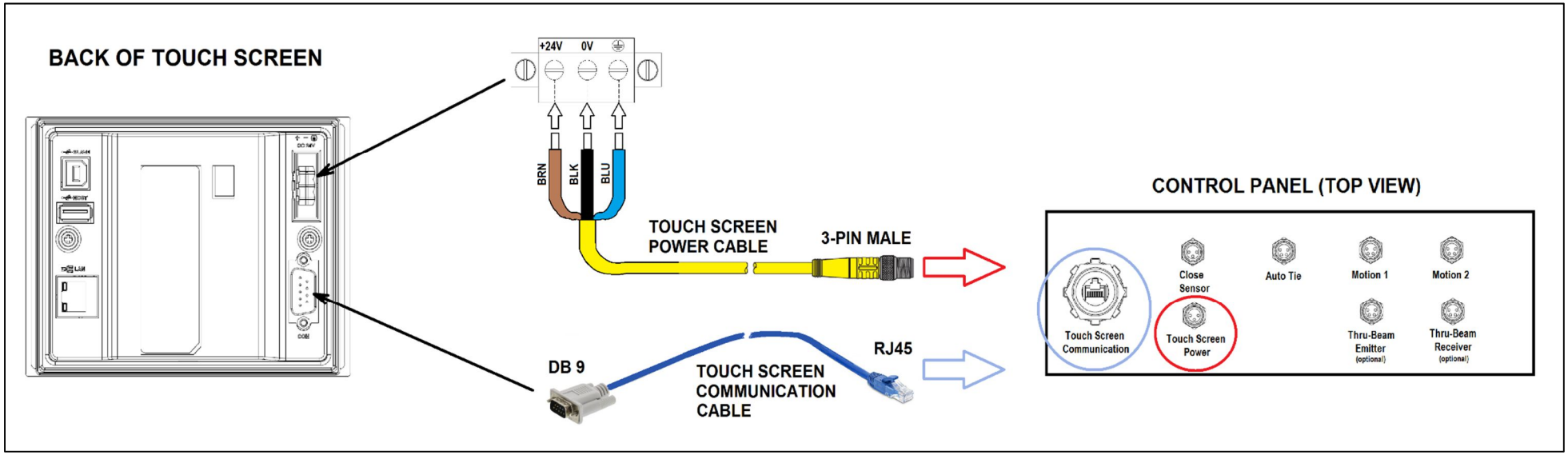
The system is controlled by a high resolution color touch screen. **DO NOT INSTALL THE TOUCH SCREEN UNTIL THE FINISHED WALL & FINISHED FLOOR HAS BEEN COMPLETED, AND THERE IS NO MORE CONSTRUCTION BEING DONE AROUND THE DOOR.**



Wiring of Touch Screen:

Touch Screen Power (located on back of screen) uses a 3-pin cable wired to a Green Quick Disconnect Plug on the back of the touchscreen: Connect the Brown wire to +24V, the Black wire to 0V, and the Blue wire to Earth Ground. The 3-pin male connector plugs and screws into the TOUCH SCREEN POWER on top of the control panel. (INSTALL PLUG WHEN INSTALLING SCREEN)

Touch Screen Communication (located on back of screen) is a DB-9 input, which you plug into the mating connector on the screen and secure it with the two screws on the connector. The opposite end is an RJ45 connector which plugs into the control box.

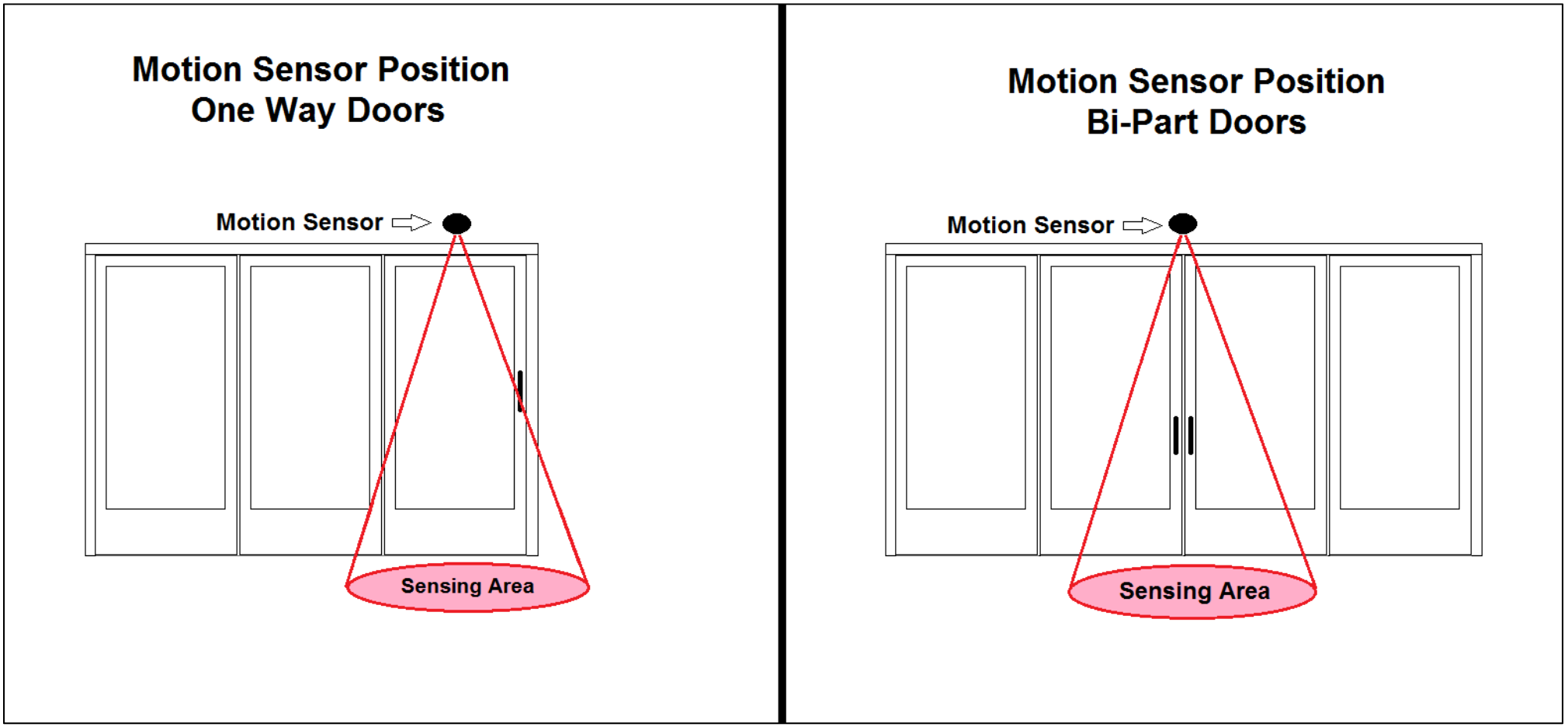


MOTION SENSORS INSTALLATION

Motion Sensors are mounted on the **FINISHED SURFACE** above the door over the close side of the door. There are two Motion Sensors; 1-Interior & 1-Outside**. Make sure the exterior motion sensor is properly protected by a covered patio and is not being exposed to outside elements, like rain & snow**.

LOCATION OF MOTION SENSORS

(The Exterior Motion Sensor is mounted in the same position over the door as the interior sensor but on the **outside finished surface**)



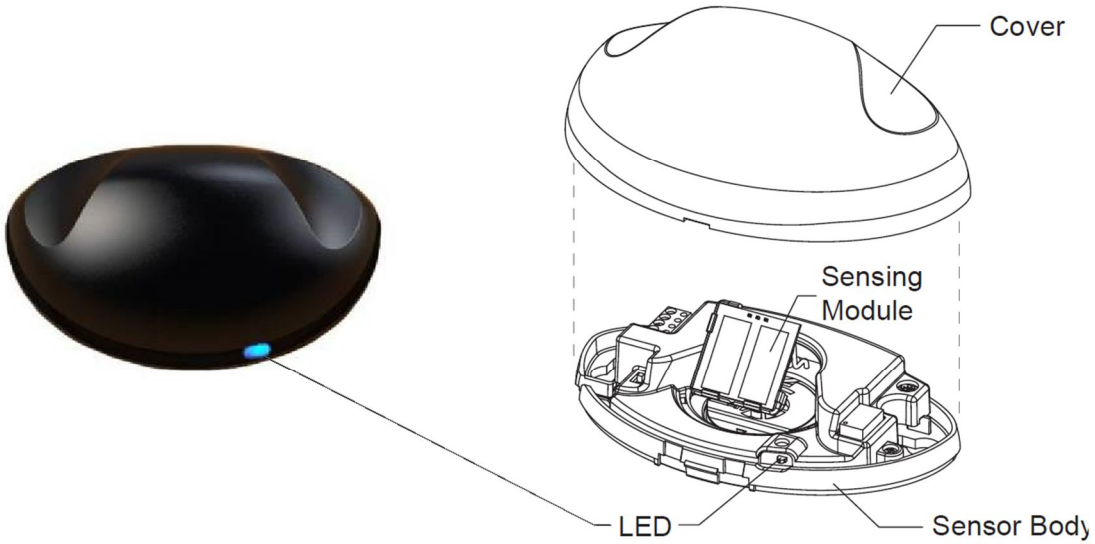
MOTION SENSORS MOUNTING

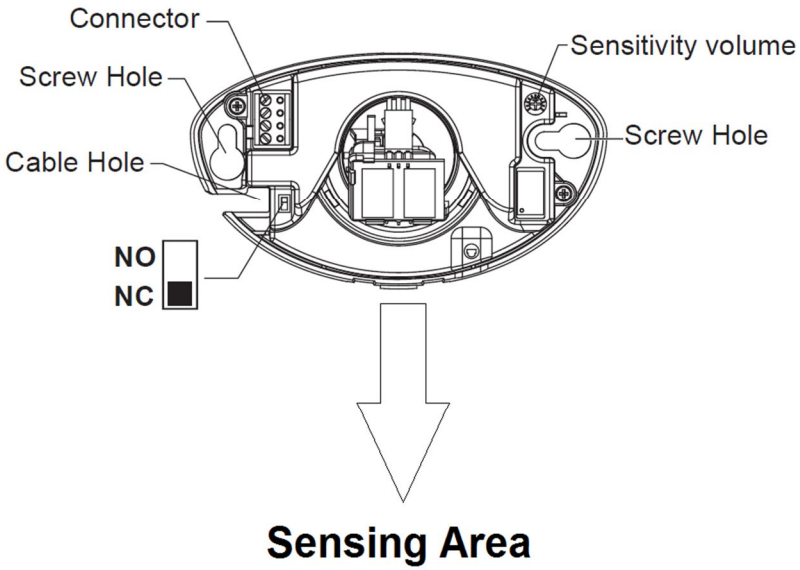
Mounting the Motion Sensors: **(INSTALL ONLY WHEN FINISHED WALLS & FLOOR ARE IN & CONSTRUCTION IS COMPLETE)**

1. Using the template provided, mark the location for the mounting holes and drill two pilot holes.

2. Feed the flying lead end of the 4-Pin Cable through the Cable Hole in the Motion Sensor Body.

3. Mount the motion sensor to the finished surface with the two screws provided. Be sure the LED is pointed down toward the floor. (Repeat the same mounting instructions for the exterior Motion Sensor)



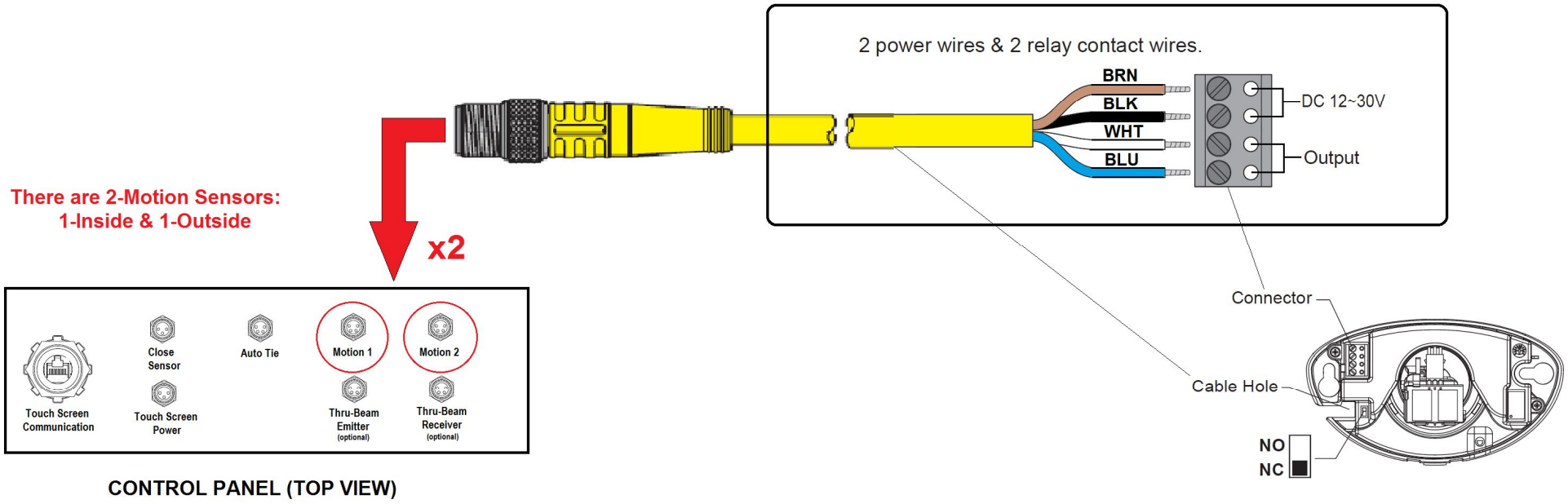


MOTION SENSOR WIRING

Wiring the Motion Sensors:

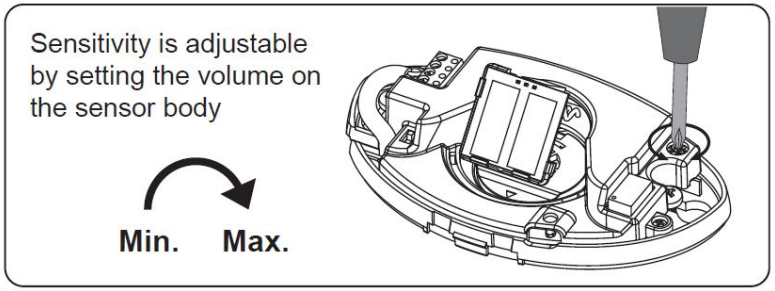
1. Wire the Motion Sensor using the provided 4-Pin Cable. Follow the wiring instructions listed below. Be sure there aren't any wires touching each other when inserting them into the connector on the motion sensor.
2. Plug in and screw down the 4-Pin connector into Motion 1 input on top of the control box for interior motion sensor. Repeat the same wiring directions for the exterior motion sensor using another 4-pin cable (provided) and plug it into and screw down into Motion 2 input on top of the control box.

NOTE: BE SURE THE DIP-SWITCH ON THE MOTION SENSOR IS SET TO THE NC POSITION.

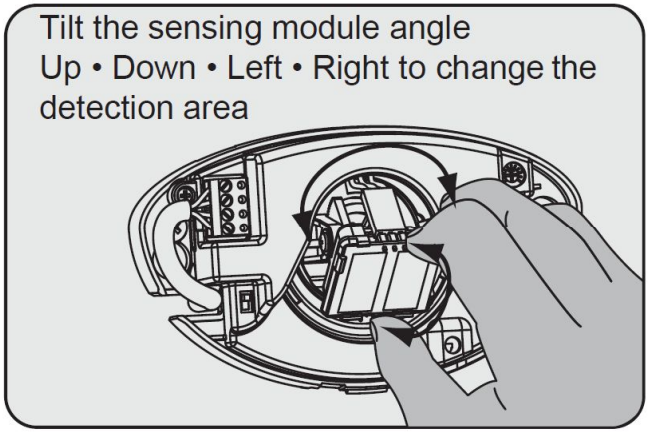


MOTION SENSOR ADJUSTING

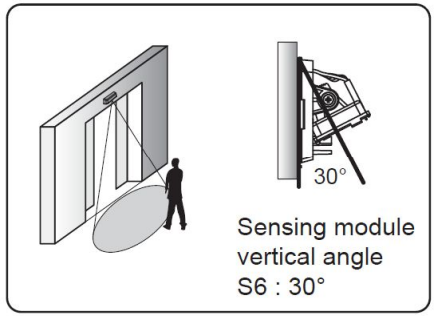
Motion Sensor Sensitivity: Adjust the sensitivity on the motion sensor using a small Philips head screwdriver. **Make sure not to set the sensitivity too high as it can intermittently trip causing the door to not close.**

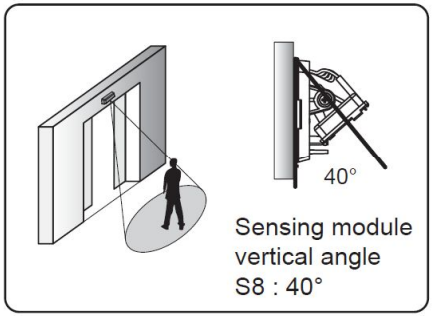


Motion Sensor Adjustment: Adjust the sensing module UP, DOWN, RIGHT, & LEFT to set the sensing area in front of the close area of the door. **MAKE SURE TO TILT THE MODULE UP FAR ENOUGH SO THAT THE MOVING DOOR PANELS ARE NOT DETECTED BY THE MOTION SENSORS.**

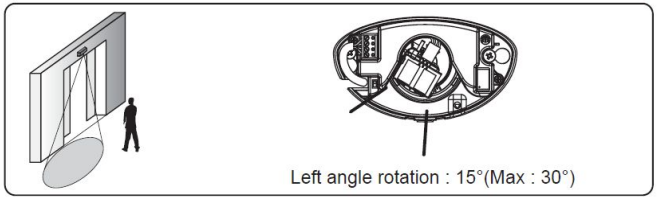


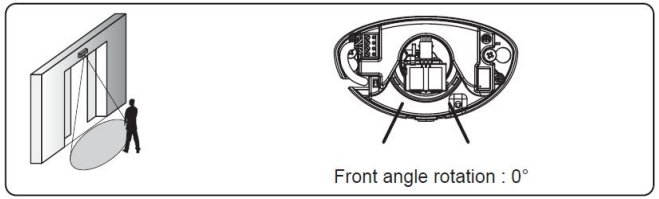
Tilting the sensing module out

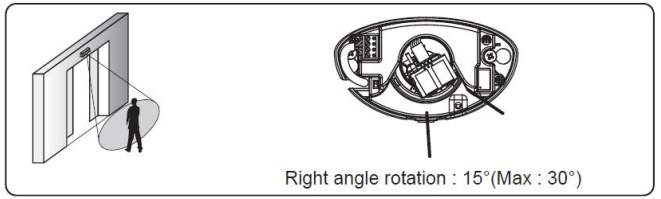




Tilting the sensing module side-to-side



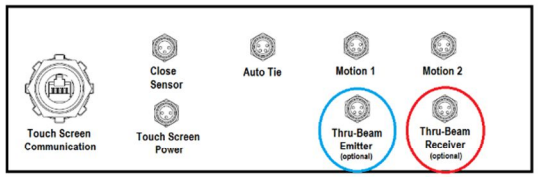




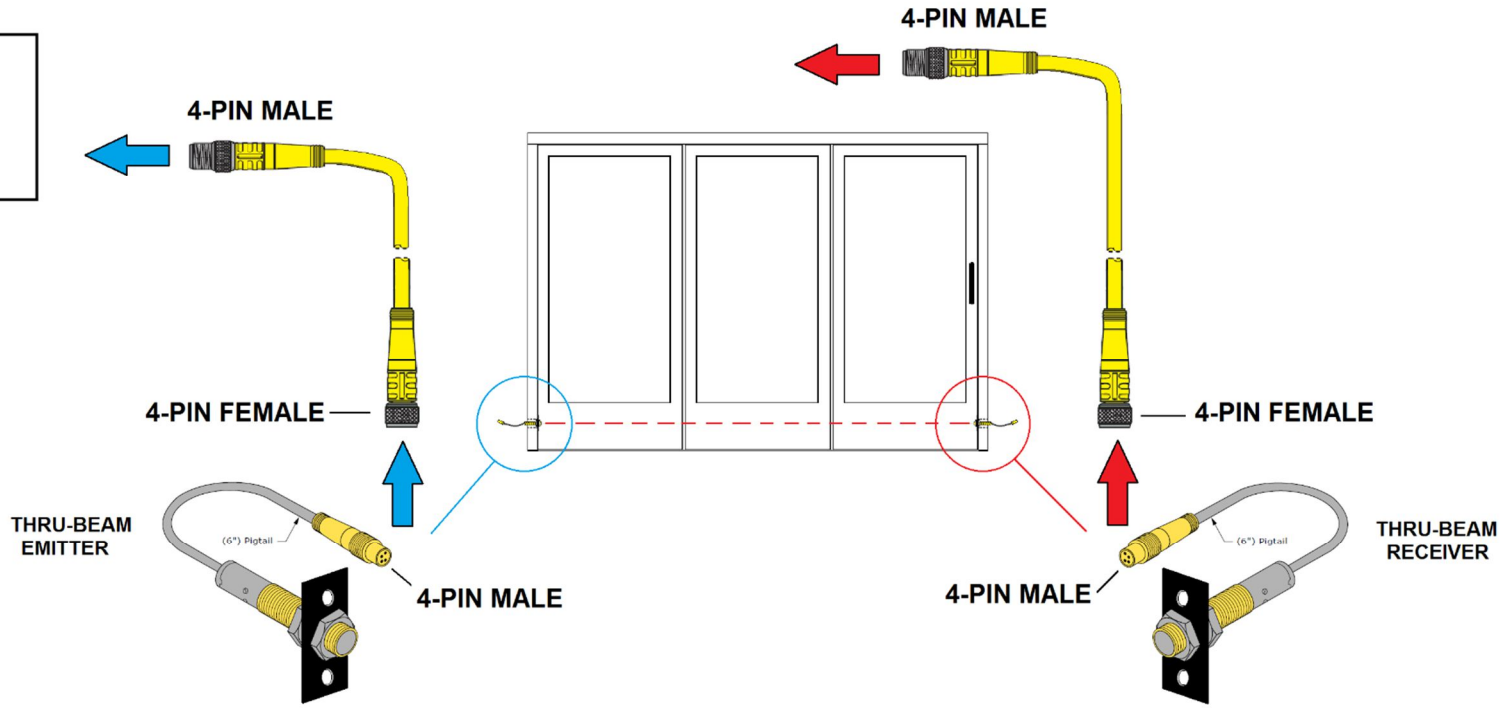
INSTALLING THE THRU-BEAM SENSORS (OPTIONAL)

Mounting the Thru-Beam Sensor: The Thru-Beam Sensor system has an EMITTER, which emits an infrared beam across the opening span of the door to the RECEIVER. It is recommended that you mount the Thru-Beam Sensor system at least 12" above the finished floor. Measure with the tape measure 12" up from the finished floor and put an "X" with your marker. Drill a ¾" diameter hole through the jamb. It is imperative that both of them are aligned on the same plane so that the Emitter's infrared beam "shines" onto the face of the Receiver mounted on opposite side of the door. When they are aligned properly, the LED on the Receiver will turn from RED to GREEN. When an object blocks the beam it will send a signal to the controller that an object is in the way and the door will stop and back up. Secure each side with two #8- ¾" wood screws.

Wiring the Thru-Beam Sensor: Both the Emitter & Receiver have a 4-pin Male, pre-molded cable connector attached to them. Plug the 4-pin male connector into the mating 4-pin female connector on the cable provided, and plug the other end of the mating connector into the control box by plugging it in and screwing it down. MAKE SURE TO LABEL EACH CABLE WITH ITS CORRESPONDING SENSOR and insert it into the correct input.



CONTROL PANEL (TOP VIEW)

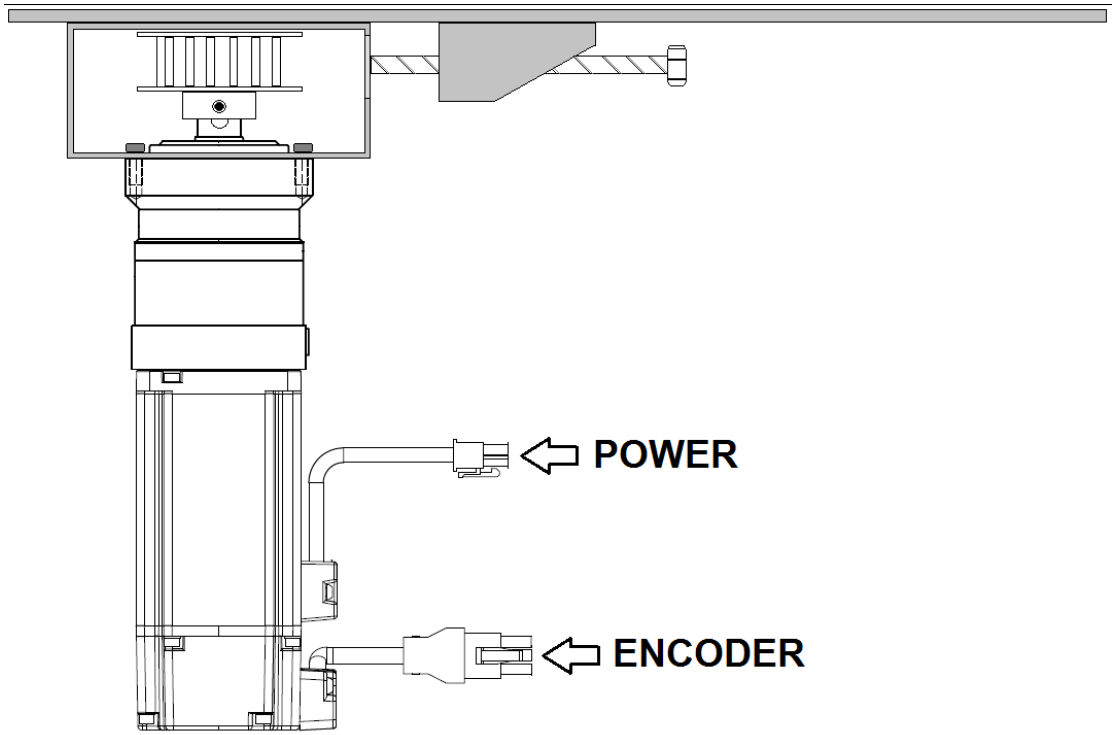


WIRING OF MOTOR

DO NOT PLUG IN MOTOR CABLES UNTIL YOU ARE READY TO POWER ON THE SYSTEM

Wiring the motor is simple.

1. DO NOT PLUG IN THE AC POWER
2. The motor has 2-cables, each with a connector on the end, that are mounted on the body of the motor. One cable is for power and the other cable is for the encoder (see example below).



(NOTE: Each connector should be wrapped with a plastic baggy to protect the internal connections during construction stage).

WIRING OF MOTOR CONTINUED

3. The bottom of the control box has two cables, 14-feet standard length, with connectors that mate to the motor cables, with connectors.
    a. Power Connector: 4-pins
    b. Encoder Connector: 9-pins
4. Snap together the motor power cable connectors (as shown below)
5. Snap together the motor encoder cable connectors (as shown below).