VERTICAL EXPRESS

LD-16 Door Operator

FOR MODERNIZATION

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Safety Precautions

IMPORTANT!

Read this page before any work is performed on elevator equipment. The procedures contained in this manual are intended for the use of qualified elevator personnel. In the interest of your personal safety and the safety of others, do not attempt any procedure that you are not qualified to perform.

All procedures must be accomplished in accordance with the applicable rules in the latest edition of the National Electrical Code, the latest edition of ASME A17.1, and any governing local codes.

Terms in This Manual

CAUTION

CAUTION statements identify conditions that may result in damage to the equipment or other property if improper procedures are followed.

WARNING

WARNING statements identify conditions that may result in personal injury if improper procedures are followed.

General Safety

CAUTION

Before applying power to the controller, check that all manufacturing wire connections are tight on relays, contactors, fuse blocks, resistors, and terminals on boards and DIN rail terminals. Connections loosened during shipment may cause damage or intermittent operation.

Other specific warnings and cautions are found where applicable and do not appear in this summary. See the *Employee Safety and Accident Prevention Program Manual* and the *Elevator Industry Field Employees' Safety Handbook* for electrical equipment safety information on installation and service.

Electrical Safety

All wiring must be in accordance with the National Electrical Code and be consistent with all state and local codes.

Use the Proper Fuse

To avoid fire hazards, use only the correct type fuse, voltage, and current rating. See the job specific drawings sheet (Power Supplies) for fusing information.

Electric shocks can cause personal injury or loss of life. Circuit breakers, switches, and fuses may not disconnect all power to the equipment. Always refer to the wiring diagrams. Whether the AC supply is grounded or not, high voltage will be present at many points.

Electrical Safety
(continued)

Printed Circuit Boards

Printed circuit boards may be damaged if removed or installed in the circuit while applying power. Before installation and/or removing printed circuit boards, secure all power. Always store and ship printed circuit boards in separate static bags.

Mainline Disconnect

Unless otherwise directed, always Turn OFF, Lockout, and Tagout the mainline disconnect to remove power from elevator equipment. Before proceeding, confirm that the equipment is de-energized with a volt meter. Refer to the *Employees' Safety and Accident Prevention Program Manual* for the required procedure.

When Power Is On

To avoid personal injury, do not touch exposed electrical connections or components while power is ON.

Test Equipment Safety

Always refer to manufacturers' instruction book for proper test equipment operation and adjustments.

Buzzer-type continuity testers can damage electronic components. Connection of devices such as voltmeters on certain low level analog circuits may degrade electronic system performance. Always use a voltmeter with a minimum impedance of 1 M Ohm/Volt. A digital voltmeter is recommended.

Mechanical Safety

See the *Employees' Safety and Accident Prevention Program Manual* and the *Elevator Industry Field Employees' Safety Handbook* for mechanical equipment safety information on installation and service.

Power Unit Fluid System

If working on the power unit fluid system, the static car weight is applying pressure to the jack and valve system and this stored pressure is present at the power unit.

Before working on any component of the power unit, do one of the following:

- Manually lower the car onto the buffers to relieve the stored pressure.
- Close the machine room oil line shutoff valve, and then release the power unit pressure by momentarily opening the manual lowering adjuster valve.

Arrival of Equipment

Receiving

Upon arrival of the equipment, inspect it for damage. Promptly report all visible damage to the carrier. All shipping damage claims must be filed with the carrier.

Storing

During storage in a warehouse or on the job site, precautions should be taken to protect the equipment from dust, dirt, moisture, and temperature extremes.

Static Protection Guidelines

IMPORTANT! **Read this page before working with electronic circuit boards.**

Elevator systems use electronic circuit boards to control various functions of the elevator. These boards have components that are extremely sensitive to electrostatic voltage, which can cause board damage or failure.

Proper handling and shipping of boards is important to ensure their reliability and long-term operation. For this reason, manufacturing bases warranty decisions on the guidelines below.

Handling

- Store boards in separate, sealed, anti-static bags until time for installation.
- When handling boards, wear an anti-static wrist strap with ground wire. Acceptable straps are available through local electronics parts suppliers. Typical anti-static wrist straps are intended for applications below 240 VAC.
- Do not place boards on any surface without adequate static protection.
- Handle boards only by their edges using proper anti-static techniques. Avoid touching components, traces, and connectors.
- Take extra care when handling individual components, such as integrated chips, metal oxide semiconductors, and field-effect transistors. These components can be destroyed with as little as 30 volts of electrostatic discharge.

Shipping

- Complete the included board discrepancy sheet.
- Any board returned to manufacturing must be packaged in a closed, sealed anti-static bag designed for the board, and packaged in a sturdy protective shipping carton.
- Clear bubble wrap and Styrofoam are unacceptable packing materials.

Failure to adhere to the above guidelines will void the board warranty.

Access and Egress Procedures

The access and egress procedures that are used entering the hoistway determine whether or not power is needed to perform the required task(s). If not, Turn OFF, Lockout, and Tagout the mainline disconnect.

WARNING **DO NOT stand on the car top emergency access cover.**

Car Top Safety

Safety Precautions When Accessing/Egressing Car Tops

- Before opening the hoistway door, ensure that the correct hoistway has been selected and that the car is at the proper floor (to avoid a fall hazard).
- Access car tops from the top terminal landing whenever possible.
- Never access a hoistway, unless a reliable method of controlling the car has been determined.
- Locate the emergency stop switch.
- Before accessing the car top, place the stop switch in the STOP position, and confirm the proper operation.
- Locate a safe refuge area.
- Always maintain control of the hoistways doors during access/egress.
- Fall protection is to be used when a fall hazard exists. The only exception to this is when routine maintenance is being performed on top of complete, operational elevator cars, Do Not use fall protection where there is a greater risk of entanglement.
- When opening hoistway doors from the car top, do so slowly, so that no one steps in from the landing thinking a car has arrived.
- Observe overhead clearances.
- Use extra care when working on car tops that are curved, domed, or located in unenclosed hoistways.

WARNING **DO NOT turn the following switches to Automatic Operation until the hoistway door interlock is open–and remains open–and the hoistway is empty.**

- When egressing the hoistway/car top, ensure that the stop switch is in the STOP position, and that the inspection switch is on Inspection Operation.

Access and Egress Procedures
(continued)

Safety Precautions When Working on Car Tops

CAUTION **DO NOT attach electrical cords on the car or counterweight ropes.**

- Before beginning work, check the car top for oil or grease, and clean as required.
- Locate the position and counterweights of the car being accessed, as well as any other cars/counterweights in the vicinity. Take appropriate measures to avoid hazards.
- Verify proper operation of the top-of-car inspection operating buttons. Where outlets are provided, use a grounded, portable light with a suitable, non-conductive; or use a grounded lamp guard and reflector.

Pit Safety

Before entering a pit, ensure that every employee is aware of the hazards. Some common hazards are:

- Recognized refuge space
- Inadequate lighting
- Improper access
- Tripping hazards
- Improper use of pit ladders
- Moisture/water/fluid
- Moving equipment

Safety Precautions Before Entering a Pit

Take appropriate steps to minimize the following hazards and any others that are identified, such as:

- Locate the position of the car being accessed, as well as any other cars in the vicinity.
- Before accessing the pit, the car MUST be located high enough to allow the placement of the pit prop pipe stands to be inserted into the buffers.
- Once the pit is initially accessed, the pit props must be installed and the oil line shutoff valve closed to prevent car movement.
- Obtain control of the car.
- Identify a refuge space.
- If movement of the elevator is not needed to complete the work being performed, Turn OFF, Lockout, and Tagout procedures are required.

Access and Egress Procedures
(continued)

Safety Precautions Before Entering a Pit *(continued)*

- If notified by the building owner or representative that the pit and/or hoistway has been classified as a Permit Required Confined Space (this notification could be verbal or the pit/hoistway may be labeled), contact the appropriate person for authorization. In either case, do not enter the pit/hoistway until authorization is received.

Safety Precautions When Working In Pits

- Before entering a pit, test and verify the door lock circuit and stop switch circuit.
- Ensure that all portable lights and tools are connected through a ground fault (GFCI).
- Take care to protect all lighting from damage.
- DO NOT work in a pit with standing water.
- Before climbing, always examine shoes for fluid/grease.
- Use both hands when working with ladders and also when accessing and egressing a pit.
- Be aware of moving equipment (e.g., pump, motors, belts, and sheaves), and ensure that clothing and hands cannot get caught in them.
- Avoid smoking or the use of open flames in the pit.

Overview

Integral Cab Header

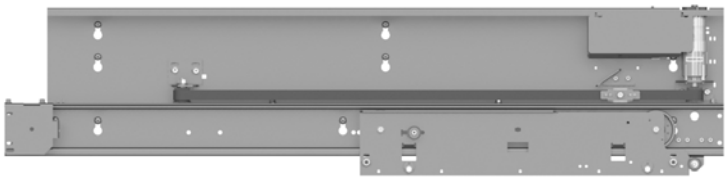
Side-Opening Single-Speed Assembly (3002BG)

Side-Opening Two-Speed Assembly (3002BH)

Center-Opening Single-Speed Assembly (3002BF)

Center-Opening Two-Speed Assembly (3002BJ)

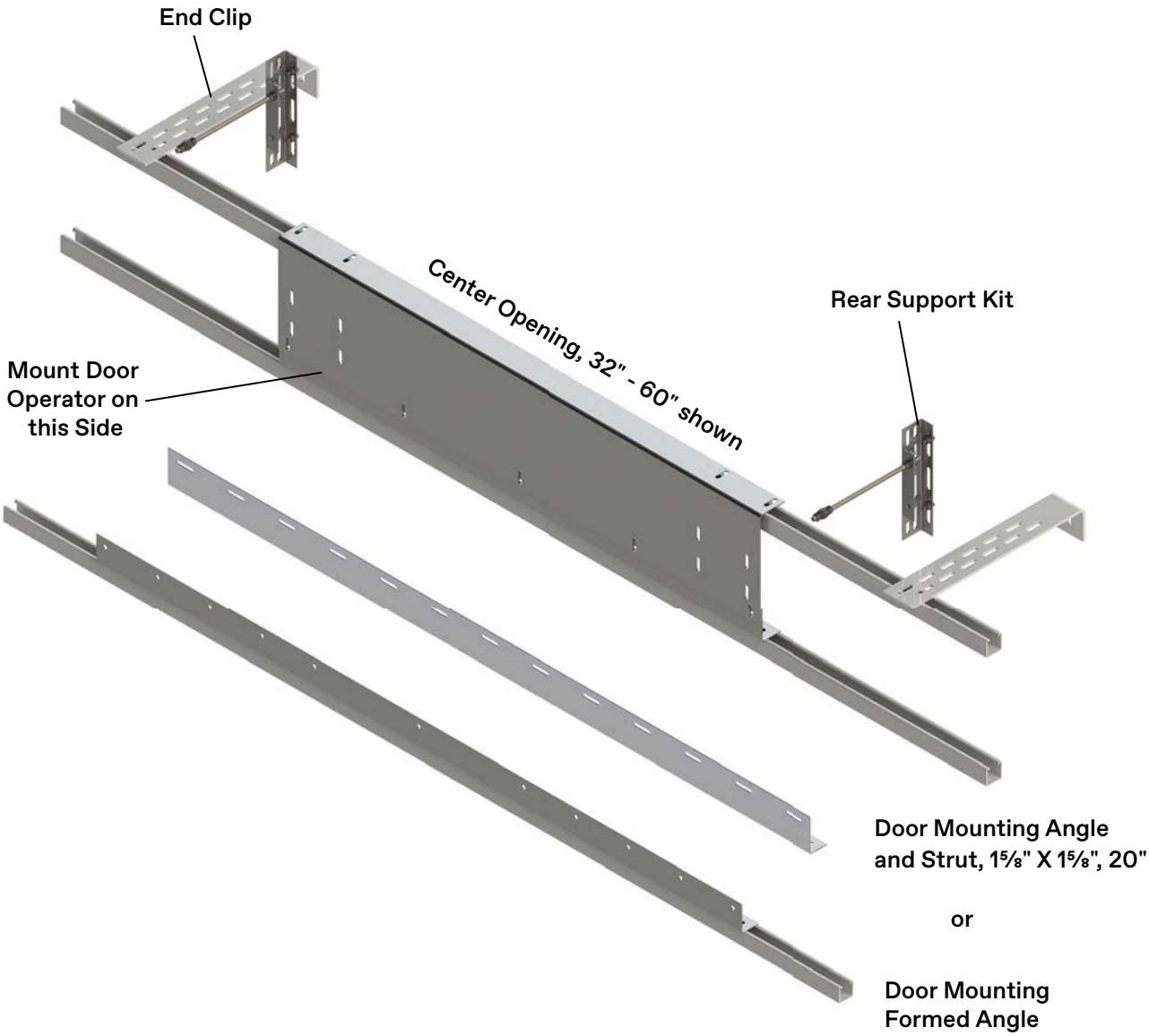
Cimarron Assembly (3002BN)



Overview
(continued)

Existing Cab Header

See Universal MOD Kit (200CJD) Installation on page 28.



To obtain clearance with existing equipment, use the proper door angle for the job installation.

Performance Specifications

	MIDI+	SUPRA
	All NI, SS, CO, and 2SPD with elevator speed <=200 fpm. and elevator travel <=100 feet.	• All NI with elevator travel >100 feet or elevator speed >200 fpm. • All 2SCO. • All MOD operators with tracks/hangers.
Motor Characteristics	Three-phase Permanent Magnet Synchronous Motor	
Drive	V3F-Converter (vector control)	
Average power consumption	92W	170W
Maximum momentary power consumption	475W	900W
Power supply	Universal 115-230V+20% 50/60Hz	
Protection class	IP20	
Storage temperature	–45° to 70° C	
Operating ambient temperature	–20° to 50° C	
Humidity range	98% maximum 40°C	
Regulations and codes	ASME A17.1/CSA B44, EN81	
Electromagnetic compatibility	Immunity and emission protection EN12015/16	
Maximum movable masses	600 lbs. (270 kg)	1322 lbs. (600 kg)
Estimated lifetime	More than 3 million cycles	More than 5 million cycles
Safety device for cab egress	Car door interlock	
Door operator noise level* *sound levels in a stopped car	Average 55 dBA Maximum 60 dBA	Average 50 dBA Maximum 55 dBA
Maximum door speed capability* *actual top door speed for a specific installation may be different depending on door mass or door travel.	2.16 ft/sec	2.96 ft/sec
Reopening device* *on modernization installations: door reversal could be greater if the door edge bypasses the door control board and is connected to the elevator controller.	Safety light edge with door reversal capability less than $2^{1}/_{2}$"	

Motor Specifications

	Unit of Measure	MIDI PMSM	SUPRA PMSM
Motor Type	—	57BL74	M763
Operation Mode	—	S1	S1
Insulation Class	—	B	B
Protection Degree	—	IP40	IP40 (IP54 opt.)
Storage Temperature	°C	-45 to +70	-45 to +70
Operating Temperature	°C	-20 to +65	-25 to +55
Humidity	%RH	93% @ 40° C	98% @ 40° C
Noise Level	dBA	50 avg./55 max.	45 avg./50 max.
Door Cycles, Lifetime	—	7,000,000	10,000,000
Hours, Lifetime	Hours	12,000	20,000
NR Pole	—	4	4
Rated Voltage	V	36	42
Rated Speed	rpm	4000	3300
Rated Torque	Nm	0.22	0.41
Nominal Current	A	3.45	4
Rated Output Power	W	92	142
Efficiency	%	—	84.5
Overload (Imax/Irated)	—	5	7
DC-Link Voltage	V	18 to 42	18 to 75
Rotor Inertia	gcm^2	119	760
Max. Cogging Force	Ncm	< 85, 9	< 85, 9
Cogging Torque (Motor Only)	Ncm	< 4, 5	< 4, 5
Gear Rate	—	8.2	6.43
Tooth Belt Diameter	mm	38.2	38.2
Tooth Belt Tension	N	800	1,100
Duty	Starts/Hour	250	250
Top Speed	ft/sec	1.96	2.96

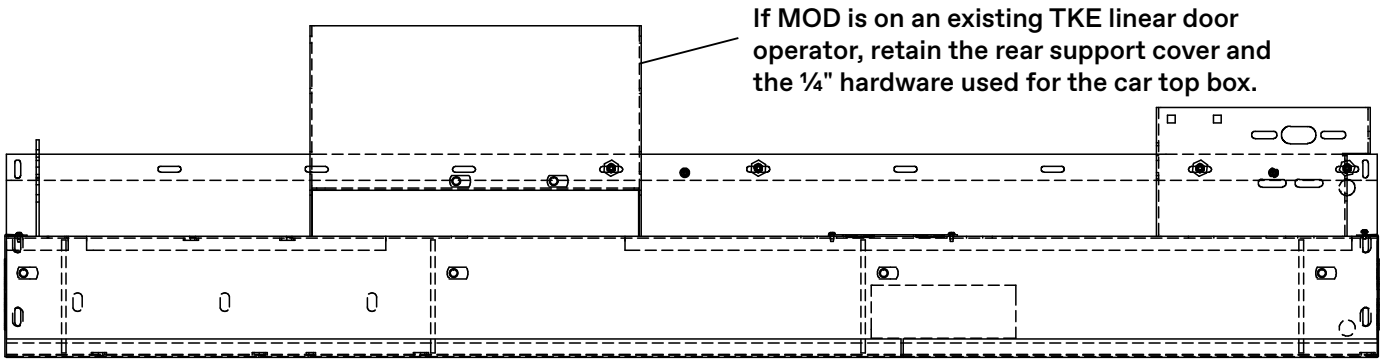
Required Tools and Materials

- Ratchet wrenches: 13 mm, 17 mm, $^{1}/_{16}$", $^{3}/_{4}$"
- $^{3}/_{8}$" ratchet & extension
- Sockets: 13 mm, 14 mm, 15 mm,$^{1}/_{64}$", $^{3}/_{4}$"
- T-handle (Allen keys): 4 mm, 5 mm, 6 mm, $^{3}/_{16}$"
- $^{3}/_{8}$" socketed-head Allen key
- Flat & Phillips screwdrivers
- Torpedo or tool box level
- Tape measure or folding ruler
- Door pressure gauge
- $^{1}/_{4}$" cordless impact with 12'' extension
- Sawsall with metal cutting blades (MOD applications)
- Pallet jack
- Hand trucks
- Tin snips
- Pry bar
- Claw hammer
- Tri square
- Small plumb bob
- Large channel locks
- $^{5}/_{16}$" nut driver for impact
- $^{3}/_{8}$" impact gun adapter
- Wire strippers
- Scribe
- Electrical tape
- Small straight slot screwdriver (plug wiring)
- Runbug
- Grinder
- Hack saw

Single-Speed Side-Opening Doors Integral Cab Header Installation

Other Installation Configurations			Starts on
Single-Speed Center-Opening Doors Integral Cab Header			page 21
Two-Speed Side-Opening Doors Integral Cab Header			page 15
Existing Cab	Not Integral Cab Header	“Universal MOD Kit (200CJD)”	page 28
		“Separate Header Installation”	page 35

1. Ensure that the car will run on runbug operation.
2. Remove the doors and the related door components and keep these items if they will be reused. Keep all removed components until elevator is running. See Figure 1.



- Header shown is for a TKE linear operator, 42'' opening width.
- Headers for HD and other widths will be different.

Figure 1 - Header Modifications

3. Remove the existing door operator wiring harness and the Car Top Station (CTS).
4. Remove all door operator parts and components that interfere with new equipment.
5. Remove part of the header (for clearance of the mounting angles) so that it is even with the top of the header. See Figure 2 on page 9.
6. Use the included hardware to install the mounting angles. See Figure 3 on page 9 for Dimension C.

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

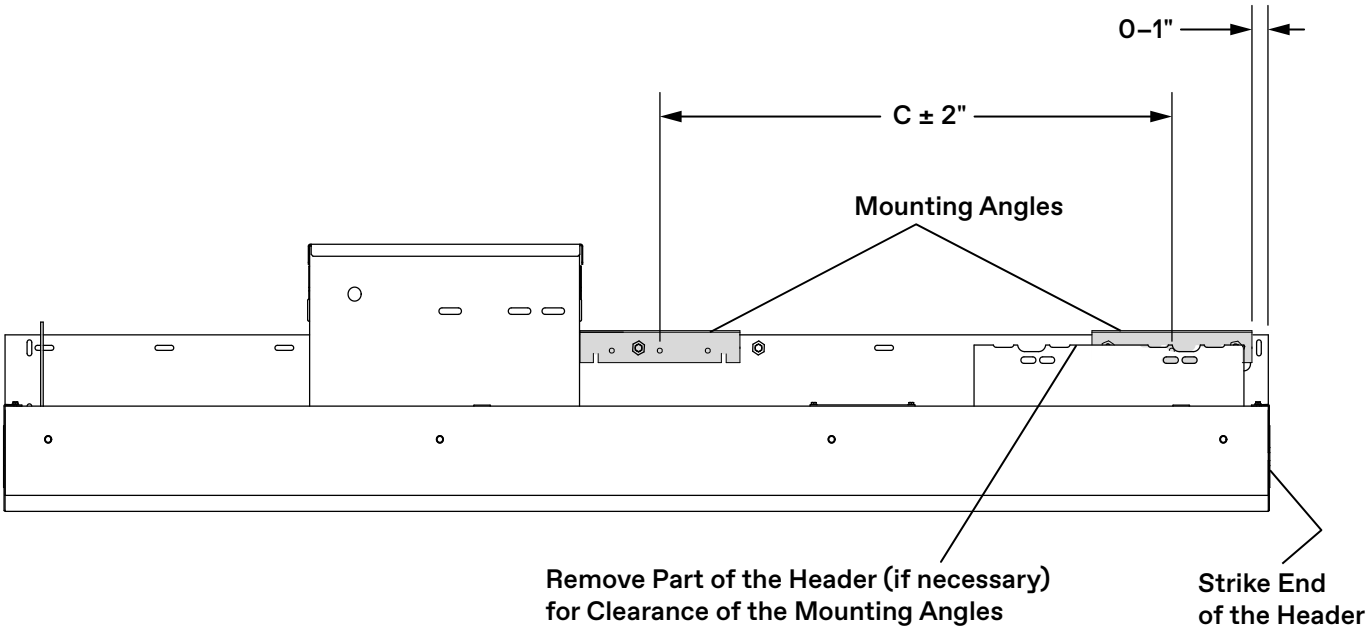
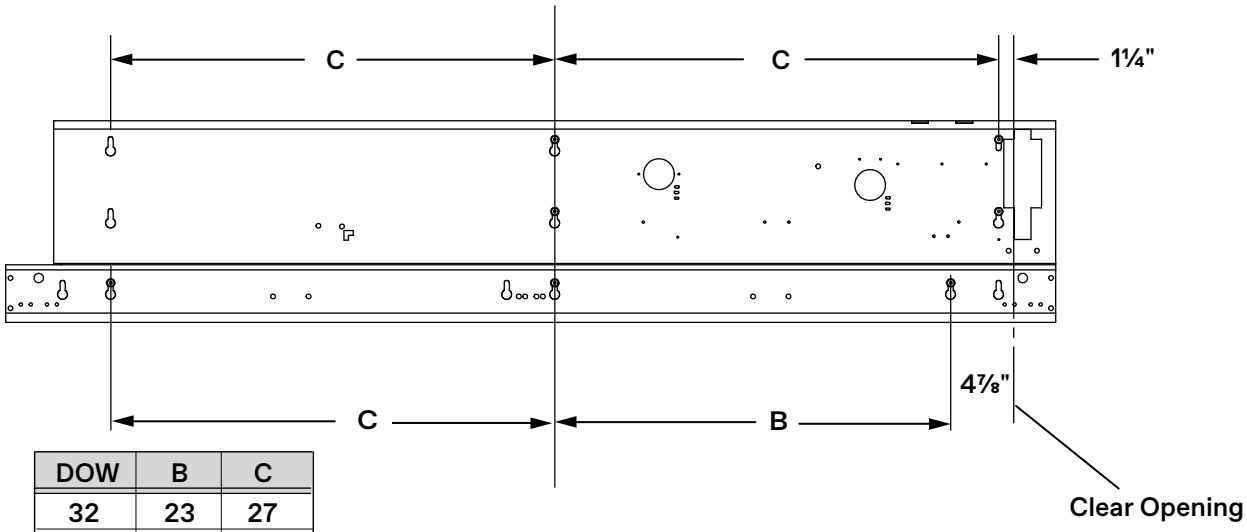


Figure 2 - Modify Header and Install Mounting Angles



DOW	B	C
32	23	27
34	25	29
36	27	31
38	29	33
40	31	35
42	33	37
44	35	39
46	37	41
48	39	43
Dimension C = ±2" (all dim. in inches)		

Primary location for keyslots used to brace the door operator back to the cab start at 1¼" from the clear opening, and spaced at Dimension C inches. See Chart for Dimension C.

(right-hand shown; left-hand opposite)

Figure 3 - Relationship of Keyslots and Door Operator Machine to Clear Opening

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

7. Use the existing door track holes to align the adapter angle. See Figure 4 below and Figure 5 on page 11.

8. Use included hardware to attach the adapter angle to the header, but do not tighten; leave hardware loose to allow adapter alignment with track keyslots.
   a. Use low profile bolts at the following locations:

      When looking from the strike end of the side opening,

      - Small Hole/Slot = Right-Hand Openings
      - No Hole/Slot = Left-Hand Openings

   b. Use push nuts to help position the low profile bolts.

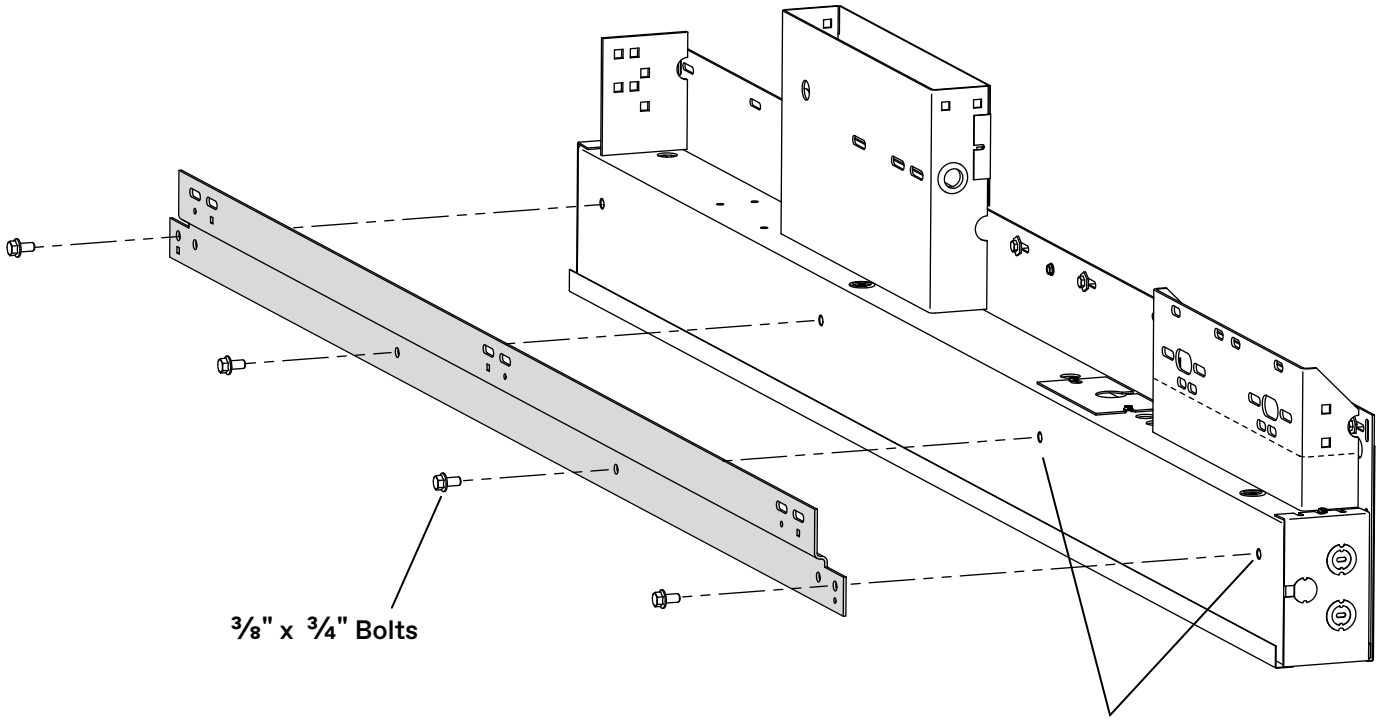
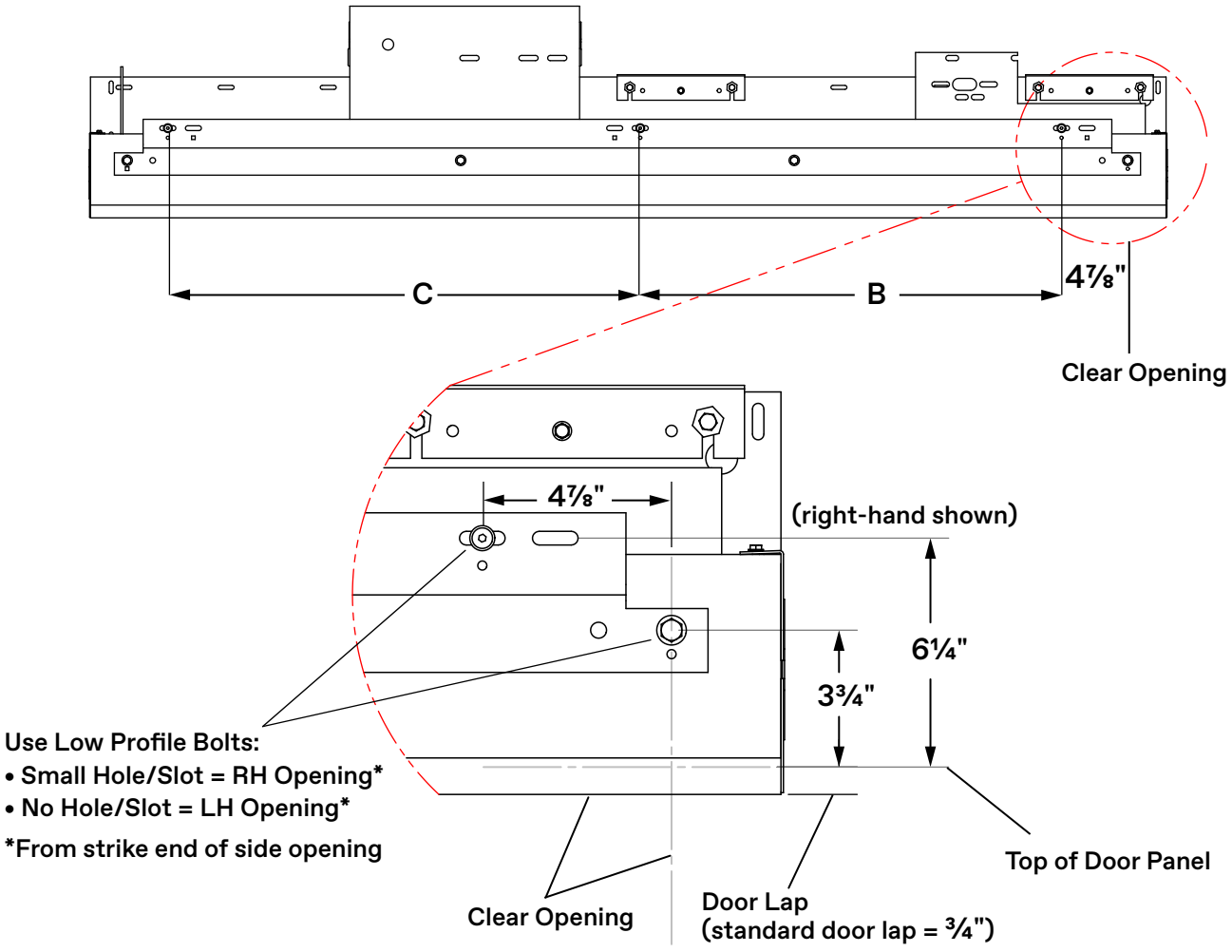


Figure 4 - Adapter Angle Installation (1 of 2)

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)



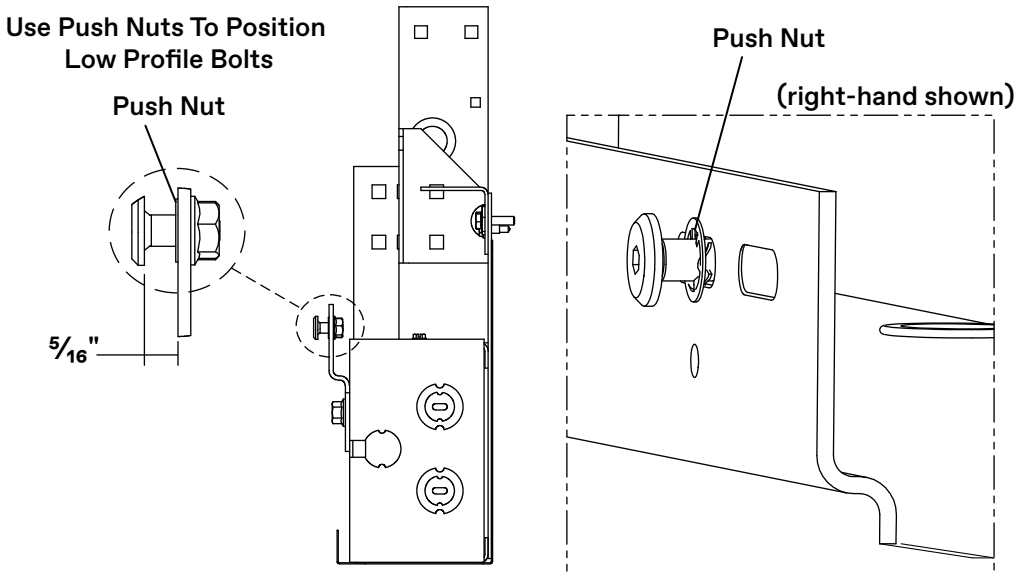


Figure 5 - Adapter Angle Installation (2 of 2)

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

9. Route the door operator harness to the Car Operating Panel (COP).
See Maintenance on page 82 and the Generic Wiring Diagrams on page A-16.

- Do not install the plugs on the operator door card or on the COP.
- Before moving the car, replace the door card cover.

10. Install the door operator to the adapter angle. See Figure 6 below and Figure 7 on page 13.
    a. Align the door track bolts with the keyslots in the track, and attach the door operator to the adapter.
    b. Verify that the door operator is level.
    c. Verify that there is $5^{1}/_{4}$" between the clear opening and the B dimension.
    d. Use a $^{3}/_{16}$" Allen wrench to tighten down the bolts.
11. Install the door operator mounting angles.
12. Add bolts to brace the cab to the door operator back.
13. Check for plumb.
14. Verify that the track-to-sill is parallel.

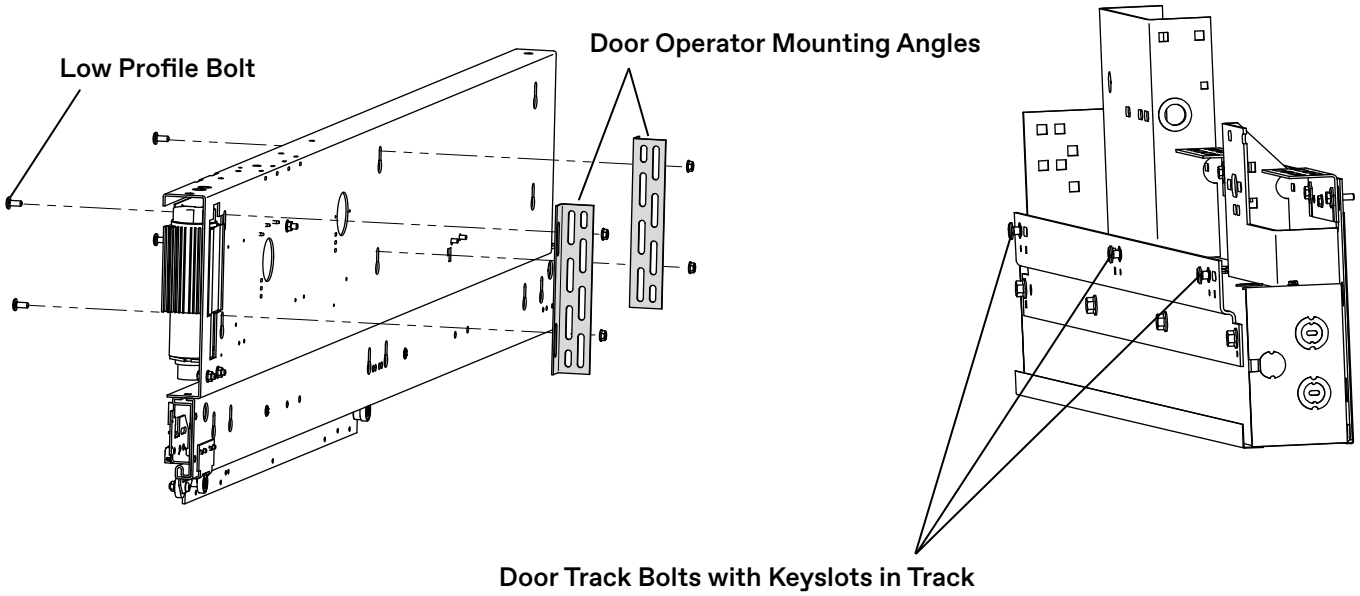


Figure 6 - Door Operator Machine Installation (1 of 2)

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

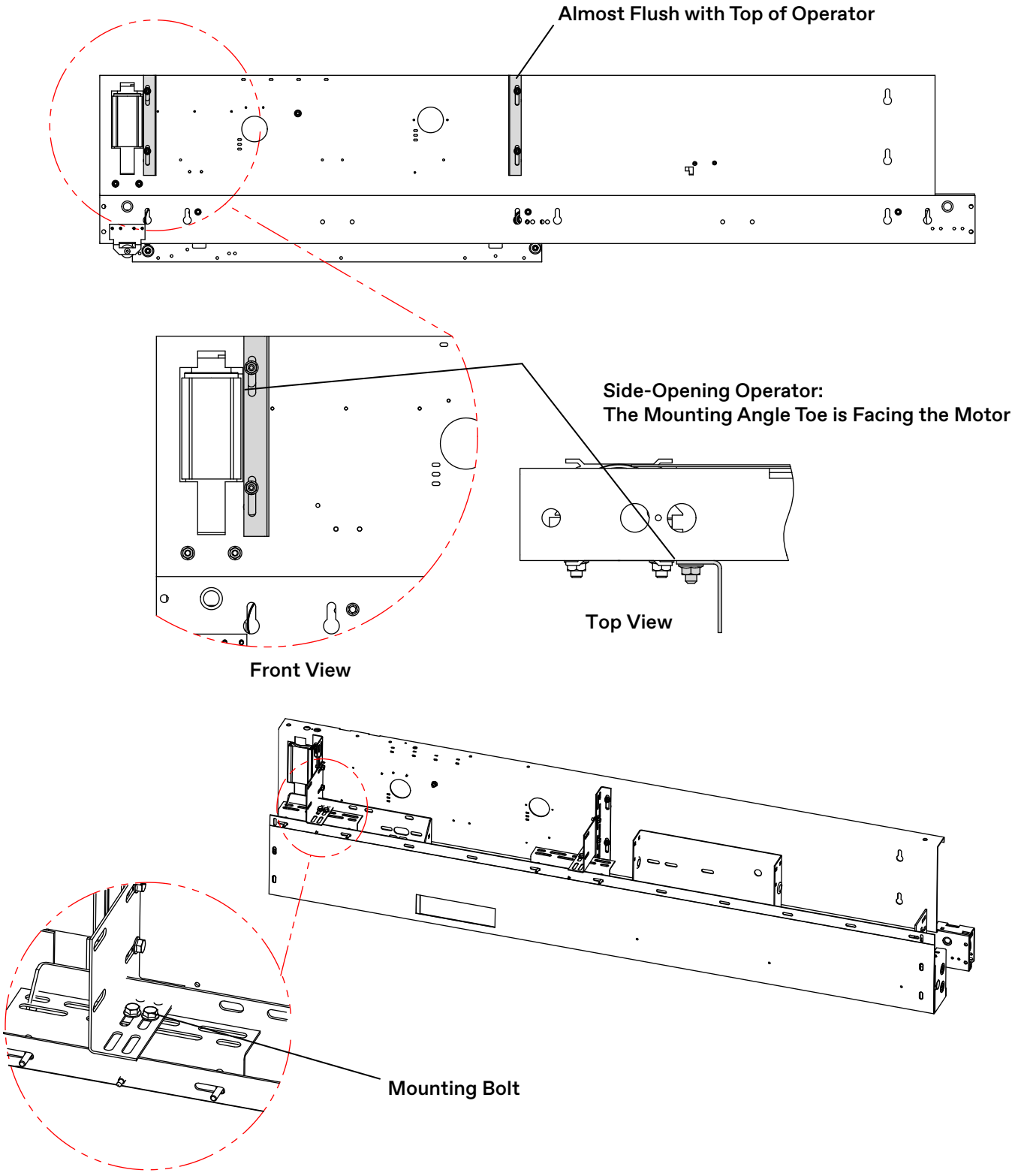


Figure 7 - Door Operator Machine Installation (2 of 2)

Single-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

15. Use a 4 mm Allen wrench to remove the door controller cover, and remove the rubber grommet from the operator box.

16. Install the junction box to the door operator. See Figure 8.

17. Route the wiring harness through the $1^1/_2$" flex conduit, and then install the $1^1/_2$" flex and straight connectors.

18. Install the wiring harnesses through the flex conduit; insert the OPERF or OPERR plug into the COP harness end.

19. Install the CTS to the top of the junction box. See Figure 8.

20. Before routing, cable tie the CTS wiring.

21. Proceed to New/Existing Car Door Panel Installation on page 44.

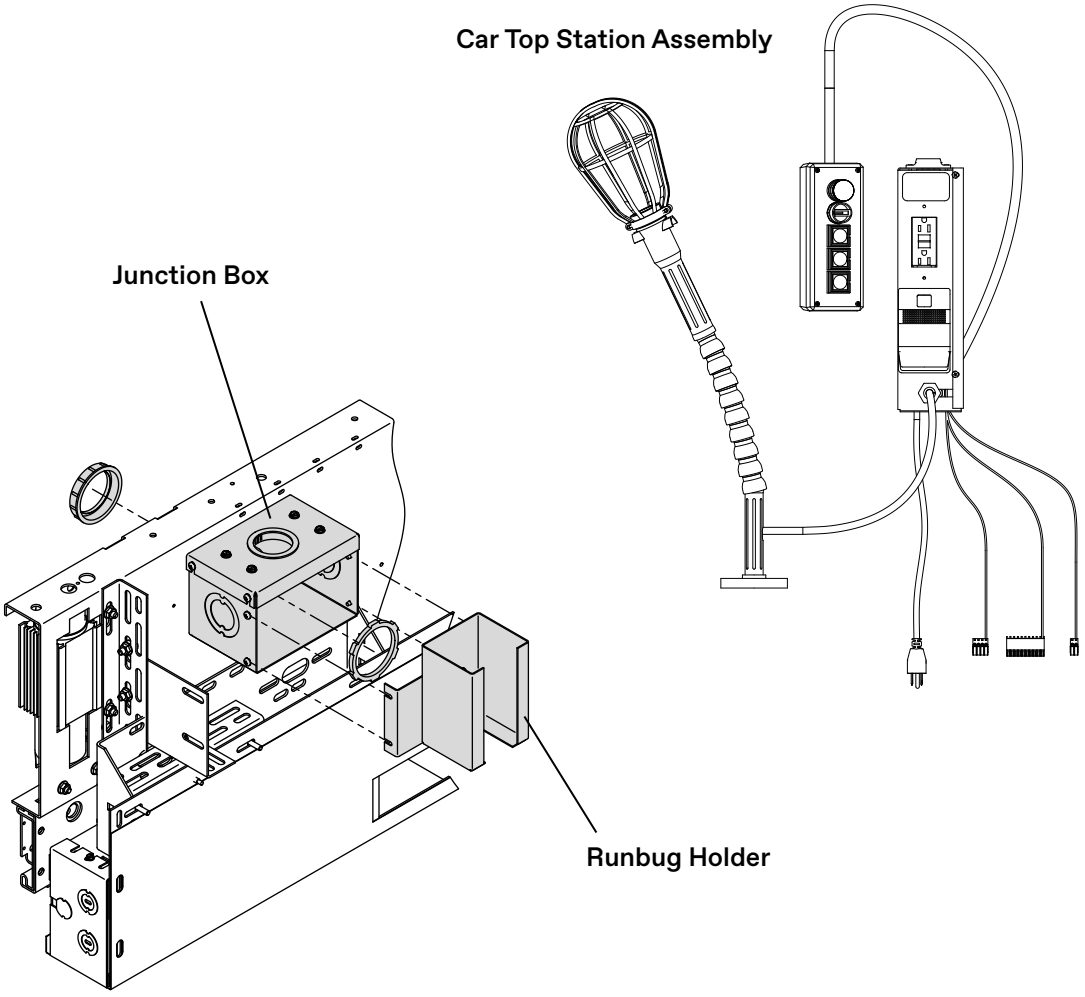
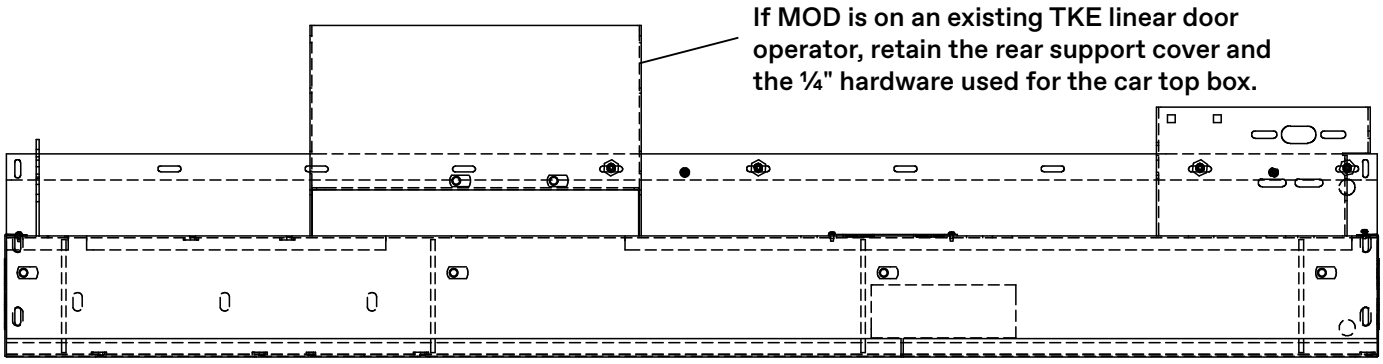


Figure 8 - Car Top Station Installation

Two-Speed Side-Opening Doors Integral Cab Header Installation

Other Installation Configurations			Starts on
Single-Speed Side-Opening Doors Integral Cab Header			page 8
Single-Speed Center-Opening Doors Integral Cab Header			page 21
Existing Cab	Not Integral Cab Header	“Universal MOD Kit (200CJD)”	page 28
		“Separate Header Installation”	page 35

1. Ensure that the car will run on runbug operation.
2. Remove the doors and related door components and keep these items if they will be reused. Keep all removed components until the elevator is running. See Figure 9.



- Header shown is for a TKE linear operator, 42" opening width.
- Headers for HD and other widths will be different.

Figure 9 - Header Modifications

3. Remove existing door operator wiring harness and Car Top Station (CTS).
4. Remove all door operator parts and components that interfere with new equipment.
5. Remove part of the header (for clearance with mounting angles) so that it is even with the top of the header. See Figure 10 on page 16.
6. Use the included hardware to install the mounting angles. See Figure 11 on page 16 for Dimension C.

Two-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

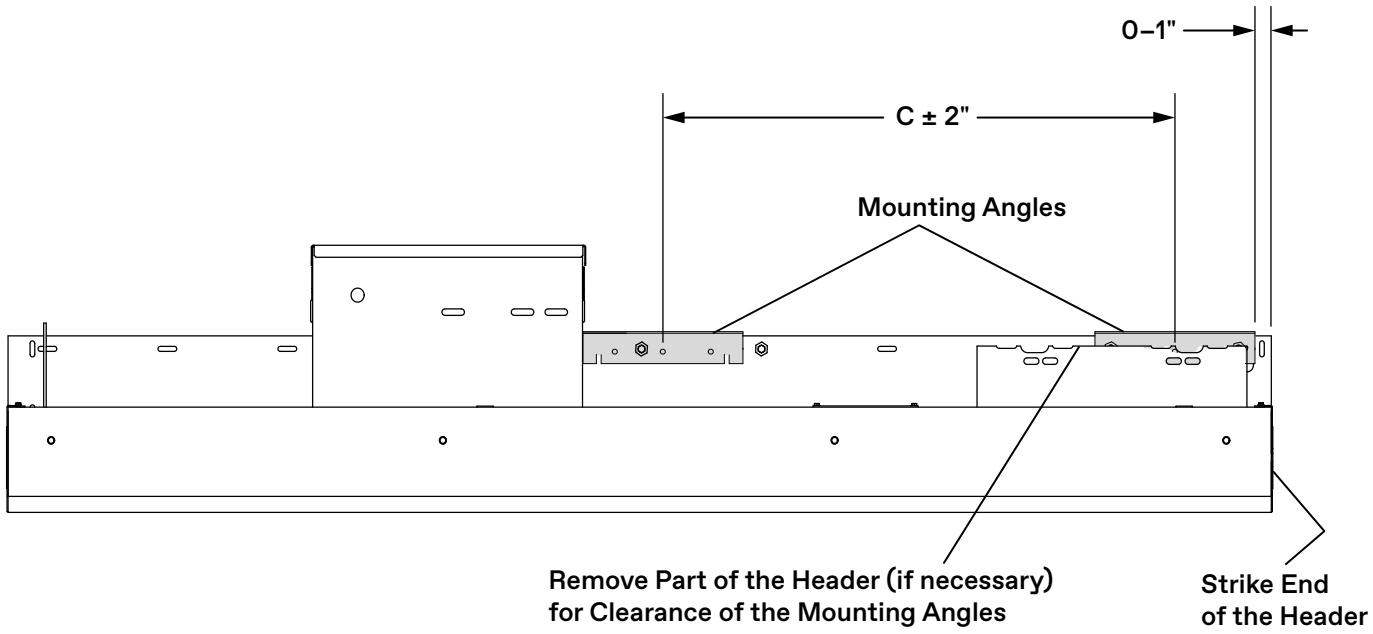
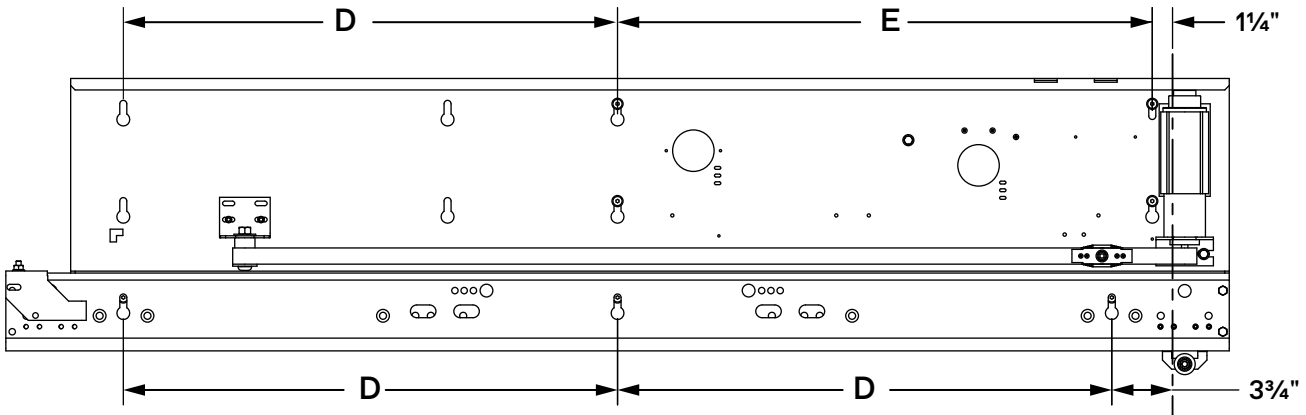


Figure 10 - Modify Header and Install Mounting Angles



2SP Clear Opening	D	E
36	24	21½
38	25½	23
40	27	24½
42	28½	26
44	30	27½
46	31½	29
48	33	30½
50	34½	32
52	36	33½

2SP Clear Opening	D	E
54	37½	35
56	39	36½
58	40½	38
60	42	39½
62	43½	41
64	45	42½
66	46½	44
68	48	45½
70	49½	47
72	51	48½

(all dim. in inches)

Figure 11 - Relationship of Keyslots and Door Operator Machine to Clear Opening

Two-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

7. Use the existing door track holes to align the adapter angle. See Figure 12 below and Figure 13 on page 18.

8. Use included hardware to attach the adapter angle to the header, but do not tighten; leave hardware loose to allow adapter alignment with track keyslots.
   a. Use low profile bolts at the following locations:

      When looking from the strike end of the side opening,

      - Small Hole/Slot = Right-Hand Openings
      - No Hole/Slot = Left-Hand Openings

   b. Use push nuts to help position the low profile bolts.

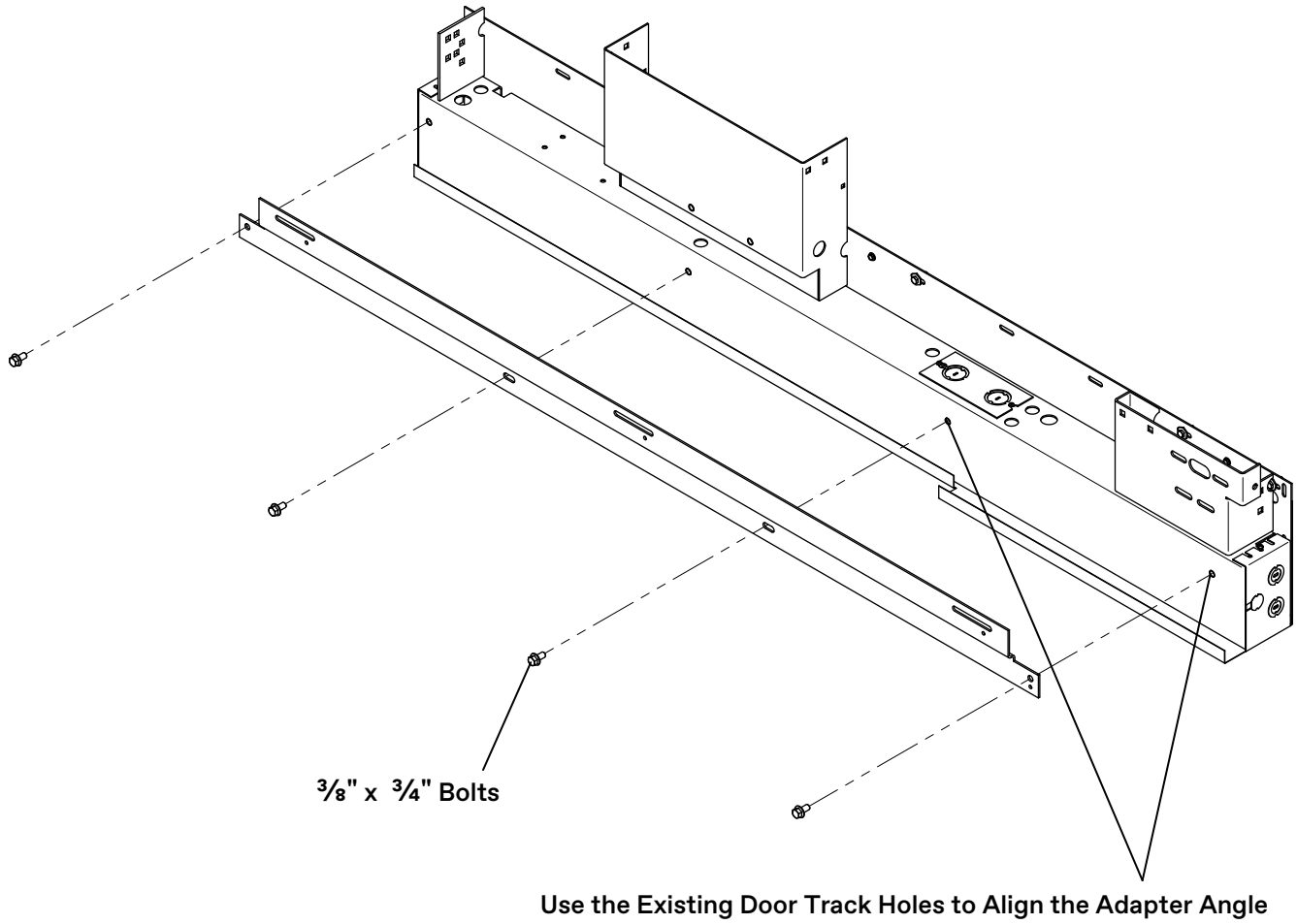


Figure 12 - Adapter Angle Installation (1 of 3)

Two-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

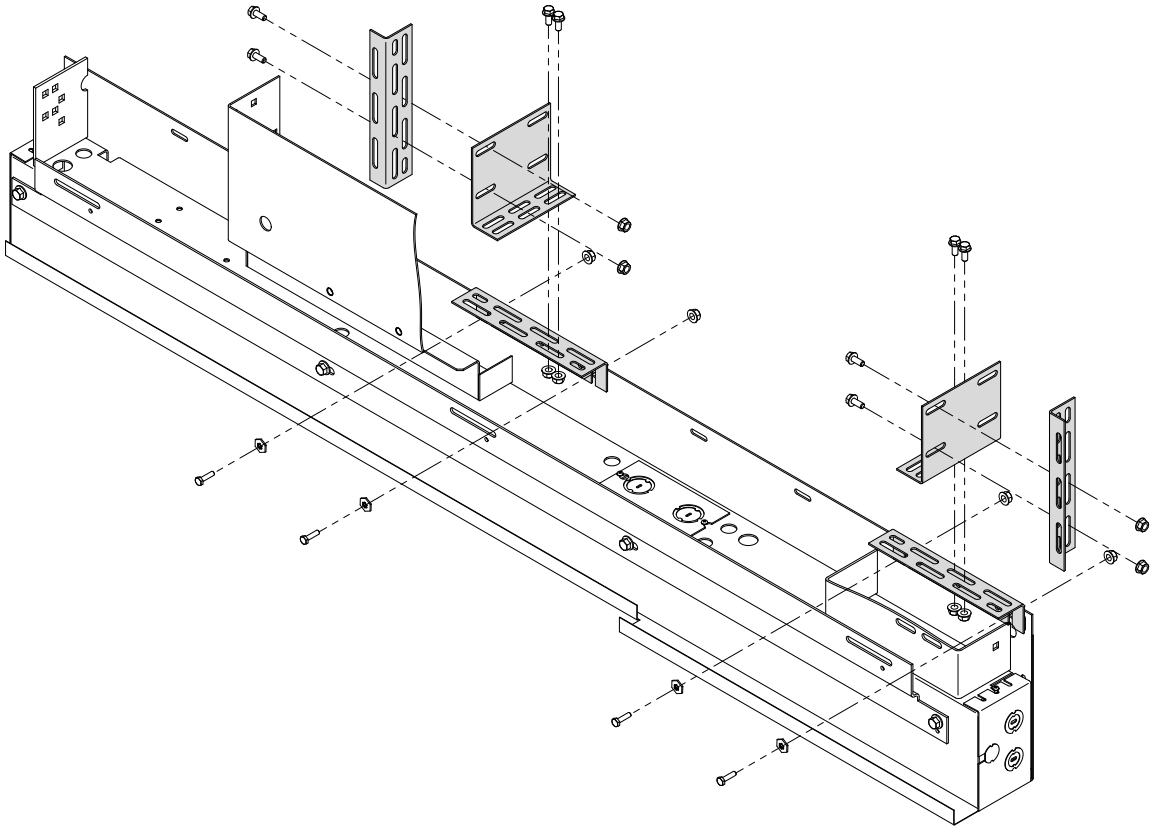


Figure 13 - Adapter Angle Installation (2 of 3)

9. Route the door operator harness to the Car Operating Panel (COP).
See Maintenance on page 82 and the Generic Wiring Diagrams on page A-16.

- Do not install the plugs on the operator door card or on the COP.
- Before moving the car, replace the door card cover.

Two-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

10. Install the door operator to the adapter angle. See Figure 14 on page 19.
    a. Align the door track bolts with the keyslots in the track, and attach the door operator to the adapter.
    b. Verify that the door operator is level.
    c. Verify that there is $5^{1}/_{4}$" between the clear opening and the B dimension.
    d. Use a $^{3}/_{16}$" Allen wrench to tighten down the bolts.
11. Install the door operator mounting angles.
12. Add bolts to brace the cab to the door operator back.
13. Check for plumb.
14. Verify that the track to sill is parallel.

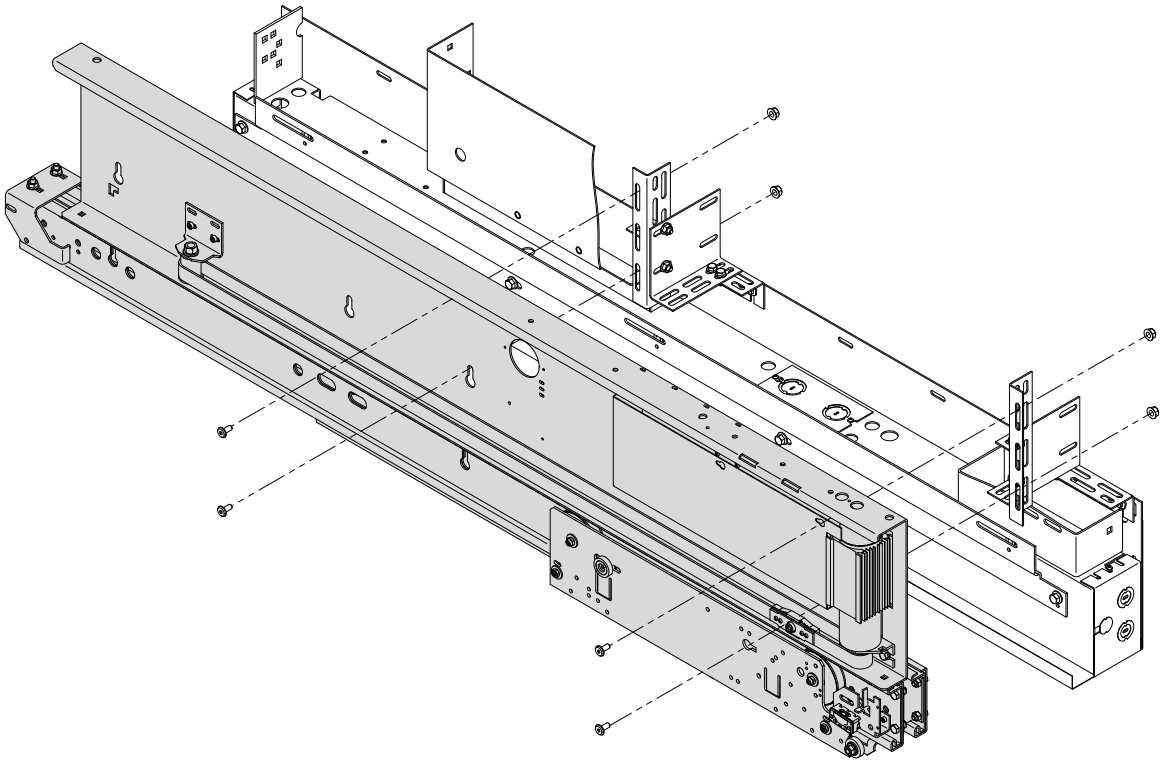


Figure 14 - Adapter Angle Installation (3 of 3)

Two-Speed Side-Opening Doors Integral Cab Header Installation
(continued)

15. Use a 4 mm Allen wrench to remove the door controller cover, and remove the rubber grommet from the operator box.

16. Install the junction box to the door operator. See Figure 15.

17. Route the wiring harness through the $1^1/_2$" flex conduit, and then install the $1^1/_2$" flex and straight connectors.

18. Install the wiring harnesses through the flex conduit; insert the OPERF or OPERR plug into the COP harness end.

19. Install the CTS to the top of the junction box. See Figure 15.

20. Before routing, cable tie the CTS wiring.

21. Proceed to New/Existing Car Door Panel Installation on page 44.

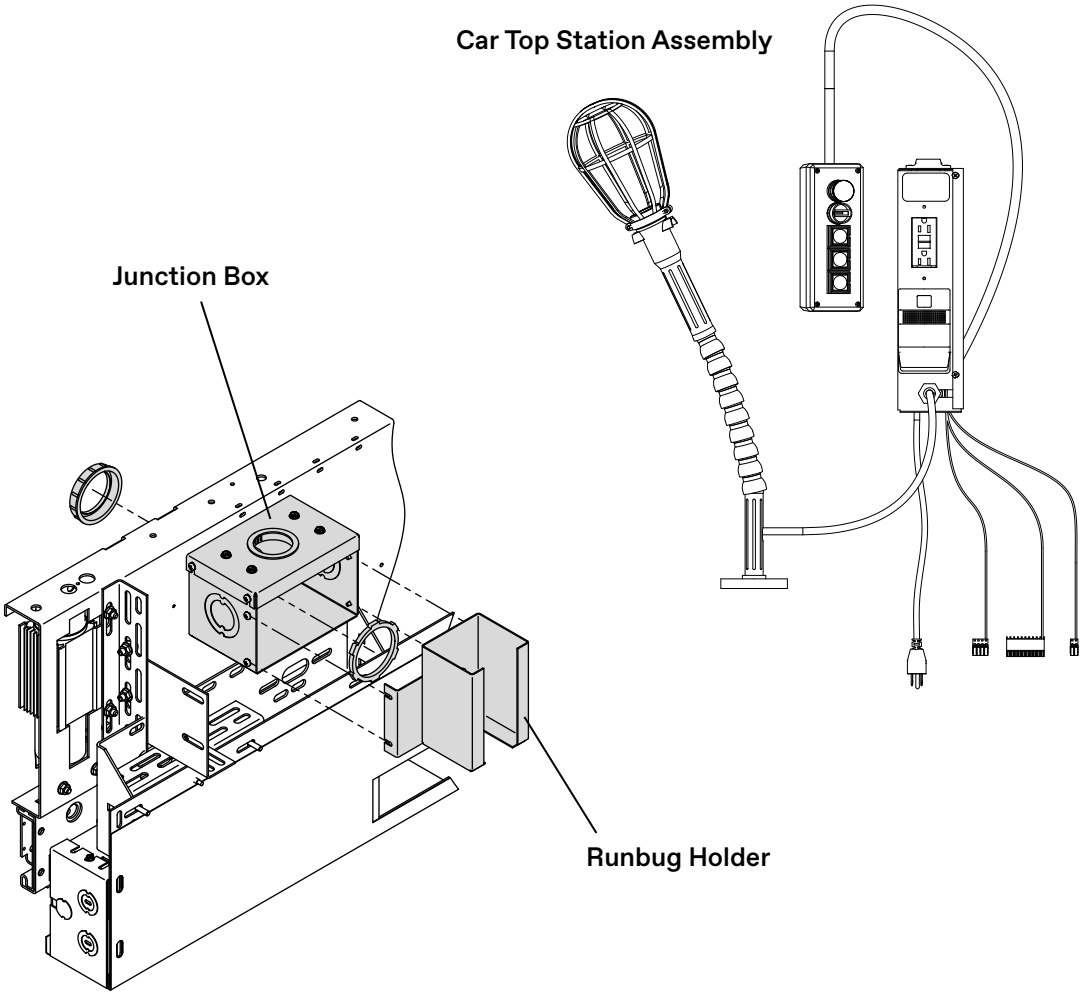


Figure 15 - Car Top Station Installation

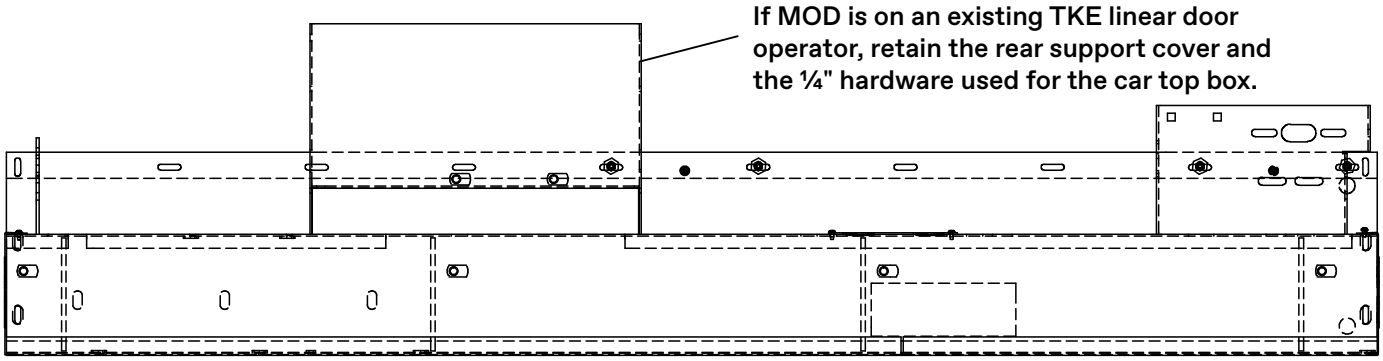
Single-Speed Center-Opening Doors Integral Cab Header Installation

Other Installation Configurations			Starts on
Single-Speed Side-Opening Doors Integral Cab Header			page 8
Two-Speed Side-Opening Doors Integral Cab Header			page 15
Existing Cab	Not Integral Cab Header	“Universal MOD Kit (200CJD)”	page 28
		“Separate Header Installation”	page 35

1. Ensure that the car will run on runbug operation.

NOTE To later locate the center of the door opening, make a reference mark on the header where the car doors meet.

2. Remove the doors and related door components and set aside if they will be reused. Keep all removed components until the elevator is running. See Figure 16.



- Header shown is for a TKE linear operator, 42" opening width.
- Headers for HD and other widths will be different.

Figure 16 - Header Modifications

3. Remove the existing door operator wiring harness and the Car Top Station (CTS).
4. Strip the header of all door operator parts and components that may interfere with new equipment.
5. Remove part of the header, where necessary, for clearance with mounting angles located 21" from the center. See Figure 17 on page 22.
6. Use the included hardware to install the mounting angles. See Figure 18 on page 22.

Single-Speed Center-Opening Doors Integral Cab Header Installation
(continued)

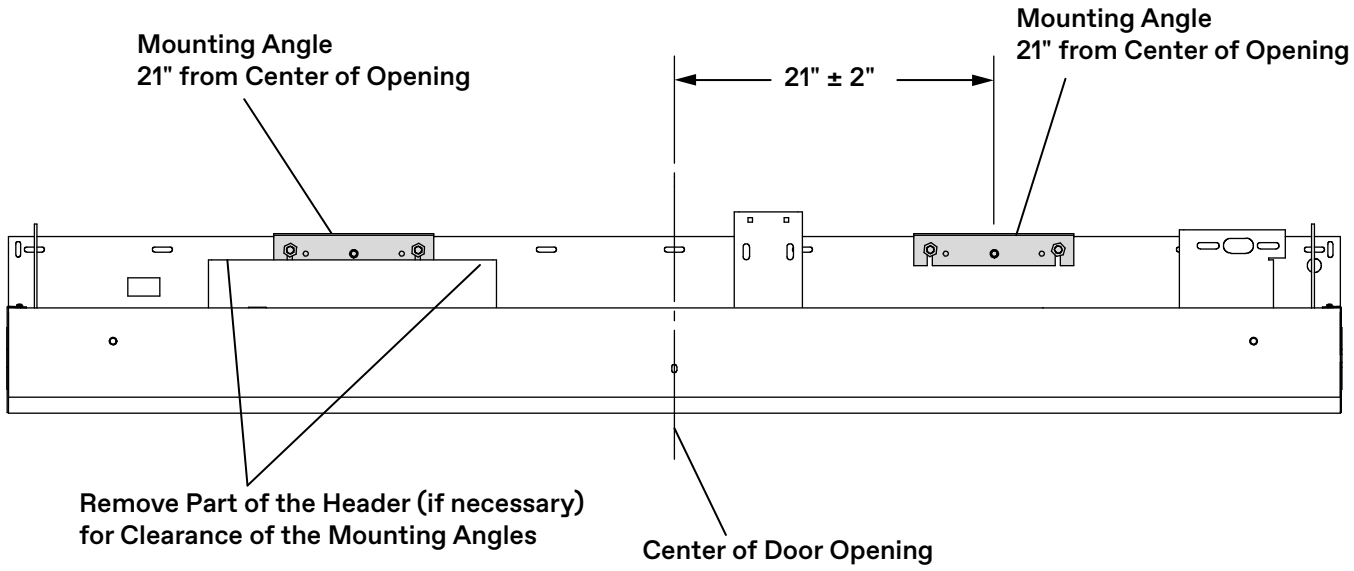
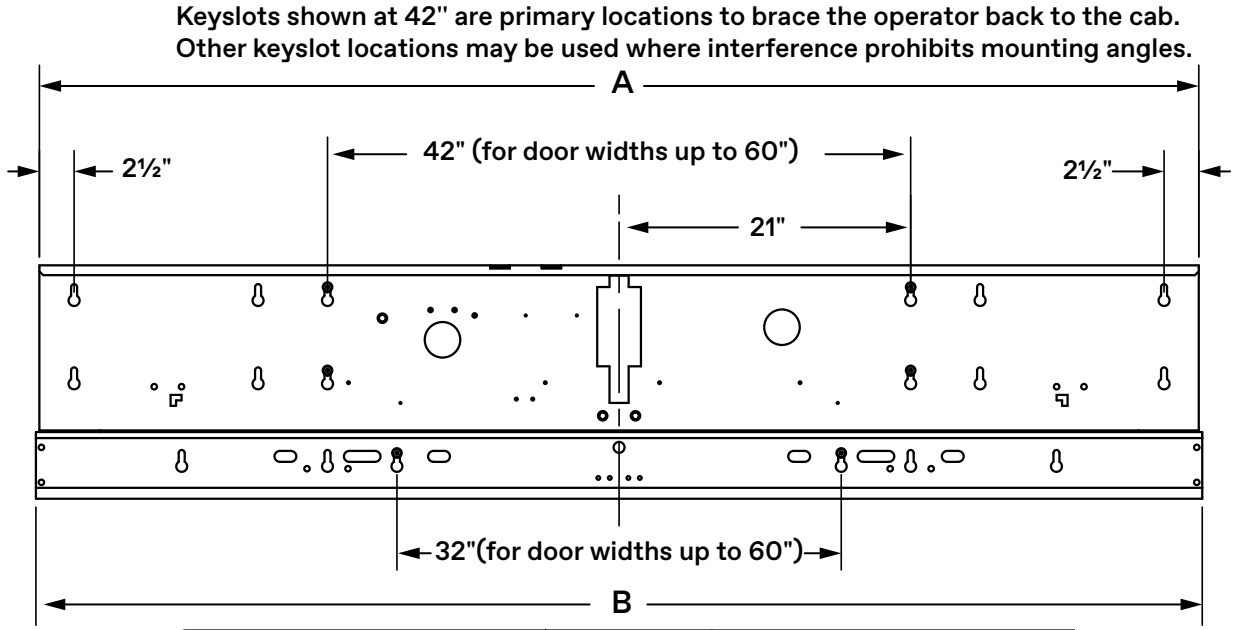


Figure 17 - Modify Header and Install Mounting Angles



Clear Opening	B	A		Clear Opening	B	A
32	64	63½	All dimensions in inches	46	92	91½
34	68	67½		48	96	95½
36	72	71½		50	100	99½
38	76	75½		52	104	103½
40	80	79½		54	108	107½
42	84	83½		56	112	111½
44	88	87½		58	116	115½
				60	120	119½

Figure 18 - Relationship of Keyslots and Door Operator Machine to Clear Opening

Single-Speed Center-Opening Doors Integral Cab Header Installation
(continued)

7. Use included hardware to attach the adapter angle to the header, but do not tighten; leave hardware loose to allow adapter alignment with track keyslots.See Figure 19.

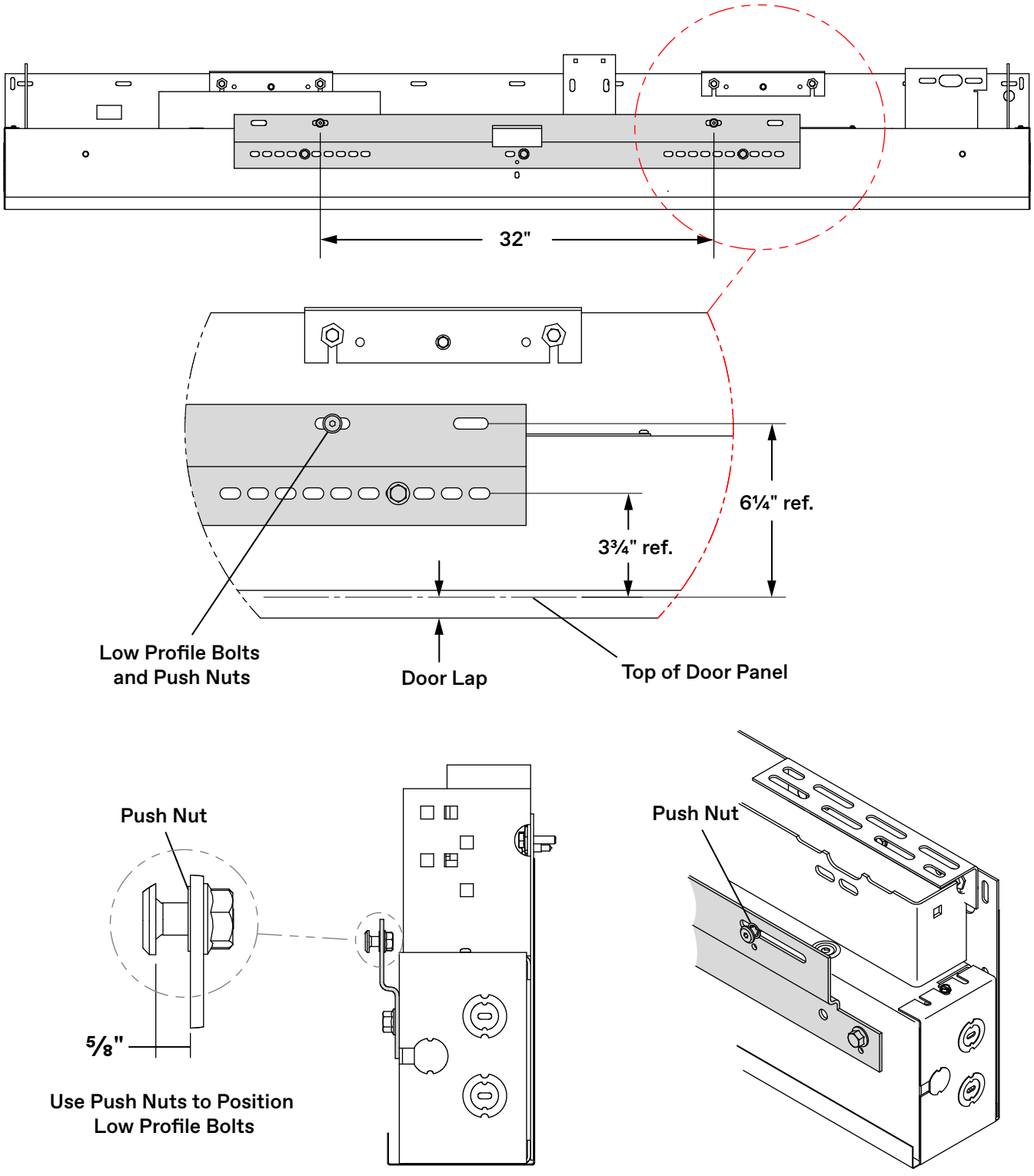


Figure 19 - Adapter Angles Installation Detail

Single-Speed Center-Opening Doors Integral Cab Header Installation
(continued)

8. Route the door operator harness to the Car Operating Panel (COP).
   See Maintenance on page 82 and the Generic Wiring Diagrams on page A-16.

- Do not install the plugs on the operator door card or on the COP.
- Before moving the car, replace the door card cover.

9. Install the door operator to the adapter angle. See Figure 20 below and Figure 21 on page 25.
   a. Align the door track bolts with the keyslots in the track, and attach the door operator to the adapter.
   b. Verify that the door operator is level.
   c. Verify that there is 21" ±2" from the center of the door opening.
   d. Use a $^{3}/_{16}$" Allen wrench to tighten down the bolts.
10. Install the door operator mounting angles.
11. Add bolts to brace the cab to the door operator back.
12. Check for plumb.
13. Verify that the track to sill is parallel.

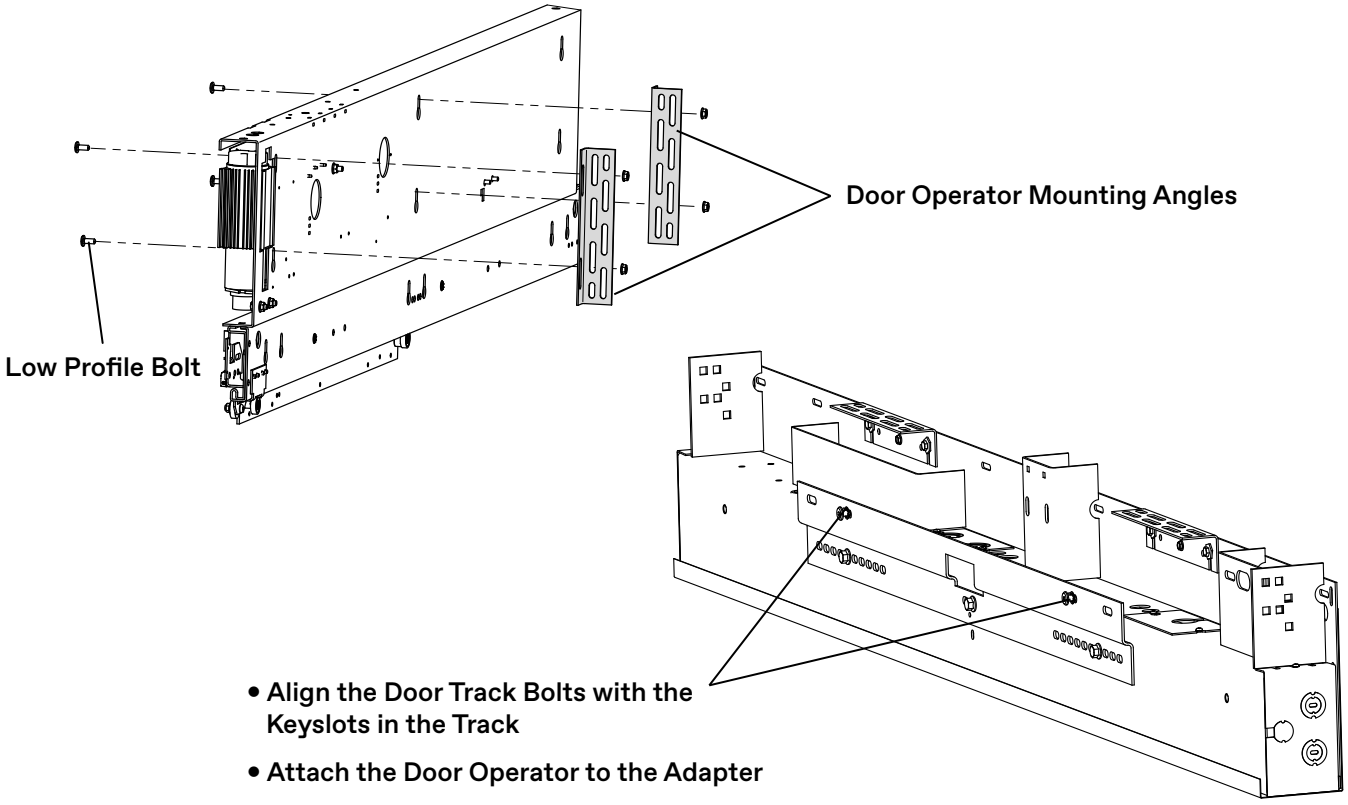


Figure 20 - Door Operator Machine Installation (1 of 2)

Single-Speed Center-Opening Doors Integral Cab Header Installation
(continued)

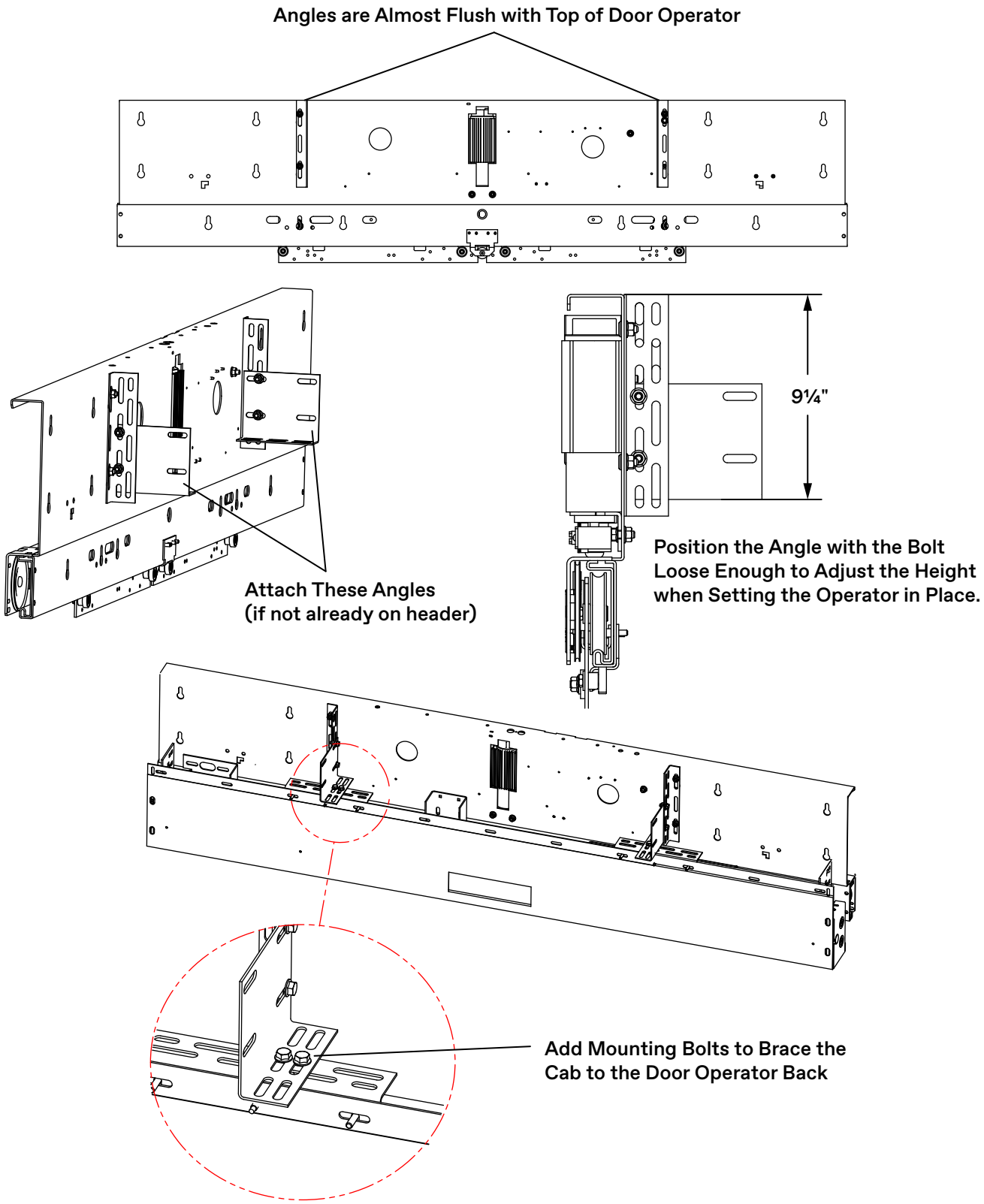


Figure 21 - Door Operator Machine Installation (2 of 2)

Single-Speed Center-Opening Doors Integral Cab Header Installation
(continued)

14. Use a 4 mm Allen wrench to remove the door controller cover, and remove the rubber grommet from the operator box.

15. Install the junction box to the door operator. See Figure 22.

16. Route the wiring harness through the $1^1/_2$" flex conduit, and then install the $1^1/_2$" flex and straight connectors.

17. Install the wiring harnesses through the flex conduit; insert the OPERF or OPERR plug into the COP harness end.

18. Install the CTS to the top of the junction box. See Figure 22.

19. Before routing, cable tie the CTS wiring.

20. Proceed to New/Existing Car Door Panel Installation on page 44.

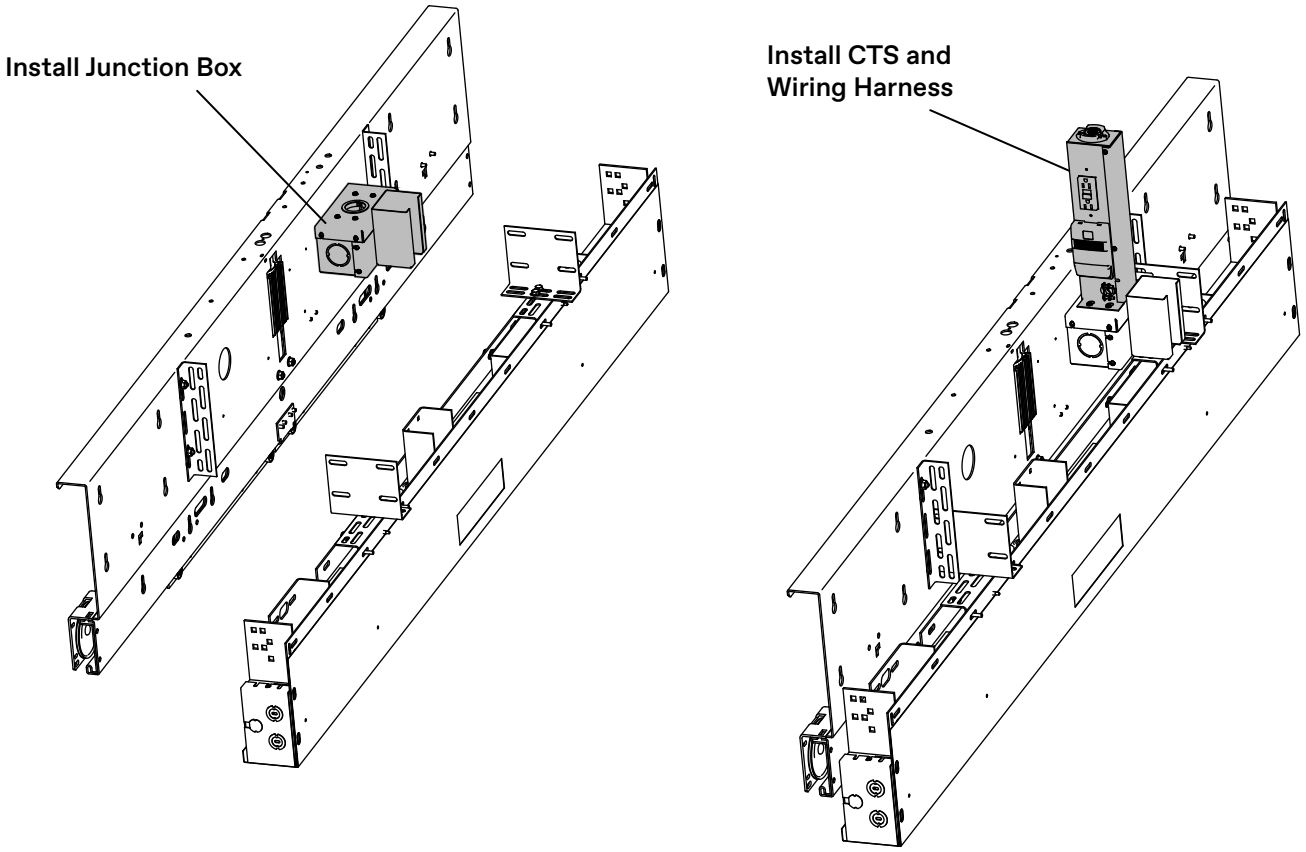


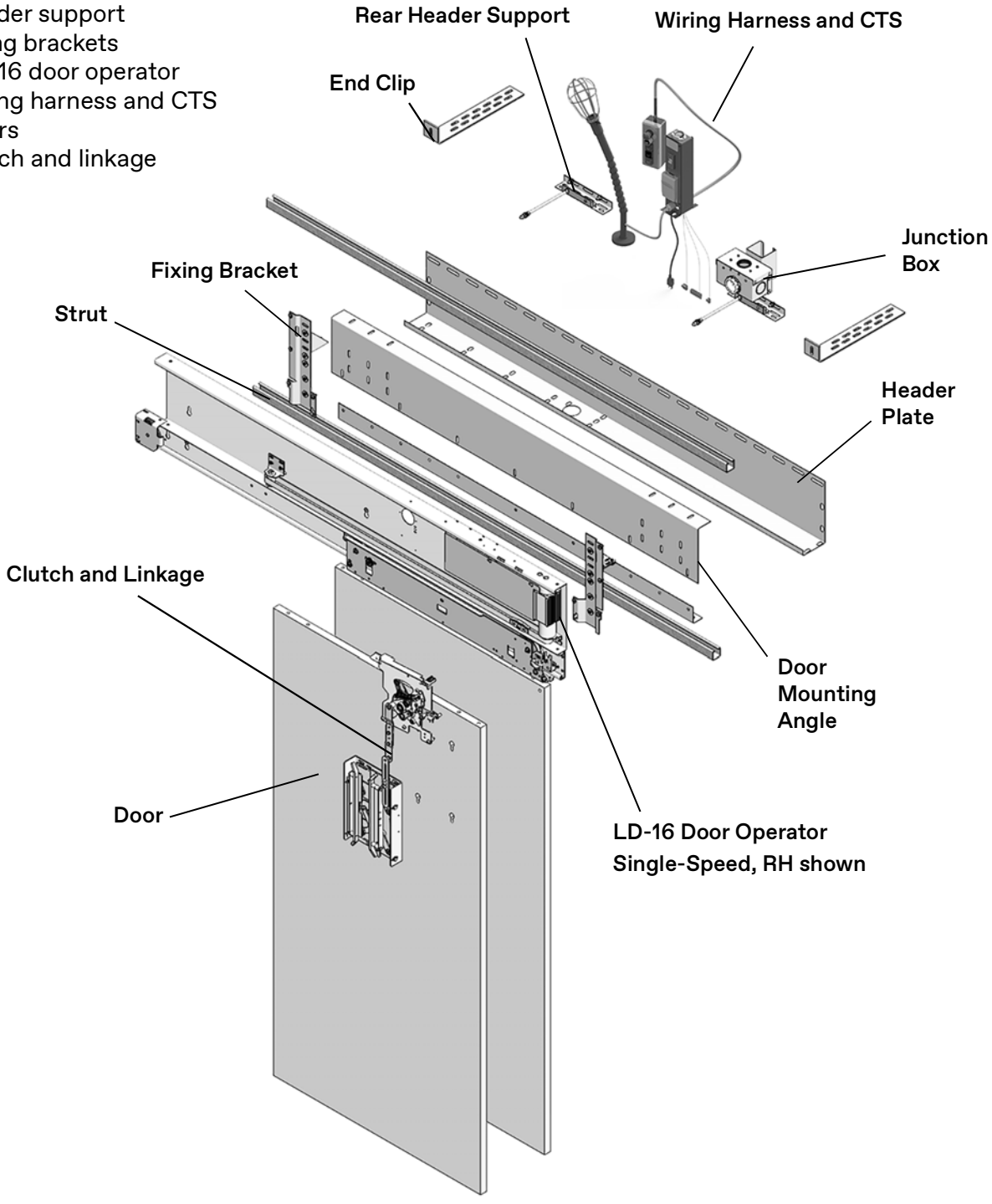
Figure 22 - Car Top Station Installation

Existing Cab Header Installation

Overview

Installation Steps

1. Remove existing door operator
2. Install bottom strut
3. Install door mounting angle
4. Install header plate
5. Install header support
6. Install fixing brackets
7. Install LD-16 door operator
8. Install wiring harness and CTS
9. Install doors
10. Install clutch and linkage



Existing Cab Header Installation
(continued)

Universal MOD Kit (200CJD)

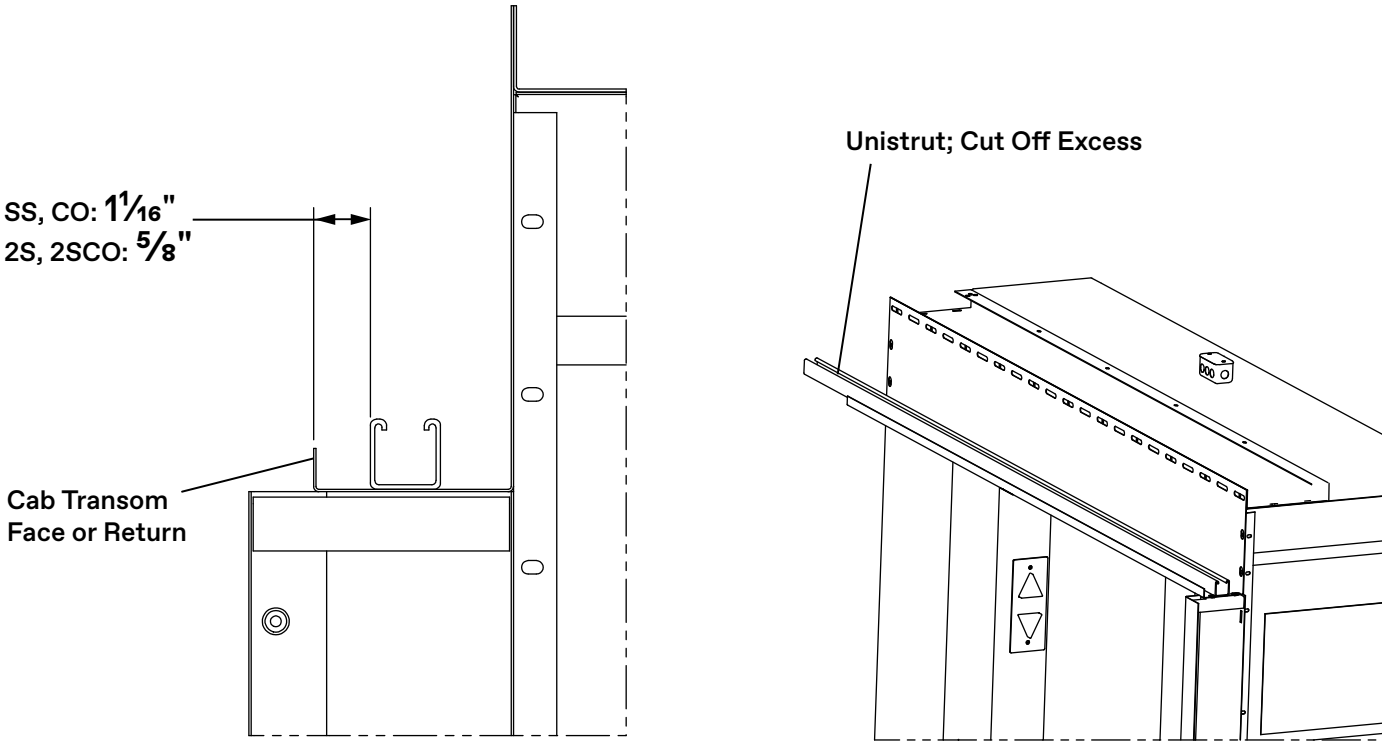
1. Remove any doors or equipment that may interfere with the LD-16 Door Operator.
2. Install the strut. See Figure 23.

IMPORTANT!

- **The strut may require notching depending on job conditions. This applies to all parts in the Universal MOD Kit.**
- **The dimensions shown in the following drawings are reference points and apply to TKE or Dover equipment ONLY.**

   a. Place the strut above the cab transom face or the return per the applicable dimensions:
      - Single-Speed and Center-Opening: $1^{1}/_{16}$"
      - Two-Speed and Two-Speed Center-Opening: $^{5}/_{8}$"

   b. Cut off the excess material.



Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 23 - Strut Installation

Universal MOD Kit
(continued)

3. Use the included hardware to install the door operator mounting angles to the strut. See Figure 24 on page 29.
   - Single-Speed and Center-Opening = $1^{1}/_{16}$" (to have $^{5}/_{16}$" door panel to cab running clearance).
   - Two-Speed and Two-Speed Center-Opening = $^{5}/_{8}$"
4. Use the included hardware to install the door operator header to the mounting angle. See Figure 24 on page 29.

NOTE For side-opening: align one end of the header plate with the clear opening.

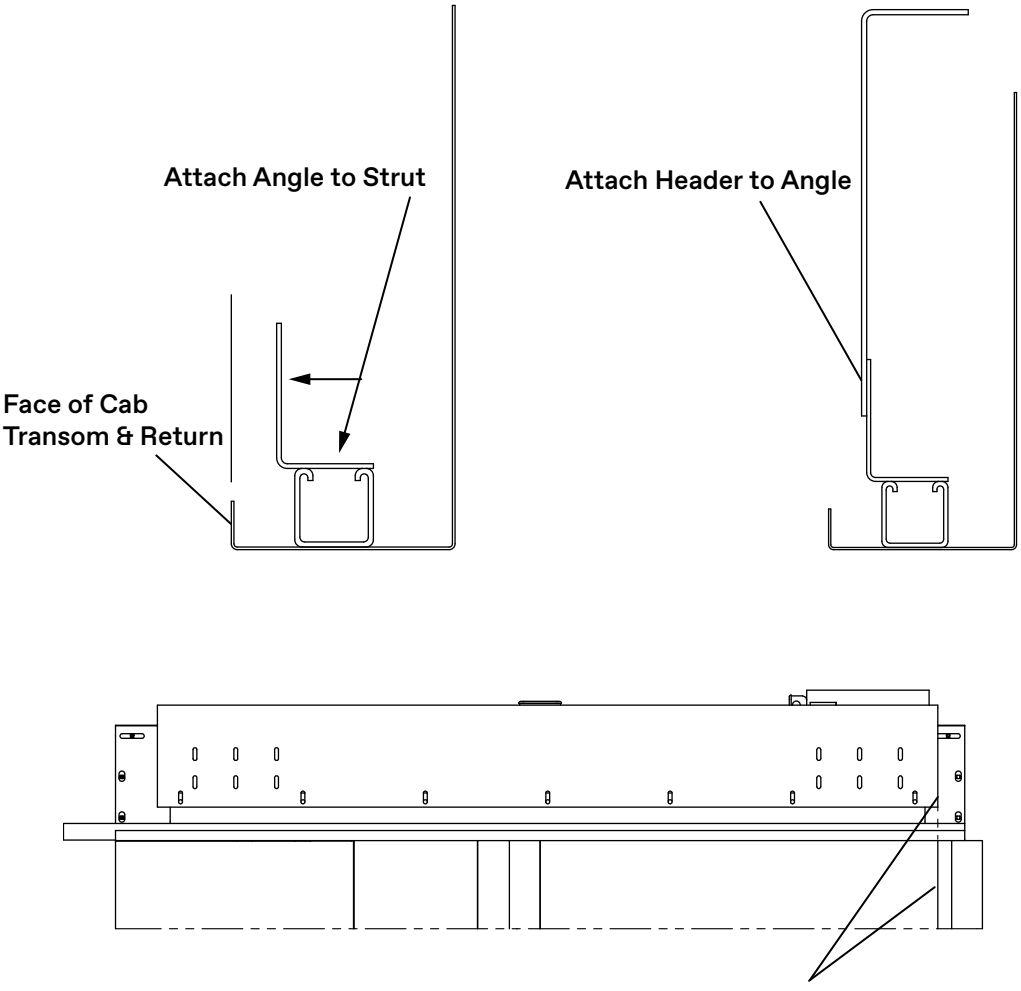


Figure 24 - Mounting Angles and Header Installation

Universal MOD Kit
(continued)

5. Install the header support. See Figure 25.
   a. Place the strut under the top angle of the header, and cut off the excess.
   b. Align the end clip with the strut at the first set of slots on the strike side.

NOTE Side opening distance = $3^{11}/_{16}$" – $3^{3}/_{4}$"

   c. Use the included hardware to attach the end clips to each end of the strut.
   d. Install the rear header support brackets.

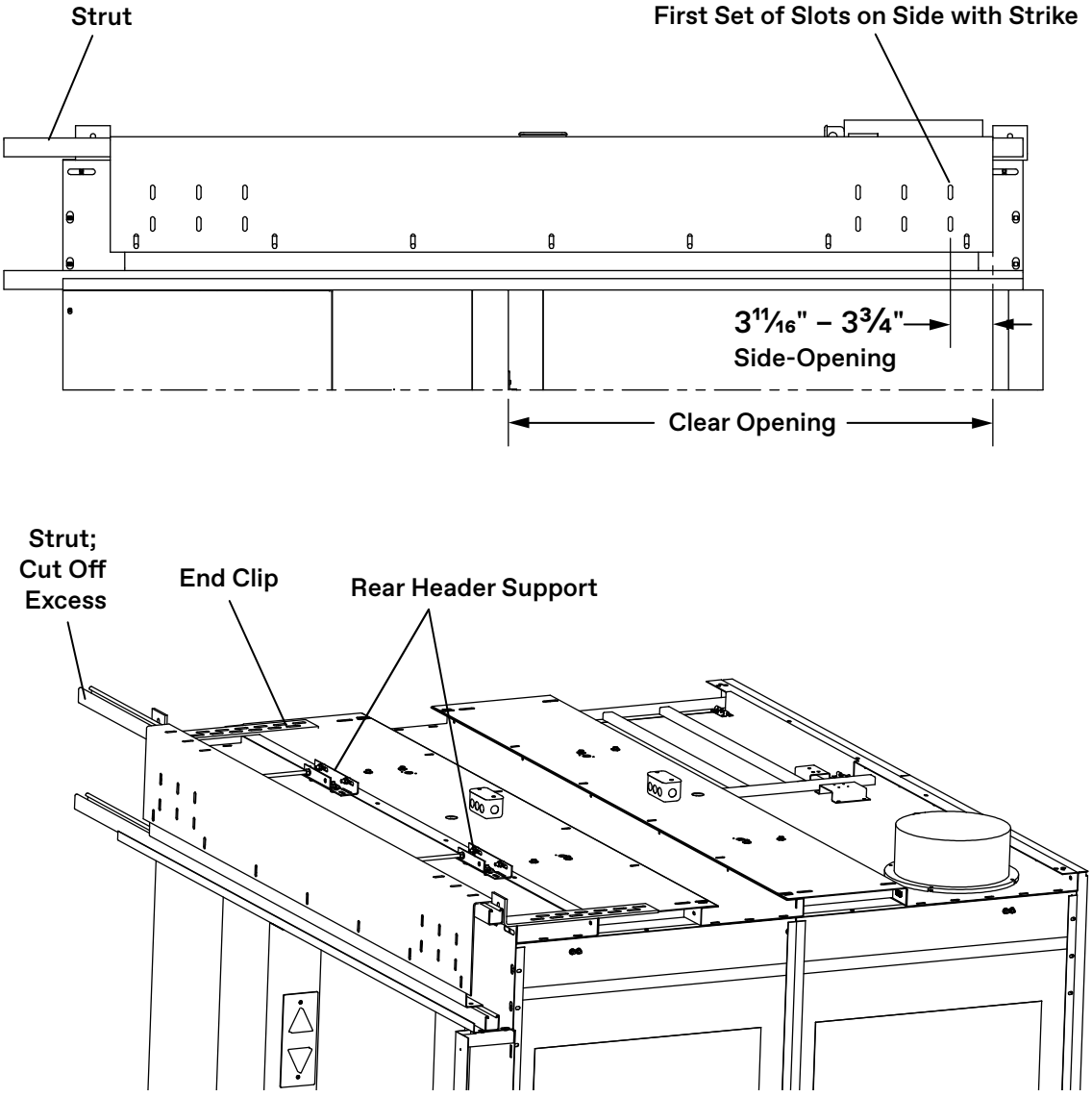
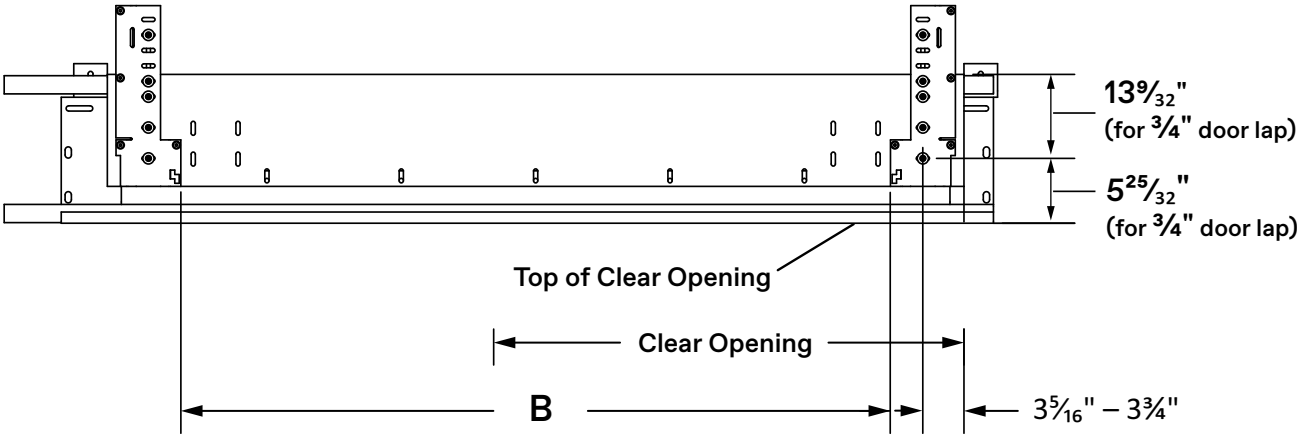


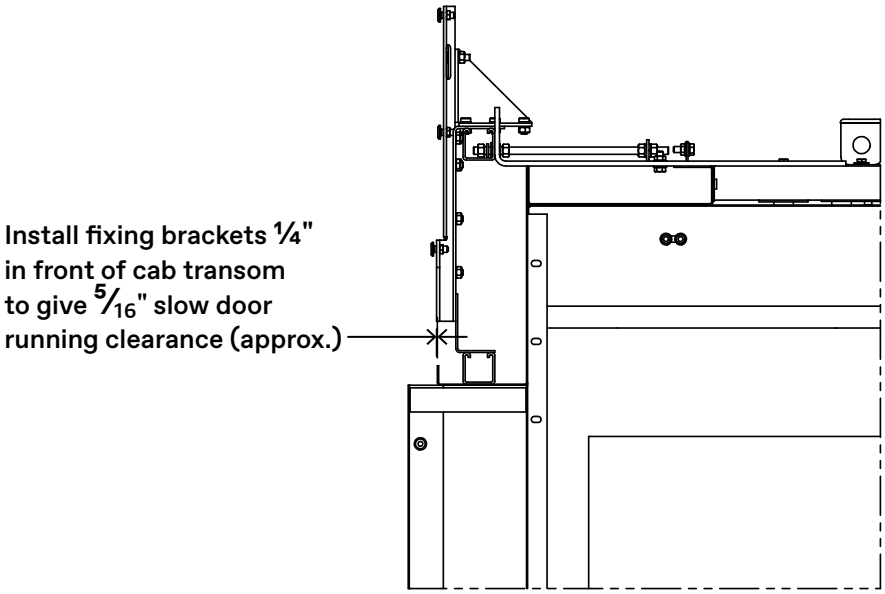
Figure 25 - Header Support Installation

Universal MOD Kit
(continued)

6. Install the fixing brackets per the applicable door operator.
   - Single-Speed: Figure 26.
   - Two-Speed: Figure 27 on page 32.
   - Center-Opening: Figure 28 on page 33.



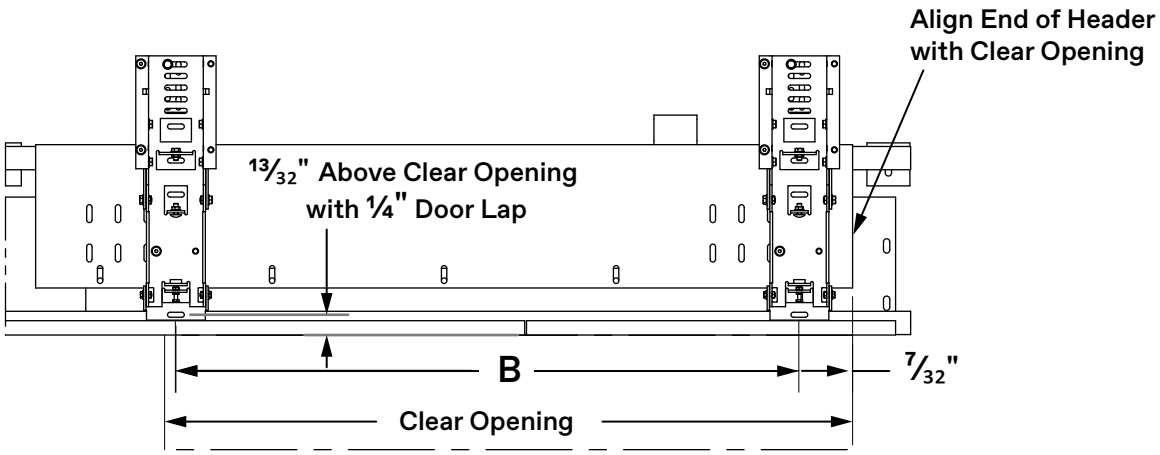
SS Clear Opening	Dim. B
32	32 3/8
34	47 3/8
36	51 3/8
38	55 3/8
40	59 3/8
42	63 3/8
44	67 3/8
46	71 3/8
48	75 3/8
(all dim. in inches)	



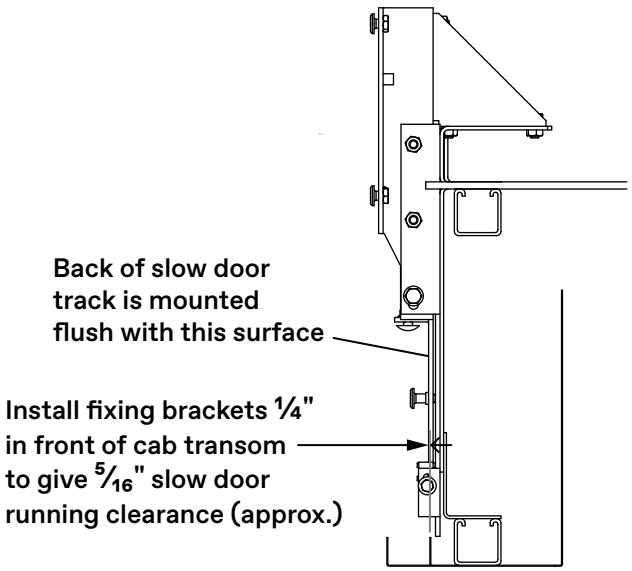
Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 26 - Single-Speed Fixing Brackets

Universal MOD Kit
(continued)



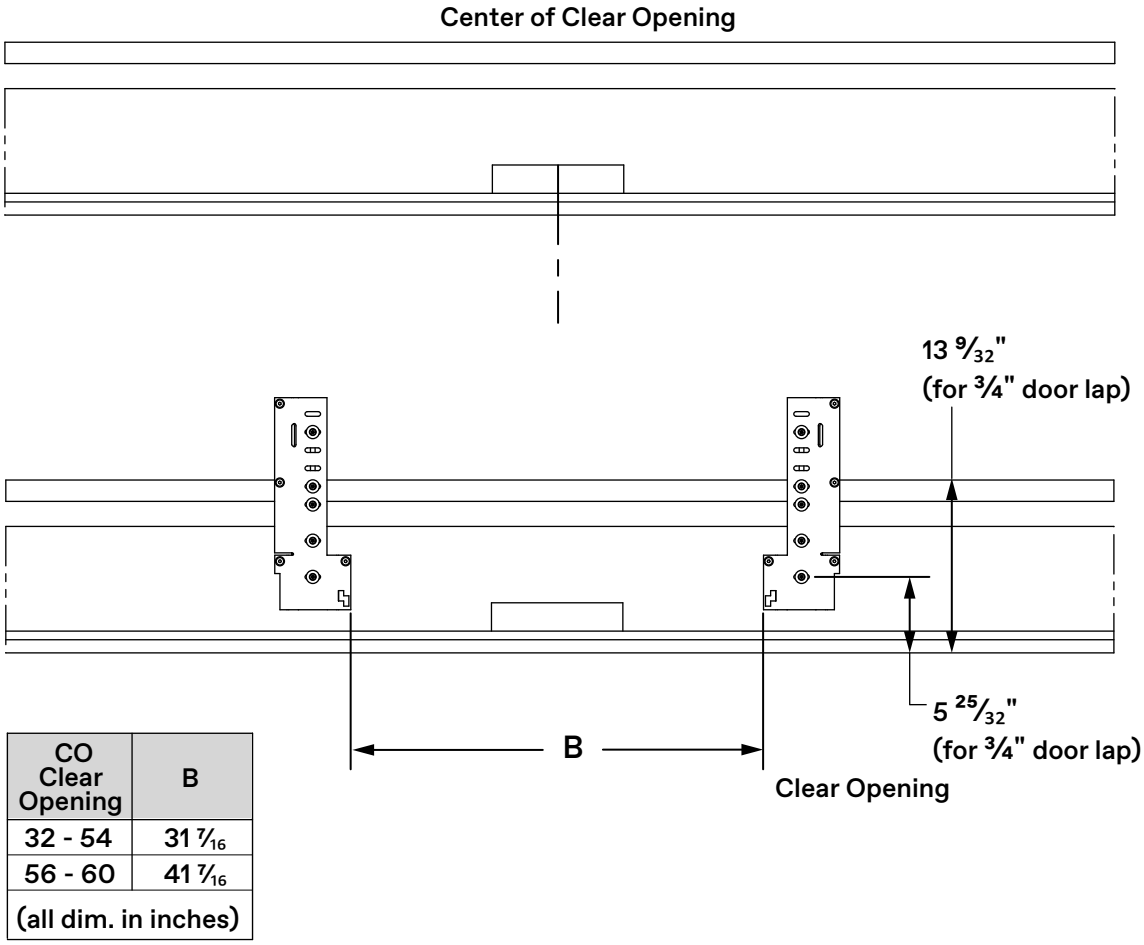
2SP Clear Opening	B	2SP Clear Opening	B
36	31½	54	49½
38	33½	56	51½
40	35½	58	53½
42	37½	60	55½
44	39½	62	57½
46	41½	64	59½
48	43½	66	61½
50	45½	68	63½
52	47½	70	65½
(all dim. in inches)		72	65½



Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 27 - Two-Speed Fixing Brackets

Universal MOD Kit
(continued)



CO Clear Opening	B
32 - 54	31 7/16
56 - 60	41 7/16
(all dim. in inches)	

Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 28 - Center-Opening Fixing Brackets

Universal MOD Kit
(continued)

7. Install the door operator. See Figure 29.
8. Install the junction box to the door operator.
9. Install the CTS and the wiring harness to the COP.
10. Proceed to New/Existing Car Door Panel Installation on page 44.

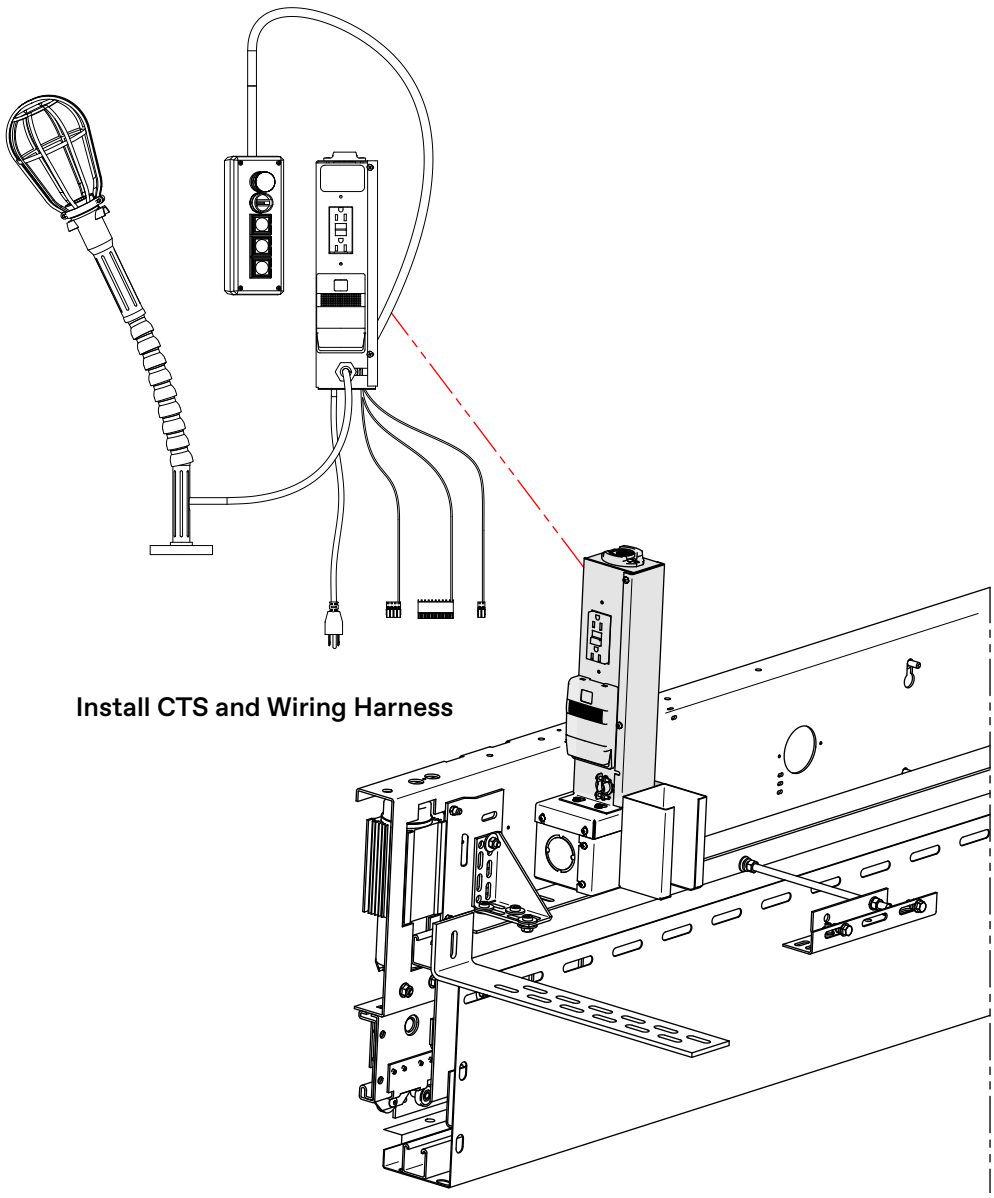


Figure 29 - Door Operator, CTS, and Wiring Harness Installation

Separate Header Installation

1. Remove the following parts—*Do Not Remove the Header Angle*. See Figure 30.
   - Door operator
   - Tracks
   - Hangers

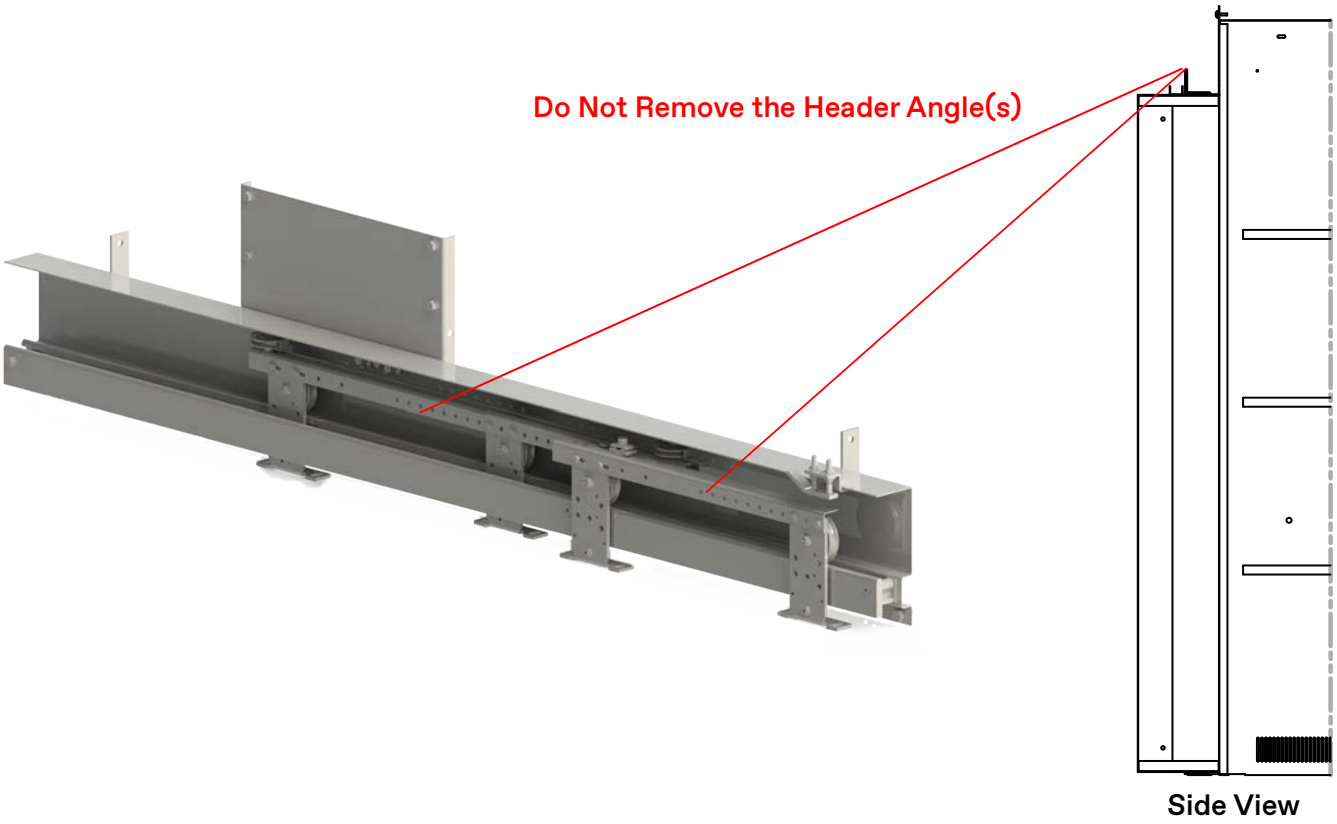
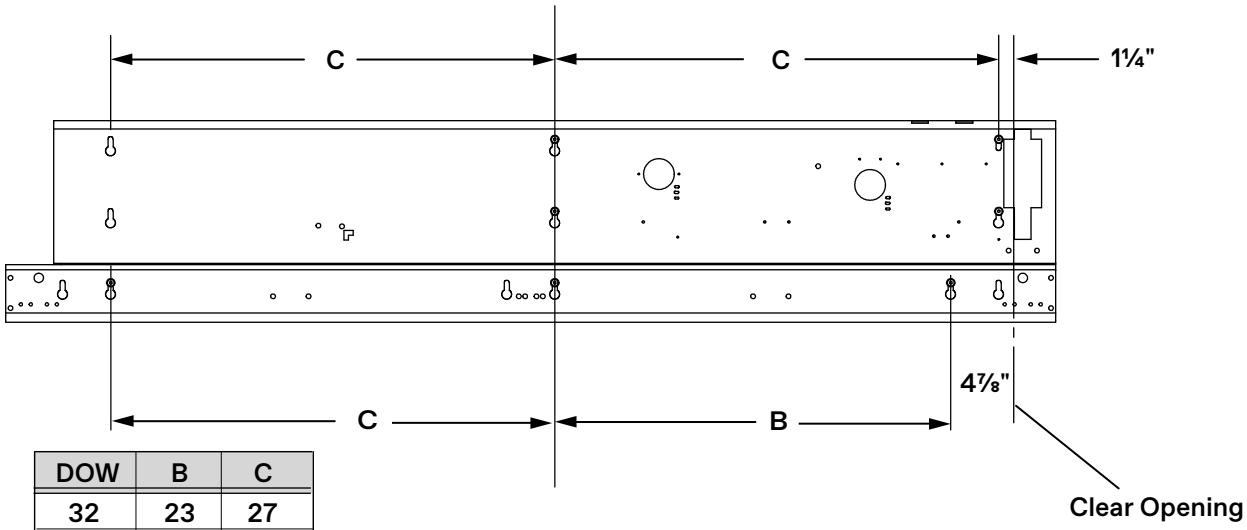


Figure 30 - Remove Door Operator and Equipment—Do Not Remove the Header Angle(s)

2. Install the door operator mounting per the applicable application.
   - Single-Speed: Figure 31 on page 36.
   - Center-Opening: Figure 32 on page 37.
   - Two-Speed: Figure 33 on page 38.

Separate Header Installation
(continued)



DOW	B	C
32	23	27
34	25	29
36	27	31
38	29	33
40	31	35
42	33	37
44	35	39
46	37	41
48	39	43
Dimension C = ±2" (all dim. in inches)		

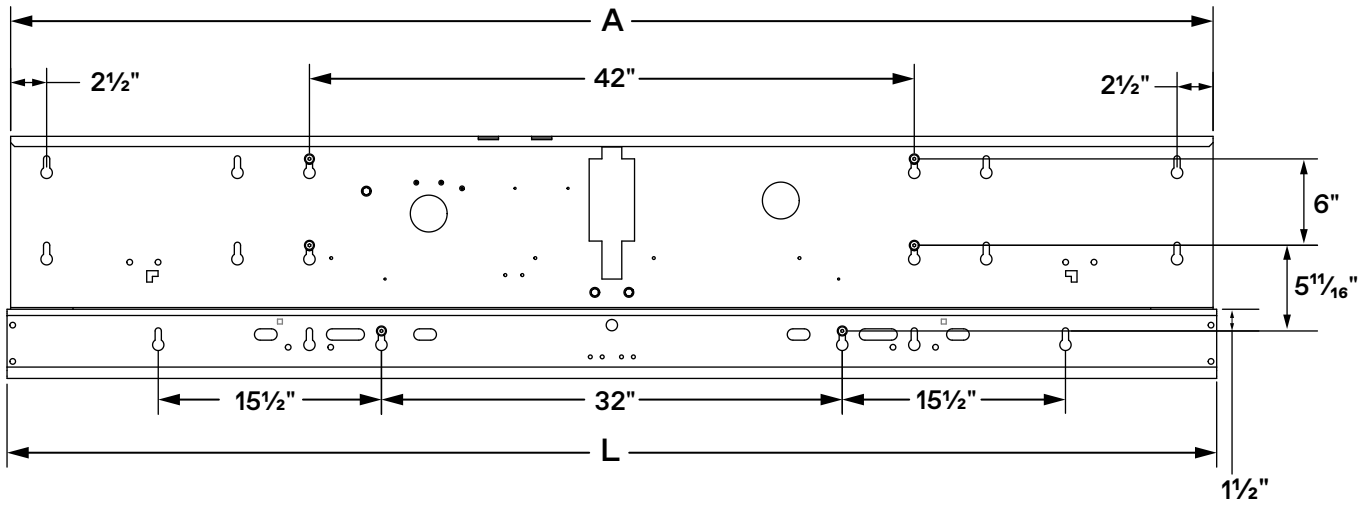
Primary location for keyslots used to brace the door operator back to the cab start at 1¼" from the clear opening, and spaced at Dimension C inches. See Chart for Dimension C.

(right-hand shown; left-hand opposite)

Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 31 - Single-Speed Door Operator Mounting

Separate Header Installation
(continued)

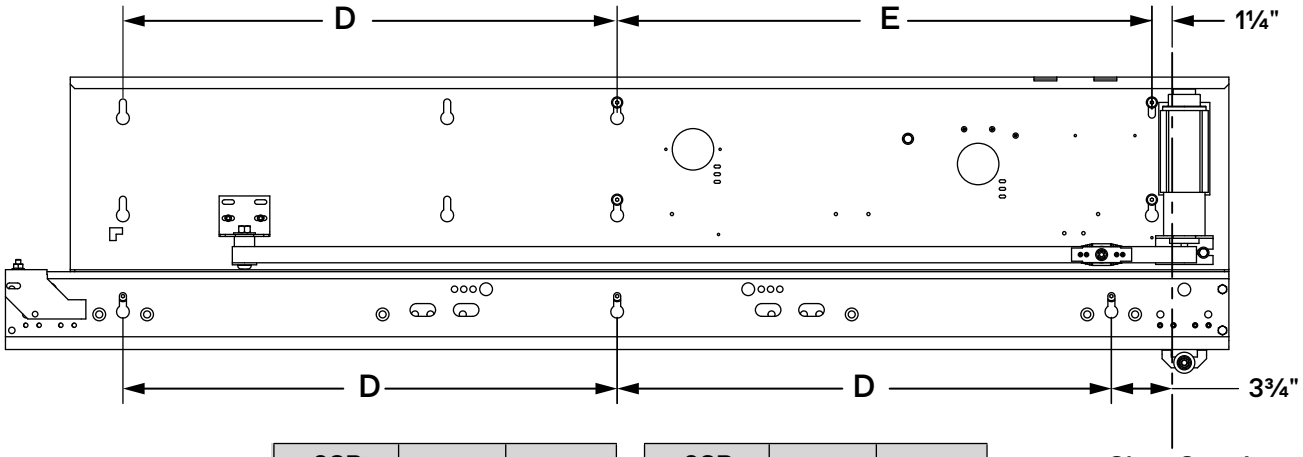


Clear Opening C	L	A
32	64	63½
34	68	67½
36	72	71½
38	76	75½
40	80	79½
42	84	83½
44	88	87½
46	92	91½
48	96	95½
50	100	99½
52	104	103½
54	108	107½
56	112	111½
58	116	115½
60	120	119½
(all dim. in inches)		

Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 32 - Center-Opening Door Operator Mounting

Separate Header Installation
(continued)



2SP Clear Opening	D	E
36	24	21½
38	25½	23
40	27	24½
42	28½	26
44	30	27½
46	31½	29
48	33	30½
50	34½	32
52	36	33½

2SP Clear Opening	D	E
54	37½	35
56	39	36½
58	40½	38
60	42	39½
62	43½	41
64	45	42½
66	46½	44
68	48	45½
70	49½	47
72	51	48½

(all dim. in inches)

Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

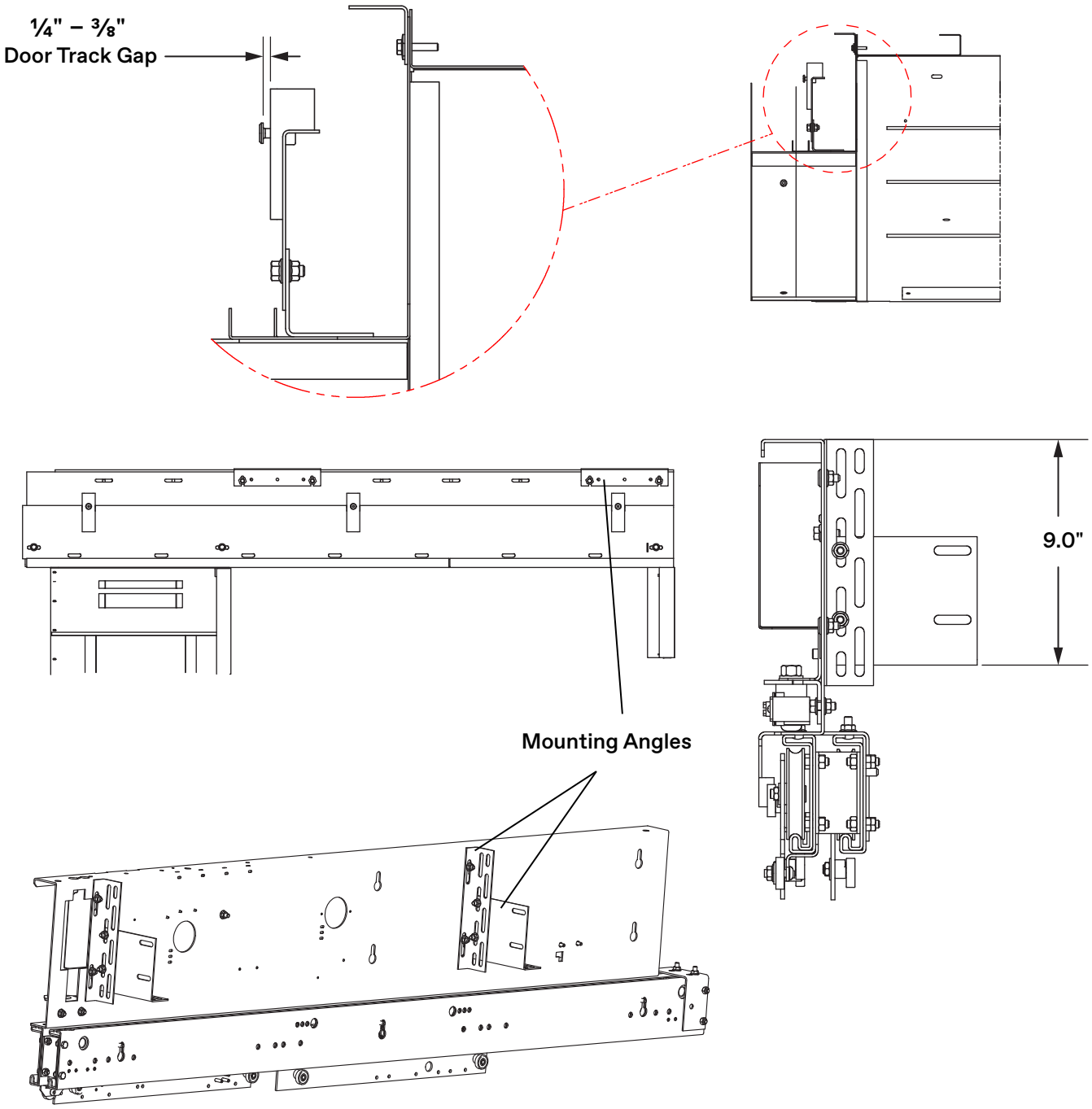
Figure 33 - Two-Speed Door Operator Mounting

3. Install the door track leaving a gap of $^{1}/_{4}$" – $^{3}/_{8}$" or more. See Figure 34 on page 39.

4. Install the door operator mounting angles. Use the included hardware to attach the mounting angles, but do not tighten; leave hardware loose to allow for adjustment when setting the door operator in place.

5. Install the door operator. Figure 35 on page 40.
   a. Align the door operator with the door track and the mounting angles.
   b. Verify that the door operator is level with the face of the door track.
   c. Tighten all hardware.

Separate Header Installation
(continued)



Dimensions shown are reference points and apply to TKE or Dover equipment ONLY.

Figure 34 - Door Track and Mounting Angles Installation

Separate Header Installation
(continued)

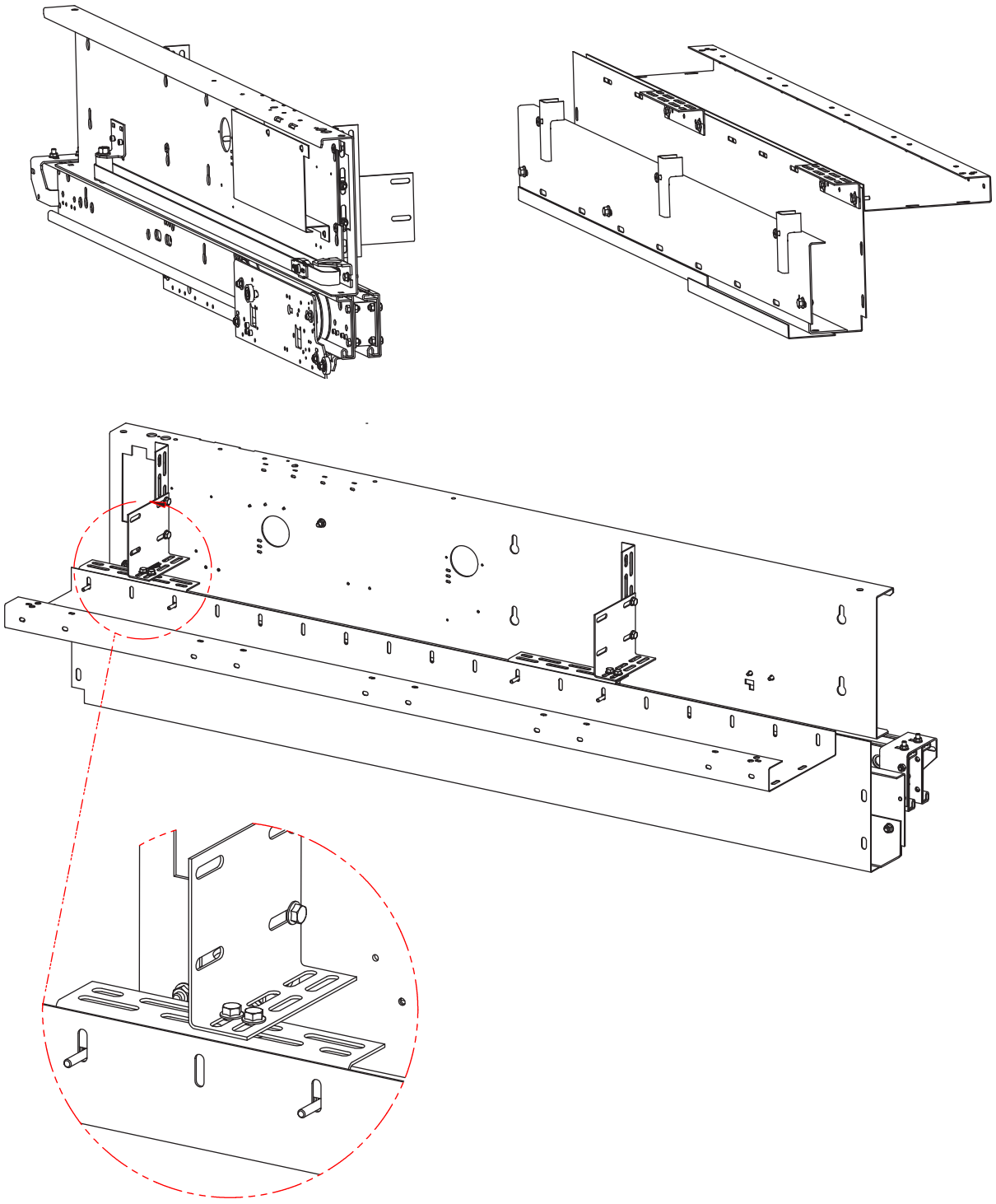


Figure 35 - Door Operator Installation

Separate Header Installation
(continued)

6. Install the junction box. See Figure 36.

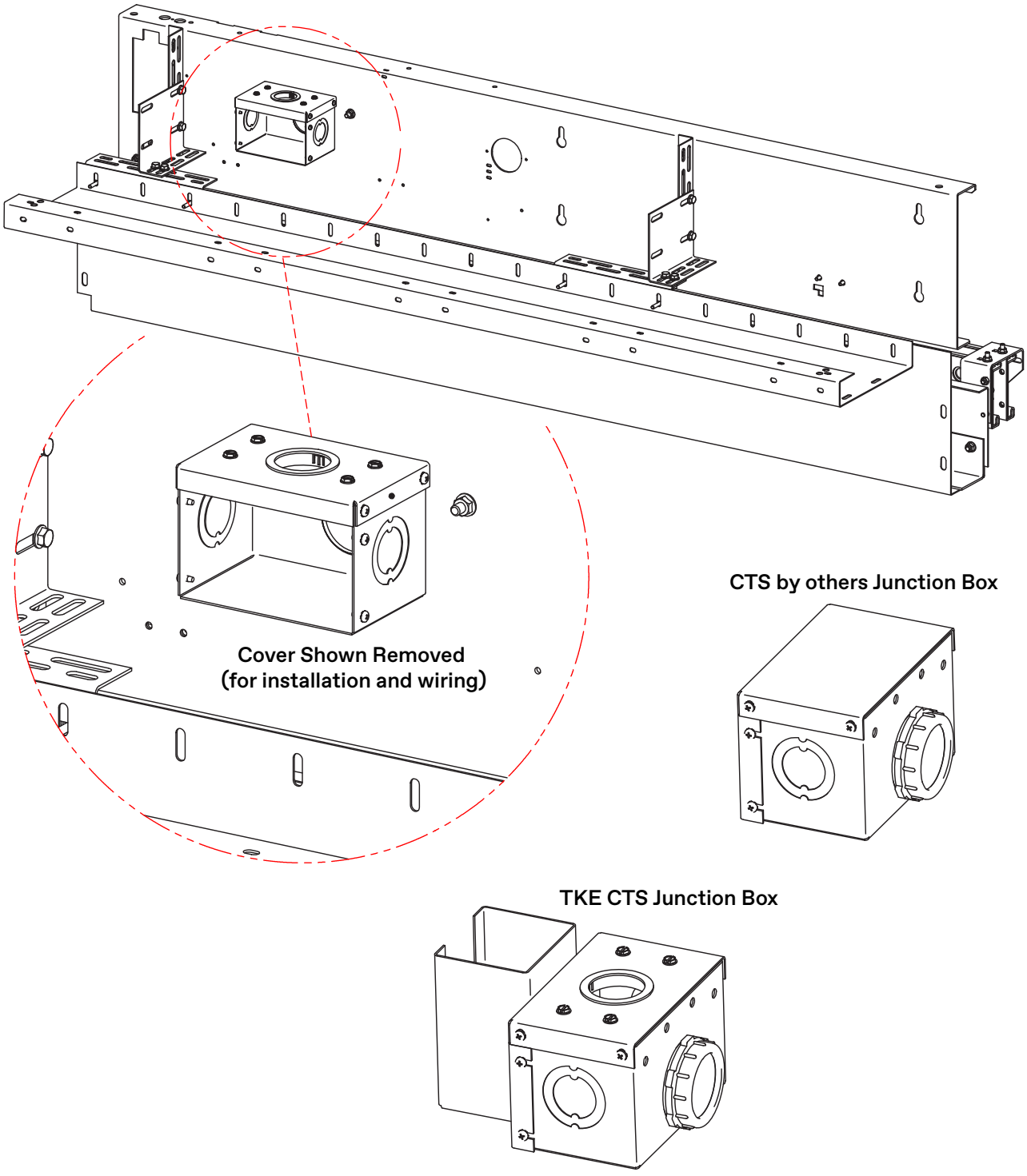


Figure 36 - Junction Box Installation

Separate Header Installation
(continued)

7. Install the CTS to the top of the junction box. See Figure 37.
8. Route the wiring harness from the junction box to the COP.
9. Install the junction box cover.

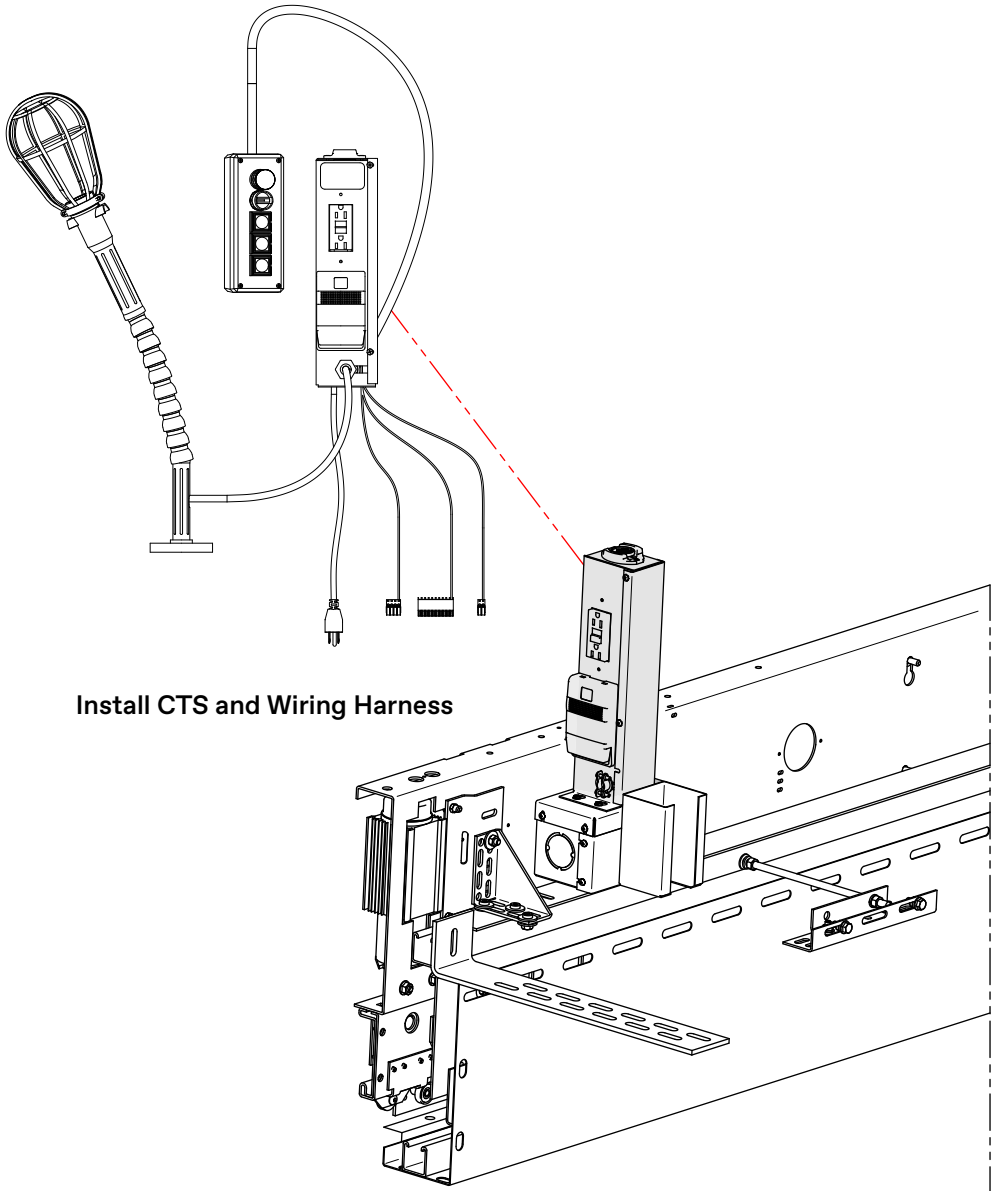
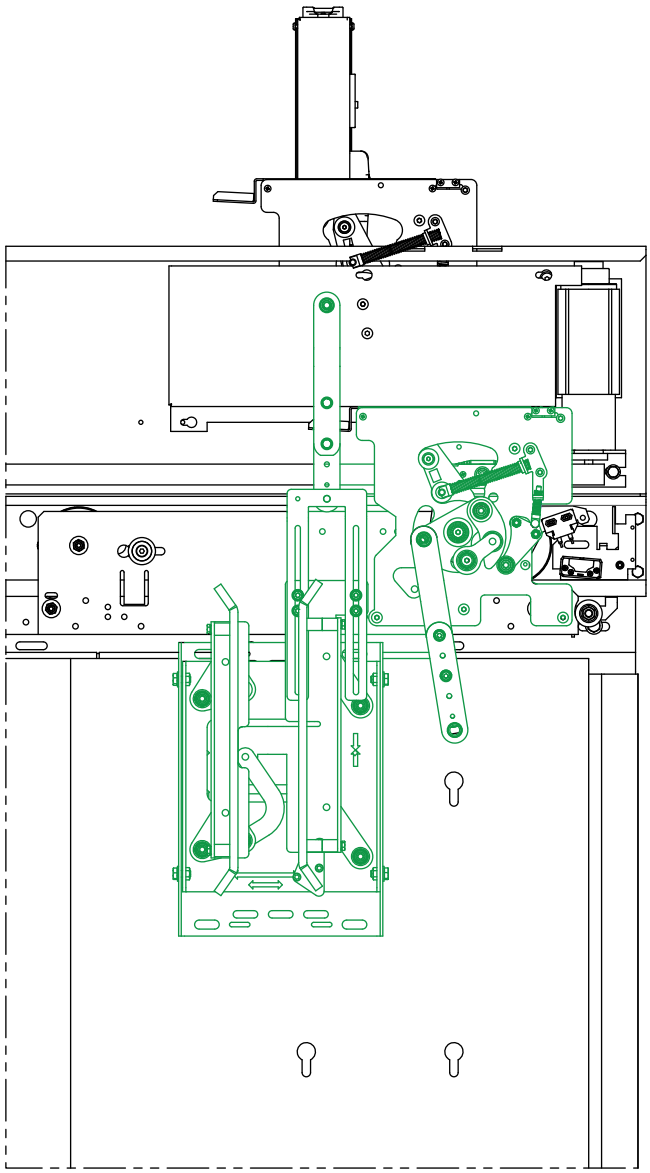


Figure 37 - CTS and Wiring Harness Installation

Separate Header Installation
(continued)

10. Install the clutch. See Figure 38.



(clutch shown in green)

Figure 38 - Clutch Installation

New/Existing Car Door Panel Installation

1. Remove the existing door hangers.
2. Assemble the door panel and angle, and align the angle to be parallel to the door. See Figure 40 below and Figure 40 on page 45.
3. Set the door panel with the angle into the door opening on top of the $^{1}/_{4}$" spacers on the sill.
4. Use included hardware to install the door interface angle to the top of the existing car door.
5. Shim (as necessary) to ensure that the interface angle is plumb to the car door.
6. Install the car door on the two eccentrics, and align the adapter slots with the holes in the hanger.
7. Install and hand-tighten the four 8 mm bolts.

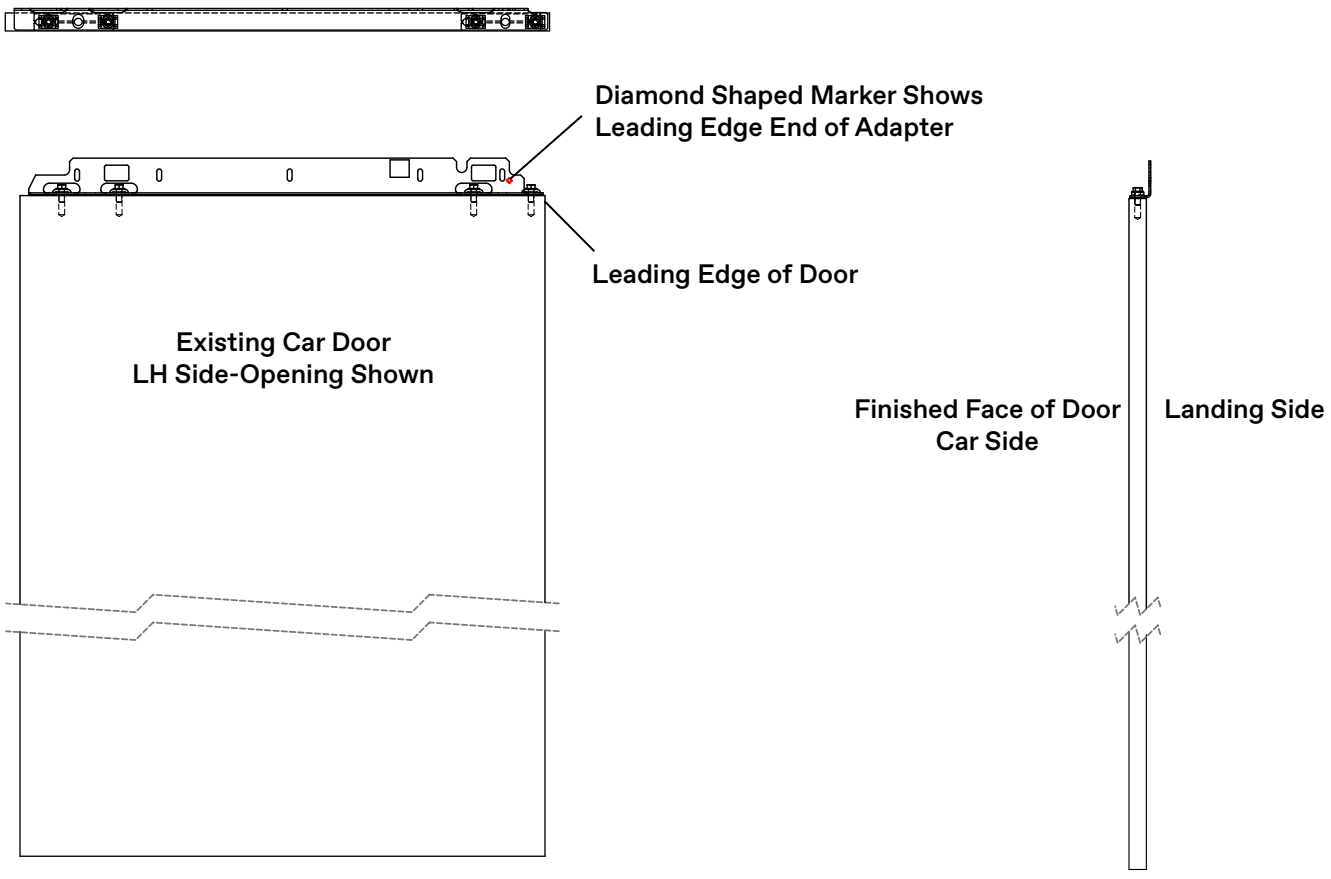


Figure 39 - Assemble and Align Door Panel and Angle (1 of 2)

New/Existing Car Door Panel Installation
(continued)

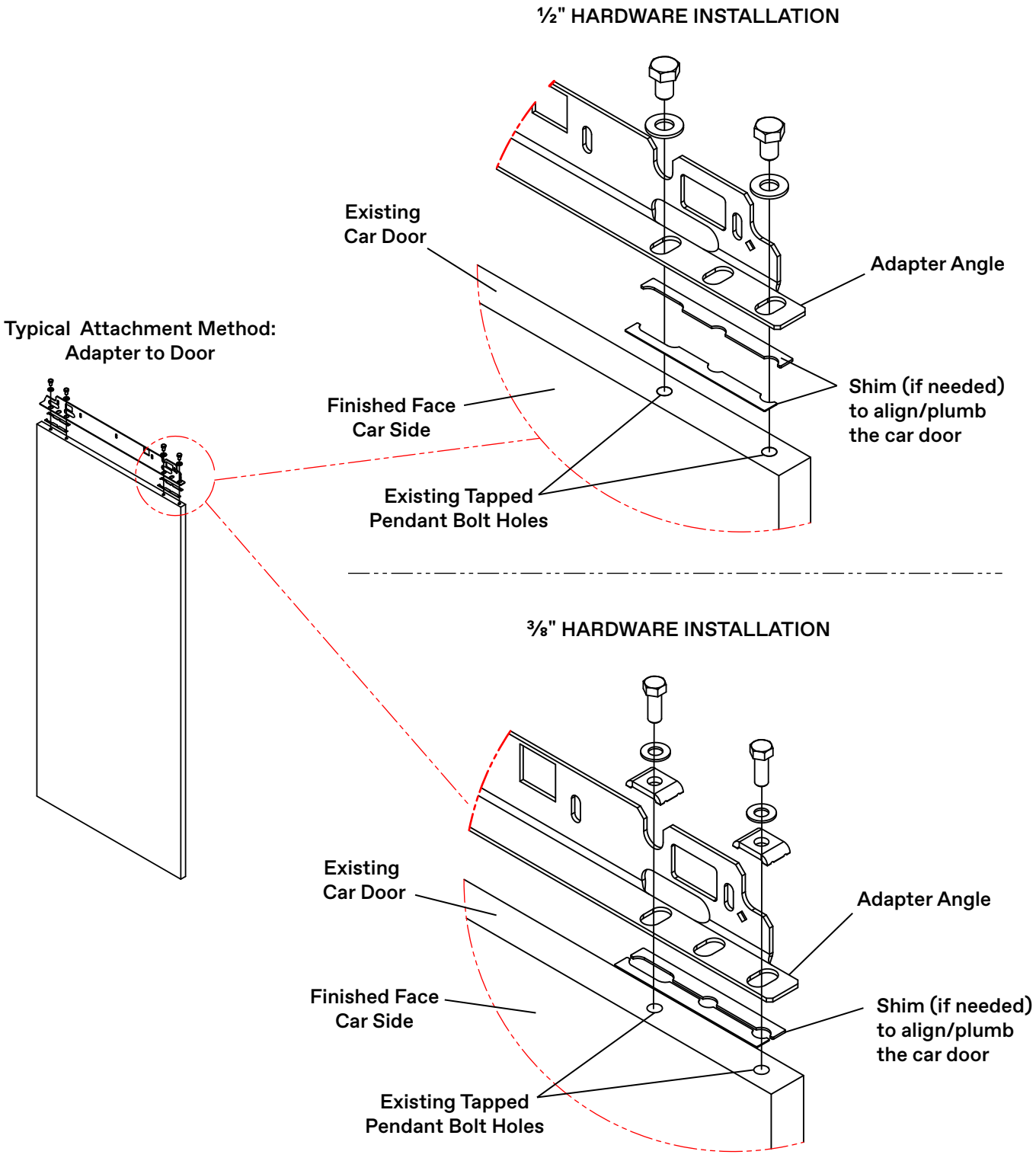


Figure 40 - Assemble and Align Door Panel and Angle (2 of 2)

New/Existing Car Door Panel Installation
(continued)

8. Use a 6 mm T-handle Allen wrench to rotate the eccentrics and align the car door panel with the return. See Figure 41.

9. Verify that there is $^{1}/_{4}$" clearance from the door to the top of the sill.

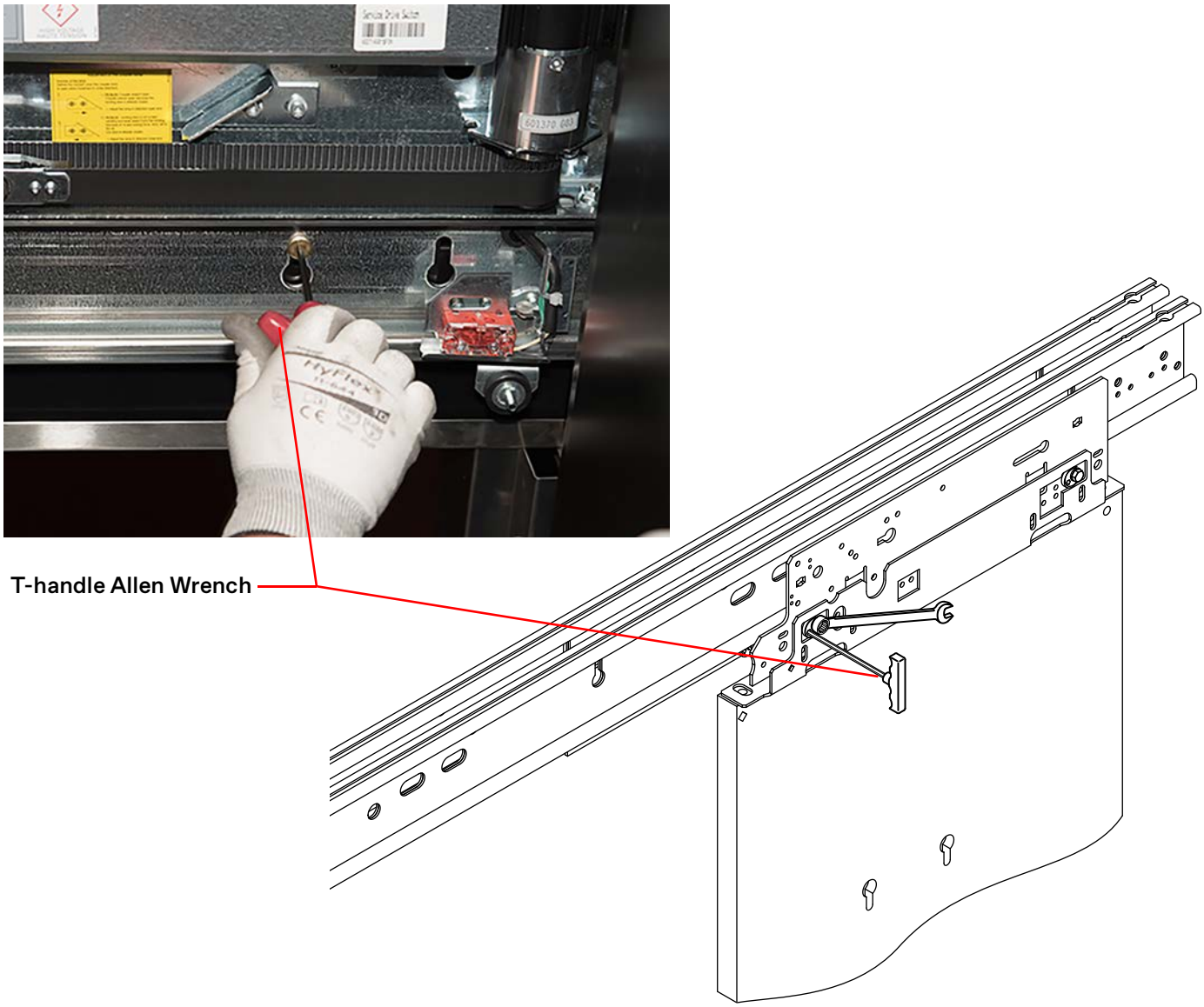


Figure 41 - Car Door Installation

Car Door Panel Adjustment

1. Move the door hanger(s) to the fully closed position against the LD-16 bumper. See Figure 42.

NOTE For center-opening doors: secure the door hanger(s) with a cable tie for easier adjustment.

2. Adjust doors until the upper and lower leading edge of door panel makes contact with either the LD-16 bumper or the opposite door panel on center-opening doors.

3. Verify that the door-to-sill clearance is between $^{3}/_{16}$" and $^{5}/_{16}$".

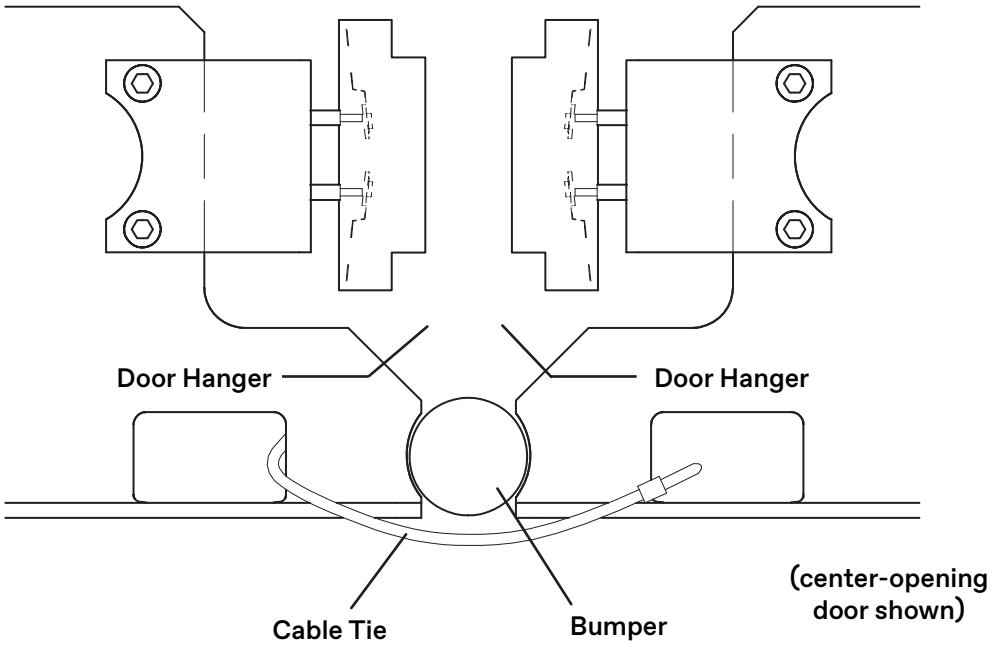


Figure 42 - Door Hanger Fully Closed Position Against Bumper

4. Use a 13 mm wrench to tighten the eccentric bolt; then tighten the mounting bolts. See Figure 43 on page 48.

5. Set a $^{1}/_{4}$" – $^{3}/_{8}$" required gap (per code) between the transom, the returns, and the door panel.
   a. Loosen the $^{1}/_{2}$" bolts that attach the interface angle to the top of the car door.
   b. Tighten the $^{1}/_{2}$" hardware.

6. Install the gibs.

7. Verify that the car door travels freely along the entire path of travel and also maintains a $^{1}/_{4}$" – $^{3}/_{8}$" gap during travel.

Car Door Panel Adjustment
(continued)

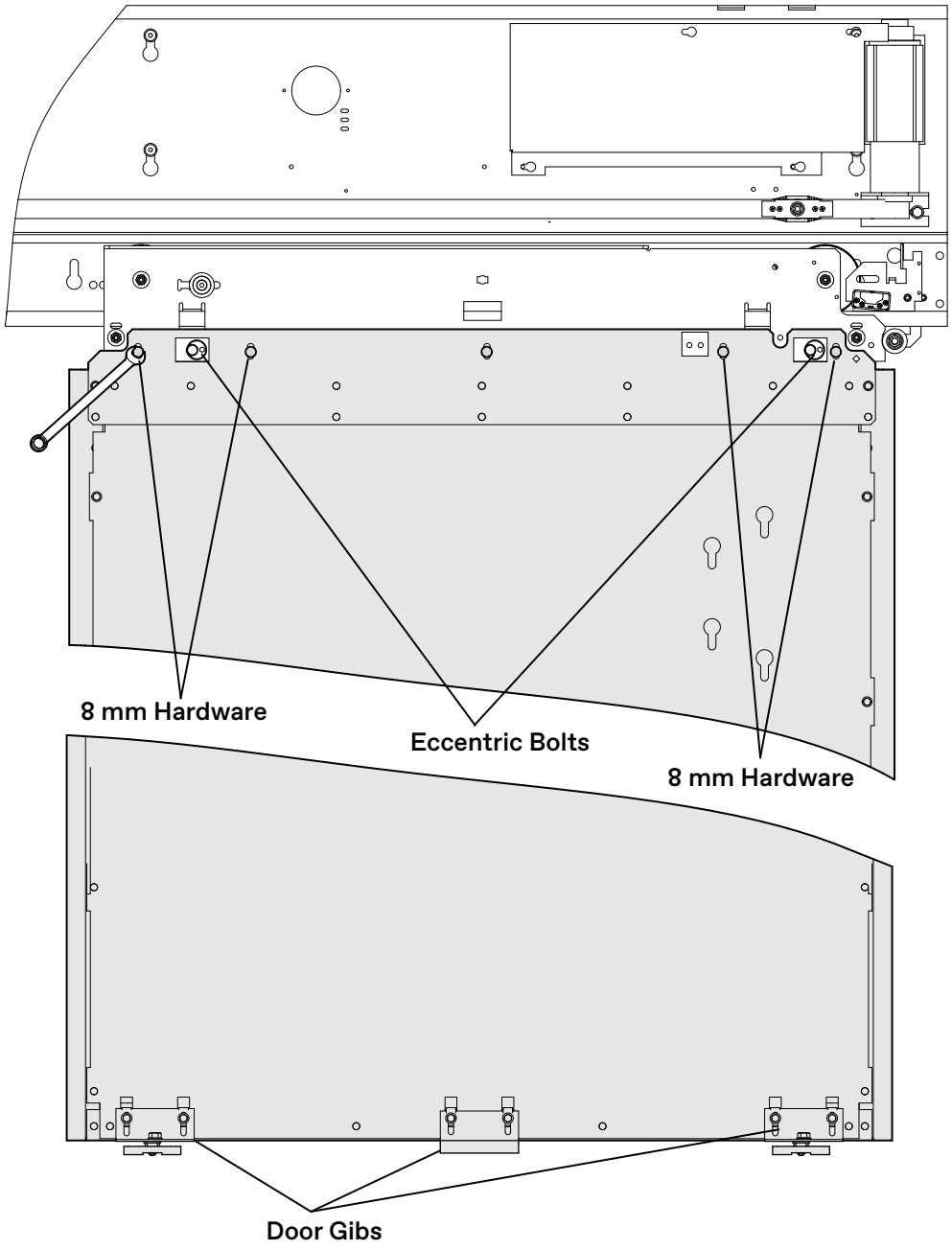


Figure 43 - Tighten Mounting Bolts

Set Eccentrics on the Car Door Hanger

1. Verify that the gap between the upthrust roller and the rail is $^{1}/_{64}$".
2. If the upthrust roller needs adjustment, loosen the nut and use the Allen wrench to turn the roller shaft.

Clutch Installation and Adjustment

1. Verify that the clutch with spacer configuration matches the hoistway equipment. See Clutch Assemblies on page A-1 (Appendix).
2. Remove and discard 4 shipping nuts from the clutch actuator/restrictor assembly. See Figure 44.
3. Use included hardware to mount the clutch actuator assembly to the hanger plate.
4. Check all clutch bolts and fasteners for tightness (may be loose from shipping).
5. Use 2 Allen screws to connect the clutch assembly to the drive belt.

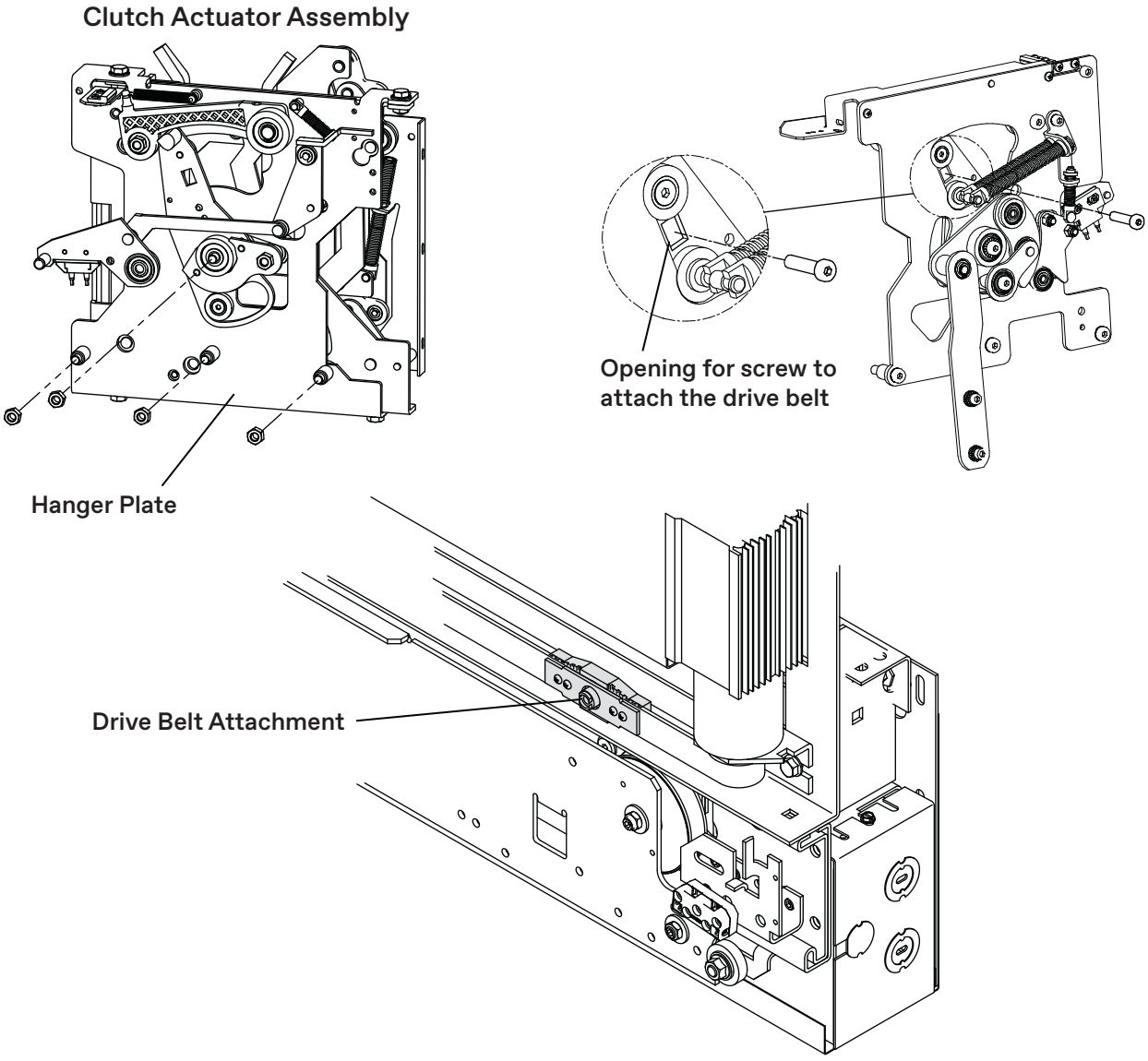


Figure 44 - Clutch Actuator Assembly Installation

Clutch Installation and Adjustment
(continued)

6. Move the car to the tightest hatch pickup roller to car sill clearance location.
7. Mark the level edge of closed door stationary pickup roller location onto the car sill.
8. Close the car door and transfer roller location mark from the car sill to the car door.
9. Install cage nuts in the car door keyslots. If existing keyslots do not exist, scribe the elevation of rollers above the sill; use the clutch baseplate as a drilling template.
10. Use the supplied metric bolts to attach the clutch assembly. See Figure 45.

NOTE Clutch location = the hatch door rollers are centered vertically in the clutch with the car at floor level.

11. Verify that the running clearance is between $^{1}/_{4}$" and $^{5}/_{16}$" with the hatch sill at the tightest landing in the hoistway, and adjust as required.
12. Check the alignment and adjust as required.

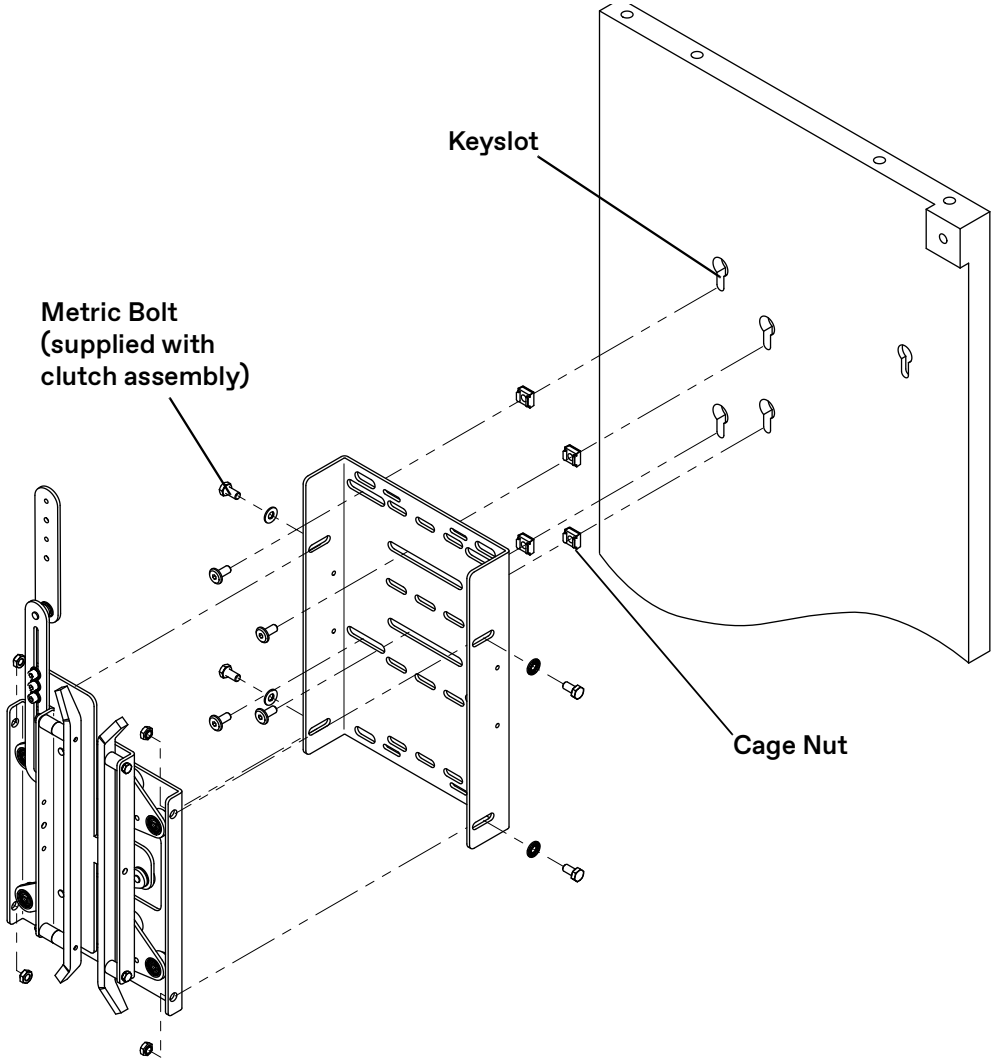


Figure 45 - Clutch Installation

Clutch Installation and Adjustment
(continued)

13. Use the enclosed hardware screws to connect the door linkages.

14. Adjust clutch and clutch actuator linkage. See Figure 46 below and Figure 47 on page 52.

    a. Place a spacer between the vanes. Use one of the following methods to determine the spacer width:

    - Distance of the squeezed pickup rollers
    - Actual rollers
    - TKE interlock rollers width = $1^{5}/_{8}$"

    b. Use a 5 mm hex key to adjust the linkage length until the lock hook is in the fully lifted position, and tighten the linkage screws.To extend the lengths of the push rod (if needed) use the linkage extensions.

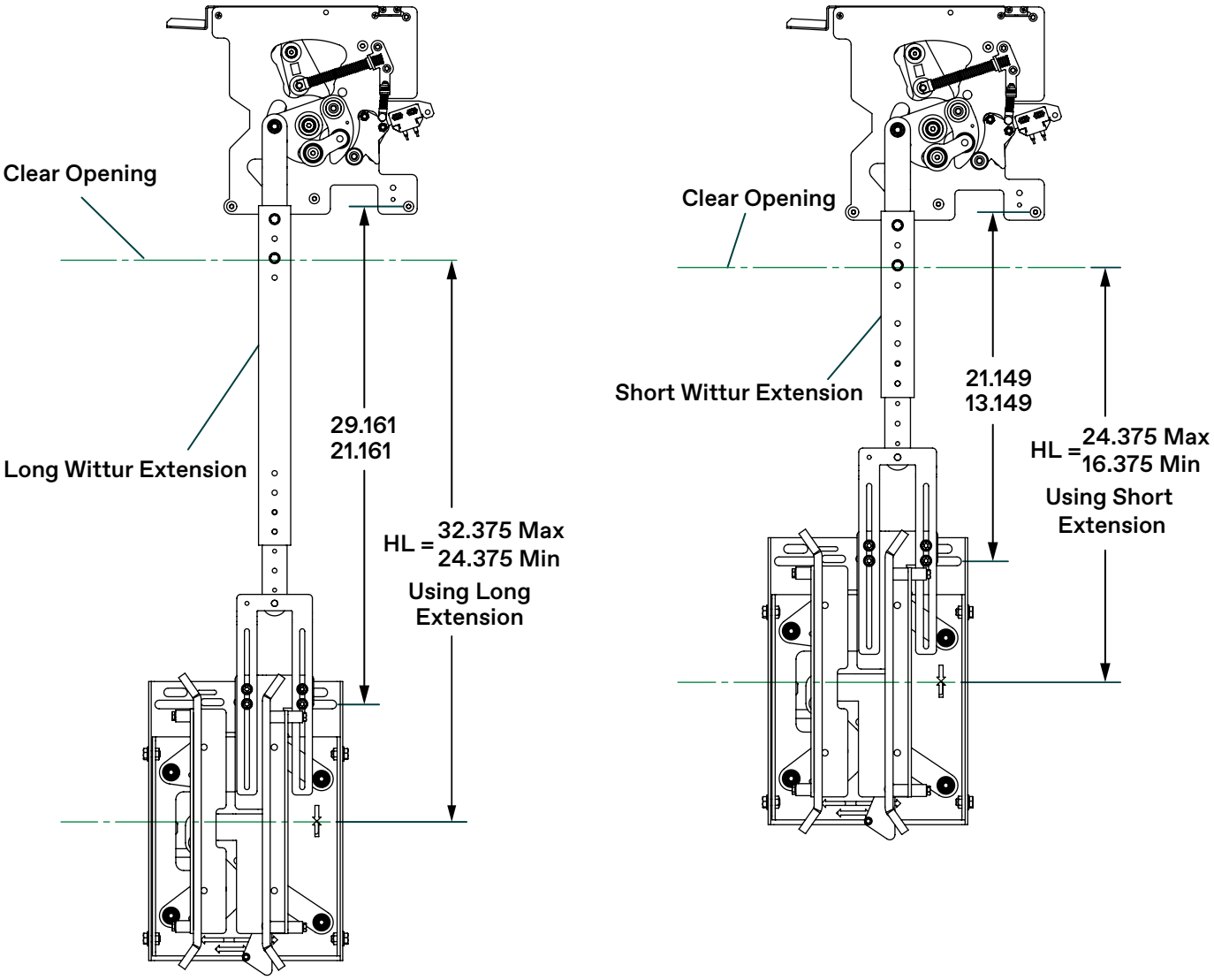


Figure 46 - Adjust Clutch and Linkage - Short and Long Wittur Extensions

Clutch Installation and Adjustment
(continued)

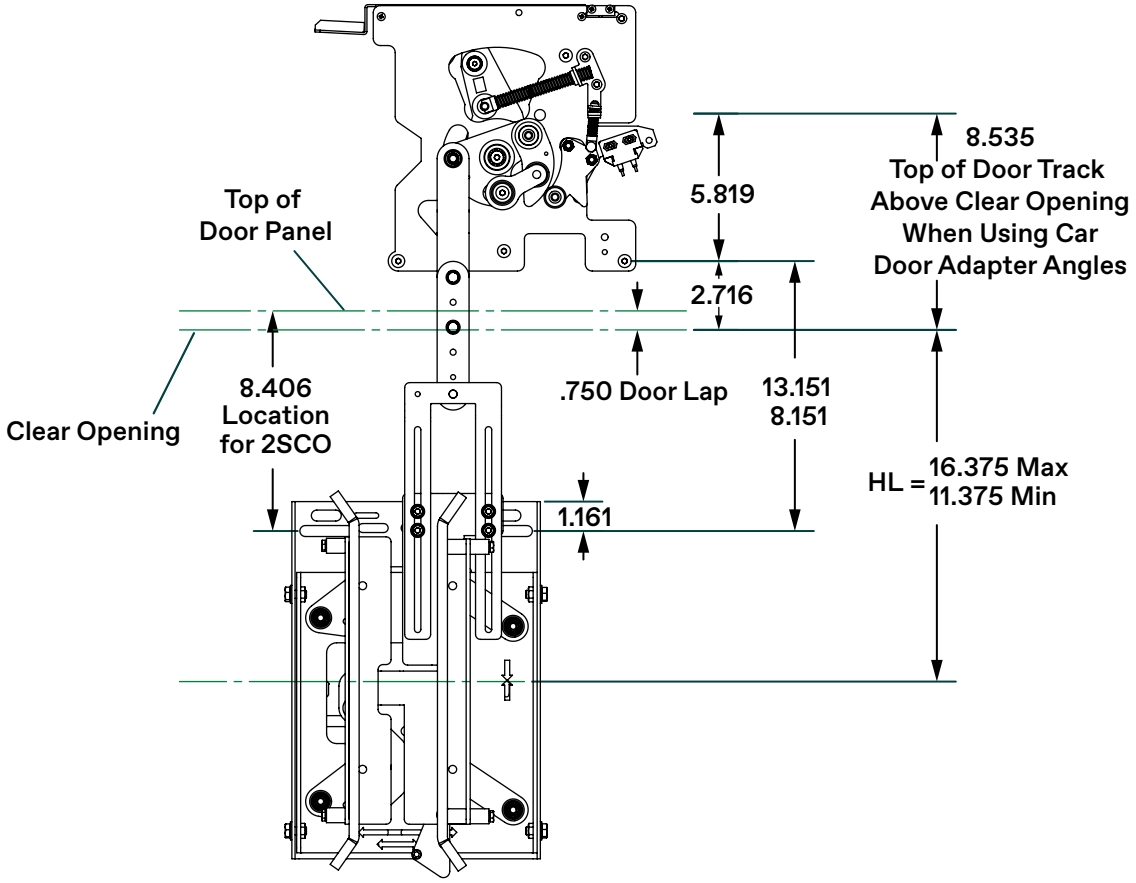


Figure 47 - Adjust Clutch and Linkage

Adjust Door Contacts and Door Lock Contact (Relating Cable Adjustment)

Center-Opening Doors

1. Verify the distance from the bumpers to the pendants is equal for both pendants.

   If the distance is not equal:

   a. Loosen the set screw on the rope guide (relating cable rope guide).

   b. Move the car door hanger until the distance is equal for both pendants.

   c. Tighten the set screws on the rope guide.

All Other Doors

2. When the door lock pins are just touching the door contacts, verify that the measurement between the door hanger and the bumper is $^{1}/_{8}$". See Figure 48.

   If the measurement is not $^{1}/_{8}$":

   a. Loosen the screws.

   b. Move the bracket(s).

   c. Verify that the measurement is $^{1}/_{8}$".

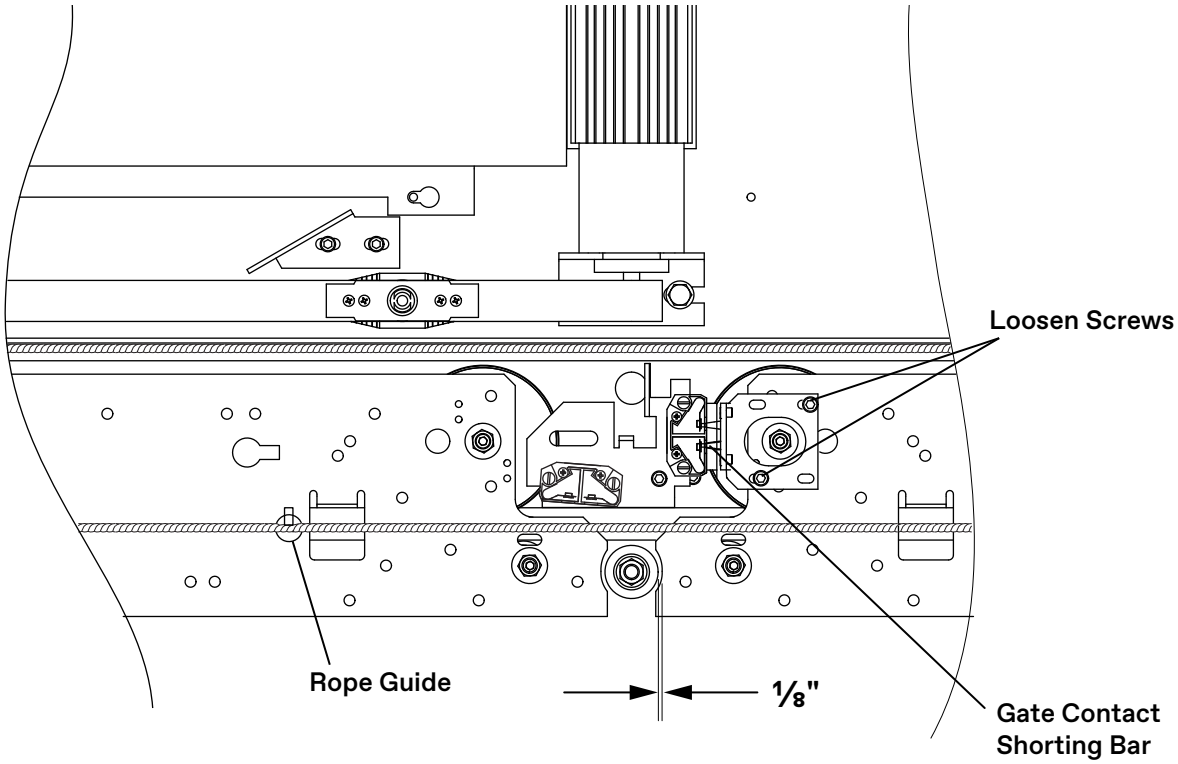


Figure 48 - Adjust Door Contacts/Door Lock Contact (Center-Opening Shown)

Adjust Car Door Interlock/Restrictor

The horizontal location of the car door interlock/restrictor ramp determines when the restrictor latch starts to open as the car door reaches a fully closed position. See Figure 49.

Troubleshooting

Problem	Reason	Solution
Car door interlock/restrictor does not open.	Hoistway door is already closed.	Move car door interlock/restrictor ramp in the Door Open direction.
Hoistway door is not locked and the car door is closed.	Hoistway door latch does not lock because of closing force, wind, or dirt in the sill.	Move car door interlock/restrictor ramp in the Door Close direction.

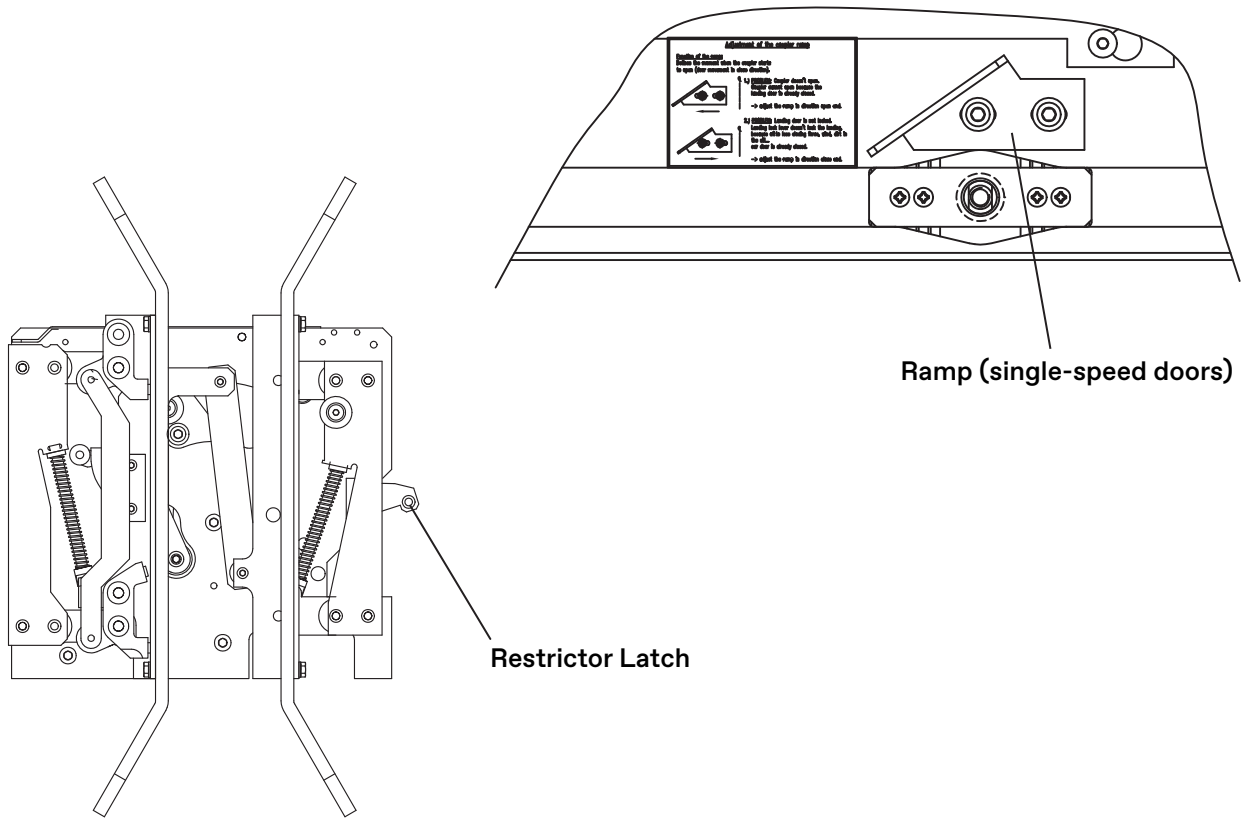


Figure 49 - Adjust Car Door Interlock/Restrictor

Verify Running Clearances

IMPORTANT!

- To move the doors open under power when not floor level, manually open the clutch to operate the restrictor. See “Block LD-16 Clutch Open” (next section).
- To retract the clutch with the doors all the way closed, move the screw towards the Door Close direction.

Verify that there is a $^{3}/_{8}$" running clearance for the following areas. See Figure 50.

1. Clutch to sill - use the four bolts (see below) for adjustment.
2. Stationary pickup roller to rear clutch cam - after one pickup roller is adjusted, transfer the roller position to the top of the LD-16 header and use this position to set the pickup rollers at all other entrances.

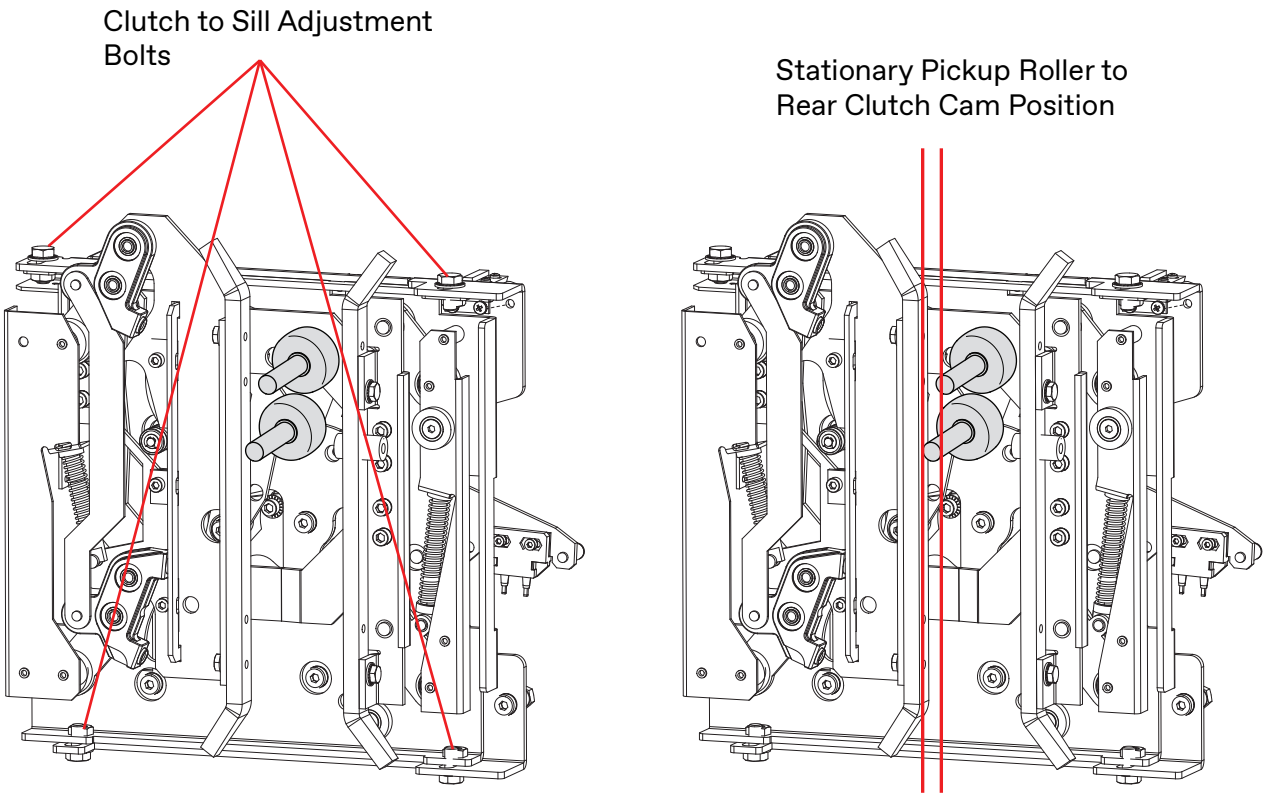


Figure 50 - Verify Running Clearances

Block LD-16 Clutch Open

If it is necessary to move the car with no power to the door operator, block the LD-16 clutch open.

CAUTION

Failure to provide proper clutch-roller clearance will cause roller or clutch damage. Failure to block the clutch open when running the car with the LD-16 powered OFF will cause roller or clutch damage.

1. Remove the screw from the parking position on the clutch. See Figure 51.
2. Open the clutch vanes, and install the screw in the lock position hole.
3. Run the car on Inspection Operation, and check the running clearance between the clutch and the hatch door rollers at each floor. Adjust the hatch door rollers (or clutch) as required.
4. After checking the running clearance, remove the screw from the lock position hole and reinstall it in the parking position hole.

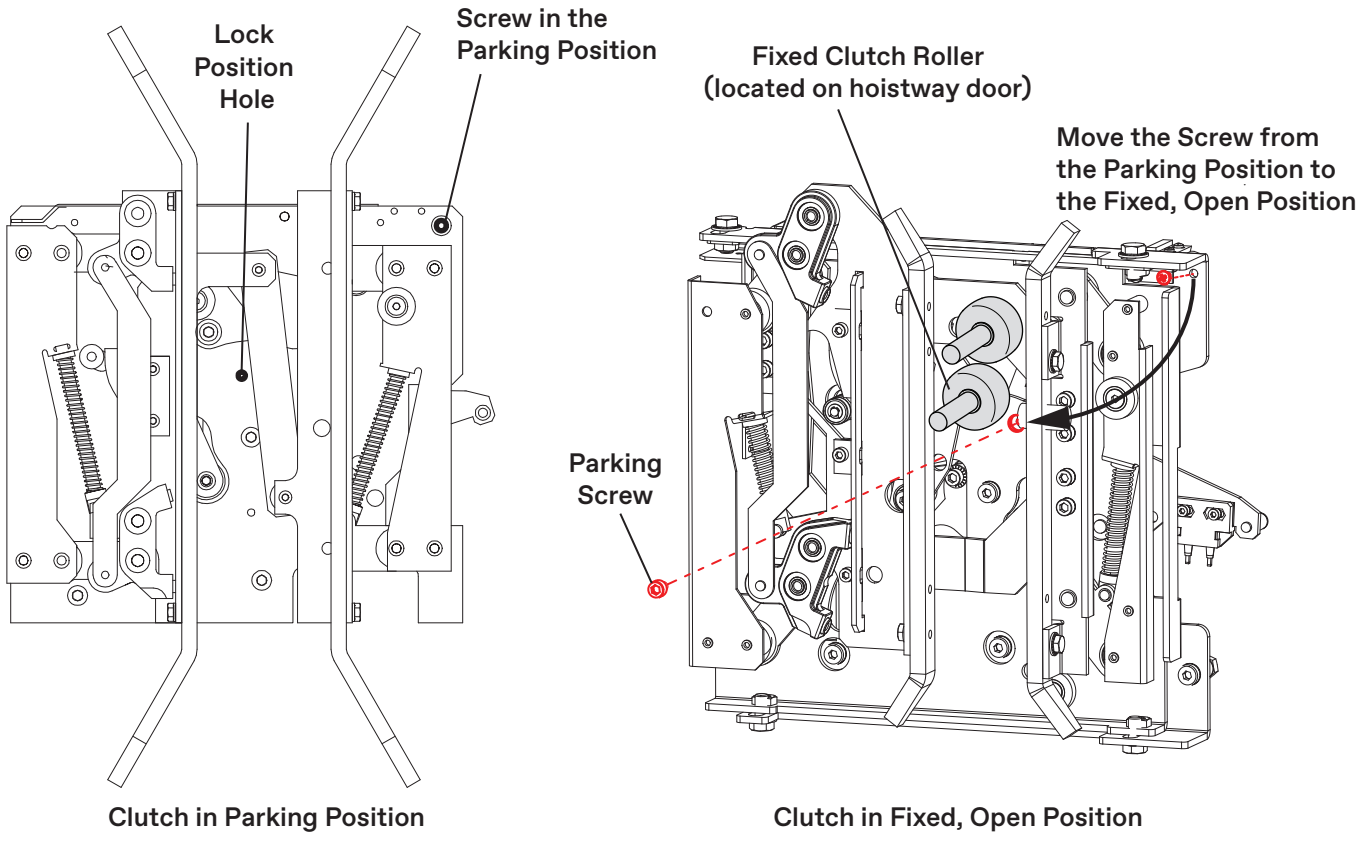


Figure 51 - Block LD-16 Clutch Open

Install Electronic Edge

1. Install the electronic edge per the included instructions. See also: *Door Protection Installation Manual* located on the Lobby.
2. Route cables—avoid tight bends and sharp edges—from the light curtain to the ends of the door track, and secure with cable ties. See Figure 52 on page 58.
3. Use clips to secure the electronic edge cables to the doors.
4. Route the electronic edge cables up to the top of the door operator C-channel, and secure with cable ties.
5. Route the electronic edge cables to the Door Operator Control Board located behind the cover.
6. Plug in the cable from the receiver to X15 on the Door Operator Control Board.
7. Plug in the cable from the transmitter to X16 on the Door Operator Control Board. See Electronic Edge Wiring.

Electronic Edge Wiring

The electronic edge is wired to the X15/X16 plugs on the door board (the quickest response to edge activation).

DIP SW 2 controls how the door board responds when the edge activates.

- When DIP SW 2 is ON and the edge activates: the door board will reopen the doors, and the REOPEN relay output 3 at the X2 plug will also activate. The REOPEN output can be wired to the controller's electronic edge input to satisfy that control need.
- When DIP SW 2 is OFF and the edge activates: the door board will not reopen the doors, but the REOPEN relay output 3 at the X2 plug will activate. The REOPEN output contacts need to be wired to the controller's electronic edge input to achieve a door reopen.

IMPORTANT!

If the electronic edge is wired directly to the controller—not to the X15/X16 plugs on the door board—the doors will only be allowed run at slow speed, open and close. To achieve normal, full speed door cycles with an unused IPD edge input, the door board must have a permanent jumper placed on the X15 plug, signal IPD to GND.

Install Electronic Edge
(continued)

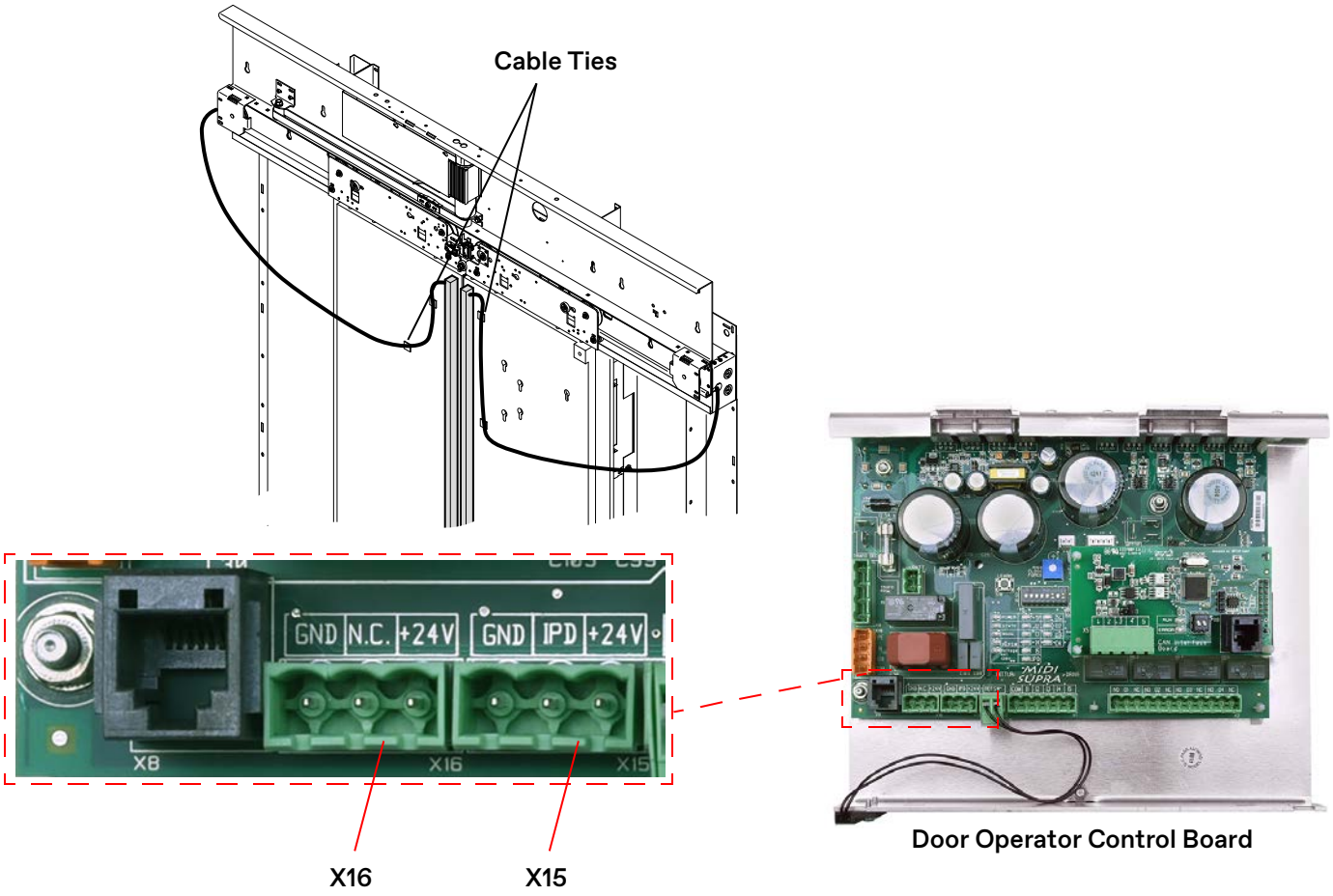


Figure 52 - Install Electronic Edge

Electronic Setup & Adjustment

Wiring

See also: Job wiring diagrams and generic wiring diagrams starting on page A-16 (Appendix).

1. Verify that the doors are mechanically adjusted for smooth movement with no binding or interference.

2. Remove the cover from the Door Operator Control Board. See Figure 53 on page 59.
   a. If required, move the car doors partially open.
   b. Loosen 4 screws, slide the cover over and off of the screws, and set the cover aside. The Door Operator Control Board should not have power at this point.

Wiring
(continued)

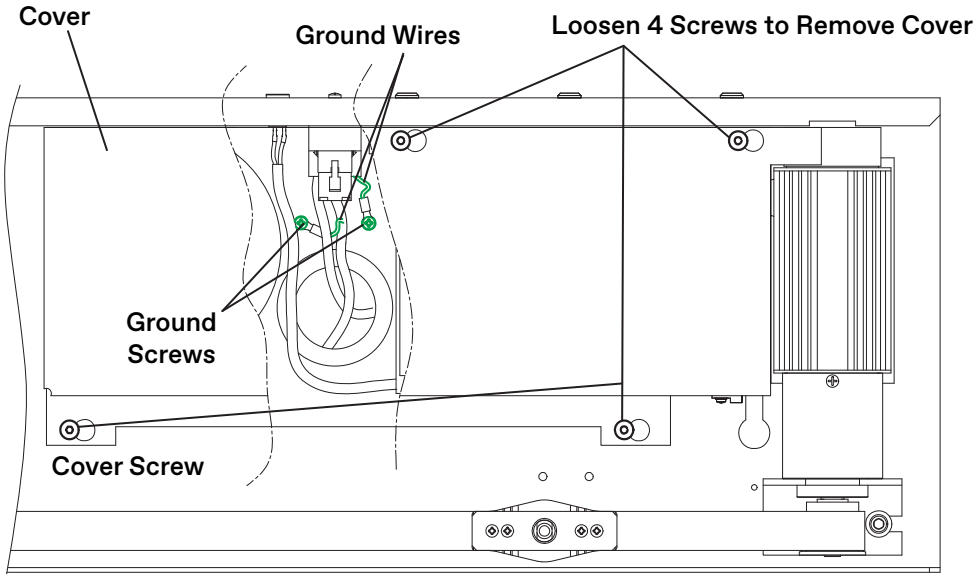
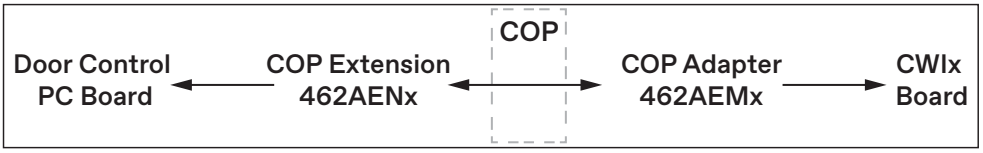


Figure 53 - Remove Cover and Attach Ground Wires

3. Attach the previously installed door operator harness and the plugs in the COP to the Door Operator Control Board. See Figure 54 on page 60.

   If non-TKE system, remove the COP plugs from the 462AEMx harness and wire the harness directly to the COP terminals.

Harness Installation Overview



The 120VAC female plug receptacle powers the GFCI receptacle in the CTS

See also:

- Harness Assembly diagrams start on page A-8.
- Serial Communications - TKE Legacy Control Systems on page 71.
- Discrete Controller Interface on page 74.

Wiring
(continued)

4. Attach the following wires to the ground screws.
   a. Ring lug ground wire from X19.
   b. Ring lug ground wire in the harness from the COP.

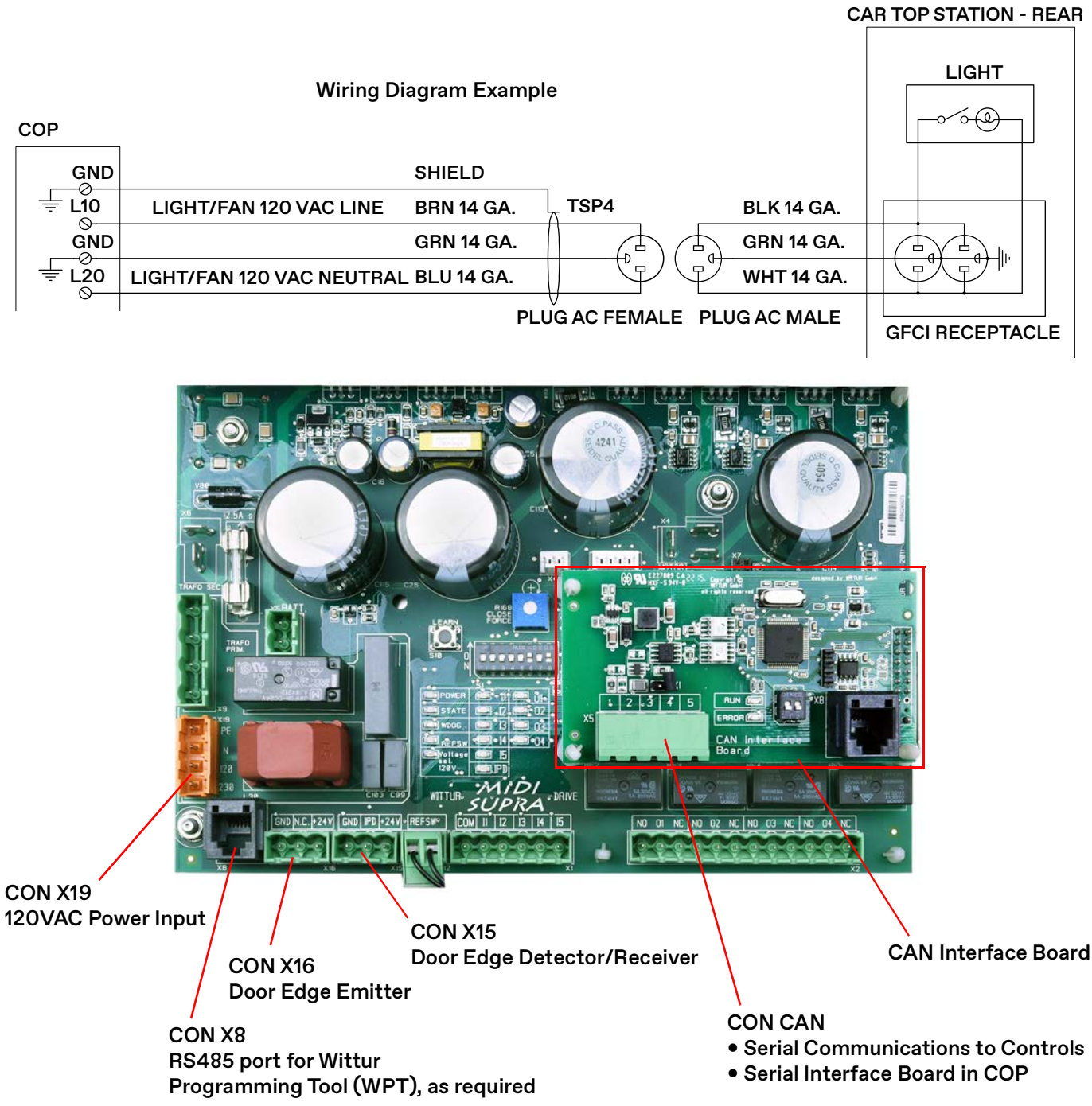


Figure 54 - Wiring Diagram Example and Harness Connections

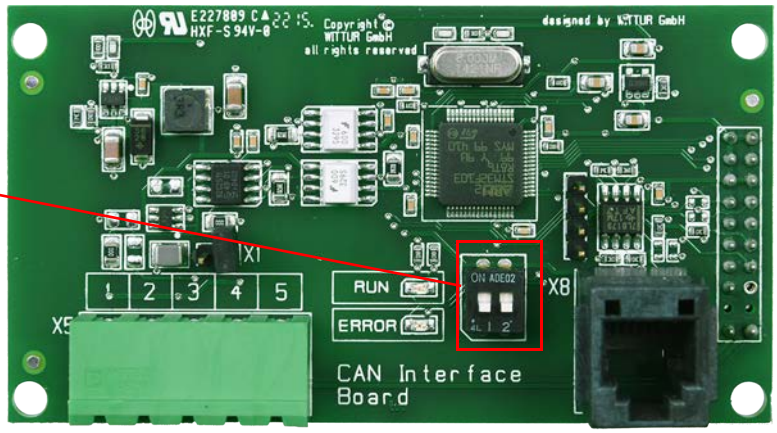
DIP Switch Settings

CAUTION **Disconnect power from door operator when changing DIP Switch settings.**

Verify DIP Switch settings. See Figure 55 below and Tables 1 and 2 on page 62.

CAN Interface Board

DIP Switch 1: Front = OFF, Rear = ON
DIP Switch 2: OFF



Door Operator Control Board

Serial Communications
DIP Switch 2 & 8 = ON
All Others = OFF

Discrete Interface
DIP Switch 2 = ON
DIP Switch 1, 3, 4, 7 = OFF
DIP Switch 5 & 6 = Desired Speed Pattern - See Table 1 on page 62.

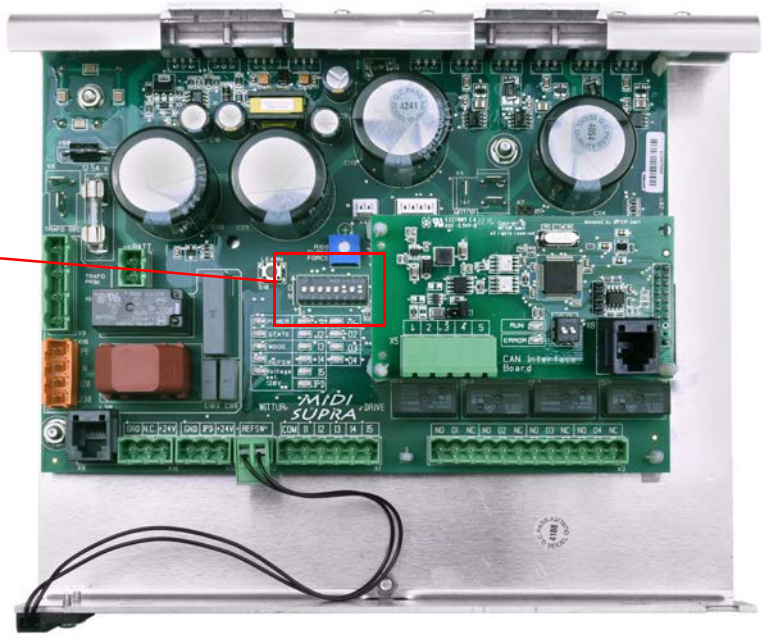


Figure 55 - DIP Switch Default Settings

DIP Switch Settings
(continued)

Switch	ON	OFF
S1/1*	Test Drive Button Operation (Buttons active) Performs same function as TEST/RUN switch	Normal Operation (Command Inputs Active)
S1/2	Automatic Reopen on Obstruction or IPD (Reopen O3 switched as long as Reopen in progress)	No Automatic Reopen (Only Reopen O3 is switched)
S1/3	Electric Shoe Operation, Command Input Always I1 (Swing Door Mode) (*)	Normal Operation (Command Inputs Active)
S1/4	Reduced Motor Torque Used	Maximal Possible Motor Torque Used
S1/7	Open Force Limitation Active	No Open Force Limitation
S1/8	Automatic End-Keeping	Hold Open/Closed Only on Active Open/Close Command

Desired Speed Pattern - Discrete Interface Only				
Switch No.	Min.	Speed Pattern Selection		Max.
	1	2	3	4
S1/5	OFF	ON	OFF	ON
S1/6	OFF	OFF	ON	ON

Table 1 - Door Operator Control Board DIP Switch Definitions

LED	Application	Description - When Illuminated
I1	Discrete Input Status	Discrete input I1 is active - Open command (COM connected)
I2		Discrete input I2 is active - Close command (COM connected)
I3		Discrete input I3 is active - Nudging command (COM connected)
I4		Discrete input I4 is active - Inspection command (COM connected)
I5		Discrete input I5 active - Alt speed profile command (COM connect)
IPD	Input - Passenger Detection	Light curtain signal is active - Doors are obstructed
O1	Discrete Output Status	Discrete output O1 is active - Door Open Limit - relay is ON and serial bit sent
O2		Discrete output O2 is active - Door Close Limit- relay is ON and serial bit sent
O3		Discrete output O3 is active - Reopening - relay is ON
O4		Discrete output O4 is active - SIX Inch Limit- relay is ON and serial bit sent
POWER	Board Power Supply	Board power supply is ON
WDOG	Microprocessor Function	Board microprocessor is not executing software - locked up
REFSW	Closed Limit Area	Car door is in the REFSW area - closed limit area, REFSW is active
Voltage Sel 120VAC	120VAC Supply Selected	120VAC power input is selected and active
STATE	—	OFF = Normal Operation
	—	Constant ON = Learn Mode and Start Up
	Error/Status See Troubleshooting Guide on page 70	Flashing: 1X = Motor or encoder fault 3X = Internal board fault 4X = Abnormal operation 5X = Learn error

Table 2 - Door Operator Control Board LEDs

Learn Door Travel

CAUTION **Before performing a Learn Door Travel Procedure, install a tie wrap to keep the CDI picked and eliminate the risk of getting fingers pinched.**

1. Place the elevator on Inspection Operation, and manually close the doors.
2. Power up the door operator, and verify the following LEDs. See Figure 56 on page 64.
   a. POWER, VOLTAGE SEL 120VAC, and REFSW are illuminated.
   b. WDOG is not illuminated.
3. Press **LEARN**, and then release it. The **STATE** LED should flash 2 or 3 times and then remain illuminated; If it remains in the flashing mode, there is an error and setup cannot proceed.

NOTE The first LEARN cycle will operate at a reduced speed.

   a. Press and hold **DOOR CLOSE** until 02 and REFSW LEDs illuminate—the door will jerk and then start powered motion to learn the direction and the closed limit. If the doors move open, continue to press **DOOR CLOSE** until the doors move in the correct direction and 02 illuminates.
   b. Pick the Car Door Interlock (CDI).
   c. Press and hold **DOOR OPEN** until the door is fully open on its door stop bumper and the 01 LED illuminates.
   d. Press **DOOR CLOSE** until the 02 LED light illuminates.
   e. Press **DOOR OPEN** until the 02 LED illuminates again. When the STATE LED is not illuminated, a LEARN Run Scan has been completed.
   f. Repeat Step a and Step c until STATE LED is not illuminated.

NOTE
- The doors have learned the hardware parameters. Door direction, opening width, and clutch width are retained until manually reset or re-learned.
- A soft learn (used for fine-tuning the belt position) must happen after every power cycle. In this case, the door will not move itself to LEARN, but will LEARN while moving.

4. Rotate the TEST/RUN switch to the RUN position. The door system is now capable of Automatic Operation, and learned parameters are automatically saved.

Learn Door Travel
(continued)

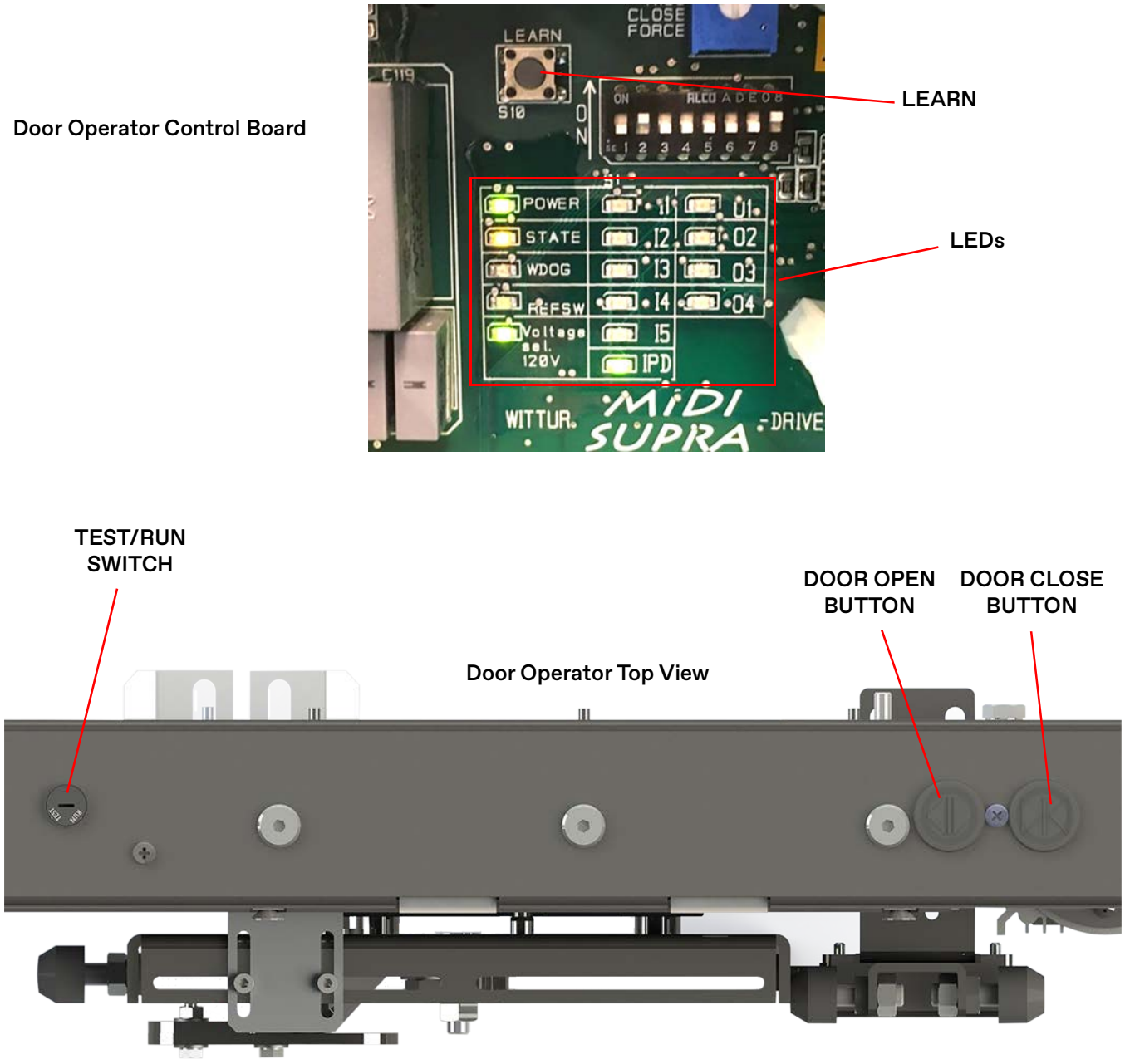


Figure 56 - LEDs and Test Buttons for Learn Door Travel

Speed Pattern Adjustment with the Wittur Programming Tool (WPT)

The LD-16 Door Operator is shipped with standard speed pattern default settings for the open and close movement profiles (doors come pre-adjusted, but nudging and closing force must always be adjusted per car). However, these default speed pattern settings may not provide the operation desired. Operate the elevator on Automatic Operation to observe the default door operation and, if modifications are desired, perform the Speed Pattern Adjustment process below.

Use with: *Programming Tool WPT* manual (located in the WPT Kit, see page 85).

NOTE The port for the WPT on the door card is only active when the CAN Interface Card communications are removed (uncoupling door operator from the control system). When this link is removed, automatic cycling of doors from the control system is not possible.

Automatic Door Cycling During Adjustment Procedure

See Figure 57 on page 66 for all steps in this procedure.

1. Place the car on Inspection Operation, then power down and remove the X5 plug from the CAN Interface Card (located on top of the door card). Power back up, and the Wittur tool communications and the X1 discrete door movement inputs are now enabled.

2. Construct a reusable harness long enough to use the WPT and also reach the door operator so that when the car is placed below floor level, or if working from the car top, the use of the X1 wires can initiate door movement.

3. Use plug 292PG6 as the male portion of X1 and install wires in the plug to correspond with the inputs in Figure 57.

4. To activate the input, connect the COM wire to any one of the other five wires.
   - inputs are active low = goes to ground to activate.
   - When the X1 inputs are used and the input is activated, the corresponding card LED will light up. See Table 3 on page 67.

5. Once all door adjustments have been performed and saved, ***power down*** and remove the reusable harness.

6. Reinstall the X5 plug onto the CAN Interface Card (located on top of the door card).

7. Power up, test, and verify door operation.

Automatic Door Cycling During Adjustment Procedure
(continued)

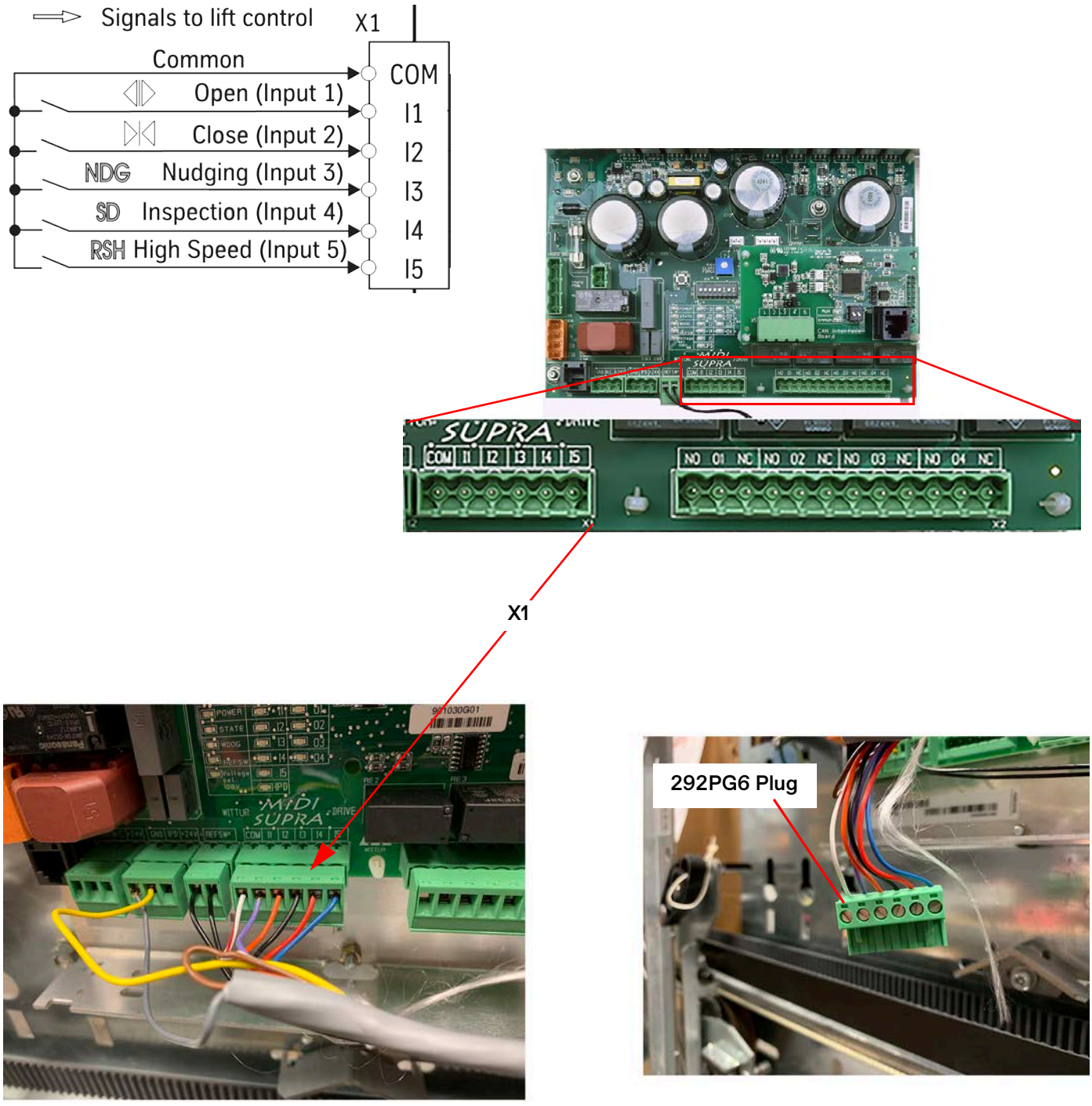


Figure 57 - X1 Inputs on Door Board

Automatic Door Cycling During Adjustment Procedure
(continued)

LED	Name	Definition
I1	OPEN Command	Drives the door in the open direction until the open position is reached. Input must be maintained all the way to the mechanical open stop. Automatic End-Keeping - DIP Switch 8 = ON; the door card and motor torque keeps doors open with this commend being active. Use If the control system does not maintain the Open Command input when DOL is reached.
I2	CLOSE Command	Drives the door in the closed direction until the closed position is reached. Input must be maintained all the way to the mechanical close stop. Automatic End-Keeping - DIP Switch 8 = ON; the door card and motor torque keeps doors closed with this commend being active. Use If the control system does not maintain the Close Command input when DOL is reached.
I3	NUDGING Command	Activates the nudging door slow speed for the Close cycle. Input must be maintained all the way to the mechanical close stop. Smoke-sensitive devices (photo cell/light curtain--IPD input) & closing force reopen ignored.
I4	INSPECTION Command	Deactivates all inputs at the X1 plug and activates the door operator test drive buttons (same function as DIP Switch 1). The X2 outputs still functional when input is active.
I5	ALT SPEED Command	Selects a higher Open or Close speed profile when active and used with an Open or Close Command input (same function as DIP Switch 6). DIP Switches 5 & 6 = OFF, speed pattern 1 in effect input selects pattern 3. DIP Switches 5 = ON & 6 = OFF, speed pattern 2 in effect input selects pattern 4. DIP Switch 6 = ON, no change.

Table 3 - Wittur Door Card X1 Discrete Input Command Descriptions and LEDs

Table 3 Notes:

- The movement input wires must be maintained so that the input is active all the way to the door limit or the doors will stop mid-travel.
- For normal speed pattern adjustment, the open and close commands can be used to cycle the doors to see the door operation results after adjustment changes.
- Use the nudging input to set the Nudging Duty/Speed.
- Use the Inspection input to enable the slow speed buttons on the operator frame and inhibit the other X1 inputs (same function as DIP Switch #1).

Closing Force Adjustment - 30 lbs. Maximum

1. Place the car at floor level on Inspection Operation.
2. Rotate the TEST/RUN switch to the TEST position.
3. Use the kinetic force gauge (TKE part no. 9869657) to measure the closing force, and press DOOR CLOSE to close the doors. Do not apply closing force for more than 10 seconds at a time. See Figure 58.

- If required, reduce the closing force by turning the CLOSE FORCE Potentiometer counterclockwise; remeasure and repeat until the closing force is within limits.
- To control kinetic energy, reduce the door closing top speed to within the code requirements.

4. Rotate the TEST/RUN switch to the RUN position.

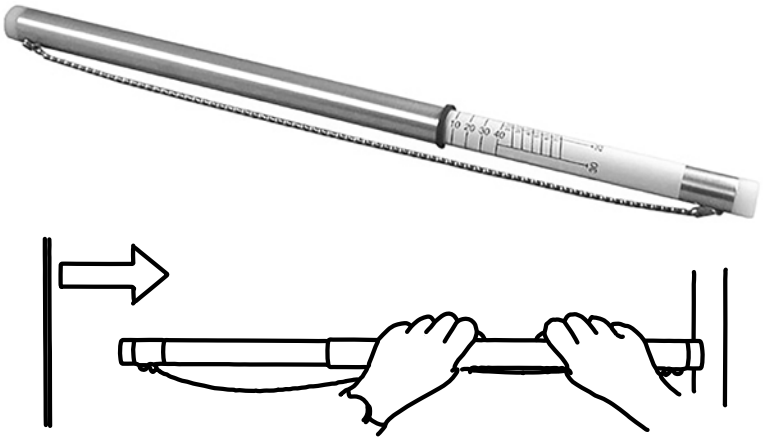


Figure 58 - Closing Force Gauge

Diagnostics

Fault Codes

WPT Tool	Description
PS	Parameter set error
EE	EEPROM writing or reading fault
OC	Overcurrent
RS	Faulty reference switch
IE	Internal software fault
AP	Fault by position counter, door width > 3.5m
TS	Faulty temperature sensor
NE	Encoder not connected
CF	Closing force potentiometer defect
ME	Fault by motor or encoder
SS	Standstill fault, door is blocked
TH	Temperature of the electronic or motor too high
FE	Set during manual change of coupler movement parameter
ES	Fault by encoder, signals out of limits
PI	Position input (ABSPOS) Invalid
BE	Electrical error during rotor angle detection, no current flowing (motor not connected)
BM	Mechanical error during rotor angle detection; door stalled wrong rotation direction; press LEARN.

Troubleshooting Guide

Problem	Possible Causes or Solutions
The Door Does Not Move At All	If STATE LED is blinking = Fault; the fault codes can be read by either IMS or WPT. (# blinks) Fault Type (1) Motor or Encoder Fault (3) Internal Board Fault (4) Abnormal Operation (5) Learn Error 1. Check if power is ON. The POWER LED must illuminate if X19 is connected and the circuit breaker in the elevator control panel is ON. 2. Check WD LED. If continuous illuminate/blink, switch OFF/ON or replace electronic unit. 3. Verify the motor and encoder wires (plug X4 and X10) are correctly connected and the motor is not overheated. 4. Verify the control panel is sending an Open or Close Command. • Discrete interface system: I1-I2/X1, LED I1, I2 • Serial system: see Serial Communication for TKE Legacy Control Systems on page 71. 5. Verify that the friction is not too high when the door is manually moved. If the STATE LED flashes, use IMS or the WPT to read the faults; switch OFF/ON. 6. Verify the DIP Switch settings.
The Door Does Not Reopen	1. When Automatic Reopen is selected (DIP switch S1/2 is ON), an Automatic Reopen process is executed by the IPD input (safety edge input) or by the Close Force Limiter. 2. Check the following reopen devices: • Curtain of Light: not defected or dirty. • Close Force Limiter: friction is not too high.
Faults Cause Reset or Switch Off	If STATE LED is blinking = Fault; the fault codes can be read by either IMS or WPT. (# blinks) Fault Type (1) Motor or Encoder short circuit - open wires and/or missing signals (3) Overcurrent, e.g., power stage or motor short circuit. (3) Internal electronic fault. (4) Door mechanically blocked (5) Mechanical end not found (>=3.5m). OFF = Undervoltage; supply voltage is measured and if too low, power stage switches OFF.
Faults Decrease Door Performance	If STATE LED is blinking = Fault; the fault codes can be read by either IMS or WPT. (# blinks) Fault Type (4) Motor and/or power stage temperature too high, and the software reduces the motor power. If the temperature exceeds a higher limit, the power stage is shut down for cooling. (5) Faulty reference switch. OFF = Low voltage supply, low line voltage.

Serial Communication for TKE Legacy Control Systems

Serial Interface Board Setup

See also:

- Serial Interface Board LED Definitions on page 72.
- Serial Interface Board Troubleshooting Guide on page 72.
- Serial Communications Troubleshooting Guide on page 73.

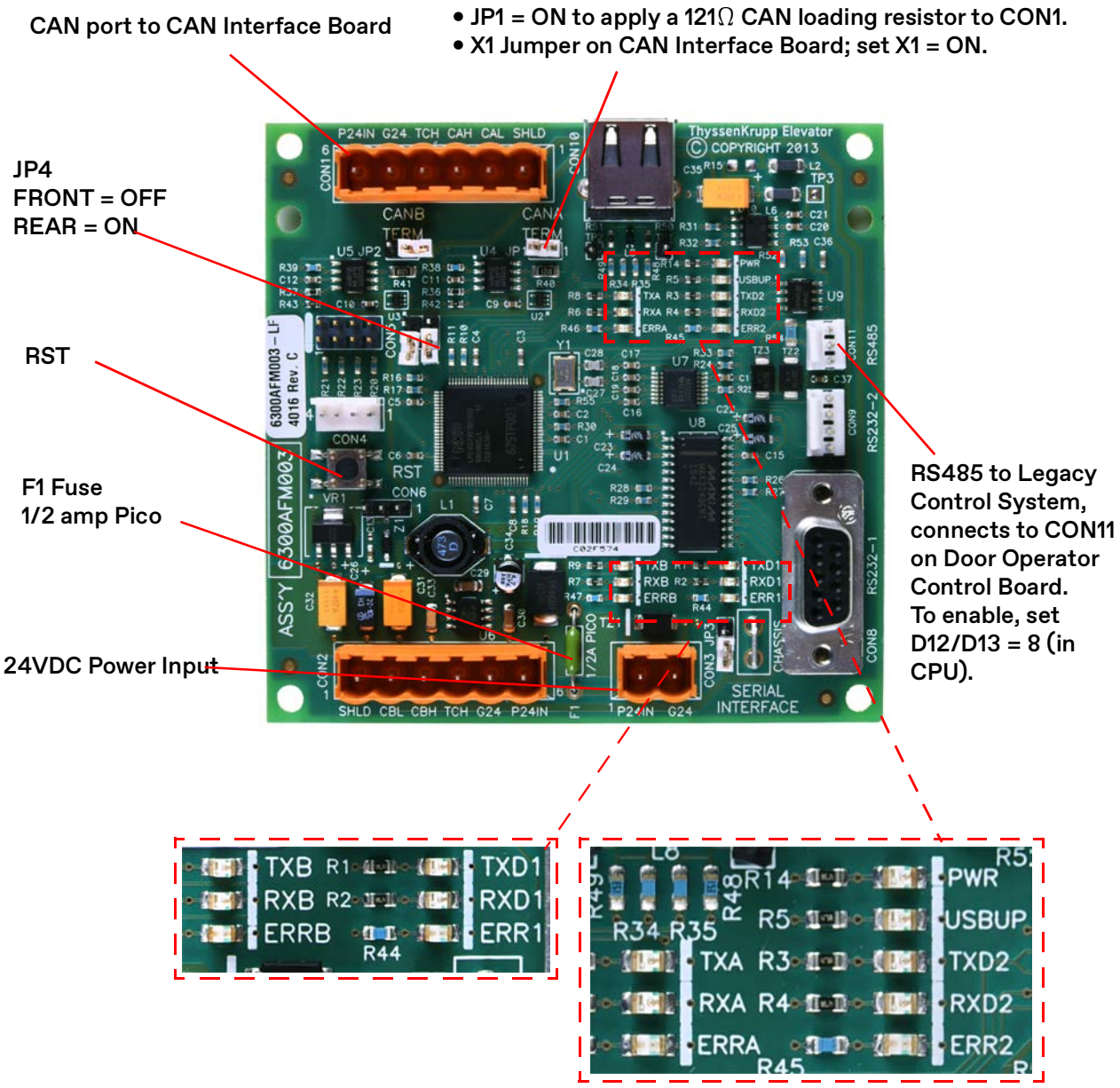


Figure 59 - Serial Interface Board (6300AFM)

Serial Interface Board LED Definitions

LED	Color	Use	Status	Definition
PWR	Green	24VDC Power Input	ON	• +24VDC correct at CON3. • F1 fuse is functional. • All low voltage power supplies are functional.
TXA	Green	CAN Packet Transmit	Blinking	CAN comm. transmitted from CON1 to CAN Interface Board.
RXA	Green	CAN Packet Receipt	Blinking	CAN comm. received at CON1 from CAN Interface Board.
ERRA	Red	CAN Packet Errors	Blinking or ON	Serial Interface Board detecting CAN packet errors.
TXD2	Green	RS485 Packet Transmit	Blinking	RS485 comm. transmit from CON11 to TKE control system CPU.
RXD2	Green	RS485 Packet Receipt	Blinking	RS485 comm. received at CON11 from TKE control system CPU.
ERR2	Red	RS485 Packet Errors	Blinking or ON	Serial Interface Board detecting RS485 packet errors.

Serial Interface Board Troubleshooting Guide

Problem	Possible Causes or Solutions
RX_ or TX_ LEDs are not blinking.	1. Press RST on the Serial Interface Board, and all LEDs illuminate for 1 second - LEDs are good and the microprocessor board is functional. If not, verify the following: a. +24VDC power input problems. b. F1 Fuse (1/2 amp Pico). c. Board replacement. The RX_LEDs will not blink if communication is not established, or if wiring is not correct. The TX_LEDs may blink at first, even with faulty wiring, as the board attempts to establish communication.
Serial Interface Board stops trying to communicate on one of the channels (CAN or RS485) because the other channel cannot be established.	• If the CAN bus to the door operator does not function for 10 seconds or longer, the board will stop trying to communicate to the TKE CPU on the RS485 channel to signal to the TKE CPU that door communications are offline, and the TXD2 LED will stop blinking. • If the RS485 bus to TKE CPU does not function for 10 seconds or longer, the board will stop trying to communicate to the LD-16 door board on the CAN channel to signal to the LD-16 door board that door communication to the controller CPU is offline, and the TXA LED will stop blinking. Verify the following: • LEDs per the Serial Interface Board - LED Definitions (see above). • Both TX_LEDs are blinking. • No ERR_LEDs are blinking or ON.
	TIP: Use the IMS Smart FAST to query the LD-16 door board for the RS485 and CAN channels. If the IMS Smart FAST fills in the adjustment menu with values, communication is established. The IMS Door I/O & Faults Screen (in Door Diagnostics) will show ONLINE status = ON.

Serial Communications Troubleshooting Guide

Door Communications Faults in the Host CPU/CPUa, or Door Serial Communications Not Working Correctly	
Verify the following applicable items.	
CAN Systems	Jumper X1 on the CAN Interface Board is not installed. (inserts a termination resistor – not used in this mode).
	Door Adjustments D12 and D13 = 7.
	462AEN/462AEM harness connections between CWIx (in COP) and CAN Interface Board are correct.
	Wires are properly inserted in OPERF plug and OPERR plug.
TAC32 CAN Systems	Car CAN channel is fully functional; the DCN Command shows the CWIx node online.
RS485 Systems	462AEM harness connections between CWIx (in the COP) and Serial Interface Board are correct.
	462AEN harness connections between CAN Interface Board and Serial Interface Board correct.
	Wires are properly inserted in the OPERF plug and the OPERR plug.
RS485 Systems with Serial Interface Board in the COP	Door Adjustments D12 and D13 = 8.
	Jumper X1 on the CAN Interface Board = ON. JP1 on the Serial Interface Board (in the COP) = ON.
	Door communication travel cable wires are not damaged and correctly connected at both ends.
CAN Interface Board	DIP Switch S1-2 = OFF (for 50K baud).
Door Operator Control Board	RS485 Systems JP4 on Serial Interface Board. Front = OFF Rear = ON
	CAN Interface Board DIP Switch S1-1. Front = OFF Rear = ON

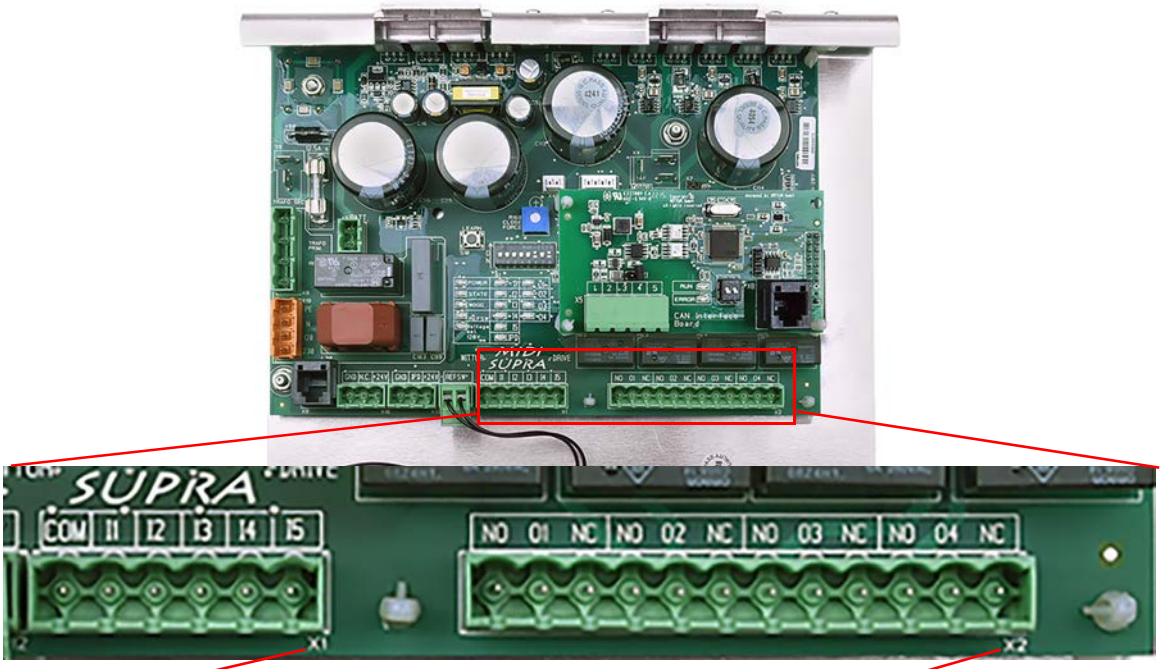
Discrete Controller Interface for non-TAC Systems

Discrete Controller Interface Setup

See also:

- I/O Signal Definitions on page 75.
- I/O Wiring Diagram on page 76.

If a CAN board is present, remove it to use the discrete interface ports.



X1

- INPUTS enter the board here.
- Do not wire any controller power supply to any pin.
- Circuits designed for low current.
- Suggested relays = <100mA.

COM = Common
I1 = OPEN
I2 = CLOSE
I3 = NUDGING
I4 = INSPECTION
I5 = ALT SPEED

X2

- OUTPUTS exit the board here.
- Relay output contacts are rated at 5A, 30VDC or 5A, 250VAC.

NO = Normally Open
O1 = Door Open Limit
NC = Normally Closed
O2 = Door Close Limit
O3 = Reopening
O4 = SIX

Figure 60 - Discrete Controller Interface

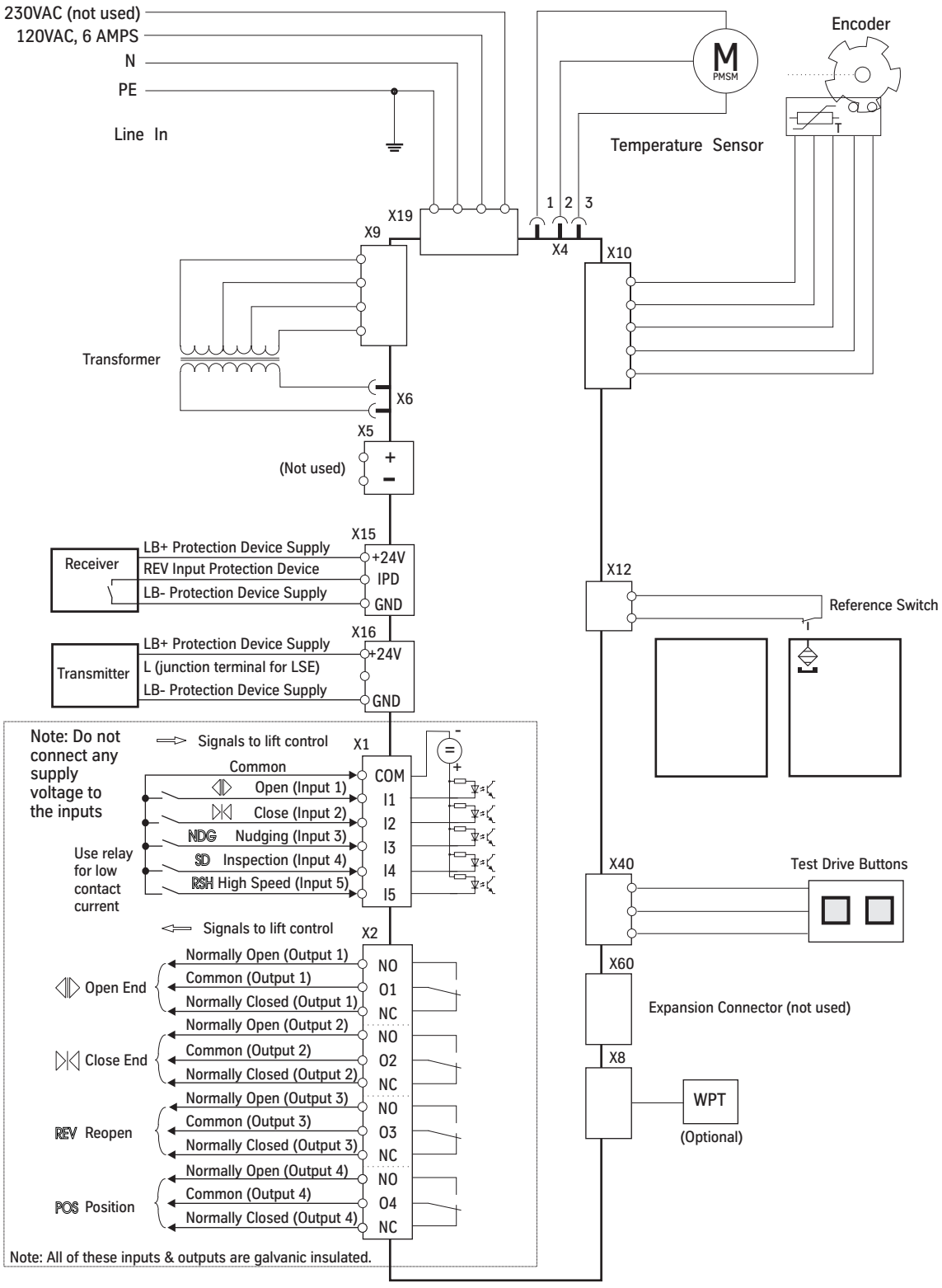
Discrete Controller Interface
(continued)

I/O Signal Definitions

LED	Name	Definition
INPUTS		
I1	OPEN Command	Drives the door in the open direction until the open position is reached. Input must be maintained all the way to the mechanical open stop. Automatic End-Keeping - DIP Switch 8 = ON, the door card and motor torque keeps doors open without this command being active; use if the control system does not maintain the Open Command input when DOL is reached.
I2	CLOSE Command	Drives the door in the closed direction until the closed position is reached. Input must be maintained all the way to the mechanical close stop. Automatic End-Keeping - DIP Switch 8 = ON, the door card and motor torque keeps doors closed without this command being active; use if the control system does not maintain the Close Command input when DOL is reached.
I3	NUDGING Command	Activates the nudging door slow speed for the Close cycle. Input must be maintained all the way to the mechanical close stop. Smoke-sensitive devices (photo cell/light curtain--IPD input) & closing force reopen ignored.
I4	INSPECTION Command	Deactivates all inputs at the X1 plug and activates the door operator test drive buttons (same function as DIP Switch 1). The X2 outputs still functional when input is active.
I5	ALT SPEED Command	Selects a higher Open or Close speed profile when active and used with an Open or Close Command input (same function as DIP Switch 6). DIP Switches 5 & 6 = OFF, speed pattern 1 in effect input will select pattern 3. DIP Switch 5 = ON & 6 = OFF, speed pattern 2 in effect input will select pattern 4. DIP Switch 6 = ON, no change.
OUTPUTS		
O1	Door Open Limit	Activates when the car door panels reach the fully open position and stays active until the panels move off of this position.
O2	Door Closed Limit	Activates when the car door panels reach the fully closed position and stays active until the panels move off of this position.
O3	Reopening	Activates whenever an Automatic Reopen is performed or when a Reopen request is coming into the door card from the light curtain or closing force limiter. Typically, the light curtain is connected to the door's X15/X16 plugs and DIP Switch 2 = ON (allows the door card to perform Automatic Reopen upon obstruction or IPD input).
O4	SIX	Activates when the car door panels reach a preset position in their travel, typically 6" from the closed point. If the door panels are between the closed limit and this adjustable point, this output will be active. Adjust this position point with either of the following methods: • IMS = SIX Parameter (serial control systems) • WPT = Position Out Adjustment.

Discrete Controller Interface
(continued)

I/O Wiring Diagram



Calculate Minimum Door Closing Times

Based on Kinetic Energy

1. Use the Car or Hoistway Door Weight Tables on page 78 through page 80 to determine the weight of the car doors and the weight of the hoistway doors.

2. Add the weight of the car doors and the weight of the hoistway doors, and enter this number as the typical door weight on the Total Door System Weight label (580AWP001). See Figure 61.

   a. If hoistway doors are heavier at one or more floors, determine weight of doors.

   b. Add weight of the car doors to weight of the heavier hoistway doors, and enter the heavy door weight on the Total Door System Weight label (580AWP001).

3. Install the Total Door System Weight label (580AWP001) per Figure 61.

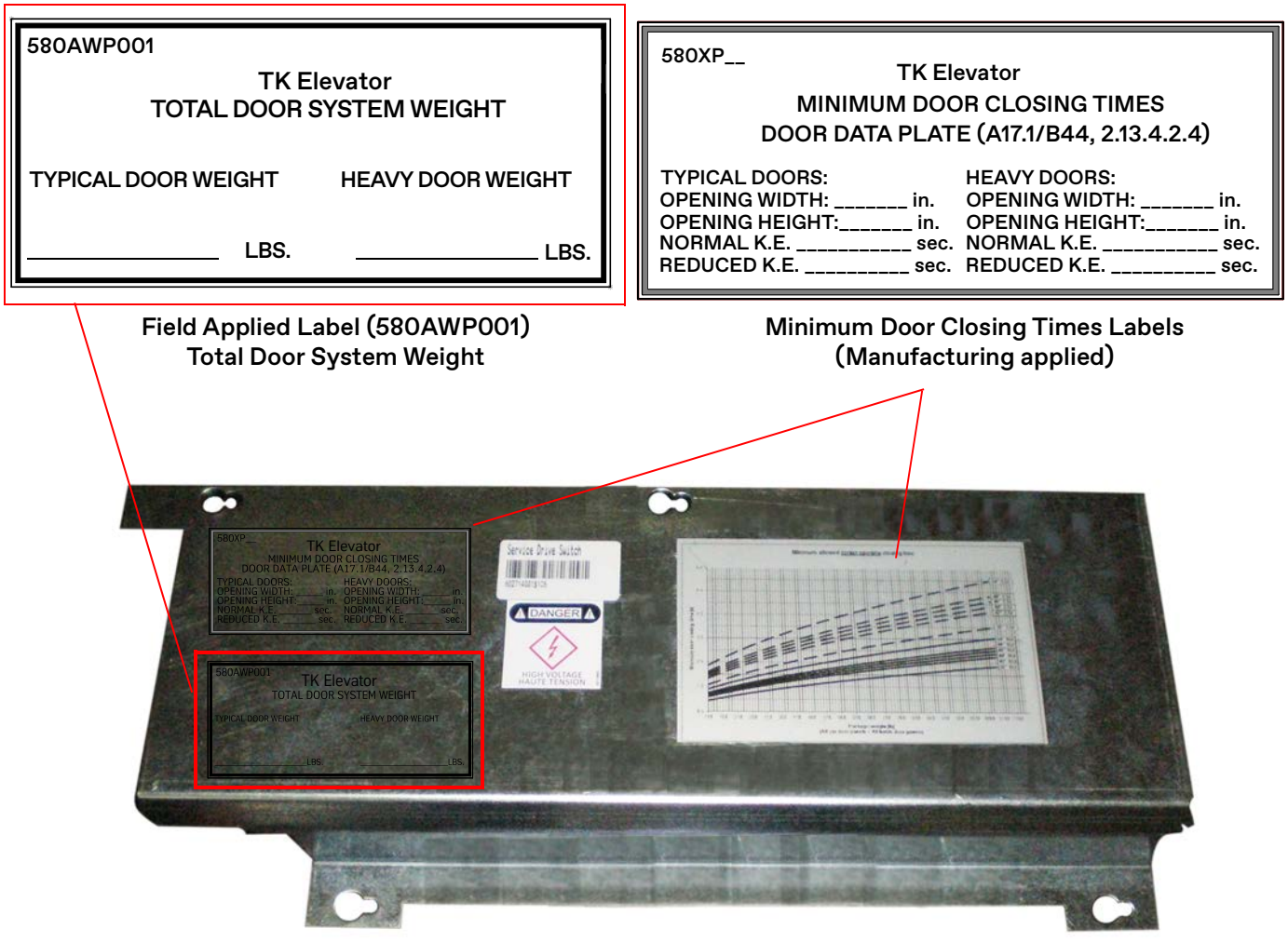


Figure 61 - Door Labels

Car or Hoistway Door Weight

SINGLE SPEED SIDE OPENING

Weight Density = 7.600

Door weights include allowance for door hangers, clutch, crank, etc.
The IMS Monitor variable, MASS, can be used to determine total door weight for label.

DOOR OPENING HEIGHT	32	34	36	38	40	42	44	46	48
120	208	221	234	247	260	273	285	298	311
118	205	218	230	243	255	268	281	293	306
116	202	214	226	239	251	264	276	288	301
114	198	210	222	235	247	259	271	283	296
112	195	207	219	231	243	255	267	279	291
110	191	203	215	227	238	250	262	274	285
108	188	199	211	222	234	246	257	269	280
106	184	196	207	218	230	241	252	264	275
104	181	192	203	214	226	237	248	259	270
102	178	188	199	210	221	232	243	254	265
100	174	185	196	206	217	228	238	249	260
98	171	181	192	202	213	223	234	244	255
96	167	178	188	198	208	219	229	239	250
94	164	174	184	194	204	214	224	234	244
92	160	170	180	190	200	210	220	229	239
90	157	167	176	186	196	205	215	225	234
88	154	163	172	182	191	201	210	220	229
86	150	159	169	178	187	196	206	215	224
84	147	156	165	174	183	192	201	210	219
82	143	152	161	170	178	187	196	205	214
80	140	148	157	166	174	183	191	200	209

DOOR OPENING WIDTH

CENTER OPENING

Weight Density = 8.500

Door weights include allowance for door hangers, clutch, crank, etc.
The IMS Monitor variable, MASS, can be used to determine the total door weight for the label.

DOOR OPENING HEIGHT	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60
120	233	247	262	276	290	305	319	333	348	362	377	391	405	420	434
118	229	243	257	272	286	300	314	328	342	356	370	384	399	413	427
116	225	239	253	267	281	295	309	323	336	350	364	378	392	406	420
114	222	235	249	262	276	290	303	317	331	344	358	372	385	399	412
112	218	231	245	258	271	285	298	312	325	338	352	365	379	392	405
110	214	227	240	253	267	280	293	306	319	332	346	359	372	385	398
108	210	223	236	249	262	275	288	301	313	326	339	352	365	378	391
106	206	219	232	244	257	270	282	295	308	320	333	346	359	371	384
104	202	215	227	240	252	265	277	290	302	314	327	339	352	364	377
102	199	211	223	235	247	260	272	284	296	309	321	333	345	357	370
100	195	207	219	231	243	255	267	279	291	303	315	327	339	350	362
98	191	203	214	226	238	250	261	273	285	297	308	320	332	344	355
96	187	199	210	222	233	245	256	268	279	291	302	314	325	337	348
94	183	194	206	217	228	240	251	262	273	285	296	307	318	330	341
92	179	190	201	212	224	235	246	257	268	279	290	301	312	323	334
90	176	186	197	208	219	230	240	251	262	273	284	294	305	316	327
88	172	182	193	203	214	225	235	246	256	267	277	288	298	309	320
86	168	178	189	199	209	220	230	240	250	261	271	281	292	302	312
84	164	174	184	194	204	214	225	235	245	255	265	275	285	295	305
82	160	170	180	190	200	209	219	229	239	249	259	269	278	288	298
80	156	166	176	185	195	204	214	224	233	243	253	262	272	281	291

DOOR OPENING WIDTH

TWO SPEED SIDE OPENING

Weight Density = 7.900

Door weights include allowance for door hangers, clutch, crank, etc.
The IMS Monitor variable, MASS, can be used to determine the total door weight for the label.

DOOR OPENING HEIGHT	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
120	243	257	270	283	297	310	323	337	350	363	377	390	403	417	430	443	457	470	483
118	239	252	266	279	292	305	318	331	344	357	370	384	397	410	423	436	449	462	475
116	235	248	261	274	287	300	313	326	338	351	364	377	390	403	416	429	442	454	467
114	231	244	257	269	282	295	307	320	333	345	358	371	383	396	409	421	434	447	459
112	227	240	252	265	277	290	302	314	327	339	352	364	377	389	402	414	427	439	451
110	223	236	248	260	272	284	297	309	321	333	346	358	370	382	395	407	419	431	443
108	219	231	243	255	267	279	291	303	315	327	339	351	363	375	387	399	411	424	436
106	215	227	239	251	262	274	286	298	310	321	333	345	357	369	380	392	404	416	428
104	211	223	234	246	258	269	281	292	304	315	327	339	350	362	373	385	396	408	420
102	207	219	230	241	253	264	275	287	298	309	321	332	344	355	366	378	389	400	412
100	203	214	226	237	248	259	270	281	292	303	315	326	337	348	359	370	381	393	404
98	199	210	221	232	243	254	265	276	287	297	308	319	330	341	352	363	374	385	396
96	195	206	217	227	238	249	259	270	281	292	302	313	324	334	345	356	366	377	388
94	191	202	212	223	233	244	254	265	275	286	296	306	317	327	338	348	359	369	380
92	187	197	208	218	228	239	249	259	269	280	290	300	310	321	331	341	351	362	372
90	183	193	203	213	223	233	243	253	264	274	284	294	304	314	324	334	344	354	364
88	179	189	199	209	218	228	238	248	258	268	277	287	297	307	317	327	336	346	356
86	175	185	194	204	214	223	233	242	252	262	271	281	290	300	310	319	329	338	348
84	171	181	190	199	209	218	227	237	246	256	265	274	284	293	303	312	321	331	340
82	167	176	186	195	204	213	222	231	240	250	259	268	277	286	295	305	314	323	332
80	163	172	181	190	199	208	217	226	235	244	253	262	271	279	288	297	306	315	324

DOOR OPENING WIDTH

TWO SPEED CENTER OPENING

Weight Density = 7.900

Door weights include allowance for door hangers, clutch, crank, etc.
The IMS Monitor variable, MASS, can be used to determine the total door weight for the label.

DOOR OPENING HEIGHT	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96
120	403	417	430	443	457	470	483	497	510	523	537	550	563	577	590	603	617	630	643
118	397	410	423	436	449	462	475	488	502	515	528	541	554	567	580	593	606	620	633
116	390	403	416	429	442	454	467	480	493	506	519	532	545	558	570	583	596	609	622
114	383	396	409	421	434	447	459	472	485	497	510	523	535	548	561	573	586	599	611
112	377	389	402	414	427	439	451	464	476	489	501	514	526	539	551	564	576	588	601
110	370	382	395	407	419	431	443	456	468	480	492	505	517	529	541	554	566	578	590
108	363	375	387	399	411	424	436	448	460	472	484	496	508	520	532	544	556	568	580
106	357	369	380	392	404	416	428	439	451	463	475	487	498	510	522	534	546	557	569
104	350	362	373	385	396	408	420	431	443	454	466	477	489	501	512	524	535	547	559
102	344	355	366	378	389	400	412	423	434	446	457	468	480	491	503	514	525	537	548
100	337	348	359	370	381	393	404	415	426	437	448	459	471	482	493	504	515	526	537
98	330	341	352	363	374	385	396	407	418	429	439	450	461	472	483	494	505	516	527
96	324	334	345	356	366	377	388	398	409	420	431	441	452	463	473	484	495	505	516
94	317	327	338	348	359	369	380	390	401	411	422	432	443	453	464	474	485	495	506
92	310	321	331	341	351	362	372	382	392	403	413	423	433	444	454	464	474	485	495
90	304	314	324	334	344	354	364	374	384	394	404	414	424	434	444	454	464	474	484
88	297	307	317	327	336	346	356	366	376	385	395	405	415	425	435	444	454	464	474
86	290	300	310	319	329	338	348	358	367	377	386	396	406	415	425	434	444	454	463
84	284	293	303	312	321	331	340	349	359	368	378	387	396	406	415	425	434	443	453
82	277	286	295	305	314	323	332	341	350	360	369	378	387	396	405	415	424	433	442
80	271	279	288	297	306	315	324	333	342	351	360	369	378	387	396	405	414	423	431

DOOR OPENING WIDTH

Maintenance

Replace the Door Operator Control Board

Replacement Door Operator Control Boards are mounted in an aluminum box; the reference sensor is included.

1. Remove the car from service, and then remove the door operator power.
2. Remove all door board plugs.
3. Remove 3 Allen bolts from the top of the door board box, and then slide the aluminum box down and out of the door operator.
4. Set the new door board DIP switches and jumpers to match the replaced unit.
5. Attach the new door board box onto the door operator hanger, and then install the 3 Allen bolts at the top to attach the unit to the door operator—do not omit any spacers that may be present.
6. Verify that the REFRSW (reference switch) LED activates approximately $^{1}/_{2}$" before the door is closed. See Figure 62.

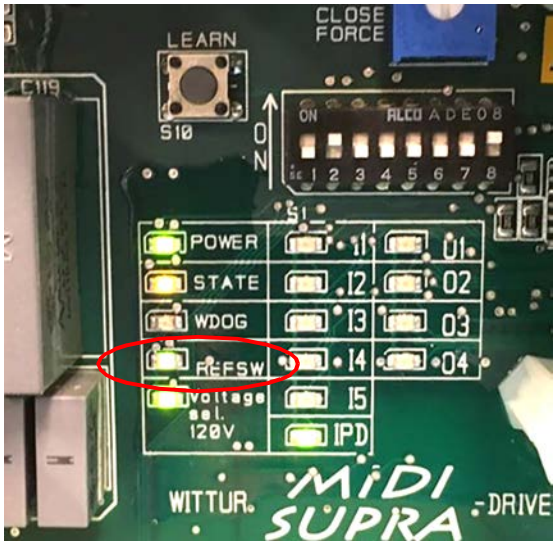


Figure 62 - Activated REFRSW (reference switch) LED

7. Verify the following:
   a. The doors are fully closed on their rubber buffer stop.
   b. The control system is on Inspection Service.
8. Power up the door board, and verify POWER, WDOG, and REPSW LEDs illuminate.
9. Perform a new door scan. See Learn Door Travel on page 63.

Replace the Door Operator Control Board
(continued)

10. Verify door speeds and door operation.
    a. Operate the doors either on Automatic Operation, or use the test buttons on top of the door operator.
    b. Adjust the speed or operation (as needed). See Speed Pattern Adjustment with the Wittur Programming Tool (WPT) on page 65.
11. Adjust the kinetic and closing force of the new door board. See Closing Force Adjustment - 30 lbs. Maximum on page 68.
12. Return the car to service.

Replace the Drive Belt

1. Remove the drive belt screws. See Figure 63.
2. Release the old belt from the bracket.
3. Shorten the new belt to match the length of the old belt.
4. Install the new belt. Loosen the screws of the diverting pulley, and use a screwdriver to tighten the belt.

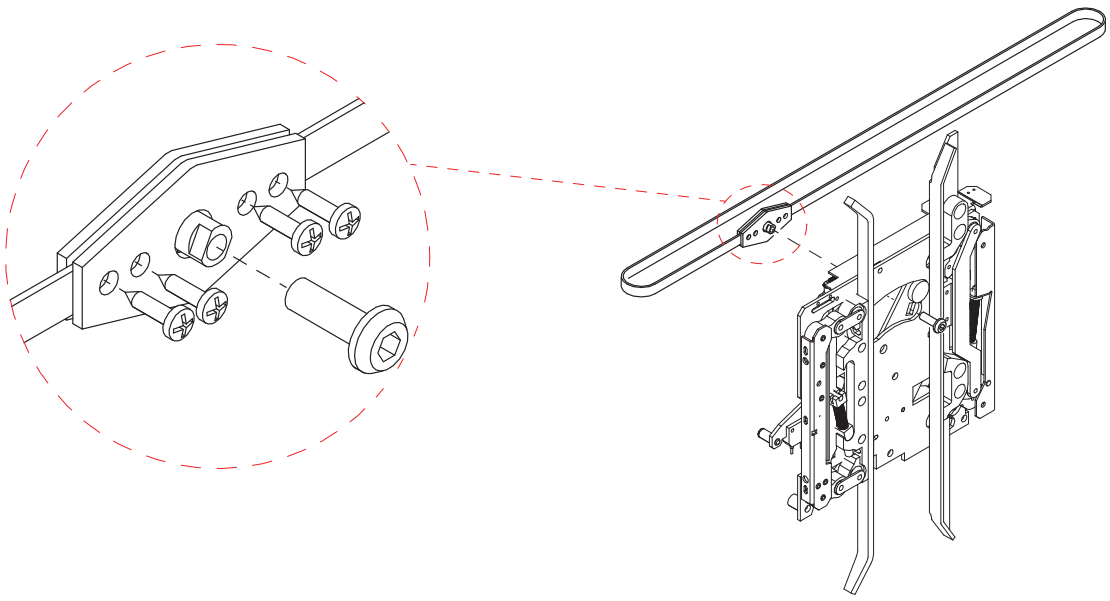


Figure 63 - Replace the Drive Belt

Replacement Parts

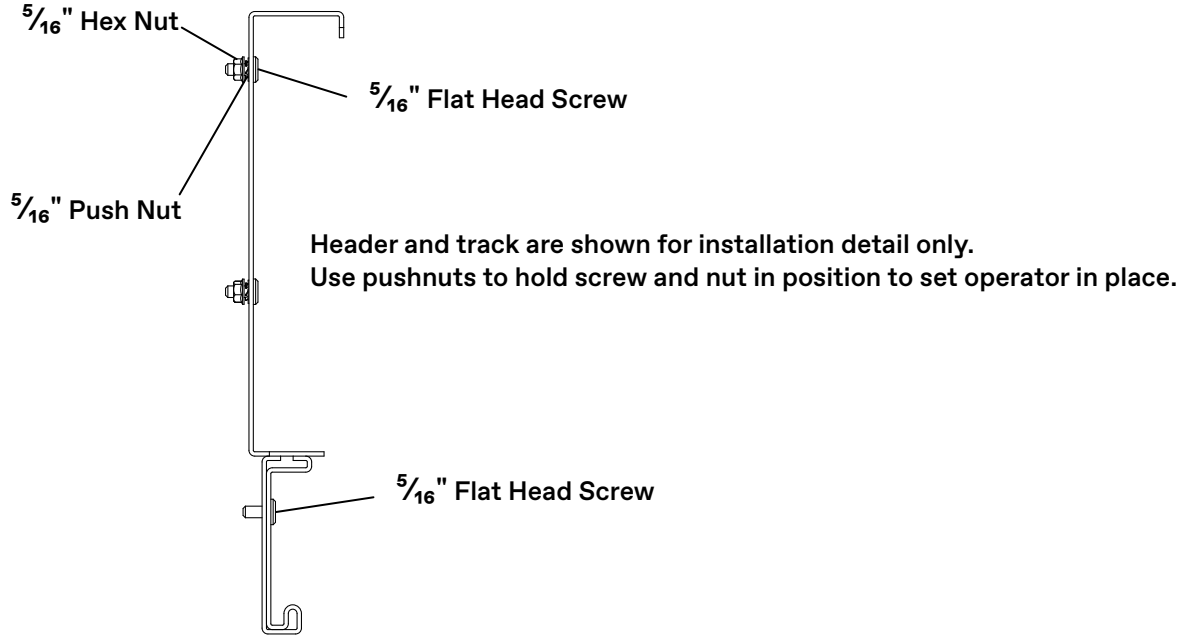
ITEM	PART NO.	DESCRIPTION
1	9732100	Hanger Roller, D94 x 19 mm with Bushing
2	9732202	Counter Roller, D30 x 9 mm with Shaft
3	9732305	Buffer Cup
4	9731714	Buffer
5	9731313	Door Contact
6	9731416	Door Contact Bridge
7	9731910	Synchronization Rope, L= 5010
8	9732019	Synchronization Rope, L=1750 mm
9	9732317	Coupler Contact Bridge
10	9732718	Rope Diverting Pulley, Left
11	9733012	Rope Diverting Pulley, Right
12	9747977	Rubber Puffer
13	9732240	Fixing Screw (for clutch), M8 x 20 mm
14	9733310	Belt, L=3000 mm, SS <=42"; SS-C/O,<=48"
15	9731325	Belt, L=3900 mm, All Others >46"
16	9731428	Belt Diverting Pulley
17	9731726	Belt Diverting Pulley, Left
18	9731829	Door Drive Control Box - Standard
19	9731921	Door Drive Control Box with CAN Interface
20	9732123	Motor Unit Midi, C/O, LH
21	9732226	Motor Unit Midi, C/O, RH
22	9732329	Motor Unit Supra, C/O, LH
23	9733127	Motor Unit Supra, C/O, RH
24	9733220	Motor Unit, Double Coupler Main, LH
25	9731349	Transformer (Universal Trafo)
26	9731337	Magnet Switch, L=220 mm
27	9731430	Magnet
28	9731933	Belt Fixing Clamp
29	9732238	Belt Fixing Clamp, Main Belt
30	9732330	Belt Fixing Clamp, Second Belt
31	9733139	Service Switch, Electrical Box
33	9731829	Wittur Door Drive Control Box Kit, Discrete
34	9371921	Wittur Door Drive Control Box with Can Interface Kit, Serial
32	9736918	Wittur Programming Tool (WPT), see next page.

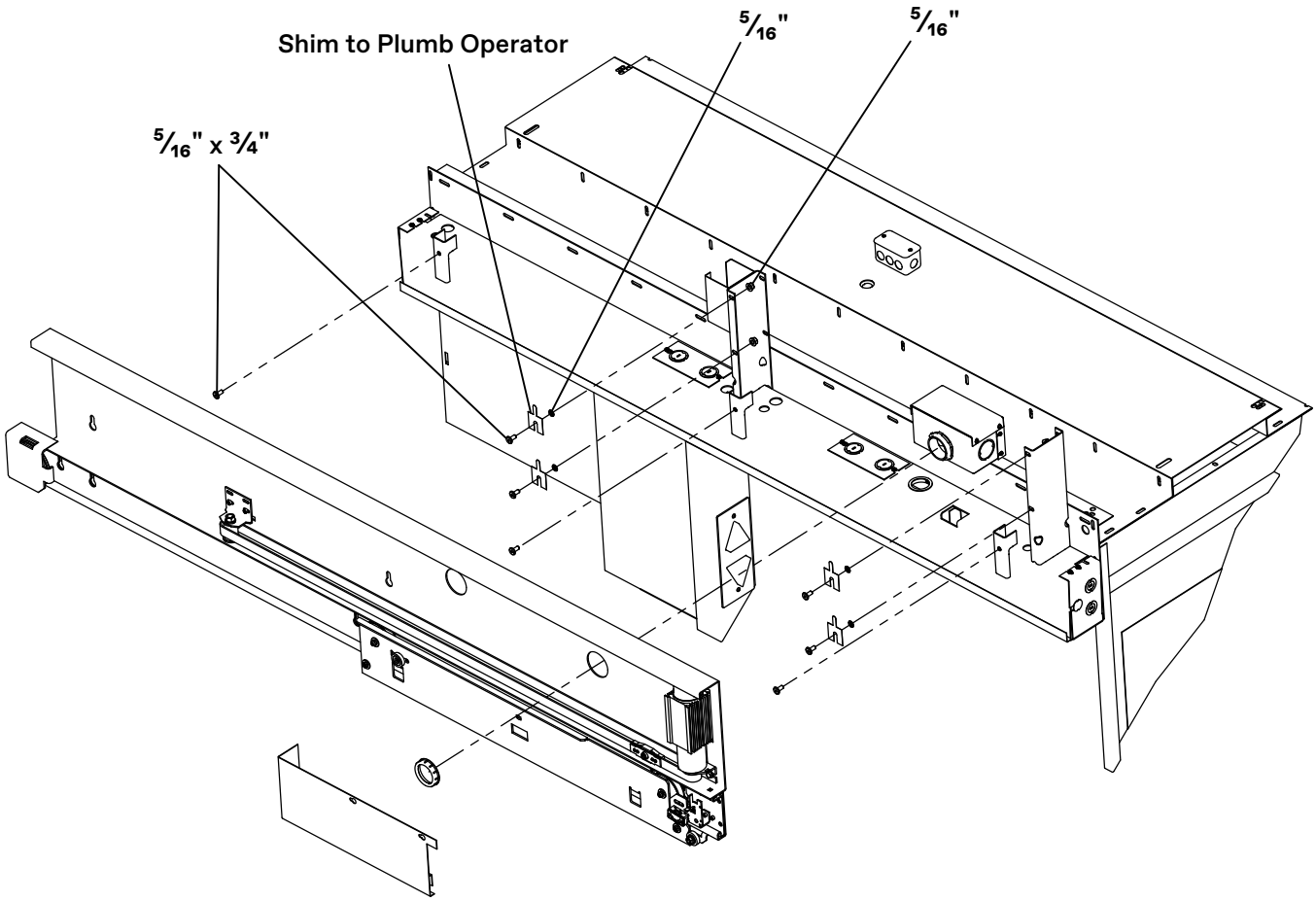
Replacement Parts
(continued)

Wittur Programming Tool (WPT)
Part No. 9736918

Replacement Parts
(continued)

Door Operator Bolt Kit (200CHN001)





APPENDIX

APPENDIX

Clutch Assemblies

GAL Interlock Rollers (364AG_)

See also: Clutch Operating Space on page A-7

GAL ENGAGED

Front View **Isometric View**

GAL RETRACTED

Front View **Isometric View**

- **Clutches shown with spacers are configured for GAL Interlock Rollers.**
- **TKE LH shown, RH opposite.**

Clutch Assemblies
(continued)

MAC Interlock Rollers (364AG_)

See also: Clutch Operating Space on page A-7

MAC ENGAGED

Front View **Isometric View**

MAC RETRACTED

Front View **Isometric View**

- **Clutches shown with spacers are configured for MAC Interlock Rollers.**
- **TKE LH shown, RH opposite.**

Clutch Assemblies
(continued)

TKE Interlock Rollers (364AG_)

See also: Clutch Operating Space on page A-7

TKE, Dover ENGAGED

Front View **Isometric View**

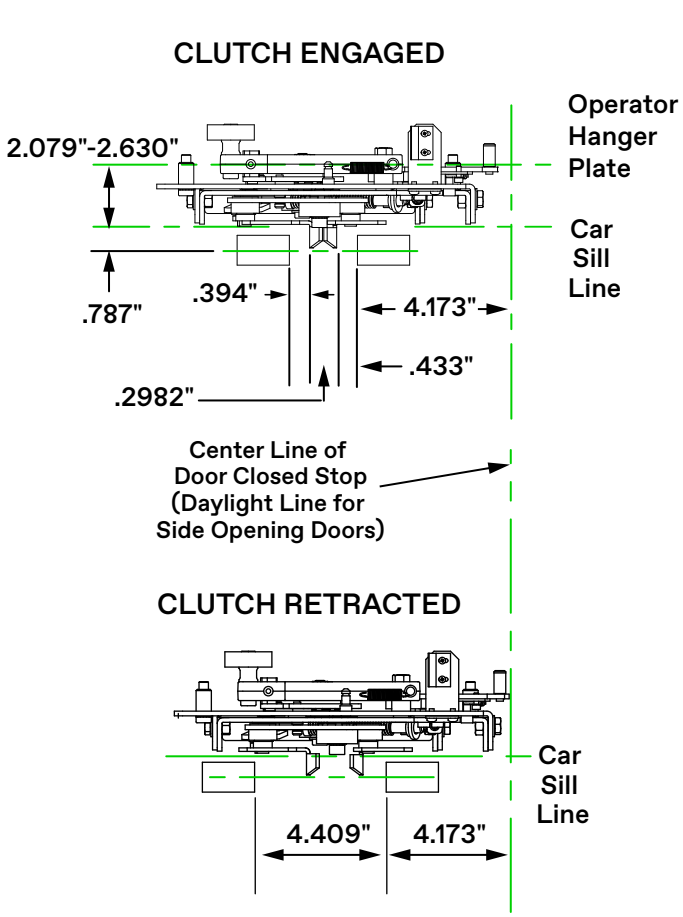
TKE, Dover RETRACTED

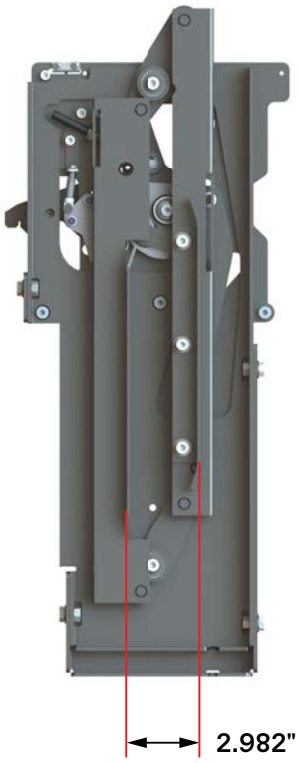
Front View **Isometric View**

- **Clutches shown with spacers are configured for TKE, Dover Interlock Rollers.**
- **TKE LH shown, RH opposite.**

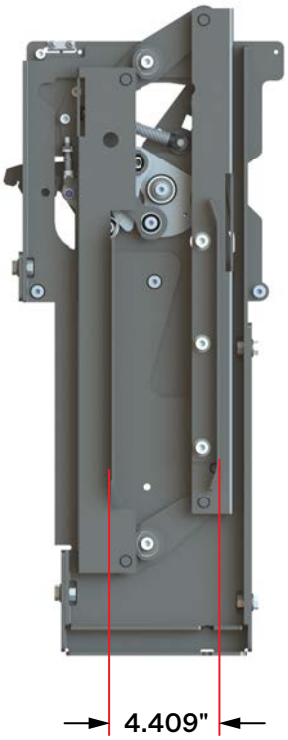
Clutch Assemblies
(continued)

Otis 6940 Interlock (364AJ_)



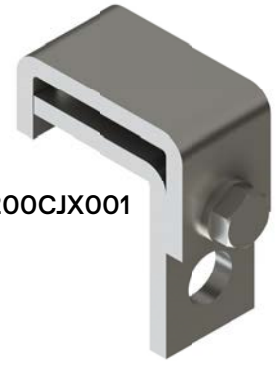


Retracted for Running Clearance



Engaged with Interlock Rollers

- Clutch shown must be used with Otis Landing Lock Kit, (part no. 200CJX001) 1 Lock Kit per Otis 6940 Interlock.
- When using this clutch with side opening doors, locate the door operator so that the center line of the door closed stop aligns with the strike side of the clear opening.
- Dimensions to interlock rollers on this page are for reference only.
- TKE RH shown, LH opposite.

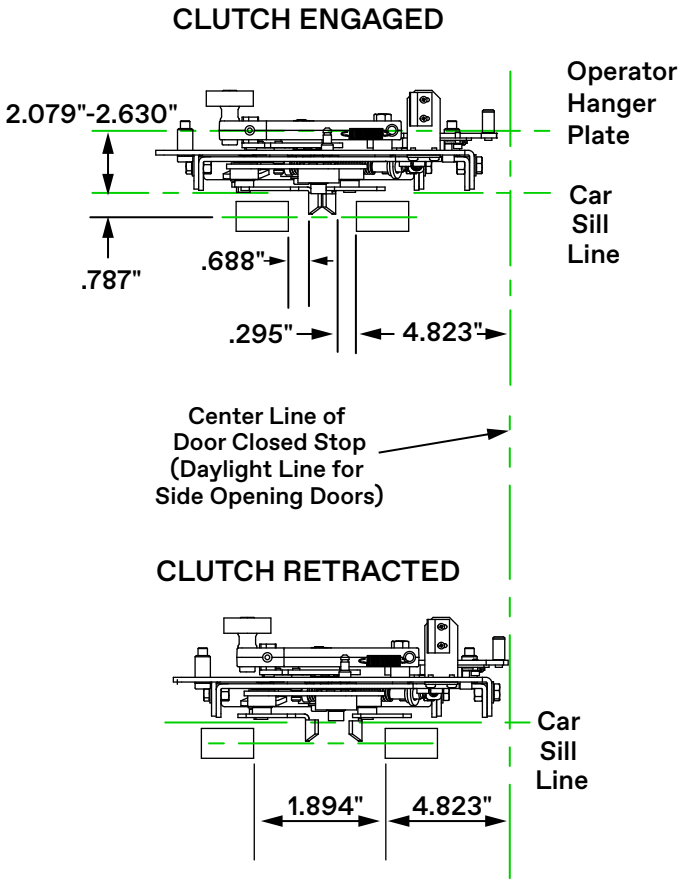


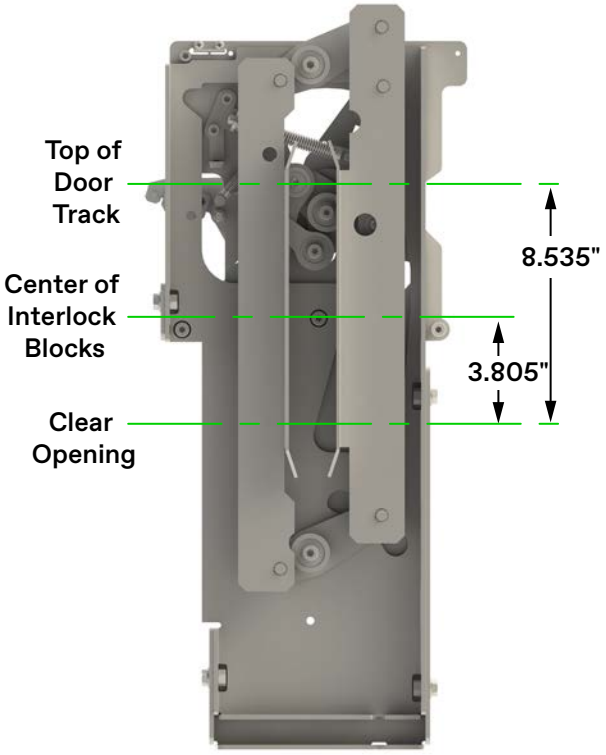
200CJX001

Isometric View

Clutch Assemblies
(continued)

Westinghouse Interlocks Model E5A (364AK_)



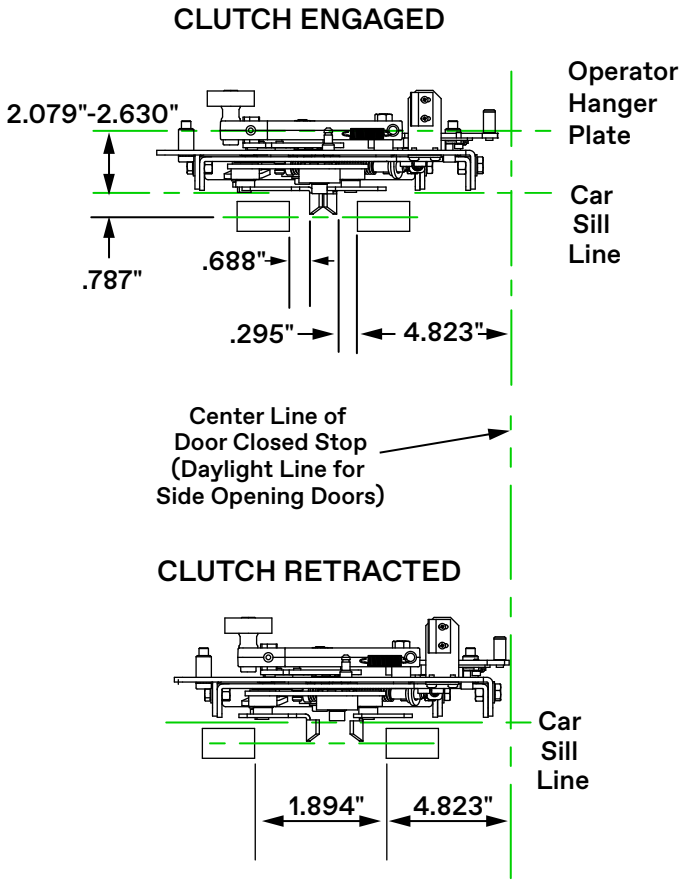


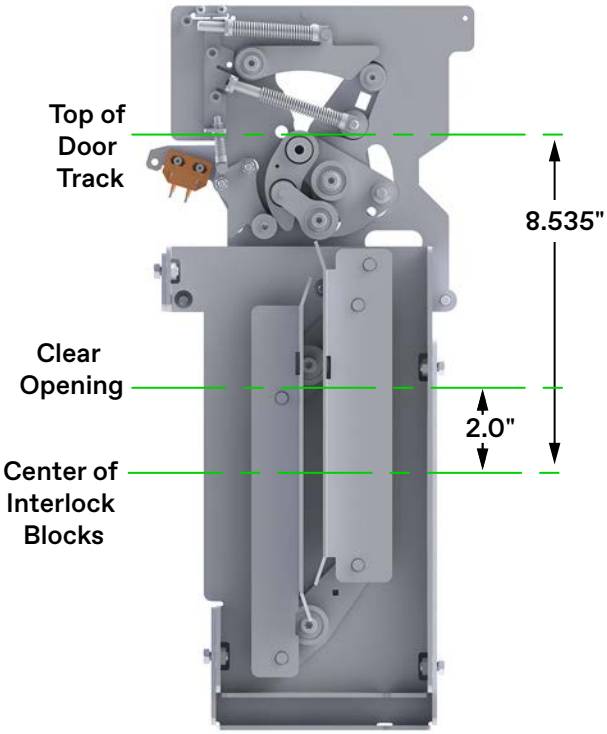
Isometric View

- When using this clutch with side opening doors, locate the door operator so that the center line of the door closed stop aligns with the strike side of the clear opening.
- Dimensions to interlock rollers on this page are for reference only.
- TKE LH shown, RH opposite.

Clutch Assemblies
(continued)

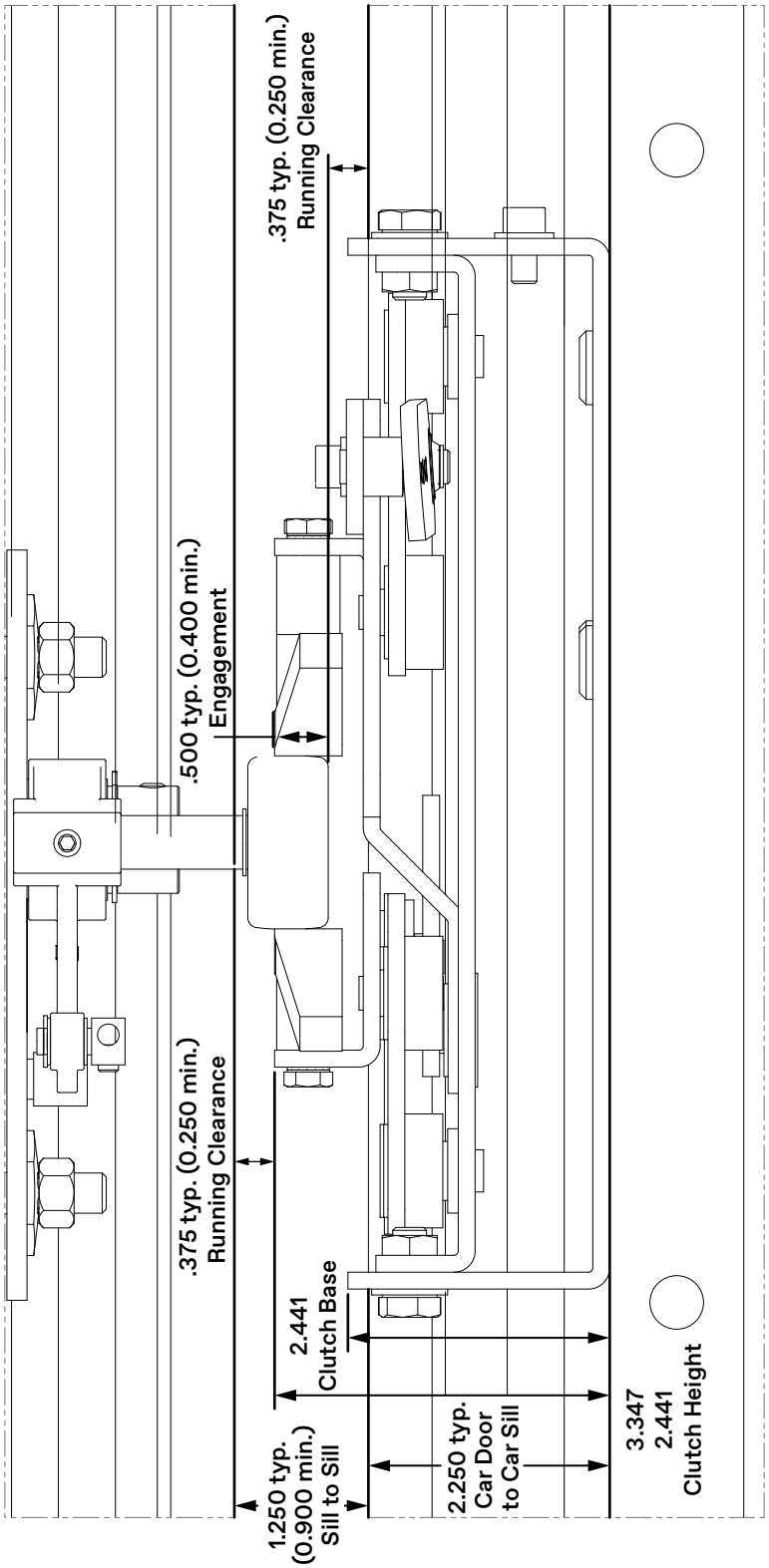
Westinghouse (364AL_)





- When using this clutch with side opening doors, locate the door operator so that the center line of the door closed stop aligns with the strike side of the clear opening.
- Dimensions to interlock rollers on this page are for reference only.
- TKE RH shown, LH opposite.

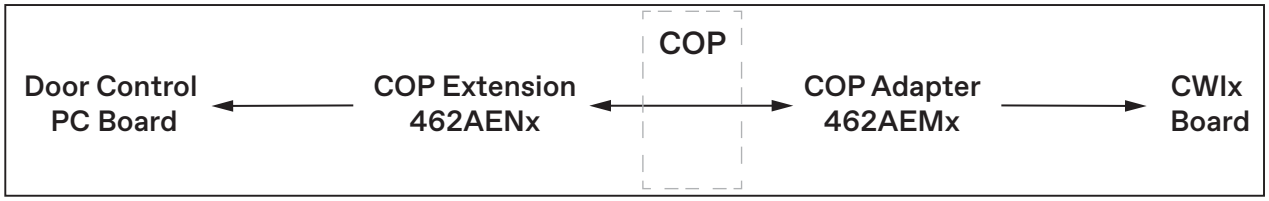
Clutch Operating Space



Sill To Sill	Required Space Car Door To Car Sill	
	For .375 Running Clearance	For .250 Running Clearance
1.250	1.566	1.441
1.000	1.816	1.691
0.900	1.916	1.791

Harness Assembly Diagrams

Installation Overview

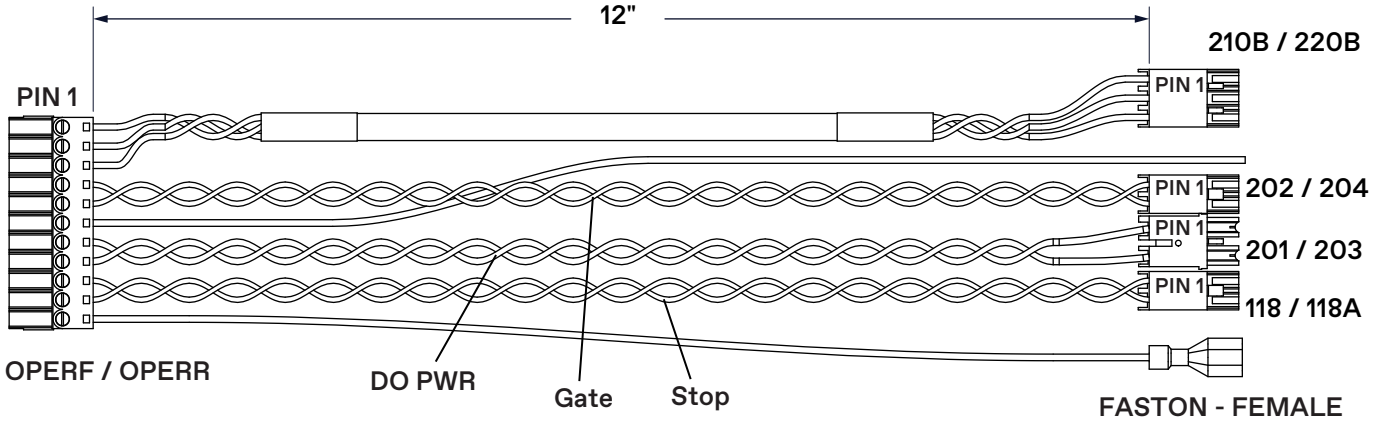


The 120VAC female plug receptacle powers the GFCI receptacle in the CTS

COP Extension Harness, 462AEN_ starts on page A-14.

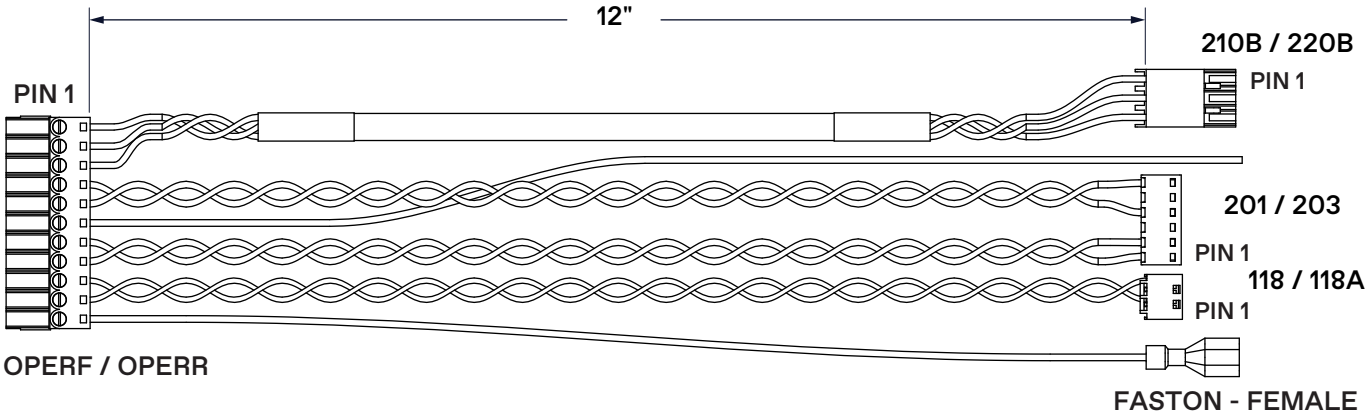
COP Adapter Harness, 462AEM_

Type: Door Operator
Use: TAC32T
Front: 462AEM001
Rear: 462AEM002

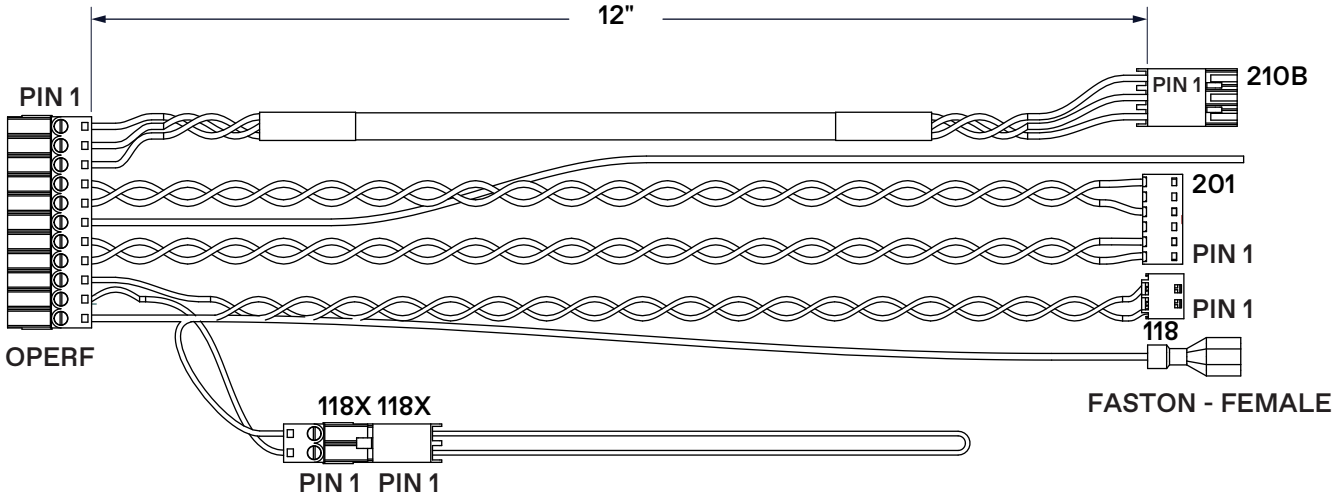


Harness Assembly Diagrams - COP Adapter, 462AEM_
(continued)

Type: Door Operator
Use: TAC32H
Front: 462AEM004
Rear: 462AEM005

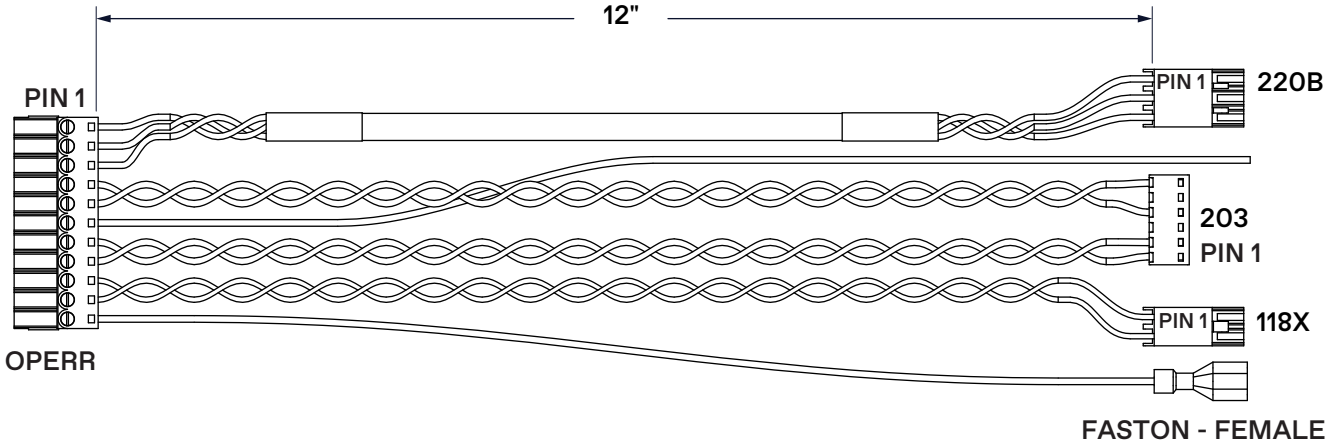


Type: Door Operator
Use: Futura T, TAC50-04
Front: 462AEM006

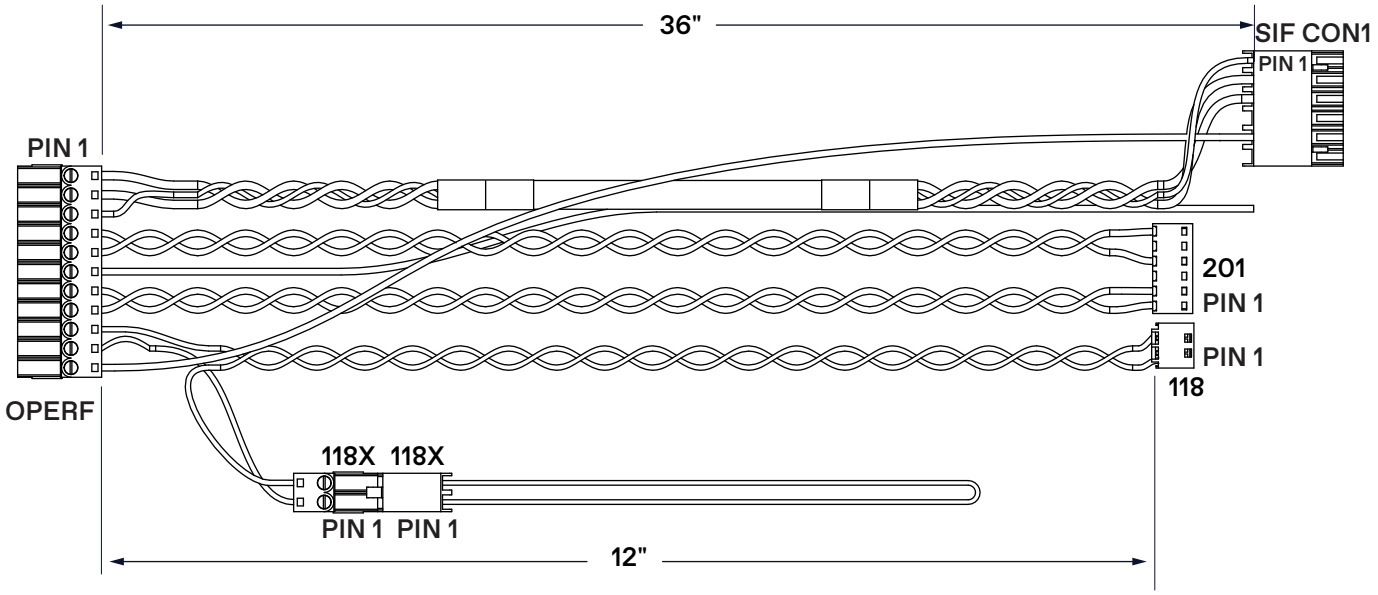


Harness Assembly Diagrams - COP Adapter, 462AEM_
(continued)

Type: Door Operator
Use: Futura T, TAC50-04
Rear: 462AEM007

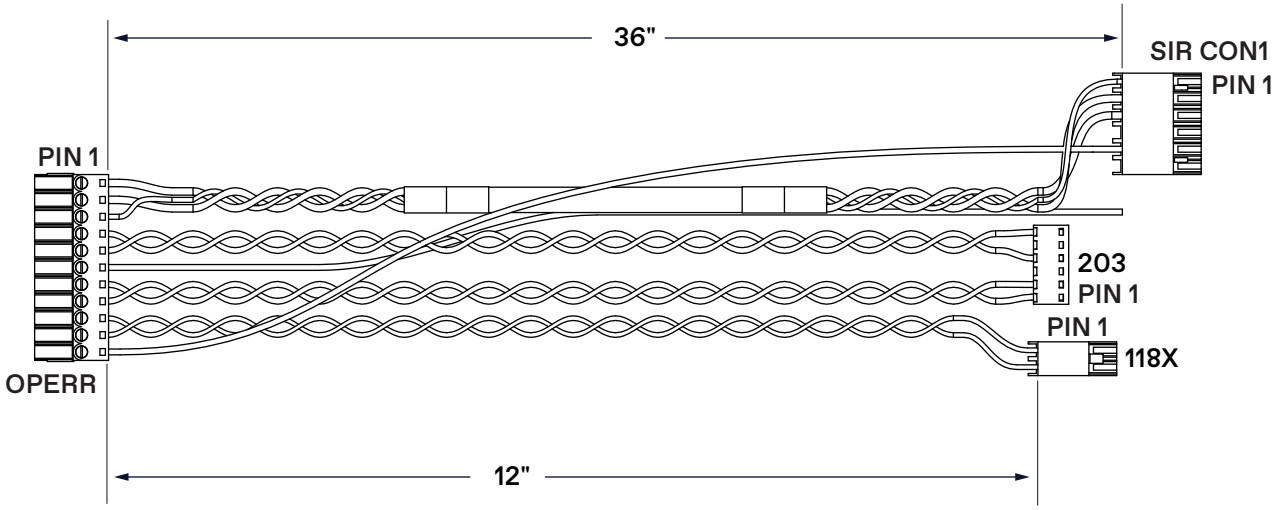


Type: Door Operator
Use: TAC22, ICON, TAC20-03, TAC20, TAC50-03
Front: 462AEM008

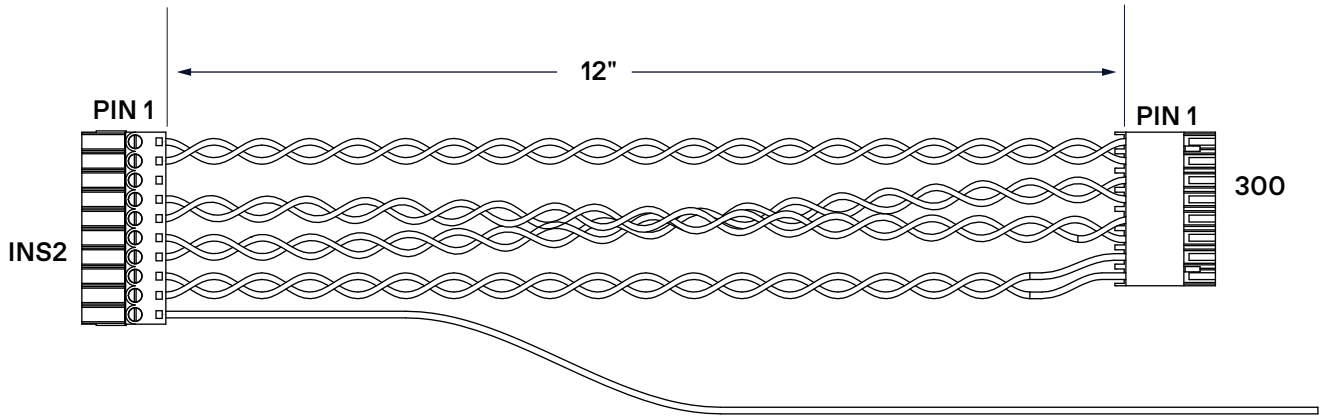


Harness Assembly Diagrams - COP Adapter, 462AEM_
(continued)

Type: Door Operator
Use: TAC22, ICON, TAC20-03, TAC20, TAC50-03
Rear: 462AEM009

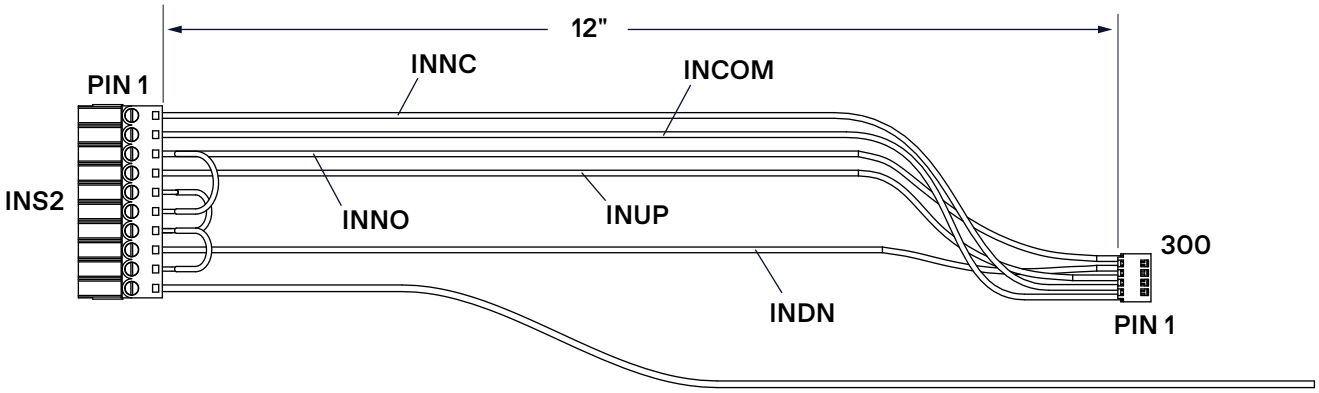


Type: Inspection
Use: TAC32T
Front: 462AEM010

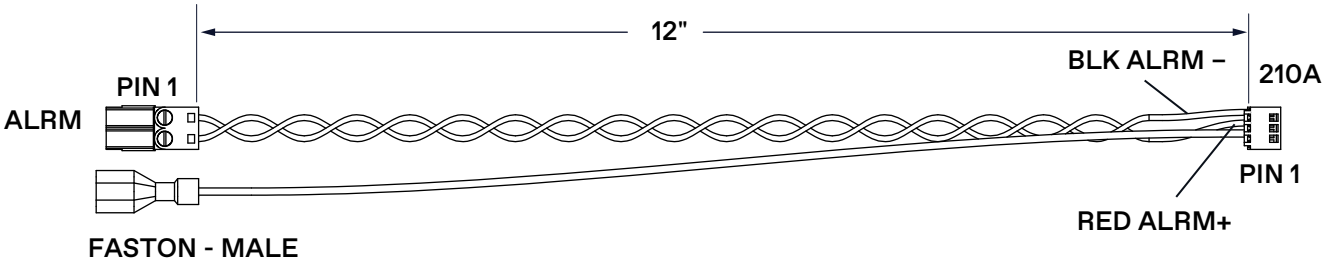


Harness Assembly Diagrams - COP Adapter, 462AEM_
(continued)

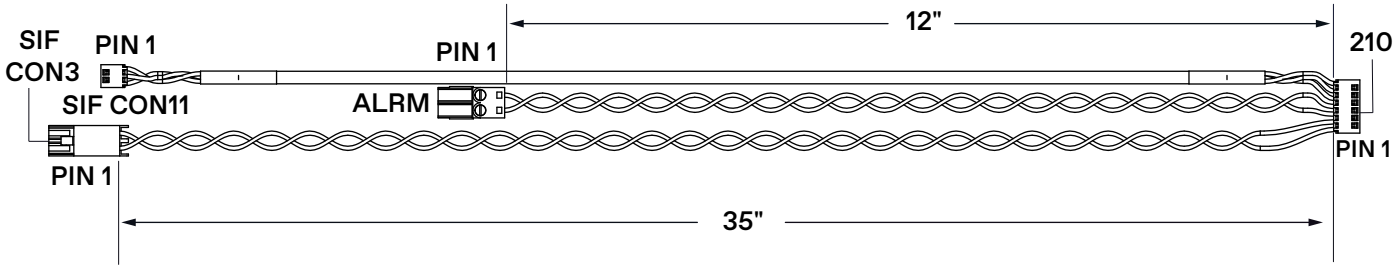
Type: Inspection
Use: TAC32H
Front: 462AEM011



Type: Alarm
Use: TAC32T, TAC32H
Front: 462AEM012

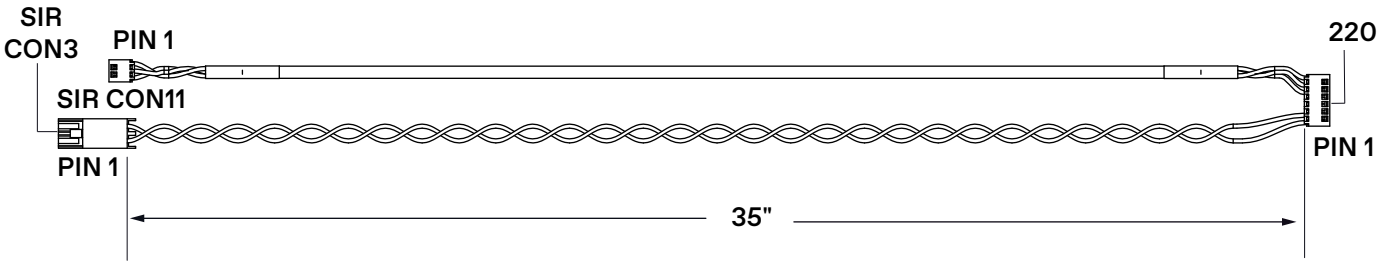


Type: Alarm, 485
Use: TAC22, ICON, TAC20-03, TAC20, TAC50-03
Front: 462AEM0013

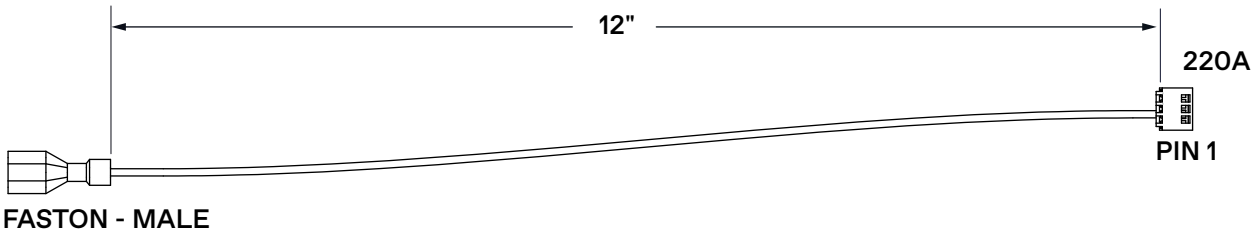


Harness Assembly Diagrams - COP Adapter, 462AEM_
(continued)

Type: Alarm, 485
Use: TAC22, ICON, TAC20-03, TAC20, TAC50-03
Rear: 462AEM0014

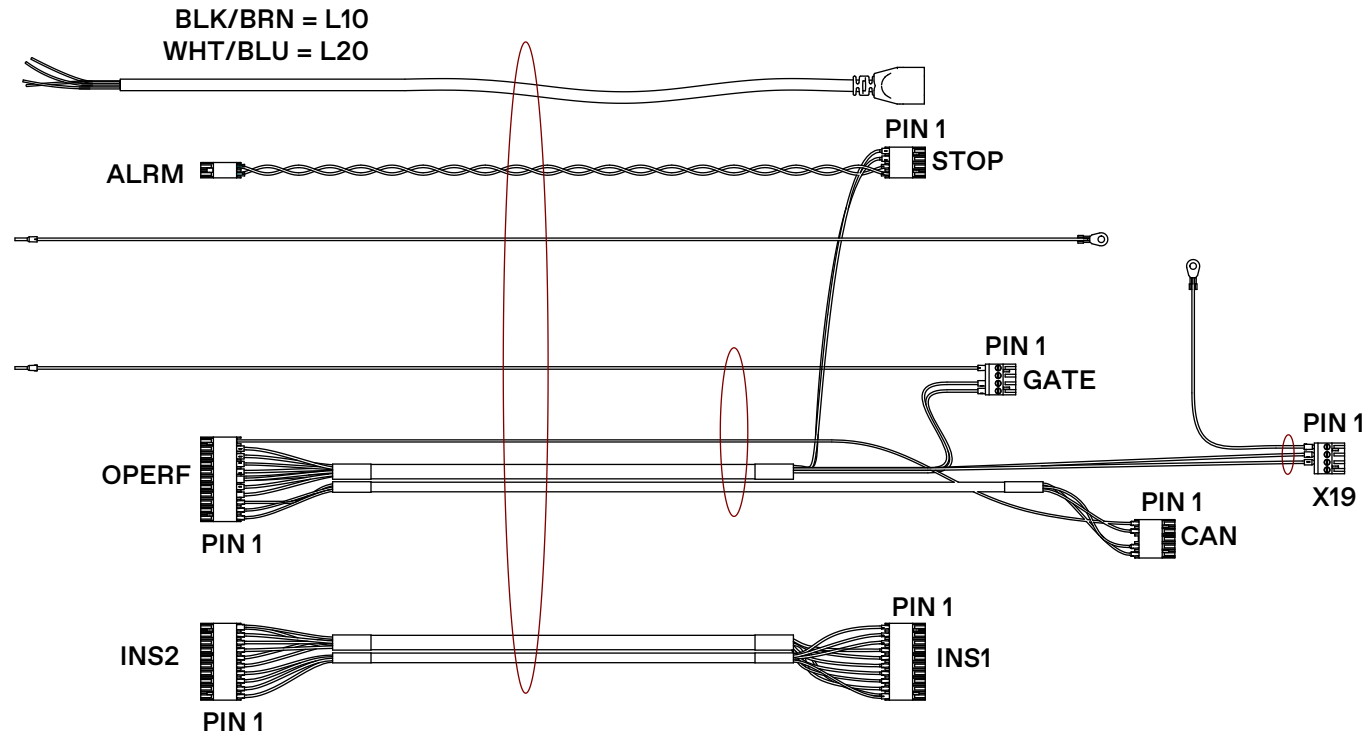


Type: Door Operator Ground
Use: TAC32T, TAC32H
Rear: 462AEM016

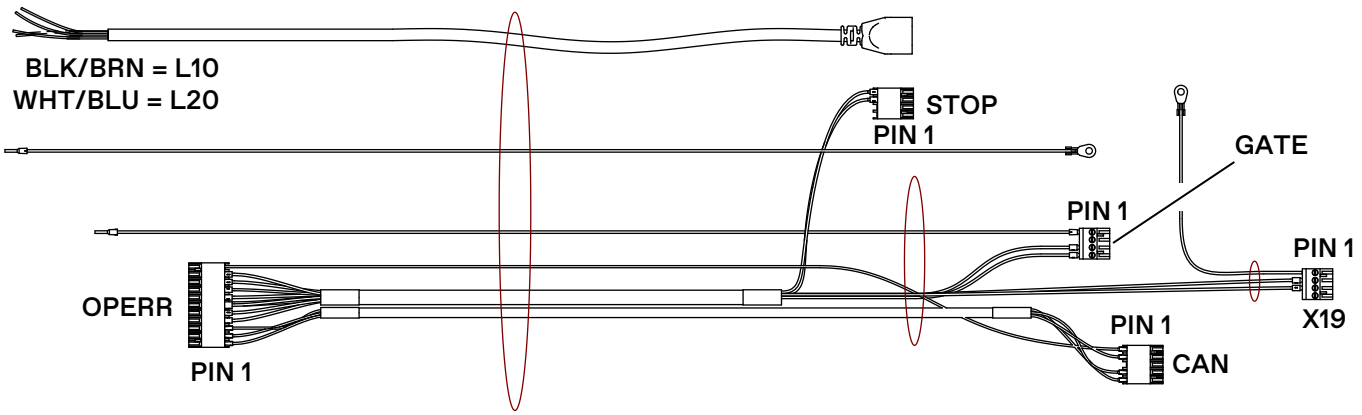


Harness Assembly Diagrams - COP Extension, 462AEN_

Type: COP
Use: Front with Inspection Station
Print No: 462AEN001

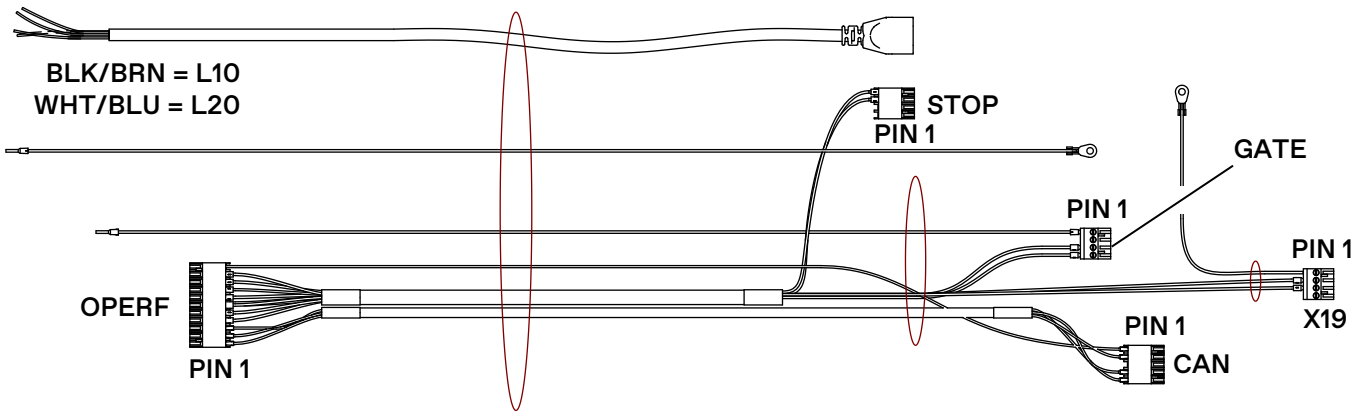


Type: COP/CTB
Use: Rear, No Inspection Station
Print No: 462AEN002

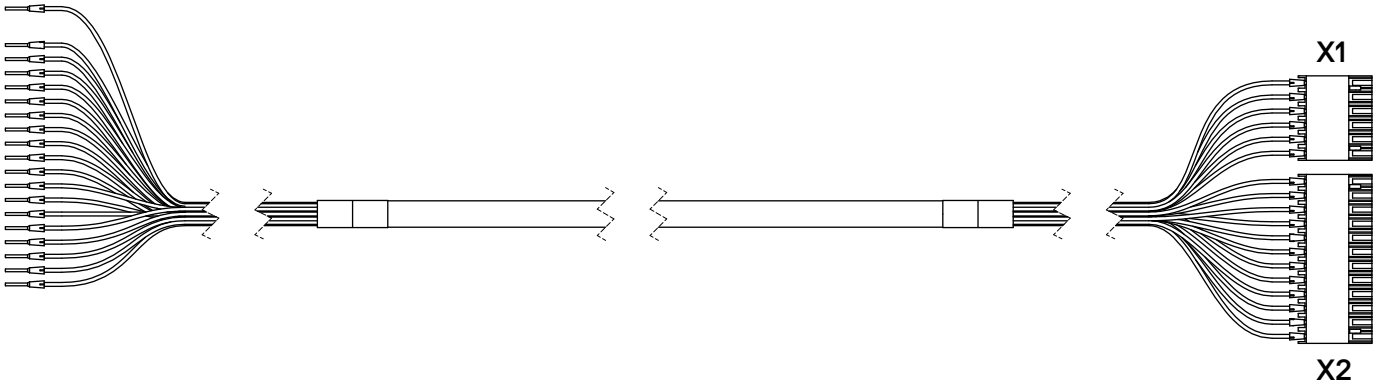


Harness Assembly Diagrams - COP Extension, 462AEN_
(continued)

Type: CTB
Use: Front, No Inspection Station
Print No: 462AEN004

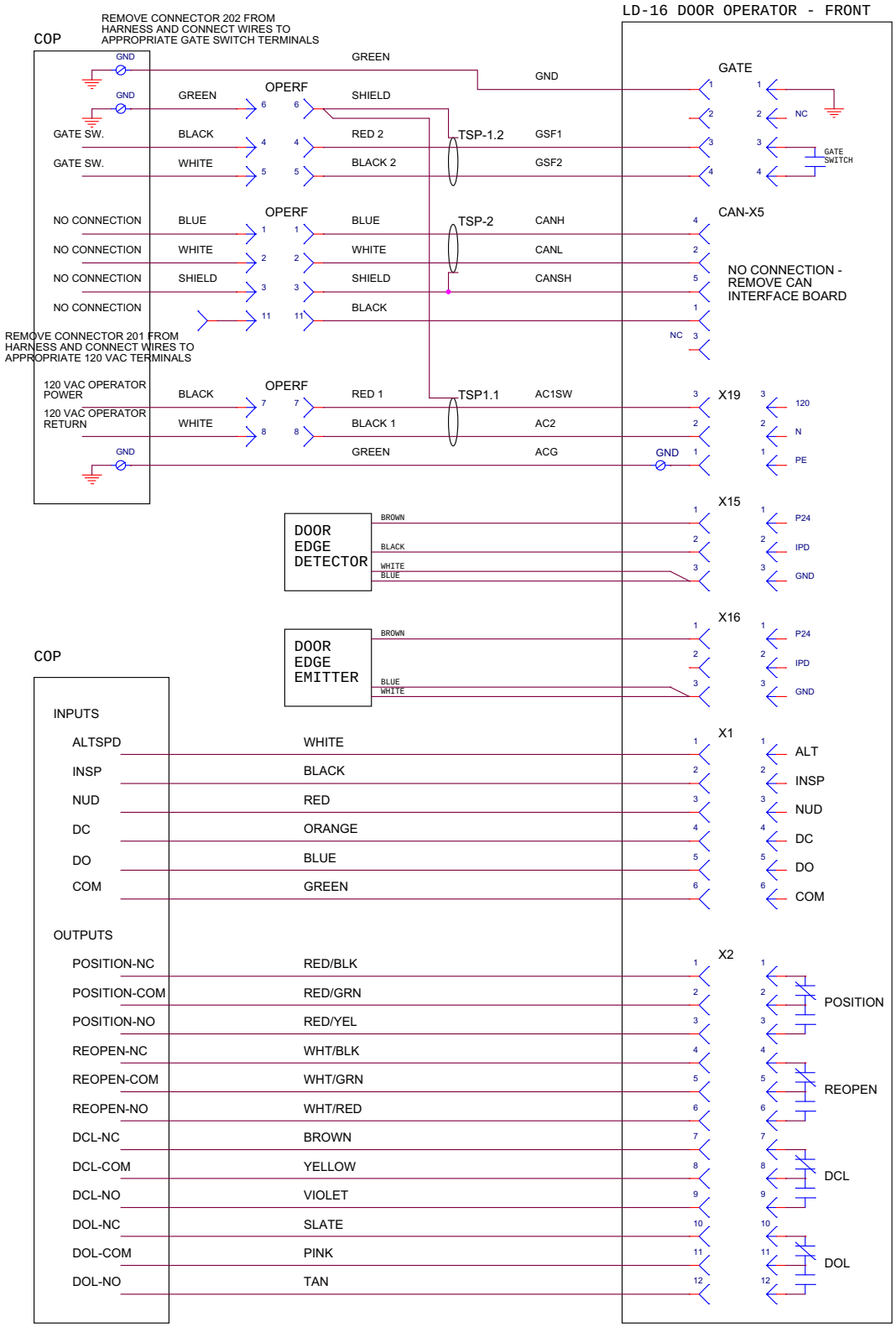


Type: Discrete
Use: Add On
Print No: Front, 462AEN005
Print No: Rear, 462AEN006

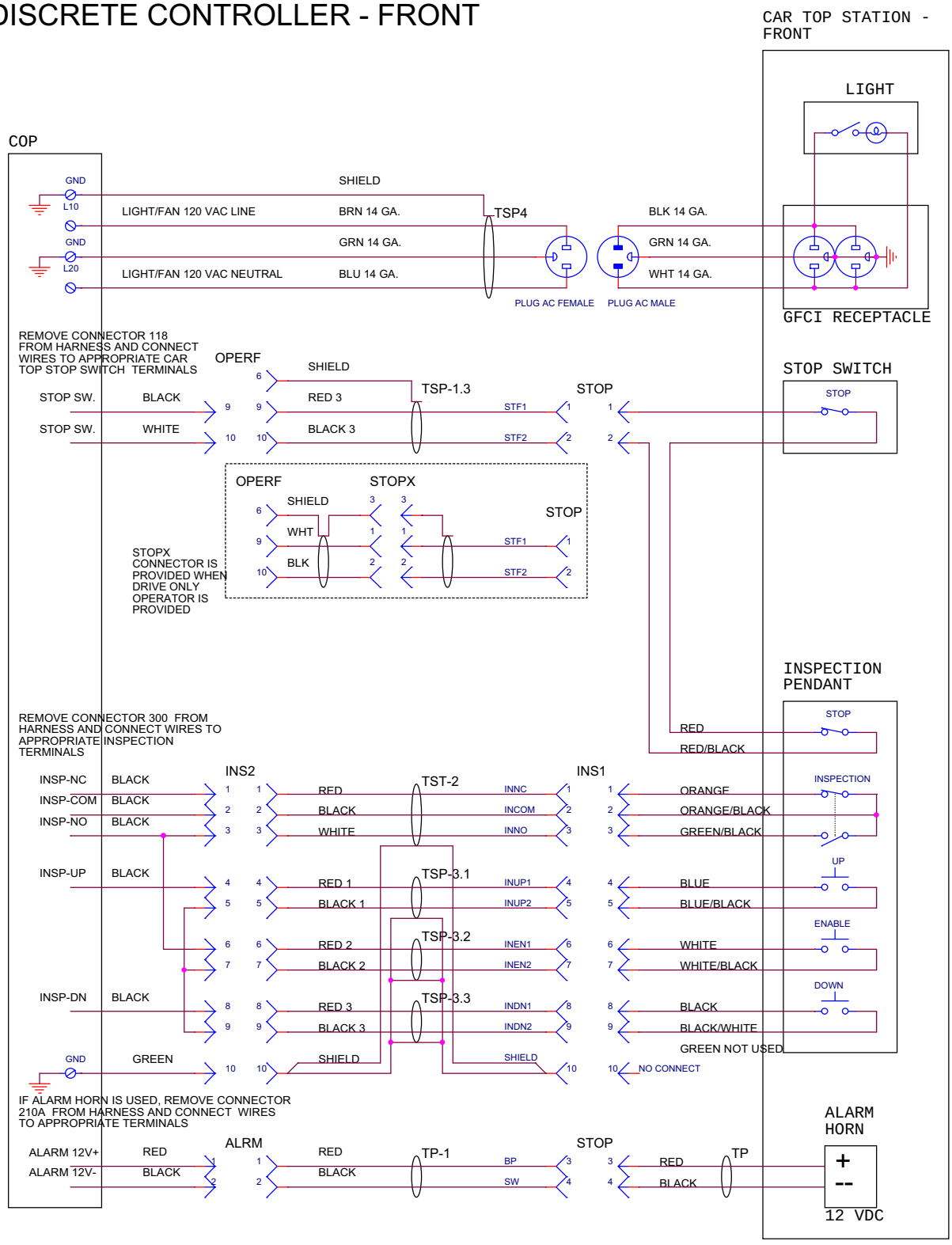


Generic Wiring Diagrams

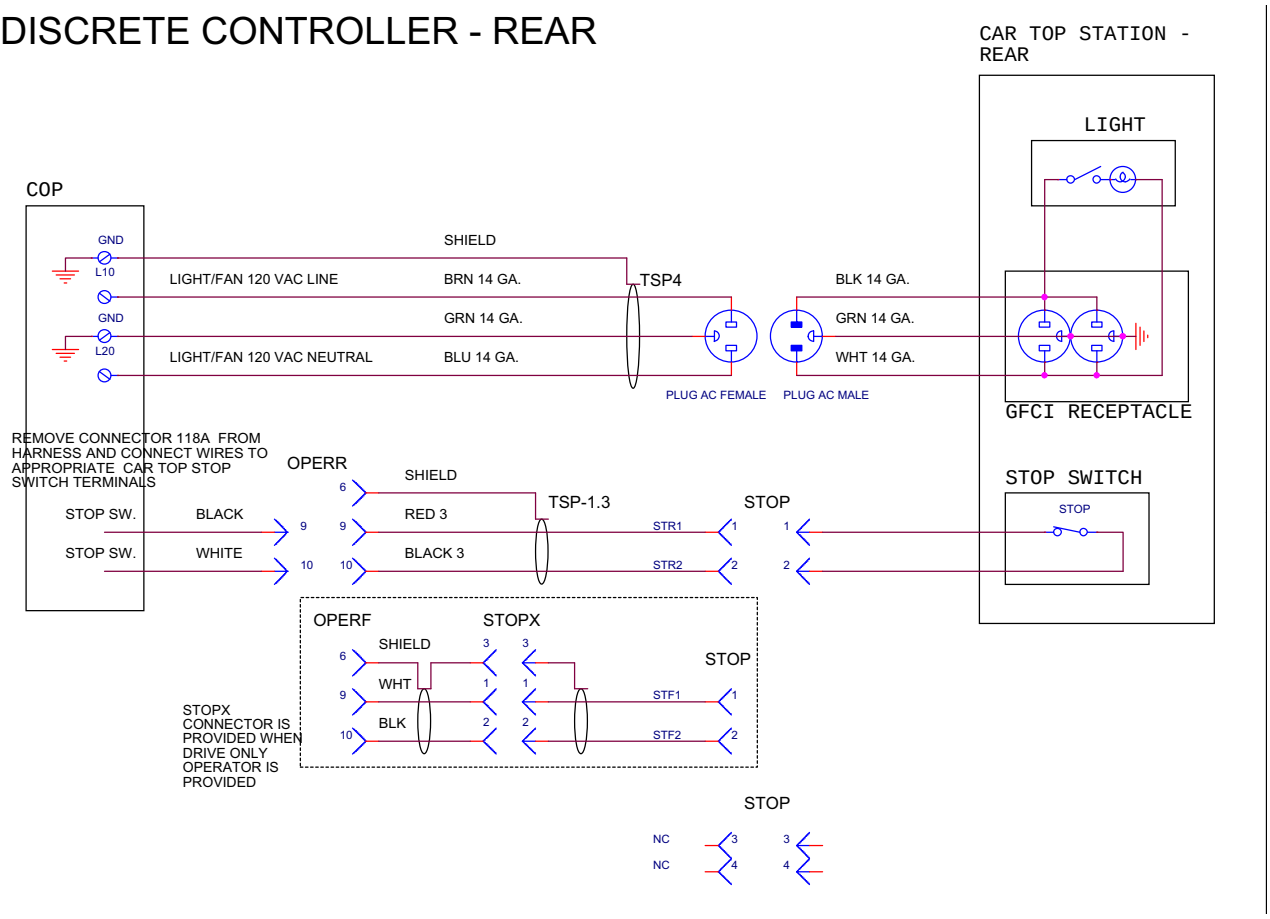
DISCRETE CONTROLLER - FRONT



DISCRETE CONTROLLER - FRONT



DISCRETE CONTROLLER - REAR



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