Pre-ordering notes of caution:

1. Use only for relay logic based 7770A operator installations.
2. Up to four new traveling cables will likely be needed.

Plan you job accordingly.

7770A to AT400 Retrofit Installation
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(860) 286-1625 Fax

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All jobsite work activity must be in full compliance with Otis World Wide Jobsite Safety Standards (WWJSSS). When carrying out this procedure, particular consideration should be given to control of the elevator, LOTO, hoisting and rigging, ensuring public safety (signs and barriers), working in close proximity of unguarded rotating equipment (sheaves) and the wearing of appropriate PPE (hand gloves, etc.). It is recommended that the mechanic(s) carrying out the repair complete the appropriate JHA for the task at hand to familiarize themselves with the work environment. If you are unsure of the WWJSSS standards in regard to the work task at hand, immediately stop work and consult your Supervisor.

Ordering Instructions

The Otis door operator 7770A to AT400 operator electro-mechanical retrofit kit can be used whenever this replacement is occurring. The electrical interface kit is designed primarily for relay-based controllers on hydraulic systems. For all other types of controllers, please plan to engineer the electrical interface locally or consider a full modernization.

For each 7770A operator upgrade, select and order one arrangement from each of the following four tables. Installation drawings are included in each mechanical interface kit.

Use Table 1 to select the proper AT400 engine unit arrangement depending on the existing door type and entrance size, the operator length, and the door hand.

Table 1: AT400 Engine Unit

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Opening Hand</th>
<th>Door Type and Entrance Width</th>
<th>Operator Length (L)</th>
<th>Check One</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAB24350BK45</td>
<td>Right</td>
<td>S/S and 2/S: ≥1067 mm (42 in.) and &lt;1371 mm (54 in.)</td>
<td>1920 mm (75 in.)</td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK46</td>
<td>Left</td>
<td>C/O: ≥1219 mm (48 in.) and &lt;1524 mm (60 in.)</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK47</td>
<td>Right</td>
<td>S/S and 2/S: ≥914 mm (36 in.) and &lt; 1067 mm (42 in.)</td>
<td>1615 mm (63 in.)</td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK48</td>
<td>Left</td>
<td>C/O: ≥914 mm (36 in.) and &lt; 1219 mm (48 in.)</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK49</td>
<td>Right</td>
<td>S/S and 2/S: ≥813 mm (32 in.) and &lt; 914 mm (36 in.)</td>
<td>1489 mm (58 in.)</td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK50</td>
<td>Left</td>
<td>C/O: ≤914 mm (36 in.)</td>
<td></td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK51</td>
<td>Right</td>
<td>S/S and 2/S: &lt; 813 mm (32 in.)</td>
<td>1323 mm (52 in.)</td>
<td>☐</td>
</tr>
<tr>
<td>AAB24350BK52</td>
<td>Left</td>
<td></td>
<td></td>
<td>☐</td>
</tr>
</tbody>
</table>
Use Table 2 to select the proper mechanical interface kit depending on existing door type (see NOTE).

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Opening Type</th>
<th>Check One</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA24430R15</td>
<td>7770A to AT400 Mechanical Interface Kit</td>
<td>S/S, C/O</td>
<td>□</td>
</tr>
<tr>
<td>ABA24430R16</td>
<td>2/S</td>
<td></td>
<td>□</td>
</tr>
</tbody>
</table>

NOTE: Before removing the existing door operator, review drawing ABA24430R (included in mechanical kit). Some parts and mounting brackets from the existing door operator must be retained.

The 7770A to mechanical Interface kit (p/n ABA24430R15 and 16) includes the following mechanical interfacing hardware:

- Car door hitch brackets
- Door operator mounting brackets
- Fasteners for brackets and hitch (nuts, bolts, etc.)
- Mechanical installation diagram (drawing ABA24430R)
- Standard gate switch roller (field modifications may be necessary)

Use Table 3 to select the proper power supply depending on the existing available power. The ABA621BJ type power supply provides both 24–30 VDC signal and 120 VDC operator power required by the AT400 engine unit.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Check One</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA621BJ1</td>
<td>DC Power Supply, 208-240 VAC Primary Input</td>
<td>□</td>
</tr>
<tr>
<td>ABA621BJ2</td>
<td>DC Power Supply, 440-600 VAC Primary Input</td>
<td>□</td>
</tr>
</tbody>
</table>

Use Table 4 to order the electrical interface kit. The electrical interface kit provides relays, timers, and other components needed to interface the AT400 to the existing controller. Included are new DOL, DCL 24 VDC relays, 110 VDC nudge relay, and three 120 VAC relays to replace existing DO, DC, and DCR relays.

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Check One</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA24430R411</td>
<td>Electrical Interface Kit</td>
<td>□</td>
</tr>
</tbody>
</table>
The 7770A to AT400 electrical interface kit (p/n ABA24430R410) includes the following electrical hardware.

- Top-of-Car junction box (p/n AAA25580AM1)
- DOL, DCL 24 VDC relays (p/n AAA613CZ8)
- DO, DC, DCR 120 VAC relays (p/n AAA613CZ9)
- Nudging relay, 110 VDC (p/n AAA613CZ12)
- NDG timer (p/n AAA623AA1)
- Relay sockets for DOL, DCL, NDG, DO, DC, DCR (p/n 618AE2)
- Diode suppressor (p/n AAA612T7)
- Suppressors (p/n AAA00605AAA014)
- Din rail (p/n 401B14)
- Hookup wire 18-gauge (red, red/white, brown, brown/white), 30 ft. each
- Door emergency stop switch p/n AAA25580AJ1 is included with engine unit

**Electrical Installation**

**Door Operator Relay Panel**

The 7770A door operator includes a door panel (types: 6840CL, A6840CI, or 8200AJ1). The panel contains functions such as door open protection timer (DOP), door close protection timer (DCP), and door reversal timer (DRT). The DOP and DCP timers are needed for proper operation of the controller. In order to minimize installation time, it is recommended to retain the terminal blocks, the DOP and DCP timers, and their associated timer resistors. It is also highly recommended at this time (for optimal final performance) to replace all problematic relays (p/n P613AP6, 7, and 9) from the door operator panel or PC board with respective relays (p/n AAA613DL17, 613BX32, and 613BX31). Note that Unitec will not provide unless ordered separately.

**Eliminate Circuits**

**Follow proper LOTO and wear proper PPE.** Take control of the car prior to performing any upgrade steps.

Eliminate DOP circuits as shown in Figure 1 (Area 3), Figure 2 (Area 4), Figure 3 (Area 5), and Figure 4 (Area 6). When completed, a potential of six traveling cables may be gained. The Field must identify four more spare travelers or install new ones for a total of 10 travelers to be available.

**NOTE:** Retain DOP terminal blocks, which will be used to add the new DO, DC, and DCR circuits.

**NOTE:** Ensure existing gate switch is completely eliminated.
Figure 2: Area 4

Figure 3: Area 5
Figure 4: Area 6
Install New Parts

Identify and mark all relays and terminals as they are mounted or connected.

![Assembled DIN Rail](image)

**Figure 5: Assembled DIN Rail**

1. Install provided DIN rail (p/n 401B14) inside the controller.

2. Mount three 120 VAC relays (p/n AAA613CZ9) for DO, DC, and DCR to the DIN rail.

3. Mount one 110 VDC relay (p/n AAA613CZ12) for NDG and NDG timer (NDGT p/n AAA623AA1) to the DIN rail.

4. Mount two 24 VDC relays (p/n AAA613CZ8) for Door Close Logic (DCL) and Door Open Logic (DOL) to the DIN rail.

5. Install two IN4007 freewheeling diodes (p/n AAA612T7) to the DOL and DCL relays.

6. Install three suppressors (p/n AAA00605AAA014) to the DO, DC, and DCR relays.

7. Install type AAA621BJ transformer/power supply inside the controller.

Add Circuits

Wire up the new DOL, DCL, NDG, and NDGT relay(s) and timer(s).

1. Retain the Open Protection Timer on the DOP panel by wiring the new DCR relay contact 9-5 to the DOP terminal blocks 22 and 23. See Figure 6 (Area 4).

2. Retain the Close Protection Timer on the DOP panel by wiring the new DCR relay contact 10-6 to the DOP terminal blocks 25 and 27. Wire the new DO relay back contact 12-4 between DOP terminal block 26 and CPT timer pin 2. See Figure 7 (Area 5).
3. Install the new DO and DCR relay contacts to the appropriate DOP terminal blocks. See Figure 7 (Area 3).
4. Install top-of-car junction box.

Figure 8: New DO and DCR Contacts
5. Make appropriate connections between TOC junction box AAA25580AM1 and the AT400 Operator. See Figure 9.

---

**Figure 9: Interface Connection**

---

WARNING: The use and ownership of this work is defined in the legend upon the front page hereof.
Start Up

1. Double check mechanical and electrical work.

2. Follow all applicable safety guidelines.
Setup and Adjustment Instructions

NOTE: Install per drawings included with the operator.

WARNINGS:

This door operator will move without warning during Learn Run operations.

Always take control of this door operator by placing the local operation switch to the ON position while working locally.

A Learn Run must be done with the car and hoistway doors coupled at the landing with the heaviest hoistway door. Failure to do so will result in door close speeds that could exceed code requirements.

Misadjustment of the values shown in this article can cause the doors to move beyond the code mandated limits.

1. The gate switch assembly includes the normal electro-mechanical switch for the safety circuit, plus a proximity sensor, which is used for DCP (door close position). The integral gate switch should be adjusted before the belt is attached to the door, for ease of door movement. The adjustability has been removed from the switch assembly and both the horizontal and vertical adjustments are made in the roller assembly.

   • Move the door until the roller is just below the kick-off tab, as shown in Position 1 in Figure 10.

   • Use the vertical adjustment slots and set the gap between the roller and tab to approximately 1 mm—tighten the bolts in the vertical slots.

   • Set the gate switch at maximum 50 mm.

   • Move the door closed until the shunt just touches the contact in the switch (this can be determined by either using a voltmeter, on ohms, or by feeling of contact by tapping on the shunt lever) and note the distance from fully closed. The maximum code distance that the door can be from fully closed when the switch closes is 50 mm (on single-slide and two-speed doors, the door can be 50 mm from fully closed; on center-opening doors, the doors can be 50 mm apart). The shape of the lever arm is such that the optimum distance for the shunt to contact the switch is 14 mm. This will meet the code requirement for all door types and allow for some endplay (space between the shunt and underside of the switch assembly) when door is fully closed. Use the...
horizontal slots in the U-channel to adjust the switch closure to be 14 mm from fully closed for side-slide doors, and 28 mm apart for C/O doors. When this adjustment is correct, the shunt should penetrate into the switch assembly, compressing the contact by approximately 5 mm (see Position 2 in Figure 11). Ensure that the lever is not pressing up against the assembly (there must be some endplay when the doors are fully closed). The proximity switch has been factory adjusted to activate at the same time as the electro-mechanical switch on the integral arrangement used with the discrete arrangements. There is an LED on the proximity switch, which will indicate the device is activated.

- When the proper adjustments have been achieved, the roller assembly should be pinned, using the roll pin provided. Pilot holes have been provided for this purpose.

**Position 1**

![Vertical Adjustment](Figure 10: Position 1, Vertical Adjustment)
2. Ensure that the belt is tracking properly into the pulleys, without any belt “draw.” Traverse the door and take notice of where it is riding in the pulleys. Adjust the hitch as necessary to eliminate any rubbing of the pulley flanges.

3. The belt tension has been set at the factory. If it should be necessary to tighten the toothed belt, follow the belt tensioning procedure below.

**Belt Tensioning Procedure** (see Figure 12)

- Loosen bolts A and B.
- Tighten bolts C to compress spring until both brackets touch. Do not over torque.
- Slide brackets away from motor to remove belt slack, tighten bolt B.
- Loosen bolt C until head of bolt is free of bracket, belt tension is now set.
- Tighten bolt A.
4. Once power is applied to the door operator, a Learn Run will need to be performed. The doors **must** be in the closed position to initiate a learn operation.
Learn Run Overview

Learn Run Description

All Learn Run operations must be initiated with the car doors closed and coupled with the hoistway doors at the landing that has the heaviest hoistway door configuration. To abort a Learn Run from local mode, press the learn button.

There is a learn button located on the controller interface. During a Learn Run, the control system will learn three things: the hand of the door, the width of the door, and the mass of the door system. This is why it is imperative that the Learn Run is performed with the car and hoistway doors coupled. To initiate a Learn Run, the doors must be fully closed and the local operation switch must be depressed to the ON position. The learn button must be pressed and held in for three seconds, at which time the power LED will flash rapidly. Once the learn operation has begun, the LED will flash slowly—the button should be released at this time. The doors will move open slightly, then close against the stop. Next, the doors will open, and accelerate for a short distance (the mass is being learned at this time), then open fully. The doors will close, accelerate for a short distance (again, learning the mass), and then close fully. When this motion is complete, and the LED stops flashing, the Learn Run is done. The local operation switch should be placed to the OFF position, which will allow the door controller to take commands from the elevator controls. The internal setting to the operator will not permit the door speed to be set beyond the code allowed speed, based on the learned mass.

Step-by-Step Learn Run for UNITEC AT400 Operator

Once power is applied to the door operator, a Learn Run will need to be performed. **The doors must be in the closed position to initiate a Learn Run operation.** To perform a Learn Run on this door operator, follow the steps below:

- All Learn operations must be initiated with the car doors closed.

- Couple the car door lock vane/clutch with the closed hoistway doors that are the **heaviest doors** in that hoistway.

- If it is desired to abort a Learn Run for some reason, just press the Learn button again.

- Three things are learned by the operator during the Learn Run:
  1. The hand of the door system (the direction it intends to travel for open and close);
  2. The width of the door;
3. The mass of the set of doors.

To initiate the Lear Run, read through the following procedures prior to pressing any buttons.

- Ensure the doors are closed.
- Ensure that the top cover to the door operator is removed exposing the learn and local operation buttons.
- Ensure nothing is hindering the doors’ movement.
- Ensure the door bumpers and full door travel is set where you desire it to be set.
- Always keep fingers clear of any pinch points (sheave, gate switch, cables, etc.)
- Ensure personal safety and stay clear of the door travel for the full length of door travel.
- Turn power on to the elevator in question being sure to take the normal safety precautions to prevent the elevator from moving.
- Ensure the power LED is lit.
- Depress the Local Operation Switch into the ON position.
- Press and hold the Learn button for three seconds.
- The power LED should now be flashing rapidly.
- Look for the power LED to start flashing slowly.
- At this time release the learn button and move yourself clear of operator at this point.
- The Learn operation has begun when the power LED is flashing slowly.

What happens during the Learn Run:

- Doors will move open slightly and then close against the stop (DFC sensed).
- The doors will open and accelerate for a short distance and then open fully (DFO sensed).
- The doors will begin to close, accelerate for a short distance and then close fully.
- When this motion is complete and the power LED stops flashing, the Learn Run is complete.
- Place the Local Operation switch in the OFF position (not depressed).

- The door controller will now take commands from the elevator controller (car calls or hall calls).

- If the power LED remains flashing after the Learn Run is complete, this means some kind of fault has occurred. Should this happen, cycle the main power to the operator that will reset the faults.

- Perform the Learn Run again. If the same flashing condition persists, review installation guide, check all wiring.

No further adjustment to the Unitec AT400 door operator is possible since the internal settings to the operator will not permit the door speed to be set beyond the ANSI code allowed speed, based on the learned mass of the doors.

If at any time during the life of the elevator (while this AT400 door operator is in place), doors change or equipment fastened to the doors (car or hoistway) changes and a different mass set of doors results, it is imperative that another Learn Run be done in order to establish the proper door opening motion profile.
3. Follow all applicable safety guidelines.
Appendix A: Part Numbers

The following table lists all part numbers this document mentions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Door Type/ Entrance Width</th>
<th>Door Hand</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT400 Engine Unit</td>
<td>S/S &amp; 2/S up to 1371mm (54&quot;)</td>
<td>Right</td>
<td>AAB24350BK45</td>
</tr>
<tr>
<td></td>
<td>C/O up to 1524mm (60&quot;)</td>
<td>Left</td>
<td>AAB24350BK46</td>
</tr>
<tr>
<td></td>
<td>S/S &amp; 2/S up to 1067mm (42&quot;)</td>
<td>Right</td>
<td>AAB24350BK47</td>
</tr>
<tr>
<td></td>
<td>C/O up to 1219mm (48&quot;)</td>
<td>Left</td>
<td>AAB24350BK48</td>
</tr>
<tr>
<td></td>
<td>C/O, S/S &amp; 2/S up to 914mm (36&quot;)</td>
<td>Right</td>
<td>AAB24350BK49</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left</td>
<td>AAB24350BK50</td>
</tr>
<tr>
<td></td>
<td>S/S &amp; 2/S up to 813mm (32&quot;)</td>
<td>Right</td>
<td>AAB24350BK51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left</td>
<td>AAB24350BK52</td>
</tr>
<tr>
<td>Delay on Pull-in Timer</td>
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<td>Diode Supressor for DC Relays</td>
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<td>AAA612T7</td>
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<td>2/S</td>
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<td>ABA24430R16</td>
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<tr>
<td>NDG Relay, 110 VDC, 4NO-4NC</td>
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<td>AAA613CZ12</td>
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<td>Single Phase DC Power Supply (208, 220, 230, 240 V)</td>
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<td>ABA621BJ1</td>
</tr>
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<td>Single Phase DC Power Supply (440, 460, 480, 575, 600 V)</td>
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<td></td>
<td>ABA621BJ2</td>
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<tr>
<td>Socket (to mount relays)</td>
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<tr>
<td>TOC Junction Box</td>
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