Pre-Installation Notes of Caution

1. Please be sure your building has the original controller wiring diagram prior to ordering equipment or beginning work.

2. Refer to page 35 right now for multiple advisory cautions and hints.
   Do not begin work without reading that page.

7300AC, A7777 (PWM), 7777 Resistance Control and Generic Installations to AT400 Door Operator Retrofit Kit
7300AC, A7777 (PWM), 7777 Resistance Control and Generic Installations to AT400 Door Operator Retrofit Kit Installation Manual

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Getting Started

1. Go to the job site and determine the type of door, opening, and hand (see Figure 1).

A. The opening size is determined by the “x” dimension (in inches), not door travel as with other door operators.

B. The “hand” (right-hand or left-hand) is determined from inside the car.

   1) If the door opens to the left, the door is a left-hand door.

   2) If the door opens to the right, the door is a right-hand door.

   3) The “hand” of a center-opening door operator is determined by which door ("A" or "B") is being driven by the door operator. If the door operator drives door “A,” it is a right-hand door operator.
General Description of AT400 Door Operator

The AT400 door operator is a self-contained unit within a U-channel. The equipment included with the operator are the proper length channel, channel mounting brackets, mounting hardware, the motor/gear box, controller, the controller power supply, the idler tension pulley, the toothed belt, a toothed belt door attachment bracket, and the gate switch assembly. On the top of the housing, there is an opening provided to access the controller interface panel. The controller interface has a disable switch (local operation only), which will interrupt the commands from the elevator control system. Additionally, there is a LED, which will indicate the presence of power to the controller, and also serve as a flash indicator for active faults. There is also a "learn" button provided in the interface panel. The AT400 is capable of moving a total mass of up to 600 lbs. (coupled car and hoistway doors).

![Diagram of AT400 Door Operator Components]

Figure 2: AT400 Door Operator Components
AT400 Interface Panel

The interface panel located under the plastic cover in the U-channel is used to control the operator as well as to provide feedback.

![Diagram of AT400 Interface Panel]

**Local Operation Switch:** This switch is provided to disable all commands from the elevator control system, thereby ensuring that the operator is being controlled locally. In order to perform a local Learn Run, the switch must be placed to the disable position.

**Local Operation Indicator:** This LED is used to clearly distinguish the position of the local operation switch. When the switch is depressed (input commands ignored), the LED will be on.

**Learn Button:** The learn button is used to initiate a Learn Run. Once the disable switch has been activated, **the button must be held down for three seconds** to perform a learn operation. When a Learn Run is requested, the power LED will blink rapidly. Once the Learn Run has been started, the LED will blink slowly.

**Power and Microprocessor (µc) LED:** The LED will perform the following functions:

1. will indicate the presence of 24 VDC at the controller
2. will flash to show Learn Run request and operation (fast & slow)
3. will flash a number of times to indicate active door operator faults
Power and Signal Requirements

The power and signal requirements for the discrete AT400 (120 VDC) operator are as follows. See Table 1 for details.

Table 1: Power and Signal Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>Wires</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door Power</td>
<td>(108-132 VDC) at 3 Amp</td>
<td>Two</td>
</tr>
<tr>
<td>Door Signal Power</td>
<td>(19-24 VDC) at 0.2 Amp</td>
<td>Two</td>
</tr>
<tr>
<td>Output Signals</td>
<td>Door Open Limit (DOL)</td>
<td>Two</td>
</tr>
<tr>
<td></td>
<td>Door Close Limit (DCL)</td>
<td></td>
</tr>
<tr>
<td>Input Signals</td>
<td>Door Open (DO)</td>
<td>Three</td>
</tr>
<tr>
<td></td>
<td>Door Close (DC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nudge (NDG) (if required)</td>
<td></td>
</tr>
<tr>
<td>Traveling Cable</td>
<td>9-18 Gauge Conductors</td>
<td></td>
</tr>
</tbody>
</table>

* Floating grounds have been shown to be problematic for getting the AT400 to run properly. Ensure that the car top, operator, and controller in the machine room all share a common reference ground. Digging out an additional traveling cable for this purpose may be necessary.

Figure 4: Label on AT400 PC Controller
Top-of-Car Junction Box

The AT400 retrofit kits include a junction box (AAA25580AM1, see Figure 5). The box is to be mounted on top of the car and be used as junction box between the AT400 and existing traveling cable wires.

- Wire the top-of-car junction box to the AT400 as shown in Figures 6 and 7.

Figure 5: Junction Box AAA25580AM1
Typical Wiring Between AT400 Door Operator and Junction Box

Note: Connect door emergency stop SW in series with existing TOC emergency stop to prevent operation of existing controller. Disable valves and pump motor operation.

Figure 6: Traveling Cable Wiring, Junction Box and Door Emergency Stop Box Wiring
Single-Phase Power Supply

The AT400 requires 120 VDC (no ripple)* for power and 24 VDC for signal power. For existing controllers where these voltages are unavailable, a DC power supply is required. Two supplies are available depending on the building power supply: the ABA621BJ1 accepts primary voltages from 208–240, and the ABA621BJ2 accepts voltages from 440 to 600. The power supplies are part of the electrical kits shipped with the retrofit packages on select controllers, or are specified separately as necessary for other control systems.

* Most start up issues for the AT400 are traced back to elevator companies either making their own inadequate unfiltered DC power supplies or their controller manufacturers not being fully aware of the filtered power needs of the AT400. Please use the UNITEC pre-engineered power supply and avoid start up headaches.

Typical Wiring Between the Single-Phase Power Supply and the Top-of-Car Junction Box

![Typical Wiring Between the Single-Phase Power Supply and the Top-of-Car Junction Box](image-url)

Figure 7: Typical Wiring Between the Single-Phase Power Supply and the Top-of-Car Junction Box

WARNING: The use and ownership of this work is defined in the legend upon the front page hereof.
### A7777 (PWM) or 7777 Resistance Control to AT400

#### Ordering Instructions

The retrofit kit for the A7777 PWM and 7777 resistance control operators is ordered in two steps. The door operator, hardware kit and mechanical interface kits are ordered all together under one of the part numbers in the range AAA24430Q6 through Q10. Additionally, an electrical interface kit dictated by the controller type and building power supply must be ordered using one of the part numbers in the range AAA24430Q412 through Q415.

1. Use Table 2 to select the door operator type.

   **Table 2: A7777 or 7777 to AT400 (120 VDC) Door Operator Kit**

<table>
<thead>
<tr>
<th>Interlocks</th>
<th>Cab Height</th>
<th>Door Type</th>
<th>Opening Width (in.)</th>
<th>Door Hand</th>
<th>AT400 Kit Part No.</th>
<th>Check Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>You must replace existing interlocks and clutch/vane assembly with Otis 6940 interlocks (UNITEC will help specify).</td>
<td>Standard Cab Height</td>
<td>S/S</td>
<td>36</td>
<td>Right</td>
<td>AAA24430Q6</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>36</td>
<td>Left</td>
<td>AAA24430Q7</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>42</td>
<td>Right</td>
<td>AAA24430Q8</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>42</td>
<td>Left</td>
<td>AAA24430Q9</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C/O</td>
<td>42</td>
<td>Right</td>
<td>AAA24430Q10</td>
<td>☐</td>
</tr>
</tbody>
</table>

2. Use Table 3 to select an electrical interface type. This kit will need to be ordered separately.

   **Table 3: A7777 or 7777 to AT400 (120 VDC) Electrical Interface Kit**

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Check Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA24430Q412</td>
<td>LRV Controller, PWM Operator</td>
<td>☐</td>
</tr>
<tr>
<td>AAA24430Q413</td>
<td>LRV Controller; RES Operator; 208, 220, 230, 240 Primary Voltage</td>
<td>☐</td>
</tr>
<tr>
<td>AAA24430Q414</td>
<td>LRV Controller; RES Operator; 440, 460, 480, 575, 600 Primary Voltage</td>
<td>☐</td>
</tr>
<tr>
<td>AAA24430Q415</td>
<td>MRVF Controller, PWM Operator</td>
<td>☐</td>
</tr>
</tbody>
</table>

**NOTE 1:** The AT400 door operator retrofit kit (AAA24430Q6 through Q10) includes the following mechanical interfacing hardware and diagrams:

- Door operator mounting brackets
- Car door hitch bracketry and Otis “Bayonet” style vane AAA6940BZ or AAA24395C; Otis 6940 interlocks must be ordered separately (E6940AP1 for center-opening doors, E6940AP2 or RH single-slide doors, and E6940AP3 for LH single-slide doors). These interlocks include a spirator type door closer.
• Mechanical installation diagram (Otis DWG AAA24430Q)
• Standard gate switch roller (modification may be necessary). Refer to notes on AAA24430Q.

NOTE 2: The AT400 door operator electrical interface kit (AAA24430Q412 through Q415) includes the following wiring diagrams and electrical hardware:
• ABA621BJ_ DC power supply only necessary for AAA24430Q409 and Q410 (for 7777 resistance control only, see Figure 7)
• Top-of-car junction box AAA25580AM1
• Nudging relay AAA613CZ9 (120 VAC, 4NO-4NC)—shown but may not be necessary
• Nudging relay socket 618AE2—shown but may not be necessary
• Nudging suppressor AAA00605AAA014—shown but may not be necessary
• Typical wiring diagram 8-1S7900AG (LRV), and 4-2S7416G (MRVF)
• Hookup wire 18 gauge (red, red/white, brown, brown/white, grey/yellow)
• Door emergency stop switch AAA25580AJ1

IMPORTANT: Before removing existing door operator, review Otis DWG AAA24430Q (included in the kit). Some parts from the existing door operator must be retained.

NOTE 3: UNITEC recommends door hanger support kits 1F-A7777G2 (for single-slide car doors) and 1F-A7777G1 (for center-opening car doors).

* Just ask UNITEC to specify all of the necessary equipment for your 7777 to AT400 needs—and you’ll be on your way!
TOC Wiring: A7777 (PWM) to AT400 on Hydro

Field to remove existing door operator and rewire as shown.

Field to use spare traveling cable or find HAC wire.

Figure 8: TOC Wiring A7777 (PWM) to AT400 on Hydro
Figure 9: TOC Wiring for 7777 Door Operator on Hydro

Field to remove the existing door operator and rewire as shown.

WARNING: The use and ownership of this work is defined in the legend upon the front page hereof.
TOC Wiring: A7777 (PWM) to AT400 on MRVF

Field to remove existing door operator and rewire as shown.

Field to use spare traveling cable or find HAC wire.

Figure 10: TOC Wiring A7777 (PWM) to AT400 on MRVF
7300 Type to AT400

Ordering Instructions

The retrofit kit for the 7300AC operator is ordered in two steps. The door operator, hardware kit, and mechanical interface kit are ordered together under part numbers ABA24430R1 through R14. Additionally, an electrical interface kit (ABA24430R408 or ABA24430R409) must be ordered separately based on the building power supply.

1. Use Table 4 to select 7300AC to AT400 door operator retrofit kit.

Table 4: Changing 7300 to AT400 (120 VDC) Kit

<table>
<thead>
<tr>
<th>7300 Door Type</th>
<th>Door Hand</th>
<th>Opening Width (in.)</th>
<th>AT400 Kit Part No.</th>
<th>Check Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>S/S</td>
<td>Right</td>
<td>32 to 42</td>
<td>ABA24430R1</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R2</td>
<td>☐</td>
</tr>
<tr>
<td>C/O</td>
<td>Right</td>
<td>32 to 36</td>
<td>ABA24430R3</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R4</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>36 to 48</td>
<td>ABA24430R5</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R6</td>
<td>☐</td>
</tr>
<tr>
<td>2/S</td>
<td>Right</td>
<td>32 to 33</td>
<td>ABA24430R7</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R8</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>33 to 39</td>
<td>ABA24430R9</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R10</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>39 to 46</td>
<td>ABA24430R11</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R12</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Right</td>
<td>46 to 48</td>
<td>ABA24430R13</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td>ABA24430R14</td>
<td>☐</td>
</tr>
</tbody>
</table>

2. Use Table 5 to select an electrical interface type.

Table 5: 7300 to AT400 (120 VDC) Electrical Interface Kit

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Check Box</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA24430R408</td>
<td>UCL, Hydro, 208, 220, 230, 240 Primary Voltage</td>
<td>☐</td>
</tr>
<tr>
<td>ABA24430R409</td>
<td>UCL, Hydro, 440, 460, 480, 575, 600 Primary Voltage</td>
<td>☐</td>
</tr>
</tbody>
</table>
NOTE 1: The AT400 door operator retrofit kit (ABA24430R1 through R14) includes the following mechanical interfacing hardware and diagrams:

- Door operator mounting brackets
- Car door hitch bracketry
- Otis “Bayonet” style vane AAA6940BZ or AAA24395C
- Mechanical installation diagram (Otis DWG ABA24430R)
- Fasteners for brackets and hitch (nuts, bolts, etc.)
- Standard gate switch roller (modification may be necessary). Refer to notes on DWG ABA24430R.

IMPORTANT: Before removing existing door operator, review DWG ABA24430R (included in the kit). Some parts from the existing door operator must be retained.

NOTE 2: The AT400 door operator electrical interface kit (ABA24430R408 and R409) includes the following wiring diagrams and electrical hardware:

- ABA621BJ_DC Power Supply
- Top-of-car junction box AAA25580AM1
- Typical hookup wiring diagram: 7-1S7561DC for 7300AC (hydro) and A1S7501D for 7300AC (UCLS)
- DOL, DCL relays AAA613CZ8, 24 VDC relays; refer to Figure 13.
- Nudging relay AAA613CZ12 (110 VDC); refer to Figure 13.
- Delay on pull-in timer (AAA623AA1); refer to Figure 13.
- Relay sockets for DOL, DCL, and nudging relay 618AE2; refer to Figure 13.
- Diode suppressor AAA612T7; refer to Figure 13.
- Din rail 401B14; refer to Figure 13.
- Hookup wire 18-gauge (red, red/white, brown, brown/white), 30 feet
- Door emergency stop switch AAA25580AJ1
TOC Wiring: 7300AC to AT400 Changeover

Field to remove existing door operator and rewire as shown.

Figure 11: W/D 7-1S7561DC for 7300AC Door Operator

NOTE: Figure 11 depicts hydraulic diagram only. UCL diagrams as well as hydraulic are included in the installation drawing package.

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

NOTE: Generic equipment has been successfully used on certain non-Otis applications as well as for Otis types O, QL, and 6970 operators.

In addition to the operator-specific kits, a generic package has been made available to interface the AT400 to a variety of control and door systems. The generic package is designed for controllers set up for discrete door operator communication. Depending on the current system, two to five kits must be ordered.

Ordering Instructions

1. Operator Engine Unit (must order)
2. Wiring Harness (must order)
3. Mechanical Interface Kit (optional)
4. Belt Relater for C/O Applications (optional)
5. Electrical Interface Kit (must order if existing controller is retained)
6. Power Supply (order if existing controller is retained; see NOTE on p. 7)

1. Order an AT400 engine unit depending on the opening type, hand, and entrance width. Ensure that there is room for the operator. Refer to Figure 12 for the overall dimensions of the AT400 operator. Use Table 6 to select the appropriate AT400 engine unit.

![Figure 12: Overall Dimensions of AT400 Operator](image-url)
Table 6: AT400 Engine Unit

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Door Type / Entrance Width</th>
<th>Operator Length (L)</th>
<th>Door Hand</th>
<th>Check One</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAB24350BK45</td>
<td>S/S &amp; 2/S over 1067 mm (42 in.)–1371 mm (54 in.)</td>
<td>1920 mm (75 in.)</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK46</td>
<td>C/O over 1219 mm (48 in.)–1524 mm (60 in.)*</td>
<td></td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK47</td>
<td>S/S &amp; 2/S over 914 mm (36 in.)–1067 mm (42 in.)</td>
<td>1615 mm (63 in.)</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK48</td>
<td>C/O over 914 mm (36 in.)–1219 mm (48 in.)*</td>
<td></td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK49</td>
<td>S/S &amp; 2/S over 813 mm (32 in.)–914 mm (36 in.)</td>
<td>1489 mm (58 in.)</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK50</td>
<td>C/O up to 914 mm (36 in.)*</td>
<td></td>
<td>Left</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK51</td>
<td>S/S &amp; 2/S up to 813 mm (32 in.)</td>
<td>1323 mm (52 in.)</td>
<td>Right</td>
<td></td>
</tr>
<tr>
<td>AAB24350BK52</td>
<td></td>
<td></td>
<td>Left</td>
<td></td>
</tr>
</tbody>
</table>

* For C/O applications that will use the AT400 belt as the means to relate the doors, order p/n AAB24350BK45 or AAB24350BK46 for openings in range of 42 in. to 54 in. For openings less than 42 in., order p/n AAB24350BK47 or AAB24350BK48.

To mount the operator via the header, there needs to be enough room between the header and cab front to attach an operator mounting bracket. Figure 13 illustrates an example of a header mount AT400.

If current system can accommodate the mounts detailed above, proceed to order an installation document package p/n AAA24430V430-UNITEC along with your base operator kit from Table 6, and a wiring harness per step 2 below. These three items comprise the most basic and least costly material sets available for the generic AT400 door operator offering.

2. Always order an AT400 wiring harness p/n AAA24431E7.
To mount the door hitch to the hanger, the hanger needs to have enough surface area for the hitch to attach. Figure 14 details the overall dimensions of the hitch.

3. The generic mechanical interface kit (see Table 7) is needed in addition to the AT400 engine unit (AAB24350BK__) if the current door system cannot accommodate a header mount door operator and a hanger mount hitch.
4. For center opening applications, the AT400 door operator belt can be used to relate the motion of the doors. If you desire to relate the doors using the operator belt, order equipment per Table 8. This is especially important on Otis type O operator applications.

Table 8: C/O Belt Relater Kit Material

<table>
<thead>
<tr>
<th>Part No.</th>
<th>QTY</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA24430V420</td>
<td>1</td>
<td>C/O Belt Relater Kit Content, w/ Door Mount Hitch</td>
<td></td>
</tr>
<tr>
<td>109P2</td>
<td>4</td>
<td>Screw</td>
<td>For C/O Doors</td>
</tr>
<tr>
<td>AAA283ATJ2</td>
<td>1</td>
<td>Angle, Belt Hitch</td>
<td></td>
</tr>
<tr>
<td>AAA141AV1</td>
<td>2</td>
<td>Rivet, Drive</td>
<td></td>
</tr>
</tbody>
</table>

5. **Ordering the electrical interface kit is mandatory when applying AT400 to existing controller applications.** The electrical kit provides relays, timers, and other components to properly interface the AT400 to the existing controller (see NOTE 2).

Table 9: Generic AT400 Electrical Interface Kit

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAA24430V401-UNITEC</td>
<td>Electrical Interface Kit</td>
</tr>
</tbody>
</table>

6. The 120 VDC door control power must be filtered DC (no ripple) to avoid risking damage to the door controller. The surest way to avoid any risk is to use the pre-engineered power supply (see Table 10). If appropriate voltages are not present, you must order the appropriate ABA621BJ power supply in addition to the operator mechanical and electrical package. The ABA621BJ type power supply provides both 24–30V signal and 120 VDC no-ripple/filtered door operator power. Refer to Table 10.

Table 10: Power Supply

<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</td>
<td></td>
</tr>
<tr>
<td>ABA621BJ2</td>
<td>DC Power Supply, 440–600 VAC Primary</td>
<td></td>
</tr>
</tbody>
</table>
Suggested Tools

Table 11: Suggested Tools

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP-765842</td>
<td>Step Drill Bit; 3/16 in. to 7/8 in. in 1/16 in. Increments</td>
</tr>
<tr>
<td>VP-764800</td>
<td>13/64 in. Drill Bit, Standard Length</td>
</tr>
<tr>
<td>MT-105050-58</td>
<td>Allen Wrench, 8 mm</td>
</tr>
<tr>
<td>MT-105050-59</td>
<td>Allen Wrench, 10 mm</td>
</tr>
<tr>
<td>MT-114370-5</td>
<td>8 mm Allen Socket, 3/8 in. Drive</td>
</tr>
<tr>
<td>MT-114370-6</td>
<td>10 mm Allen Socket, 3/8 in. Drive</td>
</tr>
</tbody>
</table>

NOTE 1: The generic mechanical interface kit (p/n AAA24430V410-UNITEC) includes the following mechanical interfacing hardware:

- Door operator mounting brackets
- Car door hitch bracketry
- Otis “Bayonet” style vane AAA6940BZ or AAA24395C (included with operator).
- Fasteners for brackets and hitch (nuts, bolts, etc.)
- Standard gate switch roller (modification may be necessary depending on application)

IMPORTANT: Before removing the existing door operator, review DWG AAA24430V (included in the kit).

NOTE 2: The electrical interface kit (p/n AAA24430V401-UNITEC) includes the following electrical hardware:

- Top-of-car junction box p/n AAA25580AM1
- DOL, DCL relays p/n AAA613CZ8 (24 VDC)
- Nudging relay p/n AAA613CZ12 (110 VDC)
- Delay on pull-in timer p/n AAA623AA1
- Relay sockets for DOL, DCL, and nudging relay p/n 618AE2
- Diode suppressor p/n AAA612T7
- Din rail p/n 401B14
- Hookup wire 18-gauge (red, red/white, brown, brown/white), 30 feet
- Door emergency stop switch p/n AAA25580AJ1 (included with operator)
Wiring Instructions

Wiring of necessary control signals between other existing controllers and the AT400 operator will vary depending on the type of controller. Specific wiring hookups are included in cut-in wiring diagrams provided, if kits are ordered for the specific 7300 or 7777 operator upgrades.

Figure 15: DCL, DOL, NDG Relays, Timer, and Diode Suppressor
Figure 16 provides a number of available contacts and signals to interface the AT400 door operator to existing control systems, and for generic operator upgrades, when you utilize the UNITEC supplied relays, timers, diodes, and relay bases.

Figure 16: Typical Wiring Between an Existing Controller and the AT400 Junction Box (AAA25580AM1) Using Supplied Interface Components

NOTE: For DOL and DCL logic, see Figure 21 on p. 31.
* Careful! If existing door and control system does not have nudging plus you are not planning on adding that provision, be sure to add the jumper as shown, otherwise doors will perpetually run at slow speed.

NOTE: The AT400 includes a gate switch that must be used. Therefore, the field is required to remove the existing gate switch and rewire the applicable gate switch circuits to utilize the AT400 supplied switch.
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 18.

• 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 19). 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 and the operator installation is complete with no faults flashing, the roller assembly should be pinned, using the roll pin provided. Pilot holes have been provided for this purpose.

**Position 1**

![Vertical Adjustment Diagram](image-url)

*Figure 18: Position 1, Vertical Adjustment*
Position 2

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 20)

- Loosen bolts A and B.
- Tighten bolts C to compress spring until both brackets touch. Do not overtorque.
- 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 Learn Run, read through the following procedures prior to pressing any buttons.

- Ensure the doors are closed.
- Ensure a hard stop or bumper is present at the full open position of the car doors.
- 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. Ensure hoistway door stop position is set at least 3/4 in. further than car door stop location.
- 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 (see page 31). Should this happen, cycle the main power to the operator which 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.

✓ Ensure you are using 24 VDC relays for DOL and DCL as driven by AT400 outputs.

✓ Have someone monitor those DOL and DCL relays in the controller to be sure they are energizing and de-energizing according to logic in Figure 21 on p. 31.

✓ Monitor your door close position (DCP) sensor to ensure the LED is seen to turn on plus off when doors crack open plus close.

✓ Be sure voltage at the operator is no more than 24 VDC for controller voltage feeds plus no more than 132 VDC for motor power voltage.

✓ Check the voltage outputs at the UNITEC pre-engineered power supply in the main controller.
FLASH FAULT CODES:
– FLASH POWER LED
– PAUSE 2.5 SEC
– REPEAT FLASH
2 – MOTOR OVERCURRENT
3 – OVERSPEED
4 – ENCODER DEFECT
5 – DOOR SENSOR
6 – LEARN STOPPED
7 – PROCESSOR ERROR
8 – MOTOR OVERSTRESS
9 – WRONG COMMAND
10 – NEED LEARN RUN
11 – COMM TIMEOUT

Figure 21: DOL and DCL Logic
Appendix A: Part Numbers

The following table lists all part numbers this document mentions.

<table>
<thead>
<tr>
<th>Description</th>
<th>Door Type</th>
<th>Opening Width (in.)</th>
<th>Door Hand</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AT400 (120 VDC) Door Operator</td>
<td>S/S</td>
<td>32 to 42</td>
<td>Right</td>
<td>ABA24430R1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R2</td>
</tr>
<tr>
<td></td>
<td>C/O</td>
<td>32 to 36</td>
<td>Right</td>
<td>ABA24430R3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36 to 48</td>
<td>Right</td>
<td>ABA24430R5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R6</td>
</tr>
<tr>
<td></td>
<td>2/S</td>
<td>32 to 33</td>
<td>Right</td>
<td>ABA24430R7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33 to 39</td>
<td>Right</td>
<td>ABA24430R9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>39 to 46</td>
<td>Right</td>
<td>ABA24430R11</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>46 to 48</td>
<td>Right</td>
<td>ABA24430R13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Left</td>
<td>ABA24430R14</td>
</tr>
</tbody>
</table>

DO, DC, Ice Cube Relays, 24 VDC, 4NO-4NC | AAA613CZ8
NDG Relay, 110 VDC, 4NO-4NC | AAA613CZ12
Socket (to mount relays) | 618AE2
Delay on Pull-in Timer | AAA623AA1
Diode Suppressor for DC Relays | AAA612T7
Din Rail (to mount hardware), 13.5 in. | 401B14
Single Phase DC Power Supply (208, 220, 230, 240 V) | ABA621BJ1
Single Phase DC Power Supply (440, 460, 480, 575, 600 V) | ABA621BJ2
Din Rail (7.12 in.) | 401B11
TOC Junction Box | AAA25580AM1
### Table 13: Related Part Number for Changing A7777 or 7777 Door Operators

<table>
<thead>
<tr>
<th>Options w/Existing Door Locks</th>
<th>Cab Height</th>
<th>Door Type</th>
<th>Opening Width (in.)</th>
<th>Door Hand</th>
<th>AT400 Kit Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace existing interlocks and clutch/vane assembly with Otis 6940 interlocks</td>
<td>Standard Cab Height</td>
<td>S/S</td>
<td>36</td>
<td>Right</td>
<td>AAA24430Q6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>36</td>
<td>Left</td>
<td>AAA24430Q7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>42</td>
<td>Right</td>
<td>AAA24430Q8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S/S</td>
<td>42</td>
<td>Left</td>
<td>AAA24430Q9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C/O</td>
<td>42</td>
<td>Right</td>
<td>AAA24430Q10</td>
</tr>
</tbody>
</table>

- **Electrical Interface Kit, LRV Controller, PWM Operator**
  - AAA24430Q412

- **Electrical Interface Kit, LRV Controller; RES Operator; 208, 220, 230, 240**
  - AAA24430Q413

- **Electrical Interface Kit, LRV Controller; RES Operator; 440, 460, 480, 575, 600**
  - AAA24430Q414

- **Electrical Interface Kit, MRVF Controller, PWM Operator**
  - AAA24430Q415

- **TOC Junction Box**
  - AAA25580AM1

- **Nudging Ice Cube Relay (120 VAC), 4NO-4NC**
  - AAA613CZ9

- **Relay Socket**
  - 618AE2

- **NudgingSuppressor**
  - AAA00605AAA014

---

**WARNING:** The use and ownership of this work is defined in the legend upon the front page hereof.
### Table 14: Related Part Numbers for Interfacing AT400 to Generic Controller

<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 1371 mm (54&quot;)</td>
<td>Right</td>
<td>AAB24350BK45</td>
</tr>
<tr>
<td></td>
<td>C/O up to 1524 mm (60&quot;)</td>
<td>Left</td>
<td>AAB24350BK46</td>
</tr>
<tr>
<td></td>
<td>S/S &amp; 2/S up to 1067 mm (42&quot;)</td>
<td>Right</td>
<td>AAB24350BK47</td>
</tr>
<tr>
<td></td>
<td>C/O up to 1219 mm (48&quot;)</td>
<td>Left</td>
<td>AAB24350BK48</td>
</tr>
<tr>
<td></td>
<td>C/O, S/S &amp; 2/S up to 914 mm (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 813 mm (32&quot;)</td>
<td>Right</td>
<td>AAB24350BK51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Left</td>
<td>AAB24350BK52</td>
</tr>
<tr>
<td>Generic Mechanical Interface Kit</td>
<td></td>
<td></td>
<td>AAA24430V410-unitec</td>
</tr>
<tr>
<td>Generic Installation Document Package</td>
<td></td>
<td></td>
<td>AAA24430V430-unitec</td>
</tr>
<tr>
<td>C/O Belt Relater Kit w/ Door Mount Hitch</td>
<td></td>
<td></td>
<td>AAA24430V420</td>
</tr>
<tr>
<td>Electrical Interface Kit</td>
<td></td>
<td></td>
<td>AAA24430V401-unitec</td>
</tr>
<tr>
<td>Single Phase DC Power Supply (208, 220, 230, 240 V)</td>
<td></td>
<td></td>
<td>ABA621BJ1</td>
</tr>
<tr>
<td>Single Phase DC Power Supply (440, 460, 480, 575, 600 V)</td>
<td></td>
<td></td>
<td>ABA621BJ2</td>
</tr>
<tr>
<td>DO, DC, Ice Cube Relays, 24 VDC, 4NO-4NC</td>
<td></td>
<td></td>
<td>AAA613CZ8</td>
</tr>
<tr>
<td>NDG Relay, 110 VDC, 4NO-4NC</td>
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<td></td>
<td>AAA613CZ12</td>
</tr>
<tr>
<td>Socket (to mount relays)</td>
<td></td>
<td></td>
<td>618AE2</td>
</tr>
<tr>
<td>Delay on Pull-in Timer</td>
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<td></td>
<td>AAA623AA1</td>
</tr>
<tr>
<td>Diode Suppressor for DC Relays</td>
<td></td>
<td></td>
<td>AAA612T7</td>
</tr>
<tr>
<td>Din Rail (to mount hardware), 13.5 in.</td>
<td></td>
<td></td>
<td>401B14</td>
</tr>
<tr>
<td>Din Rail (7.12 in.)</td>
<td></td>
<td></td>
<td>401B11</td>
</tr>
<tr>
<td>TOC Junction Box</td>
<td></td>
<td></td>
<td>AAA25580AM1</td>
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</tbody>
</table>

**WARNING:** The use and ownership of this work is defined in the legend upon the front page hereof.
### Appendix B: Reference to UT-ID 22.16-500

<table>
<thead>
<tr>
<th>UNITEC®</th>
<th>AT400 DOOR OPERATOR QUICK INSTALLATION HELP GUIDE</th>
<th>AUGUST 3, 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT-ID 22.16-500</td>
<td><strong><strong>READ BEFORE STARTING</strong></strong></td>
<td>Page 1 of 1</td>
</tr>
</tbody>
</table>

**REQUIRED**

- For AT400 installation where original controller is retained, original wiring diagrams (W/D) will be needed to ensure smooth installation.
- For AT400 installation used with a new controller of non-Otis origin, it is strongly suggested that:
  - Controller manufacturer be made aware of signal, power, and logic requirements for the AT400.
  - (and if not)
  - In the least, utilize the pre-engineered power supply for AT400 available through UNITEC.
- Watch for floating grounds. The AT400 must have a commonly wired reference point between the negative side of the DO, DC, DOL, DCL and NDG relays and dry contacts and the negative side of the 24 VDC power supply. Also, use a separate body ground from controller to car top and operator.
- Dry contacts from DO and DC (and Nudge if present) relays are needed. 7300 operator control does not have a DC relay.
- The AT400 outputs either 24 VDC or 0 VDC to drive/drop the DOL and DCL circuits. DOL logic state is 24 V high with doors fully closed. DCL logic state is 24 V high with doors fully opened. 24 VDC DOL & DCL relays are supplied with UNITEC kits for arrangements where the existing controller is being retained. Driving any other devices directly from the DPS proximity switch is not permissible.
- It is a must that the car do have a hard stop of some sort installed (if not present) on the open side of its travel. If the open position of the car door is left undefined (with no stop), the AT400 could sense that the doors have either not reached or gone beyond full open and a fault may occur. Each hoistway landing full open stop bumper may be located differently. Do not rely on hall door stop for full open position on car doors. If car doors chatter or bounce at full open, controller manufacturer must ensure “DO” signal remains high through entire door dwell open time.

**ALERTS**

- Circuits vary within manufacturers’ equipment. Any UNITEC supplied W/D or cut in diagrams provided as part of any AT400 upgrade kits are guides only. Plan to engineer wiring locally.
- AT400 is a closed loop operator and carries an encoder on the motor to govern door position and velocity after a LEARN run. There is no need for additional microswitches to sense door limits. Both a gate switch contact and a secondary door close position sensor are integral with AT400.
- Pay close attention to the AT400 breaking nudging contact requirement and how the existing door reversal system and nudge relay operate. (For AT400, operator is “ON” nudging operation when the nudging relay energizes).
- Door Force Measurement. Please be sure the mechanics and local inspectors are using a common (and ANSI Code directed) method for measuring door force. The AT400 operator achieves door force after a stall at very close to (but not over) the code limit of 30 lbs. If your reading exceeds 30 lbs.:
  - Be sure to calibrate your existing or use a new door force gauge.
  - Confirm with ANSI A17.2 item 1.8.1 that the correct method for measurement is being used.

**NOTE:** Door force must be measured within approximately 1.5 seconds after the doors stall.

- A Service Tool is not needed to make operator adjustments to establish an acceptable door motion profile. Speeding up the doors is not permissible since the AT400 learn run accounts for the doors moving mass and fully satisfies the ANSI code max kinetic energy requirement.

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