ASCO 7000 SERIES 7ATB, 7ACTB, 7ADTB
Automatic Transfer & Bypass–Isolation Switches
G, Q, S, & U design
Installation Manual

381333-415 A
9/2016

DANGER is used in this manual to warn of a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING is used in this manual to warn of a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION is used in this manual to warn of a hazardous situation which, if not avoided, could result in minor or moderate injury.

Refer to the outline and wiring drawings provided with your 7000 Series ATB for all installation and connection details and accessories.

Refer to Group 5 Controller User’s Guide 381333–126 for ATS status display messages, time delays, pickup & dropout settings, and adjustments.

Rating Label
Each 7000 Series ATB contains a rating label to define the load and fault circuit withstand/closing ratings. Refer to the label on the Transfer Switch for specific values.

WARNING
Do not exceed the values on the rating label. Exceeding the rating can cause personal injury or serious equipment damage.

Nameplate
The Transfer Switch nameplate includes data for each specific 7000 Series ATB. Use the switch only within the limits shown on this nameplate. A typical Catalog Number is shown below with its elements explained:

An experienced licensed electrician must install the ATB.

typical 4000 A
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## Catalog Number Identification

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<tr>
<th>Design prefix letter</th>
<th>Transition Type</th>
<th>Neutral</th>
<th>Phase Poles</th>
<th>Amperes</th>
<th>Voltage</th>
<th>Controller</th>
<th>Enclosure</th>
</tr>
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<tr>
<td>G</td>
<td>07A open</td>
<td>A- solid</td>
<td>2 single</td>
<td>600</td>
<td>A 115</td>
<td>5 standard</td>
<td>C type 1</td>
</tr>
<tr>
<td>Q</td>
<td>7AC closed</td>
<td>B- switching</td>
<td>3 three</td>
<td>800</td>
<td>B 120</td>
<td>5X if accessories ordered</td>
<td>F type 3R</td>
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<tr>
<td>S</td>
<td>7AD delayed</td>
<td>C- overlapping* blank-none</td>
<td></td>
<td>1000</td>
<td>C 208</td>
<td></td>
<td>G type 4</td>
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<td>D 220</td>
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<td></td>
<td>blanc – open type</td>
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<td>R 600</td>
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</tr>
</tbody>
</table>

* Overlapping neutral not available for Q, S, & U-designs

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![Typical G7ATB with lower doors open (transfer switch shown)](image_url)

Typical G7ATB with lower doors open (transfer switch shown)
INSTALLATION

The ASCO 7000 Series Automatic Transfer & Bypass–Isolation Switch (ATB) consists of an upper bypass–isolation switch, a lower transfer switch, a monitoring and transfer controller, and door–mounted controls. The ATB is factory wired and tested. Installation requires removal of the shipping skid then securing the enclosure to the supporting foundation.

Remove the Shipping Skid

Open the front lower door and remove the two front lag screws securing the enclosure to the wood skid. Next remove the rear lower panel and remove the two rear lag screws securing the enclosure to the wood skid.

Supporting Foundation and Mounting

The supporting foundation for the enclosure must be level and straight. Allow at least 35 inches in front of the enclosure for draw out of the Transfer Switch. Refer to the enclosure outline drawing included with the 7000 Series ATB for all mounting details including door opening space.

If bottom cable entry is used, the foundation must be prepared so that the conduit stubs are located correctly. Refer to the appropriate enclosure outline drawing for specified cable entrance area and location. Provide cable bending space and clearance to live metal parts. When a concrete floor is poured, use interlocking conduit spacer caps or a wood or metal template to maintain proper conduit alignment.

Mounting

Refer to the enclosure outline drawing furnished with this switch and mount the 7000 Series ATB according to the details and instructions shown on the drawing.

Remove Shipping Brackets / Angles from the Transfer Switch

Open the lower front door(s). The Transfer Switch carriage is secured to the frame for shipment. Remove the three or four shipping brackets or L–angles: (1 upper left, 1 upper right, and 2 lower).

NOTICE

To prevent serious damage, remove three or four shipping brackets or L–angles from the Transfer Switch carriage. Do not turn the Isolation Handle until they are removed!
**DANGER**

De–energize the conductors before making any line or auxiliary circuitry connections. Be sure that Normal and Emergency line connections are in proper phase rotation. Place engine generator starting control in the OFF position. Make sure engine generator is not in operation.

**Testing Power Conductors**

Do not connect the power conductors to the ATB until they are tested. Installing power cables in conduit, cable troughs, and ceiling-suspended hangers often requires considerable force. The pulling of cables can damage insulation and stretch or break the conductor’s strands. For this reason, after the cables are pulled into position, and before they are connected they should be tested to verify that they are not defective or have been damaged during installation.

**NOTICE**

Protect the switch from construction grit and metal chips to prevent malfunction or shortened life of the ATB switch.

**Connecting Power Conductors**

A *Wiring Diagram* is furnished with the ATB. All wiring must be made in accordance with the local codes. After the power cables have been tested, connect them to the appropriate terminal lugs on the Bypass Switch as shown on the wiring diagram provided with this ATB. Make sure that the lugs provided are suitable for use with the cables being installed. Standard terminal lugs are solderless screw type and will accept the wire sizes listed on the drawings provided with the ATB. Be careful when stripping insulation from conductors; avoid nicking or ringing the conductor. Remove surface oxides from conductors by cleaning with a wire brush. Follow conductor manufacturer’s instructions when aluminum conductor is used. Apply joint compound to conductor, then carefully wipe away excess compound. Tighten the cable lugs to the torque specified on the rating label.

**NOTICE**

Be sure that the Normal and Emergency power connections are in proper phase rotation.

**Bus Connections**

If bus connection is used, use SAE grade 5 hardware to connect bus to appropriate terminal plates on bypass switching device. Wipe off bus surfaces before they are joined. If bus is dirty, gently clean surfaces with a non-flammable solvent. Avoid touching cleaned surfaces.

**CAUTION**

Do not breathe cleaning solvent vapors.

Use SAE grade 5 hardware and tighten the bolted joints to the torque specified in Table A.

**NOTICE**

The reliability of the connection depends on how clean and how tight the joint is.

**Harnesses**

All internal connections are made at the factory. The bypass switch, transfer switch, and control panel are joined together by an interconnecting wire harness. The disconnect plugs are already engaged on enclosed switches. For open–type switches, the plugs must be engaged after installation is completed. Align harness plugs with sockets in the control and push them together until they are secure.

**Controller Ground**

A grounding wire must be connected to the controller’s lower left mounting stud. Because the controller is mounted on the enclosure door, a conductive strap must be used between the enclosure and the door. This connection provides proper grounding which does not rely upon the door hinges.

**Engine Starting Contacts and Auxiliary Circuits**

The engine control contact signal connections and auxiliary circuits are located on terminal block TB as shown on the *Wiring Diagram* provided with the ATB. Connect the signal wires to the appropriate terminals.
Functional Test

Read all instructions on the Wiring Diagrams and labels affixed to the ATB. Note the control features that are provided and review their operation before proceeding.

After installing the ATB check the following:
- Bypass Handle should be in the OPEN position.
- Isolation Handle should be in the CLOSED position.
- Transfer switch should be in NORMAL position. (For ACTB and ADTB the CN transfer switch should be CLOSED and the CE transfer switch should be OPEN).

If handles are not in correct positions, follow instructions for Bypassing and Isolating the automatic transfer switch (pages 10-12). Do not force the handles. Electrical interlocks prevent a wrong sequence of operation.

1 – Voltage Checks

First check nameplate on transfer switch; rated voltage must be the same as normal and emergency line voltage.

**DANGER**

Use extreme caution when using a meter to measure voltages. Do not touch power terminals; shock, burns, or death could result! Perform steps 1–6 at the right. Observe the status lights. See Figure 3.

- Black square means light is on.
- White square means light is off.

* If necessary, adjust voltage regulator on generator per the manufacturer’s recommendations. The ATB will respond only to rated voltage specified on the nameplate.

Now continue to 2 – Electrical Operation.

2 – Electrical Operation

This procedure checks electrical operation of the ATS.

**WARNING**

Be sure to close the enclosure doors before proceeding to prevent person injury in case of electrical system fault.

Transfer Test

The ATS should be bypassed and isolated. Follow instructions for Bypassing and Isolating the automatic transfer switch (pages 10-12). Both normal and emergency sources must be available and the emergency source generator (if used) must be capable of being started; put engine starting control switch (on generator set) in automatic position. The Transfer Switch Connected to Normal light and the Normal Source Accepted light should be on.
Figure 4. Standard controls and indicators.

(Transfer Test continued from page 6)

1. Turn the Isolation Handle counterclockwise (approximately 12 turns) until the window shows TEST position.

NOTE: The engine generator may be signaled to start while turning the Isolation Handle. If emergency source is available, the ATS may operate to the emergency position. If it does, operate Retransfer Delay Bypass switch.

2. Perform steps 1–5 at right. Observe the status lights.
   - Black square means light is on.
   - White square means light is off.

7ACTB

The load is transferred via overlap (closed) transition. Transfer switch CE closes, then transfer switch CN opens. The operation is reversed for retransfer back to normal. If you do not want closed–transition transfer, press the Closed Transition Bypass button (Figure 5) while the controller display shows Waiting for In–Sync. This action causes open–transition (momentary load interruption) transfer to the opposite source, if conditions permit.

7ADTB

The load is disconnected and light (Figure 6) comes on during the delayed–transition transfer delay.

3. Turn the Isolation Handle clockwise (approximately 12 turns) to the CONN (connected) position.

4. Push in the Bypass Handle and turn it counterclockwise until the OPEN indicator shows green.

This completes the Functional Test of the ATB.
TESTING & SERVICE

TRANSFER TEST

Test the Automatic Transfer Switch portion of the 7000 Series ATB at least once a month. This procedure checks the electrical operation of the Transfer Switch and Controller. Turn the Engine Control switch to Auto and put the engine–generator starting control (at the engine–generator set) in automatic mode.

In the test the generator will start, the load will be transferred to the Emergency source, then back to the Normal source. An interruption to the load will occur, unless the Transfer Switch contacts are bypassed before the test. See pages 10 and 1 for bypassing and isolating instructions if no interruption of load is required.

![WARNING]
Be sure to close the enclosure doors before proceeding to prevent person injury in case of electrical system fault.

Perform the Electrical Operation – Transfer Test procedure on pages 6 and 7.

PREVENTIVE MAINTENANCE

Reasonable care in preventive maintenance will insure high reliability and long life for the 7000 Series ATB. An annual preventive maintenance program is recommended.

ASCO Services, Inc. is ASCO Power Technologies’ national service organization. They can be contacted at 1-800-800-2726 for information on preventive maintenance agreements.

YEARNINGLY INSPECTION

![DANGER]
Hazardous voltage capable of causing shock, burns, or death is used in this switch. De-energize both Normal – Emergency power sources before performing inspections!

Clean the ATS enclosure. Brush and vacuum away any excessive dust accumulation. Remove any moisture with a clean cloth.

Check the transfer switch contacts. Remove transfer switch barriers and check the condition of the contacts. Replace contacts when pitted or worn excessively. Reinstall the barriers carefully.

Maintain transfer switch lubrication. If switch is subjected to severe dust or abnormal operating conditions, renew factory lubrication on all movements and linkages. Re-lubricate solenoid operator if TS coil is replaced. Don’t use oil; order lubrication kit 75-100.

Check all cable connections & retighten them.

REPLACEMENT PARTS

Replacement parts are available in kit form. When ordering parts provide the Serial No., Bill of Material No. (BOM), and Catalog No. from the transfer switch nameplate. For service call ASCO Services at 1–800–800–2726; you will be put in contact with your local ASI office.

MANUAL LOAD TRANSFER

This procedure manually transfers load to other source if the Transfer Switch or Control Panel are out of service.

![WARNING]
Close enclosure doors to prevent personal injury in case of electrical system fault.

1. Be sure that the Bypass Handle is CLOSED on either Emergency or Normal (see page 10).

2. Be sure that the Isolation Handle is in the TEST or ISOLATE position (see page 11).

3. Turn the Bypass Handle counterclockwise to OPEN the Bypass Switch. Then Bypass to the other source (see page 10).

MAINTENANCE HANDLE

Bypass and isolate the Transfer Switch before using the maintenance handle! See pages 10 and 11. Remove the hub and handle after using them and store on frame.

Figure 7. Maintenance handle and hub.

for 7ATB

- Turn counterclockwise to Emergency.
- Turn clockwise to Normal.

for 7ACTB & 7ADTB

- Slide hub onto shaft & insert pin.
- Pull out shaft to operate Emergency contacts.
- Push in shaft to operate Normal contacts.

Grasp handle firmly.
## TROUBLESHOOTING

Note any optional accessories that may be furnished on the ATB and review their operation. Refer to any separate drawings and/or instructions that may be packed with the ATB.

Table B. Trouble-Shooting Checks.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>CHECK IN NUMERICAL SEQUENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 OPERATION</strong></td>
<td></td>
</tr>
<tr>
<td>Engine–generator set does not start when the <strong>Transfer Control</strong> switch is turned and held in <strong>Transfer Test</strong> position or when normal source fails.</td>
<td>Hold <strong>Transfer Test</strong> switch 15 seconds or the outage must be long enough to allow for Feature 1C time delay plus engine cranking and starting. Starting control must be in the automatic position. Batteries must be charged and connected. Check wiring to engine starting contacts.</td>
</tr>
<tr>
<td>Transfer switch does not transfer the load to the emergency source after the engine–generator set starts.</td>
<td>Wait for Feature 2B time delay to time out. Generator output circuit breaker must be closed. Generator frequency must be at least 95% of nominal (57 Hz for a 60 Hz system.)*</td>
</tr>
<tr>
<td>Transfer switch does not transfer the load to normal source when normal returns or when the <strong>Transfer Control</strong> switch is released.</td>
<td>Wait for Feature 3A time delay to time out. Voltmeter should read at least 90% of nominal phase to phase voltage between terminals EA and EC (or EL1 and EL2 for 2 pole switches)*</td>
</tr>
<tr>
<td>Gen. does not stop after load retransfer to normal source.</td>
<td>Wait for Feature 2E time delay to time out. Starting control must be in the automatic position. Voltmeter should read at least 90% of nominal phase to phase voltage between terminals NB and NC, NC and NA, and NA and NB (or NL1 and NL2 for 2 pole switches).</td>
</tr>
</tbody>
</table>

| **2 GEN-SET**                                                          |                                                                                             |
| **3 VOLTAGE**                                                          |                                                                                             |

| **7ACTB**                                                                 |                                                                                             |
| **Failure to Synchronize** light comes on.                              | Conditions of Normal or Emergency Sources not suitable for closed transition transfer. Recheck voltage and frequency of both sources. Press **Alarm Reset** pushbutton. |
| **7ACTB**                                                                 | CN and CE contacts are closed longer than setting in the controller. Open the disconnected source circuit breaker, then call your nearest ASCO Service Center for assistance. |
| **7ACTB**                                                                 | Transfer lockout operation has occurred; transfer switch is disabled from automatic operation. Open the disconnected source circuit breaker, then call your nearest ASCO Power Services, Inc for assistance. |
| **7ADTB**                                                                 | Delayed transition transfer operation. If load is disconnected longer than the setting in Group 5 controller (see User’s Guide 381333–126), then contact ASCO Power Services, Inc for assistance. |

* These are factory settings. Refer to **Controller User’s Guide**.

If the problem is isolated to circuits on the controller or the transfer switch, call your local ASCO Power Technologies sales office or ASCO Power Services, Inc at 1–800–800–2726. Furnish the Serial No. and Catalog No. from the transfer switch nameplate.
BYPASSING & ISOLATING

BYPASSING THE ATS*

This procedure explains how to Bypass the closed automatic transfer switch contacts. Bypassing is required before the ATS can be tested or isolated. The Bypass Handle must be in the OPEN position (green indicator) and the Isolation Handle must be in the CLOSED position (window). See Figures 8, 9 and 10.

You can only bypass to the same source that the Transfer Switch is connected. Solenoid interlock prevents incorrect operation.

1. Observe which Transfer Switch Connected To light is on (Normal or Emergency) on the door. This is the position of the automatic transfer switch.

2. Bypass to the same source as connected to transfer switch as follows (select Normal or Emergency).

*NOTE*: When Accessory 66A (reversed Normal & Emergency connections) is specified, the handle push–pull operation is reversed. Follow instructions on the door.
ISOLATING THE ATS

Isolating is required before any service work can be performed on the automatic transfer switch (ATS). Refer to Figures 11, 12, 13, 14 and 15.

1. Bypass the closed automatic transfer switch contacts. See BYPASSING on page 10.

NOTICE

Align the position indicator. Do not leave the handle in an intermediate position.

2. Turn the Isolation Handle counterclockwise (approx. 16 turns, approx. 12 turns for 4000A) until window shows TEST. The ATS can be tested now without load interruption (see page 8).

3. Continue turning the Isolation Handle counterclockwise (approx. 7 turns, approx. 8 turns for 4000 A) until the window shows ISOLATE.

4. Open the lower enclosure doors(s). Pull out the side rail carriage. On 4000 A extend two support legs. See Figures 14 and 15. Then roll out the transfer switch. It can be safely inspected in this position. The transfer switch can also be removed for easier maintenance operations.

Hazardous voltage capable of causing electrical shock, burns, or death; do not touch any control circuit terminals.

600–3000 A transfer switches weigh 350-450 lbs.; use lifting yoke kit 607064 or other device capable of lifting this weight to avoid personal injury or equipment damage.

Continued on next page
Figure 15. 4000 A transfer switch isolated and pulled out for inspection.

4000 A transfer switch draw-out procedure

1. Bypass and Isolate the ATS, then open both lower doors.
2. Pull out the rail support carriage all the way.
3. Remove left & right clevis and locking pins, drop two support legs, reinstall locking and clevis pins (to lock in place), and adjust both leg lengths to extend to the floor.
4. Stand directly in front of transfer switch. Grasp both handles, and pull straight out (detents on the rails require high initial force to overcome resistance).

**WARNING**

For the 4000 A transfer switch, to avoid personal injury and equipment damage, two support legs must be extended as shown in Figure 15. Substantial initial force is required to pull out the transfer switch (there are detents on rail).

**WARNING**

The 4000 A transfer switch weighs approx. 600 lb.; use lifting yoke 835745–001 or other device capable of lifting this weight to avoid personal injury or equipment damage.
RETURN TO SERVICE

This procedure explains how to return the automatic transfer switch (ATS) to service after inspection and maintenance. Observe the Bypass Switch Position indicator and lights. Refer to Figures 14 through 18.

1. Slide the transfer switch (ATS) into the enclosure (isolation contacts facing inward) until its crank pins engage the latch plates on both sides. Substantial force is required to overcome detents on the rails. Next push in side rail carriage. On 4000 A first retract the two legs and lock them in place. See Figures 14 and 15. Then close enclosure door(s).

WARNING

Close the enclosure door to prevent personal injury in case of electrical system fault.

NOTE

Align the position indicator. Do not leave the handle in an intermediate position.

2. Turn the Isolation Handle clockwise (approx. 7 turns, approx. 8 turns for 4000 A) until the window shows TEST. The ATS can be tested now without load interruption (see page 8).

NOTE

Solenoid interlock prevents closing the isolation contacts until the ATS is in the same position as the Bypass Switch.

3. Observe which Bypass Switch Position indicator is black (NORMAL or EMERGENCY) at Bypass Switch Handle. This shows the source connected to the load.

4. Observe which Transfer Switch Connected To light is on (Normal or Emergency) on the door. This is the position of the Transfer Switch. If it is not in the same position as the Bypass Handle change the position of the Transfer Switch as follows:

To change the position of transfer switch

<table>
<thead>
<tr>
<th>Operate to NORMAL</th>
<th>Operate to EMERGENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turn Transfer Control switch to Retransfer Delay Bypass.</td>
<td>Turn Transfer Control switch to Transfer Test (hold 15 seconds).*</td>
</tr>
<tr>
<td>Connected To Normal light should come on.</td>
<td>Connected To Emergency light should come on.</td>
</tr>
</tbody>
</table>

* If Feature 2B time delay is used, there will be a delay before transfer to Emergency.

NOTE

With Normal available, the ATS will not stay in the emergency position unless Feature 3A time delay is used (at least 30 seconds).

WARNING

Do not close the isolation contacts unless the Transfer Switch (ATS) and Bypass Switch are in the same position!

5. When the transfer switch is in the same position as the Bypass Switch handle, continue turning the isolation Handle clockwise (approx. 16 turns, approx. 12 turns for 4000 A) until the window shows CONN (connected).
RETURN TO SERVICE continued*

This procedure explains how to return the Bypass Switch Handle to the OPEN position. The Bypass Handle must be in the CLOSED position (yellow indicator on NORMAL or EMERGENCY) and the Isolation Handle must be in the TEST position (window). If the handles are not in these positions, refer to Return to Service on page 13. See Figures 19, 20 and 21.

**NOTICE**
You can only bypass to the same source that the ATS is connected. Solenoid interlock prevents incorrect operation.
1. Observe which Bypass Switch Position indicator is yellow (NORMAL or EMERGENCY) at the Bypass Switch Handle. This indicates the source connected to the load.
2. Un–Bypass to same source as the Bypass Switch Position as follows (select Normal or Emergency).

![Diagram of Bypass Switch Handle and position indicators.](image)

**To Un–Bypass Normal** push in handle all the way & turn it counterclockwise.*

Indicator shows: green OPEN when the ATS is not bypassed.

**To Un–Bypass Emergency** pull out handle all the way & turn it counterclockwise.*

Indicator shows: yellow EMERGENCY CLOSED when ATS is bypassed to Emergency or yellow NORMAL when ATS is bypassed to Normal Source.

---

**To Un–Bypass Normal Source***

*(Load connected to Normal Source)*
The Transfer Switch Connected To Normal light is on and Transfer Switch Connected To Emergency light is off.

Push in* the Bypass Handle then turn it counterclockwise until Bypass Switch Position shows OPEN (green indicator). The Unit Not in Automatic light should be off.

**To Un–Bypass Emergency Source***

*(Load connected to Emergency Source)*
The Transfer Switch Connected To Emergency light is on and Transfer Switch Connected To Normal light is off.

Pull out* the Bypass Handle then turn it counterclockwise until Bypass Switch Position shows OPEN (green indicator). The Unit Not in Automatic light should be off.

---

![Diagram of Un–Bypass Normal.](image)

![Diagram of Un–Bypass Emergency.](image)

The Automatic Closed–Transition Transfer & Bypass–Isolation Switch should be left in this position.

**NOTICE**
When Accessory 40°B (reversed Normal & Emergency connections) is specified, the handle push–pull operation is reversed. Follow instructions on the door.
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customercare@ascopower.com
800–800–2726(ASCO)

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