Changing a Damper Actuator

How To Guides

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Figure 1. Typical ECE air handling unit showing access doors, control panel and yellow lockable isolator.

Video Duration: 8 minutes 13 seconds
Applies to: Motorised dampers installed within AHU fresh air intake (FAI), supply air (SUP), exhaust (EHA) or extract air (EXT) sections.
Document Status: Controlled technical instruction

1. Purpose

This booklet accompanies the video demonstrating how to safely remove a faulty damper actuator, install a replacement actuator, and wire it correctly in accordance with the manufacturer's data sheet and AHU wiring diagram.

Correct installation ensures the damper operates as intended within the AHU control strategy.

Damper actuators control the position of dampers to regulate airflow through the AHU.

2. Important AHU Information

- ECE AHUs are bespoke. Do not assume that information, access arrangements, terminal numbers, wiring colours, component selections or controls logic from another AHU applies to the AHU being reviewed or worked on.
- The certified drawing and current project-specific documentation are the primary sources for the AHU arrangement and component technical information.
- Where component technical information is checked, it must be checked against the certified drawing and related manufacturer data for the exact AHU.

IMPORTANT: Always use the project-specific asset information, certified drawing, relevant ECE product-range IOM, quotation scope and component information for the exact AHU being reviewed or worked on.

3. Safety and Competency Requirements

- Only competent and authorised personnel should carry out this procedure. The required competency depends on the task being undertaken.
- Before starting, confirm the correct AHU, asset tag, certified drawing, relevant ECE product-range IOM and any applicable wiring diagram, controls description, component technical information or manufacturer data sheet.
- Follow all site-specific RAMS, permits, PPE, isolation and access requirements.
- Where the task requires physical access to the AHU, do not open access doors, remove panels or work inside the AHU unless fans and relevant equipment are isolated, stationary and safe to access.
- Do not bypass safety devices, interlocks, alarms or controls.
- Stop and escalate if the AHU identity, current technical information, safe isolation, access condition or required competency cannot be confirmed.

Figure 2. Site personnel in PPE reviewing the project-specific certified drawing. Confirm AHU identity, asset tag and document revision before opening any access door.

Task-specific requirements:

- Only competent and authorised personnel should remove, refit, wire or test damper actuators.
- Any actuator electrical/control wiring must be carried out by electrically competent personnel in accordance with the AHU wiring diagram, controls description, site requirements and current BS 7671 / IET Wiring Regulations where applicable.
- Before opening access doors or removing panels, select Maintenance Mode where applicable, allow fans to ramp down fully, confirm airflow has stopped, isolate relevant equipment and apply lock-off/tag-out where required by site procedure.
- Do not drill AHU panels, frames or casing unless this has been approved and the proposed location has been checked against internal components, wiring, casing structure, drainage paths and access requirements.
- Stop and escalate if the actuator type, rotation direction, voltage, control signal, terminal numbers or damper position feedback do not match the certified drawing, wiring diagram or manufacturer data.

4. Before You Begin

- Access the AHU asset information via the ECE Client Portal using the asset tag or 18-digit reference number where available.
- Confirm the AHU reference, project name, location and latest document revision.
- Review the certified drawing, relevant ECE product-range IOM, quotation scope, component schedule and manufacturer data sheets where applicable.
- Review the wiring diagram, controls description and commissioning information where the task involves electrical, controls or BMS interfaces.
- Confirm the required personnel, tools, PPE, access equipment, permits and isolation method before starting work.

Figure 3. Asset Tag plate carrying the unique 18-digit reference number used to retrieve AHU technical information from the ECE Client Portal.

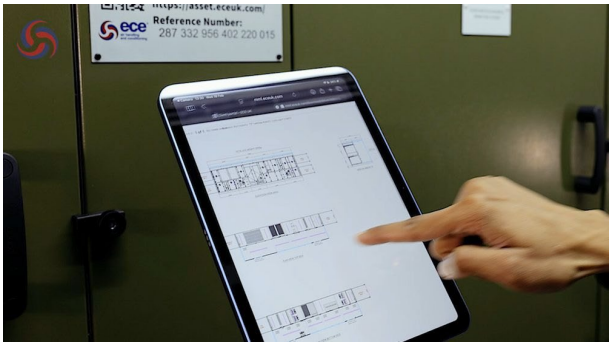

Figure 3b. AHU technical information opened on a device via the Asset Tag link, used to confirm AHU reference, drawing revision and fan information before starting work.

5. Additional Pre-Start Checks

Before starting any work:

- Isolate the AHU at the control panel isolator.
- Confirm that the control panel is de-energised.
- Apply lock-off/tag-out procedures if required by site regulations.

> **WARNING:** Never work on actuator wiring while the system is energised.

Figure 4. Operative isolating the AHU at the control panel. Confirm the panel is de-energised before proceeding.

6. Required Tools, Equipment, PPE and Information

- Project-specific wiring diagram or interface drawing
- Certified drawing and controls description
- Manufacturer data sheet for the device or component
- Approved cable, glands, ferrules and labels
- Multimeter / approved voltage indicator and proving unit
- Electrical test equipment required by site procedure
- Commissioning or test record
- Correct replacement damper actuator
- Manufacturer data sheet
- Electrical test meter
- Terminal labels/ferrules
- Small hand tools

7. Procedure

Correct wiring and installation ensure:

- Accurate airflow control
- Reliable system operation
- Compliance with electrical wiring standards
- Correct feedback to the control system

This procedure demonstrates how to safely replace and wire a damper actuator.

7.1 Obtaining the Replacement Actuator

- Obtain the correct replacement damper actuator.
- Confirm that the actuator specification matches the original unit.
- Review the manufacturer's data sheet to identify terminal functions.

Figure 5. "Buy Spares Here" plate installed on an AHU access door, showing QR code, web address and 18-digit reference number.

Typical actuator terminals include:

- Power supply
- Control signal
- Common

Understanding the terminal layout ensures correct wiring.

7.2 Accessing Wiring Information

Before disconnecting the actuator:

- Locate the AHU asset tag.
- Use the asset tag to access the ECE Client Portal.
- Retrieve the AHU wiring diagrams.
- Refer to the wiring diagram to confirm the correct cable connections.

Always follow the approved wiring diagram for the unit.

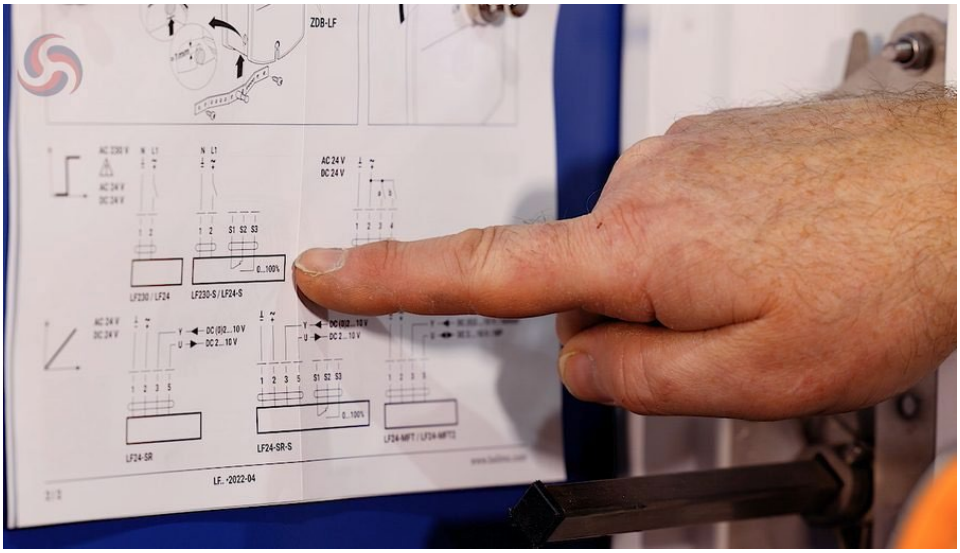

Figure 6. Operative referring to the project-specific AHU wiring diagram to confirm correct actuator connections before any wiring is disturbed.

7.3 Disconnecting the Faulty Actuator

- Locate the actuator junction box.
- Open the junction box lid.
- Identify the actuator wiring connections.
- Disconnect the actuator cables from the terminal block.

Ensure cables are handled carefully and not damaged during removal.

Figure 7. Opening the actuator junction box lid to access the terminal block.

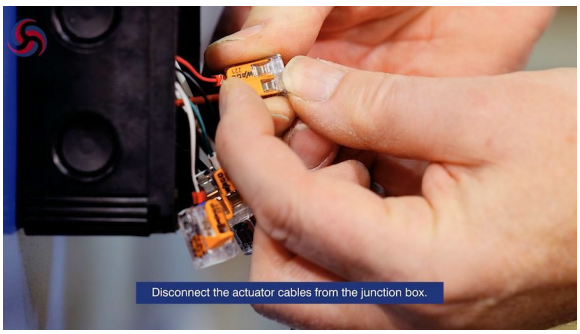

Figure 8. Disconnecting the actuator cables from the terminal block. Handle cables carefully so they are not damaged during removal.

7.4 Removing the Faulty Actuator

- Locate the actuator mounting bracket.
- Release the fixing screws or clamp securing the actuator.
- Slide the actuator off the damper spindle.
- Remove the faulty actuator from the assembly.

Inspect the damper spindle and linkage for damage before installing the replacement.

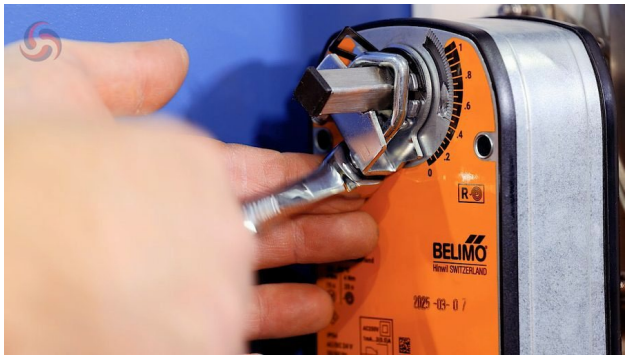

Figure 9. Releasing the actuator clamp from the damper spindle.

Figure 10. Sliding the actuator off the damper spindle once the clamp is released.

7.5 Installing the New Damper Actuator

- Position the replacement actuator onto the damper spindle.
- Align the actuator with the spindle correctly.
- Secure the actuator using the mounting bracket or clamp.
- Tighten all fixing screws firmly.

Ensure the actuator is seated securely and aligned with the spindle.

Figure 11. Installing the new actuator onto the damper spindle and aligning it with the mounting bracket.

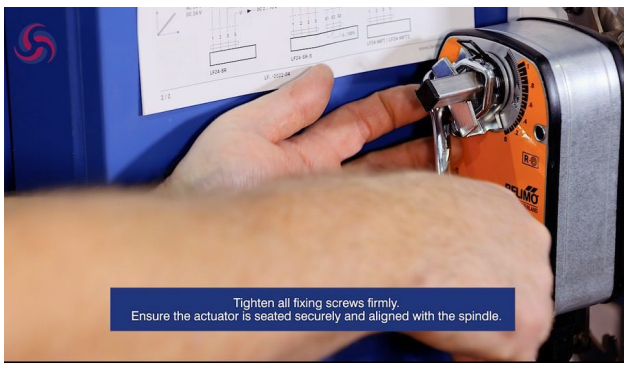

Figure 12. Tightening the actuator fixing screws. Confirm the actuator is seated securely and aligned with the spindle.

7.6 Selecting and Preparing the Cable

- Select the correct multi-core control cable.
- Ensure the cable matches the wiring diagram requirements.
- Prepare the cable ends for termination.

Correct cable preparation ensures reliable connections.

7.7 Wiring the Actuator

Using the manufacturer's data sheet and AHU wiring diagram:

- Identify the correct actuator terminals.
- Identify the numbered cable cores.
- Insert each cable into the correct terminal.
- Clamp each terminal securely.

Always verify the terminal identification before tightening the terminals.

Incorrect wiring may prevent the actuator from operating correctly.

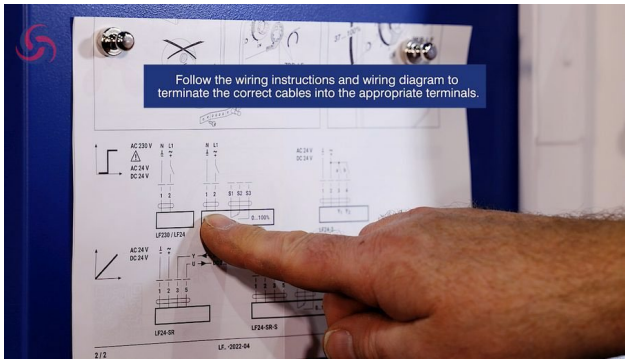

Figure 13. Following the wiring instructions and wiring diagram to terminate the correct cores into the appropriate terminals.

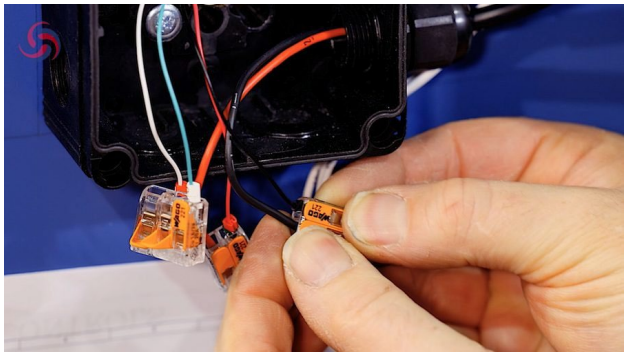

Figure 14. Terminating the cable cores at the actuator junction box. Verify terminal identification before clamping.

7.8 Securing the Junction Box

- Confirm that all wiring connections are secure.
- Arrange cables neatly inside the junction box.
- Ensure no exposed conductors are visible.
- Close and secure the junction box lid.

This protects the wiring from dust and damage.

Figure 15. Closing the actuator junction box lid securely. Confirm no exposed conductors remain visible.

7.9 Restoring Power to the AHU

- Turn the AHU back on at the control panel isolator.
- Allow the control system to initialise.
- Observe the actuator as the system starts.

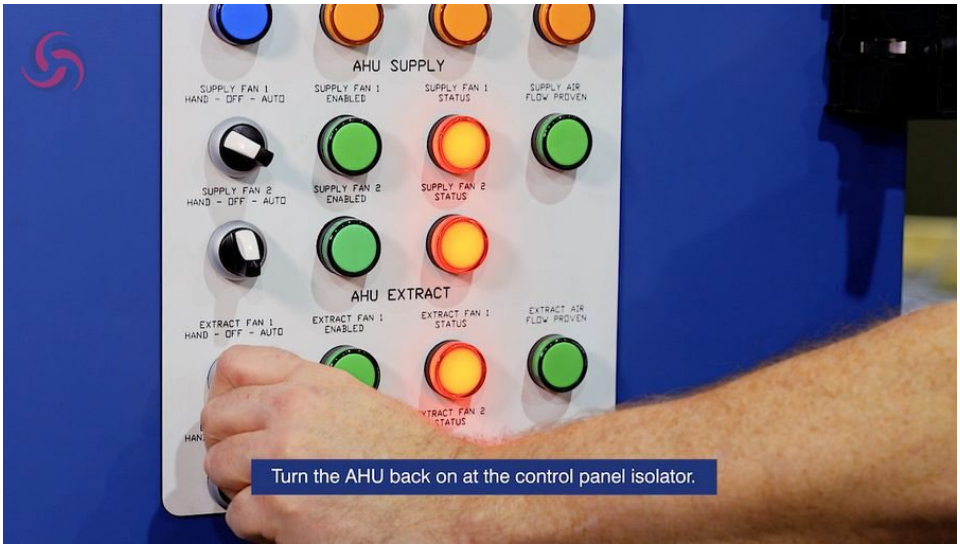

Figure 16. Turning the AHU back on at the control panel isolator. Allow the control system to initialise before checking operation.

7.10 Confirming Correct Damper Operation

After power is restored:

- Observe the extract damper (or relevant damper).
- Confirm the actuator drives the damper open correctly.
- Ensure movement is smooth and unrestricted.

Figure 17. Observing the damper in its closed position before the actuator drives it open.

Figure 18. Damper driven fully open by the replacement actuator. Movement should be smooth and unrestricted across the full travel.

8. Verification / Functional Test

- Supply voltage, polarity, protective earth and protection arrangement are verified where applicable.
- Terminal numbers, cable identifiers and signal types match the wiring diagram.
- Control signal, enable, status, fault, interlock or sensor value is verified at the controller, HMI or BMS where applicable.
- No exposed conductors, loose strands, unsealed glands, damaged insulation or unsecured cables remain.
- Damper moves fully from open to closed, actuator direction is correct and feedback/status is correct where fitted.

Figure 19. Verifying actuator status, control signal and damper feedback at the 5-inch HMI display.

Additional Verification Notes

- Navigate to the Alarms Browser on the 5-inch HMI display.
- Check that the Damper Fail alarm is no longer present.

The absence of the alarm confirms that the actuator replacement has been successful.

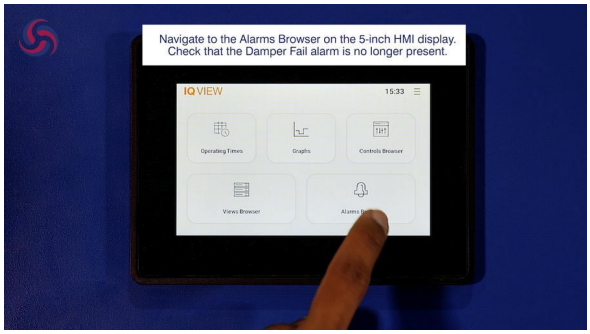

Figure 20. HMI home screen on the 5-inch IQ View display. Select Alarms Browser.

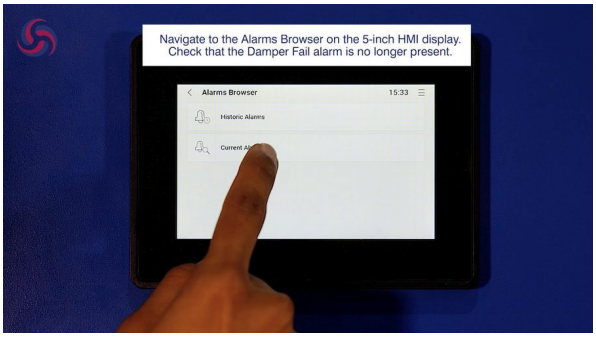

Figure 21. Alarms Browser menu – select Current Alarms to display any active alarms.

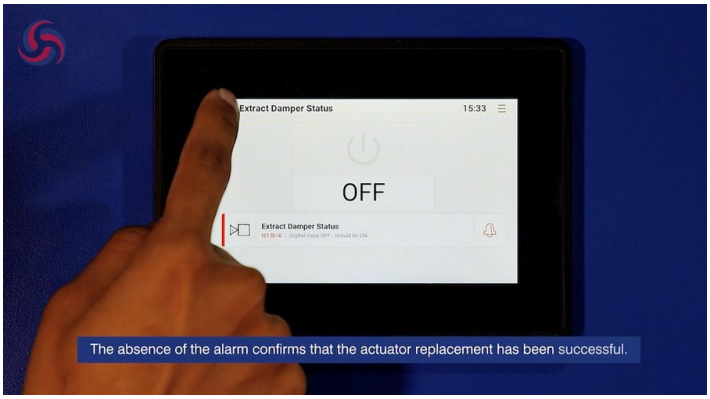

Figure 22. Extract Damper Status shown OFF (no active alarm). The absence of the Damper Fail alarm confirms the actuator replacement has been successful.

9. Stop-and-Escalate Conditions

STOP: Stop work or stop the review and escalate to the responsible ECE/project technical contact if any of the following apply:

- The AHU reference, asset tag, certified drawing or document revision cannot be confirmed.
- The information found does not match the physical AHU, installed component or project scope.
- Safe access, safe isolation or required site permits cannot be confirmed.
- A required component technical detail, wiring detail, control signal or manufacturer data sheet is missing.
- The task would block or compromise AHU maintenance access, withdrawal routes, isolators, terminal boxes or emergency access.
- The circuit cannot be isolated or proved dead.
- Terminal numbers, cable colours or signal types differ from the wiring diagram.
- A backfeed or unexpected voltage is present.
- The device technical information or signal type cannot be confirmed.
- Damper blade position, rotation direction or actuator control signal cannot be confirmed.
- Damper fails to move freely by hand before fitting the actuator.

10. Final Checks

- Confirm the AHU, component, wiring, control function or approval item has been left in the intended safe and complete condition.
- Confirm access doors, panels, terminal boxes, covers, guards, isolators and labels are secure where applicable.
- Confirm no tools, temporary materials, loose items, debris or packaging remain in or around the AHU.
- Confirm any alarms, faults, abnormal indications or unresolved comments have been recorded and escalated.

11. Records to Complete

Record enough evidence to prove that the task, review or test has been completed using the correct AHU information and by competent personnel.

- Isolation and prove-dead completed
- Terminal numbers and cable IDs recorded
- Signal/function verified
- Panel/terminal box closed and secured
- Test result recorded

Evidence item	Required entry
AHU reference / asset tag	To be completed
Certified drawing revision / document revision	To be completed
Person completing task / review	To be completed
Date completed	To be completed
Result / status	Pass / fail / comment / not applicable
Outstanding actions	To be completed or marked none

12. Completion Checklist

[ ] Correct AHU and guide number confirmed.
[ ] Latest asset information and certified drawing checked.
[ ] Relevant IOM, wiring diagram, controls description or manufacturer data checked where applicable.
[ ] Safety and competency requirements confirmed.
[ ] Procedure completed or approval review completed.
[ ] Verification / functional test completed.
[ ] Stop-and-escalate conditions checked and no unresolved stop condition remains.
[ ] Records to Complete section completed.
[ ] AHU returned to safe condition or review status recorded.

13. Task-Specific Completion Checks

- [ ] AHU isolated safely
- [ ] Replacement actuator obtained
- [ ] Wiring diagram accessed via asset tag
- [ ] Faulty actuator disconnected
- [ ] Faulty actuator removed
- [ ] New actuator fitted to damper spindle
- [ ] Correct cable selected
- [ ] Actuator wired per data sheet
- [ ] Junction box secured
- [ ] AHU powered back on
- [ ] Damper opens correctly
- [ ] Alarm cleared on HMI

14. Learning Outcome

After completing this procedure, viewers will understand:

- How to read manufacturer actuator data sheets
- How to identify actuator terminals correctly
- How to safely replace and wire a damper actuator
- How to confirm correct operation using the AHU control system

This ensures damper actuators are installed safely and operate as intended within the AHU control strategy.