FlowShield
Marine Shutoff Damper

With (Belimo) Actuator

1. Description

The ActionAir shut-off damper is designed to isolate duct runs and compartments against both hazardous and safe atmospheres. Tested to EN1751, it achieves class 3 blade leakage and class C case leakage, independently tested by BSRIA.

2. Tests, approvals and certification

- CSAcertification (Ex) category 2 equipment
- Corrosion Tested - EN60068-2-52 severity 2 conditions
- Vibration Tested – EN60068-2-6 (5Hz to 350Hz @2g)
- Case and blade leakage to EN1751. Class C case and Class 3 blade.

3. Health and Safety

- Care must be taken when installing and inspecting dampers, as they are likely to close without warning due to loss of electrical power. This is their prime function.
- **Do not introduce any items, fingers or limbs between the blades.**
- Larger dampers are heavy and must be handled in accordance with current local regulations and good practice.
- All wiring should be carried out in accordance with the wiring details provided, to the IEC regulations.

4. General Information

- The Actionair Marine Shutoff Damper is suitable for both vertical and horizontal applications, with airflow in either direction.
- The Actionair Marine Shutoff Dampers are supplied with the blades in the fully interlocked closed position to avoid damage during transit and installation. It is recommended that the dampers remain closed until actual date of commissioning. All dampers must be treated with care during handling, storage and installation.
- Actionair Marine Dampers are designed for applications in normal dry filtered air systems and should be subjected to a planned inspection programme.

5. Installation - see below.

6. Maintenance & Cleaning

- Dampers are supplied in two casing and blade material options: -

  1/ Galvanised Steel casing and 430 Stainless steel blades, only suitable for installation in dry filtered systems.

  2/ 316 Stainless steel casing and blades and drive - more suited for corrosive conditions, but even this will rapidly corrode and fail if not properly maintained, when used in air intake systems at sea. The addition of a mist eliminator is highly recommended, and access must be provided for maintenance.

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7. Testing

Two levels of testing exist.

- Routine testing - Monthly, or in accordance with maintenance programme, release and reset damper (via control system). Check remote indication or visual check of mechanical pointer as appropriate.
- Visual check at damper - At commissioning and at least once a year, check damper operation by removing and re-applying power to actuator.
- Visually check blades for damper closed and open positions.

Prove remote indication if applicable.

8. Routine Maintenance

- Depending upon environmental conditions, each damper will merit its own cleaning regime. Particularly hostile areas.
- 'Frequency of maintenance' should be determined by collecting historical data from previous visits, and for this reason, commence maintenance programmes.
- Dampers in 'Dry Filtered Air' require very limited maintenance. When exposed to fresh air intakes and/or inclement conditions this may require monthly cleaning and lubrication maintenance to be performed.

9. Cleaning

- Using light lubricant, clean all exposed surfaces, using a cloth.
- Remove all traces of surface staining, as this will deteriorate further causing deeper material corrosion.
- For 316 stainless steel blades and case, pay specific attention to the blade rivets where crevice corrosion will cause rapid failure of blades if not kept in check.
- If damper is stiff to operate lubricate blade ends, open and close damper successively until the damper moves with ease. (This may necessitate removal of the actuator and perating the blades manually by the drive shaft).
- Refit actuator and re-test.
- Clean off excessive lubricant.

10. Damper installation

All installations shall be carried out in accordance with the relevant Marine/Offshore Authority requirements.

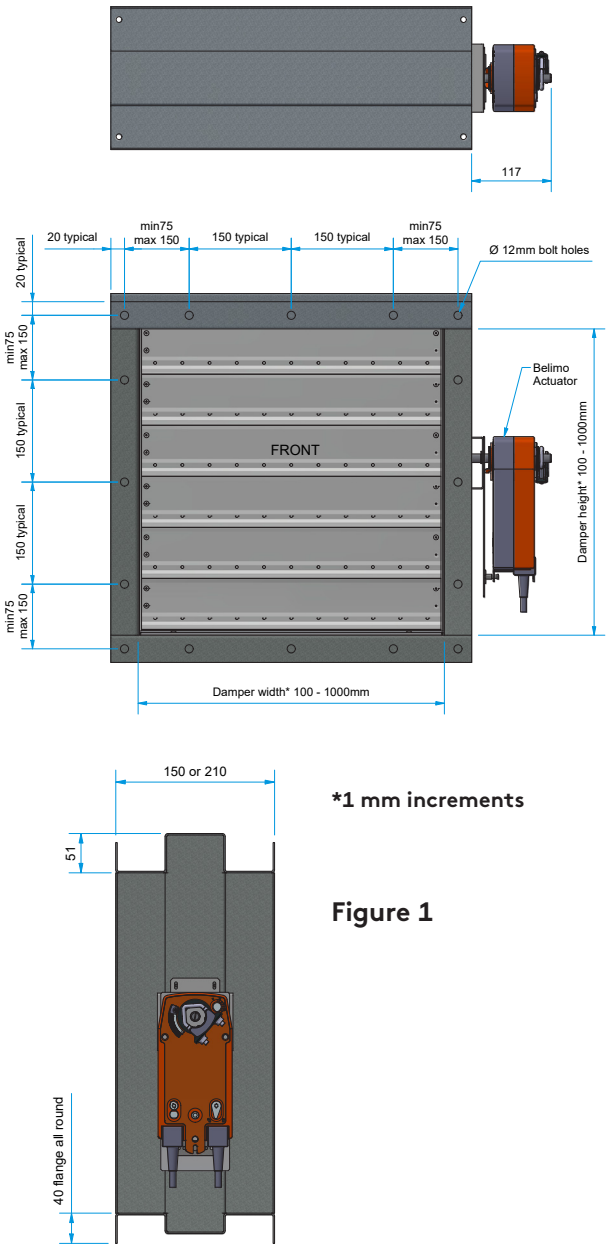
Bolt holes provided as standard on the damper flanges (unless otherwise stated) at 150mm maximum centres. Matching hole positions are necessary on mating coaming/duct flanges.

Apply sealant/gasket to mating flanges and position damper.

Bolt square/rectangular dampers using suitable steel bolts minimum M8 diameter and minimum M6 diameter on circulars.

Single Damper Assembly

Tested and approved to size of 1000x1000mm



***1 mm increments**

Figure 1

11. Control Modes (3 positions) (Refer to figure 5)

Correctly sized Control Modes are designed to fit only to the relevant sized damper. (See 'Control Mode Standard Parameters' figure) Rivet actuator mounting to the damper in the correct orientation using four rivets.

Slide the actuator over the drive shaft and locate the pin from the anti rotation bracket into the slot on the actuator so that it sits centrally in the slot.

Tighten up the 'U' clamp on the actuator evenly.

12. Mechanical Operation check

As an interim check, the damper should be manually reset and released using the manual reset key provided, (refer to Control Mode label) to ensure that correct mechanical operation is achieved. This feature may be used for system commissioning when electrical power is unavailable.

13. Electrical Connection and Final Operational Test

The unit must be wired as described in the Application and Wiring section 16. When power is available, the unit must be checked for electrical operation. Power to motor open, spring to close.

Electrical ATEX (Ex) rated as below the associated electrical Control Modes are available in one Universal version with 24 – 230V AC and 24 - 125V DC.

14. Actuator Installatiion

Figure 2

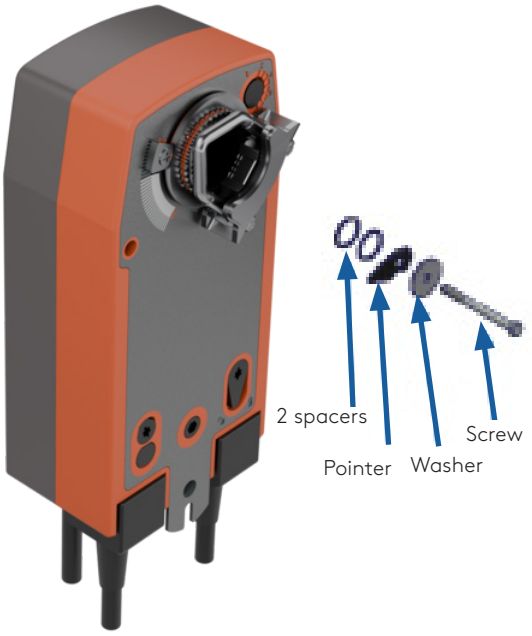
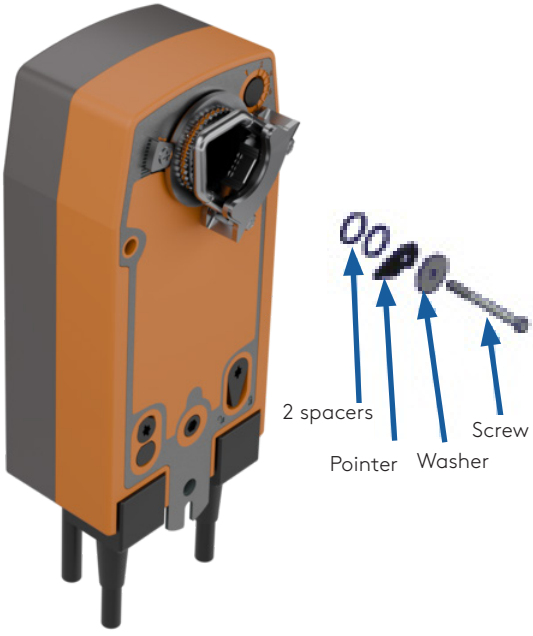


Figure 3



15. Three position Actuator mounting & dimensional date

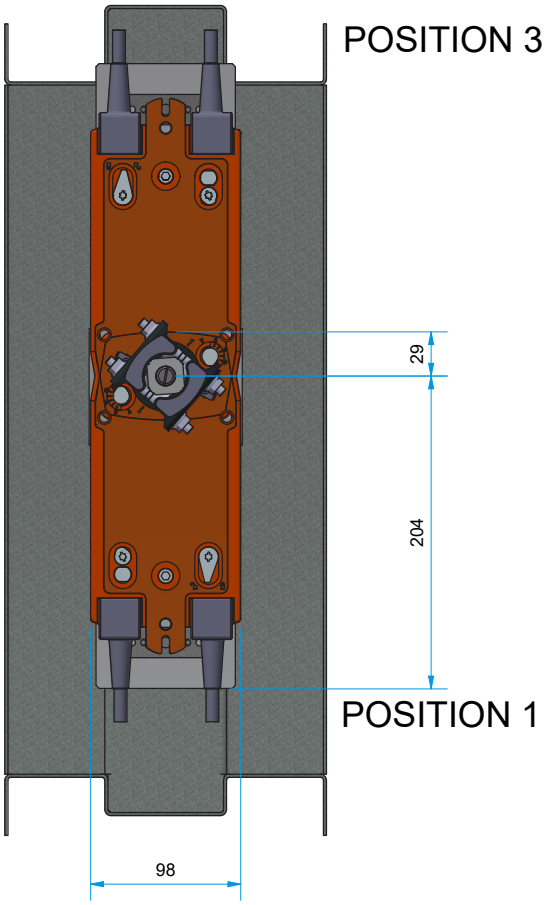


Figure 5

Detail A Earthing
Boss for Atex Rating

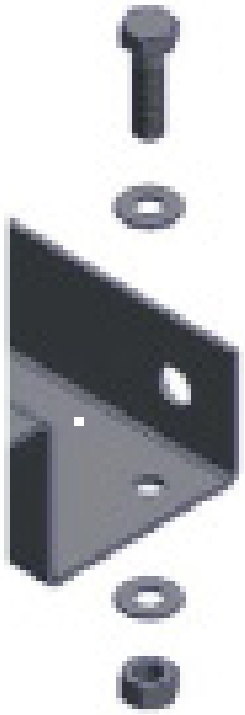
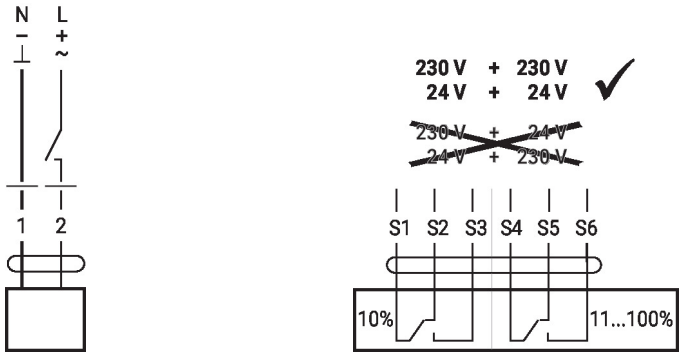


Figure 6

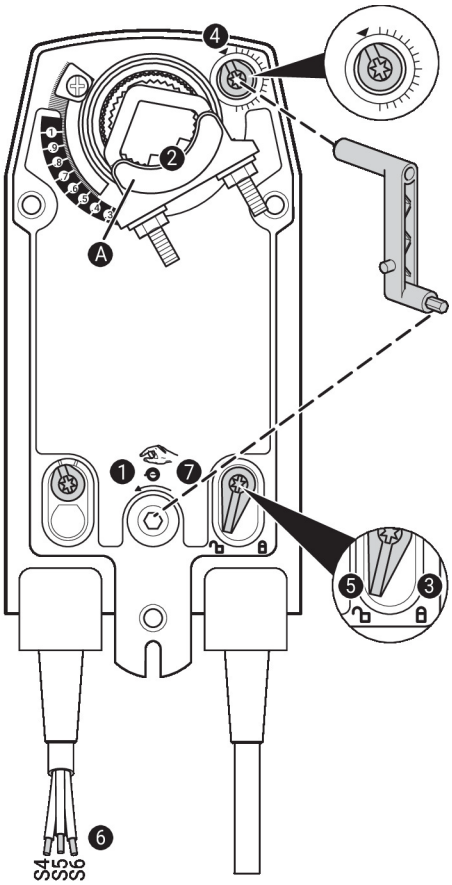
16. Standard Application & Wiring

Wiring Diagrams
AC 24… 240 V / DC 24… 125 V, open / Auxiliary switch close



Wire Colours
1 = blue
2 = brown
S1 = violet
S2 = red
S3 = white
S4 = orange
S5 = pink
S6 = grey

Figure 7



Auxiliary switch settings

> ⚠ **Note:** Perform settings on the actuator only in deenergised state.

For the auxiliary switch position settings, carry out points ❶ to ❼ successively.

❶ **Manual override**
Turn the hand crank until the desired switching position is set.

❷ **Shaft clamp**
Edge line Ⓐ displays the desired switching position of the actuator on the scale.

❸ **Fasten the locking device**
Turn the locking switch to the „Locked padlock“ symbol.

❹ **Auxiliary switch**
Turn rotary knob until the notch points to the arrow symbol.

❺ **Unlock the locking device**
Turn the locking switch to the „Unlocked padlock“ symbol or unlock with the hand crank.

❻ **Cable**
Connect continuity tester to S4 + S5 or to S4 + S6.

❼ **Manual override**
Turn the hand crank until the desired switching position is set and check whether the continuity tester shows the switching point.

Figure 8

Trouble shooting:

Fault	Possible problem	Recommended action
Control Mode does not fit damper	Two sizes of Control mode exist	Check correct selection (page)
Control Mode does not fit to damper drive shaft when Control Mode is correctly positioned	Damper shalf not in 'danger closed' position	Damper shalf has an 'indication groove' which is parallel to damper blades. Damper must be in closed position before fitting Control mode
	Control Mode not in released position	If not electrically connected, check manual reset mechanism is released. (Refer to Control Mode label). If electrically powered, with ETR fitted, press and hold test switch on ETR
Control Mode does not operate electrically (ETR LED not illuminated)	ETR not correctly fitted	Refer to Page 3
	ETR activated	Remove probe section of ETR. Check electrical continuity of ETR probe, replace if necessary
Control Mode operated, but limited or no movement of damper blades evident	The Control Mode is fitted back to front	Universal: Label "FAIL SAFE CLOSED" facing outermost. Check and correct if necessary
		Compact: Label "FAIL SAFE CLOSED" facing outermost. Check and correct if necessary
	Over tightening of M5 x 80mm screw. (3 position only)	Loosen screw to 5Nm torque
	Damper/Control Mode positions not synchronised	Remove Control Mode. Check damper closed (see indication Groove on damper shalf), and Control Mode released. Refit Control Mode
	Obstruction impeding damper blade	Check visually, remove obstruction. If necessary, remove Control Mode and operate damper drive shalf with14mm A/F spanner