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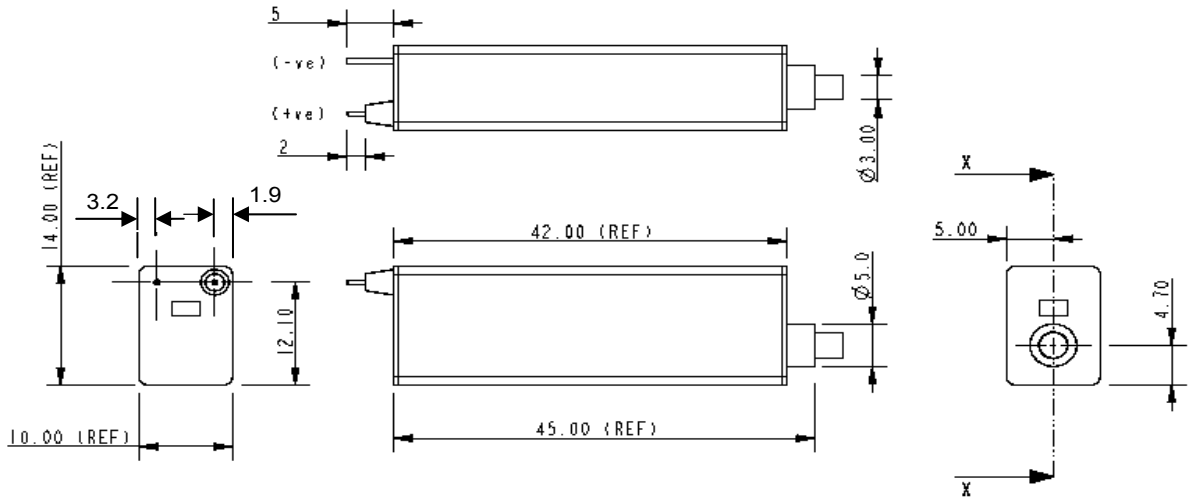
AL2 Design Guides

1. What is AL2?

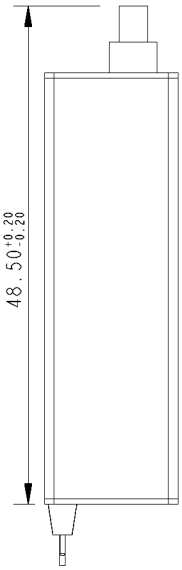
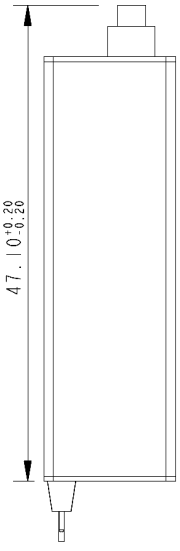
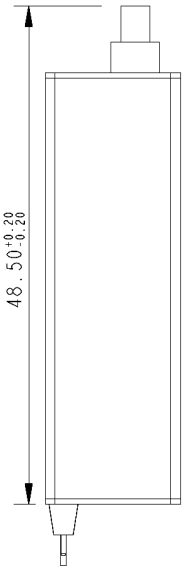
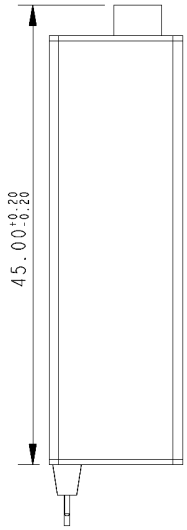
AL2 is an environmentally sealed Active Latch suitable for indoor/outdoor applications (see data sheet for environmental ranges). Active Latches are ideally suited to act as the interface between electronic access control systems and mechanical locking mechanisms. The AL2 has the physical appearance of a sprung piston, whose travel into its casing can be permitted or prevented electronically.



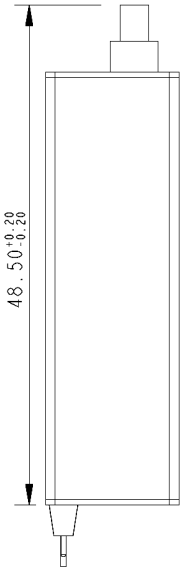
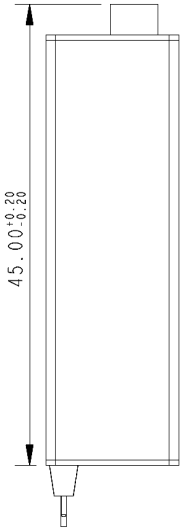
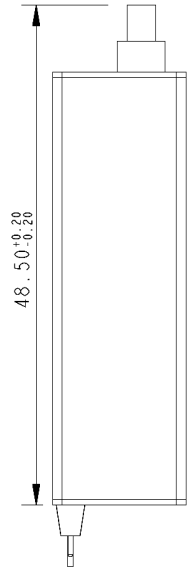
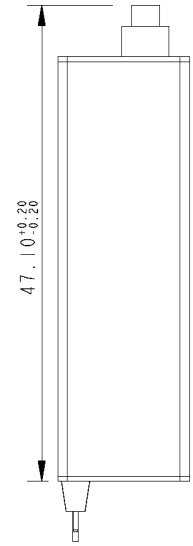
2. Operational Sequence

AL2 is currently available in two versions, Normally Blocked and Normally Free.

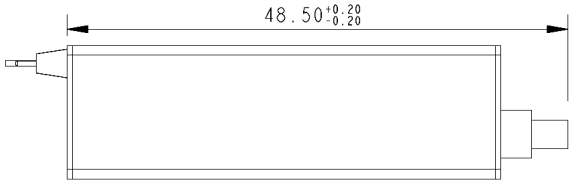
2.1 Normally Blocked

AL2 state	A	B	C	D
				
Shaft position	Rest Position	Blocked	Rest Position	Compressed
Power status	Off	Off	On	On
Change state if powered	Yes	No	Yes	No

2.2 Normally Free

AL2 state	A	B	C	D
				
Shaft position	Rest Position	Compressed	Rest Position	Blocked
Power status	Off	Off	On	On
Change state if powered	Yes	No	Yes	No

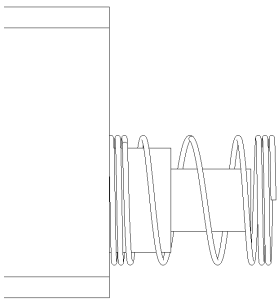
3. Considerations for the successful operation of AL2

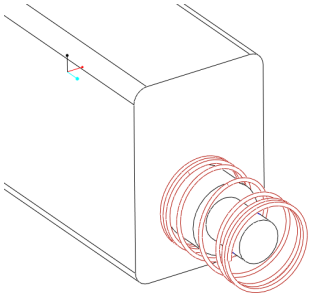


AL2 in the rest state is nominally 48.50mm long. The plunger MUST be permitted to fully reset between operations in order for the AL2 to function correctly, i.e. change state. The plunger cannot be used as a primary reset spring for the interfacing mechanism; it cannot be pre-loaded in any way. Where possible, Servocell recommend an air gap between the plunger and the interface of the mechanism to ensure a system reset.

4. Increasing the spring force of the AL2 plunger

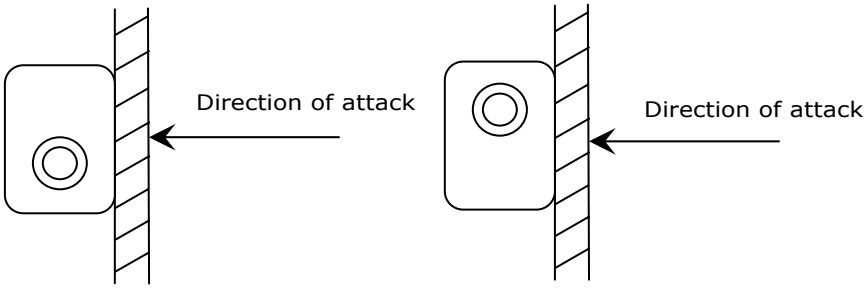
The bearing collar of the AL2 makes for a convenient location for an additional spring. This spring can serve two functions; providing an additional complimentary spring force to the AL2 plunger and ensuring and air gap between the plunger and the interfacing mechanism. This additional spring is not a necessity, but can prove useful.





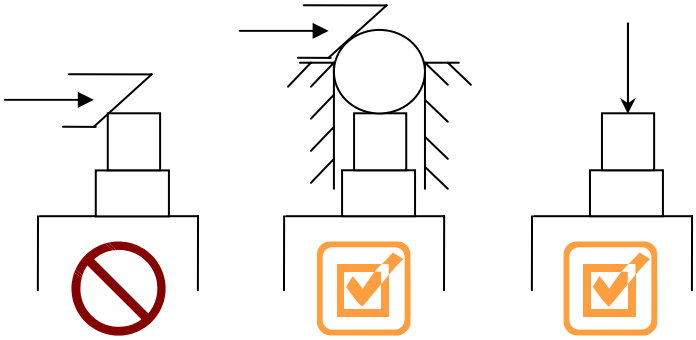
5. Orientating AL2 for increased resilience

AL2 has internal components which under extreme circumstances are vulnerable to extreme shock or vibration (such as dedicated and prolonged physical attack). Resilience will be enhanced by orientating AL2 perpendicular to the plane of anticipated attack.



6. Interfacing AL2 with a mechanism for best reliability

The internal seals of the AL2 are optimised for the shaft receiving a force normal to the axis. Whilst it is possible to 'side load' and compress the plunger, this causes increased wear on the seals and increases the chance that internal components may 'skew', potentially resulting in inconsistent performance.



Servocell have found the inclusion of a roller/ball bearing/intermediate sliding block or lever in the mechanism design to be a useful method of mitigating the side load on the shaft when an axial load style implementation is not possible or undesirable.

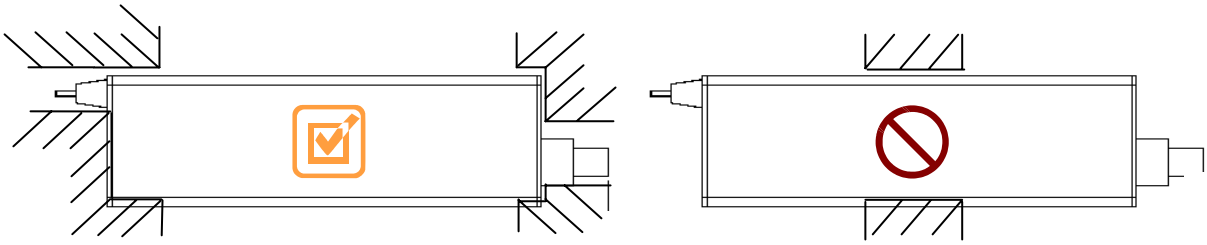
7. Indirect implementation

The AL2 plunger has a limited stroke in its blocked and free states (nominally 1.2mm and 3.55mm respectively); designs often call for much more stroke in the free state. In this case Servocell would advocate the application of AL2 in an indirect or 'non axial' position. By positioning AL2 at 90^0 to the direction of force the stroke of the AL2 is only relevant to the amount of desired engagement permitting or blocking the mechanism from functioning; this allows for an infinite amount of travel past the AL2 in the fully compressed state, rather than only 3.50mm.

See section 6 for examples of non axial loading.

8. Mounting AL2 safely and securely

The AL2 assembly is primarily Stainless Steel and is therefore particularly rugged. However its structural design is primarily for purposes of environmental sealing and is not designed to bear load in directions other than that of its axial shaft.



It is best to support the AL2 by its corners, and not to clamp or tighten on any of the flat side surfaces. Any deformation of the side surfaces could lead to inconsistent performance or failure from the AL2.

9. Electronic connection protection

Provision should be made for wiring to the back of AL2. It is recommended that the joint of any wires connected to the positive terminal of AL2 be insulated.

10. Additional high moisture environments

If AL2 is operating in a high moisture environment, particularly if the possibility of sub-zero operation exists; Servocell recommend some form of seal to minimise moisture ingress into the mechanism, especially where interfacing with the AL2.

11. Advanced Implementation

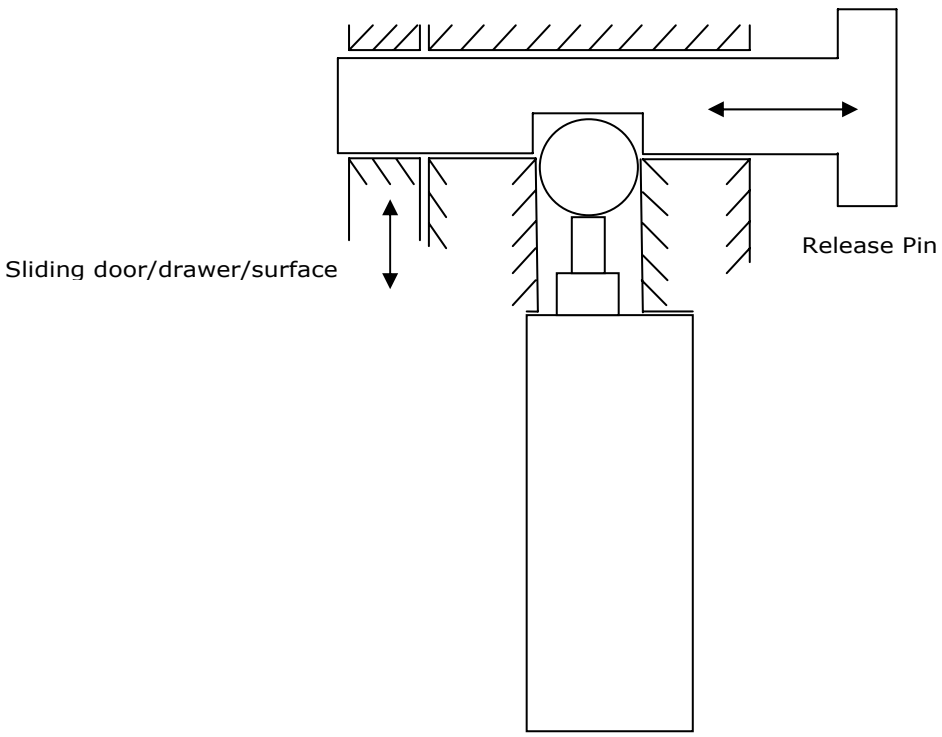
To implement AL2 for maximum resilience and security, it is possible to allow AL2 to rest in the 'blocked' state. By pre-loading the plunger in the mechanism rest state, the AL2 is effectively jammed and it is impossible for any physical attack to change the state of AL2. However, this pre-load MUST be removed as part of the release sequence of the mechanism in order for AL2 to change state. This is suitable for security systems with a mechanical 'push-to-release' style operation.

12. Example AL2 Concepts

These concepts are only intended to be a simple representation of possible AL2 applications. They do not constitute finalised designs.

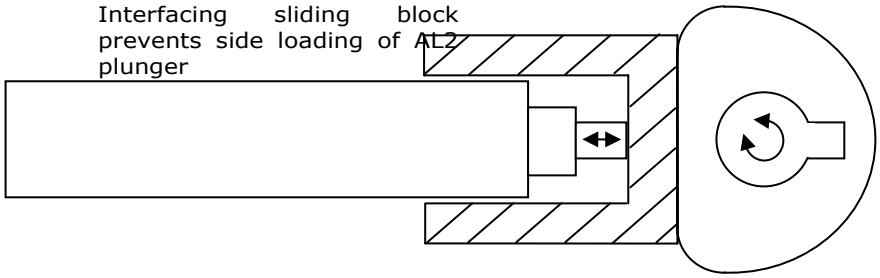
12.1 Simple 'Sliding Pin' Concept

AL2 applied to a pin-release lock mechanism.



12.2 Axially loaded AL2 Interfaced with 'D' cam.

AL2 applied to a rotary input mechanism.



D cam rotated by an external handle/key/knob creates a thrust along the AL2 axis in either direction of rotation