

## DICTATOR Damping Solutions

### Types of Dampers and Functioning

DICTATOR damping solutions offer four different lines of dampers:

#### 1) EDH and ZDH final dampers

Final dampers are used to slow down a movement before reaching the final position, e.g. with sliding doors in the positions OPEN and CLOSED. The relatively long stroke dimensions assure a sufficient safety zone. Final dampers are adjustable, to fit exactly the requirements of each door.

#### 2) Oil dampers with fixings on both ends

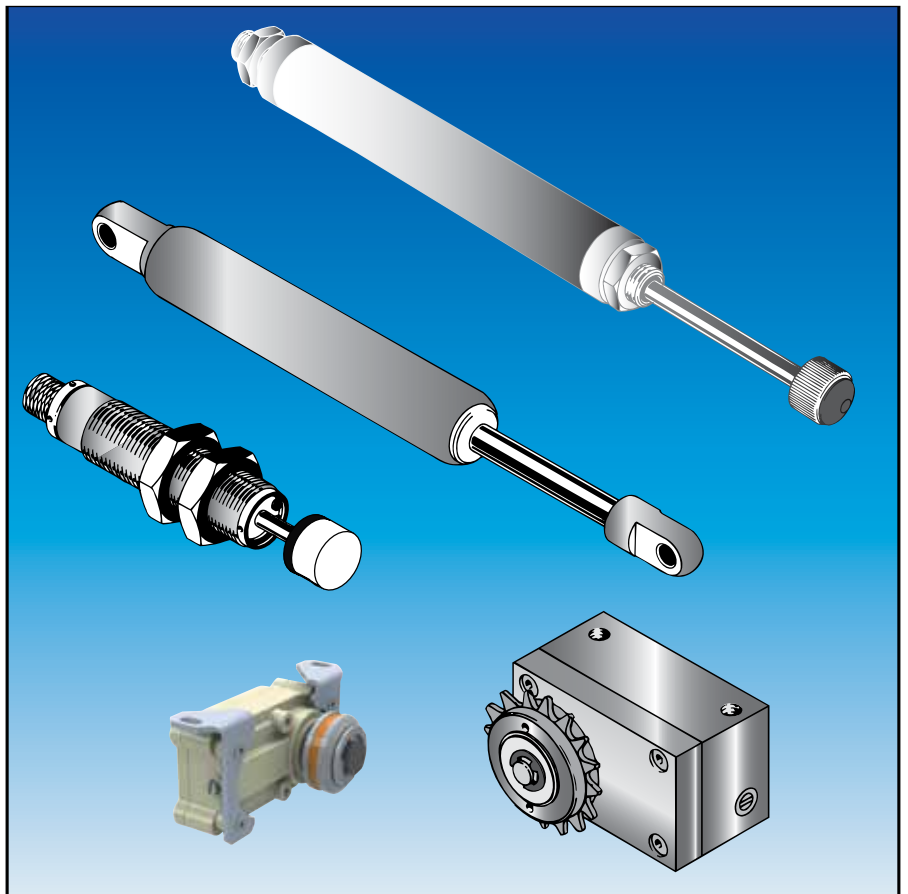
Oil dampers with fixings on both ends are connected firmly to the object that has to be damped (e.g. a flap). This way they control the movement from the very first moment. They are fabricated in two different lines: adjustable and preset.

#### 3) High-performance final dampers

These dampers slow down high loads on a very short distance. They are mainly used in machine construction.

#### 4) Radial dampers

Radial dampers use the rotation principle for damping. This way they provide constant damping even for high loads over large travel distances (e.g. sliding doors).



### Summary

Types of dampers	linear and radial
Damping	hydraulic
Damping fluid	hydraulic, biological, silicone oil
Product range	standard product line and customised production (also single units)

## Functional Principle

### Basic Information

Masses are moved almost everywhere in daily life and working units: doors and gates, flaps, transported goods or machinery parts. These involve high kinetic energy and high impact speed. If these forces are not controlled and slowed down, products and machinery can be damaged and people can get injured.

DICTATOR dampers are based on the principle of transforming kinetic energy into thermal energy. The movement is transmitted to the damping cylinder - depending on the type of damper either via the piston rod or the wheel of the radial damper. Inside the cylinder the piston or the gear pump displaces the hydraulic fluid and pushes it through one or several of the throttling ports. With most DICTATOR dampers the diameter of the throttling port can be adjusted individually to achieve an optimum damping result for different requirements.

In the following the functioning principles of the different types of dampers are shown, along with information for which application area each type is designed.

### Fields of Application

Final dampers are needed to slow down the rotative or linear movement of all kinds of objects. DICTATOR final dampers are used

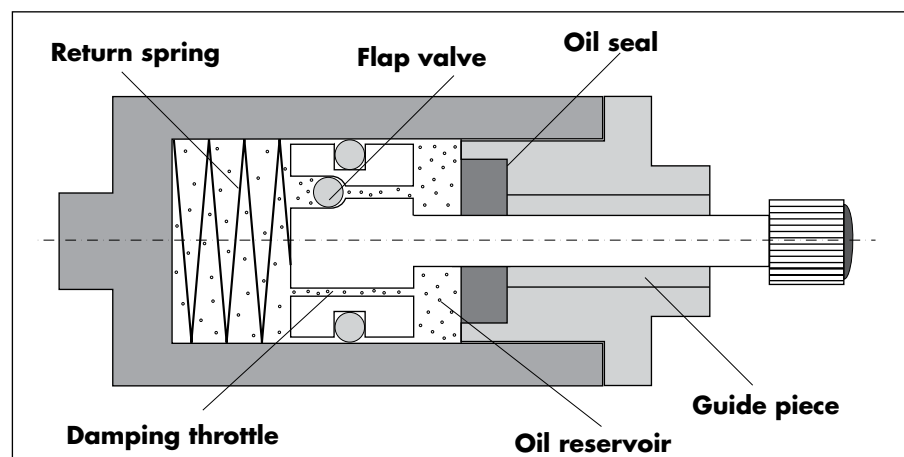
- if the distance is too large to control the movement during the whole travel.
- if the object should move unrestrictedly during most of the distance (e.g. as fast as possible).
- due to space restrictions.

The relatively long strokes offer safety distances allowing for protection against pinching and squeezing.

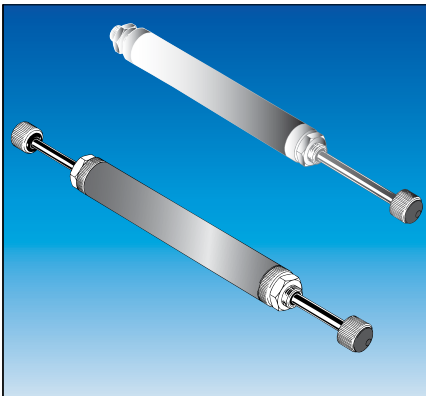
Detailed examples you will find in our overview folder.

### Functional Principle of Final Dampers

#### Basic functional principle



Hydraulic dampers are an indispensable alternative to springs (spiral springs, rubber buffers) as these return the taken energy at once by springing back. They lessen the impact but neither can regulate nor slow down the kinetic energy. Hydraulic dampers in contrast bring moving objects in a controlled way to a standstill. The movement of the impacting mass is transferred by the piston rod to the damper. The entering piston is damped continually by pushing the oil in the cylinder through one or several throttling ports. The displaced oil is collected in a reservoir. From there it flows back by the flap valve as soon as the piston rod returns to its starting position.



### Functional Principle - cont.

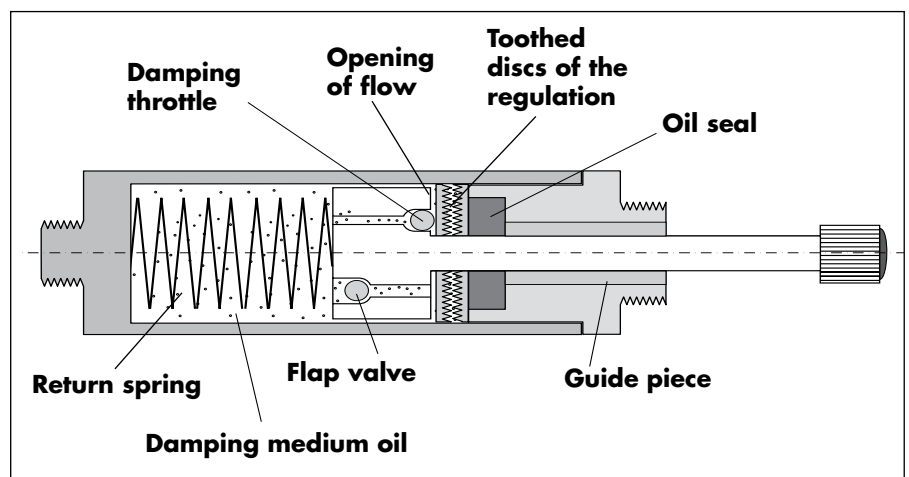
The diameter of the throttling port in the piston is adjustable with the final dampers.

There exist **two different kinds of adjusting**:

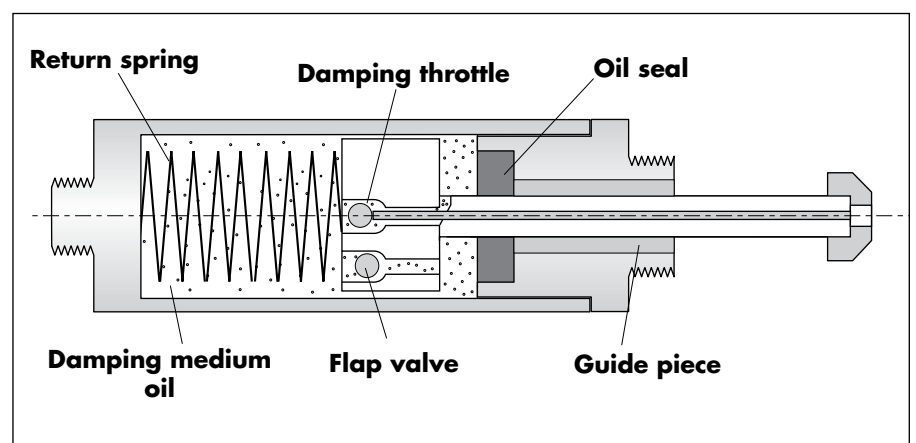
- stepped adjustment
- screw adjustment

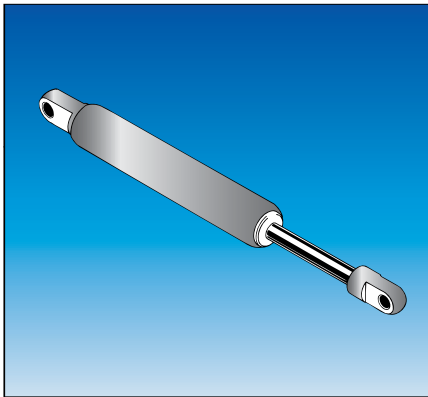
The stepped adjustment is more common. It has got its name by two toothed discs, which allow to adjust the opening of the throttling port only when being intertwined. The farther to the front the two discs are positioned the bigger is the flow opening for the oil, i.e. the less the damping.

To adjust the opening of the throttling port the piston rod has to be pulled out completely.



The screw adjustment allows a very precise adjustment and works as follows: The throttling port in the piston is adjusted by a setting screw in the front of the piston rod. The adjusting bar changes the position of the ball in the throttling port: the farther it is pushed to the back the more oil can flow through, i.e. the less is the damping. However this type of regulation is only possible with the damper types EDH 28 and ZDH 28, because the buckling resistance of the piston rod with the internal bore is diminished in comparison to one of solid material.





## Functional Principle of Oil Dampers with Fixings on Both Ends

**DICTATOR** oil dampers with fixings on both ends are chosen,  
- when you need a damping as constant as possible during the whole travel.  
- if otherwise the risk of accident would be too high (e.g. with roof hatches).

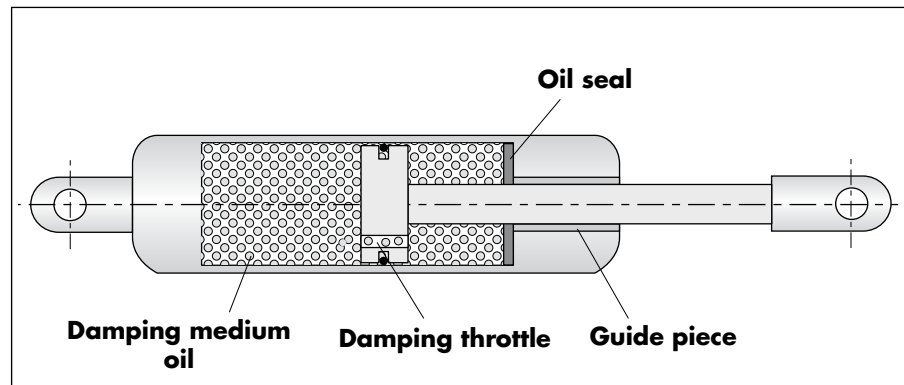
Oil dampers are installed in the same way as gas springs. But contrary to gas springs, which for example should assist in opening, they are intended to damp a movement (e.g. to prevent a hatch opening too fast downward).

Detailed examples you will find in our overview folder.

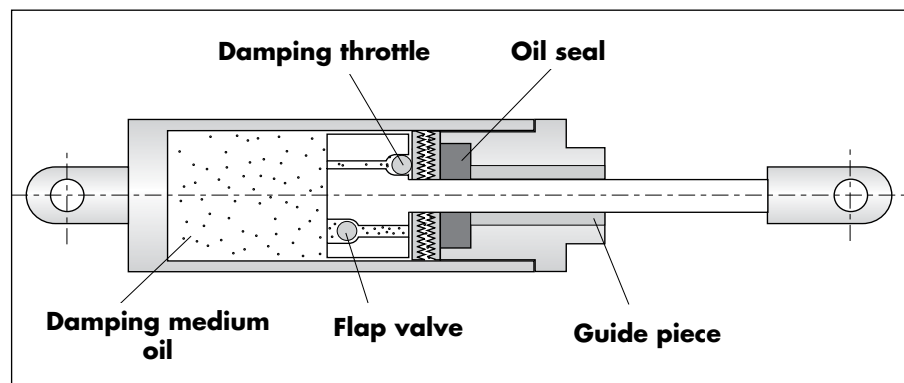
## Functional Principle of Oil Dampers with Fixings on Both Ends

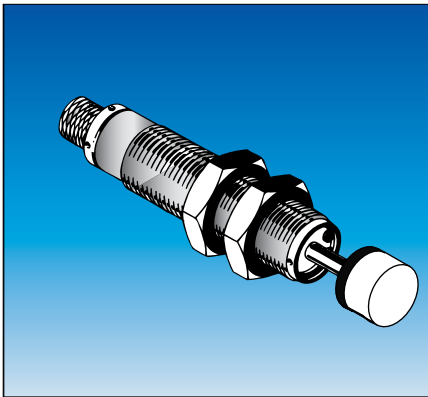
Apart from some exceptions oil dampers with fixings on both ends are always **custom made** as they are connected firmly with the object to be damped. They are available with and without adjustment of the damping. The factory preadjusted oil dampers (ÖD) are mainly used in unchanging applications (e.g. damping of a flap in a serial-production machine) or when all data to calculate the necessary damping force are known. The non-adjustable oil dampers are more economic than the ones with regulation (ÖDR).

To determine the required damping with the preadjusted oil dampers with fixings on both ends we need among other data the mass to slow down and its speed, as they determine the diameter of the throttling port in the piston. Our technical service will gladly assist you in calculating and choosing the appropriate oil damper. We just need the information asked for in the questionnaire on page 03.074.00 et sqq. at the end of this chapter.



The **adjustable oil dampers with fixings on both ends (ÖDR)** use the stepped adjustment of the final dampers. The damping is adjusted by pulling and turning the piston rod.





## Functional Principle of High-Performance Final Dampers

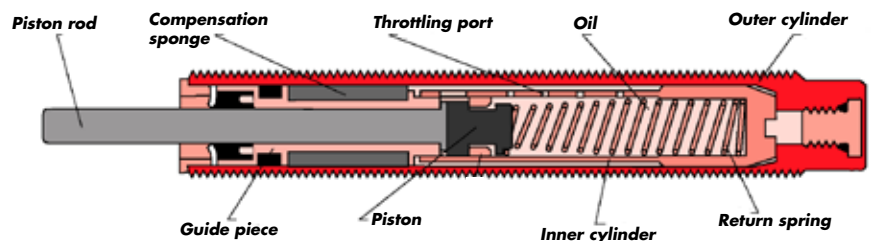
**DICTATOR** high-performance final dampers slow down big masses on very short distances smoothly and without bouncing. They are especially designed for the use in machine construction and in handling systems. They lengthen the life cycle of machines, increase the quality of production and the operating speed.

Detailed examples you will find in our overview folder.

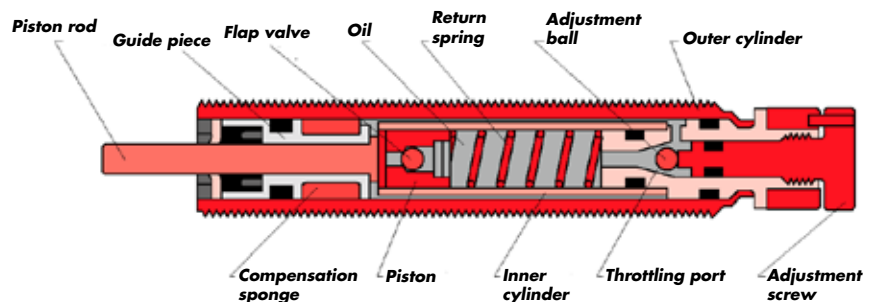
## Functional Principle of High-Performance Final Dampers

High-performance final dampers are available in two versions: with and without adjustment of the damping.

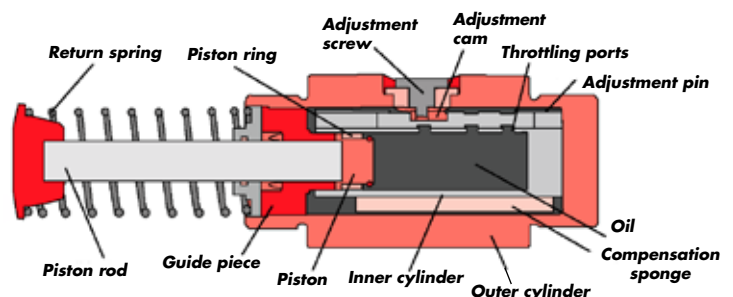
The **preadjusted high-performance final dampers** use an additional inner cylinder being concentrically built in the outer cylinder. When the piston rod enters, it displaces the oil by throttling ports in the wall of the inner cylinder. A compensation sponge provides the necessary compensation of volume and thus realises the damping from the very beginning.

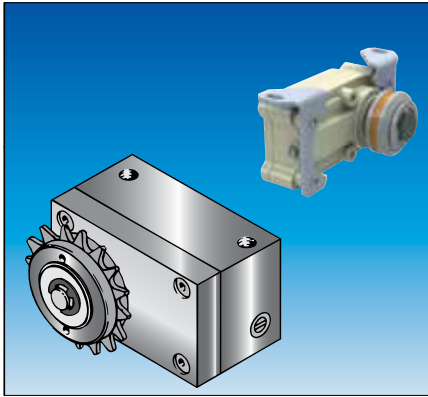


The **adjustable high-performance final dampers** use two different types of adjusting. The dampers designed for a lower energy compensation dispose of a single throttling port, which can be adapted to the requirements by an **adjustment screw in the bottom of the cylinder**.



The dampers designed for a very high energy compensation dispose of an **adjustment screw built in the side of the cylinder**. With this adjustment screw you can adapt the opening/closing of several throttling ports in the inner cylinder.





### Functional Principle Radial Dampers

**dictator radial dampers** are designed to continuously control the speed of high masses on long distances. The movement is controlled during the whole travel. Often they are used on sliding doors.

To transfer the force to be controlled to the radial damper there exist different possibilities: by tensioned chain or rope, by revolving chain, rope or toothed belt, by rack or directly by a friction wheel on the radial damper.

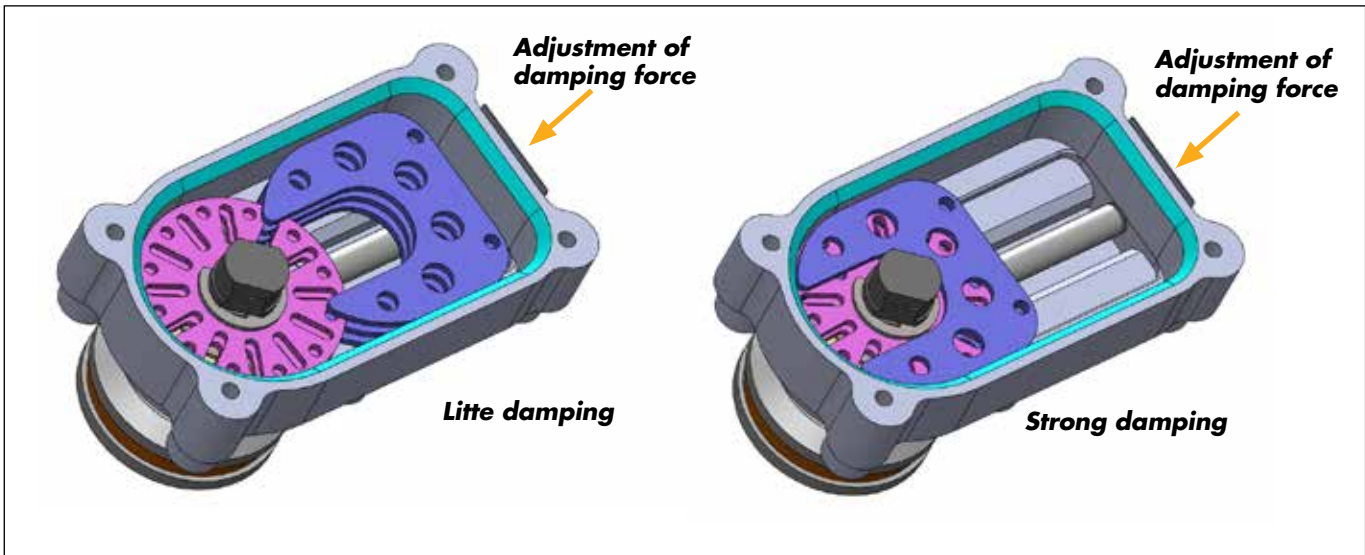
The radial dampers are furnished in two different base types: in a plastic casing or in an aluminium casing (for very heavy loads and for use on fire protection doors).

Detailed examples you will find in our overview folder.

### Functional Principle Radial Dampers

The damping force of the radial dampers can be adjusted continuously.

The damping force of the **lamellar radial dampers LD** is determined by how far the movable lamellae gear into the lamellae fixed on the axle of the damper. The farther they gear into, the stronger the damping.



In case of the radial dampers **type RD 240/241** the damping is adjusted by an adjusting screw on the side of the aluminium casing.

