



Anti-backdrive device

LMS 07.1 – LMS 16.1

for ensuring self-locking and self-braking

Locking torques from 60 Nm – 1,000 Nm





Anti-backdrive device

Self-locking and self-braking

Self-locking and self-braking are the fundamental requirements of an actuator to achieve a desired position accurately and maintain it against a load without further movement.

Actuators are self-locking, if the valve position cannot be changed from standstill while a torque acts upon the output shaft. Self-locking is usually achieved via the efficiency of the gearbox. A value of < 0.5 can be used as a guideline for the self-locking of a worm gearbox.

If the valve is effectively brought to standstill after operation, this is called self-braking.

AUMA actuators

Most AUMA actuators are self-locking without further measure. However, actuators with high output speeds and, in particular, actuator/gearbox combinations are generally not. In this case self-locking can be achieved by using an anti-backdrive device.

In case of special valve combinations, e.g. dampers (and guillotine isolators in particular), the use of an anti-backdrive device is recommended. The anti-backdrive device ensures safe braking while in motion and prevents the self-locking from being released by vibration.

With anti-backdrive devices, the use of expensive brake motors is no longer required for many applications. The anti-backdrive device is less expensive, much simpler and safer to use.

High efficiency levels and self-locking

The anti-backdrive device combines two principles which appear to contradict each other, that is, self-locking and high efficiency (for actuators and valve gearboxes).

This is one of the prerequisites for being able to use actuators and valve gearboxes with high efficiency levels and therefore lower energy consumption in the future. It marks an important step in satisfying the demand for energy-efficient devices which will gain increasing importance in the years to come.

Service conditions

Enclosure protection IP

AUMA products in the standard version conform to enclosure protection IP 67 according to EN 60 529. IP 67 means protection against immersion up to max. 1 m head of water for max. 30 minutes.

For higher requirements the actuators are available in increased enclosure protection IP 68.

Corrosion protection

The standard AUMA corrosion protection KN is a high quality coating. This is suitable for outdoor installation and for slightly aggressive atmospheres with a low level of pollution.

For exposure to more aggressive substances, the actuators are available in the protection classes KS and KX.

Explosion protection

The anti-backdrive device corresponds to explosion protection classification II2G c IIC T4 according to ATEX 94/9/EC.

Ambient temperatures¹

Version	Temperature range
Standard	+ 25 °C ... + 80 °C
Low temperature	- 40 °C ... + 60 °C
High temperature	0 °C ... + 120 °C

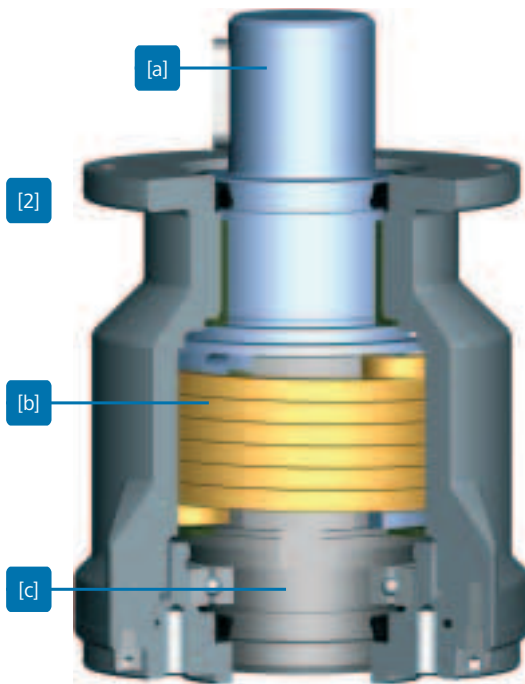
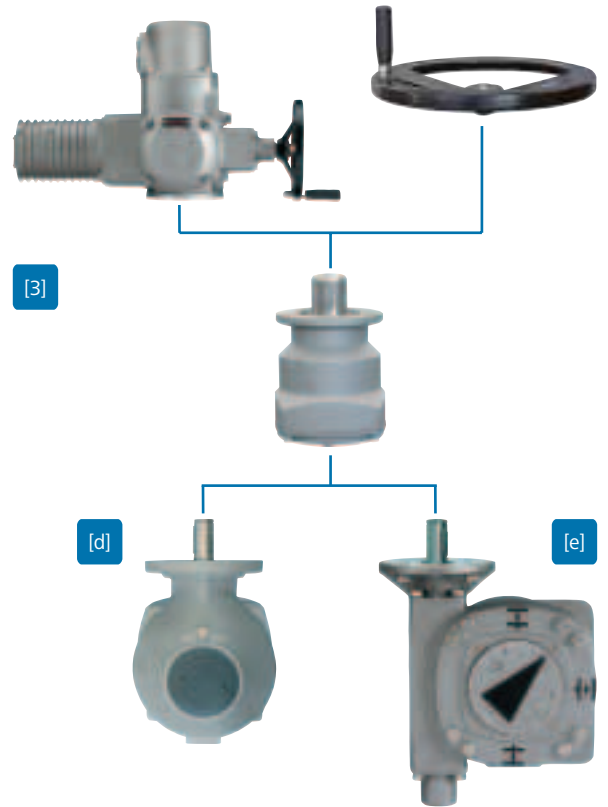
¹ Applies to the non-explosion-proof version

Technical data

Size	Locking torque	Flange size
	[Nm]	in compliance with EN ISO 5210
LMS 07.1	60	F10
LMS 10.1	120	F10
LMS 14.1	500	F14
LMS 16.1	1,000	F16

Further literature

For detailed information, refer to the technical data sheet LMS 07.1 – LMS 16.1



[1] Anti-backdrive device mounted to SA multi-turn actuator

When mounting an anti-backdrive device, even SA multi-turn actuators with high output speeds, i.e. 125 rpm and 180 rpm, become self-locking. An actuator with anti-backdrive device can be directly mounted to the valve. As an alternative, a valve gearbox can additionally be mounted between the anti-backdrive device and the valve. The entire valve/gearbox combination will then be self-locking.

[2] Active principle

The locking or brake torque is generated by a so called wrap spring within the anti-backdrive device. If a torque acts upon the input shaft [a] of the anti-backdrive device, the spring diameter and therefore the friction of the spring [b] on the inner housing is reduced. The unit can rotate. The torque is transmitted via the output shaft [c] to the valve or to the mounted gearbox. When a torque acts on the spring on the output side due to a force acting upon the valve, the spring is pressed against the housing. This locks the shaft and prevents any rotary movement.

[3] Applications

The anti-backdrive device can be used for motor-operated and manually operated valves. Therefore there is either an actuator or a handwheel mounted at the input flange of the anti-backdrive device.

If the anti-backdrive device is used in combination with a valve gearbox, the anti-backdrive device is mounted at the gearbox input. The input torques at the gearbox input are comparatively low, the required locking or brake torques are lower than the torques at the gearbox output. The only exception are small-size gearboxes

[d] Multi-turn gearbox GK

[e] Part-turn gearbox GS

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Solutions for a world in motion

[1] Multi-turn actuators
SA 07.1 – SA 48.1
Torques from 10 to 32,000 Nm
Output speeds from 4 to 180 rpm

[2] Multi-turn actuators SA/SAR
with controls AUMATIC
Torques from 10 to 1,000 Nm
Output speeds from 4 to 180 rpm

[3] Linear actuators SA/LE
Combination of multi-turn actuator SA
with linear thrust unit LE
Thrusts from
4 kN to 217 kN
Strokes up to 500 mm
Linear speeds
from 20 to 360 mm/min

[4] Part-turn actuators
SG 05.1 – SG 12.1
Torques from 100 to 1,200 Nm
Operating times for 90° from 4 to 180 s

[5] Part-turn actuators SA/GS
Combination of multi-turn actuator SA with
multi-turn gearbox GS
Torques up to 360,000 Nm

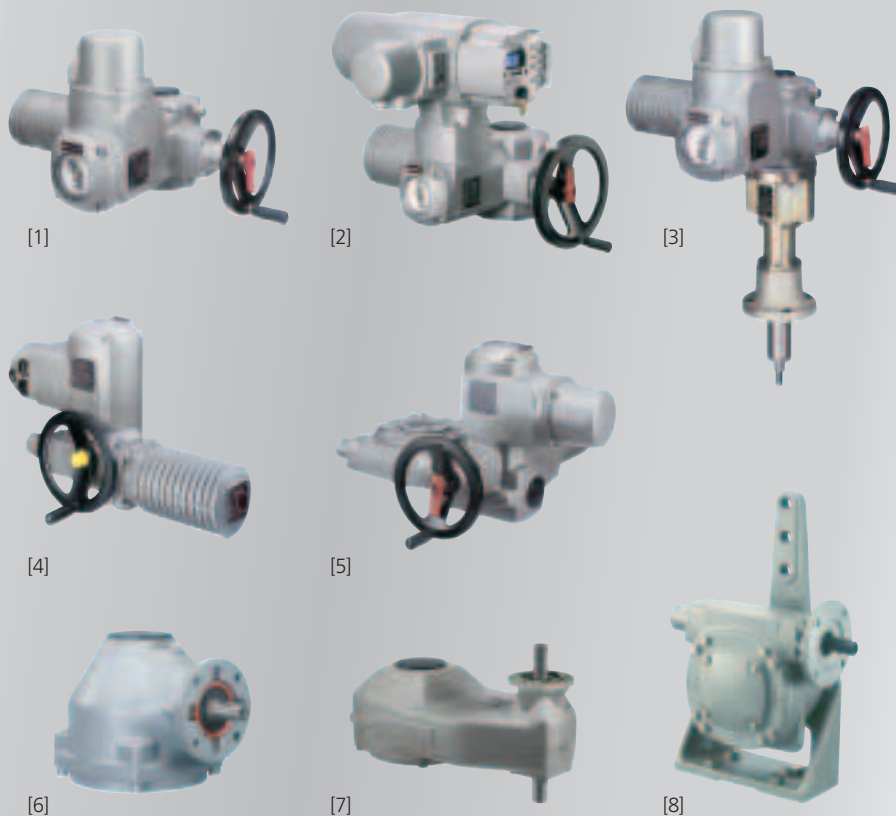
[6] Bevel gearboxes
GK 10.2 – GK 40.2
Torques up to 16,000 Nm

[7] Spur gearboxes
GST 10.1 – GST 40.1
Torques up to 16,000 Nm

[8] Worm gearboxes with base and lever
GF 50.3 – GF 250.3
Torques up to 32,000 Nm

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