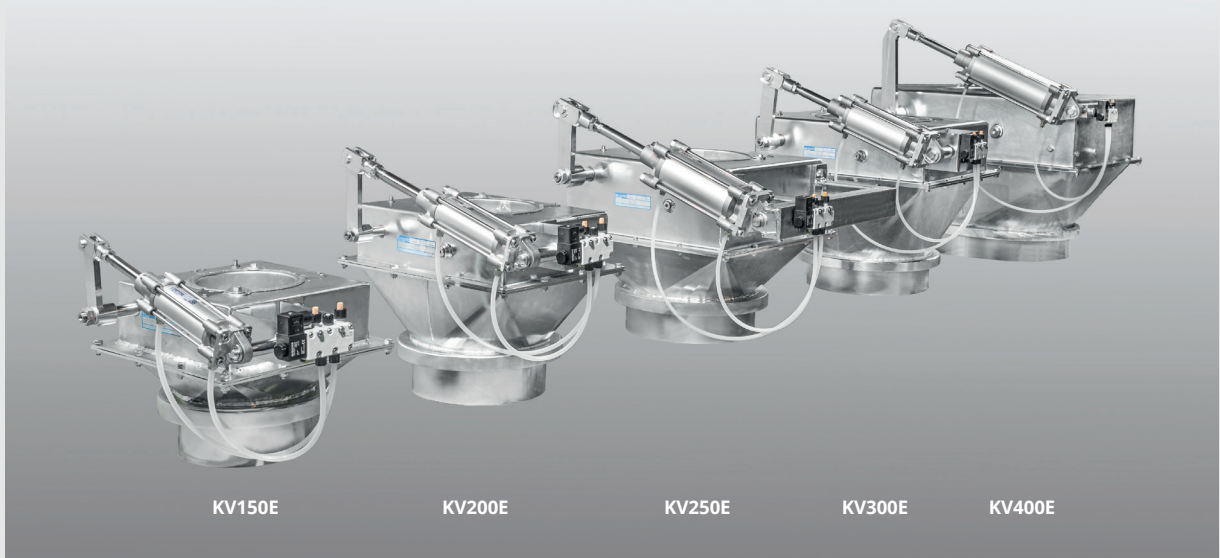


GENERAL DESCRIPTION

Free Flow Flap Shutter from singold



- Globally unique, sophisticated flap mechanism
- No friction or shear forces on the seal
- The flap swings completely out of the product flow
- Bearings and joints are positioned outside the product flow
- Suitable for all conceivable bulk materials for complete discharge
- Virtually wear-free even with highly abrasive materials

1 APPLICATION

The **singold Flap Shutter** is suitable for all conceivable bulk materials and solid-liquid mixtures if the container is emptied completely.

Classic applications include:

- Container scales
- Containers
- Pre- and post-containers in mixing systems
- Railcars
- Collection bins under filters and separators
- Cone screw mixers

The singold Flap Shutter is very popular in the glass industry, for example, where various bulk materials, including highly abrasive ones, have to be emptied into container scales.



Fig. 1: singold Flap Shutter KV200E

2 DESIGN AND FUNCTIONAL PRINCIPLE OF THE BASIC MECHANISM OF ALL SINGOLD FLAP SHUTTERS

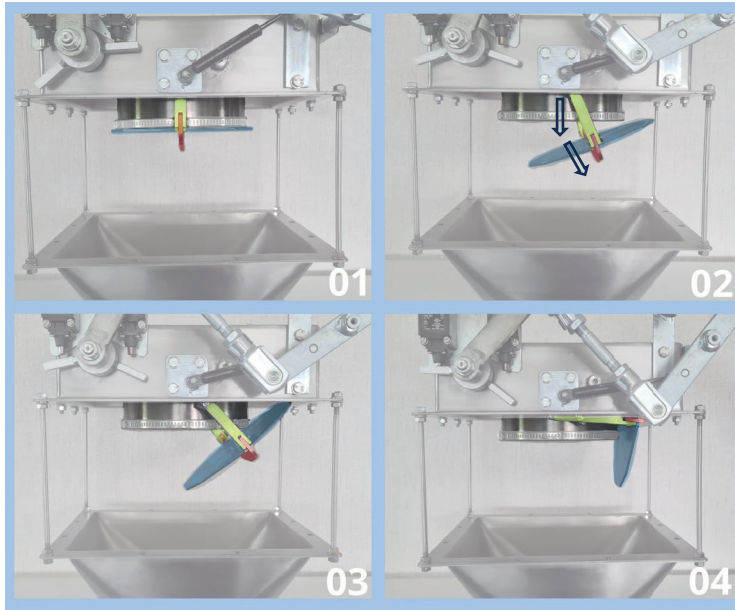


Fig. 2: Flap shutter mechanism

The movement sequence of the flap is shown on the left in Fig. 2.

In the home position, the **flap** (coloured blue) is closed (01). The flap drive (usually a pneumatic cylinder, as shown above in Fig. 1) presses on the lever system.

The **flap** is pulled via the **pull rods** (coloured green) and the **bracket** (coloured red) onto the **seal** (coloured white) of the round insert (coloured grey).

The round insert always corresponds to the nominal diameter of the respective flap shutter.

Thanks to the sophisticated lever system, the **flap** is first lowered vertically when opened (02) and then swivelled sideways next to the outlet opening (03). This means that no frictional or shearing forces are exerted on the seal.

After a very short time, the flap is completely open (04) so that the product can flow out freely. The flap opens very quickly in the pneumatic version. The product flow is not deviated.

Even in case of manually operated flap designs, large nominal widths can be opened quickly with low energy consumption at a high flap load. The bearings and joints are located outside the product flow and are fitted with maintenance-free bearings as standard.

Fig. 3 below shows a schematic diagram of the emptying process with bulk material.

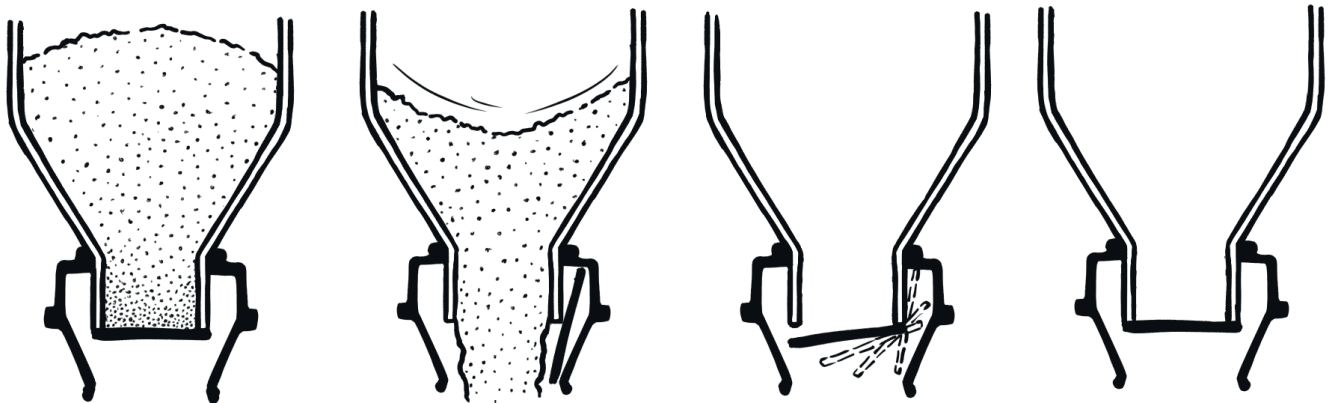


Fig. 3: Schematic representation of the flap closure mechanism during full emptying

3 OVERVIEW OF DIFFERENT FLAP SHUTTER TYPES

3.1 Standard versions TYPE E (simple version) and TYPE A (reinforced version)

Our simple basic versions are available with the following specifications:

- With or without shaft seals, depending on requirements
 - o V-ring, O-ring or shaft seal ring
- Flap and flange seals available in various designs and materials.
- Temperatures of up to 160 °C and up to 300 °C possible.
- Possible materials: galvanised steel, primed steel, stainless steel, heat-resistant or other steels.
- Drive possible as compressed air cylinder, geared motor and manual drive.

3.1.1 Simple version for bulk solids up to approx. 0.35 bar closing pressure TYPE E KV150E – KV500E

- Type E Flap Shuttters are suitable for standard applications with closing pressures from 0.346 to 0.52 bar.

Closing forces are specified below as pressure on the nominal area:

- o KV150E: 0.426 bar
- o KV200E: 0.357 bar
- o KV250E: 0.520 bar
- o KV300E: 0.361 bar
- o KV400E: 0.346 bar
- o KV500E: 0.490 bar

3.1.2 Reinforced version for special applications up to approx. 1 bar closing pressure TYPE A KV100A – KV500A

- Type A Flap Shuttters are suitable for special applications with closing pressures from 0.99 to 1.02 bar.
- Closing forces are specified below as pressure on the nominal area:
 - o KV100A: 1.02 bar
 - o KV150A: 0.99 bar
 - o KV200A: 1.00 bar
 - o KV300A: 1.00 bar
 - o KV400A: 1.00 bar
 - o KV500A: 1.00 bar

3.2 Special version for converter dedusting in the metallurgical industry TYPE T KV400T and KV500T

- The reinforced version T (T=Thyssen) as a solid and durable device has been specially developed for the metallurgical industry.
- Type T Flap Shuttters are used for what is known as converter dedusting.
- Here, great importance was given to airtightness from the outside in order to prevent chemical reactions of the dust with the air.
- Closing forces are specified below as pressure on the nominal area:
 - o KV400T: 0.5 bar
 - o KV500T: 0.5 bar
- Maximum temperature of 350 °C.

3.3 Special designs and variants available on request

Only the standard versions regularly purchased from us are listed above. The Flap Shuttters can be supplied in many materials, nominal diameters, pressure, temperature and design variants. For example, sieve, filter, heating and cooling surfaces can also be provided to simplify the process plant.

Below are some examples of special designs that have already been realised:

- Centralised grease lubrication.
- Cooled or heated surfaces.
- Internal limit switches to directly query flap position.
- Position-controlled flap shutter with wear-resistant coated insert and wear-resistant coated flap.
- Ground flap and flat sealing surface on the insert for metal-to-metal process sealing flap closure.



Fig. 6: Flap Shutter KV200E



Fig. 5: Flap Shutter with lateral purge air connection

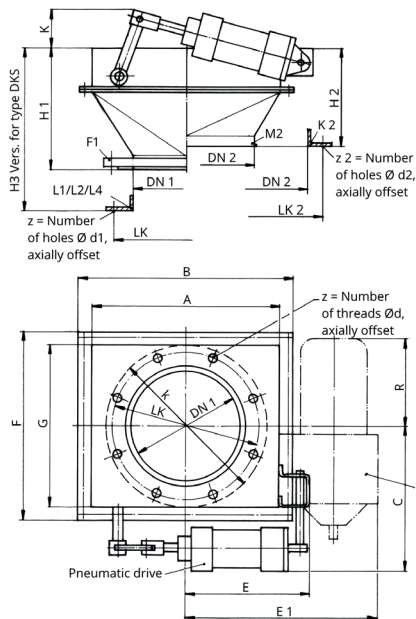


Fig. 4: Flap Shutter KV500T

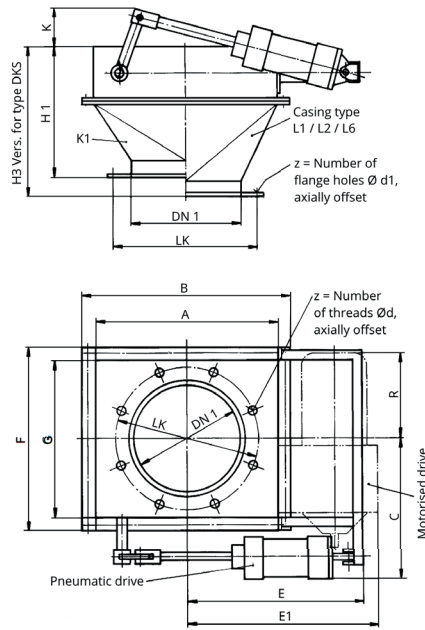
4 TECHNICAL DATA FOR FLAP SHUTTERS E, A AND T

SUBJECT TO ALTERATIONS!

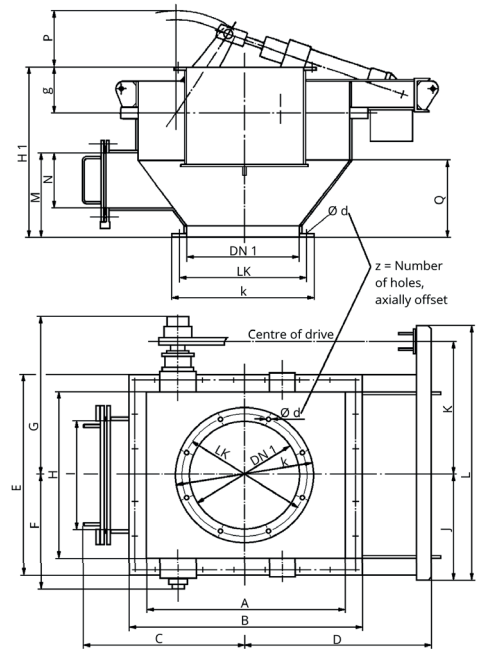
KV Type E



KV Type A



KV Type T



4.1 Flap Shutter KV Type E

Version: E													H1 Installation height				H2	Wt.	At 6 bar compressed air			
DN1	DN2	A	B	C	E	F	G	K	LK	k	d	z	H1	d1	H2	LK2	d2	z2	ca. [kg]	Closing force [N]	Closing pres. [bar]	Air consumption
150	200	280	340	207	275	330	270	84	190	210	M 8	4	250	9	205	250	9	4	19	753	0,426	1,30
200	250	380	430	245	325	340	290	73	250	270	M 8	4	350	9	280	300	9	8	26	1120	0,357	2,53
250	300	450	510	345	425	480	420	120	300	320	M 8	8	390	9	350	350	12	8	55	2545	0,520	8,38
300	350	530	590	340	360	490	430	130	350	370	M10	8	490	12	425	400	12	8	59	2550	0,361	8,38
400	500	720	780	440	400	640	580	222	450	480	M10	8	600	12	495	570	14	12	111	4350	0,346	21,40
500	600	920	990	570	790	870	800	370	570	600	M12	12	730	14	650	670	14	12	267	9600	0,490	53,20

4.2 Flap Shutter KV Type A

Version: A													H1 Installation height				H2	Wt.	At 6 bar compressed air		
DN1	DN2	A	B	C	E	F	G	K	LK	d	z	H1	d1	H2	LK2	d2	z2	ca. [kg]	Closing force [N]	Closing pres. [bar]	Air consumption
100	150	200	250	185	290	250	200	70	150	M 8	8	185	9	150	220	9	8	13	801	1,02	1,30
150	200	300	375	240	415	320	270	100	220	M12	8	280	14	270	270	14	8	35	1743	0,99	2,51
200	250	410	478	305	430	398	330	100	270	M12	8	365	14	365	320	14	8	63	3145	1,00	8,38
300	350	600	670	480	660	610	540	295	370	M12	8	490	14	455	400	14	8	133	7069	1,00	26,65
400	500	750	834	520	985	754	670	460	470	M12	12	635	14	555	570	14	12	320	12566	1,00	53,28
500	600	950	1030	660	1130	900	820	410	570	M12	16	840	14	760	670	14	16	585	19598	1,00	109,12

4.3 Flap Shutter KV Type T

DN1	A	B	C	D	E	F	G	H	I	J	K	L	H1	M	N	g	P	Q	LK	d	k	z
400	760	864	492	655	784	540	580	664	400	400	475	940	600	310	200	160	182	270	450	14	500	8
500	864	984	710	935	904	600	660	784	520	460	535	1075	730	425	240	175	263	265	580	18	620	16

5 DOUBLE FLAP SLUICE DKS FROM SINGOLD

If two flap shutters are arranged one above the other, the result is a Double Flap Sluice.

The areas of application of the Double Flap Sluice include:

- Conveying bulk materials to a different pressure level
 - o e.g. when discharging from cyclones or extraction systems etc.
- Feed and discharge products or bulk materials in batches
 - o e.g. in cement and glass production.
- Feed bulk materials in batches to other processes or plants
 - o e.g. feeding or discharging in incineration or biogas plants.

The Singold Double Flap Sluices are described in detail in a separate brochure.

