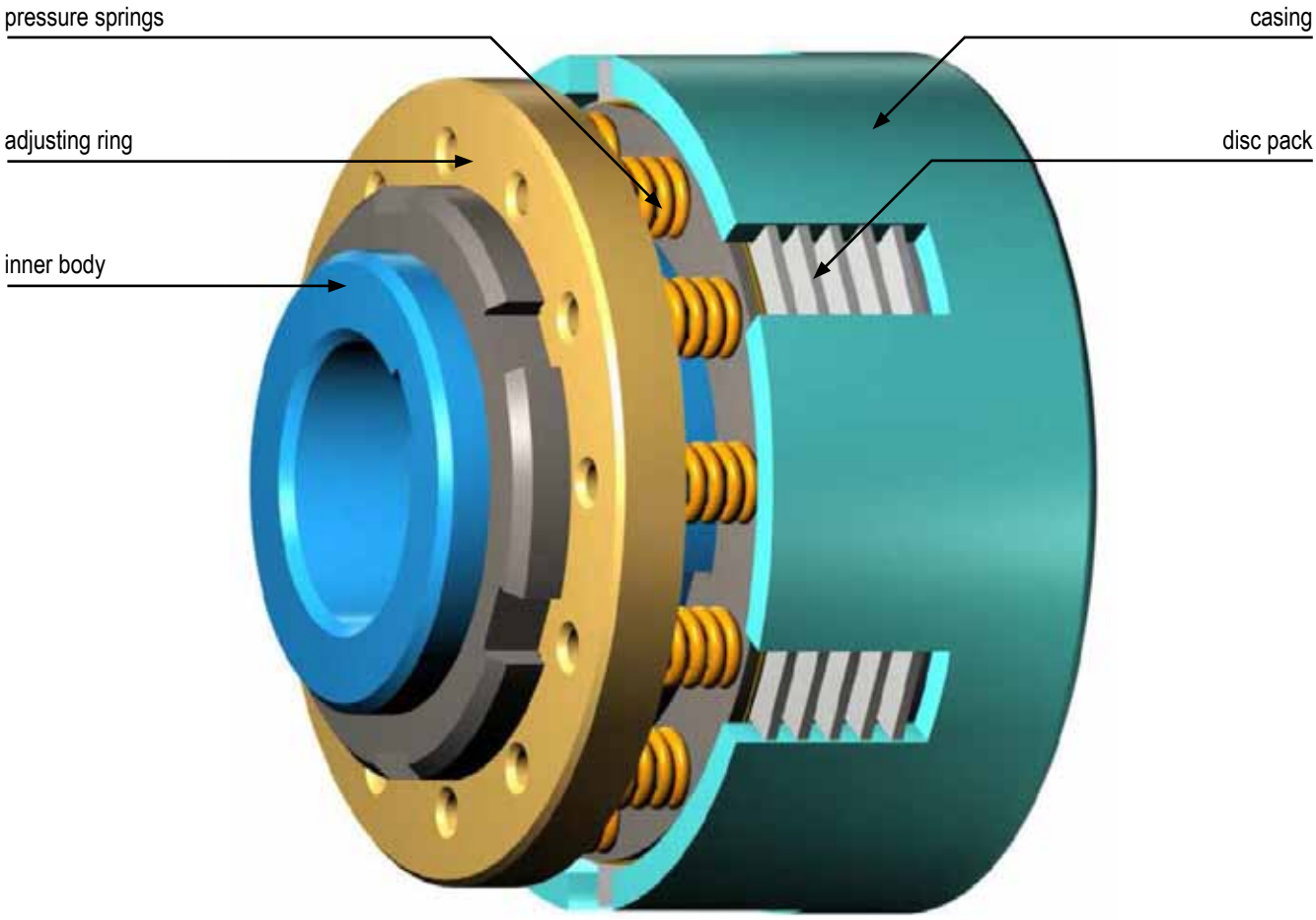
KWD
KUPPLUNGSWERK DRESDEN

Multiple disc safety and start-up clutches LASI, LAAN

KWN 26000, KWN 26001

Couplings from Dresden/Germany

By specialists – for specialists



technical features

Multiple-disc safety clutches are frictional connecting elements for the transmission of torques. They limit the torque to be transmitted and thus protects the driving and driven machine against overloads.

When overload occurs, the clutch slips with the dynamic friction torque (=nominal torque) and, after the slipping process is over, it reattains the static frictin torque.

We offer clutches in various sizes and torque ratings from 25 to 25000 Nm. There are two designs available (see „types“ on page 3).

The smallest adjustable dynamic friction torque is 40% of the nominal torque rating.

For vertical installation or of combustion-engine driven applications, please consult the manufacturer.

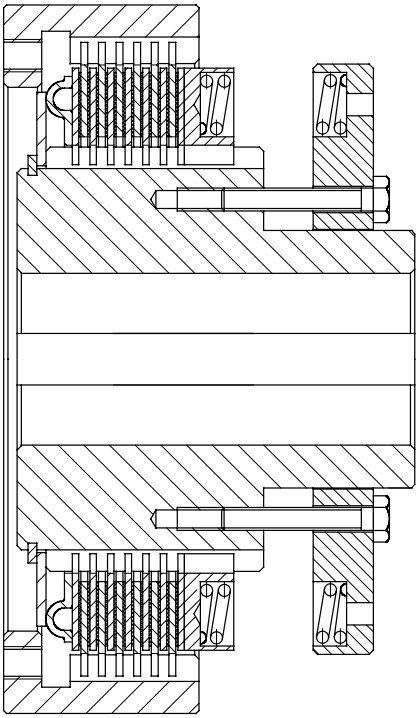
Übersicht

types

type S multiple-disc safety clutches,
without bearing support, available with various casings:

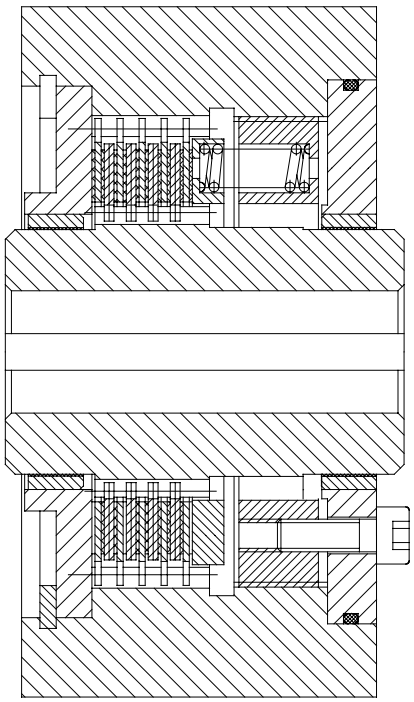
- **E with internal flange, open**
- **G with internal flange, closed**
- **D with external flange, open**
- **F with external flange, closed**

usable for wet and dry running



version example:
Multiple-disc safety coupling LASI, with internal flange, open

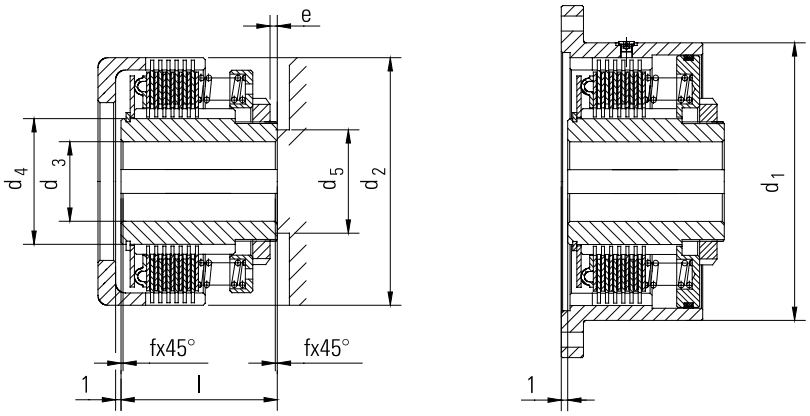
type A
multiple-disc start-up clutches,
bearing supported, closed for wet running



sizes 2,5 to 63

shown are

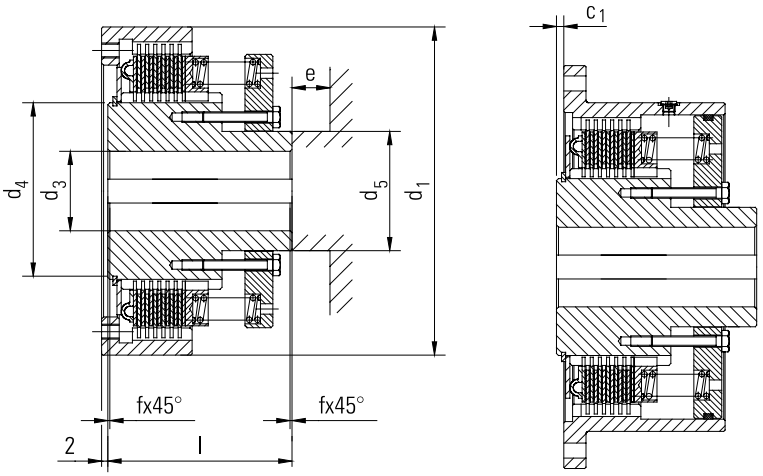
left: S 5 E and
right: S 5 F[1] (missing dimensions and data same as S 5 E)



sizes 100 to 400

shown are

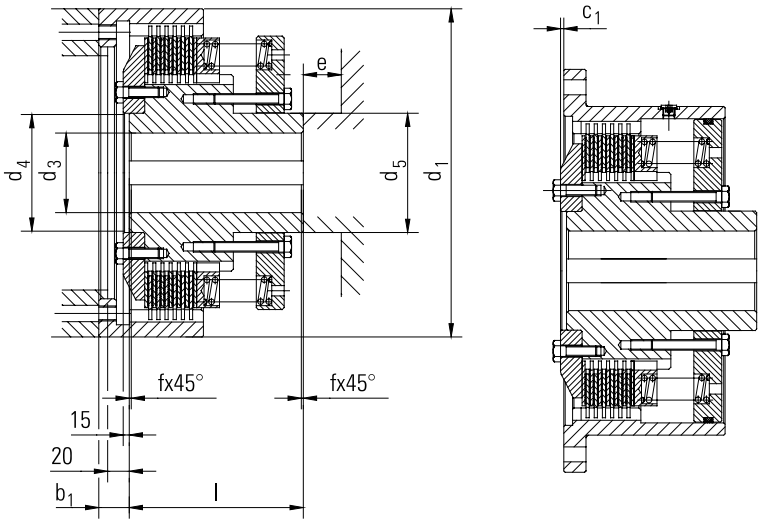
left: S 5 E and
right: S 5 F[1] (missing dimensions and data same as S 5 E)



sizes 630 to 2500

shown are

left: S 5 E and
right: S 5 F[1] (missing dimensions and data same as S 5 E)



Designs for wet running are illustrated;

the data applies likewise to designs for dry running (S2) in accordance with table 1.

Ordering example:

multiple-disc safety clutch S5 D 6,3 - 30H7P1 KWN 26000
Designation of a multiple-disc safety clutch type S5 D, nominal size 6,3, bore d_3=30 mm, tolerance H7 and keyway according to DIN 6885 sheet 1.

Footnotes for Design S

1) closed design only after consulting with the manufacturer."
2) keyway according to DIN 6885 sheet 1, dimension tolerance JS 9
3) free space for readjustment of the couplings
4) Inside and outside discs can be reordered in sets. Example: Designation of a set of discs for multiple-disc safety clutches with friction pairing steel/sintered bronze lining for wet running (S5) and rated size of discs =69: 1 set of discs S5 - 69 KWN 26000
5) calculated with 7,85 kg/dm³ and maximum dimension d3
6) oil filling not included in delivery

table 1 — main dimensions

size	nominal torque T_{KN} [Nm]	d_3 [2] H7 min	d_3 [2] H7 max	b_1	c_1	d_1	d_2	d_4	d_5 [3]	e [3]	l
2,5	25	14	20	-	-	70	55	30	30	10	50
4	40	16	25	-	-	90	80	38	42	10	60
6,3	63	16	30	-	-	100	90	45	52	10	60
10	100	20	35	-	-	118	105	50	55	10	60
16	160	22	40	-	-	130	115	55	62	10	75
25	250	25	45	-	-	135	125	60	68	10	78
40	400	30	50	-	-	152	140	75	80	10	95
63	630	35	60	-	-	170	155	85	90	10	110
100	1 000	40	70	-	8	215	-	110	98	45	125
160	1 600	45	80	-	14	245	-	130	100	45	140
250	2 500	50	90	-	18	265	-	140	109	45	150
400	4 000	60	100	-	16	320	-	160	124	55	170
630	6 300	70	120	33	15	370	-	170	160	40	160
1 000	10 000	80	140	35	10	440	-	205	195	40	185
1 600	16 000	90	160	35	10	490	-	220	210	50	200
2 500	25 000	110	180	40	10	650	-	345	300	35	210

table 2 — characteristic values

size	nominal torque T_{KN} [Nm]	slip frequency z_{th} max [h^{-1}]	angular velocity ω max [rad/s]	speed n max [min^{-1}]	rated size of the discs [4]	mass moment of inertia without casing [5] ≈ [kgm^2]	mass without casing [5] ≈ [kg]	oil filling [6] ≈ [l]
2,5	25	40	356	3 400	41	0,0003	0,5	0,01
4	40	36	335	3 200	59	0,0007	1,0	0,03
6,3	63	25	314	3 000	69	0,0014	1,4	0,03
10	100	20	293	2 800	78	0,0029	1,7	0,05
16	160	15	272	2 600	88	0,0045	2,9	0,08
25	250	13	251	2 400	95	0,007	3,1	0,09
40	400	12	230	2 200	107	0,012	5,3	0,1
63	630	8	209	2 000	122	0,026	8,1	0,17
100	1 000	7	178	1 700	160	0,063	15	0,3
160	1 600	5	157	1 500	182	0,10	23	0,3
250	2 500	4	136	1 300	196	0,11	26	0,65
400	4 000	3	115	1 100	240	0,38	47	0,85
630	6 300	2,5	105	1 000	286	1,2	77	0,95
1 000	10 000	2	89	850	340	3,6	120	1,65
1 600	16 000	1,6	79	750	380	4,4	153	2,3
2 500	25 000	1,2	52	500	510	7,2	276	-

table 3

bevel	d_3				
	6 bis 24	25 bis 48	50 bis 80	85 bis 120	130 bis 190
f	0,6	1	1,6	2,5	4

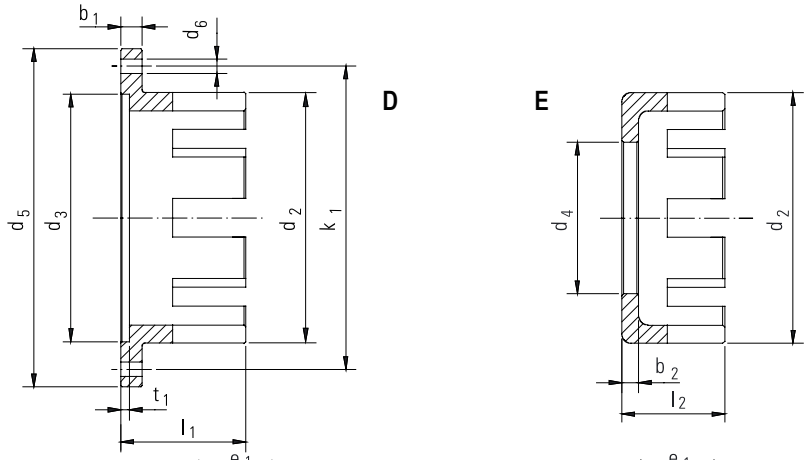
Footnotes see page 4

sizes 2,5 to 63

for wet running (S5) and dry running (S2)

D: open with external flange (left)

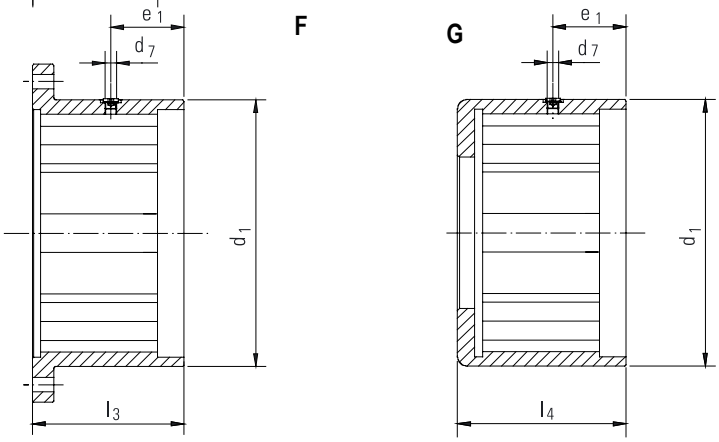
E: open with internal flange (right)



for wet running (S5)

F: closed with external flange (left)
(missing dimensions same as D)

G: closed with internal flange (right)
(missing dimensions same as E)



main dimensions table 4

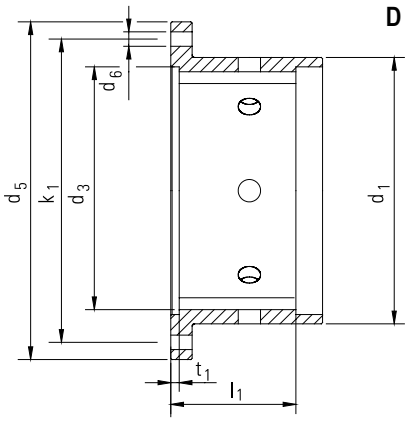
size	b_1	b_2	d_1	d_2	d_3 H7	d_4 H7	d_5	d_6	d_7	d_8	e_1	mounting holes k_1	qtyl	k_2	qtyl	l_1 wet running (S5)	l_1 dry running (S2)	l_2 wet running (S5)	l_2 dry running (S2)
2,5	4	6	70	55	60	35	95	7	M 10x1	-	22	82	3	-	-	27	27	33	33
4	6	6	90	80	85	40	130	11	M 10x1	-	27	110	4	-	-	31	31	36	36
6,3	6	6	100	90	95	45	150	11	M 10x1	-	27	125	4	-	-	36	36	41	41
10	10	6	118	105	110	50	165	11	M 10x1	-	27	140	4	-	-	37	37	43	43
16	10	8	130	115	120	60	180	11	M 12x1,5	-	32	155	4	-	-	43	43	51	51
25	10	8	135	125	130	70	185	11	M 12x1,5	-	34	160	4	-	-	45	45	53	53
40	10	10	152	140	145	80	205	11	M 12x1,5	-	32	180	4	-	-	51	51	61	61
63	13	10	170	155	160	90	220	11	M 16x1,5	-	45	195	6	-	-	59	65	65	75
100	13	13	215	-	200	175	260	11	-	M 10	50	235	6	190	6	45	62	55	72
160	13	13	245	-	225	200	290	11	-	M 10	62	265	6	216	6	46	74	62	90
250	15	15	265	-	245	215	315	14	-	M 12	60	290	6	234	6	54	72	74	92
400	15	15	320	-	295	260	370	14	-	M 12	62	345	8	280	8	64	88	82	106
630	20	20	370	-	350	305	430	18	-	M 16	62	400	8	332	8	67	102	100	135
1 000	20	20	440	-	415	370	500	18	-	M 16	78	470	8	395	8	80	120	110	150
1 600	20	20	490	-	465	420	550	18	-	M 16	58	520	12	450	12	100	125	130	155
2 500	25	25	650	-	620	550	730	22	-	M 20	-	690	12	595	12	-	130	-	165

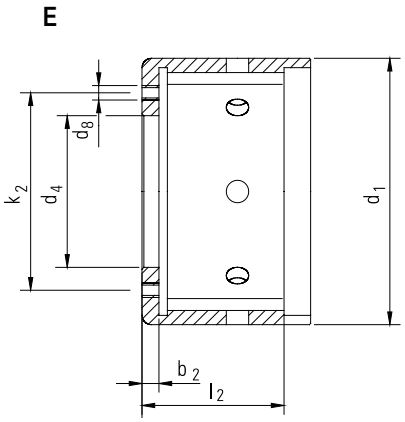
sizes 100 to 2 500

for wet running (S5) and dry running (S2)

D: open with external flange (left)

E: open with internal flange (right)

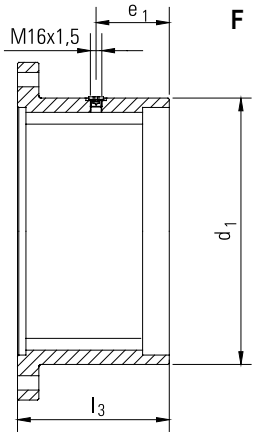




for wet running (S5)

F: closed with external flange (left)
(missing dimensions same as D)

G: closed with internal flange (right)
(missing dimensions same as E)



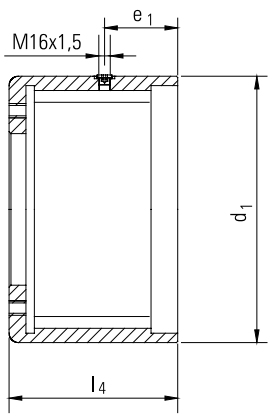


table 5 — **characteristic values / main dimensions**

size	l_3	l_4	t_1	mass moment of inertia ≈ [kgm²]						mass ≈ [kg]					
	wet run. (S5)			D		E		F	G	D		E		F	G
				wet run. (S5)	dry run. (S2)	wet run. (S5)	dry run. (S2)	wet run. (S5)	wet run. (S5)	wet run. (S5)	dry run. (S2)	wet run. (S5)	dry run. (S2)	wet run. (S5)	wet run. (S5)
2,5	40	46	2	0,0003		0,0001		0,0006	0,0005	0,23	0,23	0,14	0,14	0,53	0,55
4	46	52	2	0,0014		0,0006		0,0022	0,0013	0,60	0,60	0,29	0,29	0,86	0,81
6,3	50	56	2	0,0026		0,0009		0,0034	0,0019	0,83	0,83	0,56	0,56	1,8	0,96
10	53	59	3	0,0057		0,0017		0,0071	0,0042	1,4	1,4	0,81	0,81	1,9	1,5
16	60	68	3	0,0078		0,0025		0,011	0,0068	1,6	1,6	0,96	0,96	2,4	2,0
25	65	73	3	0,0090		0,0037		0,012	0,0073	1,7	1,7	1,2	1,2	2,4	2,0
40	70	85	4	0,014		0,0071		0,021	0,016	2,2	2,2	1,8	1,8	3,5	3,2
63	85	95	5	0,022	0,022	0,009	0,010	0,035	0,026	2,7	2,8	1,9	2,0	4,6	4,4
100	90	100	5	0,049	0,059	0,032	0,047	0,071	0,056	4,1	5,1	3,6	4,6	6,1	5,4
160	102	118	5	0,079	0,106	0,067	0,097	0,136	0,123	5,2	7,2	5,1	7,3	9,8	8,8
250	110	130	5	0,126	0,142	0,110	0,136	0,191	0,172	7,1	9,0	7,1	8,8	11	11
400	130	148	5	0,260	0,328	0,260	0,317	0,430	0,408	10	13	12	14	18	18
630	140	173	5	0,505	0,648	0,469	0,622	0,785	0,749	14	19	15	20	23	24
1 000	170	200	10	1,02	1,35	1,00	1,35	1,72	1,67	21	29	23	31	36	38
1 600	175	205	10	1,62	1,90	1,61	1,91	2,32	2,25	28	33	29	35	41	41
2 500	-	-	10	-	6,35	-	6,26	-	-	-	61	-	65	-	-

casing design

Casing D and E for multiple-disc safety clutches for wet running (S5, installation in the gear unit) and for multiple-disc safety clutches for dry running (S2, for open installation).

Casings F and G for multiple-disc safety clutches for wet running (S5, for open installation).

Other casing designs are available on request.

In case of dynamic load, it is recommended that, in addition to the screw connection, 2 dowel pins be arranged on the bolt hole diameter k_1 or k_2.

ordering example:

casing D 4 - S5 KWN 05061

Designation of a size 4 clutch with a casing D for wet running (S5).

material

inside body and casing:
steel with a tensile strength of at least 490 N/mm² and a yield point of at least 275 N/mm²

discs:
steel with a tensile strength of at least 600 N/mm²

friction lining:
sintered bronze or pressed fibre material

lubrication
The couplings for wet running are intended for submersed, centrifugal, splash or oil spray lubrication. We recommend an oil with a nominal viscosity of 30 cSt at 40°C and a corrosion degree of max. 2 as per DIN 51759.

Lubricating oil GH 85 W 90 (former GH 125) may not be used due to its incompatibility with the sintered bronze lining.

The correct oil fill capacity with closed design is shown in table 2.

With dry running couplings (S2), lubricants on the friction surfaces must be absolutely avoided.

setting and readjustment

The nominal torques T_{KN} per tables 1 and 2 are the maximum permissible adjustable dynamic friction torques which are transmitted in the event of slippage between the friction surfaces.

When selecting a clutch size, a torque decrease, due to wear, of 20% during the readjustment period is to be taken into account, that is, a safe transmission of power has to be still be guaranteed with a dynamic friction torque of 80% of the set value.

$T_{KN\ set}$ is the set dynamic friction torque, which can be 40 to 100% of the nominal torque T_{KN}. In case of multiple-disc safety clutches for wet running, the values of the nominal torque refer to an oil viscosity of 30 cSt and an operating temperature of 40°C.

With a higher viscosity, the given nominal torques can not be attained.

Dependend upon the operating conditions (friction surface temperature, rotational speed, torque setting, lubrication), the static frictional torque T_{KH} is:

- 1,4 to 1,8 times greater than the actual dynamic frictional torque with the friction pairing steel/sintered bronze lining for wet running
- 1,2 to 1,4 times greater with the friction pairing steel/pressed fibre lining for dry running

installation and operating conditions

The couplings in open design can be used in any position, whereby the inside part of the coupling and the casing need to be supported independently.

Couplings in closed design are only suitable for a horizontal installation.

For the shaft seat, in the diameter range of 10 to 50 mm, a tolerance of k6 and a tolerance of m6 for the diameter range of over 50 to 180 mm is recommended.

The couplings are adjustable within the range of 40 to 100% of the nominal torque and can be readjusted in the event of a torque decrease due to wear.

A loading of the coupling by externel forces is not permissible.

The slippage has to be limited. We recommend that the coupling operates in connection with a slippage control device. At maximum torque, maximum rotational speed, as well as maximum switching frequency, slipping duration in excess of 2 s has to be avoided. If longer slipping cannot be ruled out, please consult the manufacturer.

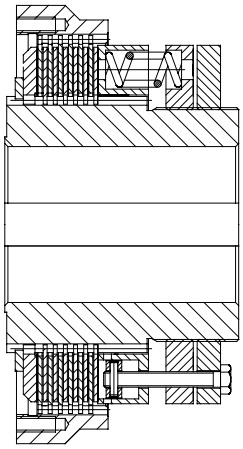
Furthermore, the manufacturers installation and maintenance instruction (KWN 36000) has to be observed.

The permissible ambient temperature is: ϑzul= -25 to +75°C

Multiple-disc safety clutches are also available in various special designs.

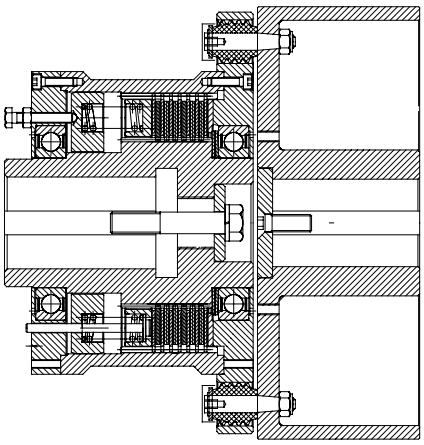
multiple-disc safety coupling type S5

in flange-shaft design (adjustment in special design)



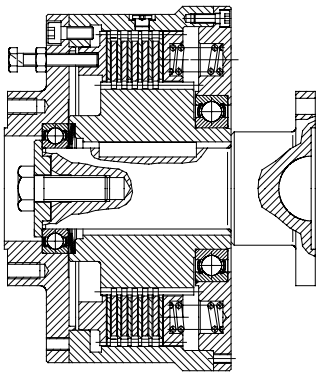
multiple-disc safety coupling type S5

in shaft-shaft design with self storage, flexible coupling and brake drum



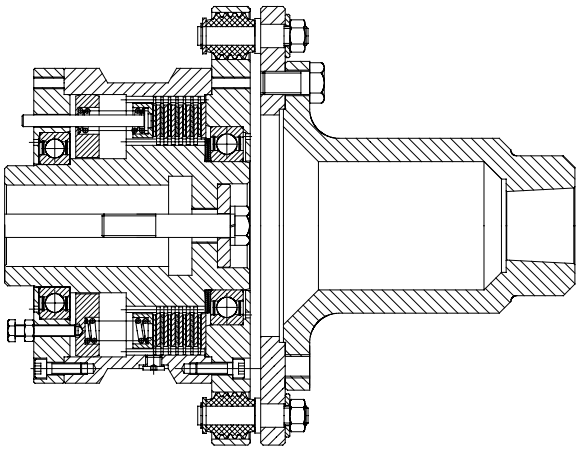
multiple-disc safety coupling type S5

in flange-flange design with self storage



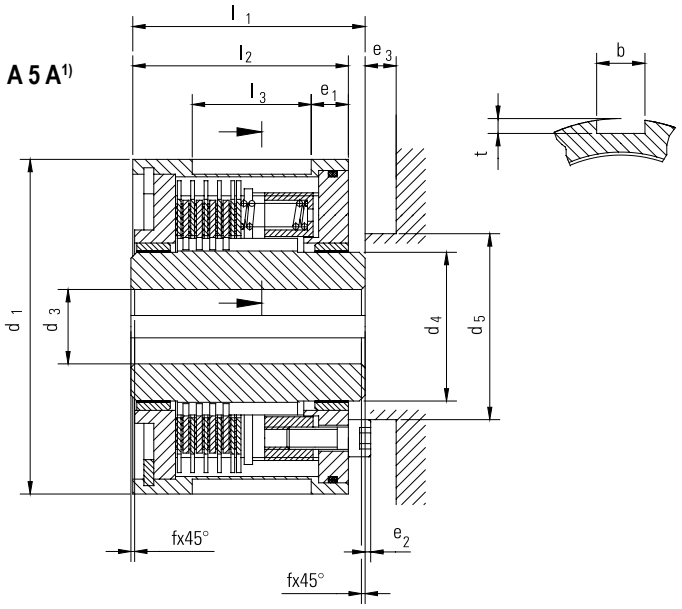
multiple-disc safety coupling type S5

in shaft-shaft design with self storage, flexible coupling in special design

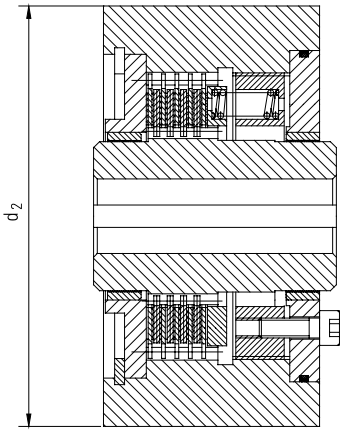


type A

A 5 A[1)]



A 5 B[1)]



Ordering example:

multiple-disc start-up coupling A5B4 - 20v KWN 26001

Designation of multiple-disc start-up clutch type A5B, nominal size 4 and bore d_3=20 mm, pilot bore (v).

main dimensions

table 6

size	nominal torque T_{KN} [Nm]	d_3[2)] H7 min	d_3[2)] H7 max	d_1 n6	d_2	d_4	d_5[3)]	e_1	e_2	e_3[3)]	l_1	l_2	l_3	keyway b P9	keyway t +0,15
2,5	25	10	16	70	100	25	30	10	2	35	60	55	32	6	3,5
4	40	12	28	90	125	40	45	10	1	35	63	58	32	8	4
6,3	63	16	35	100	140	45	55	13	2	35	70	66	36	8	4
10	100	20	38	120	160	50	65	12	2	35	72	67	40	10	5
16	160	22	45	130	170	60	70	12	2	40	80	74	45	12	5
25	250	25	45	140	180	60	80	13	2	40	82	78	45	14	5,5
40	400	30	55	155	200	70	90	14	2	40	102	94	63	14	5,5
63	630	35	70	170	220	90	105	18	2	40	118	110	70	18	7
100	1 000	40	80	220	280	100	160	24	4	60	138	127	90	20	7,5
160	1 600	45	90	250	320	125	160	26	3	60	160	150	110	22	9

characteristic values

table 7

size	nominal torque T_{KN}	slip frequency z_{th} max [h^{-1}]	radial load capacity F max [N]	angular velocity ω max [rad/s]	speed n max [min^{-1}]	nominal size of the discs[4)]	mass moment of inerti[5)] ≈ [kgm^2] A 5 A	mass moment of inerti[5)] ≈ [kgm^2] A 5 B	mass[5)] ≈ [kg] A 5 A	mass[5)] ≈ [kg] A 5 B	oil filling[6)] [l]
2,5	25	40	500	356	3 400	41	0,001	0,004	1,4	3,1	0,009
4	40	36	600	335	3 200	59	0,002	0,011	2,3	5,5	0,017
6,3	63	25	800	314	3 000	69	0,004	0,019	2,9	6,8	0,023
10	100	20	1 000	293	2 800	78	0,008	0,032	4,3	9,1	0,023
16	160	15	1 200	272	2 600	88	0,013	0,045	5,8	11,0	0,034
25	250	13	1 500	251	2 400	95	0,020	0,060	6,9	12,9	0,045
40	400	12	1 700	230	2 200	107	0,034	0,110	9,8	19	0,056
63	630	8	2 200	209	2 000	122	0,055	0,182	13,2	26	0,10
100	1 000	7	2 600	178	1 700	160	0,176	0,55	25	48	0,28
160	1 600	5	3 000	157	1 500	182	0,34	1,1	39	76	0,39

Footnotes see page 11

table 8

bevel	d_3			
	6 to 24	25 to 48	50 to 80	85 to 120
f	0,6	1	1,6	2,5

installation and operating conditions

DThe clutches are designed for horizontal installation.
For use with combustion-engines, please consult the manufacturer.

The permissible ambient temperature is: ϑ_{zul} = -25 bis +75°C.

material

inside body:
steel with a tensile strength of at least 490 N/mm²
and a yield point of at least 275 N/mm²

discs:
steel with a tensile strength of at least 600 N/mm²

Friction lining:
sintered bronze

lubrication

The correct oil fill capacity is shown in table 7.

We recommend oil with a nominal viscosity of 30 cSt at 40°C and a corrosion degree of max. 2 as per DIN 51759.
Lubricating oil GH 85 W 90 (former GH 125) may not be used due to its incompatibility with the sintered bronze lining.

setting and readjustment

When selecting the size, a torque decrease, due to a wear, of 20% during the readjustment period is to be taken into account, that is, a safe transmission of power still has to be guaranteed with a dynamic frictional torque of 80% of the set value.

$T_{KN\,set}$ is the set dynamic frictional torque, which can be 40 to 100% of the nominal torque T_{KN}. The values of the nominal torque refer to an oil viscosity of 30 cSt and an operating temperature of 40°C.

With a higher viscosity, the given nominal torques can not be attained.

Dependend upon the operating conditions (friction surface temperature, rotational speed, lubrication), the static frictional torque T_{KH} is

- 1,4 to 1,8 times greater than the existing dynamic frictional torque.

Footnotes for type A

1) A5A: Suitable for installation in gear wheels, pulleys, etc. A5B: The outer body can be used with spur gear toothing, belt profile, etc. be provided
2) keyway according to DIN 6885 sheet, dimension tolerance JS 9
3) free space for readjustment of the couplings
4) Inside and outside discs can be orderedin sets.
Example: Designation of a set of discs for multiple start-up clutches, type A, with friction pairing steel/sintered bronze lining for wet running (A5) and rated size of discs = 69: 1 set of discs A5-69 KWN 26001
5) calculated with 7,85 kg/dm³ and maximum dimension d3
6) oil filling not included with delivery

KWD
KUPPLUNGSWERK DRESDEN

Löbtauer Straße 45, D-01159 Dresden
Postfach 27 01 44, D-01171 Dresden
Tel.: +49 (0) 351/49 99-0, Fax: +49 (0) 351/49 99-2 33
E-mail: kwd@kupplungswerk-dresden.de

www.kupplungswerk-dresden.de

Certified in accordance with ISO 9001: 2008
Scope development, manufacture, sale and servicing of couplings in the drive technology field

Certified Welding Company / GSI SLV

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