Electromagnetic brake systems

for hoists

INTORQ

setting the standard

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Electromagnetic brake systems for hoists

Our products have been setting standards for years, and meet the highest performance demands. Our knowledge of customer requirements during the development stage, our expertise in selecting materials and our production competence are reflected in our products. Our success speaks for itself and our brakes and clutches stand for quality, sophisticated technology and innovation.

Many different brake designs have proved successful when used in lift technology. The shift from conventional lift drives to direct drives means that brake systems adapted specifically for this purpose are needed. The kidney-shaped multi-coil technology INTORQ BFK466 brake with calliper provides the high braking torque required by direct drives. If several callipers are arranged optimally around the contour of the motor, braking torques of up to 14000 Nm per calliper can be achieved. The high demands made by passenger lifts are met by taking the required redundancy into account.

Double spring-applied brakes

INTORQ BFK457

INTORQ BFK458

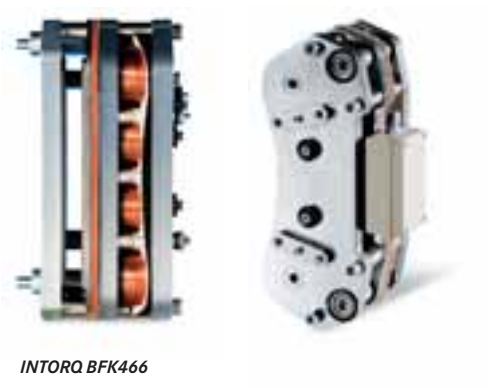
Dual-circuit spring-applied brakes

INTORQ BFK454

INTORQ BFK464

Spring-applied brakes with callipers

INTORQ BFK456



INTORQ BFK466

Double spring-applied brake INTORQ BFK457

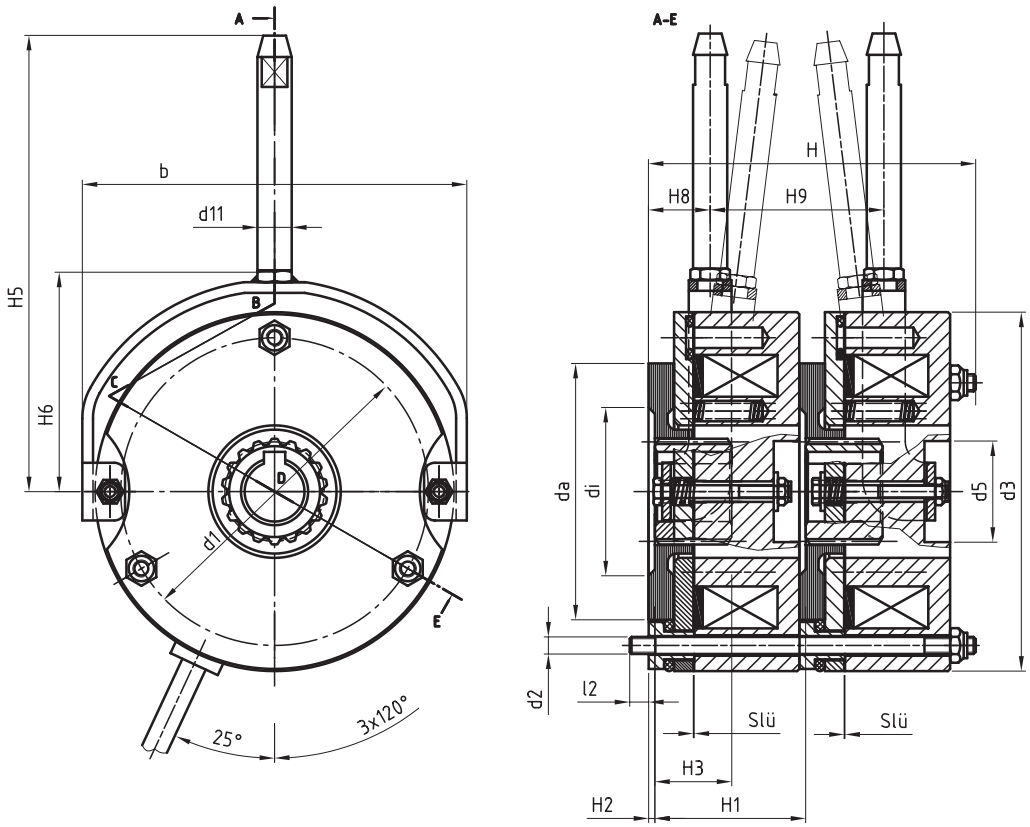
INTORQ BFK457 double spring-applied brakes meet the high demands made on redundant brake systems in hoists. Operating noises can be minimised to values < 50 dbA using special damping element arrangements. In addition, noises in the shaft/hub connection are reduced through the use of a noise-limiting sleeve in the rotor (compare BFK458).

Features

- Noise-reduced < 50 dbA
  Noise-reduced armature plate
  Noise-reduced rotor
- Modular structure comprised of individual BFK457 components
- Simple mounting using stud bolts
- "Single-handed" manual release

Size	M_K	P_{20}	b	d J7 1)	d H7 max	d1	d2	d3	d5	d11	da	di	H
06	2x4	20	90	10	15	72	3xM4	84	31	8	60	40	75.5
08	2x8	25	108	10	20	90	3xM5	102	41.5	8	77	47	90.5
10	2x16	30	137	10	20	112	3xM6	130	44	10	95	66	102.9
12	2x32	40	157	14	25	132	3XM6	150	52	10	115	70	114.7
14	2x60	50	174	14	30	145	3XM8	165	60	12	124	80	140.5
16	2x80	55	203	15	38*	170	3xM8	190	70	12	149	104	153.1

- Standard voltages 24 V, 103 V, 180 V, 205 V
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20 °C in W
- l1: Connecting cable length
- $S_{iü}$: Working air gap
- Standard keyway according to DIN 6885/1-P9
  *Keyway according to DIN 6885/3-P9
- Dimensions in mm



Size	H1	H2	H3	H5	H6	H8	H9	l1	l2	$S_{lü}$ ± 0.1	$S_{lü\ max}$	m [kg]
06	35.3	1	18	109	54	13	44	400	6	0.2	0.5	1.9
08	42.8	1.5	20	121.7	62	12.7	63.3	400	9	0.2	0.5	3.2
10	48.4	2	20	147	84	16	70	400	11	0.3	0.5	6.4
12	54.4	2	25	166	93	18.3	78.4	400	11	0.3	0.75	9.8
14	66.3	2	30	186	106	22	91.5	400	14	0.3	0.75	14.8
16	72.5	2.25	30	230	120.5	24.5	100	600	14	0.3	0.75	21.0

- Standard voltages 24 V, 103 V, 180 V, 205 V
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20 °C in W
- l1: Connecting cable length
- $S_{lü}$: Working air gap
- Standard keyway according to DIN 6885/1-P9
- Dimensions in mm

Double spring-applied brake INTORQ BFK458

INTORQ BFK458 double spring-applied brakes are suitable for use in passenger lifts. The required redundant brake system has a modular structure and is comprised of INTORQ BFK458 components.

Features

- Noise-reduced (optional)

Impact noise-reduced armature plate

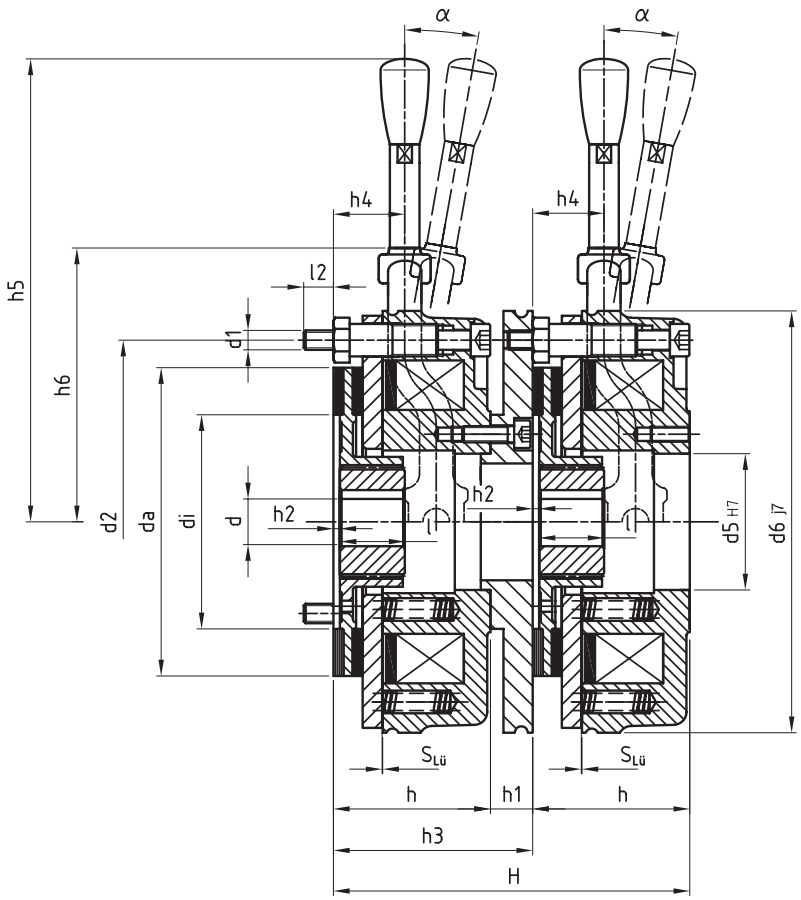
The brake's operating noise can be minimised using special damping elements, which act as shock absorbers between the pole face and the armature plate.

Noise-reduced aluminium rotor

Rattling noises, which can occur in the rotor/hub connection during frequency inverter operation, load alternation or in the context of non-constant speeds, for example, are reduced by using a rotor with a plastic sleeve. The plastic sleeve also ensures a longer service life for the rotor/hub connection.

Size	M_K	P_{20}	d J7 vorg.	d H7 max	d1	d2	d5	d6	di	da	H	h	h1
06	2x4	2x20	10	15	3xM4	72	25	87	40	60	84,6	36,3	12
08	2x8	2x25	10	20	3xM5	90	32	105	56	77	97,6	42,8	12
10	2x16	2x30	10	20	3xM6	112	42	130	66	95	109,8	48,4	13
12	2x32	2x40	14	25	3xM6	132	50	150	70	115	125,8	54,9	16
14	2x60	2x50	14	30	3xM8	145	60	165	80	124	148	65,5	17
16	2x80	2x55	15	38*	3xM8	170	68	190	104	149	165	72,5	20
18	2x150	2x85	20	45	6xM8	196	75	217	129	174	186,2	83,1	20
20	2x260	2x100	25	50	6xM10	230	85	254	148	206	215,2	97,6	20
25	2x400	2x110	30	70	6xM10	278	115	302	199	254	236,4	105,7	25

- Standard voltages 24 V, 103 V, 180 V, 205 V
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20 °C in W
- l1: Connecting cable length
- S_{li}: Working air gap
- Standard keyway according to DIN 6885/1-P9
  *Keyway according to DIN 6885/3-P9
- Dimensions in mm



Größe	h2	h3	h4	h5	h6	α	l	l1	l2	$S_{Iü}$ +0,1 −0,05	$S_{Iü\ max}$	m [kg]
06	1	48,3	15,8	107	56,3	12°	18	400	8,7	0,2	0,5	2
08	1,5	54,8	16,3	118	65	10°	20	400	9,8	0,2	0,5	3,18
10	2	61,4	27,4	134	77,8	9°	20	400	12,7	0,2	0,5	5,56
12	2	70,9	29,4	163,5	88,5	10°	25	400	13,1	0,3	0,75	9,24
14	2	82,5	33	195,5	101,5	9°	30	400	13,1	0,3	0,75	13,26
16	2,25	92,5	37,5	240	116	10°	30	600	16,4	0,3	0,75	19,61
18	2,75	103,1	41,1	347	128,5	9°	35	600	17,5	0,4	1,0	29,26
20	3,5	117,6	47,6	418	149,5	10°	40	600	17,8	0,4	1,0	46,06
25	4,5	130,7	57,7	504	175,5	10°	50	600	21,5	0,5	1,25	70,6

- Standard voltages 24 V, 103 V, 180 V, 205 V
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20°C in W
- l1: Connecting cable length
- $S_{Iü}$: Working air gap
- Standard keyway according to DIN 6885/1-P9
  *Keyway according to DIN 6885/3-P9
- Dimensions in mm

Dual-circuit spring-applied brake INTORQ BFK454

INTORQ dual-circuit spring-applied brakes for hoists meet the requirements of TRA 200 and EN 81 for hoists.

The dual-circuit brake system is achieved by splitting the armature plate in two. The spring force used to generate the braking torque acts

- 80% directly on the front armature plate and
- 20% indirectly via the rear armature plate (default setting values)

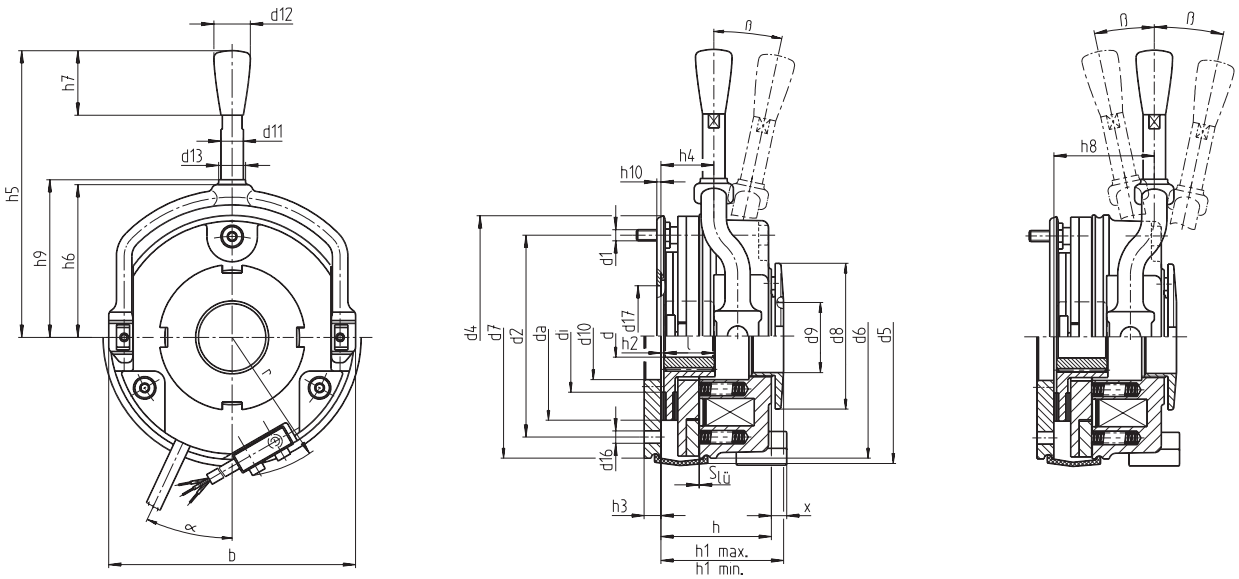
The front armature plate is supported on the rear armature plate's axial guideways. This design ensures that, in case of failure, at least the spring force acting directly on the front armature plate is retained.

Size	M_K	P_{20}	b	d J7 1)	d H7 max	d1	d2	d4	d5	d6	d7	d8	d9 H8	d10	d11	d12	d13	d16
10	15	33	132	10	20	3xM6	112	132	134	130	130	68	35	45	10	13	12	3x6.6
12	30	40	152	14	25	3xM6	132	154	155	150	150	82	40	52	10	13	12	3x6.6
14	60	53	169	14	30	3xM8	145	171	169	165	165	92	52	55	12	24	14	3x9
16	90	56	194.5	15	38*	3xM8	170	195	195	190	190	102	52	70	12	24	14	3x9
18	150	85	222	20	45	6xM8	196	–	222	217	217	116	62	77	14	24	15.5	4x9 2)
20	200	100	258	25	50	6xM10	230	–	259	254	254	135	72	90	14	24	16.5	4x11 2)
25	400	110	302	30	70	6xM10	278	–	307	302	302	165	85	120	16	24	18.4	6x11

- Standard voltage 205 V (other voltages available on request)
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20°C in W
- $S_{ü}$: Working air gap
- l1: Connecting cable length
- Standard keyway according to DIN 6885/1-P9
  *Keyway according to DIN 6885/3-P9
- Manual release angle tolerance +3°
- Subject to modifications
- Dimensions in mm

Features

- Small unit volume
- Low moment of inertia
- Easy adjustment (reduction) of braking torque via the central setting ring gauge
- Simple maintenance and monitoring of dual-circuit function
- No division of the rubbing surfaces



Size	d17	di	da	h	h1 min	h1 max	h2	h3	h4	h5	h6	h7	h8	h9	h10	l	l1	r	$S_{Iü}$ +0.1 −0.05	$S_{Iü\ max}$	x	α	β	m [kg]
10	60	66	95	52.5	56.5	60.1	2	9	31.4	134	73.8	23	46.4	77.8	1.5	20	400	–	0.3	0.5	–	25°	9°	2.6
12	68	70	115	58.9	63	68.5	2	9	33.4	163.5	85	23	51.4	88.5	1.5	25	400	80.5	0.3	0.75	13	25°	10°	4.3
14	85	80	124	68.5	73.5	79.5	2	11	36	195.5	98	32	53	101.5	1.5	30	400	88.5	0.3	0.75	11.5	25°	9°	6
16	98	104	149	77.5	82.5	87.5	2.25	11	42.5	240	113	32	58.5	116	1.5	30	600	99	0.3	0.75	11	25°	10°	9.2
18	–	129	174	88.1	94	103	2.75	11	46.1	347	124	32	64.1	128.5	–	35	600	112.5	0.4	1.0	7	25°	9°	14
20	–	148	206	102.6	109	119	3.5	11	52.6	418	146	32	73.6	149.5	–	40	600	3)	0.4	1.0	3)	25°	10°	21.9
25	–	199	254	111.7	120	130	4.5	12.5	63.7	504	170	32	94.7	175.5	–	50	600	155	0.5	1.25	3)	25°	10°	32.5

1) Predrilled, without keyway

2) Each bore offset by 30° in relation to the centre axis of the manual release lever

3) No overshoot

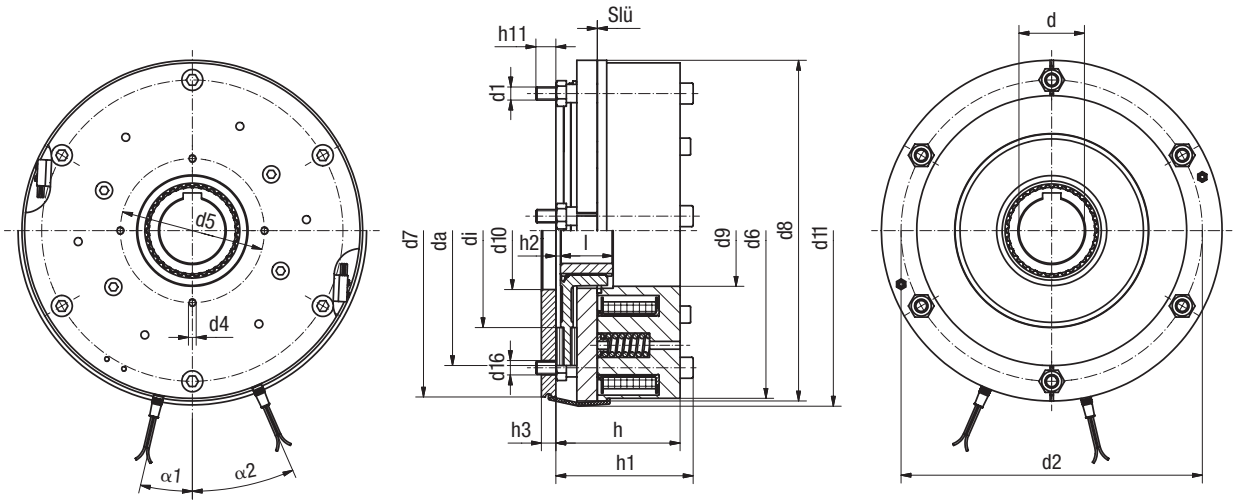
Dual-circuit spring-applied brake INTORQ BFK464

Powerful and featuring multi-coil technology, BFK464 dual-circuit spring-applied brakes are ideally suited for use in passenger lifts. The required redundancy is achieved by splitting the armature plate.

Safe operation is also guaranteed thanks to monitoring of both brake circuits with microswitches.

Features

- Each armature plate segment with multi-coil technology can be activated as a separate unit
- Manual release optional
- Low energy consumption due to overexcitation and holding current derating



Size	M_K	P_{20} Switch	Hold	d J7 1)	d H7 max	d1	d2	d4	d5	d6	d7	d8	d9 H8	d10
20/1	2x275	2x204	2x51	25	50	6xM10	230	4xM6	110	256	254	260	85	90
25/1	2x600	2x264	2x66	30	65	6xM10	278	4xM6	140	313	302	313	115	120

Size	d11	d16	da	di	h	h1	h2	h3	h11	l	l1	$S_{lü}$	α1	α2	m
20/1	264	6x11	206	148	94.8	95.8	3.5	11	15.2	40	600	0.3	13	24	24.5
25/1	318	6x11	254	199	113	123	4.5	12.5	16.7	50	600	0.3	11	21	47.3

- Standard voltages: 205 V switch/103 V hold
- M_K: Characteristic braking torque in Nm based on Δn = 100 rpm (other characteristic torques on request)
- P_{20}: Coil power at 20 °C in W
- l1: Connecting cable length
- $S_{lü}$: Working air gap
- Standard keyway according to DIN 6885/1-P9
- m: Mass in kg
- Dimensions in mm
- 1) Predrilled, without keyway

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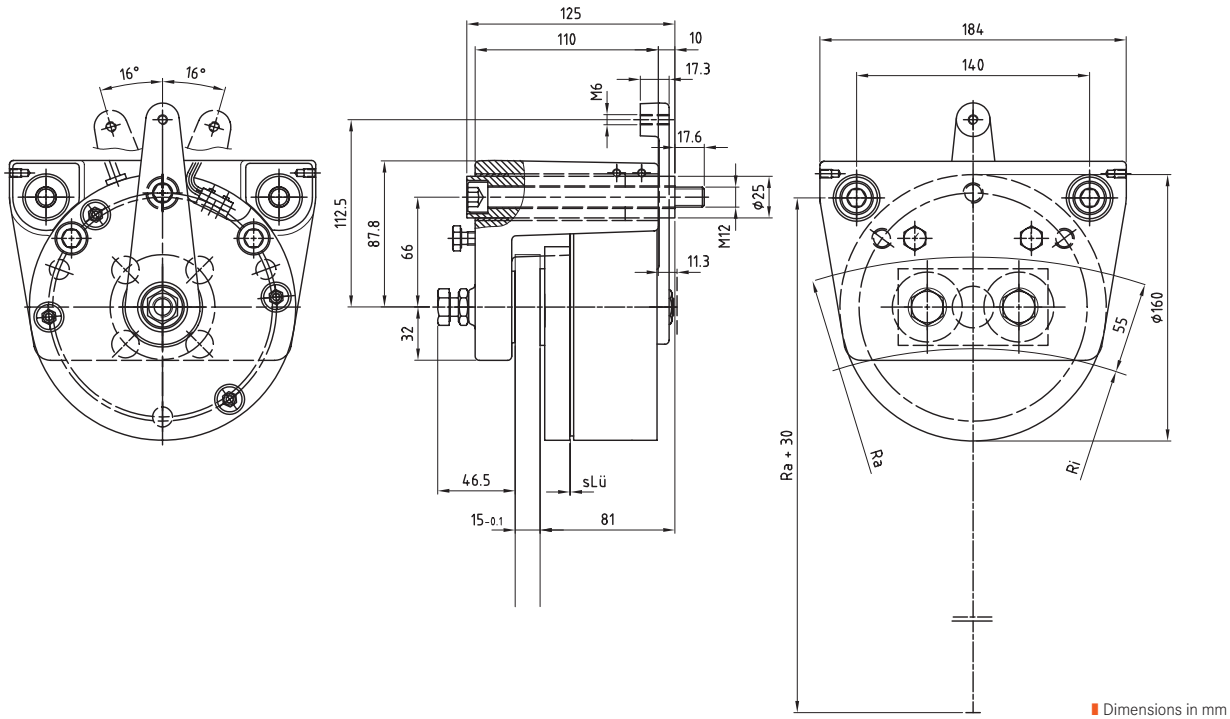
Spring-applied brake with calliper
INTORQ BFK456

The BFK456 spring-applied brake with calliper has been specifically designed for use in direct drives. The required redundancy is achieved through the use of at least two callipers.

Features

- Single-coil technology
- Low energy consumption due to overexcitation and holding current derating
- Safe operation due to microswitch monitoring



Dimensions in mm

Calculation of characteristic torque

$M_K = F_R \times r_o$

Friction radius

$r_o = 2x\,(Ra^3 - Ri^3) / 3x\,(Ra^2 - Ri^2)$

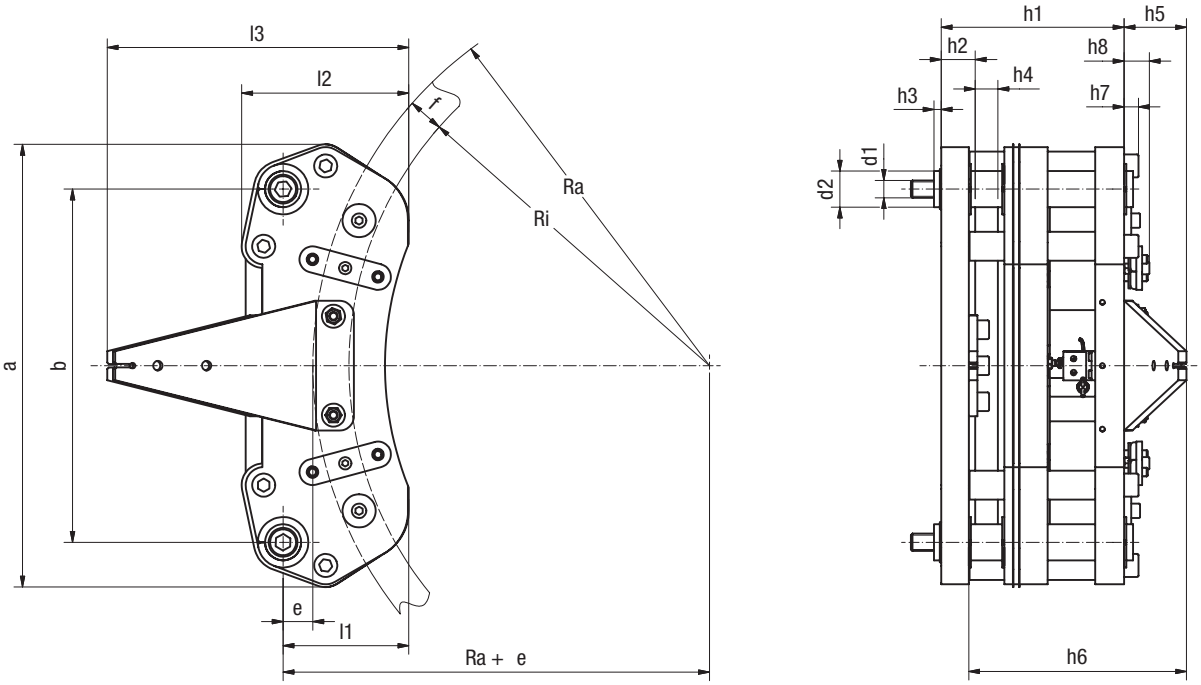
Design	Friction force F_R	Power P_{20} Switch	Hold	Ra min.	max.
33	3314 N	180 W	45 W	165 mm	450 mm
45	4490 N	200 W	50 W	165 mm	450 mm

Spring-applied brake with calliper INTORQ BFK466

BFK466 spring-applied brakes with callipers were specifically developed for use in direct drives. Multi-coil technology generates the power required for high braking torques. The required redundancy is achieved through the use of at least two callipers.

Features

- **Powerful**
  High braking torque and large working air gap due to multi-coil technology
- **Low-noise operation**
  Release without residual torque and quiet Switching due to elastic dampers and multilayer inserts
- **Compact**
  Contours adapted perfectly to the motor design
- **High energy density**
  High magnetic forces caused by overexcitation
- **Low energy consumption**
  through holding current derating
- **Safe**
  Air gap or wear monitoring using microswitch



Calculation of characteristic torque

$M_K = F_R \times r_o$

Friction radius

$r_o = 2x\,(Ra^3 - Ri^3) / 3x\,(Ra^2 - Ri^2)$

$Ri = Ra - f$

Design	Friction force [N]	Power P_{20} Switch	Hold	a	b	d1	d2	e	f	h1	h2
12	1172	367 W	92 W	236	206	M10	20	26	30	101	15
22	2240	353 W	88 W	276	220	M10	20	20	40	108	19
35	3506	473 W	118 W	307	245	M12	25	20	32	128	25
60	5992	471 W	118 W	410	310	M16	40	25	60	138	29
185	18517	608 W	152 W	639	565	M30	55	22.5	115	212	43

Design	h3	h4	h5	h6	h7	h8	l1	l2	l3	Ra min	Ra max
12	5	15	–	–	8	19	83	98	–	250	500
22	5	15	–	–	8	22	88.6	105	–	150	425
35	5	15	44	152	10	19	87	116	209	225	375
60	15	25	43	–	12	18	122.5	152.5	385	300	600
185	10	30	40	–	16	–	181.3	252.5	1196	500	850

Dimensions in mm

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