Spring-applied brake

INTORQ BFK461

4 – 235 Nm

INTORQ

setting the standard

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INTORQ BFK461, sealed design

The INTORQ range of spring-applied brakes is being expanded with the addition of the new BFK461 series of sealed designs. This brake has been specifically developed for application areas with high enclosure requirements. It is a self-contained system available in seven sizes and with braking torques of 4 – 235 Nm is ideal for use in wind power plants, cranes and textile machines.

Features

- Spring-applied brake, sealed design, IP65 enclosure
- Designs with and without flange
- Long maintenance intervals

Example applications

- Brake motors
- Wind power plants
- Car wash systems
- Cranes
- Hoists
- Textile machines

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Contents

Product key INTORQ BFK461-□□□

B	F K	4 6 1	-	□□	□

Product group: Brakes

Product family: Spring-applied brakes

Type

Size

Design

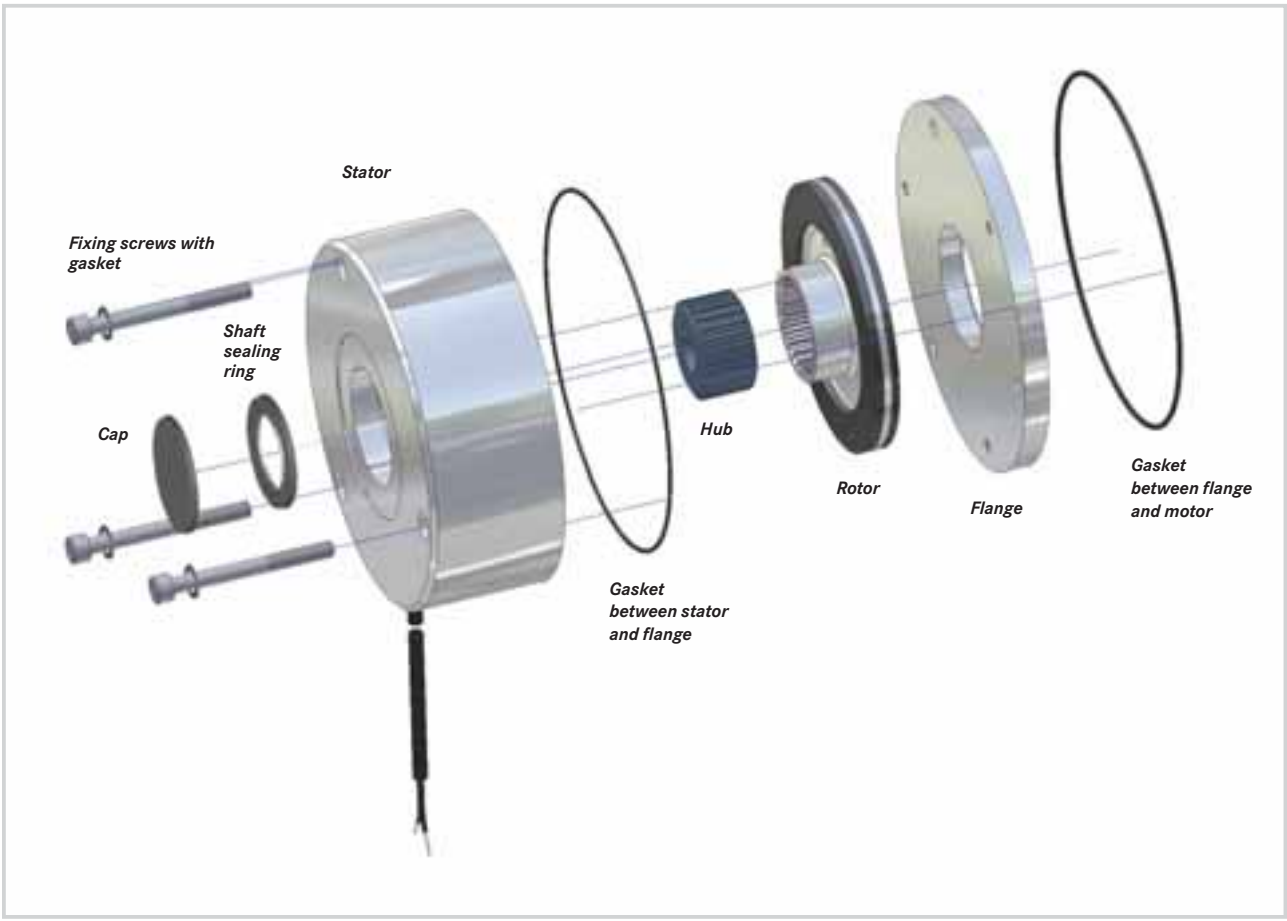
Sizes

06, 08, 10, 12, 14, 16, 18

Stator design

N – Non-adjustable in the sealed design

Not coded:
Supply voltage, hub bore, options



Product information

INTORQ BFK461 spring-applied brake

A powerful and complete range
- 7 sizes
- Standard voltages 24 V, 103 V, 180 V, 205 V
- Torque range 4 – 235 Nm

Versatile
- Modular structure for virtually all applications
- Dimensions identical to the BFK458 range

Torque transmission
- Designed for dry running

Ready for operation immediately
- Preset air gap, quick and easy mounting
- Special machining of the friction surfaces ensures that the characteristic torques are achieved after very few switching operations.
- No fixed bearing is required on the brake

Durable
- The insulation system to temperature class F (155 °C) ensures that the winding has a long service life
- These brakes are designed for 100% operating time (current applied to the brake)

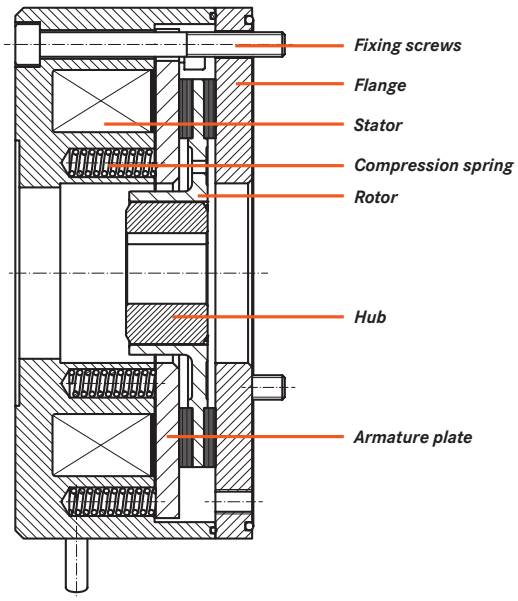
Low maintenance
- Long rotor/hub connection with low rate of wear and a tried-and-tested involute gear
- Asbestos-free fiction linings with low rate of wear

Reliable
- The certified ISO 9001 and ISO 14001 quality system provides the basis for consistently high-quality products
- Manufacture and testing to VDE 0580

Principle of operation

INTORQ BFK461 spring-applied brake

Brake module E + rotor + hub + flange

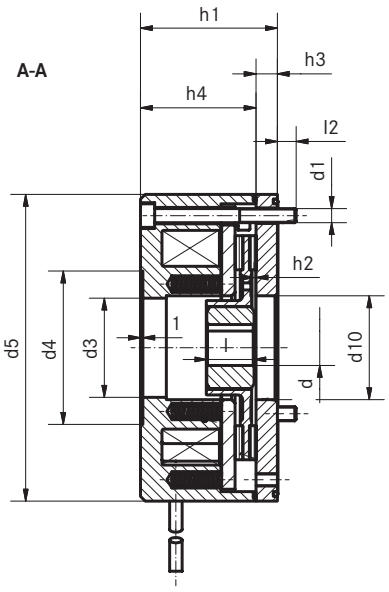


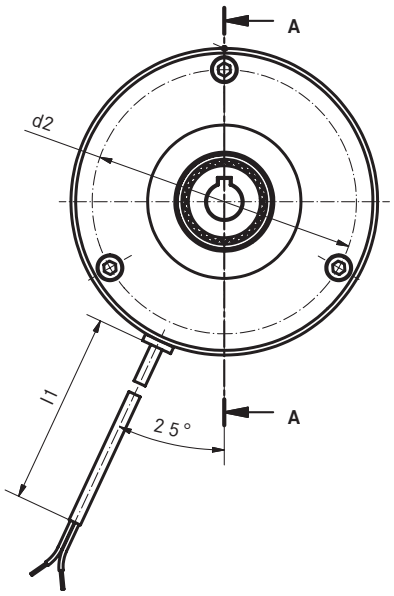
INTORQ BFK461 spring-applied brakes are single-disc brakes with two friction surfaces. When de-energised, several compression springs are used to generate the braking torque through friction locking. The brake is released electromagnetically. During braking, the compression springs use the armature plate to press the rotor (which can be shifted axially on the hub) against the counter friction face.
When the brakes are applied, an air gap s_{air} is present between the armature plate and the stator.
The stator's coil is energised with DC voltage in order to release the brake.
The resulting magnetic force works against the spring force to pull the armature plate towards the stator. This relieves the spring force on the rotor which can then rotate freely.

Technical data

BFK461, sealed design with rotor and flange

Dimensions





Size	M_k default	M_k max.	P_{20}	dH7 max.	d_1	d_2	d_3 H7	d_4	d_5	d_{10}	h_1	h_2	h_3	h_4	l	l_1	l_2	s_{air}
06	4	6	20	15	3 x M4	72	24	45	87	31	42	1	6	36	18	400	7	0.2
08	8	12	25	20	3 x M5	90	32	55	103	41.5	50	1.5	7	43	20	400	9	0.2
10	16	32	30	20	3 x M6	112	42	65	130	44	58	2	9	49	20	400	12	0.2
12	32	46	40	25	3 x M6	132	52	75	148	52.5	63.5	2	9	54.5	25	400	11.5	0.2
14	60	80	50	30	3 x M8	145	52	100	165	55	76	2	11	65	30	400	12	0.3
16	80	125	55	38 [1)]	3 x M8	170	52	100	200	70	83	2.25	11	72	30	600	15	0.3
18	150	235	85	45	6 x M8	196	62	115	221	77	94	2.75	11	83	35	600	14	0.4

- M_K: Rated torque of the brake in Nm at n = 100 rpm
- P_{20}: Coil power at 20 °C in W
- [1)] Standard keyway to DIN 6885/1-P9
- All dimensions in mm

Technical data

Rated data

Size	p [1] [20°C] [W]	s_{airmax} service brake [mm]	s_{airmax} holding brake [mm]	$J_{plastic\ rotor}$ [kgcm²]	$J_{alu\ rotor}$ [kgcm²]	Mass of stator Assembly [kg]
06	20	0.5	0.3	0.11	0.15	0.75
08	25	0.5	0.3	0.34	0.61	1.2
10	30	0.5	0.3	–	2.0	2.1
12	40	0.5	0.3	–	4.5	3.5
14	50	0.75	0.45	–	6.3	5.2
16	55	0.75	0.45	–	15	7.9
18	85	1.0	0.6	–	29	12

[1] Coil power at 20°C in W, possible deviation up to +10%, depending on supply voltage selected

Braking torques, depending on speed and permissible limit speeds

Size	Average braking torque when decelerating from Δn_0 to a standstill [%]	Braking torque at Δn_0 [rpm] 1,500 [%]	3,000 [%]	max. [%]	Max. speed Δn_{0max} [rpm]
06	100	87	80	65	12400
08	100	85	78	66	10100
10	100	83	76	66	8300
12	100	81	74	66	6700
14	100	80	73	67	6000
16	100	79	72	66	5300
18	100	77	70	66	4400

As speed increases, so does wear

Optional noise-reduced aluminium rotor

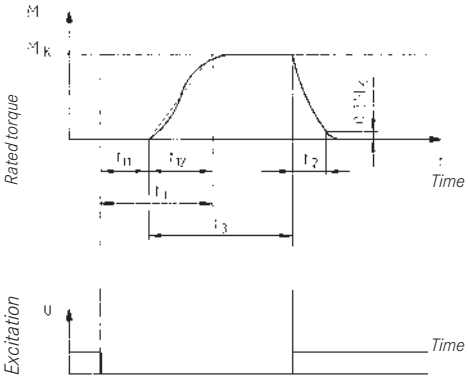
Rattling noises, which can occur in the rotor/hub connection, for example, during frequency inverter operation, or as a result of load alternation, or non-constant speeds, are reduced by using a rotor with a plastic sleeve.

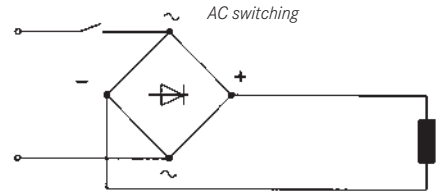
Technical data

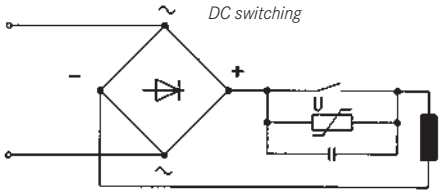
Operating times

The listed operating times are guide values which apply to DC switching with rated air gap s_{air}, warm coil and standard characteristic torque. The times shown are mean values. The engagement time t_1 is approximately 8 to 10 times longer for AC switching.

Torque time characteristic, dependent on excitation voltage







Explanations

t_1	[s]	Engagement time, $t_1 = t_{11} + t_{12}$
t_2	[s]	Disengagement time (time from the beginning of the torque drop until 0.1 M is reached$_K$)
t_3	[s]	Slipping time (time during which a relative movement occurs between drive and output with brake applied)
t_{11}	[s]	Delay time (time from disconnecting the voltage until the torque begins to rise)
t_{12}	[s]	Rise time of braking torque
Q_{perm}	[J]	Max. permissible friction energy per switching cycle
S_h	[h^{-1}]	Operating frequency, i.e. the number of periodical brake operations
S_{air}		Rated air gap

Size	Braking torque rated value at Δn = 100 rpm M_K [1]	Maximum permissible switching energy with single operating Q_E	Transition operating frequency frequency S_{air}	Operating times [ms] [2] at S_{airr} Engagement on DC side			Disengagement
	[Nm]	[J]	[h^{-1}]	[t_{11}]	[t_{12}]	[t_1]	[t_2]
06	4	3000	79	14	30	44	62
08	8	7500	50	39	27	66	61
10	16	12000	40	29	41	70	100
12	32	24000	30	40	38	78	150
14	60	30000	28	36	50	86	300
16	80	36000	27	30	45	75	330
18	150	60000	20	68	67	135	320

[1] Minimum braking torque for run-in friction pairs.
[2] Operating times valid for 205 V DC coils

Technical data

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Service life and wear

The friction energy to be withstood until s_{airmax} is reached is dependent on a number of factors: in particular, the inertias to be braked, the braking speed, the operating frequency and the resulting temperature on the friction surfaces. For this reason, no universal value for all operating conditions can be given in respect of the amount of friction energy that can be handled.

In addition, increased wear should be expected with vertical mounting.

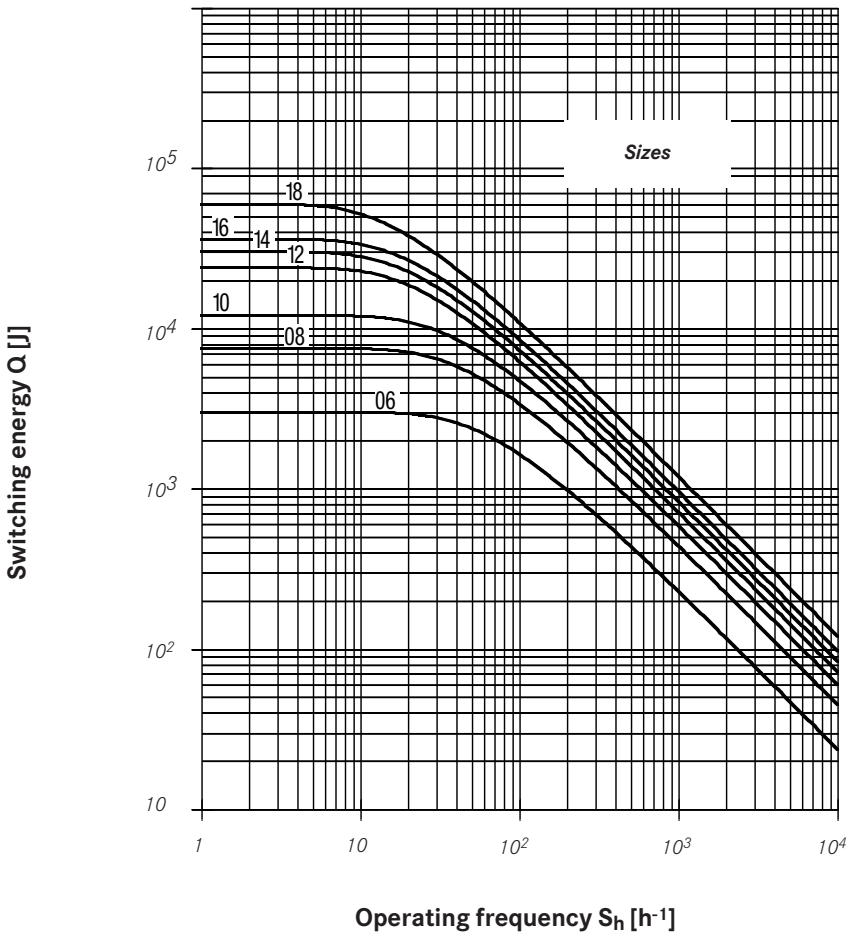
When the maximum permissible working air gap (s_{airmax}) is reached, the rotor must be replaced.

Where the amount of friction energy per switching operation is low, the brake's mechanical components can impose limitations in terms of service life. In particular, the rotor/hub connection, springs, armature plate and sleeves are subject to operational wear. The expected service life of the standard design is around 1 million load alternations. Solutions that are optimised in terms of service life are available in cases where a longer service life is required (consult the manufacturer).

Maintenance

Brakes are components which are subject to a great deal of wear. When installing the brake, it must be ensured that it can be easily accessed for inspection and maintenance purposes. Intervals between inspections should be set in accordance with the expected service life and load. For more information, please see the Operating Instructions.

Permissible friction energy Q_{perm} depending on operating frequency S_h



Available variants

INTORQ BFK461-☐☐☐
Complete stator

Size	☐ 06 ☐ 08 ☐ 10 ☐ 12 ☐ 14 ☐ 16 ☐ 18
Design	☐ With flange ☐ Without flange
Brake voltage	☐ 24 V ☐ 103 V ☐ 180 V ☐ 205 V
Braking torque	_____ Nm (see torque ratings)
Cable length	☐ Standard _____ mm (from 100 mm to 1000 mm in 100 mm steps, from 1000 mm to 2500 mm in 250 mm steps)

Accessories

Rotor	☐ Standard ☐ Noise-reduced (rotor with sleeve)
Hub	_____ mm (for bore diameter, see Dimensions)
Fixing screw set	☐ For mounting onto the flange ☐ For mounting on the motor
Sealing of the back wall of the housing	☐ Shaft sealing ring (shaft diameter on request) ☐ Cap

Electrical accessories

Bridge rectifier	☐ 4-pole without snap-in stud ☐ 4-pole with snap-in stud ☐ 6-pole vertical, integrated spark suppressor ☐ 6-pole horizontal, integrated spark suppressor
Half-wave rectifier	☐ 4-pole without snap-in stud ☐ 4-pole with snap-in stud ☐ 6-pole vertical, integrated spark suppressor ☐ 6-pole horizontal, integrated spark suppressor
Spark suppressor	☐

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