

INTORQ

setting the standard



Spring-applied brake BFK457

Compact and easily fitted

0.12 - 125 Nm

www.intorq.com

We set the standards

The INTORQ brand stands for reliable brake solutions with the highest product standards. INTORQ products are used in a very diverse range of applications, from brake motors and industrial trucks to hoists, cranes and wind turbines. We can create the right solution for you and your drive – individually and reliably.

The INTORQ module system offers numerous variants that can be used in many motors and geared motors, setting standards worldwide. We have been increasing our international presence step by step, establishing sites in Shanghai, Atlanta and Pune. So our network of sales and service staff is close at hand all over the world, ready to support you.



INTORQ at a glance

- Electromagnetic brakes and clutches
- Flexibility with standard options as well as customised solutions
- Centralised product development and production located in aerzen
- Fast response and delivery times globally thanks to production and warehousing in Shanghai, Atlanta and Pune.
- Over 50 million euros a year sales volume
- 800,000 units a year
- 13,000 square metres production area
- 250 employees
- Market leader with 63 sales partners in 49 countries



BFK457 – compact and easily fitted

Often, the brake is only required to perform its basic function. The BFK457 is ideal for these situations. The speed of fitting with integral fixing screws and fixed air gap make this spring-applied brake even more attractive.

Thanks to the quality standards which we apply to research and development, production and assembly, the INTORQ BFK457 spring-applied brakes meet the highest demands. These electromagnetically released spring-applied brakes can be used wherever rapid deceleration of moving masses or controlled holding of masses is required.

Since the braking force comes from pressure springs, the braking torque, which is generated by friction, is available when no current is applied – even in the event of a mains failure. The brake is released electromagnetically.

Applications

- General engineering
- Engine construction
- Vehicles for the disabled
- Automation technology
- Sport and recreation
- Rotary indexing technology
- Industrial trucks
- Hoists
- Materials handling technology
- Wood working machines



Materials handling technology



Industrial trucks



Hoists

Sizes and properties

Sizes 01/02/03/04/05

- Braking torques: 0.12–4 Nm
- Compact: Fully assembled with rotor and flange
- Can be mounted on both sides
- Hand release available as an option

Sizes 06/08/10/12/14/16

- Braking torques: 4–125 Nm
- Emergency Hand release
- Designs:
Compact: Fully assembled with rotor and flange
Basic: Stator complete with rotor
- Hand release available as an option

Properties for all sizes

- Standard voltages 24 V DC and 205 V DC (other voltages on request)
- Temperature class F (155°C)
- Compact design with flange – for small overall dimensions
- Easy assembly by means of integrated fixing screws
- No fixed bearing is required on the brake



Compact, sizes 01 and 02



Compact, sizes 03, 04, 05



Compact, sizes 06 – 16



Basic, sizes 06 – 16



Hand release available as an option



Noise-reduced as a double spring-applied brake <50dB(A)

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List of abbreviations

| | | | | | |
|-------------------------|---------------------|---|-------------------------|-------|---|
| P_N | [W] | Rated coil power at rated voltage and 20°C | S_{hue} | [1/h] | transitional operating frequency, thermal rating of the brake/clutch |
| U_N | [V DC] | Rated coil voltage | S_{hmax} | [1/h] | Maximum permissible operating frequency, depending on the friction work per operation |
| M_K | [Nm] | Rated torque of the brake at a relative speed of 100 r/min | SLN | [mm] | Rated air gap |
| M_{dyn} | [Nm] | dynamic brake torque, measured at constant speed of rotation | SHL | [mm] | Hand-release air gap, setting dimension of hand-release |
| M_L | [Nm] | Load torque, torque that the static load produces at the motor shaft | t₁ | [s] | Engagement time, the total of the reaction delay and torque rise time $t_1 = t_{11} + t_{12}$ |
| Δn₀ | [r/min] | Initial relative speed of the brake | t₂ | [s] | Disengagement time, time from switching the stator until the torque has reduced to 0.1 M _K |
| J_L | [kgm ²] | moment of inertia of the load, referred to referred to the output shaft (load shaft) | t₃ | [s] | Slipping time to standstill (after t ₁₁) |
| Q | [J] | Heat/energy | t₁₁ | [s] | Delay time when connecting, time from disconnecting the voltage until the torque begins to rise |
| Q_E | [J] | Maximum permissible friction work per switching cycle, thermal rating of the brake | t₁₂ | [s] | Rise time of braking torque, time from beginning of rise of torque until braking torque is reached |
| Q_{smax} | [J] | maximum permissible friction work during cyclic switching, depending on the operating frequency | | | |
| S_h | [1/h] | Operating frequency, the number of repeated operations per unit time | | | |

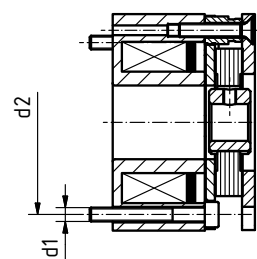
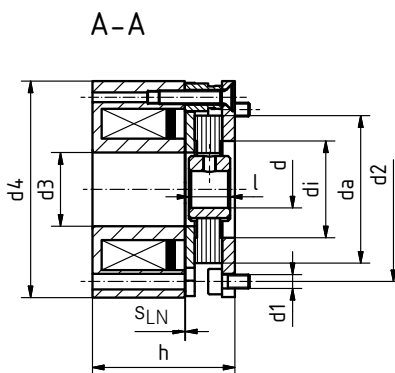
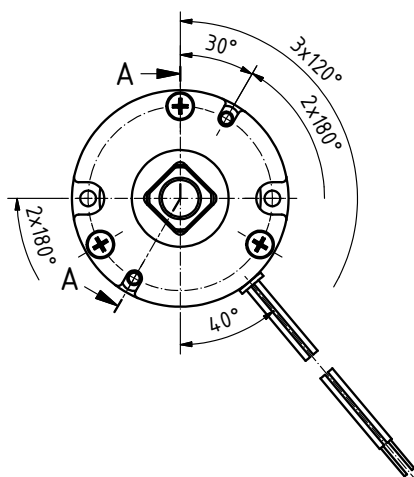
Spring-applied brake BFK457-01...05

Sizes 01 and 02

(Size 02 also available with hand release)

Mounted on flange

Mounted on stator



| Size | M _K [Nm] | M _{Kmax} [Nm] | P _N ⁽¹⁾ [W] | dH7 ⁽³⁾ | d1 | d2 | d3 | d4 | da | di | h | l | sLN ⁽⁵⁾ | sL max at M _K | sL max at M _{Kmax} | m [kg] |
|------|------------------------|---------------------------|--------------------------------------|--|--------|----|------|----|------|----|------|----|--------------------|--------------------------|-----------------------------|-----------|
| 01 | 0,12 | 0,24 | 5 | 5 ⁽²⁾ / 6 ⁽²⁾ | 2xM2,5 | 32 | 13,5 | 37 | 25 | 18 | 31,3 | 9 | 0,1+0,08/-0,05 | 0,35 | 0,23 | 0,2 |
| 02 | 0,25 | 0,5 | 6,6 | 6 ⁽²⁾ / 7 ⁽²⁾ / 8 ⁽²⁾ | 2xM3 | 40 | 16 | 47 | 32 | 21 | 31 | 12 | 0,1+0,08/-0,05 | 0,35 | 0,23 | 0,25 |
| 03 | 0,5 | 1,0 | 9 | 6/7/8/9/10 | 3xM3 | 48 | 19 | 56 | 38,5 | 30 | 31,8 | 15 | 0,15 ±0,1 | 0,4 | 0,3 | 0,4 |
| 04 | 1 | 2,0 | 11,5 | 6/7/8/9/10 | 3xM3 | 58 | 24 | 65 | 47,5 | 35 | 33,8 | 15 | 0,15 ±0,1 | 0,4 | 0,3 | 0,55 |
| 05 | 2 | 4,0 | 13 | 8/10/11/12/15 ⁽⁴⁾ | 3xM4 | 66 | 28 | 75 | 55 | 40 | 35,9 | 15 | 0,15 ±0,1 | 0,4 | 0,3 | 0,8 |

⁽¹⁾ Power of coil at 20°C in watt, aberration up to +10% according to the choosen connection voltage possible

⁽²⁾ Without keyway

⁽³⁾ Standard keyway in accordance with DIN 6885/1-P9

⁽⁴⁾ Ø 15mm, keyway in accordance with DIN 6885/3-P9

⁽⁵⁾ Minimum air gap, the actual value is determined by the sum tolerances of the individual components

M_K: Rated torque of the brake in Nm, based on Δn = 100 r/min

Caution: The braking torque depends on the speed

M_{Kmax}: Holding brake with emergency stop

Standard voltages: 24 V DC and 205 V DC, other voltages on request

Standard keyway according to DIN 6885/1-P9

Length of connecting cable: 400 mm

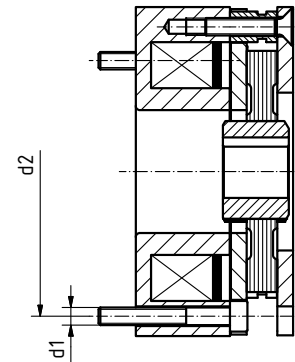
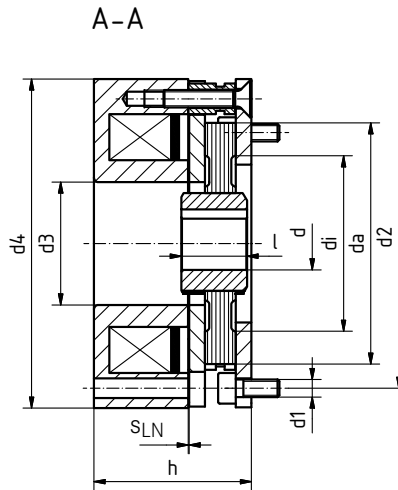
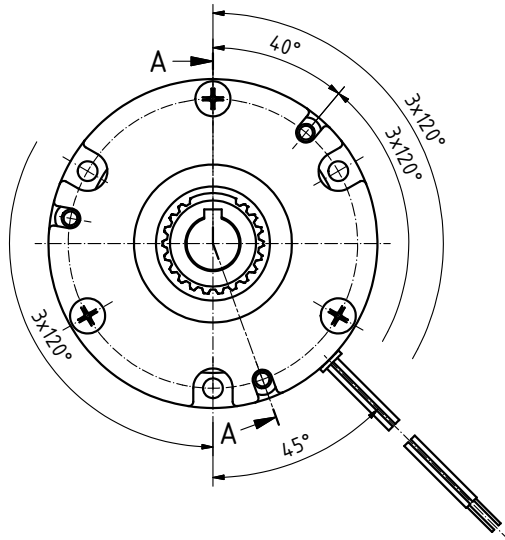
All dimensions in mm

Sizes 03 to 05

(also available with hand release)

Mounted on flange

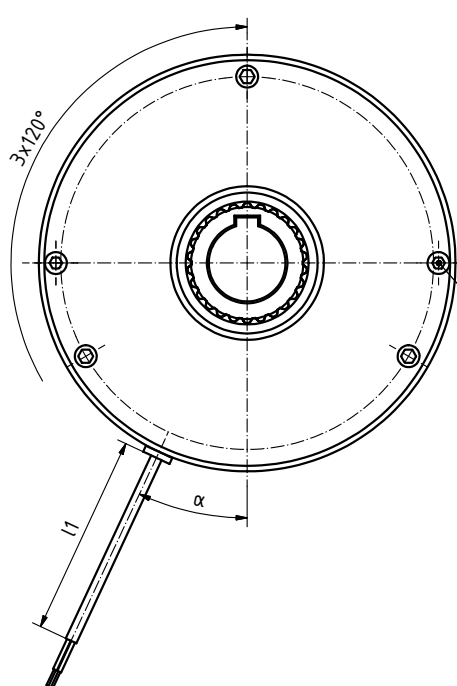
Mounted on stator



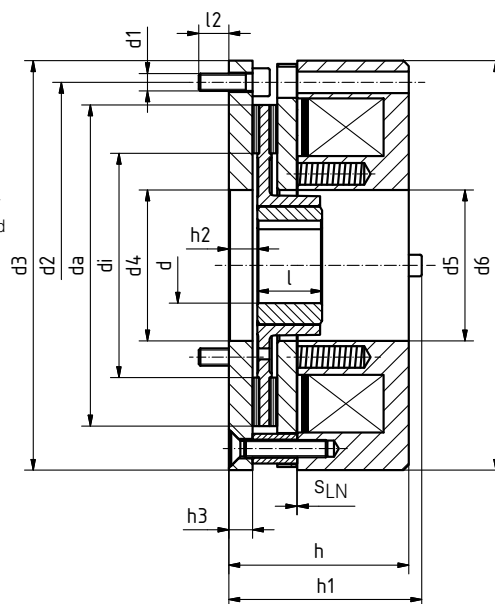
| Size | M_K [Nm] | Max. speed n_{max} [r/min] | Max. permissible friction work per switching cycle Q_E [J] | Transition operating frequency S_{hue} [1/h] | Operating times [ms] with standard rated torque and s_{LN} DC switching | | | | Moment of inertia of rotor [kgcm ²] |
|------|---------------|------------------------------------|---|---|---|----------|-------|------------------|---|
| | | | | | t_{11} | t_{12} | t_1 | Release t_2 | |
| 01 | 0.12 | 5000 | 200 | 160 | 2 | 9 | 11 | 17 | 0.00254 |
| 02 | 0.25 | 5000 | 400 | 125 | 3 | 5 | 8 | 17 | 0.01 |
| 03 | 0.5 | 5000 | 800 | 100 | 5 | 7.5 | 12.5 | 18 | 0.021 |
| 04 | 1 | 5000 | 1200 | 90 | 9 | 9 | 18 | 23 | 0.058 |
| 05 | 2 | 5000 | 1800 | 80 | 10 | 16 | 26 | 35 | 0.105 |

Spring-applied brake BFK457-06... 16

Compact design, fully assembled with rotor and flange



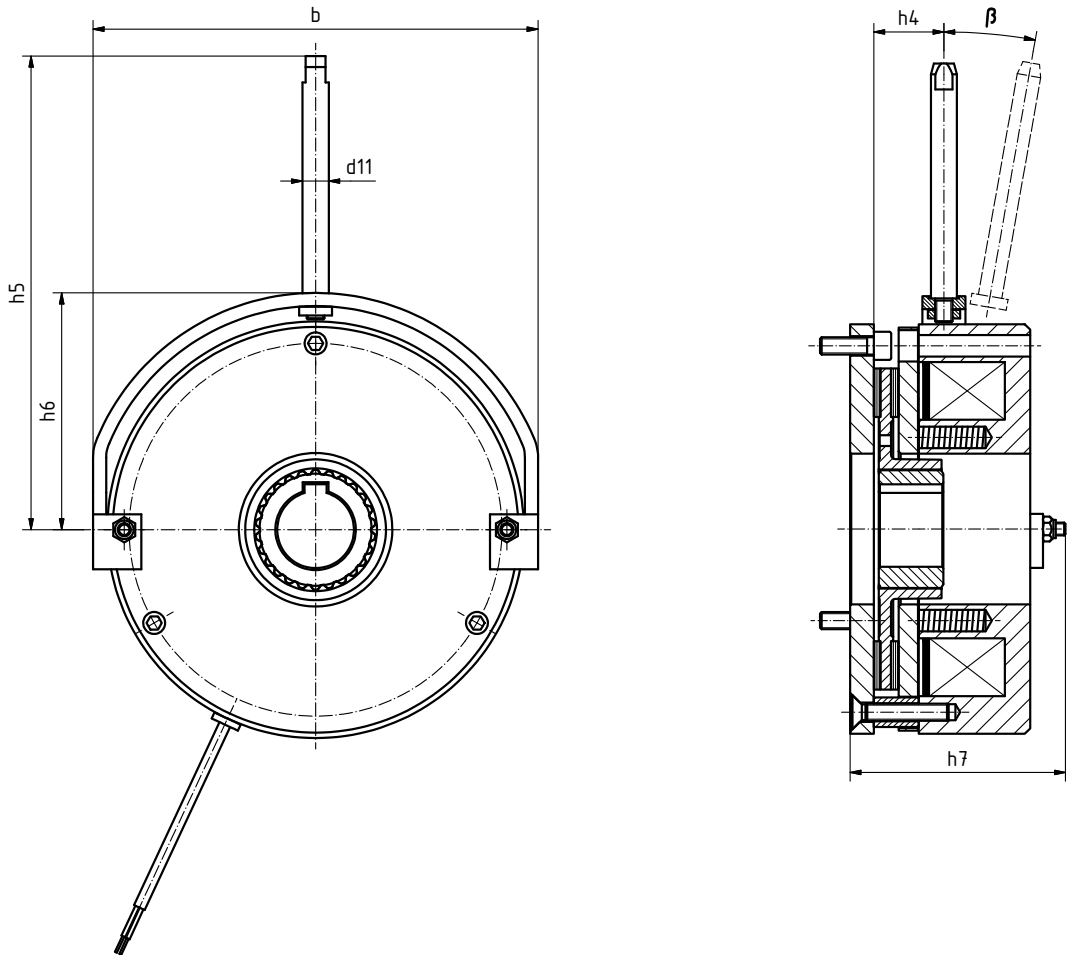
Cheese head screw for emergency manual release only, not to be used for normal braking operation (cheese head screw according to DIN EN ISO 4762; see d7)



| Size | M _K [Nm] | M _{Kmax} [Nm] | P _N ⁽¹⁾ [W] | b | dI7 spec. (2) | dH7 standard (3) | d1 | d2 | d3 | d4 | d5 | d6 | d7 | d11 | da | di |
|------|------------------------|---------------------------|--------------------------------------|-----|------------------|----------------------------|------|-----|-----|----|------|-----|-------|-----|-----|-----|
| 06 | 4 | 6 | 20 | 90 | 10 | 11/12/14/15 | 3xM4 | 72 | 84 | 31 | 31 | 84 | M4x30 | 8 | 60 | 40 |
| 08 | 8 | 12 | 25 | 108 | 10 | 11/12/14/15/20 | 3xM5 | 90 | 102 | 42 | 41.5 | 102 | M5x35 | 8 | 77 | 57 |
| 10 | 16 | 23 | 30 | 137 | 10 | 15/20 | 3xM6 | 112 | 130 | 44 | 44 | 130 | M5x40 | 10 | 95 | 66 |
| 12 | 32 | 46 | 40 | 157 | 14 | 20/25 | 3XM6 | 132 | 150 | 52 | 52 | 150 | M5x45 | 10 | 115 | 70 |
| 14 | 60 | 95 | 50 | 174 | 14 | 20/25/30 | 3XM8 | 145 | 165 | 55 | 60 | 165 | M6x55 | 12 | 124 | 80 |
| 16 | 80 | 125 | 55 | 203 | 15 | 25/30/35/38 ⁽⁴⁾ | 3xM8 | 170 | 190 | 70 | 70 | 190 | M6x60 | 12 | 149 | 104 |

| Size | M _K [Nm] | Max. speed n _{max} [r/min] | Max. permissible friction work per switching cycle Q _E [J] | Transition operating frequency S _{hue} [h ⁻¹] | Operating times [ms] with standard rated torque and S _{LN} Nenn DC switching | | | | Moment of inertia of rotor [kgcm ²] |
|------|------------------------|---|--|---|---|-----------------|----------------|---------------------------|---|
| | | | | | t ₁₁ | t ₁₂ | t ₁ | Release t ₂ | |
| 06 | 4 | 6000 | 3000 | 79 | 29 | 19 | 48 | 37 | 0.13 |
| 08 | 8 | 5000 | 7500 | 50 | 60 | 35 | 95 | 42 | 0.45 |
| 10 | 16 | 4000 | 12000 | 40 | 35 | 60 | 95 | 100 | 2.00 |
| 12 | 32 | 3600 | 24000 | 30 | 45 | 53 | 98 | 135 | 4.50 |
| 14 | 60 | 3600 | 30000 | 28 | 50 | 57 | 107 | 240 | 6.30 |
| 16 | 80 | 3600 | 36000 | 27 | 71 | 50 | 121 | 275 | 15.00 |

Compact design, with hand release



| Size | h | h1 | h2 | h3 | h4 | h5 | h6 | h7 | l | l1 | l2 ⁽⁵⁾ | s _{LN} ± 0.1 | s _{Lmax} at M _K | s _{Lmax} at M _{Kmax} | α | β | m [kg] |
|------|------|------|------|----|------|-----|-----|------|----|-----|-------------------|--------------------------|--|---|-----|-----|-----------|
| 06 | 41.3 | 45.3 | 7 | 6 | 15.8 | 107 | 49 | 49.7 | 18 | 400 | 6 | 0.2 | 0.6 | 0.4 | 25° | 10° | 1.1 |
| 08 | 49.8 | 54.8 | 8.5 | 7 | 16.3 | 118 | 59 | 57.1 | 20 | 400 | 9 | 0.2 | 0.6 | 0.45 | 25° | 10° | 1.9 |
| 10 | 56.4 | 61.5 | 10 | 8 | 27.4 | 142 | 74 | 65.2 | 20 | 400 | 12 | 0.3 | 0.7 | 0.5 | 25° | 10° | 3.8 |
| 12 | 62.4 | 67.4 | 10 | 8 | 29.4 | 162 | 84 | 71.2 | 25 | 400 | 12 | 0.3 | 0.8 | 0.5 | 25° | 10° | 5.7 |
| 14 | 77.3 | 83.3 | 13 | 11 | 33 | 201 | 94 | 89 | 30 | 400 | 14 | 0.3 | 0.8 | 0.5 | 25° | 10° | 8.6 |
| 16 | 83.5 | 89.5 | 13.3 | 11 | 37.5 | 250 | 108 | 99.9 | 30 | 600 | 14 | 0.3 | 0.9 | 0.6 | 25° | 10° | 12 |

(1) Power of coil at 20°C in watt, aberration up to +10% according to the chosen connection voltage possible

(2) Pilot bored without keyway

(3) Standard keyway in accordance with DIN 6885/1-P9

(4) Ø38mm, keyway in accordance with DIN 6885/3-P9

(5) Please contact the manufacturer if a different mounting surface made from steel is used

Standard voltages: 24 V DC and 205 V DC, other voltages on request

M_K: Rated torque of the brake in Nm, based on Δn = 100 rpm

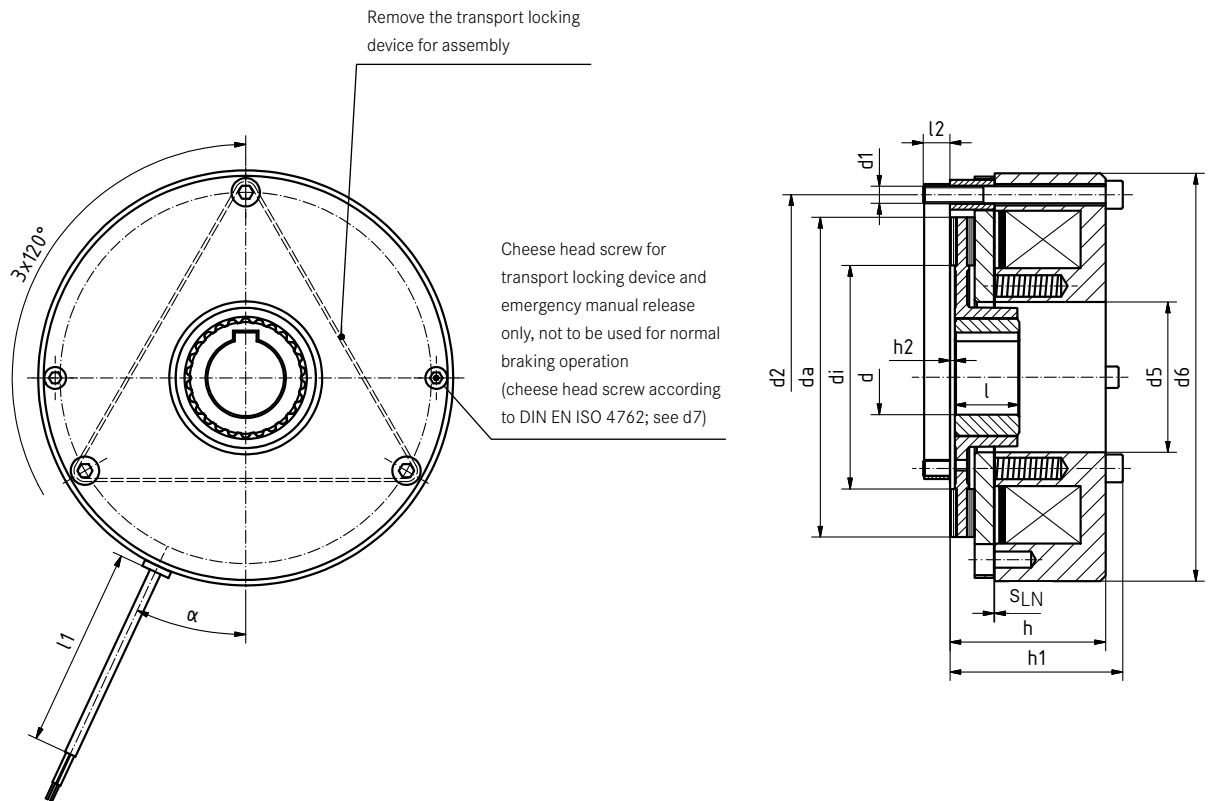
Caution!: The braking torque depends on the speed

M_{Kmax}: Holding brake with emergency stop

Dimensions in mm

Spring-applied brake BFK457-06...16

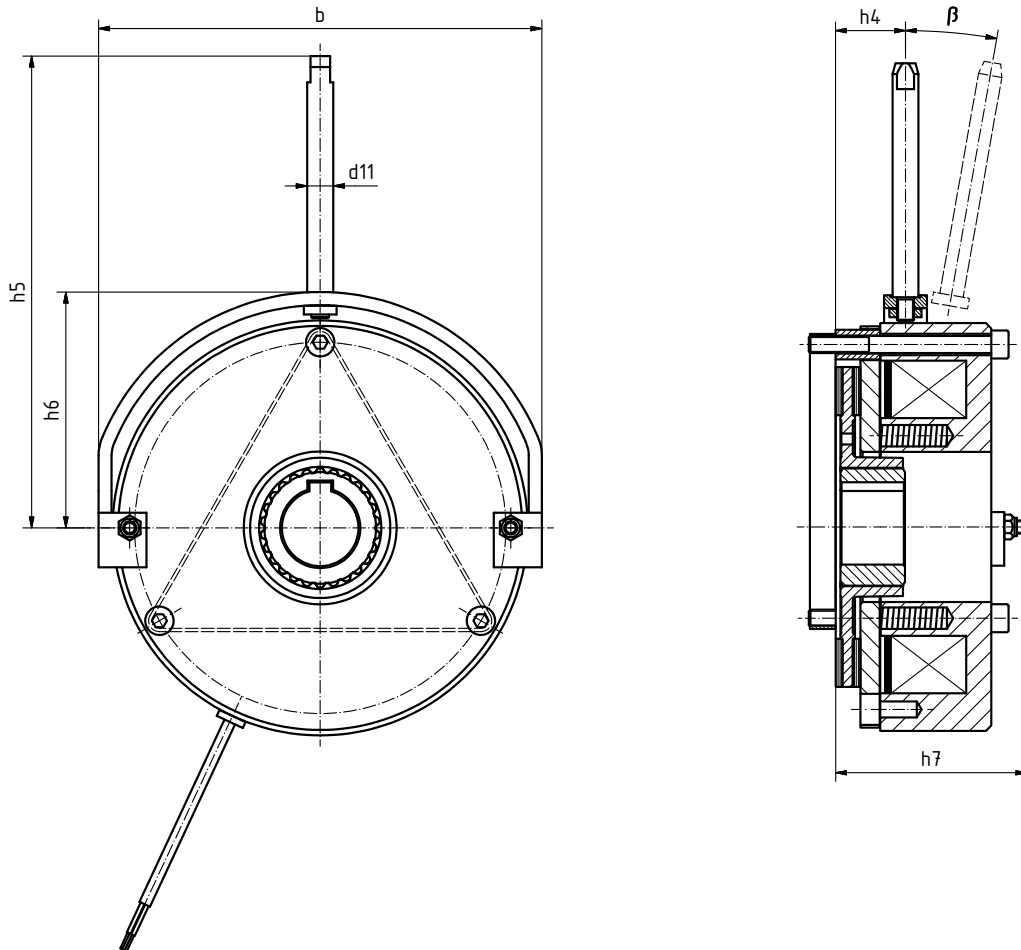
Basic design: Stator complete with rotor



| Size | M _K [Nm] | M _{Kmax} [Nm] | P _N ⁽¹⁾ [W] | b | dI7 spec. (2) | dH7 standard (3) | d1 | d2 | d5 | d6 | d7 | d11 | da | di |
|------|------------------------|---------------------------|--------------------------------------|-----|------------------|---------------------|------|-----|------|-----|-------|-----|-----|-----|
| 06 | 4 | 6 | 20 | 90 | 10 | 11/12/14/15 | 3xM4 | 72 | 31 | 84 | M4x30 | 8 | 60 | 40 |
| 08 | 8 | 12 | 25 | 108 | 10 | 11/12/14/15/20 | 3xM5 | 90 | 41.5 | 102 | M5x35 | 8 | 77 | 57 |
| 10 | 16 | 23 | 30 | 137 | 10 | 15/20 | 3xM6 | 112 | 44 | 130 | M5x40 | 10 | 95 | 66 |
| 12 | 32 | 46 | 40 | 157 | 14 | 20/25 | 3XM6 | 132 | 52 | 150 | M5x45 | 10 | 115 | 70 |
| 14 | 60 | 95 | 50 | 174 | 14 | 20/25/30 | 3XM8 | 145 | 60 | 165 | M6x55 | 12 | 124 | 80 |
| 16 | 80 | 125 | 55 | 203 | 15 | 25/30/35/38 (4) | 3xM8 | 170 | 70 | 190 | M6x60 | 12 | 149 | 104 |

| Size | M _K [Nm] | Max. speed n _{max} [r/min] | Max. permissible friction work per switching cycle Q _E [J] | Transition operating frequency S _{hue} [h ⁻¹] | Operating times [ms] with standard rated torque and S _{LN} Nenn DC switching | | | | Moment of inertia of rotor [kgcm ²] |
|------|------------------------|---|--|---|---|-----------------|----------------|---------------------------|---|
| | | | | | t ₁₁ | t ₁₂ | t ₁ | Release t ₂ | |
| 06 | 4 | 6000 | 3000 | 79 | 29 | 19 | 48 | 37 | 0.13 |
| 08 | 8 | 5000 | 7500 | 50 | 60 | 35 | 95 | 42 | 0.45 |
| 10 | 16 | 4000 | 12000 | 40 | 35 | 60 | 95 | 100 | 2.00 |
| 12 | 32 | 3600 | 24000 | 30 | 45 | 53 | 98 | 135 | 4.50 |
| 14 | 60 | 3600 | 30000 | 28 | 50 | 57 | 107 | 240 | 6.30 |
| 16 | 80 | 3600 | 36000 | 27 | 71 | 50 | 121 | 275 | 15.00 |

Basic design with hand release



| Size | h | h1 | h2 | h4 | h5 | h6 | h7 | l | l1 | I2 ⁽⁵⁾ ± 0.1 | sLN at M _K | sLmax at M _{Kmax} | sLmax | α | β [kg] | m |
|------|------|------|------|------|-----|-----|------|----|-----|----------------------------|--------------------------|-------------------------------|-------|-----|--------|-----|
| 06 | 35.3 | 39.3 | 1 | 15.8 | 107 | 49 | 43.7 | 18 | 400 | 9.7 | 0.2 | 0.6 | 0.4 | 25° | 10° | 0.9 |
| 08 | 42.8 | 47.8 | 1.5 | 16.3 | 118 | 59 | 50.1 | 20 | 400 | 12.2 | 0.2 | 0.6 | 0.45 | 25° | 10° | 1.5 |
| 10 | 48.4 | 54.5 | 2 | 27.4 | 142 | 74 | 57.2 | 20 | 400 | 11.5 | 0.3 | 0.7 | 0.5 | 25° | 10° | 3 |
| 12 | 54.4 | 60.4 | 2 | 29.4 | 162 | 84 | 63.2 | 25 | 400 | 11 | 0.3 | 0.8 | 0.5 | 25° | 10° | 4.7 |
| 14 | 66.3 | 74.3 | 2 | 33 | 201 | 94 | 78 | 30 | 400 | 14 | 0.3 | 0.8 | 0.5 | 25° | 10° | 7.1 |
| 16 | 72.5 | 80.5 | 2.25 | 37.5 | 250 | 108 | 88.9 | 30 | 600 | 12.5 | 0.3 | 0.9 | 0.6 | 25° | 10° | 10 |

(1) Power of coil at 20°C in watt, aberration up to +10% according to the chosen connection voltage possible

(2) Pilot bored without keyway

(3) Standard keyway in accordance with DIN 6885/1-P9

(4) Ø38mm, keyway in accordance with DIN 6885/3-P9

(5) Please contact the manufacturer if a different mounting surface made from steel is used

Standard voltages: 24 V DC and 205 V DC, other voltages on request

M_K: Rated torque of the brake in Nm, based on Δn = 100 rpm

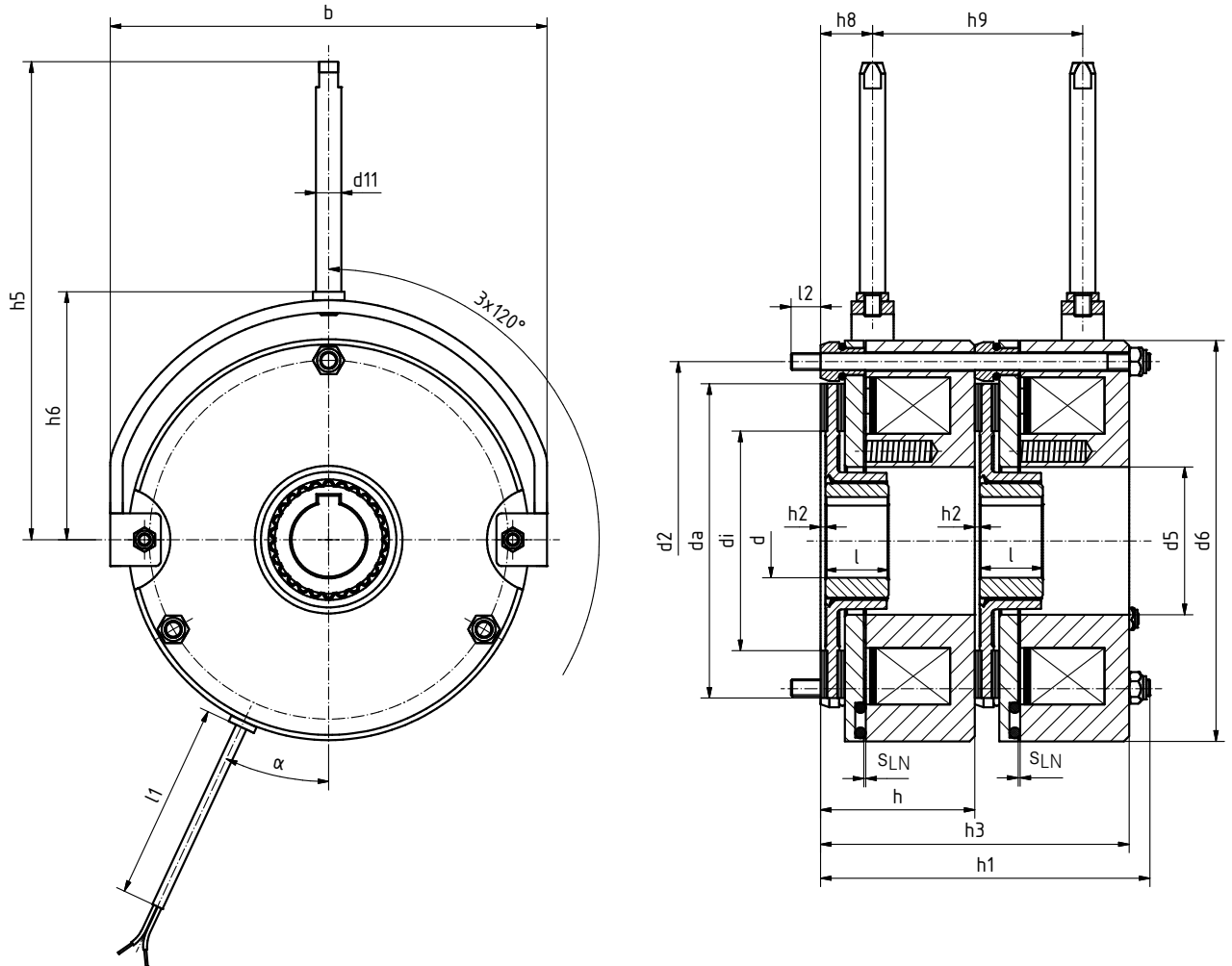
Caution!: The braking torque depends on the speed

M_{Kmax}: Holding brake with emergency stop

Dimensions in mm

Double spring-applied brake BFK457-06... 16

Low-noise design < 50 dbA



Features double spring-applied brake

- Basic design without flange
- Noise-reduced aluminium rotor
- Noise-reduced armature plate
- The brake is delivered in parts

| Size | M _K [Nm] | P _N ⁽¹⁾ [W] | b | dJ7 spec. (2) | dH7 standard (3) | d1 | d2 | d5 | d6 | d11 | da | di | h | h1 |
|------|---------------------|-----------------------------------|-----|---------------|------------------|------|-----|------|-----|-----|-----|-----|------|-------|
| 06 | 2x4 | 20 | 90 | 10 | 11/12/14/15 | 3xM4 | 72 | 31 | 84 | 8 | 60 | 40 | 35.3 | 75.5 |
| 08 | 2x8 | 25 | 108 | 10 | 11/12/14/15/20 | 3xM5 | 90 | 41.5 | 102 | 8 | 77 | 57 | 42.8 | 90.5 |
| 10 | 2x16 | 30 | 137 | 10 | 15/20 | 3xM6 | 112 | 44 | 130 | 10 | 95 | 66 | 48.4 | 102.9 |
| 12 | 2x32 | 40 | 157 | 14 | 20/25 | 3xM6 | 132 | 52 | 150 | 10 | 115 | 70 | 54.4 | 114,7 |
| 14 | 2x60 | 50 | 174 | 14 | 20/25/30 | 3xM8 | 145 | 60 | 165 | 12 | 124 | 80 | 66.3 | 140,5 |
| 16 | 2x80 | 55 | 203 | 15 | 25/30/35/38 (4) | 3xM8 | 170 | 70 | 190 | 12 | 149 | 104 | 72.5 | 153,1 |

(1) Power of coil at 20°C in watt, aberration up to +10% according to the chosen connection voltage possible
 (2) Pilot bored without keyway
 (3) Standard keyway in accordance with DIN 6885/1-P9
 (4) Ø38mm, keyway in accordance with DIN 6885/3-P9
 (5) Please contact the manufacturer if a different mounting surface made from steel is used
 Standard voltages: 24 V DC and 205 V DC, other voltages on request
 M_K: Rated torque of the brake in Nm, based on Δn = 100 rpm
 Caution!: The braking torque depends on the speed
 Dimensions in mm

General Information

INTORQ brakes are designed so that the stated rated torques are reliably attained after a short run-in operation.

Given the fluctuating properties of the organic friction linings used and changing environmental conditions, there may however be deviations from the stated braking torques. Appropriate safety factors in the design must take this into account.

An increased breakaway torque may in particular be experienced in damp conditions and with changing temperatures after long downtimes.

The braking torque should be checked when using the brake on the customer's friction surfaces. If the brake is being used solely as a holding brake without any dynamic load, the friction lining must be reactivated regularly.

| Size | h2 | h3 | h5 | h6 | h8 | h9 | l | l1 | l2 ⁽⁵⁾ | s _{LN} ± 0.1 | s _{Lmax at} M _K | α | m [kg] |
|------|------|-------|-------|-------|------|------|----|-----|-------------------|--------------------------|--|-----|-----------|
| 06 | 1 | 70.6 | 109 | 54 | 13 | 44 | 18 | 400 | 6 | 0.2 | 0.5 | 25° | 1.9 |
| 08 | 1.5 | 85.6 | 121.7 | 62 | 12.7 | 63.3 | 20 | 400 | 9 | 0.2 | 0.5 | 25° | 3.2 |
| 10 | 2 | 96.8 | 147 | 84 | 16 | 70 | 20 | 400 | 11 | 0.3 | 0.5 | 25° | 6.4 |
| 12 | 2 | 108.8 | 166 | 93 | 18.3 | 78.4 | 25 | 400 | 11 | 0.3 | 0.75 | 25° | 9.8 |
| 14 | 2 | 132.6 | 186 | 106 | 22 | 91.5 | 30 | 400 | 14 | 0.3 | 0.75 | 25° | 14.8 |
| 16 | 2.25 | 145 | 230 | 120.5 | 24.5 | 100 | 30 | 600 | 14 | 0.3 | 0.75 | 25° | 21.0 |

Model overview

Spring-applied brake BFK457

Size 01 02 03 04 05

Compact: Fully assembled with rotor and flange

06 08 10 12 14 16

Basic: Stator with rotor

Compact: Fully assembled with rotor and flange

Noise-reduced: Double spring-applied brake in low-noise design <50 dba

Spannung 24 V DC 205 V DC (other voltages on request)

Braking torque

| | 01 | 02 | 03 | 04 | 05 | 06 | 08 | 10 | 12 | 14 | 16 |
|--|------|------|-----|-----|-----|----|----|----|----|----|-----|
| | 0,12 | 0,25 | 0,5 | 1 | 2 | 4 | 8 | 16 | 32 | 60 | 80 |
| | 0,24 | 0,5 | 1,0 | 2,0 | 4,0 | 6 | 12 | 23 | 46 | 95 | 125 |

Hand release Assembled (except size 01)

Hub Bore diameter in mm (see technical data, tables)



Compact, sizes 01 and 02



Hand release available as an option



Noise-reduced as a double spring-applied brake <50dB(A)