

# KENDRION

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KENDRION SOLUTIONS

## High Torque Line

Permanent magnet brake –  
Highest power density  
through innovative design

PRECISION. SAFETY. MOTION.

# Our brakes – perfect for your safe application

KENDRION Industrial Brakes – stands for smart innovation and excellent service, which we consistently apply for the benefit of our customers:

## Strong know-how

Our specialists develop the leading-edge permanent magnet and spring-applied brakes. With INTORQ as a new member of KENDRION, we have once again consistently expanded our range of spring-applied brakes and clutches for you. This way, we can find the right solution for any of your requirements.



## Complete product portfolio

Electromagnetic brakes and clutches as well as perfectly matched accessories: with us you will find an exceptionally large selection of quickly available off-the-shelf products that can be put together in a modular system and the best expertise for customer-specific solutions.

## Dynamic innovative power

More than 50 specialists working in agile teams in our research and development worldwide are creating convincing product solutions for tomorrow.

## Excellent market knowledge

We are very familiar with our focus markets - thanks to extensive experience and research, but also thanks to long-term customer relationships built on partnership and eye-to-eye cooperation.

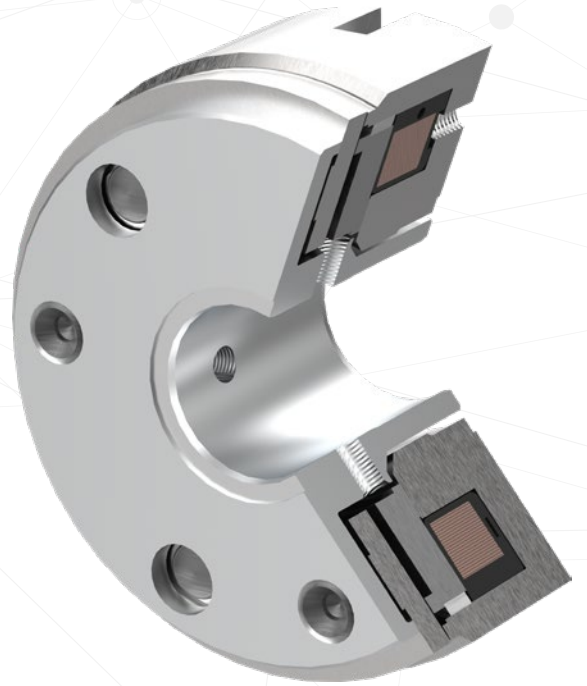
## International power

Committed and competent employees, production sites in Germany, America, India and China as well as a large number of certified sales partners all over the world make us a strong partner for you!

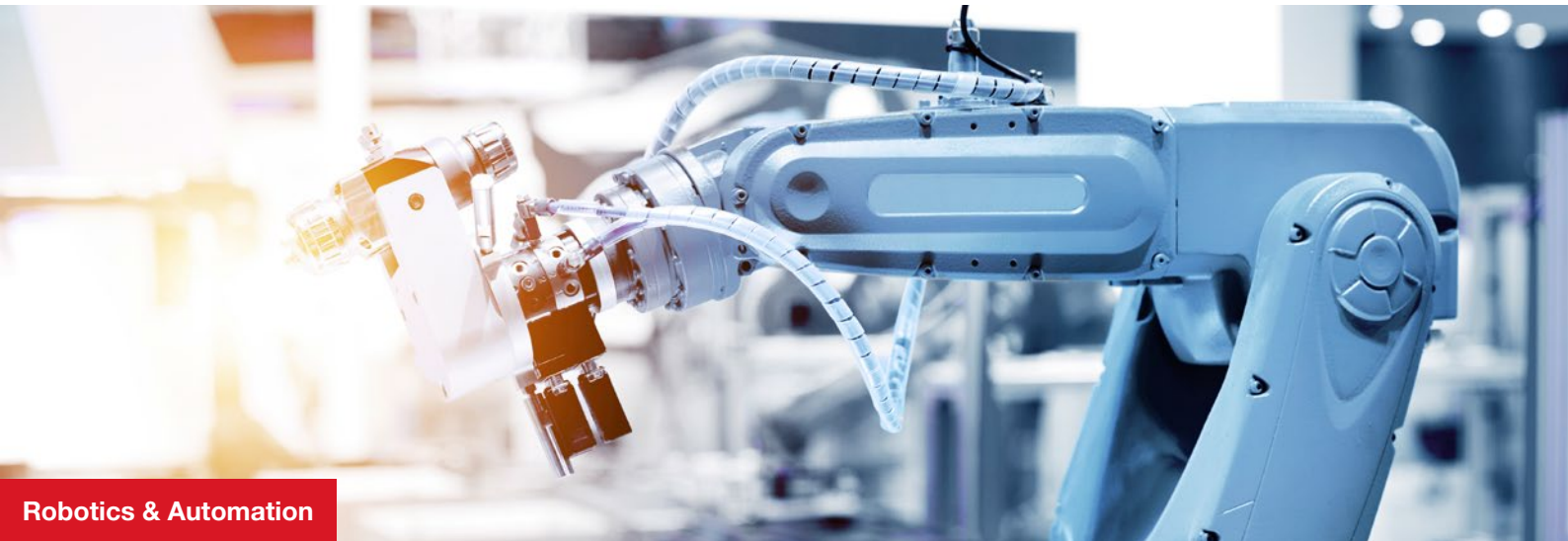
# The High Torque Line

## On the point

- Fail-safe permanent magnet brake
- Holding brake with emergency stop function
- In total 13 different sizes available
- Torque range from 0.1 Nm to 280 Nm
- Standard temperature range from  $-15^{\circ}\text{C}$  to  $+120^{\circ}\text{C}$



## Suitable for the use of:



Robotics & Automation

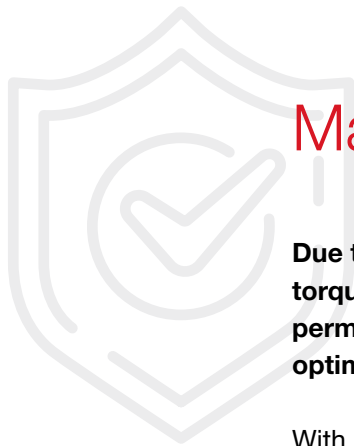
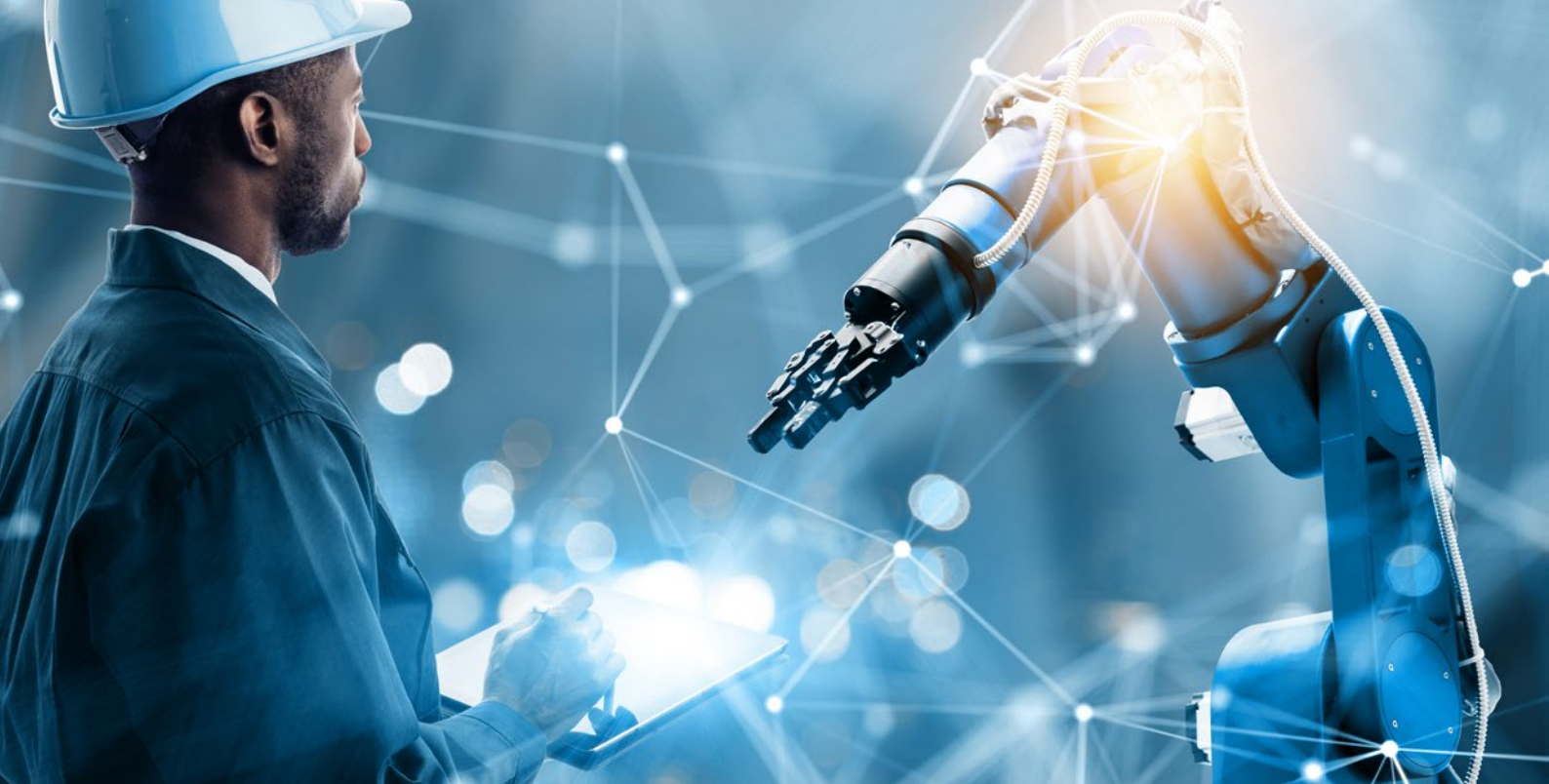


Wind Power



Medical Technology





## Massive power needed?

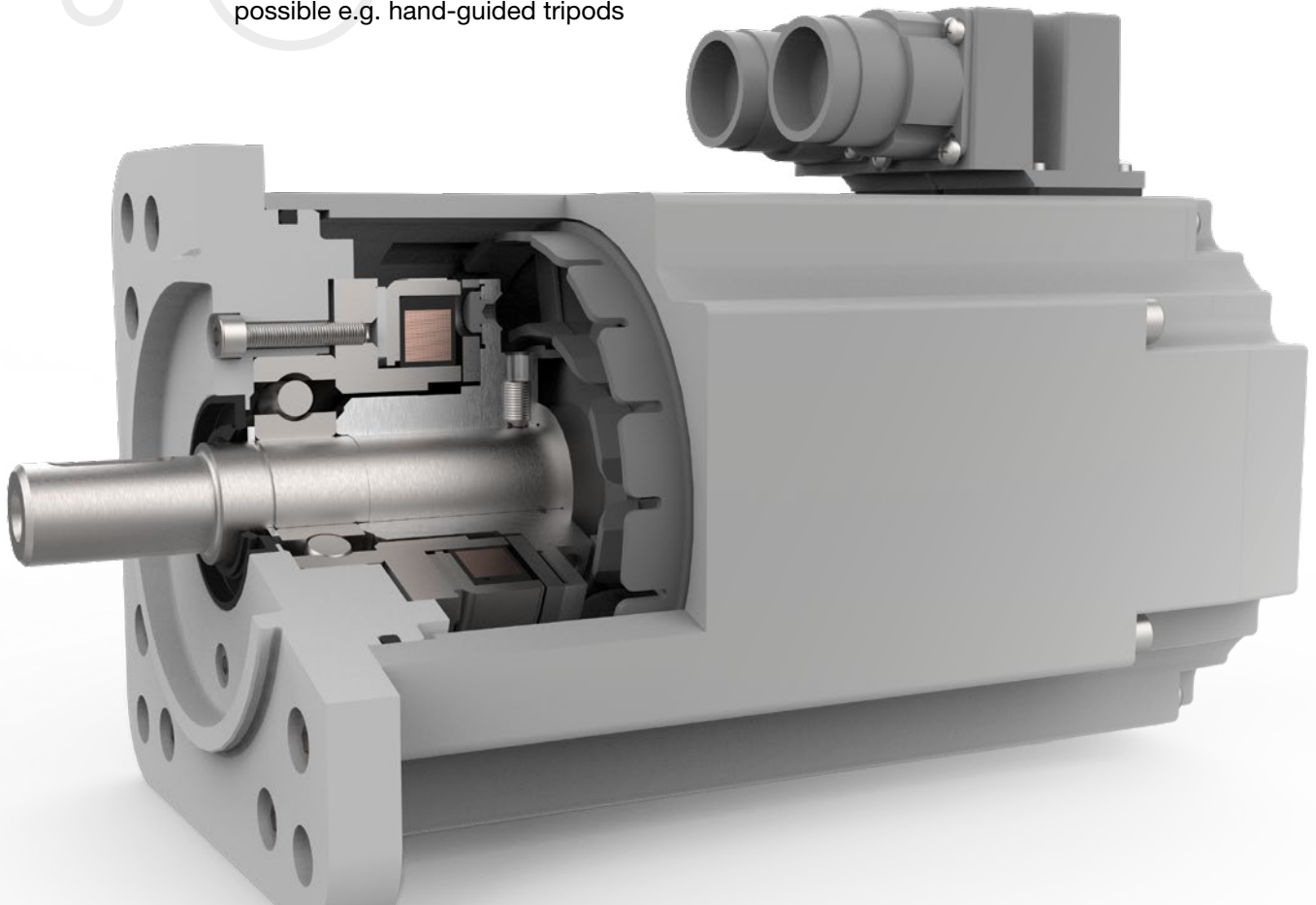
**Due to their high power density, wear- and residual torque-free operation and short switching cycles permanent magnet brakes are in most cases the optimum solution in robotics and machine building.**

With respect to voltage tolerances and operating temperatures, however, the conventional design of the permanent magnet brake may reach its limit.

Taking advantage of a completely new setup of the magnetic circuit these limits can be overcome by the High Torque Line. This patented setup optimizes the magnetic flow while the coil is energized, i.e. when the brake is opened, thus allowing an operation at up to  $-40^{\circ}\text{C}$ . Especially in case of highly demanding applications, e.g. in the safety area or with outdoor applications such as wind turbines, the brakes of the High Torque Line are the perfect choice.

## Ideal for integration into servomotors

- Designed for integrated installation in the motor
- A- and B-side mounting position on the fixed bearing possible
- Integration in non-motor applications possible e.g. hand-guided tripods



## Technical highlights

- Highest power density in small installation space
- High and more stable torque due to innovative magnetic circuit
- Extended lifetime up to 2,000 emergency stops
- Extended temperature range down to  $-40^{\circ}\text{C}$
- Torque transmission without backlash
- Residual torque-free opening regardless of mounting position
- Wear-free at dynamic changes of direction
- Brakes factory-sided grinded & torque tested

# Brake types

The High Torque Line was specially designed for integration in the servo motor and offers two brake versions as standard, the K00 and P00. We will be pleased to discuss your individual requirements and develop your specific solution.



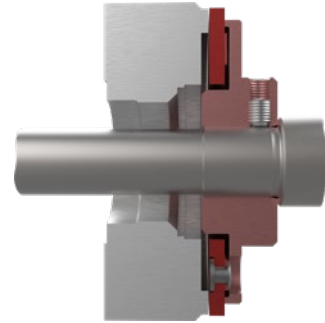
# Armature types

We have compiled a selection of our different armature systems for you. Apart from the standard armatures further types are available on request. The armature systems depend on the brake type and size.

## Standard

### Armature type 300 Manual air gap adjustment

- Short hub
- Fixing thread **outside** brake
- Air gap adjustment by feeler gauge

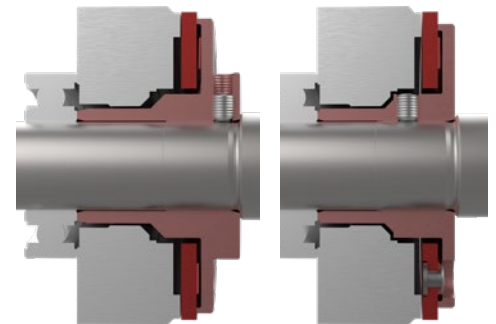


### Armature type 800 Automatic air gap adjustment

- Long hub with ball bearing contact
- Fixing thread **inside or outside** brake
- Automatic air gap adjustment by ball bearing

Type 800-A

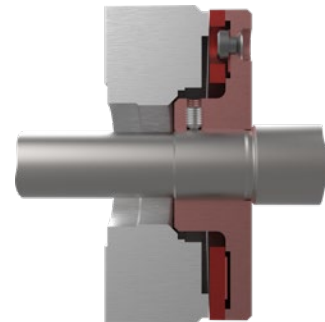
Type 800-B



## Available on request

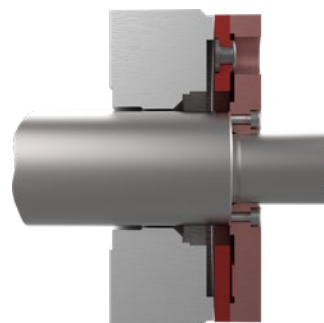
### Armature type 400 Manual air gap adjustment

- Short hub
- Fixing thread **inside** brake
- Air gap adjustment by component position



### Armature type 200 Without hub

- Hub in responsibility of customer
- Armature-hub interface acc. specification
- Air gap adjustment by customer



# Technical details

|                                 |   |
|---------------------------------|---|
| <b>Model Types</b>              | 86 611..K00 ; 86 611..P00   |
| <b>Operation mode</b>           | Holding brake<br>with emergency stop function   |
| <b>Standard nominal voltage</b> | 24 VDC (other variants on request)  |
| <b>Protection class</b>         | IP00  |
| <b>Thermal class</b>            | F (155°C)   |
| <b>Torque range</b>             | 0.1 to 280 Nm   |
| <b>Duty cycle</b>               | 100% ED   |
| <b>Nominal backlash</b>         | 0°  |
| <b>Ambient temperature</b>      | -15 to +120°C (standard)<br>-40 to +120°C (extended <sup>6)</sup> )   |
| <b>Note</b>                     | Please observe the general information<br>on data sheets and the corresponding<br>operating instructions.<br>Design is subject to change. |

| Brake size | Brake types | Min. transmittable torque <sup>1)</sup> | Nominal torque <sup>2)</sup> | Nominal power | Max. rotation speed <sup>3)</sup> | Max. emergency stop rotation speed | Max. switching energy per emergency stop (Z=1) | Number of emergency stops                        | Switching times             |              | Max. inertia Armature type 800 | Max. weight brake incl. Armature type 800 |
|------------|-------------|---|------------------------------|---------------|-----------------------------------|------------------------------------|--|--|-----------------------------|--------------|--------------------------------|---|
|            |             |   |                              |               |                                   |                                    |  |  | Coupling time <sup>4)</sup> | Opening time |                                |   |
|            |             | $M_s$ [Nm]                              | $M_{4N}$ [Nm]                | $P_N$ [W]     | $n_{max}$ [min <sup>-1</sup> ]    | $n$ [min <sup>-1</sup> ]           | $W_{max}$ [J]                                  | $Z_{ges}$  | $t_{c1}$ [ms]               | $t_o$ [ms]   | $J$ [kgcm <sup>2</sup> ]       | $m$ [kg]                                  |
| 02         | K00 –       | 0.1                                     | 0.15                         | 2.5           | 49000                             | 6000                               | 5  | 500 (standard)<br>2.000 <sup>6)</sup> (extended) | 12                          | 25           | 0.0018                         | 0.03                                      |
| 03         | K00 –       | 0.4                                     | 1                            | 6             | 10000                             | 3000                               | 10   |  | 13                          | 24           | 0.019                          | 0.1                                       |
| 04         | K00 P00     | 2.5                                     | 4                            | 9             | 10000                             | 3000                               | 30   |  | 20                          | 35           | 0.09                           | 0.25                                      |
| 05         | K00 P00     | 5                                       | 7                            | 12            | 10000                             | 3000                               | 150  |  | 25                          | 50           | 0.39                           | 0.4                                       |
| 06         | K00 P00     | 9                                       | 13                           | 15            | 10000                             | 3000                               | 300  |  | 25                          | 60           | 0.55                           | 0.65                                      |
| 07         | K00 P00     | 12                                      | 17                           | 16.5          | 10000                             | 3000                               | 600  |  | 25                          | 90           | 0.83                           | 0.72                                      |
| 08         | K00 P00     | 15                                      | 21                           | 18            | 10000                             | 3000                               | 900  |  | 29                          | 130          | 1.35                           | 1.15                                      |
| 09         | K00 P00     | 22                                      | 30                           | 19            | 10000                             | 3000                               | 600 <sup>5)</sup>                              |  | 40                          | 100          | 2.73                           | 1.2                                       |
| 10         | K00 P00     | 32                                      | 45                           | 22.5          | 10000                             | 3000                               | 1200   |  | 60                          | 200          | 4.1                            | 1.86                                      |
| 11         | K00 P00     | 60                                      | 85                           | 25            | 10000                             | 3000                               | 1200   |  | 50                          | 220          | 14.7                           | 3.1                                       |
| 14         | K00 P00     | 95                                      | 130                          | 36.5          | 10000                             | 3000                               | 1400   |  | 65                          | 280          | 27                             | 4.4                                       |
| 16         | K00 P00     | 140                                     | 200                          | 43            | 6000                              | 3000                               | 1400   |  | 60                          | 450          | 51                             | 7.3                                       |
| 21         | K00 P00     | 280                                     | 390                          | 41.8          | 6000                              | 3000                               | 2000   |  | 300                         | 350          | 200                            | 13.6                                      |

<sup>1)</sup> Minimum guaranteed static torque over lifetime in the specified ambient temperature range with ground-in brake

<sup>2)</sup> Expected average static torque over lifetime at room temperature with ground-in brake

<sup>3)</sup> Without emergency stop

<sup>4)</sup> Measured with parallel varistor (quick shutdown)

<sup>5)</sup> Short brake design with reduced switching energy level

<sup>6)</sup> Extended temperature range or increased number of emergency stops with reduced switching energy available on request



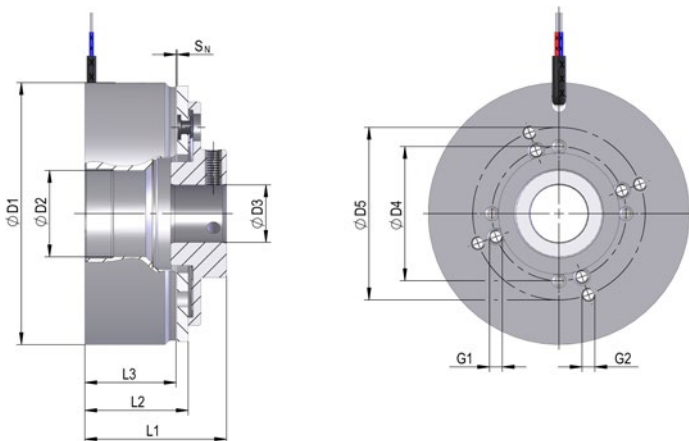
# Dimensions

| Brake size | Armature types |       | $\varnothing D_1$ [mm] | $\varnothing D_2$ [mm] | $\varnothing D_3$ <sup>2)</sup> [mm] |      | $\varnothing D_4$ [mm] | $\varnothing D_5$ [mm] | $G_1$ [mm] | $G_2$ [mm] | $L_1$ [mm] |       | $L_2$ [mm] | $L_3$ [mm] | $S_N$ <sup>1)</sup> [mm] |
|------------|----------------|-------|------------------------|------------------------|--------------------------------------|------|------------------------|------------------------|------------|------------|------------|-------|------------|------------|--------------------------|
|            | K00            | P00   |                        |                        | Min.                                 | Max. |                        |                        |            |            | P00        | K00   |            |            |                          |
| 02         | 300            | –     | 19.3                   | 5                      | 3                                    | 4    | –                      | 16.4                   | –          | 6 x M2     | –          | 28.1  | 24.9       | 20.9       | 0.1                      |
| 03         | 300            | –     | 32                     | 9.6                    | 4                                    | 8    | –                      | 27                     | –          | 3 x M3     | –          | 29.6  | 21.2       | 19         | 0.1                      |
| 04         | 300            | 800-A | 44                     | 14.9                   | 6                                    | 10   | 31                     | 35                     | 3 x M3     | 3 x M3     | 26.9       | 26.9  | 21.55      | 18.6       | 0.15                     |
| 05         | 300            | 800-A | 56                     | 23                     | 12                                   | 17.2 | 35                     | 42                     | 4 x M4     | 4 x M4     | 34.8       | 34.8  | 27         | 23.8       | 0.2                      |
| 06         | 300            | 800-A | 65                     | 23                     | 12                                   | 18   | 42                     | 48                     | 4 x M4     | 4 x M4     | 34.5       | 34.5  | 27         | 23.8       | 0.2                      |
| 07         | 300            | 800-A | 72                     | 25.9                   | 12                                   | 22   | 42                     | 54                     | 4 x M4     | 4 x M4     | 41.4       | 41.4  | 29.6       | 25.9       | 0.2                      |
| 08         | 300            | 800-B | 82                     | 27                     | 16                                   | 20.2 | 42                     | 54                     | 4 x M4     | 4 x M4     | 36.3       | 44.4  | 32.4       | 28.6       | 0.3                      |
| 09         | 300            | 800-B | 92                     | 32                     | 18                                   | 26.2 | 62                     | 72                     | 4 x M5     | 4 x M5     | 38         | 48    | 32         | 27.7       | 0.27                     |
| 10         | 300            | 800-A | 102                    | 44                     | 25.2                                 | 36   | 72                     | 83                     | 4 x M6     | 4 x M6     | 52         | 52    | 41.3       | 36.5       | 0.3                      |
| 11         | 300            | 800-B | 122                    | 48.5                   | 28                                   | 36   | 72                     | 83                     | 4 x M6     | 4 x M6     | 52.4       | 60.4  | 46.4       | 38         | 0.4                      |
| 14         | 300            | 800-B | 140                    | 56.5                   | 35                                   | 40.2 | 83                     | 97                     | 4 x M8     | 4 x M8     | 56.6       | 69.9  | 49.6       | 40.8       | 0.3                      |
| 16         | 300            | 800-A | 160                    | 63                     | 30                                   | 45.5 | 97                     | 120                    | 4 x M8     | 6 x M5     | 74.6       | 74.6  | 53.6       | 44.8       | 0.3                      |
| 21         | 300            | 800-B | 205                    | 91                     | 48                                   | 65.2 | 140                    | 167                    | 6 x M8     | 6 x M8     | 80.8       | 100.8 | 68.8       | 56.1       | 0.4                      |

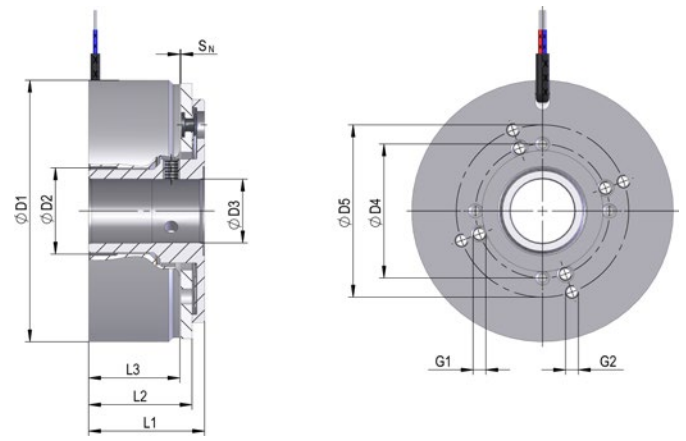
<sup>1)</sup> Min. nominal air gap

<sup>2)</sup> Keyway on request (acc. DIN 6885-1)

Brake type K00 | Armature 300



Brake type P00 | Armature 800



Not found the right brake?  
Talk to us!

# Order code

Our order code helps you to assemble the brake variant.  
It consist of brake size, brake type and version.



|                   |        |    |   |   |    |                                    |
|-------------------|--------|----|---|---|----|------------------------------------|
|                   | 86 611 | —  | — | — | —  | —                                  |
| <b>Brake size</b> |        | 02 |   |   |    |                                    |
|                   |        | 03 |   |   |    |                                    |
|                   |        | 04 |   |   |    |                                    |
|                   |        | 05 |   |   |    |                                    |
|                   |        | 06 |   |   |    |                                    |
|                   |        | 07 |   |   |    |                                    |
|                   |        | 08 |   |   |    |                                    |
|                   |        | 09 |   |   |    |                                    |
|                   |        | 10 |   |   |    |                                    |
|                   |        | 11 |   |   |    |                                    |
|                   |        | 14 |   |   |    |                                    |
|                   |        | 16 |   |   |    |                                    |
|                   |        | 21 |   |   |    |                                    |
| <b>Brake type</b> |        |    | K |   |    | Armature 300                       |
|                   |        |    | P |   |    | Armature 800                       |
| <b>Version</b>    |        |    |   |   | 00 | Standard series                    |
|                   |        |    |   |   | XY | Customer-specific types on request |
| <b>Example</b>    | 86 611 | 0  | 9 | P | 0  | 0                                  |

High Torque Line size 09, armature 800, standard series

# Customized solutions – tailored exactly to your needs

**Automation solutions have become an indispensable part of industry and everyday life. In this context, it is often the brakes that ensure safety: They hold loads and brake reliably in an emergency.**

Just as automation continues to evolve, brakes must also face higher demands - forward-looking products are in demand. At the same time, quality and safety must be unconditionally guaranteed. This is a challenge that Kendrion Industrial Brakes meets with passion and care.



When it comes to developing customer-specific solutions, we have three aces up our sleeves:

- With our **new agile organization**, we respond much faster to customer requests.
- Our **modularly developed products** enable new configurations without complete redevelopment.
- The **global structure of our organization** bundles competencies and ensures valuable knowledge transfer.

This makes us a competent and reliable partner for our customers – starting with industry-savvy consulting, through product development with practical experience, to uncompromising quality assurance.



We will find the  
solution that suits  
you best!



**KENDRION**

**Kendrion (Villingen) GmbH**

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