

# S M M

**SERVO MOTORS**

[www.regal.dk](http://www.regal.dk)

MADE  
IN  
GERMANY



# Modular drive system: **KEB Servo** motor

KEB **Servo** motor describes the actual program of the closed-loop synchronous motors with special suitability for all dynamic drive tasks.

Efficient drive systems result in combination with the servo inverter series **KEB COMBIVERT F5** which can be optimally preset by web-based system configuration.

Complete solutions for different requirements in machine and plant engineering result in addition with the proper encoder system for the application, optional **KEB** holding brake and a mechanical adaption of torque/speed characteristic by different gear boxes.

Pre-assembled cables form ready for connection systems and are the base for a simple installation, fast start-up and trouble-free operation.

|                                     |    |
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## Synchronous motors

are ideal drives for dynamic movements and offer in comparison to robust asynchronous drives significant lower mass inertia and high pulse torque.

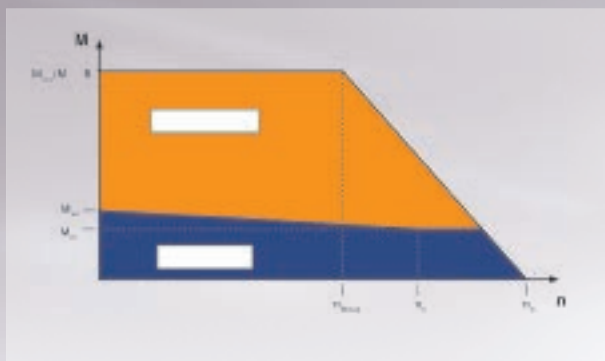
Equipped with resolver or high-resolution SinCos encoders inclusive absolute information and electronic type plate, two series are available with up to 500% overload for all systems of rotating applications.

Synchronous motors offer a great energy optimization in machines and systems with efficiencies clearly above 95%.

### DYNAMIC LINE I 0,2... 70 Nm

the approved series for general mechanical engineering

- ribbed surface with high thermal reserves
- lateral connections for encoder system and power



### DYNAMIC LINE II 0,5... 50 Nm

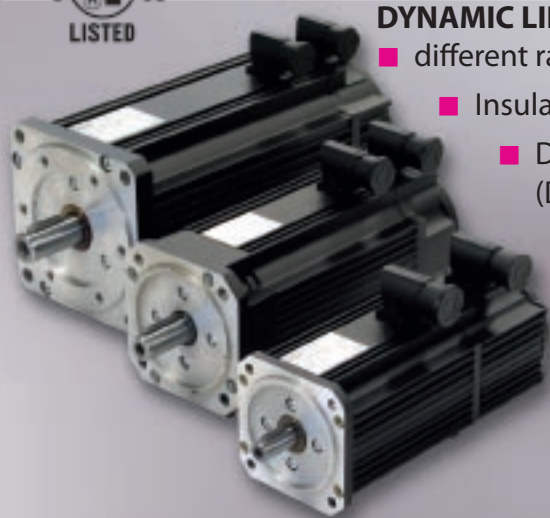
by latest manufacturing technology increased component packaging density for special compact requirements in robotics, handling, bearing technology ...

- smooth housing surface
- parallel power and encoder connections



# DYNAMIC LINE I - Synchronous servo motors SM.0

Servo motors of the series **SM.0** are permanent-field, electronic commutated synchronous motors for applications with highest requirements at simultaneously small unit volume and weight. 6-pole motors with NdFeB permanent magnets and three-phase winding for sine commutation captivate through impressed dynamics and a compact design.



**DYNAMIC LINE I** - motors are available with

- different rated speed
- Insulation class F
- Degree of protection IP65 (DIN EN 60034-5)
- Resolver or
- high-resolution Hiperface- / Endat- / SSI encoder

Rotating connection socket for power and feedback are general standards.



55 mm



70 mm



92 mm



110 mm



140 mm



190 mm

| Motor size | M <sub>N</sub> [Nm] |
|------------|---------------------|
| A1.SM      | 0.32                |
| A2.SM      | 0.48                |
| A3.SM      | 0.6                 |
| A4.SM      | 0.8                 |
| B1.SM      | 0.6                 |
| B2.SM      | 0.5                 |
| B3.SM      | 1.3                 |
| B3.SM      | 1.0                 |
| B3.SM      | 2.0                 |
| B3.SM      | 1.5                 |
| C1.SM      | 0.8                 |
| C1.SM      | 0.75                |
| C1.SM      | 0.7                 |
| C2.SM      | 2.4                 |
| C2.SM      | 2.2                 |
| C2.SM      | 2.0                 |
| C3.SM      | 3.9                 |
| C3.SM      | 3.5                 |
| C3.SM      | 2.8                 |
| C4.SM      | 5.0                 |
| C4.SM      | 4.5                 |
| C4.SM      | 3.0                 |
| D1.SM      | 3.7/5.5             |
| D1.SM      | 3.5/5.1             |
| D1.SM      | 3.0/4.2             |
| D2.SM      | 6.1/8.7             |
| D2.SM      | 5.8/8.4             |
| D2.SM      | 3.8/7.5             |
| D3.SM      | 8.4/12.2            |
| D3.SM      | 7.6/12.0            |
| D3.SM      | 5.0/10.5            |
| D4.SM      | 9.9/15.6            |
| D4.SM      | 8.6/15.5            |
| E1.SM      | 7.0/11.2            |
| E1.SM      | 6.5/10.3            |
| E1.SM      | 5.2/9.3             |
| E2.SM      | 12.2/18.7           |
| E2.SM      | 11.0/17.1           |
| E2.SM      | 7.6/15.5            |
| E3.SM      | 16.5/26.0           |
| E3.SM      | 14.6/23.8           |
| E3.SM      | 8.7/21.6            |
| E4.SM      | 21.4/33.0           |
| E4.SM      | 15.5/31.6           |
| F1.SM      | 22.5/35.4           |
| F1.SM      | 21.5/35.0           |
| F1.SM      | 20.0/31.7           |
| F1.SM      | 16.0/28.0           |
| F2.SM      | 42.0/64.0           |
| F2.SM      | 38.0/63.0           |
| F2.SM      | 31.0/58.2           |
| F3.SM      | 61.0/92.8           |
| F3.SM      | 52.0/90.0           |
| F3.SM      | 33.0/85.0           |

## Properties

- thermal winding protection with PTC thermistor 140°C
- Shaft end with keyway
- Vibration severity grade B according to EN 60034-14
- Half-key balancing according to DIN ISO 8821 with keyway
- Flange accuracy of the grade N according to DIN 42955
- Radial groove ball bearing with high temperature resistant special grease and lifetime lubrication
- Rating designed for operating mode S1
- Ambient temperature range of -20 to +40°C
- site altitude 1000m above sea level no derating

## Options

- **KEB** holding brake
- Built-on gearbox
- Special shaft
- External ventilation

| M <sub>0</sub><br>[Nm] | M <sub>max</sub><br>[Nm] | n <sub>N</sub><br>[rpm] | n <sub>max</sub><br>[rpm] | J <sub>L</sub><br>[kgcm <sup>2</sup> ] | 400 V                      |                            |                              |                                   | 230 V                      |                            |                              |                                   |
|------------------------|--------------------------|-------------------------|---------------------------|--|----------------------------|----------------------------|------------------------------|-----------------------------------|----------------------------|----------------------------|------------------------------|-----------------------------------|
|                        |                          |                         |                           |  | I <sub>N/400V</sub><br>[A] | I <sub>0/400V</sub><br>[A] | I <sub>max/400V</sub><br>[A] | ** recommended<br>controller size | I <sub>N/200V</sub><br>[A] | I <sub>0/200V</sub><br>[A] | I <sub>max/200V</sub><br>[A] | ** recommended<br>controller size |
| 0.34                   | 1.7                      | 6,000                   | 9,000                     | 0.17                                   | 0.8                        | 0.85                       | 5.0                          | 07.                               | 1.0                        | 1.2                        | 7.1                          | 05.                               |
| 0.5                    | 2.5                      | 6,000                   | 9,000                     | 0.24                                   | 0.9                        | 1.0                        | 6.0                          | 07.                               | 1.5                        | 1.5                        | 9.0                          | 05.                               |
| 0.65                   | 3.2                      | 6,000                   | 9,000                     | 0.31                                   | 1.1                        | 1.2                        | 6.5                          | 07.                               | 2.0                        | 2.0                        | 10.8                         | 07.                               |
| 1.0                    | 5.0                      | 6,000                   | 9,000                     | 0.45                                   | 1.4                        | 1.6                        | 8.5                          | 07.                               | 2.9                        | 3.2                        | 17.0                         | 07.                               |
| 0.65                   | 3.1                      | 4,000                   | 9,000                     | 0.22                                   | 0.9                        | 0.9                        | 5.4                          | 07.                               | 2.0                        | 1.9                        | 11.4                         | 07.                               |
|                        | 3.1                      | 6,000                   | 9,000                     | 0.22                                   | 1.2                        | 1.3                        | 7.8                          | 07.                               | 2.5                        | 2.6                        | 15.6                         | 07.                               |
| 1.5                    | 7.2                      | 4,000                   | 9,000                     | 0.36                                   | 1.4                        | 1.6                        | 9.6                          | 07.                               | 2.9                        | 3.2                        | 19.2                         | 07.                               |
|                        | 7.2                      | 6,000                   | 9,000                     | 0.36                                   | 2.1                        | 2.4                        | 14.4                         | 09.                               | 4.4                        | 5.0                        | 30.0                         | 09.                               |
| 2.3                    | 11.0                     | 4,000                   | 9,000                     | 0.57                                   | 2.0                        | 2.4                        | 14.4                         | 07.                               | 4.7                        | 5.5                        | 33.0                         | 10.                               |
|                        | 11.0                     | 6,000                   | 9,000                     | 0.57                                   | 3.0                        | 3.5                        | 21.0                         | 09.                               | 6.6                        | 7.7                        | 46.2                         | 12.                               |
| 0.95                   | 4.3                      | 3,000                   | 6,000                     | 1.2                                    | 0.75                       | 0.8                        | 4.0                          | 07.                               | 1.4                        | 1.5                        | 7.5                          | 05.                               |
|                        |                          | 4,000                   | 6,000                     | 1.2                                    | 0.9                        | 1.1                        | 5.4                          | 07.                               | 1.8                        | 2.0                        | 10.0                         | 05.                               |
|                        |                          | 6,000                   | 6,000                     | 1.2                                    | 1.3                        | 1.6                        | 8.0                          | 07.                               | 2.4                        | 3.0                        | 15.0                         | 07.                               |
| 2.7                    | 12.2                     | 3,000                   | 6,000                     | 2.7                                    | 1.8                        | 1.9                        | 9.4                          | 07.                               | 3.0                        | 3.2                        | 16.0                         | 07.                               |
|                        |                          | 4,000                   | 6,000                     | 2.7                                    | 2.1                        | 2.5                        | 12.4                         | 09.                               | 3.6                        | 4.3                        | 21.5                         | 09.                               |
|                        |                          | 6,000                   | 6,000                     | 2.7                                    | 3.0                        | 3.7                        | 18.5                         | 09.                               | 5.3                        | 6.5                        | 32.5                         | 10.                               |
| 4.5                    | 20.3                     | 3,000                   | 6,000                     | 4.2                                    | 2.7                        | 2.9                        | 14.5                         | 09.                               | 4.6                        | 5.1                        | 25.5                         | 09.                               |
|                        |                          | 4,000                   | 6,000                     | 4.2                                    | 3.1                        | 3.8                        | 19.0                         | 09.                               | 5.5                        | 6.7                        | 33.4                         | 10.                               |
|                        |                          | 6,000                   | 6,000                     | 4.2                                    | 3.8                        | 5.6                        | 27.9                         | 10.                               | 6.7                        | 9.9                        | 49.5                         | 10.                               |
| 6.0                    | 27.0                     | 3,000                   | 6,000                     | 5.4                                    | 3.7                        | 4.2                        | 21.0                         | 10.                               | 6.3                        | 7.1                        | 35.5                         | 10.                               |
|                        |                          | 4,000                   | 6,000                     | 5.4                                    | 4.4                        | 5.5                        | 27.5                         | 12.                               | 7.3                        | 9.1                        | 45.5                         | 12.                               |
|                        |                          | 6,000                   | 6,000                     | 5.4                                    | 4.5                        | 7.8                        | 39.0                         | 12.                               | 7.9                        | 13.7                       | 68.4                         | 12.                               |
| 4.2/6.2                | 18.9                     | 3,000                   | 6,000                     | 4.8                                    | 2.8/4.2                    | 3.0/4.1                    | 14.4                         | 09./12.                           | 4.9/-                      | 5.3/-                      | 25.4/-                       | 09.                               |
|                        |                          | 4,000                   | 6,000                     | 4.8                                    | 3.5/5.0                    | 4.0/5.4                    | 19.2                         | 10./12.                           | 6.1/-                      | 7.0/-                      | 33.6/-                       | 10.                               |
|                        |                          | 6,000                   | 6,000                     | 4.8                                    | 4.8/6.7                    | 6.0/8.1                    | 28.8                         | 12./13.                           | 8.2/-                      | 10.2/-                     | 48.9/-                       | 12.                               |
| 7.0/10.5               | 31.5                     | 3,000                   | 6,000                     | 7.4                                    | 4.5/6.4                    | 4.8/6.8                    | 23.0                         | 12./13.                           | 8.1/-                      | 8.5/-                      | 40.8/-                       | 12.                               |
|                        |                          | 4,000                   | 6,000                     | 7.4                                    | 5.8/8.4                    | 6.4/9.2                    | 30.7                         | 12./14.                           | 10.5/-                     | 11.6/-                     | 55.7/-                       | 12.                               |
|                        |                          | 6,000                   | 6,000                     | 7.4                                    | 5.9/11.7                   | 9.9/14.2                   | 47.5                         | 13./15.                           | 9.6/-                      | 16.0/-                     | 76.8/-                       | 12.                               |
| 10.0/14.5              | 45.0                     | 3,000                   | 6,000                     | 9.8                                    | 6.3/9.2                    | 7.2/10.4                   | 34.5                         | 12./14.                           | 10.9/-                     | 12.4/-                     | 59.5/-                       | 12.                               |
|                        |                          | 4,000                   | 6,000                     | 9.8                                    | 7.7/12.2                   | 9.7/14.1                   | 46.5                         | 13./15.                           | 13.5/-                     | 17.0/-                     | 81.6/-                       | 13.                               |
|                        |                          | 6,000                   | 6,000                     | 9.8                                    | 7.6/16.0                   | 13.6/19.7                  | 65.3                         | 14./16.                           | 12.7/-                     | 22.6/-                     | 108.0/-                      | 13.                               |
| 12/18.0                | 54.0                     | 3,000                   | 6,000                     | 12.7                                   | 7.3/11.5                   | 8.5/12.3                   | 40.8                         | 13./15.                           | 12.2/-                     | 14.2/-                     | 68.1/-                       | 13.                               |
|                        |                          | 4,000                   | 6,000                     | 12.7                                   | 8.6/14.7                   | 11.6/16.8                  | 55.7                         | 13./16.                           | 13.5/-                     | 18.2/-                     | 87.3/-                       | 13.                               |
| 8.5/12.9               | 42                       | 2,000                   | 4,000                     | 12.3                                   | 2.6/4.2                    | 3.1/4.7                    | 16                           | 09./12.                           | 4.4/-                      | 5.3/-                      | 28/-                         | 09.                               |
|                        |                          | 3,000                   | 4,000                     | 12.3                                   | 3.8/5.9                    | 4.7/7.1                    | 25                           | 10./12.                           | 6.4/-                      | 8.0/-                      | 42/-                         | 10.                               |
|                        |                          | 4,000                   | 4,000                     | 12.3                                   | 4.0/7.2                    | 6.2/9.3                    | 33                           | 12./13.                           | 6.9/-                      | 10.7/-                     | 57/-                         | 12.                               |
| 14/21.5                | 70                       | 2,000                   | 4,000                     | 19.5                                   | 4.1/6.3                    | 4.7/6.5                    | 25                           | 10./12.                           | 7.5/-                      | 8.6/-                      | 46/-                         | 12.                               |
|                        |                          | 3,000                   | 4,000                     | 19.5                                   | 5.8/9.1                    | 7.5/9.7                    | 40                           | 12./14.                           | 10.4/-                     | 13.3/-                     | 71/-                         | 12.                               |
|                        |                          | 4,000                   | 4,000                     | 19.5                                   | 5.4/11.1                   | 10.0/12.7                  | 53                           | 13./15.                           | 9.7/-                      | 17.8/-                     | 94/-                         | 13.                               |
| 19/30                  | 85                       | 2,000                   | 4,000                     | 26.7                                   | 6.1/9.6                    | 6.8/10.7                   | 33                           | 12./14.                           | 10.6/-                     | 11.7/-                     | 56/-                         | 12.                               |
|                        |                          | 3,000                   | 4,000                     | 26.7                                   | 8.3/13.4                   | 10.3/16.3                  | 49                           | 13./15.                           | 14.0/-                     | 17.6/-                     | 84/-                         | 13.                               |
|                        |                          | 4,000                   | 4,000                     | 26.7                                   | 6.4/15.9                   | 13.5/21.3                  | 65                           | 14./16.                           | 10.4/-                     | 21.9/-                     | 105/-                        | 13.                               |
| 27/42                  | 121                      | 2,000                   | 3,000                     | 36.0                                   | 7.8/12.1                   | 9.9/12.7                   | 47                           | 13./15.                           | 13.0/-                     | 16.5/-                     | 79/-                         | 13.                               |
|                        |                          | 3,000                   | 3,000                     | 36.0                                   | 8.3/16.8                   | 14.4/18.5                  | 69                           | 15./16.                           | 13.3/-                     | 23.2/-                     | 111/-                        | 13.                               |
| 25/39                  | 88                       | 1,500                   | 4,000                     | 84.0                                   | 7.5/11.8                   | 8.2/12.3                   | 29                           | 13./15.                           |                            |                            |                              |                                   |
|                        |                          | 2,000                   | 4,000                     | 84.0                                   | 9.7/15.8                   | 11.1/16.6                  | 39                           | 14./16.                           |                            |                            |                              |                                   |
|                        |                          | 3,000                   | 4,000                     | 84.0                                   | 13.8/21.9                  | 17.0/25.4                  | 60                           | 15./17.                           |                            |                            |                              |                                   |
|                        |                          | 4,000                   | 4,000                     | 84.0                                   | 14.8/25.5                  | 22.2/33.2                  | 78                           | 16./18.                           |                            |                            |                              |                                   |
| 50/75                  | 175                      | 1,500                   | 4,000                     | 147                                    | 14.5/22.1                  | 17.0/25.5                  | 60                           | 16./17.                           |                            |                            |                              |                                   |
|                        |                          | 2,000                   | 4,000                     | 147                                    | 17.2/28.5                  | 22.3/33.5                  | 78                           | 16./19.                           |                            |                            |                              |                                   |
|                        |                          | 3,000                   | 4,000                     | 147                                    | 20.6/38.7                  | 32.2/48.3                  | 113                          | 17./20.                           |                            |                            |                              |                                   |
| 70/110                 | 245                      | 1,500                   | 4,000                     | 210                                    | 20.9/31.8                  | 23.1/34.8                  | 81                           | 17./19.                           |                            |                            |                              |                                   |
|                        |                          | 2,000                   | 4,000                     | 210                                    | 23.7/41.1                  | 30.8/46.0                  | 108                          | 17./20.                           |                            |                            |                              |                                   |
|                        |                          | 3,000                   | 4,000                     | 210                                    | 22.9/56.0                  | 46.2/69.0                  | 162                          | 17./22.                           |                            |                            |                              |                                   |

■ with external ventilation

\*\* recommended controller size F5-M/-S for M<sub>max</sub> = approx. 2,5xM<sub>N</sub>



# DYNAMIC LINE II - Synchronous servo motors SM.5

The new synchronous motors **DYNAMIC LINE II** are characterised by increased packaging density and thereby especially predestinated for tasks with special requirements on size/volume and weight.

UL listed motors are characterised by small inertia and high overload torque and they are available alternatively also with **KEB** brake. Parallel arranged and rotating plug connections for power and position offer universal application in the mechanics. In addition to the basic version with resolver feedbacks, BISS encoder are available in single- and multiturn version.



Together with preassembled cables and the electronic type plate there is a minimum start-up time. The complete solution reduces the assembly error potential and secures high availability and best service.

## Properties

- thermal winding protection with PTC thermistor 150°C
- smooth shaft end
- Vibration severity grade B according to EN 60034-14
- Degree of protection IP65 (shaft seal IP64)
- Flange accuracy of the grade N according to DIN 42955
- Radial groove ball bearing with high temperature resistant special grease and lifetime lubrication
- Rating designed for operating mode S1
- Ambient temperature range of -20 to +40°C
- site altitude 1000m above sea level no derating

## Options

- **KEB** holding brake
- Gear assembly
- Special shaft
- External ventilation
- Half-key balancing according to DIN ISO 8821 with keyway

### Motor size

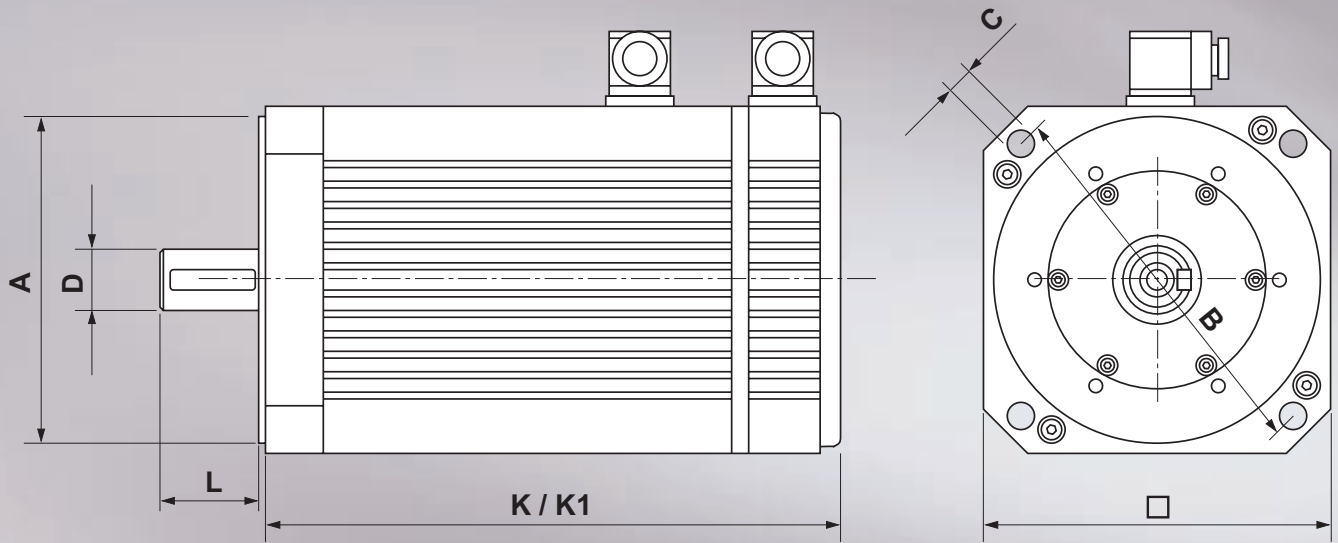
|   |                                  |
|---|----------------------------------|
|    | A1.SM<br>A2.SM<br>A3.SM<br>A4.SM |
| <b>55 mm</b>  | B1.SM                            |
|    | B2.SM                            |
| <b>90 mm</b>  | B3.SM                            |
|    | C1.SM<br>C2.SM                   |
| <b>102 mm</b>   | C3.SM                            |
|  | C4.SM<br>D1.SM                   |
| <b>140 mm</b>   | D2.SM                            |
|  | D3.SM                            |
| <b>195 mm</b>   | D4.SM                            |
|   | E1.SM                            |
|   | E2.SM                            |
|   | E3.SM                            |

| M <sub>N</sub><br>[Nm] | M <sub>0</sub><br>[Nm] | M <sub>max</sub><br>[Nm] | n <sub>N</sub><br>[rpm] | n <sub>max</sub><br>[rpm] | J <sub>L</sub><br>[kgcm <sup>2</sup> ] | 400 V                        |                              |                                |                                       | 230 V                        |                              |                                |                                       |
|------------------------|------------------------|--------------------------|-------------------------|---------------------------|--|------------------------------|------------------------------|--------------------------------|---------------------------------------|------------------------------|------------------------------|--------------------------------|---------------------------------------|
|                        |                        |                          |                         |                           |  | I <sub>N / 400V</sub><br>[A] | I <sub>0 / 400V</sub><br>[A] | I <sub>max / 400V</sub><br>[A] | **recommen-<br>ded<br>controller size | I <sub>N / 200V</sub><br>[A] | I <sub>0 / 200V</sub><br>[A] | I <sub>max / 200V</sub><br>[A] | **recommen-<br>ded<br>controller size |
| 0.43                   | 0.47                   | 2.1                      | 6,000                   |                           | 0.13                                   | 0.93                         | 0.94                         | 4.5                            | 07.                                   | 1.66                         | 1.81                         | 8.9                            | 05.                                   |
| 0.62                   | 0.66                   | 2.9                      | 6,000                   | 9,000                     | 0.18                                   | 1.16                         | 1.24                         | 5.6                            | 07.                                   | 1.92                         | 2.04                         | 10.1                           | 05.                                   |
| 0.80                   | 0.87                   | 3.8                      | 6,000                   |                           | 0.23                                   | 1.44                         | 1.43                         | 6.9                            | 07.                                   | 2.54                         | 2.52                         | 13.2                           | 07.                                   |
| 1.05                   | 1.14                   | 5.0                      | 6,000                   |                           | 0.34                                   | 1.64                         | 1.55                         | 8.0                            | 07.                                   | 3.29                         | 3.10                         | 17.4                           | 07.                                   |
| 0.90                   |                        |                          | 3,000                   |                           |  | 1.0                          | 1.0                          | 3.6                            | 07.                                   | 1.7                          | 1.6                          | 5.9                            | 05.                                   |
| 0.87                   | 0.92                   | 2.7                      | 4,000                   | 9,000                     | 0.30                                   | 1.2                          | 1.2                          | 4.5                            | 07.                                   | 2.1                          | 2.0                          | 7.4                            | 05.                                   |
| 0.76                   |                        |                          | 6,000                   |                           |  | 1.3                          | 1.5                          | 5.5                            | 07.                                   | 2.4                          | 2.8                          | 10.1                           | 07.                                   |
| 1.83                   |                        |                          | 3,000                   |                           |  | 1.7                          | 1.6                          | 6.1                            | 07.                                   | 3.1                          | 2.8                          | 11.0                           | 07.                                   |
| 1.75                   | 1.8                    | 5.4                      | 4,000                   | 9,000                     | 0.56                                   | 2.1                          | 2.0                          | 7.7                            | 07.                                   | 4.2                          | 3.9                          | 15.4                           | 07.                                   |
| 1.5                    |                        |                          | 6,000                   |                           |  | 2.3                          | 2.5                          | 9.9                            | 09.                                   | 4.2                          | 4.8                          | 18.9                           | 09.                                   |
| 2.6                    |                        |                          | 3,000                   |                           |  | 2.6                          | 2.3                          | 9.2                            | 09.                                   | 4.3                          | 3.9                          | 15.2                           | 09.                                   |
| 2.5                    | 2.6                    | 7.8                      | 4,000                   | 9,000                     | 0.79                                   | 2.9                          | 2.7                          | 10.8                           | 09.                                   | 4.9                          | 4.7                          | 18.4                           | 09.                                   |
| 2.3                    |                        |                          | 6,000                   |                           |  | 3.6                          | 3.9                          | 15.5                           | 09.                                   | 6.5                          | 7.1                          | 28.0                           | 09.                                   |
| 3.8/5.2                |                        |                          | 2,000                   |                           |  | 2.5/3.3                      | 2.5/3.2                      | 8.4                            | 09./09.                               | 4.1                          | 4.3                          | 15.3                           | 09.                                   |
| 3.5/4.7                | 3.9/5.0                | 12.0                     | 3,000                   | 6,000                     | 2.7                                    | 2.8/3.8                      | 3.1/4.0                      | 10.5                           | 09./10.                               | 5.7                          | 6.2                          | 22.4                           | 09.                                   |
| 3.1/4.2                |                        |                          | 4,000                   |                           |  | 3.1/4.2                      | 3.9/5.0                      | 13.2                           | 09./10.                               | 6.2                          | 7.7                          | 27.6                           | 09.                                   |
| 5.5/7.4                |                        |                          | 2,000                   |                           |  | 3.7/4.9                      | 3.8/4.9                      | 12.6                           | 09./10.                               | 5.8                          | 6.2                          | 14.8                           | 09.                                   |
| 4.8/6.4                | 5.7/7.4                | 17.5                     | 3,000                   | 6,000                     | 3.7                                    | 4.2/5.7                      | 5.0/6.5                      | 16.8                           | 10./12.                               | 7.1                          | 8.8                          | 30.6                           | 10.                                   |
| 4.2/5.6                |                        |                          | 4,000                   |                           |  | 4.5/6.1                      | 6.1/7.9                      | 20.4                           | 12./12.                               | 8.4                          | 11.7                         | 40.8                           | 12.                                   |
| 6.9/9.3                |                        |                          | 2,000                   |                           |  | 4.3/5.8                      | 5.7/7.4                      | 16.2                           | 12./12.                               | 6.8                          | 8.9                          | 25.5                           | 10.                                   |
| 6.4/8.6                | 7.1/9.2                | 22.0                     | 3,000                   | 6,000                     | 4.7                                    | 4.9/6.7                      | 7.0/9.1                      | 20.0                           | 12./12.                               | 9.6                          | 13.8                         | 39.4                           | 10.                                   |
| 5.7/7.7                |                        |                          | 4,000                   |                           |  | 5.5/7.5                      | 8.8/11.4                     | 25.1                           | 12./13.                               | 10.8                         | 17.3                         | 49.3                           | 12.                                   |
| 8.3/11.2               |                        |                          | 2,000                   |                           |  | 4.2/5.7                      | 5.5/7.1                      | 15.3                           | 10./12.                               | 8.1                          | 8.8                          | 29.7                           | 10.                                   |
| 7.6/10.3               | 8.5/11.1               | 26.0                     | 3,000                   | 6,000                     | 6.0                                    | 6.0/8.0                      | 8.5/11.0                     | 23.8                           | 12./13.                               | 10.8                         | 12.9                         | 43.5                           | 12.                                   |
| 6.8/9.2                |                        |                          | 4,000                   |                           |  | 6.6/8.9                      | 10.7/13.7                    | 29.6                           | 12./14.                               | 11.9                         | 16.1                         | 54.4                           | 12.                                   |
| 8.0/10.8               |                        |                          | 1,500                   |                           |  | 3.3/4.4                      | 3.6/4.7                      | 12.1                           | 10./10.                               |                              |                              |                                |                                       |
| 7.6/10.3               | 8.2/10.6               | 25.0                     | 2,000                   | 4,500                     | 7.9                                    | 4.0/5.4                      | 4.6/6.0                      | 15.5                           | 10./12.                               |                              |                              |                                |                                       |
| 6.8/9.1                |                        |                          | 3,000                   |                           |  | 4.6/6.2                      | 6.0/7.9                      | 20.1                           | 12./12.                               |                              |                              |                                |                                       |
| 11.5/15.6              |                        |                          | 1,500                   |                           |  | 5.1/6.9                      | 5.6/7.3                      | 19.0                           | 12./12.                               |                              |                              |                                |                                       |
| 11.0/14.9              | 11.6/15.1              | 36.0                     | 2,000                   | 4,500                     | 11.2                                   | 6.0/8.1                      | 6.9/9.0                      | 23.3                           | 12./12.                               |                              |                              |                                |                                       |
| 9.5/12.8               |                        |                          | 3,000                   |                           |  | 6.7/9.1                      | 8.9/11.6                     | 30.1                           | 12./13.                               |                              |                              |                                |                                       |
| 15.0/20.2              |                        |                          | 1,500                   |                           |  | 6.1/8.2                      | 6.8/8.8                      | 22.7                           | 12./12.                               |                              |                              |                                |                                       |
| 14.0/18.9              | 18.4/19.9              | 47.0                     | 2,000                   | 4,500                     | 14.4                                   | 7.3/9.9                      | 8.8/11.4                     | 29.4                           | 13./13.                               |                              |                              |                                |                                       |
| 11.9/16.1              |                        |                          | 3,000                   |                           |  | 8.0/10.9                     | 11.2/14.6                    | 37.7                           | 13./14.                               |                              |                              |                                |                                       |
| 18.0/24.3              |                        |                          | 1,500                   |                           |  | 7.4/9.9                      | 8.2/10.7                     | 27.2                           | 12./13.                               |                              |                              |                                |                                       |
| 16.0/22.8              | 18.4/23.9              | 57.0                     | 2,000                   | 4,500                     | 19.5                                   | 8.8/11.9                     | 10.4/13.6                    | 35.3                           | 13./14.                               |                              |                              |                                |                                       |
| 13.4/18.5              |                        |                          | 3,000                   |                           |  | 9.6/12.9                     | 14.0/18.2                    | 47.4                           | 14./15.                               |                              |                              |                                |                                       |
| 23.0/30.0              |                        |                          | 1,000                   |                           |  | 6.9/9.3                      | 7.6/9.9                      | 23.3                           | 12./14.                               |                              |                              |                                |                                       |
| 19.0/28.0              | 23.5/30.6              | 65.0                     | 2,000                   | 4,000                     | 57.0                                   | 9.7/14.4                     | 12.7/17.1                    | 39.3                           | 13./15.                               |                              |                              |                                |                                       |
| 14.0/24.0              |                        |                          | 3,000                   |                           |  | 9.4/16.6                     | 16.9/22.8                    | 52.2                           | 14./15.                               |                              |                              |                                |                                       |
| 34.0/45.0              |                        |                          | 1,000                   |                           |  | 9.8/13.3                     | 10.9/14.4                    | 36.3                           | 09./14.                               |                              |                              |                                |                                       |
| 28.0/40.0              | 35./45.5               | 106.0                    | 2,000                   | 4,000                     | 79.0                                   | 14.2/21.0                    | 19.3/25.5                    | 64.1                           | 15./16.                               |                              |                              |                                |                                       |
| 19.0/34.0              |                        |                          | 3,000                   |                           |  | 12.4/22.3                    | 24.8/32.5                    | 81.7                           | 14./16.                               |                              |                              |                                |                                       |
| 47.0/62.0              |                        |                          | 1,000                   |                           |  | 14.5/19.9                    | 16.1/21.4                    | 53.2                           | 14./15.                               |                              |                              |                                |                                       |
| 40.0/57.0              | 48.0/62.5              | 145.0                    | 2,000                   | 4,000                     | 102                                    | 20.8/30.8                    | 27.7/36.9                    | 90.4                           | 16./17.                               |                              |                              |                                |                                       |
| 27.0/48.0              |                        |                          | 3,000                   |                           |  | 19.6/36.2                    | 38.2/51.6                    | 127.0                          | 16./18.                               |                              |                              |                                |                                       |

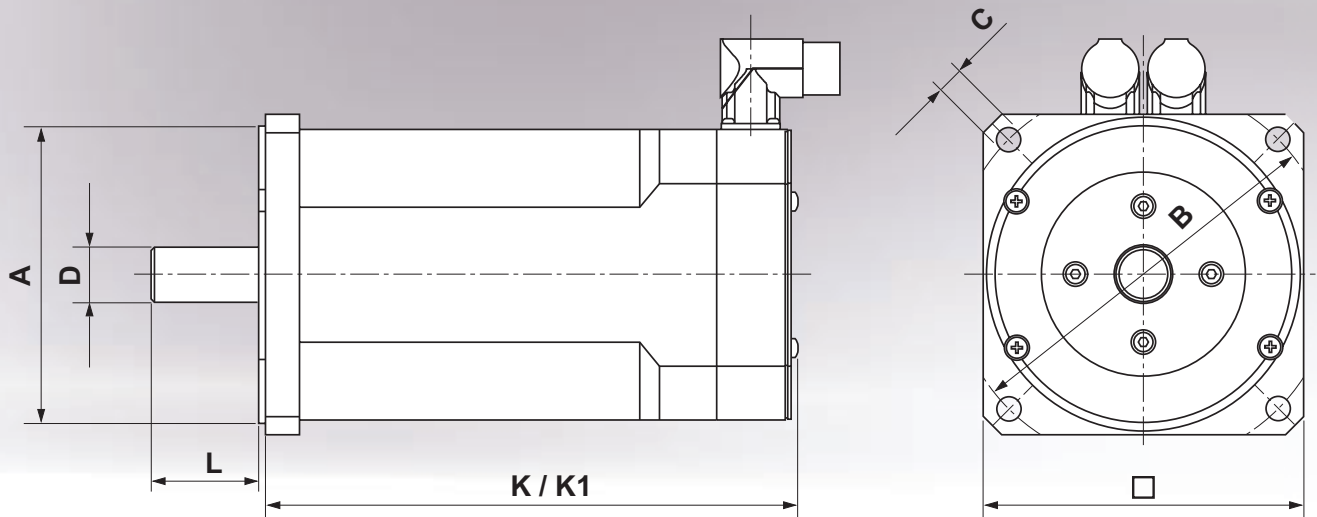
■ with external ventilation

\*\* recommended controller size F5-M/-S for M<sub>max</sub> = approx. 2,0 x M<sub>N</sub>

## DYNAMIC LINE I SM.0



## DYNAMIC LINE II SM.5





| Motor size | □   | Ø A | Ø B | Ø C | Ø D | K   | L  | m    | K1   | Data permanent-magnet brake * |     |       |       |       |       |                             |                      |                  |                    |                    |       |       |      |
|------------|-----|-----|-----|-----|-----|-----|----|------|------|-------------------------------|-----|-------|-------|-------|-------|-----------------------------|----------------------|------------------|--------------------|--------------------|-------|-------|------|
|            |     |     |     |     |     |     |    |      |      | Dimensions                    |     |       |       | Motor | Brake | $M_{\text{Brake (static)}}$ | $J_{\text{Brake}}$   | $n_{\text{max}}$ | $U_{\text{rated}}$ | $I_{\text{rated}}$ | $t_1$ | $t_2$ | Type |
|            |     |     |     |     |     |     |    |      |      | [mm]                          |     |       |       | [kg]  | [kg]  | [Nm]                        | [kgcm <sup>2</sup> ] | [rpm]            | [V]                | [A]                | [ms]  | [ms]  |      |
| A1.SM      |     | 40  | 63  | 5.8 | 9   | 121 |    | 1.0  | 0.18 | 145                           | 2   | 0.068 | 9,000 | 24    | 0.46  | 6                           | 25                   | 03.P1            |                    |                    |       |       |      |
| A2.SM      | 55  | 40  | 63  | 5.8 | 9   | 133 | 20 | 1.2  | 0.18 | 157                           | 2   | 0.068 | 9,000 | 24    | 0.46  | 6                           | 25                   | 03.P1            |                    |                    |       |       |      |
| A3.SM      |     | 40  | 63  | 5.8 | 9   | 145 |    | 1.4  | 0.18 | 169                           | 2   | 0.068 | 9,000 | 24    | 0.46  | 6                           | 25                   | 03.P1            |                    |                    |       |       |      |
| A4.SM      |     | 40  | 63  | 5.8 | 9   | 170 |    | 1.8  | 0.18 | 194                           | 2   | 0.068 | 9,000 | 24    | 0.46  | 6                           | 25                   | 03.P1            |                    |                    |       |       |      |
| B1.SM      |     | 60  | 75  | 5.8 | 11  | 136 |    | 1.5  | 0.30 | 164                           | 2.5 | 0.18  | 9,000 | 24    | 0.50  | 7                           | 35                   | 05.P1            |                    |                    |       |       |      |
| B2.SM      | 70  | 60  | 75  | 5.8 | 11  | 160 | 23 | 2.1  | 0.30 | 188                           | 2.5 | 0.18  | 9,000 | 24    | 0.50  | 7                           | 35                   | 05.P1            |                    |                    |       |       |      |
| B3.SM      |     | 60  | 75  | 5.8 | 11  | 196 |    | 2.9  | 0.30 | 223                           | 2.5 | 0.18  | 9,000 | 24    | 0.50  | 7                           | 35                   | 05.P1            |                    |                    |       |       |      |
| C1.SM      |     | 80  | 100 | 7   | 14  | 156 |    | 2.7  | 0.50 | 202                           | 9   | 0.6   | 6,000 | 24    | 0.75  | 7                           | 40                   | 06.P1            |                    |                    |       |       |      |
| C2.SM      |     | 80  | 100 | 7   | 14  | 180 | 30 | 3.9  | 0.50 | 226                           | 9   | 0.6   | 6,000 | 24    | 0.75  | 7                           | 40                   | 06.P1            |                    |                    |       |       |      |
| C3.SM      | 92  | 80  | 100 | 7   | 14  | 214 |    | 5.2  | 0.50 | 260                           | 9   | 0.6   | 6,000 | 24    | 0.75  | 7                           | 40                   | 06.P1            |                    |                    |       |       |      |
| C4.SM      |     | 80  | 100 | 7   | 14  | 248 |    | 6.6  | 0.50 | 294                           | 9   | 0.6   | 6,000 | 24    | 0.75  | 7                           | 40                   | 06.P1            |                    |                    |       |       |      |
| D1.SM      |     | 95  | 115 | 9   | 19  | 218 |    | 6.3  | 0.78 | 226                           | 11  | 2.3   | 6,000 | 24    | 0.84  | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| D2.SM      | 110 | 95  | 115 | 9   | 19  | 248 | 40 | 7.9  | 0.78 | 56                            | 11  | 2.3   | 6,000 | 24    | 0.84  | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| D3.SM      |     | 95  | 115 | 9   | 19  | 278 |    | 9.6  | 0.78 | 286                           | 11  | 2.3   | 6,000 | 24    | 0.84  | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| D4.SM      |     | 95  | 115 | 9   | 19  | 308 |    | 11.2 | 0.78 | 316                           | 11  | 2.3   | 6,000 | 24    | 0.84  | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| E1.SM      |     | 130 | 165 | 11  | 24  | 231 |    | 10.2 | 1.63 | 276                           | 35  | 5.9   | 4,000 | 24    | 1.1   | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| E2.SM      | 140 | 130 | 165 | 11  | 24  | 261 | 50 | 12.3 | 1.63 | 306                           | 35  | 5.9   | 4,000 | 24    | 1.1   | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| E3.SM      |     | 130 | 165 | 11  | 24  | 291 |    | 15.5 | 1.63 | 336                           | 35  | 5.9   | 4,000 | 24    | 1.1   | 22                          | 90                   | 08.P1            |                    |                    |       |       |      |
| F1.SM      |     | 180 | 215 | 14  | 32  | 348 |    | 30.5 | 3.80 | 348                           | 85  | 17.6  | 4,000 | 24    | 1.5   | 25                          | 140                  | 09.P1            |                    |                    |       |       |      |
| F2.SM      | 190 | 180 | 215 | 14  | 32  | 428 | 50 | 44.0 | 3.80 | 428                           | 85  | 17.6  | 4,000 | 24    | 1.5   | 25                          | 140                  | 09.P1            |                    |                    |       |       |      |
| F3.SM      |     | 180 | 215 | 14  | 32  | 508 |    | 57.5 | 3.80 | 508                           | 85  | 17.6  | 4,000 | 24    | 1.5   | 25                          | 140                  | 09.P1            |                    |                    |       |       |      |

| Motor size | □   | Ø A | Ø B | Ø C | Ø D | K   | L  | m    | K1   | Data permanent-magnet brake * |     |       |       |       |       |                             |                      |                  |                    |                    |       |       |      |
|------------|-----|-----|-----|-----|-----|-----|----|------|------|-------------------------------|-----|-------|-------|-------|-------|-----------------------------|----------------------|------------------|--------------------|--------------------|-------|-------|------|
|            |     |     |     |     |     |     |    |      |      | Dimensions                    |     |       |       | Motor | Brake | $M_{\text{Brake (static)}}$ | $J_{\text{Brake}}$   | $n_{\text{max}}$ | $U_{\text{rated}}$ | $I_{\text{rated}}$ | $t_1$ | $t_2$ | Type |
|            |     |     |     |     |     |     |    |      |      | [mm]                          |     |       |       | [kg]  | [kg]  | [Nm]                        | [kgcm <sup>2</sup> ] | [rpm]            | [V]                | [A]                | [ms]  | [ms]  |      |
| A1.SM      |     | 40  | 63  | 5.8 | 9   | 121 |    | 1.0  | 0.18 | 145                           | 2   | 0.070 | 9,000 | 24    | 0.46  | 6                           | 18                   | 03.P1            |                    |                    |       |       |      |
| A2.SM      | 55  | 40  | 63  | 5.8 | 9   | 133 | 20 | 1.2  | 0.18 | 157                           | 2   | 0.070 | 9,000 | 24    | 0.46  | 6                           | 18                   | 03.P1            |                    |                    |       |       |      |
| A3.SM      |     | 40  | 63  | 5.8 | 9   | 145 |    | 1.4  | 0.18 | 169                           | 2   | 0.070 | 9,000 | 24    | 0.46  | 6                           | 18                   | 03.P1            |                    |                    |       |       |      |
| A4.SM      |     | 40  | 63  | 5.8 | 9   | 170 |    | 1.9  | 0.18 | 194                           | 2   | 0.070 | 9,000 | 24    | 0.46  | 6                           | 18                   | 03.P1            |                    |                    |       |       |      |
| B1.SM      |     | 80  | 100 | 7   | 14  | 132 |    | 2.3  | 0.28 | 164                           | 4.5 | 0.18  | 9,000 | 24    | 0.58  | 7                           | 25                   | 05.P1            |                    |                    |       |       |      |
| B2.SM      | 90  | 80  | 100 | 7   | 14  | 158 | 23 | 3.0  | 0.28 | 190                           | 4.5 | 0.18  | 9,000 | 24    | 0.58  | 7                           | 25                   | 05.P1            |                    |                    |       |       |      |
| B3.SM      |     | 80  | 100 | 7   | 14  | 184 |    | 3.7  | 0.28 | 216                           | 4.5 | 0.18  | 9,000 | 24    | 0.58  | 7                           | 25                   | 05.P1            |                    |                    |       |       |      |
| C1.SM      |     | 95  | 115 | 9   | 19  | 178 |    | 4.8  | 0.57 | 214                           | 10  | 1.01  | 6,000 | 24    | 0.71  | 7                           | 25                   | 06.P1            |                    |                    |       |       |      |
| C2.SM      | 102 | 95  | 115 | 9   | 19  | 206 | 30 | 6.3  | 0.57 | 242                           | 10  | 1.01  | 6,000 | 24    | 0.71  | 7                           | 25                   | 06.P1            |                    |                    |       |       |      |
| C3.SM      |     | 95  | 115 | 9   | 19  | 234 |    | 7.4  | 0.57 | 270                           | 10  | 1.01  | 6,000 | 24    | 0.71  | 7                           | 25                   | 06.P1            |                    |                    |       |       |      |
| C4.SM      |     | 95  | 115 | 9   | 19  | 262 |    | 8.6  | 0.57 | 298                           | 10  | 1.01  | 6,000 | 24    | 0.71  | 7                           | 25                   | 06.P1            |                    |                    |       |       |      |
| D1.SM      |     | 130 | 165 | 11  | 24  | 203 |    | 10.0 | 1.15 | 237                           | 22  | 2.76  | 6,000 | 24    | 0.84  | 22                          | 70                   | 07.P1            |                    |                    |       |       |      |
| D2.SM      | 140 | 130 | 165 | 11  | 24  | 233 | 40 | 11.9 | 1.15 | 267                           | 22  | 2.76  | 6,000 | 24    | 0.84  | 22                          | 70                   | 07.P1            |                    |                    |       |       |      |
| D3.SM      |     | 130 | 165 | 11  | 24  | 263 |    | 14.0 | 1.15 | 297                           | 22  | 2.76  | 6,000 | 24    | 0.84  | 22                          | 70                   | 07.P1            |                    |                    |       |       |      |
| D4.SM      |     | 130 | 165 | 11  | 24  | 293 |    | 18.0 | 1.15 | 327                           | 22  | 2.76  | 6,000 | 24    | 0.84  | 22                          | 70                   | 07.P1            |                    |                    |       |       |      |
| E1.SM      |     | 180 | 215 | 14  | 32  | 266 |    | 24.0 | 3.40 | 300                           | 60  | 20.1  | 4,000 | 24    | 2.3   | 50                          | 130                  | 09.P1            |                    |                    |       |       |      |
| E2.SM      | 195 | 180 | 215 | 14  | 32  | 294 | 50 | 26.0 | 3.40 | 328                           | 60  | 20.1  | 4,000 | 24    | 2.3   | 50                          | 130                  | 09.P1            |                    |                    |       |       |      |
| E3.SM      |     | 180 | 215 | 14  | 32  | 322 |    | 29.0 | 3.40 | 356                           | 60  | 20.1  | 4,000 | 24    | 2.3   | 50                          | 130                  | 09.P1            |                    |                    |       |       |      |

\* all technical data with 20 °C

# PLANET GEAR SG.AL

The gears of the series **SG.AL** offer the designer a compact, economic and precise conversion of speed and torque in the machine.

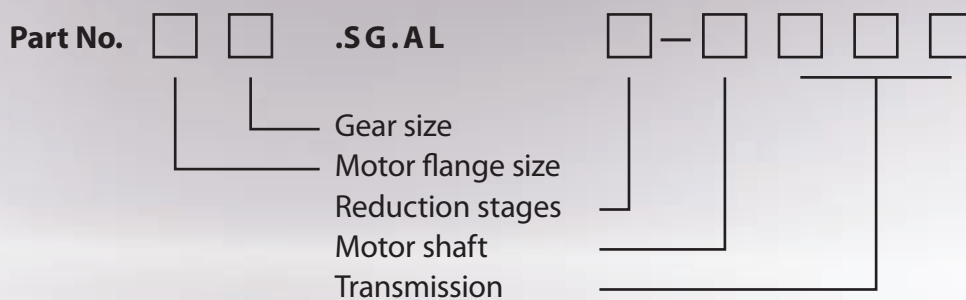
The design contains actual 4 sizes in 1 - and 2-step structure with rated output torque upto 100 Nm. The large reduction range permits an optimal adaption of motor and speed.

- high reliability and high overload security in series
- large gear ratio  $i = 3 \dots 100$
- lifetime lubrication, maintenance-free
- small operating noises
- optimal efficiency  $> 95 \%$
- output shaft with featherkey
- simple, direct motor connection, applicable for

## DYNAMIC Line I and II



### The economic gear in compact design!



Planet gears **SG.AL** AL with hardened, integrated gearing, high strength and precision at minimum dimensions offer furthermore:

**Universal motor connection**

to **DYNAMIC LINE** motors **I** and **II** with prepared motor flanges and clamping hubs.

**Maintenance-free operation**

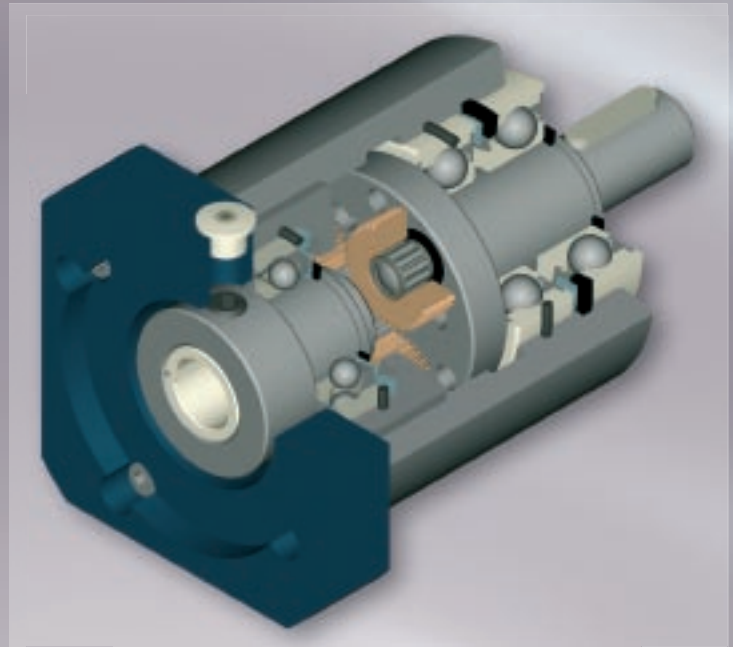
by lifetime grease packing means: no service necessary!

**Balanced properties**

by precise, simple design mean good torsional backlash quality at smallest costs.

**Reinforced output bearing**

designed for high axial and radial force at small mounting location.



**Mechanical allocation table servomotors / planetary gear**

| Motor sizes     |          |         |               |          | Gear sizes      |                 |                 |                 |
|-----------------|----------|---------|---------------|----------|-----------------|-----------------|-----------------|-----------------|
| Dynamic Line I  | Flange Ø | Shaft   | Hole circle Ø | Recess Ø |                 |                 |                 |                 |
| A1 .. A4. SM.   | 55       | 9 x 20  | 63            | 40       | <b>A1.SG.AL</b> | —               | —               | —               |
| B1 .. B3. SM.0  | 70       | 11 x 23 | 75            | 60       | <b>B1.SG.AL</b> | <b>B2.SG.AL</b> | —               | —               |
| C1 .. C4. SM.0  | 92       | 14 x 27 | 100           | 80       | —               | <b>C2.SG.AL</b> | <b>C3.SG.AL</b> | —               |
| D1 .. D4. SM.0  | 110      | 19 x 30 | 115           | 95       | —               | —               | <b>D3.SG.AL</b> | <b>D4.SG.AL</b> |
| E1 .. E4. SM.0  | 140      | 24 x 50 | 165           | 130      | —               | —               | —               | <b>E4.SG.AL</b> |
| Dynamic Line II | Flange Ø | Shaft   | Hole circle Ø | Recess Ø |                 |                 |                 |                 |
| A1 .. A4. SM.   | 55       | 9 x 20  | 63            | 40       | <b>A1.SG.AL</b> | —               | —               | —               |
| B1 .. B3. SM.0  | 90       | 14 x 23 | 100           | 80       | —               | <b>C2.SG.AL</b> | <b>C3.SG.AL</b> | —               |
| C1 .. C4. SM.0  | 102      | 19 x 30 | 115           | 95       | —               | —               | <b>D3.SG.AL</b> | <b>D4.SG.AL</b> |
| D1 .. D4. SM.0  | 140      | 24 x 40 | 165           | 130      | —               | —               | —               | <b>E4.SG.AL</b> |

[Measures in mm]

# Headquarters

**Karl E. Brinkmann GmbH**  
Försterweg 36 - 38  
D-32683 Barntrup  
Internet: [www.keb.de](http://www.keb.de)

Tel.: +49 (0) 5263 401-0  
Fax: + 49 (0) 5263 401-116  
E-mail: [info@keb.de](mailto:info@keb.de)

## SUBSIDIARIES

### AUSTRIA

KEB Antriebstechnik  
Austria GmbH  
Ritzstraße 8  
A - 4614 Marchtrenk  
Tel.: +43 (0)7243 53586-0  
Fax: +43 (0)7243 53586-21  
E-mail: [info@keb.at](mailto:info@keb.at)  
Internet: [www.keb.at](http://www.keb.at)

### CHINA

KEB Power Transmission  
Technology (Shanghai) Co. Ltd.  
No. 435 QuianPu Road  
Songjiang East Industrial Zone  
CN-201611 Shanghai, PR. China  
Tel.: +86 (0)21 37746688  
Fax: +86 (0)21 37746600  
E-mail: [info@keb.cn](mailto:info@keb.cn)  
Internet: [www.keb.cn](http://www.keb.cn)

### GERMANY

KEB Antriebstechnik GmbH  
Wildbacher Straße 5  
D-08289 Schneeberg  
Tel.: +49 (0)3772 67-0  
Fax: +49 (0)3772 67-281  
E-mail: [info@keb-combidrive.de](mailto:info@keb-combidrive.de)

### FRANCE

Société Française KEB  
Z.I. de la Croix St. Nicolas  
14, rue Gustave Eiffel  
F - 94510 LA QUEUE EN BRIE  
Tel.: +33 (0)149620101  
Fax: +33 (0)145767495  
E-mail: [info@keb.fr](mailto:info@keb.fr)  
Internet: [www.keb.fr](http://www.keb.fr)

### GREAT BRITAIN

KEB (UK) Ltd.  
6 Chieftain Business Park,  
Morris Close  
Park Farm, Wellingborough  
GB - Northants, NN8 6 XF  
Tel.: +44 (0)1933 402220  
Fax: +44 (0)1933 400724  
E-mail: [info@keb-uk.co.uk](mailto:info@keb-uk.co.uk)  
Internet: [www.keb-uk.co.uk](http://www.keb-uk.co.uk)

### ITALY

KEB Italia S.r.l.  
Via Newton, 2  
I - 20019 Settimo Milanese (Milano)  
Tel.: +39 02 33535311  
Fax: +39 02 33500790  
E-mail: [info@keb.it](mailto:info@keb.it)  
Internet: [www.keb.it](http://www.keb.it)

### JAPAN

KEB - Japan Ltd.  
15 - 16, 2 - Chome  
Takanawa Minato-ku  
J - Tokyo 108 - 0074  
Tel.: +81 (0)33 445-8515  
Fax: +81 (0)33 445-8215  
E-mail: [info@keb.jp](mailto:info@keb.jp)  
Internet: [www.keb.jp](http://www.keb.jp)

### RUSSIA

KEB RUS Ltd.  
Lesnaya str, house 30  
Dzerzhinsky (MO)  
RUS - 140091 Moscow region  
Tel.: +7 (0)495 6320217  
Fax: +7 (0)495 6320217  
E-mail: [info@keb.ru](mailto:info@keb.ru)  
Internet: [www.keb.ru](http://www.keb.ru)

### USA

KEB America, Inc  
5100 Valley Industrial  
Blvd. South  
USA - Shakopee, MN 55379  
Tel.: +1 952 2241400  
Fax: +1 952 2241499  
E-mail: [info@kebamericacom](mailto:info@kebamericacom)  
Internet: [www.kebamericacom](http://www.kebamericacom)

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