

# DCmind: BRUSHLESS MOTORS

## Motors 38 to 145 W nominal output power range TNi21



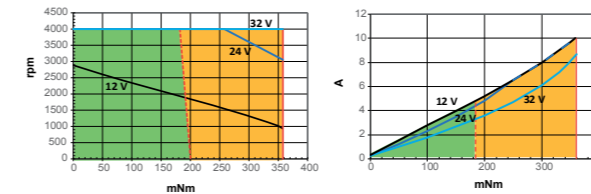
- › For control, speed and torque applications
- › Very high power density
- › 4 inputs (where 2 of them analog) / 3 outputs integrated electronic controls
- › Holding torque function
- › Battery supply compatible 12 V and 24 V

### Part numbers

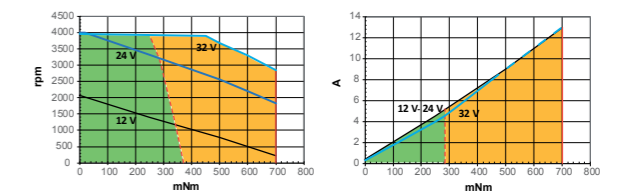
|   | 38 to 75 W  | 45 to 102 W   | 72 to 145 W   |
|---|---|---|---|
| Type  | 80140 TNi21   | 80180 TNi21   | 80280 TNi21   |
| <b>Part numbers</b>   |   |   |   |
| PWM speed mode, cable output  | <b>80140059</b>   | <b>80180056</b>   | <b>80280013</b>   |
| 0-10 V speed mode, cable output   | <b>80140051</b>   | <b>80180050</b>   | <b>80280007</b>   |
| PWM speed mode, connector M16 - 12 pins   | <b>80140079</b>   | <b>80180072</b>   |   |
| 0-10 V speed mode, connector M16 - 12 pins  | <b>80140071</b>   | <b>80180066</b>   |   |
| Nominal power supply range (V <sub>---</sub> )                                      | 12 - 32   | 12 - 32   | 12 - 32   |
| Min. max. power supply (V <sub>---</sub> )  | 10 - 36   | 10 - 36   | 10 - 36   |
| <b>No-load characteristics</b>  | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> |
| Speed of rotation (rpm)   | 2900 4000 4000  | 2100 4000 3950  | 2000 3950 3950  |
| Absorbed current (A)  | 0.34 0.29 0.27  | 0.35 0.39 0.34  | 0.5 0.7 0.6   |
| <b>Nominal characteristics</b>  | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> |
| Speed (rpm)   | 1900 4000 4000  | 1250 3350 3900  | 1400 3250 3900  |
| Absorbed current (A)  | 5.2 4.4 3.2   | 6.7 5.4 4   | 8.5 6.9 6   |
| Torque (mNm)  | 193 184 178   | 340 285 250   | 490 390 355   |
| Output power (W)  | 38 77 75  | 45 100 102  | 72 133 145  |
| <b>Maximal characteristics</b>  | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> | 12 V <sub>---</sub> 24 V <sub>---</sub> 32 V <sub>---</sub> |
| Speed (rpm)   | 1600 3050 4000  | 1040 2160 3100  | 800 1900 2400   |
| Absorbed current (A)  | 6.5 10 10   | 7.2 11 12   | 15 15 12.5  |
| Torque (mNm)  | 250 358 358   | 400 600 650   | 1000 1000 1000  |
| Output power (W)  | 42 114 150  | 44 136 211  | 84 199 251  |
| <b>General characteristics</b>  |   |   |   |
| Regulation (quadrants)  | 4   | 4   | 4   |
| Conformity to EMC Directive in accordance with (EN 55022)                           | Class B   | Class B   | Class B   |
| Insulation conforming to IEC60085   | Class E   | Class E   | Class B   |
| Thermal time constant (mn)  | 20  | 30  | 30  |
| Noise level (dBA)   | 40  | 40  | 50  |
| Inertia (g.cm <sup>2</sup> )  | 75  | 115   | 120   |
| Number of rotor poles   | 4   | 4   | 8   |
| Ambient operating temperature (°C)  | -30 → +70   | -30 → +70   | -30 → +70   |
| Service life (h)  | 20000   | 20000   | 20000   |
| Ball bearing  | ✓   | ✓   | ✓   |
| Weight (kg)   | 0.95  | 1.34  | 1.44  |
| <b>0-10 V or PWM Speed input characteristics</b>                                    |   |   |   |
| Input impedance (kΩ)  | 69  | 69  | 69  |
| Speed control (rpm)   | 120 → 4000  | 120 → 4000  | 120 → 4000  |
| Level 0 input voltage (V)   | 0 → 2   | 0 → 2   | 0 → 2   |
| Level 1 input voltage (V)   | 7.5 → 39  | 7.5 → 39  | 7.5 → 39  |
| Frequency range (Hz)  | 100 → 2000  | 100 → 2000  | 100 → 2000  |
| <b>0-10 V or PWM Torque input characteristics</b>                                   |   |   |   |
| Input impedance (kΩ)  | 69  | 69  | 69  |
| Torque limit (mNm)  | 360 → 35  | 700 → 30  | 1000 → 40   |
| Holding limit (mNm)   | 150 → 35  | 230 → 30  | 310 → 40  |
| Level 0 input voltage (V)   | 0 → 2   | 0 → 2   | 0 → 2   |
| Level 1 input voltage (V)   | 7.5 → 39  | 7.5 → 39  | 7.5 → 39  |
| Frequency range (Hz)  | 100 → 2000  | 100 → 2000  | 100 → 2000  |
| <b>On/Off and Direction digital input characteristics</b>                           |   |   |   |
| Input impedance (kΩ)  | 57  | 57  | 57  |
| Level 0 input voltage (V <sub>---</sub> )   | 0 → 2   | 0 → 2   | 0 → 2   |
| Level 1 input voltage (V <sub>---</sub> )   | 4 → 39  | 4 → 39  | 4 → 39  |
| <b>Torque alarm, Encoder and Direction output characteristics</b>                   |   |   |   |
| Type of output-Maximum admissible current (mA)                                      | PNP   | PNP   | PNP   |
| Maximum admissible current (mA)   | 50  | 50  | 50  |
| IP65 over the whole motor apart from the shaft output. Versions with brake are IP20 |   |   |   |
| <b>Accessory</b>  |   |   |   |
| 2 metre shielded cable with 12-pin female M16 connector                             |   |   | <b>15275008</b>   |

### Curves

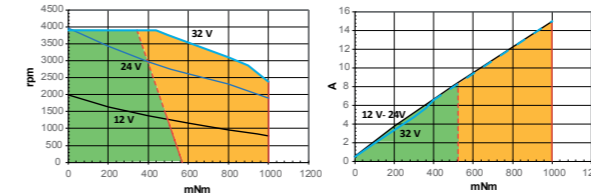
Speed / Torque 80140 TNi21 - Current / Torque 80140 TNi21



Speed / Torque 80180 TNi21 - Current / Torque 80180 TNi21



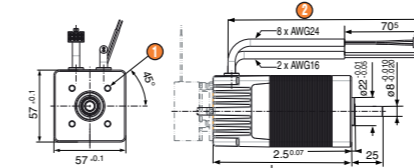
Speed / Torque 80280 TNi21 - Current / Torque 80280 TNi21



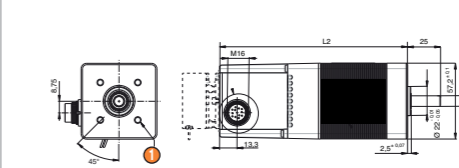
- Continuous running area
- Cycling running area
- Maximum continuous torque
- Maximum peak torque

### Dimensions (mm)

Cable output versions



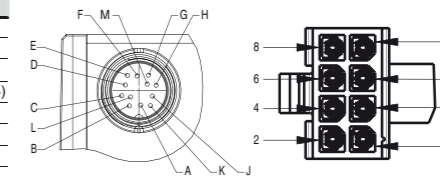
M16 connector version - 12 pins



- L: 80140: 92 max
  - L: 80180 / 80280: 112 max
  - L2: 80140: 123 max
  - L2: 80180 / 80280: 143 max
- More information: see page 16

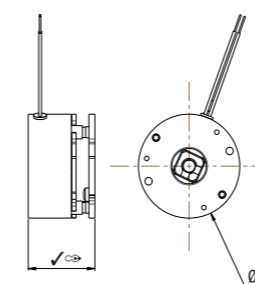
### Connections

|                          | Connector M16 | Cable color      |
|--------------------------|---------------|------------------|
| Power ground             | G+M           | AWG16 Blue       |
| Power supply 24 V        | E+F           | AWG16 Brown      |
| Logic ground             | H             | AWG24 Black (5)  |
| Input 1: On/Off          | C             | AWG24 Green (1)  |
| Input 2: Direction       | B             | AWG24 Yellow (2) |
| Input 3: Speed           | J             | AWG24 Orange (4) |
| Output 1: Tachometer     | A             | AWG24 Brown (6)  |
| Output 2: Real direction | L             | AWG24 Red (8)    |
| Input 4: Torque          | D             | AWG24 Blue (3)   |
| Output 3: Torque at max. | K             | AWG24 Purple (7) |



### Options

Holding brake 0.5 Nm - 24 V<sub>---</sub>



- › Shaft, pinion, pulley dimensions
- › Cable wire length
- › Powerful controlled brake (directed)
- › Programs evolution

### User information

Notice available on website, please read it before use.

# GEARBOXES FOR DCmind BRUHLESS RANGE

## 4 to 120 Nm

- > Planetary and worm gearboxes
- > Shafts on ball bearings
- > Long service life
- > IP65



| Gearboxes                      | Planetary Ø 52             | Planetary Ø 62                             | Planetary Ø 81           | Worm                  |
|--------------------------------|----------------------------|--|--------------------------|-----------------------|
| Type                           | 810495                     | 810496                                     | 810497                   | 810410                |
| Associated motors              | Part number                | Part number                                | Part number              | Part number           |
| 80140 TNi21                    | 801495 TNi21               | 801496 TNi21                               | 801897 TNi21             | 801410 TNi21          |
| 80180 TNi21                    |                            | 801896 TNi21                               | 802897 TNi21             | 801810 TNi21          |
| 80280 TNi21                    |                            |  |                          | 802810 TNi21          |
| 80140 SMi21                    | 801495 SMi21               | 801496 SMi21                               | 801897 SMi21             | 801410 SMi21          |
| 80180 SMi21                    |                            | 801896 SMi21                               | 802897 SMi21             | 801810 SMi21          |
| 80280 SMi21                    |                            |  |                          | 802810 SMi21          |
| <b>Gearbox characteristics</b> |                            |  |                          |                       |
| Number of stages               | 1, 2, 3                    | 1, 2, 3                                    | 1, 2, 3                  | 1                     |
| Maximum permitted torque (Nm)  | 4, 12, 25                  | 8, 25, 50                                  | 20, 60, 120              | 10                    |
| Efficiency                     | 0.8, 0.75, 0.7             | 0.9, 0.8, 0.7                              | 0.9, 0.8, 0.7            | 0.6 → 0.3             |
| Axial dynamic load (daN)       | 6, 10, 15                  | 7, 10, 15                                  | 8, 12, 20                | 10                    |
| Radial dynamic load (daN)      | 20, 32, 45                 | 24, 36, 52                                 | 40, 60, 100              | 15                    |
| Operating temperature          | -20 → +70°C                |  |                          | -20 → +70°C           |
| Weight (kg)                    | 0.7, 0.8, 1.1              | 0.8, 1.2, 1.6                              | 1.8, 2.5, 3.2            | 0.7                   |
| Standard reduction ratios      | 6.75, 25, 93, 46, 169, 308 | 5.16, 19, 100, 6.75, 27, 139, 46, 236, 308 | 5, 19, 100, 27, 139, 236 | 5 - 10 - 20 - 30 - 50 |
| Other ratios possible          |                            |  |                          | 15 - 100              |
| <b>Comments</b>                |                            |  |                          |                       |

**Ø 52 planetary gearbox:** Metal gears on all stages. IP65 apart from the output shaft.

**Ø 62 planetary gearbox:** On the first stage, the planet gears are made of composite materials which improve efficiency and service life. On the other stages, the metal gears turn on needle bearings. IP65 apart from the output shaft.

**Ø 81 planetary gearbox:** All gears are metal and turn on needle bearings, resulting in excellent robustness and a very long service life. IP65 apart from the output shaft.

**Worm gearbox:** This gearbox combines a tempered steel worm and a hard bronze helical gear wheel, thus ensuring a long service life. The wheel is coated with grease, ensuring an excellent slip coefficient and good heat dissipation. O-rings and lipseals are used in combination with a compression spring to create a tight seal at the gearbox output shaft and the motor input shaft. IP65 gearbox.

The casing is made of aluminium to maximise heat exchanges with its supporting surface on the machine. However, due to the high power that can be transmitted by this gearbox and the low efficiency inherent in large worm gearbox reduction ratios, make sure that the gearbox casing temperature does not exceed 75°C during operation.

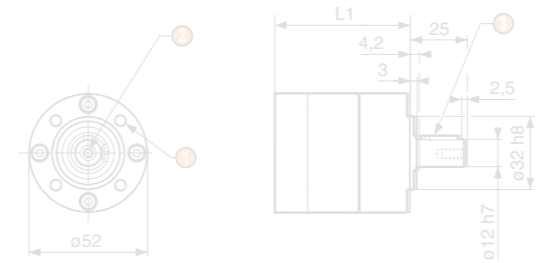
The output shaft can be placed on the right or left, or can be a double shaft (shaft output on both sides).

### Made to order products, available on request

- > Special shafts
- > Other reduction ratios
- > Other fixing holes
- > Special mounting flange

## Dimensions (mm)

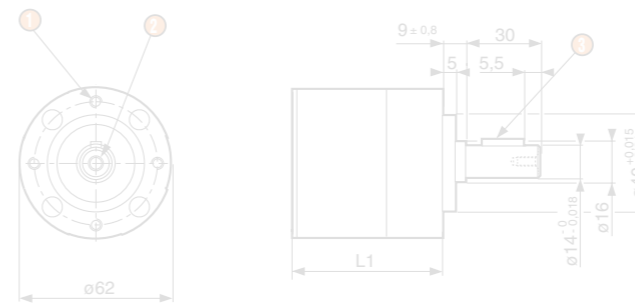
Planetary gearbox Ø 52 (810495)



- ① 4 x M5 at 90°, depth 10 over Ø 40
- ② M4 x 10
- ③ Parallel key 4 x 4 x 16 DIN 6885 A

L1 1 stage: 55.3 ± 0.5  
L1 2 stages: 69.5 ± 0.5  
L1 3 stages: 83.7 ± 0.5

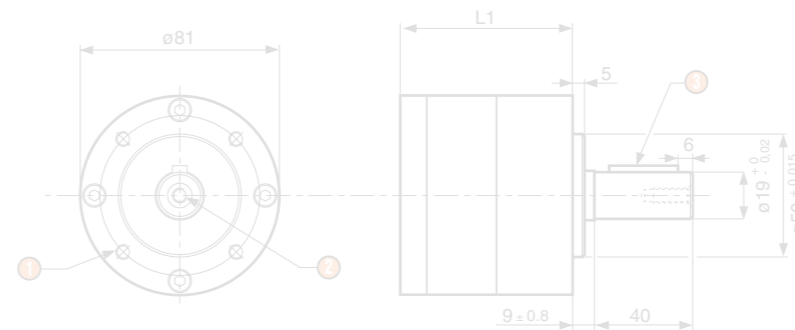
Planetary gearbox Ø 62 (810496)



- ① 4 x M5 at 90°, depth 10 over Ø 52
- ② M5, depth 12.5
- ③ Parallel key 5 x 5 x 18 DIN 6885 A

L1 1 stage: 52.1 ± 0.7  
L1 2 stages: 67.9 ± 0.7  
L1 3 stages: 83.8 ± 0.7

Planetary gearbox Ø 81 (810497)

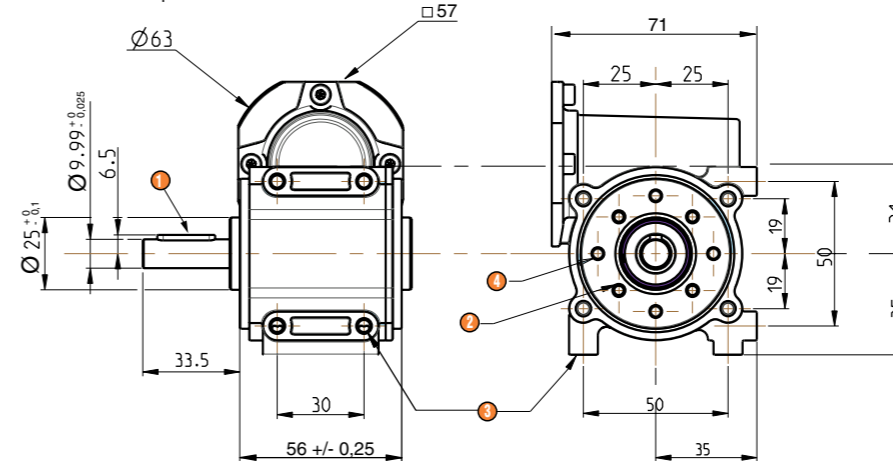


- ① 4 x M6, depth 12 over Ø 65
- ② M6 x 16
- ③ Parallel key 6 x 6 x 28 DIN 6885 A

L1 1 stage: 70.5 ± 0.6  
L1 2 stages: 92.2 ± 0.6  
L1 3 stages: 113.8 ± 0.6

Worm gearbox RAD10

Version with output shaft on left



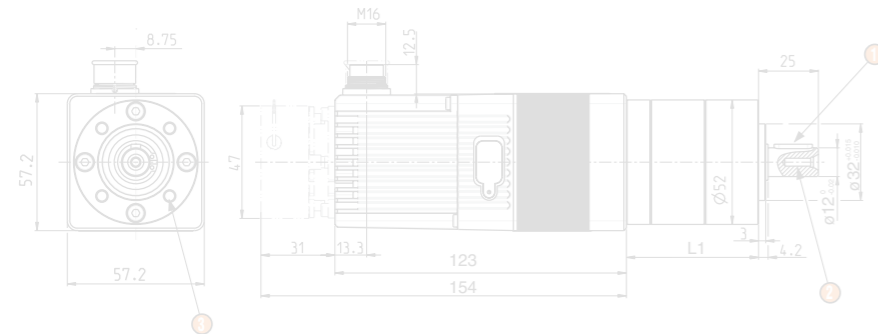
- ① Parallel key 4 x 4 x 20 DIN6885
- ② 4 x M4, depth 8 over Ø 36
- ③ 8 x M5, depth 8
- ④ 4 x Ø 3.8 depth 10 over Ø 40

The left-hand and right-hand sides of the gearbox are identical.

## DC GEARED DCmind BRUSHLESS TNi21

### Dimensions (mm)

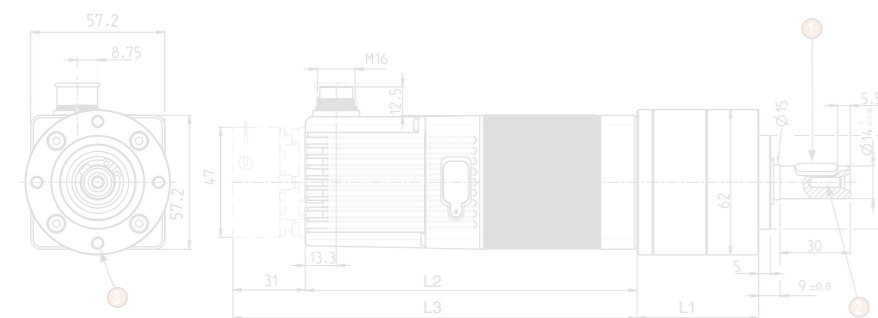
801495 - TNi21 + P52 M16 connector with or without brake



- L1 1 stage: 55.3 ±0.5
- L1 2 stages: 69.5 ±0.5
- L1 3 stages: 83.7 ±0.5

- 1 Parallel key 4 x 4 x 16 DIN 6885 A
- 2 M4 x 10
- 3 4 x M5 at 90°, depth 10 over Ø 40

801496 - 801896 - TNi21 + P62 M16 connector with or without brake

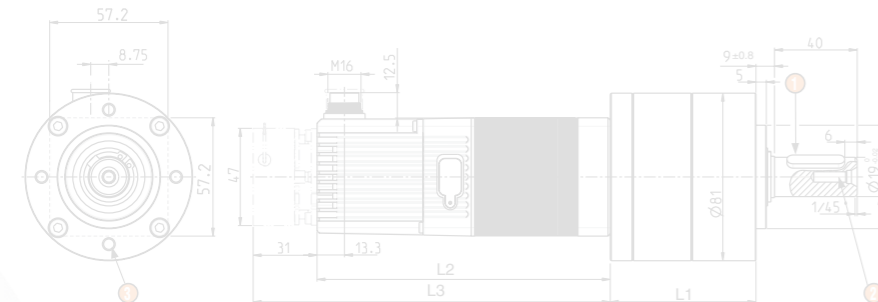


- L1 1 stage: 52.1 ±0.7
- L1 2 stages: 67.9 ±0.7
- L1 3 stages: 83.8 ±0.7

- L2 80140: 123 max.
- L2 80180: 143 max.
- L3 80140: 154 max.
- L3 80180: 174 max.

- 1 Parallel key 5 x 5 x 18 DIN 6885 A
- 2 M5 x 12
- 3 4 x M5 at 90°, depth 10 over Ø 52

801897 - TNi21 + P81 M16 connector with or without brake

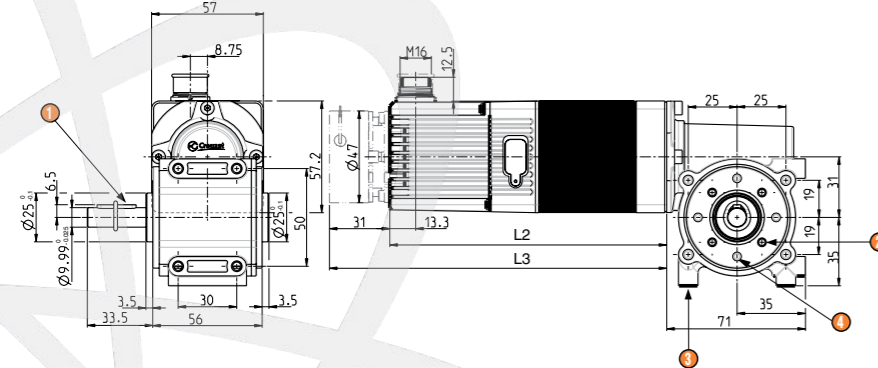


- L1 1 stage: 70.5 ±0.6
- L1 2 stages: 92.2 ±0.6
- L1 3 stages: 113.8 ±0.6

- L2 80180: 143 max.
- L3 80180: 174 max.

- 1 Parallel key 6 x 6 x 28 DIN 6885 A
- 2 M6 x 16
- 3 4 x M6, depth 12 over Ø 65

801410 - 801810 - 802810 - TNi21 + RAD10 M16 connector with or without brake



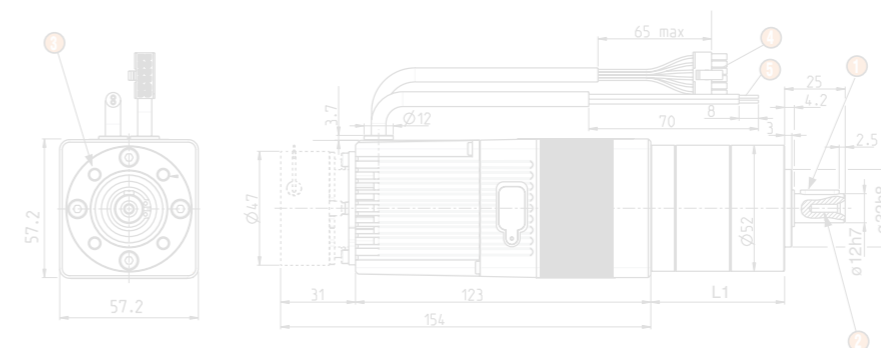
- L2 80140: 123 max.
- L2 80180-80280: 143 max.
- L3 80140: 154 max.
- L3 80180-80280: 174 max.

- 1 Parallel key 4 x 4 x 20 DIN 6885 A
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5, depth 8
- 4 4 x 3.8, depth 10 over Ø 40

## DC GEARED DCmind BRUSHLESS SMi21

### Dimensions (mm)

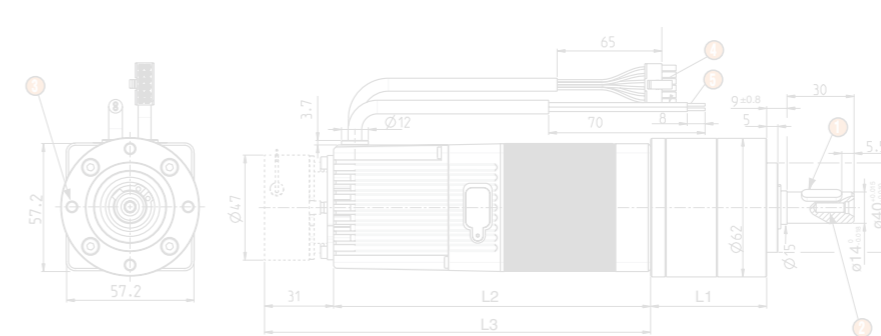
801495 - SMi21 + P52 with or without brake



- L1 1 stage: 55.3 ±0.5
- L1 2 stages: 69.5 ±0.5
- L1 3 stages: 83.7 ±0.5

- 1 Parallel key 4 x 4 x 16 DIN 6885 A
- 2 M4 x 10
- 3 4 x M5 at 90°, depth 10 over Ø 40
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801496 - 801896 - SMi21 + P62 with or without brake

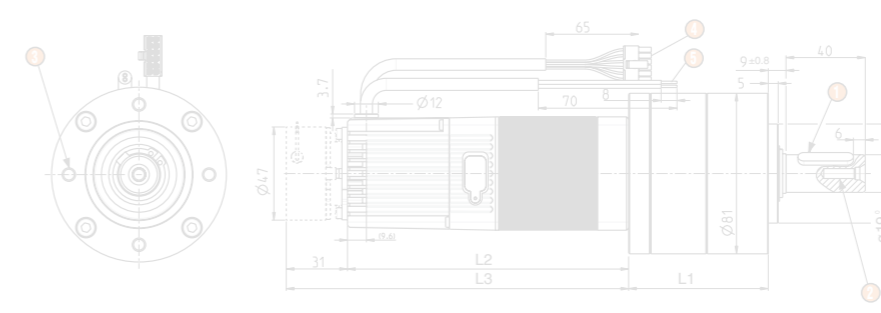


- L1 1 stage: 52.1 ±0.7
- L1 2 stages: 67.9 ±0.7
- L1 3 stages: 83.8 ±0.7

- L2 80140: 123 max.
- L2 80180: 143 max.
- L3 80140: 154 max.
- L3 80180: 174 max.

- 1 Parallel key 5 x 5 x 18 DIN 6885 A
- 2 M5 x 12
- 3 4 x M5 at 90°, depth 10 over Ø 52
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801897 - 802897 - SMi21 + P81 with or without brake

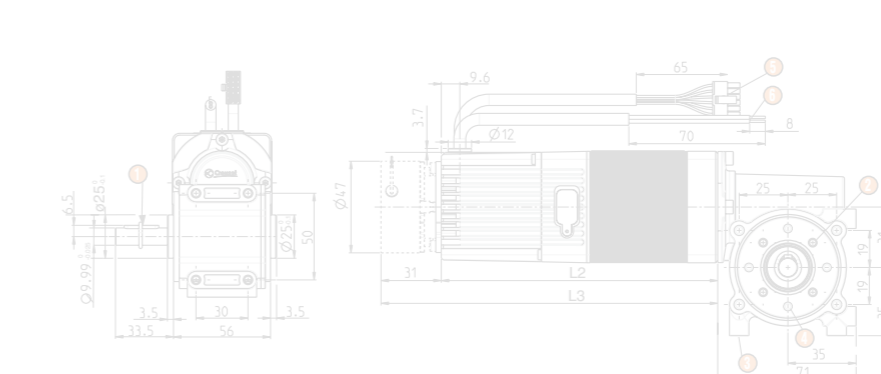


- L1 1 stage: 70.5 ±0.6
- L1 2 stages: 92.2 ±0.6
- L1 3 stages: 113.8 ±0.6

- L2 80180 - 80280: 143 max.
- L3 80180 - 80280: 174 max.

- 1 Parallel key 6 x 6 x 28 DIN 6885 A
- 2 M6 x 16
- 3 4 x M6 at 90°, depth 12 over Ø 65
- 4 Command cable 12 x AWG26 / 500 mm
- 5 Power cable 2 x AWG16 / 500 mm

801410 - 801810 - 802810 - SMi21 + RAD10 with or without brake



- L2 80140: 123 max.
- L2 80180 - 80280: 143 max.
- L3 80140: 154 max.
- L3 80180 - 80280: 174 max.

- 1 Parallel key 4 x 4 x 20 DIN 6885 A
- 2 4 x M4, depth 8 over Ø 36
- 3 8 x M5, depth 8
- 4 4 x Ø 3.8, depth 10 over Ø 40
- 5 Command cable 12 x AWG26 / 500 mm
- 6 Power cable 2 x AWG16 / 500 mm