

Brushless DC-Servomotors

2 Pole Technology

190 mNm
232 W

Series 4490 ... B

| Values at 22°C and nominal voltage | | 4490 H | 024 B | 036 B | 048 B | |
|--|---|-------------------------|---------------------------|----------------------|----------------------|---------------------------------|
| 1 | Nominal voltage | U_N | 24 | 36 | 48 | V |
| 2 | Terminal resistance, phase-phase | R | 0,22 | 0,44 | 0,7 | Ω |
| 3 | Efficiency, max. | η_{max} | 87 | 87 | 87 | % |
| 4 | No-load speed | n_0 | 9 700 | 10 400 | 10 800 | min ⁻¹ |
| 5 | No-load current, typ. (with shaft \varnothing 6 mm) | I_0 | 0,527 | 0,397 | 0,317 | A |
| 6 | Stall torque | M_H | 2 635 | 2 760 | 2 978 | mNm |
| 7 | Friction torque, static | C_0 | 4,96 | 4,96 | 4,96 | mNm |
| 8 | Friction torque, dynamic | C_V | $7,72 \cdot 10^{-4}$ | $7,72 \cdot 10^{-4}$ | $7,72 \cdot 10^{-4}$ | mNm/min ⁻¹ |
| 9 | Speed constant | k_n | 395 | 283 | 220 | min ⁻¹ /V |
| 10 | Back-EMF constant | k_E | 2,53 | 3,54 | 4,56 | mV/min ⁻¹ |
| 11 | Torque constant | k_M | 24,2 | 33,8 | 43,5 | mNm/A |
| 12 | Current constant | k_I | 0,041 | 0,03 | 0,023 | A/mNm |
| 13 | Slope of n-M curve | $\Delta n / \Delta M$ | 3,6 | 3,7 | 3,5 | min ⁻¹ /mNm |
| 14 | Terminal inductance, phase-phase | L | 73 | 142 | 235 | μ H |
| 15 | Mechanical time constant | τ_m | 4,9 | 5 | 4,8 | ms |
| 16 | Rotor inertia | J | 130 | 130 | 130 | gcm ² |
| 17 | Angular acceleration | α_{max} | 203 | 212 | 229 | $\cdot 10^3$ rad/s ² |
| 18 | Thermal resistance | R_{th1} / R_{th2} | 0,96 / 3,9 | | | K/W |
| 19 | Thermal time constant | τ_{w1} / τ_{w2} | 23 / 1 222 | | | s |
| 20 | Operating temperature range: | | | | | |
| | – motor | | -30 ... +125 | | | °C |
| | – winding, max. permissible | | +125 | | | °C |
| 21 | Shaft bearings | | ball bearings, preloaded | | | |
| 22 | Shaft load max.: | | | | | |
| | – with shaft diameter | | 6 | | | mm |
| | – radial at 3 000 min ⁻¹ (5 mm from mounting flange) | | 113 | | | N |
| | – axial at 3 000 min ⁻¹ (push only) | | 45 | | | N |
| | – axial at standstill (push only) | | 135 | | | N |
| 23 | Shaft play: | | | | | |
| | – radial | \leq | 0,015 | | | mm |
| | – axial | $=$ | 0 | | | mm |
| 24 | Housing material | | aluminium, black anodized | | | |
| 25 | Mass | | 742 | | | g |
| 26 | Direction of rotation | | electronically reversible | | | |
| 27 | Speed up to | n_{max} | 18 000 | | | min ⁻¹ |
| 28 | Number of pole pairs | | 1 | | | |
| 29 | Hall sensors | | digital | | | |
| 30 | Magnet material | | NdFeB | | | |
| Rated values for continuous operation | | | | | | |
| 31 | Rated torque | M_N | 148 | 139 | 137 | mNm |
| 32 | Rated current (thermal limit) | I_N | 7,45 | 5,06 | 3,91 | A |
| 33 | Rated speed | n_N | 9 650 | 10 470 | 10 930 | min ⁻¹ |

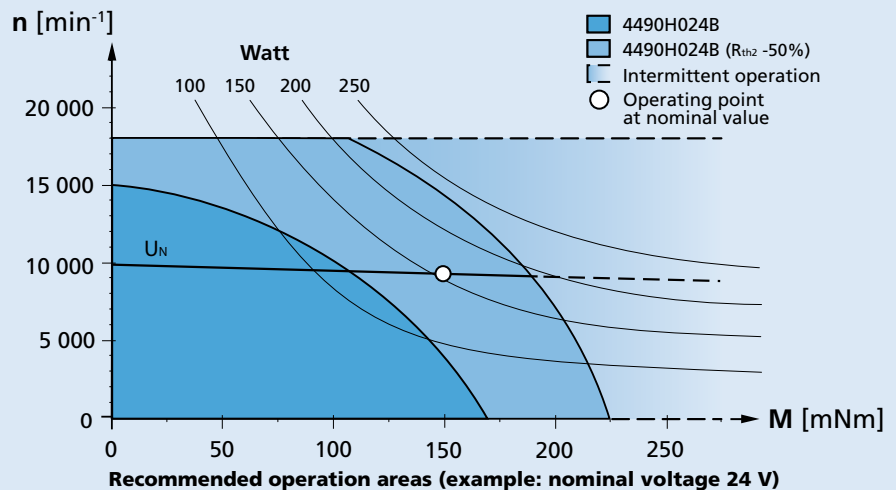
Note: Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The R_{th2} value has been reduced by 25%.

Note:


The diagram indicates the recommended speed in relation to the available torque at the output shaft for a given ambient temperature of 22°C.

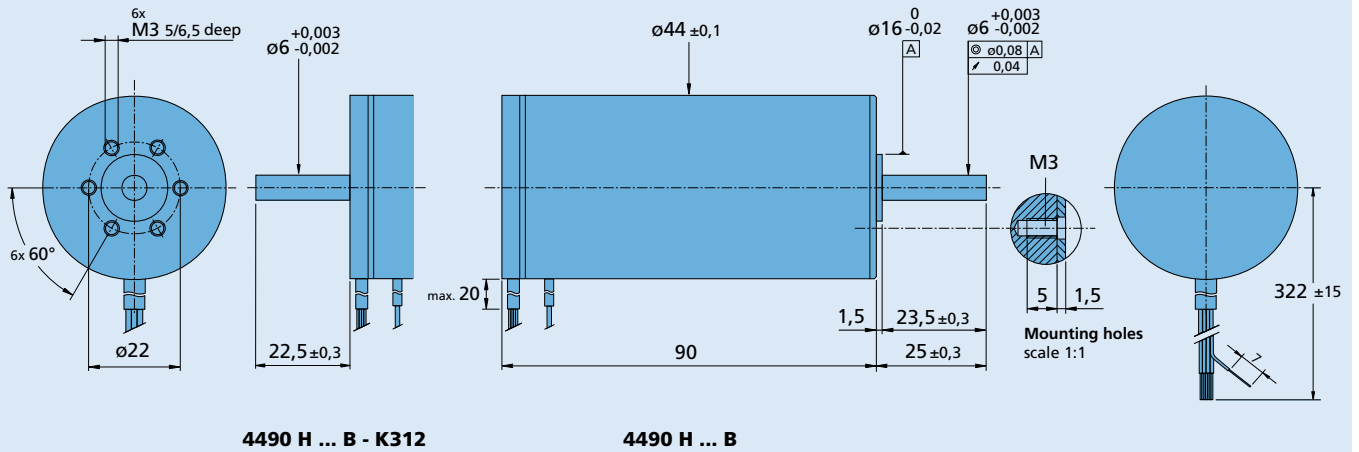
The diagram shows the motor in a completely insulated as well as thermally coupled condition (R_{th2} 50% reduced).

The nominal voltage (U_N) curve shows the operating point at nominal voltage in the insulated and thermally coupled condition. Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.



Dimensional drawing

Scale reduced 



Option, cable and connection information

Example product designation: **4490H024B-K1155**

| Option | Type | Description | Connection | |
|--------|------------------------|--|---|--------|
| | | | Function | Colour |
| K1155 | Controller combination | Analog Hall sensors for combination with Speed Controller SC or Motion Controller MC | Phase C | yellow |
| K1026 | Sensorless | Motor without Hall sensors | Phase B | orange |
| K1838 | Encoder combination | Motor with rear end shaft for combination with Encoder IE3 | Phase A | brown |
| K312 | Encoder combination | Motor with rear end shaft for combination with Encoder HEDS/HEDL/HEDM | GND | black |
| K3051 | Encoder combination | Motor with rear end shaft for combination with Encoder AES | U _{DD} (+5V) | red |
| K179 | Bearing lubrication | For vacuum of 10 ⁻⁵ Pa @ 22°C | Hall sensor C | grey |
| | | | Hall sensor B | blue |
| | | | Hall sensor A | green |
| | | | Standard cable | |
| | | | Single wires, material PTFE | |
| | | | AWG 16: Phase A/B/C | |
| | | | AWG 26: Hall A/B/C, U _{DD} , GND | |

Product combination

| Precision Gearheads / Lead Screws | Encoders | Drive Electronics | Cables / Accessories |
|-----------------------------------|--|-------------------------------------|---|
| 42GPT 44/1 | HEDS 5500 IE3-1024 IE3-1024 L HEDL 5540 AEMT-12/16 L AES-4096 L | SC 5004 P SC 5008 S MC 5010 S | MBZ To view our large range of accessory parts, please refer to the "Accessories" chapter. |