# Brushless DC-Flat Motors

112 mNm

External rotor technology, with housing

60 W

## Series 4221 ... BXT H

| Values at 22°C and nominal voltage | | 4221 G | | 018 BXT H | 024 BXT H | 048 BXT H | |
|---|---|---|---|---|---|---|---|
| 1 | Nominal voltage | $U_N$ | | 18 | 24 | 48 | V |
| 2 | Terminal resistance, phase-phase | $R$ | | 0,46 | 0,74 | 2,6 | Ω |
| 3 | Efficiency, max. | $\eta_{max.}$ | | 88 | 87 | 88 | % |
| 4 | No-load speed | $n_0$ | | 5 710 | 6 040 | 6 070 | min$^{-1}$ |
| 5 | No-load current, typ. (with shaft ø 5 mm) | $I_0$ | | 0,177 | 0,139 | 0,103 | A |
| 6 | Starting torque | $M_A$ | | 1 170 | 1 220 | 1 390 | mNm |
| 7 | Speed constant | $k_n$ | | 320 | 253 | 127 | min$^{-1}$/V |
| 8 | Back-EMF constant | $k_E$ | | 3,13 | 3,95 | 7,87 | mV/min$^{-1}$ |
| 9 | Torque constant | $k_M$ | | 29,8 | 37,7 | 75,2 | mNm/A |
| 10 | Current constant | $k_I$ | | 0,0335 | 0,0265 | 0,0133 | A/mNm |
| 11 | Slope of n-M curve | $\Delta n/\Delta M$ | | 4,93 | 4,97 | 4,4 | min$^{-1}$/mNm |
| 12 | Terminal inductance, phase-phase | $L$ | | 396 | 664 | 2 550 | µH |
| 13 | Mechanical time constant | $\tau_m$ | | 3,56 | 3,59 | 3,18 | ms |
| 14 | Rotor inertia | $J$ | | 69 | 69 | 69 | gcm² |
| 15 | Angular acceleration | $\alpha_{max.}$ | | 169 | 177 | 201 | ·10³rad/s² |
| | | | | | | | |
| 16 | Operating temperature range: | | | | | | |
| | – motor | | -40 ... +100 | | | | °C |
| | – winding, max. permissible | | +125 | | | | °C |
| 17 | Shaft bearings | | ball bearings, preloaded | | | | |
| 18 | Shaft load max.: | | | | | | |
| | – with shaft diameter | | 5 | | | | mm |
| | – radial at 3 000 min$^{-1}$ (5 mm from mounting flange) | | 25 | | | | N |
| | – axial at 3 000 min$^{-1}$ (push / pull) | | 4 | | | | N |
| | – axial at standstill (push / pull) | | 50 | | | | N |
| 19 | Shaft play: | | | | | | |
| | – radial | ≤ | 0,015 | | | | mm |
| | – axial | = | 0 | | | | mm |
| 20 | Mass | | 142 | | | | g |
| 21 | Direction of rotation | | electronically reversible | | | | |
| 22 | Speed up to | $n_{max.}$ | 10 000 | | | | min$^{-1}$ |
| 23 | Number of pole pairs | | 7 | | | | |
| 24 | Hall sensors | | digital | | | | |
| 25 | Magnet material | | NdFeB | | | | |
| **Rated values for continuous operation** | | | | | | | |
| 26 | Rated torque | $M_N$ | | 102 | 112 | 107 | mNm |
| 27 | Rated current (thermal limit) | $I_N$ | | 3,33 | 2,87 | 1,39 | A |
| 28 | Rated speed | $n_N$ | | 3 980 | 4 380 | 4 700 | min$^{-1}$ |
| 29 | Rated slope of n-M curve | $\Delta n/\Delta M$ | | 17 | 14,8 | 12,8 | min$^{-1}$/mNm |

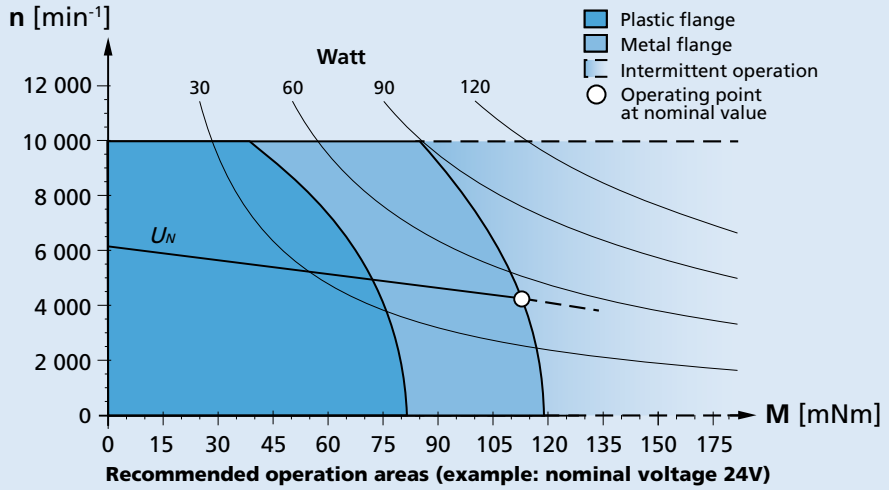
**Note:** Rated values are measured at nominal voltage and 22°C ambient temperature.

**Note:**

The display shows the range of possible operation points of the drives at a given ambient temperature of 22°C.

The diagram indicates the recommended speed in relation to the available torque at the output shaft.
It includes the assembly on a plastic- as well as on a metal flange (assembly method: IM B 5).

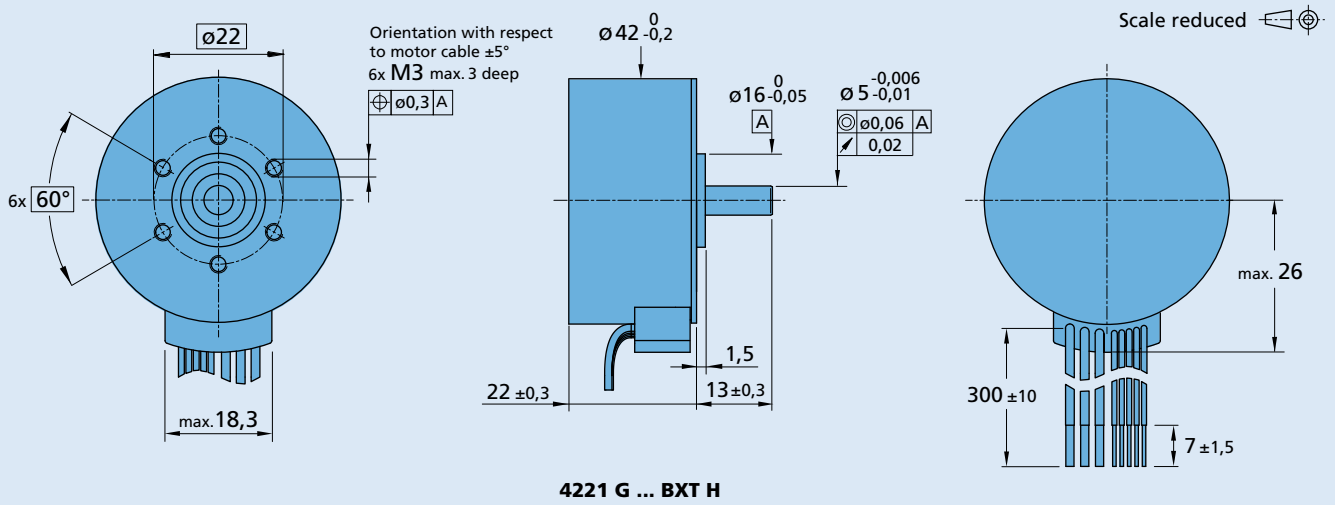
The nominal voltage linear slope describes the maximal achievable operating points at nominal voltage.
Any points of operation above this linear slope will require a supply voltage $U_{mot} > U_N$.




**Recommended operation areas (example: nominal voltage 24V)**

For notes on technical data and lifetime performance refer to "Technical Information".

## Dimensional drawing




**4221 G ... BXT H**

## Option, cable and connection information

Example product designation: **4221G018BXTH-3830**

| Option | Type | Description |
|---|---|---|
| 3830 |  | Standard cable with connector MOLEX Microfit 3.0, 43025-0800, recommended mating connector 43020-0800 |

### Connection

| No. | Function | Colour |
|---|---|---|
| 1 | Phase C | yellow |
| 2 | Phase B | orange |
| 3 | Phase A | brown |
| 4 | GND | black |
| 5 | $U_{DD}$ (+5V) | red |
| 6 | Hall sensor C | grey |
| 7 | Hall sensor B | blue |
| 8 | Hall sensor A | green |

### Standard cable

Single wires, material PVC,
AWG 20, Phase A/B/C
AWG 26, Hall A/B/C, $U_{DD}$, GND

## Product combination

| Precision Gearheads / Lead Screws | Encoders | Drive Electronics | Cables / Accessories |
|---|---|---|---|
| 38/1<br>38/1 S<br>38/2<br>38/2 S<br>42GPT | IE3-1024<br>IE3-1024 L<br>IEF3-4096<br>IEF3-4096 L<br>IERS3-500<br>IERS3-500 L<br>IER3-10000<br>IER3-10000 L | SC 2804 S<br>SC 5004 P<br>SC 5008 S<br>MC 3603 S<br>MC 5004 P<br>MC 5005 S | PMB32<br><br>To view our large range of accessory parts, please refer to the “Accessories” chapter. |