NEW

FAULHABER

# DC-Micromotors

## Precious Metal Commutation

2,75 mNm

5,32 W

## Series 1424 ... SXR

| Values at 22°C and nominal voltage | 1424 U | 003 SXR | 4,5 SXR | 006 SXR | 009 SXR | 012 SXR | 018 SXR | 024 SXR | |
|---|---|---|---|---|---|---|---|---|---|
| Nominal voltage | $U_N$ | 3 | 4,5 | 6 | 9 | 12 | 18 | 24 | V |
| Terminal resistance | $R$ | 1,08 | 2,78 | 4,66 | 11,3 | 17,6 | 45,1 | 71,6 | Ω |
| Rotor inductance | $L$ | 34,8 | 90 | 152 | 370 | 581 | 1 480 | 2 370 | µH |
| Efficiency, max. | $\eta_{max.}$ | 66 | 65 | 66 | 65 | 66 | 65 | 66 | % |
| No-load current, typ. | $I_0$ | 0,0997 | 0,0598 | 0,0468 | 0,0293 | 0,0241 | 0,0147 | 0,0119 | A |
| No-load speed | $n_0$ | 10 100 | 9 370 | 9 650 | 9 250 | 9 860 | 9 250 | 9 750 | min⁻¹ |
| Stall torque | $M_H$ | 7,43 | 6,94 | 7,17 | 6,93 | 7,43 | 6,94 | 7,39 | mNm |
| Rotor inertia | $J$ | 0,798 | 0,798 | 0,798 | 0,798 | 0,798 | 0,798 | 0,798 | gcm² |
| Friction torque | $M_R$ | 0,273 | 0,264 | 0,267 | 0,262 | 0,27 | 0,262 | 0,269 | mNm |
| Torque constant | $k_M$ | 2,77 | 4,45 | 5,77 | 9,02 | 11,3 | 18 | 22,9 | mNm/A |
| Speed constant | $k_n$ | 3 450 | 2 150 | 1 650 | 1 060 | 844 | 529 | 418 | min⁻¹/V |
| Slope of n-M curve | $\Delta n/\Delta M$ | 1 340 | 1 340 | 1 330 | 1 330 | 1 320 | 1 320 | 1 310 | min⁻¹/mNm |
| | | | | | | | | | |
| Thermal resistance: | | | | | | | | | |
| – winding to housing | $R_{th1}$ | 12 | | | | | | | K/W |
| – housing to ambient (external plastic flange) | $R_{th2\,p}$ | 31 | | | | | | | K/W |
| – housing to ambient (external metal flange) | $R_{th2\,m}$ | 3,4 | | | | | | | K/W |
| Thermal time constant: | | | | | | | | | |
| – winding | $\tau_{w1}$ | 8,2 | | | | | | | s |
| – housing (external plastic flange) | $\tau_{w2\,p}$ | 190 | | | | | | | s |
| – housing (external metal flange) | $\tau_{w2\,m}$ | 21 | | | | | | | s |
| Operating temperature range: | | | | | | | | | |
| – motor | | -30 ... +85 | | | | | | | °C |
| – winding, max. permissible | | +125 | | | | | | | °C |
| Shaft bearings | | sintered bearings | | | | ball bearings, preloaded | | | |
| Shaft diameter | | 2 | | | | 2 | | | mm |
| Radial shaft load max.: | | | | | | | | | |
| – dynamic at 3 000 min⁻¹ (4 mm from mounting face) | | 2 | | | | 8 | | | N |
| Axial shaft load max.: | | | | | | | | | |
| – dynamic at 3 000 min⁻¹ | | 0,2 | | | | 0,8 | | | N |
| – static (shaft unsupported) | | 40 | | | | 40 | | | N |
| – static (shaft supported) | | 300 | | | | 300 | | | N |
| Shaft play, max.: | | | | | | | | | |
| – radial | | 0,03 | | | | 0,015 | | | mm |
| – axial | | 0,2 | | | | 0 | | | mm |
| Speed up to | $n_{max.}$ | 15 000 | | | | | | | min⁻¹ |
| Number of pole pairs | | 1 | | | | | | | |
| Mass | | 14,9 | | | | | | | g |
| Housing material | | steel, nickel plated | | | | | | | |
| Magnet material | | NdFeB | | | | | | | |
| | | | | | | | | | |
| **Rated values for continuous operation** | | | | | | | | | |
| Rated torque | $M_N$ | 1,98 | 2,72 | 2,72 | 2,74 | 2,73 | 2,75 | 2,74 | mNm |
| Rated current (thermal limit) | $I_N$ | 0,84 | 0,721 | 0,556 | 0,358 | 0,285 | 0,179 | 0,142 | A |
| Rated speed | $n_N$ | 7 030 | 4 300 | 4 630 | 4 190 | 4 920 | 4 200 | 4 810 | min⁻¹ |

**Note:** Rated values are calculated with nominal voltage and at a 22°C ambient temperature. The $R_{th2\,p}$ value has been reduced by 0%.

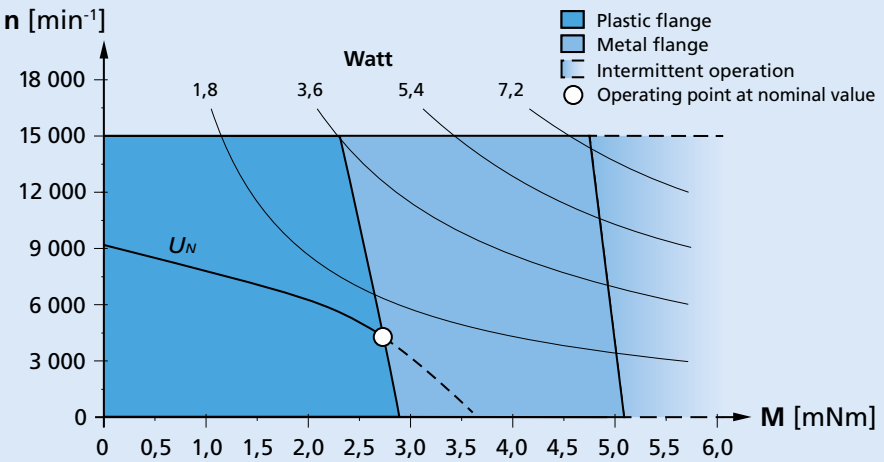
**Note:**

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 different conditions of thermal coupling, i.e. mounted respectively on a plastic flange and a metal flange.

The nominal voltage ($U_N$) curve shows, up to the thermal limit, the operating point at nominal voltage for the motor mounted on a plastic flange. Higher torque can be achieved by further reducing the thermal resistance.

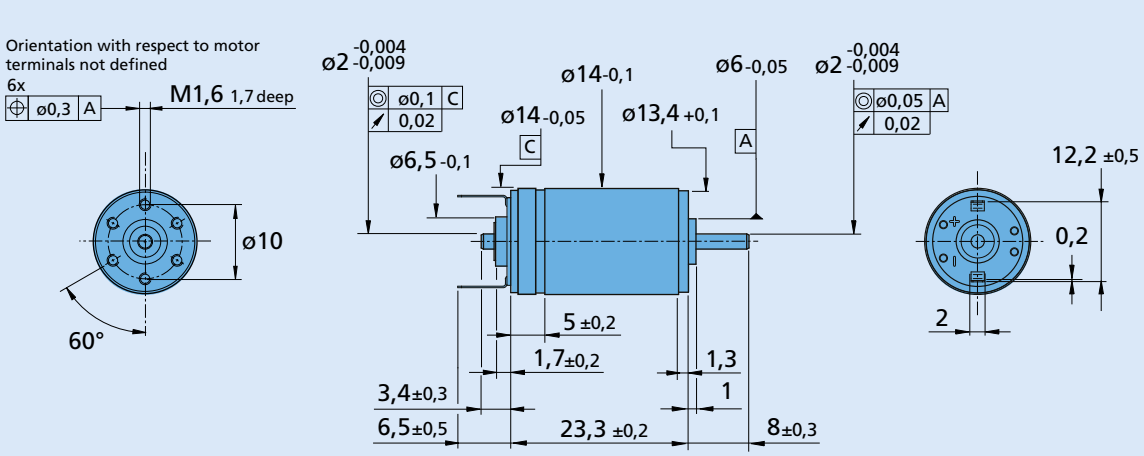
Any points of operation above the curve at nominal voltage will require a higher operating voltage. Any points below the nominal voltage curve will require less voltage.




**Recommended operation areas (example: nominal voltage 18V)**

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

## Dimensional drawing




**1424 U ... SXR**

## Options

Example product designation: **1424U012SXR-7960**

| Option | Type | Description |
|---|---|---|
| 7931 | Bearings | Motor with 2 preloaded ball bearings |
| 7961 | Temperature Range | Motor with 2 preloaded ball bearings, extended temperature range (-30°C...+125°C) |
| 7962 | Ambient Conditions | Motor with 2 preloaded ball bearings, for vacuum down to $10^{-5}$ Pa @22°C |
| 7933 | Bearings | Motor with reinforced sintered bearings (shaft press fit force, max. 60N) |
| 7927 | Shaft End | Motor front shaft ø2 mm, 6,5 mm long from motor front [1] |
| 7928 | Shaft End | Motor front shaft ø2 mm, 8 mm long with single flat end of 5 mm |
| 7925 | Front-Flange | Additional front flange with 6x60° threaded holes, motor leads oriented at 0° vs flange front threads (90° CCW in case of terminals) [2] |
| 7948 | Front-Flange | Additional front flange with 4x90° threaded holes, motor leads / terminals oriented at 0° vs flange front threads [2] |
| 7960 | Electrical Interface | Motor terminals oriented radially outwards |
| 7935 | Leads | Motor with twin leads (PVC), length 50 mm, red (+) / black (-) |
| X7935 | Leads | Motor with twin leads (PVC), length 100 mm, red (+) / black (-) |
| Y7935 | Leads | Motor with twin leads (PVC), length 150 mm, red (+) / black (-) |
| Z7935 | Leads | Motor with twin leads (PVC), length 300 mm, red (+) / black (-) |
| XX7935 | Leads | Motor with twin leads (PVC), length 600 mm, red (+) / black (-) |
| 7936 | Leads | Motor with single leads (PTFE), length 150 mm, red (+) / black (-) |
| 7937 | Leads | Motor with twin leads (PVC), length 150 mm, red (+) / black (-) and connector PHOENIX 1012267 |
| 7938 | Leads | Motor with twin leads (PVC), length 150 mm, red (+) / black (-) and connector AMP 179228-2 |

[1] Front shaft, on request other lengths from 4 mm to 17 mm (standard step 1 mm); rear shaft, on request other lengths from 1 mm to 12 mm (standard step 1 mm)
[2] Dimensional drawing available on product website at faulhaber.com, other orientations available (in 15° steps CCW)

## Product combination

| Precision Gearheads / Lead Screws | Encoders | Drive Electronics | Cables / Accessories |
|---|---|---|---|
| 14GPT<br>15A<br>15/5<br>15/5 S<br>15/8<br>16GPT | IEP3-4096 | SC 1801 S<br>SC 2804 S<br>MC 3001 B<br>MC 3001 P<br>MC 3602 B<br>MC 3603 S | To view our large range of accessory parts, please refer to the "Accessories" chapter. |