

## Stepper Motors

2,4 mNm

Two phase, 20 steps per revolution

### ADM1220-ww-ee

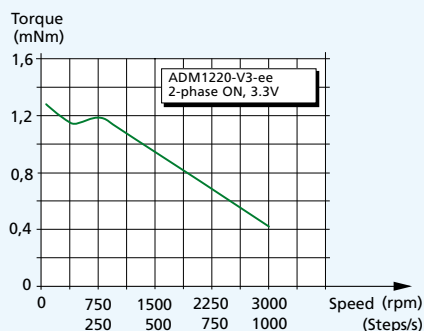
|  | V2      |                                     | V3      |         | V6                                  |         | V12     |         | Drive mode                          |
|--|---------|-------------------------------------|---------|---------|-------------------------------------|---------|---------|---------|-------------------------------------|
|  | Voltage | Current                             | Voltage | Current | Voltage                             | Current | Voltage | Current |                                     |
| 1 Nominal voltage  | 2       | –                                   | 3       | –       | 6                                   | –       | 12      | –       | V DC                                |
| 2 Nominal current per phase (both phases ON)                       | –       | 0,3                                 | –       | 0,2     | –                                   | 0,09    | –       | 0,055   | A                                   |
| 3 Phase resistance (at 20°C)                                       |         | 4,4                                 |         | 13      |                                     | 48      |         | 156     | Ω                                   |
| 4 Phase inductance (1kHz)  |         | 2,6                                 |         | 3,8     |                                     | 7,2     |         | 13      | mH                                  |
| 5 Back-EMF amplitude   |         | 1,5                                 |         | 2,2     |                                     | 4,2     |         | 7,4     | V/k step/s                          |
| 6 Holding torque <sup>1)</sup> (at nominal current in both phases) |         | 2,4                                 |         |         |                                     |         |         |         | mNm                                 |
| 7 Holding torque <sup>1)</sup> (at twice the nominal current)      |         | 4,1                                 |         |         |                                     |         |         |         | mNm                                 |
| 8 Step angle (full step)   |         | 18                                  |         |         |                                     |         |         |         | degree                              |
| 9 Angular accuracy <sup>2)</sup>                                   |         | ± 5                                 |         |         |                                     |         |         |         | % of full step                      |
| 10 Residual torque   |         | 0,3                                 |         |         |                                     |         |         |         | mNm                                 |
| 11 Rotor inertia   |         | 7,6                                 |         |         |                                     |         |         |         | · 10 <sup>-9</sup> kgm <sup>2</sup> |
| 12 Resonance frequency (at no load)                                |         | 187                                 |         |         |                                     |         |         |         | Hz                                  |
| 13 Electrical time constant  |         | 0,3                                 |         |         |                                     |         |         |         | ms                                  |
| 14 Ambient temperature range                                       |         | –35 ... +70                         |         |         |                                     |         |         |         | °C                                  |
| 15 Winding temperature tolerated, max.                             |         | 130                                 |         |         |                                     |         |         |         | °C                                  |
| 16 Thermal resistance winding-ambient air                          |         | 62                                  |         |         |                                     |         |         |         | °C/W                                |
| 17 Thermal time constant   |         | 205                                 |         |         |                                     |         |         |         | s                                   |
| 18 Shaft bearings  |         | sintered sleeve bearings (standard) |         |         | ball bearings, preloaded (optional) |         |         |         |                                     |
| 19 Shaft load, max.:   |         |                                     |         |         |                                     |         |         |         |                                     |
| – radial (3 mm from bearing)                                       |         | 0,5                                 |         |         | 6,0                                 |         |         |         | N                                   |
| – axial  |         | 0,5                                 |         |         | 3,0                                 |         |         |         | N                                   |
| 20 Shaft play, max.:   |         |                                     |         |         |                                     |         |         |         |                                     |
| – radial (0,2N)  |         | 15                                  |         |         | 12                                  |         |         |         | µm                                  |
| – axial (0,2N)   |         | ~0                                  |         |         | ~0                                  |         |         |         | µm                                  |
| 21 Isolation test voltage  |         | 200                                 |         |         |                                     |         |         |         | V DC                                |
| 22 Motor dimensions:   |         |                                     |         |         |                                     |         |         |         |                                     |
| – diameter   |         | 12                                  |         |         |                                     |         |         |         | mm                                  |
| – length   |         | 17,4                                |         |         |                                     |         |         |         | mm                                  |
| – shaft diameter   |         | 1,5                                 |         |         |                                     |         |         |         | mm                                  |
| 23 Weight  |         | 9                                   |         |         |                                     |         |         |         | g                                   |

<sup>1)</sup> with bipolar driver

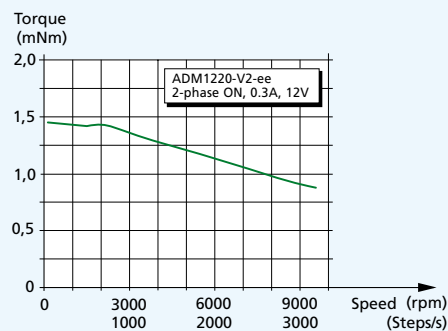
<sup>2)</sup> 2-phase ON, balanced phase currents

<sup>3)</sup> Curves measured with a load inertia of 10 · 10<sup>-9</sup> kgm<sup>2</sup>

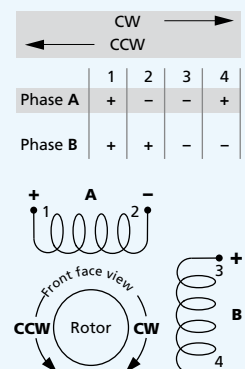
<sup>4)</sup> Testing the motor at lower supply voltages in current mode will result in a decrease in torque at higher speed, even with the same current setting



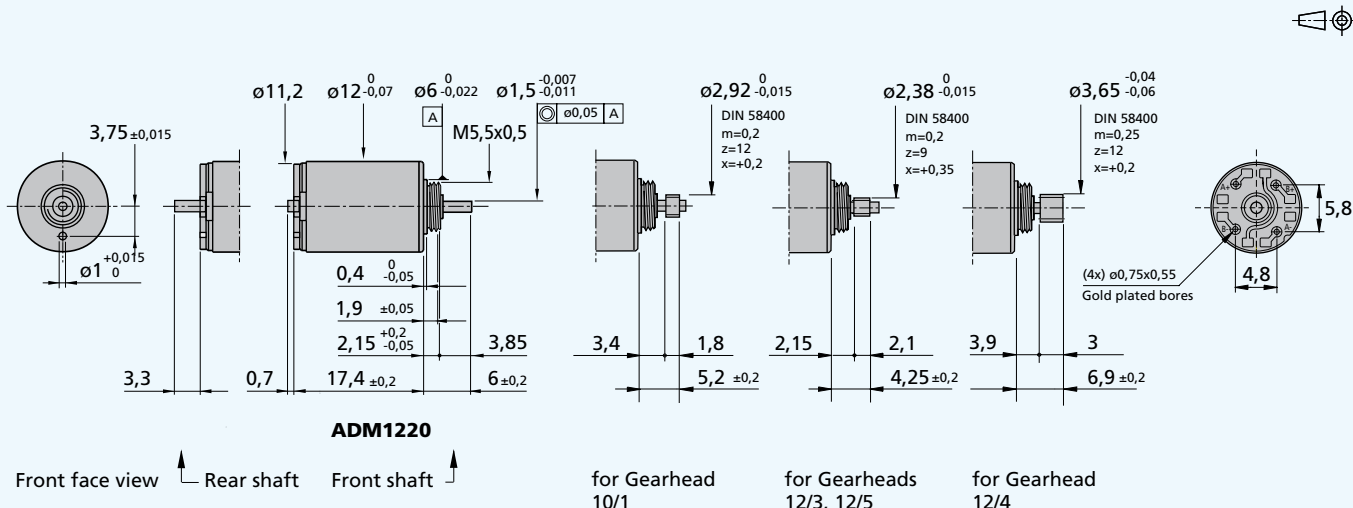
**Voltage mode (V) <sup>3)</sup>**  
Driver AD VL M15



**Current mode (A) <sup>3) 4)</sup>**  
Driver AD CM M15



## Dimensional drawing



## Combinations

| Drive Electronics | Encoders | Stepper Motors | Gearheads / Lead screws          |
|-------------------|----------|----------------|----------------------------------|
|                   |          |                |                                  |
| <b>AD VL M_S</b>  |          | <b>ADM1220</b> | <b>10/1</b>                      |
| <b>AD VM M_S</b>  |          |                | <b>12/3</b>                      |
| <b>AD CM M_S</b>  |          |                | <b>12/4</b>                      |
|                   |          |                | <b>12/5*</b>                     |
|                   |          |                | <b>Lead screws M2</b>            |
|                   |          |                | <b>Lead screws M2.5</b>          |
|                   |          |                | <b>* Zero Backlash Gearheads</b> |

## Ordering information

Example: **ADM1220-2R-V2-01**

| Motor type<br>ADM = Motor design<br>12 = Motor diameter (mm)<br>20 = Steps per revolution | Bearings* (rr)<br>Standard, sintered sleeve bearings | Winding (ww) | Motor execution (ee)    |                          |                           |
|---|--|--------------|-------------------------|--------------------------|---------------------------|
|   |  |              | Only front output shaft | With double output shaft | Front output shaft        |
| <b>ADM1220</b>  | - (sleeve bearings)                                  | <b>-V2</b>   | <b>-01</b>              | <b>-00</b>               | Plain shaft               |
|   | <b>-2R</b> (2 ball bearings)                         | <b>-V3</b>   | <b>-05</b>              | <b>-06</b>               | Pinion 10/1               |
|   |  | <b>-V6</b>   | <b>-07</b>              | <b>-08</b>               | Pinion 12/3, 12/5         |
|   |  | <b>-V12</b>  | <b>-09</b>              | <b>-10</b>               | Pinion 12/4               |
|   |  |              | <b>-23</b>              | <b>-22</b>               | Plain shaft <sup>1)</sup> |

\*Special lubricant options available

<sup>1)</sup> Prepared for assembly of lead screws size M2 and M2,5