

# Stepper Motors

1,6 mNm

Two phase, 20 steps per revolution

## Series AM1020

Values at 20°C	AM1020	0250	0180	0090	0045	
Nominal current per phase (both phases ON)		0,25	0,18	0,09	0,045	A
Boosted current per phase (both phases ON)		0,5	0,36	0,18	0,09	A
Nominal voltage per phase (both phases ON)		2	3	6	12	V
Phase resistance		8	16	65	250	Ω
Phase inductance (1 kHz)		2,4	5,2	21,4	80,1	mH
Holding torque (at nominal current in both phases)		1,6	1,6	1,6	1,6	mNm
Holding torque at boosted current		2,4	2,4	2,4	2,4	mNm
Residual torque, typ.		0,14	0,14	0,14	0,14	mNm
Back-EMF amplitude		1,8	2,6	5,3	10,5	V/k step/s
Electrical time constant	0,32					ms
Rotor inertia	9·10 <sup>-9</sup>					kgm <sup>2</sup>
Step angle (full step)	18					°
Angular accuracy	±10					%
Angular acceleration, max.	256·10 <sup>3</sup>					rad/s <sup>2</sup>
Resonance frequency (at no load)	65					Hz
Thermal resistance	3,9 / 53,8					K/W
Thermal time constant	4,5 / 200					s
Operating temperature range	-35 ... +70					°C
Winding temperature, max.	+130					°C
Shaft bearings <sup>1) 2)</sup>	sintered bearings (Bearing code: SB)		ball bearings, preloaded (Bearing code: 2R)			
Shaft load max.:						
– with shaft diameter	1,2		1,2			mm
– radial at 5 000 min <sup>-1</sup> (3 mm from bearing)	0,3		4			N
– axial at 5 000 min <sup>-1</sup>	0,3		3			N
– axial at standstill	0,3		11			N
Shaft play:						
– radial	0,015		0,012			mm
– axial	0,15		0			mm
Housing material	aluminium, black anodized					
Mass	5,5					g
Magnet material	NdFeB					

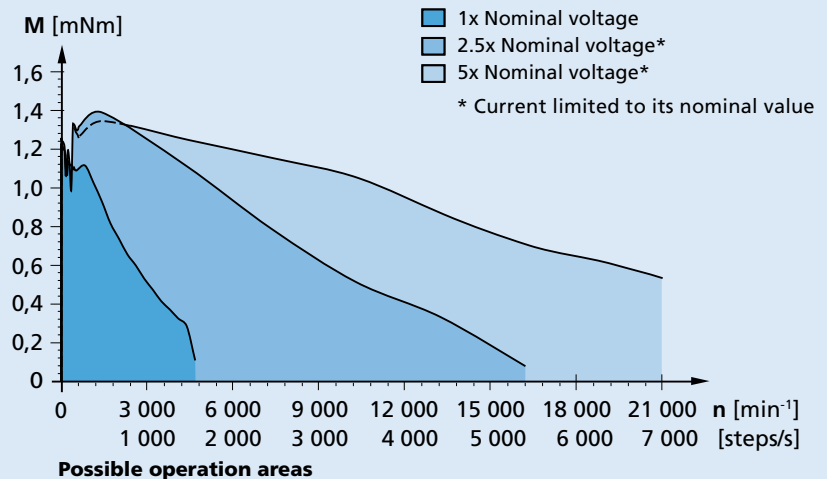
<sup>1)</sup> Special lubricant options available on request.

<sup>2)</sup> 2 preloaded ball bearings available on request for vacuum / low temperature (bearing code: RC).

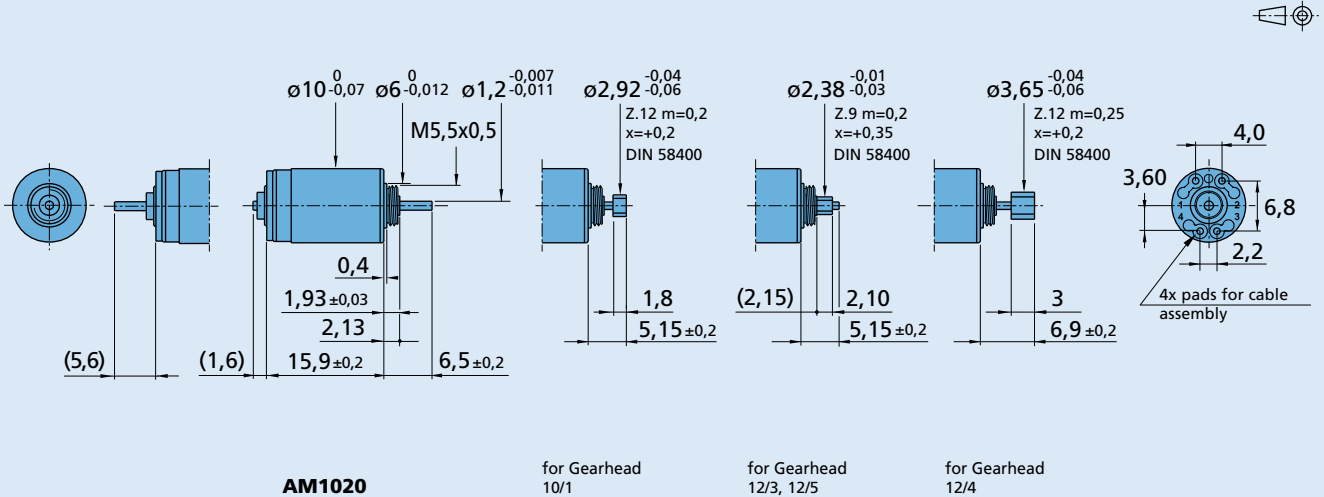
### Driver settings

Relevant for 2 phases ON only.  
On PWM drivers or chopper (current mode), the current is set to the nominal value and the supply voltage is typically 2.5 to 5x higher than the nominal voltage.

Curves measured with a load inertia of 6·10<sup>-9</sup> kgm<sup>2</sup>, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.



### Dimensional drawing



### Options and connection information

Example product designation: **AM10202R018001**

Motor executions		Front shaft description	Connection	
front shaft	double shaft		No.	Function
01	00	Plain shaft	1	Phase A +
08	09	With pinion for gearheads 10/1	2	Phase A -
10	11	With pinion for gearheads 12/3 and 12/5	3	Phase B +
21	20	Plain shaft for lead screw M1,2	4	Phase B -
23	22	Plain shaft for lead screw M2 - M3		
25	24	Plain shaft for lead screw M1,6		
31	30	With pinion for gearheads 12/4		
	40	Plain shaft with encoder IEP3-4096 (an additional motor cable is mandatory)		
	41	Plain shaft for lead screw M2 - M3 with encoder IEP3-4096 (an additional motor cable is mandatory)		
	42	Plain shaft for lead screw M1,6 with encoder IEP3-4096 (an additional motor cable is mandatory)		
	43	Plain shaft for lead screw M1,2 with encoder IEP3-4096 (an additional motor cable is mandatory)		
	44	With pinion for gearheads 10/1 with encoder IEP3-4096 (an additional motor cable is mandatory)		
	45	With pinion for gearheads 12/3 and 12/5 with encoder IEP3-4096 (an additional motor cable is mandatory)		
	46	With pinion for gearheads 12/4 with encoder IEP3-4096 (an additional motor cable is mandatory)		

Option	Description
Single leads	PTFE single leads length 50/100/150/300 mm
Connector	PVC single leads length 50/100/150/300 mm or ETFE/PTFE single leads length 150 mm with connector Molex 51021-0400

### Product combination

Precision Gearheads / Lead Screws	Encoders	Drive Electronics	Cables / Accessories
10/1 12/3 12/4 12/5 M1,2 x 0,25 x L1 M1,6 x 0,35 x L1 M2 x 0,2 x L1 M3 x 0,5 x L1 10L ... SL	IEP3-4096	MCST 3601	Detailed cable options can be found in Application Note AN 010 to be downloaded on FAULHABER website.