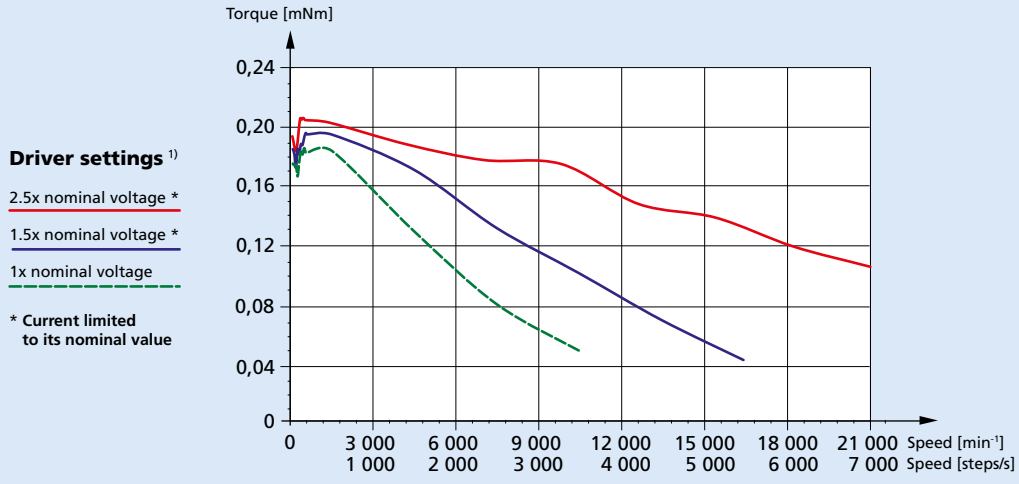
Stepper Motors 0,25 mNm

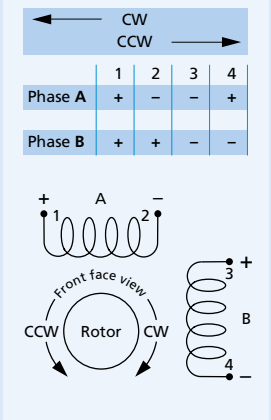
Two phase, 20 steps per revolution
PRECIstep® Technology

FDM0620-ww-ee

	ww =		V2		V3		V6		
			Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON)		0,13	–	0,08	–	0,04	–	A
2	Nominal voltage per phase (both phases ON)		–	2	–	3	–	6	V DC
3	Phase resistance (at 20°C)		13,6		30		120		Ω
4	Phase inductance (1kHz)		2		4,5		18,5		mH
5	Back-EMF amplitude		0,53		0,83		1,6		V/k step/s
6	Holding torque (at nominal current in both phases)		0,25						mNm
7	Holding torque (at twice the nominal current)		0,39						mNm
8	Step angle (full step)		18						degree
9	Angular accuracy		± 5						% of full step
10	Residual torque, max.		0,06						mNm
11	Rotor inertia		0,5						$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)		60						Hz
13	Electrical time constant		0,15						ms
14	Ambient temperature range		–35 ... +70						°C
15	Winding temperature tolerated, max.		130						°C
16	Thermal resistance	R_{th1} / R_{th2}	15 / 96,6						°C/W
17	Thermal time constant	τ_{w1} / τ_{w2}	3,2 / 120						s
18	Shaft bearings		Sintered sleeve bearing (standard)		ball bearings, preloaded (optional)				
19	Shaft load, max.:								
	– radial (3 mm from bearing)		0,3		3,0				N
	– axial		0,5		0,5				N
20	Shaft play, max.:								
	– radial (0,2N)		20		12				µm
	– axial (0,2N)		~0		~0				µm
21	Mass		1,1						g

[1] On PWM drivers or chopper (current mode), the current is set to the nominal value and the supply voltage is typically 1 to 3x higher than the nominal voltage. Microstepping is recommended below 200 steps/s. Curves measured with a load inertia of 3.10-9 kgm^2.





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Edition 2016 Feb. 09

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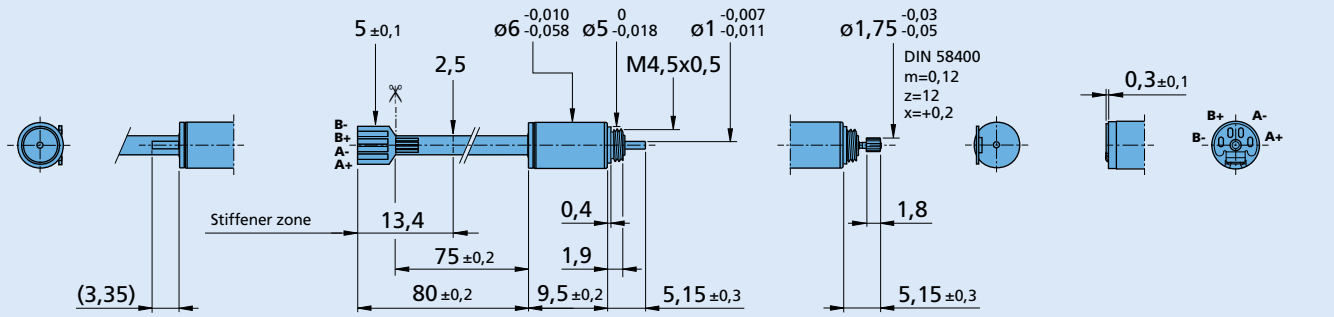
Dimensional drawing



Recommended connectors
Pitch: 1mm - FPC/FFC, 4 poles
JST 04FMN-SMT-A-TF or similar
Pitch: 0,5mm - FPC/FFC, 4 poles
Molex 52745 or similar

Flex PCB
thickness: 0,15 mm. Bending radius 3 mm min.
Thickness of pads area (stiffener)
0,3 mm (±0,05), not flexible

FDM0620

for Gearhead 06/1

Flex PCB for cables

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601		Complete list available on request	**06/1** Lead screws **M1,2 - M1,6**

Ordering information

Example: **FDM0620-2R-V3-10**

Motor type FDM = Motor design 06 = Motor diameter (mm) 20 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
FDM0620	**-** (sleeve bearing)	**-V2**	**-31** (Flex PCB 80mm p=1mm)	**-30** (Flex PCB 80mm p=1mm)	Plain shaft Ø1mm
	-2R (2 ball bearings)	**-V3**	**-35** (Flex PCB 80mm p=1mm)	**-36** (Flex PCB 80mm p=1mm)	Pinion 06/1
		-V6	**-76** (Flex PCB 80mm p=1mm)	**-75** (Flex PCB 80mm p=1mm)	for lead screw M1,2
			-78 (Flex PCB 80mm p=1mm)	**-77** (Flex PCB 80mm p=1mm)	for lead screw M1,6
			-11 (Flex PCB for cable)		Plain shaft Ø1mm
			-15 (Flex PCB for cable)		Pinion 06/1
			-26 (Flex PCB for cable)		for lead screw M1,2
			-28 (Flex PCB for cable)		for lead screw M1,6

Note : Standard version is delivered with a flex PCB of 80mm that the user can cut himself as indicated on the drawing above. A version with pre-cut PCB is available on request.

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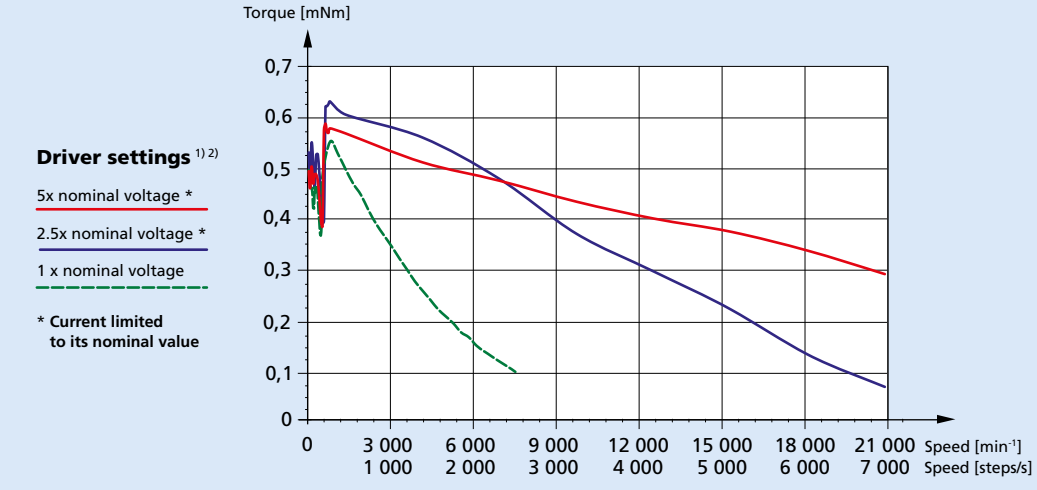
Stepper Motors 0,65 mNm

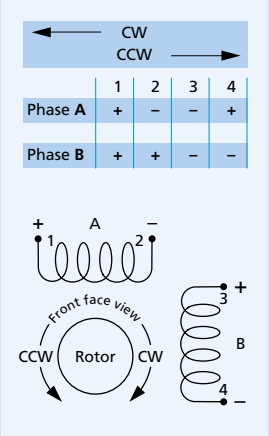
Two phase, 20 steps per revolution
PRECIstep® Technology

AM0820-ww-ee

			ww =	A-0,225-7		V-3-18		V-5-56		
				Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]			0,225	–	0,15	–	0,08	–	A
2	Nominal voltage per phase (both phases ON) [1]			–	2	–	3	–	5	V DC
3	Phase resistance (at 20°C)			7,3		18		56		Ω
4	Phase inductance (1kHz)			1,4		3,9		12,6		mH
5	Back-EMF amplitude			0,8		1,3		2,4		V/k step/s
6	Holding torque (at nominal current in both phases)		0,65							mNm
7	Holding torque (at twice the nominal current)		1							mNm
8	Step angle (full step)		18							degree
9	Angular accuracy [1]		± 10							% of full step
10	Residual torque, max.		0,17							mNm
11	Rotor inertia		2,75							$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)		170							Hz
13	Electrical time constant		0,21							ms
14	Ambient temperature range		–30 ... +70							°C
15	Winding temperature tolerated, max.		130							°C
16	Thermal resistance	R_{th1} / R_{th2}	4,1 / 65,3							°C/W
17	Thermal time constant	τ_{w1} / τ_{w2}	3,5 / 160							s
18	Shaft bearings		sintered sleeve bearings (standard)			ball bearings, preloaded (optional)				
19	Shaft load, max.:									
	– radial (3 mm from bearing)		0,3			3,0				N
	– axial		0,2			1,5				N
20	Shaft play, max.:									
	– radial (0,2N)		15			12				µm
	– axial (0,2N)		140			~0				µm
21	Mass		3,3							g

[1] 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 3 to 5x higher than the nominal voltage.
[2] Curves measured with a load inertia of 6 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.





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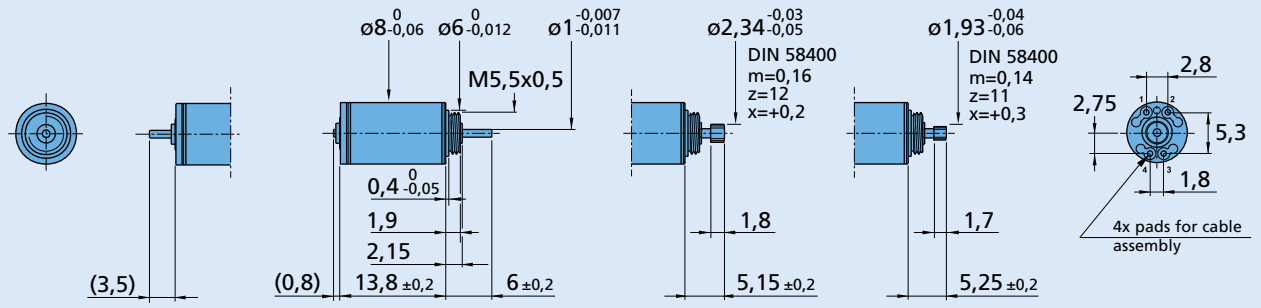
Dimensional drawing



AM0820

for Gearhead 08/1

for Gearhead 08/2, 08/3

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601	Available on request	List available on request	**08/1**
			08/2
			08/3*
			10/1
			Lead screws **M1,2 - M1,6**
			Lead screws **M2 - M3**

* Zero Backlash Gearheads

Ordering information

Example: **AM0820-2R-V-3-18-08**

Motor type AM = Motor design 08 = Motor diameter (mm) 20 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
AM0820	**-** (sleeve bearings)	**-V-3-18**	**-01**	**-00**	Plain shaft
	-2R (2 ball bearings)	**-V-5-56**	**-08**	**-09**	Pinion 08/1
		-A-0,225-7	**-10**	**-11**	Pinion 10/1
			-12	**-13**	Pinion 08/2, 08/3
			-21	**-20**	Shaft for lead screw M1,2
			-23	**-22**	Shaft for lead screw M2 - M3
			-25	**-24**	Shaft for lead screw M1,6

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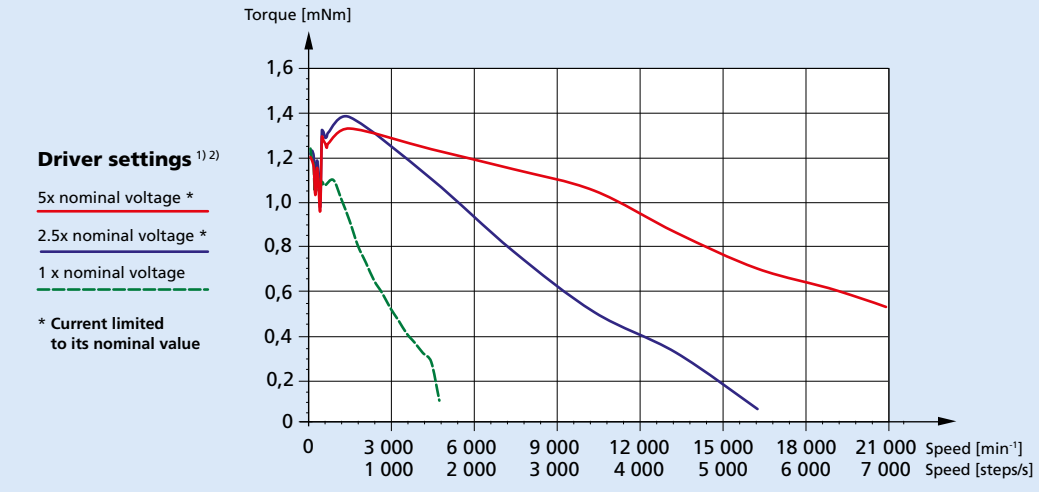
Stepper Motors 1,6 mNm

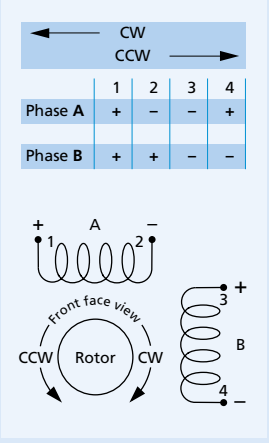
Two phase, 20 steps per revolution
PRECIstep® Technology

AM1020-ww-ee

		ww =	A-0,25-8		V-3-16		V-6-65		V-12-250		
			Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]		0,25	–	0,18	–	0,09	–	0,045	–	A
2	Nominal voltage per phase (both phases ON) [1]		–	2	–	3	–	6	–	12	V DC
3	Phase resistance (at 20°C)		8		16		65		250		Ω
4	Phase inductance (1kHz)		2,4		5,2		21,4		80,1		mH
5	Back-EMF amplitude		1,8		2,6		5,3		10,5		V/k step/s
6	Holding torque (at nominal current in both phases)		1,6								mNm
7	Holding torque (at twice the nominal current)		2,4								mNm
8	Step angle (full step)		18								degree
9	Angular accuracy [1]		± 10								% of full step
10	Residual torque, max.		0,20								mNm
11	Rotor inertia		9								$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)		140								Hz
13	Electrical time constant		0,32								ms
14	Ambient temperature range		–35 ... +70								°C
15	Winding temperature tolerated, max.		130								°C
16	Thermal resistance	R_{th1} / R_{th2}	3,9 / 53,8								°C/W
17	Thermal time constant	τ_{w1} / τ_{w2}	4,5 / 200								s
18	Shaft bearings		sintered sleeve bearings (standard)				ball bearings, preloaded (optional)				
19	Shaft load, max.:										
	– radial (3 mm from bearing)		0,3				4,0				N
	– axial		0,3				3,0				N
20	Shaft play, max.:										
	– radial (0,2N)		15				12				µm
	– axial (0,2N)		150				~0				µm
21	Mass		5,5								g

[1] 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 3 to 5x higher than the nominal voltage.
[2] Curves measured with a load inertia of 6 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.





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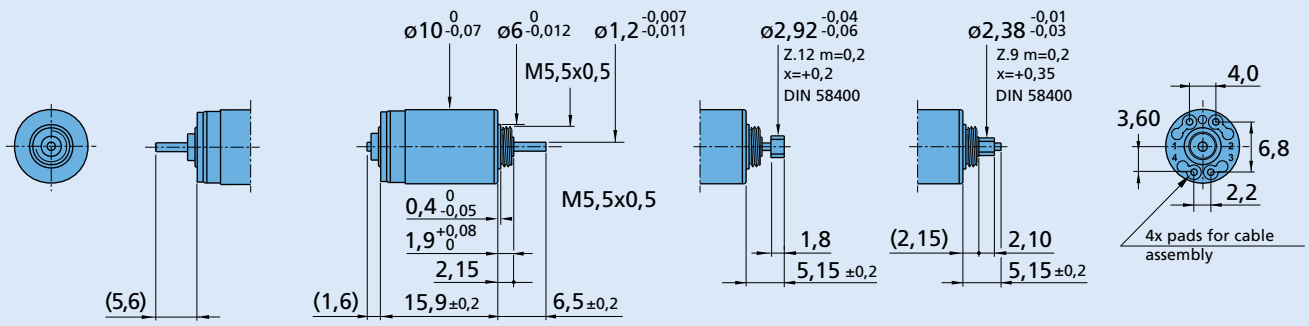
Dimensional drawing



AM1020

for Gearhead 10/1

for Gearhead 12/3, 12/5

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601	Available on request	List available on request	**10/1**
			12/3
			12/5*
			Lead screws **M1,2 M1,6**
			Lead screws **M2 - M3**

* Zero Backlash Gearheads

Ordering information

Example: **AM1020-2R-V-3-16-08**

Motor type AM = Motor design 10 = Motor diameter (mm) 20 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
AM1020	**-** (sleeve bearings)	**-V-3-16**	**-01**	**-00**	Plain shaft
	-2R (2 ball bearings)	**-V-6-65**	**-08**	**-09**	Pinion 10/1
		-V-12-250	**-10**	**-11**	Pinion 12/5
		-A-0,25-8		**-12**	Plain shaft, Rear = 3,7mm for encoder
				-13	Pinion 10/1, Rear = 3,7mm for encoder
				-14	Pinion 12/5, Rear = 3,7mm for encoder
			-21	**-20**	Plain shaft for lead screw M1,2
			-23	**-22**	Plain shaft for lead screw M2 - M3
			-25	**-24**	Plain shaft for lead screw M1,6

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Stepper Motors 2,4 mNm

Two phase, 20 steps per revolution
microstepping motor (low residual torque), PRECIstep® Technology

ADM1220S-ww-ee

	ww =	V2		V3		V6		V12		
		Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]	0,33	–	0,22	–	0,11	–	0,055	–	A
2	Nominal voltage per phase (both phases ON) [1]	–	2	–	3	–	6	–	12	V DC
3	Phase resistance (at 20°C)	4,5		10,4		41		168		Ω
4	Phase inductance (1kHz)	1,3		3,5		13		57		mH
5	Back-EMF amplitude	1,7		2,6		5,0		10,0		V/k step/s
6	Holding torque (at nominal current in both phases)	2,4								mNm
7	Holding torque (at twice the nominal current)	4,1								mNm
8	Step angle (full step)	18								degree
9	Angular accuracy [1]	± 3								% of full step
10	Residual torque, max.	0,15								mNm
11	Rotor inertia	18,5								$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)	128								Hz
13	Electrical time constant	0,28								ms
14	Ambient temperature range	–35 ... +70								°C
15	Winding temperature tolerated, max.	130								°C
16	Thermal resistance R_{th1} / R_{th2}	11,9 / 46,5								°C/W
17	Thermal time constant τ_{w1} / τ_{w2}	5 / 300								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	3,0				3,0				N
20	Shaft play, max.:									
	– radial (0,2N)	15				12				µm
	– axial (0,2N)	~0				~0				µm
21	Mass	9								g

[1] 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 3 to 5x higher than the nominal voltage.
[2] Curves measured with a load inertia of 20 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.

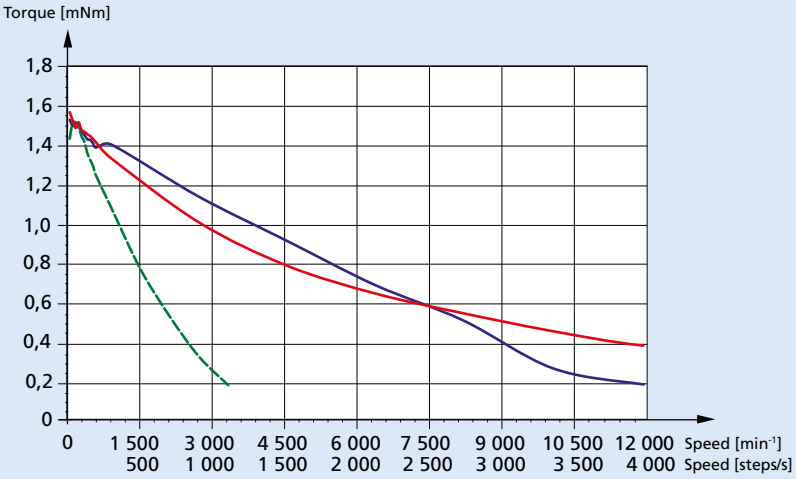
Driver settings [1] [2]

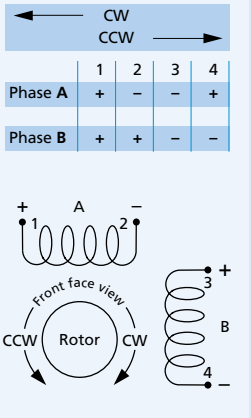
5x nominal voltage *

2.5x nominal voltage *

1 x nominal voltage

* **Current limited to its nominal value**





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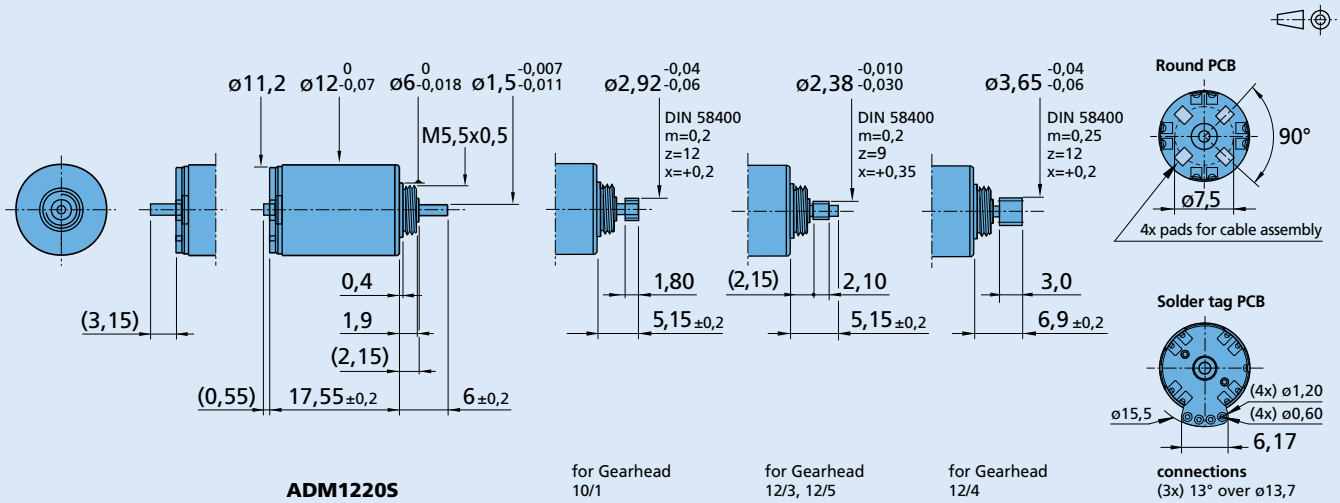
Dimensional drawing



ADM1220S

for Gearhead 10/1

for Gearhead 12/3, 12/5

for Gearhead 12/4

connections
(3x) 13° over ø13,7

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601		List available on request	**10/1**
			12/3
			12/4
			12/5*
			Lead screws **M2 - M3**

* Zero Backlash Gearheads

Ordering information

Example: **ADM1220S-2R-V2-51**

Motor type ADM = Motor design 12 = Motor diameter (mm) 20 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
ADM1220S	**-** (sleeve bearings)	**-V2**	**-51** (Round PCB)	**-50** (Round PCB)	Plain shaft, plain shaft for lead screw M3
	-2R (2 ball bearings)	**-V3**	**-55** (Round PCB)	**-56** (Round PCB)	Pinion 10/1
		-V6	**-57** (Round PCB)	**-58** (Round PCB)	Pinion 12/3, 12/5
		-V12	**-59** (Round PCB)	**-60** (Round PCB)	Pinion 12/4
			-83 (Round PCB)	**-82** (Round PCB)	Plain shaft for lead screw M2
			-31 (Solder tag PCB)	**-30** (Solder tag PCB)	Plain shaft, plain shaft for lead screw M3
			-35 (Solder tag PCB)	**-34** (Solder tag PCB)	Pinion 10/1
			-37 (Solder tag PCB)	**-36** (Solder tag PCB)	Pinion 12/3, 12/5
			-39 (Solder tag PCB)	**-38** (Solder tag PCB)	Pinion 12/4
			-53 (Solder tag PCB)	**-52** (Solder tag PCB)	Plain shaft for lead screw M2

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Stepper Motors 6,0 mNm

Two phase, 24 steps per revolution
PRECIstep® Technology

AM1524-ww-ee

	ww =	A-0,45-3,6		A-0,25-12,5		V-6-35		V-12-150		
		Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]	0,45	–	0,25	–	0,15	–	0,075	–	A
2	Nominal voltage per phase (both phases ON) [1]	–	2	–	3,5	–	6	–	12	V DC
3	Phase resistance (at 20°C)	3,6		12,5		35		138		Ω
4	Phase inductance (1kHz)	1,9		6,3		16,5		70,6		mH
5	Back-EMF amplitude	2,4		4,4		7,2		14,7		V/k step/s
6	Holding torque (at nominal current in both phases)	6,0								mNm
7	Holding torque (at twice the nominal current)	10								mNm
8	Step angle (full step)	15								degree
9	Angular accuracy [1]	± 10								% of full step
10	Residual torque, max.	0,9								mNm
11	Rotor inertia	45								$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)	120								Hz
13	Electrical time constant	0,5								ms
14	Ambient temperature range	–35 ... +70								°C
15	Winding temperature tolerated, max.	130								°C
16	Thermal resistance R_{th1} / R_{th2}	12,9 / 31,6								°C/W
17	Thermal time constant τ_{w1} / τ_{w2}	6 / 350								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				2,0				N
20	Shaft play, max.:									
	– radial (0,2N)	15				12				µm
	– axial (0,2N)	150				~0				µm
21	Mass	12								g

[1] 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 3 to 5x higher than the nominal voltage.
[2] Curves measured with a load inertia of 50 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.

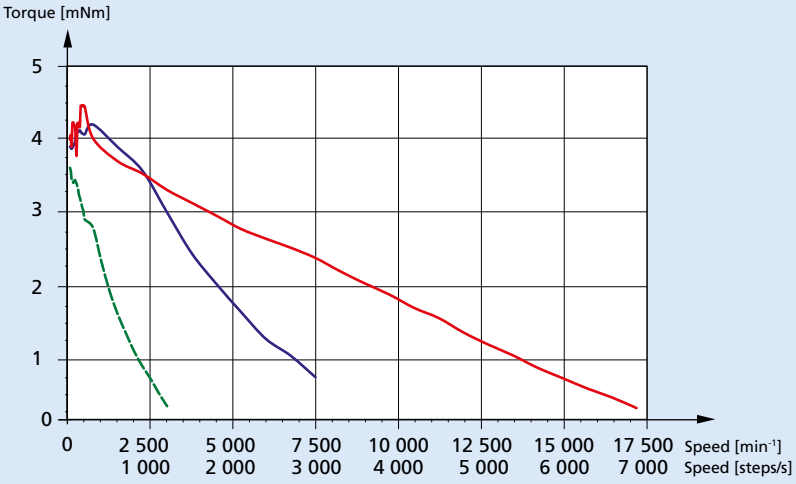
Driver settings [1] [2]

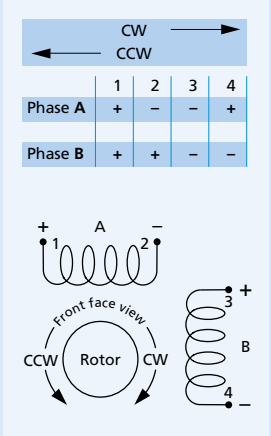
5x nominal voltage *

2.5x nominal voltage *

1 x nominal voltage

* **Current limited to its nominal value**





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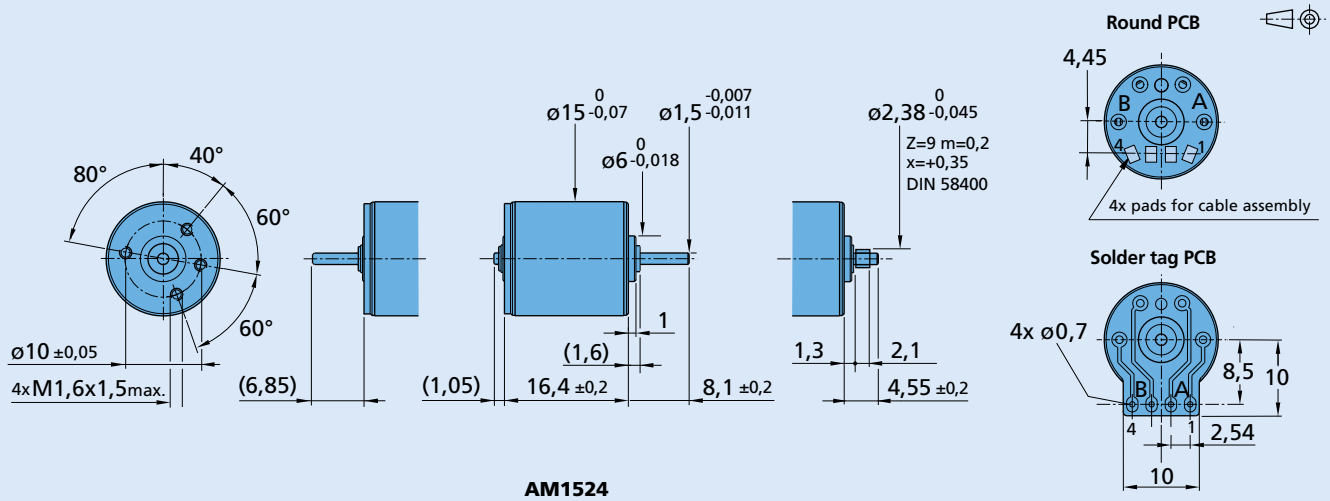
Dimensional drawing



AM1524

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601	Available on request	List available on request	**15A**
			15/5(S)
			15/8*
			15/10
			16/7
			17/1
			Lead screws **M2 - M3**

* Zero Backlash Gearheads

Ordering information

Example: **AM1524-2R-V-6-35-57**

Motor type AM = Motor design 15 = Motor diameter (mm) 24 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
AM1524	**-** (sleeve bearings)	**-V-6-35**	**-55** (Round PCB)	**-54** (Round PCB)	Plain shaft, L=8,1 mm for 15/10,16/7, 17/1, M3
	-2R (2 ball bearings)	**-V-12-150**	**-57** (Round PCB)	**-56** (Round PCB)	Pinion 15/5(S), 15/8
		-A-0,25-12,5	**-70** (Round PCB)	**-71** (Round PCB)	Plain shaft, L=4,5 mm for gearhead 15A
		-A-0,45-3,6	**-83** (Round PCB)	**-82** (Round PCB)	Plain shaft for lead screw M2
			-05 (Solder tag PCB)	**-04** (Solder tag PCB)	Plain shaft, L=8,1 mm for 15/10,16/7, 17/1, M3
			-07 (Solder tag PCB)	**-06** (Solder tag PCB)	Pinion 15/5(S), 15/8
			-72 (Solder tag PCB)	**-73** (Solder tag PCB)	Plain shaft, L=4,5 mm for gearhead 15A
			-23 (Solder tag PCB)	**-22** (Solder tag PCB)	Plain shaft for lead screw M2
				-04-0904	Idem -04 & for encoder
				-06-0904	Idem -06 & for encoder
				-73-0904	Idem -73 & for encoder

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Stepper Motors 22 mNm

Two phase, 24 steps per revolution
PRECIstep® Technology

AM2224-ww-ee

	ww =	AV-0,9		AV-4,8		AV-18		V-12-75		
		Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]	1,0	–	0,5	–	0,25	–	0,125	–	A
2	Nominal voltage per phase (both phases ON) [1]	–	1,4	–	3	–	6	–	12	V DC
3	Phase resistance (at 20°C)	0,9		4,8		18		75		Ω
4	Phase inductance (1kHz)	0,9		4,3		16,3		65,6		mH
5	Back-EMF amplitude	3,8		8,3		16,3		32,7		V/k step/s
6	Holding torque (at nominal current in both phases)	22								mNm
7	Holding torque (at twice the nominal current)	37								mNm
8	Step angle (full step)	15								degree
9	Angular accuracy [1]	± 10								% of full step
10	Residual torque, max.	2								mNm
11	Rotor inertia	253								$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)	100								Hz
13	Electrical time constant	1,7								ms
14	Ambient temperature range	–35 ... +70								°C
15	Winding temperature tolerated, max.	130								°C
16	Thermal resistance winding-ambient air R_{th1} / R_{th2}	4,8 / 20,4								°C/W
17	Thermal time constant τ_{w1} / τ_{w2}	10 / 620								s
18	Shaft bearings	sintered sleeve bearings (standard with 2 mm shaft)				ball bearings, preloaded (optional)				
19	Shaft load, max.:									
	– radial (3 mm from bearing)	1,5				8,0				N
	– axial	0,5				4,0				N
20	Shaft play, max.:									
	– radial (0,2N)	30				15				µm
	– axial (0,2N)	200				~0				µm
21	Mass	43								g

[1] 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 3 to 8x higher than the nominal voltage.
[2] Curves measured with a load inertia of 600 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.

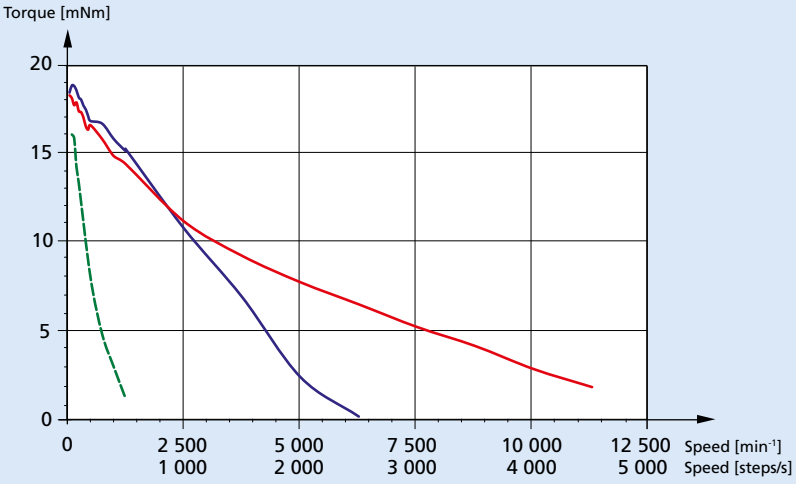
Driver settings [1] [2]

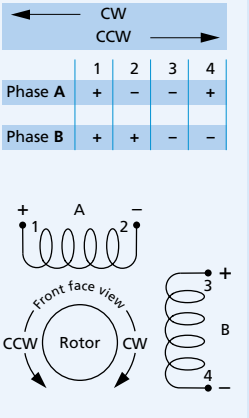
8x nominal voltage *

4x nominal voltage *

1 x nominal voltage

* **Current limited to its nominal value**





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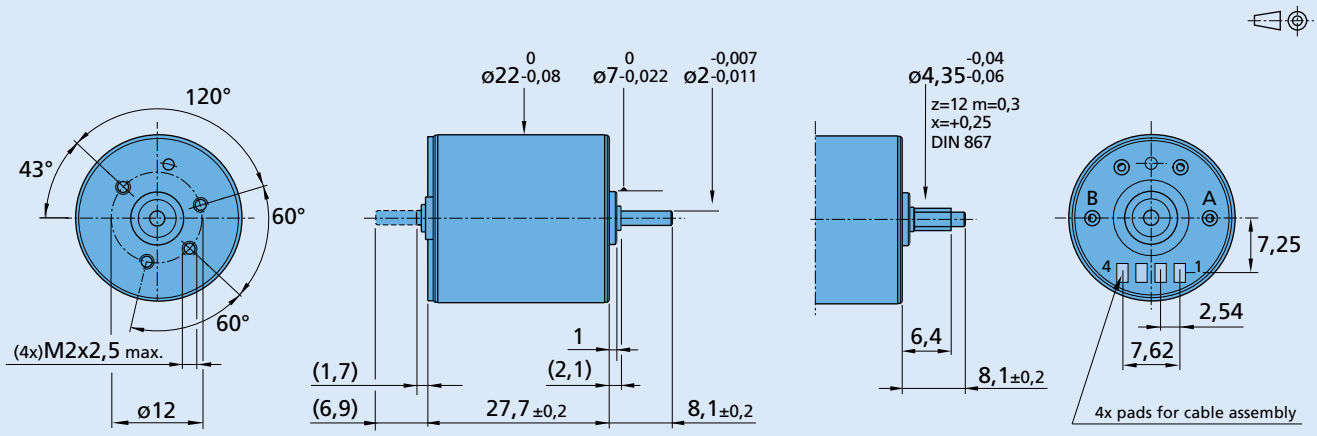
Dimensional drawing



AM2224

for Gearheads
22/2, 22/5

Combinations

Drive Electronics	Encoders	Cables	Gearheads / Lead screws
MCST3601	**PE 22-120**	List available on request	**22E**
			22EKV
			22/2
			22/5*
			22/7
			23/1

* Zero Backlash Gearheads

Ordering information

Example: **AM2224-2R-AV-18-10**

Motor type AM = Motor design 22 = Motor diameter (mm) 24 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
AM2224	**-** (sleeve bearings)	**-AV-0,9**	**-10**	**-11**	Plain shaft, L=8,1 mm ø2 mm for 22/7, 23/1
	-2R (2 ball bearings)	**-AV-4,8**	**-12**	**-13**	Plain shaft, L=6,6 mm ø1,5 for 22E, 22EKV
		-AV-18	**-14**	**-15**	Pinion 22/2, 22/5
		-V-12-75		**-16**	Plain shaft for 22/7, 23/1, encoder PE22-120
				-17	Plain shaft for 22E, encoder PE22-120
				-18	Pinion 22/2, 22/5, encoder PE22-120

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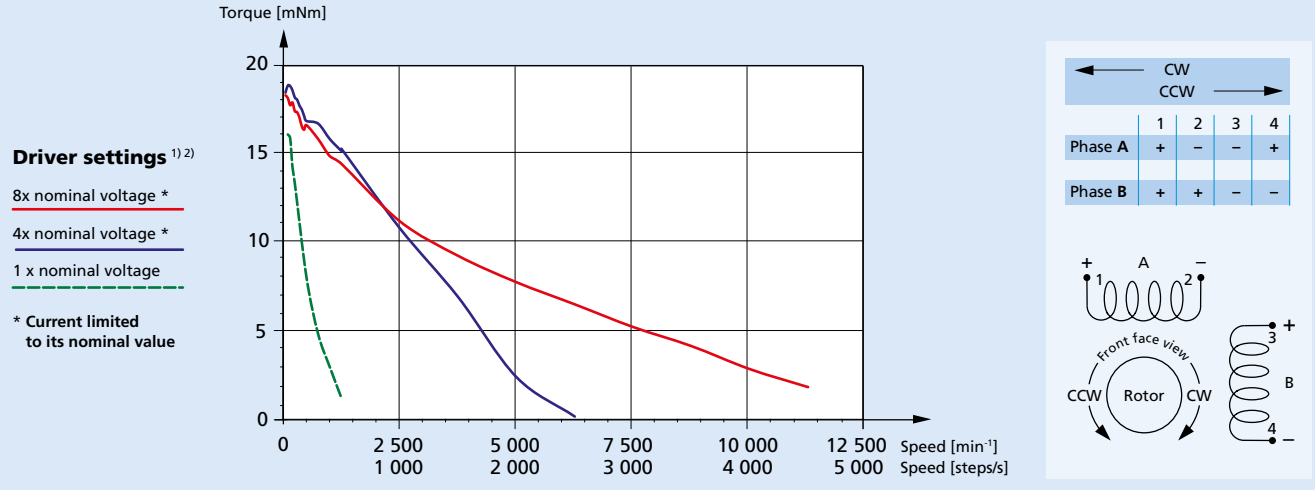
Stepper Motors 22 mNm

Two phase, 24 steps per revolution
PRECIstep® Technology

AM2224-R3-ww-ee

	ww =	AV-0,9		AV-4,8		AV-18		V-12-75		
		Current	Voltage	Current	Voltage	Current	Voltage	Current	Voltage	Drive mode
1	Nominal current per phase (both phases ON) [1]	1,0	–	0,5	–	0,25	–	0,125	–	A
2	Nominal voltage per phase (both phases ON) [1]	–	1,4	–	3	–	6	–	12	V DC
3	Phase resistance (at 20°C)	0,9		4,8		18		75		Ω
4	Phase inductance (1kHz)	0,9		4,3		16,3		65,6		mH
5	Back-EMF amplitude	3,8		8,3		16,3		32,7		V/k step/s
6	Holding torque (at nominal current in both phases)	22								mNm
7	Holding torque (at twice the nominal current)	37								mNm
8	Step angle (full step)	15								degree
9	Angular accuracy [1]	± 10								% of full step
10	Residual torque, max.	2								mNm
11	Rotor inertia	253								$\cdot 10^{-9}$ kgm^2
12	Resonance frequency (at no load)	100								Hz
13	Electrical time constant	0,92								ms
14	Ambient temperature range	–35 ... +70								°C
15	Winding temperature tolerated, max.	130								°C
16	Thermal resistance R_{th1} / R_{th2}	4,8 / 20,4								°C/W
17	Thermal time constant τ_{w1} / τ_{w2}	10 / 620								s
18	Shaft bearings	ball bearings, preloaded (standard with 3 mm shaft)								
19	Shaft load, max.:									
	– radial (3 mm from bearing)	20,0								N
	– axial	4,0								N
20	Shaft play, max.:									
	– radial (0,2N)	15								µm
	– axial (0,2N)	~0								µm
21	Mass	50,5								g

[1] 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 3 to 8x higher than the nominal voltage.
[2] Curves measured with a load inertia of 600 $\cdot 10^{-9}$ kgm^2, in half-step mode for the "1 x nominal voltage" curve, in 1/4 micro-stepping mode for the other curves.



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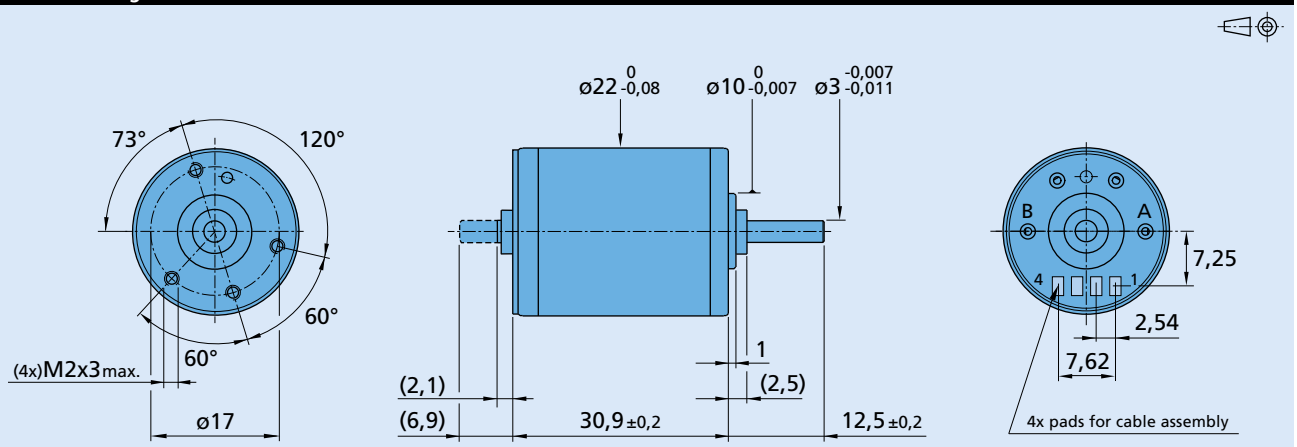
Dimensional drawing



AM2224-R3

Combinations

Drive Electronics	Encoders	Kabel	Gearheads / Lead screws
MCST3601	**PE22-120**	List available on request	**26/1(S)** Lead screws **M3**

Ordering information

Example: **AM2224-R3-AV-18-31**

Motor type AM = Motor design 22 = Motor diameter (mm) 24 = Steps per revolution	**Bearings** (rr) Special lubricant options available	**Winding** (ww)	**Motor execution** (ee) Only front output shaft	With double output shaft	Front output shaft
AM2224	**-R3** (2 ball bearings)	**-AV-0,9**	**-30**	**-31**	Plain shaft for 26/1(S)
		-AV-4,8	**-85**	**-84**	Plain shaft for lead screw M3
		-AV-18		**-36**	Plain shaft for encoder PE22-120
		-V-12-75		**-86**	Plain shaft for lead screw M3, PE22-120

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