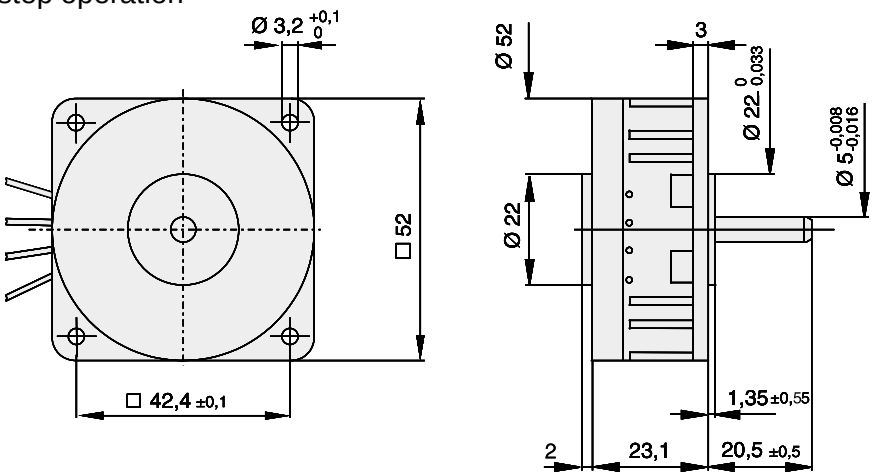
MSD-521 Miniature 52mm Disc Magnet Step Motor

Suitable for microstep operation

100 steps/revolution
3.6° step angle



dimensions in mm
mass : 180 g
lead wires: 195 ±10 mm 0.25 mm² (AWG 24)

MSD - 521 - XXXX

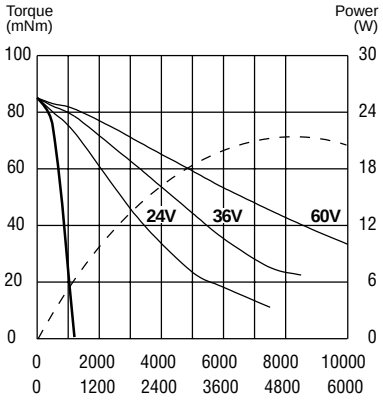
Suffix (XXXX)		**0002**	**0003**	
Coil dependent parameters		typ	typ	
1 Phase resistance	ohm	4.4	0.7	
2 Phase inductance (1 kHz)	mH	8	1.3	
3 Nominal phase current (2 ph. on)	A	0.9	2.3	
4 Nominal phase current (1 ph. on)	A	1.3	3.3	
5 Back-EMF amplitude	V/kst/s	5.5	2.1	
Coil independent parameters (1)		min	typ	max
Torque parameters				
6 Holding torque (nominal current)	mNm (oz-in)	102 (15)	120 (17)	140 (20)
7 Holding torque (2 x nominal current) (2)	mNm (oz-in)	175 (25)	205 (29)	240 (34)
8 Detent torque amplitude and friction	mNm (oz-in)	4 (0.5)	10 (1.4)	15 (2.1)
Thermal parameters				
9 Thermal resistance coil-ambient (3)	°C/W		9.5	
Angular accuracy				
10 Absolute accuracy (2 ph. on full-step mode/microstep)	% full-step		±3/±5	±5/±8
Mechanical parameters				
11 Rotor inertia	$kgm^2 \times 10^{-7}$		12	
Other parameters				
12 Natural resonance frequency (nominal current)	Hz		250	
13 Electrical time constant	ms		1.8	
14 Angular acceleration (nominal current)	rad/s^2		100000	

(1) Bipolar driver; (2) The maximum coil temperature must be respected; (3) Motor unmounted.

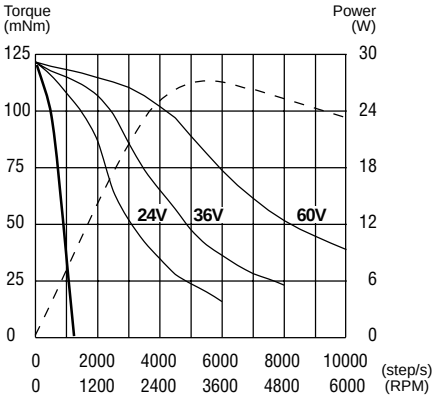
- Max. rated coil temperature: 130°C
- Recom. ambient temperature range: -20 °C to +50 °C
- Radial shaft play (1N): 15 µm
- Axial shaft play (1N): 10 µm
- Max. radial load(4): 20 N
- Max. axial load(5): 30 N
- Test voltage (1 min): 500 V_{RMS}
- "Power rate" (nominal current): 12 kW/s
- Motor fitted with ball bearings

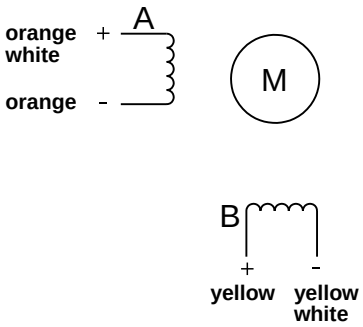
(4) Load at 12mm from face.
(5) Support shaft for press-fitting a pulley or pinion.

MSD-521-0002
ESD-1200 driver
I = 0.9A



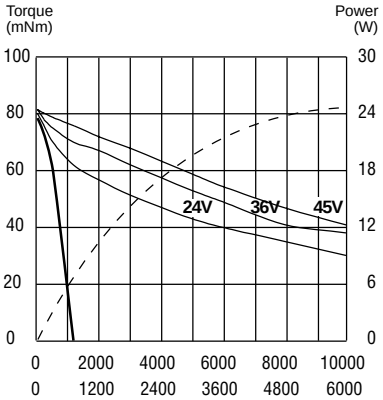
MSD-521-0002
ESD-1200 driver
I = 1.4A



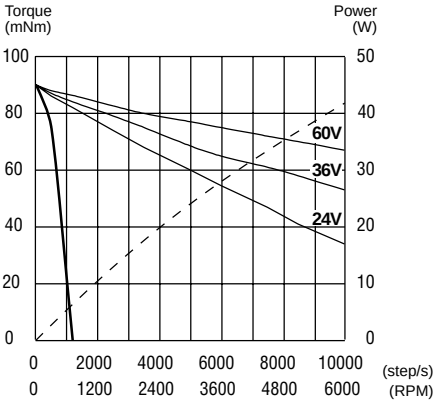


Motor connections

MSD-521-0003
EDM-453 or DM-224i driver
I = 3A



MSD-521-0003
ESD-1300 driver
I = 2.3A



Pull-in range
Pull-out range
Power output

Pull-in is measured with a load inertia equal to the rotor inertia.

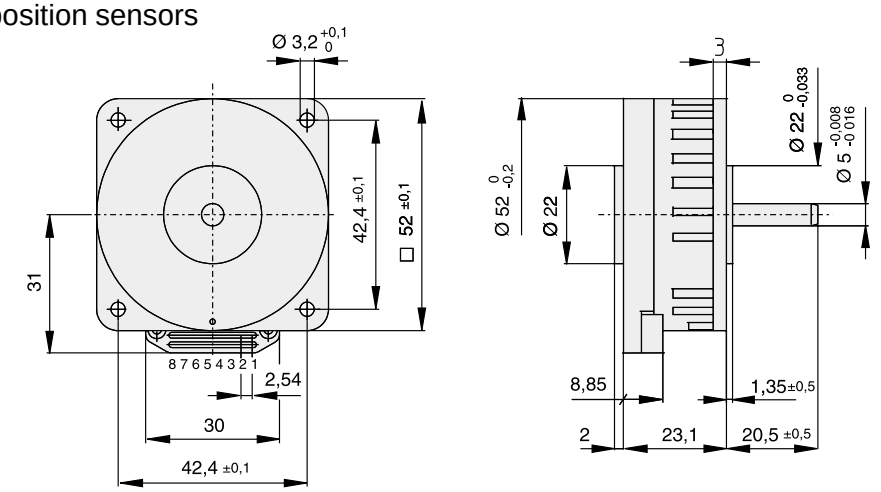
Notes

- The speed scale is indicated in full-steps/s for all drive modes.
- The motor is driven in half-steps unless otherwise specified.
- The motor is energized with nominal current unless otherwise specified.

MSD-521 Miniature 52mm Disc Magnet Step Motor

With integrated position sensors

100 steps/revolution
3.6° step angle



dimensions in mm
mass : 170 g

MSD - 521 - XXXX

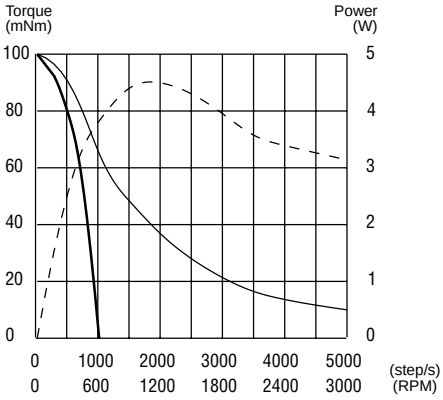
Suffix (XXXX)		**1014**	**1002**	
Coil dependent parameters		typ	typ	
1 Phase resistance	ohm	13.5	0.7	
2 Phase inductance (1 kHz)	mH	27	1.3	
3 Nominal phase current (2 ph. on)	A	0.5	2.3	
4 Nominal phase current (1 ph. on)	A	0.75	3.3	
5 Back-EMF amplitude	V/kst/s	9.8	2.1	
Coil independent parameters (1)		min	typ	max
Torque parameters				
6 Holding torque (nominal current)	mNm (oz-in)	102 (14.4)	120 (17)	140 (19.8)
7 Holding torque (2 x nominal current) (2)	mNm (oz-in)	175 (24.8)	205 (29)	240 (34)
8 Detent torque amplitude and friction	mNm (oz-in)	4 (0.6)	10 (1.4)	15 (2.1)
Thermal parameters				
9 Thermal resistance coil-ambient (3)	°C/W		9.5	
Angular accuracy				
10 Absolute accuracy (2 ph. on full-step mode)	% full-step		±3	±5
Mechanical parameters				
11 Rotor inertia	$kgm^2 \times 10^{-7}$		12	
Other parameters				
12 Natural resonance frequency (nom. current)	Hz		250	
13 Electrical time constant	ms		1.8	
14 Angular acceleration (nominal current)	rad/s^2		100000	
Hall sensor (4)				
15 Supply voltage	V	5		24
16 Operating temperature	°C	–40		125
17 Signal periods per revolution (5)	-		25	
18 Elec. angle between motor ph./hall signal	degrees	35	45	55

(1) Bipolar driver; (2) The maximum coil temperature must be respected; (3) Motor unmounted; (4) Two sensors with output signals in quadrature. Open-collector (I_{max} = 10mA);
(5) When using both signals' edges, a resolution of 100 positions per rev. is obtained.

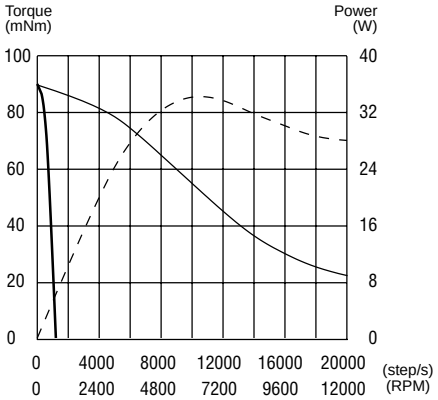
- Max. rated coil temperature: 130°C
- Recom. ambient temperature range: -20 °C to +50 °C
- Radial shaft play (5N): 15 µm
- Axial shaft play (5N): 10 µm
- Max. radial load (6): 20 N
- Max. axial load (7): 30 N
- Test voltage (1 min): 500 V_{RMS}
- "Power rate" (nominal current): 12 kW/s
- Motor fitted with ball bearings

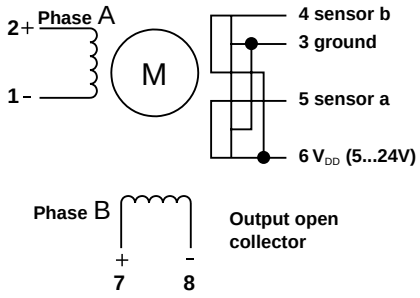
(6) Load at 12mm from face.
(7) Support shaft for press-fitting a pulley or pinion.

MSD-521-1014
Voltage drive type L/R
33Ω in series, 36V



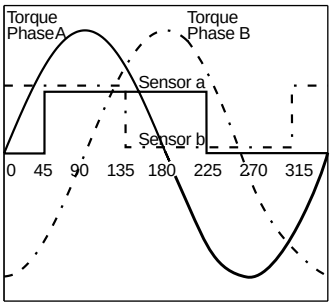
MSD-521-1002
ESD-1300 drive
V = 36V





Motor connections

Torque and sensor signal phasing in electrical degrees CW operation.



Pull-in range
Pull-out range
Power output

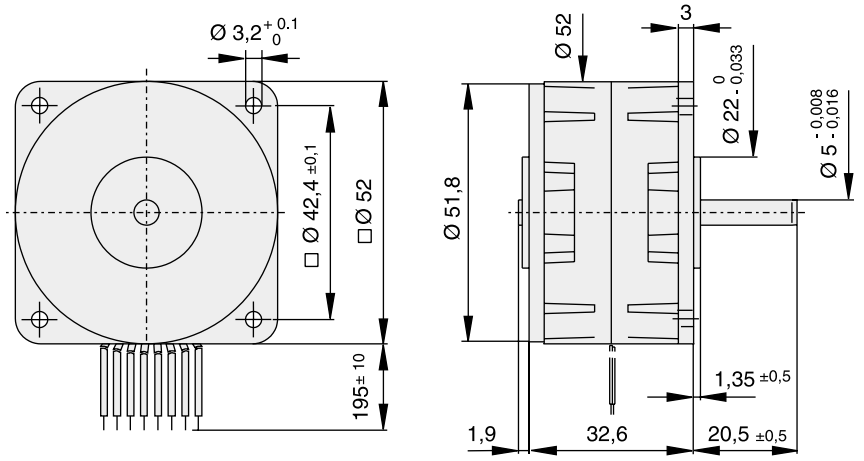
Pull-in is measured with a load inertia equal to the rotor inertia.

Notes

- The speed scale is indicated in full-steps/s for all drive modes. The motor is driven in half-steps unless otherwise specified.
- The motor is energized with nominal current unless otherwise specified.
- With the integrated Hall sensors, the PP520 motor can operate as a stepper motor with confirmation of step execution. With an adequate drive circuit it can also position, with the automatic commutation assuring full torque usage.

MSD-521 Miniature 52mm Disc Magnet Step Motor

100 steps/revolution
3.6° step angle



dimensions in mm
mass : 250 g
lead wires: 195 ±10 mm
0.25 mm² (AWG 24)

MSD - 521 - XXXX

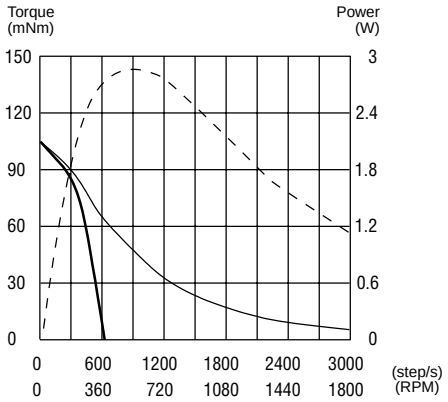
Suffix (XXXX)		**3014**	**3014**	**3016**
Coil dependent parameters		coils in series	coils in parallel	coils in parallel
		typ	typ	typ
1 Phase resistance	ohm	8.8	2.2	0.35
2 Phase inductance (1 kHz)	mH	20	5	0.7
3 Nominal phase current (2 ph. on)	A	0.7	1.4	3.7
4 Nominal phase current (1 ph. on)	A	1	2	5.2
5 Back-EMF amplitude	V/kst/s	12	6	2.3
Coil independent parameters (1)		min	typ	max
Torque parameters				
6 Holding torque (nominal current)	mNm (oz-in)	174 (24.6)	205 (29)	236 (33.4)
7 Holding torque (2 x nominal current) (2)	mNm (oz-in)	306 (43.3)	360 (51)	414 (58.6)
8 Detent torque amplitude and friction	mNm (oz-in)	14 (2)	28 (4)	40 (5.7)
Thermal parameters				
9 Thermal resistance coil-ambient (3)	°C/W		7.3	
Angular accuracy				
10 Absolute accuracy (2 ph. on full-step mode)	% full-step		±3	±5
Mechanical parameters				
11 Rotor inertia	$kgm^2 \times 10^{-7}$		12	
Other parameters				
12 Natural resonance frequency (nominal current)	Hz		330	
13 Electrical time constant	ms		2.3	
14 Angular acceleration (nominal current)	rad/s^2		171000	

(1) Bipolar driver; (2) The maximum coil temperature must be respected; (3) Motor unmounted.

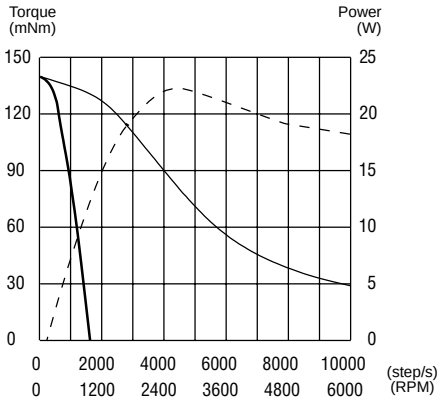
- Max. rated coil temperature: 130°C
- Recom. ambient temperature range: -20 °C to +50 °C
- Radial shaft play (5N): 25 µm
- Axial shaft play (5N): 25 µm
- Max. radial load (4): 20 N
- Max. axial load (5): 30 N
- Test voltage (1 min): 500 V_{RMS}
- "Power rate" (nominal current): 35 kW/s
- Motor fitted with ball bearings

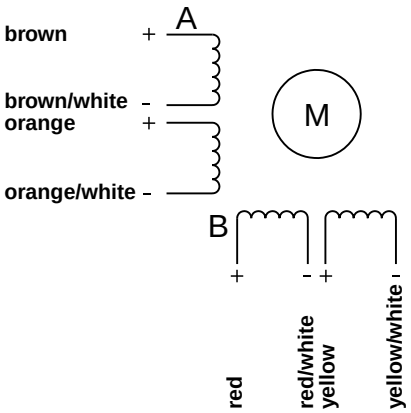
(4) Load at 12mm from face.
(5) Support shaft for press-fitting a pulley or pinion.

MSD-521-3014
Coils in series / L/R driver
33Ω series resistor, 24V



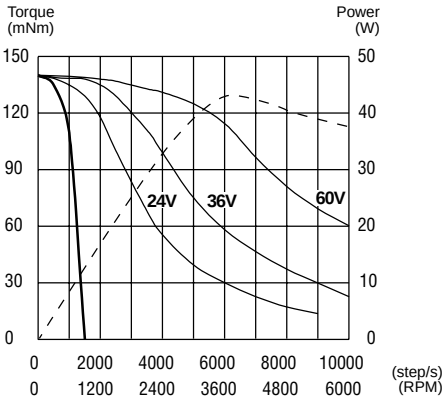
MSD-521-3014
Coils in parallel / EDM-453 driver
34V, 2A



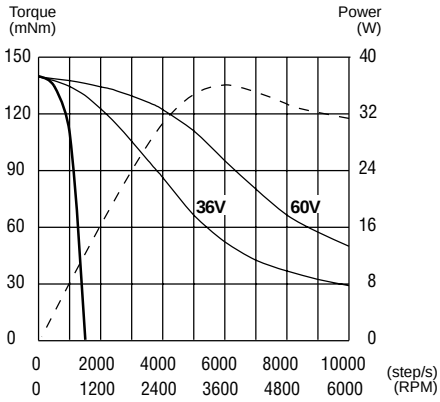


Motor connections

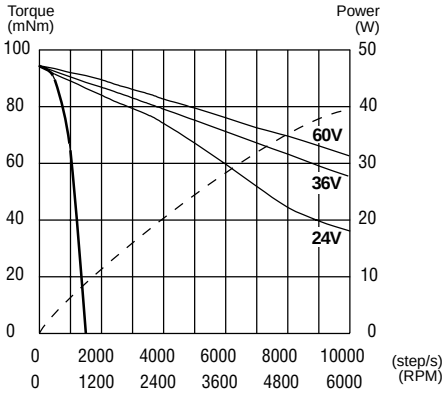
MSD-521-3014
Coils in parallel / ESD-1200 driver
I = 2A



MSD-521-3016
Coils in series / ESD-1300 driver
I = 2.4A



MSD-521-3016
Coils in series
ESD-1300 driver / I = 3A



Pull-in range
Pull-out range
Power output

Pull-in is measured with a load inertia equal to the rotor inertia.

Notes

- The low inertia, extended pull-in range, high peak speed and boost torque capability of this motor are benefits for fast incremental motion.
- The speed scale is indicated in full-steps/s for all drive modes.
- The motor is driven in half-steps unless otherwise specified.
- The motor is energized with nominal current unless otherwise specified.