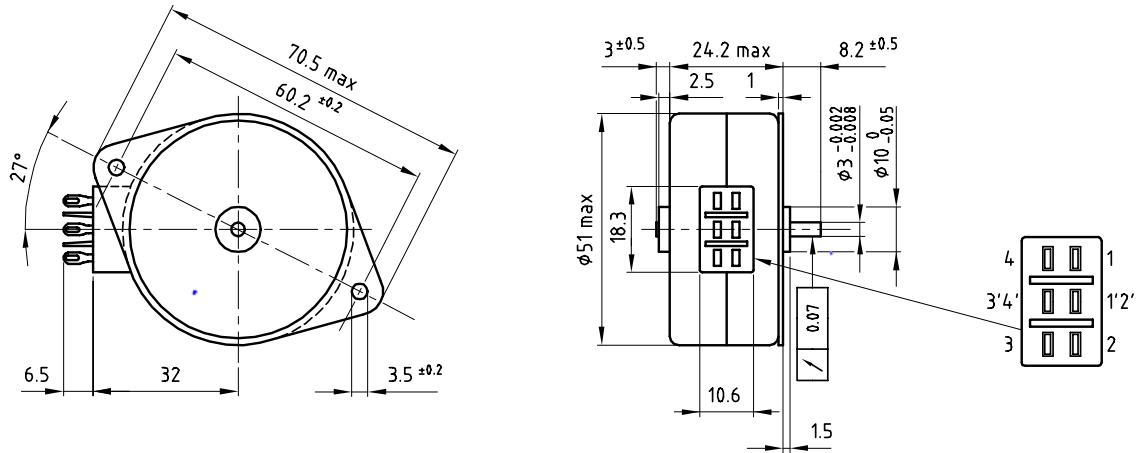


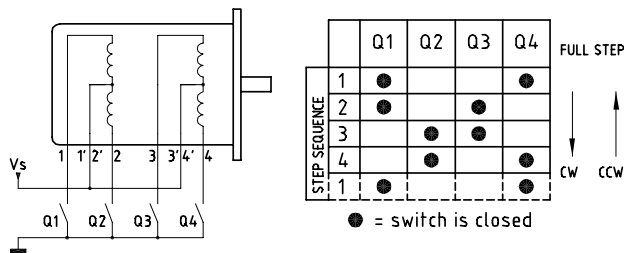
Dimensional drawing



Motor data

Motor order number	9904 112 +	31104	31004	31106	31006
Number of phases		4	4	4	4
Drive Electronics		Unipolar	Unipolar	Unipolar	Unipolar
Nominal Voltage	[V]	5	12	5	12
Number of steps per revolution		48	48	48	48
Step angle	[°]	7.5	7.5	7.5	7.5
Step angle tolerance	[°]	± 0.4	± 0.4	± 0.4	± 0.4
Max. working Torque	[mNm]	24	20	33	30
Holding Torque	[mNm]	32	28	46	42
Absorbed power	[W]	3.5	3.8	3.5	3.8
Resistance per phase	[Ohm]	11	65	11	65
Inductance per phase	[mH]	16	100	16	100
Current per phase	[mA]	400	175	400	175
Thermal resistance winding-ambient	[K/W]	13	13	13	13
Rotor Moment of Inertia	[kgm ²]	1.1x10 ⁻⁶	1.1x10 ⁻⁶	1.1x10 ⁻⁶	1.1x10 ⁻⁶

Electrical Connection



General data

x	Type of bearings	sleeve	
x	Maximum radial load	5	N
x	Maximum axial load	1.5	N
x	Ambient temp. range operating	-20/+70	°C
x	Ambient temp. range storage	-40/+100	°C
x	Mass of motor	170	g

Product combinations

- x Gearbox S52A
- x Gearbox S70A
- x Gearbox S70B

catalogue number	9904 112 31004
Power consumption of motor only	3,8
Maximum working torque	20
Holding torque	28
Torque derating	-0,4
Maximum pull-in rate	240
Maximum pull-out rate	-
Resistance per phase at 20 °C	65
Inductance per phase	100
Current per phase	175
Thermal resistance, coil-ambient	13
Permissible ambient temperature range	-20 to + 70
Permissible storage temperature range	-40 to + 100
Permissible motor temperature	120
Insulation resistance at 500 V (CEE 10)	> 2
Step angle	7° 30'
Step angle tolerance, not cumulative	± 25'
Number of steps per revolution	48
Direction of rotation	reversible
Rotor inertia	11
Mass	170
Maximum radial force	5
Maximum axial force	1,5
Bearings	slide (bronze)

Instrument stepper motors

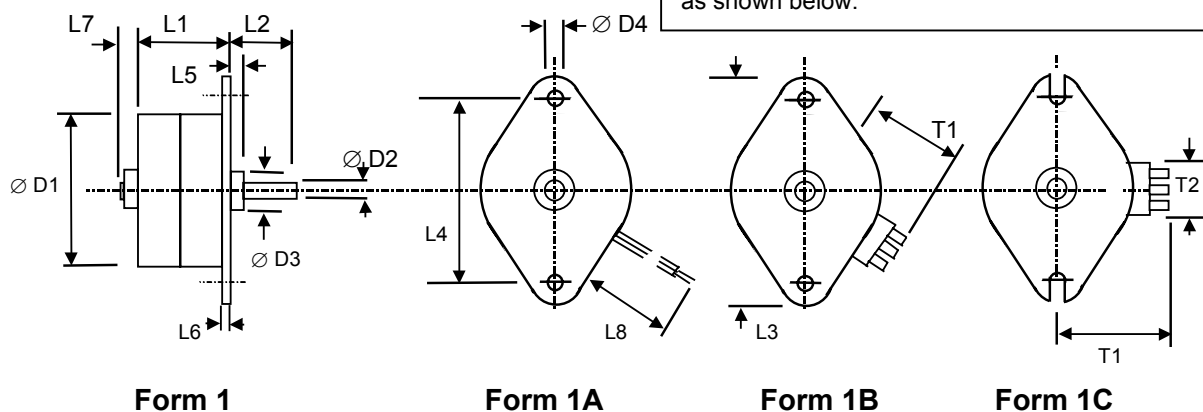
The instrument stepper motors are high quality permanent magnet types providing a 7.5 degree step angle

The motors may be specified factory fitted with a gearhead where increased torque and resolution are required at reduced operating speed. The programme has gained a world-wide reputation for high reliability and is widely used in industrial control and instrumentation drives. The miniature 1415 series, incorporates a low backlash precision gearhead to provide outstanding torque and resolution for a unit of such compact dimensions. A comprehensive programme of drives, power supplies and controllers have been developed to match the motor's characteristics to enable single or multi-axis systems to be readily constructed.



ID series stepper motor dimensions

ID series motors are either provided with leads (Form 1 A) or solder terminals (Forms 1B & 1C) as shown below:



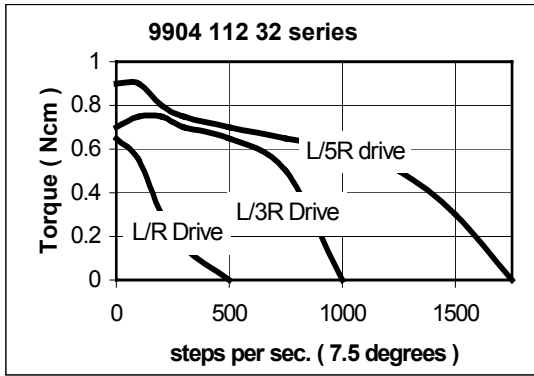
motor type	form	dimensions mm													
		D1	D2	D3	D4	L1	L2	L3	L4	L5	L6	L7	L8	T1	T2
9904 112 series	1 A	35	2	10	3.2	21.5	8.8	50	42	1.2	0.8	2.2	175	N/A	N/A
9904 112 31001	1 A	51	3	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	175	N/A	N/A
9904 112 31101	1 B	51	3	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	N/A	38.5	18.3
9904 112 31004	1 B	51	3	10	3.5	25	8.2	70.5	60.2	1.5	1.0	3	N/A	38.5	18.3
9904 112 35 series	1 C	56.3	4	12	4.4	33.5	16	76.5	66	1.5	1.5	3.8	N/A	37.1	20

specification

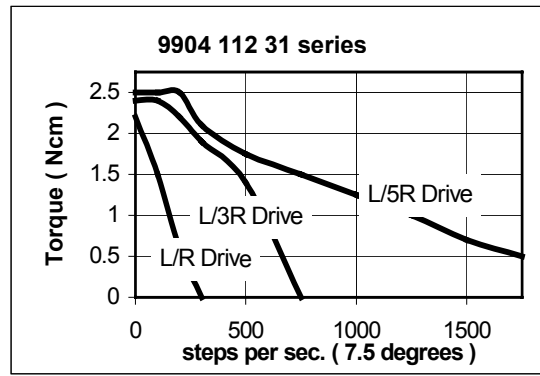
motor type	step angle degrees	holding torque Ncm	rotor inertia Kgcm ²	resistance per phase ohms	current per phase amps	inductance per phase mH	number of leads or terminals	mass gms
9904 112 32001	7.5	1.0	0.0026	120	0.1	160	6	80
9904 112 32101	7.5	1.0	0.0026	21	0.22	30	6	80
9904 112 31004	7.5	2.8	0.011	65	0.175	100	6 terminals	170
9904 112 31001	7.5	3.0	0.011	62	0.190	160	8	200
9904 112 31104	7.5	3.2	0.011	11	0.4	16	6 terminals	170
9904 112 31101	7.5	3.4	0.011	17	0.325	45	8	200
9904 112 31206 **	7.5	5.5	0.011	7	0.50	18	4	170
9904 112 35014	7.5	8.5	0.045	47	0.24	400	6 terminals	300
9904 112 35114	7.5	8.5	0.045	7.7	0.60	65	6 terminals	300
Precision Geared stepper motors								
1415 - 41:1 **	0.366	10	0.00045	12.5	0.25	5.5	4	47
1415 - 76:1 **	0.197	10	0.00045	12.5	0.25	5.5	4	50
1415 -141:1 **	0.106	10	0.00045	12.5	0.25	5.5	4	50

note** The above motors are, in general, 4 phase units suitable for use with uni-polar or bi-polar drive circuits. Motors identified by '**' however are only designed for bi-polar operation.

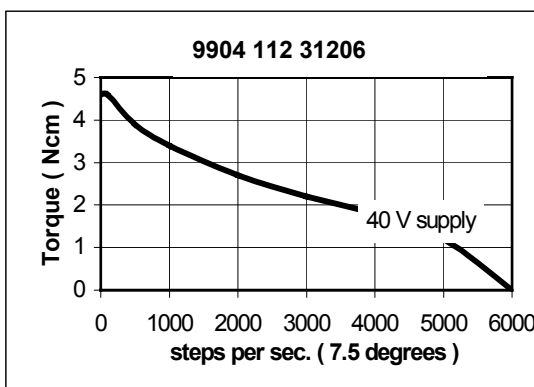
Typical stepper motor performance



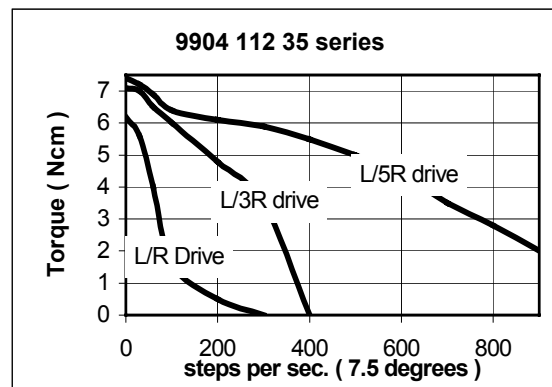
Uni-polar drive



Uni-polar drive



Bi-polar drive

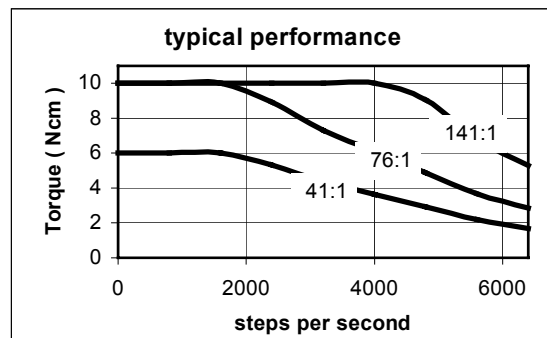


Uni-polar drive

1415 series miniature geared stepper motor

The 1415 series miniature geared stepper motor is ideally suited for use in precision instrumentation mechanisms. The unit incorporates a two phase bi-polar stepper motor and a precision gearhead featuring an anti-backlash system to ensure accurate positioning.

When required a dual; track encoder may be specified, as shown below, to enable the unit to be used under closed loop control



Dimensions: mm

