

4-PHASE UNIPOLAR STEPPING MOTORS

permanent magnet version

QUICK REFERENCE DATA

motor type	9904 112 31004	9904 112 31104
performance obtained with	integrated circuit SAA1027	drive unit 9904 131 03006
Step angle	7° 30'	7° 30'
Max. working torque	20 mNm	22 mNm
Holding torque	28 mNm	32 mNm
Max. pull-in rate	240 steps/s	400 steps/s
Max. pull-out rate	—	500 steps/s

APPLICATION

These motors are designed as economy versions. They have six solder tag connections for automated production.

TECHNICAL DATA

Outlines

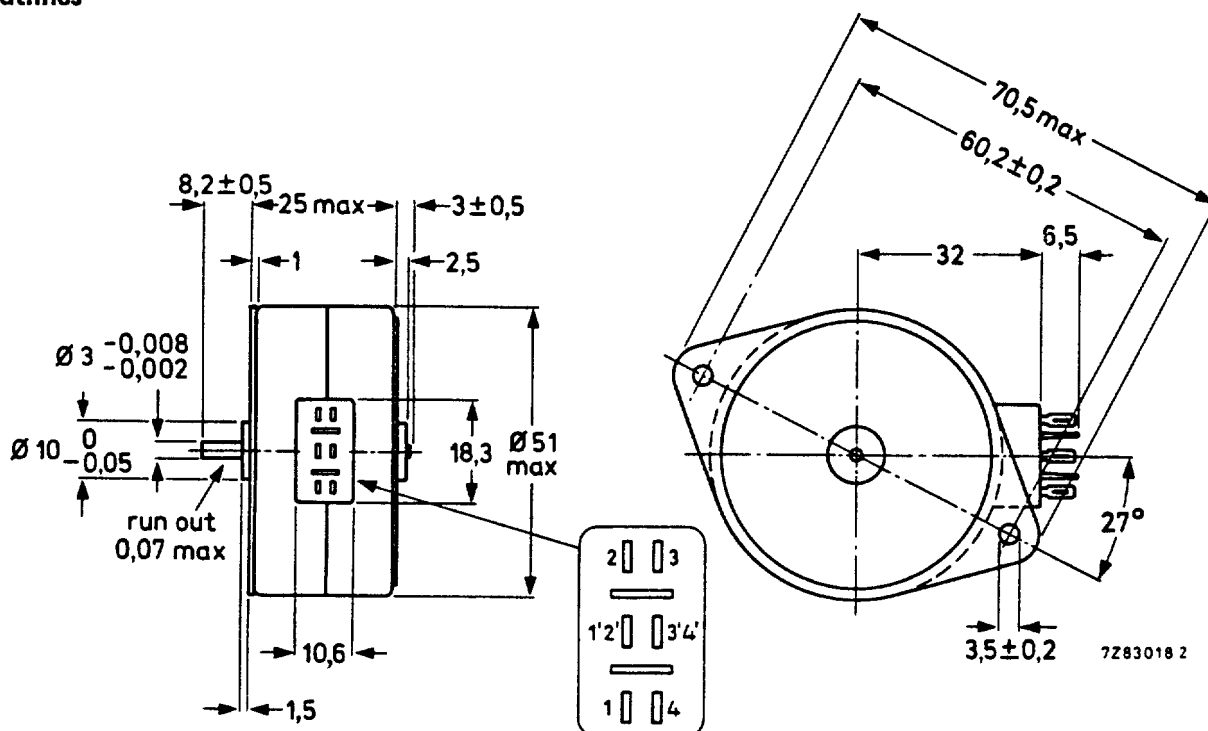


Fig. 1.

catalogue number	9904 112 31004	9904 112 31104	
Power consumption of motor only	3,8	3,5	W
Maximum working torque	20	22	mNm
Holding torque	28	32	mNm
Torque derating	-0,4	-0,4	%/K
Maximum pull-in rate	240	400	steps/s
Maximum pull-out rate	—	500	steps/s
Resistance per phase at 20 °C	65	11	Ω
Inductance per phase	100	16	mH
Current per phase	175	400	mA
Thermal resistance, coil-ambient	13	13	K/W
Permissible ambient temperature range	-20 to + 70	-20 to + 70	°C
Permissible storage temperature range	-40 to + 100	-40 to + 100	°C
Permissible motor temperature	120	120	°C
Insulation resistance at 500 V (CEE 10)	> 2	> 2	MΩ
Step angle	7° 30'	7° 30'	
Step angle tolerance, not cumulative	± 25'	± 25'	
Number of steps per revolution	48	48	
Direction of rotation	reversible	reversible	
Rotor inertia	11	11	gcm ²
Mass	170	170	g
Maximum radial force	5	5	N
Maximum axial force	1,5	1,5	N
Bearings	slide (bronze)	slide (bronze)	

Connections

The connecting tags are marked as shown in Fig. 1 and are connected to the IC or drive unit as shown in the General Section on 4-phase unipolar stepping motors.

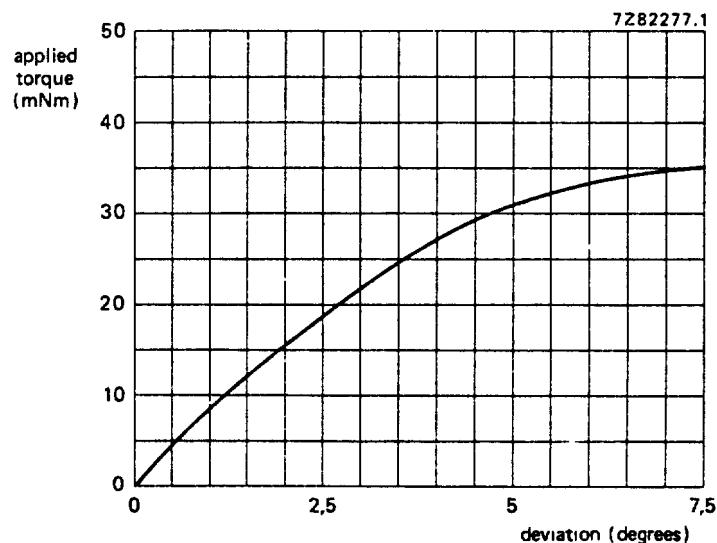


Fig. 2 Applied torque versus deviation.

Motor 9904 112 31004 with integrated circuit SAA1027

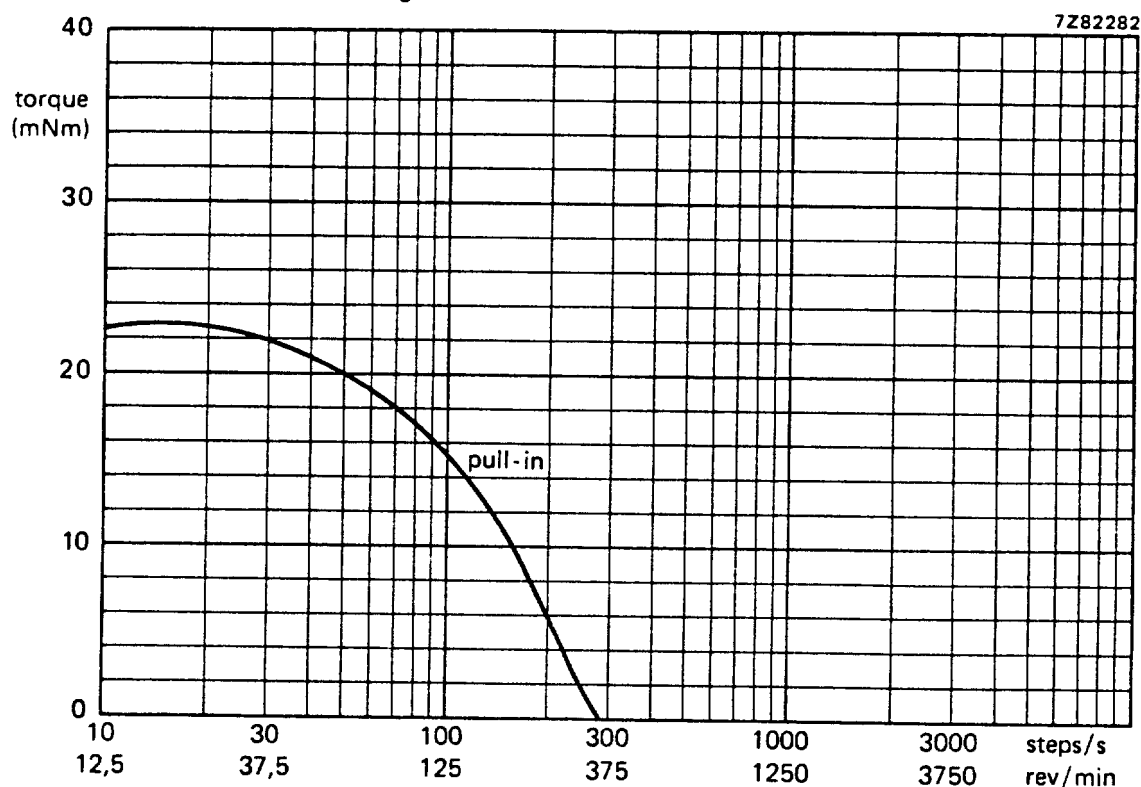


Fig. 3 Torque versus stepping rate measured at room temperature.

Motor 9904 112 31104 with drive unit 9904 131 03006

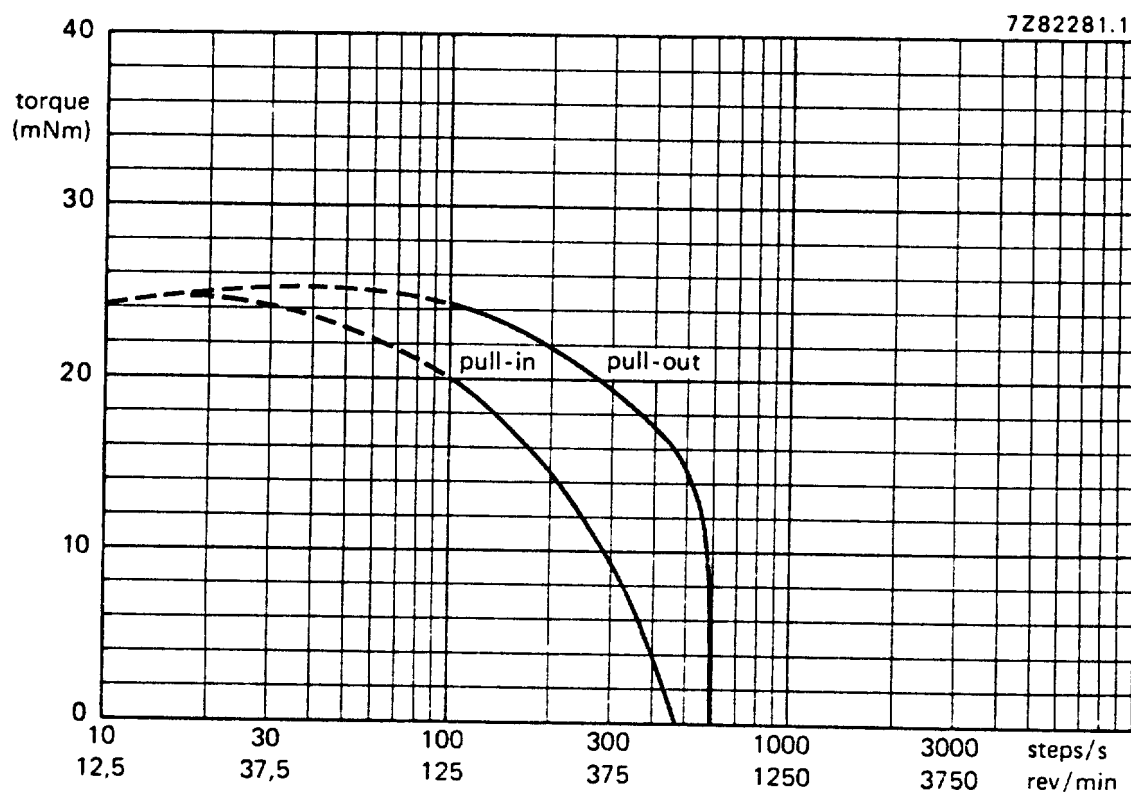


Fig. 4 Torque versus stepping rate, measured at room temperature.

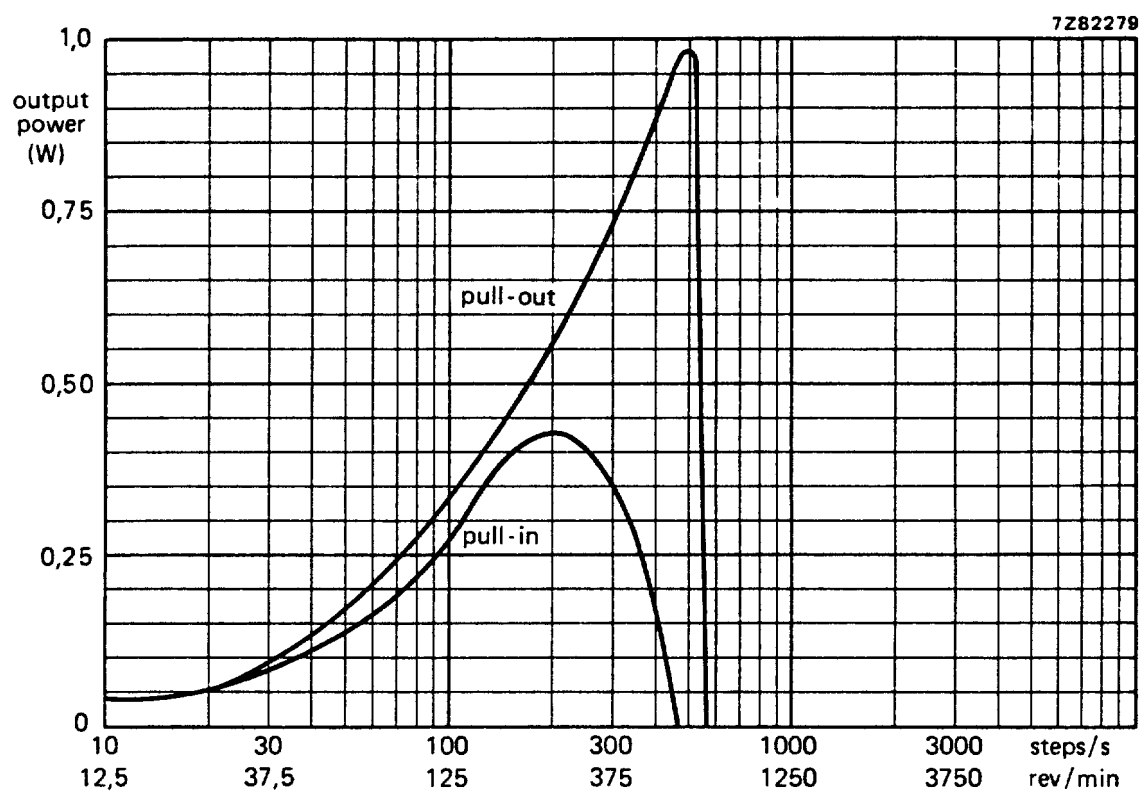


Fig. 5 Output power versus stepping rate measured at room temperature.

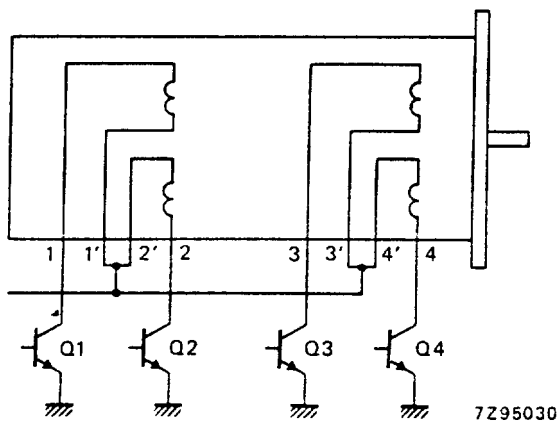


Fig. 12c.

UNIPOLAR – 4 PHASE

	Q1	Q2	Q3	Q4
1	ON	OFF	OFF	ON
2	ON	OFF	ON	OFF
3	OFF	ON	ON	OFF
4	OFF	ON	OFF	ON
1	ON	OFF	OFF	ON

1	ON	OFF	OFF	ON
2	ON	OFF	OFF	OFF
3	ON	OFF	ON	OFF
4	OFF	OFF	ON	OFF
5	OFF	ON	ON	OFF
6	OFF	ON	OFF	OFF
7	OFF	ON	OFF	ON
8	OFF	OFF	OFF	ON
1	ON	OFF	OFF	ON

1	ON	OFF	OFF	OFF
2	OFF	OFF	ON	OFF
3	OFF	ON	OFF	OFF
4	OFF	OFF	OFF	ON
1	ON	OFF	OFF	OFF

FULL STEP

↓ ↑
CW CCW

HALF STEP

↓ ↑
CW CCW

WAVE DRIVE

↓ ↑
CW CCW

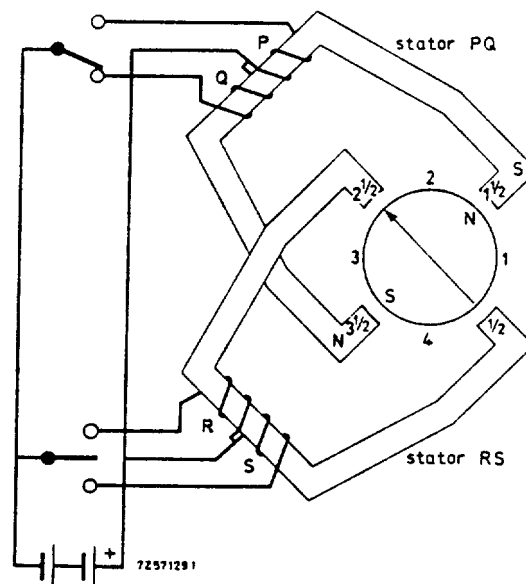


Fig. 13 Principle of half step mode.

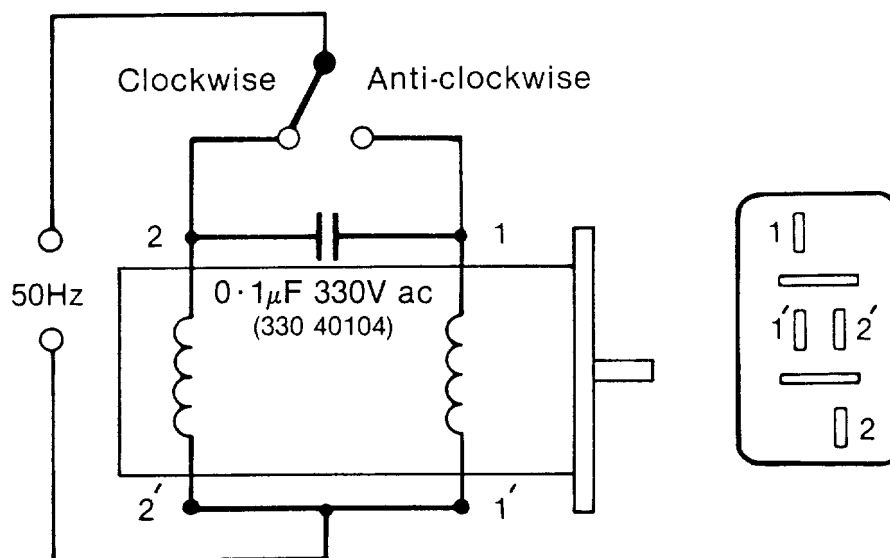


Farnell Technical Data Service

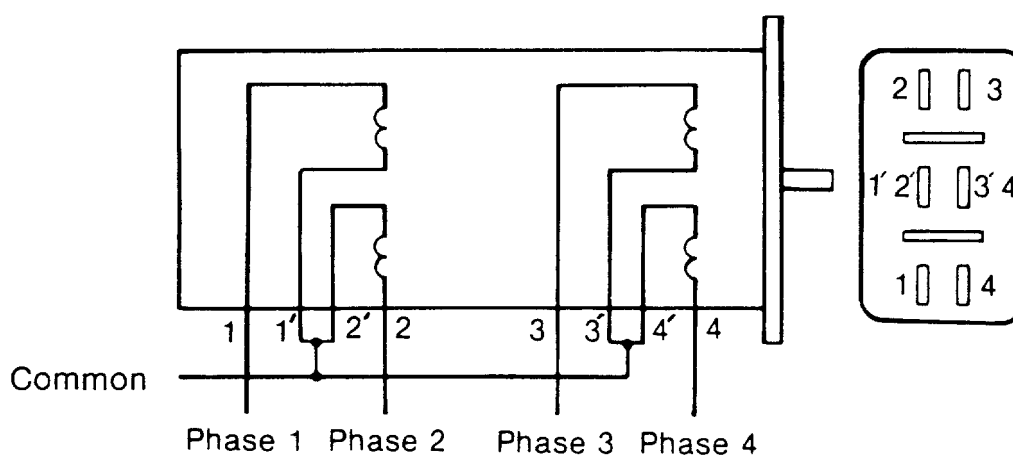
Farnell Electronic Components Limited
Canal Road, Leeds LS12 2TU
Tel: Leeds (0532) 636311 Telex. 55147.

Pin Connections for 240 Volt ac Synchronous Motors Four Phase Unipolar Stepping Motors

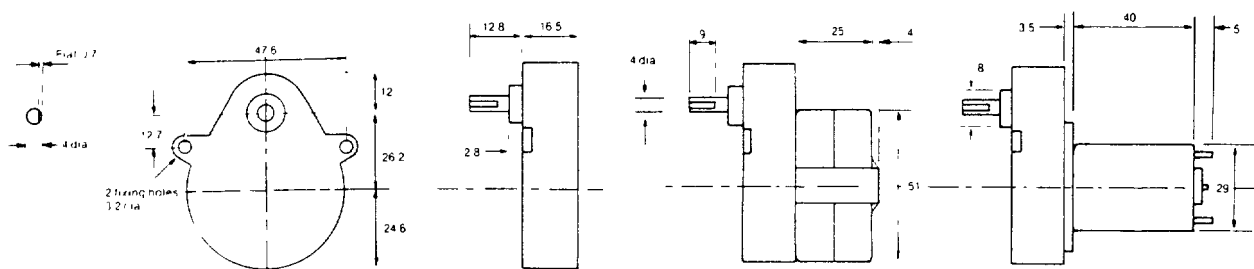
Connections



240 Volt ac Synchronous Motor (147-876 and 147-877)



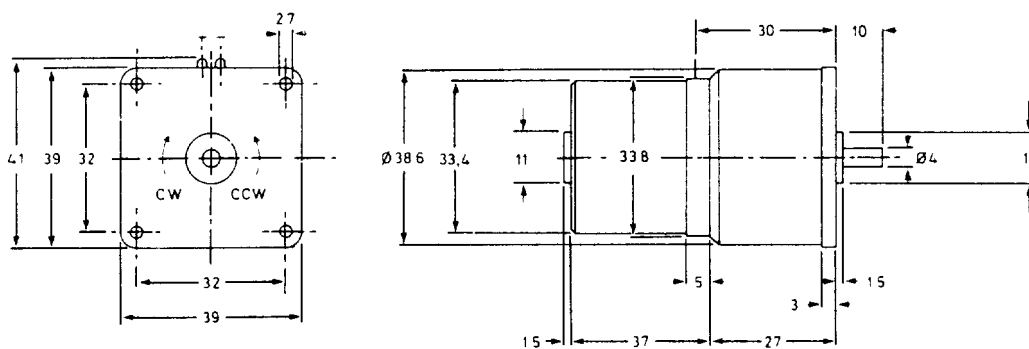
Four Phase Unipolar Stepping Motor (147-878 and 147-879)



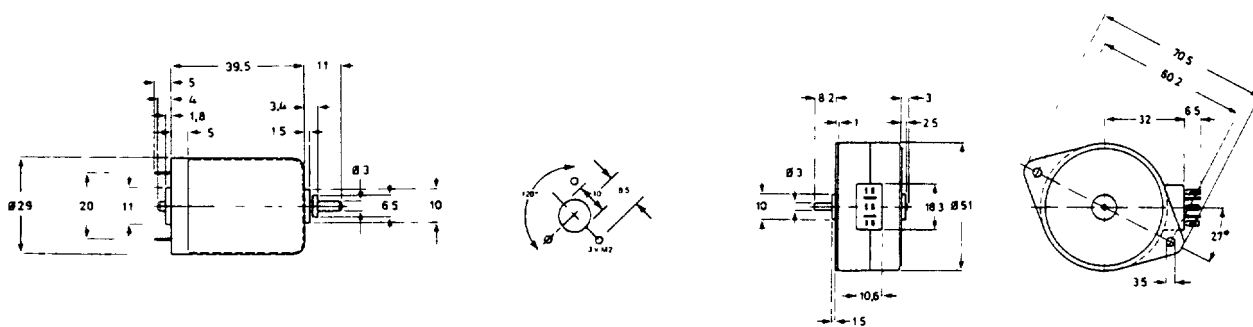
Gearbox

Gearbox with Synchronous or
Stepping Motor Fitted
Without Mounting Ears

Gearbox with 12V dc
Servo Motor Fitted



12V Geared Motors



12V dc Servo Motor

Synchronous or Stepping Motor
With Mounting Ears

All dimensions in mm



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Gearbox & Motor Dimensions