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**1990 Volvo 740 L4-2320cc 2.3L DOHC VIN 89 B234F FI**
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## Bosch EV 12 V 2 KW

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### Bosch EV 12 V 2 kW

<b>Voltage</b>		12 V
<b>Direction Of Rotation</b>		Clockwise
<b>Output</b>		2 kW
<b>Mechanical Values</b>	<b>Armature End Clearance</b>	0.1-0.3 mm
<b>Brush Spring Force</b>		23-25 N
<b>Distance</b>	<b>Pinion To Ring Gear</b>	2.5-3 mm
<b>Friction Torque</b>	<b>Armature Brake</b>	45-75 Nm
<b>Pinion Idling Torque</b>		28-40 Nm
<b>Backlash</b>		0.35-0.60 mm
<b>Pinion Modulus</b>		2.12 mm
<b>Commutator</b>	<b>Min. Diameter</b>	42.5 mm
	<b>New</b>	45 mm
<b>Carbon Brushes</b>	<b>Min. Length</b>	8.5 mm
	<b>New</b>	16.5 mm
<b>Max. Radial Run-Out</b>	<b>Armature</b>	0.05 mm
	<b>Commutator</b>	0.05 mm
<b>Unloaded Motor</b>	<b>11.5 V @ 95 Amps</b>	6500 rpm
<b>Locked Motor</b>	<b>4.5 V @ 700-880 Amps</b>	0 rpm
<b>Control Solenoid</b>	<b>Cut-In-Voltage</b>	7.5 V

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## Bosch DW 12 V 1.4 KW

[Notes](#)

### Bosch DW 12 V 1.4 kW

<b>Voltage</b>		12 V
<b>Direction Of Rotation</b>		Clockwise
<b>Output</b>		1.4 kW
<b>Mechanical Values</b>	<b>Armature End Clearance</b>	0.05-0.4 mm
<b>Distance</b>	<b>Pinion To Ring Gear</b>	2.0-3.0 mm
<b>Friction Torque</b>	<b>Armature Brake</b>	0.9-1.4 Nm
<b>Pinion Idling Torque</b>		0.12-0.18 Nm
<b>Backlash</b>		0.3-0.6 mm
<b>Pinion Modulus</b>		2.12 mm
<b>Commutator</b>	<b>Min. Diameter</b>	31.2 mm
<b>Carbon Brushes</b>	<b>Min. Length</b>	8.0 mm
<b>Max. Radial Run-Out</b>	<b>Armature</b>	0.05 mm
	<b>Commutator</b>	0.05 mm
<b>Unloaded Motor</b>	<b>11.5 V @ 75 Amps</b>	2900 rpm
<b>Locked Motor</b>	<b>4.5 V @ 625-800 Amps</b>	0 rpm
<b>Control Solenoid</b>	<b>Cut-In-Voltage</b>	7.3 V

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## Bosch GF 12 V 1.1 KW

[Notes](#)

### Bosch GF 12 V 1.1 kW

<b>Voltage</b>		12 V
<b>Direction Of Rotation</b>		Clockwise
<b>Output</b>		1.1 kW
<b>Mechanical Values</b>	<b>Armature End Clearance</b>	0.1-0.3 mm
<b>Brush Spring Force</b>		18-21 N
<b>Distance</b>	<b>Pinion To Ring Gear</b>	2-3 mm
<b>Friction Torque</b>	<b>Armature Brake</b>	0.30-0.35 Nm
<b>Pinion Idling Torque</b>		0.14-0.22 Nm
<b>Backlash</b>		0.3-0.6 mm
<b>Pinion Modulus</b>		2.12 mm
<b>Commutator</b>	<b>Min. Diameter</b>	33.5 mm
	<b>New</b>	36 mm
<b>Carbon Brushes</b>	<b>Min. Length</b>	13 mm
	<b>New</b>	18 mm
<b>Max. Radial Run-Out</b>	<b>Armature</b>	0.05 mm
	<b>Commutator</b>	0.01 mm
<b>Unloaded Motor</b>	<b>11.5 V @ 70 Amps</b>	7500 rpm
<b>Locked Motor</b>	<b>7.4 V @ 480-560 Amps</b>	0 rpm
	<b>6.5 V @ 410-490 Amps</b>	0 rpm
<b>Control Solenoid</b>	<b>Cut-In-Voltage</b>	8 V

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## Hitachi 12 V 1.4 KW S 114-232

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### Hitachi 12 V 1.4 kW S 114-232

<b>Voltage</b>		12 V
<b>Direction Of Rotation</b>		Clockwise
<b>Output</b>		1.4 kW
<b>Mechanical Values</b>	<b>Armature End Clearance</b>	0.03-0.1 mm
<b>Pinion Modulus</b>		2.12 mm
<b>Commutator</b>	<b>Min. Diameter</b>	39 mm
<b>Carbon Brushes</b>	<b>Min. Length</b>	11 mm
	<b>New</b>	16 mm
<b>Unloaded Motor</b>	<b>12 V @ 60 Amps</b>	7000 rpm
<b>Locked Motor</b>	<b>10.38 V @ 200 Amps</b>	2200 rpm
	<b>6 V @ 650 Amps</b>	0 rpm
<b>Control Solenoid</b>	<b>Cut-In-Voltage</b>	8 V

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## Hitachi 12 V 2.0 KW S 13-91

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### Hitachi 12 V 2.0 kW S 13-91

<b>Voltage</b>		12 V
<b>Direction Of Rotation</b>		Clockwise
<b>Output</b>		2.0 kW
<b>Mechanical Values</b>	<b>Armature End Clearance</b>	0.2-0.5 mm
<b>Brush Spring Force</b>		26.5-32.4 N
<b>Pinion Modulus</b>		2.12 mm
<b>Pinion Backlash</b>		0.3-1.5 mm
<b>Commutator</b>	<b>Min. Diameter</b>	39 mm
<b>Carbon Brushes</b>	<b>Min. Length</b>	11 mm
<b>Unloaded Motor</b>	<b>11 V @140 Amps</b>	3900 rpm
<b>Locked Motor</b>	<b>8.8 V @ 300 Amps</b>	1500 rpm
	<b>3 V @ 880 Amps</b>	0 rpm
<b>Control Solenoid</b>	<b>Cut-In-Voltage</b>	7.3 V