D.C. motors with and without transmissions, blowers and pumps

The proper drive for your projects

Bosch electric motors for industrial applications

Bosch provides a wide range of technically and economically interesting product solutions. Take advantage of our engineers' experience gathered from application in millions of automobiles and from many other industrial uses.

The ideal contact person can be found on the last page of the catalogue.
Electric motors from Bosch encourage movement in product development

With its competence, Bosch, as the leading global developer and manufacturer of automotive technology, has proved itself millions of times over in mobile applications. As a development partner to various industrial branches, Bosch is aligned to the requirements of its customers. Thus, Bosch electric motors are also the ideal solution for many applications outside of the automobile. The total of its advantages are immediately obvious, where quality, reliability and inexpensive prices through high-volume production are called for.

Industrial customers in particular, expect to have competent contact partners at their suppliers. To this end, an independent engineering team has been set up. Bosch engineers will advise and support you in the application engineering for D.C. motors, blowers and pumps. The proper contact person can be found on the last page of the catalogue.

www.bosch-elektromotoren.de
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Notes
This catalog lists the standard parts supplied, with all the technical information normally required by design engineers to select the best motor for their particular requirements. These motors were originally designed for use in motor vehicles.

We recommend that Bosch be consulted first before you use motors for any applications other than those specified, particularly in the case of other requirements, loads, or environmental conditions. Please use the "Inquiry Sheet" for this purpose.

Subject to change.
The current drawings quoted shall prevail.
The worldwide competent partner for industrial applications

As the largest manufacturer of electric motors in Europe, Bosch provides its customers with a comprehensive range of products including brushless D.C. motors and brush-type D.C. motors. Bosch electric motors are developed for the automotive industry and installed into automobiles and commercial vehicles as drives for wiping systems, engine cooling and passenger compartment air-conditioning as well as for the adjustment of windows, sliding roofs and seats. The Bosch electric motors referred to here are permanent-magnet-excited D.C. motors. They excel on account of an excellent power/weight ratio, a broad working range and through outstanding flexibility for adaptation to different requirements and installation situations. In addition to this they are extremely quiet and very robust (see D.C. motors without transmission). Bosch plants around the globe operate according to the stringent, internationally-binding Bosch quality guidelines, which only permit products for series production that have been well-proven in tough endurance tests. For several years now, Bosch has also extremely successfully provided its products to customers outside the automobile industry.
Customer orientation in development, production and sales

Innovative technology from the automobile industry

• Many million times well proven and reliable Bosch quality – As a leading developer and manufacturer of automotive technology Bosch is also a mobile and experienced partner outside the automobile industry.

• Bosch electric motors operate absolutely reliably – They are available in a light and compact design, have a high output and long service life.

• Price and performance, that match up – High-volume production results in inexpensive prices.

Individual solutions for your application

• The right solution for every requirement – Due to a variety of different designs and sizes, the Bosch range of electric motors provides a great deal of flexibility for installation and use.

Bosch electric motors operate in a D.C. voltage range of 12 to 24 Volt. They are also optionally available with and without Hall elements.

• Successful application examples – Power-operated hospital beds, wheel chairs, garage-door drives, lawnmowers, locking systems and output systems, electric mopeds and lots more.

Professional customer service

• Engineering team for new developments – Right from the very start, Bosch engineers provide their support and advice in the application engineering for D.C. motors, blowers or pumps.

• All-encompassing customer orientation – Bosch guarantees worldwide uniform production and quality standards, and availability of its products.

• Technical information – Comprehensive information on Bosch electric motors is available in our catalogue or on the available CD-ROM. Apart from this, you can also find all technical details online at www.bosch-elektromotoren.de.
Parameter explanation

Nominal values

Nominal value
Value of a variable (e.g. voltage, current, resistance ...) according to which a motor, blower, or pump, or its characteristics and parts are specified or according to which they are designated.

Power consumption $P_1$

$P_1 = U \cdot I$

$P_1$: Power consumption in W
$U$: Voltage in V
$I$: Current in A

Output power $P_2$

For motors the output power $P_2$ is always given.

$P_2 = 2 \cdot \frac{\pi}{60} \cdot M \cdot n$

$P_2$: Output power in W
$M$: Torque in Nm
$n$: Rotational speed in min$^{-1}$

Efficiency $\eta$

Efficiency refers to the relationship between mechanical output $P_2$ and electrical power input $P_1$.

$\eta_2 = \frac{P_2}{P_1}$

Example

Theoretically, a nominal voltage of 24 V and a rated current of 35 A result in a power input of $P_1$:

$P_1 = U \cdot I$: $P_1 = 24 \text{ V} \cdot 35 \text{ A}$; $P_1 = 840$ W.

This power consumption $P_1$ and the output $P_{2N}$ (see Fig. page 7) determined from the characteristic-curves chart are used to calculate the efficiency $\eta$:

$\eta = \frac{P_{2N}}{P_1}$

$\eta = \frac{600 \text{ W}}{840 \text{ W}} = 0.71 = 71 \%$

Rated torque $M_N$

The motor’s rated torque is calculated from:

$M_N = \frac{60}{2\pi} \cdot \frac{P_{2N}}{n_{N}}$

$M_N$: Rated torque in Nm
$P_{2N}$: Rated power output in W
$n_{N}$: Rated speed in min$^{-1}$

Rated speed $n_{N}$

Rated speed refers to the speed of a motor supplied with rated voltage and driven at a rated output.

Direction of rotation

When looking at the motor’s shaft end, clockwise operation is deemed to be right-handed rotation. For motors with two shaft ends, the shaft end opposite the commutator determines the direction of rotation.

Short-circuit values

The current consumed by the motor in case of short-circuit (when armature is braked to stand-still), is the maximum current $I_{\text{max}}$.

When a short circuit occurs, the maximum torque $M_C$ (breakaway torque) is effective.

IP degrees of protection

Valid for electrical equipment of road vehicles as under IEC 60529 and DIN 40050, Part 9.

- Protection of electrical equipment within housing against influence of solid foreign bodies including dust.
- Protection of electrical equipment within housing against ingress of water.
- Protection of people against touching hazardous parts$^1$ within housing.

$^1$ Moving mechanical parts.

Fastening

- Housing fastening: By means of screws on the motor or transmission housing. Blowers are fastened in a similar manner, either to the drive motor or the air shroud.
- Flange mounting: The motor’s drive-end support has a two or three-hole flange, or the front side contains three or four threaded holes for fastening.

Cooling

- Internal natural cooling: open-type design, without fan.
- Internal natural cooling: open-type design, with separate fan.
- Internal forced-air cooling: open-type design, with externally-driven fan.
- Surface natural cooling: closed design, without fan.
- Surface natural cooling: closed design, with separate fan.

Bosch Automotive Aftermarket 2006 | 2007
**IP-code structure**

<table>
<thead>
<tr>
<th>Code letters</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>C</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>First index number</td>
<td>0...6 or letter X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second index number</td>
<td>0...9 or letter X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplementary letter (facultative)</td>
<td>A, B, C, D</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supplementary letter (facultative)</td>
<td>M, S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If an index number is not given, then the letter "X" must be substituted (i.e. "XX", if both index numbers are missing). Additional and/or supplementary letters can be omitted without any substitution.

2) The supplementary letter "K" is placed either immediately after the first index numbers 5 and 6 or immediately after the second index numbers 4, 6 and 9.

3) During the water test for example: IP16KB protection against ingress of solid foreign bodies with a diameter \( \geq 50 \text{ mm} \), protection against powerful spray water at high pressure, protection against being touched by fingers.

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**Explanations of IP code**

<table>
<thead>
<tr>
<th>Index number and supplementary letter</th>
<th>Protection of electrical equipment against ingress of foreign bodies</th>
<th>People</th>
<th>Index number and supplementary letter</th>
<th>Protection of electrical equipment against ingress of water</th>
<th>Letter (facultative)</th>
<th>Protection of people in event of contact with hazardous parts</th>
<th>Letter (facultative)</th>
<th>Motion of moving parts 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Not protected</td>
<td>Not protected</td>
<td>0</td>
<td>Not protected</td>
<td>A</td>
<td>Protection against contact with back of hand</td>
<td>M</td>
<td>Motion of moving parts 3)</td>
</tr>
<tr>
<td>1</td>
<td>Protection against foreign bodies ( \phi \geq 50 \text{ mm} )</td>
<td>Protection against contact with back of hand</td>
<td>1</td>
<td>Protection against vertical droplets</td>
<td>B</td>
<td>Protection against contact with fingers</td>
<td>S</td>
<td>Standstill of moving parts 3)</td>
</tr>
<tr>
<td>2</td>
<td>Protection against foreign bodies ( \phi \geq 12.5 \text{ mm} )</td>
<td>Protection against contact with fingers</td>
<td>2</td>
<td>Protection against droplets, 15° Inclination</td>
<td>C</td>
<td>Protection against contact with tools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Protection against foreign bodies ( \phi \geq 2.5 \text{ mm} )</td>
<td>Protection against contact with tools</td>
<td>3</td>
<td>Protection against spray water</td>
<td>D</td>
<td>Protection against contact with wire</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Protection against foreign bodies ( \phi \geq 1.0 \text{ mm} )</td>
<td>Protection against contact with wire</td>
<td>4</td>
<td>Protection against spray water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5K</td>
<td>Dust-protected</td>
<td>Protection against contact with wire</td>
<td>4K</td>
<td>Protection against spray water with increased pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K</td>
<td>Dust-proof</td>
<td>Protection against contact with wire</td>
<td>5</td>
<td>Protection against spray water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>6</td>
<td>Protection against powerful spray water</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6K</td>
<td></td>
<td></td>
<td>6K</td>
<td>Protection against powerful spray water with increased pressure</td>
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<td></td>
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<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>Protection against temporary immersion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>Protection against permanent immersion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9K</td>
<td></td>
<td></td>
<td></td>
<td>Protection against high pressure/vapor pressure cleaning</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Operating modes (VDE 0530)

Continuous operation S 1
Operation with constant load condition, the duration of which is sufficient to reach the thermal steady-state condition.

Parameters for curve inspection
- $P_1$: Power input
- $P_V$: Power loss
- $\theta$: Temperature
- $t_B$: Load period
- $t_r$: Relative on period (as percentage)
- $t_S$: Duration
- $t_{St}$: Standstill period

Short-term operation S 2
Operation with constant load condition, which does not last long enough however to enable the thermal steady-state condition to be reached, and a subsequent pause, which lasts long enough for the motor temperature not to deviate more than 2 K from the coolant temperature.

Example: S 2 – 60 min
(The stated time refers to 60 minutes of operation at normal rating)

Intermittent operation S 3
Operation, comprised of a sequence of similar cycles, each of which encompasses a time with constant load and a pause, whereby the startup current does not exert any perceptible influence on heating.

Example: S 3 – 10%
(Stated percentage refers to on period)

Symbols
- Permanent-(magnet) excited
- D.C. motor
- Interference-suppression component
- Throttle
- Interference-suppression component
- Capacitor
- Varistor disk
- Resistance
- Thermoswitch
- Limit shutoff
- Varistor (voltage-dependent resistor)
- Bridge rectifier
Characteristic curves

With a specified working point of 160 Ncm one plots a vertical line to the torque axis. The intersecting points of these vertical lines with the various characteristic curves result in the operating data for the rated speed $n_n$, rated current $I_n$ and mechanical output $P_{2N}$.

Explanation of characteristic curve evaluation
- $M$: Torque
- $P_2$: Power input
- $I$: Current
- $n$: Rotational speed

Example:
Given: $M = 160 \text{ Ncm}$.
Found: $n_n = 3,800 \text{ min}^{-1}$.
$P_{2N} = 600 \text{ W}$ and $I_n = 35 \text{ A}$.

CE-Identification and manufacturer declaration in accordance with EU directive

As under the EU Directive all electrically-powered machines, devices and systems, which are manufactured, imported and sold within the borders of the European Union must have a CE-label attached to them. The EU Directive also includes the following individual guidelines, which are of significance for motor users.

   It is valid for self-contained operational machines or any interlinking of machines to form integral systems. It is not valid for machine components however, such as, for example, electrical control systems or electric motors which have no independent function. The entire machine or system must always comply with the Directive.

2. Low-voltage Directive
   It is valid and is to be applied for all electric motors as from a low-voltage limit of 75 V for D.C. voltage and 50 V for A.C. voltage and higher. Because the electric motors listed in this catalogue are designed for rated voltages of up to maximum 24 V, they are not governed by this Directive.

3. EMC Directive
   This Directive is valid for all electrical and electronic devices, installations and systems. However, this Directive is also valid for complex components such as, e.g. electric motors, although this only applies where they are openly available for purchase by the public. The electric motors listed in this catalogue are solely shipped as supplied parts or replacement parts, and are not subject to § 5 paragraph 5 of the EMC Act regarding a mandatory CE label.

The limits for the relaying and the radiation of high-frequency interference are specified in EN 55014 of the EMC Act. Because of the previously-mentioned reasons, Bosch electric motors are on no account subject to mandatory CE labeling.

We will gladly assist you with information in all matters relating to the acceptance of your application.
Motors with Hall sensor

Hall effect

If a current $I_S$ flows through a chip, a Hall voltage $U_H$ is generated transverse to the direction of the current, the size of which is proportional to the magnetic induction $B$ (vertical to $I_S$) and the current $I_S$. The Hall voltage $U_H$ is made up of:

$$U_H = R_H \cdot \frac{I_S \cdot B}{d}$$

$R_H$: Hall-constant factor

Since the resulting Hall voltages are extremely small, they are amplified. When using silicon Hall elements, the circuit for signal processing (e.g. a Schmitt trigger with subsequent driver) are integrated directly onto the same chip. This component is then designated a Hall-IC. The output is a transistor with open collector, with which a switching function is realized.

Permanently connected to the armature shaft is a magnetic ring, the magnetic field of which permeates the Hall element. When the armature shaft rotates, the magnetomotive-force direction in the Hall element changes. The output transistor is then either switched through or open.
Hall-effect applications in D.C. motors
By counting the generated output-voltage pulses, one can determine the number of rotations and thus the speed. If the rotational motion is converted into a linear motion, it then becomes possible to monitor the adjustment travel exactly. If there are two Hall generators installed offset to each other at a specific angle $\alpha$ in a motor, then the direction of rotation can also be determined.

### Basic arrangement in motor with 2-pole ring magnet.

- **$H_1$, $H_2$**: Hall generator
- **$N$**: North pole
- **$S$**: South pole
- **$\alpha$**: Angle between the two Hall generators

### Output signals, 1 armature rotation.

- **$U_{A1}$**: Output voltage of first Hall generator
- **$U_{A2}$**: Output voltage of second Hall generator
- **$\varphi$**: Rotational angle

### Basic arrangement in motor with 8-pole ring magnet.

- **$H_1$, $H_2$**: Hall generator
- **$N$**: North pole
- **$S$**: South pole
- **$\alpha$**: Angle between the two Hall generators

### Output signals, 1 armature rotation.

- **$U_{A1}$**: Output voltage of first Hall generator
- **$U_{A2}$**: Output voltage of second Hall generator
- **$\varphi$**: Rotational angle

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Parameter explanation
D.C. motors without transmission

The Bosch D.C. motors without transmission referred to here are permanent-magnet D.C. motors developed for use in motor vehicles. They excel on account of an excellent power/weight ratio, and a broad working range in different requirements and installation situations.

Bosch electric motors without transmission are typically used in motor vehicles as a motor for heater or air-conditioning devices or for power-seat adjustment. The installation position can vary arbitrarily from horizontal to vertical. Bosch electric motors without transmission, are also the suitable solution for many applications outside the automobile.

Product features

- Wide range of permanent-magnet D.C. motor products
- D.C. voltage range from 12 to 24 Volt
- Speed range from 1,750 to 9,500 min⁻¹
- Available with and without Hall elements

Advantages for your application

- Robust and reliable quality, well-proven in many millions of motor vehicles
- High reliability and service life
- A multitude of different sizes and designs for greater flexibility
- Favorable price/performance ratio

Application examples

Automotive technology:
Heater and air-conditioning blowers, engine cooling, power-seat adjustment

Industrial applications:
Electric mopeds, sweeping machines, hospital wheelchairs, adjustable office desks, window adjustment, hoisting winches and lots more.
D.C. motors without transmission

12 V 20 W

Part number 0130002211
Nominal voltage $U_N$ 12 V
Nominal power $P_N$ 20 W
Nominal current $I_N$ 2.8 A
Nominal speed $n_N$ 9500 min$^{-1}$
Nominal torque $M_N$ 2 Ncm
Breakaway torque $M_b$ 20 Ncm
Direction of rotation R
Type of duty S 1
Degree of protection IP 54 A
Weight approx. 0.30 kg

1) Bearings excluded

24 V 20 W

Part number 0130002092
Nominal voltage $U_N$ 24 V
Nominal power $P_N$ 20 W
Nominal current $I_N$ 1.7 A
Nominal speed $n_N$ 9500 min$^{-1}$
Nominal torque $M_N$ 2 Ncm
Breakaway torque $M_b$ 20 Ncm
Direction of rotation R
Type of duty S 1
Degree of protection IP 54 A
Weight approx. 0.30 kg

N Cap supplied separately (part number 3130508003)

N Cap supplied separately (part number 3130508003)
S Round plug, Kostal (part number 1022432944-0)
**API**

### 12 V 28 W

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 002 525</td>
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<td>Nominal voltage</td>
<td>$U_n = 12$ V</td>
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<tr>
<td>Nominal power</td>
<td>$P_n = 28$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 7.0$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 3100$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 9$ Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s = 38$ Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50 A</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.44 kg</td>
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<tr>
<td>Clockwise:</td>
<td>I to term (+), II to term (–)</td>
</tr>
<tr>
<td>Counterclockwise:</td>
<td>I to term (–), II to term (+)</td>
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</table>

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**API**

### 12 V 28 W with Hall sensor

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<tr>
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<td>Nominal power</td>
<td>$P_n = 28$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 7.0$ A</td>
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<tr>
<td>Nominal speed</td>
<td>$n_n = 3100$ min$^{-1}$</td>
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<tr>
<td>Nominal torque</td>
<td>$M_n = 9$ Ncm</td>
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<tr>
<td>Breakaway torque</td>
<td>$M_s = 38$ Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50 A</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.44 kg</td>
</tr>
<tr>
<td>Clockwise:</td>
<td>I to term (+), II to term (–)</td>
</tr>
<tr>
<td>Counterclockwise:</td>
<td>I to term (–), II to term (+)</td>
</tr>
</tbody>
</table>
12 V 46 W

Part number: 0 130 002 529
Nominal voltage: $U_n = 12$ V
Nominal power: $P_n = 46$ W
Nominal current: $I_n = 9.0$ A
Nominal speed: $n_n = 2900$ min$^{-1}$
Nominal torque: $M_n = 15$ Ncm
Breakaway torque: $M_s = 63$ Ncm
Direction of rotation: L/R
Type of duty: S 3 - 15 %
Degree of protection: IP 50
Weight: approx. 0.44 kg

Clockwise: I to term (+), II to term (–)
Counterclockwise: I to term (–), II to term (+)

API

API with Hall sensor

12 V 46 W

Part number: 0 130 002 530
Nominal voltage: $U_n = 12$ V
Nominal power: $P_n = 46$ W
Nominal current: $I_n = 9.0$ A
Nominal speed: $n_n = 2900$ min$^{-1}$
Nominal torque: $M_n = 15$ Ncm
Breakaway torque: $M_s = 63$ Ncm
Direction of rotation: L/R
Type of duty: S 3 - 15 %
Degree of protection: IP 50
Weight: approx. 0.44 kg

Clockwise: I to term (+), II to term (–)
Counterclockwise: I to term (–), II to term (+)
24 V 25 W

- **Part number**: 0 130 002 562
- **Nominal voltage**: $U_N = 24$ V
- **Nominal power**: $P_N = 25$ W
- **Nominal current**: $I_N = 2.7$ A
- **Nominal speed**: $n_N = 2950$ min$^{-1}$
- **Nominal torque**: $M_N = 8$ Ncm
- **Breakaway torque**: $M_a = 27$ Ncm
- **Direction of rotation**: L/R
- **Type of duty**: S 3 - 15 %
- **Degree of protection**: IP 50
- **Weight**: approx. 0.50 kg

Clockwise:
- red (rt) to term (+), brown (br) to term (–)

Counterclockwise:
- red (rt) to term (–), brown (br) to term (+)

---

24 V 46 W

- **Part number**: 0 130 002 671
- **Nominal voltage**: $U_N = 24$ V
- **Nominal power**: $P_N = 46$ W
- **Nominal current**: $I_N = 4.5$ A
- **Nominal speed**: $n_N = 2900$ min$^{-1}$
- **Nominal torque**: $M_N = 15$ Ncm
- **Breakaway torque**: $M_a = 63$ Ncm
- **Direction of rotation**: L/R
- **Type of duty**: S 3 - 15 %
- **Degree of protection**: IP 50
- **Weight**: approx. 0.44 kg

1) On request

Clockwise: I to term (+) II to term (–)

Counterclockwise: I to (–) II to (+)
**API**

with Hall sensor

### 24 V 46 W

**Part number** 0 130 002 672  
**Nominal voltage** $U_N$ 24 V  
**Nominal power** $P_N$ 46 W  
**Nominal current** $I_N$ 4,5 A  
**Nominal speed** $n_N$ 2900 min$^{-1}$  
**Nominal torque** $M_N$ 15 Ncm  
**Breakaway torque** $M_{br}$ 63 Ncm  
**Direction of rotation** L/R  
**Type of duty** S 3 - 15 %  
**Degree of protection** IP 50  
**Weight** approx. 0,44 kg

1) On request  
Clockwise: I to term (+) II to term (-)  
Counterclockwise: I to term (-) II to term (+)

### 12 V 34.5 W

**Part number** 0 130 002 632  
**Nominal voltage** $U_N$ 12 V  
**Nominal power** $P_N$ 34,5 W  
**Nominal current** $I_N$ 6,8 A  
**Nominal speed** $n_N$ 3350 min$^{-1}$  
**Nominal torque** $M_N$ 10 Ncm  
**Breakaway torque** $M_{br}$ 49 Ncm  
**Direction of rotation** L/R  
**Type of duty** S 3 - 15 %  
**Degree of protection** IP 50  
**Weight** approx. 0,45 kg

Clockwise: I to term (+), II to term (-)  
Counterclockwise: I to term (-), II to term (+)
D.C. motors without transmission

API

12 V 34.5 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 130 002 633</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>U₀ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>P₀ 34.5 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>I₀ 6.8 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>n₀ 3360 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>M₀ 10 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>Mₐ 45 Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.45 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to term (+), II to term (–)
Counterclockwise: I to term (–), II to term (+)

API with Hall sensor

12 V 36.4 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 130 002 634</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>U₀ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>P₀ 36.4 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>I₀ 6.3 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>n₀ 3480 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>M₀ 10 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>Mₐ 62 Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.53 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to term (+), II to term (–)
Counterclockwise: I to term (–), II to term (+)
API

**12 V 29.2 W**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 002 636</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_N = 12$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N = 29.2$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N = 5.8$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N = 2790$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N = 10$ Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a = 69$ Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.60 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to term (+), II to term (–)
Counterclockwise: I to term (–), II to term (+)

API

**12 V 29.2 W with Hall sensor**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 002 613</td>
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<tr>
<td>Nominal voltage</td>
<td>$U_N = 12$ V</td>
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<tr>
<td>Nominal power</td>
<td>$P_N = 29.2$ W</td>
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<tr>
<td>Nominal current</td>
<td>$I_N = 5.8$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N = 2790$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N = 10$ Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a = 69$ Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 3 - 15 %</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.60 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to term (+) II to term (–)
Counterclockwise: I to term (–) II to term (+)
**API with Hall sensor**

**24 V 29.2 W**

- **Part number**: 0 130 002 673
- **Nominal voltage**: $U_{nk} = 24$ V
- **Nominal power**: $P_{nk} = 29.2$ W
- **Nominal current**: $I_{nk} = 2.9$ A
- **Nominal speed**: $n_{nk} = 2790$ min$^{-1}$
- **Nominal torque**: $M_n = 10$ Ncm
- **Breakaway torque**: $M_B = 69$ Ncm
- **Direction of rotation**: L/R
- **Type of duty**: S 3 - 15 %
- **Degree of protection**: IP 50
- **Weight**: approx. 0.60 kg

1) On request

Clockwise: I to term (+) II to term (-)
Counterclockwise: I to term (-) II to term (+)

---

**24 V 29.2 W**

- **Part number**: 0 130 002 674
- **Nominal voltage**: $U_{nk} = 24$ V
- **Nominal power**: $P_{nk} = 29.2$ W
- **Nominal current**: $I_{nk} = 2.9$ A
- **Nominal speed**: $n_{nk} = 2790$ min$^{-1}$
- **Nominal torque**: $M_n = 10$ Ncm
- **Breakaway torque**: $M_B = 69$ Ncm
- **Direction of rotation**: L/R
- **Type of duty**: S 3 - 15 %
- **Degree of protection**: IP 50
- **Weight**: approx. 0.60 kg

1) On request

Clockwise: I to term (+) II to term (-)
Counterclockwise: I to term (-) II to term (+)
**BPA**

**12 V 34 W**

- **Part number**: 0 130 007 343
- **Nominal voltage**: $U_N = 12\, \text{V}$
- **Nominal power**: $P_N = 34\, \text{W}$
- **Nominal current**: $I_N = 5.5\, \text{A}$
- **Nominal speed**: $n_N = 5425\, \text{min}^{-1}$
- **Nominal torque**: $M_N = 6\, \text{Ncm}$
- **Breakaway torque**: $M_{B} = 40\, \text{Ncm}$
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0.40 kg

**Diagram:**

- A (−) Receptacle for blade terminal 6.3 x 0.8
- B (+) Blade terminal 6.3 x 0.8

---

**BPA**

**24 V 25 W**

- **Part number**: 0 130 007 051
- **Nominal voltage**: $U_N = 24\, \text{V}$
- **Nominal power**: $P_N = 25\, \text{W}$
- **Nominal current**: $I_N = 1.8\, \text{A}$
- **Nominal speed**: $n_N = 4000\, \text{min}^{-1}$
- **Nominal torque**: $M_N = 6\, \text{Ncm}$
- **Breakaway torque**: $M_{B} = 40\, \text{Ncm}$
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0.40 kg

**Diagram:**

- A (−) Receptacle for blade terminal 6.3 x 0.8
- B (+) Blade terminal 6.3 x 0.8
**BPA**

### 12 V 14 W

- **Part number**: 0 130 007 342
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 14$ W
- **Nominal current**: $I_n = 2.5$ A
- **Nominal speed**: $n_n = 2860$ min$^{-1}$
- **Nominal torque**: $M_n = 4.6$ Ncm
- **Breakaway torque**: $M_{br} = 31$ Ncm
- **Direction of rotation**: L
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0.40 kg

### 12 V 28 W

- **Part number**: 0 130 007 027
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 28$ W
- **Nominal current**: $I_n = 4.0$ A
- **Nominal speed**: $n_n = 4500$ min$^{-1}$
- **Nominal torque**: $M_n = 6$ Ncm
- **Breakaway torque**: $M_{br} = 35$ Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0.40 kg

---

**Connections**: (+) green, (–) black.

**A** (-) Receptacle for blade terminal 6.3 x 0.8

**B** (+) Blade terminal 6.3 x 0.8
**CPB**

### 12 V 24 W

- **Part number:** F 006 810 148
- **Nominal voltage:** $U_N = 12$ V
- **Nominal power:** $P_N = 24$ W
- **Nominal speed:** $n_N = 2950$ min$^{-1}$
- **Nominal torque:** $M_N = 7$ Ncm
- **Breakaway torque:** $M_s = 26$ Ncm
- **Direction of rotation:** R
- **Type of duty:** S 1
- **Degree of protection:** IP 10
- **Weight:** approx. 0.50 kg

### 12 V 99 W

- **Part number:** 0 130 063 075
- **Nominal voltage:** $U_N = 12$ V
- **Nominal power:** $P_N = 99$ W
- **Nominal current:** $I_N = 13.0$ A
- **Nominal speed:** $n_N = 3800$ min$^{-1}$
- **Nominal torque:** $M_N = 25$ Ncm
- **Breakaway torque:** $M_s = 108$ Ncm
- **Direction of rotation:** L
- **Type of duty:** S 1
- **Degree of protection:** IP 10
- **Weight:** approx. 0.72 kg
**CPB**

**12 V 86 W**

- **Part number**: 0 130 063 076
- **Nominal voltage**: \( U_N = 12 \text{ V} \)
- **Nominal power**: \( P_N = 86 \text{ W} \)
- **Nominal current**: \( I_N = 12,0 \text{ A} \)
- **Nominal speed**: \( n_N = 3300 \text{ min}^{-1} \)
- **Nominal torque**: \( M_N = 25 \text{ Ncm} \)
- **Breakaway torque**: \( M_d = 118 \text{ Ncm} \)
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0,80 kg

**12 V 75 W**

- **Part number**: 0 130 063 012
- **Nominal voltage**: \( U_N = 12 \text{ V} \)
- **Nominal power**: \( P_N = 75 \text{ W} \)
- **Nominal current**: \( I_N = 12,0 \text{ A} \)
- **Nominal speed**: \( n_N = 4800 \text{ min}^{-1} \)
- **Nominal torque**: \( M_N = 15 \text{ Ncm} \)
- **Breakaway torque**: \( M_d = 105 \text{ Ncm} \)
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 0,75 kg
**CPB 12 V 84 W**

Part number: 0 130 063 040

- Nominal voltage: \( U_n = 12 \text{ V} \)
- Nominal power: \( P_n = 84 \text{ W} \)
- Nominal current: \( I_n = 12.0 \text{ A} \)
- Nominal speed: \( n_n = 4000 \text{ min}^{-1} \)
- Nominal torque: \( M_n = 20 \text{ Ncm} \)
- Breakaway torque: \( M_k = 97 \text{ Ncm} \)
- Direction of rotation: \( R \)
- Type of duty: \( S 1 \)
- Degree of protection: \( IP 10 \)
- Weight: approx. 0.70 kg

**CPB 24 V 44 W**

Part number: 0 130 063 042

- Nominal voltage: \( U_n = 24 \text{ V} \)
- Nominal power: \( P_n = 44 \text{ W} \)
- Nominal current: \( I_n = 2.5 \text{ A} \)
- Nominal speed: \( n_n = 3000 \text{ min}^{-1} \)
- Nominal torque: \( M_n = 12 \text{ Ncm} \)
- Breakaway torque: \( M_k = 84 \text{ Ncm} \)
- Direction of rotation: \( R \)
- Type of duty: \( S 1 \)
- Degree of protection: \( IP 10 \)
- Weight: approx. 0.70 kg
24 V 36 W

Part number: F 006 MG0 30B
Nominal voltage: $U_n = 24$ V
Nominal power: $P_n = 120$ W
Nominal current: $I_n = 2.5$ A
Nominal speed: $n_n = 2300$ min$^{-1}$
Nominal torque: $M_n = 50$ Ncm
Breakaway torque: $M_A = 450$ Ncm
Direction of rotation: R
Type of duty: S 1
Degree of protection: IP 10
Weight: approx. 0.67 kg

24 V 57 W

Part number: 0 130 063 092
Nominal voltage: $U_n = 24$ V
Nominal power: $P_n = 57$ W
Nominal current: $I_n = 3.5$ A
Nominal speed: $n_n = 3650$ min$^{-1}$
Nominal torque: $M_n = 15$ Ncm
Breakaway torque: $M_A = 112$ Ncm
Direction of rotation: L/R
Type of duty: S 1
Degree of protection: IP 10
Weight: approx. 0.70 kg

A (-) Receptacle for blade terminal 6.3 x 0.8
B (+) Blade terminal 6.3 x 0.8
**CPB**

### 24 V 67 W

- **Part number:** 0 130 063 059
- **Nominal voltage** \( U_N \) 24 V
- **Nominal power** \( P_N \) 67 W
- **Nominal current** \( I_N \) 6,0 A
- **Nominal speed** \( n_N \) 4300 min\(^{-1}\)
- **Nominal torque** \( M_N \) 15 Ncm
- **Breakaway torque** \( M_K \) 51 Ncm
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 10
- **Weight** approx. 0,70 kg

![Motor with dimensions](image1)

- A (--) Receptacle for blade terminal 6.3 x 0.8
- B (+) Blade terminal 6.3 x 0.8

### 24 V 75 W

- **Part number:** 0 130 063 029
- **Nominal voltage** \( U_N \) 24 V
- **Nominal power** \( P_N \) 75 W
- **Nominal current** \( I_N \) 6,0 A
- **Nominal speed** \( n_N \) 4800 min\(^{-1}\)
- **Nominal torque** \( M_N \) 15 Ncm
- **Breakaway torque** \( M_K \) 100 Ncm
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 10
- **Weight** approx. 0,80 kg

![Motor with dimensions](image2)
CPR

12 V 102 W

Part number 0 130 063 604
Nominal voltage $U_n$ 12 V
Nominal power $P_n$ 102 W
Nominal current $I_n$ 17.0 A
Nominal speed $n_n$ 3500 min$^{-1}$
Nominal torque $M_n$ 28 Ncm
Breakaway torque $M_s$ 140 Ncm
Direction of rotation L
Type of duty S 1
Degree of protection IP 10
Weight approx. 0.75 kg

CPR

24 V 123 W

Part number 0 130 063 602
Nominal voltage $U_n$ 24 V
Nominal power $P_n$ 123 W
Nominal current $I_n$ 7.5 A
Nominal speed $n_n$ 4300 min$^{-1}$
Nominal torque $M_n$ 27.5 Ncm
Breakaway torque $M_s$ 188 Ncm
Direction of rotation R
Type of duty S 1
Degree of protection IP 10
Weight approx. 0.72 kg
12 V 80 W

Part number: 0 130 111 003
Nominal voltage: $U_n = 12$ V
Nominal power: $P_n = 80$ W
Nominal current: $I_n = 9.6$ A
Nominal speed: $n_n = 3100$ min$^{-1}$
Nominal torque: $M_n = 25$ Ncm
Breakaway torque: $M_k = 178$ Ncm
Direction of rotation: L
Type of duty: S 1
Degree of protection: IP 10
Weight: approx. 1.30 kg

12 V 120 W

Part number: 0 130 111 171
Nominal voltage: $U_n = 12$ V
Nominal power: $P_n = 120$ W
Nominal current: $I_n = 15.0$ A
Nominal speed: $n_n = 4600$ min$^{-1}$
Nominal torque: $M_n = 25$ Ncm
Breakaway torque: $M_k = 198$ Ncm
Direction of rotation: L
Type of duty: S 1
Degree of protection: IP 10
Weight: approx. 1.10 kg
D.C. motors without transmission

**12 V 120 W**

- **Part number**: 0 130 111 159
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 120$ W
- **Nominal current**: $I_n = 15.0$ A
- **Nominal speed**: $n_n = 4600$ min$^{-1}$
- **Nominal torque**: $M_n = 25$ Ncm
- **Breakaway torque**: $M_a = 198$ Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 1,10 kg

**12 V 140 W**

- **Part number**: 0 130 111 110
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 140$ W
- **Nominal current**: $I_n = 17.0$ A
- **Nominal speed**: $n_n = 5250$ min$^{-1}$
- **Nominal torque**: $M_n = 25$ Ncm
- **Breakaway torque**: $M_a = 194$ Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 1,10 kg
**DPD**

### D.C. motors without transmission

#### 12 V 150 W

- **Part number**: 0 130 111 189
- **Nominal voltage** \( U_N \): 12 V
- **Nominal power** \( P_N \): 150 W
- **Nominal current** \( I_N \): 21.0 A
- **Nominal speed** \( n_N \): 3500 min\(^{-1}\)
- **Nominal torque** \( M_N \): 40 Ncm
- **Breakaway torque** \( M_A \): 170 Ncm
- **Direction of rotation**: L
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 1.12 kg

![Diagram of 12 V 150 W D.C. motor]

#### 12 V 160 W

- **Part number**: 0 130 111 136
- **Nominal voltage** \( U_N \): 12 V
- **Nominal power** \( P_N \): 160 W
- **Nominal current** \( I_N \): 18.0 A
- **Nominal speed** \( n_N \): 3700 min\(^{-1}\)
- **Nominal torque** \( M_N \): 40 Ncm
- **Breakaway torque** \( M_A \): 190 Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 1.12 kg

![Diagram of 12 V 160 W D.C. motor]
24 V 100 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 111 101</td>
</tr>
<tr>
<td>Nominal voltage $U_n$</td>
<td>24 V</td>
</tr>
<tr>
<td>Nominal power $P_n$</td>
<td>100 W</td>
</tr>
<tr>
<td>Nominal current $I_n$</td>
<td>7.5 A</td>
</tr>
<tr>
<td>Nominal speed $n_n$</td>
<td>4000 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque $M_n$</td>
<td>25 Ncm</td>
</tr>
<tr>
<td>Breakaway torque $M_B$</td>
<td>155 Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 10</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.10 kg</td>
</tr>
</tbody>
</table>

24 V 104 W

<table>
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<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Part number</td>
<td>0 130 111 130</td>
</tr>
<tr>
<td>Nominal voltage $U_n$</td>
<td>24 V</td>
</tr>
<tr>
<td>Nominal power $P_n$</td>
<td>104 W</td>
</tr>
<tr>
<td>Nominal current $I_n$</td>
<td>7.0 A</td>
</tr>
<tr>
<td>Nominal speed $n_n$</td>
<td>4950 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque $M_n$</td>
<td>20 Ncm</td>
</tr>
<tr>
<td>Breakaway torque $M_B$</td>
<td>170 Ncm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 10</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.10 kg</td>
</tr>
</tbody>
</table>
### 24 V 170 W

**Part number**: 0 130 111 042  
**Nominal voltage** $U_N$ 24 V  
**Nominal power** $P_N$ 170 W  
**Nominal current** $I_N$ 10,0 A  
**Nominal speed** $n_N$ 5400 min⁻¹  
**Nominal torque** $M_N$ 30 Ncm  
**Breakaway torque** $M_k$ 270 Ncm  
**Direction of rotation** $R$  
**Type of duty** S 1  
**Degree of protection** IP 10  
**Weight** approx. 1,30 kg

---

![Diagram of motor](image)

- A: Receptacle for blade terminal 6.3 x 0.8
- B: Blade terminal 6.3 x 0.8
**DPB**

### 24 V 32 W

- **Part number:** 0 130 110 003
- **Nominal voltage:** $U_n = 24$ V
- **Nominal power:** $P_n = 32$ W
- **Nominal current:** $i_n = 2.5$ A
- **Nominal speed:** $n_n = 1300$ min$^{-1}$
- **Nominal torque:** $M_n = 24$ Ncm
- **Breakaway torque:** $M_s = 110$ Ncm
- **Direction of rotation:** L
- **Type of duty:** S 1
- **Degree of protection:** IP 44
- **Weight:** approx. 1.8 kg

Connections: (+) red, (-) black.

### 24 V 50 W

- **Part number:** 0 130 110 005
- **Nominal voltage:** $U_n = 24$ V
- **Nominal power:** $P_n = 50$ W
- **Nominal current:** $i_n = 4.4$ A
- **Nominal speed:** $n_n = 6000$ min$^{-1}$
- **Nominal torque:** $M_n = 10$ Ncm
- **Breakaway torque:** $M_s = 160$ Ncm
- **Direction of rotation:** R
- **Type of duty:** S 1
- **Degree of protection:** IP 44
- **Weight:** approx. 1.5 kg

Connections: (+) Blade receptacle B 6.3-2.5 DIN 46 247 (brown), (-) Blade terminal B 6.3-2.5 DIN 46 248 (black), Ø4.4 for Tapite M5.
**24 V 73 W**

Part number: 0 130 110 002  
Nominal voltage: $U_n = 24$ V  
Nominal power: $P_n = 73$ W  
Nominal current: $I_n = 4.4$ A  
Nominal speed: $n_n = 4000$ min$^{-1}$  
Nominal torque: $M_n = 17.5$ Ncm  
Breakaway torque: $M_{br} = 212$ Ncm  
Direction of rotation: R  
Type of duty: S 1  
Degree of protection: IP 54 A  
Weight: approx. 1.80 kg

A. (−) Blade terminal 6.3−2.5 DIN 46 343 (brown).  
B. (+) Blade terminal 6.3−2.5 DIN 46 343 (black).

---

**24 V 100 W**

Part number: 0 130 110 019  
Nominal voltage: $U_n = 24$ V  
Nominal power: $P_n = 100$ W  
Nominal current: $I_n = 5.5$ A  
Nominal speed: $n_n = 4500$ min$^{-1}$  
Nominal torque: $M_n = 20$ Ncm  
Breakaway torque: $M_{br} = 170$ Ncm  
Direction of rotation: R  
Type of duty: S 1  
Degree of protection: IP 44  
Weight: approx. 1.40 kg

Connections: (+) black, (−) brown.
**DPG**

### 24 V 59 W

- **Part number**: 0 130 107 100
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 59$ W
- **Nominal current**: $I_n = 4.5$ A
- **Nominal speed**: $n_n = 2800$ min$^{-1}$
- **Nominal torque**: $M_n = 20$ Ncm
- **Breakaway torque**: $M_a = 176$ Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 23
- **Weight**: approx. 1.10 kg

---

**Diagram:**

- Blade terminal 6.3-2.5 DIN 46 343 – Bz.
**DPL**

### 12 V 115 W

- **Part number:** 0 130 101 103
- **Nominal voltage** $U_N$: 12 V
- **Nominal power** $P_N$: 115 W
- **Nominal current** $I_N$: 16.0 A
- **Nominal speed** $n_N$: 4400 min$^{-1}$
- **Nominal torque** $M_N$: 25 Ncm
- **Breakaway torque** $M_a$: 208 Ncm
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 10
- **Weight** approx. 1.40 kg

### 12 V 119 W

- **Part number:** 0 130 101 108
- **Nominal voltage** $U_N$: 12 V
- **Nominal power** $P_N$: 119 W
- **Nominal current** $I_N$: 14.0 A
- **Nominal speed** $n_N$: 3800 min$^{-1}$
- **Nominal torque** $M_N$: 30 Ncm
- **Breakaway torque** $M_a$: 270 Ncm
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 10
- **Weight** approx. 1.40 kg
DPL

12 V 141 W

Part number 0 130 101 102
Nominal voltage \(U_n\) 12 V
Nominal power \(P_n\) 141 W
Nominal current \(I_n\) 16,0 A
Nominal speed \(n_n\) 4500 min\(^{-1}\)
Nominal torque \(M_n\) 30 Ncm
Breakaway torque \(M_a\) 307 Ncm
Direction of rotation L
Type of duty S 1
Degree of protection IP 10
Weight approx. 1,40 kg

12 V 138 W

Part number 0 130 101 112
Nominal voltage \(U_n\) 12 V
Nominal power \(P_n\) 138 W
Nominal current \(I_n\) 14,0 A
Nominal speed \(n_n\) 4400 min\(^{-1}\)
Nominal torque \(M_n\) 30 Ncm
Breakaway torque \(M_a\) 215 Ncm
Direction of rotation L
Type of duty S 1
Degree of protection IP 10
Weight approx. 1,20 kg
12 V 131 W

Part number 0 130 101 117
Nominal voltage $U_N$ 12 V
Nominal power $P_N$ 131 W
Nominal current $I_N$ 13,0 A
Nominal speed $n_N$ 4200 min$^{-1}$
Nominal torque $M_N$ 30 Ncm
Breakaway torque $M_A$ 220 Ncm
Direction of rotation R
Type of duty S 1
Degree of protection IP 10
Weight approx. 1,20 kg

12 V 138 W

Part number 0 130 101 123
Nominal voltage $U_N$ 12 V
Nominal power $P_N$ 138 W
Nominal current $I_N$ 16,0 A
Nominal speed $n_N$ 4400 min$^{-1}$
Nominal torque $M_N$ 30 Ncm
Breakaway torque $M_A$ 225 Ncm
Direction of rotation R
Type of duty S 1
Degree of protection IP 10
Weight approx. 1,40 kg
GPB

24 V 175 W

- Part number: F 006 KM0 60F
- Nominal voltage: $U_n = 24$ V
- Nominal power: $P_n = 175$ W
- Nominal current: $I_n = 10.5$ A
- Nominal speed: $n_n = 2200$ min$^{-1}$
- Nominal torque: $M_n = 75$ Ncm
- Breakaway torque: $M_a = 480$ Ncm
- Direction of rotation: $R$
- Type of duty: $S 1$
- Degree of protection: IP 03
- Weight: approx. 1.50 kg

Clockwise: I to (+) II to (-)
Counterclockwise: I to (-) II to (+)

GPB

12 V 84 W

- Part number: 0 130 303 003
- Nominal voltage: $U_n = 12$ V
- Nominal power: $P_n = 84$ W
- Nominal current: $I_n = 11.0$ A
- Nominal speed: $n_n = 2300$ min$^{-1}$
- Nominal torque: $M_n = 35$ Ncm
- Breakaway torque: $M_a = 197$ Ncm
- Direction of rotation: $R$
- Type of duty: $S 1$
- Degree of protection: IP 03
- Weight: approx. 1.30 kg

Connections: Yazaki 7114-2872
**12 V 99 W**

- Part number: 0 130 303 001
- Nominal voltage: $U_N = 12$ V
- Nominal power: $P_N = 99$ W
- Nominal current: $I_N = 12.0$ A
- Nominal speed: $n_N = 2700$ min$^{-1}$
- Nominal torque: $M_N = 35$ Ncm
- Breakaway torque: $M_{ak} = 200$ Ncm
- Direction of rotation: R
- Type of duty: S 1
- Degree of protection: IP 03
- Weight: approx. 1.30 kg

**12 V 146 W**

- Part number: 0 130 303 015
- Nominal voltage: $U_N = 12$ V
- Nominal power: $P_N = 146$ W
- Nominal current: $I_N = 17.0$ A
- Nominal speed: $n_N = 2900$ min$^{-1}$
- Nominal torque: $M_N = 48$ Ncm
- Breakaway torque: $M_{ak} = 250$ Ncm
- Direction of rotation: R
- Type of duty: S 1
- Degree of protection: IP 03
- Weight: approx. 1.50 kg
**GPB**

### 12 V 147 W

- **Part number**: 3 137 227 713
- **Nominal voltage**: $U_n$ 12 V
- **Nominal power**: $P_n$ 147 W
- **Nominal current**: $I_n$ 16,0 A
- **Nominal speed**: $n_n$ 2800 min⁻¹
- **Nominal torque**: $M_n$ 50 Ncm
- **Breakaway torque**: $M_s$ 378 Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 03
- **Weight**: approx. 1,50 kg

---

**GPB**

### 12 V 181 W

- **Part number**: 3 137 227 744
- **Nominal voltage**: $U_n$ 12 V
- **Nominal power**: $P_n$ 181 W
- **Nominal current**: $I_n$ 20,0 A
- **Nominal speed**: $n_n$ 3450 min⁻¹
- **Nominal torque**: $M_n$ 50 Ncm
- **Breakaway torque**: $M_s$ 400 Ncm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 03
- **Weight**: approx. 1,50 kg

---

A  For counterpart from Kabelwerk Reinshagen No. AK 15 444

A  Blade terminal housing VW No. 357 972 782, blade terminal EF 4.8-4 N101573.
**GPA**

**12 V 400 W**

Part number: 0 130 302 003

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage ( U_N )</td>
<td>12 V</td>
</tr>
<tr>
<td>Nominal power ( P_N )</td>
<td>400 W</td>
</tr>
<tr>
<td>Nominal current ( I_N )</td>
<td>50,0 A</td>
</tr>
<tr>
<td>Nominal speed ( n_N )</td>
<td>3400 min(^{-1})</td>
</tr>
<tr>
<td>Nominal torque ( M_N )</td>
<td>1,2 Nm</td>
</tr>
<tr>
<td>Breakaway torque ( M_{br} )</td>
<td>6,4 Nm</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 3,10 kg</td>
</tr>
</tbody>
</table>

A Blade receptacle 9.6 x 6 DIN 46 247.
M When mounting, clamp ball-bearing inner ring with ring (part number 3 130 202 004, not in scope of delivery).

---

**GPA**

**12 V 400 W**

Part number: 0 130 302 002

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage ( U_N )</td>
<td>12 V</td>
</tr>
<tr>
<td>Nominal power ( P_N )</td>
<td>400 W</td>
</tr>
<tr>
<td>Nominal current ( I_N )</td>
<td>55,0 A</td>
</tr>
<tr>
<td>Nominal speed ( n_N )</td>
<td>3200 min(^{-1})</td>
</tr>
<tr>
<td>Nominal torque ( M_N )</td>
<td>1,2 Nm</td>
</tr>
<tr>
<td>Breakaway torque ( M_{br} )</td>
<td>7,7 Nm</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 3,10 kg</td>
</tr>
</tbody>
</table>

G (+) for blade terminal 9.5 x 1.2 (red).
K (–) cable lug A4 x 3.4 DIN 46 225 (brown).
M When mounting, clamp ball-bearing inner ring with ring (part number 3 130 202 004, not in scope of delivery).
GPA

12 V 630 W

Part number: 0 130 302 009
Nominal voltage: $U_{N} = 12$ V
Nominal power: $P_{N} = 630$ W
Nominal current: $I_{N} = 75.0$ A
Nominal speed: $n_{N} = 3000$ min$^{-1}$
Nominal torque: $M_{N} = 2$ Nm
Breakaway torque: $M_{A} = 9$ Nm
Direction of rotation: R
Type of duty: S 1
Degree of protection: IP 10
Weight: approx. 3.80 kg

Connections: (+) red

When mounting, clamp ball-bearing inner ring with ring (part number 3 130 202 004, not in scope of delivery).

GPA

24 V 255 W

Part number: 0 130 302 012
Nominal voltage: $U_{N} = 24$ V
Nominal power: $P_{N} = 255$ W
Nominal current: $I_{N} = 14.0$ A
Nominal speed: $n_{N} = 1750$ min$^{-1}$
Nominal torque: $M_{N} = 1.4$ Nm
Breakaway torque: $M_{A} = 8$ Nm
Direction of rotation: L
Type of duty: S 1
Degree of protection: IP 20
Weight: approx. 3.80 kg

Connections: (+) red, (–) black.

Blade terminal housing Tyco No. 180 908.
### GPA

#### 24 V 650 W

- **Part number**: 0 130 302 015
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 650$ W
- **Nominal current**: $I_n = 35,0$ A
- **Nominal speed**: $n_n = 3100$ min$^{-1}$
- **Nominal torque**: $M_n = 2$ Nm
- **Breakaway torque**: $M_k = 12$ Nm
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 3.80 kg

---

#### 24 V 750 W

- **Part number**: 0 130 302 001
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 750$ W
- **Nominal current**: $I_n = 40,0$ A
- **Nominal speed**: $n_n = 3300$ min$^{-1}$
- **Nominal torque**: $M_n = 2,2$ Nm
- **Breakaway torque**: $M_k = 11$ Nm
- **Direction of rotation**: L
- **Type of duty**: S 1
- **Degree of protection**: IP 10
- **Weight**: approx. 3.80 kg

---

*Note: Cable lug A8 x 3.4 DIN 46 225 (red).
K (−) Cable lug B4 x 3.4 DIN 46 225 (black).
M When mounting, clamp ball-bearing inner ring with ring (part number 3 130 202 004, not in scope of delivery).*
**24 V 750 W**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 130 302 013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage $U_N$</td>
<td>24 V</td>
</tr>
<tr>
<td>Nominal power $P_N$</td>
<td>750 W</td>
</tr>
<tr>
<td>Nominal current $I_N$</td>
<td>40.0 A</td>
</tr>
<tr>
<td>Nominal speed $n_N$</td>
<td>3300 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque $M_N$</td>
<td>2.2 Nm</td>
</tr>
<tr>
<td>Breakaway torque $M_B$</td>
<td>11 Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 10</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 3.80 kg</td>
</tr>
</tbody>
</table>

![Diagram of D.C. Motor](image)

**Notes:**
- J (+) Cable lug A8 x 3.4 DIN 46 225 (red).
- K (–) Cable lug B4 x 3.4 DIN 46 225 (brown).
- M When mounting, clamp ball-bearing inner ring with ring (part number 3 130 202 004, not in scope of delivery).
Inverse speed motor
Grounded frame

12 V 1.2 kW

<table>
<thead>
<tr>
<th>Part number</th>
<th>F 000 MM0 618</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_N = 12$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N = 1200$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N = 195$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N = 2100$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N = 5.4$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_k = 24$ Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 6 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 44</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 7.00 kg</td>
</tr>
</tbody>
</table>

Inverse speed motor
Grounded frame

24 V 1.7 kW

<table>
<thead>
<tr>
<th>Part number</th>
<th>F 000 MM0 617</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_N = 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N = 1700$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N = 110$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N = 3200$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N = 5.4$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_k = 24$ Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 7 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 44</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 7.00 kg</td>
</tr>
</tbody>
</table>
**Inverse speed motor**

**Grounded frame with flange**

### 12 V 1.2 kW

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>F 000 MM0 616</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 1200 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 195 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 2100 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 5.4 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a$ 24 Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 6 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 44</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 7.00 kg</td>
</tr>
</tbody>
</table>

### 24 V 1.7 kW

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>F 000 MM0 619</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 24 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 1700 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 110 A</td>
</tr>
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<td>Nominal speed</td>
<td>$n_n$ 3200 min$^{-1}$</td>
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<tr>
<td>Nominal torque</td>
<td>$M_n$ 5.4 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a$ 24 Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 44</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 7.00 kg</td>
</tr>
</tbody>
</table>
Inverse speed motor

12 V 1.6 kW

- **Part number:** F 000 MM0 001
- **Nominal voltage:** $U_n$ 12 V
- **Nominal power:** $P_n$ 1600 W
- **Nominal current:** $I_n$ 220 A
- **Nominal speed:** $n_n$ 3000 min$^{-1}$
- **Nominal torque:** $M_n$ 5.1 Nm
- **Direction of rotation:** L/R
- **Type of duty:** S 2 - 2.8 min
- **Degree of protection:** IP 00
- **Weight:** approx. 7.50 kg

Inverse speed motor

24 V 2.38 kW

- **Part number:** F 000 MM0 003
- **Nominal voltage:** $U_n$ 24 V
- **Nominal power:** $P_n$ 2380 W
- **Nominal current:** $I_n$ 140 A
- **Nominal speed:** $n_n$ 3250 min$^{-1}$
- **Nominal torque:** $M_n$ 7 Nm
- **Direction of rotation:** L/R
- **Type of duty:** S 2 - 4 min
- **Degree of protection:** IP 00
- **Weight:** approx. 7.00 kg
Permanent-magnet motor
without flange

12 V 0.9 kW

<table>
<thead>
<tr>
<th>Part number</th>
<th>F 000 MM0 805</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 12$ V</td>
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<tr>
<td>Nominal power</td>
<td>$P_n = 900$ W</td>
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<tr>
<td>Nominal current</td>
<td>$I_n = 150$ A</td>
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<tr>
<td>Nominal speed</td>
<td>$n_n = 4000$ min$^{-1}$</td>
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<tr>
<td>Nominal torque</td>
<td>$M_n = 2.66$ Nm</td>
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<tr>
<td>Breakaway torque</td>
<td>$M_{B} = 10$ Nm</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 · 2.4 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 00</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 2.10 kg</td>
</tr>
</tbody>
</table>

Bosch Automotive Aftermarket
2006 | 2007
D.C. motors with transmission

Bosch electric motors with transmission provide fitting solutions for almost every application. They provide a wide range of performance and are highly versatile in their application. The new generation of Bosch adjustment motors have a compact design and have been optimized in terms of installation space and weight. In addition to this, they are exceptionally quiet and highly robust.

The desired speed can easily be regulated by changing the voltage. The direction of rotation can be inverted by changing over +/- Maximum torque is available during the startup phase.

Product features
- Wide range of permanently-excited motor-and-gear assemblies
- D.C. voltage range from 12 to 24 Volt
- Available with and without self-locking feature
- Breakaway torques from 1 Nm to 70 Nm
- Speed range from 16 to 700 min⁻¹
- Available with and without Hall elements

Advantages for your application
- A multitude of different sizes and designs for greater flexibility
- Robust and reliable quality, well-proven millions of times over in automobiles
- High reliability
- Favorable price/performance ratio

Application examples
Automotive technology:
Flap positioning for climate control, air proportioning and distribution, wiper motors, power-window motors, seat-adjustment motors, adjustment motors

Industrial applications:
Control motors, garage-door drives, locking systems, medical technology etc.
The VMC flap actuators generation from Bosch

As comfort requirements on air conditioners increase and the resulting number of air flaps also increase, the number of air-flap actuators also rises. Modern vehicles are equipped with 4–16 air-flap actuators.

Technology
The flap actuator consists of a permanently-excited D.C. motor and a transmission. The mechanical angle of rotation can be limited by means of stops attached to the housing. The electrical connector is designed for the AMP Micro Quadlock system.

VMC modular system with:
• Standard on/off switching
• Integrated potentiometer
• Automatic limit stop
• Output consumption for different positioning elements

In many applications outside the automobile too, exact flap and valve positioning is required. This is why Bosch VMC motors are ideal for your concept.

Application examples
The VMC air-flap positioner is used for positioning flaps during climate control in automobiles. It is also ideally suited for industrial applications such as valve positioning for water, oil, gas or for instance, for proportioning air quantities in solariums.

Bring your idea and application along to us. Together we will get your project moving – with electric motors from Bosch.
VMC with potentiometer

**24 V 0.22 W**

- **Part number:** 0 132 801 141
- **Nominal voltage:** $U_n = 24$ V
- **Nominal power:** $P_n = 0.22$ W
- **Nominal current:** $I_n \leq 55$ mA
- **Maximum current:** $I_{max} = 250$ mA
- **Nominal speed:** $n_n = 6$ min$^{-1}$
- **Rated torque:** $M_n = 40$ Ncm
- **Breakaway torque:** $M_s \geq 100$ Ncm
- **Reduction:** $i = 405 : 1$
- **Direction of rotation:** L/R
- **Shaft load max. axial:** $F_s \leq 30$ N
- **Shaft load max. radial:** $F_r \leq 50$ N
- **Type of duty:** S 1
- **Degree of protection:** IP 54
- **Weight:** approx. 0.12 kg

Clockwise: 4 to (+), 6 to (–)
Counterclockwise: 6 to (+), 4 to (–)

**VMC**

**12 V 0.16 W**

- **Part number:** 0 132 801 346
- **Nominal voltage:** $U_n = 12$ V
- **Nominal power:** $P_n = 0.16$ W
- **Nominal current:** $I_n \leq 150$ mA
- **Maximum current:** $I_{max} = 270$ mA
- **Nominal speed:** $n_n = 4.5$ min$^{-1}$
- **Rated torque:** $M_n = 35$ Ncm
- **Breakaway torque:** $M_s \geq 120$ Ncm
- **Reduction:** $i = 450 : 1$
- **Direction of rotation:** L/R
- **Shaft load max. axial:** $F_s \leq 30$ N
- **Shaft load max. radial:** $F_r \leq 50$ N
- **Type of duty:** S 1
- **Degree of protection:** IP 50
- **Weight:** approx. 0.09 kg

Clockwise: 11 to (+), 1 to (–)
Counterclockwise: 1 to (+), 11 to (–)
VC

12 V 0.16 W

Design, technical data, overall dimensions, and sequence chart are identical to the motor 0 132 801 346, but with an additional potentiometer to adjust the different angle positions exactly (see connection diagram).

<table>
<thead>
<tr>
<th>Angle of rotation</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>360°</td>
<td>0 132 801 347</td>
</tr>
<tr>
<td>360°</td>
<td>0 132 801 348</td>
</tr>
<tr>
<td>360°</td>
<td>0 132 801 349</td>
</tr>
<tr>
<td>360°</td>
<td>0 132 801 350</td>
</tr>
<tr>
<td>360°</td>
<td>0 132 801 351</td>
</tr>
</tbody>
</table>

Plug housing Tyco-No. 1355082-1.
Terminal housing PN Tyco-No. 928 999

VMC

24 V 0.26 W

Part number | 0 132 801 143
Nominal voltage | $U_N = 24\,V$
Nominal power | $P_N = 0.26\,W$
Nominal current | $I_N \leq 100\,mA$
Maximum current | $I_{max} = 200\,mA$
Nominal speed | $n_N = 7\,\text{min}^{-1}$
Rated torque | $M_N \geq 35\,\text{Ncm}$
Breakaway torque | $M_{break} \geq 70\,\text{Ncm}$
Reduction | $i = 310:1$
Direction of rotation | L/R
Shaft load max. axial $F_a \leq 30\,\text{N}$
Shaft load max. radial $F_r \leq 50\,\text{N}$
Type of duty | S 1
Degree of protection | IP 40
Weight | approx. 0.12 kg

Clockwise: 1 to (+), 3 to (–)
Counterclockwise: 1 to (–), 3 to (+)
**12 V 0.29 W**

- **Part number**: 0 132 801 142
- **Nominal voltage**: $U_N = 12$ V
- **Nominal power**: $P_N = 0.29$ W
- **Nominal current**: $I_N \leq 180$ mA
- **Maximum current**: $I_{max} = 400$ mA
- **Nominal speed**: $n_0 = \text{min}^{-1}$
- **Rated torque**: $M_N = 40$ Ncm
- **Breakaway torque**: $M_s \geq 90$ Ncm
- **Reduction**: $i = 310 : 1$
- **Direction of rotation**: L/R
- **Shaft load max. axial**: $F_a \leq 30$ N
- **Shaft load max. radial**: $F_r \leq 50$ N
- **Type of duty**: S 1
- **Degree of protection**: IP 40
- **Weight**: approx. 0.12 kg

Clockwise: 1 to (+), 3 to (–)
Counterclockwise: 1 to (–), 3 to (+)

---

S Connection: Socket housing 1 982 403 095 with socket contact Tyco No. 928 999-1
Adjusting elements
for VMC motors
0 132 801 142, ..143

Part number 1 132 061 016

Part number 1 132 061 023

Part number 1 132 061 025

Part number 1 132 061 027

Number of teeth = 24, Modul 1
Part number 1 132 061 028

Part number 1 132 061 047

Part number 1 132 061 048

Part number 1 132 061 049

Part number 1 132 061 050

Adjusting elements
don VMC motors
0 132 801 142, ..143
AHC

12 V 21 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 201 900</th>
</tr>
</thead>
<tbody>
<tr>
<td>mirror-image</td>
<td>0 390 201 912</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 21 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 6 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 17 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 675 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 30 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a$ 100 Ncm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 27 : 4</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.33 kg</td>
</tr>
</tbody>
</table>

1) On request

Clockwise: I to (–), II to (+)
Counterclockwise: I to (+), II to (–)

A Inner spur gear, number of teeth 8, module 0.8
S Matching plug housing Tyco No. 968 182-1

AHC

12 V 29 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 201 901</th>
</tr>
</thead>
<tbody>
<tr>
<td>mirror-image</td>
<td>0 390 201 913</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 29 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ $\leq$ 7.5 mA</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 22 mA</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 700 min$^{-1}$</td>
</tr>
<tr>
<td>Rated torque</td>
<td>$M_r$ 40 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a$ $\geq$ 140 Ncm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 27 : 4</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.40 kg</td>
</tr>
</tbody>
</table>

1) On request

Clockwise: I to (–), II to (+)
Counterclockwise: I to (+), II to (–)
## AHC with Hall sensor

### 12 V 21 W

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 201 902</td>
</tr>
<tr>
<td>Mirror-image</td>
<td>0 390 201 914</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_N$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N$ 21 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N$ 6 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 17 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N$ 675 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N$ 30 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_\text{br}$ 100 Ncm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 27 : 4</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.33 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to (+), II to (–)
Counterclockwise: I to (–), II to (+)

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø39</td>
<td>ø11</td>
</tr>
<tr>
<td>ø14</td>
<td>23.1</td>
</tr>
<tr>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>157.4</td>
<td>6.45</td>
</tr>
<tr>
<td>53.5</td>
<td>31.1</td>
</tr>
<tr>
<td>35</td>
<td>11,4</td>
</tr>
<tr>
<td>4,6</td>
<td>11</td>
</tr>
<tr>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

A Inner spur gear, number of teeth 8, module 0.8
S Matching plug housing Tyco-No. 968 182-1

### 12 V 29 W

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 201 903</td>
</tr>
<tr>
<td>Mirror-image</td>
<td>0 390 201 915</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_N$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N$ 29 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N$ 7.5 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 22 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N$ 700 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N$ 40 Ncm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_\text{br}$ 140 Ncm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 27 : 4</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.40 kg</td>
</tr>
</tbody>
</table>

Clockwise: I to (+), II to (–)
Counterclockwise: I to (–), II to (+)
A square-wave period is generated for each turn of the armature.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø39</td>
<td>ø11</td>
</tr>
<tr>
<td>ø14</td>
<td>23.1</td>
</tr>
<tr>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>157.4</td>
<td>6.45</td>
</tr>
<tr>
<td>53.5</td>
<td>31.1</td>
</tr>
<tr>
<td>35</td>
<td>11,4</td>
</tr>
<tr>
<td>4,6</td>
<td>11</td>
</tr>
<tr>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>11</td>
<td>11</td>
</tr>
</tbody>
</table>

A Inner spur gear, number of teeth 8, module 0.8
S Matching plug housing Tyco-No. 968 182-1
### AHC 12 V 10 W

- **Part number**: 0 390 201 997
- **Nominal voltage**: $U_{\text{n}} = 12$ V
- **Nominal power**: $P_{\text{n}} = 10$ W
- **Nominal current**: $I_{\text{n}} = 5$ A
- **Maximum current**: $I_{\text{max}} = 15$ A
- **Nominal speed**: $n_{\text{n}} = 115$ min$^{-1}$
- **Nominal torque**: $M_{\text{n}} = 0.85$ Nm
- **Breakaway torque**: $M_{\text{b}} = 3.4$ Nm
- **Reduction**: $i = 29 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: $S \ 2 \cdot 5 \min$
- **Degree of protection**: IP 50
- **Weight**: approx. 0.55 kg

**Clockwise**: (+) to 3
**Counterclockwise**: (+) to 1

---

### AHC 12 V 10.4 W

- **Part number**: 0 390 201 964
- **Nominal voltage**: $U_{\text{n}} = 12$ V
- **Nominal power**: $P_{\text{n}} = 10.4$ W
- **Nominal current**: $I_{\text{n}} = 5$ A
- **Maximum current**: $I_{\text{max}} = 17$ A
- **Nominal speed**: $n_{\text{n}} = 22$ min$^{-1}$
- **Nominal torque**: $M_{\text{n}} = 4.5$ Nm
- **Breakaway torque**: $M_{\text{b}} = 12$ Nm
- **Reduction**: $i = 119.5 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: $S \ 2 \cdot 5 \min$
- **Degree of protection**: IP 50
- **Weight**: approx. 0.62 kg

**Clockwise**: (+) to I
**Counterclockwise**: (+) to II
AHC

12 V 8 W

Part number 0 390 201 918  
Nominal voltage $U_N$ 12 V  
Nominal power $P_N$ 8 W  
Nominal current $I_N$ 8 A  
Maximum current $I_{\text{max}}$ 23.5 A  
Nominal speed $n_N$ 26 min$^{-1}$  
Nominal torque $M_N$ 3 Nm  
Breakaway torque $M_\text{br}$ 23 Nm  
Reduction $i$ 185.5 : 1  
Direction of rotation L/R  
Type of duty S 2 - 5 min  
Degree of protection IP 50  
Weight approx. 0.45 kg

A square-wave period is generated for each turn of the armature.

X Suitable coupling connector: Housing Tyco No. 0-968 182-1

AHC with Hall sensor

12 V 8 W

Part number 0 390 201 925  
Nominal voltage $U_N$ 12 V  
Nominal power $P_N$ 8 W  
Nominal current $I_N$ 8 A  
Maximum current $I_{\text{max}}$ 23.5 A  
Nominal speed $n_N$ 26 min$^{-1}$  
Nominal torque $M_N$ 3 Nm  
Breakaway torque $M_\text{br}$ 23 Nm  
Reduction $i$ 185.5 : 1  
Direction of rotation L/R  
Type of duty S 2 - 5 min  
Degree of protection IP 50  
Weight approx. 0.45 kg

A square-wave period is generated for each turn of the armature.

X Suitable coupling connector: Housing Tyco No. 0-968 182-1
### AHC

**12 V 6,3 W**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 201 973</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 6,3 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 6 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 15 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 20 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 3 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{\text{br}}$ 17,5 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 185,5 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0,49 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to 1  
Counterclockwise: (+) to 3

### AHC with Hall sensor

**12 V 6,3 W**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 201 972</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 6,3 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 6 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 15 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 20 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 3 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{\text{br}}$ 17,5 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 185,5 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0,49 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to 1  
Counterclockwise: (+) to 3

---

Bosch Automotive Aftermarket 2006 | 2007
**AHC 12 V 8 W**

- **Part number**: 0 390 201 944
- **Nominal voltage**: $U_N$ 12 V
- **Nominal power**: $P_N$ 8 W
- **Nominal current**: $I_N$ 8 A
- **Maximum current**: $I_{\text{max}}$ 24 A
- **Nominal speed**: $n_N$ 26 min⁻¹
- **Nominal torque**: $M_N$ 3 Nm
- **Breakaway torque**: $M_\alpha$ 21 Nm
- **Reduction**: $i$ 185.5 : 1
- **Type of duty**: S 2 - 5 min
- **Degree of protection**: IP 50
- **Weight**: approx. 0.45 kg

Clockwise: (+) to 1
Counter-clockwise: (+) to 2

**AHC 12 V 6,3 W**

- **Part number**: 0 390 201 999
- **Nominal voltage**: $U_N$ 12 V
- **Nominal power**: $P_N$ 6.3 W
- **Nominal current**: $I_N$ 6 A
- **Maximum current**: $I_{\text{max}}$ 15 A
- **Nominal speed**: $n_N$ 20 min⁻¹
- **Nominal torque**: $M_N$ 3 Nm
- **Breakaway torque**: $M_\alpha$ 17.5 Nm
- **Reduction**: $i$ 185.5 : 1
- **Type of duty**: S 2 - 5 min
- **Degree of protection**: IP 50
- **Weight**: approx. 0.49 kg

Clockwise: (+) to 1
Counter-clockwise: (+) to 3
D.C. motors with transmission

AHC

12 V 5 W

Part number: 0390 203 224
Nominal voltage $U_N$: 12 V
Nominal power $P_N$: 5 W
Nominal current $I_N$: 4.5 A
Maximum current $I_{max}$: 14 A
Nominal speed $n_0$: 16 min$^{-1}$
Nominal torque $M_N$: 3 Nm
Breakaway torque $M_s$: 19.4 Nm
Reduction $i$: 217 : 1
Direction of rotation L/R
Type of duty S 2 - 5 min
Degree of protection IP 50
Weight approx. 0.50 kg

Clockwise: (+) to II
Counterclockwise: (+) to I

AHC

12 V 5 W

Part number: 0390 203 225
Nominal voltage $U_N$: 12 V
Nominal power $P_N$: 5 W
Nominal current $I_N$: 4.5 A
Maximum current $I_{max}$: 14 A
Nominal speed $n_0$: 16 min$^{-1}$
Nominal torque $M_N$: 3 Nm
Breakaway torque $M_s$: 19.4 Nm
Reduction $i$: 217 : 1
Direction of rotation L/R
Type of duty S 2 - 5 min
Degree of protection IP 50
Weight approx. 0.50 kg

Clockwise: (+) to II
Counterclockwise: (+) to I
### 24 V 5 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0390 203 310</td>
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<tr>
<td>Nominal voltage $U_N$</td>
<td>24 V</td>
</tr>
<tr>
<td>Nominal power $P_N$</td>
<td>5 W</td>
</tr>
<tr>
<td>Nominal current $I_N$</td>
<td>2.3 A</td>
</tr>
<tr>
<td>Maximum current $I_{max}$</td>
<td>7 A</td>
</tr>
<tr>
<td>Nominal speed $n_N$</td>
<td>16 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque $M_N$</td>
<td>3 Nm</td>
</tr>
<tr>
<td>Breakaway torque $M_\lambda$</td>
<td>19.4 Nm</td>
</tr>
<tr>
<td>Reduction $i$</td>
<td>217 : 1</td>
</tr>
<tr>
<td>Direction of rotation L/R</td>
<td></td>
</tr>
<tr>
<td>Type of duty $S$</td>
<td>2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection IP</td>
<td>50</td>
</tr>
<tr>
<td>Weight approx.</td>
<td>0.50 kg</td>
</tr>
</tbody>
</table>

On request
AHC

**12 V 5 W**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 203 226</th>
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</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 5 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 4.5 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 14 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 16 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 3 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s$ 19.4 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 217 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.50 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to II
Counterclockwise: (+) to I
**24 V 5 W**

Part number: 0 390 203 312

- Nominal voltage: $U_N = 24$ V
- Nominal power: $P_N = 5$ W
- Nominal current: $I_N = 2,3$ A
- Maximum current: $I_{\text{max}} = 7$ A
- Nominal speed: $n_N = 16$ min$^{-1}$
- Nominal torque: $M_N = 3$ Nm
- Breakaway torque: $M_A = 19,4$ Nm
- Reduction: $i = 217 : 1$
- Direction of rotation: L/R
- Type of duty: S 2 - 5 min
- Degree of protection: IP 50
- Weight: approx. 0,50 kg

On request
**AHC**

**Actuator motor with spindle**

12 V

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 201 941</td>
</tr>
<tr>
<td>Nominal voltage ( U_n )</td>
<td>12 V</td>
</tr>
<tr>
<td>Nominal current ( I_n )</td>
<td>6 A</td>
</tr>
<tr>
<td>Maximum current ( I_{\text{max}} )</td>
<td>23 A</td>
</tr>
<tr>
<td>Nominal force</td>
<td>500 N</td>
</tr>
<tr>
<td>Maximum force</td>
<td>3200 N</td>
</tr>
<tr>
<td>Adjustment speed ( v_\text{adj} )</td>
<td>7 mm/s</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.54 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to I  
Counterclockwise: (+) to II

---

**AHC**

**with Hall sensor**

Actuator motor with spindle

12 V

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 201 927</td>
</tr>
<tr>
<td>Nominal voltage ( U_n )</td>
<td>12 V</td>
</tr>
<tr>
<td>Nominal current ( I_n )</td>
<td>4 A</td>
</tr>
<tr>
<td>Maximum current ( I_{\text{max}} )</td>
<td>17 A</td>
</tr>
<tr>
<td>Nominal force</td>
<td>500 N</td>
</tr>
<tr>
<td>Maximum force</td>
<td>2800 N</td>
</tr>
<tr>
<td>Adjustment speed ( v_\text{adj} )</td>
<td>4 mm/s</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 50</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.55 kg</td>
</tr>
</tbody>
</table>

A square-wave period is generated for each turn of the armature.
AHC with Hall sensor
Actuator motor with spindle

Part number: 0 390 201 989
Nominal voltage: $U_N = 12\, V$
Nominal current: $I_N = 8.5\, A$
Maximum current: $I_{\text{max}} = 24\, A$
Nominal force: $F_N = 1000\, N$
Maximum force: $F_{\text{max}} = 3000\, N$
Adjustment speed: $v_N = 6\, \text{mm/s}$
Degree of protection: IP 50
Weight: approx. $0.57\, \text{kg}$

AHC Actuator motor with spindle

Part number: 0 390 203 229
Nominal voltage: $U_N = 12\, V$
Nominal current: $I_N = 13\, A$
Maximum current: $I_{\text{max}} = 28\, A$
Nominal force: $F_N = 1000\, N$
Maximum force: $F_{\text{max}} = 2500\, N$
Adjustment speed: $v_N = 9\, \text{mm/s}$
Degree of protection: IP 50
Weight: approx. $0.64\, \text{kg}$
**AHP**

### 12 V 4 W

- **Part number**: 0 390 206 692
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 4$ W
- **Nominal current**: $I_n = 1.7$ A
- **Maximum current**: $I_{max} = 3.8$ A
- **Nominal speed**: $n_n = 65$ min$^{-1}$
- **Nominal torque**: $M_n = 0.6$ Nm
- **Breakaway torque**: $M_0 = 2.2$ Nm
- **Reduction**: $i = 33 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 20 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0.42 kg

![Diagram of 12 V 4 W motor](image)

### 12 V 35 W

- **Part number**: 0 390 206 693
- **Nominal voltage**: $U_n = 12$ V
- **Nominal power**: $P_n = 35$ W
- **Nominal current**: $I_n = 9$ A
- **Maximum current**: $I_{max} = 24$ A
- **Nominal speed**: $n_n = 550$ min$^{-1}$
- **Nominal torque**: $M_n = 0.6$ Nm
- **Breakaway torque**: $M_0 = 2.2$ Nm
- **Reduction**: $i = 33 : 3$
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 10 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0.42 kg

![Diagram of 12 V 35 W motor](image)
### 24 V 35 W

- **Part number**: 0 390 202 600
- **Nominal voltage**: $U_N = 24$ V
- **Nominal power**: $P_N = 35$ W
- **Nominal current**: $I_N = 4.5$ A
- **Maximum current**: $I_{\text{max}} = 12$ A
- **Nominal speed**: $n_N = 550$ min$^{-1}$
- **Nominal torque**: $M_N = 0.6$ Nm
- **Breakaway torque**: $M_e = 2.2$ Nm
- **Reduction**: $i = 33 : 3$
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 10 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0.42 kg

![Diagram of 24 V 35 W motor](image)

---

### 12 V 9.2 W

- **Part number**: 0 390 206 634
- **Nominal voltage**: $U_N = 12$ V
- **Nominal power**: $P_N = 9.2$ W
- **Nominal current**: $I_N = 4$ A
- **Maximum current**: $I_{\text{max}} = 11.5$ A
- **Nominal speed**: $n_N = 350$ min$^{-1}$
- **Nominal torque**: $M_N = 0.25$ Nm
- **Breakaway torque**: $M_e = 1.2$ Nm
- **Reduction**: $i = 33 : 3$
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 20 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0.42 kg

![Diagram of 12 V 9.2 W motor](image)
**12 V 6,2 W**

- **Part number**: 0 390 206 682
- **Nominal voltage**: $U_{N}$ 12 V
- **Nominal power**: $P_{N}$ 6,2 W
- **Nominal current**: $I_{N}$ 2,8 A
- **Maximum current**: $I_{max}$ 9 A
- **Nominal speed**: $n_{N}$ 60 min$^{-1}$
- **Nominal torque**: $M_{N}$ 1 Nm
- **Breakaway torque**: $M_{k}$ 4,5 Nm
- **Reduction**: $i$ 33 : 1
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 20 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0,49 kg

**B** Blade terminal 6.3 x 0.8

**W** With rotation of shaft

---

**24 V 12 W**

- **Part number**: 0 390 207 605
- **Nominal voltage**: $U_{N}$ 24 V
- **Nominal power**: $P_{N}$ 12 W
- **Nominal current**: $I_{N}$ 3,5 A
- **Maximum current**: $I_{max}$ 18 A
- **Nominal speed**: $n_{N}$ 140 min$^{-1}$
- **Nominal torque**: $M_{N}$ 0,8 Nm
- **Breakaway torque**: $M_{k}$ 11,6 Nm
- **Reduction**: $i$ 61 : 2
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 10 min
- **Degree of protection**: IP 20
- **Weight**: approx. 0,63 kg

On request

---

Bosch Automotive Aftermarket
**24 V 12 W**

Part number 0 390 207 606

Nominal voltage $U_n$ 24 V

Nominal power $P_n$ 12 W

Nominal current $I_n$ 3,5 A

Maximum current $I_{max}$ 16 A

Nominal speed $n_n$ 75 min⁻¹

Nominal torque $M_n$ 1,4 Nm

Breakaway torque $M_A$ 17,2 Nm

Reduction $i$ 61 : 1

Direction of rotation L/R

Type of duty S 2 - 10 min

Degree of protection IP 20

Weight approx. 0,63 kg

On request

---

**24 V 12 W**

Part number 0 390 207 698

Nominal voltage $U_n$ 24 V

Nominal power $P_n$ 12 W

Nominal current $I_n$ 1,5 A

Maximum current $I_{max}$ 5 A

Nominal speed $n_n$ 125 min⁻¹

Nominal torque $M_n$ 0,9 Nm

Breakaway torque $M_A$ 3,6 Nm

Reduction $i$ 61 : 3

Direction of rotation L/R

Type of duty S 2 - 10 min

Degree of protection IP 20

Weight approx. 0,51 kg

---

**Bosch Automotive Aftermarket**

2006 | 2007
D.C. motors with transmission

AHP

24 V 8 W

- Part number: 0 390 207 697
- Nominal voltage: $U_n = 24$ V
- Nominal power: $P_n = 8$ W
- Nominal current: $I_n = 3$ A
- Maximum current: $I_{\text{max}} = 7.2$ A
- Nominal speed: $n_n = 120$ min$^{-1}$
- Nominal torque: $M_n = 0.5$ Nm
- Breakaway torque: $M_s = 6.2$ Nm
- Reduction: $i = 61 : 3$
- Direction of rotation: L/R
- Type of duty: S 2 - 10 min
- Degree of protection: IP 20
- Weight: approx. 0.63 kg

AHP

24 V 11.5 W

- Part number: 0 390 207 696
- Nominal voltage: $U_n = 24$ V
- Nominal power: $P_n = 11.5$ W
- Nominal current: $I_n = 4$ A
- Maximum current: $I_{\text{max}} = 22$ A
- Nominal speed: $n_n = 220$ min$^{-1}$
- Nominal torque: $M_n = 0.5$ Nm
- Breakaway torque: $M_s = 7.5$ Nm
- Reduction: $i = 61 : 3$
- Direction of rotation: L/R
- Type of duty: S 2 - 10 min
- Degree of protection: IP 20
- Weight: approx. 0.63 kg
### AHP

#### 12 V 11 W

<table>
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<tr>
<th>Specification</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 206 616</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_N$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N$ 11 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N$ 8 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 32 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N$ 210 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N$ 0.5 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{\text{br}}$ 8 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>i 61 : 3</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 10 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.63 kg</td>
</tr>
</tbody>
</table>

![Diagram](image1)

F: Blade terminal 6.3 x 0.8 DIN 46 244

### AHP

#### 12 V 10 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 206 617</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_N$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_N$ 10 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_N$ 8 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 28 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_N$ 190 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_N$ 0.5 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{\text{br}}$ 8 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>i 61 : 3</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 10 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.63 kg</td>
</tr>
</tbody>
</table>

![Diagram](image2)

A: Blade terminal 6.3 x 0.8 DIN 46 244

---

Bosch Automotive Aftermarket

2006 | 2007
**AHP**

### 24 V 10 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 207 604</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n 10$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n 2$ A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max} 14$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n 190$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n 0.5$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_a 8$ Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i 61 : 3$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 10 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 20</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.63 kg</td>
</tr>
</tbody>
</table>

**Blade terminal 6.3 x 0.8 DIN 46 244**

---

**Graph**

- $P$ vs $i$
- $M$ vs $n$
- $M$ vs $i$

---

**Diagram**

- Mechanical diagram of the motor showing the blade terminal and dimensions.
**ADP**

### 24 V 8 W

- **Part number**: 0 390 207 405
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 8$ W
- **Nominal current**: $I_n = 1.5$ A
- **Maximum current**: $I_{max} = 8$ A
- **Nominal speed**: $n_n = 45$ min$^{-1}$
- **Nominal torque**: $M_n = 1.8$ Nm
- **Breakaway torque**: $M_s = 9$ Nm
- **Reduction**: $i = 89 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: S 1
- **Degree of protection**: IP 23
- **Weight**: approx. 0.70 kg

Four square-wave periods are generated for each turn of the armature.

**ADP**

### 18 V 23 W

- **Part number**: 0 390 207 406
- **Nominal voltage**: $U_n = 18$ V
- **Nominal power**: $P_n = 23$ W
- **Nominal current**: $I_n = 5$ A
- **Maximum current**: $I_{max} = 31$ A
- **Nominal speed**: $n_n = 150$ min$^{-1}$
- **Nominal torque**: $M_n = 1.5$ Nm
- **Breakaway torque**: $M_s = 15$ Nm
- **Reduction**: $i = 84 : 2$
- **Direction of rotation**: L/R
- **Type of duty**: S 1
- **Degree of protection**: IP 23
- **Weight**: approx. 0.70 kg

Four square-wave periods are generated for each turn of the armature.

---

**Electronic speed detection with Hall sensor.**

A Socket housing Tyco No. 280 592-0
Plug socket Tyco No. 181 299-1
FPC

12 V 9 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 130 822 003</th>
</tr>
</thead>
<tbody>
<tr>
<td>mirror-image</td>
<td>0 130 822 004</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_{n}$ 12 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_{n}$ 9 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_{n}$ 7 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max}$ 27 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_{n}$ 82 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_{n}$ 1 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{s}$ 11 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>72 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 - 5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 53</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.50 kg</td>
</tr>
</tbody>
</table>

Bosch Automotive Aftermarket 2006 | 2007
### FPG

#### 12 V 9.7 W

- **Part number**: 0 130 821 666
- **Nominal voltage**: $U_N = 12$ V
- **Nominal power**: $P_N = 9.7$ W
- **Nominal current**: $I_N = 7$ A
- **Maximum current**: $I_{\text{max}} = 30$ A
- **Nominal speed**: $n_N = 93$ min$^{-1}$
- **Nominal torque**: $M_N = 1$ Nm
- **Breakaway torque**: $M_\text{br} = 11$ Nm
- **Reduction**: $i = 62 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 5 min
- **Degree of protection**: IP 53
- **Weight**: approx. 0.63 kg

#### 12 V 8.9 W

- **Part number**: 0 130 821 530
- **Nominal voltage**: $U_N = 12$ V
- **Nominal power**: $P_N = 8.9$ W
- **Nominal current**: $I_N = 6$ A
- **Maximum current**: $I_{\text{max}} = 25$ A
- **Nominal speed**: $n_N = 85$ min$^{-1}$
- **Nominal torque**: $M_N = 1$ Nm
- **Breakaway torque**: $M_\text{br} = 12$ Nm
- **Direction of rotation**: L/R
- **Degree of protection**: IP 5X
- **Weight**: approx. 0.56 kg
FPG

12 V 9,7 W

Part number 0 130 821 682
Mirror-image 0 130 821 683
Nominal voltage $U_n$ 12 V
Nominal power $P_n$ 9,7 W
Nominal current $I_n$ 9 A
Maximum current $I_{max}$ 36 A
Nominal speed $n_0$ 93 min$^{-1}$
Nominal torque $M_0$ 1 Nm
Breakaway torque $M_a$ 12,2 Nm
Reduction $i$ 73 : 1
Direction of rotation L/R
Type of duty $S$ 2 - 5 min
Degree of protection IP 53
Weight approx. 0,62 kg

FPG

24 V 11.6 W

Part number 0 130 821 542
Mirror-image 0 130 821 543
Nominal voltage $U_n$ 24 V
Nominal power $P_n$ 11,6 W
Nominal current $I_n$ 4 A
Maximum current $I_{max}$ 15,5 A
Nominal speed $n_0$ 110,5 min$^{-1}$
Nominal torque $M_0$ 1 Nm
Breakaway torque $M_a$ 12 Nm
Direction of rotation L/R
Degree of protection IP 5X
Weight approx. 0,56 kg
**FPG**

**24 V 9.7 W**

- **Part number**: 0 130 821 916
- **Mirror-image**: 0 130 821 917
- **Nominal voltage**: $U_N$, 24 V
- **Nominal power**: $P_{N}$, 9.7 W
- **Nominal current**: $I_N$, 3.5 A
- **Maximum current**: $I_{\text{max}}$, 8 A
- **Nominal speed**: $n_N$, 56 min$^{-1}$
- **Nominal torque**: $M_N$, 1 Nm
- **Breakaway torque**: $M_{\text{br}}$, 11.3 Nm
- **Reduction**: $i_1$, 73 : 1
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 5 min
- **Degree of protection**: IP 53
- **Weight**: approx. 0.65 kg

**24 V 8.9 W**

- **Part number**: 0 130 821 782
- **Mirror-image**: 0 130 821 783
- **Nominal voltage**: $U_N$, 24 V
- **Nominal power**: $P_{N}$, 8.9 W
- **Nominal current**: $I_N$, 3 A
- **Maximum current**: $I_{\text{max}}$, 14 A
- **Nominal speed**: $n_N$, 85 min$^{-1}$
- **Nominal torque**: $M_N$, 1 Nm
- **Breakaway torque**: $M_{\text{br}}$, 9 Nm
- **Reduction**: $i_1$, 73 : 1
- **Direction of rotation**: L/R
- **Type of duty**: S 2 - 5 min
- **Degree of protection**: IP 53
- **Weight**: approx. 0.60 kg
### CHP

#### 12 V 20 W

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<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
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<tr>
<td>Nominal voltage</td>
<td>U_n = 12 V</td>
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<tr>
<td>Nominal power</td>
<td>P_n = 20 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>i_n = 8 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>i_max = 30 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>n_n = 38 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>M_n = 5 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>M_s = 25 Nm</td>
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<tr>
<td>Reduction</td>
<td>i = 55 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.10 kg</td>
</tr>
</tbody>
</table>

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#### 24 V 27,5

<table>
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<th>Specification</th>
</tr>
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<td>Part number</td>
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<tr>
<td>Nominal voltage</td>
<td>U_n = 24 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>P_n = 27.5 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>i_n = 7.5 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>i_max = 27 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>n_n = 53 min⁻¹</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>M_n = 5 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>M_s = 26 Nm</td>
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<tr>
<td>Reduction</td>
<td>i = 69 : 1</td>
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<tr>
<td>Direction of rotation</td>
<td>L/R</td>
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<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.20 kg</td>
</tr>
</tbody>
</table>

---

On request

---

Bosch Automotive Aftermarket 2006 | 2007
CHP

12 V 40 W

Part number  F 006 820 093
Nominal voltage  $U_N$  12 V
Nominal power  $P_N$  40 W
Nominal current  $I_N$  10 A
Maximum current  $I_{\text{max}}$  60 A
Nominal speed  $n_N$  151 min$^{-1}$
Nominal torque  $M_N$  2.5 Nm
Breakaway torque  $M_{\text{a}}$  17 Nm
Reduction  $i$  52 : 2
Direction of rotation  L/R
Type of duty  S 1
Degree of protection  IP 23
Weight  approx. 1,10 kg

Clockwise: Green (+)

---

CHP

12 V 40 W

Part number  0 390 251 684
Nominal voltage  $U_N$  12 V
Nominal power  $P_N$  40 W
Nominal current  $I_N$  10 A
Maximum current  $I_{\text{max}}$  60 A
Nominal speed  $n_N$  151 min$^{-1}$
Nominal torque  $M_N$  2.5 Nm
Breakaway torque  $M_{\text{a}}$  17 Nm
Reduction  $i$  52 : 2
Direction of rotation  L/R
Type of duty  S 1
Degree of protection  IP 23
Weight  approx. 1,10 kg

Clockwise: Green (+)

---

G  Housing for blade receptacles Typ No. 926 474-1
Z  Grooved toothing 8 x 10 DIN 5481 (28 teeth)
D.C. motors with transmission

CHP

24 V 2,5 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 697</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24 \text{ V}$</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 2,5 \text{ W}$</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 0,7 \text{ A}$</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}} = 3 \text{ A}$</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 16 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 1,5 \text{ Nm}$</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s = 9 \text{ Nm}$</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 55 : 1$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1,20 kg</td>
</tr>
</tbody>
</table>

(+ to 53 (green))

CHP

24 V 21 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 699</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24 \text{ V}$</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 21 \text{ W}$</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 2 \text{ A}$</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}} = 9 \text{ A}$</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 40 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 5 \text{ Nm}$</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s = 25 \text{ Nm}$</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 55 : 1$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1,20 kg</td>
</tr>
</tbody>
</table>

53 green, 31 brown.
**24 V 12 W**

- Part number: 0 390 257 689
- Nominal voltage: $U_N = 24\, \text{V}$
- Nominal power: $P_N = 12\, \text{W}$
- Nominal current: $I_N = 2,5\, \text{A}$
- Maximum current: $I_{\text{max}} = 11\, \text{A}$
- Nominal speed: $n_N = 29\, \text{min}^{-1}$
- Nominal torque: $M_N = 4\, \text{Nm}$
- Breakaway torque: $M_{\text{b}} = 22\, \text{Nm}$
- Reduction: $i = 55 : 1$
- Direction of rotation: L/R
- Type of duty: S 1
- Degree of protection: IP 23
- Weight: approx. 1,20 kg

G Housing for blade receptacles DIN 46 340 – B 6.3-MS
Z Grooved toothing $8 \times 10$ DIN 5481 (28 teeth)

---

**24 V 27,5 W**

- Part number: 0 390 257 685
- Nominal voltage: $U_N = 24\, \text{V}$
- Nominal power: $P_N = 27,5\, \text{W}$
- Nominal current: $I_N = 7,5\, \text{A}$
- Maximum current: $I_{\text{max}} = 27\, \text{A}$
- Nominal speed: $n_N = 53\, \text{min}^{-1}$
- Nominal torque: $M_N = 5\, \text{Nm}$
- Breakaway torque: $M_{\text{b}} = 26\, \text{Nm}$
- Reduction: $i = 69 : 1$
- Direction of rotation: L/R
- Type of duty: S 1
- Degree of protection: IP 23
- Weight: approx. 1,20 kg

Clockwise: Green (+)
### CHP

#### 24 V 26 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 690</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 24 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 26 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 6 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 24 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 42 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 6 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s$ 30 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 55 : 1</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.20 kg</td>
</tr>
</tbody>
</table>

Counterclockwise: (+) to red, (–) to green.

### CHP

#### 24 V 35 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 694</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 24 V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n$ 35 W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n$ 3.7 A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{\text{max}}$ 17.5 A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n$ 112 min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n$ 3 Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s$ 20 Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i$ 52 : 2</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.10 kg</td>
</tr>
</tbody>
</table>

Counterclockwise: (+) to red, (–) to green.
**CHP 24 V 35 W**

- **Nominal voltage** $U_N = 24$ V
- **Nominal power** $P_N = 35$ W
- **Nominal current** $I_N = 3.7$ A
- **Maximum current** $I_{\text{max}} = 17.5$ A
- **Nominal speed** $n_N = 112$ min$^{-1}$
- **Nominal torque** $M_N = 3$ Nm
- **Breakaway torque** $M_{\text{br}} = 20$ Nm
- **Reduction** $i = 52:2$
- **Type of duty** S 1
- **Degree of protection** IP 23
- **Weight** approx. 1.10 kg

Clockwise: (-) at terminal (green)
Counterclockwise: (+) to red, (-) to green.

---

**CHP 24 V 42 W**

- **Nominal voltage** $U_N = 24$ V
- **Nominal power** $P_N = 42$ W
- **Nominal current** $I_N = 3.5$ A
- **Maximum current** $I_{\text{max}} = 16$ A
- **Nominal speed** $n_N = 90$ min$^{-1}$
- **Nominal torque** $M_N = 4.5$ Nm
- **Breakaway torque** $M_{\text{br}} = 19$ Nm
- **Reduction** $i = 52:2$
- **Type of duty** S 1
- **Degree of protection** IP 23
- **Weight** approx. 1.10 kg

Clockwise: (-) at terminal (green)
Counterclockwise: (+) to red, (-) to green.
### CHP

#### 24 V 43 W

- **Part number:** 0 390 257 691
- **Nominal voltage:** $U_n$ 24 V
- **Nominal power:** $P_n$ 43 W
- **Nominal current:** $I_n$ 3.8 A
- **Maximum current:** $I_{\text{max}}$ 21 A
- **Nominal speed:** $n_h$ 165 min\(^{-1}\)
- **Nominal torque:** $M_n$ 2.5 Nm
- **Breakaway torque:** $M_s$ 16 Nm
- **Reduction:** 52 : 2
- **Direction of rotation:** L/R
- **Type of duty:** S 1
- **Degree of protection:** IP 23
- **Weight:** approx. 1.10 kg

![Diagram of CHP 24 V 43 W](image1.png)

---

#### 24 V 53 W

- **Part number:** 0 390 257 688
- **Nominal voltage:** $U_n$ 24 V
- **Nominal power:** $P_n$ 53 W
- **Nominal current:** $I_n$ 7 A
- **Maximum current:** $I_{\text{max}}$ 37 A
- **Nominal speed:** $n_h$ 170 min\(^{-1}\)
- **Nominal torque:** $M_n$ 3 Nm
- **Breakaway torque:** $M_s$ 20 Nm
- **Reduction:** 52 : 2
- **Direction of rotation:** L/R
- **Type of duty:** S 1
- **Degree of protection:** IP 23
- **Weight:** approx. 1.10 kg

![Diagram of CHP 24 V 53 W](image2.png)

---

Bosch Automotive Aftermarket  
2006 | 2007
24 V 21.7 W

Part number 9 390 453 009
Nominal voltage $U_N$ 24 V
Nominal power $P_N$ 21.7 W
Nominal current $I_N$ 4 A
Maximum current $I_{\text{max}}$ 13 A
Nominal speed $n_N$ 260 min⁻¹
Nominal torque $M_N$ 0.8 Nm
Breakaway torque $M_s$ 3.8 Nm
Reduction $i$ 38 : 4
Direction of rotation L/R
Type of duty S 1
Degree of protection IP 23
Weight approx. 1.03 kg
**24 V 12/16.5 W**

- Part number: 0 390 242 301
- Nominal voltage: $U_n = 24$ V
- Nominal power: $P_n = 12/16.5$ W
- Nominal current: $i_n = 2.5/3.5$ A
- Maximum current: $I_{max} = 9/12$ A
- Nominal speed: $n_n = 26/45$ min$^{-1}$
- Nominal torque: $M_n = 4.5/3.5$ Nm
- Breakaway torque: $M_s = 23/20$ Nm
- Reduction: $i = 63 : 1$
- Direction of rotation: L
- Type of duty: S 1
- Degree of protection: IP 23
- Weight: approx. 1.10 kg

---

**24 V 26 W**

- Part number: F 006 B20 106
- Nominal voltage: $U_n = 24$ V
- Nominal power: $P_n = 26$ W
- Nominal current: $i_n = 7$ A
- Maximum current: $I_{max} = 32$ A
- Nominal speed: $n_n = 42$ min$^{-1}$
- Nominal torque: $M_n = 6$ Nm
- Breakaway torque: $M_s = 40$ Nm
- Reduction: $i = 79 : 1$
- Direction of rotation: L/R
- Type of duty: S 1
- Degree of protection: IP 23
- Weight: approx. 1.20 kg
### CEP

#### 24 V 26 W

- **Part number**: F 006 820 111
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 26$ W
- **Nominal current**: $I_n = 7$ A
- **Maximum current**: $I_{\text{max}} = 32$ A
- **Nominal speed**: $n_n = 42$ min$^{-1}$
- **Nominal torque**: $M_n = 6$ Nm
- **Breakaway torque**: $M_{\text{break}} = 40$ Nm
- **Reduction**: $i = 79 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: S1
- **Degree of protection**: IP 23
- **Weight**: approx. 1.20 kg

#### 24 V 23 W

- **Part number**: 0 390 257 652
- **Nominal voltage**: $U_n = 24$ V
- **Nominal power**: $P_n = 23$ W
- **Nominal current**: $I_n = 6.5$ A
- **Maximum current**: $I_{\text{max}} = 30$ A
- **Nominal speed**: $n_n = 37$ min$^{-1}$
- **Nominal torque**: $M_n = 6$ Nm
- **Breakaway torque**: $M_{\text{break}} = 33$ Nm
- **Reduction**: $i = 79 : 1$
- **Direction of rotation**: L/R
- **Type of duty**: S1
- **Degree of protection**: IP 23
- **Weight**: approx. 1.30 kg

Clockwise: (+) to green, (–) to brown.
Counterclockwise: (+) to brown, (–) to green.

---

**F** Receptacles 1 394 478 041, Tyco No. 160 824-6

**Z** Grooved toothing $8 \times 10$ DIN 5481, (28 teeth)
## CEP

### Electronic speed detection with Hall sensor.

#### 24 V 26 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 651</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 26$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 7$ A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max} = 32$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 42$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 6$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{b} = 40$ Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 79 : 1$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1,20 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to green, (−) to brown.
Counterclockwise: (+) to brown, (−) to green.
A square-wave period is generated for each turn of the armature.

---

#### 24 V 10,5 W

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 390 257 653</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 10,5$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 2,5$ A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max} = 11$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 26$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 4$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_{b} = 22$ Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 63 : 1$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1,10 kg</td>
</tr>
</tbody>
</table>

Clockwise: (+) to green, (−) to brown.
Counterclockwise: (+) to brown, (−) to green.
A square-wave period is generated for each turn of the armature.

---

X: Housing for blade receptacles DIN 46 340-B 6.3-MS
Y: Plug: 4-pole Lumberg 2.5 MBC, plug connector 2.5 MSF, terminal spring FC 01 L
Z: Grooved toothing 8 x 10 DIN 5481 (28 teeth)
**CDP**

### 24 V 22/29 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 242 409</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 22/29$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 4.5/5.5$ A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max} = 17/18$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 21/35$ min$^{-1}$</td>
</tr>
<tr>
<td>Nominal torque</td>
<td>$M_n = 10/8$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s = 50/41$ Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 77 : 1$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.40 kg</td>
</tr>
</tbody>
</table>

### 24 V 22 W

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 390 242 401</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 24$ V</td>
</tr>
<tr>
<td>Nominal power</td>
<td>$P_n = 22$ W</td>
</tr>
<tr>
<td>Nominal current</td>
<td>$I_n = 4$ A</td>
</tr>
<tr>
<td>Maximum current</td>
<td>$I_{max} = 15$ A</td>
</tr>
<tr>
<td>Nominal speed</td>
<td>$n_n = 35$ min$^{-1}$</td>
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<tr>
<td>Nominal torque</td>
<td>$M_n = 6$ Nm</td>
</tr>
<tr>
<td>Breakaway torque</td>
<td>$M_s = 30$ Nm</td>
</tr>
<tr>
<td>Reduction</td>
<td>$i = 108 : 2$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L/R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.30 kg</td>
</tr>
</tbody>
</table>

---

Bosch Automotive Aftermarket  
2006 | 2007
24 V 32/39 W

Part number 0 390 442 451
Nominal voltage $U_n$ 24 V
Nominal power $P_n$ 32/39 W
Nominal current $I_n$ 3/4 A
Maximum current $I_{\text{max}}$ 26/30 A
Nominal speed $n_n$ 21/36 min$^{-1}$
Nominal torque $M_n$ 15/10 Nm
Breakaway torque $M_{\text{B}}$ 105/80 Nm
Reduction $i$ 96 : 2
Direction of rotation L
Type of duty S 1
Degree of protection IP 23
Weight approx. 4,40 kg

1) Level I/level II
**EFP**

### 24 V 56 W

**Part number** 0 390 442 409  
**Nominal voltage** $U_N$ 24 V  
**Nominal power** $P_N$ 56 W  
**Nominal current** $I_N$ 9 A  
**Maximum current** $I_{\text{max}}$ 36 A  
**Nominal speed** $n_N$ 60 min$^{-1}$  
**Nominal torque** $M_N$ 10 Nm  
**Breakaway torque** $M_{\text{br}}$ 70 Nm  
**Reduction** $i$ 80 : 2  
**Direction of rotation** L/R  
**Type of duty** S 1  
**Degree of protection** IP 33  
**Weight** approx. 2,90 kg

---

### 24 V 67 W

**Part number** 0 390 442 410  
**Nominal voltage** $U_N$ 24 V  
**Nominal power** $P_N$ 67 W  
**Nominal current** $I_N$ 10 A  
**Maximum current** $I_{\text{max}}$ 42 A  
**Nominal speed** $n_N$ 75 min$^{-1}$  
**Nominal torque** $M_N$ 10 Nm  
**Breakaway torque** $M_{\text{br}}$ 70 Nm  
**Reduction** $i$ 80 : 2  
**Direction of rotation** L/R  
**Type of duty** S 1  
**Degree of protection** IP 33  
**Weight** approx. 2,90 kg

---

**B Blade terminal 6.3 x 0.8**
Blowers with D.C. motors

As the largest manufacturer of electric motors in Europe, Bosch provides a comprehensive range of blower and engine-cooling products for every output range. Our blower range consists of single or multiple-stage suction or pressure blowers. The delivery range encompasses radial and axial-type blowers for 12 V and 24 V. The blowers are designed for operating mode S1 (continuous operation). The modules are available with brush-type motors or as brushless drives. The compact design of the modules means that they can be easily installed in areas where space is at a premium.

Application examples
Heating, ventilation, air-conditioning and engine cooling, cooler blowers in general

Product features
- Wide range of blowers
- D.C. voltage range 12 V and 24 V
- Axial and radial-type blowers available
- RPM control

Advantages for your application
- Low noise development
- High efficiency
- Low weight
- Favorable price/performance ratio
Blowers with D.C. motors

12 V radial

Part number 0 130 002 830
Nominal voltage $U_N$ 12 V
Volumetric flow $V$ 10 m³/h
Differential pressure $\Delta p$ 62,5 Pa
Speed $n_N$ 4600 min⁻¹
Direction of rotation $R$
Type of duty $S\, 1$
Degree of protection IP 23
Weight approx. 0,12 kg

12 V radial

Part number 0 130 002 828
Nominal voltage $U_N$ 12 V
Volumetric flow $V$ 10 m³/h
Differential pressure $\Delta p$ 60,0 Pa
Speed $n_N$ 4700 min⁻¹
Direction of rotation $L$
Type of duty $S\, 1$
Degree of protection IP 23
Weight approx. 0,11 kg
Blowers with D.C. motors

### 12 V radial

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 007 804</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_{N} = 12 \text{ V}$</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V = 190 \text{ m}^3/\text{h}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p = 400 \text{ Pa}$</td>
</tr>
<tr>
<td>Speed level I</td>
<td>$2000...2500 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Speed level II</td>
<td>$3000...4000 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 10</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.64 kg</td>
</tr>
</tbody>
</table>

Connections: 33f black-red, 33b black-yellow, 31 brown

---

### 12 V axial

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 007 304</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_{N} = 12 \text{ V}$</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V = 400 \text{ m}^3/\text{h}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p = 150 \text{ Pa}$</td>
</tr>
<tr>
<td>Speed</td>
<td>$n_{N} = 4500 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.72 kg</td>
</tr>
</tbody>
</table>

Connections: Blade terminals 2.8 x 1
### 12 V radial

- **Part number**: 0 130 007 810
- **Nominal voltage**: $U_n = 12\, \text{V}$
- **Volumetric flow**: $V = 400\, \text{m}^3\cdot\text{h}^{-1}$
- **Differential pressure**: $\Delta p = 250\, \text{Pa}$
- **Speed**: $n = 6500\, \text{min}^{-1}$
- **Direction of rotation**: L
- **Type of duty**: S 1
- **Degree of protection**: IP 13
- **Weight**: approx. 0.56 kg

### 24 V radial

- **Part number**: 0 130 007 803
- **Nominal voltage**: $U_n = 24\, \text{V}$
- **Volumetric flow**: $V = 100\, \text{m}^3\cdot\text{h}^{-1}$
- **Differential pressure**: $\Delta p = 150\, \text{Pa}$
- **Speed level I**: $n = 1800\, \text{min}^{-1}$
- **Speed level II**: 2300...2800 \text{min}^{-1}
- **Direction of rotation**: L
- **Type of duty**: S 1
- **Degree of protection**: IP 13
- **Weight**: approx. 0.75 kg

---

A Blade receptacles 6.3 x 0.8.
Connections: 33b red, 33f black, 31 brown.
**BPA**

**24 V axial**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 007 802</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>24 V</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>150 m³/h</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>150 Pa</td>
</tr>
<tr>
<td>Speed level I</td>
<td>n₁ = 3900 min⁻¹</td>
</tr>
<tr>
<td>Speed level II</td>
<td>n₂ = 5850...6550 min⁻¹</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 12</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.61 kg</td>
</tr>
</tbody>
</table>

Connections: Blade receptacles 6.3 x 0.8.
### 12 V radial

**Part number** 0 130 063 805

**Nominal voltage** $U_N$ 12 V

**Volumetric flow** $V$ 400 m³·h⁻¹

**Differential pressure** $\Delta p$ 200 Pa

**Speed** $n_N$ 2350...2900 min⁻¹

**Direction of rotation** R

**Type of duty** S 1

**Degree of protection** IP 13

**Weight** approx. 1.30 kg

Connections: (+) blade terminal 6.3 x 0.8 (red), (-) blade terminal 6.3 x 0.8 (brown).

**Part number** 0 130 063 804

**Nominal voltage** $U_N$ 12 V

**Volumetric flow** $V$ 400 m³·h⁻¹

**Differential pressure** $\Delta p$ 350 Pa

**Speed** $n_N$ 3250...3800 min⁻¹

**Direction of rotation** R

**Type of duty** S 1

**Degree of protection** IP 10

**Weight** approx. 1.00 kg

Connections: (+) blade terminal 6.3 x 0.8 (red), (-) blade receptacle 6.3 x 0.8 (brown).
**CPB**

**12 V radial**

- **Part number**: 0 130 063 810
- **Nominal voltage**: $U_n = 12\, \text{V}$
- **Volumetric flow**: $V = 400\, \text{m}^3\cdot\text{h}^{-1}$
- **Differential pressure**: $\Delta p = 470 \, \text{Pa}$
- **Speed**: $n_h = 3510 \ldots 4200 \, \text{min}^{-1}$
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 13
- **Weight**: approx. 1.13 kg

Connections: (+) green, (–) black.

---

**24 V radial**

- **Part number**: 0 130 063 809
- **Nominal voltage**: $U_n = 24\, \text{V}$
- **Volumetric flow**: $V = 400\, \text{m}^3\cdot\text{h}^{-1}$
- **Differential pressure**: $\Delta p = 200 \, \text{Pa}$
- **Speed**: $n_h = 2350 \ldots 2900 \, \text{min}^{-1}$
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 13
- **Weight**: approx. 1.13 kg

Connections: (+) blade terminal 6.3 x 0.8 (red), (–) blade terminal 6.3 x 0.8 (brown)

---

Blade terminal housing MPM-280/2, blade terminal MPP-280/3.9-2.0.
24 V radial

Part number 0 130 063 814
Nominal voltage \( U_n \) 24 V
Volumetric flow \( V \) 400 m\(^3\)-h\(^{-1}\)
Differential pressure \( \Delta p \) 500 Pa
Speed \( n_n \) 3'000...4'200 min\(^{-1}\)
Direction of rotation R
Type of duty S 1
Degree of protection IP 13
Weight approx. 1.3 kg

Connections: (+) red, (–) brown.

F Blade terminal housing Tyco 180 908-0, blade terminal Tyco 928 847-2.
**12 V axial**

- **Part number**: 0 130 109 207
- **Nominal voltage** $U_n$: 12 V
- **Volumetric flow** $V$: 0.55 m$^3$.s$^{-1}$
- **Differential pressure** $\Delta p$: 200 Pa
- **Speed level I** $n_{I}$: $\geq$ 2800 min$^{-1}$  
- **Speed level II** $n_{II}$: $\geq$ 3400 min$^{-1}$
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 23
- **Weight**: approx. 2.50 kg

---

**24 V axial**

- **Part number**: 0 130 109 213
- **Nominal voltage** $U_n$: 24 V
- **Volumetric flow** $V$: 0.36 m$^3$.s$^{-1}$
- **Differential pressure** $\Delta p$: 200 Pa
- **Speed** $n$: $\geq$ 3100 min$^{-1}$
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 23
- **Weight**: approx. 2.50 kg
DPG

12 V axial

Part number 0 130 107 077
Nominal voltage $U_n$ 12 V
Volumetric flow $V$ 0,37 m$^3$s$^{-1}$
Differential pressure $\Delta p$ 118 Pa
Speed $n_n \geq 2700$ min$^{-1}$
Direction of rotation R
Type of duty S 1
Degree of protection IP 23
Weight approx. 1.60 kg

B: Blade terminal 6.3 x 0.8

DPG

12 V

Part number F 006 B10 134
Nominal voltage $U_n$ 13 V
Volumetric flow $V$ 0,419 m$^3$s$^{-1}$
Differential pressure $\Delta p$ 105 Pa
Speed $n_n \geq 2990$ min$^{-1}$
Direction of rotation R
Type of duty S 1
Degree of protection IP 23
Weight approx. 1.10 kg
Blowers with D.C. motors

### DPG

#### 24 V axial

<table>
<thead>
<tr>
<th>Specification</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 107 212</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n$ 24 V</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V$ 0.24 m$^3$·s$^{-1}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p$ 105 Pa</td>
</tr>
<tr>
<td>Speed</td>
<td>$n_H$ ≥ 2300 min$^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>$R$</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 1.80 kg</td>
</tr>
</tbody>
</table>

- **B** Blade terminal 6.3 x 0.8
**12 V axial**

- **Part number**: 0 130 303 245
- **Nominal voltage**: $U_N$ = 12 V
- **Volumetric flow**: $V$ = 0.53 m³/s
- **Differential pressure**: $\Delta p$ = 140 Pa
- **Speed level I**: $n_{II}$ = 1900 min⁻¹
- **Speed level II**: $n_{II}$ = 2400 min⁻¹
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 23
- **Weight**: approx. 1.80 kg

---

**24 V 260 W**

- **Part number**: F 006 D10 029
- **Nominal voltage**: $U_N$ = 24 V
- **Nominal power**: $P_N$ = 260 W
- **Nominal current**: $I_N$ = 11.0 A
- **Direction of rotation**: R
- **Type of duty**: S 1
- **Degree of protection**: IP 03
- **Weight**: approx. 2.50 kg
GPB

12 V axial

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>F 006 B10 132</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 12$ V</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V = 0.44 \text{ m}^3\text{s}^{-1}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p = 190 \text{ Pa}$</td>
</tr>
<tr>
<td>Speed</td>
<td>$n_{th} = 3400 \text{ rpm}^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 2.30 kg</td>
</tr>
</tbody>
</table>

Connections: (+) red, (-) brown.

GPB

12 V axial

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>0 130 303 246</td>
</tr>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 12$ V</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V = 0.6 \text{ m}^3\text{s}^{-1}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p = 200 \text{ Pa}$</td>
</tr>
<tr>
<td>Speed level I</td>
<td>$n_{th} = 1900 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Speed level II</td>
<td>$n_{th} = 2700 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>R</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 2.20 kg</td>
</tr>
</tbody>
</table>

Connections: (+) red, (-) brown.
**12 V axial**

Part number 0 130 303 233  
Nominal voltage $U_n$ 12 V  
Volumetric flow $V$ 0.25 m³/s⁻¹  
Differential pressure $\Delta p$ 200 Pa  
Speed level I $n_{\text{nom}}$ 1800 min⁻¹  
Speed level II $n_{\text{nom}}$ 2900 min⁻¹  
Direction of rotation R  
Type of duty S 1  
Degree of protection IP 23  
Weight approx. 2.90 kg  

Connections: 1 black, 2 white, 3 green.

---

**12 V axial**

Part number 0 130 303 897  
Nominal voltage $U_n$ 12 V  
Volumetric flow $V$ 0.44 m³/s⁻¹  
Differential pressure $\Delta p$ 190 Pa  
Speed $n_{\text{nom}}$ 3400 rpm⁻¹  
Direction of rotation R  
Type of duty S 1  
Degree of protection IP 23  
Weight approx. 2.30 kg  

Connections: 1 brown, 2 red.
12 V axial

**Part number** 0 130 303 805

- **Nominal voltage** $U_n = 12$ V
- **Volumetric flow** $V = 0.6 \text{ m}^3\cdot\text{s}^{-1}$
- **Differential pressure** $\Delta p = 100$ Pa
- **Speed** $n_{\text{R}} = 2200$ rpm
- **Direction of rotation** R
- **Type of duty** S 1
- **Degree of protection** IP 23
- **Weight** approx. 2.70 kg

(-) brown, (+) red.
12 V axial

Part number 0 130 303 902
Nominal voltage $U_n$ 12 V
Volumetric flow $V$ 0.41 m$^3$/s$^{-1}$
Differential pressure $\Delta p$ 160 Pa
Speed $n_n$ 3200 rpm$^{-1}$
Direction of rotation $R$
Type of duty $S 1$
Degree of protection IP 23
Weight approx. 2.90 kg

Connections: 1 brown, 2 black.
**GPD**

**12 V axial**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 130 305 206</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 12 \text{ V}$</td>
</tr>
<tr>
<td>Volumetric flow</td>
<td>$V = 0.4 \text{ m}^3\cdot\text{s}^{-1}$</td>
</tr>
<tr>
<td>Differential pressure</td>
<td>$\Delta p = 260 \text{ Pa}$</td>
</tr>
<tr>
<td>Speed</td>
<td>$n_H = 3400 \text{ min}^{-1}$</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>$R$</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 1</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 23</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 2.90 kg</td>
</tr>
</tbody>
</table>

Connections: (-) brown, (+) black red.
**Brushless D.C. motors as blower drives**
Developed for use as engine cooling blowers in the vehicle

**Product features**
- Short installation length
- High output
- High efficiency
- RPM control
- Soft start
- Lock-up detection
- Broad ambient-temperature range
- Integrated power electronics
- High continuous output
- Long service life
- Diagnosis capability

**Design**
Electronically commutated, brushless D.C. external-rotor motor with permanent excitation and integrated control electronics (BLDC motor).

**Description of operation**
The motor speed can be continuously adjusted and regulated in a range between 625...2,500 min⁻¹. To do so, a pulse-width-modulated signal has to be generated.
A microcontroller evaluates the input signal and adjusts the set value for the speed.

Commutation of the coil currents is by means of an integrated inverter.
The motor is configured for a single direction of rotation. It is not protected against reverse polarity.

The motor housing is connected internally to the negative terminal of the voltage supply.

**Overrun cut-off**
- for blocked motor
- outside permissible operating-voltage range
Blowers with D.C. motors

12 V

Rated voltage $U_N = 12$ V
Operating voltage $U_B = 8.5 \ldots 16.2$ V
Maximum current¹ $I_{max} = 48.4 \pm 2$ A
Max. volumetric flow $V_{max} = 0.85$ m$^3$ · s$^{-1}$
Max. pressure difference $\Delta p_{max} = 220$ Pa
Rotational-speed range $n = 625 \ldots 2,500$ min$^{-1}$
RPM control PWM signal²
Direction of rotation $R$
Operating mode $S$
Weight approx. 4.6 kg
Order number 0 130 706 816

¹ Internal current limitation
² Pulse-width modulation

Connection diagram for PWM signal wire

1 Minus
2 Plus
3 Control line
4 Signal wire for PWM signal

Duty cycle $T_{Vin}$ of the PWM signal

$T_P$: Period of PWM signal
$T_{high}$: Duration of high level
$U_{high} \geq 5.66$ V; $U_{low} \leq 1.80$ V

Control line Pin 3 on

Speed $n$

<table>
<thead>
<tr>
<th>Control line Pin 3 on</th>
<th>Speed $n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ≤ TV ≤ 5%</td>
<td>Uncontrolled $n_{un}$</td>
</tr>
<tr>
<td>5% ≤ TV ≤ 12%</td>
<td>Motor off</td>
</tr>
<tr>
<td>12% ≤ TV ≤ 15%</td>
<td>Minimum $n_{min}$</td>
</tr>
<tr>
<td>15% ≤ TV ≤ 85%</td>
<td>Controlled</td>
</tr>
<tr>
<td>85% ≤ TV ≤ 100%</td>
<td>Uncontrolled $n_{un}$</td>
</tr>
<tr>
<td>100% constant</td>
<td>Uncontrolled $n_{un}$</td>
</tr>
</tbody>
</table>

Control line Pin 3 off

Speed $n$

<table>
<thead>
<tr>
<th>Control line Pin 3 off</th>
<th>Speed $n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ≤ TV ≤ 5%</td>
<td>Motor off</td>
</tr>
<tr>
<td>5% ≤ TV ≤ 12%</td>
<td>Motor off</td>
</tr>
<tr>
<td>12% ≤ TV ≤ 15%</td>
<td>Minimum $n_{min}$</td>
</tr>
<tr>
<td>15% ≤ TV ≤ 85%</td>
<td>Controlled</td>
</tr>
<tr>
<td>85% ≤ TV ≤ 100%</td>
<td>Uncontrolled $n_{un}$</td>
</tr>
<tr>
<td>100% constant</td>
<td>Motor off</td>
</tr>
</tbody>
</table>

Set-value signal

Pulse-width-modulated signal (PWM signal) with a duty cycle of 5...50 Hz and a high level dependent on the operating voltage.

The set value of the speed is defined by the duty cycle $TV = T_{high}/T_P$.
**Water pressure pumps with D.C. motors**

**Application**
The main application is for vehicle washer-pump assemblies. Please contact us if the pumps are to be used for fluids other than water.

**Type**
Water pumps are centrifugal pumps with permanent-magnet DC motors.

---

**PAC 12 V**

<table>
<thead>
<tr>
<th>Part number</th>
<th>0 392 003 501</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal voltage</td>
<td>$U_n = 12$ V</td>
</tr>
<tr>
<td>Delivery</td>
<td>$V = 0.75$ dm$^3$-min$^{-1}$</td>
</tr>
<tr>
<td>Delivery pressure</td>
<td>$p = 1.5$ bar</td>
</tr>
<tr>
<td>Direction of rotation</td>
<td>L</td>
</tr>
<tr>
<td>Type of duty</td>
<td>S 2 · 1.5 min</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 54A</td>
</tr>
<tr>
<td>Weight</td>
<td>approx. 0.09 kg</td>
</tr>
</tbody>
</table>

---

Water pressure pumps with D.C. motors
12 V

Part number 0 392 040 008
Nominal voltage $U_n$ 12 V
Delivery $V$ 2 dm³/min⁻¹
Delivery pressure $p$ 2,0 bar
Direction of rotation $R$
Type of duty $S$ 2 - 1,5 min
Degree of protection IP 54A
Weight approx. 0,10 kg

24 V

Part number 0 392 040 001
Nominal voltage $U_n$ 24 V
Delivery $V$ 0,75 dm³/min⁻¹
Delivery pressure $p$ 1,5 bar
Direction of rotation $L$
Type of duty $S$ 2 - 2 min
Degree of protection IP 54A
Weight approx. 0,09 kg
**Water-circulation pumps with D.C. motors**

**Application**
If the pumps are to be used for fluids other than water, please consult us first.

**Version**
Rotary pumps with solenoid-operated coupling, no sealing between motor and pump unit, and therefore leak-proof.

**Note**
Operation of these water pumps is not regenerative.

1. Pump housing made of polyamide wv. polyetherimide
2. Bearing bolt made of stainless steel
3. Pump housing made of polyphenylene sulfide
4. Pump housing made of polyamide
5. Impeller made of plasto ferrite
6. Solenoid-operated coupling made of plasto ferrite
7. O-ring made of soft rubber
**PAA**

**12 V**

- **Part number**: 0 392 020 024
- **Nominal voltage**: $V_n = 12\,V$
- **Delivery**: $V = 530\,\text{dm}^3\cdot\text{h}^{-1}$
- **Delivery pressure**: $p = 0.1\,\text{bar}$
- **Direction of rotation**: $R$
- **Type of duty**: $S\,1$
- **Degree of protection**: $\text{IP 4 K 0}$
- **Weight**: approx. 0.4 kg

---

**12 V**

- **Part number**: 0 392 020 064
- **Nominal voltage**: $V_n = 12\,V$
- **Delivery**: $V = 1200\,\text{dm}^3\cdot\text{h}^{-1}$
- **Delivery pressure**: $p = 0.1\,\text{bar}$
- **Direction of rotation**: $R$
- **Type of duty**: $S\,1$
- **Degree of protection**: $\text{IP 5 K 4}\,1$
- **Weight**: approx. 0.5 kg

---

*1) Applies only with receptacle housing in place*
Water-circulation pumps with D.C. motors

**12 V**

<table>
<thead>
<tr>
<th>Specification</th>
<th>0392 020 039</th>
<th>0392 020 034</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal voltage $U_n$</td>
<td>12 V</td>
<td>12 V</td>
</tr>
<tr>
<td>Delivery $V$</td>
<td>530 dm$^3$/h$^1$</td>
<td>750 dm$^3$/h$^1$</td>
</tr>
<tr>
<td>Delivery pressure $p$</td>
<td>0,1 bar</td>
<td>0,1 bar</td>
</tr>
<tr>
<td>Direction of rotation $R$</td>
<td></td>
<td></td>
</tr>
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<td>Type of duty $S$</td>
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<td>Weight $m$</td>
<td>approx. 0,4 kg</td>
<td>approx. 0,4 kg</td>
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1) Applies only with receptacle housing in place

---

**Bosch Automotive Aftermarket**

2006 | 2007
**24 V**

- **Part number**: 0 392 020 027
- **Nominal voltage**: $U_n\ 24\ V$
- **Delivery**: $V\ 1200\ dm^3\cdot h^{-1}$
- **Delivery pressure**: $\rho\ 0.1\ bar$
- **Direction of rotation**: $R$
- **Type of duty**: $S\ 1$
- **Degree of protection**: IP 54
- **Weight**: approx. 0.5 kg

1) Applies only with receptacle housing in place
PCA

12 V

Part number 0 392 022 002
Nominal voltage $U_N$ 12 V
Delivery $V$ 1200 dm$^3$h$^{-1}$
Delivery pressure $p$ 0,3 bar
Direction of rotation $R$
Operating mode S 1
Degree of protection IP 5 K 4$^1$
Weight approx. 1,0 kg

1) Applies only with receptacle housing in place

PCA

12 V

Part number 0 392 022 010
Nominal voltage $U_N$ 12 V
Delivery $V$ 1400 dm$^3$h$^{-1}$
Delivery pressure $p$ 0,3 bar
Direction of rotation $R$
Operating mode S 1
Degree of protection IP 5 K 4$^1$
Weight approx. 1,1 kg

1) Applies only with receptacle housing in place
The PAD is a rotary pump. The stator and electronics are mechanically fully-separated from the rotor in the dry motor housing. The electronics and the stator winding generate an alternating electrical magnetic field, which in turn drives the rotor. The rotor, as part of the pump wheel, is seated in the separate pump housing. The non-contact torque transmission serves to ensure that throughout the entire service life coolant does not come into contact with the electronics.

**Application examples**
For versatile applications Bosch offers auxiliary water pumps with electronically commutated drive motors:
- Heater circuit
- Auxiliary heater
- Charge-air cooling
- Generator cooling
- Turbocharger cooling
- Fuel cooling
- Afterrun cooling of combustion engines
- Thermal management of electric vehicles
- Battery and electronic cooling

**Advantages for your application**
The essential advantages of the PAD auxiliary water pump in comparison to pumps, which are driven by carbon-brush mechanically-commutated electric motors, are:
- A reduction in installation length of up to approx. one third
- Approx. half the weight
- High delivery rate
- Longer service life
- Better efficiency
- Quieter operation
 PAD

Water-circulating pump driven by brushless motor

12 V

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<td>$U_n$ 12 V</td>
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<td>$V$ 900 dm$^3$/h$^1$</td>
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Circuit diagram for connection please contact us
**Bi-pressure pump**

**Application**
Example applications in automotive engineering:
- Individual comfort seat adjustment
- Raising and lowering headrests
- Central locking
- Closing assistance for doors and trunk lids
- Operation of pneumatic actuators

---

**Bi-pressure pump**
Air pump for mobile and stationary pressure supply

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[Diagram of Bi-pressure pump]
## Solenoid valves

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<th>Application</th>
<th>Valve models</th>
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<td>Heater control for passenger cars and commercial vehicles.</td>
<td>The lower valve cone is designed as a non-return valve. The valves are open when de-energized.</td>
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### Shutoff- or pulse valve

*W* and *W*’ heat exchanger optionally upstream or downstream of valve

### Changeover valve or pulse valve
Shutoff or timing valves

12 V

Part number: 1 147 412 020
Nominal voltage: $U_N = 12$ V
Nominal resistance: $R_{20} = 12.4$ Ω
Pressure drop: $\Delta p = 0.25$ bar
at a throughput of: $V = 2000$ dm³·min⁻¹
Switchable pressure difference: $\Delta p = 1.6$ bar
Switching times: $\leq 150$ ms
Duty cycle: $0 \ldots 100\%$
Degree of protection: IP 54
Weight: approx. 390.0 g

Shutoff or timing valves

24 V

Part number: 1 147 412 033
Nominal voltage: $U_N = 24$ V
Nominal resistance: $R_{20} = 48$ Ω
Pressure drop: $\Delta p = 0.4$ bar
at a throughput of: $V = 2000$ dm³·min⁻¹
Switchable pressure difference: $\Delta p = 1.6$ bar
Switching times: $\leq 150$ ms
Duty cycle: $0 \ldots 100\%$
Degree of protection: IP 54
Weight: approx. 410.0 g
### 12 V

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<td>Switching times</td>
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### 24 V

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Should you have any special requests, which go beyond the range of motors we have on offer, please note these on the following data sheet. In the event of any modifications, please state the known product here.

**Bosch-Order no.:**

Please select address (from list opposite):

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<th>Address 2</th>
<th>Address 3</th>
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Please use this printed data sheet as a master copy and return the filled out copy.

**Sender (customer):**

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**Direction of rotation**

(viewed towards drive shaft end)

- Right
- Left

**Installation space**

- Installation length

**Shaft end**

- as for series motor
- as under

**Ball bearing in drive**

- Performance specification

**Customer drawing**

- Degree of protection