

Micro-motors

Innovative D.C. motorisation solutions adapted to your applications

Catalogue



■ D.C. brushed and brushless motors and geared motors

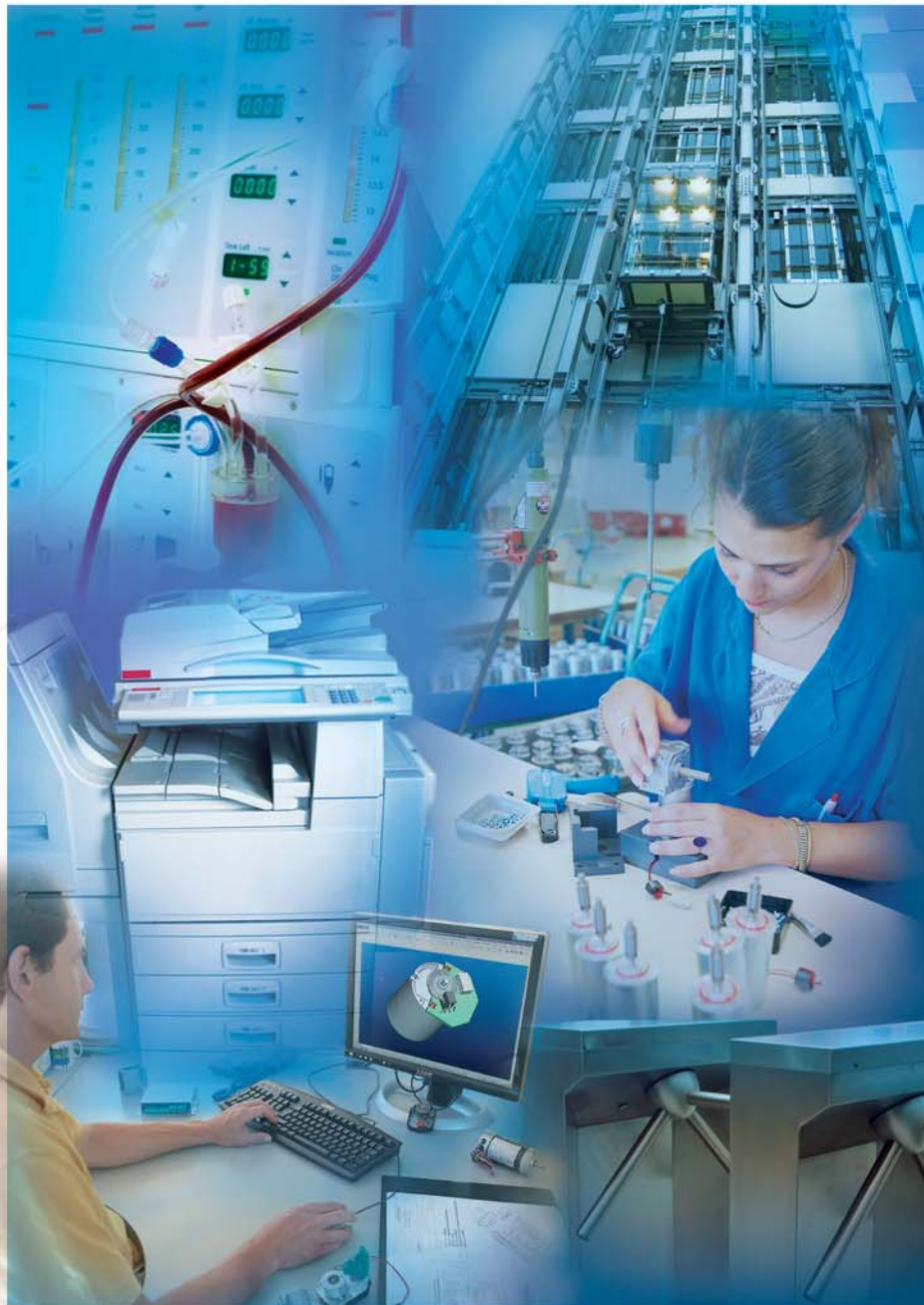


■ Control and servocontrol



■ Adapted products for customer applications

www.crouzet.com



Innovative solutions specially designed

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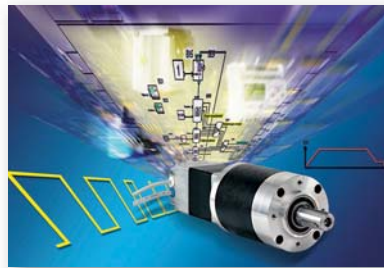
■ Brushless motors and control electronics P. 105



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Widely recognised for over 50 years for its adapted motor solutions, Crouzet brings you its latest innovative range of 1 to 200 W and 0.1 to 50 Nm D.C. brushed and brushless motors.

At the heart of this innovation lie exceptional motor and servocontrol performance, a wide range of associated gearboxes and the flexibility to adapt to any application, with complete solutions available based around several individual components or all-in-one versions (Motomate).



Crouzet is also continuing to innovate in terms of processes, production, logistics and quality to achieve the highest levels of service.

That means you are guaranteed quality products on time, every time.

Whatever your strategy or requirements, Crouzet is your ideal partner for providing **innovative motorisation solutions designed for your applications.**



CST (Custom Sensors and Technologies) incorporates the companies BEI Ideacod, Crouzet, Crydom, Kavlico and Kimco.

This new organisation means even better service and technical choice for our customers.

In addition to the motorisation solutions contained in this D.C. motors catalogue, CST also offers a complete range of detection and micro-control products.

Understanding of customer requirements + Motorisation expertise + Service expertise =



Electronics and Mechatronics

External or integrated control cards:

- 1982** Stepper.
- 1983** D.C. brushed motors
- 1986** Electronics for brushless motors (35000 rpm).

Mechanical engineering and Micromechanics

- 1963** First "ovoid" gearboxes providing excellent reduction ratios combined with compact dimensions.



- 1970** First electromechanical servomotors dedicated to standard applications, such as cam timers (domestic appliances), etc.

- 1982** Extended range of standard and special gearboxes (metal and plastic).
- 1984** Monobloc geared motor solutions for photocopiers.



Electrical

- 1955** One of the first manufacturers of non-reversible synchronous motors.



- 1979** Developed a range of new generation stepper and reversible synchronous motors.



- 1986** First high-speed brushless motor (35000 rpm).
- 1989** Launch of the D.C. brushed motors range.

Services

- 1955 to 1969** 7 European sales subsidiaries established.

- 1978** Subsidiaries in USA and Sweden.

- 1985** Automatic winding machine for flexible production lines.
- 1987** Production site set up in Mexico.

at your service

Crouzet innovation at your service



Software and Software engineering

1999 Electronic control cards for D.C. brushed motors and brushless motors (integrated or external).



1995 Range of planetary gearboxes (1 to 50 Nm) released on the market.

1998 Acoustic research: reduced noise in geared motors, etc. (anechoic chamber).

1999 First brushless motors (BLDC) with integrated electronics: easy setup and control.

1992 ISO 9001.
1995 Kamban - EDI.
1997 ISO 14001.
1996 Production site in Morocco.

2003 Motomate: the only range of brushless motors incorporating a motor control card and the Millenium logic controller (all-in-one solution).

2002 Range of right-angle gearboxes released on the market.

2002 Motomate.



2004 Lean Manufacturing.
2004 Six Sigma.
2005 Subsidiaries in China, India and Brazil.

2006 Simple motor servocontrol configuration.
2008 Servocontrol reduces noise levels and electrical consumption.

2008 Data bus (Modbus, CAN, Ethernet, etc.).



2004 Linear actuator for gas valves: the only solution in the world that improves the efficiency of gas boilers and meets European requirements (RT 2010).

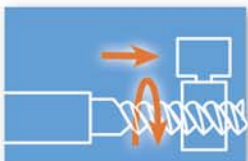
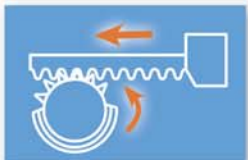
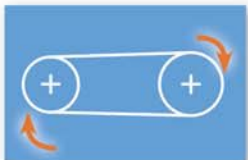
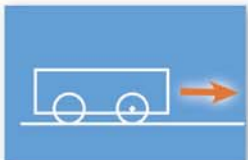
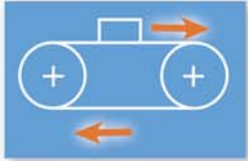
2007 High-performance motors:
- low speed/high torque direct drive motors
- very high speed direct drive motors.

2006 RoHS.
2006 Production in China.
2007 Eco-design.



Because each movement is different...

Whatever movement needs to be executed, Crouzet has all the technological expertise to develop a complete motorisation solution for you.



Controlling

Whether this is with an integrated logic microcontroller (Motomate), or in combination with an external logic controller (e.g.: Millennium 3), Crouzet can manage all the control functions of your application: I/O, types of movement, counting, log, self-test functions, etc.

Braking and holding

Crouzet offers electromechanical brakes that can hold your system in position.

Communicating

Adding a communication module provides an interface with your central controller or PLC using various methods: standard and analogue I/O (0-10 V, 4-20 mA), PWM, fieldbus (Modbus, CAN, etc.) or radio link (Zigbee, etc.).

Electrical interface

Logic controller

EMC filter

Filtering and protecting

Whatever the environment of your application, Crouzet can protect and filter its solutions:

- EMC (received and emitted)
- Temperature
- Mechanical (vibration, shock, etc.)
- Seal

Supplying power

- A number of possible voltages: 6-12-24-48-90 V DC
- Regulated AC/DC power supplies available: output 24 V DC – 2 to 10 A

adapted

motorisation solution?

Crouzet, an expert in motorisation, designs, manufactures and approves all the components of a motorisation system: motors, gearboxes, accessories, sensors, control electronics, software. From the simplest component (a rotor or a stator, a gear wheel, etc.) to the most complete solution (which may or may not be integrated), Crouzet has just the right motorisation solutions for your applications.

Driving

Open loop (stepper) or closed loop (DCB, BLDC), integrated or not integrated, Crouzet offers speed, torque and/or position controllers with control parameters (PID) adapted to your applications.

Controller/Variable speed drive/Torque/Position control

Converting

Using Crouzet gearboxes, the motor speed and torque can be adapted to your applications: from 1 to 50000 rpm and 0.1 to 30 Nm.

Gearbox

Mechanical interface

Integration

Crouzet adapts the mechanical interfaces of its solutions for perfect integration in your equipment: fixing plate, transmission shafts, special pinions.

Sensing

To optimise motorisation servocontrol, Crouzet is skilled in making current sensors, linear or angular position sensors (Hall effect, optical, magnetic, etc.), and temperature sensors.

Sensors

Brushless motor

The Motomate presented above is an example of an all-in-one adapted motorisation solution offering:

- low development, assembly and installation costs
- quick and easy setup
- easy and effective motor control
- autonomous motorisation that's easy to update (programming)

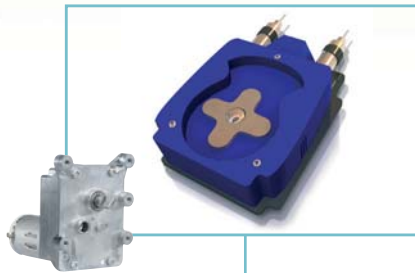
Innovation at the heart of your applications...

Today, Crouzet is not only an expert in motorisation technology, it also has specialist knowledge of applications as well as their requirements, environment and constraints.

Our expertise is not solely limited to motorisation parameters (speed, torque, load, servocontrol, etc.) but also encompasses all aspects of the user's application (flow, operating rate, pressure, flux, force, dynamics, etc.).

Always ahead of the game, Crouzet's experts can understand the general and specific requirements of your projects and offer the most suitable solution every time.

Industrial and medical



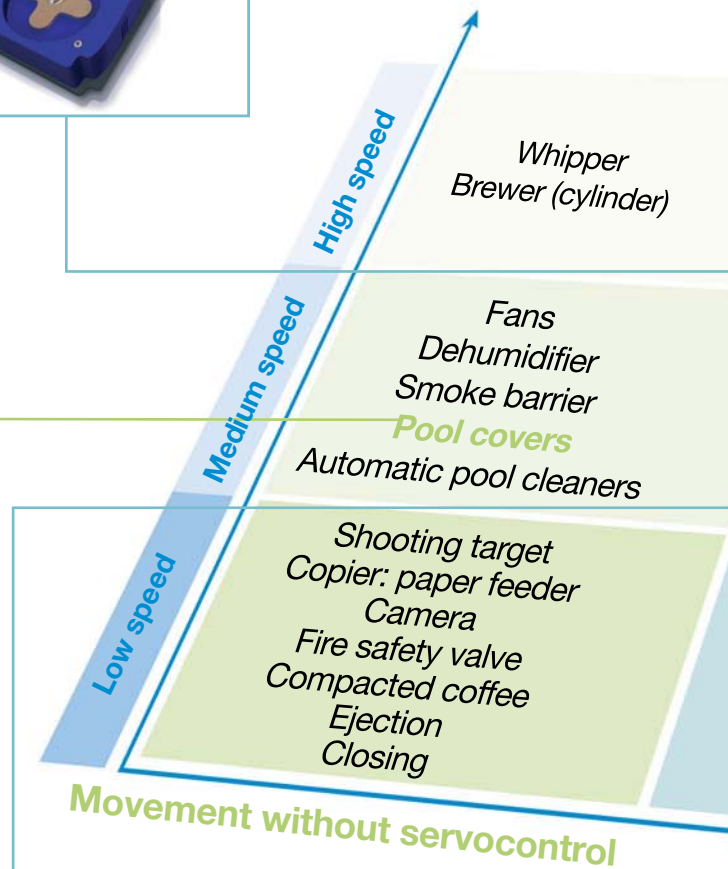
Pool



HVAC



Heating



solutions adapted to your applications

Medical



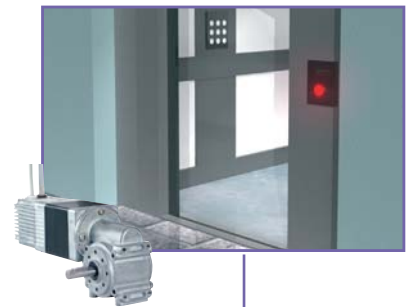
Centrifugal machine
Molecular pumps and
turbo pumps
Pumps
CPAP

Street furniture



Labeller
Packing machine

Lift



Variable air extractor
Conveyor belts

Peristaltic pumps

Disabled access ramps

Variable speed ventilation variable

Toll barrier
Scrolling advertising signs

Lift doors

Sliding doors

Automatic barriers

Kebab
Proportional damper
Pellet feeder
Blood analyser
Time delays

Saw positioning - woodworking
machine

Water valve

Thermostatic valve

Gas safety and control valve

Solar panels

Building automation



Speed servocontrol
Torque limiting

Position servocontrol

Control



Innovation tailored to your projects...

To meet market expectations and provide customers with the right solutions within the shortest timeframes, Crouzet has structured all company processes around the different types of product available: standard products, adapted products or products specially developed for a customer. Introducing the adaptation wheel...



Special products

Dedicated project engineers and teams

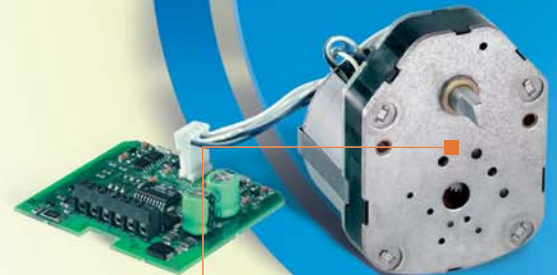
From the very start of a project, Crouzet experts work closely with your teams to develop the specifications. All our design, industrialisation and approval expertise goes into developing motorisation solutions that are tailored to your requirements.



Adapted products

Customer Adaptation Centre

Defined in coordination between your project teams and our specialists, these adapted products have exactly the right levels of performance and functionality you need for your applications.



of your

equipment and machines

These processes and skills are perfectly honed to meet all our customers' requirements within the best possible timeframes.

From special components to standard motors and complete, tailored solutions, Crouzet can adapt its full range of motorisation products to meet your requirements.



Standard products

Sales service

A full range of motors, geared motors and associated controllers are immediately available so that you can create your automation applications as quickly as possible.

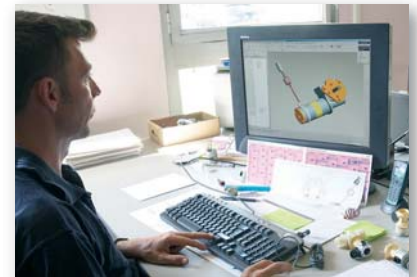


Products with added value

Customer Adaptation Centre

All our standard products can have additional factory-mounted auxiliaries or accessories, including connectors, leads, special terminals, dedicated shafts, adaptor plates, etc.

Seamless integration in your equipment means you benefit from simpler logistics and optimum installation reliability.



D.C. motorisation access all areas

D.C. brushless
motors. Linear
actuators.

Millenium³



Microswitches,
limit switches,
position sensors,
current sensors,
programmable micro
controllers, etc.

Crouzet

BEI
KIMCO MAGNETICS

Mechanical

Electronic

Material processing

Electrical

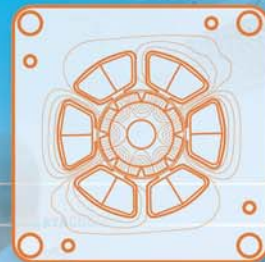


Magnetism

Software
engineering

Acoustics

Integration



Environment

Microtechnology

Thermal control

Solid state relays

Crouzet's Motorisation Expertise

crydom

in cutting-edge technology

Crouzet continues to invest in the latest motorisation technologies and expertise, including electrical and mechanical engineering, micromechanics, analogue and digital electronics, software engineering, etc.

This means we are able to develop innovative motorisation products that meet your needs today and tomorrow.



The creation of the new **CST (Custom Sensors & Technologies)** business unit has enhanced Crouzet's technological expertise by harnessing the combined skills of CST's international teams to meet customer requirements.

Crouzet/CST development and testing

- 3D CAD: Pro/Engineer
- Electronic CAD: flux 2D, flux 3D
- Thermal simulation
- Magnetic simulation
- Mechanical simulation
- Anechoic chamber for analysing sound levels and psychoacoustic noise:
 - Vibration
 - Temperature
 - Impact
 - EMC

Detection: sensors or encoders
(optical, magnetic, Hall effect, linear, etc.)

Your motorisation solution a dynamic

Project analysis

- Technical sales experts at your side
- Analysis of your objectives, constraints and key success factors to draw up the project specifications
- Advisory and recommendations meeting
- Action plan for seamless project execution.

Choosing the right solution and process

Taking account of your project and goals, we can:

- Process your order within 24 hours for standard products in stock
- Adapt a standard product (Customer Adaptation Centre)
- Develop an innovative solution just for you (Project team).

Development, validation and approval

Crouzet has effective processes in place for developing, validating and approving all product offers:

- Simulation tools
- Test bench (servocontrol/motor performance, service life, etc.)
- Laboratories, etc.

Six Sigma process management

For product offers that comply with the highest quality standards and ensure fast and efficient deliveries.



from Crouzet process in motion



After-sales support

Long-term partnership

Our specialists work closely with customers in managing the various project phases, ensuring they are on hand as the project progresses to offer support in tackling any new developments or challenges.



Logistics

Logistics teams are involved in all new projects from the outset and share a set of common goals:

- Weekly and daily planning (forecasts)
- A close relationship with your departments
- Just-in-time processes
- Network of partnerships with our suppliers

The Crouzet logistics platform ensures optimum logistics flows as well as the reliability of your supplies.



Logistics



Industrialisation and production: Lean Manufacturing

From standard to special products, and small-scale to mass production, our production facilities offer all the industrial flexibility and expertise required to ensure that our products meet your needs in terms of logistics, quality and competitiveness.

Production



Approval

Industrialisation

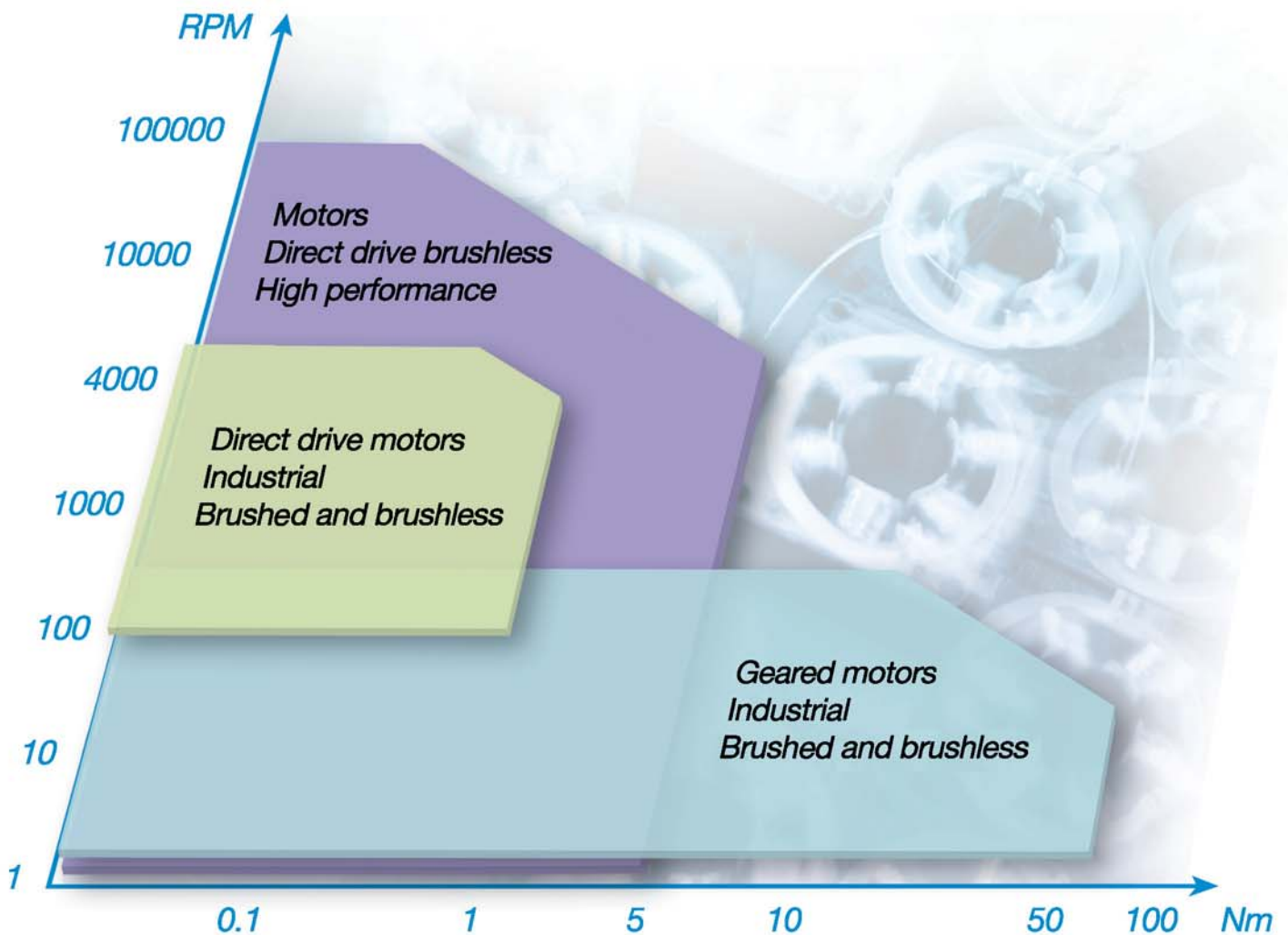
Quality and sustainable development

For over 20 years now, Crouzet has been committed to a quality policy that conforms to the strictest international standards: ISO 9001, ISO 14001, eco-design.

Why choose a Crouzet

D.C. motor solutions offer countless advantages:

- **High starting torque:** The D.C. motor, by its very nature, has a high torque vs. speed characteristic, enabling it to deal with high resistive torques and absorb sudden rises in load effortlessly. The speed of the motor adjusts to the load.
- **Miniaturisation:** D.C. motors offer higher efficiency than other designs.
- **Safe operation:** The low voltage supply provides a level of safety that complies with machine requirements EN 60335-1 and IEC 335-1 "Safety of household and similar electrical appliances".
- **Simple and cost-effective** speed, torque and position servocontrol.



D.C. motor?

Industrial D.C. direct drive brushed and brushless motors, from 1 to 350 W



Crouzet's industrial D.C. motors offer low operating speeds (2000 to 4000 rpm) and some of the best technical criteria on the market in terms of exceptionally long service life (over 20000 hours), very low sound level, outstanding protection, etc.

Crouzet's range of brushless motors offers distinct advantages over the competition: exceptionally long service life (over 20000 operating hours), very low sound level (no brushed switching), good efficiency (optimised motor control), integrated sensors and excellent dynamics.

High-performance direct drive motors, from 1 to 700 W



Harnessing CST's technical and industrial expertise, Crouzet can now offer high-performance BLDC motor solutions that are widely

recognised in the USA:

- Extended Speed/Torque range (high speed and low speed/high torque)
- Optimised motor characteristics: detent torques, zero-speed friction, breakaway torque, torque fluctuation, sound level, power density, etc.

Gearboxes and geared motors, from 0.1 to 50 Nm



Crouzet has been developing and industrialising its range of gearboxes and combining them with motors for more than 50 years:

Flat gearboxes: up to 5 Nm nominal torque (more than 10 models)

- Excellent reduction ratios within compact units (up to 1:1600000).
- Mechanical interfaces specifically adapted to customer applications.

Worm gearboxes (right-angle): up to 8 Nm

- The right-angle (90°) design of these ultra quiet gearboxes means they offer a compact solution in relation to the length of the output shaft.
- These gearboxes may also be offered as a simple solution where applications need to be held in the off position.

Planetary gearboxes: up to 50 Nm nominal torque

These gearboxes have maximum continuous torques and excellent efficiency while offering compact dimensions around the gearboxes' output shaft (centred shaft): 4 sizes are available in the Crouzet range.

Gearboxes made to order:

Crouzet also offers customised solutions that focus on your key criteria and integrate seamlessly into your application: compact dimensions, rotary or linear movement, sound level and psychoacoustic noise, special shapes and fixtures, etc.

Standard and adapted motor control cards



Crouzet has a range of standard control solutions (integrated or not integrated in the motor) but also offers the option of adapting these to match your specifications. The objective is to create the perfect motorisation and control solution for your key functions.

Information about other available technologies (non-reversible synchronous motors, reversible synchronous motors, stepper motors, asynchronous motors) can be found on the Crouzet website www.crouzet.com or just ask your local Crouzet representative (see back page of catalogue for your nearest contact).

To place an Order

DC direct-drive brushed motors
 → 21 to 33 mm - 22 and 47 Watts

Key features:
 • Long service life
 • High torque
 • Low speed ripple
 • High efficiency
 • Low noise level

Part numbers:

| Part number | Power (W) | Speed (rpm) | Current (A) | Voltage (V) | Dimensions (mm) |
|-------------|-----------|-------------|-------------|-------------|-----------------|
| 82830010 | 22 | 3000 | 0.7 | 24 | 21 x 33 x 40 |
| 82830047 | 47 | 3000 | 1.9 | 24 | 21 x 33 x 40 |
| 82830049 | 47 | 3000 | 1.9 | 24 | 21 x 33 x 40 |
| 82830051 | 47 | 3000 | 1.9 | 24 | 21 x 33 x 40 |

Additional features:
 • Encoder
 • Brake
 • Gear
 • Other options

Standard products:

Part numbers shown against a dark blue background are **standard products**.

82830010
 82830047
 82830049
 82830051

D.C. geared motors with brushes
 → 2.5 to 8 mm - 8 and 18 Watts

Key features:
 • High torque
 • Low speed ripple
 • High efficiency
 • Low noise level

Part numbers:

| Part number | Power (W) | Speed (rpm) | Current (A) | Voltage (V) | Dimensions (mm) |
|-------------|-----------|-------------|-------------|-------------|-----------------|
| 82733000 | 8 | 3000 | 0.3 | 24 | 8 x 25 x 30 |
| 82733003 | 8 | 3000 | 0.3 | 24 | 8 x 25 x 30 |
| 82733004 | 8 | 3000 | 0.3 | 24 | 8 x 25 x 30 |
| 82733005 | 8 | 3000 | 0.3 | 24 | 8 x 25 x 30 |

Additional features:
 • Encoder
 • Brake
 • Gear
 • Other options

Standard products not held in stock:

Part numbers shown against a light blue background are **standard products not held in stock**.

Products indicated by a black dot against a light blue background are also **standard products not held in stock**.

To order these products, however, select the part number listed above it and specify the additional characteristics required. For example: 827230 - 24 V - ratio 600.

82733000
 82733003
 82733004
 82733005

Brushless DC geared motors
 → 40 W right-angle geared motors

Key features:
 • High torque
 • Low speed ripple
 • High efficiency
 • Low noise level

Part numbers:

| Part number | Power (W) | Speed (rpm) | Current (A) | Voltage (V) | Dimensions (mm) |
|-------------|-----------|-------------|-------------|-------------|-----------------|
| 82633000 | 40 | 3000 | 1.7 | 24 | 40 x 60 x 80 |

Additional features:
 • Encoder
 • Brake
 • Gear
 • Other options

Adaptations:
 • 2-quadrant operation
 • With built-in elec.
 • No lead output cable
 • Dimensions of gear
 • Cable length, with
 • Other reductions
 • Other windings

Adapted products:

This symbol indicates that the product can be adapted to your requirements. Please contact us for further details about your applications.

■ Stocked product ■ Product made to order

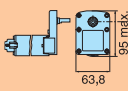
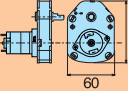
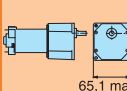
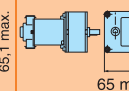
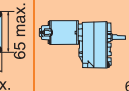
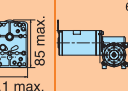
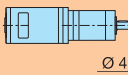
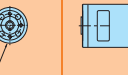
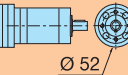


























Warning: The product information contained in this catalogue is given purely as information and does not constitute a representation, warranty or any form of contractual commitment. CROUZET Automatismes and its subsidiaries reserve the right to modify their products without notice. It is essential to contact us for any special use/application of our products, and it is the responsibility of the purchaser to check, in particular using all appropriate tests, that the product used is suitable for the application. Our guarantee may under no circumstances be invoked, nor our responsibility sought for any application of our products such as, amongst others, modification, addition, use in combination with other electrical or electronic components, circuits or mounting systems, or any other inappropriate equipment or substance which has not been expressly approved by us prior to the finalisation of the sale.

Motors and geared motors

D.C. brush



Brush

| | 2 | 2.5 | 5 | | 6 | 10 | 25 | | | |
|--|--|---|--|---|---|---|---|--|--|--|
| | 81044 RE2 | 81023 3 Nm | 81035 RC5 pal | 81037 RC65 | 810326 | 81041 90° | Planetary | | | |
| |  |  |  |  |  |  |  |  |  |  |
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| | | 827230 p. 76  | | | | | | | | |
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1

Basic concepts - D.C. motors and geared motors

Why choose a D.C. motor?

Many applications require a high starting torque. The D.C. motor, by its very nature, has a high torque vs. speed characteristic, enabling it to deal with high resistive torques and absorb sudden rises in load effortlessly; the motor speed adapts to the load. In addition, D.C. motors are an ideal way of achieving the miniaturisation that is so desirable to designers, since they offer a high efficiency as compared with other technologies.

How to choose from the Crouzet range

The motor is chosen on the basis of the usable power that is required. A direct drive motor or a geared motor can be chosen, depending on the required speed.

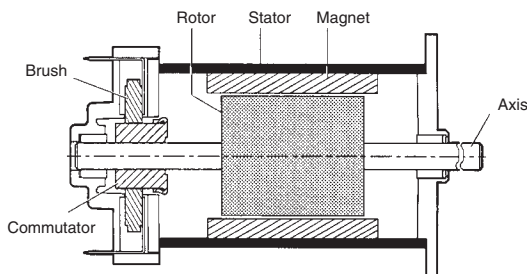
Speeds from 1000 to 5000 rpm → Direct drive motor
 Speeds below 500 rpm → Geared motor

The gearbox is chosen on the basis of the maximum recommended torque in the steady state.

Definition of a D.C. motor

This motor is characterised by linear operating principles. These principles make the features of the motor easier to use than those of synchronous or asynchronous motors.

→ Composition of a D.C. motor



The stator consists of a metal housing and one or more magnets creating a magnetic field inside the stator. At the rear of the stator are the brush holders and the brushes, which provide the electrical contacts with the rotor.

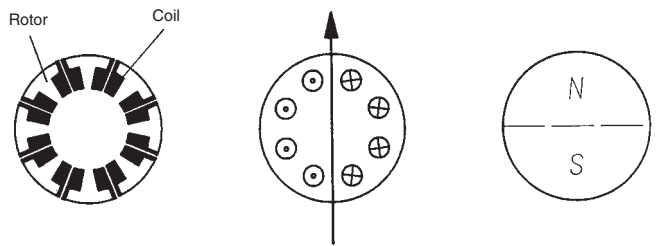
The rotor itself consists of a metal housing with coils which are interconnected at the commutator.

The commutator/brush unit is used to select all the coils through which current will pass in one direction and all the coils through which current will pass in the other direction.

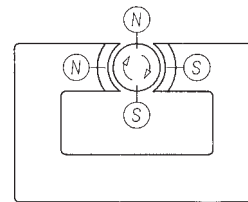
Operating principle

No matter how complex the winding is, once it is supplied with power it can be represented as a ferromagnetic cylinder with a solenoid at its edge.

The wire of this solenoid is made up of the bundle of wire located in each slot of the rotor. The rotor then acts as an electromagnet. The direction of its magnetic induction is the axis separating the wires of the solenoid according to the direction of the current passing through them.



Therefore the motor consists of fixed magnets, a moving magnet (the rotor) and a metal housing to concentrate the flux.



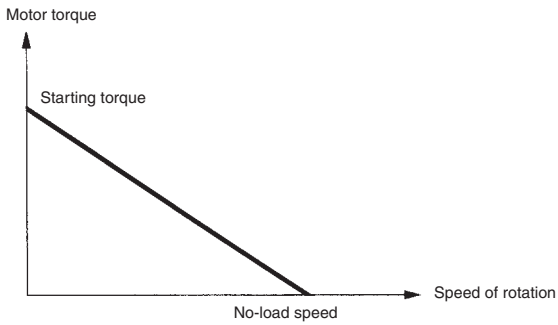
Attraction of the unlike poles and repulsion of the like poles generates a torque which is applied to the rotor, causing it to turn. This torque is at its maximum when the axis of the rotor poles is perpendicular to the axis of the stator poles.

When the rotor starts to turn, the brushes change commutator segments. The coils are supplied with different supply voltages, so the axis of the new rotor poles is still perpendicular to that of the stator. Thanks to the action of the commutator, the rotor never stops turning, no matter what its position. The resulting torque ripple decreases as the number of commutator segments increases.

Switching round the power supply leads in the motor reverses the current in the rotor coils and hence the north and south poles. The torque is then applied in the opposite direction from before. The motor changes its direction of rotation. By its very nature, the D.C. motor is a reversible motor.

→ Torque and speed of rotation

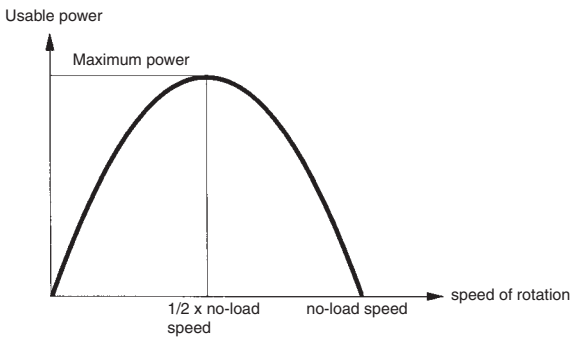
The torque delivered by the motor and its speed of rotation are mutually dependent.
 This is a fundamental characteristic of the motor. This is a linear relation which determines the no-load speed and the starting torque of the motor.



The torque/speed curve can be used to determine the usable power curve for the motor.

$$P_u (W) = \frac{2\pi}{60} \times C (N.m) \times N (rpm)$$

| | | |
|--------------|--------------|-------------------|
| Usable power | Motor torque | Speed of rotation |
|--------------|--------------|-------------------|



The torque/speed and usable power curves are dependent on the supply voltage to the motor.
 The supply voltage given for the motor corresponds to continuous use of the motor at an ambient temperature of 20°C at the nominal operating point.

It is perfectly possible for the motor to be supplied with a different voltage (generally between -50% and +100% of the intended motor voltage).
 If it is supplied at a lower voltage, the motor will be less powerful.
 If it is supplied at a higher voltage, it will be more powerful but will heat up more (for intermittent operation).

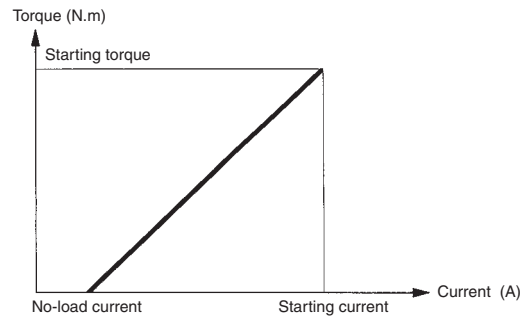
For variations in supply voltage of around -25% to +50%, the new torque/speed curve is parallel to the old one. The starting torque and the no-load speed vary by the same percentage (n%) as the supply voltage. The maximum usable speed of the motor has to be multiplied by (1 + n%)².

Example: For a supply voltage greater than 20%

- Starting torque above 20% (x 1.2)
- No-load speed above 20% (x 1.2)
- Usable power above 44% (x 1.44)

→ Torque and supply current

This is the second important characteristic of the D.C. motor. It is a linear relation and can be used to determine the no-load current and the locked-rotor current (starting current).



This curve is not dependent on the motor supply voltage. The end of the curve simply lengthens to a greater or lesser degree depending on the torque and the starting current.
 The gradient of this curve is known as the "torque constant".

$$K_c = \frac{C_d}{I_d - I_0}$$

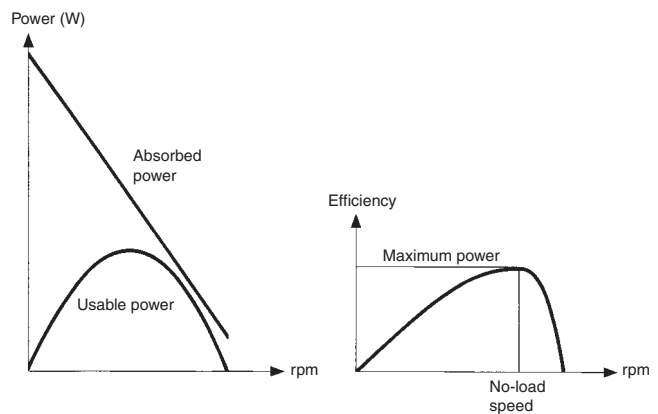
This torque constant is such that:

$$C = K_c (I - I_0)$$

$K_c I_0$ is known as the "rotational friction torque".
 The torque is then expressed as follows:

$$C = K_c I - C_f \text{ where } C_f = K_c I_0$$

- Kc** = Torque constant (Nm/A)
- C** = Torque (Nm)
- Cd** = Starting torque (Nm)
- Cf** = Rotational friction torque (Nm)
- I** = Current (A)
- I0** = No-load current (A)
- Id** = Starting current (A)



The torque/current and torque/speed curve can be used to derive the curve for the power consumption as a function of the speed of rotation of the motor.

→ Efficiency

The efficiency of a motor is the ratio between the usable mechanical power that it can deliver and the electrical power that it absorbs. Since the usable power and the absorbed power vary differently with the speed of rotation, the efficiency also depends on the motor speed. The efficiency is at its maximum at a given speed of rotation that is greater than half the no-load speed.

Design of Crouzet D.C. motors

→ Safety

Crouzet D.C. motors are designed and manufactured to be integrated into appliances or machines which meet, for example, the specifications of the machine standard:

EN 60335-1 (IEC 335-1, "Safety of household and similar electrical appliances").

The integration of Crouzet D.C. motors into appliances or machines should generally take account of the following motor characteristics:

- no earth connection
 - "simple isolation" motors

 - protection index: IP00 to IP40
 - insulation system class: A to F
- } (see detailed characteristics on the catalogue page for each type of motor)

EUROPEAN LOW VOLTAGE DIRECTIVE 73/23/EEC OF 19.02.73

CROUZET D.C. motors and geared motors are outside the scope of this directive (LVD 73/23/EEC applies to voltages over 75 volts D.C.).

→ Electromagnetic compatibility (EMC)

On request, Crouzet Automatismes will provide the EMC characteristics of the various types of product.

EUROPEAN DIRECTIVE 89/336/EEC OF 03/05/89, "ELECTROMAGNETIC COMPATIBILITY":

D.C. motors and geared motors which are components designed for professionals to be incorporated in more complex devices, and not for end users, are not covered by this directive because they are outside its scope.

DC direct-drive brushed motors

→ Ø 24.4 mm 1.4 Watts

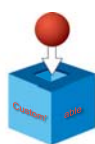
- Long service life
- Resistant to prolonged jamming
- Class A EMC interference suppression
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional encoder



Part numbers

| | 1.4 W | 1.4 W |
|--|-----------------|-----------------|
| Type | 827100 | 827100 |
| Voltage | 12 V | 24 V |
| References | | |
| Without option | 82710001 | 82710002 |
| With class B EMC filter (radiated) | 82710004 | 82710005 |
| With 1 pulse/revolution encoder | 82710008 | 82710009 |
| With 5 pulses/revolution encoder | 82710010 | 82710011 |
| With 12 pulses/revolution encoder | 82710012 | 82710013 |
| With 48 pulses/revolution encoder | 82710006 | 82710007 |
| No-load characteristics | | |
| Speed of rotation (rpm) | 4490 | 4460 |
| Absorbed power (W) | 0.36 | 0.36 |
| Absorbed current (A) | 0.03 | 0.015 |
| Nominal characteristics | | |
| Speed (rpm) | 3365 | 3320 |
| Torque (mNm) | 3 | 3 |
| Usable power (W) | 1.06 | 1.04 |
| Absorbed power (W) | 1.80 | 1.82 |
| Absorbed current (A) | 0.15 | 0.076 |
| Gearbox case temperature rise (°C) | 10 | 10 |
| Efficiency (%) | 59 | 57 |
| General characteristics | | |
| Conformity to standard EN 55022 (radiated EMC) | Class A | Class A |
| Temperature rise conf. to EN 60950 | ✓ | ✓ |
| Coil wire insulation class | H | H |
| Protection rating | IP 30 | IP 30 |
| Max. output power (W) | 1.40 | 1.40 |
| Start torque (mNm) | 12 | 12 |
| Starting current (A) | 0.51 | 0.25 |
| Resistance (Ω) | 24 | 96 |
| Inductance (mH) | 33 | 144 |
| Torque constant (Nm/A) | 0.023 | 0.047 |
| Electrical time constant (ms) | 1.4 | 1.5 |
| Mechanical time constant (ms) | 32 | 32 |
| Thermal time constant (mn) | 5 | 5 |
| Inertia (g.cm ²) | 7 | 7 |
| Weight (g) | 50 | 50 |
| Number of segments | 3 | 3 |
| Service life (h) | 4000 | 4000 |
| Sintered bronze bearings | ✓ | ✓ |
| Encoder characteristics | | |
| Connection via connector | ✓ | ✓ |
| Output current (mA) | < 20 | < 20 |
| Supply (V) | 5 | 5 |

Product adaptations



- Encoder with different number of pulses per revolution
- Push-fit pinion
- Additional connectors

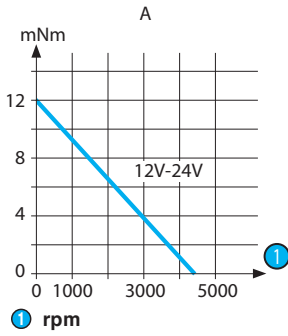
Stocked product

Product made to order

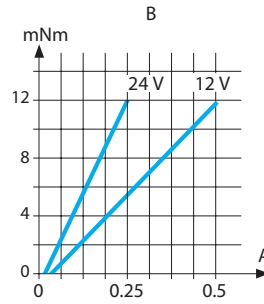
To order, see page 18

Curves

Curve: torque/speed 827100

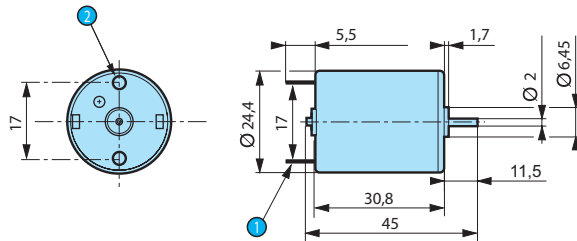


Curve: torque/current 827100



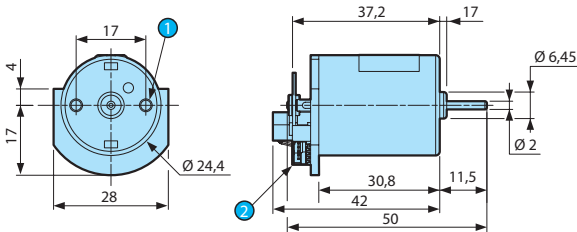
Dimensions

82710001 - 82710002

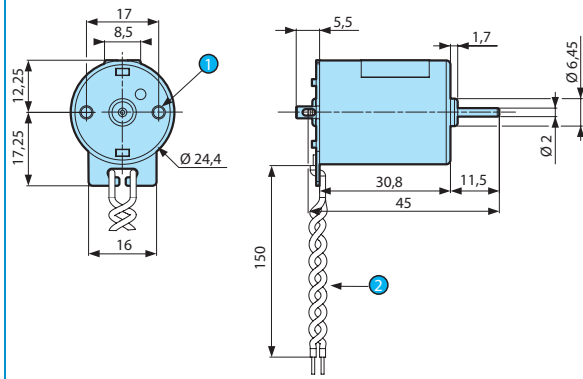


- 1 2 solder tags 2.8 x 0.5 mm
- 2 2 holes M3 depth 2.3 max.

With encoder



With EMC filter 82710004 - 82710005

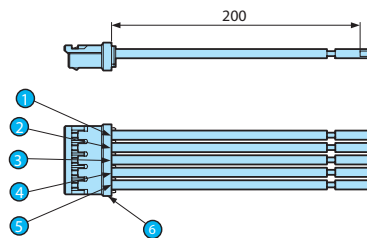


- 1 2 holes M3 depth 2.3 max.
- 2 AWG 24 leads

- 1 2 holes M3 depth 2.3 max.
- 2 Molex connector 87438 - 0532

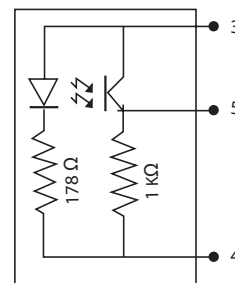
Connections

Accessory 79260417



- 1 Motor (+) → red
- 2 Motor (-) → blue
- 3 +5 VDC encoder power supply → white
- 4 0 VDC encoder power supply → blue
- 5 Encoder output signal → grey
- 6 Molex connector 87439 - 0500

Internal encoder diagram



DC direct-drive brushed motors

→ Ø 27.5 mm 3.2 Watts

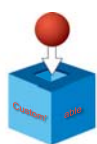
- Long service life
- Resistant to prolonged jamming
- Class A EMC interference suppression
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional encoder



Part numbers

| | 3.2 W | 3.2 W |
|--|-----------------|-----------------|
| Type | 827200 | 827200 |
| Voltage | 12 V | 24 V |
| References | | |
| Without option | 82720001 | 82720002 |
| With class B EMC filter (radiated) | 82720003 | 82720004 |
| With 1 pulse/revolution encoder | 82720007 | 82720008 |
| With 5 pulses/revolution encoder | 82720009 | 82720010 |
| With 12 pulses/revolution encoder | 82720011 | 82720012 |
| With 48 pulses/revolution encoder | 82720005 | 82720006 |
| No-load characteristics | | |
| Speed of rotation (rpm) | 4785 | 4740 |
| Absorbed power (W) | 1.2 | 1.2 |
| Absorbed current (A) | 0.098 | 0.049 |
| Nominal characteristics | | |
| Speed (rpm) | 3500 | 3500 |
| Torque (mNm) | 7 | 7 |
| Usable power (W) | 2.6 | 2.6 |
| Absorbed power (W) | 5.0 | 5.0 |
| Absorbed current (A) | 0.42 | 0.21 |
| Gearbox case temperature rise (°C) | 25 | 25 |
| Efficiency (%) | 51 | 51 |
| General characteristics | | |
| Conformity to standard EN 55022 (radiated EMC) | Class A | Class A |
| Temperature rise conf. to EN 60950 | ✓ | ✓ |
| Coil wire insulation class | H | H |
| Protection rating | IP 30 | IP 30 |
| Max. output power (W) | 3.20 | 3.20 |
| Start torque (mNm) | 26 | 26 |
| Starting current (A) | 1.3 | 0.64 |
| Resistance (Ω) | 9 | 37.5 |
| Inductance (mH) | 13 | 52 |
| Torque constant (Nm/A) | 0.022 | 0.044 |
| Electrical time constant (ms) | 1.4 | 1.4 |
| Mechanical time constant (ms) | 16.5 | 16.5 |
| Thermal time constant (mn) | 6.3 | 6.3 |
| Inertia (g.cm ²) | 9 | 9 |
| Weight (g) | 70 | 70 |
| Number of segments | 5 | 5 |
| Service life (h) | 4000 | 4000 |
| Sintered bronze bearings | ✓ | ✓ |
| Encoder characteristics | | |
| Connection via connector | ✓ | ✓ |
| Output current (mA) | < 20 mA | < 20 |
| Supply (V) | 5 | 5 |

Product adaptations



- Encoder with different number of pulses per revolution
- Push-fit pinion
- Additional connectors

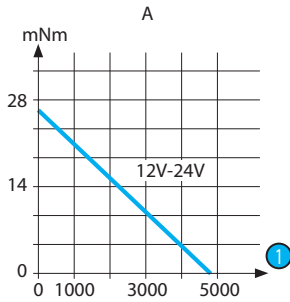
Stocked product

Product made to order

To order, see page 18

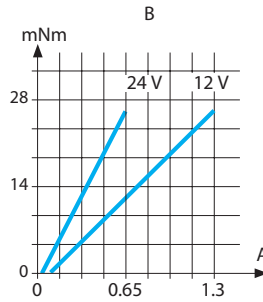
Curves

Curve: torque/speed 827200



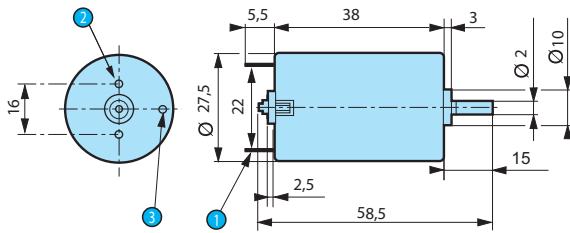
① rpm

Curve: torque/current 827200



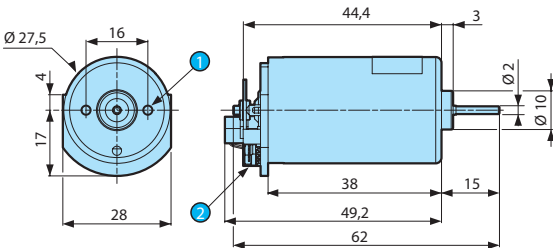
Dimensions

82720001 - 82720002

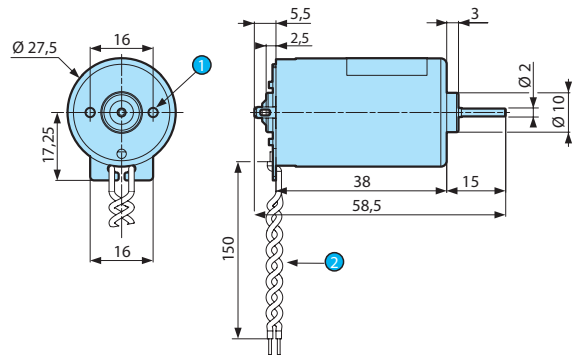


- ① 2 solder tags 2.8 x 0.5 mm
- ② 2 holes M2.6 screw depth max. 3 mm
- ③ Hole \varnothing 2.38 mm

With encoder



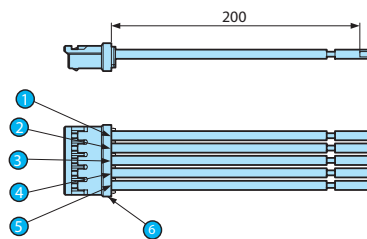
With EMC filter 82720003 - 82720004



- ① 2 holes M2.6 depth 3 max.
- ② AWG 24 leads

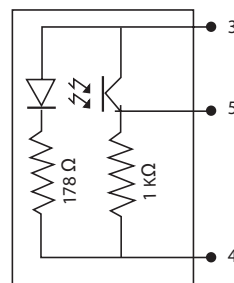
Connections

Accessory 79260417



- ① Motor (+) → red
- ② Motor (-) → blue
- ③ +5 V_{DC} encoder power supply → white
- ④ 0 V_{DC} encoder power supply → blue
- ⑤ Encoder output signal → grey
- ⑥ Molex connector 87439 - 0500

Internal encoder diagram



DC direct-drive brushed motors

→ Ø 32 mm 3.9 Watts

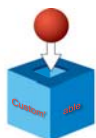
- Nominal power: 3 W
- Versions with tag or lead connection
- Versions without filter or with standard filter or class B filter built into the motor
- Versions with or without encoder, 1 or 5 pulses per revolution, built into the motor



Part numbers

| | 3.9 W with tags | 3.9 W with leads | 3.9 W with tags | 3.9 W with leads |
|---|-----------------|------------------|-----------------|------------------|
| Type | 82860 | 82860 | 82860 | 82860 |
| Voltage | 12 V | 12 V | 24 V | 24 V |
| References | | | | |
| Without filter | 82860001 | 82860011 | 82860002 | 82860012 |
| Varistor filter | 82860003 | 82860017 | 82860004 | 82860018 |
| With class B EMC filter | 82860040 | - | 82860041 | - |
| With 1 pulse/revolution encoder and varistor | 82860501 | - | 82860502 | - |
| With 5 pulses/revolution encoder and varistor | 82860503 | - | 82860504 | - |
| No-load characteristics | | | | |
| Speed of rotation (rpm) | 5000 | 5000 | 5000 | 5000 |
| Absorbed power (W) | 1.2 | 1.2 | 1.92 | 1.92 |
| Absorbed current (A) | 0.1 | 0.1 | 0.08 | 0.08 |
| Nominal characteristics | | | | |
| Speed (rpm) | 3700 | 3700 | 3700 | 3700 |
| Torque (mNm) | 7.7 | 7.7 | 7.7 | 7.7 |
| Usable power (W) | 3 | 3 | 3 | 3 |
| Absorbed power (W) | 6.2 | 6.2 | 6 | 6 |
| Absorbed current (A) | 0.43 | 0.43 | 0.26 | 0.26 |
| Gearbox case temperature rise (°C) | 50 | 50 | 50 | 50 |
| Efficiency (%) | 48 | 48 | 50 | 50 |
| General characteristics | | | | |
| Insulation class (conforming to IEC 85) | B (130 °C) | B (130°C) | B (130 °C) | B (130°C) |
| Protection rating | IP40 | IP40 | IP40 | IP40 |
| Max. output power (W) | 3.9 | 3.9 | 3.9 | 3.9 |
| Start torque (mNm) | 30 | 30 | 30 | 30 |
| Starting current (A) | 1.5 | 1.5 | 0.76 | 0.76 |
| Resistance (Ω) | 8 | 8 | 32 | 32 |
| Inductance (mH) | 10 | 10 | 41.6 | 41.6 |
| Torque constant (Nm/A) | 0.0214 | 0.0214 | 0.0448 | 0.0448 |
| Electrical time constant (ms) | 1.3 | 1.3 | 1.3 | 1.3 |
| Mechanical time constant (ms) | 36 | 36 | 36 | 36 |
| Thermal time constant (mn) | 8 | 8 | 8 | 8 |
| Inertia (g.cm ²) | 19 | 19 | 19 | 19 |
| Weight (g) | 96 | 96 | 95 | 95 |
| Number of segments | 3 | 3 | 3 | 3 |
| Service life (h) | 3000 | 3000 | 3000 | 3000 |
| Sintered bronze bearings | ✓ | ✓ | ✓ | ✓ |
| Leads connection 250 mm | - | AWG24 | - | AWG24 |
| Encoder characteristics | | | | |
| Connection | AWG24 | - | AWG24 | - |
| Output current (mA) | < 20 | - | < 20 | - |
| Supply (V) | 4.5 → 30 --- | - | 4.5 → 30 --- | - |

Product adaptations



- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special cable length
- Special ball bearings

- Special mounting plate
- Customised electronics
- Special connectors
- Shorter 1 W motor

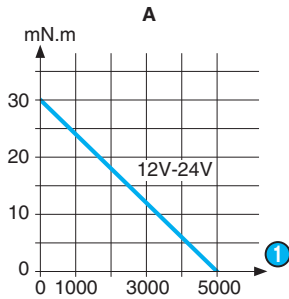
Stocked product

Product made to order

To order, see page 18

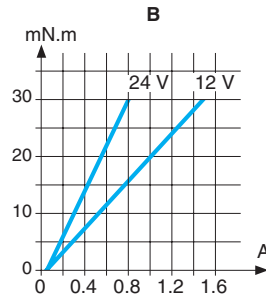
Curves

A - Torque/nominal speed curve
 B - Torque/current curve
 82860



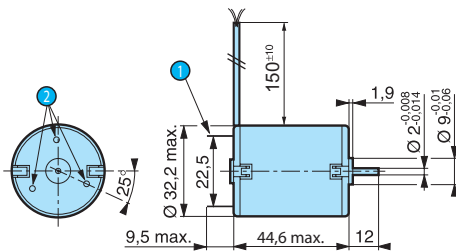
① rpm

82860



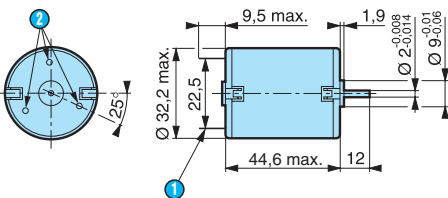
Dimensions

With encoder



- ① 2 tags NFC 20 - 120; series 2.8 x 0.5
- ② 3 holes at 120° over Ø 26 mm: use self-tapping M2.2 screws; screw depth max. 6 mm

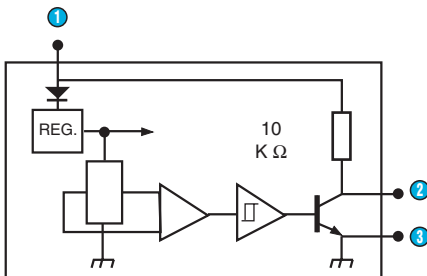
Without encoder



- ① 2 tags NFC 20 - 120; series 2.8 x 0.5
- ② 3 holes at 120° over Ø 26 mm: use self-tapping M2.2 screws; screw depth max. 6 mm

Connections

Encoder



- ① Brown: +5 → +24 V (encoder power supply)
- ② Yellow: Signal output
- ③ Blue: 0 V (power supply earth)

DC direct-drive brushed motors

→ Ø 36 mm 8 Watts

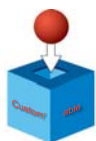
- Long service life
- Class A EMC interference suppression
- Optional class B interference suppression
- Optional encoder with class B interference suppression



Part numbers

| | 8 W | 8 W |
|--|-----------------|-----------------|
| Type | 827300 | 827300 |
| Voltage | 12 V | 24 V |
| References | | |
| Without option | 82730001 | 82730002 |
| With class B EMC filter (radiated) | 82730003 | 82730004 |
| With 1 pulse/revolution encoder | 82730007 | 82730008 |
| With 5 pulses/revolution encoder | 82730009 | 82730010 |
| With 12 pulses/revolution encoder | 82730011 | 82730012 |
| With 48 pulses/revolution encoder | 82730005 | 82730006 |
| No-load characteristics | | |
| Speed of rotation (rpm) | 4650 | 4440 |
| Absorbed power (W) | 2.5 | 2.4 |
| Absorbed current (A) | 0.21 | 0.1 |
| Nominal characteristics | | |
| Speed (rpm) | 3265 | 3100 |
| Torque (mNm) | 20 | 20 |
| Usable power (W) | 6.8 | 6.5 |
| Absorbed power (W) | 12 | 12 |
| Absorbed current (A) | 1 | 0.5 |
| Gearbox case temperature rise (°C) | 25 | 25 |
| Efficiency (%) | 57 | 54 |
| General characteristics | | |
| Conformity to standard EN 55022 (radiated EMC) | Class A | Class A |
| Coil wire insulation class | H | H |
| Protection rating | IP 20 | IP 20 |
| Max. output power (W) | 8.2 | 7.7 |
| Start torque (mNm) | 67 | 66 |
| Starting current (A) | 2.9 | 1.42 |
| Resistance (Ω) | 4 | 16.9 |
| Inductance (mH) | 3 | 10 |
| Torque constant (Nm/A) | 0.025 | 0.05 |
| Electrical time constant (ms) | 0.65 | 0.6 |
| Mechanical time constant (ms) | 19.5 | 19.5 |
| Thermal time constant (mn) | 12 | 15 |
| Inertia (g.cm ²) | 29 | 29 |
| Weight (g) | 145 | 145 |
| Number of segments | 5 | 5 |
| Service life (h) | 3000 | 3000 |
| Sintered bronze bearings | ✓ | ✓ |
| Encoder characteristics | | |
| Connection via connector | ✓ | ✓ |
| Output current (mA) | < 20 | < 20 |
| Supply (V) | 5 | 5 |

Product adaptations



- Encoder with different number of pulses per revolution
- Push-fit pinion
- Additional connectors

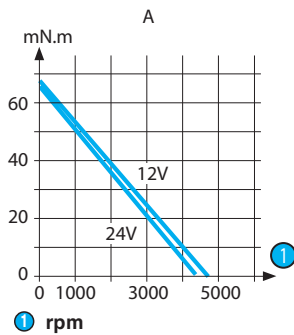
Stocked product

Product made to order

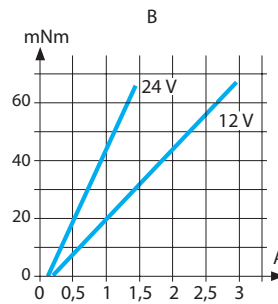
To order, see page 18

Curves

Curve: torque/speed 827300

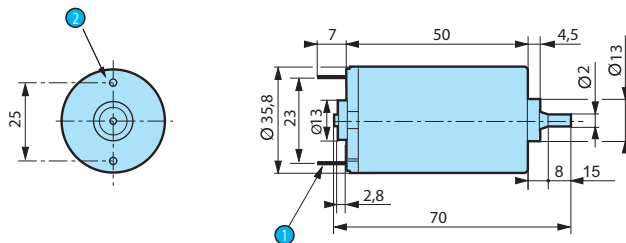


Curve: torque/current 827300



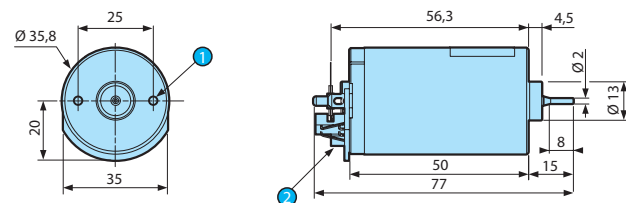
Dimensions

82730001 - 82730002



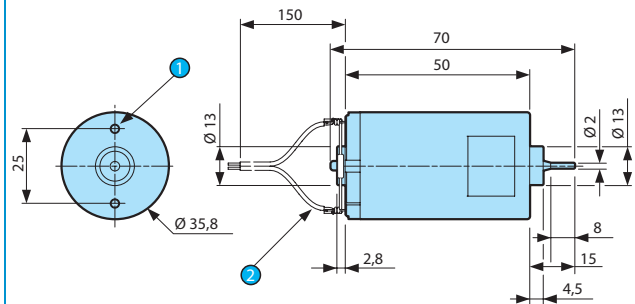
- 1 2 solder tags 4.75 x 0.5 mm
- 2 2 holes M3; screw depth max. 3 mm

With encoder



- 1 2 holes M3 depth 3 max.
- 2 Molex connector 87 438 - 0532

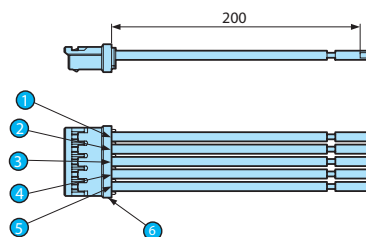
With EMC filter 82730003 - 82730004



- 1 2 solder tags 4.75 x 0.5 mm
- 2 2 holes M3; screw depth max. 3 mm

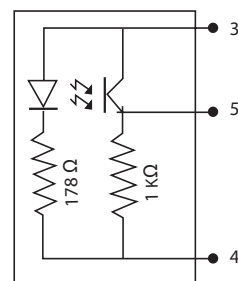
Connections

Accessory 79260417



- 1 Motor (+) → red
- 2 Motor (-) → blue
- 3 +5 V_{DC} encoder power supply → white
- 4 0 V_{DC} encoder power supply → blue
- 5 Encoder output signal → grey
- 6 Molex connector 87439 - 0500

Internal encoder diagram



DC direct-drive brushed motors

→ Ø 36 mm 16 Watts

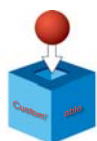
- Long service life
- With varistor EMC filtering
- Optional class B interference suppression
- Optional encoder with class B interference suppression



Part numbers

| | 16 W | 16 W |
|------------------------------------|-----------------|-----------------|
| Type | 827400 | 827400 |
| Voltage | 12 V | 24 V |
| References | | |
| Without option | 82740001 | 82740002 |
| With class B EMC filter (radiated) | 82740003 | 82740004 |
| With 1 pulse/revolution encoder | 82740007 | 82740008 |
| With 5 pulses/revolution encoder | 82740009 | 82740010 |
| With 12 pulses/revolution encoder | 82740011 | 82740012 |
| With 48 pulses/revolution encoder | 82740005 | 82740006 |
| No-load characteristics | | |
| Speed of rotation (rpm) | 3900 | 3900 |
| Absorbed power (W) | 1.9 | 1.9 |
| Absorbed current (A) | 0.16 | 0.08 |
| Nominal characteristics | | |
| Speed (rpm) | 3000 | 3000 |
| Torque (mNm) | 35 | 35 |
| Usable power (W) | 11 | 11 |
| Absorbed power (W) | 16.8 | 16.8 |
| Absorbed current (A) | 1.4 | 0.7 |
| Gearbox case temperature rise (°C) | 27 | 27 |
| Efficiency (%) | 65 | 65 |
| General characteristics | | |
| Coil wire insulation class | H | H |
| Protection rating | IP 20 | IP 20 |
| Max. output power (W) | 15.8 | 15.8 |
| Start torque (mNm) | 155 | 155 |
| Starting current (A) | 5.5 | 2.75 |
| Resistance (Ω) | 2 | 8.73 |
| Inductance (mH) | 2 | 9.6 |
| Torque constant (Nm/A) | 0.029 | 0.058 |
| Electrical time constant (ms) | 0.9 | 1.1 |
| Mechanical time constant (ms) | 12.2 | 11.1 |
| Thermal time constant (mn) | 6.5 | 6.5 |
| Inertia (g.cm ²) | 45 | 45 |
| Weight (g) | 200 | 200 |
| Number of segments | 5 | 5 |
| Service life (h) | 3000 | 3000 |
| Sintered bronze bearings | ✓ | ✓ |
| Encoder characteristics | | |
| Connection via connector | ✓ | ✓ |
| Output current (mA) | < 20 | < 20 |
| Supply (V) | 5 | 5 |

Product adaptations



- Encoder with different number of pulses per revolution
- Push-fit pinion
- Additional connectors

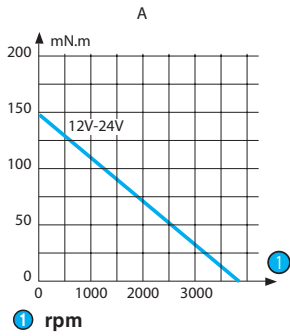
Stocked product

Product made to order

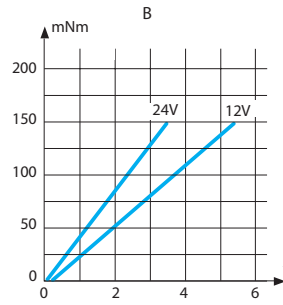
To order, see page 18

Curves

Curve: torque/speed 827400

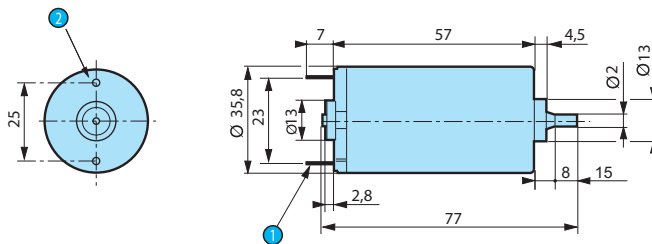


Curve: torque/current 827400



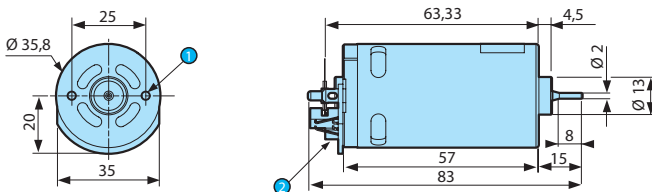
Dimensions

82740001 - 82740002



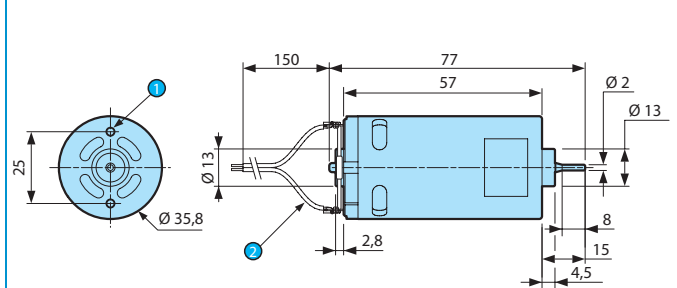
- 1 2 solder tags 4.75 x 0.5 mm
- 2 2 holes M3: screw depth max. 3 mm

With encoder



- 1 2 holes M3 depth 3 max.
- 2 Molex connector 87438 - 0532

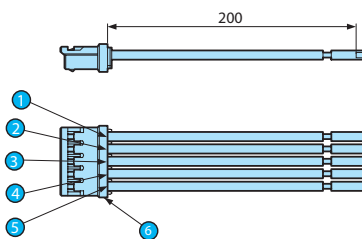
With EMC filter 82740003 - 82740004



- 1 2 holes M3 depth 3 max.
- 2 AWG 24 leads

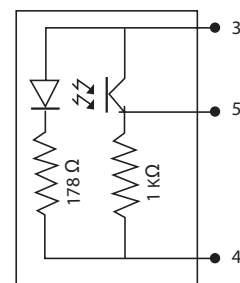
Connections

Accessory 79260417



- 1 Motor (+) → red
- 2 Motor (-) → blue
- 3 +5 V_{DC} encoder power supply → white
- 4 0 V_{DC} encoder power supply → blue
- 5 Encoder output signal → grey
- 6 Molex connector 87439 - 0500

Internal encoder diagram



DC direct-drive brushed motors

→ Ø 36 mm 30 Watts

- Nominal power 20 W
- Long service life
- High power
- With varistor EMC filtering



Part numbers

| | |
|---------------------|-----------------|
| Type | 827404 |
| Voltage | 24 V |
| Part numbers | 82740402 |

No-load characteristics

| | |
|-------------------------|------|
| Speed of rotation (rpm) | 5800 |
| Absorbed power (W) | 2.6 |
| Absorbed current (A) | 0.11 |

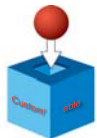
Nominal characteristics

| | |
|------------------------------------|------|
| Speed (rpm) | 4800 |
| Torque (mNm) | 40 |
| Usable power (W) | 20 |
| Absorbed power (W) | 26 |
| Absorbed current (A) | 1.1 |
| Gearbox case temperature rise (°C) | 40 |
| Efficiency (%) | 77 |

General characteristics

| | |
|-------------------------------|-------|
| Coil wire insulation class | H |
| Protection rating | IP 20 |
| Max. output power (W) | 30 |
| Start torque (mNm) | 200 |
| Starting current (A) | 5.7 |
| Resistance (Ω) | 4.2 |
| Inductance (mH) | 5.2 |
| Torque constant (Nm/A) | 0.035 |
| Electrical time constant (ms) | 1.24 |
| Mechanical time constant (ms) | 19.24 |
| Thermal time constant (mn) | 15.5 |
| Inertia (g.cm ²) | 45 |
| Weight (g) | 200 |
| Number of segments | 5 |
| Service life (h) | 2000 |
| Sintered bronze bearings | ✓ |

Product adaptations



- Encoder between 1 and 48 pulses/revolution
- Push-fit pinion
- Additional connectors

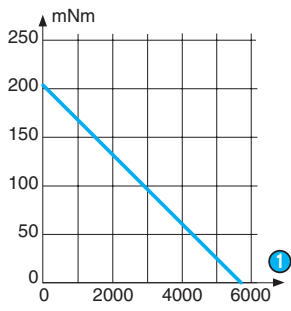
Stocked product

Product made to order

To order, see page 18

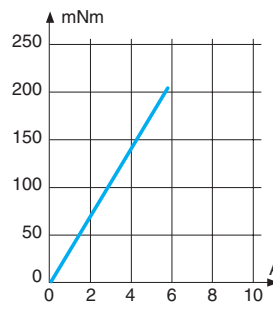
Curves

Curve: torque/speed 827404



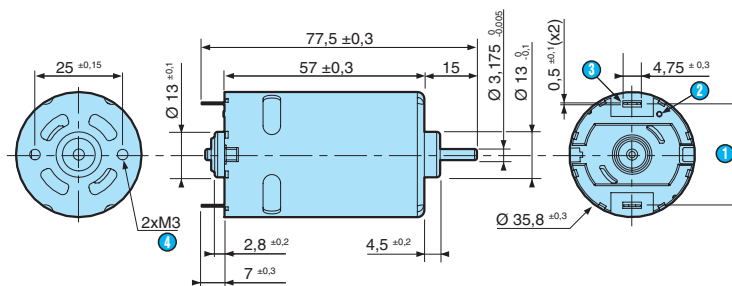
① rpm

Curve: torque/current 827404



Dimensions

827404



- ① 29 REF
- ② Red dot
- ③ Tag
- ④ 2 x M3, depth 3 max.

DC direct-drive brushed motors

→ Ø 42 mm 10 and 17 Watts

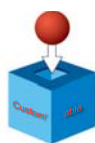
- Usable power: 9 to 16 W
- For low-speed drive applications
- Sintered bronze bearings lubricated for life
- Power supply by 4.75 mm tags
- Interchangeable brushes
- Optional one-channel encoder



Part numbers

| | 10 W | 10 W | 17 W | 17 W |
|---|-----------------|-----------------|-----------------|-----------------|
| Type | 828100 | 828100 | 828000 | 828000 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| References | | | | |
| Without encoder | 82810017 | 82810018 | 82800036 | 82800037 |
| With 1 pulse/revolution encoder | 82810024 | 82810025 | 82800039 | 82800040 |
| No-load characteristics | | | | |
| Speed of rotation (rpm) | 2850 | 2780 | 2960 | 2750 |
| Absorbed power (W) | 4.8 | 4.3 | 4.8 | 4.3 |
| Absorbed current (A) | 0.4 | 0.18 | 0.4 | 0.18 |
| Nominal characteristics | | | | |
| Speed (rpm) | 2000 | 2000 | 2000 | 2000 |
| Torque (mNm) | 45 | 41.5 | 75 | 75 |
| Usable power (W) | 9.4 | 8.7 | 15.7 | 15.6 |
| Absorbed power (W) | 20.4 | 15.6 | 30 | 26.4 |
| Absorbed current (A) | 1.7 | 0.65 | 2.5 | 1.1 |
| Gearbox case temperature rise (°C) | 45 | 46 | 44 | 40 |
| Efficiency (%) | 46 | 55.7 | 52 | 59 |
| General characteristics | | | | |
| Insulation class (conforming to IEC 85) | F (155 °C) | F (155 °C) | F (155 °C) | F (155 °C) |
| Protection (IEC 529) | IP20 | IP20 | IP20 | IP20 |
| Max. output power (W) | 10.3 | 9.5 | 16.3 | 17 |
| Start torque (mNm) | 127 | 117 | 185 | 210 |
| Starting current (A) | 4 | 1.7 | 5.8 | 2.7 |
| Resistance (Ω) | 3.1 | 14.6 | 2 | 7.7 |
| Inductance (mH) | 2.5 | 10.7 | 1.8 | 6.9 |
| Torque constant (Nm/A) | 0.035 | 0.077 | 0.0342 | 0.0724 |
| Electrical time constant (ms) | 0.8 | 0.73 | 0.89 | 0.89 |
| Mechanical time constant (ms) | 19 | 17 | 18 | 16 |
| Thermal time constant (mn) | 10 | 10 | 12 | 12 |
| Inertia (g.cm ²) | 80 | 72 | 105 | 110 |
| Weight (g) | 310 | 310 | 400 | 400 |
| Number of segments | 8 | 8 | 8 | 8 |
| Service life (h) | 3000 | 3000 | 3000 | 3000 |
| Sintered bronze bearings | ✓ | ✓ | ✓ | ✓ |
| Replaceable brushes | ✓ | ✓ | ✓ | ✓ |
| Encoder characteristics | | | | |
| Output current (mA) | < 25 (25°C) | < 25 (25°C) | < 25 (25°C) | < 25 (25°C) |
| Supply (V) | 4.5 → 30 --- | 4.5 → 30 --- | 4.5 → 30 --- | 4.5 → 30 --- |
| Ambient temperature (°C) | -40 → 85°C | -40 → 85°C | -40 → 85°C | -40 → 85°C |

Product adaptations



- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special ball bearings
- Special mounting plate
- Special connections
- Encoder: 5, 200, 500 or 1000 pulses/revolution

Stocked product

Product made to order

To order, see page 18

Curves

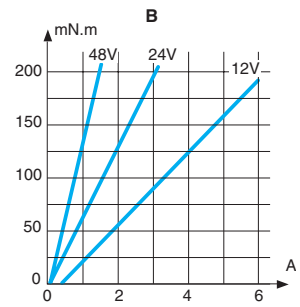
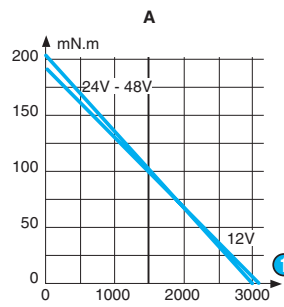
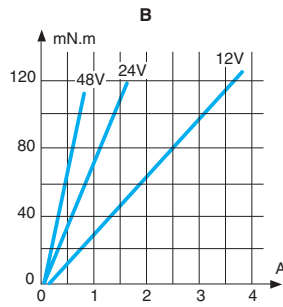
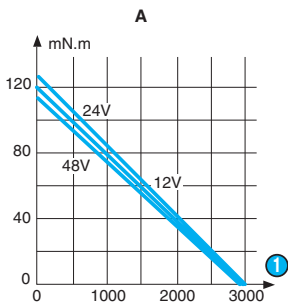
A - Torque/speed curve, B - Torque/current curve

828100

828100

828000

828000

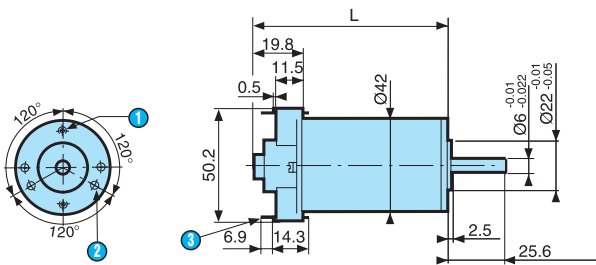


① rpm

① rpm

Dimensions

828000 - 828100

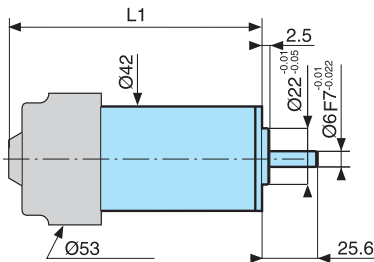


- ① 2 x M3 at 180°, depth 5 mm over Ø 32
- ② 2 holes Ø 2.75 ± 0.05 at 120° depth 5 mm Ø 32
- ③ 2 tags IEC 760, series 4.8 x 0.5

L: 828000: 84.8 mm max.
L: 828100: 69.8 mm max.

Options

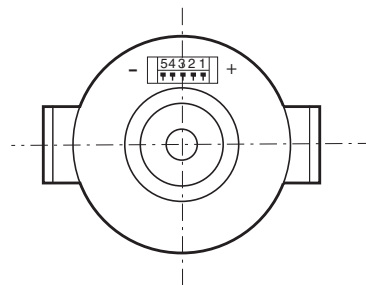
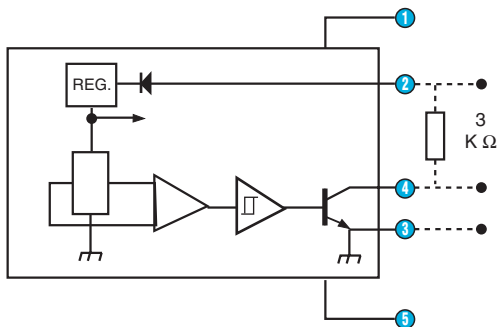
Dimensions with magnetic encoder



L1: 828000: 99.1 mm max. - L1: 828100: 84.1 mm max.

Connections

Encoder



Connector: STOCKO MKS 3735-6-0-505

- ① Motor power supply
- ② +5 → +24 V \equiv (encoder power supply)
- ③ 0 V \equiv (encoder power supply)
- ④ Encoder signal output
- ⑤ Motor power supply

Part number of female connector to be used: STOCKO MKF 17-230 / 260 / 330 / 360

DC direct-drive brushed motors

→ Ø 42 mm 14 to 31 Watts

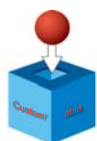
- Usable power: 12 to 22 Watts
- For high-power drive applications
- Sintered bronze bearings lubricated for life
- Power supply by 4.75 mm tags
- Interchangeable brushes
- Optional channel encoder



Part numbers

| | 14 W | 16 W | 22 W | 31 W |
|---|-----------------|-----------------|-----------------|-----------------|
| Type | 828105 | 828105 | 828005 | 828005 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| References | | | | |
| Without encoder | 82810501 | 82810502 | 82800501 | 82800502 |
| With 1 pulse/revolution encoder | 82810504 | 82810505 | 82800504 | 82800505 |
| No-load characteristics | | | | |
| Speed of rotation (rpm) | 3840 | 3860 | 3920 | 4010 |
| Absorbed power (W) | 12 | 11.28 | 9.96 | 12.24 |
| Absorbed current (A) | 1 | 0.47 | 0.83 | 0.51 |
| Nominal characteristics | | | | |
| Speed (rpm) | 2580 | 2750 | 2670 | 3070 |
| Torque (mNm) | 45 | 45 | 70 | 70 |
| Usable power (W) | 12 | 13 | 20 | 22 |
| Absorbed power (W) | 31 | 32 | 37 | 41 |
| Absorbed current (A) | 2.6 | 1.32 | 3.05 | 1.71 |
| Gearbox case temperature rise (°C) | 32 | 33 | 38 | 40 |
| Efficiency (%) | 39 | 40.8 | 54 | 54 |
| General characteristics | | | | |
| Insulation class (conforming to IEC 85) | F (155 °C) | F (155 °C) | F (155 °C) | F (155 °C) |
| Protection (IEC 529) | IP20 | IP20 | IP20 | IP20 |
| Max. output power (W) | 14 | 16 | 22 | 31 |
| Start torque (mNm) | 138 | 156 | 219 | 298 |
| Starting current (A) | 6.2 | 3.4 | 9 | 6.16 |
| Resistance (Ω) | 1.94 | 7.06 | 1.33 | 3.9 |
| Inductance (mH) | 4.45 | 16.94 | 2.67 | 9.35 |
| Torque constant (Nm/A) | 0.0265 | 0.0532 | 0.0268 | 0.0527 |
| Electrical time constant (ms) | 2.3 | 2.4 | 2 | 2.4 |
| Mechanical time constant (ms) | 26 | 23 | 20 | 15 |
| Thermal time constant (mn) | 8 | 8 | 12 | 12 |
| Inertia (g.cm ²) | 80 | 72 | 105 | 110 |
| Weight (g) | 310 | 310 | 400 | 400 |
| Number of segments | 8 | 8 | 8 | 8 |
| Service life (h) | 2000 | 2000 | 2000 | 2000 |
| Sintered bronze bearings | ✓ | ✓ | ✓ | ✓ |
| Replaceable brushes | ✓ | ✓ | ✓ | ✓ |
| Encoder characteristics | | | | |
| Output current (mA) | < 25 (25°C) | < 25 (25°C) | < 25 (25°C) | < 25 (25°C) |
| Supply (V) | 4.5 → 30 --- | 4.5 → 30 --- | 4.5 → 30 --- | 4.5 → 30 --- |
| Ambient temperature (°C) | -40 → 85°C | -40 → 85°C | -40 → 85°C | -40 → 85°C |

Product adaptations



- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special ball bearings
- Optical or Hall effect encoder
- Special mounting plate
- Special connections

Stocked product

Product made to order

To order, see page 18

Curves

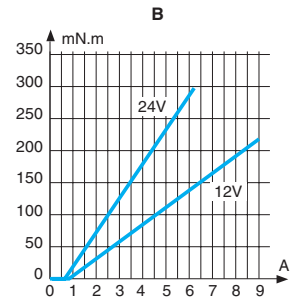
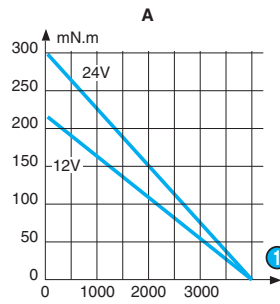
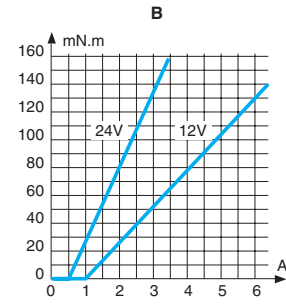
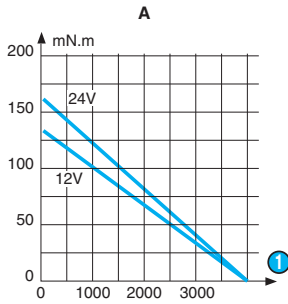
A - Torque/speed curve, B - Torque/current curve

828105

828105

828005

828005

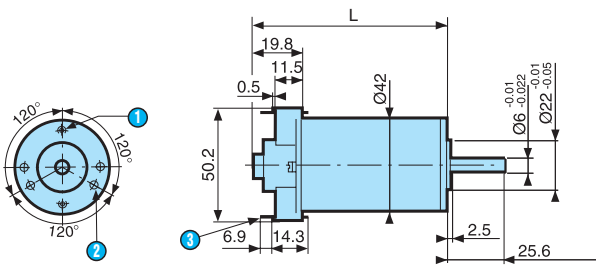


① rpm

① rpm

Dimensions

828005 - 828105

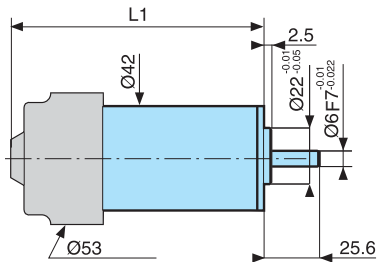


- ① 2 x M3 at 180°, depth 5 mm over Ø 32
- ② 2 holes Ø 2.75 at 120° depth 5 mm over Ø 32
- ③ 2 tags IEC 760, series 4.8 x 0.5

L: 828005: 84.8 mm max.
L: 828105: 59.8 mm max.

Options

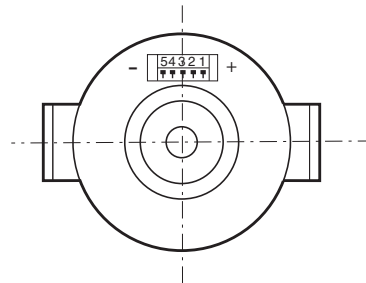
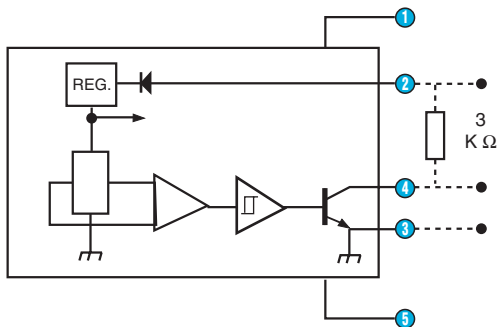
Dimensions with magnetic encoder



L1: 828005: 99.1 mm max. - L1: 828105: 84.1 mm max.

Connections

Encoder



Connector: STOCKO MKS 3735-6-0-505

- ① Motor power supply
- ② +5 → +24 V (encoder power supply)
- ③ 0 V (encoder power supply)
- ④ Encoder signal output
- ⑤ Motor power supply

Part number of female connector to be used: STOCKO MKF 17-230 / 260 / 330 / 360

DC direct-drive brushed motors

→ Ø 42 mm 22 to 52 Watts

- Usable power: 20 to 50 W
- For high-power drive applications
- Sintered bronze bearings lubricated for life
- Power supply via 2 output leads
- Optional 1 or 2-channel encoder
- Optional EMC filter



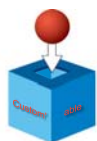
Part numbers

| | 22 W | 31 W | 42 W | 52 W |
|---|--------------|--------------|--------------|--------------|
| Type | 828008 | 828008 | 828500 | 828500 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| References | | | | |
| Without encoder | 82800801 | 82800802 | 82850001 | 82850002 |
| With 1 pulse/revolution 2-channel encoder | 82800867 | 82800868 | - | - |
| With 5 pulses/revolution 2-channel encoder | 82800869 | 82800870 | - | - |
| With 12 pulses/revolution 2-channel encoder | 82800871 | 82800872 | 82850011 | 82850012 |
| No-load characteristics | | | | |
| Speed of rotation (rpm) | 3920 | 4010 | 4150 | 4050 |
| Absorbed power (W) | 9.96 | 12.24 | 7.32 | 7.44 |
| Absorbed current (A) | 0.83 | 0.51 | 0.61 | 0.31 |
| Nominal characteristics | | | | |
| Speed (rpm) | 2670 | 3070 | 3100 | 3200 |
| Torque (mNm) | 70 | 70 | 100 | 100 |
| Usable power (W) | 20 | 22 | 32.5 | 33.5 |
| Absorbed power (W) | 37 | 41 | 51 | 52 |
| Absorbed current (A) | 3.05 | 1.71 | 4.25 | 2.15 |
| Gearbox case temperature rise (°C) | 38 | 40 | 63 | 54 |
| Efficiency (%) | 54 | 54 | 63 | 64 |
| General characteristics | | | | |
| Insulation class (conforming to IEC 85) | F (155 °C) | F (155 °C) | F (155 °C) | F (155 °C) |
| Protection (IEC 529) | IP20 | IP20 | IP20 | IP20 |
| Max. output power (W) | 22 | 31 | 42 | 52 |
| Start torque (mNm) | 219 | 298 | 390 | 490 |
| Starting current (A) | 9 | 6.16 | 14.8 | 9.6 |
| Resistance (Ω) | 1.33 | 3.9 | 0.81 | 2.5 |
| Inductance (mH) | 2.67 | 9.35 | 0.7 | 2.5 |
| Torque constant (Nm/A) | 0.0268 | 0.0527 | 0.027 | 0.052 |
| Electrical time constant (ms) | 2 | 2.4 | 0.85 | 1 |
| Mechanical time constant (ms) | 20 | 15 | 16 | 13 |
| Thermal time constant (mn) | 12 | 12 | 26 | 21 |
| Inertia (g.cm ²) | 105 | 110 | 140 | 140 |
| Weight (g) | 400 | 400 | 640 | 640 |
| Number of segments | 8 | 8 | 8 | 8 |
| Service life (h) | 3000 | 3000 | 3000 | 3000 |
| Sintered bronze bearings | ✓ | ✓ | ✓ | ✓ |
| Wires length (mm) | 200 | 200 | 200 | 200 |
| Encoder characteristics | | | | |
| Current consumption (mA) | 0.5 → 15 | 0.5 → 15 | 0.5 → 15 | 0.5 → 15 |
| Output current (mA) | < 20 (25°C) | < 20 (25°C) | < 20 (25°C) | < 20 (25°C) |
| Supply (V) | 4.5 → 35 --- | 4.5 → 35 --- | 4.5 → 35 --- | 4.5 → 35 --- |
| Ambient temperature (°C) | -25 → +85 | -25 → +85 | -25 → +85 | -25 → +85 |

Accessories

| Connection | Code |
|---|----------|
| Pre-assembled female connector, casing 179228-3, tags 179227-1 and leads AWG24 250 mm | 79209895 |

Product adaptations



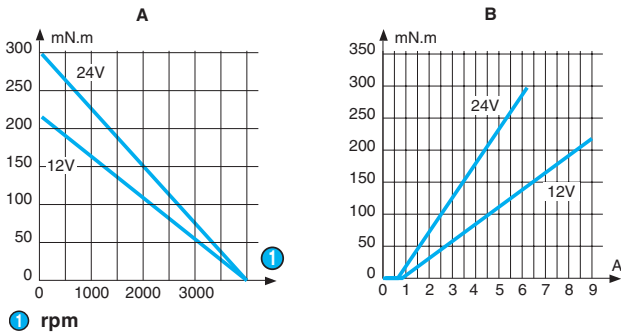
- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special cable length
- Special ball bearings
- Optical or Hall effect encoder - 1 or 2 channels - other resolutions
- Special mounting plate
- Customised electronics
- Special connectors
- EMC filter

Stocked product Product made to order To order, see page 18

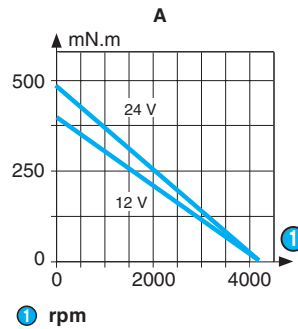


Curves

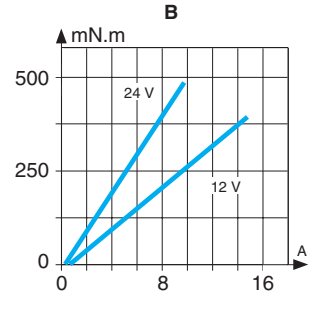
A - Torque/speed curve, B - Torque/current curve
828008



828500

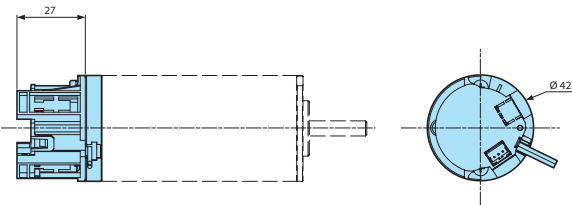


828500

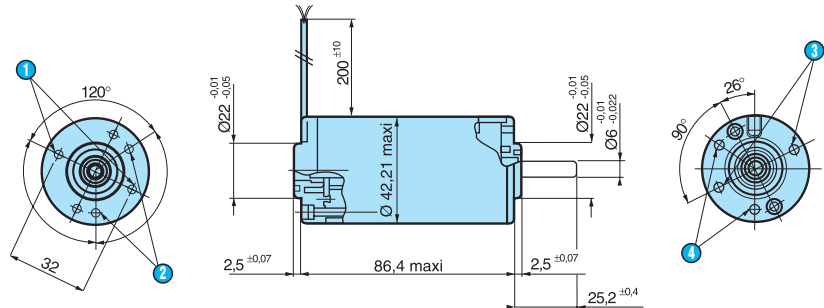


Dimensions

Encoder on types 828008 - 828500

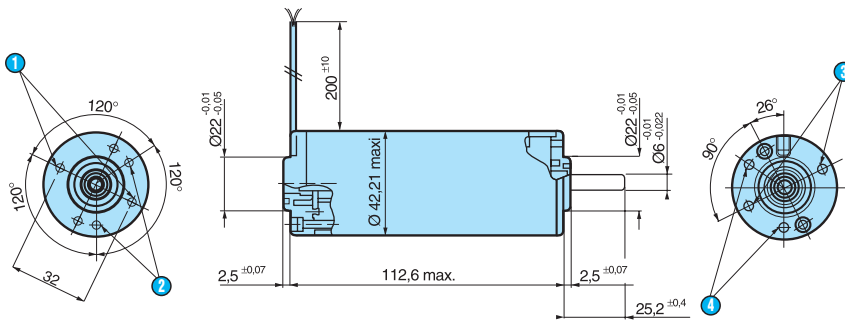


828008 without encoder



- ① 2 holes M3 x 0.5 at 180° depth 5 over Ø 32
- ② 2 holes 2.75 ± 0.05 at 120° depth 5 over Ø 32
- ③ 2 holes M3 x 0.5 at 180° depth 5.5 over Ø 32
- ④ 2 holes M3 x 0.5 at 120° depth 5.5 over Ø 32

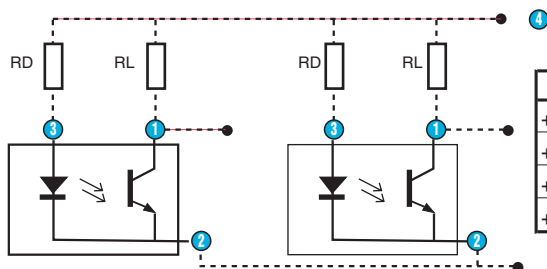
828500 without encoder



- ① 2 holes M3 x 0.5 at 180° depth 5 over Ø 32
- ② 2 holes 2.75 ± 0.05 at 120° depth 5 over Ø 32
- ③ 2 holes M3 x 0.5 at 180° depth 5.5 over Ø 32
- ④ 2 holes M3 x 0.5 at 120° depth 5.5 over Ø 32

Connections

Encoder



| V DC | RD | RL |
|--------|---------------|----------------|
| + 5 V | 190 Ω - 1/4 W | 1,5 KΩ - 1/4 W |
| + 12 V | 560 Ω - 1/2 W | 3,9 KΩ - 1/4 W |
| + 24 V | 1200 Ω - 1 W | 8,2 KΩ - 1/4 W |
| + 30 V | 1500 Ω - 1 W | 10 KΩ - 1/4 W |

- ① Signal output
- ② 0 V --- (encoder power supply earth)
- ③ Emitting diode
- ④ Power supply V ---

DC direct-drive brushed motors

→ Ø 63 mm 33 and 67 Watts

- Long service life
- Usable power: 27 to 50 W
- For low-speed, high-power drive applications
- With 2 ball bearings
- Power supply via 2 output leads



Part numbers

| | 33 W | 33 W | 67 W | 67 W |
|---|-----------------|-----------------|-----------------|-----------------|
| Type | 828300 | 828300 | 828305 | 828305 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| References | | | | |
| Without encoder | 82830009 | 82830010 | 82830501 | 82830502 |
| With 1 pulse/revolution 2-channel encoder | 82830046 | 82830047 | - | - |
| With 5 pulses/revolution 2-channel encoder | 82830048 | 82830049 | - | - |
| With 12 pulses/revolution 2-channel encoder | 82830050 | 82830051 | - | - |
| No-load characteristics | | | | |
| Speed of rotation (rpm) | 2100 | 2100 | 3400 | 3660 |
| Absorbed power (W) | 4.8 | 4.8 | 12.6 | 12 |
| Absorbed current (A) | 0.4 | 0.2 | 1.05 | 0.5 |
| Nominal characteristics | | | | |
| Speed (rpm) | 1500 | 1500 | 2630 | 2770 |
| Torque (mNm) | 172 | 172 | 170 | 170 |
| Usable power (W) | 27 | 27 | 47 | 50 |
| Absorbed power (W) | 43 | 45 | 72 | 72 |
| Absorbed current (A) | 3.6 | 1.9 | 6 | 3 |
| Gearbox case temperature rise (°C) | 50 | 50 | 46 | 50 |
| Efficiency (%) | 62 | 60 | 65 | 69.4 |
| General characteristics | | | | |
| Insulation class (conforming to IEC 85) | F (155 °C) | F (155 °C) | F (155 °C) | F (155 °C) |
| Protection (IEC 529) | IP20 | IP20 | IP20 | IP20 |
| Max. output power (W) | 33 | 33 | 67 | 67 |
| Start torque (mNm) | 600 | 600 | 750 | 700 |
| Starting current (A) | 12 | 6.2 | 23.1 | 11.8 |
| Resistance (Ω) | 1 | 3.9 | 0.52 | 2.03 |
| Inductance (mH) | 1.4 | 6.4 | 1.19 | 4.68 |
| Torque constant (Nm/A) | 0.0517 | 0.1 | 0.034 | 0.0619 |
| Electrical time constant (ms) | 1.4 | 1.64 | 2.3 | 2.3 |
| Mechanical time constant (ms) | 19 | 19 | 33 | 33 |
| Thermal time constant (mn) | 37 | 37 | 20 | 18 |
| Inertia (g.cm ²) | 514 | 492 | 520 | 500 |
| Weight (g) | 840 | 840 | 840 | 840 |
| Number of segments | 12 | 12 | 12 | 12 |
| Service life (h) | 5000 | 5000 | 4000 | 4000 |
| Ball bearings | ✓ | ✓ | ✓ | ✓ |
| Wires length (mm) | 200 | 200 | 200 | 200 |
| Encoder characteristics | | | | |
| Current consumption (mA) | 0.15 → 15 | 0.15 → 15 | 0.5 → 15 | 0.15 → 15 |
| Output current (mA) | < 20 (25°C) | < 20 (25°C) | < 20 (25°C) | < 20 (25°C) |
| Supply (V) | 4.5 → 35 --- | 4.5 → 35 --- | 4.5 → 35 --- | 4.5 → 35 --- |
| Ambient temperature (°C) | -25 → +85 | -25 → +85 | -25 → +85 | -25 → +85 |

Accessories

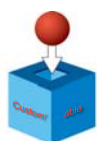
Connection

Pre-assembled female connector, casing 179228-3, tags 179227-1 and leads AWG24 250 mm

Code

79209895

Product adaptations



- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special cable length
- Special ball bearings

- Optical or Hall effect encoder - 1 or 2 channels - other resolutions
- Special mounting plate
- Special connectors
- EMC filter

Stocked product

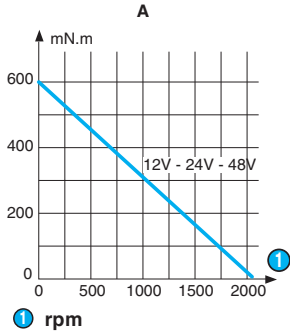
Product made to order

To order, see page 18

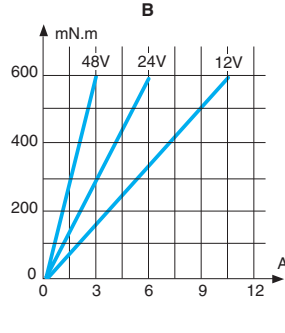
Curves

A - Torque/speed curve
B - Torque/current curve

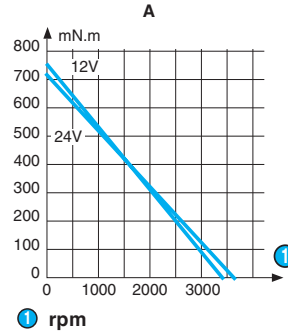
828300



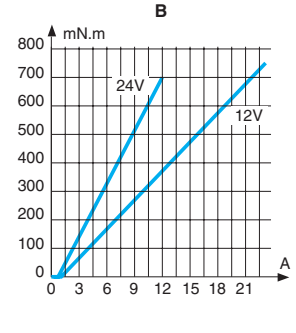
828300



828305

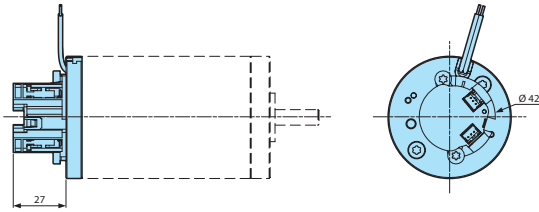


828305

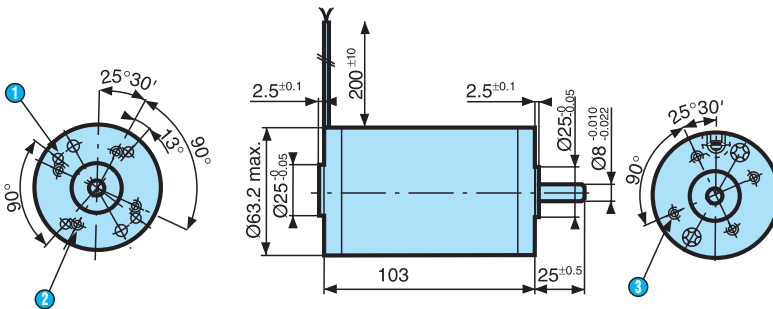


Dimensions

Encoder on types 828300 - 828305



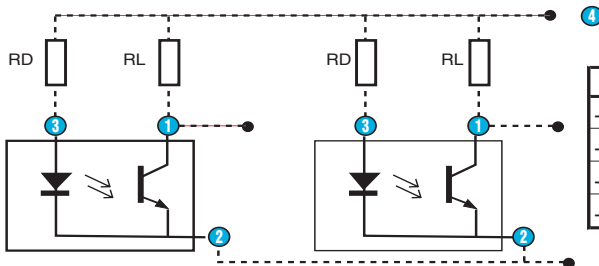
828300 - 828305 without encoder



- ① 4 holes $\text{Ø } 3.65^{+0.05}$ at 90° over $\text{Ø } 48$
- ② 4 holes M5 over $\text{Ø } 40$ mm depth 7 mm
- ③ 4 holes M5 over $\text{Ø } 40$ mm depth 7 mm

Connections

Encoder



| V DC | RD | RL |
|--------|----------------------|------------------------|
| + 5 V | 190 Ω - 1/4 W | 1,5 K Ω - 1/4 W |
| + 12 V | 560 Ω - 1/2 W | 3,9 K Ω - 1/4 W |
| + 24 V | 1200 Ω - 1 W | 8,2 K Ω - 1/4 W |
| + 30 V | 1500 Ω - 1 W | 10 K Ω - 1/4 W |

- ① Signal output
- ② 0 V \equiv (encoder power supply earth)
- ③ Emitting diode
- ④ Power supply V \equiv

DC direct-drive brushed motors

→ Ø 63 mm 194 to 255 Watts

- Long service life
- Nominal power: 90 W
- For high-power drive applications
- Motor with long service life, 2 ball bearings
- Power supply via 2 output leads



Part numbers

| | 194 W | 255 W |
|---|-----------------|-----------------|
| Type | 828900 | 828900 |
| Voltage | 24 V | 48 V |
| References | | |
| Without encoder | 82890001 | 82890002 |
| With 12 pulses/revolution 1-channel encoder | 82890027 | 82890028 |
| With 12 pulses/revolution 2-channel encoder | 82890029 | 82890030 |
| No-load characteristics | | |
| Speed of rotation (rpm) | 3700 | 3750 |
| Absorbed power (W) | 10.8 | 9.6 |
| Absorbed current (A) | 0.45 | 0.2 |
| Nominal characteristics | | |
| Speed (rpm) | 3200 | 3360 |
| Torque (mNm) | 270 | 270 |
| Usable power (W) | 90 | 95 |
| Absorbed power (W) | 120 | 118 |
| Absorbed current (A) | 5.00 | 2.45 |
| Gearbox case temperature rise (°C) | 50 | 50 |
| Efficiency (%) | 75 | 80 |
| General characteristics | | |
| Insulation class (conforming to IEC 85) | F (155 °C) | F (155 °C) |
| Protection (IEC 529) | IP20 | IP20 |
| Max. output power (W) | 194 | 255 |
| Start torque (mNm) | 2000 | 2600 |
| Starting current (A) | 34.1 | 21.7 |
| Resistance (Ω) | 0.7 | 2.2 |
| Inductance (mH) | 1.05 | 4.62 |
| Torque constant (Nm/A) | 0.059 | 0.12 |
| Electrical time constant (ms) | 1.5 | 2.1 |
| Mechanical time constant (ms) | 16 | 12 |
| Thermal time constant (mn) | 41 | 36 |
| Inertia (g.cm ²) | 795 | 795 |
| Weight (g) | 1580 | 1580 |
| Number of segments | 12 | 12 |
| Service life (h) | 5000 | 5000 |
| Ball bearings | ✓ | ✓ |
| Wires length (mm) | 200 | 200 |
| Encoder characteristics | | |
| Current consumption (mA) | 0.5 → 15 | 0.5 → 15 |
| Output current (mA) | < 20 (25°C) | < 20 (25°C) |
| Supply (V) | 4.5 → 35 --- | 4.5 → --- |
| Ambient temperature (°C) | -25 → +85 | -25 → +85 |

Accessories

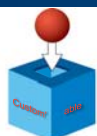
Connection

Pre-assembled female connector, casing 179228-3, tags 179227-1 and leads AWG24 250 mm

Code

79209895

Product adaptations



- Special output shaft
- Pinion on output shaft
- Special supply voltage
- Special cable length
- Special ball bearings

- Optical or Hall effect encoder - 1 or 2 channels - other resolutions
- Special mounting plate
- Special connectors
- EMC filter

Stocked product

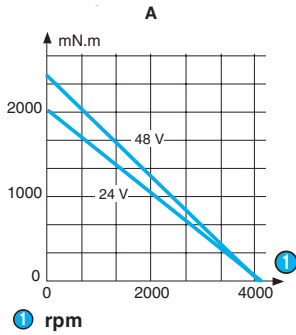
Product made to order

To order, see page 18

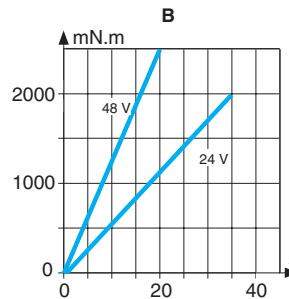
Curves

A - Torque/speed curve
B - Torque/current curve

828900

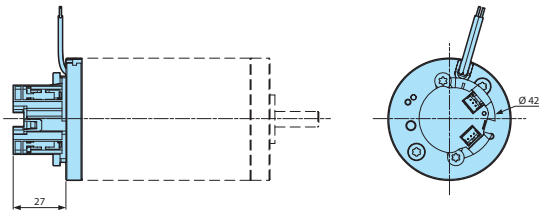


828900

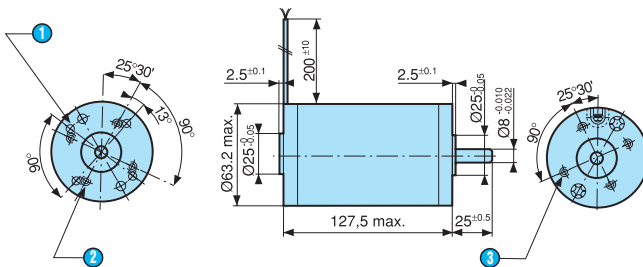


Dimensions

Encoder on type 828900



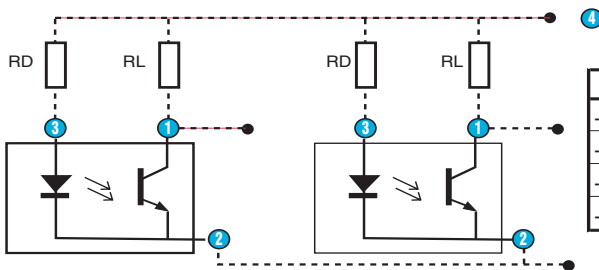
828900 without encoder



- ① 4 holes $\varnothing 3.65 \pm 0.05$ at 90° over $\varnothing 48$
- ② 4 holes M5 over $\varnothing 40$ mm depth 7 mm
- ③ 4 holes M5 over $\varnothing 40$ mm depth 7 mm

Connections

Encoder



| V DC | RD | RL |
|--------|----------------------|------------------------|
| + 5 V | 190 Ω - 1/4 W | 1,5 K Ω - 1/4 W |
| + 12 V | 560 Ω - 1/2 W | 3,9 K Ω - 1/4 W |
| + 24 V | 1200 Ω - 1 W | 8,2 K Ω - 1/4 W |
| + 30 V | 1500 Ω - 1 W | 10 K Ω - 1/4 W |

- ① Signal output
- ② 0 V \equiv (encoder power supply earth)
- ③ Emitting diode
- ④ Power supply V \equiv

D.C. geared motors with brushes

→ 0.5 Nm RPT5 1.4 and 3.2 Watts

- Gearbox 0.5 Nm
- Motor power max. 3.2 W
- Class A EMC interference suppression (radiated)
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional 1, 5, 12 or 48 pulses/rev encoder

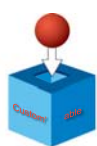


Part numbers

| | | 1.4 W | 1.4 W | 3.2 W | 3.2 W |
|--------------------|------------|----------|----------|----------|----------|
| Type | | 827120 | 827120 | 827220 | 827220 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 696 | 4.8 | 82712001 | 82712007 | 82722001 | 82722007 |
| 342 | 9.76 | 82712002 | 82712008 | 82722002 | 82722008 |
| 222 | 15 | 82712003 | 82712009 | 82722003 | 82722009 |
| 109 | 30.5 | 82712004 | 82712010 | 82722004 | 82722010 |
| 71 | 47 | 82712005 | 82712011 | 82722005 | 82722011 |
| 35 | 95 | 82712006 | 82712012 | 82722006 | 82722012 |

| General characteristics | | | | | |
|--|--|----------|----------|----------|----------|
| Motor | | 82710001 | 82710002 | 82720001 | 82720002 |
| Gearbox | | 810220 | 810220 | 810220 | 810220 |
| Maximum permitted torque from gearmotor under continuous conditions (for 0.5 million turns) (Nm) | | 0.5 | 0.5 | 0.5 | 0.5 |
| Axial load static (daN) | | 1 | 1 | 1 | 1 |
| Radial load static (daN) | | 4 | 4 | 4 | 4 |
| Max. output power (W) | | 1.4 | 1.4 | 3.2 | 3.2 |
| Nominal output (W) | | 1 | 1 | 2.6 | 2.6 |
| Gearbox case temperature rise (°C) | | 40 | 40 | 40 | 40 |
| Weight (g) | | 80 | 80 | 100 | 100 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special adaptor plate
- Class B EMC filter
- Greasing at low temperature
- 1 to 48 pulses/revolution encoder

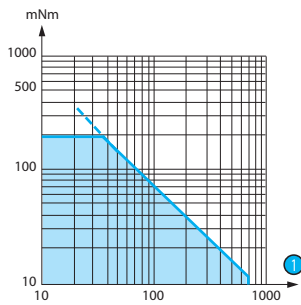
Stocked product

Product made to order

To order, see page 18

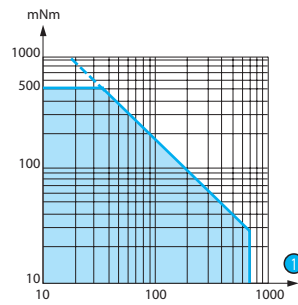
Curves

Curve: torque/nominal speed
827120



① rpm

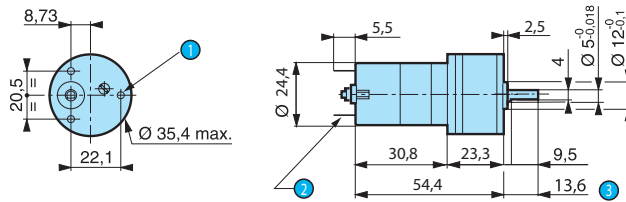
Curve: torque/nominal speed
827220



① rpm

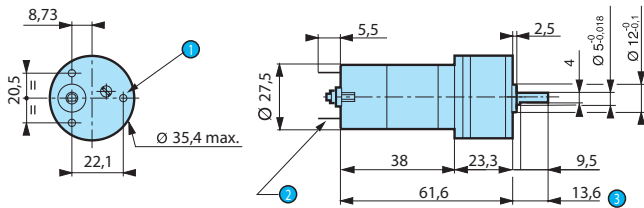
Dimensions

827120



- ① 3 fixing holes M3
- ② 2 solder tags 2.8 x 0.5 mm
- ③ Shaft pushed-in

827220



- ① 3 fixing holes M3
- ② 2 solder tags 2.8 x 0.5 mm
- ③ Shaft pushed-in

D.C. geared motors with brushes

→ 0.5 Nm RPT5 3.9 Watts

- Torque rating of gearbox: 0.5 Nm, sintered metal gears
- Motors: nominal power 3 W, interference suppression for standard stocked products
- Speed range: 1 to 895 rpm
- Optional encoder built into the motor



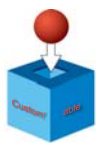
Part numbers

| | | 3.9 W | 3.9 W |
|---------------------------|-------------------|-----------------|-----------------|
| Type | | 828620/2 | 828620/2 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 895 | 4.8 | ● | ● |
| 440 | 9.76 | 82862001 | 82862004 |
| 285 | 15 | ● | ● |
| 140 | 30.5 | 82862002 | 82862005 |
| 90 | 47 | ● | ● |
| 45 | 95.4 | 82862003 | 82862006 |
| 30 | 146.7 | ● | ● |
| 14 | 298 | 82862201 | 82862204 |
| 9 | 458.8 | ● | ● |
| 4.6 | 931 | 82862202 | 82862205 |
| 3 | 1432.8 | ● | ● |
| 1.5 | 2910 | 82862203 | 82862206 |

General characteristics

| Motor | 828600 | 828600 |
|--|-----------------|-----------------|
| Gearbox | 810120 / 810122 | 810120 / 810122 |
| Maximum permitted torque from gearmotor under continuous conditions (for 1 million turns) (Nm) | 0.5 | 0.5 |
| Axial load static (daN) | 1 | 1 |
| Radial load static (daN) | 8 | 8 |
| Max. output power (W) | 3.9 | 3.9 |
| Nominal output (W) | 3 | 3 |
| Gearbox case temperature rise (°C) | 50 | 50 |
| Weight (g) | 160 / 170 | 160 / 170 |

Product adaptations



- Special supply voltage
- Lead output
- 1 or 5 pulse Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for pinion
- Special ball bearings
- Special adaptor plate
- EMC filter
- With shorter 1 W motor

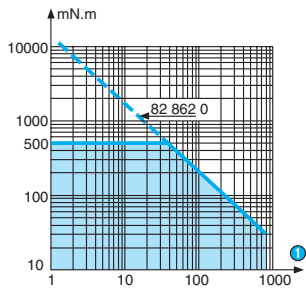
Stocked product

Product made to order

To order, see page 18

Curves

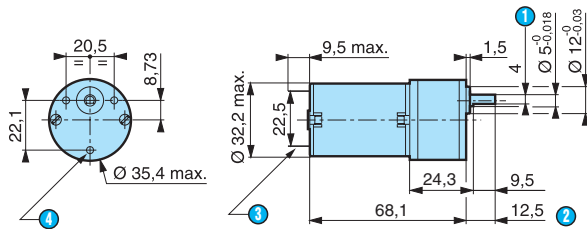
Curve: torque/nominal speed



① rpm

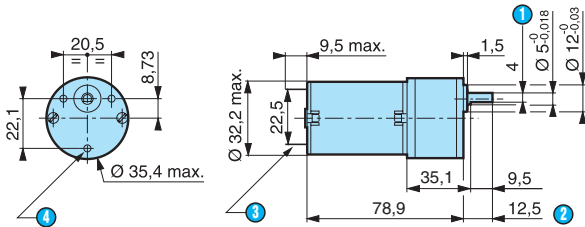
Dimensions

828620



- ① 4 across flats
- ② Shaft pushed-in
- ③ 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ④ 3 holes M3 depth 4.5 mm

828622



- ① 4 across flats
- ② Shaft pushed-in
- ③ 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ④ 3 holes M3 depth 4.5 mm

D.C. geared motors with brushes

→ 0.5 Nm ovoid 1.4 and 3.2 Watts

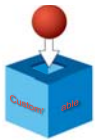
- Gearbox 0.5 Nm
- Motor power max. 3.2 W
- Class A EMC interference suppression (radiated)
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional 1, 5, 12 or 48 pulses/rev encoder



Part numbers

| | | 1.4 W | 1.4 W | 3.2 W | 3.2 W |
|--|-------------------|----------|----------|----------|----------|
| Type | | 827140 | 827140 | 827240 | 827240 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 469 | 15/2 | ● | ● | ● | ● |
| 422 | 25/3 | ● | ● | 82724001 | 82724009 |
| 293 | 12 | ● | ● | 82724002 | 82724010 |
| 235 | 15 | 82714001 | 82714008 | ● | ● |
| 196 | 18 | ● | ● | 82724003 | 82724011 |
| 186 | 45/2 | 82714002 | 82714009 | 82724004 | 82724012 |
| 117 | 30 | 82714003 | 82714010 | 82724005 | 82724013 |
| 78 | 45 | 82714004 | 82714011 | 82724006 | 82724014 |
| 63 | 225/4 | 82714005 | 82714012 | 82724007 | 82724015 |
| 40 | 250/3 | 82714006 | 82714013 | 82724008 | 82724016 |
| 31 | 120 | 82714007 | 82714014 | ● | ● |
| 21 | 200 | - | - | ● | ● |
| 12 | 375 | - | - | ● | ● |
| General characteristics | | | | | |
| Motor | | 82710001 | 82710002 | 82720001 | 82720002 |
| Gearbox | | 810210 | 810210 | 810210 | 810210 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 0.5 | 0.5 | 0.5 | 0.5 |
| Axial load static (daN) | | 1 | 1 | 1 | 1 |
| Radial load static (daN) | | 8 | 8 | 8 | 8 |
| Max. output power (W) | | 1.4 | 1.4 | 3.2 | 3.2 |
| Nominal output (W) | | 1 | 1 | 2.6 | 2.6 |
| Gearbox case temperature rise (°C) | | 40 | 40 | 40 | 40 |
| Weight (g) | | 120 | 120 | 140 | 140 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- Class B EMC filter
- Friction
- Y system
- Greasing at low temperature
- Different number of pulses

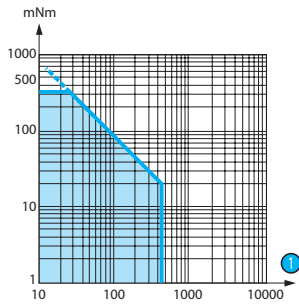
Stocked product

Product made to order

To order, see page 18

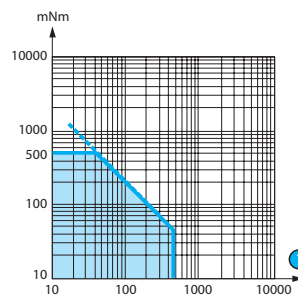
Curves

Curve: torque/nominal speed 827140



① rpm

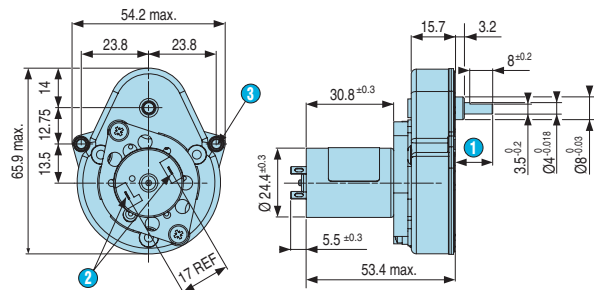
Curve: torque/nominal speed 827240



① rpm

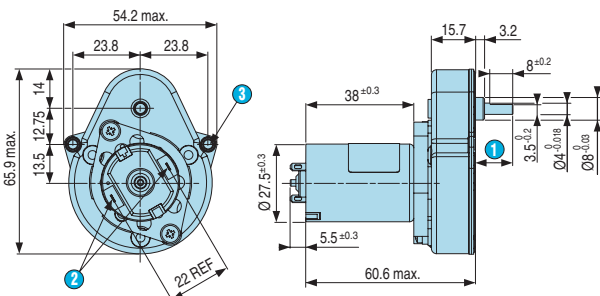
Dimensions

827140



- ① 13.2 mm max. shaft pushed-in
- ② 2 solder tags 2.8 x 0.5 mm
- ③ 2 fixing holes Ø 3.2 mm

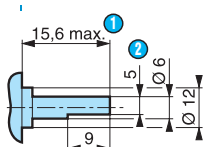
827240



- ① 13.2 mm max. shaft pushed-in
- ② 2 solder tags 2.8 x 0.5 mm
- ③ 2 fixing holes Ø 3.2 mm

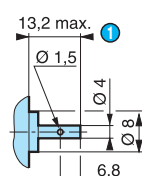
Options

Shaft 70999421 SP1295.10



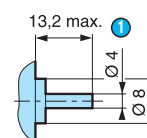
- ① Shaft pushed-in
- ② 5 cross flats

Shaft 79200779



- ① Shaft pushed-in

Shaft 79200967



- ① Shaft pushed-in

D.C. geared motors with brushes

→ 0.5 Nm ovoid 3.9 Watts

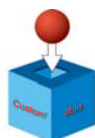
- Torque rating of gearboxes: 0.5 Nm, high-performance plastic gears
- Motors: nominal power 3 W, interference suppression for standard stocked products
- Wide speed range: 0.3 to 430 rpm
- Optional encoder built into the motor



Part numbers

| | | 3.9 W | 3.9 W |
|--|-------------------|----------|----------|
| Type | | 828610 | 828610 |
| Voltage | | 12 V | 24 V |
| Standard speed (rpm) | | 4300 | 4300 |
| Output speed (rpm) | Ratios (i) | | |
| 430 | 10 | 82861006 | 82861015 |
| 215 | 20 | 82861007 | 82861016 |
| 179 | 24 | ● | ● |
| 143 | 30 | 82861008 | 82861017 |
| 108 | 40 | 82861009 | 82861018 |
| 90 | 48 | ● | ● |
| 54 | 80 | 82861010 | 82861019 |
| 49 | 90 | ● | ● |
| 29 | 150 | ● | ● |
| 22 | 200 | 82861011 | 82861020 |
| 11 | 375 | 82861012 | 82861021 |
| 8.6 | 500 | 82861013 | 82861022 |
| 5.8 | 750 | ● | ● |
| 3.6 | 1200 | 82861014 | 82861023 |
| 1.8 | 2400 | ● | ● |
| 0.80 | 5400 | ● | ● |
| 0.36 | 12000 | ● | ● |
| General characteristics | | | |
| Motor | | 828600 | 828600 |
| Gearbox | | 810210 | 810210 |
| Maximum permitted torque from gearmotor under continuous conditions (for 1 million turns) Nm | | 0.5 | 0.5 |
| Axial load static (daN) | | 1 | 1 |
| Radial load static (daN) | | 8 | 8 |
| Max. output power (W) | | 3.9 | 3.9 |
| Nominal output (W) | | 3 | 3 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 160 | 160 |

Product adaptations



- Special supply voltage
- Lead output
- 1 or 5 pulse encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- EMC filter
- More than 200 reduction ratios available

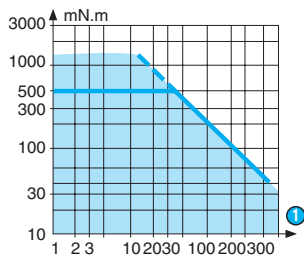
Stocked product

Product made to order

To order, see page 18

Curves

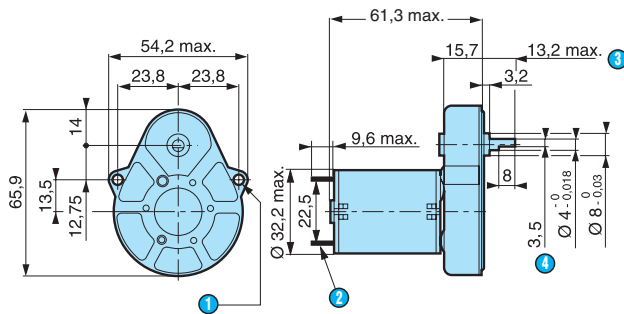
Curve: torque/nominal speed 828610



① rpm

Dimensions

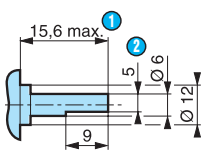
828610



- ① 2 fixing holes \varnothing 3.2
- ② 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ③ Shaft pushed-in
- ④ 3.5 across flats

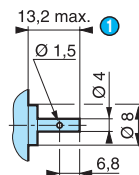
Options

Shaft 70999421
SP1295.10



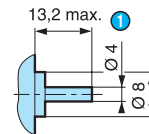
- ① Shaft pushed-in
- ② 5 across flats

Shaft 79200779



- ① Shaft pushed-in

Shaft 79200967



- ① Shaft pushed-in

D.C. geared motors with brushes

→ 0.5 Nm PPGM 8 Watts

- Specially designed for applications using peristaltic pumps
- Long service life
- Silent operation
- Wide range of speeds
- Wide range of fixings

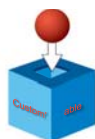


Part numbers

| | | 8 W | 8 W |
|---------------------------|-------------------|--------|--------|
| Type | | 827380 | 827380 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 290 | 10.6 | ● | ● |
| 240 | 12.8 | ● | ● |
| 210 | 14.5 | ● | ● |
| 150 | 20.8 | ● | ● |
| 130 | 24.2 | ● | ● |
| 96 | 32.2 | ● | ● |
| 89 | 34.7 | ● | ● |
| 74 | 42.1 | ● | ● |
| 60 | 51.2 | ● | ● |
| 53 | 58.1 | ● | ● |
| 45 | 83.2 | ● | ● |
| 37 | 104 | ● | ● |
| 30 | 121.3 | ● | ● |

| General characteristics | | 8 W | 8 W |
|--|--|----------|----------|
| Motor | | 82730001 | 82730002 |
| Gearbox | | 810380 | 810380 |
| Maximum permitted torque from gearmotor under continuous conditions (Nm) | | 0.5 | 0.5 |
| Axial load dynamic (daN) | | 3.5 | 3.5 |
| Radial load dynamic (daN) | | 5 | 5 |
| Max. output power (W) | | 8.2 | 7.7 |
| Nominal output (W) | | 6.8 | 6.5 |
| Gearbox case temperature rise (°C) | | 45 | 45 |
| Weight (g) | | 600 | 600 |
| Service life (h) | | 3000 | 3000 |

Product adaptations



- Different gearbox shaft (shape and diameter)
- Different gear material
- Different reduction ratio
- Connections
- M5 or 8-32 UNC-2B threads
- With centring diameter
- With 1 to 48 pulses/revolution encoder

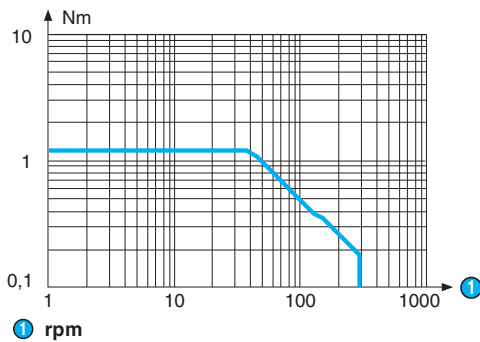
Stocked product

Product made to order

To order, see page 18

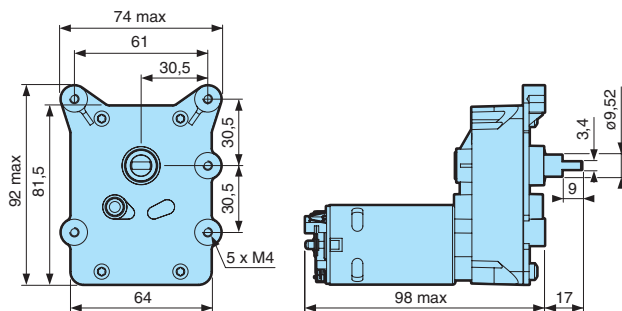
Curves

Curve: torque/nominal speed 827380



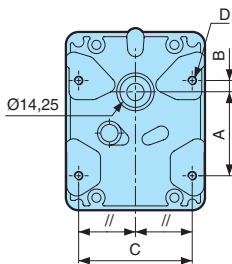
Dimensions

827380 - cover WM



Options

Cover E

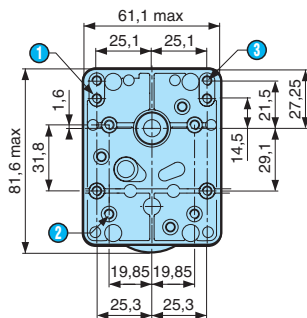


| | A | B | C | D |
|----------|------|------|------|----|
| 79207808 | 41,3 | 1,6 | 39,7 | M4 |
| 79510107 | 43,6 | 5,16 | 52,4 | M4 |
| 79510106 | 31,8 | 1,6 | 39,7 | M4 |

Special fixing holes can be made

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827385)

Cover 1

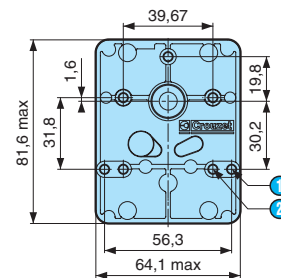


- ① 4 holes M4 depth: 7.5 mm
- ② 3 holes M5 at 120° depth 7.5 mm
- ③ 4 holes M4 depth: 7.5 mm

Available only for shaft Ø 8 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827385)

Cover 2



- ① 3 holes M4 depth: 7.5 mm
- ② 4 x 8-32 UNC-2B holes depth: 7.5 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827385)

D.C. geared motors with brushes

→ 0.5 Nm PPGM 16 Watts

- Specially designed for applications using peristaltic pumps
- Long service life
- Silent operation
- Wide range of speeds
- Wide range of fixings



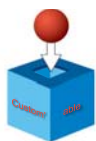
Part numbers

| | | 16 W | 16 W |
|---------------------------|-------------------|--------|--------|
| Type | | 827480 | 827480 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 280 | 10.6 | ● | ● |
| 230 | 12.8 | ● | ● |
| 200 | 14.5 | ● | ● |
| 140 | 20.8 | ● | ● |
| 120 | 24.2 | ● | ● |
| 93 | 32.2 | ● | ● |
| 86 | 34.7 | ● | ● |
| 71 | 42.1 | ● | ● |
| 60 | 51.2 | ● | ● |
| 50 | 58.1 | ● | ● |
| 44 | 83.2 | ● | ● |
| 36 | 104 | ● | ● |
| 29 | 121.3 | ● | ● |

General characteristics

| | 16 W | 16 W |
|--|----------|----------|
| Motor | 82740001 | 82740002 |
| Gearbox | 810380 | 810380 |
| Maximum permitted torque from gearmotor under continuous conditions (Nm) | 0.5 | 0.5 |
| Axial load dynamic (daN) | 3.5 | 3.5 |
| Radial load dynamic (daN) | 5 | 5 |
| Max. output power (W) | 16 | 16 |
| Nominal output (W) | 11 | 11 |
| Gearbox case temperature rise (°C) | 45 | 45 |
| Weight (g) | 600 | 600 |
| Service life (h) | 3000 | 3000 |

Product adaptations



- Different gearbox shaft (shape and diameter)
- Different gear material
- Different reduction ratio
- Connections
- M5 or 8-32 UNC-2B threads
- With centring diameter
- With 1 to 48 pulses/revolution encoder

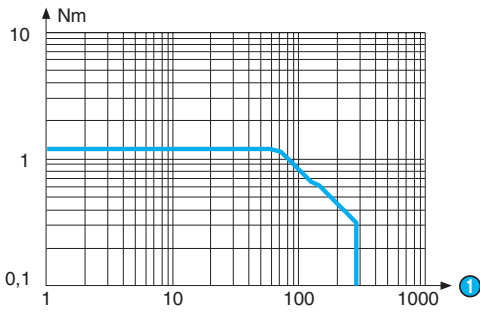
Stocked product

Product made to order

To order, see page 18

Curves

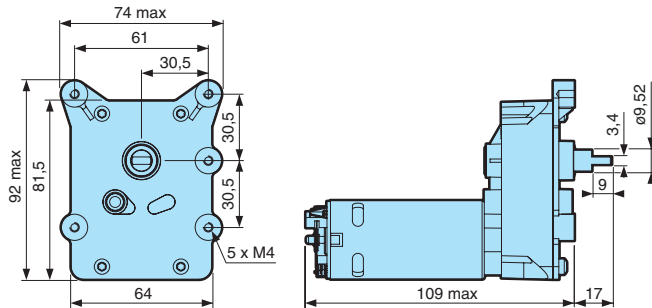
Curve: torque/nominal speed 827480



① rpm

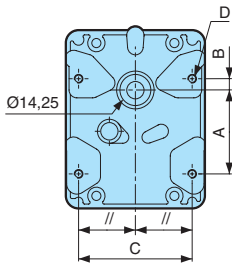
Dimensions

827480 - Cover WM



Options

Cover E

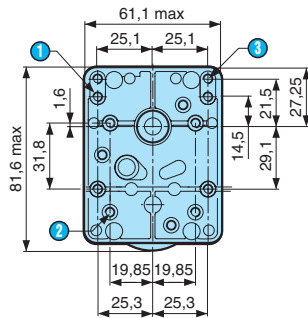


| | A | B | C | D |
|----------|------|------|------|----|
| 79207808 | 41,3 | 1,6 | 39,7 | M4 |
| 79510107 | 43,6 | 5,16 | 52,4 | M4 |
| 79510106 | 31,8 | 1,6 | 39,7 | M4 |

Special fixing holes can be made

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827485)

Cover 1

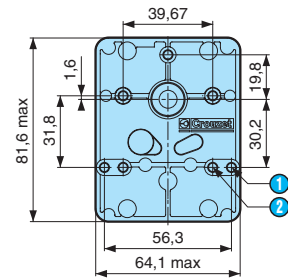


- ① 4 holes M4 depth: 7.5 mm
- ② 3 holes M5 at 120° depth 7.5 mm
- ③ 4 holes M4 depth: 7.5 mm

Available only for shaft Ø 8 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827485)

Cover 2



- ① 3 holes M4 depth: 7.5 mm
- ② 4 x 8-32 UNC-2B holes depth: 7.5 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827485)

D.C. geared motors with brushes

→ 0.5 Nm PPGM 30 Watts

- Specially designed for applications using peristaltic pumps
- Long service life
- Wide range of speeds
- Wide range of fixings



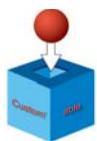
Part numbers

| | | 30 W |
|--------------------|------------|--------|
| Type | | 827483 |
| Voltage | | 24 V |
| Output speed (rpm) | Ratios (i) | |
| 455 | 10.56 | ● |
| 375 | 12.8 | ● |
| 331 | 14.52 | ● |
| 231 | 20.8 | ● |
| 198 | 24.19 | ● |
| 149 | 32.19 | ● |
| 138 | 34.67 | ● |
| 116 | 42.07 | ● |
| 94 | 51.21 | ● |
| 83 | 58.07 | ● |
| 70 | 68.34 | ● |
| 58 | 83.20 | ● |
| 46 | 104 | ● |

General characteristics

| | |
|--|----------|
| Motor | 82740402 |
| Gearbox | 810380 |
| Maximum permitted torque from gearmotor under continuous conditions (Nm) | 0.5 |
| Axial load dynamic (daN) | 3.5 |
| Radial load dynamic (daN) | 5 |
| Max. output power (W) | 30 |
| Nominal output (W) | 20 |
| Gearbox case temperature rise (°C) | 45 |
| Weight (g) | 600 |
| Service life (h) | 2000 |

Product adaptations



- Different gearbox shaft (shape and diameter)
- Different gear material
- Different reduction ratio
- Connections
- M5 or 8-32 UNC-2B threads
- With centring diameter
- With 1 to 48 pulses/revolution encoder

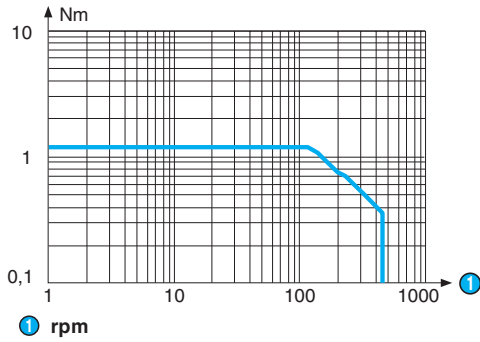
Stocked product

Product made to order

To order, see page 18

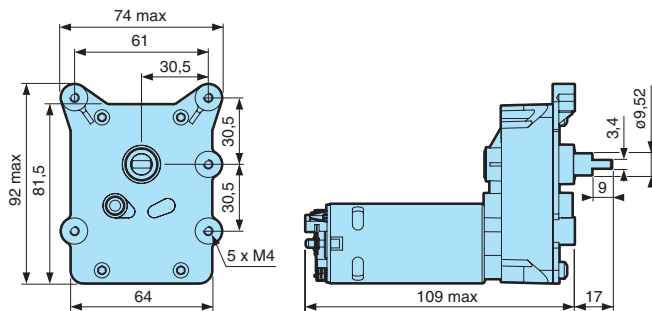
Curves

Curve: torque/nominal speed 827483



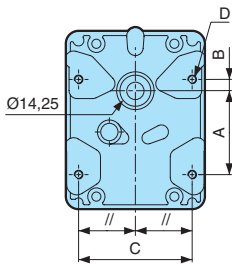
Dimensions

827483 - Cover WM



Options

Cover E

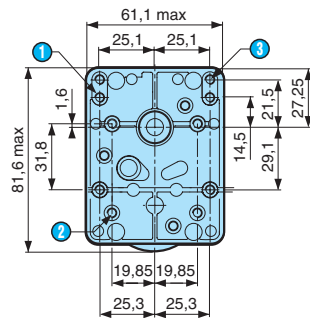


| | A | B | C | D |
|----------|------|------|------|----|
| 79207808 | 41,3 | 1,6 | 39,7 | M4 |
| 79510107 | 43,6 | 5,16 | 52,4 | M4 |
| 79510106 | 31,8 | 1,6 | 39,7 | M4 |

Special fixing holes can be made

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827488)

Cover 1

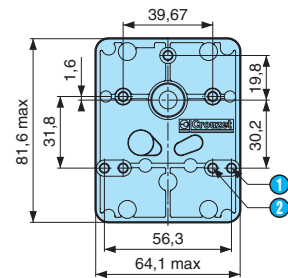


- ① 4 holes M4 depth: 7.5 mm
- ② 3 holes M5 at 120° depth 7.5 mm
- ③ 4 holes M4 depth: 7.5 mm

Available only for shaft Ø 8 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827488)

Cover 2



- ① 3 holes M4 depth: 7.5 mm
- ② 4 x 8-32 UNC-2B holes depth: 7.5 mm

1, 5, 12, 48 pulses/revolution encoder
(part number becomes 827488)

D.C. geared motors with brushes

→ 1.2 Nm GDR1 10 and 17 Watts

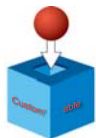
- Torque rating of gearboxes: 1.2 Nm, for long service life
- Motors: nominal power of 10 W and 17 W
- Speed range: 20 to 100 rpm
- Replaceable brushes



Part numbers

| | | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|--------|--------|
| Type | | 828120 | 828120 | 828020 | 828020 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 100 | 26 | ● | ● | ● | ● |
| 80 | 32.5 | ● | ● | ● | ● |
| 60 | 130/3 | ● | ● | ● | ● |
| 38 | 67.6 | ● | ● | ● | ● |
| 30 | 598/7 | ● | ● | ● | ● |
| 20 | 130 | ● | ● | ● | ● |
| General characteristics | | | | | |
| Motor | | 828100 | 828100 | 828000 | 828000 |
| Gearbox | | 810321 | 810321 | 810321 | 810321 |
| Maximum permitted torque from gearmotor under continuous conditions for 10 millions turns (Nm) | | 1.2 | 1.2 | 1.2 | 1.2 |
| Axial load dynamic (daN) | | 3.5 | 3.5 | 3.5 | 3.5 |
| Radial load dynamic (daN) | | 5 | 5 | 5 | 5 |
| Max. output power (W) | | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | | 9.4 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | | 45 | 46 | 44 | 40 |
| Weight (g) | | 670 | 670 | 670 | 670 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Drawn cup needle bearings
- Special adaptor plate
- With 82830 - 30 W motor

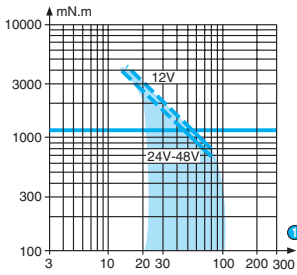
Stocked product

Product made to order

To order, see page 18

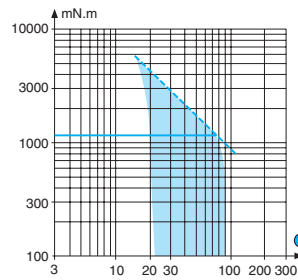
Curves

Curve: torque/nominal speed 828120



1 rpm

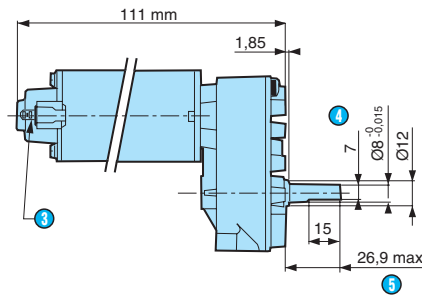
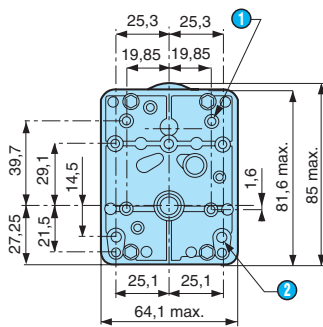
Curve: torque/nominal speed 828020



1 rpm

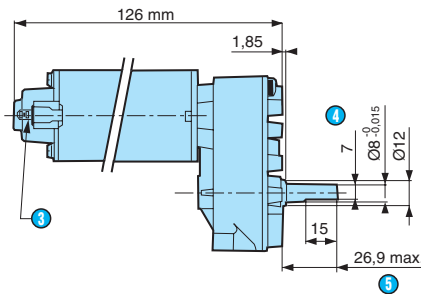
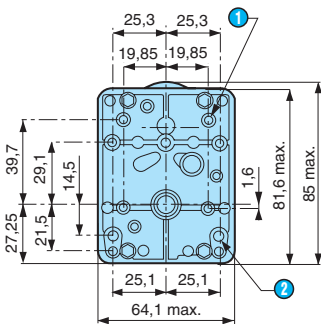
Dimensions

828120 standard



- 1 8 holes M4 depth 7.5
- 2 3 holes M5 at 120° depth 7.5
- 3 2 tags IEC 760, series 4.8 x 0.5
- 4 7 across flats
- 5 Shaft pushed-in

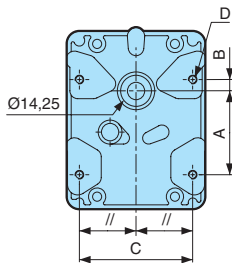
828020 standard



- 1 4 holes M4 depth 7.5 mm
- 2 3 holes M5 at 120° depth 7.5 mm
- 3 2 tags IEC 760, series 4.8 x 0.5
- 4 7 across flats
- 5 Shaft pushed-in

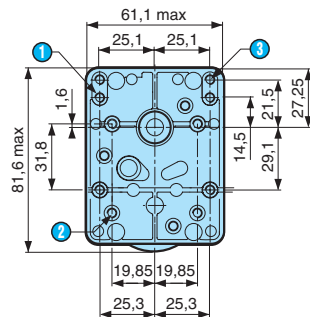
Options

Cover E



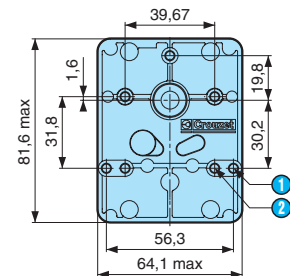
Special fixing holes

Cover 1



- 1 4 holes M4 depth: 7.5 mm
- 2 3 holes M5 at 120° depth: 7.5 mm
- 3 4 holes M4 depth: 7.5 mm

Cover 2



- 1 3 holes M4 depth: 7.5 mm
- 2 4 x 8-32 UNC-2B holes depth: 7.5 mm

D.C. geared motors with brushes

→ 2 Nm double ovoid 1.4 and 3.2 Watts

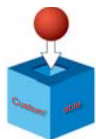
- Gearbox 2 Nm nominal
- Class A EMC interference suppression (radiated)
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional 1, 5, 12 or 48 pulses/rev encoder



Part numbers

| | | 1.4 W | 1.4 W | 3.2 W | 3.2 W |
|--|-------------------|----------|----------|----------|----------|
| Type | | 827190 | 827190 | 827290 | 827290 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 21 | 160 | ● | ● | 82729001 | 82729005 |
| 18 | 192 | ● | ● | 82729002 | 82729006 |
| 16 | 216 | ● | ● | 82729003 | 82729007 |
| 14 | 250 | ● | ● | 82729004 | 82729008 |
| 11 | 320 | ● | ● | ● | ● |
| 8 | 400 | ● | ● | ● | ● |
| 6 | 600 | - | - | ● | ● |
| 5 | 800 | - | - | ● | ● |
| 3 | 1500 | - | - | ● | ● |
| General characteristics | | | | | |
| Motor | | 82710001 | 82710002 | 82720001 | 82720002 |
| Gearbox | | 810330 | 810330 | 810330 | 810330 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 2 | 2 | 2 | 2 |
| Axial load static (daN) | | 1 | 1 | 1 | 1 |
| Radial load static (daN) | | 10 | 10 | 10 | 10 |
| Max. output power (W) | | 1.4 | 1.4 | 3.2 | 3.2 |
| Nominal output (W) | | 1 | 1 | 2.6 | 2.6 |
| Gearbox case temperature rise (°C) | | 40 | 40 | 40 | 40 |
| Weight (g) | | 200 | 200 | 220 | 220 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- Class B EMC filter
- Friction
- Y system
- Greasing at low temperature
- 1 to 48 pulses/revolution encoder

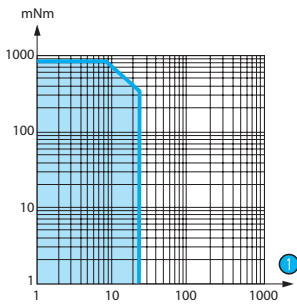
Stocked product

Product made to order

To order, see page 18

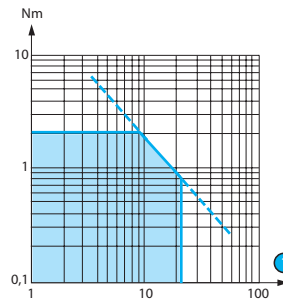
Curves

Curve: torque/nominal speed 827190



① rpm

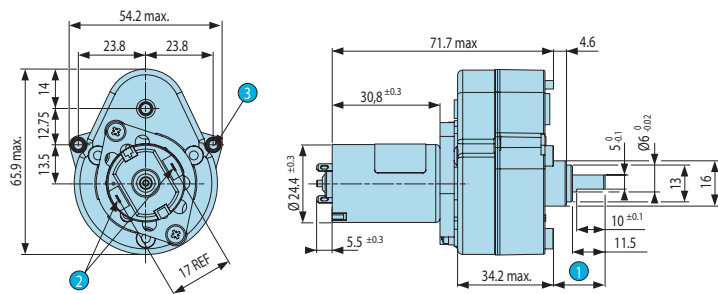
Curve: torque/nominal speed 827290



① rpm

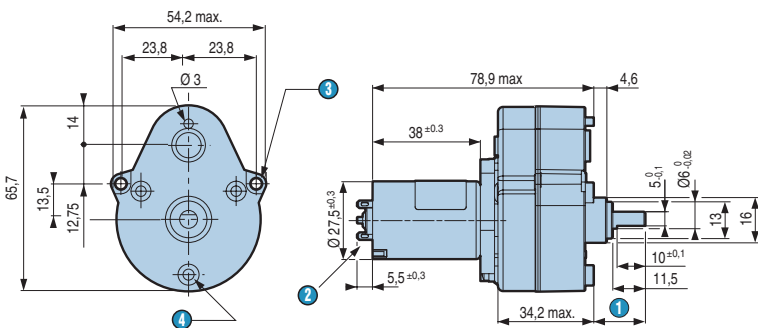
Dimensions

827190



- ① 18.2 mm max. shaft pushed-in
- ② 2 solder tags 2.8 x 0.5 mm
- ③ 2 fixing holes \varnothing 3.2

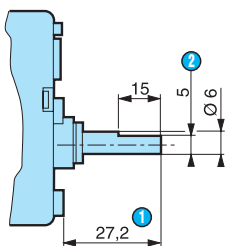
827290



- ① 18.2 mm max. shaft pushed-in
- ② 2 solder tags 2.8 x 0.5 mm
- ③ 2 fixing holes \varnothing 3.2 mm
- ④ 3 bosses \varnothing 7.2 at 120° on $R=19.5$ with M3 holes, depth : 4 mm

Options

Shaft 79202573



- ① Shaft pushed-in
- ② 5 across flats

D.C. geared motors with brushes

→ 2 Nm double ovoid 3.9 Watts

- Torque rating of gearboxes: 2 Nm, high-performance plastic gears
- Motors: nominal power 3 W, interference suppression for standard stocked products
- Wide speed range: 0.3 to 430 rpm
- Optional encoder built into the motor

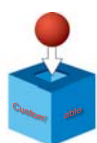


Part numbers

| Voltage | | | 3.9 W | 3.9 W |
|---------|---------|--------------------|----------|----------|
| | Type | Output speed (rpm) | 12 V | 24 V |
| | 828690 | 108 | 82869001 | 82869011 |
| | 82 8690 | 54 | 82869006 | 82869012 |
| | 828690 | 27 | 82869007 | 82869013 |
| | 828690 | 13 | 82869008 | 82869014 |
| | 828690 | 7.2 | 82869009 | 82869015 |
| | 828690 | 5.4 | ● | ● |
| | 828690 | 2.9 | 82869010 | 82869016 |
| | 828690 | 0.90 | ● | ● |

| General characteristics | | |
|--|--------|--------|
| Motor | 828600 | 828600 |
| Gearbox | 810330 | 810330 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | 2 | 2 |
| Axial load static (daN) | 1 | 1 |
| Radial load static (daN) | 10 | 10 |
| Max. output power (W) | 3.9 | 3.9 |
| Nominal output (W) | 3 | 3 |
| Gearbox case temperature rise (°C) | 50 | 50 |
| Weight (g) | 240 | 240 |

Product adaptations



- Special supply voltage
- Lead output
- 1 or 5 pulse Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- Finishing and system Y
- More than 200 reduction ratios available
- With shorter 1 W motor

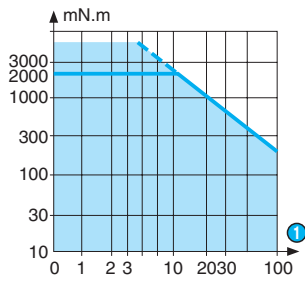
Stocked product

Product made to order

To order, see page 18

Curves

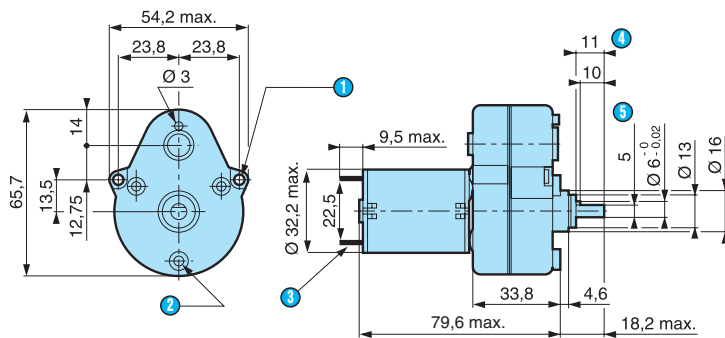
Curve: torque/nominal speed



① rpm

Dimensions

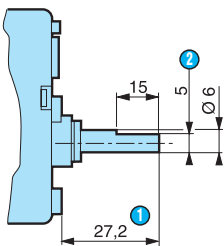
828690



- ① 2 fixing holes $\varnothing 3.2$
- ② 3 bosses $\varnothing 7.2$ at 120° on $R=19.5$ with M3 holes
- ③ 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ④ Shaft pushed-in
- ⑤ 5 across flats

Options

Shaft 79202573



- ① Shaft pushed-in
- ② 5 across flats

D.C. geared motors with brushes

→ 2 Nm RE1 3.9 Watts

- Torque rating of gearboxes: 2 Nm, metal gears
- Motors: nominal power 3 W
- Speed range: 99 to 662 rpm for cyclic operation only

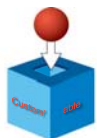


Part numbers

| | | 3.9 W | 3.9 W |
|---------------------------|-------------------|--------|--------|
| Type | | 828630 | 828630 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 662 | 13/2 | ● | ● |
| 498 | 855/99 | ● | ● |
| 266 | 728/45 | ● | ● |
| 198 | 65/3 | ● | ● |
| 170 | 455/18 | ● | ● |
| 132 | 32.5 | ● | ● |
| 99 | 130/3 | ● | ● |

| General characteristics | | 828600 | 828600 |
|--|--|--------|--------|
| Motor | | 828600 | 828600 |
| Gearbox | | 810430 | 810430 |
| Maximum permitted torque from gearmotor under continuous conditions (for 1 million turns) (Nm) | | 2 | 2 |
| Axial load dynamic (daN) | | 2 | 2 |
| Radial load dynamic (daN) | | 2 | 2 |
| Max. output power (W) | | 3.9 | 3.9 |
| Nominal output (W) | | 3 | 3 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 285 | 285 |

Product adaptations



- Special supply voltage
- Lead outputs or tag terminals
- 1 or 5 pulse Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With shorter 1 W motor

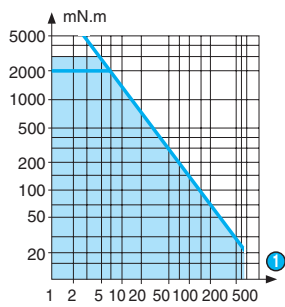
Stocked product

Product made to order

To order, see page 18

Curves

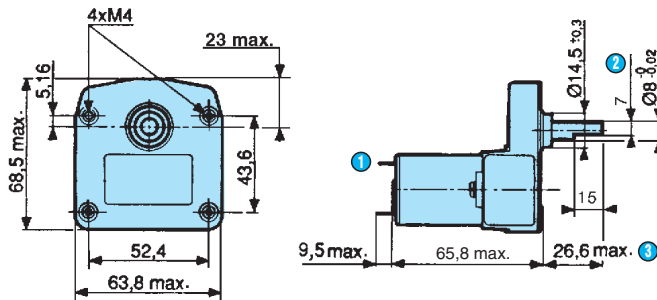
Curve: torque/nominal speed 828630



① rpm

Dimensions

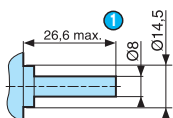
828630



- ① 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ② 7 across flats
- ③ Shaft pushed-in

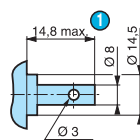
Options

Shaft 79261300



- ① Shaft pushed-in

Shaft 79261309



- ① Shaft pushed-in

D.C. geared motors with brushes

→ 2 Nm RE2 3.9 Watts

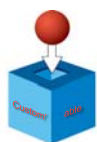
- Torque rating of gearboxes: 2 Nm, metal gears
- Motors: nominal power 3 W
- Speed range: 2 to 66 rpm for cyclic operation only
- Optional encoder built into the motor



Part numbers

| | | 3.9 W | 3.9 W |
|--|-------------------|--------|--------|
| Type | | 828640 | 828640 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 66 | 65 | ● | ● |
| 40 | 325/3 | ● | ● |
| 26 | 162.5 | ● | ● |
| 13 | 325 | ● | ● |
| 7 | 650 | ● | ● |
| 2 | 2600 | ● | ● |
| General characteristics | | | |
| Motor | | 828600 | 828600 |
| Gearbox | | 810440 | 810440 |
| Maximum permitted torque from gearmotor under continuous conditions (for 1 million turns) (Nm) | | 2 | 2 |
| Axial load dynamic (daN) | | 2 | 2 |
| Radial load dynamic (daN) | | 2 | 2 |
| Max. output power (W) | | 3.9 | 3.9 |
| Nominal output (W) | | 3 | 3 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 355 | 355 |

Product adaptations



- Special supply voltage
- Lead outputs or tag terminals
- 1 or 5 pulse Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With shorter 1 W motor

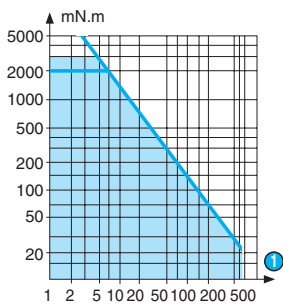
Stocked product

Product made to order

To order, see page 18

Curves

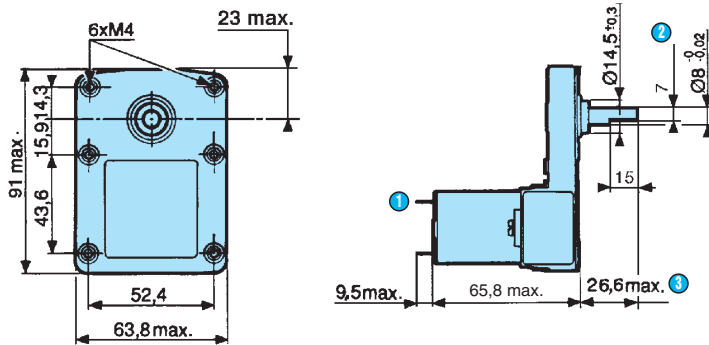
Curve: torque/nominal speed 828640



① rpm

Dimensions

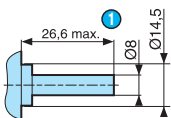
828640



- ① 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ② 7 across flats
- ③ Shaft pushed-in

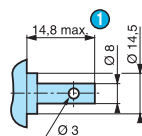
Options

Shaft 79261300



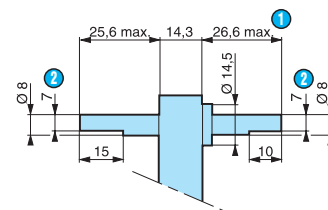
- ① Shaft pushed-in

Shaft 79261309



- ① Shaft pushed-in

Shaft 79261314



- ① Shaft pushed-in
- ② 7 across flats

D.C. geared motors with brushes

→ 2 Nm RE1 10 and 17 Watts

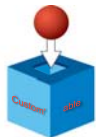
- Torque rating of gearboxes: 2 Nm, metal gears
- Motors: nominal power 9 W and 15 W
- Speed range: 60 to 400 rpm
- Cyclic operation only
- Replaceable brushes



Part numbers

| | | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|-----------------|-----------------|
| Type | | 808130 | 808130 | 808030 | 808030 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 400 | 13/2 | ● | ● | ● | ● |
| 301 | 855/99 | ● | ● | ● | ● |
| 161 | 728/45 | ● | ● | 80803005 | 80803008 |
| 120 | 65/3 | ● | ● | ● | ● |
| 103 | 455/18 | ● | ● | ● | ● |
| 80 | 32.5 | ● | ● | 80803006 | 80803009 |
| 60 | 130/3 | ● | ● | 80803007 | 80803010 |
| General characteristics | | | | | |
| Motor | | 828100 | 828100 | 828000 | 828000 |
| Gearbox | | 810430 | 810430 | 810430 | 810430 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 2 | 2 | 2 | 2 |
| Axial load dynamic (daN) | | 2 | 2 | 2 | 2 |
| Radial load dynamic (daN) | | 2 | 2 | 2 | 2 |
| Max. output power (W) | | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | | 9.4 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | | 45 | 46 | 44 | 40 |
| Weight (g) | | 500 | 500 | 600 | 600 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With 828105 or 828005 motors

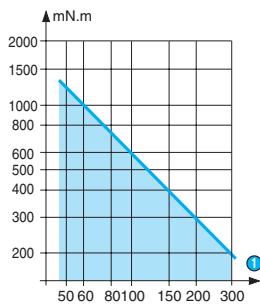
Stocked product

Product made to order

To order, see page 18

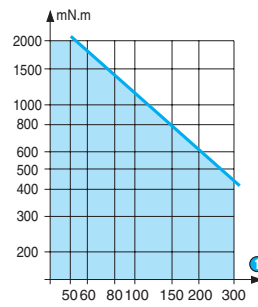
Curves

Curve: torque/nominal speed 808130



① rpm

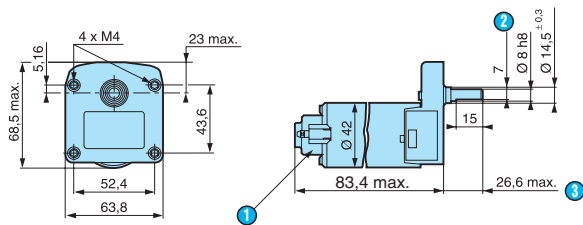
Curve: torque/nominal speed 808030



① rpm

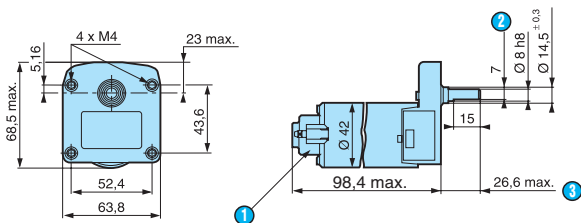
Dimensions

808130 standard



- ① 2 tags IEC 760, series 4.8 x 0.5
- ② 7 across flats
- ③ Shaft pushed-in

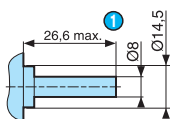
808030 standard



- ① 2 tags IEC 760, series 4.8 x 0.5
- ② 7 across flats
- ③ Shaft pushed-in

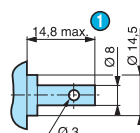
Options

Shaft 79261300



- ① Shaft pushed-in

Shaft 79261309



- ① Shaft pushed-in

D.C. geared motors with brushes

→ 2 Nm RE2 10 and 17 Watts

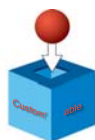
- Torque rating of gearboxes: 2 Nm, metal gears
- Motors: nominal power 9 W and 15 W
- Speed range: 1 to 40 rpm
- Cyclic operation only
- Replaceable brushes



Part numbers

| | | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|-----------------|-----------------|
| Type | | 808140 | 808140 | 808040 | 808040 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 40 | 65 | • | • | • | • |
| 24 | 325/3 | • | • | 80804006 | 80804009 |
| 16 | 162.5 | • | • | • | • |
| 8 | 325 | • | • | 80804007 | 80804010 |
| 4 | 650 | • | • | 80804008 | 80804011 |
| 1 | 2600 | • | • | • | • |
| General characteristics | | | | | |
| Motor | | 828100 | 828100 | 828000 | 828000 |
| Gearbox | | 810440 | 810440 | 810440 | 810440 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 2 | 2 | 2 | 2 |
| Axial load dynamic (daN) | | 2 | 2 | 2 | 2 |
| Radial load dynamic (daN) | | 2 | 2 | 2 | 2 |
| Max. output power (W) | | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | | 9.3 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | | 45 | 46 | 44 | 40 |
| Weight (g) | | 570 | 570 | 670 | 670 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate

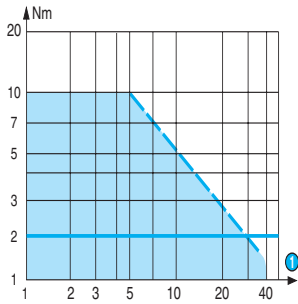
Stocked product

Product made to order

To order, see page 18

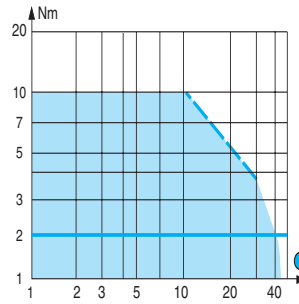
Curves

Curve: torque/nominal speed 808140



① rpm

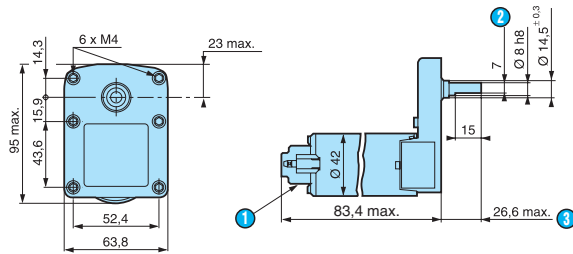
Curve: torque/nominal speed 808040



① rpm

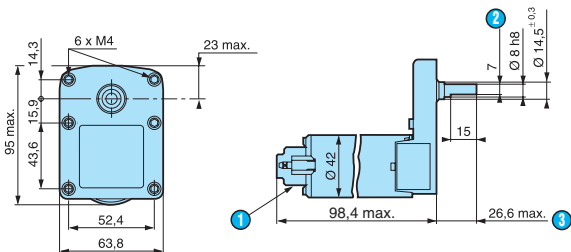
Dimensions

808140 standard



- ① 2 tags IEC 760, series 4.8 x 0.5
- ② 7 across flats
- ③ Shaft pushed-in

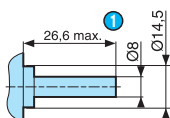
808040 standard



- ① 2 tags IEC 760, series 4.8 x 0.5
- ② 7 across flats
- ③ Shaft pushed-in

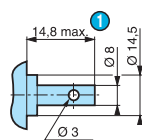
Options

Shaft 79261300



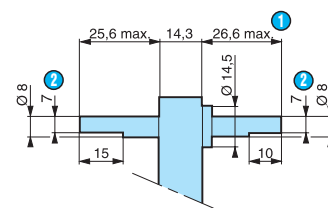
- ① Shaft pushed-in

Shaft 79261309



- ① Shaft pushed-in

Shaft 79261314



- ① Shaft pushed-in
- ② 7 across flats

D.C. geared motors with brushes

→ 2.5 Nm 1.4 and 3.2 Watts

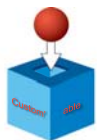
- Gearbox 2.5 Nm nominal
- Class A EMC interference suppression (radiated)
- Compatible with 6 V, 9 V or 12 V battery power supply
- Optional class B interference suppression
- Optional 1, 5, 12 or 48 pulses/rev encoder



Part numbers

| | | 1.4 W | 1.4 W | 3.2 W | 3.2 W |
|--|-------------------|----------|----------|----------|----------|
| Type | | 827130 | 827130 | 827230 | 827230 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 165 | 20.83 | 82713001 | 82713009 | 82723001 | 82723008 |
| 82 | 41.66 | 82713002 | 82713010 | 82723002 | 82723009 |
| 41 | 83.33 | 82713003 | 82713011 | 82723003 | 82723010 |
| 23 | 150 | 82713004 | 82713012 | 82723004 | 82723011 |
| 18 | 187.5 | 82713005 | 82713013 | 82723005 | 82723012 |
| 11 | 300 | 82713006 | 82713014 | 82723006 | 82723013 |
| 9 | 375 | 82713007 | 82713015 | 82723007 | 82723014 |
| 6 | 600 | 82713008 | 82713016 | ● | ● |
| 5 | 750 | ● | ● | ● | ● |
| 3 | 1200 | ● | ● | ● | ● |
| 1.5 | 2250 | ● | ● | - | - |
| 1.4 | 2400 | ● | ● | - | - |
| 0.9 | 3600 | ● | ● | - | - |
| General characteristics | | | | | |
| Motor | | 82710001 | 82710002 | 82720001 | 82720002 |
| Gearbox | | 810230 | 810230 | 810230 | 810230 |
| Maximum permitted gearbox torque (Nm). Duty cycle 15%. T ON < 20 seconds | | 2.5 | 2.5 | 2.5 | 2.5 |
| Axial load static (daN) | | 2 | 2 | 2 | 2 |
| Radial load static (daN) | | 4 | 4 | 4 | 4 |
| Max. output power (W) | | 1.4 | 1.4 | 3.2 | 3.2 |
| Nominal output (W) | | 1 | 1 | 2.6 | 2.6 |
| Gearbox case temperature rise (°C) | | 40 | 40 | 40 | 40 |
| Weight (g) | | 320 | 320 | 340 | 340 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- Class B EMC filter
- 1 to 48 pulses/revolution encoder

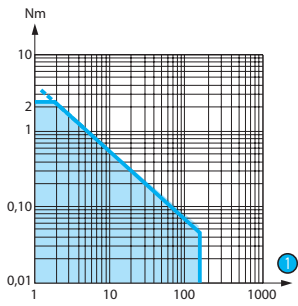
Stocked product

Product made to order

To order, see page 18

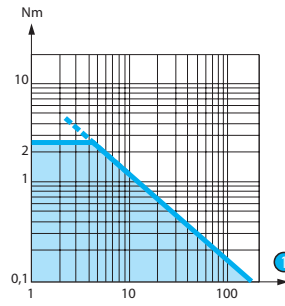
Curves

Curve: torque/nominal speed 827130



① rpm

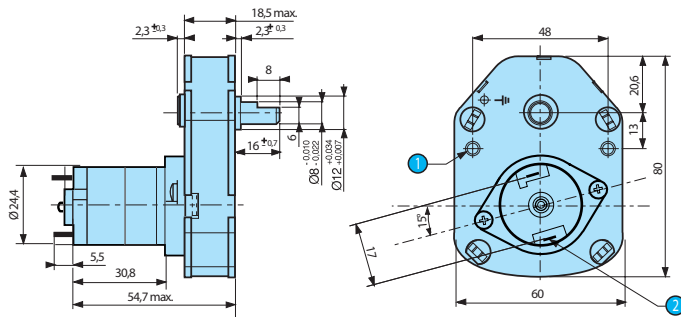
Curve: torque/nominal speed 827230



① rpm

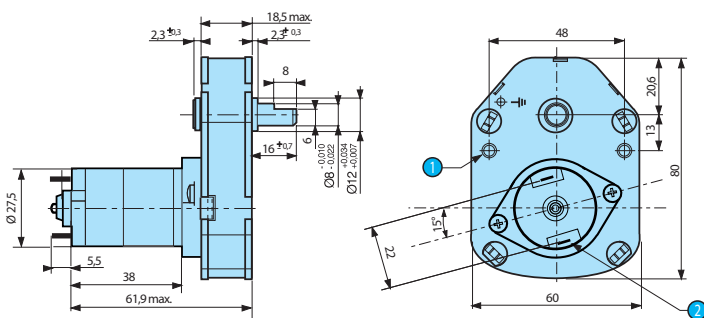
Dimensions

827130



- ① 2 holes $\varnothing 4$ Fixing points
- ② Tags 2.8 x 0.5

827230



- ① 2 holes $\varnothing 4$ fixing points
- ② Tags 2.8 x 0.5

D.C. geared motors with brushes

→ 2.5 Nm 8 and 16 Watts

- Gearbox 2.5 Nm nominal
- With varistor filter
- Optional EMC filter
- Optional 1, 5, 12 or 48 pulses/rev encoder



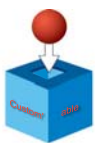
Part numbers

| | | 8 W | 8 W | 16 W | 16 W |
|---------------------------|-------------------|-----------------|-----------------|-----------------|-----------------|
| Type | | 827330 | 827330 | 827430 | 827430 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 147 | 20.83 | 82733001 | 82733006 | 82743001 | 82743006 |
| 74 | 41.66 | 82733002 | 82733007 | 82743002 | 82743007 |
| 37 | 83.33 | 82733003 | 82733008 | 82743003 | 82743008 |
| 21 | 150 | 82733004 | 82733009 | 82743004 | 82743009 |
| 18 | 187.5 | 82733005 | 82733010 | 82743005 | 82743010 |
| 12 | 300 | ● | ● | ● | ● |
| 10 | 375 | ● | ● | - | - |
| 7 | 600 | ● | ● | - | - |

General characteristics

| | 82730001 | 82730002 | 82740001 | 82740002 |
|--|----------|----------|----------|----------|
| Motor | 82730001 | 82730002 | 82740001 | 82740002 |
| Gearbox | 810230 | 810230 | 810230 | 810230 |
| Maximum permitted gearbox torque (Nm). Duty cycle 15%. T ON < 20 seconds | 2.5 | 2.5 | 2.5 | 2.5 |
| Axial load static (daN) | 2 | 2 | 2 | 2 |
| Radial load static (daN) | 4 | 4 | 4 | 4 |
| Max. output power (W) | 8 | 8 | 16 | 16 |
| Nominal output (W) | 6.5 | 6.5 | 11 | 11 |
| Gearbox case temperature rise (°C) | 40 | 40 | 40 | 40 |
| Weight (g) | 420 | 420 | 480 | 480 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- Class B EMC filter
- 1 to 48 pulses/revolution encoder

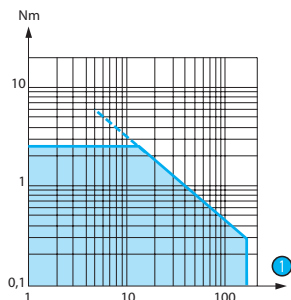
Stocked product

Product made to order

To order, see page 18

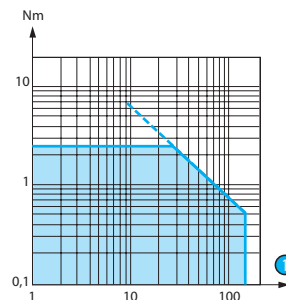
Curves

Curve: torque/nominal speed 827330



① rpm

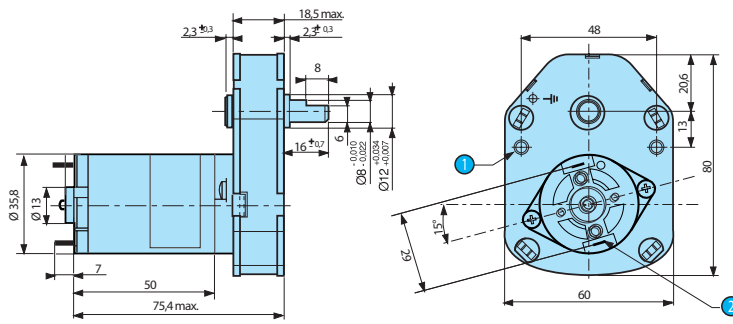
Curve: torque/nominal speed 827430



① rpm

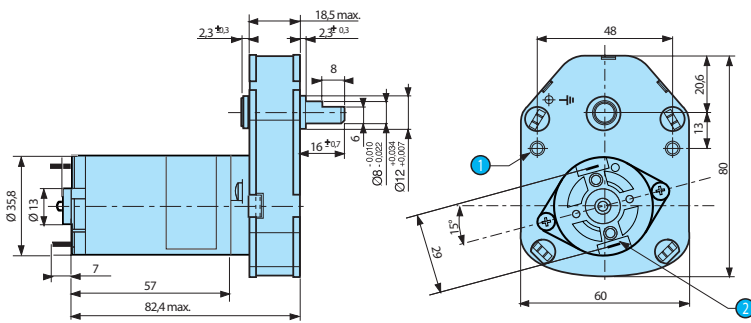
Dimensions

827330



- ① 2 holes Ø 4 fixing points
- ② Tags 4.75 x 0.5

827430



- ① 2 holes Ø 4 fixing points
- ② Tags 4.75 x 0.5

D.C. geared motors with brushes

→ 5 Nm RC65 3.9 Watts

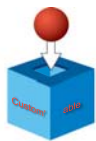
- Torque rating of gearboxes: 5 Nm, metal gears
- Motors: nominal power 3 W / interference suppression for standard stocked products
- Speed range: 1.7 to 344 rpm
- Optional encoder built into the motor



Part numbers

| | | 3.9 W | 3.9 W |
|--|-------------------|-----------------|-----------------|
| Type | | 828670 | 828670 |
| Voltage | | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | |
| 344 | 12.5 | 82867001 | 82867007 |
| 258 | 50/3 | ● | ● |
| 172 | 25 | 82867002 | 82867008 |
| 103 | 125/3 | 82867003 | 82867009 |
| 69 | 62.5 | 82867004 | 82867010 |
| 34 | 125 | 82867005 | 82867011 |
| 17 | 250 | ● | ● |
| 8.6 | 500 | 82867006 | 82867012 |
| 1.72 | 2500 | ● | ● |
| General characteristics | | | |
| Motor | | 828600 | 828600 |
| Gearbox | | 810370 | 810370 |
| Maximum permitted torque from gearmotor under continuous conditions (for 1 million turns) (Nm) | | 5 | 5 |
| Axial load dynamic (daN) | | 2 | 2 |
| Radial load dynamic (daN) | | 3 | 3 |
| Max. output power (W) | | 3.9 | 3.9 |
| Nominal output (W) | | 3 | 3 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 465 | 465 |

Product adaptations



- Special supply voltage
- Lead output
- 1 or 5 pulse Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio (40 ratios available from 4 to 3750)
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- EMC filter
- With shorter 1 W motor

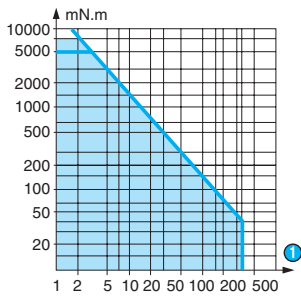
Stocked product

Product made to order

To order, see page 18

Curves

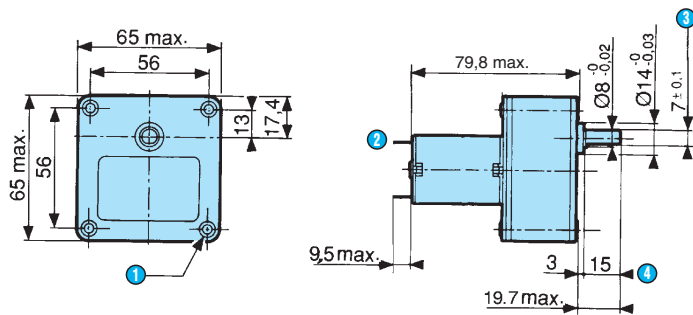
Curve: torque/nominal speed



① rpm

Dimensions

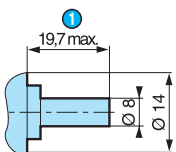
828670



- ① 4 fixing holes $\text{\O} \text{M4} \times 12$
- ② 2 standard tags NFC 20-120, series 2.8 x 0.5 mm
- ③ 7 ± 0.1 across flats
- ④ Shaft pushed-in

Options

Shaft 79206478



- ① Shaft pushed-in

D.C. geared motors with brushes

→ 5 Nm 8 and 16 Watts

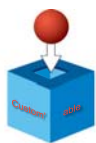
- Gearbox 5 Nm nominal
- With varistor filter
- Optional EMC filter
- Optional 1, 5, 12 or 48 pulses/rev encoder



Part numbers

| | | 8 W | 8 W | 16 W | 16 W |
|--|-------------------|-----------------|-----------------|-----------------|-----------------|
| Type | | 827370 | 827370 | 827470 | 827470 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 250 | 25/2 | 82737001 | 82737010 | 82747001 | 82747010 |
| 125 | 25 | 82737002 | 82737011 | 82747002 | 82747011 |
| 100 | 125/4 | 82737003 | 82737012 | 82747003 | 82747012 |
| 75 | 125/3 | 82737004 | 82737013 | 82747004 | 82747013 |
| 50 | 125/2 | 82737005 | 82737014 | 82747005 | 82747014 |
| 40 | 250/3 | 82737006 | 82737015 | 82747006 | 82747015 |
| 25 | 125 | 82737007 | 82737016 | 82747007 | 82747016 |
| 12 | 250 | 82737008 | 82737017 | 82747008 | 82747017 |
| 7 | 500 | 82737009 | 82737018 | 82747009 | 82747018 |
| General characteristics | | | | | |
| Motor | | 82730001 | 82730002 | 82740001 | 82740002 |
| Gearbox | | 810370 | 810370 | 810370 | 810370 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 5 | 5 | 5 | 5 |
| Axial load static (daN) | | 2 | 2 | 2 | 2 |
| Radial load static (daN) | | 3 | 3 | 3 | 3 |
| Max. output power (W) | | 8 | 8 | 16 | 16 |
| Nominal output (W) | | 6.8 | 6.5 | 11 | 11 |
| Gearbox case temperature rise (°C) | | 40 | 40 | 40 | 40 |
| Weight (g) | | 520 | 520 | 580 | 580 |

Product adaptations



- Special supply voltage
- Lead output
- Special connectors
- Special shaft
- Special reduction ratio (40 ratios available from 4 to 3750)
- Special materials for pinion
- Special ball bearings
- Special adaptor plate
- Class B EMC filter

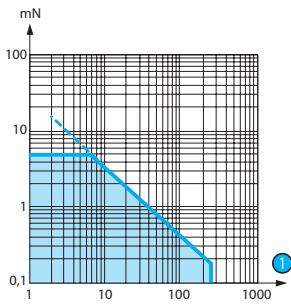
Stocked product

Product made to order

To order, see page 18

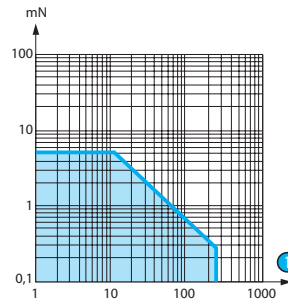
Curves

Curve: torque/nominal speed 827370



rpm

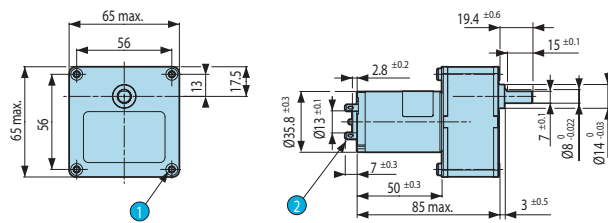
Curve: torque/nominal speed 827470



rpm

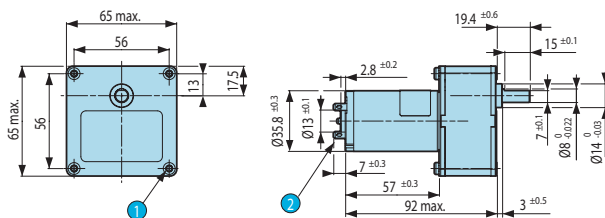
Dimensions

827370



- ① 4 fixing holes M4 x 12 mm
- ② Tags 4.75 x 0.5

827470



- ① 4 fixing holes M4 x 12 mm
- ② Tags 4.75 x 0.5

D.C. geared motors with brushes

→ 5 Nm RC5 10 and 17 Watts

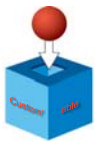
- Torque rating: 5 Nm, for long service life
- Motors: nominal power 9 to 16 W
- All-metal high-quality gearboxes, "integrated" geared motors
- Base speed range: 7.3 to 616 rpm
- Replaceable brushes



Part numbers

| | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|--------|
| Type | 808150 | 808150 | 808050 | 808050 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| Standard speed (rpm) | 2600 | 2600 | 2600 | 2600 |
| Output speed (rpm) | Ratios (i) | | | |
| 616 | 4.22 | ● | ● | ● |
| 385 | 6.75 | ● | ● | ● |
| 339.5 | 7.66 | ● | ● | ● |
| 212 | 12.25 | ● | ● | ● |
| 170 | 15.31 | ● | ● | ● |
| 106 | 24.5 | ● | ● | ● |
| 68 | 38.28 | ● | ● | ● |
| 53 | 49 | ● | ● | ● |
| 42.5 | 61.25 | ● | ● | ● |
| 21 | 122.5 | ● | ● | ● |
| 10.5 | 245 | ● | ● | ● |
| General characteristics | | | | |
| Motor | 828100 | 828100 | 828000 | 828000 |
| Gearbox | 810350 | 810350 | 810350 | 810350 |
| Maximum permitted torque from gearmotor under continuous conditions (Nm) | 5 | 5 | 5 | 5 |
| Axial load dynamic (daN) | 6 | 6 | 6 | 6 |
| Radial load dynamic (daN) | 6 | 6 | 6 | 6 |
| Max. output power (W) | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | 9.4 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | 45 | 46 | 44 | 40 |
| Weight (g) | 820 | 820 | 920 | 920 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With 828105 or 828005 motors - 15 and 30 W
- With UL - 828108 and 808008 motors

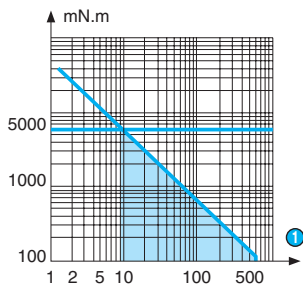
Stocked product

Product made to order

To order, see page 18

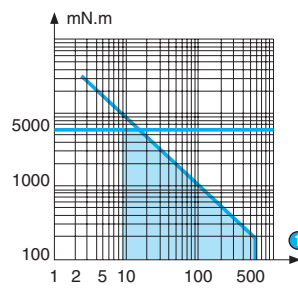
Curves

Curve: torque/nominal speed 808150



① rpm

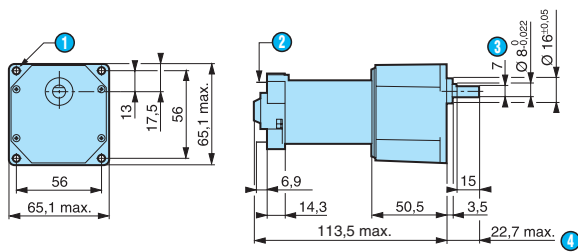
Curve: torque/nominal speed 808050



① rpm

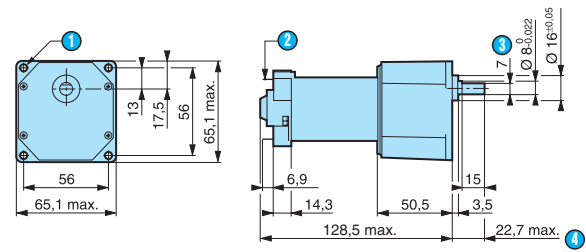
Dimensions

808150 standard



- ① 4 fixing holes $\text{Ø } 4.2$
- ② 2 tags IEC 760, series 4.8 x 0.5
- ③ 7 ± 0.1 across flats
- ④ Shaft pushed-in

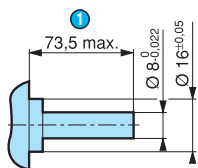
808050



- ① 4 fixing holes $\text{Ø } 4.2$
- ② 2 tags IEC 760, series 4.8 x 0.5
- ③ 7 ± 0.1 across flats
- ④ Shaft pushed-in

Options

Gearbox shaft 79290064



- ① Shaft pushed-in

Other information

Options

- Ball bearings on gearbox output shaft: part numbers become 808155 and 808055
- 48 V motor
- One-channel encoder, 1, 5 or 12 pulses/rev (SP 1737)

D.C. geared motors with brushes

→ 5 Nm RC65 10 and 17 Watts

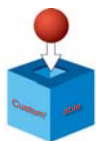
- Torque rating of gearboxes: 5 Nm, metal gears
- Motors: nominal power 9 W to 15 W
- Speed range: 1.04 to 208 rpm
- Replaceable brushes



Part numbers

| | | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|-----------------|-----------------|
| Type | | 808170 | 808170 | 808070 | 808070 |
| Voltage | | 12 V | 24 V | 12 V | 24 V |
| Output speed (rpm) | Ratios (i) | | | | |
| 208 | 12.5 | ● | ● | 80807012 | 80807018 |
| 156 | 50/3 | ● | ● | ● | ● |
| 104 | 25 | ● | ● | 80807013 | 80807019 |
| 62 | 125/3 | ● | ● | 80807014 | 80807020 |
| 42 | 62.5 | ● | ● | 80807015 | 80807021 |
| 21 | 125 | ● | ● | 80807016 | 80807001 |
| 10 | 250 | ● | ● | ● | ● |
| 5.20 | 500 | ● | ● | 80807017 | 80807022 |
| 1.04 | 2500 | ● | ● | ● | ● |
| General characteristics | | | | | |
| Motor | | 828100 | 828100 | 828000 | 828000 |
| Gearbox | | 810370 | 810370 | 810370 | 810370 |
| Maximum permitted torque from gearmotor under continuous conditions for 1 million turns (Nm) | | 5 | 5 | 5 | 5 |
| Axial load dynamic (daN) | | 2 | 2 | 2 | 2 |
| Radial load dynamic (daN) | | 3 | 3 | 3 | 3 |
| Max. output power (W) | | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | | 9.4 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | | 45 | 46 | 44 | 40 |
| Weight (g) | | 710 | 710 | 800 | 800 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio (40 ratios available from 4 to 3750)
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With 828105 or 828005 motor
- With 82830 - 30 W motor

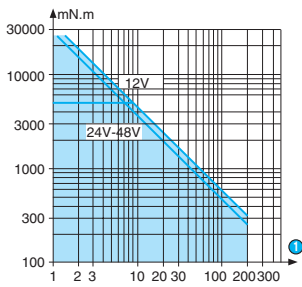
Stocked product

Product made to order

To order, see page 18

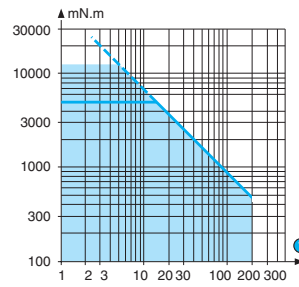
Curves

Curve: torque/nominal speed 808170



① rpm

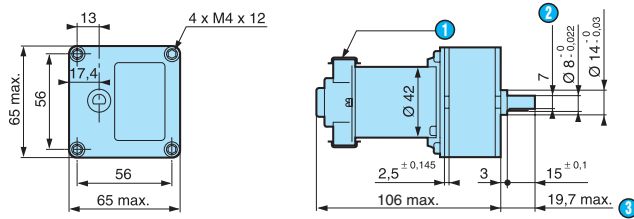
Curve: torque/nominal speed 808070



① rpm

Dimensions

808170 standard

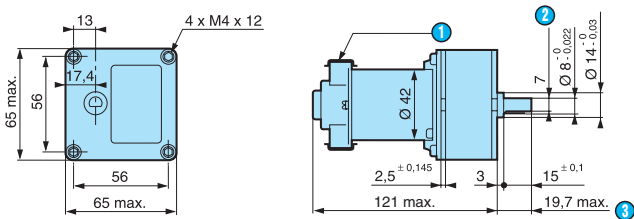


① 2 tags IEC 760, series 4.8 x 0.5

② 7 across flats

③ Shaft pushed-in

808070 standard



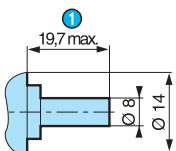
① 2 tags IEC 760, series 4.8 x 0.5

② 7 across flats

③ Shaft pushed-in

Options

Gearbox shaft 79206478



① Shaft pushed-in

D.C. geared motors with brushes

→ 5 Nm RC5 33 Watts

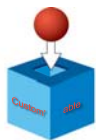
- Torque rating: 5 Nm, for long service life
- Motors: nominal power 27 W
- All-metal high-quality gearboxes, "integrated" geared motors
- Base speed range: 7.4 to 426 rpm
- UL approved



Part numbers

| | | 33 W | 33 W |
|--|-------------------|-----------------|-----------------|
| Type | | 808350 | 808350 |
| Voltage | | 12 V | 24 V |
| Standard speed (rpm) | | 1800 | 1800 |
| Output speed (rpm) | Ratios (i) | | |
| 426 | 4.22 | ● | ● |
| 266 | 6.75 | 80835012 | 80835009 |
| 235 | 7.66 | ● | ● |
| 147 | 12.25 | 80835013 | 80835004 |
| 118 | 15.31 | ● | ● |
| 73 | 24.5 | 80835014 | 80835002 |
| 47 | 38.28 | 80835015 | 80835003 |
| 37 | 49 | ● | ● |
| 29.4 | 61.25 | 80835016 | 80835008 |
| 14.7 | 122.5 | 80835017 | 80835006 |
| 7.4 | 245 | 80835018 | 80835005 |
| General characteristics | | | |
| Motor | | 828300 | 828300 |
| Gearbox | | 810350 | 810350 |
| Maximum permitted torque from gearmotor under continuous conditions (Nm) | | 5 | 5 |
| Axial load dynamic (daN) | | 6 | 6 |
| Radial load dynamic (daN) | | 6 | 6 |
| Max. output power (W) | | 33 | 33 |
| Nominal output (W) | | 27 | 27 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 1540 | 1540 |
| Approvals | | UL 1004 | UL 1004 |

Product adaptations



- Special supply voltage
- Special cable length
- Optical or Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- UL/CSA logo on label
- With 828305 - 67 W motors

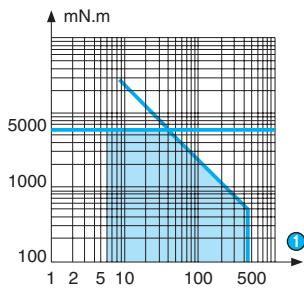
Stocked product

Product made to order

To order, see page 18

Curves

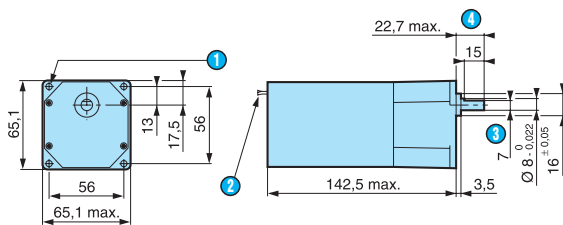
Curve: torque/nominal speed



① rpm

Dimensions

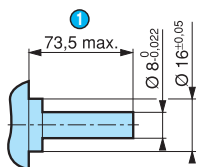
808350



- ① 4 fixing holes \varnothing 4.2
- ② Lead length 200 mm \pm 10
- ③ 7 across flats
- ④ Shaft pushed-in

Options

Gearbox shaft 79290064



- ① Shaft pushed-in

Other information

Options

- Ball bearings on gearbox output shaft: part number becomes 808355
- EMC filter
- 48 V, 90 V, 110 V motor
- 1- or 2-channel encoder, 1, 5 or 12 pulses/revolution

D.C. geared motors with brushes

→ 5 Nm RC5 42 and 52 Watts

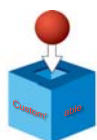
- Torque rating: 5 Nm, for long service life
- Motors: nominal power 32 W
- High-quality gearbox, moulded zamac casing
- Base speed range: 13.8 to 805 rpm
- UL approved



Part numbers

| | | 42 W | 52 W |
|---|-------------------|---------|---------|
| Type | | 808550 | 808550 |
| Voltages | | 12 V | 24 V |
| Standard speed (rpm) | | 3400 | 3400 |
| Output speed (rpm) | Ratios (i) | | |
| 805 | 4.22 | ● | ● |
| 503 | 6.75 | ● | ● |
| 444 | 7.66 | ● | ● |
| 277 | 12.25 | ● | ● |
| 222 | 15.31 | ● | ● |
| 139 | 24.5 | ● | ● |
| 89 | 38.28 | ● | ● |
| 69 | 49 | ● | ● |
| 55 | 61.25 | ● | ● |
| 28 | 122.5 | ● | ● |
| 13.8 | 245 | ● | ● |
| General characteristics | | | |
| Motor | | 828500 | 828500 |
| Gearbox | | 810350 | 810350 |
| Maximum permitted torque from gearmotor under continuous conditions (2.5 million revolution) (Nm) | | 5 | 5 |
| Axial load dynamic (daN) | | 6 | 6 |
| Radial load dynamic (daN) | | 6 | 6 |
| Max. output power (W) | | 42 | 52 |
| Nominal output (W) | | 32 | 32 |
| Gearbox case temperature rise (°C) | | 45 | 45 |
| Weight (g) | | 985 | 985 |
| Approvals | | UL 1004 | UL 1004 |

Product adaptations



- Special supply voltage
- Special cable length
- Optical or Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special ball bearings
- Special adaptor plate
- With UL/CSA logo on label
- With shorter 828108 and 808008 motors - 10 and 17 W

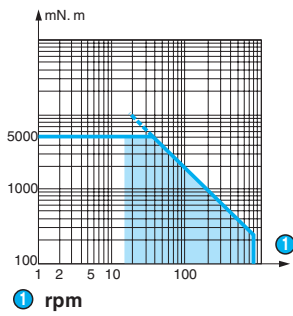
Stocked product

Product made to order

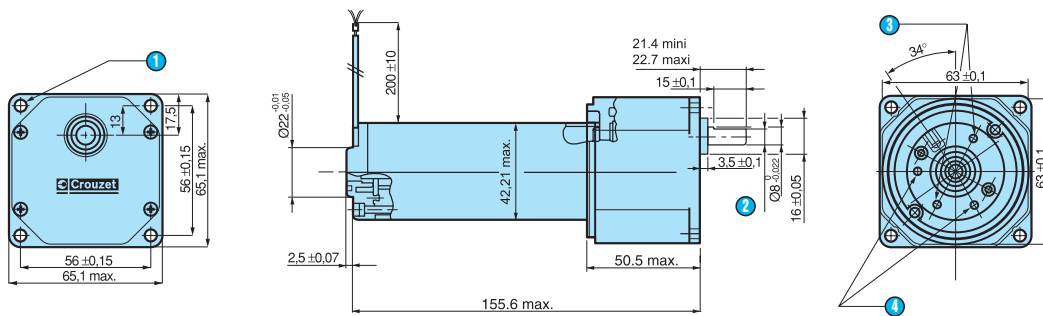
To order, see page 18

Curves

Curve: torque/nominal speed



Dimensions



- ① 4 fixing holes $\varnothing 4.2$
- ② 7 ± 0.1 across flats
- ③ 2 holes $M3 \times 0.5$ at 180° depth 4 over $\varnothing 32$
- ④ 2 holes 2.5 ± 0.5 at 120° depth 4.5 over $\varnothing 32$

Other information

Options

- Ball bearings on gearbox output shaft: part number becomes 808555
- EMC filter
- 48 V motor
- 1- or 2-channel encoder, 1, 5 or 12 pulses/revolution

D.C. geared motors with brushes

→ 6 Nm GDR2 10 and 17 Watts

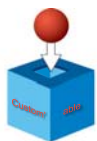
- Torque rating of gearboxes: 6 Nm, metal gears for long service life
- Motors: nominal power 9 W to 16 W
- Speed range: 4 to 12 rpm
- Replaceable brushes



Part numbers

| | 10 W | 10 W | 17 W | 17 W |
|--|-------------------|--------|--------|--------|
| Type | 828125 | 828125 | 828025 | 828025 |
| Voltage | 12 V | 24 V | 12 V | 24 V |
| Standard speed (rpm) | 2600 | 2600 | 2600 | 2600 |
| Output speed (rpm) | Ratios (i) | | | |
| 20 | 130 | ● | ● | ● |
| 16 | 162.5 | ● | ● | ● |
| 12 | 216.7 | ● | ● | ● |
| 10 | 260 | ● | ● | ● |
| 8 | 338 | ● | ● | ● |
| 6 | 427.1 | ● | ● | ● |
| 5 | 520 | ● | ● | ● |
| 4 | 650 | ● | ● | ● |
| General characteristics | | | | |
| Motor | 828100 | 828100 | 828000 | 828000 |
| Gearbox | 810326 | 810326 | 810326 | 810326 |
| Maximum permitted torque from gearmotor under continuous conditions for 10 millions turns (Nm) | 6 | 6 | 6 | 6 |
| Axial load dynamic (daN) | 3.5 | 3.5 | 3.5 | 3.5 |
| Radial load dynamic (daN) | 5 | 5 | 5 | 5 |
| Max. output power (W) | 10.3 | 9.5 | 16.3 | 17 |
| Nominal output (W) | 9.4 | 8.7 | 15.7 | 15.6 |
| Gearbox case temperature rise (°C) | 45 | 46 | 44 | 40 |
| Weight (g) | 880 | 880 | 970 | 970 |

Product adaptations



- Special supply voltage
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special adaptor plate
- With 828105 or 808005 motors - 15 and 30 W
- With UL - 828108 and 828008 motors

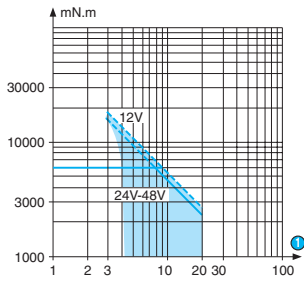
Stocked product

Product made to order

To order, see page 18

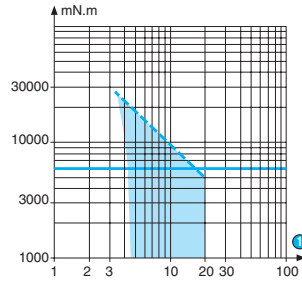
Curves

Curve: torque/nominal speed 828125



① rpm

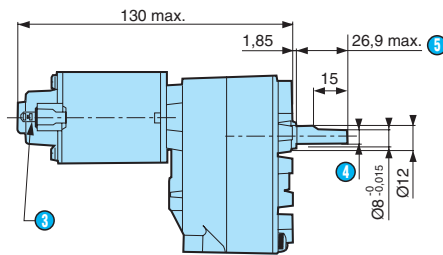
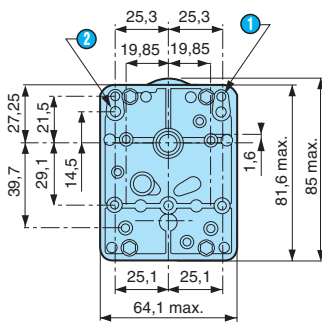
Curve: torque/nominal speed 828025



① rpm

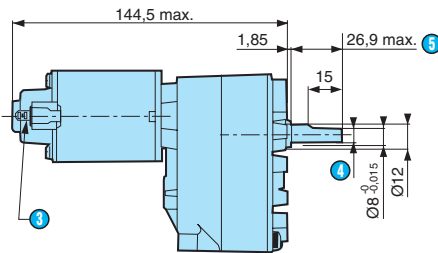
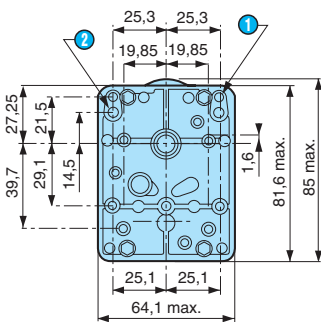
Dimensions

828125 standard



- ① 8 holes M4 depth 7.5
- ② 3 holes M5 at 120° depth 7.5
- ③ 2 tags IEC 760, series 4.8 x 0.5
- ④ 7 across flats
- ⑤ Shaft pushed-in

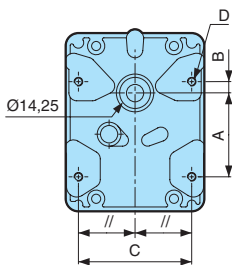
828025 standard



- ① 8 holes M4 depth 7.5
- ② 3 holes M5 at 120° depth 7.5
- ③ 2 tags IEC 760, series 4.8 x 0.5
- ④ 7 across flats
- ⑤ Shaft pushed-in

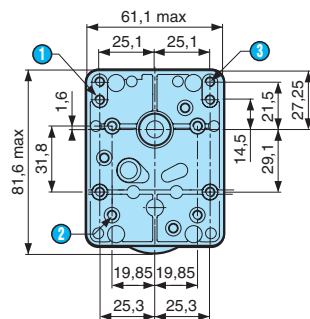
Options

Cover E



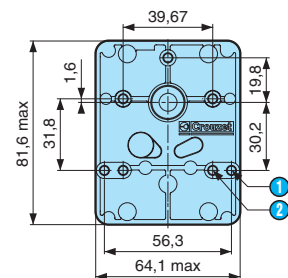
Special fixing holes can be made

Cover 1



- ① 4 holes M4 depth: 7.5 mm
- ② 3 holes M5 at 120° depth: 7.5 mm
- ③ 4 holes M4 depth: 7.5 mm

Cover 2



- ① 3 holes M4 depth: 7.5 mm
- ② 4 x 8-32 UNC-2B holes depth: 7.5 mm

Other information

Options

- 48 V motor
- Drawn cup needle bearings on gearbox output shaft
- Cover 1 or 2 or E
- Shaft diameter 9.52 or 8 mm
- One-channel encoder, 1, 5 or 12 pulses/rev (SP 1737)

D.C. geared motors with brushes

→ 6 Nm GDR2 33 Watts

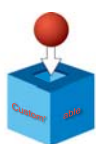
- Torque rating of gearboxes: 6 Nm, metal gears for long service life
- Motors: usable power 27 W
- Speed range: 5 to 14 rpm
- Output via 200 mm lead
- UL approved



Part numbers

| | | 33 W | 33 W |
|--|-------------------|---------|---------|
| Type | | 828325 | 828325 |
| Voltages | | 12 V | 24 V |
| Standard speed (rpm) | | 2600 | 2600 |
| Output speed (rpm) | Ratios (i) | | |
| 14 | 130 | ● | ● |
| 11 | 162.5 | ● | ● |
| 9 | 216.7 | ● | ● |
| 7 | 260 | ● | ● |
| 6 | 338 | ● | ● |
| General characteristics | | | |
| Motor | | 828300 | 828300 |
| Gearbox | | 810326 | 810326 |
| Maximum permitted torque from gearmotor under continuous conditions for 10 millions turns (Nm) | | 6 | 6 |
| Axial load dynamic (daN) | | 3.5 | 3.5 |
| Radial load dynamic (daN) | | 5 | 5 |
| Max. output power (W) | | 33 | 33 |
| Nominal output (W) | | 27 | 27 |
| Gearbox case temperature rise (°C) | | 50 | 50 |
| Weight (g) | | 1400 | 1400 |
| Approvals | | UL 1004 | UL 1004 |

Product adaptations



- Special supply voltage
- Special cable length
- Optical or Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special adaptor plate
- UL/CSA logo on label
- High-speed version 828320

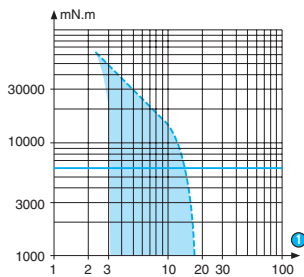
Stocked product

Product made to order

To order, see page 18

Curves

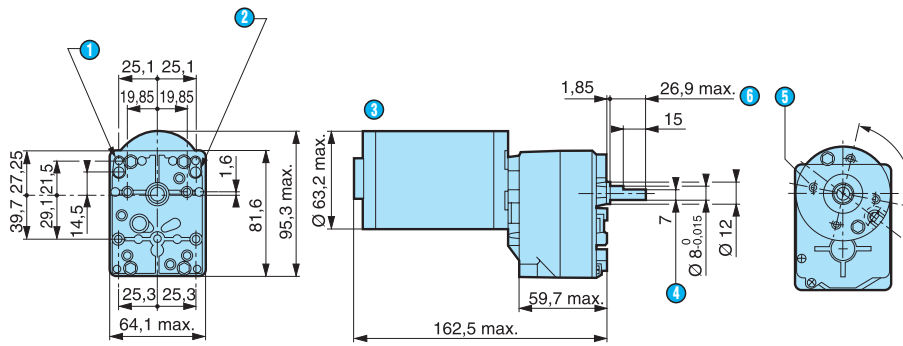
Curve: torque/nominal speed



① rpm

Dimensions

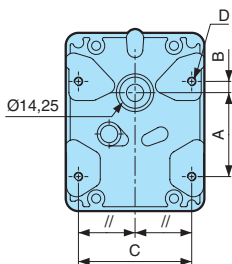
828325



- ① 3 holes M5 at 120° depth 7.5 mm
- ② 8 holes M4 depth 7.5 mm
- ③ Lead length 200 mm
- ④ 7 across flats
- ⑤ 4 holes M5 over $\varnothing 40$ depth 7 mm
- ⑥ Shaft pushed-in

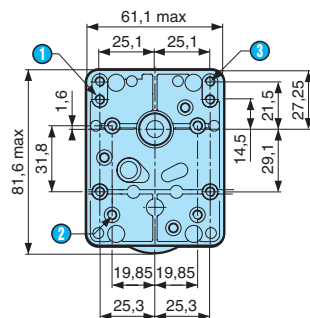
Options

Cover E



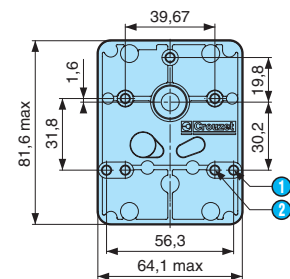
Special fixing holes can be made

Cover 1



- ① 4 holes M4 depth: 7.5 mm
- ② 3 holes M5 at 120° depth: 7.5 mm
- ③ 4 holes M4 depth: 7.5 mm

Cover 2



- ① 3 holes M4 depth: 7.5 mm
- ② 4 x 8-32 UNC-2B holes depth: 7.5 mm

Other information

Options

- 48 V motor
- Drawn cup needle bearings on gearbox output shaft
- Cover 1 or 2 or E
- Shaft diameter 9.52 or 8 mm

D.C. geared motors with brushes

→ 10 Nm Right-angle gearbox with 33 W motor

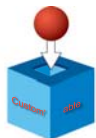
- Output perpendicular to motor
- Ideal for short reduction ratios
- Silent-running gearbox
- Non-reversible movement at high ratios
- UL approved



Part numbers

| | | | 33 W | 33 W | 33 W |
|----------------------------------|-----------------------|--------|-----------------|-----------------|-----------------|
| Type | | | 808310 | 808310 | 808310 |
| Voltages | | | 12 V | 24 V | 48 V |
| Speed (rpm) | Available torque (Nm) | Ratios | | | |
| 300 | 0.45 | 5 | 80831001 | 80831007 | 80831013 |
| 150 | 0.8 | 10 | 80831002 | 80831008 | 80831014 |
| 75 | 1.8 | 20 | 80831003 | 80831009 | 80831015 |
| 50 | 2.1 | 30 | 80831004 | 80831010 | 80831016 |
| 30 | 2.9 | 50 | 80831006 | 80831012 | 80831018 |
| General characteristics | | | | | |
| Motor | | | 828300 | 828300 | 828300 |
| Gearbox | | | 810410 | 810410 | 810410 |
| Maximum permitted torque (Nm) | | | 10 | 10 | 10 |
| Axial load dynamic (daN) | | | 10 | 10 | 10 |
| Radial load dynamic (daN) | | | 15 | 15 | 15 |
| Operating temperature range (°C) | | | -10 → +40 | -10 → +40 | -10 → +40 |
| Service life (h) | | | 5000 | 5000 | 5000 |
| Weight (g) | | | 2110 | 2110 | 2110 |
| Approvals | | | UL 1004 | UL 1004 | UL 1004 |

Product adaptations



- Encoder with 1, 5, 12 pulses/revolution - 1 or 2 channels, or 48 pulses/revolution - 1 channel
- 2-channel encoder, 200, 500 or 1000 pulses/revolution
- Left-hand, right-hand, double, special shaft
- Special connectors
- Special reduction ratio
- UL/CSA logo on label
- With 828305 - 67 W motor

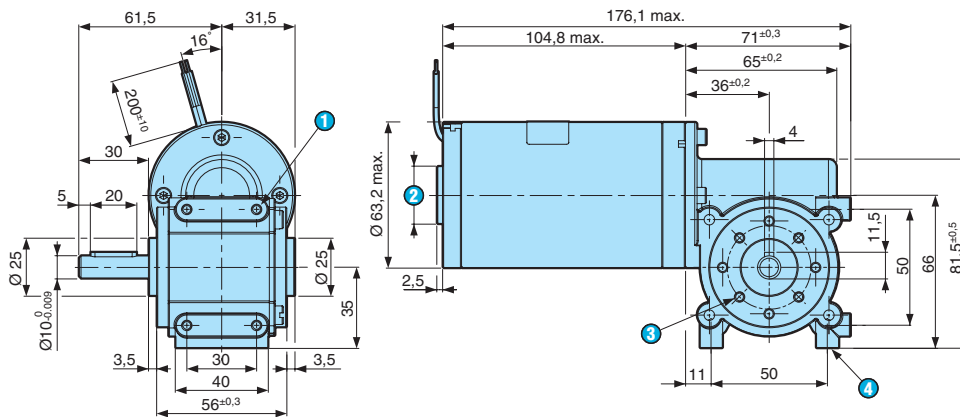
Stocked product

Product made to order

To order, see page 18

Dimensions

808310



- ① 4 x M5 depth 8 mm
- ② Centring diameter
- ③ 4 x M4 over $\varnothing 36$ - depth 8 mm
- ④ 4 x M5 - depth 8 mm

D.C. geared motors with brushes

→ 10 Nm Right-angle gearbox with 194 to 255 W motor

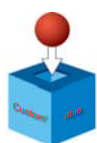
- Output perpendicular to motor
- Ideal for short reduction ratios
- Silent-running gearbox
- Non-reversible movement at high ratios
- UL approved



Part numbers

| | | | 194 W | 255 W |
|------------------------------------|-----------------------|--------|-----------------|-----------------|
| Type | | | 808910 | 808910 |
| Voltages | | | 24 V | 48 V |
| Speed (rpm) | Available torque (Nm) | Ratios | | |
| 640 | 0.7 | 5 | 80891001 | 80891007 |
| 320 | 1.3 | 10 | 80891002 | 80891008 |
| 160 | 2.9 | 20 | 80891003 | 80891009 |
| 107 | 3.4 | 30 | 80891004 | 80891010 |
| 64 | 4.5 | 50 | 80891006 | 80891012 |
| General characteristics | | | | |
| Motor | | | 828900 | 828900 |
| Gearbox | | | 810410 | 810410 |
| Maximum permitted torque (Nm) | | | 10 | 10 |
| Axial load dynamic (daN) | | | 10 | 10 |
| Radial load dynamic (daN) | | | 15 | 15 |
| Operating temperature range (°C) | | | -10 → +40 | -10 → +40 |
| Temperature rise at 50% cycle (°C) | | | 50 | 50 |
| Service life (h) | | | 5000* | 5000* |
| Weight (g) | | | 2520 | 2520 |
| Approvals | | | UL 1004 | UL 1004 |

Product adaptations



- Encoder with 1, 5, 12 pulses/revolution - 1 or 2 channels, or 48 pulses/revolution - 1 channel
- 2-channel encoder, 200, 500 or 1000 pulses/revolution
- Left-hand, right-hand, double, special shaft
- Special connectors
- Special reduction ratio
- UL/CSA logo on label

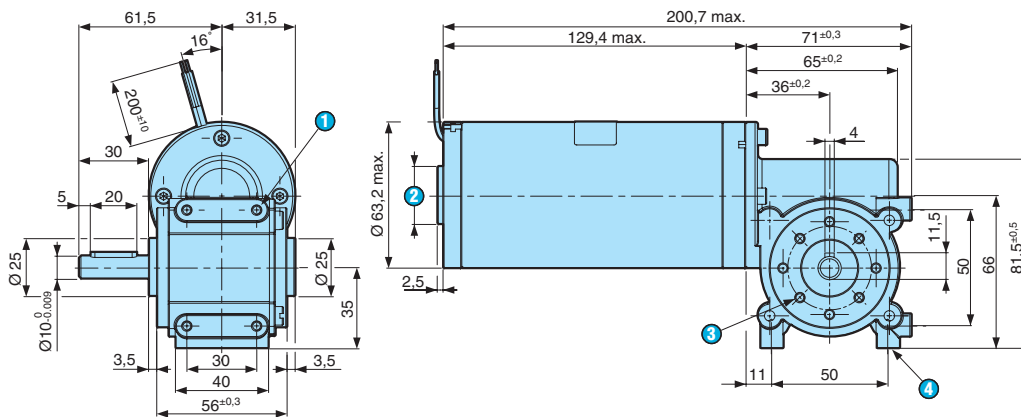
Stocked product

Product made to order

To order, see page 18

Dimensions

808910



- ① 4 x M5 depth 8 mm
- ② Centring diameter
- ③ 4 x M4 over Ø 36 - depth 8 mm
- ④ 4 x M5 - depth 8 mm

User information

* Operation at available torque with a 50% load factor to prevent overheating, or continuous operation at 50% of available torque.

D.C. geared motors with brushes

→ 15 Nm 22 and 42 Watts

- Torque rating of gearboxes: 0.8 to 15 Nm
- Associated DC motors: 20 to 32 W
- Planetary DC geared motors with brushes
- Speed range: 11 to 454 rpm

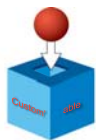


Part numbers

| | | | 22 W | 42 W |
|------------------|-------------|--------|--------------|--------------|
| Type | | | 808092 | 808593 |
| Voltages | | | 12 V or 24 V | 12 V or 24 V |
| Number of stages | Speed (rpm) | Ratios | | |
| 1 | 454 | 6.75 | ● | - |
| 1 | 477 | 6.75 | - | ● |
| 2 | 122 | 25.0 | ● | - |
| 2 | 128 | 25.0 | - | ● |
| 2 | 69 | 46 | ● | - |
| 2 | 70 | 46 | - | ● |
| 3 | 33 | 93 | ● | - |
| 3 | 34 | 93 | - | ● |
| 3 | 20 | 169 | ● | - |
| 3 | 19 | 169 | - | ● |
| 3 | 12 | 308 | ● | - |
| 3 | 11 | 308 | - | ● |

| General characteristics | | 22 W | 42 W |
|--------------------------------|--|---|--|
| Motor | | 828005 | 828500 |
| Gearbox | | 810492 | 810493 |
| Max. torque (Nm) | | 0.8 (1 stage) 2 (2 stages) 4 (3 stages) | 3 (1 stage) 7.5 (2 stages) 15 (3 stages) |
| Efficiency (%) | | 0.75 (1 stage) 0.7 (2 stages) 0.65 (3 stages) | 0.8 (1 stage) 0.75 (2 stages) 0.7 (3 stages) |
| Radial load dynamic (daN) | | 1.5 (1 stage) 3 (2 stages) 4.5 (3 stages) | 16 (1 stage) 23 (2 stages) 30 (3 stages) |
| Axial load dynamic (daN) | | 0.5 (1 stage) 1 (2 stages) 1.5 (3 stages) | 5 (1 stage) 8 (2 stages) 11 (3 stages) |
| Output ball bearing | | - | ✓ |
| Sintered bronze output bearing | | ✓ | - |
| Casing | | Plastic | Metal |
| Approvals | | - | UL 1004 |

Product adaptations



- Special supply voltage
- Special cable length
- Optical or Hall effect encoder
- Special connections
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special adaptor plate
- Low-noise version
- UL/CSA logo on label
- With other 82800 and 82810 motors

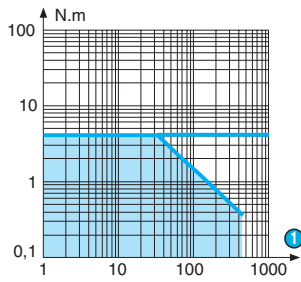
Stocked product

Product made to order

To order, see page 18

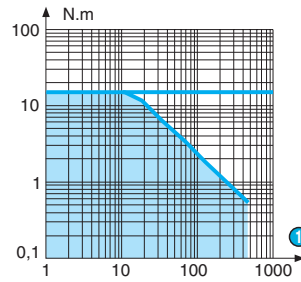
Curves

808092



① rpm

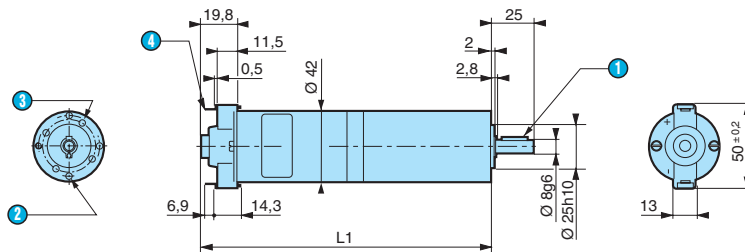
808593



① rpm

Dimensions

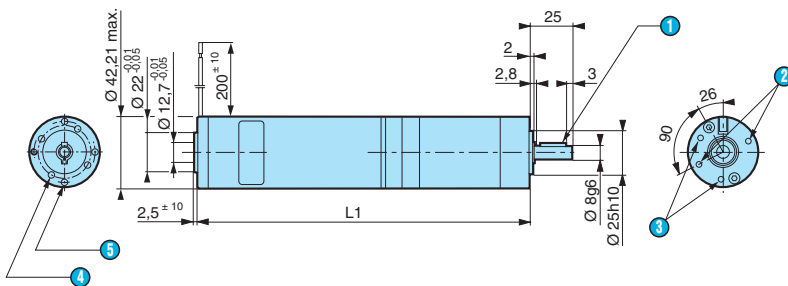
808092



- ① Key 3 x 3 x 16
- ② 4 M4 x 10 over Ø 36
- ③ 4 holes for M3 self-tapping screws over Ø 32, depth 10
- ④ 2 x 4.75 tags

L1 1 stage: 134 mm
 L1 2 stages: 147 mm
 L1 3 stages: 160 mm

808593



- ① Key 3 x 3 x 16
- ② 2 M3 x 0.5 at 180°, depth 5.5 over Ø 32
- ③ 2 M3 x 0.5 at 120°, depth 5.5 over Ø 32
- ④ 4 M4 x 10 over Ø 36
- ⑤ 4 M3 x 10 over Ø 32

L1 1 stage: 162 mm
 L1 2 stages: 175 mm
 L1 3 stages: 188 mm

D.C. geared motors with brushes

→ 25 Nm 67 and 195 Watts

- Torque rating of gearboxes: 2 to 25 Nm
- Associated DC motors: 47 to 90 W
- Planetary DC geared motors with brushes
- Speed range: 11 to 454 rpm
- UL approved



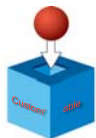
Part numbers

| | | | 67 W | 195 W |
|------------------|-------------|--------|--------------|--------|
| Type | | | 808394 | 808995 |
| Voltages | | | 12 V or 24 V | 24 V |
| Number of stages | Speed (rpm) | Ratios | | |
| 1 | 410 | 6.75 | ● | - |
| 1 | 474 | 6.75 | - | ● |
| 2 | 110 | 25.0 | ● | - |
| 2 | 128 | 25.0 | - | ● |
| 2 | 62 | 46 | ● | - |
| 2 | 70 | 46 | - | ● |
| 3 | 30 | 93 | ● | - |
| 3 | 34 | 93 | - | ● |
| 3 | 18 | 169 | ● | - |
| 3 | 19 | 169 | - | ● |
| 3 | 11 | 308 | ● | - |
| 3 | 11 | 308 | - | ● |

General characteristics

| | 67 W | 195 W |
|--------------------------------|---|--|
| Motor | 828305 | 828900 |
| Gearbox | 810494 | 828495 |
| Max. torque (Nm) | 2 (1 stage) 5 (2 stages) 10 (3 stages) | 4 (1 stage) 12 (2 stages) 25 (3 stages) |
| Efficiency (%) | 0.75 (1 stage) 0.7 (2 stages) 0.65 (3 stages) | 0.8 (1 stage) 0.75 (2 stages) 0.7 (3 stages) |
| Radial load dynamic (daN) | 20 (1 stage) 32 (2 stages) 45 (3 stages) | 20 (1 stage) 32 (2 stages) 45 (3 stages) |
| Axial load dynamic (daN) | 6 (1 stage) 10 (2 stages) 15 (3 stages) | 6 (1 stage) 10 (2 stages) 15 (3 stages) |
| Output ball bearing | Yes | Yes |
| Sintered bronze output bearing | No | No |
| Approvals | UL 1004 | UL 1004 |

Product adaptations



- Special supply voltage
- Special cable length
- Optical or Hall effect encoder
- Special connectors
- Special shaft
- Special reduction ratio
- Special materials for gears
- Special adaptor plate
- UL/CSA logo on label
- Mechanical holding brake

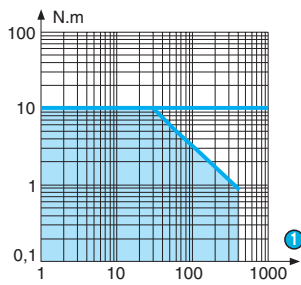
Stocked product

Product made to order

To order, see page 18

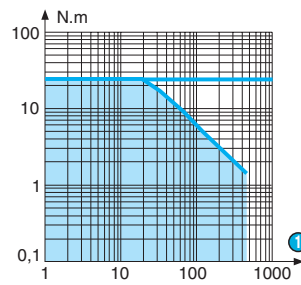
Curves

808394



① rpm

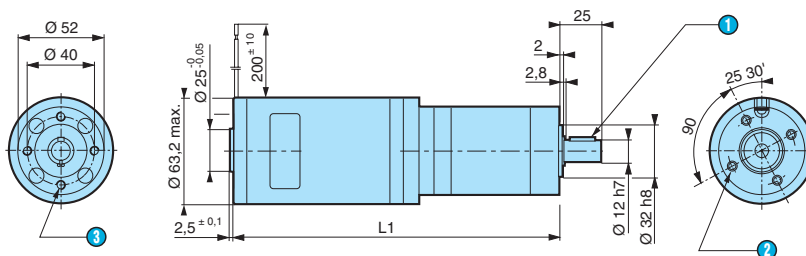
808995



① rpm

Dimensions

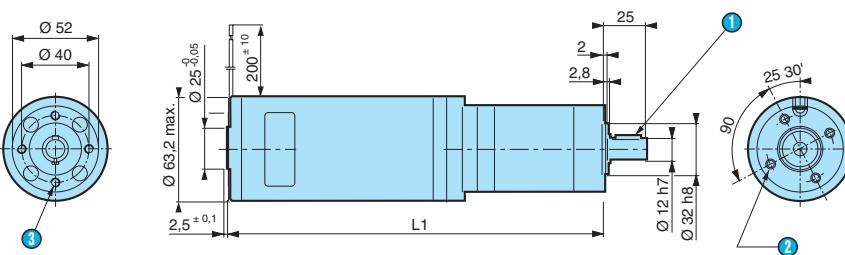
808394



- ① Key 4 x 4 x 16
- ② 4 M5 x 0.86 h depth 7 over $\varnothing 40$
- ③ 4 M5 x 10

L1 1 stage: 159 mm
 L1 2 stages: 173 mm
 L1 3 stages: 187 mm

808995



- ① Key 4 x 4 x 16
- ② 4 M5 x 0.8 h depth 7 over $\varnothing 40$
- ③ 4 M5 x 10

L1 1 stage: 184 mm
 L1 2 stages: 198 mm
 L1 3 stages: 212 mm



D.C. motors and geared motors without brushes and Control electronics



Brushless

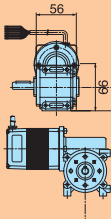
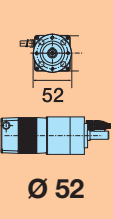
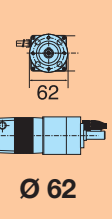
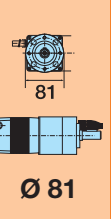
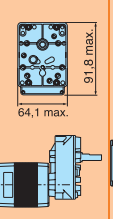
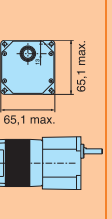
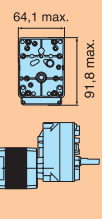


D.C. motors and geared motors without brushes (brushless) and

2

Motors and geared motors

| Gearbox | Nominal torque (Nm) |
|---------|---------------------|
| | Type of gearbox |

| 8 | 25 | 50 | 120 | 1.2 | 5 | 6 |
|---|---|--|---|---|---|---|
| 81041 | 810495 | 810496 | 810497 | 810320 | 81035 | 810325 |
|  |  |  |  |  |  |  |
| | Ø 52 | Ø 62 | Ø 81 | | | |
| 801415 p. 120 | 801495 p. 122 | 801496 p. 124 | | | | |
| 801410 p. 120 | * | 801496 p. 124 | | * | * | * |
| 801815 p. 126 | | 801896 p. 128 | 801897 p. 130 | | | |
| 801810 p. 126 | | * | 801897 p. 130 | | | |
| * | | | 801997 p. 132 | | | |

Direct drive motors

| Power range | Integrated electronics | Part number |
|-------------|------------------------|---------------|
| 20 W | Without | 801405 p. 114 |
| 60 W | With | 801400 p. 116 |
| 60 W | Without | 801805 p. 114 |
| 120 W | With | 801800 p. 118 |
| 120 W | Without | 801905 p. 114 |
| 200 W | | |

High-performance direct drive motors/Designed and built to customer specification

| | | | | |
|---|---|---|---|--|
| 51 mm diameter | 28 mm diameter | 46 mm diameter | 86 mm diameter | |
|  |  |  |  |  |
| p. 156 | p. 152 | p. 154 | p. 160 | |

Torque: 0.1 to 5 Nm
Size: 12.5 to 150 mm
Speed: 100 to 100,000 rpm

* Adapted



Brushless

Control electronics

| Control electronics | | | | | |
|---|---|---|---|---|---|
| Integrated electronics | | | External electronics | | Special electronics as per customer specification |
| SNi 10 | TNi 20 | Motomate | BDE 30 | BDE 40 | |
|  |  |  |  |  |  |
| | | | p. 134 | p. 137 | * |
| ■ | * | * p. 142 | | | * |
| | | | p. 134 | p. 137 | * |
| | ■ | ■ p. 142 | | | * |
| | | | | p. 137 | * |
| | | | | ■ p. 137 | * |

■ Standard * Adapted

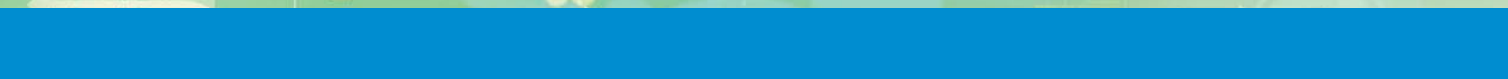
Functions of the control electronics for D.C. brushless motors

| Control circuits for brushless motors | | Internal | |
|---|--------------------------|--|---|
| | |  SNI 10 |  TNI 20 |
| Supply voltage (V ~) | Min | 18 | 18 |
| | Max | 28 | 37 |
| Current (A) | Nominal | 2 | 5 |
| | Max | 3 | 6 |
| Torque limiting | | | ■ |
| Speed adjustment | | ■ | ■ |
| Positioning | | | M |
| Torque limit adjustment | 0-10 V + PWM | | ■ |
| Speed adjustment | 0-10 V | | ■ |
| | PWM | | ■ |
| | 0-10 V + PWM | ■ | |
| | Open loop | ■ | * |
| | Closed loop | ■ | ■ |
| Data bus | | | * CAN, Modbus |
| 2 quadrants (without braking) | | ■ | * |
| 4-quadrant- braking | Fixed, without rejection | ■ | ■ |
| | Adjustable | | |
| | Energy-absorbing | | |
| Hold in position | Adjustable | | * |
| Encoder output (3 x number of poles) | | ■ | ■ |
| Direction output | | | ■ |
| Torque limit reached output | | | ■ |
| Safety stop after 1 second of stalling | | ■ | * |
| "Current limited to max. current" safety function | | ■ | ■ |
| Electronic temperature safety function | | ■ | ■ |
| Motor temperature safety function | | | ■ |
| Emergency stop by motor short-circuit | | | * |

■ Standard * Adapted

M With external logic controller (e.g. Millenium 3, Crouzet)

Control electronics



| | External | | |
|--|---|---|---|
| |  |  |  |
| | Motomate | BDE 30 | BDE 40 |
| | 20 | 18 | 11 |
| | 37 | 37 | 37 |
| | 5 | 5 | 10 |
| | 6 | 6 | 14 |
| | ■ | ■ | ■ |
| | ■ | ■ | ■ |
| | ■ | M | M |
| | | ■ | ■ |
| | | ■ | |
| | | ■ | |
| | | | ■ |
| | | * | * |
| | | ■ | ■ |
| | | | * CAN, Modbus |
| | | * | * |
| | | ■ | ■ |
| | | ■ | ■ |
| | | ■ | ■ |
| | | ■ | ■ |
| | | ■ | ■ |
| | | * | * |
| | | ■ | ■ |
| | | ■ | ■ |
| | | | ■ |
| | | * | * |

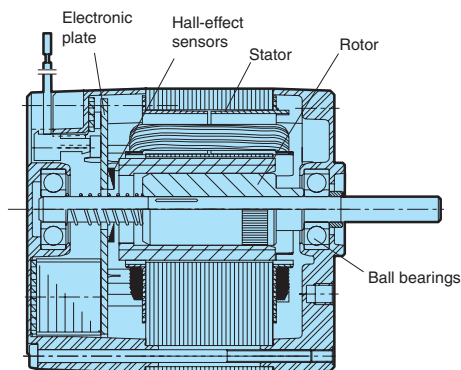
Logic controller
(4 inputs/4 outputs)
integrated in the motor with
TNi 20 control electronics

■ Standard * Adapted M With external logic controller (e.g. Millenium 3, Crouzet)

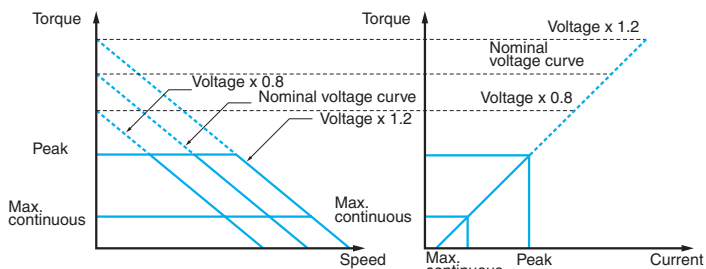
Basic concepts - Brushless motors and geared motors

Principle

D.C. brushless motors principally comprise a wound stator and a permanent magnet rotor. They differ from D.C. brushed motors, which have stator magnets and rotor windings together with a commutator, which switches over the power supply to the coils according to the position of the rotor. Brushless motors require control electronics to carry out this switching.

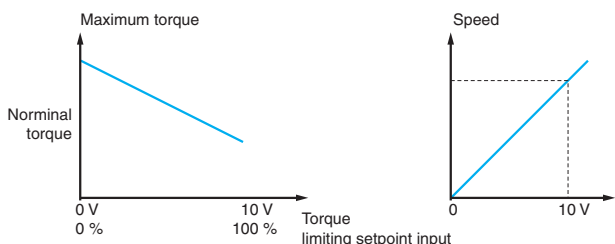
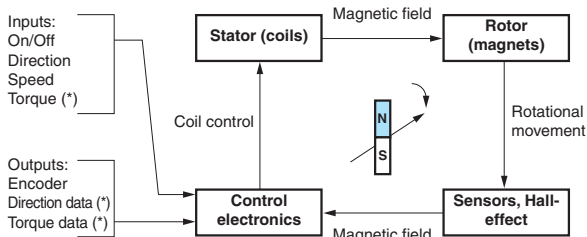


Since brushed DC and brushless DC structures are similar, the performances obtained are of the same type. Linear curves, performances varying according to the supply voltage.



By introducing an electronic circuit to support the Hall-effect sensors inside the motor (they decode the position of the rotor so that the control electronics know when to switch over the coils), additional functions (e.g. a temperature probe) or even in some cases the control electronics themselves can be added.

The motor performance is very closely linked to the control electronics (current and speed limiting, control loop settings, etc.).



Customer requirements vary so widely in terms of functions, simplicity, connections, dimensions, price ranges, etc., that it is impossible to provide a single electronics system to meet every requirement.

That is why Crouzet offers a range of brushless motors without electronics (allowing the customer to use its own electronics system with its specific characteristics) or with internal control electronics, or with control electronics external to the motor.

The control electronics are designed and manufactured by Crouzet Automatismes too. We are therefore able to offer our customers tailored software adaptations to further improve operation in the machines or even to integrate the machine functions.

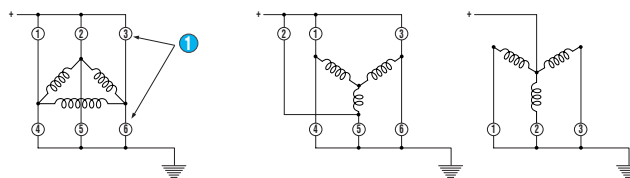
Motors without electronics

Brushless motors are generally designed with a 3-phase configuration (3 coils, 3 output leads) because the efficiency is better, the torque less pulsed and the control more accurate.

All the brushless motors in our range are 3-phase motors.

The coils are interconnected in the motor in a delta or star configuration.

1 Switching transistors



The motors can be supplied with power at any supply voltage within the limits of their isolation system (a dielectric strength of 500 V means that the motor must not be supplied with a supply voltage above 75 V DC in accordance with European regulations).

The performance of a motor is determined by the following factors:

- The capacity to deliver the highest possible torque without overheating (causing the coils to be destroyed). We refer here to torque peak and maximum continuous torque
- Within the smallest possible dimensions (motor diameter and length)
- With the lowest possible electrical power consumption. We refer here to motor constant (= torque/UI^{1/2}).

This key data is not dependent on the motor winding; it is linked to the size of the motor, the magnets (shape and performance), the quality of the magnetic steel sheets, the shapes of the poles, the air gap, etc., all of which are independent of the winding.

The speed is obtained by altering the supply voltage or the winding resistance (number of turns, diameter).

Speeds and currents vary according to the windings and the supply voltages used.

The most important values are the electromotive force produced by the magnets in the coils, the resistance and the inductance of the motor, which reduce the build-up of current.

Some explanations of the data provided in the catalogue:

→ Maximum speed

Above this speed, mechanical problems may damage the rotor (centrifugal force on the magnets). Higher speeds are available on special request (we can use our expertise to obtain speeds of up to 100,000 rpm).

A common error:

Confusing the maximum speed with the motor speed

→ Speed of rotation

The speed of rotation of the motor depends on the supply voltage that you use and the torque that the motor has to deliver, depending on your machine. Therefore the speed has to be calculated. All Crouzet sales staff have tools for doing this. However, a good approximation can be obtained using the following equation:

$$\text{Voltage} = \text{speed} \times \text{EMF constant} + \text{resistance} \times \text{torque} / \text{torque constant}$$

→ Torque peak

This is the torque that can be delivered for 10 seconds without exceeding a temperature of 125/155°C in the motor windings (starting from cold).

→ Maximum continuous torque

Maximum torque that can safely be produced continuously. This value is measured with the motor mounted on an aluminium heatsink until the windings reach a temperature of 125/155°C.

All torque values are given at rest; the actual torque for the user varies according to the speed because the losses (bearing friction + iron losses) vary according to the speed.

→ Motor constant

$$= \text{Torque peak} / (U I)^{1/2}$$

This describes the ability of the motor to deliver a torque with very little energy (it replaces the concept of efficiency when the speed is zero).

The higher the constant, the better the motor.

→ Electrical time constant

$$= L/R = \text{time taken for the current to build up in the motor (at 63\% of the value)}$$

This value is used by electronics designers to determine how to adjust their current controller, etc.

→ Mechanical time constant

This is the time taken by the motor to reach 63% of its stabilised speed (with the torque limited to the "torque peak").

It is an indicative value because it changes as soon as the user adds the inertia of his application.

→ Energy losses at torque peak

$$= R \times I_{\text{peak}}^2 = \text{Theoretical energy losses at torque peak (cold motor)}$$

Used to calculate the "motor constant".

→ Torque/speed factor (at zero impedance)

This is the theoretical slope of the torque/speed curve when the inductive effect of the winding is discounted.

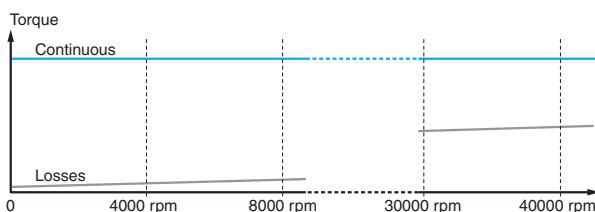
This slope is therefore a "true" value at very low speeds when inductance is negligible.

However, it can only be used when the motor is running at high speed. Nevertheless it does allow different motors to be compared.

→ Friction torque

This is a "friction-equivalent torque" representing the total value of the losses to be deducted from the peak and continuous torques.

Its typical shape is as follows:



For speeds below 10000 rpm its value is low. In this case the calculations are simplified by assuming it to be constant.

→ Rotor inertia

The inertias (application + rotor) create an over-torque to be delivered by the motor when the speed value changes.

So these inertias have to be known before the over-torques can be calculated.

As a general rule, the torque peak requirement is determined by the sum of the inertias (returned to the rotor) x the maximum acceleration required.
 $C_{\text{peak}} \geq \text{total inertia} \times \text{max. acceleration}$

→ Thermal resistance

This value is used to quickly determine the temperature of the winding based on the current consumption in the steady state.

It is obtained from the following calculation:

$$R_{\text{th}} = ((\text{hot resistance}) \times (I_{\text{constant torque}})^2) / (\text{max. winding temp.} - 25^\circ\text{C})$$

→ Max. winding temperature

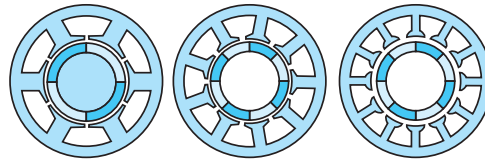
Value not to be exceeded in order to prevent damage to the components adjacent to the coils (rotor magnets or winding)

→ Number of poles

This is the number of north and south poles of the rotor magnets. It can be 2 or 4 or 6 or 8, etc.

The higher the number, the easier it is to control the motor at low speed.

The lower the number, the less influence the inductance has at high speed.



→ Resistance

Value measured between 2 motor leads when the motor is cold

Its value varies with the actual temperature of the windings

→ Voltage at torque peak

Theoretical voltage to apply in order to obtain sufficient current to deliver the torque peak AT REST.

Be careful not to make this common error:

Confusing it with the supply voltage necessary to turn the motor

→ Current at torque peak

Theoretical value of the current to deliver the torque peak.

Check that the power supply and the control electronics are compatible with the maximum current you require (at torque peak or below, depending on the application).

→ Torque constant

= Torque/current = constant if the torque is the "magnetic motor torque"

It is therefore the torque delivered by the motor in the application + the "friction-equivalent" torque due to friction losses in the bearings and the iron losses.

NB: Torque constant (Nm) = EMF constant (rd/s)

→ EMF

Back electromotive force

This derives directly from the rotor magnets which turn in front of the coils, thereby creating an induced voltage.

It is proportional to the speed and is alternating in the coils but only the upper part is used owing to the switching electronics.

The difference in voltage between the power supply and the back electromotive force allows a current to be generated and a motor torque to be obtained.

→ Inductance

All windings have an inductance. The inductance has a natural tendency to oppose the rapid changes in the current passing through the windings.

The higher the speed of the motor, the faster the currents are inverted in the windings and the more the inductance limits the value of the current.

Key points when choosing a motor:

→ For "stabilised speed" drives

The torque value to be delivered must be less than the "maximum continuous torque - friction-equivalent torque".

From the Power/Speed table choose the most appropriate winding for your application according to the supply voltage.

The lower the motor resistance, the lower the supply voltage needed to reach high speeds. This catalogue contains the low-resistance windings.

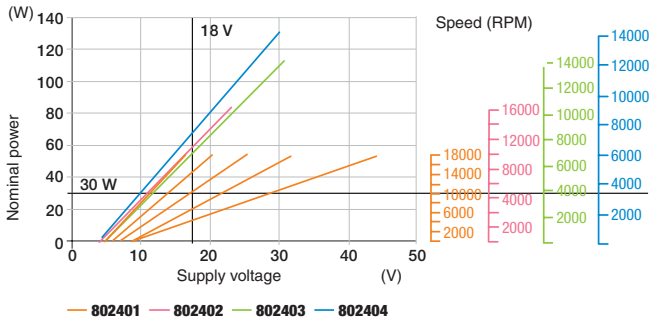
The curves also show other resistance values which are available as standard. Please refer to the Crouzet Automatismes website for information about their characteristics.

The lowest resistances also work at higher voltages since the control electronics adjust the speed of rotation according to your settings.

The most suitable winding for your application will be one with a resistance slightly less than but close to your requirement. In this case the control electronics switch the lowest currents and the efficiency is improved.

→ Example of how to choose a winding

- "Stabilised speed" operation: Required speed: 4000 rpm under 18 volts at 0.071 Nm. This equates to a nominal power requirement of $4000 \times 0.071 \times 2\pi/60 = 30 \text{ W}$
 If we take the curves for a motor which delivers slightly less than 0.071 Nm in continuous operation, we can read directly from the curves.



From reading the curves we see that motors 802401 and 802402 need to run at speeds above 4000 rpm in order to reach 30 W (9000 and 5000 rpm). They are not suitable.

By contrast, motors 802403 and 802404 reach 30 W at speeds above 3500 and 3000 rpm respectively. These two motors are able to deliver the necessary power. 4000 rpm is "above" the 30 W line.

Now we need to check whether there is a winding that will allow operation with electronics operating at 18 volts. The answer is yes, the two motors need a voltage greater than or equal to 11 and 13 volts to run at 4000 rpm. Their curves are to the left of the 18 V line at 4000 rpm.

Now in order to allow for production tolerances and temperature-related changes in characteristics, we take a safety margin of 20% on the value of the torque (and therefore of the power). We therefore require a power of 36 W (30×1.2).

On that basis only motor 802404 is suitable.

The curves included in this catalogue take account of the inductive effect of the motor on high-speed performance and can therefore be used directly.

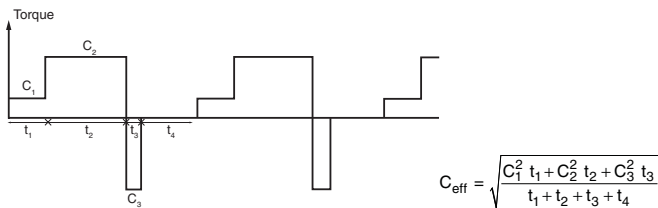
→ "Accelerating/decelerating" operation

- Determining the torque peak requirement:

This depends on the inertias to be driven and the accelerations required in the application. The torque peak of the motor has to be greater than or equal to the total inertia to be driven (application + motor) x acceleration. $C_{peak} \text{ (Nm)} \geq \text{Inertia (kgm}^2) \times \text{acceleration (rad/s}^2)$.

- Determining the continuous torque requirement:

This involves determining what will cause the motor to "heat up". We therefore simply calculate the RMS torque to be delivered.



- Determining the motor winding

Once a motor has been chosen on the basis of its torque capacities, the required winding must be determined. This depends of course on the supply voltage to be used. The higher the voltage or the lower the resistance of the winding, the higher the maximum possible speed and the higher the current in the motor. At the same time, the higher the current, the more expensive the control circuit (transistors and EMC). It is therefore important to choose the right winding.

"Accelerating/decelerating" operations generally take place at relatively low speed where the inductive effect of the motors is virtually non-existent. It is therefore sufficient for the chosen winding to satisfy the following equation: $U - EMF > R \times \text{current}$.

In other words:

Voltage - (EMF constant x speed) > resistance x torque/(torque constant)
 This applies to each (torque and max. speed at this torque) in the application.

To avoid having to test every winding, they can be preselected by only choosing those for which: $EMF \text{ constant} < \text{voltage}/\text{max. speed}$

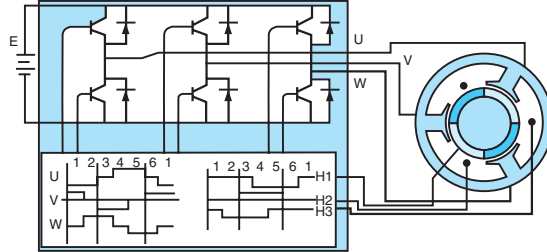
Motors with control electronics

There are many different brushless motor commands. They can be very simple or very complex.

The Crouzet control electronics included in this catalogue are designed to build many useful functions into the applications while remaining easy to use.

→ Power section and switching logic

All the control electronics include this section. Without them the motor cannot operate. They are both necessary and sufficient to run the motor.



Brushless motors with "2-wire" control electronics integrated into the motor are of this type.

The characteristics of the motor are similar to those of a D.C. motor. On start-up the motor builds up speed and tries to reach its no-load speed (the speed at which the EMF is virtually equal to the supply voltage), but the torque to be delivered to run the application limits it to a lower speed. When the machine torque varies, the motor speed varies correspondingly.

→ Speed control

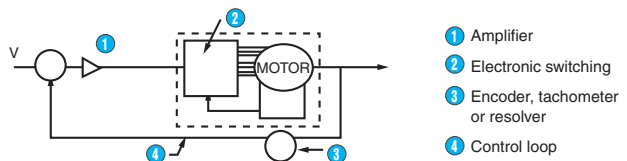
In order to have different speeds of rotation it is useful to have a speed control system which takes account of a setpoint fixed by the user.

A logic block is added to the control electronics to break up the supply voltage in the motor, thereby lowering the average voltage sent to the motor. This results in a drop in the "torque/speed" curve proportional to this setpoint. This type of control is called "open-loop control".

If the actual speed of the motor is also taken into account and compared with the setpoint, the control block automatically adapts the average voltage to maintain a constant speed, regardless of fluctuations in the torque being supplied to the machine. This type of control is called "closed-loop control".

Depending on the accuracy of the information about the "actual speed" of the motor, the motor speed control will be more or less accurate. Depending on the control parameters and the inertias to be driven, the control dynamics will be faster or slower.

The most cost-effective closed-loop speed controls use position information provided by the 3 Hall-effect sensors. More sophisticated speed controls require an encoder or tachometer outside the motor.

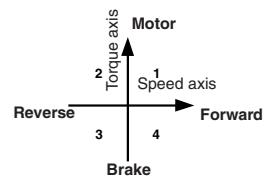


All the Crouzet control electronics included in this catalogue have a closed-loop speed control block which uses information from the Hall-effect sensors. There is therefore no need for an external encoder. Open-loop controls can be made to order.

The setpoints are either voltages (voltage supplied by a potentiometer) or PWM (fixed frequency with a variable cyclical ratio supplied by a PLC), sometimes both.

As well as influencing the average voltage sent to the motor, speed controls can also take into account the option of braking or not braking the motor when its speed is above the setpoint.

This is known as 2-quadrant control (without braking) or 4-quadrant control (with braking).



→ Torque limiting/control

Since the torque is linked directly to the current passing through the motor coils, limiting the current directly limits the value of the torque that can be delivered by the motor. This function is used to deliberately check the motor at certain moments in the operation of a system:

- If there is a risk of encountering an end stop or jamming, to prevent damage to the system:
- To generate an acceleration ramp
- To maintain a force (holding in position or pressed against an end stop)
- To control the tension of a tape, a display or a conveyor belt in the case of a drive between two motors

When the torque limiting function triggers a **"torque limit reached" information output**, it is easy to create automation systems which self teach the position of the operating limit stops when the machine starts up.

→ Current drawn

The currents drawn by the control electronics depend on the motors being driven and the torques to be delivered of course, but also on the speed control. When the electronics are not limiting the motor speed, the current absorbed is more or less equal to the current passing through the motor. When the control system reduces the motor speed (without changing the torque to be delivered), the current drawn by the electronics also falls. Therefore the current drawn by the speed control electronics is no longer representative of the torque delivered by the motor. Only the currents sent to the windings are representative.

→ Emergency stop by short-circuit

In order to stop the brushless motor as quickly as possible, the control electronics disconnect the motor from the power supply and short-circuit all the windings.

The EMF generated in the windings self-locks the motor very quickly by creating currents which are no longer limited by the control electronics. These currents trigger very high braking torques (NB: risk of weakening or mechanical damage to the machine). The kinetic energy is then dissipated as joule effect in the motor.

Since the braking torque decreases with the speed of rotation of the motor, depending on the application it may be useful to ensure a clean stop by means of a "position-holding torque" triggered at very low speed.

→ Braking

Braking means absorbing the energy of the mechanical system. There are several different types of braking, depending on the use made of this absorbed energy:

Regenerative braking converts the energy of the system into electrical current, which will be directed to the motor power supply.

Apart from batteries, most commercially available power supplies do not accept this type of current feedback (they are known as non-reversible). It is therefore necessary to ensure that the directed current can be consumed by another device, without which the power supply may be damaged or may trip its protection systems.

This type of braking is offered as standard in Crouzet external control circuits. The BDE40 electronics include a system for absorbing this directed energy using an external braking resistor.

By contrast, control circuits built into the motor have 'non-regenerative' braking as standard. This means that on braking the kinetic energy of the system is converted into heat inside the motor itself, with no feedback to the power supply. This is the most suitable type of braking for most applications.

However, if there is prolonged braking, the heat that is generated may trip the thermal protection of the motor. For high inertia applications, or operation as a generator:

PLEASE CONSULT CROUZET. Depending on the circumstances, our specialists will advise you to select either 2-quadrant control or regenerative braking.

→ Position holding

In applications requiring the position of a machine to be held when the motor is stopped (load lifting, barrier, turnstile), the "position holding" function is useful. In this function the motor is powered with a speed setpoint equal to zero. Torque limiting is therefore in operation, preventing the motor from running.

This function is also useful in cases where the motor is to be stopped completely after a deceleration. With speed control from an encoder generating a few pulses per revolution, it is difficult to determine the actual speed of the motor when it is close to zero. In order to stop at a fixed position, starting "position holding" when the speed drops below 100 rpm and the target position has been reached simplifies the settings.

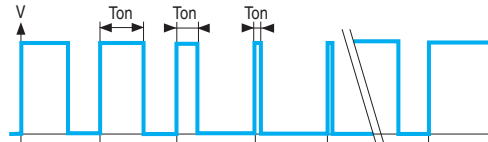
→ 0-10 V or PWM controls

If you want to control the motor from a potentiometer, it is advisable to choose a voltage control (0-10 V for example). For controls from a PLC, on the other hand, it is more customary (and less expensive) to use PWM control. For that reason we also offer electronics that are compatible with PWM controls.

→ PWM control

PWM (Pulse Width Modulation) control is a method of indicating the speed setpoint to the motor. **A PWM control motor should be chosen in the following cases:**

- Control by CROUZET Millenium logic controllers (see MOTOMATE information)
- Control by PLC with PWM outputs
- Control by digital control system



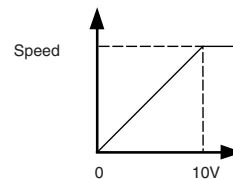
PWM control consists of pulse trains of fixed frequency (period "T") but variable width ("Ton" period of the pulse). The speed setpoint depends on the Ton/T ratio. However, it is independent of the voltage or frequency of the pulses, within the limits of the stated specifications.

| | |
|--------------|---|
| Ton/T = 0% | Speed setpoint = 0 |
| Ton/T = 100% | Speed setpoint = No-load speed of the motor |
| Ton/T = 50% | Speed setpoint = No-load speed of the motor/2 |

→ 0-10 V control

0-10 V voltage control is the other method of indicating the speed setpoint to the motor. **A 0-10 V input motor should be chosen in the following cases:**

- Control by potentiometer
- Control by PLC with analogue converter outputs
- Control by analogue control system



In this type of control, the speed setpoint depends on the voltage U at the speed setpoint input:

| | |
|----------|---|
| U = 0 | Speed setpoint = 0 |
| U ≥ 10 V | Speed setpoint = No-load speed of the motor |
| U = 5 V | Speed setpoint = No-load speed of the motor/2 |

→ Creating automation systems

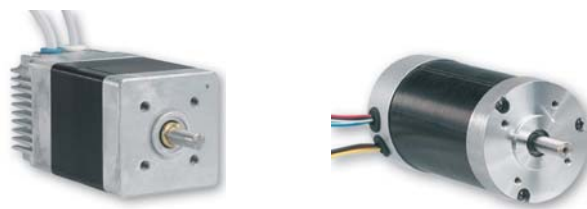
With a motor and control electronics which can be used to control speed, forces and the direction of movement, to accelerate and decelerate and count up and down the distance covered, it is easy to create automation systems from a PLC. Examples include the position control of a 1/4 turn or multiturn valve, creating a door opening/closing system, controlling and actuating a scrolling advertising banner, etc...

For simple applications Crouzet Automatismes can simplify your applications still further by integrating the functions of your application into the control electronics of the brushless motor. The BDE 40 electronic card, for example, has an oversize memory so that it can accommodate all your requirements. The control card inputs and outputs are then revised and modified to make your machine even more simple.

Brushless DC motors

→ 57 mm square and 57 mm Ø - 463 mNm continuous with Hall effect sensors

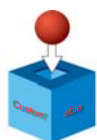
- Powerful motors (up to 150 W continuous at 24 V)
- Suitable for voltages between 6 and 75 V
- Ideal for applications where the control electronics have to be off centre due to the high ambient temperature
- For use in motors directly or with a reduction gear



Part numbers

| | 57 mm square | 57 mm square | Ø 57 mm |
|---|------------------|------------------|------------------|
| Type | 801405 | 801805 | 801905 |
| Part numbers | 80140510 | 80180506 | 80190502 |
| General characteristics | | | |
| Max. speed (rpm) | 10000 | 10000 | 8000 |
| Torque peak in (mNm) | 498* | 845* | 1160* |
| Maximum continuous torque (mNm) | 199** | 338** | 463** |
| Motor constant (mNm/W ^{1/2}) | 57 | 78 | 103 |
| Electrical time constant (ms) | 2.2 | 2.6 | 2.5 |
| Mechanical time constant (ms) | 15 | 17 | 22 |
| Energy losses at peak torque (W) | 77 | 116 | 127 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 3.2 | 6.1 | 10.6 |
| Detent torque (mNm) | 15 | 25 | 30 |
| Rotor inertia (gcm ²) | 50 | 105 | 230 |
| Thermal resistance (°C/W) | 5.7 | 3.8 | 3.4 |
| Max. coil temperature (°C) | 120 | 120 | 120 |
| Integrated temperature sensor | Yes | Yes | No |
| Number of phases | 3 (delta config) | 3 (delta config) | 3 (delta config) |
| Number of poles | 4 | 4 | 4 |
| Ambient operating temperature (°C) | -40 → 70°C | -40 → 70°C | -40 → 70°C |
| Dielectric strength at 500 V --- | 1000 MΩ | 1000 MΩ | 1000 MΩ |
| Service life (h) | 20000 | 20000 | 20000 |
| Output ball bearing | Yes | Yes | Yes |
| Weight (g) | 900 | 1300 | 1250 |
| Length (mm) | 73 | 94 | 114 |
| Protection index | IP54 | IP54 | IP20 |
| Comments | | | |
| Motor mounted on aluminium plate 254 x 254 x 10 mm thick to encourage heat flow | | | |
| * 10 sec. at 25°C ambient temperature | | | |
| ** 25°C ambient temperature and 120°C winding temperature | | | |
| Standard winding | | | |
| Phase-to-phase resistance (Ω) | 1.72 ± 12.5% | 0.44 ± 12.5% | 0.24 ± 12.5% |
| Voltage at peak torque (V) | 11.5 | 7.2 | 5.5 |
| Current at peak torque (A) | 6.7 | 16.3 | 23 |
| Torque constant (mN.m/A) | 74.5 ± 10% | 52 ± 10% | 50.4 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.0745 | 0.052 | 0.0504 |
| Back EMF constant (V/Krpm) | 7.8 ± 10% | 5.45 ± 10% | 5.28 ± 10% |
| Inductance (mH) | 3.8 ± 30% | 1.15 ± 30% | 0.59 ± 30% |

Product adaptations



- Connections for card BDE30
- Special shafts
- Lead length
- Other winding resistance values (see curve diagram for available values)
- Mechanical brake
- 200, 500, 1000 points/revolution encoder

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors

Stocked product

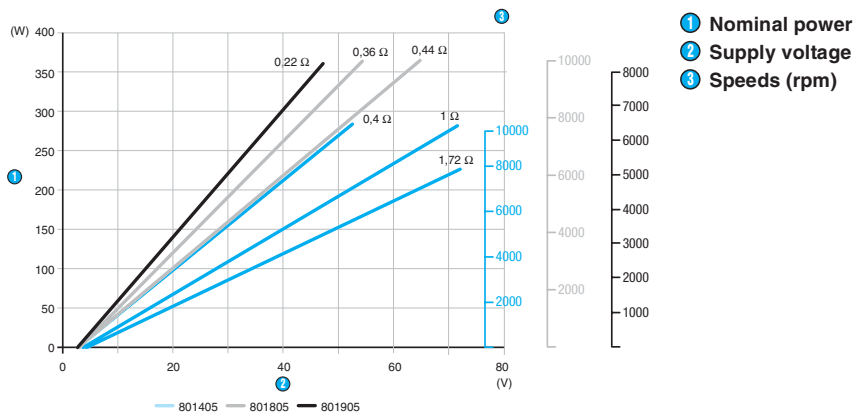
Product made to order

To order, see page 18



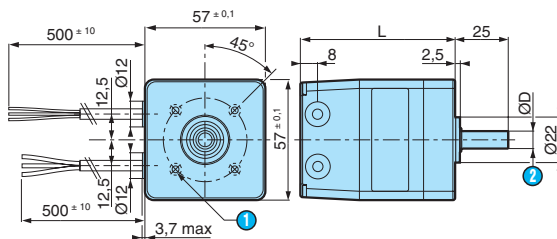
Curves

Power/Power supply



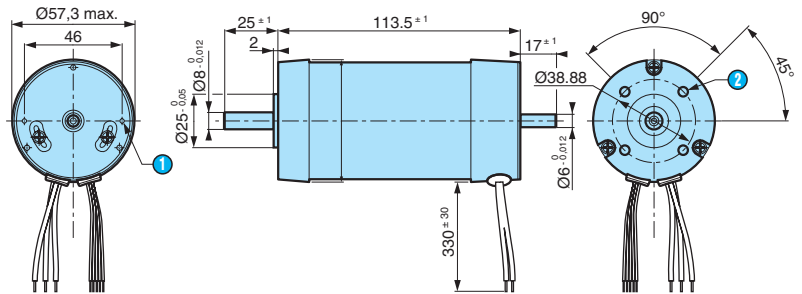
Dimensions

801405 - 801805



- 1 4 holes M5 over $\varnothing 40$ mm - depth of thread: 4.5 mm - depth of hole 6.6 mm
- 2 801405: D: $\varnothing 6 - 0.010 - 0.020$ mm
801805: D: $\varnothing 8 - 0.010 - 0.020$ mm
801405 - L: 73.2 mm max.
801805 - L: 94.2 mm

801905



- 1 2 x M2.5 - depth 4 min.
- 2 4 x M4 at 90° - depth 3 min., screw penetration ≤ 4 mm

Connections

Forward

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | 0 | 0 | 0V | +V | - |
| 1 | 1 | 0 | 0V | - | +V |
| 0 | 1 | 0 | - | 0V | +V |
| 0 | 1 | 1 | +V | 0V | - |
| 0 | 0 | 1 | +V | - | 0V |
| 1 | 0 | 1 | - | +V | 0V |

1 Winding

Reverse

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 0 | 1 | - | 0V | +V |
| 0 | 0 | 1 | 0V | - | +V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 1 | 0 | - | +V | 0V |
| 1 | 1 | 0 | +V | - | 0V |

1 Winding

Part number 801405 - 801805

| Wire colour | Connection name | Wire gauge (AWG) |
|-------------|------------------------------|------------------|
| Black | Winding 1 | 20 |
| Brown | Winding 2 | 20 |
| Red | Winding 3 | 20 |
| Red | + Hall power supply | 24 |
| Black | - Hall power supply (return) | 24 |
| Yellow | Sonde temp. | 24 |
| Orange | Hall 1 | 24 |
| Brown | Hall 2 | 24 |
| Green | Hall 3 | 24 |

Hall effect:

Voltage range: 4.5 → 24 V $\overline{\text{DC}}$
Max. current: 20 mA
Type of output: NPN open collector
Not protected against connection errors

Part number 801905

| Wire colour | Connection name | Wire gauge (AWG) |
|-------------|------------------------------|------------------|
| Red | Winding 1 | 20 |
| Yellow | Winding 2 | 20 |
| Black | Winding 3 | 20 |
| Red | + Hall power supply | 26 |
| Black | - Hall power supply (return) | 26 |
| Green | Hall 1 | 26 |
| Blue | Hall 2 | 26 |
| White | Hall 3 | 26 |

Hall effect:

Voltage range: 4.5 → 24 V $\overline{\text{DC}}$
Max. current: 20 mA
Type of output: NPN open collector
Not protected against connection errors

Brushless DC motors

→ 30 W motors with built-in electronic control SNI10

Ideal for small variable-speed automated systems

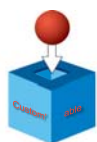
- Flexible: 4-quadrant variable speed control
- Complete: brake, encoder and class B EMC-compliant
- Discreet: compact and quiet
- Open: compatible with our logic controller PLCs
- High performance: excellent efficiency and long service life
- Safety measures on locking: torque limitation and automatic stop after 1 second



Part numbers

| | 801400 | 800400 |
|---|-----------------|-----------------|
| Speed control | 0-10 V and PWM | 0-10 V and PWM |
| Part numbers | 80140004 | 80040002 |
| Supply voltage (V) | 24 (18 → 28) | 24 (18 → 28) |
| No-load characteristics | | |
| Speed of rotation (rpm) | 3100 | 3100 |
| Absorbed current (A) | 0.2 | 0.2 |
| Nominal characteristics | | |
| Speed (rpm) | 2200 | 2200 |
| Torque (mNm) | 140 | 140 |
| Absorbed current (A) | 1.9 | 1.9 |
| Maximum characteristics | | |
| Start torque (mNm) | 220 | 220 |
| Starting current (A) | 3.0 | 3.0 |
| General characteristics | | |
| Speed regulation | 4 | 2 |
| Conformity to EMC Directive in accordance with class (EN 55022) | B | B |
| Insulation class (conforming to IEC 85) | B (120°C) | B (120°C) |
| Casing temperature rise at 40°C ambient max. (°C) | 15 | 15 |
| Thermal time constant (mn) | 15 | 15 |
| Inertia (g.cm ²) | 50 | 50 |
| Weight (g) | 800 | 800 |
| Acoustic pressure at 50 cm (dBA) | 40 | 40 |
| Service life L10 (h) | 20000 | 20000 |
| Connection via connector on the cable | Yes | - |
| Connection via connector built into the motor | - | Yes |
| Supplied with connection accessory (bundle of wires) | - | Yes |
| Protection index | IP54 | IP40 |
| 0-10 V speed input characteristics | | |
| Input impedance (kΩ) | 10 | 10 |
| Full scale speed (rpm) | 3100 | 3100 |
| PWM speed input characteristics | | |
| Input impedance (kΩ) | 10 | 10 |
| Level 0 input voltage (V) | < 1.7 | < 1.7 |
| Level 1 input voltage (V) | > 3 | > 3 |
| Frequency range (Hz) | 150 → 5000 | 150 → 5000 |
| Full scale speed (rpm) | 3100 | 3100 |
| Relay output characteristics | | |
| Type of output | NPN | NPN |
| Max. current (mA) | 50 | 50 |
| Functions | | |
| See table in selection guide, page | 108 | 108 |

Product adaptations



- 4- or 2-quadrant speed regulation, open or closed loop
- With built-in electronic card TNi20
- No lead output but connector in motor
- Dimensions of motor shaft (Ø 2 to 8, lengths, pinion sized to shaft, etc.)
- Cable length, with or without connector

User information

Necessary precautions to avoid damaging the motor

*a) Do not reverse the polarity

*b) Do not short-circuit the encoder output (NPN) at the power supply

Do not use the motor as a generator

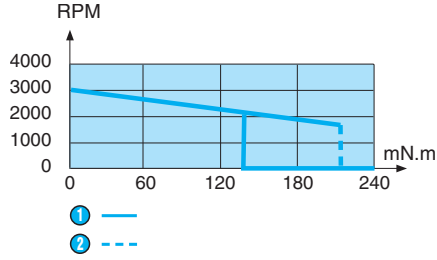
Stocked product

Product made to order

To order, see page 18

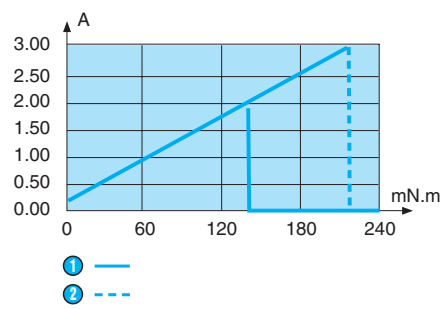
Curves

Speed/torque



- ① Continuous operation
- ② Cyclic operation

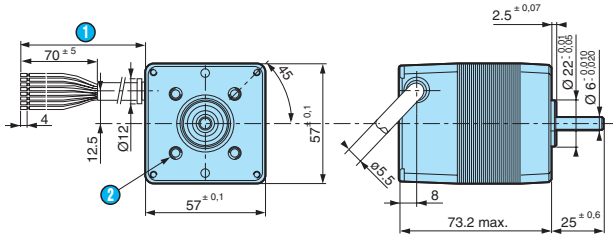
Current/torque



- ① Continuous operation
- ② Cyclic operation

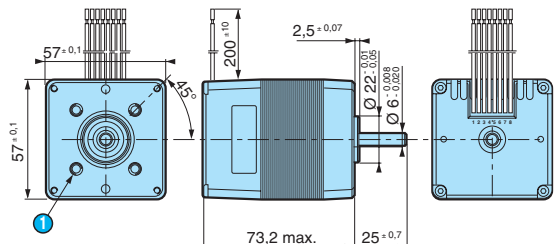
Dimensions

Version IP54 - 801400



- ① Cable length: 400 ± 10 mm
- ② 4 holes M5 x 0.86 H at 90° over Ø 40 depth of thread 4.5 min.

Version IP40 - 80040



- ① 4 holes M5 x 0.86 H at 90° over Ø 40 depth of thread 4.5 min.

Connections

Version IP54 - 801400

| Marking on motor | Function | Wire colour |
|------------------|------------------------------|-------------|
| 1 *a | Power earth | Black |
| 2 *a | 24 V power supply | Red |
| 3 | Signal earth | Blue |
| 4 | On/off input | Green |
| 5 | Direction input | Yellow |
| 6 | PWM speed setpoint | Orange |
| 7 | 0-10 V speed setpoint | Brown |
| 8 *b | 12 points/rev encoder output | Purple |

1 power cable
AWG24
8 conductors
UL2464

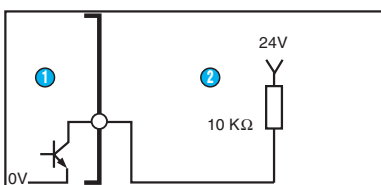
Version IP40 - 80040

| Marking on motor | Function | Wire colour |
|------------------|------------------------------|-------------|
| 1 *a | Power earth | Black |
| 2 *a | 24 V or 36 V power supply | Red |
| 3 | Signal earth | Blue |
| 4 | 0-10 volts speed setpoint | Brown |
| 5 | PWM speed setpoint | Orange |
| 6 | Direction input | Yellow |
| 7 | On/off input | Green |
| 8 *b | 12 points/rev encoder output | White |

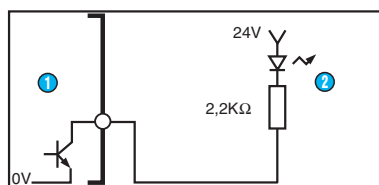
Use a connector type AMP MTA 100 640 400-8 or the assembly of connector and cable AWG22 delivered with the motor

Applications

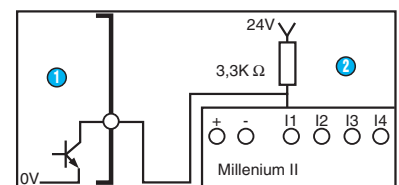
Wiring examples for encoder output (purple)



- ① Motor - ② Resistive load



- ① Motor - ② LED load



- ① Motor - ② Millennium II

Brushless DC motors

→ 80 W motors with built-in electronic control TNi20

Ideal for motion and positioning applications

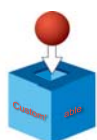
- Flexible: 4-quadrant variable speed control
- Control of max. torque with "limit reached" indicator
- Complete: Brake, encoder and class B EMC-compliant
- Compact: Excellent efficiency and high start torque
- 120 W nominal at 32 V $\overline{\text{---}}$
- Open: Compatible with our logic controller PLCs
- Versatile: Compatible with 24 V $\overline{\text{---}}$ battery



Part numbers

| | 801800 / PWM | 801800 / 0-10 V |
|---|-----------------|-----------------|
| Speed control | PWM | 0-10 V |
| Part numbers | 80180001 | 80180002 |
| Supply voltage (V) | 24 (18 → 37) | 24 (18 → 37) |
| No-load characteristics | | |
| Speed of rotation (rpm) | 4200 | 4200 |
| Absorbed current (A) | 0.4 | 0.4 |
| Nominal characteristics | | |
| Speed (rpm) | 3250 | 3250 |
| Torque (mNm) | 240 | 240 |
| Absorbed current (A) | 4.8 | 4.8 |
| Maximum characteristics | | |
| Start torque (mNm) | 300 | 300 |
| Starting current (A) | 6.0 | 6.0 |
| General characteristics | | |
| Conformity to EMC Directive in accordance with class (EN 55022) | B | B |
| Insulation class (conforming to IEC 85) | B (120°C) | B (120°C) |
| Casing temperature rise at 40°C ambient max. (°C) | 20 | 20 |
| Thermal time constant (mn) | 15 | 15 |
| Inertia (g.cm ²) | 105 | 105 |
| Acoustic pressure at 50 cm (dBA) | 50 | 50 |
| Service life L10 (h) | 20000 | 20000 |
| Weight (g) | 1400 | 1400 |
| Protection index | IP54 | IP54 |
| 0-10 V speed input characteristics | | |
| Input impedance (kΩ) | - | 440 |
| Full scale speed (rpm) | - | 4200 |
| PWM speed input characteristics | | |
| Input impedance (kΩ) | 19 | - |
| Level 0 input voltage (V) | < 2.5 | - |
| Level 1 input voltage (V) | > 11.5 | - |
| Frequency range (Hz) | 150 → 1000 | - |
| Full scale speed (rpm) | 4200 | - |
| Relay output characteristics | | |
| Type of output | PNP | PNP |
| Max. current (mA) | 50 | 50 |
| Functions | | |
| See table in selection guide, page | 108 | 108 |

Product adaptations



- 2-quadrant speed regulation, open or closed loop
- Dimensions of motor shaft (Ø 2 to 8 mm, length, pinion sized to shaft, etc.)
- Cable length, with or without connector
- Special software and extensions
- Mechanical holding brake

User information

Necessary precautions to avoid damaging the motor

*a) Do not reverse the polarity

*b) Do not short-circuit the encoder output, encoder direction and torque saturation (PNP) to earth

Do not use the motor as a generator

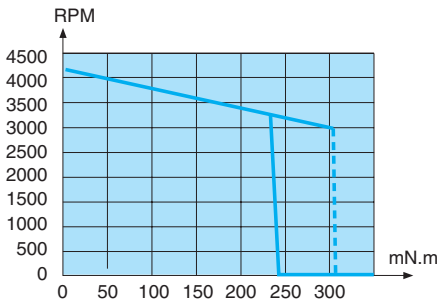
Stocked product

Product made to order

To order, see page 18

Curves

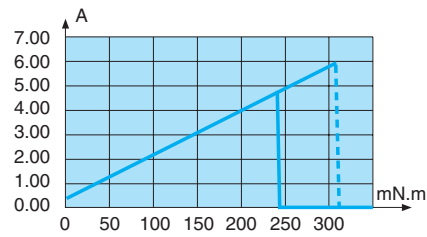
Speed/torque



① —
② - - -

- ① Continuous operation
- ② Cyclic operation

Current/torque

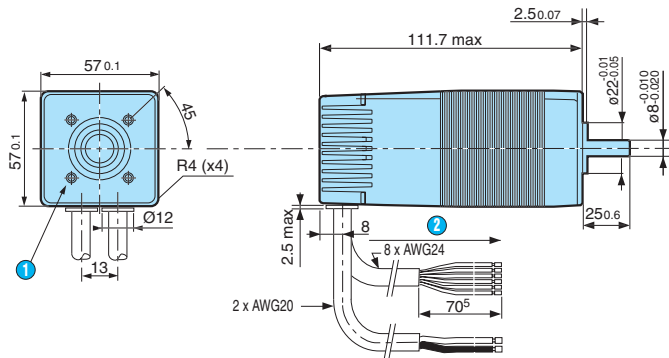


① —
② - - -

- ① Continuous operation
- ② Cyclic operation

Dimensions

801800



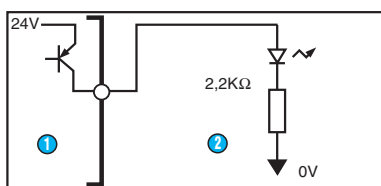
- ① 4 holes M5 x 0.86 H at 90° over Ø 40 depth of thread 4.5 min.
- ② Cable length: 500 ± 15 mm

Connections

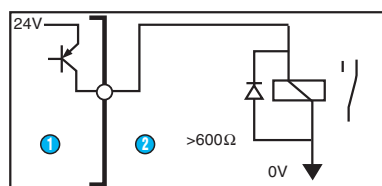
| Marking on motor | Function | Wire colour | |
|------------------|------------------------------|-------------|-----------------------|
| *a | Power earth | Black | 1 power cable AWG20 |
| *a | 24 V power supply | Brown | 2 conductors UL2464 |
| | Signal earth | Black | |
| | On/off input | Green | |
| | Direction input | Yellow | |
| | Speed setpoint | Orange | 1 control cable AWG24 |
| *b | 12 points/rev encoder output | Brown | 8 conductors UL2464 |
| *b | Encoder direction output | Red | |
| | Torque limiting setpoint | Blue | |
| *b | Torque saturation output | Purple | |

Applications

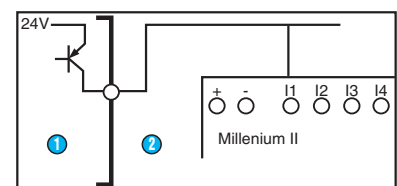
Wiring examples for encoder outputs, encoder direction, torque saturation (brown - red - purple)



- ① Motor
- ② LED load



- ① Motor
- ② Relay load



- ① Motor
- ② Millenium II

Brushless DC geared motors

→ 40 W right-angle geared motors

With or without integrated control electronics

- Output perpendicular to motor
- Ideal for short reduction ratios
- Ideal for very compact applications
- Silent operation
- Non-reversible movement at high ratios

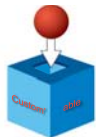


Part numbers

| | | | 801410 | 801415 |
|--|--------------------------------------|-----------------------|----------|--------|
| With built-in electronic control | | | SNi10 | - |
| Without built-in control, with Hall effect sensors | | | - | ✓ |
| Ratios (i) | Output speed (rpm) 24 V --- | Available torque (Nm) | | |
| 5 | 440 | 0.6 | 80141001 | ● |
| 10 | 220 | 1.0 | 80141002 | ● |
| 20 | 110 | 1.7 | 80141003 | ● |
| 30 | 74 | 2.1 | 80141004 | ● |
| 50 | 44 | 2.4 | 80141006 | ● |
| General characteristics | | | | |
| Motor | | | 801400 | 801405 |
| Nominal motor power at 24 V (W) | | | 30 | 40 |
| Axial load dynamic (N) | | | 100 | 100 |
| Radial load dynamic (N) | | | 150 | 150 |
| Temperature rise at 50% cycle (°C) | | | 45 | 45 |
| Weight (g) | | | 1480 | 1480 |
| With connectors for card BDE30 | | | - | ✓ |
| Protection index | | | IP54 | IP54 |
| Comments | | | | |

If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify: "BDE30-compatible" or "BDE40-compatible", depending on your application
 "BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor
 "BDE40-compatible" is supplied with bare leads

Product adaptations



- 2-quadrant speed regulation
- With built-in electronic card TNi20
- No lead output but connector in motor
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Other reduction ratios
- Other windings

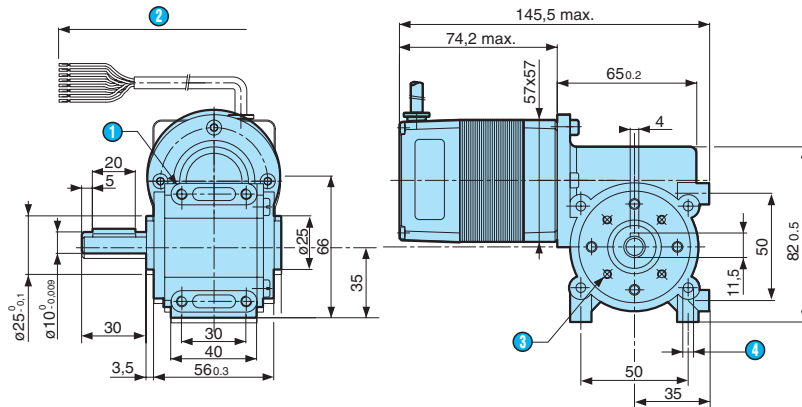
Stocked product

Product made to order

To order, see page 18

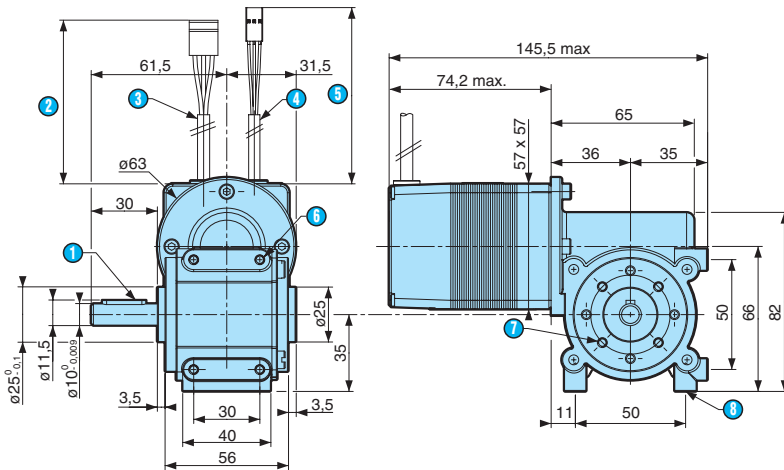
Dimensions

801410 with SNI10



- ① 4 x M5 depth 8 mm (on rectangle 30x50)
 - ② Length of cable 400 ± 10 mm
 - ③ 4 x M4 over $\varnothing 36$ depth 8 mm
 - ④ 4 x M5 over depth 8 mm (on rectangle 30x50)
- The left-hand and right-hand sides of the gearbox are identical

801415, BDE30-compatible or BDE40-compatible



- ① Parallel key 4x4x20 DIN 6885 A
- ② Length of power cable 500 ± 10 mm
- ③ Cable 3 x AWG18
- ④ Cable 6 x AWG24
- ⑤ Length of control cable 500 ± 10 mm
- ⑥ 4 holes M5 depth 8 mm
- ⑦ 4 holes at 90° over $\varnothing 36$ mm, depth 8 mm
- ⑧ 4 holes M5 depth 8 mm

User information

The limits and precautions for use described in the 30 W brushless motor section must be observed.

Brushless DC geared motors

→ 40 W planetary geared motors Ø52 mm

With Hall effect sensors

- Output in motor shaft
- Ideal for high reduction ratios
- Ideal for high-torque applications
- Excellent efficiency
- Reversible movement
- Suitable for voltages between 6 and 75 V \pm



Part numbers

801495

Without built-in control, with Hall effect sensors

| Number of stages | Ratios (i) | Output speed (rpm) 24 V \pm | Available torque (Nm) | |
|------------------|------------|-------------------------------|-----------------------|---|
| 1 | 7 | 326 | 0.9 | ✓ |
| 2 | 25 | 88 | 2.8 | ● |
| 2 | 46 | 48 | 5.2 | ● |
| 3 | 93 | 24 | 9.1 | ● |
| 3 | 169 | 13 | 16.6 | ● |
| 3 | 308 | 7 | 30.2 | ● |

General characteristics

| | |
|------------------------------------|-----------------------|
| Motor | 801405 |
| Nominal motor power at 24 V (W) | 40 |
| Axial load dynamic (N) | 100 |
| Radial load dynamic (N) | 50 / 70* / 120** |
| Efficiency (%) | 90 / 80* / 70** |
| Gearbox case temperature rise (°C) | 35 |
| Weight (g) | 1500 / 1700* / 1800** |
| Protection index | IP54 |

Comments

* 2nd stage - ** 3rd stage

All gears are metal for good resistance to torque.

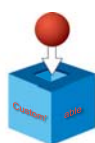
If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify:

"BDE30-compatible" or "BDE40-compatible", depending on your application

"BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor

"BDE40-compatible" is supplied with bare leads

Product adaptations



- With built-in electronic controls SNI10 or TNI20
- No lead output but connector in motor
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Other windings
- Other reduction ratios
- Low-noise version
- Mechanical holding brake

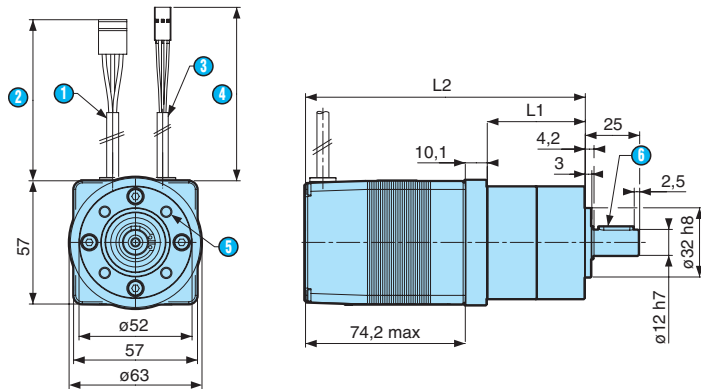
Stocked product

Product made to order

To order, see page 18

Dimensions

801495, BDE30-compatible or BDE40-compatible



- ① Cable 3 x AWG18
- ② Length of power cable 500±10 mm
- ③ Cable 6 x AWG24
- ④ Length of control cable 500±10 mm
- ⑤ 4 holes M5 at 90° over Ø 40 mm, depth: 10 mm
- ⑥ Parallel key (4x4x16 DIN 6885 A)

L1 1 stage: 46 mm
 L1 2 stages: 60 mm
 L1 3 stages: 74 mm

L2 1 stage: 131 mm max.
 L2 2 stages: 145 mm max.
 L2 3 stages: 159 mm max.

Brushless DC geared motors

→ 40 W planetary geared motors Ø62 mm

With or without integrated control electronics

- Output in motor shaft
- Ideal for high reduction ratios
- Ideal for high-torque applications
- Excellent efficiency
- Reversible movement

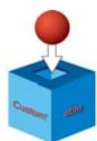


Part numbers

| | | | | 801496 | 801496 |
|--|------------|--------------------------------|-----------------------|-----------------------|-----------------------|
| With built-in electronic control | | | | SNi10 | - |
| Without built-in control, with Hall effect sensors | | | | - | ✓ |
| Number of stages | Ratios (i) | Output speed (rpm) 24 V --- | Available torque (Nm) | | |
| 1 | 5.2 | 423 | 0.7 | ● | - |
| 1 | 5.2 | 423 | 0.8 | - | ● |
| 1 | 6.75 | 326 | 0.9 | 80149604 | - |
| 1 | 6.75 | 326 | 1.1 | - | ● |
| 2 | 19.20 | 115 | 2.2 | ● | - |
| 2 | 19.20 | 115 | 2.8 | - | ● |
| 2 | 26.86 | 82 | 3 | ● | - |
| 2 | 26.86 | 82 | 3.9 | - | ● |
| 2 | 45.96 | 48 | 5.1 | 80149605 | - |
| 2 | 45.96 | 48 | 6.6 | - | ● |
| 3 | 99.52 | 22 | 10 | ● | - |
| 3 | 99.52 | 22 | 12.5 | - | ● |
| 3 | 139.2 | 16 | 14 | ● | - |
| 3 | 139.2 | 16 | 18 | - | ● |
| 3 | 236.2 | 9 | 23 | ● | - |
| 3 | 236.2 | 9 | 30 | - | ● |
| 3 | 307.5 | 7 | 30 | 80149606 | - |
| 3 | 307.5 | 7 | 39 | - | ● |
| General characteristics | | | | | |
| Motor | | | | 801400 | 801405 |
| Nominal motor power at 24 V (W) | | | | 30 W | 40 W |
| Axial load dynamic (N) | | | | 100 | 100 |
| Radial load dynamic (N) | | | | 50 / 70* / 120** | 50 / 70* / 120** |
| Efficiency (%) | | | | 90 / 80* / 70** | 90 / 80* / 70** |
| Gearbox case temperature rise (°C) | | | | 35 | 35 |
| Weight (g) | | | | 1600 / 1900* / 2200** | 1600 / 1900* / 2200** |
| Protection index | | | | IP54 | IP54 |
| Comments | | | | | |
| * 2 nd stage - ** 3 rd stage | | | | | |

For stages 2 and 3, all gears are metal.
They are also mounted on drawn cup needle bearings for excellent service life.
If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify:
"BDE30-compatible" or "BDE40-compatible", depending on your application
"BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor
"BDE40-compatible" is supplied with bare leads

Product adaptations



- With built-in electronic controls SNi10 or TNi20
- No lead output but connector in motor
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Open-loop control in 2 quadrants
- Low-noise version
- Other windings
- Other reduction ratios
- Mechanical holding brake

Stocked product

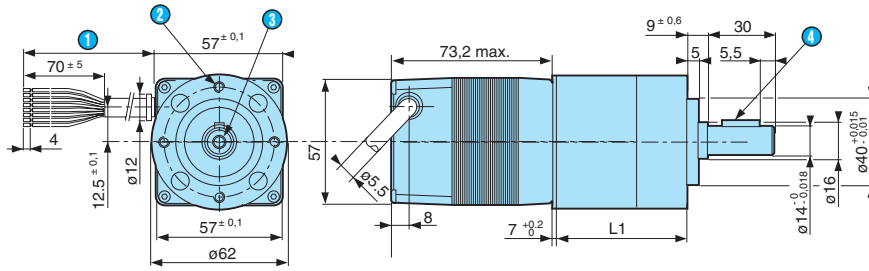
Product made to order

To order, see page 18



Dimensions

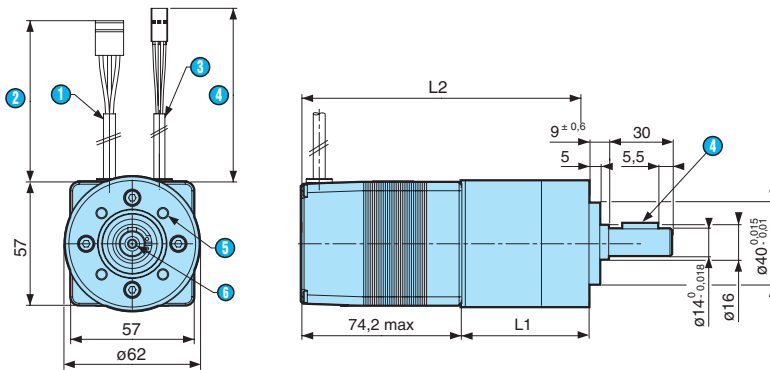
801496 with SNI10



- ① Length of cable 400±10 mm
- ② 4 holes M5 depth 10 at 90° over Ø 52
- ③ Fixing hole M5, depth 12.5
- ④ Key A5 x 5 x 18 DIN 6885 A

L1 1 stage: 43.7 mm max.
 L1 2 stages: 59.7 mm max.
 L1 3 stages: 75.2 mm max.

801496, BDE30-compatible or BDE40-compatible



- ① Cable 3 x AWG18
- ② Length of power cable 500±10 mm
- ③ Cable 6 x AWG24
- ④ Length of control cable 500±10 mm
- ⑤ 4 holes M5 depth 10 at 90° over Ø 52
- ⑥ Fixing hole M5, depth 12.5
- ⑦ Parallel key (5x5x18 DIN 6885 A)

L1 1 stage: 43.7 mm
 L1 2 stages: 58.9 mm
 L1 3 stages: 74.8 mm

L2 1 stage: 124 mm max.
 L2 2 stages: 139.8 mm max.
 L2 3 stages: 155.7 mm max.

User information

The limits and precautions for use described in the 30 W brushless motor section must be observed.

Brushless DC geared motors

→ 100 W right-angle geared motors

With or without integrated control electronics

- Output perpendicular to motor
- Ideal for short reduction ratios
- Ideal for very compact applications
- Silent operation
- Non-reversible movement at high ratios

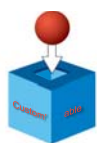


Part numbers

| | | | 801810 | 801810 | 801815 |
|--|-----------------------------|-----------------------|----------|----------|--------|
| With built-in electronic control | | | TNi20 | TNi20 | - |
| Without built-in control, with Hall effect sensors | | | - | - | ✓ |
| Ratios (i) | Output speed (rpm) 24 V --- | Available torque (Nm) | | | |
| 5 | 650 | 1.0 | 80181001 | 80181010 | - |
| 5 | 600 | 1.3 | - | - | ● |
| 10 | 325 | 1.7 | 80181002 | 80181011 | - |
| 10 | 300 | 2.1 | - | - | ● |
| 20 | 163 | 2.9 | 80181003 | 80181012 | - |
| 20 | 150 | 3.6 | - | - | ● |
| 30 | 108 | 3.5 | 80181004 | 80181013 | - |
| 30 | 100 | 4.3 | - | - | ● |
| 50 | 65 | 4.1 | 80181006 | 80181015 | - |
| 50 | 60 | 5.1 | - | - | ● |
| General characteristics | | | | | |
| Motor | | | 801800 | 801800 | 801805 |
| Nominal motor power at 24 V (W) | | | 80 | 80 | 100 |
| Speed control | | | PWM | 0-10V | - |
| Axial load dynamic (N) | | | 100 | 100 | 100 |
| Radial load dynamic (N) | | | 150 | 150 | 150 |
| Temperature rise at 50% cycle (°C) | | | 45 | 45 | 45 |
| Weight (g) | | | 1920 | 1920 | 1920 |
| Protection index | | | IP54 | IP54 | IP54 |
| Comments | | | | | |

If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify: "BDE30-compatible" or "BDE40-compatible", depending on your application
 "BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor
 "BDE40-compatible" is supplied with bare leads

Product adaptations



- 2-quadrant speed regulation
- With built-in electronic card TNi20
- No lead output but connector in motor
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Other reduction ratios
- Other windings
- Mechanical holding brake

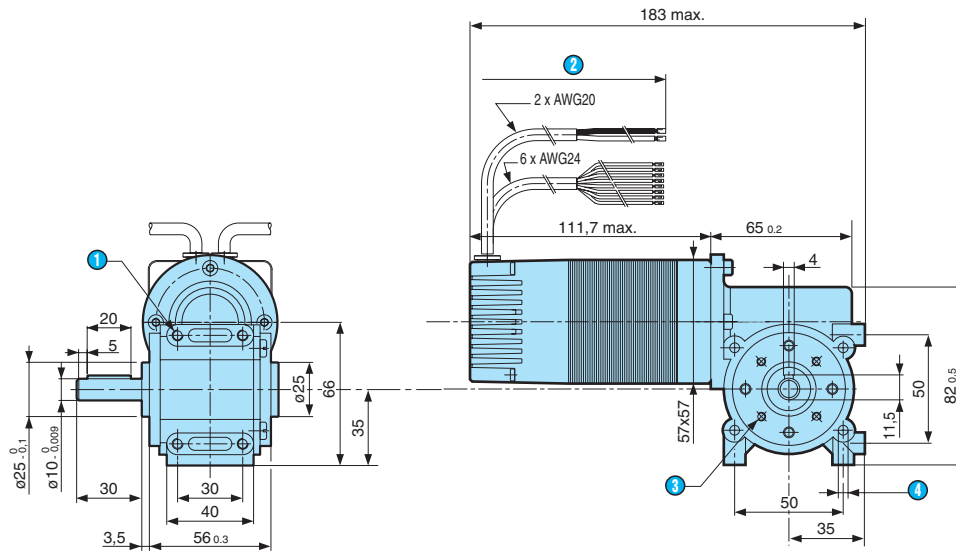
Stocked product

Product made to order

To order, see page 18

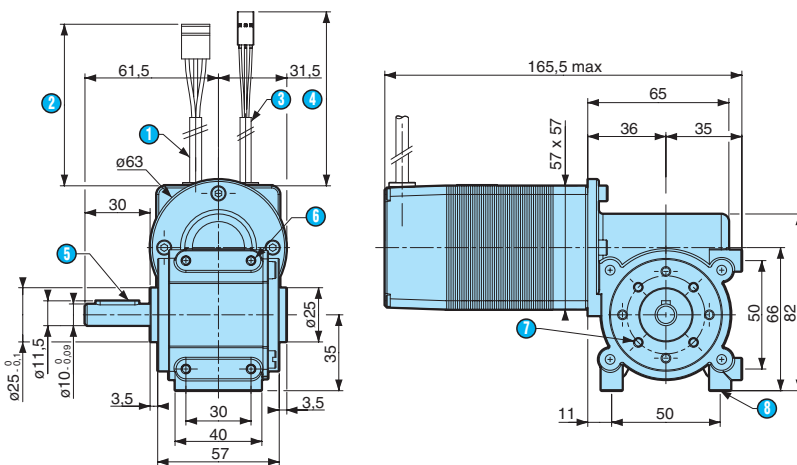
Dimensions

801810 with built-in TNi20



- ① 4 x M5 over depth 8 mm
- ② Length of cable 500±5 mm
- ③ 4 x M4 over Ø 36 depth 8 mm
- ④ 4 x M5 depth 8 mm

801815, BDE30-compatible or BDE40-compatible



- ① Cable 3 x AWG18
- ② Length of power cable 500±5 mm
- ③ Cable 6 x AWG24
- ④ Length of control cable 500±5 mm
- ⑤ Parallel key (4x4x20 DIN 6885 A)
- ⑥ 4 holes M5, depth 8 mm
- ⑦ 4 holes M4 at 90° over Ø 36, depth 8 mm
- ⑧ 4 holes M5 depth 8 mm

User information

The limits and precautions for use described in the 80 W brushless motor section must be observed. Continuous use may cause the gearbox to overheat. This geared motor is recommended for applications in which the operating time does not exceed 50% of the total time. For longer times, please consult us.

Brushless DC geared motors

→ 100 W planetary geared motor Ø62 mm

With Hall effect sensors

- Output in motor shaft
- Ideal for high reduction ratios
- Ideal for high-torque applications
- Excellent efficiency
- Reversible movement
- Suitable for voltages from 6 to 75 V ...



Part numbers

801896

Without built-in control, with Hall effect sensors

| Number of stages | Ratios (i) | Output speed (rpm) 24 V ... | Available torque (Nm) | |
|------------------|------------|-----------------------------|-----------------------|---|
| 1 | 5.16 | 627 | 1.4 | ✓ |
| 1 | 6.75 | 481 | 1.8 | ● |
| 2 | 19.2 | 169 | 4.6 | ● |
| 2 | 26.86 | 121 | 6.4 | ● |
| 2 | 46 | 71 | 11 | ● |
| 3 | 99.52 | 33 | 21 | ● |
| 3 | 139.23 | 23 | 29 | ● |
| 3 | 236.15 | 14 | 49.6 | ● |
| 3 | 308 | 11 | 65 | ● |

General characteristics

| | |
|------------------------------------|-----------------------|
| Motor | 801805 |
| Nominal motor power at 24 V (W) | 100 |
| Axial load dynamic (N) | 100 |
| Radial load dynamic (N) | 50 / 70* / 120** |
| Efficiency (%) | 90 / 80* / 70** |
| Gearbox case temperature rise (°C) | 45 |
| Weight (g) | 2000 / *2300 / **2600 |
| Protection index | IP54 |

Comments

* 2nd stage - ** 3rd stage

For stages 2 and 3, all gears are metal. They are also mounted on drawn cup needle bearings for excellent service life.

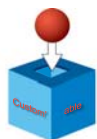
If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify:

"BDE30-compatible" or "BDE40-compatible", depending on your application

"BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor

"BDE40-compatible" is supplied with bare leads

Product adaptations



- With built-in electronic control TNi20
- Other windings
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Low-noise version
- Other windings
- Other reduction ratios
- Mechanical holding brake

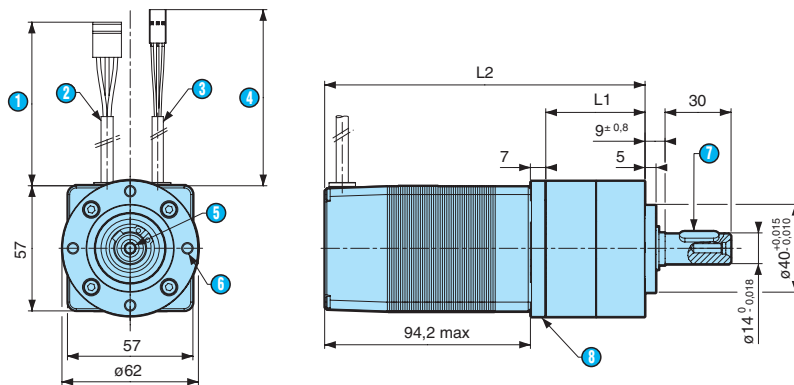
Stocked product

Product made to order

To order, see page 18

Dimensions

801896, BDE30-compatible or BDE40-compatible



- ① Length of power cable 500 ± 10 mm
- ② Cable 3 x AWG18
- ③ Cable 6 x AWG24
- ④ Length of control cable 500 ± 10 mm
- ⑤ Fixing hole M5, depth 12 mm
- ⑥ 4 holes M5 at 90° over $\varnothing 52$ depth 10 mm
- ⑦ Parallel key (5x5x18 DIN 6885 A)
- ⑧ Motor adaptor plate

L1 1 stage: 43.1 mm
 L1 2 stages: 58.9 mm
 L1 3 stages: 74.8 mm

L2 1 stage: 145 mm max.
 L2 2 stages: 160.8 mm max.
 L2 3 stages: 176.7 mm max.

Brushless DC geared motors

→ 100 W planetary geared motors Ø81 mm

With or without integrated control electronics

- Output in motor shaft
- Ideal for high reduction ratios
- Ideal for high-torque applications
- Excellent efficiency
- Reversible movement

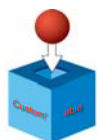


Part numbers

| | | | 801897 | 801897 | 801897 |
|--|-----------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| With built-in electronic control | | | TNi20 | TNi20 | - |
| Without built-in control, with Hall effect sensors | | | - | - | ✓ |
| Ratios (i) | Output speed (rpm) 24 V --- | Available torque (Nm) | | | |
| 5 - 1 stage | 627 | 1.1 | 80189701 | 80189704 | - |
| 5 - 1 stage | 579 | 1.4 | - | - | ● |
| 19 - 2 stages | 169 | 3.7 | ● | ● | - |
| 19 - 2 stages | 156 | 4.8 | - | - | ● |
| 27 - 2 stages | 121 | 5.2 | 80189702 | 80189705 | - |
| 27 - 2 stages | 112 | 6.7 | - | - | ● |
| 100 - 3 stages | 33 | 16.7 | ● | ● | - |
| 100 - 3 stages | 30 | 21.6 | - | - | ● |
| 139 - 3 stages | 23 | 23 | 80189703 | 80189706 | - |
| 139 - 3 stages | 22 | 30 | - | - | ● |
| General characteristics | | | | | |
| Motor | | | 801800 | 801800 | 801805 |
| Nominal motor power at 24 V (W) | | | 80 | 80 | 100 |
| Speed control | | | PWM | 0-10V | - |
| Axial load dynamic (N) | | | 100 | 100 | 100 |
| Radial load dynamic (N) | | | 50 / *70 / **120 | 50 / *70 / **120 | 50 / *70 / **120 |
| Efficiency (%) | | | 90 / *80 / **70 | 90 / *80 / **70 | 90 / *80 / **70 |
| Gearbox case temperature rise (°C) | | | 35 | 35 | 45 |
| Weight (g) | | | 2900 / *3600 / **4200 | 2900 / *3600 / **4200 | 2900 / *3600 / **4200 |
| Protection index | | | IP54 | IP54 | IP54 |
| Comments | | | | | |
| * 2 nd stage - ** 3 rd stage | | | | | |

All gears are metal and are mounted on drawn cup needle bearings for excellent robustness and a very long service life.
 If you wish to order the geared motor without control electronics but with Hall effect sensors, please specify:
 "BDE30-compatible" or "BDE40-compatible", depending on your application
 "BDE30-compatible" is supplied with connectors but without a temperature sensor in the motor
 "BDE40-compatible" is supplied with bare leads

Product adaptations



- Modification of software for other speed, torque and speed controller settings, position holding, emergency stop via short-circuit
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Other windings
- Low-noise gearbox version
- Other reduction ratios
- Mechanical holding brake

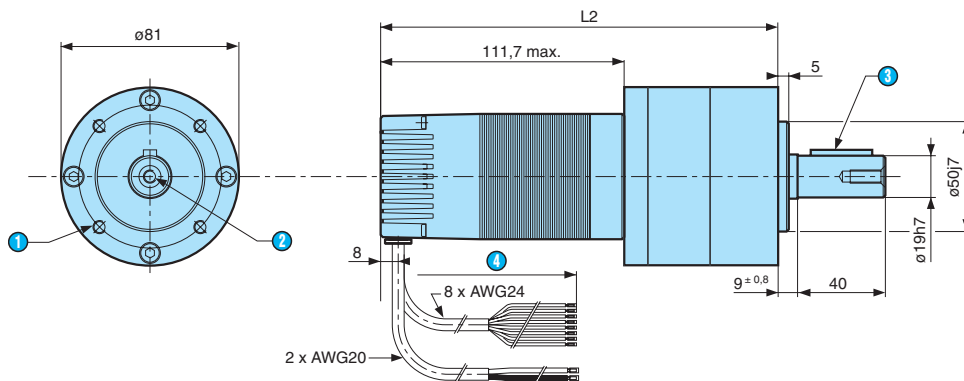
Stocked product

Product made to order

To order, see page 18

Dimensions

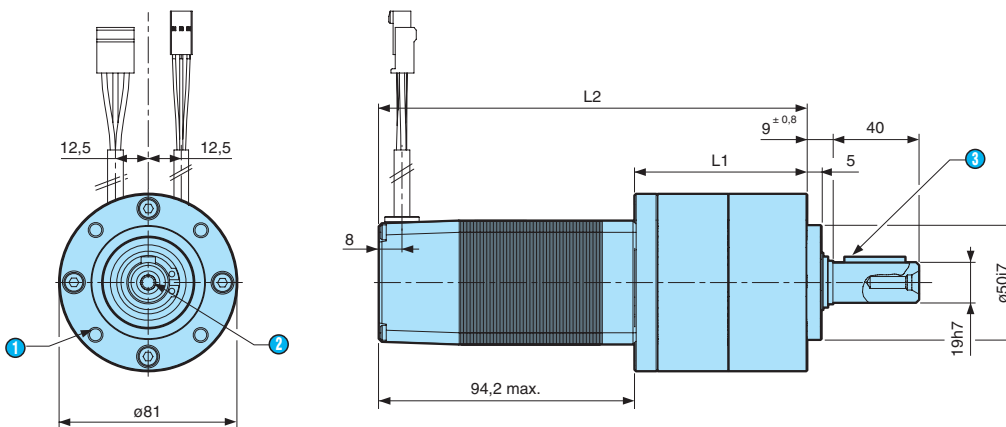
801897 with built-in TNi20



- ❶ 4 holes M6 x 12 over Ø 65
- ❷ Fixing hole M6 x 16
- ❸ Length of cable 500±15 mm
- ❹ Parallel key (6 x 6 x 28 conforming to DIN 6885 A)

L2 1 stage: 182 mm max.
 L2 2 stages: 203.9 mm max.
 L2 3 stages: 226 mm max.

801897, BDE30-compatible or BDE40-compatible



- ❶ 4 holes M6 x 12 over Ø 65
- ❷ Fixing hole M6 x 16
- ❸ Length of cable 500±15 mm
- ❹ Parallel key (6 x 6 x 28 conforming to DIN 6885 A)

L2 1 stage: 165.3 mm max.
 L2 2 stages: 187 mm max.
 L2 3 stages: 208.6 mm max.

User information

The limits and precautions for use described in the 80 W brushless motor section must be observed.

Brushless DC geared motors

→ 150 W planetary geared motor Ø81 mm

With Hall effect sensors

- Output in motor shaft
- Ideal for high reduction ratios
- Ideal for high-torque applications
- Excellent efficiency
- Reversible movement
- Suitable for voltages from 6 to 75 V ---



Part numbers

801997

Without built-in control, with Hall effect sensors

✓

| Number of stages | Ratios (i) | Output speed (rpm) 24 V --- | Available torque (Nm) | |
|------------------|------------|-----------------------------|-----------------------|----------|
| 1 | 5 | 627 | 2.1 | 80199701 |
| 2 | 19 | 169 | 6.8 | 80199705 |
| 2 | 27 | 121 | 9.5 | 80199702 |
| 3 | 100 | 33 | 30.7 | 80199706 |
| 3 | 139 | 23 | 43 | 80199703 |

General characteristics

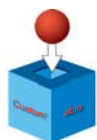
| | |
|------------------------------------|-----------------------|
| Motor | 801905 |
| Gearbox | 800497 |
| Nominal motor power at 24 V (W) | 150 |
| Speed control | - |
| Axial load dynamic (N) | 100 |
| Radial load dynamic (N) | 50 / *70 / **120 |
| Efficiency (%) | 90 / *80 / **70 |
| Gearbox case temperature rise (°C) | 50 |
| Weight (g) | 2900 / *3600 / **4200 |
| Protection index | IP40 |

Comments

* 2nd stage - ** 3rd stage

All gears are metal and are mounted on drawn cup needle bearings for excellent robustness and a very long service life.

Product adaptations



- Other windings
- Dimensions of gearbox shaft
- Cable length, with or without connector
- Different motor length
- Low-noise gearbox version
- Other reduction ratios
- Mechanical holding brake

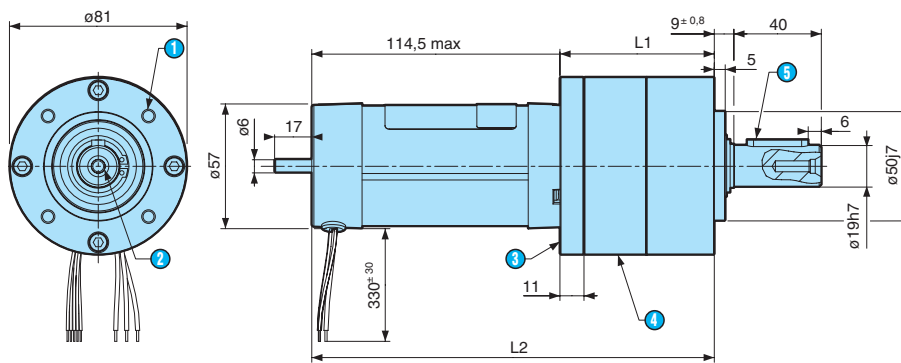
Stocked product

Product made to order

To order, see page 18

Dimensions

801997



- ① 4 holes M6 at 90° over $\varnothing 65$ mm, depth 12 mm
- ② Fixing hole M6, depth 16 mm
- ③ Motor adaptor plate
- ④ Gearbox
- ⑤ Parallel key (6x6x28 DIN 6885 A)

L1 1 stage: 70.5 mm
 L1 2 stages: 92.2 mm
 L1 3 stages: 113.8 mm

L2 1 stage: 185.5 mm max.
 L2 2 stages: 207.3 mm max.
 L2 3 stages: 228.9 mm

Control electronics

→ BDE30: 18 to 36 V DC - 6 A nominal

- 4 quadrants, for closed-loop speed control, torque, position-holding and braking control
- Specific part numbers by motor, winding and options
- Push-in connections for series connection
- For use alone or with a PLC, depending on the part numbers
- Voltage, current and temperature protection devices



Part numbers

| | BDE30 | BDE30 |
|---|---|---|
| Type | | |
| PWM speed control | 79238956 | 79238958 |
| 0-10 V speed control | 79238957 | 79238959 |
| General characteristics | | |
| Motor | 80140501 | 80180502 |
| Supply voltage (V) | 18 → 36 (= V ---) | 18 → 36 (= V ---) |
| Nominal current (A) | 2.5 | 6 |
| Max. current (A) | 2.5 (internal limiting) | 6 (internal limiting) |
| Absorbed current (A) | 0.1 (consumption without motor) | 0.1 (consumption without motor) |
| Temperature rise (°C) | 15 | 40 |
| Ambient operating temperature (°C) | -20 → 70 | -20 → 70 |
| Storage temperature (°C) | -40 → 90 | -40 → 90 |
| Weight (g) | 200 g | 200 g |
| Safety standards | | |
| EC standards EN 55022 Level B, EN 61000-4-2, EN 61000-4-3 EN 61000-4-4, EN 64000-4-6, EN 64000-4-29 | | |
| On/Off input and Direction of rotation input | | |
| Input impedance (kΩ) | 59 | 59 |
| Level 0 input voltage (V) | < 2 or non-connected | < 2 or non-connected |
| Level 1 input voltage (V) | 4 → V --- | 4 → V --- |
| Speed input, PWM version | | |
| Input impedance (kΩ) | 59 | 59 |
| Level 0 input voltage (V) | < 2.5 or non-connected | < 2.5 or non-connected |
| Level 1 input voltage (V) | 11.5 → V --- | 11.5 → V --- |
| Operating frequency (Hz) | 100 → 1000 | 100 → 1000 |
| Speed input, 0-10 V version | | |
| Input impedance (kΩ) | 440 | 440 |
| Control voltage | 0 → 10 | 0 → 10 |
| Torque limit/ holding/ braking input (0-10 V and PWM) | | |
| Input impedance (kΩ) | 16.4 | 16.4 |
| Level 0 input voltage (V) | 0 | 0 |
| Level 1 input voltage (V) | 11.5 → V --- | 11.5 → V --- |
| Frequency (Hz) | 100 → 1000 | 100 → 1000 |
| Control voltage | 0 → 10 | 0 → 10 |
| Hall effect inputs | | |
| | Includes a pull-up resistor connected to 5 V 4.7 kΩ | Includes a pull-up resistor connected to 5 V 4.7 kΩ |
| Output | | |
| Type PNP open collector | ✓ | ✓ |
| Max. current (A) | 0.02 | 0.02 |
| Encoder output | | |
| Rest state (V) | + V --- | + V --- |
| Number of 250 μs pulses per motor revolution | 12 | 12 |
| Torque limit reached output | | |
| Rest state (V) | 0 | 0 |
| Active torque limitation (V) | + supply voltage | + supply voltage |

Accessories

| Description | Code |
|---|----------|
| Pre-assembled connector + 8 AWG24 leads - length 210 mm for connection to the "control connector" | 79294810 |

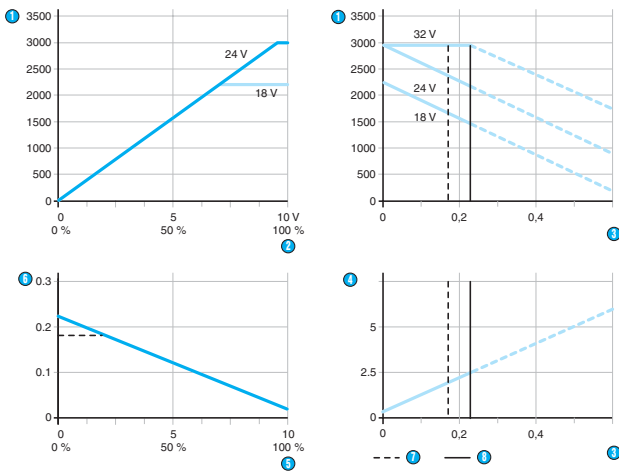
Stocked product

Product made to order

To order, see page 18

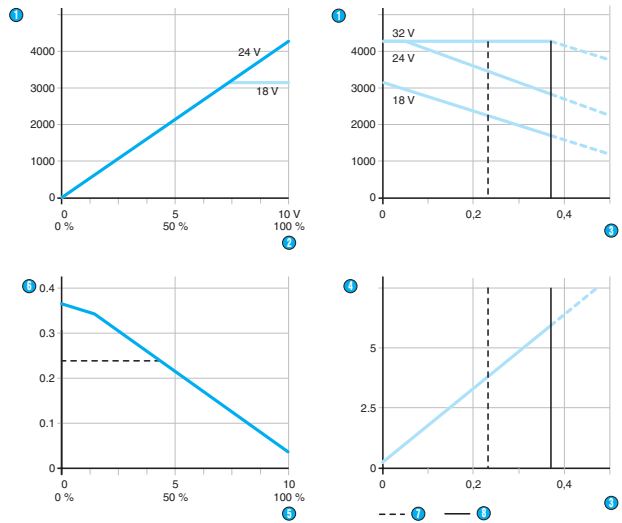
Curves

Motor 80140501



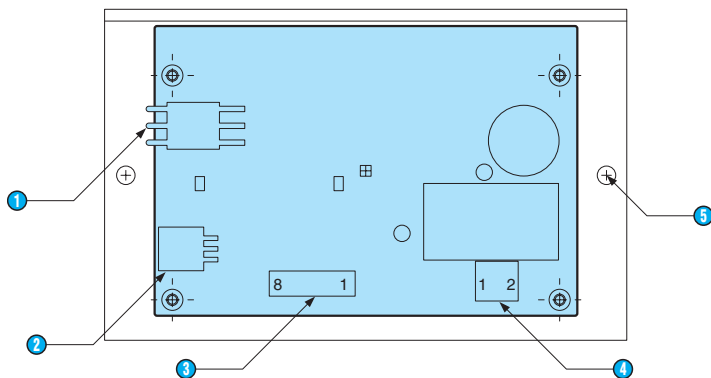
- ① Speed (rpm)
- ② Speed setpoint
- ③ Torque (Nm)
- ④ Current (A)
- ⑤ Torque limit setpoint
- ⑥ Torque limit
- ⑦ Nominal torque
- ⑧ Maximum torque

Motor 80180501



- ① Speed (rpm)
- ② Speed setpoint
- ③ Torque (Nm)
- ④ Current (A)
- ⑤ Torque limit setpoint
- ⑥ Torque limit
- ⑦ Nominal torque
- ⑧ Maximum torque

Connections

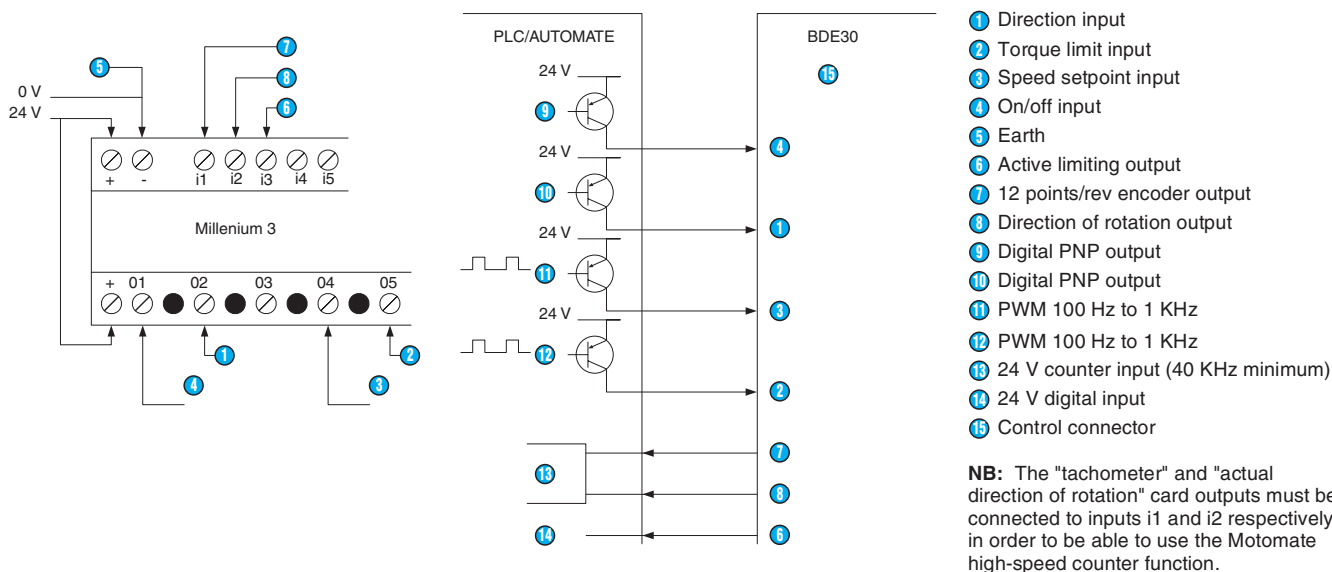


- ① Motor windings
- ② Hall effect sensor input
- ③ Control connector
 - 1 - Direction input
 - 2 - Torque limiting setpoint input
 - 3 - Speed setpoint input
 - 4 - On/Off input
- ④ Supply connector (1 = + 24 V and 2 = 0 V)
- ⑤ Fixing holes 4.5 mm Ø, 114 mm apart
- ⑥ Torque saturation output
- ⑦ 12 points/rev encoder output
- ⑧ Direction encoder output

Dimensions : 125 x 81 x 43 mm

Control electronics

Examples of connection diagram with a Millenium 3 logic controller or a PLC



Principles

Speed setpoint

Adjustable between 0 and 100% of the no-load speed of the motor by PWM signal or by analogue 0-10 V signal, depending on the part numbers.

Torque limit

Adjustable between 10% and 140% of the nominal motor torque by PWM signal or analogue 0-10 V signal. If the control is at 0% or 0 V or non-connected, the current limit is 140%.

If the current in the motor reaches the specified limit, the "active limiting" output switches to the "+ supply voltage" value and the current in the motor is automatically limited.

Since the torque value is directly related to the current in the motor, the torque limit can be set in this way.

Holding torque

Activates if on/off= 1 and speed setpoint= 0.

Its value depends on the "torque limit" setpoint.

Encoder and actual direction of rotation outputs

These two related outputs are used for positioning purposes, using the "high-speed counting" function of a Millenium or other PLC with high-speed inputs (>40 KHz in order to correctly manage the "actual direction of rotation" information and to be able to "upcount and downcount" without losing pulses on changing direction).

Overheating protection

If the supply voltage becomes insufficient, the protection activates and shuts off the motor. The motor restarts automatically as soon as the supply voltage returns to the operating range.

Undervoltage protection

If the supply voltage becomes insufficient, the protection activates and shuts off the motor. The motor restarts automatically as soon as the supply voltage returns to the operating range.

Braking

The value of the braking torque is adjustable and is controlled by the "torque limit" setpoint within limits linked to the reduction in the back electromotive force of the motor.

The electronic card includes a (limited) internal device for dissipating braking energy, which limits overvoltages to 40 V. This device is adequate for short braking cycles or if the braking energy is absorbed by another motor.

Example of usage restriction:

- Braking every 8 seconds of $14.5 \cdot 10^{-4} \text{ kg.m}^2$ from 3000 rpm to 0 rpm.

- Braking every 8 seconds of $25.4 \cdot 10^{-4} \text{ kg.m}^2$ from 2000 rpm to 0 rpm.

- Caution: If the specified limits are exceeded, this device will overheat and destroy the card.

In some cases, overvoltages due to braking must be prevented from returning to the power supply or other equipment (see "braking" in the basic concepts). For connections please refer to the guide supplied with the card.

Control electronics

→ BDE40: 11 to 36 V DC - 10 A nominal

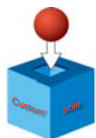
- Control of all 3-phase brushless Hall effect motors
- 4 quadrants, for closed-loop speed control, torque, holding and power braking control
- Ready for use, supplied with guide, braking resistor, protection diodes and connectors
- For use alone or with a PLC (0-10 V and PWM compatible inputs)



Part numbers

| | BDE40 |
|--|--|
| Type | 848551 |
| Part numbers | 84855101 |
| Supply voltage (V) | 11 → 36 (= V ---) |
| Nominal current (A) | 10 |
| Max. current (A) | 14 (internal limiting) |
| Absorbed current (A) | 0.1 (consumption without motor) |
| Temperature rise (°C) | 50 |
| Ambient operating temperature (°C) | -20 → 40 |
| Storage temperature (°C) | -40 → 90 |
| Weight (g) | 305 |
| Safety standards | |
| EC standards | |
| EN 55022 Level B, EN 61000-4-2, EN 61000-4-3 | |
| EN 61000-4-4, EN 64000-4-6, EN 64000-4-29 | |
| On/Off input and Direction of rotation input | |
| Input impedance (kΩ) | 59 |
| Level 0 input voltage (V) | < 2 |
| Level 1 input voltage (V) | 4 → V --- |
| Speed input and Torque limit / holding / braking input (0-10 V and PWM) | |
| Input impedance (kΩ) | 10 |
| Control voltage | 0 → 10 V |
| Level 0 input voltage (V) | 0 |
| Level 1 input voltage (V) | 11.5 → V --- |
| Frequency (Hz) | 100 → 1000 |
| Hall effect inputs | |
| | Includes a pull-up resistor connected to 5 V |
| Output | |
| Type PNP open collector | ✓ |
| Max. current (A) | 0.02 |
| Encoder output | |
| Rest state (V) | + V --- |
| Number of 250 μs pulses per motor revolution | 3 x number of rotor poles |
| Torque limit reached output | |
| Rest state (V) | 0 |
| Active torque limitation (V) | + V --- |

Product adaptations



- Optimisation of settings according to individual applications (speed and torque limit ranges, speed controller parameters, current limits)
- Versions available without accessories (connectors, resistor, diodes, casing)
- Some programming elements for your machine's automation system can be integrated into the card micro-controller

Stocked product

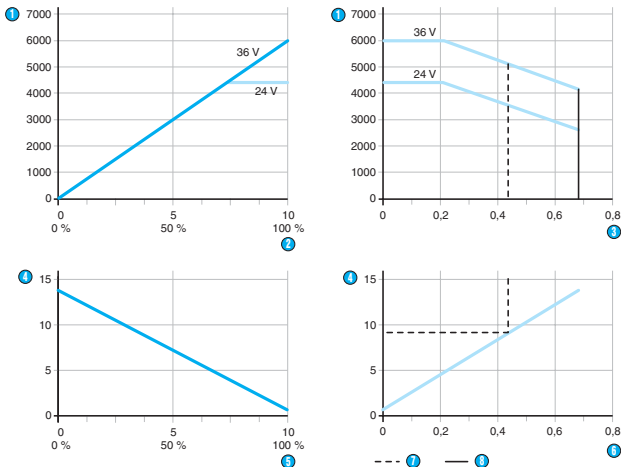
Product made to order

To order, see page 18



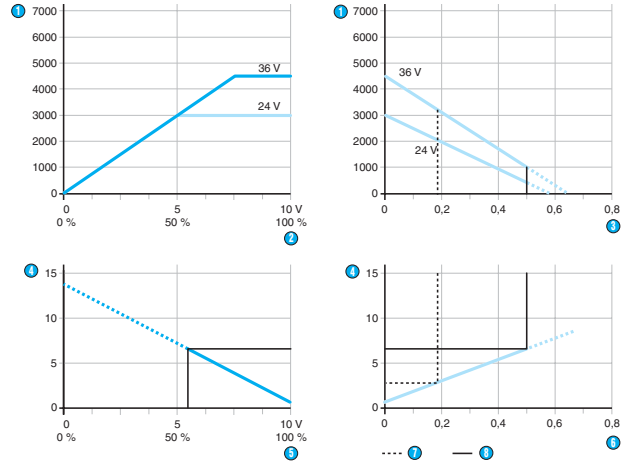
Curves

Motor 80190502



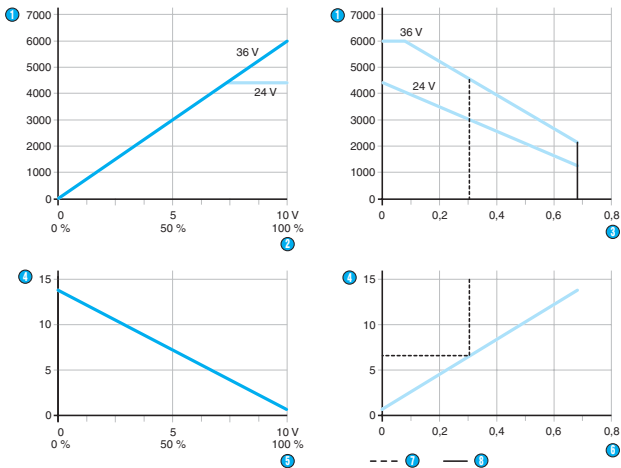
- ① Speed (rpm)
- ② Speed setpoint
- ③ Torque (Nm)
- ④ Current (A)
- ⑤ Torque limit setpoint
- ⑥ Torque (N.m)
- ⑦ Nominal torque
- ⑧ Peak torque

Motor 80140510



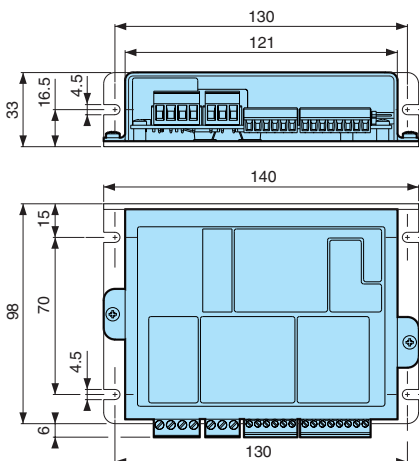
- ① Speed (rpm)
- ② Speed setpoint
- ③ Torque (Nm)
- ④ Current (A)
- ⑤ Torque limit setpoint
- ⑥ Torque (N.m)
- ⑦ Nominal torque
- ⑧ Peak torque

Motor 80180506

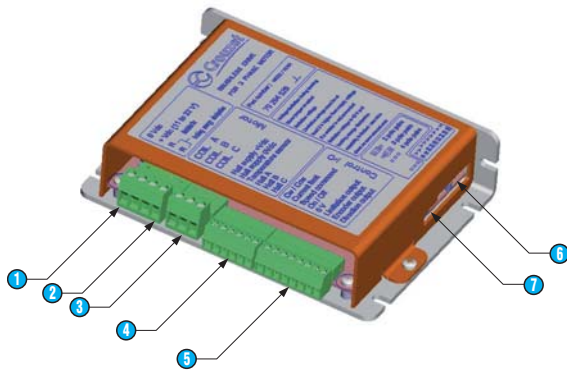


- ① Speed (rpm)
- ② Speed setpoint
- ③ Torque (Nm)
- ④ Current (A)
- ⑤ Torque limit setpoint
- ⑥ Torque (N.m)
- ⑦ Nominal torque
- ⑧ Peak torque

Dimensions



Connections



- ① Supply voltage
- ② Braking resistor
- ③ Motor windings
- ④ Motor Hall effect
- ⑤ Inputs and outputs
- ⑥ Braking overvoltage limiting jumper
- ⑦ Number of pairs of rotor poles selection jumper

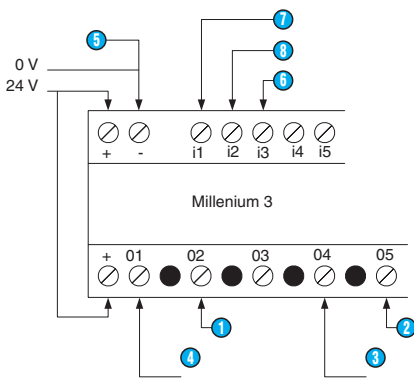
P1: Supply connector
 1: 0 V
 2: + V DC
 3 - 4: Braking energy dissipation resistor

P2: Motor power
 1: Phase 1
 2: Phase 2
 3: Phase 3

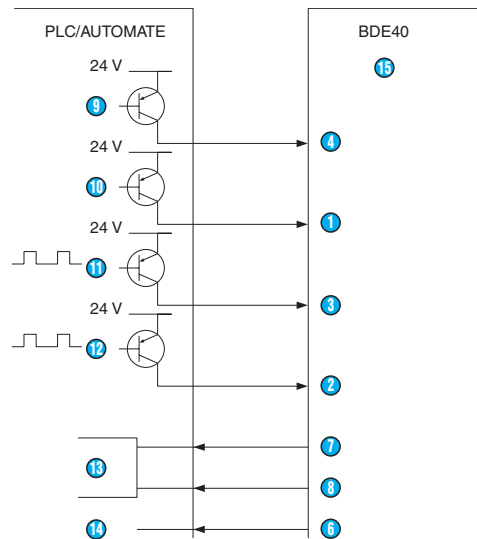
P3: Hall sensors
 1: Hall supply output +10 V DC
 2: 0 V DC Hall supply
 3: Temperature sensor
 4: Hall sensor 1
 5: Hall sensor 2
 6: Hall sensor 3

P4: Control I/O
 1: Direction of rotation
 2: Current limit
 3: Speed control
 4: On/off
 5: 0 V
 6: Current limiting output
 7: Encoder output
 8: Actual direction of rotation output

Examples of connection diagram with a Millenium 3 logic controller or a PLC



- ① Direction input
- ② Torque limit input
- ③ Speed setpoint input
- ④ On/off input
- ⑤ Earth
- ⑥ Active limiting output
- ⑦ 12 points/rev encoder output
- ⑧ Direction of rotation output
- ⑨ Digital PNP output



- ⑩ Digital PNP output
- ⑪ PWM 100 Hz to 1 KHz
- ⑫ PWM 100 Hz to 1 KHz
- ⑬ 24 V counter input (40 KHz minimum)
- ⑭ 24 V digital input
- ⑮ Control connector

NB: The "tachometer" and "actual direction of rotation" card outputs must be connected to inputs i1 and i2 respectively in order to be able to use the Motomate high-speed counter function.

Principles

Speed setpoint

Adjustable between 10% and 100% of 6000 rpm by PWM signal or analogue (0-10 V) signal.

Torque limit

Adjustable between 10% and 140% of the nominal card current by PWM signal or analogue 0-10 V signal. If the control is at 0% or 0 V or non-connected, the current limit is 140%.

If the current in the motor reaches the specified limit, the "active limiting" output switches to the "+ supply voltage" value and the current in the motor is automatically limited.

Since the torque value is directly related to the current in the motor, the torque limit can be set in this way.

Make sure that this setpoint is set correctly to avoid exceeding the capacities of the motor used.

Holding torque

Activates if on/off= 1 and speed setpoint= 0.

Its value depends on the "torque limit" setpoint.

Encoder and actual direction of rotation outputs

These two related outputs are used for positioning purposes, using the "high-speed counting" function of a Millenium or other PLC with high-speed inputs (>40 KHz in order to correctly manage the "actual direction of rotation" information and to be able to "upcount and downcount" without losing pulses on changing direction).

Overheating protection

If the temperature is too high, the protection activates and shuts off the motor. After it has cooled down, an action at the "on/off" input (switching "off" and then "on" again) is required in order to restart the motor.

Overheating is detected at the card and at the motor (if the motor is fitted with an NTC, such as BDE40-compatible motors 801405 and 801805).

Undervoltage protection

If the supply voltage becomes insufficient, the protection activates and shuts off the motor. The motor restarts automatically as soon as the supply voltage returns to the operating range.

Braking

The braking torque value is adjustable and is controlled by means of the "torque limit" setpoint.

The electronic card has two internal devices for dissipating braking energy. The first system is designed for low dissipation values, the second for higher values.

The first system limits overvoltages to 42 V. For inertias and low speeds, this device is adequate.

Example of usage restriction:

- Braking every 8 seconds of $14.5 \cdot 10^{-4}$ kg.m² from 3000 rpm to 0 rpm.

- Braking every 8 seconds of $25.4 \cdot 10^{-4}$ kg.m² from 2000 rpm to 0 rpm.

- Caution: If the specified limits are exceeded, this device will overheat and destroy the card.

In case of doubt, or if the braking phase is long or very frequent, the second internal braking circuit must be used; this requires an external energy dissipation resistor. In this case the trip threshold for this braking can be set to values below 42 V by means of a jumper on the side of the card.

Overvoltage limiting jumper

Located on the side of the card; various positions allow overvoltages due to heavy braking to be reduced.

Always set the jumper to a value greater than or equal to the "supply voltage + 2 V" to avoid disrupting the power supply.

Number of poles jumper

In order to limit the rotational speed to 6000 rpm, this jumper must be set to the number of "pairs of rotor poles" on the motor used.

Otherwise the speed will be adjusted within a different range. For example, a 4-pole motor (2 pairs) and a jumper set to 4 pairs will give a speed range of up to 12000 rpm. On the other hand, with an 8-pole motor (4 pairs) and a jumper set to 2 pairs, the speed range will be limited to 3000 rpm.

Braking resistor

The control card is supplied with a braking resistor to enable you to carry out your tests. However, you must check that its characteristics correspond to your requirements. Depending on your application, it is possible that it may overheat, in which case it will have to be replaced with a more suitable resistor.

The lower the resistor value, the higher the braking current. Typical values are in the region of a few ohms. The resistor must also be matched to the dissipation power (average and peak), see the guide supplied with the card.

The card is supplied with a 3.3 Ω - 25 W resistor.

"Non-return" diodes

In some cases, overvoltages due to braking must be prevented from returning to the power supply or other equipment (see "braking" in the basic concepts). If necessary, use the diodes supplied with the card. For connections please refer to the guide supplied with the card.

Motomate

2



Motomate - Brushless motor with integrated logic controller

→ 80 W Motomate

- Movement control for simple mechanisms
- All-in-one solution for quick integration
- Compact with high performance
- Intuitive programming with graphical function blocks
- Adapted for severe environments
- Integrated encoder : 12 pulses per revolution of the motor
- Independant torque control
- Uses the functionalities of TNi20
- And still more on the 'motomate' website at www.crouzet.com



Part numbers

| Type | Ratio | Max. speed (rpm) | Available torque (Nm) | Code |
|---------------------|-------|------------------|-----------------------|----------|
| Motor direct drive | - | 3 250 | 0.24 | 80080005 |
| Right angle gearbox | 5 | 650 | 1 | 80081001 |
| | 10 | 325 | 1.7 | 80081002 |
| | 20 | 163 | 2.9 | 80081003 |
| | 30 | 108 | 3.5 | 80081004 |
| | 50 | 65 | 4.1 | 80081006 |
| Planetary gearboxes | 5 | 630 | 1.1 | 80089704 |
| | 19 | 170 | 3.7 | • |
| | 27 | 120 | 5.2 | 80089705 |
| | 100 | 33 | 17 | • |
| | 139 | 23 | 23 | 80089706 |

Accessories

| Description | Code |
|---|----------|
| Programming cable PC/Motomate - serial port | 79294791 |
| Programming cable PC/Motomate - USB | 79294790 |
| Programming software on CD ROM | 79294792 |

General characteristics

| | |
|-------------------------------------|--------------|
| Supply voltage (V) | 24 (20 → 37) |
| Max. current (A) | 6 |
| Immunity from micro power cuts (ms) | 1 |
| Operating temperature (°C) | -20 → +40 |
| Protection index | IP 54 |

Programming

| | |
|-------------------------|-----------------------|
| Inputs / outputs | 4I/4O |
| Programming method | Function blocks / SFC |
| Program size | 128 |
| Program memory | Flash EEPROM |
| Program cycle time (ms) | 10 |
| Real-time clock | No |

Logic inputs

| | |
|-------------------------------|-------------|
| Max. number | 4 (I1 → I4) |
| Input impedance (kΩ) | > 10 |
| Logic 1 voltage threshold (V) | > 15 |
| Logic 0 voltage threshold (V) | < 5 |
| Response time (ms) | 10 |

High speed inputs

| | |
|----------------------|-------------|
| Max. number | 2 (I1 → I2) |
| Max. frequency (KHz) | 4 |

Analogue input

| | |
|-------------------|-----------------------|
| Max. number | 2 (I3 → I4) |
| Measurement range | 0-10 V ₋₋₋ |
| Resolution | 8 bits |
| Accuracy | ± 5% |

Logic outputs / PWM

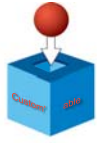
| | |
|------------------------|-------------|
| Max. number | 4 (O1 → O4) |
| Type of output | PNP |
| Insulation | No |
| Max. current (mA) | 250 |
| Leakage current (mA) | < 0.1 |
| Response time (ms) | 10 |
| PWM frequency (KHz) | 0.11 → 1.8 |
| PWM accuracy at 120 Hz | 5% |

Stocked product

Product made to order

To order, see page 18

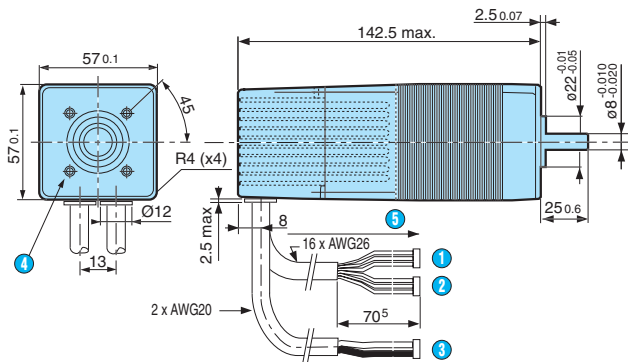
Product adaptations



- Special output shaft
- Special supply voltage
- Special cable length
- Customised electronics
- Special connectors
- Special gear ratios
- Special material for the gear wheels
- Special mounting plate
- Customer programs installed at the factory

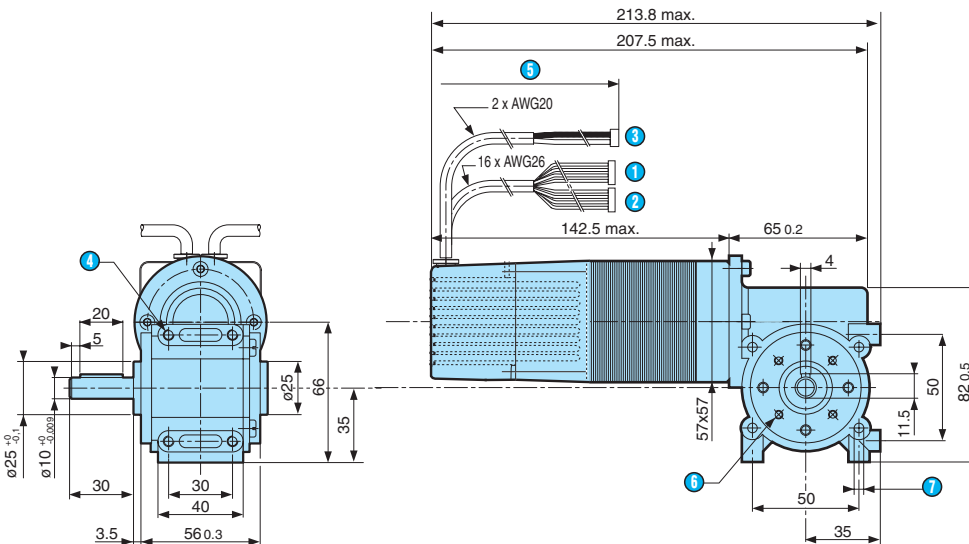
Dimensions

Direct drive



- ① Connector 6 way: programming motomate
- ② Connector 10 way: inputs/outputs motomate
- ③ Connector 2 way: power supply
- ④ 4 holes M5 at 90° on Ø 40 depth 4.5 mm
- ⑤ Cable length: 500 ± 15 mm

Right angle gearbox



- ① Connector 6 way: programming motomate
- ② Connector 10 way: inputs/outputs motomate
- ③ Connector 2 way: power supply
- ④ 4 x M5 depth 8 mm
- ⑤ Cable length 500 ± 5 mm

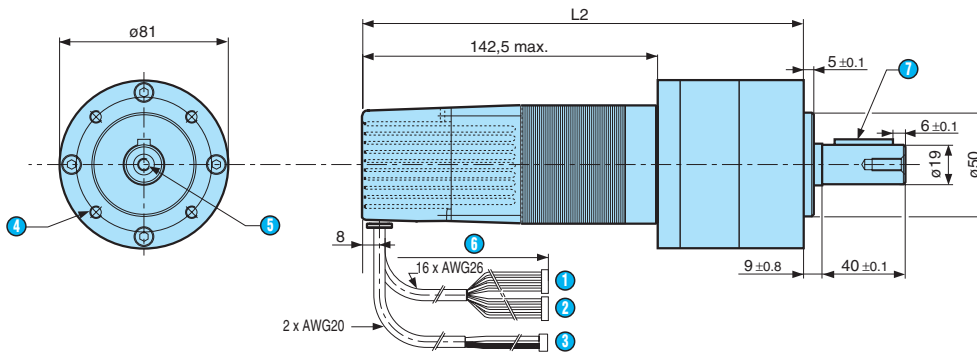
- ⑥ 4 x M4 on Ø 36 depth 8 mm
- ⑦ 4 x M5 depth 8 mm

Radial load max. = 150 N
Axial load max. = 100 N

Motomate - Brushless motor with integrated logic controller

Dimensions

Planetary gearboxes



- ① Connector 6 way: programming motomate
- ② Connector 10 way: inputs/outputs motomate
- ③ Connector 2 way: power supply
- ④ 4 holes M6 on Ø 65 depth 12 mm
- ⑤ Fixing hole M6 x 16
- ⑥ Cable length: 500 ± 15 mm
- ⑦ Key A6 x 6 x 28 according to DIN 6885

L2 Ratio 5: 212.8 mm max.
 L2 Ratio 27: 234.7 mm max.
 L2 Ratio 139: 256.8 mm max.

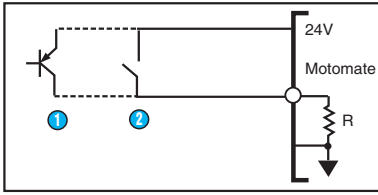
Radial load max. = 200/300/500 N
 Axial load max. = 80/120/200 N
 (according to no. of stages)

Connections

| Comment | Legend | Pin N° | Wire color | Motomate connector | Application connector |
|---------|--------|--------|--------------|--|--|
| *a | +24V | 1 | Brown | 1 power connector Molex 2-way (Ref. 51144-0200) | PCB side top view Ref. 53520-0220 |
| *a | GND | 2 | Black | | |
| | IN1 | 1 | Brown | 1 I/O connector Molex 10-way 2.54 mm spacing (Ref. 90142-0010) | PCB side top view Ref. 90130-1110 |
| *b | OUT1 | 2 | Blue | | |
| | IN2 | 3 | Orange | | |
| *b | OUT2 | 4 | Purple | | |
| | IN3 | 5 | Yellow | | |
| *b | OUT3 | 6 | Grey | | |
| | IN4 | 7 | Green | | |
| *b | OUT4 | 8 | White | | |
| *a | GND | 9 | Black | 1 programming connector Molex 6-way 2.54 mm spacing (Ref. 90142-0006) | PCB side top view Ref. 90130-1106 |
| *a | +24V | 10 | Red | | |
| *a | +5V | 1 | White-Red | | |
| *a | GND | 2 | White-Black | | |
| | SCL | 3 | White-Yellow | | |
| | SDA | 4 | White-Green | | |
| | RX | 5 | White-Brown | | |
| | TX | 6 | White-Orange | | |

Applications

Examples of input connections



1 Sensor output PNP or 2 Contact

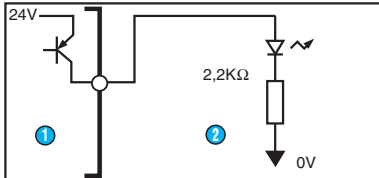


1 Sensor output NPN

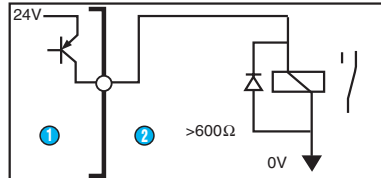


1 Potentiometer

Example of output connections



1 Motor
2 Load LED



1 Motor
2 Load relay

User information

- *a) Never reverse the polarity of the supply
- *b) Do not short-circuit the outputs O1 to O4 to earth
- Do not use the motor as a generator
- For more details on the geared motors, consult the brushless catalogue



High performance brushless motors







If you are looking for a motor with very specific characteristics ...

Harnessing CST's technical and industrial expertise, Crouzet can now offer high-performance brushless D.C. motor solutions that are widely recognised in the USA:

- High and very high speeds: 10000 rpm to 100000 rpm
- Low speed and high torque: up to 5 Nm per motor shaft
- Excellent dynamics due to the low inertia and low mechanical time constant of the motors
- Very high power density
- Reduced noise level resulting from the build quality of the motors and the management of magnetic fields (low torque fluctuation)
- Maximum possible torque constancy and smooth speed
- Motor start-up under low voltage...

3

Standard product selection

| | | | Max. speed | Peak stall torque | Continuous torque | Motor constant |
|---------------|---|----------|------------|-------------------|-------------------|---------------------------|
| | | | rpm | mNm | mNm | mNm/(Watt) ^{1/2} |
| | | | WNL | T _p | TCs | K _M |
| | | | | | | |
| Diameter (mm) | Product family | | | | | |
| Ø 28 |  <p>25 mNm steady state</p> <p>p. 152</p> | 80220101 | 18000 | 21.2 | 7.8 | 3.7 |
| | | 80220301 | 18000 | 56.5 | 24.7 | 7.8 |
| Ø 46 |  <p>95 mNm steady state</p> <p>p. 154</p> | 80240101 | 18000 | 84.7 | 30.4 | 7.8 |
| | | 80240201 | 16000 | 141.2 | 53.0 | 13.1 |
| | | 80240301 | 14000 | 197.7 | 81.2 | 18.5 |
| | | 80240401 | 14000 | 254.2 | 95.3 | 19.8 |
| Ø 51 |  <p>155 mNm steady state (without housing)</p> <p>p. 156</p> | 80258101 | 14000 | 98.9 | 29.7 | 12.0 |
| | | 80258201 | 12000 | 303.6 | 67.1 | 23.3 |
| | | 80258301 | 12000 | 423.7 | 101.0 | 30.4 |
| | | 80258401 | 10000 | 564.9 | 123.6 | 36.0 |
| | | 80258501 | 10000 | 656.7 | 155.4 | 42.4 |
| Ø 86 |  <p>953 mNm steady state</p> <p>p. 160</p> | 80280101 | 18000 | 850.0 | 353.1 | 78.4 |
| | | 80280201 | 18000 | 1760.0 | 706.2 | 137.0 |
| | | 80280301 | 18000 | 2470.0 | 953.3 | 164.5 |

brushless motors

Crouzet can meet even the most specific customer requirements by adapting the mechanical and magnetic structures of its motors and fine-tuning their individual characteristics. Factors such as the shape of the magnetic fields, the choice of materials used (pole pairs, magnets, bearings), the size of the components, the design of special air gaps, the number of rotor poles and the installation process can all be adapted to your requirements.

Many customers have already opted for this range, in the following applications in particular:

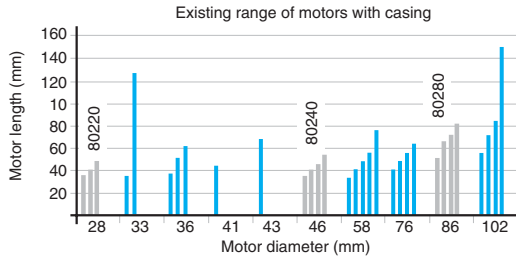
- **Medical:**
 - CPAP (Constant Positive Air Pressure)
 - Respiratory aid (ventilation)
 - Blood pumps
 - Ultrasound equipment
- **Industrial:**
 - Turbomolecular pumps
 - Industrial pumps
- **Transport:**
 - Motor-gas analysis
- **Laboratory:**
 - Centrifugal machine
 - Analysers
 - Gas analysis

| Electrical constant | Mechanical constant | Torque/speed factor | Friction torque | Weight | Length |
|---------------------|---------------------|---------------------|-----------------|--------|--------|
| millisec | millisec | mNm/(rad/sec) | mNm | g | mm |
| τE | τM | Fo | T _F | M | L |
| 0.15 | 13.70 | 0.011 | 0.5 | 57.0 | 35.6 |
| 0.26 | 5.00 | 0.056 | 0.7 | 85.0 | 47.0 |
| 0.39 | 15.70 | 0.056 | 2.1 | 150.0 | 35.6 |
| 1.44 | 10.80 | 0.169 | 3.5 | 200.0 | 40.6 |
| 0.51 | 7.90 | 0.346 | 4.9 | 240.0 | 45.7 |
| 0.55 | 0.93 | 0.395 | 7.1 | 280.0 | 53.3 |
| 0.52 | 21.00 | 0.148 | 4.9 | 60.0 | 15.2 |
| 0.50 | 12.30 | 0.537 | 8.5 | 130.0 | 27.8 |
| 0.56 | 11.70 | 0.918 | 14.1 | 170.0 | 35.6 |
| 0.62 | 10.00 | 1.271 | 17.7 | 220.0 | 43.2 |
| 0.68 | 9.60 | 1.836 | 21.2 | 280.0 | 50.8 |
| 1.90 | 8.80 | 6.214 | 21.2 | 910.0 | 50.8 |
| 3.10 | 5.70 | 18.713 | 35.3 | 1360.0 | 66.0 |
| 3.70 | 5.40 | 28.741 | 49.4 | 1870.0 | 81.3 |



Basic concepts - High-performance brushless motors

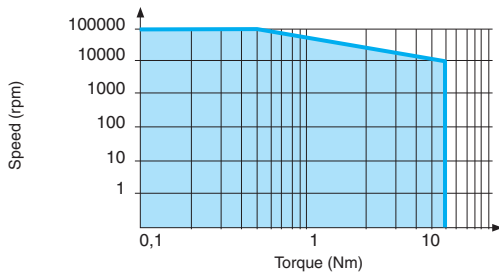
Our high-performance brushless motors are specially designed and created according to your specifications. Specialist teams can either develop a completely new model for you from scratch, or adapt an existing model from a current range of over 10 different motor diameters and various lengths, meaning you can save on design and tooling costs.



All motors supplied in casings are available without the housing, thus simplifying the mechanical interface and increasing overall precision (shorter chain of dimensions) for seamless integration in your application.



If you require a brushless motor which falls within the range shown in the table below, contact Crouzet Automatismes.



Depending on your application, the customary standard motor parameters may not be sufficient. The following section describes a number of examples of applications which call for special expertise in the design and manufacture of the motor. Crouzet Automatismes can help you by developing a motor specific to your application. These examples will give you an understanding of the terminology and concepts involved.

→ Example 1

In servocontrol applications which require the ability to fine-tune the position of the rotor and/or to start up at very low voltages, it is important to be able to optimise the following parameters:

Cogging torque

When there is no power to the motor, the rotor magnet tries to maximise its flux via the magnetic circuit of the stator. This generates a cogging torque which seeks to return the rotor to its preferred positions. This is an alternating magnetic torque, the shape of which depends on the geometry of the poles (iron and magnet).

Zero-speed friction:

Depending on the ball bearings used (size, backlash, lubrication, precision), there is a friction torque which has to be overcome in order to turn the rotor.

Breakaway torque

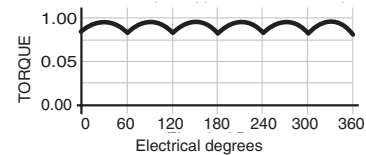
This torque is the sum of the cogging torque and the zero-speed friction torque. This is the parameter which has to be controlled in order to ensure that the motor starts up at very low voltage.

→ Example 2

In cases where the torque must be kept as constant as possible in order to generate a very stable instantaneous speed (photocopier) or to control the tension and running of a tape (direct drive tape reader), a critical parameter is the following:

Ripple torque

The motor torque fluctuates slightly between each stator pole and each switching of the control electronics.



These fluctuations can be minimised by modifying the shape of the stator poles and of the rotor magnets. The frequency of the ripples can be increased by increasing the number of rotor poles.

→ Example 3

Some applications require a very low noise level which is controlled with absolute precision. Noise is caused by mechanical resonances associated with the vibration frequencies generated by the motor (ripple torque, cogging torque), backlash in the parts (ball bearings), and unbalances in rotating parts (rotor).

By choosing more accurate motor components (reduced tolerances), installing them with care and attention and balancing rotating parts, we can build very silent motors which will meet your most exacting criteria.

→ Example 4

Applications such as centrifuges and turbomolecular pumps can demand very high speeds (in the order of 70000 rpm). We can manufacture special motors which are capable of reaching these speeds.

By working on the characteristics of the materials used for the motor, by modifying the mechanical design, by changing the air gaps, by redrawing certain shapes, and by optimising the inductance of the motor, we can create and manufacture motors specifically for this type of application.

→ Example 5

Applications requiring slow speeds combined with high torque (on-board military applications).

By creating larger motor diameters and increasing the number of stator and rotor poles. Using high-temperature leads to meet military standards.

Other possibilities:

- Electrical: Star winding with or without centre wire, delta winding, connections
- Electronics: Integrated control
- Mechanical: Different dimensions - Housing shape - Lead output - Shaft shape - Brake - Encoder - Fixing points, etc.



Electromechanical: Different winding, different length, different torque (up to 5 Nm), speed (up to 100000 rpm), rare-earth magnets.

Magnetism: Modification of shapes and materials to obtain the desired performance.

High-performance brushless motors

→ Ø 28 mm - 8 to 25 mNm

- Smallest size
- Operates up to 18000 rpm with no special adaptation
- Aluminium housing
- Operates in explosive atmospheres



Part numbers

| | 8 mNm | 25 mNm |
|--------------|-----------------|-----------------|
| Type | 802201 | 802203 |
| Part numbers | 80220101 | 80220301 |

| General characteristics | | |
|--|-----------------|-----------------|
| Max. speed (rpm) | 18000 | 18000 |
| Peak torque (mNm) | 21.2* | 56.5* |
| Continuous stall torque (mNm) | 7.8** | 24.7** |
| Motor constant (mNm/W ^{1/2}) | 3.7 | 7.8 |
| Electrical time constant (ms) | 0.15 | 0.26 |
| Mechanical time constant (ms) | 13.7 | 5 |
| Energy losses at peak torque (W) | 32.9 | 54.4 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 0.011 | 0.056 |
| Detent torque (mNm) | 0.5 (5000 rpm) | 0.7 (5000 rpm) |
| Rotor inertia (gcm ²) | 1.5 | 2.9 |
| Thermal resistance (°C/W) | 12 | 8 |
| Max. coil temperature (°C) | 125 | 125 |
| Number of phases | 3 (star config) | 3 (star config) |
| Number of poles | 4 | 4 |
| Ambient operating temperature (°C) | -55 → 65°C | -55 → 65°C |
| Dielectric strength at 500 V ~ | 1000 MΩ min. | 1000 MΩ min. |
| Bearings | Ball bearings | Ball bearings |
| Service life (h) | 20000 | 20000 |
| Weight (g) | 57 | 85 |
| Length (mm) | 35.6 | 47 |

Comments

* 10 sec. at 25°C ambient temperature
 ** 25°C ambient temperature, 125°C winding temperature, motor mounted on aluminium plate 305 x 305 x 6.4 mm thick to assist heat flow

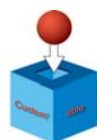
Standard winding ***

| | | |
|---------------------------------|--------------|-------------|
| Phase-to-phase resistance (Ω) | 39.2 ± 12.5% | 3.4 ± 12.5% |
| Voltage at peak torque (V) | 36.8 | 13.6 |
| Current at peak torque (A) | 0.94 | 4 |
| Torque constant (mN.m/A) | 22.6 ± 10% | 14.1 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.023 ± 10% | 0.014 ± 10% |
| Back EMF constant (V/Krpm) | 2.37 ± 10% | 1.48 ± 10% |
| Inductance (mH) | 6 ± 30% | 0.9 ± 30% |

Comments

*** Other windings or motor lengths can be made to obtain other torques and speeds.

Product adaptations



- Other windings
- Other dimensions
- Other performance levels
- Without housing
- Without Hall effect sensors
- Coil centre wire

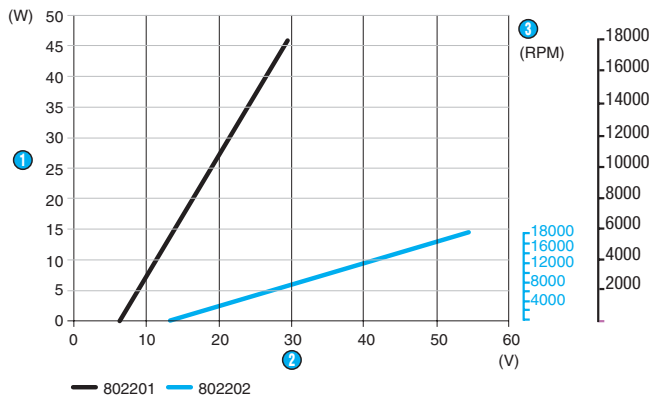
Stocked product

Product made to order

To order, see page 18

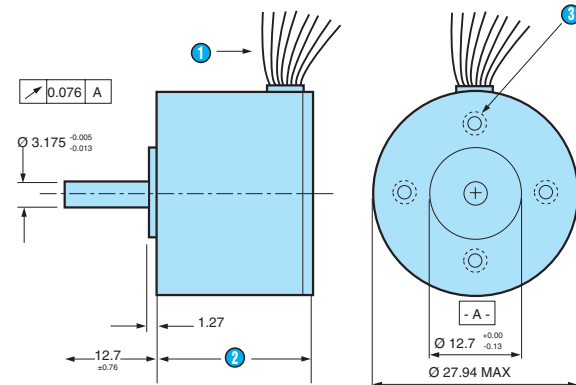
Curves

Power/Power supply



- ① Nominal power
- ② Supply voltage
- ③ Speeds

Dimensions



- ① UL1061 PVC wires - 80°C
Length 300 mm min.
3 x AWG24 (coils)
5 x AWG28 (Hall effect sensors)
- ② See length in General characteristics
- ③ 4 x holes with 4-40 UNC-2B American thread, thread depth 4.6 mm - Equally spaced over Ø 19.05 mm

Connections

Forward

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 1 | 0 | +V | - | 0V |
| 0 | 1 | 0 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 0 | 1 | 0V | - | +V |
| 1 | 0 | 1 | - | 0V | +V |
| 1 | 1 | 1 | | | |

- ① Winding

Reverse

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | 0V | +V | - |
| 1 | 0 | 1 | - | +V | 0V |
| 0 | 0 | 1 | +V | - | 0V |
| 0 | 1 | 1 | +V | 0V | - |
| 0 | 1 | 0 | - | 0V | +V |
| 1 | 1 | 0 | 0V | - | +V |
| 1 | 1 | 1 | | | |

- ① Winding

Marking

| Wire colour | Connection name | AWG wire gauge |
|-------------|------------------------|----------------|
| Brown | Hall 1 | 28 |
| Blue | Hall 2 | 28 |
| Orange | Hall 3 | 28 |
| Yellow | Hall + supply | 28 |
| Grey | Hall - supply (return) | 28 |
| Red | Winding A | 24 |
| Black | Winding B | 24 |
| Green | Winding C | 24 |

Hall effect:

Voltage range: 4.5 → 24 V_{DC}
Max. current: 50 mA
Type of output: NPN open collector

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors.

High-performance brushless motors

→ Ø 46 mm - 30 to 95 mNm

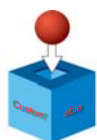
- Exceptional performance for its size
- Operates up to 14000/18000 rpm without any special adaptation
- Aluminium housing
- Operates in explosive atmospheres



Part numbers

| | 30 mNm | 53 mNm | 81 mNm | 95 mNm |
|--|-----------------|-----------------|-----------------|-----------------|
| Type | 802401 | 802402 | 802403 | 802404 |
| Part numbers | 80240101 | 80240201 | 80240301 | 80240401 |
| General characteristics | | | | |
| Max. speed (rpm) | 18000 | 16000 | 14000 | 14000 |
| Peak torque (mNm) | 84.7* | 141.2* | 197.7* | 254.2* |
| Continuous stall torque (mNm) | 30.4** | 53** | 81.2** | 95.3** |
| Motor constant (mNm/W ^{1/2}) | 7.8 | 13.1 | 18.5 | 19.8 |
| Electrical time constant (ms) | 0.39 | 0.44 | 0.51 | 0.55 |
| Mechanical time constant (ms) | 15.7 | 10.8 | 7.9 | 9.3 |
| Energy losses at peak torque (W) | 122.4 | 117.2 | 114.2 | 164.3 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 0.056 | 0.169 | 0.346 | 0.395 |
| Detent torque (mNm) | 2.1 (5000 rpm) | 3.5 (5000 rpm) | 4.9 (5000 rpm) | 7.1 (5000 rpm) |
| Rotor inertia (gcm ²) | 9.2 | 18.4 | 26.8 | 36.7 |
| Thermal resistance (°C/W) | 5.4 | 4.9 | 4.4 | 3.8 |
| Max. coil temperature (°C) | 155 | 155 | 155 | 155 |
| Number of phases | 3 (star config) | 3 (star config) | 3 (star config) | 3 (star config) |
| Number of poles | 4 | 4 | 4 | 4 |
| Ambient operating temperature (°C) | -55 → 65°C | -55 → 65°C | -55 → 65°C | -55 → 65°C |
| Dielectric strength at 500 V --- | 1000 MΩ min. | 1000 MΩ min. | 1000 MΩ min. | 1000 MΩ min. |
| Bearings | Ball bearings | Ball bearings | Ball bearings | Ball bearings |
| Service life (h) | 20000 | 20000 | 20000 | 20000 |
| Weight (g) | 150 | 200 | 240 | 280 |
| Length (mm) | 35.6 | 40.6 | 45.7 | 53.3 |
| Comments | | | | |
| * 10 sec. at 25°C ambient temperature | | | | |
| ** 25°C ambient temperature and 155°C winding temperature | | | | |
| Standard winding *** | | | | |
| Phase-to-phase resistance (Ω) | 0.85 ± 12.5% | 0.75 ± 12.5% | 0.91 ± 12.5% | 0.73 ± 12.5% |
| Voltage at peak torque (V) | 10.2 | 9.38 | 10.2 | 11 |
| Current at peak torque (A) | 12 | 12.5 | 11.2 | 15 |
| Torque constant (mN.m/A) | 7.06 ± 10% | 11.3 ± 10% | 17.7 ± 10% | 16.9 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.007 ± 10% | 0.011 ± 10% | 0.018 ± 10% | 0.017 ± 10% |
| Back EMF constant (V/Krpm) | 0.74 ± 10% | 1.18 ± 10% | 1.85 ± 10% | 1.77 ± 10% |
| Inductance (mH) | 0.33 ± 30% | 0.33 ± 30% | 0.46 ± 30% | 0.4 ± 30% |
| Comments | | | | |
| *** On aluminium metal plate 254 x 254 x 10 mm thick for the heat flow | | | | |

Product adaptations



- Other windings
- Other dimensions
- Other performance levels
- Without housing
- Without Hall effect sensors
- Coil centre wire

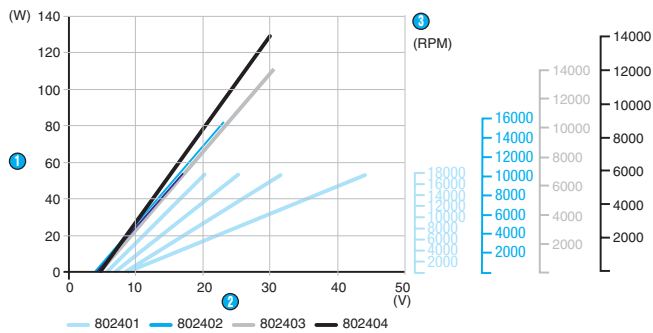
Stocked product

Product made to order

To order, see page 18

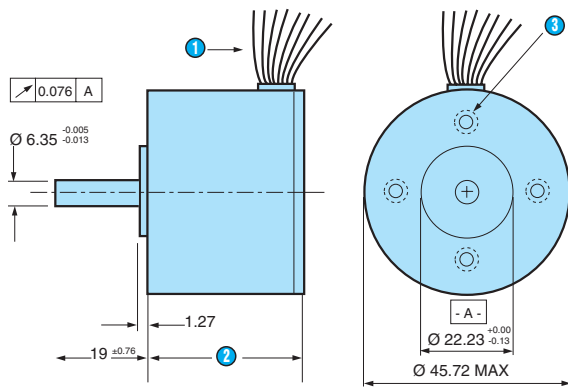
Curves

Power/Power supply



- ① Nominal power
- ② Supply voltage
- ③ Speeds

Dimensions



- ① UL1061 PVC wires - 80°C
Length 300 mm min.
3 x AWG20 (coils)
5 x AWG24 (Hall effect sensors)
- ② See length in General characteristics
- ③ 4 holes with 4-40 UNC-2B American thread, thread depth 7 mm
Equally spaced over $\varnothing 31.75$ mm

Connections

Forward

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 1 | 0 | +V | - | 0V |
| 0 | 1 | 0 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 0 | 1 | 0V | - | +V |
| 1 | 0 | 1 | - | 0V | +V |
| 1 | 1 | 1 | | | |

- ① Winding

Reverse

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 0 | 1 | +V | - | 0V |
| 0 | 0 | 1 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 1 | 0 | 0V | - | +V |
| 1 | 1 | 0 | - | 0V | +V |
| 1 | 1 | 1 | | | |

- ① Winding

Marking

| Wire colour | Connection name | AWG wire gauge |
|-------------|------------------------|----------------|
| Brown | Hall 1 | 24 |
| Blue | Hall 2 | 24 |
| Orange | Hall 3 | 24 |
| Yellow | Hall + supply | 24 |
| Grey | Hall - supply (return) | 24 |
| Red | Winding A | 20 |
| Black | Winding B | 20 |
| Green | Winding C | 20 |

Hall effect:
Voltage range: 4.5 → 24 V D.C.
Max. current: 50 mA
Type of output: NPN open collector

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors.

High-performance brushless motors

→ Ø 51 mm - 30 to 100 mNm

- For mounting directly in the application mechanism
- Operates up to 12000/14000 rpm without any special adaptation
- Extensive range of lengths and windings
- Operates in explosive atmospheres



Part numbers

| | 30 mNm | 67 mNm |
|--------------|-----------------|-----------------|
| Type | 802581 | 802582 |
| Part numbers | 80258101 | 80258201 |

| General characteristics | | |
|--|--------------------------------|----------------------------------|
| Max. speed (rpm) | 14000 | 12000 |
| Peak torque (mNm) | 98.9* | 303.6* |
| Continuous stall torque (mNm) | 29.7** | 67.1** |
| Motor constant (mNm/W ^{1/2}) | 12 | 23.3 |
| Electrical time constant (ms) | 0.52 | 0.5 |
| Mechanical time constant (ms) | 21 | 12.3 |
| Energy losses at peak torque (W) | 67.3 | 173.5 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 0.148 | 0.537 |
| Detent torque (mNm) | 4.9 (5000 rpm) | 8.5 (5000 rpm) |
| Rotor inertia (gcm ²) | 32.5 | 64.3 |
| Thermal resistance (°C/W) | 12 | 9.5 |
| Max. coil temperature (°C) | 155 | 155 |
| Number of phases | 3 (star config) | 3 (star config) |
| Number of poles | 8 | 8 |
| Ambient operating temperature (°C) | -55 → 65°C | -55 → 65°C |
| Dielectric strength at 500 V --- | 1000 MΩ min. | 1000 MΩ min. |
| Service life (h) | 20000 | 20000 |
| Weight (g) | 60 | 130 |
| Length (mm) | L1: 6.6 L2: 7.6 L3: 15.2 | L1: 14.2 L2: 15.2 L3: 27.9 |

Comments

* 10 sec. at 25°C ambient temperature, torque to reach 155°C at winding

** 25°C ambient temperature, 155°C winding temperature, motor mounted on aluminium plate 152 x 152 x 3.2 mm thick to assist heat flow

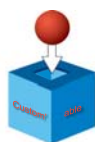
Standard winding ***

| | | |
|---------------------------------|-------------|-------------|
| Phase-to-phase resistance (Ω) | 1.3 ± 12.5% | 1.9 ± 12.5% |
| Voltage at peak torque (V) | 9.1 | 18.2 |
| Current at peak torque (A) | 7 | 9.6 |
| Torque constant (mN.m/A) | 14.01 ± 10% | 32 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.014 ± 10% | 0.032 ± 10% |
| Back EMF constant (V/Krpm) | 1.47 ± 10% | 3.35 ± 10% |
| Inductance (mH) | 0.7 ± 30% | 1 ± 30% |

Comments

*** Performance levels measured with housing and at 25°C ambient temperature

Product adaptations



- Other windings
- Other dimensions
- Other performance levels
- Without Hall effect sensors

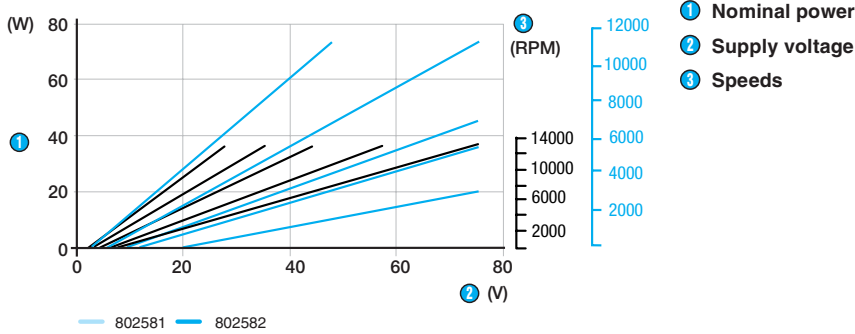
Stocked product

Product made to order

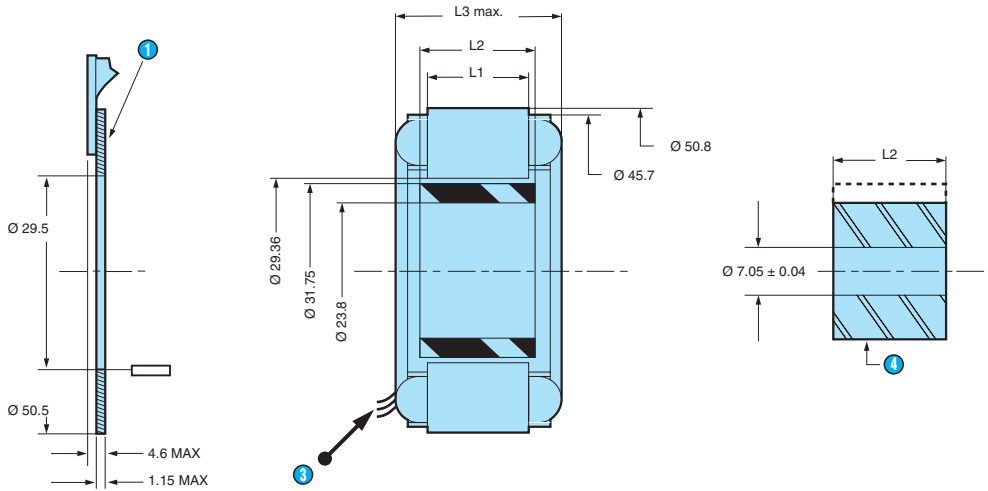
To order, see page 18

Curves

Power/Power supply



Dimensions



- 1 Hall effect sensor plate (Factory-mounted on appropriate mounts)
- 2 See length in General characteristics
- 3 UL1061 PVC wires - 80°C
Length 300 mm min.
3 x AWG20 (coils)
5 x AWG24 (Hall effect sensors)
- 4 Hub

Connections

Forward

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 1 | 0 | +V | - | 0V |
| 0 | 1 | 0 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 0 | 1 | 0V | - | +V |
| 1 | 0 | 1 | - | 0V | +V |
| 1 | 1 | 1 | | | |

1 Winding

Reverse

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | 0V | +V | - |
| 1 | 0 | 1 | - | +V | 0V |
| 0 | 0 | 1 | +V | - | 0V |
| 0 | 1 | 1 | +V | 0V | - |
| 0 | 1 | 0 | - | 0V | +V |
| 1 | 1 | 0 | 0V | - | +V |
| 1 | 1 | 1 | | | |

1 Winding

Marking

| Wire colour | Connection name | AWG wire gauge |
|-------------|------------------------|----------------|
| Brown | Hall 1 | 24 |
| Blue | Hall 2 | 24 |
| Orange | Hall 3 | 24 |
| Yellow | Hall + supply | 24 |
| Grey | Hall - supply (return) | 24 |
| Red | Winding A | 20 |
| Black | Winding B | 20 |
| Green | Winding C | 20 |

Hall effect:

Voltage range: 4.5 → 24 V_{DC}

Max. current: 50 mA

Type of output: NPN open collector

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors.

High-performance brushless motors

→ Ø 51 mm - 120 to 155 mNm

- For mounting directly in the application mechanism
- Operates up to 10000 rpm without any special adaptation
- Extensive range of lengths and windings
- Operates in explosive atmospheres



Part numbers

| | 101 mNm | 124 mNm | 155 mNm |
|--------------|-----------------|-----------------|-----------------|
| Type | 802583 | 802584 | 802585 |
| Part numbers | 80258301 | 80258401 | 80258501 |

| General characteristics | | | |
|--|----------------------------------|----------------------------------|----------------------------------|
| Max. speed (rpm) | 12000 | 10000 | 10000 |
| Peak torque (mNm) | 423.7* | 564.9* | 656.7* |
| Continuous stall torque (mNm) | 101** | 123.6** | 155.4** |
| Motor constant (mNm/W ^{1/2}) | 30.4 | 36 | 42.4 |
| Electrical time constant (ms) | 0.56 | 0.62 | 0.68 |
| Mechanical time constant (ms) | 11.7 | 10 | 9.6 |
| Energy losses at peak torque (W) | 197.5 | 250 | 240 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 0.918 | 1.271 | 1.836 |
| Detent torque (mNm) | 14.1 (5000 rpm) | 17.7 (5000 rpm) | 21.2 (5000 rpm) |
| Rotor inertia (gcm ²) | 105.9 | 127.1 | 162.4 |
| Thermal resistance (°C/W) | 7.7 | 6.7 | 6.1 |
| Max. coil temperature (°C) | 155 | 155 | 155 |
| Number of phases | 3 (star config) | 3 (star config) | 3 (star config) |
| Number of poles | 8 | 8 | 8 |
| Ambient operating temperature (°C) | -55 → 65°C | -55 → 65°C | -55 → 65°C |
| Dielectric strength at 500 V $\overline{\text{---}}$ | 1000 MΩ min. | 1000 MΩ min. | 1000 MΩ min. |
| Service life (h) | 20000 | 20000 | 20000 |
| Weight (g) | 170 | 220 | 280 |
| Length (mm) | L1: 21.6 L2: 22.9 L3: 35.6 | L1: 29.5 L2: 30.5 L3: 43.2 | L1: 37.1 L2: 38.1 L3: 50.8 |

Comments

* 10 sec. at 25°C ambient temperature, torque to reach 155°C at winding

** 25°C ambient temperature, 155°C winding temperature, motor mounted on aluminium plate 152 x 152 x 3.2 mm thick to assist heat flow

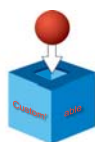
Standard winding ***

| | | | |
|---------------------------------|-------------|-------------|-------------|
| Phase-to-phase resistance (Ω) | 1.6 ± 12.5% | 3.3 ± 12.5% | 0.4 ± 12.5% |
| Voltage at peak torque (V) | 17.8 | 28.7 | 9.8 |
| Current at peak torque (A) | 11.1 | 8.7 | 24.5 |
| Torque constant (mN.m/A) | 38 ± 10% | 65 ± 10% | 26.8 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.038 ± 10% | 0.065 ± 10% | 0.027 ± 10% |
| Back EMF constant (V/Krpm) | 3.98 ± 10% | 6.8 ± 10% | 2.83 ± 10% |
| Inductance (mH) | 0.9 ± 30% | 2.1 ± 30% | 0.3 ± 30% |

Comments

*** Performance levels measured with housing and at 25°C ambient temperature

Product adaptations



- Other windings
- Other dimensions
- Other performance levels
- Without Hall effect sensors

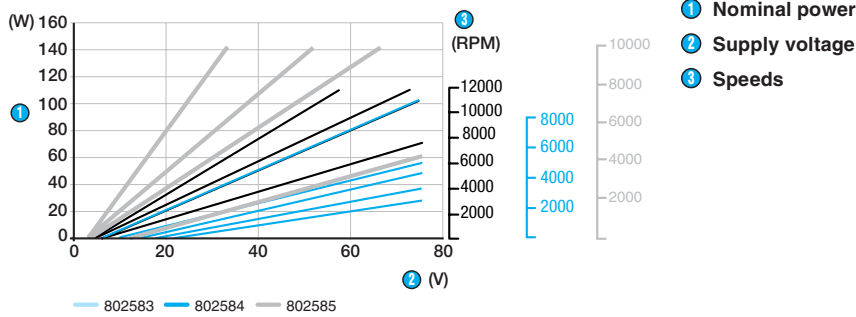
Stocked product

Product made to order

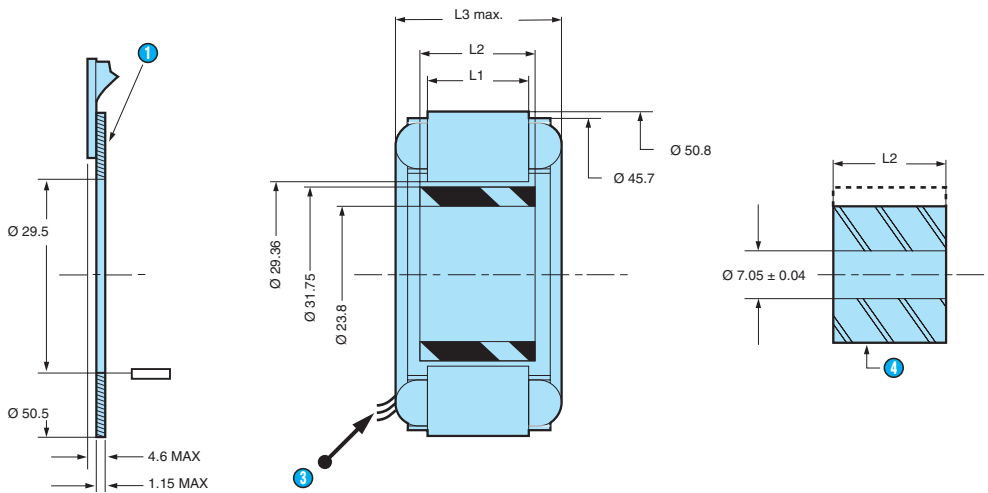
To order, see page 18

Curves

Power/Power supply



Dimensions



- 1 Hall effect sensor plate (Factory-mounted on appropriate mounts)
- 2 See length in General characteristics
- 3 UL1061 PVC wires - 80°C
Length 300 mm min.
3 x AWG20 (coils)
5 x AWG24 (Hall effect sensors)
- 4 Hub

Connections

Forward

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 1 | 0 | +V | - | 0V |
| 0 | 1 | 0 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 0 | 1 | 0V | - | +V |
| 1 | 0 | 1 | - | 0V | +V |
| 1 | 1 | 1 | | | |

1 Winding

Reverse

| Hall | | | 1 | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | 0V | +V | - |
| 1 | 0 | 1 | - | +V | 0V |
| 0 | 0 | 1 | +V | - | 0V |
| 0 | 1 | 1 | +V | 0V | - |
| 0 | 1 | 0 | - | 0V | +V |
| 1 | 1 | 0 | 0V | - | +V |
| 1 | 1 | 1 | | | |

1 Winding

Marking

| Wire colour | Connection name | AWG wire gauge |
|-------------|------------------------|----------------|
| Brown | Hall 1 | 24 |
| Blue | Hall 2 | 24 |
| Orange | Hall 3 | 24 |
| Yellow | Hall + supply | 24 |
| Grey | Hall - supply (return) | 24 |
| Red | Winding A | 20 |
| Black | Winding B | 20 |
| Green | Winding C | 20 |

Hall effect:

Voltage range: 4.5 → 24 V_{DC}
Max. current: 50 mA
Type of output: NPN open collector

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors.

High-performance brushless motors

→ Ø 86 mm - 353 to 953 mNm

- Very quiet and powerful
- Low torque ripple
- Ideal for low speeds
- Aluminium housing
- Operates in explosive atmospheres



Part numbers

| | 353 mNm | 706 mNm | 953 mNm |
|--------------|-----------------|-----------------|-----------------|
| Type | 802801 | 802802 | 802803 |
| Part numbers | 80280101 | 80280201 | 80280301 |

| General characteristics | | | |
|--|-----------------|-----------------|-----------------|
| Max. speed (rpm) | 18000 | 18000 | 18000 |
| Peak torque (mNm) | 847.4* | 1765.4* | 2471.5* |
| Continuous stall torque (mNm) | 353.1** | 706.2** | 953.3** |
| Motor constant (mNm/W ^{1/2}) | 78.4 | 137.0 | 164.5 |
| Electrical time constant (ms) | 1.9 | 3.1 | 3.7 |
| Mechanical time constant (ms) | 8.8 | 5.7 | 5.4 |
| Energy losses at peak torque (W) | 116.1 | 166.4 | 212.3 |
| Torque/speed factor - zero impedance (mNm/ (rad/s)) | 6.214 | 18.713 | 28.741 |
| Detent torque (mNm) | 21.2 (5000 rpm) | 35.3 (5000 rpm) | 49.4 (5000 rpm) |
| Rotor inertia (gcm ²) | 544 | 1059 | 1554 |
| Thermal resistance (°C/W) | 3.2 | 2.5 | 2.2 |
| Max. coil temperature (°C) | 125 | 125 | 125 |
| Number of phases | 3 (star config) | 3 (star config) | 3 (star config) |
| Number of poles | 6 | 6 | 6 |
| Ambient operating temperature (°C) | -55 → 65°C | -55 → 65°C | -55 → 65°C |
| Dielectric strength at 500 V ~ | 1000 MΩ min. | 1000 MΩ min. | 1000 MΩ min. |
| Bearings | Ball bearings | Ball bearings | Ball bearings |
| Service life (h) | 20000 | 20000 | 20000 |
| Weight (g) | 910 | 1360 | 1870 |
| Length (mm) | 50.8 | 66 | 81.3 |

Comments

* 10 sec. at 25°C ambient temperature

** 25°C ambient temperature, 125°C winding temperature, motor mounted on aluminium plate 305 x 305 x 6.4 mm thick to assist heat flow

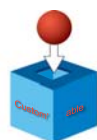
Standard winding ***

| | | | |
|---------------------------------|-------------|--------------|--------------|
| Phase-to-phase resistance (Ω) | 0.3 ± 12.5% | 0.45 ± 12.5% | 0.36 ± 12.5% |
| Voltage at peak torque (V) | 5.9 | 8.65 | 9 |
| Current at peak torque (A) | 19.67 | 19.2 | 25 |
| Torque constant (mN.m/A) | 43.08 ± 10% | 91.8 ± 10% | 98.9 ± 10% |
| Back EMF constant (V/ (rad/s)) | 0.043 ± 10% | 0.092 ± 10% | 0.099 ± 10% |
| Back EMF constant (V/Krpm) | 4.50 ± 10% | 9.63 ± 10% | 10.37 ± 10% |
| Inductance (mH) | 0.57 ± 30% | 1.4 ± 30% | 1.33 ± 30% |

Comments

*** Other windings or motor lengths can be made to obtain other torques and speeds.

Product adaptations



- Other windings
- Other dimensions
- Other performance levels
- Without housing
- Without Hall effect sensors
- With 1000 pulses/rev encoder

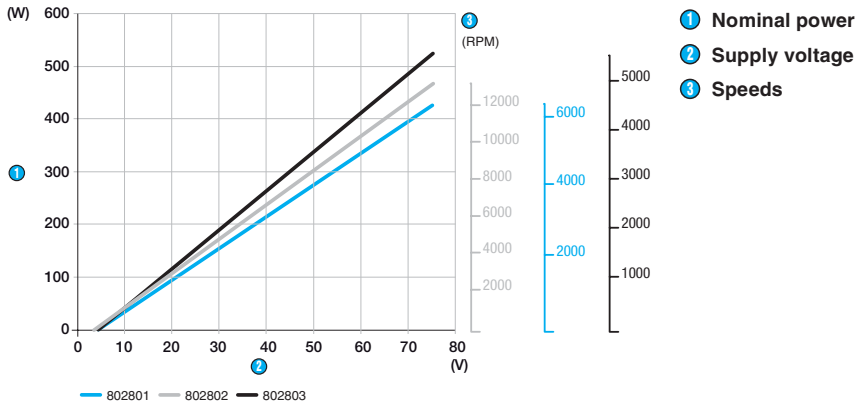
Stocked product

Product made to order

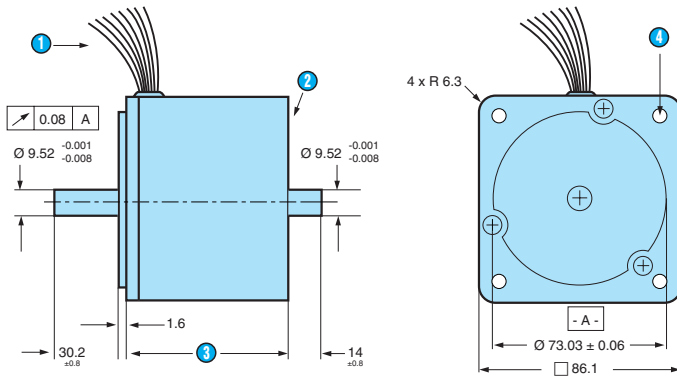
To order, see page 18

Curves

Power/Power supply



Dimensions



- ① Type E Teflon wires
Length 300 mm min.
3 x AWG18 and 5 x AWG24
- ② 2 holes with 4-40 UNC-2B American thread
Depth 6.8 mm
Equally spaced over $\varnothing 46$ mm
- ③ See length in General characteristics
- ④ 4 through holes: $\varnothing 5.58$ mm equally spaced over the $\varnothing 98.43$ mm

Connections

Forward

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | +V | 0V | - |
| 1 | 1 | 0 | +V | - | 0V |
| 0 | 1 | 0 | - | +V | 0V |
| 0 | 1 | 1 | 0V | +V | - |
| 0 | 0 | 1 | 0V | - | +V |
| 1 | 0 | 1 | - | 0V | +V |
| 1 | 1 | 1 | | | |

① Winding

Reverse

| Hall | | | ① | | |
|------|---|---|----|----|----|
| 1 | 2 | 3 | 1 | 2 | 3 |
| 0 | 0 | 0 | | | |
| 1 | 0 | 0 | 0V | +V | - |
| 1 | 0 | 1 | - | +V | 0V |
| 0 | 0 | 1 | +V | - | 0V |
| 0 | 1 | 1 | +V | 0V | - |
| 0 | 1 | 0 | - | 0V | +V |
| 1 | 1 | 0 | 0V | - | +V |
| 1 | 1 | 1 | | | |

① Winding

Marking

| Wire colour | Connection name | AWG wire gauge |
|-------------|------------------------|----------------|
| Brown | Hall 1 | 24 |
| Blue | Hall 2 | 24 |
| Orange | Hall 3 | 24 |
| Yellow | Hall + supply | 24 |
| Grey | Hall - supply (return) | 24 |
| Red | Winding A | 18 |
| Black | Winding B | 18 |
| Green | Winding C | 18 |

Hall effect:

Voltage range: 4.5 → 24 V_{DC}
Max. current: 50 mA
Type of output: NPN open collector

Other information

For other standard windings visit www.crouzet.com

User information

Not protected against connection errors.

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| 82800504 | DC direct-drive brushed motors - Ø 36 - 22 W | 40 |
| 82800505 | DC direct-drive brushed motors - Ø 36 - 31 W | 40 |
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| 82810504 | DC direct-drive brushed motors - Ø 36 - 14 W | 40 |
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