

# Micromotors

Motorisation solutions tailored to your applications

## 10 Overview



■ D.C. motors and geared motors



■ Brushless motors and geared motors



■ Stepper motors and synchronous motors

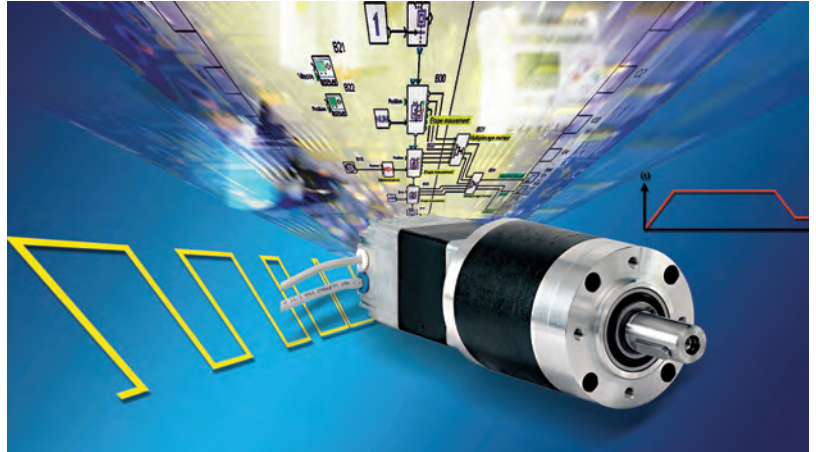
[www.crouzet.com](http://www.crouzet.com)



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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 250 W and 0.1 to 50 Nm D.C. brush and brushless motors.

At the heart of this innovation lie exceptional motor performance and control, 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. This means you are guaranteed quality products on time, every time.

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



Since 2005, the CST (Custom Sensors & Technologies) "Business Unit" has incorporated 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 catalogue, CST also offers a complete range of detection and control products.

Crouzet's Quality Control System has integrated environmental management into its processes. The production sites are ISO 9001 and ISO 14001 certified.



All Crouzet products are fully compliant with the RoHS Directive.

Eco-design is central to the company's "Offer Creation Process", the aim of which is to design products and services that correspond as closely as possible to customers' requirements and reduce their environmental impact throughout their life cycle.

# Expertise in micromotors

## ► Tailored to your needs

### ▷ Innovation tailored to individual 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...

## Specific 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.

*Linear disengageable stepper motor*

*Geared motor with brushes*

## 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.

Specific products

Standard components

Adapted products

Components with added value

*Electronic card*

## Products with added value

### Customer Adaptation Centre

All our standard products can be supplemented by factory-mounted auxiliaries, accessories or programs, including connectors, leads, special terminals, dedicated shafts, adaptor plates, software, etc. Seamless integration in your equipment means you benefit from simpler logistics and optimum installation reliability.

## Adapted products

### Customer Adaptation Centre

Defined by your project teams and our specialists as part of a collaborative approach, these adapted products have exactly the right levels of performance and dedicated functionality you need for your applications.

*Brushless geared motor*

*Motomate integrated electronics*



Help with compiling specifications



Development work in the design office



Production



Adaptation

► Benefits of an adapted motorisation solution

▷ 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.

The Motomate shown on the right 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).

Braking and holding

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

Communicating

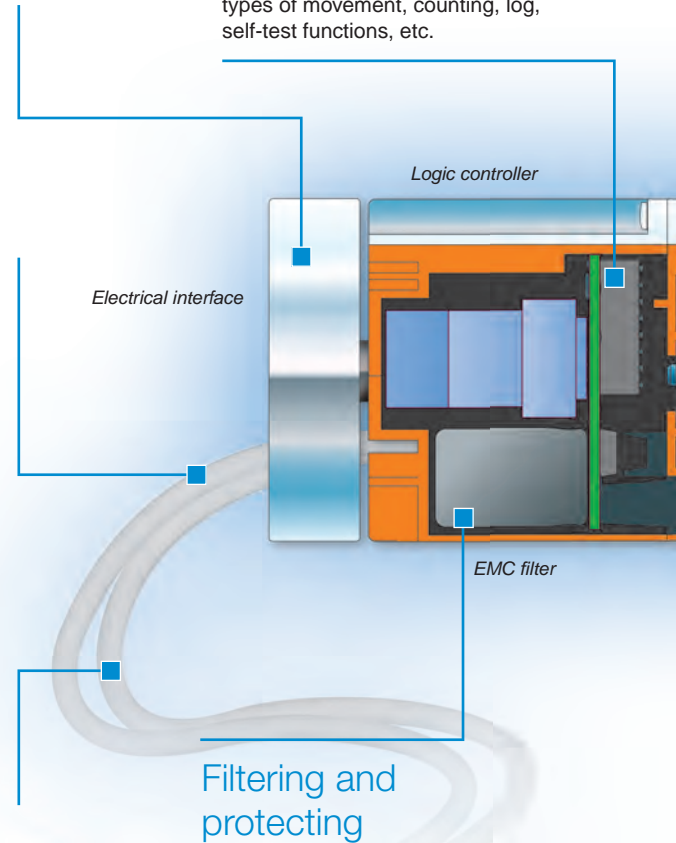
Adding a communication module provides an interface with your central controller or PLC using various methods: standard and analogue I/O (0-10 V, 4-20 mA), PWM, fieldbus (Modbus, CAN, etc.) or radio link (Zigbee, etc.).

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

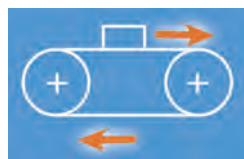
Controlling

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



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.)
  - Sealing



# Motorisation solutions tailored to your needs

## ▷ Crouzet, experts in motorisation

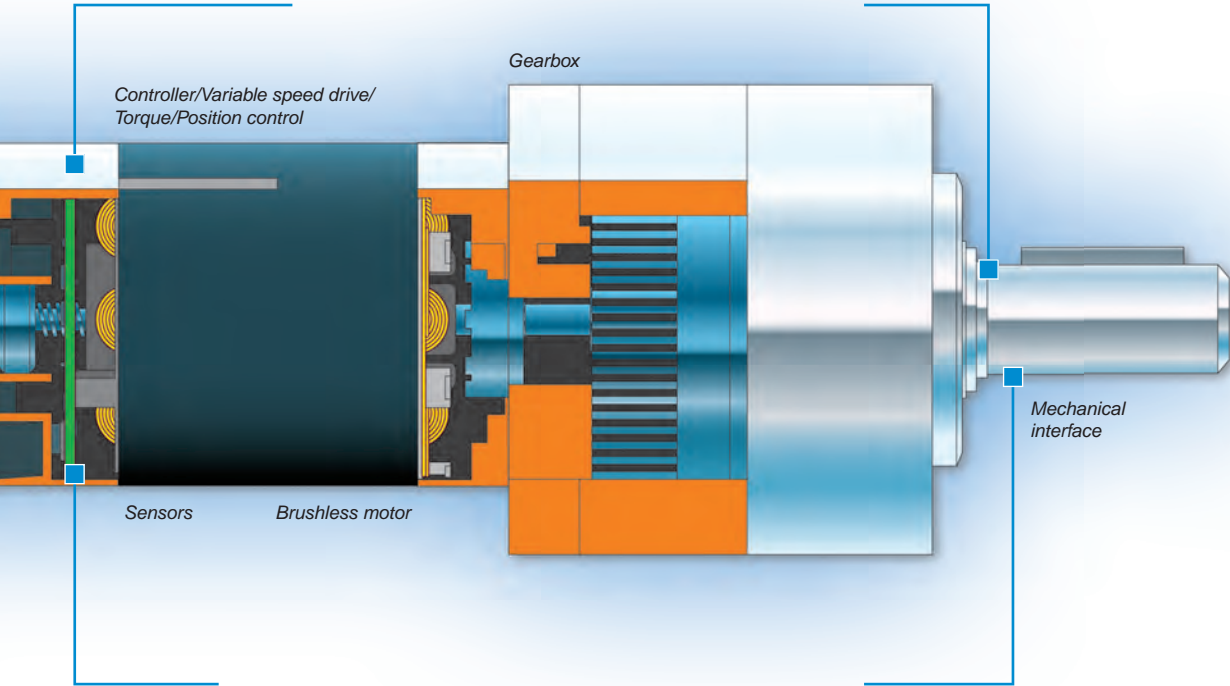
Crouzet designs, manufactures and approves all the components of a motorisation system: motors, gearboxes, accessories, sensors, control electronics and software. From the simplest component (a rotor or a stator, a gear wheel, etc.) to the most complete solution (which may or may not be integrated),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

### Converting

Using Crouzet gearboxes, motor speed and torque can be adapted to your applications: from 1 to 50,000 rpm and 0.1 to 30 Nm.

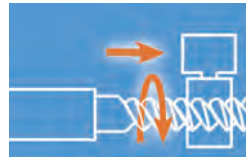
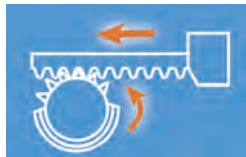
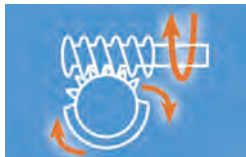
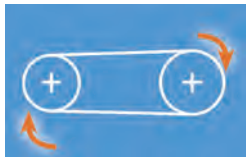


### Sensing

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

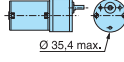
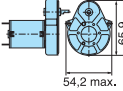
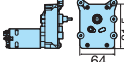
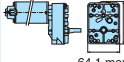
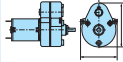
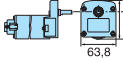
### Integration

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





















➤ Gearboxes

Nominal torque (Nm)	
Type of gearbox	Family

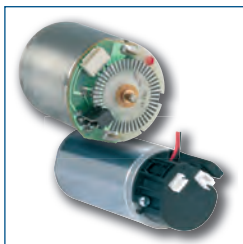
			0.5			1.2	2	
			81012	81021	81038	81032	81033	81043
			RPT5	Ovoid	PPGM	GDR	Double ovoid	RE1
								
			Ø 35.4 max.	65.9 54.2 max.	64 Ø 11.5	65 max. 64.1 max.	65.7 54.2 max.	63.8 66.5 max.

➤ Direct drive motors

Diameter (mm)	Usable power (W)	Nominal torque (mNm)	Nominal speed (rpm)						
<b>Ø 24</b>									
	1	3	3365						
82710				827120	827140			827190	
<b>Ø 28</b>									
	3	7	3500						
82720				82722	827240			827290	
<b>Ø 32</b>									
	3	7.7	3700						
82860				82862	82861			82869	82863
<b>Ø 36</b>									
	6.8	20	3265						
82730						82738			
	11 and 20	35	4600						
82740						827480			
<b>Ø 42</b>									
	8.7 and 13	41.5	2750						
82810						82812			80813
	16 and 22	75	3070						
82800						82802			80803
	32.5 and 33.5	100	3200						
82850									
<b>Ø 63</b>									
	27 and 50	172	2770						
82830									
	90 and 95	270	3360						
82890									

■ Adapted

► Options

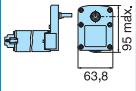
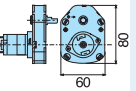
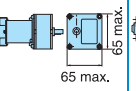
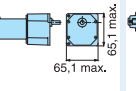
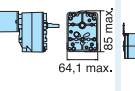
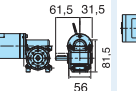
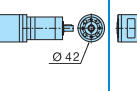
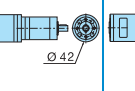
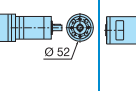
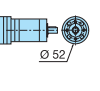



























■ **Encoder**  
The entire Crouzet motor range is also available with a factory-mounted encoder (optical, magnetic).



■ **Brake**  
Ø 42 mm and Ø 63 mm products can be fitted with a mechanical brake at power switch off.

# D.C. brush motors and geared motors

	3	5		6	10	25				
	81044 RE2	81023 3 Nm	81037 RC65	81035 RC5	810326 GDR2	81041 90°	Planetary			
										
										
										
										
					■					
					■					
							■			
								■		
										
			■							
										

Note: All motors can be supplied with 12 or 24 V DC (Ø 42 and Ø 63 versions are also available in 48 V DC).

## Applications

### ■ Medical

- Endoscopy
- X-ray equipment
- Dental equipment.

### ■ Industrial

- Pool robot
- Peristaltic pump
- Access control
- Printing.

Control electronics

Gearboxes

Nominal torque (Nm)
Type of gearbox
Family

5	1.2	6	4.5	15	
81037 RC65	81035 RC5	810320 GDR1	810326 GDR2	810491 Planetary 32	810493 Planetary 42

Direct drive motors

Cross-section (mm)	Usable power (W)*	Output	
		Wires	Connector

--	--	--	--	--	--

<b>Ø 28</b>											
	17.5	✓								■	
<b>□ 42</b>											
	25	✓								■	
	50	✓									
	100	✓									
<b>□ 57</b>											
	40	✓	✓								
	80	✓	✓								
	40/80	✓			■	■	■				
<b>Ø 57</b>											
	150	✓									
<b>□ 86</b>											
	205	✓									

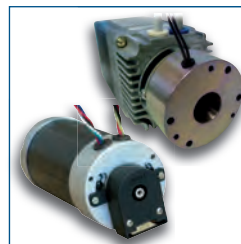
\* With 24 V DC

■ Adapted

Options



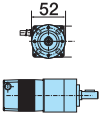
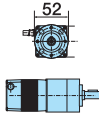
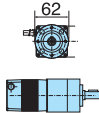
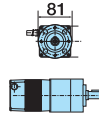
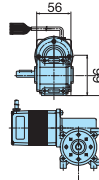
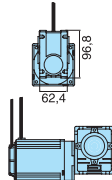
















- Connections
  - Cables
  - Office connectors
  - Industrial connectors.



- Brake
  - Mechanical brake at power switch off.
- Encoder
  - Encoder with up to 1000 points per revolution.



# D. C. brushless motors and geared motors

	25		50	120	10	20	
	810494	810495	810496	810497	810410	810412	
	Planetary K52	Planetary 52	Planetary 62	Planetary 81	Right angle		
							
							BDE30 BDE40
	 801191						BDE30 BDE40
	■	 801194					BDE30 BDE40
		 801197	■				BDE40
	■	 801495	 801496		 80141		BDE30 BDE40 SNI10 TNI20
		■	 801896	 801897	 80181		BDE30 BDE40 TNI20
	■	■	■	 800897	 800810		Motomate
			 801996	 801997	 801915		BDE40
				 801297		 801213	BDE40



## Electronic cards

For more information, see pages 10-11.

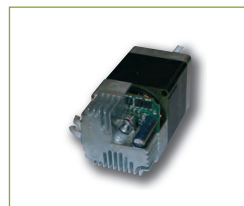
### ■ BDE30 and BDE40



### ■ SNI10



### ■ TNI20



### ■ Motomate



► Functions of the control electronics

► Control circuits for brushless motors

Type		SNi 10	Internal
			
<b>Operating characteristics</b>			
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			■
Speed adjustment	0-10 V + PWM		■
	0-10 V		■
	PWM		■
	0-10 V + PWM	■	
	Open loop	■	■
Data bus	Closed loop	■	■
			■ 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)






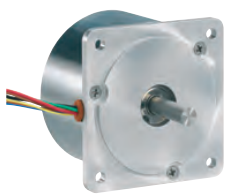
▶ Selection, standard and tailor-made

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

**Crouzet, which is at the very heart of CST's motor business, is armed with the technical and industrial expertise it needs to offer high-performance brushless D.C. motor solutions that are widely recognised in the USA: BEI Kimco Magnetics.**

- High and very high speeds: 10,000 rpm to 100,000 rpm
- Low speeds and high torques: 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, etc.
- Specifically shaped and dimensioned for your applications.

Standard product selection

Part numbers	Parameters	Steady-state torque	Maximum speed	Peak stall torque	Electrical constant
	Unit	mNm	RPM	mNm	Millisec.
	Symbols	Tp	WNL	Tp	τ E
<b>Ø 28</b>					
	80220101	8	18,000	21.2	0.15
	80220301	25	18,000	56.5	0.26
<b>Ø 46</b>					
	80240101	30	18,000	84.7	0.39
	80240201	53	16,000	141.2	1.44
	80240301	81	14,000	197.7	0.51
	80240401	95	14,000	254.2	0.55
<b>Ø 51</b>					
	80258101	30	14,000	98.9	0.52
	80258201	67	12,000	303.6	0.50
	80258301	101	12,000	423.7	0.56
	80258401	123	10,000	564.9	0.62
	80258501	155	10,000	656.7	0.68
<b>Ø 86</b>					
	80280101	353	18,000	850.0	1.90
	80280201	706	18,000	1760.0	3.10
	80280301	953	18,000	2470.0	3.70

▶ Applications

- **Medical**
  - CPAP (Constant Positive Air Pressure)
  - Respiratory aid (ventilation)
  - Blood pumps
  - Ultrasound equipment.
- **Industrial**
  - Turbomolecular pumps
  - Industrial pumps, etc.
- **Transport**
  - Motor gas analysis, etc.
- **Laboratory**
  - Centrifuges
  - Analysers
  - Gas analysers, etc.

# Brushless D.C. motors High performance

▷ The wide range of existing motor sizes supports faster implementation and production and helps keep prices low.

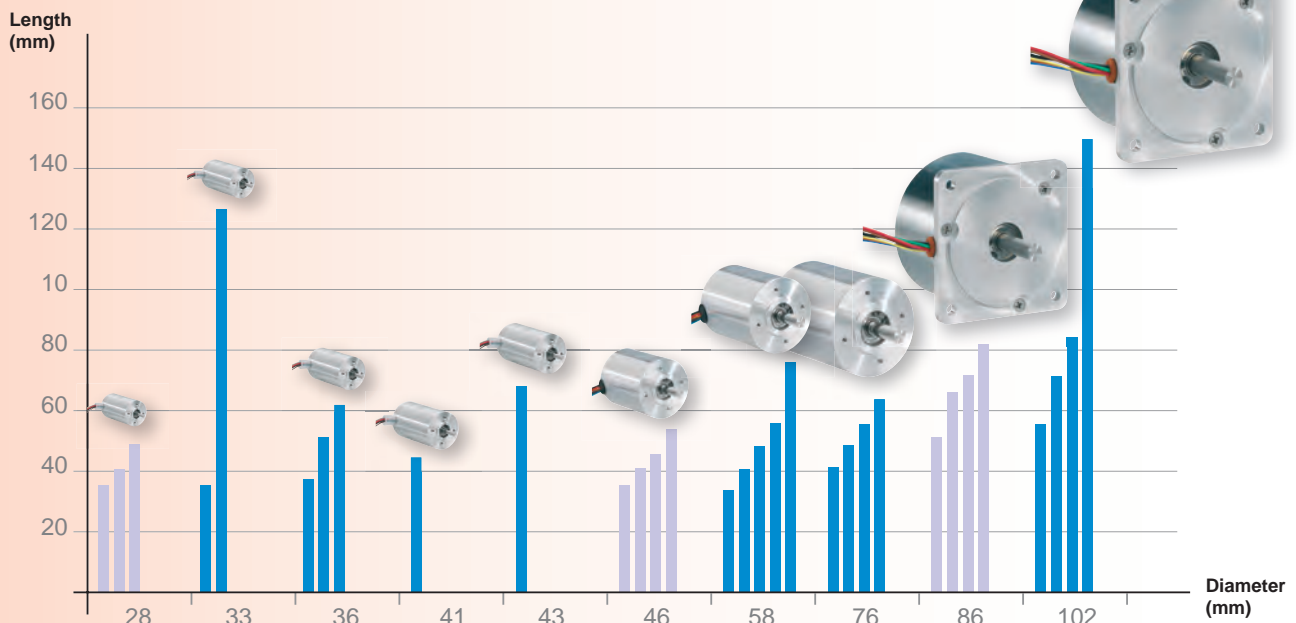
Crouzet can meet even the most specific customer requirements by adapting the mechanical and magnetic structures of its motors and fine-tuning their individual characteristics.

Factors such as the shape of the magnetic fields, the choice of materials used (stator, 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.

## Tailor-made product selection

Continuous torque	Motor constant	Mechanical constant	Torque/speed factor	Friction torque	Mass
mNm	$\text{mNm}/(\text{watt})^{1/2}$	Millisec.	$\text{mNm}/(\text{rad}/\text{sec})$	mNm	g
TCs	$K_M$	$\tau M$	$F_o$	$T_F$	M

Existing range of motors (with casing)



### Adapted products



- Adhesive mixer
- Hollow shaft
- Wires integrated in a rigid tube
- Special shape and connector for fast assembly in the application.



- Centrifugal machine
- High-speed performance and smoothed torque
- Balancing and accuracy of the shaft
- High power density with good levels of dissipation through casing.







▶ Linear voice coil actuator

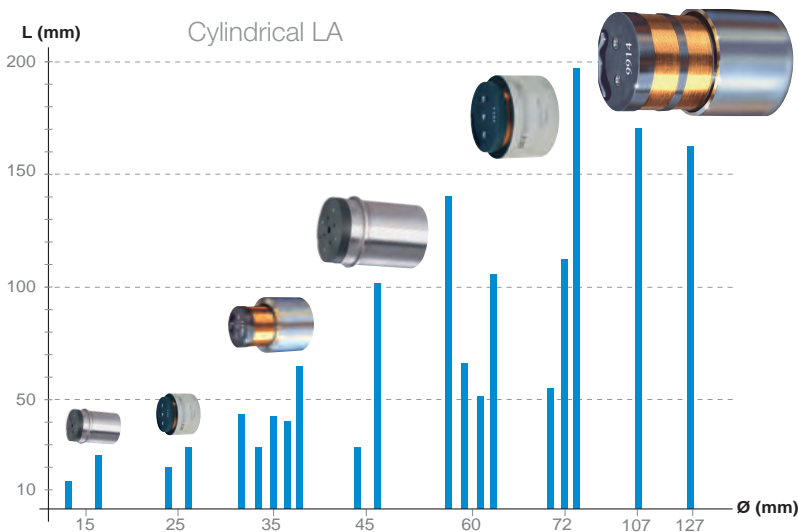
**Crouzet, which is at the very heart of CST's motor business, is armed with the technical and industrial expertise it needs to offer innovative actuator solutions.**

Voice coil (LA) actuators from BEI Kimco offer the perfect solution for more demanding applications. These include equipment for installing semi-conductors, military defence systems and intensive care equipment in hospitals. They use direct drives, are not subject to hysteresis or jerks and offer fast acceleration. They support precise position control; any restrictions in this respect are imposed by the resolution of the feedback device. The new types of housing offer the designer greater scope for miniaturisation and more flexibility. All products can be integrated and installed (including the encoder, shaft, limit switches or other functions) to help reduce workloads and costs.

▷ Operating principle:

The actuator consists of a stator bearing a high-performance magnet and an iron-free moving coil with very low inertia. By adding an encoder and controlling the value and frequency of the current, the user can generate very fast and highly precise linear movements.

Model	Part number	Dimensions (mm)	Peak force (N)	Continuous force (N)	Total stroke (mm)
<b>Flat, rectangular</b>					
	LA05-30-001Z	78 x 74 x 12	37.8	15.1	10
<b>Rectangular</b>					
	LA15-65-000A	76 x 38 x 165	88.69	24.47	6.35
<b>Housed</b>					
	LA16-27-000A	∅ 40 - L 46	60	17	6
<b>Cylindrical (see image below)</b>					
	LA08-10-000A	∅ 19 - L 25	6.67	1.96	4.06
	LA15-26-000A	∅ 38 - L 65	44.48	11.57	25.4
	LA28-22-000A	∅ 70 - L 55	266.89	87.74	11.43



▶ Adapted products



■ Assembly containing 4 voice coil actuators for movement along 2 axes (Laser beam reflected by a pivoting mirror)

## ▶ Rotary voice coil actuator

Rotary actuators (RA) from BEI Kimco are used in many applications. These range from control of shafts and bonding equipment to "gimbal" and "pick-and-place" applications in the field of robotics.

The maximum function range of the actuators is  $\pm 60$  degrees and the maximum torque is 20 Nm.





The shaft has a hole to facilitate coupling and there are two holes for mounting on the application.

Rotary actuators are available in arc-segment or cylindrical designs.

### ▷ Operating principle:

The fixed magnet is supported by a stator (more or less rectangular in shape).

The coil is able to move around the arc of the circle, depending on the current flowing through it.

	Part number	Dimensions (mm)	Torque peak (Nm)	Continuous torque (Nm)	Max. angle (°)
	RA29-11-002A	72 x 27 x 45	0.226	0.093	32
	RA54-18-000A	35 x 45 x 60	1.85	0.798	7.5
	RA60-10-001A	95 x 30 x 38	0.847	0.396	30
	RA68-12-001A	95 x 30 x 45	1.2	0.649	20
	RA68-19-000A	120 x 46 x 55	7.06	1.76	14

## ▶ Applications

### ■ Medical

- Hospital respirator
- Valve control (pressure and flow)
- Scanner (per elastography)
- Endoscopic N2O inflator.

### ■ Industrial



















- Tension control in textile applications
- Inspection metrology
- Pick-n-place equipment
- Stud welding tools
- Ophthalmic lenses manufacturing.

### ■ Laboratory


- Auto-focus in optical applications
- Valve control (pressure and flow)
- High dynamic vibration machine.

# Stepper motors - 5 to 12.5 W Linear stepper motors

## ▶ Stepper motors and geared stepper motors

Gearboxes		Max. torque (Nm)		0.5		2		3		5	
Type of gearbox				81021		81033		81023		81037	
▶ Direct drive motors				65.7 max. 56 max.		65.8 max. 56 max.		80 60		65 max.	
Dimensions (mm)	Part number	Power consumption (W)	Holding torque (Nm)		Number of steps						
			2-phase	4-phase							
Ø 35/50											
	829105	5	25	20	24						
	829100	5	20	15	48						
Ø 51/77											
	829200	7.5	70	57	48						
Ø 58/79											
	829300	10	180	155	48						
Ø 65/65											
	829400	12.5	300	240	48						

## ▶ Linear stepper motors (2 or 4-phase)

Dim. (mm)	Part number	Angular step of motor (°)	Avg. thrust force at 100 Hz (N)	Nominal stroke (mm)	Step (mm)
Ø 35/50					
	809100	7.5	58	10	0.0167
	809105	15	43	10	0.033

- Special output shaft.
- Special supply voltage.



























- Special cable length.
- Special mounting plate.

- Customised electronics.
- Special connectors.




# Non-reversible/reversible synchronous motors Synchronous linear motors

## Synchronous motors and geared motors

Gearboxes		Max. torque (Nm)				0.5	2	3	5
Type of gearbox						81021	81033	81023	81037
									
						65.7 max. 56 max.	65.8 max. 56 max.	80 60	65 max. 65 max.
Direct drive motors									
Dimensions (mm)	Part number	Usable power (W)	Nominal torque (mNm)	Nominal speed (rpm)	Supply voltage (V/Hz)				
<b>Non-reversible</b>									
<b>Ø 47</b>									
	823400	0.16	2.5	600	230/50				
	823305	0.42	8	600	230/50				
<b>Reversible = 2 directions of rotation</b>									
<b>Ø 36/50</b>									
	825100	0.31	12	250	230/50				
	825105	0.52	10	500	230/50				
<b>Ø 51/75</b>									
	825200	0.98	37.5	250	230/50				
	825204	1.12	30	375	230/50				
<b>Ø 58/79</b>									
	825300	1.37	55	250	230/50				
<b>Ø 65/65</b>									
	825400	2.65	106	250	230/50				

## Synchronous linear motors

Dim. (mm)	Part number	Voltage/Frequency (V/Hz)	Avg. thrust force (N)	Nominal stroke (mm)	Speed (mm/s)
<b>Ø 35/50</b>					
	805100	230/50	45 max.	10	3.33
	805105	230/50	38 max.	10	6.67

- Special output shaft.
- Special supply voltage.

- Special cable length.
- Special mounting plate.

- Customised electronics.
- Special connectors.

► A customer-oriented process

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).



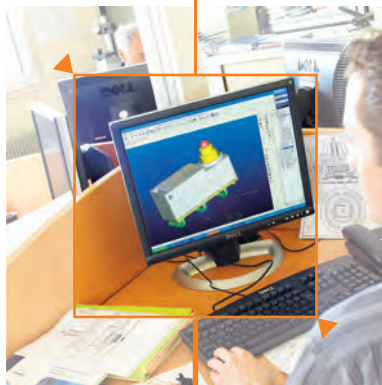
Project analysis

- 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.

Development, validation and approval

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

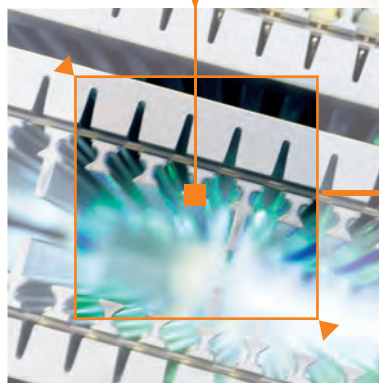
- Simulation tools
- Test bench (servocontrol/motor performance, service life, etc.)
- Laboratories, etc.



Innovation

Based on their experience in a wide range of sectors, Crouzet's design offices share common objectives:

- Basing innovation on market standards and the best technological options.
- Combining a number of technologies to create innovative concepts.



Long-term partnerships

Our specialists work closely the various project phases, as the project progresses to new developments or challenges.

# Process solutions: a dynamic process in motion



## Six Sigma process management

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



## 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.

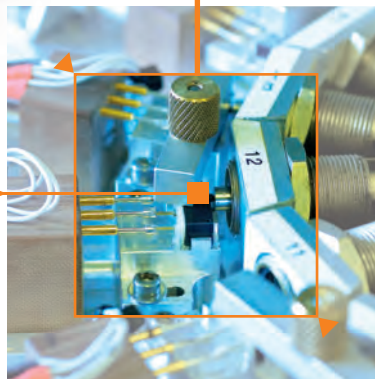
## Industrialisation and production: lean manufacturing

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.



## Test laboratory

Our laboratories have facilities for testing all our products from design through to production. Whether this is done using simulation or in real tests (electrical, mechanical or environmental endurance), our products are validated, approved and monitored throughout the project development process.



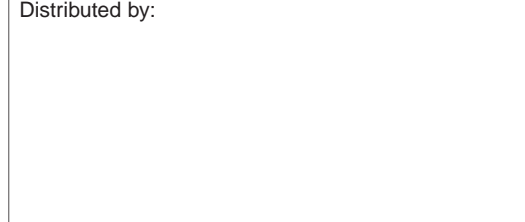
ship  
with customers in managing  
ensuring they are on hand  
to offer support in tackling any  
changes.



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