



Creating value through customer involvement!

Industrial innovation is the key element in driving economic success of companies today. Speed and readiness are the criteria that decide and influence more issues of our life than ever before, to the point that real value might easily not be the main criteria of choice in a product. Innovation and continuous engineering are being put into optimizing the basic function of products, cost reductions and zero defects. SONCEBOZ has excelled in optimizing these customer benefits, setting a world standard with the MM39 stepper motor and establishing itself as the world leader for pointer actuators in the automotive instrument cluster market.

Committed to working together with customers and manufacturers of interfacing components, simultaneous engineering with market partners generates additional values through optimizing the interaction between components, system functionality and manufacturability. The result of this integrated approach is improved system efficiency, process capability, system cost savings and customer satisfaction up to the end user.

Martin STRAHM
Business Unit Manager



■ Slimline stepper motors for instrument clusters

As a global leader in the AFIC (Actuators For Instrument Clusters) market, SONCEBOZ strives to further develop its position in this automotive segment with innovative and cost effective solutions.

Automotive instrument clusters are required to provide to the driver a large and continuously increasing amount of information as well as offering more and more aesthetic, ergonomic and safety aspects, all of which are important sale incentives of today's vehicles. The introduction in the 1990s of fully digitally controlled solutions through data bus systems have also driven the automotive industry to look for stepper motor solutions offering the ideal driver interface together with improved accuracy, reliability, size and weight features. Due to such technological evolutions, market requirements and constant cost optimisation, stepper motors have replaced cross-coil actuators in automotive instrument cluster applications. The SONCEBOZ

MM39 actuator has largely contributed to this fact and with its advantages in motion smoothness, low noise, robustness and cost efficiency, and has become a worldwide Standard in this industry. With its unique concept and licensed production, SONCEBOZ holds a leading market position in the AFIC business. Our customers can expect optimal solutions for their entire product line, whether the application is for an entry level or luxury vehicle. Based on this proven MM39 principle, SONCEBOZ has developed and is mass-producing a family of innovative and reliable products answering market requirements featuring efficient pointer illumination, simplifying instrument cluster assembly and allowing process and system cost savings.

Features

Actuators For Instrument Clusters (AFIC)

The entire range of SONCEBOZ AFIC products is based on MM39 technology. It consists of a two-phase motor with 90° shift and a rotor with five pole pairs. The stator, composed of eight poles located 45° from each other, comprises one single stack of laminations. Two of those poles are radially extended and each one supports one coil. It is possible to adjust the residual detent torque for each application. All of this results in outstanding magnetic performances at low rotor speeds.

This patented technology permits robust design, low noise emission and reduced cost of the end-application, the instrument cluster itself. Due to this solid foundation, for years SONCEBOZ has designed all of its range around this technology. Many different slimline stepper motors dedicated to various transportation markets, are already available off the shelf; and SONCEBOZ commits to further developments leading to increased product excellence.

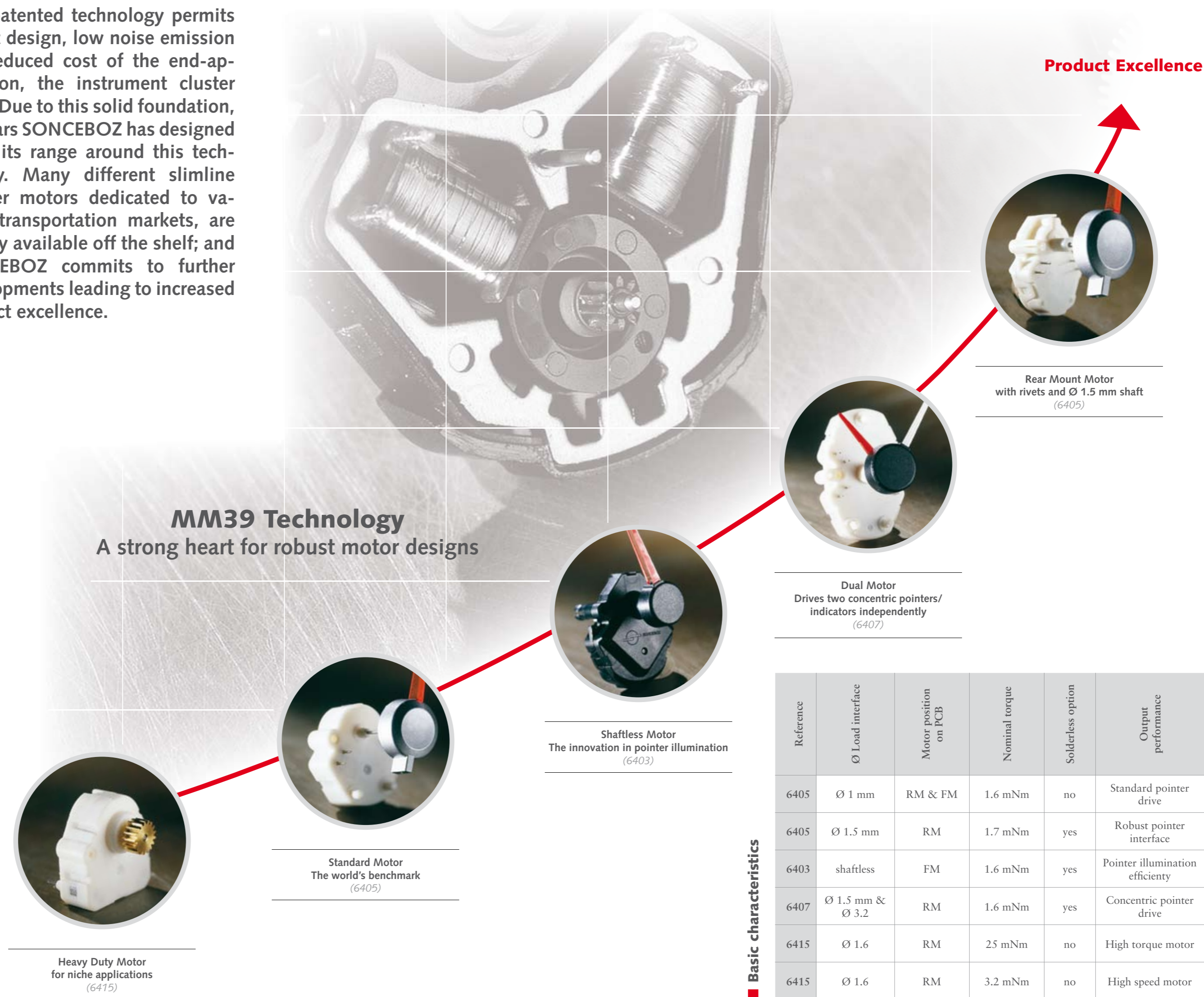
- The 6405 Shafted stepper motor is a benchmark and the worldwide standard in instrument cluster applications. Mainly used in a Rear Mount configuration i.e. assembled to the back of the PCB. Mass-produced since 1999 at SONCEBOZ, this product is used for applications which require slim design of instrument cluster with warning lights positioned around the shaft.

- The 6403 Shaftless Stepper Motor design optimises pointer illumination efficiency, pointer assembly process and pointer design freedom. The direct interface between the light source (LED) and the pointer combines advantages of a remarkable light efficiency as well as consistency of light intensity at all angular positions. By saving LED and assembly costs, this product responds to automotive industry requirements in terms of continuous process improvement and system cost savings.

- The 6407 Dual Stepper Motor permits independent movement of two concentric output shafts and is used in applications where specific designs for related parameter indication or space saving is required.

- The 6415 Stepper Motor is ideal for high performance applications requiring movement of high inertia loads such as carry-on LED pointers, disc pointers, Head-Up Displays, ...

MM39 Technology A strong heart for robust motor designs



Heavy Duty Motor
for niche applications
(6415)



Standard Motor
The world's benchmark
(6405)



Shaftless Motor
The innovation in pointer illumination
(6403)



Dual Motor
Drives two concentric pointers/
indicators independently
(6407)



Rear Mount Motor
with rivets and Ø 1.5 mm shaft
(6405)

Product Excellence

Basic characteristics

Reference	Ø Load interface	Motor position on PCB	Nominal torque	Solderless option	Output performance
6405	Ø 1 mm	RM & FM	1.6 mNm	no	Standard pointer drive
6405	Ø 1.5 mm	RM	1.7 mNm	yes	Robust pointer interface
6403	shaftless	FM	1.6 mNm	yes	Pointer illumination efficiency
6407	Ø 1.5 mm & Ø 3.2	RM	1.6 mNm	yes	Concentric pointer drive
6415	Ø 1.6	RM	25 mNm	no	High torque motor
6415	Ø 1.6	RM	3.2 mNm	no	High speed motor

FM : Front Mount RM : Rear Mount

Markets



Passenger cars



Commercial vehicles



Marine



Two wheelers



Agriculture and construction

PERSPECTIVE

System cost efficiency in optimising the motor interface for customer's satisfaction

Nowadays vehicle interior design has outstanding significance and is one of the key factors for success of passenger and commercial vehicles. End users focus on the external aspect of one application, i.e. the instrument cluster will be judged on its shape, personality, look & feel, colours and readability. To achieve a highly satisfactory function and aspect, concept and design of the internal and hidden components have to be continuously optimised. Apart from a basic function of a component, great importance has to be given to the interfacing aspects.

SONCEBOZ's competitive solutions rely on the simplification in manufacturing and assembly processes and the standardisation of core technology and components for each of the different actuators. Design flexibility and assembly simplification are facilitated by the optimisation of the three critical interfaces: optical, electrical and mechanical. From an OEM standpoint these values contribute to innovative solutions for efficient illumination, combined indications, increased torque and finally resulting in cost savings.

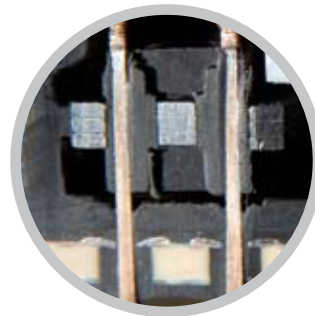


OPTICAL INTERFACE

Shaftless motor for a maximum illumination efficiency with a single LED.

BENEFITS:

- Up to six times higher light intensity as compared to standard shafted motors
- System cost savings by the suppression of LEDs
- Homogeneity of light at any angular position of the pointer
- More freedom in pointer and cluster design



ELECTRICAL INTERFACE

Solderless SMD contacts on tape & reel.

BENEFITS:

- Product compatible with standard SMD pick & place equipments
- Elimination of selective soldering process
- Compatible with single sided PCB
- Increased benefits in outsourced PCB assembly
- Optimised logistic flow of outsourced PCB assembly
- Process and system cost savings



MECHANICAL INTERFACE

Expandable rivets with locking pins fully integrated in the housing.

BENEFITS:

- Application of solderless solution by avoiding screw attachment
- Accurate positioning of the motor onto the PCB
- Simple motor assembly process onto the PCB
- Efficient and robust motor attachment to the PCB

Performance Award

Excellence: is the key word in our AFIC manufacturing process, targeting "0 ppm" and full customer's satisfaction. As a matter of fact SONCEBOZ is proud of being recognized as "Very Important Partner of the Year" (VIP) by one of the major instrument cluster manufacturers in the world: Visteon.

Quality, product values, delivery time and technology constituted the selection criteria of the award. SONCEBOZ competitive advantages and product values benefit throughout the value chain, from Tier 1 up to the end user. Visteon award recognition lies on SONCEBOZ product core values: simplicity, efficiency and security. Designing a simplified stator has given the stepper motor production a more reliable output, leading to a safer integration in the end application. Driven by concern for customer satisfaction, SONCEBOZ will continue to place the quest for excellence in the long-term corporate strategy.

SONCEBOZ SA

2605 Sonceboz - Switzerland
Phone: +41 (0) 32 488 11 11
Fax: +41 (0) 32 488 11 00
info@sonceboz.com
www.sonceboz.com

