MAVILOR
INFRANOR GROUP COMPANY
EXPRESS
November 2004

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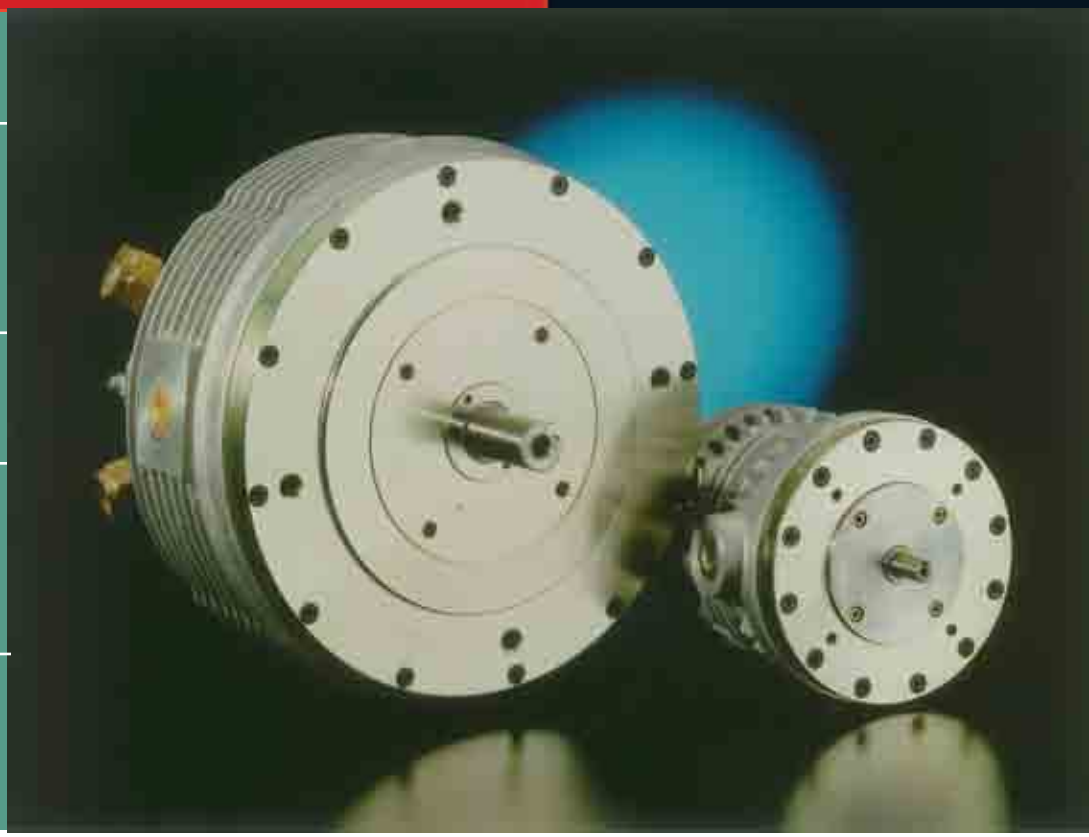


EExdIIC Series are axial air-gap servomotors housed in an enclosure into which gas can gain access: the gas can be ignited within the enclosure without the explosion damaging the enclosure or being transmitted to any flammable atmosphere external to the enclosure. Brushless motors are included in the EExdIIC Series, incorporating options of tachometer, resolver and parking brake fitted internally.

Introduction

In this month´s Mavilor Express, we feature an article by Pol Valero about how to create commutation indicators. These indicators would allow us to know the appropriate time to trigger current in the coils to optimize output. His article provides several graphics, showing the sensors in varying configurations.

In addition, we have an article about an application by Infranor Barcelona, Spain using a Mavilor motor that measures the grade of impact of vehicles on their drivers.

And finally, we would like to take the opportunity to remind readers of our contact information. Please do not hesitate to contact us.

Thank you, the Mavilor Team.

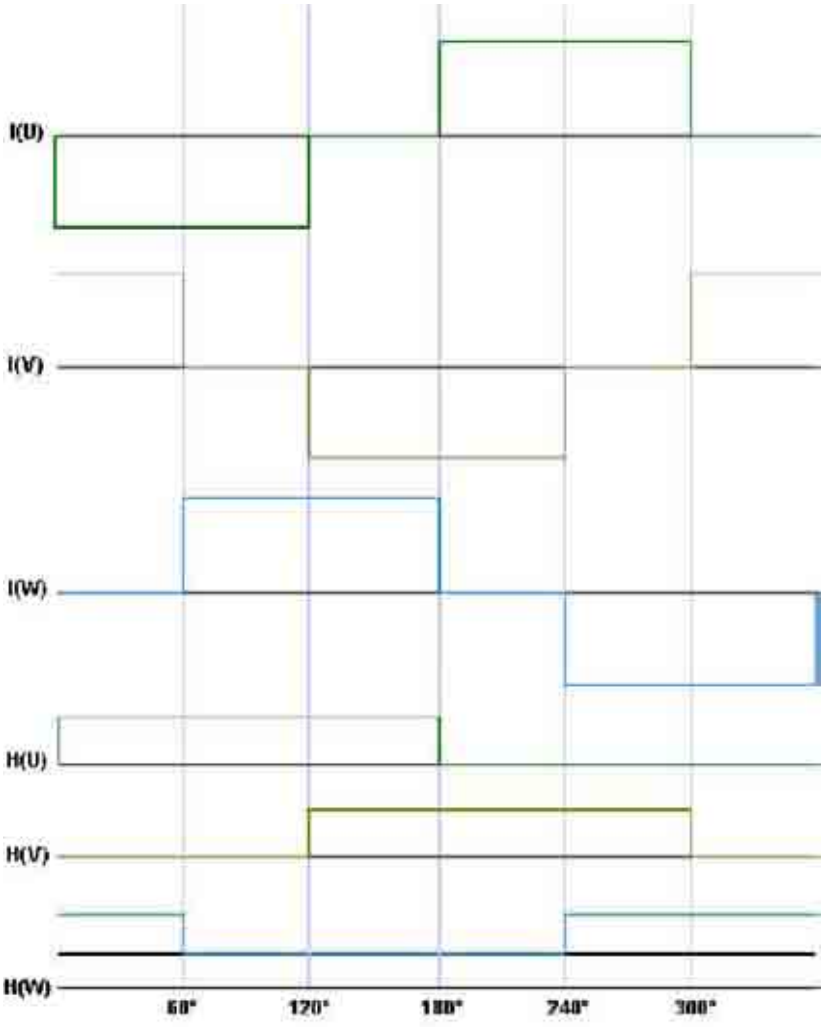
MAVILOR MOTORS, S.A.
Polígono Industrial URVASA,
E- 08130 Santa Perpètua de Mogoda (Barcelona) Spain
Tel. +34 93 574 36 90 - Fax: +34 93 574 35 70

Geometry on hall sensors

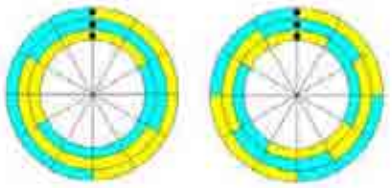
by Pol Valero Mavilor Motors

Introduction

In a sincron trapezoidal servomotor, it is necessary to know the position of the rotor in order to be able to inject the current to the appropriate coil and to obtain the maximum possible output. One way to do this is, for each coil, to obtain an indication that says when to inject the current and when not to.



For a tri-phasic motor of two poles, each coil must have current at a 180º rotor angle, and the indication between one coil and another would have to be at phase displacements of 120º (360º / 3 coils).
This is shown in the attached graphic, in which the indications I(x) represent the current that circulates by coil x in the indicated angle, and the indications H(x) represent the state of the commutation sensors at each angle.



Codification of Stator of 2 or 4 pols

Due to the delays of the current during commutation, in applications of very high velocity large phase difference may be produced between the indications of commutation and current. In some cases, to optimize the motor performance, the indications of commutation are shifted to compensate for this delay and assure that the current arrives at the appropriate moment. It is necessary to evaluate that this shift is adjusted for specific velocity and direction. For this reason, the work cycle of the application must be known to adjust it to the optimum form.

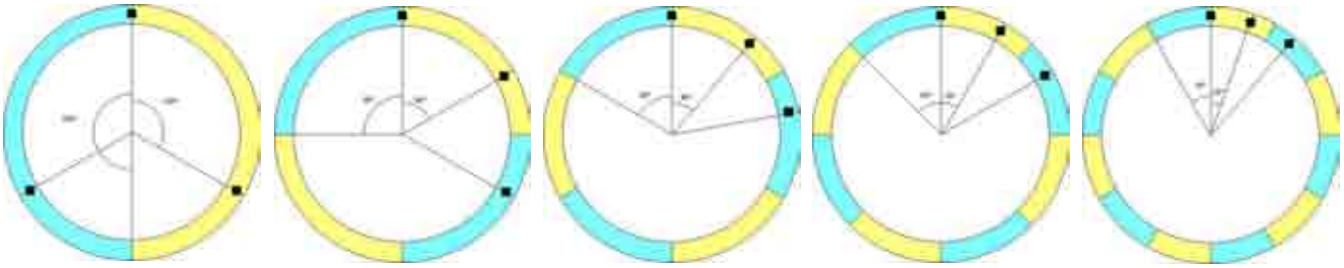


Figura 3: Sensors de 2,4, 6, 8 i 12 pols

Normally, the commutation indications are obtained with an angle sensor of the rotor of the motor. This sensor has a rotor in which some angle positions are codified by the change of physical properties, such as reflection or magnetic field, and a stator with some sensors which permit these properties to be detected.

Three-track codification

One way to achieve the commutation indications is to codify in three different tracks each of the necessary commutation signals. In this way, three sensors placed at the same angle (but with different radius) obtain each of the three commutation signals. These indicators vary in their number of poles varying the codification of the rotor, without varying the position of the sensors. This method of codification has the advantage that all the sensors are together physically and that to change the the number of poles, it is only necessary to change the codification of the disk. This is usually used in encoders.

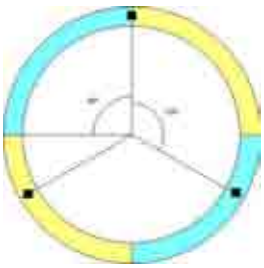
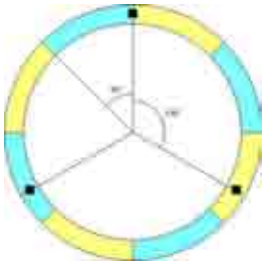


Figura 4: Rotors de 4, i 8 pols per a posició de halls 120º estàndar.



Single-track codification

In codification of Hall stators, usually the three commutation indications are obtained starting with only one rotor track, changing the position of the sensors. Specifically, the sectors of the rotor must cover an angle of 180/p, p being the pair poles number. The three sensors must be separated at an angle of 120/p. The following figure shows the configuration for 4, 6, 8, and 12 poles.If given that the mechanical angles $\theta = n \cdot 2 \cdot PI / w$ are equivalent (having the same electric angle), a hall sensor that is at any angle will give exactly the same indication.

With these equivalencies, standardization of the positions at the halls stator is achieved, for the cases of 2, 4 and 8 poles, that are arranged at 120º, as these figures indicate.
This is also applicable to hall sensors with 6 and 12 poles, although these cannot be situated at 120º, so this angle is not equivalent to the angles 20º or 40º. For sensors of 12 poles, they are equivalent to angles of 20 or 80, so they can be placed in the same position as in the case of 6 poles.

Another standard position of hall sensors exists at 60º. It is the natural position for rotors of 4 poles, and represents an equivalent for rotors of 8 poles, but does not function at two poles.
In the figures above the equivalent is shown.

In this way the halls position is standardized, while it is only necessary to change the codification of the rotor in relation to the pulse number needed. Mavilor uses the configuration in 120º for their motors of 4 and 8 poles.

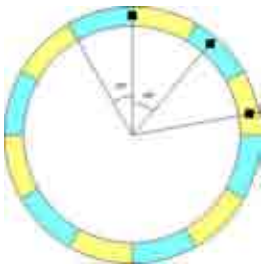


Figura 6: Sensors de 4 i 8 pols en configuració 60º

Shanghai CeMAT Asia 2004

Introducction

Mavilor with the Spanish Institute for Foreign Trade in International Exhibition for Materials Handling, Automotion Technology, Transport Systems and Logistics, Shanghai New International Expo Center (SNIEC)

Recently we had the pleasure of participating in the tradeshow of PTC ASIA, CeMAT ASIA, ENERGY ASIA, Factory Automation ASIA and Metal Working China 2004 that took place from 12-15 October at the Shanghai New International Expo Centre(SNIEC). It is China's most modern exhibition centre and is located in Pudong, Shanghai.

With Mavilor at the tradeshow were 1660 exhibitors from 21 countries and regions. It covered the seven halls at the EXPO center with more than 80,000 square meters of display space.

Those of us at the tradeshow saw an excellent turnout of 51,085 trade and professional visitors from all over China and

consisted of companies who, like Mavilor, came from abroad, 8% in total. These are mainly decision makers for investment, technology, cooperation and consultancy in Chinese industry. Registered delegations from government, large state-owned factories, research institutes and other organizations witnessed and experienced the latest innovations in the industries, found solutions, and met important business partners from all over the world face to face. This year's joint event of the five industrial shows established a unique and excellent platform in China for networking to initiate solid commercial contacts.

Mavilor in Automation 2004 MUMBAI - INDIA

Our distributor in India, participated with Mavilor in Automotion 2004, wor king together with us in the event organization and following up with s upport of our future customers.

This October 14th to the 17th, Mavilor was present at the Automation 2004 tradefair in Mumbai, India.

This was the second time in India that a truly international exhibition and conference had been organized for the automation industry to realise greater business opportunities by showcasing their products or services to a larger and wider business visitor profile. We were glad to take part in such an important event and have the opportunity to offer our products in this quickly growing market. Besides Mavilor, companies also in attendance represented the fields of factory automation, instrumentation and controls, information technology and software solutions, building automation, safety and environment,electricals and energy conservation, security electronics, and telecommunications. We were also quite pleased with the turnout and profile of the visitors who inquired for product information at our stall.

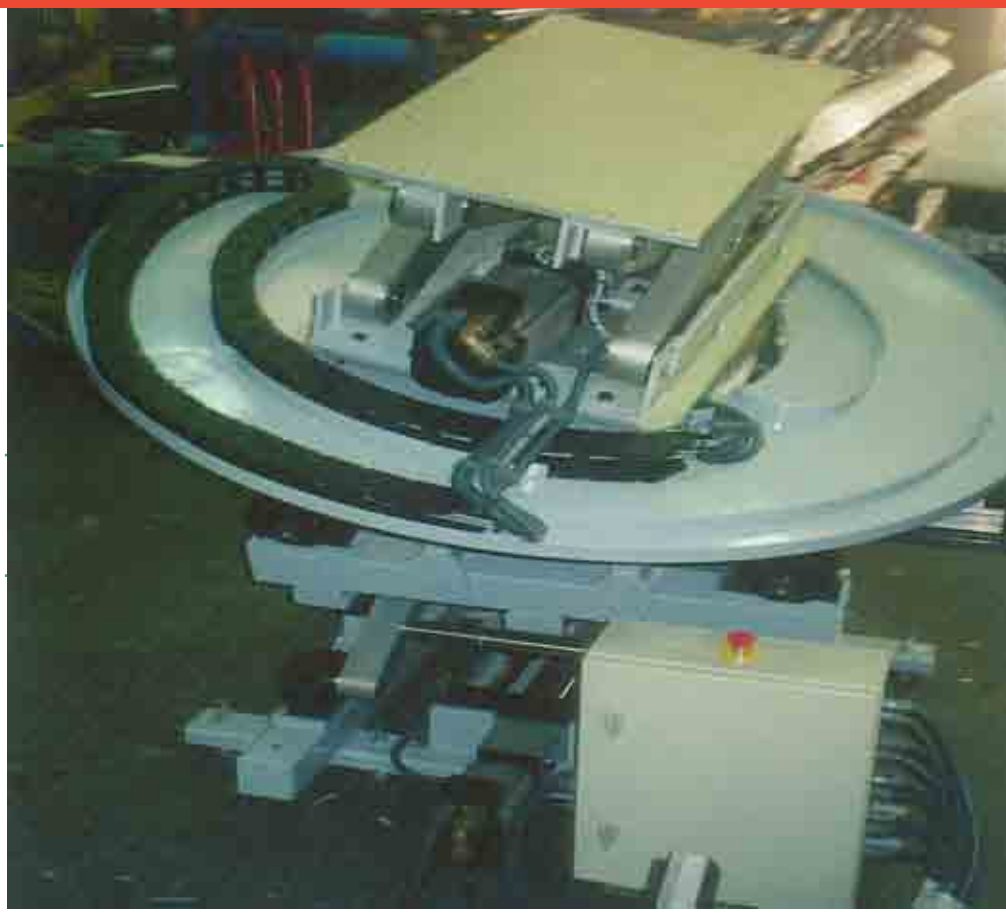
Infranor Barcelona Spain

ROLIPSA

Application

The University of Zaragoza in 2002, Vehicle Driving Simulator. In this application Mavilor motors have been used: 2 BLS 143, 1 BLS 144 and a BLS 115 with a gearbox and electronic SMTBD at 220 / 45, with numeric control of 4 axis.

This application measures the influence of vehicle absorption on the drivers.



MAVILOR TEAM

The Best way to contact us

e-mail adresses

Manager	Mr. Francesc Cruellas	fcruellas@mavilor.es
Sales	Mr. Enric Solsona	esolsona@mavilor.es
Finance	Mr. Jordi Mayolas	jmayolas@mavilor.es
Factory	Mr. Joan Galceran	jgalceran@mavilor.es
Quality	Mr. Alfred Domenech	adomenech@mavilor.es
I+D	Mr. Ivan Flotats	iflotats@mavilor.es
I+D	Mr. Pol Valero	pol@mavilor.es
Technical office	Mr. Albert Bel	bel@mavilor.es
Laboratory	Mr. Enric Ciurana	eciurana@mavilor.es
Planning	Mr. Antoni Gregori	agregori@mavilor.es
Purchasing	Mr. Antoni Garcia	agarcia@mavilor.es
Purchasing	Ms. Karina Verdaguer	kverdaguer@mavilor.es
Communication	Ms. Silvia Romero	sromero@mavilor.es

MAVILOR

INFRANOR GROUP COMPANY

Mavilor around the world

Our Distributors

Argentina	+54 1142225040
Australia	+61 733974575
Austria	+43 225271110
Brazil	+55 152283730
Chile	+56 2450 4200
China / Beijing	+86 10 8208 0369
China / Shanghai	+86 21 5435 4316
China / Guangzhou	+86 20 8759 1568
Czech Republic	+420 261123187
Denmark	+45 43718088
France	+33169633515
Germany	+49 6181180120
Greece	+30 3105566239
Holland	+31 186 610 155
Hungary	+36 1265 0677
India	+91 222 2872211
Iran	+98 2139 30203
Israel	+972 36470471
Italy	+39 0266200980
Japan	+81 3 5298 2700
Korea	+82 27852262
Malaysia	+60 52538555
Mexico	+52 55 5696 3932
Norway	+47 22335301
Russia	+7 095 9135161
South Africa	+27 114681881
Spain	+34 934601631
Sweden	+46 21 24860
Switzerland	+41 22 960 70 70
Taiwan	+886 229145767
Turkey	+90 216 641 6884
United Kingdom	+44 1522699500
United States	+1 2037298258