

Strong cost-savings potential in the food and beverage sector

**Hygienic design of the washdown servomotor
offers a compact, powerful and cost-effective solution**

Written by: Jörg Peters, Product Manager Motors

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With its new foodstuff compatible washdown motor series, Kollmorgen brings compact, cost-effective, and powerful servomotors to the food and beverage sector. This highly sensitive market segment needs to balance hygiene regulations with technical requirements - a balance that has historically led to elevated costs. The special coating of the well-proven AKM™ servomotor is characteristic of this innovative, pioneering solution. It allows the manufacturer to do away with expensive, heavy, stainless steel housings as well as other stainless steel components, without sacrificing hygiene or motor output. Customers benefit from the extraordinarily high power density and flexibility of the AKM™, but they also benefit from 30% lower material costs and 20% lower maintenance and commissioning costs compared with competitive servomotor options. Plus, the life cycle of the AKM™ is three times that of comparable motors.

The new foodstuff compatible AKM™ synchronous servomotors are well suited for use in varied applications that are subject to strict requirements regarding hygienic and aseptic equipment, and machines that are regularly washed, such as packaging, laboratory machinery, pharmaceuticals, and medical equipment.

In many applications, washdown motors, with their unique coating and various beneficial features, are a sensible and more cost-effective alternative to motors with stainless steel housings that cost around 30% more. Machine weight is also increased if using standard motors with an extra stainless steel housing, which also requires more space to install the motor. Another disadvantage of using stainless steel designs is their generally poorer heat dissipation. With an additional enclosure, there is not only a build-up of heat in the motor itself, but also between the motor and its housing. By contrast, Kollmorgen's washdown AKM™ motors series have very good heat dissipation due to optimized compact construction and the selection of materials, leading to an extraordinarily life cycle.

These washdown motors, available in frame sizes 2 to 6, deliver standstill torques from 0.5 Nm to 25 Nm for supply voltages from 75 V to 480 V. Different overall lengths and various windings, plus several feedback systems and connection systems, enable machine builders to configure AKM™ washdown motors to best suit the particular need.

Hygienic design makes it possible

To meet demanding hygienic requirements, Kollmorgen washdown motors use a special hygienic design that includes using only rounded and smooth surfaces that will repel the medium, with no corners that would promote bacteria growth or capture dirt. This simplifies thorough cleaning and sterilization. Only food-compatible lubricants certified by the FDA are used to lubricate the bearings in the food version of the washdown motors. In addition a chemical-resistant Teflon® shaft-sealing ring, and stainless steel shafts, bolts and connectors are used. The motor nameplate is specially milled in to eliminate any risk for it coming away from the motor body as conventional rating plates are prone to do over time, and it also complies with the hygiene requirements.

A 2-component epoxy coating in white - also available in grey to resemble a stainless steel finish - provides a highly efficient protective coating for the housing. It is resistant to chemicals such as acids and alkalis. In particular, it is resistant to detergents with pH values between >2 and <12 and against corrosion. The coating material used on the AKM™ washdown meets all global migration requirements. Washdown motors built to this specification are subjected to various severe tests in the factory, and also by the authorities and testing institutions.



The coating has been accepted and approved after a lengthy, comprehensive, test phase with a focus on detergent use, by a laboratory specializing in hygiene tests, EcoLab. No additional protective measures for the motor housing are necessary. By eliminating the need for expensive stainless steel, machine builders can considerably reduce space requirements as well as total costs. Compliance with IP 67 permits wet cleaning with detergents and similar chemicals.

Tried-and-tested technology makes its mark

The motors also feature highly dynamic behavior due to their integrated high performance magnets and their superior heat dissipation without requiring any separate ventilation. The motors are maintenance-free thanks to their brushless operation. These rotary motors have proven a five-times overload capacity and a long life cycle because of their quality and smooth running characteristics (low cogging rates and magnetic balance.)

A number of technical measures combine to allow the motors to achieve the same output, even though the structure is 30 to 50% smaller than motors based on conventional technology. This remarkable compactness reduces the motor weight by up to 30%.

Production concept and high production capacity promotes flexibility even as far as custom solutions

The customer can configure a washdown motor from the AKM™ toolbox that best meets his requirements. With the overlapping static torques and nominal speeds, a fine graduation of the power consumption is available. In other words, motors may be selected with the same torques but with different frame sizes. Greater stability can be achieved in an application by using a motor with a larger frame size versus a smaller frame size with the same torque. This results in a greater mass moment of inertia.

For very dynamic stresses, it is better to use more compact motors since they require less mass to be moved as opposed to conventional motors. These overlapping steps in terms of masses and torques create the ideal opportunity to adapt the ratio between the mass moment of the inertia of the motor and the external moment of inertia. Maximum controllability is achieved if these masses are roughly the same.

Conclusion

With some thought and armed with the knowledge of coupling mechanisms, users can be equipped to effectively minimize EMI issues when best practices are not available.

About Kollmorgen

Kollmorgen is a leading provider of motion systems and components for machine builders around the globe, with over 70 years of motion control design and application expertise. Through world-class knowledge in motion, industry-leading quality and deep expertise in linking and integrating standard and custom products, Kollmorgen delivers breakthrough solutions unmatched in performance, reliability and ease-of-use, giving machine builders an irrefutable marketplace advantage.

For more informations contact us.

The variety offered - up to 150,000 variants may theoretically be created - enables the OEM to configure a suitable and cost-effective motor that is designed to be energy efficient with a reserve, and yet not be over-specified. During configuration there is an opportunity to retrieve specifications that deviate from the broadly specified standard in order to obtain a motor version that is tailored to individual requirements. Only a few manufacturers can offer this advantage since producing a customer-specific solution typically demands a significant increase in investment.

Always appropriate to needs and designed for a long life cycle

One important reason for the robustness of AKM™ motors is that the front, consisting of the front flange and motor housing, is a single press-molded part. Another advantage is that the individual components in the motor are cast using epoxy casting resin, which results in no friction and no short circuits, and ultimately no faults or production outages.

The 'magnetic balance' achieved between rotor and stator also contributes to the long life of AKM™ washdown motors. Other motors of the same design do not generally have this magnetic balance; they exhibit magnetic asymmetry, which directly stresses the bearing(s) through the rotor. When this happens, severe radial forces occur that cause vibration and generate noise. The bearing(s) will fail early, thus reducing the life cycle of the motors.

Washdown motors have a remarkable power profile

The first implementations of AKM™ washdown motors in the meat processing industry and bottle filling machinery have put the benefits to the test. The resulting field-tested benefits of these new motors are:

- reduced space requirements,
- a substantially higher power output,
- considerably simplified installation and integration into the system when compared with conventional servo motors
- output that is 30% higher than comparable, stainless steel motors

Furthermore, intensive practical testing has shown that it is possible to extend life cycle by a factor of three with this innovative motor design. It is practically maintenance-free and even the replacement of machine parts is rarely necessary, which is reflected in the servicing and commissioning savings of 20%.