Hygienic Design: Keep a cool head
Less dissipated heat prolongs the service life of drive technology

Servo motors such as those of the AKM range must be properly protected prior to their use in applications in the food and packaging industry so that contact with water, products, and cleaning agents does not cause any damage. At the same time, the technology itself must not present problems in terms of hygiene. This is why KOLLMORGEN has covered the synchronous servo motors with a certified and robust Washdown Food coating.

The use of servo drives in food processing poses questions about hygiene as well as performance capacity: How can national and international standards be met most effectively and how durably does the technology work in the process? Each additional component used has knock-on effects: Firstly, the complexity at the drive level is increased; secondly, energy efficiency falls; and thirdly, the service life of the entire system is affected. That is why with its single-cable connection technology Kollmorgen halves the number of cables and plug connections. Furthermore, there is the option of introducing motors without gears or housings in hygienically demanding applications.

In packaging and production processes, machines with fewer cables are easier to clean and are less susceptible to breakdown, because every single cable omitted means two less ports. This results in a proportionate fall in the risk of faults and damage from water ingress due to damaged seals or faulty installations. There is a range of additional measures which benefits the lifespan of drive technology. For example, if stainless steel motors are used in applications with direct food contact, the dissipated heat of drive units designed for hygiene plays an important role. Firstly, the temperature of the production environment increases with unwanted heat transfer into the product; and secondly, the heat build-up in the motor obstructs power output (derating).
More output thanks to low derating
In order to avoid completely an internal temperature of the motors which negatively impacts on service life, with a new design principle, KOLLMORGEN succeeded in discharging the dissipated heat of the AKMH stainless steel motors better via the A bearing shield. Derating is thus below 20 percent. With standard stainless steel motors, this figure is around ten percent higher. For a variety of reasons, these special motors dissipate heat poorly. Stainless steel is a weak conductor of heat, something which is amplified by the very smooth and shiny surfaces. Ideally, for improved heat emission, motors should be painted black and, in particular, they should not have a round shape, which reduces the radiation surface ratio to the volume. These relationships make it clear why engineering partnerships with drive technology manufacturers are worthwhile when it comes to designing axes for use in the food, beverage, and pharmaceutical industries. Co-engineering of this kind may perhaps have the result of driving axles directly; i.e. without gears. Provided the motors supply the necessary speeds and torques within reasonable model sizes, this omission of a component brings with it a range of advantages. On the one hand, within a drive axle with the gear unit, the very component with the greatest mechanical wear and tear is dispensed with. On the other hand, a source of heat from the natural losses of efficiency is noticeably eliminated from the assembly – which also saves on installation space and the use of food-certified lubricants. The logic in this respect is really simple: If there is no gear unit, there is also no risk of oil leaks.

Dry inside even with pressure equalization
Viewed from a physical, structural perspective, Kollmorgen has found a clever way to keep moisture away from inside the motors without hygiene restrictions or costly sealing air connections. The build-up of condensation here has less to do with leaks or faulty seals, and is rather a result of differences in pressure. Meat processing operations usually cut up their goods at just over freezing point due to the firmer meat characteristics. The production facilities become just as cold during this time. In this regard, the processing of frozen foods has
Robust coating
Kollmorgen provides hygienically clean single-cable connection technology both for stainless steel motors in the AKMH range and for the AKM Washdown Food servo motors equipped with an FDA-compliant coating. This protects the compact drive units from water and corrosive cleaning agents and ensures that fluids cannot stick to the surface at all thanks to the pearl effect. The protection that is presented of the technology used in hygienic applications is a means of ensuring secure operation over a long service life. A second method integrates the drive technology directly into the protective machine frame. With the KBM series Kollmorgen has developed a motor construction kit from which direct drives can be con-
figured variably. These reveal their full strength when it is tight in machines. Mounted directly onto the drive axle, the KBM motors save on valuable space – and in the majority of applications on the gear unit, too; something which has another positive effect on the service life and efficiency of a machine. With a total of 14 model sizes, up to five model lengths per model size, more than 150 prefabricated motor windings, and additional options, Kollmorgen presents machine designers with a generous scope of freedom for design: for improved hygiene, greater efficiency, and longer service life. The torque motors in the KBM series reveal their full strength as direct drives when it is tight in machines. Since they are mounted directly onto the drive axles, it is not uncommon for them to save 75 percent on installation space which is otherwise required. Weight, too, plays a role if drives – in robots or portal systems, for example – have to be moved or weighed at the same time.

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About KOLLMORGEN
KOLLMORGEN is a leading provider of integrated automation and drive systems along with corresponding components for machine builders all over the world. With over 70 years of motion control design and application expertise and deep expertise in constructing standard and custom solutions, Kollmorgen always delivers solutions which are characterized by performance, quality, reliability and ease-of-use. Customers can therefore gain an irrefutable marketplace advantage. For further information please contact think@kollmorgen.com or visit our website www.kollmorgen.com