High performance control for heavy duty servo applications

22 November 2023

The majority of servo applications are characterised by compact machinery that usually require relatively low current. However, when there's the need to drive heavier equipment, but precise control is still required, higher current servo drives and motors are necessary. To power largescale machine tools, or even satellite control applications, servo systems rated to 24A (amps) or more might be needed.

Gerard Bush, Engineer at INMOCO, discusses specification requirements for high current servo applications.

When high speed and dynamic performance are necessary, servo control systems are often the solution. Typically, these uses cover compact machinery with low power requirements. However, larger applications, from gantry systems through to satellite tracking stations, that require higher torque to drive the load, may still need the precise, fast actuation and control that servo solutions provide.

This capability could be necessary for a continuous duration, but often, an application needs just a short pulse of current, lasting a few seconds or more. Taking a satellite tracking station as an example, several motion axes are usually required to control the position of the dish, including a gear rack and pinion system for lateral movement, as well as azimuth and elevation. A satellite tracking system that

monitors orbiting satellites has to constantly update its position, and this is where a servo solution comes into its own, providing pulses of frequent and rapid adjustment.

Peak duty

The weight of the satellite tracking dish is significant, but not an exception. Gantry systems required for heavy duty material handling, as well as larger CNC machines and machine tools, as well as some robotic applications too, can also come into this high load category. To provide the necessary torque at high speed to achieve dynamic and precise control over the mass, higher input current is needed. A large motor and drive system could be used, but drawbacks include the larger footprint – a particular problem if the control devices require cabinet mounting – as well as decreased energy efficiency, and the greater total cost.

Instead, a servo drive that can handle short bursts of high current during peak duty operation can control these higher loads while maintaining compact dimensions. This is what Kollmorgen has achieved with the release of the new 24A version of its AKD2G high performance servo drive. The drive provides 24 amps for continuous duty, at 240V or 480V, but it can generate three times this rate - up to 72 amps peak current in a pulse lasting up to five seconds. For even heavier duty equipment, INMOCO can also supply Kollmorgen’s S700 drive that can achieve up to 140 amp peak duty.

Performance and safety

High current generation in a compact package – the AKD2G is 100 mm wide and fits into a standard 254 mm (10 inch) deep control panel - are not the only application

requirements. Dynamic control enables the servo drive to rapidly accommodate changes in load demand. This is a result of a position loop rate of 250 µs, supported by a Dual-Core ARM™ A9, 800 MHz processor.

Especially within manufacturing automation, drive systems that integrate a range of safety features are also essential, particularly for heavy duty production or material handling applications. Protecting operatives, as well as the safety of the surrounding environment, is a given, but the challenge is to minimise disruption to productivity at the same time. Functions such as Safe Limited Speed enable safe machine interaction without the need for a total power down. The AKD2G servo drive also features functions such as Safe Stop (1 & 2) that immediately bring the drive and motor to a standstill. This is combined with features that return the application back to speed with safe control, such as Safe Limited Acceleration and Safe Limited Position.

Design assistance

Applications ranging from factory automation all the way to satellite dish control have various needs, hence differing integration requirements are necessary. As a result, the 24A AKD2G servo drive offers flexibility, including a feedback port with a variety of options such as EnDAT 2.2, BiSS, and Resolver. To integrate wider devices, the drive has 16 I/O ports, and the drive can run over multiple bus choices, including EtherCAT & FSoE, CANopen, PROFINET IRT and Ethernet/IP.

INMOCO’s engineers can advise on specifications, including recommending functionality to suit particular needs, as well as sizing motors and drives. If the application’s design specification requires further specialization, bespoke motor adaptions can include specific frame and stack length combinations, as well as

different electrical configurations. If a full automation system is required, INMOCO can also guide OEM engineers through the Kollmorgen Automation Suite (KAS) that provides a complete portfolio of products for virtually any size of motion solution.

Image Captions:

Image 1: Kollmorgen 24A AKD2G servo drive offers flexibility, including a feedback port with a variety of options.

About INMOCO

Established in 1987, INMOCO now offers an extensive range of motion control equipment including: compact servo amplifiers, position controllers, stepper motors, PLC controllers, linear motors, sensors, electric actuators and gearheads. INMOCO's product portfolio is supported by extensive applications and technical expertise, in addition to customer-specified electro-mechanical development and sub-assembly services; including calibrating and testing in a class 10,000 clean room facility.

Press contact:
INMOCO
Gerard Bush
Tel.: +44 (0)1327 307600
GerardB@inmoco.co.uk

PR agency:
DMA Europa
Elizabeth Patrick
Progress House, Great Western Avenue, Worcester,
WR5 1AQ, UK
Tel.: +44 (0) 1905 917477
liz.patrick@dmaeuropa.com
news.dmaeuropa.com