

Safe Motion

Why should a whole production line be brought to a standstill during user interventions when only one part of it is affected? Kollmorgen has put the idea of building drives with safe motion instead of safe standstill into practice with its Motion Safety solution that integrates the safety logic and monitoring within the drive. Without compromising on safety, drives utilizing or using Motion Safety achieve considerably higher productivity and offer more flexibility when adjusting to new requirements.

Kollmorgen offers safety expansion cards for installation in the S700 servo drive and the KSM compact and KSM modular safety control systems.

Make the Most of the Advantages of the Kollmorgen Motion Safety Strategy

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| <ul style="list-style-type: none">• Higher productivity | <ul style="list-style-type: none">• Motion Safety enables user interventions in running processes• Safe motion instead of safe deactivation• Risk-dependent triggering of safety functions |
| <ul style="list-style-type: none">• Low system costs | <ul style="list-style-type: none">• Optimal adjustment to requirements due to modular structure• Wide range of standard products• Safety control and drive monitoring in one device |
| <ul style="list-style-type: none">• Flexible | <ul style="list-style-type: none">• Modular concept and simple upgrade of existing drives• Seamless transition from hardwired to configurable safety logic |
| <ul style="list-style-type: none">• Simple and fast implementation | <ul style="list-style-type: none">• Important motion-related safety functions are integrated• Predefined safety function blocks• Intuitive tools for programming and parameterization in the field by the customer |

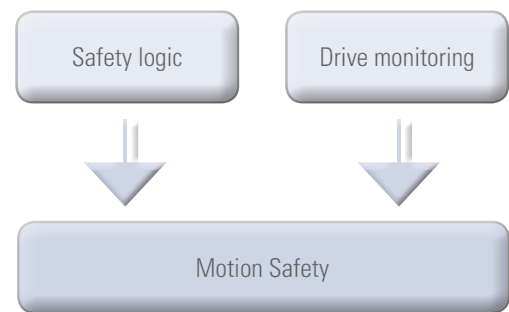
Safe Motion

Safety Logic and Drive Monitoring Integrated within the Drive

Motion Safety – innovative safety technology from Kollmorgen. Motion Safety means: safe processing of sensor and actuator signals, safe motion monitoring, and safe communication directly in the drive. The result: significantly higher productivity when compared to conventional safety technology thanks to safe drive solutions.

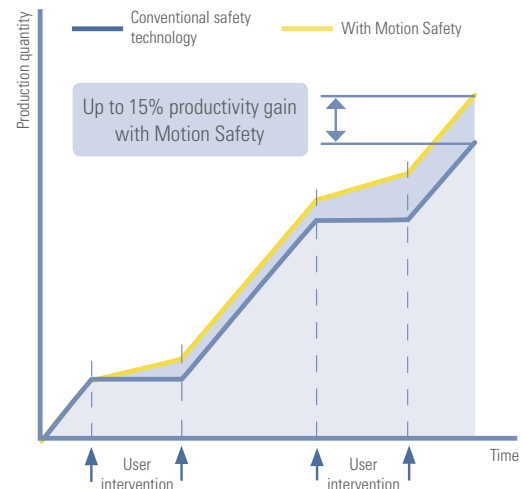
With Motion Safety: Safe Motion Instead of Safe Standstill

Motion Safety combines the safety logic and the drive monitoring in the drive. Conventional safety technology keeps the user away from areas with dangerous motion. By contrast, drives with Motion Safety work according to the safe motion principle and permit user interventions without interrupting the process. The safety logic in the drive controls motion sequences so that no danger can result from them and the process is not interrupted.



Productivity Gains with Motion Safety

Safety functions for areas with dangerous motion are activated when intervening in a running process. With intelligent safety functions, motion sequences are controlled so that each motion is safe. For example, this is performed through position monitoring and restricting the range of motion or by increasing the cycle times. Parts of the machine that do not constitute a risk to the user are not affected. The graph clearly shows the productivity gains when using Kollmorgen's Motion Safety technology.



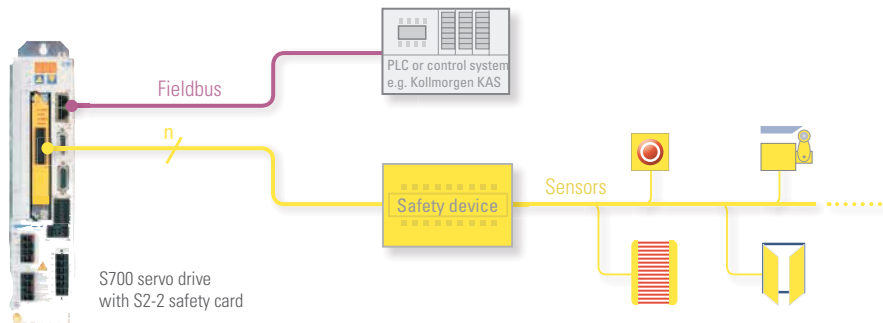
Kollmorgen – your Competent Partner for Safe Drive Solutions

As the leading manufacturer of electrical drive technology, Kollmorgen boasts extensive expertise gained from thousands of drive projects around the world. Safety logic, servo drives, motors, through to complete automation solutions – Kollmorgen supplies coordinated components for safe drive solutions, all from one source. Whether it is a standard implementation or a new development as part of a co-engineering project, make use of Kollmorgen's innovative capacity and experience for developing your safe drive.

Demanding Safety Solutions Realized efficiently

Safe Single-axis Drive with Minimum Response Time

S700 safety concept: The optional S1-2 S2-2 safety expansion cards equip the S700 servo drive with safety functions



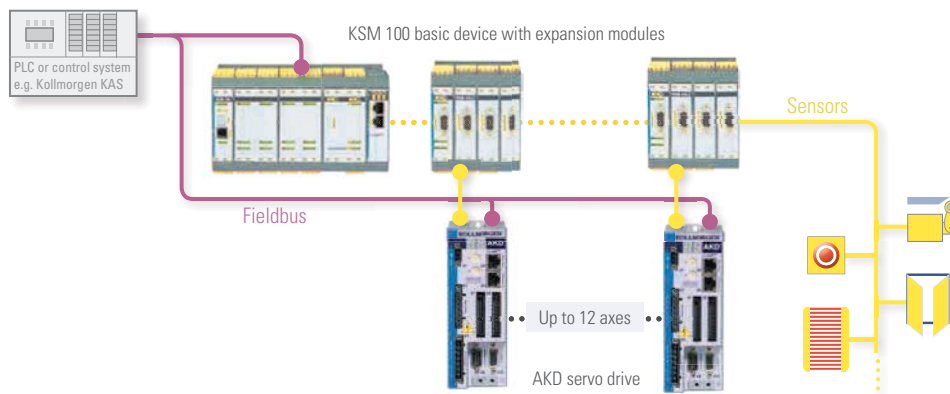
Compact, Simple Safety Solution for up to 2 Axes

KSM compact safety control system with AKD servo drive for drives with up to 2 axes and up to 32 secure I/O



High-Performance Safety Control System for Demanding Safety Requirements

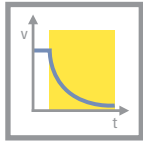
KSM modular: The modular safety control system for demanding, safe drives with up to 12 axes and up to 200 secure I/O



Safe Motion

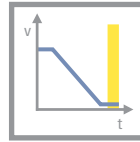
Extensive Safety Functions for Safe Motion

STO (Safe Torque Off)



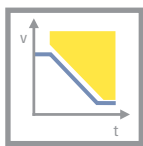
STO safely interrupts the power supply to the motor in the servo drive. The motor becomes torque-free.

SS1 (Safe Stop 1)



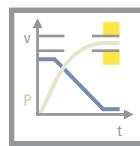
The drive is brought to a standstill by controlled braking. Then the power supply to the motor is safely interrupted and the motor becomes torque-free.

SS2 (Safe Stop 2)



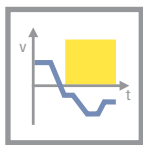
The drive is brought to a standstill by controlled braking and subsequently remains in controlled standstill. The control functions of the drive are maintained.

SOS (Safe Operating Stop)



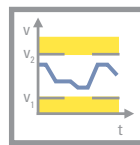
Monitors the stop position reached and triggers SS1 in the event of deviations beyond the specified limits. The control functions of the drive remain active.

SDI (Safe Direction)



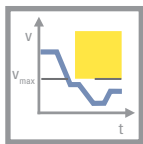
The SDI function ensures that the drive can only move in a defined direction. In the event of an error, SS1 is triggered.

SSR (Safe Speed Range) 1



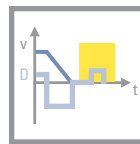
Monitors that the drive observes a defined speed limit. In the event of an error, SS1 is triggered.

SLS (Safe Limited Speed)



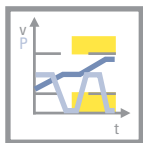
Monitors that the drive observes a defined speed limit. In the event of an error, SS1 is triggered.

SBC (Safe Brake Control), SBT



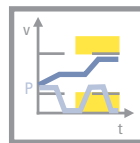
SBT (Safe Brake Test) (non-standardized)
Test function for external brakes and the internal motor holding brake

SLP (Safe Limited Position)



Monitors the absolute position of the drive. If the limit value is reached or the brake torque is too low to keep the drive within the limit value, SS1 is triggered.

SLI (Safe Limited Increments)

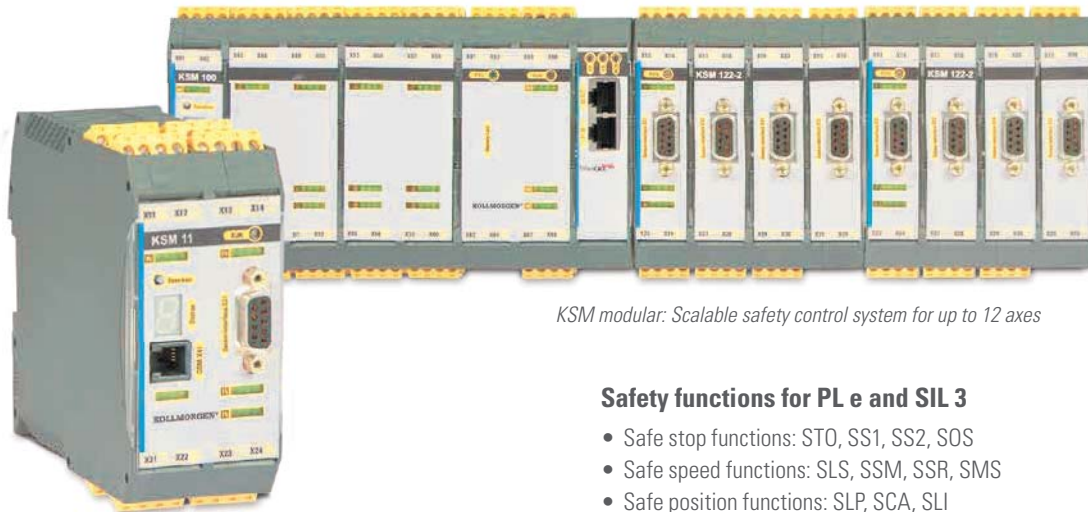


Monitors the relative position of the drive with respect to the current position when activating the SLI function. SS1 is triggered when the prescribed limit value is reached.

KSM Safety Control System

The Safety Chain for Motion from the Sensor to the Drive

Safe drive solutions with higher productivity: The KSM safety control system achieves SIL 3/PL e and perfectly meets the requirements of modern safety concepts thanks to its modular structure. From safe dual-axis drives with just a few safe I/O through to a 12-axis drive with 100 or more safe I/O, in combination with AKD servo drives and Kollmorgen automation solutions, you can develop expandable, safe drives that offer more power and higher productivity with lower system costs.



*KSM compact:
single module for up to 2 axes*

KSM modular: Scalable safety control system for up to 12 axes

Safety functions for PL e and SIL 3

- Safe stop functions: STO, SS1, SS2, SOS
- Safe speed functions: SLS, SSM, SSR, SMS
- Safe position functions: SLP, SCA, SLI
- Safe direction functions: SDI
- Safe braking functions: SBC

KSM Compact Safety Control

With KSM compact you can turn a drive into a safe one in next to no time. Important safety and monitoring functions for motion and function blocks for the processing of sensor and actuator signals are already integrated.

- For 1 or 2 axes
- Up to 2 expansion modules
- Basic module with 16 safe inputs/outputs
- Expandable to up to 60 safe inputs/outputs
- 1 safe relay output, expandable
- 2 pulse and 2 message outputs
- Expandable to up to 6 pulse and 6 message outputs
- Up to 800 function blocks
- Space-saving, compact design

KSM Modular Safety Control System / Safety PLC

KSM modular is designed for drive solutions with complex safety functions and a large number of interfaces. With up to 3000 function blocks, KSM modular offers the functionality of a safety PLC.

- Up to 12 axes
- Up to 8 expansion modules
- Basic module with up to 56 safe inputs/outputs
- Expandable to up to 200 safe inputs/outputs
- 1 safe relay output, expandable
- 2 pulse and up to 10 message outputs
- Expandable to up to 14 pulse and 22 message outputs
- Up to 3000 function blocks
- For applications with many interfaces