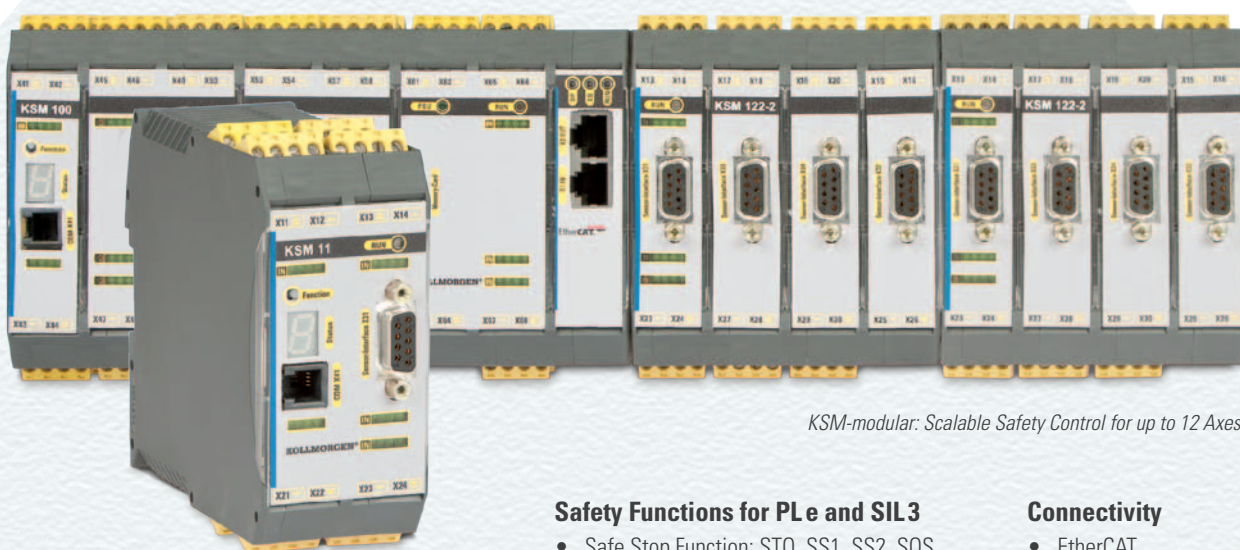


KSM Safety Solutions Significantly Improve Productivity

With KSM Kollmorgen completes the motion safety chain from sensor-to-drive

- ▶ Significantly higher productivity using the Motion Safety Concept
- ▶ Low system costs using standard commercial of-the-shelf (COTS) components
- ▶ Flexible and expandable safety solutions utilizing modular design
- ▶ Tested and certified by TUV achieving PLe (ISO 13849) and SIL3 (IEC 61508)
- ▶ Interfaces seamlessly to Kollmorgen's AKD, ServoStar, and Kollmorgen motion systems
- ▶ All important safety functions are available with the modules



KSM-compact:
Stand-alone Unit for 1 or 2 Axes

KSM-modular: Scalable Safety Control for up to 12 Axes

Safety Functions for PLe and SIL3

- Safe Stop Function: STO, SS1, SS2, SOS
- Safe Velocity Function: SLS, SSM, SSR, SMS
- Safe Position Function: SLP, SCA, SLI
- Safe Direction Function: SDI
- Safe Brake Function: SBC

Connectivity

- EtherCAT
- CANopen
- Profinet
- PROFI-safe and EtherCAT FSOE slave

In combination with AKD servo drives and other Kollmorgen solutions you can develop expandable motion systems to increase performance and productivity at lower costs.

KSM-compact Safety Module

- For 1 or 2 safe axes
- Up to 2 expansion modules
- Base unit with 16 safe I/O
- Expandable up to 60 safe I/O
- 1 safe relay output, expandable
- 2 pulse outputs, 2 standard outputs
- Expandable up to 6 pulse and 6 standard outputs
- Up to 800 function blocks
- Space-saving, compact design

KSM-modular Safety PLC

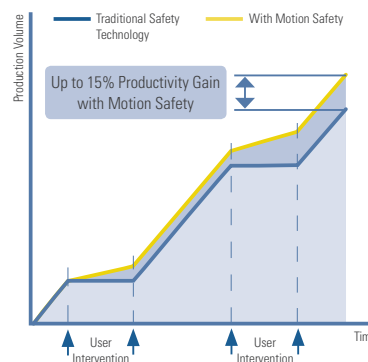
- Up to 12 safe axes
- Up to 8 expansion modules
- Base unit with 56 safe I/O
- Expandable up to 200 safe I/O
- 1 safe relay output, expandable
- 2 pulse outputs, up to 10 standard outputs
- Expandable up to 14 pulse and 22 standard outputs
- Up to 3000 function blocks
- For applications with large number of interfaces

Motion Safety - The Concept for Safe Motion

Motion Safety - this is innovative safety technology from Kollmorgen combining safety logic and drive monitoring in the drive. Conventional safety technology keeps the operator away from areas with hazardous motion. Drives with Motion Safety, however, allow operator intervention without process interruption.

Productivity Gains with Motion Safety

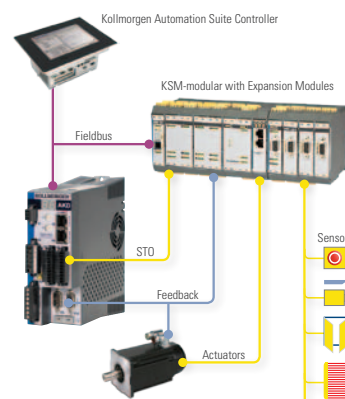
Intelligent Safety functions monitor areas with hazardous motion allowing the machine to effectively intervene with minimal process interruption. Functions such as safe position (SLP) limit the range of machine motion to ensure that personnel remains safe. Machine zones that pose no risk to the operator remain running. The diagram shows the gain in productivity. You can see from the yellow line that production continues during user intervention with Kollmorgen Motion Safety technology.



Productivity gain with Motion Safety: Machine zones that pose no risk to the operator remain running.

Kollmorgen - Your Skilled Partner for Safe Motion Control Solutions Safe Motion from a Motion Expert

Safety logic, servo drives and motors and even complete safe automation solutions - Kollmorgen delivers matched components from one source. Additionally, we offer efficient development tools and engineering support for existing machine designs or innovative new developments. Take advantage of Kollmorgen's innovative capacity and experience for the development of your safe motion control solution.



Example solution using the Kollmorgen Motion Safety concept.

KSM Safety Modules and Safety PLC - System Overview

	Base Units					Expansion Modules					
			KSM 100-1	KSM 100-2	KSM100-4	KSM 121/-2	KSM 122/-2	KSM 122A	KSM 131	KSM 131R	
KSM-modular											
KSM-compact	KSM 11/-2	KSM 12/-2							KSM 31	KSM 31R	KSM 5x
Expansion Modules	2	2	8/6 ¹⁾	8/6 ¹⁾	8/6 ¹⁾						
Safe Axes	1	2	Up to 6 with 6 KSM 121 Modules Up to 12 with 6 KSM 122 Modules			1 ³⁾	2 ⁴⁾	2 ⁴⁾			
Axis Interface ²⁾	Up to 2	Up to 2				Up to 2	Up to 2	1			
Safe Digital Input	14	14	14	14	14	12	12	12	12	12	
Safe Digital I/O ⁵⁾	—	—	—	20	40	—	—	—	10	2	
Safe Digital Output	2	2	2	2	2	—	—	—	—	—	
Safe Analog Input	—	—	—	—	—	—	—	2	—	4	
Safe Relay	2	2	2	2	2	—	—	—	2	4	
Standard Output	2	2	2	6	10	—	—	—	2	—	
Pulse Output	2	2	2	2	2	—	—	—	2	—	
Communication ⁶⁾	With KSM 5x		Option, onboard								Yes
Function Blocks	800	800	3000	3000	3000						

1): Up to 6 expansion modules KSM 121/122 2): Single axis interface: Safe velocity monitoring only. Two axis interfaces: Safe velocity and safe position monitoring
 3): Up to 6 axes with 6 KSM 121 modules 4): Up to 12 axes with 6 KSM 122(A) modules 5) Assignable as inputs or outputs
 6): Either EtherCAT, CANopen, or Profinet, PROFIsafe Slave and EtherCAT FSOE slave