



### Safety in Automation

Estimate and assess potential risks and minimize hazards proactively

STO, SS1, SS2 and SLS

## Sigma-5 Functional Safety

Machine movements represent a major source of hazard for operators and staff members carrying out maintenance tasks. Typical situations requiring safe machine states occur during commissioning, in setup mode, troubleshooting and when operating or maintenance personnel are required to approach the machine.

The safety module SGD-V-OSA01A for the Sigma-5 series servo drives enables you to realise safe and cost-effective automated motion applications.

- ▶ YASKAWA's Sigma-5 servo drive functionality allows for a smooth integration of the mandatory legal safety standards.
- ▶ The STO function is implemented by default in all Sigma-5 series servo amplifiers. The safety functions SS1, SS2 and SLS are integrated by using the SGD-V-OSA01A safety module.

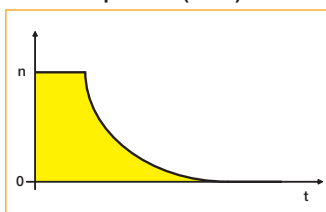
With the coming into effect of the standard EN ISO 13489 1:2008 "Safety of machinery – Safety-related parts of control systems" the construction of safe machines will now be assessed either according to the performance level (PL a – e) or according to the safety integrity level (SIL 1 – 4). The security relevant functions for variable speed drives are defined in the standard IEC 61800-5-2.

The Sigma-5 servo drives are certified by TÜV Süd and comply with the following safety standards:

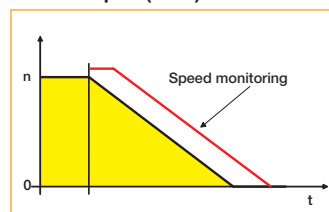


Description	Standard	Performance
Safety Integrity Level	IEC 61508	SIL 2
	IEC 62061	SILCL2
Performance Level	EN ISO 13849-1	PL-d
Stop functions	IEC 60204-1	Stop category 0/1/2
Functional Safety	IEC 61800-5-2	STO/SS1/SS2/SLS

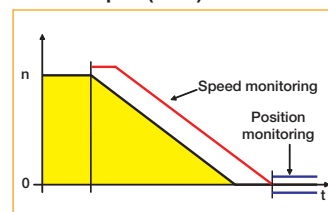
Safe Torque Off (STO)



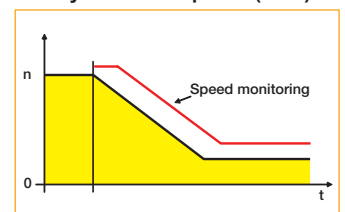
Safe Stop 1 (SS1)



Safe Stop 2 (SS2)



Safely Limited Speed (SLS)





## Standard Specifications

Items		Specifications		
Applicable Servopack	Sigma-5 Series	Rotational Motor	SGDV-□□□□01 (Analog pulse model) SGDV-□□□□11 (Mechatrolink-II model) SGDV-□□□□E1 (Command option attachable type)	
		Linear motor	SGDV-□□□□05 (Analog pulse model) SGDV-□□□□15 (Mechatrolink-II model) SGDV-□□□□E5 (Command option attachable type)	
Safety Functions	Number of Functions: 2			
		Safety Function A	Inputs	Number of Channels: 2 Function: Safety Request Input Signal (SRI-A1, SRI-A2)
	Output		Number of Channels: 1 Function: External Device Monitor Output Signal (EDM-A)	
	Safety Function B	Inputs	Number of Channels: 2 Function: Safety Request Input Signal (SRI-B1, SRI-B2)	
		Output	Number of Channels: 1 Function: External Device Monitor Output Signal (EDM-B)	
	Stopping methods	Safety Functions (IEC 61800-5-2)		Function names of Safety Module
		Safe Torque Off (STO)		Safe BaseBlock Function (SBB Function)
		Safe Stop 1 (SS1)		Safe BaseBlock with Delay Function (SBB-D function)
Safe Stop 2 (SS2)		Safe Position Monitor with Delay Function (SPM-D function)		
Safely Limited Speed (SLS)		Safely Limited Speed with Delay Function (SLS-D function)		
Others		Active Mode Function		
Response Time		Max. 200 ms		
Proof Test Interval		10 years		

► When opening the door, the motion controller outputs, for example a “creep speed”. The Sigma-5 safety module monitors that the set limited speed of the motor is not exceeded (SLS = Safely Limited Speed). If the speed is not inside the limit values after an adjustable response time, the power supply for the motor is safely interrupted immediately by the STO function.

The Sigma-5 series: Compact servo drives for optimum application efficiency and highest machine quality.

