

ABB industrial drives

Safety functions module for extending application safety

ACS880 industrial drives come with integrated safety functions that enhance machine safety and simplify configuration.

The drive is equipped with safe torque off (STO) as standard. The optional safety functions module provides an easy way to extend the drive's safety functions. The plug-in module is installed and cabled inside the drive, enabling different safety functions and safety diagnostics in a compact and reliable module.



Integrated safety in the drive

For improved application safety, ABB has created a SIL 3 capable safety solution for easy installation into ACS880 industrial drives. This optional and compact safety module is easy to connect to the drive's control unit and its standard safety function, safe torque off (STO). The safety functions module (FSO-12 and -21) offers a wide range of safety functions and a self-diagnostic function. The module has SIL 3/PL e capability and conforms to European Union Machinery Directive 2006/42/EC. Compared to using external safety components, the safety functions module comes with the supported functions seamlessly integrated with the drive's functionality, reducing the implementation of safety function connections and configuration.

Several safety functions in one safety module

Selection and configuration of a safety function is done with the Drive composer pro PC tool, which is also used for other configurations in the ACS880 series.

- **Safe stop 1 (SS1)** brings the machine to a stop using a monitored deceleration ramp. It is typically used in applications where the machinery motion needs to be brought to a stop in a controlled way before switching over to the no-torque state.
- **Safe stop emergency (SSE)** can be configured to, upon request, either activate STO instantly (category 0 stop), or first initiate motor deceleration and then, once the motor has stopped, activate the STO (category 1 stop).
- **Safe brake control (SBC)** provides a safe output for controlling the brakes, together with STO.
- **Safely-limited speed (SLS)** ensures that the specified speed limit of the motor is not exceeded. This allows machine interaction to be performed at a slow speed without stopping the drive. The safety functions module comes with four individual SLS settings for speed monitoring. The module also provides a variable

SLS function with PROFIsafe connection. This allows the user to change the speed limit of the SLS on the fly through safety fieldbus communication.

- **Safe maximum speed (SMS)** monitors that the speed of the motor does not exceed the configured speed limit.
- **Prevention of unexpected startup (POUS)** ensures that the machine remains stopped when people are in a danger area.
- **Safe direction (SDI)** ensures that rotation is allowed only in the selected direction. Available only with FSO-21 and FSE-31.
- **Safe speed monitor (SSM)** provides information that the speed is within the configured limits. Available only with FSO-21.



Safety functions module



Pulse encoder interface module, FSE-31

Support with feedback encoder

The safety functions module enables safety functions without an encoder. If the application requires safe encoder feedback, it can be established with the safety-certified pulse encoder interface module FSE-31. The FSE-31 provides safe encoder data to the FSO-21 safety functions module and can simultaneously be used as a feedback device for the drive.

Reliable and easy to integrate into the control system

The optional safety functions module is a fully electronic component without any moving parts, which reduces the need for maintenance. Module inputs and outputs are used to activate the safety functions. Internal diagnostics in the module monitors operating conditions and makes sure that the safety functions are available when needed. Diagnostics

information, such as fault codes and warnings from the module, is available via the PC tool or the drives assistant control panel. In larger systems where several drives are in use, the overall safety system can be controlled using a safety PLC, such as ABB's AC500-S. The safety functions module integrated into the drive provides local monitoring and safety control for the safety PLC. The safety function module is certified according to PROFIsafe over profinet.

Technical data

Safety functions with FSO-12 and -21	Safe stop 1 (SS1) Safe stop emergency (SSE) Safe brake control (SBC) Safely-limited speed (SLS) Safe maximum speed (SMS) Prevention of unexpected startup (POUS) Safe direction (SDI), (requires FSO-21 and FSE-31, with a safe feedback encoder) Safe speed monitoring (SSM), (requires FSO-21) IEC 61508, ed. 2 and IEC 61800-5-2: SIL 3 capability, IEC 61511: SIL 3 capability, EN IEC 62061: SILCL 3, EN ISO 13849-1: Cat. 3/PL e
Product compliance	ACS880 Industrial drive
Configuration tool	Drive composer pro PC tool
Dimensions	Length: 100 mm Width: 60 mm Depth (with wiring): 50 mm Weight: 0.230 kg
Safe digital inputs and outputs	Inputs: 4 redundant or 8 single, or combination of redundant and single, 24 V DC Outputs: 3 redundant or 6 single, or combination of redundant and single, 24 V DC, 150 mA each, 700 mA total
Operational frequency	Drive output up to 200 Hz
Power supply	
Supply voltage	+24 ±3 V DC (external power supply)
Current consumption	1000 mA max
Environmental limits	
Ambient temperature	
Transportation and storage (in protective package)	-40 °C to +70 °C
Relative humidity:	5 to 95 percent, no condensation allowed
Operation (installed for stationary use):	-15 °C to +70 °C
Degree of protection	IP20
Electromagnetic immunity (EMI)	IEC 61326-3-1
Certificate	
TÜV Nord certified	
PROFIsafe certified	

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