SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) safety CPUs
Sales Presentation - Safe CPU to CPU Communication on PROFINET/ PROFIsafe
AC500-S Safety PLC product range
Real-time exchange of high volume safety data using PROFINET / PROFIsafe

AC500-S Safety PLC
Integrated AC500-S Safety PLC

1. Standard communication module
2. Safety CPU
3. Standard CPU
4. Standard I/O module
5. Safety I/O module
Product information
AC500-S Safety PLC

Safety CPU and I/O modules with Terminal Units

Engineering Tool / Safety Libraries / Safety Code Analysis Tool

Functional safety offer (complies to IEC 61508 / 62061 / ISO 13849-1 / 61511)
Overview of AC500-S Safety CPUs

New SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Safety CPUs extend existing SM560-S (-XC) offer

**SM560-S (-XC)**
Safety CPU with PROFIsafe F-Host

**SM560-S-FD-1 (-XC)**
Safety CPU with PROFIsafe F-Host and PROFIsafe F-Devices for 1 F-Host

**SM560-S-FD-4 (-XC)**
Safety CPU with PROFIsafe F-Host and PROFIsafe F-Devices for up to 4 F-Hosts
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Safety CPUs

Typical customer applications

– Material handling (Distribution centers, airports, harbors, etc.)
  • AGVs (Automated Guided Vehicles)
  • Cranes
  • Hoists, etc.
– Robot applications
  • Robot cells (B&W, press, laser cutting, etc.)
– Winder applications (Metals, Pulp&Paper, etc.)
– Various process automation applications
  • Hydrogen tank stations
  • Boilers
  • Burner Management Systems, etc.
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Features

Hardware and Firmware

All features of SM560-S safety CPUs are available on new SM560-FD-1 and SM560-S-FD-4 safety CPUs as well:

– SIL3 (IEC 61508, IEC 62061 and IEC 61511) and PL e (ISO 13849-1)
– PROFIsecure F-Host V2.4 functionality
– Performance characteristics are not changed
– All existing functions of SM560-S including new functions from firmware V2.0.0 released in 2018 (triggering safe stop and reading safety boot project CRC)

Functions available on SM560-S-FD-1 and SM560-S-FD-4 (-XC) safety CPUs only

– PROFIsecure F-Device V2.4 functionality for all existing AC500 CPUs
  • SM560-S-FD-1 (-XC) to communicate with 1 PROFIsecure F-Host (controller)
  • SM560-S-FD-4 (-XC) to communicate with up to 4 PROFIsecure F-Hosts (controllers)
– Bigger safety program size: 1.3 MB (SM560-S safety CPU has 1.0 MB)
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Features

Hardware and Firmware

– PROFIsafe addresses (F_Dest_Add) are defined for SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) safety CPUs using the rotary address switch and engineering
  • The same safety boot project can be used for different machines using different rotary address switch settings on machines
  • The allowed range of the address switch value is 1 to 239 (0 would indicate no usage of F-Devices)
  • One address switch value represents F_Dest_Add for all possible 32 F-Device instances on SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) according to this rule:

    \[ \text{F\_Dest\_Add} = \text{Address Switch Value} \times 100 + \text{F-Device Instance Nr. (0..31)} \]

– Communication with 3rd party PROFINET IO controllers and PROFIsafe F-Hosts (GSDML file is available for download) at www.abb.com/plc

– PROFINET standard diagnosis is supported
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Features

Hardware and Firmware

- Communication with 3rd party PROFINET IO controllers / PROFIsafe F-Hosts (GSDML file is available for download) at www.abb.com/plc
  - Use of CM589-PNIO (-XC) or CM589-PNIO-4 (-XC) PROFINET IO device communication modules
  - PROFINET standard diagnosis is supported using CM589-PNIO (-XC) or CM589-PNIO-4 (-XC) PROFINET IO device communication modules
- SM560-S-FD-1, 1SAP286000R0001, standard version and SM560-S-FD-1-XC, 1SAP386000R0001, eXtreme Condition versions
  - PROFIsafe F-Device functionality to communicate with 1 PROFIsafe F-Host (controller)
- SM560-S-FD-4, 1SAP286100R0001, standard version and SM560-S-FD-4-XC, 1SAP386100R0001, eXtreme Condition versions
  - PROFIsafe F-Device functionality to communicate with up to 4 PROFIsafe F-Hosts (controllers)
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Features

Easy Engineering

– Automation Builder (AB)
  • SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) safety CPUs are supported from AB 2.1 and PM5xx CPU FW V2.7.0
– Simple configuration steps in Automation Builder to implement the safety communication
  • No programming efforts for safety data transfer
– Up to 384 bytes of cyclic safety input and 384 bytes of cyclic safety output data
  • The safety data volume is configurable using 12 BYTE data segments
  • SM560-S-FD-4 (-XC) – safety data segments of 12 BYTES can be split between up to 4 PROFIsafe F-Hosts (controllers)
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Features

Application Areas and Customer Benefits

– Generic applications
  • Remote or distributed control solutions to improve safety and productivity as well as reduce downtimes
  • Fast safety reaction times using real-time PROFINET / PROFIsafe communication
  • WLAN for real-time PROFINET / PROFIsafe communication to mobile machines
  • 3rd party PN/PN PROFIsafe couplers/gateways are not needed any more (save costs and space in control cabinets; increase allowed safety data transfer volumes from 12 BYTES to 384 BYTES)

– eXtreme Condition applications
  • Operating temperature from -40°C ... up to +70°C
  • Freezing climate, high humidity, high altitude up to 4000 m, etc.
  • Corrosive gases, salt mist and dust
  • Large vibration ranges and extended EMC requirements
Safe CPU to CPU Communication on PROFINET/PROFIsafe

Many SM560-S-FD-1 safety CPUs to 1 SM560-S safety CPU
Safe CPU to CPU Communication on PROFINET/PROFIsafe

Many SM560-S-FD-4 safety CPUs to up to 4 SM560-S safety CPUs
Safe CPU to CPU Communication on PROFINET/PROFIsafe

Mixed configuration using SM560-S-FD-1 and SM560-S-FD-4 safety CPUs
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Safety CPUs

Summary – Safe CPU to CPU communication on PROFINET / PROFIsafe

- PROFIsafe F-Device functionality for all existing AC500 CPUs
  - SM560-S-FD-1 (-XC) to communicate with 1 PROFIsafe F-Host (Controller)
  - SM560-S-FD-4 (-XC) to communicate with up to 4 PROFIsafe F-Hosts (Controllers)

- Safe CPU to CPU Communication on PROFINET / PROFIsafe with big data volumes
  - Up to 384 bytes of cyclic safety input and 384 bytes of cyclic safety output data
  - Communication with 3rd party PROFINET / PROFIsafe controllers

- Simple configuration steps in Automation Builder to implement the safe communication
  - No programming efforts for safety data transfer

- Easy engineering – 2 rotary switches for F_Dest_Add setting of F-Devices
  - One SM560-S-FD-1 or -4 (-XC) CPU boot project will work on different machines with unique F_Dest_Add setting of F-Devices
SM560-S-FD-1 (-XC) and SM560-S-FD-4 (-XC) Safety CPUs

Customer benefits – Safe CPU to CPU Communication on PROFINET / PROFIsafe

- Material handling (Distribution centers, airports, harbors, etc.), robot applications and various process automation applications
  - Remote or distributed control solutions to improve safety and productivity as well as reduce downtimes
  - Fast safety reaction times using real-time PROFINET / PROFIsafe communication
  - WLAN for real-time PROFINET / PROFIsafe communication to mobile machines
  - eXtreme Conditions version (Extended temperature, pressure, altitude, etc.)
  - 3rd party PN/PN couplers/gateways are not needed any more (save costs and space in control cabinets; increase allowed safety data transfer volumes from 12 BYTES to 384 BYTES)