

SIEMENS

SIMATIC

Automation System S7-300 ET 200M Distributed I/O Device Fail-safe signal modules

Installation and Operating Manual

Translation of original operating instructions

Preface


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Rules for using the safety protector

The safety protector is used to protect the F-SMs from any overvoltage developing in the case of a fault/error.

 WARNING
<p>The safety protector must be used for SIL3/Category 4/PLe applications:</p> <ul style="list-style-type: none"> • Only with operation of <ul style="list-style-type: none"> – SM 336; AI 6 x 13 Bit (6ES7336-1HE00-0AB0) – SM 326; DI 8 x NAMUR (6ES7326-1RF00-0AB0) – SM 326; DO 10 x DC 24V/2A (6ES7326-2BF01-0AB0) – SM 326; DI 24 x DC 24V (bis 6ES7326-1BK01-0AB0) – SM 326; DO 8 x DC 24V/2A PM (6ES7326-2BF40-0AB0) • if the F-SMs are integrated centrally in an S7-300. • if the PROFIBUS DP is wired using a copper cable. • If PROFIBUS DP is installed with fiber-optic cables, and if standard and fail-safe signal modules must be operated on the same ET 200M.

Configuration variants depending on availability

Table 2- 1 Configuration variants of fail-safe systems based on availability

In system	Configuration variant	Description	Availability
S7 Distributed Safety	<ul style="list-style-type: none"> • Single-channel I/O 	Single-channel, fail-safe (F-CPU and F-SMs not redundant)	Normal availability
S7 F/FH Systems			
S7 FH systems	<ul style="list-style-type: none"> • Single-channel switched I/O 	Single-channel, switched, fail-safe (redundant F-CPU, F-SMs not redundant; system changes to the other F-CPU in case of error)	Enhanced availability
	<ul style="list-style-type: none"> • Redundant switched I/O 	Multi-channel, fail-safe (redundant F-CPU, PROFIBUS DP and F-SMs)	Highest availability

3.1 Configuring [ID: 431470091]

- For use in conjunction with S7 Distributed Safety and *with* the HART function:
 - *STEP 7* V5.4 SP 3 +HF3 or higher
 - *SIMATIC PDM* V6.0 SP3 or higher + *SIMATIC PDM Devices* V6.0 SP5
 - *EDD* for ET 200M V1.1.9 or higher
- For use in conjunction with S7 Distributed Safety and *without* the HART function:
 - *STEP 7* V5.4 SP 3 +HF3 or higher

You can download the *F Configuration Pack* from the Internet (<http://support.automation.siemens.com/WW/view/en/15208817>)

Configuring

The fail-safe signal modules are configured as usual, similar to standard modules, using *HW Config*.

Configuration in RUN (CiR)

The SM 326; DI 24 x DC 24 V (as of order no. 6ES7326-1BK01-0AB0) supports configuration in run (CiR) when operated in standard mode (non-safety mode).

Additional information on CiR

For additional information on CiR, refer to:

- In the *STEP 7* online help: "System changes in run using CiR"
- In the *Safety Engineering in SIMATIC S7* system description

Enhanced availability in standard and safety mode

You can enhance availability by means of redundant operation of the F-SMs fail-safe signal modules in **standard mode** (exception: SM 326; DO 8 x DC 24V/2A PM, SM 326; F-DO 10 x DC 24V/2A PP and SM 336; F-AI 6 x 0/4 ... 20 mA HART).

Requirements:

- *STEP 7* V5.3 and higher, or
- *STEP 7* V5.2 or higher, plus optional software package *S7 H Systems* V5.2 or higher

In **safety mode**, you can operate the F-SMs redundantly in **S7 F/FH Systems** F-systems (with the exception of SM 326; DO 8 x DC 24V/2A PM).

Requirements:

- *STEP 7* V5.3 and higher, or
- *STEP 7* V5.2 or higher, plus optional software package *S7 H Systems* V5.2 or higher
- *S7 F Systems* optional software package
- *F Configuration Pack* V5.3 Service Pack 1 or higher
- for SM 326; DI 24 x DC 24V, as of order no. 6ES7326-1BK01-0AB0: *F Configuration Pack* V5.3 Service Pack 3 or higher
- for SM 336; F-AI 6 x 0/4 20 mA HART: *F Configuration Pack* V5.5 Service Pack 4 or higher
- for SM 326; F-DO 10 x DC 24V/2A PP: *F Configuration Pack* V5.5 Service Pack 6 or higher

You can download the *F Configuration Packs* from the Internet (<http://support.automation.siemens.com/WW/view/en/15208817>).

You enhance availability of the modules by assigning the corresponding parameters in the "Redundancy" tab of the object properties dialog for the modules.

4.3 Assigning the PROFIsafe address

4.3.1 Introduction [ID: 431542795]

PROFIsafe address

Each fail-safe signal module is assigned a unique PROFIsafe address. Configure the PROFIsafe address for safety mode using *HW Config* and the selection switch on the module.

Overview: Assigning the PROFIsafe address

You have two options of assigning the PROFIsafe address to the F-SMs for operation in safety mode, depending on the module. These two addressing options are described in separate chapters.

Table 4- 3 Overview: Assigning the PROFIsafe address

Module	Assigning the PROFIsafe address (starting address of F-SM)	Assigning the PROFIsafe address (F_destination_address)
SM 326; DI 24 x DC 24 V 6ES7326-1BK00-0AB0	x	—
SM 326; DI 24 x DC 24 V ab 6ES7326-1BK01-0AB0	—	x
SM 326; DI 8 x NAMUR	x	—
SM 326; DO 8 x DC 24V/2A PM	—	x
SM 326; DO 10 x DC 24V/2A	x	—
SM 326; F-DO 10 x DC 24V/2A PP	—	x
SM 336; AI 6 x 13 Bit	x	—
SM 336; F-AI 6 x 0/4 ... 20 mA HART	—	x

4.3.3 Assigning PROFIsafe Address (F_destination_address) [ID: 431547659]

Introduction

In order to use

- SM 326; DI 24 x DC 24V (as of order no. 6ES7326-1BK01-0AB0),
- SM 326; DO 8 x DC 24V/2A PM,
- SM 326; F-DO 10 x DC 24V/2A PP and the
- SM 336; F-AI 6 x 0/4 ... 20 mA HART

in safety mode, you must perform the following steps:

1. setting the operating mode "Safety mode" for the SM 326; DI 24 x DC 24V
2. Set the PROFIsafe address = F_destination_address using the address switch before you install the fail-safe signal module.

By contrast to the PROFIsafe address setting, which is based on the start address, there is no correlation between the module start address and the PROFIsafe address for the modules mentioned earlier. You set the module start address in the object properties of the module similar to the addressing of S7-300 standard I/O modules in *STEP 7HW Config*.

Setting safety mode

Set "Safety mode" in the object properties of the module in SM 326; DI 24 x DC 24V (as of order no. 6ES7326-1BK01-0AB0) in *HW Config*.

The SM 326; DO 8 x DC 24V/2A PM, SM 326; F-DO 10 x DC 24V/2A PP and SM 336; F-AI 6 x 0/4 ... 20 mA HART operate in safety mode only. This module is set up permanently for operation in "safety mode".

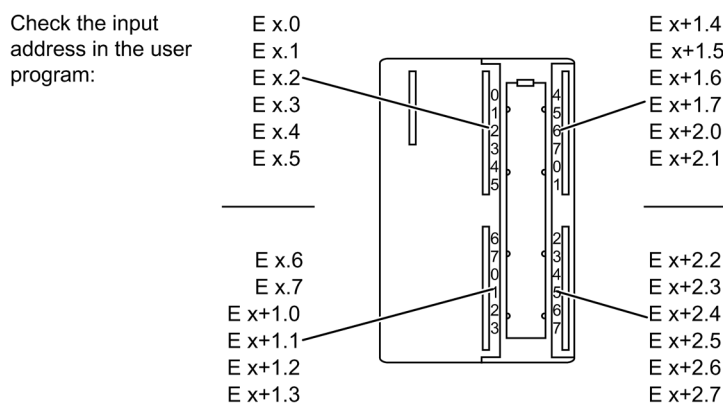
Assigning PROFIsafe addresses

The PROFIsafe addresses (F_source_address, F_destination_address) are assigned automatically to the two F-SMs mentioned earlier when you configure these modules in *STEP 7*. The F_destination_addresses of the FMs are shown in their object properties in *HW Config* and are returned in binary format at the "DIP switch setting" parameters.

You can edit the configured F_destination_address in *HW Config*. It is advisable, however, to use the F_destination_address which is assigned automatically.

Address assignment

The following figure shows the assignment of channels to addresses.



x = Module start address

Figure 8-1 Address assignment for SM 326; DI 24 x DC 24V

Configuration in RUN (CiR)

The SM 326; DI 24 x DC 24V (as of order no. 6ES7326-1BK01-0AB0) supports configuration in run (CiR) when operated in standard mode (non-safety mode).

Additional information on CiR

For additional information on CiR, refer to:

- *STEP 7* online help: "System changes in run using CiR"
- in the *Safety Engineering in SIMATIC S7* system description.