

SIEMENS

SIMOTION

PROFINET Standard V2.2 for SIMOTION V4.1 SP 2

Product Information

Introduction

1

Configuration

2

In which configurations is
PROFINET V2.2 required?

3




Compatibility of devices with
PROFINET PN V2.1 and
PN V2.2

4

Legal information

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 WARNING
indicates that death or severe personal injury may result if proper precautions are not taken.
 CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
CAUTION
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Table of contents

1	Introduction.....	5
2	Configuration	7
2.1	Inserting a SIMOTION device into the SCOUT project	7
2.2	Inserting the CBE30 – PROFINET module into the SIMOTION D4x5 device from the hardware HW catalog in HW Config	8
2.3	Setting the RT class in HW Config.....	9
2.4	Connecting SINAMICS S120 with IRT using the HW catalog in HW Config.....	11
3	In which configurations is PROFINET V2.2 required?	13
4	Compatibility of devices with PROFINET PN V2.1 and PN V2.2.....	15

Introduction

The standardization of PROFINET for IEC61158 requires a transition from Version V2.1 to V2.2. The contents related to PROFINET with IRT have changed.

When using the RT class 'IRT' in the PROFINET network, versions V2.1 and V2.2 are not compatible. This means that when using PROFINET with IRT in both SIMOTION and SINAMICS, it is important to ensure that all devices that participate in IRT communication support the standard according to either V2.1 or V2.2.

Since not all devices available on the market currently support PROFINET with IRT in accordance with V2.2, during the transition phase, SIMOTION and SINAMICS S120 provide the option to operate PROFINET according to the relevant standard. For SIMOTION, you will need to load the corresponding firmware to enable this option. An exception is the new SIMOTION platform SIMOTION C240 PN, which only offers PROFINET V2.2.

The necessary firmware files for the SIMOTION devices D410 PN, D425, D435, D445 and P350 are stored on the SCOUT Add-on CD (CD_6). This CD contains the required firmware for both PROFINET V2.1 and V2.2. More information on the firmware update is contained in the readme file on the SIMOTION SCOUT DVD.

For SINAMICS S120, the upgrade from PROFINET V2.1 to PROFINET V2.2 is performed by editing the optboard.inf configuration file. This file is located in the root directory of the CF card.

The entry "CBE20=0" is a factory setting and stands for PN V2.1.

To switch to PN V2.2, the entry must be changed to "CBE20=1".

This applies as of firmware version V2.5.1 HF10, as of V2.6 the upgrade will be performed using parameter settings.

Configuration

Both PROFINET versions must be considered in configuration. As a prerequisite, you must use STEP 7 V5.4 SP4 or above. The differences are important in the following configuration steps:

2.1 Inserting a SIMOTION device into the SCOUT project

One SIMOTION device version with PROFINET V2.1 and one version with V2.2 are available for selection.

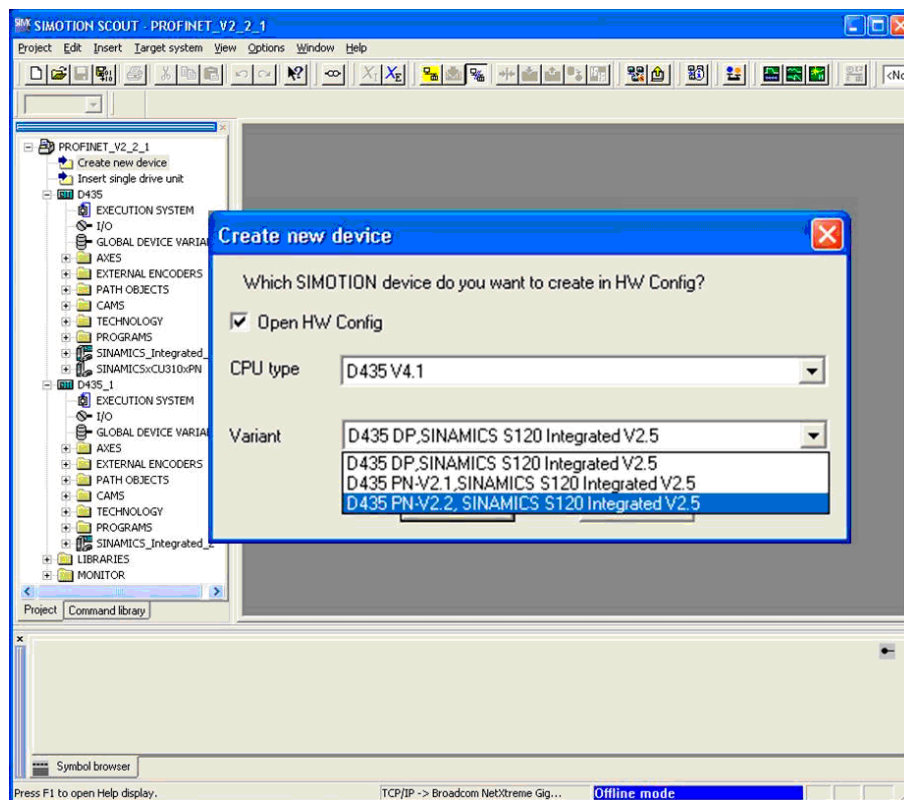


Figure 2-1 Inserting a SIMOTION device into the SCOUT project

2.2 Inserting the CBE30 – PROFINET module into the SIMOTION D4x5 device from the hardware HW catalog in HW Config

2.2 Inserting the CBE30 – PROFINET module into the SIMOTION D4x5 device from the hardware HW catalog in HW Config

When selecting the CBE30 communication board for SIMOTION D4x5, the relevant CBE30 module from the HW catalog for either PROFINET V2.1 or V2.2 must be connected to the SIMOTION device.

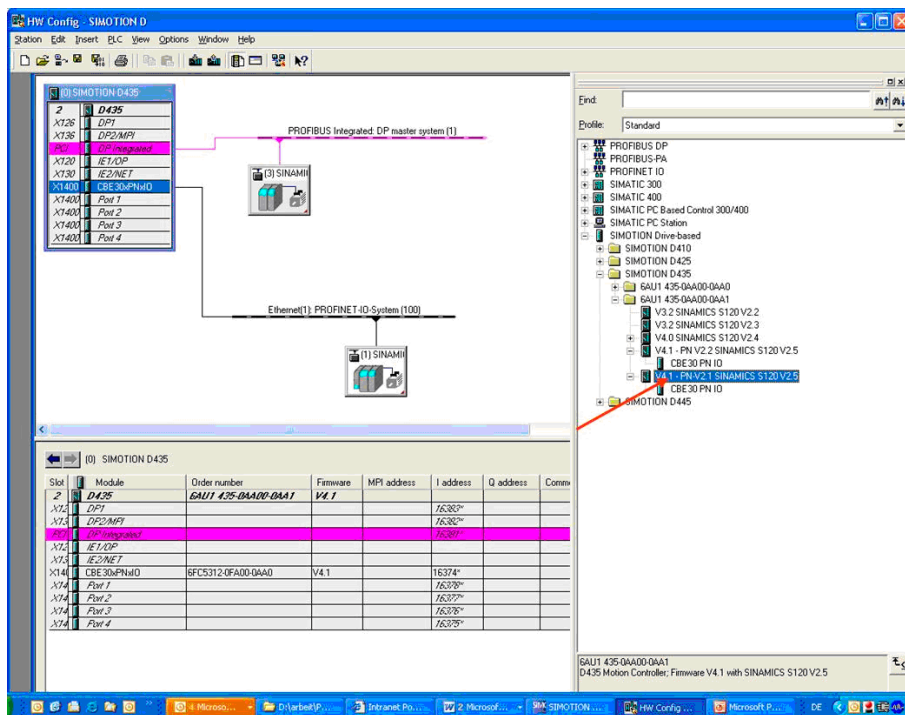


Figure 2-2 Inserting the CBE30 – PROFINET module into the SIMOTION D4x5 device from the hardware HW catalog in HW Config

2.3 Setting the RT class in HW Config

Step 7 versions up to V5.3 SP3 only supported PROFINET according to the V2.1 standard. The following RT classes were available:

- RT
- IRTflex (not released for Siemens devices)
- IRTtop

The new Step 7 version as of V5.4 SP4 supports both PROFINET versions 2.1 and 2.2. Step 7 V5.4 SP4 uses the following new names for the RT class settings:

- RT (compatible with V5.4 SP3)
- IRT with the options: (new in V5.4 SP4)
 - High flexibility
 - High performance

In Step 7 V5.4 SP4, you can configure devices that only support PN V2.1. Note that previously IRTtop was configured, but now IRT* is set with the "high performance" option. See the configuration steps for SIMOTION and SINAMICS S120 described in the following.

Depending on whether you have integrated a SIMOTION device according to PROFINET V2.1 or V2.2, the Properties dialog on the PROFINET interface is displayed differently with reference to the RT class:

If you selected a device according to PROFINET V2.1, you can set the RT classes RT or IRT*. If you select IRT, this is displayed as IRT*, as the identification for IRT in accordance with the previous standard PN V2.1. The option is then fixed to "high performance" since no further option is available for selection in PN V2.1. In versions prior to Step 7 V5.4 SP4, this is still called IRTtop.

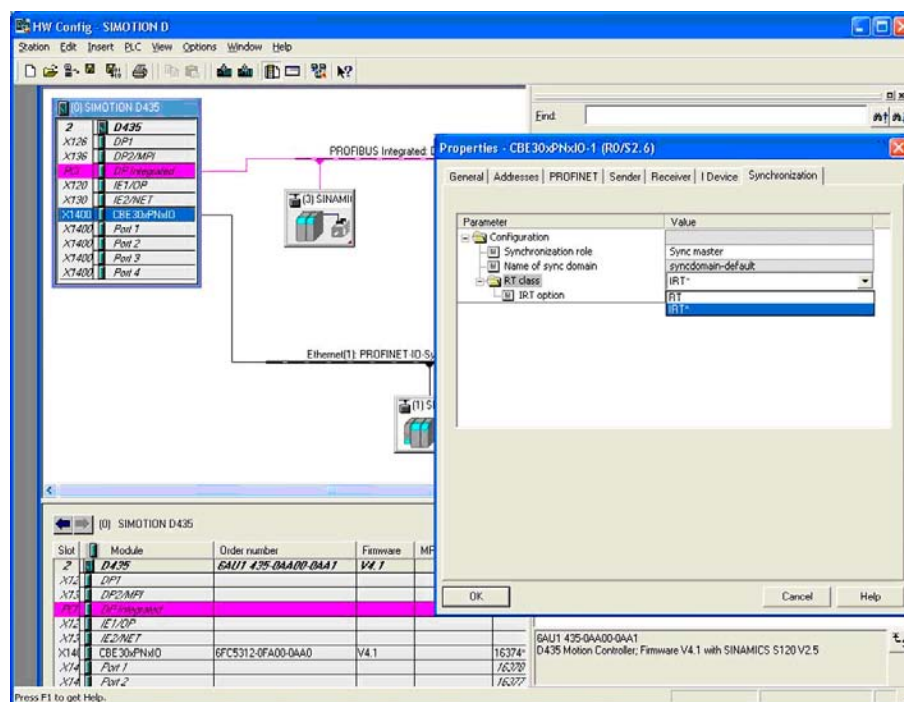


Figure 2-3 Setting the RT class in HW Config with PROFINET V2.1

2.3 Setting the RT class in HW Config

If you selected a device according to PROFINET V2.2, you can configure the RT classes RT or IRT. If you select IRT, you can set the options "high performance" or "high flexibility".

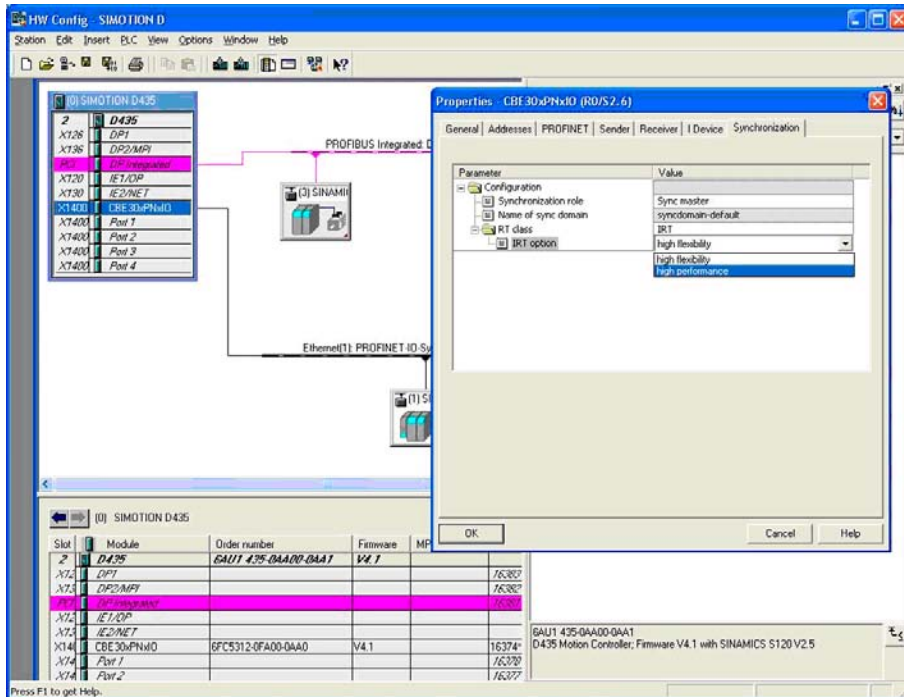


Figure 2-4 Setting the RT class in HW Config with PROFINET V2.2

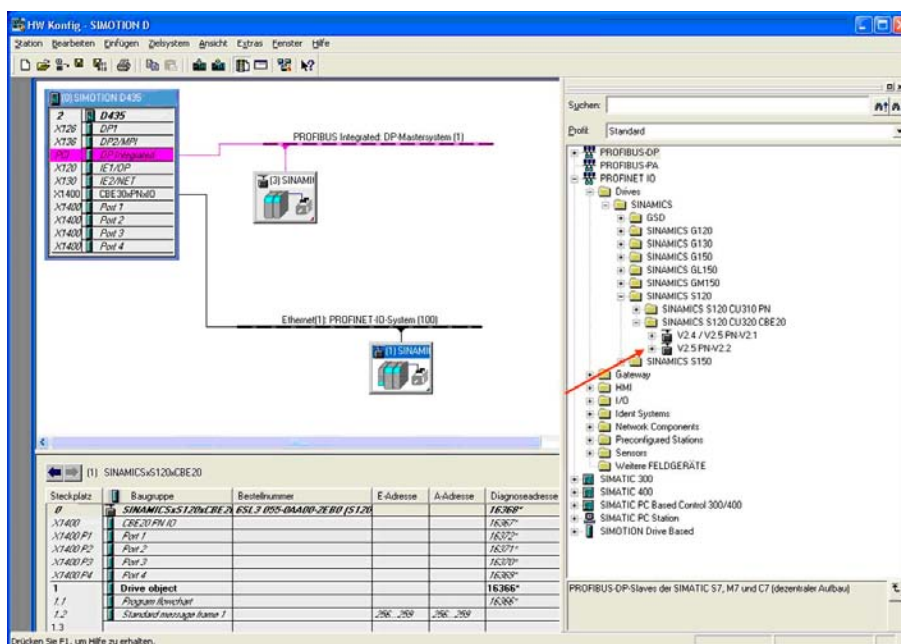
Note

It is not possible to operate IRT high flexibility and IRT high performance simultaneously on the same device (controller).

2.4 Connecting SINAMICS S120 with IRT using the HW catalog in HW Config

Depending on whether you inserted a SIMOTION device according to PROFINET V2.1 or V2.2, the relevant variant of SINAMICS S120 should be used for configuration. If you use SIMOTION SCOUT, the configuration is usually performed using the DeviceOM. However, it is also possible to perform configuration using GSD.

With the DeviceOM in SINAMICS S120, ensure that you select the relevant SINAMICS variant for PROFINET version V2.2.



Configuration

2.4 Connecting SINAMICS S120 with IRT using the HW catalog in HW Config

If using GSD for the configuration, it is also important to ensure that you select the relevant variant from the HW catalog. The PN version is identified by the name of the GSD. Use the following GSD: gsdml-v2.2-siemens-sinamics-s-cu3x0-20080603.xml.

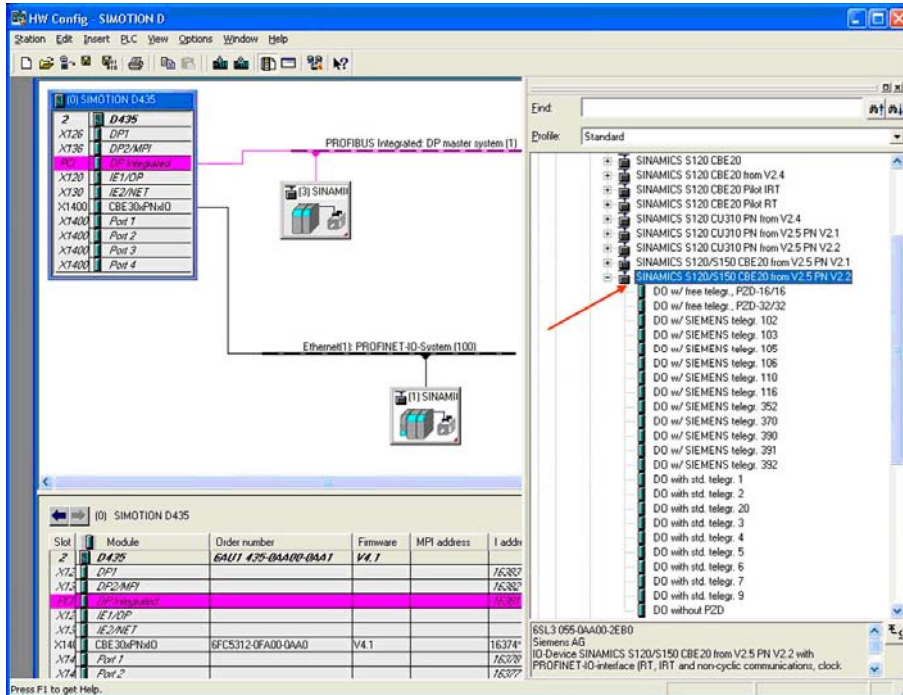


Figure 2-5 Connecting SINAMICS S120 with IRT using the HW catalog in HW Config

The GSD files are available on the SINAMICS CF card under:
.SIEMENS\SINAMICS\DATA\CFG\CBE20GSD.ZIP

In which configurations is PROFINET V2.2 required?

PN V2.2 is required with SIMOTION in the following configurations:

In devices delivered from mid 2008 onwards, new modules will be available that support PROFINET with IRT according to V2.2 only. SIMOTION must therefore be operated with PROFINET V2.2 in the following configurations:

- Connection of the following distributed I/Os to SIMOTION with PROFINET with IRT:
 - ET200S HS (only IRT with high performance)
 - ET200S HF (only IRT with high flexibility)
 - ET200 Pro (only IRT with high flexibility)
- Connection of a SIMOTION device as an input device to a higher-level SIMATIC CPU via PROFINET with IRT (only IRT with high flexibility)
- Use of a SCALANCE switch in the PROFINET-IRT network
 - SCALANCE X204 IRT
 - SCALANCE X202-2 IRT
 - SCALANCE X202-2P IRT
 - SCALANCE X201-3P IRT
 - SCALANCE X200-4P IRT

If SIMOTION and SINAMICS S120 are implemented with PROFINET V2.2 and IRT high performance, the SCALANCE X200IRT switches must also support IRT high performance. If you then use the SCALANCE X200IRT switches in the IRT path, you will need firmware version 4.1. This version is currently in progress and is scheduled for release in the near future. The current version V4.0 only supports IRT high flexibility. Until the new version becomes available, you can use the integrated SIMOTION and SINAMICS switches, or use the devices that comply with PROFINET V2.1. The SCALANCE X200IRT must then be downgraded to firmware version V3.x.

- Communication between SIMOTION and CP1616 or CP1604 via IRT with controller
 - Controller slave-to-slave communication or as a device connected to SIMOTION

The current firmware version V2.2 of CP1616/CP1604 only supports IRT with the high flexibility option. If you require IRT high performance, use firmware version V2.3 (see the table in the 'Compatibility' section), this is scheduled for release in the near future. Otherwise, you can operate the devices in accordance with PROFINET V2.1. In this case, the CP1616/1604 must be downgraded to firmware V2.0.1.

- Connection of a SIMOTION C240 PN via PROFINET with IRT (in progress)

Note

If you use the modules with PROFINET and the RT class 'RT', you can use both PROFINET V2.1 and V2.2 because the RT class 'RT' is compatible with both variants.

The following table shows a summary of the configuration procedure.

Table 3- 1 Versions STEP 7 and SCOUT with PN version V2.1 or V2.2

Configuring tools	IRT according to PN V2.1	IRT according to PN V2.2
STEP 7 5.4 SP3	Supported	Not supported
STEP 7 5.4 SP4	Supported	Supported
SCOUT 4.1.10	Supported	Not supported
SCOUT V4.1.2	Supported	Supported

Table 3- 2 Summary of configuration for PN version V2.1 or V2.2

Configuration step	IRT according to PN V2.1	IRT according to PN V2.2
Configuring the RT class in HW Config	IRT*	IRT with option: high performance or high flexibility
Configuration of SINAMICS S120 via GSD	GSD V2.0, GSD V2.1, GSD V2.2	GSD V2.2
Configuration of SINAMICS S120 via DeviceOM	Supported	Supported

Compatibility of devices with PROFINET PN V2.1 and PN V2.2

4

The following table shows the compatibility of the most important PROFINET devices (SIMOTION, SINAMICS S120, ET200, S7 CPUs, network components for IRT communication, and PC cards) in terms of IRT communication as a comparison between PN V2.1 and PN V2.2.

Table 4- 1 Devices with IRT according to PN V2.1 or PN V2.2

Devices	IRT according to PN V2.1	IRT according to PN V2.2
SIMOTION		
SIMOTION P350 PN 6AU1350-3AK4x-2BE2	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION P350 DP with MCI-PN 6AU1350-3AK4x-1BE2	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION D425 with CBE30 6AU1425-0AA00-0AA0	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION D435 with CBE30 6AU1435-0AA00-0AA1	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION D445 with CBE30 6AU1445-0AA00-0AA0	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION D410 PN 6AU1410-0AB00-0AA0	as of V4.1.2: IRT* with high performance up to V4.1.1: IRT _{top}	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SIMOTION C240 PN 6AU1240-1AB00-0AA0 (in progress)	-	as of V4.1.2 (IRT with high performance and IRT with high flexibility)
SINAMICS S120		
SINAMICS S120 with CU320 and CBE20 6SL3040-0MA01-0AA1	as of V2.5.1 HF10 IRT* with high performance previously: IRT _{top}	as of 2.5.1 HF10 (IRT with high performance and IRT with high flexibility)
SINAMICS S120 with CU310 PN 6SL3040-0LA01-0AA1	as of V2.5.1 HF10 IRT* with high performance previously: IRT _{top}	as of 2.5.1 HF10 (IRT with high performance and IRT with high flexibility)

Devices	IRT according to PN V2.1	IRT according to PN V2.2
ET 200		
ET200S HS 6ES7 151-3BA50-0AB0 (old)	V1.0 (totally discontinued) (only IRT* high performance, previously IRTtop)	-
ET200S HS 6ES7 151-3BA60-0AB0	-	only V2.0 (only IRT with high performance)
ET200S HF 6ES7 151-3BA23-0AB0	-	as of V6.0 (only IRT with high flexibility)
ET200S ST 6ES7 151-3AA23-0AB0	-	as of V6.0 (only IRT with high flexibility)
ET200eco PN 6ES7 142-6BF00-0AB0	-	as of V6.0 (only IRT with high flexibility)
ET200 Pro 6ES7 154-4AB10-0AB0	-	as of V6.0 (only IRT with high flexibility)
ET200 M 6ES7 153-4AA00-0XB0	-	-
SCALANCE		
SCALANCE X204 IRT 6GK5 204-0BA00-2BA3	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X204 IRT Pro 6GK5 204-0JA00-2BA6	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X202-2 IRT 6GK5 202-2BB00-2BA3	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X202-2P IRT 6GK5 202-2BH00-2BA3	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X202-2P IRT Pro 6GK5 202-2JR00-2BA6	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X201-3P IRT 6GK5 201-3BH00-2BA3	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)
SCALANCE X200-4P IRT 6GK5 200-4AH00-2BA3	up to V3.0 (with IRT* high performance, previously IRTtop)	as of V4.0 (only IRT with high flexibility) as of V4.1 (plus IRT with high performance)

Devices	IRT according to PN V2.1	IRT according to PN V2.2
S7 CPUs		
S7 CPU 319-3 PN/DP 6ES7 318-3EL00-0AB0	-	as of V2.7 (only IRT with high flexibility)
S7 CPU 319F-3 PN/DP 6ES7 318-3FL00-0AB0	-	as of V2.7 (only IRT with high flexibility)
S7 CPU 414-3 PN/DP 6ES7 414-3EM05-0AB0	-	as of V5.2 (only IRT with high flexibility)
S7 CPU 416-3 PN/DP 6ES7 416-3ER05-0AB0	-	as of V5.2 (only IRT with high flexibility)
S7 CPU 416F-3 PN/DP 6ES7 416-3FR05-0AB0	-	as of V5.2 (only IRT with high flexibility)
ET200S IM151-8 PN/DP CPU 6ES7151-8AB00-0AB0	-	as of V2.7 (only IRT with high flexibility)
ET200S IM151-8F PN/DP CPU 6ES7151-8FB00-0AB0	-	as of V2.7 (only IRT with high flexibility)
CP1616		
CP1616 6GK1 161-6AA00	V2.0 (with IRT* high performance, previously IRT _{top})	V2.2 (only IRT with high flexibility) as of V2.3 (plus IRT with high performance)
CP1604 6GK1 160-4AA00	V2.0 (with IRT* high performance, previously IRT _{top})	V2.2 (only IRT with high flexibility) as of V2.3 (plus IRT with high performance)