

Migration from SIMATIC ET 200pro FC to SIMATIC ET 200pro FC-2

SIMATIC ET 200pro FC-2

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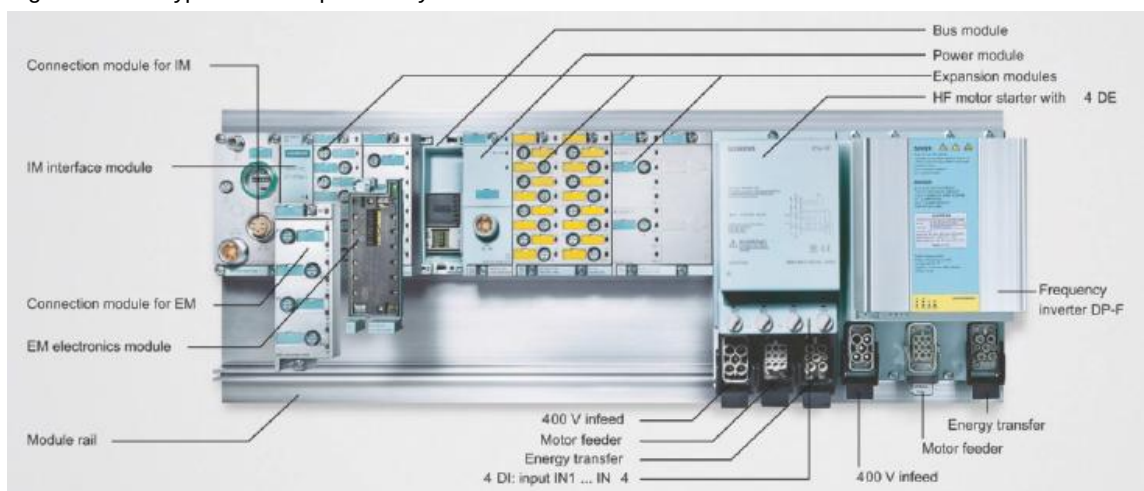
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1 SIMATIC ET 200pro FC Concept

1.1 Introduction

The SIMATIC ET 200pro FC is a decentralized inverter drive product. It is part of the SIMATIC ET 200pro family of products. That is basically a compact and rugged high-performance I/O system with IP65 degree of protection. It comprises Interface Modules to connect with PROFIBUS or PROFINET environment with standard as well as failsafe functionality.

Figure 1 Typical ET 200pro FC layout



The purpose of this document is to provide basic advice on the transition from the current ET 200pro FC product to the replacement version, known as the ET 200pro FC-2

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2 SIMATIC ET 200pro Power Modules

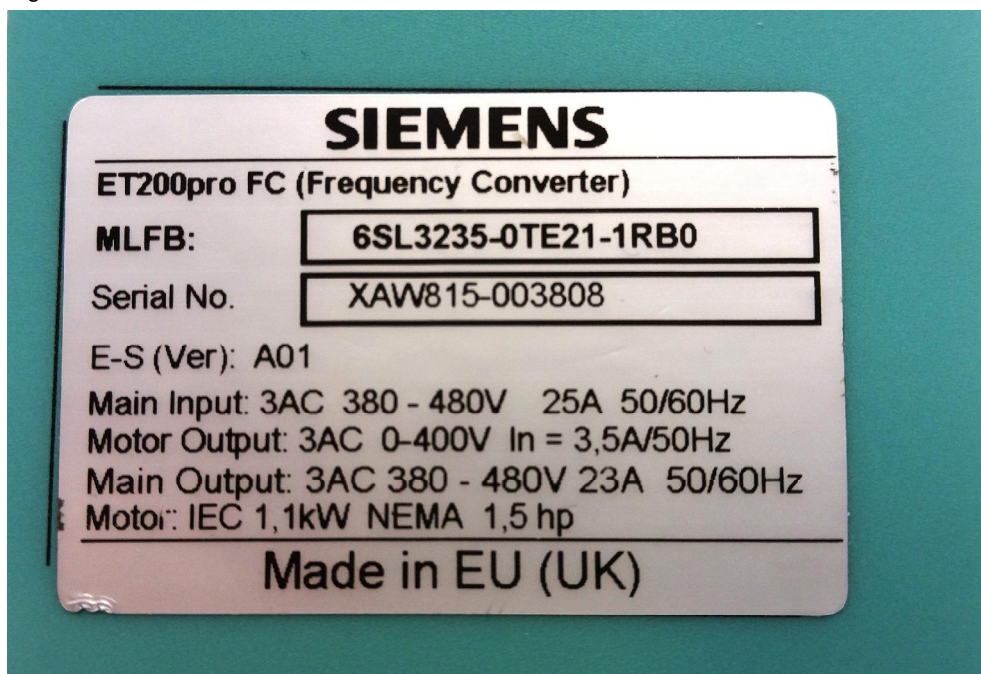
2.1 First generation SIMATIC ET 200pro Power Module

The original SIMATIC ET 200pro FC product had:

- two MLFB`s Both 1.1KW 380/480V 3 phase.
- 2 or 6 LED`s, depending on MLFB (Safety/Non Safety)

2.1.1 SIMATIC ET 200pro FC without safety functions (6SL3235-0TE21-1RB0)

Figure 2



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Figure 3

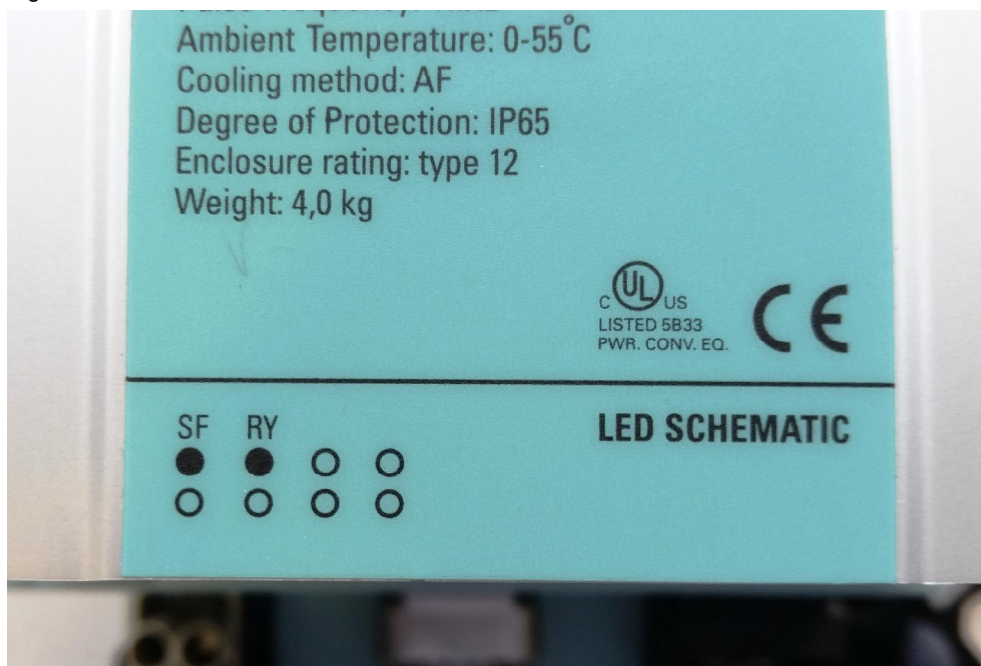


Figure 4



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2.1.2 SIMATIC ET 200pro FC with safety functions (6SL3235-0TE21-1SB0)

Figure 5

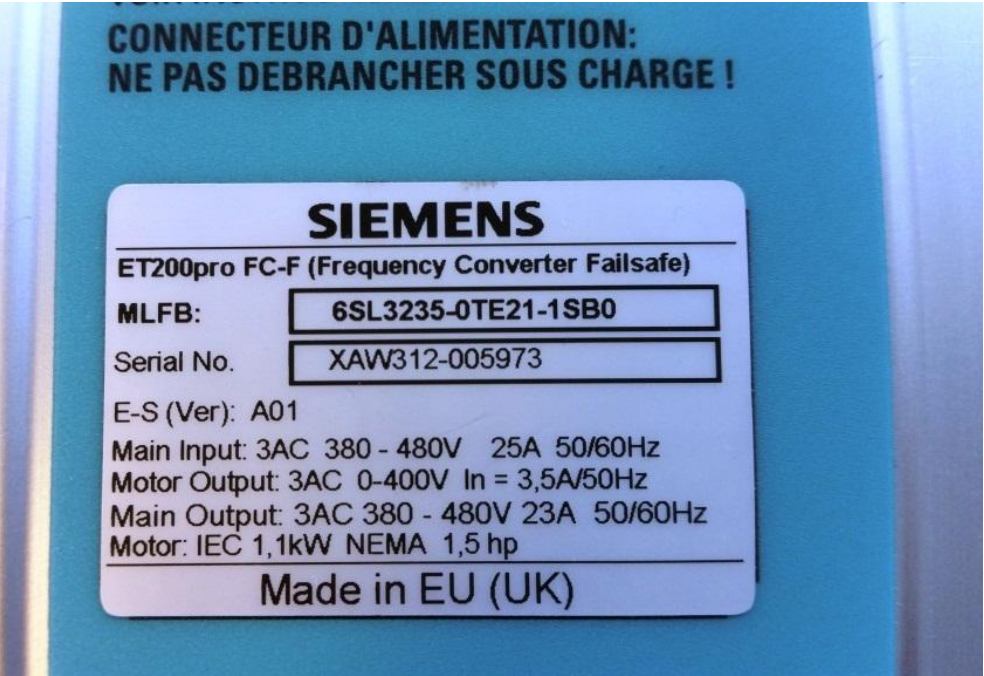
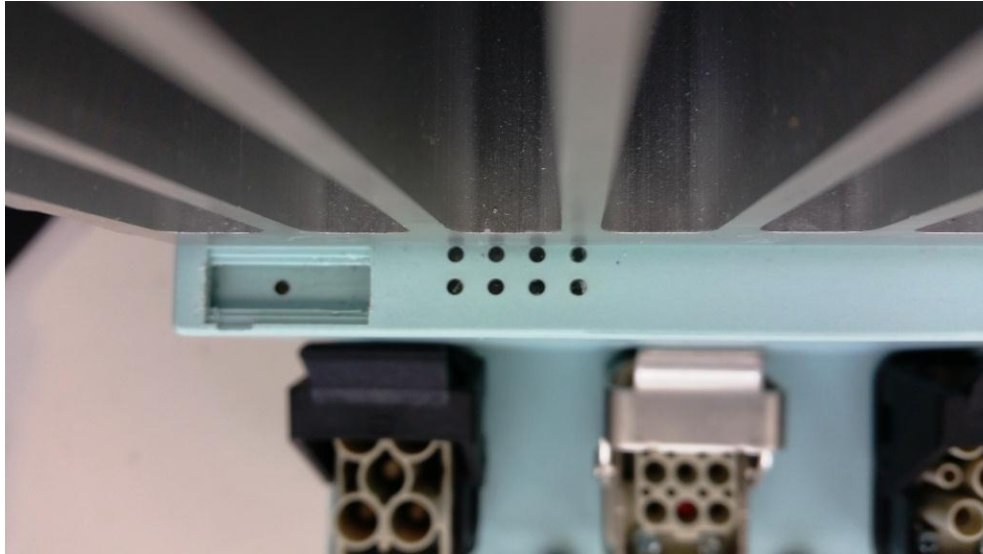


Figure 6



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Figure 7

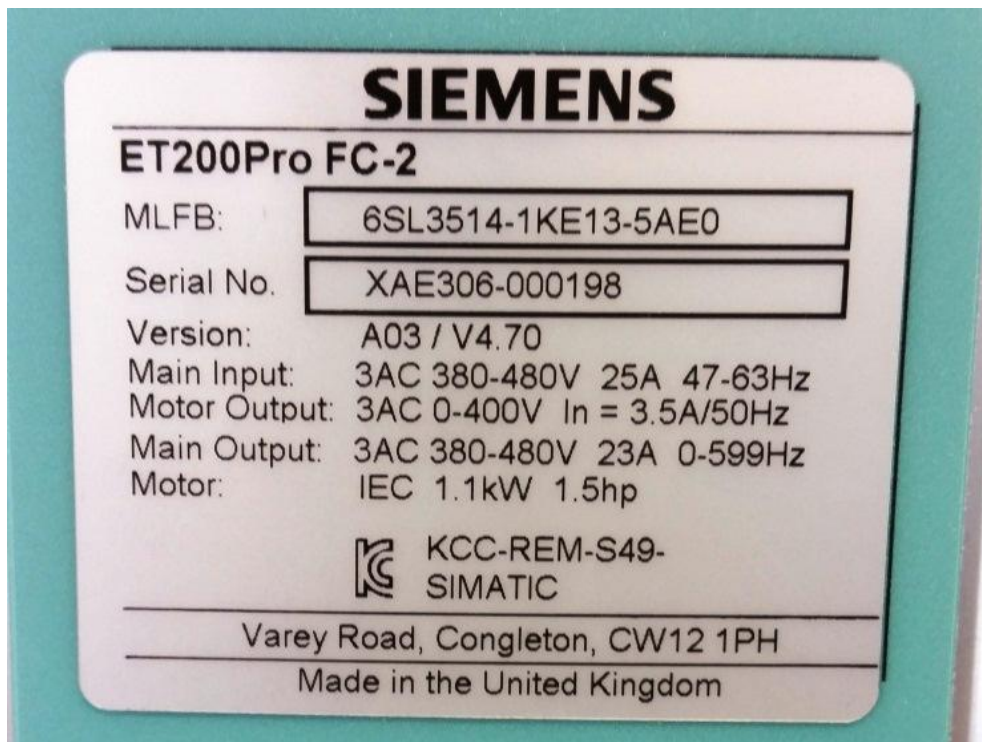


2.2 Second generation SIMATIC ET 200pro

2.2.1 Power Module

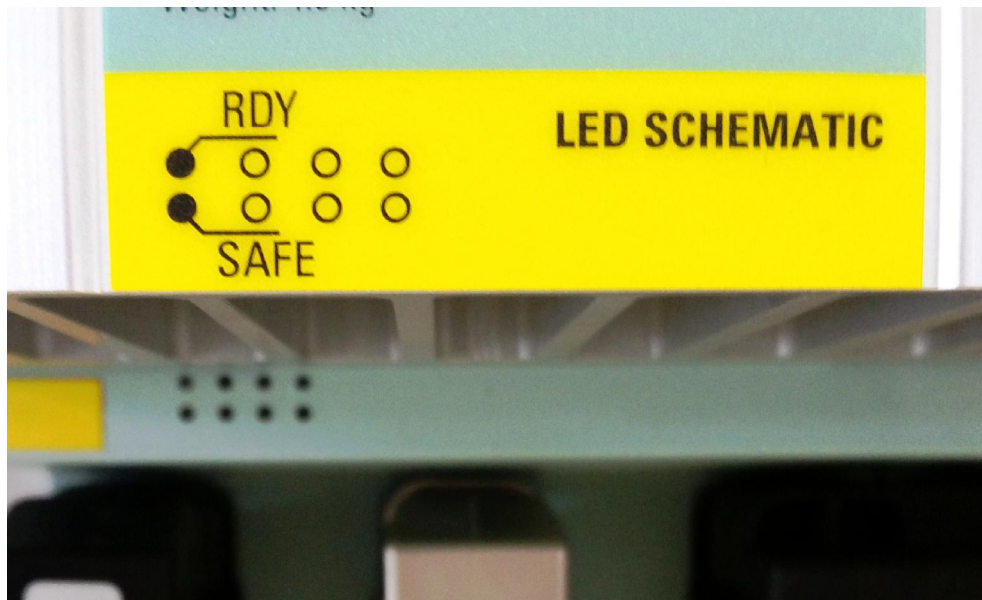
The new SIMATIC ET 200pro FC-2 product has only one MLFB;
6SL3514-1KE13-5AE0 1.1KW 380/480V 3 phase.

Figure 8



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Figure 9



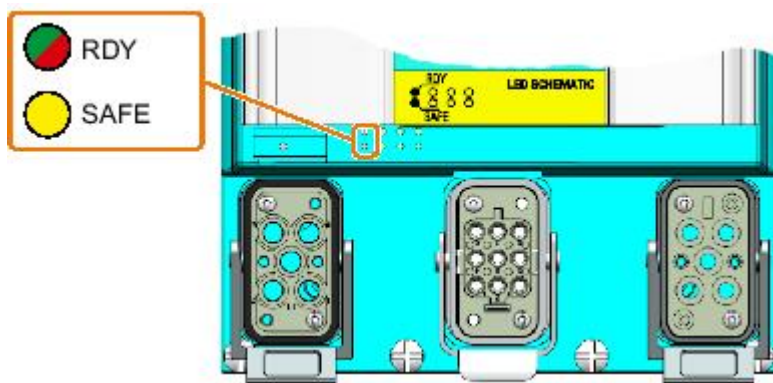
2.2.2

LED Function

The SIMATIC ET 200PRO FC-2 has 2 LED's

The LEDs have different colours and flashing rates to indicate the status of the system in general, or the status of a specific function.

Figure 10 LED on the converter casing



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Signal states of the LED

Table 1 RDY LED

RDY LED	Description
GREEN - on	There is no fault present
GREEN - slow	Commissioning or reset to factory settings
RED - on	General system fault or Firmware update is running
RED - slow	Converter is waiting for a power cycled after a firmware update
RED - fast	Fault present - possibly incorrect memory card or unsuccessful firmware update
ORANGE - on	Converter start-up in progress

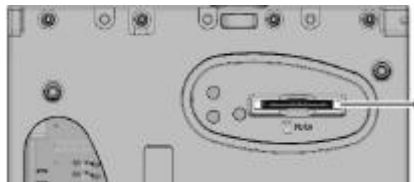
Table 2 SAFE LED

SAFE LED	Description
YELLOW - on	One or more safety functions are enabled, but not active or firmware update failed
YELLOW - slow	One or more safety functions are active or Converter is waiting for a power cycle after firmware update
YELLOW - fast	The converter has detected a safety function fault and initiated a STOP response or Firmware update is running

Memory Card.

The location of the MMC card slot remains unchanged on the back of the unit, however there will be potential for future Firmware upgrades via the card as per other current products.

Figure 11 Memory Card slot



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Figure 12



USB Interface.

An innovation for ET 200pro FC-2 is the USB programming interface which allows configuration via USB in the same way as other current products.

Figure 13

USB interface behind removable waterproof plug

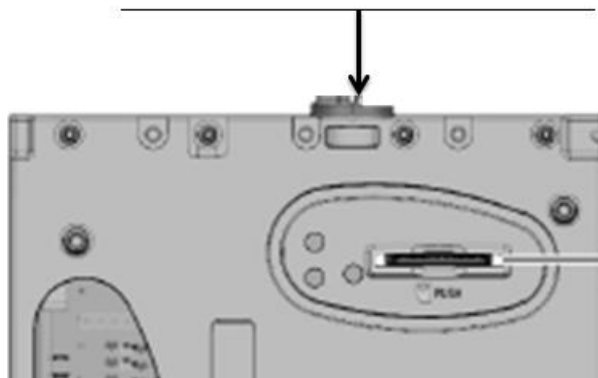


Figure 14

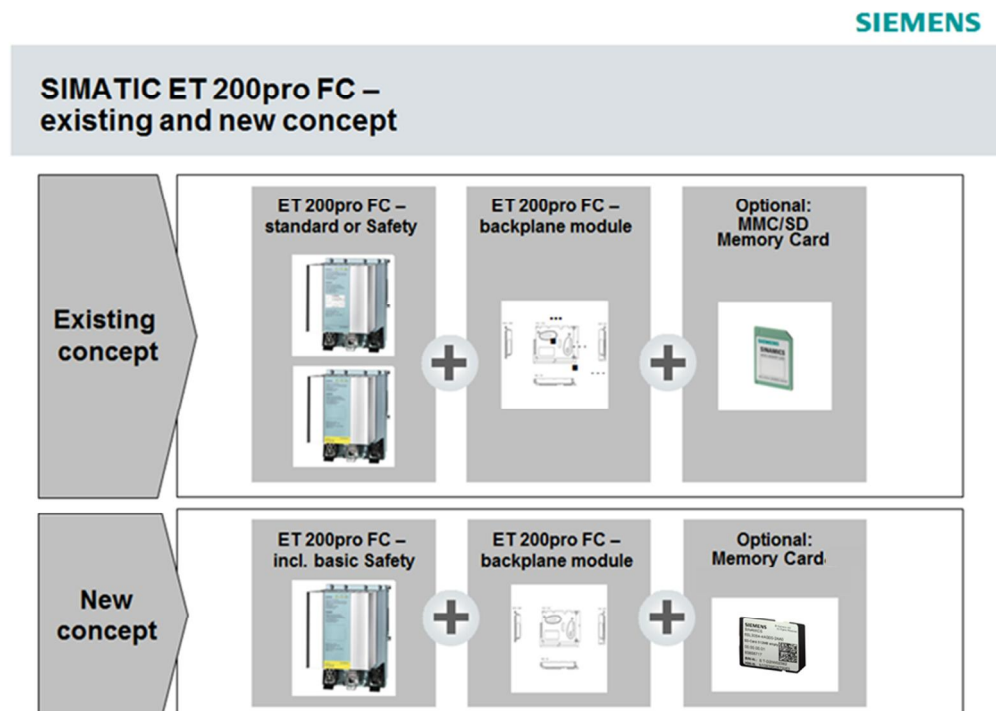


Safety Concept

The new unit has Basic Safety only. (STO)
Extended Safety features are not available.

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Figure 15



Mounting

The new Pro-2 Power Modules can be fitted on the same mounting backplane accessory as before. There are no changes in the mounting arrangements

2.3 Control Units.

The control unit (CU) of the ET 200pro FC and ET 200pro FC-2 are integrated into the Power Module. All hardware is within the IP65 casing when delivered.

However, ET 200pro FC was based on GP Pool software (similar to MM4) whereas ET 200pro FC-2 firmware is based on SINAMICS Pool. (eg. G120D)

Therefore the Power Modules are not directly interchangeable due to the differences in CU Firmware.

NOTE

The ET 200pro FC Header Modules are typically IM154-2 DP or IM154-2 PN for Profibus or Profinet interfacing..

2.4 Preferred Migration.

Whilst the new ET 200pro FC-2 product is very similar in appearance to the previous ET 200pro FC, the firmware is completely different.

The original ET 200pro FC was based on GP Pool firmware (< V4.0). The new ET 200pro FC is based on SINAMICS Pool firmware V4.7.

The firmware is very different migration from ET 200pro FC to ET 200pro FC-2 requires a complete new Hardware Configuration and commissioning process.

Published documents regarding the original migration from GP Pool firmware to SINAMICS Pool should be treated as background information only. This is because they were written for earlier releases of SINAMICS Pool firmware.

Therefore the process for replacing ET 200pro FC with ET 200pro FC-2 should be to treat the installation as a new project, using the support documentation listed below.

2.5 Overview Connections.

Other than the new USB connector the connections to the ET 200pro FC-2 remain unchanged when compared to ET 200pro FC

Figure 16

USB interface behind removable waterproof plug

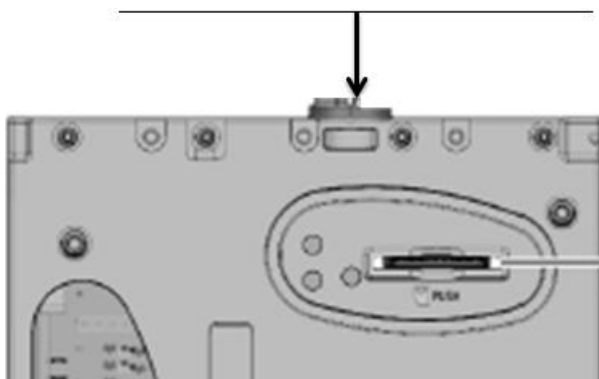


Figure 17



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2.6 Overview Hardware.

The mechanical assembly of the new ET 200pro FC-2 remains identical to that of the old ET 200pro FC unit. The same mounting rail arrangement and connection of other ET200 modules for the various functions remains unchanged.

2.6.1 Spare Parts and Accessories.

The spare parts and accessories below remain unchanged compared to the old ET 200pro FC apart from the memory card MLFB which is different.

Optical cable

The optical cable is used to connect a configuring or operating device with an RS232 interface to the optical interface of the converter. Electronics integrated in the cable converts electrical signals of up to 115 kBd into optical signals and vice versa.

Table 3

Order No.	
3RK19 22-2BP00	

Motor cable

Prefabricated motor cables up to 10 m long are available ex stock for connecting the motor. Longer lengths up to 15 m can be obtained from our SINAMICS service providers.

Table 4

Order No.	Length
6ES7194-1LA01-0AA0	1.5m
6ES7194-1LB01-0AA0	3.0m
6ES7194-1LC01-0AA0	5.0m
6ES7194-1LD01-0AA0	10.0m

Power jumper connector

Using the power jumper connector it is possible for one converter to loop through up to 25 A from 3AC 400 V to another frequency converter mounted directly alongside. The common fusing of the primary supply is provided externally.

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Table 5

Order No.	
3RK19 22-2BQ00	

Sealing cap for power bus

Unused connections without a sealing cap have a degree of protection of only IP54, with a sealing cap it is IP65.

Table 6

Order No.	Quantity
3RK19 02-0CK00	1
3RK19 02-0CJ00	10

Memory cards

The following memory cards are available as medium to back up converter settings:

Table 7

Order No.	Description
6SL3054-4AG00-2AA0	Card without firmware
6SL3054-7Ex00-2BA0	Card with firmware

NOTE

The digit at position x designates the firmware version: EG, 4.7 $\triangleq$ EH

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3 Overview of the Commissioning Tools.

The Commissioning tools remain unchanged compared to the old ET 200pro FC.

Table 1 Operator panel for commissioning, diagnostics and controlling converters

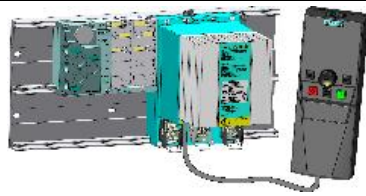
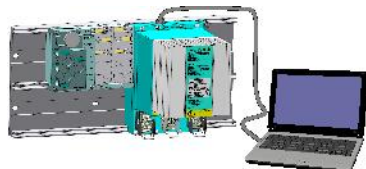
	Description	Order No.
	IOP (Intelligent Operator Panel) - for snapping on the IOP handheld • Plain text display • Menu-based operation and application wizards • Backing up and transferring the converter settings	6SL3255-0AA00-4JA0
	IOP handheld with power supply unit and rechargeable batteries as well as RS232 connection cable If you are using your own connection cable, carefully note the maximum permissible length of 5 m	6SL3255-0AA00-4HA0

Table 2 PC tools for commissioning, diagnostics and controlling the converter

	Description	Order No.
	STARTER Connection to the converter via USB port Download: STARTER	STARTER on DVD: 6SL3072-0AA00-0AG0
	SINAMICS PC Inverter Connection Kit 2 Contains the correct USB cable (3 m) to connect a PC to the converter.	6SL3255-0AA00-2CA0

NOTE

ET 200pro FC-2 inverter can only be commissioned via STARTER as the old ET 200pro FC inverter

4 Communication Interface Overview.

The Communications interfaces remain unchanged compared to the old ET 200pro FC apart from the option to use the new USB interface for inverter point to point connections to a PG.

Figure 18

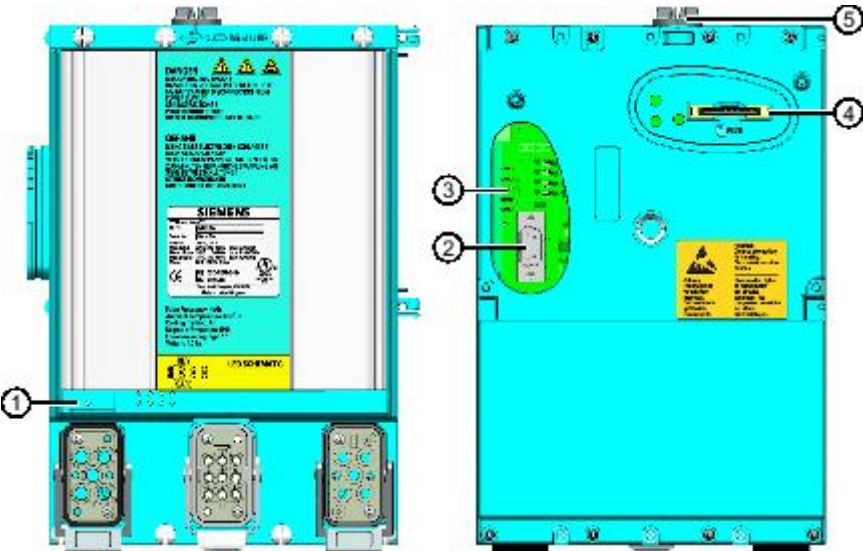


Table 1

No	Description
1	Optical Interface for commissioning the frequency converter using an IOP (Intelligent Operator Panel)
2	ET 200pro system and bus interface
3	Safety inputs and 24 V input supply connections
4	Memory card reader
5	Mini USB connector for commissioning the frequency converter using a direct connection to a PC through a local USB connection

5 Safety Functions.

The initial release of the new ET 200pro FC-2 includes only basic safety functions. Safe Torque Off (STO)

This differs from the old ET 200PRO 6SL3235-0TE21-1SB0 (With safety functions) which had the following safety functions:

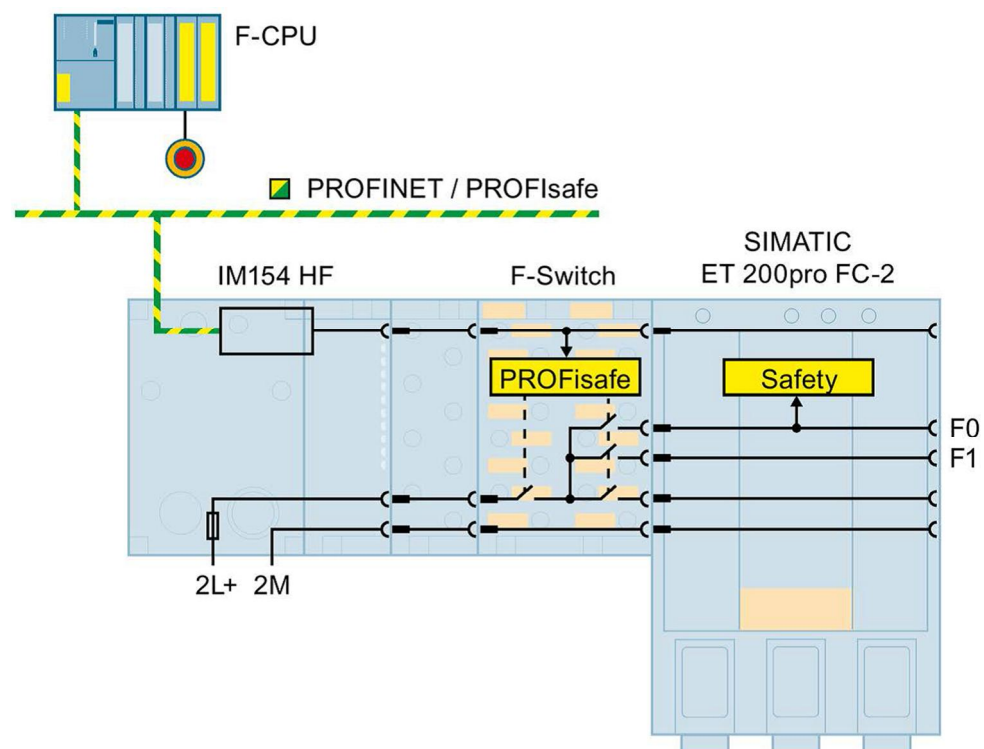
- "Safe Torque Off" (STO)
- "Safe Stop 1" (SS1)

5.1 Controlling the safety functions

The SIMATIC ET 200pro FC-2 converter does not have its own PROFIsafe interface. The central F-CPU controls the safety functions of the ET 200pro FC-2 via a "High Feature" interface module and the PROFIsafe "F-Switch" module.

The F-Switch module switches the "F0" and "F1 rails" in the backplane bus of the ET 200pro system. The inverter evaluates the F0 rail using an internal, safety-related input.

Figure 19 F-Switch to connect PROFIsafe of the ET 200pro FC-2 converter, e.g. via PROFINET



Additional information on the ET 200pro system and the F-Switch module is available in the "SIMATIC distributed ET 200pro I/O system - Fail-Safe Modules" Operating instructions. See also Section: Manuals for your inverter (Page 423).

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Additional possibilities of installing the F-Switch module are listed in the Internet:
[26694409](#)

5.2 Simplified parameterization

New function

Just the same as for the SINAMICS G120, parameterization is performed in one channel, and only at the end of the commissioning phase is it duplicated to the second channel by pressing a button. As a consequence, it is no longer necessary to enter safety parameters through two channels (for instance Hz and kHz). Furthermore, it is no longer necessary to confirm the checksum.

NOTE This simplifies commissioning and avoids incorrect parameter assignments.

5.3 Offline safety parameterization

New function

Just the same as for the SINAMICS G120, it is now also possible to parameterize the safety functions offline.

NOTE Safety parameterization can already be prepared in an office environment.

5.4 Standard STARTER parameterizing screens

New function

The STARTER parameterizing screens are now the same as the parameterizing screens of the SINAMICS G120.

NOTE It is no longer necessary to get to know a new system when changing over to a different SINAMICS converter.

6 Drive Parameterization

It is not possible to directly migrate from ET 200pro FC STARTER projects to an ET 200pro FC-2 as a result of the modified parameter structure.

NOTE

The drive must be re-commissioned again using STARTER or an IOP.

- STARTER V4.4 SP1 with SSP for the ET200pro FC-2, ID: [109476613](#)
- TIA portal support is planned for release with V13.SP1 (Update Hardware Catalogue)
- Step 7 Classic (Update Hardware Catalogue)

6.1 STARTER parameterizing software

6.1.1 TRACE

New function

Contrary to the old GP Pool FW products, the new Sinamics family has a trace function to optimize drives included in the STARTER tool.

6.1.2 Acceptance report

New function

Using the STARTER parameterizing software, an acceptance report for the safety functions can be generated; all of the relevant parameter values are automatically entered into this report.

NOTE

This can be found in STARTER under the drive unit in the folder Documentation

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6.2 Changes to ET 200pro FC

6.2.1 Changed reference quantities

The reference quantities (p2000 ... 2004) apply in the ET200pro FC-2 as standard for all data sets. In addition, the reference quantities have been expanded by the reference temperature (p2006).

In the ET 200pro FC-2, the speed set-point and actual value no longer refer to Hz but to rpm; this means that it is no longer necessary to convert the required speed into a frequency.

6.2.2 Change for the second ramp function via JOG ramp-function generator

It is no longer possible to use the JOG ramp-function generator to implement a second ramp function.

NOTE

However, when using the data set changeover (DDS), up to 4 different parameterizable ramp functions are now available. The data set changeover can be implemented in operation via the fieldbus. For details, refer to the operating instructions.

Further, it is possible to variably enter the ramp times via cyclic communication. For details, refer to the operating instructions

6.2.3 Changes to the command and drive data sets

There are now up to 4 command data sets (CDS) and up to 2 drive data sets (DDS) available in the ET 200 pro FC-2. Contrary to the ET 200pro FC, these must now first be enabled using parameter p170 (CDS) or p180 (DDS).

6.2.4 U/f points along a characteristic (U/f with programmable characteristic)

Contrary to the ET 200pro FC (3 voltage points and 3 frequency points along a characteristic), the ET 200pro FC-2 has 4 voltage/frequency points, which means that the characteristic can be more finely parameterized.

NOTE

If the additional points are not required, then set points 3 and 4 to the same value.

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6.2.5 Free function blocks (FFBs) have been eliminated

The Free function blocks available in the ET 200pro FC are no longer available in the ET 200pro FC-2.

6.2.6 Changes to the phase failure monitoring

For the ET 200pro FC-2, the phase failure monitoring (ET 200pro FC, p291) is always active and cannot be deactivated.

6.2.7 Positioning down ramp has been eliminated

The positioning down ramp available in the ET 200pro FC (parameters p2480 ... p2488) is no longer available in the ET 200pro FC-2.

6.2.8 Wobulation generator has been eliminated

The wobulation generator available in the ET 200pro FC is no longer available in the ET 200pro FC-2.

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6.3 New functions when using the ET 200pro FC-2

6.3.1 Improved closed-loop control performance

The performance and stability of the individual control modes of the ET 200pro FC-2 has been significantly improved over the closed-loop control in the ET 200pro FC

6.3.2 Expansion of the motor holding brake function

The parameterization of the motor holding brake has been expanded. Various modes are now available, where the brake, as before, can be opened or closed from the process, but now also permanently or as a function of an external signal.

NOTE For details, refer to the operating instructions or the STARTER screens.

6.3.3 Cyclically changing the ramp-up/ramp-down times

The ramp-up/ramp-down times can be cyclically scaled using parameters p1138 (ramp-up time) and p1139 (ramp-down time). As a consequence, the ramp times can be adapted via the fieldbus.

NOTE For details, refer to the operating instructions and the List Manual, Function diagram "Extended ramp-function generator"

6.3.4 Fixed set-points that can be freely used

Fixed set-points that can be freely used can be defined in parameters p2900 / p2901 (+/- 100.00%) and p2930 (+/- 100000.00 Nm). In addition, fixed set-points that are already defined are available in parameter r2902 [0 ... 14].

6.3.5 Speed-dependent controller adaptation

The Tn and Kp components of the controller can now be adapted as a function of the speed in the ET 200pro FC-2 (refer to the List Manual, Function diagram 6040).

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6.4 Memory card

Contrary to the ET 200pro FC (MMC card type only), for the ET 200pro FC-2 both MMC and SD memory card types can be used.

Just as before, the use of a memory card is optional.

Transferring a project from ET 200pro FC into the ET 200pro FC-2

Projects of a ET 200pro FC on a memory card cannot be transferred into a ET 200pro FC-2 as a result of the changed parameter structure.

NOTE

Clear the memory card and write the ET 200pro FC-2 parameterization to it

Handling memory cards

Writing data to a memory card has been significantly simplified for the ET 200pro FC-2. Parameter changes are automatically saved to the memory card.

For details, refer to the operating instructions and FAQ: [43512514](#)

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7 Drive Fault Messages

The fault messages/signals of the new ET200pro FC-2 have changed when compared to the ET200pro FC.

If the fault texts are to be displayed on an HMI for diagnostic purposes, then the corresponding fault texts can be downloaded under the following ID: [47520881](#)

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8 Related Literature

Table 1

Description and Link
Compatibility Information
Background information on SINAMICS firmware
Operating Instructions
Getting Started Guide
Parameter List