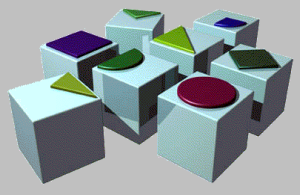


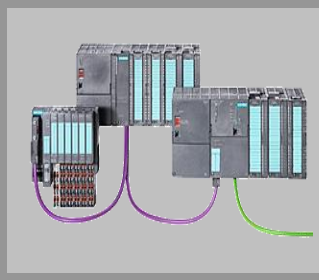
RENAULT

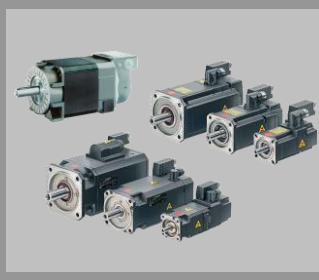
PLANT: All Plants

PROJECT: All Projects

Generic Project Book Generic

Editing 10/2017





Solutions for Powertrain

TRANSLINE

SIEMENS

SIEMENS

Solutions for Powertrain

RENAULT

PLANT: All Plants
PROJECT: All Projects

Generic Project Book

Documentation specific to Renault

Editing 10/2017
non restricted distribution

Further information is available on the Internet under:
http://www.workplace.automation.siemens.com/

This publication was produced with Microsoft Office.

We have checked that the contents of this documentation correspond to the hardware and software described. However, as discrepancies are not excluded, we cannot be held accountable for full compliance. The information contained in this documentation is subject to regular monitoring and any necessary corrections will be included in future editions. Please share your suggestions with us.

Table of Contents

Figures

Notes

1 General Information

This documentation is intended for RENAULT suppliers with regard to automation projects or business concerning powertrain installations, engines, transmissions, powertrain using NC configurations and machines from SIEMENS.

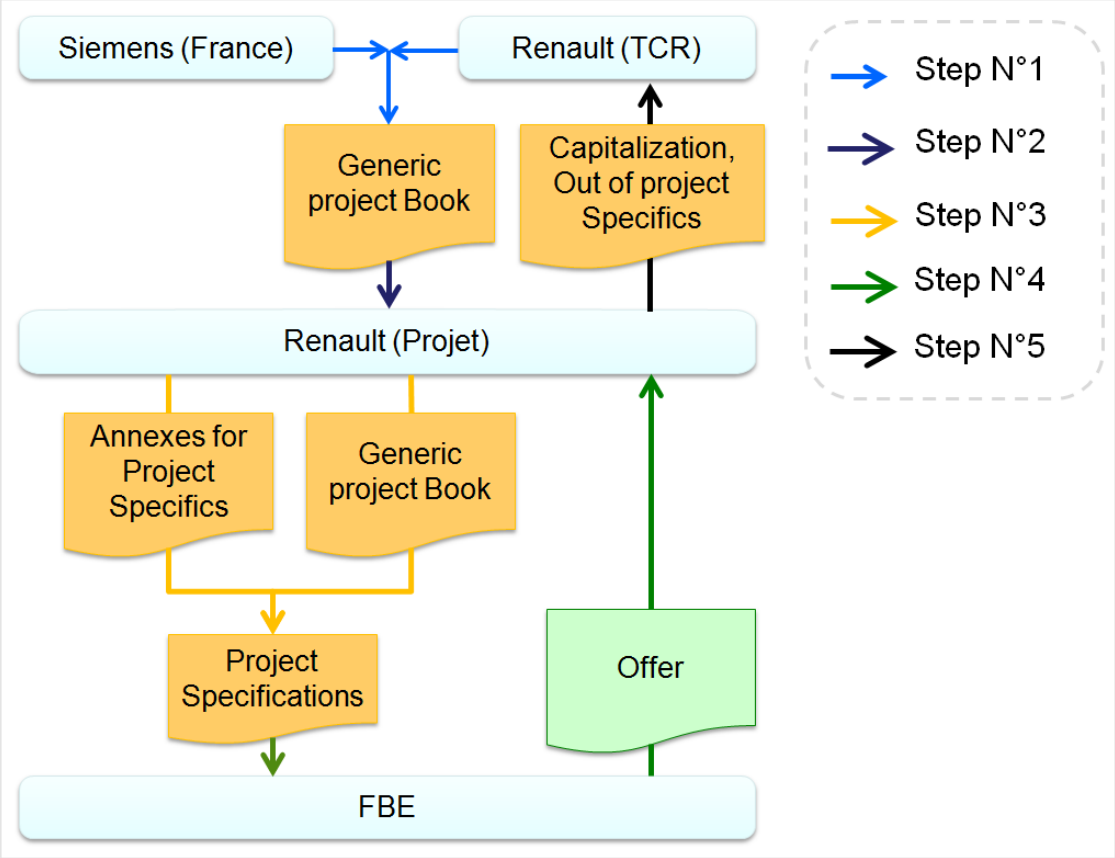


Figure 0-1 Definition of the project specifications

Step 1:

This documentation, which is specific, is complete and has been adapted with Renault TCR and Siemens France Automotive Branch to the Solutions for Powertrain TRANSLINE standard project.

The aim is to simplify the implementation of Siemens hardware through standardization, while still respecting the technical specifications of projects RENAULT.

Step 2:

Renault (Project) creates a list of differences. The project has in charge to integrate this list of differences in their specific project annexes.

The project specifications list the architectures choices and the SIEMENS Products kept for this project.

The generic project book is not modified in itself. But, the generic project book and the project specifications result in the project requirement specifications used for the consultations.

Thus, the project specifics must include the following informations:

- The SIEMENS product list according to the restricted list which is limited to the kept products.
- The chapters of the generic project book the FBE has to care for in this project.
- The names of the RENAULT contacts

Step N°3 :

With help of the specific project specification, RENAULT makes its consultations to the FBE.

Step N°4 :

The FBE return their offers to RENAULT (Project).

Step N°5 :

During the project, in spite of all our cross controls some discordances may remain between the different documents, so from SIEMENS or from RENAULT TCR.

The Step 5 is to be used in order to allow the necessary updatings and to release them as soon as possible.

At the end of a project, in form of an experience return, RENAULT (Project) returns to RENAULT TCR the capitalized experiences that are usefull for all next coming projects.

3 Siemens Project team

3.1 Siemens project team

Siemens has set up a project team to take account of the requirements of the project or automation tasks.

The Siemens project team is responsible for defining and updating the present project specifications and for defining the list of hardware and software for the powertrain projects, in coordination with the RENAULT project teams responsible for automation tasks or projects.

The Siemens project team shall be available to the RENAULT project teams responsible for the projects, in order to provide any support required during all phases of the project, such as:

- Consultation phase,
- Study phase,
- Implementation phase,
- Start-up phase.

The Siemens regional organization shall remain at the disposal of each equipment supplier, to provide any support required.

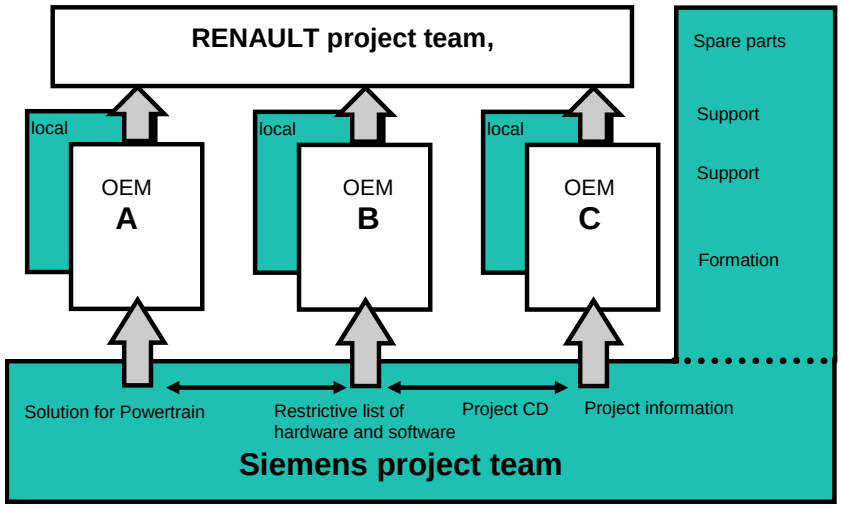


Figure 0-2 Project teams

3.2 Project Coordination

3.2.1 Siemens Central Contacts

Central coordination of the project is undertaken by the Siemens contacts listed below:

Mr. Markus PEINE Siemens AG DF MC MTS SV 1 Frauenauracher Str. 80 91056 Erlangen, Germany Tel.: +49 (0) 9131 98 3993 Email: markus.peine@siemens.com	

Table 0-1 Siemens contacts in Germany (TRANSLINE)

Mr. Sylvain JOLY Siemens SAS RC-FR DF FA S-VSS 9 boulevard Finot 93527 Saint-Denis Cedex 2 France Tel.: +33 (0) 1 49 22 35 75 Mobile: +33 (0) 6 29 93 10 80 Email: sylvain.joly@siemens.com	**Mr. Edouard SCHWEDA** Siemens SAS RC-FR DF FA S-VSS 9 boulevard Finot 93527 Saint Denis Cedex 2 France Tel.: +33 (0) 1 49 22 3517 Mobile: +33 (0) 6 0789-0897 Email: edouard.schweda@siemens.com

Table 0-2 Siemens Contacts in France

3.2.2 Siemens Local Contact

M. Stephane MULARD Siemens SAS Dept: RC-FR DF S-NTH DM&AREA&OEM BP 3 59 790 RONCHIN Cedex France Mobile : +33 (0) 6 64 05 60 94 Email : stephane.mulard@siemens.com	**M. DEL FABBRO Loris** Siemens SAS Dept: RC-FR DF S-NTH DM&AREA&OEM BP 3 59 790 RONCHIN Cedex France Mobile : +33 (0) 6 85 83 4270 Email : loris.delfabbro@siemens.com

Table 0-3 Siemens Local Contacts in France

3.2.3 Siemens France Technical Support

Support Line Email: support.france.automation@siemens.com	Tel. +33 (0) 821 801 122

3.2.4 Siemens TRANSLINE Technical Support

Support Line Email: transline-support.ad.sdw.rd@siemens.com	Tel. +49 (0) 711 / 137 - 3964 Fax +49 (0) 711 / 137 - 2838

3.2.5 Siemens International Technical Support

SIMATIC / SINAMICS / SINUMERIK – Hotline http://www.siemens.de/automation/service&support	Tel. +49 (0) 911 89 57 222

3.2.6 Service Card

	The AV CARD allows for fast, prioritized technical support by telephone (call-back guaranteed in less than 2 hours). It provides 24/7 access to the global support line. More information: http://support.automation.siemens.com/WW/view/en/28448132

3.2.7 Renault Central Contacts

Automation Machining Manager	**FCA Contact**
Mr. Amaury D'USSEL	**Mr. Nicolas LEFEUVRE**
Service: 65940 Automation Engineering Address: 1 Avenue du Golf API FR TCR GRA 2 20 78 284 Guyancourt CEDEX	Service: 65940 Automation Engineering Address: 1 Avenue du Golf API FR TCR GRA 2 20 78 284 Guyancourt CEDEX
Tel. +33 (1) 76 87 58 93 Email: amaury.dussel@renault.com	Tel. +33 (1) 76 87 95 43 Email: nicolas.lefeuvre@renault.com

Table 0-4 RENAULT central project coordination

3.2.8 Renault Local Contacts

Coordinator project STA Ruitz **M. Cyril FOURNOL** Service : 65940 Ingénierie Automatismes API FR TCR GRA 2 20 Adresse : 1 Avenue du Golf 78 284 Guyancourt CEDEX Tel. +33 (1) 76 83 58 97 Email : cyril.fournol@renault.com	Coordinator project STA Ruitz **M. Eddie KAZUBEK** Service : GATM Adresse : Usine STA RUITZ Zone industrielle, Secteur le moulin route d'Houchin FRSTA00B071 62 620 RUITZ Tel. +33 (1) 76 89 48 23 Email : eddie.kazubek@renault.com

Table 0-5 FCA – RENAULT local coordinator

3.3 Siemens Project Information

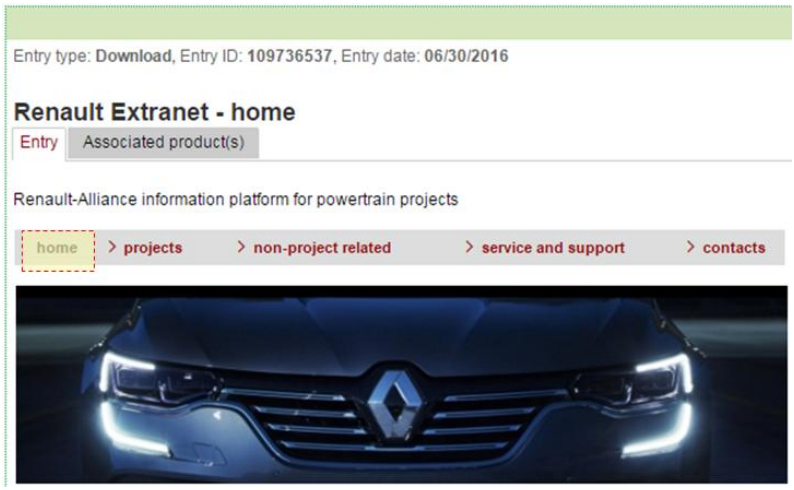
Any information in addition to the present project specifications, which is required for correct integration of the Siemens hardware and/or software in the projects, will be distributed by means of a "Project Information" intended for all identified SIEMENS/RENAULT/Supplier contacts following validation by the team RENAULT responsible for the business or project

3.4 Siemens Extranet Project

The exchange of information relating to the RENAULT projects, such as the specifications, project information, specific documentation, will be guaranteed using an Internet platform. This can be accessed via the Siemens e-business web at the following address:

https://support.industry.siemens.com/cs/document/109736537/renault-extranet-home?dti=0&lc=en-WW

You need a Login and Password which can be requested in line on this internet side. See in Annexe A1 the description of this request in line



Entry belongs to product tree folder(s):
Industries System solutions for branches Machine Building Machine tools Solutions for Powertrain - TRANSLINE Renault-Powertrain

!	Note: In order to provide access for the equipment suppliers consulted in the course of a project, the RENAULT project team responsible for the project will supply the list of suppliers with the name, telephone number and e-mail address of the relevant project contacts.

3.5 Certification of each machine type by Siemens

The machine or machines representing the supply of each equipment supplier, referred to as the "standard machine", will be certified by Siemens **after installation in the end customer factory** at the request of Renault.

Equipment suppliers will give the possible intervention dates to the local SIEMENS when both of them can be present in the end-customers factory

SIEMENS will submit a certification report to RENAULT and a copy to the equipment suppliers.

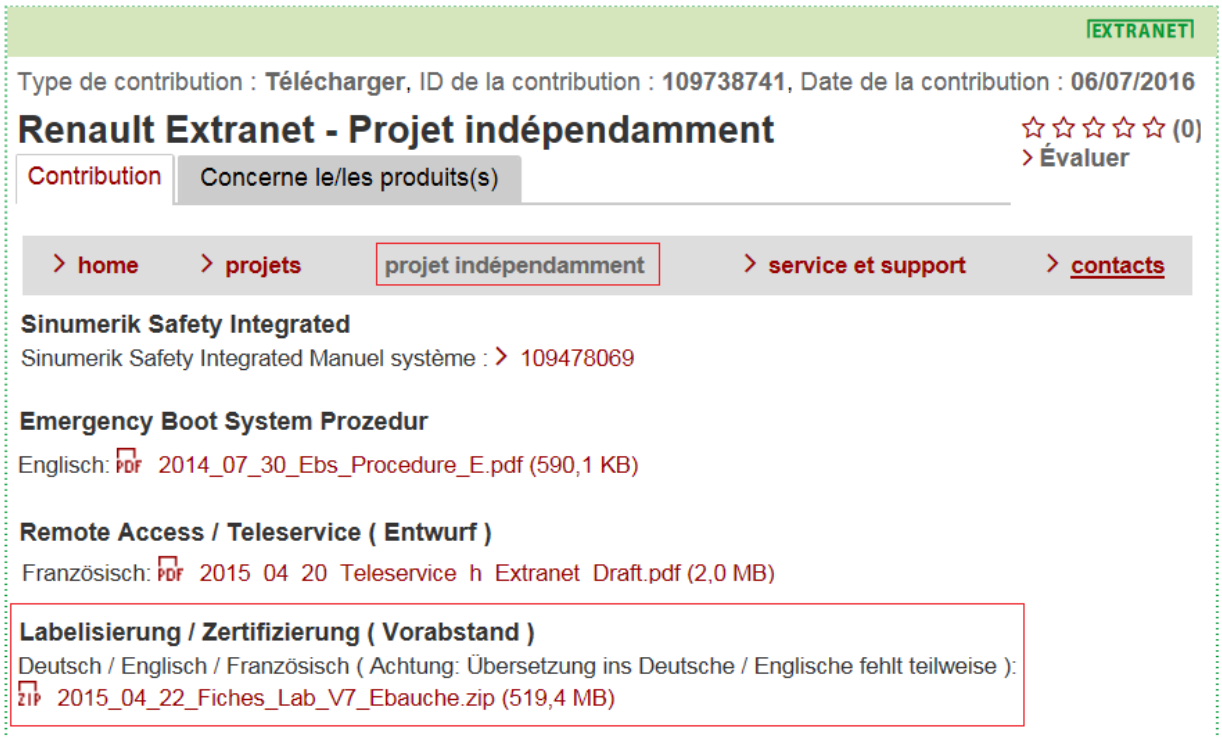
Non-conformities shall be taken into account by the equipment suppliers, under the guidance of RENAULT.

This certification shall include the following checks:

- Checking of the layout of the hardware,
- Checking of equipotential grounds,
- Checking of the laying of wiring, in accordance with Siemens recommendations
- Checking of the brake efficacy at each commissioning
- Checking of the EBS (Emergency Boot System)
- Checking of well reaction on dialog interrupt between NCU and other peripheral devices
- Commissioning of safety axes using the SIEMENS, SINUCOM NC SI software tool and the Starter V4.4 scripts
- Checking of the well mounting, setting and backup of the parameter set of the DQI encoders.
- Checking of Remote Service

Checks carried out by a technician from Siemens are listed in the certifications sheets, which are made available to equipment suppliers on the extranet

Link to the certification sheets on the extranet:



The certifications sheets do not replace the technical documents of products and software, which prevail.

Certifications performed by a technician Siemens do not replace those performed by bodies that are approved for safety checks.

Certifications performed by Siemens at the request of Renault are subject to accompanying measures established upstream of a project. The hardware and software products referred to in this project specification are part of the scope that is covered by these accompanying measures.

To enable certification, the Siemens technician will have a list of the Siemens hardware and software equipping a standard machine, as well as the wiring diagrams and documentation of the standard machine, which is provided for understanding the product assemblies and software used.

It is strongly recommended that during the machine certification by a Siemens Technician, at least one technician from Renault should take part to take advantage of the training effect

4 Presentation of Hardware and Software

NOTICE

The main items from the generic project book are listed in this chapter

Let us remind that the aim is:

- A standardization effect,
- A will to limit diversity
- While still respecting the technical specifications of projects RENAULT.
- To simplify the implementation of Siemens hardware

The Siemens products and architectures are a recommendation as the result of common tests realized by SIEMENS and RENAULT TCR

The effective choice is left to the RENAULT project responsible.

! **Note:**

The hardware and software listed in chapter 4 are described briefly without a description of particular functionalities
(see the Solution for Powertrain TRANSLINE project specifications for extranet availability).

4.1 Restricted Material List

The restricted and generic material list with the reserved references and associated to this specific project book can be reached on the extranet in Excel Format

The specific project book refers to a specific restricted list. This list can be reached on the extranet at its dedicated sheet.

4.2 Overview of the SINUMERIK hardware

The choice of type from the 840D range depends on the process technology and on the approval policy of the production lines decided on by the group RENAULT.

4.3 Overview of the SIMATIC hardware

Simatic Push Button Panel	 Push Button Panel Standard HMI KP8 PN  Push Button Panel Safety HMI KP8 **F** PN
Simatic Mobile HMI	 Mobile Panel 7 '' KTP700 F PN / ETH  Mobile Panel 9'' KTP900 F PN / ETH  Connexion Box Advanced PN
Simatic HMI Fixe Touch	 KP400 4''  TP700 Comfort 7 ''  TP900 Comfort 9''  TP1200 Comfort 12''
Simatic PLC	 Cpu 315 -2 PN/DP  Cpu 315 -2 F PN/DP  Cpu 317 -2 PN/DP  Cpu 317 -2 F PN/DP  Cpu 319-3 PN/DP, 2 Mo  Cpu 319F-3 PN/DP, 2,5 Mo
Simatic Network	 CP340 RS232 – RS422/485  CP343 -1 Lean  Scalance X208  Scalance X216  PN/PN Gateway
Simatic Periphery PN & Sinamics drives	 ET200S**P** PN HF  ET200S PN/DP Std  ET200S PN/DP HF  ET200Pro PN/DP Std  ET200Pro PN/DP HF  S120 CU 310-2 PN/DP  1FK7

4.4 Configuration with OP + TCU and Switch

During a project identified by RENAULT and SIEMENS and realized in a configuration **with OP+ TCU**, the standard software is:

- for the operator interface : HMI PRO SL
- for the NC interface : SINUMERIK Operate

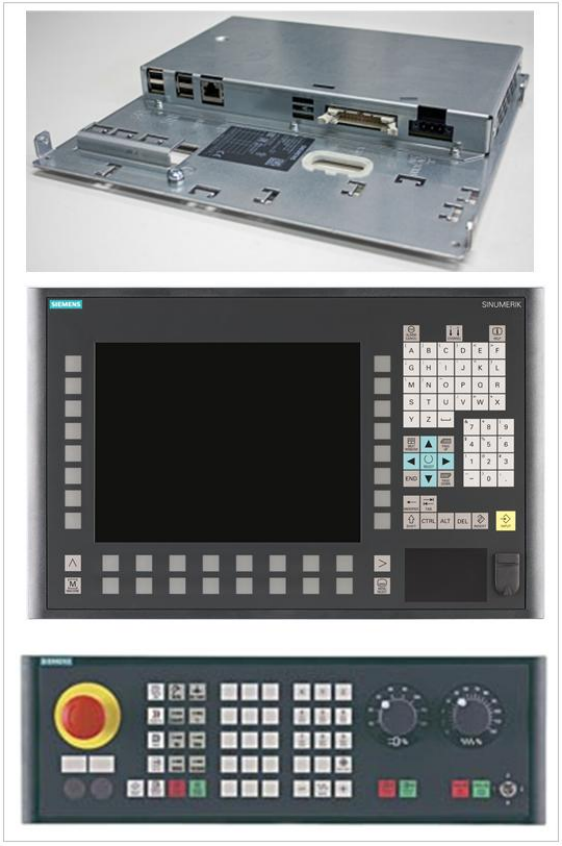
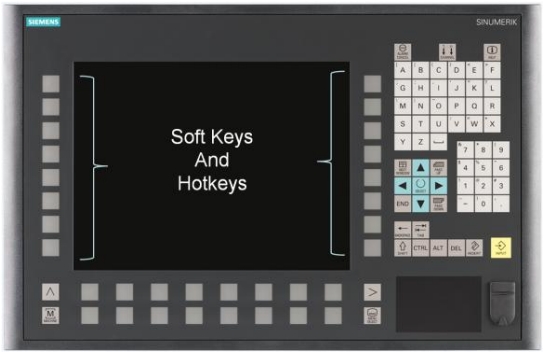


Figure 0-3 OP012 operator panel with TCU and MPP483 IE or MCP483 PN/IE

Use of the following operator and control panels is authorized:

- Operator panel OP08T. Only with additional screen (e.g.: tool management)
- Operator panel SINUMERIK OP012 (recommended)
- TCU (recommended)
- Machine control panel MCP483 PN/IE with sensitive keyboard, allows to pass the direct buttons of the OP012. (Nota: The machine control panel MCP483 **C** does not allow to pass the direct buttons of the OP012)
- Or Button control panel MPP483 IE with mechanical buttons (Nota: No PN interface available. The connexion to the TCU is made with the flat cable delivered with the button control panel. This panel allows to pass the direct buttons of the OP012).
- Portable console HT2 OR handheld terminal HT8 of the Sinumerik 840D solution line Range

4.5 Using the OP12 hotkeys



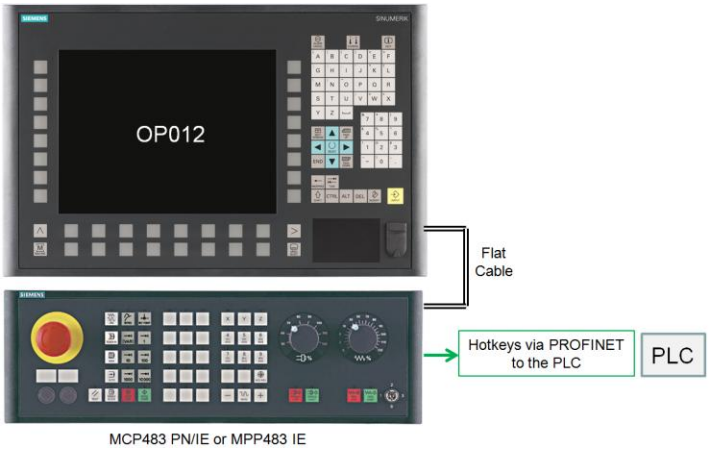
The OP12 has a set of vertical buttons to the left and right of the screen.

These are accessible:

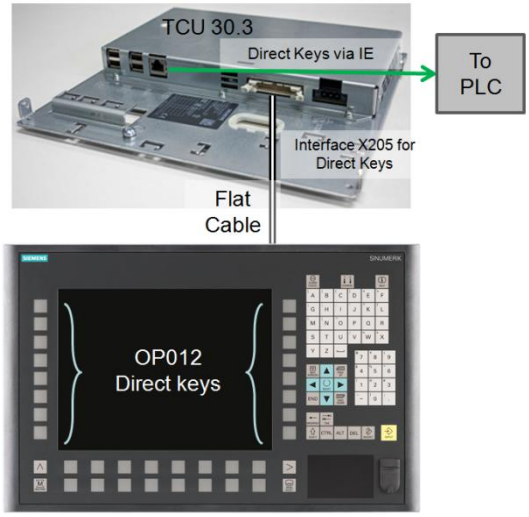
- as softkeys via a TCU.
- And can be processed as hotkeys in a PLC

- Depending on the selected architecture, the X11 connector on the OP012 can be used to create an interface with hotkeys using a flat cable:

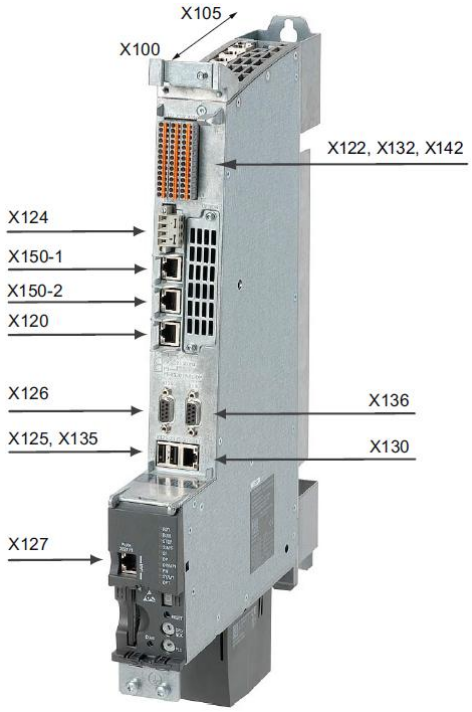
  - Using an MPP483 IE or an MCP483 PN/IE



  - Or using a TCU and connection to IE architecture

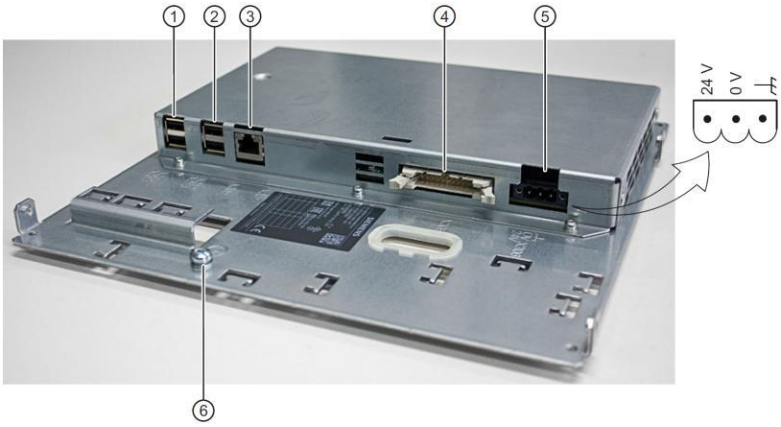


4.6 Interfaces of the NCU 7x0.3 PN



Interface no.	Description	Use
X100 ... X105	DRIVE-CLiQ	For SINAMICS drive components
X124	+24 V DC	External power supply
X150-1, X150-2	PROFINET IO	For PROFINET components
X120	Industrial Ethernet	For connection to the workshop network (TCU and/or PCU)
X126	PROFIBUS DP	PROFIBUS DP (eg. for the AP axles)
X125, X135	USB	Only during startup and for maintenance purposes
X127	Industrial Ethernet	Maintenance interface for PG/PC
X130	Industrial Ethernet	For connection to a factory network
X136	PROFIBUS DP/MPI	For PROFIBUS DP components
X122, X132, X142	Based on PROFINET	ON/OFF inputs/outputs for peripherals

4.7 Interfaces of the TCU 30.3



Number	Interface	Designation
1	X203/X204	Interface USB 1 and 2
2	X212/X213	Interface USB 3 and 4
3	X202	Interface Ethernet
4	X205	Interface direct keys
5	X206	Extern power supply 4V dc
6		Grounding

The TCU 30.3 is compatible with the Tcu 20.2, to a few restrictions about the user interface. See the manual at page 62 §5.4.4. New Tcu 30.3 and old Tcu20.2 can work mixed together.

4.8 Drives

Use of the following drive systems is authorized:

- SINAMICS S120 - CU310-2 (single axis)
- SINAMICS S120 - CU320-2 (multi-axles)

Notes regarding control of the engine holding brake:

1 - In order to ensure optimal control of the holding brake fitted to the Siemens servo motors on applications with vertical axles, Renault and Siemens prescribe the use of the "Sure" brake control fitted as standard on the SINAMICS S120 drive platforms

2 - We would emphasize that this is only a parking brake, since the standstill torque is limited to maintaining a load at standstill. These technical characteristics cannot be used to stop a mobile in motion.

- If the power inverter braking does not prove to be effective for stopping the mobile without collision, pulsed resistors will need to be installed.
- Finally, if this solution is still insufficient, an external additional braking system will have to be installed (e.g.: lock wheel, dynamic brake, etc.)

➔ **RENAULT will control the efficiency of braking during the various acceptance stages**

4.9 Engines

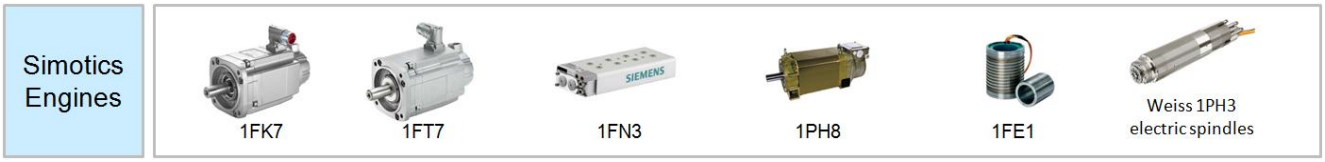


Figure 0-4 SIMOTICS engines

The use of the following engines is authorized:

- 1FK7 Generation 2,
  - Information: The Gen 2 1FK7 have a removable encoder
  - Information: to convert the Gen 1 references to Gen 2, use the conversion tool that is available in A&D Mall and the Siemens extranet
- 1FT7,
- 1PH8, successor of 1PH7
  (use the conversion tool available in A&D Mall and the Siemens extranet),
- 1FN3:

! **Notes on the wiring of SIMOTIC engines:**

1- Engines with SIMOTIC 1FT7 and 1FK7 and 1PH8 axes must be used with shielded power cables of type motion connect 800 or 800 Plus (6FX8.x..) and must be correctly dimensioned for a life of at least 5 years,

2 - Linear SIMOTIC 1FN3 engines must be used with shielded power cables of type motion connect 800 Plus(6FX8 008 - 1....) and must be correctly dimensioned for a life of at least 5 years,

* See catalog “NC Z” for complete references

⇨ The technical characteristics of these cables are only valuable in conjunction with simple bends with horizontal displacements of up to 5m in the cable assemblies.

! **Choice of engines with heating of 60 Celsius.**

1- The service life of the bearings when the engines are used as prescribed in the Siemens technical documentation is given for information purposes as 20.000 hours.
The Siemens synchronous engines are usable at an ambient temperature of –15 °C to + 40°C and the technical characteristics and operating curves given in technical documentation correspond to use with heating of 100 Celsius.

With a view to increasing the service life of the bearings, RENAULT has decided to prescribe engine use with heating limited to 60 Celsius.

We would remind you that you will find the operating curves for heating to 60 Celsius in the Siemens technical documentation.
Please consider this request RENAULT when selecting the engines.

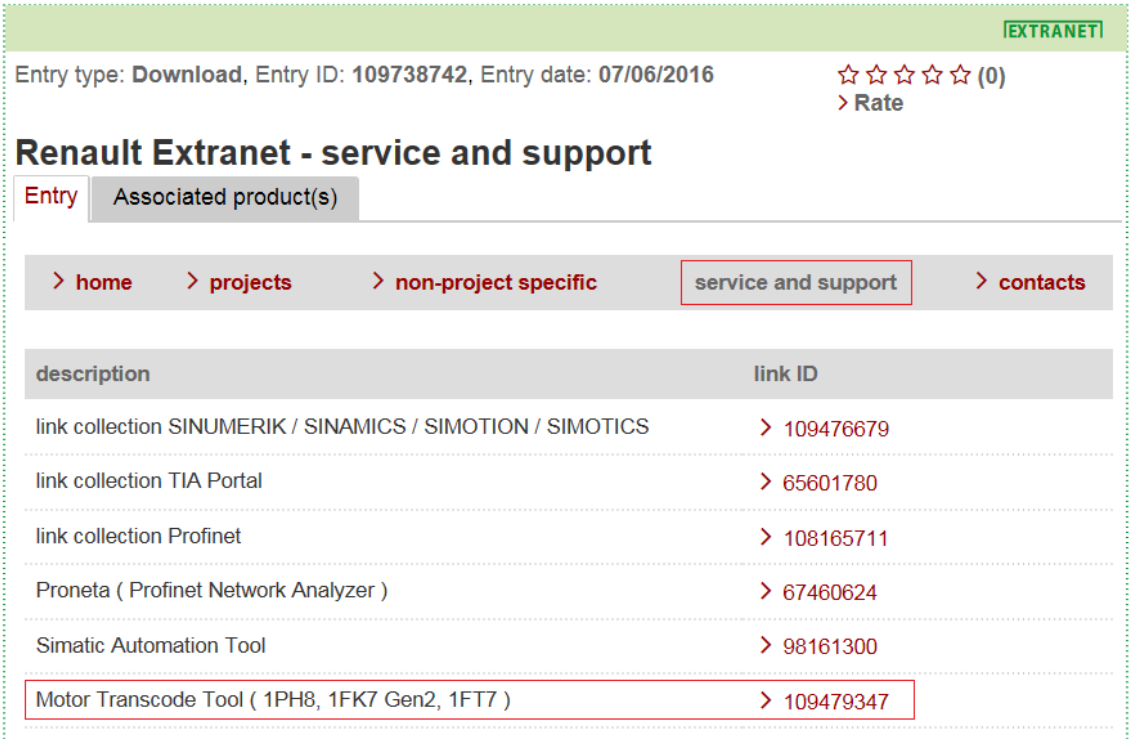
⇨ The manufacturer must justify a temperature greater than 80°C at the probe to RENAULT.

! **Comments:**

- Engines with keys are prohibited on machine tools
- The use of engines with keys is tolerated for low-speed low-dynamics handling movements

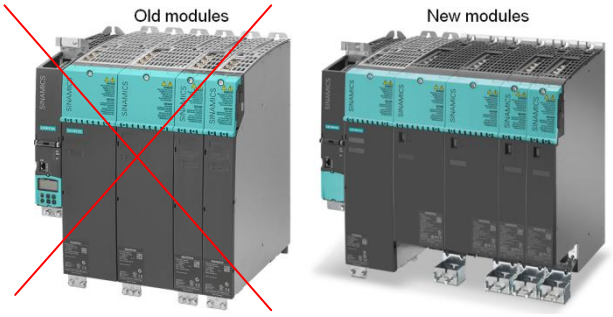
Information relating to the conversion of references from 1FK7 G1 to G2

Conversions tools are available on the extranet at:



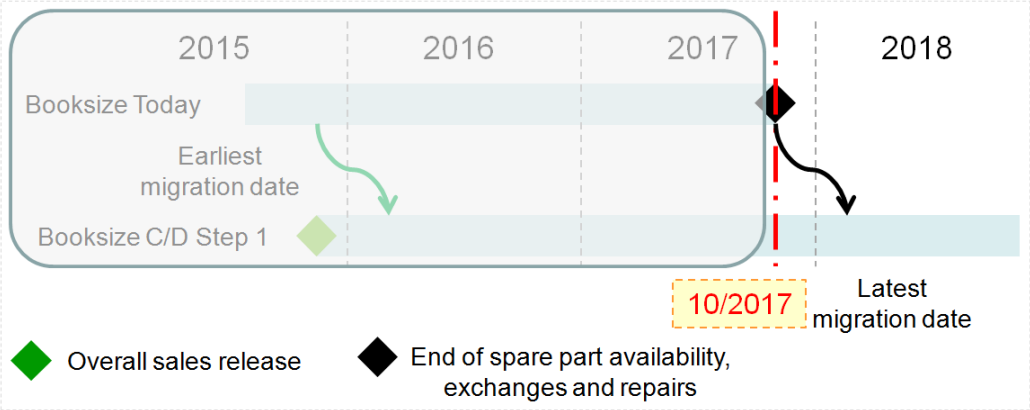
4.10 Sinamics S120 Motor Modules

4.10.1 Differences between old and new motor modules



- Mechanically the new modules can replace old modules,
- The electrical datas of the new modules are better. But an analyse must be done module per module.
- NOTE: The configuration software SIZER will show a certain while both versions of motor modules. Preferably use the new versions.

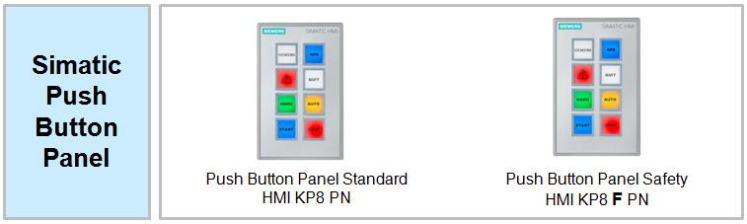
4.10.2 Foreseen migration Planning de migration prévu



4.11 Push Button HMI

For applications using push button panels, following products are authorized:

- Push Button Panel HMI KP8 PN standard version
- Push Button Panel HMI KP8 PN safety version



- The push button panels are connected to the PLC via Profinet network and are seen in the PLC as decentralized periphery.
- They have their own IP address
- The safety version HMI KP8 F has the contacts for the two channel contacts of an emergency stop button.

4.12 Mobile SIMATIC operator panels

For applications with mobile panels, the following hardware is authorized:

- Panel Mobile KTP700F PN / Eth
- Panel Mobile KTP900F PN / Eth
- Connexion Advanced PN

NOTE: SIMATIC HMI mobile desks must have parameters set WIN CC Comfort >= V13 SP1. The actual version is Win CC V14

NOTES: The use of mobile panels is subject to the recommendations in the RENAULT standard EB03D6020,-an excerpt of which is given below:

	Mobile panel connected in a fixed position	**Detachable mobile panel**
Color of the Stop Button	Red with yellow flange ring	Gray
Connection to the TDF	Wired into the emergency stops opening	Wired into the startup loop
Precaution to be implemented	Not applicable	Place a fixed Emergency Stop as close as possible to the connection area (interventions)
Recommended choices	YES	YES

Link to the RENAULT standard EB03D6020 on the CNOMO site:
http://www.cnomo.com/an/rechercheParticuliere.php?indice=EB03.D6.020&documentActif=1

4.13 Fixed SIMATIC operator panels

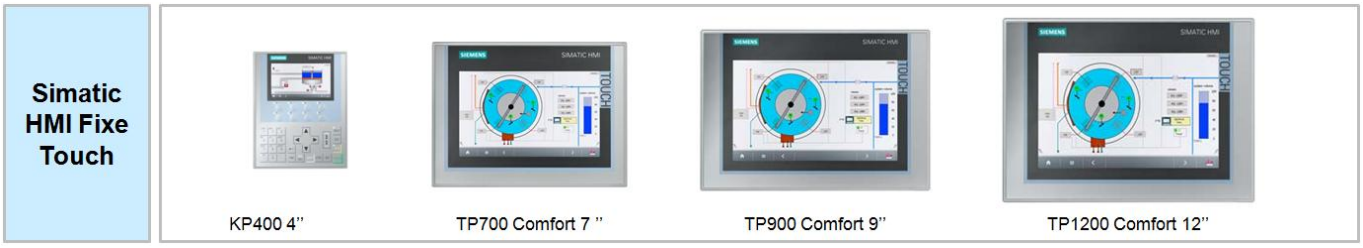


Figure 0-5 Fixed SIMATIC panels

For applications with fixed panel

- **Pupitres Comfort**
  - Simatic KP400
  - Simatic TP700 Comfort
  - Simatic TP900 Comfort
  - Simatic TP1200 Comfort

- NOTE: SIMATIC HMI mobile desks must have parameters set WIN CC Comfort >= V13 SP1. The actual version is V14.

4.14 Simatic S7-300 PLCs

The following ranges of SIMATIC CPUs are authorized.

• Cpu 315-2 PN/DP • Cpu 315**F**-2 PN/DP • Cpu 317-2 PN/D • Cpu 317**F**-2 PN/DP • Cpu319 PN/DP • Cpu319**F** PN/DP	

! **Note on use of the SIMATIC S7-300 CPUs:**

- The new generations required the use of a Micro Memory Card.
- The integrated PN interface of the CPUs is used for connection with the level 2 system. Use of a CP343-1 Lean is no longer necessary.
- On the CPU F, the security programs must be validated by the **S7-Cotic tool**.
- If the architecture is built in a way that the response time of a safety loop flows through several Plcs, the communication load on the profinet network must also been checked. In this case, use the evaluation tool **NETLOAD**. It is available on **PROFIBUS INTERNATIONAL** internet site at address www.profibus. You must be member.

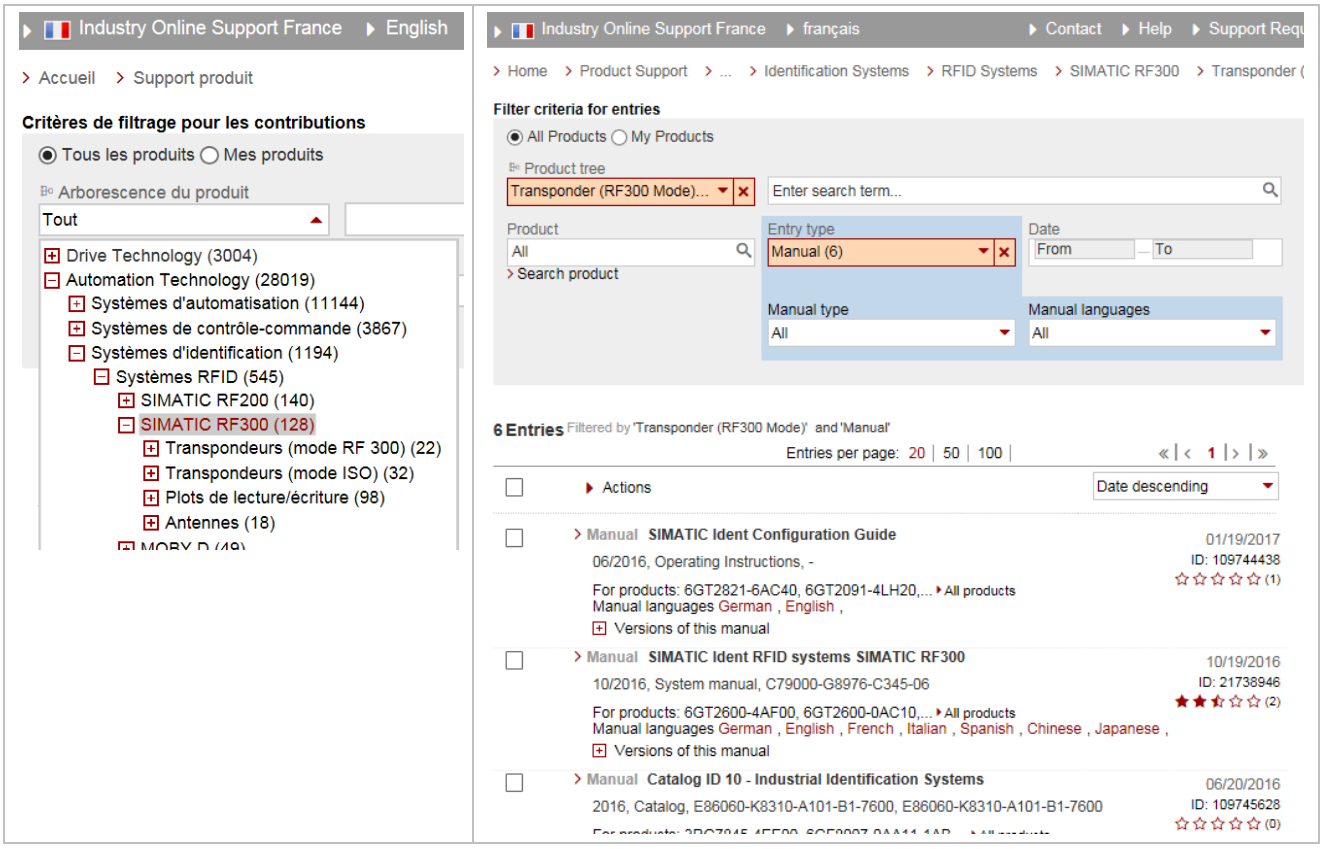
SIEMENS

4.15 Simatic RF300 identification system

Use of the RF 300 range is authorized.

RFID RF300 Communication Module	 RF300 COMMUNICATION MODULE RF180C FOR PROFINET  RF300 - ASM475 COMMUNICATION MODULE ASM 475 FOR S7 300 AND ET 200M
RFID RF300 Readers	 RF300 READER RF340R WITH RS422-INTERFACE (3964R)  RF300 READER RF380R RS422/232-INTERFACE (3964R)  RF300 TERMINAL PORTABLE RF350M
RFID RF300 Memories	 RF300 TRANSPONDER RF340T 8 KBYTE FRAM,  RF300 TRANSPONDER RF350T 32 KB FRAM,

The Industry Online Support site below gives access to documentation about the RF300 identification system



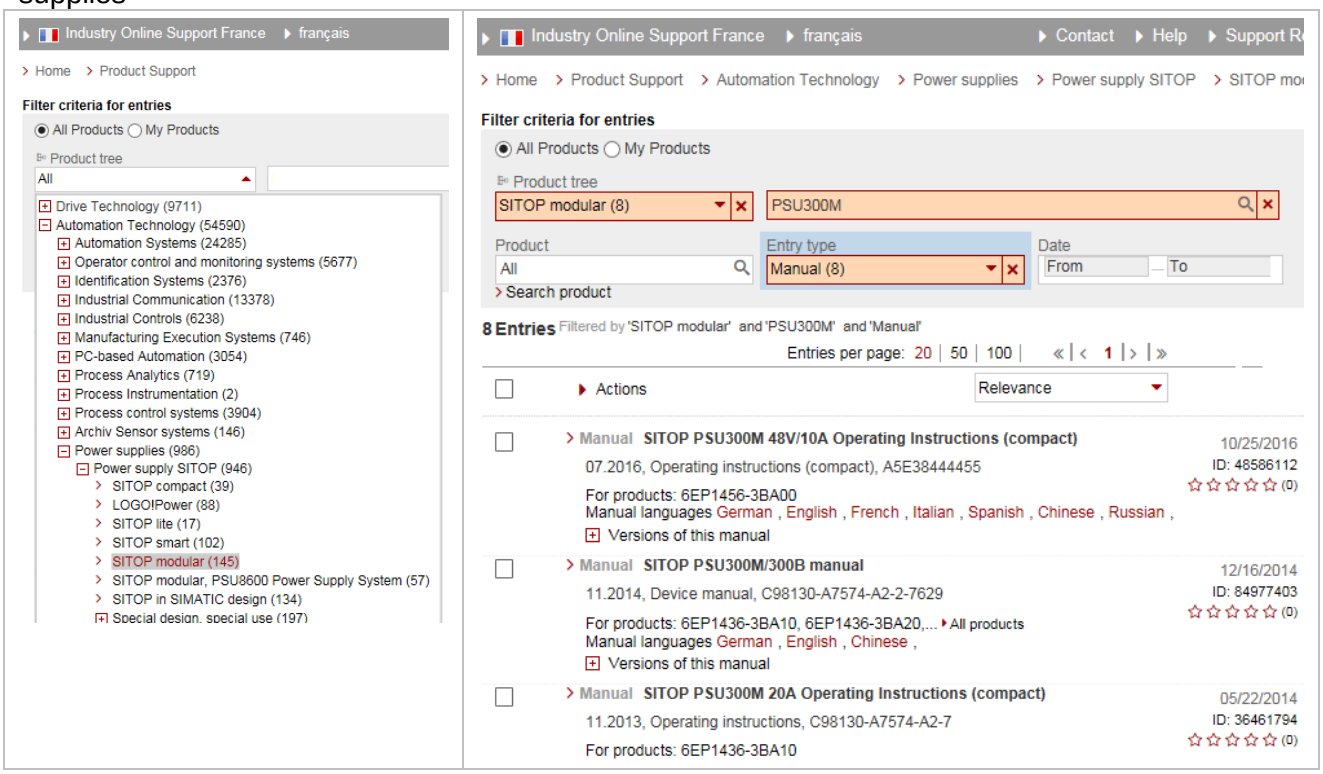
4.16 SITOP Power Supplies

Use of SITOP power supplies is authorized.

Uninterruptible SITOP Power 24V power supplies are made up of a DC-USV module with a 24V battery block and a SITOP Power 24V power supply and make it possible to maintain the supply, without interruption, during prolonged power outages.

Figure 0-6 SITOP uninterruptible power supply

The Industry Online Support site below gives access to documentation about SITOP power supplies

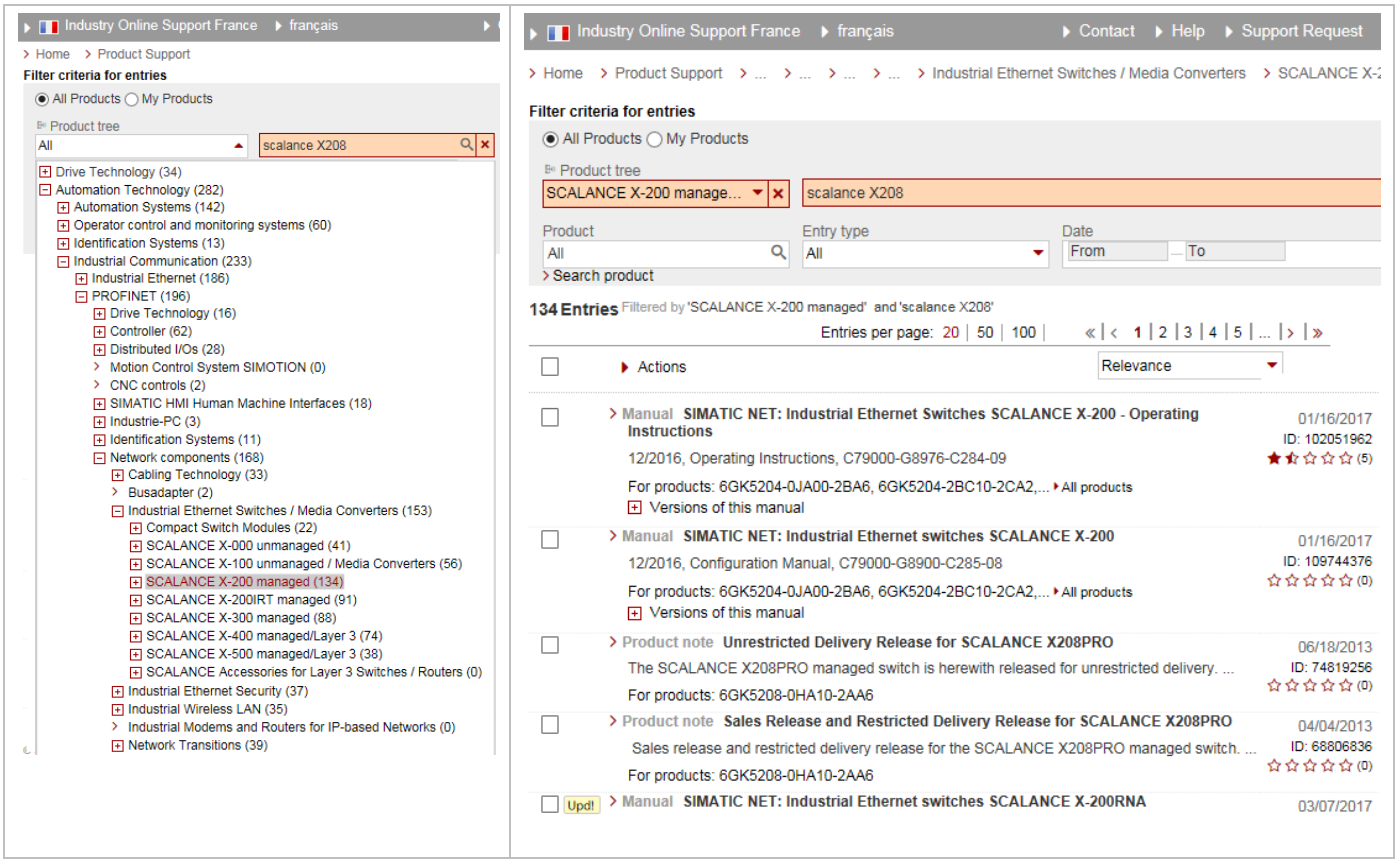


4.17 Network components

The following Network components are approved:

- Communication couplers CP340 and CP343-1 Lean
- SCALANCE managed switches: X208, X216
- Other network components: PN/PN gateway for inter-PLC communication
- Gateways to other networks of third party suppliers can be used, but without support from Siemens

Links to documentation at the Industry Online Support site: http://support.automation.siemens.com



4.18 Decentralized and implemented Profinet periphery

I/O Station **IP20**:

- ET200 S Std
- ET200 S HF for applications with Safety Integrated
- ET200 S**P** HF for applications with Safety Integrated

I/O Station **IP65**:

- ET200 PRO Std
- ET200 PRO HF for applications with Safety Integrated

	Notes on wiring of the Profinet-DP networks
!	1 - Profinet networks must be wired using the appropriate tools and in compliance with the wiring rules described in the certification record of the Profinet-DP networks, 2- The Profinet trailing cable for the cable assembly will, however, be used for embedded I/Os within the limit of its characteristics (e.g.: high speed portal). 3- The IP20 peripheral stations must be used with appropriated connectic: IP20 ➔ RJ45 ; IP65 ➔ M12the FASTCONNECT IP20 connector for Profibus-DP. 4- The IP65/IP67 peripheral stations must be used with the **encapsulated** M12-B connection**.** 5- The fixed and/or mobile parts of Profinet networks must be wired using cables that are resistant to cutting oils and are dimensioned for a service life of at least five years. Cables for the mobile part must be used within the limit of their characteristics and up to a maximum length of 5m of curvature in cable hanger chains.

! **Note regarding Profinet components other than those of SIEMENS**

*Equipment suppliers must submit **"*.gsd files"** of the Profinet components used other than those of Siemens.*

4.19 Safety Integrated

4.19.1 SINUMERIK Safety Integrated

The Profibus and Profinet networks have the Safety Integrated protocol. Safety organ signals transit via the network.

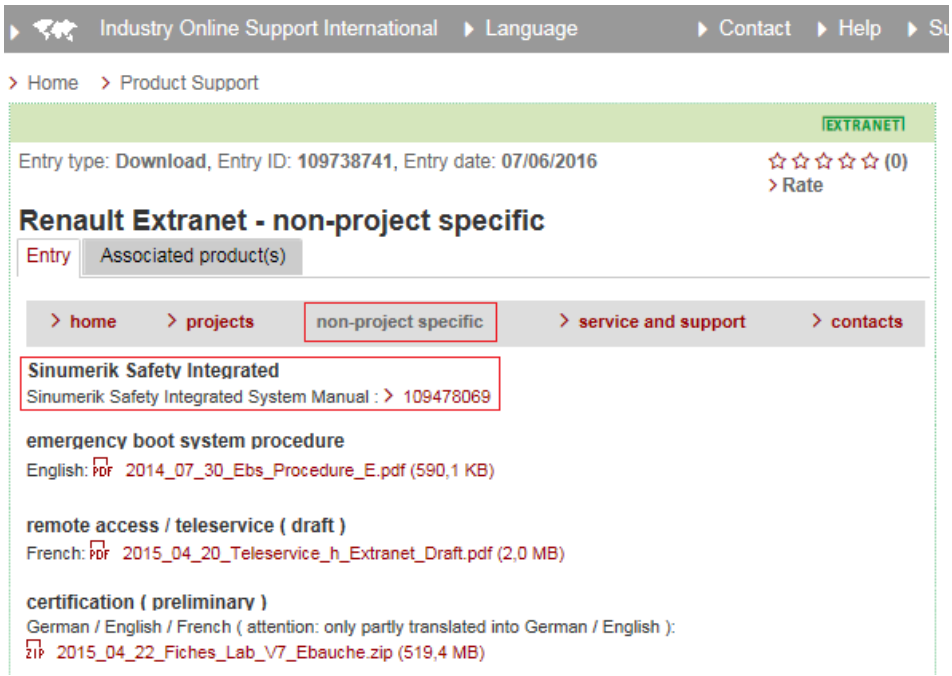
Safety Integrated functions must be used with a safety CPU as well as with the High Feature (HF) decentralized periphery.

Use of the SINUMERIK Safety Integrated function is mandatory for handling integrated safety with the SINUMERIK 840D for machines requiring operation with the doors open (axle movements) and/or manual feed.

Use of the Safety function requires project equipment suppliers to submit the following to the project:

- **A configuration document during studies,**
- **A report issued by Siemens at the time of acceptance with all the information that is needed to be able to conduct a test.**

The System Manual for Sinumerik Integrated gives an overview to near the subject and the needed prequisites as well as for the knowledges than for the commissioning tests.

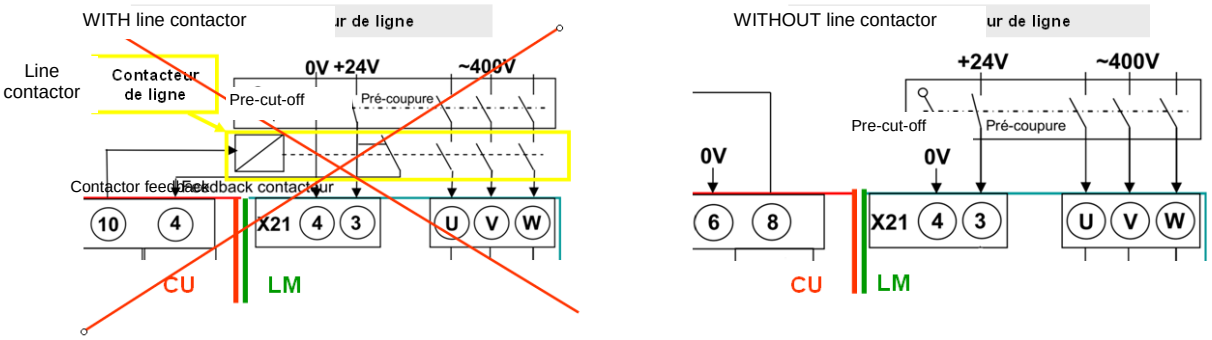


In the case of integration of SPL functions (programmed logic), the **SIRELAY safety relay software must be used** to simplify and standardize the safety programs

If vertical axes monitored by Safety Integrated are present, the "Brake efficiency control" SAFETY function must be used

NOTE:

- The without contactor diagram upstream of the LINE MODULE (LM) is the one that must be used (see diagram below) because of the SINUMERIK Safety Integrated function.



- However, please note that a maintenance operation on engines or other assemblies with a 400V three-phase power supply assumes appropriate lockout of the machine.

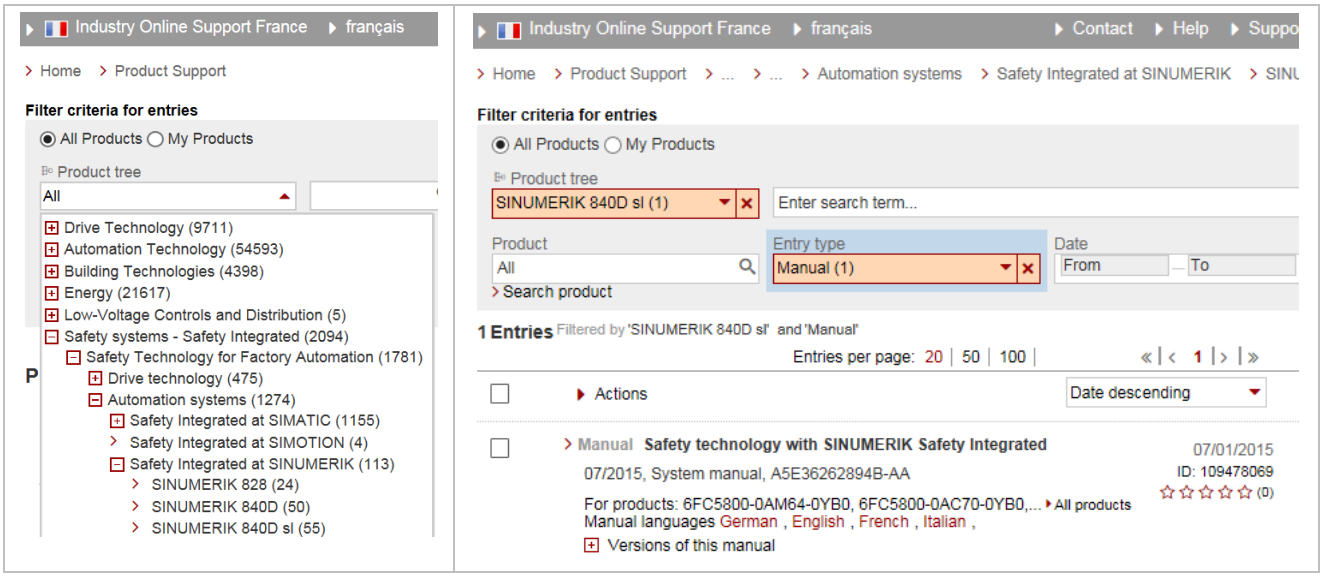
4.19.2 Responsibilities

The machine manufacturer must carry out an acceptance test of the activated SINUMERIK Safety Integrated (SI function) safety features.
The acceptance test must cause all thresholds used for validated SI functions to be exceeded in order to check that they are operating correctly.
All SI functions must be checked by a trained person.
An authorized person is a trained person of the machine manufacturer who, based on his professional training and knowledge of the safety functions, is able to perform the acceptance test in an adequate manner. The acceptance records must be signed by the person performing the test.
The records must be attached to the machine's log book.

The Safety Acceptance Record must be generated using the SIEMENS, SINUCOM NC SI software tool

SIEMENS

The link below gives access to the system manual “**Safety technology with SINUMERIK Safety Integrated “** on the SIOS. Paragraph 9.5 of this documentation describes the contents of the Safety Acceptance Report



4.19.3 RENAULT specifications

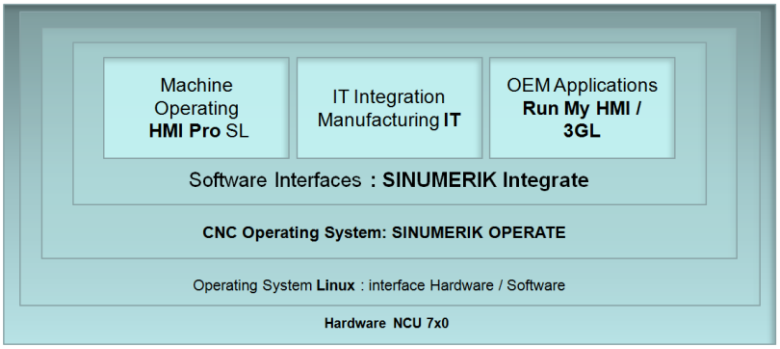
For more details about the RENAULT safety specifications, see the following CNOMO documents:

No. of the Standard	Contents of the Standard	Link on the CNOMO site
EB75.04.130	Industrial machines and installations. Safety. Working conditions.	http://www.cnomo.com/an/rechercheParticuliere.php?indice=EB75.04.130&documentActif=1
EB03.D0.020	Automatic controls safety implementation rules	http://www.cnomo.com/an/rechercheParticuliere.php?indice=EB03.D0.020&documentActif=1
EB03.D6.020	Automatic controls safety implementation rules in the mechanics plant	http://www.cnomo.com/an/rechercheParticuliere.php?indice=EB03.D6.020&documentActif=1

4.20 Control, operation and diagnostics

- Use of SINUMERIK operator panels with the TRANSLINE HMI Pro SL operation control system is intended to ensure homogeneous control, operation and diagnostics on all production resources.
- The HMI Pro SL human-machine interface must be used on all resources.
- The corresponding Hmi software is already integrated in the CNC of the NCU for control, programming and visualization.
- For the orders numbers of the NCU, refer to NC62 Catalog, page §2/7 or 23/676in the Pdf file

Brief presentation of the software structure based on NCU 7x0 with TCU



NCU 7x0:

This is the hardware card made with electronic components to form the core of the numerical control system with its interfaces to panels, networks and decentralized peripherals.

Embedded LINUX:

This is the lowest level operating system software, which forms the interface between the hardware components and the user software.

SINUMERIK Operate:

The SINUMERIK Operate interface is the software interface of the NC for the HMI functions and combines all the necessary controlling and programming functions in a single software package, regardless of the machining technology being used.

SINUMERIK INTEGRATE:

Sinumerik Integrate is a software package that consists of three main parts:

Communications IT (Integration IT, Manufacturing IT):

Which integrates the machine tool into the company processes: Engineering process, Production process, Maintenance process

HMI PRO SL:

is a configuration software package with integrated graphics editor. It is used for setting the parameters of and configuring control masks, then loading them into the OP, MP or TP target hardware, diagnostics, etc.

OEM Application HMI/3GL:

Libraries are used for creation and configuration in the user dialogue interface, for functions specific to OEM, which are oriented toward the machine tool itself or toward the company.

4.20.1 Programming and Configuration Software

Use of the following programming and configuration software is authorized:

Use of the Software	Designation of the Software	Version
PLC programming	SIMATIC STEP 7	V5.5
For Profisafe on Networks and decentralized periphery	SIMATIC S7 Distributed Safety	V5.4
The F-Configuration tool is part of S7-Distributed Safety and S7 F-Systems. It provides you with the failsafe modules for Step 7 V5 Hardware Config.	S7 Configuration Pack For an updated version, use following link https://support.industry.siemens.com/cs/document/15208817/download-of-the-f-configuration-pack?dti=0&lc=en-WW	V5.5 SP12
Programming of Simatic HMI panels	Simatic WinCC TIA Portal	V14
Operating system for Sinumerik 840D SL 1B	Sinumerik Operate	V4.7
Creation and execution of NCU interfaces.	SINUMERIK TRANSLINE HMI PRO RT and CS	V04.03.04
Settings and start of the NCU 840D SL 1B	SINUCOM NC SL et IBN Tool (alias Startup Tool) Note: Sinumerik Operate includes now the commissioning and the safety report generation	V7.7
Backup up of the memory CF Card and software utlity DIFF for read and compare of NCU/PL/Drives archives ,	Create MyConfig	V4.7
Settings for the drives	SINAMICS Starter	V4.4 SP1

Notes

6 Architectures

The automation architectures are defined in chapter 6 "Example of architectures" from the Solution for Powertrain TRANSLINE standard project specifications:
https://workplace.automation.siemens.com/extranet/solutions-powertrain/manual/

6.1 SAM

(Resources improvement system = Système d'Amélioration des Moyens)
The SAM is a RENAULT tool that is used to identify production losses.

6.1.1 Connections with SAM

Refer to the architectures to find out how to implement the hardware that is necessary for SAM deployment.

	Architecture with Peripherals on Profibus	Architecture with Peripherals on Profinet
NC	Connection Port X130 of the NCU (See Chapter 6.4.1)	Connection Port X130 of the NCU (See Chapter 6.4.2)
PLC	PN interface of the CPU (See Chapter 6.4.3.1).	Interface of the CP343-1 Lean coupler (See Chapter 6.4.3.2).

6.1.2 Implementing preparations

On the software side, RENAULT provides equipment suppliers with functional blocks (FB) and the associated documentation to facilitate implementation. Please contact your RENAULT project correspondent for more information

6.2 NCU unit / CN gate, 840D solution line

6.2.1 PROFINET configuration with OP + TCU and switch

In a configuration with TCU and Switch, the factory network connection is established via the integrated Ethernet X130 interface of the NCU.

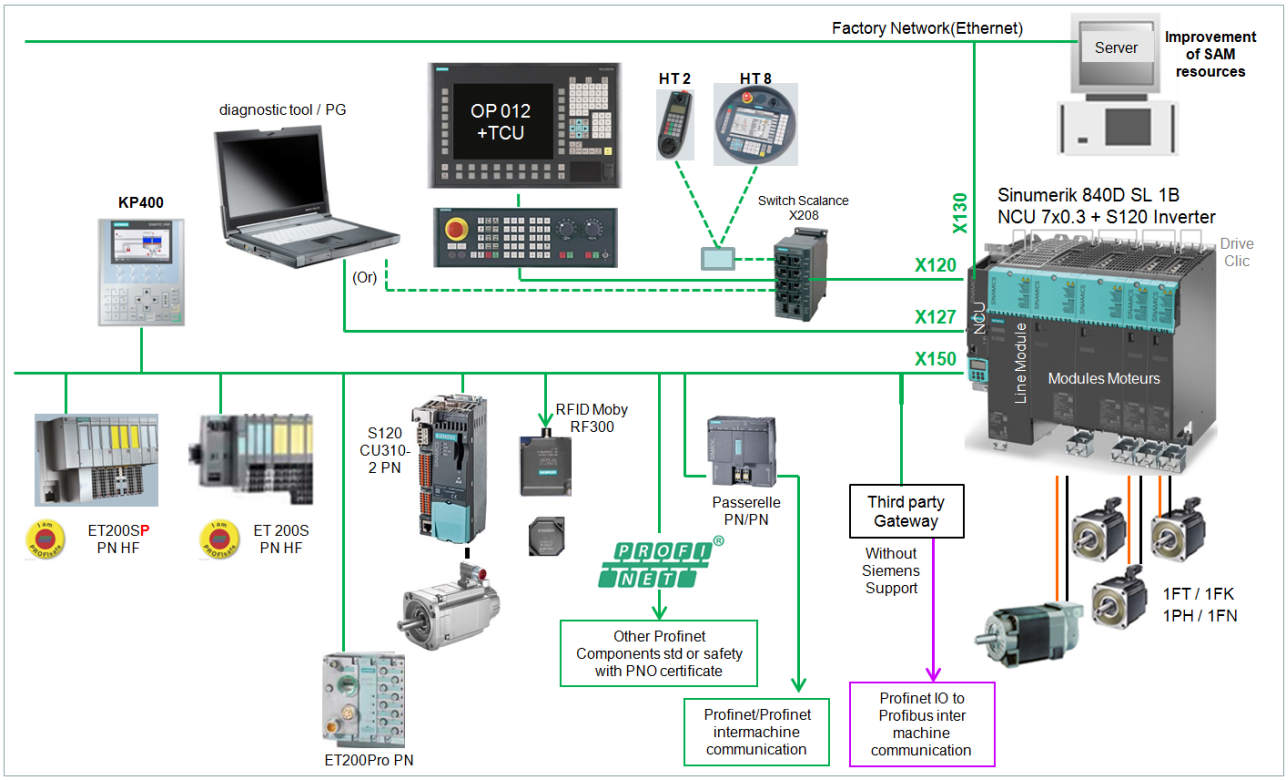


Figure 0-7 : CN solution line basic machine, Configuration with OP +TCU and PROFINET Switch

Configuration with OP + TCU and switch	
Human-Machine Interface	
Operator panel	OP08T (as an additional screen only), OP 012 (recommended)
Mobile panel	HT2 or HT 8
Machine control panel	MPP 483, MCP483
Products	Sinumerik Operate TRANSLINE HMI PRO RT
NC	SINUMERIK 840D SL 1B
PLC	Integrated UC of the SINUMERIK 840D SL 1B
NCU communications:	
To the switch	Ethernet port X120 of the NCU
To the factory network	Ethernet port X130 of the NCU
To the IO Profinet periphery	Port X150 of the NCU
To the IO Profibus periphery	Port X126 of the NCU
To the programming and diagnostics console	➢ Ethernet port X127 live on NCU ➢ Or on the switch via the network
Profibus between machines	DP/DP gateway:
Profinet between machines	PN/PN gateway:
Profinet/Profibus inter-machine	Third party gateways; no Siemens support, see Renault Standard EB03-C0-613 list.
Inter-machine to other networks	Consult the Project Manager
Drive	SINAMICS S120 motion control
Engines	SINAMICS 1FT7 / 1FK7 / 1FN3 / 1PH8

6.2.2 PLC Machine, Single Positioning Unit

6.2.2.1 PROFINET architecture

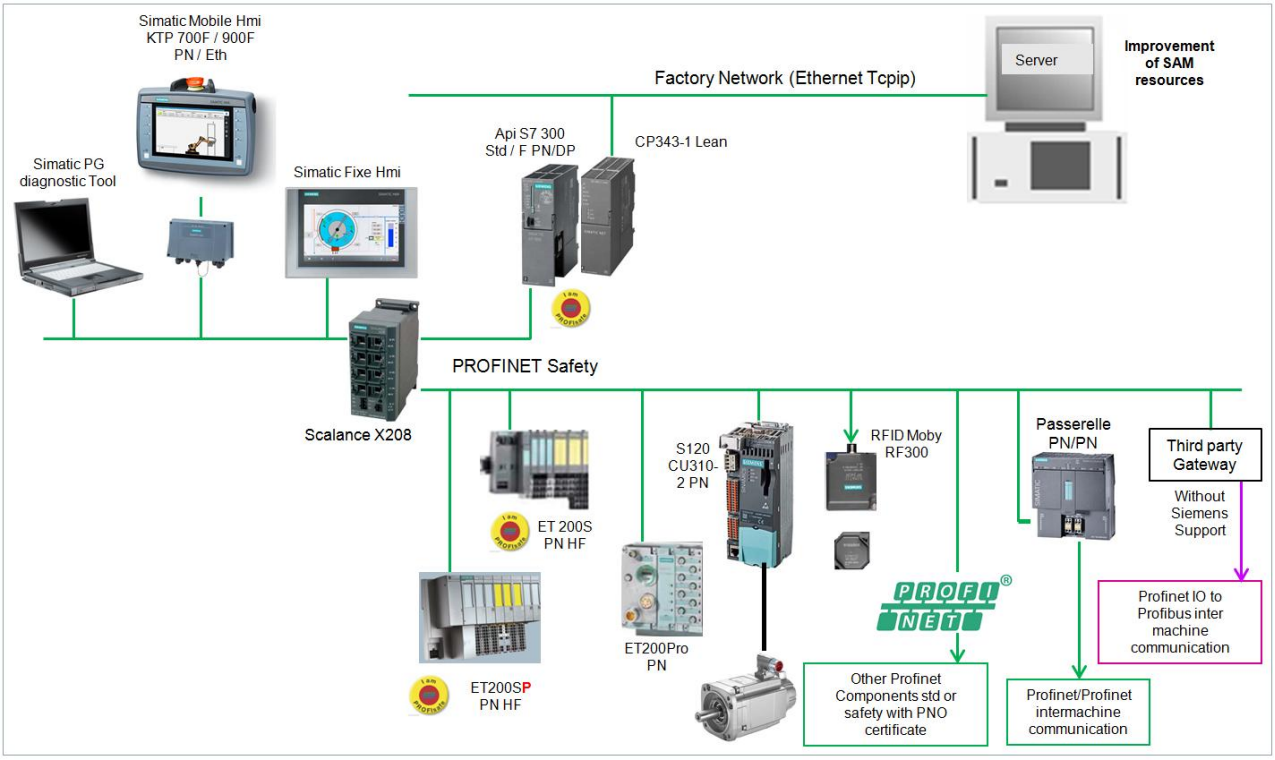


Figure 0-8 Machine base API, Configuration with Panel + PROFINET

Human-Machine Interface	
Mobile panel	Mobile panel KTP 700F / 900F PN/Eth
Fixed operator panel	Simatic KP 400 Comfort / TP700 Comfort / TP 900 Comfort / TP 1200 Comfort; Simatic KTP400 Basic PN, Simatic KTP700 Basic DP/PN, KTP900 Basic PN, KTP1200 Basic DP/PN
Software	WinCC application **TIA Portal**
PLC	CPU 315-2 PN/DP: 384 Kb CPU 317-2 PN/DP: 1024 Kb CPU 317 F-2 PN/DP
Communications	
With factory network Towards periphery and operation components Profinet between machines To Profibus network To a network other than Profibus	CP43-1 Lean coupler Profinet via scalance X208 PN/PN gateway: For using third party gateways with no Siemens support, see Renault Standard EB03-C0-613. Consult the Project Manager
Decentralized peripheral	ET200 S or Pro (Standard or HF, depending on the version) This means all Profinet decentralized peripherals released in accordance with the list of components.
RFID	RF300
Drive	SINAMICS S120 motion control + CU 310-2 or CU 320-2 for multi-axles
Engines	SINAMICS 1FK7 / 1FT7

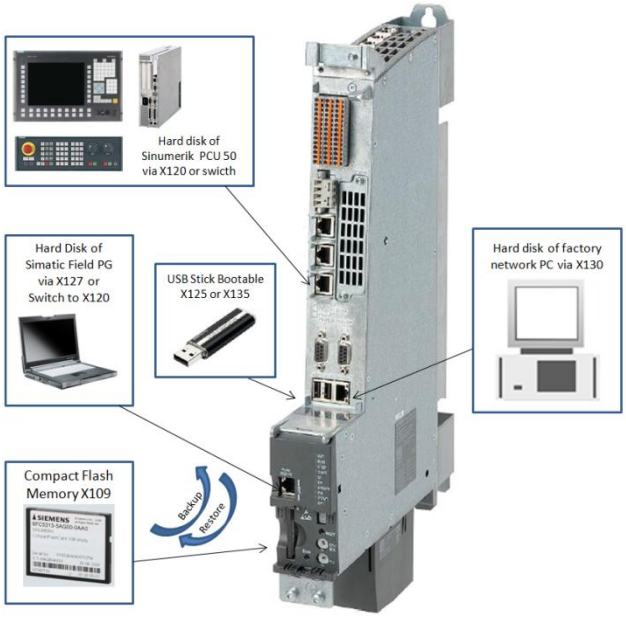
6.3 Safeguards with EBS (**E**mergency **B**oot **S**ystem)

Note :
There will be a checking of the EBS (Emergency Boot System) at end of commissioning (ATFMR)

The creation of an Emergency Boot System (EBS) allows the user to restore easily the datas of an NCU from a bootable USB Stick to the compact flash memory card in case of unawaited data loss or NCU replacement.

- With a **TCU**, the Software EBS (**E**mergency **B**oot **S**ystem) is available on CD.
- With a **PCU**, the EBS files are available on the hard disk of the PCU Itself.
- With following files:
  - A executable file INSTALLDISK.EXE
  - A ghost file for USB Flashdrive **6ES7648-0DC50-0AA0**.
  - A Text file with the most actual informations

There are two options to store backup datas:
- Data storage on a bootable USB FlashDrive **6ES7648-0DC50-0AA0**
- Data storage on a network drive. The Drive can be:
  - On a Simatic Field PG connected to X127 or with switch X208 to X120
  - On a PCU50 connected to X120 with or without switch X208
  - On factory PC connected to X130



In addition to a complete backup of the CF card, it is now also possible to list individual files (and directories) to be backed up in a file called "*files_to_save.txt*".

More informations are available in the Commissioning Manual, 03/2013, 6FC5397-1DP40-3BA1, NCU operating system (IM7) §3 page 59 or 855/1102 of the pdf file or Renault Specific document available on the extranet.

7 Software Guide

7.1 Programming languages

Notes on using the programming languages:

Use of languages S7-Higraph, CFC, C and C++ is not authorized. Use of language LIST is only authorized if the LADDER languages cannot be used.

If the sequence is programmed in LADDER, it must not be in SET/RESET (the pseudo GRAFCET is not authorized).

The equipment suppliers must refer to the Solutions for Powertrain TRANSLINE standard project specifications of Siemens.

Note on programming of CPU S7 and NCU 840D:

CPU SIMATIC S7 and NCU SINUMERIK 840D must be programmed with a memory reserve of 20% for CPU S7 and 30% for NCU 840D.

Programming measures to handle errors.
OB for reaction to errors

When the CPU detects errors in program execution (synchronous or asynchronous errors), it calls the error OB corresponding to the error detected. :
In the absence of the corresponding OB, the CPU switches to "Stop" mode (STOP).
You can design programs to respond to different types of error and determine the behavior of the CPU to minimize or suppress possible consequences of an error on the machine process and to record the diagnosis of the cause of the stop.

Use of OB85 and OB121 is forbidden.

Refer to SIMATIC manuals or the on-line help for STEP 7

7.2 General Software Guide

The Solutions for Powertrain TRANSLINE general software guide is proposed as an aid for structuring programs mainly for equipment suppliers entering into the environment of Siemens hardware and software for the first time.

The paragraphs dealing with S7-PDiag and S7-Higraph are not relevant for Powertrain projects RENAULT.

Notes:

8 Control, Visualization, Diagnostic

8.1 Human-Machine Interface for OP012

In order to guarantee homogeneity of the production lines, the human-machine interface for OP012 panels must be developed with HMI PRO CS.

The application TRANSLINE HMI PRO is recommended.

It is a library of HMI Pro RT pages and a configuration software HMI Pro CS which allows the user to select and configure standard HMI pages according to his application.

Sequencing of the visualization masks must respect the requirements of RENAULT.

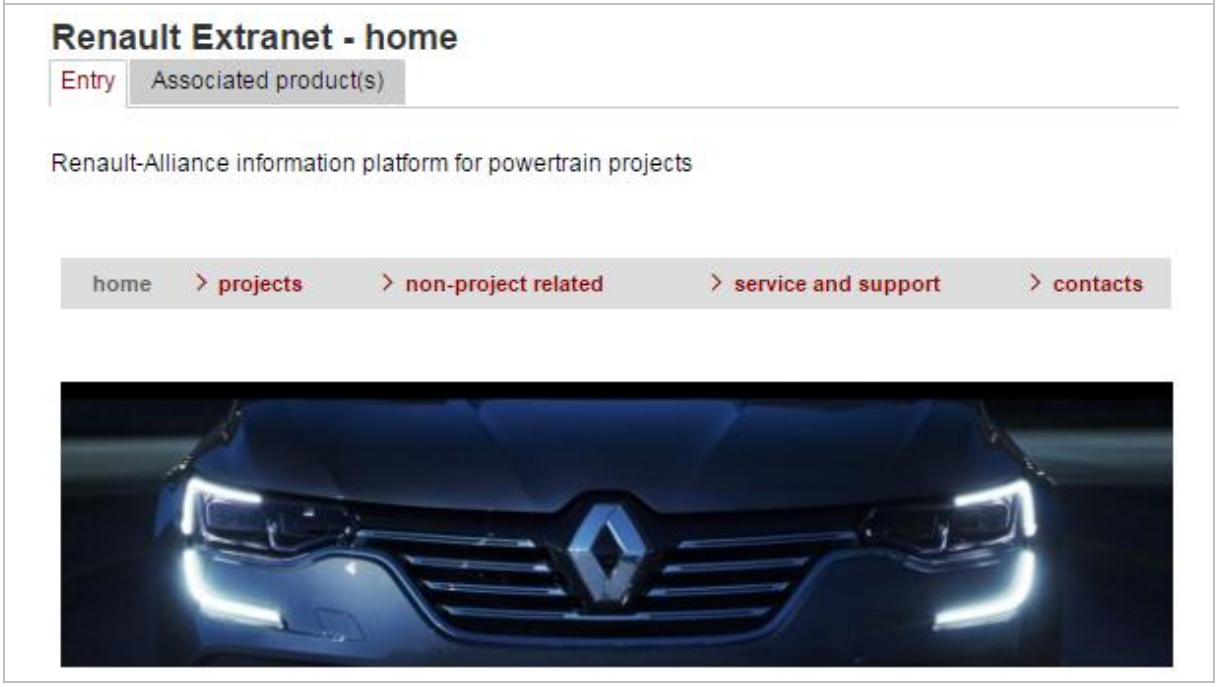
The corresponding HMI PRO projects are available on the Extranet site

https://support.industry.siemens.com/cs/document/109736537/renault-extranet-home?dti=0&lc=en-WW/ or on the project master DVD

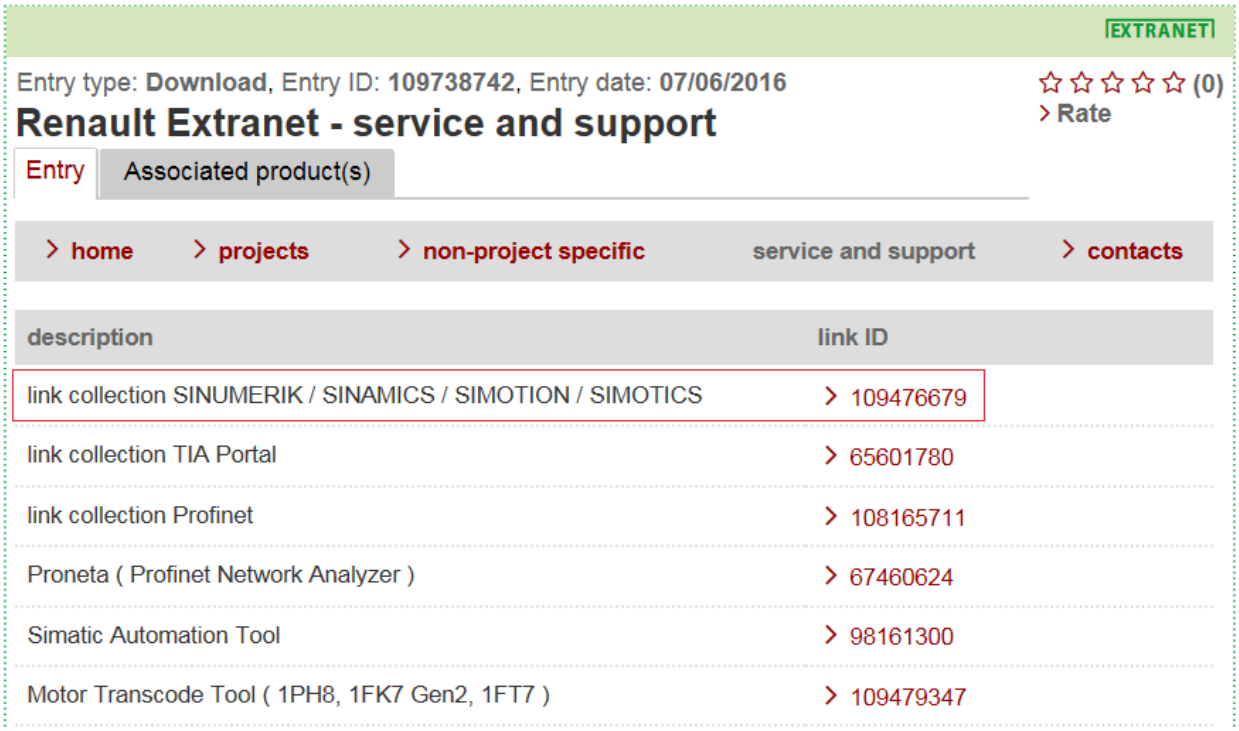
Unused masks must be deactivated and withdrawn from the mask sequencing configurator.

→ See Annexe, HTML link below: **Ctrl + Click**

Access the Renault extranet site at:
https://support.industry.siemens.com/cs/document/109736537/renault-extranet-home?dti=0&lc=en-WW/ and click "Projects"

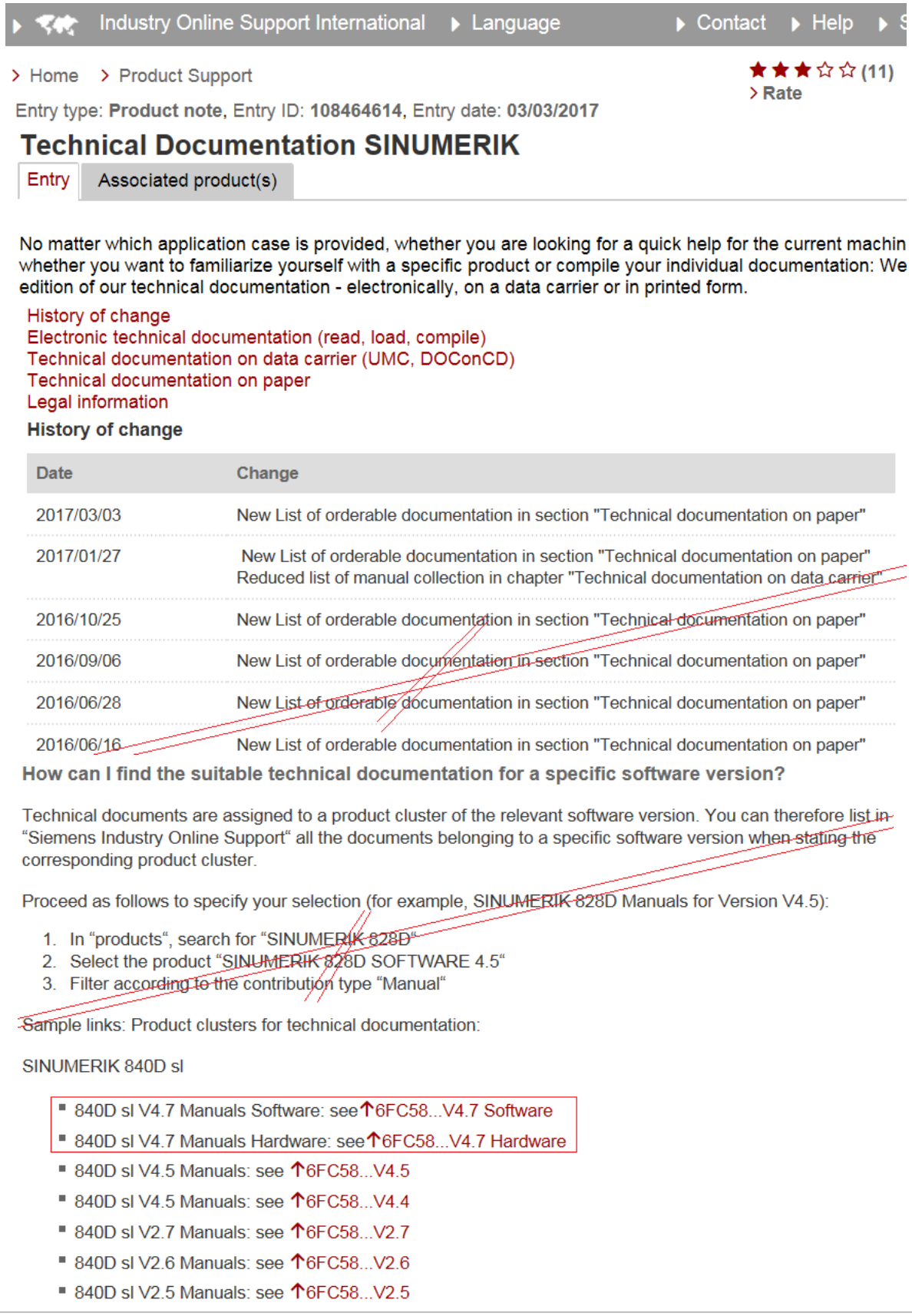


Clic on “Service And Support” then “Link Collection Sinumerik”



Clic on „SINUMERIK“

Then click Section 8.1 "Description of Functions"



Industry Online Support International | Language | Contact | Help

Home > Product Support

(11) > Rate

Entry type: **Product note**, Entry ID: **108464614**, Entry date: **03/03/2017**

Technical Documentation SINUMERIK

Entry | Associated product(s)

No matter which application case is provided, whether you are looking for a quick help for the current machin whether you want to familiarize yourself with a specific product or compile your individual documentation: We edition of our technical documentation - electronically, on a data carrier or in printed form.

History of change
Electronic technical documentation (read, load, compile)
Technical documentation on data carrier (UMC, DOConCD)
Technical documentation on paper
Legal information

History of change

Date	Change
2017/03/03	New List of orderable documentation in section "Technical documentation on paper"
2017/01/27	New List of orderable documentation in section "Technical documentation on paper" Reduced list of manual collection in chapter "Technical documentation on data carrier"
2016/10/25	New List of orderable documentation in section "Technical documentation on paper"
2016/09/06	New List of orderable documentation in section "Technical documentation on paper"
2016/06/28	New List of orderable documentation in section "Technical documentation on paper"
2016/06/16	New List of orderable documentation in section "Technical documentation on paper"

How can I find the suitable technical documentation for a specific software version?

Technical documents are assigned to a product cluster of the relevant software version. You can therefore list in "Siemens Industry Online Support" all the documents belonging to a specific software version when stating the corresponding product cluster.

Proceed as follows to specify your selection (for example, SINUMERIK 828D Manuals for Version V4.5):

1. In "products", search for "SINUMERIK 828D"
2. Select the product "SINUMERIK 828D SOFTWARE 4.5"
3. Filter according to the contribution type "Manual"

Sample links: Product clusters for technical documentation:

SINUMERIK 840D sl

- 840D sl V4.7 Manuals Software: see ↑6FC58...V4.7 Software
- 840D sl V4.7 Manuals Hardware: see ↑6FC58...V4.7 Hardware
- 840D sl V4.5 Manuals: see ↑6FC58...V4.5
- 840D sl V4.5 Manuals: see ↑6FC58...V4.4
- 840D sl V2.7 Manuals: see ↑6FC58...V2.7
- 840D sl V2.6 Manuals: see ↑6FC58...V2.6
- 840D sl V2.5 Manuals: see ↑6FC58...V2.5

You now have access to the documentation in PDF format

Mask sequencing is available in the form of a PowerPoint presentation with all the masks used on the project DVD (or on the Extranet).

Note:

If, in relation to the machine, other masks or applications must be implemented, you must insert the masks in the menu level corresponding to the function. For example, masks which complement the tool management must be positioned under "Tools"'.

Notes

9 Control, Visualization, Diagnostic

The hardware and software specified in the list of references that is attached to theses project specifications are the only items authorized for implementation by the equipment suppliers.

As an exception, if the approved hardware proves to be unsuitable for the specific needs of a process, a duly justified and calculated derogation request must have been submitted to the RENAULT coordinator during the study phase of the project

Architectures based on TCU and Profinet Network are the reference for these projects.

Architectures with TCU and profibus or with PCU on network Profibus or Profinet can be made with a derogation with arguments and calculations.

Architectures under derogations and accepted are object of a separate document.

		A

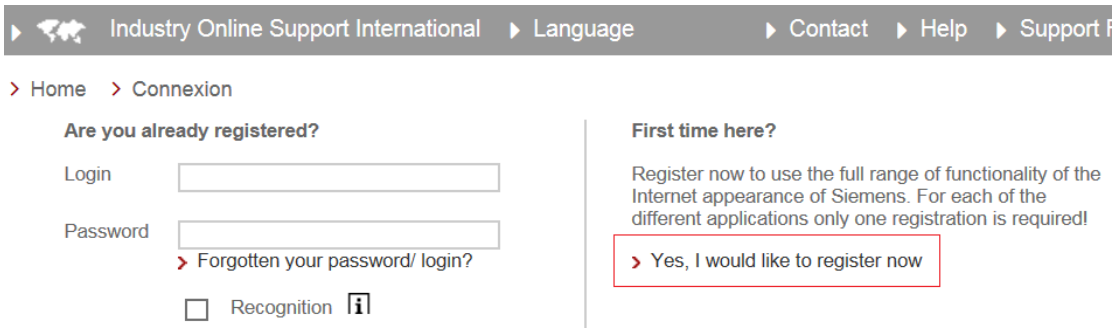
A. Annexes

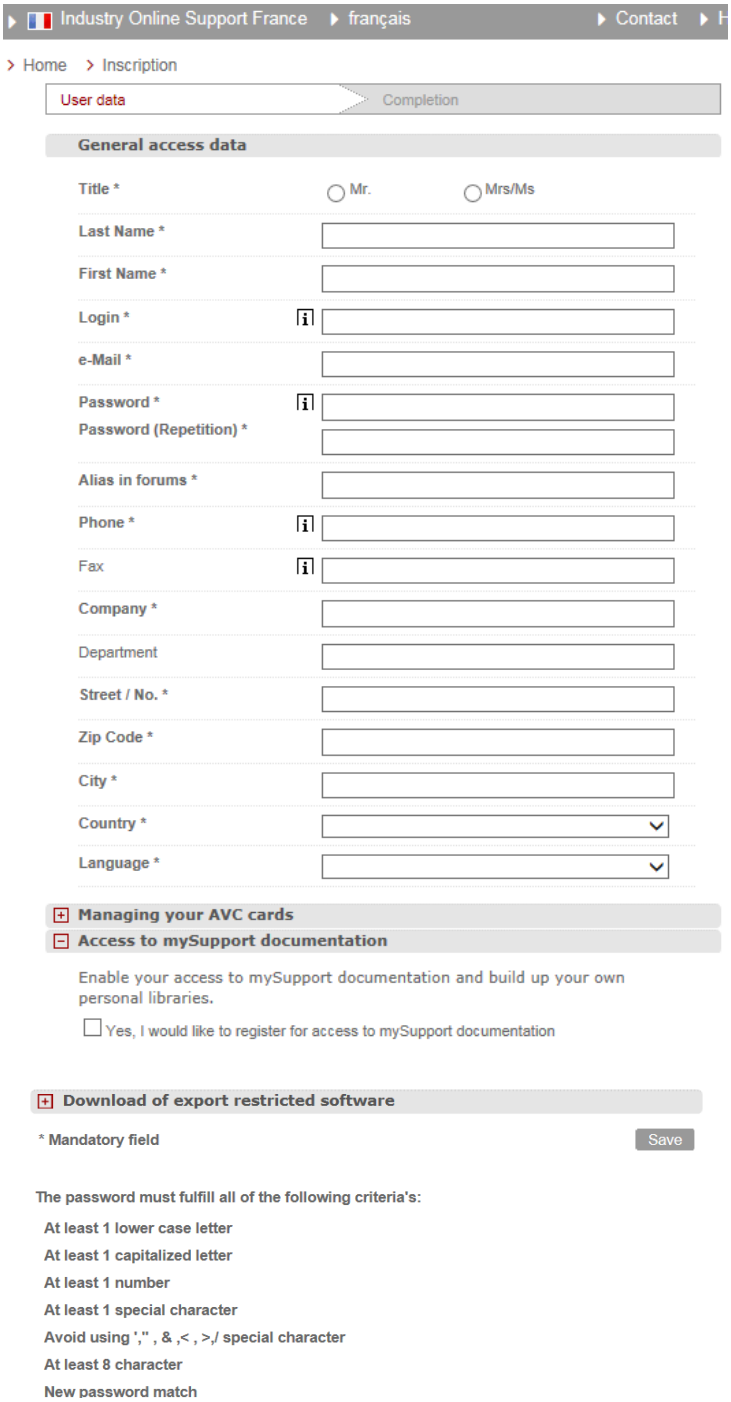
A.1 Login/Password Request to the Extranet

The Login/password request to the extranet is obtained:

- With a form that fully identifies the requester (Name, Surname, Company, geographic address, mail address, Fix and mobile phone number as well as the wished Login and password text.
- A contract precises the rules of use.
- Both informed documents, signed and scanned must be sent to Mrs MITROI Liliana (Mail = liliana.mitroi@siemens.com), copie to Markus Peine and Edouard Schweda.

You also have the possibility to request in line login and password




Industry Online Support France
français
Contact
Home
Inscription
User data
Completion
General access data
Title *
Mr.
Mrs/Ms
Last Name *
First Name *
Login *
e-Mail *
Password *
Password (Repetition) *
Alias in forums *
Phone *
Fax
Company *
Department
Street / No. *
Zip Code *
City *
Country *
Language *
Managing your AVC cards
Access to mySupport documentation
Enable your access to mySupport documentation and build up your own personal libraries.
Yes, I would like to register for access to mySupport documentation
Download of export restricted software
* Mandatory field
Save
The password must fulfill all of the following criteria's:
At least 1 lower case letter
At least 1 capitalized letter
At least 1 number
At least 1 special character
Avoid using '," , & ,< , >,/ special character
At least 8 character
New password match

A.2 Abbreviations

CF	CompactFlash card: Memory card
CFS	Cluster File System
DCK	Direct Control Keys: Direct control keys
DCP	Discovery and Basic Configuration Protocol
DHCP	Dynamic Host Configuration Protocol: Dynamic assignment of an IP address and other configuration parameters on a computer in a network
DNS	Domain Name System: Conversion of domain names into IP addresses
EBS	Emergency Boot System
EKS	Electronic Key System: System to check the identity of a user (authentication system)
EUNA	End User Notification Administration
HMI	Human Machine Interface: Operator interface
IRT	Isochronous Realtime (Ethernet)
LLDP	Link Layer Discovery Protocol: multi-vendor Layer 2 Protocol defined in accordance with the IEEE-802.1AB standard, allows information to be exchanged between devices.
MAC	Media Access Control: The MAC address is a 48-bit Ethernet ID.
MCP	Machine Control Panel: Machine control panel
MPI	Multi-Point Interface: Multiple interface
MUI	Multilanguage User Interface
NAT	Network Address Translation
NCK	Numerical Control Kernel: NC kernel with block preparation, travel range, etc.
NCU	Numerical Control Unit: NCK hardware unit
NRT	Non-Realtime (Ethernet)
NTFS	New Technology File System
NTP	Network Time Protocol: Standard for synchronizing clocks in the entire network
NTPD	NTP Daemon: Utility that runs in the background and does not have to be started by the user.
PCU	PC Unit: Computer unit
PDEV	Physical device
PG	Programming device
PLC	Programmable Logic Control: Programmable logic controller
RAM	Random Access Memory: Program memory which can be read and written into
RDY	Ready: The system is ready to operate.
RFC	Remote Function Call
SNMP	Simple Network Management Protocol (network protocol for monitoring and controlling network elements such as routers, servers, switches, and printers from a central station).
SSD	Solid State Drive
SSH	Secure Shell: Protocol for an encrypted network connection with a remote device
TCU	Thin Client Unit
TFTP	Trivial File Transfer Protocol: Very simple data transmission protocol
UDP	User Datagram Protocol: NTP is mostly processed via UDP.
USB	Universal Serial Bus
UPS	Uninterruptible power supply
UTC	Universal Time, Coordinated: Coordinated Universal Time (previously: Greenwich Mean Time)
VNC	Virtual Network Computing

A.3 Glossary

Command tree

Several dialog boxes connected each to other.

Attribut

Features that assign to an object (dialogbox or variable) certain properties.

Software touchbar

Horizontal or vertical software buttons

Bloc

Reload unit for the settings file

Dialogbox

Image of the user interface

- Software buttons depending on the dialogbox
  - Software buttons bar opened with a new configured dialogbox
- Software buttons not depending from the dialogbox
  - The software buttons are not opened with the dialogbox. This means that the software buttons are configured by the predecessor dialogbox.

Swing field

List of values in the input or visualization field. Control with the Swingfield: the input must match one of the listed value.

Input or Visualisation field.

Also called IxO field: Used for display or input of values.

Decompilation

The input fields in the dialogboxes, with help of the program, allow to create parts of CN code in a piece program.

Editor

Ascii editor that allows to enter characters in a file and to execute them.

Event

Everything that triggers the execution of a method (input of characters, push on a command button, etc.

Configuration File

File containing the definitions and instructions relative to the dialogbox appearance end their functions.

Programm Management

Availability of dialogboxes for creation of machining program dialogboxes with very sensitive components.

Column Indexfinger

Number of the column in a table

Line Indexfinger

Number of the Line in a table

Code converter

The converter converts the code defined in the settings file in a dialogbox and triggers its execution.

Text of the software buttons

Text or images that are shown at the screen and associated to a software button.

Definition Line

Program element where are defined the variables and software buttons.

Method

Programmed execution triggered to an associated event.

Access level

Authorization schematic that allows a user can access in the user interface.

Parameters

Parameters are changeable elements in the program text and are substituted in the configuration file with other words/symbols.

Machine program

Machine tool program in NCU language that leads to axes movements and other specialized actions.

Property

Feature of an object (for example a variable)

PI Services

Function that executes a fixed NCU action. Pi services can be called by the PLC or a Hmi.

Simulation

Program execution but without axes movement.

Table

Internal table that allows to save in the memory datas in standard format inb order to access them with help of an index

Access Software buttons

Software buttons that starts the first created dialogbox.

Dedicated buttons

6 buttons on the OP10, OP10C and on the Sinumerik panels with dedicated buttons that triggeres directly a functional group. 2 other buttons can be parametrized as direct buttons.

PLC Hardware buttons

Hardware button,s are provided as programmable buttons through the AP with help of the HMI. The functions they start are parametrized. They are realized as buttons of the machine control panel or use signals of the PLC in the users program. They are also called “virtual buttons”.

Variable.

Designation of a memory location that can be showed on a screen with help of the dialogbox properties and that can be input or a result of calculations.

Auxiliary variable
Internal calculation variable witch for no propery can be associated an that appears not in the dialogbox.

User Variable
User defined variables in the CN machine program or in the data bloc.

CFS (Compressed File System)
A CFS (file extension ".cfs") is a compressed file system, similar to a zip file. It contains files and subdirectories that look like normal files on the controller at runtime. Files and directories contained in a CFS cannot be changed. They are decompressed at runtime as required.

Network interface
The network interface is an interface that enables network communication. These are the Ethernet interfaces on the NCU.

NFS (Network File System)
NFS is the most common protocol for remote file systems in the world of Unix, and is also available for Windows. NFS is closely based on the Unix privilege model – each time a file is accessed, a UID and GID are supplied which the server then uses to decide whether the operation is permitted. The server relies on the client to provide the correct IDs.

Remote File System
A file system that is contacted over the network. The files are physically located on another computer in the network (the "server"), but appear locally the same as all other files. Operations performed on these files are sent via the network to the server, instead of being executed directly on a local storage medium (such as a hard drive or CompactFlash Card).
As a server usually exports more than one file system, a name for the required file system must also be entered in addition to the name of the server.

SMB (Server Message Block)
SMB is the underlying protocol of MS Windows file systems (also known as drives, releases, shares, etc.). SMB connections are always active in the context of a specific user, who must be known to the server. Exported file systems have a name (release name), by which they can be addressed. The client does not need to know the concrete path on the server.

Subsystem
A subsystem is a CFS that not only contains a collection of files, but also executes a program, for example, at runtime. To do this, the CFS contains a script that is used to control the starting and stopping of this program.

For this reason, only administrators are permitted to set up NFS file systems, and NFS is usually only implemented in uniformly administrated environments. Exported file systems on the server are addressed directly on the server via their path.

VNC (Virtual Network Computing)
Virtual Network Computing is a software that displays the screen contents of a remote computer, with a running VNC server, on a local computer, with a running VNC viewer, and in return sends keyboard and mouse movements of the local computer to the remote computer.

A.4 Informations related to the document

General informations

- The Column “Observations” contains major letters that precise the nature of the editions published up to now

- Signification of the letters:
  - A = New document
  - B = new edition unchanged with the same reference number
  - C = iproved edition with new reference and date of publication

Edition		Observations
09/03/2017	**A**	New document
08/09/2017	**C**	Replacement of TCU20.2 by TCU30.3

Common Variables for the whole document

Designation	Value of the designation
Copyright	2017
Document	Project Book Generic
Customer	RENAULT
Site	PLANT: All Plants
Product / Project	PROJECT: All Projects
Edition	10/2017
Projet Manager Name	Markus PEINE
Project Mcanager Tel.	+49 (0) 9131 98 3993
Projet Manager Mail	markus.peine@siemens.com

A.5 Index of updates

Bookmarks	Equivalent texts
Rg_Group	RENAULT
Rg_Project	Project
Rg_Version_Document	10/2017
Rg_Version_Transline	2017
Rg_List_Hardware	EB03-C0-613
Rg_Lines	Name of the line

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Suggestions

Corrections

For Publication/Manual:

Solutions for Powertrain

RENAULT, PLANT: All Plants

PROJECT: All Projects

Project Book Generic

Project specific documentation

From

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Company/Dept.

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Manual

Editing 10/2017

Should you come across any printing errors when reading this publication, please notify us on this sheet. Suggestions for improvements are also welcome.

Suggestions and/or corrections