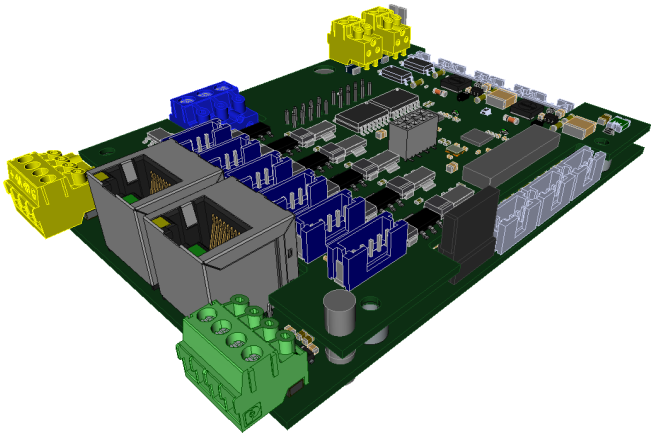
CONTROLLER

FEIG

TST RCCA-B / -C / -D

Interface module

Installation instructions



EN

IMPORTANT

Read the instructions carefully before use!

Keep instructions to hand!

DE

ACHTUNG! WICHTIGE SICHERHEITSANWEISUNGEN

Für die Sicherheit von Personen ist es wichtig, diesen Anweisungen Folge zu leisten.
Diese Anweisungen sind aufzubewahren.
Diese Anleitung finden Sie im Kundencenter unter https://www.feig.de/login/.
Bitte loggen Sie sich mit folgenden Zugangsdaten ein: Benutzername: Download / Passwort: feig

EN

ATTENTION! IMPORTANT SAFETY INFORMATION

These instructions must be observed to ensure personal safety.
Store these instructions safely.
These instructions are available from the customer center at https://www.feig.de/en/login/.
Please sign in with the following details: Username: Download / Password: feig

FR

ATTENTION ! IMPORTANTES INDICATIONS DE SÉCURITÉ

Pour la sécurité des personnes, il est important de respecter les consignes en question.
Les présentes consignes doivent être conservées en lieu sûr.
Les instructions sont téléchargeables dans le centre de clientèle de https://www.feig.de/en/login/.
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ES

¡ATENCIÓN! INDICACIONES IMPORTANTES DE SEGURIDAD

Para la seguridad de las personas es importante seguir estas indicaciones.
Deben guardarse estas indicaciones.
Puede encontrar estas instrucciones en el centro de atención al cliente en https://www.feig.de/en/login/.
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IT

ATTENZIONE! INDICAZIONI SULLA SICUREZZA IMPORTANTI

Per la sicurezza personale è importante attenersi scrupolosamente a queste indicazioni.
Queste indicazioni vanno conservate.
Le presenti istruzioni sono disponibili nell'area clienti del sito https://www.feig.de/en/login/.
Effettuare il login con i seguenti dati d'accesso: Username: Download / Password: feig

NL

LET OP! BELANGRIJKE VEILIGHEIDSINSTRUCTIES

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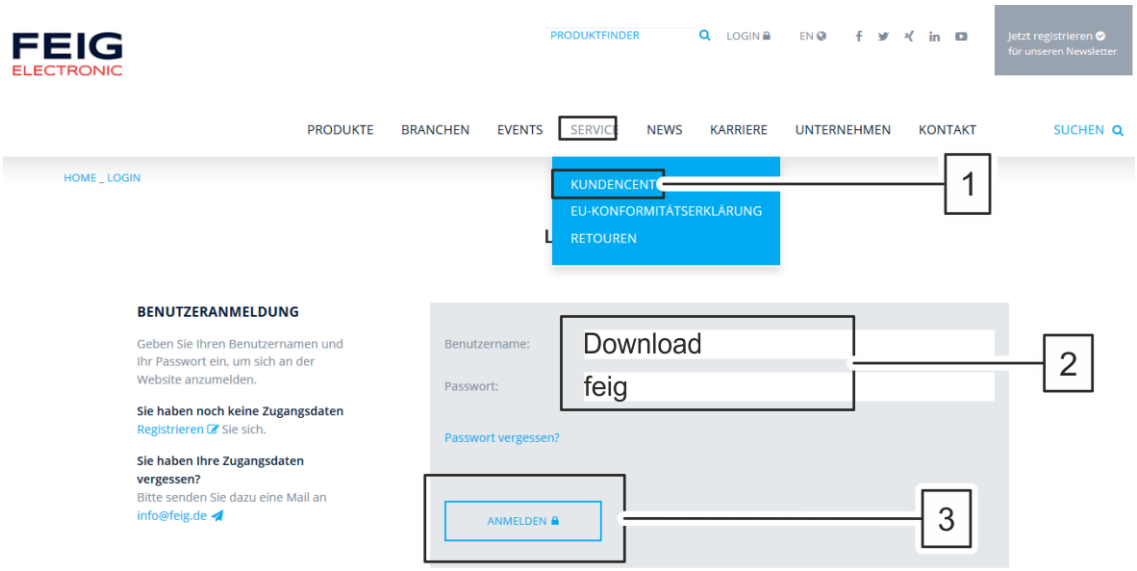
Deze aanwijzingen dienen bewaard te worden.
Deze handleiding kunt u vinden in het Customer Center op https://www.feig.de/en/login/.
Gelieve de volgende toegangsgegevens te gebruiken: Username: Download / Password: feig

DA

PAS PÅ! VIGTIGE SIKKERHEDSANVISNINGER

For sikkerheden af personer er det vigtigt at følge disse anvisninger.
Disse anvisninger skal opbeva-res.
Denne monteringsvejledning finder du i downloadområdet på https://www.feig.de/en/login/.
Log på med følgende adgangsdata: Username: Download / Password: feig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ANMELDEN
3

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2 General information

Contact details of the manufacturer

If you need spare parts or accessories or have technical questions, please contact our technical customer support.

FEIG ELECTRONIC GmbH
Industriestrasse 1A
35781 Weilburg
Germany

Website: www.feig.de
E-mail: info@feig.de
Phone: +49 (0) 6471 3109 – 0

This edition replaces all earlier versions.

The specifications in this document are subject to change without notice.

These installation instructions are a supplement to the installation instructions for a Feig Electronic door control for use with the TST RCCA communication module.

The installation instructions are specifically intended for the commissioning engineer of the FEIG ELECTRONIC GmbH door control. The installation, commissioning and maintenance of the protection device may only be performed by competent persons working in accordance with a safe working system and under the instructions of the distributor of the machine (in this case: of the door).

The completeness of the operating instructions of the complete machine (in this case: of the door) is the sole responsibility of the distributor of the machine. The installation instructions are to be composed in one of the official languages of the European Community accepted by the manufacturer of the machine in which this protection device is to be installed.

These installation instructions show only a small range of the operating functions and provide no warranty of properties. Further functions and descriptions of the individual door functions can be taken from the further descriptions.

The information in this document has been compiled to the best of our knowledge and belief. FEIG ELECTRONIC GmbH does not guarantee the correctness and completeness of the information in this document. In particular, FEIG ELECTRONIC GmbH cannot be held liable for consequential damages due to incorrect or incomplete information.

Since errors can never be completely avoided despite all efforts, we are always grateful for tips.

The installation specifications contained in this document assume favourable general conditions. FEIG ELECTRONIC GmbH does not provide any guarantee for the proper operation of the equipment in non-intended use.

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Only the direct contracting parties shall be entitled to warranty claims against FEIG ELECTRONIC GmbH; warranty claims are non-transferable. The warranty covers only products supplied by FEIG ELECTRONIC GmbH. Liability for the entire system is excluded.

The description of the products, their use, options and performance data do not constitute warranted characteristics and are subject to technical changes.

2.1 Document information

Draft instructions

All information is provisional.
The information is confidential and for internal use only!
Protection definition according to ISO 16016.

This document is valid for **TST RCCA-B / -C /** -D.

Product name: TST RCCA-B / -C / -D
Product type: Interface module
Fields of application: Control and diagnostics of industrial doors

Language of the original instructions and translations
All non-German versions of this document are translations of the original German .

Document type: Installation instructions
Document version: v1.0
Publication date: 05.12.2023

2.2 Supporting documents

No.	Document	Description
1	TST FUxx Vxx-xx-xx-EDIBFT	Parameter description of the door control
2	TST FUxx_installation_instructions-x	Installation instructions for the door control

2.3 Associated files

No.	Document	Description
1	GSDML-Vx.xx-FEIG-TST RCCA-x	Profinet device description file

2.4 Explanation of drawings

This section explains the illustrations, instructions and information contained in this document.

⚠ DANGER

Risk of death

Indicates an acute life-threatening danger for persons and gives instructions on how to avoid and prevent them.

⚠ WARNING

Risk of injury

Indicates a serious risk of injury to persons and gives instructions on how to avoid and prevent them.

⚠ CAUTION

Health risk

Indicates a possible risk of injury to persons and provides instructions on prevention and avoidance.

CAUTION

Damage to property

Indicates possible damage to property or gives instructions for device safety and function.

NOTE

Information

Provides useful information on the composition and use of the device or document.

Refers to an important document or instruction which needs to be read.

Outlines the specifications for product disposal.

Abb./Fig.	Figure
Tab.	Table
Door control (TST)	Door and barrier control with integrated frequency converter or reversing contactor for actuating or controlling a motor.
Qualified specialist	The qualified specialist has been informed concerning possible dangers in case of improper behaviour by working with electrical equipment. The qualified specialist is familiar with the necessary protective measures and devices. Furthermore, through the qualified specialists professional training and experience as well as its contemporary professional activity, the specialist has the necessary knowledge for testing work equipment.

3 Safety instructions

⚠ WARNING

Health hazard!

Disregarding the safety instructions can lead to health hazards.

When starting up and operating the control, the following important safety instructions as well as the installation and wiring information must be strictly observed.

Connection, testing and maintenance work

- Wiring, testing and maintenance work on an open control must only be performed when power has been turned off.
- All protection devices must be checked for proper functionality after they have been connected and adjusted.
- The setting of parameters, switching of bridges and connection of other controls shall only be carried out by qualified personnel.

Warning: Radio signal interference

This is a class A product according to DIN EN 55022. In a domestic environment, this product may cause radio interference. In this case, the operator may be required to take appropriate measures.

Caution: Electrostatic discharge (ESD)

This product contains electrostatically sensitive components. Electrostatic discharge can damage the product. The product may only be used in ESD protection zones in compliance with ESD protection measures.

3.1 End of Life

The maximum product life of the TST RCCA when operating properly within specifications and specified safety limits is 20 years.

Please observe the regulations for the disposal of electronic devices at the end of the product's service life.

3.2 Repair

Repair or modification of the TST RCCA unit is not permitted.

3.3 Target group

These operating instructions are directed especially at persons involved in commissioning the TST RCCA-B / -C / **-D** fieldbus communication module from FEIG ELECTRONIC GmbH.
Installation, commissioning and maintenance of the fieldbus communication module may only be carried out by personnel qualified for the respective task and in compliance with the relevant documentation for the respective task, in particular the safety and warning instructions contained therein. Qualified personnel, based on their training and experience, are able to recognise risks and avoid possible hazards when handling these systems.

3.4 Intended use

Interface module for communication between PLC control units and door controls is a Interface module for communication from FEIG ELECTRONIC GmbH. Its use must be restricted to the specifications contained in this manual.

Approved door controls
TST FU3F/FUF2

3.5 Incorrect use

Alterations to the device and the use of spare parts and additional devices not sold or recommended by the manufacturer of the device may result in injuries and damage resulting from electric shocks and fires. Such actions result in a disclaimer of liability and forfeiture of the warranty.

If third-party products and components are used, they must be recommended or approved by Feig Electronic GmbH.

Faultless and safe operation of the TST RCCA requires proper transport, storage, assembly, installation, commissioning, operation and maintenance. The permissible ambient conditions must be observed.

4 Product overview

4.1 Scope of delivery

Product	Interface module TST RCCA-B / -C / -D
Document	Installation instructions

Tab. 1: Scope of delivery

4.2 Labels

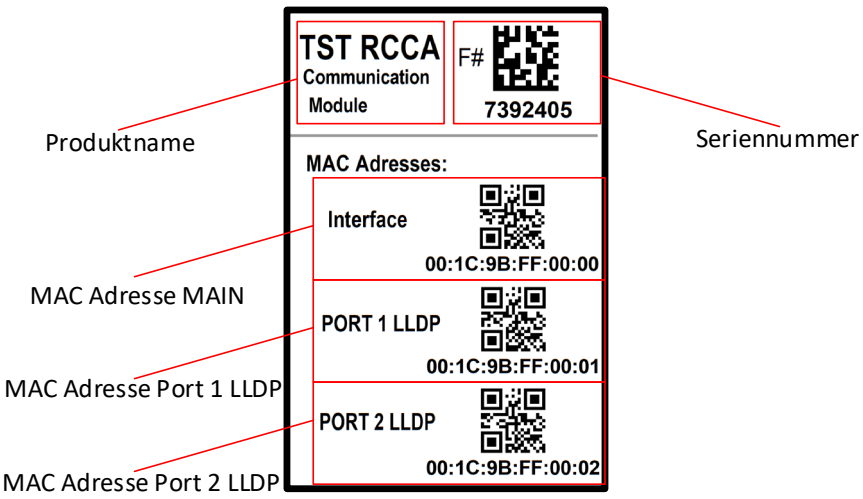


Figure 1: TST RCCA label

4.3 Type/article designation

Feature	TST RCCA-A	TST RCCA-B	TST RCCA-C	TST RCCA-D
Profinet	X	X	X	X
Profisafe		X	X	X
IO-Link			X	X
ProfiEnergy	X	X	X	X
AMR	X	X	X	X
Conformance Class: C	X	X	X	X
IRT (Switch)	X	X	X	X
SNMP	X	X	X	X
Topology detection	X	X	X	X
MRP	X	X	X	X
TCP/RT	X	X	X	X
Ethernet/RJ45	2	2	2	2
100 Mbit	X	X	X	X
CAN out	X	X	X	X
External supply	X	X	X	X
Door control supply	X			
LEDs NW module	X	X	X	X
LEDs Safety Module		X	X	X
Safety Module		X	X	X
Move commands via Profisafe		X	X	X
Move commands via Profinet	X			
MAC Main	X	X	X	X
Mac Ethernet Port 1	X	X	X	X
Mac Ethernet Port 2	X	X	X	X
Safe output		X	X	X
Safe inputs		3	3	6
Nonsafe inputs	6	6	6	6
IO-Link Ports			4	4
IO-Link Ports as DI			8	8
IO-Link Ports as DO			8	8
Door control FW update	X	X	X	X
Door control parameter update	X	X	X	X
Door control read parameters	X	X	X	X
Door control read diagnostics	X	X	X	X
TST RCCA FW Update	X	X	X	X
TST RCCA Bootloader Update	X	X	X	X
NTP time	X	X	X	X
Device exchange (with iPar server)	X	X	X	X
SMITCP tunnel on RS485 bus	X	X	X	X
UDP device search	X	X	X	X
F-CRC Tool		X	X	X
TST RCCA Tool Light	X	X	X	X

5 Product description

5.1 System environment

Doors are part of automatic processes and should be monitored and controlled by a cross-process control system.

One application is the operator safety door. The vertically moving keypad rolling doors are used as a separating guard for safe protection against dangerous machinery.

Operator safety doors are equipped with safe sensors (e.g. Cat. 4, PL "e", SIL 3) that monitor whether the safety door is closed or whether people are standing behind it on the side of the dangerous machine.

The sensor information is transmitted to a higher-level process control (PLC with F module). Depending on the feedback, this starts the safety-critical process behind the closed door.

From the perspective of the higher-level process control, it may also be necessary for all movements in the manufacturing process to be safely stopped and secured against restarting. This also includes the moving door leaf. For this purpose, the door control is equipped with a safe input via which the door drive can be stopped safely.

In order to bundle the functions for a door, the door control is extended by a communication module through which the local inputs and outputs and the data interface to the door control converge and are converted to a PROFINET interface. This interface represents the connection to the higher-level PLC.

CAUTION

The following features are only possible when using the variants TST RCCA-B / -C / -D

The safe inputs are used to connect the safe sensors with two-channel OSSD or two-channel safe buttons or switches at the door.

The safe contact is used to connect the safe Estop chain of the door control. If the two-channel contact to the door control is interrupted, the door drive is stopped safely

The input and output information is communicated securely via the PROFIsafe protocol to the connected PROFINET stations.

The PROFIsafe address of the safety module is set via a ten-way DIP switch on the module.

The safety module can be configured via the connected PLC. This configuration is secured via an F-CRC.

5.2 System design and functional description

For the "operator safety door" application, the FEIG door control with the associated fieldbus communication module **TST RCCA-B / -C /** -D is installed in an application-specific control cabinet.

The TST RCCA module is equipped with a PROFINET interface and an IRT switch for connecting additional PN devices. In addition, the TST RCCA is connected to the door control via an internal interface. This enables the following interactions between the PLC and the door control:

- Initiating or stopping movement of the door.
- Providing status and setup information of the door control and the directly connected door sensors (e.g. light curtain, rotary encoder, etc.).
- Importing and exporting password-protected parameter sets, e.g. for simple replacement of defective devices and to execute software updates.

TST RCCA includes a safety module with six secure inputs and one secure output/contact.

5.3 System overview

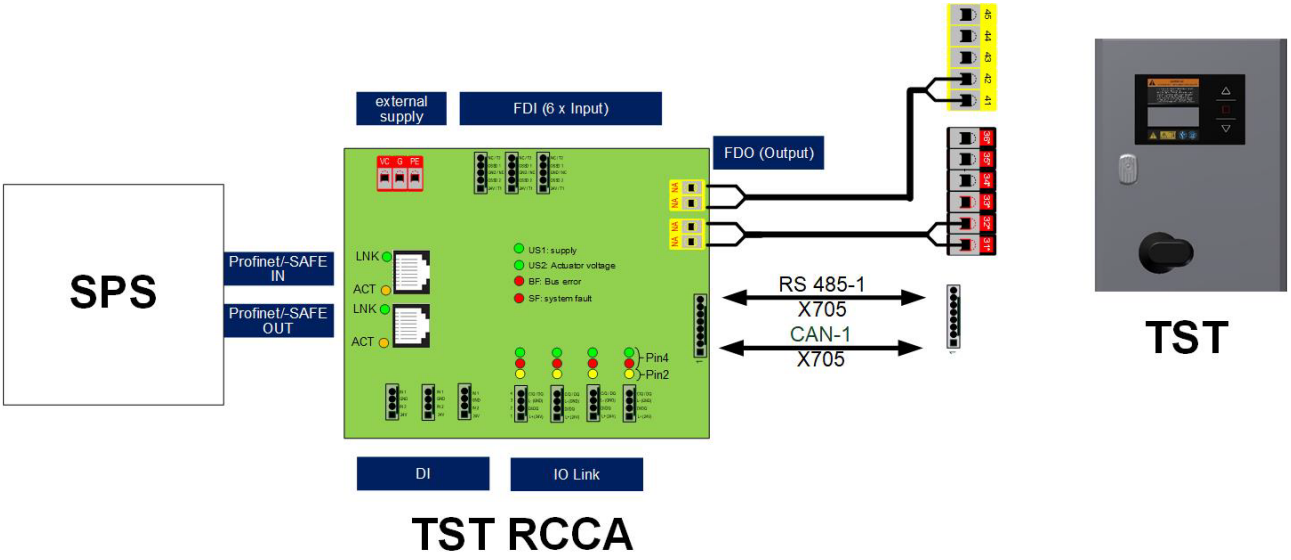


Figure 2: Schematic of a door system with TST RCCA module

5.4 Further product features

In addition to the safety module and the connection to the door control, the TST fieldbus communication module also has other interfaces and functions.

Up to four IO-Link devices (e.g. a configurable traffic light or sensor) can be connected via an IO-Link master. An IO-Link gateway converts the IO-Link interfaces to PROFINET.

Any subscribers with 24 VDC switching output can be connected to the six digital inputs. Their signals are also converted to PROFINET.

LEDs in specific arrangements and colours signal the operating status of the module.

The practical integration of the TST RCCA module into a PLC sequence is done via the device-specific GSD file, in which the properties of the module are described.

The TST RCCA module is supplied via an external 24 VDC connection.

The 24 VDC supply to the devices on the FDIs, DIs and IO-Link ports can be provided via the TST RCCA module.

In addition to the connections for the standard door application, such as mains connection and connection for the door sensors and drive, specific plug-in systems for 24 VDC input and output, PROFINET/Ethernet input and output, IO-Link, as well as safe and digital inputs are possible within the scope of FEIG control cabinet construction.

6 Assembly and electrical installation

6.1 Mounting on the printed circuit board

Connection example: To mount the TST RCCA module on the circuit board of the TST FUxF door control, screw bolts are mounted at the marked holes.

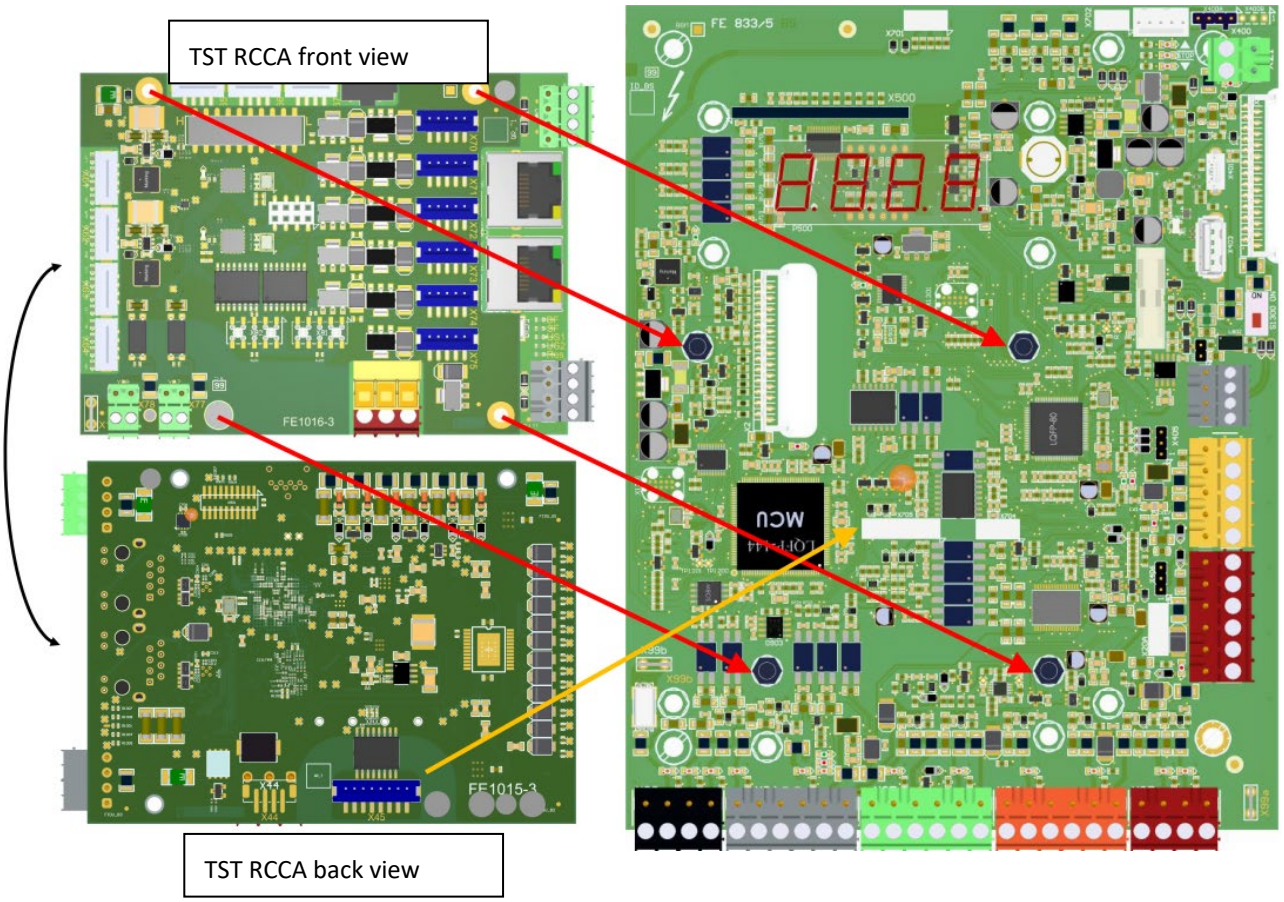


Figure 3: Mounting devices on the printed circuit board

6.2 Electrical connection

⚠ WARNING

Electrocution

Wiring must only ever be performed in voltage-free state.

For wiring in the vicinity of the door, it is essential to observe the installation instructions of the respective door control (e.g.: TST FUxF installation instructions).

6.3 Connection terminals on the TST RCCA

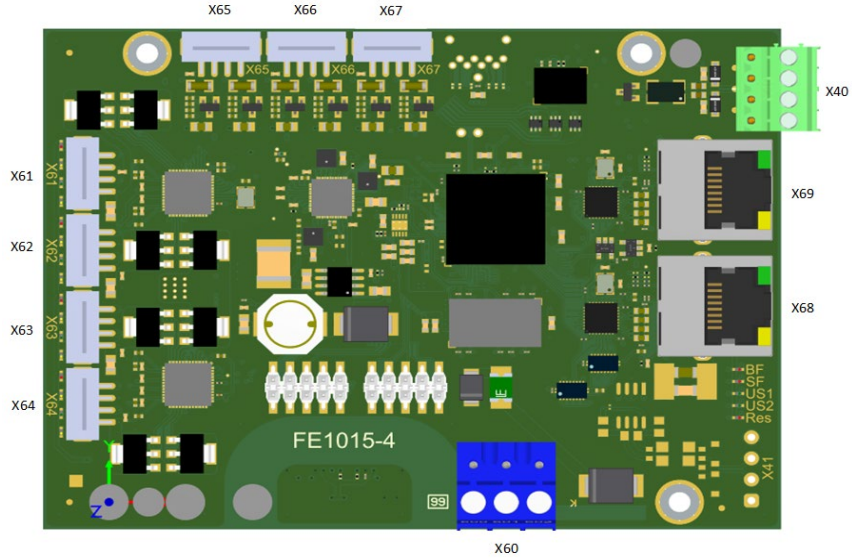


Figure 4: Terminal designations on the top of the network card

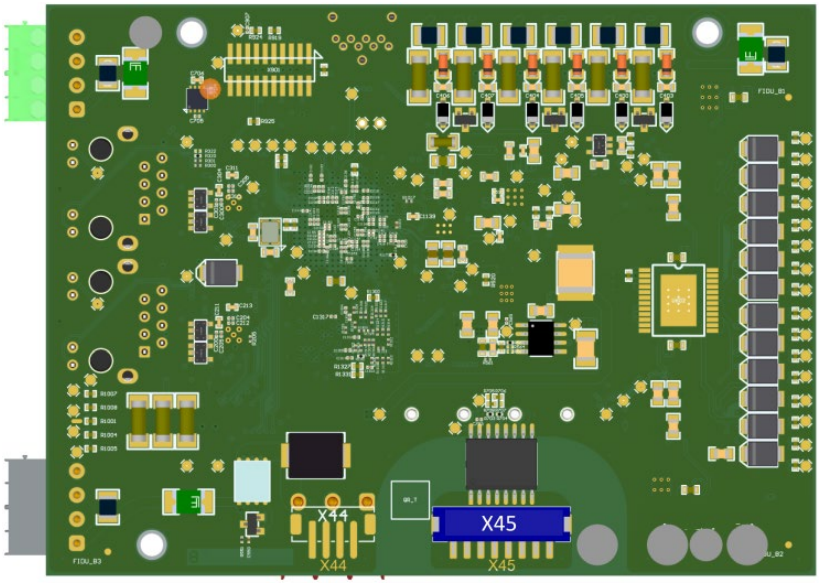


Figure 5: Terminal designations on the underside of the network card

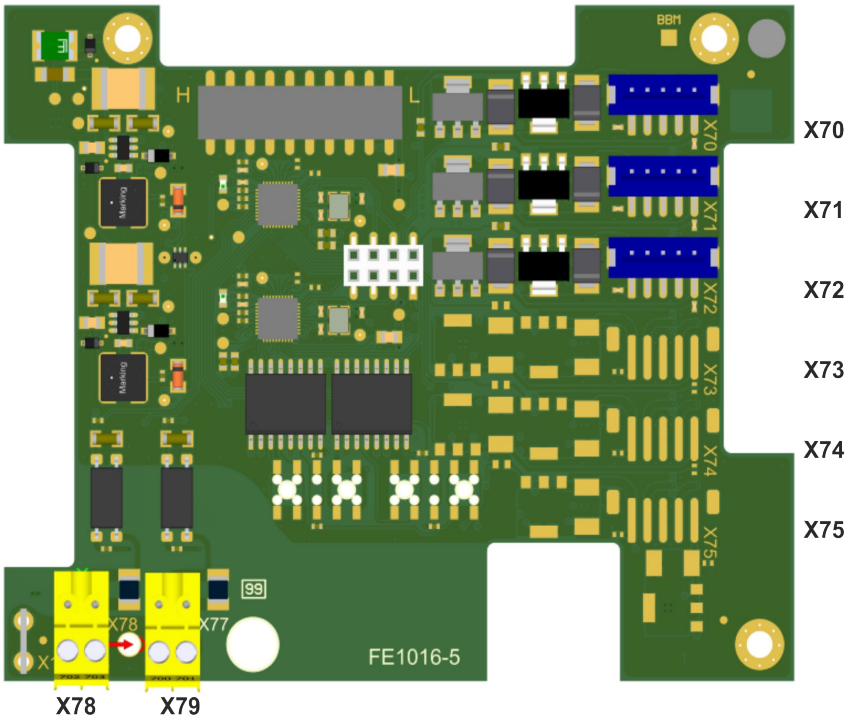


Figure 6:: Terminal designations on the top of the safety board for the variants TST RCCA B-C-D

6.4 Connection to the door control

See complete circuit diagram of the respective Feig door control, supporting documents no. 3.

6.4.1 Connection with the door control

The TST RCCA module is connected to the terminals of the Feig door control as follows:

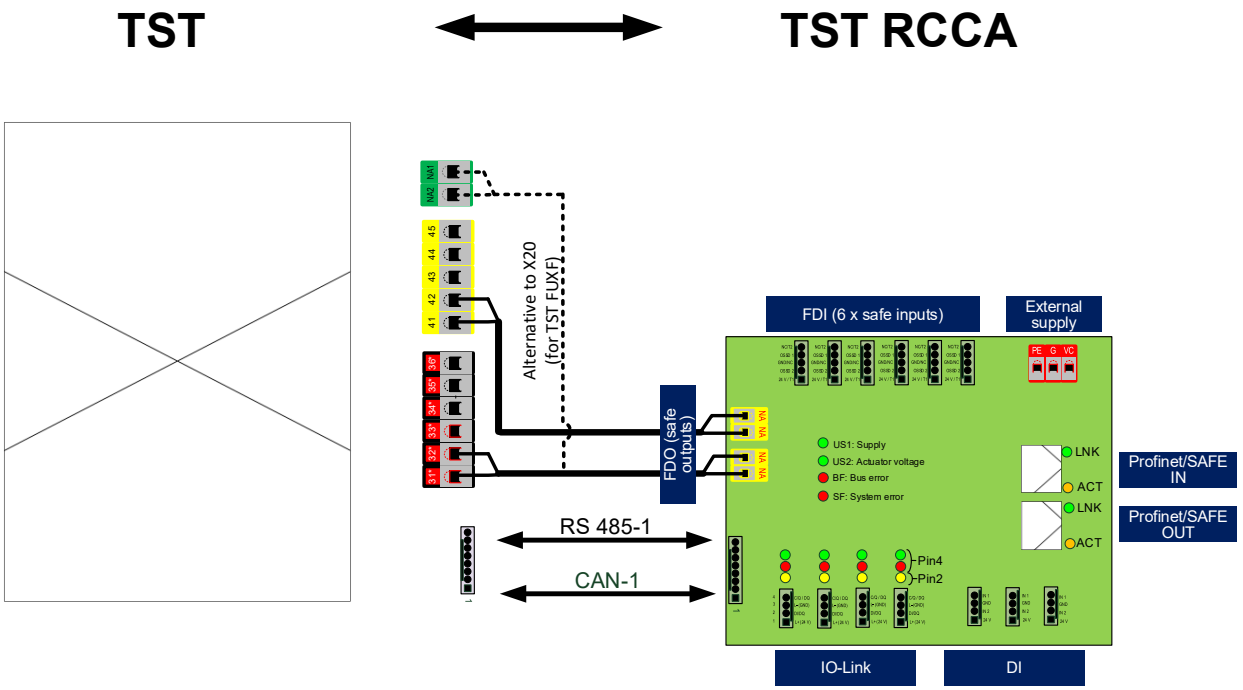


Figure 7: Connection of TST RCCA with Feig door control

6.4.2 Pin assignment of the connection terminals

The following table describes the function of the individual connection terminals of the TST RCCA:

Connector TST RCCA	Function	Feig door control terminal
X61	IO-Link 1	
X62	IO-Link 2	
X63	IO-Link 3	
X64	IO-Link 4	
X65	DI 1/2	
X66	DI 3/4	
X67	DI 5/6	
X68	ETH x	
X69	ETH x	

Connector TST RCCA	Function	Feig door control terminal
X70	FDI 1	
X71	FDI 2	
X72	FDI 3	
X73	FDI 4	
X74	FDI 5	
X75	FDI 6	
X60	T600 = PE T601 = GND T602 = 24 V	
X77	FDO – Emergency Stop door control	X22-41 X22-42
X78		X21-NA1 X21-NA2 Alternatively: X20-31* X20-32*
X45	Data interface to door control	X705
X40	Door control CAN interface	

7 Commissioning

7.1 Notes on commissioning

The installation instructions for the Feig door control used must be observed before commissioning.

To activate the TST RCCA communication module, set the door control parameter P.804 = 1 (cf. chapter Door control→ Parametrisation).

To integrate the door control into a PROFINET PLC as a PROFINET IO device, the supplied device description file (GSDML) must be used (cf. GSDML-V2.35-FEIG-TST RCCA-20200708.xml).

An active sensor connected to a semiconductor input must have the same GND reference as the TST RCCA.

CAUTION

The following features are only possible when using one of the variants TST RCCA-B / -C / **-D**

For clear identification of the TST RCCA module in a PROFINET network, the F-address of the TST RCCA safety module must be set to match the parametrisation of the higher-level control (PLC) (cf. chapter PROFIsafe→F address).

Two inputs must be defined as a two-channel safe input in order to obtain SIL 3,PL e Cat 4 without further processing of the individual input channels, at the PLC. If two identical sensors are connected to the two-channel inputs, one of the two must be connected to input 1, 3 or 5. The second must then be connected to input 2, 4 or 6. Additional measures to exclude wiring faults or the use of certified components are required.

7.2 Response times

7.2.1 Basics

Calculation of $SFRT$:

$$SFRT = TWCDT + \Delta T\_WD_{max}$$

$SFRT$	Safety Function Response Time The max. runtime for traversing the system assuming the most time-critical error occurs. That is, the max. response time of the system when the most time-critical error occurs in an element. (Elements are the input module, bus, PLC, bus and output module).
$TWCDT$	Total Worst Case Delay Time The max. runtime of a signal to traverse the system without error. This is the maximum response time of the system in the error-free case.
ΔT_WD_{max}	Delta Time to Worst Delay (maximum) The maximum additional delay time that can occur due to a single error. Related to an error in an element of a system.

Calculation of $TWCDT$:

$$TWCDT = \sum_{i=1}^{n} WCDT_i$$

Calculation of ΔT_WD_{max}:

$$\Delta T\_WD_{max} = \max_{i=1,2,..,n} (WDTime_i - WCDT_i)$$

$WDTime_i$	Watchdog Time The time taken between receipt of the last MNR (Monitoring Number) and the change to the safe state due to the watchdog.
$WCDT_i$	Worst Case Delay Time The max. delay time of an element of the safety system (e.g. input module, bus, PLC, bus, output module).

Determination of the $WDTime_i$:

Input module:	$WDTime_{Input} = OFDT_{Input}$
Bus_1:	$WDTime_{Bus1} = F\_WD\_Time_{Input} + WCDT_{Bus1} + Tcy_{F-Host}$
F-Host (PLC):	$WDTime_{F-Host} = OFDT_{F-Host}$
Bus_2:	$WDTime_{Bus2} = F\_WD\_Time_{Output} + WCDT_{Bus2} + DAT_{Output}$
Output module:	$WDTime_{Input} = OFDT_{Output}$

$OFDT_i$	One Fault Delay Time The delay time considering a worst case error.
$F\_WD\_Time_i$	F Parameter Watchdog Time The watchdog time set in the PLC for an input or output module.
Tcy_{F-Host}	Time Cycle F-Host (PLC) Cycle time of the PLC
DAT_i	Device Acknowledgement Time The time a Profisafe device needs to respond to a new frame (i.e. with a new monitoring number). (See figure 70)

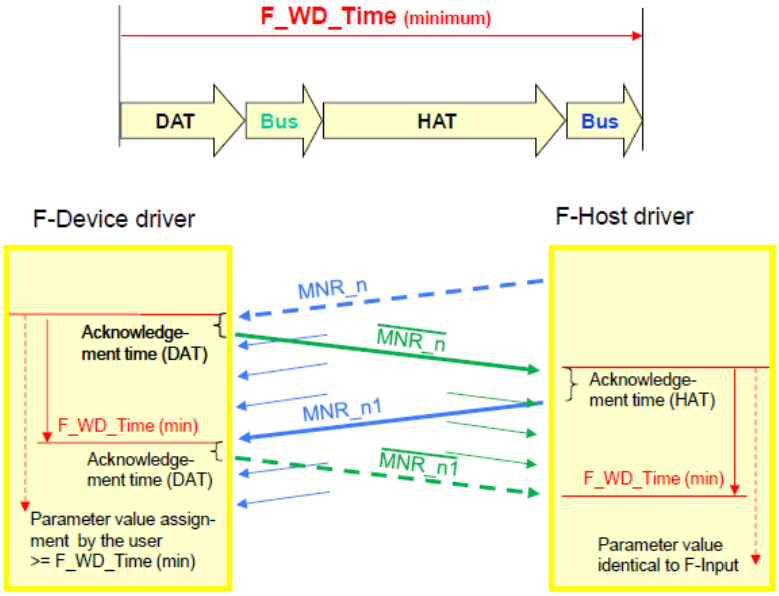


Figure 70 – Timing sections forming the FSCP 3/1 F_WD_Time

7.2.2 Key figures of the RCCA

T_{InRes}	RCCA **I**nput **R**esponse **T**ime The time to report a trip at the input.
T_{OutRes}	RCCA **O**utput **R**esponse **T**ime The time to execute an open command from the safe contact.
T_{Deb}	**D**ebounce **T**ime The debounce time of the input set by the user in the component parameters.
T_{Dis}	**D**iscrepancy **T**ime Time from which a different state of the two channels in 1oo2 operation is considered an error.
$T_{InTestCycle}$	**R**CCA **I**nput **T**est **C**ycle **T**ime This is the time until the next short circuit test is completed.
$T_{InTestOff}$	**R**CCA **I**nput **T**est **O**ff **T**ime Time for which the supply is switched off.
$T_{InTestRestart}$	**R**CCA **I**nput **T**est **R**estart **T**ime Time for which the RCCA waits until the input is active again.
$T_{OutTestCycle}$	**R**CCA **O**utput **T**est **C**ycle **T**ime

This is the time until the next contact test is completed.

$T_{SysTestCycle}$ **R**CCA **S**ystem **T**est **C**ycle **T**ime

This is the max. time until the next system test is completed.

$T_{InRes,max}$	32 ms
$T_{InRes,min}$	17 ms
$T_{InRes,avg}$	21 ms
$T_{OutRes,max}$	25 ms
$T_{OutRes,min}$	11 ms
$T_{OutRes,avg}$	15 ms
$DAT_{RCCA,max}$	38 ms
$DAT_{RCCA,min}$	25 ms
$DAT_{RCCA,avg}$	28 ms

RCCA inputs:

$$WCDT_{RCCA,Input} = T_{InRes,max} + T_{Deb}$$

$$OFDT_{RCCA,Input} = T_{InRes,max} + max(T_{InTestCycle}, T_{Dis} + T_{Deb})$$ (Redundant system)

$$T_{InTestCycle} = 25\,ms + \sum_{i=1}^{12} \begin{cases} T_{InTestOff,i} + T_{InTestRestart,i}, & wenn\ Channel\ aktiviert \\ 0, & wenn\ Channel\ deaktiviert \end{cases}$$

RCCA Output:

$$WCDT_{RCCA,Output} = T_{OutRes,max} = 20.31\,ms$$

$$OFDT_{RCCA,Output} = WCDT_{RCCA,Output} = 20.31\,ms$$ (Redundant system)

To determine the watchdog time:

$$DAT_{RCCA} = DAT_{RCCA,max} = 33.27\,ms$$

8 Functions

8.1 PROFINET

8.1.1 TST RCCA-A module structure

Slot	Module ID	Subslot	Submodule ID	API	Description	Safety	I&M	PD
0	0x10100003	1	0x00000001	0	DAP	-	-	-
		0x8000	0x10110003	0	Interface	-	0 - 5	-
		0x8001	0x10110010	0	Port 1: RJ45	-	-	-
		0x8002	0x10110020	0	Port 2: RJ45	-	-	-
1	0x00100001	1	0x10000001	0	TST Door Controller mit Torbefehlen	Nonsafe	0, 4, 5	IO
2	0x00100002	1	0x10000002	0	Digital Inputs	Nonsafe	-	I

8.1.2 TST RCCA-B module structure

Slot	Module ID	Subslot	Submodule ID	API	Description	Safety	I&M	PD
0	0x10100007	1	0x00000002	0	DAP	-	-	-
		0x8000	0x10110007	0	Interface	-	0–5	-
		0x8001	0x10110010	0	Port 1: RJ45	-	-	-
		0x8002	0x10110020	0	Port 2: RJ45	-	-	-
1	0x00100101	1	0x10000101	0	TST Door Control without door commands	Nonsafe	0, 4, 5	IO
2	0x00100002	1	0x10000002	0	Digital inputs	Nonsafe	-	I
3	0x00100004	1	0x10000004	0	3xFDI, PROFIsafe V2.4 CRC24	Safe	0, 4, 5	IO
			0x10000104	0	3xFDI, PROFIsafe V2.6 CRC32	Safe	0, 4, 5	IO

8.1.3 TST RCCA-C module structure

Slot	Module ID	Subslot	Submodule ID	API	Description	Safety	I&M	PD
0	0x1010000F	1	0x00000003	0	DAP	-	-	-
		0x8000	0x1011000F	0	Interface	-	0–5	-
		0x8001	0x10110010	0	Port 1: RJ45	-	-	-
		0x8002	0x10110020	0	Port 2: RJ45	-	-	-
1	0x00100101	1	0x10000101	0	TST Door Control without door commands	Nonsafe	0, 4, 5	IO
2	0x00100002	1	0x10000002	0	Digital inputs	Nonsafe	-	I
3	0x00100004	1	0x10000004	0	3xFDI, PROFIsafe V2.4 CRC24	Safe	0, 4, 5	IO
			0x10000104	0	3xFDI, PROFIsafe V2.6 CRC32	Safe	0, 4, 5	IO
4	0x00100008	1	0x10000008	0x4E01	IO-Link Master (IOLM)	Nonsafe	-	I
		2	0x0000xxxx	0x4E01	IO-Link Port 1 (IOLD 1)	Nonsafe	0, 5	IO
		3	0x0000xxxx	0x4E01	IO-Link Port 2 (IOLD 2)	Nonsafe	0, 5	IO
		4	0x0000xxxx	0x4E01	IO-Link Port 3 (IOLD 3)	Nonsafe	0, 5	IO
		5	0x0000xxxx	0x4E01	IO-Link Port 4 (IOLD 4)	Nonsafe	0, 5	IO

8.1.4 TST RCCA-D module structure

Slot	Module ID	Subslot	Submodule ID	API	Description	Safety	I&M	PD
0	0x1010001F	1	0x00000004	0	DAP	-	-	-
		0x8000	0x1011001F	0	Interface	-	0–5	-
		0x8001	0x10110010	0	Port 1: RJ45	-	-	-
		0x8002	0x10110020	0	Port 2: RJ45	-	-	-
1	0x00100101	1	0x10000101	0	TST Door Control without door commands	Nonsafe	0, 4, 5	IO
2	0x00100002	1	0x10000002	0	Digital inputs	Nonsafe	-	I
3	0x00100104	1	0x10000204	0	6xFDI, PROFIsafe V2.4 CRC24	Safe	0, 4, 5	IO
			0x10000304	0	6xFDI, PROFIsafe V2.6 CRC32	Safe	0, 4, 5	IO
4	0x00100008	1	0x10000008	0x4E01	IO-Link Master (IOLM)	Nonsafe	-	I
		2	0x0000xxxx	0x4E01	IO-Link Port 1 (IOLD 1)	Nonsafe	0, 5	IO
		3	0x0000xxxx	0x4E01	IO-Link Port 2 (IOLD 2)	Nonsafe	0, 5	IO
		4	0x0000xxxx	0x4E01	IO-Link Port 3 (IOLD 3)	Nonsafe	0, 5	IO
		5	0x0000xxxx	0x4E01	IO-Link Port 4 (IOLD 4)	Nonsafe	0, 5	IO

8.1.5 Assembly parameters

8.1.5.1 I-parameters – Safe IOs

WARNING

These settings are security relevant and must be adapted to the application.

CAUTION

The following features are only possible when using one of the variants TST RCCA-B/C/D.
Only the variant TST RCCA-D has 6 inputs (0x65, 0x66, 0x67, 0x68, 0x69, 0x6A)
Variants TST RCCA-A/B/C have 3 inputs. (0x65, 0x66, 0x67)

Index	Parameter
0x65	**F-DI0/F-DI0.1 & F-DI0.2**
0x66	**F-DI2/F-DI1.1 & F-DI1.2**
0x67	**F-DI4/F-DI2.1 & F-DI2.2**
0x68	**F-DI6/F-DI3.1 & F-DI3.2**
0x69	**F-DI8/F-DI4.1 & F-DI4.2**
0x6A	**F-DI10/F-DI5.1 & F-DI5.2**

Offset [byte]	Parameter	Size [Bit]	Bit offset	Options
0 1	F-DI0 Discrepancy time (upper) F-DI0 Discrepancy time (lower)	8	7-0	1–2^{16} ms
2	F-DI0 Debounce filter	8	7-0	0–255 ms
3	F-DI0 mode	1	7	0: 1oo1 Mode 1: 1oo2 Mode
3	F-DIO Device type (1oo2)	1	6	0/1: active/passive
3	F-DI0.1 Activation (1oo1)	1	5	0/1: disabled/enabled
3	F-DI0.2 Activation (1oo1)	1	4	0/1: disabled/enabled
3	F-DI0 Short circuit test	1	3	0/1: disabled/enabled
3	Reserved	3	2-0	-
4	F-DI0 Short circuit off time	4	7-4	0: 2 ms 6: 200 ms 1: 6 ms 7: 500 ms 2: 10 ms 8: 1000 ms 3: 20 ms 9: 1500 ms 4: 50 ms 10: 2000 ms 5: 100 ms
4	F-DI0 Short circuit restart time	4	3-0	

8.1.5.2 I-parameters – Nonsafe DIs

Offset [byte]	Parameter	Size [Bit]	Options
0	DI1 Debounce filter	8	0–255 ms
1	DI2 Debounce filter	8	0–255 ms
2	DI3 Debounce filter	8	0–255 ms
3	DI4 Debounce filter	8	0–255 ms
4	DI5 Debounce filter	8	0–255 ms
5	DI6 Debounce filter	8	0–255 ms

8.2 Door control interface

The door control unit is connected to the TST RCCA via an electrically isolated RS485 interface. The following data/commands are exchanged via this interface:

- Initiating or stopping an automatic door movement.
- Providing status and setup information of the door control and the directly connected door sensors (e.g. light curtain, rotary encoder, etc.).
- Reading in and out of parameter sets, e.g. for the simple replacement of defective units and for carrying out software updates.

This data is made accessible via the PROFINET interface and described accordingly in the PROFINET chapter.

8.2.1 Parametrisation

The following parameter settings on the door control are possible for the TST RCCA.

Parameter	Designation	Setting option
P.804	TST RCCA – Communication module	0: Deactivated 1: Activated

8.2.2 Cyclic data

8.2.2.1 Door control without door commands

8.2.2.2 From door control to PLC

Byte offset	Description	Content
0	Door Position	F0h: Outside of Open Position
		E0h: Crash thread position
		D0h: Inside limit switch band around Open Position (Crash Position)
		C0h: Inside limit switch band around Open Position
		B0h: Between pre-limit switch open & Open Position
		A0h: At pre-limit switch open
		90h: Between partial end position 1 & Open Position
		80h: Inside limit switch band around partial end position 1
		70h: At pre-limit switch centre
		60h: Between Closed Position and Open Position
		50h: Between Closed Position & partial end position 1
		40h: At pre-limit switch closed
		30h: Between pre-limit switch closed & Closed Position
		20h: Inside limit switch band around Closed Position
		10h: Outside of Closed Position
		05h: Door in clean position
		03h: Door below maximum permitted clean pos
		00h: Unknown position (after switching on)
1	Door status	0d: Door was stopped between the end positions
		1d: Door is closed
		2d: Door is locked in closed position
		3d: Door closing
		4d: Door is open
		5d: Door is locked in open position
		6d: Door opening
		7d: Door is in Partial Open Pos end position
		8d: Door is locked in Partial Open Pos end position
		9d: Malfunction
		10d: Control is in Calibration mode
		11d: Control is in Synchronisation mode
		12d: Door is in the clean position (hygiene)
		13d: Emergency stop of the control unit triggered
		14d: Control is in Emergency Jog mode

Byte offset	Description	Content
		15d: Control is in Jog mode
		16d: Control in Parametrisation mode
		17d: Control unit awaits the start of the correction drive
2	Door Operation Mode	0: Automatic operation for door open/close
		1: Semi-automatic mode
		2: Only Jog Mode possible
		3: Emergency Jog mode (jog mode without safeties); After Reset SERV_HD
		4: Continuous operation with safeties; After Reset SERV_HD
		5: Continuous operation without safeties
3	Cycle Count	Cycle counter byte 0
4		Cycle counter byte 1
5		Cycle counter byte 2
6		Cycle counter byte 3
7	Status Bits	Bit 0: Door operable status 0: Automatic run is not possible 1: Automatic run is possible
		Bit 1: Service warning status 0: Service is not necessary 1: Service necessary in x cycles
		Bit 2: Service status 0: Service is not necessary 1: Service is necessary
		Bit 3: Photo Eye status 0: No photo eye triggered 1: Photo eye is triggered
		Bit 4: Safety Edge status 0: No Safety Edge triggered 1: Safety Edge triggered
		Bit 5: Reserved
		Bit 6: Opening status 0: Door is not opening 1: Door is currently opening
		Bit 7: Closing status 0: Door is not closing 1: Door is currently closing
8		Bit 0: Door is in closed position
		Bit 1: Door is in open position
		Bit 2: Reserved
		Bit 3: Reserved
		Bit 4: Reserved

Byte offset	Description	Content
		Bit 5: Reserved
		Bit 6: Reserved
		Bit 7: Reserved
9	Maintenance Counter	Maintenance counter byte 0
10		Maintenance counter byte 1
11		Maintenance counter byte 2
12		Maintenance counter byte 3
13	TST Input Status 1	Bit 0: Detector 1
		Bit 1: Detector 2
		Bit 2: Detector 3
		Bit 3: Detector 4
		Bit 4: Safety strip internal 1 activation
		Bit 5: Safety strip external 1 activation
		Bit 6: Safety strip internal 2 activation
		Bit 7: Safety strip external 2 activation
14	Input Status 2	Bit 0: Radio 1
		Bit 1: Radio 2
		Bit 2: Emergency stop internal
		Bit 3: Emergency stop external 1
		Bit 4: Emergency stop external 2
		Bit 5: Foil keypad Open
		Bit 6: Foil keypad Stop
		Bit 7: Foil keypad Close
15	Input Status 3	Bit 0: Input 1
		Bit 1: Input 2
		Bit 2: Input 3
		Bit 3: Input 4
		Bit 4: Input 5
		Bit 5: Input 6
		Bit 6: Input 7
		Bit 7: Input 8
16	Input Status 4	Bit 0: Input 9
		Bit 1: Input 10
		Bit 2: Input 11
		Bit 3: Input 12
		Bit 4: Input 13
		Bit 5: Input 14

Byte offset	Description	Content
		Bit 6: Input 15
		Bit 7: Input 31
17	Input Status 5	Bit 0: Input 21
		Bit 1: Input 22
		Bit 2: Input 23
		Bit 3: Input 24
		Bit 4: Input 25
		Bit 5: Input 26
		Bit 6: Input 27
		Bit 7: Input 28
18	Input Status 6	Bit 0: Input 3A
		Bit 1: Input 3B
		Bit 2: Input 3C
		Bit 3: Input 3D
		Bit 4: Input 3E
		Bit 5: Input 3F
		Bit 6: Reserved
		Bit 7: Reserved
19	TST Output Status 1	Bit 0: Output 1
		Bit 1: Output 2
		Bit 2: Output 3
		Bit 3: Output 4
		Bit 4: Output 5
		Bit 5: Output 6
		Bit 6: Output 7
		Bit 7: Output 8
20	Output Status 2	Bit 0: Output 9
		Bit 1: Output 10
		Bit 2: Output 11
		Bit 3: Output 12
		Bit 4: Output 13
		Bit 5: Output 14
		Bit 6: Output 15
		Bit 7: Reserved
21	Output Status 3	Bit 0: Output 2D
		Bit 1: Output Status 2
		Bit 2: Output 2F

Byte offset	Description	Content
		Bit 3: Reserved
		Bit 4: Output 21
		Bit 5: Output 22
		Bit 6: Output 23
		Bit 7: Output 24
22	Output Status 4	Bit 0: Output 25
		Bit 1: Output 26
		Bit 2: Output 27
		Bit 3: Output 28
		Bit 4: Output 29
		Bit 5: Output 2A
		Bit 6: Output 2B
		Bit 7: Output 2C
23	Output Status 5	Bit 0: Output 31
		Bit 1: Output 32
		Bit 2: Output 33
		Bit 3: Output 34
		Bit 4: Output 35
		Bit 5: Output 36
		Bit 6: Output 37
		Bit 7: Output 38

8.2.2.3 From PLC to door control

To write an input of the door control, the bit corresponding to the desired input and the mask bit must be set.

Byte	Description	Content
0	TST Input Status 1	Bit 0 Input 1
		Bit 1 Input 2
		Bit 2 Input 3
		Bit 3 Input 4
		Bit 4 Input 5
		Bit 5 Input 6
		Bit 6 Input 7
		Bit 7 Input 8
1	TST Input Mask 1	Bit 0 Mask Input 1
		Bit 1 Mask Input 2
		Bit 2 Mask Input 3
		Bit 3 Mask Input 4

Byte	Description	Content
		Bit 4 Mask Input 5
		Bit 5 Mask Input 6
		Bit 6 Mask Input 7
		Bit 7 Mask Input 8
2	Input Status 2	Bit 0 Input 9
		Bit 1 Input 10
		Bit 2 Input 11
		Bit 3 Input 12
		Bit 4 Input 13
		Bit 5 Input 14
		Bit 6 Input 15
		Bit 7 Input 31
3	Input Mask 2	Bit 0 Mask Input 9
		Bit 1 Mask Input 10
		Bit 2 Mask Input 11
		Bit 3 Mask Input 12
		Bit 4 Mask Input 13
		Bit 5 Mask Input 14
		Bit 6 Mask Input 15
		Bit 7 Mask Input 31
4	Input Status 3	Bit 0 Input 21
		Bit 1 Input 22
		Bit 2 Input 23
		Bit 3 Input 24
		Bit 4 Input 25
		Bit 5 Input 26
		Bit 6 Input 27
		Bit 7 Input 28
5	Input Mask 4	Bit 0 Mask Input 21
		Bit 1 Mask Input 22
		Bit 2 Mask Input 23
		Bit 3 Mask Input 24
		Bit 4 Mask Input 25
		Bit 5 Mask Input 26
		Bit 6 Mask Input 27
		Bit 7 Mask Input 28
6	Input Status 5	Bit 0 Input 3A

Byte	Description	Content
		Bit 1 Input 3B
		Bit 2 Input 3C
		Bit 3 Input 3D
		Bit 4 Input 3E
		Bit 5 Input 3F
		Bit 6 Radio 1
		Bit 7 Radio 2
7	Input Mask 5	Bit 0 Mask Input 3A
		Bit 1 Mask Input 3B
		Bit 2 Mask Input 3C
		Bit 3 Mask Input 3D
		Bit 4 Mask Input 3E
		Bit 5 Mask Input 3F
		Bit 6 Radio 1
		Bit 7 Radio 2
8	Input Status 6	Bit 0 Input 3A
		Bit 1 Input 3B
		Bit 2 Input 3C
		Bit 3 Input 3D
		Bit 4 Input 3E
		Bit 5 Input 3F
		Bit 6 Radio 1
		Bit 7 Radio 2
9	Input Mask 6	Bit 0 Mask Input 3A
		Bit 1 Mask Input 3B
		Bit 2 Mask Input 3C
		Bit 3 Mask Input 3D
		Bit 4 Mask Input 3E
		Bit 5 Mask Input 3F
		Bit 6 Radio 1
		Bit 7 Radio 2
10	Reserved	Reserved

8.3 PROFIsafe IO/Safety Module

CAUTION

The following features are only possible when using one of the variants TST RCCA-B/C/D

The TST RCCA includes a safety module with six safe inputs FDI and one safe output/contact FDO.

The input and output information is communicated securely via the PROFIsafe protocol to the connected PLC.

The PROFIsafe/F address of the safety module can be set via DIP switches.

The safety module can be configured via the connected PLC.

This configuration is secured via an F-CRC.

To be able to use the safe inputs of the safety module as such, a PROFISAFE compatible PLC must be used.

8.3.1 FDI

The safe inputs are used to connect the safe sensors, with two-channel OSSD, single-channel buttons or switches or two-channel safe buttons or switches on the door.

8.3.2 FDO

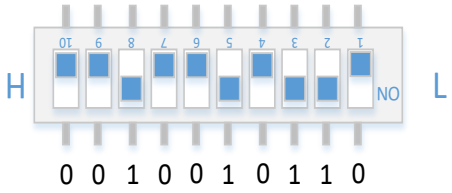
The TST RCCA is connected to the emergency stop circuit of the door control unit via the safe contact. If the two-channel contact to the door control is interrupted, the door is safely stopped.

CAUTION

Between closing the safe contact and a subsequent move command, there must be a pause of at least 100 ms.

8.3.3 F address

With the F address, the TST RCCA can be clearly assigned in the PROFINET network. It is set via the 10 dip switches on the TST RCCA. The range valid for operation extends from 1 to 1023. The address setting is binary. The least significant bit is marked L and the most significant bit is marked H. To set the respective bit, the corresponding switch must be set to ON.



Setting the F address of the safety module. The example corresponds to the decimal number "150".

8.3.4 F-CRC

The safety-relevant parameters of the safety module are secured via a checksum.

This iPar CRC is determined and mutually verified on both the PLC and the TST RCCA side.

8.3.4.1 PROFIsafe FDI/O

The following table shows the data that the TST RCCA sends to the PLC. The first two bytes (0 & 1) contain the states of the safe inputs.

If an input is configured in 1oo2 mode (redundant analysis), both channels are put together on one signal. These are the signal numbers **F-DI0, 2 to 10**.

In 1oo1 mode, however, one signal corresponds to one channel.

8.3.4.1.1 From Safe Input to PLC

Byte	Data description							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	F-DI3.2	F-DI2.2	F-DI1.2	F-DI0.2	F-DI3.1/6	F-DI2.1/4	F-DI1.1/2	F-DI0.1/0
1	-	-	-	-	F-DI5.2	F-DI4.2	F-DI5.1/10	F-DI4.1/8
2	Status							
3	CRC 32bit							
4								
5								
6								

Assignment of the signals:

Input bit	Socket	Pin
F-DI0.1	X0	4
F-DI0.2	X0	2
F-DI1.1	X1	4
F-DI1.2	X1	2
F-DI2.1	X2	4
F-DI2.2	X2	2
F-DI3.1	X3	4
F-DI3.2	X3	2
F-DI4.1	X4	4
F-DI4.2	X4	2
F-DI5.1	X5	4
F-DI5.2	X5	2

Input bit	Socket	Pin
F-DI0	X0	4 & 2
F-DI2	X1	4 & 2
F-DI4	X2	4 & 2
F-DI6	X3	4 & 2
F-DI8	X4	4 & 2
F-DI10	X5	4 & 2

8.3.4.1.2 From PLC to Safe Output (EStop and move commands)

CAUTION

There must be a pause time of at least 100 ms between the closing of a safe contact and a subsequent move command.

Byte	Data description							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	-	Mask Close	Mask Stop	Mask Open	-	Close	Stop	Open
1	-	-	-	-	-	-	-	EM Stop
2	Status							
3	CRC 32bit							
4								
5								
6								

Move command masks must be set to initiate a move command.

8.4 Digital inputs

Any stations with 24 VDC switching output can be connected to the six nonsafe inputs. Their signals are converted to PROFINET.

PROFINET figure, see chapter "PROFINET" and "Technical data".

8.4.1.1 DI

8.4.1.1.1 Input to PLC

Byte	Data description							
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	-	-	DI6	DI5	DI4	DI3	DI2	DI1

Assignment of the signals:

Input bit	Socket	Pin
DI1	X10	4
DI2	X10	2
DI3	X11	4
DI4	X11	2
DI5	X12	4
DI6	X12	2

8.5 IO-Link interface

CAUTION

The following features are only possible when using one of the variants TST RCCA-C/D

Up to four IO-Link devices (e.g. a configurable traffic light or sensor) can be connected via the IO-Link master. An IO-Link gateway converts the IO-Link interfaces to PROFINET.

Each IO-Link port can be configured as a digital input or output or IO-Link interface.

In the digital input configuration, 24 VDC signals are read in.

24 VDC signals are switched as digital output.

In the configuration as an IO-Link interface, data is exchanged according to the IO-Link device description file (IODD).

PROFINET image cf. chapters "PROFINET" and "Technical data".

8.5.1.1 IO-Link

The IO-Link module of the TST RCCA has 5 subslots. Subslot 1 represents the IO-Link master itself. 2–5 are the 4 real ports to which the user connects his own peripherals. The purpose of use can be configured by "plugging" submodules into the ports. The plugged-in submodule then also provides the required IO data.

Assignment

Input bit	Socket
Port1	X20
Port2	X21
Port3	X22
Port4	X23

The following submodules for the ports are available for selection:

1. IO-Link In/Out 32/32 bytes + PQI
2. IO-Link In/Out 16/16 bytes + PQI
3. IO-Link In/Out 8/8 bytes + PQI
4. IO-Link In/Out 4/4 bytes + PQI
5. IO-Link In/Out 2/2 bytes + PQI
6. Digital Output
7. Digital Input
8. Disabled

The modules and their IO data are discussed below.

Submodules 1–5: IO-Link

Used to configure the port for "intelligent" IO-Link devices. The appropriate module should be selected to match the IO bytes size.

CAUTION

If no IO-Link Device is connected, but an IO-Module is plugged in, there will be an error message. In this case, the disabled submodule must be plugged in.

8.5.1.1.1 Digital output to PLC

This allows pins 2 & 4 of the respective port to be used as digital outputs.

There is a special feature in the configuration as digital output. Not all the required cyclical output data is in the submodule. The IO-Link master (subslot1) has one byte of output data. This allows pin 4 of the respective IO-Link port to be switched. However, this only works if the digital output submodule is also plugged in.

Cyclic output data from subslot 1: IO-Link Master

The output byte controls pin 4 of the respective port 1–4 (bit 0–3).

Data description								
Byte	Bit 7							Bit 0
0					DO4	DO3	DO2	DO1

Cyclic output data of submodules: Digital Output

Bit 0 DO controls pin 2 of the current port. (into which this submodule is plugged)

Data description								
Byte	Bit 7							Bit 0
0								DO

8.5.1.1.2 Digital Input on PLC

This allows pin 2 of the desired port to be used as a digital input.

Cyclic input data from submodule: Digital Input

Bit 0 supplies the input state at pin 2 of the current port. (into which this submodule is plugged)

Data description								
Byte	Bit 7							Bit 0
0								DI

Submodule 7: Disabled

Used to deactivate the port.

CAUTION

If no IO-Link device is connected but an IO module is plugged in, an error message is displayed. In this case, the disabled submodule must be plugged in.

8.6 Diagnostic LEDs

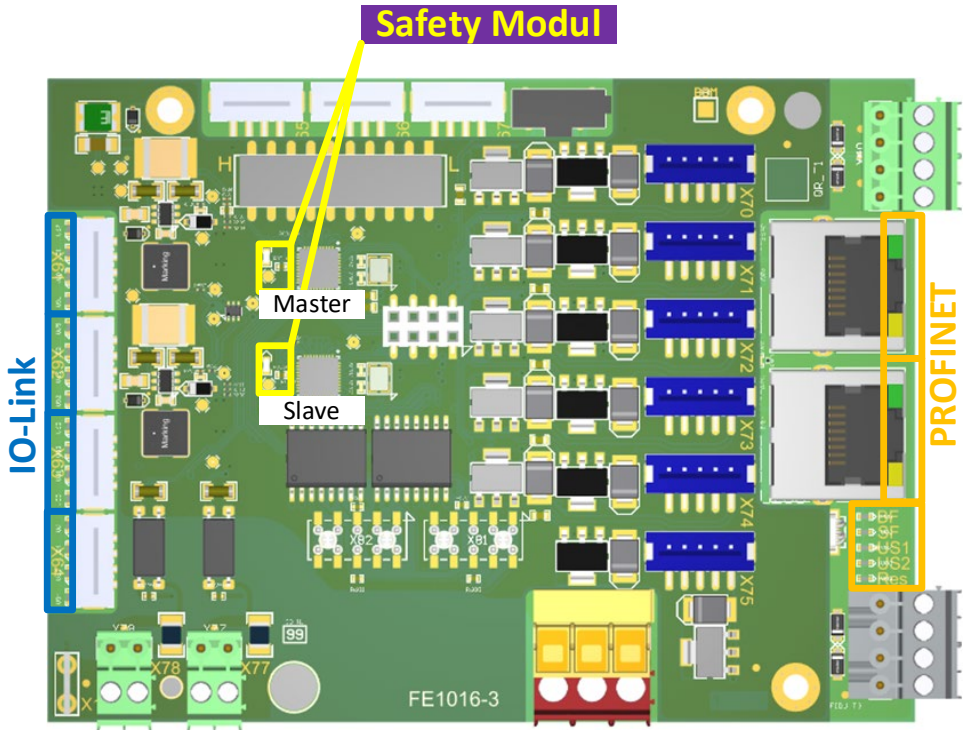


Figure 8: LED positions

8.6.1 PROFINET diagnostic LEDs

8.6.1.1 LEDs next to the RJ45 sockets (network)

LED	Meaning
Green	LNK: Connection
Orange	ACT: Activity frequency

8.6.1.2 LED field next to the RJ45 sockets (network)

LED	Meaning
BF (Bus Fault)	Link down on both ports=> LED on PLC not connected or just connecting => 2Hz flashing PLC connected => LED off
SF (System Fault)	ModuleDiffBlock with Wrong Module or Wrong Submodule => 2Hz flashing Error diagnosis available in the application => 2Hz flashing Otherwise: LED off Note: PROFINET stack-internal diagnostics are not taken into account
US1	Supply voltage >= 18V: LED on otherwise: LED off
US2	TST communication OK => LED on TST communication faulty => LED off

LED	Meaning
Reserved	Connection status: No PN connection => 1Hz 0.1s on 0.9s off flashing PN connection and PLC in STOP or establishing connection => 1Hz flashing 0.5s on 0.5s off PN connection and PLC in RUN => 1Hz flashing 0.9s on 0.1s off Energy-saving mode => 0.3Hz 0.5s on 2.5s off flashing

8.6.2 Safety Module Diagnostics

LED Master µC	LED Slave µC	Meaning
Off	Off	No supply
Off	On	Switch-on process, communication with network board not yet established
On	Off	Passivation, due to an existing external software error
On	On	Normal operation
On	Flashing	Passivation due to a previous external software error (depassivation possible by means of PLC)
Flashing	Flashing	Irreversible deactivation due to a hardware fault (depassivation with PLC not possible)
Fast flashing	Fast flashing	Bootloader mode (is exited about two seconds after switching on)

8.6.3 IO-Link Diagnostics

Each IO-Link port has its own diagnostic LEDs with the following meaning:

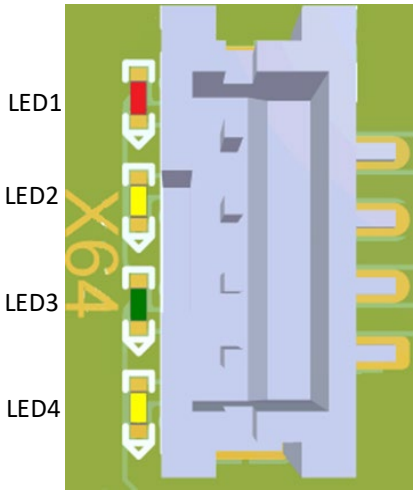


Figure 9: LED positions on the IO-LINK port

8.6.3.1 LEDs next to the IO-Link socket

LED1 red	LED2 yellow	LED3 green	LED4 yellow	Meaning
On	-	Off	-	IO-Link active and port error e.g. short circuit
1 Hz	-	-	-	IO-Link communication active and validation error
-	On	-	-	DI/DO signal is HIGH
-	Off	-	-	DI/DO signal is LOW
Off	-	On	-	IO-Link communication active and in operate mode
-	-	1 Hz	-	IO-Link active but no communication (wake-up)
-	-	2 Hz	-	IO-Link communication active and in Preoperate mode
-	-	-	On	High Side Switch on
-	-	-	Off	High Side Switch off
Off	-	Off	-	IO-Link deactivated or in SIO mode and signal is LOW
On	-	On	-	IO-Link deactivated and in SIO mode and signal is HIGH

8.7 TCI tools

8.7.1 F-CRC Tool

The iPar CRC is automatically calculated via the F-CRC tool in order to make it available for mutual adjustment with the TST RCCA module in the PLC project planning.

After installation, the F-CRC tool can be started via TCI (Tool Calling Interface) or standalone.

The use of TCI is recommended. Then the set iParameters are automatically entered in the F-CRC tool and do not have to be entered manually.

8.7.1.1 Operation of the F-CRC Tools

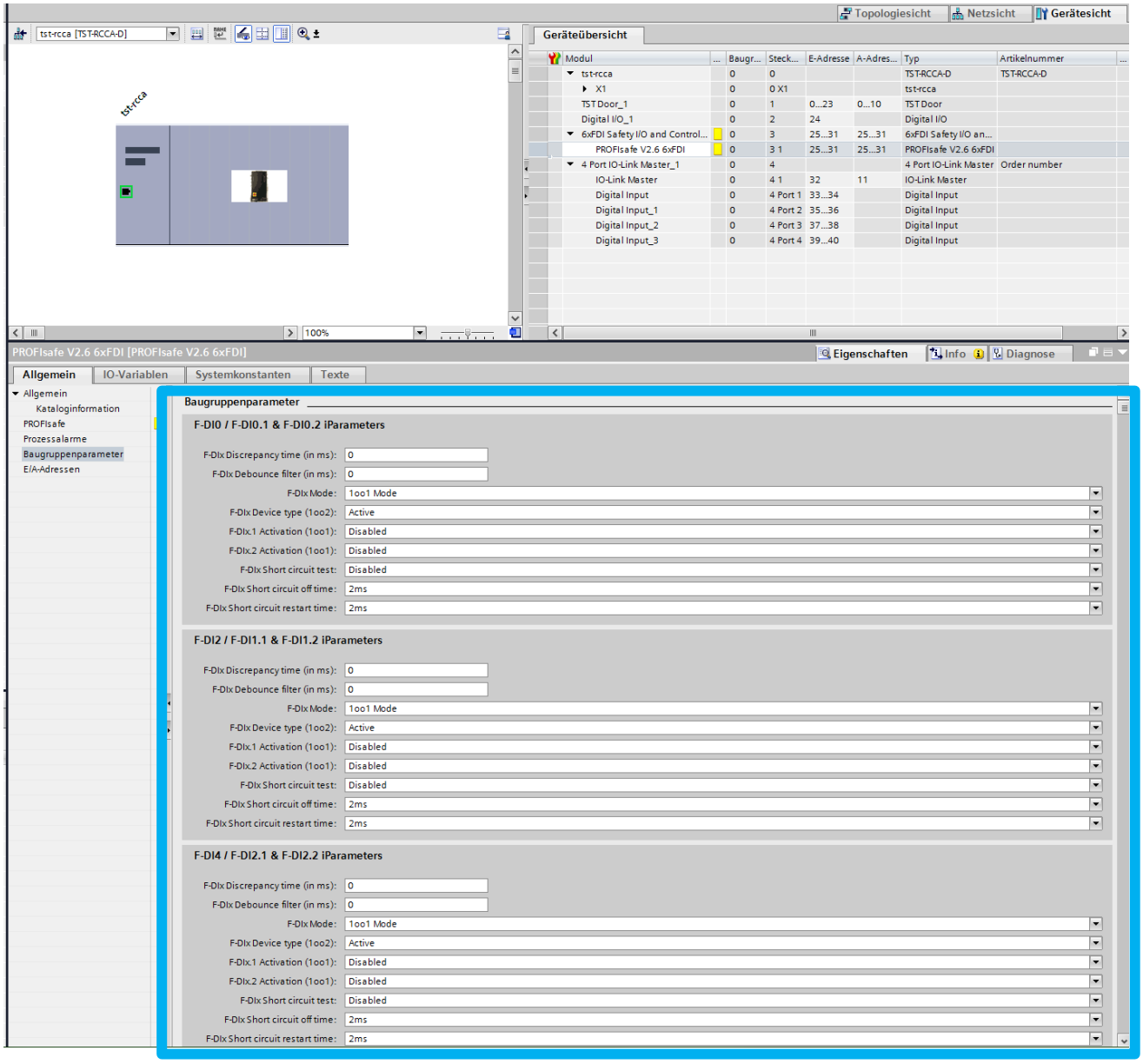
CAUTION

The following features are only possible when using one of the variants TST RCCA-B/C/D

The following description of the programme structure is based on the example of the SIEMENS TIA Portal.

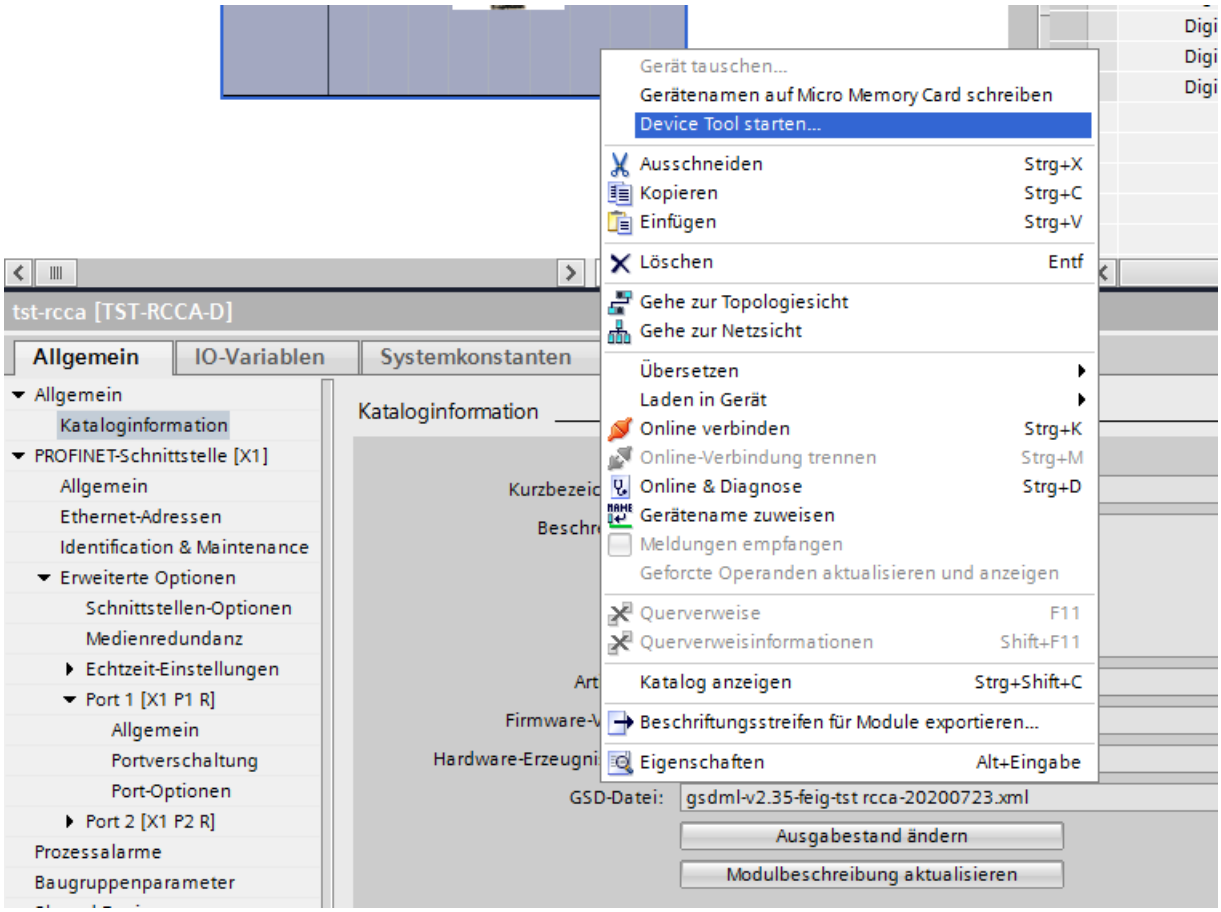
8.7.1.1.1 Overview of I-Parameter

The following graphic is a screen shot from the TIA Portal V15. In top area, the module overview of a TST RCCA is shown. In the lower area, the assembly parameters (also called iPar) of the Profisafe module selected above are shown. The CRC must be calculated via these parameters using the F-CRC tool and entered in the PROFIsafe parameters.

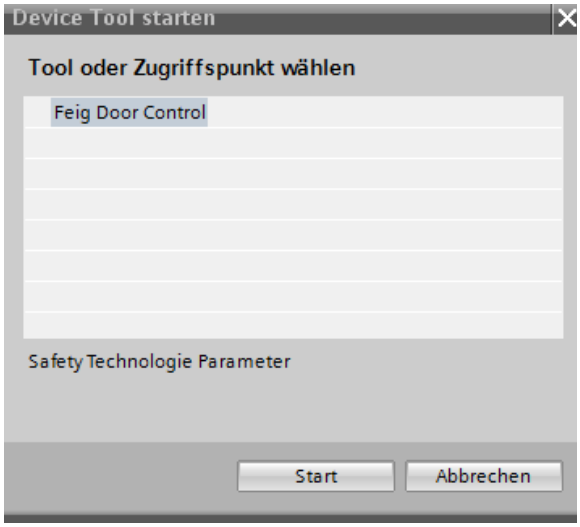


8.7.1.1.2 Start Device Tool

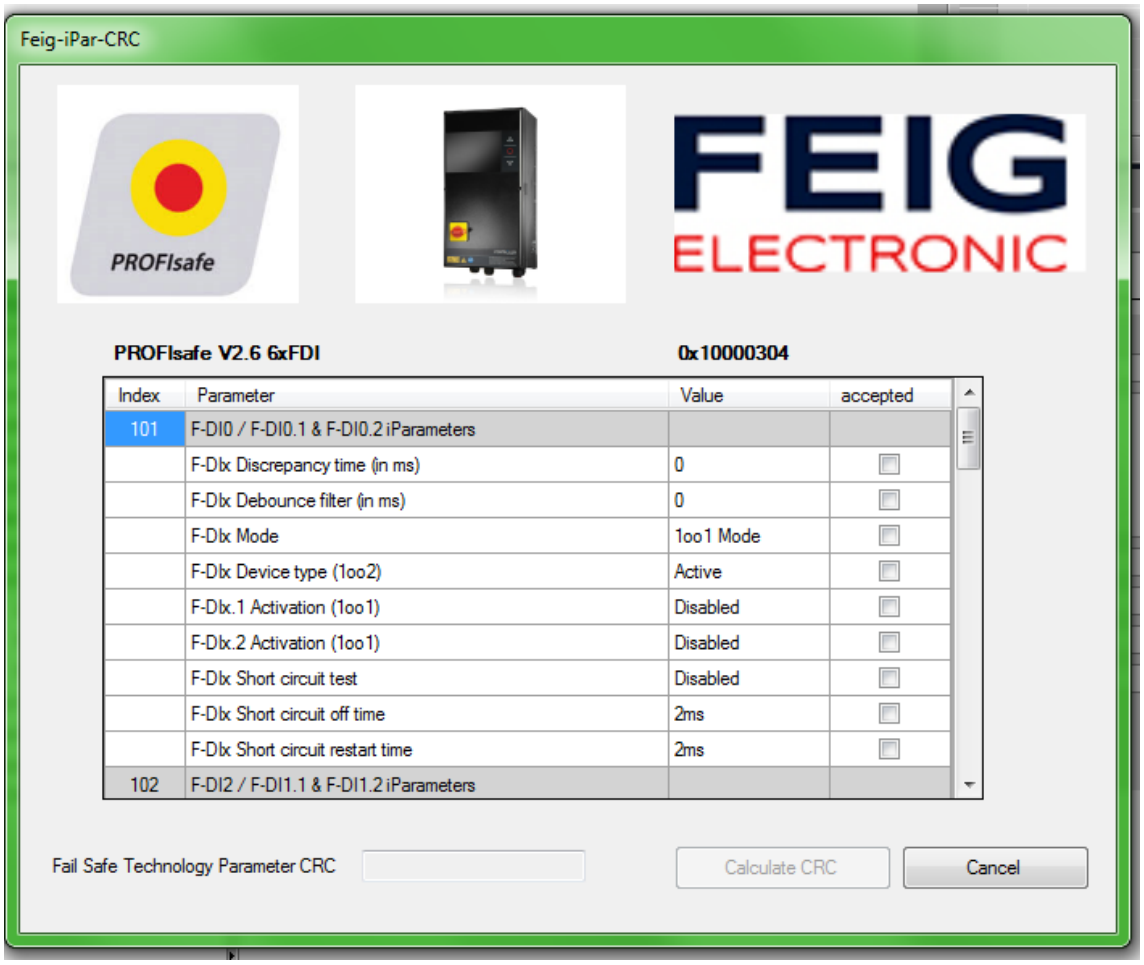
In order to start the TST F-CRC Tool via TCI, right-click on Start Device Tool on the display of the TST RCCA (top left in the screen function).



The window for selecting a device tool then appears. Select the "Feig Door Control" tool. If the tool is not displayed, install the F-CRC tool. A restart of the computer after the installation is required.



The iParameters of the PROFIsafe module can now be seen in this tool window. The third column shows the value of the parameter. If the tool was called via TCI, all parameters are already set according to the configuration in the TIA Portal. Otherwise, these values must still be set by the user.

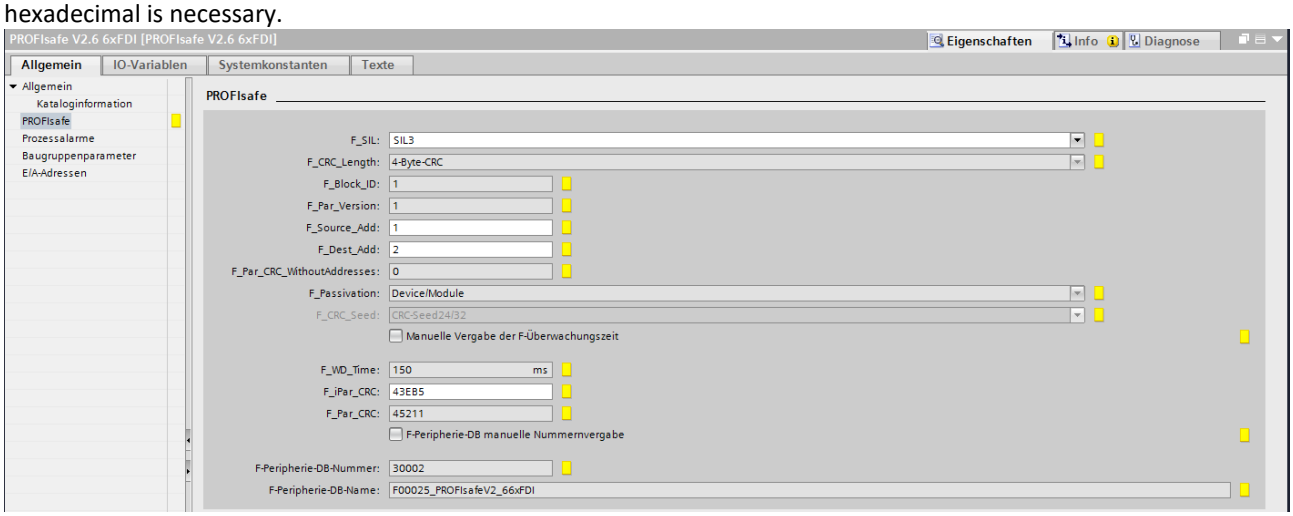


Checking settings (checking and accepting parameters)

All parameters must be checked by the user. This is confirmed with the tick in the fourth column "accepted". Only when all parameters have been checked can the CRC be calculated with the Calculate CRC button. The CRC is displayed in decimal. If the value is required in hexadecimal, it must still be converted.

Enter I-PAR-CRC in hexadecimal in the TIA Portal.

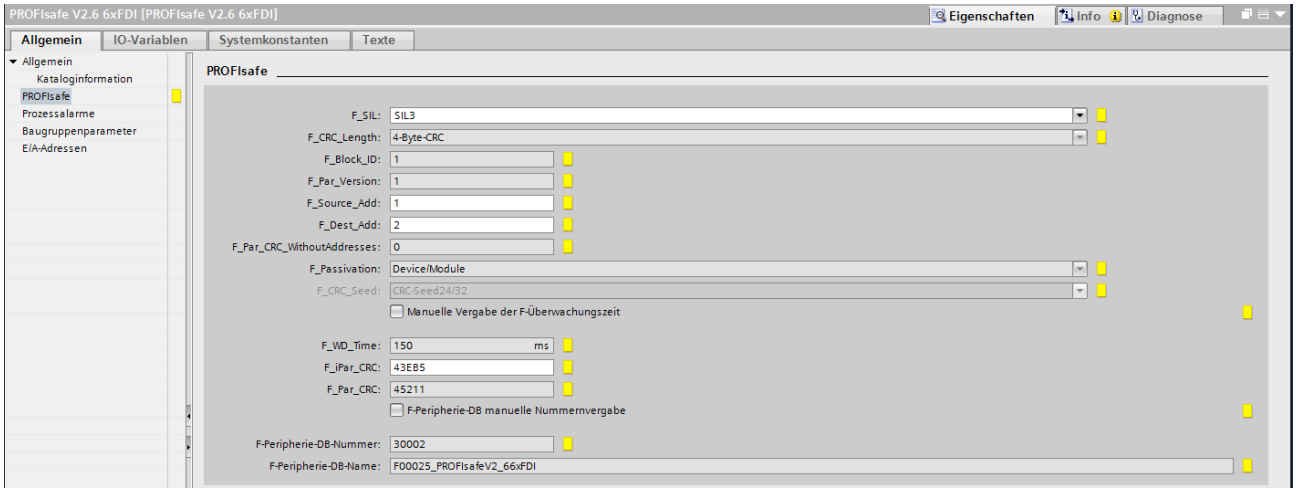
The CRC must then be entered in the parameter F_iPar_CRC. This can be found in the Profisafe module of the TST RCCA. The following graphic shows its representation in the TIA Portal. It should be noted here that a conversion to hexadecimal is necessary.



8.7.1.1.3 Checking settings (checking and accepting parameters)

8.7.1.1.4 Calculating I-PAR CRC with "calculate CRC"

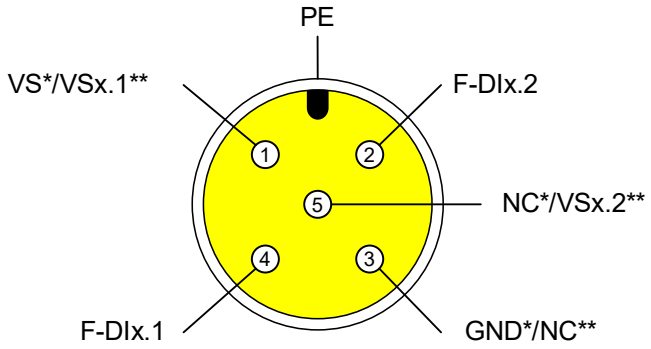
8.7.1.1.5 Entering I-PAR CRC in hexadecimal in the TIA Portal



8.8 F-Inputs connection examples

CAUTION

The following features are only possible when using one of the variants TST RCCA-B/C/D



VS* Supply 24 V
VSx.1** Encoder channel for F-DI.1
VSx.2** Encoder channel for F-DI.2
F-DIx.1 Input x Channel 1
F-DIx.2 Input x Channel 2
PE Function earth
GND Earth when unit is active
NC Not Connected

* With active signal transmitter that generates input signals itself (e.g. laser scanner)
** With passive signal transmitter that switches signals (e.g. NA switch)

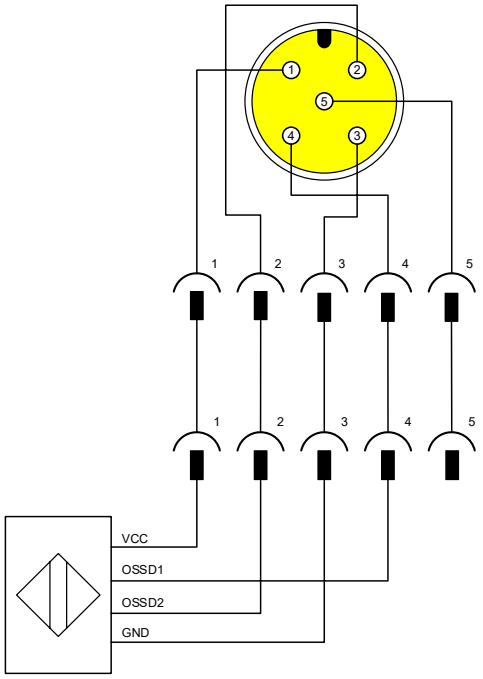
Conditions for achieving SIL/Cat./PL

The following table shows the conditions for achieving at least the corresponding safety requirement.

Use case	Analysis of the encoders	Encoder supply	Achievable SIL/Cat./PL
1	1oo1 (1v1)	Any	3 / 3 / d
2	1oo2 (2v2) equivalent	Internal, without short circuit test	3 / 3 / e
		External	
3.1	1oo2 (2v2) equivalent	Internal, with short circuit test	3 / 4 / e
3.2	1oo2 (2v2) antivalent	External/internal, with short circuit test	

8.8.1 Active signal transmitter (e.g. laser scanner)

An active signal transmitter is characterised by the fact that it generates the safe input signals itself. To do this, the unit needs the supply voltage VS and the earth GND. The output signals OSSD1/2 must be connected to F-DIx.1/2 of the M12 socket.



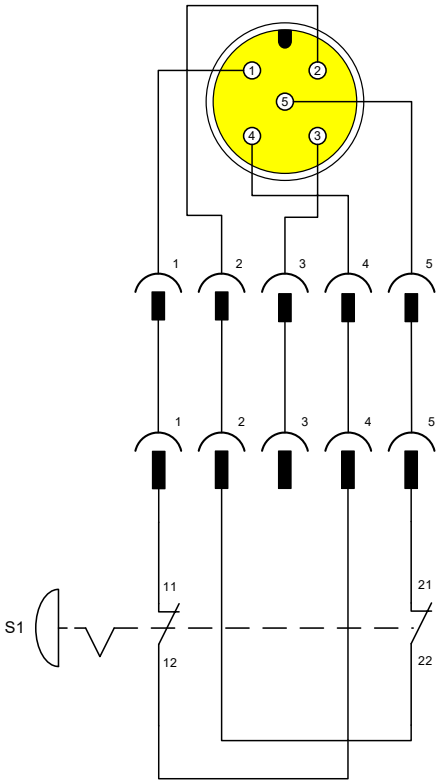
Pin (socket) Signal transmitter
1 VS VCC
2 F-DIx.2 OSSD2
3 GND GND
4 F-DIx.1 OSSD1
5 - NC

By means of parameter *F-DI Mode*, the input is set to *1oo2 Mode* in order to activate the redundant analysis. In addition, a discrepancy time must be set.

Parameter	Option
F-DIx Discrepancy time (1oo2)	1–2^{16} ms
F-DIx Debounce filter	0–255 ms
F-DIx mode	1: 1oo2 Mode
F-DIx Device type (1oo2)	0: Active
F-DIx.1 Activation (1oo1)	0: Disabled
F-DIx.2 Activation (1oo1)	0: Disabled
F-DIx Short circuit test	0: Disabled
F-DIx Short circuit off time	0: 2 ms 1: 6 ms 2: 10 ms 3: 20 ms 4: 50 ms 5: 100 ms 6: 200 ms 7: 500 ms 8: 1000 ms 9: 1500 ms 10: 2000 ms
F-DIx Short circuit restart time	

8.8.2 Passive signal transmitter 1oo2 (e.g. emergency stop switch)

A passive signal transmitter switches the encoder channels VSx.1 and 2. When connecting, ensure correct assignment to inputs F-DIx.1 and 2. If the wiring is incorrect, a wiring error will occur during the short-circuit test.



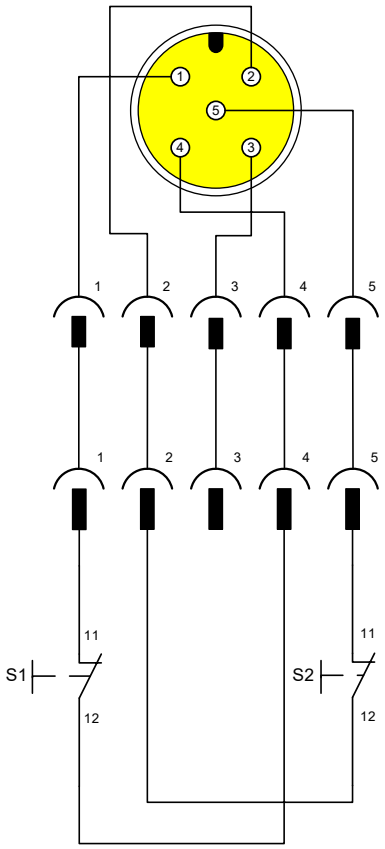
Pin (socket) Signal transmitter (S1)
1 VSx.1 11
2 F-DIx.2 22
3 - NC
4 F-DIx.1 12
5 VSx.2 21

By means of parameter *F-DI Mode*, the input is set to *1oo2 Mode* in order to activate the redundant analysis. In addition, a discrepancy time must be set. In addition, the short circuit test must be activated with *FDIx Short circuit test*.

Parameter	Option
F-DIx Discrepancy time (1oo2)	1–2^{16} ms
F-DIx Debounce filter	0–255 ms
F-DIx mode	1: 1oo2 Mode
F-DIx Device type (1oo2)	1: Passive
F-DIx.1 Activation (1oo1)	0: Disabled
F-DIx.2 Activation (1oo1)	0: Disabled
F-DIx Short circuit test	1: Enabled
F-DIx Short circuit off time	0: 2 ms 1: 6 ms 2: 10 ms 3: 20 ms 4: 50 ms 5: 100 ms 6: 200 ms 7: 500 ms 8: 1000 ms 9: 1500 ms 10: 2000 ms
F-DIx Short circuit restart time	

8.8.3 Passive signal transmitter 1oo1 (single-channel)

Single-channel switches can also be connected in the same way as two-channel signal transmitters. It should be noted, however, that this does not provide redundancy. Thus, a maximum of SIL2 can be achieved. In the following example, two switches are listed. However, only one switch per socket can be operated. The assignment of transmitter channel VSx.1 and 2 to the corresponding input channel F-DIx.1 and 2 must be correct. Otherwise, the short-circuit test detects a wiring fault.



Pin (socket)	Signal transmitter
1 VSx.1	11 (S1)
2 F-DIx.2	12 (S2)
3 -	NC
4 F-DIx.1	12 (S1)
5 VSx.2	11 (S2)

With parameter *F-DI Mode*, the input is set to *1oo1 Mode* . This allows both input channels to be used individually. The channels are activated with parameters *F-DI.1/2 Activation (1oo1)*. The *FDIx Short circuit test* parameter activates the short circuit test.

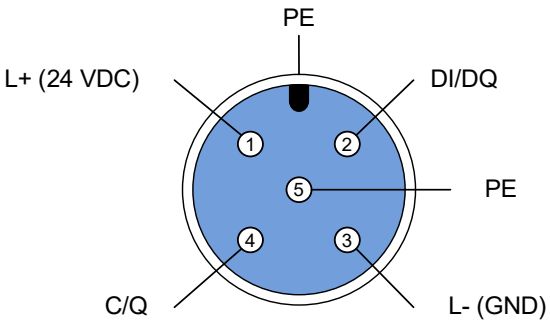
Parameter	Option
F-DIx Discrepancy time (1oo2)	1–2^{16} ms
F-DIx Debounce filter	0–255 ms
F-DIx mode	0: 1oo1 Mode
F-DIx Device type (1oo2)	0: Active
F-DIx.1 Activation (1oo1)	1: Enabled
F-DIx.2 Activation (1oo1)	1: Enabled
F-DIx Short circuit test	1: Enabled
F-DIx Short circuit off time	0: 2 ms 6: 200 ms 1: 6 ms 7: 500 ms 2: 10 ms 8: 1000 ms 3: 20 ms 9: 1500 ms 4: 50 ms 10: 2000 ms 5: 100 ms
F-DIx Short circuit restart time	

8.9 IO-Link ports connection examples

CAUTION

The following features are only possible when using one of the variants TST RCCA-C/D

The IO-Link ports of the TST RCCA are designed according to Class A. With this type, the wiring of pins 2 and 5 is not specified. Here, pin 5 is connected to PE and pin 2 can be used as both digital input and output.

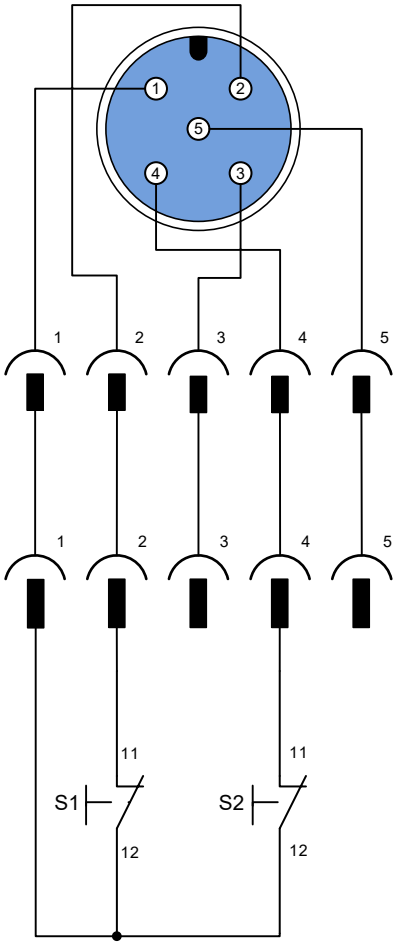


L+	Supply 24 V
L-	Earth
PE	Functional earth
DI	Digital input
DQ	Digital output
C/Q	Switching and communication line

An IO-Link port of the RCCA can be operated in three different modes. The configuration of the port takes place via the engineering tool by plugging in the respective submodule. If you do not want to use the IO-Link port, the disabled submodule must be plugged in.

8.9.1 Digital inputs

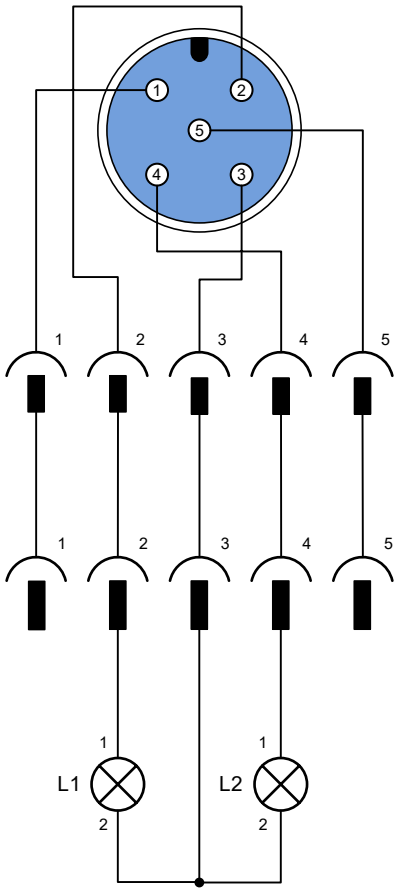
The digital inputs can be used if the *Digital Input* submodule is plugged in.



Pin (socket) Signal transmitter
1 L+ 12 (S1/S2)
2 DI 11 (S1)
3 -
4 C/Q 11 (S2)
5 -

8.9.2 Digital outputs

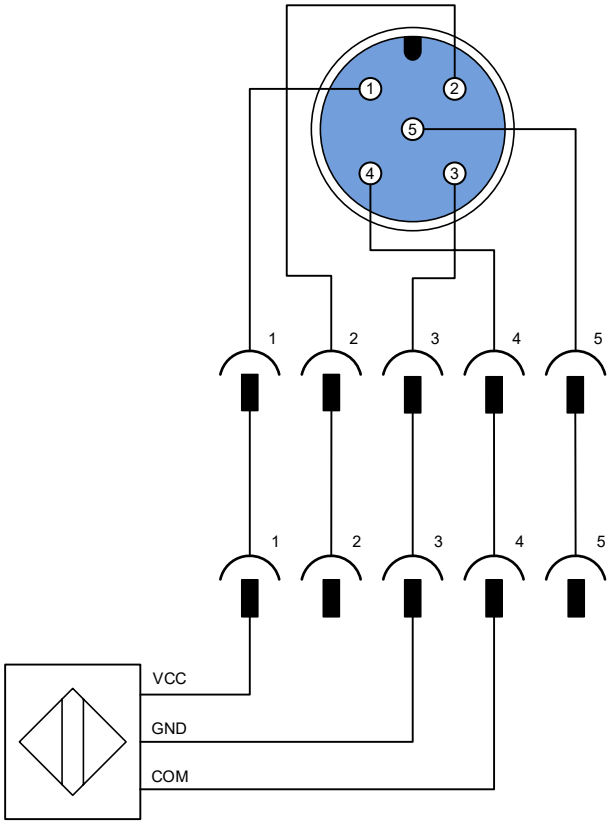
The digital outputs can be used if the *Digital Output* submodule is plugged in. The max. output power must be observed here!



Pin (socket) Signal transmitter
1 -
2 DQ 1 (L1)
3 L- 2 (L1/L2)
4 C/Q 1 (L2)
5 -

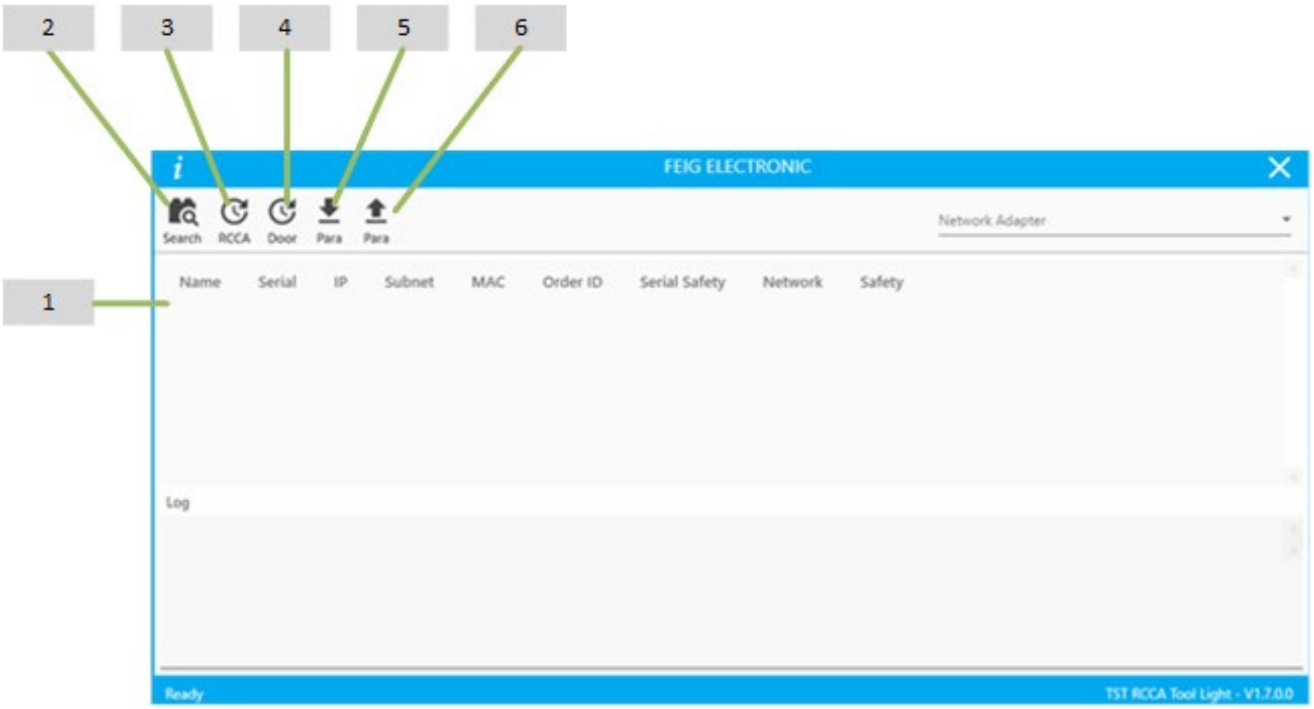
8.9.3 IO-Link interface

In order to use an "intelligent" IO-Link device, one of the *IO-Link In/Out x/x byte + PQI* submodules must be plugged in. A submodule with a suitable IO data size should be selected according to the IO device.



Pin (socket) Signal transmitter
1 L+ VCC
2 -
3 GND GND
4 C/Q COM
5 -

9 TST RCCA tool light



1 Multi-door overview	All information read out from the TST RCCA is displayed here.
2 Search Door	Displays the connected controls in the network
3 Update TST RCCA	Update function for TST RCCA
4 Update Door Control	Prepare update file for Feig door control in the network. The update must be started on the control unit via P.989 after preparation.
5 Download Control parameters	Download the parameter file from the Feig door control.
6 Upload Control parameters	Prepare the update file for the Feig door control in the network. The parameter upload after preparation for the network must be started on the control via P.944.

9.1 Backup & restore

In the event of a defect in the door control system, it is possible to replace the entire control cabinet.

In this case, it is possible to restore SW statuses and parameters of the various subordinate modules on the new system using the Backup & Restore mechanism.

9.1.1 Use of the iPar server

NOTE

Only relevant for the door control parameters! The TST RCCA itself has no remanent user parameters.

For this, the parameter **VIT_iPar_Mode** must be set to **enabled**. This then stores all door parameters on the iPar server. When the unit is replaced, the iPar server loads the parameters onto the TST RCCA and thus initiates the parametrisation of the door control. However, the operator must confirm the uploading of the parameters to the door control. This can be recognised by the message **I.950 New Para** on the display of the door control. Now it is necessary to trigger the parametrisation with **P.944 = 3** (also on the door control).

9.1.2 Manual backup and restore using tools

The TST RCCA Tool Light can be used for this purpose. With this, the door control parameters can be saved as a file and restored on the new unit after a unit replacement. Here, the necessary operator intervention after uploading the parameter file must be taken into account. This can be recognised by the message I.950 New Para on the display of the door control. Now it is necessary to trigger the parametrisation with P.944 = 3 (also on the door control).

9.2 Abbreviations

Abbreviation	Meaning
AIC	Anybus internal communication (communication protocol for non-safe controls)
CE	Labelling to comply with the harmonisation legislation in accordance with EU regulations
DI	Digital input
DIH	DI High
DIL	DI Low
DO	Digital output
DIN	Deutsche Industrienorm (German industrial standard)
DIP	Dual In-Line Package (switch panel for basic settings)
Compatibility	see EMC
EMC	Electromechanical compatibility
ESD	Electrostatic Discharge
EN	Europäische Norm (European Standard)
FDI	Safe inputs
FDO	Safe outputs
GND	Ground connection of the power supply (Ground)
IP	Protection category of electrical equipment for environmental conditions and people
ISO	International Organisation for Standardisation
MR	Machinery Directive for the European Economic Area
PELV	Protected Extra-Low Voltage (PELV) with electrically protective-separation
PL	Performance Level
RoHS	Restriction of Hazardous Substances
SELV	Safety Extra-Low Voltage
SIL	Safety edge
PLC	Programmable Logic Controller
UL	Guidelines for electrical safety (Underwriters Laboratories)
VAC	Volts of Alternating Current
VDC	Volts of Direct Current
WEEE	Waste of Electrical and Electronic Equipment Directive

Tab. 2: Meaning of the abbreviations

10 Product disposal

At the end of its service life, dispose of the product in accordance with the valid legal specifications.

11 Technical data

TST RCCA overall	External supply	Voltage range	19.2/24/30 VDC (DIN EN61131-2)
		Supply type	SELV
		Power consumption	2.4 to 240 W
		Current consumption	Unloaded: 85 mA Max. load: 10.5 A
	Weight		RCCA-B: 75 g RCCA-C/RCCA-D: 120 g
	Environmental influences	Temperature range	-20 to 70°C
		Humidity	90%, non-condensing
	EMC		EN 61000-3-2 EN 61000-3-3 EN 61000-6-2 EN 61000-6-3 EN 60335-1
FDI	Output voltage	Voltage range (24 VDC +/- x%)	19.2/24/30 VDC
	Sensor supply current output	Maximum per port overall	1 A
	OSSD output (test output)	High level	19.2/30 VDC
		High current output	100 mA
	OSSD input (test input)	High level	11/30 VDC
		High current consumption	2/15 mA
		Low level	0/5 VDC
		Signal type: Frequency, duty cycle	DC *see debounce filter
		Delay/debounce filter	Max. 50 ms
FDO	Switching voltage		19.2/24/30 VDC
	Switching current		Max. 50 mA
	Delay, switching		Max. 50 ms
	Delay, complete chain (from reaching the protocol on NW LP)		Max. 50 ms
DI	Output voltage	Voltage range (24 VDC +/- x%)	19.2/24/30 VDC
	Sensor supply current output	Max. per port and total	0.125 mA/750 mA
	Input	High level	11/30 VDC
		High current consumption	2/15 mA
		Low level	0/5 VDC
		T_HL/LH	Max. 50 ms

		Debounce filter	Max. 50 ms
TST CTRL	OPEN/CLOSED/STOP	Delay	Max. 50 ms
IO-Link	Output voltage	Voltage range (24 VDC +/- x%)	19.2/24/30 VDC
	Sensor supply current output	Max. per port and total	0.5 A/2 A
	DO	High level	19.2/24/30 VDC
		High current output	0.5 A/0.35 A
		T_HL/LH	Max. 50 ms
	DI	High level	13 to 24 VDC
		High current consumption	5/5.8/6.6 mA
		Low level	0 to 11.5 VDC
		T_HL/LH	Max. 50 ms
Standards / directives applied	2006/42/EC – Machinery Directive		
	2014/35/EU – Low Voltage Directive		
	2004/108/EC – EMC Directive		
	20011/65/EU – RoHS2 Directive		
	DIN EN 13849-1:2015	Cat. 4/ PL e for the safe inputs (FDI) and outputs (FDO)	
	EN 61062	SIL3 for the safe inputs (FDI) and outputs (FDO)	
	IEC 61508	SIL3 for the safe inputs (FDI) and outputs (FDO)	
	IEC 61158-3	For PROFIsafe	
	EN 61000-3-2		
	EN 61000-3-3		
	EN 61000-6-2:2011-06		
	EN 61000-6-3:2012-11		
	EN 60335-1		

12 Certificates

12.1 EC-Declaration of Conformity

FEIG

FEIG ELECTRONIC GmbH
Industriestraße 1a
D- 35781 Weilburg

EG-Konformitätserklärung

Hiermit erklären wir, dass das nachstehende Zubehör:

Bezeichnung	**Logikerweiterung für Torantriebssteuerungen**
Typ / Handelsbezeichnungen	**TST RCCA-A, TST RCCA-B, TST RCCA-C, TST RCCA-D**

den einschlägigen Bestimmungen folgender Richtlinien entspricht:

Maschinenrichtlinie	2006/42/EG
Niederspannungsrichtlinie	2014/35/EU
ROHS2	2011/65/EU
EMV	2014/30/EU

Angewandte harmonisierte Normen:

EN ISO 13849-1:2015	Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen – Teil 1: Allgemeine Gestaltungsleitsätze
EN ISO 13849-2:2012	Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen – Teil 2: Validierung
EN 61508-1:2010	Funktionale Sicherheit sicherheitsbezogener elektrischer/ elektronischer/programmierbarer elektronischer Systeme Teil 1: Allgemeine Anforderungen
EN 61508-2:2010	Funktionale Sicherheit sicherheitsbezogener elektrischer/ elektronischer/programmierbarer elektronischer Systeme Teil 2: Anforderungen an sicherheitsbezogene elektrische/ elektronische/programmierbare elektronische Systeme
EN 61508-3:2010	Funktionale Sicherheit sicherheitsbezogener elektrischer/ elektronischer/programmierbarer elektronischer Systeme Teil 3: Anforderungen an Software
EN 62061:2005 + Cor.:2010 + A1:2013 + A2:2015	Sicherheit von Maschinen – Funktionale Sicherheit sicherheitsbezogener elektrischer, elektronischer und programmierbarer elektronischer Steuerungssysteme
EN 60335-2-103: 2015	Sicherheit elektrischer Geräte für den Hausgebrauch und ähnliche Zwecke – Teil 2-103: Besondere Anforderungen für Antriebe für Tore, Türen und Fenster
EN 12453:2017	Tore – Nutzungssicherheit kraftbetätigter Tore – Anforderungen und Prüfverfahren; Deutsche Fassung EN 12453:2017

Bevollmächtigter für die Zusammenstellung der relevanten technischen Unterlagen:

Weilburg, den 10.03.2022

Dirk Schäfer
Technischer Leiter / Technical Director
CONTROLLER & SENSORS (VTM)

Die technische Dokumentation ist am Firmenstandort Weilburg archiviert.

Diese Erklärung bescheinigt die Übereinstimmung mit den genannten Richtlinien, beinhaltet jedoch keine Zusicherung von Eigenschaften. Die mitgelieferte Produktdokumentation und insbesondere die darin enthaltenen Sicherheitshinweise sind zu beachten.

12.2 PROFINET Declaration of Conformity

PROFIBUS • PROFINET

Certificate

PROFIBUS Nutzerorganisation e.V. grants to

FEIG ELECTRONIC GmbH
Lange Straße 4, 35781 Weilburg, Germany

the Certificate No: **Z13067** for the PROFINET IO Device:

Model Name:	TST RCCA
Revision:	SW/FW: V1.0.35; HW: 4
Identnumber:	0x055D; 0xFE01
GSD:	GSDML-V2.35-FEIG-TST RCCA-20220216.xml
DAP:	DIM 2: TST-RCCA-B; 0x10100007

This certificate confirms that the product has successfully passed the certification tests with the following scope:

☑ PNIO_Version	V2.35
☑ Conformance Class	C
☑ Optional Features	Legacy, MRP
☑ Application Class(es)	FunctionalSafety, EnergySaving
☑ Netload Class	III
☑ PNIO_Tester_Version	Version 2.4.1 with annex spirta
☑ Tester	SIEMENS AG, Fürth, Germany, PN651-1 plus Manufacturer Declaration

This certificate is granted according to the document:
"Framework for testing and certification of PROFIBUS and PROFINET products".
For all products that are placed in circulation by **February 25, 2024** the certificate is valid for life.

Karlsruhe, April 21, 2022

(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.

(Karsten Schneider)

(Dr. Jörg Hähniche)

PROFINET®

12.3 PROFINET Declaration of Conformity

PROFIBUS • PROFINET

Certificate

PROFIBUS Nutzerorganisation e.V. grants to

FEIG ELECTRONIC GmbH
Lange Straße 4, 35781 Weilburg, Germany

the Certificate No: **Z13070** for the PROFINET IO Device:

Model Name:	TST RCCA
Revision:	SW/FW: V1.0.35; HW: 4
Identnumber:	0x055D; 0xFE01
GSD:	GSDML-V2.35-FEIG-TST RCCA-20220216.xml
DAP:	DIM 3: TST-RCCA-C; 0x1010000F

This certificate confirms that the product has successfully passed the certification tests with the following scope:

☑ PNIO_Version	V2.35
☑ Conformance Class	C
☑ Optional Features	Legacy, MRP
☑ Application Class(es)	FunctionalSafety, EnergySaving
☑ Netload Class	III
☑ PNIO_Tester_Version	Version 2.4.1 with annex spirta
☑ Tester	SIEMENS AG, Fürth, Germany, PN651-1 plus Manufacturer Declaration

This certificate is granted according to the document:
"Framework for testing and certification of PROFIBUS and PROFINET products".
For all products that are placed in circulation by **February 25, 2024** the certificate is valid for life.

Karlsruhe, April 21, 2022

(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.

(Karsten Schneider)

(Dr. Jörg Hähniche)

PROFINET®

12.4 PROFINET Declaration of Conformity

Certificate

PROFIBUS Nutzerorganisation e.V. grants to

FEIG ELECTRONIC GmbH
Lange Straße 4, 35781 Weilburg, Germany

the Certificate No: **Z13066** for the PROFINET IO Device:

Model Name:	TST RCCA
Revision:	SW/FW: V1.0.35; HW: 4
Identnumber:	0x055D; 0xFE01
GSD:	GSDML-V2.35-FEIG-TST RCCA-20220216.xml
DAP:	DIM 4: TST-RCCA-D; 0x1010001F

This certificate confirms that the product has successfully passed the certification tests with the following scope:

☑ PNIO_Version	V2.35
☑ Conformance Class	C
☑ Optional Features	Legacy, MRP
☑ Application Class(es)	FunctionalSafety, EnergySaving
☑ Netload Class	III
☑ PNIO_Tester_Version	Version 2.4.1 with annex spirta
☑ Tester	SIEMENS AG, Fürth, Germany, PN651-1 plus Manufacturer Declaration

This certificate is granted according to the document:
"Framework for testing and certification of PROFIBUS and PROFINET products".
For all products that are placed in circulation by **February 25, 2024** the certificate is valid for life.

Karlsruhe, April 21, 2022

(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.

(Karsten Schneider)

(Dr. Jörg Hähniche)

12.5 PROFIsafe Declaration of Conformity

PROFIBUS • PROFINET

Certificate

PROFIBUS Nutzerorganisation e.V. grants to

FEIG ELECTRONIC GmbH
Lange Straße 4, 35781 Weilburg, Germany

the Certificate No: **Z20282** for the PROFIsafe Module:

Model Name:	TST RCCA
Order-Number:	TST RCCA-B, TST RCCA-C, TST RCCA-D
Revision:	SW/FW: V0.1.33; HW: 5
Application CRC:	Channel A: 0x95BE
	Channel B: 0x95BE

This certificate confirms that the product has successfully passed the certification tests with the following PROFIsafe scope:

☑	PROFIsafe_V2 functionality BP/LP on PROFINET IO
☑	PROFIsafe_V2 functionality XP on PROFINET IO

Test Report Number:	PS169-1 plus Manufacturer Declaration
Authorized Test Laboratory:	SIEMENS AG, Fürth, Germany

The tests were executed in accordance with the following documents:
"PROFIsafe - Test Specification for F-Slaves, F-Devices, and F-Hosts, Version 2.3, March 2018".
This certificate is granted according to the document:
"Framework for testing and certification of PROFIBUS and PROFINET products".

For all products that are placed in circulation by **April 09, 2024** the certificate is valid for life.

Karlsruhe, May 06, 2021

(Official in Charge)

PROFIsafe

Board of PROFIBUS Nutzerorganisation e. V.

(Karsten Schneider)

(Dr. Jörg Hähniche)

12.6 Type examination certificate

TÜV NORD

ZERTIFIKAT
CERTIFICATE

Hiermit wird bescheinigt, dass die Firma / *This certifies that the company*

FEIG ELECTRONIC GmbH
Lange Straße 4
35781 Weilburg / Waldhausen
Deutschland

berechtigt ist, das unten genannte Produkt mit dem abgebildeten Zeichen zu kennzeichnen
is authorized to provide the product mentioned below with the mark as illustrated

Fertigungsstätte *Manufacturing plant*	**FEIG ELECTRONIC GmbH** **Lange Straße 4** **35781 Weilburg / Waldhausen** **Deutschland**
Beschreibung des Produktes (Details s. Anlage 1) *Description of product* *(Details see Annex 1)*	**Logikerweiterungskarte für Torantriebssteuerungen,** **TST RCCA** *Logic expansion card for door drive control unit,* *TST RCCA*
Geprüft nach *Tested in accordance with*	**EN ISO 13849-1:2015 (PL d/e)** **EN ISO 13849-2:2012** **EN 61508-1:2010 (SIL 2/3)** **EN 62061:2005 + Cor.:2010 + A1:2013 + A2:2015 (SILCL 2/3)** **EN 60335-2-103: 2015** **EN 12453:2017**

TÜV NORD
TÜV NORD CERT GmbH
Baumuster geprüft
Freiwillige Zertifizierung

Registrier-Nr. / *Registered No.* 44 780 13132624
Prüfbericht Nr. / *Test Report No.* 3530 9240
Aktenzeichen / *File reference* 8003006716

Gültigkeit / *Validity*
von / *from* 2021-11-05
bis / *until* 2026-11-04

Zertifizierungsstelle der
TÜV NORD CERT GmbH

Essen, 2021-11-05

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.de technology@tuev-nord.de

Bitte beachten Sie auch die umseitigen Hinweise
Please also pay attention to the information stated overleaf