

EF2 INDEXER CONTROLLER

MANUAL

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This document is referred to as "instructions" in the following text.

These instructions are valid for the product designated subsequent.

Product: Indexer controller

Type: EF2...B V2.1

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1 INTRODUCTION

1.1 Definition

Indexer controller EF2...B

The EF2...B V2.1 indexer controller is used for the easy to operate and time-optimised control of indexers of the TC and TR series in all frame sizes.

The controller is optimally designed for operation with the TC and TR indexers and offers you the following benefits:

- Intuitive, web-based user interface for fast commissioning
- No brake wear, soft start-up from intermediate positions minimizes the impact on the gearing
- Increased performance through fully automatic optimisation cycle
- Remote support and remote diagnostics options
- Worldwide use due to various power supply configurations
- Compact hardware (all-in-one)
- Fieldbus connection: PROFIBUS and PROFINET on board
- Interface: Digital I/O optional with TM15 module
- Integrated safety function SIL2 / PLd
- SIL3 / PLe available with additional measures

1.2 Intended use

The components for the controller and drive are approved for industrial and commercial application in industrial mains supply.

All information regarding the technical data and the permissible conditions at the location of use must be complied with.

Commissioning (starting the intended operation) of the machine in which the components described here are to be installed is not allowed until the conformity of the machine with the EMC Directive 2014/30/EC and the Machinery Directive 2006/42/EC has been determined.

The operation of the controller is permissible only in enclosed housings or in superordinate control cabinets with closed protective covers while using all protective equipment.

1.3 Target group

These instructions are intended for persons who are responsible for planning, installation, as well as maintenance and service, and have the adequate qualification and skills to perform these tasks.

Handling the components of the controller is permitted only by qualified and trained personnel who know and comply with all safety instructions as stated on the components and in the relevant technical user documentation.

1.4 Controller components



FIG. 1: Controller components

The components of the controller are delivered as individual modules. Their assembly and wiring are the responsibility of the user.

Pos.	Component	Type / Characteristics
(1)	Control unit	SIMOTION D410-2
(2)	Power module	PM240-2
	(frame size FSA)	
(3)	(frame size FSB)	
(4)	External Braking resistor	Koch (Option)
(5)	Module TM15	Option: for digital inputs/outputs
(6)	Module TM15 + encoder	Option: for cam controller
(7)	Motor contactor	Option: for applications up to SIL3 / PLe
(8)	Safety relay	Option: for applications up to SIL3 / PLe

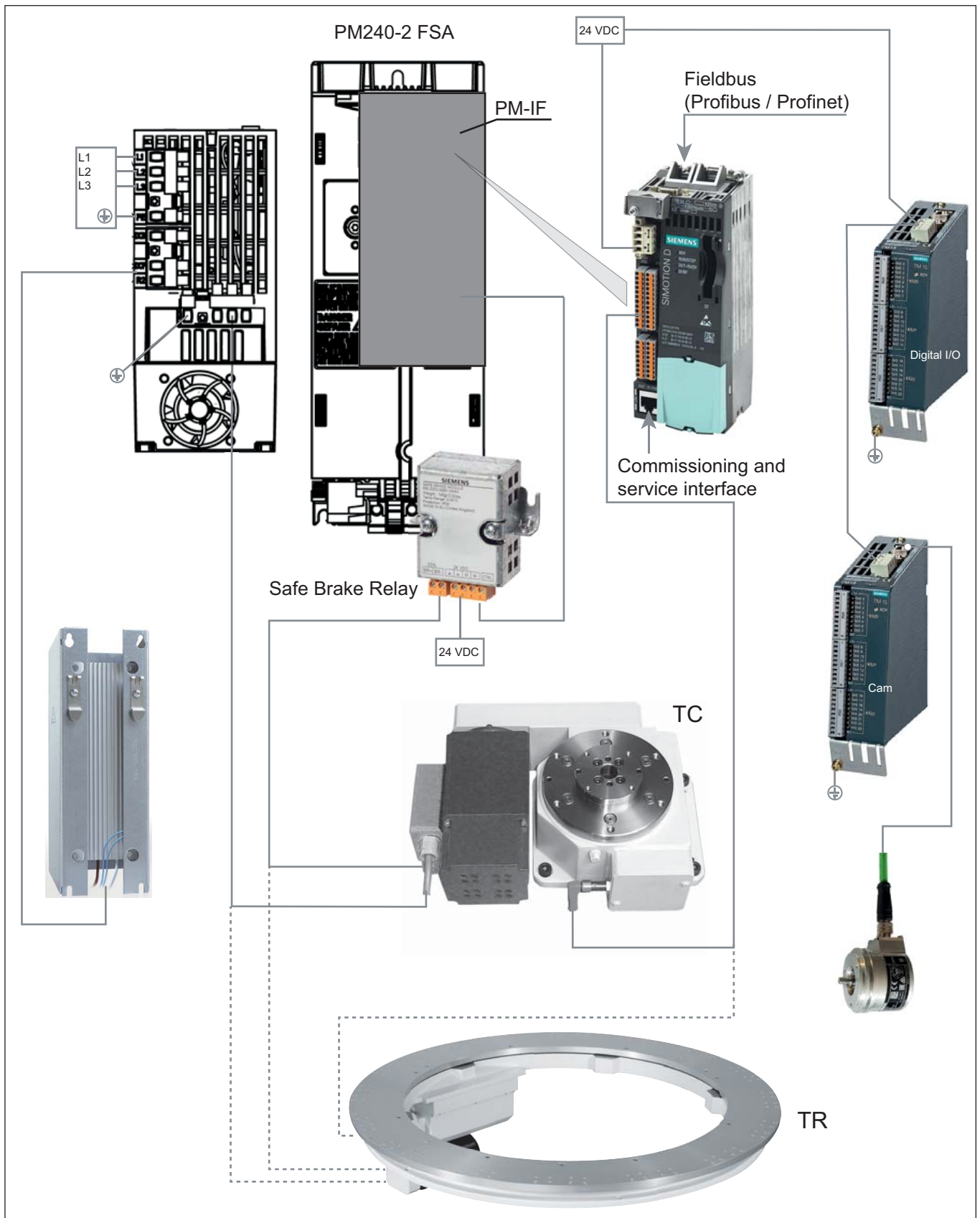


FIG. 2: Block diagram of EF2...B controller with PM240-2 FSA

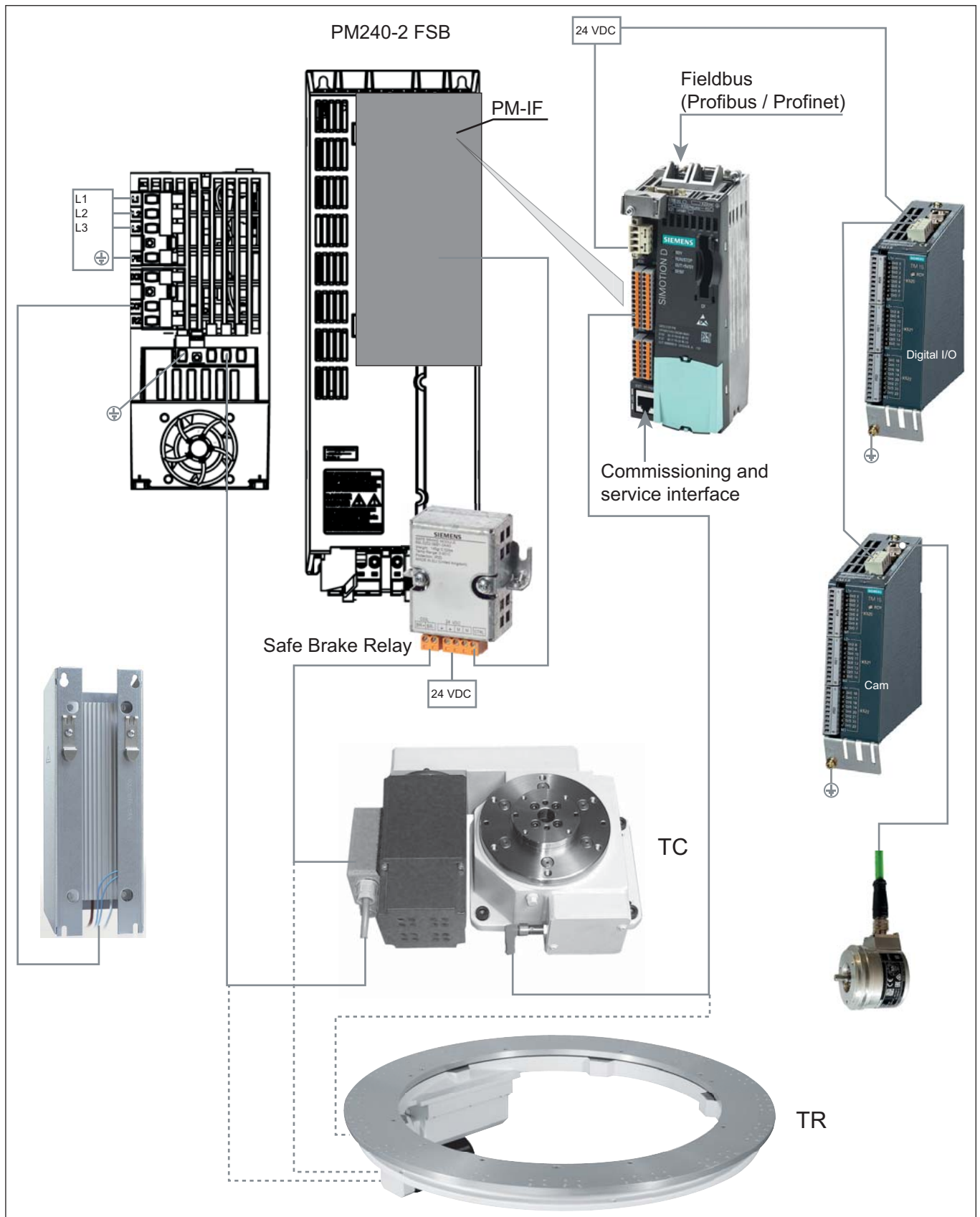



FIG. 3: Block diagram of EF2...B controller with PM240-2 FSB

1.5 Further applicable documents

In addition to this manual, further documents are required for installation of the controller and safe operation of a machine with this controller. Compliance with the information in these documents must be regarded.

 Operating manual, mechanics documentation indexer TC / TR

 Siemens_Documentations on the CF card

1.6 Manual

This manual describes the components of the controller and the installation and commissioning of a indexer with the EF2...B V2.1 controller.

We reserve the right to undertake modifications because of technical developments to the data and illustrations contained in these instructions.

The operating manual and the associated valid documentation are not subject to an automatic revision service.

Information on the respective current edition can be obtained from the manufacturer.

Local regulations must be observed.

This manual describes how to use the controller and contains important information that will support you in using the device as intended.

This manual describes the handling of the machine and contains important instructions and information to assist you in correct use of the machine.

A PDF file with these instructions is also available on the CF card of the controller.

Safety instructions in individual chapters should be observed.

The manual is to be kept for further use and must be handed over to subsequent owners, users or end customers.

1.6.1 Validity

These instructions are valid for EF2 controllers of the series:

- EF2037B For motors up to 0,25 kW
- EF2150B For motors up to 1,1 kW
- EF2220B For motors up to 1,5 kW
- EF2300B For motors up to 3,0 kW

1.6.2 Standard scope

The scope of the functionality described in this document can differ from the scope of the functionality of the drive system that is actually delivered.

Other functions that are not explained in this document may be available in the drive system. However, there is no entitlement to these functions when the equipment is first delivered or when it is being serviced.

The documentation may also contain descriptions of functions that are not available in a particular product version of the drive system. The functionalities of the supplied drive system should only be taken from the purchase order documents.




Extensions or changes made by the machine manufacturer must be documented by the machine manufacturer.

1.6.3 Explanation of safety instructions in this manual

This manual contains instructions that you should observe for your personal safety and to avoid material damage. Safety instructions for your personal safety are highlighted by a sign containing a warning triangle and signal word. The associated text describes the hazard involved, avoidance options and the consequences which may result from failure to observe the safety instructions.

General instructions or instructions relating to possible material damage are highlighted by a sign without a warning triangle.

They are, depending on the degree of risk involved, illustrated as follows:

 DANGER	<i>A warning triangle with the signal word DANGER indicates an immediate hazardous situation, which, if not avoided, will lead to fatalities or severe injuries.</i>
 WARNING	<i>A warning triangle with the signal word WARNING indicates a potential hazardous situation, which, if not avoided, can lead to fatalities or severe injuries.</i>
 CAUTION	<i>A warning triangle with the signal word CAUTION indicates a potential hazardous situation, which, if not avoided, can lead to light or medium injuries.</i>
NOTICE	<i>A sign with the signal word NOTICE indicates potential material damage or provides additional information, which should be observed when operating the machine.</i>

1.6.4 Legend


Symbols and abbreviations with the following meaning are used in this manual to make its content more clear:


1. Indicates a numbered list.

a) Indicates the second level of a numbered list.

• Indicates a list.

▶ Indicates the second level of a list.

 The book symbol before a section of text indicates further applicable documents.

 The information symbol before a section of text marks an additional note or an important tip for use.

1.6.5 Figures

The figures used show the parts of the controller as examples. There may be differences between the illustrations and the actual delivered controller.

1.6.6 List of valid pages

Pages of this manual including the title page: 198

2 SAFETY

2.1 Basic safety instructions

The controller corresponds to the state of the art and the applicable stipulations of the VDE. It provides a high level of safety.

This safety can only be achieved during actual operation, however, when all associated necessary measures have been performed. The operator is obliged to plan these measures and to inspect their execution.

Only suitably qualified personnel may install, commission, and maintain the machine.

This personnel must take into account the information provided in the technical customer documentation for the product, and be familiar with and observe the specified danger and warning notices.

2.1.1 Operator's obligation to exercise diligence

The operator must ensure that

- The controller and the machine controlled by it are only used as intended.
- The controller and the machine controlled by it are only operated in perfect working condition and the mechanical and electrical safety equipment are present.
- this manual and all other applicable documentation is maintained at all times in legible condition and is accessible at the installation site of the machine. Ensure that all personnel who must carry out tasks on the machine have access the manuals at all times..
- all safety instructions and warnings affixed to the product are not removed and must remain legible.
- national accident prevention guidelines and company-internal guidelines are complied with.
- VDE regulations are complied with.
- the EMC legislation is complied with during installation.

2.1.2 Technical safety

WARNING

During operation, electrical equipment and motors have parts and components with hazardous voltage levels, which touched, can cause severe bodily injury or death.

All work on the electrical system must be carried out when the system has been disconnected from the power supply (de-energized).

In combination with the drive system, the controllers are generally approved for operation on TN and TT systems with a grounded neutral point.

During operation on IT systems, the occurrence of a first fault between an active part and the ground must be signalled by a monitoring device. In accordance with HD 60364-4-41, it is recommended that the first fault be eliminated as quickly as practically possible.

Operation in different networks is not permissible.

In systems with a grounded external conductor, an isolating transformer with grounded neutral point (secondary side) must be connected between the mains and the drive system to protect the motor insulation from excessive stress. The majority of TT systems have a grounded external conductor, so in this case an isolating transformer must be used.

Flawless and safe operation of the controller assumes proper transportation in the transportation packaging, correct long-term storage in the transport packaging, proper setup and installation, as well as careful operation and maintenance.

In addition to the danger and warning information provided in the technical customer documentation, the applicable national, local, and system-specific regulations and requirements must also be taken into account.

To ensure compliance with EN 61800-5-1 and UL 508, only safety extra-low voltages may be connected to connections and terminals on the electronic modules.

Using protection against direct contact via DVC A (PELV) is only permissible in areas with potential equalization and in dry rooms indoors. If these conditions are not fulfilled, then other protective measures against electric shock must be taken (e.g. touch protection).

NOTICE

As part of routine material tests, the controller components will undergo a voltage test in accordance with EN 61800-5-1. Before the voltage test is performed on the electrical equipment of machines acc. to EN 60204-1, Section 19.4, all connectors of the controller component must be disconnected / unplugged to prevent the equipment from being damaged.

Motors should be connected according to the wiring schematic supplied with the motor (refer to the connection examples for motor modules). Direct connection to the three-phase supply is not permitted because it would damage the motors.

Operating the equipment in the immediate vicinity (<1.8 m) of mobile telephones with a transmitter power of >1 W may cause the components to malfunction.

2.1.3 Electrostatic safety

NOTICE

Electrostatic sensitive devices (ESDs) are individual components, integrated circuits, or modules that may be damaged by either electrostatic fields or electrostatic discharge.

Regulations for handling ESD components:

When handling electronic components, make sure that personnel, workstations, and packaging are well grounded!

Personnel may only come into contact with electronic components, if

- they are grounded with an ESD wrist band, or
- they are in ESD areas with conductive flooring, ESD shoes or ESD grounding straps.

Electronic modules should only be touched if absolutely necessary.

They must only be handled on the front panel or, in the case of circuit boards, at the edge.

Electronic modules must not come into contact with plastics or items of clothing containing synthetic fibres.

Electronic modules must only be placed on conductive surfaces (work surfaces with ESD surface, conductive ESD foam, ESD packing bag, ESD transport container).

Do not place electronic modules near display units, monitors, or television sets (minimum distance from screen > 10 cm).

Measurements can only be taken on electronic modules when the measuring device is grounded (e.g. via protective conductors) or, in the case of an isolated measuring device, when the measuring probe is briefly discharged before measurements are taken (e.g. by touching a bare metal housing).

2.1.4 Ambient and operating conditions

NOTICE

The components must be protected against conductive contamination, for example:

- Compliance with the standards (chapter 12 „Standards and approvals“ on page 167)
- Inspection of the safety equipment
- Installation in a cabinet with a degree of protection IP54B according to EN 60529

Under the circumstances that conductive contamination at the installation site can definitely be excluded, a lower degree of cabinet protection may be permitted.

2.2 Emergency Stop Circuit

For immediate shutdown and to prevent unexpected startup, an emergency stop circuit must be used.

The design of a suitable safety concept for operation of a machine with the described controller is the responsibility of the operator.

2.3 Residual hazards

When carrying out a risk assessment of a machine in accordance with the EC Machinery Directive, the machine manufacturer must consider the following residual risks which originate at the components of the controller and the drive:

- Unintentional movements of driven machine components during commissioning, operation, maintenance, and repairs caused by, for example:
 - ▶ Hardware malfunctions and/or software errors in the sensors, controllers, actuators, and connection technology
 - ▶ Response times of the controller and drive
 - ▶ Operating and/or ambient conditions which are not within the scope of the specification
 - ▶ Condensation/conductive contamination
 - ▶ Parameterization, programming, cabling, and installation errors
 - ▶ Use of radio devices / cellular phones in the immediate vicinity of the controller
 - ▶ External influences / damage
- Extreme temperatures as well as emissions of light, noise, particles, or gases caused by, for example:
 - ▶ Component malfunctions
 - ▶ Software errors
 - ▶ Operating and/or ambient conditions which are not within the scope of the specification
 - ▶ External influences / damage
- Hazardous shock voltages caused by, for example:
 - ▶ Component malfunctions
 - ▶ Influence of electrostatic charges
 - ▶ Induction of voltages in moving motors
 - ▶ Operating and/or ambient conditions which are not within the scope of the specification
 - ▶ Condensation/conductive contamination
 - ▶ External influences / damage
- Electrical, magnetic and electromagnetic fields generated in operation that can pose a danger to persons with a pacemaker, implants or metal replacements, etc. if they are too close
- Release of environmental pollutants or emissions as a result of improper operation of the system and/or improper disposal of components

i For more information about residual risks of the components in the controller, refer to the relevant chapters in this document.


WARNING
Electric shock

Power and control connections can still conduct electricity even if the machine is at a standstill. Work on electrical equipment should only be performed by qualified electricians in compliance with the instructions in the operating manual for the electrical system documentation. Electrical connections for the machine should only be disconnected or plugged in when the power supply is deactivated and secured against reactivation. Touching energised components can lead to serious or fatal injuries.

Residual energy

After the frequency converter has been disconnected from the power supply, a residual charge may still be present. After shutting down the device and before disconnecting the plugs, wait at least five minutes and then check whether the capacitor has been discharged to a voltage of < 65V DC at the "DCP" and "DCN" terminals. The fact that the LEDs on the drive are off is not an indication that the unit is disconnected from the line supply and there is no voltage. Touching live parts can result in death or serious injury.

Electrical, magnetic, or electromagnetic fields

Electrical, magnetic and electromagnetic fields (EMFs) generated in operation can pose danger to persons who are present in the immediate vicinity of the product - especially to persons with pacemakers, implants, or similar devices.

The relevant directives and standards have to be observed by the machine / plant operators and persons present in the vicinity of the product! These are, for example, EMF Directive 2004/40/EEC and standards EN 12198-1 to -3 for the European Economic Area (EEA) and in the Federal Republic of Germany, the accident prevention regulation BGV 11 and the associated rule BGR 11 "Electromagnetic fields" from the German employer's liability accident insurance association.

They state that a hazard analysis must be performed for every workplace and measures must be derived from it and applied in order to reduce dangers and their impact on persons, and that exposure and danger zones must be defined and observed.

The relevant safety instructions in each chapter must be observed.

Danger to life due to high leakage currents if the external protective conductor is interrupted

The drive components generate a high leakage current through the protective conductor. Touching conductive parts can cause death or serious injuries if the protective conductor is interrupted.

The protective conductor (PE) must meet the following conditions:

- The protective conductor (PE) is routed so that it is protected against mechanical damage.
- The protective conductor (PE) must have a cross-section of $\geq 10 \text{ mm}^2$ Cu or $\geq 16 \text{ mm}^2$ Al.
- If the protective conductor (PE) in the connection cable does not meet this minimum cross section, then an additional ground conductor needs to be routed parallel to the protective conductor (PE) and with a fixed connection to the machine.
- The protective conductor (PE) corresponds to the local regulations with increased leakage current.

RCD

When using the EF2 controller, RCDs are not suitable for establishing safety circuits for the protection of persons against electrical hazards.

The implementation of suitable protective measures is the responsibility of the operator.

Switching elements (main switches, contactors), for switching the power drive system on and off must have a max. delay time of 35 ms between the closing/opening of the individual main contacts.

Risk of injury due to absent safety equipment.

Safety equipment and covers that have been removed for maintenance purposes must be put back into place before switching the machine back on. Operation without safety equipment and covers is prohibited.

The implementation of a safety concept is the responsibility of the operator. The operator must plan for and provide sufficient protective measures such as fences, light barriers, emergency-stop circuits, covers, warning signs, etc.


CAUTION
Risk of injuries due to burning.

Depending on their design, components (motor, frequency converter) may have hot surfaces during operation. Operating temperatures > 60° C are possible. Touching hot components will lead to burns.

3 COMPONENT DESCRIPTIONS

3.1 Power Modules PM240-2

The power modules are designed as follows:

- Mains-side diode rectifier
- DC-link electrolytic capacitors with pre-charging circuit
- Output inverter IGBT
- Braking chopper for (external) braking resistor
- 24 V DC / 1 A power supply
- Gating unit, actual value acquisition
- Fan to cool the power semiconductors

The power modules cover a power range from 0.37 kW to 3.0 kW (versions without line filter).

3.1.1 Safety instructions



Electric shock

After all voltages have been disconnected, a hazardous voltage may still be present in the power unit for up to 5 minutes. The cover for the terminals may only be opened after this time has elapsed.

The DC-link discharge time must be legible on the component in the corresponding national language.

Damaged components may not be operated further. Non-observance can result in damage and accidents.

The drive components generate high leakage currents in the protective conductor. The components must only be operated in cabinets or in closed electrical operating areas and must be connected with the protective conductor. In order to provide protection against electric shock, the protective conductor connection on the cabinet or machine must be implemented in accordance with one of the following measures:

- Fixed connection and protective conductor connection with cross sectional areas $\geq 10 \text{ mm}^2 \text{ Cu}$ or $\geq 16 \text{ mm}^2 \text{ Al}$
- Stationary connection and automatic shutdown of the power supply if the protective conductor is interrupted

Ground / Protective ground

The power module housing must always be grounded. If the power module is not correctly grounded, then extremely hazardous states can develop which, under certain circumstances, can result in death.

NOTICE

Connection authorization

Power modules have been designed for use in industrial environments and generate current harmonics on the mains side as a result of the rectifier circuit.

When connecting a machine with integrated power modules to the public low-voltage line supply, authorization is required in advance from the local power supply company (utility company) if:

- the rated input current of the machine $\geq 16 \text{ A}$ per conductor, and
- the rated input current of the machine does not comply with the requirements specified in EN 61000-3-2 regarding current harmonics.

3.1.2 Power Module PM240-2; frame size FSA

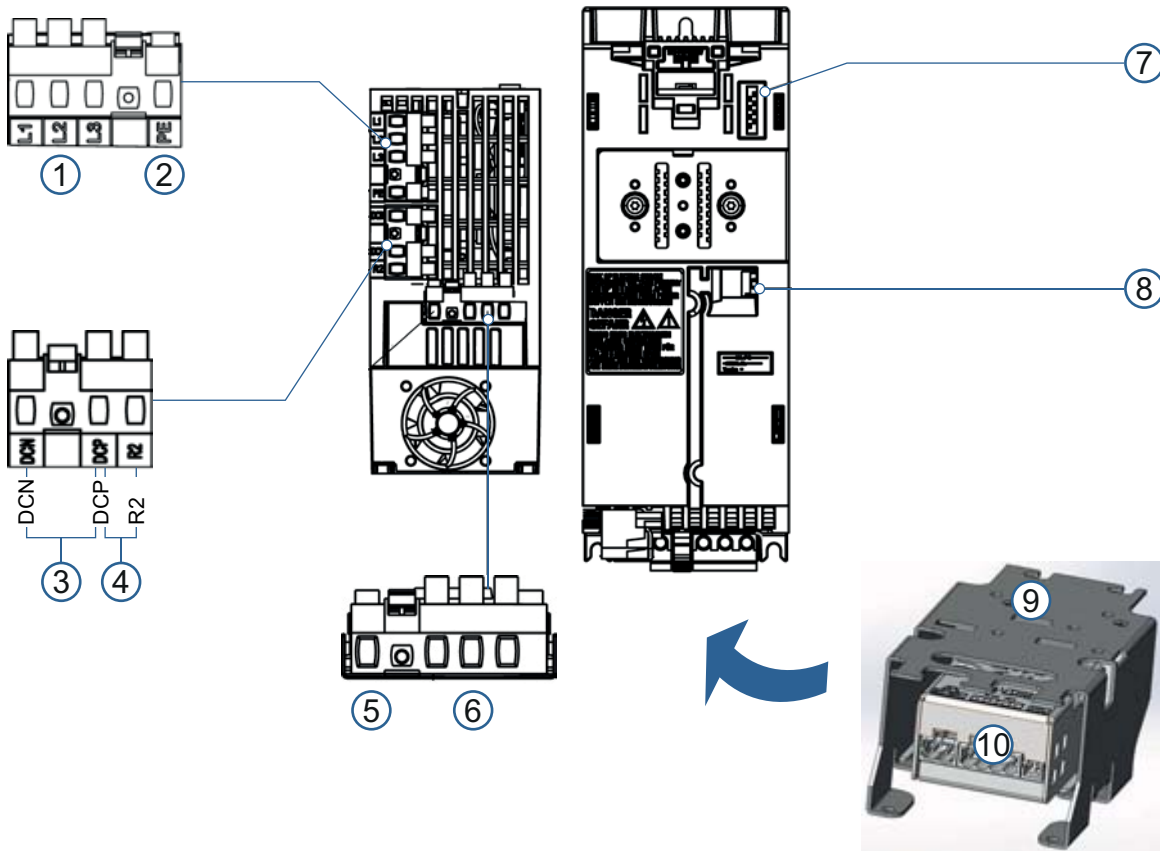


FIG. 4: Interfaces of Power Module PM240-2; frame size FSA

ⓘ The connections for mains, brake resistor and motor are detachable plug connections and are located on the bottom side of the power module.

Pos.	Interface	Description
(1)	L / N (1P) or L1 / L2 / L3 (3P)	Power mains connection
(2)	PE	Protective ground connection for the line supply cable
(3)	DCN / DCP	DC bus negative / DC bus positive
(4)	DCP / R2	Braking resistor connection
(5)	PE \oplus	Protective ground connection for the motor cable
(6)	U2 / V2 / W2	Motor connection
(7)	PM-IF	Power module interface
(8)	-	Brake relay connection
(9)	-	Shield terminal connection set
(10)	-	Brake Relay

📖 Refer to the device manual of the manufacturer for further information.

3.1.3 Power Module PM240-2; frame size FSB

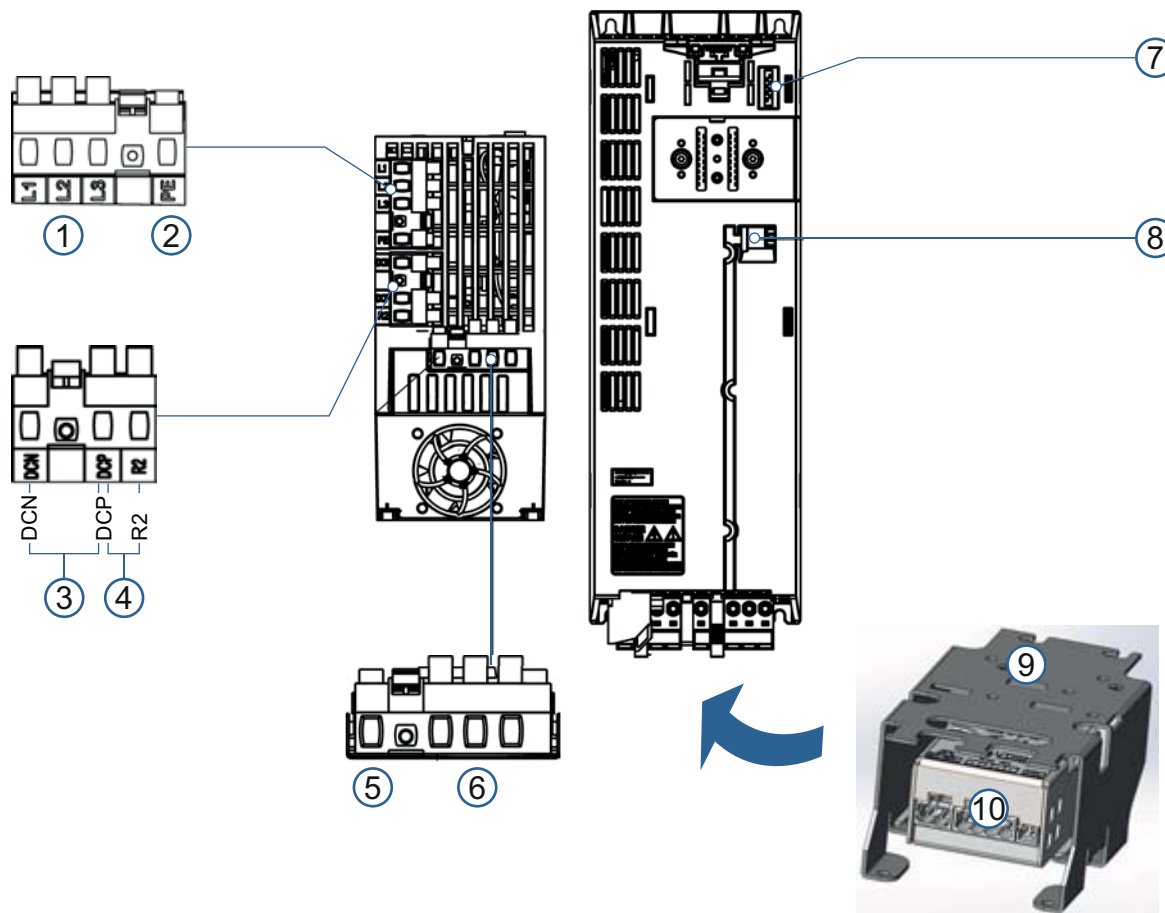


FIG. 5: Interfaces of Power Module PM240-2; frame size FSB

ⓘ The connections for mains, brake resistor and motor are detachable plug connections and are located on the bottom side of the power module.

Pos.	Interface	Description
(1)	L1 / L2 / L3	Power mains connection
(2)	PE	Protective ground connection for the line supply cable
(3)	DCN / DCP	DC bus negative / DC bus positive
(4)	DCP / R2	Braking resistor connection
(5)	PE ⊕	Protective ground connection for the motor cable
(6)	U2 / V2 / W2	Motor connection
(7)	PM-IF	Power module interface
(8)	-	Brake relay connection
(9)	-	Shield terminal connection set
(10)	-	Brake Relay

📖 Refer to the device manual of the manufacturer for further information.

3.1.4 Technical data

Standard Power Modules PM240-2					
• Without integrated line filter		6SL3210-1PB13-0UL0	6SL3210-1PE16-1UL1	6SL3210-1PE18-0UL1	6SL3210-1PE21-1UL0
• With integrated line filter		6SL3210-1PB13-0AL0	6SL3210-1PE16-1AL1	6SL3210-1PE18-0AL1	6SL3210-1PE21-1AL0
Frame size		FSA	FSA	FSA	FSB
Dimensions					
• Width	mm	73	73	73	100
• Height	mm	196	196	196	291
• Depth	mm				
▶ without operating unit	mm	165	165	165	165
▶ with operating unit	mm	248	248	248	248
Weight					
• Without integrated line filter	kg	1,4	1,4	1,4	2,9
• With integrated line filter	kg	1,6	1,5	1,5	3,1
Line supply voltage	VAC	1AC200...240	3AC380...480	3AC380...480	3AC380...480
Line frequency	Hz	50...60, ± 3			
Output current		1AC50Hz 230 V	3AC50Hz 400 V	3AC50Hz 400 V	3AC50Hz 400 V
Rated current I_N ¹⁾	A	3,2	5,9	7,7	10,2
Base-load current I_L ¹⁾	A	3,2	5,9	7,7	10,2
Base-load current I_H ²⁾	A	2,3	4,1	5,9	7,7
Peak current I_{max}	A	4,8	8,9	11,8	15,4
Rated power					
• based on I_L	kW	0,55	2,2	3,0	4,0
• based on I_H	kW	0,37	1,5	2,2	3,0
Rated pulse frequency	kHz	4	4	4	4
Efficiency factor η		>96	>96	>96	>97
Power loss ³⁾					
at rated current	kW	0,04	0,077	0,103	0,128
Cooling air requirement	m ³ /s	0,005	0,005	0,005	0,0092
Sound pressure level LpA (1 m)	dB	< 50	< 50	< 50	< 62
24 V DC supply for the control unit	A	1,0	1,0	1,0	1,0
Input current ⁴⁾					
• Rated current 1AC/3AC	A	7,5/4,3	--	--	--
• based on I_H 1AC/3AC	A	6,6/3,8	--	--	--
• Rated current	A	--	7,7	10,1	13,3
• based on I_H	A	--	6,1	8,8	11,6
Power mains connection U1/L1, V1/L2, W1/L3		Clamping connector	Clamping connector	Clamping connector	Clamping connector
• Terminal cross-section	mm ²	1,5...2,5	1,0...2,5	1,0...2,5	1,5...6,0
Line fuses					
• Siemens	A	10	10	16	20
• UL, J-type	A	15	30	30	35

COMPONENT DESCRIPTIONS | 3.1 Power Modules PM240-2

Standard Power Modules PM240-2					
• Without integrated line filter		6SL3210-1PB13-0UL0	6SL3210-1PE16-1UL1	6SL3210-1PE18-0UL1	6SL3210-1PE21-1UL0
• With integrated line filter		6SL3210-1PB13-0AL0	6SL3210-1PE16-1AL1	6SL3210-1PE18-0AL1	6SL3210-1PE21-1AL0
Motor connection U2, V2, W2		Clamping connector	Clamping connector	Clamping connector	Clamping connector
• Terminal cross-section	mm ²	1,5...2,5	1,0...2,5	1,0...2,5	1,5...6,0
PE connection	Included in the clamping connector				
Degree of protection		IP20	IP20	IP20	IP20
1) The rated output current I _N and the base-load current I _L are based on the load cycle for low overload LO.					
2) The base-load current I _H is based on the load cycle for high overload HO.					
3) Typical values. Further information in the Internet at http://support.automation.com/WW/view/de/94059311					
4) The input current depends on the motor load and network impedance. The input currents are valid for loading with rated power (based on I _N) at a network impedance according to u _k = 1%. The current values are displayed on the rating plate of the power module.					

 Refer to the device manual of the manufacturer for further information.

3.1.5 Overview Power Module PM240-2

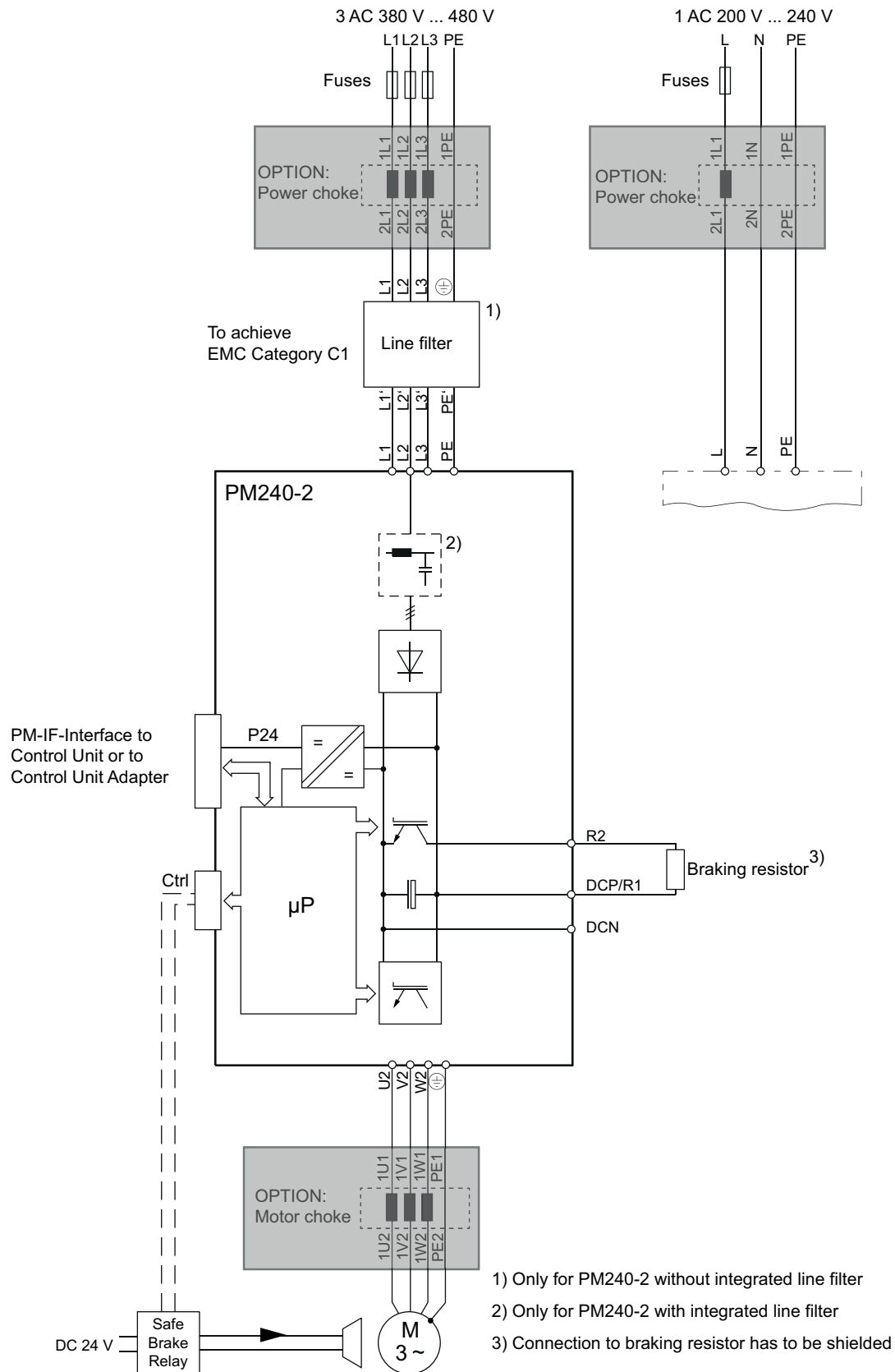


FIG. 6: Overview Power Module PM240-2

3.2 External braking resistor (option)

The Power Modules PM240-2 are assigned to fixed values of the braking resistors:

- 0.37 kW, 1 AC 230 V, 390 ohm, peak power = 1.5 kW
- 1.50 kW, 3 AC 400 V, 150 ohm, peak power = 2.75 kW
- 2.20 kW, 3 AC 400 V, 150 ohm, peak power = 2.75 kW
- 3.00 kW, 3 AC 400 V, 80 ohm, peak power = 4.0 kW

The peak power is limited to a maximum of 12 sec. in an interval of 240 sec., if there is no performance in the remaining period. It may be necessary to test the stopping time.

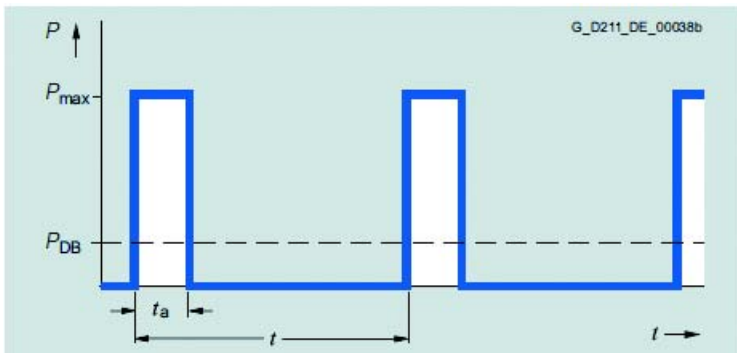


FIG. 7: Load diagram for braking resistors in blocksize format

$t_a = 12 \text{ s}$

$t = 240 \text{ s}$

3.2.1 Technical data

Order number		EF2037B	EF2150B / EF2220B	EF2300B
		BWD250390K01R0901SI	BWD500150K01R0901SI	BWD600080K01R1002SI
Suitable for power modules of frame size		FSA		FSB
Peak power P_{max}	kW	1,5	2,75	4,0
Resistance	Ω	390	150	80
Tolerance (resistance value)	%	± 5 at room temperature		
Tolerance coefficient TC	-	20...100 at $10^{-6}/K$		
Insulation resistance R_{ISO}	M Ω	≥ 100 ($U_{meas} = 1.000 \text{ VDC}$)		
Inductance L	μH	≤ 30 ($f = 300 \text{ kHz}, U_{meas} = 50 \text{ mV}$)		
Capacitance against housing C	pF	≤ 300 ($f = 300 \text{ kHz}, U_{meas} = 50 \text{ mV}$)		
cCSAus approvals	-	Standard CSA-C22.2		
cURus approvals	-	UL 508		
Max. operating voltage U_B	V	$\leq 700 \text{ AC}$ taking the intrinsic safety into account $\leq 1,000 \text{ DC}$ taking the intrinsic safety into account $\leq 600 \text{ AC}$ UL approval $\leq 850 \text{ DC}$ UL approval		
Isolation voltage U_{ISO}	V	$\geq 4.000 \text{ AC}$ (AC; $f = 50 \text{ Hz}, t = 1 \text{ min}$)		
Max. housing temperature	$^{\circ}C$	≤ 250 (free convection)		
Storage temperature	$^{\circ}C$	-25...+85		
Weight	kg	1,2	1,6	2,5

Refer to the device manual of the manufacturer for further information.

3.3 Motor contactor

A power contactor can be used as a switching device for switching the motor to comply with safety requirements according to SIL3.

In combination with a safety relay (see chapter 3.4), the requirements can be met for a safety integrity level SIL3 or performance level PLe to their fullest extent, depending on the external circuit.

The Motor Contactor 3RT2017 is suitable for switching motors of up to 5.5 kW / 400 V (AC-3) and resistive loads of up to 50 A (AC-1).

The following illustration shows an example of the features of the Motor Contactor 3RT2017-1BB42 for switching motor loads.

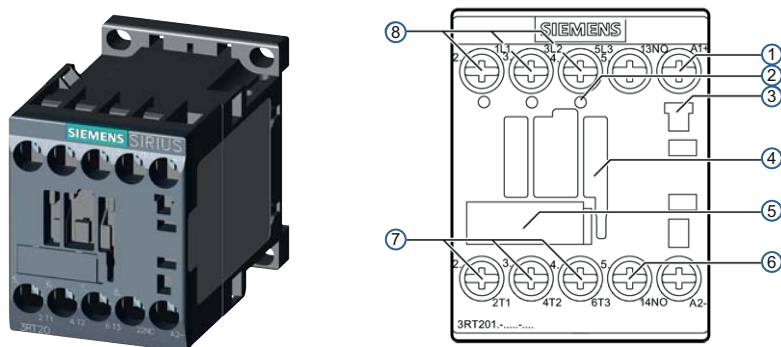


FIG. 8: Motor Contactor 3RT2017-1BB42

1	Coil terminal on the front side
2	Openings for voltage tap of the main circuit (communication-capable power contactor only)
3	Location hole for surge suppression
4	Location hole for 1-, 2-, and 4-pole auxiliary switch blocks
5	Labelling plate
6	1 integrated auxiliary contact (1 normally closed contact)
7	Main circuit terminals of the contactor to the load/motor connection (T1, T2, T3)
8	Main circuit terminals of the contactor to the power network (L1, L2, L3)

3.3.1 Technical data

Permissible mounting position		AC and DC operation	
The contactors are designed for operation on a vertical mounting surface (1) and for an upright mounting position (2).			
Mechanical durability			
	Basic device	30 Mio	Switching cycles
	Basic device with snap-on auxiliary switch block	10 Mio	Switching cycles
Rated isolation voltage U_i (degree of contamination 3)		V	690
Rated impulse withstand voltage U_{imp}		kV	6
Protective separation between coil and main contacts acc. to DIN EN 60947-1, Annex N		V	400

Refer to the device manual of the manufacturer for further information.

3.4 Safety relay

Type 3SK1122-1CB41

The safety relay 3SK1122 features two safety-related semi-conductor outputs and a non-safety-related semi-conductor signalling circuit.

The front of the device features a 4-way DIP switch for function configuration and 4 LEDs for status and function indication.

The SET/RESET button is used to save function configurations and to restart the device (reset).

NOTICE Changes

A time change is only accepted after a RESET. Changed settings do not become valid until after acknowledgement by pressing the SET/RESET button.

The device runs through a self-test during the start-up. The internal electronics and firmware are checked for proper function during that. During the operation, all internal safety critical circuit elements are cyclically monitored for faults. During this, the semi-conductor outputs are checked cyclically for correct function by a light/dark test of max. 2.5 ms length (dynamic).

The safety relays are designed so that applications can be realised up to SIL3 acc. to IEC 62061, PL e / cat. 4 acc. to ISO 13849-1.

The PL or SIL level which is achievable depends on the external connections.

Depending on the ambient conditions, the device must be installed in a control cabinet with the degree of protection IP32, IP43 or IP54 (degree of contamination 3).

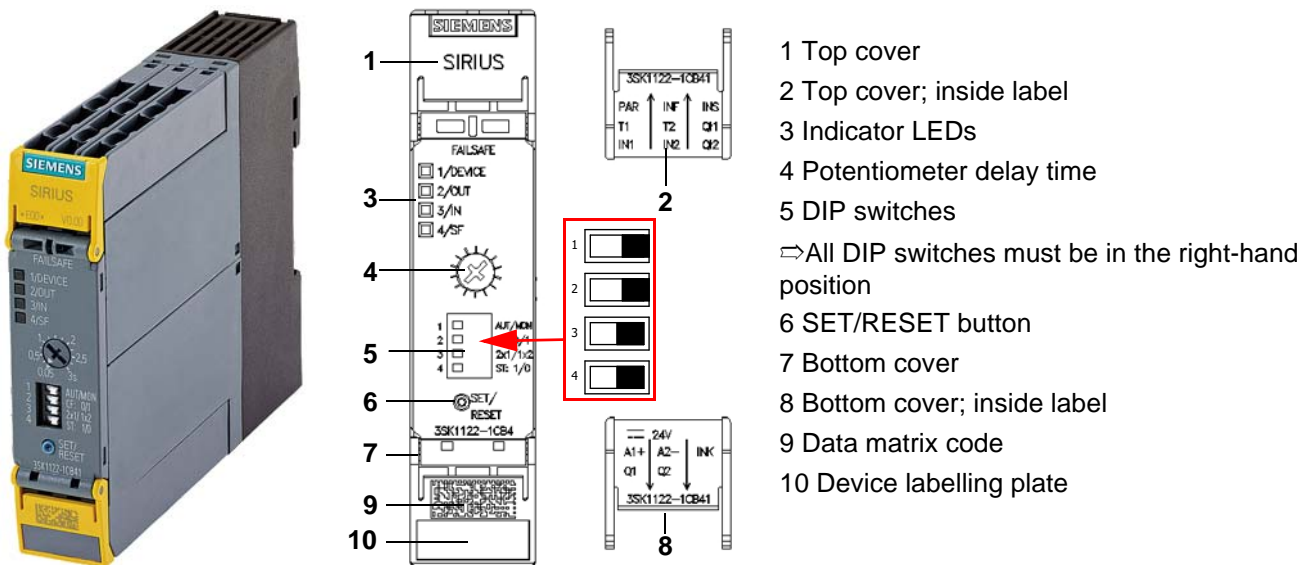


FIG. 9: Sirius Safety Relay

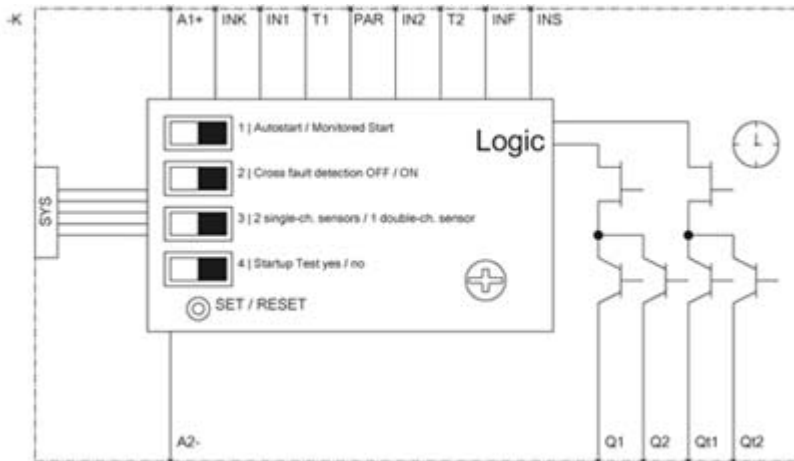


FIG. 10: Circuit safety relay

3.4.1 Technical data

Safety relay Sirius 3SK1122-1CB41	
Version	for emergency stop and protection doors
Degree of protection	IP20
Contact protection against electric shock	finger-safe
Ambient temperature	
Storage	-40 °C...+80°C
Operation	-25 °C...+60 °C
Air pressure	900 hPa...1060 hPa
Observe information on the device	
Relative humidity during operation without condensation	10 %...95 %
Elevation above sea level	2.000 m
Vibration resistance in accordance with IEC 60068-2-6	5 ... 500 Hz: 0,75 mm
Degree of contamination	3
Overvoltage category	III
Spacing to be maintained during serial installation to the side	0 mm
Spacing to be maintained to grounded components to the side	5 mm
DC _{avg} average diagnostic coverage	> 99 %
MTTF _d Mean Time To a dangerous Failure	> 30 years
Equipment identification	
• According to DIN 40719 extended acc. to IEC 204-2 / acc. to IEC 750	-
• According to DIN EN 61346-2	F
Hardware fault tolerance according to IEC 61508	1
Installation position	As desired
Type of attachment	Snap-on mounting
Type of electrical connection	Screw connection
Service	The device is service-free
Verification of suitability	
TÜV approval	Yes
UL approval	Yes
CSA approval	Yes

Refer to the device manual of the manufacturer for further information.

3.5 Terminal Module TM15 Digital A/E

The Terminal Module Digital E/A provides 24 DI/DO (digital I/Os).

In the case of EF2, the digital inputs and outputs are permanently assigned as 12 DI and 12 DO.

The TM15 terminal module is connected to the SIMOTION D410-2 via DRIVE-CLiQ. It has a separate 24 V supply.

In the case of the EF2 option DI/DO, the TM15 terminal module is delivered with an included a DRIVE-CLiQ cable.

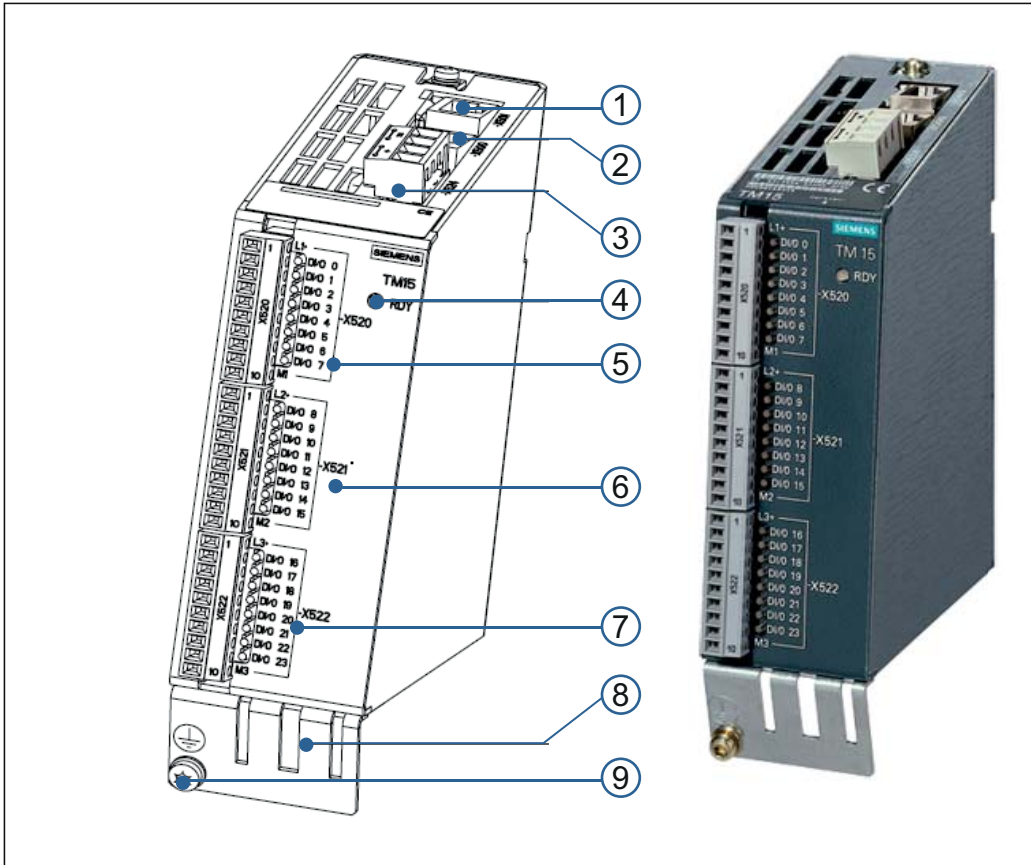



FIG. 11: Interfaces of the TM15 Terminal Module Digital E/A

Pos.	Interface	Description
(1)	X501	DRIVE-CLiQ interface
(2)	X500	DRIVE-CLiQ interface
(3)	X524	Electronics power supply
(4)	LED	Status indicator
(5)	X520	8 digital inputs
(6)	X521	4 digital inputs / 4 digital outputs
(7)	X522	8 digital outputs
(8)	Shield	Shield connection
(9)	PE	Protective ground connection

 Refer to the device manual of the manufacturer for further information.

3.6 Terminal Module TM15 for cam controllers

The terminal module TM 15 for cam controllers provides 24 DI/DO.

In the case of EF2, the digital inputs and outputs are permanently assigned as 16 DO and 8 DI.

The TM15 terminal module is connected to the SIMOTION D410-2 via DRIVE-CLiQ. It has a separate 24 V supply.

In the case of the EF2 option DI/DO, the TM15 terminal module is delivered with an included a DRIVE-CLiQ cable.

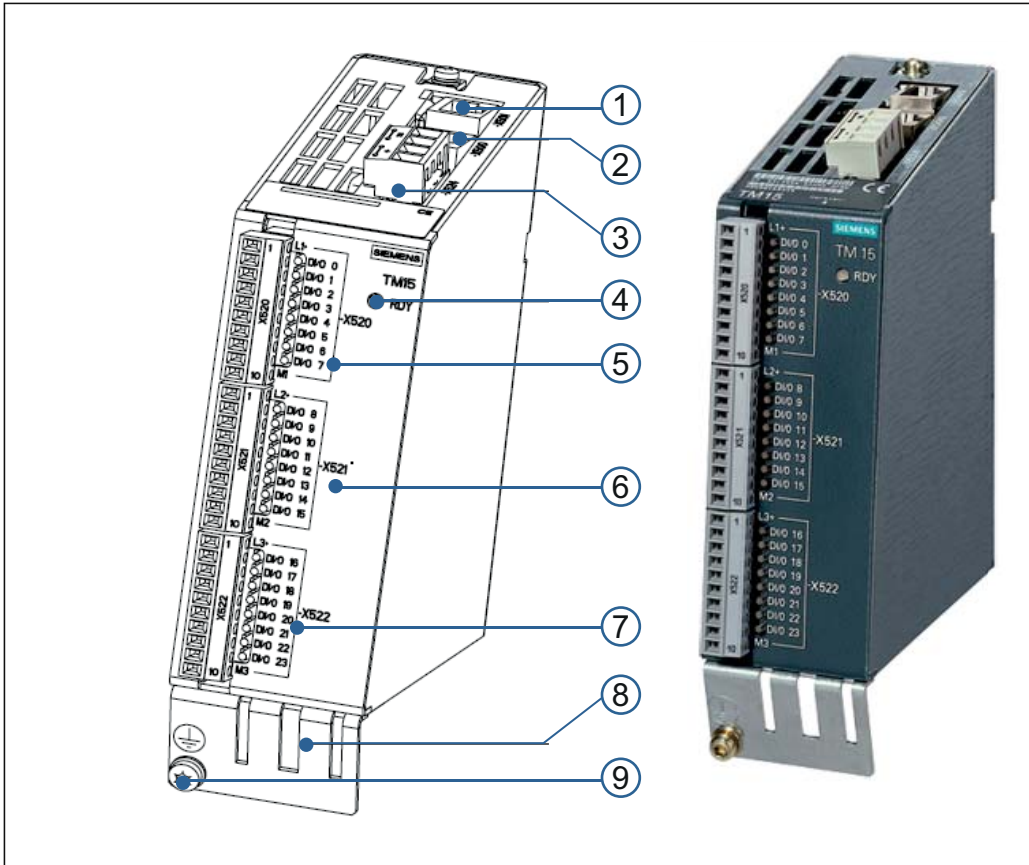



FIG. 12: Interfaces of the TM15 Terminal Module for cam controllers

Pos.	Interface	Description
(1)	X501	DRIVE-CLiQ interface
(2)	X500	DRIVE-CLiQ interface
(3)	X524	Electronics power supply
(4)	LED	Status indicator
(5)	X520	8 digital outputs
(6)	X521	8 digital outputs
(7)	X522	8 digital inputs
(8)	Shield	Shield connection
(9)	PE	Protective ground connection

 Refer to the device manual of the manufacturer for further information.

3.7 Absolute encoder for cam controller

For the cam controller and segment identification functions, an additional encoder is required to detect the position of the indexer.

A SIEMENS absolute encoder is used.

The encoder is connected to the controller via DRIVE-CLiQ. Preconfigured cables with defined lengths are supplied for this purpose.

The indexer must be prepared for installing the encoder. Retrofitting is not possible without problems.



FIG. 13: Absolute encoder

3.7.1 Technical data

Absolute encoder 6FX2001-5FD25-1AA0	
Electrical data	
Operating voltage Up	DC 24 V - 15% + 20 %
Current draw, max.	43 mA
Interface	DRIVE-CLiQ
Resistance to short-circuiting	Yes
Cable length for downstream electronics, max.	100 m
Connection type	Flange box, radial
Resolution	36-bit (24-bit single-turn + 12-bit multi-turn)
Incremental tack	2048 S/R, 1 Vpp (encoder-internal only)
Accuracy	+/- 20"
Degree of protection	At the housing IP67 At the shaft entrance IP64
Mechanical data	
Shaft version	Full shaft
Shaft diameter	6 mm
Shaft length	10 mm
Net weight	0,3 kg
Shock	6 ms 2000 m/s ²
Ambient temperature	
Operation	-30 °C...+100 °C
Standards	
Conformity to standards	CE, cULus
EMC filter class	geprüft DIN EN 50081 und EN 50082

 Refer to the device manual of the manufacturer for further information.

3.8 Brake Relay

A Brake Relay is required for operating motors with holding brakes up to 2 A (included in the scope of delivery). The Brake Relay is the interface between the CU / Power Modules Blocksize and the 24 V DC motor brake. The motor brake is electronically controlled. The supply voltage for the motor brake must be separately connected to the Brake Relay.

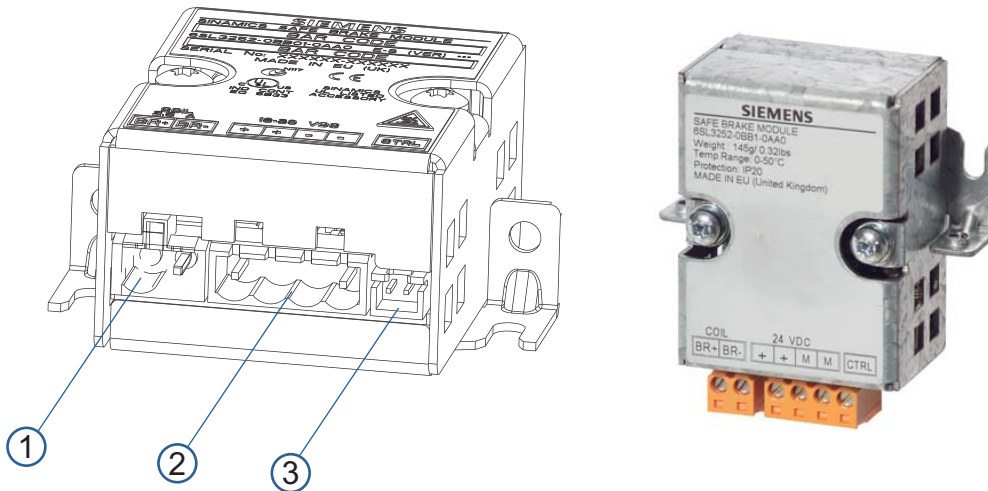


FIG. 14: Interfaces of the Brake Relay

Pos.	Interface	Description
(1)	-	Connection for the solenoid of the motor brake
(2)	-	Connection for a 24 V DC power supply
(3)	-	Connection for the cable harness (CTRL) to the power module, blocksize format (included in the scope of delivery)

3.8.1 Technical data

Pos.	Interface	Description
Power supply		DC 20.4 to 28.8 V Recommended nominal value of the power supply 26 V DC (to equalize and compensate for the voltage drop along the length of the feeder cable to the 24 V DC solenoid of the motor brake)
Current requirement, max.		
Motor brake at 24 VDC	A	2
	A	0.05 + current drawn by the motor brake
Conductor cross-section, max.	mm ²	2,5
Dimensions (W x H x D)	mm	69 x 63 x 33
Weight	kg	approx. 0.17

 Refer to the device manual of the manufacturer for further information.

3.8.2 Brake Relay connection example

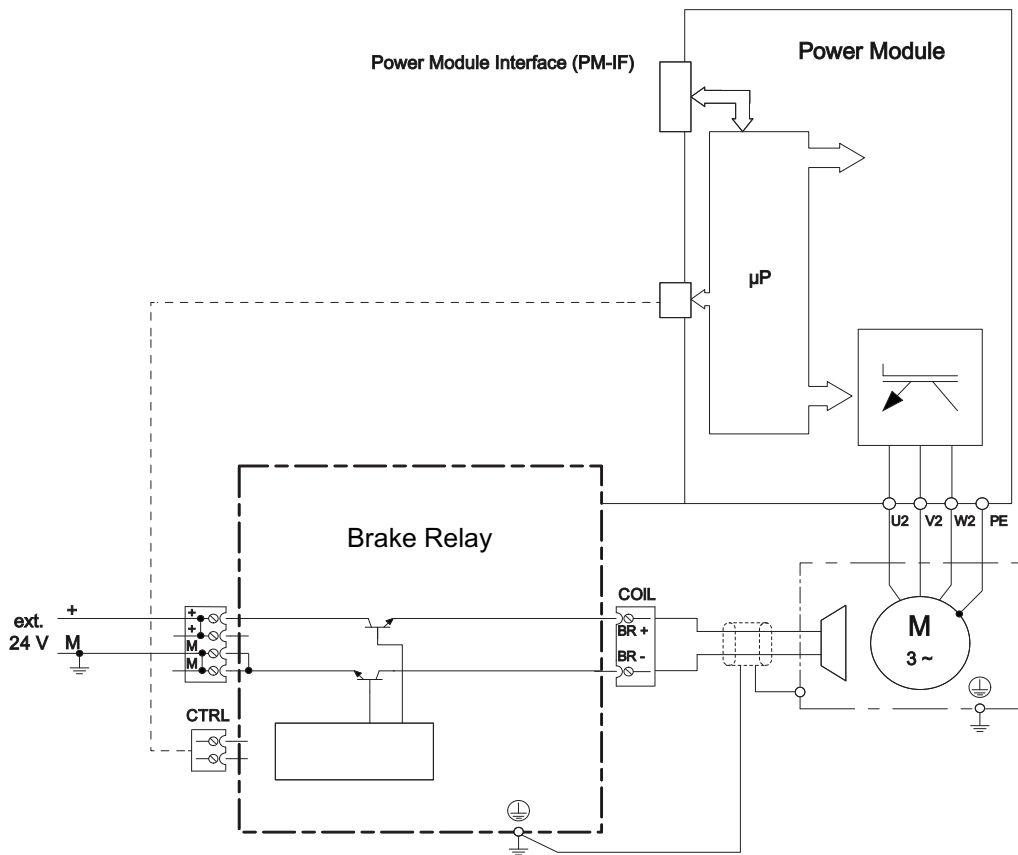


FIG. 15: Brake Relay connection example

3.9 SIMOTION D410-2 Control Unit

SIMOTION D is the drive-based version of SIMOTION based on the SINAMICS S120 drive family.

In SIMOTION D, the SIMOTION PLC and motion control functionalities as well as the SINAMICS S120 drive software run on shared control hardware.

SIMOTION D410-2 is a compact control unit predestined for single-axis applications.

The SIMOTION D410-2 Control Unit is mounted directly on to the Power Module PM240-2.

The firmware and preset parameters for operation are stored on a CF card that has to be inserted into the slot on the Control Unit D410-2.

The control unit communicates with external components via the interfaces.

LEDs indicate the operating statuses.

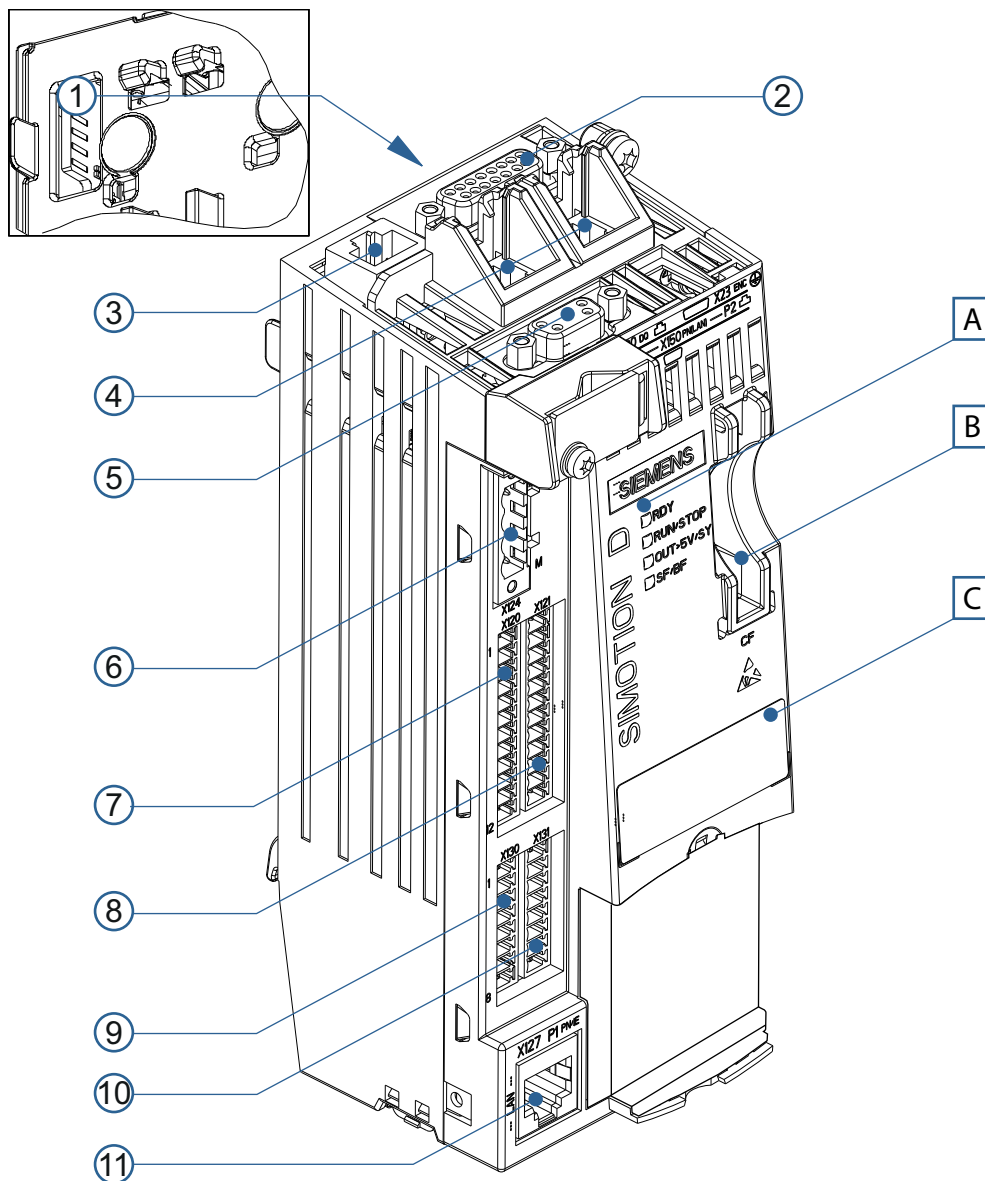


FIG. 16: Interfaces and front elements of the Control Unit D410-2 DP / PN

Pos.	Description	
[A]	LED status indicators	
[B]	CF card slot	
[C]	Type plate	
Pos.	Interface	Description
(1)	PM-IF	Interface to the power module (on the rear)
(2)	X23	Encoder interface
(3)	X100	DRIVE-CLiQ interface
(4)	X150	PROFINET IO interfaces ⓘ Setting the device name: Nodes naming by external tools must not be performed!
(5)	X21	PROFIBUS DP interface
(6)	X124	Electronics power supply
(7)	X120	Temperature sensor connection Fail-safe digital inputs EP terminals
(8)	X121	Isolated digital inputs High-speed digital inputs / outputs
(9)	X130	Isolated digital input Fail-safe digital output
(10)	X131	High-speed digital inputs / outputs Analog input
(11)	X127	Service interface

3.9.1 Technical data

System data, dimensions, weight		
Dimensions W x H x D	73 x 190,7 x 74,4 mm	
Permissible temperature range	Storage	-25 °C....+55 °C
	Operation	0 °C....+55 °C
Protection class	IP 20 (EN 60529)	
Protection class	Class I (with protective conductor connection) and class III (PELV) acc. to EN 61800-5-1:2007	
Maximum weight	0.8 kg (without packaging)	
	1.0 kg (with packaging)	
Electrical connection values		
Power supply	24 V DC (permissible range: 20.4 ... 28.8 V)	
Ripple	Max. 5% at 24 VDC	
Non-periodic overvoltage	Max. 35 VDC	
	(Condition: Max. 500 ms, 50 s recovery time, max. 10 results/h)	
Current consumption, typical ¹⁾	< 0,8 A	
Starting current, typical ¹⁾	3,0 A	
Power loss, typical ¹⁾	< 20 W	
¹⁾ With no load on inputs/outputs and no 24 V supply via DRIVE-CLiQ or PROFIBUS interface		

 Refer to the device manual of the manufacturer for further information.

3.9.2 MAC Addresses

A second type plate for the MAC address of the Ethernet interface and the PROFINET interface is attached to the front of the device.

(1)	Data matrix code	
(2)	Module designation	
(3)	Order number	
(4)	Ethernet interface MAC address of X127	
(5)	PROFINET IO interface MAC address of X150	
(6)	Serial number	
(7)	HW version	

3.9.3 CompactFlash Card

i The CompactFlash card is mandatory for operation of the SIMOTION D410-2.

The SIMOTION Kernel (SIMOTION D410-2 firmware) and the software used to control the drives (WEISS firmware) are stored on the CompactFlash card.

4 FUNCTION AND SIGNAL DESCRIPTIONS

4.1 Signal description of the software inputs

Signal	Default configuration Inputs PED 256	Function
Enable	Bit 0	<p>The output stage of the controller is enabled if the signal level is HIGH. The output stage of the controller is disabled if the signal level is LOW. In addition, the brake is activated.</p> <p>NOTICE The input signal "Enable" in the controller by itself does not meet the requirements to trigger an EMERGENCY STOP.</p>
Stop (low-active)	Bit 1	<p>With this command, all started movements are stopped and new movements are blocked. The brake is switched depending on the configuration.</p> <p>NOTICE This input signal is not intended for use as EMERGENCY STOP.</p>
Cycle CW	Bit 2	<p>With this command, the indexer starts one cycle in the direction of rotation CW.</p> <p>A LOW/HIGH edge starts one cycle.</p>
Cycle CCW	Bit 3	<p>With this command, the indexer starts one cycle in the direction of rotation CCW.</p> <p>A LOW/HIGH edge starts one cycle.</p>
Cycle CW level	Bit 4	<p>With this command, the indexer starts one cycle in the direction of rotation CW.</p> <p>The signal must be present the entire time during the movement and should only be reset when the signal "In operation" is reset.</p> <p>Resetting the signal during rotation leads to an immediate stop. A restart outside of the position cam is carried out with parameter set 3 until the position cam is reached.</p>
Cycle CCW level	Bit 5	<p>With this command, the indexer starts one cycle in the direction of rotation CCW.</p> <p>The signal must be present the entire time during the movement and should only be reset when the signal "In operation" is reset.</p> <p>Resetting the signal during rotation leads to an immediate stop. A restart outside of the position cam is carried out with parameter set 3 until the position cam is reached.</p>
Parameter set 1	Bit 6	<p>The values of the Parameter set 1 (launch pad, frequency, stop ramp) are activated.</p> <p>If no signal for parameter selection is received, the values of parameter set 1 are applied.</p>
Parameter set 2	Bit 7	<p>The values of the Parameter 2 (start ramp, frequency, stop ramp) are activated.</p> <p>If no signal for parameter selection is received, the values of parameter set 1 are applied.</p>

FUNCTION AND SIGNAL DESCRIPTIONS | 4.1 Signal description of the software inputs

Signal	Default configuration Inputs PED 256	Function
Ignore parameter set 3	Bit 8	<p>Parameter set 3 is used for starting from an intermediate position. Only if the position cam of the indexer has not been activated and a start is executed.</p> <p>This parameter set is permanently programmed and cannot be changed. If this parameter set is ignored, depending on the signals Parameter set 1 or Parameter set 2, the intermediate position will not be approached slowly.</p> <p>It is recommended to start with a slow start ramp (>100ms) and a low frequency ($f < 30\text{Hz}$) in order to be gentle on the mechanics of the indexer.</p>
Open brake	Bit 9	If emergency stop is selected and the "Open brake" signal is HIGH, the connected brake is released.
Reset error	Bit 10	On a rising edge (> 30 ms) all existing error messages are acknowledged.
Receive watchdog	Bit 31	<p>The watchdog mechanism serves to monitor the life sign of the EF2 by the superordinate controller.</p> <p>A signal can be specified by the superordinate controller via "Receive watchdog". This signal is copied in the EF2 onto the "Send watchdog" signal and sent back to the superordinate controller.</p> <p>This signal can be monitored by the superordinate controller. A flashing cycle or a static HIGH signal can be used for example as a monitoring signal.</p>
Jog CW	Not allocated	As long as this signal is HIGH, the indexer will rotate CW with Parameter set 3.
Jog CCW	Not allocated	As long as this signal is HIGH, the indexer will rotate CCW with Parameter set 3.
Special mode	Not allocated	<p>Before starting the movement, the special mode needs to be selected by this signal.</p> <p>When starting with the signal "Cycle CW level" or the signal "Cycle CCW level", the table will start to move - and movement will continue - as long as this signal is HIGH.</p> <p>If the table reaches the position cam, the setting is switched to Parameter set 2 and the table will continue to move without stopping.</p> <p>When the position cam is left again, the setting will return to Parameter set 1.</p> <p>If Parameter set 2 is selected, the indexer runs continuously with Parameter set 2.</p> <p>If the signal "Special mode" goes to LOW, then the current cycle will be completed.</p> <p>Afterwards, the "Cycle CW level" signal or otherwise the "Cycle CCW level" signal can be cancelled.</p> <p>By setting the frequency of Parameter set 2, the standstill time of the indexer can be varied within certain limits.</p>

4.2 Signal description of the software outputs

Signal	Default configuration Outputs PAD 256	Function
Ready for switching on	Bit 12	All conditions are fulfilled. The release of the drive can be given via the Enable input.
Enable active	Bit 0	Displays that the drive is in the state Enable. The bit is set to TRUE if the drive is switched off in power-saving mode.
Enable	Not allocated	Displays that the drive is in the state Enable. The bit is set to FALSE if the drive is switched off in power-saving mode.
Ready to start	Bit 1	This output signal indicates that the controller can accept a "Start" command or that the old command has been processed.
In operation	Bit 13	The indexer carries out a rotating movement.
Indexer in position	Bit 2	This output signal indicates that the indexer is in a locked position. A position cam is mounted on the indexer for this purpose. The signal from the position cam is sent to this output without being changed (1:1). If this output signal is HIGH again after the end of the cycle, then processing can be started because the indexer is no longer moving. The motor of the indexer will however continue to move as long as specified by the stop delay or stop ramp that was set, in order to reach an optimal starting position for the next cycle. NOTICE If, however, this output signal is LOW, then processing must be stopped immediately because the indexer has left its position.
Stop selected	Bit 3	Direct feedback from the Stop input.
Alarm timeout	Bit 4	The indexer did not reach the next locking position within the specified time.
Alarm position run over	Bit 5	This output signal indicates that the position cam of the indexer was over-run. NOTICE If this error message is received, then processing must be stopped immediately because the indexer has left its position.
Alarm safety	Bit 6	Internal safety function has detected a fault.
Sum error	Bit 7	This output indicates the presence of a warning.
Sum warning	Bit 8	This output indicates the presence of an error.
Forced dynamic sampling	Bit 9	Indicates that the internal safety function has requested a forced dynamization.
HW limit switch CW (low active)	Not allocated	see chapter 9.1 „HW limit switch“ on page 143
HW limit switch CCW (low active)	Not allocated	see chapter 9.1 „HW limit switch“ on page 143
Sum error flashing	Not allocated	This output can be connected to a lamp that flashes when an error occurs.
STO selected	Bit 10	The safety function STO is selected.
STO active	Bit 11	The safety function STO is active.

FUNCTION AND SIGNAL DESCRIPTIONS | 4.2 Signal description of the software outputs

Signal	Default configuration Outputs PAD 256	Function
Send watchdog	Bit 31	<p>The watchdog mechanism serves to monitor the life sign of the EF2 by the superordinate controller.</p> <p>A signal can be specified by the superordinate controller via "Receive watchdog". This signal is copied in the EF2 onto the "Send watchdog" signal and sent back to the superordinate controller.</p> <p>This signal can be monitored by the superordinate controller. A flashing cycle or a static HIGH signal can be used for example as a monitoring signal.</p>

4.3 Functions and signals TM15

4.3.1 Terminal Module TM15, digital I/O

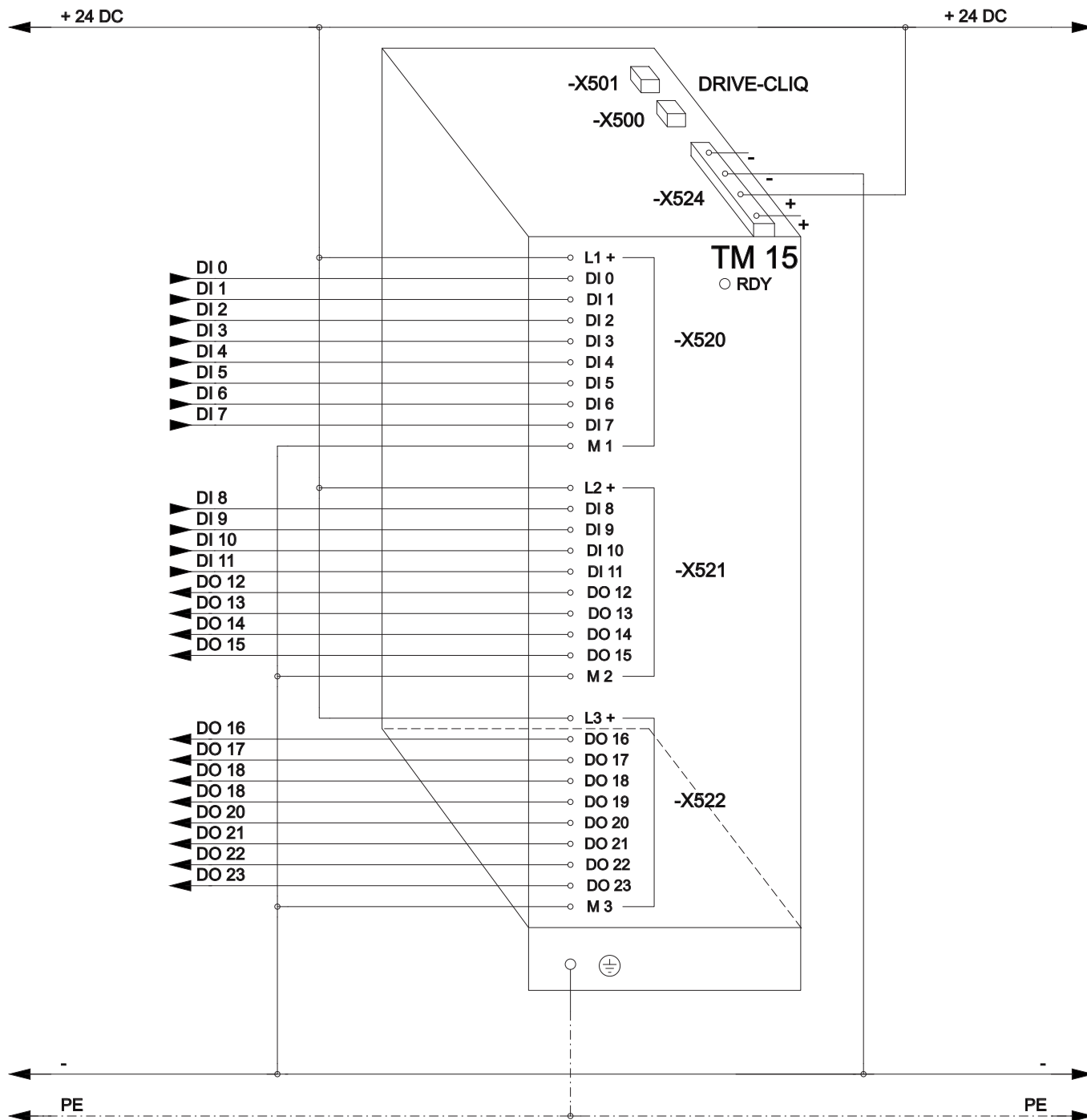


FIG. 17: Terminal Module TM15 Digital I/O connection example

4.3.2 Terminal Module TM15 for cam controllers

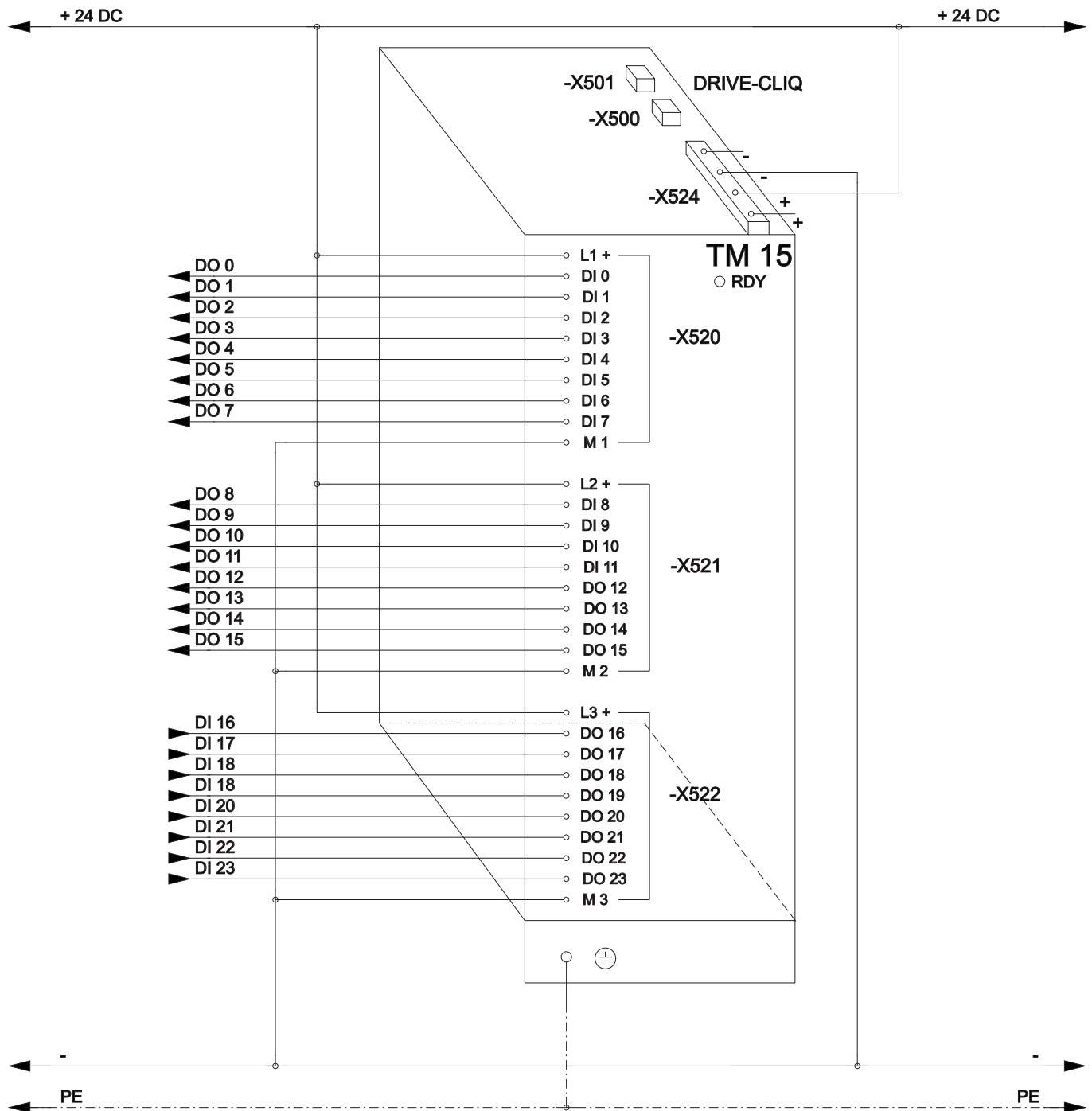


FIG. 18: Terminal Module TM15 for cam controllers connection example

4.4 Time sequence diagrams

4.4.1 Example for time sequence diagram of the signal "Start cycle CW"

ⓘ The same is also valid for the signal "Start cycle CCW".

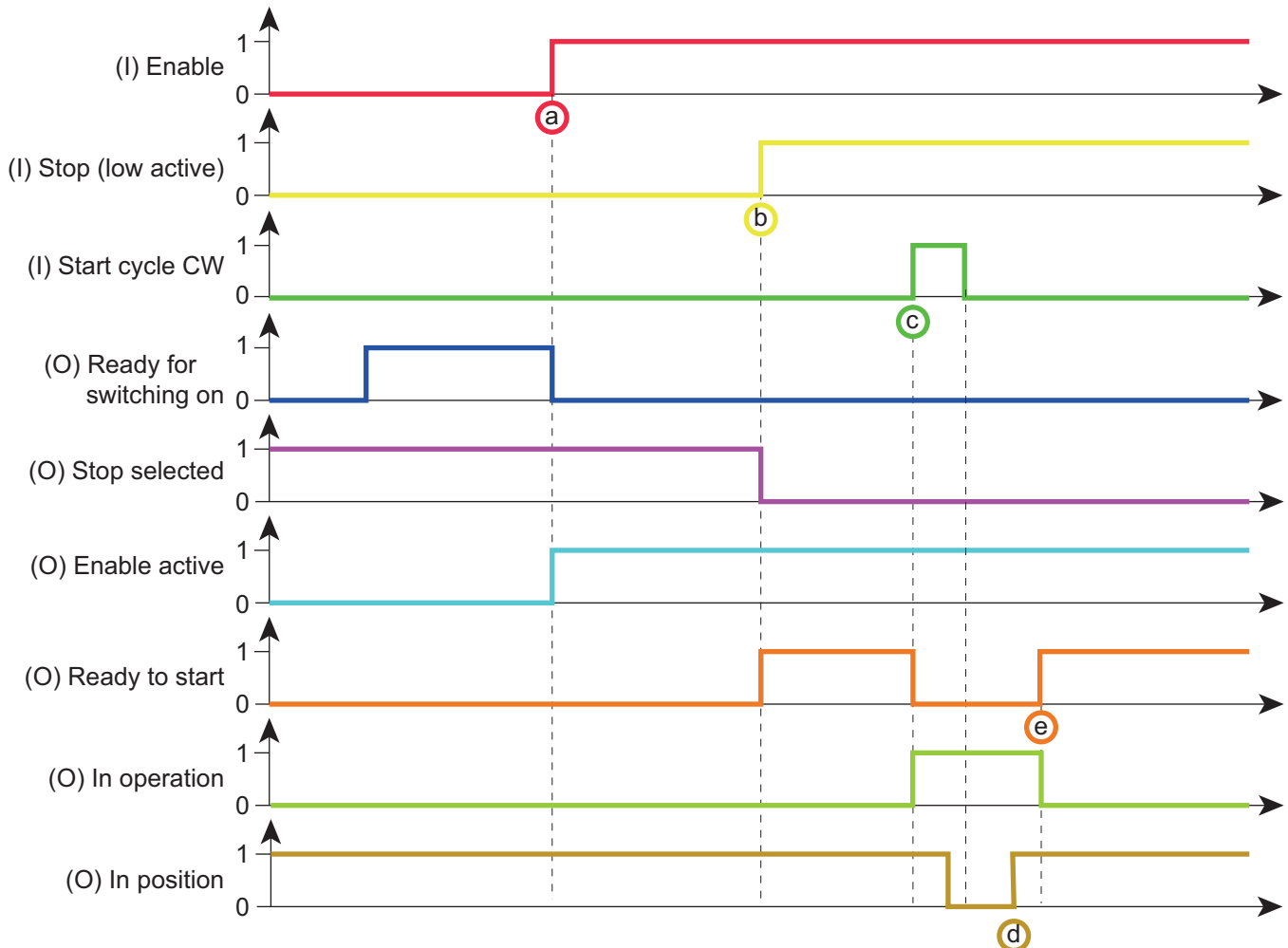


FIG. 19: Example for time sequence diagram of the signal "Start cycle CW"

- If the feedback "Ready for switching on" is HIGH, the indexer can be released by the control signal "Enable".
- a)
 - ▶ If the indexer is enabled, this is signalled by the "Enable active" feedback.
 The "Stop (low active)" signal can also be sent before the "Enable" signal.
 - b)
 - ▶ The "Stop selected" feedback switches to LOW. The "Ready to start" feedback switches to HIGH as soon as the indexer is released and "Stop (low active)" is HIGH.
 If the feedback "Ready to start" is HIGH, the indexer can be cycled by the control signal "Start cycle CW".
 - c)
 - ▶ The "Start cycle CW" control signal has to be set only for one EF2 control cycle and can then be taken back immediately. Runtime tolerances during the signal transmission need to be taken into account.
 At this time, the external processing can be started.
 - d)
 - ▶ The cycle is not completed yet at this time.
 - e) The next cycle can be started at this point.

4.4.2 Example for time sequence diagram of the signal "Start level CW"

① The same is also valid for the signal "Start level CCW".

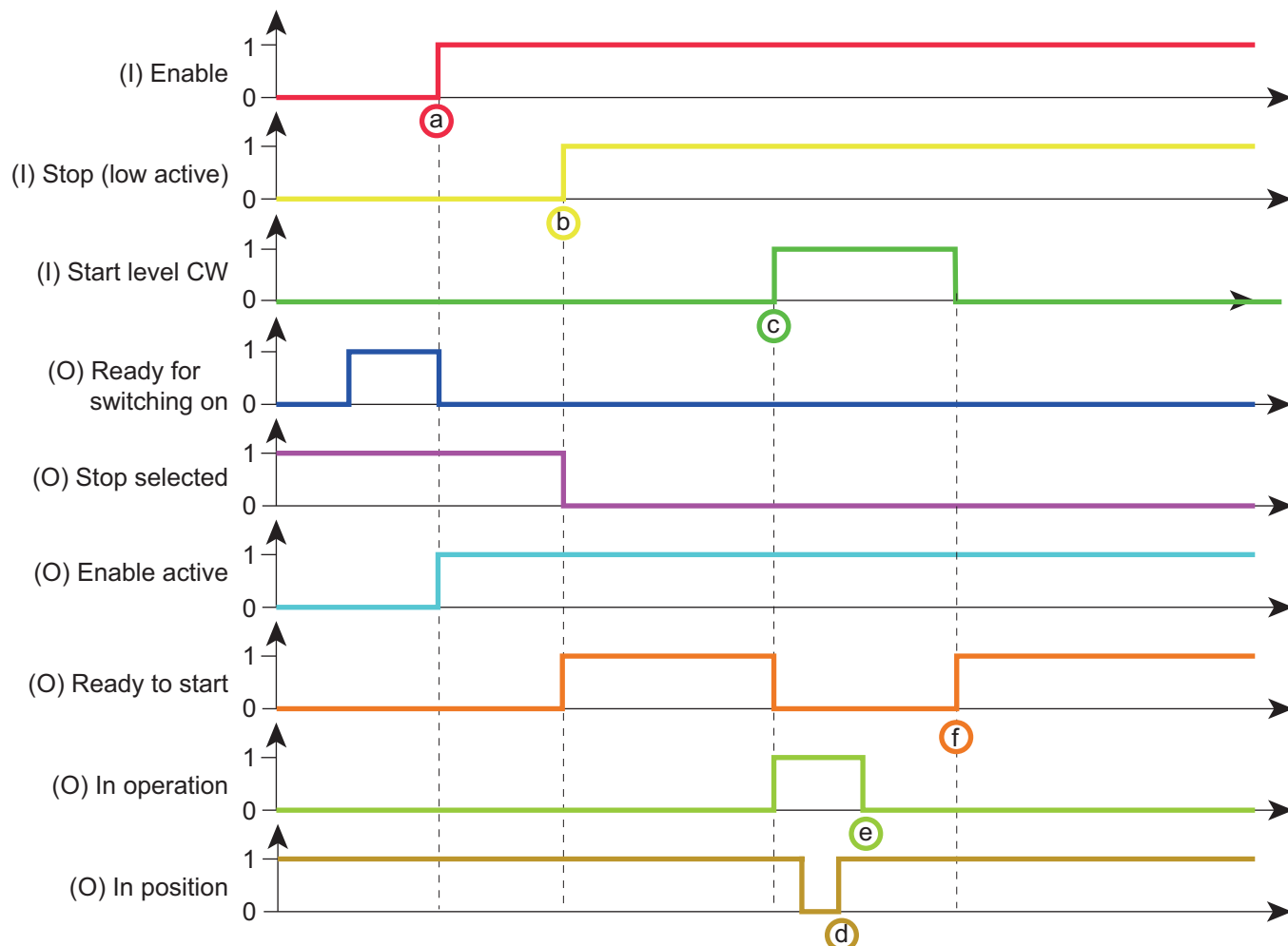


FIG. 20: Example for time sequence diagram of the signal "Start level CW"

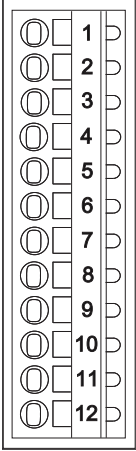
- a) If the feedback "Ready for switching on" is HIGH, the indexer can be released by the control signal "Enable".
 - ▶ If the indexer is enabled, this is signalled by the "Enable active" feedback.
- b) The "Stop (low active)" signal can also be sent before the "Enable" signal.
 - ▶ The "Stop selected" feedback switches to LOW. The "Ready to start" feedback switches to HIGH as soon as the indexer is released and "Stop (low active)" is HIGH.
- c) If the feedback "Ready to start" is HIGH, the indexer can be cycled by the control signal "Start level CW".
 - ▶ The control signal needs to be set for the total time of the cycle, otherwise the current cycle is interrupted.
- d) At this time, the external processing can be started.
 - ▶ The cycle is not completed yet at this time.
- e) At this point, the control signal "Start level CW" can be reset.
- f) The next cycle can be started at this point.
 - ▶ As soon as the control signal is reset after the end of a cycle, the "Ready to start" feedback switches back to HIGH.

4.5 Interface assignment D410-2

4.5.1 Interface X120

⚠ WARNING Electric shock

Only temperature sensors that meet the safety isolation specifications specified in EN 61800-5-1 may be connected to terminals "+Temp" and "-Temp". If safe electrical separation cannot be guaranteed (for linear motors or third-party motors, for example), a Sensor Module External (SME120 or SME125) or Terminal Module TM120 must be used. If these instructions are not complied with, there is a risk of electric shock!

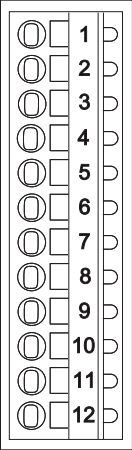
Representation	Pin	Name	Description	
	1	+ Temp	Do not use	
	2	- Temp	Do not use	
	3	F-DI 0 ²⁾	DI 16	STO (+ 24 V)
	4		DI 17+	STO (+ 24 V)
	5		DI 17-	- M
	6	F-DI 1 ²⁾	DI 18	Do not use
	7		DI 19+	
	8		DI 19- ¹⁾	
	9	F-DI 2 ²⁾	DI 20	Temperature switch for brake resistor
	10		DI 21+	Do not use
	11		DI 21- ¹⁾	
	12	M1	Reference potential for: <ul style="list-style-type: none"> • DI 16, DI 18 and DI 20 (or F-DI 0 to FDI 2; first shutdown path) • DO 16+ (or F-DO 0) 	
Colour coding in the description:				
Green: relevant for EF2				
Yellow: Not used for EF2. Do not use!				

¹⁾ Reference potential for DI 17+ / DI 19+ / DI 21+ (or F-DI 0 to F-DI 2; second shutdown path)

²⁾ Functionality depends on the parameterized Safety Integrated functions.

The functionality of the digital inputs DI 16 to DI 21 depends on the parameterized Integrated Safety functions.

4.5.2 Interface X121

Representation	Pin	Name	Description
	1	DI 0	Motor temperature switch
	2	DI 1	HW limit switch CW (low active)
	3	DI 2	HW limit switch CCW (low active)
	4	DI 3	Motor contactor feedback
	5	M2	Ground reference for DI 0 ... DI 3
	6	M	Ground reference of the electronics ¹⁾
	7	DI 8	Indexer sensor
	8	DI 9	Quick stop (low active)
	9	M	Do not use
	10	DI 10	Default IP
	11	DO 11	Controller RUN
	12	M	Do not use

Colour coding in the description:

Green: relevant for EF2

Yellow: Not used for EF2. Do not use!

White: Possible assignment

¹⁾ Reference potential for the digital inputs /digital outputs and analog input

NOTICE An open input is interpreted as "LOW".

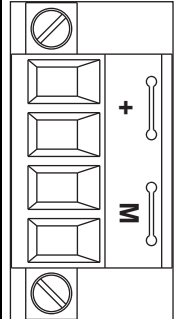
The use of the digital inputs (DI 0 ... DI 3) requires that the terminal M2 has been connected. This is achieved by a jumper to terminal M. This removes the electrical isolation for these digital inputs.

4.5.3 Interface X124

The X124 interface is provided for connection of the external power supply.

NOTICE External power supply

When using external power supplies (e.g. SITOP), the ground potential has to be connected with the protective conductor connection (PELV).

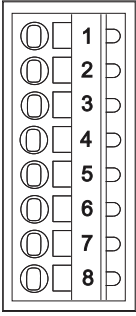
Representation	Terminal	Description
	+	Electronics power supply
	+	Electronics power supply
	M	Electronic ground
	M	Electronic ground

4.5.4 Interface X127

Interface X127 serves as the service interface.
 This interface (Web interface) is used to configure the indexer.

4.5.5 Interface X130

i This interface is not used in the standard version!

Representation	Pin	Name	Description	
	1	DI 22+	Do not use	
	2	DI 22- 2)	Do not use	
	3	M2	Do not use	
	4	M	Do not use	
	5	M1	Do not use	
	6	24 V1	Do not use	
	7		DO 16+ 3)	Do not use
	8	F-DO 0 4)	DO 16- 5)	

Colour coding in the description:

Green: relevant for EF2

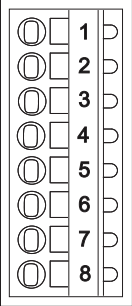
Yellow: Not used for EF2. Do not use!

- 1) Reference potential for the digital inputs /digital outputs and analog input
- 2) Reference potential for DI 20+
- 3) The proper function of the DO 16 requires that the terminals 5/6 are connected.
- 4) F-DO 0 for Safety Integrated extended functions
- 5) For applications "without safety function", DO 16- does not function

NOTICE An open input is interpreted as "LOW".

If M1 or M2 is connected with M, the electrical isolation no longer exists.

4.5.6 Interface X131

Representation	Pin	Name	Description
	1	DI/DO 12	Feedback 24-V power supply of brake relay
	2	DI/DO 13	WEISS internal allocation (enable continuous operation mode)
	3	M	Do not use
	4	DI/DO 14	Do not use
	5	DI/DO 15	Do not use
	6	M	Do not use
	7	AI 0+	Do not use
	8	AI 0-	
Colour coding in the description:			
Green: relevant for EF2			
Yellow: Not used for EF2. Do not use!			
White: Possible assignment			

NOTICE The common mode range must not be exceeded. This means that the analog differential voltage signals can have a maximum offset voltage of ± 12 V with respect to the reference potential. If the range limits are exceeded, incorrect results may occur during analog/digital conversion.

A 24 V supply voltage must be connected to terminal X124 for the digital outputs to be used.

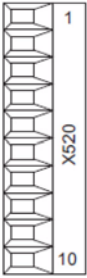
If momentary interruptions in the voltage occur in the 24 V supply, the digital outputs will be deactivated in the mean time.

4.6 Interface assignment TM15 Digital E/A

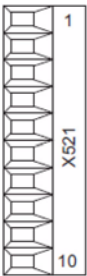
The Terminal Module Digital E/A provides 24 DI/DO (digital I/Os).

In the case of EF2, the digital inputs and outputs are permanently assigned as 12 DI and 12 DO.

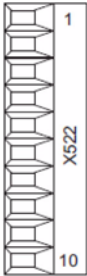
4.6.1 Interface X520

Representation	Terminal	Name
	1	L1+
	2	DI 0
	3	DI 1
	4	DI 2
	5	DI 3
	6	DI 4
	7	DI 5
	8	DI 6
	9	DI 7
	10	M1 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L1+: A 24 V DC power supply for DI/DO 0 to 7 (first potential group) must always be connected if at least one DI/DO in the potential group is used as an output.</p> <p>M1: A ground reference for DI/DO 0 to 7 (first potential group) must always be connected if at least one DI/DO in the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

4.6.2 Interface X521

Representation	Terminal	Name
	1	L2+
	2	DI 8
	3	DI 9
	4	DI 10
	5	DI 11
	6	DO 0
	7	DO 1
	8	DO 2
	9	DO 3
	10	M2 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L2+: A 24 V DC power supply for DI/DO 8 to 15 (second potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>M2: A ground reference for DI/DO 8 to 15 (second potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

4.6.3 Interface X522


Representation	Terminal	Name
	1	L3+
	2	DO 4
	3	DO 5
	4	DO 6
	5	DO 7
	6	DO 8
	7	DO 9
	8	DO 10
	9	DO 11
	10	M3 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L3+: A 24 V DC power supply for DI/DO 16 to 23 (third potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>M3: A ground reference for DI/DO 16 to 23 (third potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

4.7 Interface assignment, TM15 for cam controllers

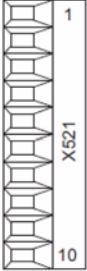
The terminal module TM 15 for cam controllers provides 24 DI/DO.

In the case of EF2, the digital inputs and outputs are permanently assigned as 16 DO and 8 DI.

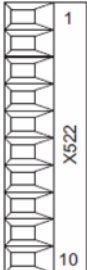
4.7.1 Interface X520

Representation	Terminal	Name
	1	L1+
	2	DO 0
	3	DO 1
	4	DO 2
	5	DO 3
	6	DO 4
	7	DO 5
	8	DO 6
	9	DO 7
	10	M1 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L1+: A 24 V DC power supply for DI/DO 0 to 7 (first potential group) must always be connected if at least one DI/DO in the potential group is used as an output.</p> <p>M1: A ground reference for DI/DO 0 to 7 (first potential group) must always be connected if at least one DI/DO in the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

4.7.2 Interface X521

Representation	Terminal	Name
	1	L2+
	2	DO 8
	3	DO 9
	4	DO 10
	5	DO 11
	6	DO 12
	7	DO 13
	8	DO 14
	9	DO 15
	10	M2 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L2+: A 24 V DC power supply for DI/DO 8 to 15 (second potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>M2: A ground reference for DI/DO 8 to 15 (second potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

4.7.3 Interface X522

Representation	Terminal	Name
	1	L3+
	2	DI 16
	3	DI 17
	4	DI 18
	5	DI 19
	6	DI 20
	7	DI 21
	8	DI 22
	9	DI 23
	10	M3 (GND)
Screw terminal		
Max. connectable cross-section: 1.5 mm ²		
<p>L3+: A 24 V DC power supply for DI/DO 16 to 23 (third potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>M3: A ground reference for DI/DO 16 to 23 (third potential group) must always be connected if at least one DI/DO of the potential group is used as an output.</p> <p>DI/DO: Digital input / output</p>		

5 SAFETY FUNCTIONS

5.1 Integrated safety functions (SIL2)

The integrated safety functions of the SINAMICS S120 devices satisfy the requirements of the standard IEC 61508 SIL 2, as well as PL d acc. to ISO 13849-1 and Category 3 acc. to ISO 12849-1 or EN 954-1.

The following integrated safety functions are currently provided by the SINAMICS S120 drive system:

- STO - Safe Torque OFF

5.2 Extended safety functions (SIL3)

The safety category SIL3 according to IEC 61508 can be fulfilled by the application of additional measures.

- Additional motor contactor
- Safe brake control by means of a safety relay
- Contactor with mirror contact (forced) and feedback to the safety relay

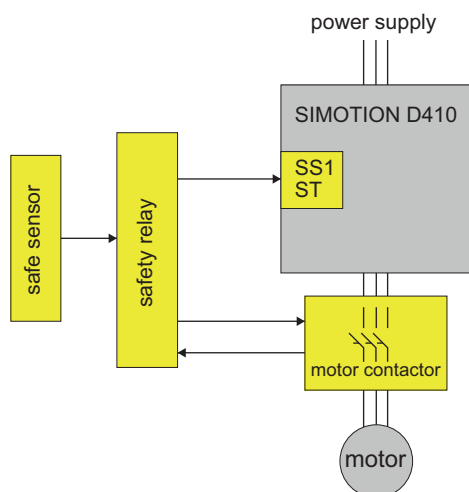


FIG. 21: SIL 3 - Basic concept

Evidence of SIL 3 capability can be demonstrated with the Siemens Evaluation Tool "SET", which is available at (<http://www.industry.siemens.com/topics/global/de/safety-integrated/maschinensicherheit/safety-evaluation-tool/Seiten/Default.aspx>). Examples of the relevant configuration pages are shown below.

SAFETY FUNCTIONS | 5.2 Extended safety functions (SIL3)

Kanal 1		Kanal 2	
Hersteller	Hersteller Direkteingabe	SINAMICS S120	Referenzkennzeichen
Ausfallrate bestimmen	über Eingabe λ D		DC (%) 0 (kein) DC ermitteln
Bestellnummer		Beschreibung	Max. Gebrauchsdauer, T1 (Jahre) 20
Weitere Bestellnummern			
Testintervall (T2)	360	Pro Stunde <input type="checkbox"/> unterschiedlich je Kanal	λD 2,80 E-08
Betrachtung der Sicherheitsintegrität nach IEC 62061			
CCF-Faktor (%)	5	CCF ermitteln	SIL CL SIL 3
			PFHD 1,63 E-08
Betrachtung der Sicherheitsintegrität			
Sicherheitsfunktion	PFHD SIL 1 SIL 2 SIL 3 E-05 E-06 E-07 E-08		

FIG. 22: SET screen: Calculation for FC

Kanal 1		Kanal 2	
Hersteller	Hersteller Direkteingabe	nachgeschaltetes Schütz	Referenzkennzeichen
Ausfallrate bestimmen	über einen B10 Wert		DC (%) 99 (hoch) DC ermitteln
Bestellnummer		Beschreibung	B10 (Schaltspiele) 30.000.000
Weitere Bestellnummern			Anteil gefährbringender Ausfälle (%) 50
Betätigungen/Testintervall	360	Pro Stunde <input type="checkbox"/> unterschiedlich je Kanal	Max. Gebrauchsdauer, T1 (Jahre) 10
			B10d (Schaltspiele) 60.000.000,00
			λD 6,00 E-07
Betrachtung der Sicherheitsintegrität nach IEC 62061			
CCF-Faktor (%)	5	CCF ermitteln	SIL CL SIL 3
			PFHD 1,63 E-08
Betrachtung der Sicherheitsintegrität			
Sicherheitsfunktion	PFHD SIL 1 SIL 2 SIL 3 E-05 E-06 E-07 E-08		

FIG. 23: SET screen: Calculation for motor contactor

SAFETY FUNCTIONS | 5.2 Extended safety functions (SIL3)

The PFHD value of the combination of the SINAMICS S120 drive including the Safety Relay 3SK1122-1CB41 and the selected Motor Contactor 3R2017-1BB42 is 1.63 E-08 in accordance with IEC62061.

A sensor can be added to the safety function, a light curtain for example. Its PFHD value must be less than ~ 8.3 E-08 so that the system as a whole can achieve SIL3.

PFH = Probability of Failure per Hour

PFH values:

- SIMOTION D410-2 = 10*10E-09
- SINAMICS PM240-2 = 18*10E-09
- Encoderless safety function = 05*10E-09

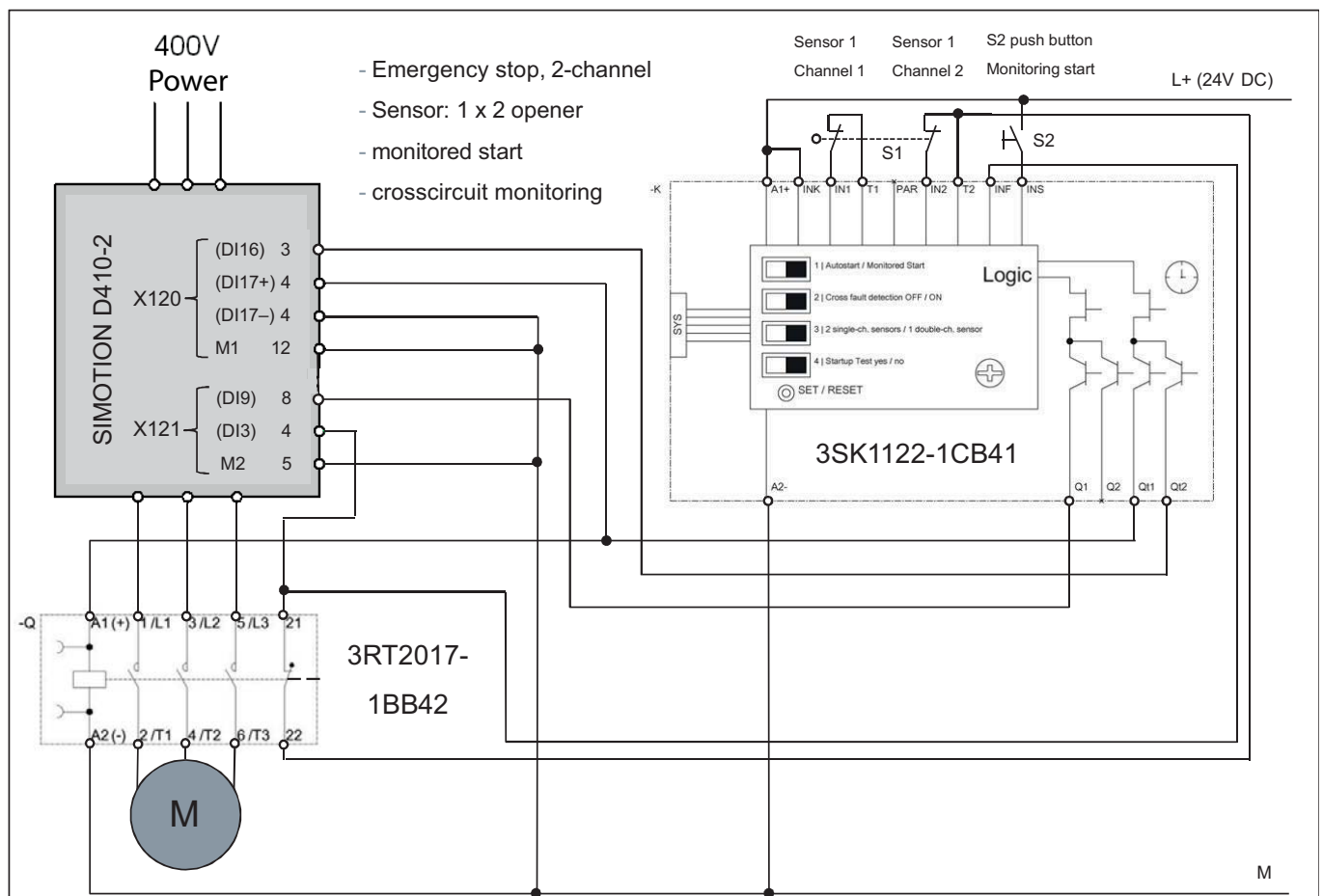


FIG. 24: SIL 3 - Solution with motor contactor and safety relay

Emergency-off sequence (SIL3):

By forcing an emergency off (S1), the drive is first brought to a standstill (t1) on an unsafe quick-stop ramp by means of the "Quick stop" function.

After a delay time (t2) which is set in the safety relay, the safety relay activates the STO function in the drive and the motor contactor is separated.

If the drive does not come to a standstill in the available shutdown time (t1), then it might not be possible to prevent the motor contactor from switching off under load.

This status, however, can be detected via the feedback contact of the motor contactor to the SIMOTION D410-2 and an error message is signalled.

ⓘ Acknowledge emergency stop by switch S2 (monitored start).

Forced dynamization:

The forced dynamisation needs to be carried out every 8 hours.

The forced dynamization of the shutdown paths serves the purpose of detecting errors on time that occur in the software and hardware of the two monitoring channels of the integrated safety functions of the SINAMICS S120. It is automatically carried out by selecting / deselecting the STO function.

A message is displayed for this.

Safety monitoring error:

When a safety error occurs, such as "simultaneity monitoring", the drive will come to a standstill by coasting down on its own.

The correct operation of the safety device must be confirmed afterwards, e.g. by pressing the "emergency stop" switch again.

The drive can be moved again only after the safety error has been eliminated and the safety device is reset.

6 INSTALLATION

6.1 External braking resistor (option)

The PM240-2 Power Modules cannot recover generated power and feed it back into the grid.

For operations which produce energy, e.g. braking of a rotating mass, a braking resistor must be connected to convert the generated power into heat.

6.1.1 Dimensions, hole patterns

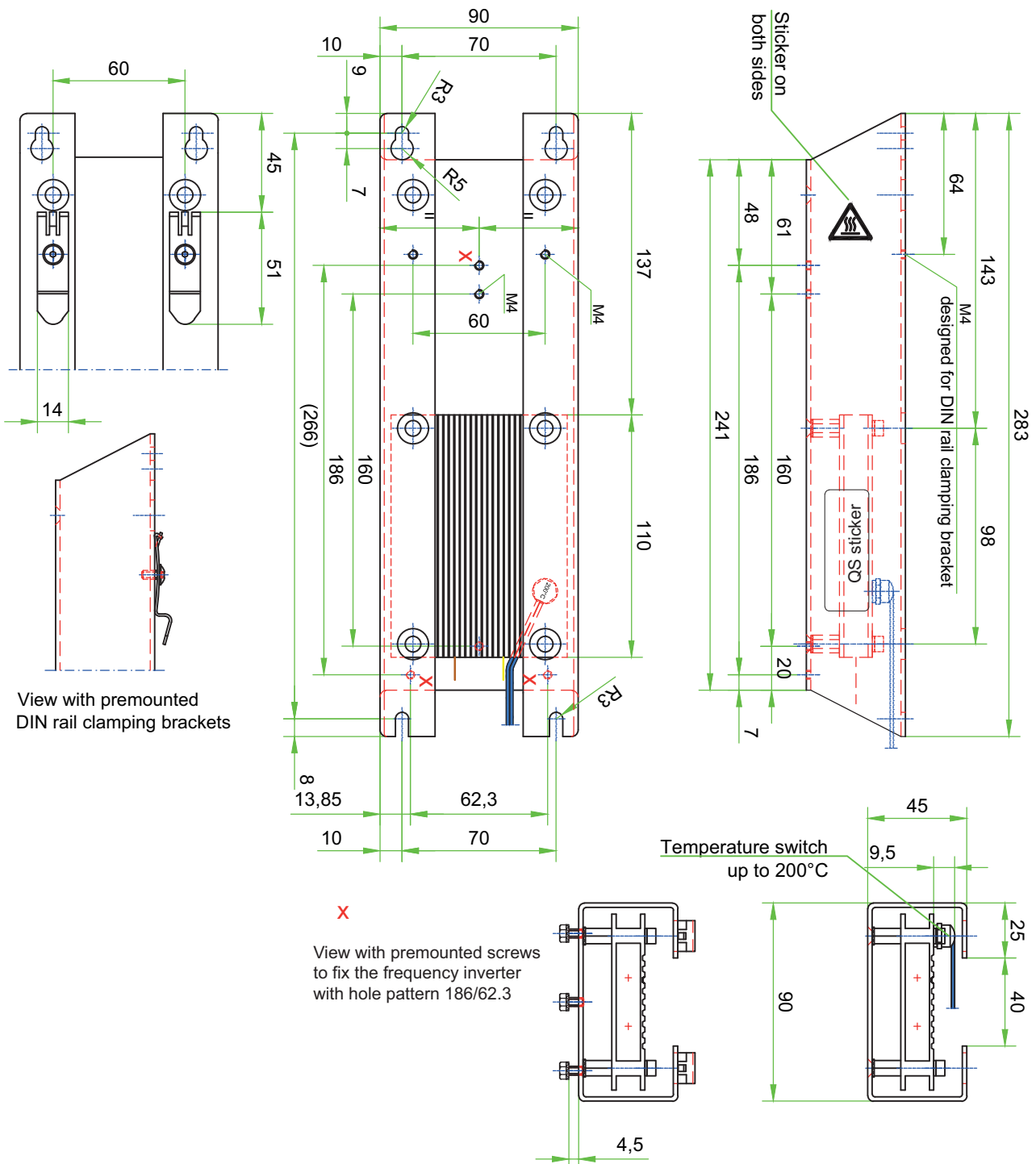


FIG. 25: Dimensions BWD250

INSTALLATION | 6.1 External braking resistor (option)

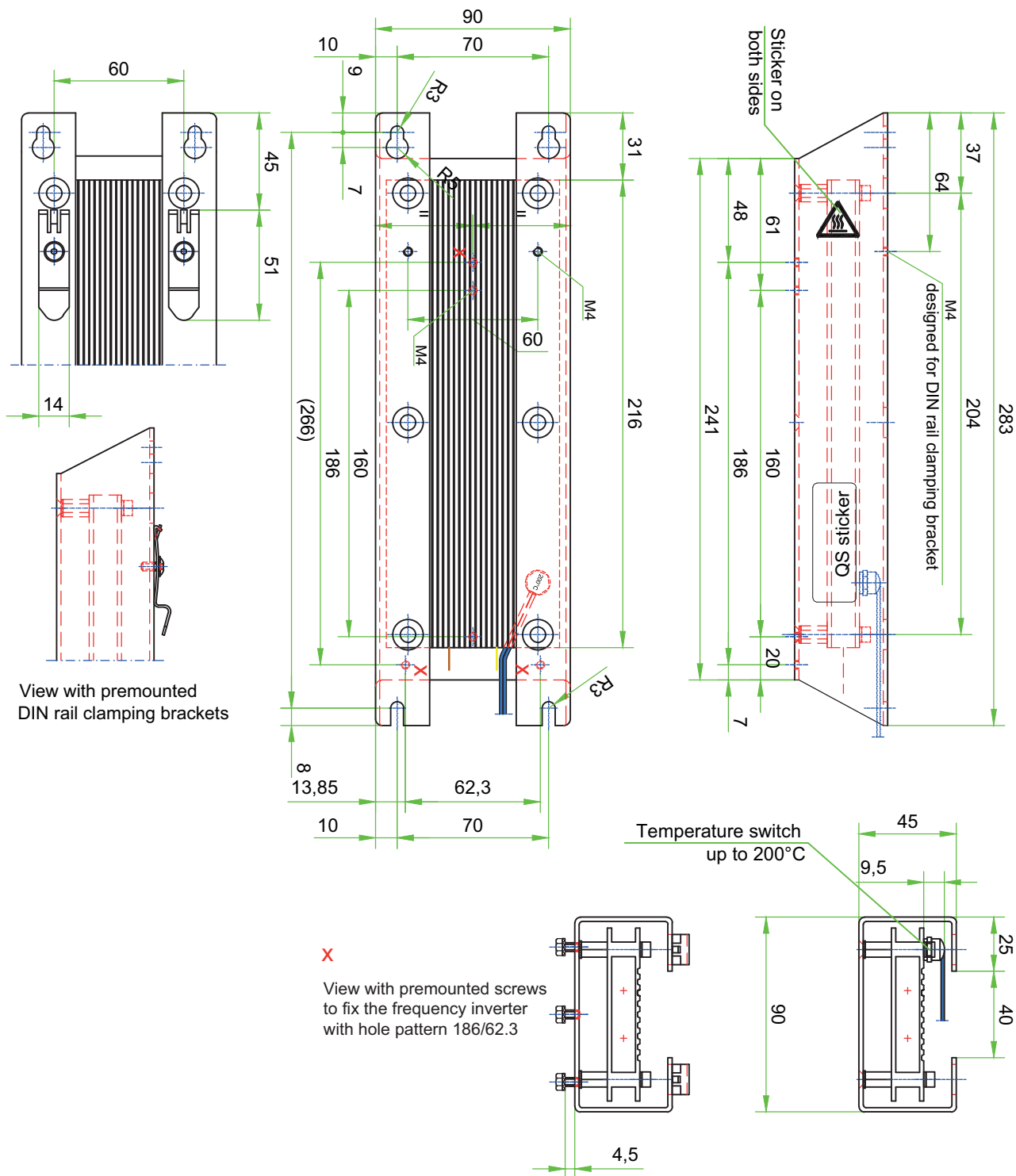


FIG. 26: Dimensions BWD500

INSTALLATION | 6.1 External braking resistor (option)

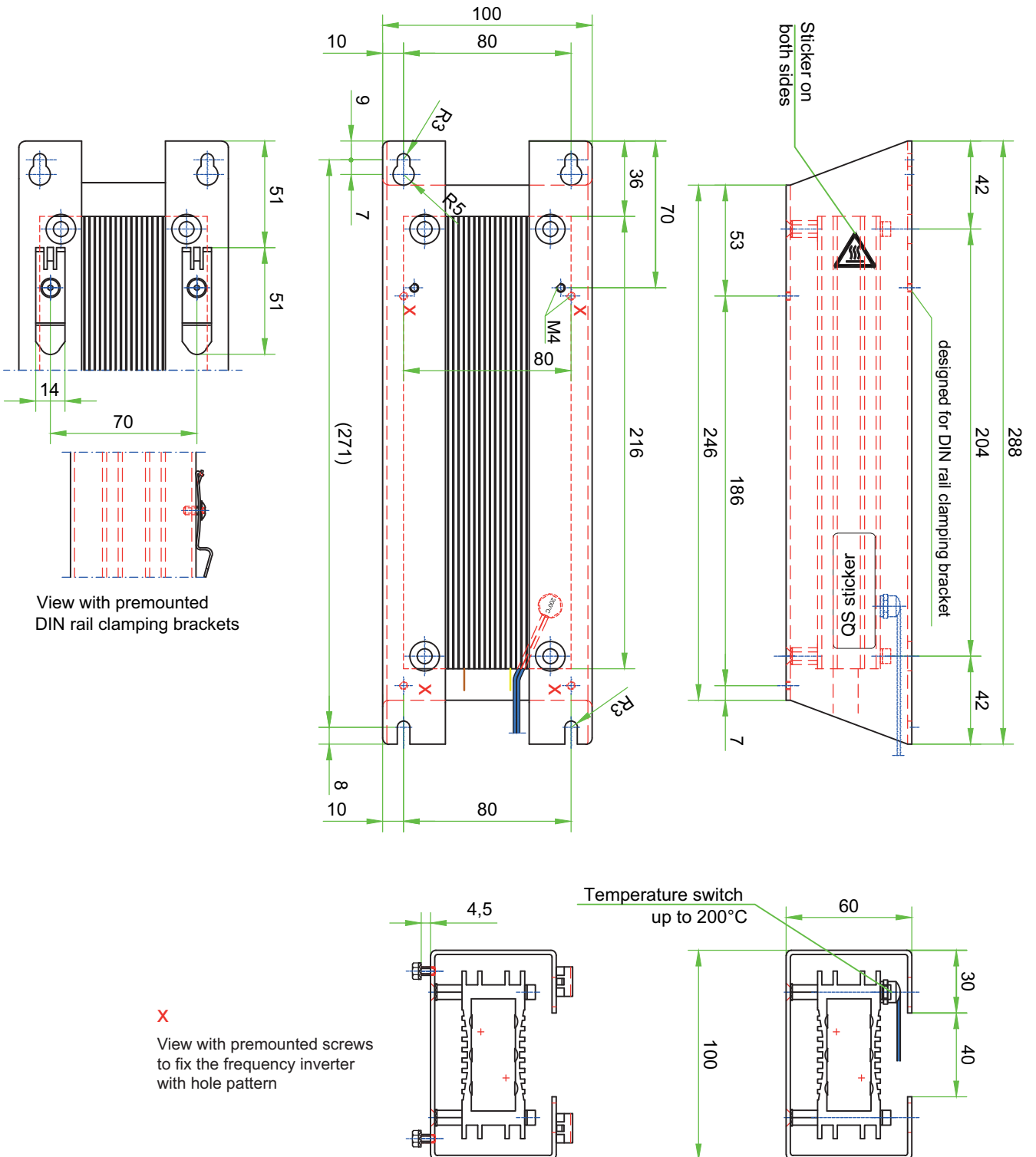


FIG. 27: Dimensions BWD600

INSTALLATION | 6.1 External braking resistor (option)

6.1.2 Mounting / Connecting the braking resistor

1. Drill boreholes in the control cabinet depending on the dimensions of the brake resistor used (see chapter 6.1.1 „Dimensions, hole patterns“ on page 55).
2. Install the brake resistor in the control cabinet (Please note! The power module is screwed onto the brake resistor. The necessary boreholes have already been made in the brake resistor. The screws are supplied. Ensure sufficient ventilation).
3. Connect the cable of the brake resistor to the terminals DCP and R2 of the power module PM240-2.

i The plug connections are located on the bottom side of the power module.

The temperature monitor of the brake resistor can be connected optionally and monitored.

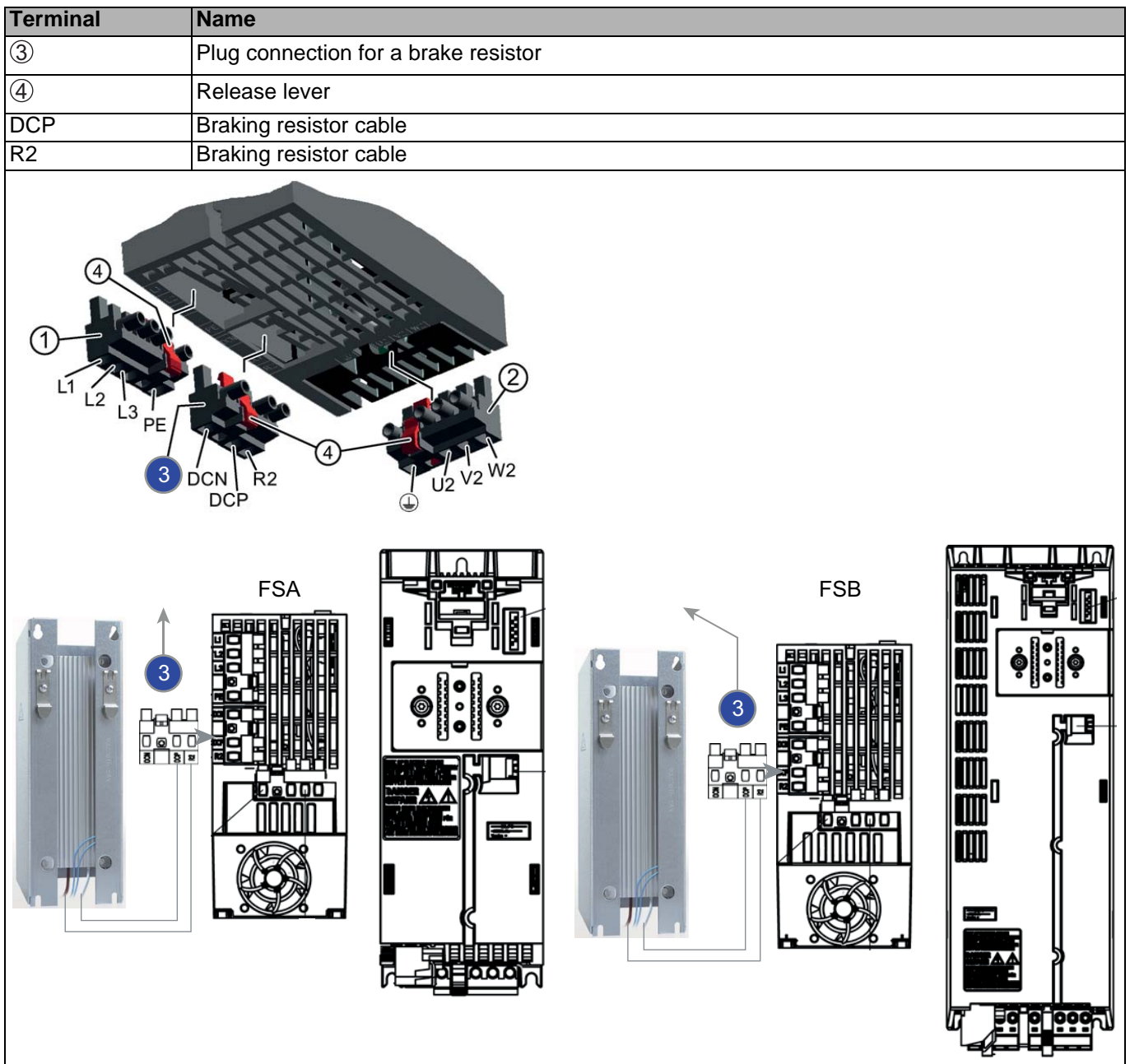


FIG. 28: Braking resistor connection on the PM240-2

i Technical data on the drive can be found in chapter 3.2 „External braking resistor (option)“ on page 24

6.2 Power Module PM240-2; frame size FSA / FSB

The following is necessary for a proper assembly of the power module:

- Mount the power module in a control cabinet.
 - ▶ The control cabinet requires a cooling air flow to protect the components against overheating. Refer to the Siemens installation manual for calculation of the cooling air flow.
 - ▶ Cooling air short circuits need to be prevented by the installation of appropriate air guide plates.
- Mount the power module vertically with the mains and motor connections downwards.

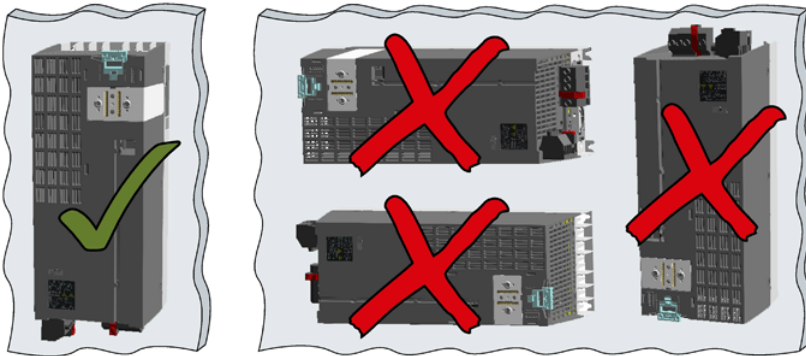


FIG. 29: Installation position of the power module

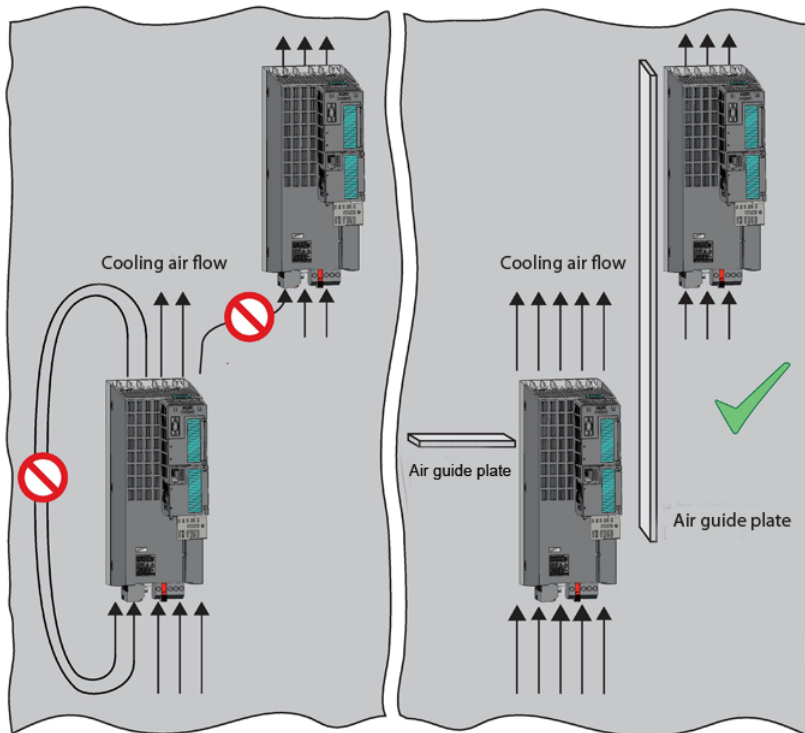


FIG. 30: Setting up of the cooling air flow

6.2.1 Dimensions, hole patterns

6.2.1.1 Frame size EF2037 to EF2220

ⓘ All dimensions in mm and (inch)

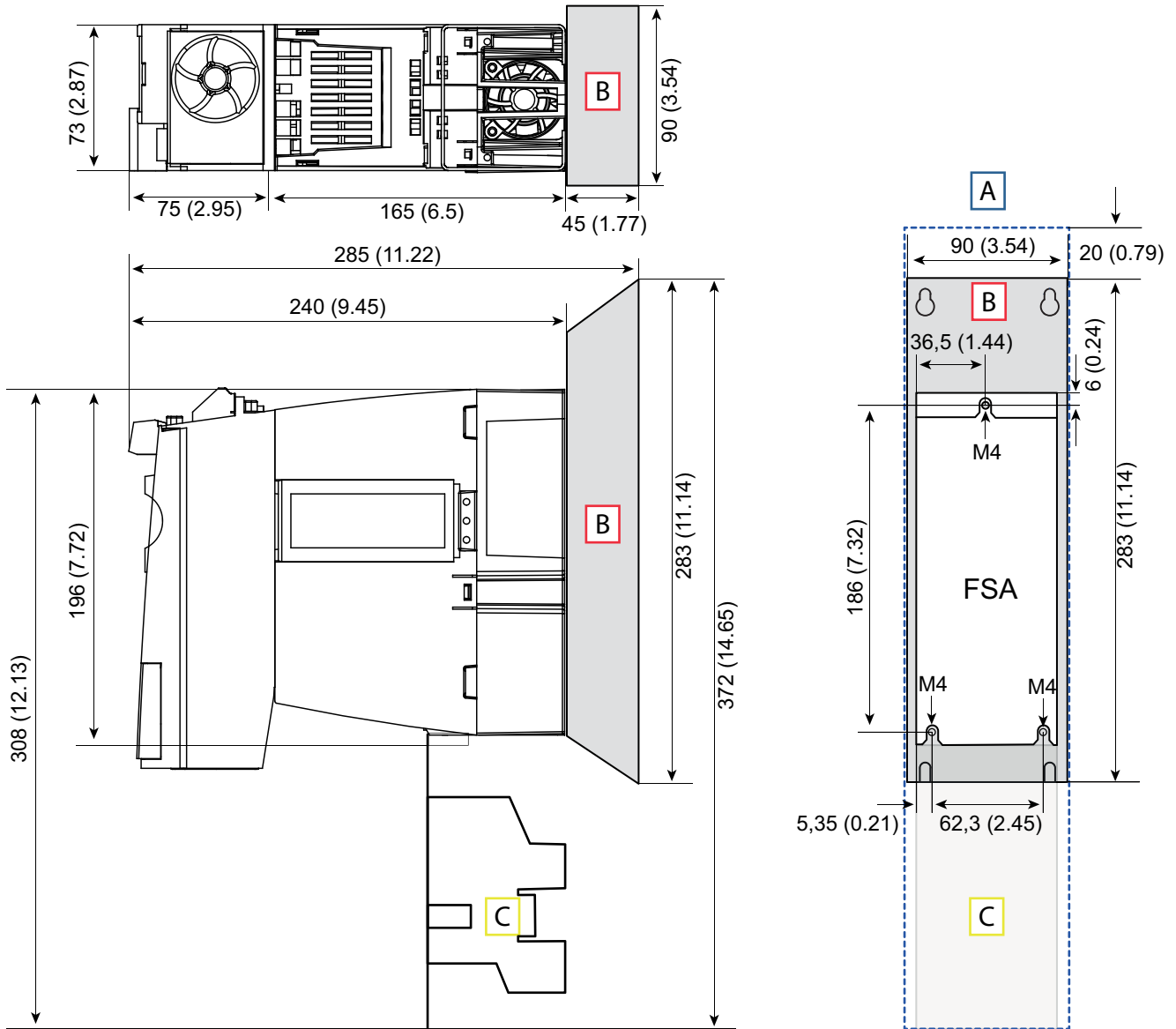


FIG. 31: Dimensions of Power Module PM240-2; frame size FSA

- [A] Ventilation clearance
- [B] Braking resistor
- [C] Shielding plate

NOTICE Take the boreholes for brake resistor and shielding plate into account

Power module, brake resistor and shielding plate have different hole patterns. WEISS GmbH recommends drilling the boreholes for all three components during the installation. This way, further drilling, possible interferences due to metal chips and mechanical loads are avoided during an eventual retrofitting.

6.2.1.2 Frame size EF2300

i All dimensions in mm and (inch)

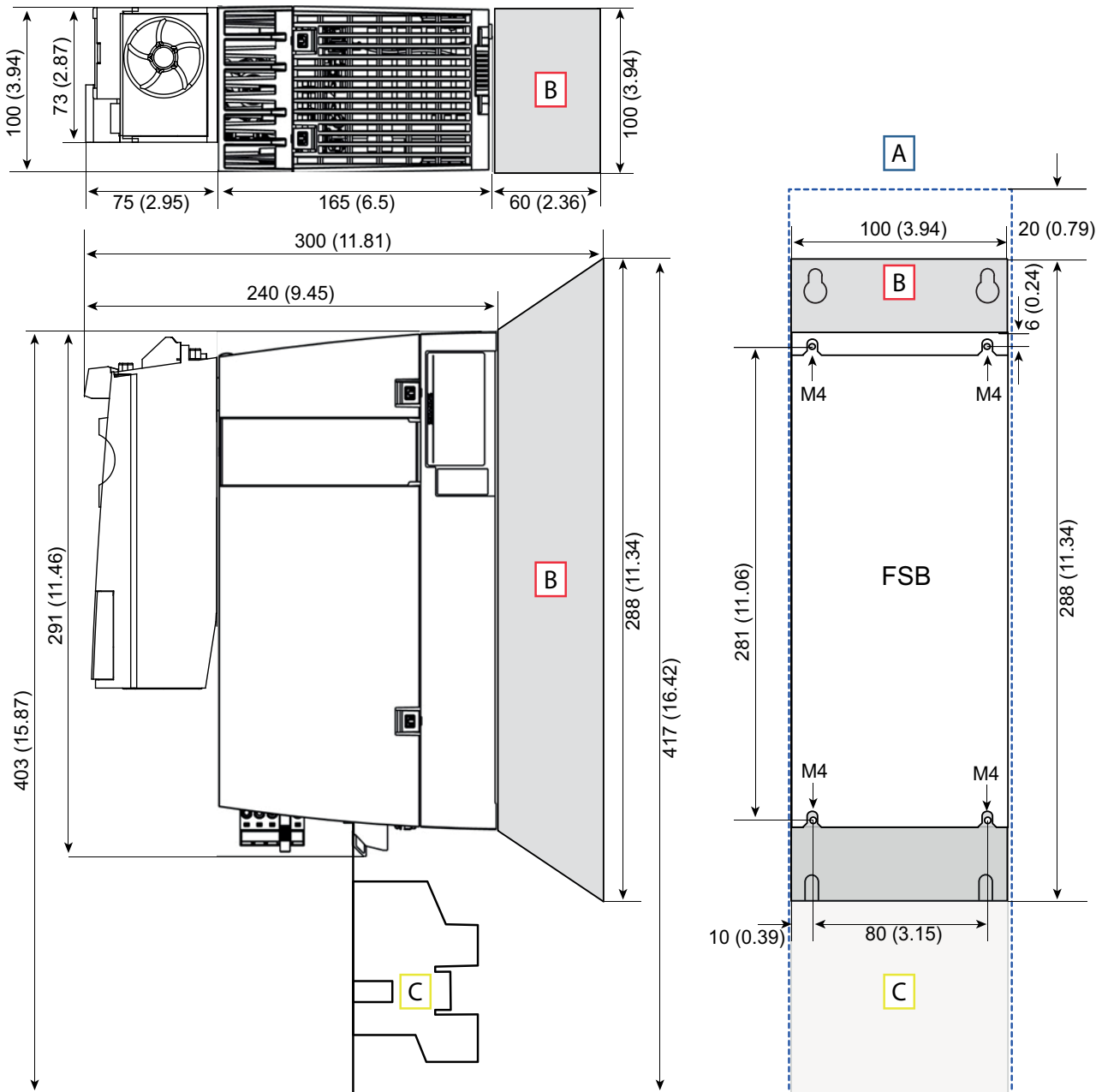


FIG. 32: Dimensions of Power Module PM240-2; frame size FSB

[A]	Ventilation clearance
[B]	Braking resistor
[C]	Shielding plate

NOTICE Take the boreholes for brake resistor and shielding plate into account

Power module, brake resistor and shielding plate have different hole patterns. WEISS GmbH recommends drilling the boreholes for all three components during the installation. This way, further drilling, possible interferences due to metal chips and mechanical loads are avoided during an eventual retrofitting.

6.2.2 Mounting the shielding plate

The shielding plate and the fastening screws are included in the accessory bag of the convertor.

ⓘ Shielding plate and safe brake relay have already been factory-fitted.

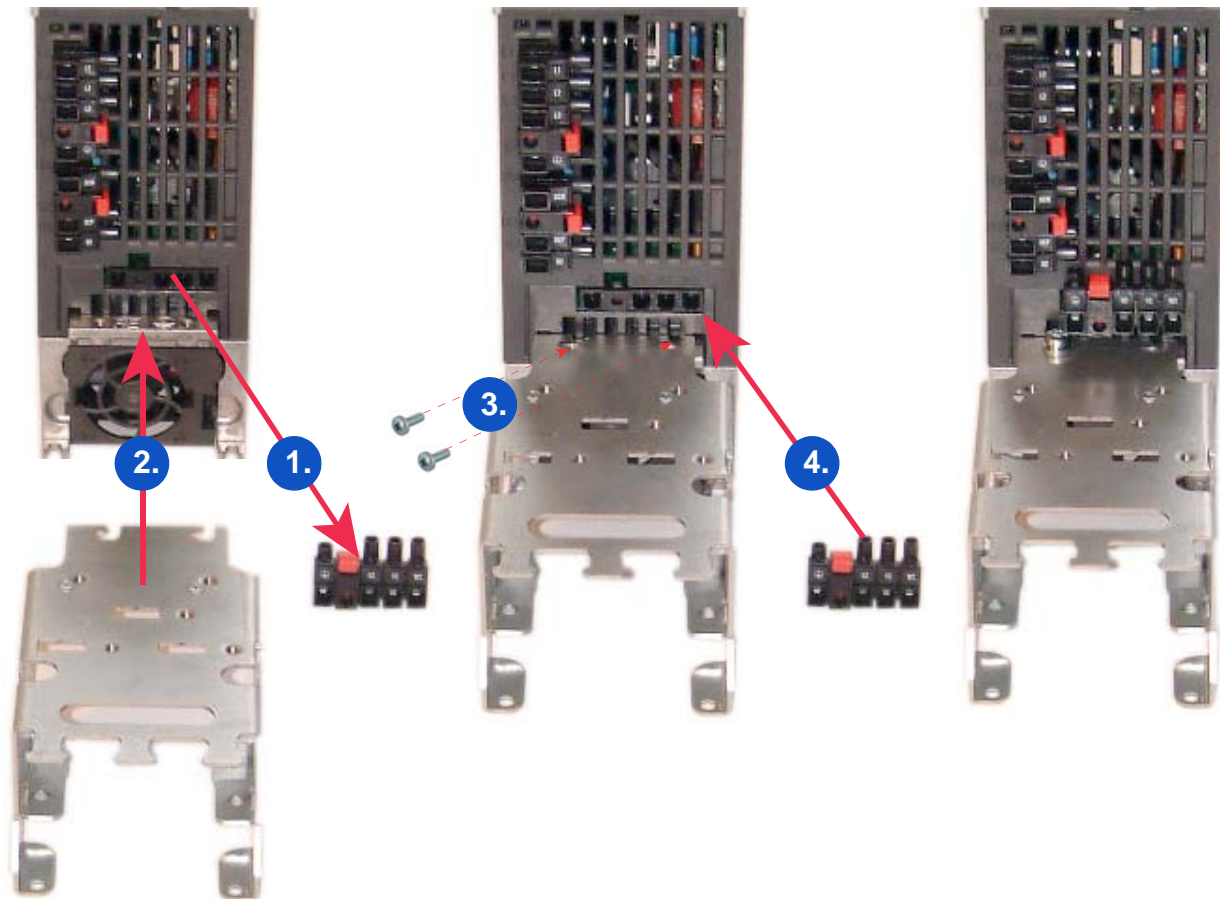


FIG. 33: Mounting the shielding plate

1. Pull off the motor connection plug.
2. Positioning the shielding plate.
3. Screwing on the shielding plate
4. Plug in the motor connection plug.

6.2.3 Mounting / Connecting the power module

NOTICE Take the boreholes for brake resistor and shielding plate into account

Power module, brake resistor and shielding plate have different hole patterns. WEISS GmbH recommends drilling the boreholes for all three components during the installation. This way, further drilling, possible interferences due to metal chips and mechanical loads are avoided during an eventual retrofitting.

1. Drill boreholes in the control cabinet depending on the dimensions of the power module used (see chapter 6.2.1 „Dimensions, hole patterns“ on page 60).
2. Drill boreholes for the brake resistor and the shielding plate according to the recommendation of WEISS GmbH.
3. Regard the required cooling and mounting clearances.
4. Screw on the power module

Fastening type and tightening torques:

Frame size	Retaining type			Tightening torque
FSA	3 x	M4	studs	2.5 Nm with washers
	3 x	M4	nuts	
	3 x	M4	washers	
FSB	4 x	M4	studs	2.5 Nm with washers
	4 x	M4	nuts	
	4 x	M4	washers	

NOTICE Cooling and mounting clearances for power modules

The following clearances must be observed between the components when mounting¹⁾:

- Frame size FSA: 30 mm (1.18 inch)
- Frame size FSB: 40 mm (1.57 inch)

The following cooling clearances must be observed above and below the device:

- Frame sizes FSA and FSB: above 80 mm (3.15 inch),
- Frame sizes FSA and FSB: below 100 mm (3.93 inch),

The following cooling clearances must be observed in front of the device:

- Frame sizes FSA: 30 mm (1.18 inch)
- Frame sizes FSB: 30 mm (1.18 inch)

Devices which could restrict the cooling air flow may not be mounted in this area. It must be ensured that the cooling air flow of the power modules is not blocked.

¹⁾ The power modules can be mounted side by side without base components up to an ambient temperature of 40 °C.

In combination with base components and at ambient temperatures of 40 °C ... 55 °C, the specified lateral minimum clearances must be observed. Where combinations of different frame sizes are concerned, the largest of the two clearances shall apply.

6.2.4 EMC-compliant installation

Rules for an EMC-compliant cable routing:

- Mount the power module on a metal mounting plate. The mounting plate has to be uncoated and electrically well conductive.
- Use shielded lines for the following connections:
 - ▶ Motor and motor temperature sensor
 - ▶ Brake resistor
 - ▶ Fieldbus
 - ▶ Brake line
 - ▶ Inputs and outputs of the terminal strip
- Attaching cable shields for EMC compliance:

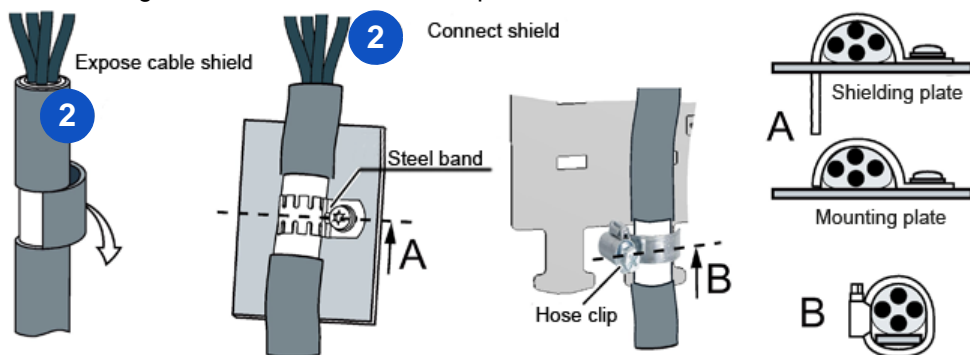


FIG. 34: EMC-compliant shield connection

EMC-compliant wiring for mains and motor connection as well as for the control unit.

- 1) Mains line - unshielded - with strain relief by cable binders
- 2) Shielded motor line with hose clamp for shielding and strain relief
- 3) Shielded line for the control unit with shielding by steel band on the shielding plate of the control unit (not shown).

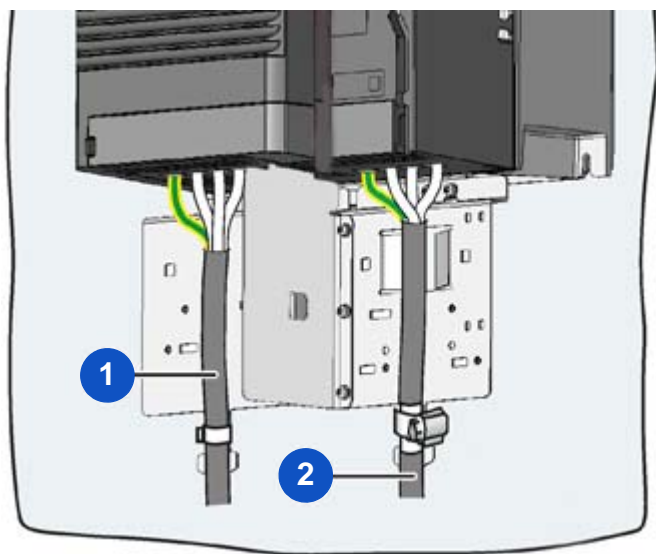


FIG. 35: EMC-compliant wiring

6.2.4.1 Power mains connection 1 AC 200 V - 240 V / 0.37 kW

NOTICE Cyclical switching of the supply voltage is not allowed. After each shutdown, wait five minutes before switching it on again.

① The plug connections are located on the bottom side of the power module.

Name	
①	Power mains connection plug
④	Release lever
L1	Line phase L
N	Line phase N
PE	Protective ground
Class J UL safety fuses	
Rated current	10 A
Screw terminals	
Cross-section	1,5 bis 2,5 mm ²
Tightening torque	0,5 mm
Stripping length	8,0 mm

FIG. 36: Power mains connection 1 AC 200 V - 240 V / 0.37 kW

6.2.4.2 Power mains connection 3 AC 380 V - 480 V / 1.5 kW

NOTICE Cyclical switching of the supply voltage is not allowed. After each shutdown, wait five minutes before switching it on again.

ⓘ The plug connections are located on the bottom side of the power module.

Name	
①	Power mains connection plug
④	Release lever
L1	External conductor L1
L2	External conductor L2
L3	External conductor L3
PE	Protective ground
Class J UL safety fuses	
Rated current	10 A
Safety fuses NH	
Rated current	10 A
Screw terminals	
Cross-section	1,5 bis 6,0 mm ²
Tightening torque	0,6 mm
Stripping length	8,0 mm

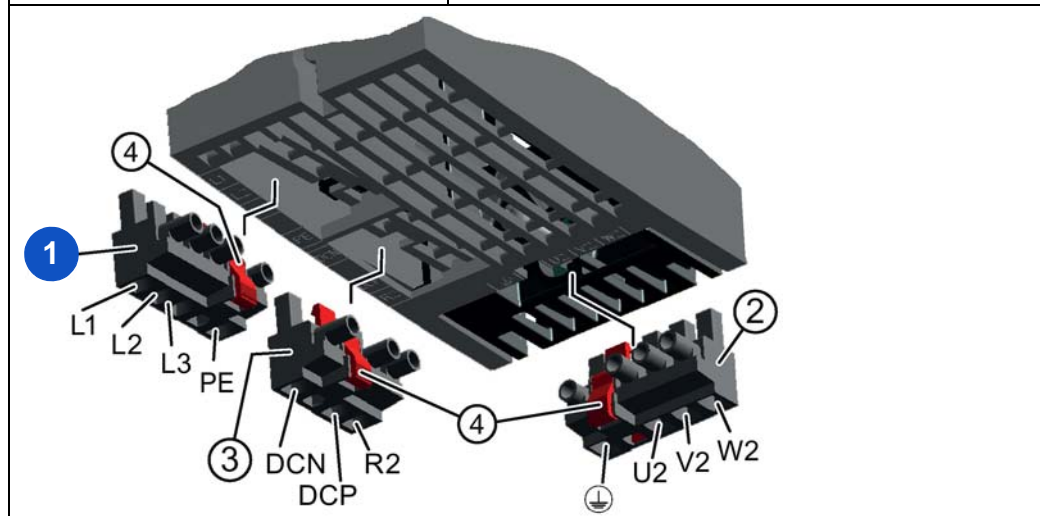


FIG. 37: Power mains connection 3 AC 380 V - 480 V / 1.5 kW

6.2.4.3 Power mains connection 3AC 380 V - 480 V / 2.2 - 3.0 kW

NOTICE Cyclical switching of the supply voltage is not allowed. After each shutdown, wait five minutes before switching it on again.

ⓘ The plug connections are located on the bottom side of the power module.

Name	
①	Power mains connection plug
④	Release lever
L1	External conductor L1
L2	External conductor L2
L3	External conductor L3
PE	Protective ground
Class J UL safety fuses	
Rated current	10 A (2,2 kW) / 12 A (3,0 kW)
Safety fuses NH	
Rated current	10 A (2,2 kW) / 16 A (3,0 kW)
Screw terminals	
Cross-section	1,5 bis 6,0 mm ²
Tightening torque	0,6 mm
Stripping length	8,0 mm

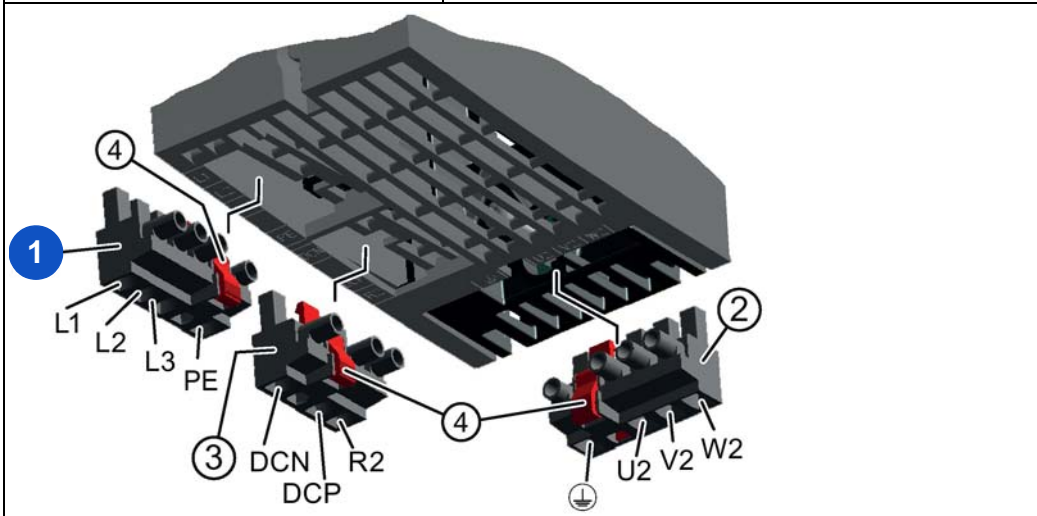


FIG. 38: Power mains connection 3AC 380 V - 480 V / 2.2 - 3.0 kW

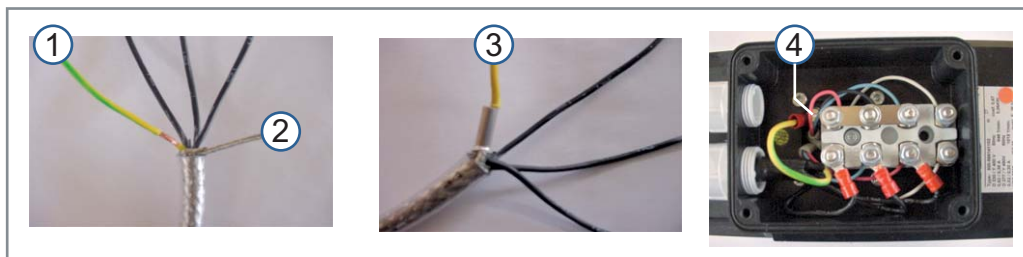
6.2.5 Connecting the motor

⚠ WARNING Electric shock

Cable shields and unused conductors of power cables (e.g. brake conductors) must be connected to PE potential to prevent capacitive cross-coupling charges. Non-observance can cause lethal shock voltages.

- Connect the cable shield on both sides (on the cabinet and the motor).
- All cables must comply with the specified requirements on site.
- Connect the shield over a large surface area.
- Connect the HF shield to the PE conductor using a clamping collar or EMC cable gland.
- Only use shields with tin or nickel-plated copper braids. Shields with steel braids are not suitable.
- Overlap of the shield braid: At least 70% to 80% with 90° overlap angle.
- Use low-capacitance cables:
 - ▶ Core/core < 75pf/m
 - ▶ Core/shield < 150pf/m

An EMC screw connection must always be used for the shield contact on motors with metal terminal box. The shield must be connected to the PE screw on motors with plastic terminal box.



- | | |
|----------------------------------|--|
| <p>1 PE wire</p> <p>2 Shield</p> | <p>3 PE wire, shield, ferrule</p> <p>4 PE clamping point</p> |
|----------------------------------|--|

FIG. 39: Connecting the motor cable to the motor

The following measures are absolutely necessary to avoid EMC problems:

Cable for the holding brake:

- A suitable cable must be used for the 24 V holding brake (2x1 mm² or 5x1 mm² if a temperature switch is connected).
- ⓘ The lines for the brake must not be routed together with the motor cable!
 - ▶ Use a separate cable!

Cable for the temperature switch:

- ⓘ The lines for the temperature switch must not be routed together with the motor cable!
 - ▶ Use a separate cable or a free wire in the cable for the holding brake!

Cable for the sensor:

- ⓘ The lines for the sensor must not be routed together with the motor cable!
 - ▶ Use a separate cable!

6.2.5.1 Permissible motors

- ① Motors should be used for converter operation or with greater isolation.
- Motors for 200-V-Power Modules
 - ▶ Asynchronous motor in the range of 25 % ... 150 % of the converter output are permissible without restrictions for 200-V-Power Modules.
- Motors for 400-V-Power Modules
 - ▶ Asynchronous motor in the range of 25 % ... 150 % of the converter output are permissible without restrictions for 400-V-Power Modules.

6.2.5.2 Motor connection PM240-2, frame size FSA

① The plug connections are located on the bottom side of the power module.

Name	
②	Motor connection plug
④	Release lever
U2	Motor phase U
V2	Motor phase V
W2	Motor phase W
⊕	Protective ground
Screw terminals	
Cross-section	1,5 bis 2,5 mm ²
Tightening torque	0,5 mm
Stripping length	8,0 mm

Motor terminal block with star bridge	Motor terminal block with delta bridge

① For terminal identifications refer to terminal block lid

FIG. 40: Motor connection PM240-2, frame size FSA

6.2.5.3 Motor connection PM240-2, frame size FSB

i The plug connections are located on the bottom side of the power module.

Name	
②	Motor connection plug
④	Release lever
U2	Motor phase U
V2	Motor phase V
W2	Motor phase W
⊕	Protective ground
Screw terminals	
Cross-section	1,5 bis 6,0 mm ²
Tightening torque	0,6 mm
Stripping length	8,0 mm

Motor terminal block with star bridge	
Motor terminal block with delta bridge	

i For terminal identifications refer to terminal block lid

FIG. 41: Motor connection PM240-2, frame size FSB

6.3 Brake Relay

6.3.1 Mounting the brake relay

The safe brake relay is mounted on the rear of the bottom shielding plate of the power module.

Frame size FSA



Frame size FSB



FIG. 42: Mounting the brake relay

1. Mount the brake relay (SBR) on the rear of the shielding plate.
2. Mount the shielding plate with brake relay on the power module.
 - ▶ Shielding plate assembly see chapter 6.2.2 „Mounting the shielding plate“ on page 62.
3. Insert the cable of the brake relay into the socket on the brake relay.
4. Remove the CPU module from the power module.
5. Insert the cable of the brake relay into the Safe-Brake terminal.
6. Route the cable of the brake relay through the channel in the power module to the Safe-Brake terminal.
7. Plug the CPU module onto the power module.

6.4 Safety relay

6.4.1 Mounting Safety Relay 3SK1122-1CB41

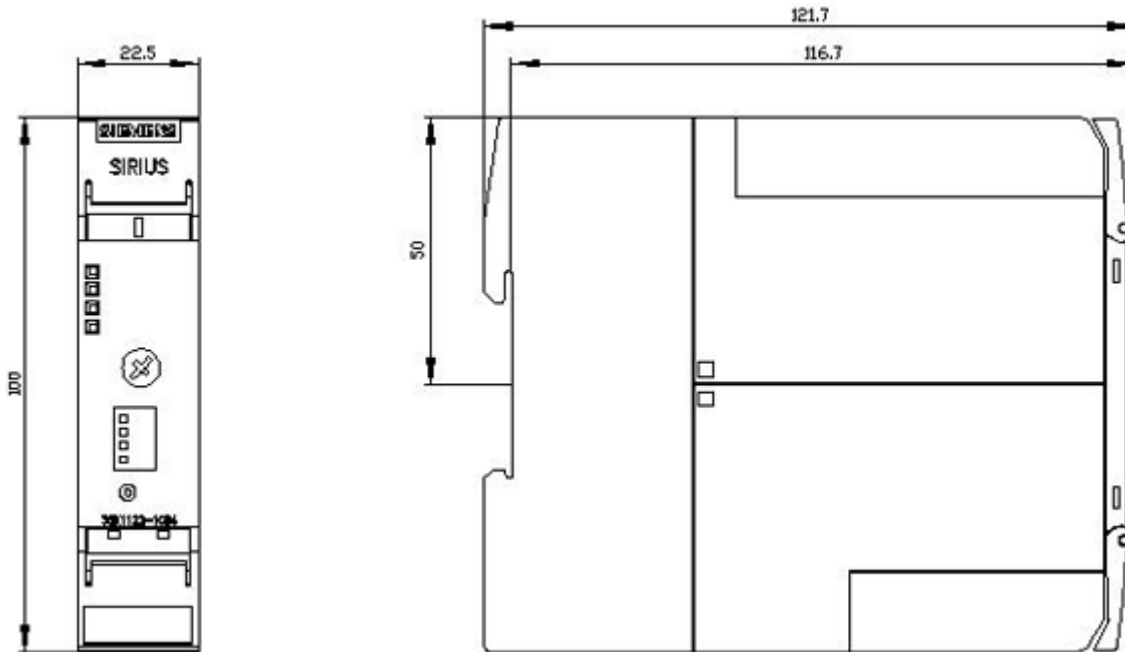


FIG. 43: Mounting Safety Relay 3SK1122-1CB41

i The safety relay is designed to be mounted on a DIN rail.

1. Latch the safety relay onto a DIN rail.
2. Note the dimensions according to the illustration.
3. Regard the required cooling and mounting clearances.

6.5 Terminal Module TM15

① The terminal modules TM15 digital I/O and TM 15 for cam controllers have identical design.

6.5.1 Mounting Terminal Module TM15

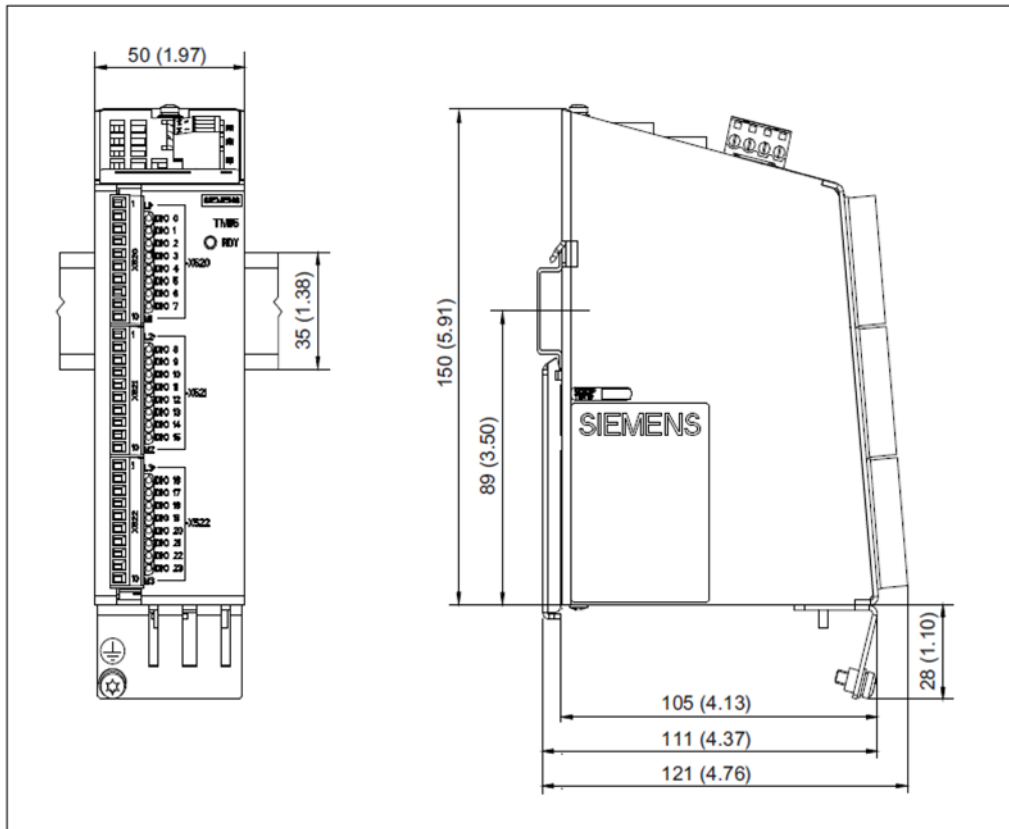


FIG. 44: Mounting Terminal Module TM15

① The Terminal Module TM15 is designed to be mounted on a DIN rail.

1. Mount the Terminal Module TM15 on to a DIN rail.
2. Note the dimensions according to the illustration.
3. Regard the required cooling and mounting clearances.

6.6 SIMOTION D410-2 Control Unit

6.6.1 Mounting the control unit

Mounting the control unit:

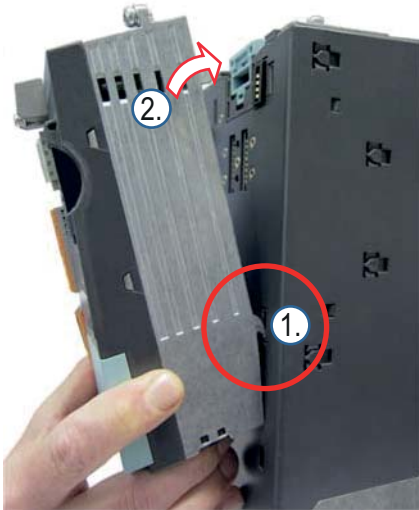


FIG. 45: Mechanical assembly of Control Unit D410-2

The SIMOTION D410-2 Control Unit is mounted directly on to the Power Module PM240-2.

1. Attach the control module to the recesses of the power module using the hooks.
2. Press the control module against the power module.
 - ▶ The blue latch must snap into place.

Disassembly of the control unit:

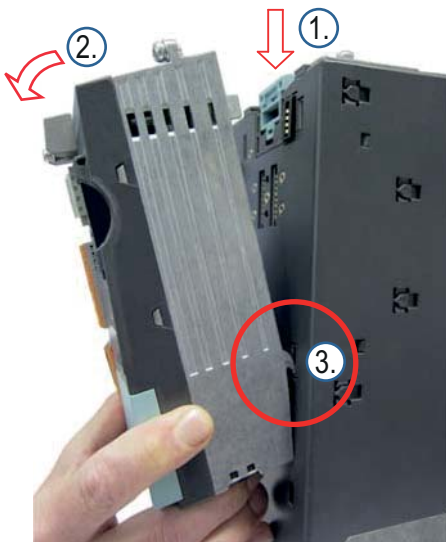


FIG. 46: Mechanical disassembly of Control Unit D410-2

1. Press the blue latch down.
2. Swivel the control unit to the front.
3. Remove the control unit.

6.6.2 Inserting the CF card

The CF card is mandatory for operation of the SIMOTION D410-2. The SIMOTION Kernel (SIMOTION D firmware) and the software used to control the drives (WEISS firmware) are stored on the CF card. The CF card always has to be plugged in for operation.

NOTICE

The CompactFlash card may only be inserted or removed while the SIMOTION D410-2 Control Unit is in a de-energized state! The SIMOTION D410-2 is in a de-energized state when all the LEDs are OFF. The CompactFlash card is an electrostatic sensitive component. When removing and inserting the CompactFlash card, observe the ESD regulations.

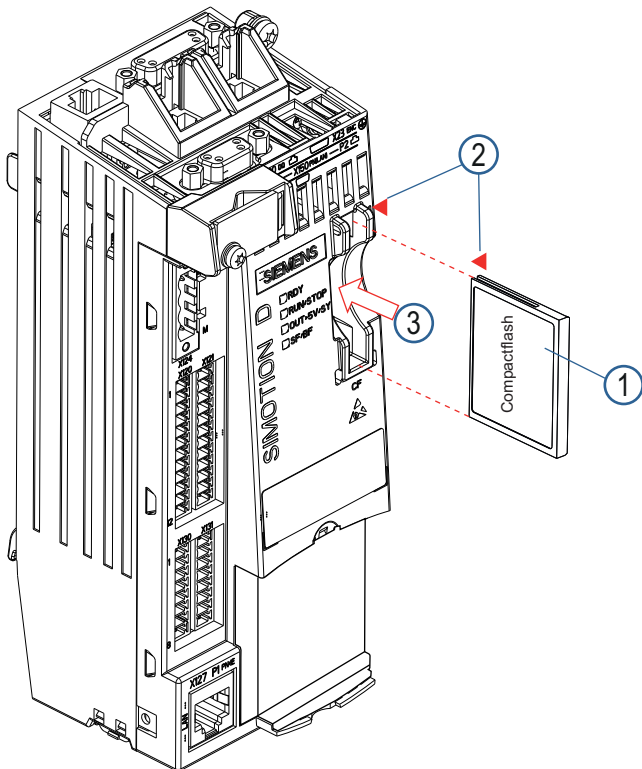


FIG. 47: Inserting the CF card into the D410-2 Control Module

1. Align the CF card (1) according to the arrows (2).
 - ▶ There is one arrow (2) on the plug-in slot and on the CF card.
 2. Insert the CF card gently into the empty slot (3) of the SIMOTION D410-2 until it snaps in.
- ⓘ When properly inserted, the CF card is flush with the housing.

6.6.3 Creating a shield connection

Using shielded cables

The following options are available for the shield connection when using shielded cables:

- A shield connection using a separately attachable shielding bus
- Shield connection via the M3 screw-on shield connecting element on the housing of the SIMOTION D410-2

Using a shielding bus:

If a shielding bus is used, proceed as follows:

1. Attach the cable shield to a grounded shielding bus after the cable entry point in the cabinet. Strip the isolation off the cable first.
2. Continue routing the shielded cable up to the module, but do not make the connection to the shield there.

Using a shield connection on the SIMOTION D410-2:

1. Unscrew the holding clamp of the M3 shield connection (Torx screwdriver T10) at the top of the SIMOTION D410-2 until there is a space below the clamp.
2. Insert the cable. The cable shield must first be exposed.
3. Tighten the fixing bracket so that the cable shield and cable are pressed against the shield connection (tightening torque 0.8 Nm).

The following figure shows how to connect the cable shield.

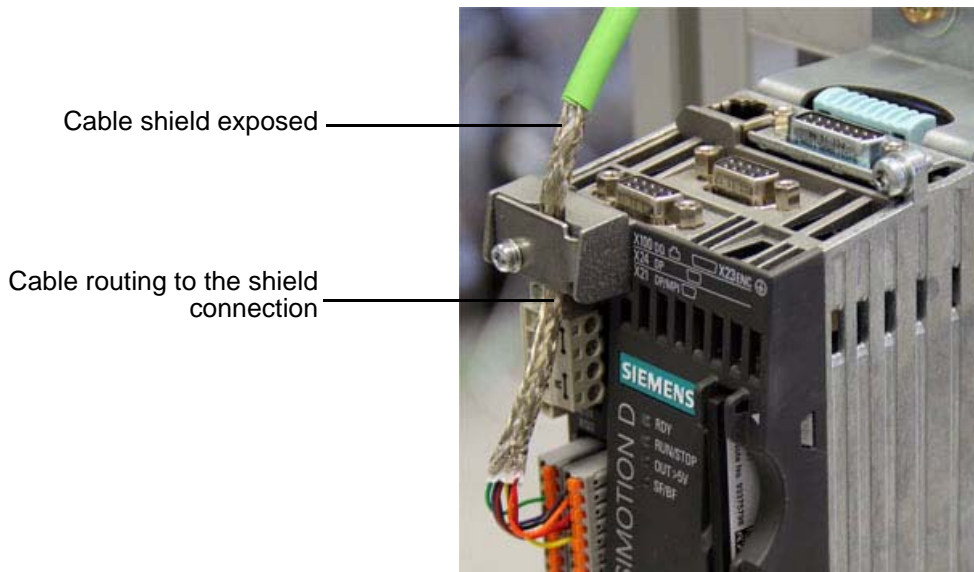


FIG. 48: Shield connection of Control Unit D410-2

7 EF2 - PC CONNECTION

The connection of the EF2 Controller to a PC or Notebook is established using a network cable.

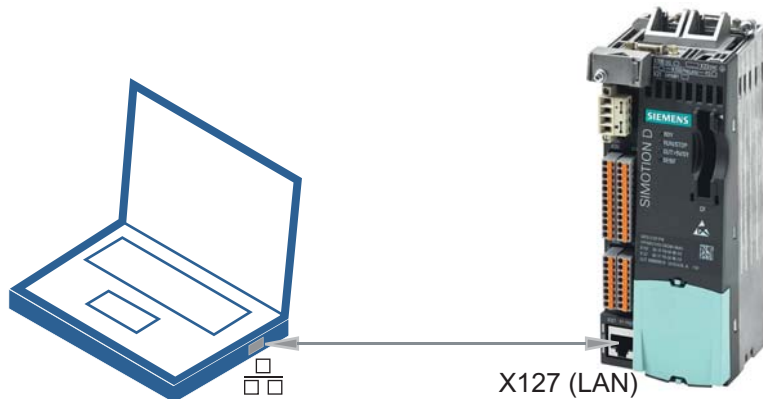


FIG. 49: PC - EF2 Controller connection

7.1 Presettings

1. Go to SYSTEM PROPERTIES (CONTROL PANEL) \ INTERNET OPTIONS \ CONNECTIONS \ LAN SETTINGS and make the following settings:

- ▶ Activate "Automatically detect settings".
- ▶ Deactivate "Use a proxy server for your LAN".

It is necessary to adjust the Internet settings or network settings on the PC or notebook.

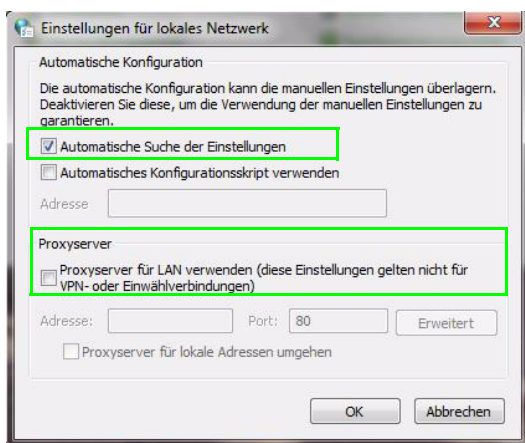


FIG. 50: Adjusting the Internet options

- ❗ Should it not be possible to establish a connection using these settings, then the LAN settings have to be changed manually (see next step).

EF2 - PC CONNECTION | 7.1 Presettings

2. Go to CONTROL PANEL \ NETWORK AND SHARING CENTER \ CHANGE ADAPTER SETTINGS \ LAN CONNECTION \ PROPERTIES and make the following settings:
 - ▶ Clear (if selected) the check box in front of Internet Protocol Version 6 (TCP/IPv6).
 - ▶ Select Internet Protocol Version 4 (TCP/IPv4).
 - ▶ Double-click Internet Protocol Version 4 (TCP/IPv4).
 - ▶ Configure a higher or lower IP address than the standard IP of the controller, e.g.: IP address 169.254.11.21 Subnet mask 255.255.0.0

Default IP address of the EF2 controller: 169.254.11.22

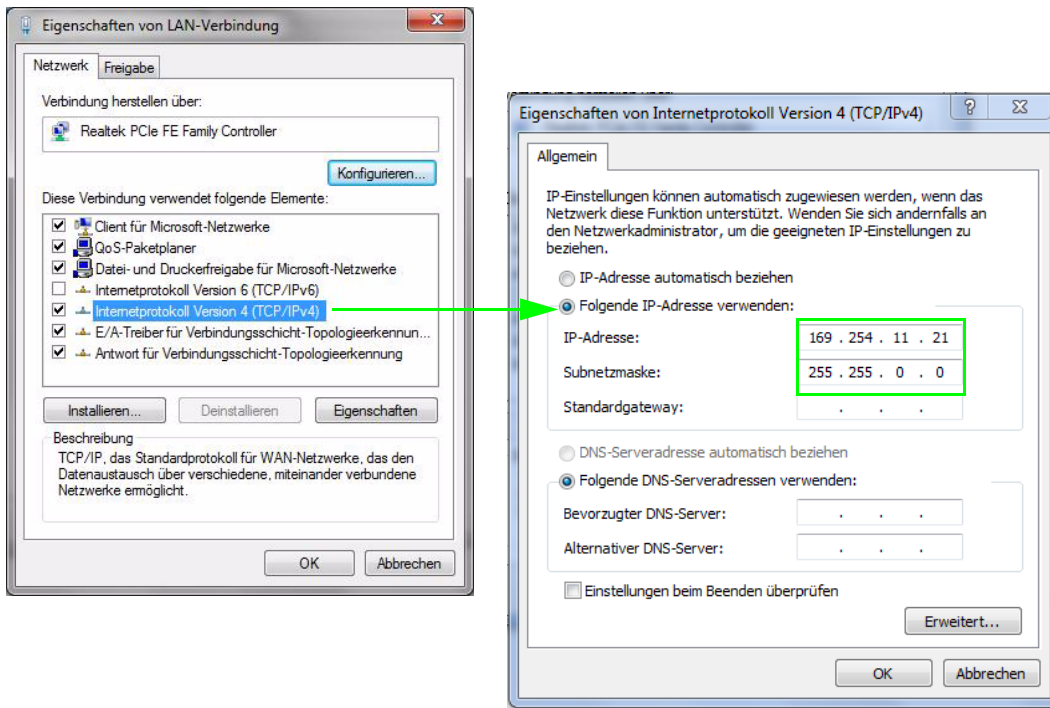


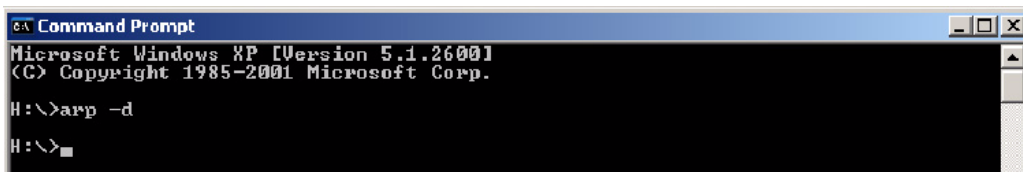
FIG. 51: Changing the adapter settings

7.2 Ethernet communication via TCP/IP (via switch)

The SIMOTION D410-2 DP/PN has an onboard IE interface which is called X127 (SS-IE). This interface has an IP address and communicates via TCP/IP. As part of the TCP/IP communication between the SIMOTION D410-2 DP/PN and the connected computers, an "Address Resolution Protocol" (ARP), a mapping table of the network address of a device to the hardware address (MAC address) of the device, is created and stored on the computer. This process remains hidden for the user, which is done automatically, so that the use of this protocol is only noticeable when a communication error occurs.

The validity period of an ARP address can become a problem if there are incorrect entries or entries which are no longer valid. As long as the incorrect entry exists it is not possible to communicate with the respective host. The error is usually not attributed to the ARP protocol but to the devices or network. To update an incorrect or old ARP table, the command <arp -d> can be entered into the MS DOS command prompt in Windows as shown in following figure.

- Entering a command into the DOS command prompt in Windows <arp -d>



```
CA Command Prompt
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

H:\>arp -d
H:\>
```

8 OPERATION / DESCRIPTION OF WEISS SOFTWARE

The Web browser of the PC or Notebook can be used to access the EF2 controller.

1. Start the Web browser.
2. Enter the IP address of the controller and confirm with ENTER.

Default IP address of the EF2 controller: 169.254.11.22

❗ If all presettings were made correctly, as described in chapter 7.1, then the start page of the controller will appear.

See chapter 8.1 „Start page“ on page 81.

An error message is displayed in case of a faulty input of an IP address or a wrong configuration.



FIG. 52: Error message website

- Check the IP address and correct if an erroneous entry had been made.
- Check configurations (chapter 7.1 „Presettings“ on page 77) and correct.

8.1 Start page

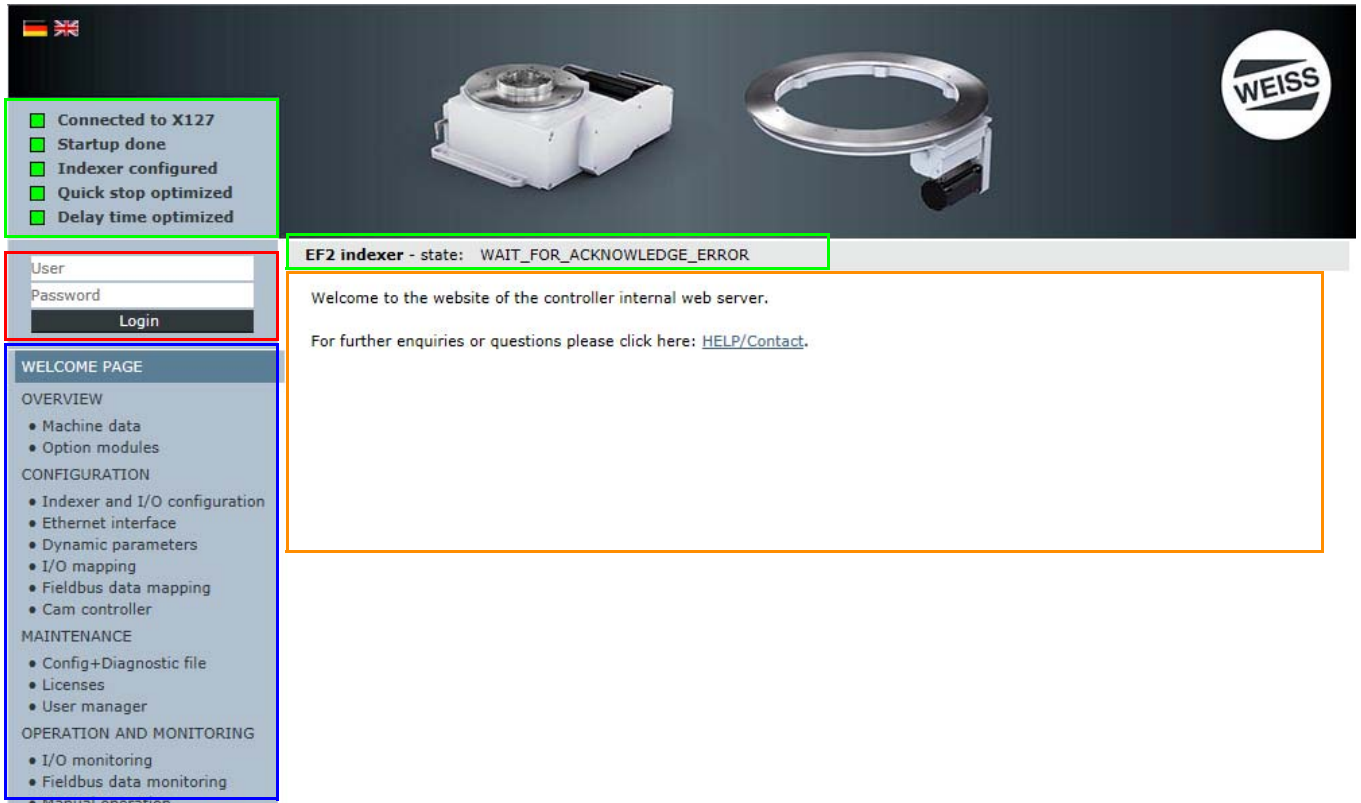


FIG. 53: Start page of the EF2 controller

The Start page is divided into four areas:

The status indicator area on the Start page shows the status of the controller and the state of the indexer.

- ▶ Connection active (green = yes / grey = no)
- ▶ Startup done (green = yes / grey = no)
- ▶ Indexer configured (green = yes / grey = no)
- ▶ Quick stop monitoring (green = yes / grey = no)
- ▶ Delay time optimised (green = yes / grey = no)
- ▶ Indexer state: e.g. WAIT_FOR_ENABLE

The login options need to be entered in the login area.

- ▶ User name
- ▶ Password

In the Navigation area, you can navigate among the available menus.

- ▶ Start page
- ▶ Overview
- ▶ Configuration
- ▶ Maintenance
- ▶ Operation and Monitoring
- ▶ Help

Current information is displayed in the Information area.

- ▶ Information
- ▶ Help topics
- ▶ Contacts

8.1.1 User interface on the start page

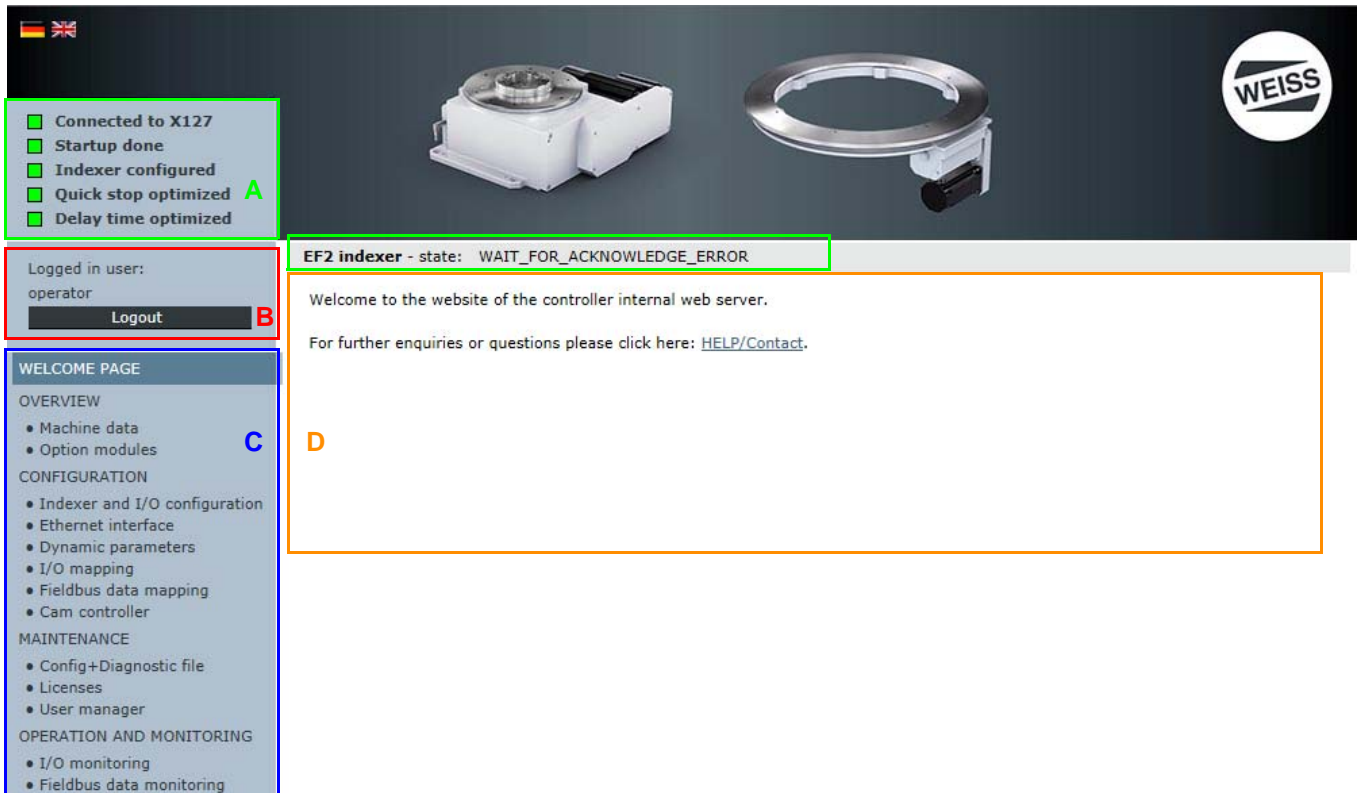


FIG. 54: Description of the user interface of the EF2 controller

[A]	Status indicator
[B]	Login
[C]	Navigation
[D]	Information / Selection

Area	Topic	Section
Status indicator	Controller	▶ Green: Action successfully completed Grey: Action not executed yet
	Indexer	▶ Indexer state: e.g. WAIT_FOR_ENABLE
Login	Certain sections in the user interface are reserved for authorized personnel. A user name and password have to be entered to access these sections. Each controller comes with a user name and password. (chapter 8.1.2 „Login“ on page 83)	

Area	Topic	Section
Navigation	Overview (see chapter 8.2)	▶ Operating state of the controller
		▶ Configured indexer type
		▶ Communication
		▶ Data
		▶ Optional modules
	Machine configuration (see chapter 8.3)	▶ Indexer and IO configuration
		▶ Ethernet interface
		▶ Dynamic parameters
		▶ I/O mapping of the inputs/outputs
		▶ Fieldbus data mapping
	Maintenance (see chapter 8.4)	▶ Config + Diagnostic file
		▶ Licenses
		▶ User manager: operator = general settings, change password, manage user groups
	Operation and Monitoring (see chapter 8.5)	▶ I/O monitoring of the inputs and outputs
		▶ Fieldbus data monitor
		▶ Manual operation
		▶ Cam controller
		▶ Statistical data
		▶ Messages
	Help (see chapter 8.6)	▶ Siemens default pages; only for WEISS Service personnel
▶ Contact details for WEISS GmbH		
	▶ Documentation (manuals from WEISS, SIEMENS, GSD files)	

Information / Selection	Information and comments about the indexer configuration Selection and/or input/modification of parameters for the indexer configuration
-------------------------	---

8.1.2 Login

Area	Topic	Section
Anmeldung	Certain sections in the user interface are reserved for authorized personnel. A user name and password have to be entered to access these sections. Each controller comes with a user name and password. User name: operator Password: 100	



8.2 Overview

8.2.1 Machine data

EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

Logged in user: operator
Logout

WELCOME PAGE

OVERVIEW

- Machine data
- Option modules

CONFIGURATION

- Indexer and I/O configuration
- Ethernet interface
- Dynamic parameters
- I/O mapping
- Fieldbus data mapping
- Cam controller

MAINTENANCE

- Config+Diagnostic file
- Licenses
- User manager

OPERATION AND MONITORING

- I/O monitoring
- Fieldbus data monitoring
- Manual operation
- Cam controller
- Statistical data
- Messages
- Siemens default pages

HELP

- Contact
- Documentation

Operational status

Operating state controller: RUN STOP

Messages: Warning Error

Piece counter: 0 [Reset]

Actual frequency [Hz]: 0.000

Motor speed at sensor [%]: 0.000

Actual motor current [A]: 0.002

Indexer encoder adjusted:

Indexer encoder position [°]: 205.520

Segment detection adjusted:

Segment number: 0

Time measurement

↓Sensor → ↑Sensor [s]: 0.000

↑Start → ↑Sensor [s]: 0.000

↑Start → End of cycle [s]: 0.000

End of cycle → ↑Start [s]: 0.000

Safety data

Min. set time safety switch device [s]: 0.109

Actual time safety switch device [s]: 0.000

Safety checksum Control Unit: 1221867082

Safety checksum Motor Module: 2212997055

Versions

Controller: V 4.5.0.1

Drive: V 4.80.65.7

Indexer software: V2.1.0

Configuration of indexer

Indexer type: TC0120G

Motor type: BG056L-4

Motor nominal voltage [V]: 230

Motor nominal current [A]: 0.800

Motor nominal power [kW]: 0.120

Motor nominal power factor: 0.660

Motor nominal frequency [Hz]: 50

Motor nominal speed [1/min]: 1380

Motor startingCurrent/nominalCurrent: 3.000

Brake opening time [ms]: 40

Brake closing time [ms]: 20

Evaluate thermoclick of motor: No Yes

Brake control motor brake: Standard Cyclic

Hardware limit switches: No Yes

Evaluate additional motor contactor: No Yes

Evaluate thermoclick braking resistor: No Yes

Segment detection: No Yes

Number of segments: 4

Cam controller: No Yes

Cam movement rate: 1

Gearbox ratio: 1

Coupling with a Pick-o-Mat: No Yes

Supply voltage power module [V]: 230

Configuration of interface

Communication: PROFINET

Source of PROFINET name of station: Controller Input

PROFINET name of station: indexer-1

Source of PROFINET IP configuration: Controller Input

PROFINET IP address: 192.168.1.1

PROFINET subnet mask: 255.255.255.0

Interface compatibility: Standard EF1

Byte order of telegram: Standard

FIG. 55: Description of the "Overview" page

The "Machine data" page provides an overview of the current status of the indexer, as well as the configuration and the system data.

i Useful data is only displayed on this page after a indexer has been configured.

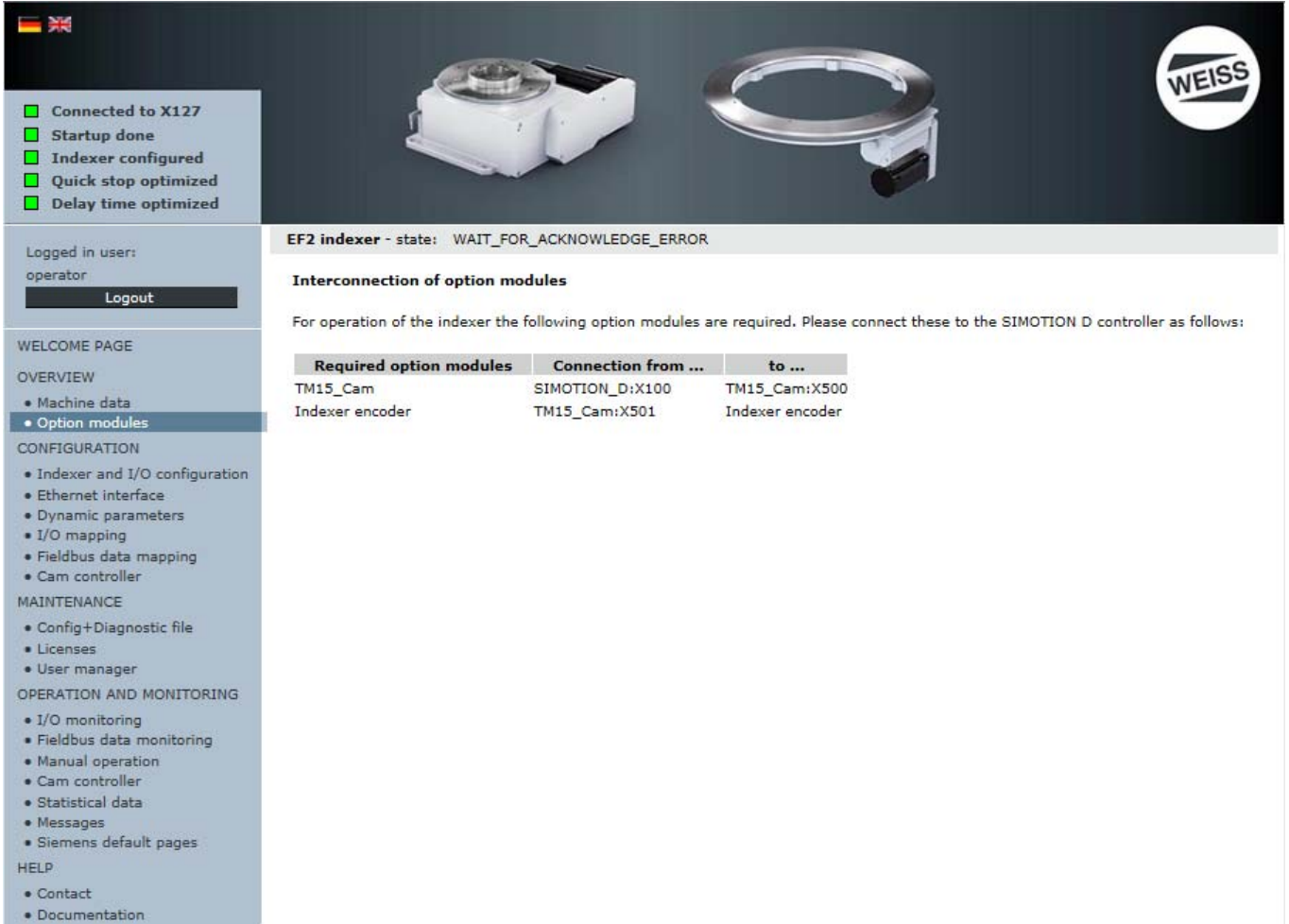
The content on the "Overview" page is informative and cannot be changed on this page. Exception:

- ▶ By clicking the RESET button next to "Batch Counter", the count will be set to zero.

Available information:

- ▶ Indexer state: e.g. WAIT_FOR_ENABLE
- ▶ Operational status
- ▶ Time measurements
- ▶ Safety data
- ▶ Configuration of indexer
- ▶ Configuration of interface
- ▶ Versions

8.2.2 Optional modules



EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

Interconnection of option modules

For operation of the indexer the following option modules are required. Please connect these to the SIMOTION D controller as follows:

Required option modules	Connection from ...	to ...
TM15_Cam	SIMOTION_D:X100	TM15_Cam:X500
Indexer encoder	TM15_Cam:X501	Indexer encoder

FIG. 56: Optional modules

On the “optional modules” side, the optional modules needed for operating the indexer are listed.

Possible Drive-Cliq topologies:

- EF2 without Drive-Cliq components
- EF2:X100 => TM15 Digital IO:X500
- EF2:X100 => TM15 Digital IO:X500, TM15 Digital EA:X501 => Siemens encoder
- EF2:X100 => TM15 Digital IO:X500, TM15 Digital EA:X501 => TM15 Cam:X500, TM15 Cam:X501 => Siemens encoder
- EF2:X100 => Siemens encoder
- EF2:X100 => TM15 Cam:X500, TM15 Cam: X501 => Siemens encoder

In addition, this page contains information about the way an optional module needs to be connected.

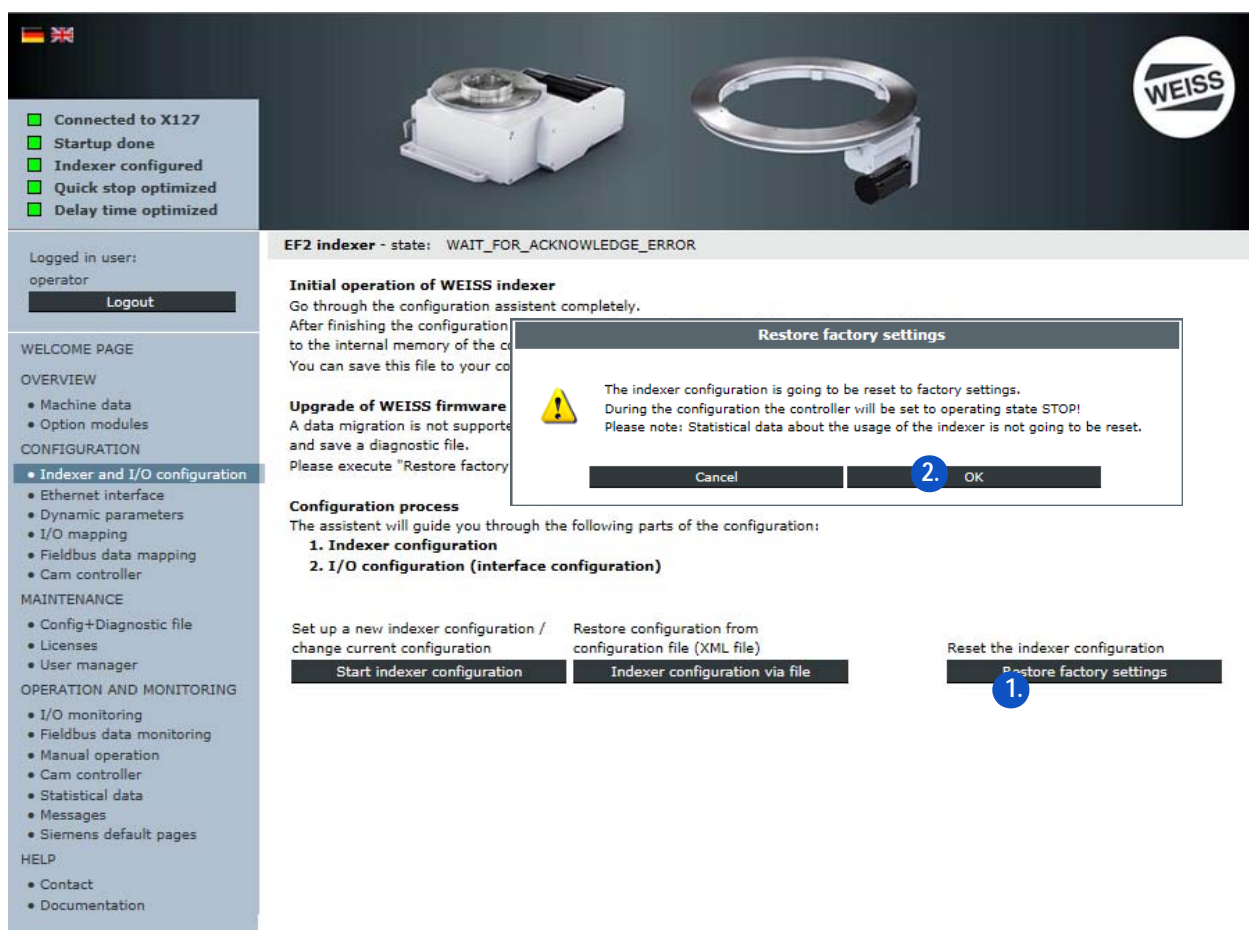
8.3 Machine configuration

8.3.1 Reset factory settings

NOTICE When upgrading the WEISS firmware or swapping the power unit, the factory settings always need to be reset before starting the configuration.

If an internal firmware update should be carried out by the controller afterwards (flashing LED 2 Hz orange at the control unit), the controller has to be switched off once more before starting the configuration and then switched back on again.

If new optional modules are activated during configuration, these optional modules may also trigger a firmware update. The RDY LED on the relevant module flashes orange at 2 Hz. In this case, the controller needs to be cycled off and on once more.



1. Switching on the controller without Drive-Cliq components.
2. Start the factory settings reset.
3. Confirm the message with OK.
 - ⇒ The configuration is reset completely.
 - ⇒ The controller is switched into the STOP operating state for the duration of the resetting to factory settings.
 - ⇒ The factory settings are loaded.
 - ⇒ The statistical data is not reset.
4. Configure controller – without Drive-Cliq components or with all Drive-Cliq components.
 - ▶ If a Drive-Cliq component triggers a firmware update after applying the configuration (RDY LED on the relevant component flashes orange at 2 Hz), cycle the controller off and on.
 - ▶ Restart the controller if no firmware update was triggered.

8.3.2 Configuration diagram

① The following configuration diagram shows all possible configurations. Follow the paths and branches of the diagram.

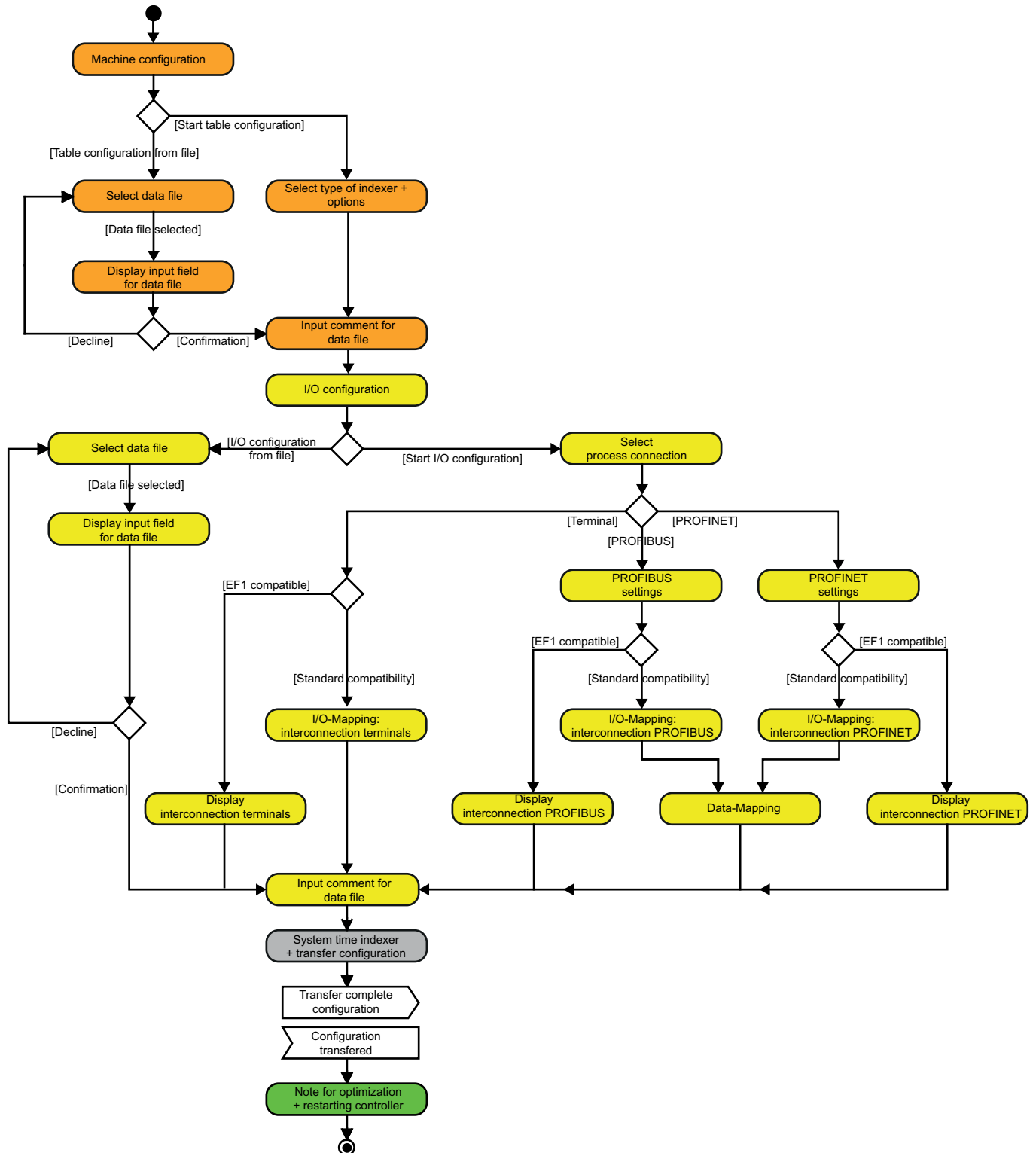
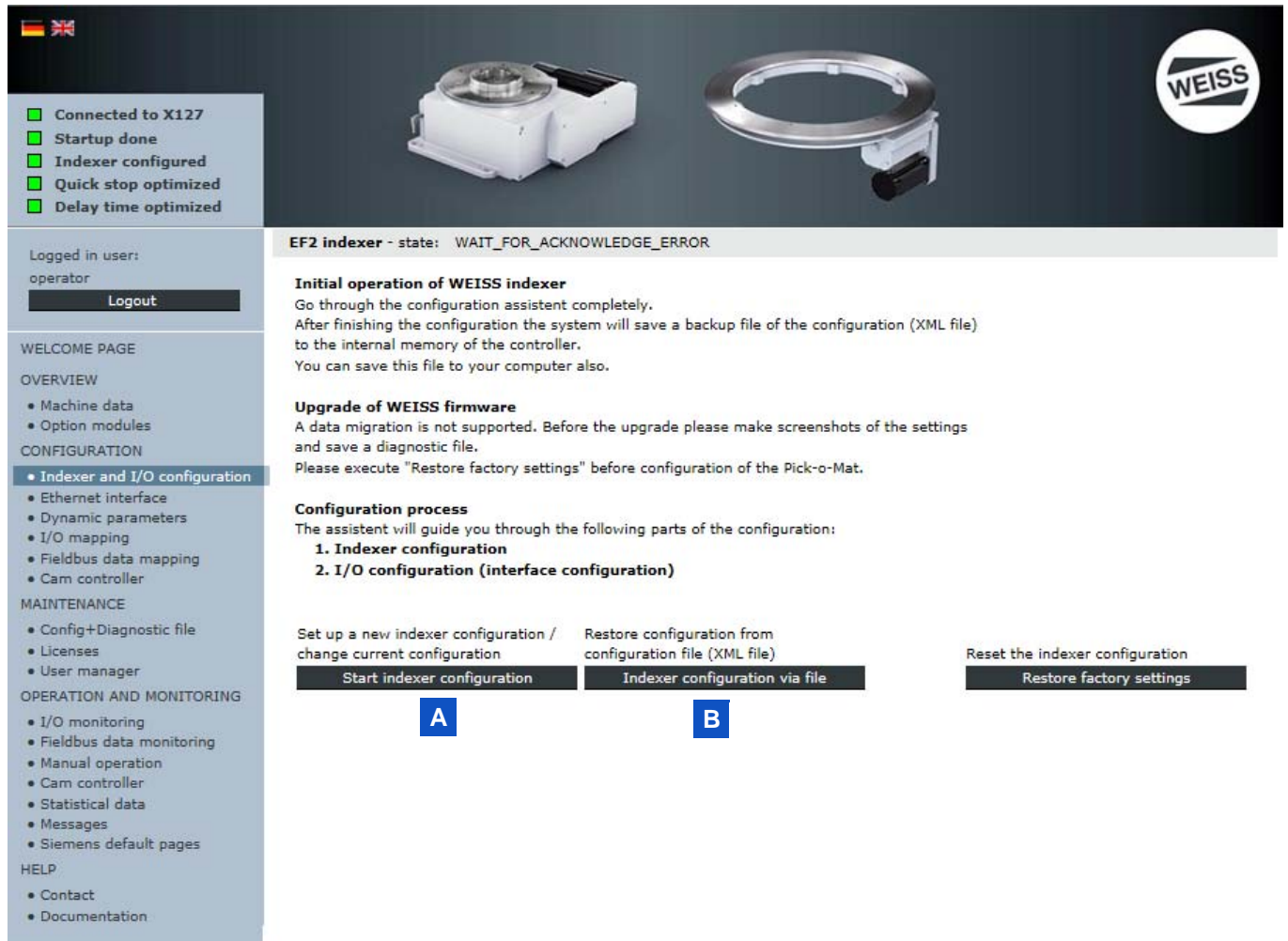


FIG. 57: EF2 configuration diagram

8.3.3 Indexer configuration

1st section of a machine configuration: Indexer configuration.

There are two different ways to configure a indexer.



[A] Start indexer configuration (chapter 8.3.3.1 „Start indexer configuration“ on page 89)

[B] Indexer configuration via file (chapter 8.3.3.2 „Indexer configuration via file“ on page 91)

NOTICE The indexer configuration and/or the resetting of the factory settings can only be started after the controller has successfully booted. A valid operation license must be available for the configuration of the table.

i Previously configured data remains intact when reconfiguring.

8.3.3.1 Start indexer configuration

The screenshot displays the WEISS software interface for configuring an EF2 indexer. On the left is a sidebar with a menu including 'Indexer and I/O configuration', 'Ethernet interface', 'Dynamic parameters', 'I/O mapping', 'Fieldbus data mapping', 'Cam controller', 'Maintenance', 'Operation and monitoring', and 'Help'. The main area shows the 'EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR' and provides instructions for initial operation, upgrade of WEISS, and the configuration process. A modal dialog box titled 'Attention' contains a warning icon and the text: 'During the configuration the controller will be set to operating state STOP!'. At the bottom of the main area, three buttons are visible: '1. Start indexer configuration', 'Indexer configuration via file', and 'Reset the indexer configuration / Restore factory settings'. The 'OK' button in the dialog is marked with a blue circle containing the number '2'.

1. Start indexer configuration.
2. Confirm the message with OK.

3. Select the type of indexer.
4. Select motor.
5. Select basic options.
6. Select extended options.
 - ▶ The values for the number of segments and the mechanical curve can be found on the name plate.
7. Input the supply voltage.
 - ▶ The supply voltage of the power module must be input manually in the respective field.
8. Click the Next button.
 - ⇒ After the Next button has been clicked, a comment box appears.

For a description of the comment box, refer to chapter 8.3.3.3 „Comment regarding indexer configuration data file“ on page 94.

By clicking on the Next button in the comment box, the indexer configuration is completed and the start window for the I/O configuration is opened.

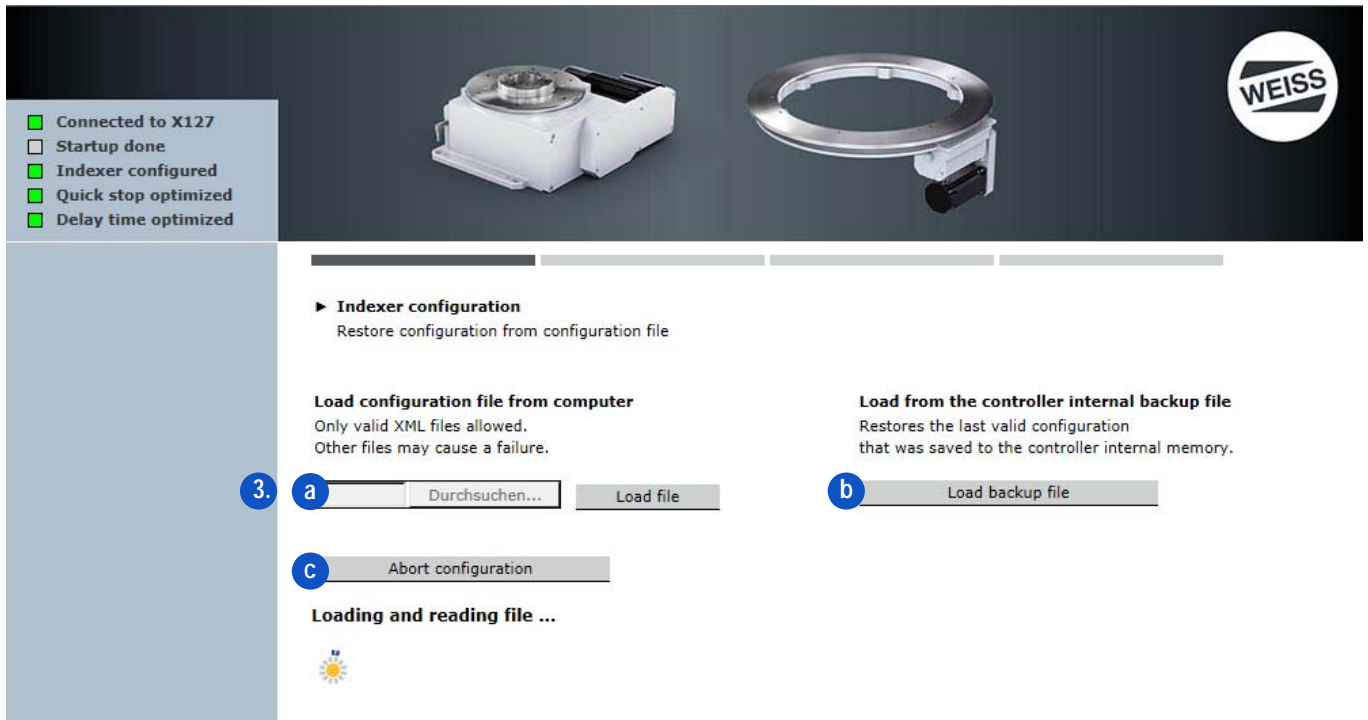
(see chapter 8.3.4 „I/O configuration“ on page 95)

8.3.3.2 Indexer configuration via file

NOTICE "Indexer configuration via file" is not possible during initial startup because no configuration file has been stored yet.

The screenshot displays the WEISS software interface. On the left is a sidebar with a menu including 'WELCOME PAGE', 'OVERVIEW', 'CONFIGURATION', 'MAINTENANCE', 'OPERATION AND MONITORING', and 'HELP'. The 'CONFIGURATION' section is expanded to show 'Indexer and I/O configuration'. The main area shows the 'EF2 indexer' status as 'WAIT_FOR_ACKNOWLEDGE_ERROR'. It contains instructions for 'Initial operation of WEISS indexer' and 'Upgrade of WEISS firmware'. A dialog box with a yellow warning icon and the text 'Attention: During the configuration the controller will be set to operating state STOP!' is open. The dialog box has 'Cancel' and 'OK' buttons, with 'OK' highlighted by a blue circle and the number '2'. Below the dialog box, three buttons are visible: 'Start indexer configuration', 'Indexer configuration via file' (highlighted with a blue circle and the number '1'), and 'Restore factory settings'.

1. Start "Indexer configuration via file".
2. Confirm the message with OK.



3. Choose action.

Selection:

- (a) "Load file" - load configuration file from computer
 - ⇒ Selection of a saved configuration file
 - ⇒ Loading a selected configuration file
- (b) "Load backup file" - load from the controller internal backup file
 - ⇒ Reloads the configuration from the controller internal backup file that was saved last.
- (c) Abort configuration
 - ⇒ Aborting the configuration => restart the controller

- ① After the loading of the selected configuration file is completed, a comment box for "Indexer configuration / User comment on the data file" is displayed.

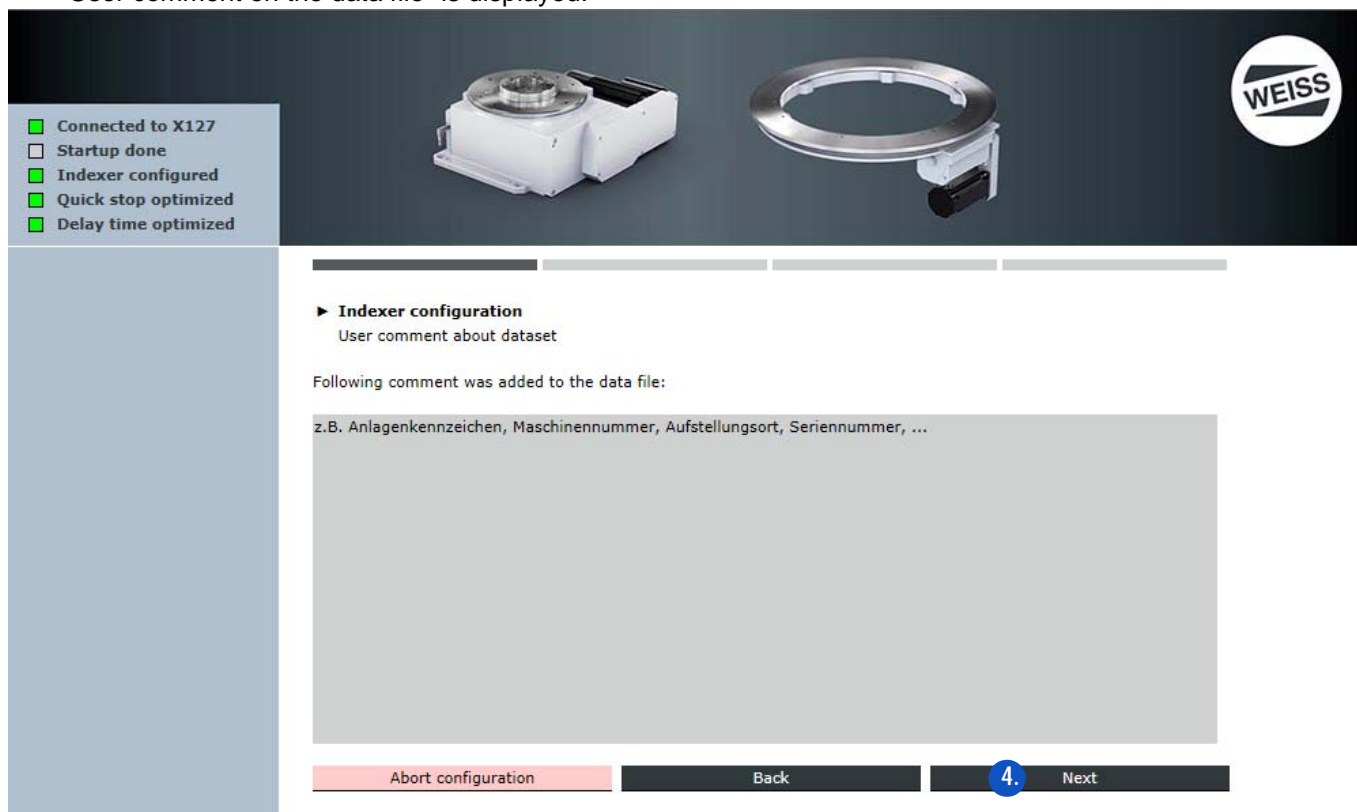


FIG. 58: User comment regarding indexer configuration data file

4. Click the Next button.

⇒ After the Next button has been clicked, a comment box appears.

📖 For a description of the comment box, refer to chapter 8.3.3.3 „Comment regarding indexer configuration data file“ on page 94.

- ① **By clicking on the Next button in the comment box, the indexer configuration is completed and the start window for the I/O configuration is opened.**

📖 (see chapter 8.3.4 „I/O configuration“ on page 95)

8.3.3.3 Comment regarding indexer configuration data file

This window contains a free text field for entering comments and notes about the data file.

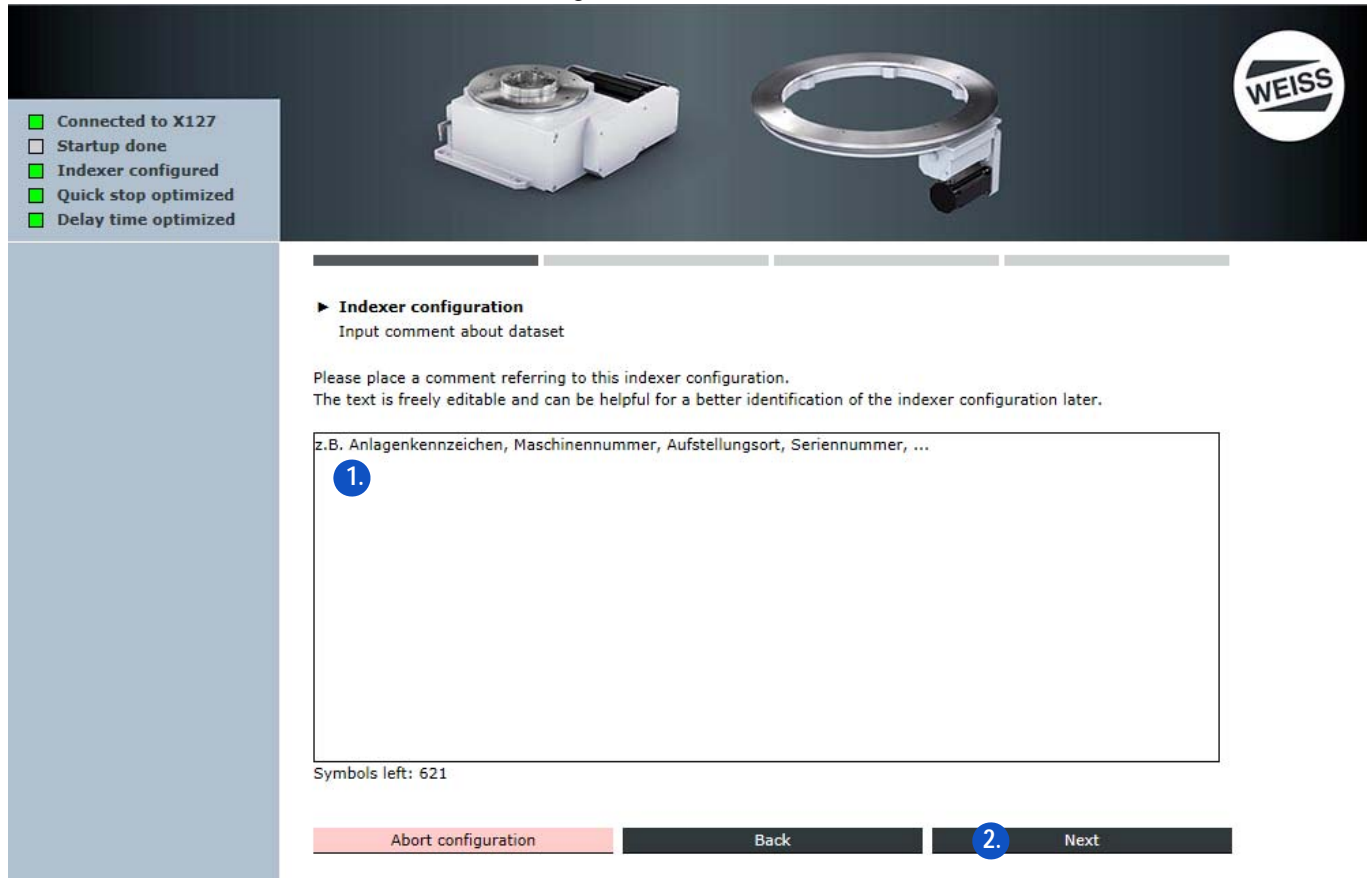


FIG. 59: Comment regarding indexer configuration data file

1. Enter a comment for the data file.
2. Click the Next button.

i By clicking on the Next button in the comment box, the indexer configuration is completed and the start window for the I/O configuration is opened.

b (see chapter 8.3.4 „I/O configuration“ on page 95)

8.3.4 I/O configuration

2nd section of the machine configuration: Interface configuration.

There are two different ways to configure the interfaces:

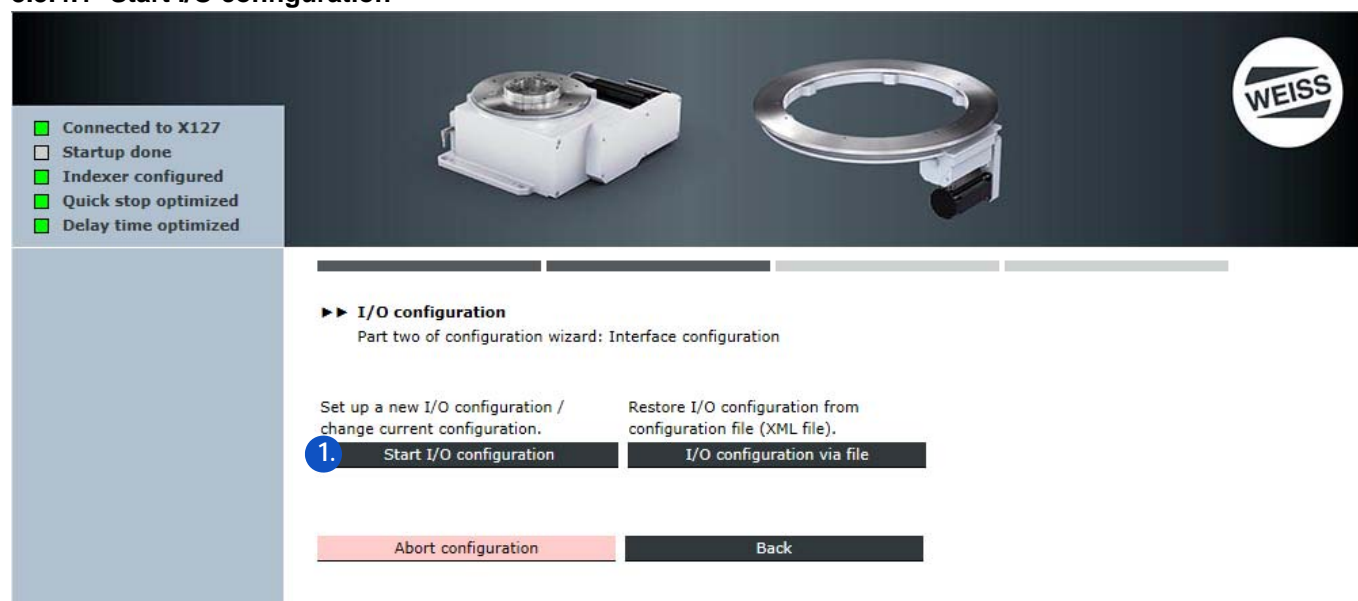
[A] Start I/O configuration

 Go to chapter 8.3.4.1 „Start I/O configuration“ on page 95

[B] I/O configuration via file

 The I/O configuration via file is carried out in the same manner as the Indexer configuration via file.


8.3.4.1 Start I/O configuration



1. Start I/O configuration.

 Configure the inputs and outputs with regard to the interface used.

I/O configuration PROFIBUS if you are using a PROFIBUS interface

 Go to chapter „I/O configuration PROFIBUS“ on page 96

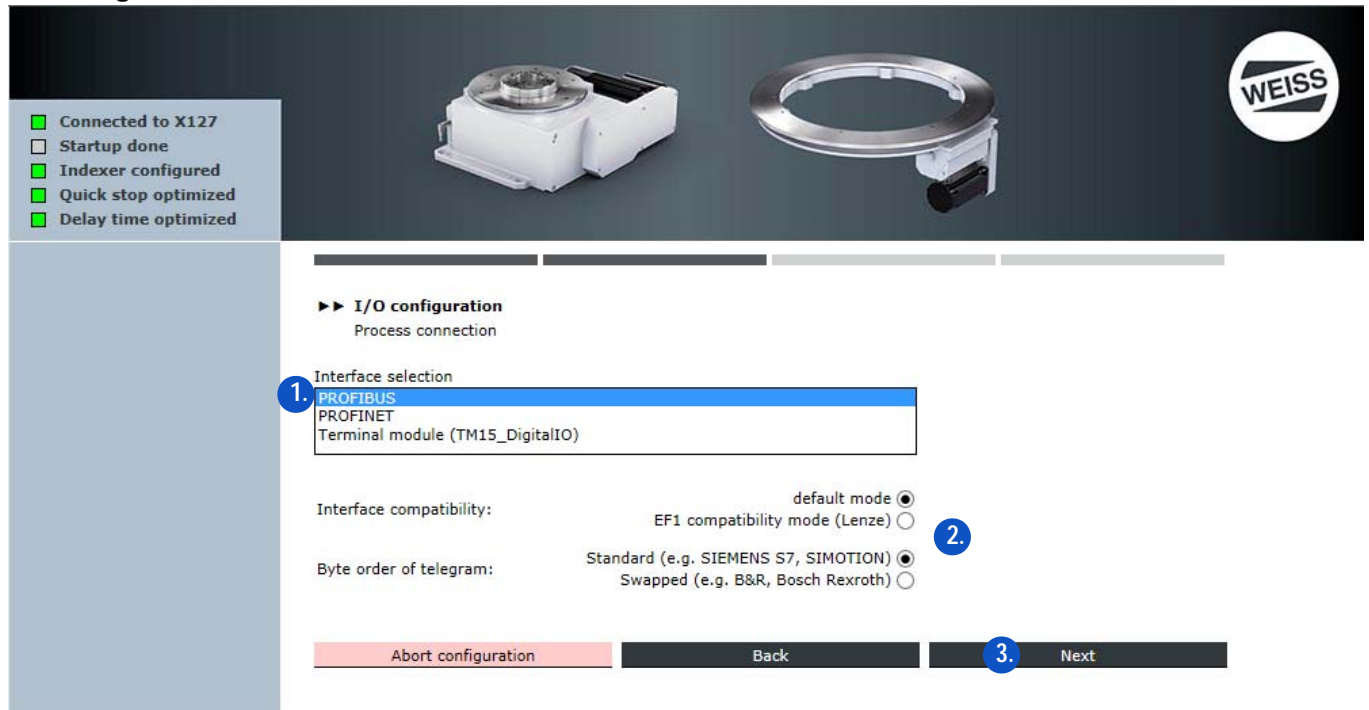
I/O configuration PROFINET if you are using a PROFINET interface

 Go to chapter „I/O configuration PROFINET“ on page 101

I/O configuration terminal module if you are using a Terminal Module (TM15) for the in-/outputs

 Go to chapter „I/O configuration terminal module“ on page 103

I/O configuration PROFIBUS



1. Select PROFIBUS interface
2. Select standard for interface compatibility and byte order in the telegram.

ⓘ The following description of the I/O configuration is valid for the interface compatibility standard. For EF1 compatibility mode see chapter 8.3.4.2 „EF1 compatible configuration“ on page 104.

3. Click the Next button.

⇒ The window for I/O configuration - PROFIBUS settings is opened.



4. Enter the PROFIBUS DP address.
5. Choose the PROFIBUS baudrate.
6. Click the Next button.

⇒ The window for I/O configuration - I/O mapping PROFIBUS telegram is opened.

ⓘ A default configuration can be used for the I/O mapping. Alternatively, the control commands can be assigned to the inputs / outputs manually.

Default configuration I/O mapping:

- ⇒ Inputs and outputs are assigned to the control functions which are defined as default.
- ⇒ Individual assignments can be deleted or changed.
- ⇒ Functions displayed in grey in the "Control functions" selection field are already assigned, those displayed in black can still be assigned.

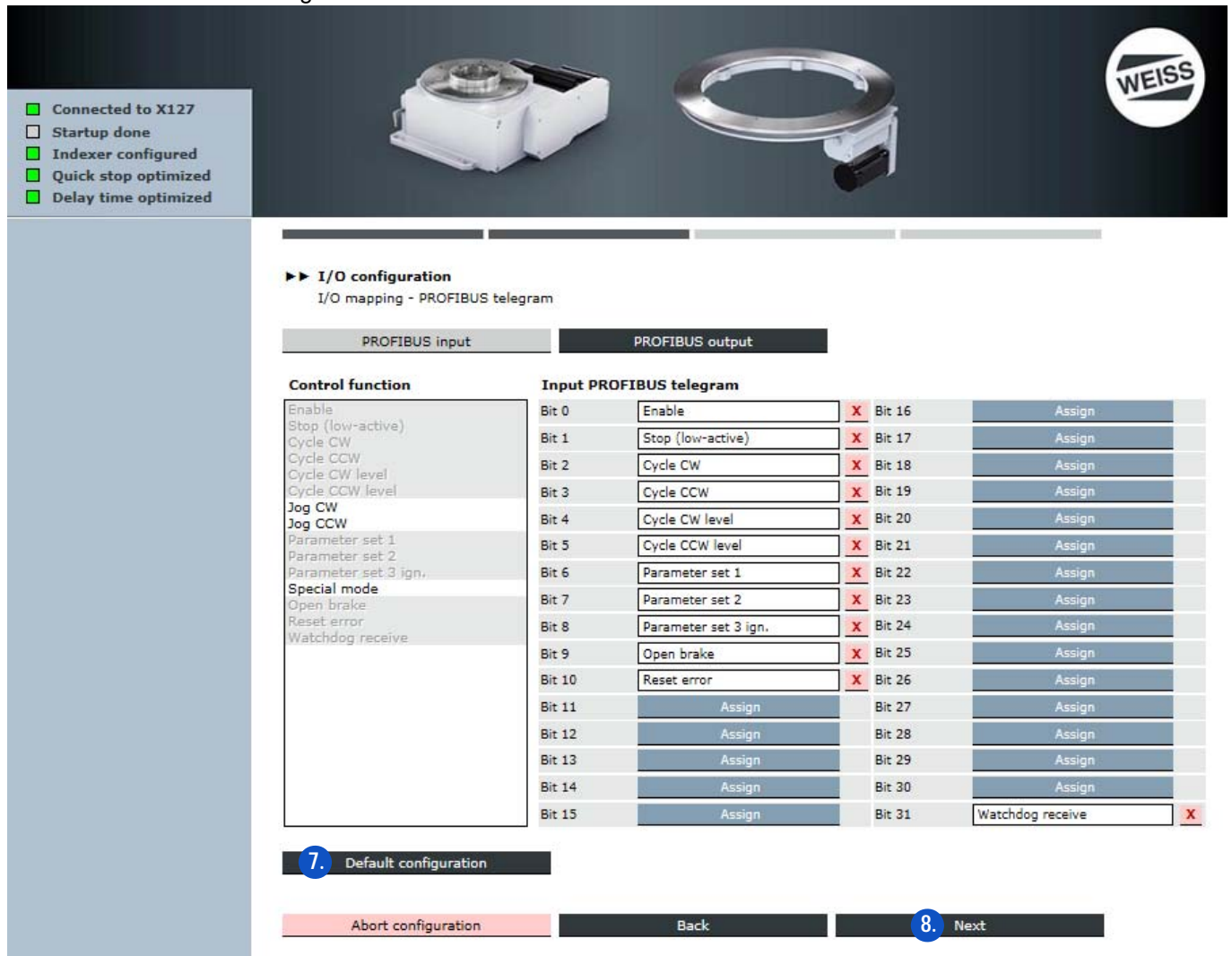


FIG. 60: Default configuration I/O mapping PROFIBUS

7. Select default configuration.

8. Click the Next button.

- ⇒ The window for I/O configuration - Data mapping is opened.

ⓘ A default configuration can be used for the data mapping. Alternatively, a manual assignment is possible.

Default configuration data mapping:

- ⇒ Inputs and outputs are assigned to the control functions which are defined as default.
- ⇒ Individual assignments can be deleted or changed.
- ⇒ Functions displayed in grey in the "Control functions" selection field are already assigned, those displayed in black can still be assigned.

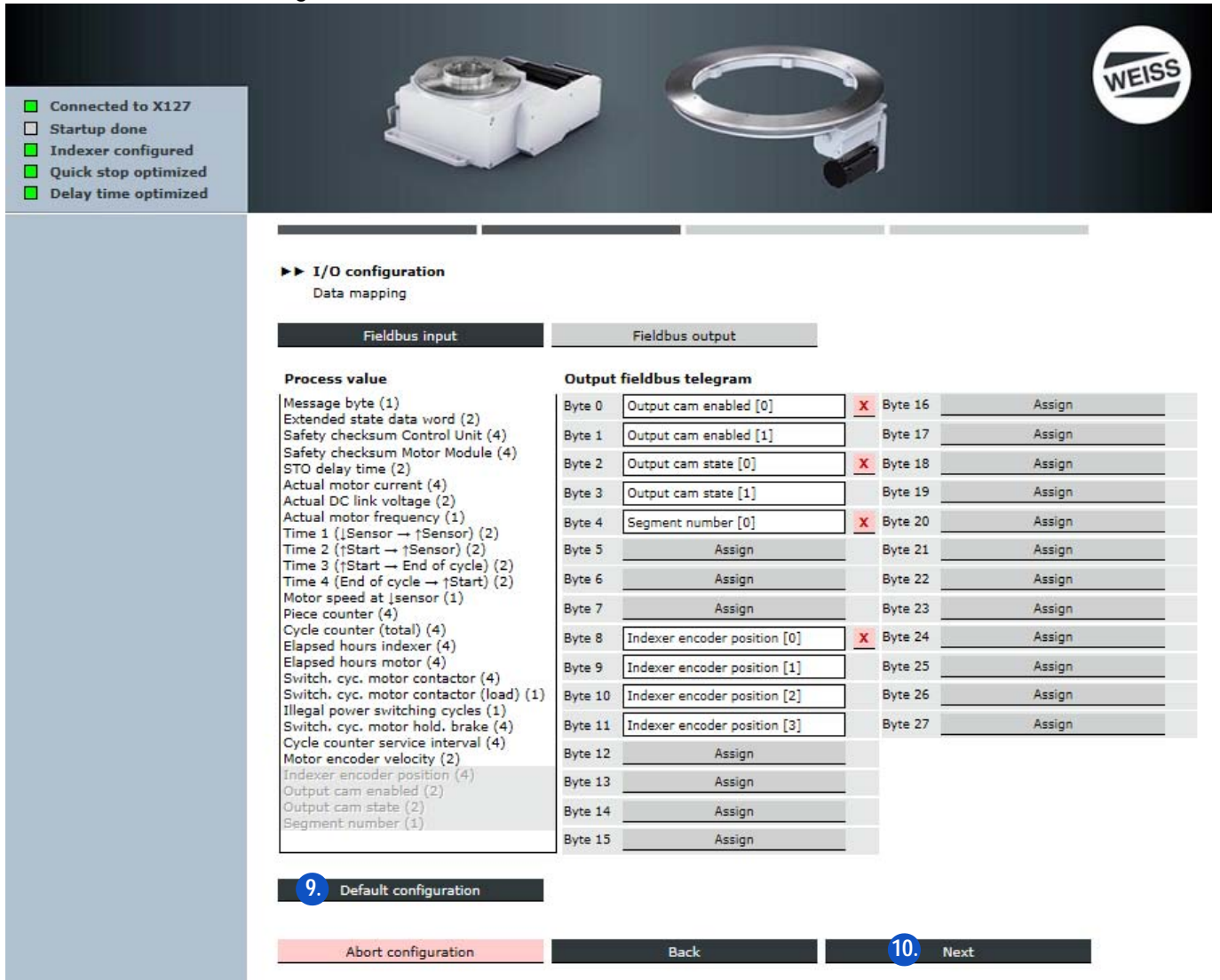


FIG. 61: Default configuration data mapping PROFIBUS

9. Select default configuration.

10. Click the Next button.

- ⇒ After the Next button has been clicked, a comment box appears.

For a description of the comment box, refer to chapter 8.3.4.3 „Comment regarding I/O configuration data file“ on page 112.

By clicking on the Next button in the comment box, the I/O configuration is completed and the window for adjusting the system time is opened.

(see chapter „Adjust system time“ on page 99)

Adjust system time

The screenshot shows the Weiss software interface for adjusting system time and configuring optional modules. The interface includes a status bar on the left with the following items:

- Connected to X127
- Startup done
- Indexer configured
- Quick stop optimized
- Delay time optimized

The main area displays the following steps:

- 1. Adjust system time:** A date field shows "Fri Nov 10 13:26:18 2017". Below it are buttons for "Set time" and "Transfer PC time".
- 2. Interconnection of option modules:** An important note states: "IMPORTANT NOTE: For operation of the indexer the following option modules are required. Please connect these to the SIMOTION D controller as follows:"

Required option modules	Connection from ...	to ...
TM15_Cam	SIMOTION_D:X100	TM15_Cam:X500
Indexer encoder	TM15_Cam:X501	Indexer encoder

If there are no option modules available yet, for apply settings it is also possible not to connect any option module to the interfaces SIMOTION_D:X23 and SIMOTION_D:X100. For operation of the indexer all option modules have to be connected properly.

Clicking the button "Apply settings" will finalize the machine configuration.

At the bottom, there are buttons for "Abort configuration", "Back", and "Apply settings".

A dialog box titled "Configuration process running" is shown, indicating that the configuration is being finalized and applied. The progress is at 3%.

- Adjust system time.
 - The currently displayed time can be used as the system time, a new time can be defined, or the PC time can be transferred.
- The connection of the optional modules is displayed during the configuration of optional modules.
- Transfer adjustments.
 - The machine configuration is completed.
 - All settings are accepted.
 - The controller needs to be restarted.

NOTICE Connecting optional modules

The proper connection of all optional modules is mandatory for accepting the settings and the later operation. As an alternative, no optional modules need to be connected for taking over the settings. In this case, the indexer does not become operative until all optional modules are properly connected.

Restart

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

Configuration finished - Restart required

The configuration of the indexer now is finished successfully.

You can modify the preset dynamic parameters of the indexer according to your application.
 To do that please go to the following page after restarting the controller:
CONFIGURATION/Dynamic parameters

1. Restart

Please wait

Waiting for startup of controller ...
 This may take a few minutes.

1. Confirm the prompt for a restart.

- ⇒ The controller boots.
- ⇒ After booting is completed, the Start page is opened.
- ⇒ The status of the indexer is displayed in the status indicator of the Start page.
 - ▶ Connected with X127
 - ▶ Startup done
 - ▶ Indexer configured
 - ▶ Quick stop optimised
 - ▶ Stop delay time optimised
 - ▶ Indexer state: WAIT_FOR_ENABLE

I/O configuration PROFINET

1. Select PROFINET interface.
2. Select standard for interface compatibility and byte order in the telegram.

① The following description of the I/O configuration is valid for the interface compatibility standard. For EF1 compatibility mode see chapter 8.3.4.2 „EF1 compatible configuration“ on page 104.

3. Click the Next button.

⇒ The window for entering the PROFINET settings is opened.

NOTICE The station name has to **match the name** that was previously declared in the higher-level controller!

Rules for assigning names:

- Only lowercase letters
- Letters a-z and numbers 0-9 are permitted
- Special characters are not allowed: !"#\$%&/()=?`*!_.;#+<>|~[]{}
- Spaces are not allowed either
- The name can have a maximum total length of 240 characters
- Reserved names which cannot be used:
 - ▶ "port-xyz" or "port-xyz-abcde..."
- The engineering system replaces invalid characters with an "x".



4. Obtain PROFINET device name from higher-level controller or enter PROFINET device name. Recommendation from WEISS GmbH:
 - ▶ Enter PROFINET device name.
 - ▶ Enter PROFINET IP configuration.

NOTICE The input must match the **settings of the higher-level controller**.

5. If necessary: Carry out new PROFINET IP configuration again.
6. Click the Next button.
 - ⇒ The window for I/O configuration / I/O mapping PROFINET telegram is opened.
- ① I/O mapping for the PROFINET interface is done in the same way as the I/O mapping for the PROFIBUS interface (see chapter „I/O configuration PROFIBUS“ on page 96).
7. Adjust the system time (see chapter „Adjust system time“ on page 99).
8. Restart the controller (see chapter „Restart“ on page 100).

NOTICE The node name of the PROFINET interface must not be assigned by external tools. The interface is configured exclusively via the controller web page!

I/O configuration terminal module

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

►► I/O configuration
 Process connection

Interface selection

PROFIBUS
 PROFINET
 Terminal module (TM15_DigitalIO)

Interface compatibility:

default mode
 EF1 compatibility mode (Lenze)

1. Select terminal module interface.

2. Select interface compatibility.

ⓘ The following description of the I/O configuration is valid for the interface compatibility standard. For EF1 compatibility mode see chapter 8.3.4.2 „EF1 compatible configuration“ on page 104.

3. Click the Next button.

⇒ The window for entering the I/O mapping - terminal assignment TM15_DigitalEA is opened.

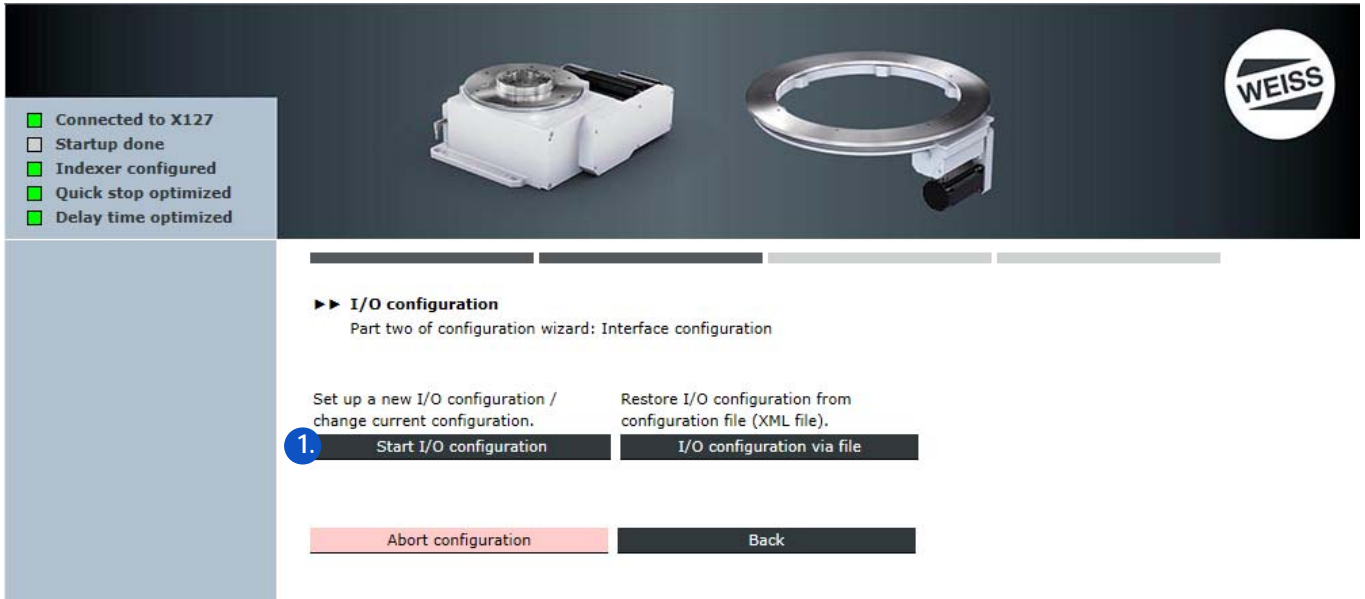
ⓘ I/O mapping for the terminal assignment TM15_DigitalEA is done in the same way as the I/O mapping for the PROFIBUS interface (see chapter „I/O configuration PROFIBUS“ on page 96).

4. Adjust the system time (see chapter „Adjust system time“ on page 99).

5. Restart the controller (see chapter „Restart“ on page 100).

8.3.4.2 EF1 compatible configuration

i Configure the inputs and outputs with regard to the interface used.



1. Start I/O configuration.

i Configure the inputs and outputs with regard to the interface used.

I/O configuration PROFIBUS if you are using a PROFIBUS interface

📖 Go to chapter „I/O configuration PROFIBUS EF1“ on page 105

I/O configuration PROFINET if you are using a PROFINET interface

📖 Go to chapter „I/O configuration PROFINET EF1“ on page 107

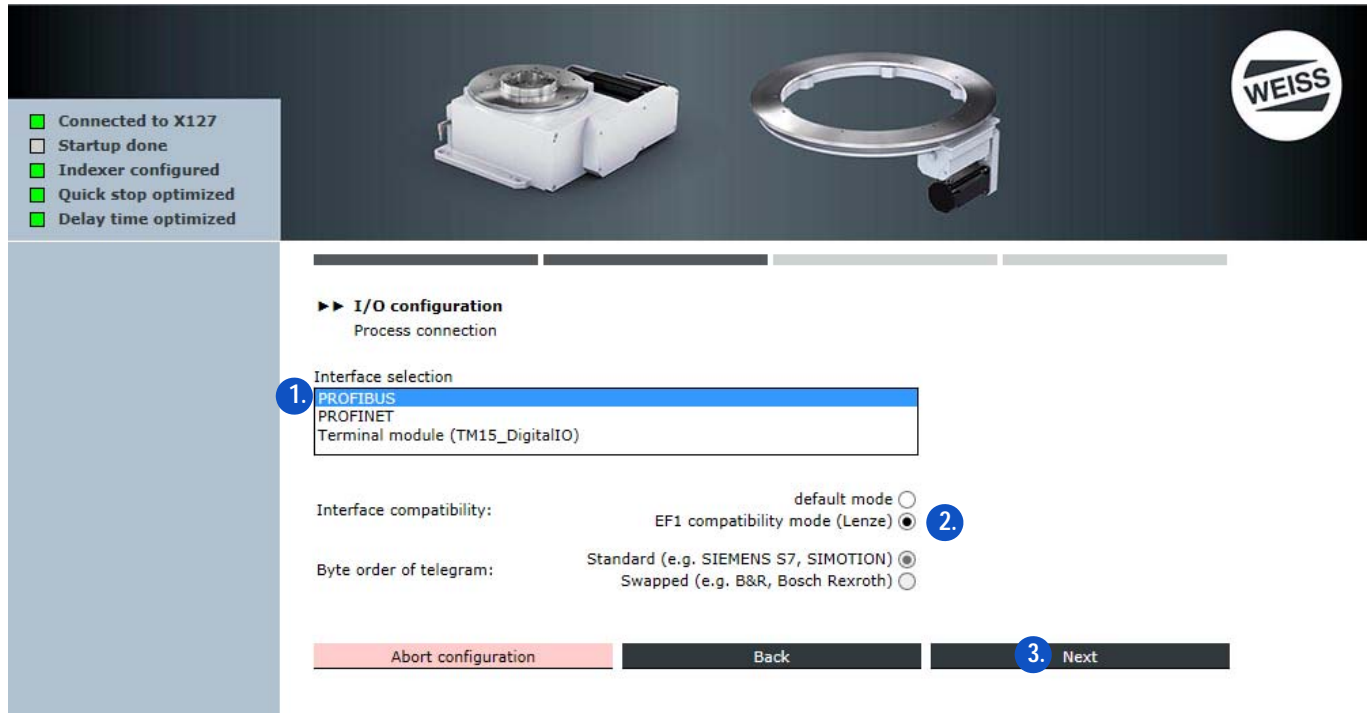
I/O configuration terminal module if you are using a Terminal Module (TM15) for the in-/outputs

📖 Go to chapter „I/O configuration terminal block connection EF1“ on page 110

I/O configuration PROFIBUS EF1

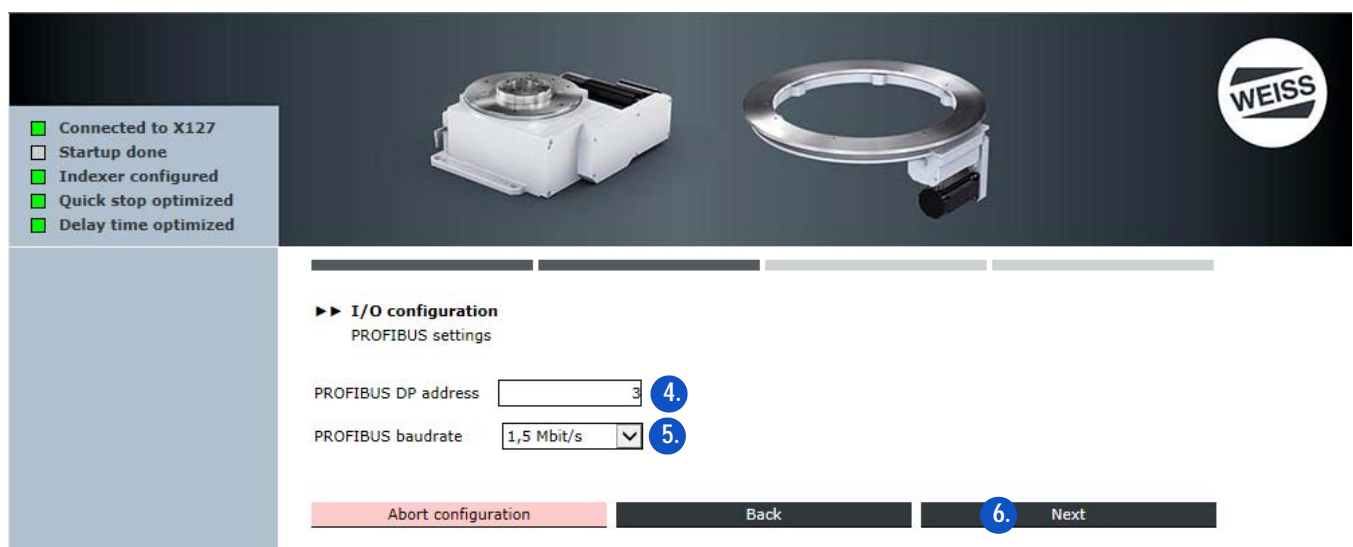
With the EF1 compatible I/O configuration, the interfaces are compatible to the WEISS indexer controller EF1.

- ⇒ Inputs and outputs are assigned to the control functions which are defined as default.
- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.



1. Select PROFIBUS interface
2. Select EF1 compatibility mode.
3. Click the Next button.

⇒ The window for I/O configuration - PROFIBUS settings is opened.



4. Enter the PROFIBUS DP address.
5. Choose the PROFIBUS baudrate.
6. Click the Next button.

⇒ The window for I/O configuration / PROFIBUS "EF1 / Lenze" compatible is opened.

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

►► I/O configuration
 PROFIBUS - "EF1 / Lenze" compatible

Input PROFIBUS telegram

Bit 0	Reset error
Bit 1	Parameter set 2
Bit 2	Parameter set 3 ign.
Bit 3	Special mode
Bit 4	Enable
Bit 5	Start (edge-trig.)
Bit 6	Start (level-trig.)
Bit 7	CW/CCW

Output PROFIBUS telegram

Bit 0	Sum error
Bit 1	Alarm position run over
Bit 2	Alarm timeout
Bit 3	Automatic mode
Bit 4	Ready to start
Bit 5	Indexer in position

Abort configuration Back **4.** Next

- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.

7. Click the Next button.

- ⇒ After the Next button has been clicked, a comment box appears.

For a description of the comment box, refer to chapter 8.3.4.3 „Comment regarding I/O configuration data file“ on page 112.

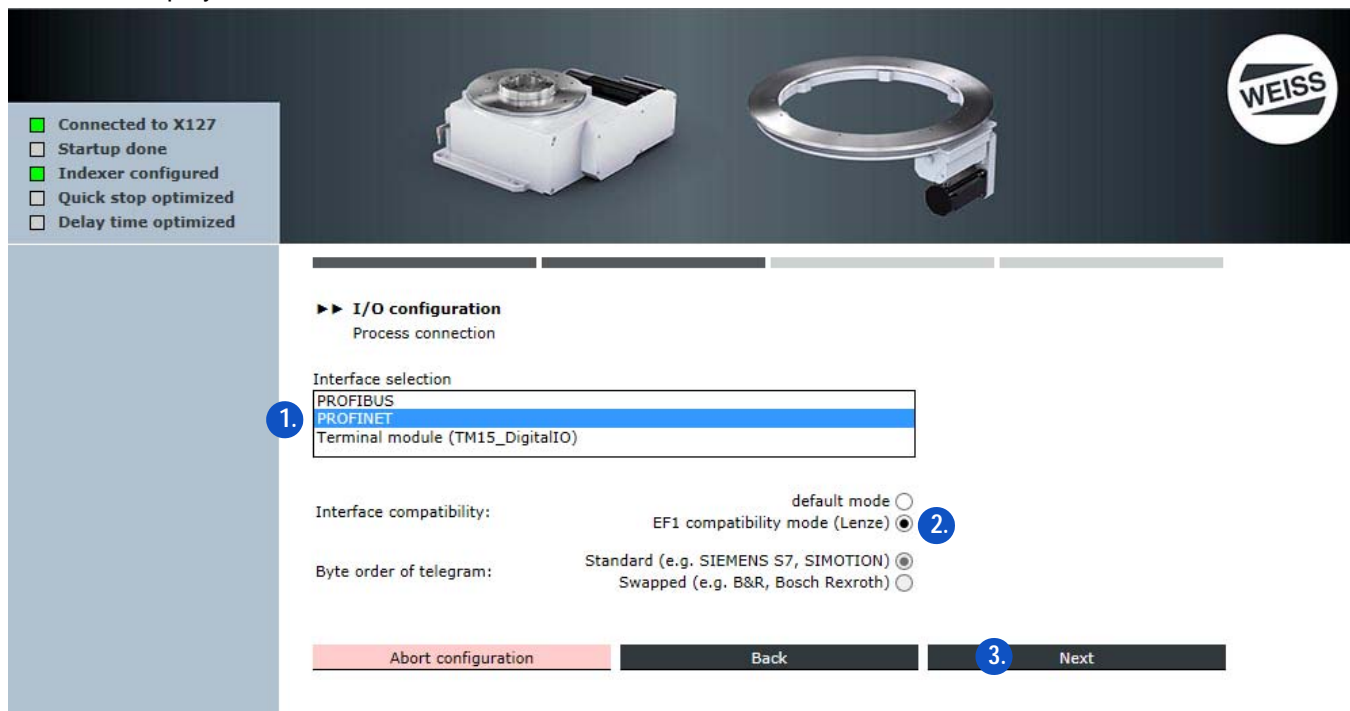
By clicking on the Next button in the comment box, the I/O configuration is completed and the window for adjusting the system time is opened.

8. Adjust the system time (see chapter „Adjust system time“ on page 99).
9. Restart the controller (see chapter „Restart“ on page 100).

I/O configuration PROFINET EF1

With the EF1 compatible I/O configuration, the interfaces are compatible to the WEISS indexer controller EF1.

- ⇒ Inputs and outputs are assigned to the control functions which are defined as default.
- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.

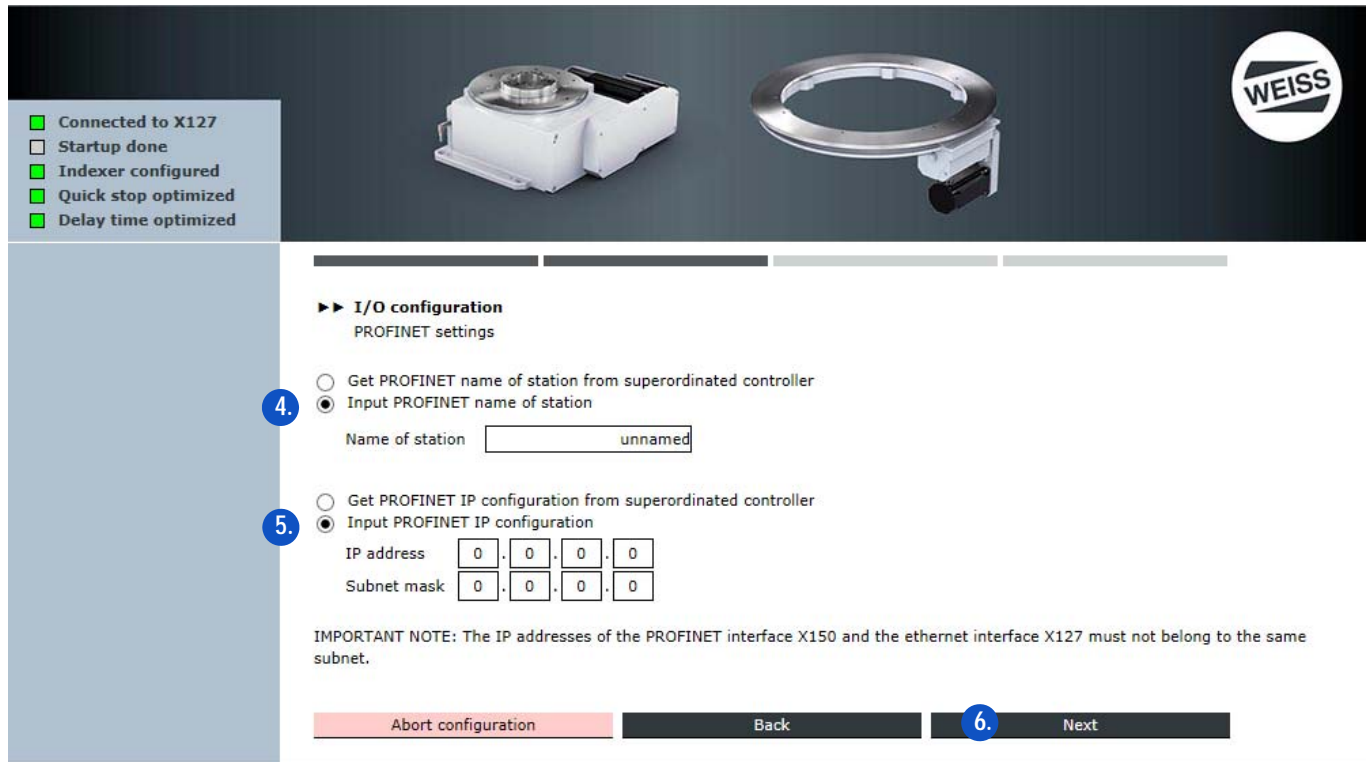


1. Select PROFINET interface.
2. Select EF1 compatibility mode.
3. Click the Next button.
 - ⇒ The window for entering the PROFINET settings is opened.

NOTICE The station name has to **match the name** that was previously declared in the higher-level controller!

Rules for assigning names:

- Only lowercase letters
- Letters a-z and numbers 0-9 are permitted
- Special characters are not allowed: !"#\$%&/()=?`*_!_.;#+<>|~[]{}
- Spaces are not allowed either
- The name can have a maximum total length of 240 characters
- Reserved names which cannot be used:
 - ▶ "port-xyz" or "port-xyz-abcde..."
- The engineering system replaces invalid characters with an "x".



4. Obtain PROFINET device name from higher-level controller or enter PROFINET device name. Recommendation from WEISS GmbH:
 - ▶ Enter PROFINET device name.
 - ▶ Enter PROFINET IP configuration.

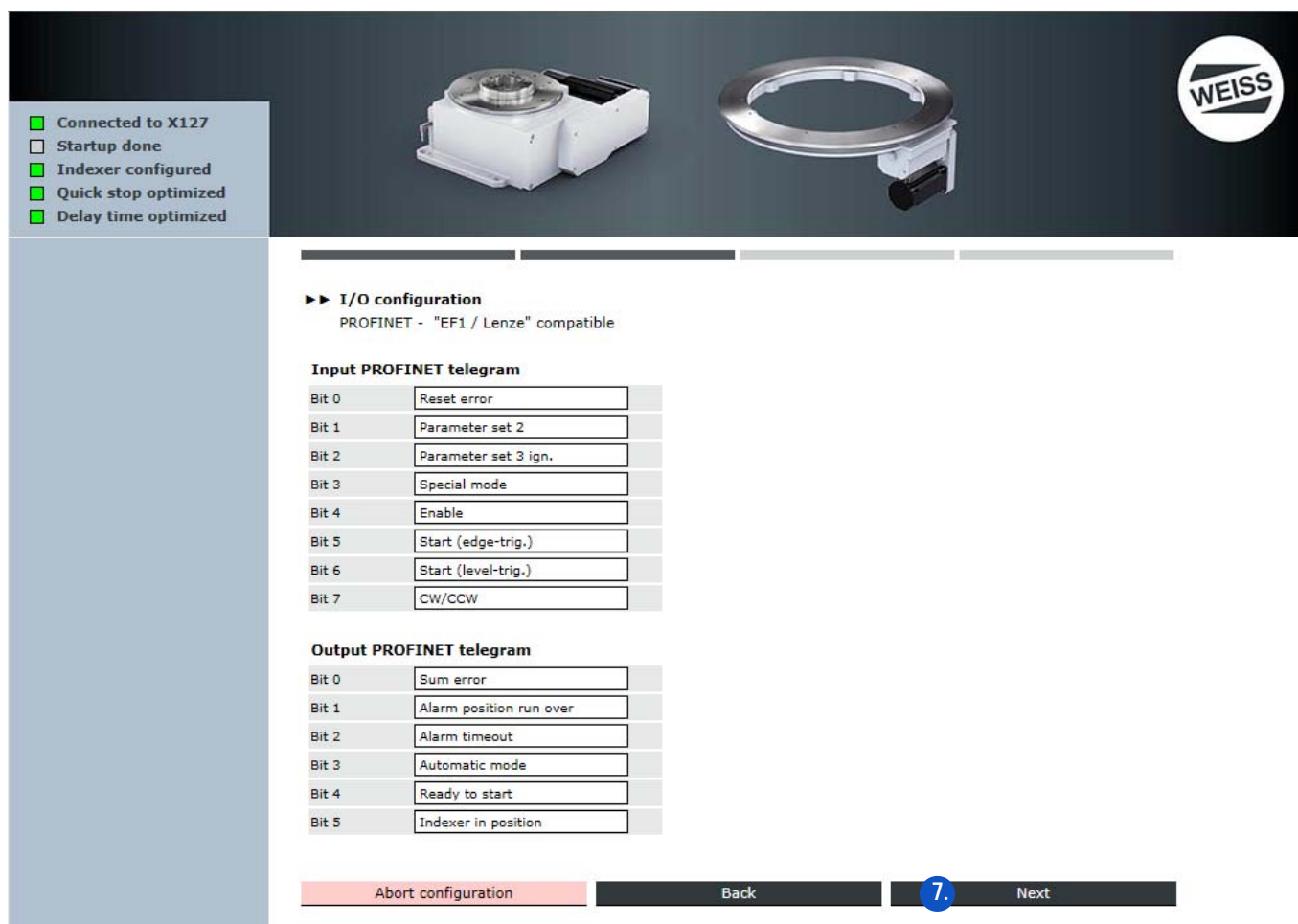
NOTICE The input must match the **settings of the higher-level controller**.

5. If necessary: Carry out new PROFINET IP configuration again.

6. Click the Next button.

⇒ The window for I/O configuration / PROFINET "EF1 / Lenze" compatible is opened.

NOTICE The node name of the PROFINET interface must not be assigned by external tools. The interface is configured exclusively via the controller web page!



Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

►► I/O configuration
 PROFINET - "EF1 / Lenze" compatible

Input PROFINET telegram

Bit 0	Reset error
Bit 1	Parameter set 2
Bit 2	Parameter set 3 ign.
Bit 3	Special mode
Bit 4	Enable
Bit 5	Start (edge-trig.)
Bit 6	Start (level-trig.)
Bit 7	CW/CCW

Output PROFINET telegram


Bit 0	Sum error
Bit 1	Alarm position run over
Bit 2	Alarm timeout
Bit 3	Automatic mode
Bit 4	Ready to start
Bit 5	Indexer in position


Abort configuration Back **7.** Next

- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.

7. Click the Next button.

- ⇒ After the Next button has been clicked, a comment box appears.

 For a description of the comment box, refer to chapter 8.3.4.3 „Comment regarding I/O configuration data file“ on page 112.

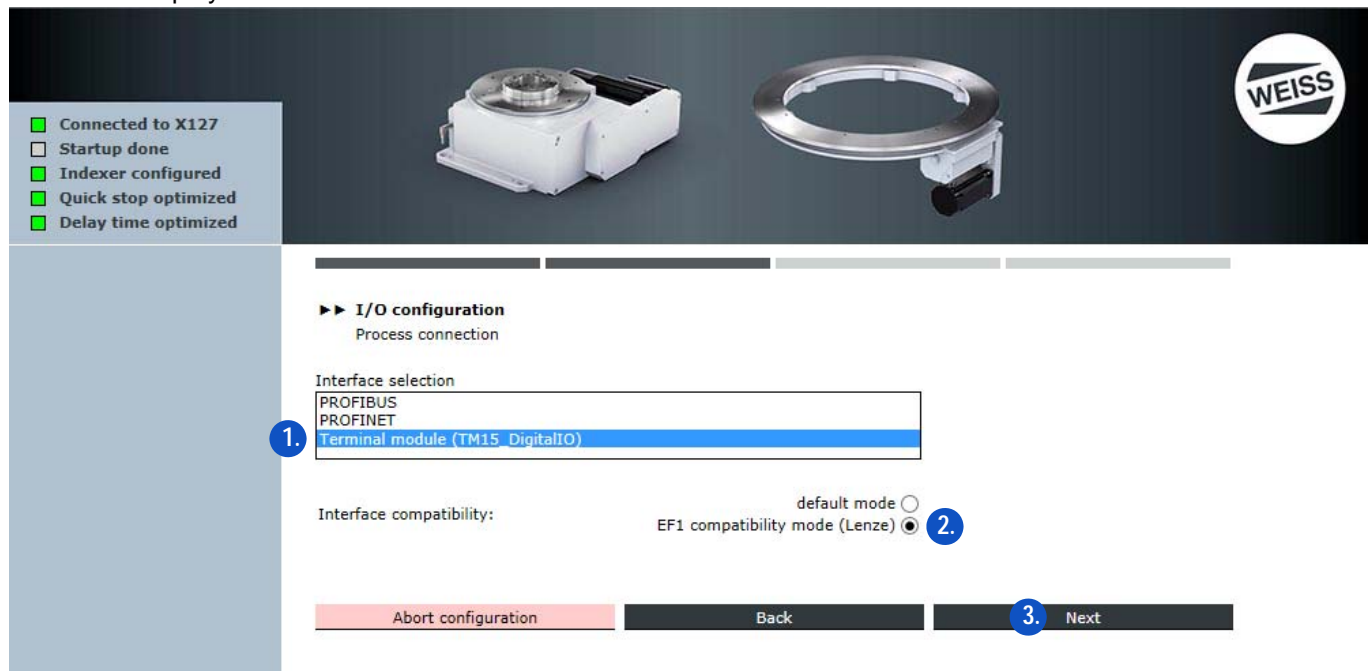
 **By clicking on the Next button in the comment box, the I/O configuration is completed and the window for adjusting the system time is opened.**

8. Adjust the system time (see chapter „Adjust system time“ on page 99).
9. Restart the controller (see chapter „Restart“ on page 100).

I/O configuration terminal block connection EF1

With the EF1 compatible I/O configuration, the interfaces are compatible to the WEISS indexer controller EF1.

- ⇒ Inputs and outputs are assigned to the control functions which are defined as default.
- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.



1. Select terminal module interface.
2. Select EF1 compatibility mode.
3. Click the Next button.

- ⇒ The window for entering the I/O configuration - terminal assignment TM15_DigitalEA "EF1 / Lenze" compatible is opened.

Terminal configuration input

D10, X520.2	Reset error
D11, X520.3	Parameter set 2
D12, X520.4	Parameter set 3 ign.
D13, X520.5	Special mode
D14, X520.6	Enable
D15, X520.7	Start (edge-trig.)
D16, X520.8	Start (level-trig.)
D17, X520.9	CW/CCW

Terminal configuration output

DO12, X521.6	Sum error
DO13, X521.7	Alarm position run over
DO14, X521.8	Alarm timeout
DO15, X521.9	Automatic mode
DO16, X522.2	Ready to start
DO17, X522.3	Indexer in position

- ⇒ Individual assignments cannot be deleted or changed.
- ⇒ The display of control functions is informative.

4. Click the Next button.

- ⇒ After the Next button has been clicked, a comment box appears.

For a description of the comment box, refer to chapter 8.3.4.3 „Comment regarding I/O configuration data file“ on page 112.

By clicking on the Next button in the comment box, the I/O configuration is completed and the window for adjusting the system time is opened.

5. Adjust the system time (see chapter „Adjust system time“ on page 99).
6. Restart the controller (see chapter „Restart“ on page 100).

8.3.4.3 Comment regarding I/O configuration data file

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

►► I/O configuration
 Input comment about dataset

Please place a comment referring to this interface configuration.
 The text is freely editable and can be helpful for a better identification of the interface configuration later.

z.B. Anlagenkennzeichen, Maschinenummer, Aufstellungsort, Seriennummer, ...

Symbols left: 620

a Abort configuration **b** Back **c** Next

❗ The comment is for describing the chosen data file.

Selection:

- (a) Abort configuration
 ⇒ Aborting the configuration => the controller is restarted
- (b) Back
 ⇒ Back to the previous screen
- (c) Next

❗ **By clicking on the Next button in the comment box, the I/O configuration is completed and the window for adjusting the system time is opened.**

7. Adjust the system time (see chapter „Adjust system time“ on page 99).
8. Restart the controller (see chapter „Restart“ on page 100).

8.3.5 Ethernet interface

Before beginning with the machine configuration, the Ethernet interface should be checked.

i If necessary, the settings can be changed.

The screenshot displays the WEISS software interface for configuring the Ethernet interface. The interface is divided into several sections:

- Language Selection:** German and English flags are visible at the top left.
- Status Indicators:** A list of status indicators on the left shows:
 - Connected to X127 (checked)
 - Startup done (unchecked)
 - Indexer configured (checked)
 - Quick stop optimized (checked)
 - Delay time optimized (checked)
- User Information:** Logged in user: operator. A 'Logout' button is present.
- Navigation Menu:** A sidebar on the left contains sections for 'WELCOME PAGE', 'OVERVIEW', 'CONFIGURATION', 'MAINTENANCE', 'OPERATION AND MONITORING', and 'HELP'. The 'Ethernet interface' option under 'CONFIGURATION' is highlighted.
- Main Content Area:**
 - Header:** EF2 indexer - state: NOT_READY
 - Title:** Ethernet configuration (RJ45 socket X127)
 - Enhanced Settings:** A checkbox labeled 'Show enhanced settings' is currently unchecked.
 - User defined IP settings active:** Marked with a blue circle '1', it shows IP address 169.254.11.22 and Subnet mask 255.255.0.0.
 - New user defined IP settings:** Marked with a blue circle '2', it shows input fields for IP address (169, 254, 11, 22) and Subnet mask (255, 255, 0, 0).
 - Default IP settings active:** Marked with a blue circle '3', it shows IP address 169.254.11.22 and Subnet mask 255.255.0.0.
 - Note:** 'Default IP settings can be set active by high level at digital input DI10 (X121.10).' and 'IMPORTANT NOTE: The IP addresses of the PROFINET interface X150 and the ethernet interface X127 must not belong to the same subnet.'
 - Action:** A 'Confirm new IP settings' button is located at the bottom.

FIG. 62: Configuring the Ethernet interface

- (1) Displays the user-defined IP setting
- (2) Input fields for the entry of new user-defined IP settings
- (3) Displays the default IP setting
 - ▶ This is the default IP setting for the supplied controller and cannot be changed.
 - ▶ The default IP setting can be used to restore the initial setting.

Setting the default IP

If the user (operator) does not know the IP configuration of an indexer, the controller cannot be accessed.

In this case, the default IP configuration (169.254.11.22) for the Ethernet interface can be activated by connecting 24 VDC to input DI10 (terminal X121.10).

This known IP address can be used to access the controller then to check or change the user-defined IP configuration.

i In order to make the user-defined IP configuration effective, the 24 VDC needs to be disconnected again from the DI10 input. Make sure that there are not several participants in the same network with the default IP configuration.

Changing the IP settings

1. Under "New user-defined IP settings", an IP address and subnet mask can be entered.
2. Confirm new IP setting.

NOTICE The IP addresses of the PROFINET interface X150 and the Ethernet interface X127 must not be in the same subnet for IT security reasons!

After checking the Ethernet interface, the machine configuration can be started.

The Configuration wizard leads through the following steps:

1. Indexer configuration (chapter 8.3.3 „Indexer configuration“ on page 88)
 2. I/O configuration (chapter 8.3.4 „I/O configuration“ on page 95)
- ⓘ Access to the entire indexer configuration is only permitted for authorised persons. User name and password are supplied with the controller (chapter 8.1.2 „Login“ on page 83).

8.3.6 Dynamic parameters

The default dynamic parameters that were taken on during selection of the indexer can be adjusted to meet the requirements of the customer.

NOTICE Changing the dynamic parameters influences the movements of the table top and the system behaviour of the indexer. A process value that is outside the set limits (upper limit / lower limit) is not permitted! For applications according to SIL2, the values for quick stop ramp and STO delay time are displayed in the Quick stop section.

For applications according to SIL3, the minimum switching time of the safety relay are displayed additionally in the Quick stop section.

For each possible movement of a indexer, a monitoring time is determined which is activated for this movement after 3 repetitions. In case the cycle time changes – e.g. due to temperature influences, the activated monitoring times can be reset. New monitoring times are determined automatically after the reset.

NOTICE Consultation with WEISS GmbH becomes necessary if the monitoring time is reset so that mechanical damage can be avoided.

1. Enter new process values.
2. Write configuration.
 - ▶ Write configuration is used to save data as current process values and simultaneously update the configuration file.
3. Confirm the message with OK.

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

Logged in user: operator
 Logout

WELCOME PAGE
 OVERVIEW
 • Machine data
 • Option modules
 CONFIGURATION
 • Indexer and I/O configuration
 • Ethernet interface
 • **Dynamic parameters**
 • I/O mapping
 • Fieldbus data mapping
 • Cam controller
 MAINTENANCE
 • Config+Diagnostic file
 • Licenses
 • User manager
 OPERATION AND MONITORING
 • I/O monitoring
 • Fieldbus data monitoring
 • Manual operation
 • Cam controller
 • Statistical data
 • Messages
 • Siemens default pages
 HELP
 • Contact
 • Documentation

EF2 indexer - state: NOT_READY

	Minimum level	Current process value	Maximum level	New process value
Parameter set 1				
Frequency [Hz]	20.000	50.000	50.000	50.000
Start ramp [s]	0.060	0.060	5.000	0.060
Stop ramp [s]	0.060	0.060	5.000	0.060
Stop delay time [s] (optimized : <input checked="" type="checkbox"/>)*	0.000	0.014	2.000	0.014
Parameter set 2				
Frequency [Hz]	20.000	30.000	50.000	30.000
Start ramp [s]	0.060	0.060	5.000	0.060
Stop ramp [s]	0.060	0.060	5.000	0.060

Quick stop
 Quick stop ramp [s] (optimized :)* **SIL2**
 STO delay time [s]
 Evaluate additional motor contactor No Yes
 Min. set time safety switch device [s] **SIL3**

Energy save mode
 Switch off delay time [s]
 (<0.0: deactivated, >=0.0: activated)

Monitoring
 Positioning timeout

* OPERATION AND MONITORING/Manual operation

2. Write configuration

Attention
 Your chosen configuration will be activated and the controller internal backup file of the machine configuration will be replaced!
 Cancel **3. OK**

8.3.6.1 Power-saving mode

A power-saving mode can be activated in the dynamic data window.

- If the controller remains active beyond the set time, then the drive is switched off independent of the “enable” control bit.
 - ▶ For short processing times, the time should be set slightly longer than the pause time in order to avoid cycling the drive on and off in every movement cycle.
 - ▶ For longer pause times in the process cycle, the time should be set very short in order to maximise energy savings.
- At the next movement order, the drive is switched on automatically and executes the movement.

8.3.6.2 Use of ramps

Ramps for regular stop

- Before execution of quick stop measuring cycle:
 - ▶ The ramps of the selected parameter set are selected first.
- After execution of quick stop measuring cycle:
 - ▶ When starting/stopping on the sensor, the ramps of the selected parameter set are used.
 - ▶ When starting/stopping during rotation, the maximum of 1.2 x the measured quick stop ramp and the ramps of the selected parameter set is used.

Quick stop ramps

- Before execution of quick stop measuring cycle:
 - ▶ The lower limit for parameter set 1 is used as a braking ramp for the quick stop.
- After execution of quick stop measuring cycle:
 - ▶ The optimised quick stop ramp is always used as the braking ramp.

8.3.7 I/O mapping

Inputs and **outputs** can be changed later during operation. A new configuration of the indexer is not necessary.

1. Click the red cross behind a terminal to delete the current terminal configuration.
 - ▶ The red cross will be hidden.
 - ▶ The "Assign" button that appears indicates that this terminal can be assigned to a controller function.
2. Choose an available control function.
3. Assign the selected control function to the telegram / the terminal.
4. Write configuration.
5. Confirm the message with OK.
 - ▶ The selected configuration will be activated and the controller internal backup file of the machine configuration will be replaced.

EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

PROFIBUS input		PROFIBUS output	
Control function	Input PROFIBUS telegram	Bit	Action
Enable	Enable	Bit 0	Assign
Stop (low-active)	Stop (low-active)	Bit 1	Assign
Cycle CW	Cycle CW	Bit 2	Assign
Cycle CCW	Cycle CCW	Bit 3	Assign
Cycle CW level	Cycle CW level	Bit 4	Assign
Cycle CCW level	Cycle CCW level	Bit 5	Assign
Jog CW	Parameter set 1	Bit 6	Assign
Jog CCW	Parameter set 2	Bit 7	Assign
Parameter set 1	Parameter set 3 ign.	Bit 8	Assign
Parameter set 2	Open brake	Bit 9	Assign
Parameter set 3 ign.	Reset error	Bit 10	Assign
Special mode	Assign	Bit 11	Assign
Open brake	Assign	Bit 12	Assign
Reset error	Assign	Bit 13	Assign
Watchdog receive	Assign	Bit 14	Assign
	Assign	Bit 15	Assign
	Assign	Bit 16	Assign
	Assign	Bit 17	Assign
	Assign	Bit 18	Assign
	Assign	Bit 19	Assign
	Assign	Bit 20	Assign
	Assign	Bit 21	Assign
	Assign	Bit 22	Assign
	Assign	Bit 23	Assign
	Assign	Bit 24	Assign
	Assign	Bit 25	Assign
	Assign	Bit 26	Assign
	Assign	Bit 27	Assign
	Assign	Bit 28	Assign
	Assign	Bit 29	Assign
	Assign	Bit 30	Assign
	Assign	Bit 31	Assign
	Watchdog receive		Assign

Buttons: Undo, **4. Write configuration**

Attention

Your chosen configuration will be activated and the controller internal backup file of the machine configuration will be replaced!

Cancel **5. OK**

FIG. 63: I/O mapping

8.3.8 Fieldbus data mapping

Inputs and outputs can be changed later during operation. A new configuration of the indexer is not necessary.

Data mapping table, see chapter 13.1 „Data for fieldbus data mapping“ on page 169.

1. Click the red cross behind a terminal to delete the current terminal configuration.
 - ▶ The red cross will be hidden.
 - ▶ The "Assign" button that appears indicates that this terminal can be assigned to a controller function.
2. Select an available process value.
3. Assign the selected control function to the fieldbus telegram.
4. Write configuration.
5. Confirm the message with OK.
 - ▶ The selected configuration will be activated and the controller internal backup file of the machine configuration will be replaced.

The screenshot shows the WEISS software interface for configuring the EF2 indexer. The status bar at the top indicates 'EF2 indexer - state: NOT_READY'. The main configuration area is divided into 'Fieldbus input' and 'Fieldbus output' sections. The 'Process value' list on the left includes various machine parameters, with 'Actual motor frequency (1)' selected and marked with a blue circle '2'. The 'Output fieldbus telegram' table on the right shows the mapping of these values to specific bytes (0-15) and the assignment of control functions to bytes 16-27. A red 'X' is visible next to the 'Output cam state [0]' and 'Indexer encoder position [0]' entries. A blue circle '3' highlights the 'Output cam enabled [0]' entry, and a blue circle '1' highlights the 'Assign' button for Byte 16. At the bottom, a 'Write configuration' button is marked with a blue circle '4', and an 'Attention' dialog box is displayed, warning that the chosen configuration will be activated and the controller internal backup file will be replaced. The dialog box has 'Cancel' and 'OK' buttons, with 'OK' marked with a blue circle '5'.

FIG. 64: Fieldbus data mapping

8.3.9 Cam controller

The cam controller enables the switching of digital outputs dependent on the position of the indexer. The cams can be used for positionally accurate control of other machine components or for cycle time optimisation.

The cam controller requires optional modules TM15_cam and rindexer encoder. In addition, a license is required for enabling the functions.

The angle of the indexer is recorded by the indexer encoder, and the cam signals are output via the dedicated module TM15_cam.

The cam controller function can be enabled in the configuration wizard during the configuration of the indexer. In addition, the mechanical curve needs to be set. The value can be obtained from WEISS GmbH based on the serial number of the indexer.

After quitting the configuration wizard, the relevant settings for the configuration of the cam controller can be input and adjusted on the “machine configuration/cam controller” page.

An adjusted indexer encoder is required for the use of the cam controller (see chapter 8.5.3 „Manual operation“ on page 130).

EF2 indexer - state: NOT_READY

Indexer encoder
 Adjusted Position ↓Sensor ↑Sensor [Link: OPERATION AND MONITORING/Cam controller](#)

Outputs cam controller (TM15_Cam)

Enable	Force	Start position [°]	End position [°]	Cam
Always enabled	Deactivated	0.000	180.000	0 (DO0, X520.2)
Fieldbus (Bit 1)	Deactivated	0.000	90.000	1 (DO1, X520.3)
Fieldbus (Bit 2)	Deactivated	90.000	0.000	2 (DO2, X520.4)
DI16, X522.2	DI23, X522.9	0.000	0.000	3 (DO3, X520.5)
DI16, X522.2	Deactivated	0.000	0.000	4 (DO4, X520.6)
DI20, X522.6	Deactivated	0.000	0.000	5 (DO5, X520.7)
Deactivated	Deactivated	0.000	0.000	6 (DO6, X520.8)
Deactivated	Deactivated	0.000	0.000	7 (DO7, X520.9)
Deactivated	Deactivated	0.000	0.000	8 (DO8, X521.2)
Deactivated	Deactivated	0.000	0.000	9 (DO9, X521.3)
Deactivated	Deactivated	0.000	0.000	10 (DO10, X521.4)
Deactivated	Deactivated	0.000	0.000	11 (DO11, X521.5)
Deactivated	Deactivated	0.000	0.000	12 (DO12, X521.6)
Deactivated	Deactivated	0.000	0.000	13 (DO13, X521.7)
Deactivated	Deactivated	0.000	0.000	14 (DO14, X521.8)
Deactivated	Fieldbus (Bit 15)	0.000	0.000	15 (DO15, X521.9)

FIG. 65: Cam controller configuration

Depending on the selected interface version, 16 path cams are made available.

- Terminal module interface version:
 - ▶ Each cam can be assigned to any of the 8 cam controllers. The assigned cams can be enabled/forced with the corresponding enable or forcing signal of the cam controller. The byte with the enable or force signals is permanently assigned to inputs DI 16 to DI 23 (terminal X522) on the optional TM15_cam module. In addition, the option exists to enable any cam at any time independent of an enable signal by selecting in a web interface.
- Profibus/Profinet interface version:
 - ▶ The cams can be enabled/forced, or permanently enabled, via the digital inputs of the TM15_cams as for the terminal module interface version. In addition, the enable or force signal can be given via the fieldbus. To do so, the “enable cam controller” process value or the “force cam controller outputs” process value needs to be mapped to the fieldbus telegram in the data mapping. Any cam can be enabled or forced via the fieldbus with a control bit. In addition, the enable condition and the switching status of cams can be read in the higher-level controller. To do so, the “cam controller enable status” process value or the “force cam controller status” process value needs to be mapped to the fieldbus telegram in the data mapping.

The cams can be parametrised by setting the start and end positions. As a setting aid, the positions of the indexer encoder for the rising and falling sensor edges are displayed (after the table has performed one cycle).

The cam signals are permanently allocated to outputs DO 0 to DO 15 on terminals X520 and X521 of the optionally pluggable TM15_cam module.

The cam signals are sent independently of the table partition between 0 and 360° within any indexer cycle. If different cams are output in subsequent indexer cycles, then the segment number (data mapping) needs to be evaluated in the higher-level controller and the cams need to be enabled depending on the segment number.

When selecting an encoder or cam controller, the indexer is only operational with a connected encoder or TM15_cam module.

Enabling:

- With a TRUE signal at the enable input, the cam output is switched depending on the set start and end position and the current position of the indexer/encoder. An inversion of the signal can be achieved by swapping the values for start and end position.

Forcing:

- With a TRUE signal, the cam output is permanently controlled to TRUE.

ⓘ The enable and force functions may be used simultaneously.

Options for enabling cams:

- Deactivated
- Always enable
- Via one of the DI16 to DI21 (several cams can be controlled simultaneously via one input. This feature may be used to form cam controllers.)
- Via a fieldbus control bit (if configured)

Options for forcing cams:

- Deactivated
- Via one of the DI16 to DI21 (several cams can be controlled simultaneously via one input. This feature may be used to form cam controllers.)
- Via a fieldbus control bit (if configured)

8.4 Maintenance

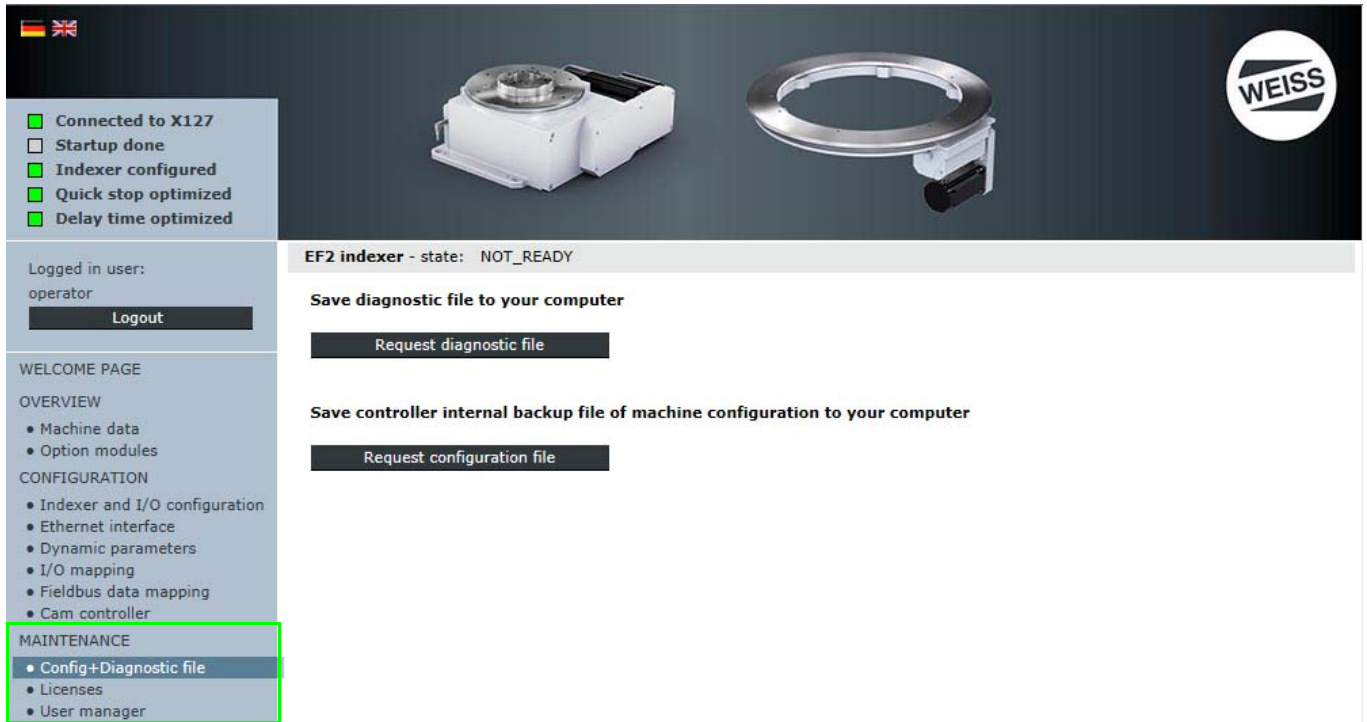


FIG. 66: Description of the "Maintenance" page

The "Maintenance" page contains the sections "Config + Diagnostic file", "Licenses" and "User manager".

In the "Config + Diagnostic file" section, a diagnostic file can be requested as a text file, and a configuration file can be requested as an XML file.

The configuration file or the diagnostic file are shown in a pop-up window.

NOTICE Pop-up blocker

Depending on the settings of the Web browser which is used, a pop-up blocker may be in use.

Blocking pop-ups may prevent the configuration file or the diagnostic file from being displayed.

To enable the display of the configuration file or the diagnostic file, you must disable the pop-up blocker in your browser's settings.

Alternatively, you can add the pop-ups that display the configuration file or the diagnostic file to the list of exceptions. This has no effect on all other Web sites whose pop-ups will be blocked as they were before.

In the "Licenses" section, the license key is displayed or entered and activated.

NOTICE User manager

By default, the user service and operator are saved in the "User manager" section.

The user **service** is reserved for WEISS service.

With the user **operator**, general user settings can be made, passwords changed and further users or user groups added.

8.4.1 Configuration file / Diagnostic file

8.4.1.1 Request diagnostic file

Click the button "Request diagnostic file" to request a text file.

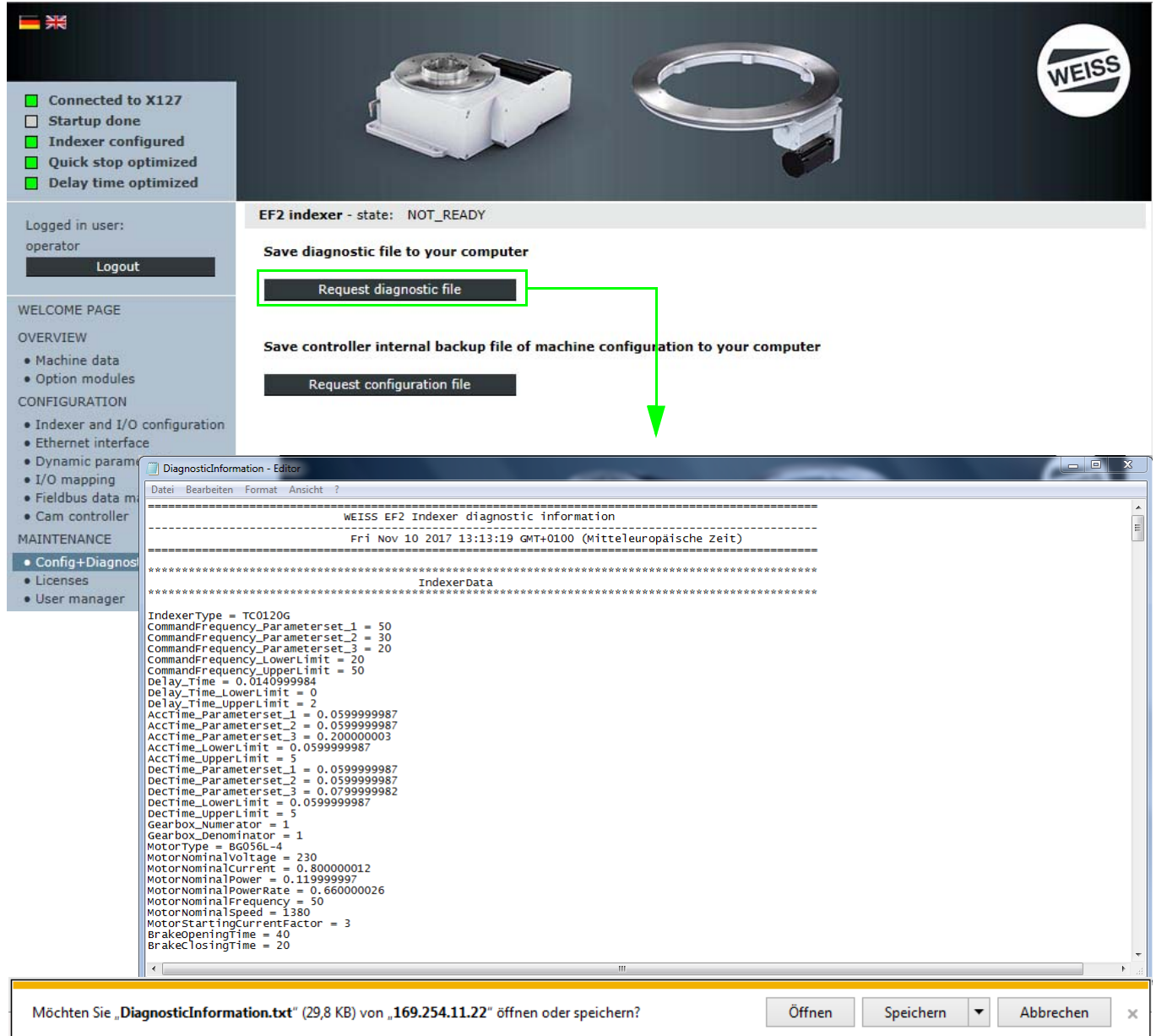
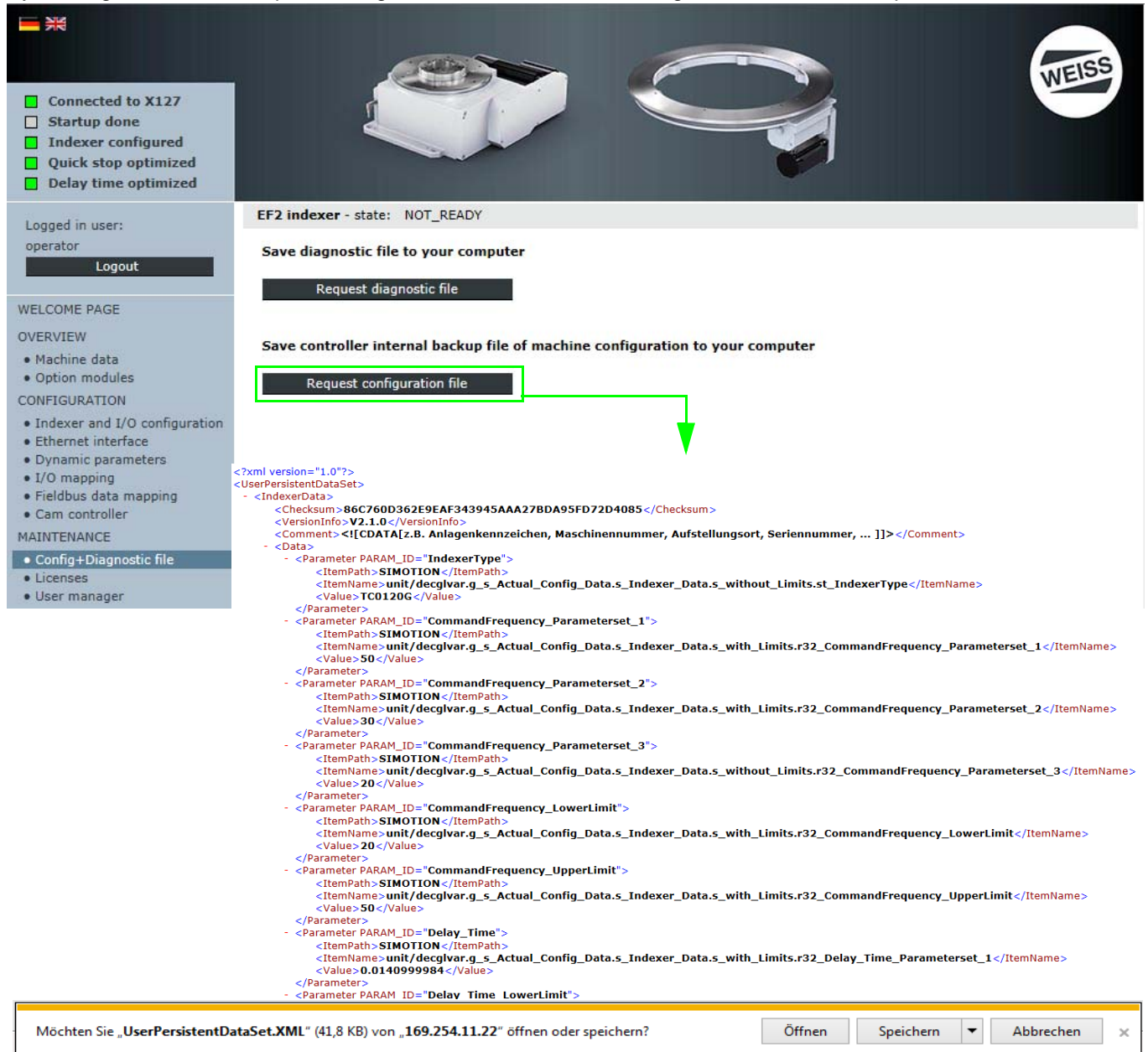


FIG. 67: Request diagnostic file

This file can either be opened for viewing or saved on a PC.

8.4.1.2 Request configuration file (controller internal backup file)

By clicking the button "Request configuration file", the current configuration file can be requested as an XML file.



The screenshot shows the Weiss software interface. On the left, there is a sidebar with navigation options: 'Config+Diagnostic file' is selected. The main area displays the 'EF2 indexer - state: NOT_READY' and two buttons: 'Request diagnostic file' and 'Request configuration file'. The 'Request configuration file' button is highlighted with a green box, and a green arrow points from it to the XML output below. The XML output is a configuration file for the SIMOTION controller, containing various parameters such as 'IndexerType', 'CommandFrequency_Parameterset_1', 'CommandFrequency_Parameterset_2', 'CommandFrequency_Parameterset_3', 'CommandFrequency_LowerLimit', 'CommandFrequency_UpperLimit', 'Delay_Time', and 'Delay_Time_LowerLimit'.

```
<?xml version="1.0"?>
<UserPersistentDataSet>
  - <IndexerData>
    <Checksum>86C760D362E9EAF343945AAA27BDA95FD72D4085</Checksum>
    <VersionInfo>V2.1.0</VersionInfo>
    <Comment><![CDATA[z.B. Anlagenkennzeichen, Maschinennummer, Aufstellungsort, Seriennummer, ... ]]></Comment>
  - <Data>
    - <Parameter PARAM_ID="IndexerType">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_without_Limits.st_IndexerType</ItemName>
      <Value>TC0120G</Value>
    </Parameter>
    - <Parameter PARAM_ID="CommandFrequency_Parameterset_1">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_with_Limits.r32_CommandFrequency_Parameterset_1</ItemName>
      <Value>50</Value>
    </Parameter>
    - <Parameter PARAM_ID="CommandFrequency_Parameterset_2">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_with_Limits.r32_CommandFrequency_Parameterset_2</ItemName>
      <Value>30</Value>
    </Parameter>
    - <Parameter PARAM_ID="CommandFrequency_Parameterset_3">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_without_Limits.r32_CommandFrequency_Parameterset_3</ItemName>
      <Value>20</Value>
    </Parameter>
    - <Parameter PARAM_ID="CommandFrequency_LowerLimit">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_with_Limits.r32_CommandFrequency_LowerLimit</ItemName>
      <Value>20</Value>
    </Parameter>
    - <Parameter PARAM_ID="CommandFrequency_UpperLimit">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_with_Limits.r32_CommandFrequency_UpperLimit</ItemName>
      <Value>50</Value>
    </Parameter>
    - <Parameter PARAM_ID="Delay_Time">
      <ItemPath>SIMOTION</ItemPath>
      <ItemName>unit/decglvar.g_s_Actual_Config_Data.s_Indexer_Data.s_with_Limits.r32_Delay_Time_Parameterset_1</ItemName>
      <Value>0.0140999984</Value>
    </Parameter>
    - <Parameter PARAM_ID="Delay_Time_LowerLimit">
```

Möchten Sie „UserPersistentDataSet.XML“ (41,8 KB) von „169.254.11.22“ öffnen oder speichern?

FIG. 68: Request configuration file (controller internal backup file)

This file can either be opened for viewing or saved on a PC.

This file contains all configuration settings that were made.

It can therefore be used as to restore a configuration.

NOTICE The function "Indexer configuration via file" (chapter 8.3.3.2 „Indexer configuration via file“ on page 91) can only be carried out if the configuration file of a completely configured indexer was requested and stored beforehand.

8.4.2 Licenses

In the "Licenses" section, the license key is displayed or entered and activated.

i The licence key and the information for activating licences are available from WEISS GmbH.

The screenshot shows the WEISS software interface. On the left is a sidebar menu with categories: WELCOME PAGE, OVERVIEW, CONFIGURATION, MAINTENANCE, OPERATION AND MONITORING, and HELP. The 'Licenses' option under MAINTENANCE is selected. The main content area displays the 'EF2 indexer - state: NOT_READY' and a 'License manager' section. Below this is a table of licenses and a section for hardware information.

EF2 indexer - state: NOT_READY

License manager

To activate a license please input the correct license key (example: 1234-5678-90AB-CDEF) and click "Activate".

License name	License key	State
Operating license	68BD-6D9A-8648-F3D1	●
Segment detection	F7C8-E936-51EE-68AF	●
Cam controller	70B9-DCC7-8E63-690B	●

If you do not have a certain license key for activation, please contact us. Please keep on hand the following data:

HW serial number of CF card	Check value
PG2016110402485	4EE0

FIG. 69: License manager

BEACHTEN The activation of a licence cannot be revoked.

8.4.3 User manager

User authorisations are displayed or entered and activated in the "User manager" section.

- Add administrator
- Add user
- Change user settings
- Define user groups

The screenshot displays the WEISS software interface for the User manager section. At the top, there are status indicators: a green square for 'Connected to X127', a white square for 'Startup done', a green square for 'Indexer configured', a green square for 'Quick stop optimized', and a green square for 'Delay time optimized'. Below these, it shows 'Logged in user: operator' with a 'Logout' button. The main content area is titled 'EF2 indexer - state: NOT_READY'. It features a 'User Database Settings' section with 'Add administrator' and 'Add user' buttons. A 'Userlist' table shows two users: 'operator' (status: green) and 'service' (status: grey). The 'operator' user is selected, and its configuration is shown in a detailed panel. This panel includes 'General settings of user:' with fields for 'User Name' (operator), 'Password' (masked), 'Real Name' (operator), and 'Description' (operator). There is a 'Change password' button and a 'Changing password' dropdown set to 'ALLOWED'. Below this is the 'Usergroups of user:' section with a 'Change groups' button and three checked checkboxes: 'Anyone', 'Administrator', and 'Operator'. At the bottom of the panel are 'Save user', 'Delete user', and 'Cancel' buttons.

FIG. 70: User manager

8.5 Operation and Monitoring

ⓘ Access to the entire indexer configuration is only permitted for authorised persons. User name and password are supplied with the controller (chapter 8.1.2 „Login“ on page 83).

8.5.1 I/O monitoring

In the "I/O monitoring" section, the following actions can be performed to monitor and force peripheral inputs and/or outputs:

- Monitoring inputs and outputs
- Forcing via the "Request authority of control" button
- Forcing via the "Open separate user screen" button

8.5.1.1 Monitoring inputs and outputs

The screenshot shows the 'EF2 indexer' control interface. At the top, it displays the state: 'WAIT_FOR_ACKNOWLEDGE_ERROR'. The interface is divided into several sections:

- Inputs of the controller (onboard):** A list of 10 items with status indicators (green for active, grey for inactive).

<input checked="" type="checkbox"/> Thermoclick motor (low-active) (DI0, X121.1)	<input type="checkbox"/> HW limit switch CW (low-active) (DI1, X121.2)
<input type="checkbox"/> HW limit switch CCW (low-active) (DI2, X121.3)	<input type="checkbox"/> Motor contactor checkback (DI3, X121.4)
<input checked="" type="checkbox"/> Sensor (DI8, X121.7)	<input checked="" type="checkbox"/> Quick stop (low-active) (DI9, X121.8)
<input type="checkbox"/> Default IP address X127 (DI10, X121.10)	<input type="checkbox"/> 24V-power supply brake relay (DI12, X131.1)
<input type="checkbox"/> Control signal of Pick-o-Mat (DI14, X131.4)	<input checked="" type="checkbox"/> STO (low-active) (DI16/17, X120.3/4)
<input type="checkbox"/> Thermoclick brake resistor (low-active) (DI20, X120.9)	
- Outputs of the controller (onboard):** Two items, both active.

<input checked="" type="checkbox"/> Controller in Run mode (DO11, X121.11)	<input checked="" type="checkbox"/> State signal for Pick-o-Mat (DO15, X131.5)
--	--
- Input periphery (PROFIBUS):** A 3x3 grid of items, all inactive.

<input type="checkbox"/> Enable	<input type="checkbox"/> Stop (low-active)	<input type="checkbox"/> Cycle CW
<input type="checkbox"/> Cycle CCW	<input type="checkbox"/> Cycle CW level	<input type="checkbox"/> Cycle CCW level
<input type="checkbox"/> Jog CW	<input type="checkbox"/> Jog CCW	<input type="checkbox"/> Parameter set 1
<input type="checkbox"/> Parameter set 2	<input type="checkbox"/> Parameter set 3 ign.	<input type="checkbox"/> Special mode
<input type="checkbox"/> Open brake	<input type="checkbox"/> Reset error	<input type="checkbox"/> Watchdog receive
- Output periphery (PROFIBUS):** A 3x3 grid of items, with some active.

<input type="checkbox"/> Ready to enable	<input type="checkbox"/> Enable active	<input type="checkbox"/> Enabled
<input type="checkbox"/> Ready to start	<input type="checkbox"/> Operating	<input checked="" type="checkbox"/> Indexer in position
<input checked="" type="checkbox"/> Stop is selected	<input type="checkbox"/> Alarm timeout	<input type="checkbox"/> Alarm position run over
<input type="checkbox"/> Alarm safety	<input checked="" type="checkbox"/> Sum error	<input type="checkbox"/> Sum error (flashing)
<input checked="" type="checkbox"/> Sum warning	<input type="checkbox"/> STO is selected	<input type="checkbox"/> STO is active
<input type="checkbox"/> Forced dynamic sampling	<input type="checkbox"/> HW limit switch CW (low-active)	<input type="checkbox"/> HW limit switch CCW (low-active)
<input type="checkbox"/> Watchdog send		

At the bottom, there are two buttons: '1. Request authority of control' and 'Open separate user screen'. A legend indicates:

- Green arrow: Activate control
- Grey arrow: Set value
- Blue arrow: Actual process status

Advice: Inputs and outputs for which is not selected "Activate control" will be controlled by the process interface.

FIG. 71: Monitoring inputs and outputs

The start page of the "I/O monitoring" section shows the status of the onboard inputs and the peripheral inputs/outputs during operation with a higher-level controller.

This display is informative.

ⓘ To force peripheral inputs and/or outputs, it is necessary to request authority of control or to open a separate user screen.

8.5.1.2 Forcing via the "Request authority of control" button

Logged in user:
operator
Logout

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OPERATION AND MONITORING

- I/O monitoring**
- Fieldbus data monitoring
- Manual operation
- Cam controller
- Statistical data
- Messages
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HELP

- Contact
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EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

Inputs of the controller (onboard)

<input checked="" type="checkbox"/> Thermoclick motor (low-active) (DI0, X121.1)	<input type="checkbox"/> HW limit switch CW (low-active) (DI1, X121.2)
<input type="checkbox"/> HW limit switch CCW (low-active) (DI2, X121.3)	<input type="checkbox"/> Motor contactor checkback (DI3, X121.4)
<input checked="" type="checkbox"/> Sensor (DI8, X121.7)	<input checked="" type="checkbox"/> Quick stop (low-active) (DI9, X121.8)
<input type="checkbox"/> Default IP address X127 (DI10, X121.10)	<input type="checkbox"/> 24V-power supply brake relay (DI12, X131.1)
<input type="checkbox"/> Control signal of Pick-o-Mat (DI14, X131.4)	<input checked="" type="checkbox"/> STO (low-active) (DI16/17, X120.3/4)
<input type="checkbox"/> Thermoclick brake resistor (low-active) (DI20, X120.9)	

Outputs of the controller (onboard)

<input checked="" type="checkbox"/> Controller in Run mode (DO11, X121.11)	<input checked="" type="checkbox"/> State signal for Pick-o-Mat (DO15, X131.5)
--	--

Input periphery (PROFIBUS)

<input type="checkbox"/> Enable	<input type="checkbox"/> Stop (low-active)	<input type="checkbox"/> Cycle CW
<input type="checkbox"/> Cycle CCW	<input type="checkbox"/> Cycle CW level	<input type="checkbox"/> Cycle CCW level
<input type="checkbox"/> Jog CW	<input type="checkbox"/> Jog CCW	<input type="checkbox"/> Parameter set 1
<input type="checkbox"/> Parameter set 2	<input type="checkbox"/> Parameter set 3 ign.	<input type="checkbox"/> Special mode
<input type="checkbox"/> Open brake	<input type="checkbox"/> Reset error	<input type="checkbox"/> Watchdog receive

Output periphery (PROFIBUS)

<input checked="" type="checkbox"/> Ready to enable	<input type="checkbox"/> Enable active	<input type="checkbox"/> Enabled
<input checked="" type="checkbox"/> Ready to start	<input type="checkbox"/> Operating	<input checked="" type="checkbox"/> Indexer in position
<input checked="" type="checkbox"/> Stop is selected	<input type="checkbox"/> Alarm timeout	<input type="checkbox"/> Alarm position run over
<input type="checkbox"/> Alarm safety	<input checked="" type="checkbox"/> Sum error	<input type="checkbox"/> Sum error (flashing)
<input checked="" type="checkbox"/> Sum warning	<input type="checkbox"/> STO is selected	<input type="checkbox"/> STO is active
<input type="checkbox"/> Forced dynamic sampling	<input type="checkbox"/> HW limit switch CW (low-active)	<input type="checkbox"/> HW limit switch CCW (low-active)
<input type="checkbox"/> Watchdog send		

Activate control 2.

Set value 3.

Actual process status 1.

1.

4.

Release authority of control

Open separate user screen

Advice: Inputs and outputs for which is not selected "Activate control" will be controlled by the process interface.

FIG. 72: Forcing via the "Request authority of control" button

NOTICE With a separate user screen or second browser window open, forcing can only be carried out by the browser window from which the operating option has been requested.

- Request authority of control (indicated by the yellow warning symbol in the window).
 - The signals from a higher-level controller can be overwritten or forced - if there is no controller.
- Activate forcing for an input or output.
- Set the force value for the activated input or output.
 - The green light indicates that the process state is active.
- Release authority of control after forcing is done.

8.5.1.3 Forcing via the "Open separate user screen" button

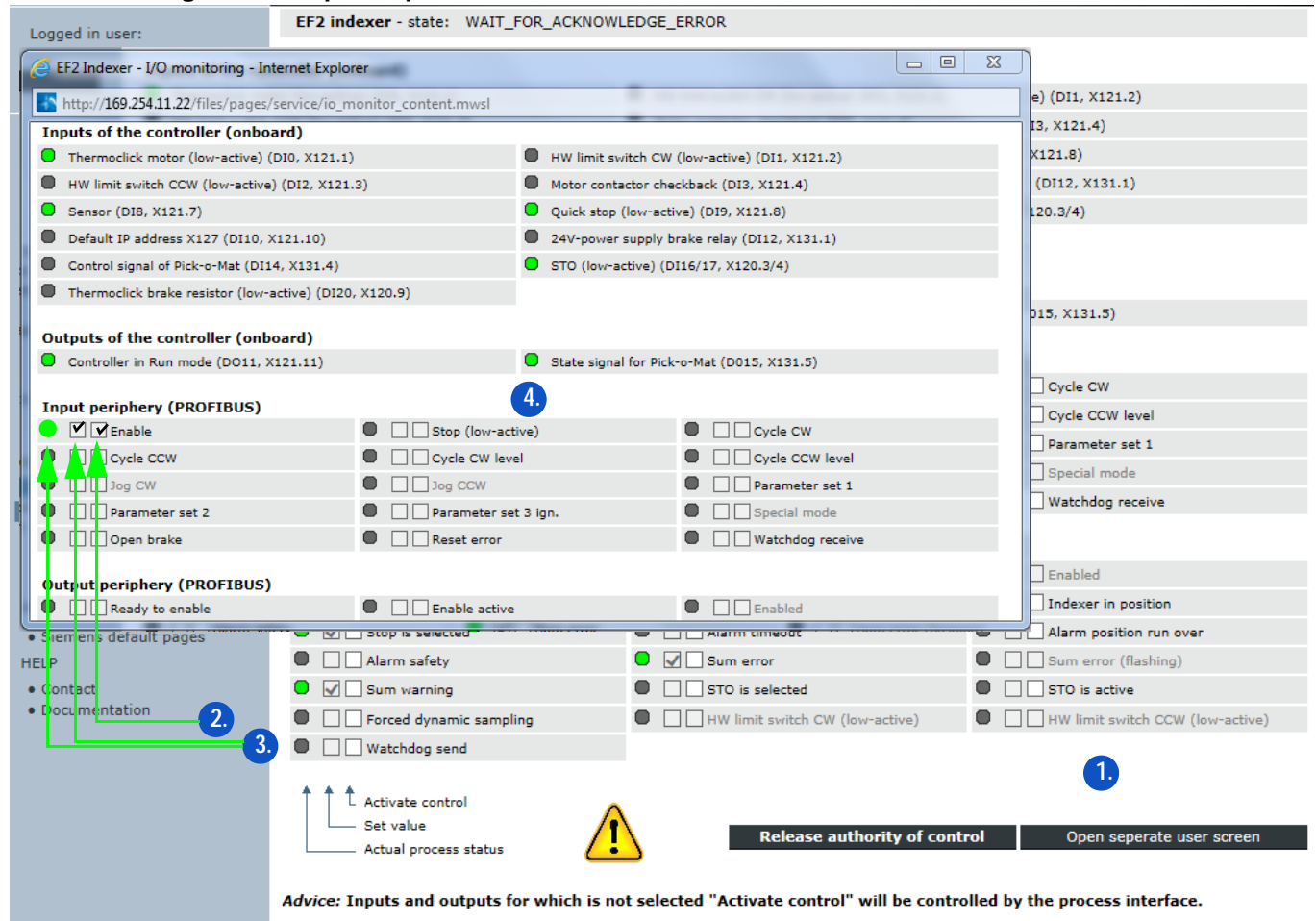


FIG. 73: Forcing via the "Open separate user screen" button

NOTICE With a separate user screen or second browser window open, forcing can only be carried out by the browser window from which the operating option has been requested.

1. Open a separate user screen.
 - ▶ Opening a separate user screen can make it unnecessary to open a second browser window.
 - ▶ Opening this window gives the user an operating option.
 - ▶ The window underneath it is now only used for monitoring.
 - ▶ The signals from a higher-level controller can be overwritten or forced - if there is no controller.
2. Activate forcing for an input or output.
3. Set the force value for the activated input or output.
 - ▶ The green light indicates that the process state is active.
4. Close the separate user screen.
 - ▶ The operating option is ended by closing the window.

8.5.2 Fieldbus data monitor

Connected to X127
 Startup done
 Indexer configured
 Quick stop optimized
 Delay time optimized

Logged in user: operator

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EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

Fieldbus input		Fieldbus output		
Output fieldbus telegram				
Byte 0	0x00	Output cam enabled [0]	Byte 16	0x00
Byte 1	0x00	Output cam enabled [1]	Byte 17	0x00
Byte 2	0x00	Output cam state [0]	Byte 18	0x00
Byte 3	0x00	Output cam state [1]	Byte 19	0x00
Byte 4	0x00	Segment number [0]	Byte 20	0x00
Byte 5	0x00		Byte 21	0x00
Byte 6	0x00		Byte 22	0x00
Byte 7	0x00		Byte 23	0x00
Byte 8	0x00	Indexer encoder position [0]	Byte 24	0x00
Byte 9	0x03	Indexer encoder position [1]	Byte 25	0x00
Byte 10	0x22	Indexer encoder position [2]	Byte 26	0x00
Byte 11	0xD1	Indexer encoder position [3]	Byte 27	0x00
Byte 12	0x00			
Byte 13	0x00			
Byte 14	0x00			
Byte 15	0x00			

FIG. 74: Fieldbus data monitor

The current values of the values mapped in the data mapping are displayed in the fieldbus data monitor. Display is by bytes in hexadecimal code.

By comparison with the data in the superordinate controller, a switch in the byte order can be detected.

- ❗ The byte sequence in the fieldbus telegram can be set in the configuration wizard. Swapping the bytes in the higher-level controller is not required.

8.5.3 Manual operation

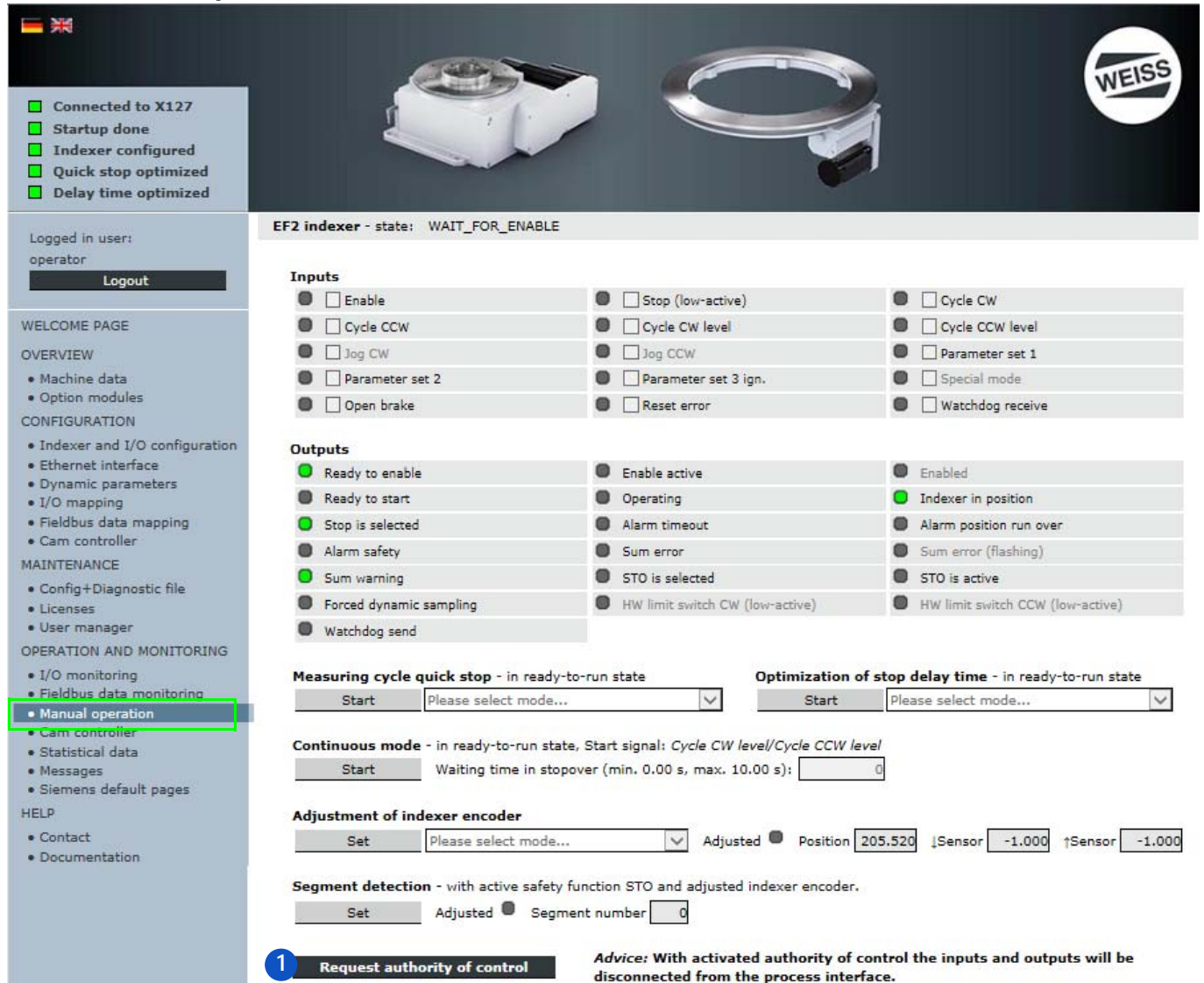


FIG. 75: Manual operation: Start screen

In the "Manual operation" section, a indexer - which is decoupled from a superordinate controller - can be operated manually by the following actions:

- Setting inputs
- Measuring cycle quick stop
- Optimization of stop delay time
- Continuous mode
- Adjusting the indexer encoder
- Segment identification

❗ In order to operate a indexer manually, it is necessary to request authority of control (1).

- ▶ "Authority of control active" is signalled by a black-yellow frame of the user screen.

8.5.3.1 Manual operation: Opening a second browser window



FIG. 76: Manual operation: Opening a second browser window

Sometimes it is helpful to open a second browser window during manual operation. That enables manual operation in the window for which there is authority of control (1), and also makes it possible to view other topics of the navigation in the second browser window (2).

The procedure used to open a second browser window depends on the Web browser which is used.

NOTICE With a second browser window open, manual operation can only be carried out by the browser window by which authority of control was requested.

8.5.3.2 Manual operation: Setting inputs

- ① Condition for manual operation: The control authority has to be activated.
 - ▶ The control authority of the browser window is indicated by the yellow and black frame around the input field.

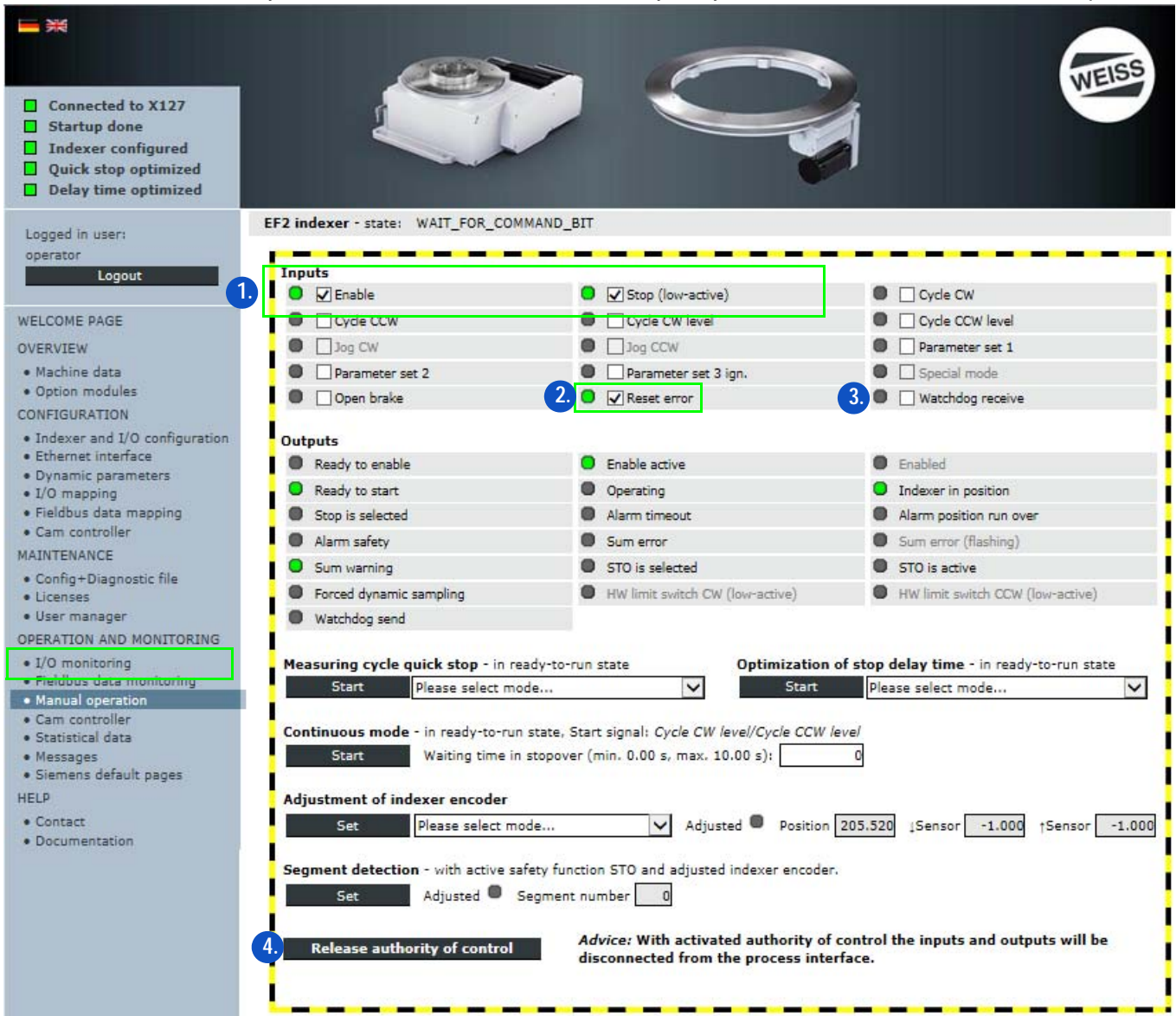


FIG. 77: Manual operation: Setting inputs

1. Set the inputs "Enable" and "Stop (low-active)".
 - ▶ These two inputs have to be set in order to move the indexer.
2. The input "Reset error" can be used to reset any existing errors.
 - ▶ The display changes from green to grey.
3. Operate inputs manually.
4. After finishing manual operation: Release control authority.

8.5.3.3 Manual operation: Measuring cycle quick stop

- ❗ Condition for manual operation: The control authority has to be activated.
 - ▶ The control authority of the browser window is indicated by the yellow and black frame around the input field.
- ❗ The Measuring cycle quick stop should always be carried out first and then the Optimization of stop delay time.

The screenshot displays the Weiss software interface for manual operation. On the left, a sidebar menu highlights 'Manual operation' under the 'OPERATION AND MONITORING' section. The main window shows the 'Measuring cycle quick stop' configuration page, which is outlined with a yellow and black dashed border. This page includes sections for 'Inputs' (with 'Enable' and 'Stop (low-active)' checked), 'Outputs' (with 'Ready to start' and 'Enable active' checked), and 'Optimization of stop delay time'. Below these are sections for 'Continuous mode', 'Adjustment of indexer encoder', and 'Segment detection'. A 'Release authority of control' button is also visible. A series of dialog boxes are shown in a sequence, starting with an 'Attention' warning about standstill measurement, followed by 'Measuring cycle quick stop finished' messages that prompt for a quick stop ramp time (0.06 s) and confirm configuration updates. A final 'Configuration process running' dialog indicates that the results are being transferred to the machine configuration.

NOTICE
The dialogues as displayed are valid for safety integrity SIL2
For safety integrity SIL3 other dialogues may be displayed

FIG. 78: Manual operation: Measuring cycle quick stop

The function "Measuring cycle quick stop" is used to determine the stopping times. The measurement triggers a movement of the indexer in the selected mode.

The result of the measurement is dependent on the mass moment of inertia of the load and the indexer. The indexer needs to be able to rotate freely during the measuring cycle.

⚠ WARNING Automatic start

A measurement is first taken while the indexer is in standstill and afterwards a measurement is taken with the rotating indexer in motion. Depending on the type and loading of the indexer, the stationary measurement can take several minutes. Due to the subsequent automatic start of the indexer for the rotating measurement, persons in the vicinity of the indexer can be in danger. The danger area must not be accessed during the entire measurement. Serious injuries are possible due to crushing and impact.

1. Set the inputs "Enable" and "Stop (low-active)".
 - ▶ These two inputs have to be set in order to enable manual operation.
 2. Select mode.
 - ▶ Measurement - only CW
 - ▶ Measurement - only CCW
 - ▶ Measurement - alternating with Start CW
 - ▶ Measurement - alternating with Start CCW
 3. Measuring cycle Start quick stop
 - ▶ The stopping times are determined and displayed.
 4. Confirm determined stopping times.
 - ▶ Confirm messages in the following windows that open up.
 - ▶ The determined stopping times are and displayed.
- ❗ **IMPORTANT for SIL 3:** Adjust a delay time, which is longer than the measured stopping time, on the safety switching device.

After the Measuring cycle quick stop has been carried out once with validity, a stopping time for the quick stop is configured in the controller.

To check the compliance with the configured time, the modes for checking the quick stop can be used.

- ▶ Checking - only CW
- ▶ Checking - only CCW
- ▶ Checking - alternating with Start CW
- ▶ Checking - alternating with Start CCW

In this case, a movement of the indexer is carried out; the duration of which is normally shorter than the actual measurement of the quick stop ramp. Result of the measurement: Quick stop ramp checked or Quick stop ramp failed.

In case the quick stop ramp has failed, it needs to be redetermined by the measurement function.

- ❗ No safety data is changed during the test. A new safety acceptance is not required.

5. After finishing manual operation: Release control authority.

NOTICE New safety acceptance necessary

The function needs to be repeated for every change of the indexer (e.g. change of load).

A new safety acceptance is mandatory, because safety data was changed.

8.5.3.4 Manual operation: Optimization of stop delay time

- ① Condition for manual operation: The control authority has to be activated.
 - ▶ The control authority of the browser window is indicated by the yellow and black frame around the input field.
- ① The Optimization of stop delay time should always be carried out after the Measuring cycle quick stop.

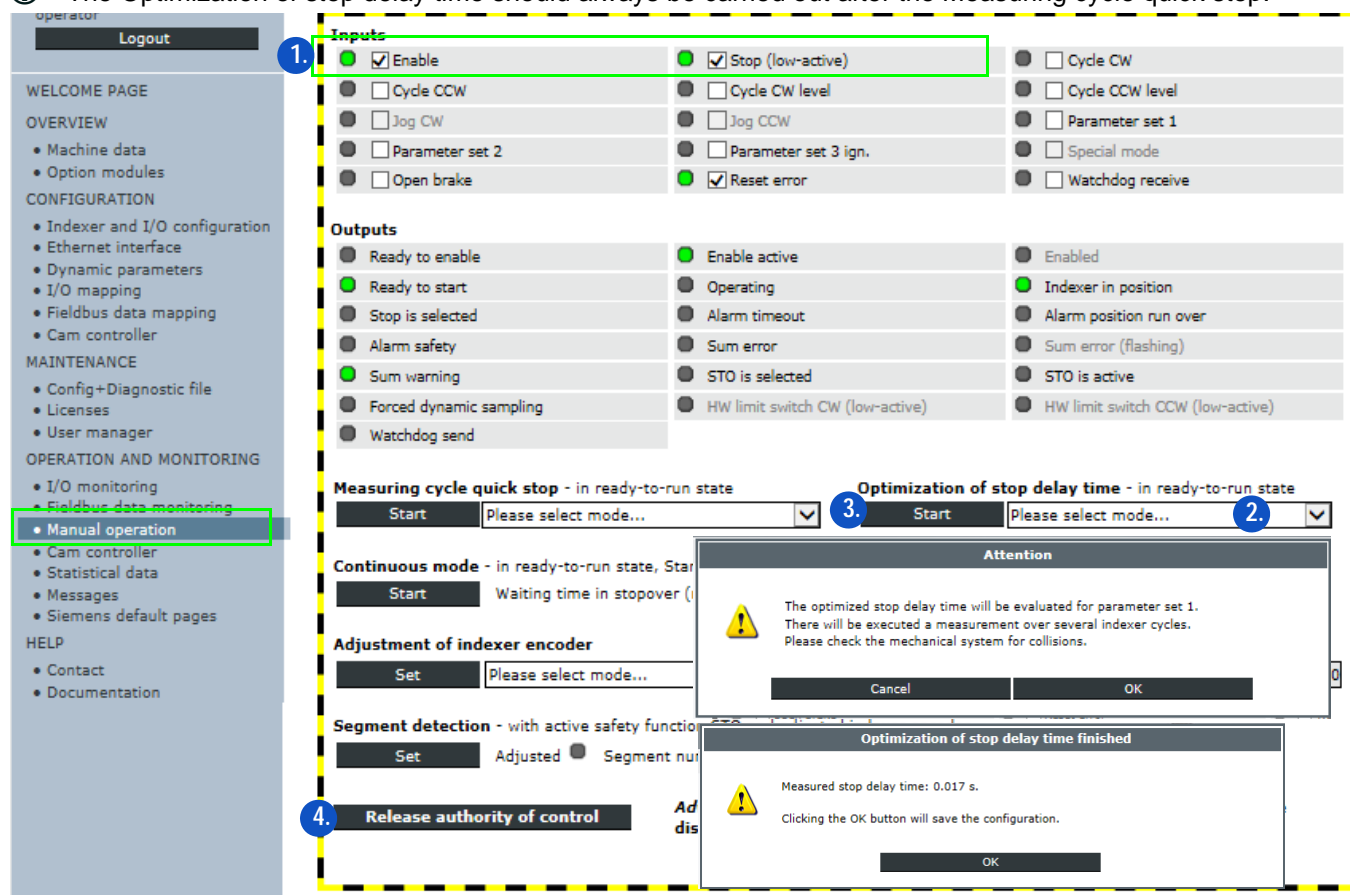


FIG. 79: Manual operation: Optimization of stop delay time

The "Optimization of stop delay time" function is used to determine the optimal starting position on the position cam.

1. Set the inputs "Enable" and "Stop (low-active)".
 - ▶ These two inputs have to be set in order to enable manual operation.
2. Select mode.
 - ▶ Measurement - only CW
 - ▶ Measurement - only CCW
 - ▶ Alternating – the delay time is set to 0. No measuring cycle or measurement is performed.
3. Start the "Optimization of stop delay time" function.
 - ▶ Confirm messages in the following windows that open up.
 - ▶ The determined stop delay time will be displayed in the dynamic parameters (chapter 8.3.6 „Dynamic parameters“ on page 115).
4. After finishing manual operation: Release control authority.

8.5.3.5 Manual operation: Continuous mode

- Condition for manual operation: The control authority has to be activated.
 - The control authority of the browser window is indicated by the yellow and black frame around the input field.

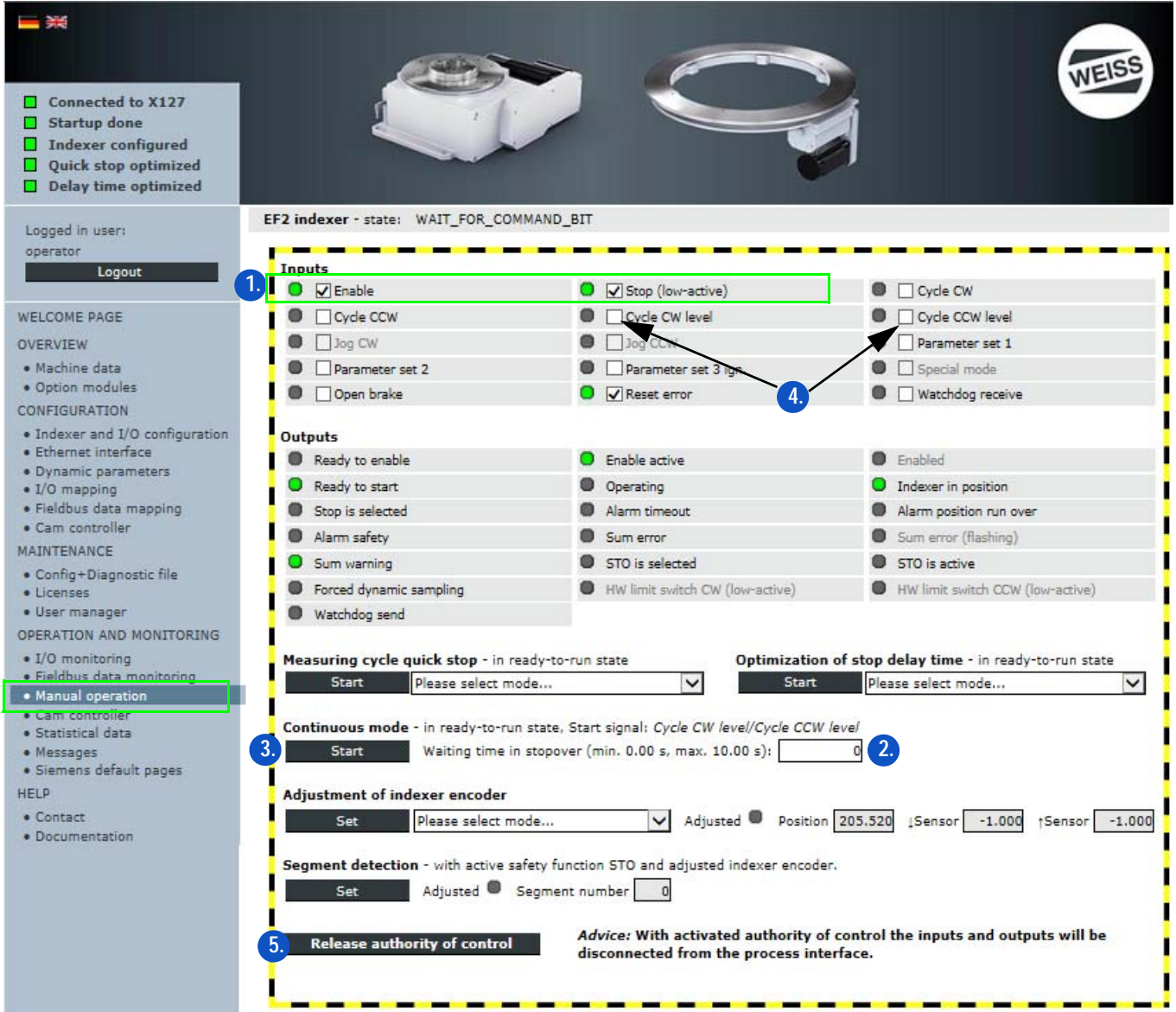


FIG. 80: Manual operation: Continuous mode


The "Continuous mode" function can be used to switch a indexer to a demonstration mode. The function can be applied for CW or CCW movements.

- Set the inputs "Enable" and "Stop (low-active)".
 - These two inputs have to be set in order to enable manual operation.
- Enter a time (in seconds) for the waiting time in stopover.
- Start and stop "Continuous mode" function.
- Starting the movement with "Cycle CW level" or "Cycle CCW level".
- After finishing manual operation: Release control authority.

Adjusting the indexer encoder

- Automatic:
 - ▶ The zero position of the indexer encoder is automatically set to the centre of the mechanical cam during a measuring cycle.
 - ▶ Advantage: The zero position can be reproduced very accurately with replacement parts.
- Manual:
 - ▶ The indexer must be brought into the zero position manually. The zero position of the indexer encoder is set to the current position of the indexer.
 - ▶ Advantage: The zero position can be determined freely by the operator.

Adjusting segment identification

 For a description see chapter 8.5.5 „Segment identification“ on page 139.

To adjust the segment identification, the indexer must be fully on the sensor. Accurate positioning of the indexer is not required for adjusting segment identification because the sensor signal is taken into account for incrementing the segment number.

By pressing the button "Set" the segment number is set to value 1.

8.5.4 Cam controller

In the “operation and monitoring/cam controller” window, the cams can be enabled and/or forced via the controller page (functionally like IO monitor / see chapter 8.5.1 „I/O monitoring“ on page 126).

i Forcing means that the cam output is always on, independent of the indexer encoder.

EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

Indexer encoder
 Adjusted Position ↓Sensor ↑Sensor Link: [CONFIGURATION/Cam controller](#)

Outputs cam controller (TM15_Cam)

Enable	Cam output	Start position [°]	End position [°]	Cam
<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000	180.000	0 (DO0, X520.2)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.000	90.000	1 (DO1, X520.3)
<input type="checkbox"/>	<input type="checkbox"/>	90.000	0.000	2 (DO2, X520.4)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	3 (DO3, X520.5)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	4 (DO4, X520.6)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	5 (DO5, X520.7)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	6 (DO6, X520.8)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	7 (DO7, X520.9)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	8 (DO8, X521.2)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	9 (DO9, X521.3)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	10 (DO10, X521.4)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	11 (DO11, X521.5)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	12 (DO12, X521.6)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	13 (DO13, X521.7)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	14 (DO14, X521.8)
<input type="checkbox"/>	<input type="checkbox"/>	0.000	0.000	15 (DO15, X521.9)

Legend:
 ● Activate control
 ▲ Set value
 ▲ Actual process status

Buttons:
 Release authority of control | Open separate user screen

Warning:

FIG. 81: Enable/force cam

8.5.5 Segment identification

The segment identification function enables an evaluation to determine the segment or indexing that the indexer is in.

The optional indexer encoder module is required for segment detection. In addition, a license is required for enabling the functions.

The segment identification function can be enabled in the configuration wizard during the configuration of the indexer. In addition, the number of segments (table indexing) and the mechanical curve need to be set. The values can be obtained from WEISS GmbH based on the serial number of the indexer.

An adjusted indexer encoder is a prerequisite for using segment identification (see the chapter on manual operation). In addition, the segment identification needs to be adjusted for the specific application (see the chapter on manual operation). If the segment identification is not adjusted, then the segment number 0 (invalid) is output, independent of the table position.

Valid segment numbers: 1 to table indexing.

To adjust the segment identification, the indexer must be fully on the sensor. Accurate positioning of the indexer is not required for adjusting segment identification because the sensor signal is taken into account for incrementing the segment number.

The segment number is incremented in the CW direction with a positive sensor edge at the end of a cycle. The segment number is decremented in the CCW direction with a positive sensor edge at the start of a cycle. This causes the segment number to be switched always at the same position independent of the movement of the indexer.

The segment number can be evaluated dependent on the selected interface:

- Terminal module interface version:
 - ▶ The segment number is output via the outputs of the cam controller. This therefore requires the TM15_cam optional module with a licence. The allocation of a segment number to the cam outputs is performed via the enable signal of individual cams in the “machine configuration/cam controller” window. The segment number is output in a bit coding at the cam outputs. E.g., only 3 cam outputs (bit 0 to bit 2) need to be allocated for a 4-segment table.
- Profibus/Profinet interface version:
 - ▶ The segment number can be read out via the fieldbus. To do so, the “segment number” process value must be mapped to the fieldbus telegram in the data mapping.

8.5.6 Statistical data

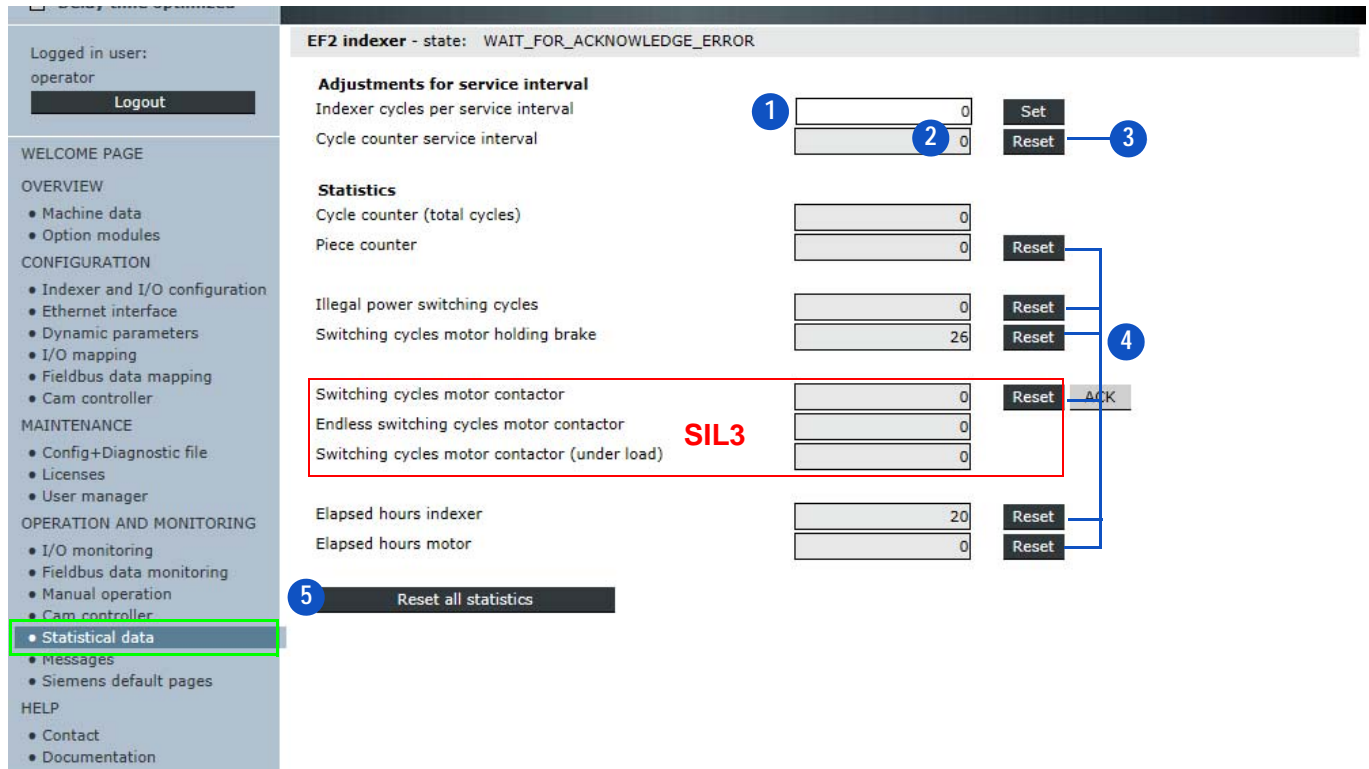


FIG. 82: Statistical data

The "Statistical data" section shows statistical data that was recorded during operation.

In this section, a number of cycles (1) for the indexer can be set as a service interval.

The indexer cycles are counted and the counter value is displayed in the "Current counter service interval" (2).

The current counter value Service interval can be reset by the operator - e.g. after performing service (3).

When the number of cycles for the service interval has been reached, a message is issued. The message is deactivated by an input value of 0.

When using applications up to SIL2, the following statistical data can be reset individually by an operator - e.g. after performing service (4).

- ▶ Cycle counter (counter of user)
- ▶ Counter of incorrect power supply switches (counter of user)
- ▶ Counter switching cycles motor holding brake
- ▶ Indexer operating hours
- ▶ Motor operating hours

When using applications after SIL3, the counter for motor contactor switching cycles can be reset additionally.

❗ As an alternative, all statistical data mentioned above can be reset together (5).

❗ All other data is informative for the operator and can only be reset by the service personnel from WEISS GmbH.

8.5.7 Messages

EF2 indexer - state: WAIT_FOR_ACKNOWLEDGE_ERROR

language: english

no	type	source	message	occurred	ack
1	Fehler	Anwenderdefinierte	Event 81: Bewegung Timeout (Ursache: 1).	2017-11-12-16:3	sofort
2	Fehler	Anwenderdefinierte	Event 66: Freigabe der Nocken ist nicht möglich. Die Justage des Rundsc	2017-11-12-16:3	sofort
3	Fehler	Anwenderdefinierte	Event 80: Bitte Segmenterkennung justieren.	2017-11-12-16:3	sofort
4	Fehler	Anwenderdefinierte	Event 78: Bitte Rundschalttisch-Geber justieren.	2017-11-12-16:3	sofort
5					
6					
7					
8					
9					
10					

message archive

no	type	source	message	occurred	gone
1	Fehler	Anwenderdefinierte	Event 79: Segmenterkennung ist nicht justiert.	2017-11-14-12:5	
2	Fehler	Anwenderdefinierte	Event 77: Rundschalttisch-Geber ist nicht justiert.	2017-11-14-12:5	
3	Informatic	Periphery-Meldung:	218: Warnungsmeldung vom DO1; Warnungen sind in den Warnpar	2017-11-14-12:5	2017-11-14-12:5
4	Informatic	Periphery-Meldung:	218: Warnungsmeldung vom DO1; Warnungen sind in den Warnpar	2017-11-14-12:5	2017-11-14-12:5
5	Informatic	Periphery-Meldung:	214: I/O-Modul Synchronisation erreicht	2017-11-14-12:5	2017-11-14-12:5
6	Fehler	Anwenderdefinierte	Event 80: Bitte Segmenterkennung justieren.	2017-11-14-12:5	
7	Fehler	Anwenderdefinierte	Event 78: Bitte Rundschalttisch-Geber justieren.	2017-11-14-12:5	
8	Informatic	Meldung durch Neue	Neuer Hochlauf	2017-11-14-12:5	2017-11-14-12:5
9	Informatic	Periphery-Meldung:	214: I/O-Modul Synchronisation erreicht	2017-11-14-12:4	2017-11-14-12:4
10	Informatic	Periphery-Meldung:	203: PROFIBUS: Stationswiederkehr eines DP Slaves / PROFINET IC	2017-11-14-12:3	2017-11-14-12:3

active messages

FIG. 83: Messages

The "Messages" section displays active and stored error messages.

- ▶ The "Active messages" window displays all current messages that have not been acknowledged yet.
- ▶ The "Message archive" window displays the last 20 error messages.

By clicking the respective button (1) it is possible to switch between the two windows.

Active messages can be acknowledged by clicking the acknowledge button (2).

8.5.8 Siemens default pages

- ❗ The "Siemens default pages" section is reserved exclusively for service personnel from WEISS GmbH and is not accessible for the operator.

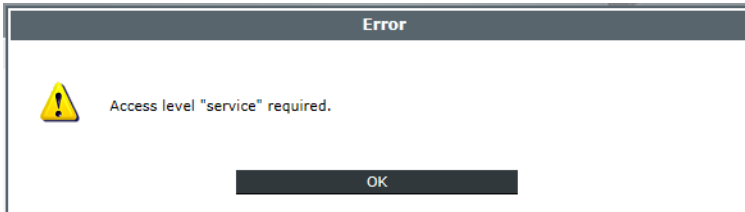


FIG. 84: Siemens default pages

8.6 Help



FIG. 85: Help

The "Help" section contains contact information, manuals, and product information.

In the "CONTACT" section you will find the address, phone number and e-mail address of WEISS GmbH.

The "Documentation" section contains

- WEISS manuals
 - ▶ Technical documentation of the TC and TR indexers
- SIEMENS manuals
 - ▶ Technical documentation of the Siemens components
- GSD files
 - ▶ for connecting via PROFIBUS
 - ▶ for connecting via PROFINET
 - ▶ Auxiliary programs

9 EXTENDED OPTIONS

9.1 HW limit switch

The function HW limit switch serves to limit the movement range in which the indexer can be cycled.

This function can be enabled by the configuration wizard.

Additionally, two sensors (low active) have to be connected to the controller as HW limit switches.

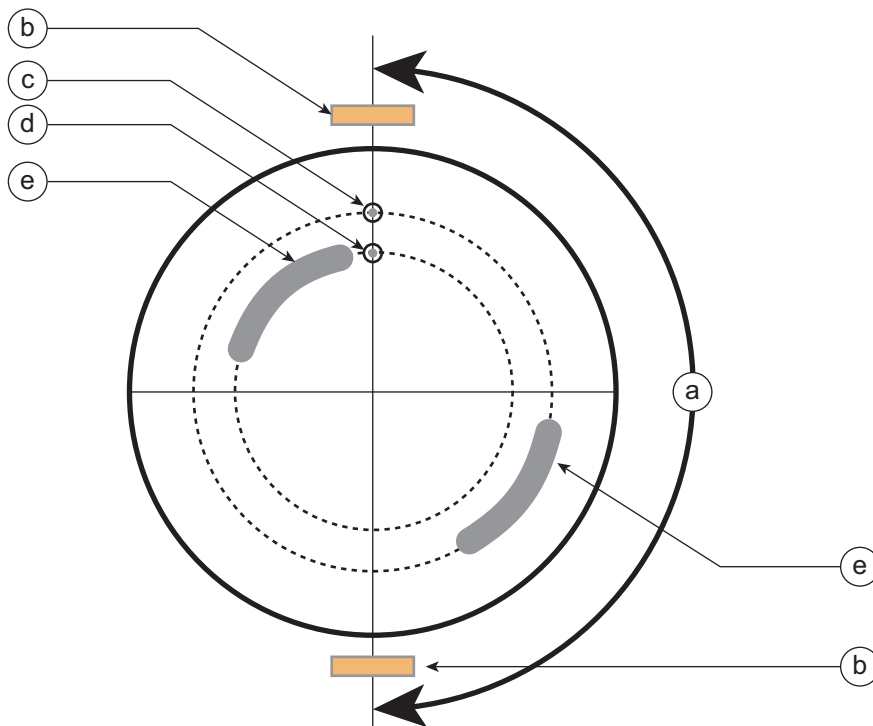
Furthermore, a cam controller needs to be mounted on the indexer or the mounting plate that supplies a high signal at both inputs of the HW limit switch for the entire desired movement range. Make sure that the cam controller reaches slightly into the blocked areas in both directions, because the rotary disc needs to carry out a rotating movement for a shut-off.

Furthermore, it is necessary for the "Measuring cycle quick stop" function that the indexer can move slightly into the blocked area without a shut-off by an HW limit switch taking place.

Example: indexer with indexing 2 in oscillating mode $\pm 180^\circ$, cam controller through milled-out long holes in the mounting plate.

White area: 1-signal of the relevant limit switch

Grey area: 0-signal of the relevant limit switch



- | | | |
|---|------------------------|-----------------------|
| a | Desired movement range | |
| b | Signal position cams | c HW limit switch CCW |
| d | HW limit switch CW | e Cut oblong hole |

If the indexer is moved beyond the permissible movement range, this will be detected by a LOW signal of the corresponding HW limit switch. An error message that needs to be acknowledged is displayed.

A further table movement is not possible in this status.

After acknowledging the error message, a warning is displayed.

The indexer can now be moved into the opposite direction of the approached HW limit switch.

As soon as the indexer is back within the movement range, the warning can be acknowledged as well.

10 COMMUNICATION WITH A HIGHER-LEVEL CONTROLLER

10.1 Versions and structure of GSD/GSDML file

10.1.1 GSD files for PROFIBUS

GSD_WEISS_EF2_DP01:

- From WEISS firmware 1.0.8
- Functions: IO mapping
- Structure:
 - ▶ 1. General ID
 - ▶ 2. General ID
 - ▶ 3. General ID
 - ▶ Master_A Slave_E 4 bytes, consistent over the entire length
 - ▶ Master_E Slave_A 4 bytes, consistent over the entire length

GSD_WEISS_EF2_DP02:

- From WEISS firmware V1.1.0
- Functions: IO mapping and data mapping (EF2 status data)
- Structure:
 - ▶ 1. General ID
 - ▶ 2. General ID
 - ▶ 3. General ID
 - ▶ Master_A Slave_E 4 bytes, consistent over the entire length
 - ▶ Master_E Slave_A 4 bytes, consistent over the entire length
 - ▶ Master_E Slave_A 28 bytes, consistent over the entire length

GSD_WEISS_EF2_DP03:

- Not required due to synchronization of version numbers with GSDML file

GSD_WEISS_EF2_DP04:

- From WEISS firmware V2.0.0
- Functions: IO mapping and data mapping (EF2 status data)
- Structure:
 - ▶ 1. General ID
 - ▶ 2. General ID
 - ▶ 3. General ID
 - ▶ Master_A Slave_E 4 bytes, consistent over the entire length
 - ▶ Master_E Slave_A 4 bytes, consistent over the entire length
 - ▶ Master_A Slave_E 28 bytes, consistent over the entire length
 - ▶ Master_E Slave_A 28 bytes, consistent over the entire length

10.1.2 GSDML files for PROFINET

GSDML_WEISS_EF2_PN01:

- From WEISS firmware 1.0.8
- Functions: IO mapping
- Structure:
 - ▶ 4 Out
 - ▶ 4 In

GSDML_WEISS_EF2_PN02:

- From WEISS firmware V1.1.0
- Functions: IO mapping and data mapping (EF2 status data)
- Structure:
 - ▶ 4 Out
 - ▶ 4 In
 - ▶ 28 In

GSDML_WEISS_EF2_PN03:

- From WEISS firmware V1.1.4
- Functions: IO mapping and data mapping (EF2 status data)
- Structure:
 - ▶ 4 Out
 - ▶ 4 In
 - ▶ 28 In

GSDML_WEISS_EF2_PN04:

- From WEISS firmware V2.0.0
- Functions: IO mapping and data mapping (EF2 control and status data)
- Structure:
 - ▶ 4 Out
 - ▶ 4 In
 - ▶ 28 Out
 - ▶ 28 In

GSDML_WEISS_EF2_PN05:

- From WEISS firmware V2.1.0
- Functions: IO mapping and data mapping (EF2 control and status data)
- Structure:
 - ▶ 4 Out
 - ▶ 4 In
 - ▶ 28 Out
 - ▶ 28 In

10.2 Profibus DP

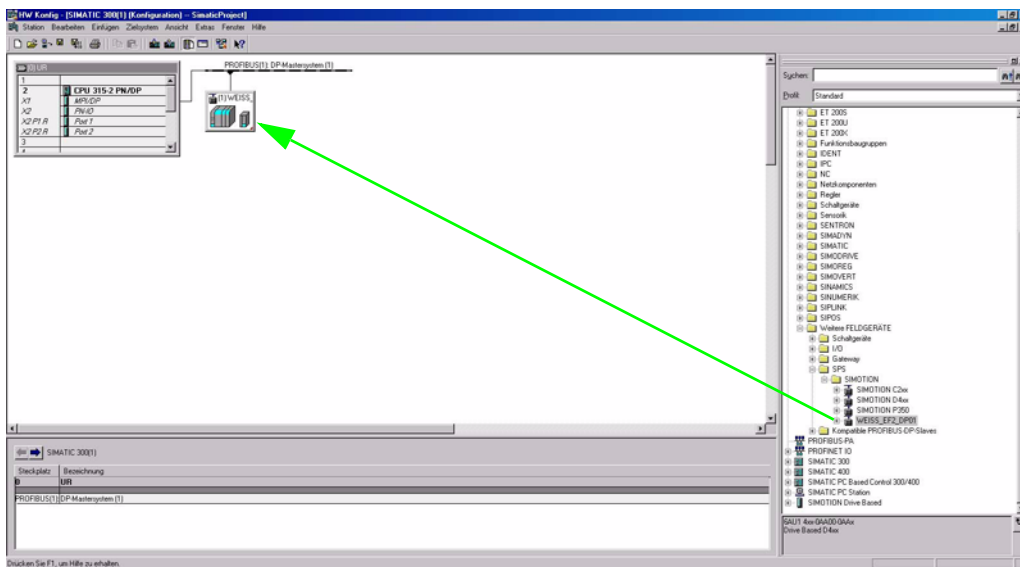
The following example describes the connection of a SIMOTION D 410-2 DP/PN with a SIMATIC S7 315-2 PN/DP. For this purpose, the SIMOTION is connected to the DP master system as a standard slave using a GSD file. The X21 interface on the SIMOTION should be used here. Integrating a SIMATIC S7 315 CPU into an existing project is not described in this manual, and is considered a prerequisite for further action.

Procedure:

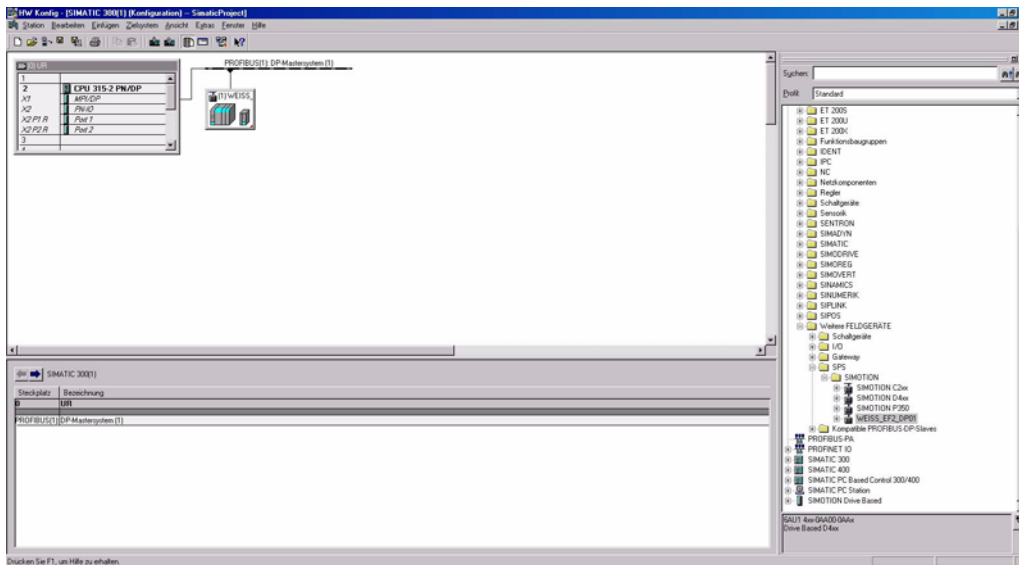
- Import GSD file into STEP 7 HW Config. To do so, double-click "Hardware" in the working area of the SIMATIC manager.



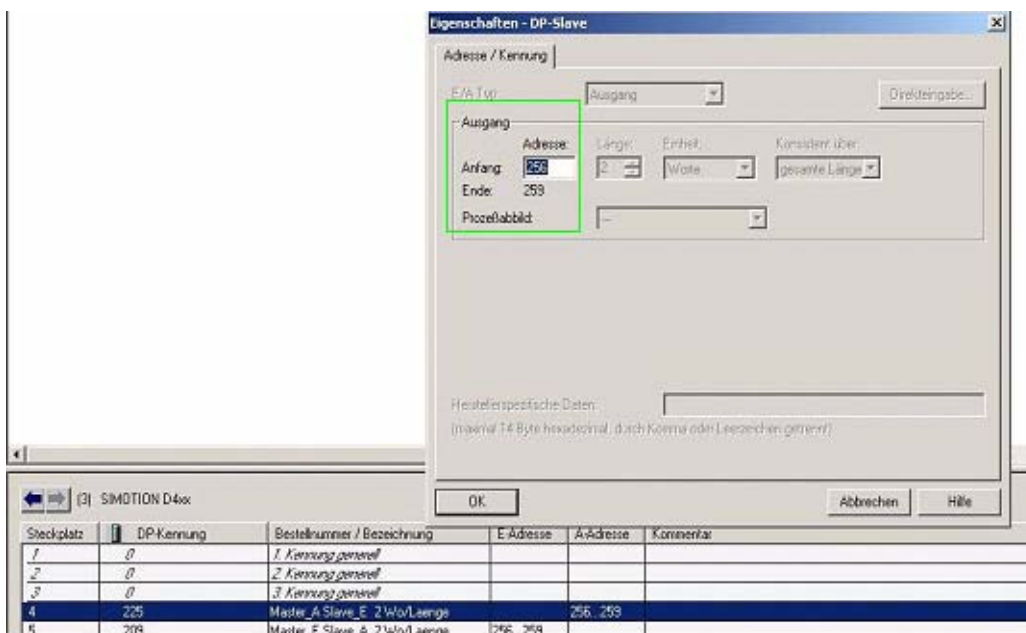
- Import the GSD file via the Options menu - Install GSD file in STEP 7 HW Config. Afterwards, the SIMOTION will appear in the HW catalogue under "PROFIBUS DP/ADDITIONAL FIELD DEVICES/PLC/SIMOTION, from where it can be dragged and dropped onto a DP master system of an S7 station.



COMMUNICATION WITH A HIGHER-LEVEL CONTROLLER | 10.2 Profibus DP

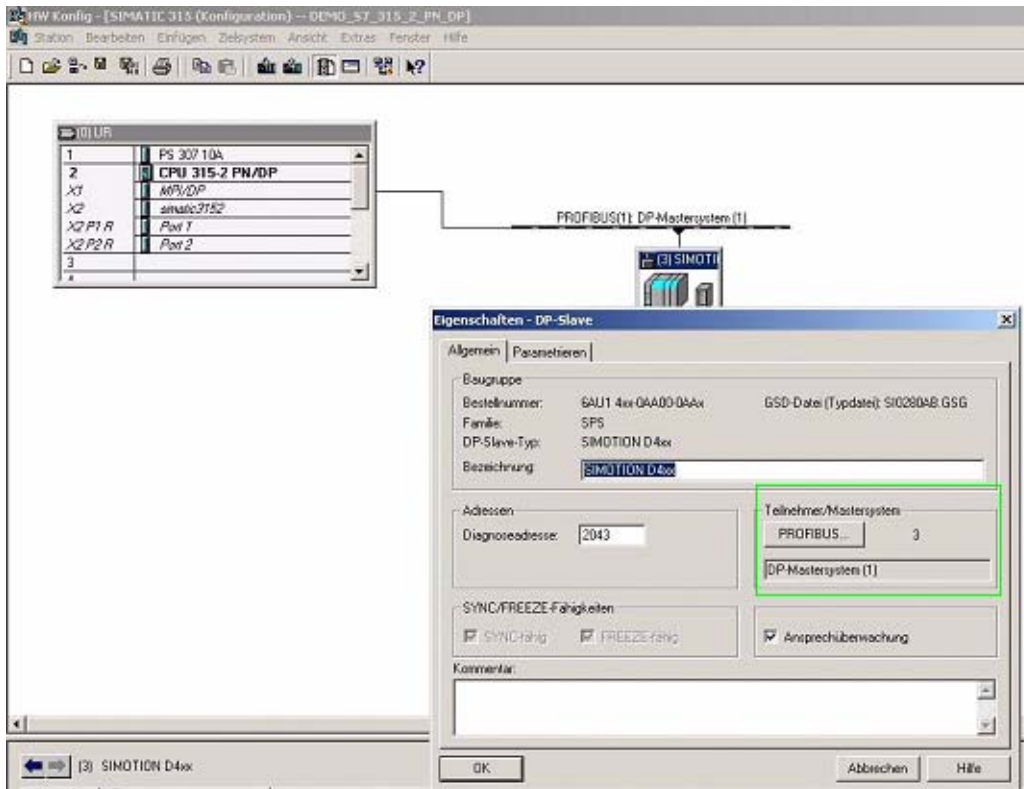


- By double-clicking slot 4 or 5, the start address proposed by HW Config can be reassigned to the desired address.



- By double-clicking the DP slave SIMOTION, the PROFIBUS DP address proposed by HW Config can be reassigned to the desired address. In this case, the preset value is PROFIBUS address 3. Any changes must also be considered in the machine configuration on the Web interface of the SIMOTION.

i Baudrates of 187.5 kbit to 12 Mbit are possible.

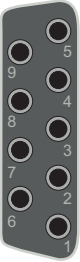


- Afterwards, the station has to be saved and compiled. If the compilation is free of errors, the station can be loaded into the S7 controller.
- To test the configured connection, a corresponding variable table can be created in the SIMATIC Manager.

Var - [YAT_1 -- DEMO_S7_315_2_PN_DP\SIMATIC 315\CPU 315-2 PN/DP\S7-Programm(1)]

	Operand	Symbol	Anzeigeformat	Statuswert	Steuerwert
1	//PROFIBUS				
2	//Statuswort 1 vom Slave				
3	PEW 256		BIN		
4	//Statuswort 2 vom Slave				
5	PEW 258		BIN		
6					
7	//Steuerwort 1 vom Master				
8	PAW 256		BIN		2#0000_0000_0000_0000
9	//Steuerwort 2 vom Master				
10	PAW 258		BIN		2#0000_0000_0000_0000
11					

10.2.1 Interface X21

Representation	Pin	Name	Type	Description
	1	-	-	Reserved, do not use
	2	M	VO	Ground to P24_SERV
	3	1RS_DP	B	RS-485 differential signal
	4	1RTS_DP	O	Request to send
	5	1M	VO	Ground to 1P5
	6	1P5	VO	5 V power supply for bus terminal, external, short-circuit proof
	7	P24_SERV	VO	24 V for teleservice, short-circuit proof, 150 mA maximum
	8	1XRS_DP	B	RS-485 differential signal
	8	-	-	Reserved, do not use

The 1P5 voltage is provided exclusively for the bus terminal.

No OLPs are permitted.

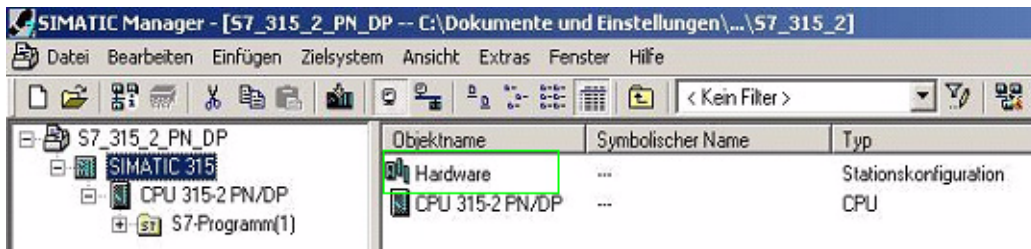
Signal type: VO = Voltage output (power supply); O = Output; B = Bidirectional

10.3 Profinet IO RT

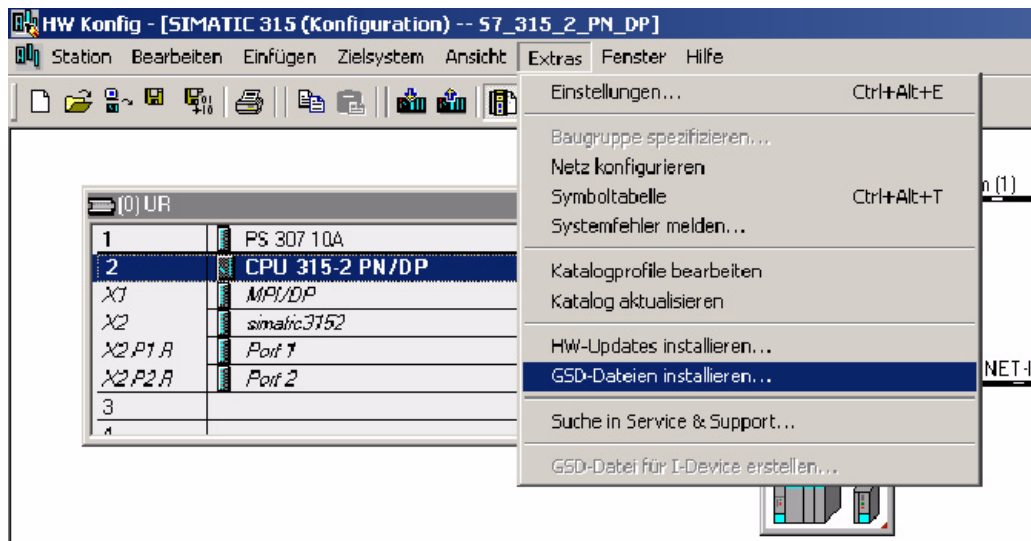
The following example describes the connection of a SIMOTION D 410-2 DP/PN with a SIMATIC S7 315-2 PN/DP. For this purpose, the SIMOTION is connected to the PROFINET IO system as an I device using a GSDML file. The X150 P1 or P2 on the SIMOTION should be used as the interface in this case. Integrating a SIMATIC S7 315 CPU into an existing project is not described in this manual, and is considered a prerequisite for further action. For the I device of a SIMOTION V4.3, an S7-300 CPU must have at least firmware V3.2 or higher, an S7-400 CPU must have at least firmware V6.0 or higher. Both the IP address which is used and the subnet of the SIMATIC controller must be considered in the machine configuration on the Web interface of the SIMOTION controller.

Procedure:

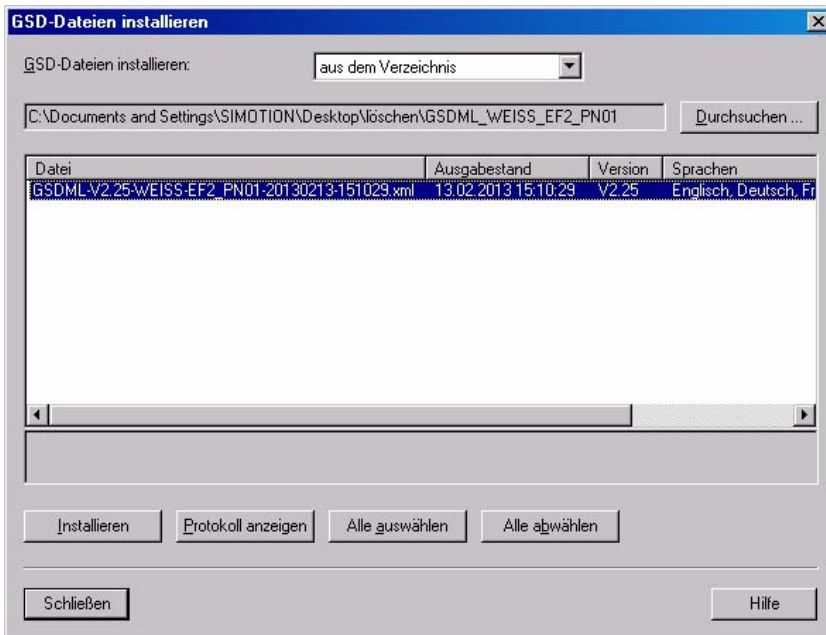
- Import the GSDML file into STEP 7 HW Config. To do so, double-click "Hardware" in the working area of the SIMATIC manager.



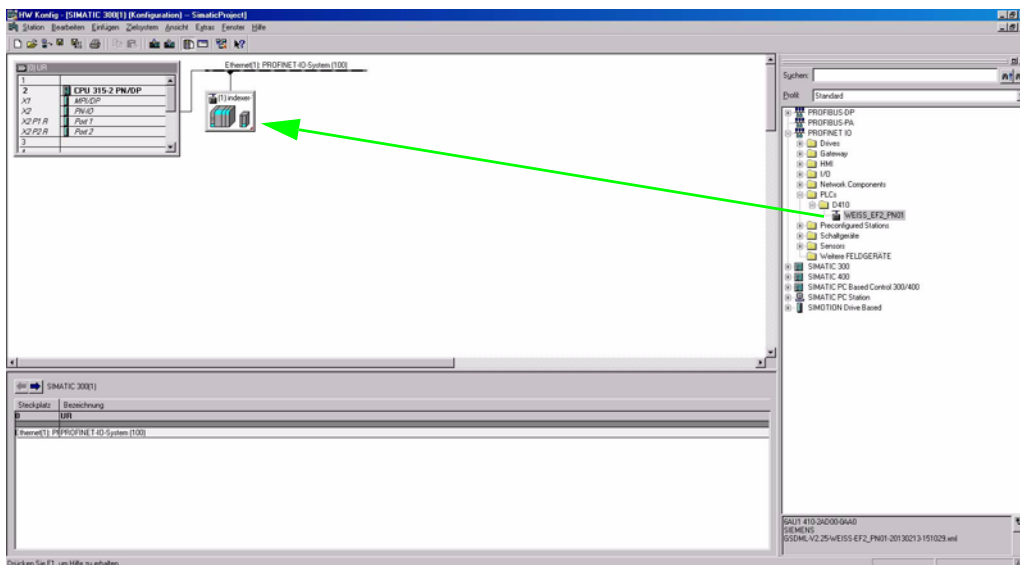
- Close the open station and then import the GSDML file into STEP 7 HW Config via the Options menu - Install GSD files.



- A dialog box will appear for selection of the source folder with the GSDML file to install. Please select the source folder and confirm with OK.



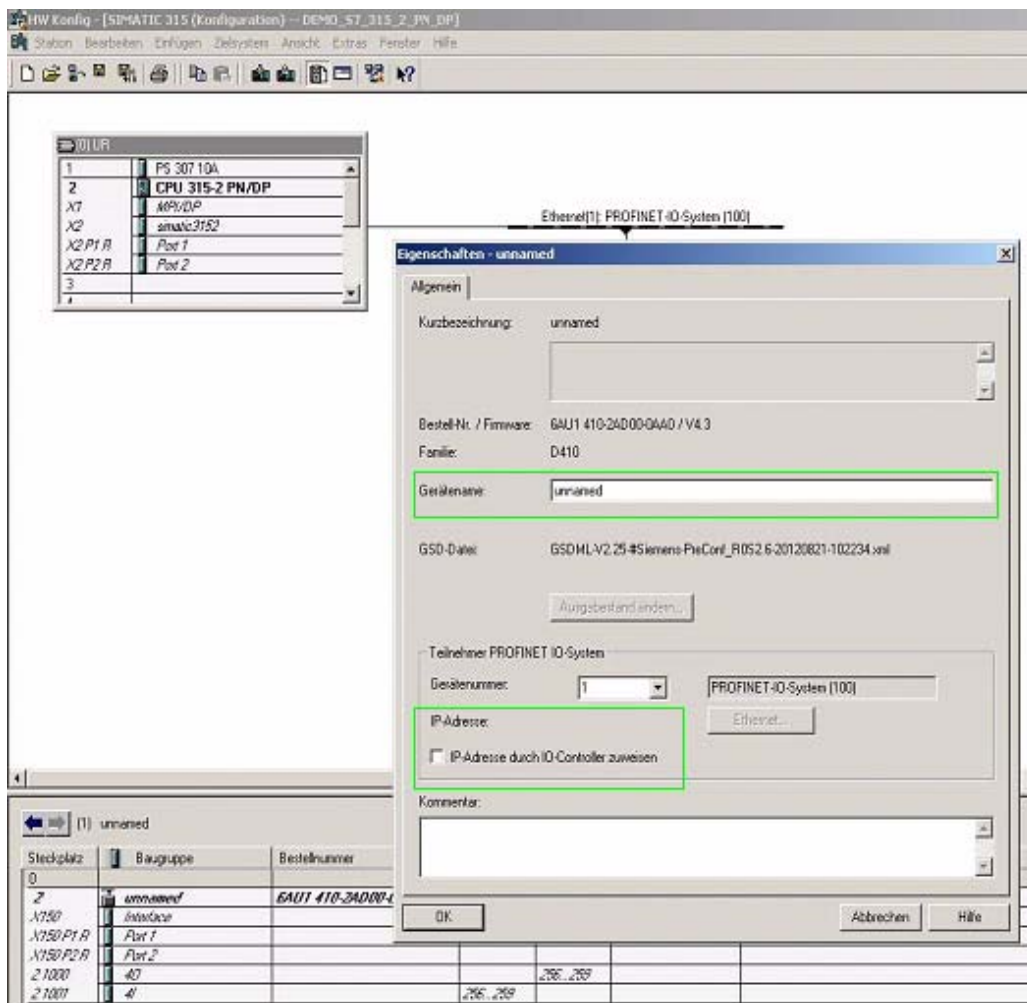
- In the following dialog, select the desired GSDML file and accept it by pressing the "Install" button in the HW catalogue of HW Config.
- Afterwards, the SIMOTION will appear in the HW catalogue from where it can be dragged and dropped onto a PROFINET IO system of an S7 station.



- Double-clicking the pasted I device opens the properties dialog box. Here, the device name proposed by HW Config "unnamed" can now be changed to the desired name. The new device name must also be considered in the machine configuration on the Web interface of the SIMOTION.

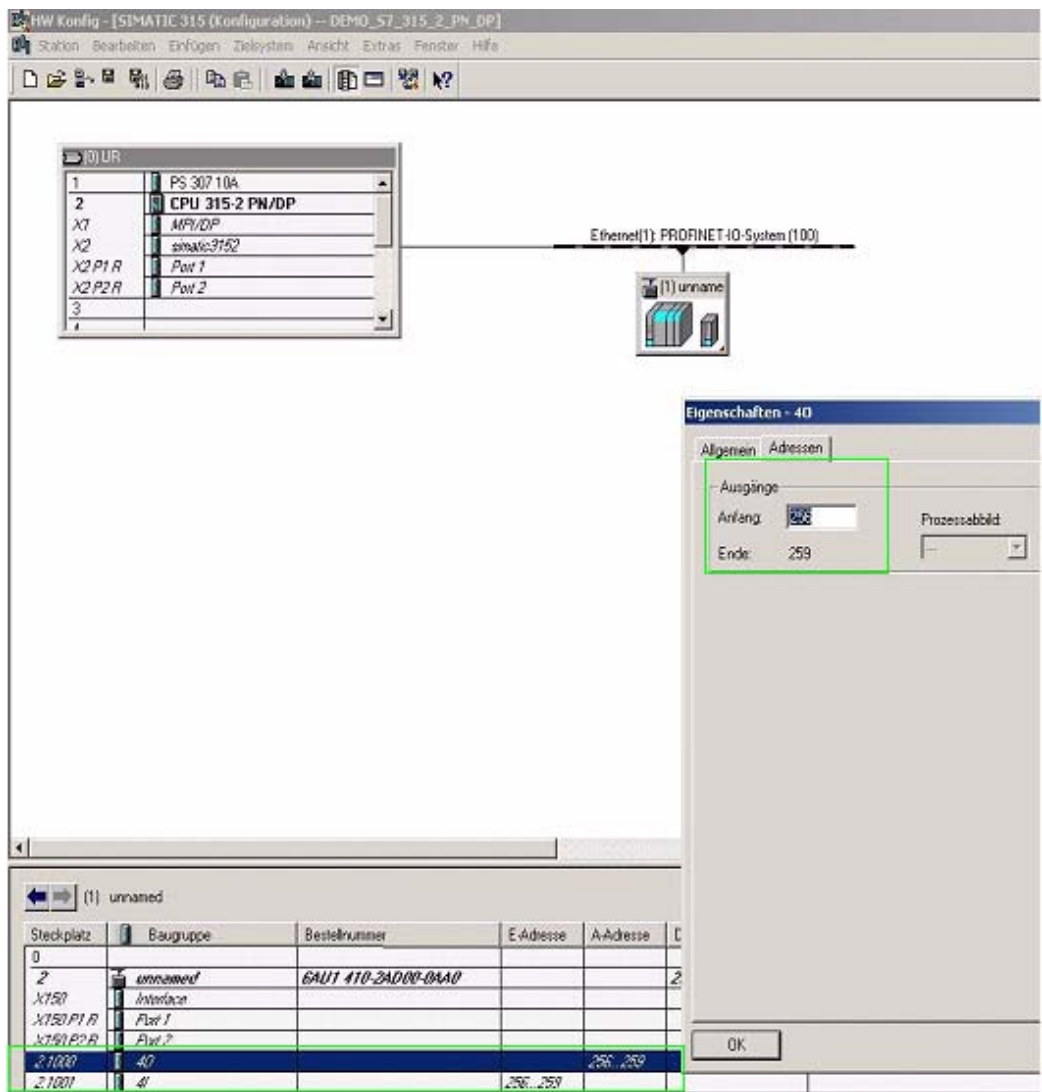
Rules for assigning names:

- Only lowercase letters
- Letters a-z and numbers 0-9 are permitted
- Special characters are not allowed: !"#\$%&/()=?`*!_:#+<>|~[]{}
- Spaces are not allowed either
- The name can have a maximum total length of 240 characters
- Reserved names which cannot be used:
 - ▶ "port-xyz" or "port-xyz-abcde..."
- The engineering system replaces invalid characters with an "x".



- The checkmark for "Assign IP address via controller" depends on the settings of the PROFINET configuration of the EF2.
- By double-clicking slot 2.1000 or 2.1001, the start address proposed by HW Config can be reassigned to the desired address.

COMMUNICATION WITH A HIGHER-LEVEL CONTROLLER | 10.3 Profinet IO RT



- Afterwards, the station has to be saved and compiled. If the compilation is free of errors, the station can be loaded into the S7 controller.
- To test the configured connection, a corresponding variable table can be created in the SIMATIC Manager.

	Operand	Symbol	Anzeigeformat	Statuswert	Steuerwert
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					

10.3.1 Interface X150

PROFINET is an open component-based industrial communication system using Ethernet for distributed automation systems.

SIMOTION D410-2 DP/PN has a PROFINET interface with two ports (X150 P1-P2) onboard. The PROFINET interface supports operation of a SIMOTION D410-2 DP/PN as an IO controller and/or as an I device.

Representation	Pin	Name		Description
	1	TXP	Output	Transmit data +
	2	TXN	Output	Transmit data -
	3	RXP	Input	Receive data +
	4	-	-	Reserved, do not use
	5	-	-	Reserved, do not use
	6	RXN	Input	Receive data -
	7	-	-	Reserved, do not use
	8	-	-	Reserved, do not use

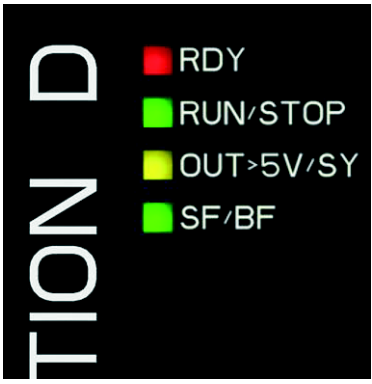
11 DIAGNOSTICS

11.1 Messages

States of the indexer	
NOT_READY	Indexer is not ready Possible causes <ul style="list-style-type: none"> • Controller is not in RUN • Failed to initialize the CF card • Table is not configured
STOP_EMERGENCY	Executing the quick stop that is controlled via the DI 9 (terminal X121.8)
SAFE_TORQUE_OFF	Controlling the safety function STO
WAIT_FOR_ACKNOWLEDGE_ERROR	At least one unacknowledged error is still active
WAIT_FOR_INDEXER_ENCODER_READY	Wait or ready status of indexer encoder
WAIT_FOR_OUTPUT_CAM_GROUP_READY	Wait for ready status of cam controller
WAIT_FOR_ENABLE	Waiting for enable to be set
WAIT_FOR_SET_NOSTOP_INPUT	Waiting for setting the stop input (low active)
WAIT_FOR_PICKOMAT_UNLOCK_STATE	Wait for enabling of indexer by the higher-level Pick-o-Mat
WAIT_FOR_RESET_COMMAND_BITS	Waiting for the resetting of at least one control bit that is still current
WAIT_FOR_COMMAND_BIT	Waiting for the setting of a control bit
RUNNING	The indexer is executing a selected control command; the table is moving.
RUNNING_INDEXER_ENCODER_AUTO_ADJUST	Automatic adjustment of indexer encoder is performed
RUNNING_MEASURECYCLE_QUICKSTOP PHASE_1_STANDSTILL	The indexer is executing the measuring cycle quick stop function (standstill phase)
RUNNING_MEASURECYCLE_QUICKSTOP PHASE_2_ROTATING	The indexer is executing the measuring cycle quick stop function (movement phase)
RUNNING_MEASURECYCLE_QUICKSTOP PHASE_3_ROTATING	The indexer is executing the measuring cycle quick stop function (movement phase)
RUNNING_MEASURECYCLE_DELAYTIME	The indexer is executing the measuring cycle stop delay time function
STOPOVER_DELAY_TIME_RUNNING	Stopover during execution of the continuous mode
JOGGING	Jogging is carried out

11.2 Error and state indicators

① The LED displays are located next to the CompactFlash card plug-in slot on the SIMOTION D410-2. The following table describes the LEDs and their meanings.

LED display		
LED	Description	
	RDY	Status indicator of the SINAMICS Integrated
	RUN/STOP	SIMOTION D410-2 operating states
	OUT > 5V/SY	Encoder current supply > 5 V (TTL/HTL) Synchronization status (SY) of the onboard PROFINET IO interface (X150)
	SF/BF	Group error / bus error

LED status		
LED	Colour	Description
RDY	orange	System startup Drive not ready for operation
	Flashing orange 2.0 Hz	Switching on/off is necessary following the internal firmware update
	green	Drive ready for operation
RUN/STOP	orange	STOP
	green	RUN
OUT > 5V/SY	-	Not relevant for EF2
SF/BF	Continuous red light	Error
	Flashing red 0.5 Hz	IT license missing
	Flashing red 2.0 Hz	Bus error

① For information about diagnostics using LED displays, refer to the *SIMOTION D410-2* Commissioning and Hardware Installation Manual, Section "Diagnostics using LED displays".

11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
1	Error	4	Incoming supply is not ready	The DC-link voltage of the power unit cannot be precharged.	Check power supply Check supply voltage level Replace power unit
2	Error	5	Input "Enable" removed during operation	The Enable signal was removed during operation of the indexer.	Check control logic
3	Error	2	Simultaneous selection of multiple control commands	Multiple control commands were executed.	Check control logic
4	Error	2	Control command is not available when the special mode is selected.	The special mode is active when the control command is selected.	Deactivate "Special mode" and activate control command again
5	Error	2	Motor overtemperature	Temperature sensor not connected or defect	Check temperature sensor connection and function
6	Error	4	Brake relay supply voltage faulty	The brake relay cannot be controlled properly.	Check brake supply voltage Check wiring of feedback signal of the brake relay
7	Error	5	Motor contactor feedback error	In the configuration "Evaluate additional motor contactor", the feedback from the motor contactor cannot be evaluated.	Check if configuration "Evaluate additional motor contactor" is correct. Check if the feedback contact of the motor contactor is wired correctly.
8	Error	4	Run time monitoring was triggered in step x	There was a timeout during execution of the program.	Check the dynamic parameter settings. Contact WEISS GmbH
9	Error	2	Control command is not available when the special mode is selected.	The continuous mode is active when the control command is selected.	Deactivate "Continuous mode" and activate control command again
10	Error	2	Simultaneous selection of "Special mode" and "Continuous mode" is not supported.	"Special mode" and "Continuous mode" are selected simultaneously.	Deactivate one of the two commands.
11	Error	2	Off time of 5 minutes was not observed. Loss of the warranty possible. Refer to the operation instructions for further information.	After switching off the power supply, a defined off time of 5 minutes must be observed.	Observe stop time before switching on again
12	Error	4	position overrun	The sensor was overrun at the end of the cycle.	Check the dynamic parameter settings. Contact WEISS GmbH

DIAGNOSTICS | 11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
13	Error	4	Movement timeout Set time (x) ms	Time monitoring for the cycle has been triggered.	Check if mechanical components run smoothly Check feedback of the sensor signal Resetting the monitoring of the movement timeout via the dynamics page of the Web interface
14	Error	5	Motor contactor switched under load	The motor contactor was switched during movement.	Check electrical connection of the motor contactor
15	Error	2	Timeout during adaptation of TO data (diagnostic value: x).	The parameters set in the drive cannot be read out during controller start-up.	Contact WEISS GmbH
16	Error	4	Error during execution of the measuring cycle quick stop Cause: (1...12)	-	
			1 The indexer is not on the sensor at the start of the measuring cycle quick stop	To ensure a proper direction specification at the start of the measuring cycle quick stop, the indexer has to be on the sensor at the start.	
			2 During oscillating mode, the indexer has not yet reached the constant movement phase as it leaves the sensor.	The measured start ramp time on the sensor is too long. Please check the setup of the mechanics and the connection of the motor Contact WEISS GmbH	
			3 End of the measurement data field reached	Increase upper limit nominal frequency, parameter set 1 Contact WEISS GmbH	
			4 During the measurement of the quick stop ramp, the calculation of the start value for the quick stop ramp could not be ended on time.	Repeat the measurement. In case the fault persists: Contact WEISS GmbH	
			5 During measuring of the dynamic parameters on the sensor, the indexer has not yet reached the constant movement phase as it leaves the sensor.	Reduce start ramp time, parameter set 1	
			6 The start/stop ramp time cannot be increased any further during measuring of the dynamic parameters on the sensor.	Increase upper limit start/stop ramp time, parameter set 1 Contact WEISS GmbH	
			7 The brake ramp time cannot be increased any further during measuring of the quick stop ramp.	Increase upper limit stop ramp time, parameter set 1 Contact WEISS GmbH	

Event number	Category	Reaction	Event text	Cause	Remedy
16	Error	4	8 The selected mode requires an already optimised quick stop ramp.		The measurement of the optimal quick stop ramp has to be carried out in advance.
			9 The brake test or quick stop test mode is selected even though no motor encoder is configured or the service function is not enabled.		Configure the motor encoder or enable the service function in the configuration wizard. Functionality only for WEISS Service
			10 When executing the service function brake test or quick stop test, the motor encoder provides a speed below the standstill threshold during the rotating movement of the indexer.		Check the installation of the motor encoder. Check electrical connection of the motor encoder.
			11 The sensor is approached during the stopping within the cycle.		Check loading. During brake test: Check function and connection of the motor holding brake.
			12 During execution of the quick stop service function, there is a drop below the standstill threshold of the motor encoder before ending the stopping procedure.		Check the installation of the motor encoder. Check electrical connection of the motor encoder.
17	Note	-1	Configuration data, indexer are limited (Parameter-ID: x)	The configuration data is checked by the software for plausibility and, if necessary, adjusted automatically.	None
18	Note	-1	Error in Ethernet configuration The configuring is rejected and the previous configuring remains active.	The configuration of the Ethernet interface cannot be set.	Check validity of the IP address and of the subnet mask Check gateway The configuration must not be within the subnet of the Profinet interface. Set the default IP address via the input for selecting the default IP configuration.
19	Error	2	Error reading out the drive parameters Error ID: (x)	The required drive parameters cannot be read.	Switch controller on and off Contact WEISS GmbH
20	Error	2	Ethernet configuration cannot be set when starting the controller. Error ID: (x)	The configuration of the Ethernet interface cannot be set.	Check validity of the IP address and of the subnet mask Check gateway The configuration must not be within the subnet of the Profinet interface. Set the default IP address via the input for selecting the default IP configuration.

DIAGNOSTICS | 11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
21	Error	2	Profibus configuration cannot be set when starting the controller. Error ID: (x)	The configuration of the Profibus interface cannot be set.	Contact WEISS GmbH
22	Error	2	Profinet IP configuration cannot be set when starting the controller. Error ID: (x)	The IP configuration of the Profinet interface cannot be set.	Check validity of the IP address and of the subnet mask The configuration must not be within the subnet of the Ethernet interface.
23	Error	2	The Profinet device name cannot be set when starting the controller. Error ID: (x)	The device name of the Profinet interface cannot be set.	Check the validity of the device name.
24	Error	2	Timeout when booting the controller internal drive system Error ID: (x)	Parts of the controller were not able to finish startup on time.	Switch controller on and off Contact WEISS GmbH
25	Warning	1	The maximum permissible number of switching cycles of the motor contactor will soon be reached. Please exchange the motor contactor	The motor contactor is only allowed to perform a certain number of cycles in order to maintain the safety function.	Replace the motor contactor and reset the counter.
26	Warning	1	The number of indexer cycles for a service interval has been reached. Please carry out maintenance according to the maintenance schedule.	The service interval must be carried out.	Carry out service interval
27	Error	4	Optimization of stop delay time: position overrun Reduce stop ramp time parameter set 1 and repeat measurement	The sensor was overrun during optimization of stop delay time.	Reduce stop ramp time parameter set 1 and repeat measurement
28	Error	4	Error during optimization of stop delay time Reduce start/stop ramp time parameter set 1 and repeat measurement	It is not possible to determine a optimized stop delay time.	Reduce start/stop ramp time parameter set 1 and repeat measurement
29	Error	2	Invalid CF card serial number	The CF card does not contain a valid serial number.	Contact WEISS GmbH
30	Note	-1	Operation license is not available. Please validate the license of the controller and carry out a restart.	The license for operating the indexer is not available.	Follow up on the validation the operational license via the WEISS user interface. Restart the controller after that.

Event number	Category	Reaction	Event text	Cause	Remedy
31	Error	4	Error adjusting the indexer encoder (cause: 1-6).		-
			1	Automatic adjustment is selected although no indexer encoder has been configured.	Configure indexer and execute function again.
			2	Indexer is not on the sensor when starting the automatic adjustment.	Position indexer on the sensor and execute function again.
			3	Position difference between the two sensor edges is not plausible.	Contact WEISS GmbH
			4	The adjustment of the indexer encoder is cancelled with error.	Verify proper connection of the encoder. The error can be specified more precisely with additional error messages. Contact WEISS GmbH
			5	STO (safe torque off) must be selected for manual adjustment.	Select STO (safe torque off) and execute function again.
32	Error	2	Power unit type incompatible Type number: (x)	The controller is operated by a power unit that is not authorised for the operation.	Employ the correct power unit type. The types PM340 and PM240-2 (as of WEISS firmware V2.0.0) can be used.
			33	Reserve	-
34	Error	5	The quick stop could not be carried out completely (x ms)	The quick stop ramp to stop the indexer was not carried out completely before activating the STO safety function. This can cause the table to coast down. The quick stop was either not selected beforehand or interrupted in its execution. The displayed time corresponds to the duration of the execution of the quick stop until aborting. Possible causes for an abort are a premature selection of the STO safety function or a fault occurring during the quick stop ramp.	Check wiring of the quick stop input. When using a motor contactor, a time needs to be set at the safety relay that is longer than the time displayed on the Overview page of the Web interface. The time can be optimised by the measuring cycle quick stop function. Check error messages that occurred during execution of the quick stop ramp.

DIAGNOSTICS | 11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
35	Error	2	Error while deactivating the PROFIBUS Dummy DP Slave. Error ID: (x)	The configuration cannot be created for the interface configurations "PROFINET" and "Terminal/TM15".	Contact WEISS GmbH
36	Error	5	Sensor drops	The sensor monitor was triggered while the indexer was standing still.	Check function of the sensor
37	Warning	1	Braking resistor is required	A brake resistor is required to operate the indexer.	Connect the braking resistor Minimize load
38	Error	2	Temperature switch for brake resistor has triggered.	Temperature monitor of the brake resistor has triggered.	Wait until the brake resistor has cooled. Check size of the brake resistor Reduce load Increase stop ramp time of the parameter set used
39	Note	-1	Fault during reading of the Profinet device name Controller status: RUN	The IP configuration of the Profinet interface cannot be set.	Check validity of the IP address and of the subnet mask The configuration must not be within the subnet of the Ethernet interface.
40	Note	-1	Fehler beim Auslesen der Profinet IP-Konfiguration Controller status: RUN	The device name of the Profinet interface cannot be set.	Check the validity of the device name.
41	Note	-1	Group Technology Error A precise diagnostics is done via the respective detailed error message.	A technology object (e.g axis) has caused an error	Details regarding the error can be accessed via the Web interface.
42	Note	-1	Group Drive Error A precise diagnostics is done via the respective detailed error message.	The drive has caused an error	Details regarding the error can be accessed via the Web interface.
43	Note	-1	Group Peripheral Error A precise diagnostics is done via the respective detailed error message.	A peripheral error has occurred	Details regarding the error can be accessed via the Web interface.

Event number	Category	Reaction	Event text	Cause	Remedy
44	Error	2	The maximum permissible number of switching cycles of the motor contactor has been reached. Acknowledgeable only by OPERATOR on the Weiss user interface	The motor contactor is only allowed to perform a certain number of cycles in order to maintain the safety function.	Acknowledge error on the WEISS user interface on the Statistical data page with password level for OPERATOR; afterwards the error can be acknowledged. Replace the motor contactor and reset the counter.
45	Warning	1	The maximum permissible number of switching cycles of the motor contactor has been exceeded. Please exchange the motor contactor	The motor contactor is only allowed to perform a certain number of cycles in order to maintain the safety function.	Replace the motor contactor and reset the counter.
46	Error	4	Error in the indexer encoder (error ID: x).	An error occurred in the indexer encoder (SIEMENS encoder).	Verify proper connection of the encoder. The error can be specified in more detail for the Web user interface.
47	Error	2	Timeout of start-up test, message handling	The message management integrated in the controller could not complete the start-up test.	Switch controller on and off Contact WEISS GmbH
48	Reserve	-	-	-	-
49	Error	2	Invalid assignment between CF card and control.	The control is operated by a CF card that was not used for the configuration of the indexer.	Replace CF card for the original CF card. Reconfigure the indexer with this CF card.
50	Error	4	Error at cam 0 of the cam controller (error ID: x).	An error occurred at the cam of the cam controller.	Verify cam parameters (start/end position). The error can be specified in more detail for the Web user interface.
51	Error	4	Error at cam 1 of the cam controller (error ID: x).	See event 50.	See event 50.
52	Error	4	Error at cam 2 of the cam controller (error ID: x).	See event 50.	See event 50.
53	Error	4	Error at cam 3 of the cam controller (error ID: x).	See event 50.	See event 50.
54	Error	4	Error at cam 4 of the cam controller (error ID: x).	See event 50.	See event 50.
55	Error	4	Error at cam 5 of the cam controller (error ID: x).	See event 50.	See event 50.
56	Error	4	Error at cam 6 of the cam controller (error ID: x).	See event 50.	See event 50.
57	Error	4	Error at cam 7 of the cam controller (error ID: x).	See event 50.	See event 50.
58	Error	4	Error at cam 8 of the cam controller (error ID: x).	See event 50.	See event 50.

DIAGNOSTICS | 11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
59	Error	4	Error at cam 9 of the cam controller (error ID: x).	See event 50.	See event 50.
60	Error	4	Error at cam 10 of the cam controller (error ID: x).	See event 50.	See event 50.
61	Error	4	Error at cam 11 of the cam controller (error ID: x).	See event 50.	See event 50.
62	Error	4	Error at cam 12 of the cam controller (error ID: x).	See event 50.	See event 50.
63	Error	4	Error at cam 13 of the cam controller (error ID: x).	See event 50.	See event 50.
64	Error	4	Error at cam 14 of the cam controller (error ID: x).	See event 50.	See event 50.
65	Error	4	Error at cam 15 of the cam controller (error ID: x).	See event 50.	See event 50.
66	Warning	1	Cams cannot be enabled. Adjustment of indexer encoder required.	Adjustment of indexer encoder is required to enable cams. Cams can still be forced.	Adjust the indexer encoder.
67	Reserve	-	-	-	-
68	Reserve	-	-	-	-
69	Reserve	-	-	-	-
70	Error	4	HW limit switch is actuated which is approached in the CW direction.	The indexer was moved in the HW limit switch by a motion command. Limit switch is low active.	Acknowledge error message Move indexer in the CCW direction out of the HW limit switch. Check logic of the application program. Check position of the HW limit switch.
71	Error	4	HW limit switch is actuated which is approached in the CCW direction.	The indexer was moved in the HW limit switch by a motion command. Limit switch is low active.	Acknowledge error message Move indexer in the CW direction out of the HW limit switch. Check logic of the application program. Check position of the HW limit switch.

Event number	Category	Reaction	Event text	Cause	Remedy
72	Warning	1	Please run the indexer free out of the HW limit switch in the CCW direction.	The indexer was moved in the HW limit switch by a motion command. Limit switch is low active.	The corresponding error message 70 was already acknowledged. Move indexer in the CCW direction out of the HW limit switch. Acknowledge warning
73	Warning	1	Please run the indexer free out of the HW limit switch in the CW direction.	The indexer was moved in the HW limit switch by a motion command. Limit switch is low active.	The corresponding error message 71 was already acknowledged. Move indexer in the CW direction out of the HW limit switch. Acknowledge warning
74	Reserve	-	-	-	-
75	Reserve	-	-	-	-
76	Error	4	Configuration data, indexer are faulty Parameter ID: (x)	There is an error in the configuration data.	Check configuration data of the indexer for plausibility. The coefficient can be used to draw conclusions about the affected configuration date.
77	Error	4	Indexer encoder is not adjusted.	The indexer encoder is not adjusted. This means that the encoder position has not yet been aligned with the mechanical position. WARNING: The encoder position must not be evaluated; the cam controller is not synchronised with the mechanical assembly.	The error message can be acknowledged directly. Then the indexer can be moved to the adjustment position to adjust the indexer encoder via the WEISS user interface.
78	Warning	1	Adjust the indexer encoder.	See event 77.	The corresponding error message 77 has already been acknowledged. Remedy: See event 77.
79	Error	4	Segment identification is not adjusted.	Segment identification is not adjusted. WARNING: The segment number must not be evaluated.	The error message can be acknowledged directly. Then the indexer can be moved to the adjustment position to adjust the segment identification via the WEISS user interface. The indexer must be on the sensor to do so.
80	Warning	1	Adjust the segment identification.	See event 79.	The corresponding error message 79 has already been acknowledged. Remedy: See event 79.

DIAGNOSTICS | 11.3 Error messages

Event number	Category	Reaction	Event text	Cause	Remedy
81	Error	4	Movement timeout. Cause (1-2):		-
			1	The movement monitoring via the indexer encoder has tripped.	Check the mechanical coupling of the indexer encoder. Check the toothed belt on the reduction gear. Check the motor for proper connection. Check if mechanical components run smoothly.
			2	The movement monitoring via the motor encoder has tripped.	Check the mechanical coupling of the motor encoder. Check the motor for proper connection. Check if mechanical components run smoothly.
82	Error	4	Improper motor phase sequence.	The motor's direction of rotation is checked via the connected indexer encoder. The motor has been connected with the wrong phase sequence so that the indexer turns in the wrong direction.	Change phase sequence by swapping 2 phases of the motor cable at the power unit or the motor. Updated wiring diagram if required.
83	Reserve	-	-	-	-
84	Reserve	-	-	-	-
85	Reserve	-	-	-	-
86	Reserve	-	-	-	-
87	Reserve	-	-	-	-
88	Reserve	-	-	-	-
89	Reserve	-	-	-	-
90	Reserve	-	-	-	-
Description of the reactions					
-1	No reaction (note)				
0	No reaction (note, reserved for errors of the message handling)				
1	No reaction (warning)				
2	Execution of a stop after cycle end (error)				
3	Execution of a quick stop without cancellation of the enable signal (error)				
4	Execution of a quick stop with subsequent cancellation of the Enable signal (error)				
5	Drive coasts down immediately (error)				

12 STANDARDS AND APPROVALS

12.1 CE marking

WEISS GmbH needs the type plate exclusively for identifying the product and documentation of the installed components. WEISS GmbH itself does not issue a CE logo for the product.

The purchased components feature corresponding CE logos (see supplier documentation and type plate of the individual component).

12.2 Electromagnetic compatibility

Standards for EMC are satisfied, if the EMC Installation Guideline is observed.

SIMOTION products are designed for industrial use in accordance with product standard DIN EN 61800-3:2004, Category C3.

Category C3 is complied with:


- used cable length < 15 m
 - network impedance (e.g. uk) = 1%
 - Category C2 can be achieved by using devices with internal filter.
- ❗ Superior categories can be achieved by using additional provisions.
- ❗ Extended cable lengths are possible after consulting WEISS GMBH.

USA	
Federal Communications Commission Radio Frequency Interference Statement	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
Shielded Cables	Shielded cables must be used with this equipment to maintain compliance with FCC regulations.
Modifications	Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.
Conditions of Operations	This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.


CANADA	
Canadian Notice	This Class B digital apparatus complies with Canadian ICES-003.

STANDARDS AND APPROVALS | 12.3 cULus approval

SOUTH KOREA	
For sellers or other users, please keep in mind that this device is an A-grade electromagnetic wave device. This device is intended to be used in areas other than at home.	
The EMC limit values to be observed for Korea correspond to the limit values of the EMC product standard for variable-speed electric drives EN 61800-3 of category C2 or the limit value class A, Group 1 to EN55011.	
By implementing appropriate additional measures, the limit values according to category C2 or limit value class A, Group 1, are observed.	
For this purpose, additional measures, such as the use of an additional RFI suppression filter (EMC filter) may be necessary.	
In addition, measures for EMC-compliant configuration of the system are described in this Manual and/or the Configuration Manual "EMC Installation Guideline".	
Please note that it is ultimately always the label on the device that provides the relevant information about the compliance with standards.	

AUSTRALIA	
	D410-2 DP and D410-2 DP/PN meet the requirements of the AS61800-3.

12.3 cULus approval

	Listed component mark for United States and the Canada Underwriters Laboratories (UL) according to Standard UL 508, File E164110, File E115352, File E85972.
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13 APPENDIX

13.1 Data for fieldbus data mapping

13.1.1 Input data fieldbus data mapping

Name	No. of bytes	Data type	Unit	Value range	Comment	From version
Cam controller enabling	2	WORD	--	--	Bit number corresponds to cam number	V2.1.0
Force cam controller	2	WORD	--	--	Bit number corresponds to cam number	V2.1.0

13.1.2 Output data, fieldbus data mapping

Name	No. of bytes	Data type	Unit	Value range	Comment	From version
Message byte	1	USINT	--	0..255		V1.1.0
Expanded status data word	2	WORD	--	--		V1.1.0
Control unit safety checksum	4	UDINT	--	0 .. 4294967295	0 -> value is invalid	V1.1.0
Motor module safety checksum	4	UDINT	--	0 .. 4294967295	0 -> value is invalid	V1.1.0
STO delay time (drive)	2	INT	ms	-32768 .. 32767	negative value -> value is invalid	V1.1.0
Actual motor current	4	UDINT	mA	0 .. 4294967295		V1.1.0
Actual intermediate circuit voltage	2	UINT	V	0 .. 65535		V1.1.0
Actual motor frequency	1	SINT	Hz	-128 .. 127		V1.1.0
Time 1 (↓ sensor → ↑ sensor)	2	UINT	ms	0 .. 65535	0 -> value is invalid	V1.1.0
Time 2 (↑ start → ↑ sensor)	2	UINT	ms	0 .. 65535	0 -> value is invalid	V1.1.0
Time 3 (↑ start → in position)	2	UINT	ms	0 .. 65535	0 -> value is invalid	V1.1.0
Time 4 (in position → ↑ start)	2	UINT	ms	-128 .. 127	0 -> value is invalid (also for measurement time >60 s)	V2.1.0
Motor speed at ↓ sensor (from V2.1.0, previously: actual freq./target freq. at ↓ sensor)	1	USINT	%	0..255		V1.1.0
Output counter	4	UDINT	--	0 .. 4294967295		V1.1.0
Cycle counter (total)	4	UDINT	--	0 .. 4294967295		V1.1.0
Indexer operating hours	4	UDINT	h	0 .. 4294967295		V1.1.0
Motor operating hours	4	UDINT	h	0 .. 4294967295		V1.1.0
Motor contactor circuits	4	UDINT	h	0 .. 4294967295		V1.1.0
Motor contactor circuits (load)	1	USINT	--	0..255		V1.1.0
Impermissible mains connections	1	USINT	--	0..255		V1.1.0
Motor holding brake circuits	4	UDINT	--	0 .. 4294967295		V1.1.0
Service interval counter	4	UDINT	--	0 .. 4294967295		V1.1.0
Indexer encoder position	4	UDINT	m°	0 .. 4294967295	Position in millidegrees	V2.1.0
Cam controller enable status	2	WORD	--	--	Bit number corresponds to cam number	V2.1.0
Cam controller switching status	2	WORD	--	--	Bit number corresponds to cam number	V2.1.0
Segment number	1	USINT	--	0..255	0 -> adjustment required	V2.1.0

13.1.3 Allocation of expanded status data item

Name	Bit number	From version
Indexer encoder is ready	0	V2.1.0
Indexer encoder is adjusted	1	V2.1.0
Cam controller is ready	2	V2.1.0
Segment identification is adjusted	3	V2.1.0
Reserve	4	
Reserve	5	
Reserve	6	
Reserve	7	
Reserve	8	
Feed is ready	9	V1.1.0
Quick stop is selected	10	V1.1.0
The safety function STO is selected	11	V1.1.0
Safety function STO is activev	12	V1.1.0
Motor contactor feedback	13	V1.1.0
Brake relay supply voltage feedback	14	V1.1.0
Reserve	15	

13.2 EF2...B V2.1; 0.37 kW Controller connection examples

13.2.1 SIL2 Power Module connection example

see wiring diagram in appendix

13.2.2 SIL2 D410-2 Interface I/O connection example

see wiring diagram in appendix

13.2.3 Connection example, SIL2 interface I/O module TM15 digital I/O (option)

see wiring diagram in appendix

13.2.4 Connection example, SIL2 interface I/O module TM15 cam controller (option)

see wiring diagram in appendix

13.2.5 SIL3 Power Module connection example

see wiring diagram in appendix

13.2.6 SIL3 D410-2 Interface I/O connection example

see wiring diagram in appendix

13.2.7 SIL3 Safety relais connection example

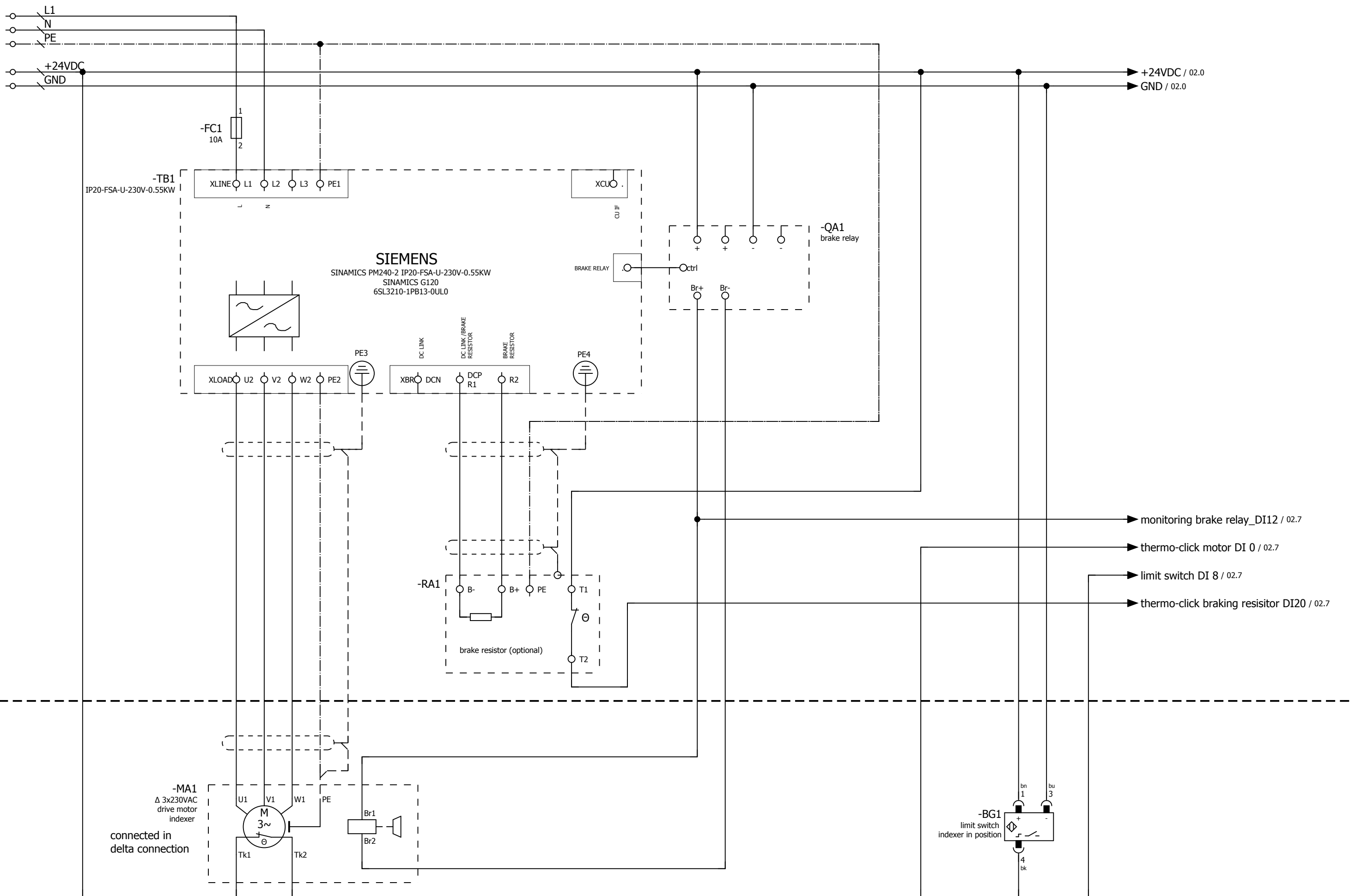
see wiring diagram in appendix

13.2.8 Connection example, SIL3 interface I/O module TM15 digital I/O (option)

see wiring diagram in appendix

13.2.9 Connection example, SIL3 interface I/O module TM15 cam controller (option)

see wiring diagram in appendix



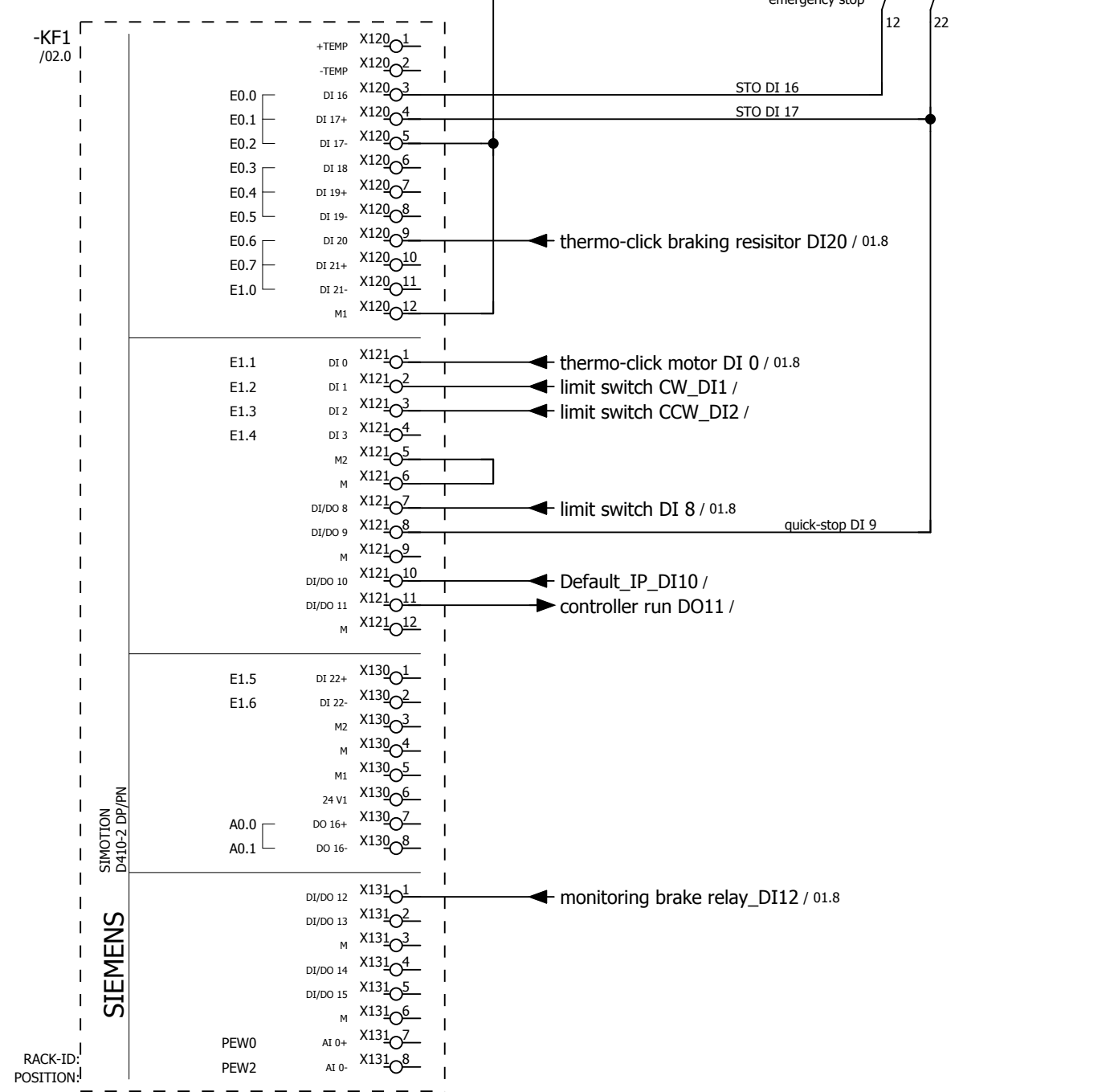
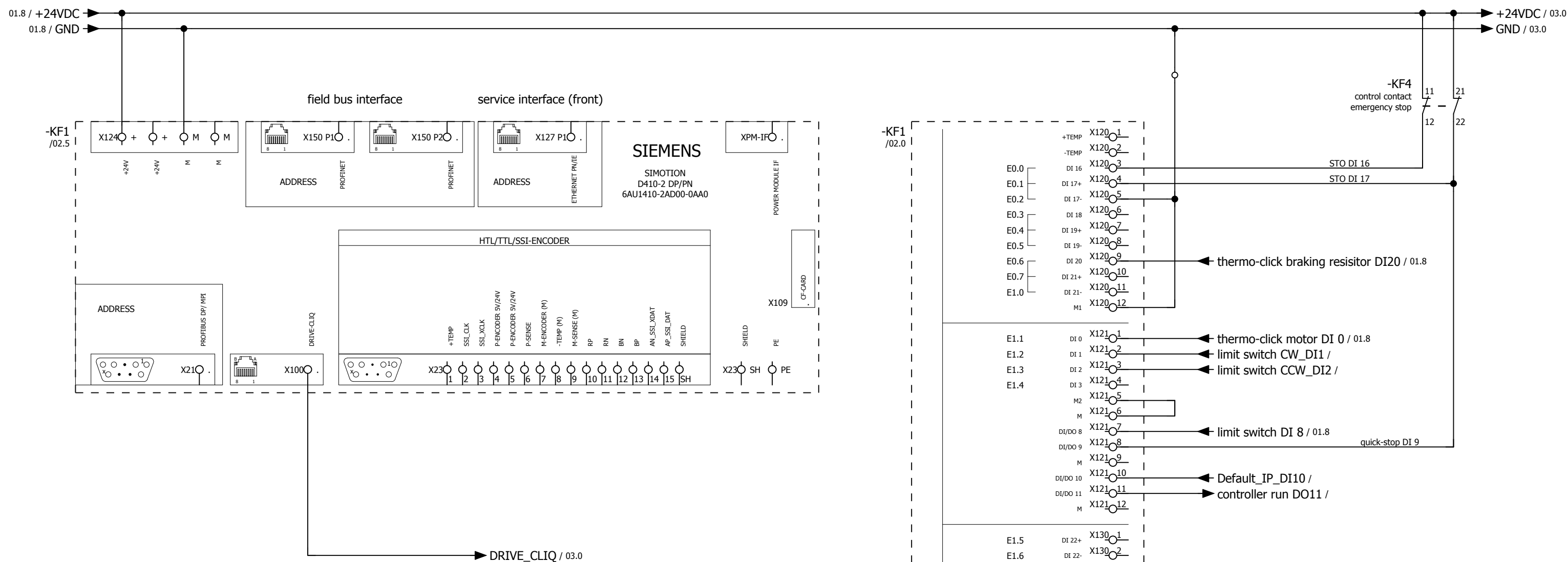
Date	10.08.2017
Ed.	djahn
Appr	
Modification	Date
Name	Original

examples indexer control	
Replacement of	Replaced by

WEISS GmbH
 Siemensstraße 17
 D-74722 Buchen
 Tel. +49 (0)6281-5208-0

wiring example SIL2 POWER MODUL
 0,37kW

= EF2_1ph_0,37kW	
+ Sil2	
Page	01
Page	18



The customer, is responsible for the assessment of risk and for the choice of the switching devices

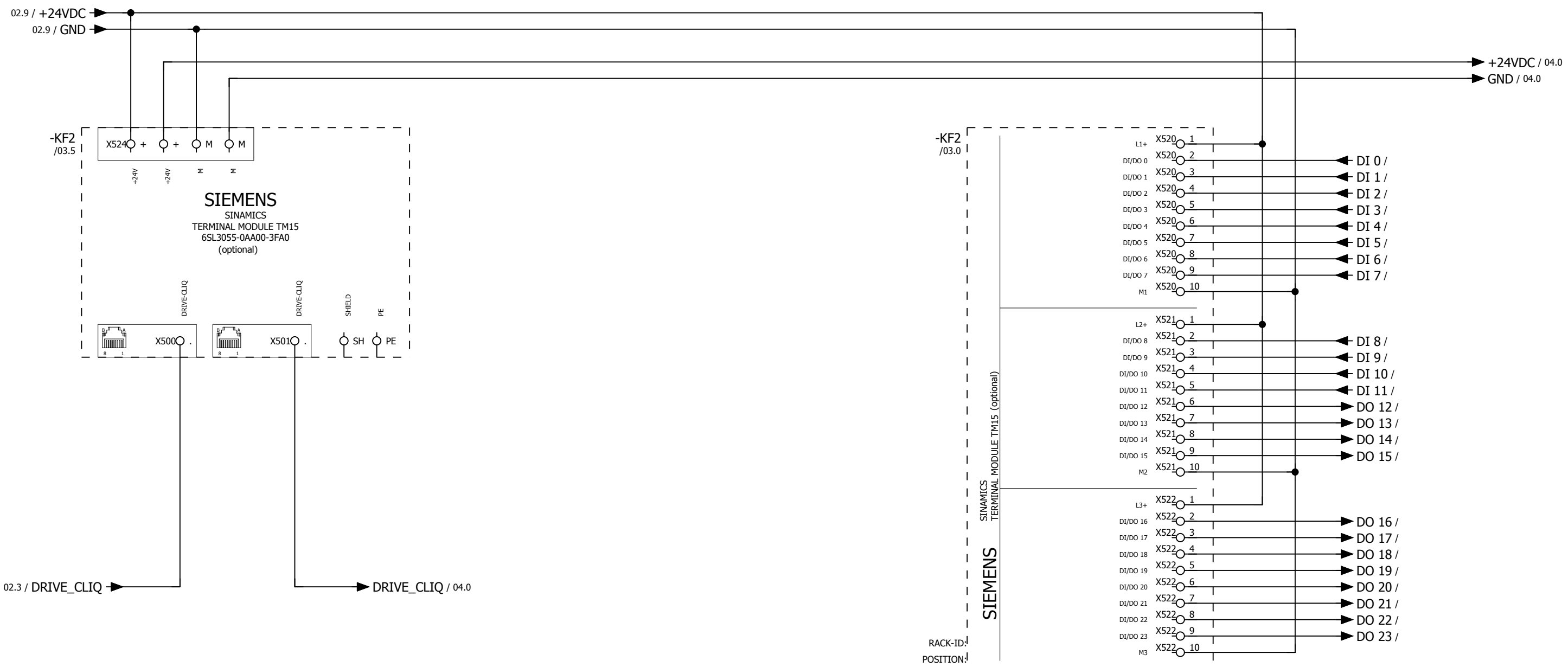
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Ed.	djahn	---
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Modification	Date	Name
Original		
Replacement of	Replaced by	

examples indexer control	
Replacement of	Replaced by

WEISS
 WEISS GmbH
 Siemensstraße 17
 D-74722 Buchen
 Tel. +49 (0)6281-5208-0

wiring example SIL2 D410-2 digital I/O
 0,37kW

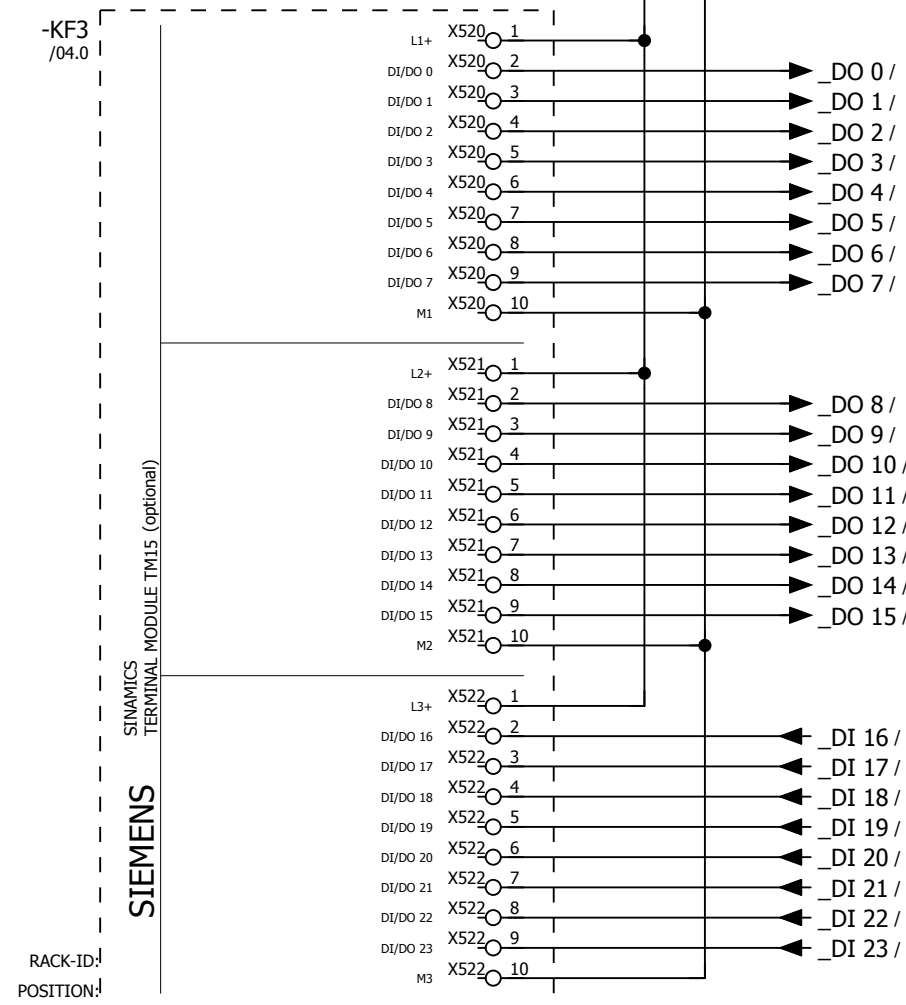
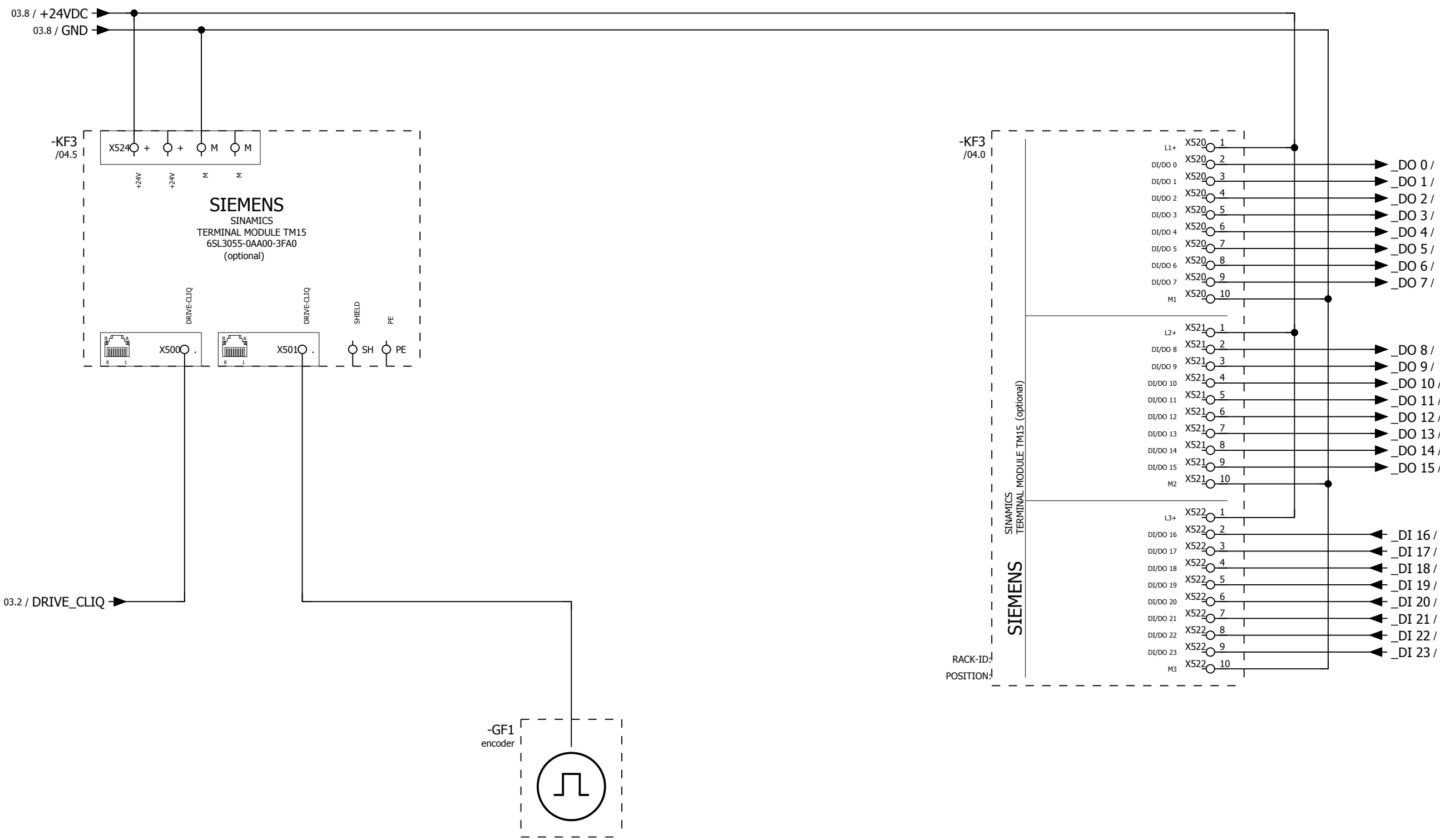
= EF2_1ph_0,37kW		Page 02	
+ Sil2		Page 18	



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		Ed.	djahn	examples indexer control				+ Sil2	
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Modification	Date	Name	Original					Page	18



wiring example SIL2
option TM 15 digital I/O
0,37kW



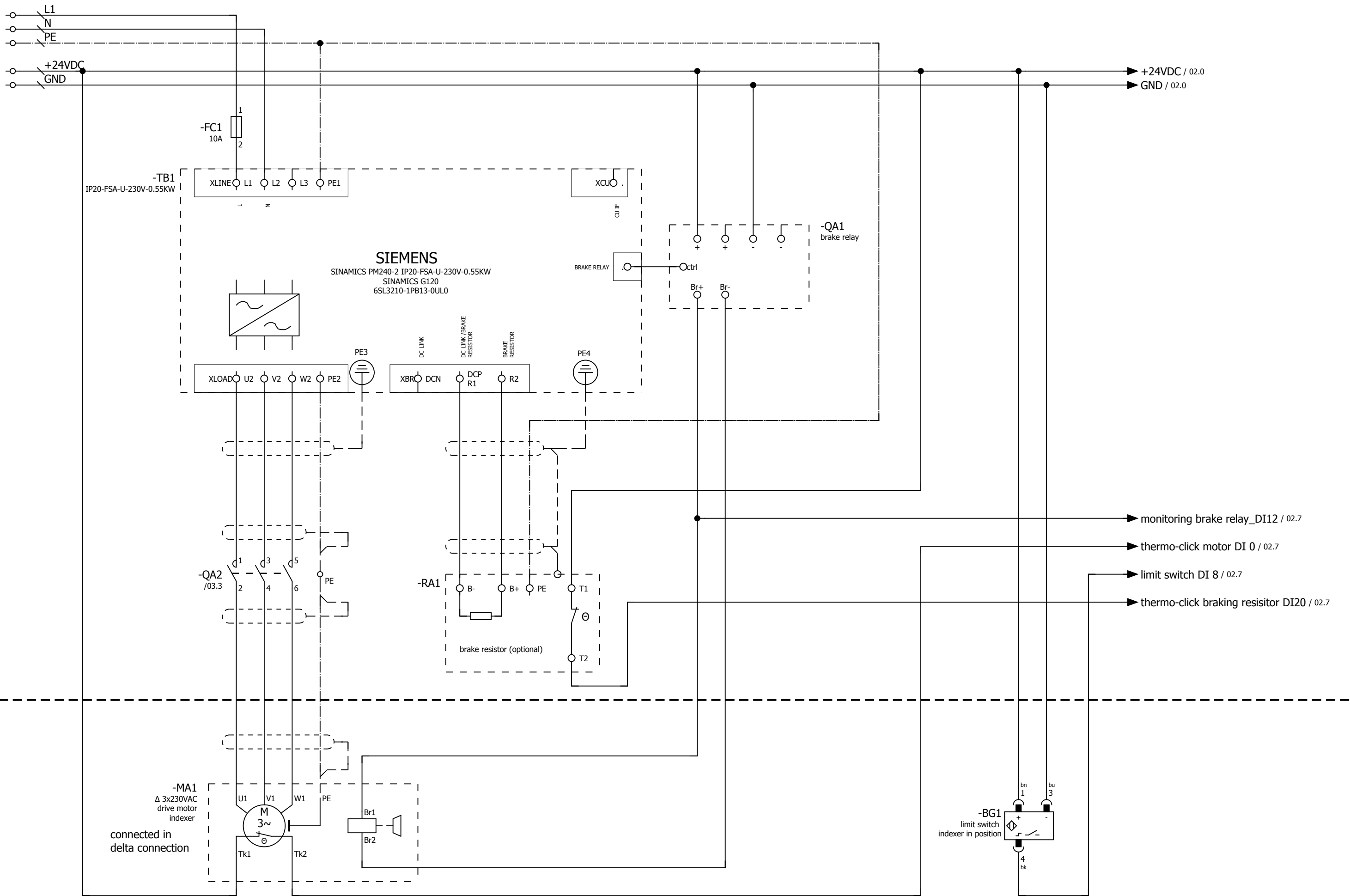
Date	10.08.2017		
Ed.	djahn		
Appr			
Modification	Date	Name	Original

---	examples indexer control
Replacement of	Replaced by

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wiring example SIL2
 option TM 15 electronic cam switch
 0,37kW

= EF2_1ph_0,37kW	
+ Sil2	
Page	04
Page	18



+Sil2/04

02

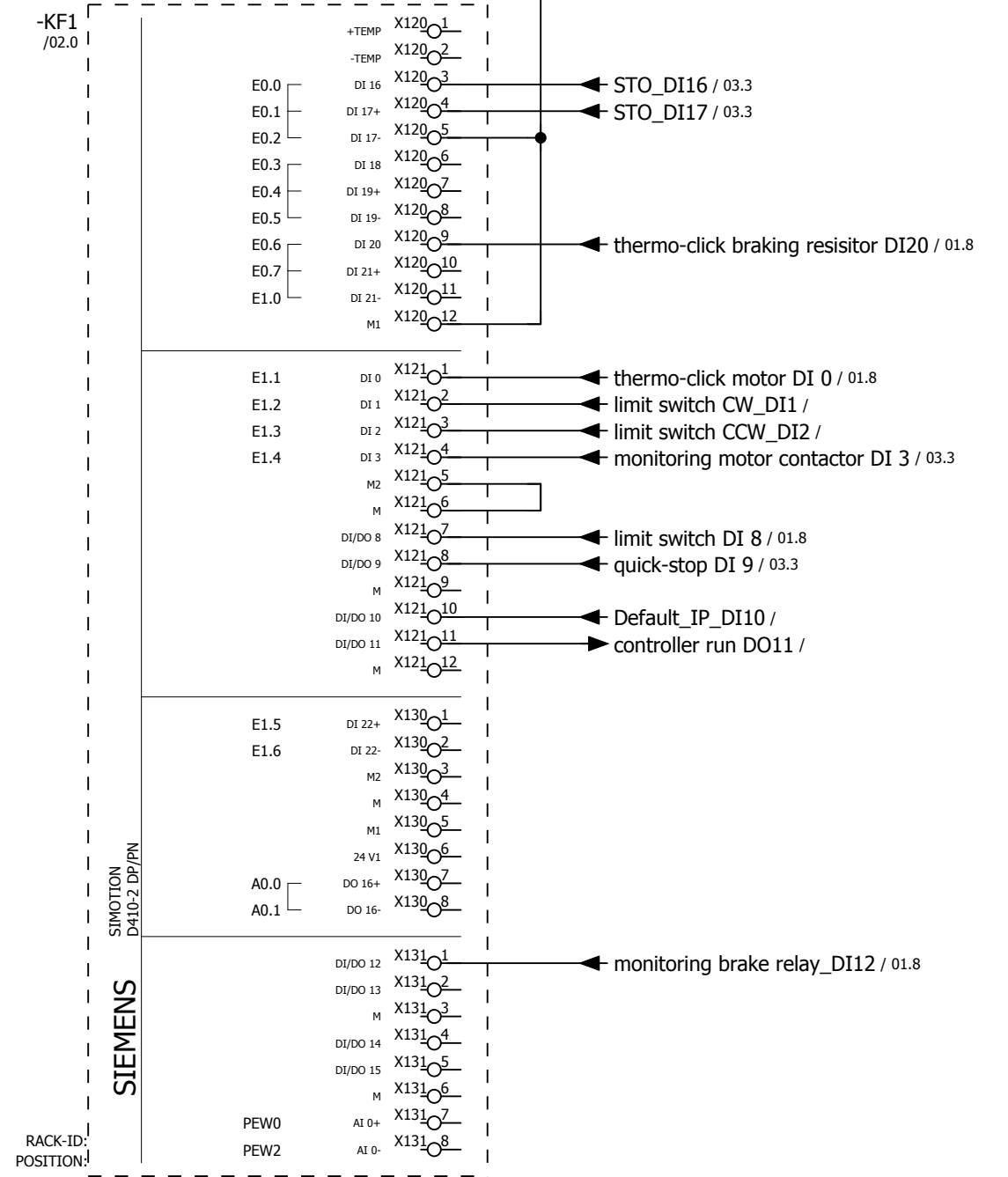
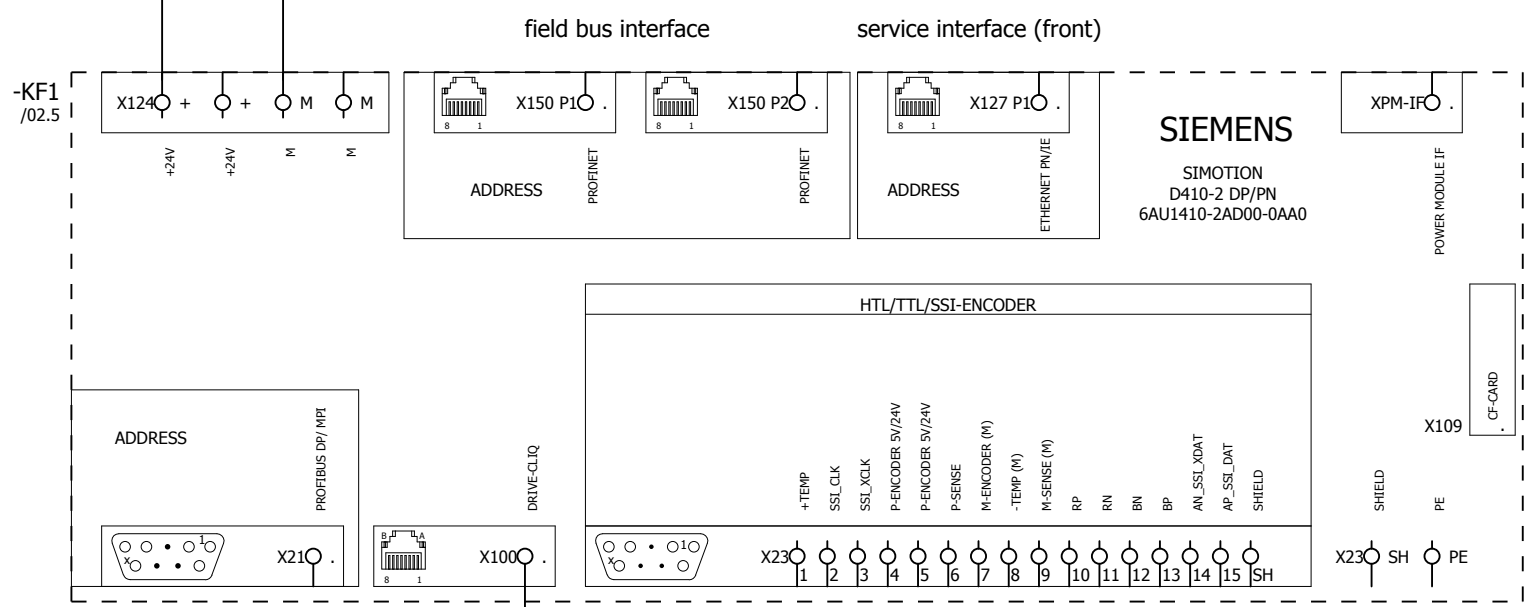
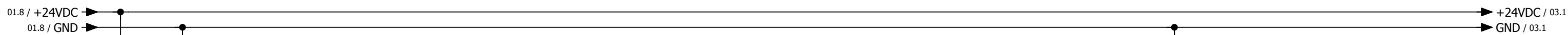
Date	10.08.2017
Ed.	djahn
Appr	
Modification	Date
Name	Original

examples indexer control	
Replacement of	Replaced by

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 D-74722 Buchen
 Tel. +49 (0)6281-5208-0

wiring example SIL3 POWER MODUL
 0,37kW

= EF2_1ph_0,37kW	
+ Sil3	
Page	01
Page	18

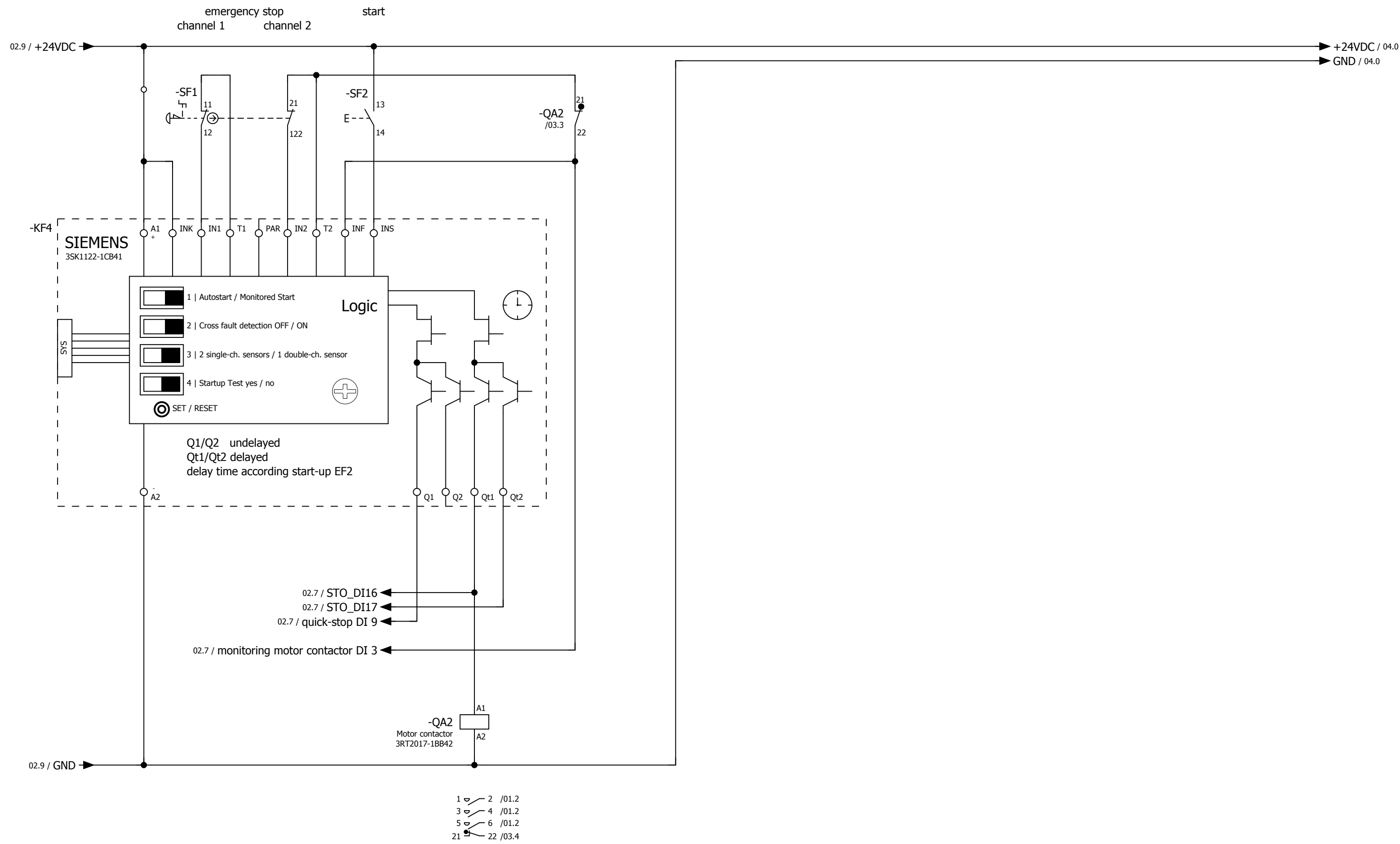


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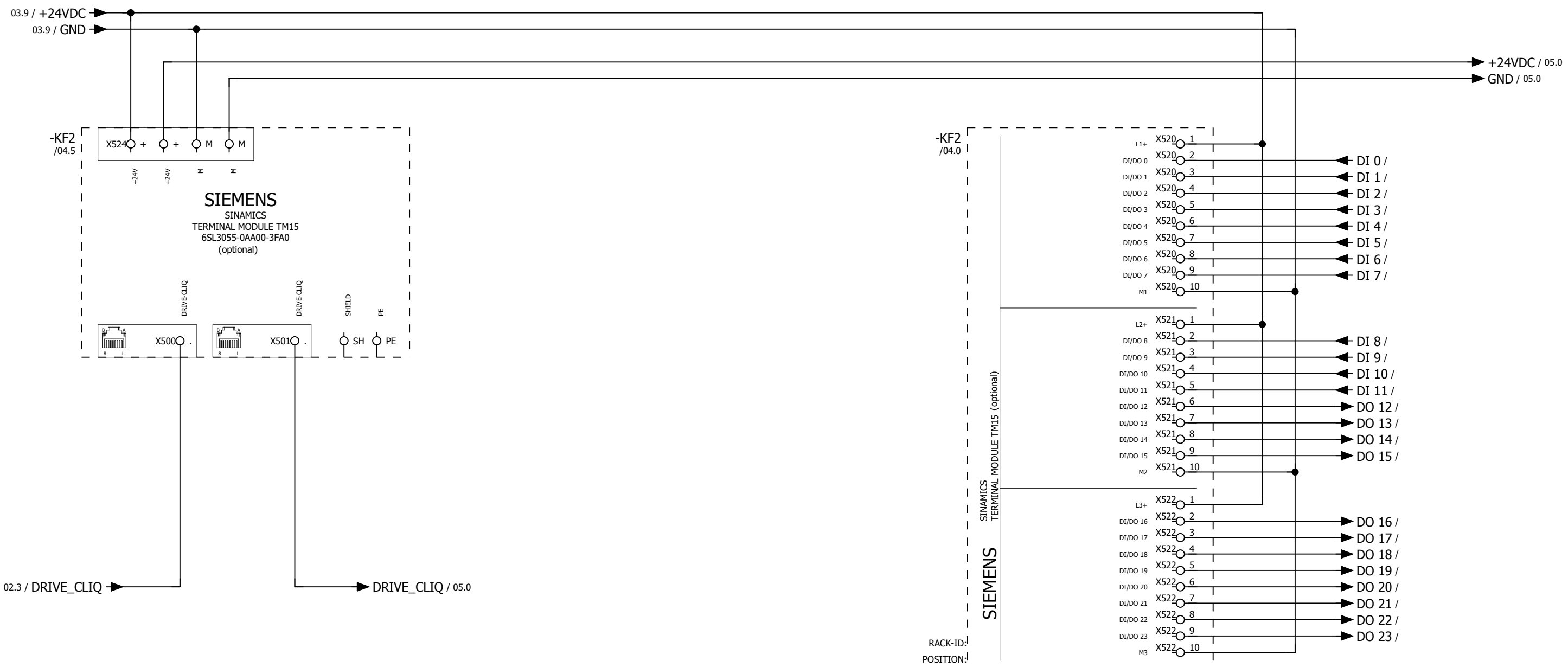
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				Ed.	djahn	examples indexer control		+ Sil3	
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Modification	Date	Name	Original			Replaced by			Page 18



wiring example SIL3 D410-2 digital I/O
0,37kW



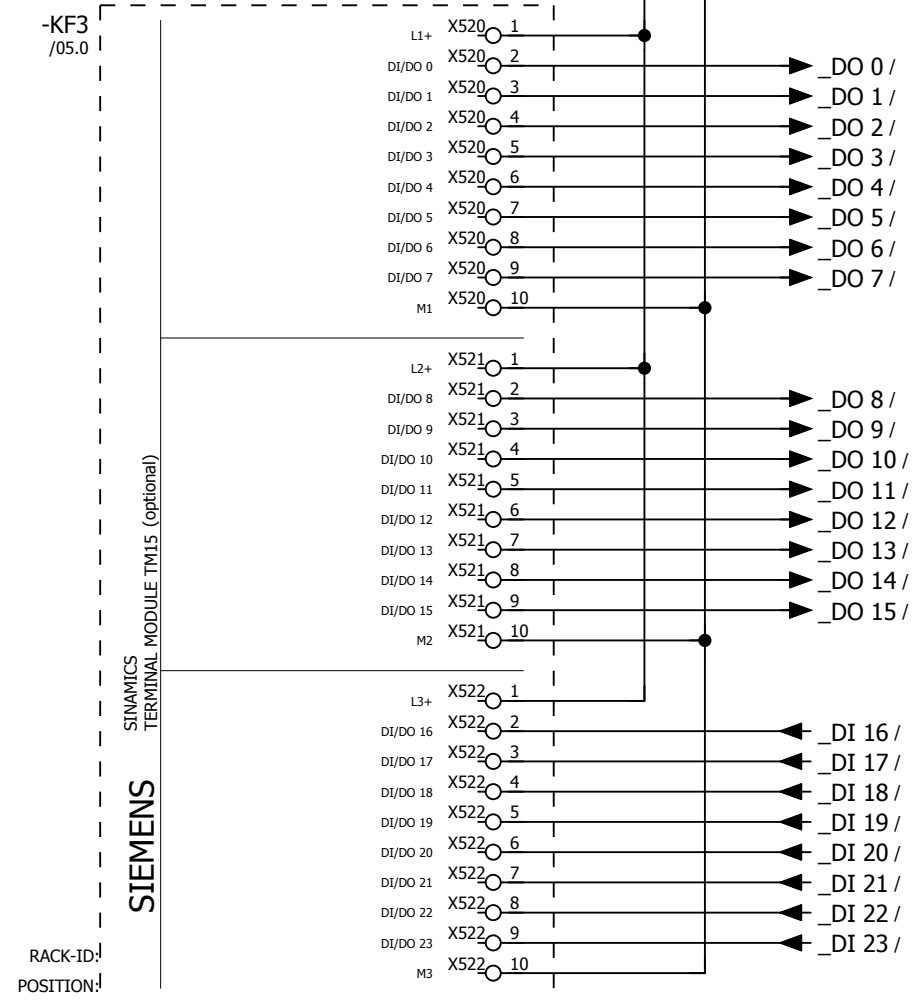
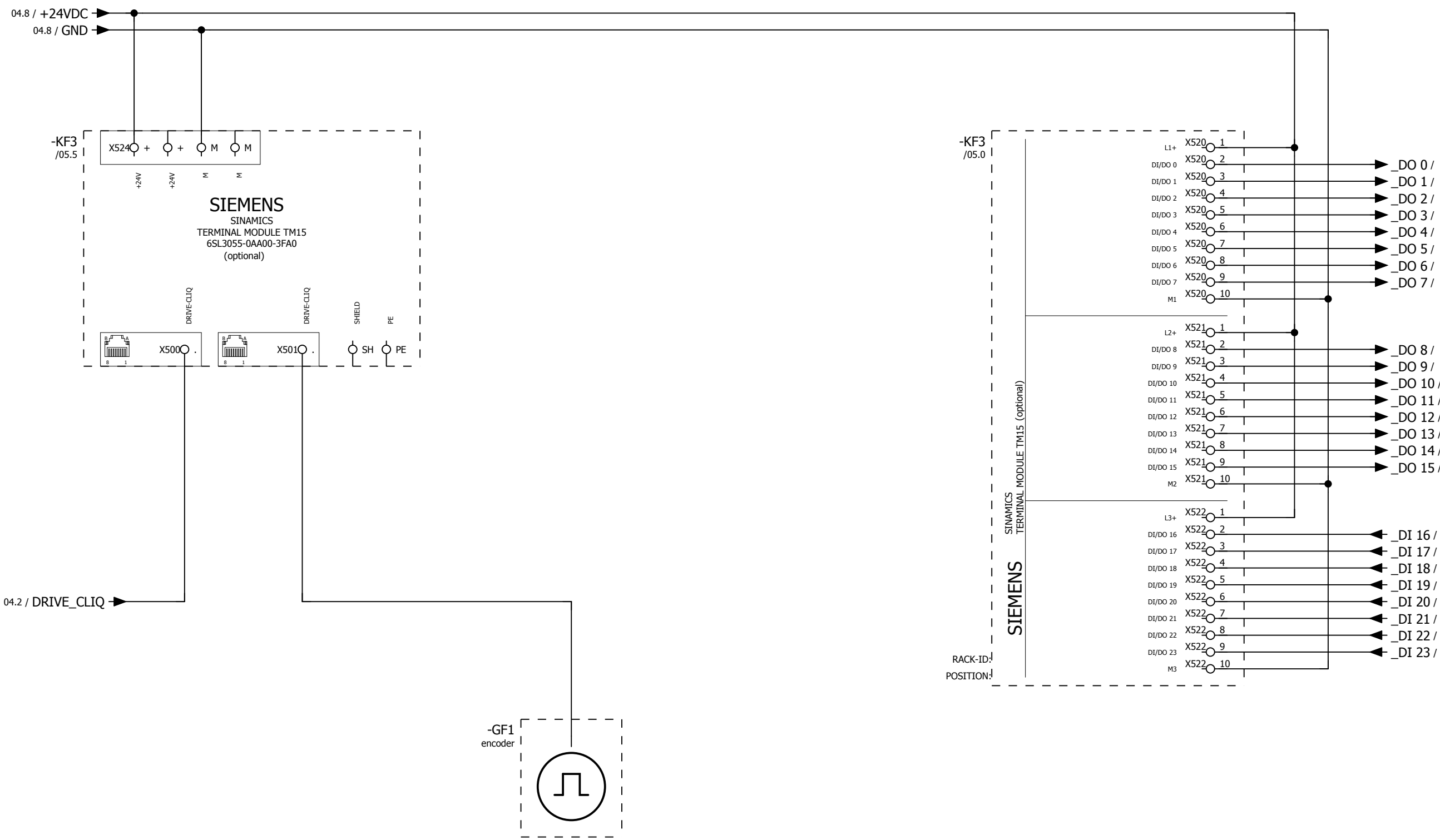
The customer, is responsible for the assessment of risk and for the choice of the switching devices



			Date	10.08.2017	---		= EF2_1ph_0,37kW	
			Ed.	djahn	examples indexer control		+ Sil3	
			Appr		Replacement of		Page 04	
Modification	Date	Name	Original		Replaced by		Page 18	



wiring example SIL3
option TM 15 digital I/O
0,37kW



Date	10.08.2017
Ed.	djahn
Appr	
Modification	Date
	Name
	Original

examples indexer control	
Replacement of	Replaced by

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 Siemensstraße 17
 D-74722 Buchen
 Tel. +49 (0)6281-5208-0

wiring example SIL3
 option TM 15 electronic cam switch
 0,37kW

= EF2_1ph_0,37kW	
+ Sil3	
Page	05
Page	18

13.3 EF2...B V2.1; 1.5 kW to 3.0 kW Controllers connection examples

13.3.1 SIL2 Power Module connection example

see wiring diagram in appendix

13.3.2 SIL2 D410-2 Interface I/O connection example

see wiring diagram in appendix

13.3.3 Connection example, SIL2 interface I/O module TM15 digital I/O (option)

see wiring diagram in appendix

13.3.4 Connection example, SIL2 interface I/O module TM15 cam controller (option)

see wiring diagram in appendix

13.3.5 SIL3 Power Module connection example

see wiring diagram in appendix

13.3.6 SIL3 D410-2 Interface I/O connection example

see wiring diagram in appendix

13.3.7 SIL3 Safety relais connection example

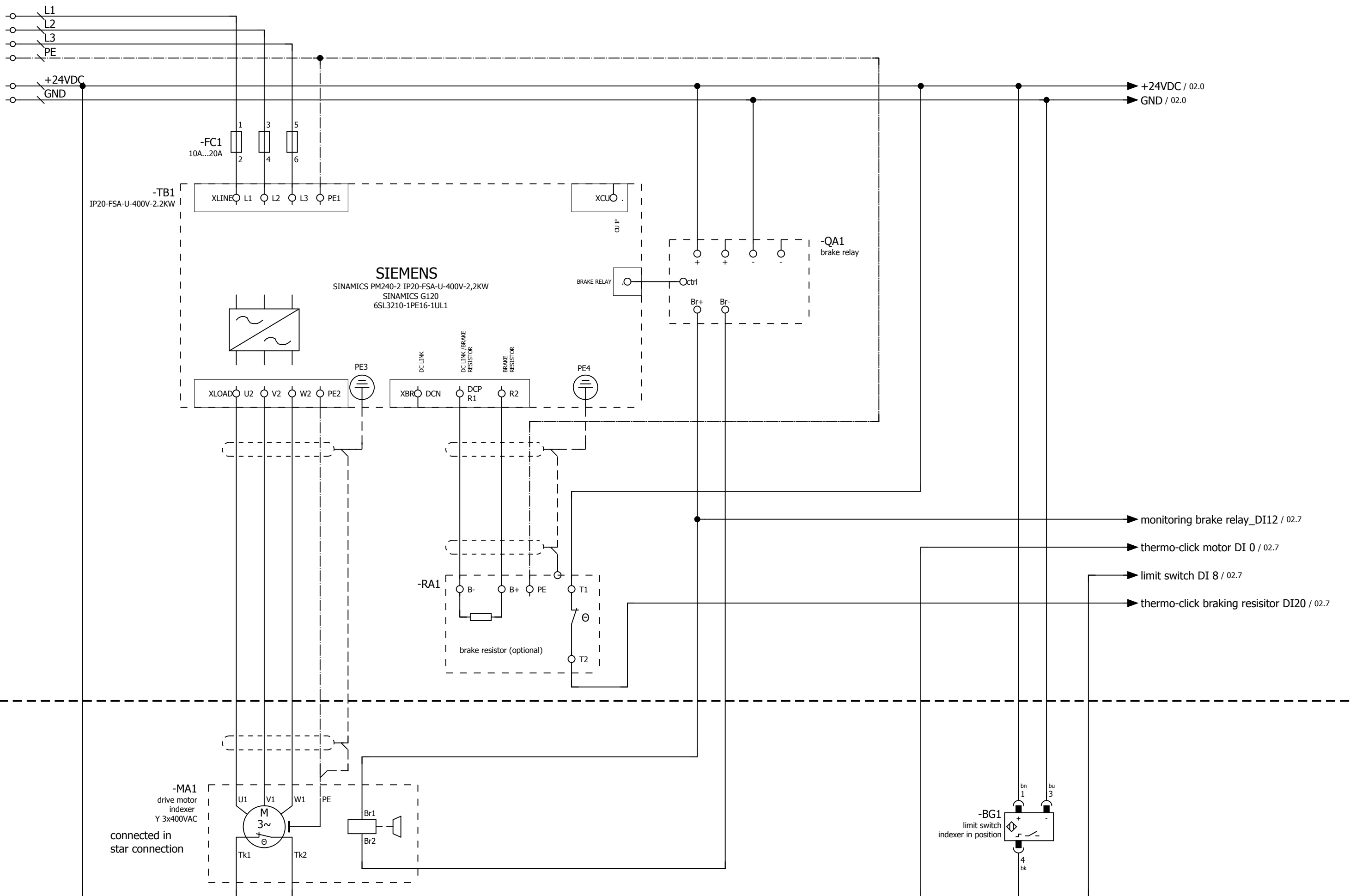
see wiring diagram in appendix

13.3.8 Connection example, SIL3 interface I/O module TM15 digital I/O (option)

see wiring diagram in appendix

13.3.9 Connection example, SIL3 interface I/O module TM15 cam controller (option)

see wiring diagram in appendix



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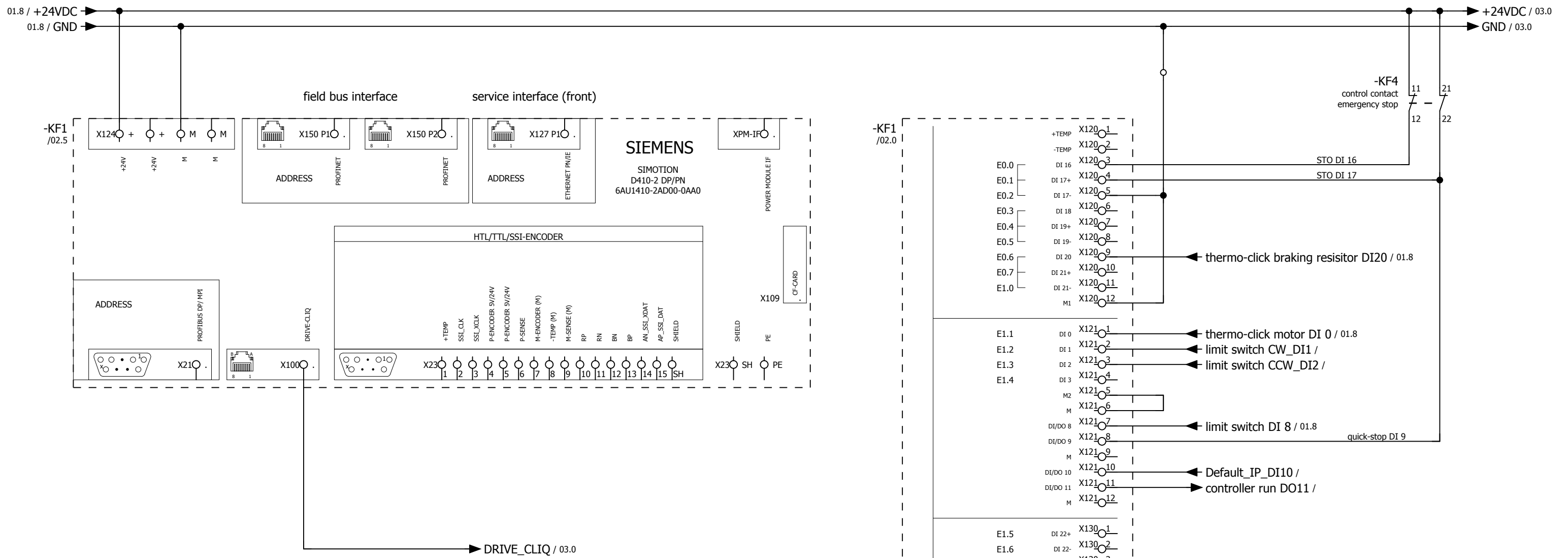
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Modification	Date
Name	Original

examples indexer control	Replacement of	Replaced by
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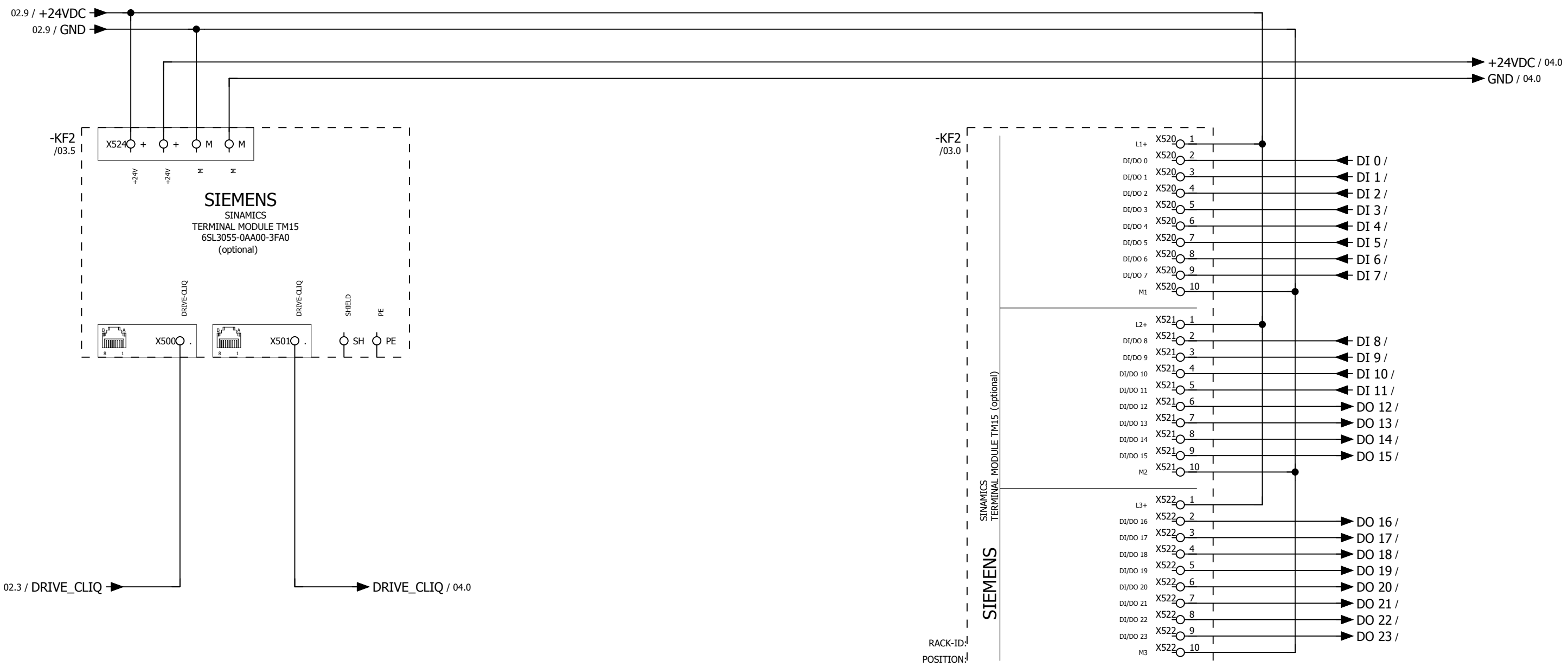
wiring example SIL2 POWER MODUL
1,5-(3)kW

= EF2_3ph_1,5-(3)kW
+ SiI2



The customer, is responsible for the assessment of risk and for the choice of the switching devices

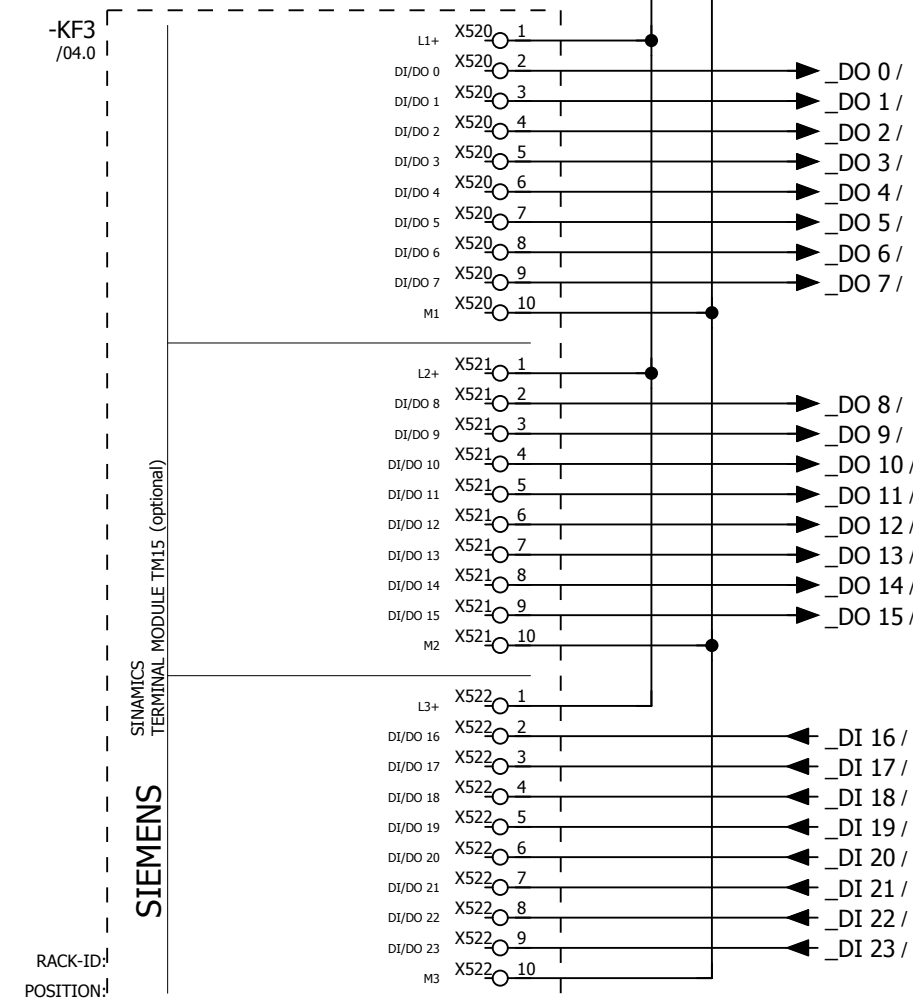
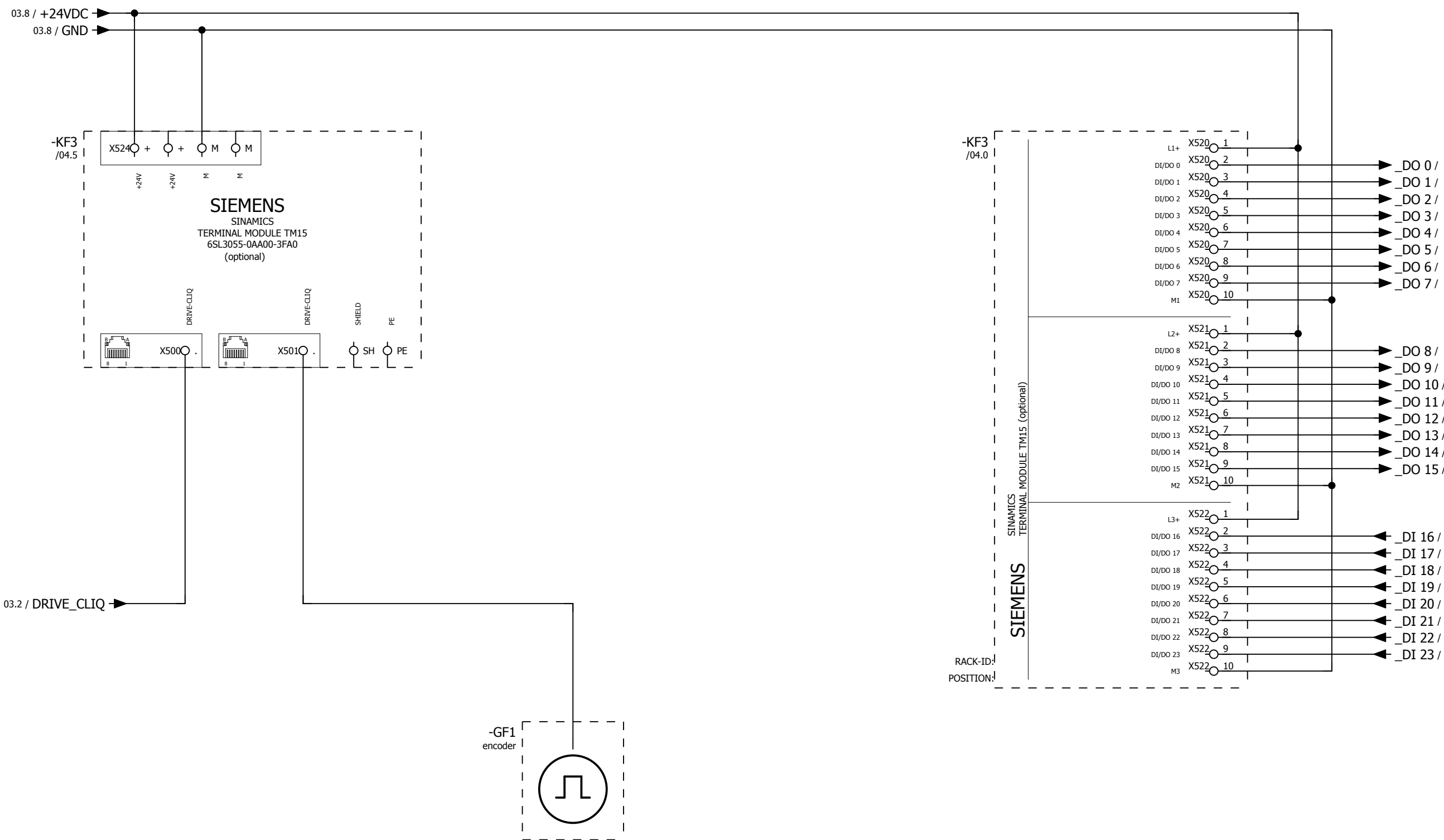
01		03	
Date	26.09.2017	---	
Ed.	djahn		
Appr		examples indexer control	
Modification	Date	Name	Original
		Replacement of	Replaced by
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		wiring example SIL2 D410-2 digital I/O 1,5-(3)kW	
		= EF2_3ph_1,5-(3)kW + Sil2	
		Page	02
		Page	18



		Date	26.09.2017	---				= EF2_3ph_1,5-(3)kW	
		Ed.	djahn	examples indexer control				+ Sil2	
		Appr		Replacement of	Replaced by			Page	03
Modification	Date	Name	Original					Page	18



wiring example SIL2
option TM 15 digital I/O
1,5-(3)kW



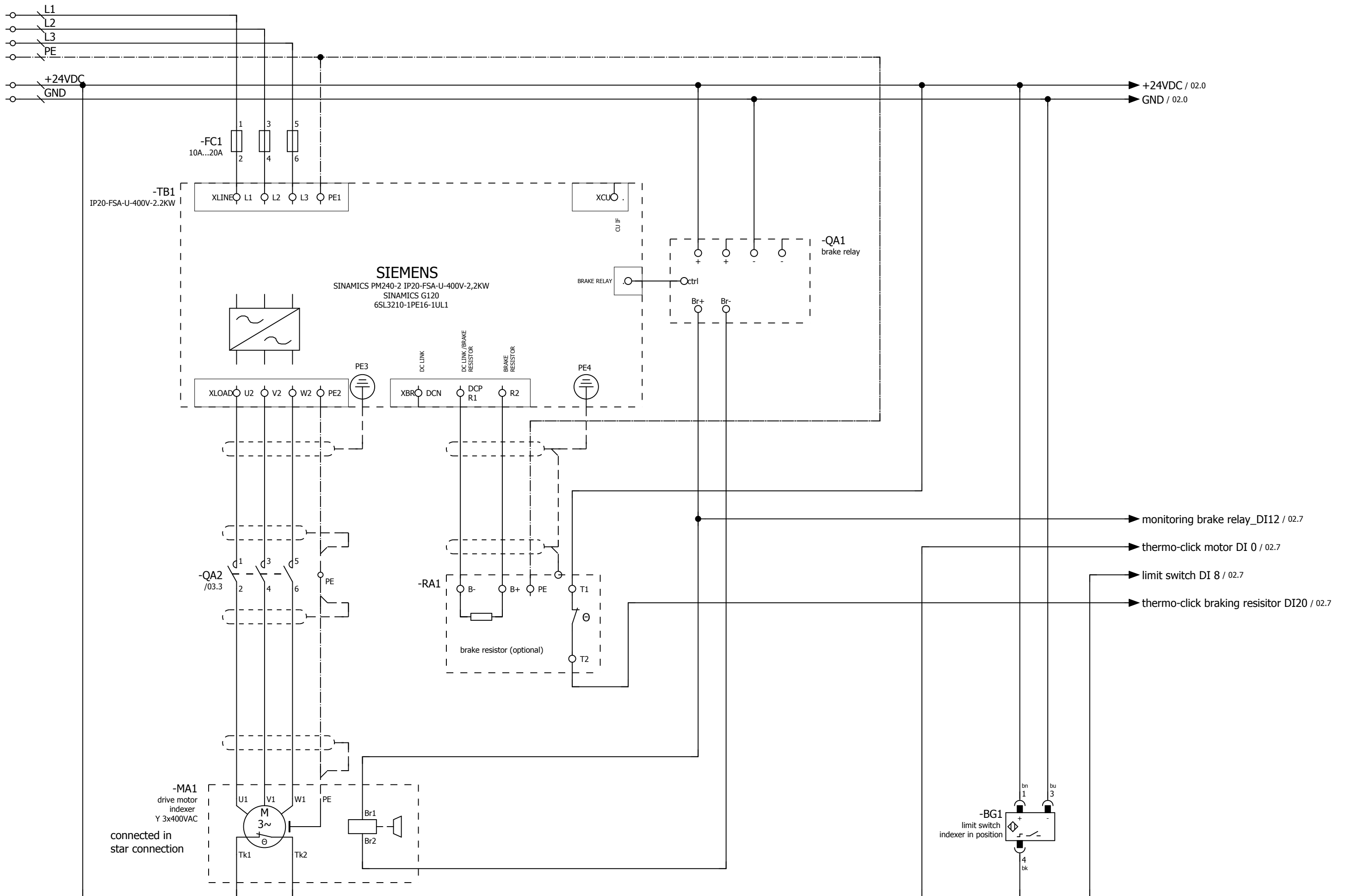
Date	10.08.2017
Ed.	djahn
Appr	
Modification	Date
Name	Original

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wiring example SIL2
 option TM 15 electronic cam switch
 1,5-(3)kW

= EF2_3ph_1,5-(3)kW	Page	04
+ Sil2	Page	18



- monitoring brake relay_DI12 / 02.7
- thermo-click motor DI 0 / 02.7
- limit switch DI 8 / 02.7
- thermo-click braking resistor DI20 / 02.7

+Sil2/04

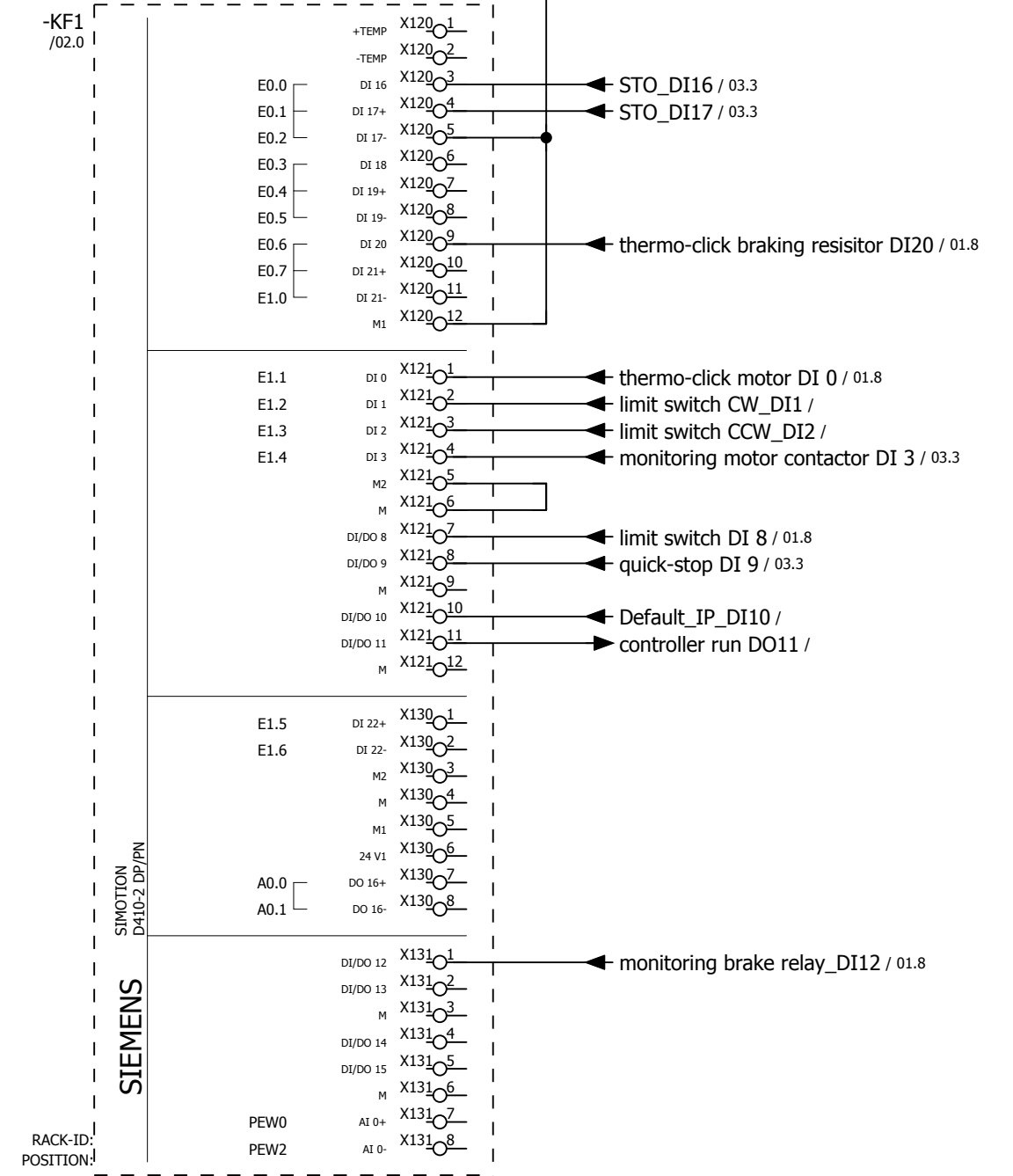
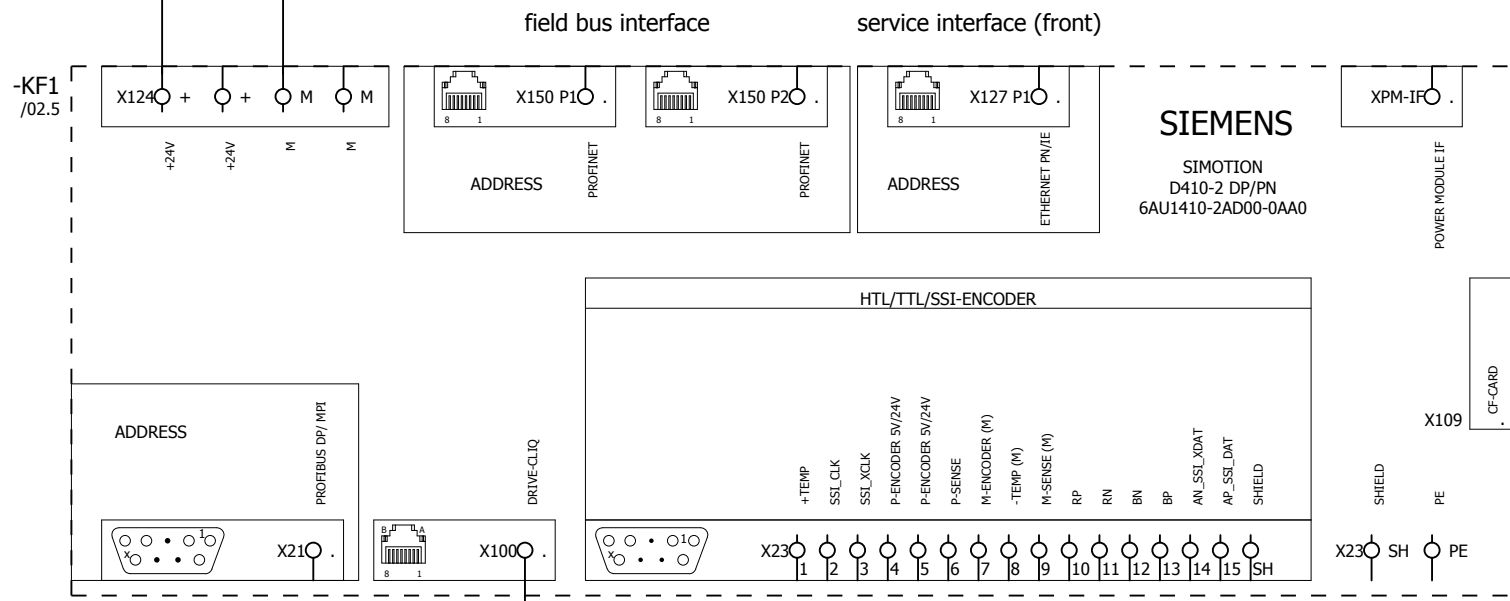
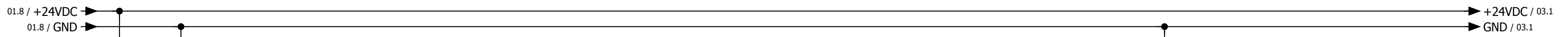
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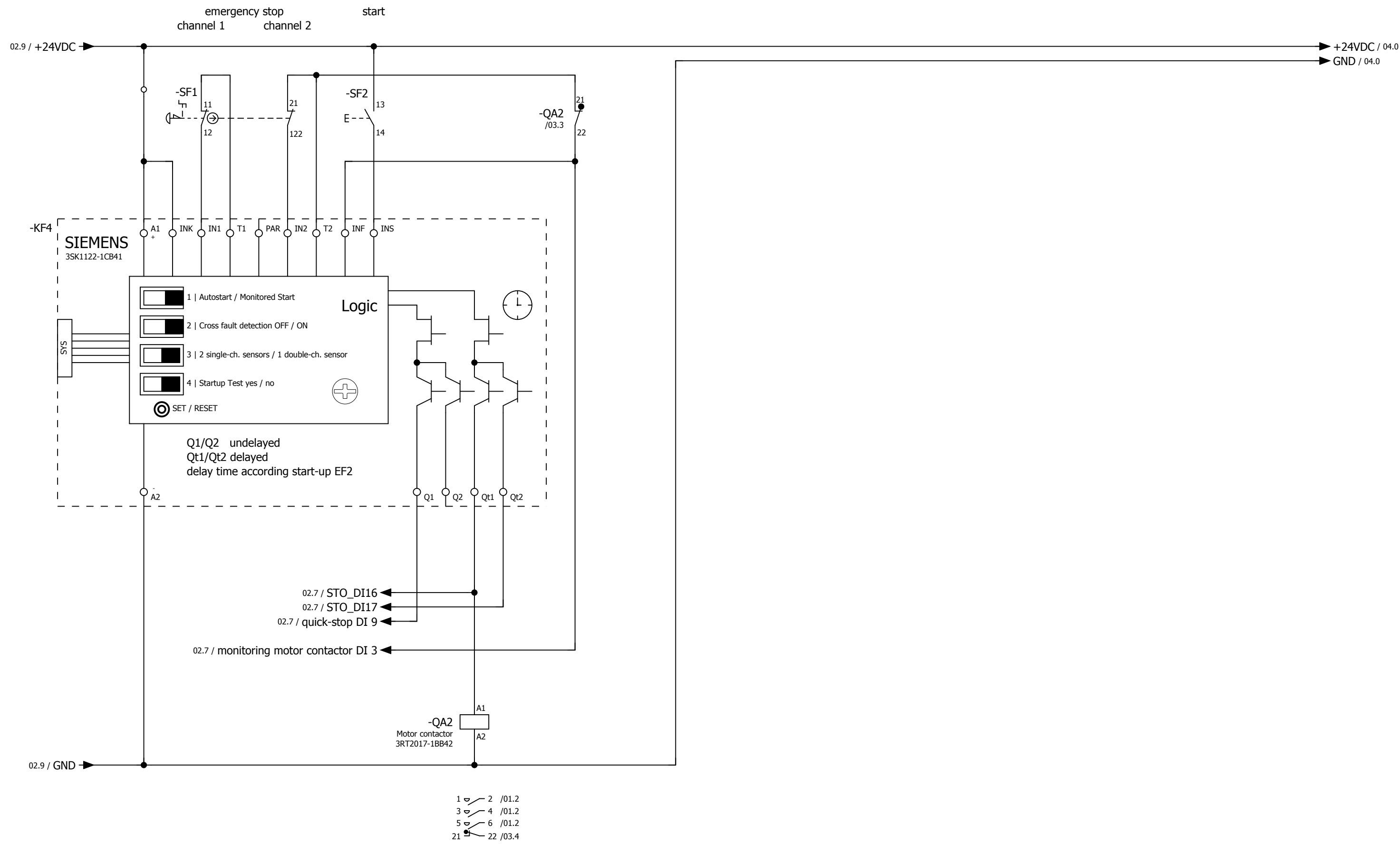
Date	10.08.2017	---
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Modification	Date	Name
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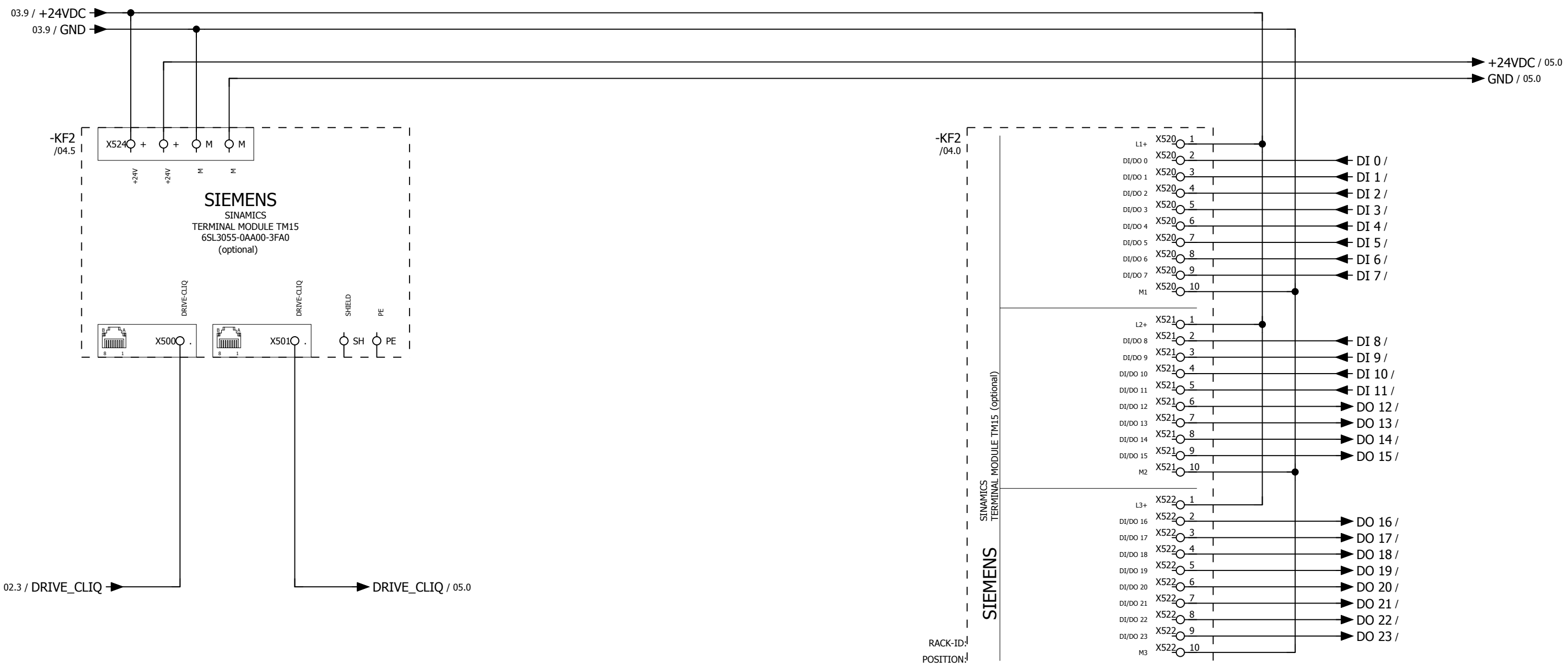
wiring example SIL3 POWER MODUL
 1,5-(3)kW

		= EF2_3ph_1,5-(3)kW
		+ Sil3
		Page 01
		Page 18





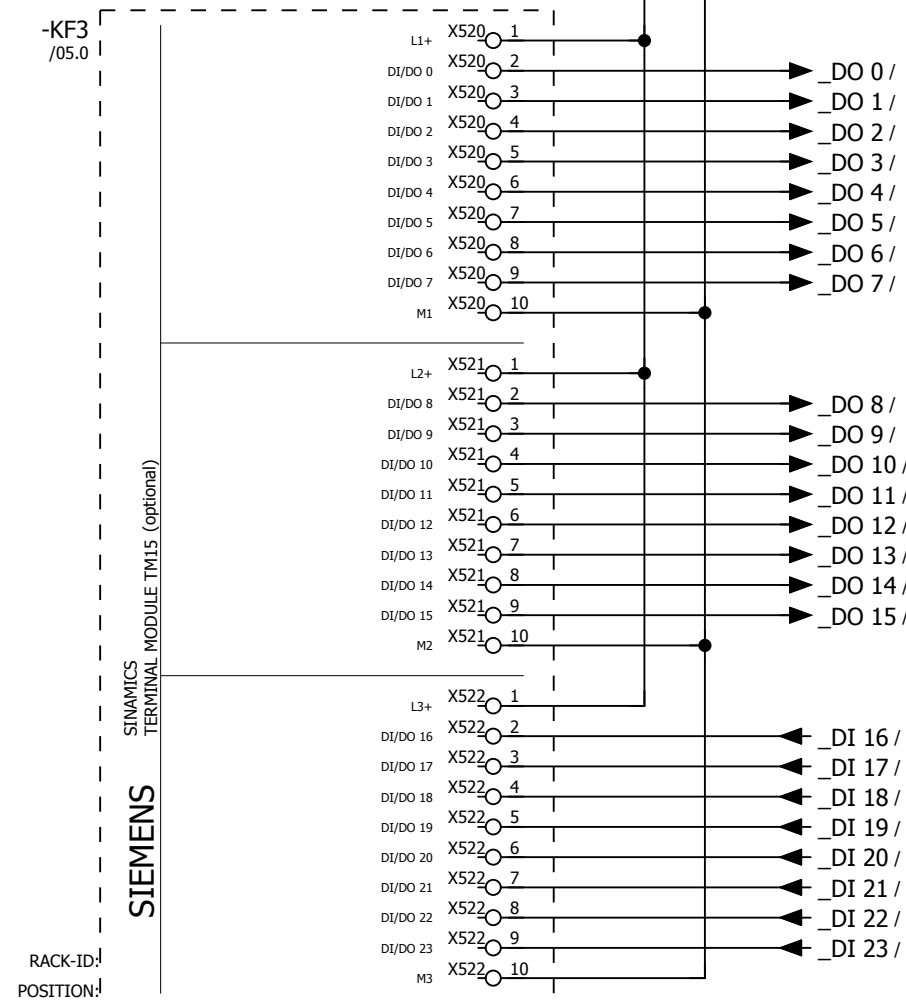
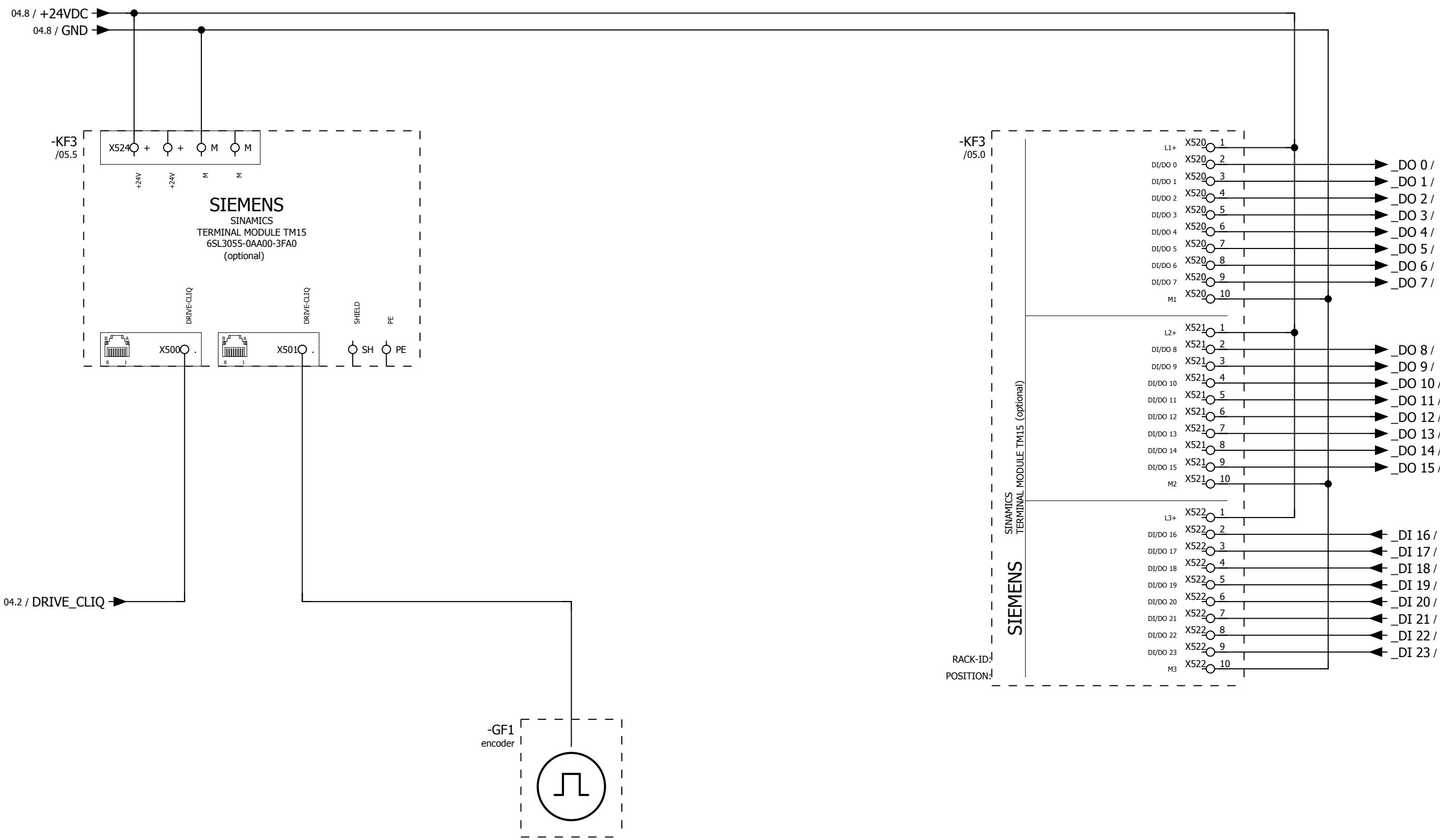
The customer, is responsible for the assessment of risk and for the choice of the switching devices



			Date	26.09.2017	---				= EF2_3ph_1,5-(3)kW	
			Ed.	djahn	examples indexer control				+ Sil3	
			Appr		Replacement of		Replaced by		Page 04	
Modification	Date	Name	Original						Page 18	



wiring example SIL3
option TM 15 digital I/O
1,5-(3)kW



04

Date	26.09.2017		
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Appr			
Modification	Date	Name	Original

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wiring example SIL3
 option TM 15 electronic cam switch
 1,5-(3)kW

= EF2_3ph_1,5-(3)kW		Page	05
+ Sil3		Page	18

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