BECKHOFF New Automation Technology

Operating Instructions | EN

XTS Starter Kit with NCT Functionality

Linear product transport

2024-09-11 | Version 1.4.2

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1 Documentation notes

1.1 Disclaimer

Beckhoff products are subject to continuous further development. We reserve the right to revise the documentation at any time and without notice. No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams, and descriptions in this documentation.

1.1.1 Trademarks

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1.1.2 Patents

The EtherCAT technology is protected by patent rights through the following registrations and patents with the relevant applications and registrations in various other countries:

- EP1590927
- EP1789857
- EP1456722
- EP2137893
- DE102015105702

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH.

1.1.3 Limitation of liability

All components of this product described in the original operating instructions are delivered in a hardware and software configuration, depending on the application requirements. Modifications and changes to the hardware or software configuration that go beyond the documented options are prohibited and nullify the liability of Beckhoff Automation GmbH & Co. KG.

The following is excluded from the liability:

- Failure to comply with this documentation
- Improper use
- Use of untrained personnel
- Use of unauthorized spare parts

1.1.4 Copyright

1.2 Version numbers

Provision of revision levels
On request we can send you a list of revision levels for changes to the documentation.

motion-documentation@beckhoff.com

Origin of the document
This documentation was originally written in German. All other languages are derived from the German original.

Product features
The valid product features are always those specified in the current documentation. Further information given on the product pages of the Beckhoff homepage, in emails or in other publications is not authoritative.

1.3 Scope of the documentation

In addition to this documentation, the following documents are part of the complete documentation:

Translation of the original manual | XTS
Description of the mechanical and electrical parameters as well as all necessary information for the assembly of the XTS system.

Manual | TF5850
Description of the basic software package for the use and integration of the XTS in the TwinCAT 3 environment.

1.4 Staff qualification

This documentation is aimed at trained specialists working in control technology and automation who have knowledge of the applicable and required standards and directives.

Specialists must have knowledge of drive technology and electrical equipment as well as knowledge of safe working on electrical systems and machines. This includes knowledge of proper setup and preparation of the workplace as well as securing the working environment for other persons.

The documentation published at the time must be used for each installation and commissioning. The products must be used in compliance with all safety requirements, including all applicable laws, regulations, provisions and standards.

Instructed person

Instructed persons have a clearly defined task area and have been informed about the work to be carried out. Instructed persons are familiar with:

- the necessary protective measures and protective devices
- the intended use and risks that can arise from use other than for the intended purpose

Trained person

Trained persons meet the requirements for instructed persons. Trained persons have additionally received training from the machine builder or vendor:

- machine-specific or
- plant-specific

Trained specialists

Trained specialists have received specific technical training and have specific technical knowledge and experience. Trained specialists can:

- apply relevant standards and directives
- assess tasks that they have been assigned
- recognize possible hazards
- prepare and set up workplaces

Qualified electricians

Qualified electricians have comprehensive technical knowledge gained from a course of study, an apprenticeship or technical training. They have an understanding of control technology and automation. They are familiar with relevant standards and directives. Qualified electricians can:

- independently recognize, avoid and eliminate sources of danger
- implement specifications from the accident prevention regulations
- assess the work environment
- independently optimize and carry out their work

1.5 Safety and instruction

Read the contents that are related to the activities you will perform with the product. Always read the For your safety chapter in the documentation. Observe the warning notes in the chapters so that you can handle the product and work with it properly and safely.

1.6 Explanation of symbols

Various symbols are used for a clear arrangement:

- ► The triangle indicates instructions that you should execute.
- • The bullet point indicates an enumeration.
- […] The square brackets indicate cross-references to other text passages in the document.
- [1] The number in the square brackets refers to the position in the adjacent figure.
- [+] The plus sign in square brackets indicates ordering options and accessories.

In order to make it easier for you to find text passages, pictograms and signal words are used in warning notices:

⚠ DANGER

Failure to comply will result in serious or fatal injuries.

⚠ WARNING

Failure to comply may result in serious or fatal injuries.

⚠ CAUTION

Failure to comply may result in minor or moderate injuries.

NOTICE

Notes are used for important information on the product. The possible consequences of failure to observe these include:

- product malfunctions
- damage to the product
- damage to the environment

Information
This symbol indicates information, tips, and notes for handling the product or the software.

Examples
This symbol shows examples of how to use the product or software.

Required tool
This symbol indicates a tool that is required for the following steps.

Required accessories [+]
This symbol shows the accessories required for the following steps. The accessories are not included in the scope of delivery and can be ordered from Beckhoff.

Assembly material required
This symbol shows the assembly material required for the following steps. The assembly material is not included in the scope of delivery and must be purchased separately.

Permitted cleaning agents
This symbol indicates the permitted cleaning agents that the components may be cleaned with. The permitted cleaning agents are not included in the scope of delivery and must be purchased separately.

QR codes
This symbol shows a QR code that you can scan to watch videos or animations. Internet access is required in order to use it.

1.7 Beckhoff Services

Beckhoff and its international partner companies offer comprehensive support and service.

www.beckhoff.com/en-en/support/global-availability/

1.7.1 Support services

The Beckhoff Support offers technical advice on the use of individual Beckhoff products and system planning. The support engineers offer you competent assistance, for comprehension questions as well as for commissioning.

+49 5246 963-157
support@beckhoff.com
www.beckhoff.com/en-en/support/our-support-services/

1.7.2 Training offerings

Training in Germany takes place at the Beckhoff branches or, after consultation, at the customer's premises. Beckhoff offers both face-to-face and online training courses.

+49 5246 963-5000
training@beckhoff.com
www.beckhoff.com/en-en/support/training-offerings/

1.7.3 Service offerings

The Beckhoff service experts support you worldwide in all areas of after-sales service.

+49 5246 963-157
service@beckhoff.com
www.beckhoff.com/en-en/support/our-service-offerings/

1.7.4 Headquarters Germany

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info@beckhoff.com
www.beckhoff.com/en-en/

A detailed overview of the Beckhoff locations worldwide can be found at:

www.beckhoff.com/en-en/company/global-presence/

1.7.5 Downloadfinder

In the Download finder you will find configuration files, technical documentation and application reports to download.

www.beckhoff.com/documentations

2 For your safety

Read this chapter containing general safety information. The chapters in these operating instructions also contain warning notices. Always observe the safety instructions for your own safety, the safety of other persons and the safety of the product.

When working with control and automation products, many dangers can result from careless or incorrect use. Work particularly thoroughly, not under time pressure and responsibly towards other people.

2.1 General safety instructions

This chapter provides you with instructions on safety when handling the product. This product is not capable of stand-alone operation and is therefore categorized as an incomplete machine. The product must be installed in a machine or plant by the machine manufacturer. Read the documentation prepared by the machine manufacturer.

2.1.1 Before operation

Hazard resulting from magnetic fields
The magnetic fields of some of the components are dangerous to:

- People fitted with cardiac pacemakers
- People with magnetically conducting implants
- Implanted and external defibrillators
- Magnetic data storage devices, chip cards with magnetic strips and other electronic devices

Maintain a safety distance to all magnetic parts and prevent direct contact between magnetic parts and parts that are sensitive to interference.

Observe the requirements of BGV B 11 for electromagnetic fields (Germany) and applicable national regulations in other countries.

Use output voltages SELV / PELV
Operate all electronic modules and components in the drive system only with a SELV (Safety Extra Low Voltage) or PELV (Protective Extra Low Voltage) output voltage.

Keep the surroundings clean
Keep your workplace and the surrounding area clean. Ensure safe working.

Secure the control cabinet
When working on machines, secure the control cabinet against inadvertent power-up.

Do not use damaged components
Observe the specifications in the technical data during storage, transport, and operation. Do not use damaged components.

Check safety pictograms
Check whether the designated pictograms are on the product. Replace missing or illegible stickers.

Observe tightening torques
Install connections and components in compliance with the specified tightening torques and check them regularly.

Ground electrical components or modules correctly
Do not touch electrical components or modules unless you are wearing protective ESD clothing. Only walk on conductive floors.

Only use original packaging for further processing
When shipping, transporting, storing, and packing, use the original packaging or conductive materials.

2.1.2 During operation

Observe the GND concept
Special conditions need to be observed for the grounding of the XTS. Further information can be found in chapter Earthing of the supply.

Do not work on live electrical parts
Ensure that the protective conductor is properly connected. Never disconnect electrical connections while they are live. Only work on the XTS when the voltage has dropped to < 10 V. Disconnect all components from the mains and secure against reconnection.

Do not touch hot surfaces
Check cooling of the surfaces with a thermometer. Do not touch the components during operation. Allow the components to cool down for at least 15 minutes after switching off.

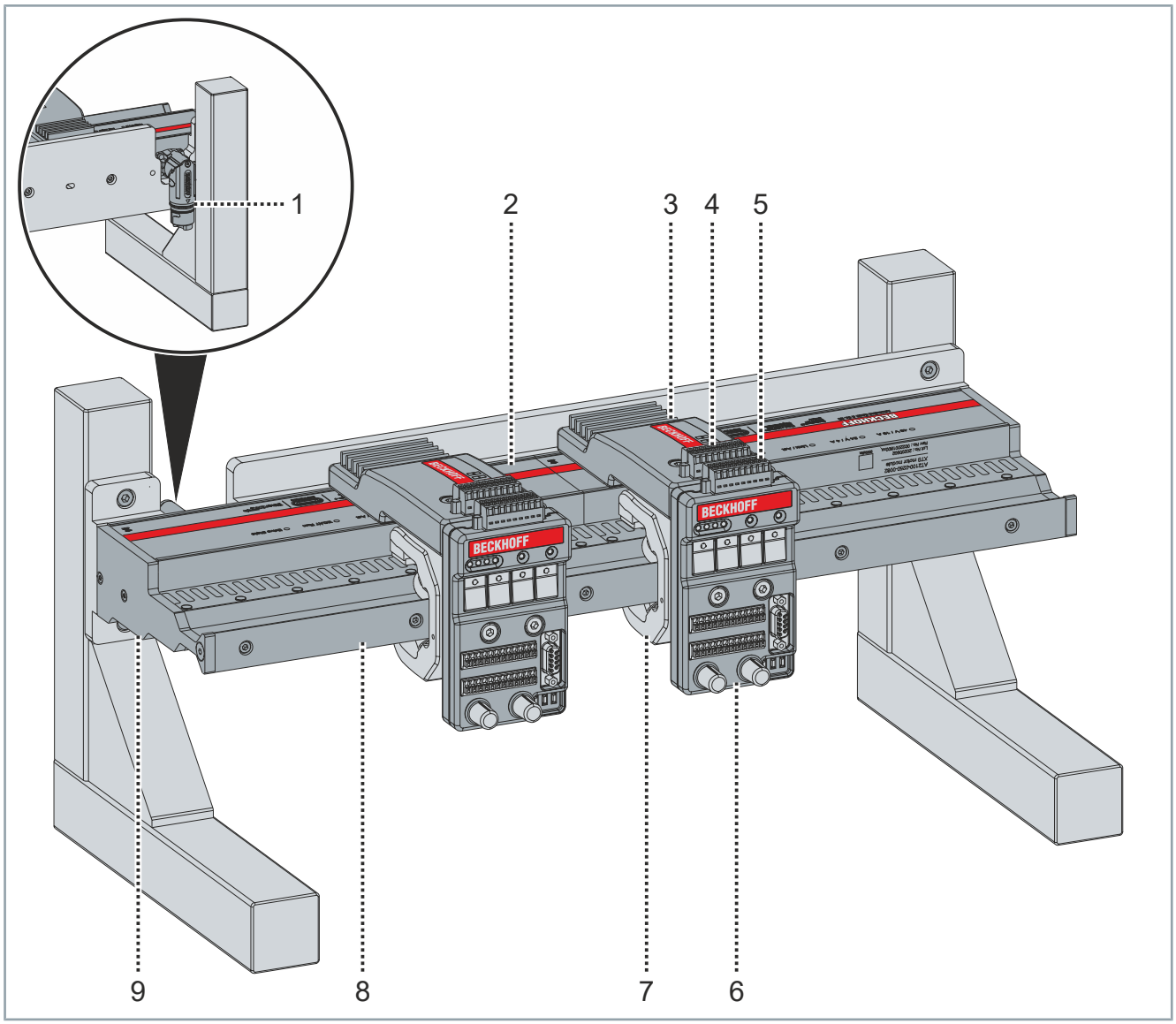
Avoid overheating
Operate the components according to the technical specifications. Further information can be found in chapter Technical data. Ensure sufficient cooling and switch off the components immediately if the temperature is too high.

Do not touch any moving or rotating components
Do not touch any moving or rotating components. Fasten all parts or components on the machine or plant.

2.1.3 After operation

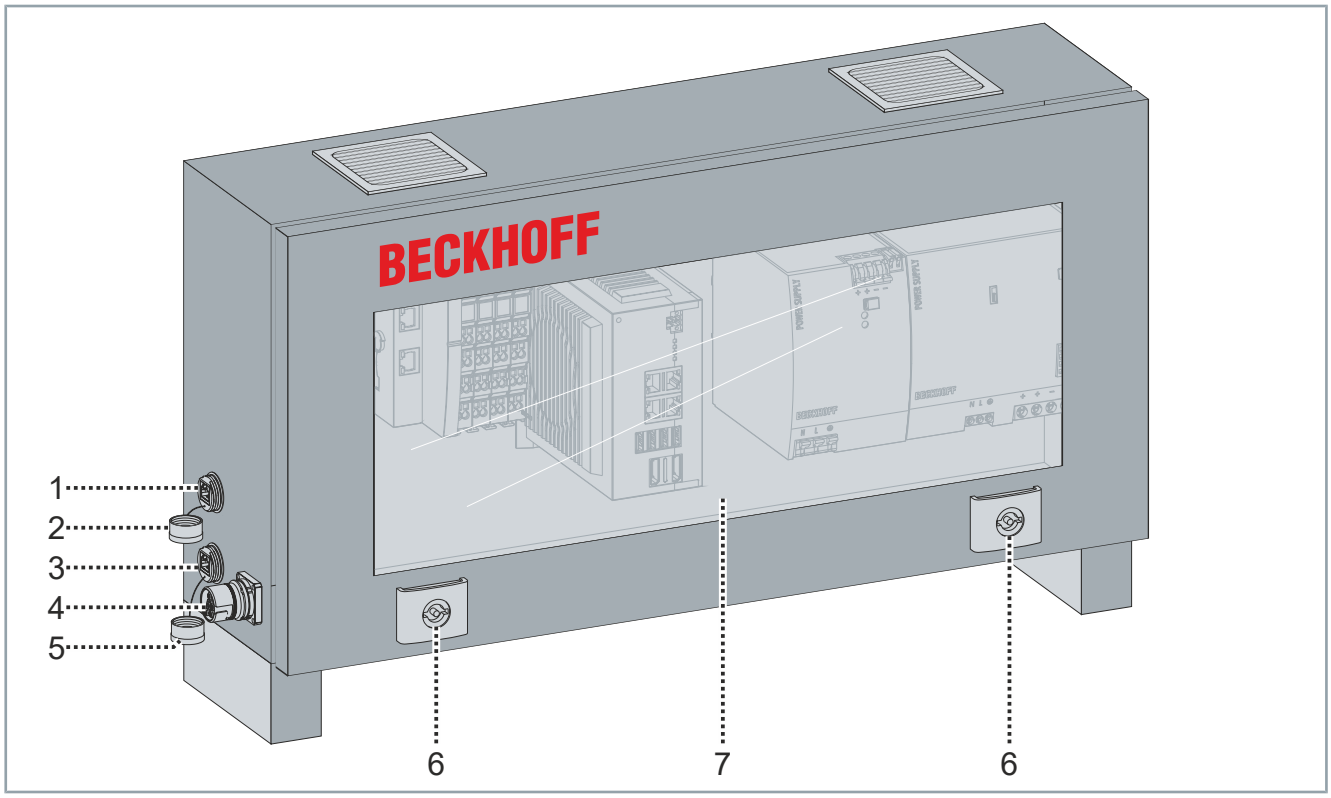
De-energize and switch off components before working on them
Carry out a voltage test and check all safety-relevant devices for functionality. Secure the working environment and the control cabinet against inadvertent power-up. For more information, see the chapters Decommissioning.

3 Product overview



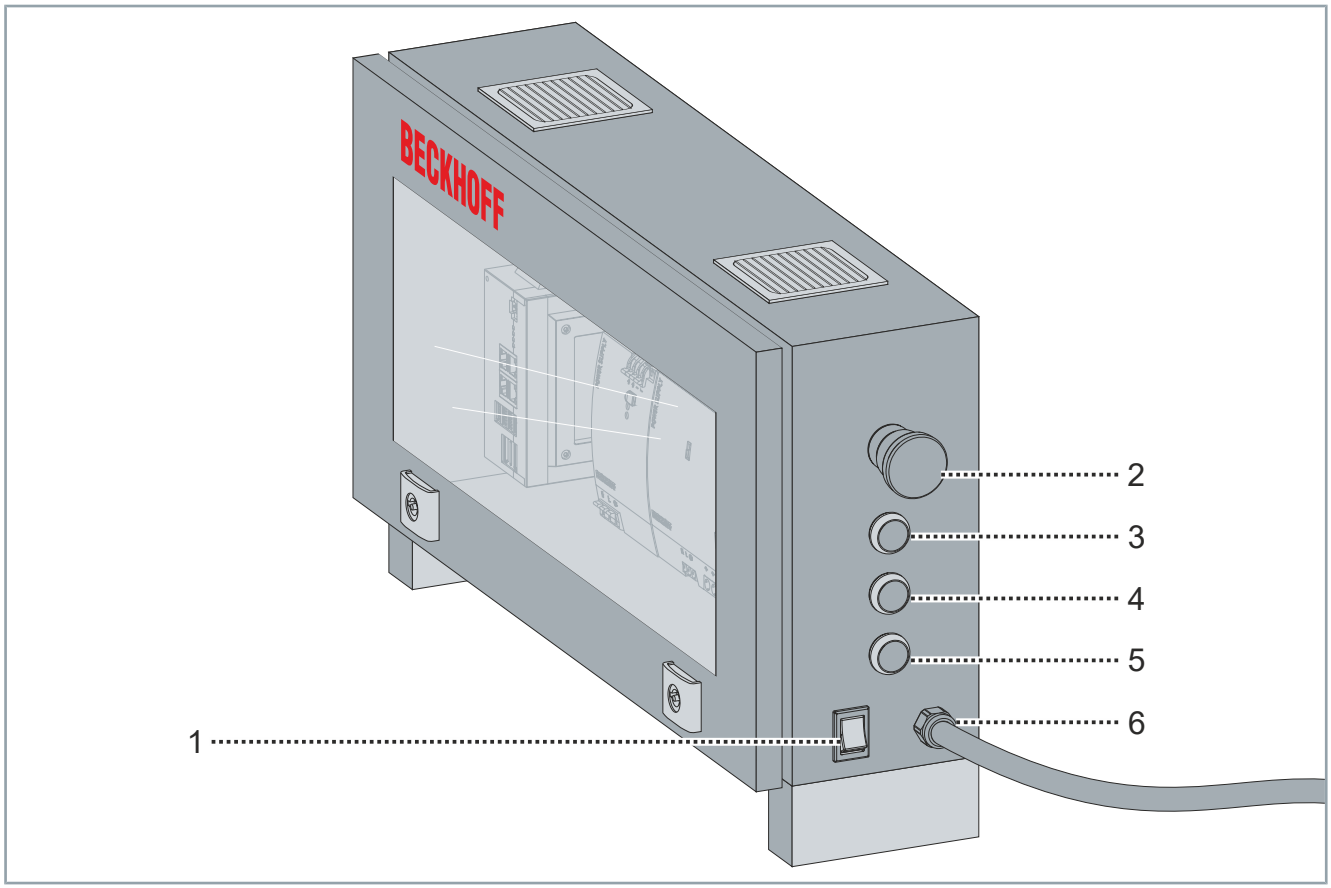
Position	Designation
1	Connector
2	Straight motor module with integrated NCT functionality
3	Basic electronics
4	2 x 9 connection strip basic electronics
5	2 x 9 connection strip test board
6	Test board
7	Mover
8	Guide rail
9	End cap

3.1 Control cabinet part 1



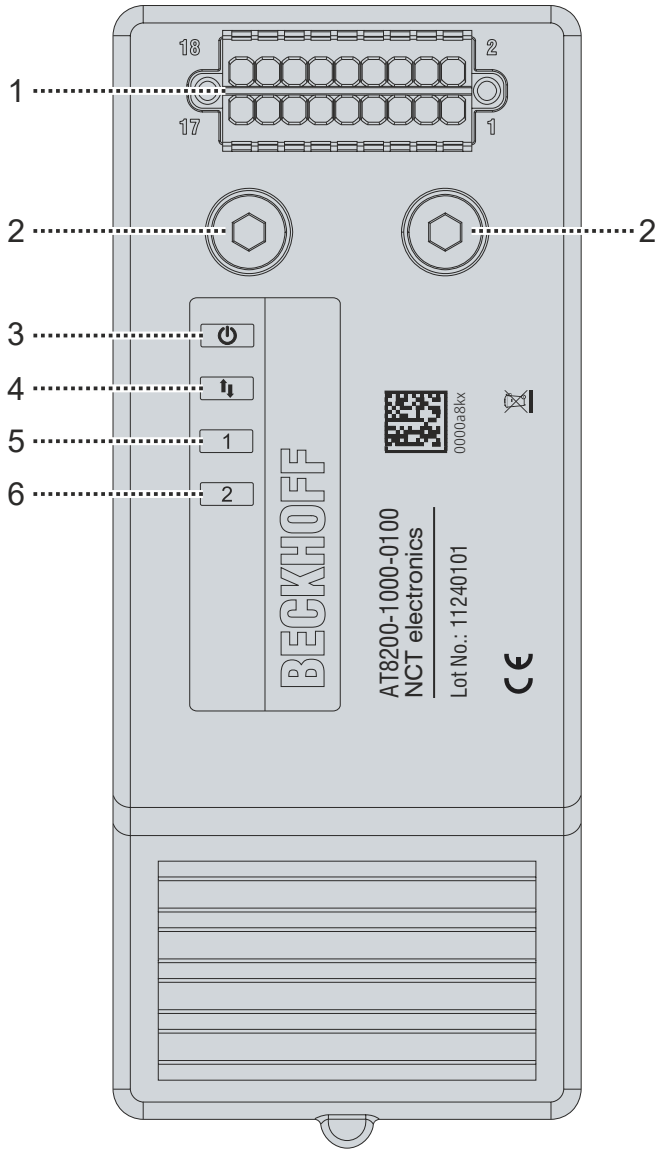
Position	Designation
1	RJ45 connector for data line
2	Cap for RJ45 connector
3	RJ45 connector for additional I/Os
4	Connector for connecting cable
5	Cap for RJ45 connector
6	Locking control cabinet door
7	Window in control cabinet door

3.2 Control cabinet part 2



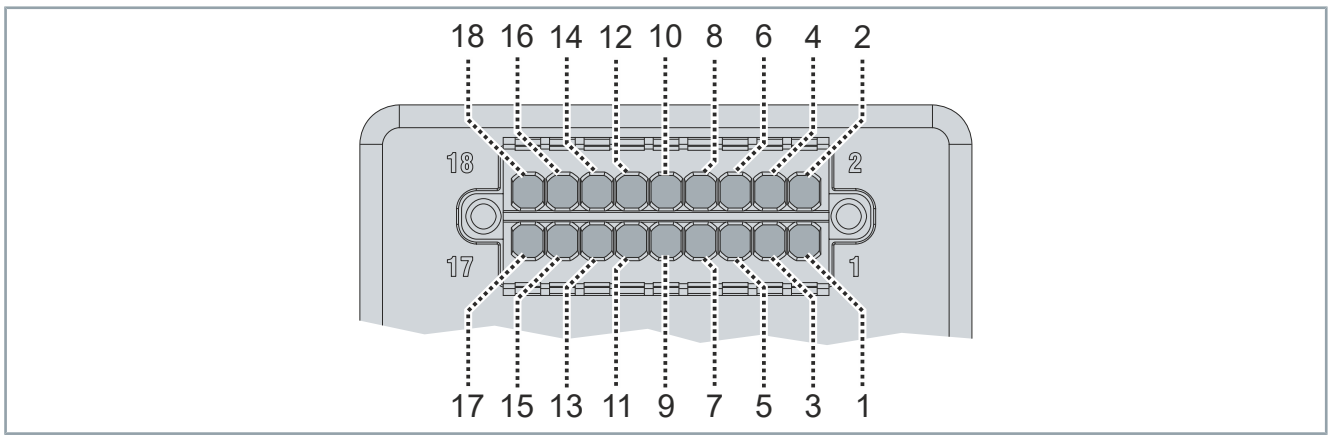
Position	Designation
1	On/off switch
2	Emergency stop button
3	Start button
4	Stop button
5	Reset button
6	Power supply

3.3 NCT electronics



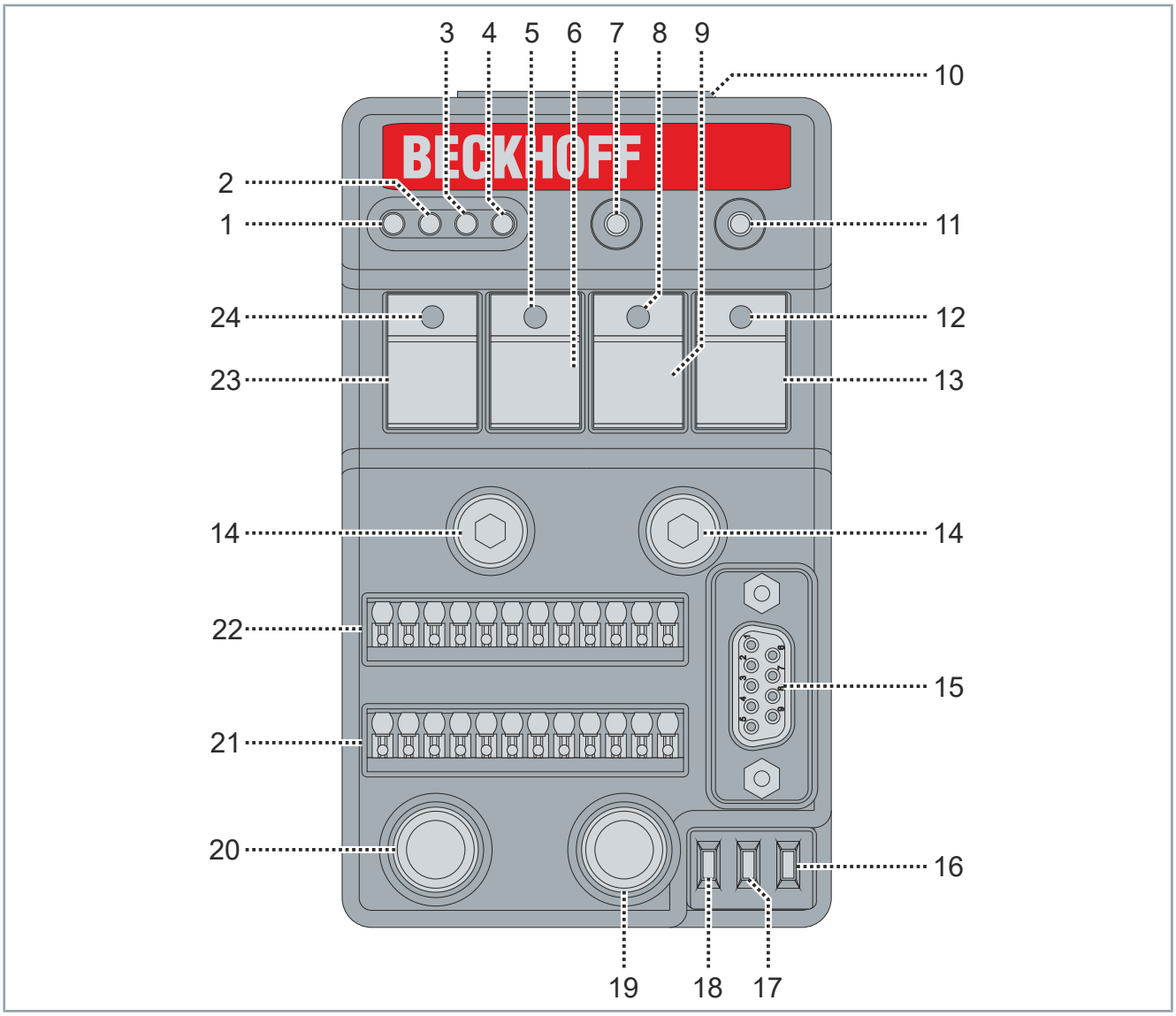
Position	Name
1	2 x 9 NCT electronics connection strip
2	Fastening screw M6 x 25
3	Power LED
4	Communication LED
5	LED 1 Use input and output, adjustable
6	LED 2 Diagnostic data available, adjustable

3.3.1 2 x 9 NCT electronics connection strip



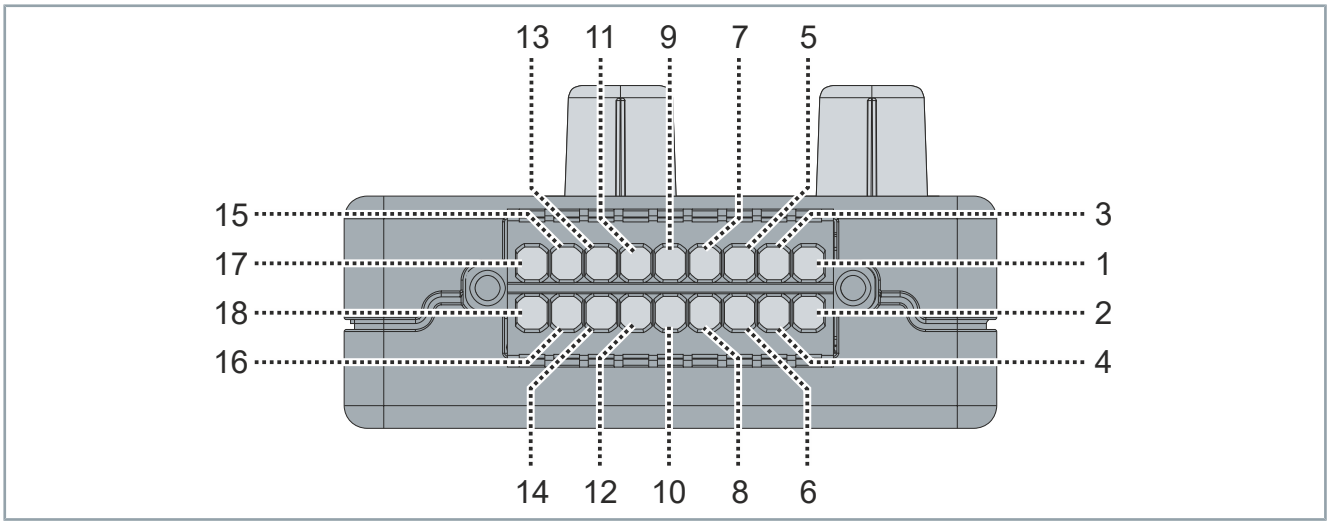
Position	Name
1	Digital input 1
2	Digital input 3 / analog input 1
3	Digital input 2
4	Digital input 4 / analog input 2
5	Digital output 1
6	Digital output 3
7	Digital output 2
8	Digital output 4
9	*Not yet occupied.*
10	*Not yet occupied.*
11	*Not yet occupied.*
12	*Not yet occupied.*
13	Ground
14	24 V
15	PWM output 1
16	Ground
17	PWM output 2
18	PWM output 3

3.4 Test board



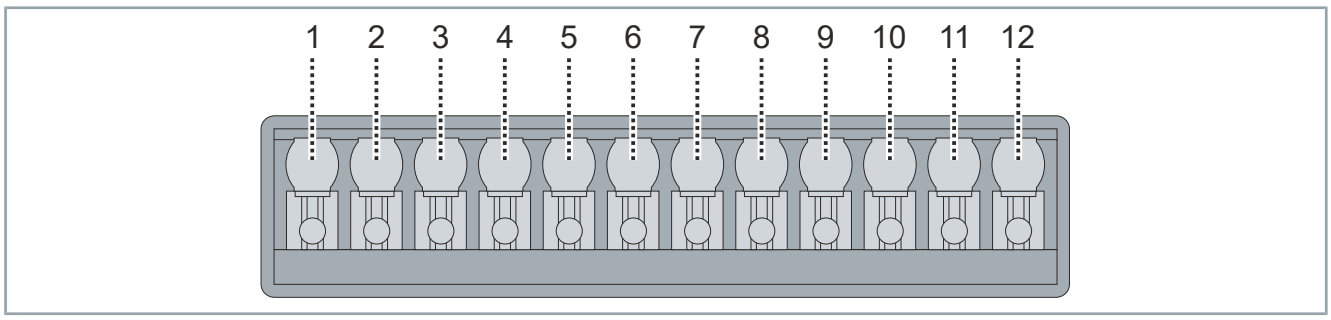
Position	Designation
1	LED 1: digital output 1
2	LED 2: digital output 2
3	LED 3: digital output 3
4	LED 4: digital output 4
5	LED button 2: button feedback 2
6	Button 2: digital input 2
7	LED 24 V
8	LED button 3: button feedback 3
9	Button 3: digital input 3
10	2 x 9 connection strip test board
11	RGB LED: PWM outputs
12	LED button 4: button feedback 4
13	Button 4: digital input 4
14	Fastening screw M6 x 20
15	*Not yet occupied.*
16	Switch 3: 5 V RS232 ON/OFF. Lower position: ON
17	Switch 2: digital input 3 or analog input 1. Lower position: potentiometer on
18	Switch 1: digital input 4 or analog input 2. Lower position: potentiometer on
19	Potentiometer 2: 0 to 10 V potentiometer, analog input 2
20	Potentiometer 1: 0 to 10 V potentiometer, analog input 1
21	Connection strip 2
22	Connection strip 1
23	Button 1: digital input 1
24	LED button 1: button feedback 1

3.4.1 2 x 9 connection strip test board



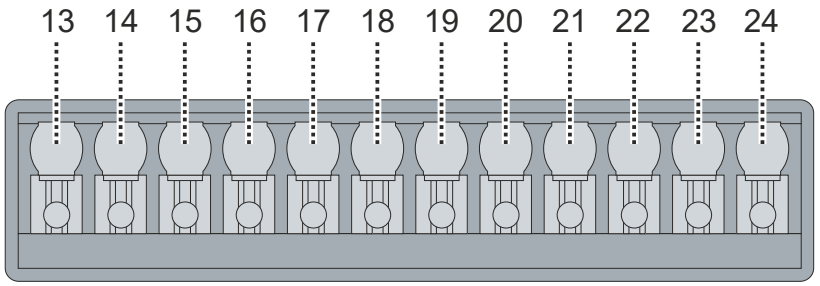
Position	Designation
1	Digital input 1
2	Digital input 3 / analog input 1
3	Digital input 2
4	Digital input 1 / analog input 2
5	Digital output 1
6	Digital output 3
7	Digital output 2
8	Digital output 4
9	*Not yet occupied.*
10	*Not yet occupied.*
11	*Not yet occupied.*
12	*Not yet occupied.*
13	Ground
14	24 V
15	PWM output 1
16	Ground
17	PWM output 2
18	PWM output 3

3.4.2 Connection strip 1 test board



Position	Designation
1	24 V
2	24 V
3	Ground
4	Ground
5	Digital output 1
6	Digital output 2
7	Digital output 3
8	Digital output 4
9	Ground
10	PWM output 1
11	PWM output 2
12	PWM output 3

3.4.3 Connection strip 2 test board

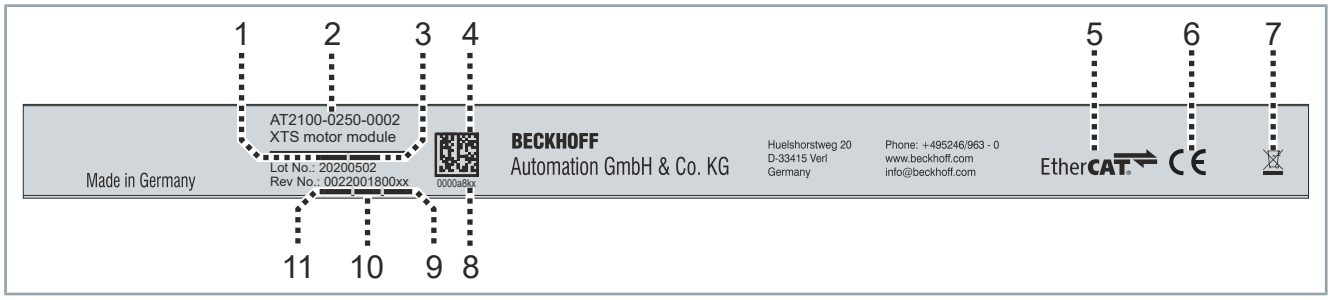


Position	Designation
13	Potentiometer 2
14	Potentiometer 1
15	Digital input 1
16	Digital input 2
17	Digital input 3
18	Digital input 4
19	24 V
20	*Not yet occupied.*
21	*Not yet occupied.*
22	5 V
23	*Not yet occupied.*
24	*Not yet occupied.*

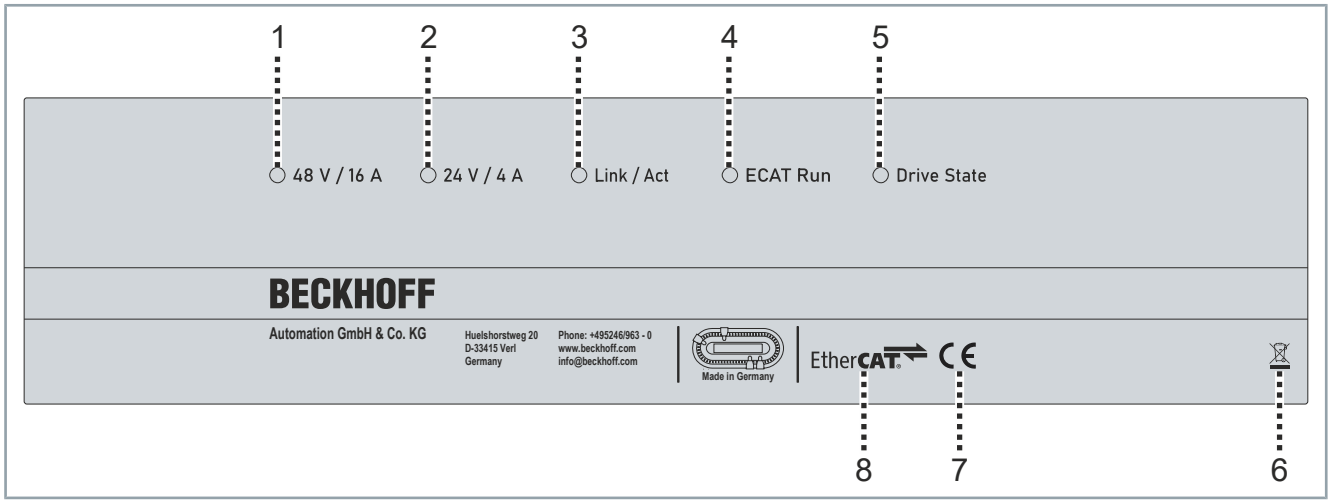
3.5 Name plate

3.5.1 Motor module

The name plate of motor modules with integrated NCT functionality is divided into two parts.

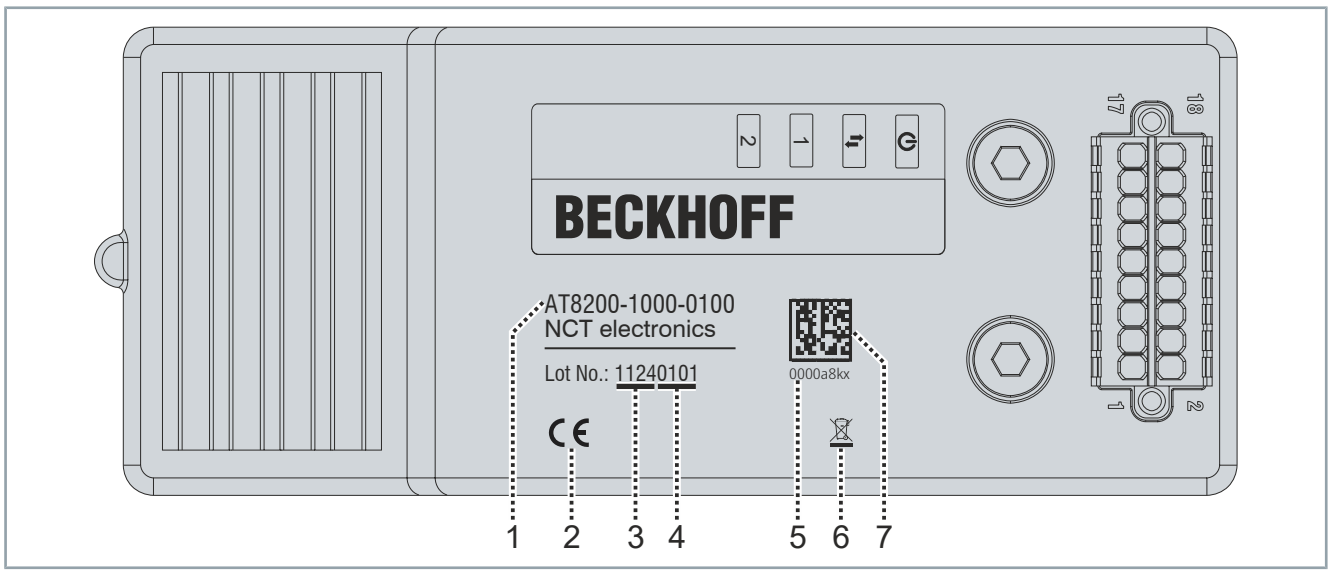


Position	Designation
1	Date of manufacture - week/year
2	Product designation
3	Firmware and hardware revision
4	DataMatrix code
5	EtherCAT marking
6	CE conformity
7	WEEE compliance
8	BTN - Beckhoff Traceability Number
9	XML sensor PCB revision number
10	XML revision number NCT board
11	XML motor PCB revision number



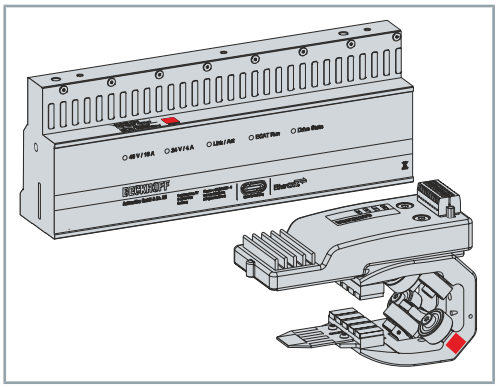
Position	Designation
1	Status LEDs supply voltage 48 V | 16 A
2	Status LEDs control voltage 24 V | 4 A
3	Link / Act status LED
4	Status LED ECAT Run
5	Drive State status LED
6	WEEE compliance
7	CE conformity
8	EtherCAT marking

3.5.2 Basic electronics



Position	Name
1	Product designation
2	CE conformity
3	Date of manufacture - week/year
4	Firmware and hardware revision
5	BTN - Beckhoff Traceability Number
6	WEEE compliance
7	DataMatrix code

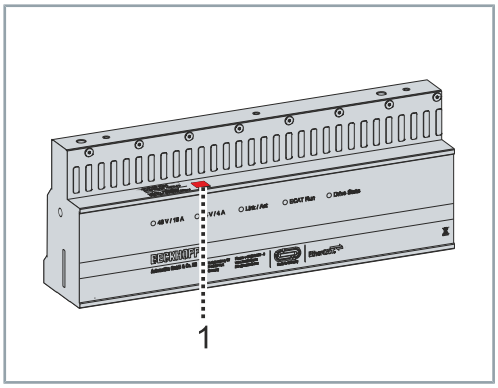
3.6 DataMatrix code



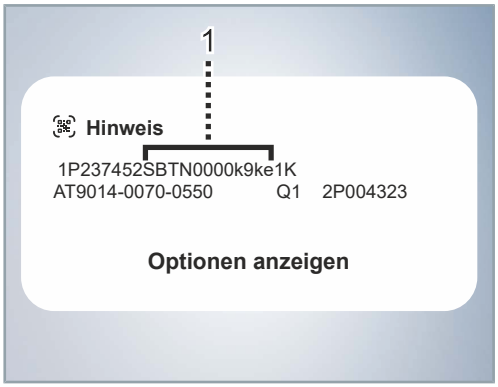
The DataMatrix code can be found on all movers and modules. If there is no Beckhoff Traceability Number (BTN) under the DataMatrix code, you can read it out via the DataMatrix code.

For example, you can read the DataMatrix code with the camera of your smartphone or tablet.

Example scan on a straight module
This example shows how to read the BTN on a smartphone screen after a scan.



► Scan the DataMatrix code [1]



► Read the BTN [1] from the screen of your end device via the camera or the reader app

3.7 Type key

3.7.1 XTS starter kit with NCT functionality

AT2100–001x	Explanation
AT	*Product area* • AT = drive technology
2100	*Product type* • 2100 = starter kit
001	*System type* • 001 = open end
x	*Product length* • 1 = 500 mm • 2 = 1000 mm

3.7.2 Motor module

AT21xx–0250	Explanation
AT	*Product area* • AT = drive technology
2	*Product type* • 2 = module
1	*Module type* • 1 = with integrated NCT functionality
xx	*Module variants* • 00 = straight • 02 = straight, with connector for power supply
0250	*Module length* • 0250 = 250 mm

3.7.3 Mover

AT8300-1x00	Explanation
AT	*Product area* • AT = drive technology
8300	*Product type* • 8300 = Mover with NCT electronics fitted
1x00/	*Base mover* • 0 = AT9014-1070-0550 • 1 = AT9014-1070-1550

NCT electronics

AT 8200–1000	Explanation
AT	*Product area* • AT = drive technology
8200	*Product type* • 8200 = NCT electronics, basic electronics
1000	*Suitable for base movers* • 1000 = AT9014-1070-x550

Base mover

AT9014-1070-x550	Explanation
AT	*Product area* • AT = drive technology
90	*Product type* • 90 = mover
14	*Roll variant* • 14 = 6 rollers, 2 of which are spring-loaded
10	*Mover type* • 10 = suitable for mounting the NCT electronics
70	*Length of the mover* • 70 = 70 mm
x	*Identifier of the magnetic plate set* • 0 = standard • 1 = mover 1
5	*Number of poles of the magnetic plate set* • 5 = 5 poles
50	*Length of the magnetic plate set* • 50 = 50 mm

3.8 Product characteristics

Permanent magnets

The permanent magnets used are made of a hard magnetic material. The permanent magnets develop high forces even in small designs. They enable the precise and highly dynamic positioning of the movers.

Scalable travel path

The number of installed modules is variable. The length of the travel path can be adapted to any application.

Rail system

The best combination of several rail systems and movers can be selected for each application.

Armature short circuit brake

In the case of an emergency stop the movers can optionally be decelerated by means of an armature short-circuit.

Integrated power electronics

The entire power electronics is integrated in the modules. A 24 V_{DC} control voltage and a 48 V_{DC} load voltage are required to supply the modules.

Software-based control

The XTS is controlled by a software-based cascade control. The control loop structure is stored in the XTS drivers and is calculated cyclically on the control IPC. No additional drive software is required.

Programming according to IEC 61131-3

The standardized *Motion Control* function blocks according to the PLC Open standard *IEC 61131-3* are available for the programming of the XTS.

3.9 Intended use

The XTS may be operated exclusively for the activities foreseen and defined in this documentation, taking into account the prescribed environmental conditions.

The components must be installed in electrical systems or machines and may only be put into operation as integrated components of the system or machine.

All components of the XTS are intended only to be programmed and commissioned with the help of the Beckhoff TwinCAT automation software.

Read the entire drive system documentation:

- This translation of the original instructions
- Translation of the original instructions for the control computer

3.9.1 Improper use

Any use exceeding the permissible values specified in the Technical data is considered improper and therefore prohibited.

The Standard XTS is not suitable for use in the following areas:

- in ATEX zones without a suitable housing
- in areas with aggressive environments, for example aggressive gases or chemicals

The relevant standards and directives for EMC interference emissions must be complied with in residential areas.

4 Technical data

Below you will find definitions of terms, environmental conditions and operating specifications as well as technical data.

4.1 Definition

All details relate to an ambient temperature of 25 °C. The data can have a tolerance of +/- 10 %.

4.1.1 Technical terms

Nominal force F_0 [N]

Nominal force that a mover can continuously apply.

Force constant K_F [N/A]

Specification of how much force [N] the mover generates with a certain mover current.

$F_0 = I_{0Mover} \cdot K_F$

Voltage constant K_E [Vs/m]

Induced motor EMF related to 1 m/s as a peak sine value on a motor coil.

Thermal time constant tTH [min]

Specification of the heating time of the cold module when loaded with the nominal force until 63 % of the maximum overtemperature is reached. This temperature rise happens in a much shorter time when the motor is loaded with the peak current.

Absolute accuracy [mm]

Specification of the difference between an expected set position and the mean value of the actual position resulting from approaching the set position from different directions (multi-directional). The absolute accuracy is valid within a module and is defined as the difference between the set position and the actual position of the positioning system.

Standstill repeatability [mm]

Specification of how accurately the system positions when approaching a position from the same direction (unidirectional). The standstill repeatability is to be evaluated as the average difference between the actual position and the set position and is the most important measure for the assessment of a positioning system. It defines the variance around the mean value with a large number of positionings.

The variance of the positions is illustrated by the Gauss distribution or normal distribution. The standstill repeatability is defined by three standard deviations (3σ) with a probability of 99.74 %.

Synchronization accuracy [mm]

Specification of the fluctuations that the system exhibits in the position / following error during a position-controlled movement at a constant set velocity. The synchronization accuracy depends on the mechanical rigidity, the applied load on the movers, the controller settings, the set velocity and also any mechanical offset between the modules.

4.2 XTS starter kits with NCT functionality

On the Beckhoff website you will find more information about:

- Energy transfer
- Data transmission
- digital inputs
- digital outputs
- analog inputs
- analog outputs
- Communication points
- mechanical data

NCT electronics

Direct link to XTS NCT electronics, basic electronics

Mover with NCT electronics fitted

Direct link to the XTS mover with NCT electronics

Direct link to the XTS mover with NCT electronics and Mover 1 functionality

Motor module with integrated NCT functionality

Direct link to the XTS motor module with NCT technology

Direct link to the XTS motor module with NCT technology and connector

General information about the XTS NCT functionality

Direct link to XTS NCT technology

4.3 Dimensional drawings

Dimensional drawings and 3D models online
You have the possibility to download the dimensional drawings and 3D models of the individual components from the Beckhoff website:

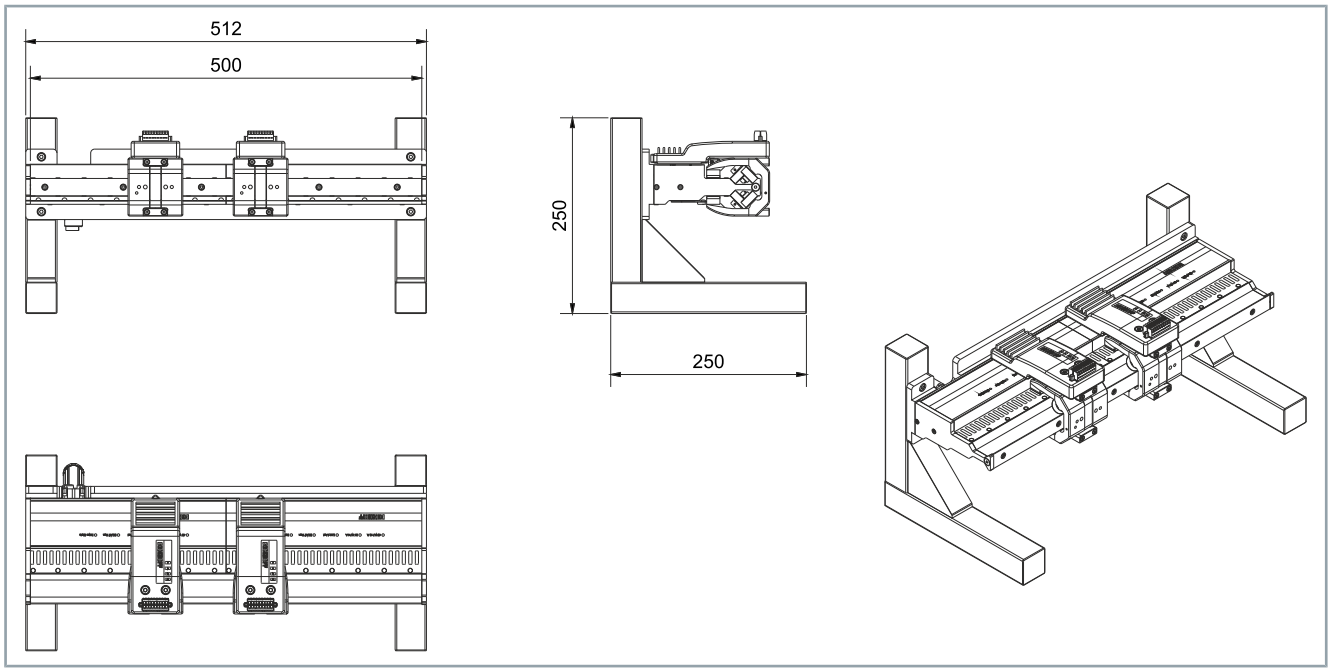
www.beckhoff.com/de-de/support/downloadfinder

4.3.1 XTS starter kits

All figures in millimeters

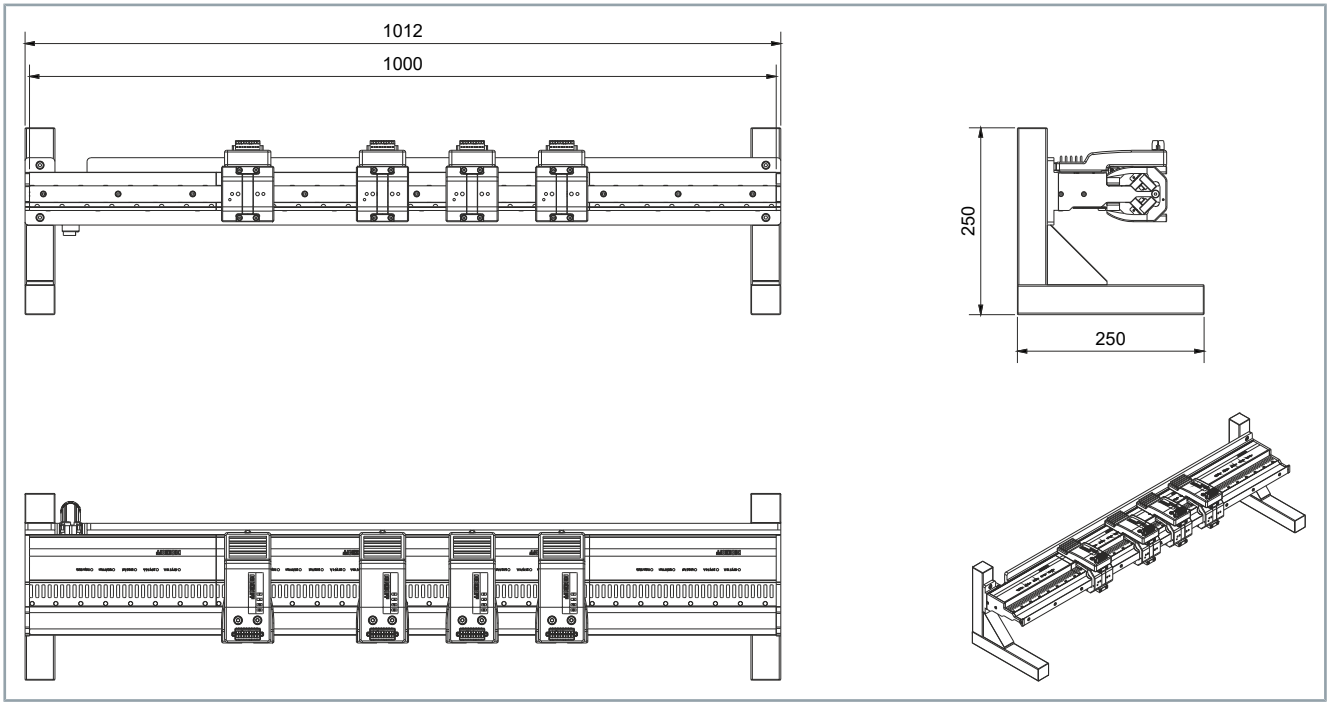
AT2100-0011-0001

- XTS starter kit with NCT functionality
- 500 mm
- open end



AT2100-0012-0001

- XTS starter kit with NCT functionality
- 1000 mm
- open end

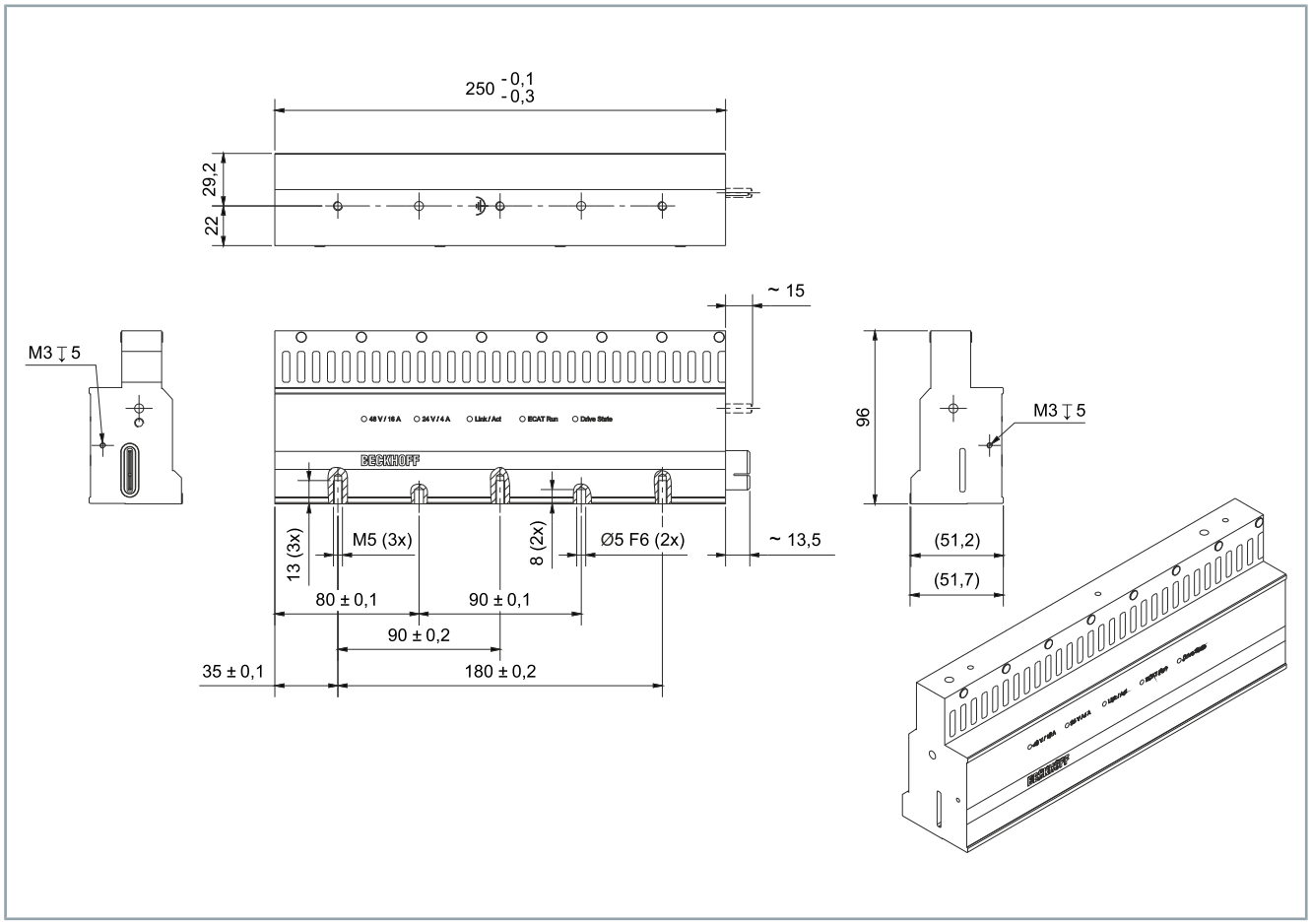


4.3.2 Modules

All figures in millimeters

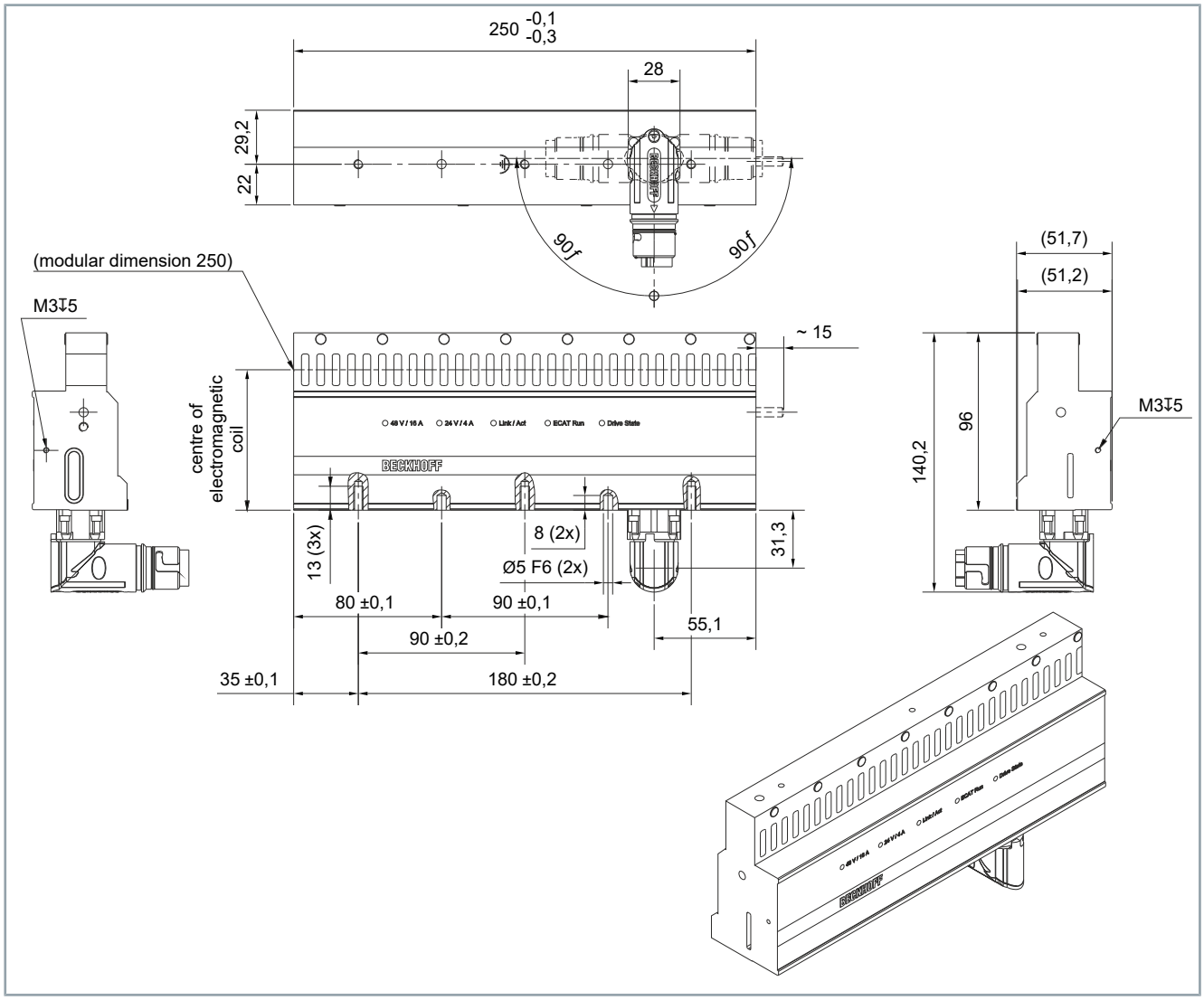
AT2100-0250

- Straight
- without supply
- 250mm
- with integrated NCT functionality



AT2102-0250, option ZX2002-0001

- Straight
- with connector for infeed, direction of rotation to feedback system
- 250mm
- with integrated NCT functionality

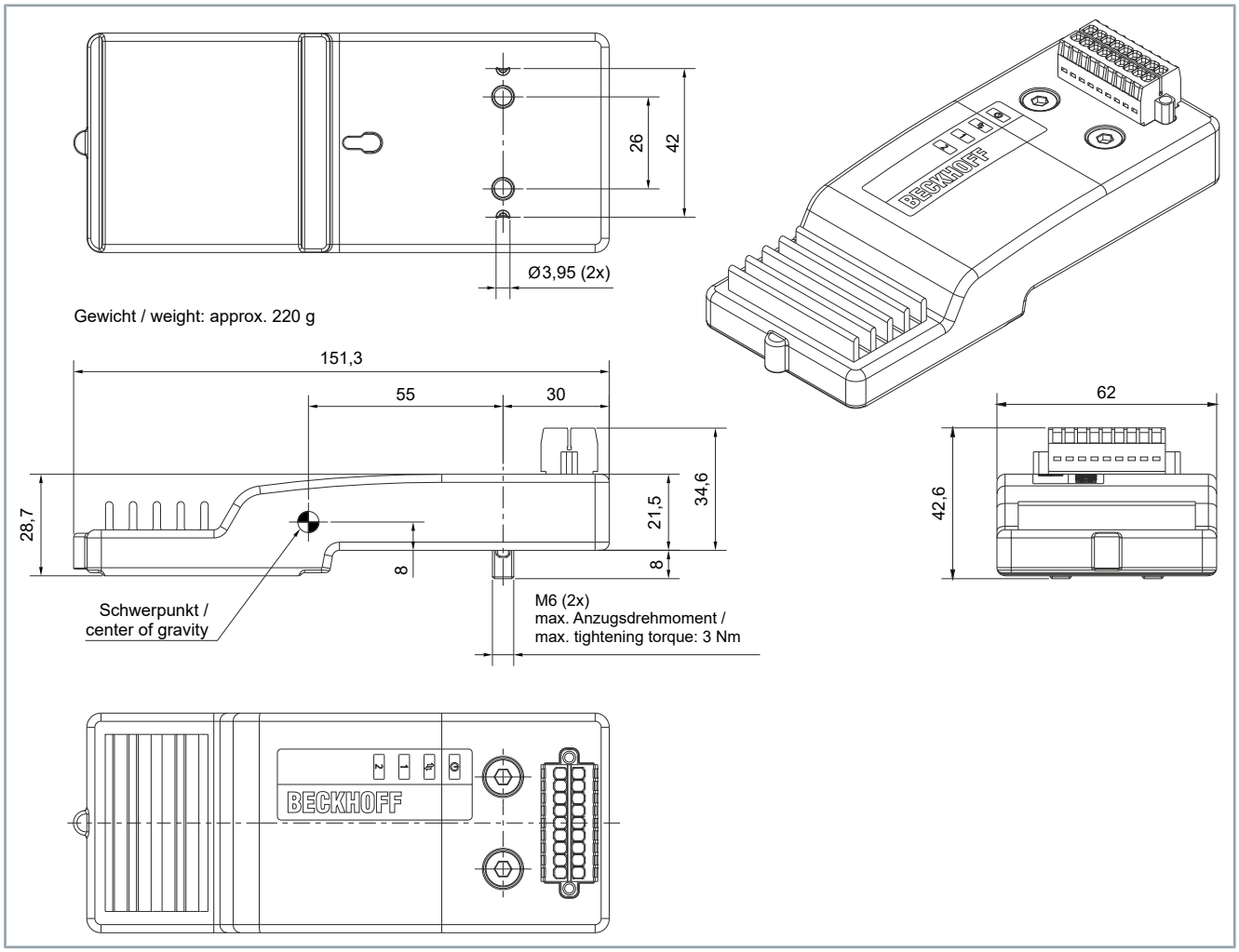


4.3.3 NCT electronics

All figures in millimeters

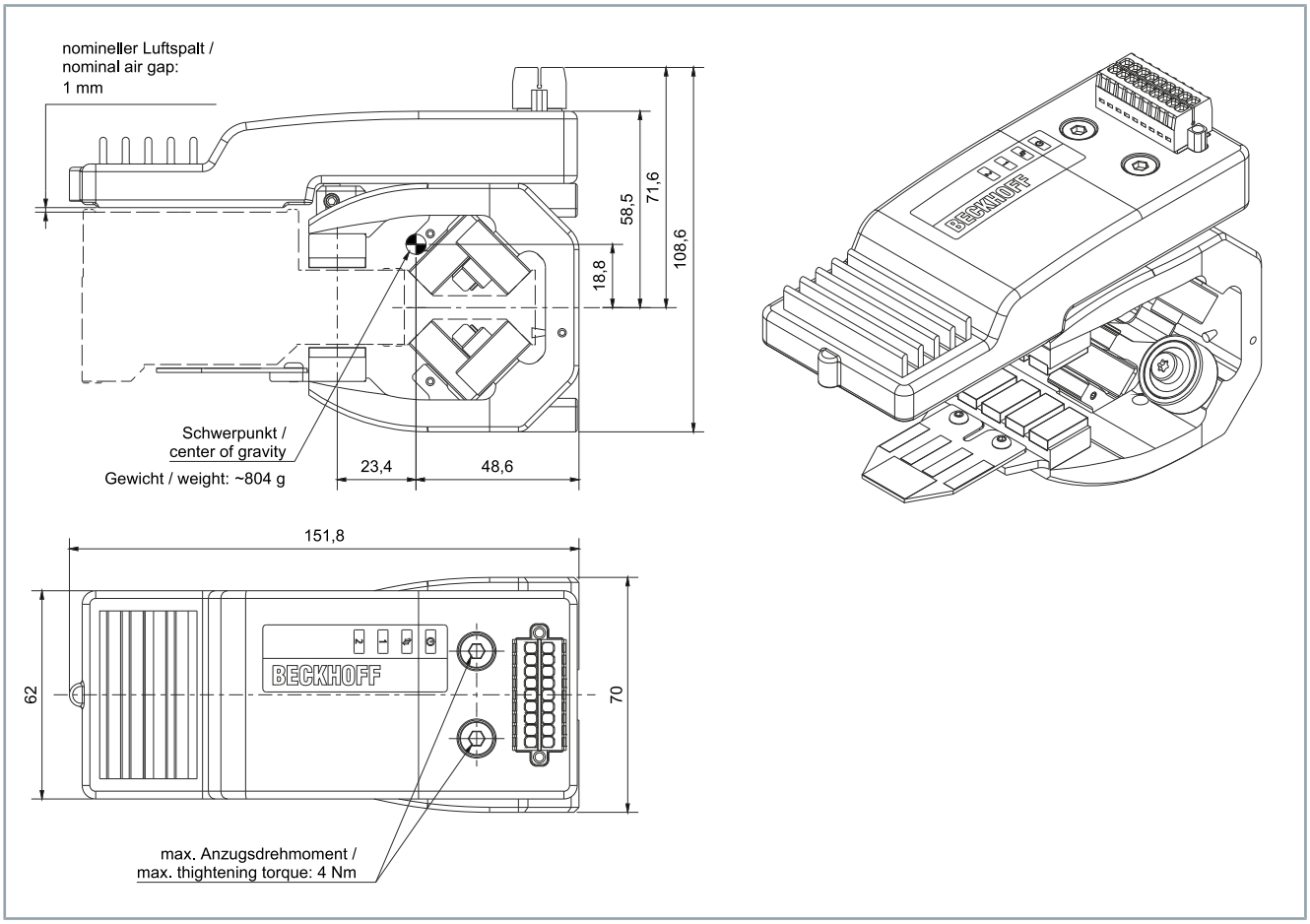
AT8200-1000-0100

- NCT electronics, basic electronics
- without mover



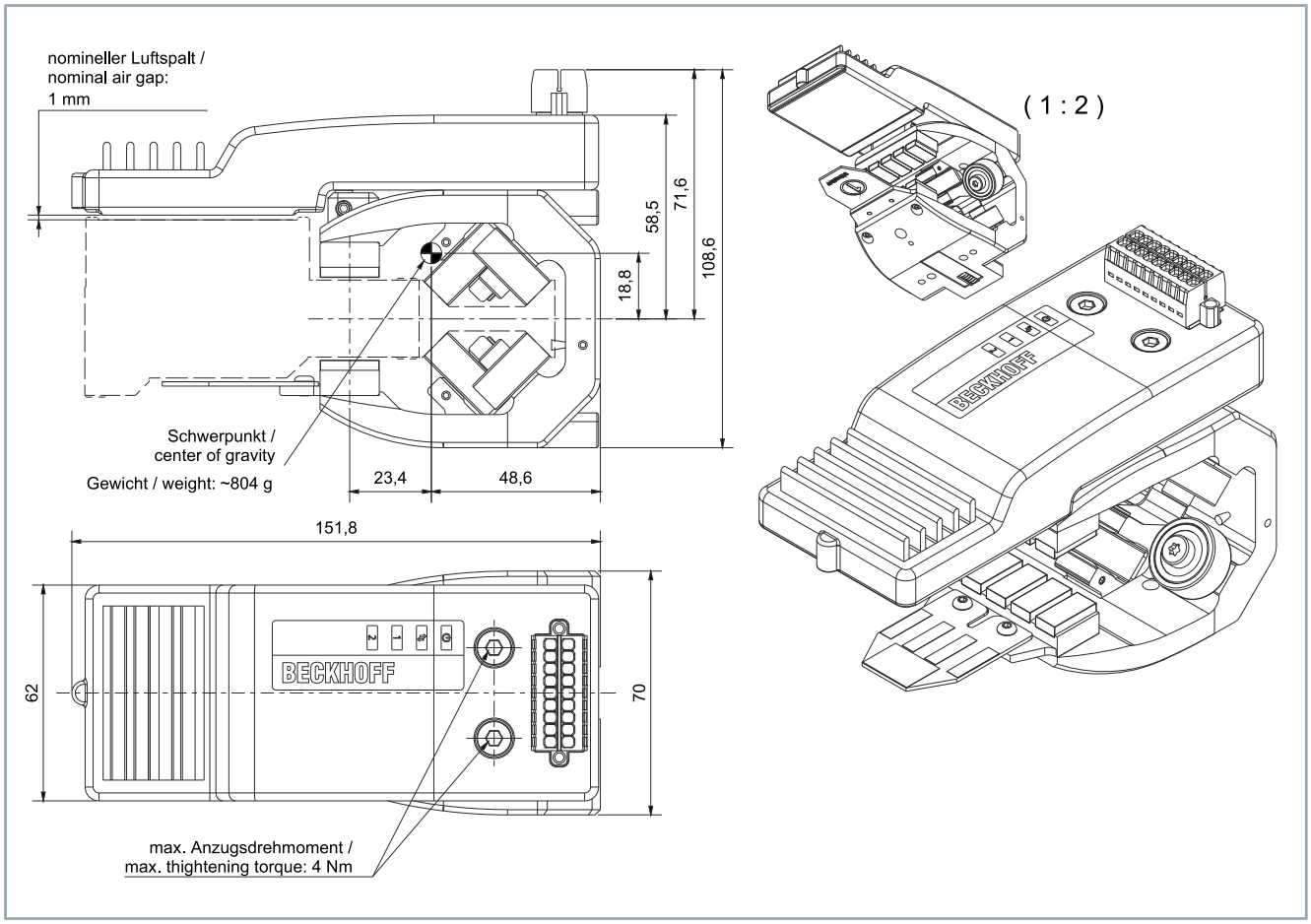
AT8300-1100-0100

- NCT electronics, basic electronics mounted on mover AT9014-1070-0550



AT8300-1200-0100

- NCT electronics, basic electronics mounted on mover AT9014-1070-1550

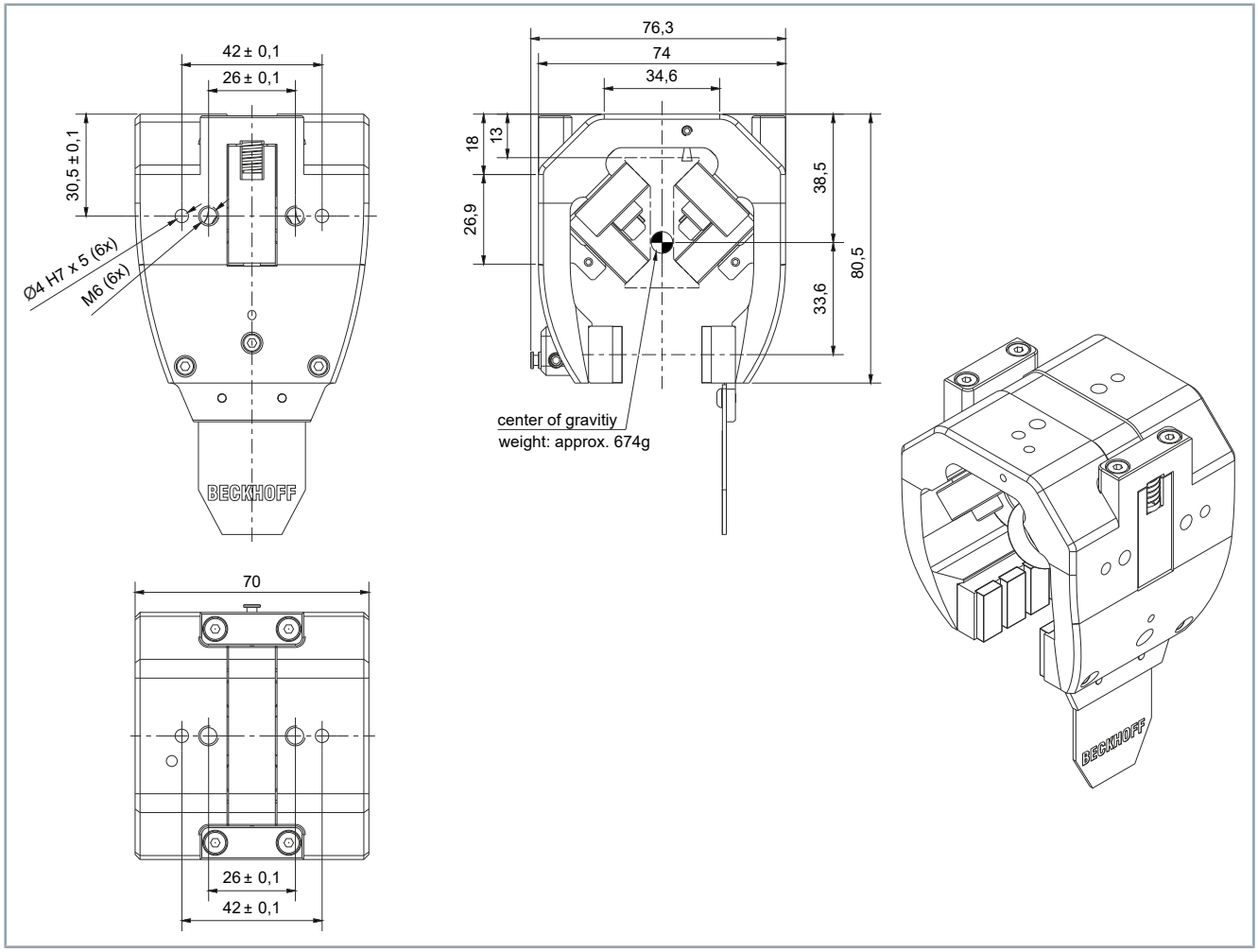


4.3.4 Mover

AT9014-1070-0550

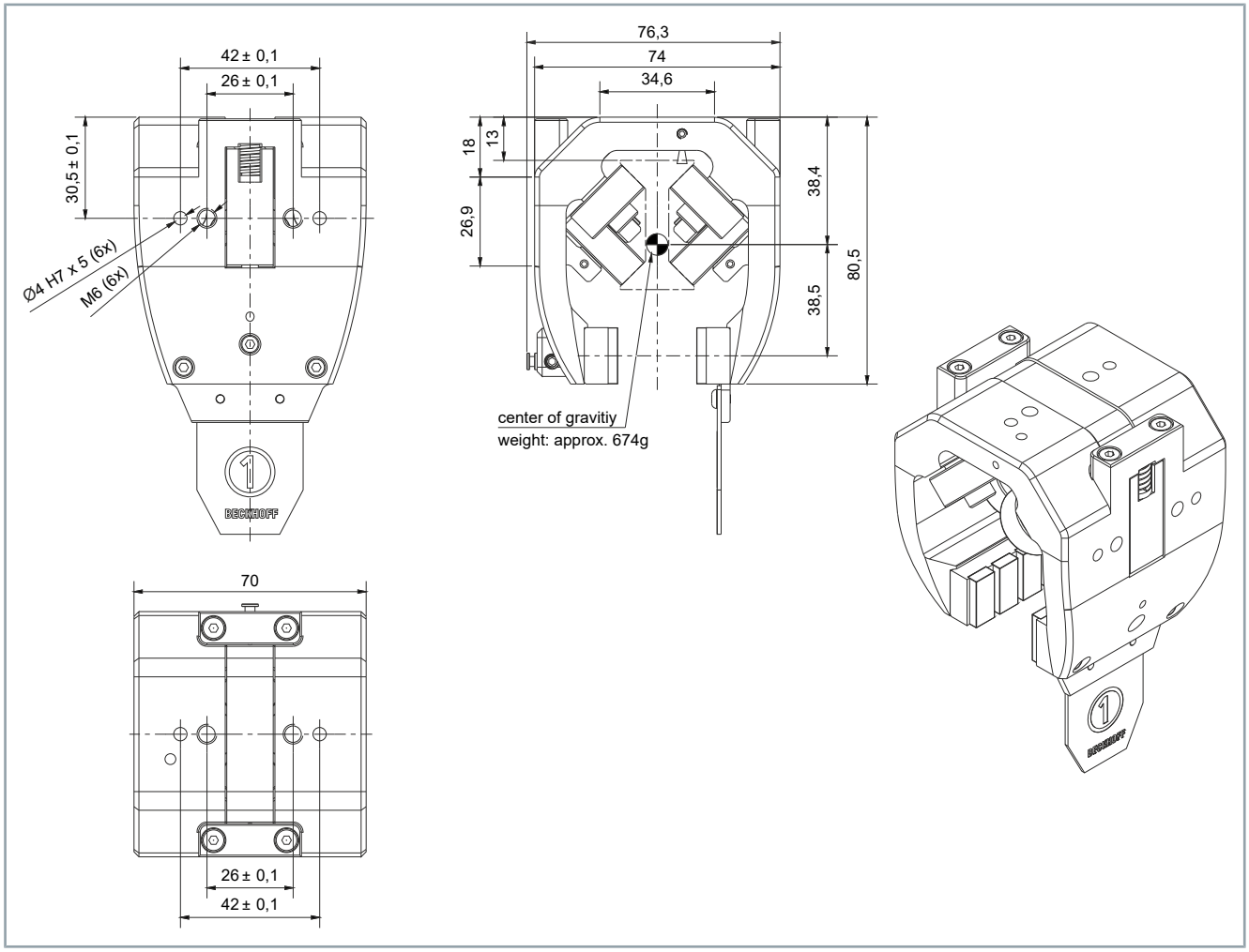
All figures in millimeters

- Mover, 70 mm
- 6 guide rollers, 2 of which are spring-loaded
- with height adjustment for NCT electronics, basic electronics



AT9014-1070-1550

- Mover, 70 mm
- 6 guide rollers, 2 of which are spring-loaded
- with height adjustment for NCT electronics, basic electronics



5 Commissioning

After unpacking the XTS starter kit with NCT technology, you must remove the transport securing devices on the movers and connect the cables.

5.1 Preparation

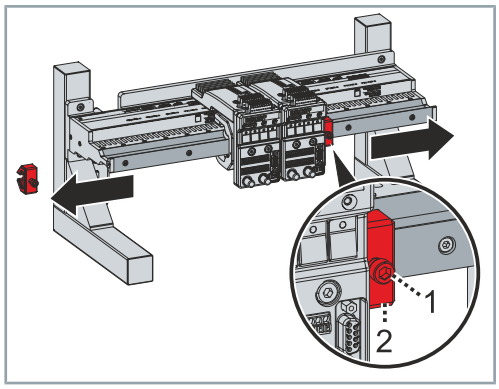
Required tool

- Suitable torque wrench
- Allen key 2 mm
- Allen key 3 mm
- Allen key 4 mm
- Slotted screwdriver
- Feeler gauge with 0.7 to 1 mm feeler gauge blades

Required accessories [+]

- Assembly tool for B23 connectors

5.2 Remove the transport securing device



► Loosen screw [1]

► Remove the transport securing device [2] to the side

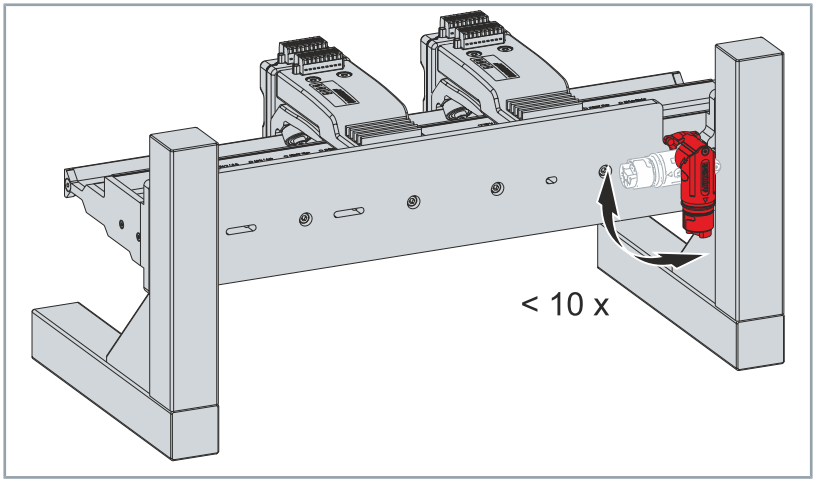
5.3 Connect the connection cable

The connection cable connects the modules to the control cabinet.

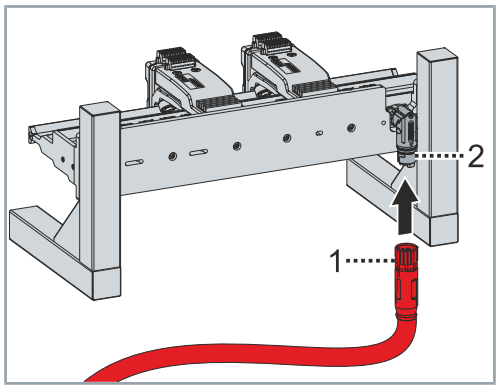
5.3.1 Module

NOTICE

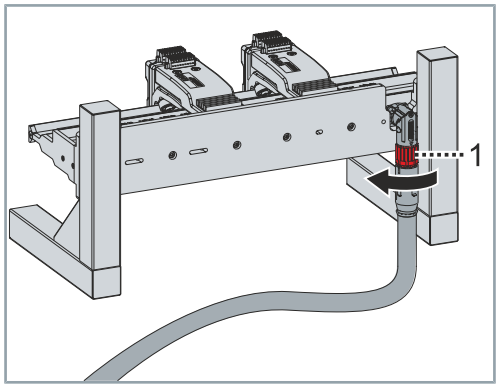
Limited number of turns
The connector may be rotated through 90° up to ten times to bring it into a safe latching position.
If you turn the connector more than ten times, the cables inside and the latching mechanism of the connector may be damaged and the connector may no longer be placed in a safe latching position.



The connector of the module may be rotated by 90° a maximum of ten times.

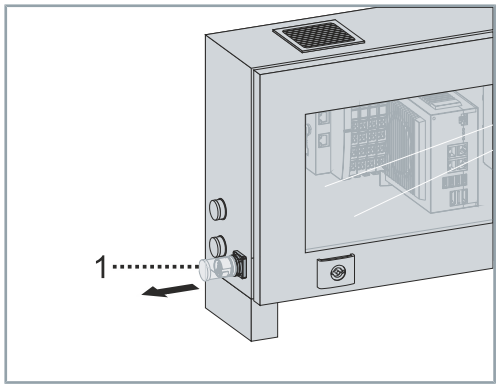


► Plug the connector [1] of the connection cable to the connector [2] of the module

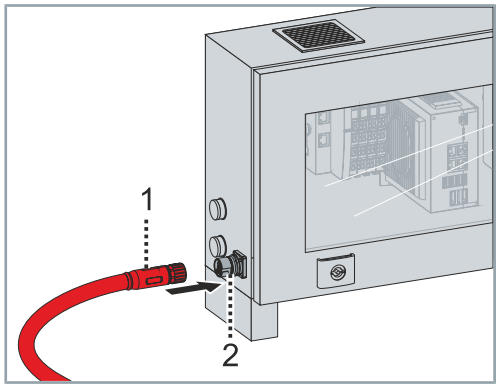


► Tighten the connector [1] with assembly tool [+]

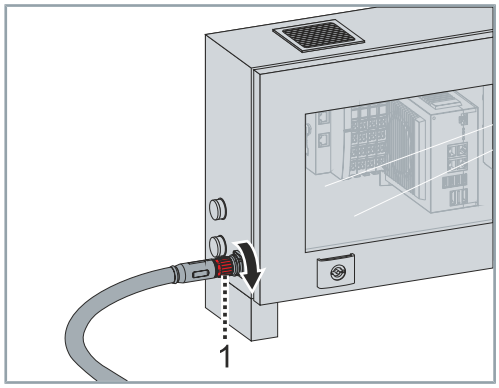
5.3.2 Control cabinet



► Remove cap [1]



► Plug the connector [1] of the connection cable into the connector [2] of the control cabinet



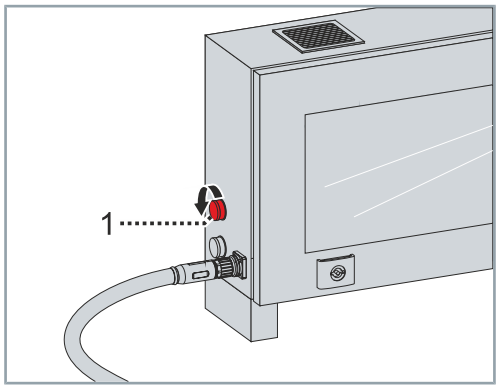
► Tighten the connector [1] with assembly tool [+]

5.4 Connect data line

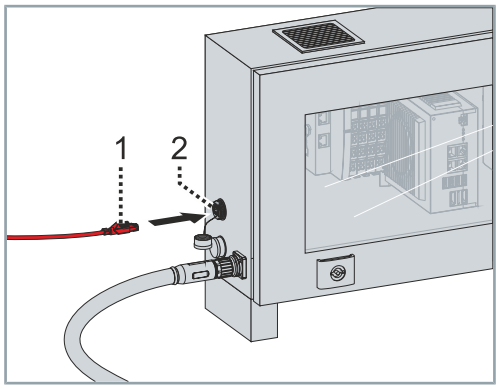
The data line connects the control cabinet with your PC or your laptop.

5.4.1 Control cabinet

The cap for connecting the data line is attached to the connector with a wire and remains on the control cabinet.

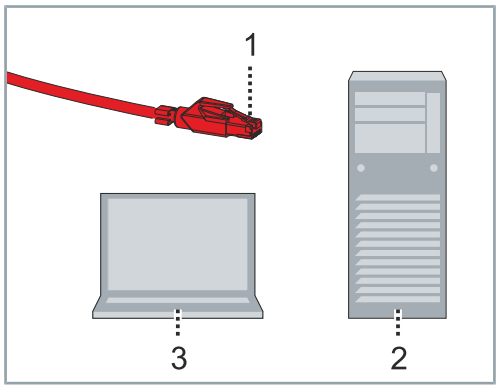


► Open cap [1]



► Connect the connector [1] of the data line to the connector [2] in the control cabinet

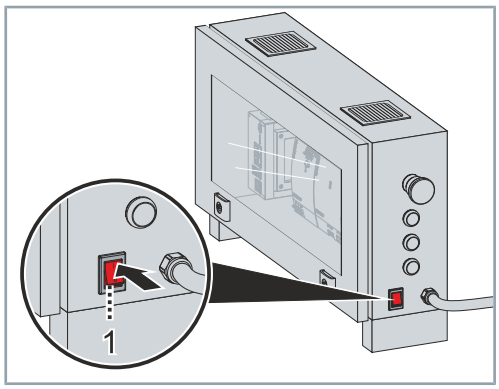
5.4.2 PC or laptop



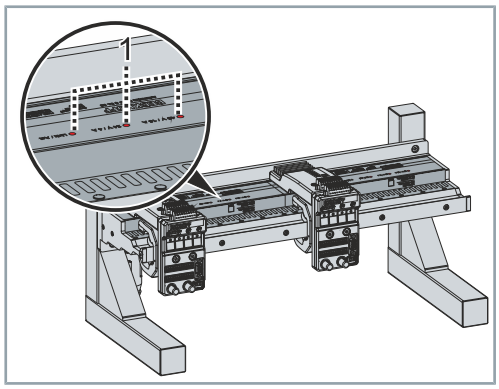
► Plug the connector [1] of the data line into the corresponding port of your PC [2] or laptop [3]

5.5 System test

► Connecting the starter set to the mains



► Switch on starter kit at control cabinet [1]



The following LEDs [1] must light up:

- Link / Act
- 48 V / 16 A
- 24 V / 4 A

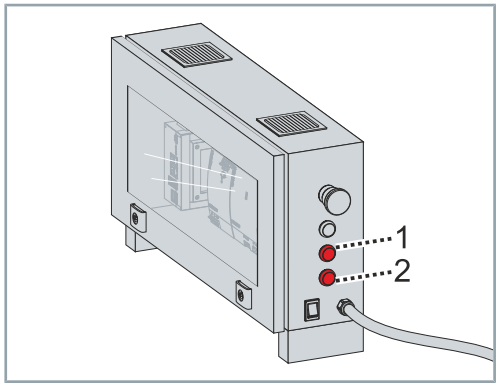
If the LEDs do not light up:

► Check cables and connectors

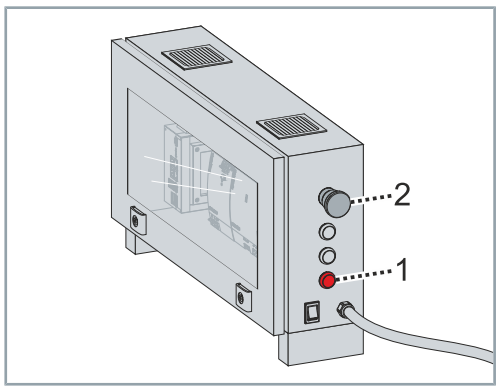
► Check the power supply units and fuses for voltage

► Contact the Support/Applications Department

5.6 Start system

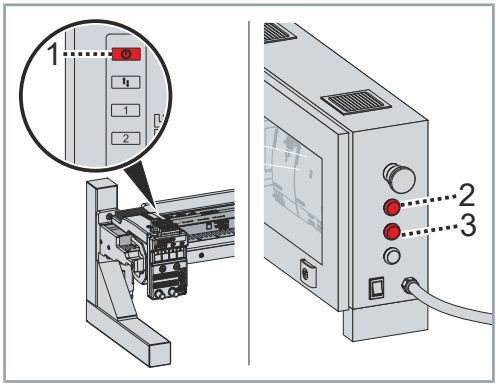


After the starter kit has been connected and switched on:
The *Stop* button [1] on the control cabinet lights up red continuously.
The *Reset* button [2] must flash blue.



► Press *Reset* button [1]

► Ensure that the *Emergency stop* button is unlocked

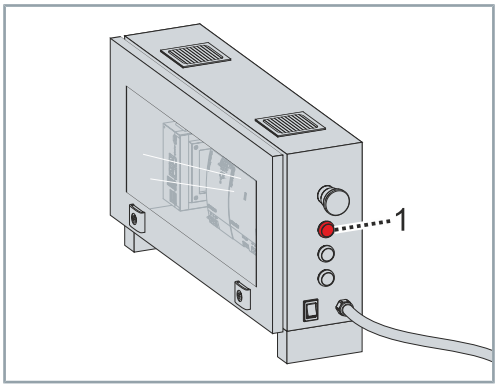


The *Power* LED [1] on the NCT electronics light up continuously.

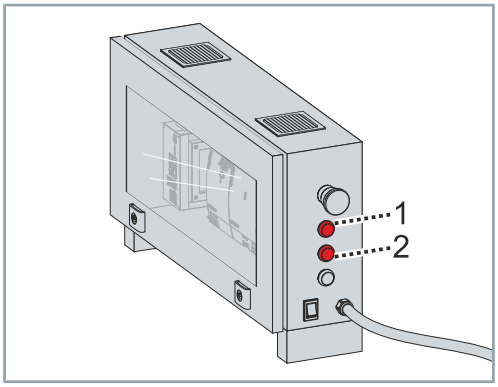
If the power LED [1] is not permanently lit, the movers must be initialized. Further information can be found in chapter "Initializing the movers", [Page 51].

The *Start* button [2] on the control cabinet must flash green.

The *Stop* button [3] on the control cabinet must go out.



► Press the *Start* button [1]

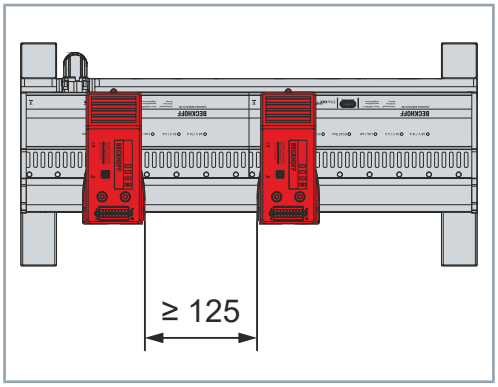


The *Stop* button [1] on the control cabinet must flash red.

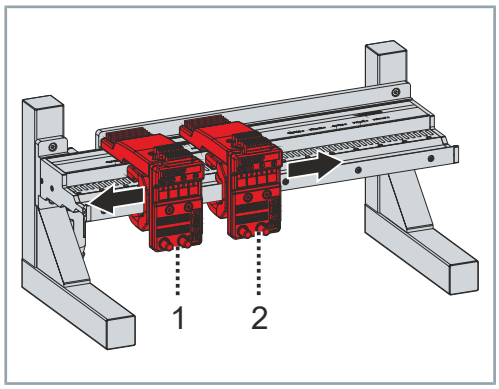
The *Start* button [2] on the control cabinet must light up green continuously.

The system is in operation.

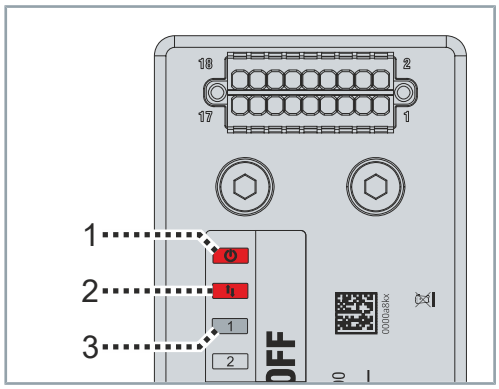
5.6.1 Initializing the movers



To initialize the movers, the distance between the movers must be at least 125 mm.



► Increase the distance between the movers [1] and [2] to at least 125 mm



After initializing the movers

The power LED [1] must light up continuously.

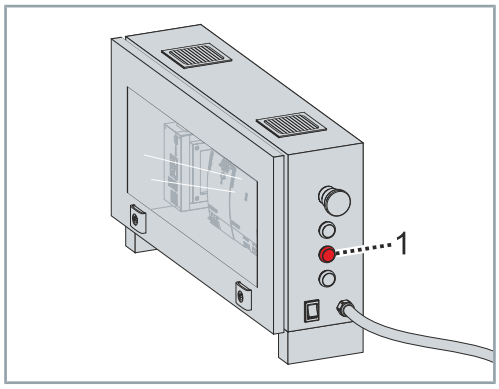
The communication LED [2] must light up continuously.

If an input or output is used on the test board or the NCT electronics, LED 1 [3] must light up continuously.

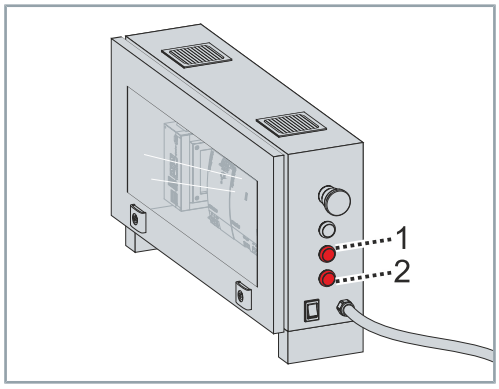
5.7 Stop system

The system can be stopped with the *Stop* button or with the *Emergency stop* button.

5.7.1 Stop button



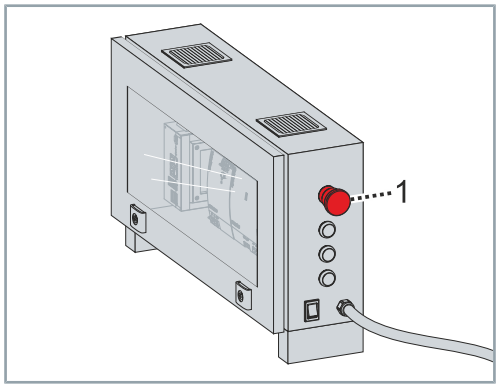
► Press the *Stop* button [1]



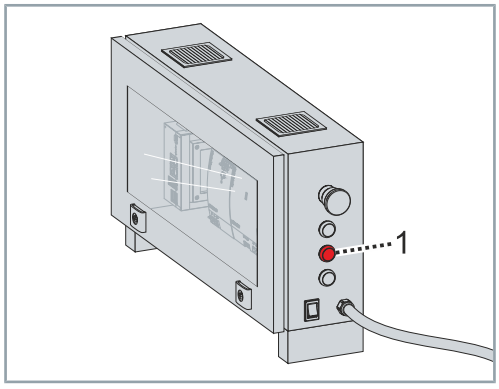
The *Stop* button [1] must light up red continuously.

The *Reset* button [2] must flash blue.

5.7.2 Emergency stop button



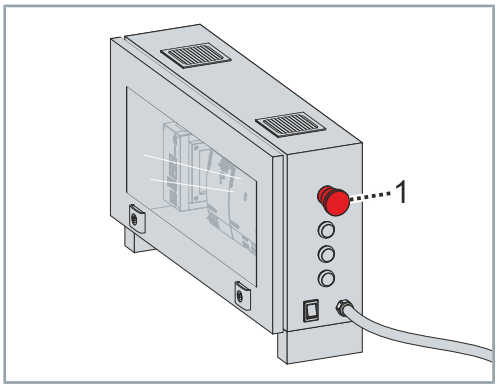
► Press the *Emergency stop* button [1]



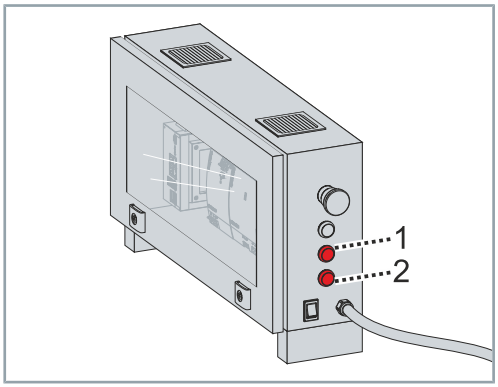
The *Stop* button [1] must light up red continuously.

Unlock

If the system is stopped with the *Emergency stop* button, the *Emergency stop* button must be unlocked to restart the system.



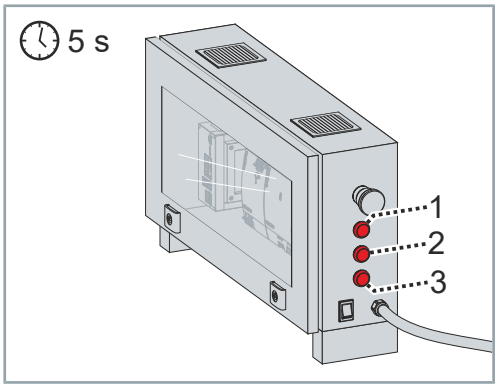
► Unlock the *Emergency stop* button [1]



The *Stop* button [1] must light up red continuously.

The *Reset* button [2] must flash blue.

5.8 Restart TwinCAT

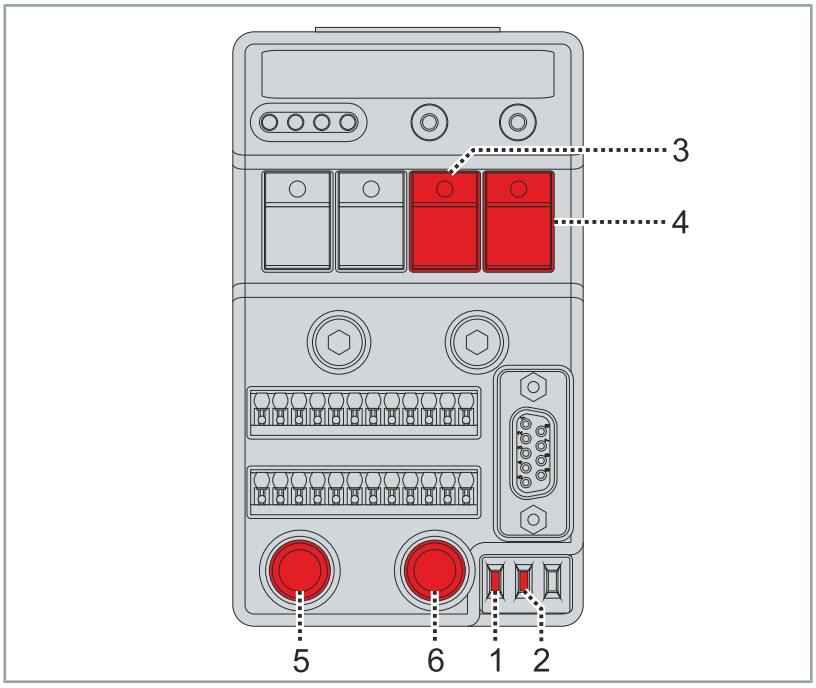


► Press the Start button [1], Stop button [2], and Reset button [3] simultaneously for 5 seconds to restart TwinCAT

6 Functionality of the test board

After commissioning, you can use the functions of the test board. Further information on the test boards can be found in chapter "Test board", [Page 22].

6.1 Digital or analog input



The position of the switches [1] and [2] on the test board determines whether the digital inputs [3] and [4] or the analog inputs [5] and [6] are enabled.

The following positions of the switches are possible:

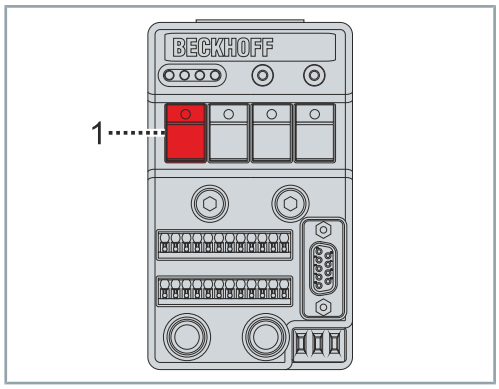
Version	Explanation
Switch [1] up	• Digital input 4 enabled: button 4 [4] with function • Analog input 2 disabled: potentiometer 2 [6] without function
Switch [1] down	• Digital input 4 disabled: button 4 [4] without function • Analog input 2 enabled: potentiometer 2 [6] with function
Switch [2] up	• Digital input 3 enabled: button 3 [3] with function • Analog input 1 disabled: potentiometer 1 [5] without function
Switch [2] down	• Digital input 3 disabled: button 3 [3] without function • Analog input 1 enabled: potentiometer 1 [5] with function

6.2 Push button

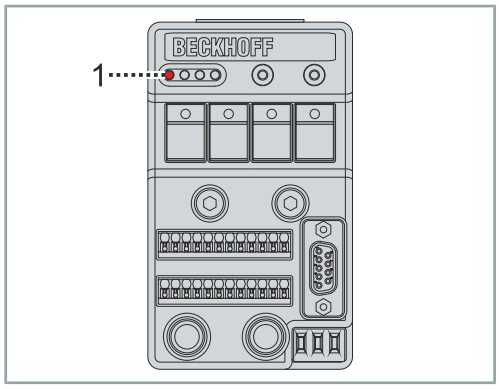
Briefly pressing the button causes the corresponding LED to light up.

Note the position of the switches
Make sure that the switches are in the up position if you want to use all the push buttons.
When a switch is in the lower position, the digital input is without function and the push button cannot light the corresponding LED.

6.2.1 Button 1 - digital input 1

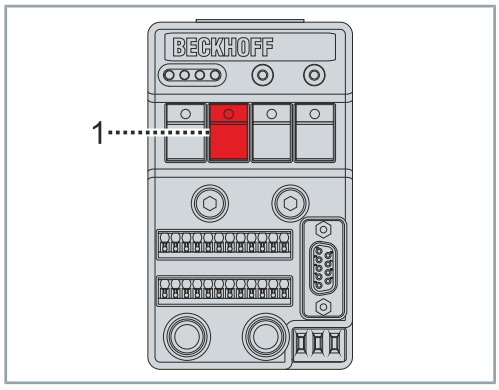


► Press button 1 [1]

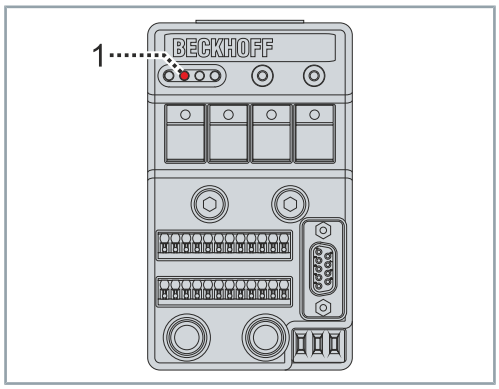


The *LED 1 Digital output 1* [1] lights up.

6.2.2 Button 2 - digital input 2

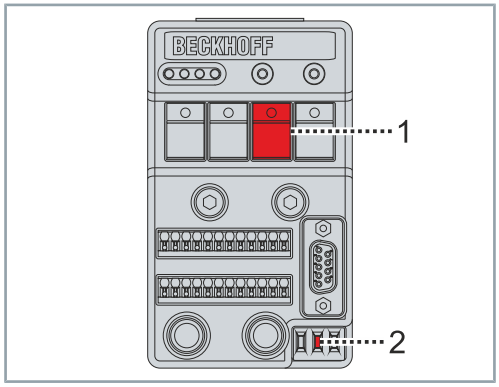


► Press button 2 [1]

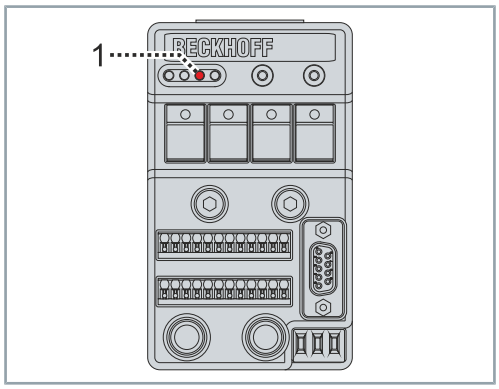


The *LED 2 Digital output 2* [1] lights up.

6.2.3 Button 3 - digital input 3

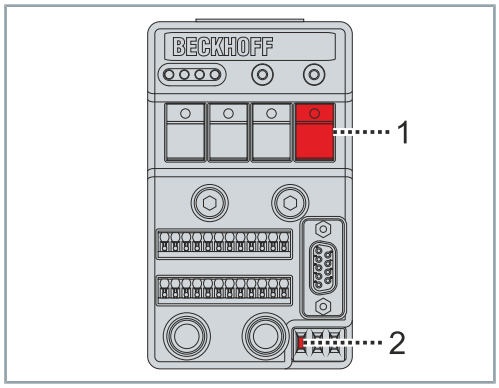


- ► Press button 3 [1]
- ► Make sure that the switch [2] is in the upper position

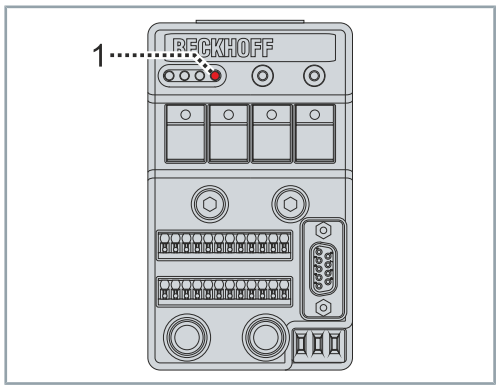


The *LED 3 Digital output 3* [1] lights up.

6.2.4 Button 4 - digital input 4



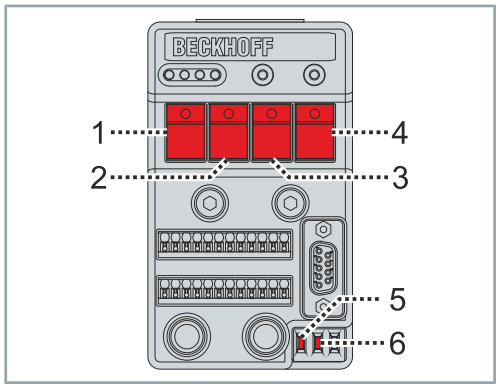
- ► Press button 4 [1]
- ► Make sure that the switch [2] is in the upper position



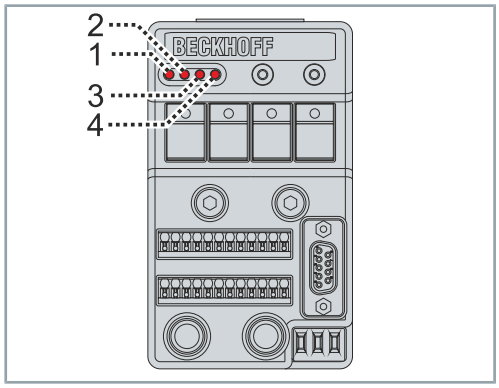
The *LED 4 Digital output 4* [1] lights up.

6.2.5 Button 1 to 4

You have the possibility to set the four LEDs into a chaser mode.

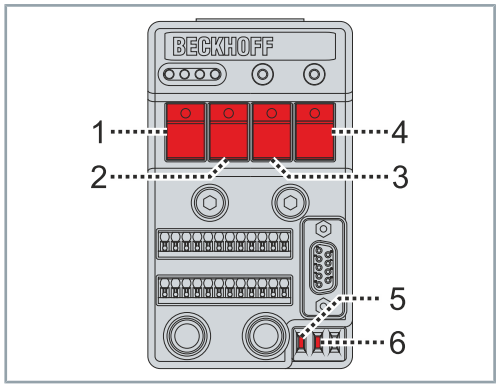


- ► Keep keys [1] to [4] pressed for five seconds
- ► Make sure that the switches [5] and [6] are in the upper position

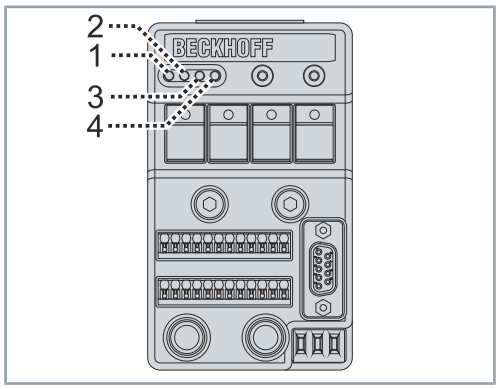


LEDs [1] to [4] are in chaser mode.

6.2.5.1 Exit chaser mode



- ► Keep keys [1] to [4] pressed for five seconds
- ► Make sure that the switches [5] and [6] are in the upper position



LEDs [1] to [4] are off.

6.3 Potentiometer

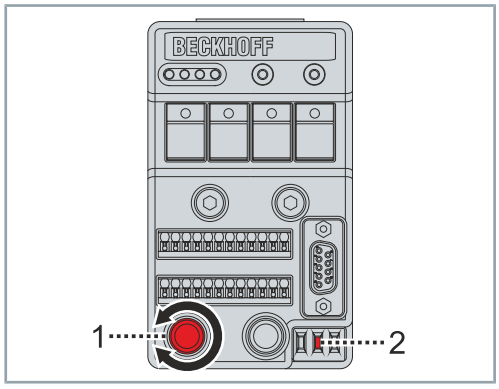
The potentiometers control the RGB LED of the PWM outputs.

Color saturation
The potentiometers convert the HSV color values into RGB colors. By default, the color saturation S of the RGB PWM outputs is preset to a value of 1 and can only be changed via an adjustment in the PLC.

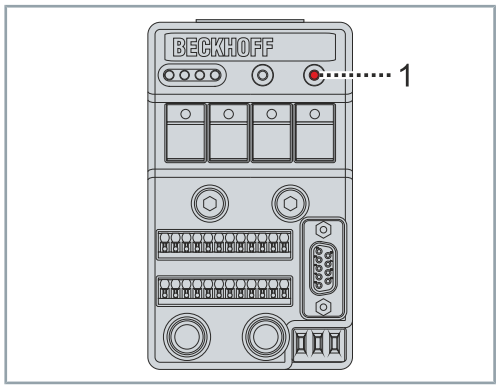
Note the position of the switches
Make sure that the switches are in the lower position if you want to use all potentiometers.
When a switch is in the lower position, the analog input is without function and the potentiometer cannot perform the corresponding function for the RGB PWM outputs.

6.3.1 Potentiometer 1 - analog input 1

With potentiometer 1 the color value H for the RGB LED can be set.



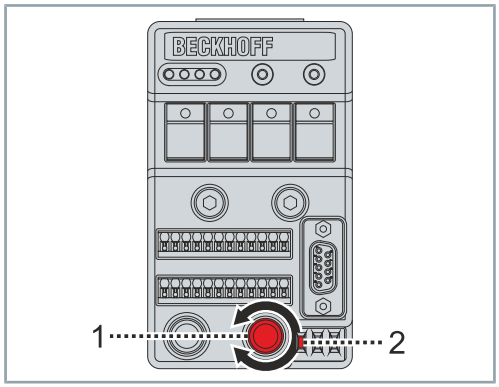
► Turn potentiometer 1 [1] to set the color of the RGB LED
► Make sure that the switch [2] is in the lower position



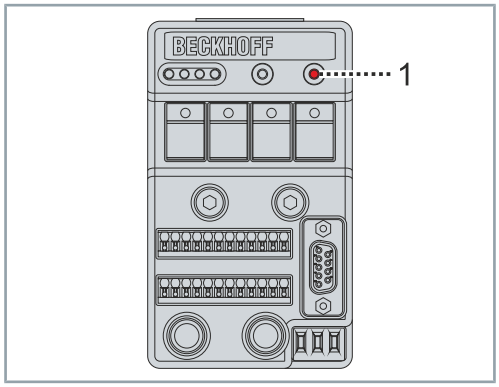
The RGB LED [1] lights up in the set color.

6.3.2 Potentiometer 2 - analog input 2

With potentiometer 2 the brightness V for the RGB LED can be adjusted.



► Turn potentiometer 2 [1] to adjust the brightness of the RGB LED
► Make sure that the switch [2] is in the lower position



The RGB LED [1] lights up in the set brightness.

7 Assembly and disassembly

7.1 Mover

The pre-assembled movers can be removed and inserted.

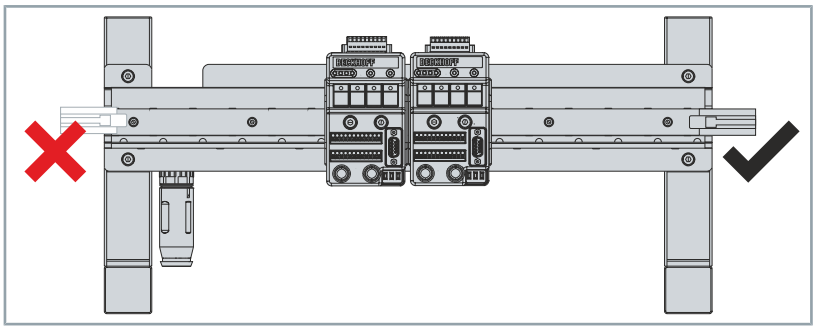
Example XTS starter kit with open end
The removal and insertion of the movers is exemplified by an XTS starter kit with open end.
The rail on support [+] *ZK9001-0000* is available for removing and inserting the movers on a circulating system. For more information, refer to the original operating instructions XTS | linear product transport:

Direct link to the XTS original operating instructions

7.1.1 Rail on support

The rail on support supplied must be mounted for inserting and removing the movers.

Position

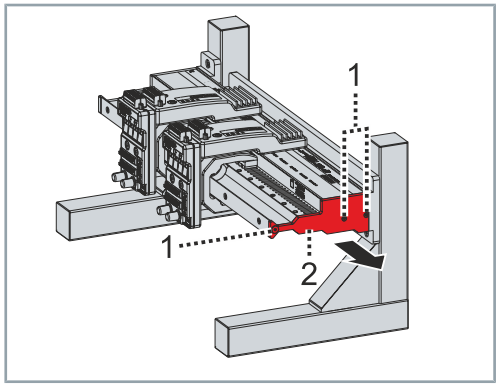


The rail on support may only be mounted on the motor module without connectors.

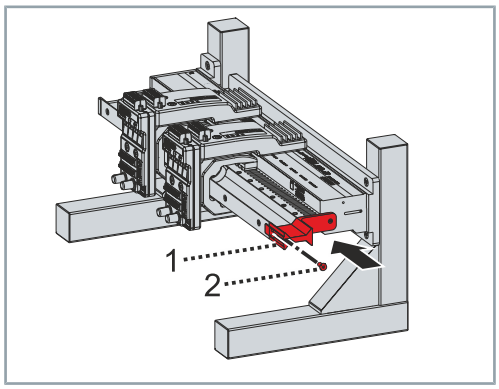
NOTICE

Installing the rail on support correctly
If the rail on support is mounted on the motor module with connectors, there is an offset between the rail on support and the guide rail.
If you mount the rail on support on the motor module with connector, damage to the mover and the guide rail may result.

Assembly

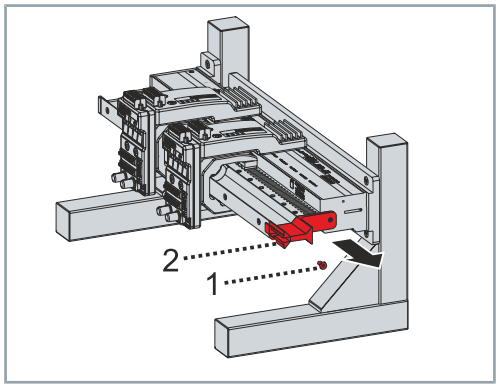


- ► Remove screws [1]
- ► Remove end cap [2]

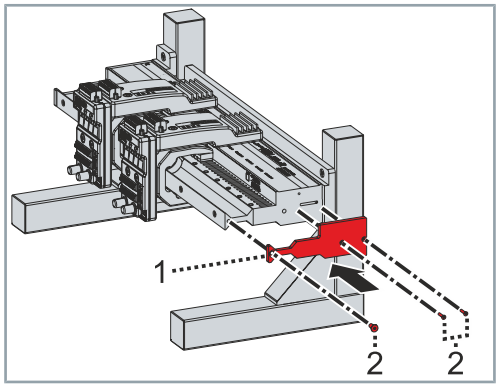


- ► Insert rail on support [1]
- ► Insert screw [2] and hand-tighten it
- ► Note the position of the rail on support

Disassembly



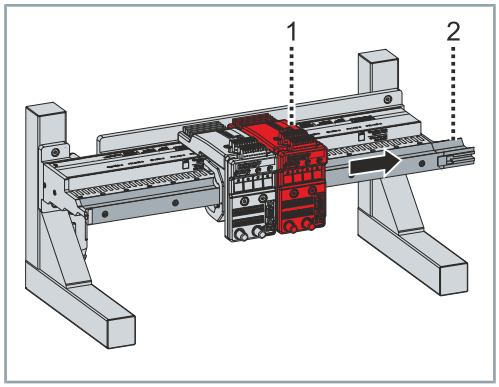
- ► Remove screw [1]
- ► Remove rail on support [2]



- ► Insert end cap [1]
- ► Insert and tighten the screws [2]
- ► Observe tightening torques:

Components	Tightening torque [Nm]
Screw, M5 x 12	2
Screws, M3 x 14	1

7.1.2 Removing



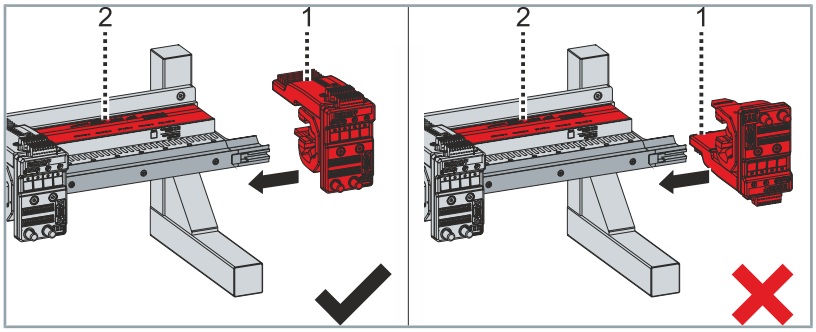
- ► Remove the mover [1] via the rail on support [2]

7.1.3 Inserting

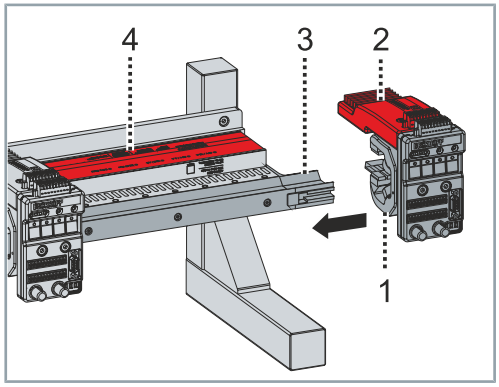
NOTICE

Observe the order of the movers
A change in the order of movers or a different number of movers on the system requires an adjustment to the project.

Mover alignment



The NCT electronics [1] must be located on the side of the name plate [2] when the mover is inserted.



- ► Insert mover [1] with the NCT electronics [2] via the rail on support [3]
- ► Observe correct alignment of the NCT electronics [2] to the name plate [4]

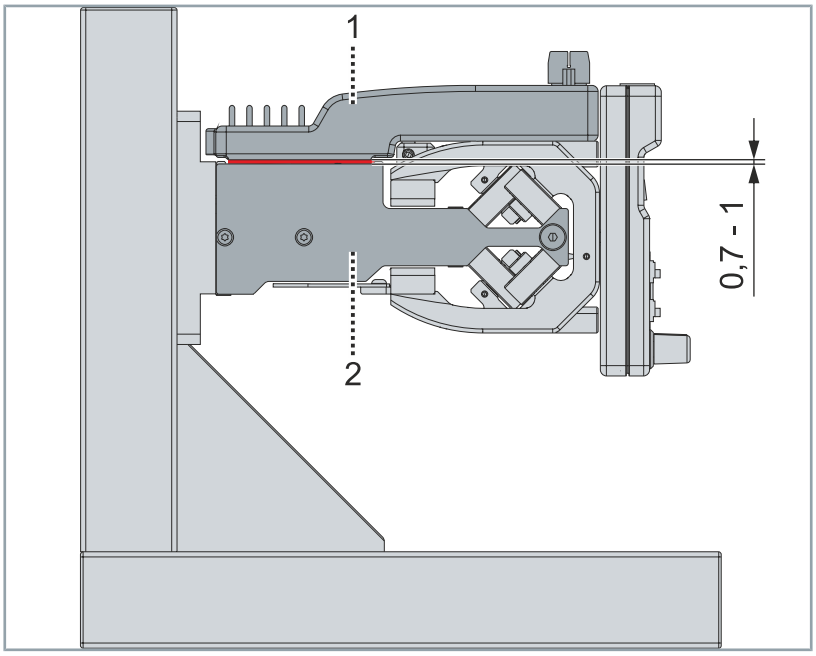
7.2 NCT electronics

The NCT electronics are pre-mounted on the mover with two screws. The air gap between the NCT electronics and the modules is preset accordingly.

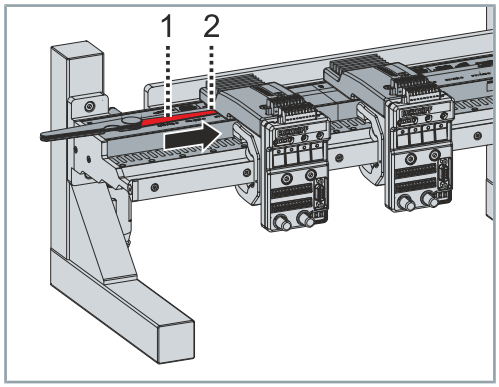
NOTICE

Checking the air gap
The air gap must be checked if a mover is inserted that is not included in the scope of delivery or if you have mounted the NCT electronics on a mover.
If the air gap is not set correctly, there may be problems with energy transfer and data transmission.

7.2.1 Checking the air gap



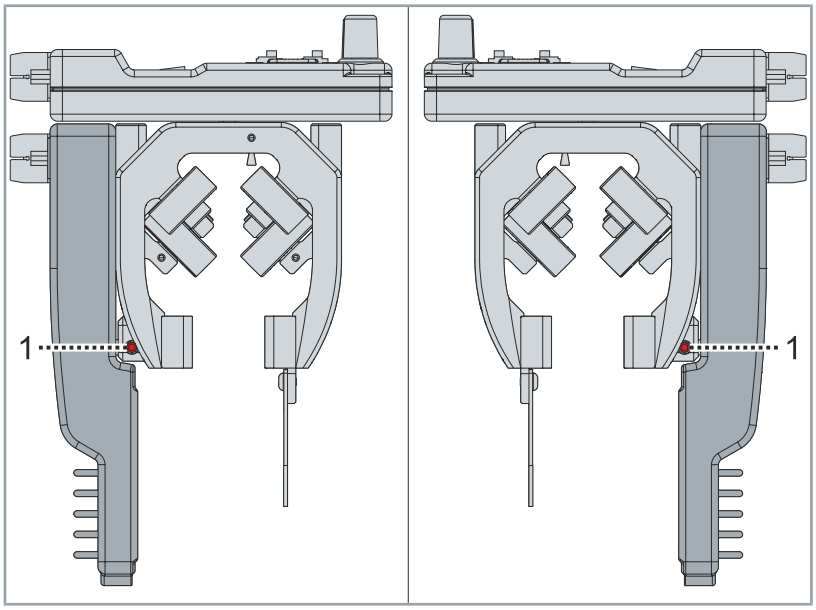
The air gap between the mounted NCT electronics [1] and the motor module [2] is preset to 1 mm ex factory. The air gap may be reduced to a minimum of 0.7 mm.



► Insert the feeler gauge blade [1] into the air gap [2] between the NCT electronics and the module

The air gap must be adjusted if the feeler gauge blade cannot be inserted into the air gap.

7.2.2 Adjust air gap

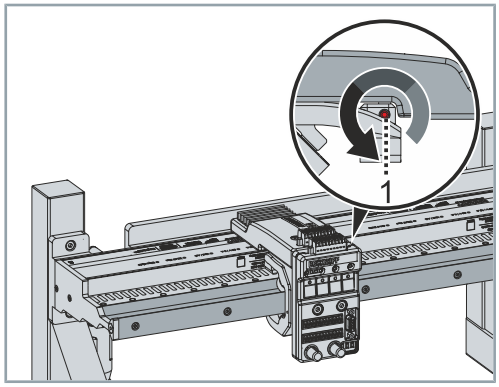


On both sides of the mover there is a set screw [1] for adjusting the position of the NCT electronics. The air gap between the NCT electronics and the module can be adjusted using the two set screws.

Reduce air gap

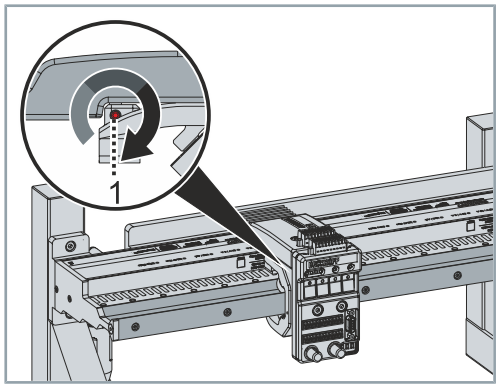
NOTICE

Air gap must be at least 0.7 mm
To check the air gap, the mover must be on the guide rail. The air gap must be at least 0.7 mm.
If the air gap is too small, damage to the mover and the system may result.



► Loosen set screw [1]

Rotation	Changing the air gap [mm]
1/4	0.1



► Tighten set screw [1] on the opposite side accordingly
► Check the air gap

If the air gap is not yet set correctly:

► Loosen and tighten the set screws again

OR

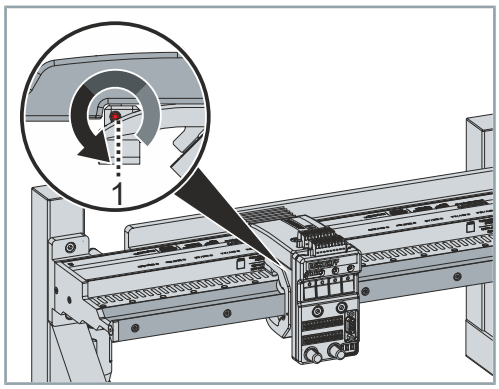
► Increasing the air gap

Further information can be found in chapter "Increasing the air gap", [Page 67].

Increasing the air gap

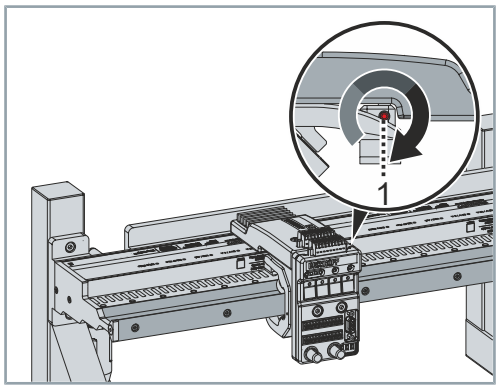
NOTICE

The air gap must not exceed 1 mm
To check the air gap, the mover must be on the guide rail. The air gap must not exceed 1 mm.
If the air gap is too large, the data transmission between the NCT electronics on the mover and the motor modules may be disturbed and the functions may not be executed correctly.



► Loosen set screw [1]

Rotation	Changing the air gap [mm]
1/4	0.1



► Tighten set screw [1] on the opposite side accordingly
► Check the air gap

If the air gap is not yet set correctly:

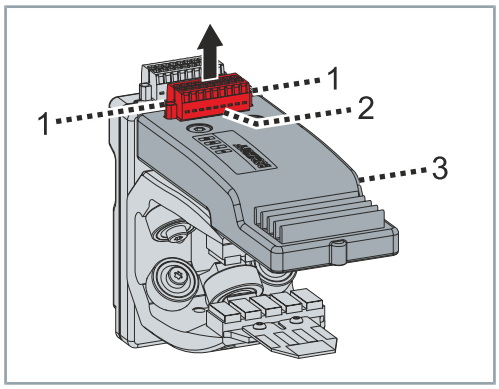
► Loosen and tighten the set screws again

OR

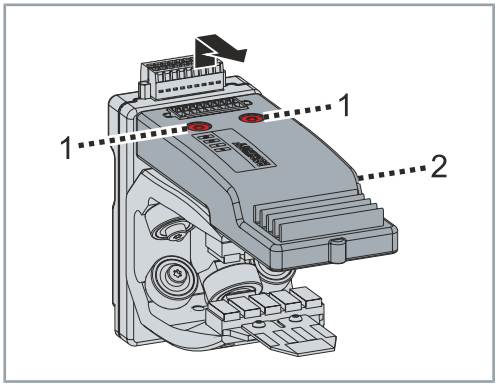
► Reduce the air gap

Further information can be found in chapter "Reduce air gap", [Page 66].

7.2.3 Disassembly



► Loosen screws [1] on the connector of the cable bridge
► Pull off the connector [2] of the cable bridge from the NCT electronics [3]

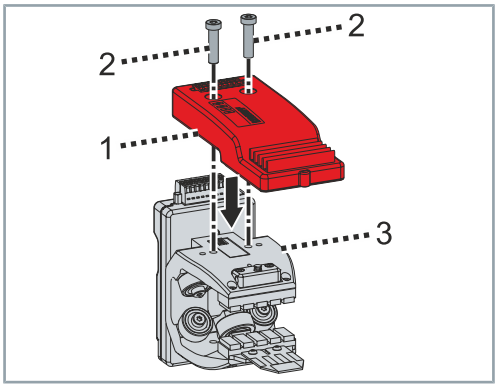


- ► Remove screws [1]
- ► Lift and remove the NCT electronics [2] in the area of the connector

7.2.4 Assembly

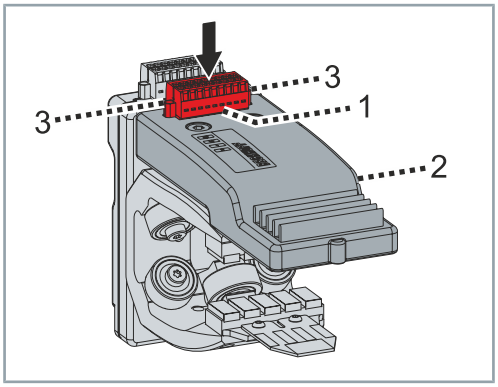
NOTICE

Note mover type
The NCT electronics may only be attached to mover *AT9014-1070-x550*. All other movers are not suitable for mounting the NCT electronics.
If you mount the NCT electronics on other movers, damage to movers and modules may result.



► Tighten the NCT electronics [1] to the mover [3] with screws [2]
► Observe tightening torques:

Components	Tightening torque [Nm]
Screws, M6 x 25	4

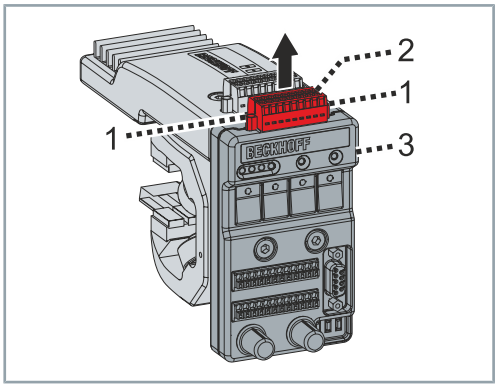


► Plug the connector [1] of the cable bridge into the connection strip of the NCT electronics [2]
► Tighten screws [3] on the cable bridge

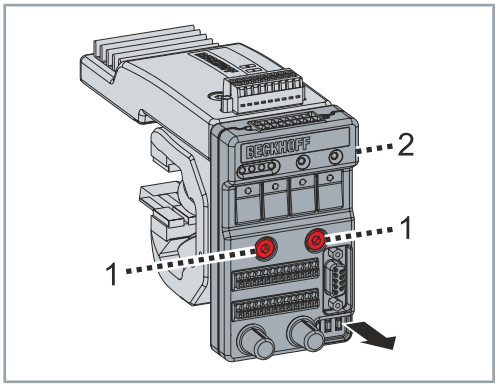
7.3 Test board

The test board is pre-mounted on the mover with two screws.

7.3.1 Disassembly



- ► Loosen screws [1] on the connector of the cable bridge
- ► Pull off the connector [2] of the cable bridge at the test board [3]

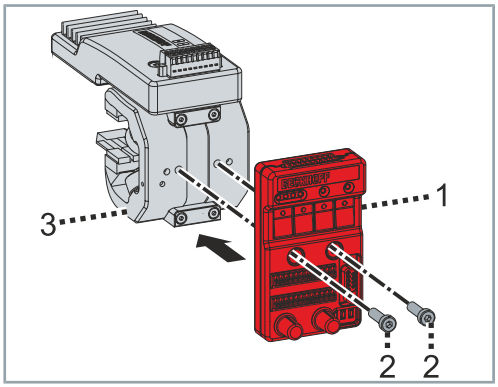


- ► Remove screws [1]
- ► Remove test board [2]

7.3.2 Assembly

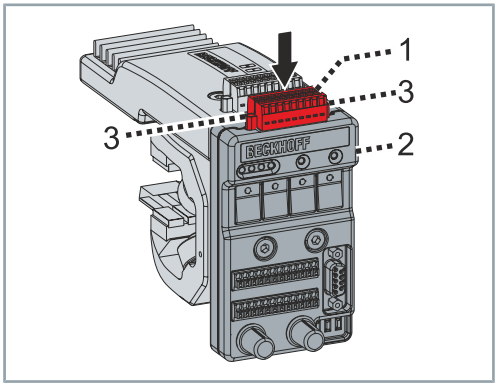
NOTICE

Note mover type
The test board may only be attached to AT9014-1070-x550 movers. All other movers are not suitable for mounting the NCT electronics.



- ► Screw the test board [1] to the mover [3] with screws [2]
- ► Observe tightening torques:

Components	Tightening torque [Nm]
Screws, M6 x 20	4



- ► Plug the connector [1] of the cable bridge into the connection strip of the test board [2]
- ► Tighten screws [3] on the cable bridge

8 Decommissioning

Disassembly may only be carried out by qualified and trained personnel.

Further information can be found in chapter Staff qualification.

When disposing of electronic waste, make sure that you dispose of it in accordance with the regulations applicable in your country. Read and follow the instructions for proper disposal.

8.1 Disassembly

⚠ WARNING

Risk of injury when disassembling the movers
Permanent magnets are installed in the magnetic plate sets of the movers. Be careful when disassembling the magnetic plate sets. Make sure that the magnetic plate sets do not magnetically attract one another with your hands in-between.
If you don't take care during the disassembly, opposite magnetic plate sets may attract each other without warning and injure your hands.

Do not remove components from the products
Only
Beckhoff Automation GmbH & Co. KG is permitted to remove components.
Contact Beckhoff Service for further information.

✉ service@beckhoff.com

Removal of the components

- ► Remove cables and electrical connections
- ► Loosen the fixing screws of the guide rails and the modules
- ► Remove the modules from the machine one after the other
- ► Transport the XTS components to the workplace or put them into storage

8.2 Disposal

Depending on your application and the products used, ensure the professional disposal of the respective components:

Cast iron and metal
Dispose of cast and metal parts as scrap metal for recycling.

Cardboard, wood and foam polystyrene
Dispose of packaging materials made of cardboard, wood or foam polystyrene in accordance with the regulations.

Plastics and hard plastics
You can recycle parts made of plastic and hard plastic via the recycling depot or re-use them depending on the component designations and markings.

Oils and lubricants
Dispose of oils and lubricants in separate containers. Hand over the containers at the used oil collection station.

Batteries and rechargeable batteries
Batteries and rechargeable batteries may also be marked with the crossed-out trash can symbol. You must separate these components from the waste and are legally obliged to return used batteries and rechargeable batteries within the EU. Observe the relevant provisions outside the area of validity of the EU Directive 2006/66/EC.

Electronic components
Products marked with a crossed-out waste bin must not be disposed of with general waste. Electronic components and device are considered as waste electrical and electronic equipment for disposal. Observe the national regulations for the disposal of old electrical and electronic equipment.

8.2.1 Returning to the vendor

In accordance with the WEEE-2012/19/EU directives, you can return used devices and accessories for professional disposal. The transport costs are borne by the sender.

Send the used devices with the note "For disposal" to:

Beckhoff Automation GmbH & Co. KG
"Service" Building
Stahlstrasse 31
D-33415 Verl

In addition, you have the option to contact a local certified specialist company for the disposal of used electrical and electronic appliances. Dispose of the old components in accordance with the regulations applicable in your country.

9 Circuit diagram

BECKHOFF
New Automation Technology

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telefax : +49 (0)5246 / 963-379
e-mail : see project manager@beckhoff.de

Company / customer	
Project description	
Job number	XTS starter kit with NCT functionality
Commission	

Manufacturer (company)	Beckhoff Automation GmbH & Co. KG Hülshorstweg 20 D-33415 Verl / Germany
Manufacturer (order number)	
Project name	XTS starter kit with NCT functionality
make	
Typ	XTS starter kit with NCT functionality
Place of installation	
Manufacturing date	2022
project manager	
Special feature	

Date of creation	22.06.2022 from MatthiasD	
Modification date	07.12.2022 from MatthiasD	Number of pages 51

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=TERMINAL/3	EMA	terminal diagram =CABINET+S1-XP24V		07.12.2022	MatthiasD	
=TERMINAL/4	EMA	terminal diagram =CABINET+S1-XPE		07.12.2022	MatthiasD	
=CABLE/1	EMB	Cable overview : =CABINET+S1-1W1 - =CABINET+M-20W1		07.12.2022	MatthiasD	
=CABLE/2	EMB	cable diagram =CABINET+S1-1W1		22.06.2022	MatthiasD	
=CABLE/3	EMB	cable diagram =CABINET+S1-30W1		07.12.2022	MatthiasD	
=CABLE/4	EMB	cable diagram =CABINET+S1-30W2		07.12.2022	MatthiasD	
=CABLE/5	EMB	cable diagram =CABINET+S1-30W4		07.12.2022	MatthiasD	
=CABLE/6	EMB	cable diagram =CABINET+S1-20WXS1		07.12.2022	MatthiasD	
=CABLE/7	EMB	cable diagram =CABINET+M-20W1		07.12.2022	MatthiasD	

contents

BECKH_P8_Dyn_v2

column X: created autom. but modified manually

page	document type	page description	page supplementary field	date	editor	X
=COMPONENTS/1	EPB	Parts list		02.12.2022	MatthiasD	
=COMPONENTS/2	EPB	Parts list		07.12.2022	MatthiasD	
=COMPONENTS/3	EPB	Parts list		07.12.2022	MatthiasD	
=COMPONENTS/4	EPB	Parts list		07.12.2022	MatthiasD	
=PLC/1	EFP	PLC diagram		07.12.2022	MatthiasD	
=PLC/2	EFP	PLC diagram		22.06.2022	MatthiasD	
=PLC/3	EFP	PLC diagram		07.12.2022	MatthiasD	
=PLC/4	EFP	PLC diagram		22.06.2022	MatthiasD	
=PLC/5	EFP	PLC diagram		22.06.2022	MatthiasD	
=PLC/6	EFP	PLC diagram		07.12.2022	MatthiasD	
=PLC/7	EFP	PLC diagram		07.12.2022	MatthiasD	
=PLC/8	EFP	PLC diagram		22.06.2022	MatthiasD	
=PLC/9	EFP	PLC diagram		02.12.2022	MatthiasD	
=PLC/10	EFP	PLC diagram		02.12.2022	MatthiasD	

Structuring principles, wiring diagram structure

BECKH_P8_01

DCC	Document kind classification	Example
&EAA =	Administrative documents	Cover sheet
&EAB =	Electrical engineering Lists (referring to documents)	Table of contents
&ETL =	electrical engineering Arrangement documents	Legend Description of the structuring principles and reference identification Function groups System diagram Layout drawings
&EFS =	Electrical engineering Circuitry documents	Circuit diagram
&EMA=	Electrical engineering Connection documents	Terminal diagram
&EMB=	Electrical engineering Cabling documents Piping documents	Cable diagram
&EPB =	Electrical engineering Parts list	Parts list / piece list
&EFP =	signal descriptions	signal list
&EQC=	Quality certification documents	validation plan

as per DIN EN 61355-1

=CONTENTS&EAB/2

2

			date	22.06.2022	XTS starter kit with NCT functionality	BECKHOFF	Legend	=LEGEND
			User	MAD				page
			gepr					&ETL 1
change	date	name	first		Replacement of	Replaced by		

Structuring principles, reference identification

BECKH_P8_02

The reference identification consists of 3 identification blocks

e.g. : =P1+S1-KM1

- Identification block 3 (identification of the equipment (here motor contactor 1))
- Identification block 2 (location of the equipment (here control cabinet 1))
- Identification block 1 (higher-level assignment / function identifier (here system pos.P1))

electrical equipment

Enclosures	:	Rittal
Power supply	:	1/PE/N AC 50Hz 230V
Control voltage	:	24V DC
Regulation	:	EN60204
Degree of protection	:	

Conductor cross-sections if not indicated

(as per DIN VDE 0298 part
4 conductor ambient temperature max 45 degrees)

load circuit	:	1,5 mm²
control circuit	:	1 mm²

Conductor colours if not indicated

neutral conductor	:	light blue
main power circuit AC/DC	:	black
power circuit AC	:	red
power circuit 24VDC	:	blue
power circuit 48VDC	:	violet
minus potential	:	blue/white
external supplied interlocked power circuits AC/DC	:	orange
Excepted electric circuits in front of the mains circuit-breaker	:	orange

Structuring principles, reference identification
Marking block 3 (-kind of operating resources)

BECKH_P8_05

-Axx	general
-Bxx	converter
-Cxx	capacitors
-Dxx	Digital elements
-Exx	miscellaneous
-Fxx	Protection devices
-Gxx	Power supply connection
-Hxx	Signal device
-Kxx	Relay, Contactors
-KMxx	Motor contactor
-KTxx	Time relay
-KYxx	Brake contactor
-Lxx	inductances
-Mxx	motors
-Nxx	Amplifier, Controller
-Pxx	Measuring instruments, test equipment
-Qxx	Power switchgear
-Rxx	resistors
-Sxx	Switch, Selector
-Txx	transformers
-Uxx	Modulators
-Vxx	Tube, semiconductor
-Wxx	Transmission paths
-Xxx	Terminals
-XSxx	Plug
-Yxx	Electrically operated mechanical equipment
-Zxx	Completion, filters

Structuring principles, reference identification

BECKH_P8_06

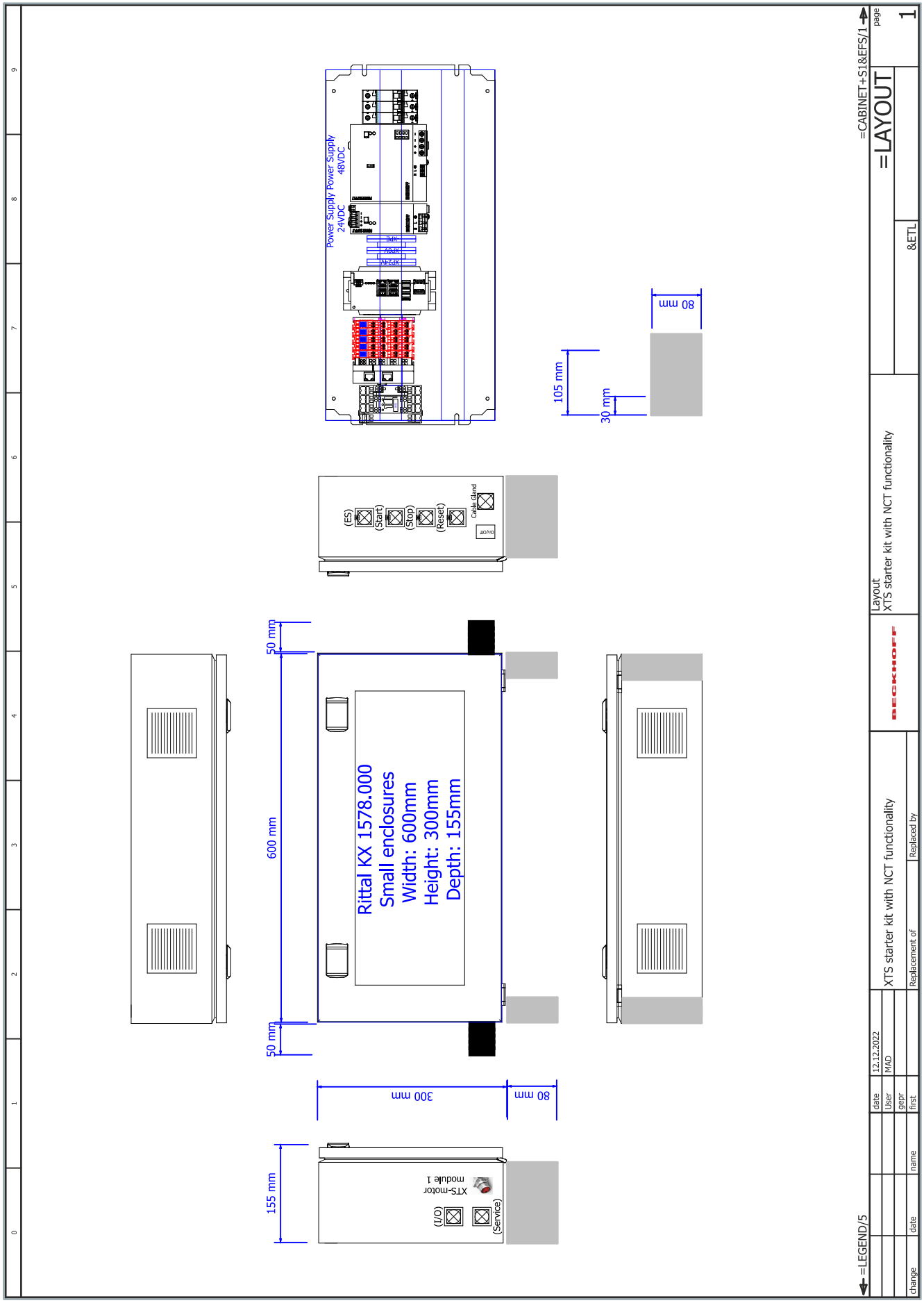
Identification block 3 (- type of equipment) Beckhoff Bus Terminals

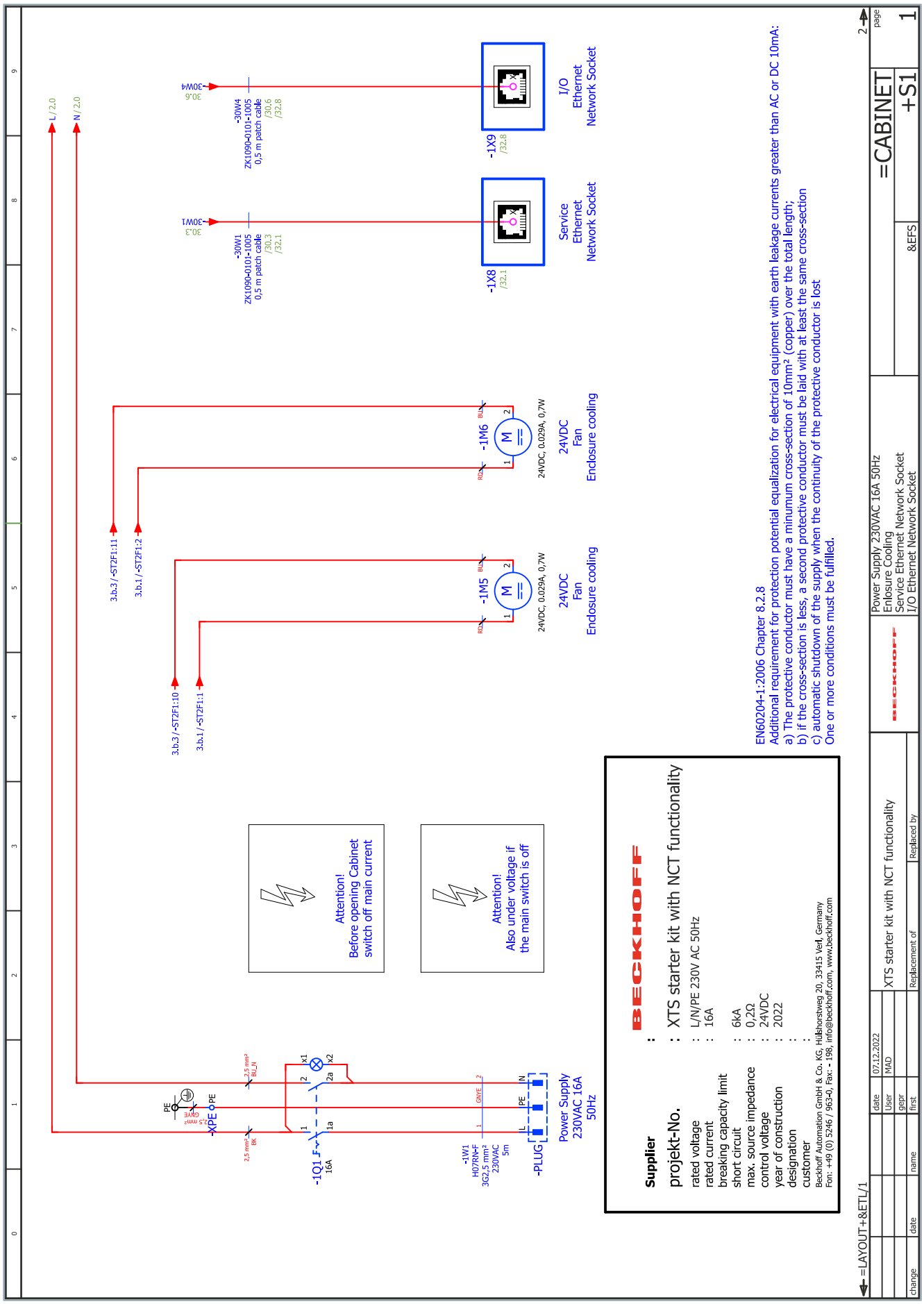
-Axx	General (CXxxxx, Cxxxx, CPxxxx)
-ACxx	Analog combination terminals
-AIxx	Analog Input Terminals (KL3xxx/EL3xxx)
-AOxx	Analog Output Terminals (KL4xxx/EL4xxx)
-BCxx	Bus Coupler, Bus Controller (BKxxxx,BCxxxx)
-BJxx	Bus junction (EK1122, EK1110)
-COxx	Terminals for communication (KL6xxx/EL6xxx)
-DCxx	Digital combination terminals (EL1859, EP2308-0001)
-DIxx	Digital Input terminals (KL1xxx/EL1xxx)
-DOxx	Digital Output Terminals (KL2xxx/EL2xxx)
-MFxx	Multifunctional (EP8309-0002)
-PMxx	Terminals for angle/distance measurement/step motor (KL5xxx/KL7xxx/EL5xxx/EL7xxx)
-SCxx	Safe bus couplers, bus controllers, combination terminals (EK1914, EK1960)
-SIxx	TwinSafe input terminals (KL19xx/EL19xx)
-SLxx	TwinSAFE logic (EL69xx)
-SOxx	Twinsafe output terminals (KLx9xx/ELx9xx)
-STxx	Terminals for communication (KL9xxx/EL9xxx)
-Uxx	Modulators, converters (EL7211, EM7004)

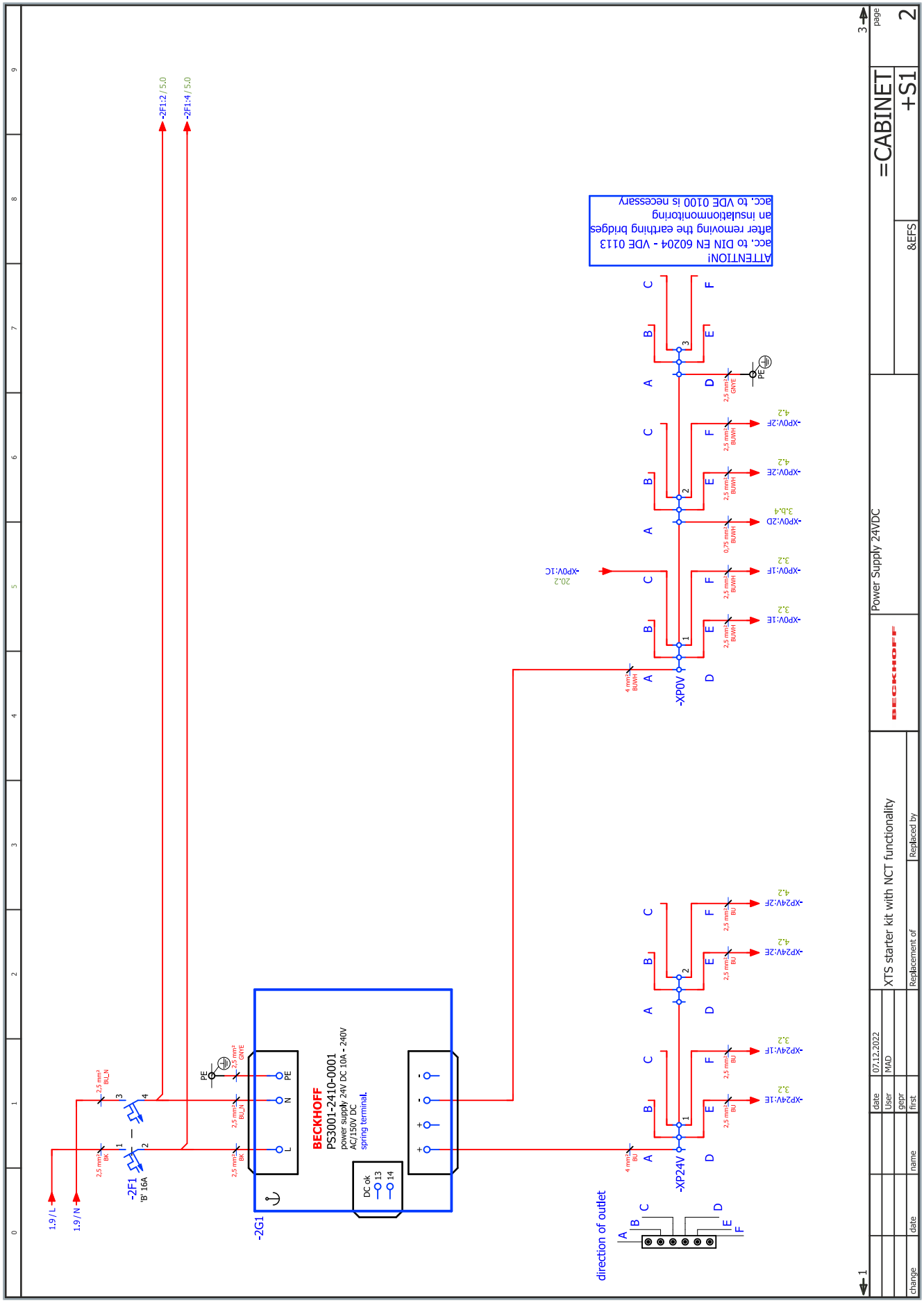
: 4

=LAYOUT/1

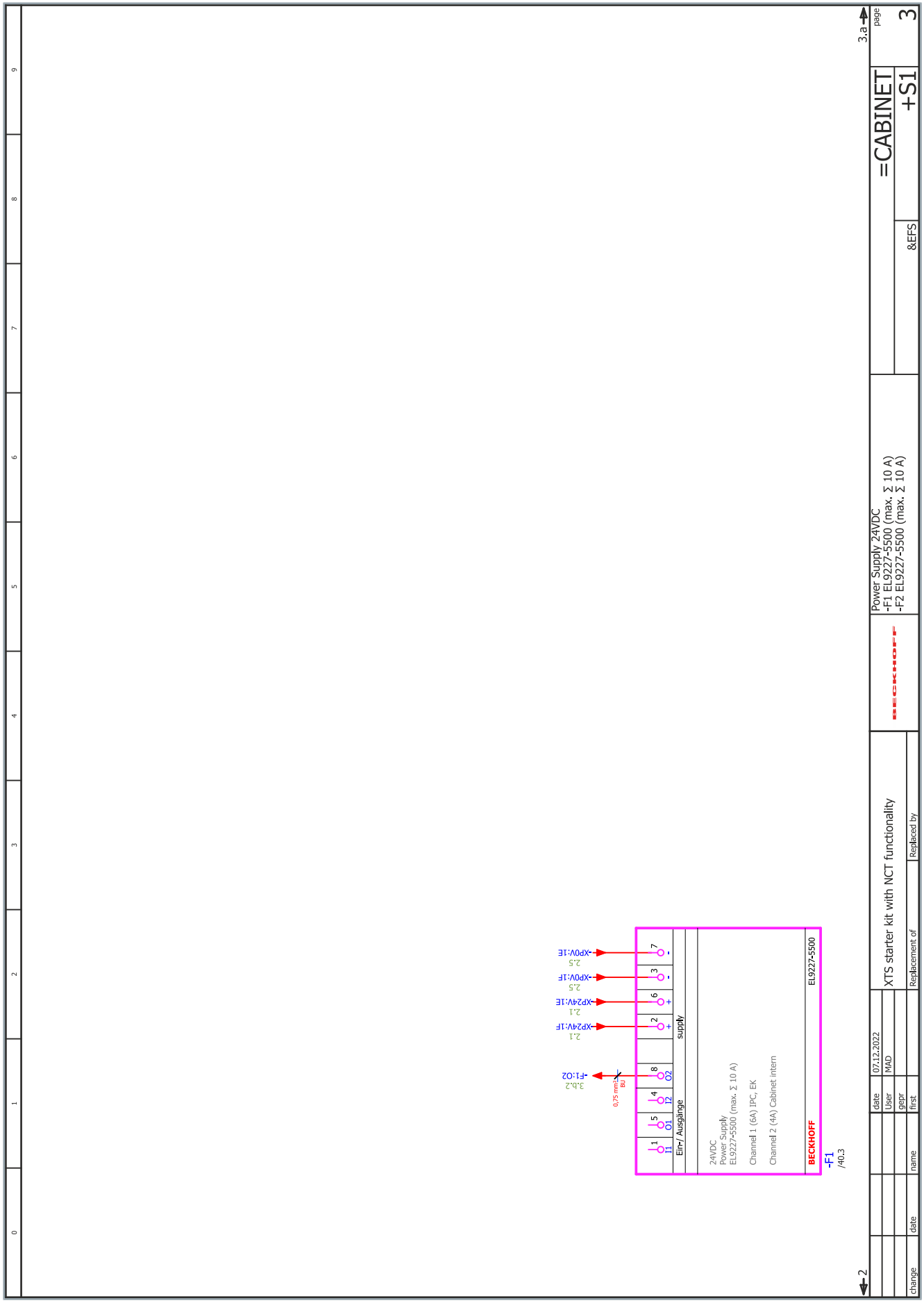
			date	22.06.2022	XTS starter kit with NCT functionality	BECKHOFF	Legend	=LEGEND page 5
			User	MAD				
			gepr					
change	date	name	first		Replacement of	Replaced by		&ETL

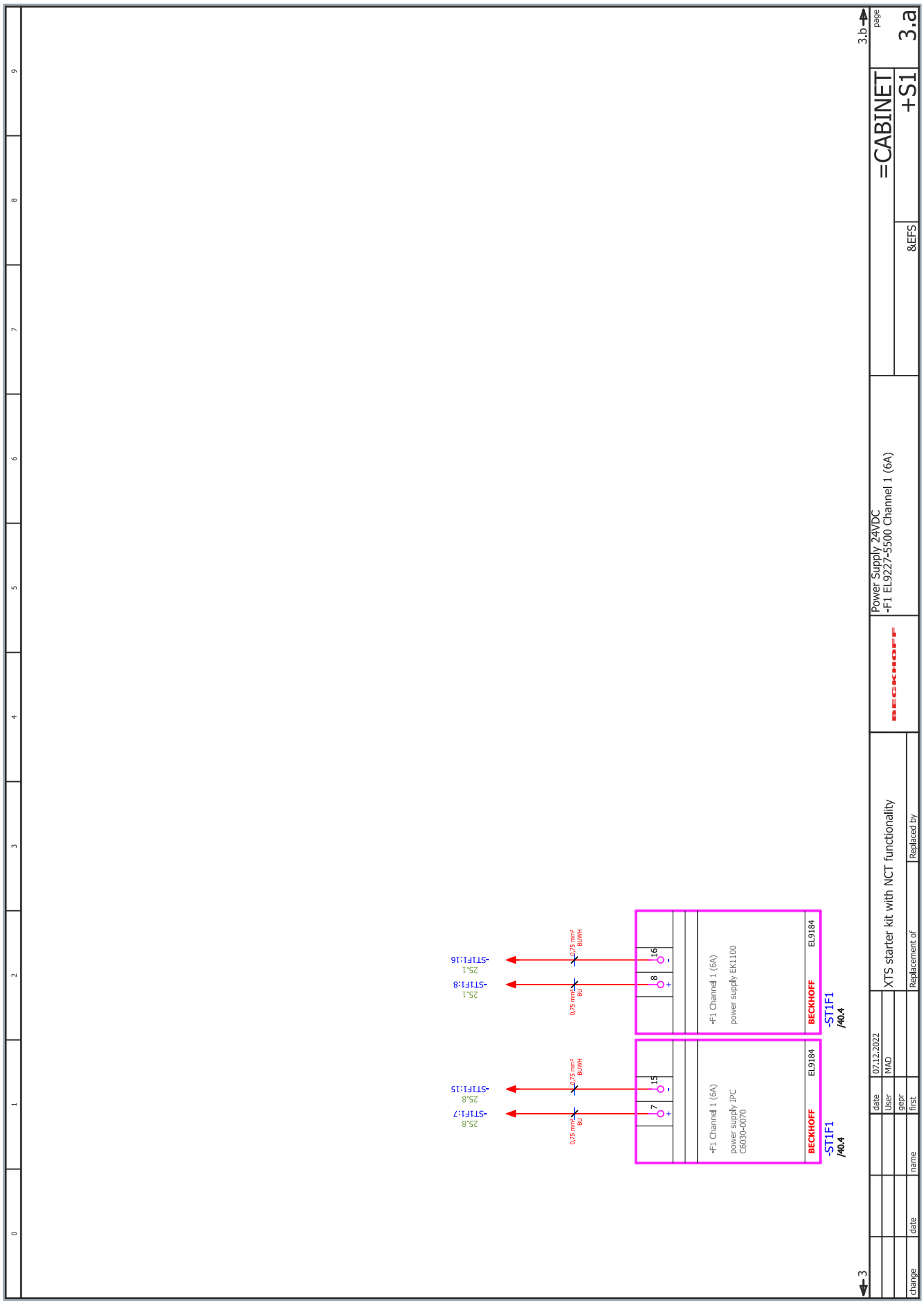

=CABINET+S1&EFS/1
page 1
=LAYOUT
&ETL
Layout
XTS starter kit with NCT functionality
BECKHOFF
XTS starter kit with NCT functionality
Replacement of
Replaced by
date 12.12.2022
User MAD
gepr
first
name
date
change
=LEGEND/5
Power Supply Power Supply 48VDC
Power Supply 24VDC
105 mm
30 mm
80 mm
(ES)
(Start)
(Stop)
(Reset)
Cable gland
On/Off
50 mm
600 mm
50 mm
Rittal KX 1578.000
Small enclosures
Width: 600mm
Height: 300mm
Depth: 155mm
300 mm
80 mm
155 mm
XTS-motor module 1
(O/I)
(Service)

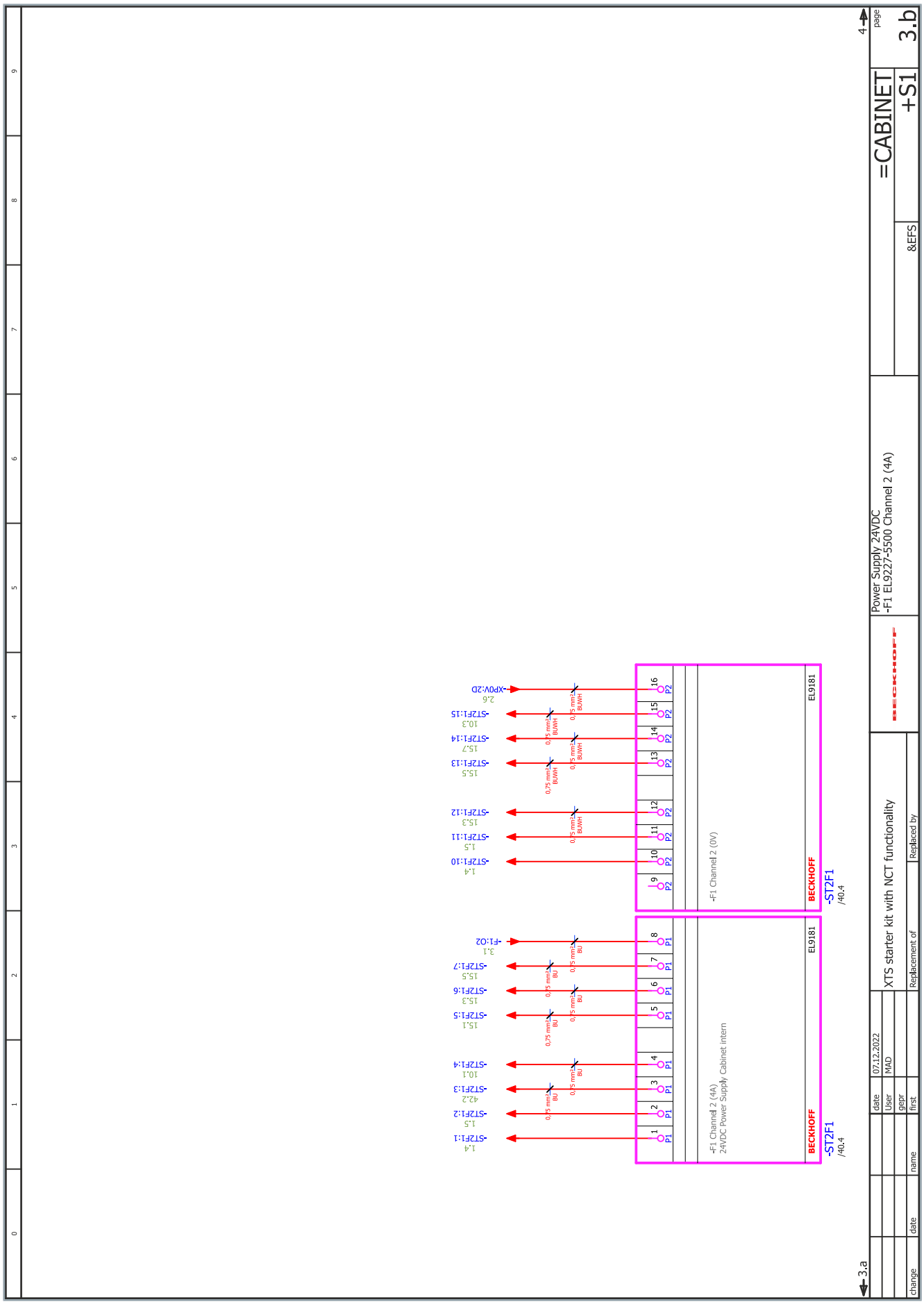

L / 2.0
N / 2.0
-XPE
PE
-1Q1 F
16A
-1W1
H07RN-F
3G2,5 mm²
230VAC
5m
-PLUG
Power Supply
230VAC 16A
50Hz
Attention!
Before opening Cabinet
switch off main current
Attention!
Also under voltage if
the main switch is off
3.b.3 / -ST2F1:11
3.b.1 / -ST2F1:2
3.b.3 / -ST2F1:10
3.b.1 / -ST2F1:1
-1M5
-1M6
24VDC, 0.029A, 0,7W
24VDC
Fan
Enclosure cooling
-30W4
ZK1090-0101-1005
0,5 m patch cable
-30W1
ZK1090-0101-1005
0,5 m patch cable
-1X9
-1X8
I/O
Ethernet
Network Socket
Service
Ethernet
Network Socket
BECKHOFF
Supplier :
projekt-No. : XTS starter kit with NCT functionality
rated voltage : L/N/PE 230V AC 50Hz
rated current : 16A
breaking capacity limit : 6kA
short circuit : 0,2Ω
max. source impedance : 24VDC
control voltage : 2022
year of construction :
designation :
customer :
Beckhoff Automation GmbH & Co. KG, Hülshorstweg 20, 33415 Verl, Germany
Fon: +49 (0) 5246 / 963-0, Fax: - 198, info@beckhoff.com, www.beckhoff.com
EN60204-1:2006 Chapter 8.2.8
Additional requirement for protection potential equalization for electrical equipment with earth leakage currents greater than AC or DC 10mA:
a) The protective conductor must have a minumum cross-section of 10mm² (copper) over the total length;
b) If the cross-section is less, a second protective conductor must be laid with at least the same cross-section
c) automatic shutdown of the supply when the continuity of the protective conductor is lost
One or more conditions must be fulfilled.
=LAYOUT+&ETL/1
change
date
name
first
gepr
User
MAD
07.12.2022
XTS starter kit with NCT functionality
Replacement of
Replaced by
BECKHOFF
Power Supply 230VAC 16A 50Hz
Enlosure Cooling
Service Ethernet Network Socket
I/O Ethernet Network Socket
=CABINET
+S1
&EFS
page
1

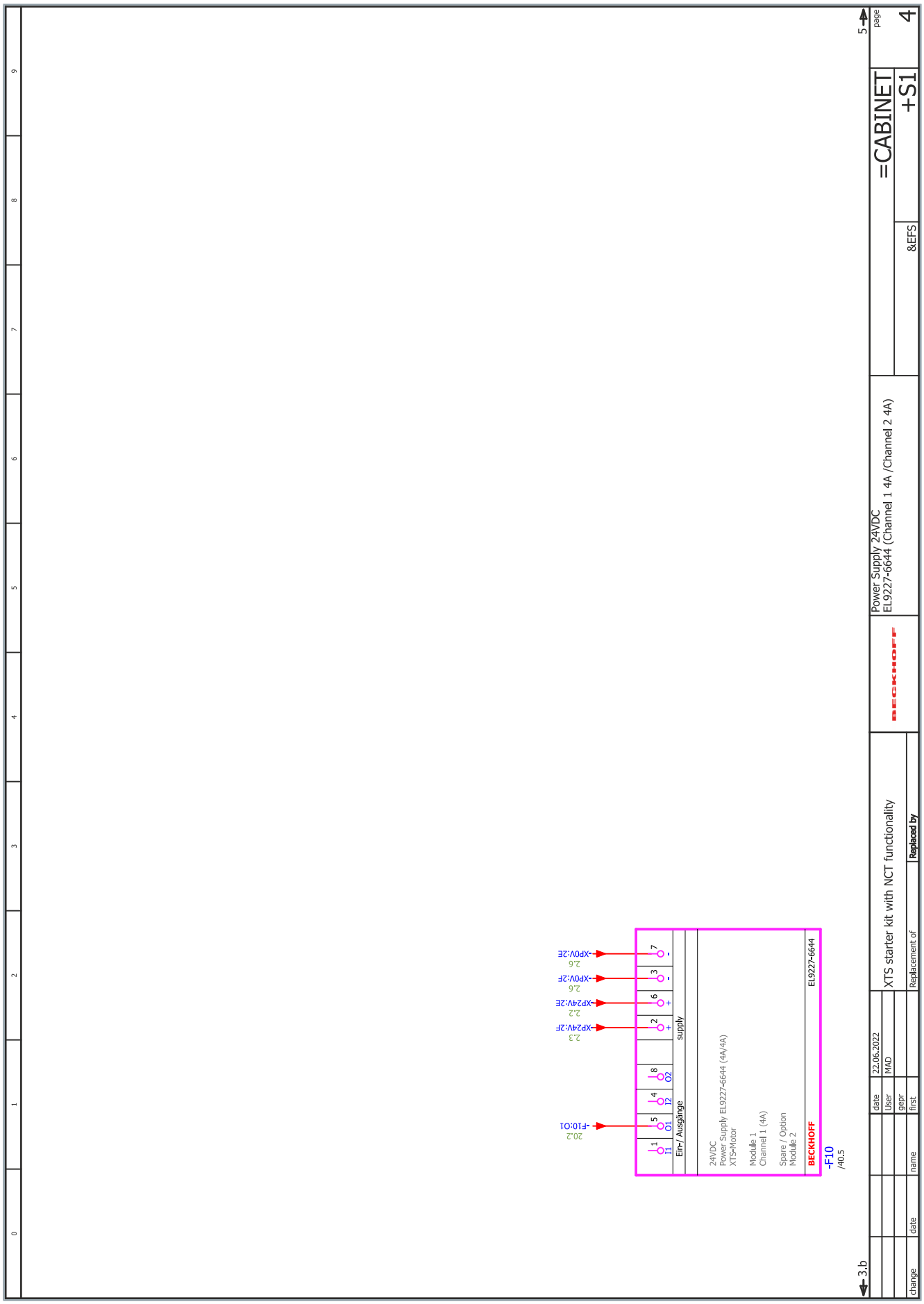

=CABINET +S1
page 2
&EFS
Power Supply 24VDC
XTS starter kit with NCT functionality
BECKHOFF
PS3001-2410-0001
power supply, 24V DC 10A - 240V AC/150V DC
spring terminal.
DC ok
-2G1
-2F1
-XP0V
-XP24V
-2F1:2 / 5.0
-2F1:4 / 5.0
1.9 / L
1.9 / N
direction of outlet
ATTENTION!
acc. to DIN EN 60204 - VDE 0113
after removing the earthing bridges
an insulationmonitoring
acc. to VDE 0100 is necessary

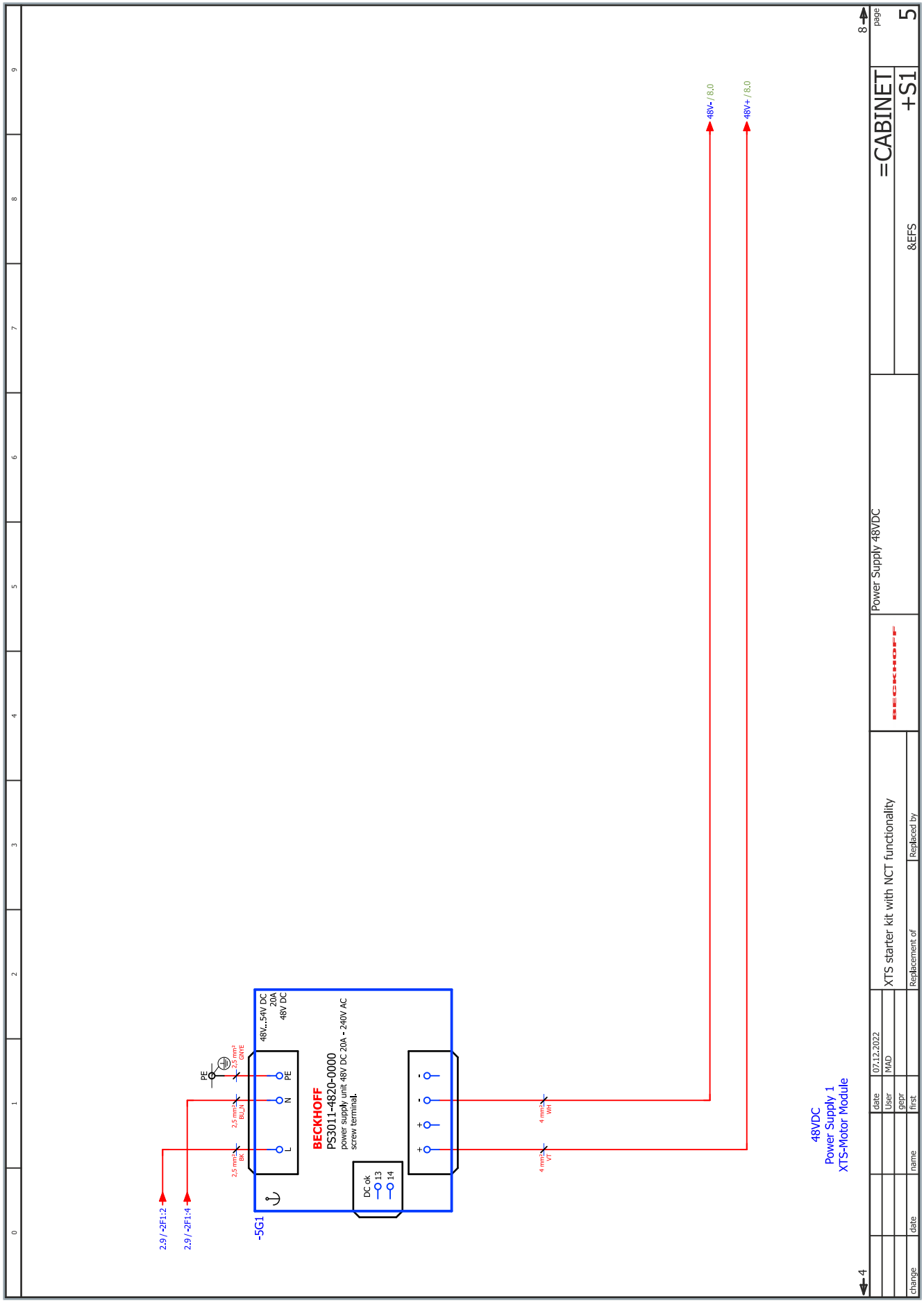
Circuit diagram

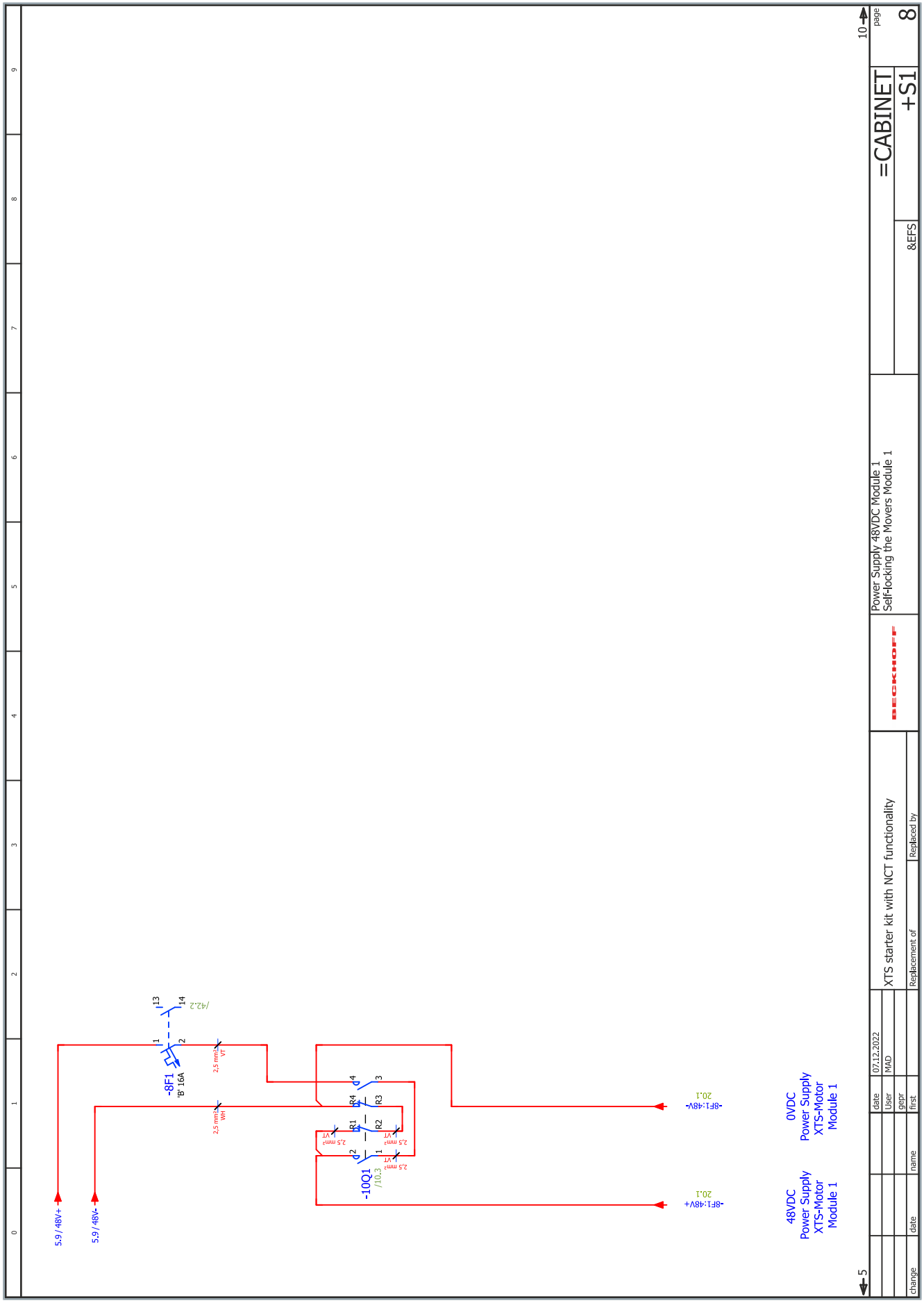


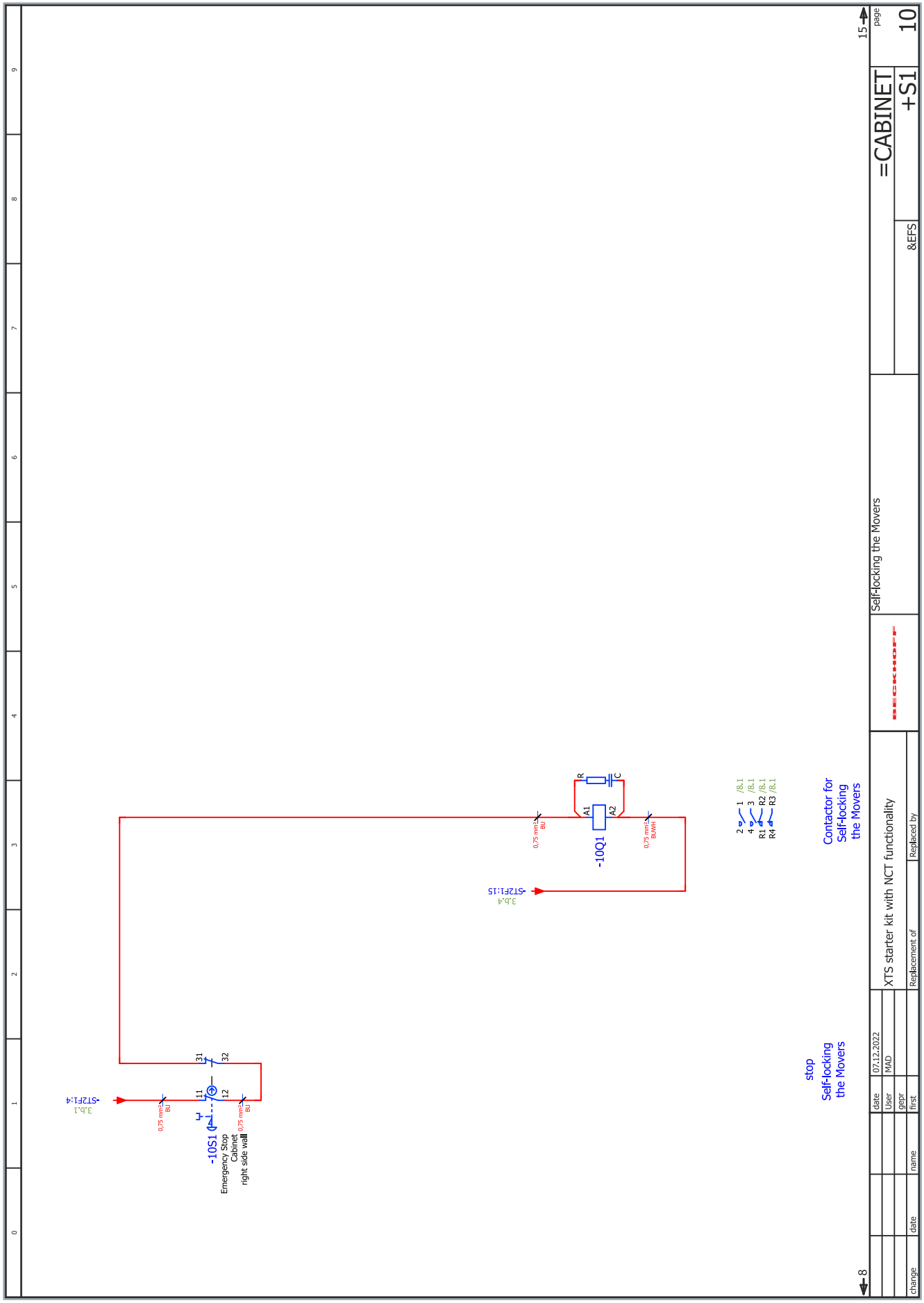

3.b
page
3.a
=CABINET
+S1
&EFS
Power Supply 24VDC
-F1 EL9227-5500 Channel 1 (6A)
BECKHOFF
XTS starter kit with NCT functionality
Replacement of
Replaced by
date
07.12.2022
User
MAD
gepr
first
name
date
change
3
-ST1F1
/40.4
BECKHOFF
EL9184
-F1 Channel 1 (6A)
power supply IPC
C6030-0070
7
15
-ST1F1:7
-ST1F1:15
25.8
0,75 mm²
BU
BUWH
-ST1F1
/40.4
BECKHOFF
EL9184
-F1 Channel 1 (6A)
power supply EK1100
8
16
-ST1F1:8
-ST1F1:16
25.1

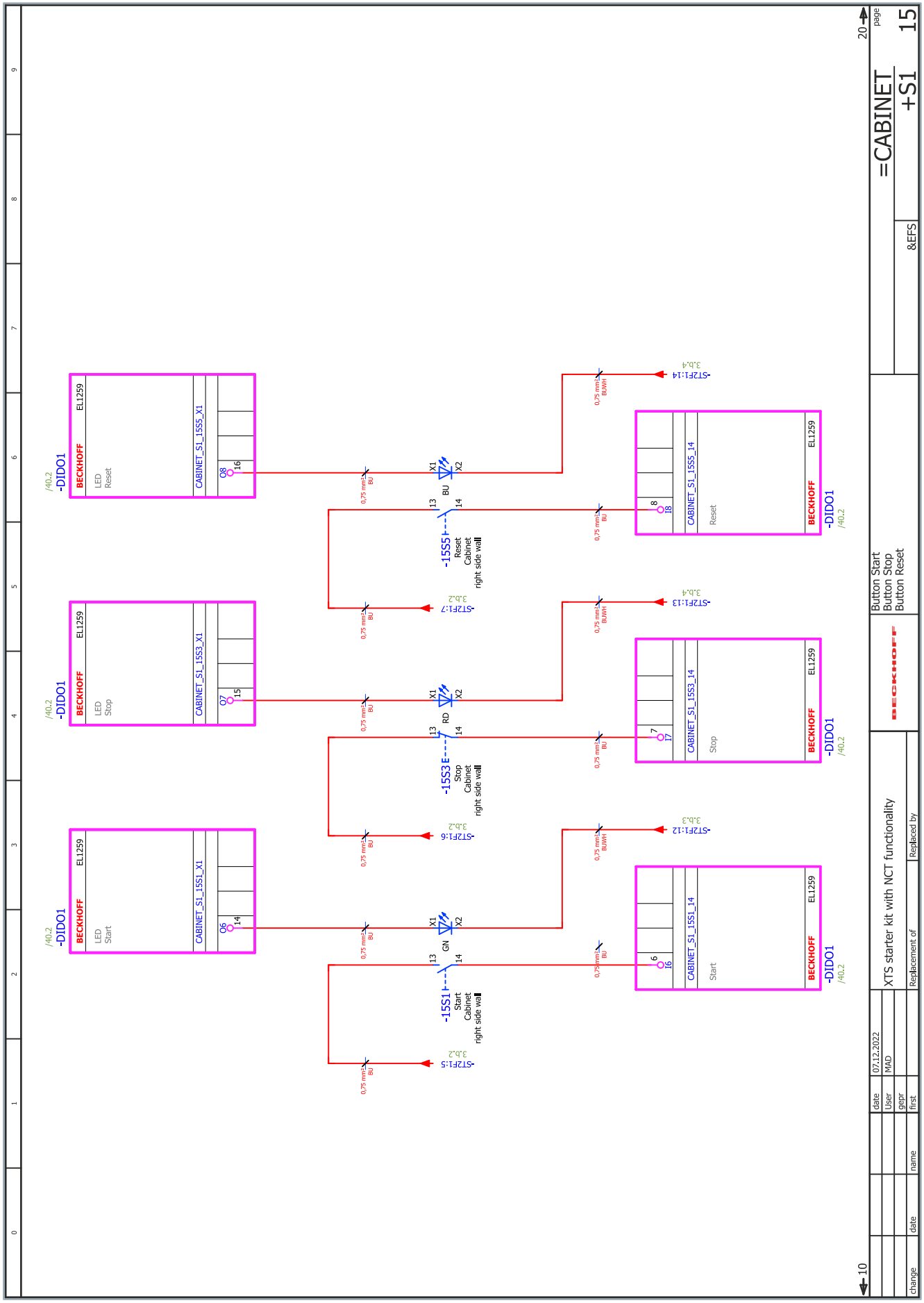

Power Supply 24VDC
-F1 EL9227-5500 Channel 2 (4A)
=CABINET
+S1
3.b
page
&EFS
XTS starter kit with NCT functionality
07.12.2022
MAD
Replacement of
Replaced by
-F1 Channel 2 (4A)
24VDC Power Supply Cabinet intern
-F1 Channel 2 (0V)
EL9181
BECKHOFF
-ST2F1
/40.4
-XP0V:ZD
-F1:O2
-ST2F1:1
-ST2F1:2
-ST2F1:3
-ST2F1:4
-ST2F1:5
-ST2F1:6
-ST2F1:7
-ST2F1:10
-ST2F1:11
-ST2F1:12
-ST2F1:13
-ST2F1:14
-ST2F1:15
0,75 mm² BU
0,75 mm² BUWH

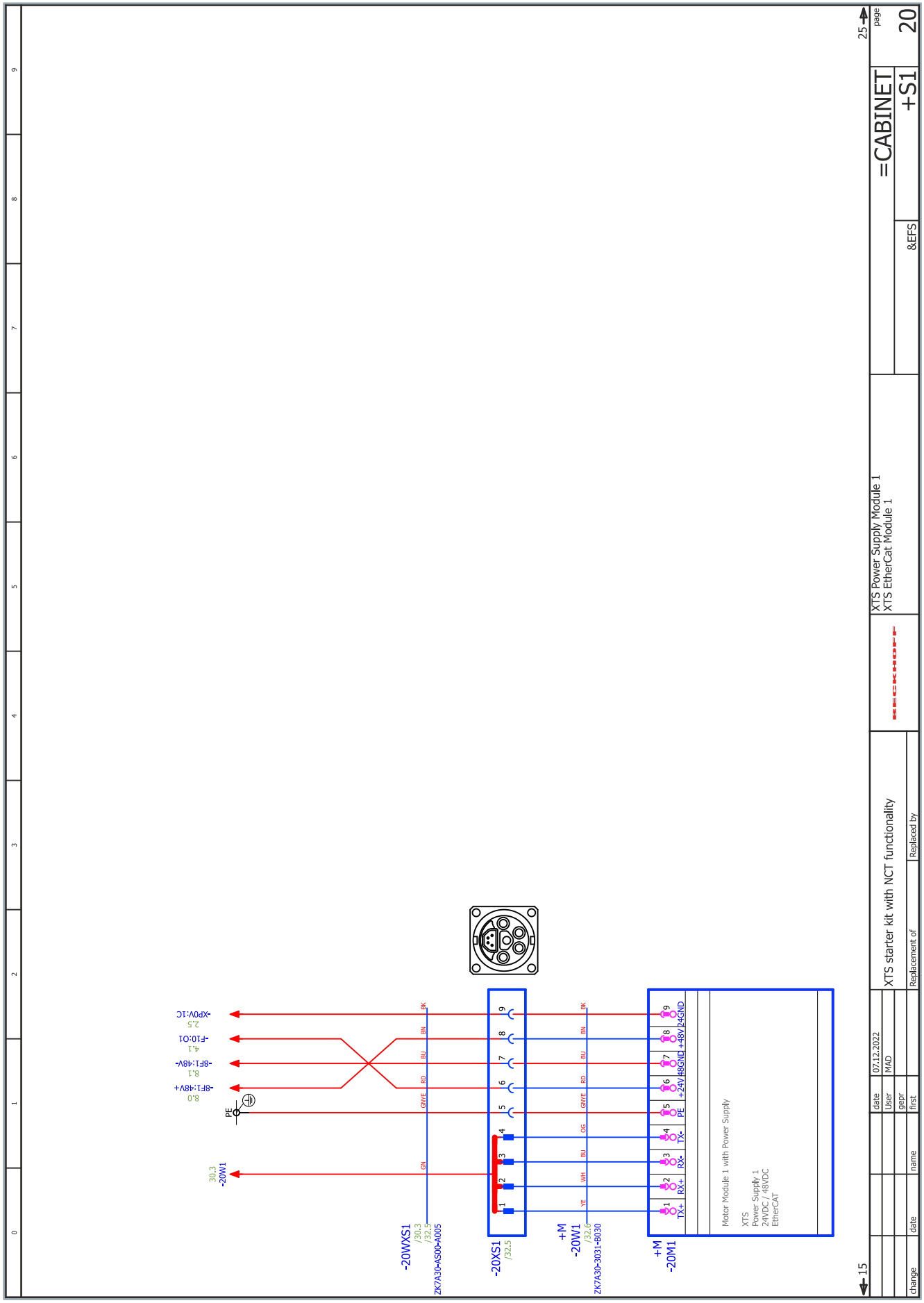

3.b
5
page
4
=CABINET
+S1
&EFS
Power Supply 24VDC
EL9227-6644 (Channel 1 4A /Channel 2 4A)
BECKHOFF
XTS starter kit with NCT functionality
date
22.06.2022
User
MAD
gepr
first
name
date
change
Replaced by
Replacement of
-F10
/40.5
BECKHOFF
EL9227-6644
24VDC
Power Supply EL9227-6644 (4A/4A)
XTS-Motor
Module 1
Channel 1 (4A)
Spare / Option
Module 2
Ein-/ Ausgänge
supply
I1
O1
I2
O2
-F10:O1
20.2
-XP24V:2F
2.3
-XP24V:2E
2.2
-XP0V:2F
2.6
-XP0V:2E
2.6

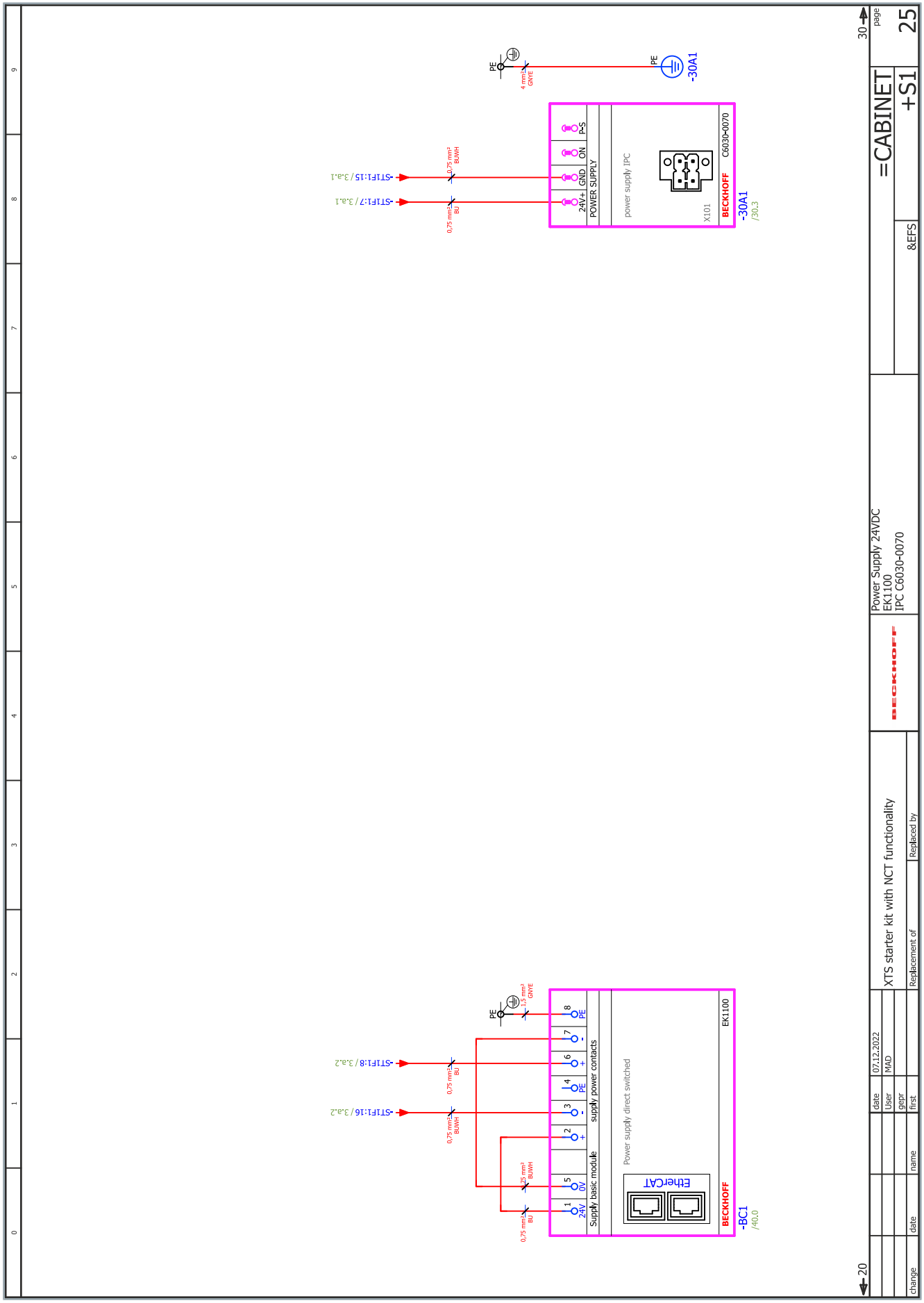

48VDC
Power Supply 1
XTS-Motor Module
48V-/ 8.0
48V+/ 8.0
2.9 / -2F1:2
2.9 / -2F1:4
-5G1
BECKHOFF
PS3011-4820-0000
power supply unit 48V DC 20A - 240V AC
screw terminal
48V...54V DC
20A
48V DC
PE
N
L
DC ok
13
14
2,5 mm²
BK
2,5 mm²
BU_N
4 mm²
GNYE
4 mm²
WH
4 mm²
VT
Power Supply 48VDC
=CABINET
+S1
&EFS
page
5
XTS starter kit with NCT functionality
07.12.2022
MAD
Replacement of
Replaced by
change
date
name
first
User
gepr

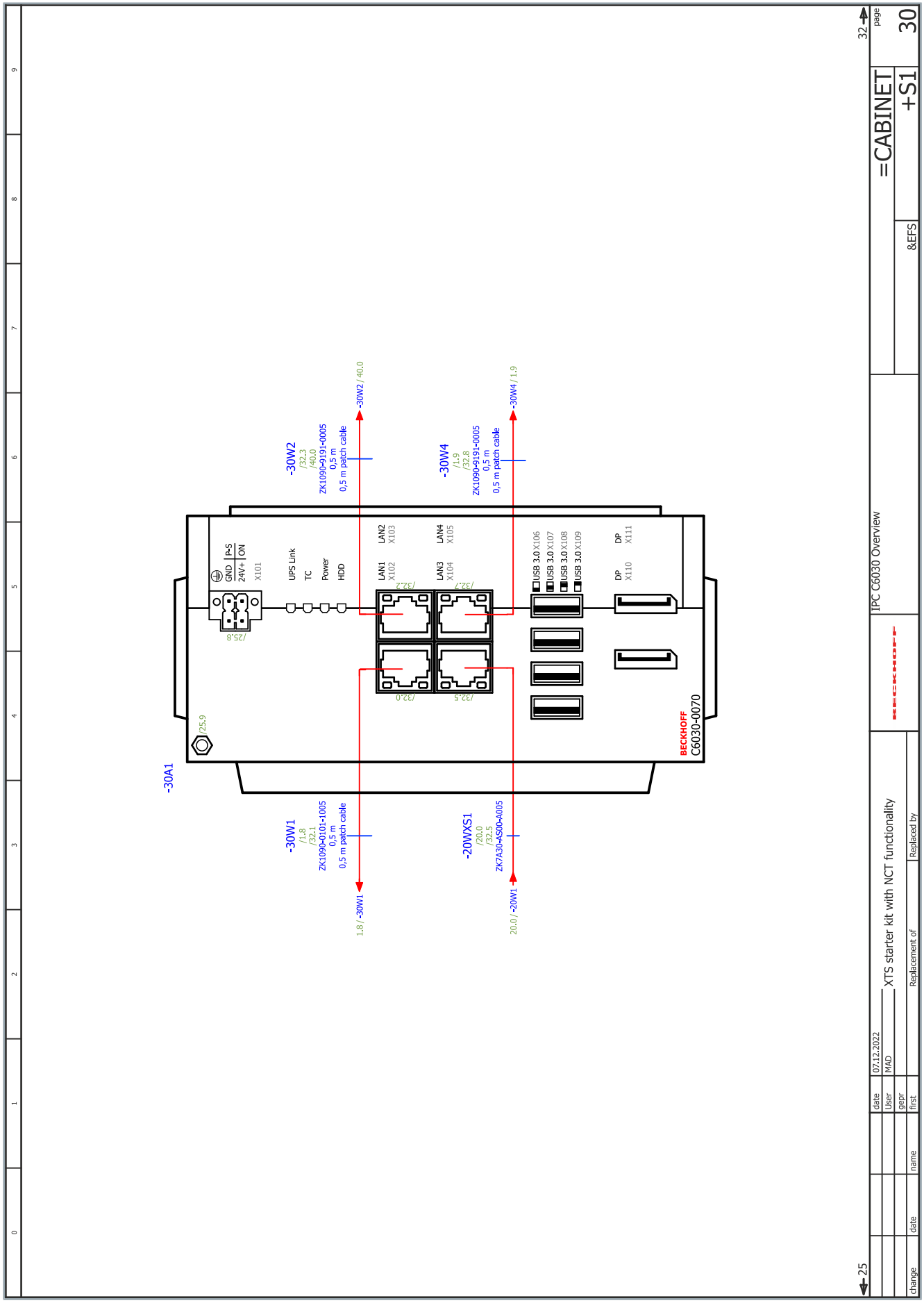

Power Supply 48VDC Module 1
Self-locking the Movers Module 1
=CABINET +S1
&EFS
page 8
XTS starter kit with NCT functionality
07.12.2022
MAD
gepr
first
name
date
change
Replacement of
Replaced by
BECKHOFF
-8F1
'B' 16A
-10Q1
/10.3
5.9 / 48V+
5.9 / 48V-
48VDC
Power Supply
XTS-Motor
Module 1
0VDC
Power Supply
XTS-Motor
Module 1
-8F1:48V+
-8F1:48V-
20.1
/42.2
2,5 mm²
VT
2,5 mm²
VH

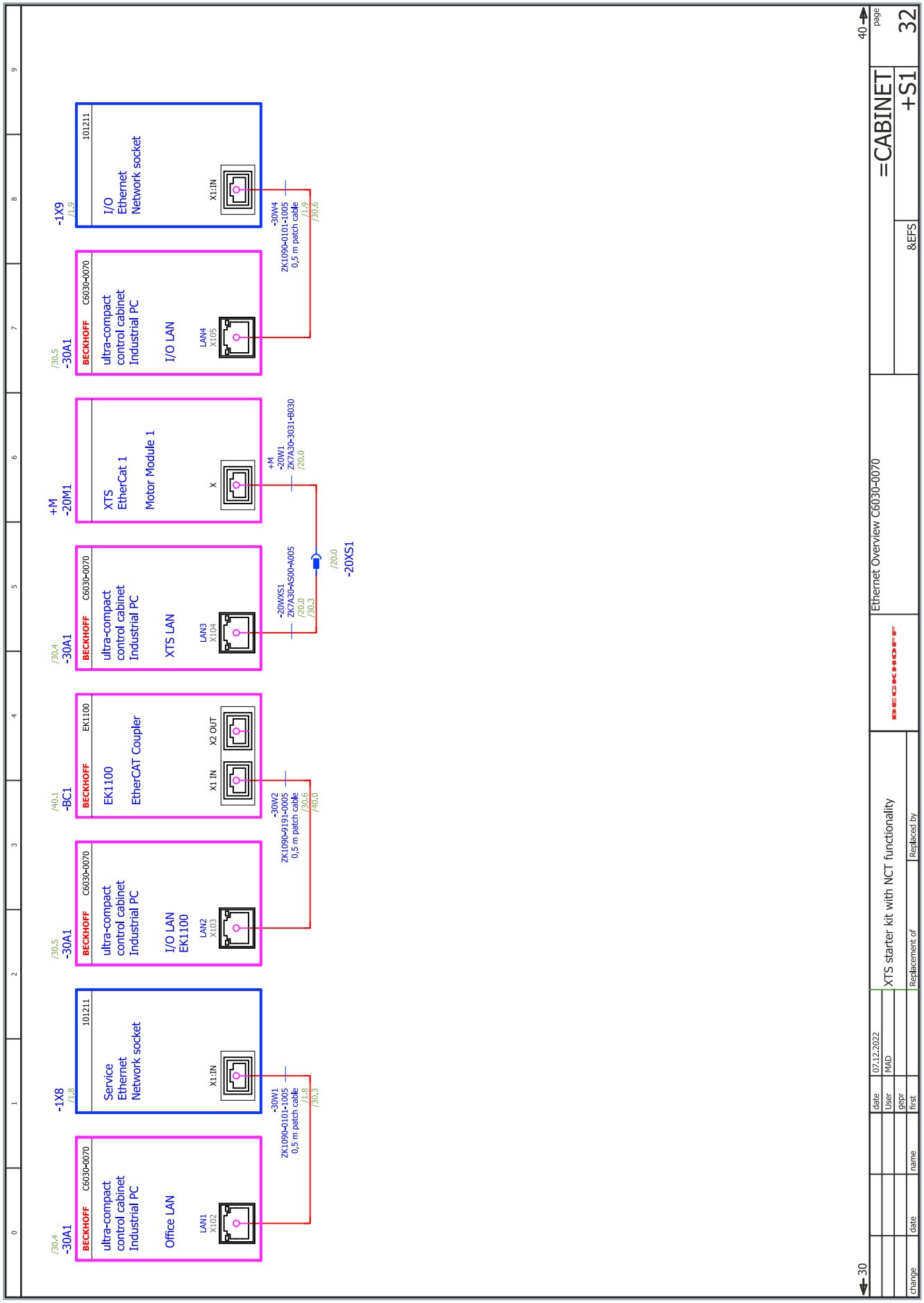

-10S1
Emergency Stop
Cabinet
right side wall
-10Q1
Contactor for
Self-locking
the Movers
stop
Self-locking
the Movers
Self-locking the Movers
=CABINET
+S1
&EFS
page
10
XTS starter kit with NCT functionality
BECKHOFF

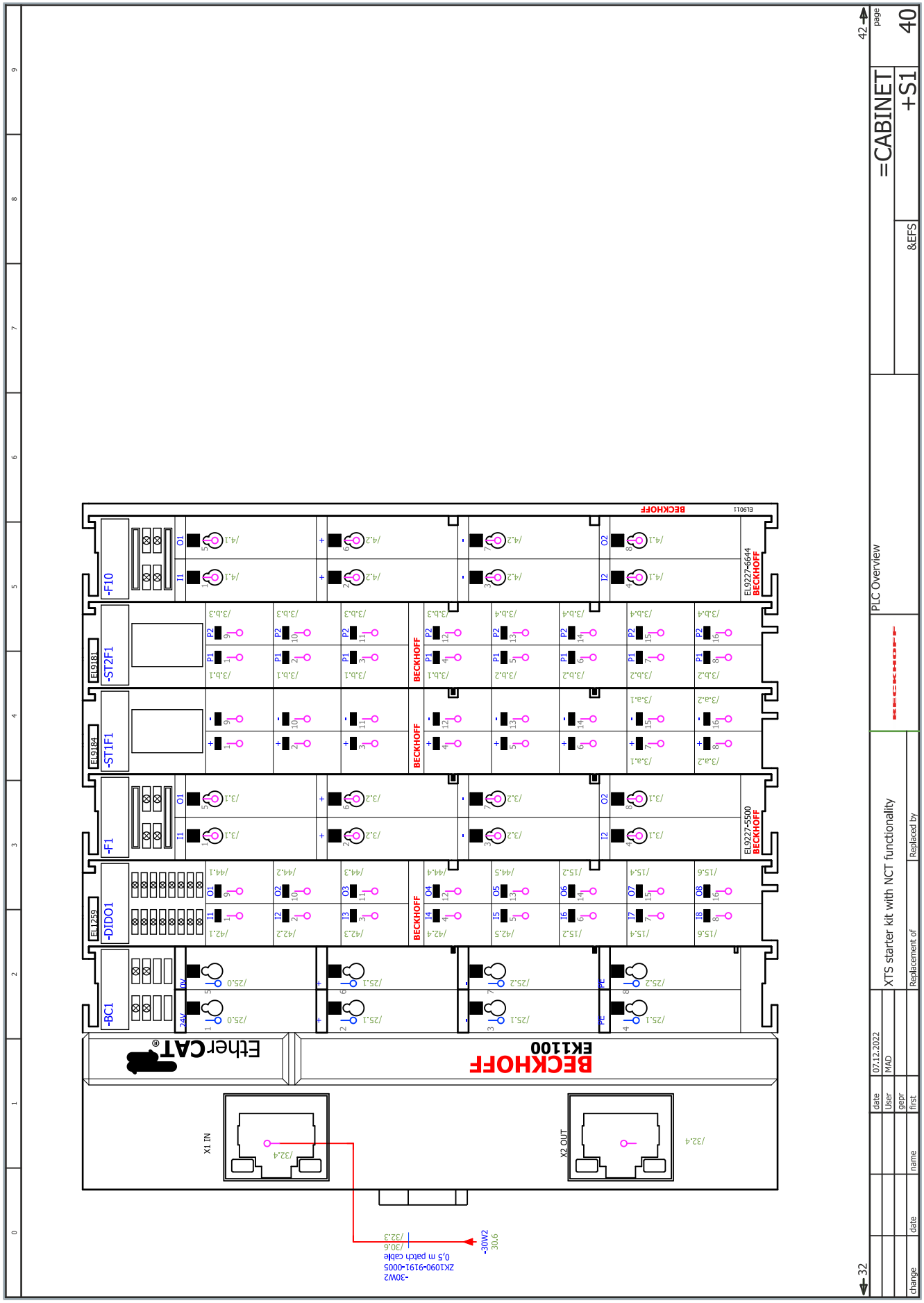

=CABINET +S1
page 15
&EFS
Button Start
Button Stop
Button Reset
XTS starter kit with NCT functionality
Replacement of
Replaced by
date 07.12.2022
User MAD
gepr
first
name
date
change
-DIDO1 /40.2
BECKHOFF EL1259
LED Reset
LED Stop
LED Start
CABINET_S1_15S5_X1
CABINET_S1_15S3_X1
CABINET_S1_15S1_X1
CABINET_S1_15S5_14
CABINET_S1_15S3_14
CABINET_S1_15S1_14
Reset
Stop
Start
-15S5 Reset Cabinet right side wall
-15S3E Stop Cabinet right side wall
-15S1 Start Cabinet right side wall
-ST2F1:5
-ST2F1:6
-ST2F1:7
-ST2F1:12
-ST2F1:13
-ST2F1:14
0,75 mm² BU
0,75 mm² BU/WH
3.b.2
3.b.3
3.b.4

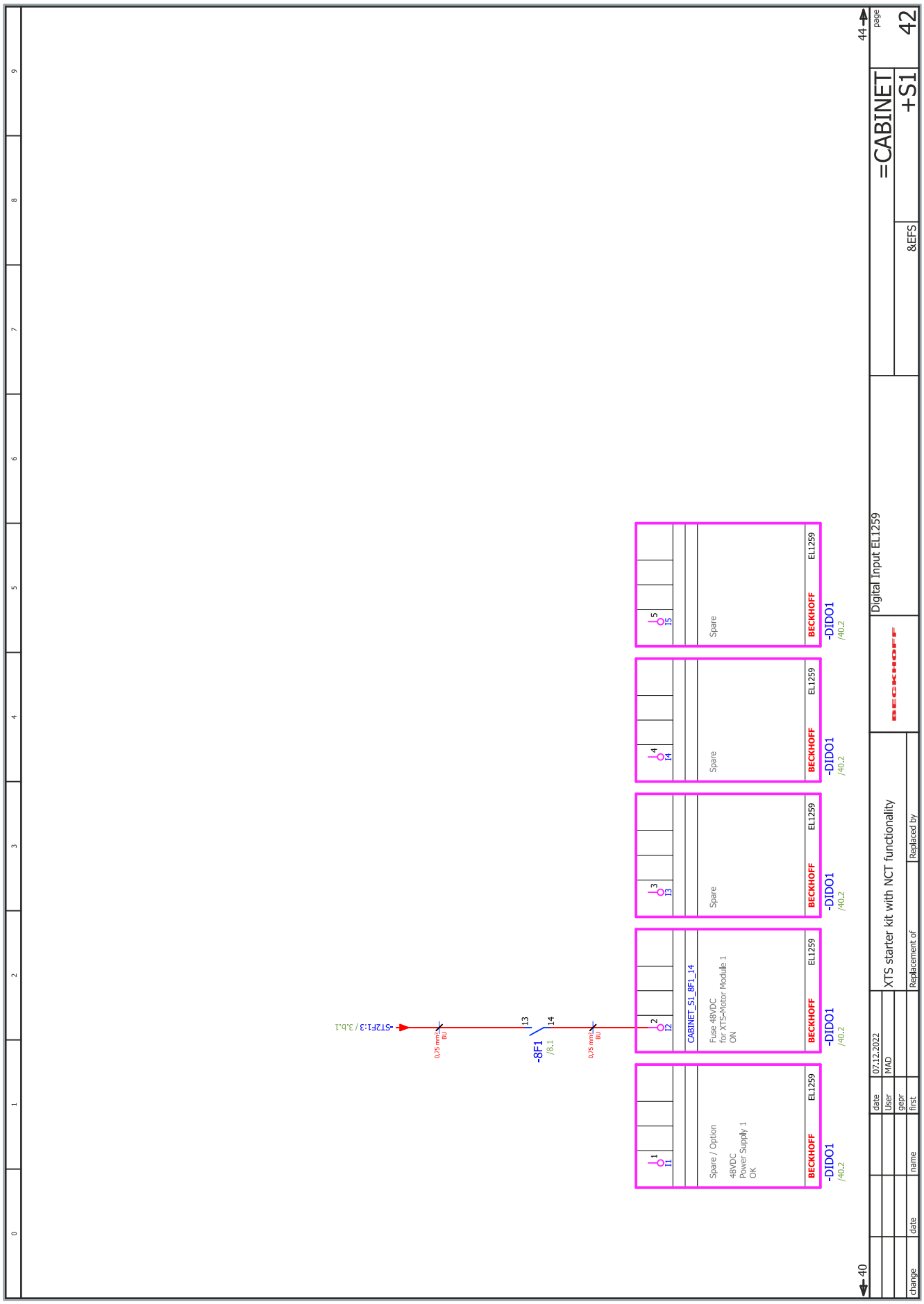

XTS starter kit with NCT functionality
XTS Power Supply Module 1
XTS EtherCat Module 1
=CABINET
+S1
20
-20WXS1
-20XS1
+M
-20W1
-20M1
ZK7A30-A500-A005
ZK7A30-3031-B030
Motor Module 1 with Power Supply
XTS
Power Supply 1
24VDC / 48VDC
EtherCAT
PE
TX+
RX+
RX-
TX-
+24V
48GND
+48V
24GND

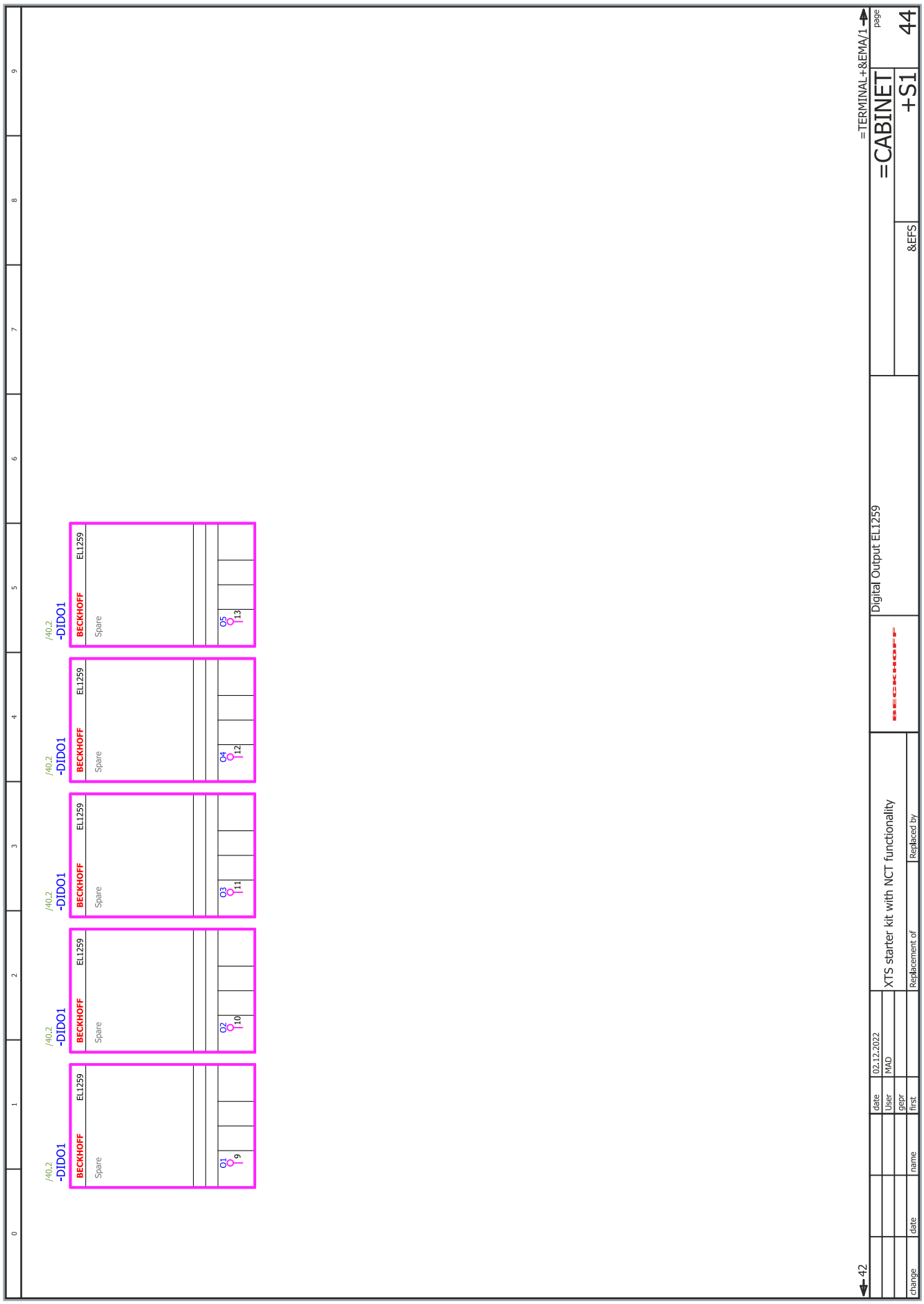

=CABINET +S1 25
page
&EFS
Power Supply 24VDC
EK1100
IPC C6030-0070
XTS starter kit with NCT functionality
BECKHOFF
-BC1
/40.0
EK1100
Supply basic module
supply power contacts
Power supply direct switched
EtherCAT
-30A1
/30.3
C6030-0070
power supply IPC
POWER SUPPLY
24V+
GND
ON
P-S
X101
-STIF1:16/3.a.2
-STIF1:8/3.a.2
-STIF1:15/3.a.1
-STIF1:7/3.a.1
PE
0,75 mm² BUWH
0,75 mm² BU
1,5 mm² GNYE
4 mm² GNYE
date
name
first
gepr
MAD
07.12.2022
Replacement of
Replaced by


-30A1
-30W1
-30W2
-30W4
-20WXS1
ZK1090-0101-1005
ZK1090-9191-0005
ZK7A30-4500-4005
0,5 m patch cable
BECKHOFF
C6030-0070
GND
24V+
P-S
ON
X101
UPS Link
TC
Power
HDD
LAN1 X102
LAN2 X103
LAN3 X104
LAN4 X105
USB 3.0 X106
USB 3.0 X107
USB 3.0 X108
USB 3.0 X109
DP X110
DP X111
-30W2 / 40.0
-30W4 / 1.9
1.8 / -30W1
20.0 / -20W1
=CABINET
+S1
&EFS
IPC C6030 Overview
XTS starter kit with NCT functionality
07.12.2022
MAD
Replacement of
Replaced by
page
30


Ethernet Overview C6030-0070
=CABINET +S1
page 32
XTS starter kit with NCT functionality
Office LAN
I/O LAN EK1100
EtherCAT Coupler
XTS LAN
Motor Module 1
I/O LAN
Service Ethernet Network socket
I/O Ethernet Network socket
-30W1 ZK1090-0101-1005 0,5 m patch cable
-30W2 ZK1090-0191-0005 0,5 m patch cable
-20WXS1 ZK7A30-AS00-A005
-20W1 ZK7A30-3031-B030
-30W4 ZK1090-0101-1005 0,5 m patch cable
-20XS1


=CABINET +S1
PLC Overview
XTS starter kit with NCT functionality
EK1100
EtherCAT
-BC1
-DIDO1
-F1
-ST1F1
-ST2F1
-F10
EL9227-5500
EL9227-6644
EL9184
EL9181
EL1259
X1 IN
X2 OUT
-30W2
ZK1090-9191-0005
0,5 m patch cable

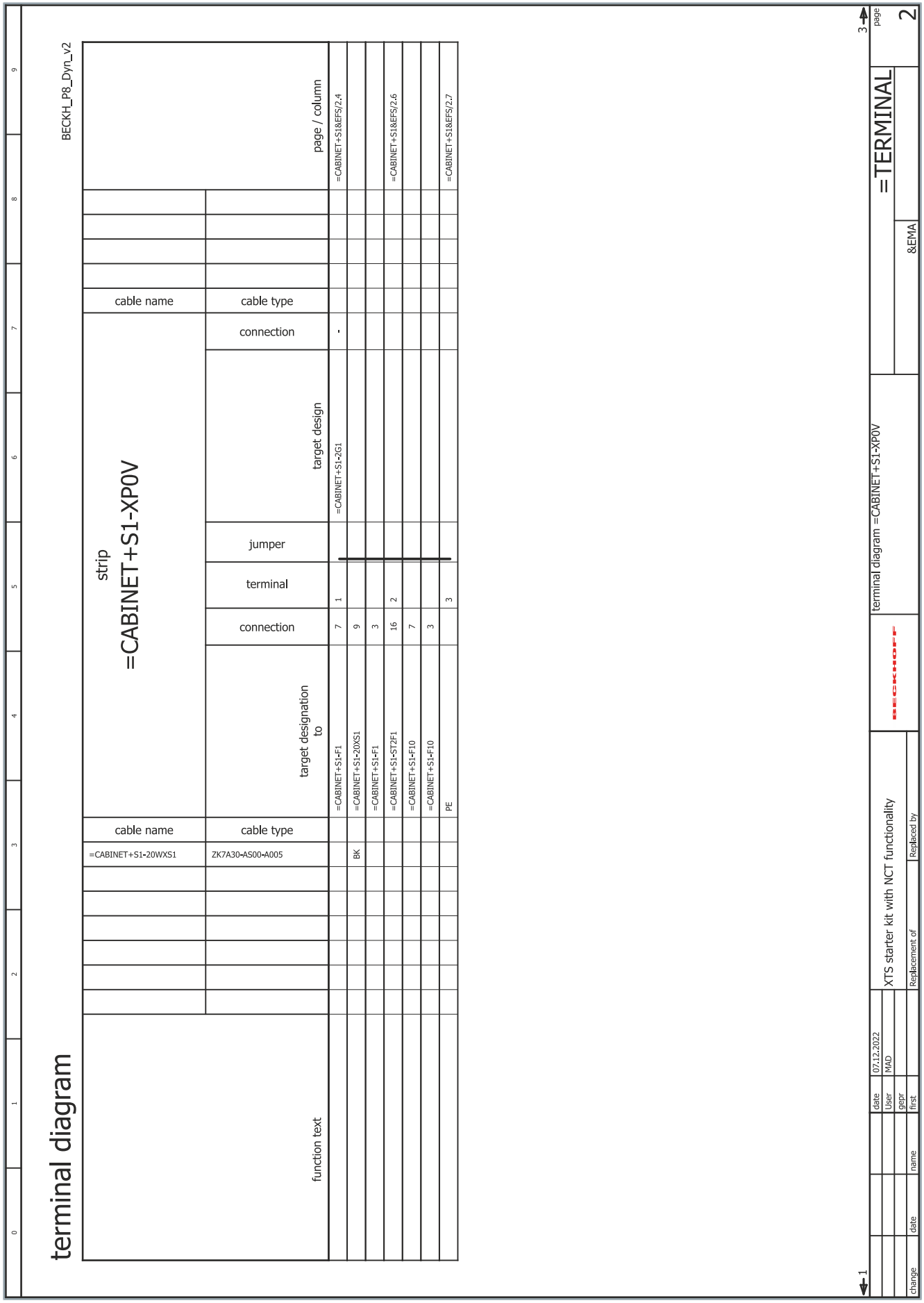

=CABINET +S1
42
page
&EFS
Digital Input EL1259
XTS starter kit with NCT functionality
07.12.2022
MAD
-8F1
-DIDO1
EL1259
BECKHOFF
Spare / Option
48VDC Power Supply 1 OK
Fuse 48VDC for XTS-Motor Module 1 ON
Spare

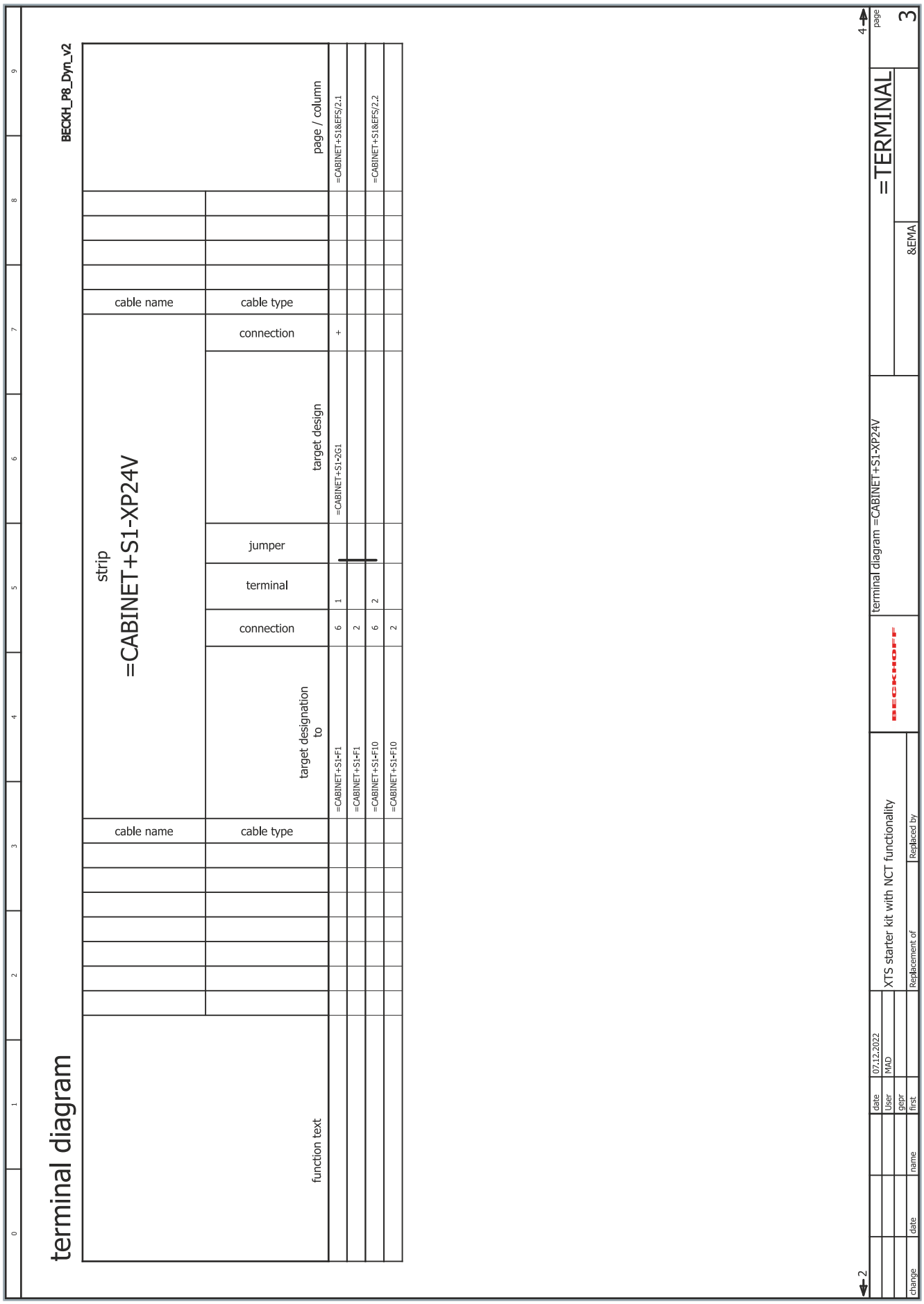

/40.2
-DIDO1
BECKHOFF
EL1259
Spare
01
9
02
10
03
11
04
12
05
13
=TERMINAL+&EMA/1
=CABINET
+S1
&EFS
page
44
Digital Output EL1259
XTS starter kit with NCT functionality
02.12.2022
MAD
Replacement of
Replaced by
change
date
name
first
42

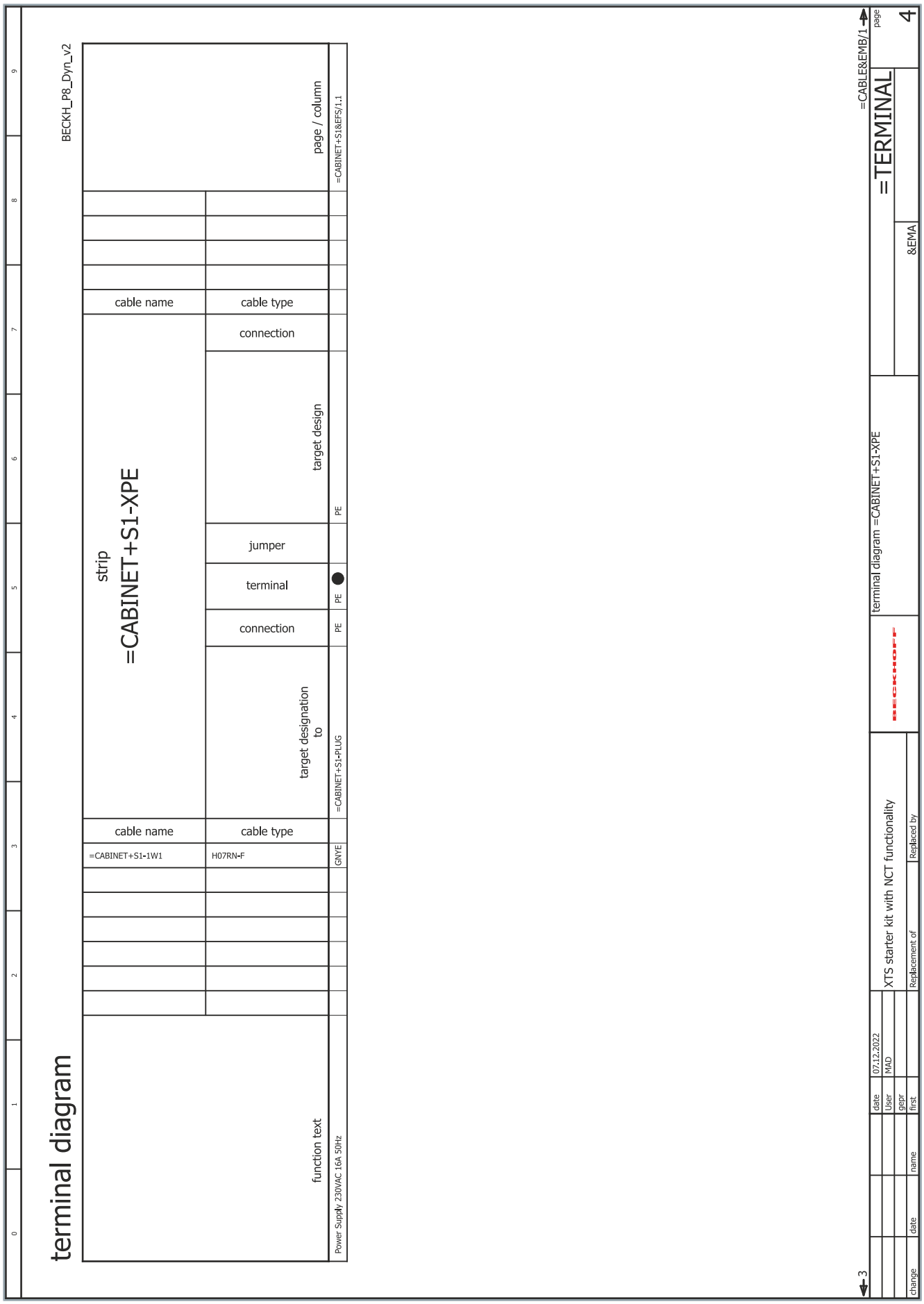
overview terminal-strips

BECKH_P8_Dyn_v2

terminal strip	function text	terminals					page of terminal diagram
		first	last	total GND	total N	total number	
=CABINET+S1-XP0V		1	3	0	0	3	=TERMINAL&EMA/2
=CABINET+S1-XP24V		1	2	0	0	2	=TERMINAL&EMA/3
=CABINET+S1-XPE		PE	PE	1	0	1	=TERMINAL&EMA/4


terminal diagram
BECKH_P8_Dyn_v2
strip
=CABINET+S1-XP0V
function text
target designation to
connection
terminal
jumper
target design
connection
cable name
cable type
page / column
=CABINET+S1-F1
=CABINET+S1-20XS1
=CABINET+S1-F1
=CABINET+S1-ST2F1
=CABINET+S1-F10
=CABINET+S1-F10
PE
=CABINET+S1-2G1
=CABINET+S1&EFS/2.4
=CABINET+S1&EFS/2.6
=CABINET+S1&EFS/2.7
=CABINET+S1-20WXS1
ZK7A30-AS00-A005
BK
terminal diagram =CABINET+S1-XP0V
=TERMINAL
&EMA
XTS starter kit with NCT functionality
07.12.2022
MAD
Replacement of
Replaced by
change
date
name
first
page
2


terminal diagram
BECKH_P8_Dyn_v2
strip
=CABINET+S1-XP24V
function text
cable name
cable type
target designation to
connection
terminal
jumper
target design
connection
cable name
cable type
page / column
=CABINET+S1-F1
=CABINET+S1-2G1
=CABINET+S1&EFS/2.1
=CABINET+S1-F10
=CABINET+S1&EFS/2.2
terminal diagram =CABINET+S1-XP24V
=TERMINAL
&EMA
XTS starter kit with NCT functionality
Replacement of
Replaced by
page
3
change
date
name
07.12.2022
MAD
gepr
first


terminal diagram
BECKH_P8_Dyn_v2
strip
=CABINET+S1-XPE
function text
target designation to
connection
terminal
jumper
target design
page / column
cable name
cable type
=CABINET+S1-1W1
H07RN-F
GNYE
Power Supply 230VAC 16A 50Hz
=CABINET+S1-PLUG
PE
=CABINET+S1&EFS/1.1
=CABLE&EMB/1
=TERMINAL
terminal diagram =CABINET+S1-XPE
XTS starter kit with NCT functionality
&EMA
page
4
3
change
date
name
first
User
MAD
gepr
07.12.2022
Replacement of
Replaced by

0	1	2	3	4	5	6	7	8	9

cable overview

BECKH_P8_Dyn_v2

cable name	source (of)	target (by)	cable type	all cores	cores used	cross-section [mm]	length [m]	function text	page of cable diagram
=CABINET+S1-1W1	=CABINET+S1-XPE;=CABINET+S1-1Q1	=CABINET+S1-PLUG	H07RN-F	3G	4	2,5	5		=CABLE&EMB/2
=CABINET+S1-30W1	=CABINET+S1-1X8	=CABINET+S1-30A1	ZK1090-0101-1005		1		0,5	Service Ethernet Network Socket	=CABLE&EMB/3
=CABINET+S1-30W2	=CABINET+S1-30A1	=CABINET+S1-BC1	ZK1090-9191-0005		1		0,5		=CABLE&EMB/4
=CABINET+S1-30W4	=CABINET+S1-1X9	=CABINET+S1-30A1	ZK1090-9191-0005		1		0,5		=CABLE&EMB/5
=CABINET+S1-20WXS1	PE;=CABINET+S1-30A1;=CABINET+S1-F10;=CABINET+S1-10Q1;=CABINET+S1-XP0V	=CABINET+S1-20XS1	ZK7A30-AS00-A005		6			Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT	=CABLE&EMB/6
=CABINET+M-20W1	=CABINET+S1-20XS1	=CABINET+M-20M1	ZK7A30-3031-B030		10			Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT	=CABLE&EMB/7

=TERMINAL&EMA/4
2

			date	07.12.2022	XTS starter kit with NCT functionality		BECKHOFF	Cable overview : =CABINET+S1-1W1 - =CABINET+M-20W1	=CABLE	page
			User	MAD						
			gepr							
change	date	name	first		Replacement of	Replaced by			&EMB	1

Cable diagram

BECKH_P8_Dyn_v3

Cable name =CABINET+S1-1W1	**cable type** H07RN-F		**no. of conductors** 3G		**cross-section** 2,5	**cable length** 5		**function text**
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	X-Ref	function text
	=CABINET+S1&EFS/1.1	=CABINET+S1-1Q1	1a	1	=CABINET+S1-PLUG	L	=CABINET+S1&EFS/1.1	
	=CABINET+S1&EFS/1.1	=CABINET+S1-1Q1	2a	2	=CABINET+S1-PLUG	N	=CABINET+S1&EFS/1.1	
	=CABINET+S1&EFS/1.1	=CABINET+S1-1Q1	x2	2	=CABINET+S1-PLUG	N	=CABINET+S1&EFS/1.1	
Power Supply 230VAC 16A 50Hz	=CABINET+S1&EFS/1.1	=CABINET+S1-XPE	PE	GNYE	=CABINET+S1-PLUG	PE	=CABINET+S1&EFS/1.1	

Cable diagram

BECKH_P8_Dyn_v3

Cable name	cable type		no. of conductors		cross-section	cable length		function text
=CABINET+S1-30W1	ZK1090-0101-1005					0,5		Service Ethernet Network Socket
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	X-Ref	function text
	=CABINET+S1&EFS/32.1	=CABINET+S1-1X8	X1:IN		=CABINET+S1-30A1	X102:1	=CABINET+S1&EFS/30.4	

			date	07.12.2022	XTS starter kit with NCT functionality	BECKHOFF	cable diagram =CABINET+S1-30W1	=CABLE	page
			User	MAD					
			gepr					&EMB	3
change	date	name	first		Replacement of	Replaced by			

Cable diagram

BECKH_P8_Dyn_v3

Cable name	cable type		no. of conductors		cross-section	cable length		function text
=CABINET+S1-30W2	ZK1090-9191-0005					0,5		
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	**X-Ref**	function text
	=CABINET+S1&EFS/30.5	=CABINET+S1-30A1	X103:1		=CABINET+S1-BC1	X1 IN	=CABINET+S1&EFS/40.1	

			date	07.12.2022	XTS starter kit with NCT functionality	BECKHOFF	cable diagram =CABINET+S1-30W2	=CABLE
			User	MAD				page
			gepr					4
change	date	name	first		Replacement of	Replaced by		&EMB

Cable diagram

BECKH_P8_Dyn_v3

Cable name	cable type		no. of conductors		cross-section	cable length		function text
=CABINET+S1-30W4	ZK1090-9191-0005					0,5		
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	X-Ref	function text
	=CABINET+S1&EFS/32.8	=CABINET+S1-1X9	X1:IN		=CABINET+S1-30A1	X105:1	=CABINET+S1&EFS/30.5	

change	date	name				
			date	07.12.2022	XTS starter kit with NCT functionality	
			User	MAD		
			gepr			
			first		Replacement of	Replaced by

BECKHOFF

cable diagram =CABINET+S1-30W4

=CABLE

&EMB

page 5

Cable diagram

BECKH_P8_Dyn_v3

Cable name =CABINET+S1-20WXS1	**cable type** ZK7A30-AS00-A005		**no. of conductors**		**cross-section**	**cable length**		**function text** Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	X-Ref	function text
	=CABINET+S1&EFS/2.4	=CABINET+S1-XP0V	1	BK	=CABINET+S1-20XS1	9	=CABINET+S1&EFS/20.2	Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT
	=CABINET+S1&EFS/8.1	=CABINET+S1-10Q1	2	BN	=CABINET+S1-20XS1	8	=CABINET+S1&EFS/20.2	=
0VDC Power Supply XTS-Motor Module 1	=CABINET+S1&EFS/8.1	=CABINET+S1-10Q1	R4	BU	=CABINET+S1-20XS1	7	=CABINET+S1&EFS/20.1	=
	=CABINET+S1&EFS/20.1	PE		GNYE	=CABINET+S1-20XS1	5	=CABINET+S1&EFS/20.1	=
	=CABINET+S1&EFS/4.1	=CABINET+S1-F10	5	RD	=CABINET+S1-20XS1	6	=CABINET+S1&EFS/20.1	=
	=CABINET+S1&EFS/30.4	=CABINET+S1-30A1	X104:1		=CABINET+S1-20XS1		=CABINET+S1&EFS/32.5	

Cable diagram

BECKH_P8_Dyn_v3

Cable name =CABINET+M-20W1		**cable type** ZK7A30-3031-B030	**no. of conductors**		**cross-section**	**cable length**		**function text** Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT
function text	X-Ref	Target designation from	Connection point	conductor	Target designation to	Connection point	X-Ref	function text
Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT	=CABINET+S1&EFS/20.2	=CABINET+S1-20XS1	9	BK	=CABINET+M-20M1	9	=CABINET+S1&EFS/20.2	
=	=CABINET+S1&EFS/20.2	=CABINET+S1-20XS1	8	BN	=CABINET+M-20M1	8	=CABINET+S1&EFS/20.2	
=	=CABINET+S1&EFS/20.1	=CABINET+S1-20XS1	3	BU	=CABINET+M-20M1	3	=CABINET+S1&EFS/20.1	
=	=CABINET+S1&EFS/20.1	=CABINET+S1-20XS1	7	BU	=CABINET+M-20M1	7	=CABINET+S1&EFS/20.1	
=	=CABINET+S1&EFS/20.1	=CABINET+S1-20XS1	5	GNYE	=CABINET+M-20M1	5	=CABINET+S1&EFS/20.1	
=	=CABINET+S1&EFS/20.1	=CABINET+S1-20XS1	4	OG	=CABINET+M-20M1	4	=CABINET+S1&EFS/20.1	
=	=CABINET+S1&EFS/20.1	=CABINET+S1-20XS1	6	RD	=CABINET+M-20M1	6	=CABINET+S1&EFS/20.1	
=	=CABINET+S1&EFS/20.0	=CABINET+S1-20XS1	2	WH	=CABINET+M-20M1	2	=CABINET+S1&EFS/20.0	
=	=CABINET+S1&EFS/20.0	=CABINET+S1-20XS1	1	YE	=CABINET+M-20M1	1	=CABINET+S1&EFS/20.0	Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT
	=CABINET+S1&EFS/32.5	=CABINET+S1-20XS1			=CABINET+M-20M1	X	=CABINET+S1&EFS/32.6	

parts list / piece list

BECKH_P8_Dyn_v2

designation (BMK) Schematic / position	quantity QTY	designation	type number ordering number	manufacturer supplier	article number function text	pos
=CABINET+S1-30A1 =CABINET+S1&EFS/30.3	1	ultra-compact control cabinet Industrial PC #basis	C6030-0070 C6030-0070	Beckhoff Automation	BEC.C6030-0070	
=CABINET+S1-BC1 =CABINET+S1&EFS/40.0	1	EtherCAT coupler for E-Bus Terminals (ELxxxx)	EK1100 EK1100	Beckhoff Automation	BEC.EK1100	
=CABINET+S1-DIDO1 =CABINET+S1&EFS/40.2	1		EL1259 EL1259	Beckhoff Automation	BEC.EL1259	
=CABINET+S1-F1 =CABINET+S1&EFS/40.3	1	2-Kanal Elektronische Überstromklemme 24V DC max. 10A adjustable extended functionalities	EL9227-5500 EL9227-5500	Beckhoff Automation	BEC.EL9227-5500	
=CABINET+S1-F10 =CABINET+S1&EFS/40.5	1	2-Kanal Elektronische Überstromschutzklemme 24V DC 4A/ 4A erweiterte Funktionen	EL9227-6644 EL9227-6644	Beckhoff Automation	BEC.EL9227-6644	
=CABINET+S1-2F1 =CABINET+S1&EFS/2.1	1	Circuit breaker 6kA 2-pole 'B' 16A	5SY6216-6 5SY6216-6	Siemens	SIE.5SY6216-6	
=CABINET+S1-8F1 =CABINET+S1&EFS/8.1	1	mini circuit breaker 10kA 1-pole 'B' 16A	5SY4116-6 5SY4116-6	Siemens	SIE.5SY4116-6	
=CABINET+S1-8F1 =CABINET+S1&EFS/8.1	1	Auxiliary switch 1NO 1NC for circuit breaker 5SY...	5ST3010 5ST3010	Siemens	SIE.5ST3010	
=CABINET+S1-2G1 =CABINET+S1&EFS/2.0	1	power supply 24V DC 10A - 240V AC/150V DC spring terminal.	PS3001-2410-0001 PS3001-2410-0001	Beckhoff Automation	BEC.PS3001-2410-0001	
=CABINET+S1-5G1 =CABINET+S1&EFS/5.0	1	power supply unit 48V DC 20A - 240V AC screw terminal.	PS3011-4820-0000 PS3011-4820-0000	Beckhoff Automation	BEC.PS3011-4820-0000	
=CABINET+S1-1M5 =CABINET+S1&EFS/1.5	1	DC axial fan, 80x80x25mm 24V DC 0,7W	8414NGL 8414NGL	EBM-Papst	PAP.8414NGL 24VDC Fan Enclosure cooling	
=CABINET+S1-1M5 =CABINET+S1&EFS/1.5	1		LZ32-4 LZ32-4	EBM-Papst	PAP.LZ32-4 =	
=CABINET+S1-1M6 =CABINET+S1&EFS/1.6	1	DC axial fan, 80x80x25mm 24V DC 0,7W	8414NGL 8414NGL	EBM-Papst	PAP.8414NGL =	
=CABINET+S1-1M6 =CABINET+S1&EFS/1.6	1		LZ32-4 LZ32-4	EBM-Papst	PAP.LZ32-4 =	
=CABINET+S1-PLUG =CABINET+S1&EFS/1.1	1		331.325.50.01 331.325.50.01	Jäger direkt	JAE.331.325.50.01	
=CABINET+S1-1Q1 =CABINET+S1&EFS/1.1	1		1835.3112 1835.3112	Marquardt	MRQ.1835.3112	
=CABINET+S1-10Q1 =CABINET+S1&EFS/10.3	1	Leistungsschütz BG S0 24VDC 11kW 4-pol. 2S 2Ö u. HS 1S 1Ö Cage Clamp-connection	3RT2526-2BB40 3RT2526-2BB40	Siemens	SIE.3RT2526-2BB40	
=CABINET+S1-10Q1 =CABINET+S1&EFS/10.3	1	RC element 24-48VAC 24-70VDC, BG S0 BG S0	3RT2926-1CB00 3RT2926-1CB00	Siemens	SIE.3RT2926-1CB00	

parts list / piece list

BECKH_P8_Dyn_v2

designation (BMK) Schematic / position	quantity QTY	designation	type number ordering number	manufacturer supplier	article number function text	pos
=CABINET+S1-10S1 =CABINET+S1&EFS/10.1	2	Contact element, cage clamp M22-CK01 1NC front fastening	M22-CK01 216385	Moeller	MOE.216385 Emergency Stop Cabinet right side wall	
=CABINET+S1-10S1 =CABINET+S1&EFS/10.1	1		M22S-PV 225528	Moeller	MOE.225528 =	
=CABINET+S1-10S1 =CABINET+S1&EFS/10.1	1	mounting adapter M22-A front mounting	M22-A 216374	Moeller	MOE.216374 =	
=CABINET+S1-15S1 =CABINET+S1&EFS/15.2	1	mounting adapter M22-A front mounting	M22-A 216374	Moeller	MOE.216374 Start Cabinet right side wall	
=CABINET+S1-15S1 =CABINET+S1&EFS/15.2	1	contact element, cage clamp M22-CK10 1NO front fastening	M22-CK10 216384	Moeller	MOE.216384 =	
=CABINET+S1-15S1 =CABINET+S1&EFS/15.2	1	label holder M22S-ST-X without label	M22S-ST-X 216392	Moeller	MOE.216392 =	
=CABINET+S1-15S1 =CABINET+S1&EFS/15.2	1	LED element Cage Clamp M22-CLED-G green 12-30V DC front attachment	M22-CLED-G 216571	Moeller	MOE.216571 =	
=CABINET+S1-15S1 =CABINET+S1&EFS/15.2	1	illuminated push-button M22-DL-G green	M22-DL-G 216927	Moeller	MOE.216927 =	
=CABINET+S1-15S3 =CABINET+S1&EFS/15.4	1	mounting adapter M22-A front mounting	M22-A 216374	Moeller	MOE.216374 Stop Cabinet right side wall	
=CABINET+S1-15S3 =CABINET+S1&EFS/15.4	1	Contact element, cage clamp M22-CK01 1NC front fastening	M22-CK01 216385	Moeller	MOE.216385 =	
=CABINET+S1-15S3 =CABINET+S1&EFS/15.4	1	label holder M22S-ST-X without label	M22S-ST-X 216392	Moeller	MOE.216392 =	
=CABINET+S1-15S3 =CABINET+S1&EFS/15.4	1	led-element cage clamp M22-CLED-R red 12-30V DC front attachment	M22-CLED-R 216570	Moeller	MOE.216570 =	
=CABINET+S1-15S3 =CABINET+S1&EFS/15.4	1	illuminated push-button M22-DL-R red	M22-DL-R 216925	Moeller	MOE.216925 =	
=CABINET+S1-15S5 =CABINET+S1&EFS/15.6	1	mounting adapter M22-A front mounting	M22-A 216374	Moeller	MOE.216374 Reset Cabinet right side wall	
=CABINET+S1-15S5 =CABINET+S1&EFS/15.6	1	contact element, cage clamp M22-CK10 1NO front fastening	M22-CK10 216384	Moeller	MOE.216384 =	
=CABINET+S1-15S5 =CABINET+S1&EFS/15.6	1	label holder M22S-ST-X without label	M22S-ST-X 216392	Moeller	MOE.216392 =	
=CABINET+S1-15S5 =CABINET+S1&EFS/15.6	1	LED element Cage Clamp M22-CLED-W white 12-30V DC front attachment	M22-CLED-W 216569	Moeller	MOE.216569 =	
=CABINET+S1-15S5 =CABINET+S1&EFS/15.6	1	illuminated push-button M22-DL-B blue	M22-DL-B 216931	Moeller	MOE.216931 =	

parts list / piece list

BECKH_P8_Dyn_v2

designation (BMK) Schematic / position	quantity QTY	designation	type number ordering number	manufacturer supplier	article number function text	pos
=CABINET+S1-ST1F1 =CABINET+S1&EFS/40.4	1	potential distribution terminal, 8 x 24V DC, 8 x 0V DC	EL9184 EL9184	Beckhoff Automation	BEC.EL9184	
=CABINET+S1-ST2F1 =CABINET+S1&EFS/40.4	1	Potenzialverteilungsklemme, 8 x 2 Potenziale neutral	EL9181 EL9181	Beckhoff Automation	BEC.EL9181	
=CABINET+S1-ST10 =CABINET+S1&EFS/40.6	1	Bus end cap	EL9011 EL9011	Beckhoff Automation	BEC.EL9011	
=CABINET+S1-1W1 =CABINET+S1&EFS/1.1	1	Anschlußleitung RN-F 3G2,5mm² schwarz Länge: 5m m. Zentralstecker	059.272 059.272	Jäger direkt	JAE.059.272	
=CABINET+S1-30W1 =CABINET+S1&EFS/32.1	1	cable for the K-bus extension with two RJ-45-plugs at both ends, red Ethernet cable STP, 0,5m	ZK1090-0101-1005 ZK1090-0101-1005	Beckhoff Automation	BEC.ZK1090-0101-1005	
=CABINET+S1-30W2 =CABINET+S1&EFS/32.3	1	ZK1090-9191-1010 EtherCAT Patchkabel 1.0m Konfektioniert: 2x RJ45-Stecker, PUR, AWG22	ZK1090-9191-1010 ZK1090-9191-1010	Beckhoff Automation	BEC.ZK1090-9191-1010	
=CABINET+S1-30W4 =CABINET+S1&EFS/32.8	1	Kabel für die K-Bus-Verlängerung mit zwei RJ-45-Steckern an beiden Enden, rot Ethernet-Kabel STP, 1,0 m	ZK1090-0101-1010 ZK1090-0101-1010	Beckhoff Automation	BEC.ZK1090-0101-1010	
=CABINET+S1-20WXS1 =CABINET+S1&EFS/32.5	1		ZK7A30-AS00-A005 ZK7A30-AS00-A005	Beckhoff Automation	BEC.ZK7A30-AS00-A005	
=CABINET+S1-1X8 =CABINET+S1&EFS/1.8	1	RJ45 built-in socket (socket/socket) Ethernet interface, with captive screw-on protective cover	101211 101211	Arnold Elektromechan.	AEB.101211	
=CABINET+S1-1X9 =CABINET+S1&EFS/1.9	1	RJ45 built-in socket (socket/socket) Ethernet interface, with captive screw-on protective cover	101211 101211	Arnold Elektromechan.	AEB.101211	
=CABINET+S1-XP0V =CABINET+S1&EFS/2.4	1	quick-fit end bracket f. TS 35 width: 9,5mm gray	CLIPFIX 35 3022218	Phoenix Contact	PHO.3022218	
=CABINET+S1-XP0V =CABINET+S1&EFS/2.4	1	terminal strip label holder, height adjustable f. end bracket CLIPFIX 15, CLIPFIX 35 and CLIPFIX 35-5	KLM 3 0811969	Phoenix Contact	PHO.0811969	
=CABINET+S1-XP0V =CABINET+S1&EFS/2.4	3	 2,5mm² push-in connection	PT 2,5-3L 3210499	Phoenix Contact	PHO.3210499	
=CABINET+S1-XP0V =CABINET+S1&EFS/2.4	2	Brücke - FBS 2-5, 2-pol. Farbe: rot	FBS 2-5 3030161	Phoenix Contact	PHO.3030161	
=CABINET+S1-XP0V =CABINET+S1&EFS/2.4	1	Abschlussdeckel - D-PT 2,5-3L Farbe: grau	D-PT 2,5-3L 3211647	Phoenix Contact	PHO.3211647	
=CABINET+S1-XP24V =CABINET+S1&EFS/2.1	1	quick-fit end bracket f. TS 35 width: 9,5mm gray	CLIPFIX 35 3022218	Phoenix Contact	PHO.3022218	
=CABINET+S1-XP24V =CABINET+S1&EFS/2.1	1	terminal strip label holder, height adjustable f. end bracket CLIPFIX 15, CLIPFIX 35 and CLIPFIX 35-5	KLM 3 0811969	Phoenix Contact	PHO.0811969	
=CABINET+S1-XP24V =CABINET+S1&EFS/2.1	2	 2,5mm² push-in connection	PT 2,5-3L 3210499	Phoenix Contact	PHO.3210499	

parts list / piece list

BECKH_P8_Dyn_v2

designation (BMK) Schematic / position	quantity QTY	designation	type number ordering number	manufacturer supplier	article number function text	pos
=CABINET+S1-XP24V =CABINET+S1&EFS/2.1	1	Brücke - FBS 2-5, 2-pol. Farbe: rot	FBS 2-5 3030161	Phoenix Contact	PHO.3030161	
=CABINET+S1-XP24V =CABINET+S1&EFS/2.1	1	Abschlussdeckel - D-PT 2,5-3L Farbe: grau	D-PT 2,5-3L 3211647	Phoenix Contact	PHO.3211647	
=CABINET+S1-XPE =CABINET+S1&EFS/1.1	2	quick-fit end bracket f. TS 35 width: 9,5mm gray	CLIPFIX 35 3022218	Phoenix Contact	PHO.3022218 Power Supply 230VAC 16A 50Hz	
=CABINET+S1-XPE =CABINET+S1&EFS/1.1	1	Klemmenleisten-Kennzeichnungsträger, höhenverstellbar, zentriertes Schriftfeld f. end bracket CLIPFIX 15, CLIPFIX 35 and CLIPFIX 35-5	KLM 4 0811970	Phoenix Contact	PHO.0811970 =	
=CABINET+S1-XPE =CABINET+S1&EFS/1.1	5	Schutzleiterklemme PT 2,5-QUATTRO-PE (4 Anschlüsse) 2,5mm² push-in connection	PT 2,5-QUATTRO-PE 3209594	Phoenix Contact	PHO.3209594 =	
=CABINET+S1-XPE =CABINET+S1&EFS/1.1	1	Abschlussplatte für ST 2,5-QUATTRO	D-ST 2,5-QUATTRO 3030514	Phoenix Contact	PHO.3030514 =	
=CABINET+S1-20XS1 =CABINET+S1&EFS/20.0	1	EtherCAT-Flansch IP67 mit Leitung 3G4.5+(2x1,5mm²)+(4xAWG22) kurz B23 FG Vierkant Buchse 5+4-pol. / RJ45 + offen 1m PUR schleppfähig gelb Cod3	ZK7A30-AS00-A010 ZK7A30-AS00-A010	Beckhoff Automation	BEC.ZK7A30-AS00-A010	
=CABINET+M-20W1 =CABINET+S1&EFS/20.0	1		ZK7A30-3031-B030 ZK7A30-3031-B030	Beckhoff Automation	BEC.ZK7A30-3031-B030 Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT	

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-30A1 C6030-0070					
		=CABINET+S1/30.3			
		=CABINET+S1/25.8	power supply IPC	=CABINET+S1-ST1F1	PLC conn. point, PLC CPS (+)
		=CABINET+S1/25.8		=CABINET+S1-ST1F1	PLC conn. point, PLC CPS (-)
		=CABINET+S1/25.8			PLC connection point, DI
		=CABINET+S1/25.9			PLC connection point, DO
		=CABINET+S1/30.4			Network / bus cable
		=CABINET+S1/30.5			Network / bus cable
		=CABINET+S1/30.4			Network / bus cable
		=CABINET+S1/30.5			Network / bus cable
		=CABINET+S1/30.4			Network / bus cable
		=CABINET+S1/30.4			Network / bus cable
		=CABINET+S1/30.5			Network / bus cable
		=CABINET+S1/30.5			Network / bus cable
		=CABINET+S1/30.4			PLC connection point,
		=CABINET+S1/30.5			PLC connection point,

=COMPONENTS&EPB/4

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			date	07.12.2022	XTS starter kit with NCT functionality	BECKHOFF	PLC diagram	=PLC page
			User	MAD				
			gepr					&EFP 1
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PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-BC1 EK1100		=CABINET+S1/40.0			
		=CABINET+S1/40.1			Network / bus cable
		=CABINET+S1/40.1			Network / bus cable

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-DIDO1 EL1259		=CABINET+S1/40.2			
Channel 1.Input event time 1		=CABINET+S1/42.1	Spare / Option 48VDC Power Supply 1 OK		PLC connection point, DI
Channel 2.Input event time 1		=CABINET+S1/42.2	Fuse 48VDC for XTS-Motor Module 1 ON	=CABINET+S1-8F1	PLC connection point, DI
Channel 3.Input event time 1		=CABINET+S1/42.3	Spare		PLC connection point, DI
Channel 4.Input event time 1		=CABINET+S1/42.4	Spare		PLC connection point, DI
Channel 5.Input event time 1		=CABINET+S1/42.5	Spare		PLC connection point, DI
Channel 6.Input event time 1		=CABINET+S1/15.2	Start	=CABINET+S1-15S1	PLC connection point, DI
Channel 7.Input event time 1		=CABINET+S1/15.4	Stop	=CABINET+S1-15S3	PLC connection point, DI
Channel 8.Input event time 1		=CABINET+S1/15.6	Reset	=CABINET+S1-15S5	PLC connection point, DI
Channel 1.Output event time 1		=CABINET+S1/44.1	Spare		PLC connection point, DO
Channel 2.Output event time 1		=CABINET+S1/44.2	Spare		PLC connection point, DO
Channel 3.Output event time 1		=CABINET+S1/44.3	Spare		PLC connection point, DO
Channel 4.Output event time 1		=CABINET+S1/44.4	Spare		PLC connection point, DO
Channel 5.Output event time 1		=CABINET+S1/44.5	Spare		PLC connection point, DO
Channel 6.Output event time 1		=CABINET+S1/15.2	LED Start	=CABINET+S1-15S1	PLC connection point, DO
Channel 7.Output event time 1		=CABINET+S1/15.4	LED Stop	=CABINET+S1-15S3	PLC connection point, DO
Channel 8.Output event time 1		=CABINET+S1/15.6	LED Reset	=CABINET+S1-15S5	PLC connection point, DO

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PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-F1 EL9227-5500					
		=CABINET+S1/40.3			
Channel 1.In		=CABINET+S1/3.1	24VDC Power Supply EL9227-5500 (max. Σ 10 A) Channel 1 (6A) IPC, EK Channel 2 (4A) Cabinet intern		PLC connection point, DI
Channel 1.In		=CABINET+S1/3.2		=CABINET+S1-XP24V	PLC conn. point, PLC CPS (+)
Channel 1.In		=CABINET+S1/3.2		=CABINET+S1-XP0V	PLC conn. point, PLC CPS (-)
Channel 2.In		=CABINET+S1/3.1			PLC connection point, DI
Channel 1.Out		=CABINET+S1/3.1			PLC connection point, DO
Channel 2.Out		=CABINET+S1/3.2		=CABINET+S1-XP24V	PLC conn. point, PLC CPS (+)
Channel 2.Out		=CABINET+S1/3.2		=CABINET+S1-XP0V	PLC conn. point, PLC CPS (-)
Channel 2.Out		=CABINET+S1/3.1		=CABINET+S1-ST2F1	PLC connection point, DO

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-F10 EL9227-6644					
		=CABINET+S1/40.5			
Channel 1.In		=CABINET+S1/4.1	24VDC Power Supply EL9227-6644 (4A/4A) XTS-Motor Module 1 Channel 1 (4A) Spare / Option Module 2 Channel 2 (4A)		PLC connection point, DI
Channel 1.In		=CABINET+S1/4.2		=CABINET+S1-XP24V	PLC conn. point, PLC CPS (+)
Channel 1.In		=CABINET+S1/4.2		=CABINET+S1-XP0V	PLC conn. point, PLC CPS (-)
Channel 2.In		=CABINET+S1/4.1			PLC connection point, DI
Channel 1.Out		=CABINET+S1/4.1		=CABINET+S1-20XS1	PLC connection point, DO
Channel 2.Out		=CABINET+S1/4.2		=CABINET+S1-XP24V	PLC conn. point, PLC CPS (+)
Channel 2.Out		=CABINET+S1/4.2		=CABINET+S1-XP0V	PLC conn. point, PLC CPS (-)
Channel 2.Out		=CABINET+S1/4.1			PLC connection point, DO

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-ST1F1 EL9184		=CABINET+S1/40.4			
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (+)
		=CABINET+S1/3.a.1		=CABINET+S1-30A1	PLC conn. point, PLC CPS (+)
		=CABINET+S1/3.a.2		=CABINET+S1-BC1	PLC conn. point, PLC CPS (+)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/40.4			PLC conn. point, PLC CPS (-)
		=CABINET+S1/3.a.1		=CABINET+S1-30A1	PLC conn. point, PLC CPS (-)
		=CABINET+S1/3.a.2		=CABINET+S1-BC1	PLC conn. point, PLC CPS (-)

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-ST2F1 EL9181					
		=CABINET+S1/40.4			
		=CABINET+S1/3.b.1	-F1 Channel 2 (4A) 24VDC Power Supply Cabinet intern	=CABINET+S1-1M5	PLC connection point, general
		=CABINET+S1/3.b.1		=CABINET+S1-1M6	PLC connection point, general
		=CABINET+S1/3.b.1		=CABINET+S1-8F1	PLC connection point, general
		=CABINET+S1/3.b.1		=CABINET+S1-10S1	PLC connection point, general
		=CABINET+S1/3.b.2		=CABINET+S1-15S1	PLC connection point, general
		=CABINET+S1/3.b.2		=CABINET+S1-15S3	PLC connection point, general
		=CABINET+S1/3.b.2		=CABINET+S1-15S5	PLC connection point, general
		=CABINET+S1/3.b.2		=CABINET+S1-F1	PLC connection point, general
		=CABINET+S1/3.b.3	-F1 Channel 2 (0V)		PLC connection point, general
		=CABINET+S1/3.b.3		=CABINET+S1-1M5	PLC connection point, general
		=CABINET+S1/3.b.3		=CABINET+S1-1M6	PLC connection point, general
		=CABINET+S1/3.b.3		=CABINET+S1-15S1	PLC connection point, general
		=CABINET+S1/3.b.4		=CABINET+S1-15S3	PLC connection point, general
		=CABINET+S1/3.b.4		=CABINET+S1-15S5	PLC connection point, general
		=CABINET+S1/3.b.4		=CABINET+S1-10Q1	PLC connection point, general
		=CABINET+S1/3.b.4		=CABINET+S1-XP0V	PLC connection point, general

0 1 2 3 4 5 6 7 8 9

PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-1X8 101211					
		=CABINET+S1/1.8			
		=CABINET+S1/1.8			Network / bus cable
		=CABINET+S1/32.1		=CABINET+S1-30A1	Network / bus cable

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			date	22.06.2022	XTS starter kit with NCT functionality	BECKHOFF	PLC diagram	=PLC
			User	MAD				
			gepr					&EFP
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PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+S1-1X9 101211					
		=CABINET+S1/1.9			
		=CABINET+S1/1.9			Network / bus cable
		=CABINET+S1/32.8		=CABINET+S1-30A1	Network / bus cable

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			date	02.12.2022	XTS starter kit with NCT functionality	BECKHOFF	PLC diagram	=PLC page
			User	MAD				
			gepr					
change	date	name	first		Replacement of	Replaced by		&EFP 9

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PLC-diagram

BECKH_P8_Dyn_v2

channel	address	position	structure- & pagedescription function text	target ID	function definition
=CABINET+M-20M1					
		=CABINET+M/20.0			
		=CABINET+M/20.0	Motor Module 1 with Power Supply XTS Power Supply 1 24VDC / 48VDC EtherCAT	=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.0		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.1		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.1		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.1		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.1		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.1		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.2		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/20.2		=CABINET+S1-20XS1	PLC connection point, general
		=CABINET+M/32.6		=CABINET+S1-20XS1	Network / bus cable

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			date	02.12.2022	XTS starter kit with NCT functionality	BECKHOFF	PLC diagram	=PLC page 10
			User	MAD				
			gepr					&EFP
change	date	name	first		Replacement of	Replaced by		

More Information:
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