

Technical documentation

Installation instructions

BOX-404-702



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1 General information

1.1 Information on the operating instructions






These operating instructions are intended to enable the user to install, commission, operate and maintain the appliance correctly.

Before starting installation work, read and understand the operating instructions in full, especially the chapter on safety! Always comply with the operating instructions, in particular the safety instructions and the accident prevention regulations applicable to the area of use.

Always pass the device on to third parties together with the operating instructions.

1.2 Explanation of symbols

Important safety instructions in these operating instructions are labelled with symbols. Always follow the instructions to avoid accidents, personal injury and damage to property.

 WARNING!	<p>This symbol indicates dangers that can lead to health hazards, injuries, permanent physical damage or death as well as considerable material damage.</p> <p>It is imperative that you strictly adhere to the instructions on work safety and exercise particular caution in these cases.</p>
 WARNING! Danger from electric current!	<p>This symbol draws attention to dangerous situations caused by electric current. If the safety instructions are not observed, there is a risk of serious injury or death and considerable damage to property. The work to be carried out may only be performed by a trained electrician.</p>
 ATTENTION! Observe ESD protective measures!	<p>Electrostatic discharges can destroy electronic components.</p>
 ATTENTION!	<p>This symbol indicates instructions which, if ignored, may result in damage, malfunction and/or failure of the appliance.</p>
 Hint	<p>This symbol emphasises tips and information that must be observed for efficient and trouble-free operation of the appliance.</p>

1.3 Declaration of Conformity to the RoHS Directive

The products of STANGE ELEKTRONIK GmbH are exempt from the application of the RoHS Directive in accordance with Article 2 / Paragraph 4c, 4d and 4e.

Nevertheless, we are convinced that their application also makes sense for our products.

Stange Elektronik GmbH hereby declares the conformity of its products with regard to the RoHS Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Only components that comply with the Directive are used in the manufacture of our products, and none of the substances listed in Annex II of the Directive are used during assembly.

We can also confirm that the four additional substances included in Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of prohibited substances are also not used.

List of substances and quantities according to Directives 2015/863/EU and 2011/65/EU:

- Lead (0.1 %)
- Mercury (0.1 %)
- Cadmium (0.01 %)
- Hexavalent chromium (0.1 %)
- Polybrominated biphenyls (PBB) (0.1 %)
- Polybrominated diphenyl ether (PBDE) (0.1 %)
- Di(2-ethylhexyl) phthalate (DEHP) (0.1 %)
- Butyl benzyl phthalate (BBP) (0.1 %)
- Dibutyl phthalate (DBP) (0.1 %)
- Diisobutyl phthalate (DIBP) (0.1 %)

1.4 Declarations of Conformity REACH Regulation

(EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006.

As a manufacturer of electronic products, Stange Elektronik GmbH is a so-called "downstream user" within the meaning of REACH. Obligations due to the manufacture and placing on the market of substances/chemicals for pre-registration or registration (ECHA) are not applicable to us.

Our products are articles and are therefore not to be defined as substances or preparations (in accordance with Article 3 Definitions). In addition, no substance is released from our products when used as intended.

Stange Elektronik GmbH is therefore not subject to the obligation to register or to prepare safety data sheets.

1.5 Liability and warranty

All information and instructions in these operating instructions have been compiled taking into account the applicable regulations, the current state of engineering development and our many years of knowledge and experience.

The translations of the operating instructions have also been prepared to the best of our knowledge. However, we cannot accept any liability for translation errors. The German version of these operating instructions provided is authoritative.

The actual scope of delivery may differ from the explanations and drawings described here in the case of special versions, the utilisation of additional ordering options or due to the latest technical changes. If you have any questions, please contact the manufacturer.



**Please
note!**

These operating instructions must be read carefully before starting any work on and with the appliance, especially before commissioning! The manufacturer accepts no liability for damage and malfunctions resulting from non-compliance with the operating instructions.

The operating instructions must be kept directly on the device and accessible to all persons working on or with the device. The transfer of the operating instructions to third parties is not permitted and may result in compensation for damages. Further claims reserved.

We reserve the right to make technical changes to the device in order to improve its performance characteristics and for further development.

1.6 Copyright protection

The operating instructions must be treated confidentially. They are intended exclusively for persons working on and with the device. The operating instructions may not be passed on to third parties without the written consent of the manufacturer. If required, please contact the manufacturer.



Please note!

The content, texts, drawings, images and other illustrations are protected by copyright and are subject to other industrial property rights. Any misuse is punishable by law.

2 EU DECLARATION OF CONFORMITY

We, the company



**Rudolf-Diesel-Str. 17- 19
51674 Wiehl
Germany**

declare under our sole responsibility that the product

Designation: **Conversion box**
Type: **BOX-404-702**

with the requirements of the standards

- **DIN EN IEC 61000-6-3:2022-06 Emission**
- **DIN EN IEC 61000-6-2:2019-11 Interference immunity**
- **DIN EN IEC 61010-2-201:2019-04 Safety**

and thus complies with the provisions of the EU directives

- **2014/30/EU (Electromagnetic Compatibility (EMC) Directive**
- **2014/35/EU (Low Voltage Directive)**

Wiehl, 22.07.2024

Place and date of the exhibition




P. Jaspert (Managing Director)

Name, legally binding signature

3 Security

This section provides an overview of all important safety aspects for optimum protection of personnel and safe and trouble-free operation of the appliance.


In addition, the individual chapters contain specific safety instructions labelled with symbols to prevent immediate danger. In addition, observe the pictograms, signs and labelling on the appliance and keep them legible at all times.

	<p>Restricted access:</p> <p>The modules are open equipment and may only be installed in electrical operating rooms, cabinets or enclosures.</p> <p>Access to the electrical operating rooms, cabinets or enclosures must only be possible using tools or keys and must only be permitted to instructed or authorised personnel</p>
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3.1 Intended use

The industrial control system is used exclusively to control machines and systems that are built in accordance with the applicable regulations and equipped with all the necessary safety devices.

Operational safety is only guaranteed if the appliance is used as intended.

	<p>Any use of the appliance that goes beyond the intended use and/or any other use is prohibited and is considered improper use. In particular, the device may not be used to control or replace protective devices within the meaning of the Machinery Directive (98137 EC).</p> <p>Claims of any kind against the manufacturer and/or its authorised representatives due to damage resulting from improper use of the device are excluded.</p> <p>The operator alone is liable for any damage caused by improper use.</p> <p>Intended use also includes correct compliance with the operating ranges and the installation, operating and cleaning instructions.</p>
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3.2 Electromagnetic compatibility (EMC)

EMC planning is required before installation, even though the devices fulfil the EMC requirements. Both sources of interference (galvanic, inductive and capacitive coupling) and radiation coupling are taken into account.

3.3 EMC protection

The following requirements should be met to ensure EMC:

- Inactive metal parts must be properly dimensioned and dimensioned over their entire surface.
- Cables and devices are correctly shielded.
- Cable routing and wiring have been carried out correctly.
- The electrical equipment is earthed and has a standardised reference potential.
- Special applications require special EMC measures.

3.4 Grounding of inactive metal parts

The influence of coupled interference is reduced if all inactive metal parts (switch cabinets, switch cabinet doors, mounting plates, top-hat rails, etc.) are connected to each other over a large area and with low impedance. This results in a uniform reference potential surface for control elements.

- In the area of screw connections, the insulating layer must be removed from painted, anodised or insulated metal parts. The joints must be protected against corrosion.
- Connection of movable grounding parts (cabinet doors, separate mounting plates, etc.) using short grounding straps with a large surface area.
- Do not use aluminium parts if possible, as the oxidation of aluminium is unsuitable for grounding.

3.5 PE connection

Connect the earth and PE connection (protective earth) centrally.

3.6 Earth-free operation

The relevant safety regulations must be observed during ungrounded operation.

3.7 Responsibility of the operator

The appliance may only be operated in a technically perfect and safe condition.

In addition to the occupational safety instructions in this operating manual, the generally applicable safety and accident prevention regulations for the area of use of the appliance as well as the applicable environmental protection regulations must be observed and complied with.

The operator and the personnel authorised by him are responsible for the fault-free operation of the appliance and for clearly defining the responsibilities for installation, operation, maintenance and cleaning.

Follow the information in the operating instructions completely and without restriction!

The operator must also ensure that

- all further instructions and safety instructions resulting from the risk assessment of the workplaces at the appliance are summarised in an operating manual in accordance with the German Ordinance on the Use of Work Equipment.
- these operating instructions are integrated into the system documentation.
- maintenance and inspection intervals are adhered to.
- The device, operating materials and waste products generated during production must be disposed of in an environmentally friendly manner and in accordance with legal regulations.

3.8 Operating personnel

The industrial control unit may only be operated by authorised specialist personnel. The operating personnel must have been specially instructed about any hazards that may occur.

Specialist personnel are those who are able to assess the work assigned to them and recognise potential hazards on the basis of their specialist training, knowledge and experience as well as knowledge of the relevant regulations.



**AT-
TENTION!**

The device may only be used for the applications specified in the technical description and only in conjunction with third-party devices and components recommended or authorised by STANGE.

Correct and safe operation of the product requires proper transport, storage, installation and assembly as well as careful operation and maintenance.

3.9 Maintenance

Battery

The battery is used to back up the real-time clock and the remanent data. When fully charged, it retains data for at least 8-10 weeks. To avoid data loss, make sure that the device is not switched off for longer than this time. If the battery is completely empty, a period of 48 hours of operation is required until the battery has reached its full capacity again.

The service life of the lithium battery is specified by the manufacturer as 10 years. Replacement is possible and must be carried out by STANGE ELEKTRONIK GmbH Service.

Transport

Only use the original packaging for transporting the device.

3.10 Cleaning the front panel

The surface of the front panel glass is treated to permanently minimize light reflections and the adhesion of fingerprints.

A soft, dry cloth is sufficient for cleaning the front panel and does a good job.

3.11 Repairs

Repairs to the SE-702 may only be carried out by STANGE Elektronik GmbH. In this case, please contact the technical support of STANGE Elektronik GmbH.

No liability is accepted for any modifications to the device that are not described in this document.

3.12 Manufacturer address

Manufacturer:

STANGE Elektronik GmbH

Rudolf-Diesel-Str. 17-19
51674 Wiehl
Germany

Tel: +49 (0)2261 - 95790
Fax: +49 (0)2261 - 55212
e-mail: info@stange-elektronik.de
Homepage: www.stange-elektronik.de

3.13 Technical support

Support:

e-mail: support@stange-elektronik.de

3.14 Waste disposal

Stange Elektronik GmbH is responsible for the environmentally friendly disposal of old SE-702 devices. We will dispose of all devices of this type if they are delivered free to the manufacturer's address stated above. Alternatively, please contact a certified disposal company for electronic waste.

Please note in particular:

- **The device contains a rechargeable lithium battery (3.5V/50mAh).**
- **The device has LED backlighting.**

Materials:

- Housing: Stainless steel
- Front frame: Aluminium
- Printed circuit board: 1st quality
- Front glass: Float glass ESG (toughened safety glass)

4 Transport, packaging and storage

4.1 Transport inspection

Check the delivery immediately upon receipt for completeness and transport damage.

In the event of externally recognisable transport damage, do not accept delivery or only accept delivery with reservations. Note the extent of the damage on the transport documents/delivery note of the carrier. Initiate a complaint.

Complain in writing about hidden defects as soon as they are recognised (at the latest within 8 days (date of receipt)), as claims for damages can only be asserted within the applicable complaint periods.

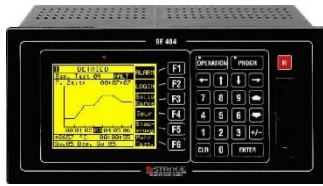
4.2 Packaging and disposal of the original packaging

The packaging is an essential part of the product. The packaging is developed by the manufacturer individually for each product. In the event that you need to send your device for servicing or customer service during the warranty period or thereafter, only use the original packaging to transport the device. For this reason, you should keep the original packaging for as long as you have the appliance in your possession. If you wish to dispose of the packaging, we are obliged to take it back in accordance with the provisions of the German Packaging Ordinance and must ensure that it is either recycled or reused.

4.3 Storage

Keep packages sealed until assembly and in compliance with the ambient conditions for storage.

5 Introduction: Conversion box BOX-404-702



SE-404



BOX-404-702

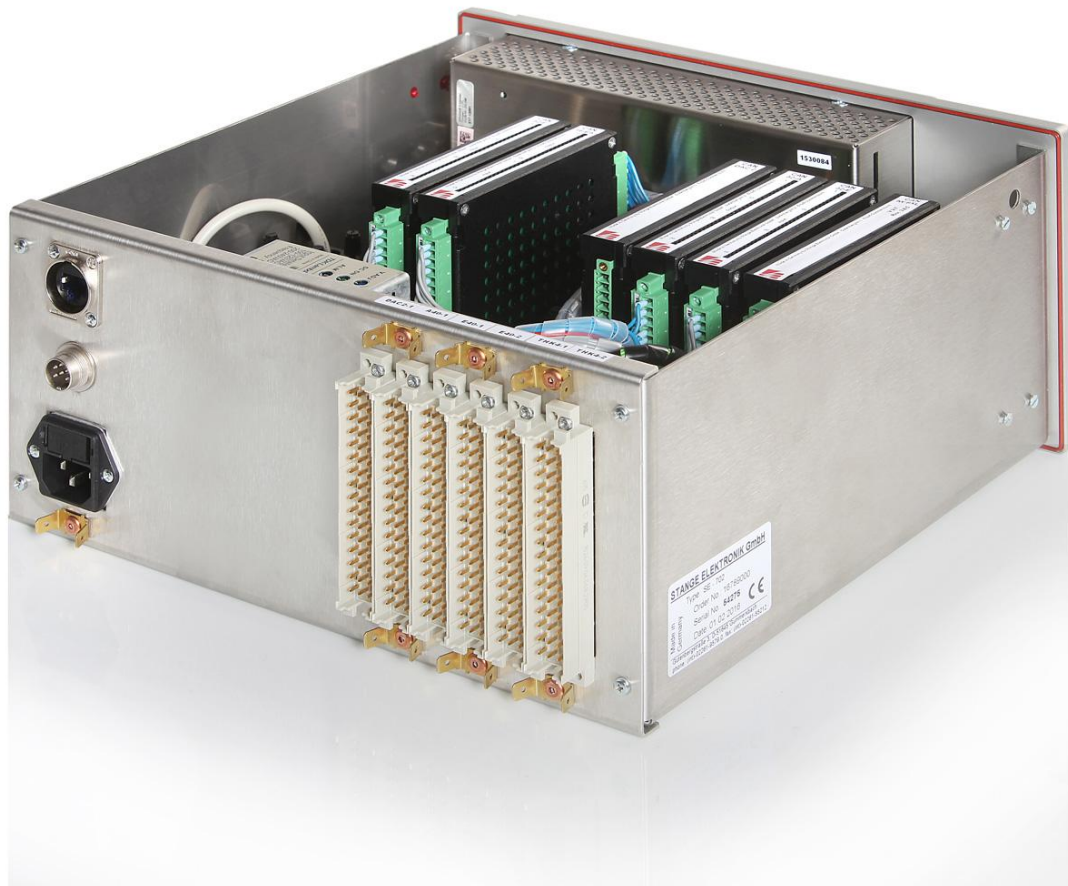
The "BOX-404-702" conversion box is designed as a replacement unit for the discontinued SE-404 program controller.

The conversion box consists of a built-in SE-702 program controller including power supply unit in the housing, as well as the connections on the rear.

The installation housing (160 x 160 x 248.8 mm (WxHxD)) is identical to the SE-404, and the connections and plugs are also compatible with those of the SE-404, as they are wired to VG plugs in the conversion box.


The optional SI-JBus serial interface is no longer required. Instead, the conversion box has an RJ45 socket for network connection. This means that the software tools of the SE-7xx series can be used for configuration and parameterisation.

Configuration, programs and parameters can be programmed onto the SE-702 as a service in accordance with customer specifications.



6 Installation of the industrial control system

6.1 Guidelines for installation

 <p>WARNING!</p>	<p>Safety requirements for assembly</p> <p>The devices are "open type" equipment in accordance with standard IEC 61010-2-201 or UL 61010-2-201 / CSA C22.2 No. 61010-2-201. In order to fulfil the requirements for safe operation with regard to mechanical strength, flame resistance, stability and protection against accidental contact, the following alternative installation types are specified:</p> <ul style="list-style-type: none"> - Installation in a suitable cabinet - Installation in a suitable housing - Installation in an appropriately equipped closed operating room
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 <p>Attention</p>	<p>Keep the installation box away from heat, high voltage and electrical interference!</p>
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As a general rule for the arrangement of devices in your system, keep devices that generate high voltage or high electrical interference away from low-voltage electronic devices such as the SE-404-702 box.

When planning the layout of the SE-404-702 box in your control panel, take heat-generating devices into account and arrange the electronic devices in the cooler areas of your control cabinet. If you operate an electronic device in an environment with high temperatures, the service life will be reduced.


Also consider how you route the wiring of the devices in the control panel. Avoid laying low-voltage signalling lines and communication cables in the same cable path as AC supply lines and fast-switching high-speed DC lines.

6.2 General installation instructions

The Box-SE-404-702 can be operated up to a maximum ambient temperature of 45°C. The ambient temperature refers to the area directly at the lower cooling slots when the device is mounted vertically, with unhindered air convection and an operating altitude of max. 2000 m above sea level. The cooling slots must always be unobstructed to maintain system cooling.

Installation in an enclosure is possible, taking into account the ambient temperature. A distance of at least 50 mm must be maintained on all sides from the enclosure walls to ensure sufficient air circulation. A minimum distance of 75 mm must be maintained from active elements such as load power supply, transformers, etc.

Avoid direct sunlight on the flat screen. Solar radiation (UV component) reduces the service life of the display.

 <p>Attention</p>	<p>The following must be observed to prevent the appliance from overheating during operation:</p> <p>The cooling slots must be clear to ensure system cooling.</p> <p>Avoid direct sunlight on the flat screen.</p> <p>The angle of inclination for vertical installation must not exceed $\pm 35^\circ$.</p> <p>If these conditions cannot be met, the installation of an external fan is recommended.</p>
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6.3 Installation housing: Dimensional drawing

Installation housing: Dimensional drawing (unit of measurement: mm):

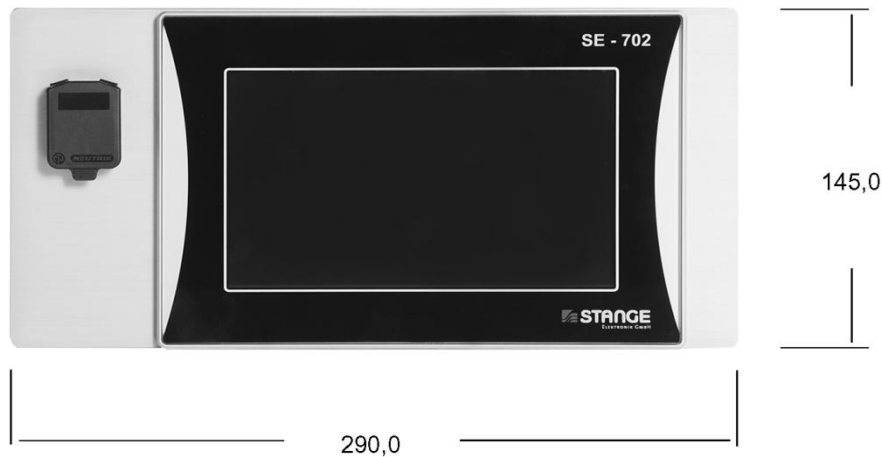


Figure 1; front view

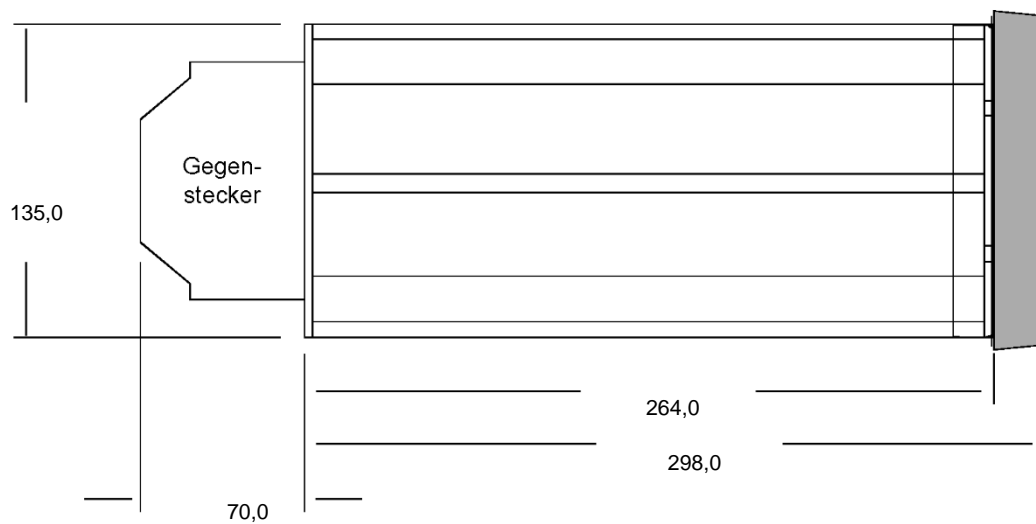


Figure 2; side view

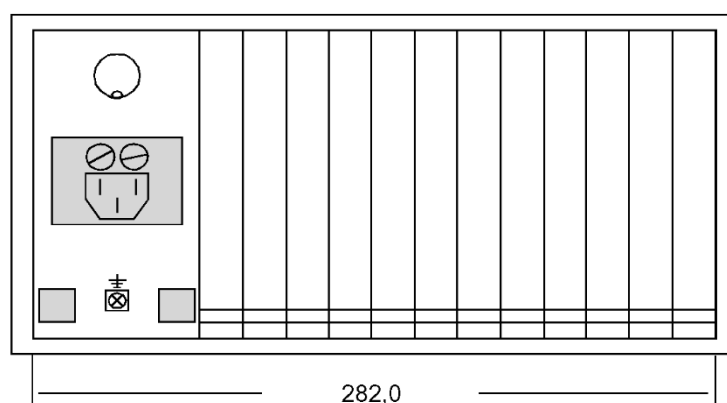


Figure 3; rear view

The installation depth for the SE-404-702 box is 298 mm plus 70 mm for the mating connector.

Length of the retaining clip: 65 mm behind the mounting plate

Installation in front panel Box-SE-404-702:

	<p>The front panel must not exceed a maximum thickness of 7 mm.</p>
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- | | |
|---|---|
|  | Minimum distance for devices installed next to each other:
50 mm |
|---|---|

3D schematic diagram of the experimental setup. The diagram shows a mounting frame (a grey L-shaped structure) with a distance of 282.8 mm between the vertical and horizontal sections. A nipple assembly is mounted on the vertical section, with a distance of 136 mm from the top of the vertical section to the nipple. The nipple assembly consists of a nipple and a retaining clip. The retaining clip is shown in two positions: one where it is being inserted into the nipple and another where it is fully inserted. The distance between the two nipples is 25 mm. The nipple is labeled "Nipple" and the retaining clip is labeled "Retaining clips". The mounting frame is labeled "Mounting frame".

Figure 4; Clamps

7 Connections

7.1 Guidelines for earthing and wiring

Proper earthing and wiring of all electrical devices is important for the optimum operation of your system and for additional interference immunity for your application and the BOX-404-702.

Prerequisites

Before earthing or wiring an electrical device, you must ensure that the power supply to the devices is switched off. Also make sure that all connected devices are switched off.

Ensure that you comply with all applicable and binding standards when wiring the BOX-404-702 and all connected devices. Observe the relevant national and regional regulations when installing and operating the devices. Ask the local authorities about the standards and regulations that must be observed in your specific case.



If you attempt to install or wire the Box-SE-404-702 or devices connected to it while it is switched on, you may receive an electric shock or the devices may malfunction. If the power supply to the Box-SE-404-702 and all devices connected to it is not switched off during the installation or removal of devices, this can lead to material damage.

Take all necessary safety precautions and ensure that the power supply to the SE-404-702 box is switched off before installing or removing a device



Always bear safety in mind when planning the earthing and wiring of your Box-SE-404-702.

Electronic control devices such as the BOX-404-702 can fail and cause unexpected operation of the controlled or monitored devices. You should therefore implement safety devices that are independent of the BOX-SE-404-702 and protect against possible personal injury and/or damage to property.



Control systems can fail in unsafe operating conditions, causing uncontrolled operation of the controlled devices. This results in unpredictable operation of the automation system, which can lead to fatal or serious injuries and/or damage to property.

Therefore, provide an EMERGENCY STOP function, electromechanical or other redundant safety devices that are independent of your Box-SE-404-702.

7.2 Device connections on the back



Figure 5; BOX-404-702 rear view

No.	Element
1	Ethernet RJ45
2	Alarm connector (A1,A2) for watchdog and alarm output
3	Fuse T2C 250 V
4	230 V AC power supply
5	Shielding connections on the cover plates of the slots
6	Option slot

Watchdog / alarm output: solder connections and wiring					
Internal alarm Watch-Dog		Internal alarm	NO	YES	No voltage
		Contact 3-2	Closed	Open	Closed
		Contact 3-4	open	Closed	open
		Watch-Dog	NO	YES	No voltage
		Contact 6-1	open	Closed	Closed
		Contact 6-5	Closed	open	open

7.3 Connecting the cables

In the conversion box, all internal cables are pre-wired to VG connectors that are compatible with those of the SE-404.

Configuration, programs and parameters can be transferred to the SE-702 as a service in accordance with customer specifications.

The CAN modules are labelled on the top of the housing above the VG connectors. The order is usually taken from the SE-404 so that the connectors can be connected in the same order.



7.3.1 Connection of digital signals:

As a rule, the wiring of the digital input and output signals is taken from the circuit diagrams of the system. Another important basis for the replacement of device generations is the evaluation of the saved configuration from the original device. This can be done by reading out and saving to an SM1288 memory card.

Alternatively, this can be done by reading out with the ECS-View software. This requires an appropriate cable for connection to the JBus interface, if available.

7.3.2 Connection of the analogue signals:

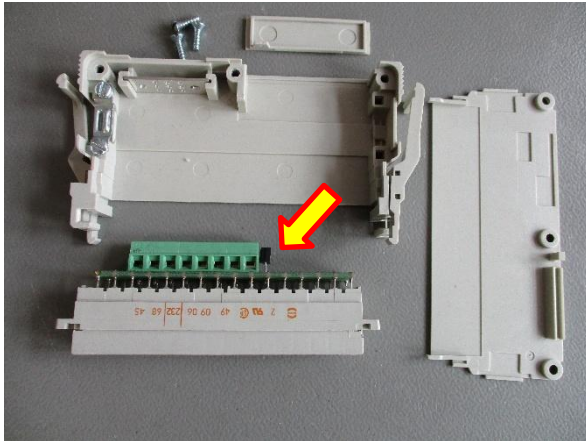
The same principle applies here as for the digital signals. The individual connections of the THK4, PTK4, ISTW4 or MUX16 U/I card are analysed and converted individually.



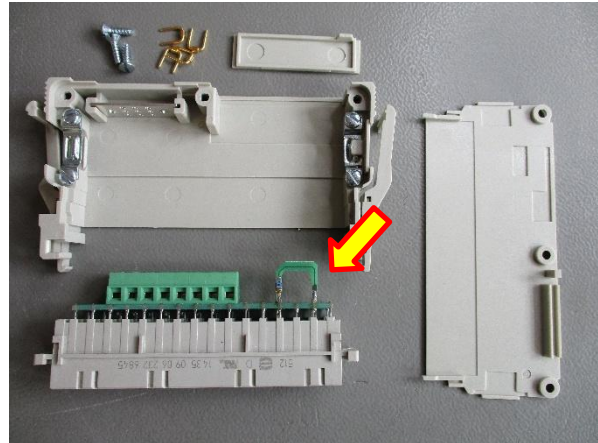
Attention

When using the THK4 card, it must be ensured that a different reference junction is used for the actual value recording. Please replace the supplied THK mating connector with the existing one.

When using thermocouples, the mating connector supplied must be installed with the appropriate clamping position sensor!

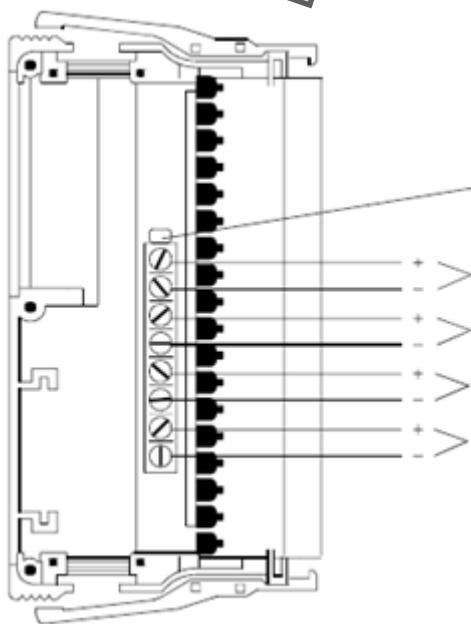
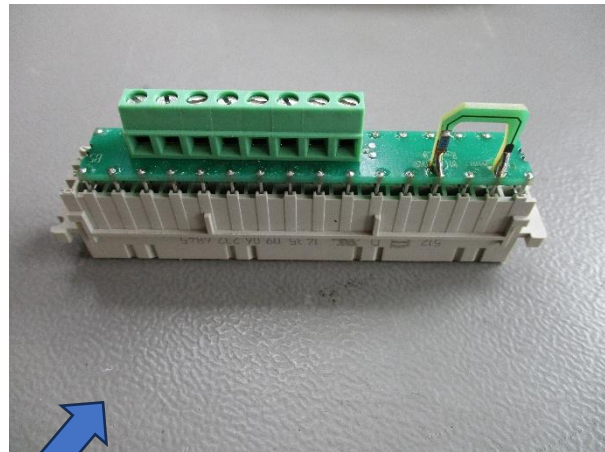
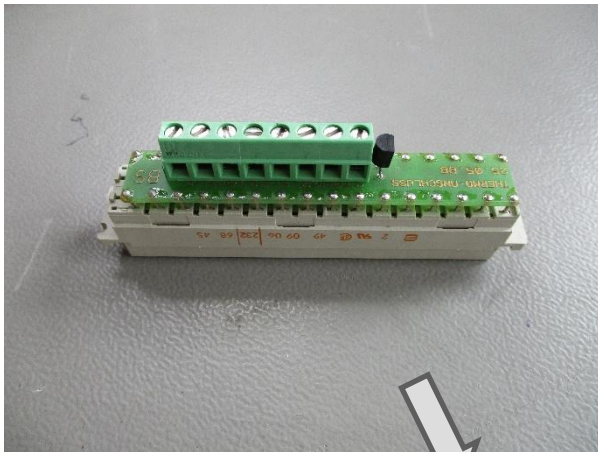


Old mating connector THK4, SE-404



New mating connector THK4, conversion box

The connections of the connected cables remain identical. The terminal position sensor changes to the current CAN hardware IW4/IW8 XL(S) card.



Terminal point temperature sensor

Actual value input 4

Actual value input 3

Actual value input 2

Actual value input 1

For other card types, such as the PTK4, ISTW4 or MUX16 U/I, the complete conversion is realised with specially manufactured special cables in the conversion box.

For this purpose, it is important that the circuit diagrams and hardware configuration of the device to be replaced are up to date.