

# Technical documentation

## Installation instructions

### BOX-402-701





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## 1 General

### 1.1 Information about the operating instructions manual






This operating manual shall put the user into the position to install the device properly.

Read and understand the operating manual completely, in particular the chapter security, before the beginning of the installation work! Comply with the operating manual, in particular the safety references as well as the regulations for the prevention of industrial accidents, valid for the area of application, absolutely.

Always pass the device together with the operating manual to a third party.

### 1.2 Symbol declaration

Important safety-relevant references are characterized by symbols in this manual. Comply with the references absolutely, in order to avoid accidents, damages to persons and physical damage.

 <b>Warning!</b>	<p>This symbol marks dangers which result in impairment of health, injuries, lasting physical injury or to death, as well as substantial property damage.</p> <p>Keep the displayed references to the operational safety absolute exactly and behave in these cases particular carefully.</p>
 <b>Caution!</b> <b>Danger by electric current!</b>	<p>This symbol makes attentive to dangerous situations by electric current. In case of non-observance of the safety references the danger of heavy injuries or death exists like substantial damage to property. The executed work may be implemented only by an instructed electrical specialist.</p>
 <b>ATTENTION!</b>	<p>Consider ESD electronic protective measures! Electrostatic unloading may destroy electronic components.</p>
 <b>ATTENTION!</b>	<p>This symbol marks references, whose non-observance can result in damages, malfunctioning and/or loss of the device.</p>
 <b>Note!</b>	<p>This symbol emphasizes hints and information, which are to be considered for an efficient and trouble-free operation of the device.</p>

### 1.3 Declaration of conformity to the RoHS Directive

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The products of STANGE ELEKTRONIK GmbH are excluded according to article 2 / paragraph 4c, 4d and 4e from the application of the RoHS directive.

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

The company Stange Elektronik GmbH hereby declares the conformity of its products with 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 said directive are used during assembly.

We can also confirm that the four substances additionally included in Directive (EU) 2015/863 amending Annex II of Directive 2011/65 / EU of the European Parliament and of the Council as regards the list of banned 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 chrome (0,1 %)
- Polybrominated biphenyl (PBB) (0,1 %)
- Polybrominated diphenyl (PBDE) (0,1 %)
- Di(2-ethylhexyl) phthalate (DEHP) (0,1 %)
- Butyl benzyl phthalate (BBP) (0,1 %)
- Dibutyl phthalate (DBP) (0,1 %)
- Disobutyl phthalate (DIBP) (0,1 %)

### 1.4 Declarations of conformity REACH Regulation

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(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" in terms of REACH. Obligations due to the manufacture and marketing of substances/chemicals for pre-registration or registration (ECHA) are not applicable to us.

Our products are articles and therefore cannot be defined as substances or preparations (according to Article 3 definitions). Furthermore, no substance is released from our products when used as intended.

Therefore, Stange Elektronik GmbH is neither subject to the obligation to register nor to create safety data sheets.

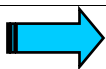
### 1.5 Liability and warranty

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All specifications and notes in this manual were arranged with consideration of the valid regulations, the current engineering level of development as well as our realizations and experiences of many years.

The translation of the manual was likewise provided after best knowledge. We cannot take over a liability for translation errors however. Considerably applies the provided German version of this manual.

The actual scope of supply can deviate with special equipment, the demands of additional order options or due to newest technical changes possibly from the explanations and graphic representations described here. Please contact the manufacturer if you have questions.



**Note!**

**This manual is to be perused before the beginning of all work on and with the device, in particular before the start-up! For damage and troubles, which result from the non-observance of the manual, the manufacturer does not take over liability.**

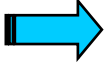
The manual is to be put aside and directly accessible with the device for all persons, who work on or with the device. The assignment of the manual to third party is not permitted and obligates if necessary to compensation. Further requirements reserved.

We reserve technical changes at the device in the context of the improvement of the performance characteristics and the advancement.

## 1.6 Copyright protection

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The manual is to be kept in confidence. It is exclusively intended for persons employed at and with the device. The assignment of the manual to third party is inadmissible without written agreement of the manufacturer. With requirement please contact the manufacturer.,



**Note!**

**The content wise specifications, texts, designs, pictures and other representations are copyrighted and are subject to further industrial property rights. Each abusive utilization is liable to prosecution.**

## 2 EU-DECLARATION OF CONFORMITY

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We, the company



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

declare under our sole responsibility that the product,

Description: **Conversion box**  
Type: **BOX-402-701**

with the requirements of the standards

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

and therefore, complies with the provisions of the EU Directives

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

Wiehl, 22.01.2024

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Place and date of issue



P. Jaspert (Managing Director)

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Name, legally binding signature

## 3 Safety


This section gives an overview of all important safety aspects for an optimal protection of the personnel as well as safe and trouble-free operation of the device.

Additionally, the individual chapters contain concrete safety references, marked by symbols, for the prevention of direct dangers. Beyond that pictograms, signboards and labelling are present at the device, which have to be kept in constantly readable condition.

### 3.1 Intended use

The industrial control exclusively serves for the control of machines and plants, which are build according to the applicable regulations and equipped with all necessary safety installations.

The operational reliability is ensured only by the intended use of the device.

 <b>ATTENTION!</b>	<p><b>Each use of the device going beyond the intended use and/or different use is forbidden and is considered as not intended. In particular the use of the device for the control or as replacement of safeguarding equipment in the sense of the machine directive (98137 EG) is not permitted.</b></p> <p><b>Requirements of any kind against the manufacturer and/or its authorized persons because of damage on the basis of not intended use of the device are excluded.</b></p> <p><b>For all damages on the basis of not intended use the operator is responsible alone.</b></p> <p><b>Among the intended use also the correct adherence of the operating ranges as well as the installation-, operation- and cleaning instructions.</b></p>
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### 3.2 Electromagnetic compatibility (EMC)

Before installing an EMC planning is necessary, even though devices fulfil the EMC requirements. Disturbance sources (galvanic, inductive and capacitive coupling) as well as radiation coupling come to consideration thereby.

### 3.3 EMC safeguarding

The following requirements should be kept, in order to safeguard EMC:

- Inactive metal parts must have a correct and extensive grounding.
- Wires and devices have a correct shielding.
- Wiring and line run must be executed correctly.
- The electric equipment is grounded and has a uniform reference potential.
- Special applications need specific EMC measures.

### 3.4 Grounding of inactive metal parts

The influence of coupled interferences can be reduced, if all inactive metal parts (switch cabinet, switch cabinet door, mounting plates, top hat rails etc.) are connected extensive and low impedance with each other. The uniform reference potential area results for control elements for this reason.

- In the range of bolted connections the insulating layer must be removed in case of painted eloxadized or isolated metal parts. It must be cared for corrosion protection of junctions.
- Connection of all free moving groundable components (cabinet doors, separate mounting plates, etc.) by using short bonding straps to large surface areas.
- No use of aluminium parts if possible, because the oxidation of aluminium is inappropriate for grounding.

### 3.5 PE connection

Connect ground and PE connection (protective earth) centrally.

### 3.6 Unearthed operation

The relevant safety regulations and standards must receive attention in case of unearthed operation.



### 3.7 Responsibility of the operator

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

Apart from the operational safety notes in this manual are to be considered and kept the generally valid safety regulations and regulations for the prevention of industrial accidents for the area of application of the device as well as the valid environmental regulations.

The operator and the personnel authorized by him are responsible for the trouble-free operation of the device as well as for clear definitions over the cognizance during installation, operation, maintenance and cleaning.

The specifications of the manual must be complied completely and without restrictions!

The operator must guarantee beyond that,


- all further instructions and safety instructions are summarized in an operating instruction in accordance with work appliance use regulation, which result from the hazard judgement of the employments at the device.
- this manual is integrated into the plant documentation.
- maintenance and inspection intervals are to be kept.
- device, operating equipment and waste products resulting with the manufacturing are disposed environmentally compatible and in agreement with legal regulations.

### 3.8 Operating personal

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The industrial control may be served only by authorized technical personnel. The service personnel must have been instructed particularly about arising dangers.

As technical personnel is considered, who can judge the transferred work and recognize possible dangers due to his technical training, knowledge and experiences as well as knowledge of the relevant regulations.

 <p><b>ATTENTION!</b></p>	<p><b>This device may only be used for the applications described in the technical descriptions, and only in connection with devices or components from other manufacturers which have been approved or recommended by STANGE.</b></p> <p><b>This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.</b></p>
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### 3.9 2.9 Maintenance

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#### Clean display screen

For the trouble-free operation of the touch screen, it is advisable to clean the internal part of the device front regularly.

#### Battery

The storage battery serves for the backup of the real-time clock and the remanent PLC data. With complete charge, the storage battery has a holding time of approx. 8-10 weeks. In order to avoid data loss, it should be paid attention to the fact that the device is switched off not longer than this time. With completely empty storage battery a time of 48 hours operation is needed, until the storage battery has again its full capacity.

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

#### Transport

For the device transport should be exclusively used the original packaging.

### 3.10 Cleaning the front panel XE "Cleaning the front panel"

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

A soft, dry cloth is sufficient for cleaning the front panel and works well.

### 3.11 Repairs

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Repairs at SE-Device may only be made by STANGE Elektronik GmbH. In this case, please contact the technical support of STANGE Elektronik GmbH.

For making changes at the device not described in this document no liability is accepted.

### 3.12 Manufacturer-Address

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**Manufacturer:****STANGE Elektronik GmbH**

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

**Fon:** +49 (0)2261 - 95790**Fax:** +49 (0)2261 - 55212**E-Mail:** [info@stange-elektronik.de](mailto:info@stange-elektronik.de)**Homepage:** [www.stange-elektronik.com](http://www.stange-elektronik.com)

### 3.13 Technical Support

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**Support:****E-mail:** [support@stange-elektronik.de](mailto:support@stange-elektronik.de)

### 3.14 Disposal

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STANGE units can be recycled. Send back the device delivered free to STANGE Elektronik GmbH for disposal. Or contact a certified electronic waste disposal centre for environmentally acceptable recycling and disposal of your old devices.

**Particularly to be considered is:**

- the device contains a lithium battery.
- devices with liquid crystal display are equipped with a mercurial fluorescence tube for the background lighting.

**Materials:**

Housing: Stainless steel  
Front frame: Aluminium  
Board: 1. quality  
Front glass: Security shatterproof glass

## **4 Transport, Packing and Storage**

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### **4.1 Transport inspection**

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Examine supply with receipt immediately for completeness and transport damages.

Do not accept delivery or only under reservation with outwardly recognizable transport damage. Note the damage on transportation document/delivery note of the carrier. Start reclamation.

Reclaim hidden damages immediately after recognizing (at the latest within 8 days (date of receipt)) in writing, because claims for damages can be made valid only within the valid complaint periods.

### **4.2 Packaging and disposal of original packaging**

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The packaging is an essential part of the product. The packaging is individually developed for each product by the manufacturer. If you want to send the device back during warranty period or for repair service, the original packaging must be used in each case for transport. For this reason, the original packaging should be kept as long as you own the device. If you want to dispose the packaging, we are obliged to take them back according to the provisions of the Packaging Regulation in order to recycle or reuse them.

### **4.3 Storage**

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Keep packages up to the assembly locked and considering of the environmental conditions for storage.

## 5 Introduction: Conversion-BOX-SE-402-701



SE-402



BOX-402-701

The "BOX-402-701" is designed as a replacement unit for the discontinued SE-402 program controller.

The conversion box consists of the built-in SE-701 program controller including power supply unit inside the housing and the connections on the rear.

The installation housing (160 x 160 x 248,8 mm (WxHxD)) is identical to the SE-402, and the connections and plugs are also compatible with those of the SE-402, as they are wired to VG plugs in the conversion box.


The configuration interface is omitted, as is the serial interface. 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-701 as a service in accordance with customer specifications.



## 6 Installation of the industrial control unit

### 6.1 Guidelines for installation

 <b>Warning!</b>	<p><b>Safety requirements for installation:</b></p> <p>The devices are open type in accordance with standard IEC 61010-2-201 and UL 61010-2-201 / CSA C22.2 No. 61010-2-201. Safe operation in terms of mechanical strength, flame resistance, stability and protection against and protection against accidental contact, the following alternative types of installation are prescribed:</p> <ul style="list-style-type: none"><li>- Installation in a suitable cabinet</li><li>- Installation in a suitable housing</li><li>- Installation in a suitably equipped closed operating room</li></ul>
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 <b>Attention</b>	<p><b>Keep the installation box away from heat, high voltage and electrical interference!</b></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 Box-SE-402-701.

When planning the layout of the Box-SE-402-701 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, its service life will be reduced.


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

### 6.2 General assembly instructions

The Box-SE-402-701 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 in order 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 from active elements such as load power supply, transformers etc. must be maintained.

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

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

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

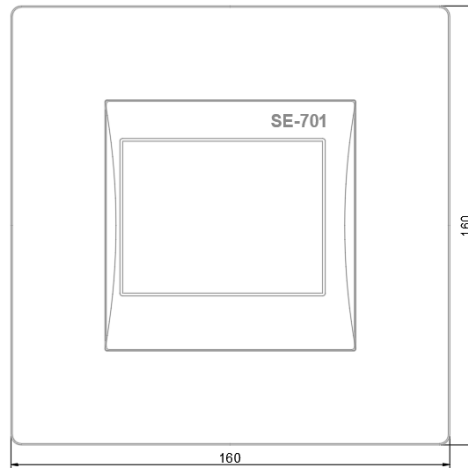


Figure 1; Front view



Figure 2; Side view

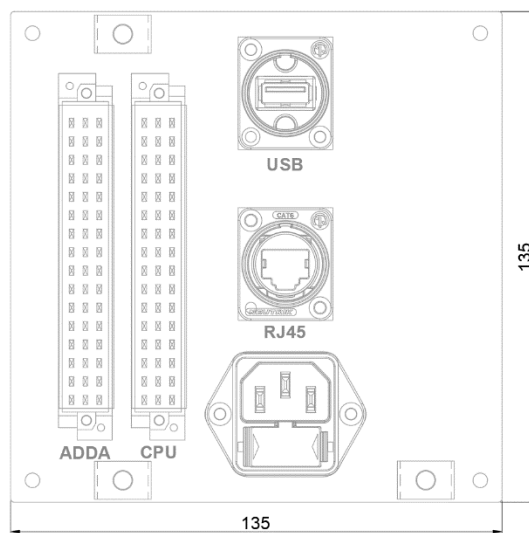


Figure 3; Rear view

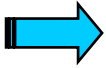
The installation depth for the SE-402-701 box is 238.5 mm plus 70 mm for the mating connector.

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

## 6.4 Installation in front panel

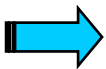
### Box-SE-402-701 Installation in front panel:

A rectangular cut-out is required for installation of the device in electrical cabinets, control panels, etc. The conversion box requires an installation cut-out of W x H: **142 ± 1 mm x 142 ± 1 mm**. The installation depth for the SE-402-701 box is 238.5 mm plus 70 mm for the mating connector. Length of the retaining clip: 65 mm behind the mounting plate.



The front panel must not exceed a maximum thickness of 7 mm.

- Slide the appliance into the cut-out from the front.
- Insert one of the supplied clamps from the rear on each side as far as it will go; the recess in the mounting plate of the clamp engages in a nipple on the side of the housing.
- Turn the screw clockwise; the device is pulled backwards and locked in place.



Minimum distance for devices installed next to each other:  
50 mm

### Assembly sketch

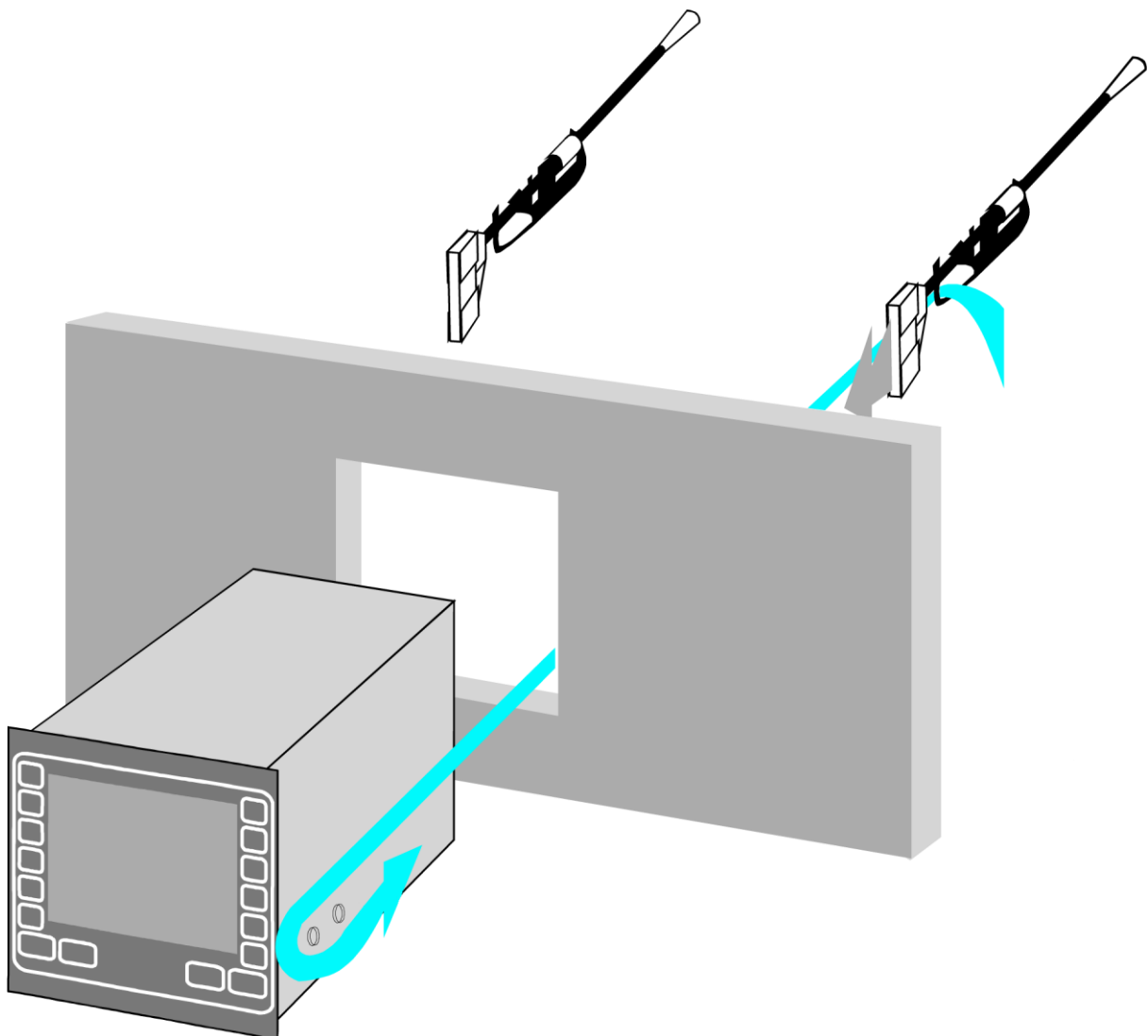


Figure 4; Retaining clamps

## 7 Connections


### 7.1 Grounding and wiring guidelines


Proper grounding and wiring of all electrical devices is important for the optimal operation of your system and for additional interference immunity for your application and the BOX-402-701.


#### Prerequisites

Before you ground or wire an electrical device, you must ensure that the power supply to the devices is switched off. Also ensure that all connected devices are switched off.

Ensure that you comply with all applicable and binding standards when wiring the BOX-402-701 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 particular case.

	<p>If you attempt to install or wire the Box-SE-402-701 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-402-701 and all devices connected to it is not switched off during the installation or removal of devices, this can lead to material damage.</p> <p>Take all necessary safety precautions and ensure that the power supply to the Box-SE-402-701 is switched off before installing or removing a device</p>
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	<p>Always consider safety when planning the grounding and wiring of your Box-SE-402-701. Electronic control devices such as the BOX-402-701 can fail and cause unexpected operation of the controlled or monitored devices. Therefore, you should implement safety devices that are independent of the Box-SE-402-701 and protect against possible personal injury and/or property damage.</p>
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	<p>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.</p> <p>Therefore, provide an EMERGENCY STOP function, electromechanical or other redundant safety devices that are independent of your Box-SE-402-701.</p>
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## 7.2 Device connections on the rear

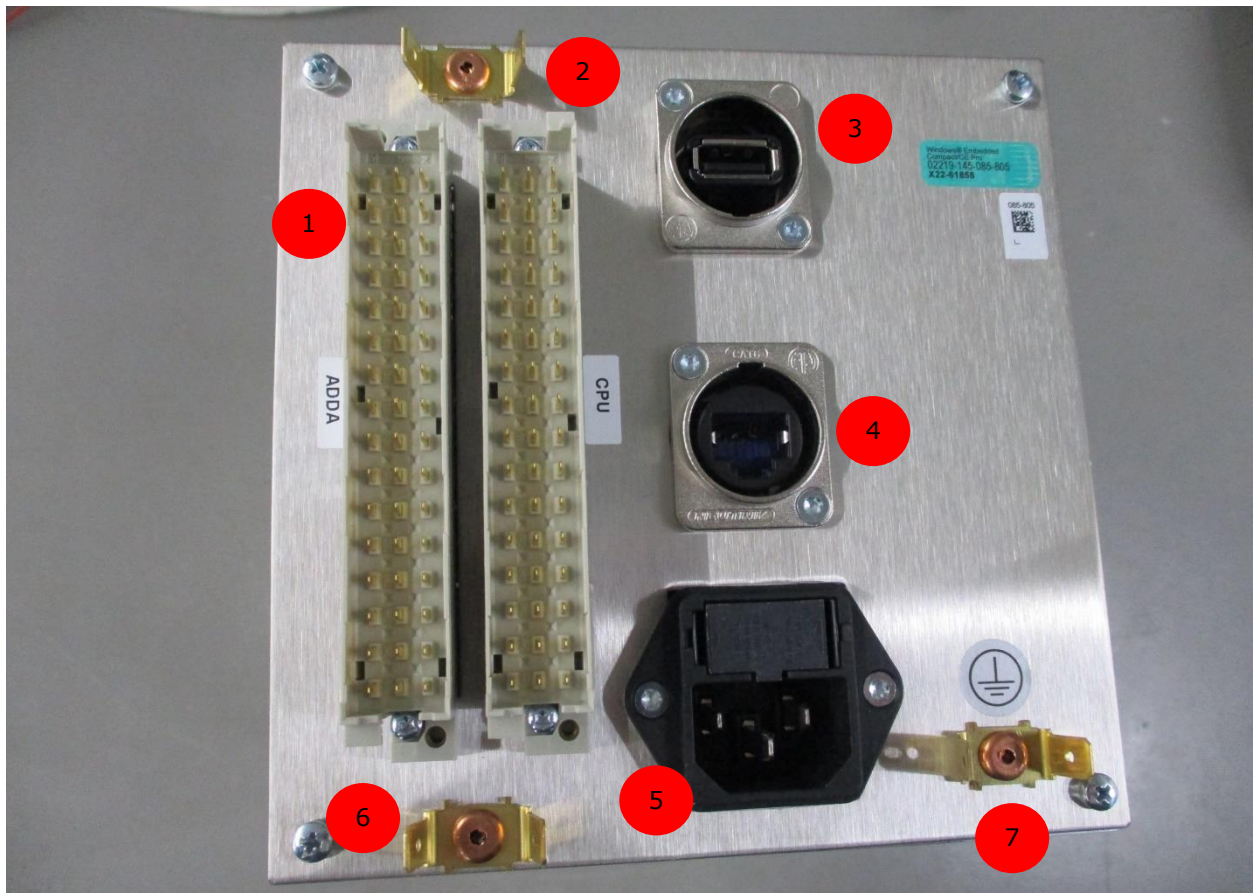


Figure 5; BOX-402-701 Rear view

No.	Element
1	ADDA socket for VG-Plug
2	CPU socket for VG-Plug
3	USB connection
4	RJ-45 Ethernet
5	230 V AC IEC connection
6	Grounding socket (PE)
7	Connection cable(s) shielding

### 7.3 Connection of the cables

In the conversion box, all internal cables are pre-wired to VG connectors that are compatible with those of the SE-402.

Configuration, programs and parameters can be transferred to the SE-701 as a service in accordance with customer specifications.

The digital and analogue I/O cards are labelled on the back of the housing next to the VG connectors. These are labelled ADDA and CPU. The order is usually adopted from the SE-402 so that the connectors are connected in the same order.

#### 7.3.1 Connection of digital signals:

Usually, the wiring of the digital input and output signals is taken from the circuit diagrams of the system. Another important basis for replacing the device generations is analysing the saved configuration from the original device.

This is done by reading it out with ECS-View software. This requires an appropriate cable, which is differentiated for connection to the configuration interface and, if available, to the JBus interface.

As a rule, the VG mating connector of the CPU card plugged into the SE-402 can be used.

PIN	Input	PIN	Output
<b>z2...z8</b>	0 V, GND, common for all inputs	<b>z10...z16</b>	+24 V DC, common for all outputs
<b>d2</b>	Input 1	d18	Output 1
<b>d4</b>	Input 2	d20	Output 2
<b>d6</b>	Input 3	d22	Output 3
<b>d8</b>	Input 4	d24	Output 4
<b>d10</b>	Input 5	d26	Output 5
<b>d12</b>	Input 6	d28	Output 6
<b>d14</b>	Input 7	d30	Output 7
<b>d16</b>	Input 8	d32	Output 8
<b>b2</b>	Input 9	b18	Output 9
<b>b4</b>	Input 10	b20	Output 10
<b>b6</b>	Input 11	b22	Output 11
<b>b8</b>	Input 12	b24	Output 12
<b>b10</b>	Input 13	b26	Output 13
<b>b12</b>	Input 14	b28	Output 14
<b>b14</b>	Input 15	b30	Output 15
<b>b16</b>	Input 16	b32	Output 16
		z30	WatchDog 1 (Relay open when active)
		z32	WatchDog 2 (Relay open when active)

#### 7.3.2 Connection of analogue signals:

The same principle applies here as for the digital signals. The individual analogue cable connections of the ADDA card are manufactured and installed according to customer configuration.

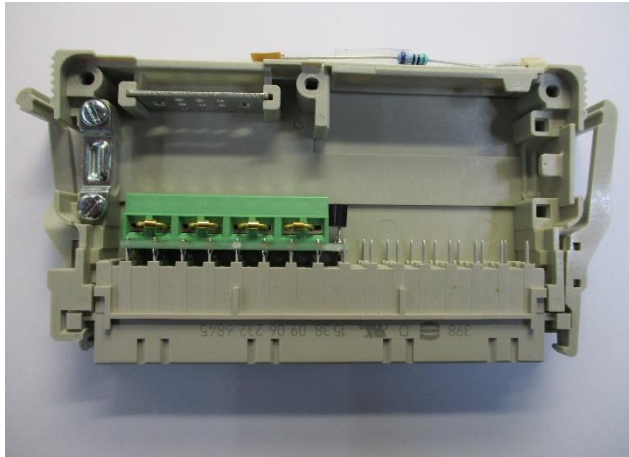


**Attention**

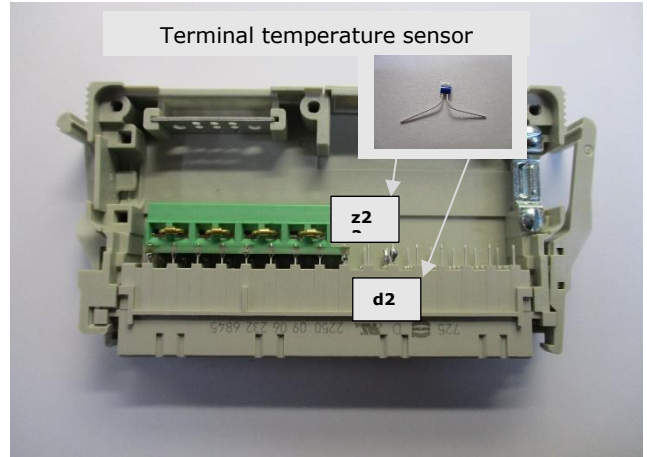
Please note that the original mating connector of the SE-402 can be used when configuring standard and PT100 signals.

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

When **using thermocouples**, the mating connector supplied with the ADDA card must be reconnected.

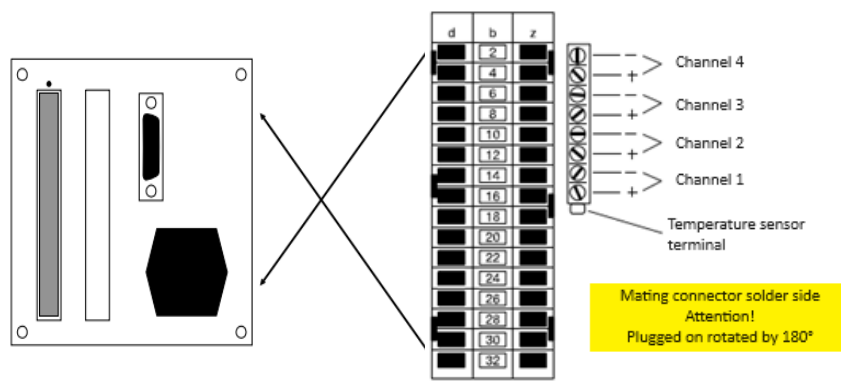
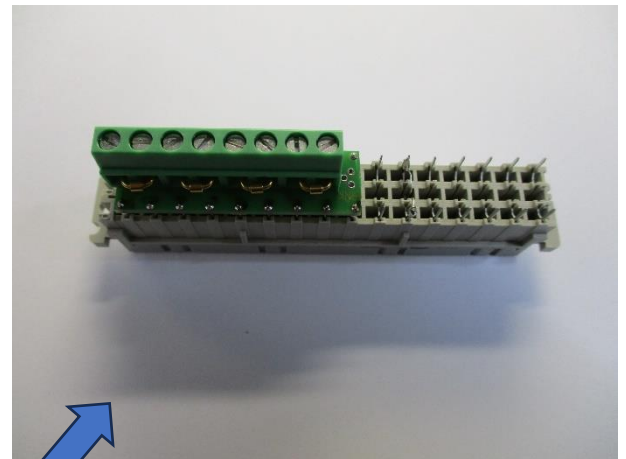
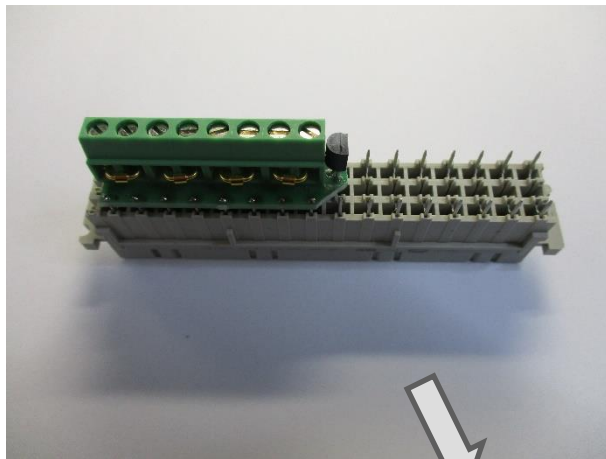


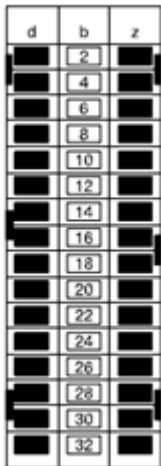
Old mating plug ADDA, SE-402



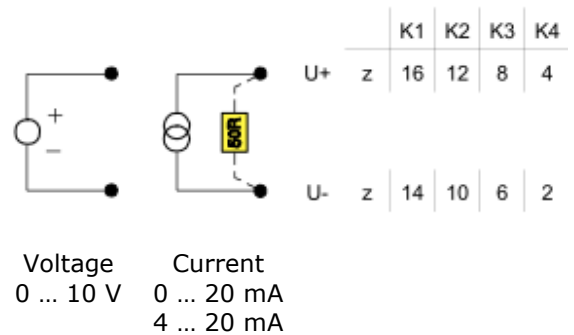
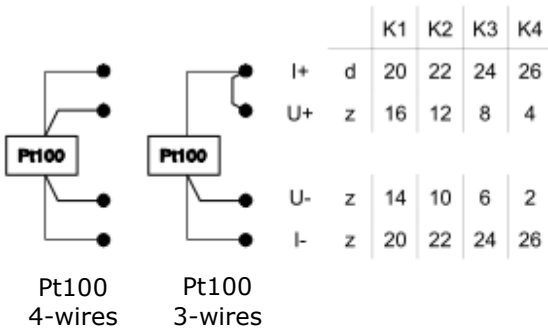
New mating plug ADDA, Box-402-701

The connections of the connected cables remain identical. The terminal temperature sensor changes to the current SE-701 hardware, the analogue input card (AIN-701).



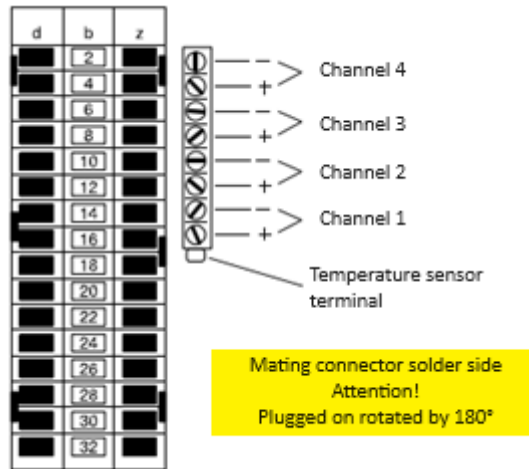


Pin	Input	
<b>z2</b>	Act. Value Channel 4 U-	Measurement inputs via <b>screw terminals</b> for voltage, current (with external resistor), thermo-couples; Pt100 elements only via voltage path
<b>z4</b>	Act. Value Channel 4 U+	
<b>z6</b>	Act. Value Channel 3 U-	
<b>z8</b>	Act. Value Channel 3 U+	
<b>z10</b>	Act. Value Channel 2 U-	
<b>z12</b>	Act. Value Channel 2 U+	
<b>z14</b>	Act. Value Channel 1 U-	
<b>z16</b>	Act. Value Channel 1 U+	
<b>d20</b>	Pt100 Channel 1 I+	Pt100 current path via <b>soldered connections</b>
<b>d22</b>	Pt100 Channel 2 I+	
<b>d24</b>	Pt100 Channel 3 I+	
<b>d26</b>	Pt100 Channel 4 I+	
<b>z20</b>	Pt100 Channel 1 I-	
<b>z22</b>	Pt100 Channel 2 I-	
<b>z24</b>	Pt100 Channel 3 I-	
<b>z26</b>	Pt100 Channel 4 I-	



### 7.3.3 Connection of analogue outputs:

The use of analogue output signals **requires the following pins to be rewired:**



Pin	Outputs	
d28	Channel 1	0(4) ... 20 mA
d30	Channel 1	0 ... +10 V
d32	Channel 1	0 V / GND
z28	Channel 2	0(4) ... 20 mA
z30	Channel 2	0 ... +10 V
z32	Channel 2	0 V / GND
d18	Protective earth connection PE	

Analogue outputs via soldered connections

Voltage output burden: minimum 2 kΩ  
 Current output burden: maximum 500 Ω

 <b>Note!</b>	<p><b>When using the new, enclosed mating connector (TH elements), the analogue outputs (z/d 28-32) must be rewired from the old mating connector!</b></p>
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