SUSPA GmbH

Installation Instructions

English

SUSPA Movotec SMS-I-40x80(Controller Laing LTC-EU)
SUSPA Movotec SMS-B-45x90 (Controller Laing LTC-EU)

Read installation instructions carefully before initial use!

Follow the safety instructions!

This partly completed machinery is intended to be incorporated into other machinery, other partly completed machinery/equipment or to be joined with another framework so as to form a complete machine as specified under the Machinery Directive. A conformity assessment procedure must be carried out on the whole completed machine in accordance with the Machinery Directive before it can be put into operation.

No revision service applies to this documentation. The current installation instructions are available at

https://www.SUSPA.com/global/downloads/

January 2024

These installation instructions are a component of the technical documentation of the system in accordance with the EC Machinery Directive.

These installation instructions correspond to the “Directive 2006/42/EC of the European Parliament and the Council for Adjustment of Legal and Administrative Regulations of Member States for Machinery” (Machinery Directive), Appendix I, Item 1.7.4.

These installation instructions are addressed to the person in charge, who must pass it on to the personnel responsible for connection, use, and maintenance of the machine. The person in charge must ensure that the installation instructions and the information contained in the accompanying documents have been read and understood.

These installation instructions must be kept in a well-known and easily accessible location and read in case of any doubt.

The manufacturer is not liable for injuries to people or animals, and damage to objects or to the machine itself arising from the improper/unauthorized use or by ignoring the safety criteria contained in these installation instructions or by modification of the machine or use of unsuitable spare parts.

SUSPA GmbH

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DEUTSCHLAND

Revision: January 2024

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1 Information Concerning this Document

1.1 Structure of the Warnings

The combination of a signal word in conjunction with a pictogram classifies the respective warning. The symbol can vary depending on the type of danger.

⚠ THE WARNING IS GIVEN BELOW A SIGNAL WORD THAT INDICATES THE EXTENT OF THE EXISTING DANGER.

The first line after the signal word describes the type and source of the potential danger.

The following section describes the consequences if no measures are adopted to safeguard against the danger.

The last paragraph describes the measures to avoid the danger.

1.2 Signal Words and Signal Colors

The following signal words are based on DIN EN 82079-1 and ANSI Z 535.4, and are used in this documentation. The safety colors have been adopted from the standard ISO 3864-1.

Signal word	Use	Explanation
⚠ DANGER	Warning	Indicates a dangerous situation, which if ignored, leads to death or severe injuries.
⚠ WARNING	Warning	Indicates a dangerous situation, which, if ignored may lead to injuries and damage to property
⚠ CAUTION	Warning	Indicates a dangerous situation, which, if ignored may lead to minor injuries and damage to property
IMPORTANT	Note	Refers to ways to facilitate and simplify operation and to cross-references. It excludes the danger of damage to property and the risk of injuries.
SAFETY INSTRUCTION	Safety instruction	Indicates certain safety-related instructions or procedures.

Table 1 Signal words and signal colors

1.3 Symbols and Warning Notice

Some of the following special safety symbols according to DIN EN ISO 7010: 2011 are used in the corresponding sections of these installation instructions and require particular attention depending on the signal word and symbol combination:

Symbol	Use	Explanation
	Note	Important information for understanding the device or for optimized operations.

Table 2 Symbols

Symbol	Explanation	Symbol	Explanation
	General warning sign		Warning against hazardous electrical voltage
	Warning against risk of hand injuries		

Table 3 Warning

2 Identification and Notes

2.1 Designation

SUSPA Movotec SMS-I-40x80 LTC (EU-Version)

Consisting of:

- Sheet 004 1012 ZB Actuator SMS-I-40x80
- Sheet 198 1011 Controller SMS LTC 384 incl. power cable
- 098 10228 Up / Down manual switch LM2LCDP or
- 098 10225 Memory manual switch LD6LC (for linking function necessary)

SUSPA Movotec SMS-B-45x90 LTC (EU-Version)

Consisting of:

- Sheet 004 1013 ZB Actuator SMS-B-45x90
- Sheet 198 1011 Controller SMS LTC 384 incl. power cable
- 098 10228 Up / Down manual switch LM2LCDP or
- 098 10225 Memory manual switch LD6LC (for linking function necessary)

2.2 Manufacturer

SUSPA GmbH

Eisenhaemmerstrasse 3

92237 Sulzbach-Rosenberg

GERMANY

2.3 Intended Use

The SUSPA Movotec SMS (Spindle Motor System) is used to adjust the height of workplaces that are used when sitting or standing. The lifting elements are designed for compressive loads.

IMPORTANT Please make sure that installation or start-up or the appropriate height adjustment has been selected. Please note in this regard the technical data (see Sec. 4.1 Technical Specifications), in particular the maximum load and adjustment range information.

Any expanded use of the Height Adjustment System is considered to be usage not in the manner intended and thus improper. In this case, the safety and protective functions of the Height Adjustment System may be impaired.

This partly completed machinery is intended to be incorporated into other machinery, other partly completed machinery/equipment or to be joined with another framework so as to form a complete machine as specified under the Machinery Directive. A conformity assessment procedure must be carried out on the whole completed machine in accordance with the Machinery Directive before it can be put into operation.

SUSPA GmbH assumes no liability for damage resulting from such improper use.

Intended use also includes:

- Following all instructions in the installation instructions
- Following all safety instructions
- Compliance with the maintenance intervals

2.4 Reasonably Foreseeable Misuse

Improper use, which could result in risks for the user, third parties and the Height Adjustment System for all operating modes are considered to be the following:

- Using the Height Adjustment System and its electrical equipment contrary to its intended use
- The installation of the Height Adjustment System on components that are not approved by SUSPA GmbH for this system
- Improper installation, start-up, operation and maintenance of the system
- Operating the system beyond the physical operating limits described in the Section "Operating Conditions"
- Modifying the controller software without prior consultation with SUSPA GmbH
- Any modifications to the height adjustment system as well as any add-ons or conversions without prior consultation with the company, SUSPA GmbH
- Operating the Height Adjustment System contrary to the specifications provided in the operating instructions regarding safety instructions, installation, operation, and malfunctions
- Operation of the Height Adjustment System with apparent malfunctions and/or defects

⚠ WARNING

Danger of injury due to impermissible changes

Unauthorized modifications to the component as well as the use of spare parts from other manufacturers (not original spare parts) may pose risks.

Do not allow any unauthorized or other modifications to the component without prior approval of SUSPA GMBH.

NOTE This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge unless they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved. Children must not play with the appliance. Cleaning and user maintenance must not be carried out by children without supervision.

2.5 General Information

2.5.1 Warranty and Liability

The "General Terms and Conditions" of SUSPA GmbH always apply. These are made available to the owner upon signing of the contract at the latest.

Warranty claims and liability claims for personal injury and material damage are excluded if they are attributed to one or more of the following causes:

- Improper use of the component
- Improper installation, start-up, operation and maintenance of the component
- Disregarding the information in the installation instructions
- Unauthorized structural modifications of the Height Adjustment System
- Opening the individual components
- Inadequate implementation of the prescribed maintenance operations
- Disasters caused by external influence or force majeure
- Repairs that have not been carried out by the manufacturer's specialists

Read the installation instructions carefully before using and putting the component into operation. The installation instructions should familiarize the user with the handling of the component and instruct the user in the details associated with function and maintenance. The installation instructions must be made accessible to personnel at all times and must be kept available near the Height Adjustment System. The notes provided in the installation instructions regarding maintenance and operational safety must be observed and complied with. SUSPA GmbH would be pleased to answer any questions extending beyond the scope of these installation instructions.

2.5.2 Objectives of the installation Instructions

These installation instructions serve as a support and contain all necessary instructions that must be observed and complied with for general safety, transport, installation, operation, setup, maintenance, storage and disposal.

These installation instructions with all safety instructions as well as all additional documents of the assemblies provided by external suppliers must be:

- Observed, read and understood by all persons working on the Height Adjustment System; this applies in particular to the safety instructions
- Must be made freely available to all persons
- Consulted even in case of slightest doubt (safety)

Objectives:

- To prevent accidents
- Increase the service life and reliability of the component
- To reduce the costs of production downtime

IMPORTANT The right to technical modifications in the context of continuous product improvement is reserved at all times without prior notification!

2.5.3 Target Audience of the Installation Instructions

At different life cycles of the Height Adjustment System, personnel with varied competences may come into contact with the Height Adjustment System.

Tasks	Operating personnel	Specialized personnel	Maintenance personnel	SUSPA GMBH	Private person
Shipping (Delivery)				x	
Transport (Dispatching)		x		x	x
Start-up / installation		x	x	x	x
Operation	x	x	x	x	x
Error diagnosis	x	x	x	x	x
Troubleshooting by Error Code	x	x	x	x	x
Repair			x	x	
Decommissioning / Dismantling		x	x	x	x

Table 4 Target group

Operating personnel

A person who has been instructed and, if required, trained by a specialist in the tasks assigned to them, the possible dangers of improper conduct and the required safety equipment and safety measures.

Qualification of operating personnel

Of course, only those persons may work with the Height Adjustment System

- who are at least 18 years of age
- who are physically and mentally suitable for this purpose

Outside of the Federal Republic of Germany, the appropriate accident prevention regulations and safety regulations of the respective country apply.

Specialists

Persons who can evaluate the work assigned to them and recognize possible dangers on the basis of their specialized training, knowledge, experience and familiarity with the relevant standards.

Maintenance personnel

Maintenance personnel are persons with adequate technical training, knowledge and experience who are familiar with and know how to avoid mechanically or electrically induced hazards. Maintenance personnel must meet the following requirements:

- Technical training
- Knowledge and experience
- Knowledge of applicable standards
- Ability to assess assigned works
- Ability to identify hazards

External professional personnel (SUSPA GmbH)

The external professional personnel are specially trained for the manufacturer's products and is familiar with every life stages of Height Adjustment System. The external professional personnel conduct the transport up to the transfer to the operator.

Private person

A person who has no previous knowledge in the installation of mechanical and electrical components.

3 Safety Notices

⚠ WARNING

Danger of injury and material damage

There are dangers posed by ignoring the installation instructions and all safety instructions provided therein.

Read the installation instructions carefully before the initial start-up. Fulfill and follow the safety conditions required. Observe and follow both the general safety instructions and also the special safety instructions provided in the other chapters.

The component has been constructed using state-of-the-art technology and in line with established safety regulations. In order to prevent danger to life and limb of the user, third parties, or to the component, use the component only for intended purpose and in perfect operating condition in terms of safety.

The operator of the component or the persons assigned by the same are liable for property damage and personal injury resulting from non-compliance with the instructions provided in the installation instructions.

3.1 Obligations

⚠ WARNING

Danger of injury by disregarding the safety symbols

There is risk of injury associated with disregarding the warning notices provided in the area of the component and in the installation instructions.

Please note all warning and safety instructions in these installation instructions.

The following circumstances could increase the hazard potential of the component:

- Danger posed to persons through mechanical influences
- Malfunctions that may impair the safety during operation of the component

3.1.1 Operating Company's Obligations

This partly completed machinery is only intended to be incorporated into other machinery or other partly completed machinery or equipment or to be joined with them so as to form a complete machine as specified under the Machinery Directive. The machine should be put into operation only after a conformity evaluation procedure in accordance with the Machinery Directive has been carried out for the complete machine.

3.2 Residual Risk

IMPORTANT There is a residual risk posed by inadvertent movement of the drives. The following are determined as potential causes for this:

- Damaged cables
- External influences (EMC)
- Defects in the lifting elements, the controller or on the manual switch

➲ Take the residual risk into consideration with the construction and while preparing the operating instructions of the final product.

3.3 Safety Equipment

The component is fitted with various safety equipment. This equipment serves to protect persons working on the component from any danger to life and limb arising from electrical and mechanical operations and to limit material damage to the component.

3.4 Additional Instructions

In principle, the provisions of the accident prevention regulations of the professional association also apply to all work on the Height Adjustment System.

In addition, observe and follow the

- Applicable and binding accident-prevention regulations
- Applicable and binding regulations at the place of use
- Recognized technical regulations for safe and professional working methods
- Existing environmental protection regulations
- Other applicable regulations

4 Design and Function

4.1 Technical Specifications

Technical specifications - Height Adjustment System				
Installation dimensions (Lifting element) SMS-I-40x80				
Dimensions outer profile:	40 mm x 80 mm			
Groove width:	8 mm			
Stroke (L_{Stroke}):	150 mm	200 mm	300 mm	400 mm
Retracted length L_{in}:	510 mm	560 mm	660 mm	760 mm
Extended length L_{out}:	660 mm	760 mm	960 mm	1160 mm
Installation dimensions (Lifting element) SMS-B-45x90				
Dimensions outer profile:	45 mm x 90 mm			
Groove width:	10 mm			
Stroke (L_{Stroke}):	150 mm	200 mm	300 mm	400 mm
Retracted length L_{in}:	510 mm	560 mm	660 mm	760 mm
Extended length L_{out}:	660 mm	760 mm	960 mm	1160 mm
Controller				
Input voltage:	230 V (220V-240V) / 50 / 60Hz (3,5A)			
Output rating:	Max 380 W at 32VDC (16kHz, 0..100%) Max. total current all channels 17A			
Standby use:	250 mW			
Protection class I:	protective conductor			
Performance data				
Traversing velocity:	ca. 8 mm/s		ca. 16 mm/s	
Max. lifting capacity and holding load per lifting element:	150 kg		75 kg	
Max. lifting capacity and holding load with 4-leg system:	600 kg		300 kg	
Recommended Duty cycle:	10% (Traversing time 2 min; Break time 18 min)			
Protection type				
Lifting elements:	IP 40 in accordance with DIN EN 60529			
Controller:	IP 40 in accordance with DIN EN 60529			
Manual switch:	IP 42 in accordance with DIN EN 60529			
Traversing cycles				
At least 5,000 cycles in compliance with maintenance				

Table 5 Technical Specifications

IMPORTANT The noise emission level of the height adjustment system is considerably less than 70 dBA

4.2 Design and Function of the Height Adjustment System

The lifting elements are driven by electric motors and synchronized by a controller. The system works purely electromechanically and without the use of hydraulics. The lifting elements are optimized for OEM or retro-fit applications and consist of three important subsystems:

- Electrical lifting element
- Electrical controller
- Manual switch

The following explains how the subsystems work together and make the raising and lowering of the Height Adjustment System possible.

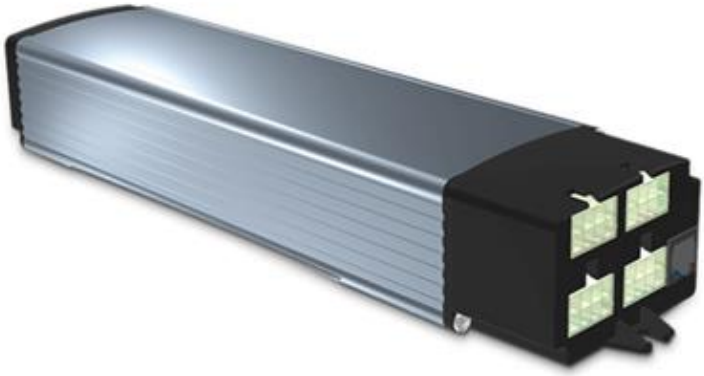


Figure 1 Electrical controller SMS LTC 384

Figure 3 UP/Down hand switch LM2LCDP

Figure 4 Memory hand switch LD6LC (optional)

Figure 2 Electrical lifting element

The lifting elements are equipped with electro-mechanical drives. The controller converts AC power to 32VDC to operate the motors with pulse width modulation (PWM 16kHz 0-100%). The controller is used to activate the raising and lowering of the lifting elements of the Height Adjustment System.

As soon as the operator presses the arrow keys (up or down) of the connected manual switch, the controller receives the signal to set the electro-mechanical drive of the lifting elements in motion. Depending on the direction of the arrow the motor moves the lifting elements up or down.

5 Transport

5.1 Safety Instructions for Transport

⚠ WARNING

Danger of falling loads

There are risks caused by human misconduct and inadequately secured loads.

Allow only those individuals who have been specially trained to perform transportation work. Secure the load against changing its position.

Pay attention to the position of the center of gravity of the component during transport.

Secure the component for transport by heavy goods vehicle on the loading surfaces with suitable means.

⚠ WARNING

Danger of injury due to unsecured transport routes

There is the risk of stumbling or slipping while transporting the components.

Arrange for proper illumination of the routes, ramps and steps over which loads are moved. Remove obstacles and stumbling points.

⚠ CAUTION

Damage caused by improper transport

Transport with extended lifting elements may result in risk of damage to property or personal injury. Retract the lifting element completely when transporting.

5.2 Transportation Procedure

The components have to be moved by suitable means. Use suitable cables, chains or straps for loading and unloading according to the load / weight.

IMPORTANT The shipment must be made by professional personnel of SUSPA GmbH. The further transport must be made by professional personnel and private persons. The following points must be observed for transporting / unloading of the components:

- Note the center of gravity.
- Avoid rubbing cables and lifting straps against sharp edges and corners.
- Check the delivered components for completeness, damage or any other abnormalities.
- Observe the applicable safety and accident prevention regulations during transport.

6 Installation

⚠ CAUTION

Danger of crushing

There is a risk of crushing due to the short distance to other objects and structures.

Make sure that the workplace has a minimum distance of 50 mm from other objects or structures. Make sure that walls, furniture, electrical wiring, or other solid structures do not impede the movement of the workplace during operation.

IMPORTANT The installation of the component must be carried out by professional personnel of SUSPA GmbH, other professional personnel, maintenance personnel and private persons.

IMPORTANT Do not lift the Height Adjustment System on the motor cables or power cords. Keep the motor cable and power cable away from heat, sharp edges, and moisture. Immediately suspend the operation of the product if you notice that the motor cable or power cord are damaged and replace the damaged components without delay. Never attempt to repair damaged motor cables or power cords.

IMPORTANT Check all components for any damage that may have occurred during transport or installation before operating the system. Do not try to dismantle the system or system components. Contact SUSPA GMBH in the event that components must be repaired or replaced.

6.1 Unpacking

Proceed with the necessary diligence and caution when unpacking the system components. Do not use any sharp-edged objects, cutters or knife blades in order to prevent damage to near electrical cables or components that may get damaged easily.

6.1.1 Disposal of Transport and Warehouse Packaging

The disposal of the transport and warehouse packaging should be performed in accordance with the local disposal regulations and environmental protection laws applicable in the operator's country.

6.1.2 Checklist of All Components Included in the Delivery

Check the completeness of the delivery while unpacking the components. Use the appropriate delivery notes on the contents of the pallets and the manufacturer's packing list for this purpose.

Examples of scope of delivery would be:

For a 4-leg system:

- 4 x Electrical lifting elements
- 1 x Electrical controller
- 1 x Manual switch
- 1 x Power cable
- 4x Adapter cables (mounted on lifting elements)
- 4 x Leveling Feet (Optional)

For a 8-leg system:

- 8 x Electrical lifting elements
- 2 x Electrical controller
- 1 x Memory Hand switch LD6LC
- 2 x Power cable
- 2 x Kabel RJ12 (2m)
- 1 x Sync-Y-Adapter
- 8 x Adapter cables (mounted on lifting elements)
- 8 x Leveling Feet (Optional)

6.2 Operating conditions

Physical operating conditions	
Operating range:	Functional operation ▪ Min + 5 °C ▪ Max + 40 °C Relative moisture: ▪ Max 80% at 32 °C, above that decreasing linearly to 50% at 40 °C
Contamination:	No heavy contamination due to dust, acids, corrosive gases

Table 6 Operating conditions

- Do not operate the system outdoors. Do not expose the system to damp or wet conditions.
- Avoid environments with chemical agents or corrosive environments.
- Do not operate the system near flammable solvents, propellants and/or explosive substances (e.g. gas, vapor, dust, etc.).
- Do not expose the components of the Height Adjustment System to any vibrations and/or shock loads.
- Do not use the controller near the equipment that generates strong electromagnetic fields. This may impair the function.
- In order to prevent overheating in the controller, it should not be installed in constrained, non-ventilated or thermally insulating locations. Adequate air circulation must be ensured.

IMPORTANT Observe the country-specific regulations regarding setup and operation of workplaces with respect to lighting of the workstations.

For example: Lighting in accordance with ASR A3.4

The Technical Rules for Workstations (ASR) reflect the state of the art technology, occupational medicine and occupational hygiene and other sound knowledge for the setup and operation of workstations.

The values given in the table are the intensity of illumination on the reference area for visual tasks that may be horizontal, vertical or inclined.

Lighting requirements (metal machining and processing, foundries and casting)		
Working rooms, workplaces and jobs	**Minimum value of the illumination intensity In lx**	**Minimum value of the color rendering Index Ra**
Metal machining and processing, foundries and casting		
Assembly work:		
- Rough	200	80
- Medium-fine	300	80
- Fine	500	80
- Very fine	750	80

Table 7 Lighting requirements

6.3 Install Components

➲ Note the exact information of the installation dimensions provided in the schematic diagrams of the Height Adjustment System.

6.3.1 Installation in General

⚠ CAUTION Electrical components (lifting elements, electrical controllers, manual switches) should be connected or disconnected only with the power plug pulled out!

➲ Bring the lifting elements in such a manner at the workplace that the load on the system is balanced out (distributed uniformly).

➲ Attach the lifting elements vertically and parallel to each other, so that they do not block each other during lifting and lowering.

SUSPA GmbH provides various brackets for reducing the holes to be drilled and facilitating the installation.

➲ Keep electrical cord away from sharp edges and moving parts.

➲ Avoid contact with moisture and heat.

➲ Attach the electrical wires and power cords to the workstation or structure using cable ties or clips.

IMPORTANT When routing electrical cables and power cords, make sure that the wires are not stretched or crushed. Position the power cord to prevent tripping hazards. Use only accessories authorized and provided by SUSPA GmbH.

The height adjustment system works properly only if it has been put into operation properly and individual components are controlled correctly.

➲ First check whether the individual components are damaged. If this is the case, do not put the height adjustment system into operation, but have the damaged components replaced by your supplier.

➲ Also check the power cable for damage. Make sure to replace damaged power cables in any case.

6.3.2 Installing the Lifting Elements

➲ Remove the protective packaging in which the lifting elements and the drilling templates are packaged.

Figure 5 Unpacking

➲ Align the workplace as described in the following in order to facilitate the positioning and installation of the components.

Figure 6 Aligning the workplace

The lifting elements consist of a linear spindle actuator, which is installed directly in the aluminum mounting profile. Thus, these lifting elements can be attached directly to the base frame as legs, using commercially available connecting elements.

Depending on the requirements of this base frame, two common outer profile versions are available, which must be specified when ordering this system.

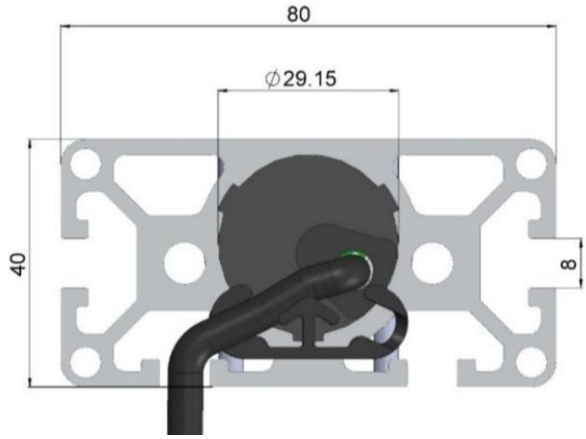


Figure 7 Lifting elements in profile (cross section) with the dimensions - SMS-I-40x80

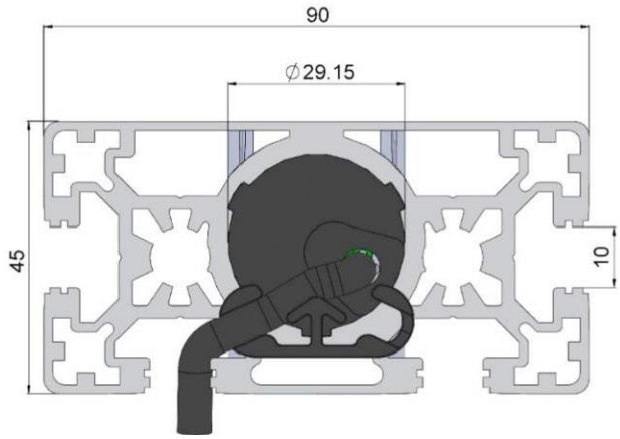


Figure 8 Lifting elements in profile (cross section) with the dimensions - SMS-B-45x90

- ➲ Attach the lifting elements directly to the base frame as legs. Use commercially available connection and fastening elements for this purpose (connecting brackets, bolt clamp connectors, etc.) and make sure that they are able to withstand the required loads.
- ➲ Check the connecting and fastening elements used on the lifting elements to ensure that they are fastened securely to the base frame. Make sure to tighten the connecting and fastening elements according to the recommended tightening torques of the respective manufacturer.

IMPORTANT When connecting the lifting elements to the base frame as legs, it is advantageous if the base frame rests on the frontal outer profile of the lifting elements and its load is thus supported (see also Figure 9). This reduces the load on the screw and clamp connections of the connection and fastening elements.

Figure 9 Supporting connection of base frame on the frontal outer profile of the lifting elements

The following figures show examples of connecting the lifting elements:

- SMS-I-40x80: Figure 10 und Figure 11
- SMS-B-45x90: Figure 12 und Figure 13

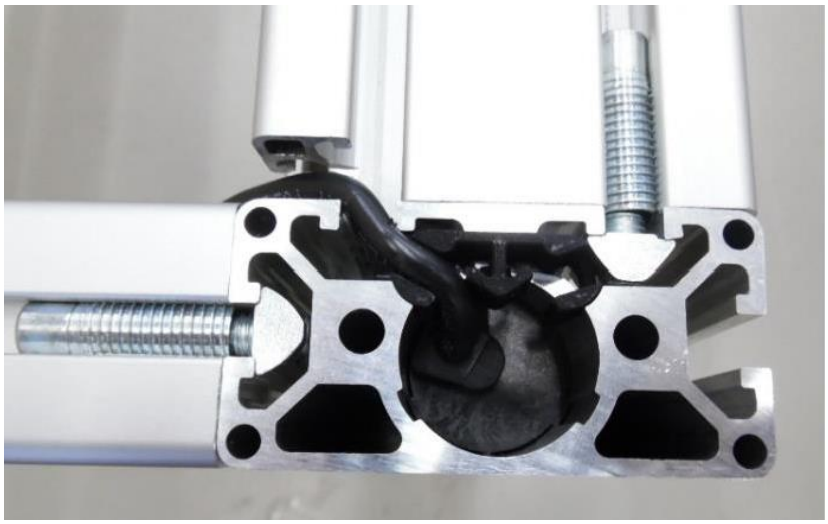


Figure 10 SMS-I 40x80: Example for connecting the lifting element to the base frame by means of standard bolt clamp connectors

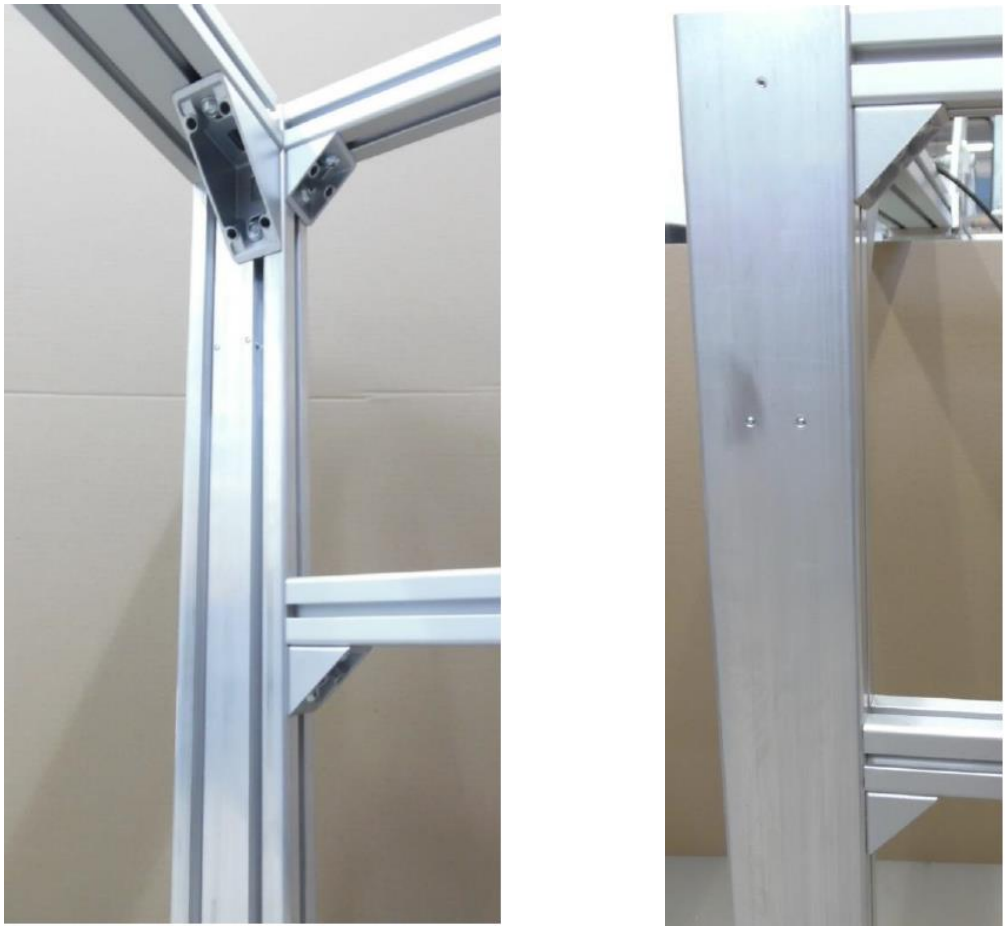


Figure 11 SMS-I-40x80: Examples of connecting the lifting element to the base frame by means of standard connection bracket (small/large)

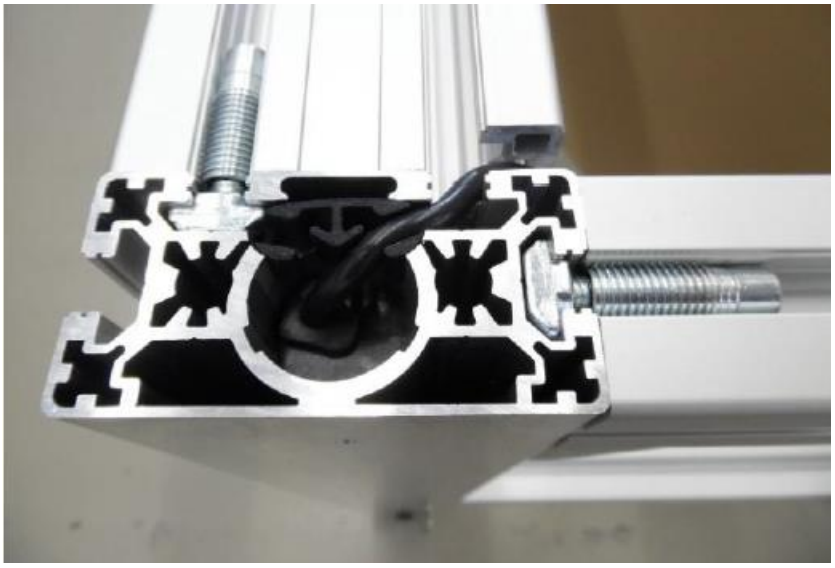
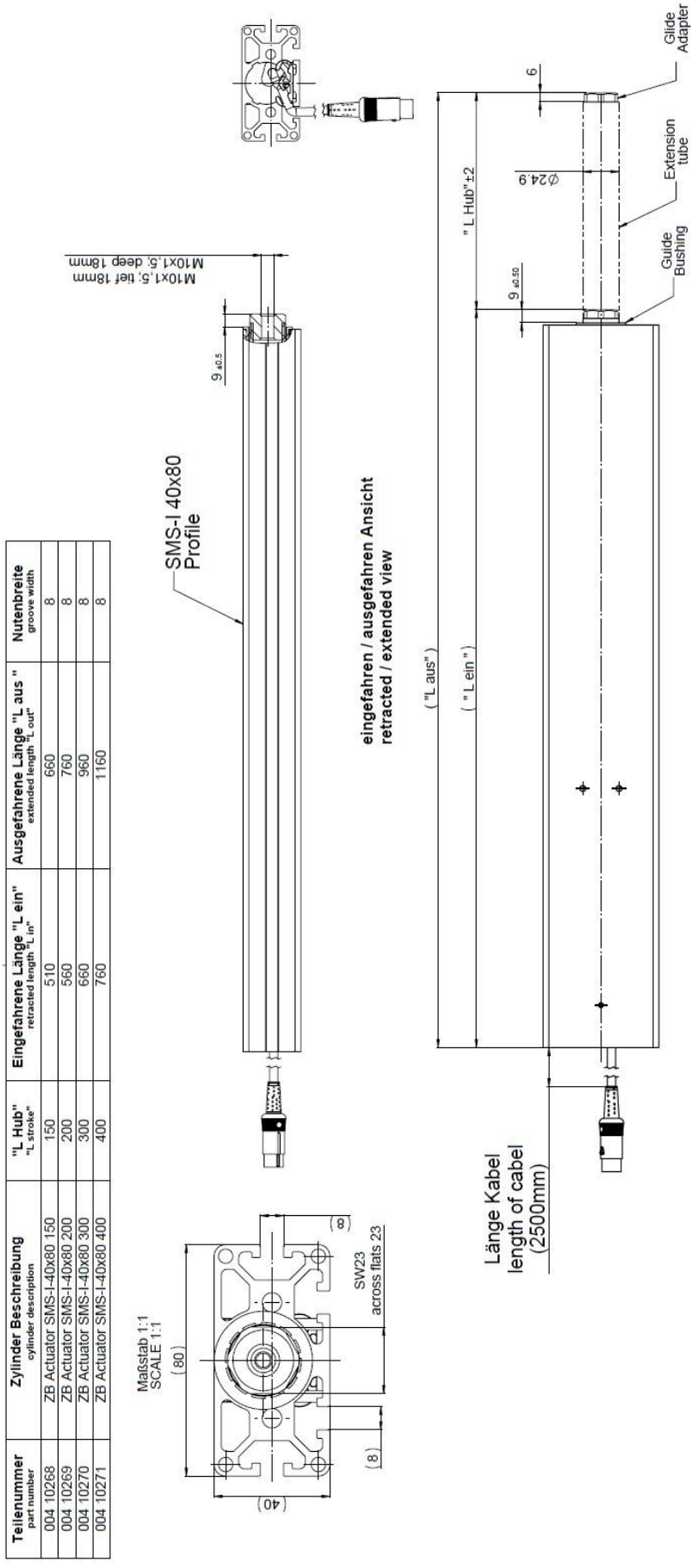


Figure 12 SMS-B-45x90: Example for connecting the lifting element to the base frame by means of standard bolt clamp connectors

Figure 13 SMS-B-45x90: Beispiele zur Verbindung Hubelement mit Grundrahmen mittels handelsüblicher Anbindungswinkel (klein/groß)

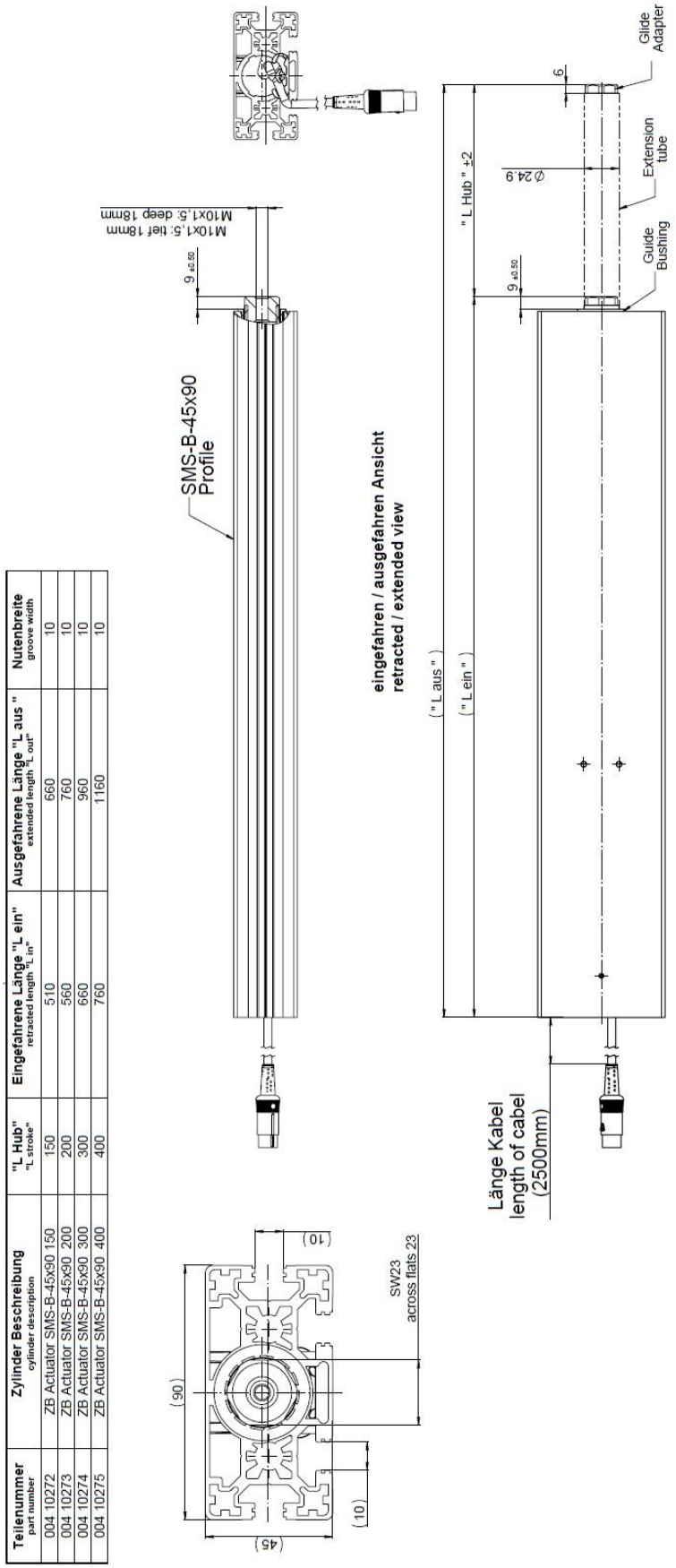
- Make sure that the electrical lines of each leg of the workplace can be laid without putting them under tension by maintaining the permissible bending radius of 57 mm (single) and 86 mm (multiple). The electrical wires to the lifting elements are each 2.5 m long.
- Screw the leveling feet (Optional) fully into the lifting elements.
- Position the workplace properly again such that the leveling feet stand on the floor.

IMPORTANT Take care to ensure that the workplace is not put down too abruptly in order to avoid damaging the lifting elements.



Teilenummer part number	Zylinder Beschreibung cylinder description	"L Hub" "L stroke"	Eingefahrene Länge "L ein" retracted length "L in"	Ausgefahrene Länge "L aus " extended length "L out"	Nutenbreite groove width
004 10268	ZB Actuator SMS-I-40x80 150	150	510	660	8
004 10269	ZB Actuator SMS-I-40x80 200	200	560	760	8
004 10270	ZB Actuator SMS-I-40x80 300	300	660	960	8
004 10271	ZB Actuator SMS-I-40x80 400	400	760	1160	8

Figure 14 Dimensions lifting element SMS-I-40x80



Teilenummer part number	Zylinder Beschreibung cylinder description	"L Hub" "L stroke"	Eingefahrene Länge "L ein" retracted length "L in"	Ausgefahrene Länge "L aus " extended length "L out"	Nutenbreite groove width
004 10272	ZB Actuator SMS-B-45x90 150	150	510	660	10
004 10273	ZB Actuator SMS-B-45x90 200	200	560	760	10
004 10274	ZB Actuator SMS-B-45x90 300	300	660	960	10
004 10275	ZB Actuator SMS-B-45x90 400	400	760	1160	10

Figure 15 Dimensions lifting element SMS-B-45x90

6.3.3 Installing the Electrical Controller

IMPORTANT Ensure sufficient cable length for the lifting elements when positioning the electrical controller. The mounting material needed for this is individual and not included in the scope of delivery.

- Mount the electrical controller with two suitable screws to the workplace.
- When attaching, insert metal washers between the screws and the electrical controller to prevent damage at the connecting points of controller plastic housing.
- Do not mount / operate the controller:
  - above or in front of heat sources (e.g. radiators),
  - at locations exposed to direct incidence of sunlight,
  - at or near easily inflammable materials or
  - near high-frequency equipment (e.g. transmitters, radiation equipment or similar devices).
- Make sure that connecting cables do not have kinks or are not exposed to mechanical stress.

For protection against over-voltage that may occur during thunderstorms, it is recommended that you install over-voltage protection. Get advice from an electrical installation engineer.

IMPORTANT Observe and follow the aspects given below in the course of installation:

- Select a centralized installation location. Empirical values have demonstrated that this offers the easiest option for the cabling.
- Fix the controller(s) tightly with screws (Figure 16). In this way, you avoid malfunctions caused by loose plug-in connections or undesirable noise development.
- During installation, make sure that the controller(s) is freely accessible even after installation. This enables ease of working in case you need to do service work.
- Ensure that there is adequate air circulation during installation. There is, in fact, little heat developed by the controller, but nonetheless, it exists.

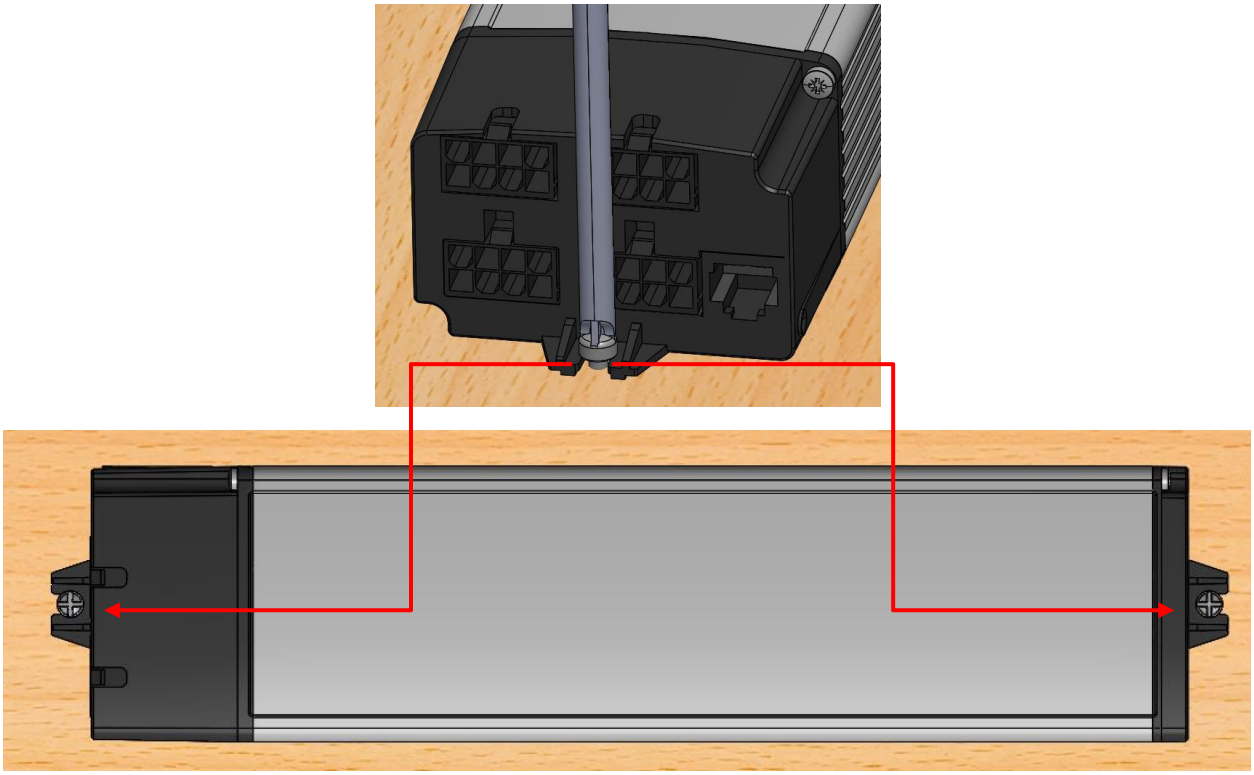


Figure 16 Attaching the electrical controller (2 screw connections)

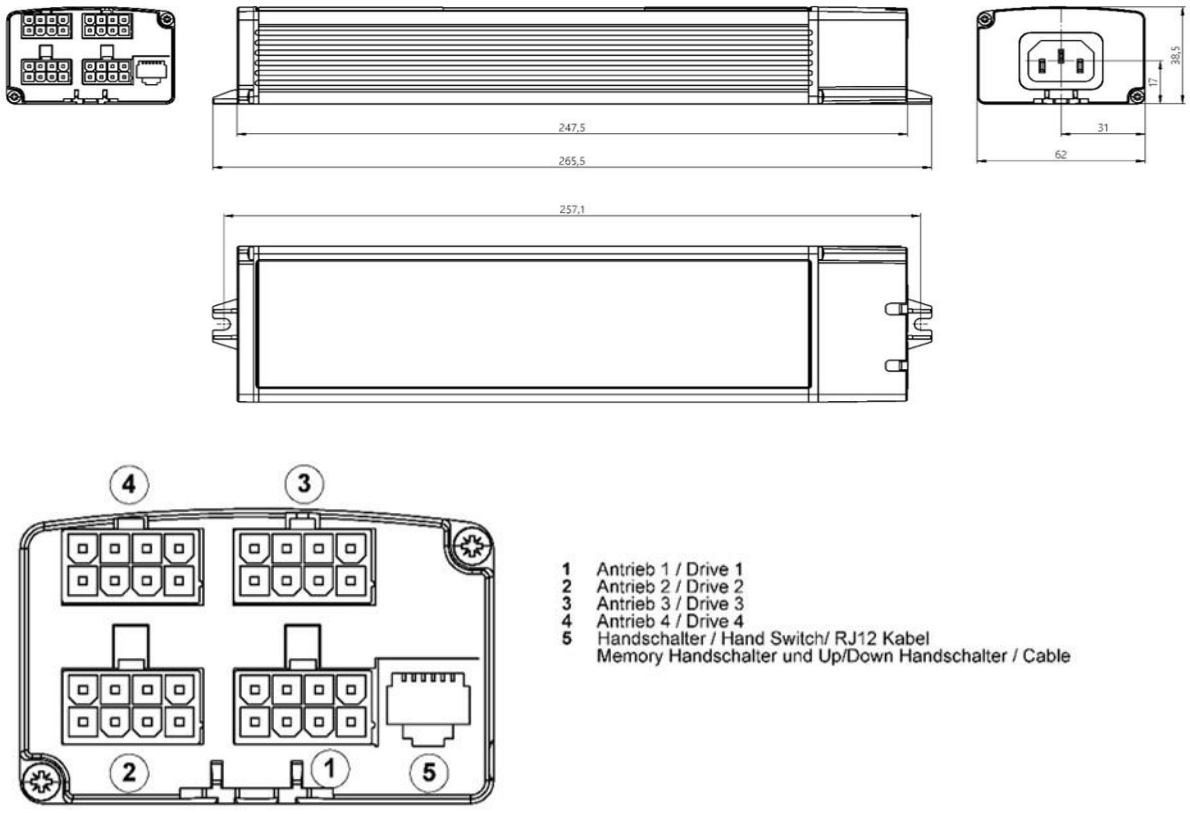
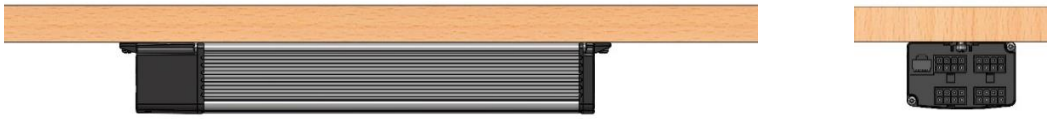


Figure 17 Electrical controller dimensions-connections

6.3.3.1 Installing the Standard Controller SMS LTC384 (without Tilt Sensor)

The standard controller SMS LTC384 does not have an integrated gyro sensor. Accordingly, this control can be fixed in a wide variety of positions and directions on the table system:

Under the table top:



On the table top:

Perpendicular to the tabletop:

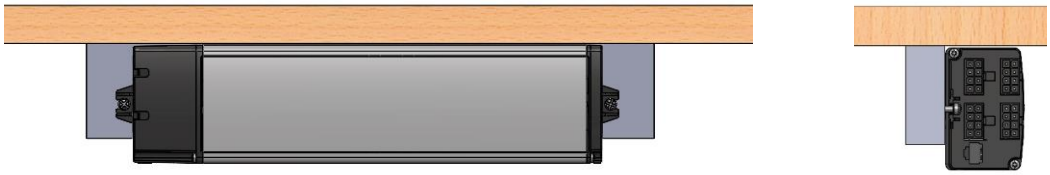


Figure 18 Positioning of standard controller SMS LTC384 (without tilt sensor)

Alternatively, this standard SMS LTC384 controller can also only be placed in one console.

6.3.3.2 Installing Controller SMS LTCT384 with Tilt Sensor (optional)

There is also the option of ordering and using an SMS LTC384 controller with an integrated gyro sensor. This tilt sensor detects inclination deviations of the moving part of the table system of approx. 2° in two axes. After detecting a change in inclination of the table top of more than approx. 2°, the controller retracts the connected SMS actuators approx. 10 mm and reports the error „F5“ (LED blinking: long short long short): Collision/misalignment.

In order to be able to detect such a change in inclination of the moving part of the table system, the SMS LTC384 electrical controller must be mounted directly on the moving table system (table top) or the table top frame.

IMPORTANT Since this tilt sensor reacts in two axes, the following alignment of the control must be observed during installation:

Under the table top:

On the table top:

Perpendicular to the tabletop:

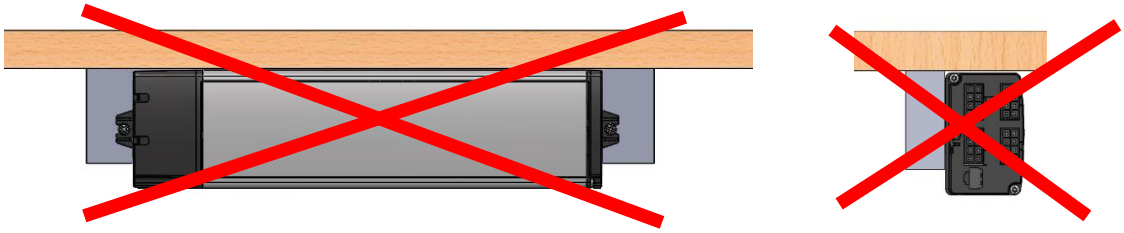


Figure 19 Positioning of controller SMS LTC384 with optional integrated tilt sensor

- ➲ A controller with integrated tilt sensor positioned perpendicular to the table system leads to false detections
- ➲ If the controller with integrated tilt sensor is only placed in a console and not firmly fixed to the moving table system, leads to false detections.

⚠ CAUTION Even if the system reliably detects inclination deviations of the controller of approx. 2° during the movement, it cannot be 100% ruled out that the movement and mechanics of the table will cause injuries to the operator of the table or to people near the table. For this reason, no responsibility can be accepted for any injury or other damage resulting from the operation of the table. The table user is solely responsible for ensuring that there is no personal injury or other damage when operating the table!

6.3.4 Installing the Manual Switch

➲ Fasten the manual switch to an appropriate position below the work surfaces.

IMPORTANT Ensure sufficient cable length for the electrical controller when positioning the manual switch.

➲ Mount the manual switch with two screws to the workplace.

➲ When attaching, insert metal washers between the screws and the manual switch to prevent damage to the plastic housing.

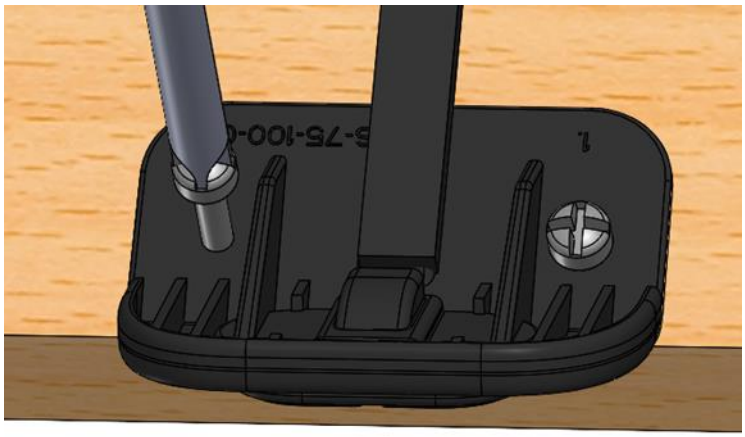


Figure 20 Attaching the Up/Down manual switch LM2LCDP

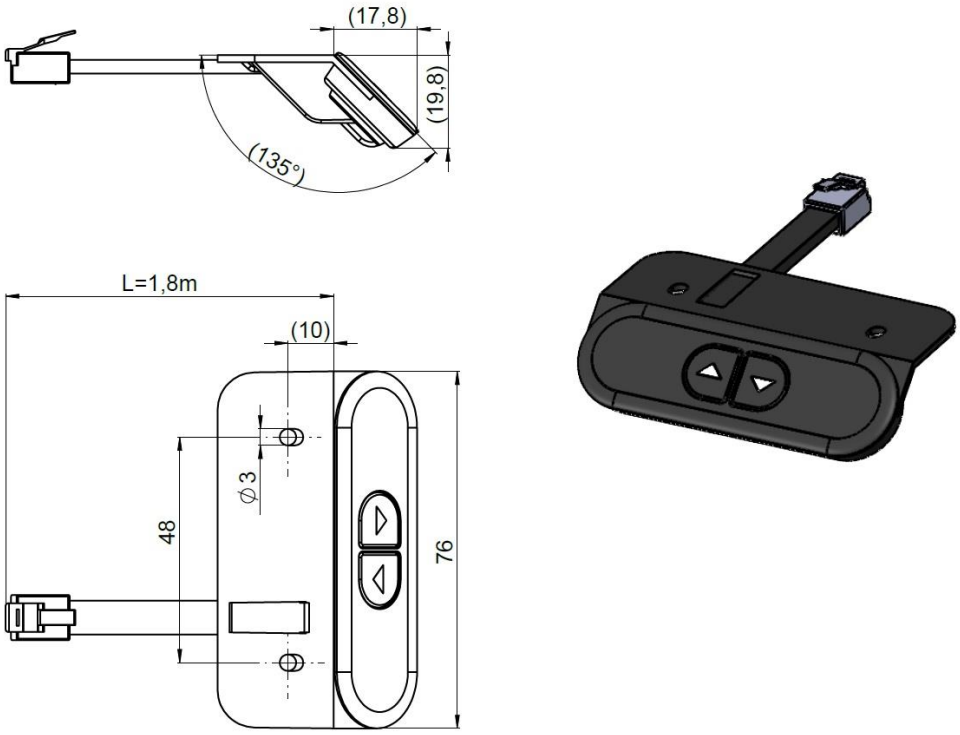


Figure 21 Dimensions of the Up/Down manual switch LM2LCDP

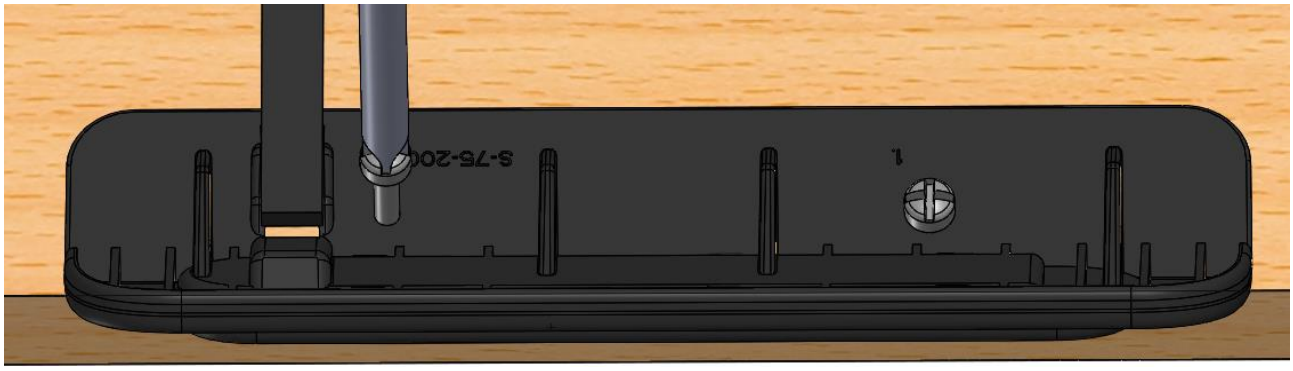


Figure 22 Attaching of the memory manual switch LD6LC

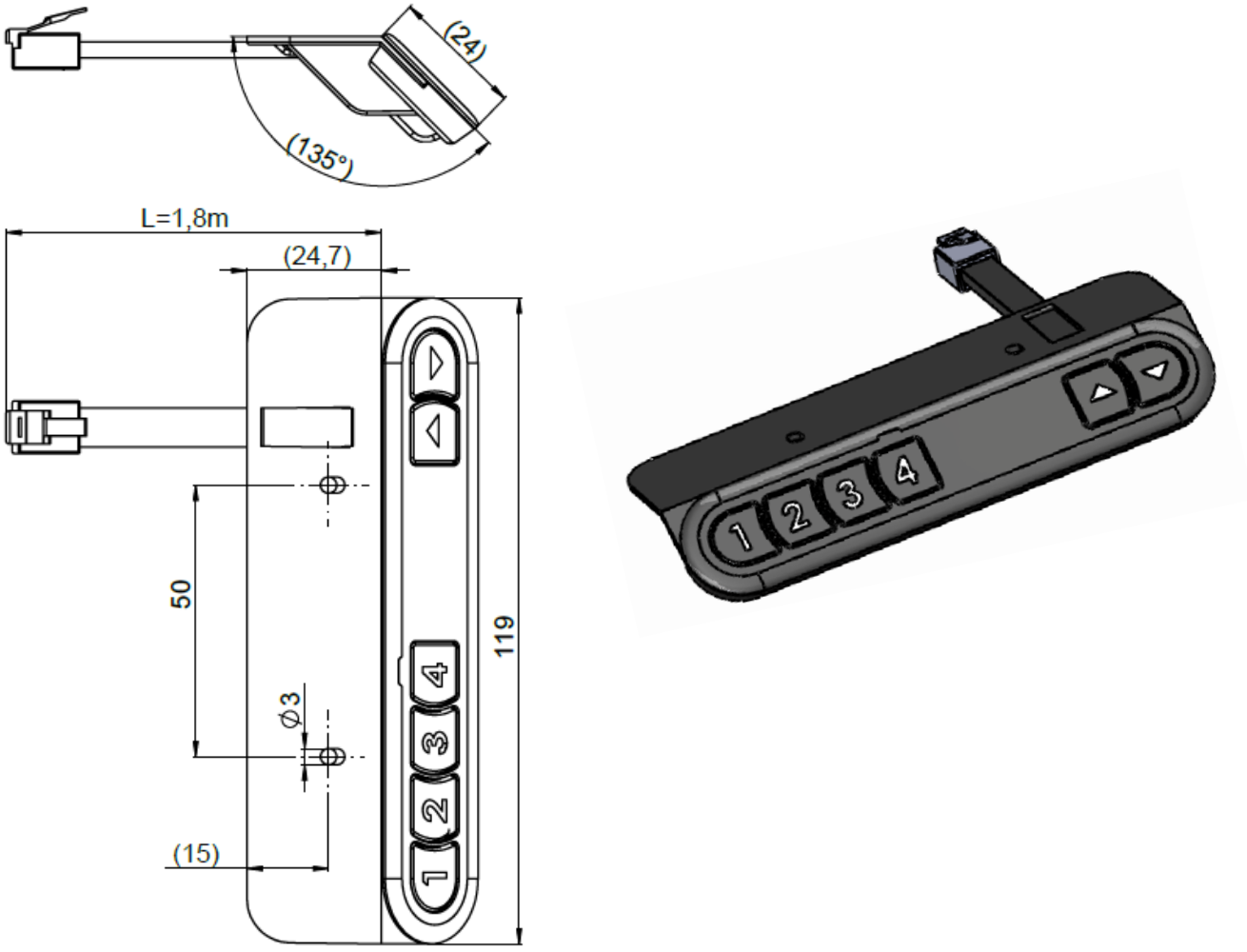
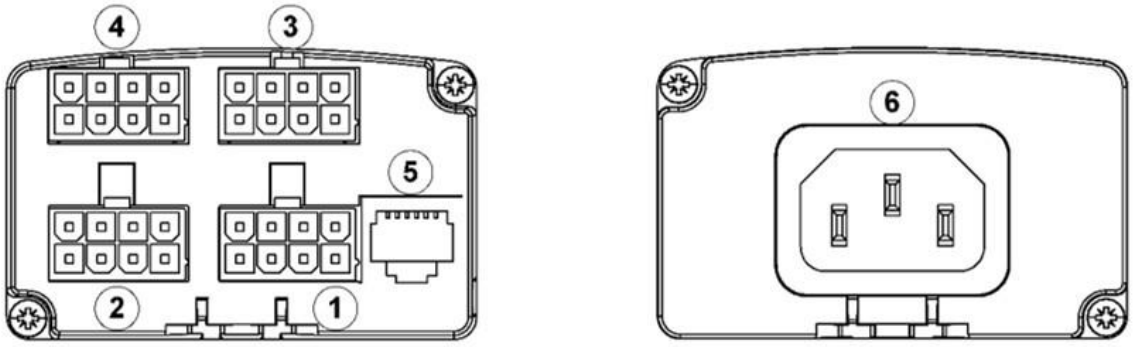


Figure 23 Dimensions of the memory manual switch LD6LC

6.3.5 Overall Installation



1 Antrieb 1 / Drive 1
2 Antrieb 2 / Drive 2
3 Antrieb 3 / Drive 3
4 Antrieb 4 / Drive 4
5 Handschalter / Hand Switch/ RJ12 Kabel
Memory Handschalter und Up/Down Handschalter / Cable
6 Netzanschluss / socket for power supply

Figure 24 Connections of the electrical controller

- Connect the plug of the lifting elements with electrical controller (Figure 19; connection No. 1-4)
- Connect the plug of the manual switch to the electrical controller using the appropriate input (Figure 19; connection No. 5)
- Connect the power cable to the appropriate input of the electrical controller Figure 19; connection No. 6)

IMPORTANT The SUSPA Movotec SMS system can be supplied in different variants. The supply variants contain 1 to 8 lifting elements. There is a different controller variant depending on the supply variant. The correct variant of the controller can be supplied only if you specify the supply variant at the time of placing the order.

Assembly of a system with more than 4 lifting elements

IMPORTANT If more than four lifting elements are used in a height adjustment system, then the two electrical controllers must be connected with two RJ12 cables and a Sync-Y-Adapter.

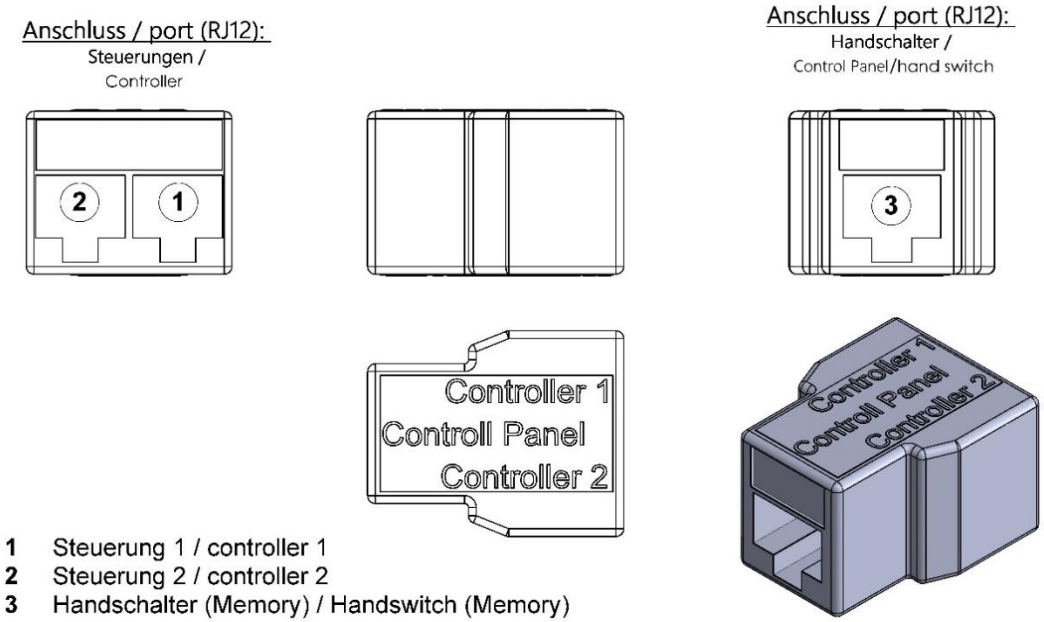


Figure 25 Sync-Y-Adapter

IMPORTANT This system can only be operated and moved with the memory manual switch LD6LC

- For the synchronous operation of the system, a RJ12 cable must be connected to each controller (Figure 24, connection No. 5). Then both RJ 12 cables of the controllers have to connected to the Sync-Y-Adapter (Figure 25 connection No. 1 and No. 2).
- Connect the Plug of the RJ12 cable to the matching input of the (Figure 24 No. 5) to the Sync-Y-Adapter (Figure 25 connection No. 1 and No. 2)
- Connect the Memory manual switch LD6LC (only possible with memory manual switch LD6LC, see Figure 23) with the Sync-Y-Adapter (Figure 25 connection No. 3)
- Connect the plug of the lifting elements with electrical controller (Figure 24; connection No. 1-4)
- Connect the power cables to the appropriate input of the electrical controller (Figure 24; connection No. 6)
- The complete assembly of this linking controller system with more than 4 lifting elements is shown at the next page in Figure 26

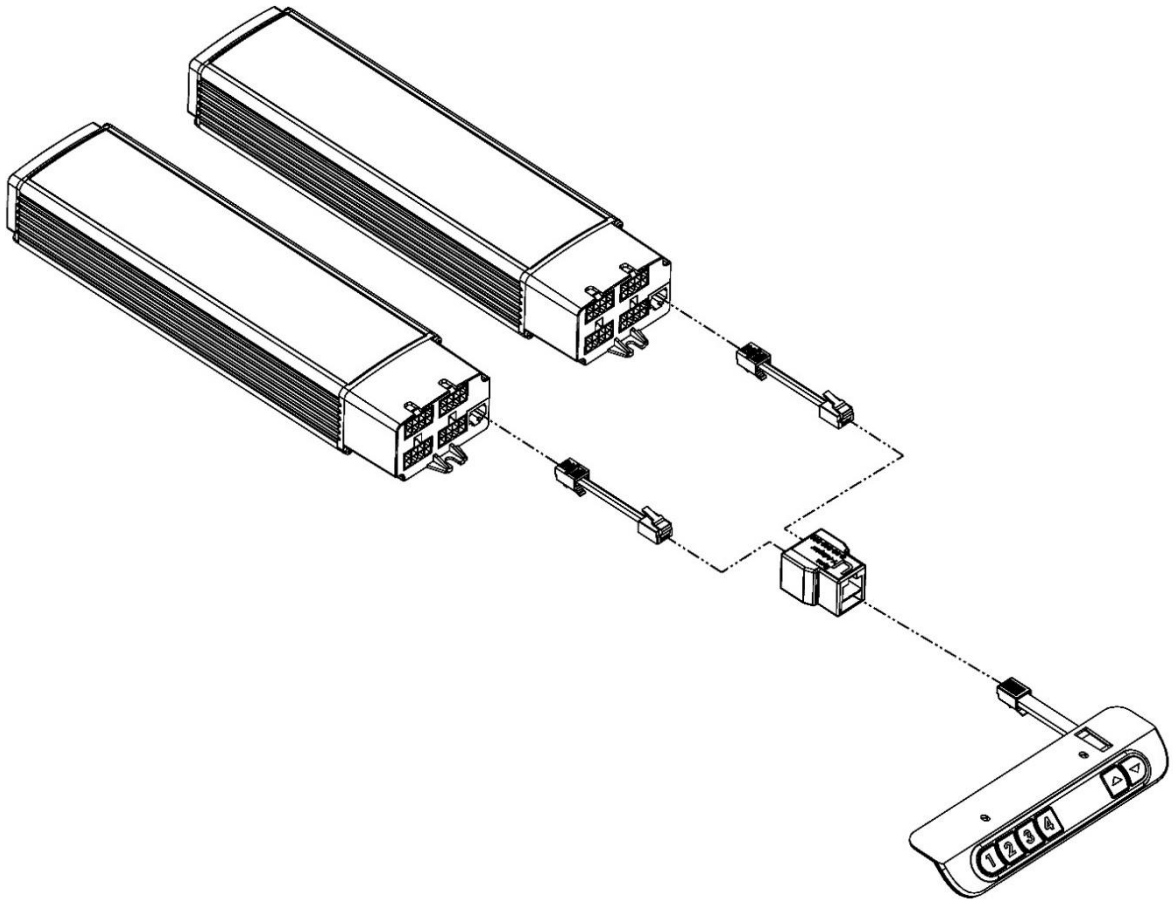


Figure 26: Assembly of linking controller system more than four lifting elements

⚠ CAUTION Two controllers are necessary if you are using more than three lifting elements in one height adjustment system. The power connector of the two controllers must be joined via a connector strip or via a distribution system provided by the customer. After the power connectors have been connected, they must be coupled to the power source (Socket).

➲ Never connect the two controller power connectors separately to the power supply (Socket).

6.3.6 Laying of Electric Wires and Cables

The electrical cables can be laid in the grooves of the upper connecting struts of the base frame. Using commercially available covers that fit directly into the grooves, the lines can be affixed.

Figure 27: Cable guide in the groove with cover

Optionally, the electrical cables can also be laid with cable holders that are fastened in the grooves. The cables are attached to the cable holders with cable ties.

Figure 28: Cable guide with cable holders

➲ When laying the cables, make sure that

- they cannot get jammed or pinched
- they are not subjected to mechanical loads or stresses (tension, pressure or bending etc.)
- they cannot be damaged in any other way

➲ Fasten the cables with adequate strain relief and adequate protection against kinks.

➲ Wind the excess length of cables together in rolls with a diameter of approx. 150 mm and fasten them with the fastening clamps and/or cable ties to the workplace.

➲ Use caution so as not to damage the wires.

➲ Check the electrical lines and cables to ensure that they are fastened securely to the workplace and have not been damaged during the operation.

Figure 29 Coiling of electric wires and cables

6.4 Space Requirements

For detailed information on space requirements refer to the Section 4.1 “Technical specifications”.

6.5 Component Alignment

A level will be required to ensure the entire work surface is horizontal and level.

- Create a good starting point for leveling, by completely threading the leveling feet in the lifting elements. The screw insertion depth is up to 32 mm. In the leveled state, the screw insertion depth should be at least 18mm.
- Place a level on the surface of the work station.
- Ensure a very uniform load distribution when using several lifting elements.

Figure 30 Adjusting the workstation with a spirit level

➲ By partially unscrewing the leveling feet of the lifting element adjust the individual leveling feet such that the working surface is leveled and all attached lifting elements have uniform contact with the ground.

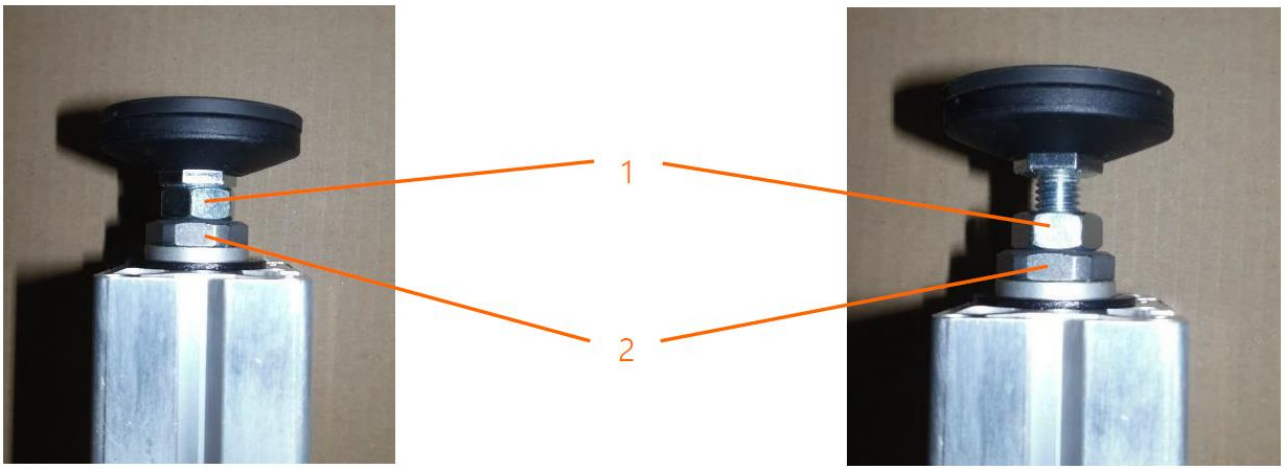


Figure 31 Adjustable leveling foot (optional)

1	Leveling feet with threaded bolts and locknut SW17	2	Steel insert with SW23 (lifting element)

➲ Fix the locknuts tightly to all leveling feet to ensure that the workplace remains leveled during operation.

⚠ CAUTION Make sure to hold the 23 mm steel inserts with a wrench while locking down the leveling feet locknuts. (see Figure 31). Otherwise, the lifting elements may be damaged.

IMPORTANT One indicator of a uniform load distribution during operation of the Height Adjustment System is that all the lifting elements in the area of drive units (motor / cable outlet) have the same temperature.

7 Operation

7.1 Warning Notices for Operation

⚠ WARNING

Crushing or amputation risk due to moving parts

There are risks posed by removing components of the protective housing.

Do not operate the Height Adjustment System if the protective housing of the components has been removed.

IMPORTANT Do not allow the electrical Height Adjustment System to be operated by children. If the device is used near children, ensure supervision by adults.

7.2 Tests Prior to Switching the Machine On

- Check all electrical and mechanical connections.
- Check whether there are damages to electrical wires which may have occurred during unpacking or installing of the system.
- Check all system components in order to ensure that they are fastened securely to the work-place.
- Make sure that the maximum load is not exceeded. The maximum load is the entire load includ-ing the raised workplace and all objects that are located on the working surface.
- Connect the workplace to the power supply only after checking the above-mentioned aspects.
- Allow the controller to adjust to the change from cold to hot environments for a few hours be-fore putting them into operation, otherwise condensed water may damage them.

7.3 Duty Cycle

The duty cycle refers to the time period in which a motor or system is in motion, compared with the rest period.

The Height Adjustment System is not designed for continuous operation without rest periods. It is designed for intermittent use. This means that the Height Adjustment System must rest after a period of operation before it could be used again.

If the motors of the lifting elements or the controller reached the defined maximum energy value, the Height Adjustment System must rest. This value depends on the load and can therefore vary. A duty cycle of 10% applies as a reference value. This means that after an operation for 2 minutes the Height Adjustment System must rest for at least 18 minutes before it is used again.

⚠ CAUTION

Danger posed by thermal energies

The motor housing may become hot if the operating time exceeds the duty cycle.

The maximum of energy absorption of the lifting elements and the controller must not be exceeded in order not to damage the system. Exceeding the maximum energy absorption on a regular basis, can lead to system malfunction or damage to the lifting element motor(s) and/or electrical controller. Moreover, this could also result in the premature wear of single components, thereby reducing the lifetime of the Height Adjustment System.

Ensure adequate ventilation to ensure sufficient heat dissipation from the components of the Height Adjustment System and do not exceed the duty cycle.

7.4 Manual Switch

All functions of the Height Adjustment System can be controlled using the manual switch.

Figure 32 Up /Down manual switch LM2LCDP

Figure 33 Memory manual switch LD6LC (optional or necessary for a more than 4-leg system)

7.4.1 Function of the Manual Switch

7.4.1.1 Up / Down Manual Switch LM2LCDP

Symbol	Function
▲	Up: Press the "Up" button until the workplace has reached the desired height or the maximum height.
▼	Down: Press the “Down” button until the workplace has reached the desired height or the minimum height.
▲ + ▼	Reset: • Press both direction keys simultaneously and keep them pressed. • After approx. 5 seconds the controller is in the reference mode if you continue to press the direction keys. This is indicated by a flashing sequence (rapid flashing) of the LED on the controller. While both buttons are still being pressed, the workstation moves slowly to the lower mechanical end stop. • If the reset is successful, the LED on the controller lights up continuously and the controller acknowledges this with a signal tone • Now the workstation can be moved by using the two direction buttons on the manual switch.

Table 8 Function of the Up /Down manual switch LM2LCDP

7.4.1.2 Memory Manual Switch LD6LC (optional)

Symbol	Function
▲	Up: Press the "Up" button until the workplace has reached the desired height or the maximum height.
▼	Down: Press the “Down” button until the workplace has reached the desired height or the minimum height.
▲ + ▼	Reset: • Press both direction keys simultaneously and keep them pressed. • After approx. 5 seconds the controller is in the reference mode if you continue to press the direction keys. This is shown on the display of the manual switch with the indication **„- - -„**. While both buttons are still being pressed, the workstation moves slowly to the lower mechanical end stop. • If the reset is successful, the display shown the position **„ 00 „**. and the controller acknowledges this with a signal tone • Now the workstation can be moved by using the two direction buttons on the manual switch.
Keys "1", "2", "3" and „4“	To operate the defined memory positions, keep buttons "1", "2", "3" or „4“ pressed. Up to four memory positions can be stored as follows: • Move the workplace with the buttons Up" ▲ or ▼ "Down" to the desired position • Storing the memory position: To save the position, the memory button ("1", "2", "3" or "4"), which is to be assigned the current height, must be pressed 4 times in quick succession The controller acknowledges this operation with one signal tone.

Table 9 Function of the memory manual switch LD6LC

Storing the memory positions:

Move to the desired position with the buttons „Up“ ▲ / „Down“ ▼ and then press the wished memory button "1", "2", "3" or "4" 4 times in quick succession. The controller acknowledges the successful storage of the position with a signal tone. The memory position is retained even after a power failure.

e.g. the memory position „1“ :

Push the key „1“ 4 times in quick succession

Repeat the described procedure to store new memory positions.

7.5 Perform Reset

A reset must be performed both during the initial start-up and upon a power failure during the process. This is used to protect the workplace. Proceed as follows:

- Up / Down manual switch LM2LCDP

Symbol	Funktion
▲ + ▼	Reset: • Press both direction keys simultaneously and keep them pressed. • After approx. 5 seconds the controller is in the reference mode if you continue to press the direction keys. This is indicated by a flashing sequence (rapid flashing) of the LED on the controller. While both buttons are still being pressed, the workstation moves slowly to the lower mechanical end stop. • If the reset is successful, the LED on the controller lights up continuously and the controller acknowledges this with a signal tone • Now the workstation can be moved by using the two direction buttons on the manual switch.

- Memory manual switch LD6LC

Symbol	Funktion
▲ + ▼	Reset: • Press both direction keys simultaneously and keep them pressed. • After approx. 5 seconds the controller is in the reference mode if you continue to press the direction keys. This is shown on the display of the manual switch with the indication „- - -„. While both buttons are still being pressed, the workstation moves slowly to the lower mechanical end stop. • If the reset is successful, the display shown the position **„ 00 „**. and the controller acknowledges this with a signal tone • Now the workstation can be moved by using the two direction buttons on the manual switch.

IMPORTANT If the Height Adjustment System does not function immediately, disconnect power from the unit and contact the authorized dealer.

IMPORTANT Do not disassemble the system components (i.e. lifting elements, electrical controller, switch) unless authorized by SUSPA GmbH. Any attempt to repair the system or the system components without the authorization of SUSPA GmbH will void the warranty.

7.6 Programming new Upper and Lower Limit

Setting new upper and lower height limitations.

In some cases, lifting elements are installed in such a way that the entire path of the drive cannot be used, e.g. by attachments or coverings on the table. For such cases it is possible to set new upper and lower limitations. In this case, the user heights can only be set within the limits set by the factory heights.

IMPORTANT Before new height limits can be saved, the existing user height limits must be saved to be deleted! You can only set new limits after deletion.

ATTENTION:

The top and lower positions must keep a minimum distance so that the table can still move after the new limits have been adjusted. This minimum distance is defined in the parameter set entered into the controller. Saving a new upper or lower limit is not possible if the minimum distance is not maintained. In this case when pushing the appropriate arrow key to save the new limit the following short beeps can be heard, indicating that the new limit was not saved. In this case the distance between the upper and lower limit must be increased.

7.6.1 Delete Setting Current Upper Limit with Up/Down manual switch

Step 1

Press „UP“ button until the desired upper limit (user height e.g. 400 mm) is reached.

=>The table must be in the upper end position

Step 2

Press „UP“ button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound

Step 3

Press „DOWN“ button 2 times in quick succession

- Reaching the limit adjustment menu will be confirmed by two sounds

Step 4

- Delete the upper limit (user height)
- Press „UP“ button 1 time to delete the current upper limit
- Successful storage will be confirmed by one sound

7.6.2 Setting Upper Limit with Up /Down manual switch

Step 1

Press „UP“  button until the desired upper limit (user height e.g. 350 mm) is reached.

=>The table must be in the uppermost desired end position

Step 2

Press „UP“  button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound

Step 3

Press „DOWN“  button 2 times in quick succession

- Reaching the limit adjustment menu will be confirmed by two sounds

Step 4

- Setting the new upper limit (user height)
- Press „UP“  button 1 time for setting the new upper limit
- Successful storage will be confirmed by two sounds

7.6.3 Delete Setting Current Lower Limit with Up/Down manual switch

Step 1

Press „DOWN“ button until the desired lower limit (user height e.g. 30 mm) is reached.

=> The table must be in the lower end position

Step 2

Press „UP“ button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound

Step 3

Press „DOWN“ button 2 times in quick succession

- Reaching the limit adjustment menu will be confirmed by two sounds

Step 4

- Delete the lower limit (user height)
- Press „DOWN“ button 1 time to delete the current lower limit
- Successful storage will be confirmed by one sound

7.6.4 Setting Lower Limit with Up/Down manual switch

Step 1

Press „UP“  or „DOWN“  button until the desired lower limit (user height e.g. 30 mm) is reached.

=>The table must be in the lowermost desired end position

Step 2

Press „UP“  button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound

Step 3

Press „DOWN“  button 2 times in quick succession

- Reaching the limit adjustment menu will be confirmed by two sounds

Step 4

- setting the new lower limit (user height)
- Press „DOWN“  button 1 time for setting the new lower limit
- Successful storage will be confirmed by two sounds

ATTENTION:

The top and lower positions must keep a minimum distance so that the table can still move after the new limits have been adjusted. This minimum distance is defined in the parameter set entered into the controller. Saving a new upper or lower limit is not possible if the minimum distance is not maintained. In this case when pushing the appropriate arrow key to save the new limit the following short beeps can be heard, indicating that the new limit was not saved. In this case the distance between the upper and lower limit must be increased.

7.6.5 Delete Setting Current Upper Limit with Memory manual switch

Step 1

Press „UP“  button until the desired upper limit (user height e.g. 400 mm) is reached.

=>The table must be in the upper end position

Step 2

Press „UP“  button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound
- The display now show „P01“

Step 3

Press „UP“  or „DOWN“  button until the display shows „P07“

- Delete the upper limit (user height)
- Press memory key „1“ shortly 1 time to confirm the deletion

- Successful deletion will be confirmed by one sound

7.6.6 Setting Upper Limit with Memory manual switch

Step 1

Press „UP“  button until the desired upper limit (user height e.g. 350 mm) is reached.

=>The table must be in the uppermost desired end position

Step 2

Press „UP“  button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound
- The display will now show „P01“

Step 3

Press „UP“  or „LOW“  button until the display shows „P07“

- Setting the new upper stroke limit (user height)
- Press memory key „1“ shortly 1 time to store the selected limit

- Successful storage will be confirmed by one sound

7.6.7 Delete Setting Current Lower Limit with Memory manual switch

Step 1

Press „UP“  or „DOWN“  button until the desired lower limit (user height e.g. 30 mm) is reached.

=>The table must be in the lower end position

Step 2

Press „UP“  button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound
- The display now show „P01“

Step 3

Press „UP“  or „DOWN“  button until the display shows „P06“

- Delete the lower limit (user height)
- Press memory key „1“ shortly 1 time to confirm the deletion

- Successful deletion will be confirmed by one sound

7.6.8 Setting Lower Limit with Memory manual switch

Step 1

Press „UP“ ▲ or „LOW“ ▼ button until the desired lower limit (user height e.g. 30 mm) is reached

=>The table must be in the lowermost desired end position

Step 2

Press „UP“ ▲ button 4 times in quick succession

- Reaching the programming mode will be confirmed by one sound
- The display will now show „P01“

Step 3

Press „UP“ ▲ or „LOW“ ▼ button until the display shows „P06“

- Setting the new lower stroke limit (user height)
- Press memory key „1“ shortly 1 time to store the selected limit

- Successful storage will be confirmed by one sound

ATTENTION:

The top and lower positions must keep a minimum distance so that the table can still move after the new limits have been adjusted. This minimum distance is defined in the parameter set entered into the controller. Saving a new upper or lower limit is not possible if the minimum distance is not maintained. In this case when pushing the appropriate arrow key to save the new limit the following short beeps can be heard, indicating that the new limit was not saved. In this case the distance between the upper and lower limit must be increased.

7.7 Faults and Error Indications

⚠ WARNING

Risk of hand injury as a result of failure to observe the danger zone

There are risks of injuries resulting from improper conduct. Never remove wedged parts or foreign bodies with your bare hands.

Use suitable aids.

Malfunctions may occur during operation. These are caused by:

- Collision with an obstacle during upward/downward movement of the lifting system.
- Overload of the lifting system with a mechanical load that is too heavy.
- Overload of the lifting system caused by traversing the system too frequently.
- Sudden power supply outage for the lifting system

Details and particulars regarding occurring errors and the rectification thereof can be found in the instruction manual of the electrical controller:

https://laing-controller.de/en/downloads

7.7.1 Fault and Operational Messages

7.7.1.1 Error Messages

The following failure indication will be shown by the control panels with height indication. If control panels without height indication are used, refer to the blinking of the LED on the controller to determine the failure mode.

Indicated Error Code or LED blinking sequence	Failure	Meaning
con	Communication error	There is no communication between the controller and the control panel. Check the electrical connection
- - - Fast blinking LED	Reference mode	The controller entered reference mode, a reference run must be performed
F5 LED blinking long short long short	Collision/misalignment detected through GyroSense or current based collision detection	Reset error by pressing any key. If the error recurs without a collision, decrease the sensitivity of the collision detection using the control panel menu system
F6 LED blinking short long long short	Motor current reached the error overcurrent	Reduce load on the table. => Reset error by pressing any key.
F7 LED blinking long long long short	Motor current reached the error overcurrent level	Reduce load on the table. => Reset error by pressing any key.
F8 LED blinking short short short long	Motor current reached the fault overcurrent level	Try to reduce load on the table or the table frame mechanism must be smoother => Reset error by pressing any key
F9 LED blinking long short short long	Maximum allowed energy amount (I^2t) entered into the motors	Wait for some time to allow the motors to cool back. The I^2t decrease mechanism allows partial usage of the system after a one minute wait time, however for a complete cool back, around 13 minutes are required => Reset error by pressing any key
F10 LED blinking short long short long	Maximum allowed energy amount (I^2t) supplied by the controller	Wait for some time to allow the motors to cool back. The I^2t decrease mechanism allows partial usage of the system after a one minute wait time, however for a complete cool back, around 13 minutes are required => Reset error by pressing any key

F11 LED blinking long long short long	Maximum temperature level of the controller main power supply reached	Wait for some time to allowed the controller to cool back => Reset error by pressing any key
F12 LED blinking short short long long	Maximum temperature level of the controllers motor one and two drive reached	Wait for some time to allowed the controller to cool back => Reset error by pressing any key
F13 LED blinking long short long long	Maximum temperature level of the motor three and four drive reached	Wait for some time to allowed the controller to cool back => Reset error by pressing any key
F14 LED blinking short long long long	Maximum height difference between the table legs has been exceeded	The system enters reference mode automatically. Execute reference run by keeping pressed up down key of the control panel until reference run is done.
F15 LED blinking long long long long	Motor blocked or so over-load that it cannot speed up	Try to reduce load on the table or ensure a smoother travel path of table mechanism => Reset error by pressing any key
F16 LED blinking short short short short long	Numbers of motors con-nected to the controller does not correspond to the number of the controller was configured for	Check if all motors are properly connected to the controller => Reset error by pressing any key
F17 LED blinking long short short short long	Controller overloaded	=> Reset error by pressing any key If the Error remains restart system by unplugging the power cable of the controller and plugging it in again after 20 seconds If the error reoccurs the controller may be damaged, contact the supplier
F18	Hardware error	=> Reset error by pressing any key If the Error remains restart system by unplugging the power cable of the controller and plugging it in again after 20 seconds If the error reoccurs the controller may be damaged, contact the supplier
F19	Incorrect order of drives	The drives must be plugged in starting at output 1 and then continuing at 2,3,4. There must be no gap
F22	One of the two Hall sensors is not giving a signal	Check Hall sensors and cables

Table 10 Error codes Memory manual switch or LED blinking sequences controller

7.7.1.2 Important Display Codes and their Meanings

Compulsory reset

The Height Adjustment System is not properly initialized during startup or is disconnected from the main power during the run or the difference in height of the lifting elements is too large due to improper operation.

Indicator: Drive commands are rejected during a keystroke with LED blinking sequence (fast blinking LED) at the controller or with error code „ - - -„ at the manual switch display

Solution: Ensure correct connection of the lifting element cables and the power cord to the electrical controller, check whether the lifting elements are not too stiff or jammed.

Reset movement (see also section 7.5):

The reference run is started by pressing the "Up"  or „Down“  button (the pressed button must be hold until the end point of the lifting elements is reached). The workplace moves slowly down until all lifting elements are on their lower mechanical end limit. The controller acknowledges this reset operation with one signal tone.

Drive monitoring

Difference between the synchronously controlled drives is too large.

Indicator: Drive commands are not implemented, LED blinking sequence (short long long long) at the controller or error code “F14” at the manual switch display.

Solution: Check connection of the lifting elements and verify and ensure their correct function. Then perform reset.

Connection error

Manual switches, motors or power plugs are not correctly connected to the controller.

Indicator: Diverse symptoms

Solution: Check the correct connection of the components, make sure that all connectors are firmly plugged into the corresponding sockets!

7.7.2 Troubleshooting

This section contains remedial measures in case of malfunctions. If an error or fault occurs that is not listed in this table, please contact your supplier.

The listing below handles problems that are caused directly in connection with the controller.

⚠ CAUTION The troubleshooting and fault rectification should be done only by a specialist who has completed his professional education as an electro-mechanical installation engineer or an equivalent qualification. Make note of the user groups in section 2.5.3.

IMPORTANT Pay attention to the initialization (reset movement) in section 7.5.

Many system problems can be attributed to electrical cables that are not connected correctly, system load conditions, or incorrect mounting hardware usage. In most cases, problems can be solved by reviewing the following system problems, possible causes, and implementing the recommended solutions.

Problem: System does not operate

Possible Causes	Recommended Solutions
Power Cord is not connected	➲ Connect power cord to motor controller and/or power source completely.
Motor Cable is not connected	➲ Connect motor cable to gear motor and/or motor controller completely.
Switch Cable is not connected	➲ Connect switch cable to motor controller completely
Defective Motor Controller	➲ Contact SUSPA GMBH for replacement.
Defective Switch	➲ Contact SUSPA GMBH for replacement.
System Load Rating Exceeded	➲ Verify system load does not exceed rating and remove weight as needed.
Striking of an object when raising or lowering (e.g. a trashcan etc.)	➲ Remove the object.

Table 11 Troubleshooting: System does not operate

	Manual switch with status LED and / or display	Manual switch without status LED and / or display
1. The controller is not working; General Testing	If nothing is output on the display and / or the status LED does not light up when pressing a button, check: ▪ whether the power cable is plugged in properly into the controller ▪ whether the power cable is plugged in properly into the socket ▪ whether the socket is supplying power or is switched on ▪ Replace the manual switch in order to ensure that the manual switch is not defective ▪ Notify your service partner if the controller is still not working.	Check: ▪ whether the power cable is plugged in properly into the controller ▪ whether the power cable is plugged in properly into the socket ▪ whether the socket is supplying power or is switched on ▪ Replace the manual switch in order to ensure that the manual switch is not defective ▪ If the error persists, continue with step 2.
2. The controller is not working, but no acoustic signal is heard (beep tone)	▪ Initialize the controller. ▪ Notify your service partner if the controller is still not working.	
3. The controller is not working, but no acoustic signal is heard (beep tone)	If the table has been moved previously for more than 2 minutes: ▪ Wait a few minutes (max. 18 minutes) and try again (duty cycle exceeded) If the table has not been moved previously: ▪ Initialize the controller. ▪ Notify your service partner if the controller is still not working.	
4. The table moves briefly and then comes to a standstill	▪ Initialize the controller. ▪ Notify your service partner if the controller is still not working.	
5. The table is moving at a slant	▪ Initialize the controller. ▪ Check the load on the table if the fault persists. ▪ Initialize the controller once more. ▪ Notify your service partner if the controller is still not working.	

Table 12 Troubleshooting

8 Service and Maintenance

8.1 General

- Observe and follow the general accident prevention guidelines.
- Carry out prescribed adjustment, maintenance, and upkeep work according to schedule.
- Replace defective components as quickly as possible.
- Only use tools that are in perfect condition.
- Keep suitable containers ready for small parts that may have to be disassembled.
- Only use original spare parts approved by the manufacturer.
- Tighten screw connections that have been loosened after doing maintenance and service work.
- Reattach disassembled protective devices before the first re-commissioning. Make sure that the protective equipment is functioning properly.
- Perform a functional test (test run) after maintenance or repair work.
- Check the proper function of all safety and protective devices.
- Remove any used tools, screws, aids or other objects from the operational area of the Height Adjustment System.

8.2 Instructions for Maintenance

8.2.1 Cleaning

⚠ WARNING

Danger of injury by disregarding the manufacturer's instructions

The function of the components may be impaired as a result of ignoring the manufacturer's cleaning instructions.

Follow all applicable environmental regulations when cleaning.

- ➲ Remove all cleaning aids after performing cleaning work.
- ➲ Retract the Height Adjustment System before cleaning.
- ➲ Remove the load from all lifting elements before maintenance works.
- ➲ Unplug the motor control from the mains before cleaning.
- ➲ Stabilize the workplace or the structure on which the Height Adjustment System is secured before maintenance works.
- ➲ Allow the components to cool off before cleaning.
- ➲ Clean the system components with a mild detergent and a damp cloth.
- ➲ Liquid entry of any kind must be strictly avoided.
- ➲ Do not use any corrosive detergents or high pressure washing systems to clean the components of the Height Adjustment System.
- ➲ Before restarting operation make sure the system is clean and dry.

8.3 Maintenance

The Height Adjustment System should be checked regularly to determine whether there are conditions that lead to excessive wear or damage to components. Especially the following possible causes of system failure should be considered.

IMPORTANT The maintenance instructions given in the following must be understood as recommendations by the manufacturer. The operator of the Height Adjustment System is obligated to document maintenance-related observations and to supplement and add specifications to the maintenance list in these installation instructions on their own. In addition, the maintenance instructions of the manufacturers of outsourced parts must be observed and followed!

8.3.1 Changing Load Conditions

- Correct the overload conditions immediately and also make sure that there is even load distribution on the workplace in order to avoid premature wear of the mechanical components.
- During the further operation note that the system remains balanced and that the mounted lifting elements have uniform contact with the ground.

IMPORTANT One indicator of a uniform load distribution is that all the lifting elements in the area of drive units (motor / cable outlet) have the same temperature.

8.3.2 Contamination

No sterile cleanliness is necessary, but regular cleaning will prolong the life of the system. Dust and dirt can cause wear in moving components, such as shafts and bearings. Therefore, efforts should be made to keep the components clean during the entire operating period.

8.3.3 Damages to Electrical Wires

Check the insulation of the electrical wires for visible signs of aging and wear. Replace defective or damaged wiring.

9 Decommissioning

9.1 Component Storage

The storage area should be cool and dry in order to prevent corrosion on the Height Adjustment System parts.

- ➲ Pack the Height Adjustment System parts in such a way that they are protected from damages by external influences during storage.
- ➲ If necessary, use cardboard boxes and other packaging material.
- ➲ Secure the Height Adjustment System parts against accidental tilting and instability.

Transport and storage conditions	
Temperature:	-25 C to +60 C (-13 F to +140 F)
Rel. Moisture:	10% to 95% (non-condensing)
Air pressure:	106 kPa to 70 kPa

Table 13 Transport and storage conditions

9.2 Disposal of Components

- ➲ Dispose of the packaging material in accordance with national regulations.
- ➲ Dispose of cardboard packaging, protective packaging made of plastics and preserving agents separately and professionally.

The users are obliged to return the old equipment to a returns center for old electrical and electronic equipment.

The disposal of the controller is subject to the Elektro-G (Electrical Equipment Act), the EC Directive 2002/95/EC internationally (RoHS with effect from 7/1/2006) or the respective national legislation. The disposal of the components (also operating materials) in other countries should be performed in accordance with the local disposal regulations and environmental protection laws in the country where the machine is used.

If the equipment has reached the end of its life cycle, ensure a safe and professional disposal when dismantling, in particular for those parts or substances which are hazardous for the environment. This includes lubricants, plastics and batteries etc.

- ➲ Have the machine disposed of properly by an authorized specialist company on account of the potential risk of environmental pollution.

10 Appendix

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10.3 Incorporation

EC-Declaration of Incorporation

in accordance with Machinery Directive (2006/42/EC)

The manufacturer declares herewith
SUSPA GmbH
Eisenhaemmerstrasse 3
92237 Sulzbach-Rosenberg
GERMANY

that the design of this partly completed machine

Machine identification:	SUSPA Movotec SMS-I / SMS-B (Controller Laing LTC-EU)
Year of construction:	2023
Designated use:	The SUSPA Movotec SMS (Controller Laing LTC-EU) is used for height adjustment of sitting or standing workstations or work tables

the delivered version is compliant with Directive 2006/42/EC of the European Parliament and of the Council dated 17 May 2006 on machinery, and conforms with the following harmonized standards and normative documents to which this declaration refers:

Applicable directives:	EC Machinery Directive (2006/42/EC) EC Directive for Electromagnetic Compatibility (2014/30/EU)

Applied harmonized standards:

1. DIN EN ISO 12100:2011: Safety of machinery – Risk assessment and risk reduction
2. DIN EN ISO 13849-1: Safety of Machinery – Safety-related components of control systems – Part 1: General design guidelines
3. DIN EN 60335-1:2012 (without functional safety chapters 19.11; 22.46 and Annex R)
   Safety of electrical appliances for household and similar purposes
4. DIN EN 61000-6-1/-6-2/-6-3/-6-4 (partially) Electromagnetic compatibility (EMC)
5. RoHS Directive 2011/65/EU: All Components fulfill the European Union RoHS Directive

The technical documentation for the partly completed machine is available.

We hereby guarantee that the certification procedure has been carried out in accordance with the Machinery Directive 2006/42 / EC. The start-up is prohibited until it has been determined that the machine into which the above mentioned partly completed machine is to be installed complies with the provisions of Machinery Directive 2006/42 / EC. This declaration will lose its validity if any modifications are made to the partly completed machine without consultation with us. Any unauthorized modifications in this sense excludes any liability on our part.

Sulzbach-Rosenberg,

24th March 2023

Signature