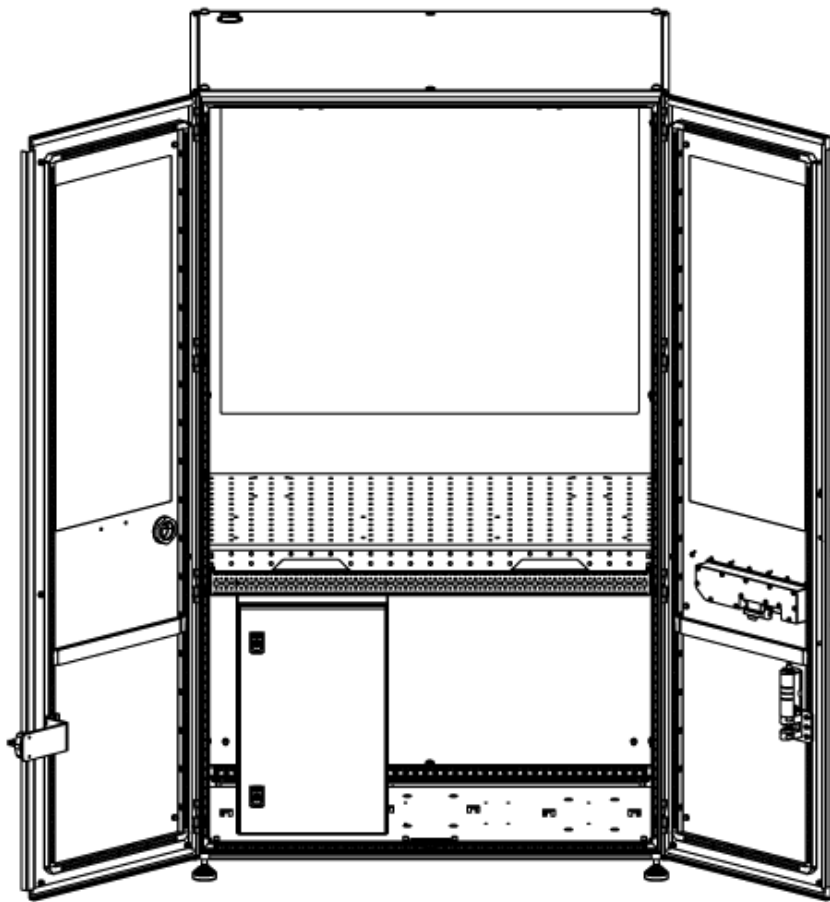


# horstCUBE for Industrial Robot HORST



## Instructions

For installation, operating, and maintenance personnel  
Always keep with the product!

Version 1.0 / 01.07.2023

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### **Original language of the documentation: German**

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fruitcore robotics GmbH  
Macairestr. 3  
78467 Konstanz, Germany

Telephone: (+)49 (0)7531 / 945 99-20  
Email: [info@fruitcore.de](mailto:info@fruitcore.de)  
Website: [www.fruitcore-robotics.com](http://www.fruitcore-robotics.com)

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## Abbreviations

AC.....	Alternating Current
AI.....	Assembly Instructions
EMC.....	Electromagnetic Compatibility
HORST.....	Highly Optimized Robotics System Technology
PE.....	Protective Earth
RCD.....	Residual Current Device



# 1 Introduction

## 1.1 Principle

**This user information describes the set-up and the safety measures to be taken when using horstCUBE and its configurations .**

The instructions contain important information on how to operate the product safely and properly. Observance of these instructions helps to avoid dangers, to reduce repair costs and downtimes and to increase the reliability and service life of horstCUBE.

The operator is obliged to supplement the instructions with instructions based on existing national or company regulations for accident prevention and environmental protection.



**Read these instructions carefully before putting horstCUBE into operation. These instructions apply exclusively to the horstCUBE product variants. All references to the HORST robot system are purely informative and are included in these instructions on the basis of the probability of combination.**

**If horstCUBE is combined with a robot system or a plant, additional requirements apply which can be found in the assembly instructions of the respective robot system and must therefore be observed. Handle the instructions with care. An illegible or missing manual must be replaced immediately. The manual must always be available at the place of use of horstCUBE.**

## 1.2 General notes



**It is possible that the representation of horstCUBE in text and picture in this manual does not exactly match the delivered product. The reason for this is the individual adaptation based on the wishes and orders of individual customers. These deviations are no basis for any claims whatsoever.**

## 1.3 Operating responsibility and liability

The operating responsibility lies with the operator of horstCUBE. The person responsible for operation and all operators are obliged to behave in accordance with these instructions.

The safety and accident prevention regulations of the following institutions must be observed:

- of the legislator of the country,
- of the employers' liability insurance associations,
- of the responsible corporate liability company.

Accidents caused by non-observance of these instructions, of safety and accident prevention regulations or due to insufficient care will be blamed on the person responsible for the operation, the operating personnel or their supervisory personnel, insofar as the operating personnel cannot be held responsible due to lack of training or basic knowledge. Therefore, please exercise the necessary caution and prudence.

### 1.3.1 Exclusion of liability

We expressly draw your attention to the fact that the manufacturer is not liable for damage caused by improper use. This also applies to modifications, additions and conversions to or of horstCUBE which could impair safety. In such cases the manufacturer's liability shall lapse.

## 1.4 Warranty

For horstCUBE and for its spare parts we grant, unless otherwise agreed in the purchase contract, the legally prescribed warranty period, beginning with the day of delivery. In addition, the warranty provisions contained in the General Terms and Conditions of fruitcore robotics GmbH or in the individual purchase contract shall apply.

## 1.5 Organisational Measures

The responsibilities for the operation of horstCUBE must be clearly defined and adhered to, so that there are no unclear competences under the aspect of safety.

A person responsible for operation is to be appointed by the operator. The person in charge of operations is obliged to allow the operating personnel time for work and safety instruction on the basis of these instructions. Malfunctions must be reported to the person in charge immediately.

In addition, the operator must observe and instruct generally applicable statutory and other binding regulations on accident prevention and environmental protection.

## 1.6 Standards, Directives and Conformity

### 1.6.1 HorstCUBE

**horstCUBE** complies with the following directives

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU
- Directive RoHS 2011/65/EU

The following standards were applied in the development of **horstCUBE**:

- **DIN EN ISO 12100:2010**  
Safety of Machinery – General principles of design – Risk assessment and risk reduction
- **DIN EN ISO 13850:2015**  
Safety of Machinery – Emergency stop principles of design
- **DIN EN ISO 10218-2:2012**  
Robots and robotic devices – Safety requirements – Part 2: Robot systems and integration
- **DIN EN ISO 13849-1:2015**  
Safety of Machinery – Safety-related parts of control systems –  
Part 1: General principles of design
- **DIN EN ISO 14119:2013**  
Safety of Machinery – Interlocking devices associated with guards
- **DIN EN ISO 14120:2015**  
Safety of Machinery – Guards
- **DIN EN 60204-1:2019**  
Safety of Machinery – Electrical equipment of machines – Part 1: General requirements

### Declaration of Conformity

HorstCUBE is delivered with a declaration of conformity according to Annex IV of the Low Voltage Directive 2014/35/EC due to the integrated control cabinet.

The conformity expires as soon as changes are made to the system or the system is integrated into other systems or machines.

### 1.6.2 Solution Kit Part Separation

The **Solution Kit Part Separation** complies with the following directives:

- Machinery Directive 2006/42/EC
- EMC Directive 2014/30/EU
- Directive RoHS 2011/65/EU

The following standards were applied in the development of the **Solution Kit Part Separation**:

- **DIN EN ISO 12100:2010**  
Safety of Machinery – General principles of design – Risk assessment and risk reduction
- **DIN EN ISO 13850:2015**  
Safety of Machinery – Emergency stop principles of design
- **DIN EN ISO 10218-2:2012**  
Robots and robotic devices – Safety requirements – Part 2: Robot systems and Integration
- **DIN EN ISO 13849-1:2015**  
Safety of Machinery – Safety-related parts of control systems –  
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Safety of Machinery – Interlocking devices associated with guards
- **DIN EN ISO 14120:2015**  
Safety of Machinery – Guards
- **DIN EN 60204-1:2019**  
Safety of Machinery – Electrical equipment of machines – Part 1: General requirements

### Declaration of Conformity

The complete Solution Kit Part Separation system is delivered with a declaration of conformity according to Annex II A of the Machinery Directive 2006/42/EC.

The conformity expires as soon as changes are made to the system or the system is integrated into other systems or machines.

## 1.7 Signs, symbols

The following symbols are used in the Assembly Instructions:

### Lists

- Simple lists are marked with “–”.

### Instructions for action

All instructions for action for a procedure are listed in chronological order.

- Instructions are marked with “►”.

Intermediate results and end results of the action are marked with “⇒”.

## Notes



This symbol stands for information that allows a more effective and economically efficient use of horstCUBE.

## 1.8 Marking of the Safety and Warning Signs

The following safety signs mark all actions that present a danger to life and limb of the operator or others around the operator.

Make sure to observe these signs and exercise particular caution in these cases. Also pass on the safety signs to other users.



### **DANGER!**

**The sign with the addition DANGER refers to an immediate danger.**

**The danger will lead to serious injury or death of persons.**

The description of the danger is followed by instructions for action that serve to avoid or remove the danger.



### **WARNING!**

**The sign with the addition WARNING refers to possible danger.**

**The danger can lead to serious injury or death of a person.**

The description of the danger is followed by instructions for action that serve to avoid or remove the danger.



### **CAUTION!**

**The sign with the addition CAUTION refers to a potentially hazardous situation.**

**The danger can lead to injury of persons.**

The description of the danger is followed by instructions for action that serve to avoid or remove the danger.

The safety signs are often used in combination with a pictogram in the text to clarify the source of the danger.



### **ELECTRICAL VOLTAGE!**

**This sign is a warning for electricity.**

It is posted for all work and operating procedures that are to be observed precisely in order to prevent danger to persons and the system by electricity.



### **ATTENTION! Danger of damage to robot or property.**

This sign indicates information that, if disregarded, presents a danger to the robot system, individual modules, or the operating environment. There is no risk of injury.



### **Wear protective clothing.**

Wear your personal protective equipment:

Safety shoes, protective helmet, safety goggles, and work gloves.



### **Danger of environmental damage.**

This sign indicates information that, if disregarded, presents a danger to the environment. There is no risk of injury.

## **2 Safety**

### **2.1 General Safety Information**

HorstCUBE is a quality product manufactured according to the recognised rules of technology. HorstCUBE has left the manufacturer's works in perfect condition in terms of safety. HorstCUBE is designed and built according to the current state of safety technology. However, a residual risk always remains!

For your safety, always observe:



#### **WARNING!**

**Incorrect handling of horstCUBE can lead to serious personal injury.**

- ▶ Persons working with horstCUBE must be familiar with the safety instructions in this manual and act accordingly.
- ▶ Therefore, always observe the currently applicable safety regulations and instructions.
- ▶ It is essential that you observe the health and safety regulations and safety rules of the legislator, the supervisory authorities and the professional associations.

### **2.2 Intended use**

HorstCUBE serves as a robot platform with safety guard for the HORST robot system. In combination with the robot system HORST, horstCUBE as a robot cell represents a safe, flexible and practical overall solution.

The mounting points for the HORST600 & HORST1000 robot system are prepared on the mounting surface. A place with a mounting option for the Control controller and a holder for the operating panel of the HORST robot system are provided. Control can be controlled from the outside via an operating panel with emergency stop, main switch, operating mode selector switch and programme keys after connection.

HorstCUBE may only be operated in dry, level indoor spaces with a solid base.



#### **DANGER!**

**HorstCUBE must not be used in rooms where there is a risk of explosion.**

#### **Please note**

- HorstCUBE may only be used as intended in accordance with the instructions (BA) and the enclosed documentation. All instructions and safety regulations in the operating instructions for the operating personnel must be followed.
- Any other use or use beyond this is considered improper and is expressly prohibited.
- In addition, the operator must observe and instruct generally applicable legal and other binding regulations for accident prevention and environmental protection.
- For the intended use of horstCUBE all protective devices must be functional.

- No modifications or conversions may be made to or from the horstCUBE without the approval of the manufacturer.

## 2.3 Non-intended use

Any use or application that deviates from the intended use is deemed to be impermissible misuse. Use that is not described in chapter 2.2 or that goes beyond it is considered improper use.



**In the event of foreseeable misuse or improper handling of horstCUBE, the manufacturer's declaration of conformity and thus the operating permit automatically expire.**

### 2.3.1 Foreseeable misuse

Examples for foreseeable misuse are:

- Use in potentially explosive environments,
- Use in medical and life-critical applications,
- Use prior to conducting a risk assessment of the entire application,
- Use as a climbing aid,
- Use as a stability support for other machines or objects,
- Use outside the permissible operating parameters,
- Use of horstCUBE by personnel without appropriate instruction, training or authorisation,
- Operation of the horstCUBE outside the prescribed technical limits,
- Use of components, accessories and attachments not approved by the manufacturer.
- Repairs to components by unauthorised personnel,
- Manipulation of power settings,
- Removal or manipulation of protective devices,
- use of unsuitable aids, e.g. tools or lifting equipment,
- Operation of horstCUBE with defects.

These misuses by operating personnel or third parties are strictly prohibited:

- The load capacity of horstCUBE must not be exceeded.
- Sensors must not be covered, taped over or otherwise rendered inoperative. The configuration of sensors must not be changed under any circumstances.

## 2.4 Operator obligations

### 2.4.1 Risk assessment by the operator



#### **DANGER!**

**Combining horstCUBE with other devices or machines can increase hazards or create new ones.**

- ▶ To ensure safety, horstCUBE must be installed in accordance with the guidelines of the DIN EN ISO 12100 standards.
- ▶ After installing horstCUBE or integrating it into a system, carry out a risk assessment for the entire system.

## 2.4.2 Operations Manager



### **DANGER!**

#### **Possible personal injury due to unsafe condition of the system**

- ▶ The operator of the horstCUBE is obliged to appoint a person responsible for operation at the place of installation.
- ▶ The person responsible for operation is obliged to operate the horstCUBE only in perfect and safe condition.

#### **The person responsible for operation is furthermore obliged,**

- only allow persons to work on the horstCUBE who are familiar with the basic regulations on work safety and accident prevention and who have been trained in the handling of the horstCUBE by fruitcore robotics or by personnel authorised by fruitcore robotics.
- to only allow persons to work on the horstCUBE who have read, understood and confirmed the OI by their signature (see work and safety instruction).
- to monitor the safety-conscious behaviour of the personnel,
- to provide the personnel with the necessary safety equipment.



The person responsible for the operation must check the safety-conscious and hazard-conscious work of the operating personnel by means of inspections.

## 2.5 Operating Personnel

### 2.5.1 Obligation of the Operating Personnel

All persons who are assigned to work on the horstCUBE undertake before starting work to

- to observe the basic regulations on work safety and accident prevention,
- to read the instructions and to follow their instructions and safety notes,
- to check horstCUBE for safety and function before starting work,
- to ask the person responsible for the operation in case of open questions.

### 2.5.2 Training of the operating personnel



### **DANGER!**

#### **Possible personal injury due to untrained operating personnel**

- ▶ The operating personnel must be trained by fruitcore robotics or by personnel authorised by fruitcore robotics about the work on and the dangers of horstCUBE.
- ▶ Persons who have not been trained in this way must not operate horstCUBE.



### **DANGER!**

#### **Possible personal injury due to operation by persons undergoing training**

- ▶ Persons to be trained, apprenticed or undergoing training may only work on horstCUBE if supervision by a trained person with technical or electrotechnical training (teaching staff) is ensured.

The operating personnel must be at least 18 years old and must be physically and mentally suitable for working on horstCUBE.

Instructed personnel **with** technical training may be used for the following activities:

- Use of horstCUBE
- Cleaning

Instructed personnel **with** technical **and** electrotechnical training may also be used for the following activities:

- Inspection, maintenance and repair

## 2.6 Working area, danger area and protected area

In Combination with the robot system HORST the following definitions apply:

The **working area** is a defined 3D space within the range of the robot. When tools, measuring devices, and workpieces are attached, the range of the robot and therefore its working area change.

The **stopping distance** is calculated on the basis of the reaction distance and braking distance of the robot.

The **danger zone** includes the working area and stopping distance of the robot. Persons must not be in the danger zone while the robot is in operation.



### **DANGER!**

**Due to the robot's automatic movement, sudden dangers must be expected within the danger zone. Moving modules may cause personal injury or property damage.**

- ▶ The robot system must be operated only in technically perfect condition and with active safety equipment.
- ▶ The robot must be used only within suitable protection devices (e.g. separating protection device, light curtain, or safety laser scanner). The protection devices must stop the robot's movement within the danger zone.

### 2.6.1 Specific safety instructions

The following safety instructions must be observed in conjunction with the HORST robot system. In general, for the combination of horstCUBE with robot, the safety instructions and information from this manual and from that of the robot must be observed.



### **WARNING!**

**Danger due to missing protective devices and defective/damaged assemblies or accessories**

- ▶ Reassemble all protective devices after completing maintenance work. Check all assemblies and accessories.
- ▶ After completing maintenance work, carry out a test run of the entire system and check the correct functioning of the protective devices.
- ▶ Make sure that the robot is properly and securely bolted down.
- ▶ At least once per working day/shift horstCUBE must be checked for externally visible damage and defects. Changes that have occurred.



### **Read the instructions!**

Refer to the instructions and, if necessary, the accompanying documentation for maintenance work on the horstCUBE.



Spare parts must comply with the technical requirements specified by fruitcore robotics. This is always guaranteed with original spare parts.

## 2.7 Safety functions



The safety-related performance of the interlocking system corresponds to performance level "d" with structure category 3 according to DIN EN ISO 13849-1:2015. It is determined by the risk assessment of the robot system or DIN EN ISO 10218-1.

## 2.8 Residual risk

HorstCUBE is built according to the state of the art and the recognised safety rules. Nevertheless, hazards for the user or third parties or impairments of the system and other material assets may occur during use.



Observe the residual risk described in the HORST robot system manual when operating, programming and maintaining the robot system.

## 3 Technical data

This chapter lists the basic technical data, in particular the weight and dimensions of horstCUBE, see table below.

Tab. 1: Technical data

	HorstCUBE
Dimensions (LxWxH)	1205 x 900 x 2060 mm
Empty weight	300 kg
Load capacity	200 kg

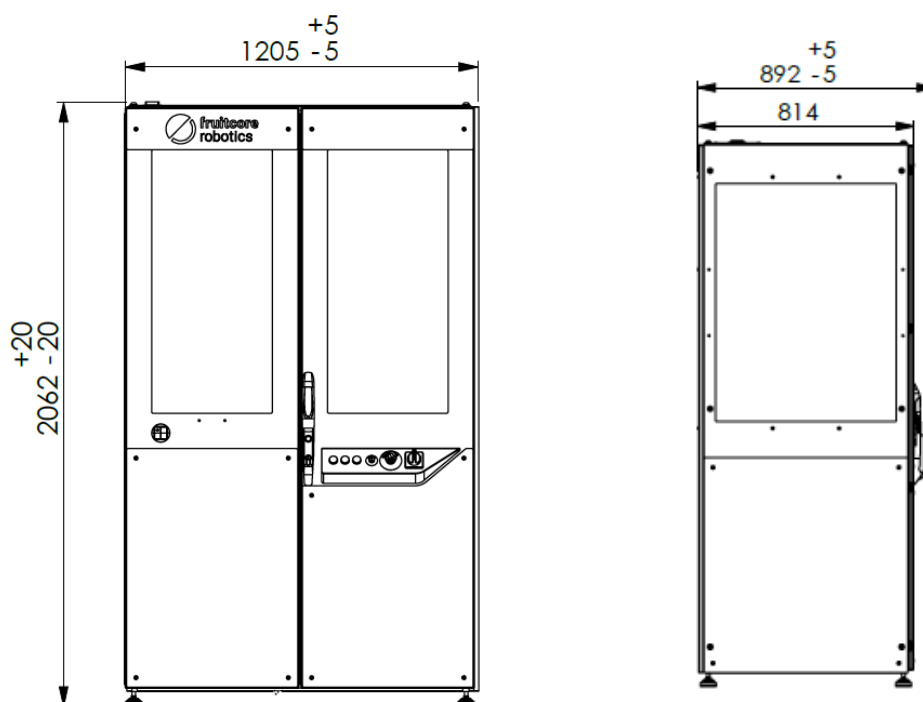


Fig. 3-1: Dimensions horstCUBE

### 3.1 Scope of delivery

HorstCUBE is delivered with:

- Instructions
- User information Rittal door handle
- Integrated SICK solenoid interlock
- Integrated lighting

Solution Kit Part Separation additionally with:

- Robot system H600 incl. adapter plate for mounting and control & operating panel incl. user information
- Holder for operating panel
- VarioShaker 270 incl. user information
- Vibration hopper 5L Basotec incl. user information
- Phase-angle controller Basotec
- SCHUNK electric 2-jaw parallel gripper EGP40-N-N-B
- Smart camera SICK PLOC2D-632C incl. user information
- Wiring diagram

### 3.2 Type plate

The horstCUBE type plate is located on the front of the left-hand door at the level of the operating console.

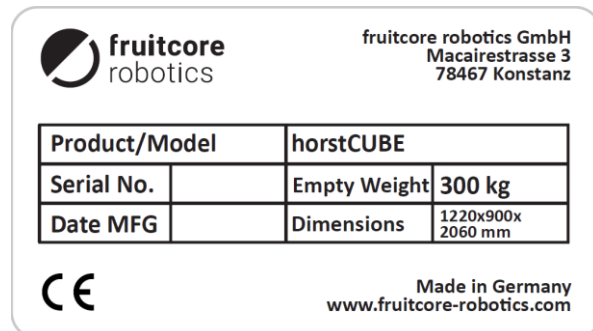


Fig. 3-2: Type plate horstCUBE

The type plate of the Solution Kit Part Separation is located on the front of the left-hand door at the level of the control panel.

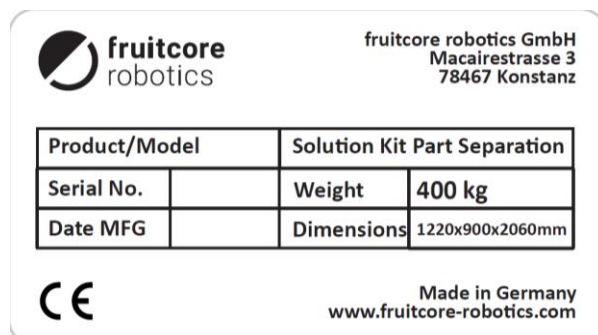


Fig. 3-3: Type plate Solution Kit Part Separation

## 4 Description of horstCUBE

### 4.1 Modules

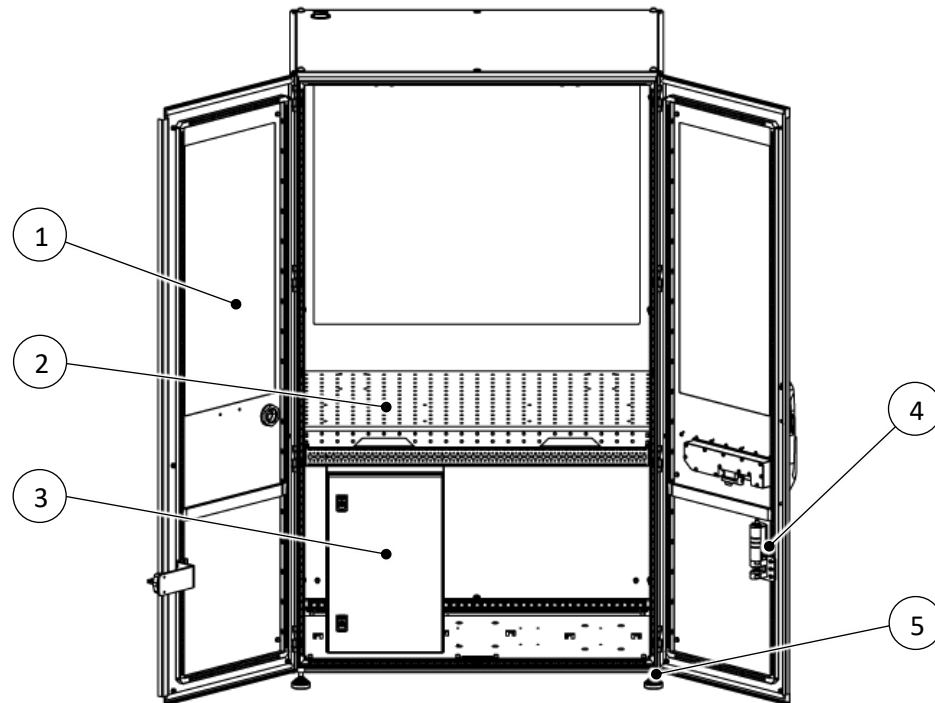
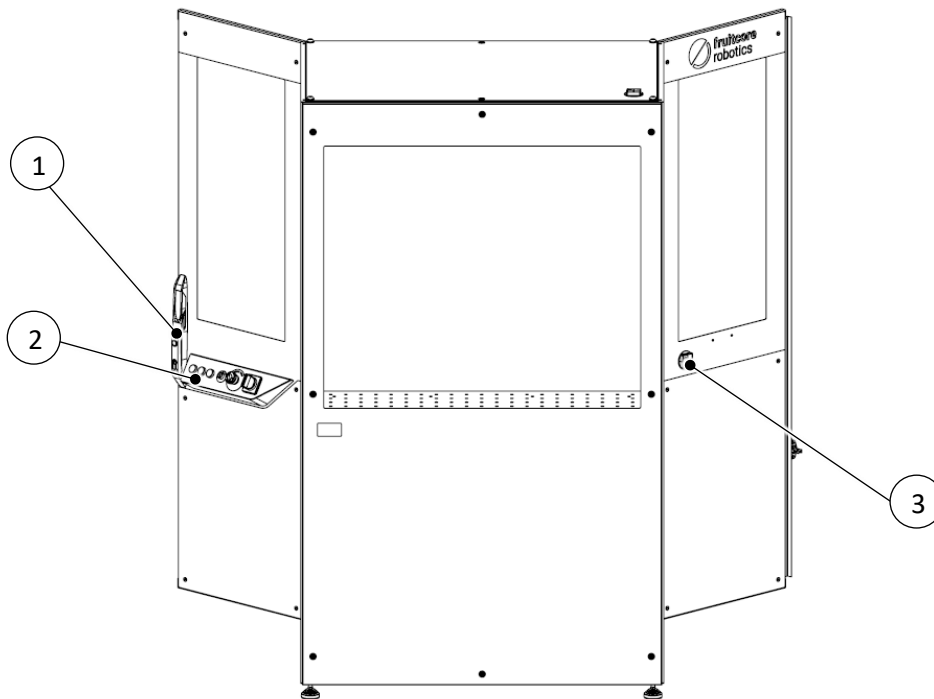


Fig. 4-1: HorstCUBE open – front

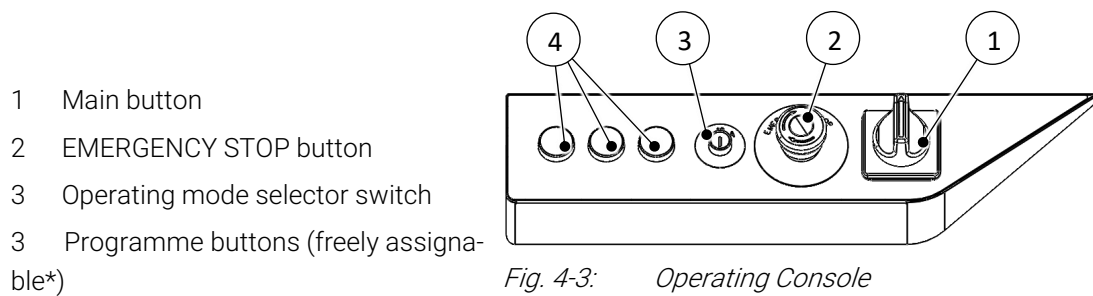
- 1 Pivot door with Plexiglas viewing panels
- 2 Mounting surface for Horst600 / Horst900 robot system
- 3 Control cabinet enclosure
- 4 SICK solenoid interlock
- 5 Height-adjustable screw base



*Fig. 4-2: HorstCUBE offen – rear side*

- 1 Rittal safety door handle with LED button
- 2 Control panel with emergency stop, main switch, operating mode selector switch and programme buttons
- 3 Cable bushing panel

## 4.2 EMERGENCY STOP Button or Operating Console



*Fig. 4-3: Operating Console*

- 1 Main button
- 2 EMERGENCY STOP button
- 3 Operating mode selector switch
- 3 Programme buttons (freely assignable\*)

\*On delivery from left to right: start/continue programme, cancel programme, pause programme



For connecting the control panel to the robot system, please refer to the instructions of the robot system.

### 4.3 Mounting surface

On the mounting surface of horstCUBE the robot can be mounted in different positions depending on the model.

The base plate of the robot system can be positioned as desired on the drilling pattern of the mounting surface.

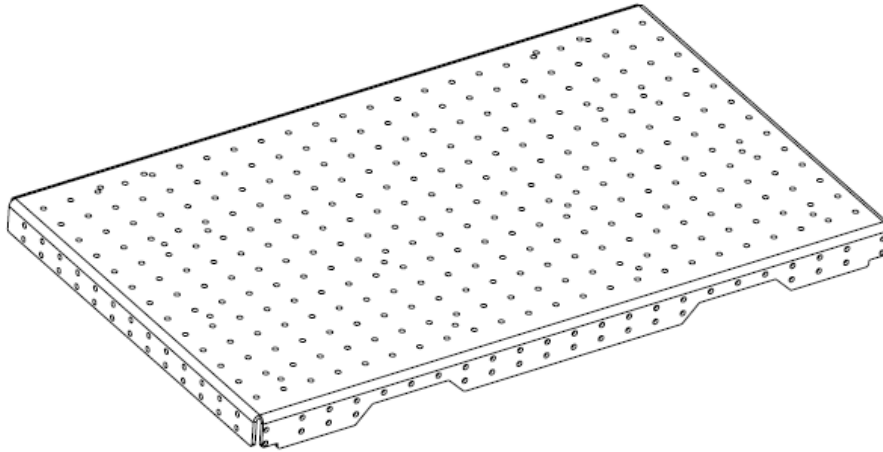


Fig. 4-4: Aluminium mounting plate robot system

## 5 Transport, Installation and Assembly

### 5.1 Transport



#### ATTENTION!

For transport horstCUBE must be in its original packaging.

### 5.2 Setting up horstCUBE

- ▶ Ensure that the horstCUBE is set up on a horizontal, level, firm and non-movable surface.
- ▶ Check horstCUBE for damage. Damaged assemblies must not be used.
- ▶ Push horstCUBE to the intended installation location.
- ▶ Set up the horstCUBE horizontally using the screw feet and a spirit level.

If the tumbler no longer engages perfectly due to transport, the height of the counterpart can be adjusted. To do this, loosen the 3 fastening screws and adjust the fastening height using the slotted holes.

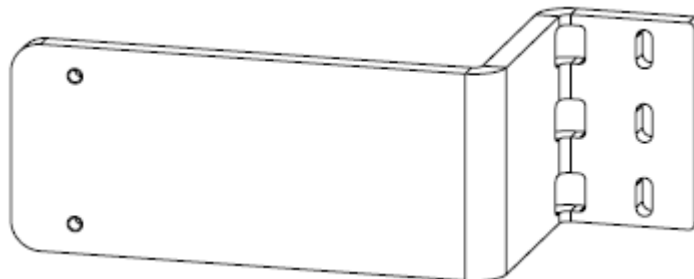


Fig. 5-1: Height adjustment of the tumbler

### 5.3 Mounting the robot system



Further warnings and information on mounting the HORST robot system can be found in the mounting instructions for the respective HORST robot system.



#### **ELECTRICAL VOLTAGE!**

##### **Possible personal injury due to electrical voltage**



- ▶ Work on the electrical equipment may only be carried out by appropriately trained personnel in accordance with the electrotechnical regulations.
- ▶ Only use the mains cable supplied for connection to the mains. Damaged cables must not be used.
- ▶ Make sure that the cables and the control cabinet do not come into direct contact with liquids.



#### **WARNING!**

##### **Improper earthing can cause EMC problems.**

- ▶ When earthing the robot system, ensure appropriate protective and functional measures in accordance with DIN VDE 0100 and EMC Directive 2014/30/EU.
- ▶ Make sure that the robot system is properly earthed. I.e. there must be a common electrical connection of all elements belonging to the system to earth.



#### **WARNING!**

##### **Trip hazard**

- ▶ Ensure that cables and hoses for media routing and power supply are properly routed and secured.



#### **WARNING!**

##### **Unexpected movements of the robot**

- ▶ Do not connect the power supply until you are sure that the assembly is complete and correct.



#### **CAUTION!**

##### **Risk of injury due to the robot falling down**

- ▶ Secure the robot against tipping until it has been fixed to the mounting surface.



#### **ATTENTION!**

##### **Risk of damage to the robot.**

- ▶ Do not lift the robot by the swivel or support arm.
- ▶ Do not move the robot's axles by force.



The mounting points for the robot are prepared on the mounting surface (see 4.3).

- Position the robot on the mounting surface in the desired position and fasten it with the supplied mounting screws.
- Make sure that the base of the robot is aligned so that the network cable, which must be connected to the interface of the robot (1), does not obstruct the later application.

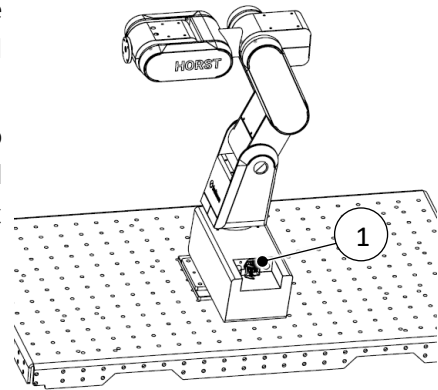


Fig. 5-2: Mounting the robot system



In the case of the Horst600 robot system, an adapter plate is necessary to make the hole pattern of the robot base compatible with that of the mounting plate.

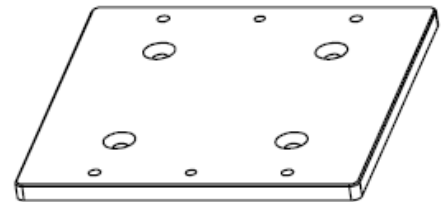


Fig. 5-3: Horst600 adapter plate

- 1 Fuse box
  - 2 Control
- Schieben Sie den Schaltschrank an die dafür vorgesehene Stelle in horstCUBE.
  - Lay the mains cable in such a way that there is no risk of the operator tripping or slipping and that it is not within the range of movement of the robot system.

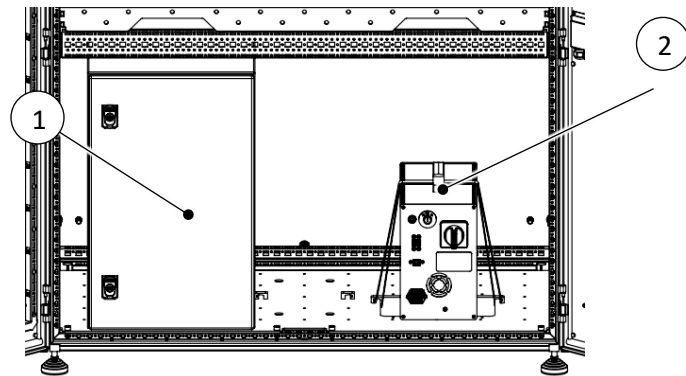


Fig. 5-4: Insertion compartment for Control

## 6 Configuration and Combination Options



Possible configurations and combinations of the horstCUBE product are explained below. The following points are to be understood as a non-exhaustive list, but safety requirements of the Machinery Directive also apply to configurations and combinations deviating from the following. Accordingly, it is essential to ensure that these safety requirements are complied with before commissioning. Conformity with the applicable regulations on the part of fruitcore robotics refers exclusively to the delivery condition.



### **DANGER!**

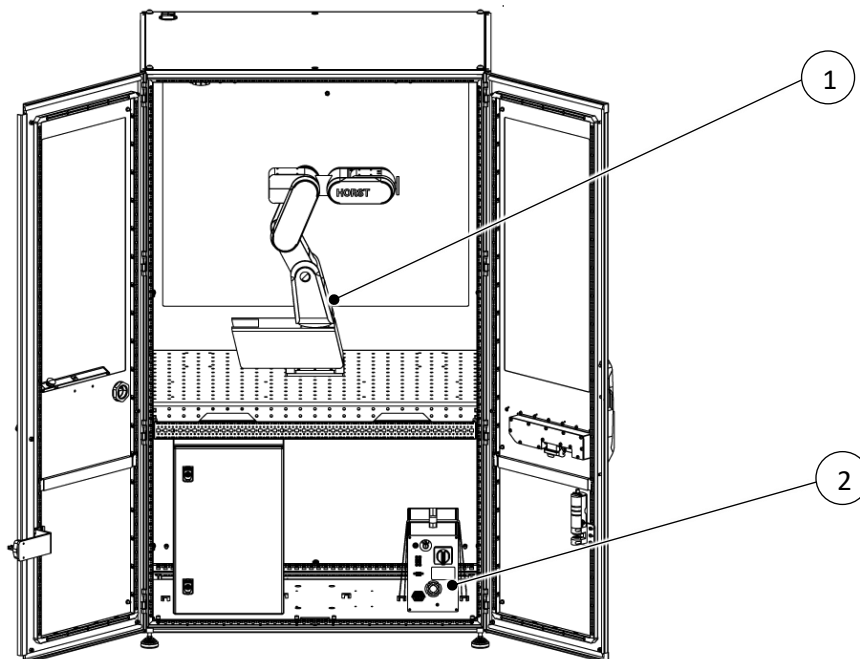
**Within the danger zone, sudden hazards are to be expected due to the automatic movement of the robot. This can result in personal injury and damage to property due to moving assemblies.**

- ▶ The robot system may only be operated in technically perfect condition and with active safety devices.
- ▶ Note that attachments and workpieces change the reach of the robot and thus the danger zone.

### 6.1 HorstCUBE with robot system HORST600



For more detailed information on the HORST600 robot system, please refer to the robot system manual.



*Fig. 6-1: HorstCUBE with assembled robot system – front side*

- 1 Robot system HORST600
- 2 Control

## 6.2 HorstCUBE with robot system HORST1000



For more detailed information on the HORST1000 robot system, please refer to the robot system manual.

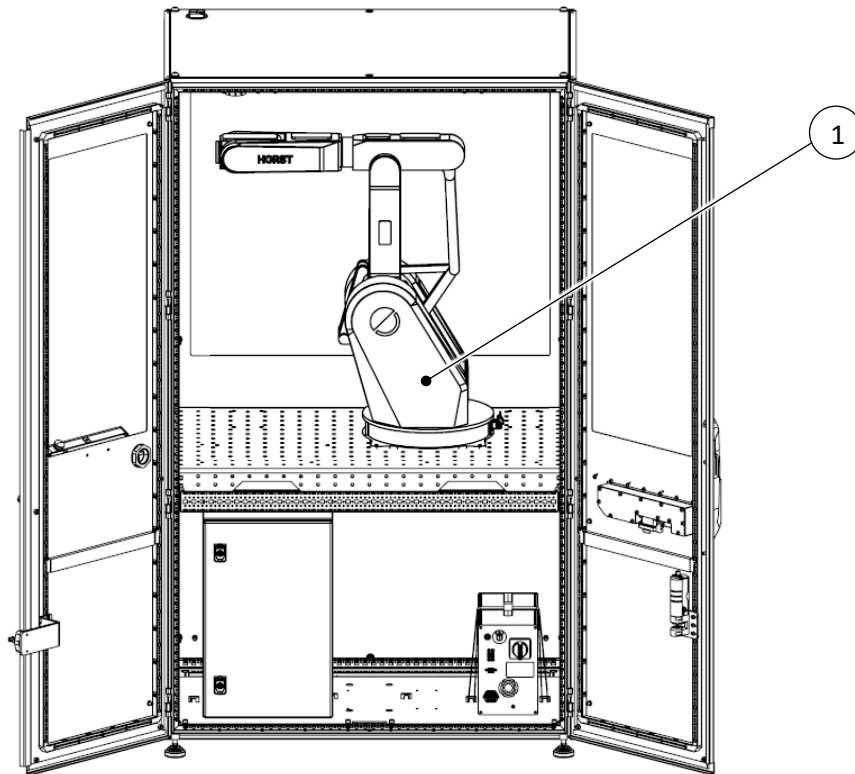


Fig. 6-2: HorstCUBE with assembled robot system – front side

1 Robot system HORST1000

### 6.3 Solution Kit Part Separation

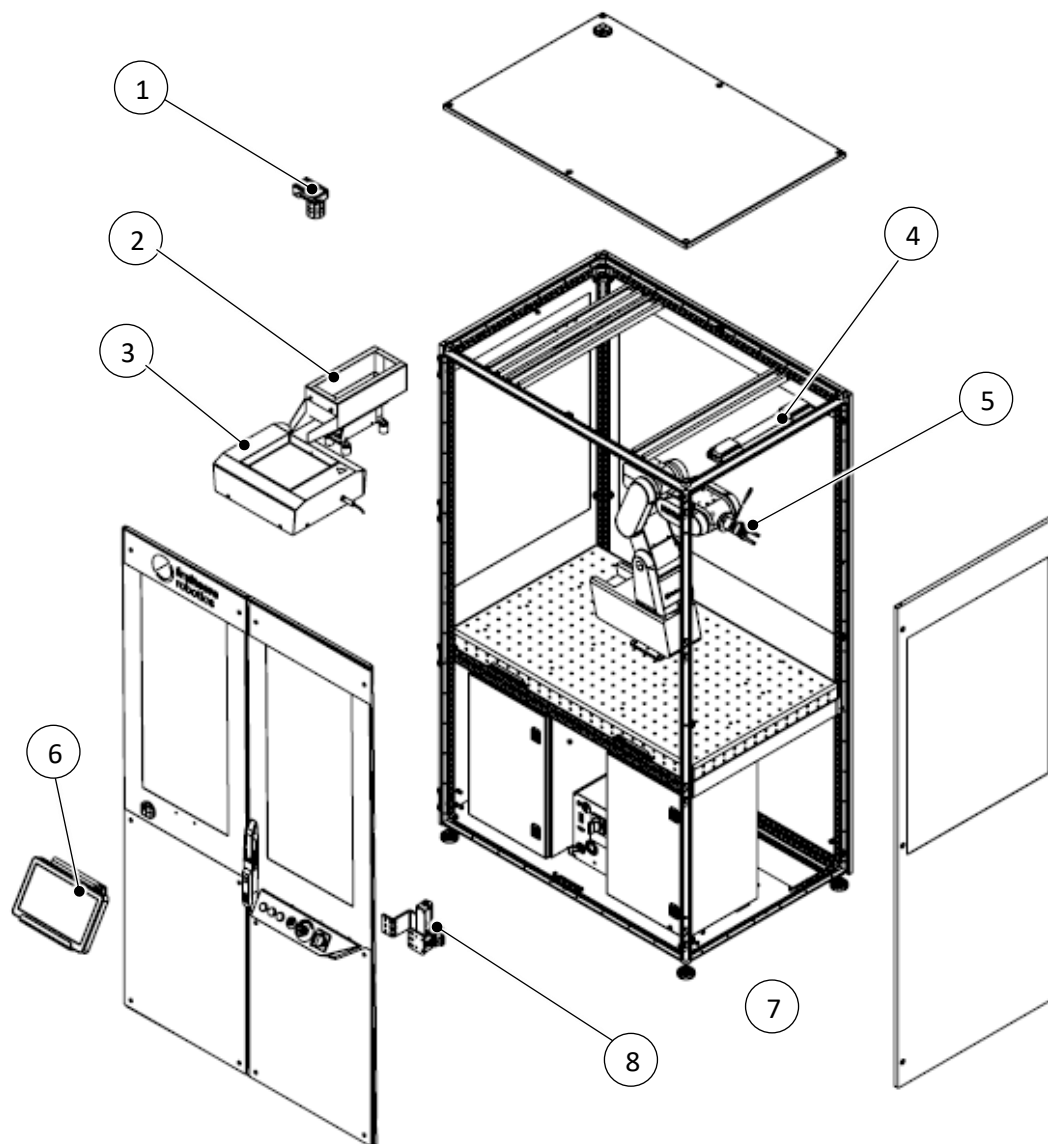


Fig. 6-3: *Solution Kit Part Separation – exploded view*

- 1 Camera system
- 2 Part hopper
- 3 VarioShaker vibrating plate
- 4 Lighting system
- 5 SCHUNK electric 2-jaw parallel gripper
- 6 Control panel incl. holder
- 7 Locking system

## 6.4 HorstCUBE without Operating Console

This variant is suitable for combining several horstCUBEs, where one operating console is sufficient and only the protective space and the application area are increased.



Also available in combination with closed side panels (see 6.5).

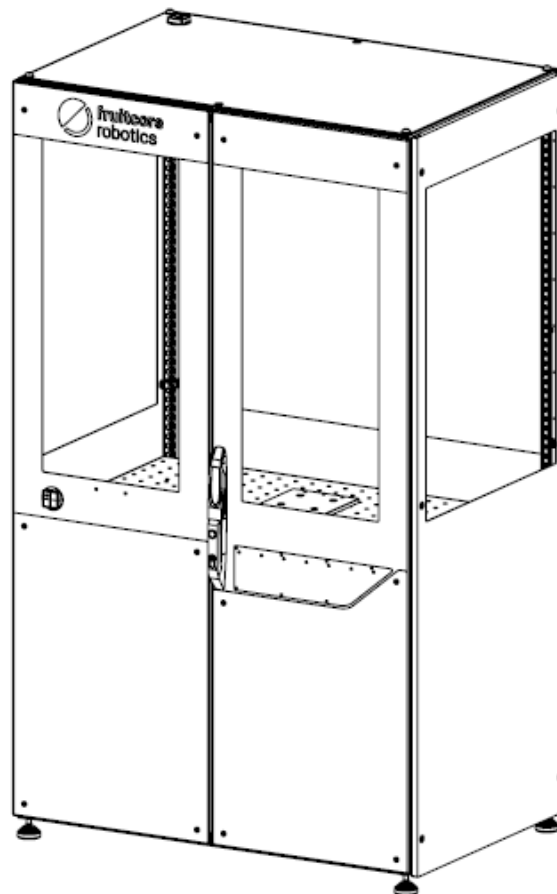


Fig. 6-4: HorstCUBE without operating console

## 6.5 HorstCUBE Side Panels without Windows



### CAUTION!

HorstCUBE generally has no working space monitoring. Therefore, with this variant of horstCUBE, it is essential to ensure that no person is in the protected area before starting the application via the control panel.

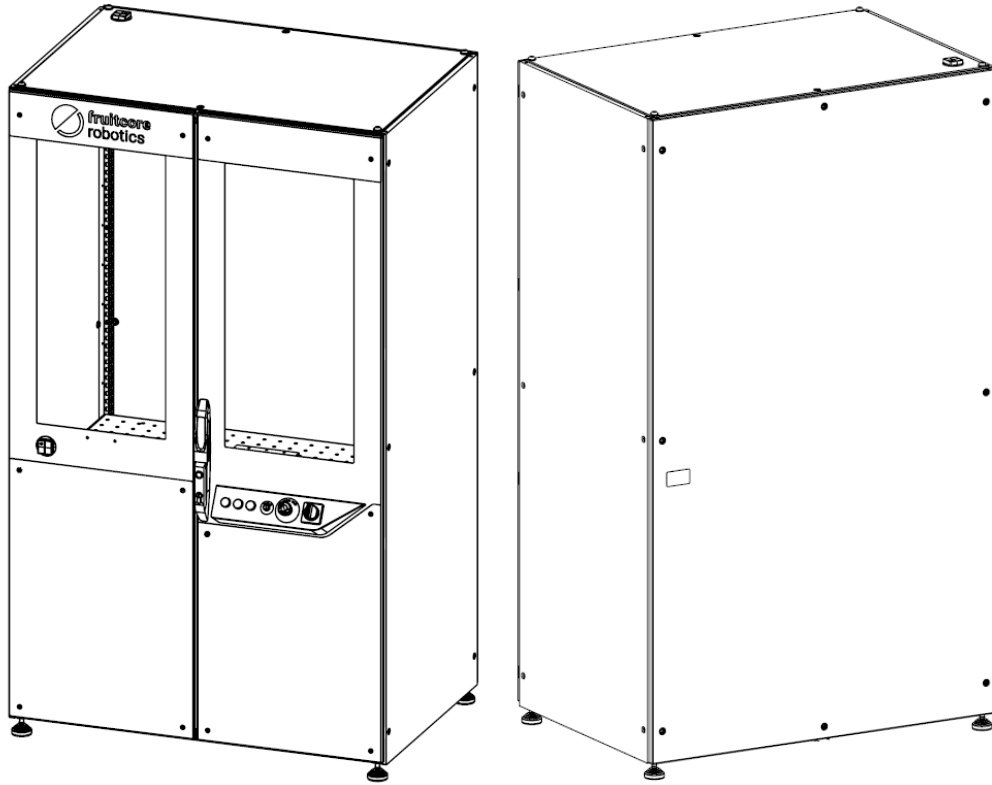


Fig. 6-5: HorstCUBE side panels without windows

# 7

## 7 Commissioning



All further steps of commissioning can be found in the assembly instructions of the respective robot model that is used in horstCUBE



The procedure for configuring the peripheral devices can be found in the documentation of the respective manufacturer.



### **DANGER!**

#### **Danger due to incorrect commissioning**

Commissioning may only be carried out by persons with technical and electrotechnical training who have also been authorised by fruitcore robotics.

Before commissioning:

- ▶ Make sure that the robot and any attachments are properly and securely screwed down.
- ▶ Ensure that there is sufficient space for the robot arm to move freely. There must be no obstacles or people in the working area. Note that attachments and workpieces change the reach of the robot and thus the danger zone.
- ▶ If the robot is combined with other machines in a system, make sure that the other machines cannot damage the robot.
- ▶ Make sure that the safety measures are set up and configured according to the risk assessment to protect commissioning personnel, operators and bystanders.
- ▶ Make sure that the safety devices stop the robot movements within the hazardous area. Check that the enabling device is working properly.
- ▶ If there is damage to the robot, control or mechanical interface or any part of the guarding, do not use the robot.
- ▶ Check the emergency stop and safety stop functions.
- ▶ Do not enter the robot's danger zone or touch the robot during operation.
- ▶ Make sure that the horstCUBE and the robot are earthed (connection of the mains plug to the PE protective conductor). A suitable RCD (residual current device) must be installed.
- ▶ Before switching on the power supply, make sure that the connection cable between the control and the robot and the mains cable are connected to the power supply.

### 7.1 Commissioning Solution Kit Part Separation

- ▶ Connect the 230V AC cable from the horstCUBE to the power supply.



It is recommended to recalibrate the camera system after transport and to adjust it to the robot.

- ▶ Follow the instructions on

[https://horst-cosmos.com/documentation/SICK\\_-\\_PLOC2D](https://horst-cosmos.com/documentation/SICK_-_PLOC2D)

- ▶ Set up the VarioShaker as described in its user information. This is enclosed with the product.
- ▶ The vibration strength of the hopper can be adjusted using the potential control on the phase control.

## 8 Operation



### CAUTION!

The operation of horstCUBE remains prohibited until all requirements for installation and commissioning have been met.



### WARNING!

**Serious injury may result from operation without functioning safety devices.**

- ▶ Check daily that the EMERGENCY STOP and the door interlock function.
- ▶ Never enter the danger zone during operation.



**This section only describes specific information related to horstCUBE. To ensure safe operation of the HORST robot system within the horstCUBE robot cell, it is essential to observe the user information on the robot system itself and its HorstFX software.**



### CAUTION!

The working area of the robot is not limited to the protected area.

- ▶ Avoid collisions with the guard during operation.
- ▶ Do not touch the side walls of horstCUBE during operation.

### 8.1 Operating Console

In addition to the panel, the operating console provides the operator with a further operating option for the robot system. The control panel enables the operator to start and stop programmes without using the control panel. The emergency stop button stops all dangerous movements within the cell.

- 1 "Start" programme button
- 2 "Stop" programme button
- 3 Programme button "Pause"
- 4 Operating mode selector switch
- 5 Emergency stop button
- 6 Main switch

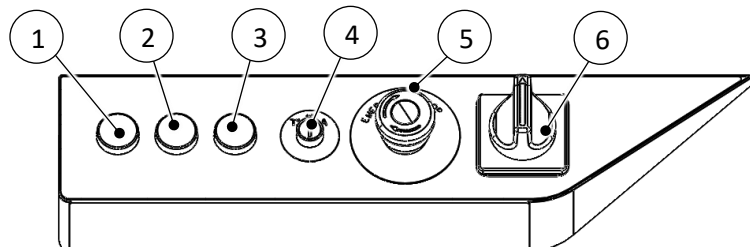


Fig. 8-1: Operating console

The three programme keys can be used to start (1), stop (2) and pause (3) the programme. In addition, the operating mode can be changed (4) and the power supply can be switched on and off via the main switch (6). Another emergency stop button (5) is provided in addition to the one on the control panel.

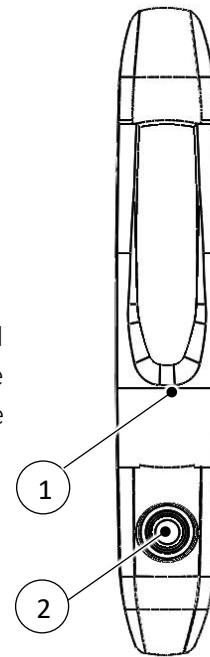
To operate the robot system in automatic mode, all protective devices must be active, which is ensured by the safety door handle and the guard locking. The T1 and T2 operating modes allow the robot system to be taught with the doors open.

## 8.2 Rittal safety door handle

The safety door handle prevents the protective devices from being overridden during hazardous movements. The door handle can only be opened when the robot is at a standstill, i.e. when a programme has been paused or stopped. The opening of the guards must be initiated from the control panel or the control console.

The door handle LED lights up blue when the robot system is in a programme. If the door handle LED button (2) is pressed during this time, a purple flash indicates that the opening request has been rejected.

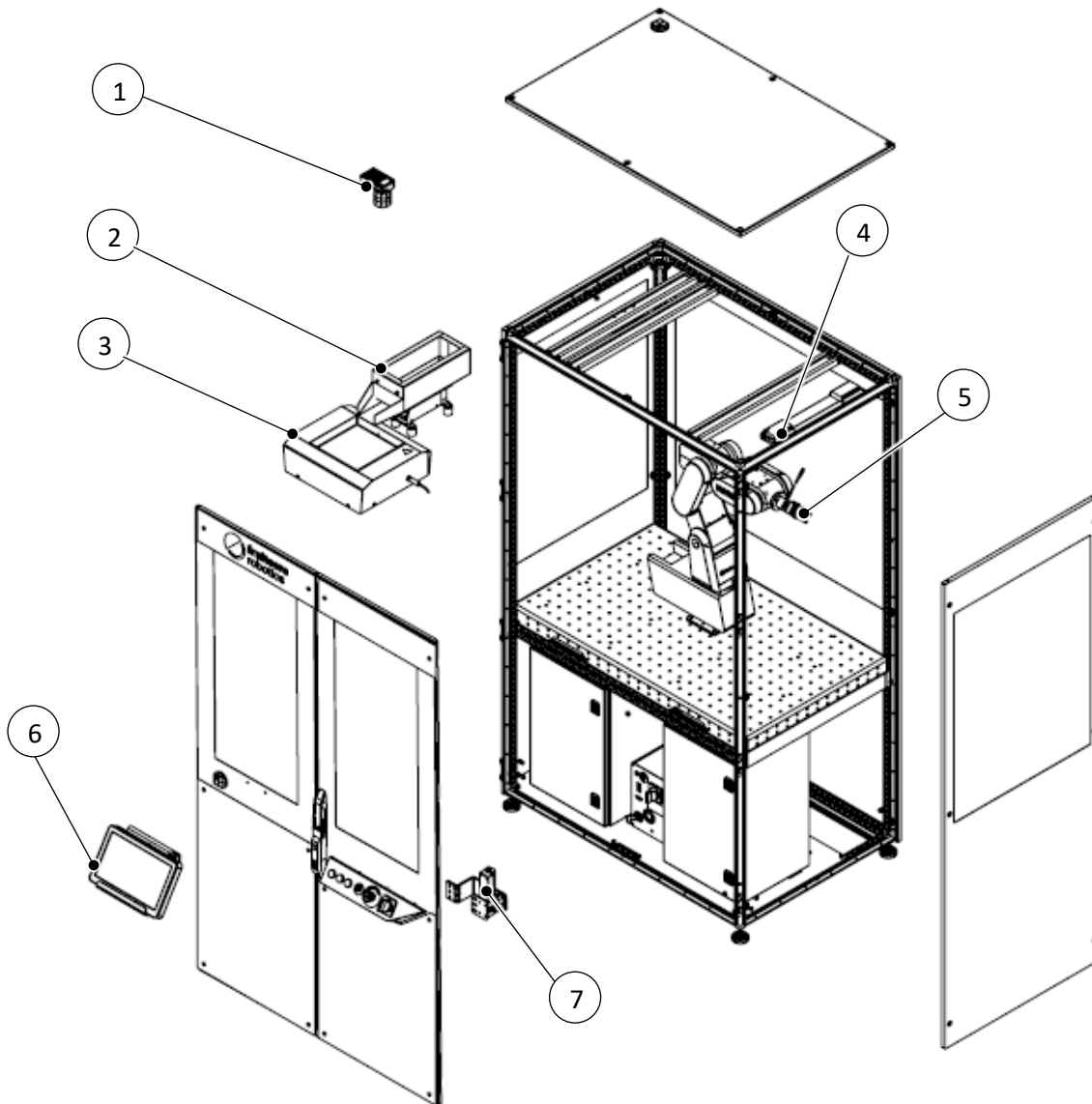
If the programme is stopped or paused via the control panel or the control console, the LED changes from blue to green and the opening can thus be requested by pressing it. In this case, the lever (1) is moved electrically to the open position and the LED lights up purple.



*Fig. 8-2: Rittal safety door handle*

### 8.3 Solution Kit Part Separation

The flexible Solution Kit Part Separation system consists of the horstCUBE robot cell, the Horst600 robot system and a vibration platform with parts feed and camera system. The vibration platform is controlled via the robot using digital inputs and outputs. The vibration platform can be configured via a web interface. For more information, refer to the wiring diagram supplied, as well as the user information of the vibration platform.



*Fig. 8-3: Solution Kit Part Separation - exploded view*

- 1 Camera system
- 2 Part hopper
- 3 VarioShaker vibrating plate
- 4 Illumination
- 5 SCHUNK electric 2-jaw parallel gripper
- 6 Control panel incl. holder
- 7 Locking system (guard locking)

## 9 Cleaning and Maintenance



### **DANGER!**

#### **Danger from electric shock**



- Connection and work on the electrical equipment may only be carried out by qualified electricians.



Spare parts must meet the technical requirements specified by fruitcore robotics. This is always guaranteed with original spare parts.

### 9.1 Cleaning

Depending on the ambient conditions of horstCUBE, the components get dirty. Clean horstCUBE as required. The frequency depends on the degree of soiling.



#### **Wear protective clothing!**

- Wear protective goggles, protective gloves for cleaning.



### **ATTENTION!**

#### **Risk of machine damage**

- **DO NOT** clean electrical components with compressed air.
- Do not use aggressive, flammable or abrasive liquids / cleaning agents to clean horstCUBE.
- Avoid penetration of liquids into electrical assemblies.
- Clean horstCUBE externally with a clean and dry cleaning cloth.
- Remove chips and other particles from horstCUBE with a Hoover, **NOT** with compressed air.
- Clean electrical assemblies with a clean and dry cleaning cloth.



#### **Environmental protection!**

- Dispose of the accumulated waste and used cleaning cloths in an environmentally friendly manner.



**Please also observe the cleaning instructions in the user information for the accessories (component hopper, camera, vibratory plate, solenoid interlock, gripper).**

### 9.2 Maintenance and repair

Maintenance must be carried out regularly depending on the operating and ambient conditions, at least once a year, and documented accordingly.

- The operating personnel must check the horstCUBE daily for external damage.

Repairs to the horstCUBE may only be carried out by fruitcore robotics.

**DANGER!****Danger from electric shock**

- ▶ Make sure that horstCUBE is disconnected from the power supply before starting maintenance.
- ▶ Check the function of the safety interlock monthly.
- ▶ Check the Plexiglas panes for damage and that they are correctly seated in the side walls.
- ▶ Check the lock for ease of movement. Spray all moving lock parts with a suitable, water-free lubricant.
- ▶ Check the door hinges for ease of movement and spray them with a suitable water-free lubricant. tighten the fastening screws if necessary.
- ▶ Refit all guards after completing maintenance work. Check all assemblies and accessories.
- ▶ After completing maintenance work, carry out a test run of the entire system and check for correct functioning.



**Please also observe the maintenance instructions in the user information for the accessories (component hopper, camera, vibratory plate, solenoid interlock, gripper).**

## 10 Storage

If horstCUBE is stored for later use or taken out of service, it must be protected with suitable packaging. HorstCUBE must be stored dry, frost-free and without the influence of precipitation and strong temperature fluctuations.

## 11 Disposal

**Danger of environmental damage!**

All parts of horstCUBE must be disposed of in such a way that damage to health and the environment is excluded.

- ▶ Dispose of all parts in such a way that damage to health and the environment is excluded. Pay attention to the materials used.