ROBOTUNITS®

Safety Fence

Operating and assembly instructions

Index

1. General Information

1.1 Guarding manufacturer

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1.2 Purpose

Barrier guarding for the protection of persons.
Prevention of entry into danger zones.

1.3 History

Version	Reason for revision	Affected pages
1	New document	2019-01-08
2	Addition: Protective grounding	2025-06-25

2. Safety

2.1 General Information

- The operating manual is an integral part of the guarding. It must be readily available at all times in the vicinity of the guarding. Strict compliance with these operating instructions is mandatory for ensuring proper use and operation of the guarding.

- Robotunits only assumes responsibility for the guarding with respect to its safety, reliability and proper functioning, if assembly, modifications, extensions and repairs are completed by Robotunits or by a body authorized by Robotunits to perform these tasks and if the guarding is used in accordance with instructions given in the operating manual.

2.2 Intended use

The guarding is designed and built for the purpose of protecting persons and/or separating persons from a hazard zone.
Use is limited to trained adults only.

2.3 Reasonably foreseeable misuse:

Improper use and prohibitions include use of the system such that the conditions and requirements do not comply with those described by the manufacturer in technical documents, data sheets, assembly, installation, and operating manuals and in other specific guidelines.

The following are to be specifically avoided:

- Manipulation or bypassing of the guarding, or rendering it unusable.
- Use as fixed guarding for keeping animals.
- Use as protection against hot substances or objects.
- Use as protection against acids and aggressive substances.

Improper use in general includes the following:

Use as boundary or protection against:

- Machine movements or moving parts
- Ejection of workpieces
- Ejection of machine parts

The manufacturer's declaration shall be null and void, if the owner uses the guarding for other purposes, not known to the manufacturer, or other than detailed in relevant contracts and specifications. In this case the national regulations then take effect.

The guarding is designed for operation at ambient temperatures from -20 bis +60 °C.

2. Safety

2.4 Safety instructions for normal operation

Robotunits has developed and designed the guarding in accordance with state-of-the-art technology. Harmful effects are not to be expected, provided the guarding is used as intended. Residual risks are reduced to a minimum.

- National laws and regulations on occupational safety and health for employees at the workplace are to be observed with respect to the guarding. The owner and the users are responsible for compliance with regulations in order to ensure safe and secure work procedures.
- The user is responsible for checking the guarding for correct functioning and proper condition before each use.
- The user must be familiar with the operating manual for the guarding.

2.5 Safety instructions for the electrical system

The guarding must be equipped with a protective ground connection before live components can be installed on it.
A qualified and authorized specialized person must carry out installation procedures.

2.6 Safety instructions for mechanical components

The guarding must only be operated in its original condition.

When installing or integrating the conveyor into a system, the “integration of safety” needs to be considered. It may be required that the owner/operator must expand or provide additional safety equipment, following a hazard analysis conducted by the operating owner of the machine.

2.7 Safety instructions for cleaning and maintenance tasks

Bring the machine or system to a safe state, de-energize it and secure it against reactivation before commencing any cleaning tasks.

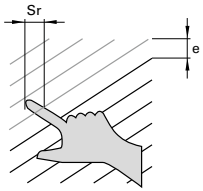
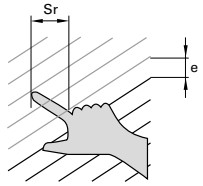
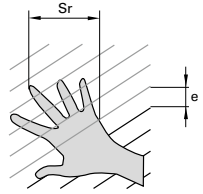
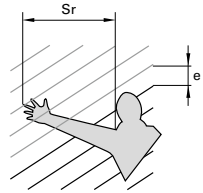
3. Safety Distances

3.1 General safety distances

- Safety distances relevant to human beings must be taken into account when hazard zones are being secured.
- These safety distances are determined by measuring the range of reach of a person with the limbs and without the aid of an object relevant to the hazard zone and adding a safety margin.

3.2 Passing through regular openings

Persons of 14 years and older

Body part	Image	Opening width e	Safety distance S_r		
			Slit	Square	Circle
Fingertips		e ≤ 4	≥ 2	≥ 2	≥ 2
		4 < e ≤ 6	≥ 10	≥ 5	≥ 5
Finger to finger base		6 < e ≤ 8	≥ 20	≥ 15	≥ 5
Hand		8 < e ≤ 10	≥ 80	≥ 25	≥ 20
		10 < e ≤ 12	≥ 100	≥ 80	≥ 80
		12 < e ≤ 20	≥ 120	≥ 120	≥ 120
		20 < e ≤ 30	≥ 850*	≥ 120	≥ 120
AArm to shoulder joint		30 < e ≤ 40	≥ 850	≥ 200	≥ 120
		40 < e ≤ 120	≥ 850	≥ 850	≥ 850

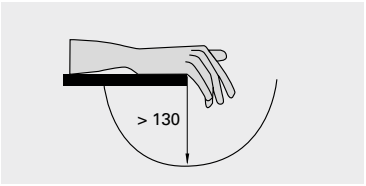
* is the length of the slit-shaped opening ≤ 65 mm, with the thumb as the limit and the safety distance can be reduced to 200 mm.

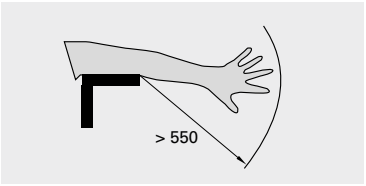
3. Safety Distances

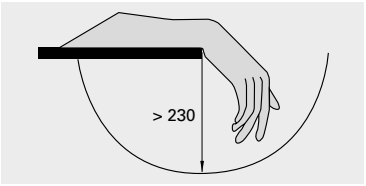
3.3 Reaching around edges

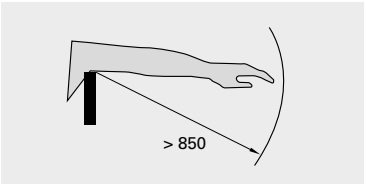
For reaching around a given edge, the minimum safety distance is:

- at least 130 mm for the hand, measured from the base of the finger to the finger tip
- at least 230 mm for the hand, measured from the base of the hand to the finger tip
- at least 550 mm for the arm, measured from the elbow to the finger tip
- at least 850 mm for the arm, measured from the armpit to the finger tip



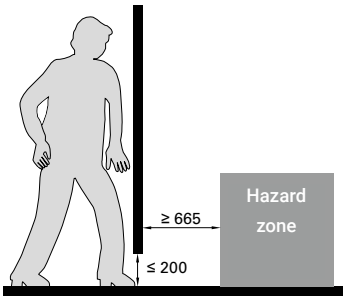






3.4 Preventing hazard zones being reached by the lower limbs

The depicted safety distance of ≥ 665 mm in the foot area is based on a ground clearance of ≤ 200 mm in accordance with DIN EN ISO 13857, whereby entry is assumed to occur from on an anatomical standing position without using any additional aid.



With slot-shaped openings larger than > 180 mm and square or round openings larger than > 240 mm, entry with the complete body is permitted in compliance with DIN EN ISO 13857.

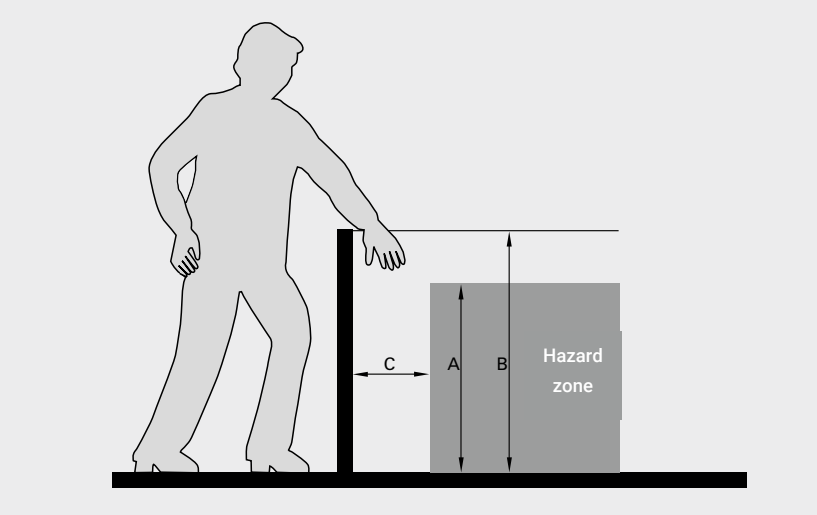
The indicated value may be inadequate if risks exist in terms of potential slip hazards or misuse. Additional precautionary measures may be required to restrict access.

3. Safety Distances

3.5 Reaching over edges of operating equipment or guarding

When reaching over edges of operating equipment or guarding, the required safety distance is achieved, if the height of the hazard zone in mm (A) and the height of the guarding in mm (B) is not below the corresponding horizontal distance to the hazard zone in mm (C) (in accordance with the diagram shown below), provided the guarding is higher than 1000 mm. It must not be possible to physically enter the area between the guarding and the hazard zone.

Due to different standards the safety distances can vary. The example shown is the standard for the European Union. Please refer to the standards applying to your country.



3. Safety Distances

Height of hazard zone in mm (A)	Height of guarding in mm (B)							
	2400	2200	2000	1800	1600	1400	1200	1000
	Horizontal distance to hazard zone in mm (C)							
2400	300	400	600	700	800	900	1000	1100
	100	100	100	100	100	100	100	100
2200	300	400	600	800	900	1000	1200	1300
		250	350	400	500	500	600	600
2000	-	400	600	800	900	1100	1300	1400
	-	-	350	500	600	700	900	1100
1800	-	-	600	800	900	1100	1400	1500
	-	-	-	600	900	900	1000	1100
1600	-	-	500	800	900	1100	1400	1500
	-	-	-	500	900	900	1000	1300
1400	-	-	-	800	900	1100	1400	1500
	-	-	-	100	800	900	1000	1300
1200	-	-	-	700	900	1100	1400	1500
	-	-	-	-	500	900	1000	1400
1000	-	-	-	-	800	1000	1400	1500
	-	-	-	-	300	900	1000	1400
800	-	-	-	-	600	900	1300	1500
	-	-	-	-	-	600	900	1300
600	-	-	-	-	-	800	1300	1400
	-	-	-	-	-	-	500	1200
400	-	-	-	-	-	400	1200	1400
	-	-	-	-	-	-	300	1200

Values for high risks | Values for low risks

4. Protective grounding

The safety fence panels are conductively connected to each other using the Safety Fence Fasteners. This enables protective grounding of the panels.

When using weld mesh, 50 panels can be grounded using one grounding point.

For single or double doors, the door leaves must additionally be connected to the base extrusion frame with a grounding cable.

When using sliding doors, the base frame and the fixed standing panel are grounded and not the sliding door panel.

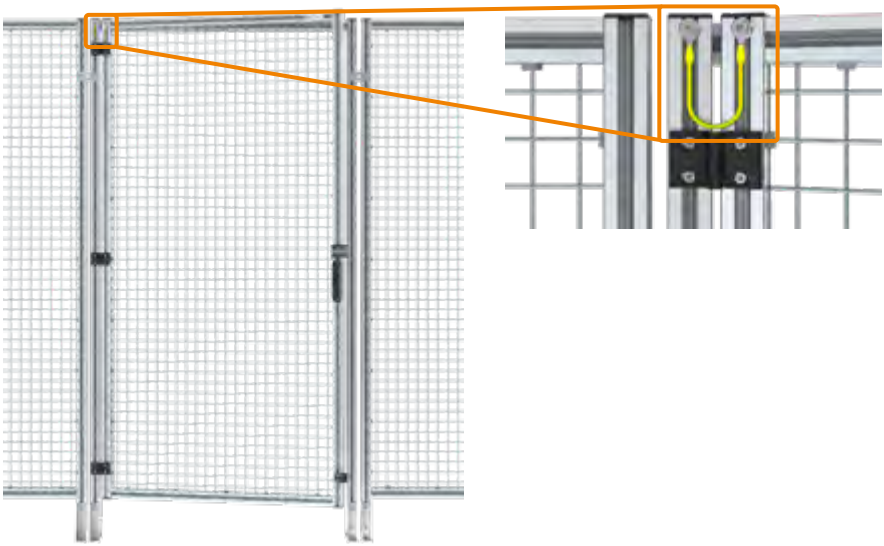


Figure 1: Grounding of a single door

5. Transport/Assembly

5.1 Storage and transportation requirements for guarding

The guarding must be secured against tipping over for transport and storage.
Do not store the guarding outdoors.

5.2 Requirements for means of transport

When lifting consider the center of gravity of the machine.
Do not stand under the load.

Be sure to use adequate packaging and transport materials.

5.3 Installation site requirements

- Ground condition, concrete quality ≥ B 25
- Only for indoor application
- Ambient temperature range: - 20 to + 60 °C
- The ground must be level to ensure absolute stability of the guarding.

6. Putting into service

6.1 Requirements of personnel

Only qualified and authorized specialized personnel may carry out work on the guarding.

6.2 Installing the guarding

If the position of the guarding is not adequately secured for assembling task, injury of limbs is possible as a result of crushing or impact should the guarding tip over. The guarding must always be secured against tipping over. Only qualified and authorized specialized personnel may carry out installation procedures.

Comply with safety instructions for electrical systems (2.5).

6.3 Putting into service for the first time

Prior to putting into service for the first time, check:

- whether the guarding and covers have been properly installed;
- compliance with safety distances specified by EN ISO 13857
- protective grounding and potential equalization where appropriate

6. Putting into Service

6.4 While putting into service

Do not remove safety equipment, covers or protective devices when putting the system into service. The hazard zone must also be secured.

6.5 Taking out of service

Injury due to power surge!
Shut down the machine/system and disconnect it from the mains, prior to taking the guarding out of service and before continuing with subsequent dismantling tasks.
The machine/system must be in a safe state for carrying out taking-out-of service procedures.
Only qualified and authorized specialized personnel may carry out taking-out-of-service procedures.

6.6 Disposal

The protection device contains valuable material, which can be recycled individually.

Dispose of the guarding in accordance with national regulations.

7. Maintenance

he safety of the operator and trouble-free operation of the guarding is only guaranteed with the use of original parts. Proper care is essential for trouble-free operation and long service life.

7.1 Requirements of maintenance personnel

The stability of the guarding must be ensured whenever maintenance tasks are carried out. Only a qualified and authorized specialized person may carry out maintenance tasks.

7.2 Maintenance table

Maintenance Point	Maintenance Interval	Task
Threaded fitting after putting into service for the first time	1 month after putting into service for the first time	Check for firm fit
Threaded fittings	Once a year	Check for firm fit

7.3 Maintenance and repair tasks

Only Robotunits personnel or a body authorized by Robotunits may perform repair tasks.

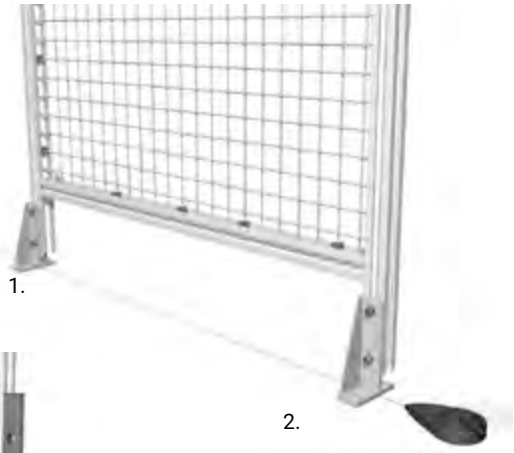
7.4 Guarding screw retainers

Use the dismantling elements provided for disassembling fixed, barrier guarding to remove it for the purpose of carrying out maintenance or repair tasks, for example. These elements of the barrier guarding are equipped with fasteners which remain connected to the guarding or machine, after the panels have been removed.

Ensure that all fasteners are refitted during reassembly. The machine must not be put into operation unless the fixed barrier guarding has been fully restored to its original condition and is fully functional in terms of operational safety.

8. Basic Safety Fence System Assembly Tips

1. Use the chalk line marker to mark off the course of the safety fence installation
2. Align first safety fence panel with the line
3. Drill hole for safety fence panel, anchor and align using a spirit level
4. Slide in the next safety fence panel, drill a hole for it, anchor and align it
5. Connect safety fence panels with the safety fence fastener
6. Slide in the next safety fence panel, drill a hole for it, and anchor and align it



1.

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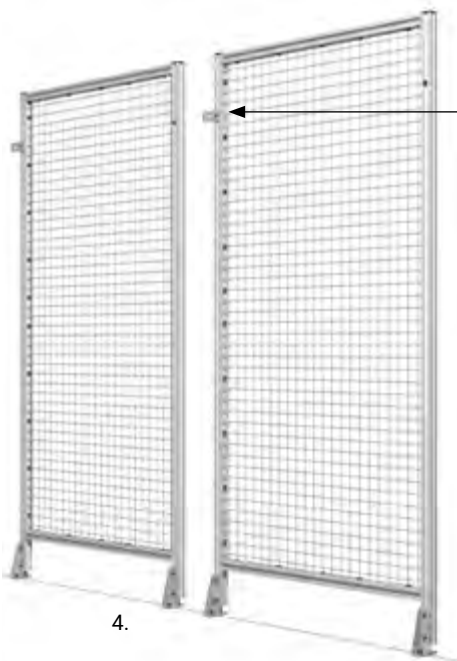
8. Basic Safety Fence System Assembly Tips



4.

5 .

6.

Required tools:

- Chalk line marker
- Roll tape measure
- Impact drill
  with 10-mm masonry drill bit
- Steel hammer
- Open-end wrench (WAF: 17)
- Allen wrench (WAF: 5)
- Spirit level

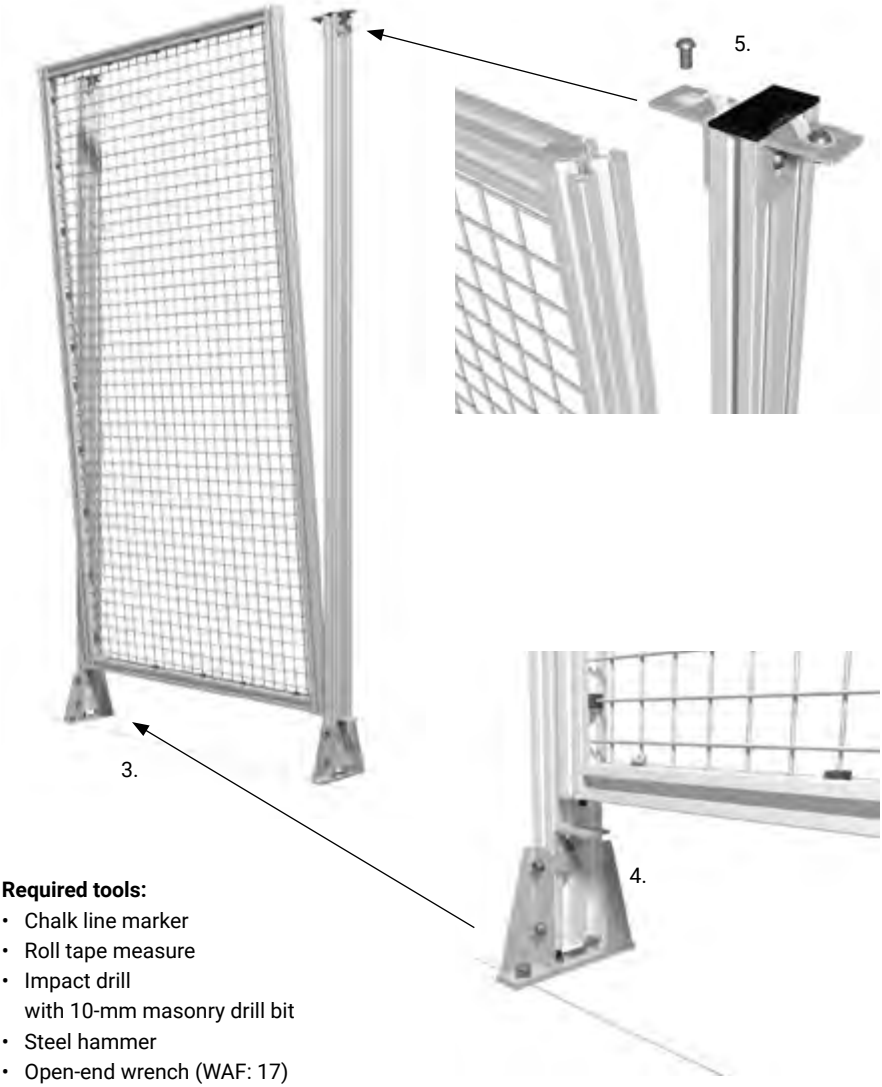
9. Allround Safety Fence System Assembly Tips

1. Use the chalk line marker to mark off the course of the safety fence installation
2. Drill hole for first post, anchor and align using a spirit level
3. Connect safety fence panel with first and second post (see 4. and 5.)
4. Fit safety fence panel at bottom to 90° fastener
5. Bolt safety fence panel at top to 90° fastener and bolt screw retainer to post
   Drill hole for second safety fence post, anchor and align

1.

2.

9. Allround Safety Fence System Assembly Tips



Required tools:

- Chalk line marker
- Roll tape measure
- Impact drill
  with 10-mm masonry drill bit
- Steel hammer
- Open-end wrench (WAF: 17)
- Allen wrench (WAF: 5)
- Spirit level

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