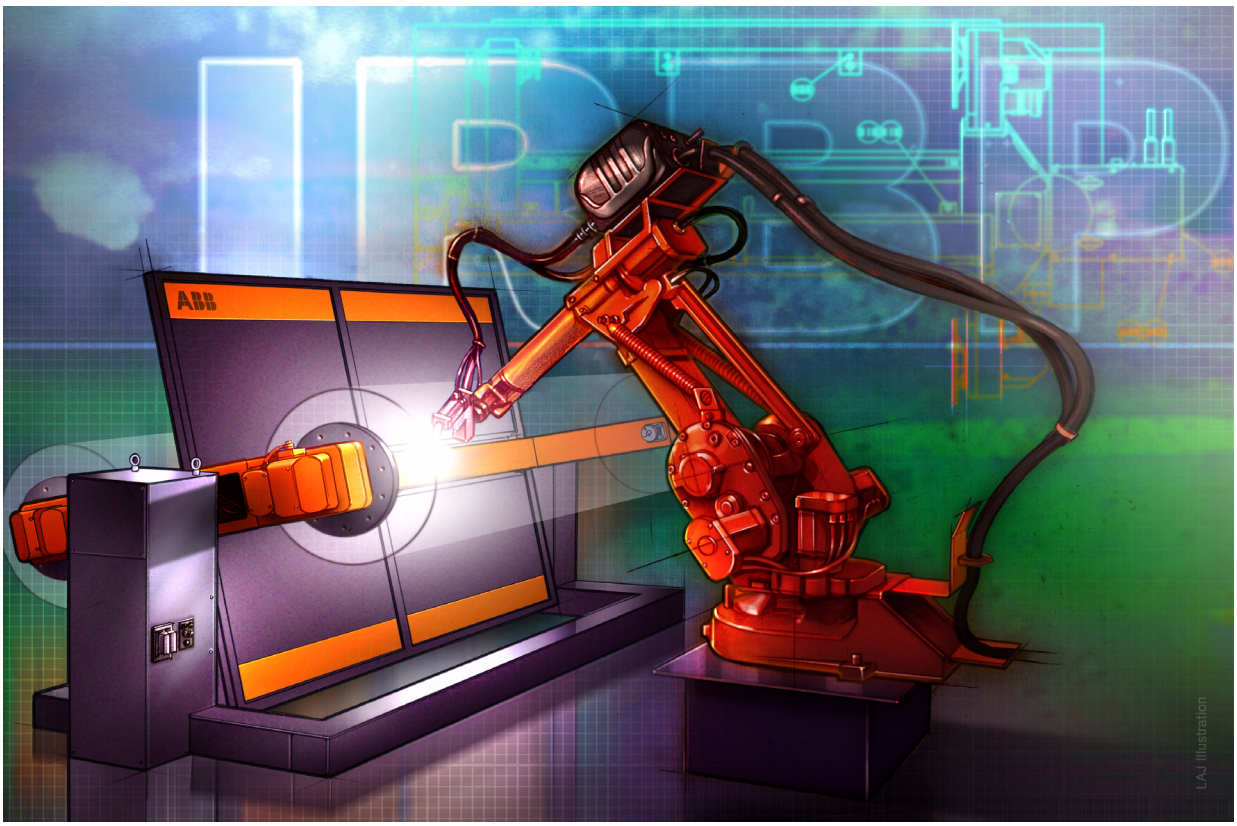
The heart of Robotics

System description

Welding robot products

IRC5



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Welding robot products

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Table of Contents

1: General

This document describes ABB's standard assortment of arc-welding robot systems. The document is included in the ***System Manual*** (binder) supplied with the welding robot system. The ***System Manual*** corresponds to the system ordered by the customer and contains detailed descriptions of the component products.

2: Welding robot system

Delivery

The welding robot system is delivered in its standard configuration in sections. Everything included in the delivery is fitted to the respective sections.

Example of single robot system

The component parts that can make up a welding robot system can consist of:

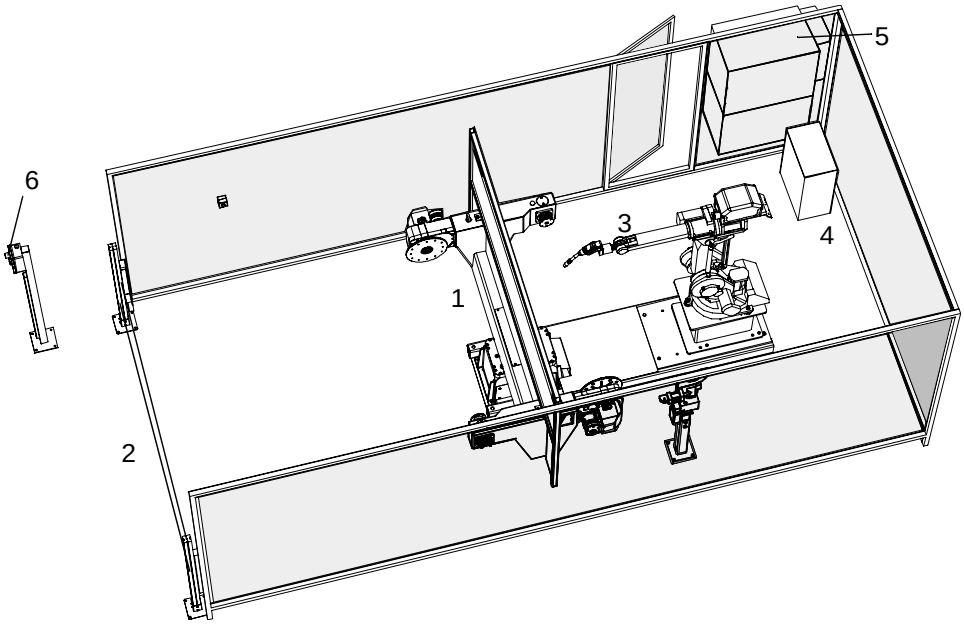


Figure 1: Complete welding robot station with one robot

Item	Description
1.	Positioner
2.	Safety equipment
3.	Robot, wire feeder, welding torch and hose bundle
4.	Welding power source
5.	Control cabinet
6.	Operator panel
7.	Travel track (not shown, see Figure 20.)
	Accessories: cooling unit, mechanical splatter cleaning unit, wire cutter, unit for checking TCP (Tool Center Point), seam locator and seam tracker

Example of multiple robot system

The component parts that can make up a welding robot system can consist of:

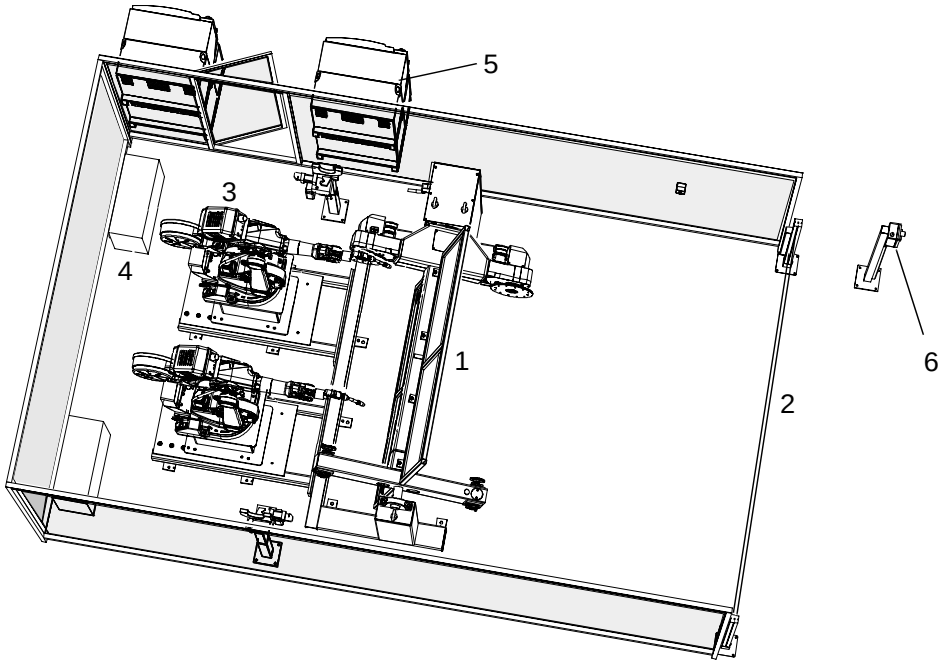


Figure 2: Complete welding robot station with two robots

Item	Description
1.	Positioner
2.	Safety equipmen
3.	Robot, wire feeder, welding torch and hose bundle
4.	Welding power source
5.	Control cabinet
6.	Operator panel
7.	Travel track (not shown, see Figure 20.)
	Accessories: cooling unit, mechanical splatter cleaning unit, wire cutter, unit for checking TCP (Tool Center Point), seam locator and seam tracker

3: Control system adapted for peripheral equipment

Description

The control system is used to control robots, welding equipment, positioners and all other peripheral equipment.

The product is designed for the following robot types:

- IRB1400/1600/2400 in AW configuration.

3.1: Robot control system

General

Control system IRC5 is available in two configurations: Single cabinet (SCC) and dual cabinet (DCC).

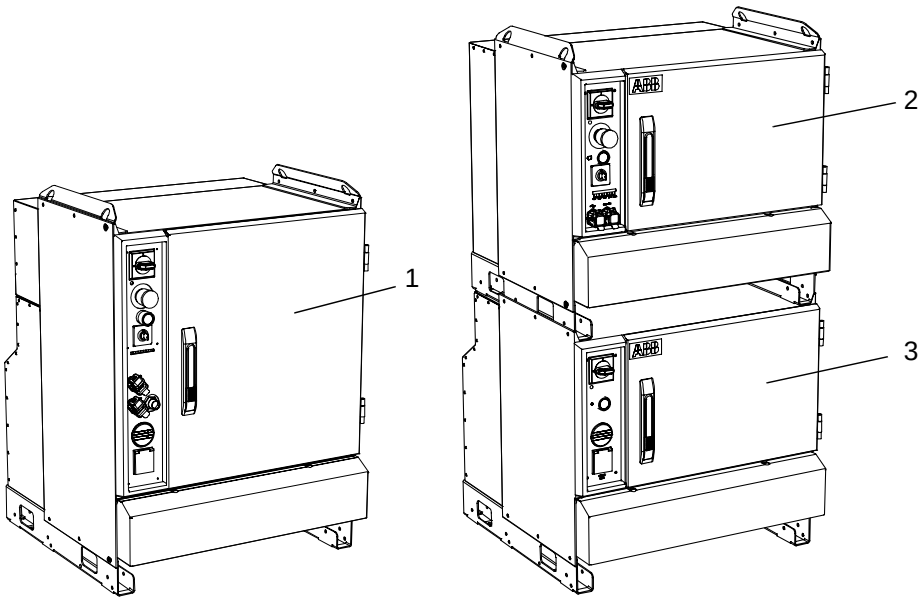


Figure 3: Single cabinet (SCC) and dual cabinet (DCC)

Item	Description
1.	Single cabinet, SCC
2.	Dual cabinet, DCC (control module)
3.	Dual cabinet, DCC (drive module)

Note!

There is a drive module for each additional robot that is connected to the system (for one robot, only single cabinet/dual cabinet).

Process module

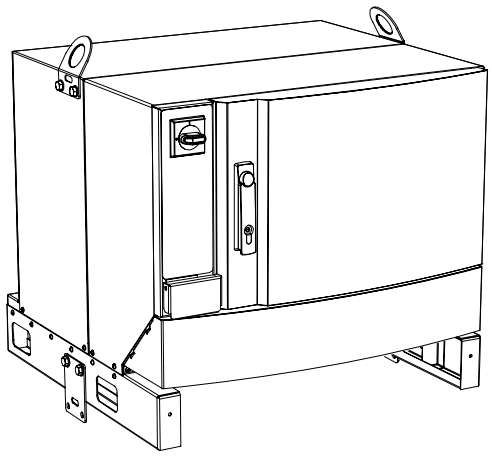


Figure 4: Process module

One process module is included in system:

	Description
1.	That has seam tracking system AWC
2.	When the customer ordered a process module for extra space

Note!

Control systems for robots are described in the product manual Robot Controller.

Control systems for peripheral equipment are described in the product manuals Positioner Control Equipment, Welding Equipment and Safety Equipment.

3.2: Control system for peripheral equipment

Description

Control system IRC5 is complemented with control equipment for positioners, welding equipment, safety equipment and other peripheral equipment.

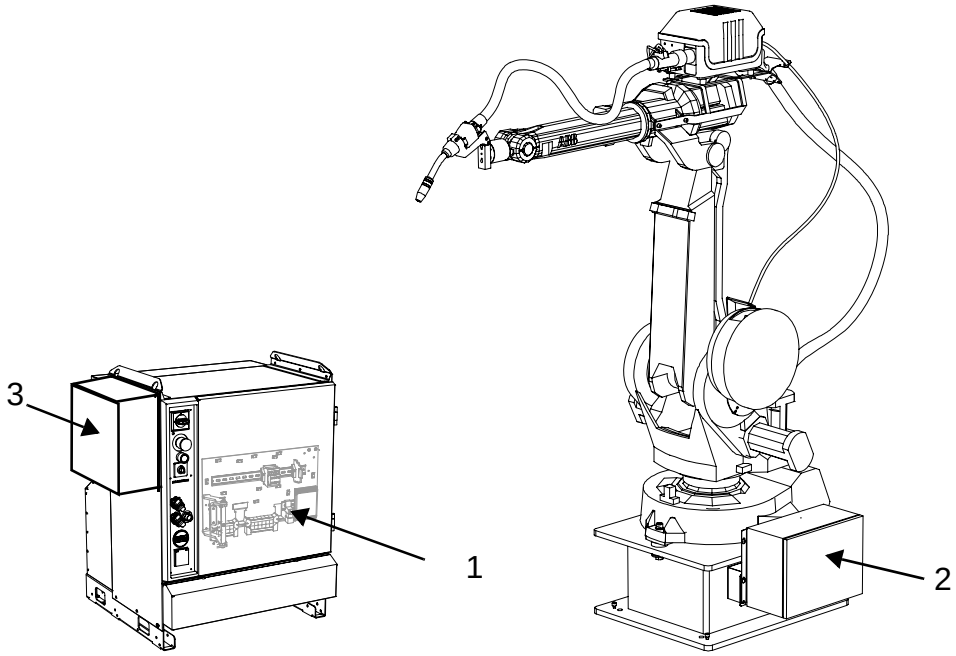


Figure 5: Control system for peripheral equipment

Pos.	Description
1.	Positioner control equipment
2.	Process control equipment
3.	Safety control equipment

3.2.1 Location

Positioner control equipment

Positioner control equipment is located in single cabinet (SCC) or dual cabinet (DCC).

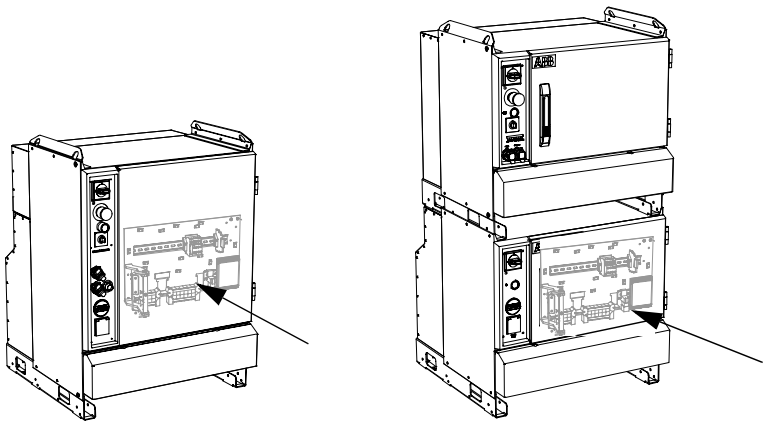


Figure 6: Location of positioner control equipment

Process control equipment

Process control equipment is located on the side of the pedestal.

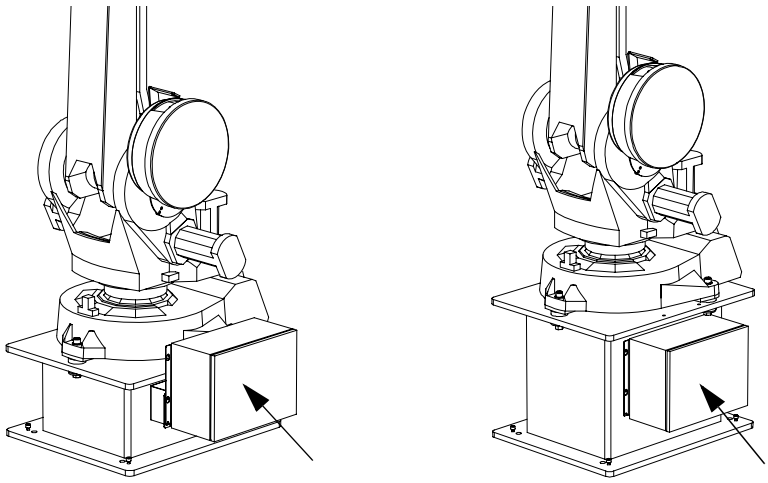


Figure 7: Location of process control equipment

Safety control equipment

Safety control equipment is located on the sidewall of the cabinet. The control equipment may also be located on the guard or on a stationary building wall.

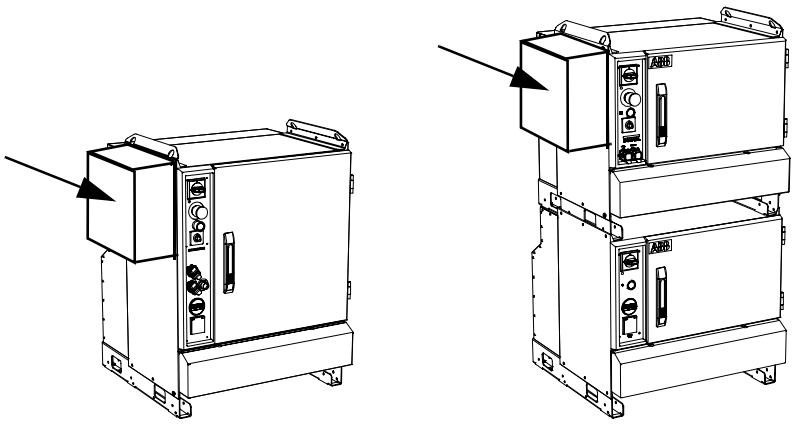


Figure 8: Placement of safety control equipment on SCC and DCC

3.2.2 Block diagram

Positioner block diagram

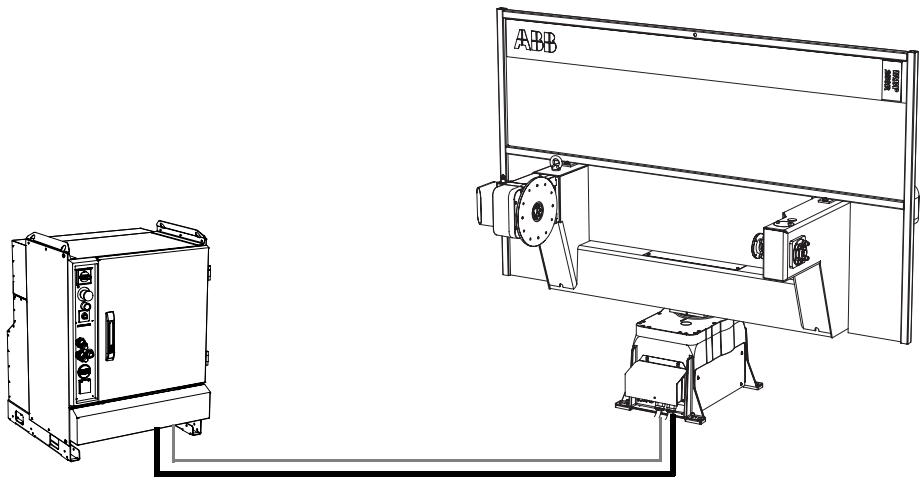


Figure 9: Positioner block diagram

Process block diagram

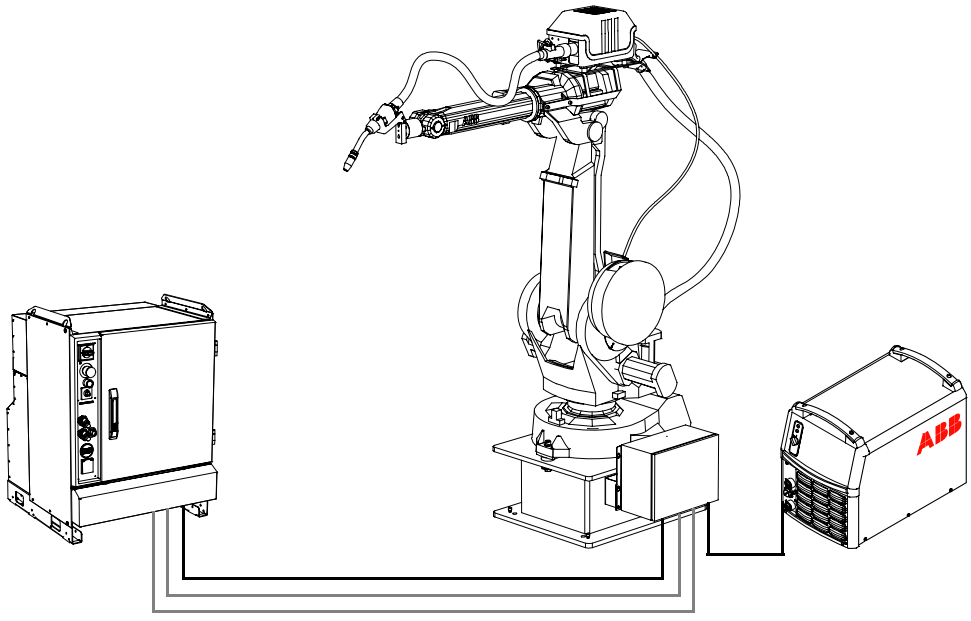


Figure 10: Process block diagram

Process options block diagram

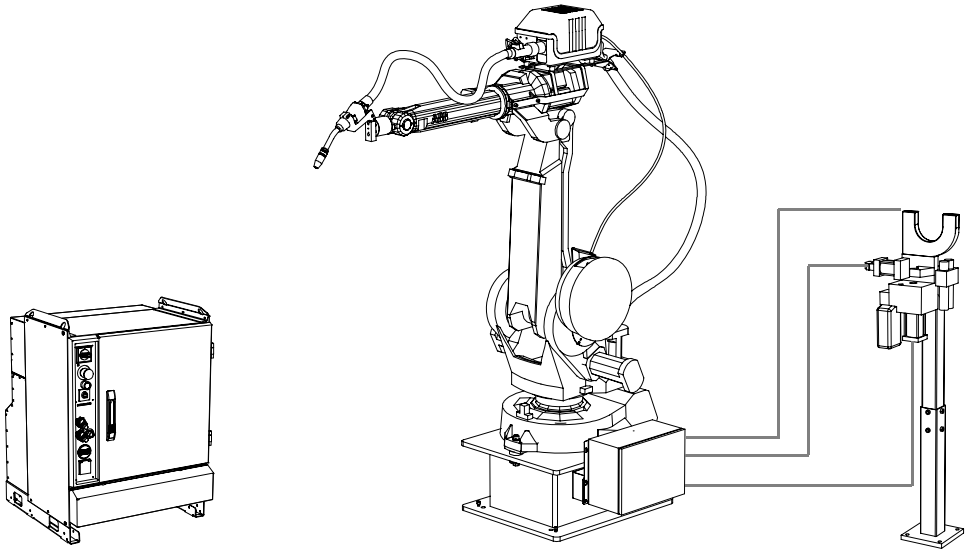


Figure 11: Process options block diagram

Operator panel and manual jog block diagram

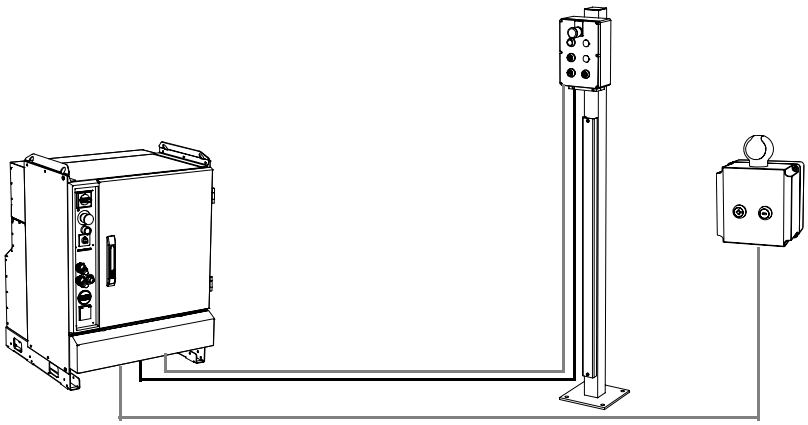


Figure 12: Operator panel and manual jog block diagram

3.2.2 Block diagram

Safety block diagram

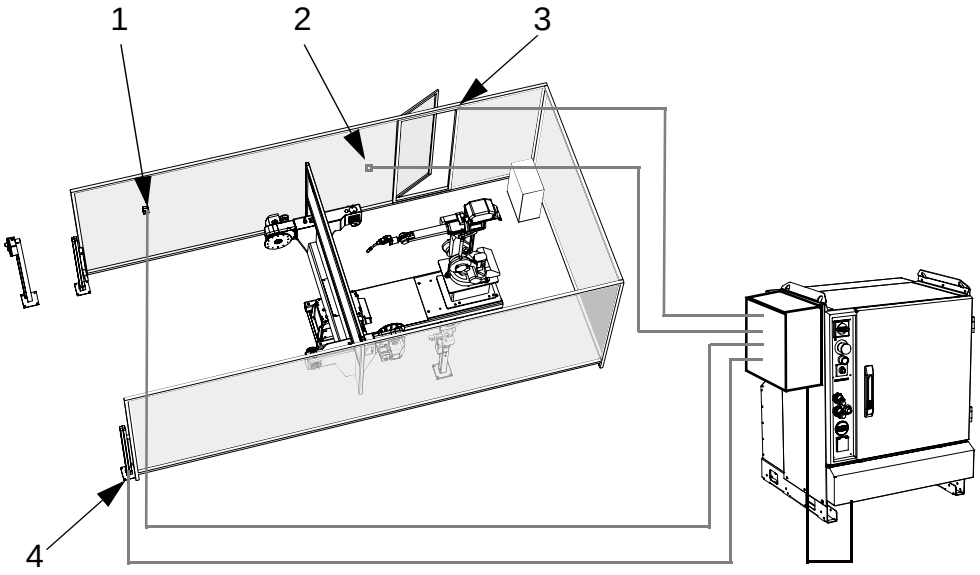


Figure 13: Safety block diagram

Item	Description
1.	Pre-reset
2.	Gate reset
3.	Gate switch
4.	Light barrier

3.2.3 Connections

Positioner connection

Note!
Control systems for positioners are described in the product manual Positioner Control Equipment.

The positioner connected to SCC or the drive module to DCC are shown below:

Positioner 1

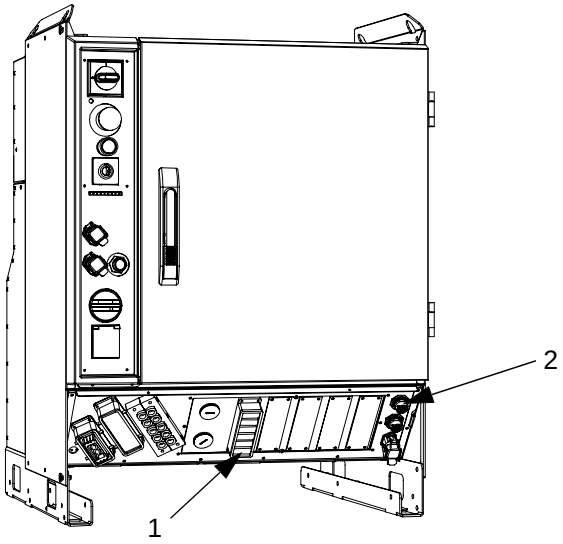


Figure 14: Positioner 1 connection

Item	Description
1.	Positioner 1
2.	Serial measurement board for positioner 1

Positioner 2

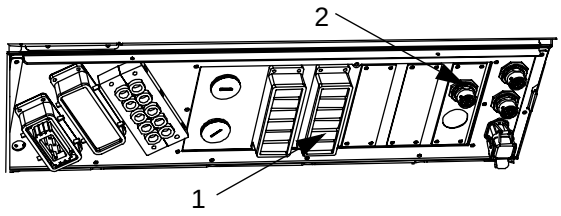


Figure 15: Positioner 2 connection

Item	Description
1.	Positioner 2
2.	Serial measurement board for positioner 2

3.2.3 Connections

Travel track RTT

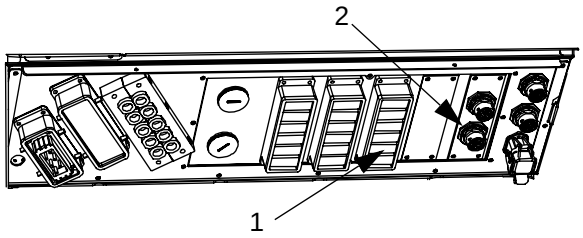


Figure 16: Travel track connection

Item	Description
1.	Travel track RTT
2.	Serial measurement board for travel track RTT

Process/safety connection

Note!
Process control equipment is described in the manual: Welding Equipment.

Note!
Safety control equipment is described in the manual: Safety Equipment.

The locations of cable bushings for process and safety equipment are shown below. The cables are connected to terminals or units inside the control cabinet.

SCC

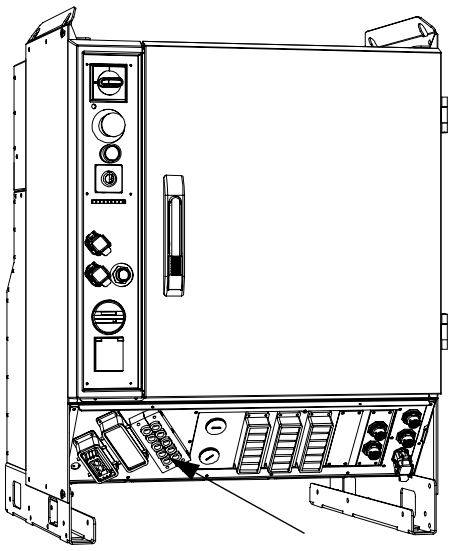


Figure 17: Bushings for process and safety, SCC

DCC

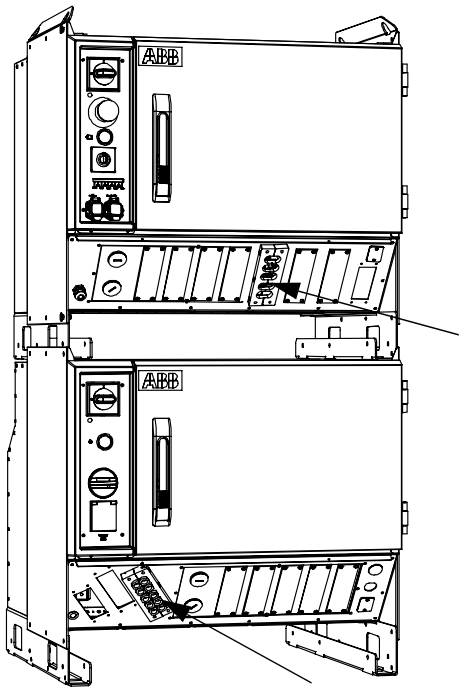


Figure 18: Bushings for process and safety, DCC

3.2.3 Connections

4: Robot with welding equipment

Arc-welding

In an arc-welding robot system, a IRB1400, IRB1600 or IRB2400 robot is normally used. In certain systems, other types can be included, such as welding, handling or machining robots.

In an arc-welding system, the robot is equipped with welding equipment consisting of the following units.

Example

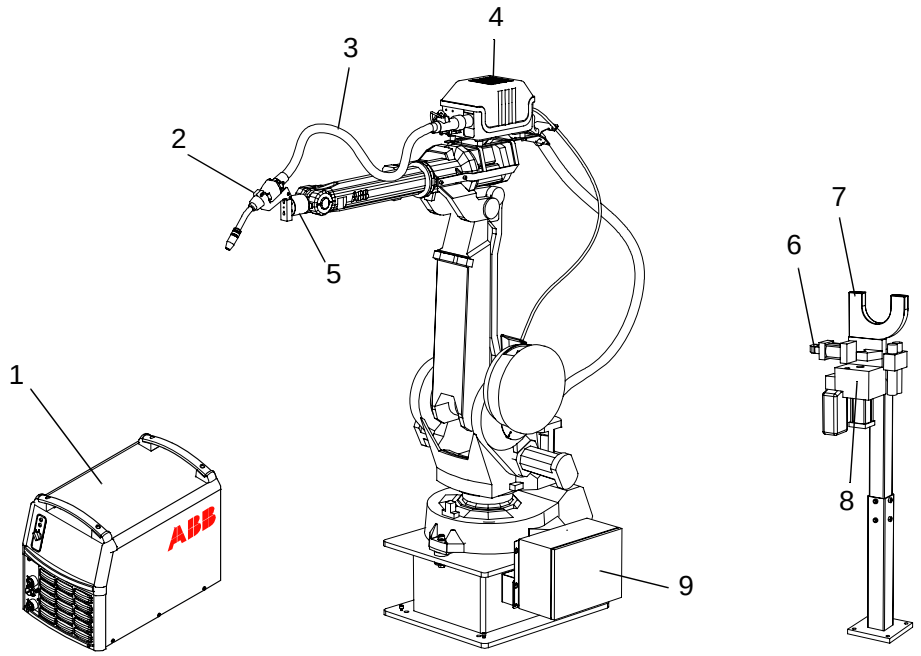
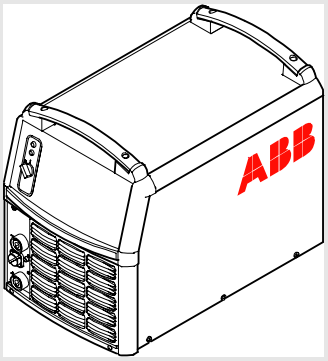
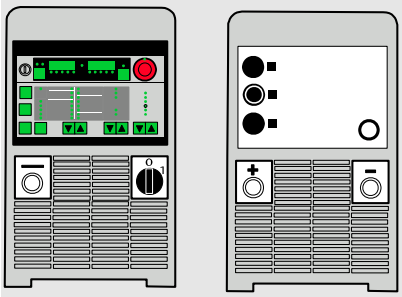


Figure 19: IRB 2400 with installed welding equipment

Item	Description
1.	Welding power source
2.	Welding torch
3.	Hose bundle
4.	Wire feeder equipment
5.	Insulator/Collision sensor (option)
6.	Wire cutter
7.	TCP calibration unit
8.	Torch cleaner
9.	Process control equipment

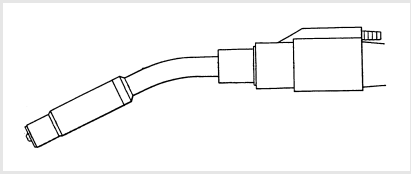
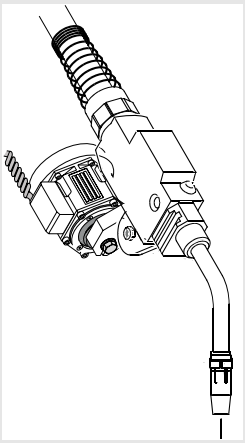
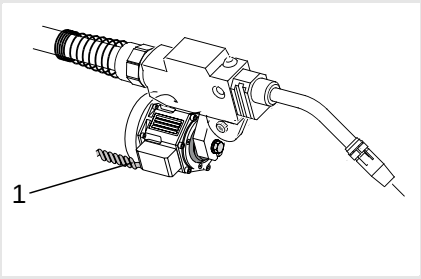
4.1: Welding power source

The following power source standard alternatives are available:

Description	Illustration
RPB 320/420/520	
MigRob 500	
TPS 4000/5000 Fronius	
Other power sources may be connected to the system, for example, LAF 635.	

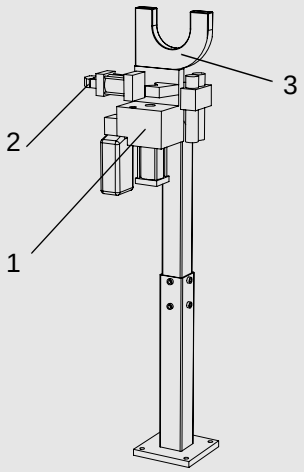
4.2: Welding torches

The following welding torch standard alternatives are available:

Description	Illustration
PKI 250/500/630/300 S PKI 250/500/630/300 D	
PSF 315/500M PSF 315/500ME	
WH Binzel	
1. Collision (option)	

4.3: Torch service units

The following torch service unit standard alternatives are available:

Description	Illustration
TSC Torch Service Center based on TC96/ TSC Torch Service Center based on BRS-LC consisting of: 1. Torch cleaner 2. Wire cutter 3. TCP calibration unit • Component parts can be bought as individual components	

4.4: Sensors

The following sensor standard alternatives are available:

Description
Seam locator • SmarTac • Touch sense (for Fronius welding equipment only)
Seam tracker • AWC

5: IRBP positioner

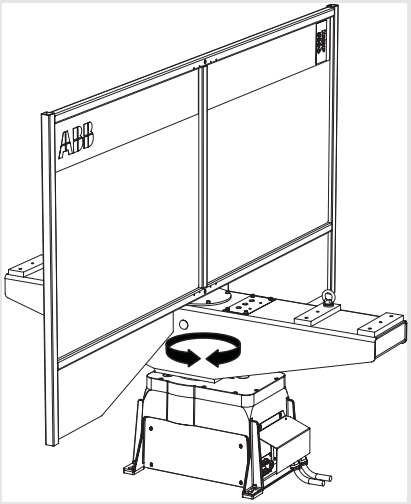
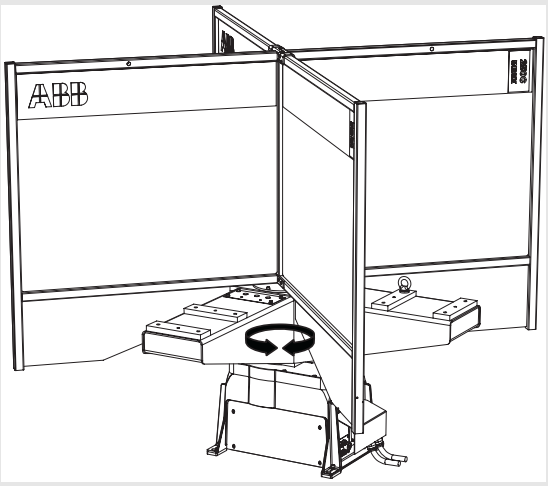
5.1: Positioner

Description

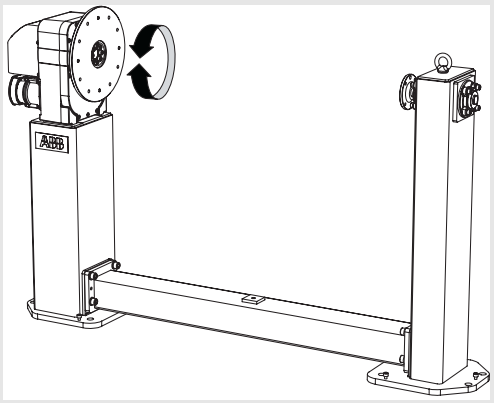
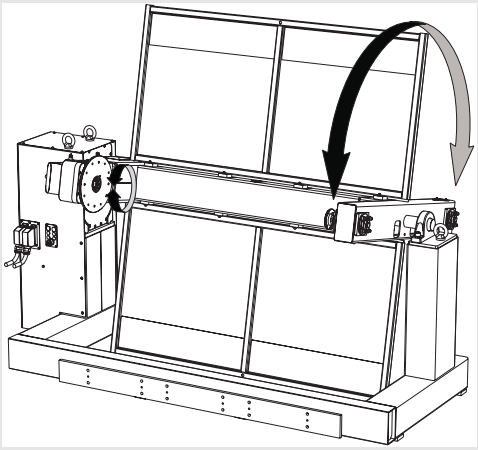
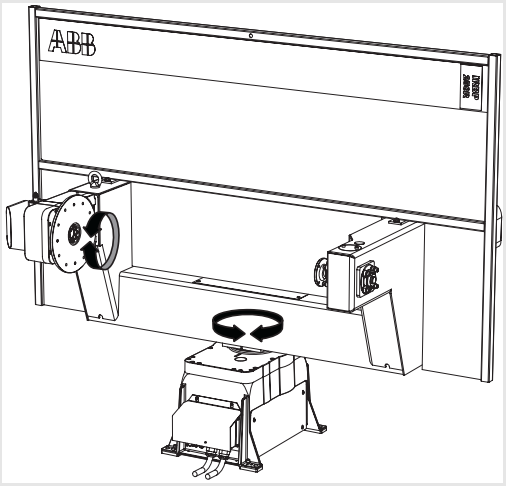
A positioner is used to position work pieces optimally for welding joints and robots. The IRBP positioner is equipped with maintenance-free AC motors with electro-magnetic brakes.

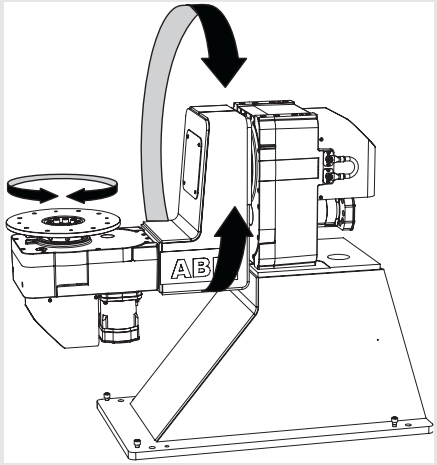
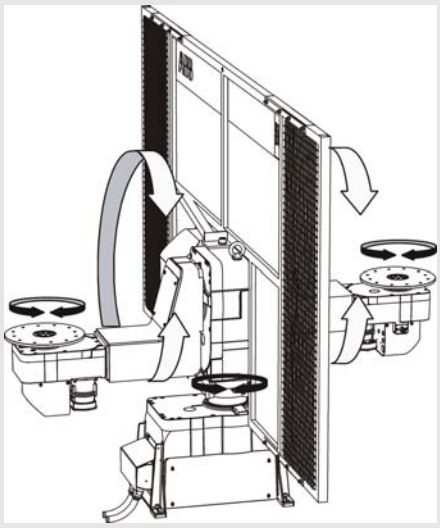
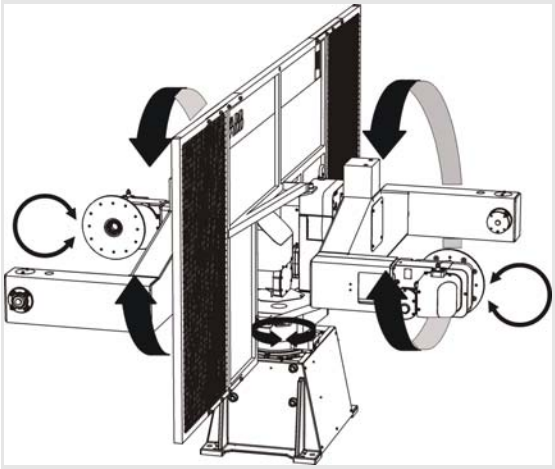
- The number in the positioner name indicates its maximum handling capacity.
- The letter in the positioner name indicates the positioner type.

The following positioner type standard alternatives are available:

Description	Illustration
IRBP 500/1000C	
IRBP 250/500C Index	

5.1: Positioner

Description	Illustration
IRBP 250/500/750/2000/5000L	
IRBP 250/500/750K	
IRBP 250/500/750R	

Description	Illustration
IRBP 250/500/750A	
IRBP 250/500/750B	
IRBP 250/500D	

5.1: Positioner

6: Travel track for robot

6.1: Travel track

Description

A travel track is used to position a robot at different work stations or within a large working area.

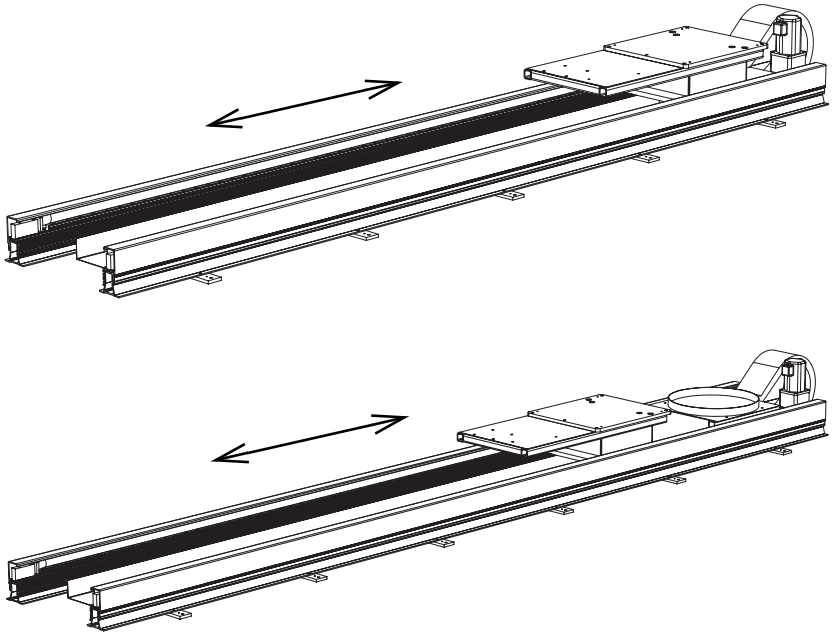


Figure 20: Travel track

Item	Description
1.	Travel track, Bobin 3.7m
2.	Travel track, Marathon 3.7m

Travel length	
1.7m	7.7m
2.7m	8.7m
3.7m	9.7m
4.7m	10.7m
5.7m	11.7m
6.7m	12.7m

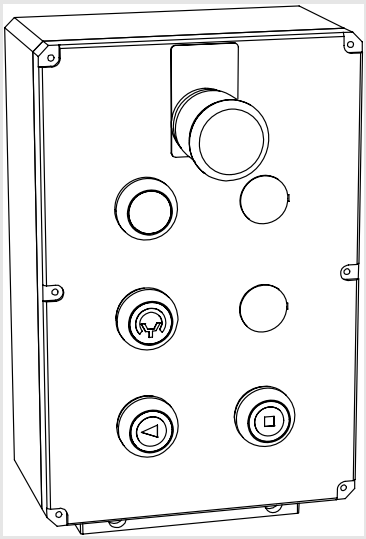
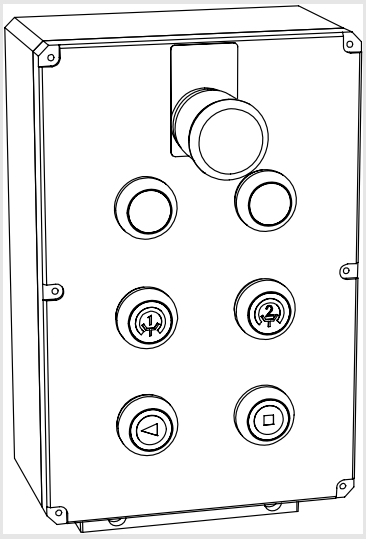
6 Travel track for robot

6.1: Travel track

7: Operator panel

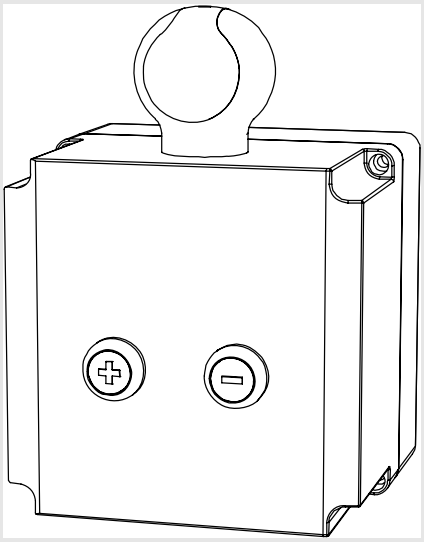
7.1: Operator communication

There is an operator panel with a number of button functions to enable the operator to communicate with the arc-welding robot system. The following operator panel standard alternatives are available:

Description	Illustration
Operator panel for one working area	
Operator panel for two working areas	

7.2: Manual job control panel

So that the operator is able to manually control the positioner, there is a control panel with two button functions (+/-) and a holding unit. The control panel is used to obtain an ergonomically correct position for loading/unloading the positioner.

Description	Illustration
Manual jog for positioner: K/R/L.	

8: Safety equipment

For personnel to work safely with an arc-welding robot system, the system must be equipped with a number of safety components, which are integrated into the control cabinet's safety system.

8.1: Safety functions

Safety functions
Working area supervision with light barriers
Pre-reset unit for light barriers
Working area indication for: • Robot or travel track • Positioner
Gate supervision
Reset unit for gate supervision

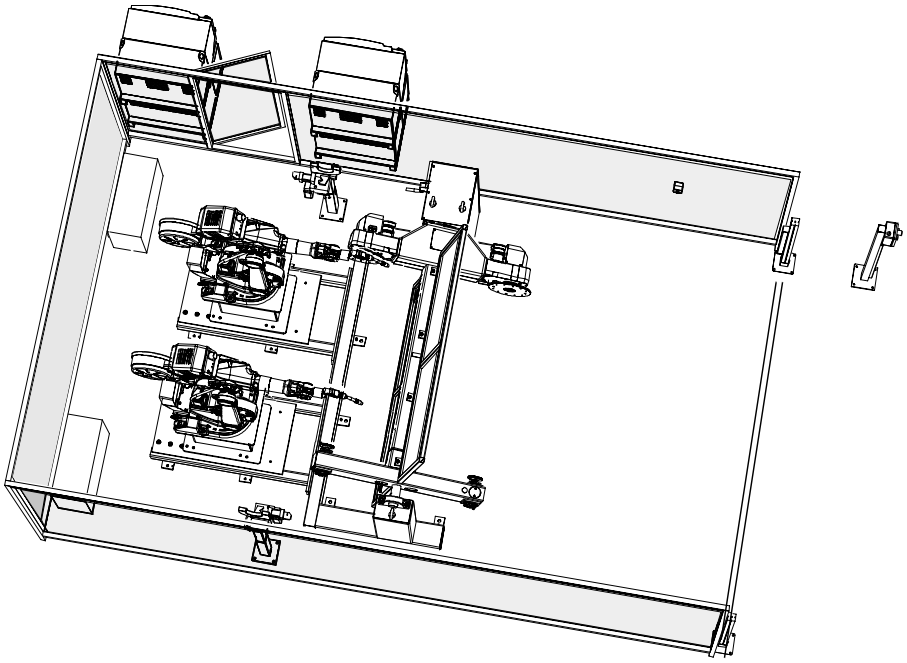


Figure 21: Welding robot station with safety equipment

8 Safety equipment

8.1: Safety functions

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