ABB Robotics

System description
Arc Welding system, IRC5

Power and productivity
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System description
Welding robot products

IRC5

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1: General

This document describes ABB's standard assortment of arc-welding robot systems.

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:

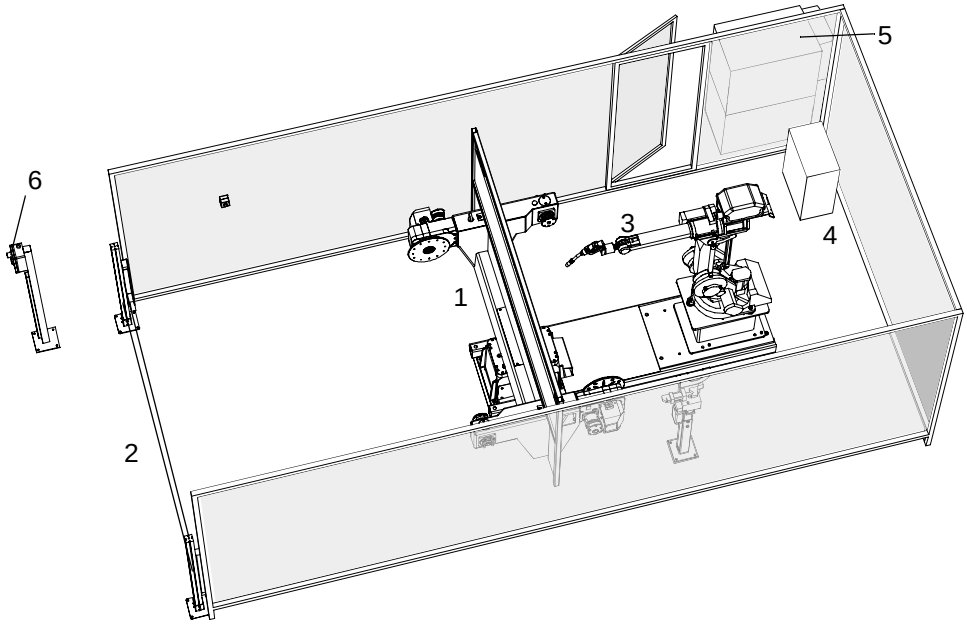


Figure 1: Complete welding robot station with one robot

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 17: on page 27)
	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:

- IRB 1600/1600ID/2400 in AW configuration.

3.1: Robot control system

General

Control system IRC5 is available in two configurations: Single Cabinet Controller and Dual Cabinet Controller.

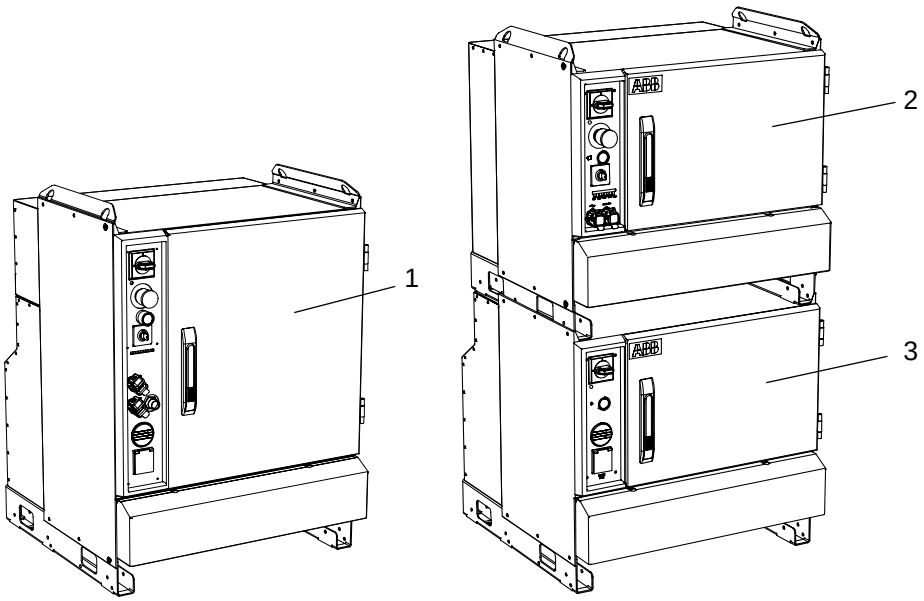


Figure 2: Single Cabinet Controller and Dual Cabinet Controller

Item	Description
1.	Single Cabinet Controller
2.	Dual Cabinet Controller, Control Module
3.	Dual Cabinet Controller, Drive Module

Note!

There is a Drive Module for each additional robot that is connected to the system (for one robot, only Single Cabinet Controller or Dual Cabinet Controller).

Process Module

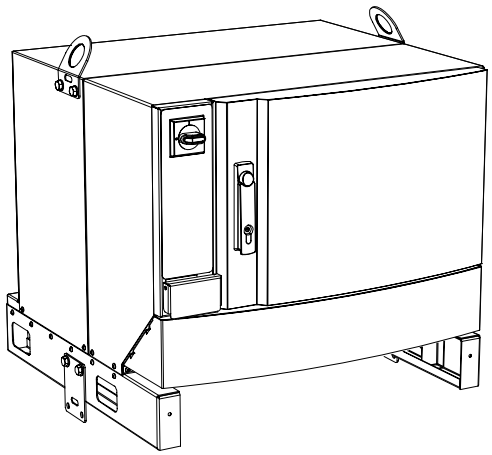


Figure 3: Process Module

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 - IRC5 Robot Controller.

Control systems for peripheral equipment are described in the Product manual - Positioner Control Equipment, Product manual - Process Interface and Product manual - 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.

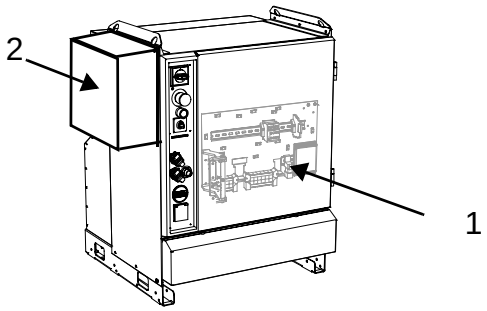


Figure 4: Control system for peripheral equipment

Pos.	Description
1.	Positioner and process control equipment
2.	Safety control equipment

3.2.1 Location

Positioner control equipment

Positioner control equipment is located in Single Cabinet Controller or Dual Cabinet Controller.

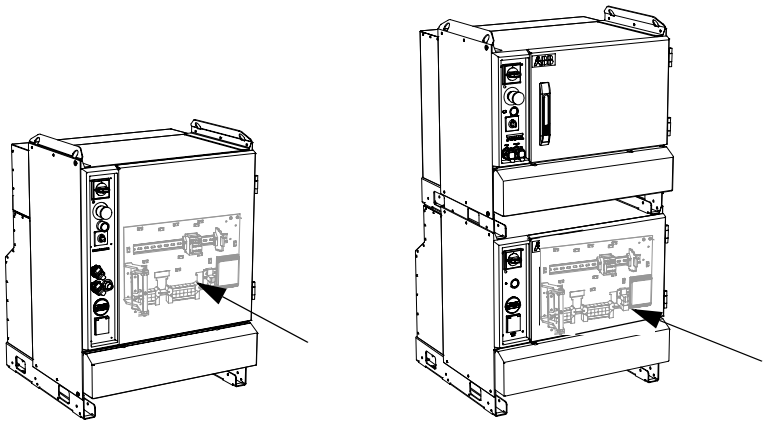


Figure 5: Location of positioner control equipment

Process control equipment

Process control equipment is located inside of the welding power source.

See ESAB weldíng power source manual.

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.

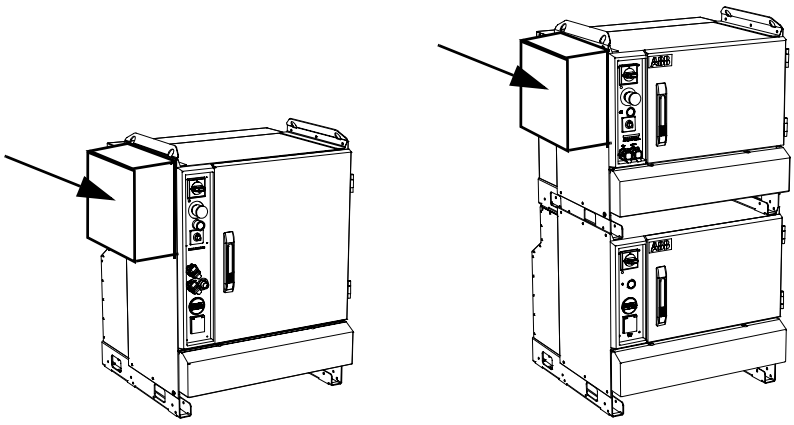


Figure 6: Placement of safety control equipment on Single Cabinet Controller and Dual Cabinet Controller

3.2.2 Block diagram

Positioner block diagram

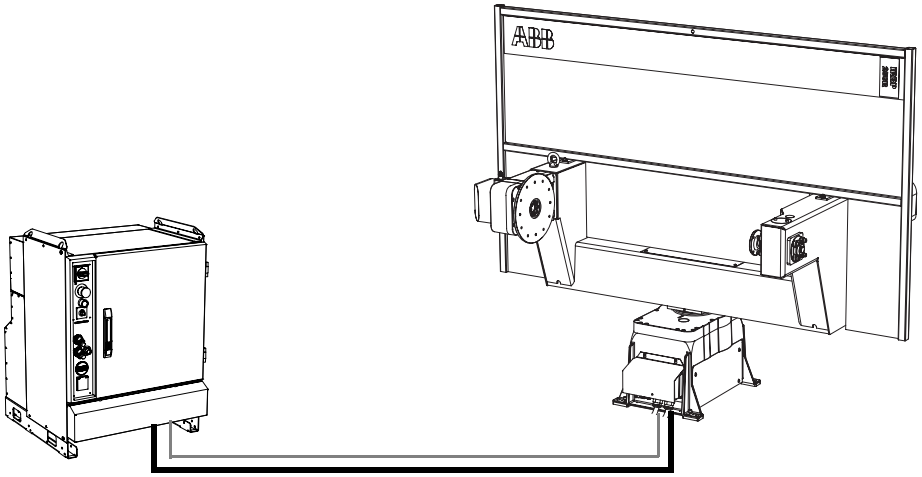


Figure 7: Positioner block diagram

Process block diagram

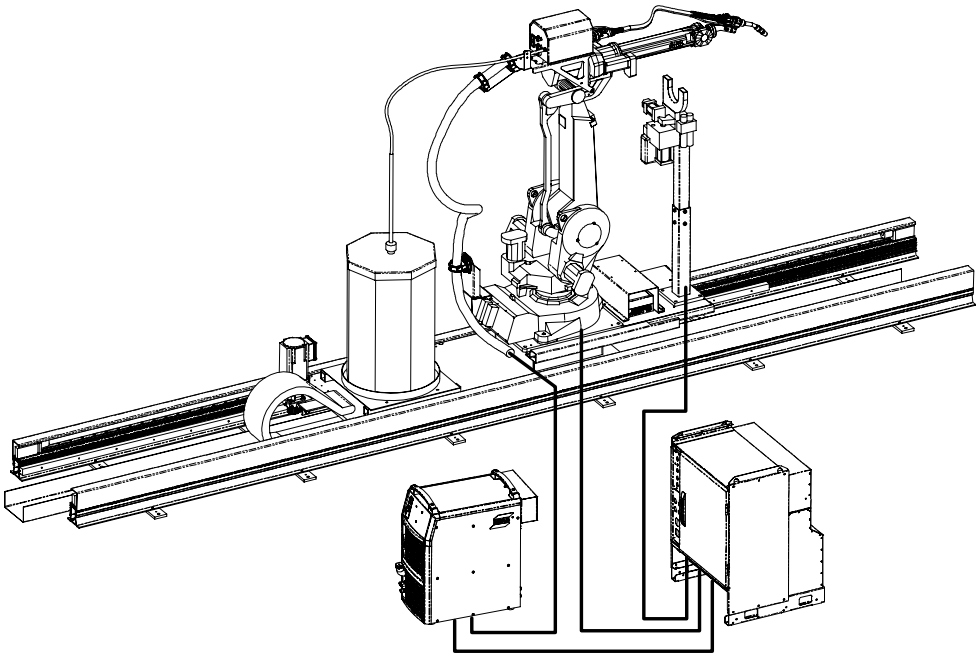


Figure 8: Process block diagram

Operator panel and manual jog block diagram

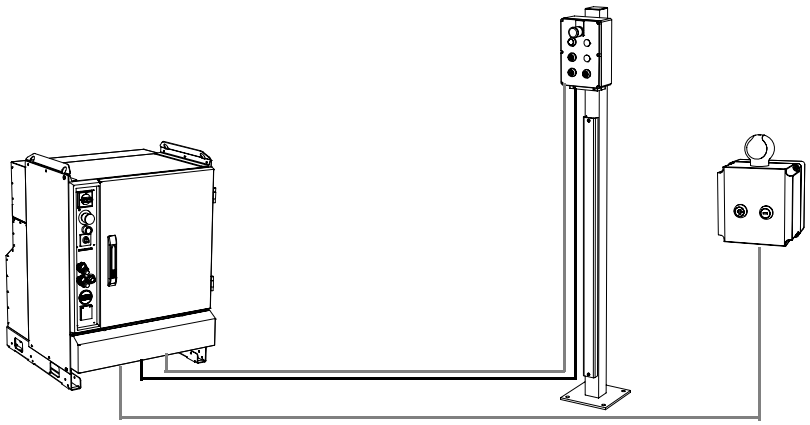


Figure 9: Operator panel and manual jog block diagram

Safety block diagram

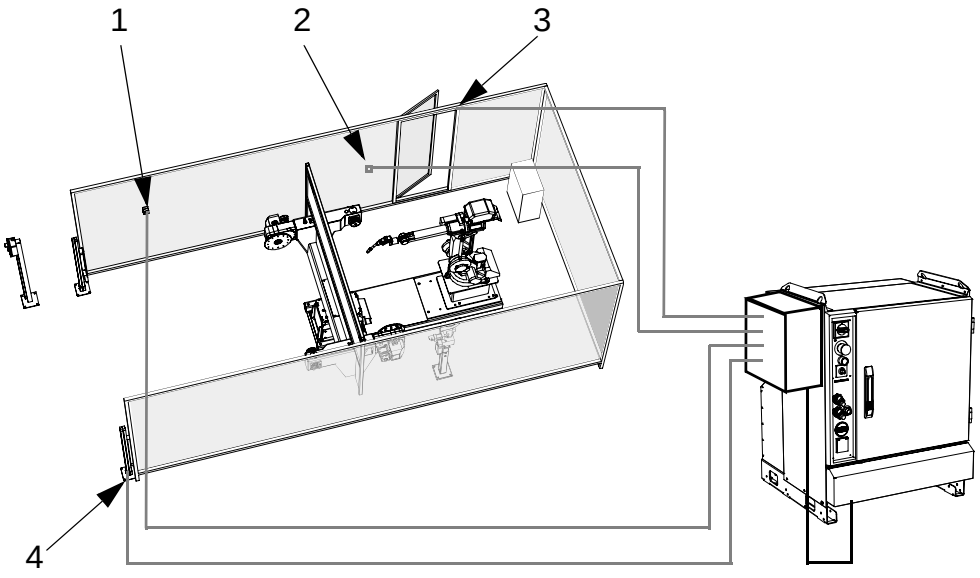


Figure 10: Safety block diagram

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 Single Cabinet Controller or the Drive Module to Dual Cabinet Controller are shown below:

Positioner 1

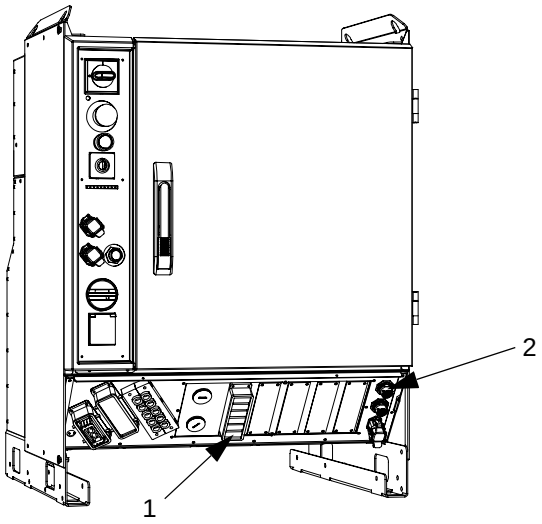


Figure 11: Positioner 1 connection

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

Positioner 2

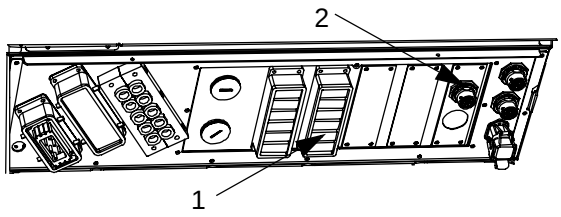


Figure 12: Positioner 2 connection

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

3.2.3 Connections

Travel track RTT

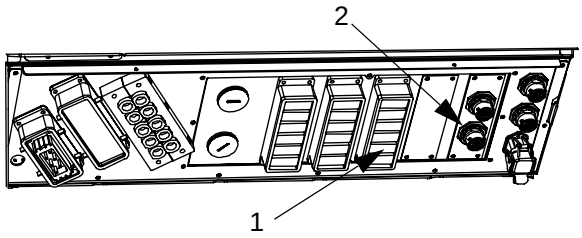


Figure 13: Travel track connection

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 Product manual - Process Interface.

Note!
Safety control equipment is described in the Product 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.

Single Cabinet Controller

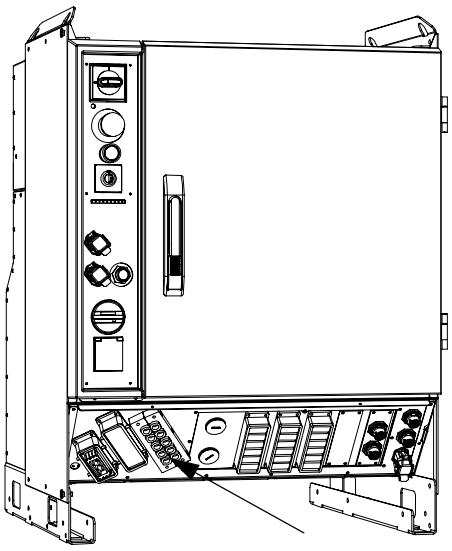


Figure 14: Bushings for process and safety, Single Cabinet Controller

Dual Cabinet Controller

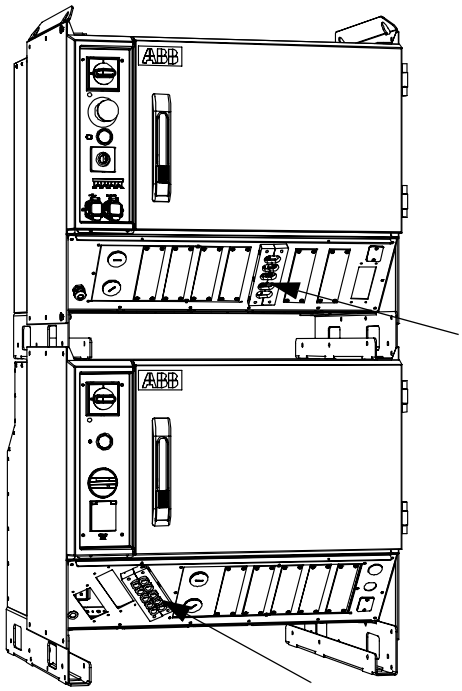


Figure 15: Bushings for process and safety, Dual Cabinet Controller

3.2.3 Connections

4: Robot with welding equipment

Arc-welding

In an arc-welding robot system, a IRB 1600 or IRB 2400L 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

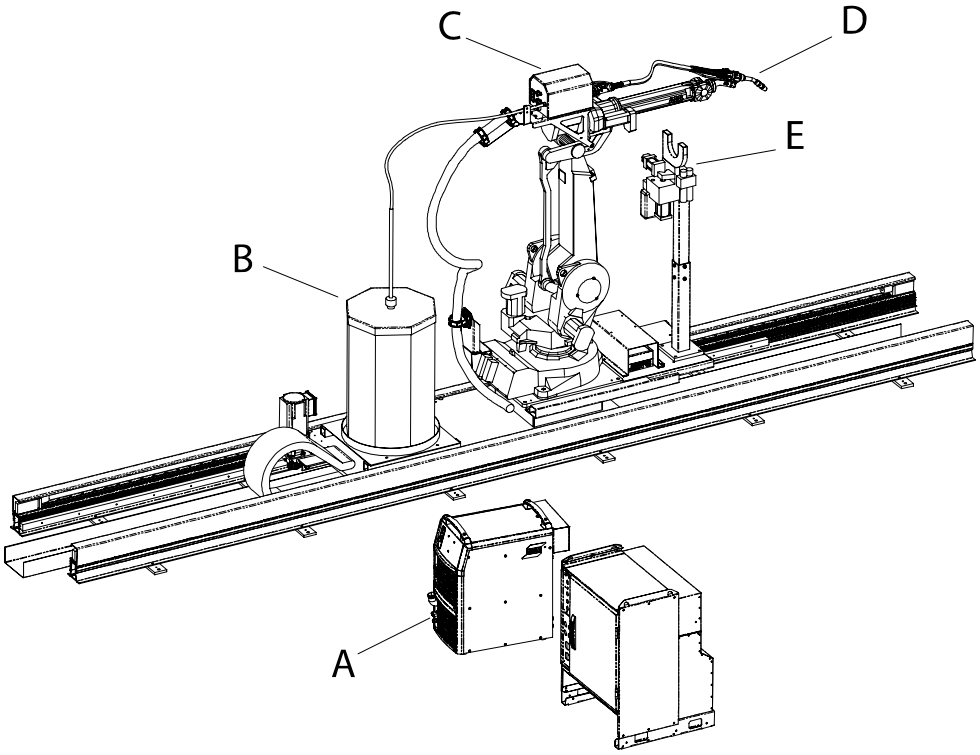
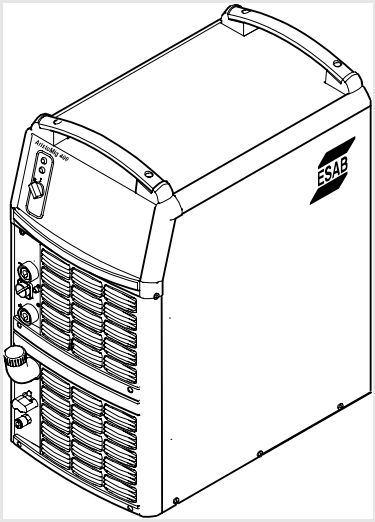


Figure 16: IRB 2400 with welding equipment

Item	Description
A	Welding Power source AristoMig
B	Wire MarathonPac
C	Wire feed unit Aristo RoboFeed
D	Torch Binzel
E	TSC Torch service center

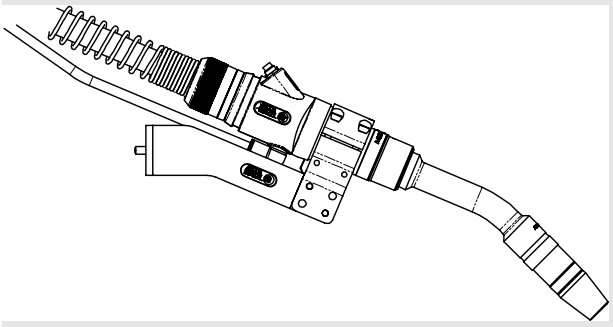
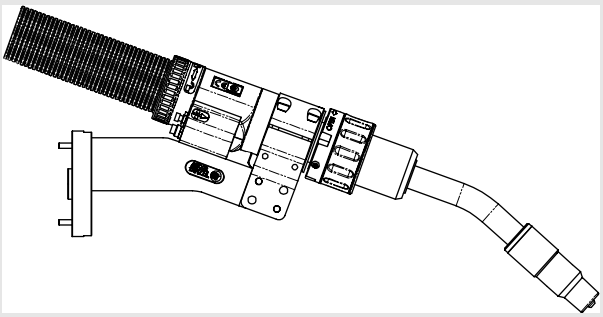
4.1: Welding power source

The following power source standard alternatives are available:

Description	Illustration
ESAB AristoMig 4000i ESAB AristoMig 4000iw ESAB AristoMig 5000i ESAB AristoMig 5000iw	

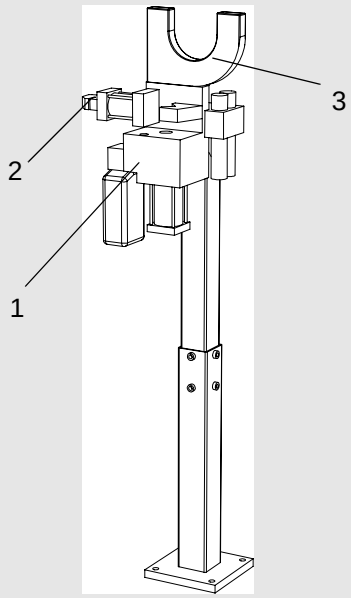
4.2: Welding torches

The following welding torch standard alternatives are available:

Description	Illustration
IRB 1600ID: Binzel ISTM ABIROB A500 22° IRB 1600/2400: Binzel ABIROB A500 22°	
IRB 1600ID: Binzel ISTM ABIROB W500 22° IRB 1600/2400: Binzel ABIROB W500 22°	

4.3: Torch service units

The following torch service unit standard alternatives are available:

Description	Illustration
TSC Torch Service Center based on TC96/ 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
Seam tracker • AWC

5: IRBP positioner

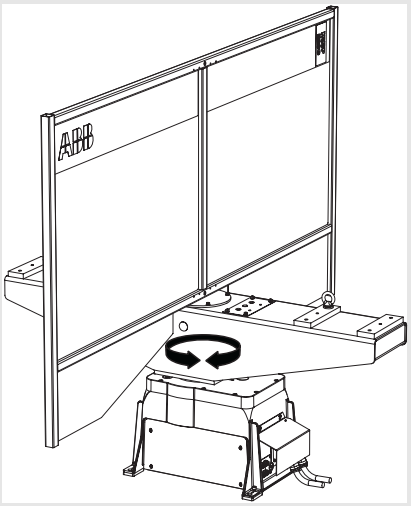
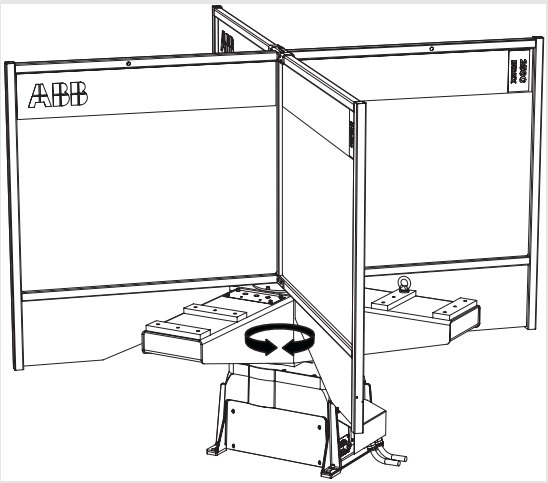
5.1: Positioner

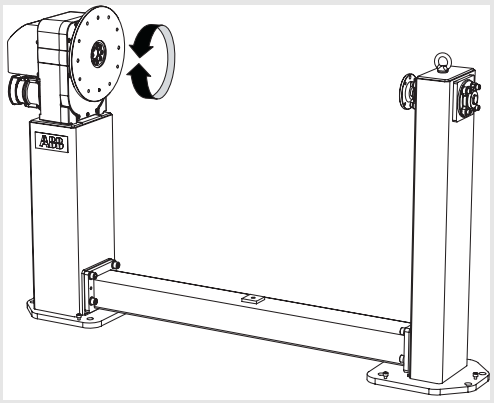
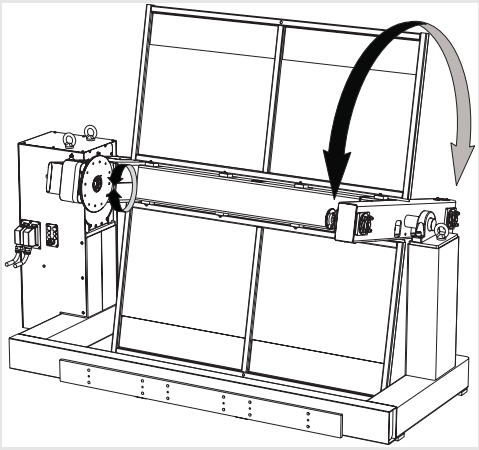
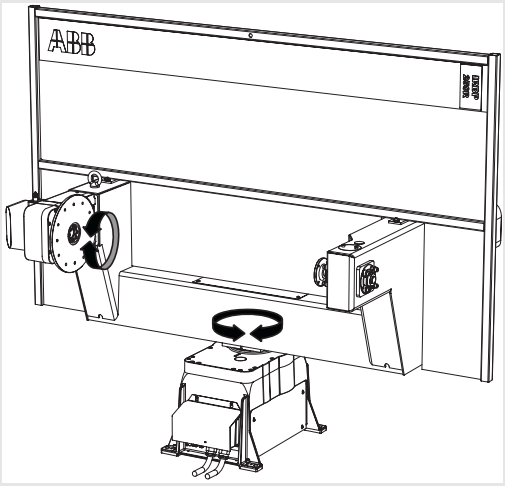
Description

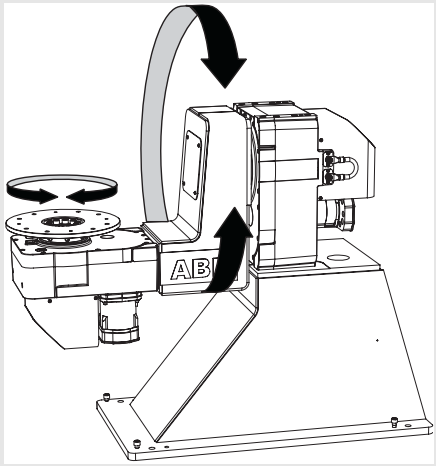
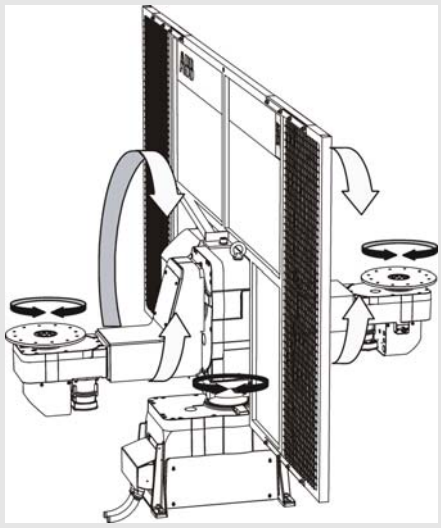
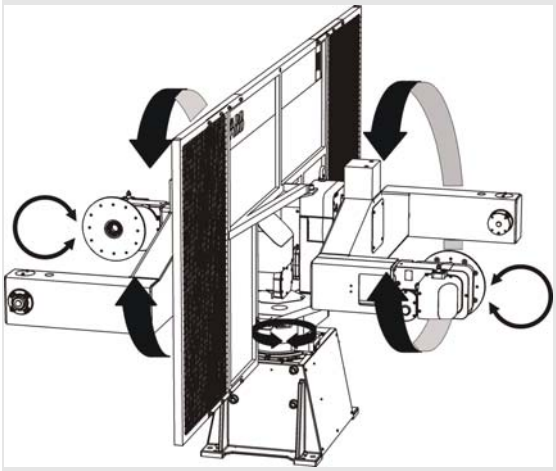
A positioner is used to position work pieces optimally for welding joints and robots. The IRBP positioner is equipped with maintenance-free AC motors with electro-magnetic brakes.

- 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	

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.

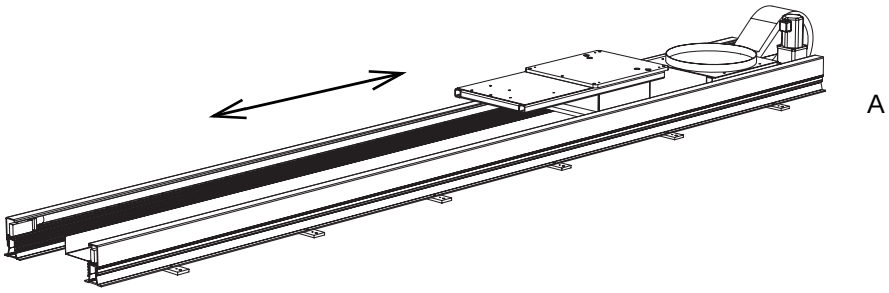


Figure 17: Travel track

Item	Description
A	Travel track, Marathon Pac or Bobin

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

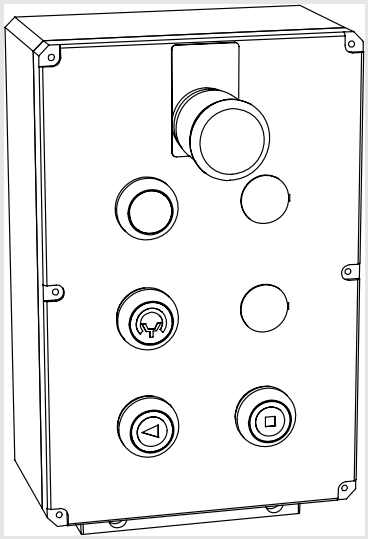
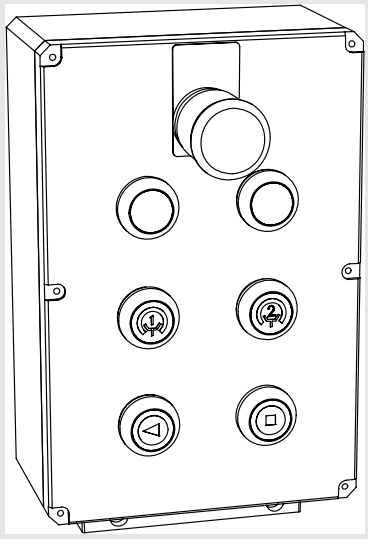
6 Travel track for robot

6.1: Travel track

7: Operator panel

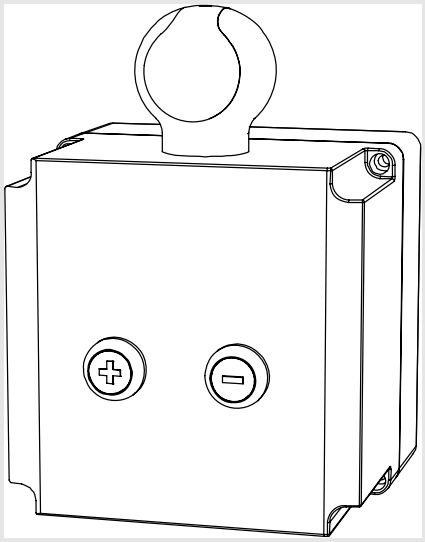
7.1: Operator communication

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

There is a control panel with two button functions (+/-) and a holding unit, so that the operator is able to manually control the positioner. 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

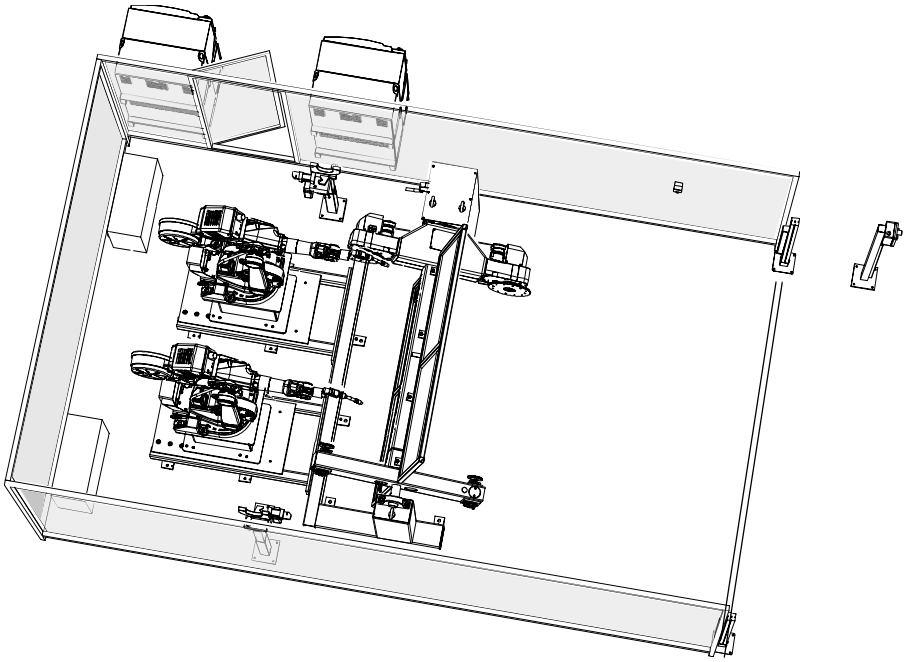


Figure 18: Welding robot station with safety equipment

8.1: Safety functions

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