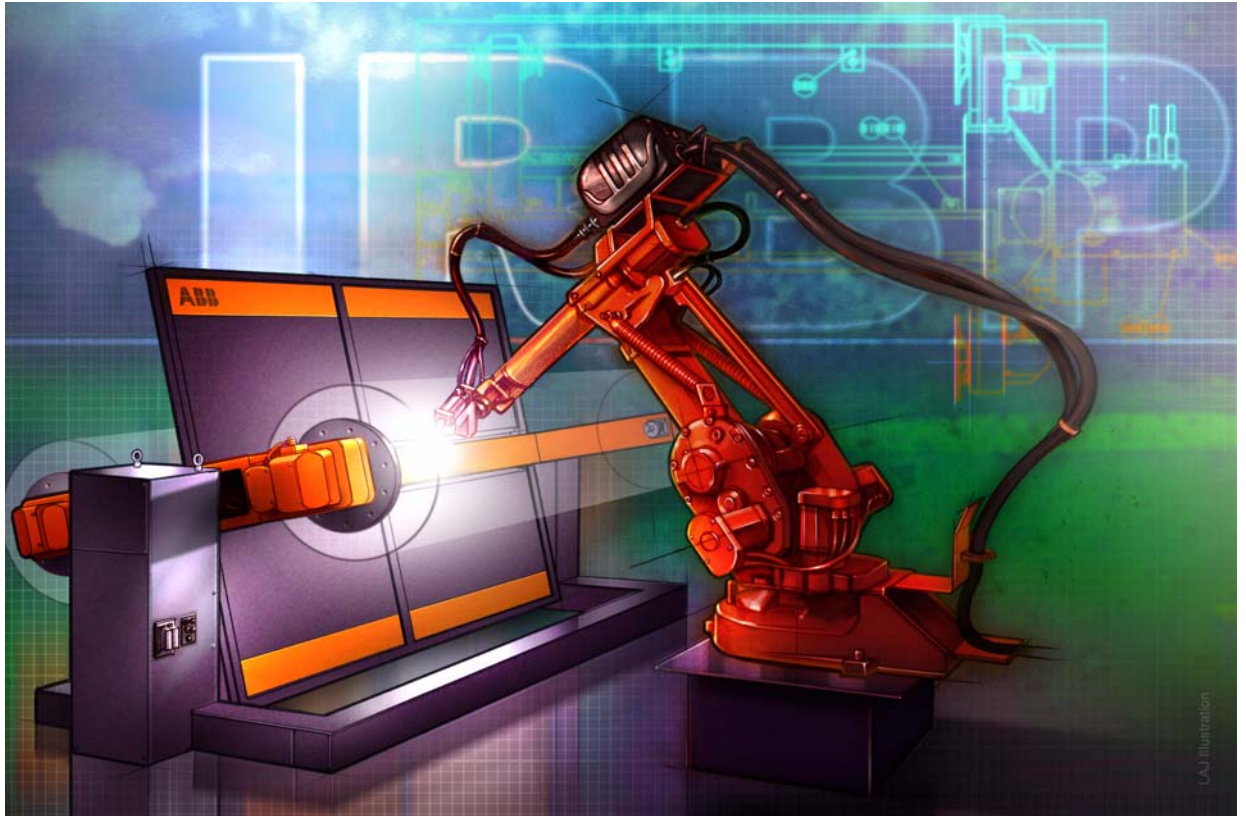




System description

Welding robot products

IRC5



System description

Welding robot products

IRC5

Document ID: 3HAC031146-001

Revision: -

The information in this manual is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this manual.

Except as may be expressly stated anywhere in this manual, nothing herein shall be construed as any kind of guarantee or warranty by ABB for losses, damages to persons or property, fitness for a specific purpose or the like.

In no event shall ABB be liable for incidental or consequential damages arising from use of this manual and products described herein.

This manual and parts thereof must not be reproduced or copied without ABB's written permission, and contents thereof must not be imparted to a third party nor be used for any unauthorized purpose. Contravention will be prosecuted.

Additional copies of this manual may be obtained from ABB at its then current charge.

© Copyright 2008 ABB All right reserved.

ABB AB
Robotics Products
SE-721 68 Västerås
Sweden

© Copyright 2008 ABB. All rights reserved.

1: General	5
2: Welding robot system	7
3: Control system adapted for peripheral equipment	9
3.1: Robot control system	9
3.2: Control system for peripheral equipment	11
3.2.1 Location	12
3.2.2 Block diagram	13
3.2.3 Connections	15
4: Robot with welding equipment	19
4.1: Welding power source	20
4.2: Welding torches	21
4.3: Torch service units	22
4.4: Sensors	22
5: IRBP positioner	23
5.1: Positioner	23
6: Travel track for robot	27
6.1: Travel track	27
7: Operator panel	29
7.1: Operator communication	29
7.2: Manual job control panel	30
8: Safety equipment	31
8.1: Safety functions	31

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:

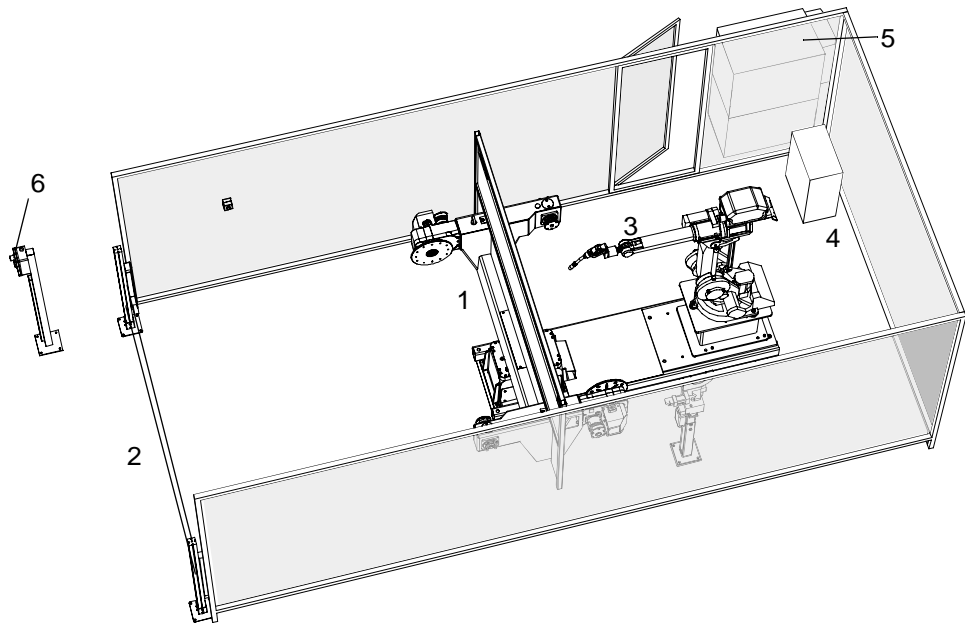


Figure 1: Complete welding robot station with one robot

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 1600/2400L in AW configuration.

3.1: Robot control system

General

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

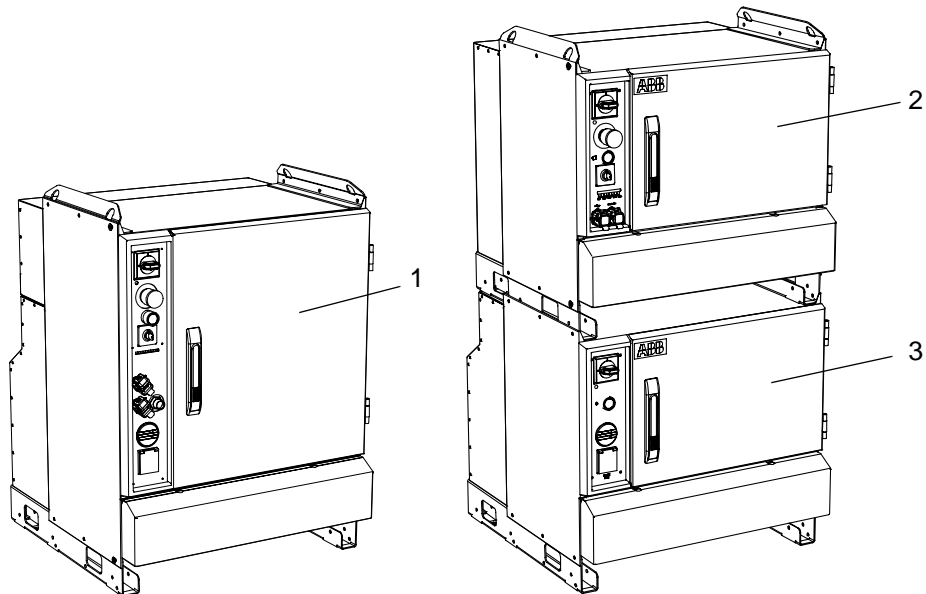


Figure 2: Single Cabinet Controller and Dual Cabinet Controller

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).

3 Control system adapted for peripheral equipment

3.1: Robot control system

Process Module

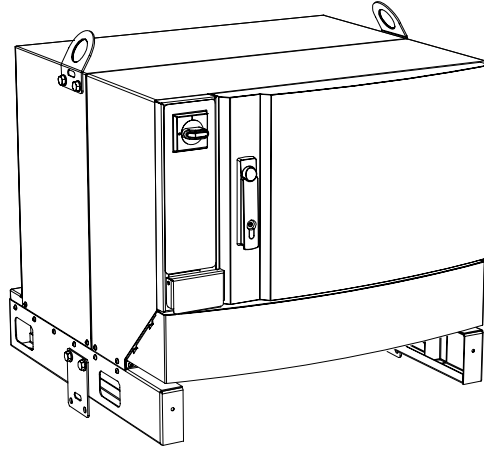


Figure 3: Process Module

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.

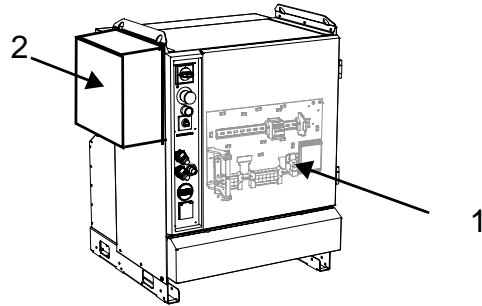


Figure 4: Control system for peripheral equipment

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

3 Control system adapted for peripheral equipment

3.2.1 Location

3.2.1 Location

Positioner control equipment

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

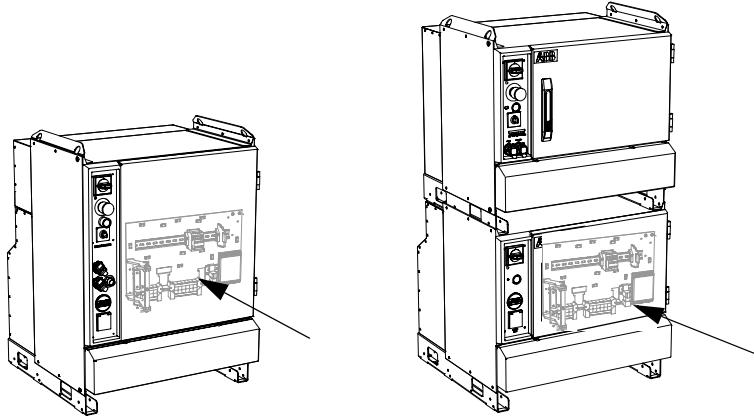


Figure 5: Location of positioner control equipment

Process control equipment

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

See ESAB welding 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.

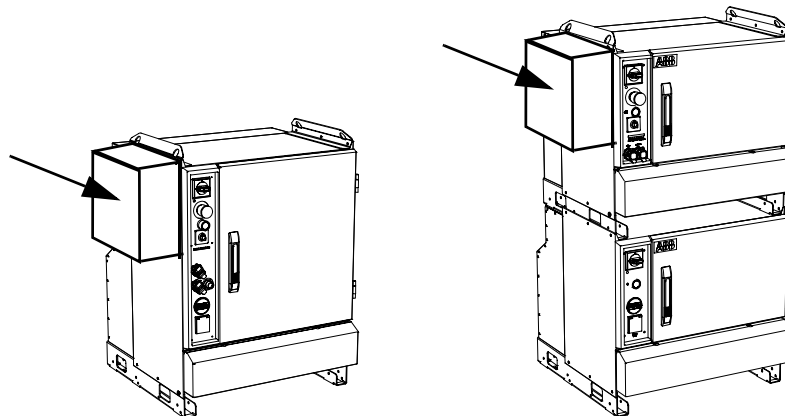


Figure 6: Placement of safety control equipment on Single Cabinet Controller and Dual Cabinet Controller

3.2.2 Block diagram

Positioner block diagram

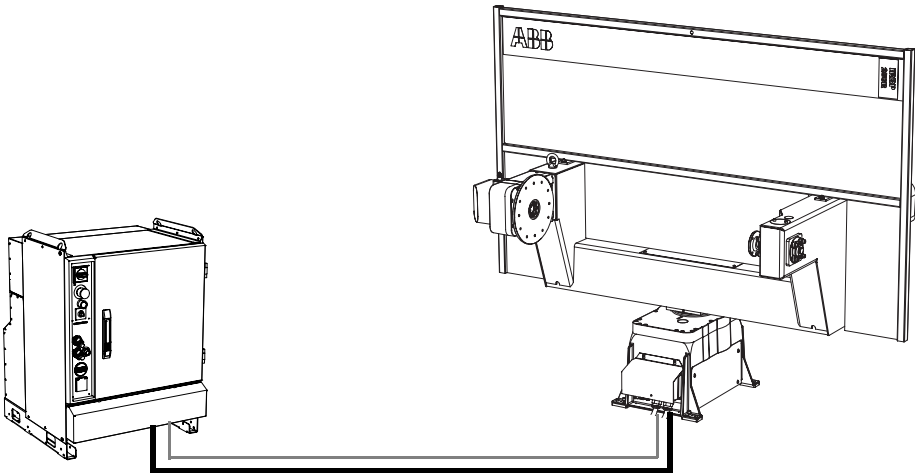


Figure 7: Positioner block diagram

Process block diagram

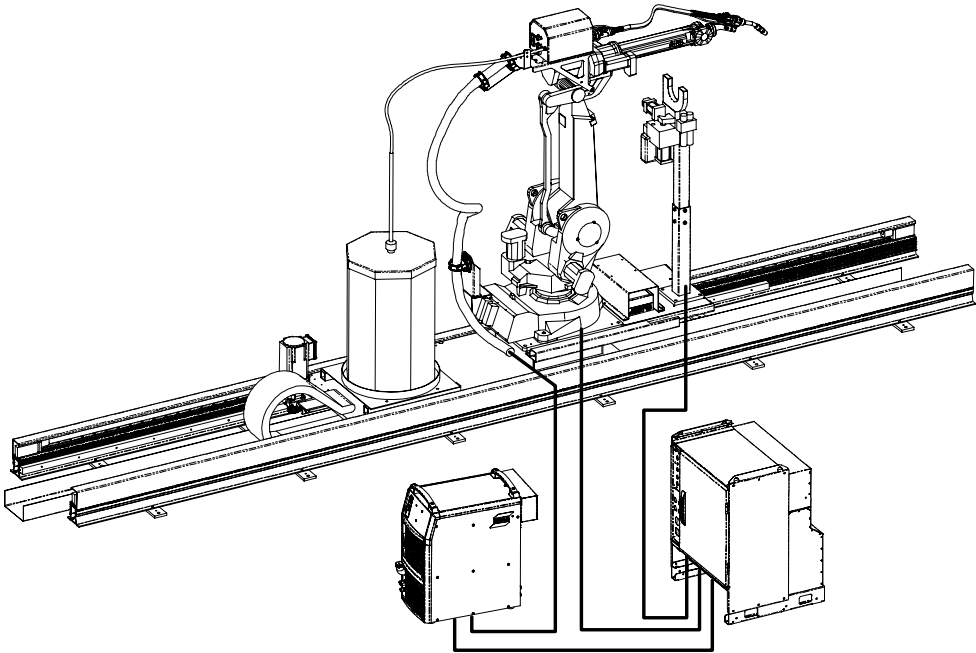


Figure 8: Process block diagram

© Copyright 2008 ABB. All rights reserved.

3 Control system adapted for peripheral equipment

3.2.2 Block diagram

Operator panel and manual jog block diagram

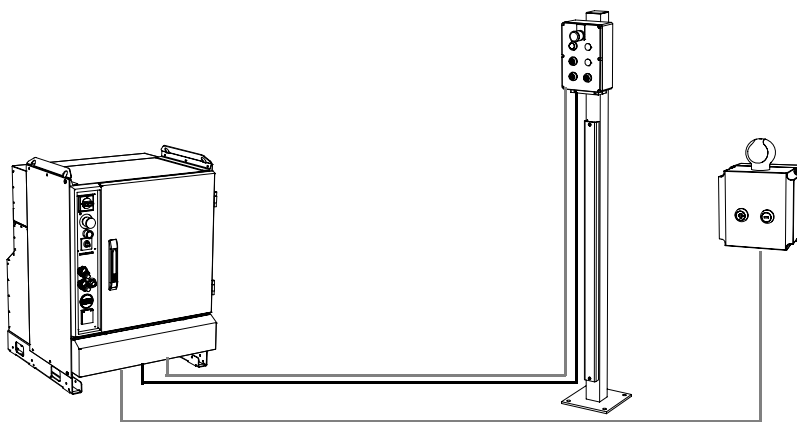


Figure 9: Operator panel and manual jog block diagram

Safety block diagram

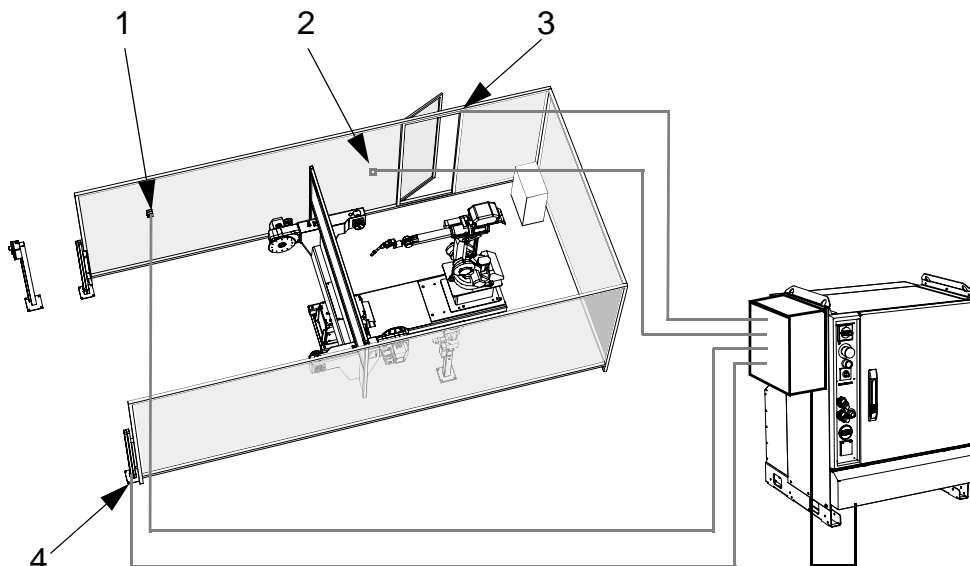


Figure 10: Safety block diagram

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

© Copyright 2008 ABB. All rights reserved.

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

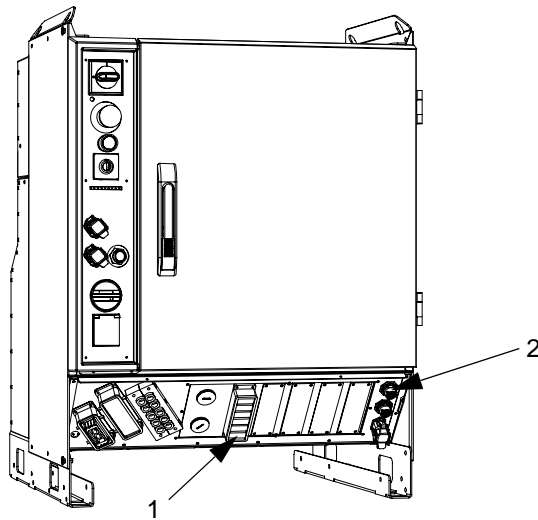


Figure 11: Positioner 1 connection

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

Positioner 2

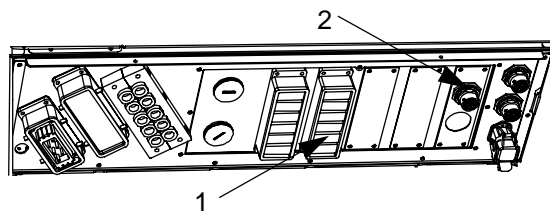


Figure 12: Positioner 2 connection

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

3 Control system adapted for peripheral equipment

3.2.3 Connections

Travel track RTT

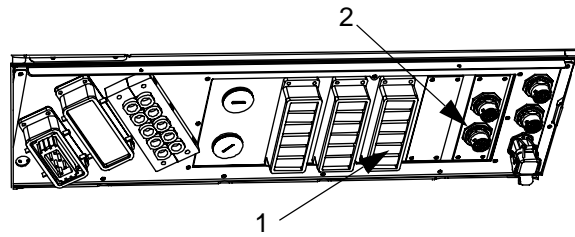


Figure 13: Travel track connection

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

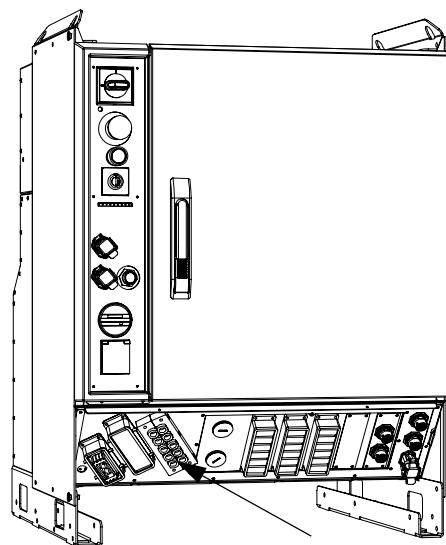


Figure 14: Bushings for process and safety, Single Cabinet Controller

Dual Cabinet Controller

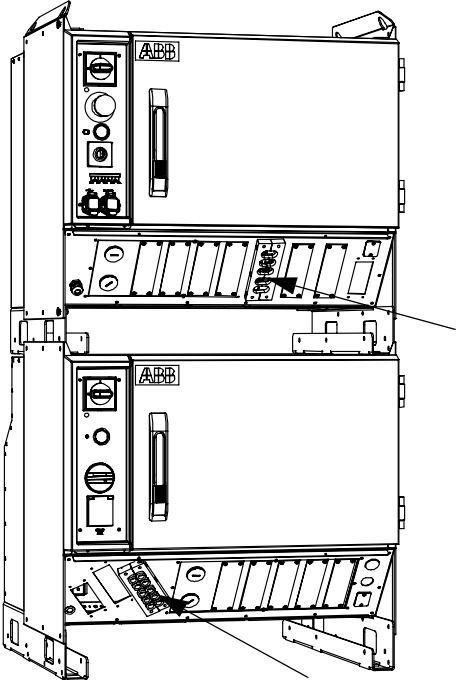


Figure 15: Bushings for process and safety, Dual Cabinet Controller

3 Control system adapted for peripheral equipment

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

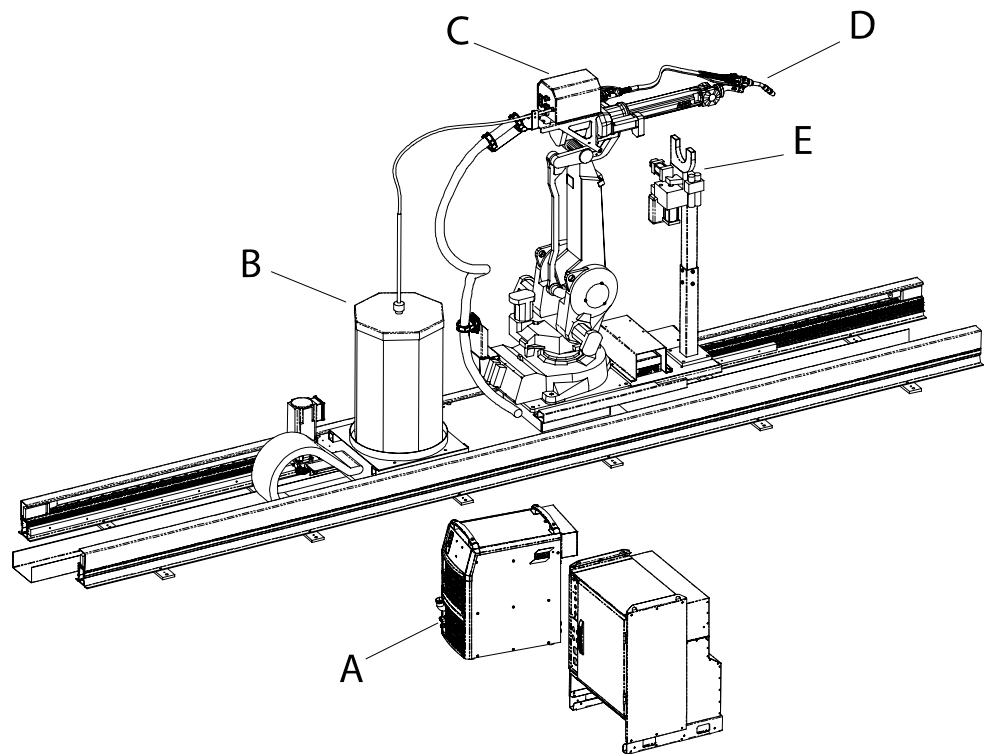


Figure 16: IRB 2400 with welding equipment

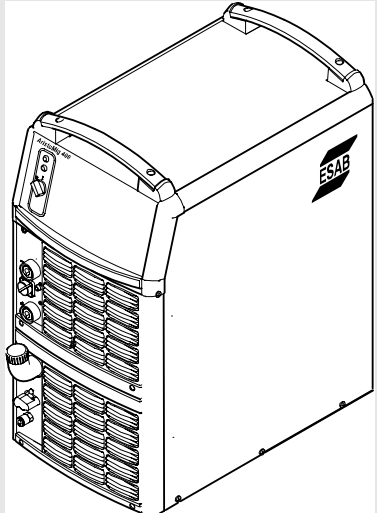
Item	Description
A	Welding Power source AristoMig
B	Wire MarathonPac
C	Wire feed unit Aristo RoboFeed
D	Torch Binzel
E	TSC Torch service center

4 Robot with welding equipment

4.1: Welding power source

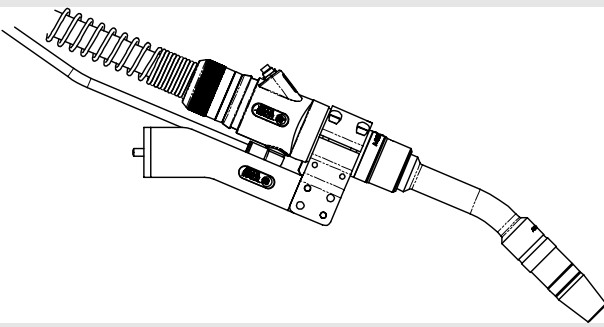
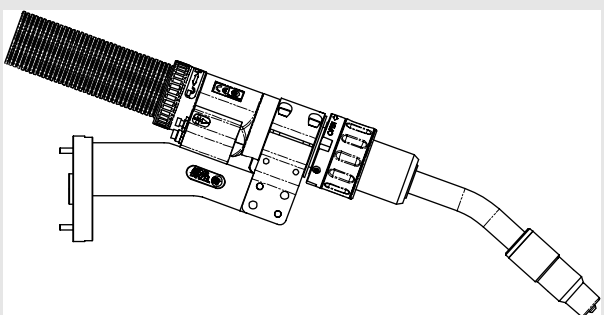
4.1: Welding power source

The following power source standard alternatives are available:

Description	Illustration
ESAB AristoMig 4000i ESAB AristoMig 4000iw ESAB AristoMig 5000i ESAB AristoMig 5000iw	 A technical line drawing of an ESAB AristoMig welding power source. The unit is rectangular with a carrying handle on top. The front panel features a control panel with a dial and several buttons, and a large cooling grille below. The ESAB logo is visible on the right side of the front panel.

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 Robot with welding equipment

4.3: Torch service units

4.3: Torch service units

The following torch service unit standard alternatives are available:

Description	Illustration
<p>TSC Torch Service Center based on TC96/ consisting of:</p> <ol style="list-style-type: none">1. Torch cleaner2. Wire cutter3. TCP calibration unit <ul style="list-style-type: none">• Component parts can be bought as individual components	

4.4: Sensors

The following sensor standard alternatives are available:

Description
Seam locator <ul style="list-style-type: none">• SmarTac
Seam tracker <ul style="list-style-type: none">• AWC

5: IRBP positioner

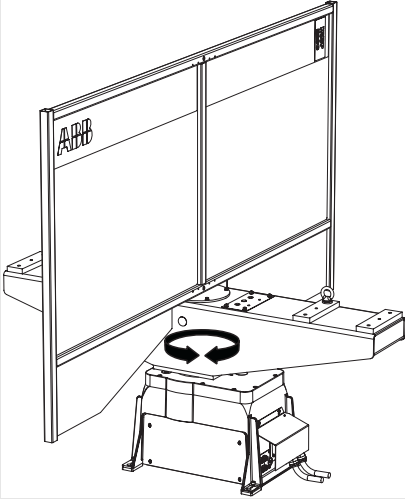
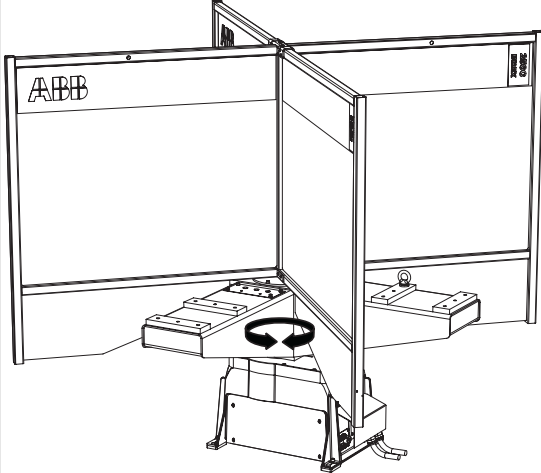
5.1: Positioner

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.

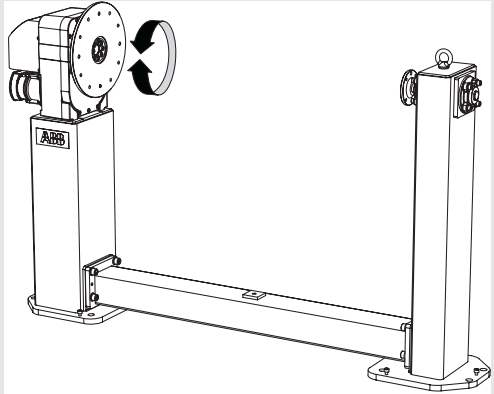
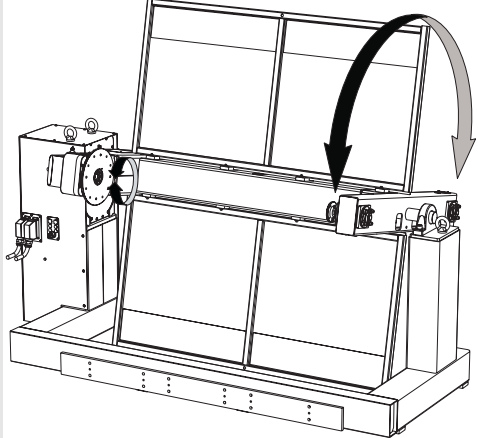
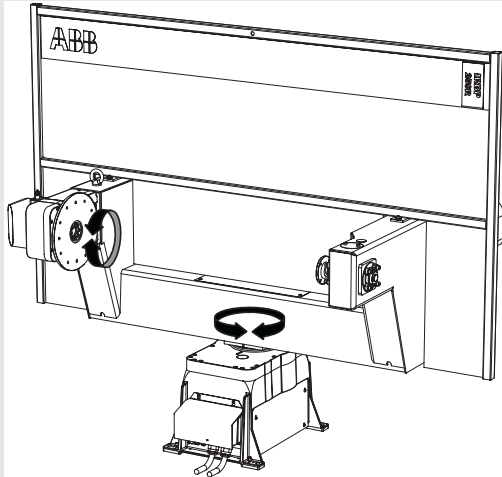
- The number in the positioner name indicates its maximum handling capacity.
- The letter in the positioner name indicates the positioner type.

The following positioner type standard alternatives are available:

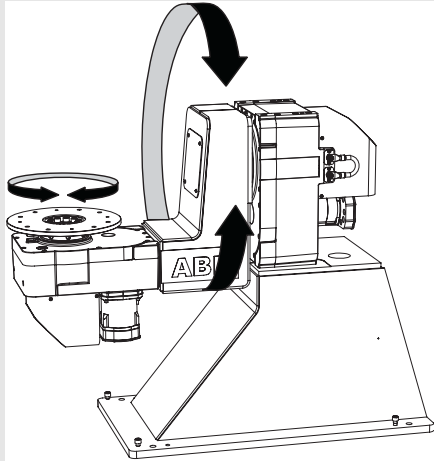
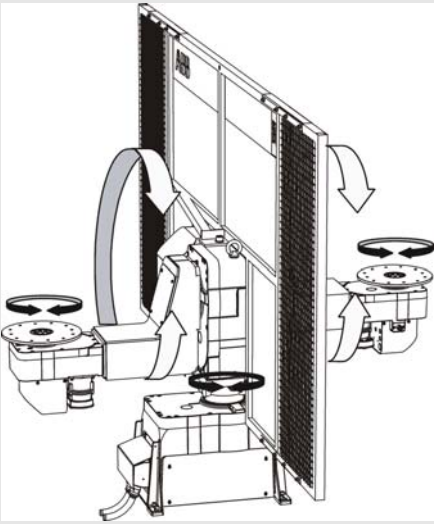
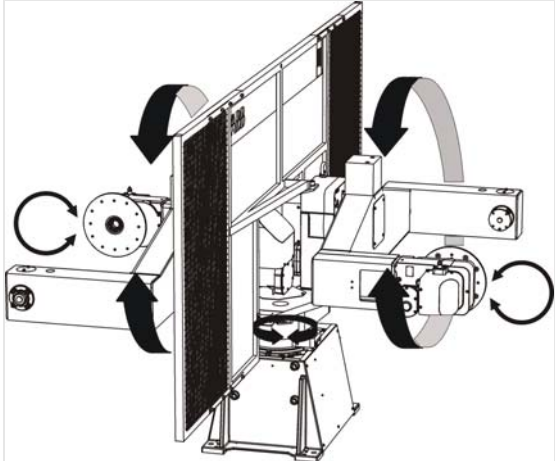
Description	Illustration
IRBP 500/1000C	
IRBP 250/500C Index	

5 IRBP positioner

5.1: Positioner

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

© Copyright 2008 ABB. All rights reserved.

Description	Illustration
IRBP 250/500/750A	 <p>The illustration shows a 3D perspective view of the IRBP 250/500/750A positioner. It features a base with a large Z-axis rotation arrow. A horizontal arm extends from the base, with a vertical column attached. The column has a horizontal rotation arrow (A-axis) and a vertical rotation arrow (B-axis). The ABB logo is visible on the side of the column.</p>
IRBP 250/500/750B	 <p>The illustration shows a 3D perspective view of the IRBP 250/500/750B positioner. It is similar to the 750A model but includes a vertical panel or screen on the right side. The rotation arrows for the Z-axis, A-axis, and B-axis are shown.</p>
IRBP 250/500D	 <p>The illustration shows a 3D perspective view of the IRBP 250/500D positioner. It features a vertical panel on the left side and a horizontal arm extending from the base. The rotation arrows for the Z-axis, A-axis, and B-axis are shown.</p>

5 IRBP positioner

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.

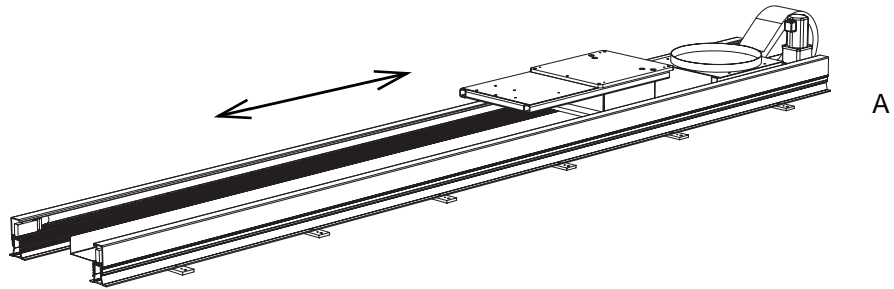


Figure 17: Travel track

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	

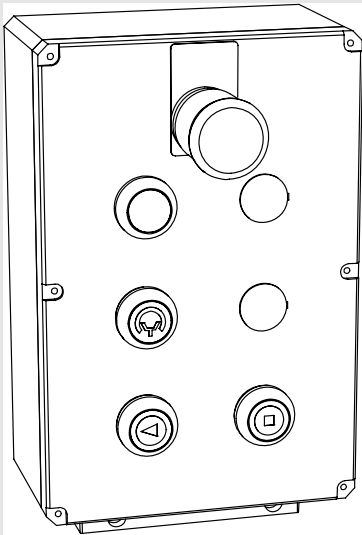
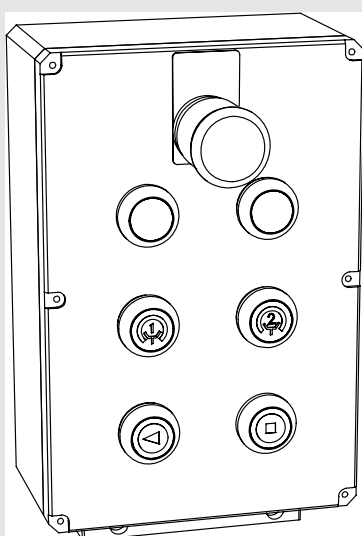
6 Travel track for robot

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:

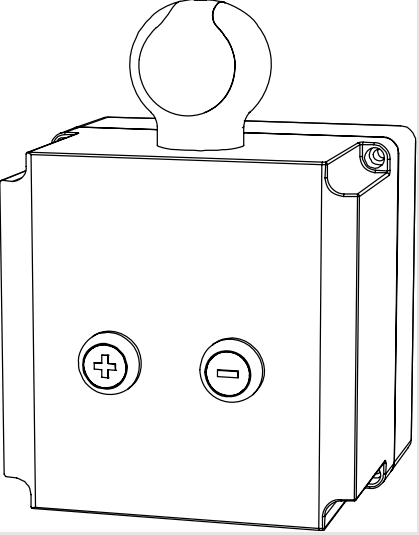
Description	Illustration
Operator panel for one working area	
Operator panel for two working areas	

7 Operator panel

7.2: Manual job control panel

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.	 A line drawing of a rectangular manual jog control panel. It features a circular handle on top. On the front face, there are two circular buttons: the left one contains a plus sign (+) and the right one contains a minus sign (-). The panel has a slightly raised edge on the right side, suggesting it might be part of a larger assembly or have a specific orientation.

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

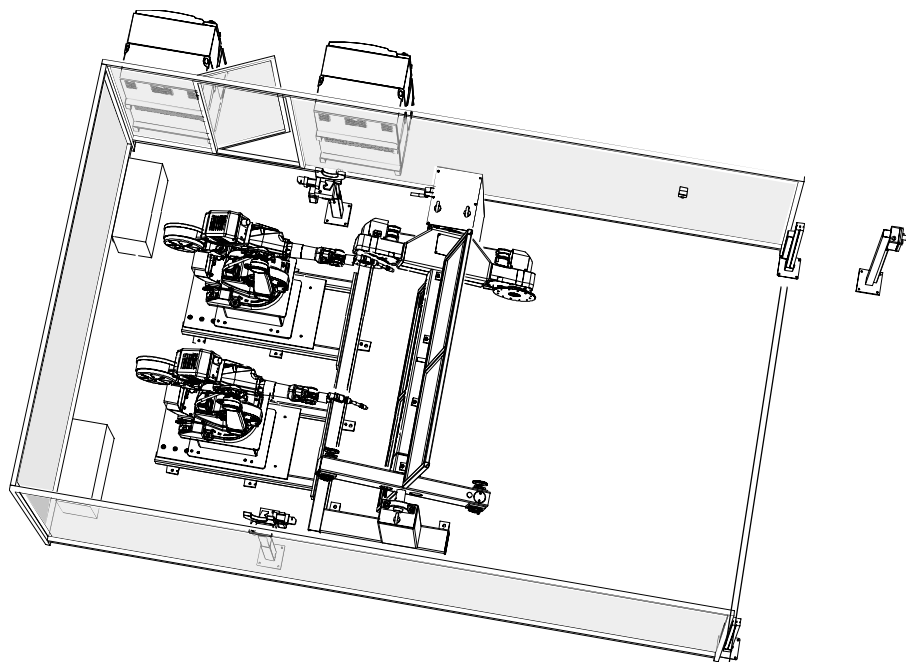


Figure 18: Welding robot station with safety equipment

8 Safety equipment

8.1: Safety functions



ABB AB
Robotics Products
S-721 68 VÄSTERÅS
SWEDEN
Telephone: +46 (0) 21 344000
Telefax: +46 (0) 21 132592

3HAC031146-001, Revision -, en