

ROBOTICS

Product specification

IRB 910SC



Trace back information:
Workspace 21A version a11
Checked in 2021-03-19
Skribenta version 5.4.005

Product specification

IRB 910SC-3/0.45

IRB 910SC-3/0.55

IRB 910SC-3/0.65

IRC5

Document ID: 3HAC056431-001

Revision: J

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, damage 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.

Keep for future reference.

Additional copies of this manual may be obtained from ABB.

Original instructions.

© Copyright 2016-2021 ABB. All rights reserved.
Specifications subject to change without notice.

Table of contents

Overview of this specification	7
1 Description	9
1.1 Structure	9
1.1.1 Introduction to structure	9
1.1.2 The robot	11
1.2 Standards	14
1.2.1 Applicable standards	14
1.3 Installation	16
1.3.1 Introduction to installation	16
1.3.2 Operating requirements	17
1.3.3 Mounting the manipulator	18
1.4 Load diagrams	20
1.4.1 Introduction to load diagram	20
1.4.2 Load diagram	21
1.4.3 Maximum load and moment of inertia	24
1.4.4 Extra loads	26
1.5 Mounting of equipment	27
1.6 Calibration	29
1.6.1 Calibration methods	29
1.6.2 Fine calibration	31
1.6.3 Absolute Accuracy option	32
1.7 Maintenance and troubleshooting	34
1.7.1 Introduction to maintenance and trouble shooting	34
1.8 Robot motion	35
1.8.1 Working range and type of motion	36
1.8.2 Performance according to ISO 9283	40
1.8.3 Velocity	41
1.8.4 Pressing force (Z-stroke)	42
1.8.5 Robot stopping distances and times	43
1.9 Customer connections	44
2 Specification of variants and options	47
2.1 Introduction to variants and options	47
2.2 Manipulator	48
2.3 Floor cables	50
2.4 User documentation	51
3 Accessories	53
Index	55

This page is intentionally left blank

Overview of this specification

About this product specification

It describes the performance of the manipulator or a complete family of manipulators in terms of:

- The structure and dimensional prints
- The fulfilment of standards, safety and operating requirements
- The load diagrams, mounting of extra equipment, the motion and the robot reach
- The specification of variants and options available

Usage

Product specifications are used to find data and performance about the product, for example to decide which product to buy. How to handle the product is described in the product manual.

Users

It is intended for:

- Product managers and product personnel
- Sales and marketing personnel
- Order and customer service personnel

References

Documentation referred to in the manual, is listed in the table below.

Document name	Document ID
<i>Product manual - IRB 910SC</i>	3HAC056430-001
<i>Product manual, spare parts - IRB 910SC</i>	3HAC056433-001
Reference to the circuit diagram for the robot.	Document ID
<i>Product manual - IRC5 Compact</i>	3HAC035738-001
<i>Operating manual - IRC5 with FlexPendant</i>	3HAC050941-001
<i>Product specification - Controller software IRC5</i>	3HAC050945-001
<i>Product specification - Controller IRC5</i>	3HAC047400-001
<i>Product specification - Robot user documentation, IRC5 with RobotWare 6</i>	3HAC052355-001

Revisions

Revision	Description
-	First edition.

Continues on next page

Revision	Description
A	<ul style="list-style-type: none"> The force and torque values under endurance load and maximum load have been updated. See Floor mounted on page 18. Ball screw spline unit is added to the warning listing the parts that are easily damaged due to overload. See Information on page 20. Working range of axis 4 has been updated. See Robot motion on page 36. Performance data of IRB 910SC-3/0.45 and IRB 910SC-3/0.65 has been added. See Performance according to ISO 9283 on page 40. Velocity of axis 3 changes from 1.02 m/s to 1 m/s. See Velocity on page 41. Minor changes.
B	<p>Published in release R16.2. The following updates are done in this revision:</p> <ul style="list-style-type: none"> Dimension drawing for fitting the end effector is updated. See Fitting of end effector to the ball screw spline shaft on page 27.
C	<p>Published in release R17.1. The following updates are done in this revision:</p> <ul style="list-style-type: none"> Restriction of load diagram added. Changed protection from IP30 to IP20
D	<p>Published in release R17.2. The following updates are done in this revision:</p> <ul style="list-style-type: none"> Updated list of applicable standards. Improved picture of end effector dimension.
E	<p>Published in release R18.2. The following updates are done in this revision:</p> <ul style="list-style-type: none"> Updated the COG figure for describing max. moment of inertia.
F	<p>Published in release R19D The following updates are done in this revision:</p> <ul style="list-style-type: none"> Updated information about <i>Absolute Accuracy</i>. The graphic of working range changed.
G	<p>Published in release R20C The following updates are done in this revision:</p> <ul style="list-style-type: none"> Add section Extra loads.
H	<p>Published in release R20D The following updates are done in this revision:</p> <ul style="list-style-type: none"> Warranty section updated.
J	<p>Published in release R21A The following updates are done in this revision:</p> <ul style="list-style-type: none"> Pressing force (Z-stroke) section added.

1 Description

1.1 Structure

1.1.1 Introduction to structure

General

The IRB 910SC is ABB Robotics first generation SCARA robot, with 4 axes and a rated payload of 3 kg (maximum payload of 6 kg) in three different reach variants 0.45 m, 0.55 m, and 0.65 m, designed specifically for manufacturing industries that use flexible robot-based automation, e.g. 3C industry. The robot has an open structure that is especially adapted for flexible use, and can communicate extensively with external systems.

Operating system

The robot is equipped with the IRC5 Compact (IRC5C) controller and robot control software, RobotWare. RobotWare supports every aspect of the robot system, such as motion control, development and execution of application programs, communication etc. See *Product specification - Controller IRC5 with FlexPendant* (IRC5C included).

Safety

The safety standards are valid for the complete robot, manipulator and controller.

Additional functionality

For additional functionality, the robot can be equipped with optional software for application support - for example dispensing and cutting, communication features - network communication - and advanced functions such as multitasking, sensor control etc. For a complete description on optional software, see *Product specification - Controller software IRC5*.

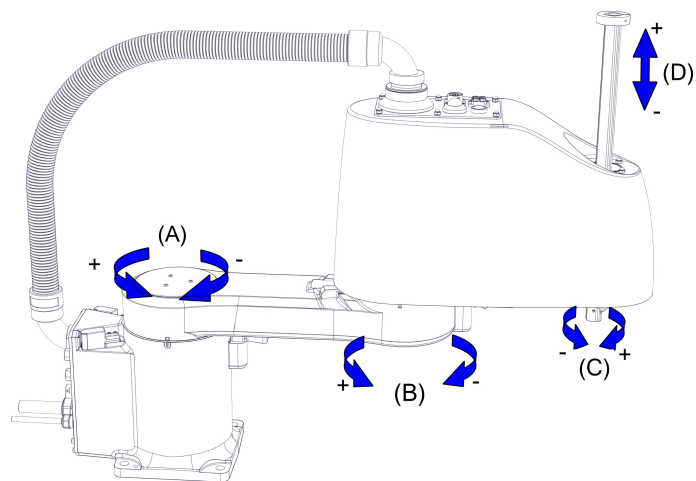
Continues on next page

1 Description

1.1.1 Introduction to structure

Continued

Manipulator axes



xx1500002631

Position	Description	Position	Description
A	Axis 1	B	Axis 2
C	Axis 4	D	Axis 3

1.1.2 The robot

General

The IRB 910SC is available in three versions and all can only be mounted on floor or other flat surface, no other mounting position is permitted.

Robot type	Rated handling capacity (kg)	Maximum handling capacity (kg)	Reach (m)
IRB 910SC	3 kg	6 kg	0.45 m
IRB 910SC	3 kg	6 kg	0.55 m
IRB 910SC	3 kg	6 kg	0.65 m

Manipulator weight

Data	Weight
IRB 910SC-3/0.45	24.5 kg
IRB 910SC-3/0.55	25 kg
IRB 910SC-3/0.65	25.5 kg

Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside	< 70 dB (A) Leq (acc. to the working space Machinery directive 2006/42/EG)

Power consumption

Robot in 0 degree position	IRB 910SC-3/0.45	IRB 910SC-3/0.55	IRB 910SC-3/0.65
Brakes engaged	71 W	71 W	71 W
Brakes disengaged	127.6 W	127.6 W	127.6 W

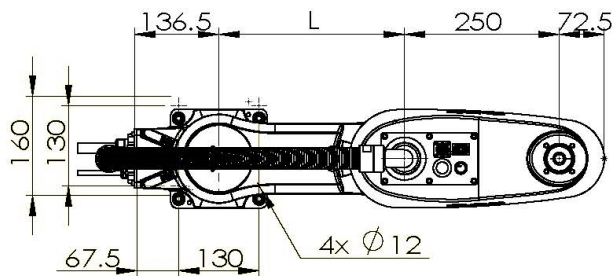
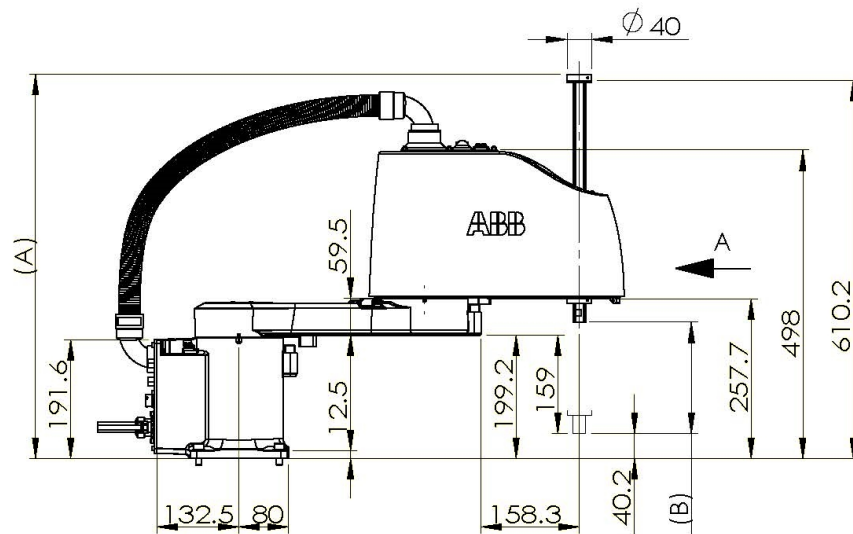
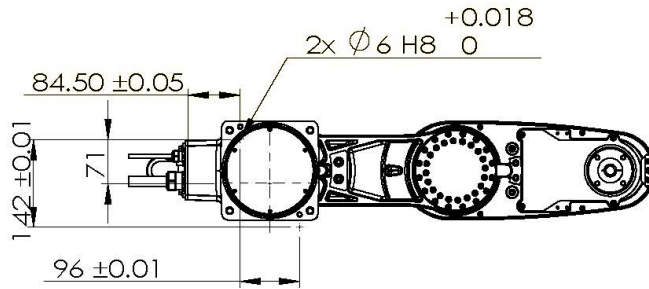
Continues on next page

1 Description

1.1.2 The robot

Continued

Dimensions



xx1500002526

Item	Description	Variant		
		IRB 910SC-3/0.45	IRB 910SC-3/0.55	IRB 910SC-3/0.65
L	Length of lower arm	200 mm	300 mm	400 mm
A	Maximum height	620 mm	620 mm	620 mm

Continues on next page

1 Description

1.1.2 The robot *Continued*

Item	Description	Variant		
		IRB 910SC-3/0.45	IRB 910SC-3/0.55	IRB 910SC-3/0.65
B	Z stroke	180 mm	180 mm	180 mm

1 Description

1.2.1 Applicable standards

1.2 Standards

1.2.1 Applicable standards



Note

The listed standards are valid at the time of the release of this document. Phased out or replaced standards are removed from the list when needed.

General

The product is designed in accordance with ISO 10218-1:2011, Robots for industrial environments - Safety requirements -Part 1 Robots, and applicable parts in the normative references, as referred to from ISO 10218-1:2011. In case of deviations from ISO 10218-1:2011, these are listed in the declaration of incorporation which is part of the product delivery.

Normative standards, ISO

Standard	Description
ISO 9283:1998	Manipulating industrial robots - Performance criteria and related test methods
ISO 10218-2	Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration
ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design
ISO 13850	Safety of machinery - Emergency stop - Principles for design
IEC 60204-1:2005	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
IEC 62061:2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems

Deviation for delay circuit

Some variants of IRB 910SC has an inherent delay circuit to enhance the lifetime of speed reducers. This only applies to variants IRB 910SC-3/0.45, IRB 910SC-3/0.55, and IRB 910SC-3/0.65.

This circuit allows an extended time period for soft stop by enabling a delay of about 0.5 s before motor brakes are engaged, e.g. when the three-position enabling device is released or compressed, or the emergency stop is pressed. During this period, the robot axes 1 and 2 will continue their movement until they are stopped by the motor or eventually by brakes. Make sure the robot safeguarded area is free from obstacles, even during manual operations. Note that this delay does not apply to axes 3 and 4.

For more details regarding stopping time and distance metric, see *Product specification - Robot stopping distances according to ISO 10218-1*.

Continues on next page

Region specific standards and regulations

Standard	Description
ANSI/RIA R15.06	Safety requirements for industrial robots and robot systems
ANSI/UL 1740	Safety standard for robots and robotic equipment
CAN/CSA Z 434-14	Industrial robots and robot Systems - General safety requirements

Other standards used in design

Standard	Description
ISO 9787:2013	Robots and robotic devices -- Coordinate systems and motion nomenclatures
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
IEC 61000-6-4 (option 129-1)	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13732-1:2008	Ergonomics of the thermal environment - Part 1
IEC 60974-1:2012 ⁱ	Arc welding equipment - Part 1: Welding power sources
IEC 60974-10:2014 ^f	Arc welding equipment - Part 10: EMC requirements
ISO 14644-1:2015 ⁱⁱ	Classification of air cleanliness
IEC 60529:1989 + A2:2013	Degrees of protection provided by enclosures (IP code)

ⁱ Only valid for arc welding robots. Replaces IEC 61000-6-4 for arc welding robots.

ⁱⁱ Only robots with protection Clean Room.

1 Description

1.3.1 Introduction to installation

1.3 Installation

1.3.1 Introduction to installation

General

IRB 910SC is adapted for normal industrial environment. An end effector with max. weight of 6 kg, including payload, can be mounted on the lower end of the ball screw spline shaft (axis 3). For more information about mounting of extra equipment, see [Mounting of equipment on page 27](#).

1.3.2 Operating requirements

Protection standard

Robot variant	Protection standard IEC529
All variants, manipulator	IP20

Explosive environments

The robot must not be located or operated in an explosive environment.

Working range limitations

EPS will not be selectable and no mechanical limitations available.

Ambient temperature

Description	Standard/Option	Temperature
Manipulator during operation	Standard	+ 5 °C ⁱ (41 °F) to + 45 °C (113 °F)
For the controller	Standard/Option	See <i>Product specification - Controller IRC5</i>
Complete robot during transportation and storage	Standard	- 25 °C (-13 °F) to + 55 °C (131 °F)
For short periods (not exceeding 24 hours)	Standard	up to + 70 °C (158 °F)

ⁱ At low environmental temperature < 10°C is, as with any other machine, a warm-up phase recommended to be run with the robot. Otherwise there is a risk that the robot stops or run with lower performance due to temperature dependent oil and grease viscosity.

Relative humidity

Description	Relative humidity
Complete robot during operation, transportation and storage	Max. 95% at constant temperature

1 Description

1.3.3 Mounting the manipulator

1.3.3 Mounting the manipulator

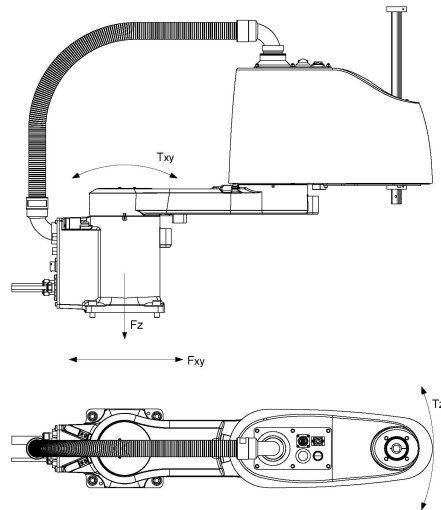
General

Maximum load in relation to the base coordination system. See Figure below.

Floor mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	± 651 N	± 945 N
Force z	255 ± 392 N	255 ± 441 N
Torque xy	± 260 Nm	± 418 Nm
Torque z	± 121 Nm	± 238 Nm

The illustration shows the directions of the robots stress forces.



xx1500002522

F_{xy}	Force in any direction in the XY plane
F_z	Force in the Z plane
T_{xy}	Bending torque in any direction in the XY plane
T_z	Bending torque in the Z plane

The table shows the various forces and torques working on the robot during different kinds of operation.



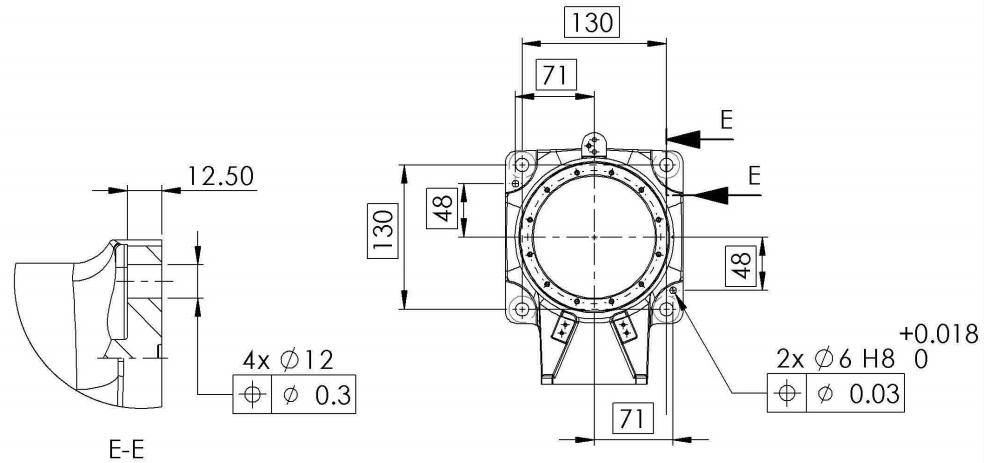
Note

These forces and torques are extreme values that are rarely encountered during operation. The values also never reach their maximum at the same time!

Continues on next page

Fastening holes robot base

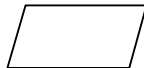
View from top.



xx1500002521

Attachment bolts, specification

The table specifies the type of securing screws and washers to be used to secure the robot directly to the foundation. It also specifies the type of pins to be used.

Suitable screws	M10x25
Quantity	4 pcs
Quality	8.8
Suitable washer	20x10.5x2
Guide pins	2 pcs, D6x20, ISO 2338 - 6m6x20 - A1
Tightening torque	45 Nm
Level surface requirements	<div style="border: 1px solid black; padding: 5px; display: flex; align-items: center; justify-content: center;">  <div style="font-size: 24px; font-weight: bold;">0.1</div> </div>

xx1500000627

1 Description

1.4.1 Introduction to load diagram

1.4 Load diagrams

1.4.1 Introduction to load diagram

Information



WARNING

It is very important to always define correct actual load data and correct payload of the robot. Incorrect definitions of load data can result in overloading of the robot.

If incorrect load data and/or loads are outside load diagram is used the following parts can be damaged due to overload:

- ball screw spline unit
- motors
- gearboxes
- mechanical structure



WARNING

In the robot system is the service routine LoadIdentify available, which allows the user to make an automatic definition of the tool and load, to determine correct load parameters. For detailed information, see *Operating manual - IRC5 with FlexPendant*.



WARNING

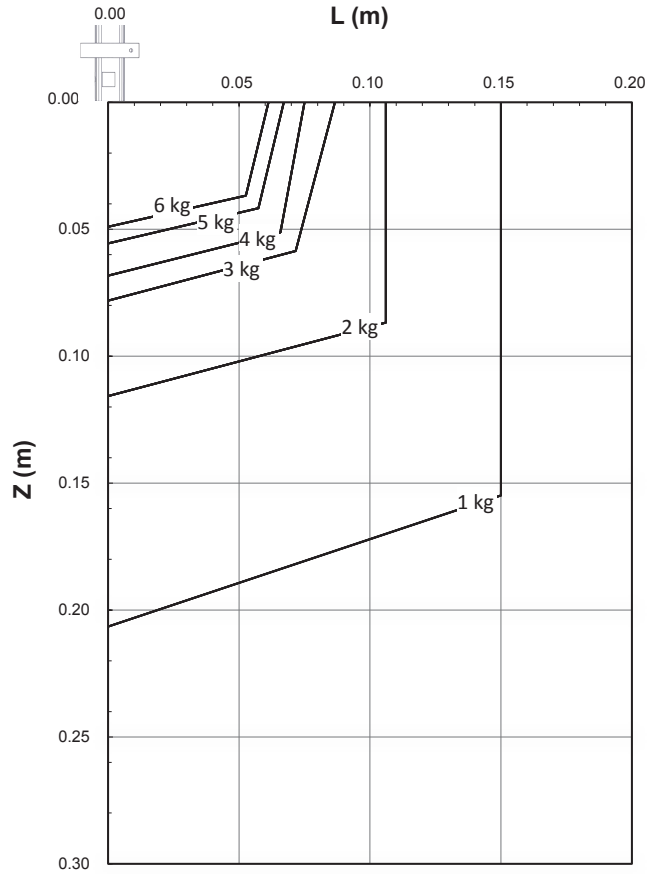
Robots running with incorrect load data and/or with loads outside diagram, will not be covered by robot warranty.

General

The load diagram includes a nominal pay load inertia, J_0 of 0.01 kgm^2 . At different moment of inertia the load diagram will be changed. For robots that are allowed tilted, wall or inverted mounted, the load diagrams as given are valid.

1.4.2 Load diagram

IRB 910SC-3/0.45



xx1500002612

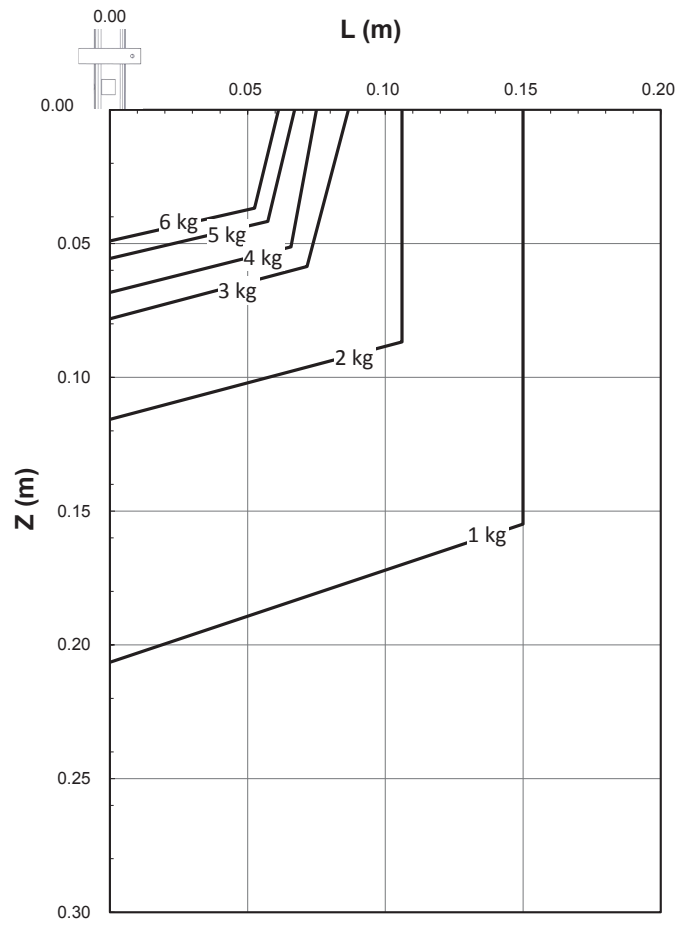
Continues on next page

1 Description

1.4.2 Load diagram

Continued

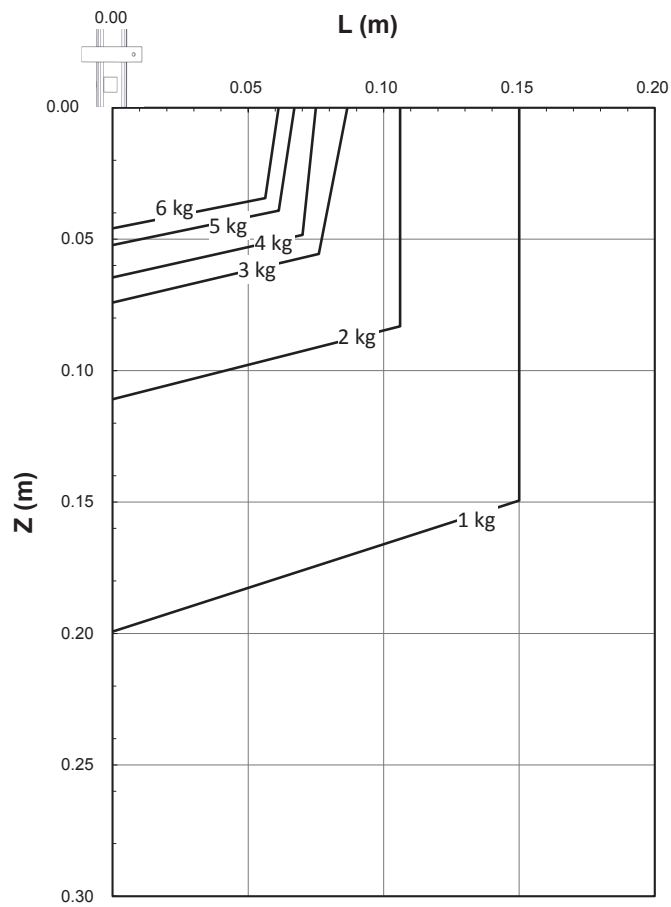
IRB 910SC-3/0.55



xx1500002613

Continues on next page

IRB 910SC-3/0.65



xx150002614

1 Description

1.4.3 Maximum load and moment of inertia

1.4.3 Maximum load and moment of inertia

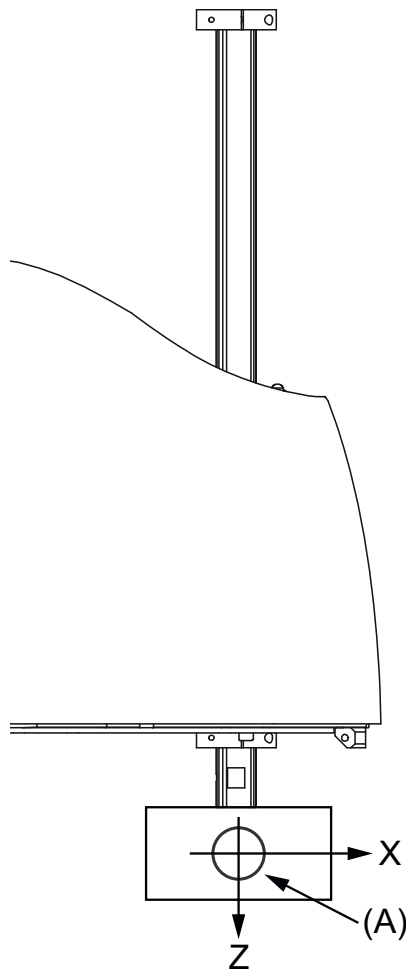
General

Total load given as: Mass in kg, center of gravity (Z and L) in m and moment of inertia (J_{ox} , J_{oy} , J_{oz}) in kgm^2 . $L = \sqrt{X^2 + Y^2}$.

For IRB 910SC, L is 0 mm at the default rating and its maximum value changes with the payload. See [Load diagram on page 21](#).

Full movement

Axis	Robot variant	Max. value
4	IRB 910SC-3/0.45	$J_4 = \text{Mass} \times L^2 + J_{0Z} \leq 0.1 \text{ kgm}^2$
	IRB 910SC-3/0.55	$J_4 = \text{Mass} \times L^2 + J_{0Z} \leq 0.1 \text{ kgm}^2$
	IRB 910SC-3/0.65	$J_4 = \text{Mass} \times L^2 + J_{0Z} \leq 0.1 \text{ kgm}^2$



xx1500002615

Position	Description
A	Center of gravity

Continues on next page

Position	Description
J_{ox}, J_{oy}, J_{oz}	Max. moment of inertia around the X, Y and Z axes at center of gravity.

1 Description

1.4.4 Extra loads

1.4.4 Extra loads

Load areas

Extra loads are not recommended. If extra load are indeed needed by application. Extra loads can be mounted on arm-1 and arm-2. The maximum extra load needs to meet the following requirement:

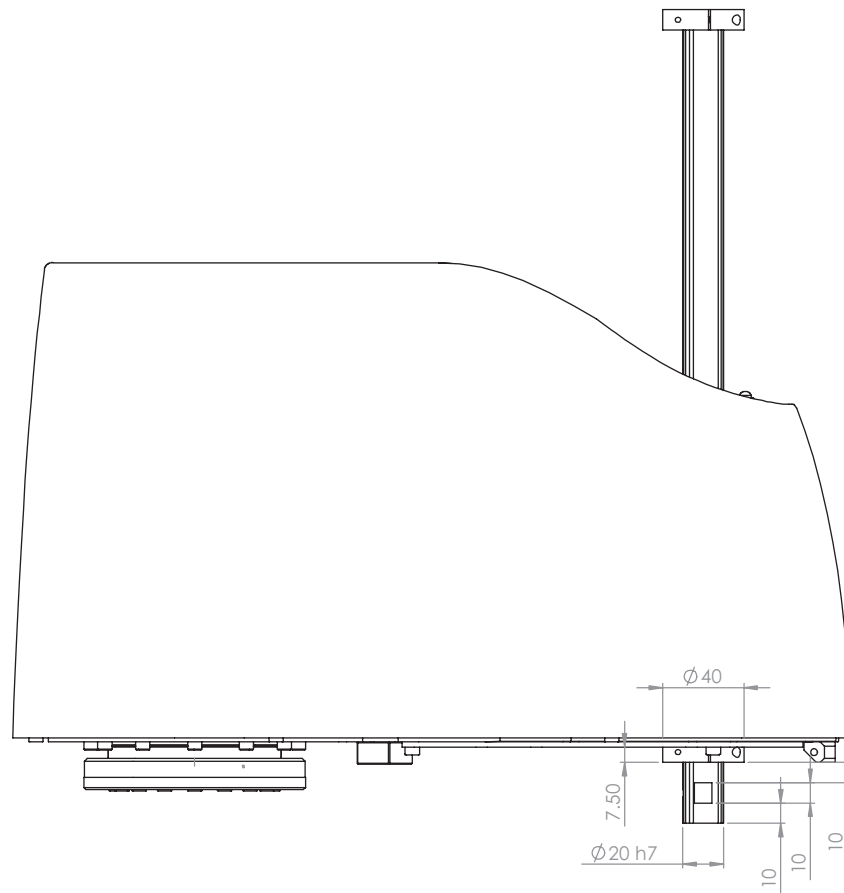
Extra loads + payload \leq payload specification.

For more information about extra loads specification and mounting method, please contact ABB.

1.5 Mounting of equipment

Fitting of end effector to the ball screw spline shaft

An end effector can be attached to the lower end of the shaft of the ball screw spline unit. The dimensions for fitting the end effector is shown in the following figure.



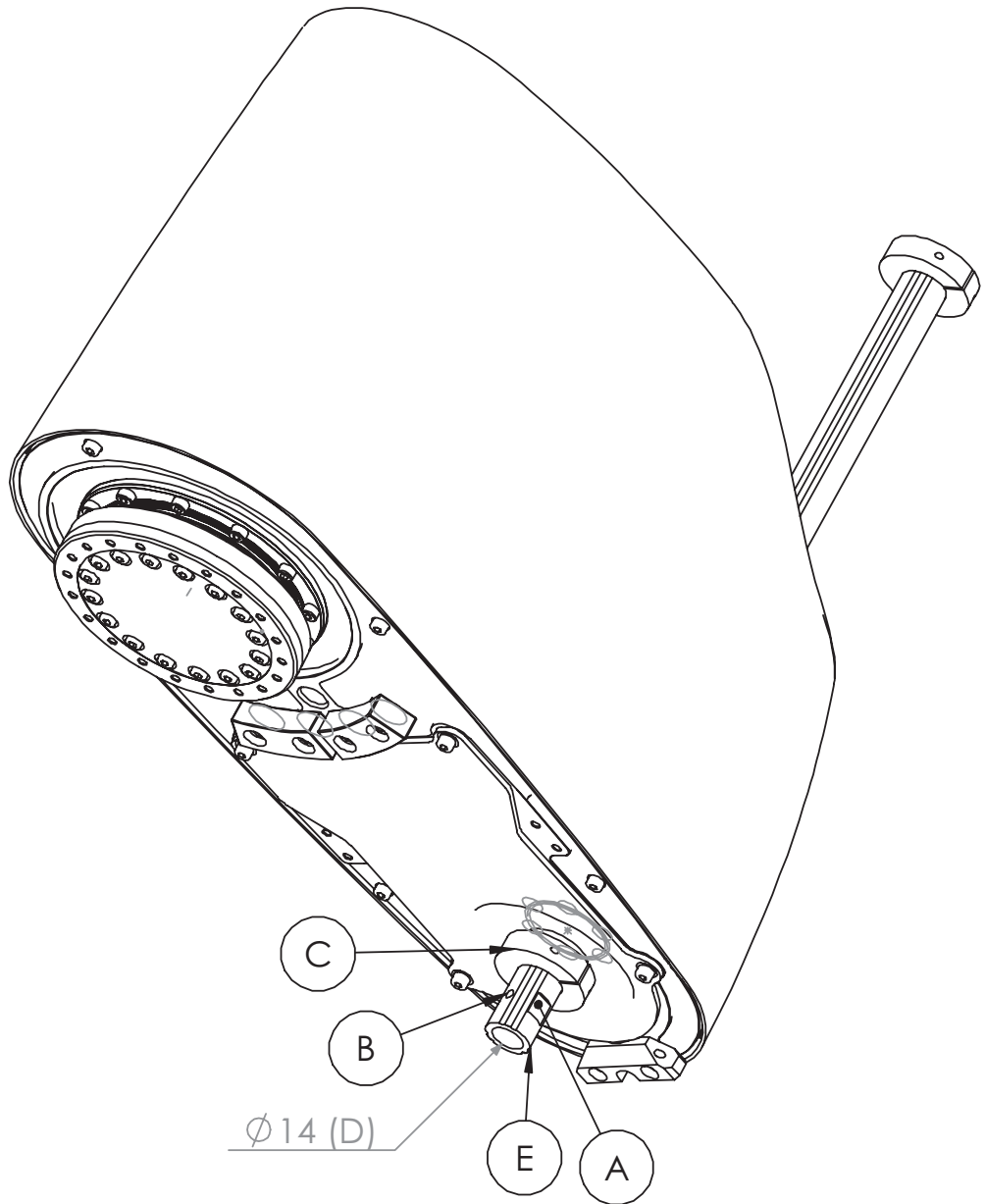
xx1700001187

Continues on next page

1 Description

1.5 Mounting of equipment

Continued



xx1500002523

A	Flat cut
B	Conical hole
C	Stop block diameter
D	Through hole
E	Shaft diameter

1.6 Calibration


1.6.1 Calibration methods

Overview

This section specifies the different types of calibration and the calibration methods that are supplied by ABB.

More information is available in the product manual.

Types of calibration

Type of calibration	Description	Calibration method
Standard calibration	<p>The calibrated robot is positioned at calibration position.</p> <p>Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot.</p> <p>For robots with RobotWare 5.04 or older, the calibration data is delivered in a file, calib.cfg, supplied with the robot at delivery. The file identifies the correct resolver/motor position corresponding to the robot home position.</p>	Manual calibration
Absolute accuracy calibration (optional)	<p>Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for:</p> <ul style="list-style-type: none"> • Mechanical tolerances in the robot structure • Deflection due to load <p>Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot.</p> <p>Absolute accuracy calibration data is found on the SMB (serial measurement board) in the robot.</p> <p>For robots with RobotWare 5.05 or older, the absolute accuracy calibration data is delivered in a file, absacc.cfg, supplied with the robot at delivery. The file replaces the calib.cfg file and identifies motor positions as well as absolute accuracy compensation parameters.</p> <p>A robot calibrated with Absolute accuracy has a sticker next to the identification plate of the robot.</p> <p>To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;">  <p style="text-align: center; margin: 0;">ABSOLUTE ACCURACY</p> <p style="text-align: right; font-size: small; margin: 0;">3HAC 14257-1</p> </div> <p style="font-size: x-small; margin-top: 5px;">xx0400001197</p>	CalibWare

Continues on next page

1 Description

1.6.1 Calibration methods

Continued

Brief description of calibration methods

Manual calibration method

With the manual calibration method, the robot's axes are positioned in specific calibration positions using calibration tools. Under this condition, the position of the axis to be calibrated is pre-determined. The axes must be calibrated one at a time.

CalibWare - Absolute Accuracy calibration

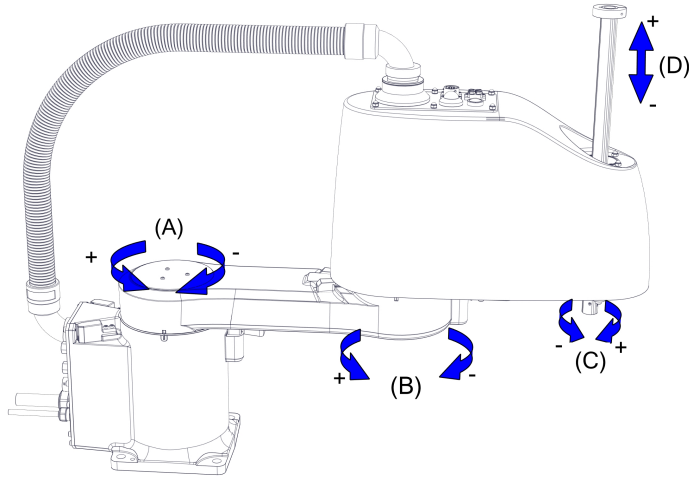
The CalibWare tool guides through the calibration process and calculates new compensation parameters. This is further detailed in the *Application manual - CalibWare Field*.

If a service operation is done to a robot with the option Absolute Accuracy, a new absolute accuracy calibration is required in order to establish full performance. For most cases after replacements that do not include taking apart the robot structure, standard calibration is sufficient.

1.6.2 Fine calibration

General

Fine calibration is made by moving the axes so that the synchronization mark on each joint is aligned. For detailed information on calibration of the robot see *Product manual - IRB 910SC*.



xx1500002631

Position	Description	Position	Description
A	Axis 1	B	Axis 2
C	Axis 4	D	Axis 3

1 Description

1.6.3 Absolute Accuracy option

1.6.3 Absolute Accuracy option

Purpose

Absolute Accuracy is a calibration concept that improves TCP accuracy. The difference between an ideal robot and a real robot can be several millimeters, resulting from mechanical tolerances and deflection in the robot structure. *Absolute Accuracy* compensates for these differences.

Here are some examples of when this accuracy is important:

- Exchangeability of robots
- Offline programming with no or minimum touch-up
- Online programming with accurate movement and reorientation of tool
- Programming with accurate offset movement in relation to eg. vision system or offset programming
- Re-use of programs between applications

The option *Absolute Accuracy* is integrated in the controller algorithms and does not need external equipment or calculation.



Note

The performance data is applicable to the corresponding RobotWare version of the individual robot.

What is included

Every *Absolute Accuracy* robot is delivered with:

- compensation parameters saved on the robot's serial measurement board
- a birth certificate representing the *Absolute Accuracy* measurement protocol for the calibration and verification sequence.

A robot with *Absolute Accuracy* calibration has a label with this information on the manipulator.

Absolute Accuracy supports floor mounted, wall mounted and ceiling mounted installations. Compensation parameters saved on the robot's serial measurement board differ depending on which *Absolute Accuracy* option is selected.

When is *Absolute Accuracy* being used

Absolute Accuracy works on a robot target in Cartesian coordinates, not on the individual joints. Therefore, joint based movements (e.g. `MoveAbsJ`) will not be affected.

If the robot is inverted, the *Absolute Accuracy* calibration must be performed when the robot is inverted.

Absolute Accuracy active

Absolute Accuracy will be active in the following cases:

- Any motion function based on robtargets (e.g. `MoveL`) and ModPos on robtargets
- Reorientation jogging

Continues on next page

- Linear jogging
- Tool definition (4, 5, 6 point tool definition, room fixed TCP, stationary tool)
- Work object definition

Absolute Accuracy not active

The following are examples of when Absolute Accuracy is not active:

- Any motion function based on a jointtarget (`MoveAbsJ`)
- Independent joint
- Joint based jogging
- Additional axes
- Track motion



Note

In a robot system with, for example, an additional axis or track motion, the Absolute Accuracy is active for the manipulator but not for the additional axis or track motion.

RAPID instructions

There are no RAPID instructions included in this option.

1 Description

1.7.1 Introduction to maintenance and trouble shooting

1.7 Maintenance and troubleshooting

1.7.1 Introduction to maintenance and trouble shooting

General

The robot requires only a minimum of maintenance during operation. It has been designed to make it as easy to service as possible:

- Maintenance-free AC motors are used.
- Grease used for all gearboxes.
- The cabling is routed for longevity, and in the unlikely event of a failure, its modular design makes it easy to change.

Maintenance

The maintenance intervals depend on the use of the robot, the required maintenance activities also depends on selected options. For detailed information on maintenance procedures, see *Maintenance* section in the *Product Manual - IRB 910SC*.

1.8 Robot motion

General

**Note**

Robot moves faster when axis 3 is at a higher position. If the axis 3 is at a relatively low position, the acceleration and deceleration of axes 1, 2 and 4 may be reduced based on the actual position and speed of the axes, and the stabilization time for final positioning may also be longer when moving the robot horizontally.

Continues on next page

1 Description

1.8.1 Working range and type of motion

1.8.1 Working range and type of motion

Robot motion

Axis	Type of motion	Working range
Axis 1	Rotation motion	-140° to +140°
Axis 2	Rotation motion	-150° to +150° ⁱ
Axis 3	Linear motion	-180 mm to 0 mm
Axis 4	Rotation motion	Default: -400° to +400° ⁱⁱ

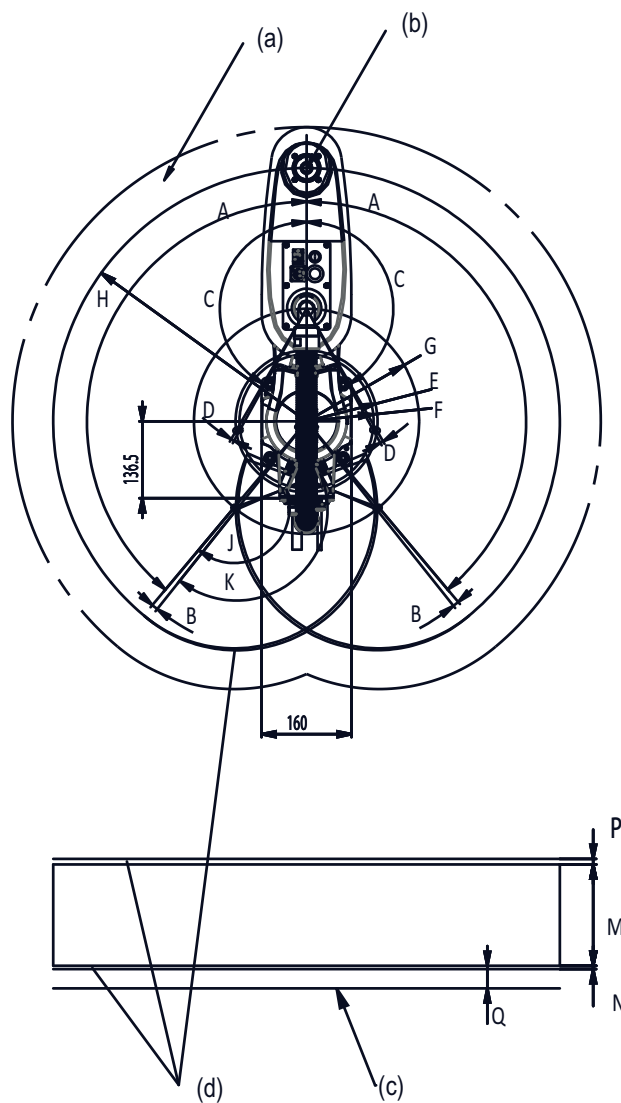
- ⁱ The axis 2 can be restricted to a smaller working range by fitting one more axis-2 mechanical stop block to the upper arm. For how to fit the block, see *Product manual - IRB 910SC*.
The additional mechanical stop block and related screws are provided in accessory package.
- ⁱⁱ The default working range for axis 4 can be extended by changing parameter values in the software.

Continues on next page

Working range

Illustration, working range and turning radius IRB 910SC-3/0.45

This illustration shows the unrestricted working range and turning radius of IRB 910SC-3/0.45.



xx1500002474

a	Maximum space	F	119 mm
b	Center joint of axis 3	G	200 mm
c	Base mounting face	H	450 mm
d	Area limited by mechanical stop	J	150°
A	140°	K	151.2°
B	1.5°	M	180 mm
C	150°	N	5 mm
D	1.2°	P	2 mm
E	126 mm	Q	40.2 mm

Continues on next page

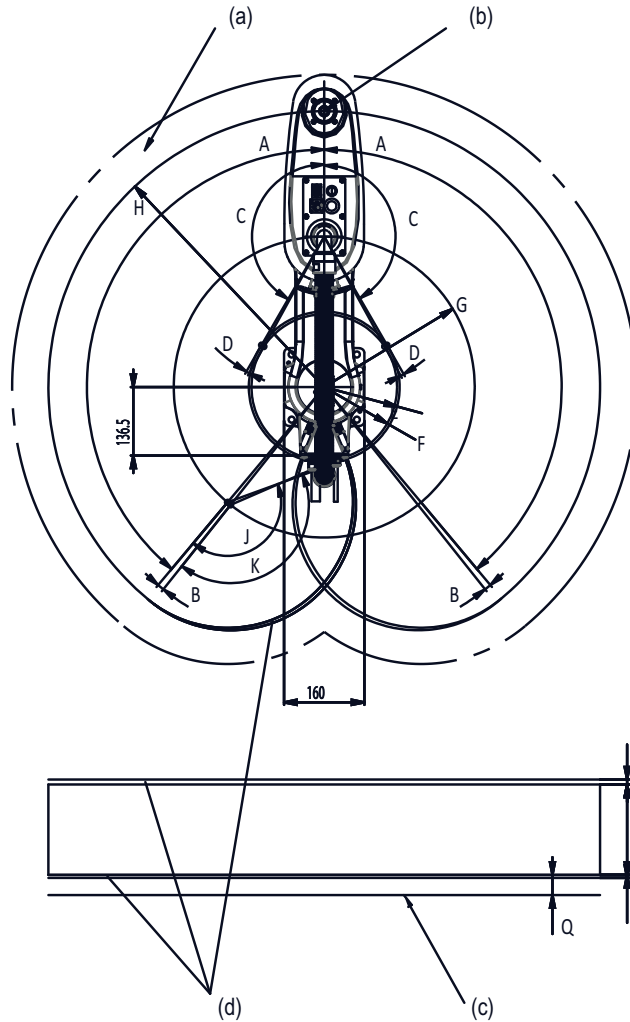
1 Description

1.8.1 Working range and type of motion

Continued

Illustration, working range and turning radius IRB 910SC-3/0.55

This illustration shows the unrestricted working range and turning radius of IRB 910SC-3/0.55.



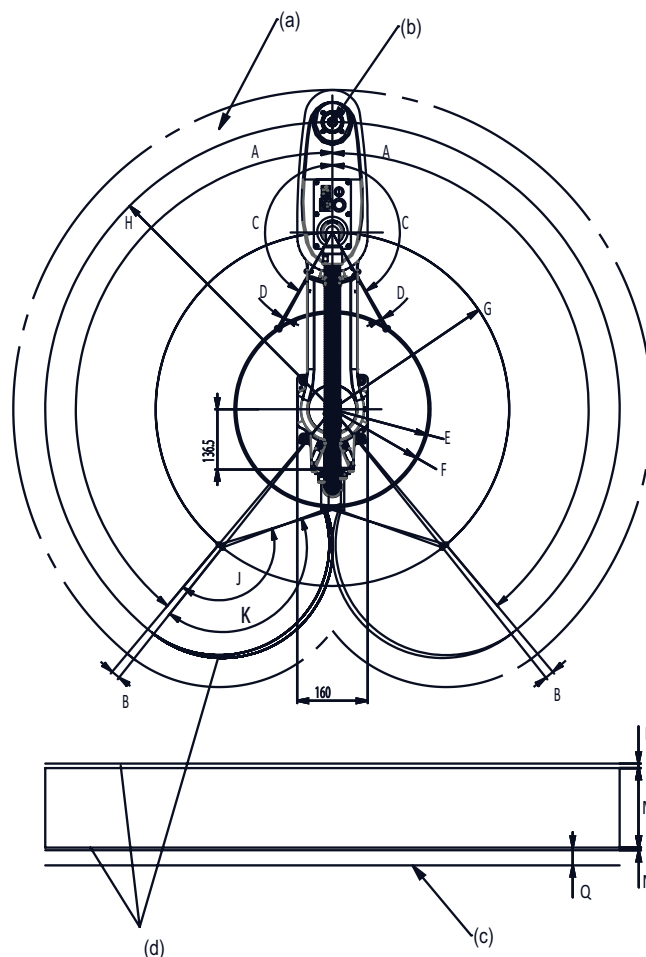
xx1500002475

a	Maximum space	F	145 mm
b	Center joint of axis 3	G	300 mm
c	Base mounting face	H	550 mm
d	Area limited by mechanical stop	J	150°
A	140°	K	151.2°
B	1.5°	M	180 mm
C	150°	N	5 mm
D	1.2°	P	2 mm
E	150 mm	Q	40.2 mm

Continues on next page

Illustration, working range and turning radius IRB 910SC-3/0.65

This illustration shows the unrestricted working range and turning radius of IRB 910SC-3/0.65.



xx1500002476

a	Maximum space	F	217 mm
b	Center joint of axis 3	G	400 mm
c	Base mounting face	H	650 mm
d	Area limited by mechanical stop	J	150°
A	140°	K	151.2°
B	1.5°	M	180 mm
C	150°	N	5 mm
D	1.2°	P	2 mm
E	222 mm	Q	40.2 mm

1 Description

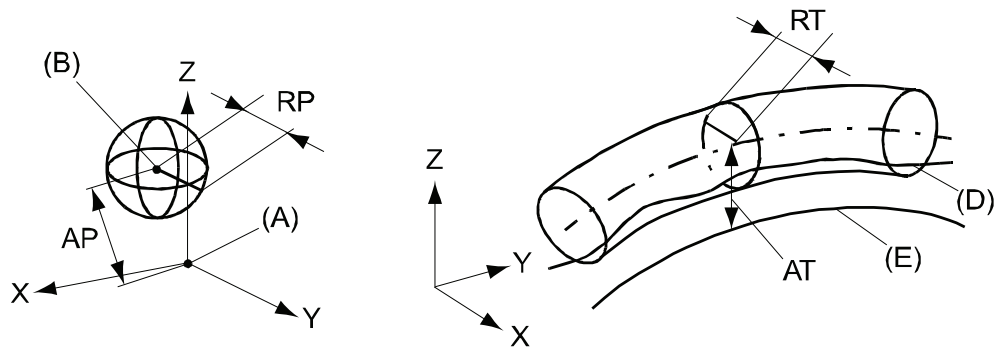
1.8.2 Performance according to ISO 9283

1.8.2 Performance according to ISO 9283

General

At rated maximum load, maximum offset and 1.6 m/s velocity on the inclined ISO test plane, with all six axes in motion. Values in the table below are the average result of measurements on a small number of robots. The result may differ depending on where in the working range the robot is positioning, velocity, arm configuration, from which direction the position is approached, the load direction of the arm system. Backlashes in gearboxes also affect the result.

The figures for AP, RP, AT and RT are measured according to figure below.



xx0800000424

Pos	Description	Pos	Description
A	Programmed position	E	Programmed path
B	Mean position at program execution	D	Actual path at program execution
AP	Mean distance from programmed position	AT	Max deviation from E to average path
RP	Tolerance of position B at repeated positioning	RT	Tolerance of the path at repeated program execution

Description	Values ⁱ		
	IRB 910SC-3/0.45	IRB 910SC-3/0.55	IRB 910SC-3/0.65
Pose repeatability, RP (mm)	0.01	0.01	0.01
Pose accuracy, AP (mm) ⁱⁱ	0.01	0.01	0.01
Linear path repeatability, RT (mm)	0.09	0.06	0.06
Linear path accuracy, AT (mm)	0.91	0.70	0.65
Pose stabilization time, PSt (s) within 0.1 mm of the position	0.08	0.19	1.01

ⁱ The values are based on the zero position of axis 3.

ⁱⁱ AP according to the ISO test above, is the difference between the taught position (position manually modified in the cell) and the average position obtained during program execution.

1.8.3 Velocity

General

Robot variant	Axis 1	Axis 2	Axis 3	Axis 4
IRB 910SC-3/0.45	415 °/s	659 °/s	1 m/s	2,400 °/s
IRB 910SC-3/0.55	415 °/s	659 °/s	1 m/s	2,400 °/s
IRB 910SC-3/0.65	415 °/s	659 °/s	1 m/s	2,400 °/s

The velocities of axes 1, 2, and 4 are measured with rated payload and axis 3 at position of 0 mm.

Supervision is required to prevent overheating in applications with intensive and frequent movements.

Resolution

Approximately 0.01° on each axis.

1 Description

1.8.4 Pressing force (Z-stroke)

1.8.4 Pressing force (Z-stroke)

General

Robot Version	IRB 910SC-3/0.45	IRB 910SC-3/0.55	IRB 910SC-3/0.65
Axis 3 (Z stroke) down force	250 N	250 N	250 N

1.8.5 Robot stopping distances and times

Introduction

The stopping distances and times for category 0 and category 1 stops, as required by EN ISO 10218-1 Annex B, are listed in *Product specification - Robot stopping distances according to ISO 10218-1 (3HAC048645-001)*.

1 Description

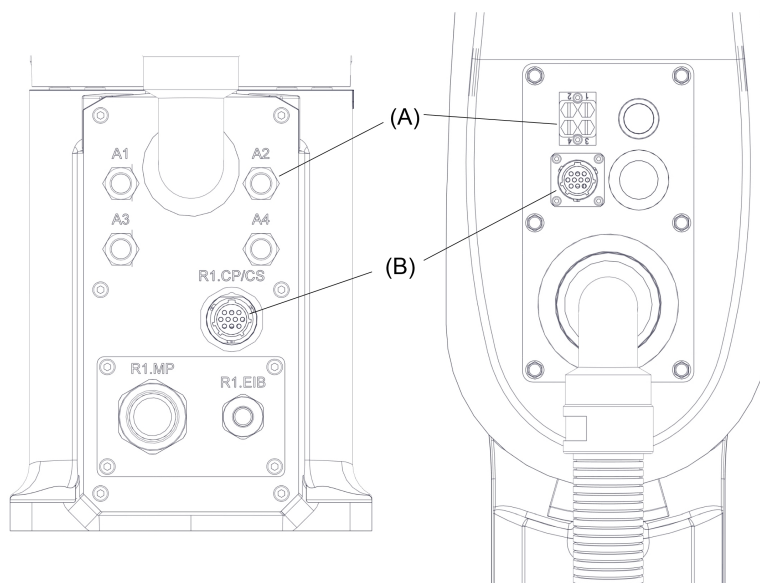
1.9 Customer connections

1.9 Customer connections

Introduction to customer connections

The cables for customer connection are integrated in the robot and the connectors are placed at the upper arm and base. There is one connector R3.CP/CS at the upper arm. Corresponding connector R1.CP/CS is located at the base.

Hose for compressed air is also integrated into the manipulator. There are 4 inlets at the base (R1/8") and 4 outlets (M5) on the upper arm.



xx1500002751

Position	Connection	Description	Number	Value
A	Air	Max. 5 bar	4	Inner hose diameter 4 mm
B	(R1)R3.CP/CS	Customer power/signal	10	49 V, 500 mA

Connectors

The tables describes the connectors on base and upper arm.

Connectors, base

Position	Description	Art. no.
Robot	Pin connector 10p, bulkhead	3HAC022117-002
Customer connector	Connector set R1.CP/CS	3HAC037038-001

Connectors, upper arm

Position	Description	Art. no.
Robot	Socket connector 10p, flange mounted	3HAC023624-002
Customer connector	Connector set R3.CP/CS	3HAC037070-001

Continues on next page

Air, connector

Position	Description	Art. no.
Robot	4xM5	
Customer cable	Air connector	3HAC032049-001

This page is intentionally left blank

2 Specification of variants and options

2.1 Introduction to variants and options

General

The different variants and options for the IRB 910SC are described in the following sections. The same option numbers are used here as in the specification form.

The variants and options related to the robot controller are described in the product specification for the controller.

2 Specification of variants and options

2.2 Manipulator

2.2 Manipulator

Variants

Option	IRB Type	Rated handling capacity (kg)	Reach (m)
435-135	IRB 910SC	3	0.45
435-136	IRB 910SC	3	0.55
435-137	IRB 910SC	3	0.65

Protection

Option	Description
287-4	Standard

Connection kit

Option	Description
431-1	For the connectors on the upper arm, customer connection.
239-1	For the connectors on the foot.

Warranty

For the selected period of time, ABB will provide spare parts and labour to repair or replace the non-conforming portion of the equipment without additional charges. During that period, it is required to have a yearly Preventative Maintenance according to ABB manuals to be performed by ABB. If due to customer restrains no data can be analyzed in the ABB Ability service *Condition Monitoring & Diagnostics* for robots with OmniCore controllers, and ABB has to travel to site, travel expenses are not covered. The Extended Warranty period always starts on the day of warranty expiration. Warranty Conditions apply as defined in the Terms & Conditions.



Note


This description above is not applicable for option *Stock warranty* [438-8]

Option	Type	Description
438-1	Standard warranty	Standard warranty is 12 months from <i>Customer Delivery Date</i> or latest 18 months after <i>Factory Shipment Date</i> , whichever occurs first. Warranty terms and conditions apply.
438-2	Standard warranty + 12 months	Standard warranty extended with 12 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-4	Standard warranty + 18 months	Standard warranty extended with 18 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.

Continues on next page

2 Specification of variants and options

2.2 Manipulator Continued

Option	Type	Description
438-5	Standard warranty + 24 months	Standard warranty extended with 24 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-6	Standard warranty + 6 months	Standard warranty extended with 6 months from end date of the standard warranty. Warranty terms and conditions apply.
438-7	Standard warranty + 30 months	Standard warranty extended with 30 months from end date of the standard warranty. Warranty terms and conditions apply.
438-8	Stock warranty	<p>Maximum 6 months postponed start of standard warranty, starting from factory shipment date. Note that no claims will be accepted for warranties that occurred before the end of stock warranty. Standard warranty commences automatically after 6 months from <i>Factory Shipment Date</i> or from activation date of standard warranty in WebConfig.</p> <p> Note Special conditions are applicable, see <i>Robotics Warranty Directives</i>.</p>

2 Specification of variants and options

2.3 Floor cables

2.3 Floor cables

Manipulator cable length

Option	Lengths
210-1	3 m
210-2	7 m
210-3	15 m

Application interface connection to

Option	Description
16-1	Cabinet

Connection of parallel communication

Option	Lengths
94-6	3 m
94-1	7 m REQUIRES: 16-1 Cabinet.
94-2	15 m REQUIRES: 16-1 Cabinet.

2.4 User documentation

User documentation

The user documentation describes the robot in detail, including service and safety instructions.



Tip

All documents can be found via myABB Business Portal, www.abb.com/myABB.

This page is intentionally left blank

3 Accessories

General

There is a range of tools and equipment available.

Basic software and software options for robot and PC

For more information, see *Product specification - Controller IRC5* and *Product specification - Controller software IRC5*.

This page is intentionally left blank

Index

A

Absolute Accuracy, 32
Absolute Accuracy, calibration, 30

C

calibration
 Absolute Accuracy type, 29
 standard type, 29
calibration, Absolute Accuracy, 30
CalibWare, 29
category 0 stop, 43
category 1 stop, 43
compensation parameters, 32

D

documentation, 51

I

instructions, 51

M

manuals, 51

O

options, 47

P

product standards, 14

S

safety standards, 14
service instructions, 51
standards, 14
 ANSI, 15
 CAN, 15
 EN IEC, 14
 EN ISO, 14
standard warranty, 48
stock warranty, 48
stopping distances, 43
stopping times, 43

U

user documentation, 51

V

variants, 47

W

warranty, 48



ABB AB

Robotics & Discrete Automation

S-721 68 VÄSTERÅS, Sweden

Telephone +46 (0) 21 344 400

ABB AS

Robotics & Discrete Automation

Nordlysvegen 7, N-4340 BRYNE, Norway

Box 265, N-4349 BRYNE, Norway

Telephone: +47 22 87 2000

ABB Engineering (Shanghai) Ltd.

Robotics & Discrete Automation

No. 4528 Kangxin Highway

PuDong District

SHANGHAI 201319, China

Telephone: +86 21 6105 6666

ABB Inc.

Robotics & Discrete Automation

1250 Brown Road

Auburn Hills, MI 48326

USA

Telephone: +1 248 391 9000

abb.com/robotics