

ROBOTICS

Product specification

IRB 910INV



Trace back information:

Workspace OmniCore and R19C version a1

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Product specification

IRB 910INV-3/0.35

IRB 910INV-6/0.55

OmniCore

Document ID: 3HAC068057-001

Revision: A

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Overview of this manual

About this product specification

This product specification 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 equipment
- The load diagrams, mounting or extra equipment, the motion, and the robot reach
- The specification of available variants and options

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.

The specification is intended for:

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

References

| Document name | Document ID |
|---|----------------|
| <i>Product manual, spare parts - IRB 910INV</i> | 3HAC068056-001 |
| <i>Product manual - IRB 910INV</i> | 3HAC068055-001 |
| <i>Circuit diagram - IRB 910INV</i> | 3HAC061899-011 |
| <i>Operating manual - General safety information ⁱ</i> | 3HAC031045-001 |
| <i>Product manual - OmniCore C30</i> | 3HAC060860-001 |
| <i>Operating manual - OmniCore</i> | 3HAC065036-001 |
| <i>Application manual - Controller software OmniCore</i> | 3HAC066554-001 |
| <i>Application manual - CalibWare Field</i> | 3HAC030421-001 |
| <i>Technical reference manual - Event logs for RobotWare 7</i> | 3HAC066553-001 |
| <i>Technical reference manual - Lubrication in gearboxes</i> | 3HAC042927-001 |
| <i>Technical reference manual - System parameters</i> | 3HAC065041-001 |

ⁱ This manual contains all safety instructions from the product manuals for the manipulators and the controllers.

Revisions

| Revision | Description |
|----------|----------------|
| A | First edition. |

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1 Description

1.1 Structure

1.1.1 Introduction to structure

General

The IRB 910INV is ABB Robotics second generation SCARA robot, with 4 axes and a max payload of 3 kg and 6 kg in two different reach variants 0.35 m and 0.55 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 OmniCore C30 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 *Operating manual - OmniCore*.

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 the *Product specification - OmniCore C line*.

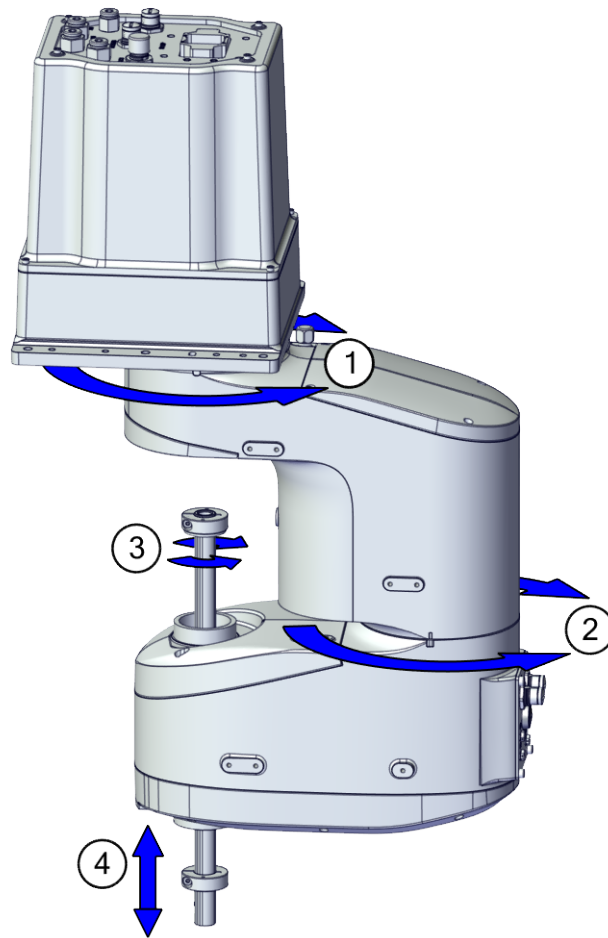
Continues on next page

1 Description

1.1.1 Introduction to structure

Continued

Manipulator axes



xx190000084

| Position | Description | Position | Description |
|----------|-------------|----------|-------------|
| 1 | Axis 1 | 2 | Axis 2 |
| 3 | Axis 3 | 4 | Axis 4 |

1.1.2 The robot

General

The IRB 910INV 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 | Maximum handling capacity (kg) | Reach (m) |
|-------------------|--------------------------------|-----------|
| IRB 910INV-3/0.35 | 3 kg | 0.35 m |
| IRB 910INV-6/0.55 | 6 kg | 0.55 m |

Continues on next page

1 Description

1.1.2.1 Technical data

1.1.2.1 Technical data

Weight, robot

The table shows the weight of the robot.

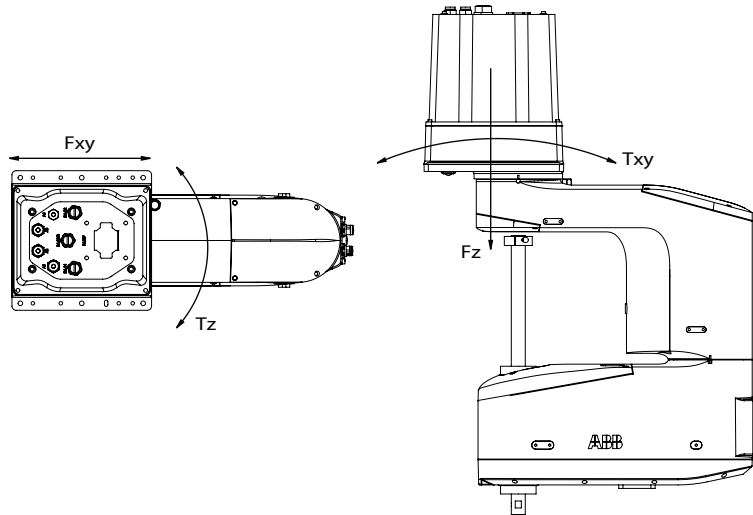
| Robot model | Weight |
|-------------|--|
| IRB 910INV | IRB 910INV-3/0.35: 19 kg IRB 910INV-6/0.55: 22 kg |



Note

The weight does not include tools and other equipment fitted on the robot!

Loads on foundation, robot



xx190000059

| | |
|----------|---|
| 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!



WARNING

The robot installation is restricted to the mounting options given in following load table(s).


Continues on next page

Inverted

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|-----------|-------------------------------|----------------------------|
| Force xy | ±420/440 N | ±770/710 N |
| Force z | 190 ±135/220 ±200 N | 190 ±660/220 ±110 N |
| Torque xy | ±220/170 Nm | ±220/320 Nm |
| Torque z | ±90/125 Nm | ±160/190Nm |

Requirements, foundation

The table shows the requirements for the foundation where the weight of the installed robot is included:

| Requirement | Value | Note |
|--------------------------------|--|---|
| Flatness of foundation surface | 0.1/500 mm | Flat foundations give better repeatability of the resolver calibration compared to original settings on delivery from ABB. The value for levelness aims at the circumstance of the anchoring points in the robot base. In order to compensate for an uneven surface, the robot can be recalibrated during installation. If resolver/encoder calibration is changed this will influence the absolute accuracy. |
| Maximum tilt | 3° | |
| Minimum resonance frequency | 22 Hz  Note It may affect the manipulator lifetime to have a lower resonance frequency than recommended. | The value is recommended for optimal performance. Due to foundation stiffness, consider robot mass including equipment. ⁱ For information about compensating for foundation flexibility, see <i>Application manual - Controller software OmniCore</i> , section <i>Motion Process Mode</i> . |

ⁱ The minimum resonance frequency given should be interpreted as the frequency of the robot mass/inertia, robot assumed stiff, when a foundation translational/torsional elasticity is added, i.e., the stiffness of the pedestal where the robot is mounted. The minimum resonance frequency should not be interpreted as the resonance frequency of the building, floor etc. For example, if the equivalent mass of the floor is very high, it will not affect robot movement, even if the frequency is well below the stated 25 Hz. The robot should be mounted as rigid as possible to the floor.

Disturbances from other machinery will affect the robot and the tool accuracy. The robot has resonance frequencies in the region 10 – 20 Hz and disturbances in this region will be amplified, although somewhat damped by the servo control. This might be a problem, depending on the requirements from the applications. If this is a problem, the robot needs to be isolated from the environment.

Storage conditions, robot

The table shows the allowed storage conditions for the robot:

| Parameter | Value |
|--|--|
| Minimum ambient temperature | -25 °C |
| Maximum ambient temperature | 55 °C |
| Maximum ambient temperature (less than 24 hrs) | 70 °C |
| Maximum ambient humidity | 95% at constant temperature (gaseous only) |

Continues on next page

1 Description

1.1.2.1 Technical data

Continued

Operating conditions, robot

The table shows the allowed operating conditions for the robot:

| Parameter | Value |
|-----------------------------|-----------------------------|
| Minimum ambient temperature | 5 °C ⁱ |
| Maximum ambient temperature | 45 °C |
| Maximum ambient humidity | 95% at constant temperature |

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.

Protection classes, robot

The table shows the available protection types of the robot, with the corresponding protection class.

| Protection type | Protection class |
|---------------------------------------|-------------------|
| Manipulator, protection type Standard | IP30 ⁱ |

ⁱ The protection class of the ballscrew area is IP20. For more information, please contact ABB.

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/EC) |

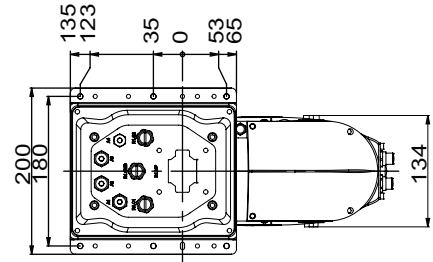
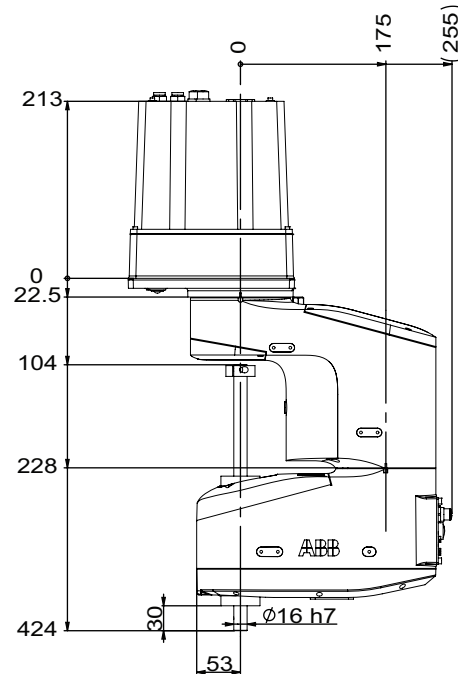
Power consumption

| Robot in 0 degree position | IRB 910INV-3/0.35 | IRB 910INV-6/0.55 |
|----------------------------|-------------------|-------------------|
| Brakes engaged (W) | 74 | 81 |
| Brakes disengaged (W) | 102 | 115 |

Dimensions

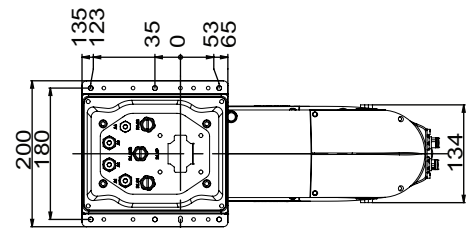
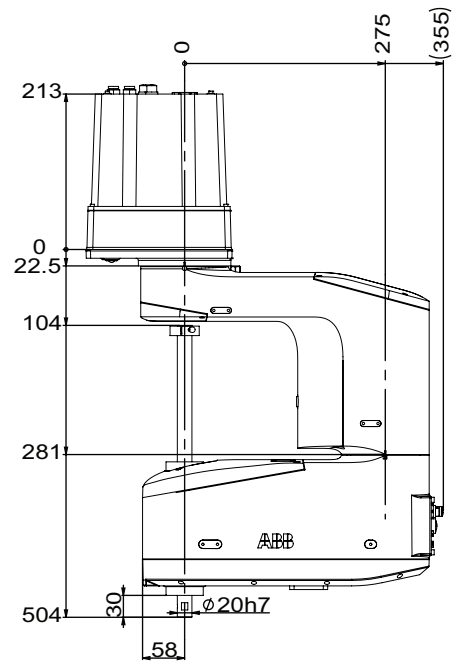
The figure shows the dimension of the robot.

IRB 910INV-3/0.35



xx1800002818

IRB 910INV-6/0.55



xx1900000217

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.

Standards, EN ISO

The product is designed in accordance with the requirements of:

| Standard | Description |
|---|--|
| EN ISO 12100:2010 | Safety of machinery - General principles for design - Risk assessment and risk reduction |
| EN ISO 13849-1:2015 | Safety of machinery, safety related parts of control systems - Part 1: General principles for design |
| EN ISO 13850:2015 | Safety of machinery - Emergency stop - Principles for design |
| EN ISO 10218-1:2011 | Robots for industrial environments - Safety requirements -Part 1 Robot |
| ISO 9787:2013 | Robots and robotic devices -- Coordinate systems and motion nomenclatures |
| ISO 9283:1998 | Manipulating industrial robots, performance criteria, and related test methods |
| EN ISO 14644-1:2015 ⁱ | Classification of air cleanliness |
| EN ISO 13732-1:2008 | Ergonomics of the thermal environment - Part 1 |
| EN 61000-6-4:2007 + A1:2011 IEC 61000-6-4:2006 + A1:2010 (option 129-1) | EMC, Generic emission |
| EN 61000-6-2:2005 IEC 61000-6-2:2005 | EMC, Generic immunity |
| EN IEC 60974-1:2012 ⁱⁱ | Arc welding equipment - Part 1: Welding power sources |
| EN IEC 60974-10:2014 ⁱⁱ | Arc welding equipment - Part 10: EMC requirements |
| EN IEC 60204-1:2006 | Safety of machinery - Electrical equipment of machines - Part 1 General requirements |
| IEC 60529:1989 + A2:2013 | Degrees of protection provided by enclosures (IP code) |

ⁱ Only robots with protection Clean Room.

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

European standards

| Standard | Description |
|-------------------------|--|
| EN 614-1:2006 + A1:2009 | Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles |

Continues on next page

1 Description

1.2.1 Applicable standards

Continued

| Standard | Description |
|-----------------------|---|
| EN 574:1996 + A1:2008 | Safety of machinery - Two-hand control devices - Functional aspects - Principles for design |

Other standards

| 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 |

1 Description

1.3.1 Introduction to installation

1.3 Installation

1.3.1 Introduction to installation

General

IRB 910INV 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 26](#).

1.3.2 Operating requirements**Protection standard**

| Robot variant | Protection standard IEC529 |
|---------------------------|----------------------------|
| All variants, manipulator | IP30 ⁱ |

ⁱ The protection class of the ballscrew area is IP20. For more information, please contact ABB.

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.

Relative humidity

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

Attachment screws

The table below specifies the type of securing screws and washers to be used for securing the robot to the base plate/foundation.

| | | | |
|--|---|--|-----|
| Suitable screws | M6x25 (robot installation directly on foundation) | | |
| Quantity | 6 pcs | | |
| Quality | 10.9 | | |
| Suitable washer | 12 x 6.4 x 1.6, steel hardness class 300HV | | |
| Guide pins | 2 pcs, D5x20, ISO 2338 - 5m6x20 - A1 | | |
| Tightening torque | 11 Nm±1.1 Nm | | |
| Level surface requirements | <table border="1" style="width: 100%;"> <tr> <td style="text-align: center;">  </td> <td style="text-align: center; vertical-align: middle;">0.2</td> </tr> </table> <p style="font-size: small; margin-top: 5px;">xx0900000643</p> |  | 0.2 |
|  | 0.2 | | |

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 *Product manual - OmniCore C30*.



WARNING

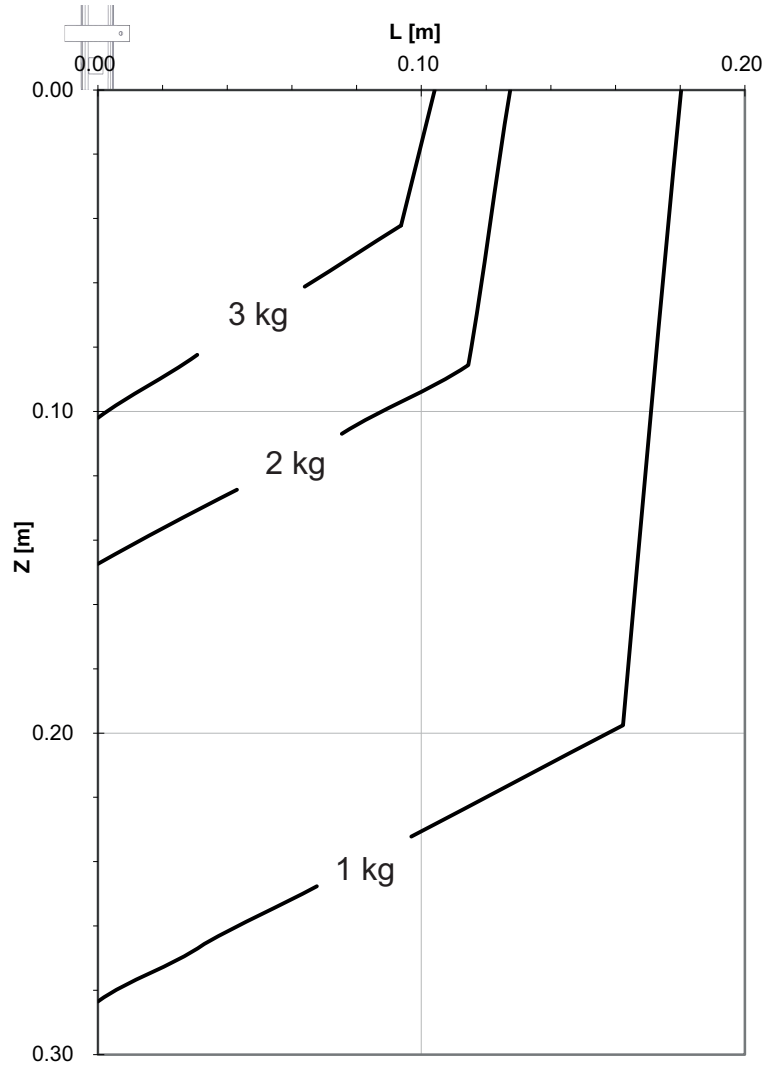
Robots running with incorrect load data and/or with loads outside diagram, will not be covered by robot warranty.

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 and thus it is also possible to use RobotLoad within those tilt and axis limits.

1.4.2 Load diagram

IRB 910INV-3/0.35



xx1800003275

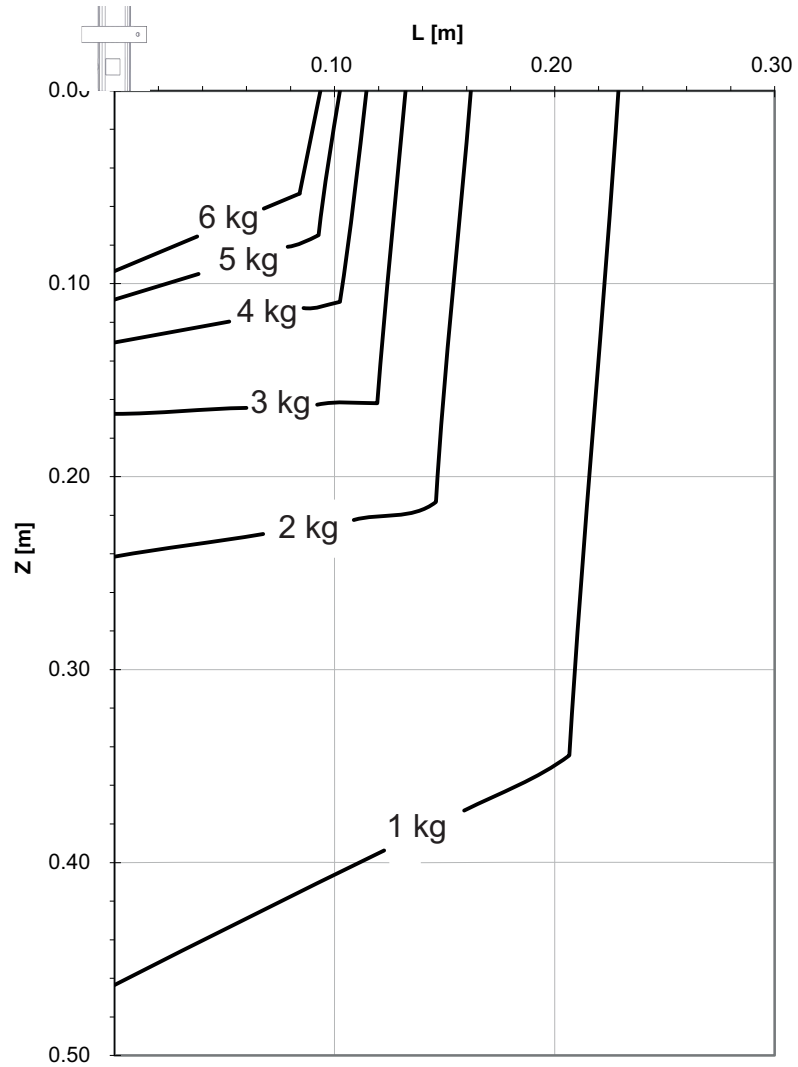
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1 Description

1.4.2 Load diagram

Continued

IRB 910INV-6/0.55



xx1800003276

1.4.3 Maximum load and moment of inertia

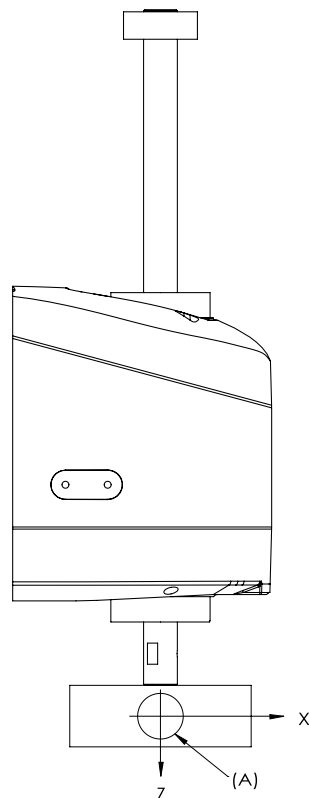
General

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 910INV, L is 0 mm at the default rating and its maximum value changes with the payload. See [Load diagram on page 23](#).

Full movement

| Axis | Robot variant | Max. value |
|------|-------------------|---|
| 4 | IRB 910INV-3/0.35 | $J_4 = \text{Mass} \times L^2 + J_{0z} \leq 0.05 \text{ kgm}^2$ |
| | IRB 910INV-6/0.55 | $J_4 = \text{Mass} \times L^2 + J_{0z} \leq 0.12 \text{ kgm}^2$ |



xx1900001317

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

1 Description

1.5 Mounting of equipment

1.5 Mounting of equipment

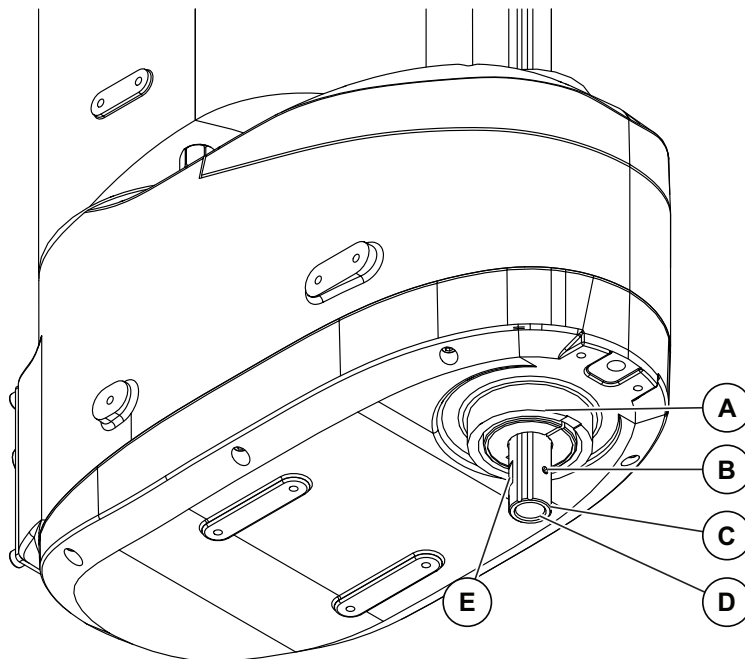
Fitting of end effector to the ball screw spline shaft

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.



Note

Mounting of other equipment on the IRB 910INV may damage the gearboxes.



xx1800002819

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

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.

The original calibration data delivered with the robot is generated when the robot is floor mounted. If the robot is not floor mounted, then the robot accuracy could be affected. The robot needs to be calibrated after it is mounted.

More information is available in the product manual.

Types of calibration

| Type of calibration | Description | Calibration method |
|--|--|-------------------------------|
| Standard calibration | The calibrated robot is positioned at calibration position. Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot. | Axis Calibration ⁱ |
| Absolute accuracy calibration (optional) | Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for: <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>A robot calibrated with Absolute accuracy has the option information printed on its name plate.</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> | CalibWare |

ⁱ Only axes 1 and 2 can be calibrated using Axis Calibration method.

Brief description of calibration methods

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRB 910INV and is the most accurate method for the standard calibration. It is the recommended method in order to achieve proper performance.

The following routines are available for the Axis Calibration method:

- Fine calibration
- Update revolution counters
- Reference calibration

Continues on next page

1 Description

1.6.1 Calibration methods

Continued

The calibration equipment for Axis Calibration is delivered as a toolkit.

The actual instructions of how to perform the calibration procedure and what to do at each step is given on the FlexPendant. You will be guided through the calibration procedure, step by step.

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*.

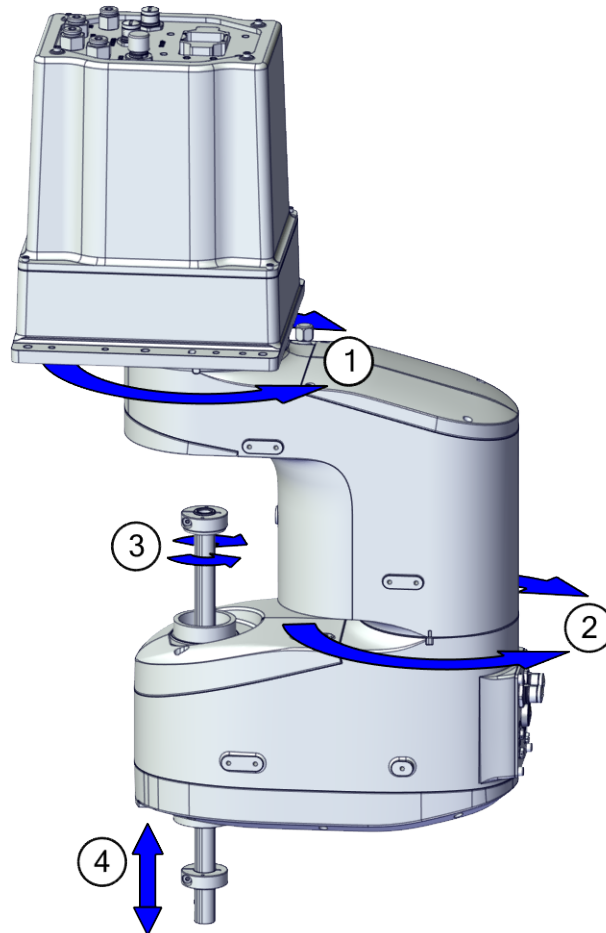
If a service operation is done to a robot with the option Absolute Accuracy, a new absolute accuracy calibration is required in order to establish full performance. For most cases after replacements that do not include taking apart the robot structure, standard calibration is sufficient.

The Absolute Accuracy option varies according to the robot mounting position. This is printed on the robot name plate for each robot. The robot must be in the correct mounting position when it is recalibrated for absolute accuracy.

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 910INV*.



xx190000084

| Position | Description | Position | Description |
|----------|-------------|----------|-------------|
| 1 | Axis 1 | 2 | Axis 2 |
| 3 | Axis 3 | 4 | Axis 4 |

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 non or minimum touch-up
- Online programming with accurate movement and reorientation of tool
- Accurate cell alignment for MultiMove coordinated motion
- 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 is marked on the manipulator.

Absolute Accuracy supports both floor mounted and inverted installations. The compensation parameters differ depending on if the robot is floor mounted or inverted.

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

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 910INV*.

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

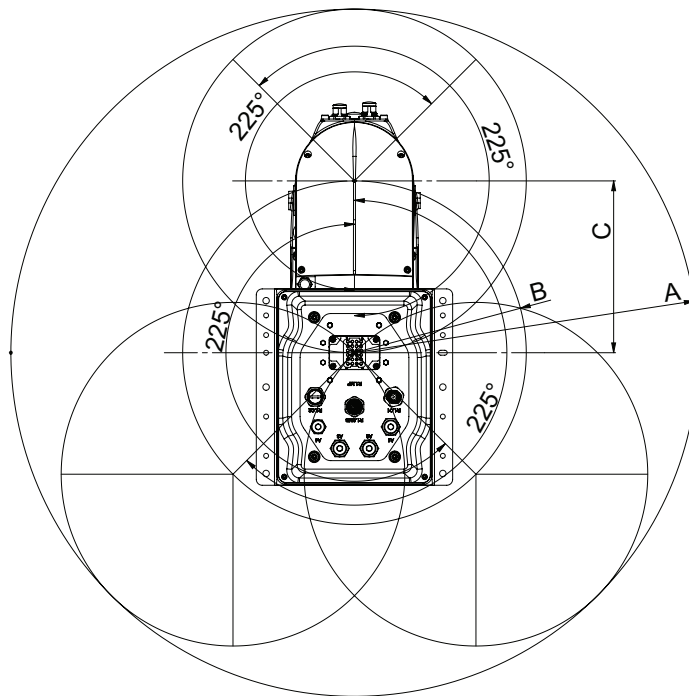
1.8.1 Working range and type of motion

Robot motion

| Axis | Type of motion | Working range | |
|--------|-----------------|-------------------|-------------------|
| | | IRB 910INV-3/0.35 | IRB 910INV-6/0.55 |
| Axis 1 | Rotation motion | ±225° | ±225° |
| Axis 2 | Rotation motion | ±225° | ±225° |
| Axis 3 | Linear motion | -140 mm to 0 mm | -190 mm to 0 mm |
| Axis 4 | Rotation motion | ±720° | ±720° |

Illustration, working range and turning radius

This illustration shows the unrestricted working range and turning radius.



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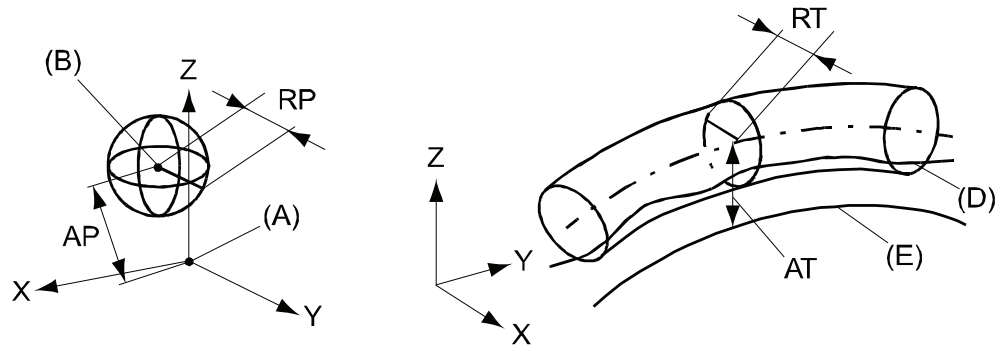
| | IRB 910INV-3/0.35 | IRB 910INV-6/0.55 |
|---|-------------------|-------------------|
| A | R350 | R550 |
| B | R175 | R275 |
| C | 175 | 275 |
| D | 140 | 190 |

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.



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| 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 910INV-3/0.35 | IRB 910INV-6/0.55 |
| Pose repeatability, RP (mm) | 0.01 | 0.01 |
| Linear path repeatability, RT (mm) | 0.06 | 0.05 |
| Pose stabilization time, PSt (s) within 0.1 mm of the position | 0.61 | 1.05 |

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

1 Description

1.8.3 Velocity

1.8.3 Velocity

General

| Robot variant | Axis 1 | Axis 2 | Axis 3 | Axis 4 |
|-------------------|---------|---------|---------|-----------|
| IRB 910INV-3/0.35 | 672 °/s | 780 °/s | 1.1m/s | 3,000 °/s |
| IRB 910INV-6/0.55 | 420 °/s | 780 °/s | 1.1 m/s | 3,000 °/s |

The velocities of axes 1, 2, and 4 are measured with 1 kg 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.

1.8.4 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

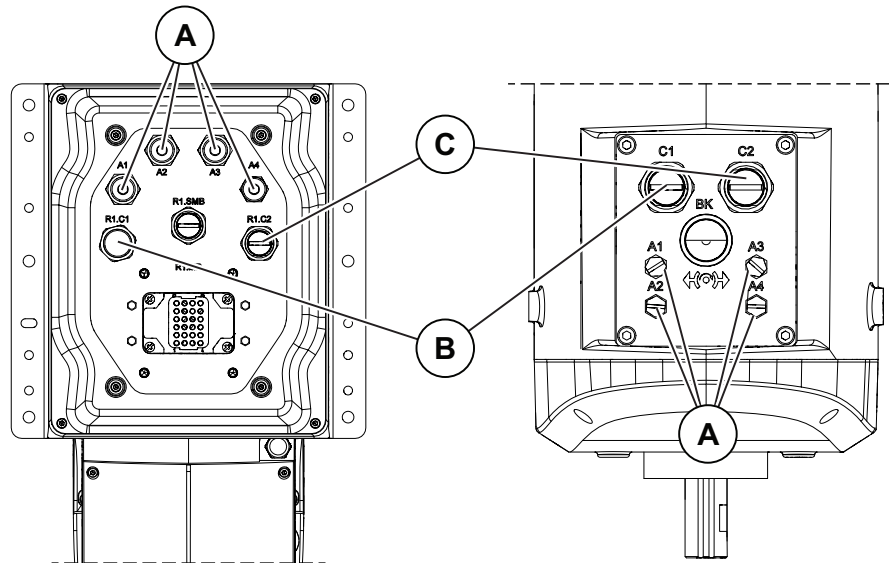
1.9 Customer connections

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 outer arm and base. There are two connectors C1/C2 at the outer arm. Corresponding connector R1.C1/R1.C2 are 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 outer arm.



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| Position | Connection | Description | Number | Value |
|----------|------------|-----------------------------------|----------------------|--|
| A | Air | Max. 6 bar | 4 | Air hose OD 4 mm x2, air hose OD 6 mm x2 |
| B | C1 | Customer power/signal | 8 wires ⁱ | 30 V, 1.5 A |
| C | C2 | Customer power/signal or ethernet | 8 wires | 30 V, 1 A or 1 Gbits/s |

ⁱ The connector has 12 pins. Only pins 1 to 8 are available for use.

Connector kits

The tables describes the CP/CS and Ethernet (if any) connector kits for the outer arm.

Connector kits, outer arm

| Position | Description | Art. no. | |
|----------------|-------------|---|----------------|
| Connector kits | CP/CS | M12 CP/CS Male straight connector kits | 3HAC066098-001 |
| | | M12 CP/CS Male angled connector kits | 3HAC066099-001 |
| | Ethernet | M12 Ethernet Cat5e Male straight connector kits | 3HAC067413-001 |
| | | M12 Ethernet Cat5e Male angled connector kits | 3HAC067414-001 |

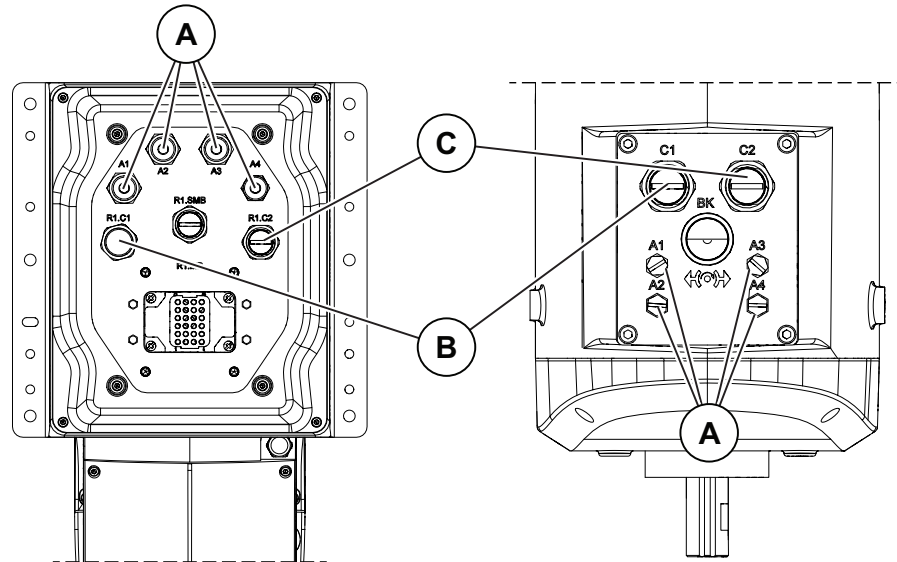
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Protection covers

Protection covers for water and dust proofing

Protection covers are delivered together with the robot and must be well fitted to the connectors in any application requiring water and dust proofing.

Always remember to refit the protection covers after removing them.



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| | |
|---|--------------------------------------|
| A | Air hose connector protection covers |
| B | CP/CS connector protection covers |
| C | Ethernet connector protection covers |

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2 Specification of variants and options

2.1 Introduction to variants and options

General

The different variants and options for the IRB 910INV 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 | Max handling capacity (kg) | Reach (m) |
|--------|------------|----------------------------|-----------|
| 3300-3 | IRB 910INV | 3 | 0.35 |
| 3300-4 | IRB 910INV | 6 | 0.55 |

Manipulator color

| Option | Description |
|--------|-----------------------------|
| 209-2 | ABB Graphite White standard |



Note

Notice that delivery time for painted spare parts will increase for none standard colors.

Protection

| Option | Description |
|----------|-------------------|
| 3350-300 | IP30 ⁱ |

ⁱ The protection class of the ballscrew area is IP20. For more information, please contact ABB.

Media & Communication

| Option | Type | Description |
|--------|-------------------------|---|
| 3303-1 | Parallel & Air | Includes customer power CP and customer signals CS + air. |
| 3303-2 | Ethernet, Parallel, Air | Includes CP, CS and PROFINET or Ethernet + air. |

Connector kit

| Option | Description |
|--------|---|
| 3304-1 | Male-type, Straight connector kits |
| 3305-1 | Male-type, Angled connector kits |
| 3306-1 | Male-type, Straight Ethernet connector kits |
| 3307-1 | Male-type, Angled Ethernet connector kits |

2.3 Floor cables

Manipulator cable length

| Option | Lengths |
|--------|---------|
| 3200-1 | 3 m |
| 3200-2 | 7 m |
| 3200-3 | 15 m |

Connection of parallel communication

| Option | Lengths |
|--------|---------|
| 3201-1 | 3 m |
| 3201-2 | 7 m |
| 3201-3 | 15 m |

Connection of Ethernet

| Option | Lengths |
|--------|---------|
| 3202-2 | 7 m |
| 3202-3 | 15 m |

Warranty


| 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. |
| 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. |

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2 Specification of variants and options

2.3 Floor cables

Continued

| Option | Type | Description |
|--------|----------------|--|
| 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</p> <p>Special conditions are applicable, see <i>Robotics Warranty Directives</i>.</p> |

2.4 User documentation

User documentation

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

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

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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 - OmniCore C line* and *Product specification - Controller software OmniCore*.

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