

ROBOTICS

Product specification

IRB 1520



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Product specification

IRB 1520

IRC5

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Table of contents

| | |
|--|-----------|
| Overview of this specification | 7 |
| 1 Description | 9 |
| 1.1 Structure | 9 |
| 1.1.1 Introduction | 9 |
| 1.1.2 Different robot versions | 11 |
| 1.2 Applicable standards | 14 |
| 1.3 Installation | 16 |
| 1.3.1 Introduction | 16 |
| 1.3.2 Technical data | 17 |
| 1.3.3 Mounting the manipulator | 21 |
| 1.4 Calibration and reference | 24 |
| 1.4.1 Calibration methods | 24 |
| 1.4.2 Fine calibration | 26 |
| 1.5 Robot load and diagrams | 27 |
| 1.5.1 Introduction | 27 |
| 1.5.2 Load diagrams | 28 |
| 1.5.3 Maximum load and moment of inertia for full and limited axis (center line down) movement | 30 |
| 1.5.4 Wrist torque | 32 |
| 1.6 Mounting of equipment | 33 |
| 1.7 Robot motion | 37 |
| 1.7.1 Introduction | 37 |
| 1.7.2 Performance according to ISO 9283 | 39 |
| 1.7.3 Velocity | 40 |
| 1.7.4 Robot stopping distances and times | 41 |
| 1.8 Customer connections | 42 |
| 1.9 Maintenance and troubleshooting | 43 |
| 2 Specification of variants and options | 45 |
| 2.1 Introduction to variants and options | 45 |
| 2.2 Manipulator | 46 |
| 2.3 Floor cables | 48 |
| 2.4 Process | 49 |
| 2.4.1 Process | 49 |
| 2.4.2 Process equipment | 50 |
| 2.5 User documentation | 51 |
| 3 Accessories | 53 |
| 3.1 Introduction to accessories | 53 |
| Index | 55 |

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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 variant 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

| Reference | Document ID |
|--|----------------|
| <i>Product specification - Controller IRC5</i> IRC5 with main computer DSQC1000. | 3HAC047400-001 |
| <i>Product specification - Controller software IRC5</i> IRC5 with main computer DSQC1000 and RobotWare 6. | 3HAC050945-001 |
| <i>Product manual - IRB 1520</i> | 3HAC043435-001 |
| <i>Product manual - Arc welding equipment for IRB 1520ID</i> | 3HAC043438-001 |
| <i>Product specification - Robot user documentation, IRC5 with RobotWare 6</i> | 3HAC052355-001 |

Revisions

| Revision | Description |
|----------|---|
| - | <ul style="list-style-type: none"> • New product specification |
| A | <ul style="list-style-type: none"> • Minor corrections/update |
| B | <ul style="list-style-type: none"> • Text for ISO test adjusted • Robot stopping distances and times for category 0 and category 1 stops are moved to a separate document, <i>Product specification - Robot stopping distances according to ISO 10218-1</i> |
| C | <ul style="list-style-type: none"> • Option 1029-17 added |
| D | <ul style="list-style-type: none"> • Minor corrections/update |

Continues on next page

Overview of this specification

Continued

| Revision | Description |
|----------|---|
| E | Published in release R17.1. The following updates are done in this revision: <ul style="list-style-type: none">• Restriction of load diagram added. |
| F | Published in release R17.2. The following updates are done in this revision: <ul style="list-style-type: none">• Updated list of applicable standards. |
| G | Published in release R18.1. The following updates are done in this revision: <ul style="list-style-type: none">• Minor changes. |
| H | Published in release R18.2. The following updates are done in this revision: <ul style="list-style-type: none">• Removed the phased out options: option Self cooled torch [878-2], option RPC S-400 [1029-15], option Process cabling [1029-17], and option Marathon Pac Octagon [1033-2] |
| J | Published in release 19C. The following updates are done in this revision: <ul style="list-style-type: none">• Note added about need to calibrate if the robot is other than floor mounted. See Calibration methods on page 24 |
| K | Published in release 23B. The following updates are done in this revision: <ul style="list-style-type: none">• Text regarding fastener quality is updated.• Warranty section updated.• Removed Axis resolution.• Correction regarding WeldGuide options |
| L | Published in release 24D. The following updates are done in this revision: <ul style="list-style-type: none">• Updated the section Technical data on page 17. |

1 Description

1.1 Structure

1.1.1 Introduction

Robot family

ABB's IRB 1520 robot is a dedicated arc welding robot available in one version. It has a compact process upper arm designed for integrated dressing packages for arc welding. The IRB 1520ID-4/1.5 is a part of the ArcPack Lean concept.

Operating system

The robot is equipped with the IRC5 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*.

Additional functionality

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

Software product range

We have added a range of software products - all falling under the umbrella designation of Active Safety - to protect not only personnel in the unlikely event of an accident, but also robot tools, peripheral equipment and the robot itself.

Safety

Safety standards valid for complete robot, manipulator and controller.

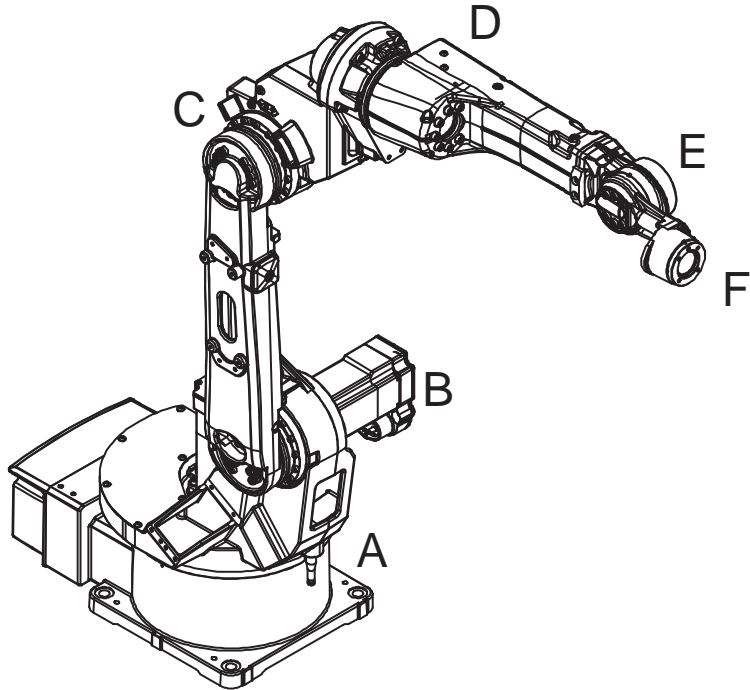
Continues on next page

1 Description

1.1.1 Introduction

Continued

Manipulator axes



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| Pos | Description | Pos | Description |
|-----|-------------|-----|-------------|
| A | Axis 1 | B | Axis 2 |
| C | Axis 3 | D | Axis 4 |
| E | Axis 5 | F | Axis 6 |

1.1.2 Different robot versions

General

The IRB 1520 is available in one version and can only be mounted on the floor or inverted (no tilting allowed around X-axis or Y-axis). See [Robot motion on page 37](#) for limitations.

| Robot type | Handling capacity (kg) | Reach (m) |
|------------|------------------------|-----------|
| IRB 1520ID | 4 kg | 1.5 m |

Manipulator weight

| Robot | Weight |
|------------------|--------|
| IRB 1520ID-4/1.5 | 170 kg |

Other technical data

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

Power consumption at max load

| | |
|-------------------------------|------------------|
| Type of movement | IRB 1520ID-4/1.5 |
| ISO cube Max. velocity | 0.75 kW |
| Robot in calibration position | IRB 1520ID-4/1.5 |
| Brakes engaged | 0.206 kW |
| Brakes disengaged | 0.233 kW |

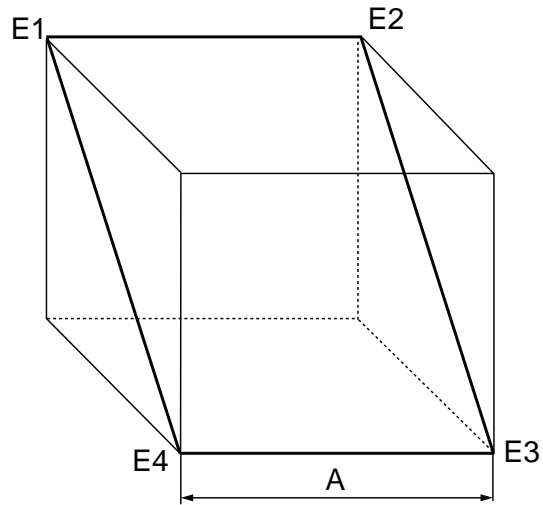
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1 Description

1.1.2 Different robot versions

Continued

Path E1-E2-E3-E4 in the ISO Cube, max.load.

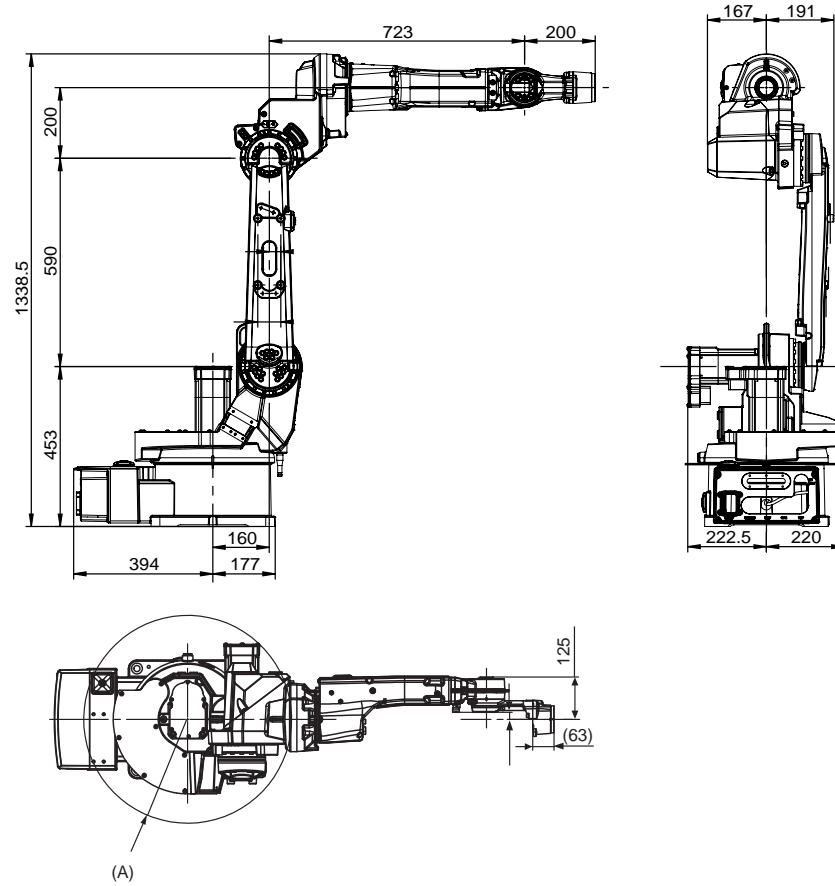


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| | |
|------------|--------|
| Pos | |
| A | 400 mm |

Continues on next page

Dimensions IRB 1520ID-4/1.5



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| Pos | Description |
|-----|---------------------------------|
| A | Minimum turning radius R=307 mm |

1 Description

1.2 Applicable standards

1.2 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 as referred to from ISO 10218-1

| 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 | Safety of machinery - Electrical equipment of machines - Part 1: General requirements |

Deviations from ISO 10218-1:2011 for IRC5 with MultiMove

A deviation exists towards ISO 10218-1:2011, paragraph 5.9 *Control of simultaneous motion*, for the option MultiMove. See the application manual for MultiMove.

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 | Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments |
| ISO 13732-1:2006 | Ergonomics of the thermal environment - Part 1 |
| IEC 60974-1:2012 ⁱ | Arc welding equipment - Part 1: Welding power sources |
| IEC 60974-10:2014 ^j | Arc welding equipment - Part 10: EMC requirements |
| ISO 14644-1:2015 ⁱⁱ | Classification of air cleanliness |

Continues on next page

| Standard | Description |
|--------------------------|--|
| 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

1.3 Installation

1.3.1 Introduction

General

IRB 1520ID-4/1.5 can only be mounted on the floor or inverted (no tilting allowed around X-axis or Y-axis). An end effector with max. weight of 4 kg including payload, can be mounted on the tool flange. See [Robot load and diagrams on page 27](#).

Extra equipment can be mounted on the upper arm. See [Mounting of equipment on page 33](#).

Extra loads

Extra load, which is included in the load diagrams, can be mounted on the upper arm. See [Robot load and diagrams on page 27](#).

Working range

Electronic Position Switches can be used on all axes for position indication of the manipulator.

Explosive environments

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

1.3.2 Technical data

Weight, robot

The table shows the weight of the robot.

| Robot model | Weight |
|-------------|--------|
| IRB 1520 | 170 kg |



Note

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

Mounting positions

The table shows valid mounting options for the manipulator.

| Mounting option | Installation angle | Note |
|-----------------|--------------------|------|
| Floor mounted | 0° ⁱ | |
| Suspended | 180° | |

ⁱ A tilt of up to 15° does not affect the payload or reach, but it can have a negative impact on performance and lifetime. The actual value must be set in the system parameters.



Note

The actual mounting angle must always be configured in the system parameters, otherwise the performance and lifetime is affected. See the product manual for details.

Continues on next page

1 Description

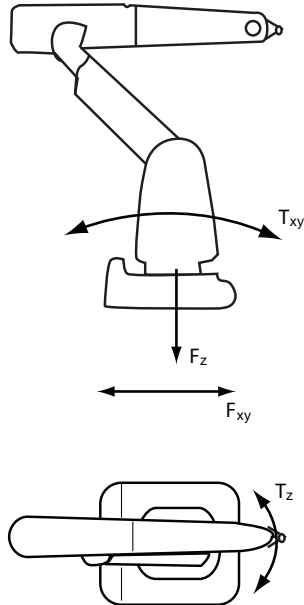
1.3.2 Technical data

Continued

Loads on foundation, robot

The illustration shows the directions of the robots stress forces.

The directions are valid for all floor mounted, suspended and inverted robots.



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| | |
|----------|---|
| 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).

Floor mounted

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|-----------|-------------------------------|----------------------------|
| Force xy | ± 1900 N | ± 4300 N |
| Force z | 1850 ± 900 N | 1850 ± 2350 N |
| Torque xy | ± 1550 Nm | ± 3900 Nm |
| Torque z | ± 390 Nm | ± 1200 Nm |


Continues on next page

Suspended

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|-----------|-------------------------------|----------------------------|
| Force xy | ± 1900 N | ± 4250 N |
| Force z | - 1850 ±750 N | -1850 ±2350 N |
| Torque xy | ± 1550 Nm | ± 3900 Nm |
| Torque z | ± 390 Nm | ± 1200 Nm |

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 | 0.5 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. |
| Minimum resonance frequency | 22 Hz  Note It may affect the manipulator life-time 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 the application manual of the controller software, 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 frequency. 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) | +75° C |
| Maximum ambient humidity | 95% at constant temperature (gaseous only) |

Continues on next page

1 Description

1.3.2 Technical data

Continued

Operating conditions, robot

The table shows the allowed operating conditions for the robot:

| Parameter | Value |
|-----------------------------|---|
| Minimum ambient temperature | +5° |
| Maximum ambient temperature | +45° |
| Maximum ambient humidity | 95% at constant temperature (gaseous only) |

Protection classes, robot

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

| Protection type | Protection class ⁱ |
|---------------------------------------|-------------------------------|
| Manipulator, protection type Standard | IP40 |

ⁱ According to IEC 60529.

1.3.3 Mounting the manipulator

General

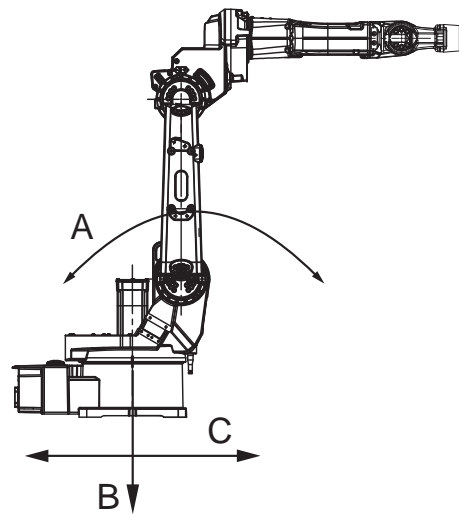
Maximum load in relation to the base coordination system. See Figure below.

Floor Mounted

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|-----------|-------------------------------|----------------------------|
| Force xy | ± 1900 N | ± 4300 N |
| Force z | 1850 ±900 N | 1850 ±2350 N |
| Torque xy | ± 1550 Nm | ± 3900 Nm |
| Torque z | ± 390 Nm | ± 1200 Nm |

Suspended

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|-----------|-------------------------------|----------------------------|
| Force xy | ± 1900 N | ± 4250 N |
| Force z | - 1850 ±750 N | -1850 ±2350 N |
| Torque xy | ± 1550 Nm | ± 3900 Nm |
| Torque z | ± 390 Nm | ± 1200 Nm |



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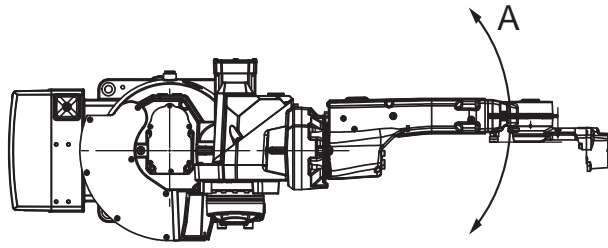
| Pos | Description |
|-----|---|
| A | Torque _{xy} (T _{xy}) |
| B | Force _z (F _z) |
| C | Force _{xy} (F _{xy}) |

Continues on next page

1 Description

1.3.3 Mounting the manipulator

Continued



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| Pos | Description |
|-----|---------------------------------------|
| A | Torque _z (T ₂) |

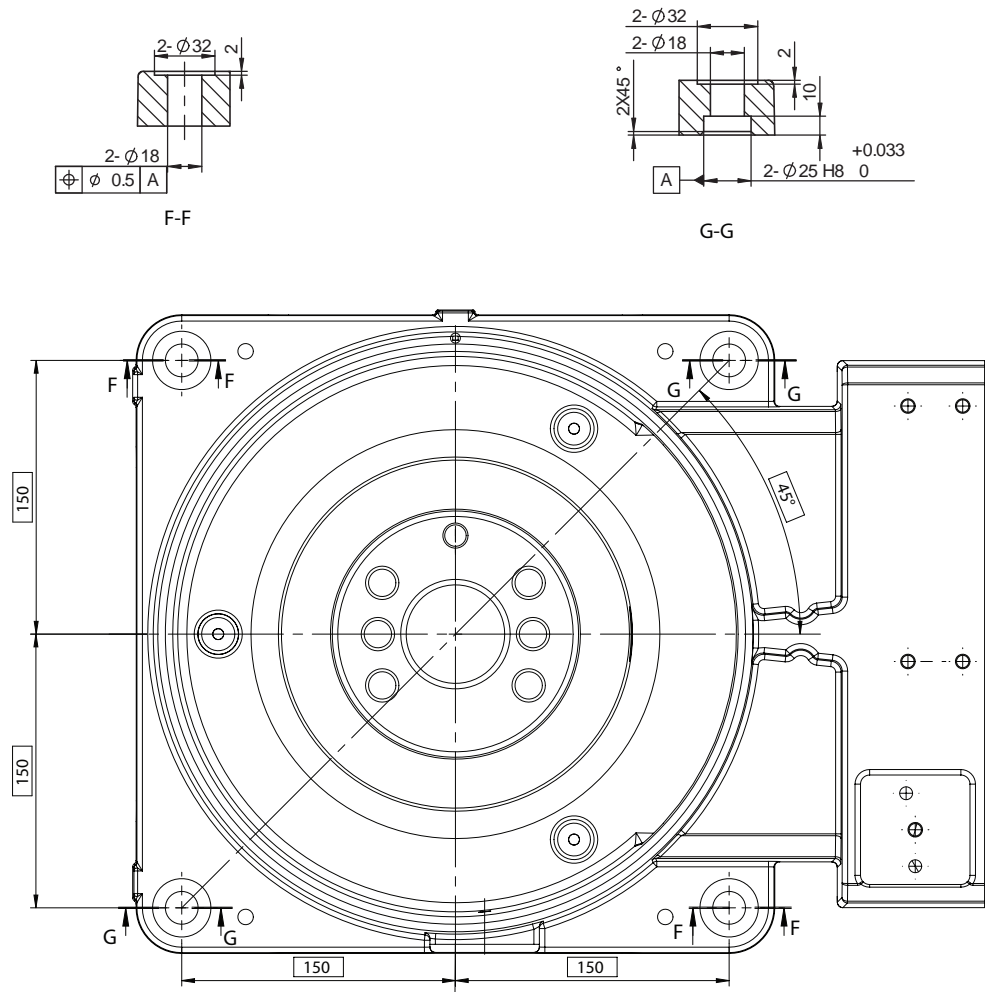
Note regarding M_{xy} and F_{xy}

The bending torque (M_{xy}) can occur in any direction in the XY-plane of the base coordinate system.

The same applies to the transverse force (F_{xy}).

Continues on next page

Fastening holes robot base



xx110000293

Attachment bolts, specification

The table below specifies required bolts and washers for securing the robot at installation site.

| Specification | Description |
|-------------------------|---|
| Attachment bolts, 4 pcs | M16 x 60 (installation directly on foundation) M16 x 70/80 (installation on foundation or base plate, using guiding sleeves) |
| Washers, 4 pcs | 17 x 30 x 3 |
| Quality | Quality 8.8 |
| Tightening torque | 200 Nm |

1 Description

1.4.1 Calibration methods

1.4 Calibration and reference

1.4.1 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. | Calibration Pendulum |
| 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 structureDeflection due to load Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot. Absolute accuracy calibration data is found on the serial measurement board (SMB) or other robot memory. For IRC5 robots, the absolute accuracy calibration data is delivered in a file, <code>absacc.cfg</code> , supplied with the robot at delivery. The file replaces the <code>calib.cfg</code> file and identifies motor positions as well as absolute accuracy compensation parameters. A robot calibrated with Absolute accuracy has a sticker next to the identification plate of the robot (IRC5). To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure. | CalibWare |



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Continues on next page

| Type of calibration | Description | Calibration method |
|---------------------|--|--------------------|
| Optimization | <p>Optimization of TCP reorientation performance. The purpose is to improve reorientation accuracy for continuous processes like welding and gluing.</p> <p>Wrist optimization will update standard calibration data for axes 4 and 5.</p> | Wrist Optimization |

Brief description of calibration methods

Calibration Pendulum method

Calibration Pendulum is a standard calibration method for calibration of some ABB robots.

Two different routines are available for the Calibration Pendulum method:

- Calibration Pendulum II
- Reference calibration

The calibration equipment for Calibration Pendulum is delivered as a complete toolkit, including the *Operating manual - Calibration Pendulum*, which describes the method and the different routines further.

Wrist Optimization method

Wrist Optimization is a method for improving reorientation accuracy for continuous processes like welding and gluing and is a complement to the standard calibration method.

The actual instructions of how to perform the wrist optimization procedure is given on the FlexPendant.

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.

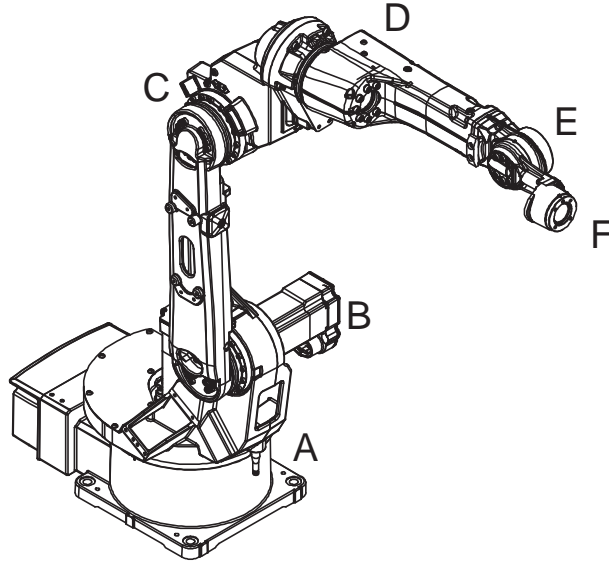
1 Description

1.4.2 Fine calibration

1.4.2 Fine calibration

General

Fine calibration is made using the Calibration Pendulum, see *Operating manual - Calibration Pendulum*.



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| Pos | Description | Pos | Description |
|-----|-------------|-----|-------------|
| A | Axis 1 | B | Axis 2 |
| C | Axis 3 | D | Axis 4 |
| E | Axis 5 | F | Axis 6 |

Calibration

| Calibration | Position |
|-----------------------------|-------------------------------|
| Calibration of all axes | All axes are in zero position |
| Calibration of axis 1 and 2 | Axis 1 and 2 in zero position |
| | Axis 3 to 6 in any position |
| Calibration of axis 1 | Axis 1 in zero position |
| | Axis 2 to 6 in any position |

1.5 Robot load and diagrams

1.5.1 Introduction

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

- motors
- gearboxes
- mechanical structure



WARNING

In RobotWare, the service routine LoadIdentify can be used to determine correct load parameters. The routine automatically defines the tool and the load.

See *Operating manual - IRC5 with FlexPendant*, for detailed information.



WARNING

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

General

The load diagrams include a nominal payload inertia, J_0 of 0.012 kgm^2 , and an extra load of 10 kg (hose package included) at the upper arm housing. 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.

Control of load case with RobotLoad

To verify a specific load case, use the RobotStudio add-in RobotLoad.

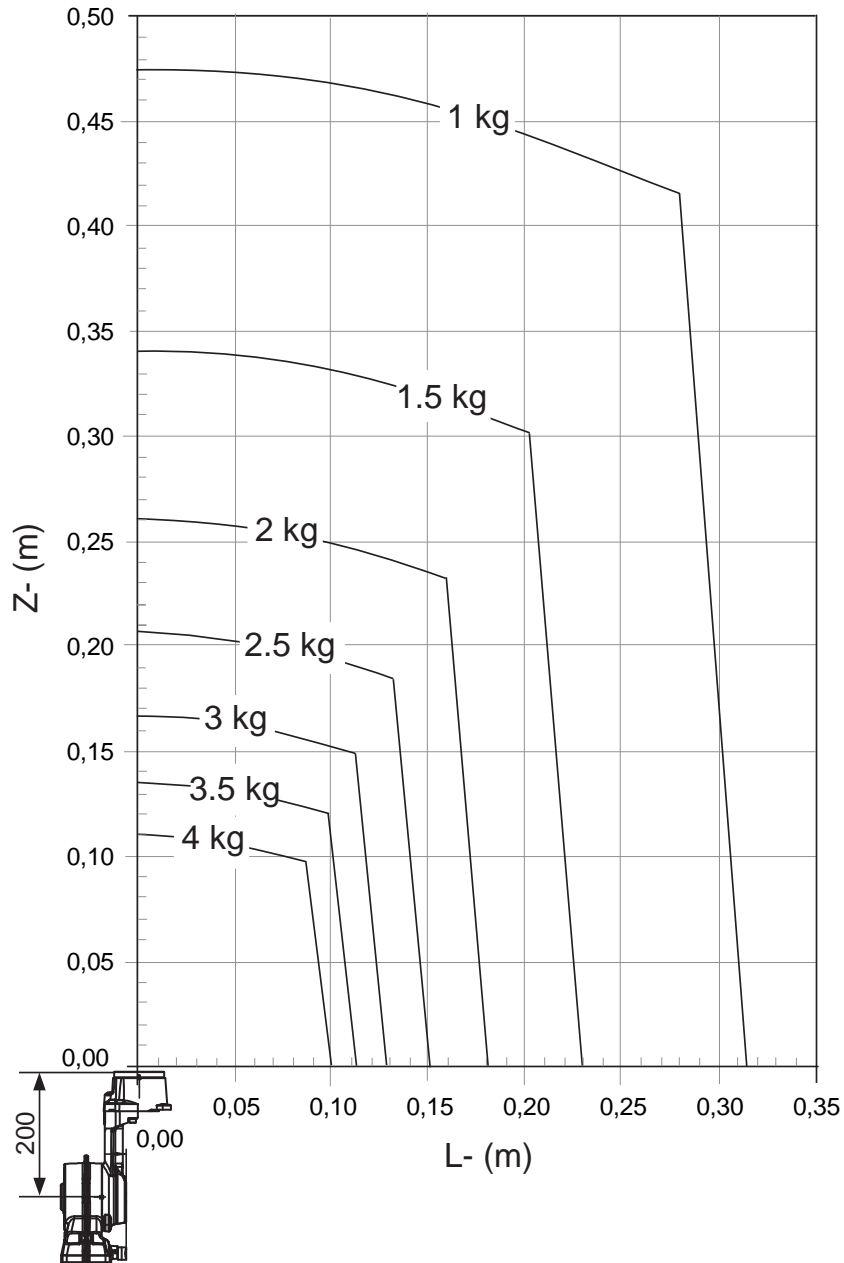
The result from RobotLoad is only valid within the maximum loads and tilt angles. There is no warning if the maximum permitted arm load is exceeded. For over-load cases and special applications, contact ABB for further analysis.

1 Description

1.5.2 Load diagrams

1.5.2 Load diagrams

IRB 1520ID-4/1.5

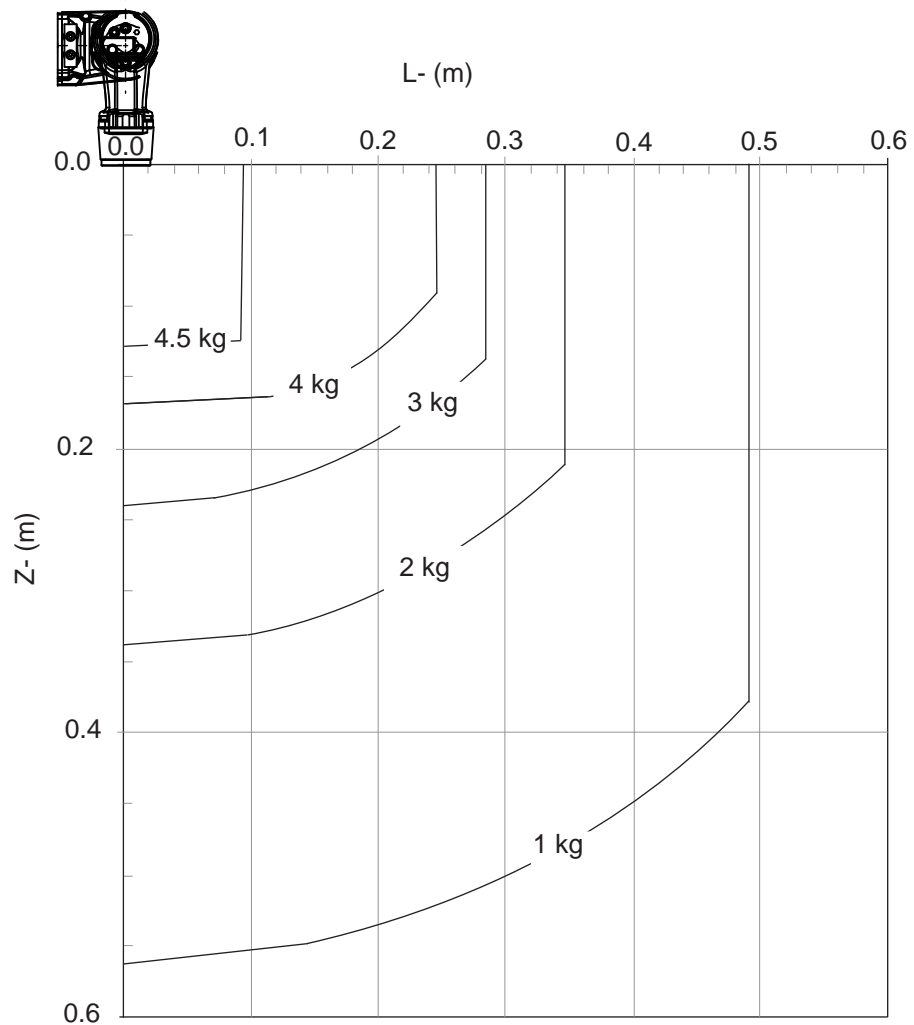


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Extra load of 10 kg (hose package included) at the upper arm housing included in the load diagram.

Continues on next page

IRB 1520ID-4/1.5 "Vertical Wrist" ($\pm 10^\circ$)



xx110000471

Extra load of 10 kg (hose package included) at the upper arm housing included in the load diagram.

For wrist down (turning disk faced downwards) with $\pm 10^\circ$ deviation from vertical line.

| | Description |
|------------------|-------------|
| Max load | 4.5 kg |
| Z _{max} | 0.128 m |
| L _{max} | 0.093 m |

1 Description

1.5.3 Maximum load and moment of inertia for full and limited axis (center line down) movement

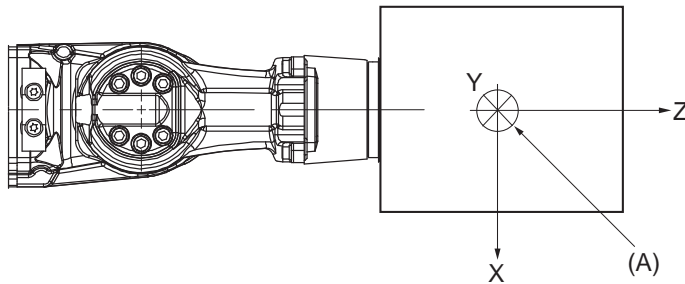
1.5.3 Maximum load and moment of inertia for full and limited axis (center line down) movement

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 . $L = \sqrt{X^2 + Y^2}$, see Figure below.

Full movement of axis 5 (+135° to -135°)

| Axis | Robot type | Max. value |
|------|-------------------|---|
| 5 | IRB 15620ID-4/1.5 | $J_5 = \text{Mass} \times ((Z + 0.200)^2 + L^2) + \max(J_{ox}, J_{oy}) \leq 0.58 \text{ kgm}^2$ |
| 6 | IRB 1520ID-4/1.5 | $J_6 = \text{Mass} \times L^2 + J_{oz} \leq 0.24 \text{ kgm}^2$ |



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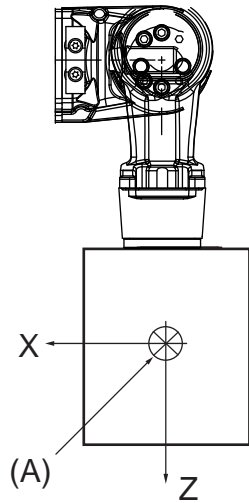
| Pos | Description |
|--------------------------|---|
| A | Center of gravity |
| Description | |
| J_{ox}, J_{oy}, J_{oz} | Max. moment of inertia around the X, Y and Z axes at center of gravity. |

Limited axis 5, Center line down

| Axis | Robot type | Max. value |
|------|------------------|---|
| 5 | IRB 1520ID-4/1.5 | $J_5 = \text{Mass} \times ((Z + 0.200)^2 + L^2) + \max(J_{ox}, J_{oy}) \leq 0.58 \text{ kgm}^2$ |
| 6 | IRB 1520ID-4/1.5 | $J_6 = \text{Mass} \times L^2 + J_{oz} \leq 0.24 \text{ kgm}^2$ |

Continues on next page

1.5.3 Maximum load and moment of inertia for full and limited axis (center line down) movement
Continued



xx110000475

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

1 Description

1.5.4 Wrist torque

1.5.4 Wrist torque

General

The table below shows the maximum permissible torque due to payload.



Note

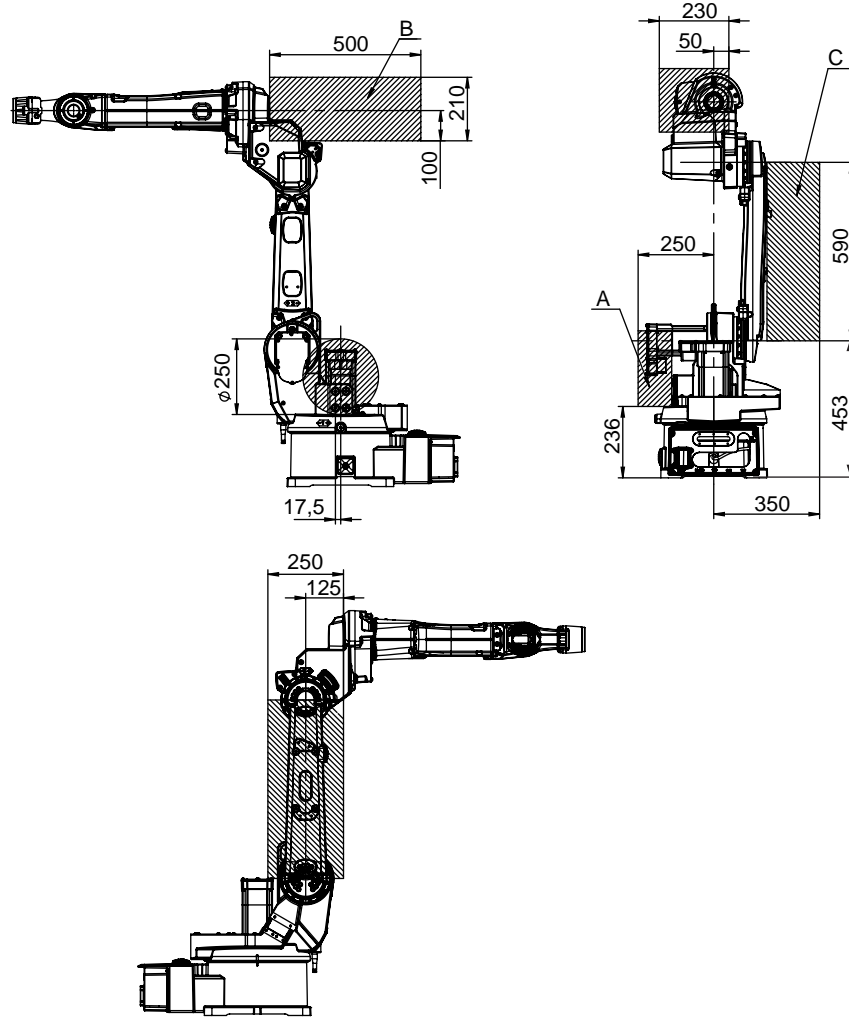
The wrist torque values are for reference only, and should not be used for calculating permitted load offset (position of center of gravity) within the load diagram, since those also are limited by main axes torques as well as dynamic loads. Furthermore, arm loads will influence the permitted load diagram. To find the absolute limits of the load diagram, use the RobotStudio add-in RobotLoad.

| Robot type | Max wrist torque axis 4 and 5 | Max wrist torque axis 6 | Max torque valid at load |
|------------------|-------------------------------|-------------------------|--------------------------|
| IRB 1520ID-4/1.5 | 12.2 Nm | 3.9 Nm | 4 kg |

1.6 Mounting of equipment

Load areas

Extra loads can be mounted on the wrist, the upper arm housing, and on the frame. Load areas and permitted loads are shown in graphic below. The center of gravity of the extra load shall be within the marked load areas.



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| Load area Robot | Max. load | | | |
|------------------|-----------|-------|-------|-------|
| | A | B | C | B+C |
| IRB 1520ID-4/1.5 | 20 kg | 10 kg | 15 kg | 25 kg |

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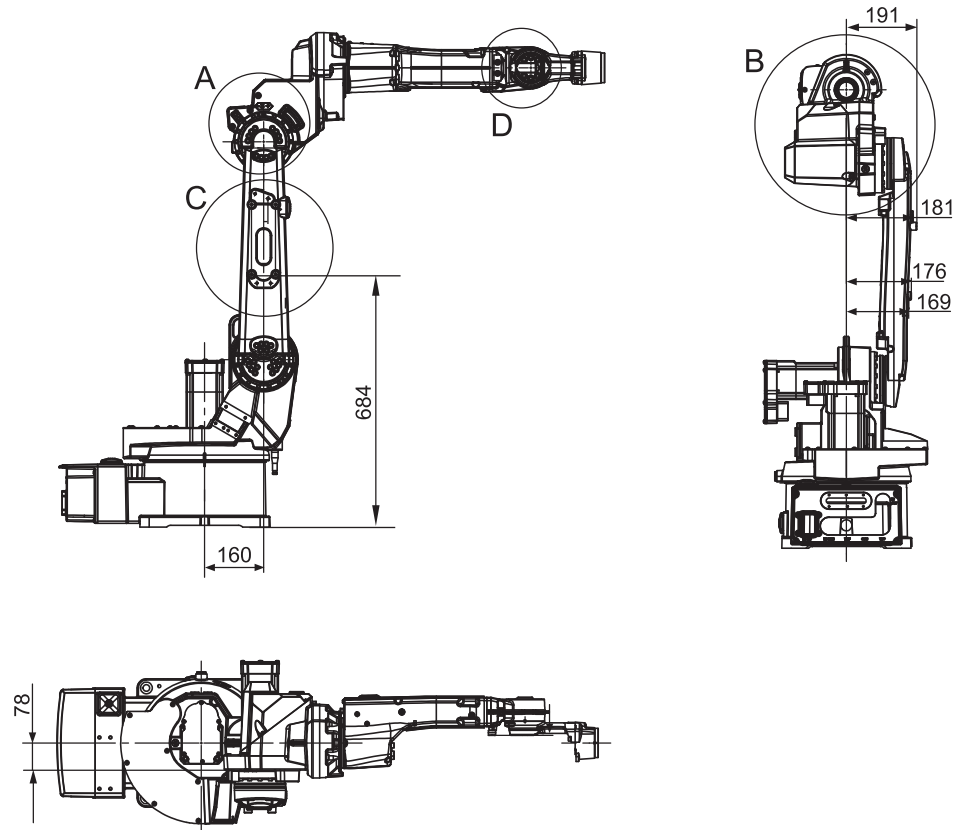
1 Description

1.6 Mounting of equipment

Continued

Holes for mounting of extra equipment

The robot has holes for mounting extra equipment.

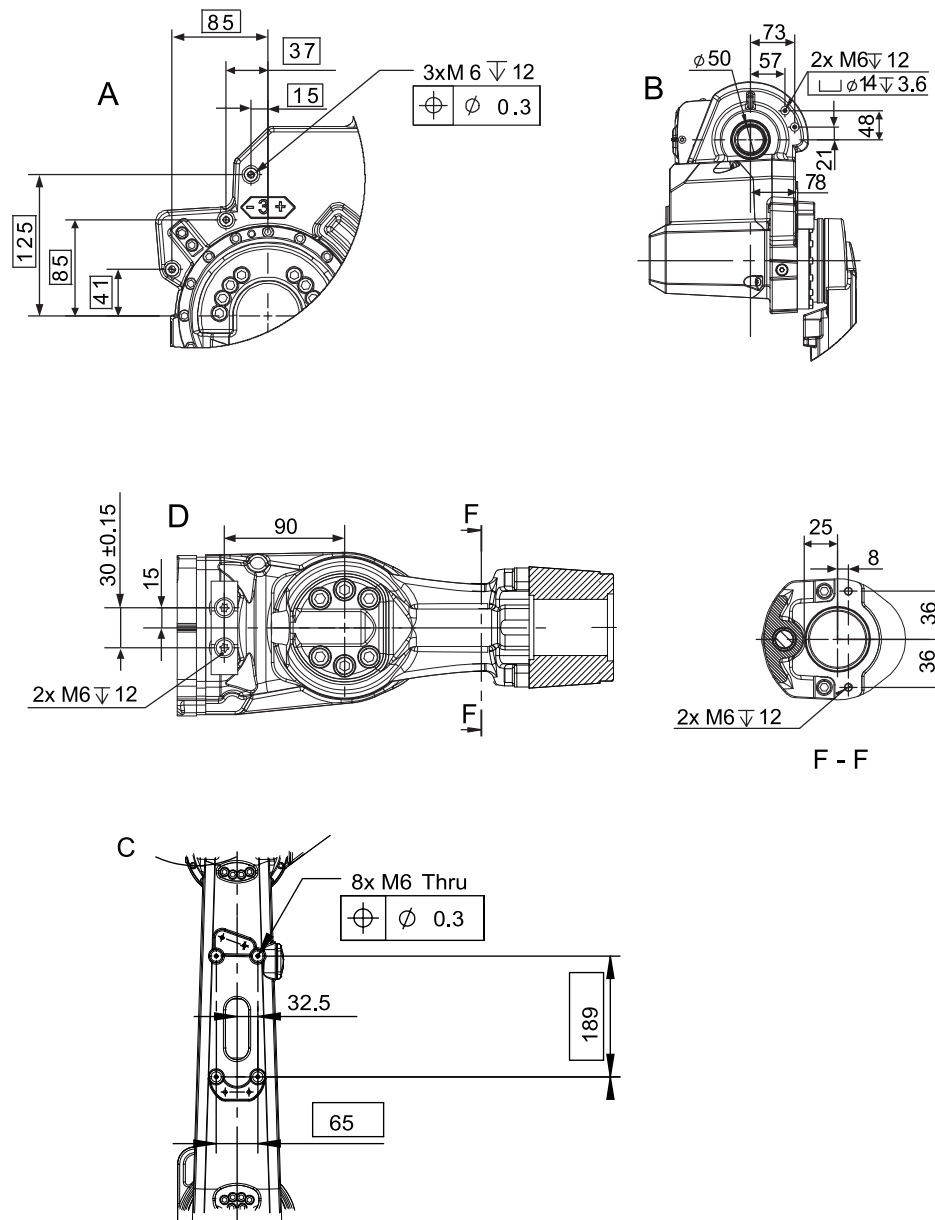


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1 Description

1.6 Mounting of equipment Continued



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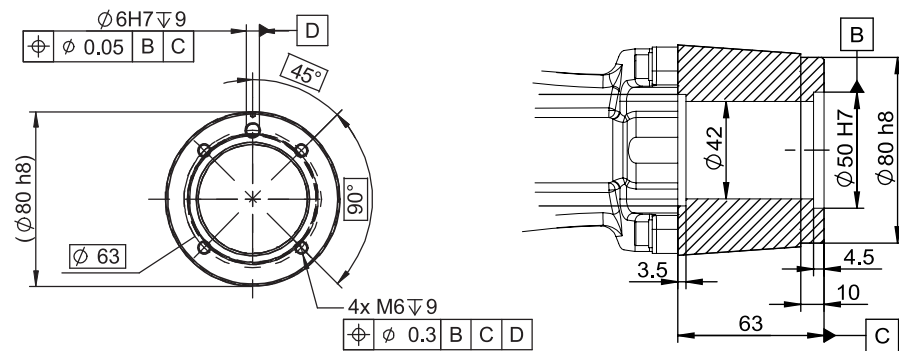
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1 Description

1.6 Mounting of equipment

Continued

Robot tool flange



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Fastener quality

When fitting tools on the tool flange, only use screws with quality 12.9. For other equipment use suitable screws and tightening torque for your application.

1.7 Robot motion

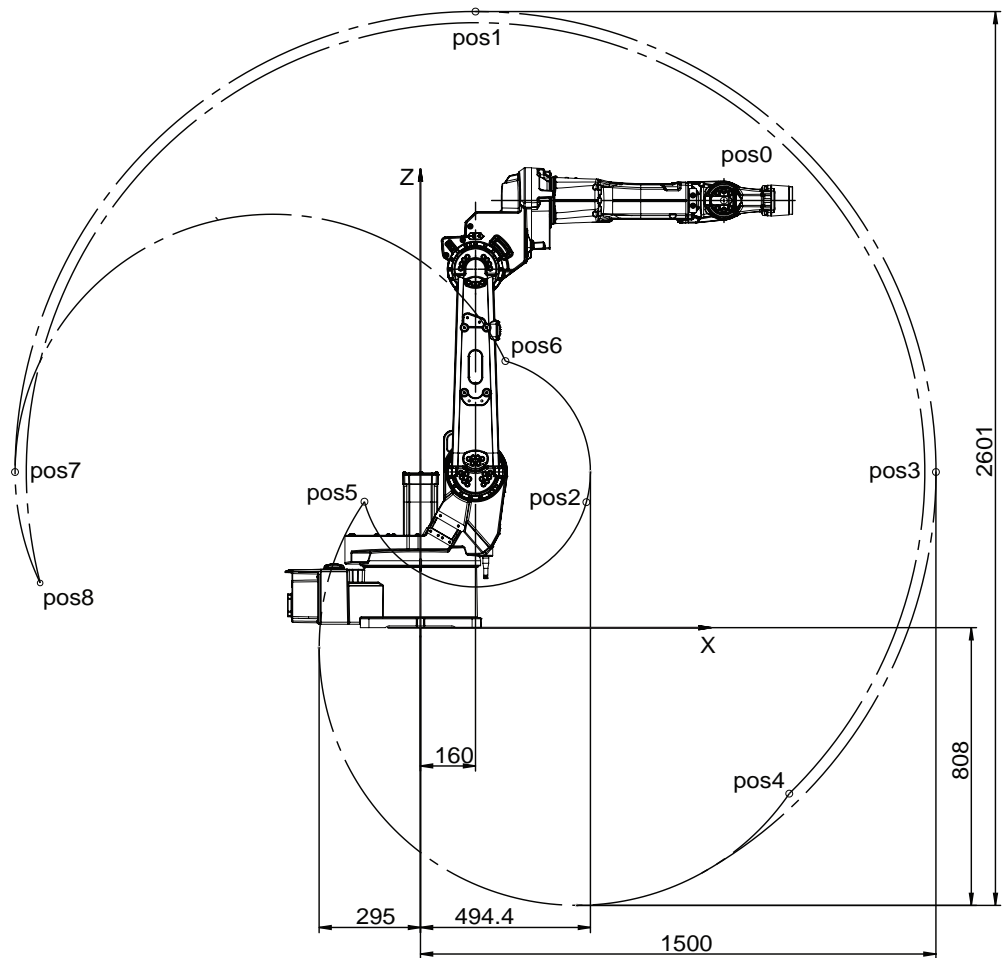
1.7.1 Introduction

IRB 1520ID-4/1.5

| Axis | Type of motion | Range of movement |
|------|-----------------|-------------------|
| 1 | Rotation motion | +170° to -170° |
| 2 | Arm motion | +150° to -90° |
| 3 | Arm motion | +80° to -100° |
| 4 | Rotation motion | +155° to -155° |
| 5 | Bend motion | +135° to -135° |
| 6 | Turn motion | +200° to -200° |

Positions at wrist center IRB 1520ID-4/1.5

Working range with extra mechanical stop on axis 3.



xx110000306

Continues on next page

1 Description

1.7.1 Introduction

Continued

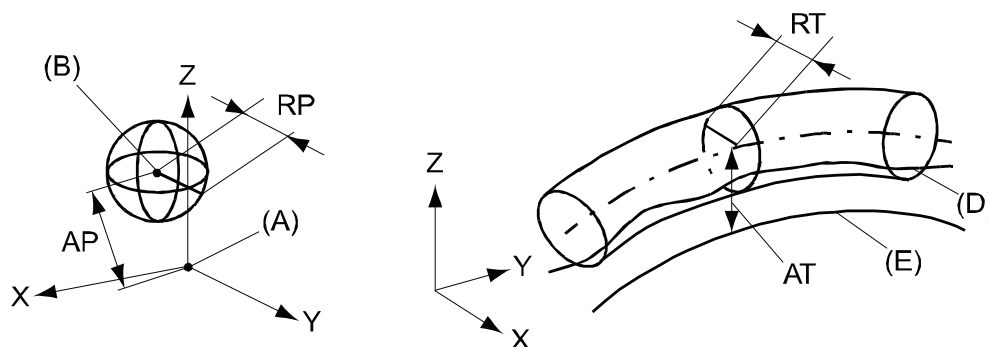
| Pos No. see Figure above | X Position (mm) | Z Position (mm) | Axis 2 Angle (degrees) | Axis 3 Angle (degrees) |
|--------------------------|-----------------|-----------------|------------------------|------------------------|
| Pos 0 | 883 | 1243 | 0 | 0 |
| Pos 1 | 160 | 1793 | 0 | -74,5 |
| Pos 2 | 483 | 365 | 0 | +80 |
| Pos 3 | 1500 | 453 | +90 | -74,5 |
| Pos 4 | 1073 | -483 | +150 | -100 |
| Pos 5 | -163 | 367 | +150 | +80 |
| Pos 6 | 247 | 776 | -90 | +80 |
| Pos 7 | -1180 | 453 | -90 | -74,5 |
| Pos 8 | -1107 | 130 | -90 | -100 |

1.7.2 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.



xx080000424

| 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 | IRB 1520ID-4/1.5 |
|---|------------------|
| Pose repeatability, RP (mm) | 0.05 |
| Pose accuracy, AP ⁱ (mm) | 0.05 |
| Linear path repeatability, RT (mm) | 0.35 |
| Linear path accuracy, AT (mm) | 1.3 |
| Pose stabilization time, (PSt) to within 0.2 mm of the position (s) | 0.1 |

ⁱ 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.

The above values are the range of average test results from a number of robots.

1 Description

1.7.3 Velocity

1.7.3 Velocity

Maximum axis speed

| Axis No. | IRB 1520ID-4/1.5 |
|----------|------------------|
| 1 | 130°/s |
| 2 | 140°/s |
| 3 | 140°/s |
| 4 | 320°/s |
| 5 | 380°/s |
| 6 | 460°/s |

1.7.4 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

1.8 Customer connections

1.8 Customer connections



Note

No customer/application connections available for IRB 1520ID-4/1.5.

1.9 Maintenance and troubleshooting

General

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

- Maintenance free AC motors are used.
- Oil and grease are used for the gear boxes.
- The cabling is routed for longevity, and in the unlikely event of a failure, its modular design makes it easy to change.
- It has a program memory “battery low” alarm.

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 Product Manual - IRB 1520.

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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 1520 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 | Handling capacity (kg)/Reach (m) |
|---------|----------|----------------------------------|
| 435-110 | 1520ID | 4/1.5 |

Manipulator color

| Option | Name | Note |
|------------|-----------------------------------|----------------|
| 209-1 | ABB Orange standard | |
| 209-2 | ABB White standard | |
| 209-202 | ABB Graphite White standard | Standard color |
| 209-4--192 | Painted with the chosen RAL-color | |



Note

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

Protection

| Option | Name | Description |
|--------|----------|-------------|
| 287-4 | Standard | IP 40 |

Mounting position

| Option | Name | Description |
|--------|-------------------|---|
| 224-2 | Inverted mounting | For inverted mounting of the manipulator. |

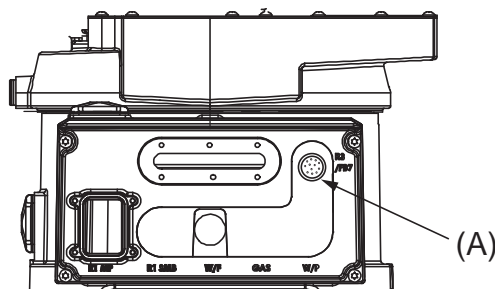


Note

Manipulators delivered for floor mounting must have the option added before changing mounting position to inverted.

Resolver connection, axis 7

A connection for resolver signals axis 7 located on the base.



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Continues on next page

| Pos | Description |
|-----|--|
| A | Resolver connection on base, option 864-1. |

Application interface connection type

| Option | Name | Description |
|--------|--------------------------|-------------|
| 17-7 | No application interface | |

Electronic Position Switches (EPS)

Electronic Position Switches (EPS) is an additional safety computer in the controller, with the purpose of providing safe output signals representing the position of robot axes. The output signals are typically connected to cell safety circuitry and/or a safety PLC which takes care of interlocking the robot cell, for example in order to prevent robot and operator to enter a common area simultaneously. See *Application manual - Electronic Position Switches*.

2 Specification of variants and options

2.3 Floor cables

2.3 Floor cables

Manipulator cable length

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

2.4 Process

2.4.1 Process

Process module

| Option | Type | Description |
|--------|---------------------|---|
| 768-1 | Empty cabinet small | See <i>Product specification - Controller IRC5 with FlexPendant</i> , see chapter 2.2.1 |
| 768-2 | Empty cabinet large | See <i>Product specification - Controller IRC5 with FlexPendant</i> , chapter 2.2.1 |

Installation kit

| Option | Type | Description |
|--------|------------------|---|
| 715-1 | Installation kit | See <i>Product specification - Controller IRC5 with FlexPendant</i> , chapter 2.2.1 |

WeldGuide IV

Weldguide IV provides tracking functionality by reading the true impedance values close to the arc at 25 kHz then guides the robot to the correct path. Weldguide IV is designed to track difficult welding joint variations resulting from cast components or other pre-process problems.

| Option | Type | Description |
|--------|----------------------|---|
| 992-1 | Basic | Occupies one slot and one Ethernet port. Digital I/O or AD Combi I/O is needed for WeldGuide functions. Requires options WG Sensor [994-1] or [995-1], and WeldGuide Multipass [815-2]. Not together with option UL/CSA [429-1]. |
| 992-2 | Advanced | Includes all <i>Basic</i> functionality and adaptive fill. This feature allows the robot to adjust to the changes in joint width, the weave stroke will increase or decrease, and the travel speed will be adjusted accordingly. Occupies one slot and one Ethernet port. Digital I/O or AD Combi I/O is needed for WeldGuide functions. Requires options WG Sensor [994-1] or [995-1], and WeldGuide Multipass [815-2]. Not together with option UL/CSA [429-1]. |
| 994-1 | WG Solid core sensor | |
| 995-1 | WG Split core sensor | |

2 Specification of variants and options

2.4.2 Process equipment

2.4.2 Process equipment

Torch service

| Option | Type | Description |
|--------|--------------|---|
| 1037-1 | ABB TSC 2013 | ABB Torch Service Center. Including: Cleaner, cutter and BullsEye. Occupies I/O signals Dig. 5In/2Out. Requires option Base Dig. 16in/16Out [1541-1]. |
| 1037-5 | BullsEye | BullsEye stand alone. Requires options RW Arc [633-4], and BullsEye [652-1] or RW Cutting [951-1]. |

2.5 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.

Warranty

For the selected period of time, ABB will provide spare parts and labor 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 with ABB Connected Services 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. |
| 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. |

2 Specification of variants and options

2.5 User documentation

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> |

3 Accessories

3.1 Introduction to accessories

General

There is a range of tools and equipment available, especially designed for the manipulator.

Basic software and software options for robot and PC

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

Robot peripherals

- Track Motion
- Motor Units
- Positioners

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Index

A

Absolute Accuracy, calibration, 25
accessories, 53
ambient humidity
 operation, 20
 storage, 19
ambient temperature
 operation, 20
 storage, 19

C

cables, 48
calibration
 Absolute Accuracy type, 24
 standard type, 24
calibration, Absolute Accuracy, 25
Calibration Pendulum, 26
CalibWare, 24
category 0 stop, 41
category 1 stop, 41
connections, 42

D

dimensions, 13
documentation, 51

E

EPS, 16

F

fastening holes, 23
fine calibration, 26
foundation
 requirements, 19

H

handling capacity, 11
humidity
 operation, 20
 storage, 19

I

instructions, 51

L

load areas, 33
load diagrams, 28
loads on foundation, 18

M

maintenance, 43
manuals, 51
motion, 37

mounting, 11, 21
 equipment, 33

N

noise level, 11

O

operating conditions, 20
options, 45

P

power consumption, 11
product standards, 14
protection classes, 20
protection type, 20

R

reach, 11
requirements on foundation, 19
robot
 protection class, 20
 protection types, 20
robot versions, 11

S

safety standards, 14
service instructions, 51
standards, 14
 EN IEC, 14
 EN ISO, 14
standard warranty, 51
stock warranty, 51
stopping distances, 41
stopping times, 41
storage conditions, 19

T

temperatures
 operation, 20
 storage, 19
tool flange, 36
torques on foundation, 18

U

user documentation, 51

V

variants, 45–46
velocity, 40
versions, 11

W

warranty, 51
weight, 11, 17
working range, 16
wrist torque, 32



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