

ROBOTICS

Product specification

IRB 2600



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Product specification

IRB 2600-20/1.65

IRB 2600-12/1.65

IRB 2600-12/1.85

IRB 2600-20/1.65 type C

IRB 2600-12/1.65 type C

IRB 2600ID-15/1.85

IRB 2600ID-8/2.0

IRC5

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Revision: AG

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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 dimensions prints
- The fulfillment of standards, safety and operating requirements
- The load diagrams, mounting or 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



Tip

All documents can be found via ABB Robotics One, <https://one.robots.abb.com/en/knowledge-hub>.

Reference	Document ID
<i>Product manual - IRB 2600</i>	3HAC035504-001
<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 specification - Robot user documentation, IRC5 with RobotWare 6</i>	3HAC052355-001
<i>Product specification - Robot stopping distances according to ISO 10218-1</i>	3HAC048645-001

Revisions

Revision	Description
-	First edition
A	Foundry Plus 2

Continues on next page

Revision	Description
B	ID-versions added
C	Minor corrections
D	- Table for ambient temperature adjusted - Value added to drawing, Mounting surface and bushings - Minor corrections
E	- Machinery directive updated - Foundation forces updated
F	General updates and minor corrections
G	General updates and minor corrections
H	Minor corrections and updates
J	- 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>
K	- Text for Foundry Plus updated. - Minor corrections and updates
L	- Description option 908-1 added - Option Tool Sytem TS 2600ID added - Tilting around X-axis added
M	- Name changed for Option 991-1, from <i>Manifold TS 2600ID</i> to <i>Tool Attachment TS 2600ID</i>. See Manipulator on page 78. - Number of M16 threaded holes in base changed.
N	Illustrations for Tool flange standard/LeanID changed, see Mounting equipment on page 54
P	Product data for AbsAcc added and changed, see Production data on page 38
Q	Published in release R17.1. The following updates are done in this revision: - Restriction of load diagram added. - Added data for tilted mounting, Mounting the manipulator on page 27. - Updated drawing for tool flange, Information about mounting equipment on page 54.
R	Published in release R17.2. The following updates are done in this revision: - Tool flange drawings changed - Updated list of applicable standards. - TCP acceleration information added
S	Published in release R18.2. The following updates are done in this revision: - Manipulator axes rotation direction figure updated. - Removed the phased out options: option Tool System TS 2600ID [989-1], option Tool Changer TS 2600ID [990-1], option Tool Attachment TS 2600ID [991-1], welding torch package options [878-X], option AristoMig 5000i [1029-14], current/hose set options [1030-X], and feed kit options [1033-X]. - Added pin hole dimension to tool flange/wrist dimension for IRB 2600ID.

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Revision	Description
T	Published in release 19B. The following updates are done in this revision: - Added IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65 to the specification. - Modify the technical data of power consumption. - Change the designation of Air hose Customer connections on page 71. - Updated information about <i>Absolute Accuracy</i>.
U	Published in release 19B. The following updates are done in this revision: Type C variants (IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65) are removed from the manual, due to later sales start.
V	Published in release 19C. The following updates are done in this revision: Note added about need to calibrate if the robot is other than floor mounted. See Calibration methods on page 33.
W	Published in release 20A. The following updates are done in this revision: Type C variants (IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65) are added.
X	Published in release 20C. The following updates are done in this revision: Modified in Customer connections section.
Y	Published in release 20D. The following updates are done in this revision: Warranty section updated.
Z	Published in release 21A. The following updates are done in this revision: Added information in section Information about mounting equipment on page 54.
AA	Published in release 21C. The following updates are done in this revision: - Text regarding fastener quality is updated. - Remove Axis resolution. - Added the introduction to inverted mounting position. See Expansion container for inverted mounting of the manipulator on page 31. - Updated section of customer connection.
AB	Published in release 22B. The following updates are done in this revision: Update descriptions in Mounting equipment chapter.
AC	Published in release 23B. The following updates are done in this revision: - Correction regarding WeldGuide options - Added RAL code in manipulator color
AD	Published in release 24D. The following updates are done in this revision: Updated the section Technical data on page 23.
AE	Published in release 25A. The following updates are done in this revision: Corrected the maximum tilt angle in Technical data on page 23.

Continues on next page

Revision	Description
AF	Published in release 25.3. The following updates are done in this revision: • Updated load diagram for IRB 2600-20/1.65 with vertical wrist. • Added table note about working range limitations on axis-1 for wall mounted and tilted manipulators. • Corrected measurements of bushing at mounting surface. • Company name updated to reflect current legal entities. • Updated portal name from myABB to ABB Robotics One.
AG	Published in release 26.1. The following updates are made in this revision: • Removed duplication of robot weight specification. • Company name updated to reflect current legal entities.

1 Description

1.1 Structure

1.1.1 Introduction to IRB 2600

Robot family

The IRB 2600 is one of ABB Robotics sharp generation robots with enhanced and new capabilities. It is available in five variants, including the IRB 2600ID with a process upper arm. The design is optimized to make it superior for the targeted applications, such as dispensing, machining, measuring, assembly, and arc welding applications.

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*.

Safety

Safety standards valid for complete robot, manipulator and controller.

Additional functionality

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

Protection type Foundry Plus 2

Robots with the option Foundry Plus 2 are designed for harsh environments where the robot is exposed to sprays of coolants, lubricants and metal spits that are typical for die casting applications or other similar applications.

Typical applications are spraying insertion and part extraction of die-casting machines, handling in sand casting and gravity casting, etc. (Please refer to Foundry Prime robots for washing applications or other similar applications). Special care must be taken in regard to operational and maintenance requirements for applications in foundry as well as in other applications areas. Please contact ABB Robotics Sales organization if in doubt regarding specific application feasibility for the Foundry Plus 2 protected robot.

The robot is painted with two-component epoxy on top of a primer for corrosion protection. To further improve the corrosion protection additional rust preventive are applied to exposed and crucial areas, e.g. has the tool flange a special preventive coating. Although, continuous splashing of water or other similar rust formation fluids may cause rust attach on the robots unpainted areas, joints, or other unprotected surfaces. Under these circumstances it is recommended to add

Continues on next page

1 Description

1.1.1 Introduction to IRB 2600

Continued

rust inhibitor to the fluid or take other measures to prevent potential rust formation on the mentioned.

The entire robot is IP67 compliant according to IEC 60529 - from base to wrist, which means that the electrical compartments are sealed against water and solid contaminants. Among other things all sensitive parts are better protected than the standard offer.

Selected Foundry Plus 2 features:

- Improved sealing to prevent penetration into cavities to secure IP67
- Additional protection of cabling and electronics
- Special covers that protect cavities
- Well-proven connectors
- Nickel coated tool flange
- Rust preventives on screws, washers and unpainted/machined surfaces
- Extended service and maintenance program

The Foundry Plus 2 robot can be cleaned with appropriate washing equipment according to the robot product manual. Appropriate cleaning and maintenance is required to maintain the protection, for example can rust preventive be washed off with wrong cleaning method.

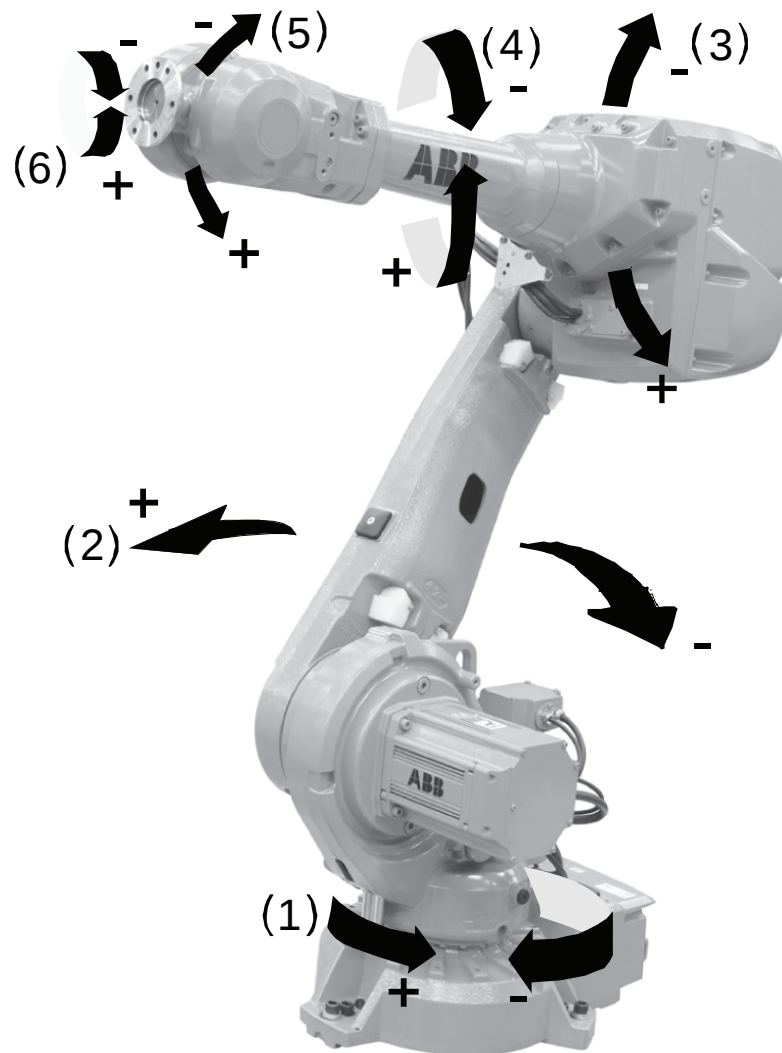
Available robot variants

The option Foundry Plus 2 might not be available for all robot variants.

See [Specification of variants and options on page 77](#) for robot versions and other options not selectable together with Foundry Plus 2.

Continues on next page

Manipulator axes



xx1800001381

1 Description

1.1.2 Different robot variants

1.1.2 Different robot variants

General

The IRB 2600 is available in five variants and they can be wall mounted, inverted or tilted (up to 45 degrees around the Y-axis or X-axis). See [Introduction to Robot load and load diagrams on page 39](#) for limitations.

Robot variant	Handling capacity (kg)	Reach (m)
IRB 2600-20/1.65	20	1.65
IRB 2600-12/1.65	12	1.65
IRB 2600-12/1.85	12	1.85
IRB 2600ID-15/1.85	15	1.85
IRB 2600ID-8/2.00	8	2.00

Other technical data

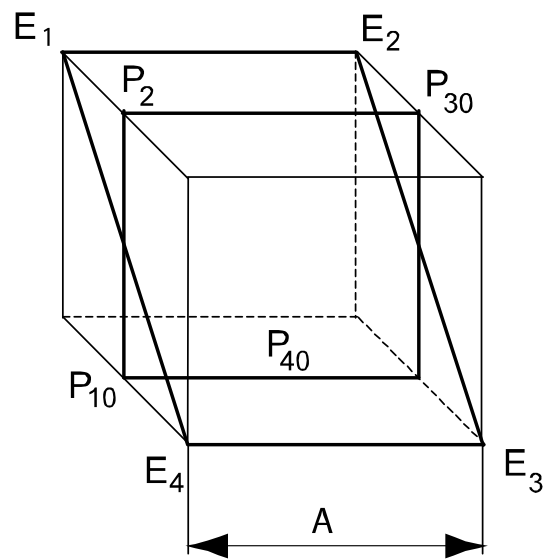
Data	Description	Note	
		IRB2600-12/1.85 IRB2600ID-15/1.85 IRB2600ID-8/20	IRB2600-20/1.65 IRB2600-12/1.65
Airborn noise level	The sound pressure level outside the working space	< 69 dB (A) Leq (acc. to Machinery directive 2006/42/EG)	< 72 dB (A) Leq (acc. to Machinery directive 2006/42/EG)

Power consumption at max speed (vmax)

Type of movement	IRB 2600				
	-20/1.65	-12/1.65	-12/1.85	ID-15/1.85	ID-8/2.00
ISO Cube Max. velocity	0.941 kW	0.953 kW	0.92 kW	0.86 kW	0.86 kW

Robot in calibration position	IRB 2600				
	-20/1.65	-12/1.65	-12/1.85	ID-15/1.85	ID-8/2.00
Brakes engaged	0.145 kW	0.146 kW	0.232 kW	0.206 kW	0.207 kW
Brakes disengaged	0.429 kW	0.366 kW	0.43 kW	0.40 kW	0.39 kW

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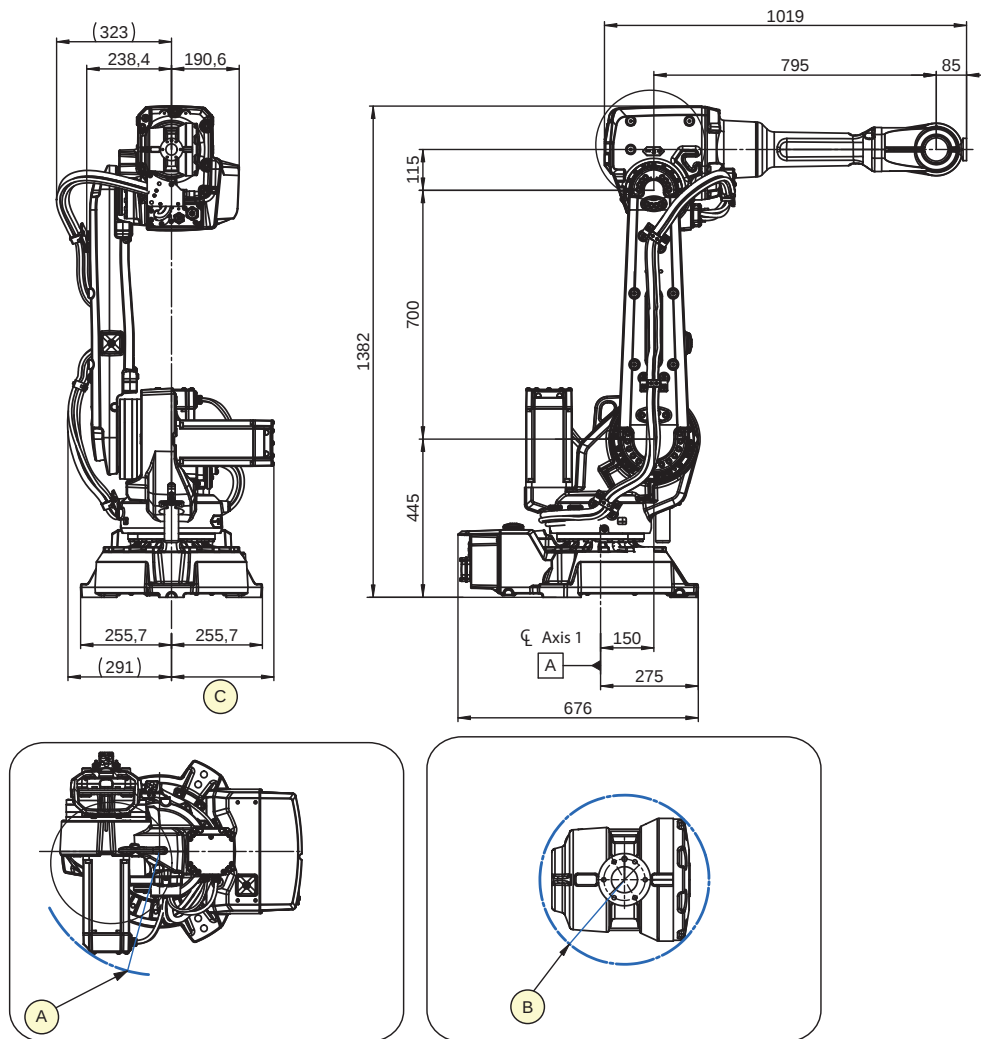
Pos	Description
A	630 mm

1 Description

1.1.2 Different robot variants

Continued

Dimensions IRB 2600-20(12)/1.65

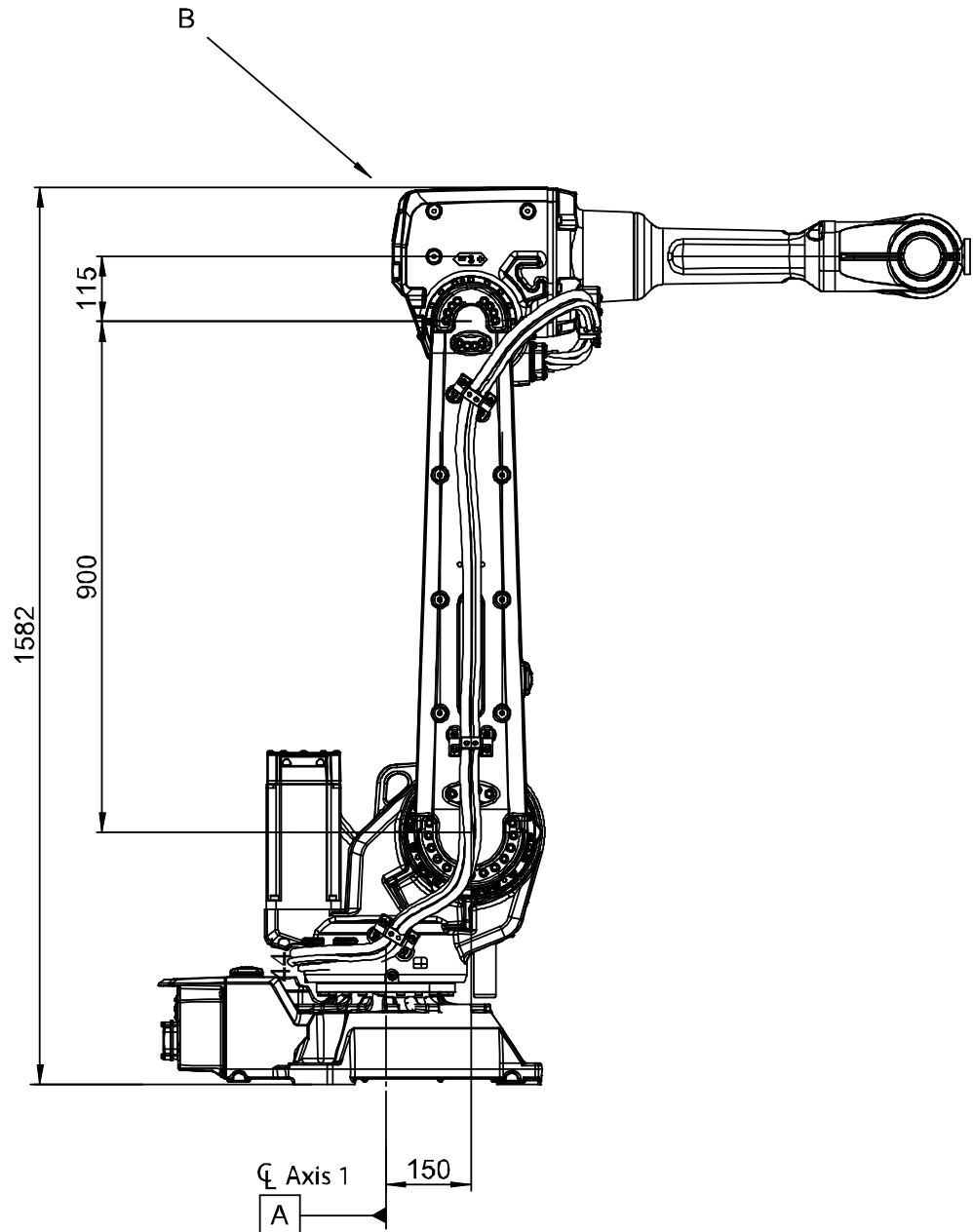


xx0900000481

Pos	Description
A	R 337 Minimum turning radius of axis 1
B	R 98 Minimum turning radius of axis 4
C	IRB 2600ID = 281 mm All Other variants = 276 mm

Continues on next page

Dimensions IRB 2600-12/1.85



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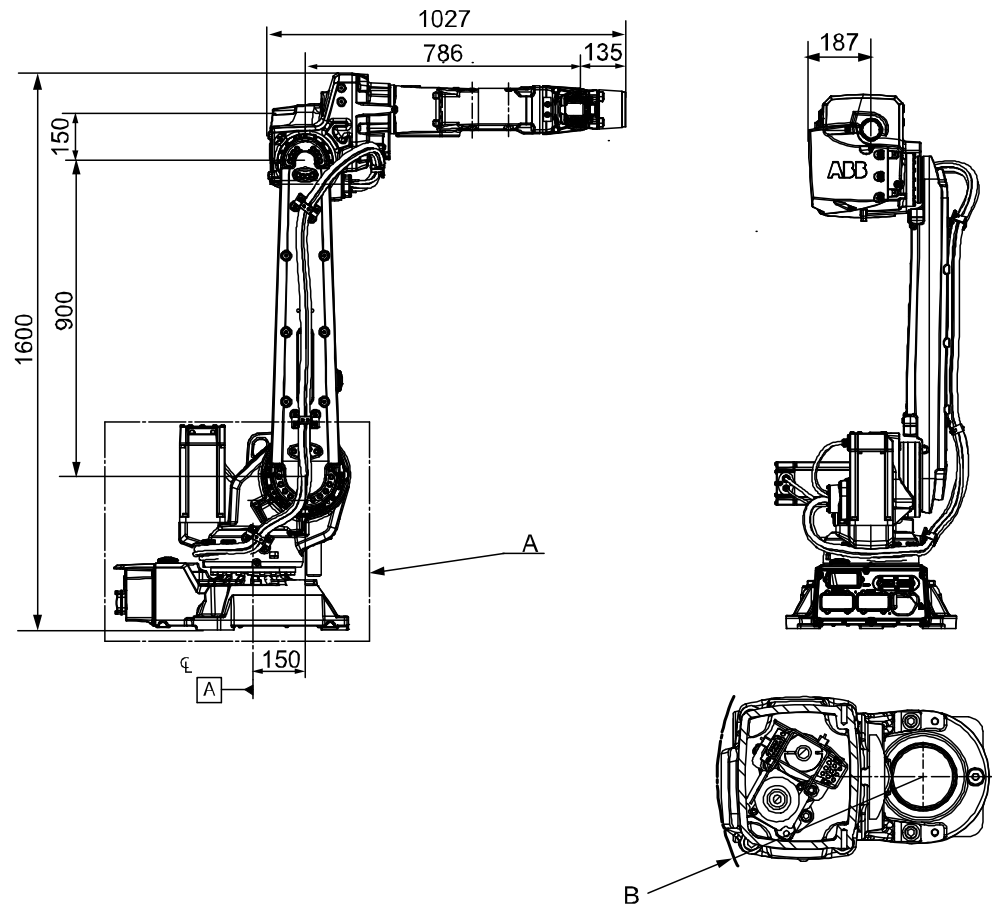
Pos	Description
B	For all other dimensions see IRB 2600-20(12)/1.65

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1 Description

1.1.2 Different robot variants
Continued

Dimensions IRB 2600ID-15/1.85

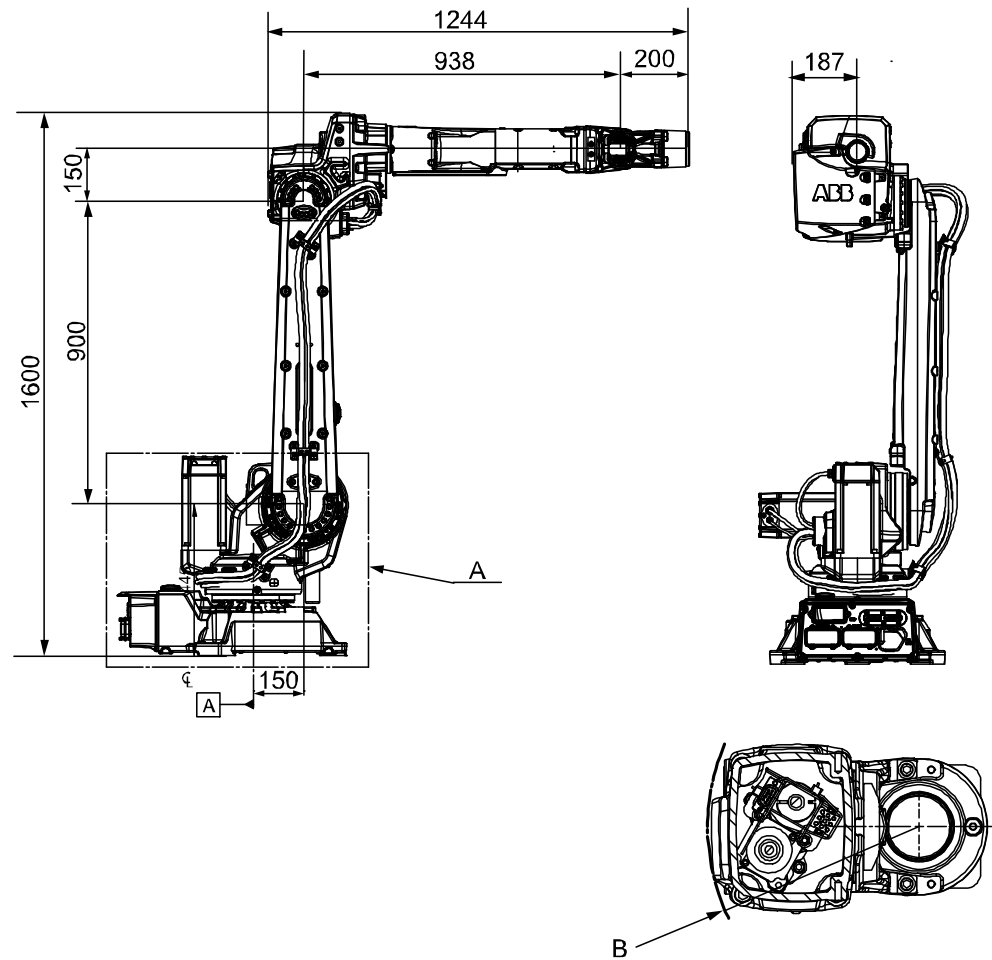


xx1000000962

Pos	Description
A	For dimensions, see IRB 2600-X/1.85
B	R 172 Minimum turning radius for axis 4

Continues on next page

Dimensions IRB 2600ID-8/2.00



xx1000000963

Pos	Description
A	For dimensions, see IRB 2600-X/1.85
B	R 172 Minimum turning radius for axis 4

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 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

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	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	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments

Continues on next page

Standard	Description
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 ⁱ	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

The IRB 2600 is designed for floor, wall, tilted (up to 45 degrees, around the Y-axis or X-axis, for more details see *Product manual - IRB 2600*) or inverted mounting. Depending on the robot version, an end effector with max. weight of 12 or 20 kg including payload, can be mounted on the tool flange (axis 6). See [Load diagrams on page 41](#), and [Introduction to Robot Motion on page 64](#) for limitations.

Extra loads

Extra loads, which are included in the load diagrams, can be mounted on the upper arm. An extra load of 35 kg can also be mounted on the frame of axis 1. See [Information about mounting equipment on page 54](#).

Working range limitations

The working range of axis 1 can be limited by mechanical stops as option. The option Electronic Position Switches can also 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 2600	284 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°	
Wall mounted	90°	The working range of axis 1 is limited. See Limitations for wall mounted robots on page 64 and Limitations for tilt and wall mounted robots on page 65 .
Suspended	180° ⁱ	
Tilted	0-45°	Contact ABB for further information about acceptable loads. The working range of axis 1 is limited. See Limitations for tilt and wall mounted robots on page 65 .

ⁱ IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65 is not available for suspended installation.

**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.

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1 Description

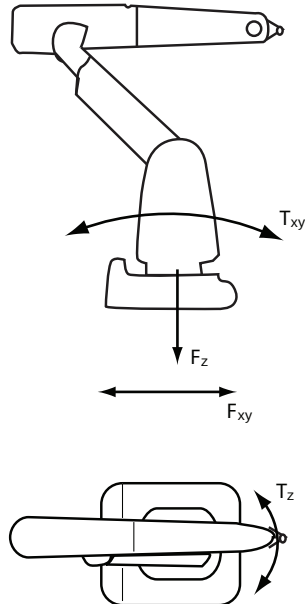
1.3.2 Technical data

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.



xx1100000521

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	± 2330 N	± 5450 N
Force z	2750 ± 1420 N	2750 ± 3970 N
Torque xy	± 3360 Nm	± 7690 Nm
Torque z	± 1120 Nm	± 3050 Nm

Continues on next page

Wall mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	2750 ±880 N	2750 ±4600 N
Force z	±1780 N	±4560 N
Torque xy	1470 ±1990 Nm	1470 ±5620 Nm
Torque z	±1150 Nm	±3130 Nm

Suspended

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±2250 N ⁱ	±5380 N ⁱ
Force z	-2750 ±1420 N ⁱ	-2750 ±4280 N ⁱ
Torque xy	±3440 Nm ⁱ	±7800 Nm ⁱ
Torque z	±1110 Nm ⁱ	±3050 Nm ⁱ

ⁱ Only valid for IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0.
IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65 is not available for suspended installation.

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	25 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.

Continues on next page

1 Description

1.3.2 Technical data

Continued

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)

Operating conditions, robot

The table shows the allowed operating conditions for the robot:

Parameter	Value
Minimum ambient temperature	+5° C
Maximum ambient temperature	+45° C
Maximum ambient humidity	95% at constant temperature

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	IRB 2600: IP 67 IRB 2600ID upper arm: IP 54
Manipulator, protection type Foundry Plus	IP 67

ⁱ According to IEC 60529.

1.3.3 Mounting the manipulator

Maximum load

Maximum load in relation to the base coordinate system

Floor mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±2330 N	±5450 N
Force z	2750 ±1420 N	2750 ±3970 N
Torque xy	±3360 Nm	±7690 Nm
Torque z	±1120 Nm	±3050 Nm

Wall mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	2750 ±880 N	2750 ±4600 N
Force z	±1780 N	±4560 N
Torque xy	1470 ±1990 Nm	1470 ±5620 Nm
Torque z	±1150 Nm	±3130 Nm

Suspended mounting

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±2250 N ⁱ	±5380 N ⁱ
Force z	-2750 ±1420 N ⁱ	-2750 ±4280 N ⁱ
Torque xy	±3440 Nm ⁱ	±7800 Nm ⁱ
Torque z	±1110 Nm ⁱ	±3050 Nm ⁱ

ⁱ Only valid for IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0.
IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65 is not available for suspended installation.



Note

The suspended mounting required option [224-2] Inverted mounting.

See [Expansion container for inverted mounting of the manipulator on page 31](#) for more details about the suspended mounting.

Tilted mounting

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	±2563 N	±5995 N
Force z	3025 ±4367 N	3025 ±4367 N
Torque xy	±3696 Nm	±8459 Nm
Torque z	±1232 Nm	±3355 Nm

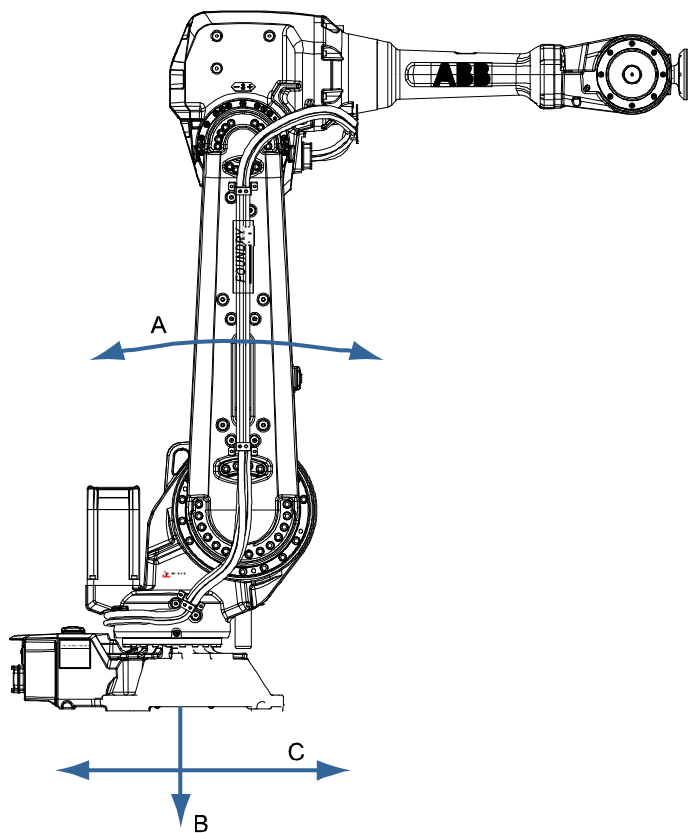
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1 Description

1.3.3 Mounting the manipulator
Continued

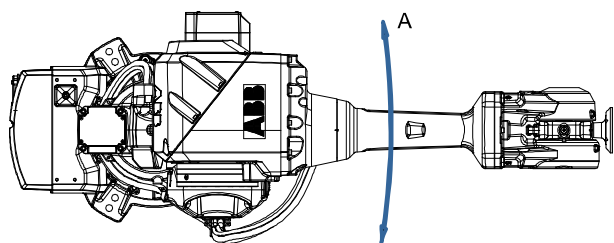
Illustration

The figures below shows IRB 2600 Standard but are also valid for IRB 2600ID.



xx0900000056

A	Torque _{xy} (T_{xy})
B	Force _z (F_z)
C	Force _{xy} (F_{xy})



xx0900000057

A	Torque _z (T_z)
---	-------------------------------

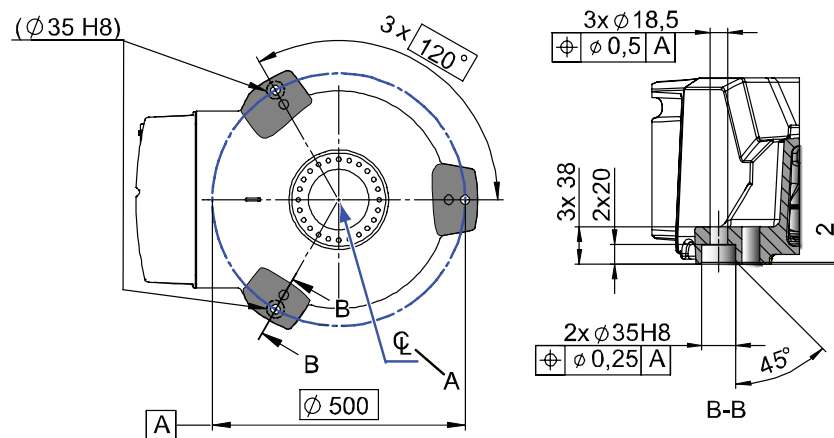
Note regarding M_{xy} and F_{xy}

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

Only 3 screws ($\varnothing 500$) are required for fastening the robot.



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Attachment bolts, specification

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

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



Note

For best AbsAcc performance, use the guide holes according to the preceeding figure.

Mounting surface and bushings



Note

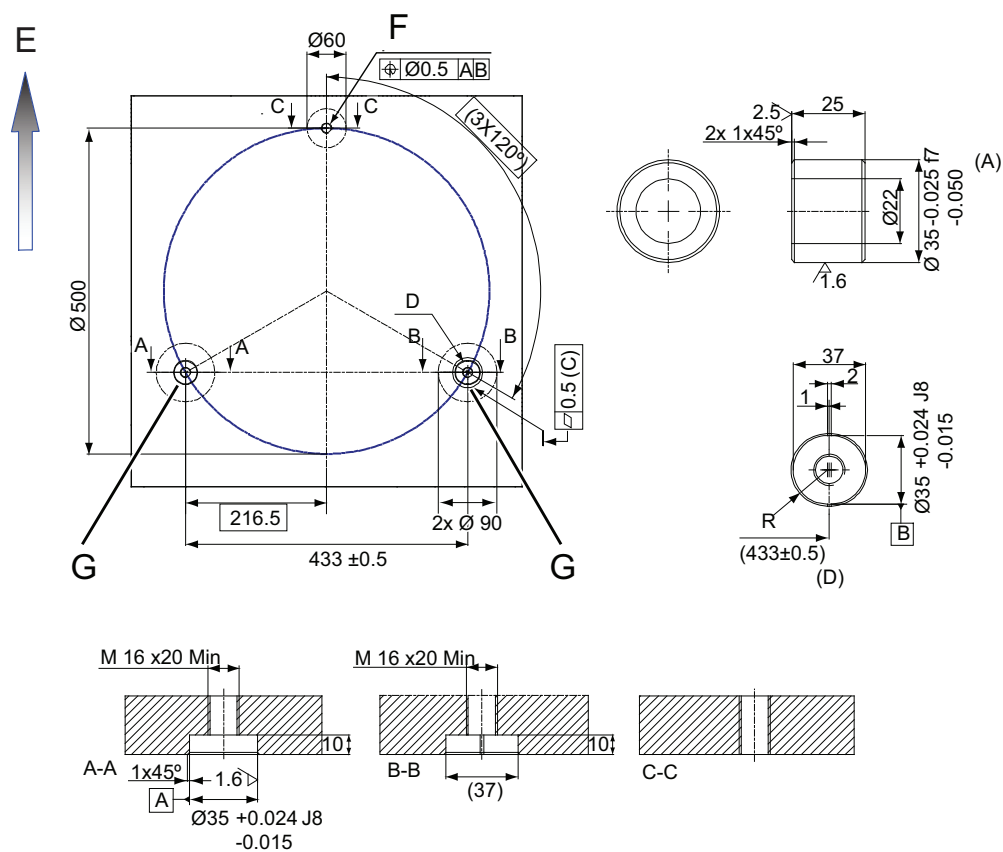
Only the three outer holes are used to secure the robot!

Continues on next page

1 Description

1.3.3 Mounting the manipulator

Continued



xx0900000392

Pos	Description
(C)	3x common zone
E	Position of the front of the robot
F	1xM16, depth 30 minimum
G	Guide sleeves (2 pcs)

1.3.4 Expansion container for inverted mounting of the manipulator



Note

If the robot is used suspended without expansion container, it will cause a reduced lifetime for the gearbox.

Validity of this section

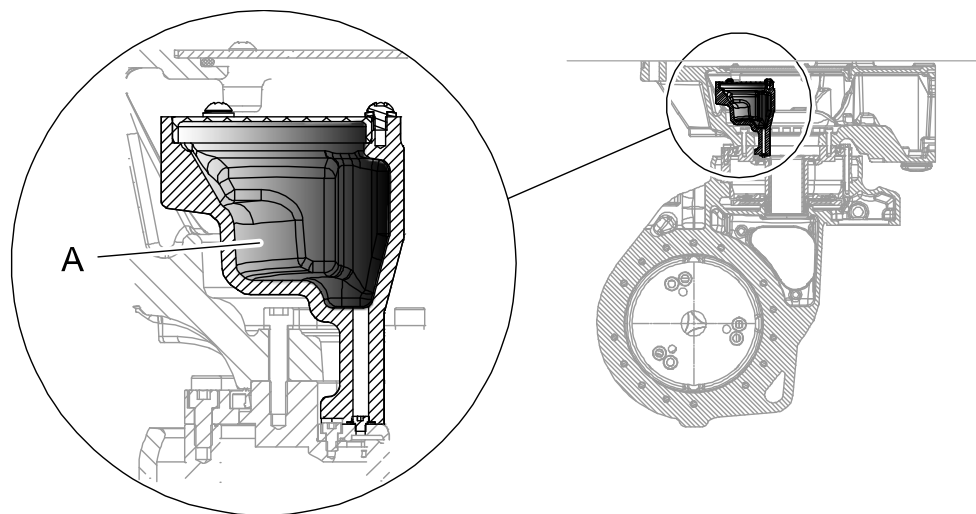
This section is only valid for IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0, with option [224-2] Inverted mounting of the manipulator.

Introduction to the expansion container

The expansion container is needed on inverted robots (IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0) to make sure that the amount of oil in gearbox axis 1 covers all important parts. Robots ordered as suspended robots have the expansion container installed on delivery.

Expansion container

When the robot is fitted in a inverted mounting position, an expansion container for oil must be fitted on gearbox axis 1.



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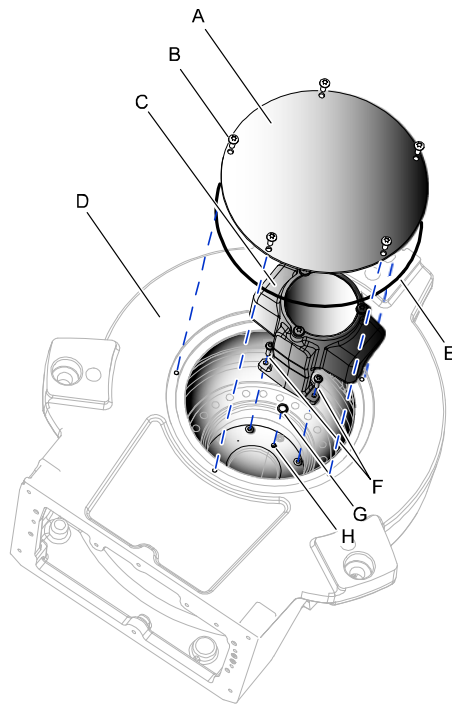
A	Expansion container
---	---------------------

Continues on next page

1 Description

1.3.4 Expansion container for inverted mounting of the manipulator

Continued



xx1000000318

A	Cover
B	Attachment screw M6x16, quality 8.8-A2F (5 pcs)
C	Oil expansion container with cover
D	Base
E	O-ring D220x5
F	Attachment screw M5x20, quality 8.8-A2F and washer (2+2 pcs)
G	O-ring D1=9.5 D2=1.6
H	Oil plug (to be removed)

1.4 Calibration and references

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.	Axis Calibration or Calibration Pendulum ¹
Absolute accuracy calibration (optional)	Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for: - Mechanical tolerances in the robot structure - Deflection 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, 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. 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.  ABSOLUTE ACCURACY 3HAC 14257-1 xx0400001197	CalibWare

Continues on next page

1 Description

1.4.1 Calibration methods

Continued

Type of calibration	Description	Calibration method
Optimization	Optimization of TCP reorientation performance. The purpose is to improve reorientation accuracy for continuous processes like welding and gluing. Wrist optimization will update standard calibration data for axes 4, 5 and 6.	Wrist Optimization

- i The robot is calibrated by either Calibration Pendulum or Axis Calibration at factory. Always use the same calibration method as used at the factory.
Information about valid calibration method is found on the calibration label or in the calibration menu on the FlexPendant.
If no data is found related to standard calibration, contact the local ABB Service.

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.

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRB 2600. 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

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.

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*.

Continues on next page

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.

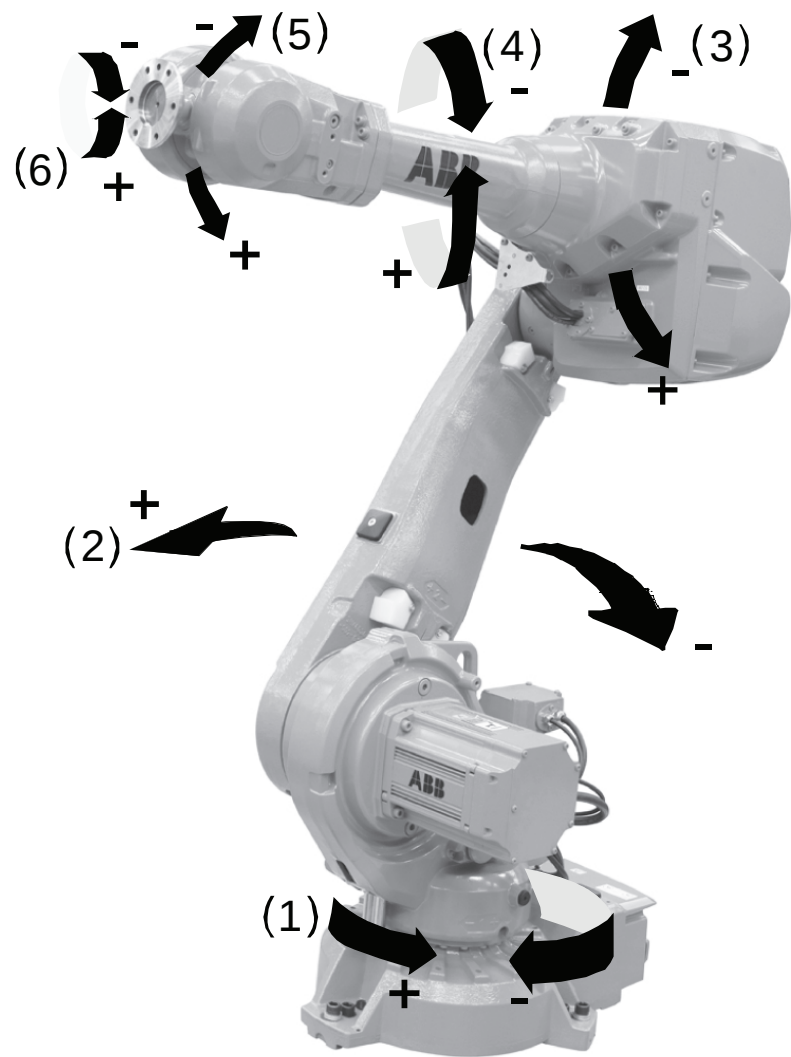
1 Description

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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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

1.4.3 Absolute Accuracy calibration

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, for example, vision systems 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.



Note

Singularities might appear in slightly different positions on a real robot compared to RobotStudio, where *Absolute Accuracy* is off compared to the real controller.

What is included

Every *Absolute Accuracy* robot is delivered with:

- compensation parameters saved in the robot memory
- 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. The compensation parameters that are saved in the robot memory 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.

Continues on next page

1 Description

1.4.3 Absolute Accuracy calibration

Continued

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
- 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.

Production data

Typical production data regarding calibration are:

Robot variant	Positioning accuracy (mm)		
	Average	Max	% Within 1 mm
IRB 2600-20/1.65 IRB 2600-12/1.65 IRB 2600-12/1.85 IRB 2600ID-15/1.85	0.25	0.65	100
IRB 2600ID-8/2.00	0.35	0.85	100

1.5 Robot load and load diagrams

1.5.1 Introduction to Robot load and load diagrams

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 0.2 kgm² for all variants, also extra load at the upper arm housing and wrist are included according to table below. 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.

Robot variant	Extra arm load	Load at wrist
IRB 2600-20/1.65 IRB 2600-12/1.85 IRB 2600ID-15/1.85	10 kg	1 kg
IRB 2600-12/1.65 IRB 2600ID-8/2.00	15 kg	1 kg

Control of load case with RobotLoad

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

Continues on next page

1 Description

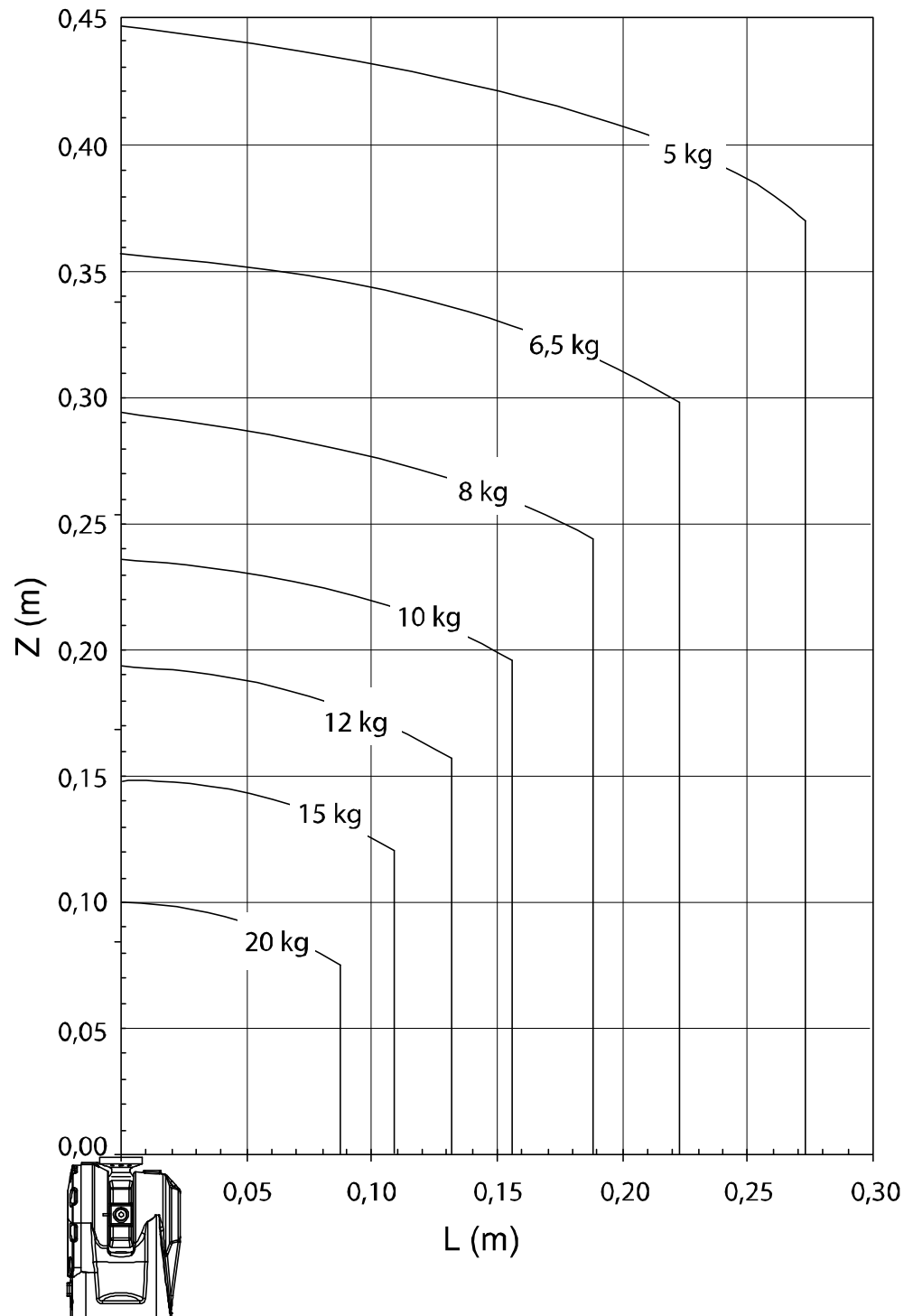
1.5.1 Introduction to Robot load and load diagrams

Continued

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.

1.5.2 Load diagrams

IRB 2600 - 20/1.65



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Extra load of 10 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

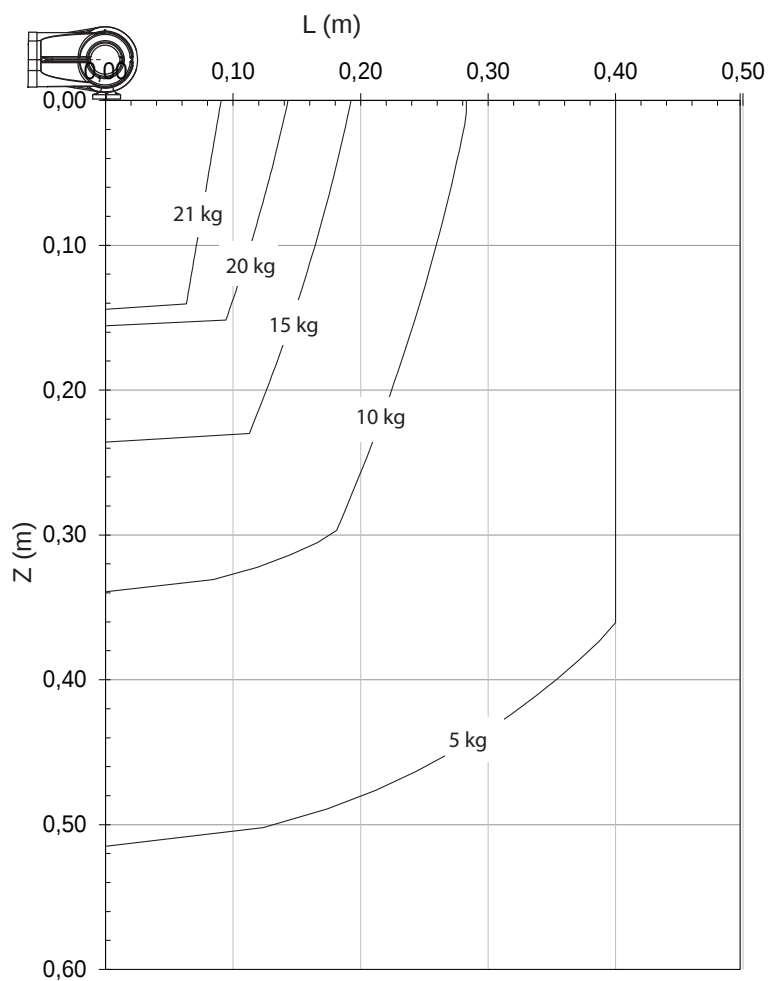
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1 Description

1.5.2 Load diagrams

Continued

IRB 2600 - 20/1.65 "Vertical wrist" ($\pm 10^\circ$)



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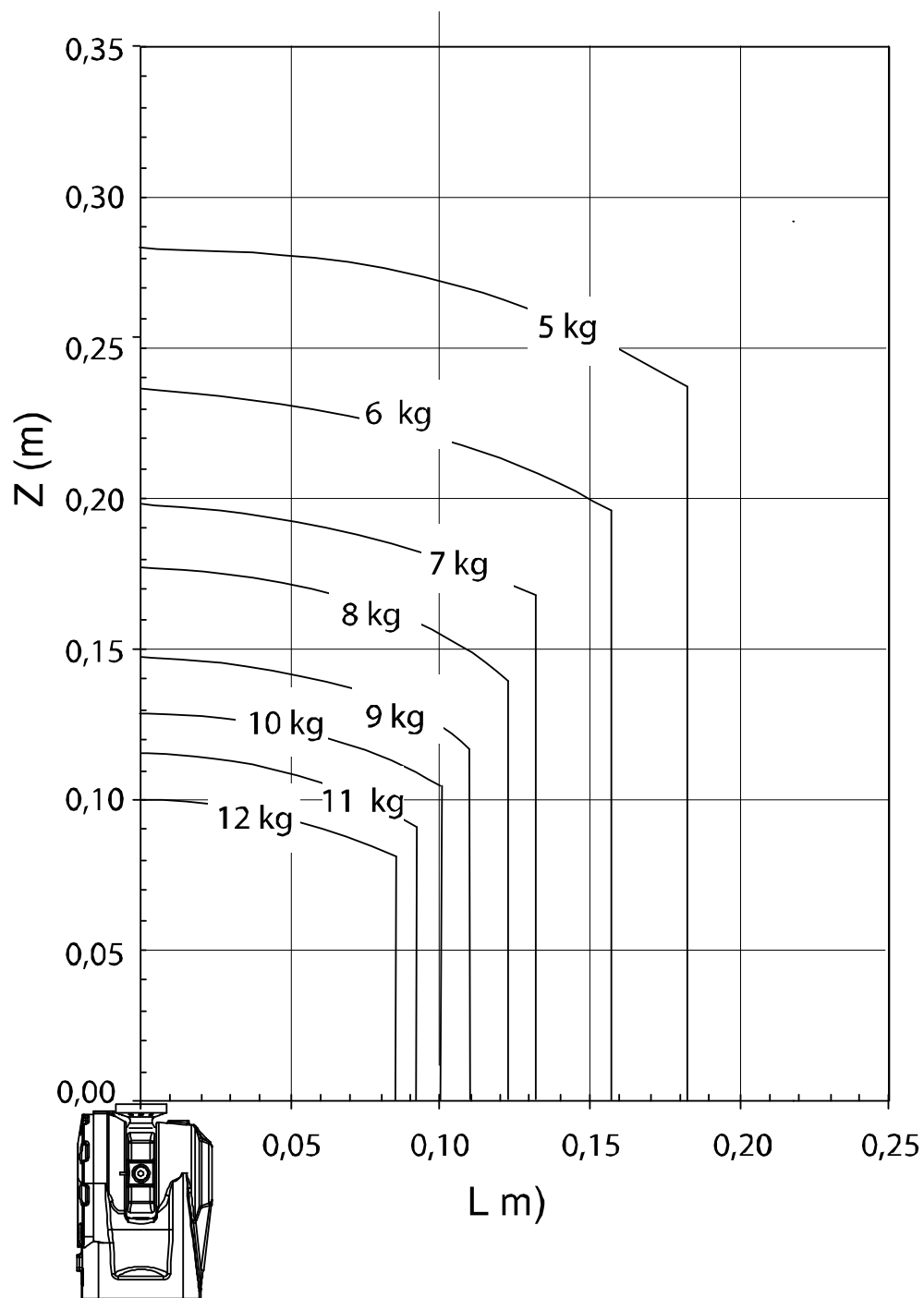
Extra load of 10 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

For wrist down $\pm 10^\circ$ deviation from vertical line.

	Description
Max load	22 kg
$Z_{\max}$	0.134 m
$L_{\max}$	0.031 m

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IRB 2600 - 12/1.65



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Extra load of 15 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

Load diagram "Vertical wrist" is not available for IRB 2600-12/1.65.

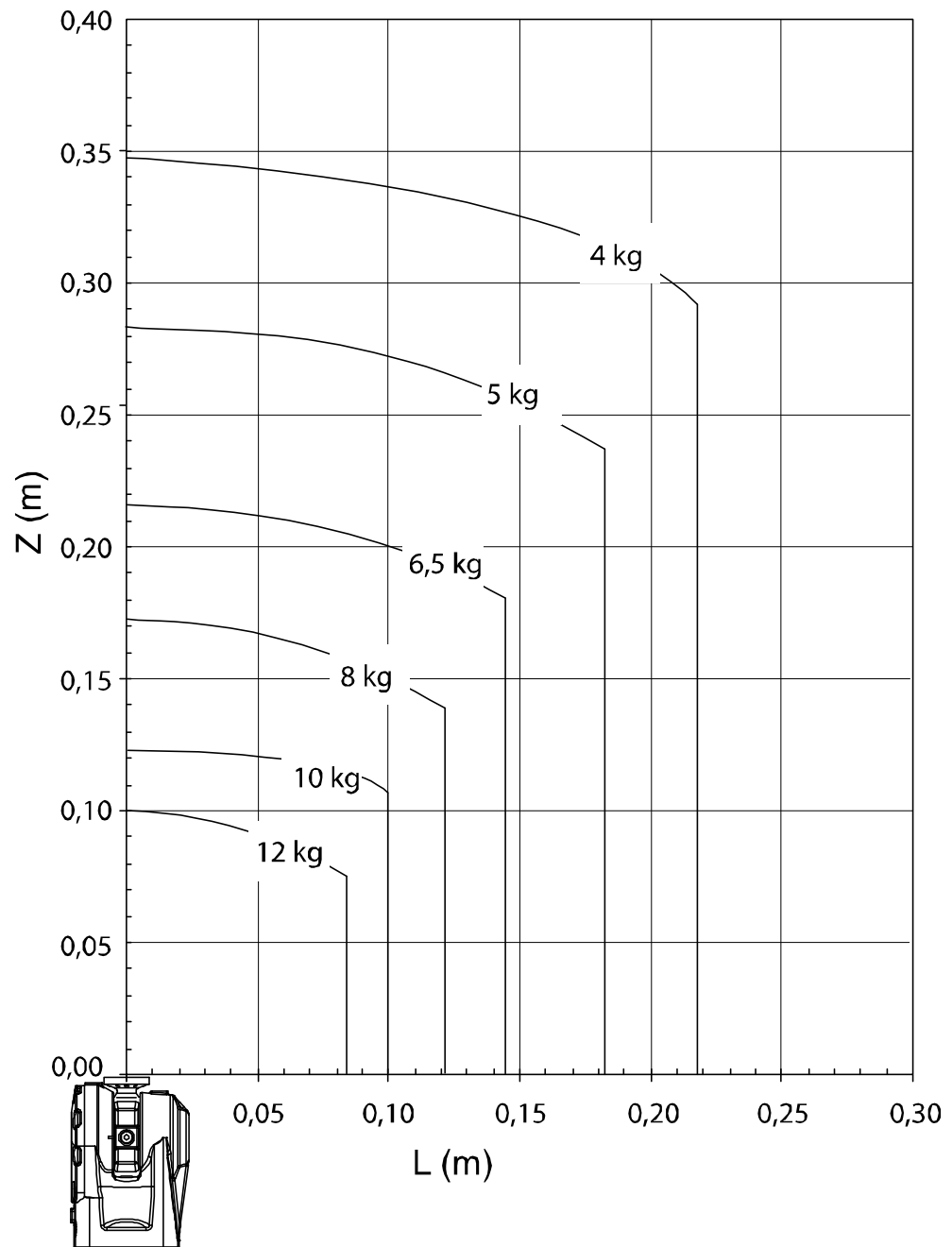
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1 Description

1.5.2 Load diagrams

Continued

IRB 2600 - 12/1.85

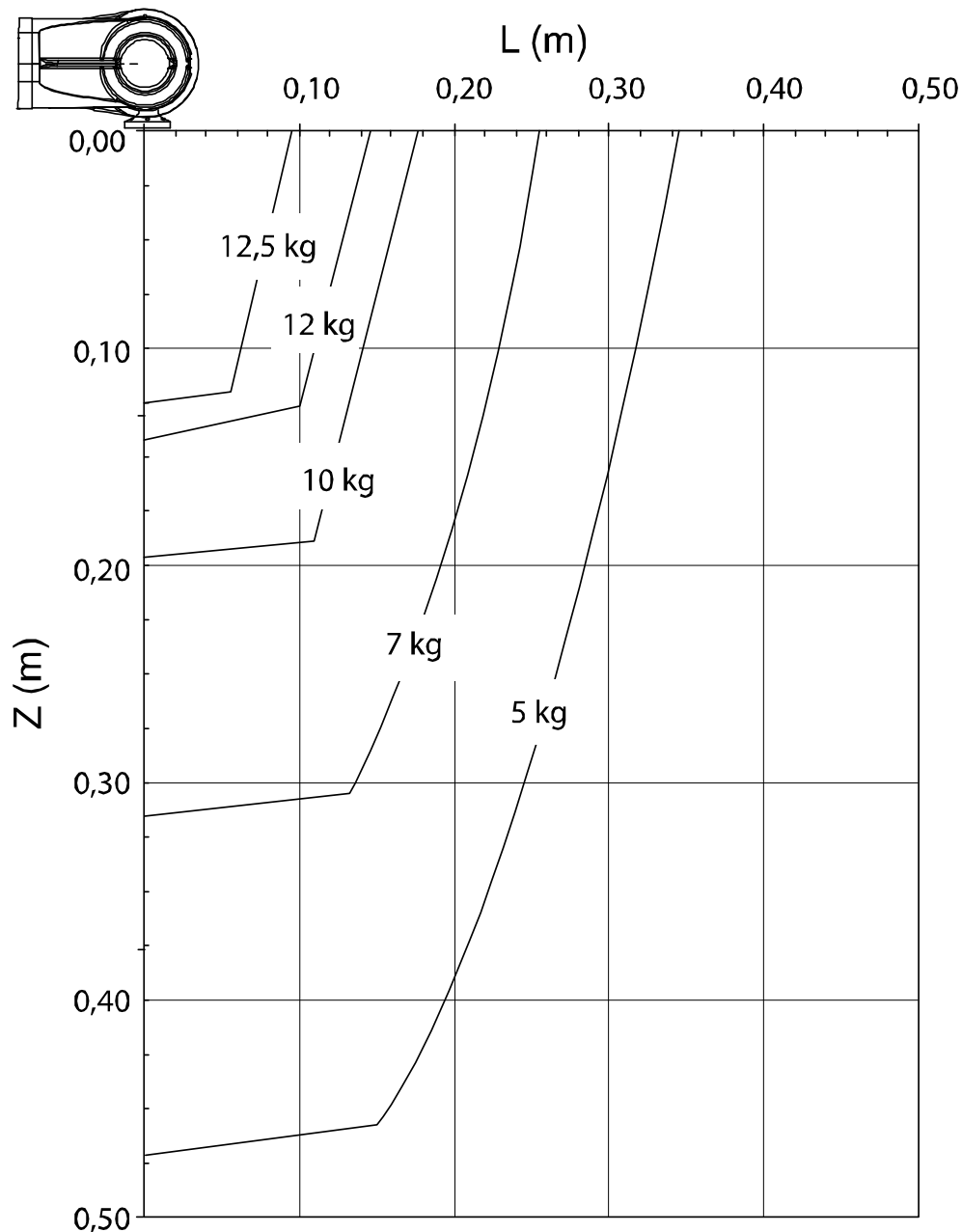


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Extra load of 10 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

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IRB 2600 - 12/1.85 "Vertical wrist" ($\pm 10^\circ$)



xx0900000709

Extra load of 10 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

For wrist down $\pm 0^\circ$ deviation from vertical line.

	Description
Max load	13 kg
Z _{max}	0.131 m
L _{max}	0.040 m

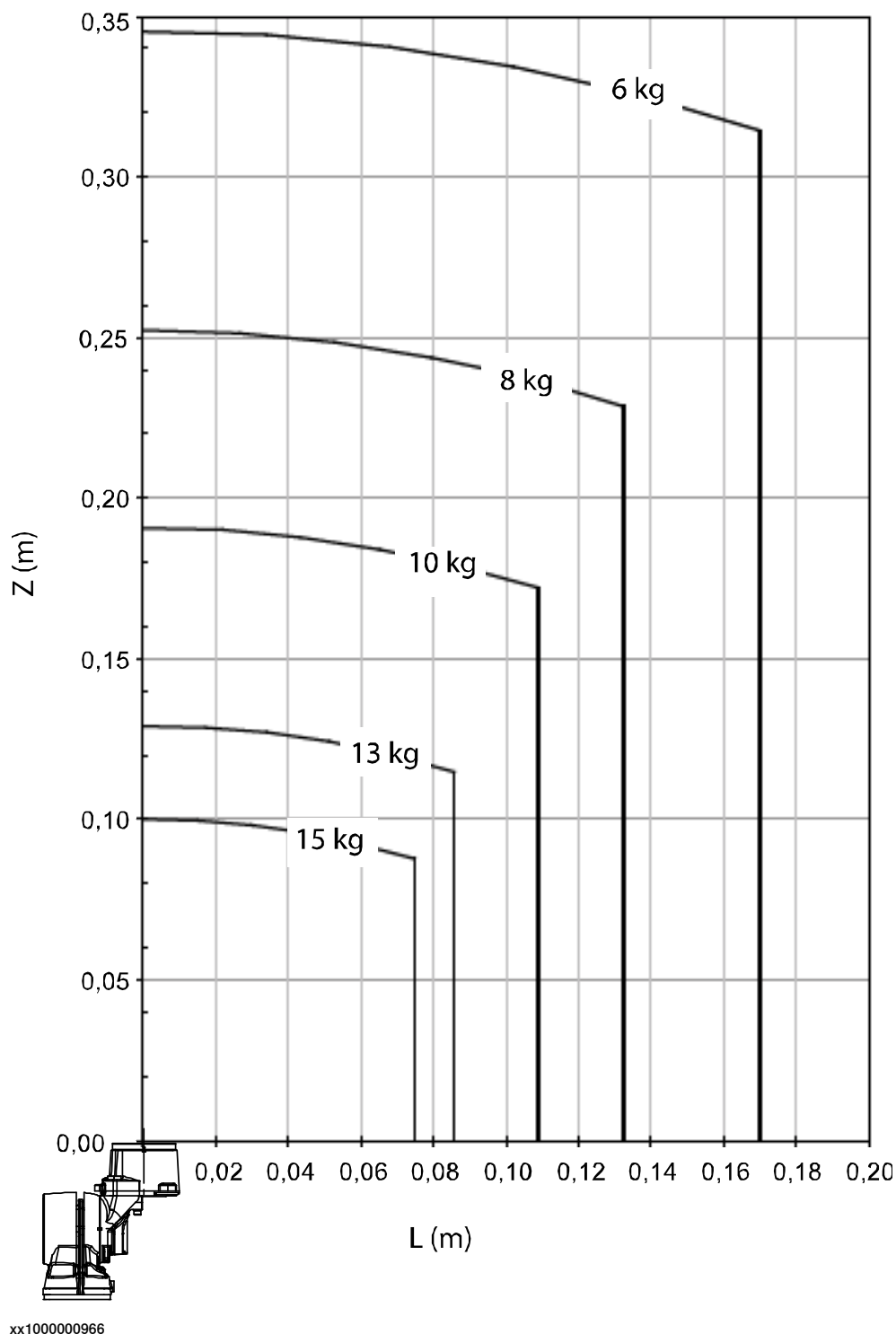
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1 Description

1.5.2 Load diagrams

Continued

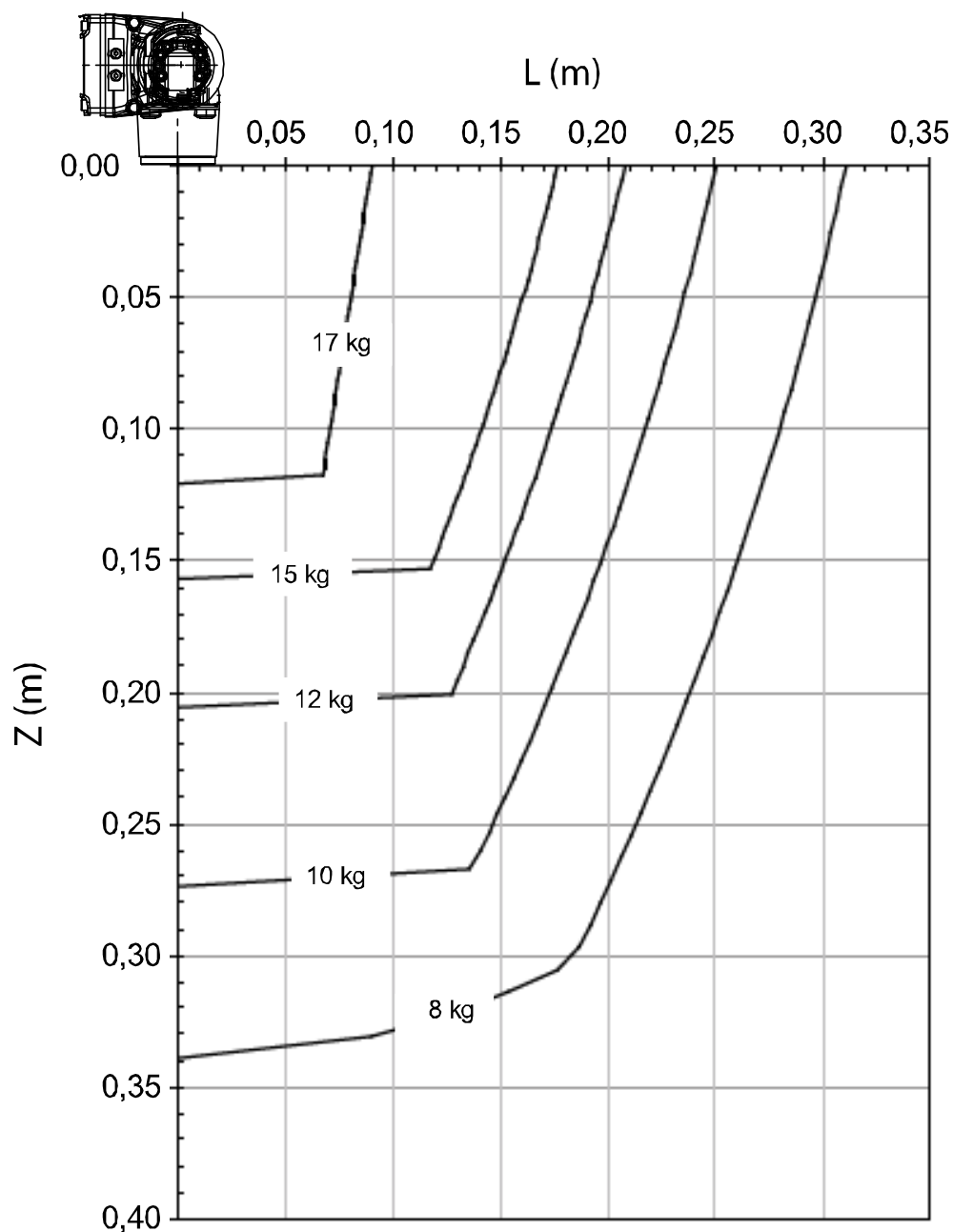
IRB 2600ID - 15/1.85



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Extra load of 10 kg at upper arm and 1 kg at wrist included in the load diagram.

Continues on next page

IRB 2600ID-15/1.85 "Vertical wrist" ($\pm 10^\circ$)

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Extra load of 10 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

For wrist down $\pm 10^\circ$ deviation from the vertical line.

	Description
Max load	16.5 kg
$Z_{\max}$	0.113 m
$L_{\max}$	0.057 m

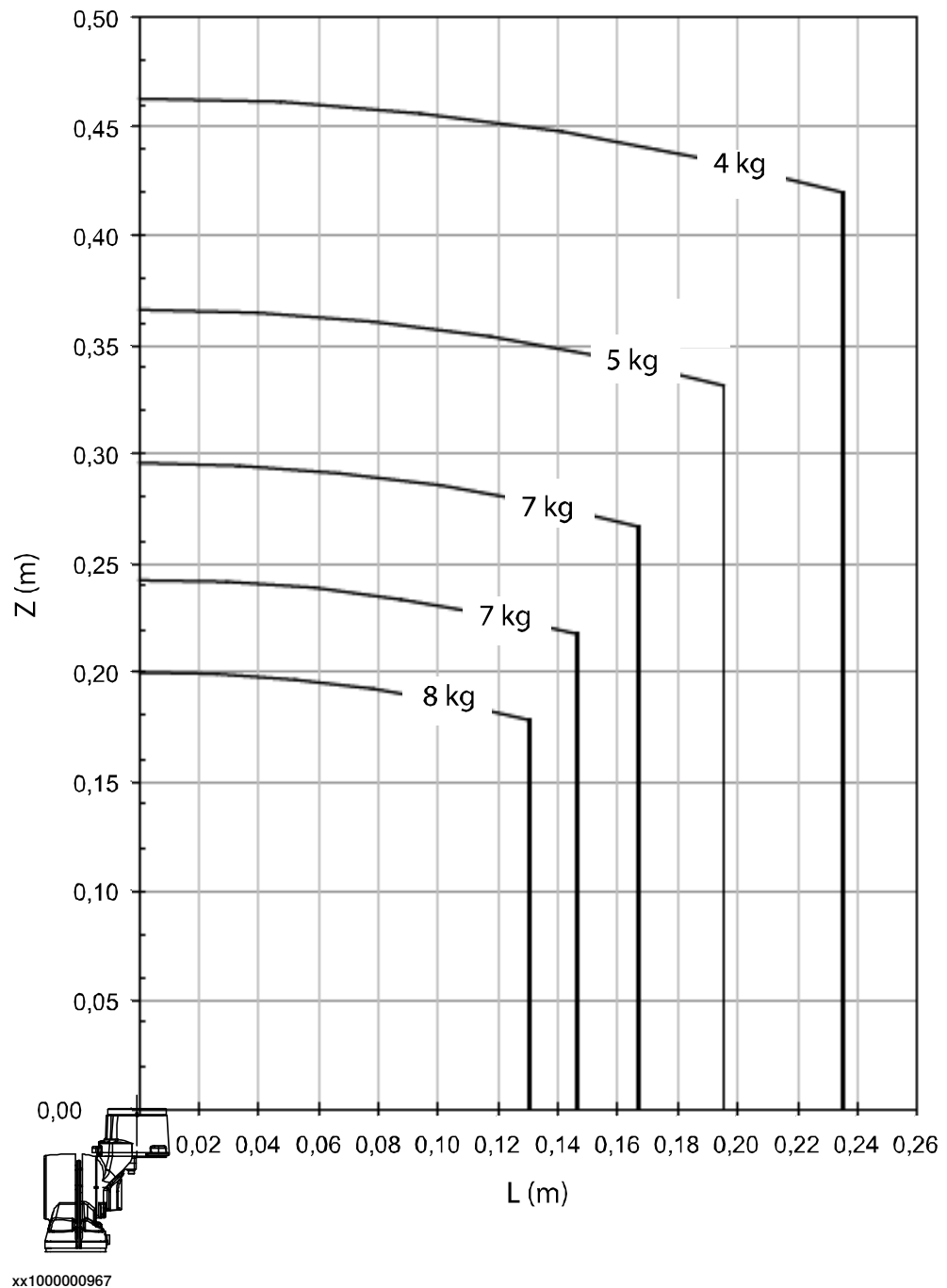
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1 Description

1.5.2 Load diagrams

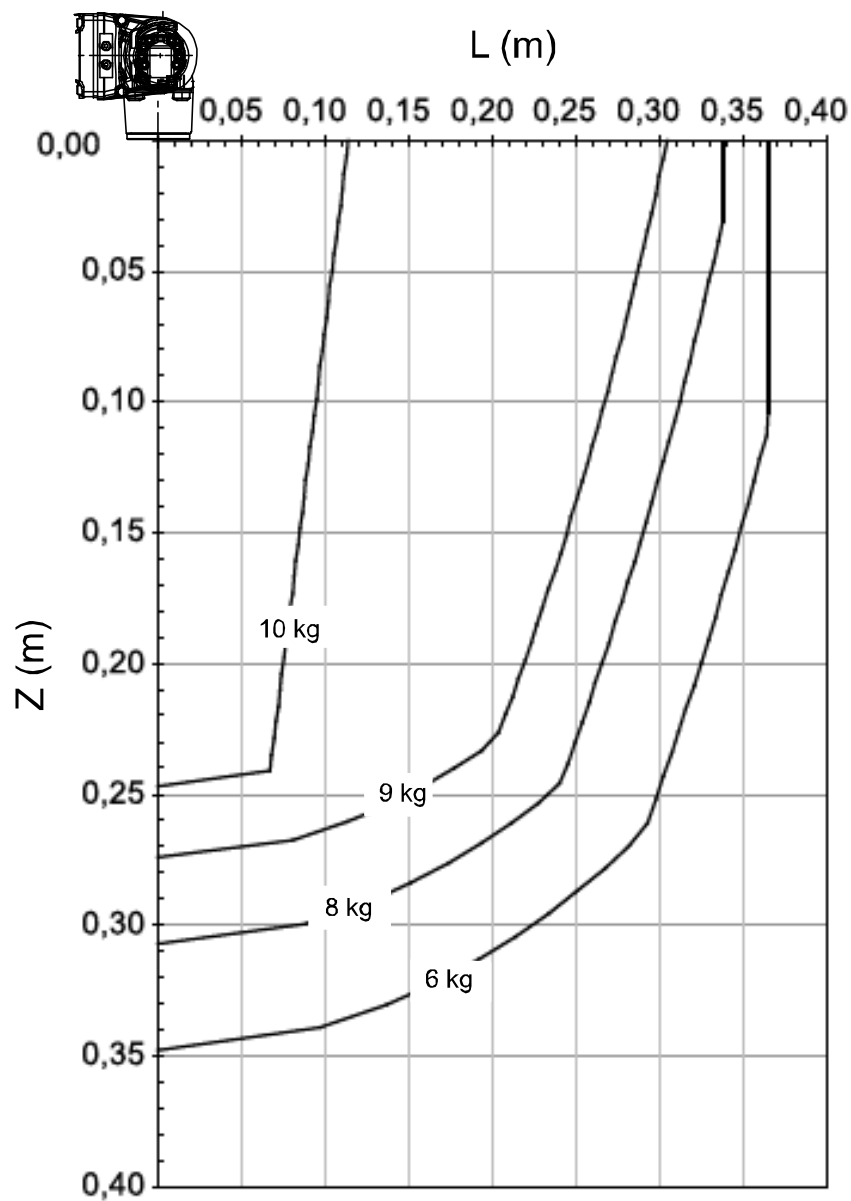
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IRB 2600ID - 8/2.00



Extra load of 15 kg at the upper arm housing and 1 kg at wrist included in the load diagram.

Continues on next page

IRB 2600ID-8/2.00 "Vertical Wrist" ($\pm 10^\circ$)

xx1000000977

Extra load of 15 kg at upper arm and 1 kg at wrist included in the load diagram.
For wrist down $\pm 0^\circ$ deviation from the vertical line.

	Description
Max load	9.5 kg
$Z_{\max}$	0.235 m
$L_{\max}$	0.041 m

1 Description

1.5.3 Maximum load and moment of inertia for full and limited axis 5 (center line down) movement

1.5.3 Maximum load and moment of inertia for full and limited axis 5 (center line down) movement

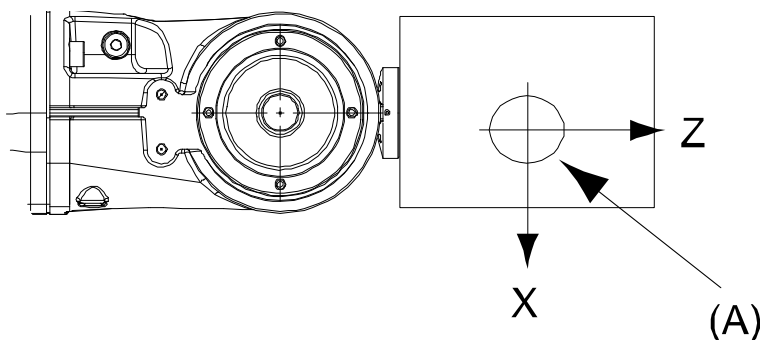


Note

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

Full movement of axis 5 ($\pm 120^\circ$)

Axis	Robot variant	Maximum moment of inertia
5	-20/1.65 -12/1.65 -12/1.85	$Ja5 = \text{Load} \times ((Z + 0,085)^2 + L^2) + \max(J_{ox}, J_{oy}) \leq 2.0 \text{ kgm}^2$
	ID-15/1.85	$Ja5 = \text{Load} \times ((Z + 0,135)^2 + L^2) + \max(J_{ox}, J_{oy}) \leq 2.0 \text{ kgm}^2$
	ID-8/2.00	$Ja5 = \text{Load} \times ((Z + 0,2)^2 + L^2) + \max(J_{ox}, J_{oy}) \leq 2.0 \text{ kgm}^2$
6	-20/1.65 -12/1.65 -12/1.85 ID-8/2.00 ID-15/1.85	$Ja6 = \text{Load} \times L^2 + J_{oz} \leq 1.0 \text{ kgm}^2$



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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.

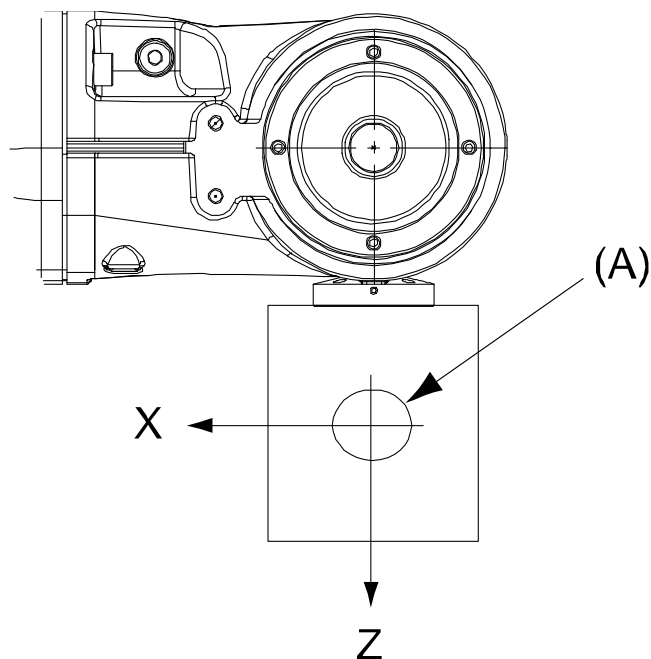
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1.5.3 Maximum load and moment of inertia for full and limited axis 5 (center line down) movement

Continued

Limited axis 5, center line down

Axis	Robot variant	Maximum moment of inertia
5	-20/1.65 -12/1.65 -12/1.85	$Ja5 = Load \times ((Z + 0,085)^2 + L^2) + \max(J_{0x}, J_{0y}) \leq 2.0 \text{ kgm}^2$
	ID-15/1.85	$Ja5 = Load \times ((Z + 0,135)^2 + L^2) + \max(J_{0x}, J_{0y}) \leq 2.0 \text{ kgm}^2$
	ID-8/2.00	$Ja5 = Load \times ((Z + 0,2)^2 + L^2) + \max(J_{0x}, J_{0y}) \leq 2.0 \text{ kgm}^2$
6	-20/1.65 -12/1.65 -12/1.85 ID-8/2.00 ID-15/1.85	$Ja6 = Load \times L^2 + J_{0z} \leq 1.0 \text{ kgm}^2$



xx0800000459

Pos	Description
A	Center of gravity
	Description
J_{0x}, J_{0y}, J_{0z}	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

Maximum torque due to payload

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 variant	Max wrist torque axis 4 and 5	Max wrist torque axis 6	Max torque valid at load
IRB 2600-20/1.65	36.3 Nm	16.7 Nm	20 kg
IRB 2600-12/1.65 IRB 2600-12/1.85	21.8 Nm	10.0 Nm	12 kg
IRB 2600ID-15/1.85	34.6 Nm	11 Nm	15 kg
IRB 2600ID-8/2.00	31.4 Nm	10.2 Nm	8 kg

1.5.5 Maximum TCP acceleration

General

Higher values can be reached with lower loads than the nominal because of our dynamical motion control QuickMove2. For specific values in the unique customer cycle, or for robots not listed in the table below, we recommend to use RobotStudio.

Maximum Cartesian design acceleration for nominal loads

Robot variant	E-stop Max acceleration at nominal load COG [m/s ²]	Controlled Motion Max acceleration at nominal load COG [m/s ²]
IRB 2600-20/1.65	94	51
IRB 2600-12/1.85	105	68
IRB 2600ID-15/1.85	104	59
IRB 2600ID-8/2.0	134	89



Note

Acceleration levels for emergency stop and controlled motion includes acceleration due to gravitational forces. Nominal load is defined with nominal mass and cog with max offset in Z and L (see the load diagram).

1 Description

1.6.1 Information about mounting equipment

1.6 Mounting equipment

1.6.1 Information about mounting equipment

General

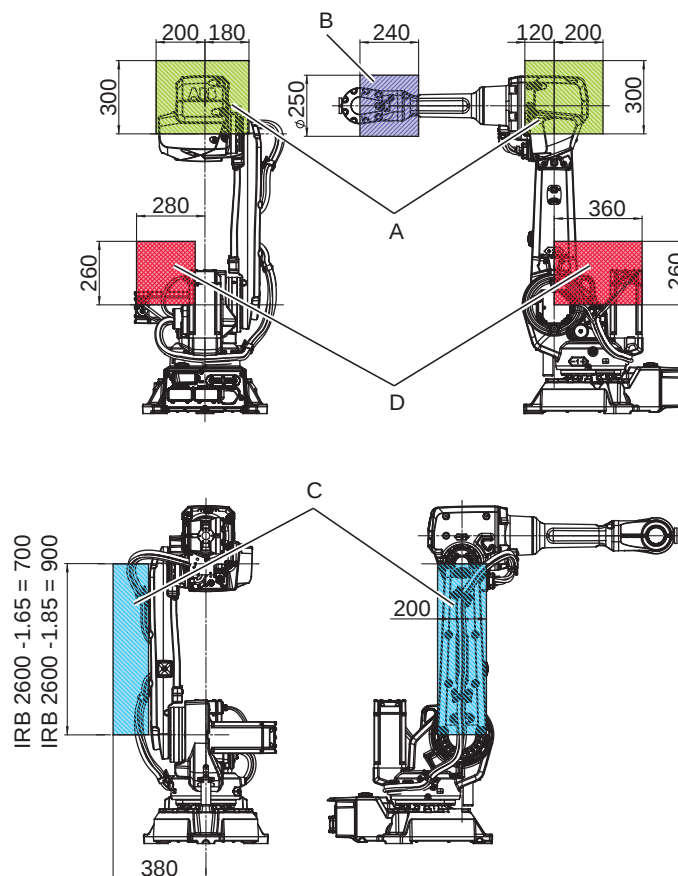
Extra loads can be mounted on the wrist, the upper arm housing and on the frame. The center of gravity of the extra load shall be within the marked load areas. The robot is supplied with holes for mounting of extra equipment. (See figures in Holes for mounting of extra equipment.)

The maximum allowed arm load depends on the center of gravity of the arm load and robot payload. Use RobotLoad in RobotStudio to verify individual load cases.



Note

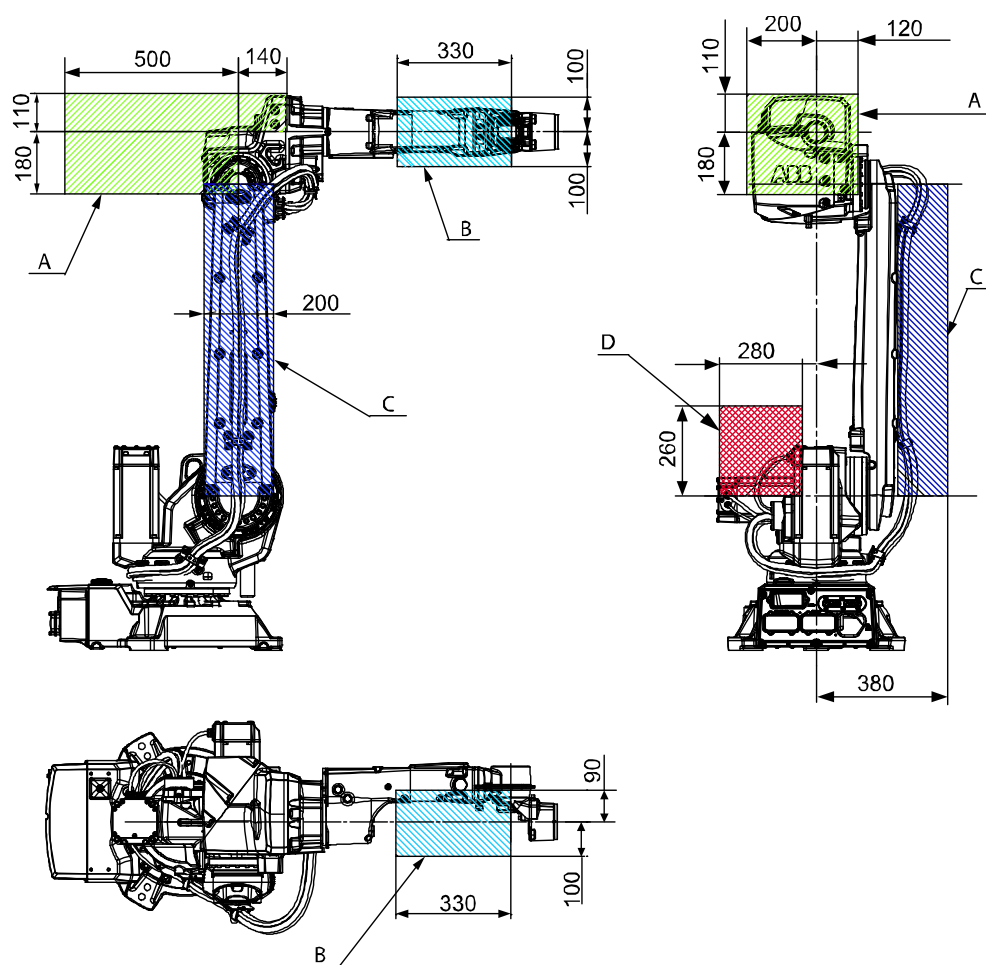
Maximum load on the frame (area D) must not be exceeded.



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Load area robot	Max load				
	A	B	C	A+C	D
IRB 2600-20/1.65 IRB 2600 - 12/1.85	10 kg	1 kg	10 kg	10 kg	35 kg
IRB 2600-12/1.65	15 kg	1 kg	15 kg	15 kg	35 kg

Continues on next page



xx1000000978

Load area robot	Max load				
	A	B	C	A+C	D
IRB 2600ID-15/1.85	10 kg	1 kg	10 kg	10 kg	35 kg
IRB 2600ID-8/2.00	15 kg	1 kg	15 kg	15 kg	35 kg

Holes for mounting of extra equipment



Note

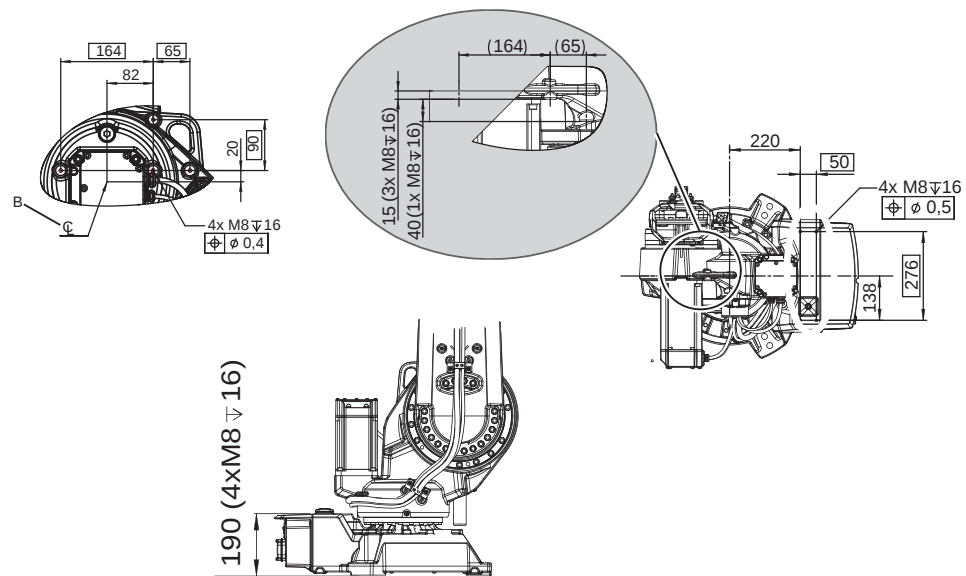
If option 213-1 Safety lamp is not selected, there are two holes on the upper arm housing that could be used for other equipment.

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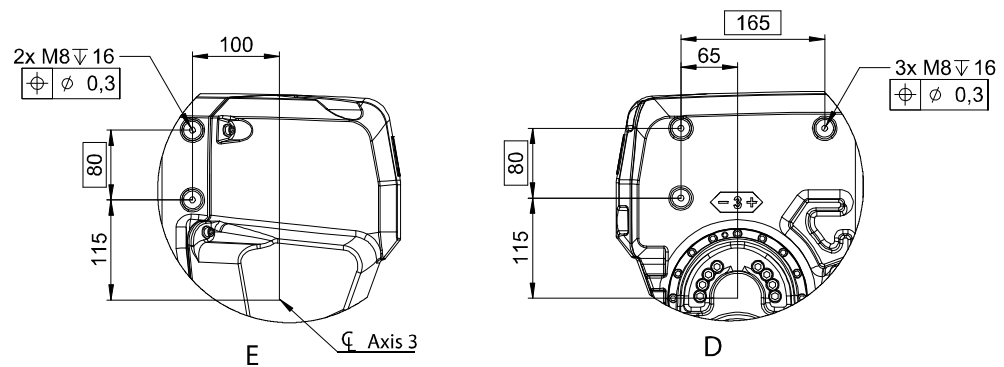
1 Description

1.6.1 Information about mounting equipment

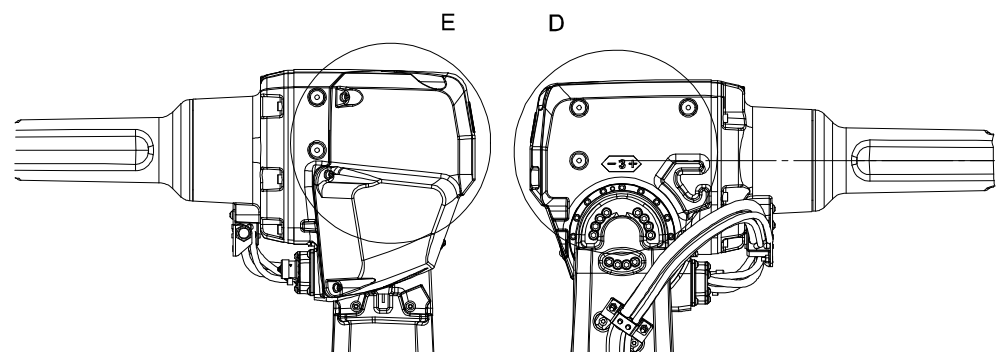
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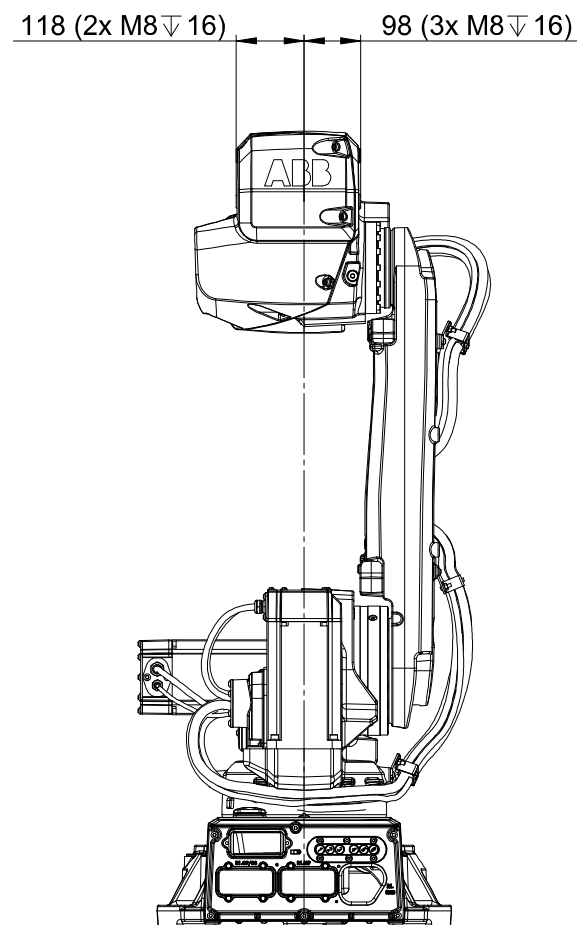


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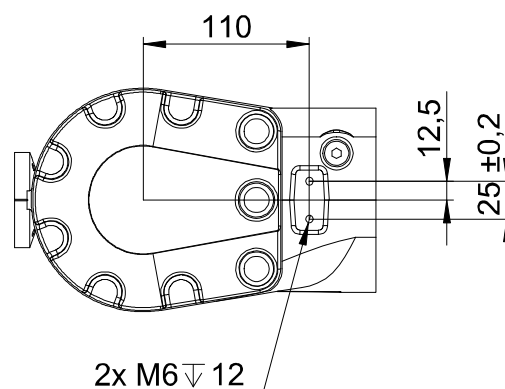


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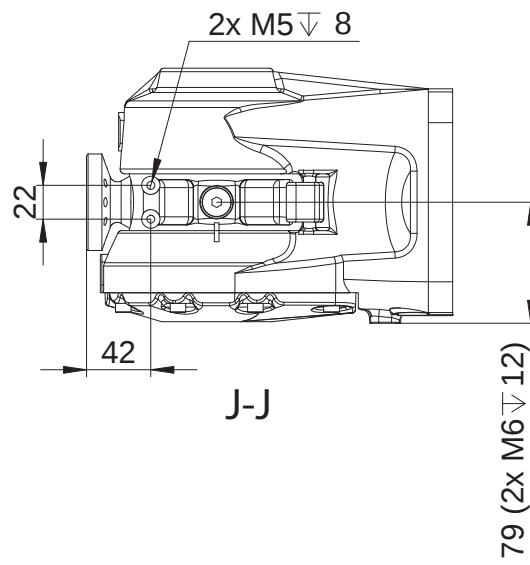
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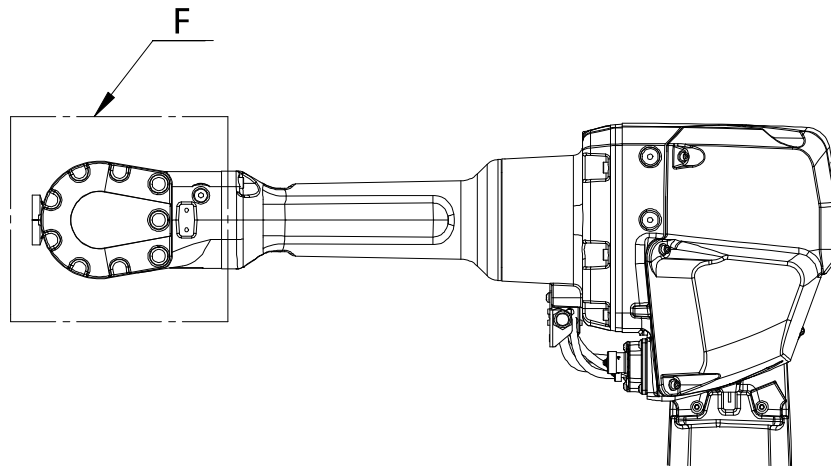
1 Description

1.6.1 Information about mounting equipment

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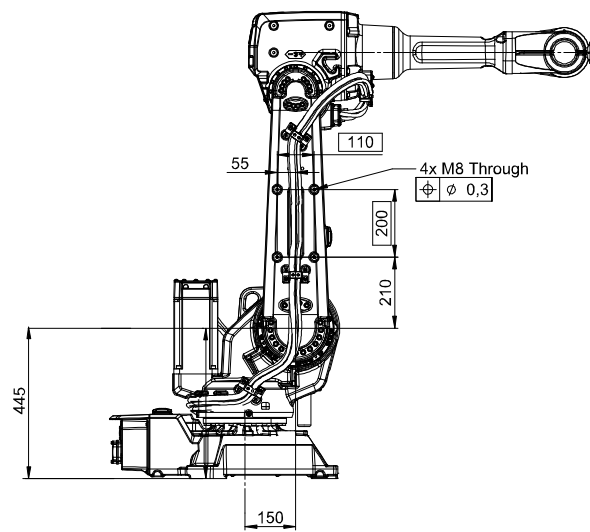
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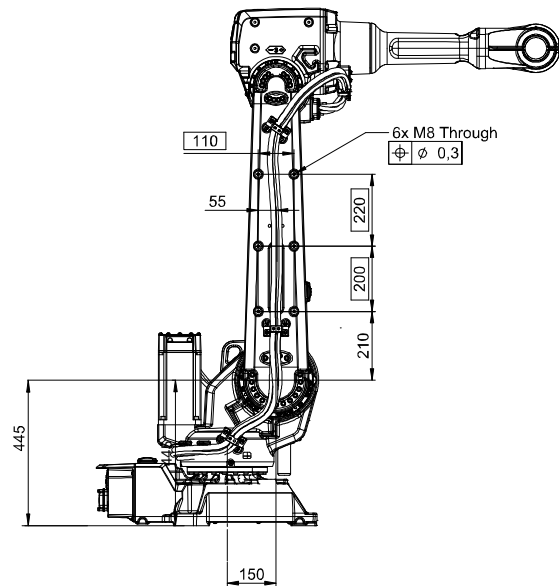
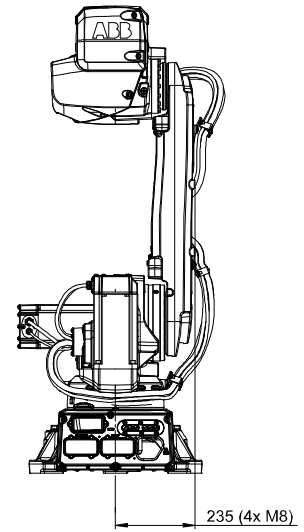
1 Description

1.6.1 Information about mounting equipment

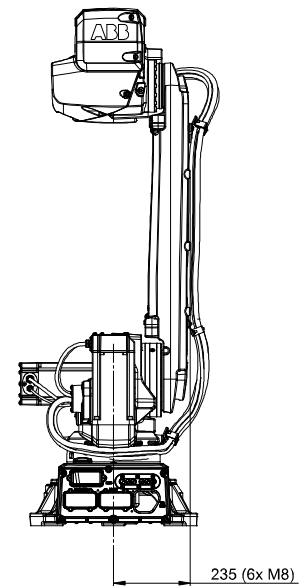
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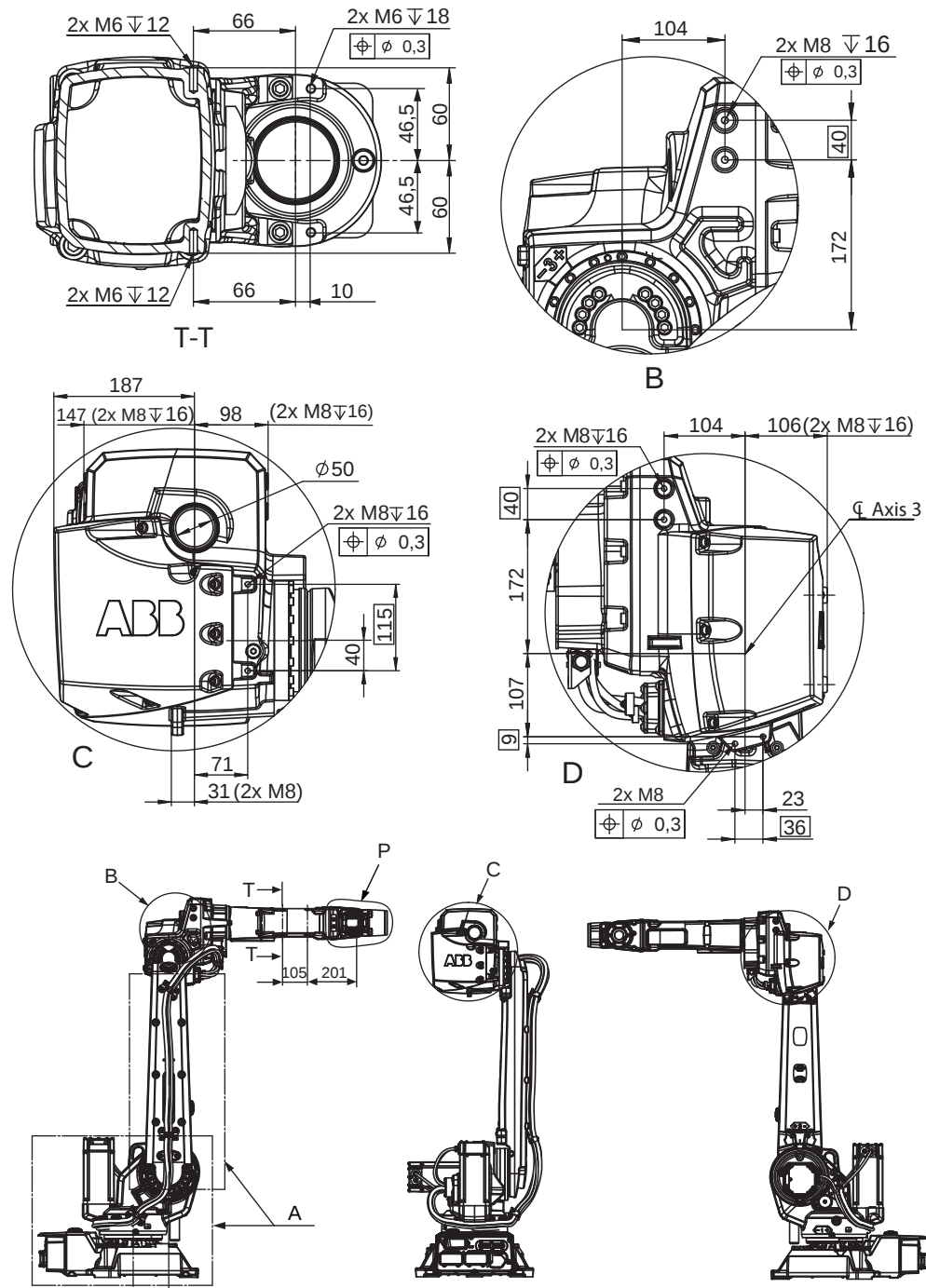


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1 Description

1.6.1 Information about mounting equipment
Continued

Holes for mounting of extra equipment for IRB 2600ID

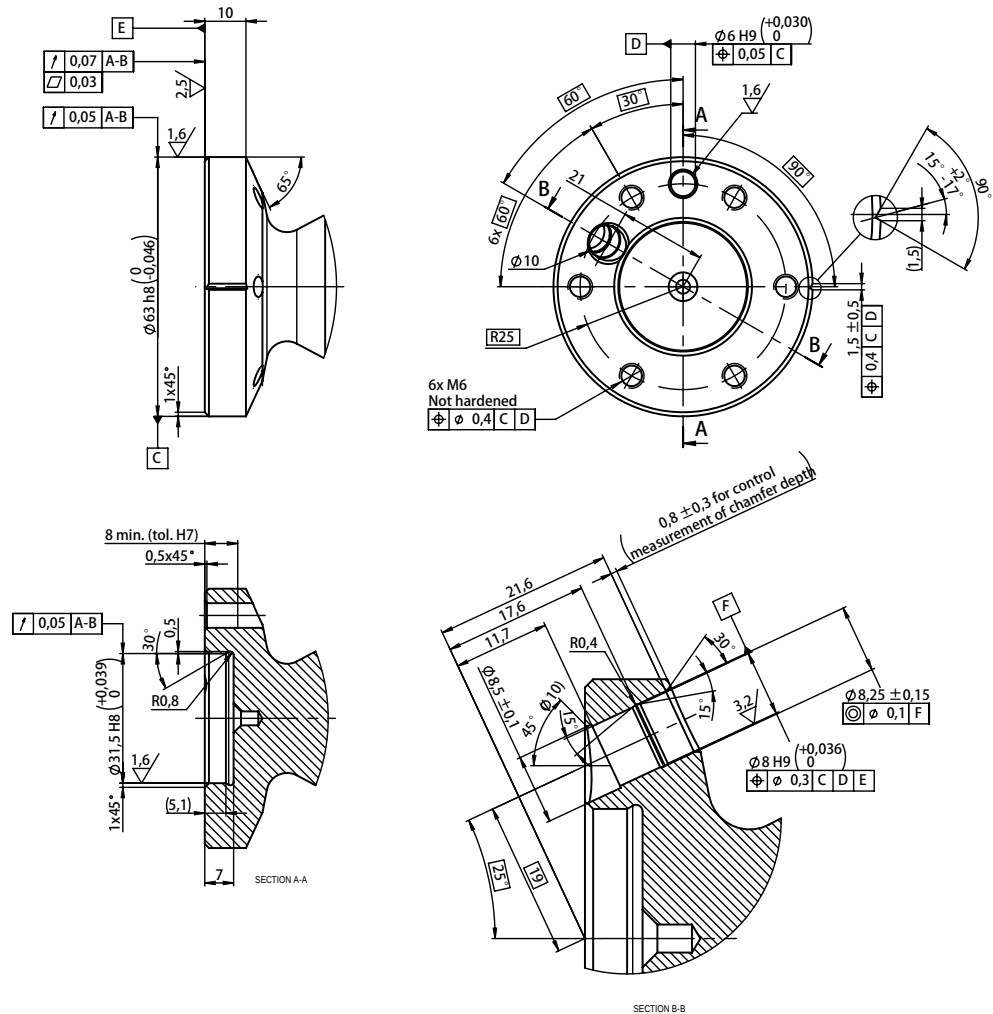


xx1000000968

Pos	Description
A	See IRB 2600 standard robot for details.

Continues on next page

Tool flange IRB 2600



xx0800000449

For fastening of gripper tool flange to Robot tool flange every one of the screw holes for 6 screws, quality class 12.9 shall be used. Min. 10 mm used thread length.

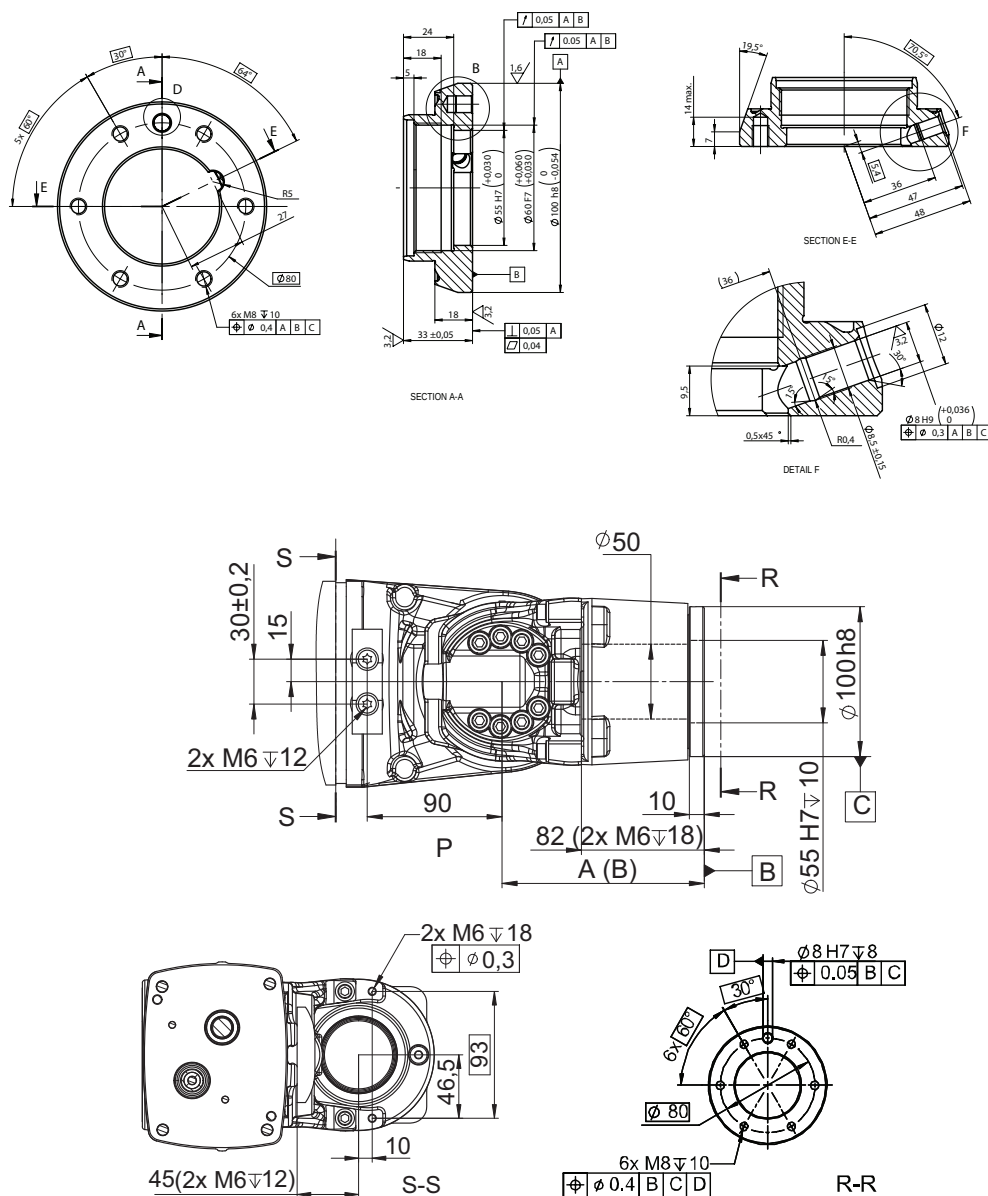
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1 Description

1.6.1 Information about mounting equipment

Continued

Tool flange/wrist for IRB 2600ID



xx1000000969

Pos	Description
A	135 mm for IRB 2600ID-15/1.85
B	200 mm for IRB 2600ID-8/2.00

For fastening of gripper tool flange to Robot tool flange every other one of the screw holes for 6 screws, quality class 12.9 shall be used.

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 Maintenance and troubleshooting

1.7.1 Introduction to Maintenance and Troubleshooting

General

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

- Maintenance-free AC motors are used.
- Oil is 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.

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.

1 Description

1.8.1 Introduction to Robot Motion

1.8 Robot motion

1.8.1 Introduction to Robot Motion

IRB 2600

Axis	Type of motion	Range of movement
1	Rotation motion	+ 180° to - 180° ⁱ
2	Arm motion	+ 155° to - 95°
3	Arm motion	+ 75° to - 180°
4	Rotation motion	+ 400° to - 400° + 251 rev. to - 251 rev. Max.
5	Bend motion	+ 120° to - 120°
6	Turn motion	+ 400° to - 400° + 274 rev. to - 274 rev. Max.

ⁱ See [Limitations for wall mounted robots on page 64](#)

For verifying each load case, please contact your local ABB organization.

The default working range for axis 4 and axis 6 can be extended by changing system parameter values in the software.

Option 610-1 *Independent axis* can be used for resetting the revolution counter after the axis has been rotated (no need for "rewinding" the axis).

Limitations for wall mounted robots

The axis 1 working range has the following limitations for wall mounted robots:

Robot variant	Max payload (kg)	Max arm-load (kg)	Working range axis 1, with max payload + max arm load	Max combined pay/arm-load (kg) for ±180° working range axis 1
IRB 2600-20/1.65	20	11	±45°	8
IRB 2600-12/1.65	12	16	±45°	8
IRB 2600-12/1.85	12	11	±40°	-

IRB 2600ID

Axis	Type of motion	Range of movements
1	Rotation motion	+ 180° to - 180° ⁱ
2	Arm motion	+ 155° to - 95°
3	Arm motion	+ 75° to - 180°
4	Rotation motion	+ 175° to - 175°
5	Bend motion	+ 120° to - 120°
6	Turn motion	+ 400° to - 400° + 191 rev. to - 191 rev. Max.

ⁱ See [Limitations for tilt and wall mounted robots on page 65](#)

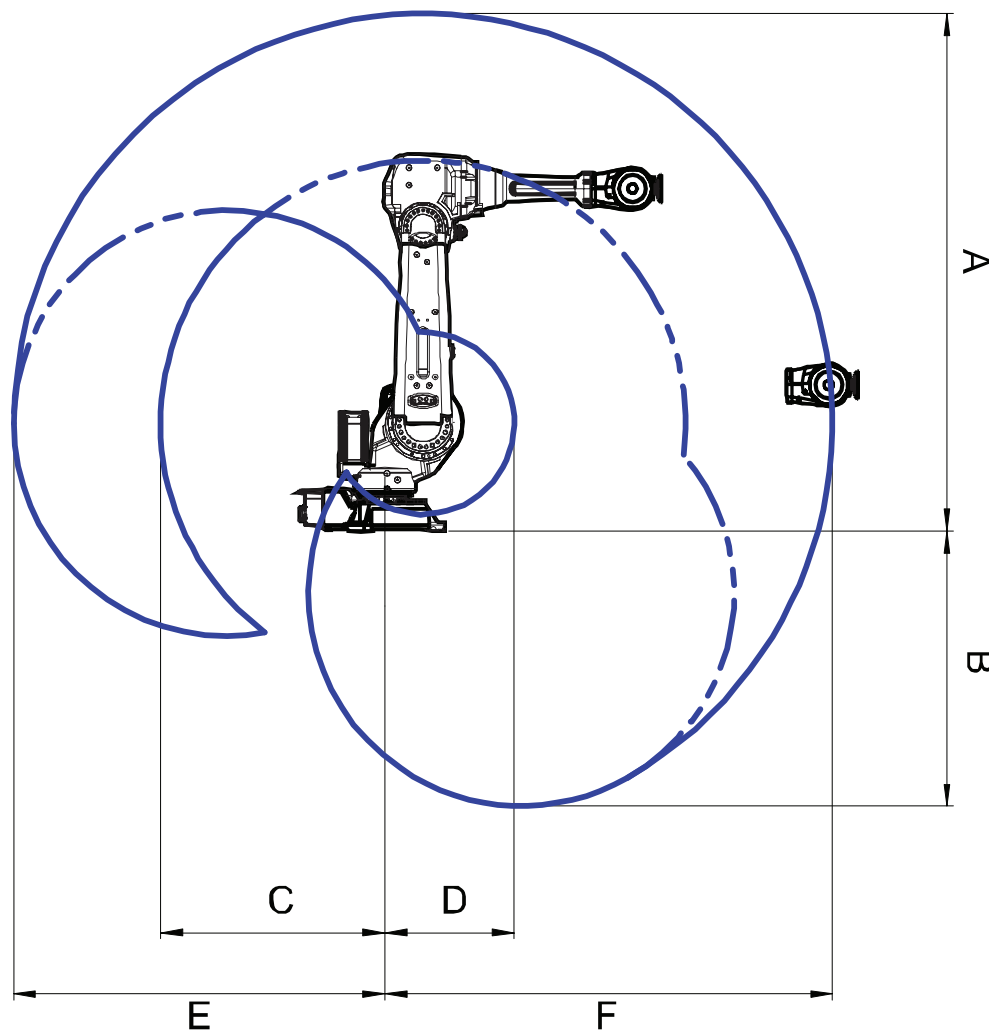
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Limitations for tilt and wall mounted robots

The axis 1 working range has the following limitation for tilt and wall mounting.

Mounting position	Description
Max tilting angle for full axis 1 working range	40 degrees
Max working range for axis 1 at wall mounting	± 40 degrees

Working range



xx0800000267

Variant	Pos. A	Pos. B	Pos. C	Pos. D	Pos. E	Pos. F
IRB 2600-20/1.65	1948 mm	993 mm	837 mm	469 mm	1353 mm	1653 mm
IRB 2600-12/1.65						
IRB 2600-12/1.85	2148 mm	1174 mm	967 mm	506 mm	1553 mm	1853 mm

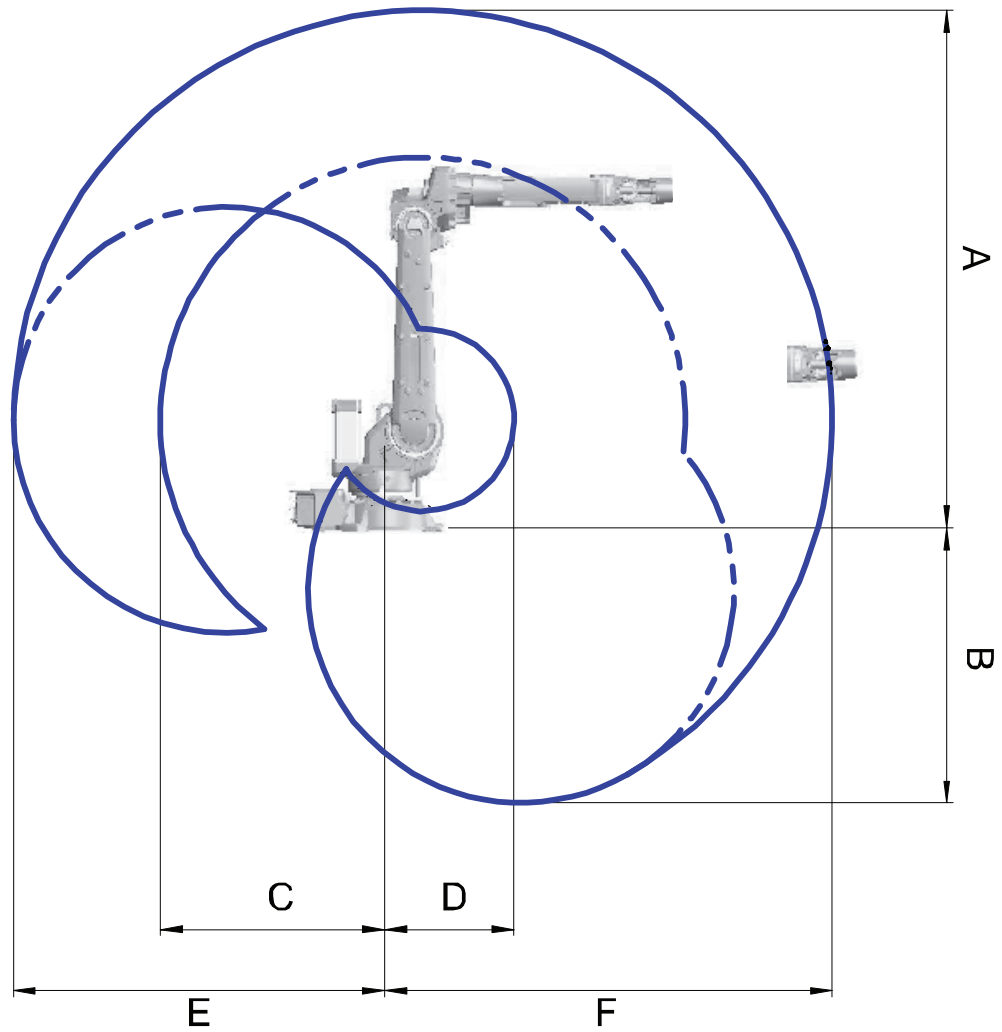
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1 Description

1.8.1 Introduction to Robot Motion

Continued

Working range IRB 2600ID



xx1000000970

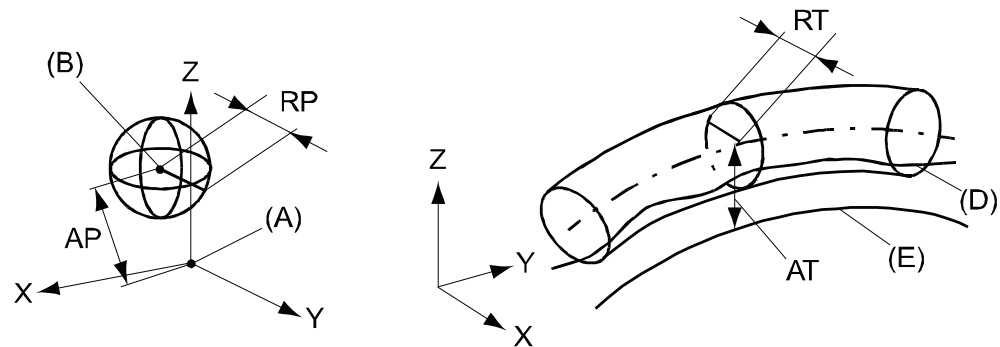
Variant	Pos. A	Pos. B	Pos. C	Pos. D	Pos. E	Pos. F
IRB 2600ID-15/1.85	2145 mm	1171 mm	936 mm	542 mm	1550 mm	1850 mm
IRB 2600ID-8/2.00	2295 mm	1321 mm	1051 mm	539 mm	1700 mm	2000 mm

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	IRB 2600			IRB 2600ID	
	-20/1.65 -20/1.65	-12/1.65 -12/1.65	-12/1.85	-15/1.85	-8/2.00
Pose repeatability, RP (mm)	0.04	0.04	0.04	0.026	0.023
Pose accuracy, AP ⁱ (mm)	0.03	0.03	0.03	0.014	0.033
Linear path repeatability, RT (mm)	0,13	0.14	0,16	0.30	0.27
Linear path accuracy, AT (mm)	0.55	0.60	0.68	0.80	0.70
Pose stabilization time, (PSt) to within 0.2 mm of the position (s)	0.00	0.02	0.03	0.05	0.063

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

1 Description

1.8.3 Velocity

1.8.3 Velocity

Maximum axis speed

Robot variant	Axis 1	Axis 2	Axis 3	Axis 4	Axis 5	Axis 6
IRB 2600-20/1.65	175 °/s	175 °/s	175 °/s	360 °/s	360 °/s	500 °/s
IRB 2600-12/1.65	175 °/s	175 °/s	175 °/s	360 °/s	360 °/s	500 °/s
IRB 2600-12/1.85	175 °/s	175 °/s	175 °/s	360 °/s	360 °/s	500 °/s
IRB 2600ID-15/1.85	175 °/s	175 °/s	175 °/s	360 °/s	360 °/s	500 °/s
IRB 2600ID-8/2.00	175 °/s	175 °/s	175 °/s	360 °/s	360 °/s	500 °/s

There is a supervision function to prevent overheating in applications with intensive and frequent movements.

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 Cooling fan for axis 1 and 2 motor

1.9 Cooling fan for axis 1 and 2 motor

Description

A cooling fan can be used to avoid overheating of motors and gears in applications with intensive motion (high average speed and /or high average torque and/or short wait time) of axis 1 and/or axis 2.

Valid protection for cooling fan is IP54. Fan failure stops the robot. The option shall not be used when the robot is placed on a track motion, IRBT.

To determine the use of cooling fans for axis 1 and/or axis 2 motor use the **Gearbox Heat Prediction Tool** in RobotStudio. Contact your local ABB organization for more information.

1.10 Customer connections

1.10.1 Customer connection on robot

Location of customer connection

For the connection of extra equipment to the robot, cables and air hose are integrated into the robot's cabling, and there can be two UTOW71210SH06 and one UTOW71626SH06 connector on the front part of the upper arm.



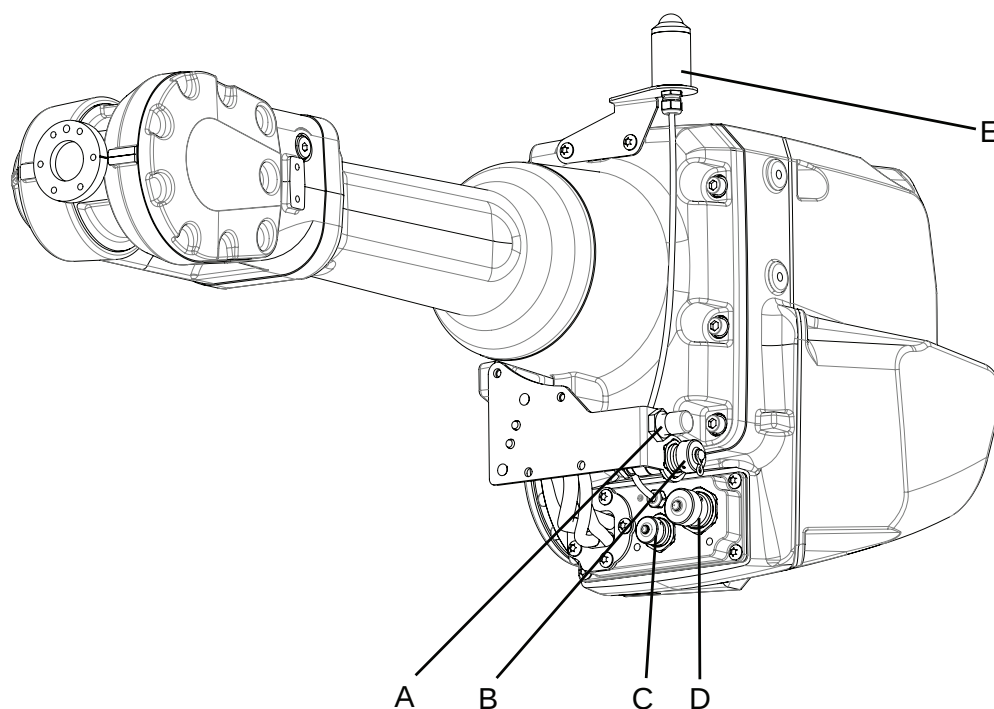
Note

The maximum leakage current for attached equipment must not exceed 10mA.

The customer connections are located on the robot as shown in the figure.

Customer connections on upper arm with signal lamp

The figure shows the customer connections on the upper arm, including the optional signal lamp that can be fitted to the arm house.



xx2000001658

A	R2.PROC1 Air M16x1.5 (24° cone sealing)
B	R2.ETHERNET
C	R2.CP or R2.CBUS
D	R2.CS or R2.CP/CS
E	Signal lamp

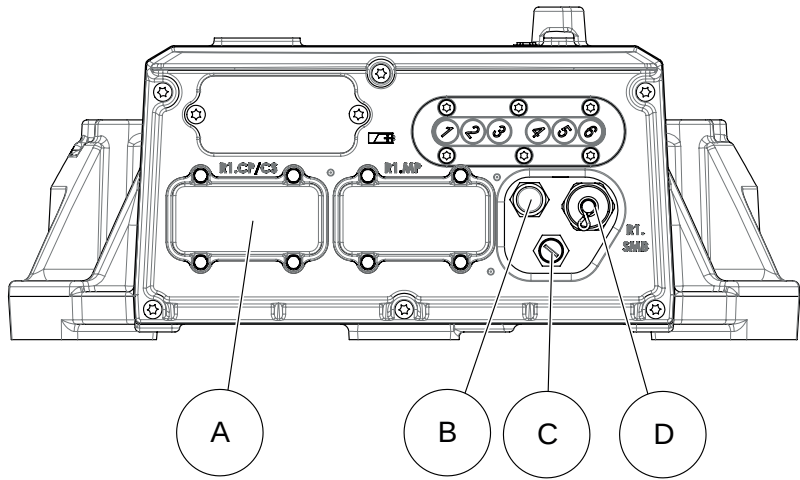
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1 Description

1.10.1 Customer connection on robot
Continued

-	R3.H1 +, R3.H2 - (inside the arm house, not shown in figure)
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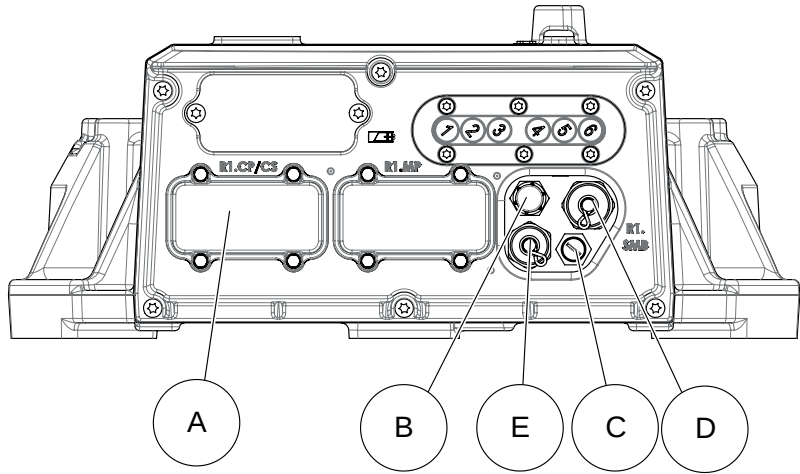
Customer connections base



xx2000001636

A	R1.CP/CS
B	R1.PROC1 (Air M16x1.5)
C	R1.ETHERNET
D	R1.SMB

Customer connections base with 7th axis



xx2000001637

A	R1.CP/CS
B	R1.PROC1 (Air M16x1.5)
C	R1.ETHERNET
D	R1.SMB
E	R2.FB7

Continues on next page

Extra equipment connections

Connections to the:

- air hose (3/8") is located on the front part of the upper arm and at the base.
Max. 8 bar. Inner diameter of the air hose: 9.5 mm.

Number of signals, customer connections option Parallel&Air (803-1):

- 23 (50V, 0.5A)
- 9 (300V, 2A). 8 are double crimped in R1.CP/CS and 1 is only accessible in the robot base.
- 1 protective ground

Number of signals, customer connections option Ethernet, Parallel&Air (803-2) and DeviceNet, Parallel&Air (803-3):

- 8 (50V, 0.5A)
- 3 (300V, 2A)
- 2 DeviceNet
- 4 EtherNet
- 1 protective ground

Number of signals, customer connections option Profibus, Parallel&Air (803-4):

- 8 (50V, 0.5A)
- 2 (300V, 2A)
- 2 Profibus
- 1 protective ground

Connection sets

To connect power and signal conductors to the robot base/upper arm connectors, the following parts are recommended.

Connection set	Connector	Art. no.	Content
PROC1 on base	R1.CP/CS	3HAC16667-1	• Sockets for cable area of 0.14-2.5 mm² • Hood foundry • Hinged frame, hood • Multicontact-module, female
Connector set on base	R1.ETHER-NET	3HAC033181-001	• Hose coupling • M12 connector, male
R2.CP/R2.CS	R2.CP/R2.CS	3HAC025396-001	• Pins for cable area 0.21 - 0.93 mm² • Bottle shaped shrinking hose • Angle shaped shrinking hose • Hose coupling
Connector set upper arm	R2.ETHER-NET	3HAC070439-001	• Pins for cable area 0.21 - 0.93 mm² • Bottle shaped shrinking hose • Angle shaped shrinking hose

Continues on next page

1 Description

1.10.1 Customer connection on robot

Continued

Power supply connections on the robot

Signal name	Customer Terminal Controller	Customer Contact on Upper arm, R2	Customer Contact on robot base (cable between robot and controller not supplied)
CPA	XP6.1	R2.CP.A	R1.CP/CS.d1
CPB	XP6.2	R2.CP.B	R1.CP/CS.d6
CPC	XP6.3	R2.CP.C	R1.CP/CS.d3
CPD	XP6.4	R2.CP.D	R1.CP/CS.d4
CPE	XP6.1	R2.CP.E	R1.CP/CS.d1
CPF	XP6.2	R2.CP.F	R1.CP/CS.d6
CPG	-	R2.CP.G (Earth)	-
CPH	-	R2.CP.H	R1.CP/CS.d7
CPJ	XP6.3	R2.CP.J	R1.CP/CS.d3
CPK	XP6.4	R2.CP.K	R1.CP/CS.d4

Signal connection on the robot

Signal name	Customer Terminal Controller	Customer Contact on Upper arm, R2	Customer Contact on robot base (cable between robot and controller not supplied)
CSA	XP5.1.1	R2.CS.A	R1.CP/CS.b1
CSB	XP5.1.2	R2.CS.B	R1.CP/CS.b2
CSC	XP5.2.1	R2.CS.C	R1.CP/CS.b3
CSD	XP5.2.2	R2.CS.D	R1.CP/CS.b4
CSE	XP5.2.3	R2.CS.E	R1.CP/CS.b5
CSF	XP5.2.4	R2.CS.F	R1.CP/CS.b6
CSG	XP5.1.9	R2.CS.G	R1.CP/CS.b7
CSH	XP5.1.10	R2.CS.H	R1.CP/CS.b8
CSJ	XP5.1.11	R2.CS.J	R1.CP/CS.b9
CSK	XP5.1.12	R2.CS.K	R1.CP/CS.b10
CSL	XP5.1.3	R2.CS.L	R1.CP/CS.b11
CSM	XP5.1.4	R2.CS.M	R1.CP/CS.b12
CSN	XP5.1.5	R2.CS.N	R1.CP/CS.b13
CSP	XP5.1.6	R2.CS.P	R1.CP/CS.b14
CSR	XP5.3.1	R2.CS.R	R1.CP/CS.b15
CSS	XP5.3.2	R2.CS.S	R1.CP/CS.b16
CST	XP5.3.3	R2.CS.T	R1.CP/CS.b18
CSU	XP5.3.4	R2.CS.U	R1.CP/CS.b19
CSV	XP5.3.5	R2.CS.V	R1.CP/CS.b20
CSW	XP5.3.6	R2.CS.W	R1.CP/CS.b21
CSX	XP5.2.9	R2.CS.X	R1.CP/CS.b22

Continues on next page

Signal name	Customer Terminal Controller	Customer Contact on Upper arm, R2	Customer Contact on robot base (cable between robot and controller not supplied)
CSY	XP5.2.10	R2.CS.Y	R1.CP/CS.b23
CSZ	XP5.2.11	R2.CS.Z	R1.CP/CS.b24

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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 2600 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)
435-95	IRB 2600	20/1.65
435-96	IRB 2600	12/1.65
435-97	IRB 2600	12/1.85
435-103	IRB 2600ID	15/1.85
435-104	IRB 2600ID	8/2.00

Manipulator color

Option	Color	RAL code ⁱ
209-1	ABB orange standard	NCS 2070-Y60R
209-2	ABB white standard	RAL 9003
209-202	ABB Graphite White std Standard color	RAL 7035
209	RAL code should be specified (ABB non-standard colors)	

ⁱ The colors can differ depending on supplier and the material on which the paint is applied.



Note

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

Protection types

Option	Protection type	Note
287-4	Standard	IRB 2600: IP 67 IRB 2600ID upper arm: IP 54
287-3	Foundry Plus 2	See Protection type Foundry Plus 2 on page 11 for a complete description of protection type Foundry Plus 2. Not valid for IRB 2600ID versions.

Mounting position

Option	Description
224-2	Inverted mounting of the manipulator Not together with option 603-1 Absolute Accuracy.

Continues on next page



Note

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

IRB2600-20/1.65 type C and IRB2600-12/1.65 type C are not valid for inverted mounting.

See [Expansion container for inverted mounting of the manipulator on page 31](#) for more details about the inverted mounting position.

Media & Communication

Air supply and signals for extra equipment upper arm, see 1.9 Customer connections.

Option	Type	Description
803-1	Parallel communication and air	Includes customer power CP and customer signals CS + air.
803-2	Ethernet, parallel communication and air	Includes CP, CS and PROFINET or Ethernet/IP + air.
803-3	DeviceNet, parallel communication and air	Includes CP, CS and DeviceNet + air
803-4	PROFIBUS	Includes CP, CS and PROFIBUS + air

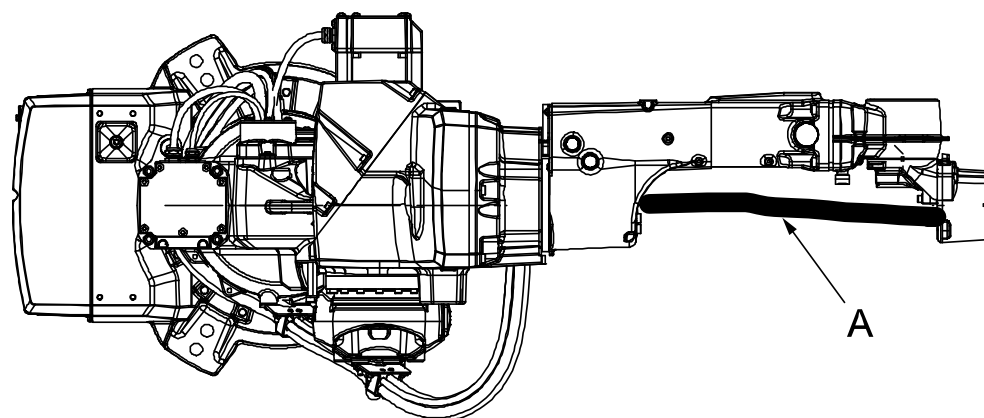
Connector kit

The kit consists of connectors, pins and sockets:

Option	Description
431-1	For the connectors on the upper arm.
239-1	For the connectors on the foot if connection to manipulator.

Flexible conduit

Protection hose for customer signals, power and hoses. Only valid for IRB 2600ID.



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Pos	Description
A	Flexible conduit, option 943-1.

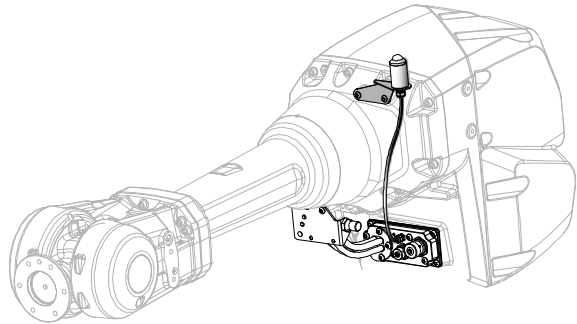
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2 Specification of variants and options

2.2 Manipulator Continued

Safety lamp

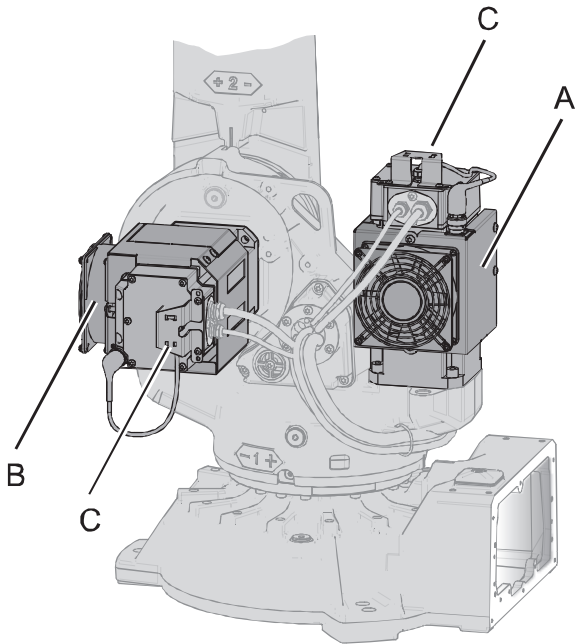
Option	Description
213-1	Safety lamp safety lamp with an orange fixed light can be mounted on the manipulator. The lamp is active in MOTORS ON mode. The safety lamp is required on a UL/UR approved robot.



xx0800000427

Cooling fans for axis 1 and 2 motor

To be used to avoid overheating of motors and gears in application with intensive motion (high average speed and/or high average torque and/or short wait time) of axis 1 and axis 2. IP54 valid for cooling fan.



xx0900000232

Option	Description
A	Cooling fan for axis 1 motor, option 87-1.
B	Cooling fan for axis 2 motor, option 88-1.
C	Protection cover

Continues on next page

Resolver connection, axis 7

A connector for resolver signals for axis 7 located on the base

Option	Description	Remark
864-1	On base	Used together with first additional drive, option 907-1.

Foundry Plus Cable Guard

The manipulator cables are equipped with an additional protection of aluminized leather against e.g. aluminium spitz and flashes and chips from machining.

Option	Type	Description
908-1	Foundry Plus Cable Guard	For extra protection of cables. Requires option 287-3 Foundry Plus.

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*.

Working range limit-Axis 1

The working range of axis 1 is limited by fixed mechanical stops. The working range can be reduced further by adding movable mechanical stops.

The mechanical turning range can be limited in steps of 22.5° from the synchronization position, between values defined in the table. The values differ depending on which design of the gearbox (and base) the robot is equipped with.

Robot variant	Limitation in mechanical turning range, calculated from synchronization position
IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65	±126° to ±13.5° in steps of 22.5°
IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0	±129° to ±16.5° in steps of 22.5°



Note

The software working range limitations must be adjusted to correspond to the changes in the mechanical limitations of the working range. The system parameters that must be changed (*Upper joint bound* and *Lower joint bound*) are described in *Technical reference manual - System parameters*.

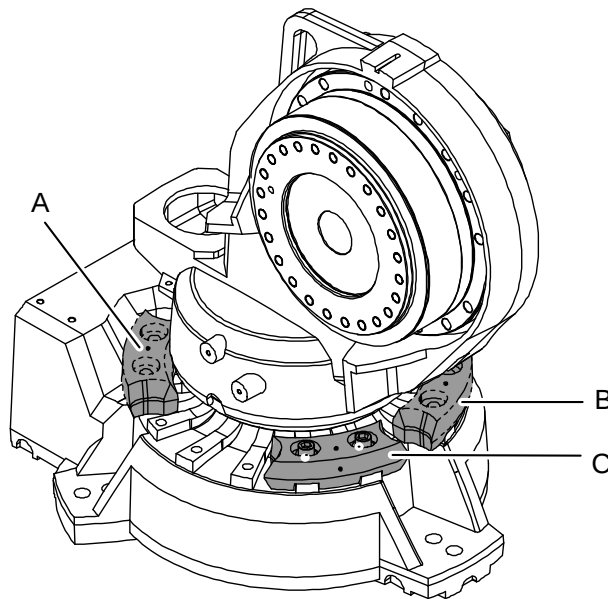
Option	Description
28-1 Axis 1	Two stops for restricting the working range. The stops can be mounted according to example in.

Continues on next page

2 Specification of variants and options

2.2 Manipulator

Continued



xx0800000410

Pos	Description
A	Movable mechanical stop. Limited to: • -126° (IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65) • -129° (IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0)
B	Movable mechanical stop. Limited to: • +13.5° (IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65) • +16.5° (IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0)
C	Movable mechanical stop. Limited to: • -13.5° (IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65) • -16.5° (IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0)

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]

Continues on next page

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.
438-8	Stock warranty	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.  Note Special conditions are applicable, see <i>Robotics Warranty Directives</i>.

2 Specification of variants and options

2.3 Positioners

2.3 Positioners

General

Regarding positioners, see *Product specification - Product.ProductName*,
Document.ID-1.

2.4 Floor cables

Manipulator cable length

Option	Lenghts (m)
210-2	7
210-3	15
210-4	22
210-5	30

Application interface connection

Option	Name	Description
16-1	Cabinet	The signals are connected to 12-pole screw terminals, Phoenix MSTB 2.5/12-ST-5.08, to the Control Module.

Connection of Parallel/CAN DeviceNet communication

Following information specifies the cable length for Parallel/CAN DeviceNet/Ethernet + PROFIBUS floor cables for connections between cabinets and manipulator.

Option	Lenghts (m)
94-1/90-2/859-1/92-2	7
94-2/90-3/859-2/92-3	15
90-4/859-3/92-4	22
94-4/90-5/859-4/92-5	30

2 Specification of variants and options

2.5 Process

2.5 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	

2.6 Process equipment

Welding torch kit

Consisting of: torch neck, hose bundle, torch holder.

Option	Type	Description
1034-1	PSF315	25 degrees. Only available for power source ABB RPC, option 1029-15.

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].

Torch service options

Option	Type	Description
1038-1	Extension pedestal	Extension pedestal for TSC/TC/BullsEye

2 Specification of variants and options

2.7 User documentation

2.7 User documentation

User documentation

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



Tip

All documents can be found via ABB Robotics One, <https://one.robotics.abb.com/en/knowledge-hub>.

3 Robot description

3.1 Robot types

Robot types

There are different versions of the IRB 2600, the initial version, Type A, and Type B. The following table explains the differences.

There is also a Type C of IRB 2600, but it only affects two variants of the robot, see the table and see [Non-compatible versions of axis-1 and axis-2 gearboxes on page 90](#).

	IRB 2600 (standard variants)	IRB 2600ID
Initial version	motor type A	motor type A
IRB 2600 Type A	Axis 2 changes gearbox	Axis 1-5 change to motor type B Axis 6 keeps motor type A
IRB 2600 Type B	Axis 1-6 change to motor type B	
IRB 2600 Type C - only IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65.	Axis 1 and 2 changes gearbox and motor pinion Axis 3, 4, 5 and 6 has motor type B	

3 Robot description

3.2 Non-compatible versions of axis-1 and axis-2 gearboxes

3.2 Non-compatible versions of axis-1 and axis-2 gearboxes

Gearboxes from different suppliers are not compatible

There are two different versions of the axis-1 and axis-2 gearboxes for robot variants IRB 2600-20/1.65 and IRB 2600-12/1.65.

- Version 1 for IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0 (supplier Spinea).
- Version 2 for IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65 (supplier Nabtesco).

The different versions affect the surrounding mechanical structure of the robot. Following parts are unique for each version of the gearbox.

- Axis-1 gearbox
- Axis-2 gearbox
- Frame
- Base
- Lower arm
- Axis-1 motor pinion
- Axis-2 motor pinion
- Cable harness

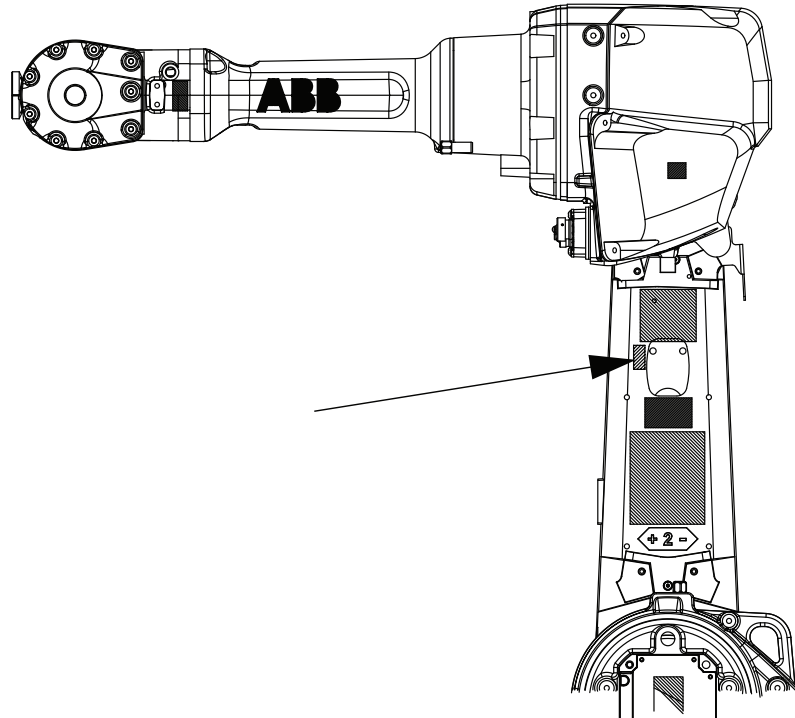
The listed parts are not interchangeable.

The gearbox oils are not interchangeable.

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Designation label on lower arm

At delivery there is a designation label fitted to the lower arm of the Type C version of the robot, informing that the robot is a Type C version.



xx1800002211

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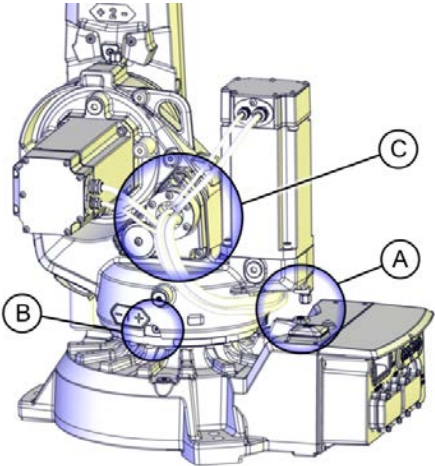
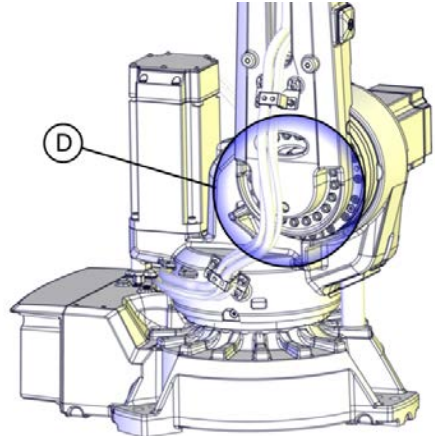
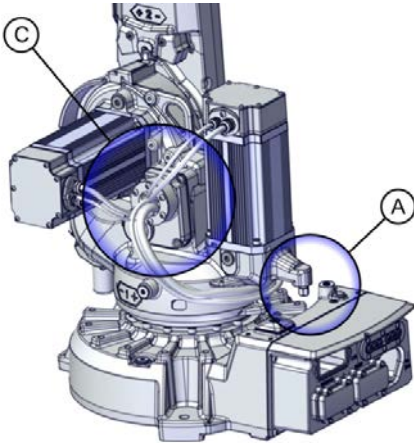
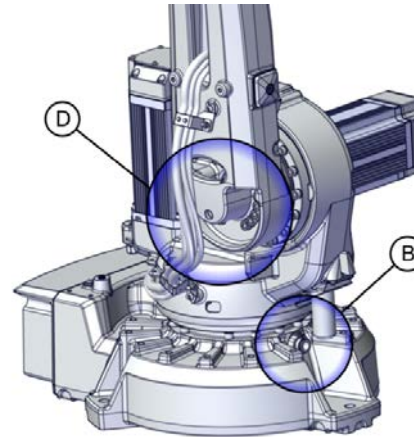
3 Robot description

3.2 Non-compatible versions of axis-1 and axis-2 gearboxes

Continued

Identifying the gearbox version visually

The mechanical structure of the robot differs depending on which axis-1 and axis-2 gearbox the robot is equipped with. Some of the differences are visible, as shown in the table.

	Identification of gearbox - mechanical structure IRB 2600-20/1.65, IRB 2600-12/1.65, IRB 2600-12/1.85, IRB 2600ID-15/1.85, IRB 2600ID-8/2.0	Identification of gearbox - mechanical structure IRB 2600 Type C-20/1.65, IRB 2600 Type C-12/1.65
	 xx1800000551  xx1800000554	 xx1800001133  xx1800001134
A	The fixed calibration pin for Axis Calibration is located straight below the motor flange. The bushing for the calibration tool is centered on the base.	The fixed calibration pin for Axis Calibration is located on a casted arm on the motor flange. The bushing for the calibration tool is located to the right on the base.
B	The oil plug for drainage is located on the left side of the gearbox and visible through an opening in the frame (when robot is standing in synchronization position).	The oil plug for drainage is located in front of the gearbox (when robot is standing in synchronization position).
C	The cable cover shape is triangular.	The cable cover shape is rectangular.
D	Hole pattern for 17 screws that fasten the lower arm to the gearbox.	Hole pattern for 16 screws that fasten the lower arm to the gearbox.

Continues on next page

3.2 Non-compatible versions of axis-1 and axis-2 gearboxes

Continued

Identifying the gearbox version by article number

Only robot variants IRB 2600-20/1.65 and IRB 2600-12/1.65 are affected by different gearbox suppliers.

Use the table to identify which gearbox versions are installed on the robot, by article number. If needed, contact your local ABB for further assistance regarding the robot type.

Robot type	Article number, axis-1 gearbox	Article number, axis-2 gearbox
IRB 2600-20/1.65	3HAC028837-001	3HAC039109-001
IRB 2600 Type C-20/1.65	3HAC043130-001	3HAC043134-001
IRB 2600 - 12/1.65	3HAC028837-001	3HAC039109-001
IRB 2600 Type C-12/1.65	3HAC043130-001	3HAC043134-001

Identifying the robot type on the FlexPendant

For an IRC5 robot, the robot type is shown on the **System Info** view on the FlexPendant, in **System properties**, **Drive modules** and **Robot1**, and then tap **Options**.

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4 Accessories

4.1 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 the product specification for the robot controller.

Robot peripherals

- Track Motion
- Motor Units
- Positioners

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