ROBOTICS

Product specification

IRB 390

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Product specification

IRB 390 - 15/1300
IRB 390 - 10/1300

OmniCore

Document ID: 3HAC087211-001

Revision: A

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Original instructions.

Table of contents

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Overview of this manual

About this manual

This manual contains instructions for:

- mechanical and electrical installation of the robot
- maintenance of the robot
- mechanical and electrical repair of the robot.

Usage

This manual should be used during:

- installation, from lifting the robot to its work site and securing it to the foundation, to making it ready for operation
- maintenance work
- repair work and calibration.

Who should read this manual?

This manual is intended for:

- installation personnel
- maintenance personnel
- repair personnel.

Prerequisites

A maintenance/repair/installation craftsman working with an ABB Robot must:

- be trained by ABB and have the required knowledge of mechanical and electrical installation/repair/maintenance work.

References

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

Document name	Document ID
Product manual, spare parts - IRB 390	*3HAC066567-001*
Product manual - IRB 390	*3HAC066566-001*
Product specification - OmniCore V line	*3HAC074671-001*
Technical reference manual - System parameters	*3HAC065041-001*
Technical reference manual - Lubrication in gearboxes	*3HAC042927-001*
Circuit diagram - IRB 390	*3HAC060545-009*

Revisions

Revision	Description
A	First edition.

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1 Description

1.1 Structure

1.1.1 Introduction to structure

Robot family

The new IRB 390 FlexPacker™ can support customized packaging, vertical packing and high-speed, high-variation sorting and on demand order picking in logistics and e-commerce fulfillment centers.

The IRB 390 FlexPacker robot will be available as a four and five axis variant delta robot. It is 35 per cent faster than the IRB 360-8/1130 FlexPicker, with a 45 per cent increase in reachable volume and payload of up to 15 kg.

Designed for customers in Food & Beverage, logistics, pharmaceutical and consumer-packaged goods industries, the IRB 390 will be ideal for secondary packaging and higher payload applications, with the speed and flexibility to support Shelf Ready Packaging (SRP) and Retail Ready Packaging (RRP).

Operating system

The robot is equipped with the OmniCore 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 - OmniCore V line*.

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 multitasking, sensor control etc. For a complete description on optional software, see *Product specification - OmniCore V line*.

PickMaster® is a specific application software for vision guided picking with high speed conveyors. It provides a task-oriented programming and execution of random flow pick and place operations on the fly, see *Product specification - PickMaster® Twin* .

Hygienic compliance

All exposed surfaces are compliant with FDA regulations for incidental food contact. The gearboxes are lubricated with food grade oil of class NSF-H1 (H1 lubricants are food-grade lubricants used in food-processing environments where there is the possibility of incidental food contact.) All greases behind exposed seals, and recommended service greases, are NSF-H1 compliant materials

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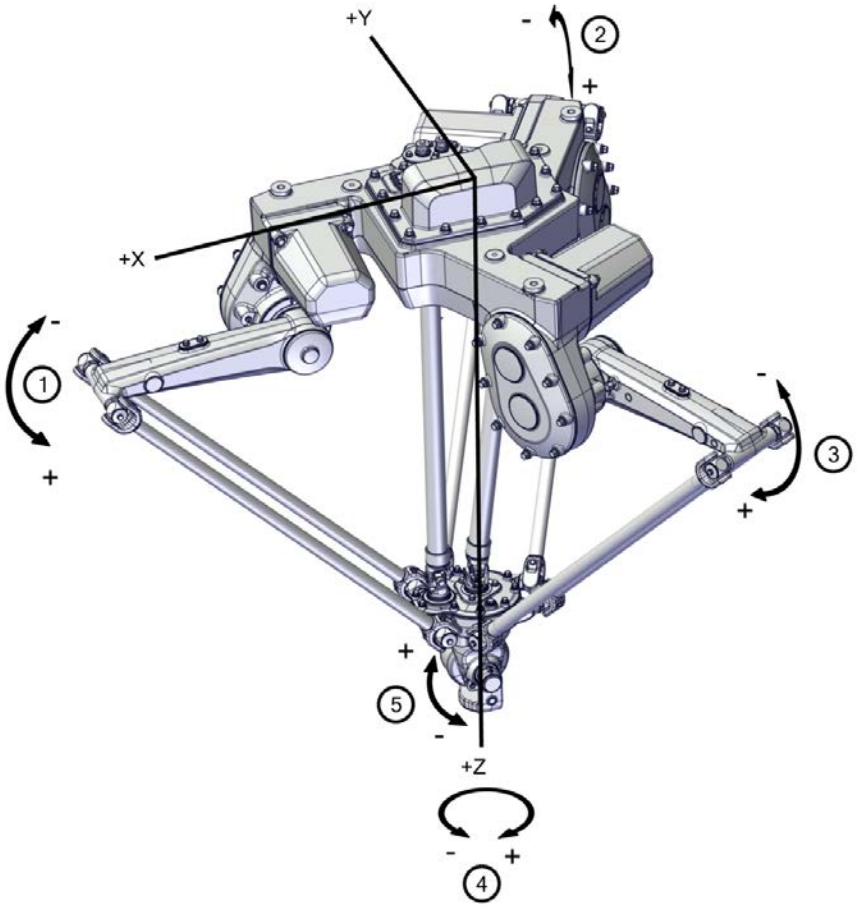
1.1.1 Introduction to structure
Continued

Robot axes



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Pos	Description	Pos	Description
1	Axis 1	2	Axis 2
3	Axis 3	4	Axis 4
5	Axis 5		

1.1.2 Different robot variants

General

The IRB 390 is available in two different variants.

Robot variants

The following different standard robot variants are available:

Robot variant	Handling capacity (kg)
IRB 390-15/1300	15 kg
IRB 390-10/1300	10 kg

1.1.3 Technical data

Weight, robot

The table shows the weight of the robot.

Robot model	Nominal weight
IRB 390	IRB 390 - 15/1300: 133 kg IRB 390 - 10/1300: 148 kg

Note

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

Mounting positions

The table shows valid mounting positions and the installation (mounting) angle for the manipulator.

Mounting position	Installation angle
Suspended in robot frame	0°

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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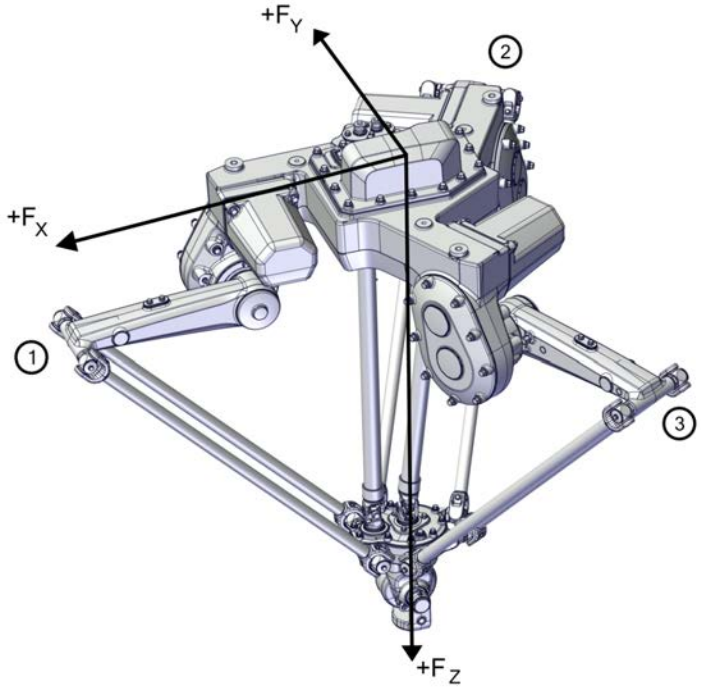
Loads on foundation, robot



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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).

Suspended in robot frame

Force	Endurance load (in operation)	Maximum load (emergency stop)
Force xy	±1.8 kN	±4.0 kN
Force z	1.4 ± 0.6 kN	1.4 ± 1.9 kN
Torque xy	2.0 kNm	4.3 kNm
Torque z	0.6 kNm	1.2 kNm

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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	0.3 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.
Minimum resonance frequency	35 Hz **Note** It may affect the manipulator lifetime to have a lower resonance frequency than recommended.	The value is recommended for optimal performance. Due to foundation stiffness, consider robot mass including equipment. [i] For information about compensating for foundation flexibility, see the description of *Motion Process Mode* in the manual that describes the controller software option, see *References on page 7*.

[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 possibly to the floor.

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

Storage conditions, robot

The table shows the allowed storage conditions for the robot:

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

Operating conditions, robot

The table shows the allowed operating conditions for the robot:

Parameter	Value
Minimum ambient temperature	0 °C [i]
Maximum ambient temperature	+50 °C
Maximum ambient humidity	95% at constant temperature

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

Continues on next page

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	IP67
External brake release box (option)	IP54

[i] According to IEC 60529.

Environmental information

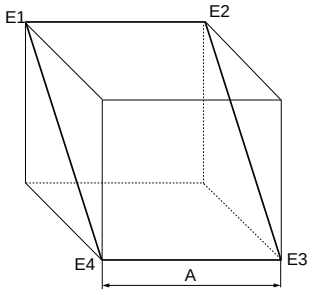
The product complies with IEC 63000. *Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances*.

Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside the working space	< 68 dB (A) Leq (acc. to Machinery directive 2006/42/EG)

Representative power consumption at nominal payload

Type of movement	All variants
ISO Cube Average power consumption (kW)	0.9



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Pos	Description
A	320 mm

Power factor (cos φ)

The power factor is above 0.95 at a steady state power consumption higher than 2.0 kW, when the IRB 390 is connected to the OmniCore V line.

1.2 Safety standards

1.2.1 Applicable standards

General

The product is compliant 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 deviation from ISO 10218-1:2011, these are listed in the declaration of incorporation. The declaration of incorporation is part of the delivery.

Robot standards

Standard	Description
ISO 9283	Manipulating industrial robots – Performance criteria and related test methods
ISO 9787	Robots and robotic devices – Coordinate systems and motion nomenclatures
ISO 9946	Manipulating industrial robots – Presentation of characteristics

Other standards used in design

Standard	Description
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements, normative reference from ISO 10218-1
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 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design, normative reference from ISO 10218-1
UL 1740 (option)	Standards For Safety - Robots and Robotic Equipment Valid for USA and Canada.

1.3 Installation

1.3.1 Introduction to installation

General

IRB 390 is adapted for normal industrial environment. Depending on the robot version, an end effector with max. weight including payload, can be mounted on the tool flange (axis 6). See *Load diagrams on page 31*.

Extra loads

The upper arm can handle an additional load of 0.5 kg.

Working range limitation

Working range can only be limited by software, not mechanically. Customer can set cartesian workspace limits if needed.

1.3.2 Operating requirements

Protection standard

Robot variant	Protection standard IEC529
All variants, manipulator	IP67

Explosive environments

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

Working range limitations

EPS will not be selectable. No mechanical limitation.

Ambient temperature

Description	Protection class	Temperature
Manipulator with food grade lubrication during operation	Standard	+ 5°C i (41°F) to + 50°C (122F)

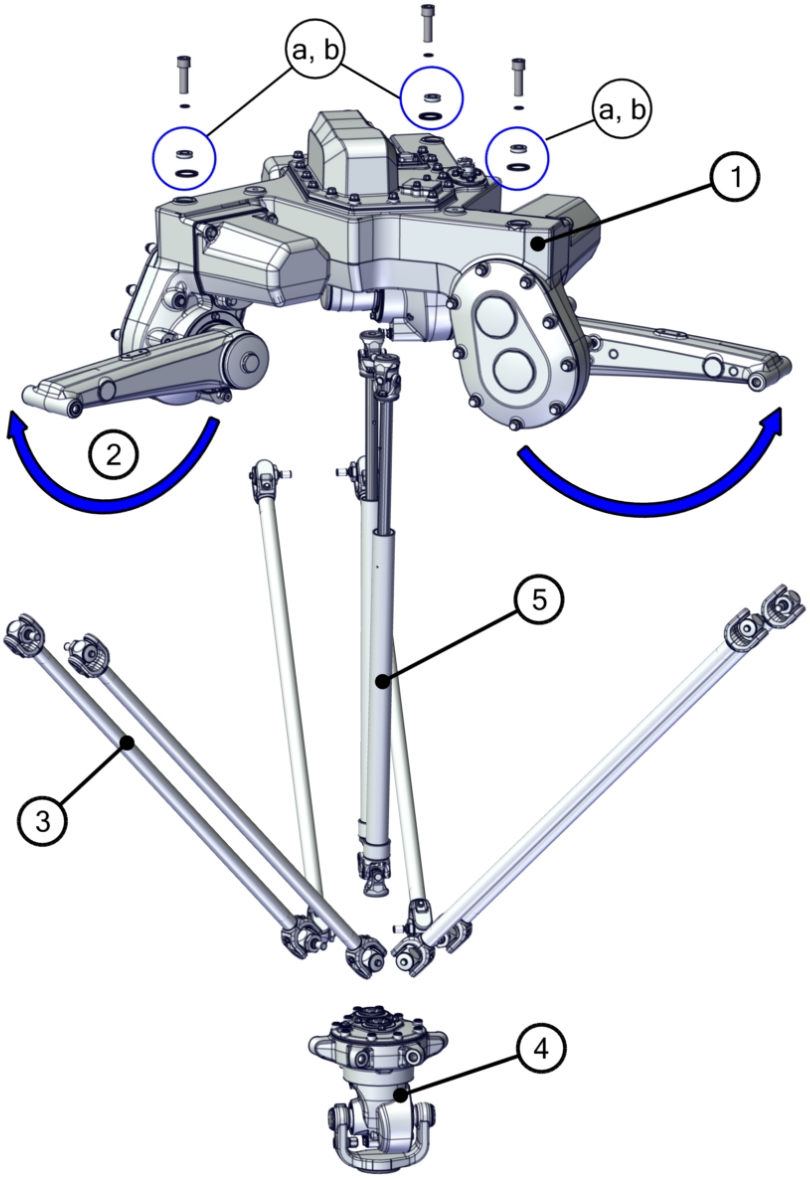
i At low environmental temperature < 10ºC is, as with any other machine, a warm-up phase recommended to be run with the robot. Otherwise there is a risk that the robot stops or run with lower performance due to temperature dependent oil and grease viscosity.

Relative humidity

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

1.3.3 Mounting the manipulator

Assembly illustration



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	Assembly order
1	Install the base unit. **Note** The mounting washer (a) and sealing (b) are packed separately in the delivery.
2	Move the upper arms into synchronization position.
3	Attach the lower arms to the upper arms.
4	Attach the delta unit to the lower arms.

Continues on next page

1.3.3 Mounting the manipulator
Continued

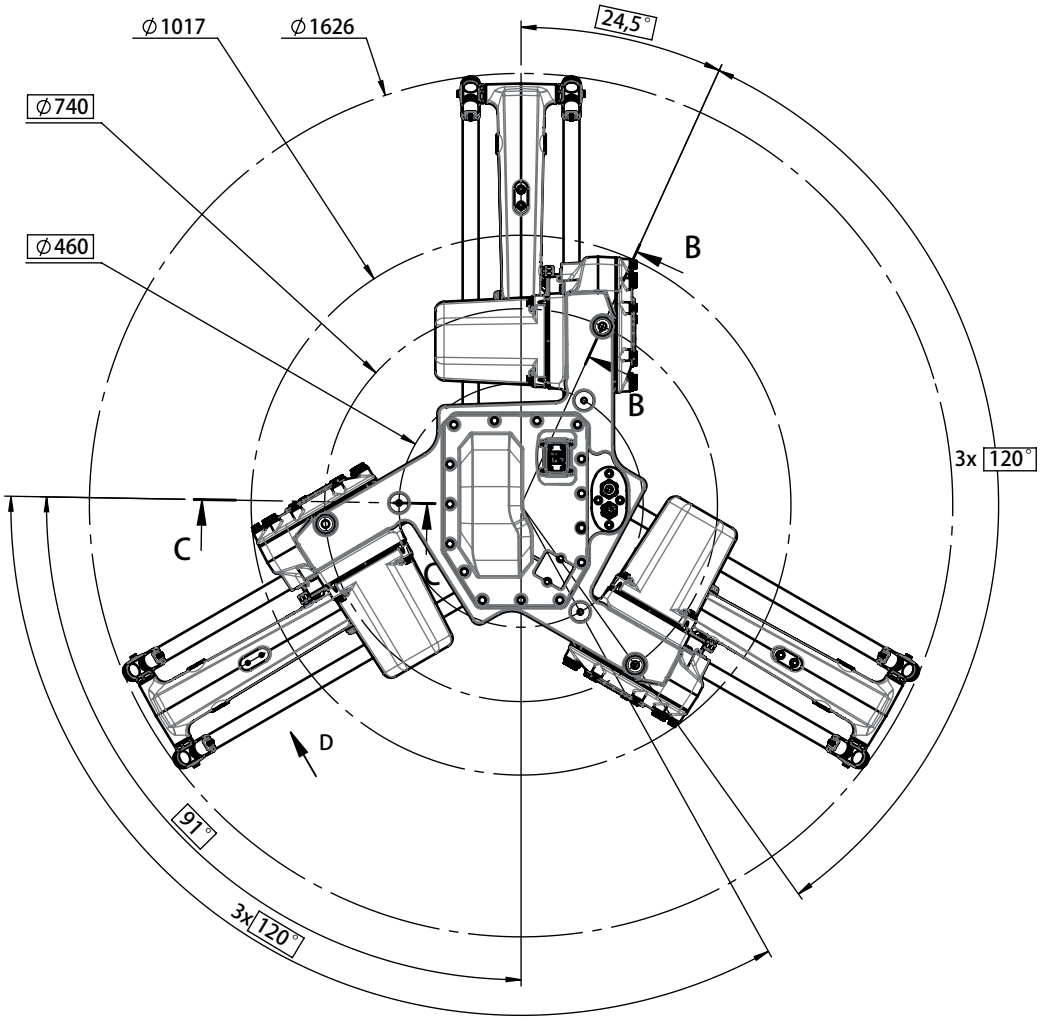
	Assembly order
5	Attach the telescopic unit.
6	Calibrate the robot.

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}).

Fastening holes robot base

View from above.



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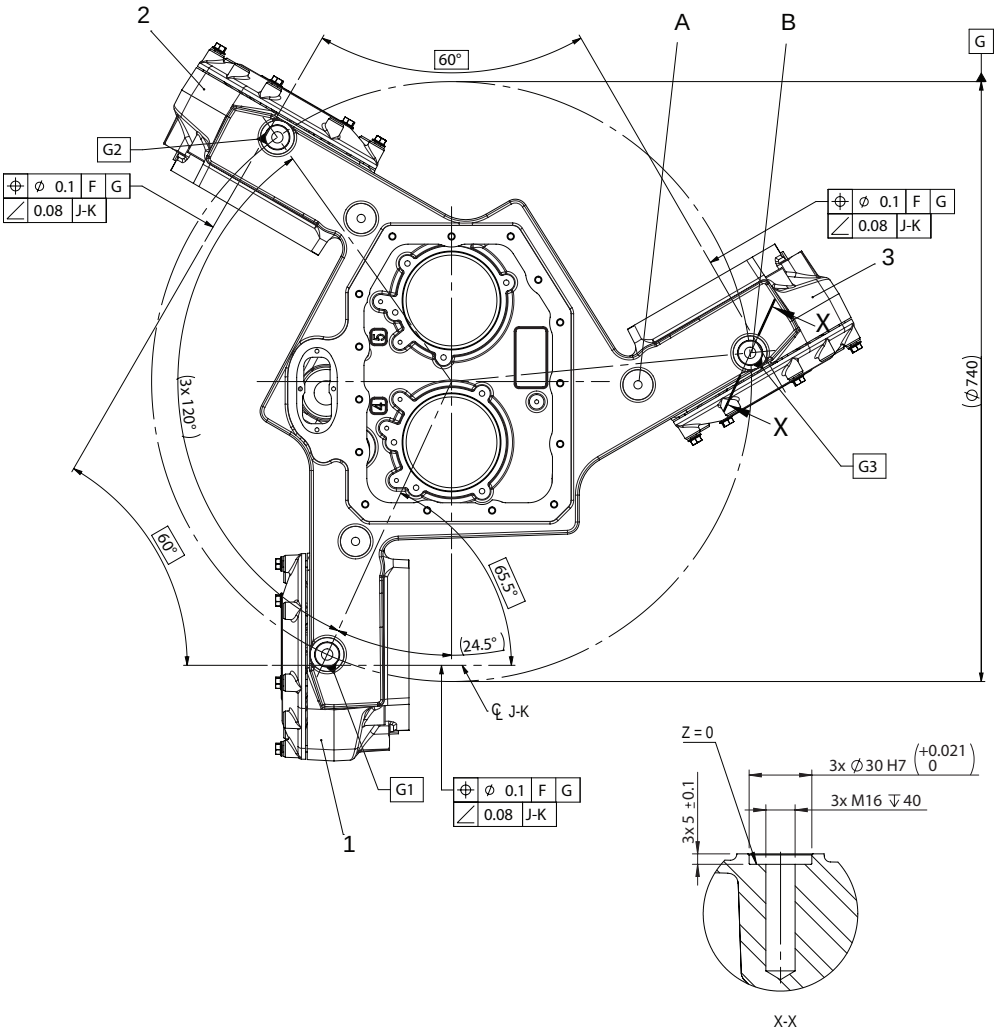
Hole configuration, base

This illustration shows the hole configuration used when securing the robot.



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1	Axis-1 gearbox
2	Axis-2 gearbox
3	Axis-3 gearbox
A	Attachment holes for lifting eyes
B	Robot mounting holes
G1, G2, G3	Reference plane for each gearbox.

The three support points of the manipulator base box shall be mounted against three flat surfaces with a flatness within the specification. Use shims if necessary.

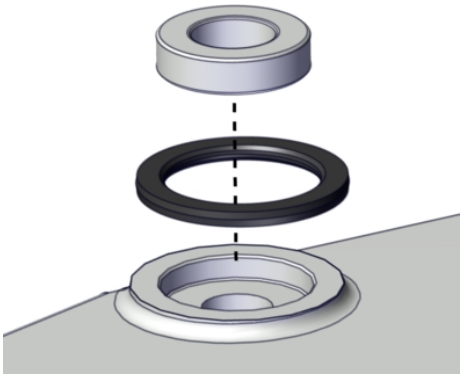
See specification in *Requirements, foundation on page 14*.

Continues on next page

1.3.3 Mounting the manipulator
Continued

Attachment screws

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

Suitable screws	M16 stainless steel. Minimum length of thread engagement: 24 mm
Quantity	3 pcs
Quality	Minimum quality: A4-80
Suitable washer	12.5x24x6.5 Steel 17x25x3 coated stainless steel
Distance washer and sealing	Distance washer: 3HAC070543-001. Sealing ring: 3HAC074660-001.  xx2000000260 Included in the manipulator delivery. Replace if damaged.
Tightening torque	250 Nm
Level surface requirements	0.3 mm

1.3.4 Type of lubrication in gearboxes

Introduction

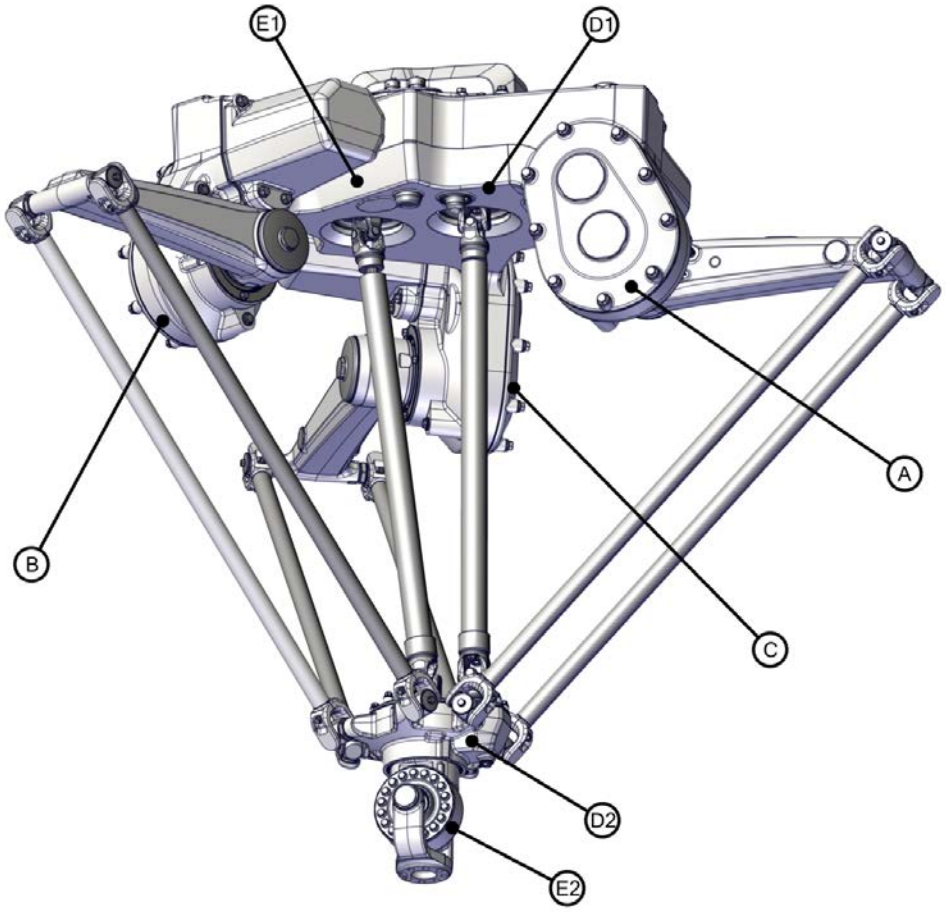
This section describes where to find information about the type of lubrication, article number and the amount of lubrication in the specific gearbox. It also describes the equipment needed when working with lubrication.

Type and amount of oil in gearboxes

Information about the type of lubrication, article number as well as the amount in the specific gearbox can be found in *Technical reference manual - Lubrication in gearboxes* available for registered users on myABB Business Portal, *www.abb.com/myABB*.

Location of gearboxes

The figure shows the location of the gearboxes.



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A	Axis-1 gear
B	Axis-2 gear
C	Axis-3 gear
D1	Axis-4 gear prestage

Continues on next page

1.3.4 Type of lubrication in gearboxes

Continued

D2	Axis-4 gear
E1	Axis-5 gear prestage
E2	Axis-5 gear

1.3.5 Installing a brake release box (option)

General

The robot cable harness is prepared for connecting a brake release box, as an option and as an addition to the standard brake release button.

This option is valuable if access to the standard brake release button is limited.

Brake release box installation

The figure shows a routed cable from the brake release box to the SMB battery compartment located on top of the base unit.

CAUTION

Risk of unintended contact with the push button. Place the brake release box in a way that eliminates the risk of unintended contact with the push button.

Note

The equipment must be installed in accordance with the specified protection class, see *Protection classes, robot on page 15*.

Note

Place the equipment in a manner that makes it obvious which manipulator it is connected to. There must be no doubt on which manipulator is affected when activating the button.

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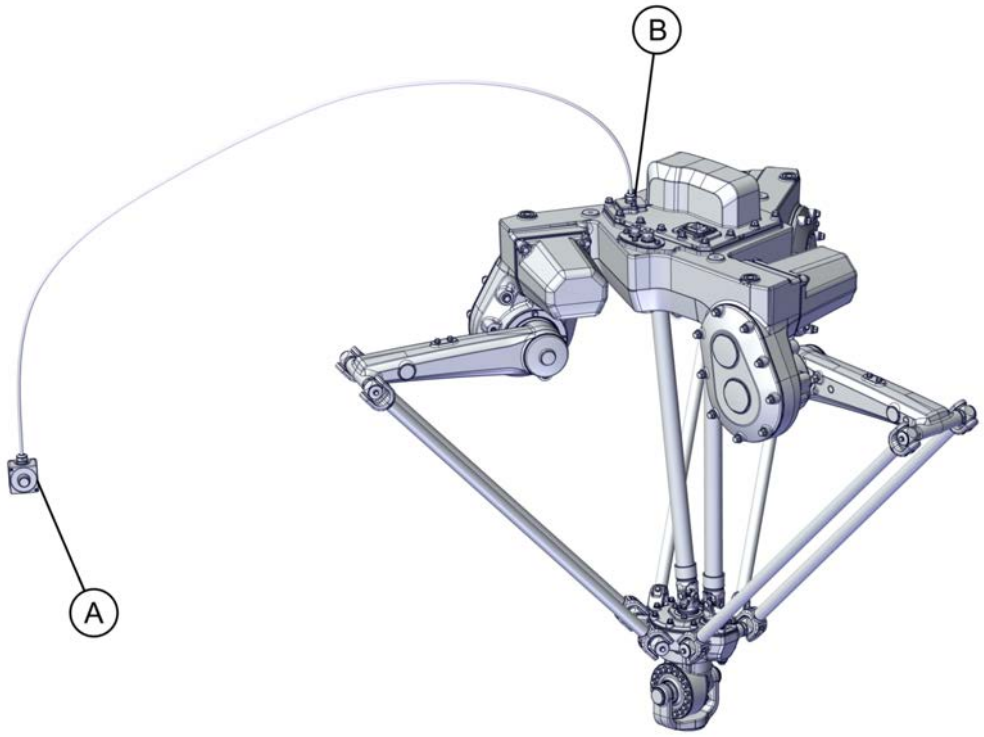
1.3.5 Installing a brake release box (option)
Continued



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A	Brake release box assembly
B	Connection to robot cable harness connector R3.H1

Technical specification

Function	Data
Signal	24V DC
Current	13A continuously

Required equipment

Equipment	Note
2-core cable, shielded	Maximum cable length: 3 m.
Cable connector	
Cable gland	To be installed in the SMB battery cover.
Push button, momentary push to make	Passive actuator with open spring return push button. Must not be susceptible to ESD. Make an installation assembly with the push button, to be fitted to the robot frame or a similar appropriate location. **CAUTION** Risk of unintended contact with the push button. Place the brake release box in a way that eliminates the risk of unintended contact with the push button.

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.

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

Brief description of calibration methods

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRB 390. 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

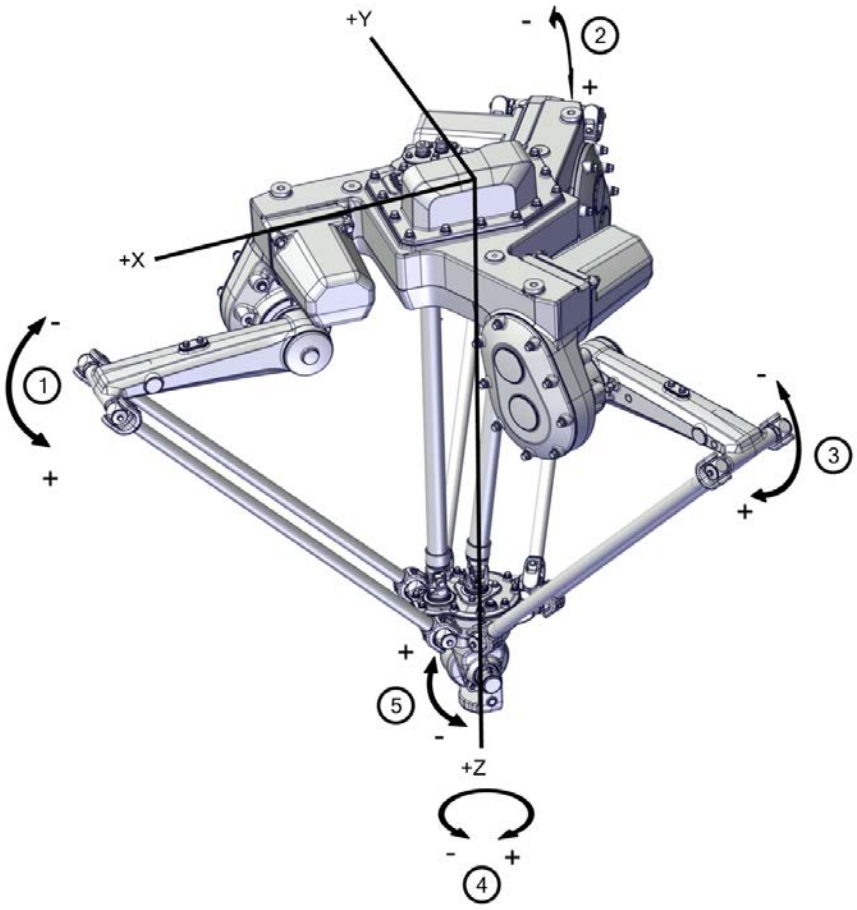
The calibration equipment for Axis Calibration is delivered as a toolkit.

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.

1.4.2 Fine calibration

General

The fine calibration is done with the Axis calibration method.



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Axes

Pos	Description	Pos	Description
1	Axis 1	2	Axis 2
3	Axis 3	4	Axis 4
5	Axis 5		

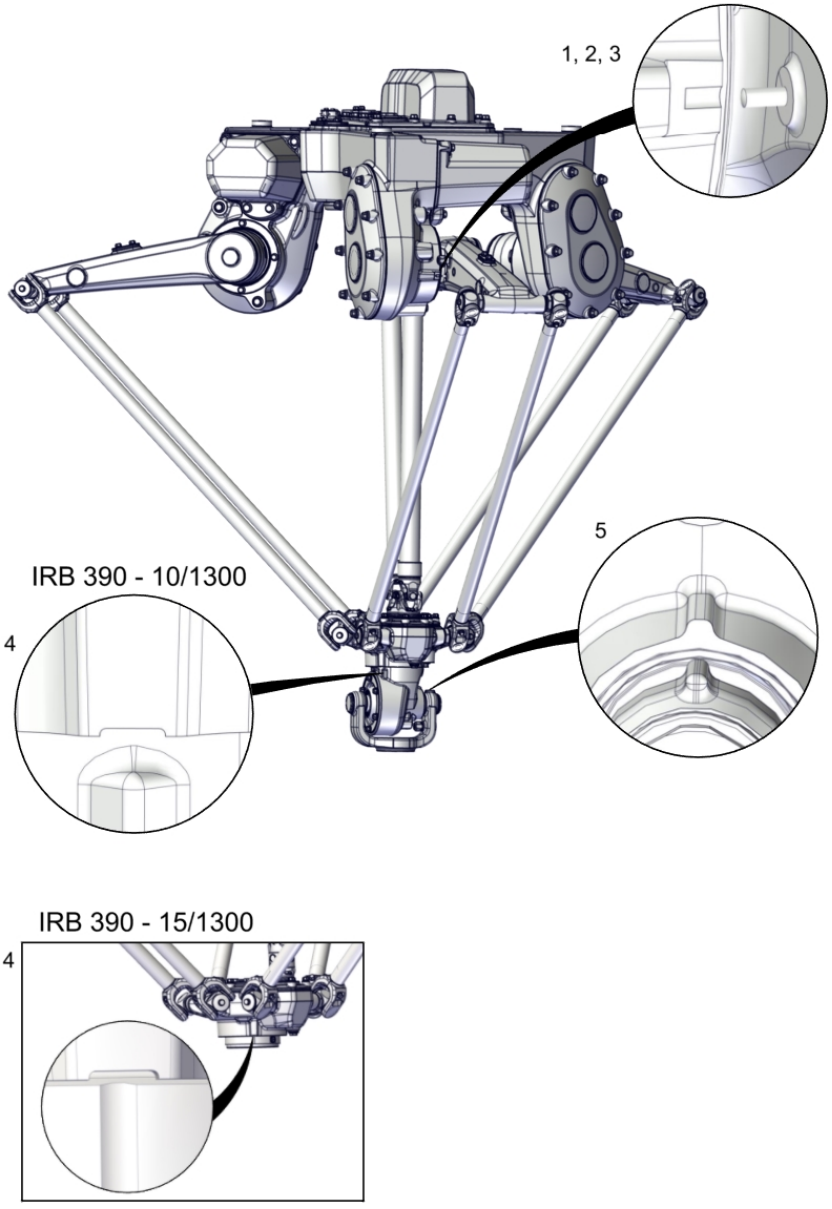
1.4.3 Synchronization marks and axis movement directions

1.4.3.1 Synchronization marks and synchronization position for axes

Introduction

This section shows the position of the synchronization marks and the synchronization position for each axis.

Synchronization marks, IRB 390



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1.4.3.2 Calibration movement directions for all axes

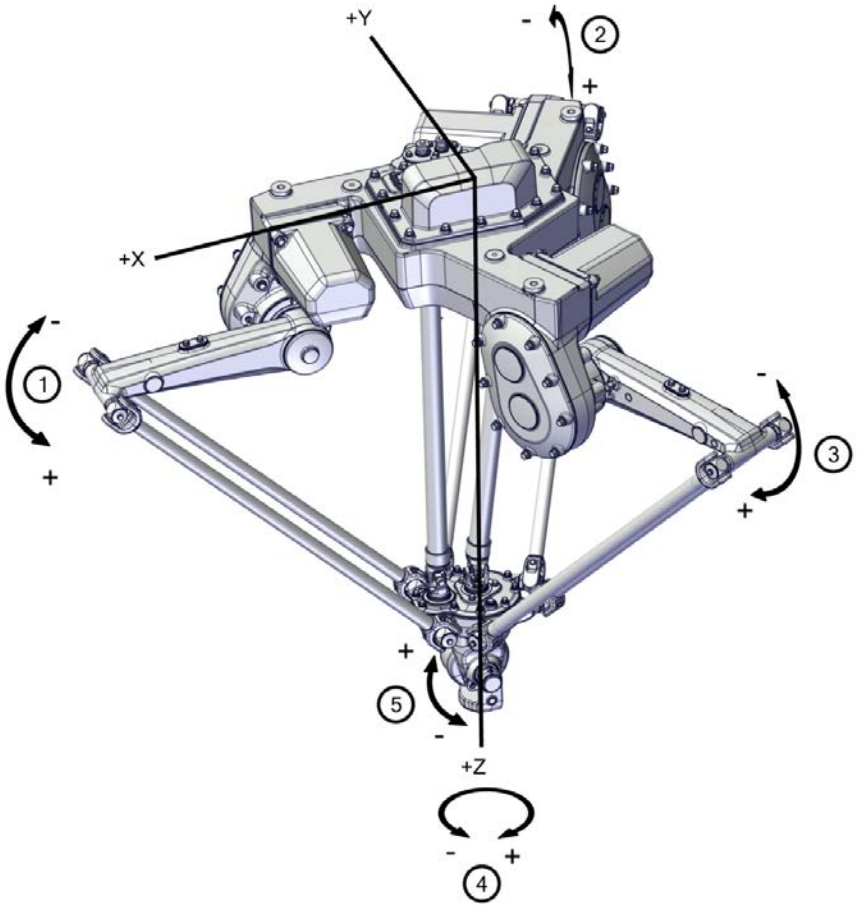
Overview

When calibrating, the axis must consistently be run towards the calibration position in the same direction in order to avoid position errors caused by backlash in gears and so on. Positive directions are shown in the graphic below.

Calibration service routines will handle the calibration movements automatically and these might be different from the positive directions shown below.

Calibration movement and jogging directions

The following graphic shows the positive and negative directions for each axis and the linear directions when jogging the robot in the base coordinate system.



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1.5 Load diagrams

1.5.1 Introduction

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

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. The J_0 for the IRB 390 - 15/1300 is 0.08 kgm^2 and for IRB 390 - 10/1300 is 0.15 kgm^2. High inertia payloads affect performance.

The maximum allowable inertia around axis 5 and 4 is 2 kgm^2. The distance from the customer interface to axis 5 rotational centre is 0.097 meter.

The IRB 390 can only be used hanging from the ceiling, other orientations are not allowed.

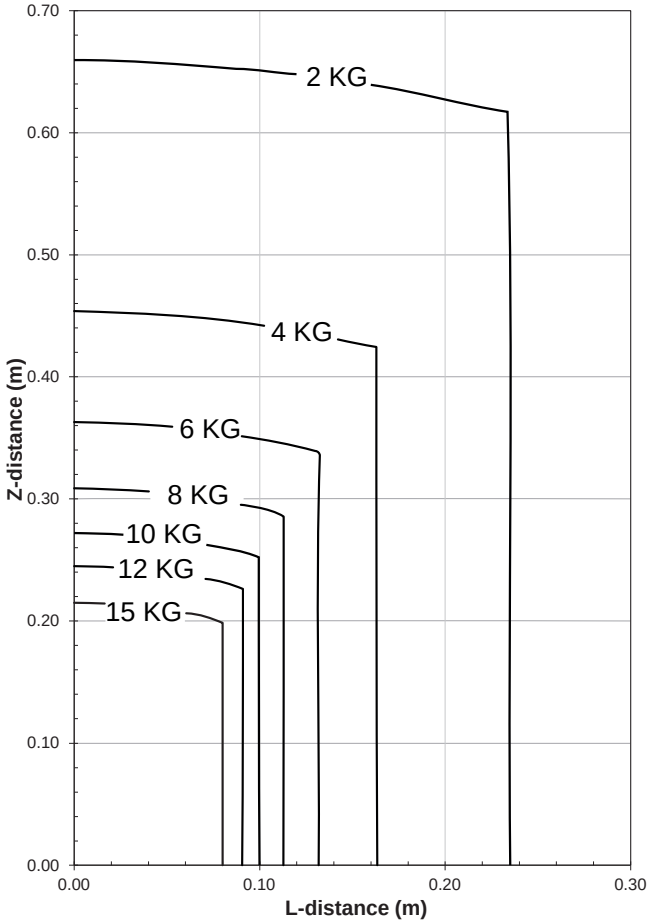
1.5.2 Load diagrams

Note

The weight permitted for loads includes grippers etc.

The data types `loaddata` and `tooldata` with moment of inertia must be used!

IRB 390 - 15/1300



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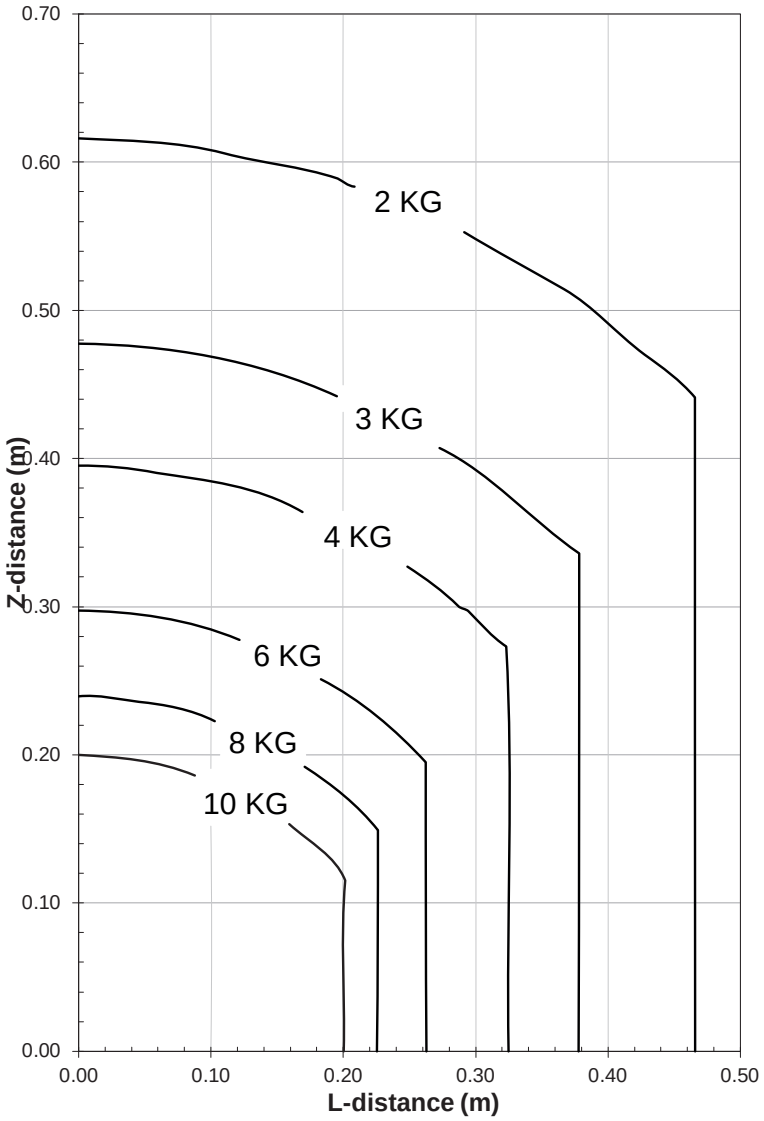
IRB 390 - 10/1300



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Extra equipment mounted on the manipulator arms

Upper arm loads have to be declared as arm loads for joint 1, 2 and 3 respectively. The extra load on the delta housing should be added as arm load data (identified in RobotWare as r1_load_4) . The extra lower arm loads can be divided between the respective upper arm load and the delta housing load.

Maximum extra load on upper arm	0.5 kg
Lower arm	0.15 kg
Delta housing	0.5 kg

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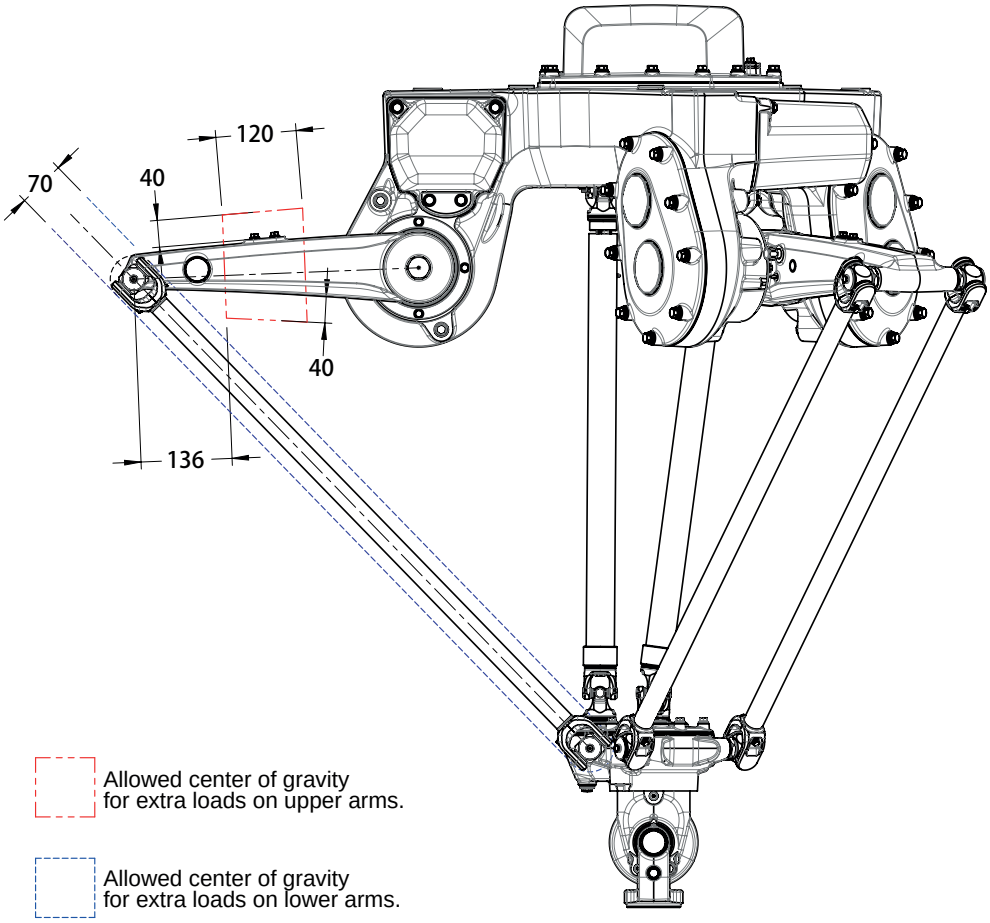
1.5.2 Load diagrams

Continued



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1.5.3 Maximum TCP acceleration

Maximum Cartesian design acceleration for nominal loads

Robot type	E-stop Max acceleration at nominal load COG [m/s^2]	Controlled Motion Max acceleration at nominal load COG [m/s^2]
IRB 390-15/1300	99	82
IRB 390-10/1300	141	98

Note

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

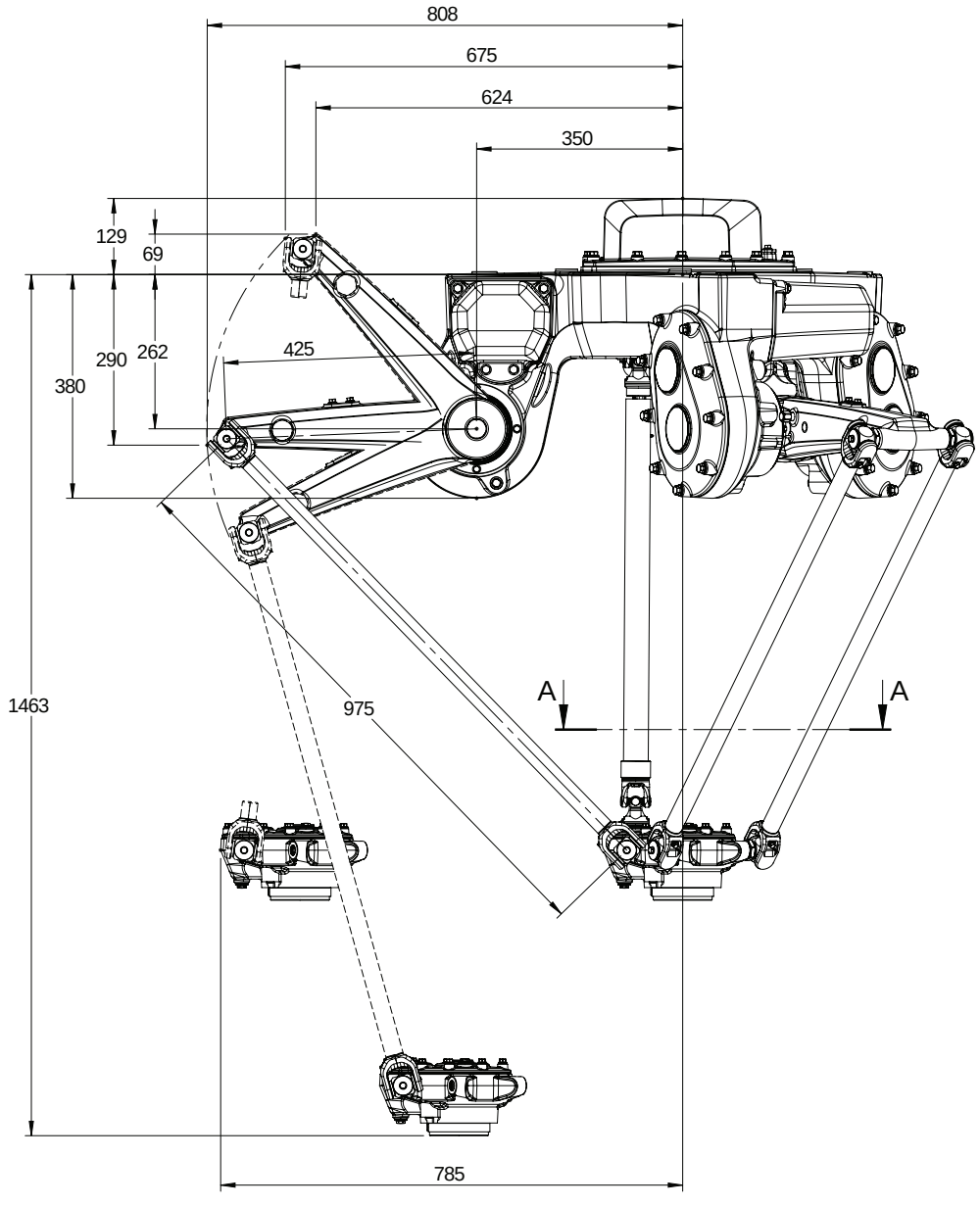
1.6 Fitting equipment on the robot (robot dimensions)

Robot dimensions

The figure shows the dimension of the robot.

The view A-A is shown in *Attachment holes for extra loads on the delta unit on page 43*.

IRB 390 - 15/1300



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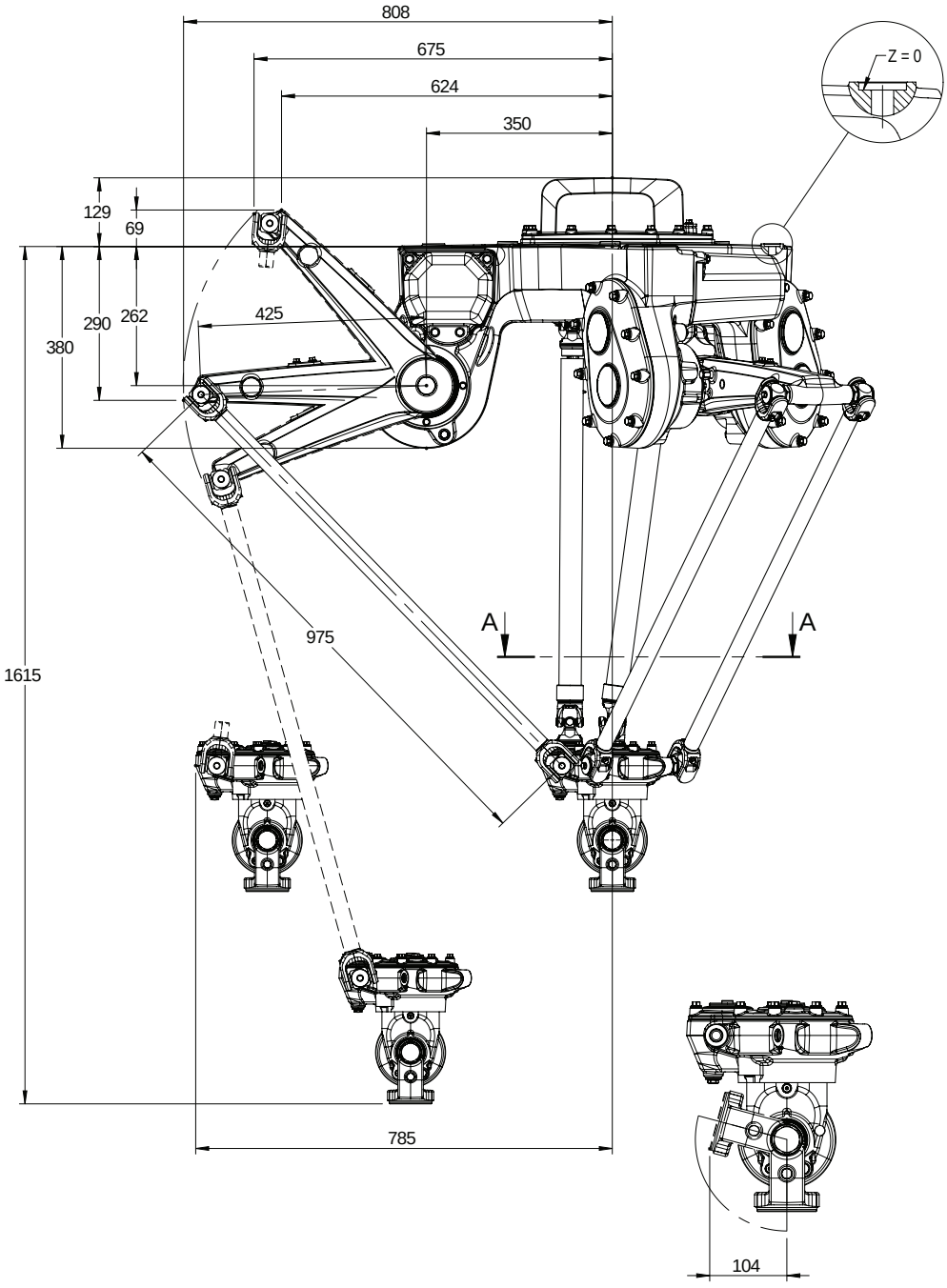
IRB 390 - 10/1300



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The view A-A is shown in *Attachment holes for extra loads on the delta unit on page 43*.

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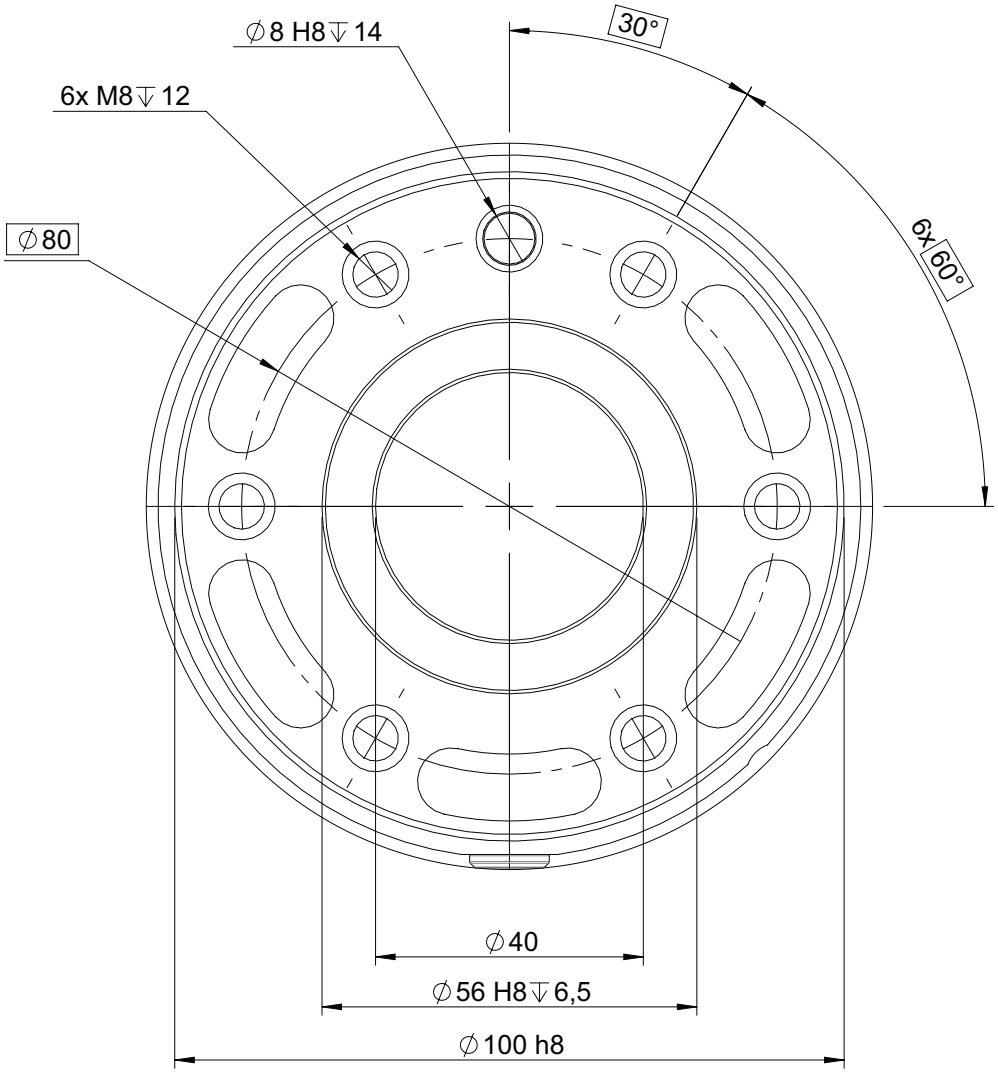
1.6 Fitting equipment on the robot (robot dimensions)
Continued

Mechanical interface of the tool flange

IRB 390 - 15/1300



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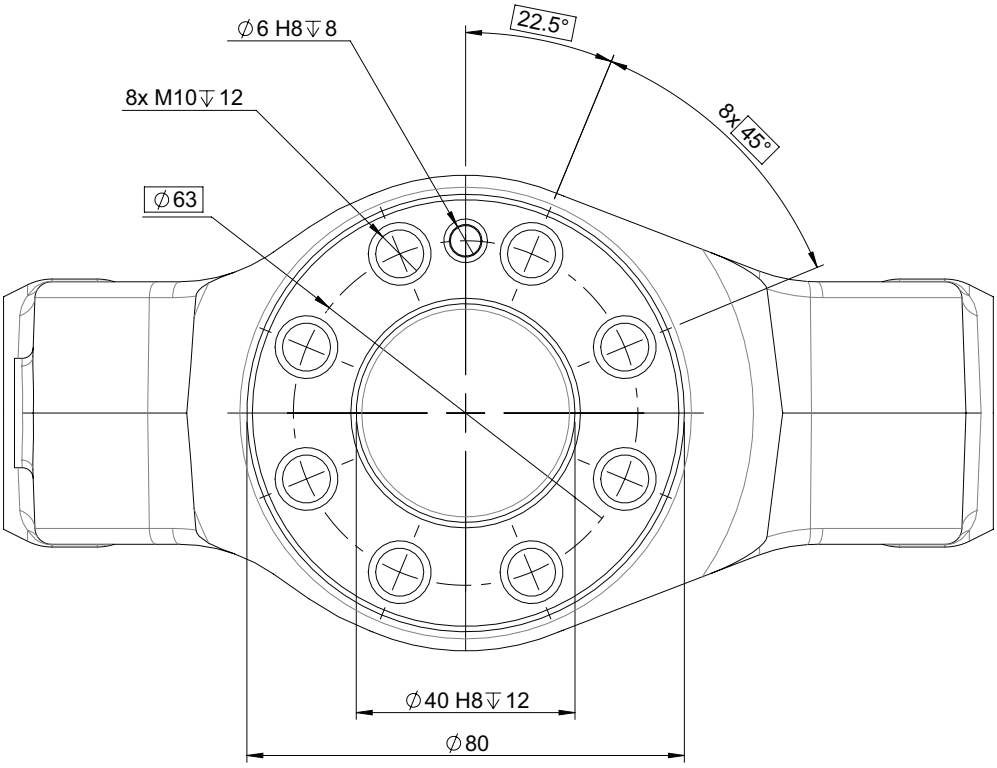
IRB 390 - 10/1300



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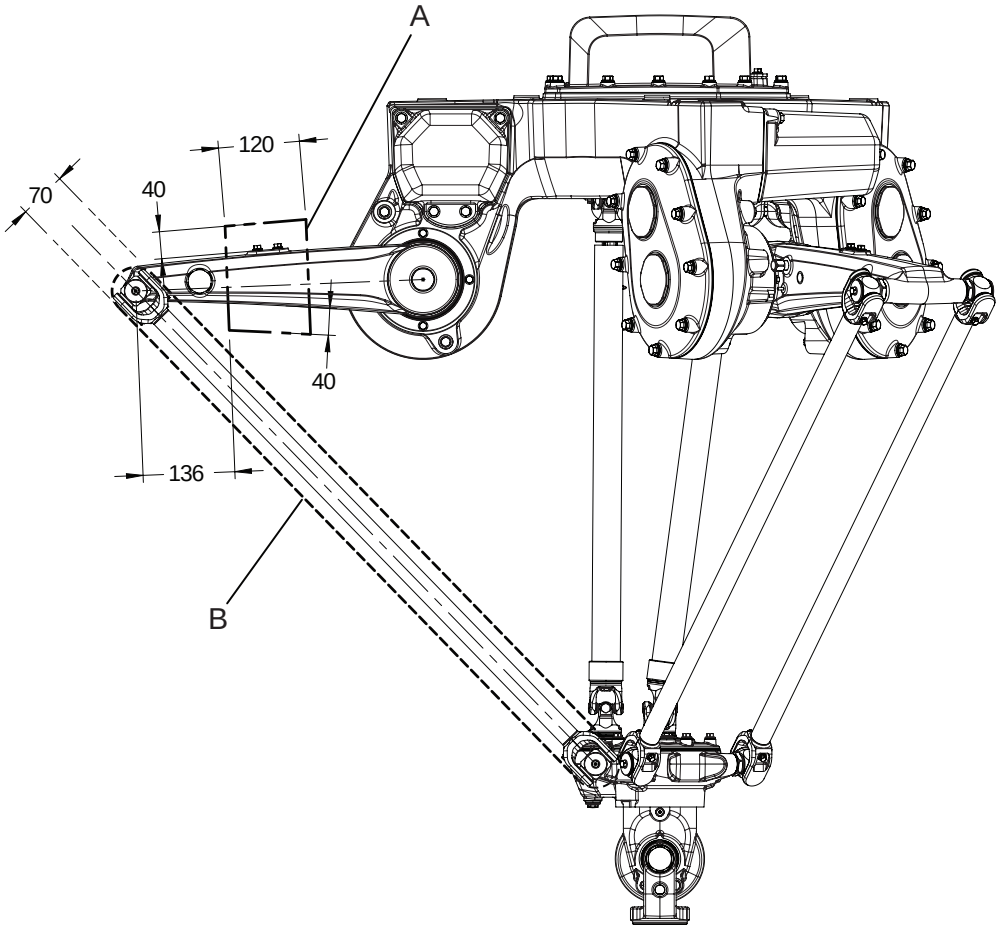
1.6 Fitting equipment on the robot (robot dimensions)
Continued

Attachment holes and dimensions for extra loads

Extra loads can be mounted on robot. Definitions of dimensions and masses are shown in the following figures. The robot is supplied with holes for fitting extra equipment. Maximum allowed arm load depends on center of gravity of arm load and robot payload.

Center of gravity for extra loads on upper and lower arms



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A	Allowed center of gravity for extra loads on upper arms.
B	Allowed center of gravity for extra loads on lower arms.

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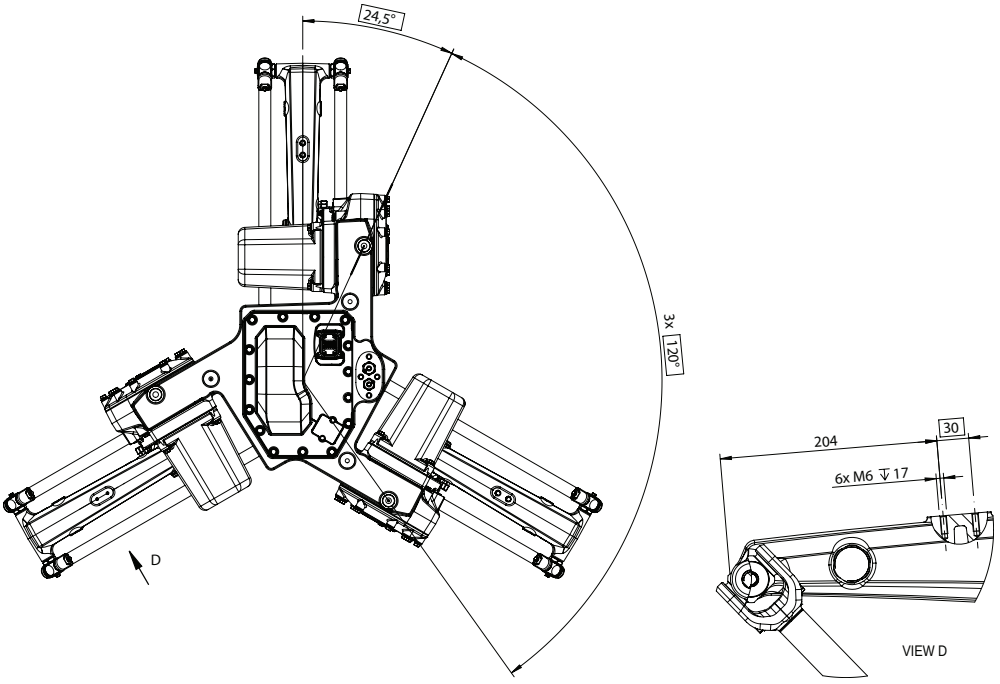
Attachment holes for extra loads on the upper arms

There is a set of two M6 holes on top of each upper arm, that can be used for attaching equipment. Maximum extra load: 0.5 kg/upper arm.



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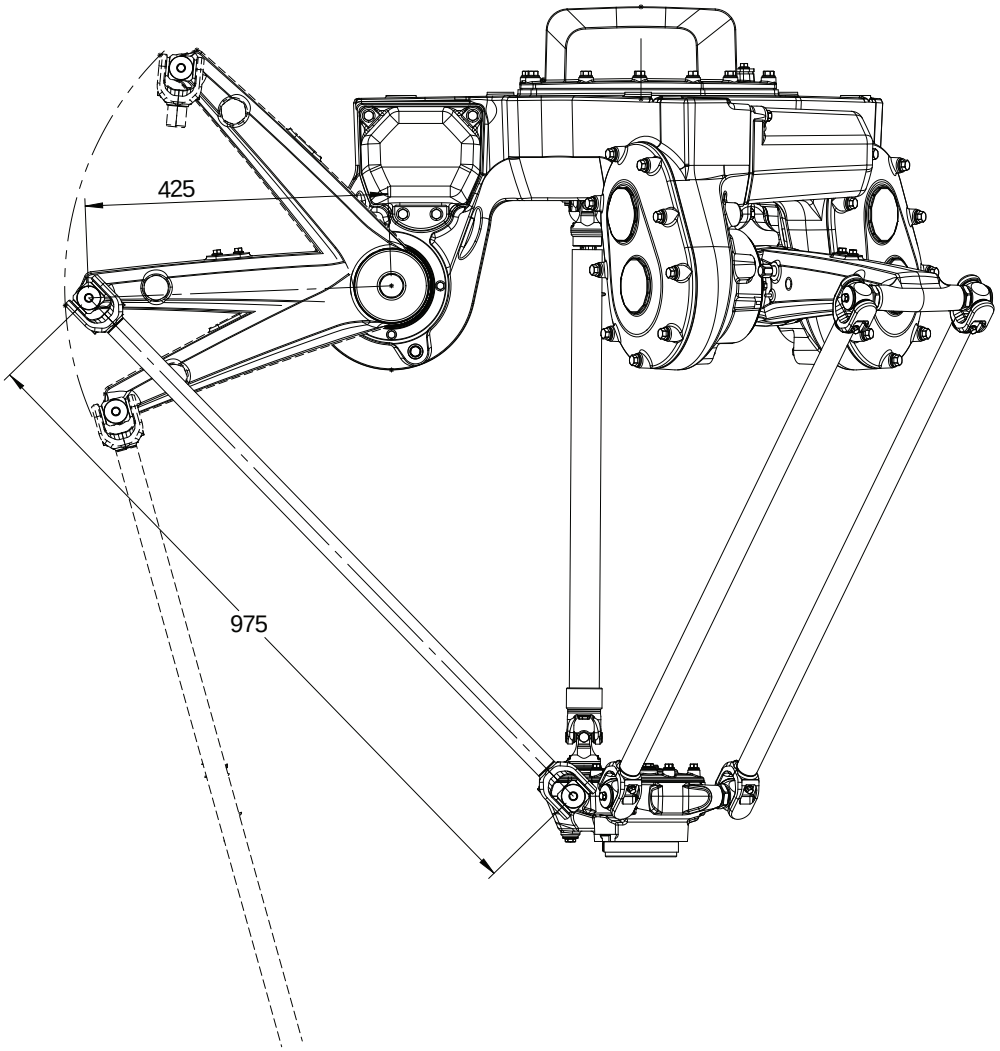
1.6 Fitting equipment on the robot (robot dimensions)
Continued

Attachment of extra loads on the lower arms

No holes for fitting extra equipment are available on the lower arms. If attaching extra equipment to the lower arms, use shaped clamping blocks. Plastic cable ties can be used but risk damaging of the paint. Do not use metal directly on the lower arms. Maximum extra load: 0.15 kg/lower arm.



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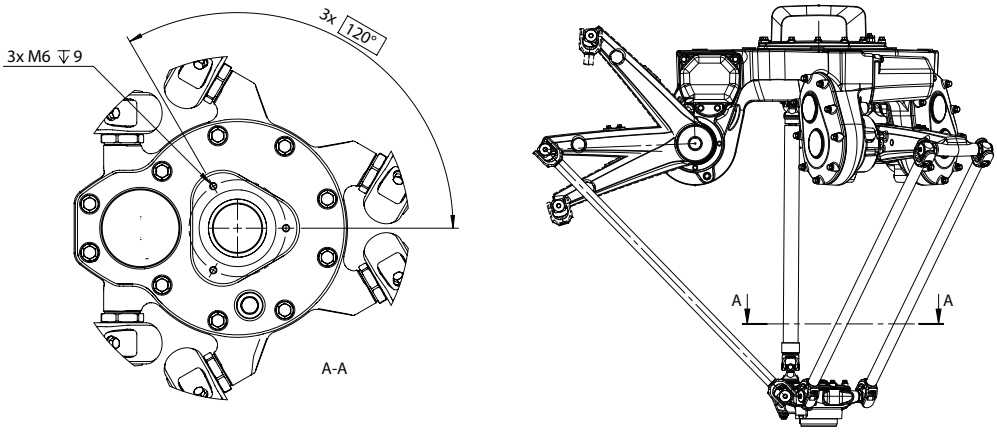
Attachment holes for extra loads on the delta unit

There is a set of three M6 holes on top of the delta unit that can be used for attaching equipment. Maximum extra load on the delta unit: 0.5 kg.



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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 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.
- All cabling is fixed, no movements. In the unlikely event of a failure, its modular design makes it easy to change.

Maintenance

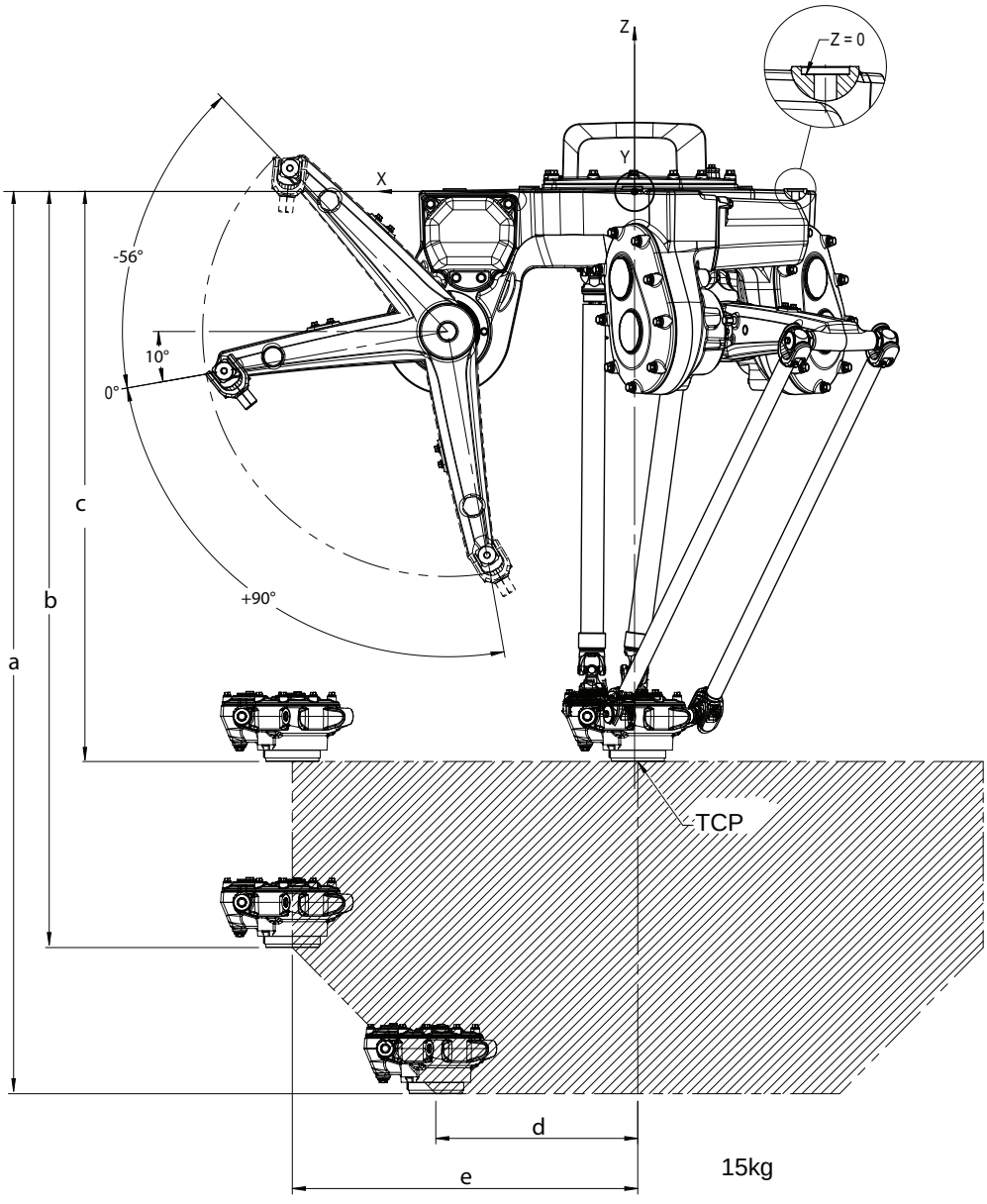
The maintenance intervals depend on the use of the robot, the required maintenance activities also depends on selected options. For detailed information on maintenance procedures, see *Product manual - IRB 390*.

1.8 Robot motion

1.8.1 Working range

Illustration, working range IRB 390 - 15/1300

This illustration shows the unrestricted working range of the robot.



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Dimensions

Measurement a	Measurement b	Measurement c	Measurement d	Measurement e
1,463 mm	1,274 mm	1,063 mm	475 mm	650 mm

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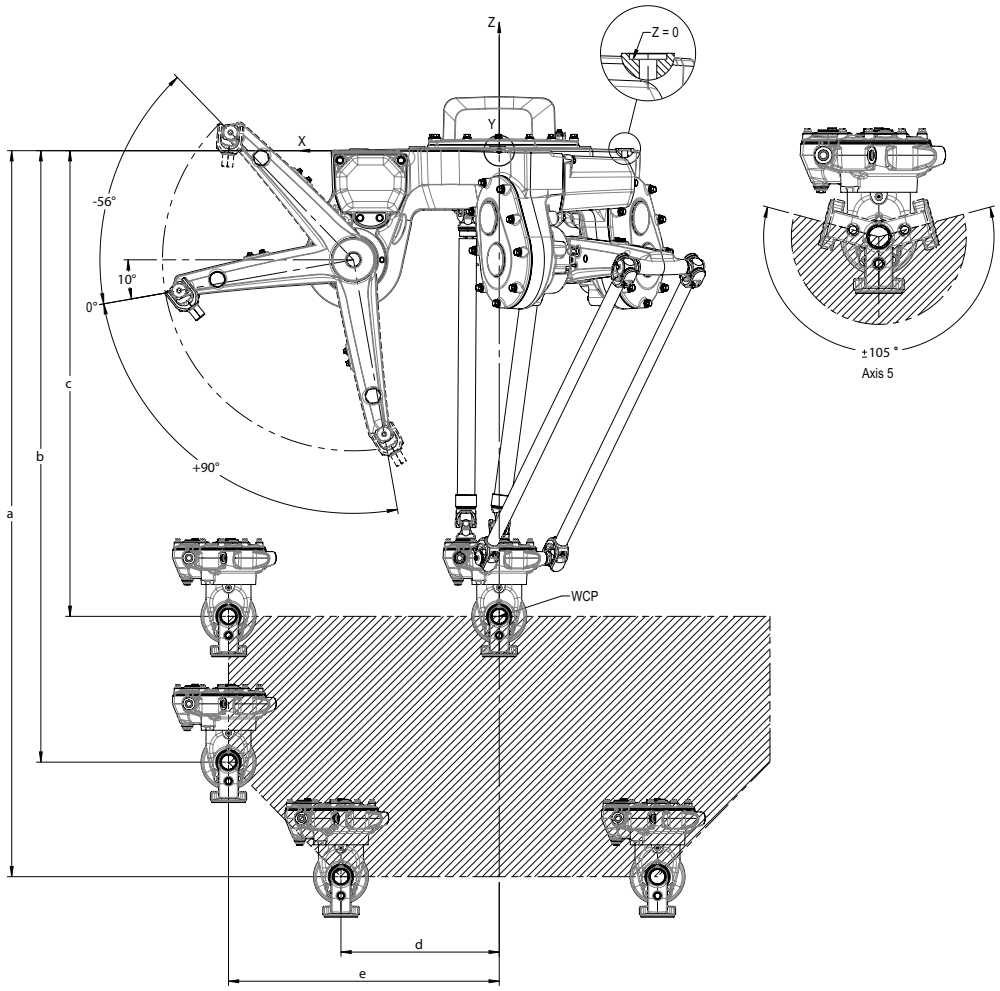
1.8.1 Working range
Continued

Illustration, working range IRB 390 - 10/1300

This illustration shows the unrestricted working range of the robot.



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Dimensions

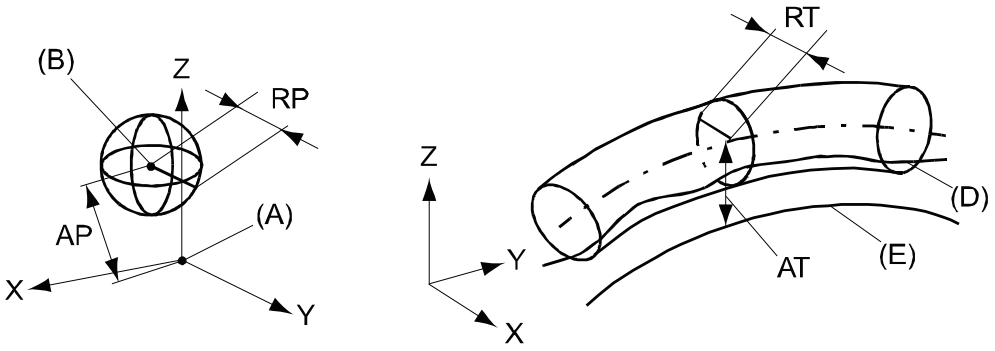
Measurement a	Measurement b	Measurement c	Measurement d	Measurement e
1,518 mm	1,329 mm	1,118 mm	380 mm	650 mm

1.8.2 Performance according to ISO 9283

General

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

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



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Position	Description	Position	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

IRB 390	IRB 390 - 15/1300	IRB 390 - 10/1300
Pose accuracy, AP[i] (mm)	0.02	0.07
Pose repeatability, RP (mm)	0.02	0.07
Pose stabilization time, PSt (s) within 0.1 mm of the position	0.14	0.30
Pose stabilization overshoot, PSo	0.16	0.29
Path accuracy, AT (mm)	0.65	1.29
Path repeatability, RT (mm)	0.03	0.05

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

Backlash axis 4 and 5

Protection class	Value
Standard	20 arc minute

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1.8.2 Performance according to ISO 9283
Continued

Velocity

Direction	Description
IRB 390 - 15/1300	5.7 m/s
IRB 390 - 10/1300	5 m/s

1.8.3 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*).

1.9 Typical cycle times

1.9.1 Introduction to typical cycle times

General

Both cycles incorporate an air activation time of 35 ms for picking and 35 ms for placing. Air activation takes place during the cycle time.

Description of typical cycles
Cycle 1 is a 90 - 400 - 90 movement, with 90 degrees rotation of axis 4.
Cycle 2 is a 90 - 700 - 90 movement, with 90 degrees rotation of axis 4.

Approximate cycle times

	IRB 390-15/1300	
Payload	5.0 kg	15.0 kg
Cycle 1	0.67	0.79
Cycle 2	0.81	0.96

	IRB 390-10/1300	
Payload	5.0 kg	10.0 kg
Cycle 1	0.74	0.79
Cycle 2	0.90	0.98

2 Specification of variants and options

2.1 Introduction to variants and options

General

The different variants and options for the IRB 390 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.

2.2 Manipulator

Manipulator variant

Option	Description
3300-99	IRB 390-15/1300
3300-100	IRB 390-10/1300

Manipulator protection

Option	Description
3350-670	Base 67, IP67

Resolver connection, axis 7

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

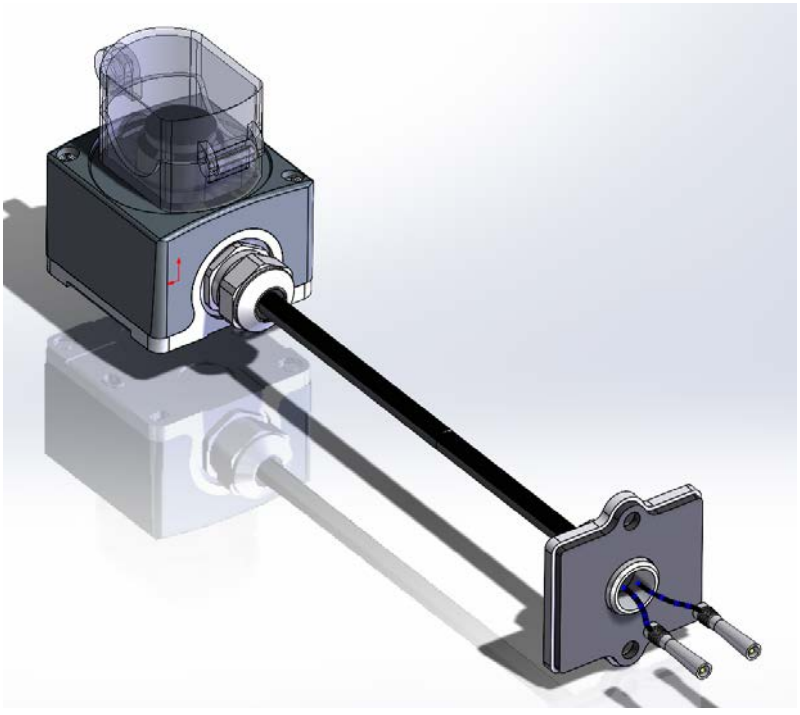
Option	Description
3322-1	On base

Remote brake release kit

Option	Description
3343-1	Remote brake release

General

The remote brake release is an extra brake release button not installed on the manipulator. With a cable connected to the manipulator it can be located where it is suitable in or outside of the production cell.



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2.3 Floor cables

Manipulator cable length

Option	Lengths
3200-1	3 m
3200-2	7 m
3200-3	15 m
3200-4	22 m
3200-5	30 m

2.4 Warranty

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 *Customer Delivery Date* or latest 18 months after *Factory Shipment Date*, 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 *Factory Shipment Date* or from activation date of standard warranty in WebConfig. **Note** Special conditions are applicable, see *Robotics Warranty Directives*.

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 - OmniCore V line*.

PickMaster and vision system

For more information, see *Product specification - PickMaster® Twin* .

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ABB AB
Robotics & Discrete Automation
S-721 68 VÄSTERÅS, Sweden
Telephone +46 10-732 50 00

ABB AS
Robotics & Discrete Automation
Nordlysvegen 7, N-4340 BRYNE, Norway
Box 265, N-4349 BRYNE, Norway
Telephone: +47 22 87 2000

ABB Engineering (Shanghai) Ltd.
Robotics & Discrete Automation
No. 4528 Kangxin Highway
PuDong New District
SHANGHAI 201319, China
Telephone: +86 21 6105 6666

ABB Inc.
Robotics & Discrete Automation
1250 Brown Road
Auburn Hills, MI 48326
USA
Telephone: +1 248 391 9000

abb.com/robotics

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