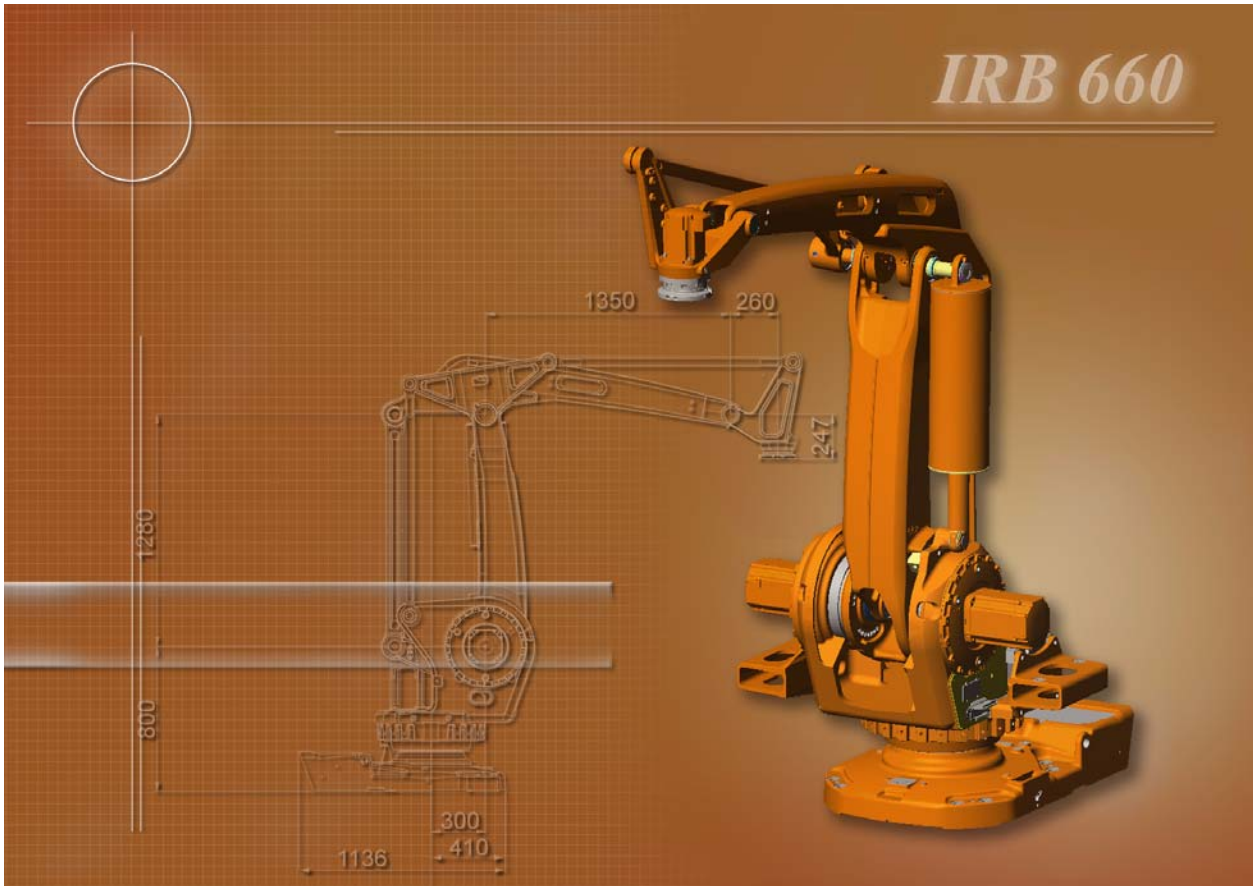
The heart of Robotics

Product specification

Articulated robot

IRB 660 - 180/3.15
IRB 660 - 250/3.15
M2004



Product specification

Articulated robot
3HAC023932-001
Rev.D
IRB 660 - 180/3.15
IRB 660 - 250/3.15
M2004

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Table of Contents

Overview

About this Product specification

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

- The structure and dimensional prints
- The fulfilment of standards, safety and operating requirements
- The load diagrams, mounting of extra equipment, the motion and the robot reach
- The integrated auxiliary equipments as that is: Customer connections on to the robot wrist
- The specification of variant and options available

Users

It is intended for:

- Product managers and Product personnel
- Sales and Marketing personnel
- Order and Customer Service personnel

Contents

Please see Table of Contents on page 3.

Revisions

Revision	Description
Revision B	- Changes in Figure 3 and Figure 16.
Revision C	- Update Customer connections - Interbus removed - Footnote added to “ Pose accuracy” - Stock Warranty
Revision D	- Changes in chapter Standards - Directions of forces - Warranty information for Load diagrams

Complementary Product specifications

Product specification	Description
Controller	IRC5 with FlexPendant, 3HAC021785-001
Controller Software IRC5	RobotWare 5.09, 3HAC022349-001
Robot User Documentation	IRC5 and M2004, 3HAC024534-001

1 Description

1.1 Structure

1.1.1 Introduction

Robot family

IRB 660 is ABB Robotics latest generation of 4-axis palletizing robot, designed with a focus on its high production capacity, short cycle time at a high payload, long reach together with the very high uptime, which is significant for ABB’s robots.

It is available in two versions; a handling capacity of 180 kg and 250 kg, both with a reach of 3.15 m.

Customer connections as power, signals, Bus signals and twin air are integrated in the robot, from the robot base to connections at the robot tool flange.

IRC5 and RobotWare

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 ect.

See Product Specification - Controller IRC5 with FlexPendant

Additional functionality

For additional functionality, the robot can be equipped with optional software for application support. For a complete description of optional software, see the Product Specification - Controller software IRC5.

Manipulator axes

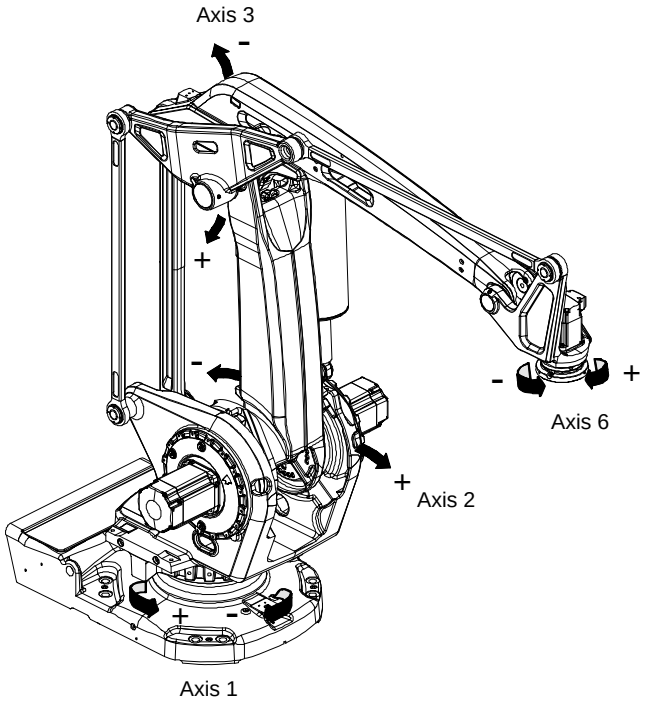

Figure 1 The IRB 660 manipulator has 4 axes.

1.1.2 Different robot versions

General

The IRB 660 is available in 2 versions.

Standard

The following different standard robot types are available:

Robot type	Handling capacity (kg)	Reach (m)
IRB 660	180 kg	3.15 m
IRB 660	250 kg	3.15 m

1.1.3 Definition of version designation

IRB 660 Mounting

Handling capacity/ Reach

	Prefix	Description
Mounting	-	Floor-mounted manipulator
Handling capacity	yyy	Indicates the maximum handling capacity (kg)
Reach	x.x	Indicates the maximum reach at wrist center (m)

Manipulator weight

Robot type	Handling capacity (kg)	Reach (m)	Weight (kg)
IRB 660	180 kg	3.15 m	1750 kg
IRB 660	250 kg	3.15 m	1750 kg

Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside the working space	Not yet available.

Power consumption at max load

Path E1-E2-E3-E4 in the ISO Cube (see Figure 2).

ISO Cube Speed [mm/s]	Power consumption [kW]	
	IRB 660-180/3.15	IRB 660-250/3.15
Max.	3.17	2.36
1000	1.31	1.50
500	0.89	1.02
100	0.61	0.70

General Palletizing movements in 48 s. at max. speed.

General Palletizing movements	Power consumption [kW]	
	IRB 660-180/3.15	IRB 660-250/3.15
Max. speed	3.08	2.34

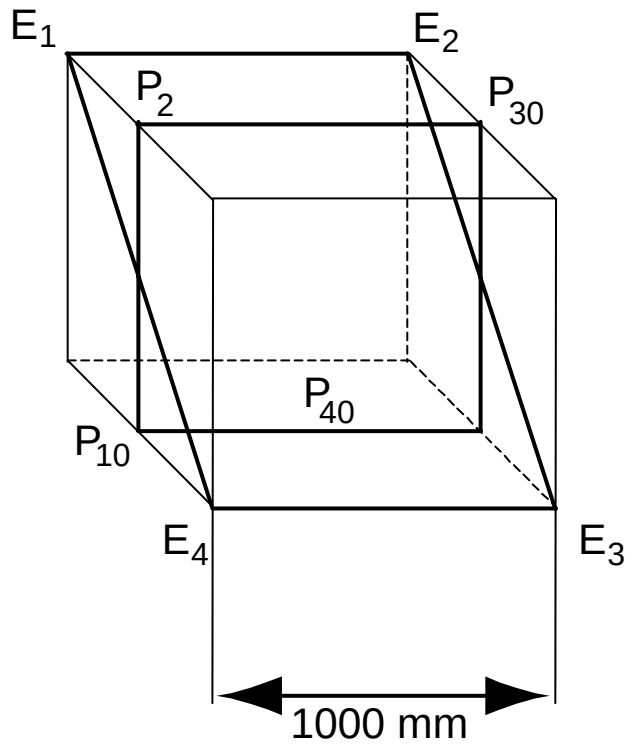

Figure 2 Path E1-E2-E3-E4 in the ISO Cube.

Dimensions IRB 660

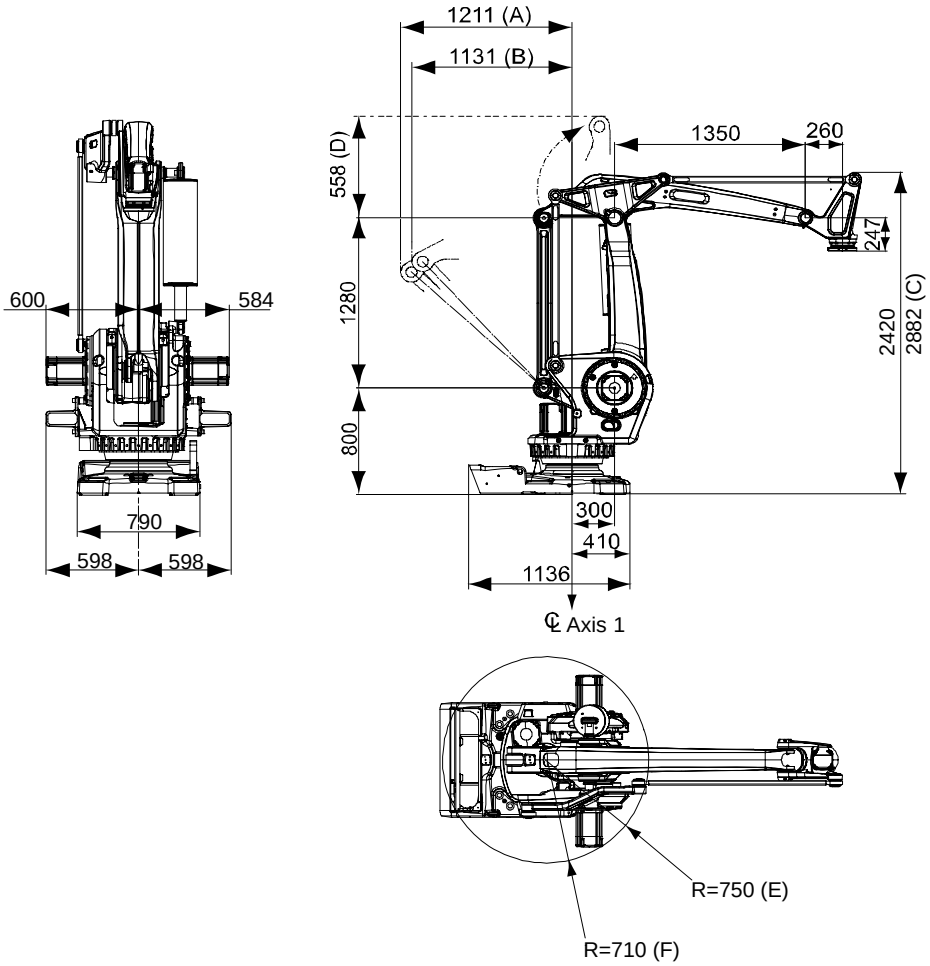

Figure 3 View of the IRB 660 manipulator from the front, the side and above (dimensions in mm). Allow 200 mm behind the manipulator foot for cables.

Pos	Description
A	At mechanical stop
B	At max. working range axis 2
C	At max. working range axis 3
D	At min. working range axis 3
E	Radius for fork lift pocket
F	Radius for axis 3 motor

1.2 Safety/Standards

1.2.1 Standards

The robot conforms to the following standards:

Standard	Description
EN ISO 12100 -1	Safety of machinery, terminology
EN ISO 12100 -2	Safety of machinery, technical specifications
EN 954-1	Safety of machinery, safety related parts of control systems
EN 60204	Electrical equipment of industrial machines
EN ISO 60204-1:2005	Safety of machinery - Electrical equipment of machines
EN ISO 10218-1:2006[a]	Robots for industrial environments - Safety requirements
EN 61000-6-4 (option)	EMC, Generic emission
EN 61000-6-2	EMC, Generic immunity

a. There is a deviation from paragraph 6.2 in that only worst case stop distances and stop times are documented.

Standard	Description
IEC 60529	Degrees of protection provided by enclosures

Standard	Description
ISO 9787	Manipulating industrial robots, coordinate systems and motions

Standard	Description
ANSI/RIA 15.06/1999	Safety Requirements for Industrial Robots and Robot Systems.
ANSI/UL 1740-1998 (option)	Safety Standard for Robots and Robotic Equipment
CAN/CSA Z 434-03 (option)	Industrial Robots and Robot Systems - General Safety Requirements

The robot complies fully with the health and safety standards specified in the EEC’s Machinery Directives.

Safety function

Safety function	Description
The Service Information System (SIS)	The service information system gathers information about the robot's usage and determines how hard the robot is used. The usage is characterized by the speed, the rotation angles and the load of every axis. With this data collection, the service interval of every individual robot of this generation can be predicted, optimized and service activities planned. The collection data is available via the FlexPendant or the network link to the robot. The Process Robot Generation is designed with absolute safety in mind. It is dedicated to actively or passively avoid collisions and offers the highest level of safety to the operators and the machines as well as the surrounding and attached equipment. These features are presented in the active and passive safety system.

The Active Safety System

The Active Safety System	Description
General	The active safety system includes those software features that maintain the accuracy of the robot's path and those that actively avoid collisions which can occur if the robot leaves the programmed path accidentally or if an obstacle is put into the robot's path.
The Active Brake System (ABS)	All robots run with an active brake system that supports the robots to maintain the programmed path in General Stop (GS), Auto Stop (AS) and Superior Stop (SS). The ABS is active during all stop modes, braking the robot to a stop with the power of the servo drive system along the programmed path. After a specific time the mechanical brakes are activated ensuring a safe stop. The stopping process is in accordance with a class 1 stop. The maximal applicable torque on the most loaded axis determines the stopping distance. In case of a failure of the drive system or a power interruption, a class 0 stop turns out. Emergency Stop (ES) is a class 0. All stops (GS, AS, SS and ES) are reconfigurable. While programming the robot in manual mode, the enabling device has a class 0 stop.
The Self Tuning Performance (STP)	The Process Robot Generation is designed to run at different load configurations, many of which occur within the same program and cycle. The robot's installed electrical power can thus be exploited to lift heavy loads, create a high axis force or accelerate quickly without changing the configuration of the robot. Consequently the robot can run in a "power mode" or a "speed mode" which can be measured in the respective cycle time of one and the same program but with different tool loads. This feature is based on QuickMove™. The respective change in cycle time can be measured by running the robot in NoMotionExecution with different loads or with simulation tools like RobotStudio.

1.2.1 Standards

The Active Safety System	Description
The Electronically Stabilised Path (ESP)	The load and inertia of the tool have a significant effect on the path performance of a robot. The Process Robot Generation is equipped with a system to electronically stabilize the robot's path in order to achieve the best path performance. This has an influence while accelerating and braking and consequently stabilizes the path during all motion operations with a compromise of the best cycle time. This feature is secured through TrueMove™.
Over-speed protection	The speed of the robot is monitored by two independent computers.
Restricting the working space	The movement of axis 1 can be restricted using software limits. As options there are safeguarded space stops for connection of position switches to restrict the working space for the axis 1. Axis 1 can also be restricted by means of mechanical stops.
Collision detection (option)	In case of an unexpected mechanical disturbance , such as a collision, electrode sticking, etc., the robot will detect the collision, stop on the path and slightly back off from its stop position, releasing tension in the tool.

The Passive Safety System

The Passive Safety System	Description
General	The Process Robot Generation has a dedicated passive safety system that by hardware construction and dedicated solutions is designed to avoid collisions with surrounding equipment. It integrates the robot system into the surrounding equipment safely.
Moveable mechanical limitation of axis 1 (option)	Axis 1 can be equipped with moveable mechanical stops, limiting the working range. The mechanical stops are designed to withstand a collision even fully loaded.
Position switches on main axis (option)	Axis 1 can be equipped with position switches. The double circuitry to the cam switches is designed to offer personal safety according to the respective standards.

The Internal Safety Concept

The Internal Safety Concept	Description
General	The internal safety concept of the Process Robot Generation is based on a two-channel circuit that is monitored continuously. If any component fails, the electrical power supplied to the motors shuts off and the brakes engage.
Safety category 3	Malfunction of a single component, such as a sticking relay, will be detected at the next MOTOR OFF/MOTOR ON operation. MOTOR ON is then prevented and the faulty section is indicated. This complies with category 3 of EN 954-1, Safety of machinery - safety related parts of control systems - Part 1.
Selecting the operating mode	The robot can be operated either manually or automatically. In manual mode, the robot can only be operated via the FlexPendant, that is not by any external equipment.
Reduced speed	In manual mode, the speed is limited to a maximum of 250 mm/s (600 inch/min.). The speed limitation applies not only to the TCP (Tool Center Point), but to all parts of the robot. It is also possible to monitor the speed of equipment mounted on the robot.
Three position enabling device	The enabling device on the FlexPendant must be used to move the robot when in manual mode. The enabling device consists of a switch with three positions, meaning that all robot movements stop when either the enabling device is pushed fully in, or when it is released completely. This makes the robot safer to operate.
Safe manual movement	The robot is moved using a joystick instead of the operator having to look at the FlexPendant to find the right key.
Emergency stop	There is one emergency stop push button on the controller and another on the FlexPendant. Additional emergency stop buttons can be connected to the robot’s safety chain circuit.
Safeguarded space stop	The robot has a number of electrical inputs which can be used to connect external safety equipment, such as safety gates and light curtains. This allows the robot’s safety functions to be activated both by peripheral equipment and by the robot itself.
Delayed safeguarded space stop	A delayed stop gives a smooth stop. The robot stops in the same way as at a normal program stop with no deviation from the programmed path. After approx. 1 second the power supplied to the motors is shut off.
Hold-to-run control	“Hold-to-run” means that you must depress the start button in order to move the robot. When the button is released the robot will stop. The hold-to-run function makes program testing safer.
Fire safety	Both the manipulator and control system comply with UL’s (Underwriters Laboratories Inc.) tough requirements for fire safety.
Safety lamp (option)	As an option, the robot can be equipped with a safety lamp mounted on the manipulator. This is activated when the motors are in the MOTORS ON state.

1.3 Installation

1.3.1 Introduction

General

IRB 660 is designed for floor mounting. Depending on the robot version, an end effector with max. weight of 180 to 250 kg including payload, can be mounted on the mounting flange (axis 6). See Load diagrams for IRB 660 generation robots in chapter Load diagrams .

Working Range

The working range of axis 1 can be limited by mechanical stops. Position switches can be supplied on axis 1 for position indication of the manipulator.

External Mains Transformer

For mains voltage 200V and 220V an external transformer will be included.

1.3.2 Operating requirements

Protection standards

Manipulator IP67.

Explosive environments

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

Ambient temperature

Description	Temperature
Manipulator during operation	±0°C[a] (32°F) to +50°C (122°F)
Complete robot during transportation and storage	-25°C (-13°F) to +55°C (131°F) for short periods not > 24 hours: +70°C (158°F)

a. At cold start (0ºC to +5ºC), run the robot in approximately 3 minutes with 25% of max. speed, before running in full performance.

Relative humidity

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

1.3.3 Mounting the manipulator

Maximum Load

Maximum load in relation to the base coordinate system.

	Endurance load in operation	Max. load at emergency stop
Force xy	± 8.0 kN	± 15.9 kN
Force z	17.0 ± 3.3 kN	17.0 ± 10.6 kN
Torque xy	± 23.2 kNm	± 40.6 kNm
Torque z	± 10.1 kNm	± 14.4 kNm

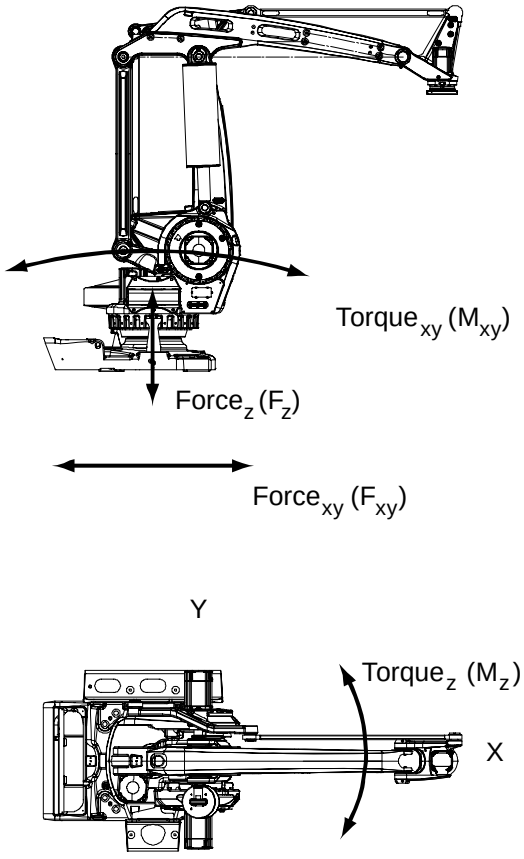

Figure 4 Direction of forces.

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

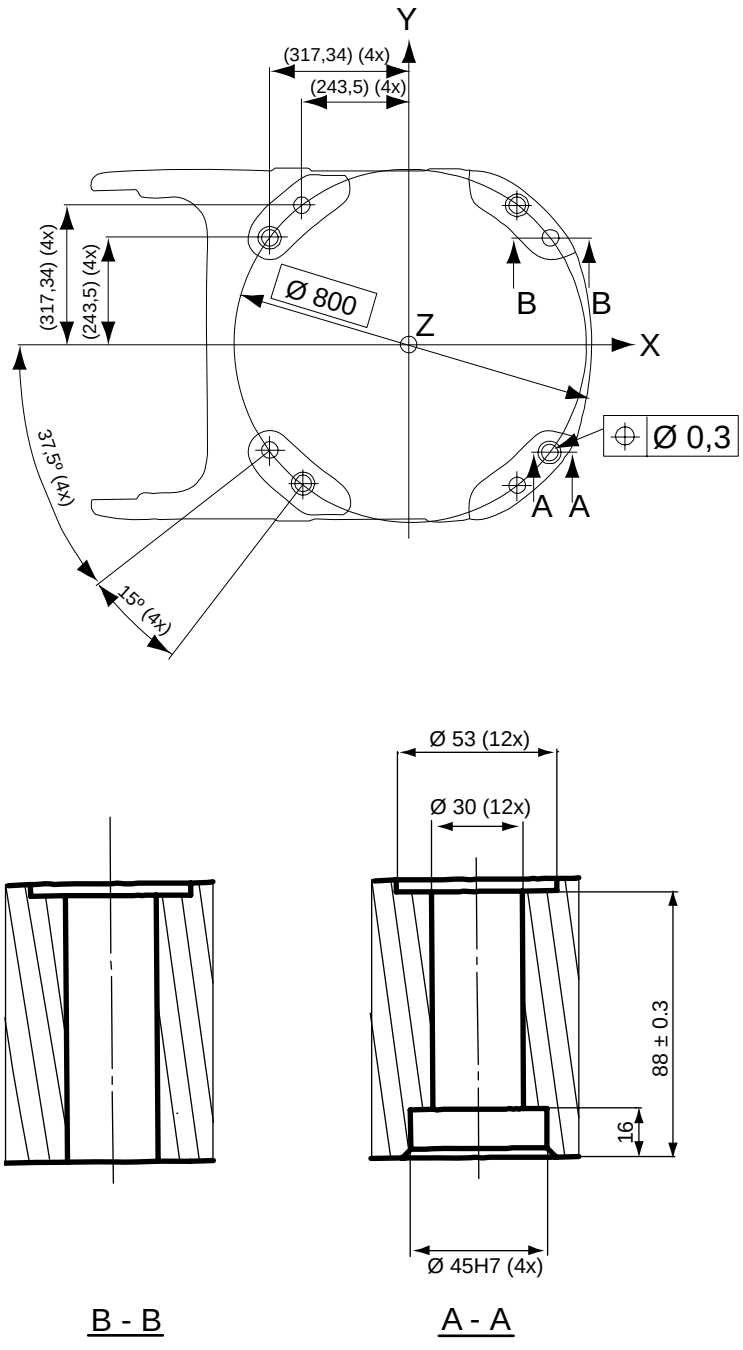

Figure 5 Hole configuration (dimensions in mm).

Recommended screws for fastening the manipulator to a base plate:

- M24 x 140 8.8 with 4 mm flat washer. Torque value 775 Nm.

Only two guiding sleeves shall be used. The corresponding holes in the base plate shall be circular and oval according to Figure 6 and Figure 9.

Regarding AbsAcc performance, the chosen guide holes according to Figure 6 and Figure 9 are recommended.

Base plate drawing

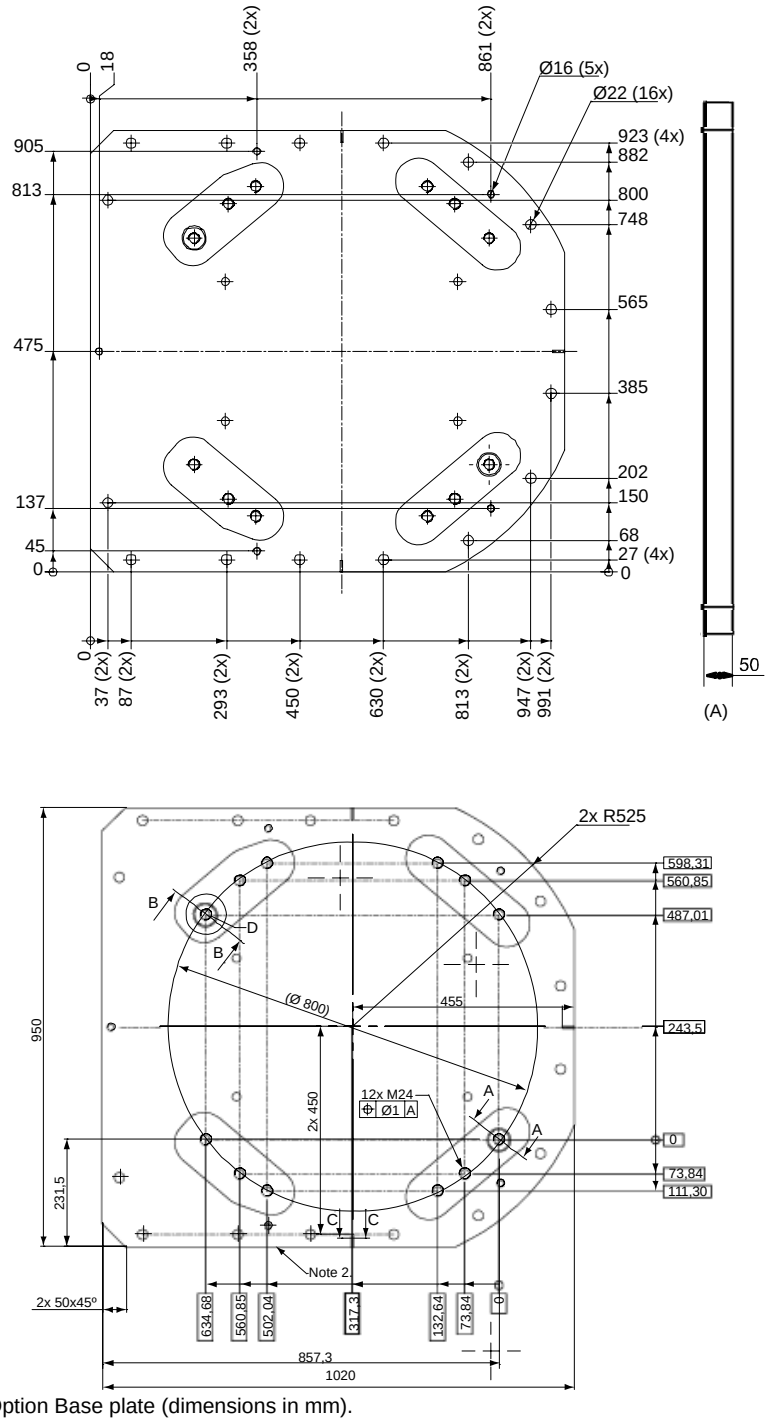

Figure 6 Option Base plate (dimensions in mm).

Pos	Description
A	Color: RAL 9005 Thickness: 80-100 µm

1.3.3 Mounting the manipulator

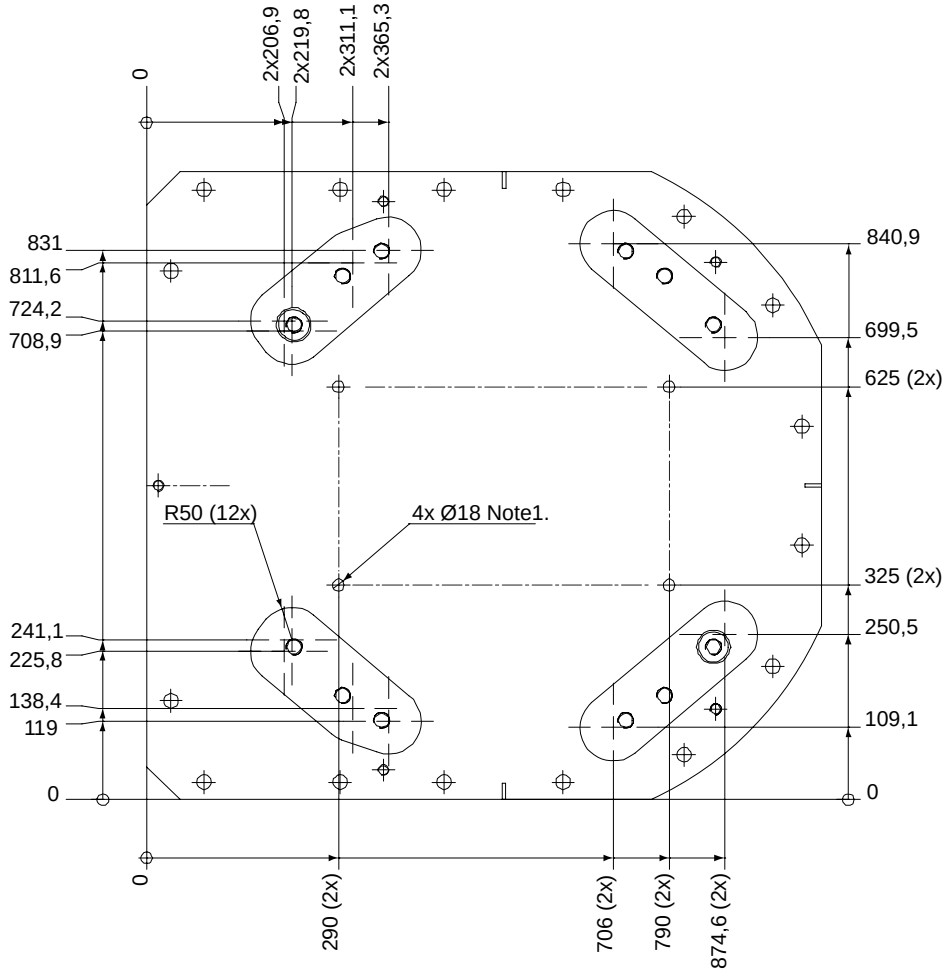

Figure 7 Option Base plate (dimension in mm).

Two guiding pins required, dimensions see Figure 8.

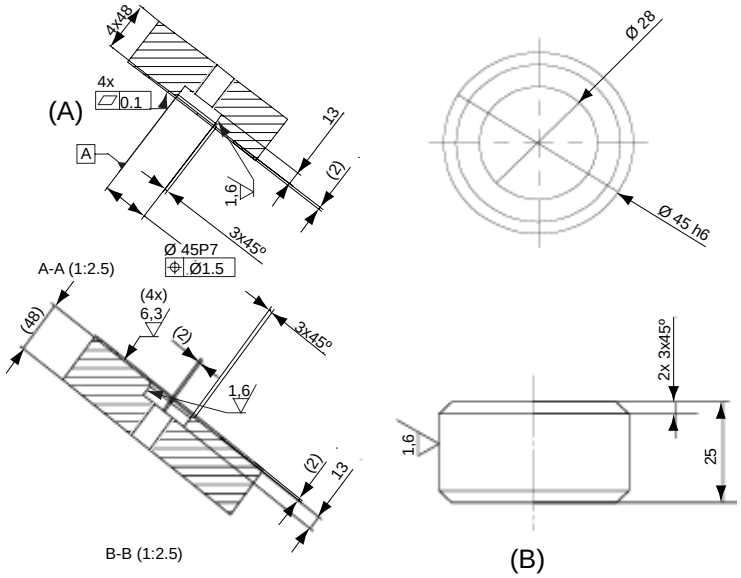

Figure 8 Sections of base plate and guide sleeve (dimensions in mm).

Pos	Description
A	Common zone
B	Guide sleeve Protected from corrosion

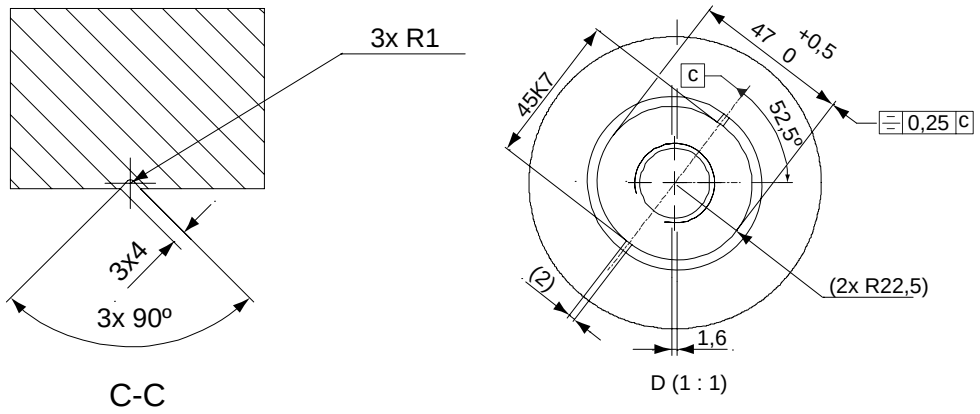

Figure 9 Sections of base plate (dimensions in mm).

1.4 Calibration and References

1.4.1 Fine calibration

General

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

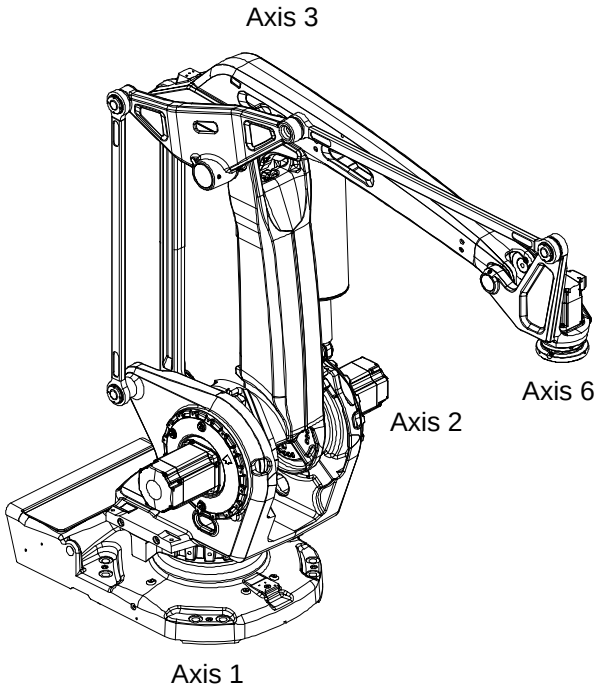

Figure 10 All axes in zero position.

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

1.5 Load diagrams

1.5.1 Introduction

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

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

- motors
- gearboxes
- mechanical structure

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

1.5.2 Load diagrams

IRB 660-180/3.15

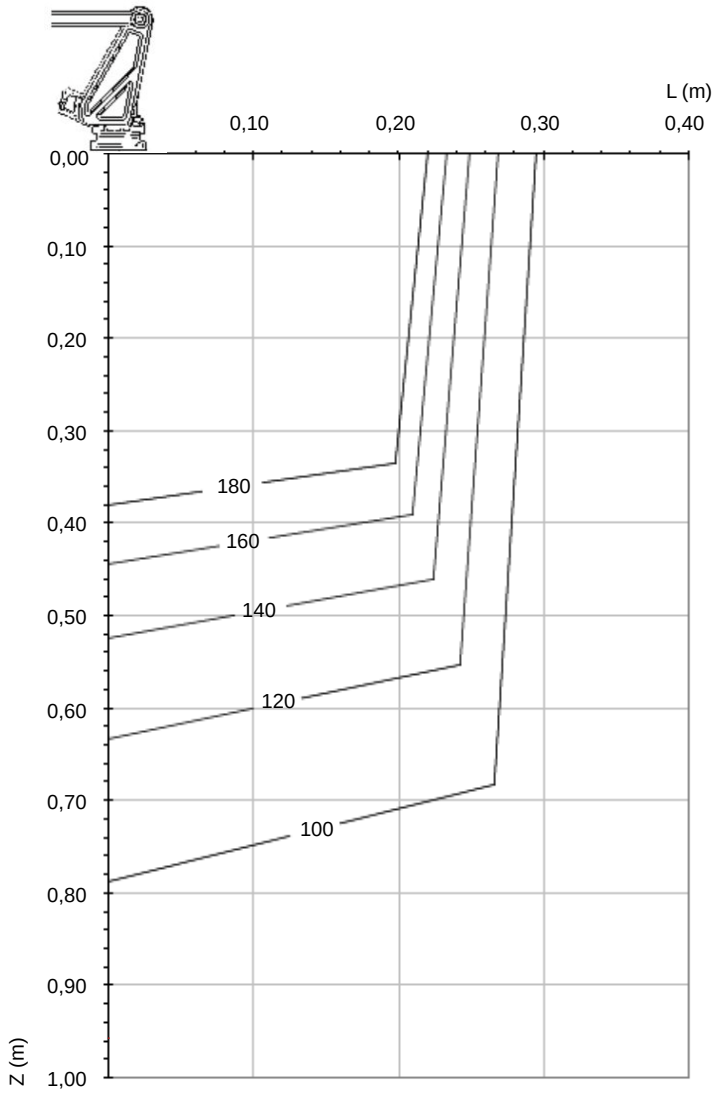

Figure 11 Maximum permitted load mounted on the robot tool flange at different positions (center of gravity).

IRB 660-250/3.15

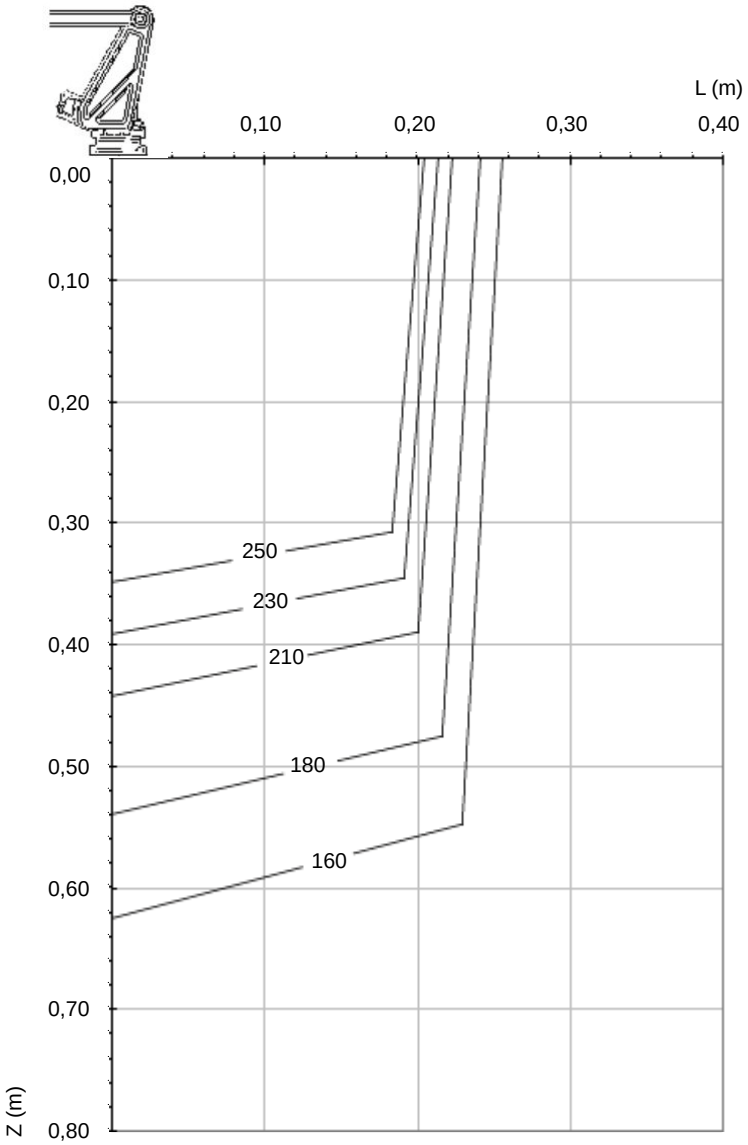

Figure 12 Maximum permitted load mounted on the robot tool flange at different positions (center of gravity).

1.5.3 Maximum load and moment of inertia

Load in kg, Z and L in m and J in kgm^2.

Axis	Maximum moment of inertia
6	Ja6 = Load x L^2 + $J_{0Z} \leq 250$ kgm^2

1.6 Mounting of equipment

General

Extra loads can be mounted on to the upper arm and on to the left side of the frame. Holes and definitions of masses are shown in Figure 13, Figure 14 and Figure 15.

For mounting of an external vacuum hose there are six holes on the upper arm (see Figure 13). The max. weight for the vaccum hose and fastening device is 35 kg. When using the holes, the weight of the vacuum hose shall be reduced from the max. Handling capacity, for each variant respectively.

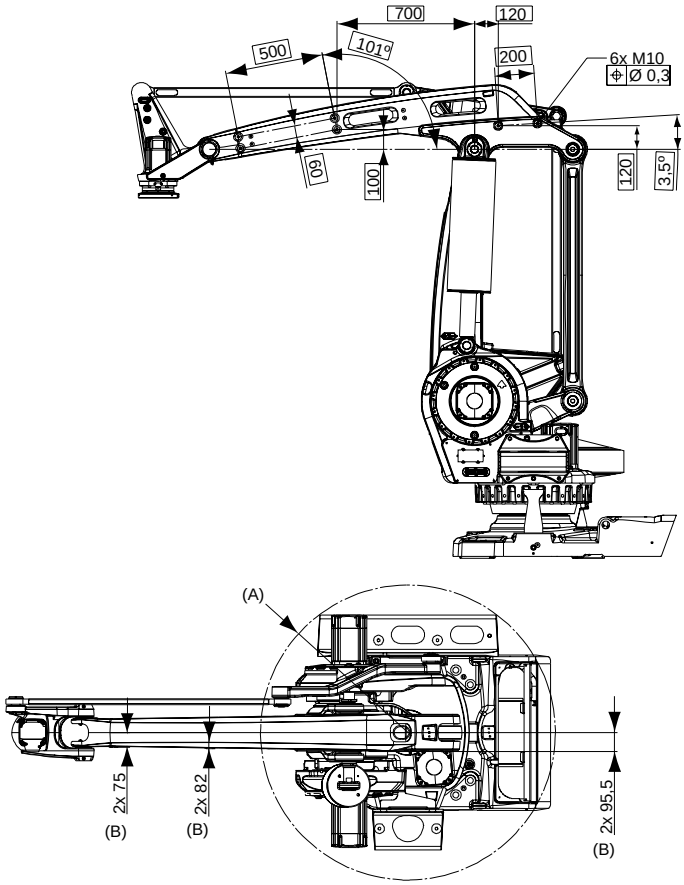

Figure 13 Fastening holes for vacuum hose on upper arm.

Pos	Description
A	R750 Right fork lift pocket
B	M10 Mounting hole, upper arm

Frame

For mounting of extra load on to the frame there are three holes on the left side (see Figure 14). The max. weight of the extra load is 150 kg and the max. moment of inertia is 120 kgm^2.

Description	Value and definition
Permitted extra load on frame	M = 150 kg
Max. moment of inertia for extra load	J_H = 120 kgm^2
Recommended position Figure 14	$J_H = J_{H0} + M \times R^2$ J_{H0} is the moment of inertia (kgm^2) for the extra load. R is the radius (m) from the center of axis 1. M is the total mass (kg) of the extra load.

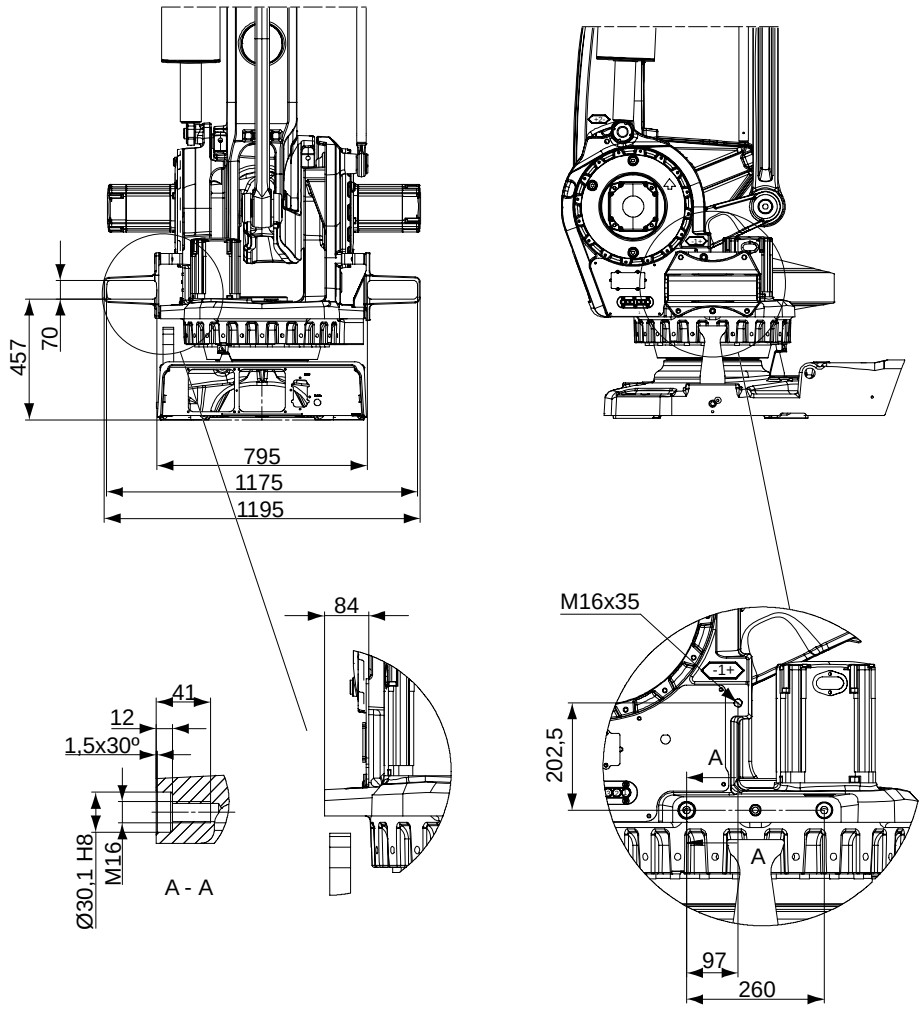

Figure 14 Fastening holes for extra load on Frame.

1.5.3 Maximum load and moment of inertia

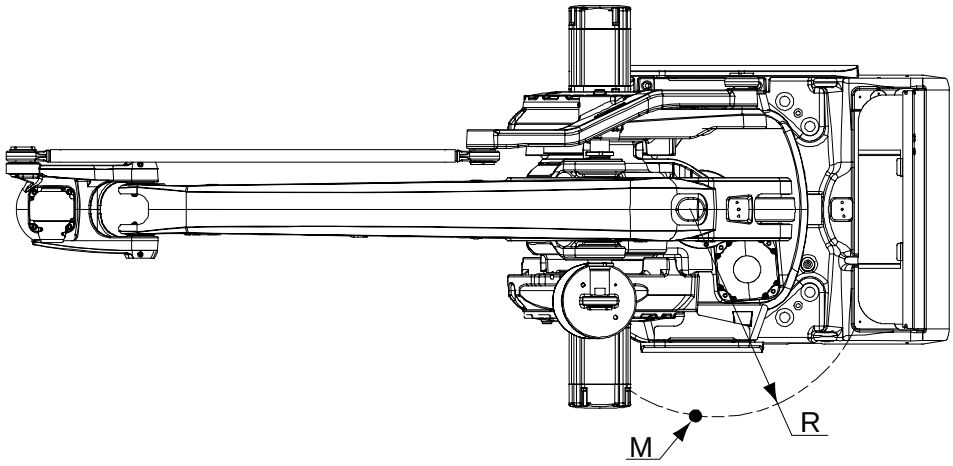

Figure 15 Radius for extra load on frame.

Robot tool flange

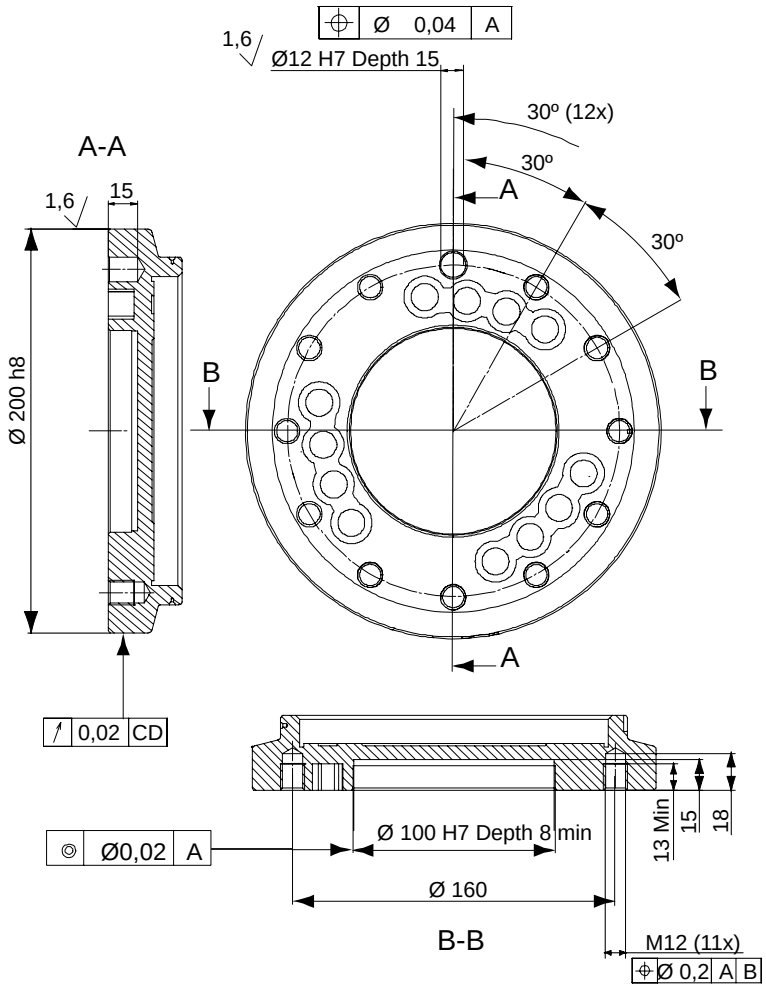

Figure 16 Robot tool flange SS-EN ISO 9409-1;2004 (dimensions in mm).

For fastening of gripper-tool-flange to robot-tool-flange all bolt holes for 11 bolts quality class 12.9 shall be used.

1.7 Robot Motion

1.7.1 Introduction

Type of Motion

Axis	Type of motion	Range of movement	Option
1	Rotation motion	+180° to -180°	+220° to -220°
2	Arm motion	+85° to -42°	
3	Arm motion	+120° to -20°	
6	Turn motion	+300° to -300° Default +150 Rev.[a] to -150 Rev. Max[b]	

a. Rev. = Revolutions
b. The default working range for axis 6 can be extended by changing parameter values in the software.

Illustration

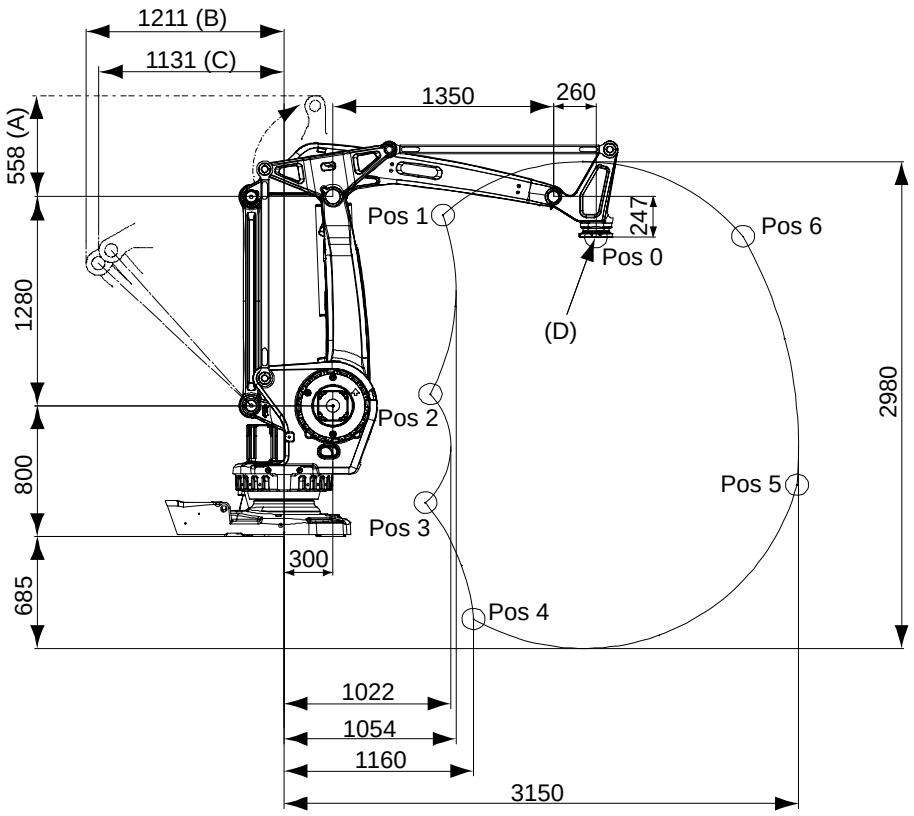

Figure 17 The extreme positions of the robot arm specified at the tool flange center (dimensions in mm).

Pos	Description
A	Min. working stop
B	Mechanical stop
C	Max. working stop
D	Tool flange center

1.7.1 Introduction

Positions at wrist center

Pos no. see Figure 17	X Position (mm)	Z Position (mm)	Axis 2 Angle (degrees)	Axis 3 Angle (degrees)
0	1910	1833	0	0
1	972	1966	-42	-20
2	895	870	-42	28
3	866	207	50	120
4	1160	-505	85	120
5	3139	315	85	15
6	2809	1837	50	-20

1.7.2 Performance according to ISO 9283

General

At rated maximum load and 1.6 m/s velocity on the inclined ISO test plane, 1 m cube with all four axes in motion.

Description	IRB 660-180/3.15	IRB 660-250/3.15
Undirectional pose accuracy, AP[a] (mm)	0.20	0.20
Unidirectional pose repeatability, RP (mm)	0.05	0.05
Linear path repeatability, RT (mm)	0.23	0.17
Linear path accuracy, AT (mm)	2.20	2.13
Pose stabilization time PST (s)	0.17	0.22

a. 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.

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

1.7.3 Velocity

Maximum axis speeds

Axis No.	IRB 660 - 180/3.15	IRB 660 - 250/3.15
1	130°/s	95°/s
2	130°/s	95°/s
3	130°/s	95°/s
6	300°/s	240°/s

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

Axis Resolution

Approx. 0.01º on each axis.

1.8 Customer connections

1.8.1 Introduction

General

The Customer connection is an option, the cables and the hosings for them are integrated in the robot and the connectors are placed at axis 6.

- Power, Signals, Bus and 2x Air (CP/CS/BUS/AIR)

For further information of the customer connection, see Specification of Variants and Options, Application interface Connection type.

Specification

Type	Application	Specification	Connection type	Harting Article No.	Comment
Power (CP)	Utility power	6x0.5mm^2 (5A/250VAC)	3-module Harting, shell size 10B, EE	Female, EE, 8 pin 9 140 083 101	
Signals (CS)	Parallel communi-cation	8x2 AWG24 (50V/1A)	3-module Harting, shell size 10B, HD+EE	Female, HD, 25 pin 9 140 253 101	Twisted pairs
Signals (CS)		5x2AWG24 (50V/1A)	3-module Harting, shell size 10B, HD	Female, HD, 25 pin 9 140 253 101	Sep. Screened
Bus Com-munication (BUS)	Profibus CANBus BUS power & BUS utility	2xAWG26 Z=150 Ohm (1MHz) 2xAWG26 Z=120 Ohm (1MHz) 2x2 AWG24	3-module Harting, shell size 10B, DD	Female, DD, 12 pin 9 140 123 101	
Air (AIR)	Utility air	2x12.7 (1/2”) P_{Nom} = 16 bar	Parker Pushlock, 1/2” M22x1,5 Brass 24 degree seal		

1.9 Maintenance and Troubleshooting

1.9.1 Introduction

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.

1.9.1 Introduction

2 Specification of Variants and Options

2.1 Introduction

2.1.1 General

The different variants and options for the IRB 660 are described in the following sections.

The same numbers are used here as in the Specification form. For controller options, see Product Specification - Controller IRC5 with FlexPendant and for software options, see Product Specification - Controller software IRC5.

2.1.2 Manipulator

Variants

Option	IRB Type	Handling capacity (kg)	Reach (m)
435-58	660	180	3.15
435-59	660	250	3.15

Manipulator color

Option	Description	Note
209-1	ABB Standard	The robot is painted in ABB orange.
209-3	ABB White	The robot is painted in white color.
209-3 --192	RAL code	The robot is painted in chosen RAL - color.

Equipment

Option	Type	Description
213-1	Safety lamp	A 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.
159-1	Fork lift device	Lifting device on the manipulator for fork-lift -handling.
37-1	Base plate	Can also be used for IRB 7600. See 1.3 Installation for dimension drawing.

Position Switches

Position switches indicating the position of axis 1. Rails with separate adjustable cams are attached to the manipulator. The cams, which have to be adapted to the switch function by the user, can be mounted in any position in the working range for each switch. No machining operation of the cams is necessary for the adaptation, simple hand tools can be used.

Position switches Axis 1

For axis 1, there are three redundant position zones available, each with two independent switches and cams.

Each position zone consists of two switches mechanically operated by separate cams. Each switch has one normally open and one normally closed contact. The design and components fulfill the demands to be used as safety switches. These options may require external safety arrangements, efor example light curtains, photocells or contact mats.

The switches can be connected either to the manipulator base or to the controller.

Option	Name	Description
25-3	Three	Three redundant position zones are available, each with two independent switches and cams.

Position switches Connection to

Option	Name	Description
271-2	Manipulator	The signals are connected directly on the robot base with one Souriau 32-pin connector.
271-1	Cabinet[a]	The signals are connected to 12-pole screw terminals, Phoenix MSTB 2.5/12-ST-5.08 in the cabinet.

a.Note! In a MultiMove application additional robots have no Control Module. The screw terminals with internal cabling are then delivered separately to be mounted in the main robot Control Module or in another encapsulation.

Work range limit Axis 1

To increase the safety of the robot, the working range of axis 1 can be restricted by extra mechanical stops.

Option	Type	Description
29-2	Axis 1, 7,5 degrees	Four stops, two which allow the working range to be restricted in increments of 15° and two stops of 7.5°.
29-1	Axis 1, 15 degrees	Two stops which allow the working range to be restricted in increments of 15°.

Extended work range

Option	Type	Description
561-1	Extended work range axis 1	To extend the working range on Axis 1 from ± 180° to ± 220°. When the option is used the mechanical stop shall be disassembled. Position switches axis 1, option 25-3, are required.

Warranty

Option	Type	Description
438-1	Standard Warranty	Standard warranty is 18 months (1 1/2 years)
438-2	Standard + 12 months	18 + 12 months (2 1/2 years)
438-4	Standard + 18 months	18 + 18 months (3 years)
438-5	Standard + 24 months	18 + 24 months (3 1/2 years)
438-6	Standard + 6 months	18 + 6 months (2 years)
438-8	Stock Warranty	18 months standard warranty. Warranty period starts automatically 6 months after delivery, or can be activated earlier at commissioning.

The warranty of robot cabling and customer connections is limited to 12 months, when running the robot in 0ºC to +5ºC environment.

2.1.3 Floor cables

General

Additional floor cables for customer connections see chapter 2.1.4 Process.

Manipulator cable length

Option	Lengths
210-2	7 m
210-3	15 m
210-4	22 m
210-5	30 m

Position switches Axis 1 cable length

Option	Lengths
273-1	7 m
273-2	15 m
273-3	22 m
273-4	30 m

2.1.4 Process

Application interface Connected to

Option	Description	
16-1	Cabinet[a]	The signals are connected to 12-pole screw terminals, Phoenix MSTB 2.5/12-ST-5.08, to the Control Module.
16-2	Manipulator	The signals are connected directly to the manipulator base in one 40-pins Harting connector.

a.Note! In a MultiMove application, additional robots have no Control Module. The screw terminal with internal cabling are then delivered separately to be mounted in the main robot Control Module or in another encapsulation, for example a PLC cabinet.

Communication

Option	Type	Description
455-6	Parallel, Bus and Air Communication	Includes Customer Signals (CS), Customer Power (CP), Bus signals and two hoses for Air (inner diameter 12.5 mm)

CAN/DeviceNet/Profibus

The following information specifies the cable length for Parallel/CAN/DeviceNet/ Profibus for connection to cabinet.

Option	Lengths
90-2/92-2	7 m
90-3/92-3	15 m
90-4/92-4	22 m
90-5/92-5	30 m

Empty cabinet

Option	Type	Description
768-1	Empty cabinet small	See Product specification - Controller IRC5 with FlexPendant, Chapter 2
715-1	Installation kit	See Product specification - Controller IRC5 with FlexPendant, Chapter 2

Connector kits Upper arm

Option	Type	Description
431-1	Upper arm	Connector for customer Power/Signals/ and Bus at Axis 6 tool side.

2.1.5 Documentation

CD User Documentation

Option	Type	Description
808-1	Documentation on CD	See Product Specification Robot User Documentation

2.1.5 Documentation

3 Accessories

General

There is a range of tools and equipment available, specially designed for the robot.

Basic software and software options for robot and PC

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

Robot Peripherals

- Track Motion
- Motor Units

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