ROBOTICS

# Product specification

## IRB 6620

Trace back information:
Workspace OmniCore and R19C version a16
Checked in 2019-09-16
Skribenta version 5.3.012

# Product specification

## IRB 6620 - 150/2.2
## IRB 6620LX-150/1.9

Document ID: 3HAC025861-001
Revision: AA

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Original instructions.

# Table of contents

# Overview of this specification

## About this product specification

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

- The structure and dimensional prints
- The fulfilment of standards, safety and operating requirements
- The load diagrams, mounting of extra equipment, the motion and the robot reach
- The integrated auxiliary equipment as that is: Customer Connections, Servo Gun, DressPack and SpotPack
- The specification of variant and options available

## Usage

Product specifications are used to find data and performance about the product, for example to decide which product to buy. How to handle the product is described in the product manual.

## Users

This manual is intended for:

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

## References

| Reference | Document ID |
|---|---|
| *Product specification - Controller IRC5*<br>IRC5 with main computer DSQC1000. | *3HAC047400-001* |
| *Product specification - Controller software IRC5*<br>IRC5 with main computer DSQC1000 and RobotWare 5.6x. | *3HAC050945-001* |
| *Product specification - Controller software IRC5*<br>IRC5 with main computer DSQC1000 and RobotWare 6. | *3HAC050945-001* |
| *Product specification - Linear Axis* | *3HAC036094-001* |
| *Product manual - IRB 6620* | *3HAC027151-001* |
| *Product manual - IRB 6620LX* | *3HAC035737-001* |
| *Product manual - DressPack/SpotPack IRB 6620* | *3HAC027309-001* |
| *Product specification - Robot user documentation, IRC5 with RobotWare 6* | *3HAC052355-001* |

## Revisions

| Revision | Description |
|---|---|
| - | New product specification |

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| Revision | Description |
|---|---|
| A | • Ambient temperature for the spot welding cabinet added<br>• Updated the section *Performance according to ISO 9283 on page 52*.<br>• Removed the options 91-2,-3,-4,-5 Interbus<br>• Added the option 785-2 |
| B | • Added footnote Safety/Standards, see *Applicable standards on page 18*<br>• Added section *Robot Gun and Track Motion on page 59*<br>• Added section *Track Motion IRBT 6004 on page 60* |
| C | • Dedicated MH<br>• Directions of forces<br>• Warranty information for load diagrams |
| D | • SpotPack Basic |
| E | • Foundry Plus<br>• Changes for Calibration data<br>• Work range<br>• Explanation of ISO values (new figure and table)<br>• Stopping distance<br>• User documentation on DVD |
| F | • General update for R09.1 |
| G | • Added new variant: IRB 6620LX-150/1.9 |
| H | • New document Structure<br>• Minor corrections |
| J | • Foundry Plus 2<br>• ISO Cube |
| K | • Minor corrections |
| L | • Table for ambient temperature adjusted |
| M | • Machinery directive updated<br>• General corrections/update |
| N | • Base plate drawing updated<br>• General update and minor corrections |
| P | • General update and minor corrections |
| Q | • Minor corrections/update |
| R | • Text for ISO test adjusted<br>• Robot stopping distances and times for category 0 and category 1 stops are moved to a separate document, *Product specification - Robot stopping distances according to ISO 10218-1* |
| S | • Text for Foundry Plus updated.<br>• Information regarding performance when using double carriages for IRB 6620LX. |
| T | • Minor corrections/update |
| U | • Minor corrections/update<br>• Tilting around X-axis added |
| V | • Updated the section *Spot Welding cabinet on page 102*.<br>• Axis Calibration method added |
| X | • Warranty information for DressPack added |

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| Revision | Description |
|---|---|
| Y | Published in release R17.1. The following updates are done in this revision:<br>• Axis Calibration method added.<br>• Restriction of load diagram added. |
| Z | Published in release R17.2. The following updates are done in this revision:<br>• Updated list of applicable standards.<br>• TCP acceleration information added.<br>• Delete option 828-1, 828-2, 768-3 and 782-1 as they were all phased out. |
| AA | Published in release 19C. The following updates are done in this revision:<br>• Updated information about *Absolute Accuracy*.<br>• Note added about need to calibrate if the robot is other than floor mounted. See *Calibration methods on page 28*. |

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# 1 Description

## 1.1 Structure

### 1.1.1 Introduction to Structure

**Robot family**

The IRB 6620 is one of ABB Robotics' generation of high payload, high performance industrial robots.

Based on the famous IRB 6600 robot family, with the highly flexible bending backwards concept, the very high wrist torque, the service friendly modular built up and the very high availability, significant for ABB's robots, the IRB 6620 goes even further, towards the excellence as a flexible tooling in automatic manufacturing.

With a focus on the very high production capacity, the compact design with an extremely low weight, the highly flexible mounting, the simple service and the low maintenance cost, the IRB 6620 is the most profitable alternative in automation of for example Spot Welding, Material Handling and Machine Tending applications.

The IRB 6620LX-150/1.9 is a 5 axis robot, mounted on a linear axis 1. The system combines the advantages of a linear axis (large scalable working envelope, limited floor space requirement) and an articulated robot (flexibility, reliability and maintainability).

**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*.

**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 - 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

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must be taken in regard to operational and maintenance requirements for applications in foundry are 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 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 versions

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

See *Specification of variants and options on page 123* for robot versions and other options not selectable together with Foundry Plus 2.

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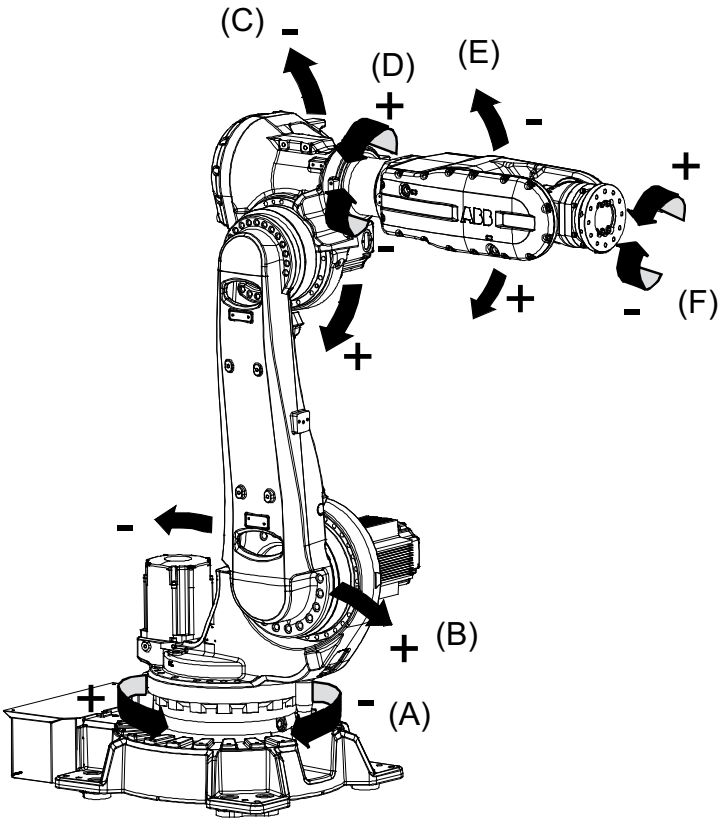
**Manipulator axes**

IRB 6620

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

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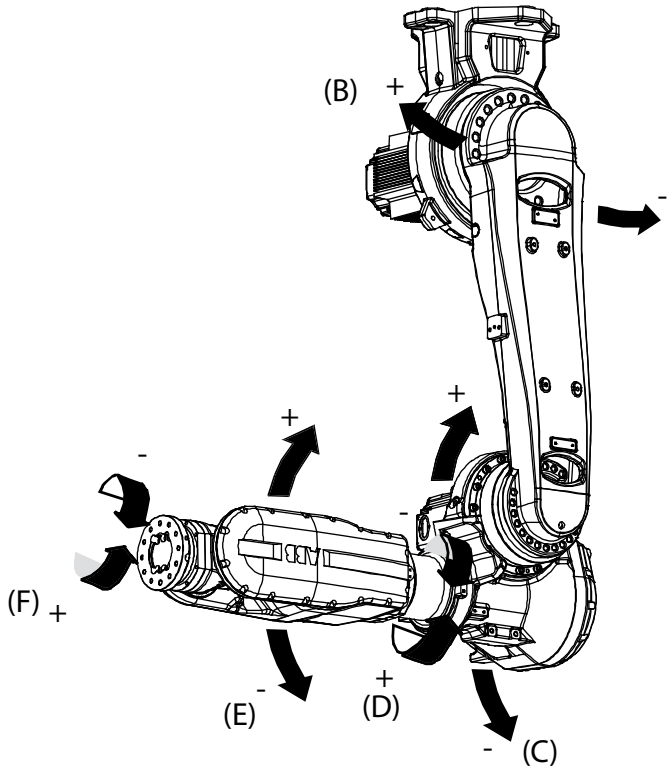
### 1.1.1 Introduction to Structure
*Continued*

IRB 6620LX

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

## 1.1.2 The robot

### General

The IRB 6620 can be mounted on to the floor or inverted, a tilting of ±15º (around the Y-axis or X-axis) is allowed for both mountings. IRB 6620LX must be mounted together with a Linear Axis, see *Product specification - Linear Axis* (*3HAC036094-001*).

| Robot Type | Handling capacity (kg) | Reach (m) |
|---|---|---|
| IRB 6620 | 150 | 2.2 |
| IRB 6620LX | 150 | 1.9 |

### Manipulator weight

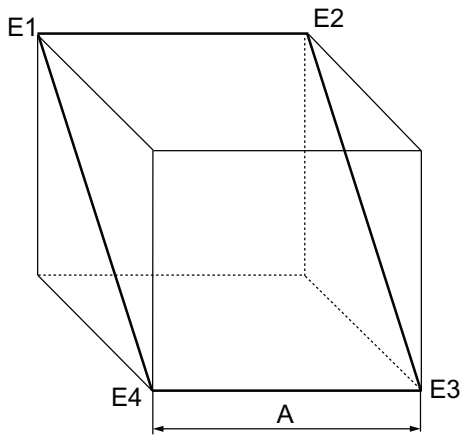
| Robot type | Weight |
|---|---|
| IRB 6620-150/2.2 | 880 kg |
| IRB 6620LX-150/1.9 | 610 kg |

### Other technical data

| Data | Description | Note |
|---|---|---|
| Airborne noise level | The sound pressure level outside the working space. | < 74 dB(A) Leq (acc. to Machinery directive 2006/42/EG) |

### Power consumption at max load

| Type of Movement | IRB6620 | IRB 6620LX |
|---|---|---|
| ISO Cube | 2.8 kW | 3.0 kW |

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| Pos | IRB 6620 |
|---|---|
| A | 1000 mm |

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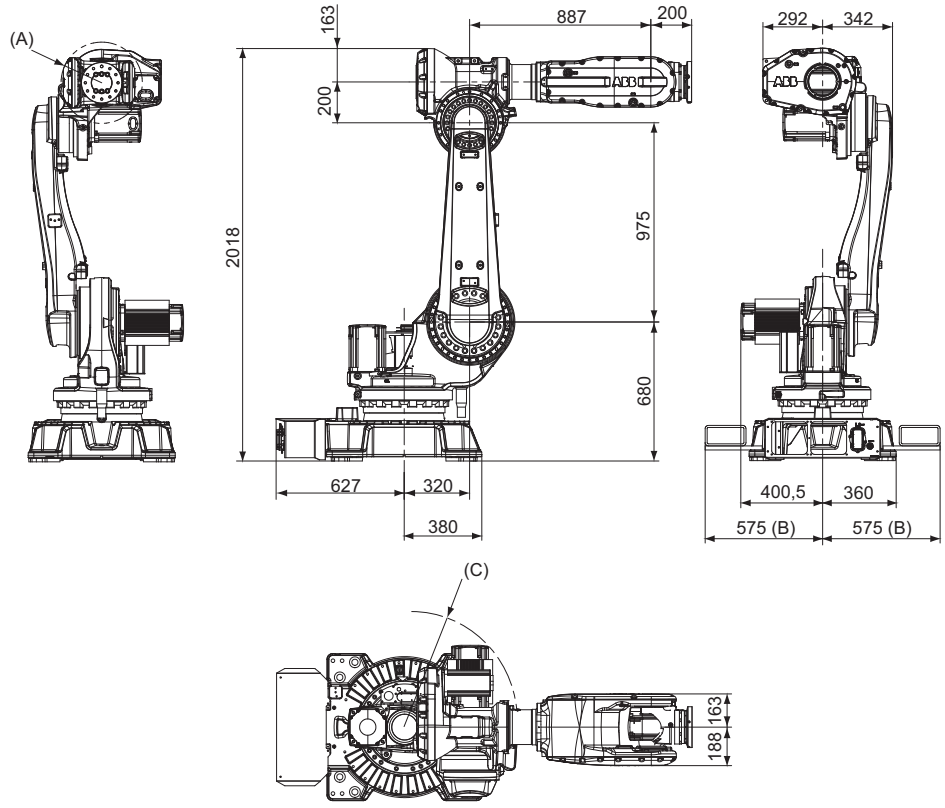
1.1.2 The robot
*Continued*

**Dimensions IRB 6620**

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| Pos | Description |
|---|---|
| A | R 199 mm for wrist rotation |
| B | Forklift width 1150mm |
| C | R 568 mm for Axis2 motor |

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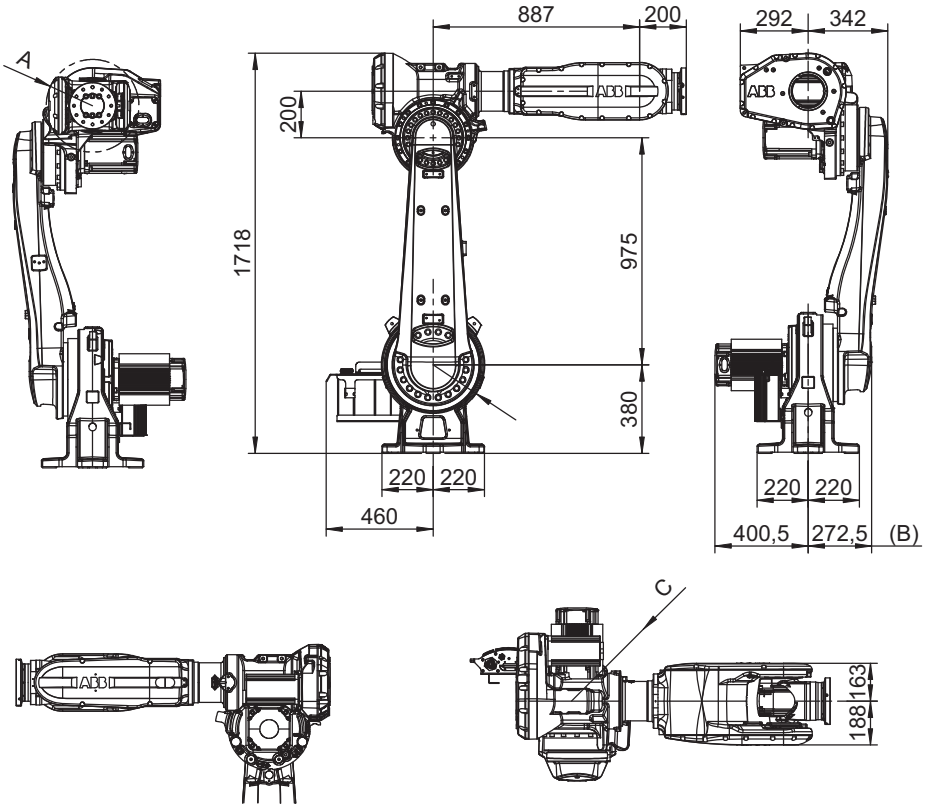
**Dimensions IRB 6620LX**

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| Pos | Description |
|---|---|
| A | R 199 mm for wrist motion |
| B | R 222 |
| C | R 427 for axis 3 |

## 1.2 Standards

### 1.2.1 Applicable standards

**Note**

The listed standards are valid at the time of the release of this document. Phased out or replaced standards are removed from the list when needed.

**Standards, EN ISO**

The product is designed in accordance with the requirements of:

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

i Only robots with protection Clean Room.
ii Only valid for arc welding robots. Replaces EN IEC 61000-6-4 for arc welding robots.

**European standards**

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

*Continues on next page*

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

**Other standards**

| Standard | Description |
|---|---|
| ANSI/RIA R15.06 | Safety requirements for industrial robots and robot systems |
| ANSI/UL 1740 | Safety standard for robots and robotic equipment |
| CAN/CSA Z 434-14 | Industrial robots and robot Systems - General safety requirements |

## 1.3 Installation

### 1.3.1 Introduction to installation

**General**

The IRB 6620 can be mounted on to the floor or inverted. Both mountings can be tilted to ±15º (around the Y-axis or X-axis, for more details see *Product manual - IRB 6620*).

The IRB 6620LX must be mounted on a linear axis 1. A tool for lifting and turning the manipulator IRB 6620LX, 3HAC035737-001, is available from Robotics Customer Service. See *Product specification - Linear Axis* for different mounting positions.

A tool or an end effector with max. weight of 150 kg including payload, can be mounted on the robot tool flange (axis 6), see *Load diagrams on page 37*.

**Note**

If two IRB 6620LX are mounted on the same linear axis, then they may influence each other causing vibrations. See *Product specification - Linear Axis* for additional information.

**Extra loads**

An extra load of 50 kg (for instance DressPack) can be mounted on to the upper arm. An extra load of 100 kg can be mounted on to the frame, for IRB 6620. See *Mounting of equipment on page 43*.

**Working range limitation**

The working range of axis 1 and axis 3 can be limited by mechanical stops as options. For axis 1 there are four stops and for axis 3 there is one stop. See *Equipment on page 126*, working range limit.

There is no working range limitation available for IRB 6620LX-150/1.9.

## 1.3.2 Operating requirements

### Protection standards

Standard Manipulator IP54, Foundry Plus IP67.

### Explosive environments

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

### Ambient temperature

| Description | Standard/Option | Temperature |
|---|---|---|
| Manipulator during operation | Standard | + 5°C [i] (41°F) to + 50°C (122°F) |
| For the controller | Standard/Option | See *Product specification - Controller IRC5 with FlexPendant* |
| For the spot welding cabinet | Standard | + 5°C (41°F) to + 45°C (113°F) |
| Complete robot during transportation and storage | Standard | - 25°C (- 13°F) to + 55°C (131°F) |
| For short periods (not exceeding 24 hours) | Standard | up to + 70°C (158°F) |

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

### Relative humidity

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

## 1.3.3 Mounting the manipulator

**Maximum Load**

For information regarding maximum load for IRB 6620LX, see *Product specification - Linear Axis*.

Maximum load in relation to the base coordinate system.

**Floor Mounted**

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|---|---|---|
| Force xy | ± 7.3 kN | ± 15.5 kN |
| Force z | 11.0 ±2.0 kN | 11.0 ±3.7 kN |
| Torque xy | ± 18.0 kNm | ± 37.2 kNm |
| Torque z | ± 4.4 kNm | ± 10.4 kNm |

**Suspended**

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|---|---|---|
| Force xy | ± 7.3 kN | ± 15.5 kN |
| Force z | - 11.0 ±2.0 kN | - 11.0 ±3.7 kN |
| Torque xy | ± 18.0 kNm | ± 37.2 kNm |
| Torque z | ± 4.4 kNm | ± 10.4 kNm |

**Tilted**

| Force | Endurance load (in operation) | Max. load (emergency stop) |
|---|---|---|
| Force xy | ± 7.3 kN | ± 15.5 kN |
| Force z | 11.0 ±2.0 kN | 11.0 ±3.7 kN |
| Torque xy | ± 18.0 kNm | ± 37.2 kNm |
| Torque z | ± 4.4 kNm | ± 10.4 kNm |

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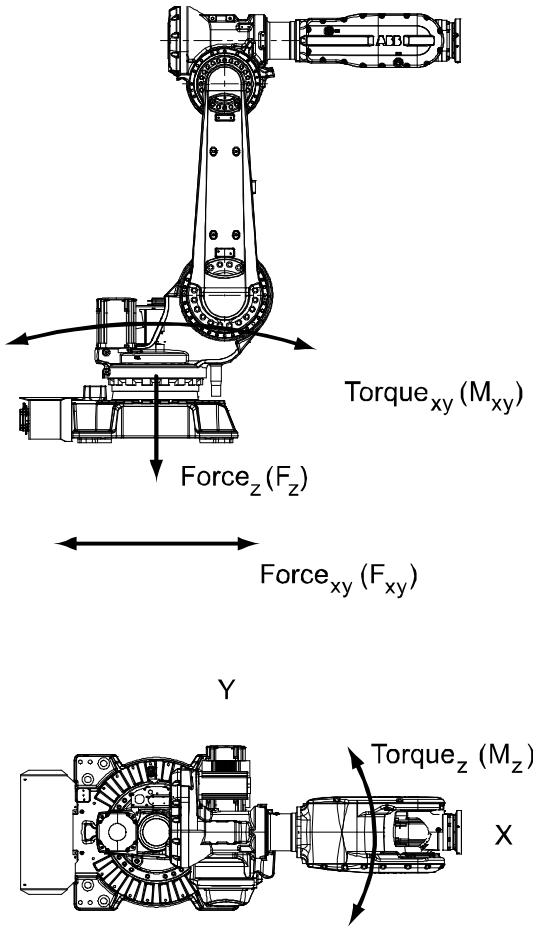


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**Note regarding $M_{xy}$ and $F_{xy}$**

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 ($F_{xy}$).

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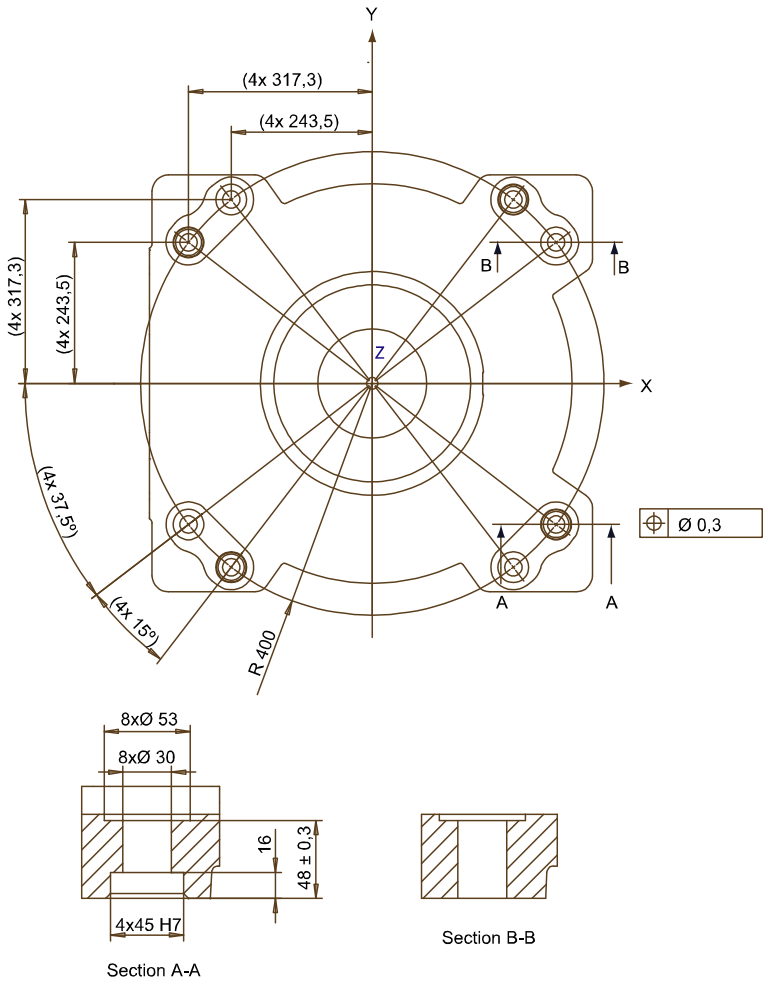
1.3.3 Mounting the manipulator
*Continued*

### Fastening holes robot base

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| | |
|---|---|
| Recommended screws for fastening the manipulator to the base | M24 x 100 8.8 with 4 mm flat washer |
| Torque value | 725 Nm |

**Note**

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

Regarding AbsAcc performance, the chosen guide holes according to Figure above and in the last Figure of this chapter.

### Mounting IRB 6620LX-150/1.9

| | |
|---|---|
| Recommended screws for fastening the manipulator to the Linear Axis | M24 x 80 or 90 8,8 (x6) |
| Tightening torque | 725 Nm |

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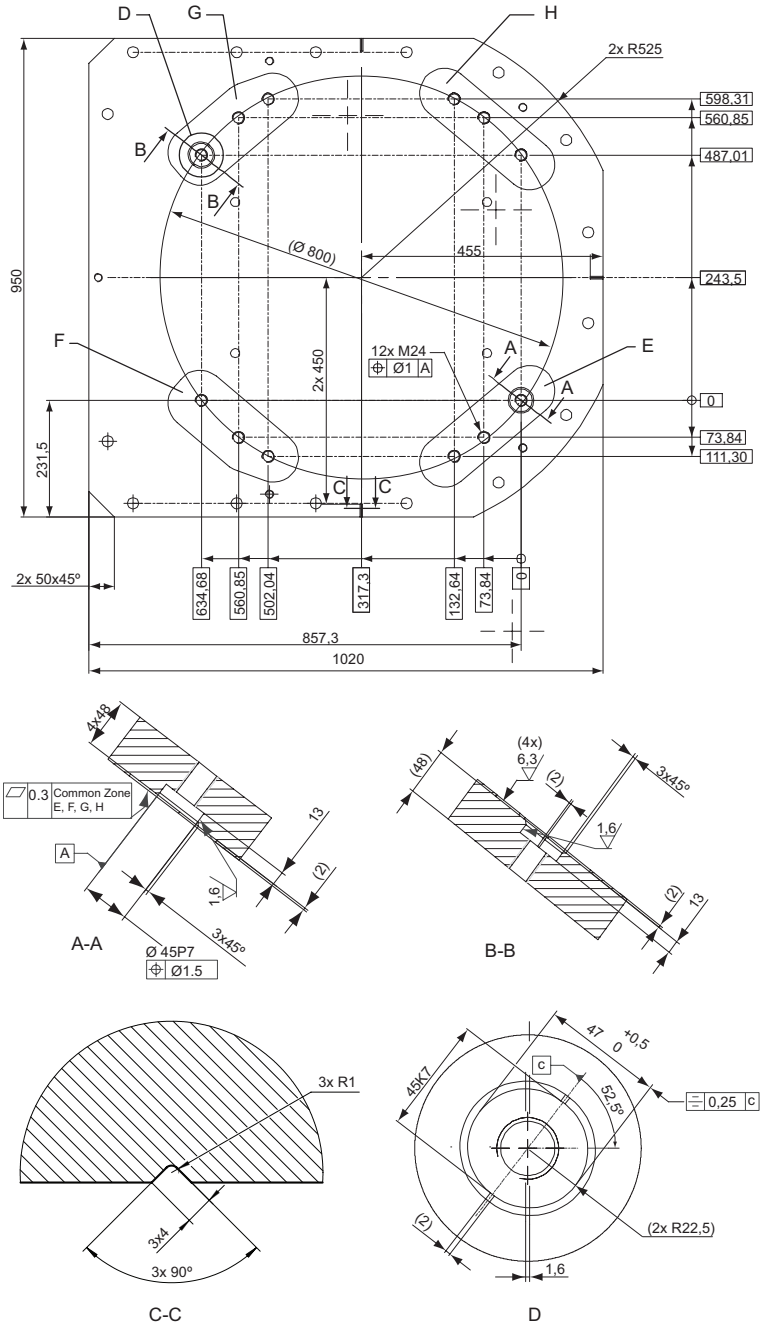
**Base plate drawing**

The following figure shows the option base plate (dimensions in mm).

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| | |
|---|---|
| E, F, G, H | Common tolerance zone (accuracy all over the base plate from one contact surface to the other) |

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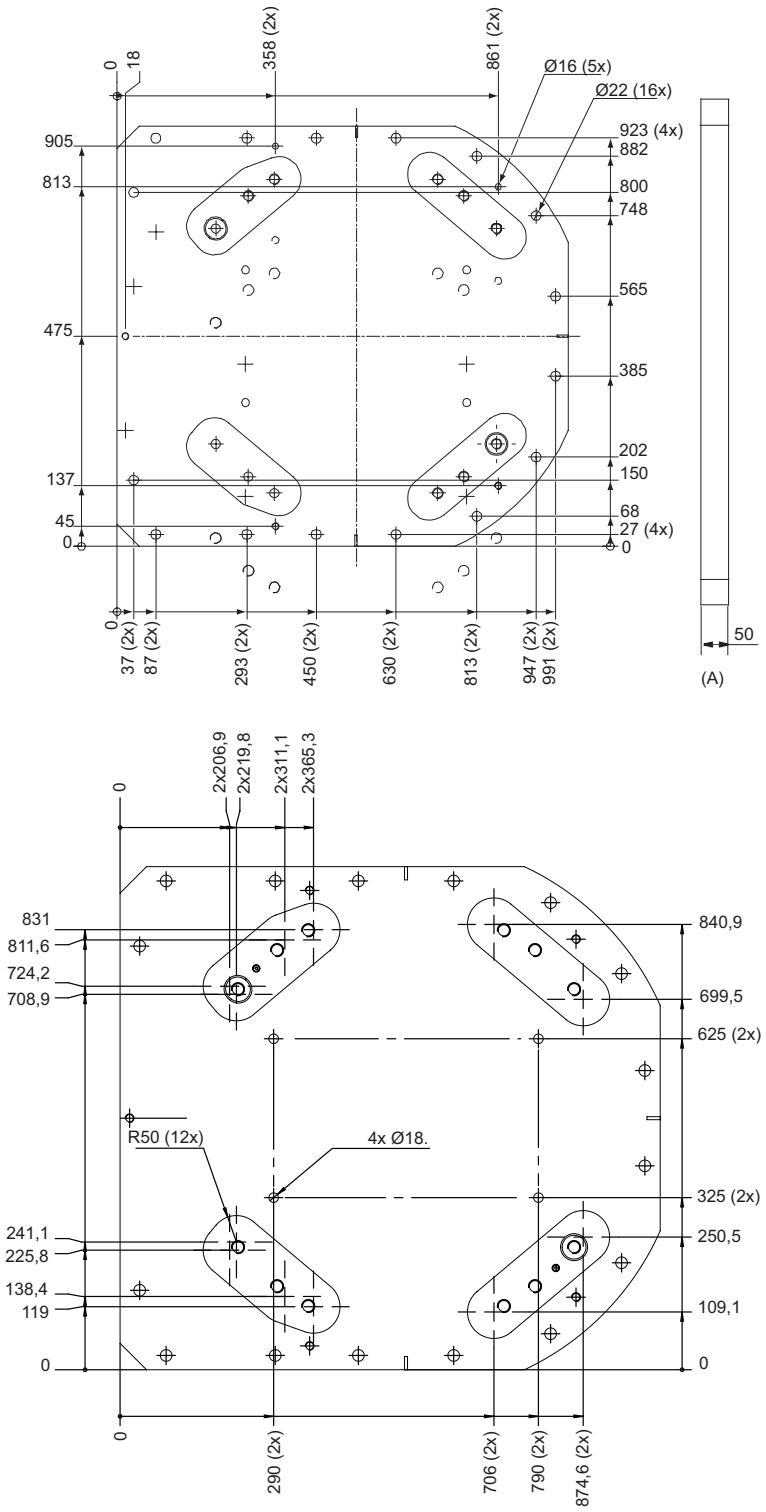
### 1.3.3 Mounting the manipulator

*Continued*

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| Pos | Description |
|---|---|
| A | Color: RAL 9005<br>Thickness: 80-100 µm |

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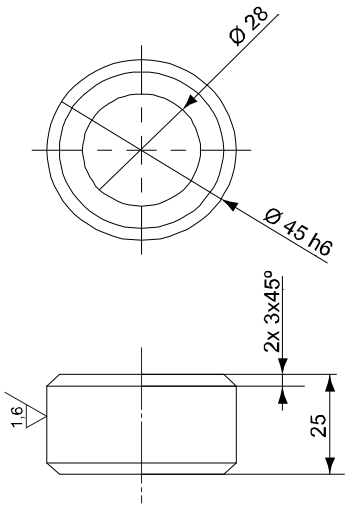


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| Pos | Description |
|---|---|
| A | Guide sleeve protected from corrosion |

## 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.<br>Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot.<br>For robots with RobotWare 5.04 or older, the calibration data is delivered in a file, calib.cfg, supplied with the robot at delivery. The file identifies the correct resolver/motor position corresponding to the robot home position. | Axis Calibration or Calibration Pendulum [i]<br>Levelmeter calibration (alternative method) |

*Continues on next page*

| Type of calibration | Description | Calibration method |
|---|---|---|
| Absolute accuracy calibration (optional) | Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for:<br>• Mechanical tolerances in the robot structure<br>• Deflection due to load<br>Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot.<br>Absolute accuracy calibration data is found on the SMB (serial measurement board) in the robot.<br>For robots with RobotWare 5.05 or older, 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.<br>A robot calibrated with Absolute accuracy has a sticker next to the identification plate of the robot.<br>To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure.<br>  <br>xx0400001197 | CalibWare |

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, Calibration Pendulum is used as default.

**Brief description of calibration methods**

Calibration Pendulum method

Calibration Pendulum is a standard calibration method for calibration of all ABB robots (except IRB 6400R, IRB 640, IRB 1400H, and IRB 4400S).

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 6620 and is the most accurate method for the standard calibration. It is the recommended method in order to achieve proper performance.

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1.4.1 Calibration methods
*Continued*

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.

CalibWare - Absolute Accuracy calibration

The CalibWare tool guides through the calibration process and calculates new compensation parameters. This is further detailed in the *Application manual - CalibWare Field*.

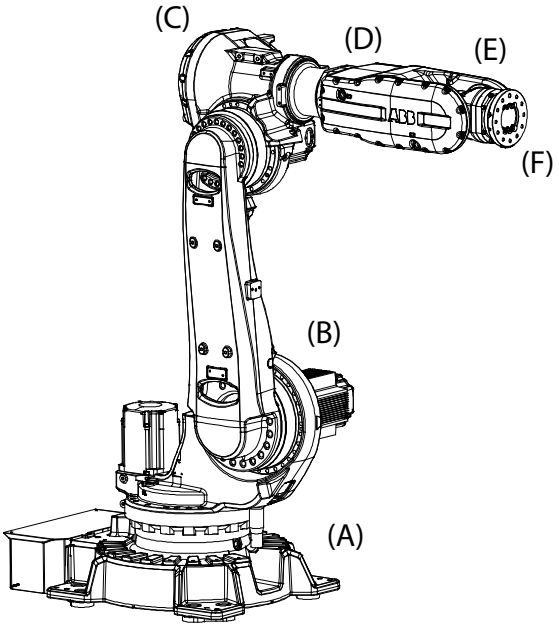
If a service operation is done to a robot with the option Absolute Accuracy, a new absolute accuracy calibration is required in order to establish full performance. For most cases after replacements that do not include taking apart the robot structure, standard calibration is sufficient.

## 1.4.2 Fine calibration with Calibration Pendulum

### General

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

To calibrate the IRB 6620LX together with the Linear Axis on site using the Calibration Pendulum, contact your local ABB organization. This should be done directly after the IRB 6620LX has been mounted on the Linear Axis, before programming is started.

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

### Calibration

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

## 1.4.3 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.

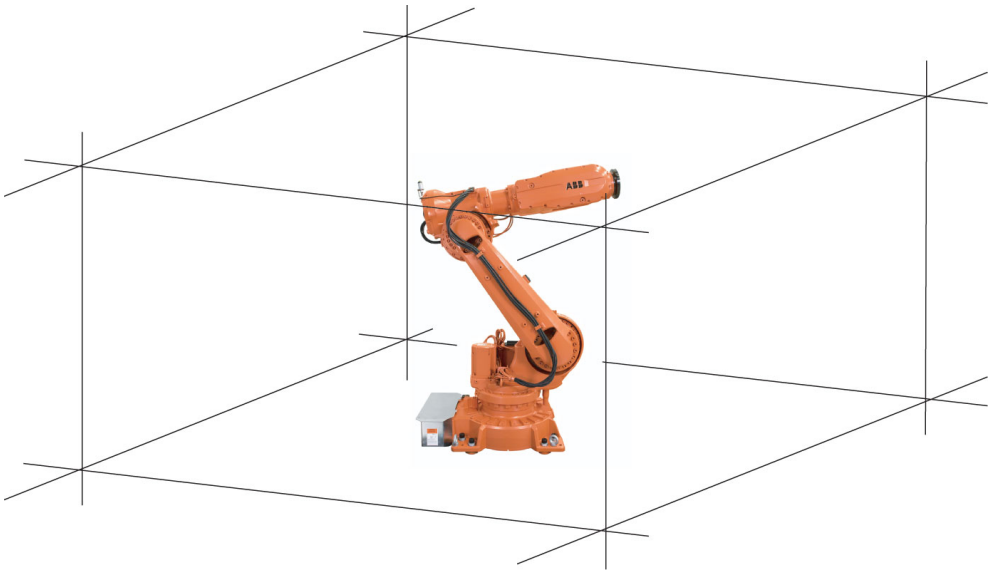
Here are some examples of when this accuracy is important:

- Exchangeability of robots
- Offline programming with non or minimum touch-up
- Online programming with accurate movement and reorientation of tool
- Accurate cell alignment for MultiMove coordinated motion
- Programming with accurate offset movement in relation to eg. vision system or offset programming
- Re-use of programs between applications

The option Absolute Accuracy is integrated in the controller algorithms and does not need external equipment or calculation.

**Note**

The performance data is applicable to the corresponding RobotWare version of the individual robot.



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### What is included

Every Absolute Accuracy robot is delivered with:

- compensation parameters saved on the robot's serial measurement board
- a birth certificate representing the Absolute Accuracy measurement protocol for the calibration and verification sequence.

*Continues on next page*

A robot with Absolute Accuracy calibration is marked on the manipulator.

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

**When is Absolute Accuracy being used**

Absolute Accuracy works on a robot target in Cartesian coordinates, not on the individual joints. Therefore, joint based movements (e.g. `MoveAbsJ`) will not be affected.

If the robot is inverted, the Absolute Accuracy calibration must be performed when the robot is inverted.

Absolute Accuracy active

Absolute Accuracy will be active in the following cases:

- Any motion function based on robtargets (e.g. `MoveL`) and ModPos on robtargets
- Reorientation jogging
- 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.

**MultiMove**

If the main robot in a MultiMove system has the Absolute Accuracy option, it opens up Absolute Accuracy capability for all the robots in the system. However, each robot needs to be calibrated individually.

**Note**

Note that this is the only RobotWare option that is relevant for an additional robot.

*Continues on next page*

1.4.3 Absolute Accuracy calibration
*Continued*

**Note**

It is possible to mix robots with and without the option Absolute Accuracy arbitrarily in a MultiMove system.

**Production data**

Typical production data regarding calibration are:

| Robot | Positioning accuracy (mm) | | |
|---|---|---|---|
| | Average | Max | % Within 1 mm |
| IRB 6620-150/2.2 | 0.5 | 0.95 | 100 |

**Note**

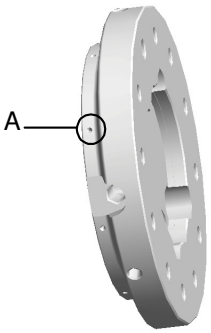
Absolute Accuracy is not available for IRB 6620LX.

## 1.4.4 Robot references

### General

The holes shown in Figures below are used for measuring the robot position when integrated in a production cell.

The holes are not available for Foundry Plus.

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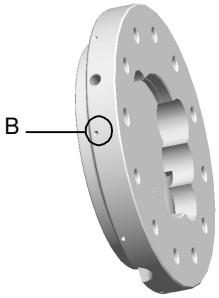


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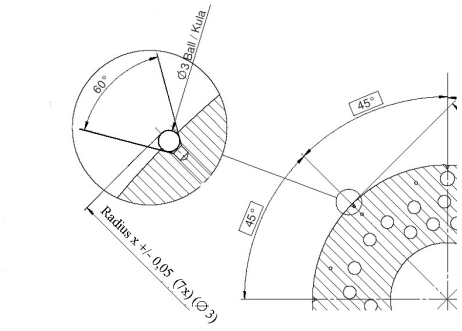


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| Robot | Radius X (mm) for references on tool flange | |
|---|---|---|
| | Standard | Insulated |
| IRB 6620 - 150/2.2<br>IRB 6620LX-150/1.9 | R=81,5 | R=101,5 |

## 1.5 Load diagrams

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

- motors
- gearboxes
- mechanical structure

**WARNING**

In the robot system is the service routine LoadIdentify available, which allows the user to make an automatic definition of the tool and load, to determine correct load parameters. Please see *Operating Manual - IRC5 with FlexPendant*, art. No. 3HAC16590-1, for detailed information.

**WARNING**

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

**General**

The load diagrams include a nominal payload inertia, $J_0$ of 15 $kgm^2$, and an extra load of 50 kg at the upper arm housing.

At different moment of inertia the load diagram will be changed. For robots that are allowed tilted, wall or inverted mounted, the load diagrams as given are valid and thus it is also possible to use RobotLoad within those tilt and axis limits.

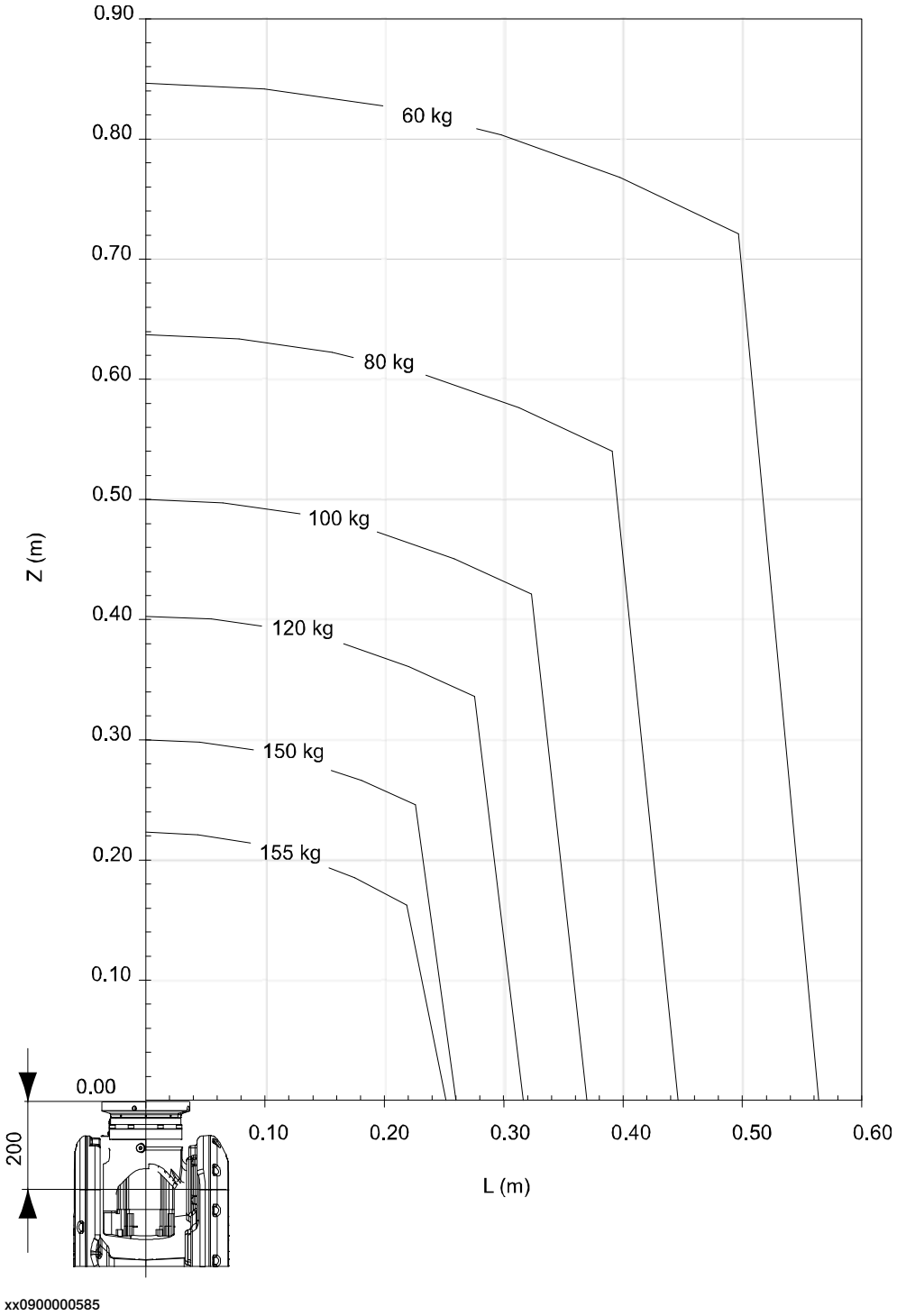
**Control of load case by "RobotLoad"**

To easily control a specific load case, use the calculation program ABB RobotLoad. Contact your local ABB organization for more information.

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

## 1.5.2 Load diagrams

**IRB 6620-150/2.2 and IRB 6620LX-150/1.9**

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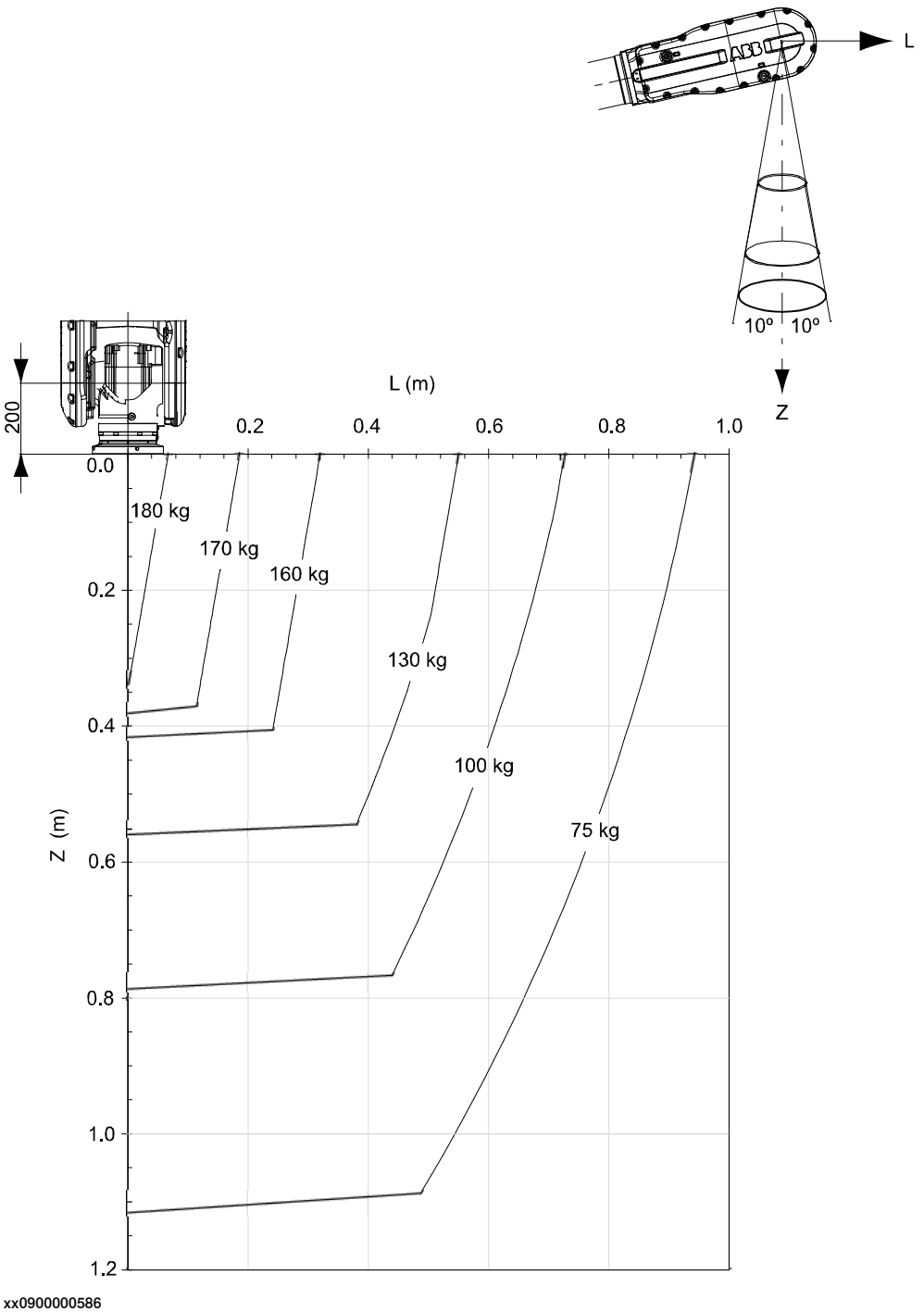
1.5.2 Load diagrams
*Continued*

**IRB 6620-150/2.2“ Vertical Wrist” (±10o)**

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For wrist down (0° deviation from the vertical line).

| | Without extra arm load | With 50kg arm load |
|---|---|---|
| Max load | 215kg | 180kg |
| $Z_{max}$ | 0.26m | 0.34m |
| $L_{max}$ | 0.088m | 0.066m |

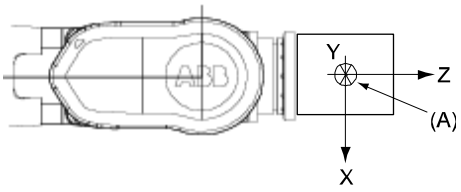
## 1.5.3 Maximum load and moment of inertia for full and limited axis 5 (center line down) movement

**Note**

Total load given as: Mass in kg, center of gravity (Z and L) in meter and moment of inertia (Jox, Joy, Joz) in $kgm^2$. $L = \sqrt{(X^2 + Y^2)}$.

### Full movement of axis 5

| Axis | Robot Type | Maximum moment of inertia |
|---|---|---|
| 5 | IRB 6620-150/2.2<br>IRB 6620LX-150/1.9 | $Ja5 = Load \times ((Z + 0{,}200)^2 + L^2) + max\ (J_{0x}, J_{0y}) \leq 138\ kgm^2$ |
| 6 | IRB 6620-150/2.2<br>IRB 6620LX-150/1.9 | $Ja6 = Load \times L^2 + J_{0Z} \leq 107\ kgm^2$ |

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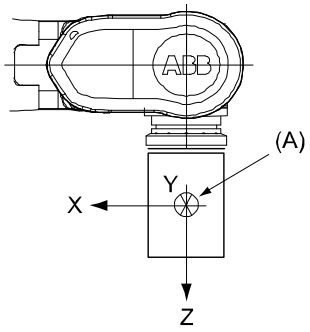
| Pos | Description |
|---|---|
| A | Center of gravity |

| | Description |
|---|---|
| Jox, Joy, Joz | Max. moment of inertia around the X, Y and Z axes at center of gravity. |

### Limited axis 5, center line down

| Axis | Robot type | Maximum moment of inertia |
|---|---|---|
| 5 | IRB 6620-150/2.2<br>IRB 6620LX-150/1.9 | $Ja5 = Load \times ((Z + 0{,}200)^2 + L^2) + max\ (J_{0x}, J_{0y}) \leq 138\ kgm^2$ |
| 6 | IRB 6620-150/2.2<br>IRB 6620LX-150/1.9 | $Ja6 = Load \times L^2 + J_{0Z} \leq 107$ kgm2 |

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

| Pos | Description |
|---|---|
| A | Center of gravity |

| | Description |
|---|---|
| Jox, Joy, Joz | Max. moment of inertia around the X, Y and Z axes at center of gravity. |

## 1.5.4 Wrist torque

### General

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

**Note**

Note! The 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. Also arm loads will influence the permitted load diagram. For finding the absolute limits of the load diagram, please use the ABB RobotLoad. Please contact your local ABB organization.

| Robot type | Max wrist torque axis 4 and 5 | Max wrist torque axis 6 | Max torque valid at load |
|---|---|---|---|
| IRB 6620 - 150/2.20<br>IRB 6620LX - 150/1.9 | 736 Nm | 383 Nm | 150 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 then to use RobotStudio.

### Maximum Cartesian design acceleration for nominal loads

| Robot type | E-stop<br>Max acceleration at nominal load COG [m/s$^2$] | Controlled Motion<br>Max acceleration at nominal load COG [m/s$^2$] |
|---|---|---|
| IRB 6620 - 150/2.2 | 48 | 28 |

**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 Mounting of equipment

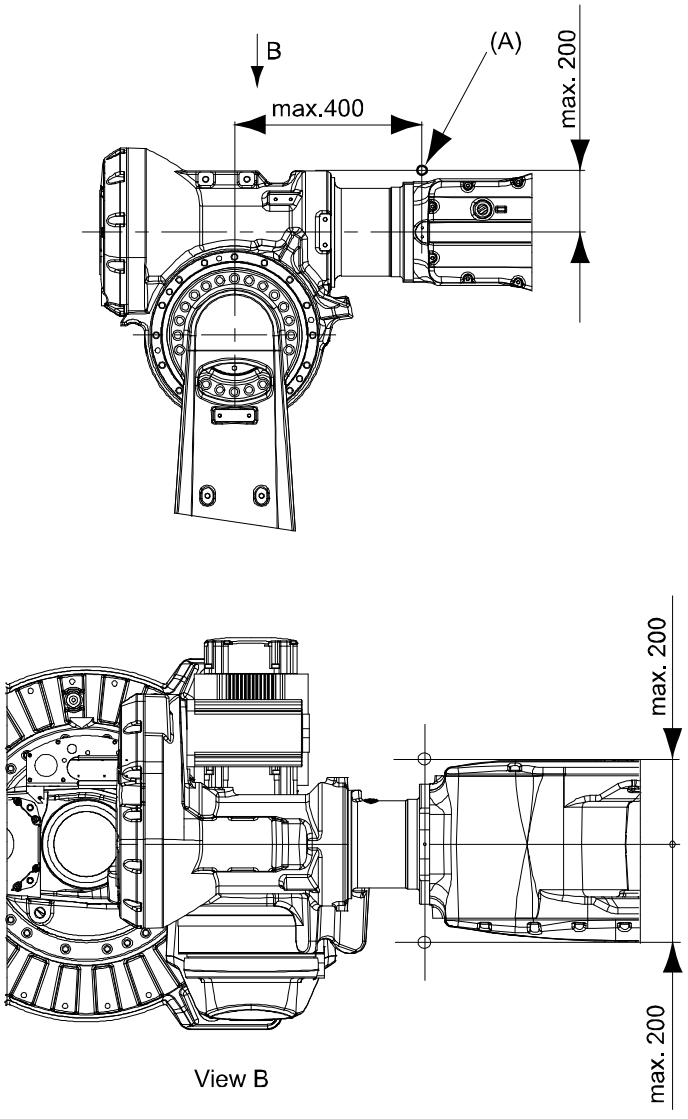
### 1.6.1 Mounting of equipment

**General**

Extra loads can be mounted on the upper arm housing and on the frame. Definitions of distances and mass are shown in Figure below. The robot is supplied with holes for mounting extra equipment (see Figure on next two pages).

**Upper arm**

Permitted extra load on to the upper arm ≤ 50 kg.




View B

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| Pos | Description |
|---|---|
| A | Center of gravity for permitted extra load ≤ 50 kg. |

*Continues on next page*

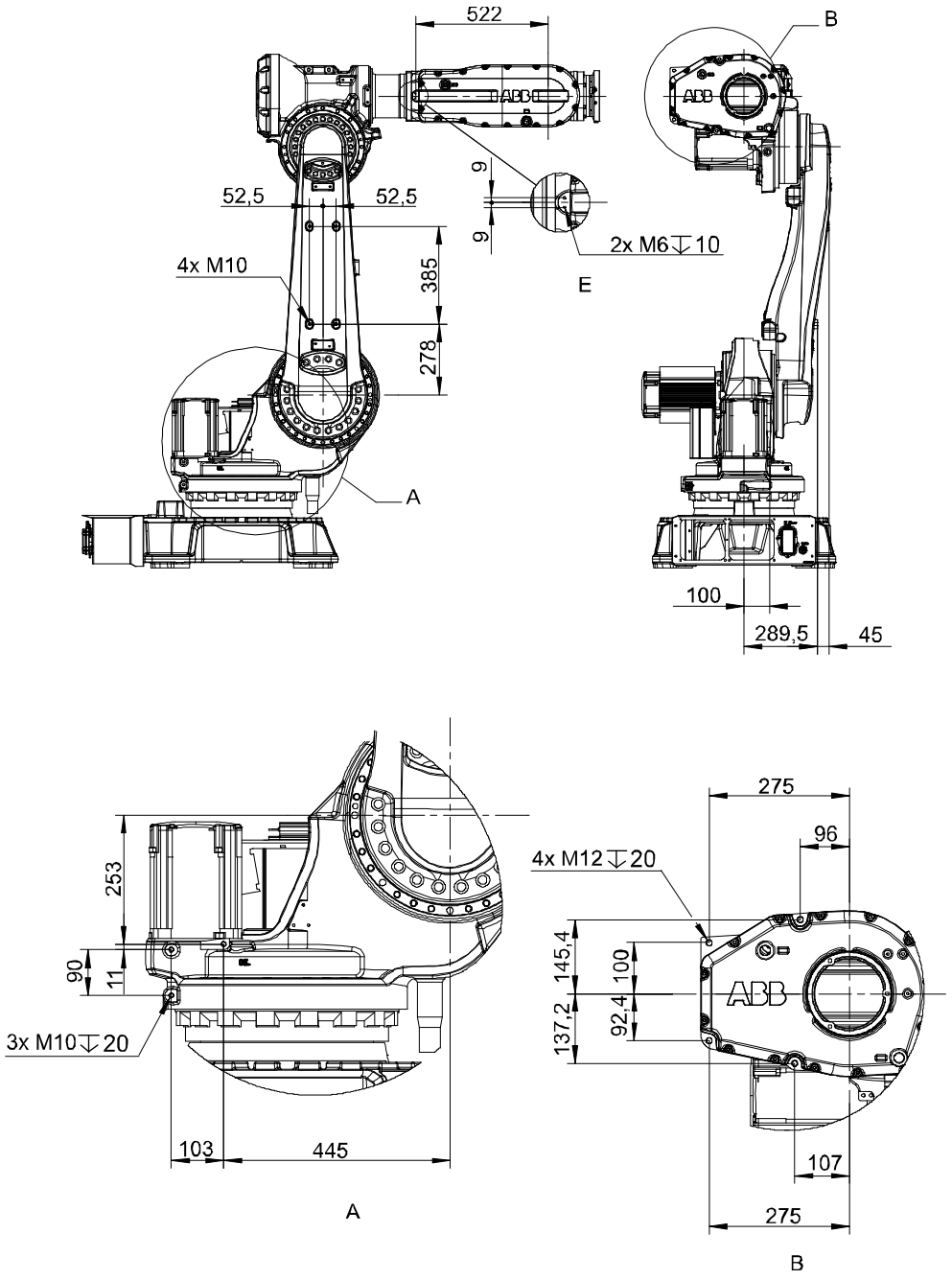
### 1.6.1 Mounting of equipment
*Continued*

**Frame**

Permitted extra load on the frame is 100kg.

> **Note**
>
> No extra loads allowed on frame for IRB 6620LX-150/1.9.

**Holes for mounting extra equipment**

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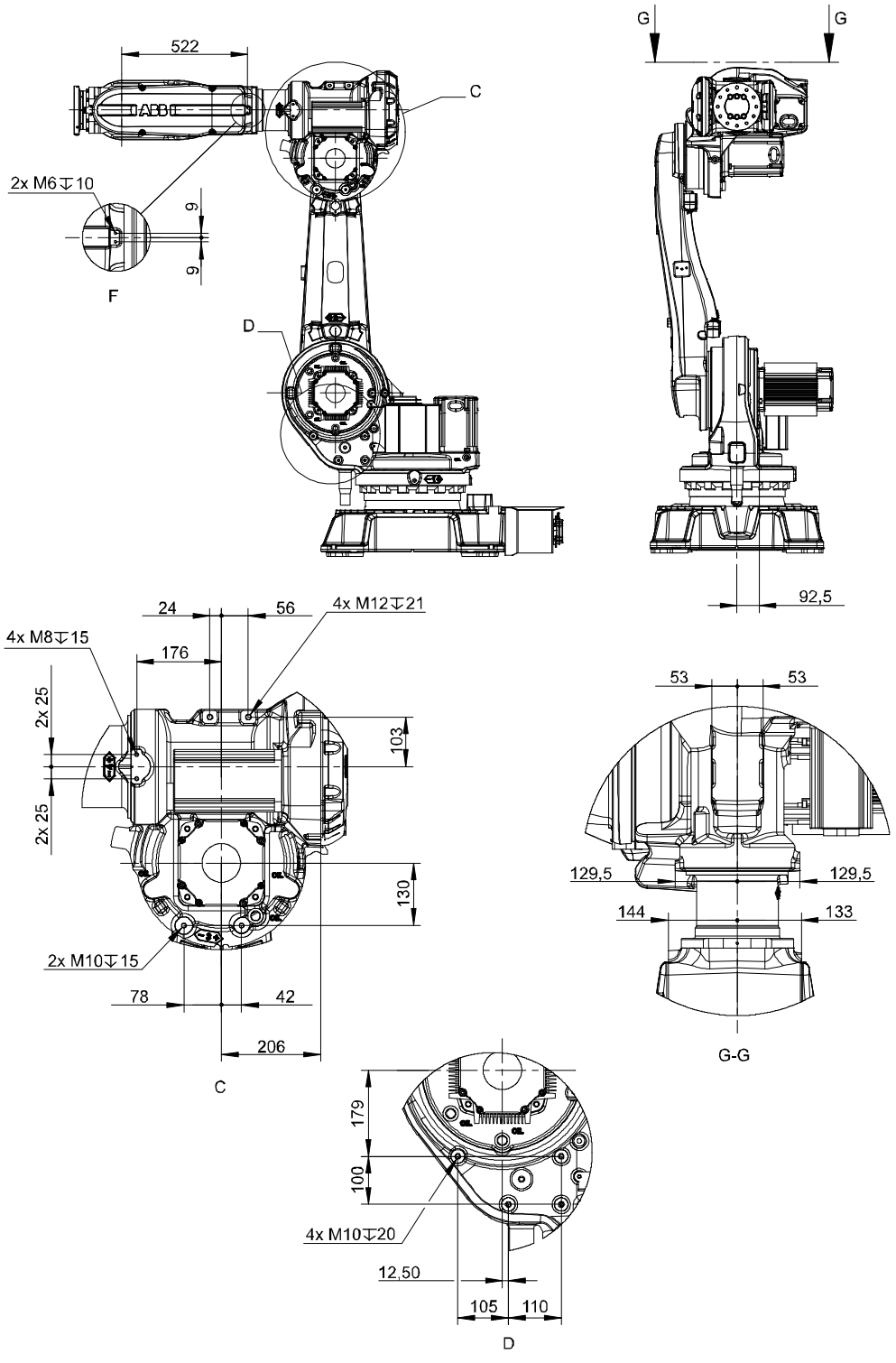


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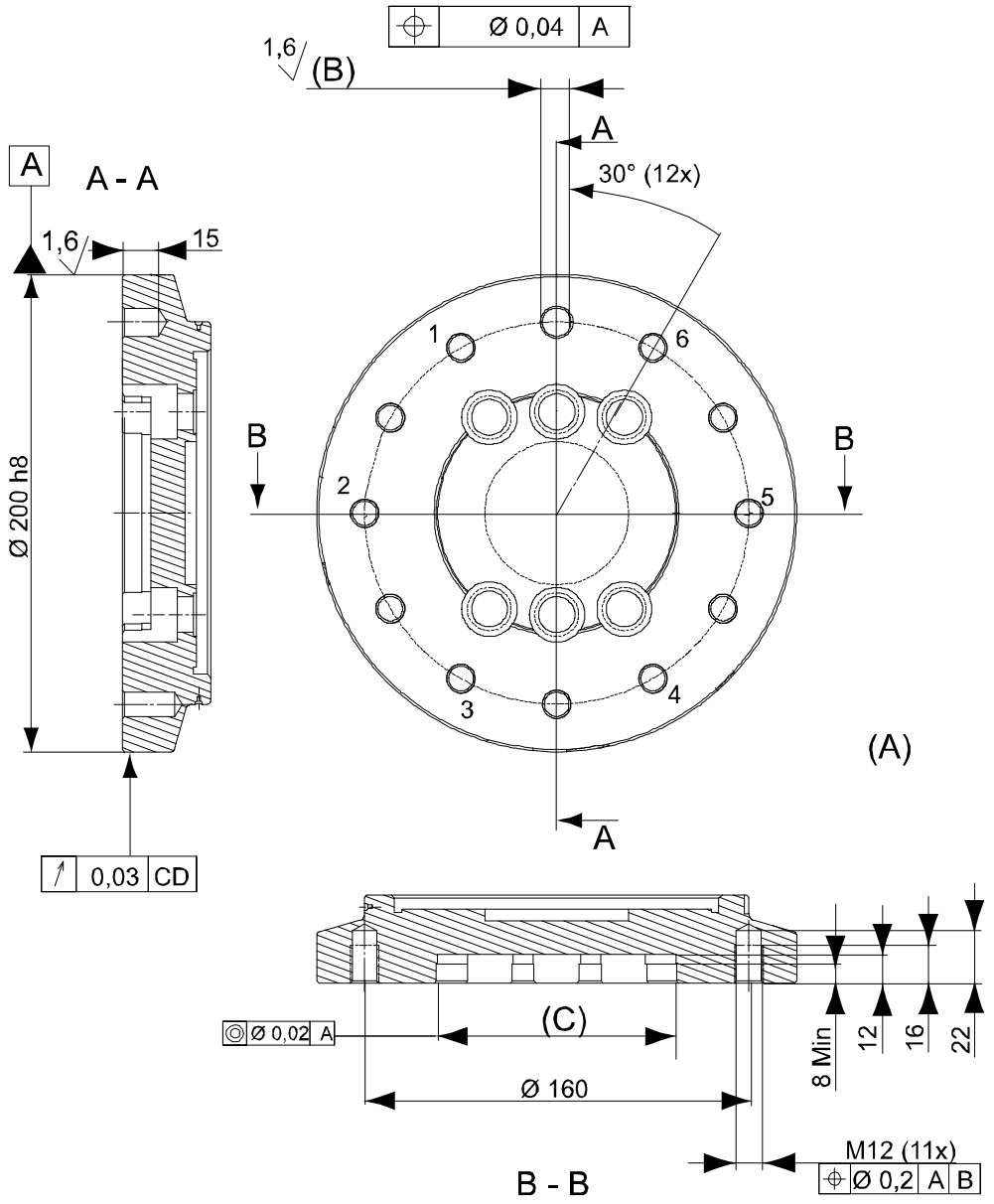
1.6.1 Mounting of equipment
*Continued*

**Robot Tool Flange**

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| Pos | Description |
|---|---|
| A | Minimum thread length for screws in M12-hole is 9 mm. |
| B | Ø 12 H7 Depth 15 |
| C | Ø 100 H7 Depth 8 min |

For fastening of Gripper tool flange to Robot tool flange every other one of the bolt holes for 6 bolts quality class 12.9 shall be used (see Figure above).

## 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.

## 1.8 Robot motion

### 1.8.1 Introduction to Robot Motion

**Type of Motion - IRB 6620-150/2.2**

| Axis | Type of motion | Range of movement |
|---|---|---|
| | | IRB 6620-150/2.2 |
| 1 | Rotation motion | + 170° to - 170° |
| 2 | Arm motion | + 140° to - 65° |
| 3 | Arm motion | + 70° to - 180° |
| 4 | Wrist motion | + 300° to - 300° |
| 5 | Bend motion | + 130° to - 130° (Limitations with DressPack) |
| 6 | Turn motion | + 300° to - 300° default<br>Max. ± 96 Revolutions[a] |

a. The default working range for axis 6 can be extended by changing 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).

| Axis | Type of motion | Range of movement |
|---|---|---|
| | | IRB 6620LX-150/1.9 |
| 1 | Travel length, Linear Axis | 1.8 to 33 m |
| 2 | Arm motion | + 125° to - 125° |
| 3 | Arm motion | + 70° to - 180° |
| 4 | Wrist motion | + 300° to - 300° |
| 5 | Bend motion | + 130° to - 130° |
| 6 | Turn motion | + 300° to - 300° default<br>Max. ± 96 Revolutions[a] |

a. The default working range for axis 6 can be extended by changing 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).

**Type of Motion - IRB 6620LX-150/1.9**

| Axis | Type of motion | Range of movement |
|---|---|---|
| | | IRB 6620LX-150/1.9 |
| 1 | Travel length, Linear Axis | 1.8 to 33 m |
| 2 | Arm motion | + 125° to - 125° |
| 3 | Arm motion | + 70° to - 180° |
| 4 | Wrist motion | + 300° to - 300° |
| 5 | Bend motion | + 130° to - 130° |

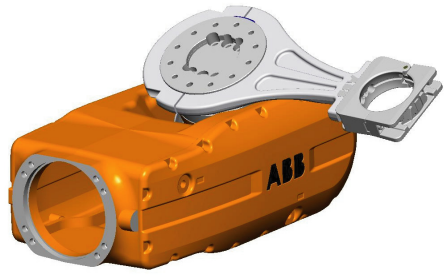
*Continues on next page*

| Axis | Type of motion | Range of movement |
|---|---|---|
| | | IRB 6620LX-150/1.9 |
| 6 | Turn motion | + 300° to - 300° default<br>Max. ± 96 Revolutions [i] |

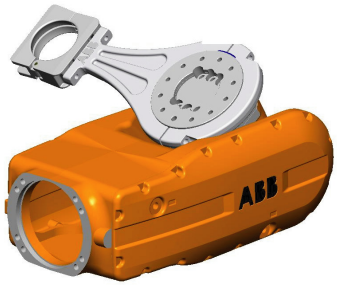
[i] The default working range for axis 6 can be extended by changing parameter values in the software. Option 610-1 “Independent axis” can be used for resetting the revolution counter after the axis has been rotated (no need for “rewinding” the axis).

### Limitations Axis5 with DressPack Holder

Due to the DressPack holder at Axis6 there are the following limitations for Axis5 movement when DressPack Upper arm is used. See Figure below.




Max. Axis 5 movement:
from -118° to +118° (A)




Max. Axis 5 movement:
from -123° to +123° (A)


Max. Axis 5 movement:
from -125° to + 60°

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| Pos | Description |
|---|---|
| A | Different limitations for the DressPack Holder are due to the asymmetric fork of the robot wrist |

### IRB6620-150/2.2

| Robot type | Handling capacity (kg) | Reach (m) |
|---|---|---|
| IRB 6620-150/2.2 | 150 | 2.2 |

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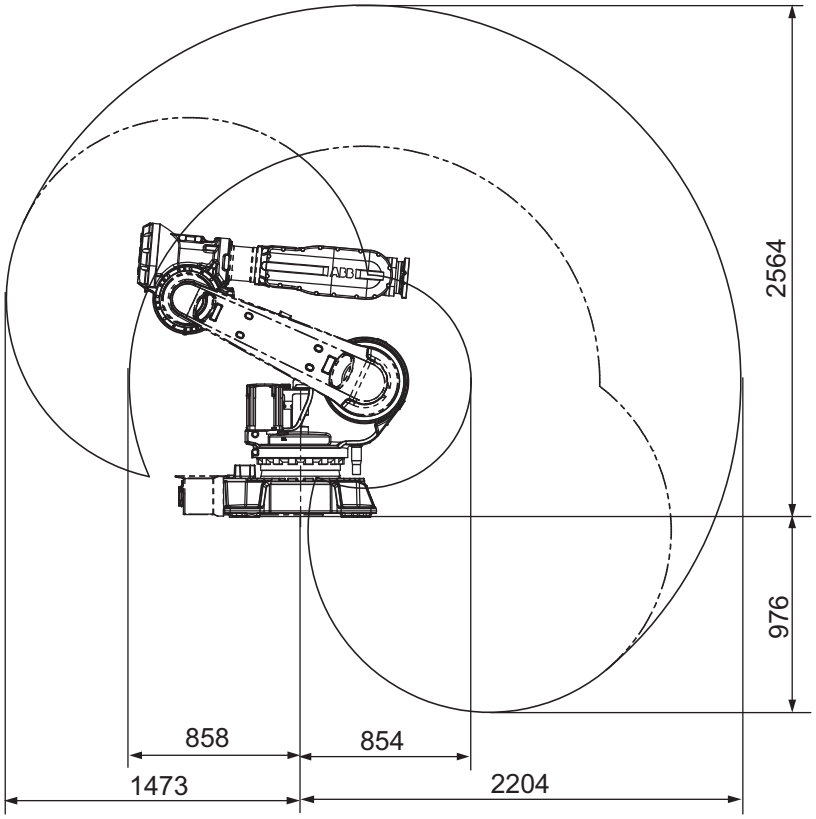
1.8.1 Introduction to Robot Motion
*Continued*

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**IRB6620LX-150/1.9**

| Robot Type | Handling capacity (kg) | Reach (m) |
|---|---|---|
| IRB 6620LX-150/1.9 | 150 | 2.2 |

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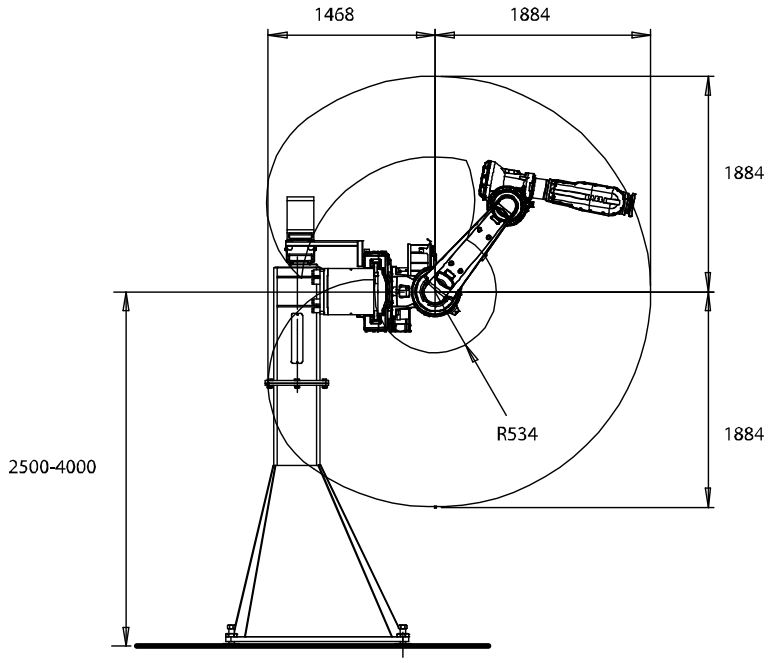


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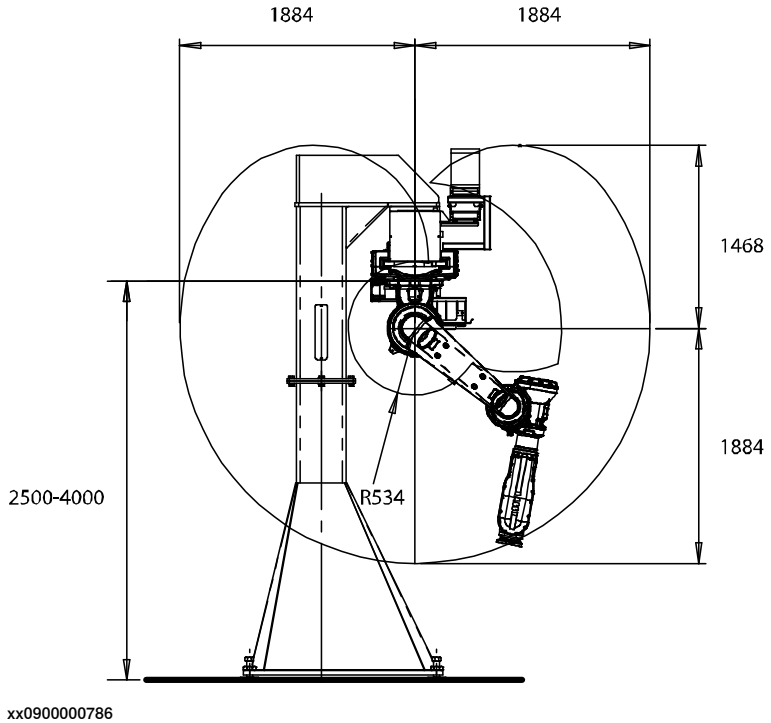


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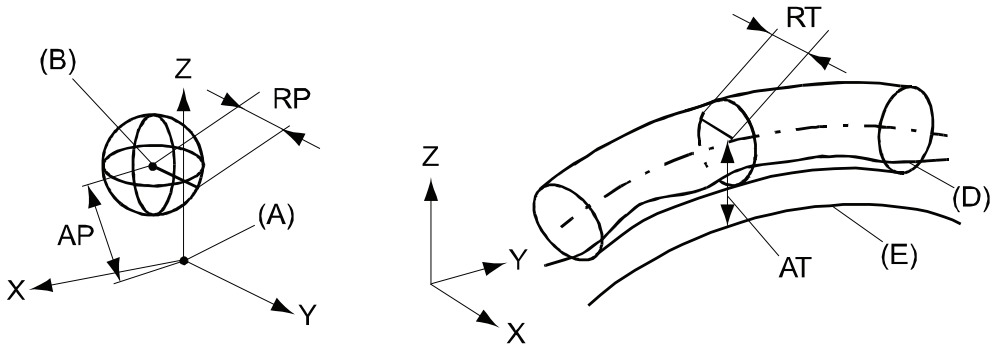
## 1.8.2 Performance according to ISO 9283

**General**

At rated maximum load, maximum offset and 1.6 m/s velocity on the inclined ISO test plane, 1m cube with all six axes in motion. Values in the table below are the average result of measurements on a small number of robots. The result may differ depending on where in the working range the robot is positioning, velocity, arm configuration, from which direction the position is approached, the load direction of the arm system. Backlashes in gearboxes also affect the result.

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

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| Pos | Description | Pos | Description |
|---|---|---|---|
| A | Programmed position | E | Programmed path |
| B | Mean position at program execution | D | Actual path at program execution |
| AP | Mean distance from programmed position | AT | Max deviation from E to average path |
| RP | Tolerance of position B at repeated positioning | RT | Tolerance of the path at repeated program execution |

| Description | Performance | |
|---|---|---|
| | IRB 6620-150/2.2 | IRB 6620LX-150/1.9 |
| Pose accuracy, AP[a] (mm) | 0.12 | 0.04 |
| Pose repeatability, RP (mm) | 0.03 | 0.05 |
| Pose stabilization time, PSt (s) | 0.08 | 0.15 |
| Path accuracy, AT (mm) | 3.03 | 3.89 |
| Path repeatability, RT(mm) | 0.62 | 0.77 |

Performance may differ slightly depending on hardware configuration. The data is measured with a side mounted manipulator, linear axis height 2.5 m and a leg distance of 6 m. The ISO-cube running is done in the middle between legs.

*Continues on next page*

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.

**Note**

Performance values for IRB 6620LX are not all valid to be used as indicators for double carriage systems.

## 1.8.3 Velocity

**Maximum axis speeds**

| Robot Type | Axis 1 | Axis 2 | Axis 3 | Axis 4 | Axis 5 | Axis 6 |
|---|---|---|---|---|---|---|
| IRB 6620-150/2.2 | 100°/s | 90°/s | 90°/s | 150°/s | 120°/s | 190°/s |
| IRB 6620LX-150/1.9 | [a] | 90°/s | 90°/s | 150°/s | 120°/s | 190°/s |

a. Travel speed for Linear Axis, 3.3 m/s

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

**Axis Resolutions**

0.001° to 0.005°.

## 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*).

## 1.9 Servo gun

### 1.9.1 Introduction to Servo Gun

**General**

Not valid for IRB 6620LX-150/1.9

The robot can be supplied with hardware and software for control of the following configurations:

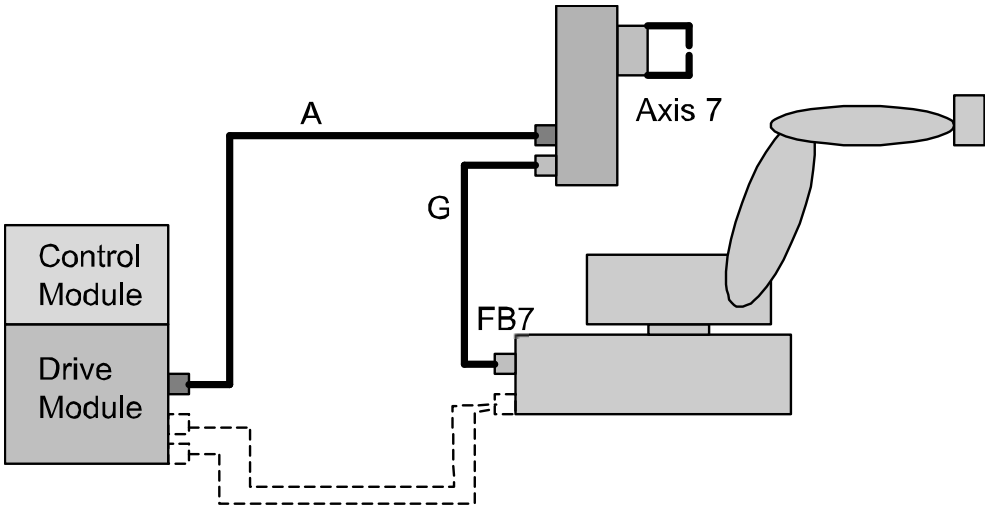
- Stationary Gun
- Robot Gun
- Robot Gun and Track Motion
- Track motion

The specific parts related to the servo motor control for electrical welding guns and for track motion configurations are shown in the conceptual pictures below. The major parts and required options are also stated in the configurations lists below each picture.

The cables for control of the basic robot are shown in the pictures with dotted lines.

## 1.9.2 Stationary Gun

### General

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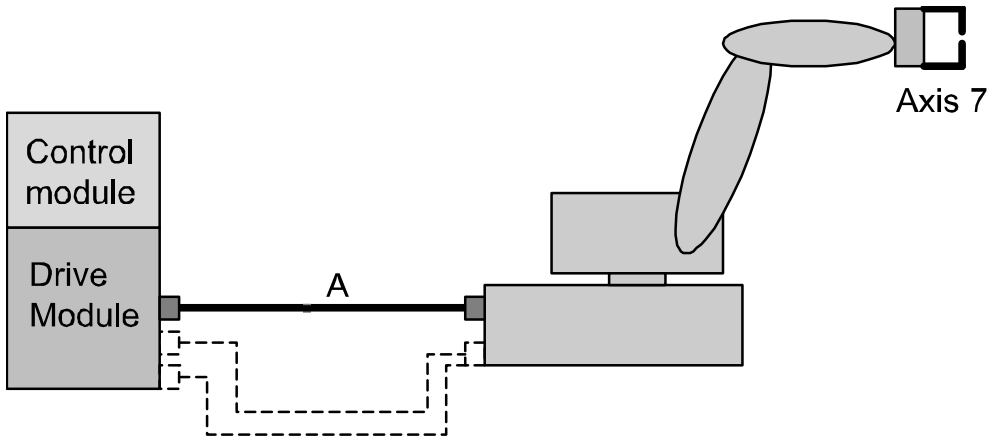
### Option

Options according to the table below are required to complete the delivery. For further details on each option see corresponding Product specification.

| Option | Description | Product specification |
|---|---|---|
| 785-5 | Stationary gun.This option includes:<br>Cable G (7 m length) for resolver signals from robot base (FB7) to stationary gun/axis 7. | |
| 770-4 | First additional drive. Drive unit for 7th axis with corresponding cables assembled inside Drive Module. | Controller IRC5 with FlexPendant |
| 786-1,-2,-3,-4 | Connection to first drive.<br>Cable A (7-30 m) between Drive Module and stationary gun/axis 7 for servo drive power. | |
| 635-3, -4 or -5 | Spot Servo, Spot Servo Multiple Guns or Spot Servo Equalizing. | Controller software IRC5 |

## 1.9.3 Robot Gun

### General

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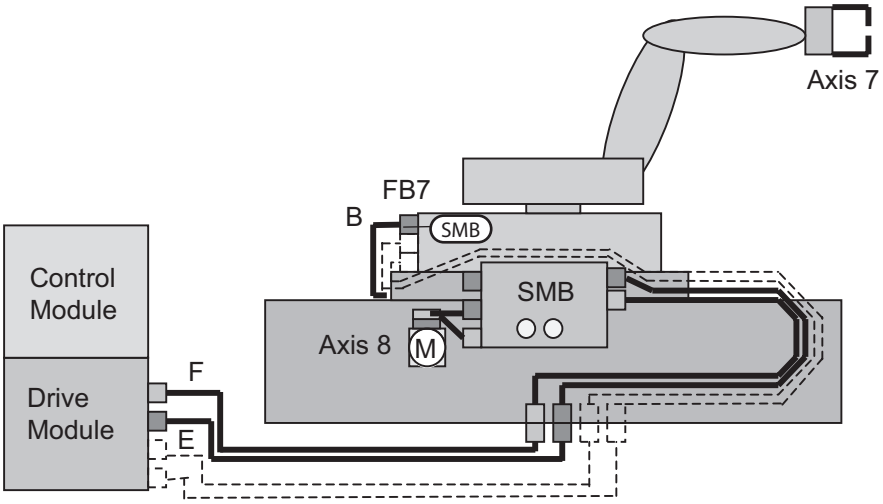
### Option

Options according to table below are required to complete the delivery. For further details on each option see corresponding Product specification.

| Option | Description | Product specification |
|---|---|---|
| 785-1 | Robot gun. This option includes:<br>Cables within manipulator for servo power signals (servo gun/axis 7). | |
| 770-4 | First additional drive. Drive unit for 7th axis with corresponding cables assembled inside Drive Module. | Controller IRC5 with FlexPendant |
| 786-1,-2,-3,-4 | Connection to first drive.<br>Cable A (7-30 m) between Drive Module and robot base for servo drive power. | |
| 635-3, -4 or -5 | Spot Servo, Spot Servo Multiple Guns or Spot Servo Equalizing. | Controller software IRC5 |

## 1.9.4 Robot Gun and Track Motion

### General

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### Option

Options according to table below are required to complete the delivery. For further details on each option see corresponding Product specification.

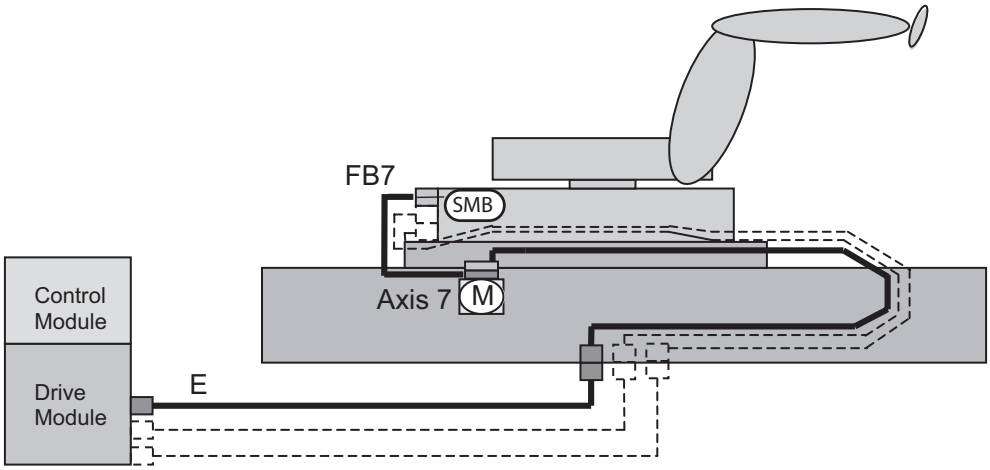
| Option | Description | Product specification |
|---|---|---|
| 785-1 + 1002-2 [i] | Robot Gun + Track Motion. This option includes:<br>Cables within manipulator for servo power signals (servo gun/axis 7). | Track motion IRBT6004 + IRB 6620 |
| Track motion delivery includes | Serial measurement box (SMB2, Split box) for distribution of servo power to axis 8.<br>The box is placed on the track motion.<br>Cables from serial measurement box to track motion.<br>Cable B for servo power (1,5 m length).Connection to first and second drive.<br>Cable E and F (7-22 m) between Drive Module and serial measurement box for dual servo drive power/resolver signals. | Track motion IRBT6004 |
| 907-1 | First additional drive. Drive unit for 7th axis with corresponding cables assembled inside Drive Module. | Controller IRC5 with FlexPendant |
| 907-1 | Second additional drive. Drive unit for 8th axis with corresponding cables assembled inside Drive Module. | Controller IRC5 with FlexPendant |
| 635-3, -4 or -5 | Spot Servo, Spot Servo Multiple Guns or Spot Servo Equalizing. | Controller software IRC5 |
| 864-1 | Resolver connection, axis 7, on base (FB7). | |

[i] To specify robot on track equipped with servo gun. Option 1002-2 from specification form for Track Motion.

## 1.9.5 Track Motion IRBT 6004

### General

The robot can be supplied with a Track Motion, see Product specification - IRBT6004. For configuration and specification of hardware see Figure below.

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**Note**

General. The robot can be combined with a Track Motion, for further details see Product specification - IRBT6004/IRBT7004.

### Options

Options according to table below are required to complete the delivery. For further details on each option see corresponding Product specification.

| Option | Description | Product specification |
|---|---|---|
| Track motion delivery includes | Serial measurement (SMB) in manipulator is used, together with option 864-1, FB7 for signals to axis 7/Track motion.<br>Cable E for between Drive Module and track motion servo for drive power. | Track motion IRBT6004/IRBT7004 |
| 907-1 | First additional drive. Drive unit for 7th axis with corresponding cables assembled inside Drive Module. | |
| 864-1 | Resolver connection, axis 7, on base (FB7). | |

# 2 DressPack and SpotPack

## 2.1 Introduction

### 2.1.1 General

**DressPack**

Includes options for Upper arm, Lower arm and Floor posC, and D, see Figure below. These are described separately below but are designed as a complete package for various applications.

The DressPack for the floor contains customer signals.

The DressPack for upper and lower arm contains process cable packages including signals, process media (water and/or air) and power feeding (for Spot Welding power) for customer use.

Necessary supports and brackets are also included.

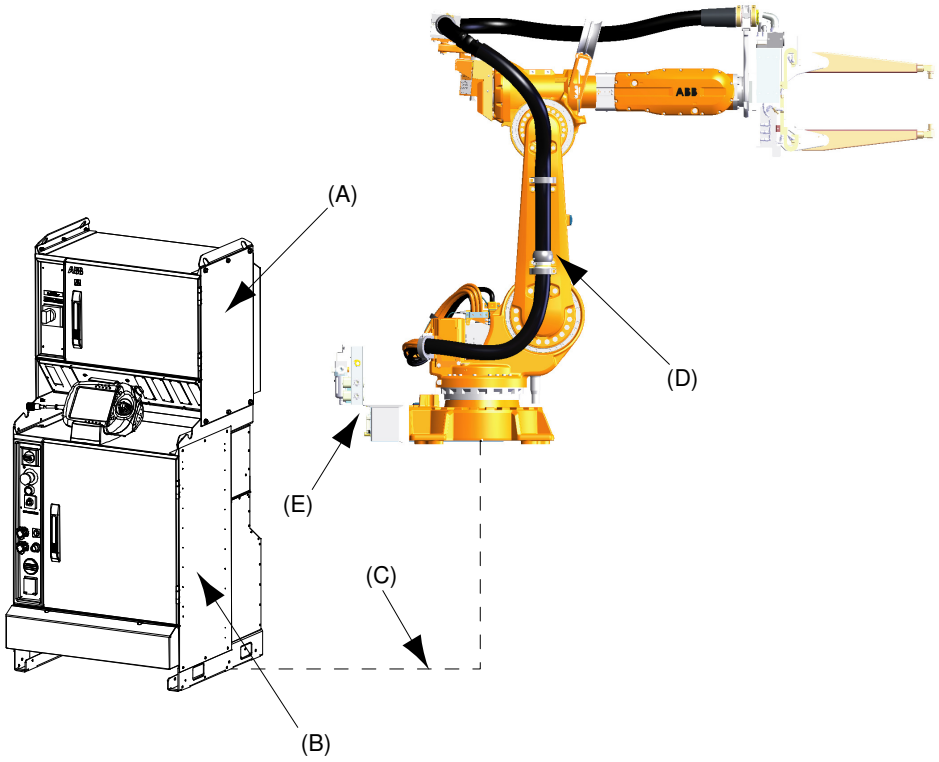
The routing of the process cable package on the robot is available in different configurations.

*Continues on next page*

2.1.1 General
*Continued*

**Spotpack**

The package supplies the transformer gun/gripper with necessary media, such as compressed air, cooling water and electrical power. It includes above described DressPack + Spot Welding cabinet, Water And Air unit posA and E (if included) and SoftWare, see Figure below.

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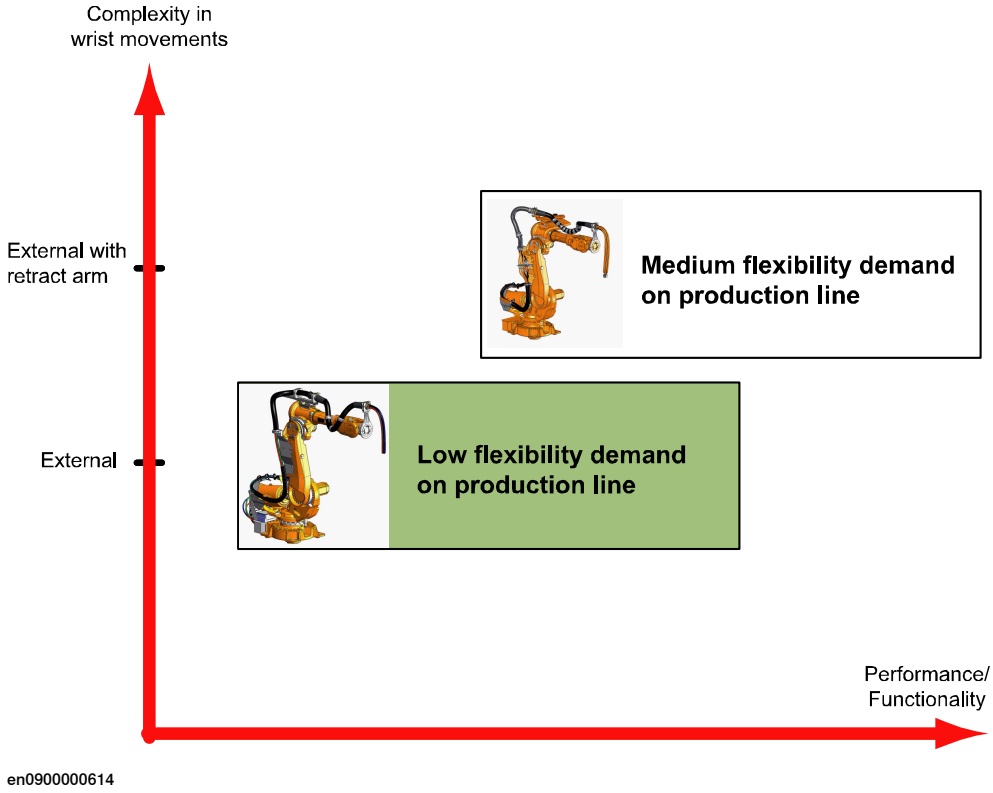
| Pos | Description |
|---|---|
| A | SpotPack, Spot Welding cabinet |
| B | Robot controller, (including 7th axis drive for servo gun) |
| C | DressPack, Floor |
| D | DressPack, Routing base to Axis 6 |
| E | SpotPack, Water and Air unit |

## 2.1.2 Product range

### DressPack solutions for different user's needs

The robot can be equipped with the well integrated cable and hose packages in the SpotPack or DressPack options. The DressPack is designed in close conjunction with the development of the manipulator and is therefore well synchronized with the robot.

As there is a big span between different user's need of flexibility, depending of the complexity of the operation/wrist movements, there are three major levels of dress pack solutions available, see Figure below.




### External with retract arm

This type of dress pack is recommended for production where there are limited complexity in wrist movements. This normally occurs when there are not to many different products running in the same production cell.

Available option is 781-1 for spot welding.

### External

This type of dress pack is recommended where there are less complexity in wrist movements. This normally occurs when there are not many different products running in the production cell. This package requires more individual adjustment to optimize towards robot program at set up.

Available options are 780-3 for material handling and 781-1 for spot welding.

## 2.1.3 Limitations of robot movements

**General**

When using DressPack options on the upper arm the robot movements will be limited. The position of bracket installed on axis 6 must be taken in consideration when optimizing the possible robot movements.

- The axis 5 working range is limited to +/- 110 degrees due to the axis 6 bracket attachment (when applicable).
- In bending backwards positions there are limitations due to interference with manipulator or Water and Air unit (if such is mounted).

**Note**

For more detail information please contact Serop Product support/SEROP/ABB.

E-mail address: serop.product_support@se.abb.com

## 2.1.4 Impact on dress pack lifetime

**General**

There are some robot movements/positions that shall be avoided in the robot production program. This will improve the lifetime significantly of external upper arm dress pack and wear parts e.g. protection hose, hose reinforcement and protective sleeves.

- The axis 5 movement is not allowed to press the DressPack against the robot upper arm.
- Combined rotation of the wrist axes must be limited so that the DressPack is not wrapped hard against the upper arm.

See the Product Manual for more detailed information and recommended set-up adjustments.

## 2.1.5 Chapter Structure

### General

The Chapters for SpotPack and DressPack are structured in the following way.

The SpotPack and DressPack can be delivered in three versions developed for two different applications. Each type is described under separate chapters.

| Chapter | Option | Description |
|---|---|---|
| 2.2 | DressPack | DressPack includes general description DressPack common information. |

### Material Handling application / DressPack

| Chapter | Option | Description |
|---|---|---|
| 2.3 | Type H | DressPack for Material Handling. |

### Spot Welding aplication / SpotPack and DressPack

| Chapter | Option | Description |
|---|---|---|
| 2.4 | Type S/Se | SpotPack for electrical servo driven or pneumatic transformer guns carried by the robot manipulator. |
| 2.5 | Type HS/HSe | SpotPack for handling the part against electrical servo driven or pneumatic transformer guns stationary mounted. |
| 2.6 | Spot Welding Cabinet | General description of SpotWelding cabinet with common information. |
| 2.7 | Water and Air unit | General description of Water and Air unit with common information. |

### Connector Kits

| Chapter | Option | Description |
|---|---|---|
| 2.8 | Connector kits | General description of Connector Kits for SpotPack and DressPack |

## 2.2 DressPack

### 2.2.1 Introduction to DressPack

**Available DressPack configurations for Material Handling**

The table below shows the different DressPack configurations available for Material Handling.

| | Lower(/upper) arm | Upper arm |
|---|---|---|
| Option 778-1, Material Handling | Option 798-1, Base to axis 3 | Option 780-3, Axis 3 to axis 6 External routing |
| | Option 781-1, Base to axis 6 | |

**Available DressPack configurations for Spot Welding**

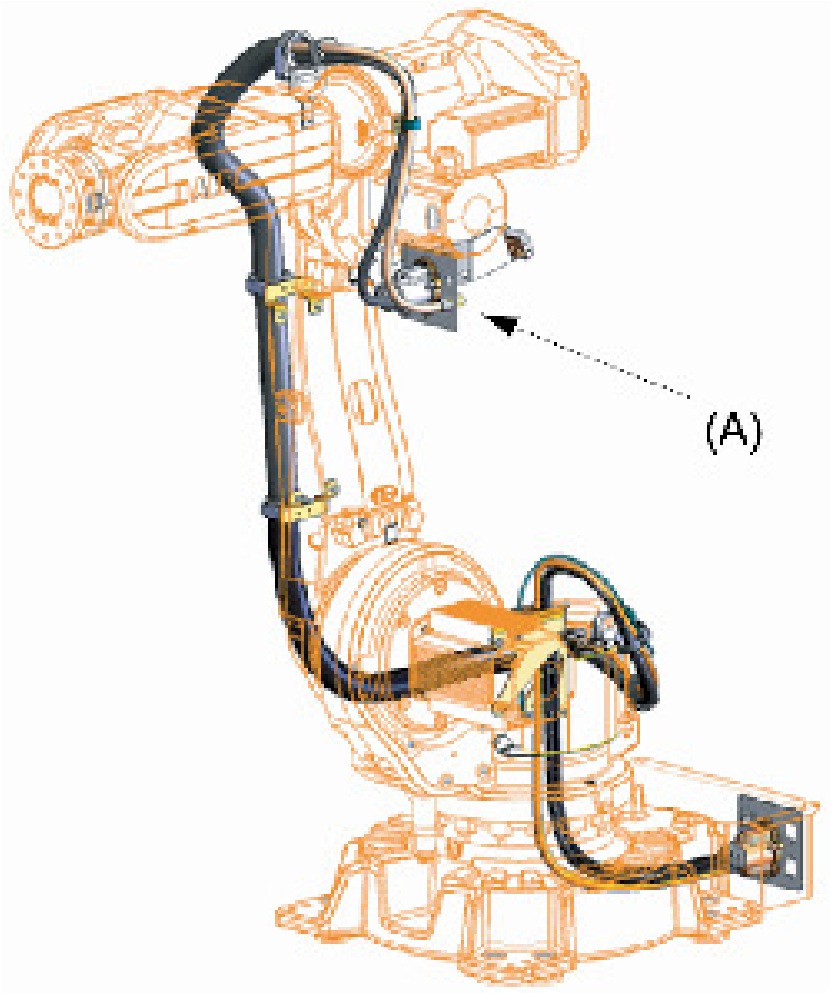
The table below shows the different DressPack configurations available for Spot Welding.

| | Lower/upper arm |
|---|---|
| Option 778-2, Spot Welding | Option 781-1, Base to axis 6 External routing |

*Continues on next page*

### DressPack lower arm

For the Material Handling application there is one routing for the lower arm, shown below in Figure below. This is designed to fit to the upper arm routing.

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| Pos | Description |
|---|---|
| A | Connection point at axis 3. Base to axis 3, option 798-1. |

*Continues on next page*

**DressPack upper arm**

There is one alternative for the Material Handling application, shown in Figure below.

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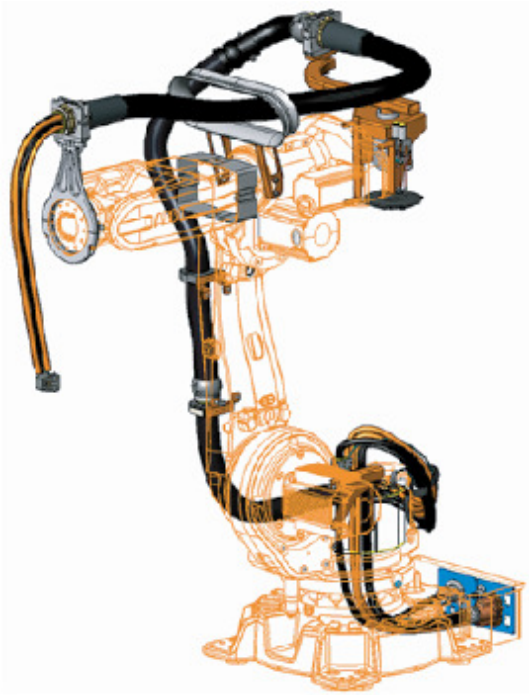
Ext. Axis 3 to axis 6, option 780-3.

*Continues on next page*

**DressPack Upper/Lower arm**

For Spot Welding application there are one alternative available, without connection point between lower and upper arm, see Figure below.



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Base to axis 6, option 781-1.

## 2.2.2 Build-in features for upper arm DressPack

**External**

Material handling (option 780-3):

- Internal routing through the rear part of the upper arm.
- Protection hose can easily be replaced if damaged.
- Adjustment for optimal hose/cable lengths.

**External with retract arm**

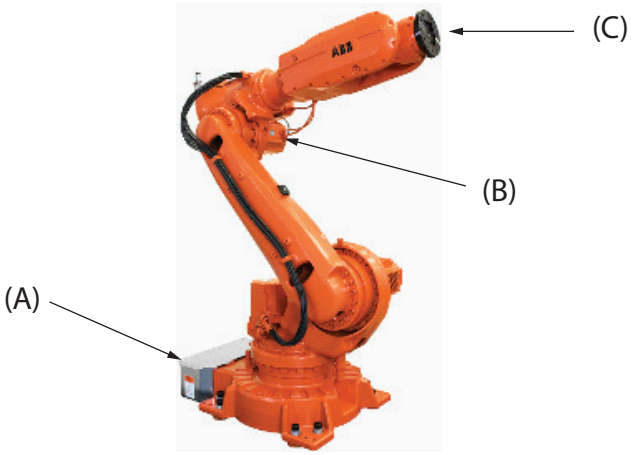
Spot welding and Material handling (option 781-1):

- Adjustable bracket axis 6 with position marking.
- Adjustable retracting force to optimize the system depending on cycle and hose package.

## 2.2.3 Interface descriptions for DressPack

### General

Below is an overview showing the different DressPack options and locations. For detailed information see the circuit diagram, see *Product manual - DressPack/SpotPack IRB 6620*

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| Pos | Location | Options |
|---|---|---|
| A | Base | 798-1, 781-1 and 864-1 |
| B | Axis 3 | 798-1 |
| C | Axis 6 | 780-3 and 781-1 |

*Continues on next page*

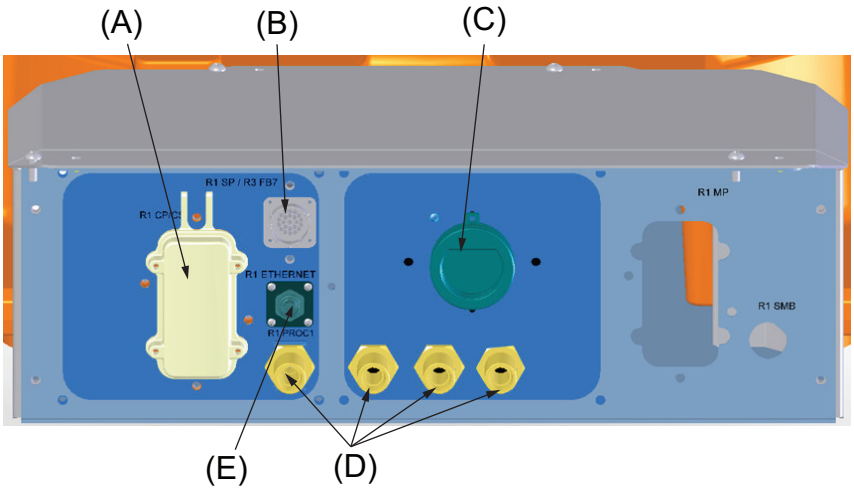
## Base

**Material handling (option 798-1)**, see figure below:

- Included are: A, B (if applicable), one D (Proc 1) and E (if applicable).

**Spot welding (option 781-1)**, see figure below:

- Included are: A, B (if applicable), C, D (Proc 1-4) and E (if applicable).

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For corresponding parts of the tool, see *Connection kits on page 118*.

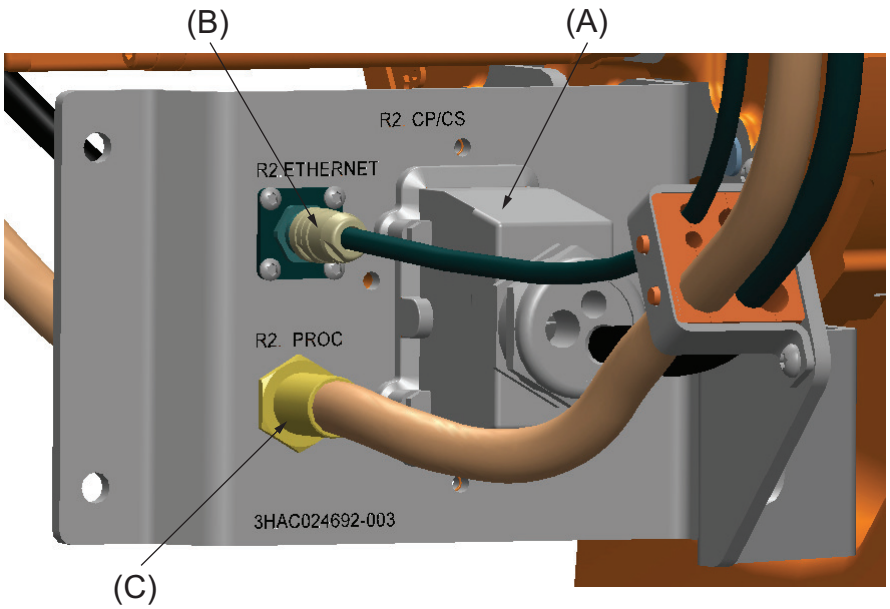
| Pos | Description |
|---|---|
| A | R1.CP/CS |
| B | R1.SP (Spot Welding Servo gun) or FB7 (Resolver connection) |
| C | R1.WELD 3x35mm2. (Spot Welding) |
| D | R1.PROC 1 (Material Handling/Spot Welding 1/2”, M22x1.5, 24 degree seal)<br>R1.PROC 2 - 4 (Spot Welding 1/2”, M22x1.5, 24 degree seal) |
| E | R1.ETHERNET (M12 connector, when EtherNet communication is selected) |

*Continues on next page*

**Axis 3**

**Material handling (option 798-1)**, see figure below:

- Included are: A, B (if applicable) and one C (Proc 1).

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For corresponding parts of the tool, see *Connection kits on page 118*.

| Pos | Description |
|---|---|
| A | R2.CP/CS |
| B | R2.ETHERNET (M12 connector, when EtherNet communication is selected) |
| C | R2.PROC 1 (Material Handling 1/2”, M22x1.5, 24 degree seal)<br>R2.PROC 2-4 (Spot Welding 1/2”, M22x1.5, 24 degree seal) |

*Continues on next page*

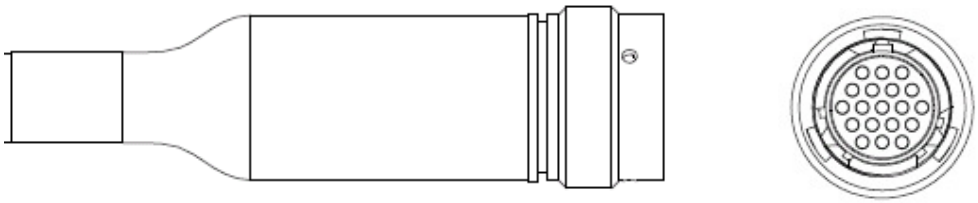
**Axis 6**

External

**Material handling (option 780-3)**, see figure below:

- Hose and cable free length, min. 1000 mm.
- Air hose ends with free end.

The cable ends with a connector, for corresponding parts of the tool, see *Connection kits on page 118*:



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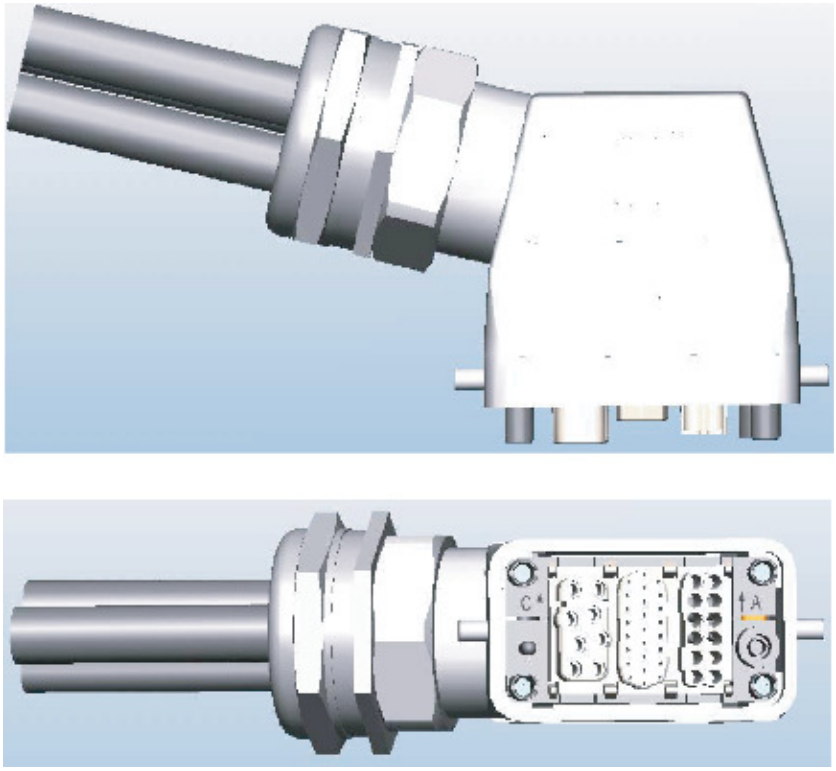
External with retract arm

**Spot welding (option 781-1)**, see figure below:

- Hose and cable free length, min. 1000 mm.
- Hoses and weld power cable (only for spot welding) end with free end.
- All signals are connected with a Harting connector.

The cable ends with a connector, for corresponding parts of the tool, see *Connection kits on page 118* and within the Harting product offer.



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2.2.3 Interface descriptions for DressPack
*Continued*

EtherNet connector

**Spot welding/Material handling (option 780-3)**, see figure below:

- Cable free length, min. 1000 m.
- Signals are connected with a M12 connector.

The cable ends with a connector, the different main parts within the connector are described in the list below, for corresponding parts of the tool, see within the Phoenix product offer.

| Name | Harting article |
|---|---|
| PIN connector, R3.ETHERNET | 21 03 882 1405 |
| PIN | 61 03 000 0094 |
| Sealing cap M12x1 | 3HAC033600-001 ABB article |

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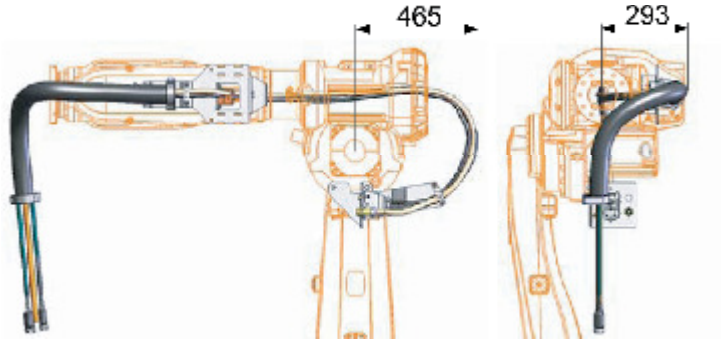
## 2.2.4 Dimensions

### General

Dimensions are shown in Figures below.

### Axis 3 - to axis 6 (option 798-1 + 780-3)

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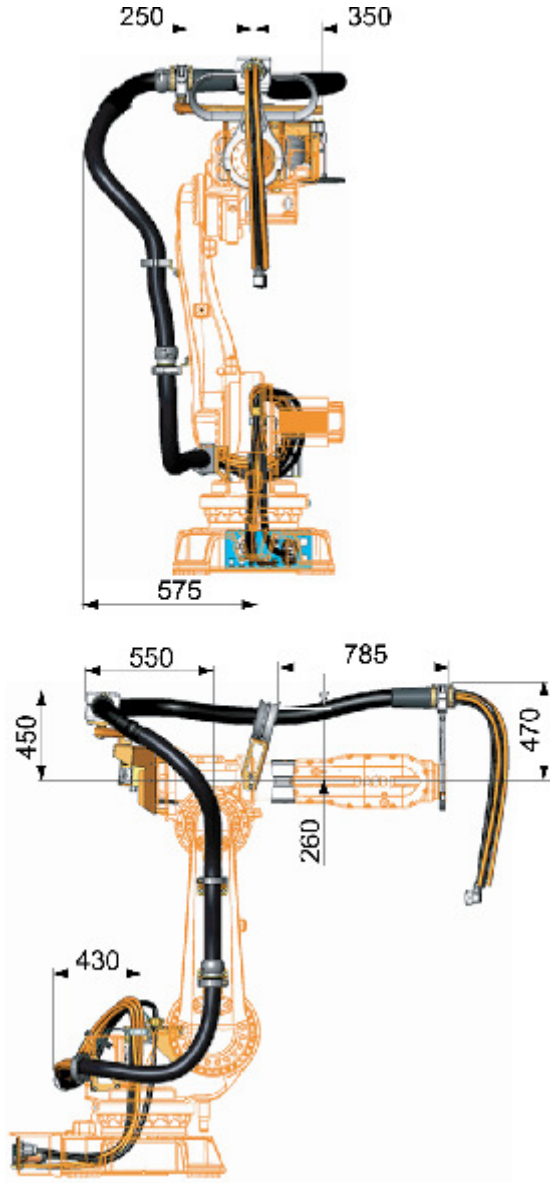
2.2.4 Dimensions
*Continued*

**Base to axis 6 (option 781-1)**

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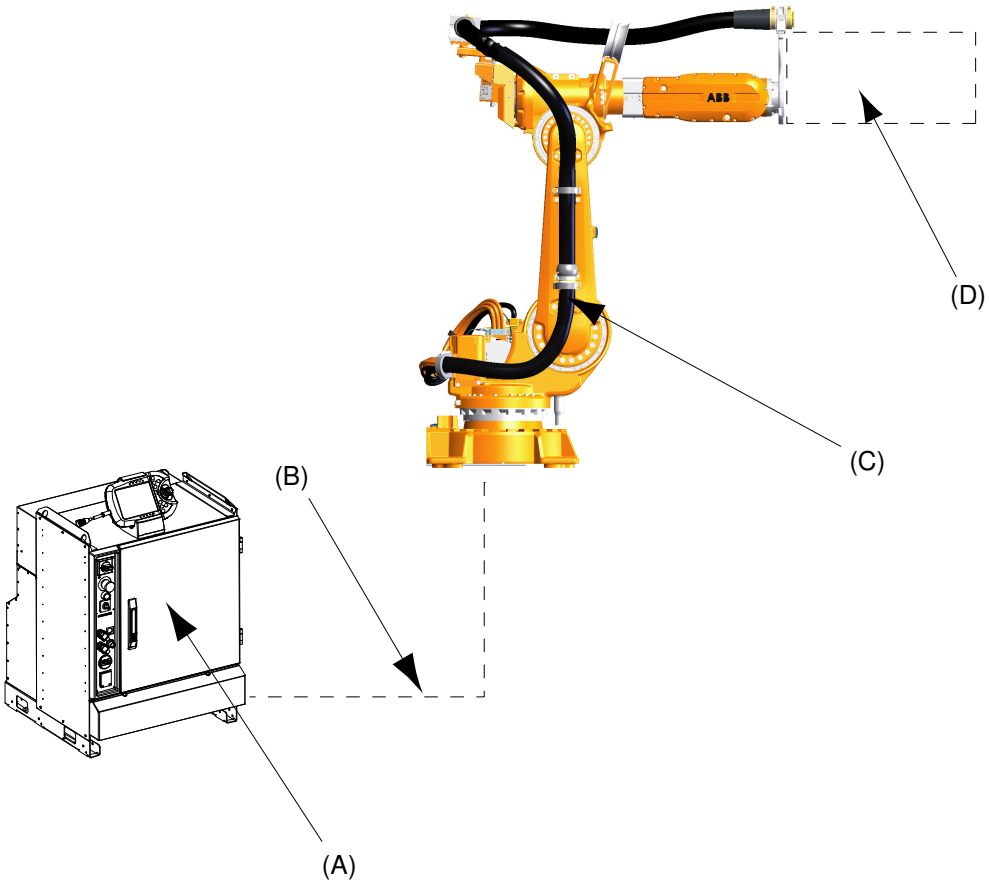
## 2.3 Type H

### 2.3.1 Introduction to TypeH

**General**

Variant Type H is designed for Material Handling (MH) application. Included modules are shown in Figure below.

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| Pos | Name |
|---|---|
| A | Robot Cabinet IRC5 |
| B | DressPack, Floor: Connection of Parallel Communication, Can/DeviceNet or Profibus |
| C | DressPack, Routing base to Axis 6 |
| D | Robot Gripper |

Available configurations with linked option numbers are described below.

*Continues on next page*

2.3.1 Introduction to TypeH
*Continued*

**Option description**

| Option | Type | Description |
|---|---|---|
| 16-1 | Connection to cabinet | Floor cables and connections inside the I/O section for the DressPack are chosen. The length and configuration of the floor harness is specified under the options below.<br>Option 94-1,-2,-3,-4 for parallel communication.<br>Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet.<br>Option 92-2,-3 for parallel communication and field bus communication with Profibus. |
| 455-1 | Parallel communication | Offers the signal cables needed for parallel communication in lower and upper arm DressPack. To be combined with option 94-1,-2,-3,-4,-5. |
| 455-4 | Parallel and Bus communication | Offers the signal cables needed for the combination of parallel and bus communication in lower and upper arm DressPack. To be combined with option90-2,-3,-4,-5 or 92-2,-3. |
| 455-8 | Parallel and Ethernet communication | Offers the signal cables needed for the bus communication in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X. |

- Option 778-1. For the application Material Handling.

  **Lower arm**
- Option 798-1. Base to axis 3. Offers DressPack Lower arm for Material Handling application with internal routing from base to axis 3.

  **Upper arm**
- Option 780-3 (and Option 798-1). Axis 3 to 6. Offers DressPack upper arm for Material Handling application with external routing from axis 3 to 6.

  **Lower/upper arm**
- Option 781-1. External base to axis 6. Offers DressPack Lower and Upper arm external routing with intermediate connection point only for signals.

The available alternatives and allowed combinations are shown in the schematic Figure below.

| | | | |
|---|---|---|---|
| Application<br>Interface connected to Option 16-1, Cabinet | Option 455-1,<br>Parallel communication | Option 94-1, -2, -3, -4<br>Cable length, Parallel communication | Option 778-1,<br>Material Handling |
| | Option 455-4,<br>Parallel and bus communication | Option 90-2, -3, -4, -5<br>Option 92-2, -3<br>Cable length, Parallel and bus communication | |
| | Option 455-8,<br>Parallel and Ethernet communication | Option 859-1, -2, -3, -4<br>Cable length, Ethernet communication | |

*Continues on next page*

Continued

| | Lower(/upper) arm | Upper arm |
|---|---|---|
| Option 778-1, Material Handling | Option 798-1, Base to axis 3 | Option 780-3, Axis 3 to 6 External routing |
| | Option 781-1, Base to axis 6 | |

## 2.3.2 Configuration result for TypeH

**General**

Depending on the choice of options above the DressPack will have different content. The choice of routing will not affect the content. See tables for signal content below.

**DressPack. Parallel communication**

- Option 16-1 with Connection to cabinet (Option 94-1,-2,-3,-4 to specify cable length)
- Option 455-1. Parallel communication
- Option 778-1. Material Handling
- Option 798-1. Internal routing, DressPack Lower arm

One of the options:

- Option 780-3 (and Option 798-1). External routing
- Option 781-1. External routing with retract arm

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At Connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms [a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC [a] |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. Air pressure 16 bar/230 PSI |

a. For option 780-3 50 VAC / 60 VDC.

b. For option 780-3 8 signals instead of 20

**Parallel and Can/DeviceNet**

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At Connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms [a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC [a] |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |

*Continues on next page*

| Type | At terminals in cabinet | At Connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (CBus)** | | | | |
| Bus signals | At bus board | 2 | 0,14 $mm^2$ | Can/DeviceNet spec |
| Bus Power | At bus board | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair | 6 | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. Air pressure 16 bar/230 PSI |

a. For option 780-3 50 VAC / 60 VDC.

b. For option 780-3 8 signals instead of 20.

### Parallel and Profibus

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis 6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms[a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC[a] |
| **Customer signals (CS)** | | | | |
| Signals twisted pair | 22 | 22 (11x2)[b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (CBus)** | | | | |
| Bus signals | At bus board | 2 | 0,14 $mm^2$ | Profibus 12 Mbit/s spec |
| Signals twisted pair | 6 | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. air pressure 16bar/230 PSI |

a. For option 780-3 50 VAC / 60 VDC.

b. For option 780-3 8 signals instead of 20.

*Continues on next page*

2.3.2 Configuration result for TypeH
*Continued*

**Parallel and Ethernet**

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis 6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms [i] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [ii] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (Ethernet)** | | | | |
| Bus signals | 4 | 4 | 0,4 $mm^2$ | Ethernet CAT 5e, 100 Mbit [iii] |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. air pressure 16bar/230 PSI |

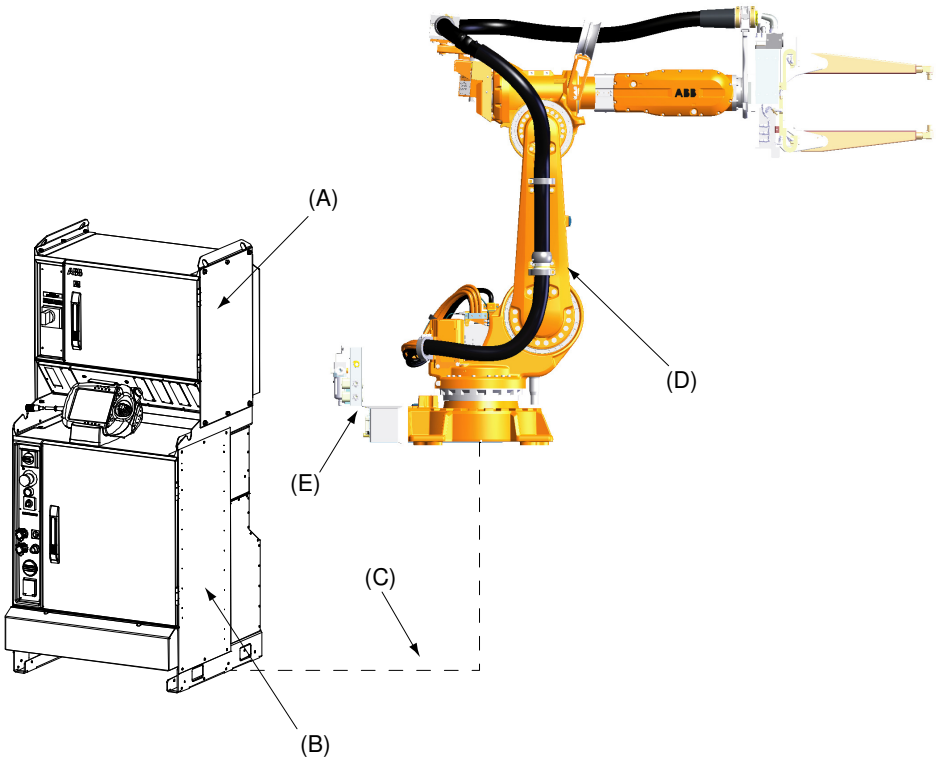
i For option 780-3 50 VAC / 60 VDC.
ii For option 780-3 8 signals instead of 20.
iii Ethernet with wire colors according to PROFINET standard, M12-connectors.

## 2.4 Type S/Se

### 2.4.1 Introduction to TypeSe

**General**

Variant Type S is designed for robot handled pneumatic gun and Se is designed for robot handled servo-controlled tool (electrical gun). Included modules are shown in Figure below. Available configurations with linked option numbers are described below.

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| Pos | Name |
|---|---|
| A | Spot Welding cabinet |
| B | Robot Cabinet IRC5 (including 7th axis drive) |
| C | DressPack, Floor |
| D | DressPack, Routing base to axis 6 |
| E | Water and Air unit with hoses |

*Continues on next page*

2.4.1 Introduction to TypeSe
*Continued*

Available configurations and allowed combinations with linked option numbers are described below.

**Option Description**

| Option | Type | Description |
|---|---|---|
| 16-1 | Connection to cabinet | Floor cables and connections inside the I/O section for the DressPack are chosen. The length and configuration of the floor harness is specified under the options below.<br>Option 94-1,-2,-3,-4 for parallel communication<br>Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet<br>Option 92-2,-3 for parallel communication and field bus communication with Profibus |
| 455-1 | Parallel communication | Offers the signal cables needed for parallel communication in lower and upper arm DressPack. To be combined with option 94-1,-2. |
| 455-4 | Parallel and Bus communication | Offers the signal cables needed for the combination of parallel and bus communication in combination in lower and upper arm DressPack. To be combined with option 90-2,-3,-4,-5 or 92-2,-3. |
| 455-8 | Parallel and Ethernet communication | Offers the signal cables needed for the bus communication in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X. |

- Option 778-2. For the application Spot Welding.

  **Lower/upper arm**
- Option 781-1 (and option 778-2). External base to axis 6, Offers DressPack Lower and Upper arm external routing without intermediate connection point.

The available alternatives and allowed combinations are shown in the schematic Figure below.

| | | | |
|---|---|---|---|
| Application interface connected to option<br>16-1, Cabinet | Option 455-1<br>Parallel communication | Option 94-1, -2, -3, -4<br>Cable length,<br>Parallel communication | Option 778-2,<br>Spot Welding |
| | Option 455-4<br>Parallel and bus communication | Option 90-2, -3, -4, -5<br>Option 92-2, -3<br>Cable length, Parallel and bus comminucation | |
| | Option 455-8,<br>Parallel and Ethernet communication | Option 859-1, -2, -3, -4<br>Cable length, Ethernet communication | |

Continued

| | Lower/upper arm |
|---|---|
| Option 778-2,<br>Spot Welding | Option 781-1, Base to axis 6<br>External routing |

## 2.4.2 Configuration result for Type S/Se

**General**

Depending on the choice of options above (combined with option 785-1 Robot gun) the DressPack will have different content. The choice of routing will not affect the content. See tables for signal content below.

**DressPack. Parallel communication**

- Option 16-1 with Connection to cabinet (not valid for 781-2) (Option 94-1,-2,-3,-4 to specify cable length)
- Option 455-1. Parallel communication
- Option 778-2. Spot Welding
- Option 781-1. Routing base to axis 6, with retract arm

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x4) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Servo motor signals** | | | | |
| Servo motor power | At drive | 3 | 1,5 $mm^2$ | 600 VAC, 12Arms |
| Protective earth | At drive | 1 | 1,5 $mm^2$ | 600 VAC |
| Signals twisted pair for resolver | - | 6 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Brake | -<br>- | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Temperature control/PTC | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Water/Air (PROC 1-3) | | 3 | 12,5 mm inner diameter | Max. air pressure 16 bar/ 230 PSI.<br>Max water pressure 10bar/ 145PSI |
| **Welding power (WELD)** | | | | |
| Lower/Upper arm | | 2 | 35 $mm^2$ | 600 VAC, 150 A rms at 20°C (68°F) |
| Protective earth (Lower/Upper arm) | | 1 | 35 $mm^2$ | |

*Continues on next page*

2.4.2 Configuration result for Type S/Se
*Continued*

**Parallel and Can/DeviceNet**

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 14 | 14 (7x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 4 | 4 (2x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Servo motor signals** | | | | |
| Servo motor power | At drive | 3 | 1,5 $mm^2$ | 600 VAC, 12Arms |
| Protective earth | At drive | 1 | 1,5 $mm^2$ | 600 VAC |
| Signals twisted pair for resolver | - | 6 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Brake | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Temperature control/PTC | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Water/Air (PROC 1-3) | | 3 | 12,5 mm inner diameter | Max. air pressure 16 bar/ 230 PSI.<br>Max water pressure 10bar/ 145PSI |
| **Welding power (WELD)** | | | | |
| Lower/Upper arm | | 2 | 35 $mm^2$ | 600 VAC, 150 A rms at 20 °C (68 °F) |
| Protective earth (Lower/Upper arm) | | 1 | 35 $mm^2$ | |

**Parallel and Profibus**

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 16 | 16 (8x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 4 | 4 (2x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (CBus)** | | | | |
| Bus signals | At bus board | 2 | 0,14 $mm^2$ | Profibus 12 Mbit/s spec |

*Continues on next page*

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| Signals twisted pair | 6 | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1 A rms |
| **Servo motor signals** | | | | |
| Servo motor power | At drive | 3 | 1,5 $mm^2$ | 600 VAC, 12Arms |
| Protective earth | At drive | 1 | 1,5 $mm^2$ | 600 VAC |
| Signals twisted pair for resolver | - | 6 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Brake | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Temperature control/PTC | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Water/Air (PROC 1-3) | | 3 | 12,5 mm inner diameter | Max. air pressure 16 bar/ 230 PSI.<br>Max water pressure 10bar/ 145PSI |
| **Welding power (WELD)** | | | | |
| Lower/Upper arm | | 2 | 35 mm2 | 600 VAC, 150 A rms at 20°C (68°F) |
| Protective earth (Lower/Upper arm) | | 1 | 35 mm2 | |

**Parallel and Ethernet**

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5 A rms |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) | 0,24 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,24 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (Ethernet)** | | | | |
| Bus signals | 4 | 4 | 0,4 $mm^2$ | Ethernet CAT 5e, 100 Mbit[ii] |
| **Servo motor signals** | | | | |
| Servo motor power | At drive | 3 | 1,5 $mm^2$ | 600 VAC, 12Arms |
| Protective earth | At drive | 1 | 1,5 $mm^2$ | 600 VAC |
| Signals twisted pair for resolver | - | 6 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Brake | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Temperature control/PTC | - | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |

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2.4.2 Configuration result for Type S/Se
*Continued*

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Media** | | | | |
| Water/Air (PROC 1-3) | | 3 | 12,5 mm inner diameter | Max. air pressure 16 bar/ 230 PSI.<br>Max water pressure 10bar/ 145PSI |
| **Welding power (WELD)** | | | | |
| Lower/Upper arm | | 2 | 35 mm2 | 600 VAC, 150 A rms at 20°C (68°F) |
| Protective earth (Lower/Upper arm) | | 1 | 35 mm2 | |

ii Ethernet with wire colors according to PROFINET standard, M12-connectors.

**Required general options**

To enable the SpotPack IRB620 to perform as intended, general robot options are required. These standard options are further described under other chapters and are also mentioned in this chapter:

- Option 716-1. 1 pc. Digital 24 VDC I/O 16 inputs/ 16 outputs
- Option 727-1. 24V 8 Amps power supply
- Option 635-1. Spot. Software option for pneumatic guns

**Required options for servo gun**

To enable the spot welding function package SpotPack IRB6620 to run with a servo controlled gun, some additional (additional to those described in previous section "Required general options") servo drive options are required. These standard options are described under other chapters ad are also mentioned below in this chapter:

- Option 770-4. First additional drive, W Drive
- Option 864-1. Resolver connection, axis 7
- Option 785-1. Robot Gun
- Option 786-1,-2,-3,-4. Connection to first drive (cable length to be stated)
- Option 635-3. Spot Servo. Software option for servo controlled guns. (software option 635-4 and option 635-5 could also be used)

Also option 630-1, Servo tool change, should be added if servo gun tool change is required.

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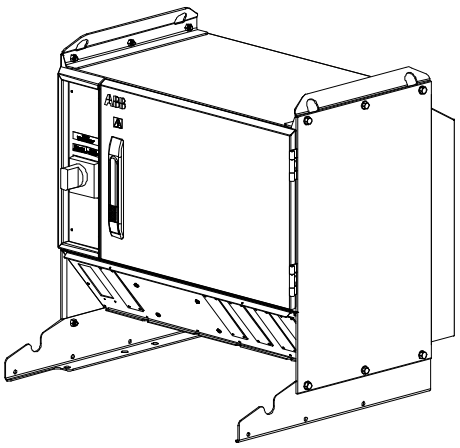
**Required Spot Welding cabinet options**

There are two different variants (see below) of Spot Welding cabinets available. Weld timer brand and weld capacity are stated by choosing one of the optional variants. Additional features could then be added to each cabinet variant. All these options are further described under chapter and are also mentioned in this chapter



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| Option | Type | Description |
|---|---|---|
| 782-7 | Bosch Basic MFDC | This option gives a basic Spot Welding cabinet equipped with a weld timer from Bosch with an integrated inverter with basic capacity. Type Bosch PSI 6100.630L1. |
| 782-11 | Bosch MFDC ProfiNet | This option gives a basic Spot Welding cabinet equipped with a weld timer from Bosch with an integrated inverter with basic capacity. Type Bosch PSI 61C0.751OEM. |

Additional options to the different Spot Welding cabinets are mentioned below. For further technical details as well as restrictions in combinations see chapter Spot Welding cabinet.

| Option | Type | Description |
|---|---|---|
| 788-1 | Forced air cooling | Offers a cooling fan with housing placed on the rear of the Spot Welding cabinet which forces air on the cooling surface/grids of the thyristor or MFDC inverter. |
| 789-1 | Earth fault protection unit | Offers an earth fault protection integrated with the circuit breaker for the weld power. |
| 790-1 | Contactor for weld power | Offers a weld contactor with necessary wiring placed inside the Spot Welding cabinet. |
| 791-1 | Weld power cable, 7 m | Offers floor cable of 7 m length for weld power. |
| 791-2 | Weld power cable, 15 m | Offers floor cable of 15 m length for weld power. |
| 791-4 | Weld power cable, 7 m | Offers floor cable of 7 m length for weld power.<br>Only together with option 781-2. |
| 791-5 | Weld power cable, 15 m | Offers floor cable of 7 m length for weld power.<br>Only together with option 781-2. |

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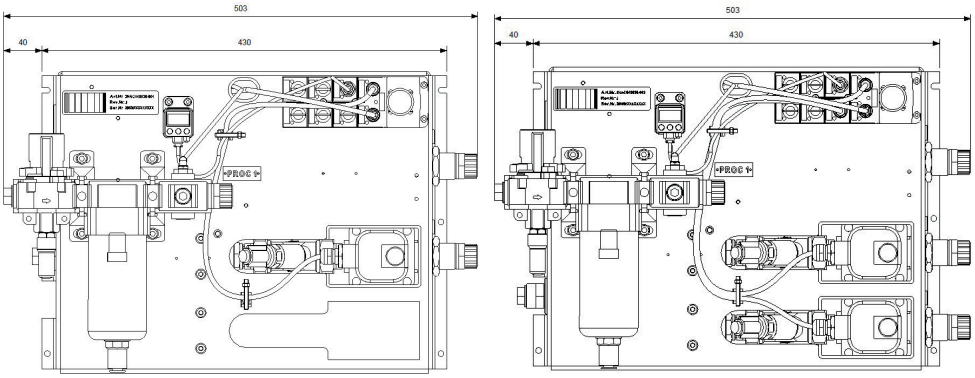
2.4.2 Configuration result for Type S/Se
*Continued*

| Option | Type | Description |
|---|---|---|
| 858-1 | Bosch Adaptive control | Offers additional functionality for adaptive welding regulation. Only possible with option 782-11. |

**Required Water and Air unit options**

The SpotPack IRB6620 also requires Water and Air unit options to perform as intended. These options are further described under chapter Water and Air unit and are also mentioned in this chapter.

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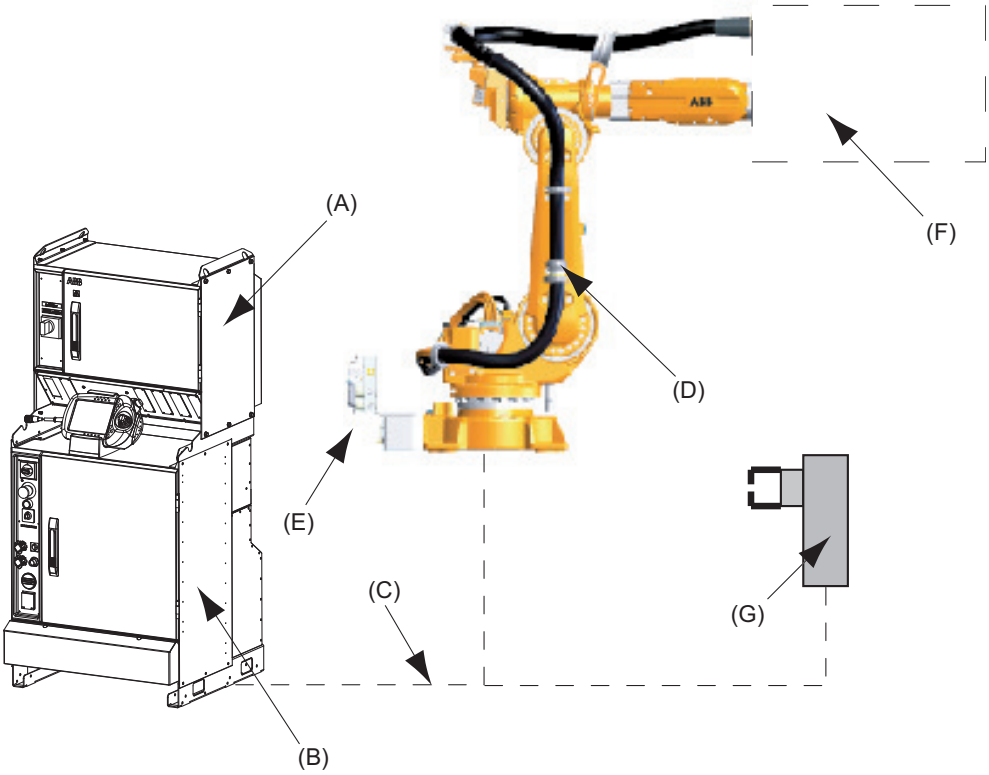
| Option | Type | Description |
|---|---|---|
| 792-1 | Water and Air unit type S(e) | Offers the basic water and air unit for type S and Se including splitbox for signal distribution. |
| 797-1 | Cable to split box, 7 m | Offers floor cable of 7 m length for signals between the Spot Welding cabinet and to the split box placed on the water and air unit |
| 797-2 | Cable to split box, 15 m | Offers floor cable of 15 m length for signals between the Spot Welding cabinet and to the split box placed on the water and air unit |
| 797-3 | Cable to split box, 22 m | Offers floor cable of 22 m length for signals between the Spot Welding cabinet and to the split box placed on the water and air unit |
| 797-4 | Cable to split box, 30 m | Offers floor cable of 30 m length for signals between the Spot Welding cabinet and to the split box placed on the water and air unit |

## 2.5 Type HS/HSe

### 2.5.1 Introduction to Type HS/HSe

**General**

Variant Type H is designed for Material Handling (MH) application and HS(e) to handling parts against a stationary Spot Welding gun (pneumatic or servo controlled). Included main modules are shown in Figure below.

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| Pos | Description |
|---|---|
| A | Spot Welding cabinet |
| B | Robot Cabinet IRC5 (incl. 7th axis drive) |
| C | DressPack, Floor |
| D | DressPack, Routing base to Axis 6 |
| E | Water and Air unit with hoses |
| F | Robot Gripper |
| G | Stationary gun with axis7 |

Available configurations with liked option numbers are described below.

*Continues on next page*

2.5.1 Introduction to Type HS/HSe
*Continued*

**Option description**

| Option | Type | Description |
|---|---|---|
| 16-1 | Connection to cabinet | Floor cables and connections inside the I/O section for the DressPack are chosen. The length and configuration of the floor harness is specified under the options below.<br>Option 94-1,-2,-3,-4 for parallel communication.<br>Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet.<br>Option 92-2,-3 for parallel communication and field bus communication with Profibus. |
| 455-1 | Parallel communication | Offers the signal cables needed for parallel communication in lower and upper arm DressPack. To be combined with option 94-1,-2,-3,-4,-5. |
| 455-4 | Parallel and Bus communication | Offers the signal cables needed for the combination of parallel and bus communication in lower and upper arm DressPack. To be combined with option 90-2,-3,-4,-5 or 92-2,-3,-4,-5. |
| 455-8 | Parallel and Ethernet communication | Offers the signal cables needed for the bus communication in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X. |

- Option 778-1. for the application Material Handling.

  **Lower arm**
- Option 798-1. Base to axis 3. Offers DressPack Lower arm for Material Handling application with internal routing from base to axis 3.

  **Upper arm**
- Option 780-3 (and option 798-1). Axis 3 to 6. Offers DressPack upper arm for Material Handling application with external routing from axis 3 to 6.

  **Lower/upper arm**
- Option 781-1. External base to axis 6. Offers DressPack Lower and Upper arm external routing without intermediate connection point.

The available alternatives and allowed combinations are shown in the schematic Figure below.

| | | | |
|---|---|---|---|
| Application Interface connected to option 16-1,<br>Cabinet | Option 455-1,<br>Parallel communication | Option 94-1, -2, -3, -4 Cable length,<br>Parallel communication | Option 778-1,<br>Material Handling |
| | Option 455-4,<br>Parallel and bus communication | Option 90-2, -3, -4, -5 Option 92-2, -3 Cable length, Parallel and bus communication | |
| | Option 455-8,<br>Parallel and Ethernet communication | Option 859-1, -2, -3, -4<br>Cable length, Ethernet communication | |

Contiued

| | Lower(/upper) arm | Upper arm |
|---|---|---|
| Option 778-1,<br>Material Handling | Option 798-1, Base to axis 3 | Option 780-3, Axis 3 to 6<br>External routing |
| | Option 781-1, Base to axis 6 | |

## 2.5.2 Configuration result for Type HS/HSe

### General

Depending on the choice of options above the DressPack will have different content. The choice of routing will not affect the content. See tables for signal content below.

### Parallel communication

The table below shows the available type of wires/media.

| Type | At terminals in cabinet | At Connection point. Base, axis6 | Cable/part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5A rms [a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. Air pressure 16bar/230 PSI |

a. For option 780-3 60 VAC / 60 VDC

b. For option 780-3 8 signals instead of 20

### Parallel and Can/DeviceNet

The table below shows the available type of wired/media.

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/ part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5A rms [a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (CBus)** | | | | |
| Bus signals | At bus board | 2 | 0,14 $mm^2$ | Can/DeviceNet spec |
| Bus Power | At bus board | 2 | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair | | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1 A rms |
| **Media** | | | | |

*Continues on next page*

2.5.2 Configuration result for Type HS/HSe
*Continued*

| Type | At terminals in cabinet | At connection point. Base, axis6 | Cable/ part area | Allowed capacity |
|---|---|---|---|---|
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. Air pressure 16bar/230 PSI |

a. For option 780-3 50 VAC / 60 VDC

b. For option 780-3 8 signals instead of 20

**Parallel and Profibus**

The table below shows the available type of wired/media.

| Type | At terminals in cabinet | At Connection point. Base Axis2/3 or axis6 | Cable/ part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5A rms [a] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 22 | 22 (11x2) [b] | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,23 $mm^2$ | 50 V DC, 1 A rms |
| **Customer bus (CBus)** | | | | |
| Bus signals | At bus board | 2 | 0,14 $mm^2$ | Profibus 12 Mbit/s spec |
| Signals twisted pair | 6 | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. air pressure 16 bar/230 PSI |

a. For option 780-3 50 VAC / 60 VDC

b. For option 780-3 8 signals instead of 20

**Parallel and Ethernet**

The table below shows the available type of wired/media.

| Type | At terminals in cabinet | At Connection point. Base Axis2/3 or axis6 | Cable/ part area | Allowed capacity |
|---|---|---|---|---|
| **Customer Power (CP)** | | | | |
| Utility Power | 2+2 | 2+2 | 0,5 $mm^2$ | 250 VAC, 5A rms [i] |
| Protective earth | | 1 | 0,5 $mm^2$ | 250 VAC |
| **Customer Signals (CS)** | | | | |
| Signals twisted pair | 20 | 20 (10x2) [ii] | 0,24 $mm^2$ | 50 V DC, 1 A rms |
| Signals twisted pair and separate shielded | 8 | 8 (4x2) | 0,24 $mm^2$ | 50 V DC, 1 A rms |

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| Type | At terminals in cabinet | At Connection point. Base Axis2/3 or axis6 | Cable/ part area | Allowed capacity |
|---|---|---|---|---|
| **Customer bus (Ethernet)** | | | | |
| Bus signals | 4 | 4 | 0,4 $mm^2$ | Ethernet CAT 5e, 100 Mbit [iii] |
| Signals twisted pair | 6 | 6 (3x2) | 0,14 $mm^2$ | 50 V DC, 1A rms |
| **Media** | | | | |
| Air (PROC 1) | | 1 | 12,5 mm inner diameter | Max. air pressure 16 bar/230 PSI |

i For option 780-3 60 VAC / 60 VDC.
ii For option 780-3 8 signals instead of 20.
iii Ethernet with wire colors according to PROFINET standard, M12-connectors.

### Required general options

To enable the SpotPack IRB 6620 to perform as intended, general standard robot options are required. These standard options are further described under other chapters and are also mentioned in this chapter.

- Option 716-1. 1 pc- Digital 24 VDC I/O 16 inputs/ 16 outputs
- Option 727-1. 24V 8 Amps power supply

### Required options for servo gun

To enabled spot welding function package SpotPack IRB 6620 to run with a servo controlled gun, some additional (additional to those described in previous section "Required general options") servo drive options are required. These standard options are described under other chapters and are also mentioned below in this chapter.

- Option 770-4. First additional drive, W Drive
- Option 864-1. Resolver connection, axis 7
- Option 785-5. Stationary gun
- Option 786-1,-2,-3,-4. Connection to first drive (cable length to be stated)
- Option 635-3. Spot Servo. Software option for servo controlled guns. (Software option option 635-5 could also be used)

Also option 630-1, Servo tool change, should be used if servo gun tool change is required

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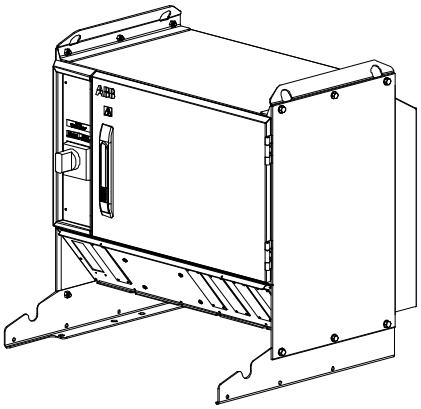
2.5.2 Configuration result for Type HS/HSe
*Continued*

**Required Spot Welding cabinet options**

There are two different variants (see below) of Spot Welding cabinets available. Weld timer brand and weld capacity are stated by choosing one of the optional variants. Additional features could then be added to each of the cabinet variants. All these options are further described under chapter Spot Welding cabinet and are also mentioned in this chapter.



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| Option | Type | Description |
|---|---|---|
| 782-7 | Bosch Basic MFDC | This option gives a basic Spot Welding cabinet equipped with a weld timer from Bosch with an integrated inverter with basic capacity. TypeBoschP-SI6100.630L1. |
| 782-11 | Bosch MFDC ProfiNet | This option gives a basic Spot Welding cabinet equipped with a weld timer from Bosch with an integrated inverter with basic capacity. Type Bosch PSI 61C0.751OEM. |

Additional options to the different Spot Welding cabinets are mentioned below. For further technical details as well as restrictions in combinations see chapter Spot Welding cabinet.

| Option | Type | Description |
|---|---|---|
| 788-1 | Forced air cooling | Offers a cooling fan with housing placed on the rear of the Spot Welding cabinet which forces air on the cooling surface/grids of the thyristor or MFDCinverter |
| 789-1 | Earth fault protection unit | Offers an earth fault protection integrated with the circuit breaker for the weld power. |
| 790-1 | Contactor for weld power | Offers a weld contactor with necessary wiring placed inside the Spot Welding cabinet. |
| 791-1 | Weld power cable, 7 m | Offers floor cable of 7 m length for weld power. |
| 791-2 | Weld power cable, 15 m | Offers floor cable of 15 m length for weld power. |
| 809-1 | Process cable to stationary gun, 7 m | Offers floor cable of 7 m length for process signals between the Spot Welding cabinet and to the stationary gun. |
| 809-2 | Process cable to stationary gun, 15 m | Offers floor cable of 15 m length for process signals between the Spot Welding cabinet and to the stationary gun. |

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| Option | Type | Description |
|---|---|---|
| 858-1 | Bosch Adaptive control | Offers additional functionality for adaptive welding regulation. Only possible with option 782-11. |

## 2.5.3 Interface description stationary gun

**General**

The interface towards the stationary gun includes 3 common parts and 2 extra for servo gun.

Common parts:

- Signal interface with a signal connector type modular Harthing (Cable option 809-1, -2). The connector configurations are described in the tables below. Signals with (parenthesis) are to be connected by customer. Other signals are connected if a complete SpotPack Type HS is ordered.
- Power cable with a Multi Contact interface (Cable option 791-1 or option 791-2) (Ending Multi contact type MC TSB 150/35).
- Water and air connections are made by the customer directly on the water and air unit (See chapter Water and Air unit)

Extra for servo gun:

- Servo power cable (Option 786-1,-2,-3 or -4). Cable goes from robot control cabinet to stationary gun and ends with a 23 pin Souriau connector (Type UT 061823SH).
- Resolver signal cable, 7 m length (included in option 785-5). cable goes from the robot foot R3.FB7 t o stationary gun and ends with a 8 pin Souriau connector (Type UT 06128SH).
- The connector configurations are described in the circuit diagram included in the Product Manual DressPack/SpotPack IRB6620, art No. 3HAC027309-001.

The Harting connector is shown below. The different main parts within the connector are showed both with name and Harting article number. Corresponding parts at the tool are available within the Harting product offer.

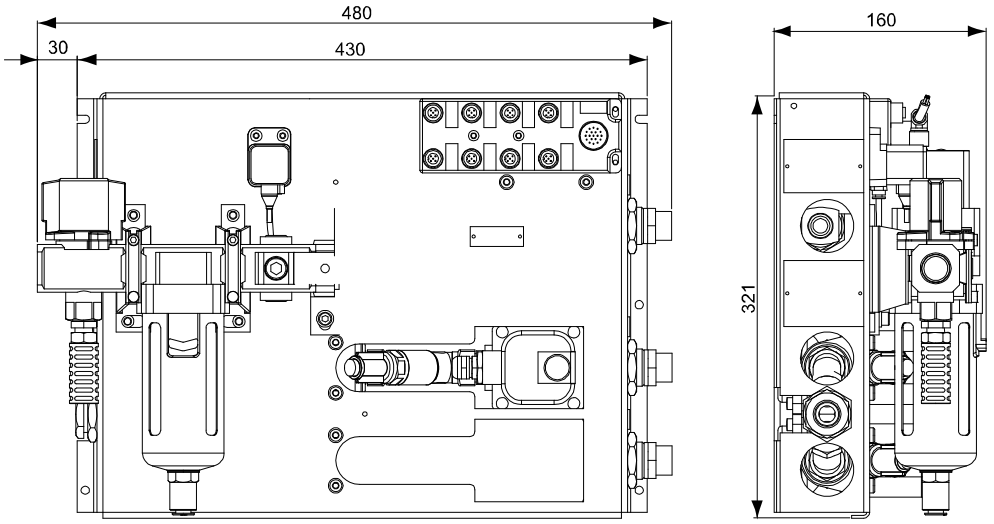
| Name | Harting article No. |
|---|---|
| Hood | 09 30 010 0543 |
| Hinged frame, hood | 09 14 010 0303 |
| *Multicontact, female (HD) (25 pin) | 09 14 025 3101 |
| *Multicontact, female (DD) (12 pin) | 09 14 012 3101 |
| *Multicontact, female (EE) (8 pin) | 09 14 008 3101 |

For the contacts above corresponding female crimp-contacts for the different cable diameters are required.

*Continues on next page*

### Required Water and Air options

The SpotPack IRB 6620 also requires Water and Air unit options to perform as intended. These options are further described under chapter Water and Air unit and are also mentioned in this chapter

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| Option | Type | Description |
|---|---|---|
| 792-2 | Water and Air unit type HS (e) | Offers the basic water and air unit for type HS and HSe including splitbox for signal distribution. |
| 797-1 | Cable to split box, 7 m | Offers floor cable of 7 m length for signals between the cabinet and to the split box placed on the water and air unit. |
| 797-2 | Cable to split box, 15 m | Offers floor cable of 15 m length for signals between the cabinet and to the split box placed on the water and air unit. |
| 797-3 | Cable to split box, 22 m | Offers floor cable of 22 m length for signals between the cabinet and to the split box placed on the water and air unit. |
| 797-4 | Cable to split box, 30 m | Offers floor cable of 30 m length for signals between the cabinet and to the split box placed on the water and air unit. |

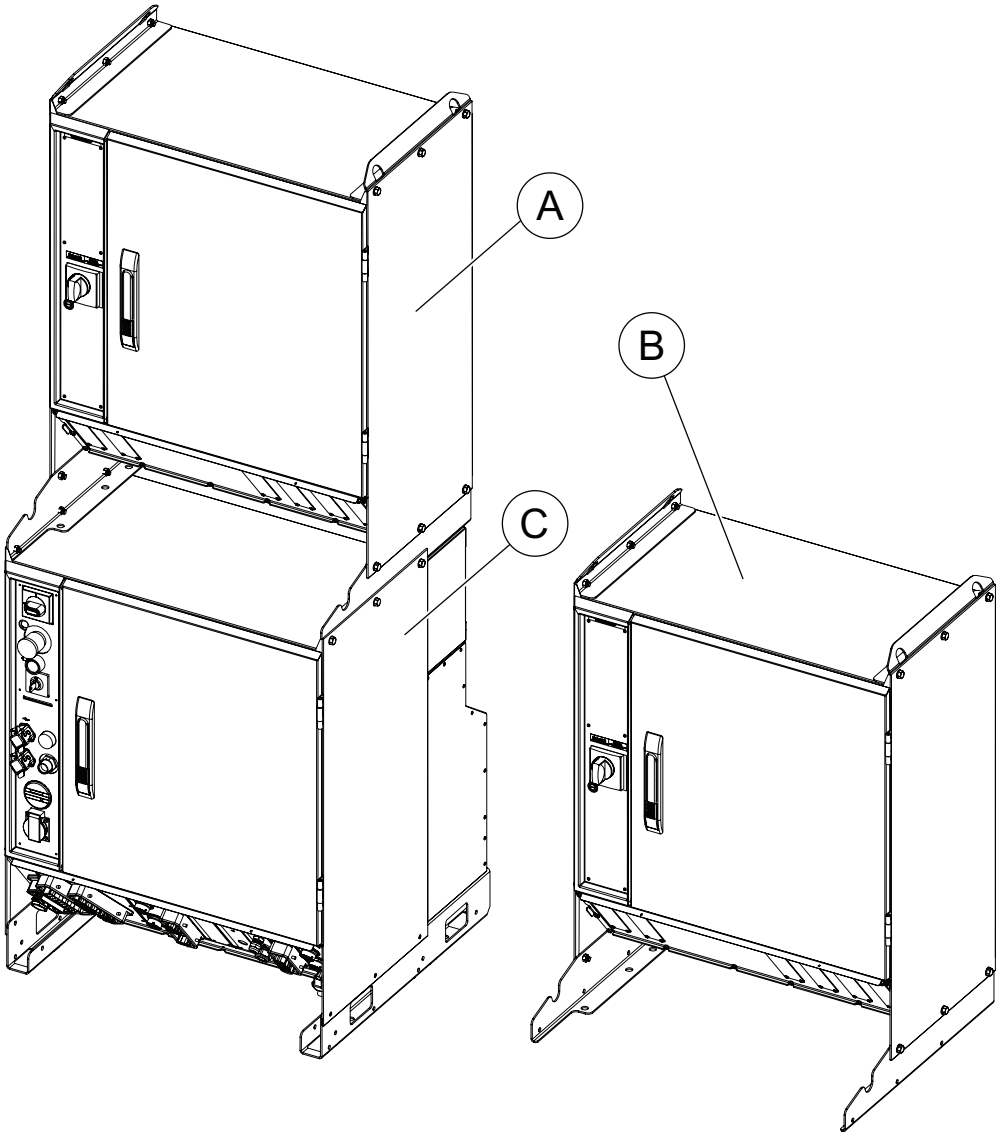
## 2.6 Spot Welding cabinet

### 2.6.1 Introduction to Spot Welding cabinet

**General**

The Spot Welding cabinet for SpotPack contains the electric components and circuits needed for spot welding application. The Spot Welding cabinet, with the welding controller build in, is controlled from the robot controller via the processor software. The capacity and functionality depends on the choice of different option combinations.

The Spot Welding cabinet is designed to be placed on top of the robot controller cabinet (Single cabinet version option 700-3), see Figure below. This is also how it is assembled at delivery.

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| | |
|---|---|
| A | Spot welding cabinet, mounted on IRC5 controller |

*Continues on next page*

| | |
|---|---|
| B | Spot welding cabinet, standing on the floor |
| C | IRC5 controller |

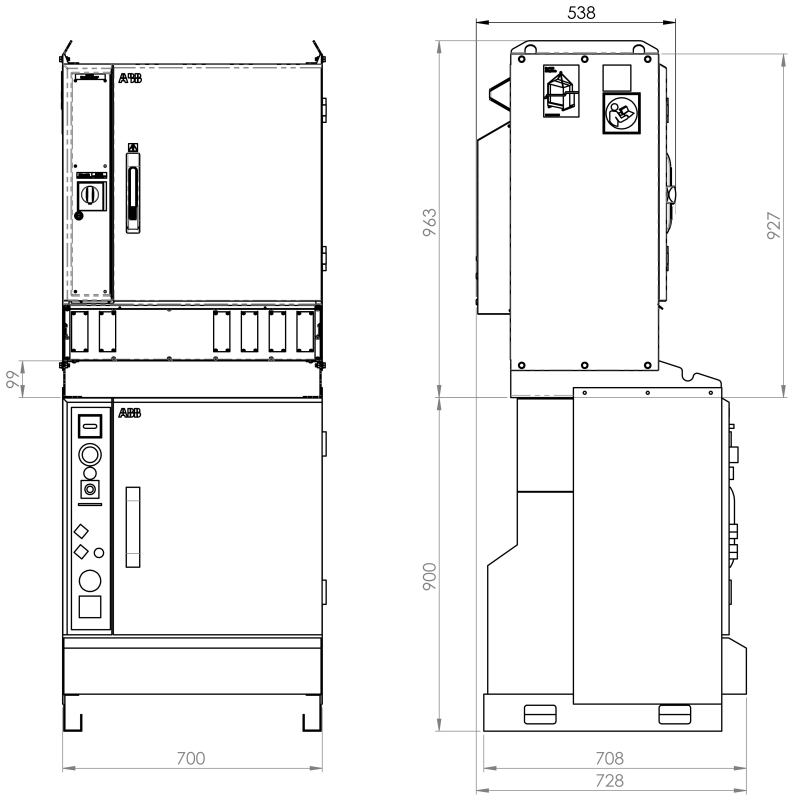
There are interface cables between the robot controller cabinet and the Spot Welding cabinet (cable length 1.5 m, connected at rear of the control cabinet and at front of Spot Welding cabinet). These cables includes power feeding for control circuits, process signals to the welding gun, safety signals, communication towards weld timer and I/O:s for indication and control. Depending on chosen options wiring will differ (see option descriptions below for further details).

The Spot Welding cabinet has the following common main features.

- Modular build for easy repair and installation (see Figure below)
- Rotary switch with adjustable thermal release and short circuit release
- Cross connection of signal handling with separate fusing for different circuits to achieve selectivity
- Programmable weld timer with proportional valve control
- A compact cabinet family based on a common platform prepared for additional options and for easy exchange

**Note**

Dimensions of the large cabinet within brackets.

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2.6.1 Introduction to Spot Welding cabinet
*Continued*

**Weld power circuit**

The electrical circuits of the Spot Welding cabinet consists of weld power circuit and control circuits to control the welding. The welding power for the welding gun is fed through a circuit breaker and inverter (for MFDC welding) and further out to the welding power cable. The cabinet is prepared for power feeding from the floor or from top. The welding power cable (outgoing feeding) is connected, via cable gland, directly to terminals inside the Spot Welding cabinet.

The circuit breaker has a built in thermal release that could be adjusted for customer specific needs to protect welding equipment and to get selectivity in the power circuit. The thermal release is set at 100 A at delivery. The maximum level should not exceed 100 A.

**Control Circuits**

Power feeding 240/115 V AC and 24V DC for the control circuits is fed from the robot controller cabinet. Also, the safety circuits in the robot controller cabinet are used to interlock the welding timer.

A welding timer (Bosch), integrated with the air cooled inverted, controls the welding current. The welding timer includes control program that gives possibility to program different weld sequences. The programming is normally done on a programming device or a PC that is connected directly to the welding timer. The interface between the robot system and the welding timer is handled via a field bus interface (ProfiNet). Examples of signals are weld start, weld ready, weld programs choice and error handling.

Also, cross connections, of interface signals and interlocking between the robot system (I/O-boards), the water and air unit, signals to DressPack or stationary gun, are done within the Spot Welding cabinet.

Programming device for the welding timer is not included in the delivery.

If the option 744-1 is chosen there will follow a door interlock with the Spot Welding cabinet.

**Note**

For more information see:

- Product manual for DressPack/SpotPack
- Circuit diagrams
- Separate manuals for the Bosch equipment

The welding capacity as well as the weld timer brand described below. Additional features could then be added to each of the cabinet variants.

*Continues on next page*

**Option 782-13 Bosch MFDC ProfiNet**

This option gives a basic Spot Welding cabinet equipped with a weld timer from Bosch with an integrated inverter with basic capacity.

General technical data

| Technical data | IEC |
|---|---|
| Weld timer and inverter | Bosch PSI 61C0.751OEM |
| Max wire range, incoming power | 3x70 $mm^2$ |
| Power feeding | 400-480 V AC |
| Max welding current | 110 A rms, 20 kA weld current |
| Protection class | IP54 |

Specific technical data large cabinet

| Technical data | IEC |
|---|---|
| Main breaker (ABB Sace XT1), thermal release | 100 A (adjustable) 70-100 A |
| Main breaker, magnetic release | 36 kA |

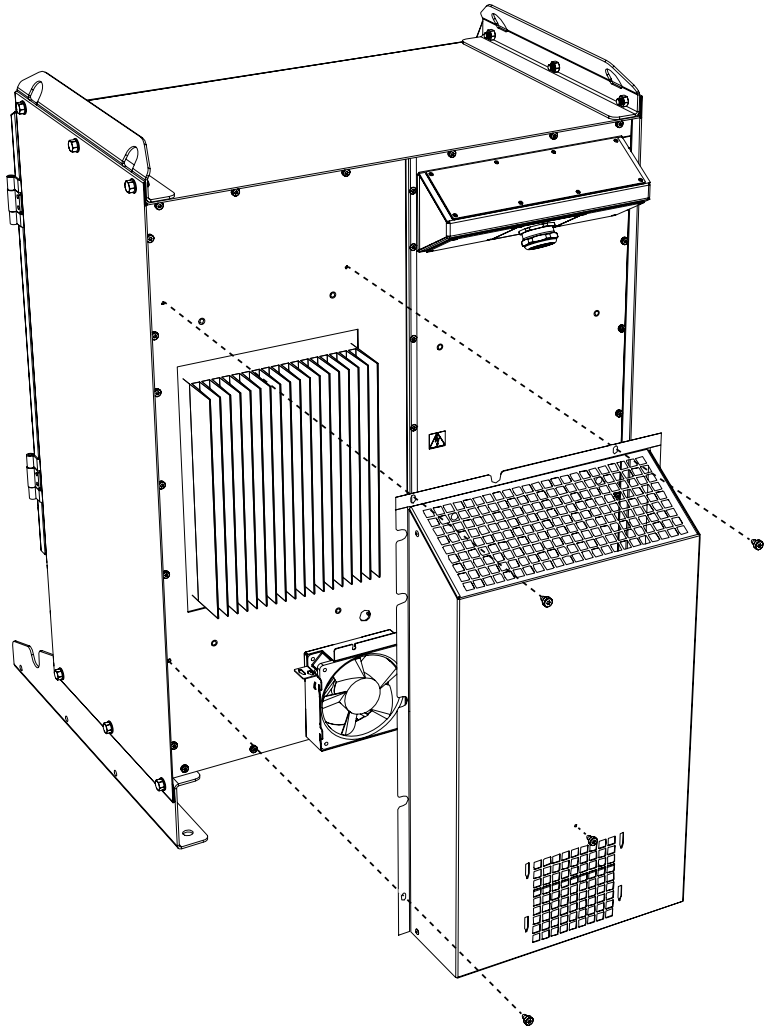
*Continues on next page*

2.6.1 Introduction to Spot Welding cabinet
*Continued*

**Option 788-1 Forced air cooling**

Offers a cooling fan with housing placed on the rear of the Spot Welding cabinet which forces air on the cooling surface/grids of the thyristor or MFDC inverter (see pictures below). Cabling to the fan goes via a cable gland at the rear of the Spot Welding cabinet. The fan runs continuously when the welding system is powered up.

The fan is required to be used together with Bosch MFDC (option 782-13).



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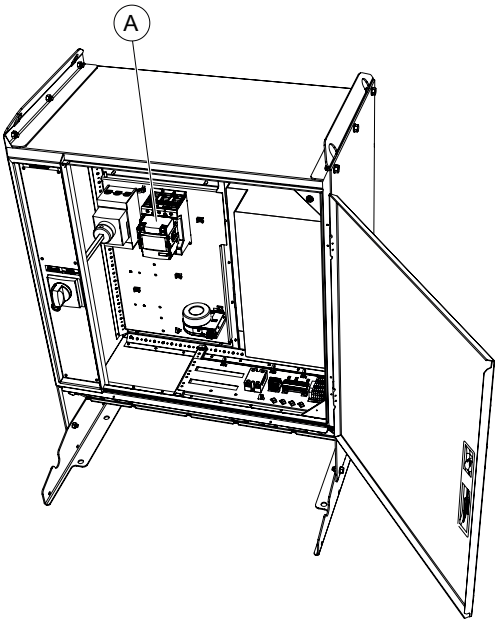
**Option 789-1 Earth fault protection unit**

Offers an earth fault protection integrated with the circuit breaker for the weld power. If an earth fault occurs the circuit breaker is tripped.

*Continues on next page*

**Option 790-1 Contactor for weld power**

Offers a weld contactor with necessary wiring placed inside the Spot Welding cabinet. The contactor is mounted after the inverter and opens up the weld circuit out from the cabinet. It is recommended to be used for increasing safety or when using tool change for weld guns. The contactor is open when the robot system is in motor off mode or when an specific I/O is set.

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| Pos | Description |
|---|---|
| A | Weld contactor |

**Option 791-1 Weld power cable, 7 m**

Offers floor cable of 7 m length for weld power (3x35 $mm^2$). One end of the weld power cable is connected at terminal to the weld timer (Bosch) or the contactor (when option 790-1 is chosen). The cable enters the Spot Welding cabinet cia cable gland. The other end is equipped with an MC connector TSB160/35 and is connected at either the manipulator base (for robot gun Type S or Se) or to the stationary gun (for Type HSe).

**Option 791-2 Weld power cable, 15 m**

Offers floor cable of 15 m length for weld power (3x35 $mm^2$). See option 791-1 for further details.

**Option 809-1 process cable to stationary gun, 7 m**

Offer floor cable of 7 m length for process signals between the Spot Welding cabinet and the stationary gun. This option also includes internal cross connections between I/O, weld timer and power feeding etc.

One end of the process cable enters the Spot Welding cabinet via cable gland and is connected at Phoenix terminals. The other end is equipped with a HD Harting 3 modules and is connected to the stationary gun (for Type HSe).

*Continues on next page*

2.6.1 Introduction to Spot Welding cabinet
*Continued*

**Option 809-2 process cable to stationary gun, 15 m**

Offer floor cable of 15 m length for process signals between the Spot Welding cabinet and the stationary gun. See option 809-1 for further details.

## 2.7 Water and Air unit

### 2.7.1 Introduction to Water and Air unit

**General**

The Water and Air unit contains components for water and air distribution and control within the SpotPack. The water and air unit is controlled from the robot controller via the process software. Wiring is made via the Spot Welding cabinet.

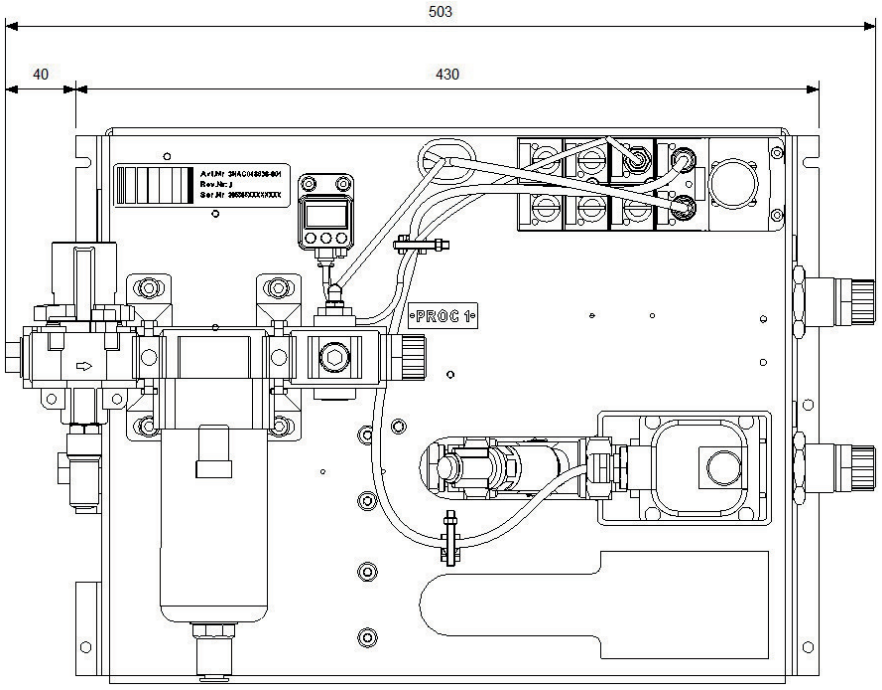
The capacity and functionality depends on the choice of different option combinations, see water and air unit options under this chapter.

The unit is only used for the spot welding application

**The Water and Air unit**

The Water and Air unit has the following main features (See Figure below):

- Adjustable, high speed water flow sensors.
- Adjustable digital pressure switch for air.
- Air filter with auto draining.
- Possibility to balance water flow for complete package and for individual circuits.
- Preparation for additional options and preparation for easy exchange of complete unit or separate circuits.
- Equipped with extra (plugged) air outlets.

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The standard water and air unit consists of four main assemblies.

- Water in circuit

*Continues on next page*

2.7.1 Introduction to Water and Air unit
*Continued*

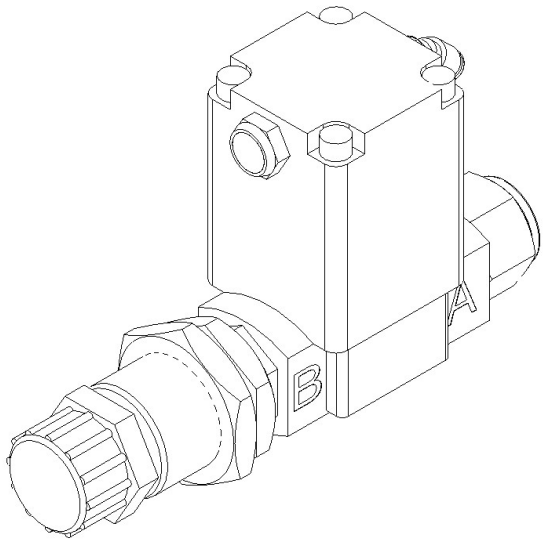
- Water return circuit
- Air supply circuit
- Split box

Cables and hoses required for Water and Air unit are defined and described under each option for water and air unit.

**Water in circuit**

The function of the water in circuit is to open / close the cooling water supply to the Spot welding gun (see Figure below). An electrical 2 port solenoid valve is used. The valve is controlled by a digital signal from the robot control system.

The circuit begins from left to right with a lead in hole in the mounting plate, a G ½" thread is used for the connection of the factory water supply system, electrical 2 port solenoid valve and ends with a Parker Pushlock adapter. (Suitable for a Parker Pushlock DIN 20 078 A, we recommend a Parker Pushlock 39C82-15-8BK fitting). From this point the water is led to the gun/robot base.

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**Water return circuit**

The water return circuit monitors the flow of the returning cooling water from the Spot welding gun (see Figure below). The flow switch detects if the water flow is too low in the cooling water circuit.

The flow switch gives a digital signal to the robot control system, which automatically shuts off the electrical shut off valve in the water in circuit if the flow is too low.

The system and the supply of cooling water are then automatically stopped to minimize risk of damage to the system.

The water return circuit is delivered with a pre-set flow limit, set to 8 liters per minute at 0.2 MPa water pressure.

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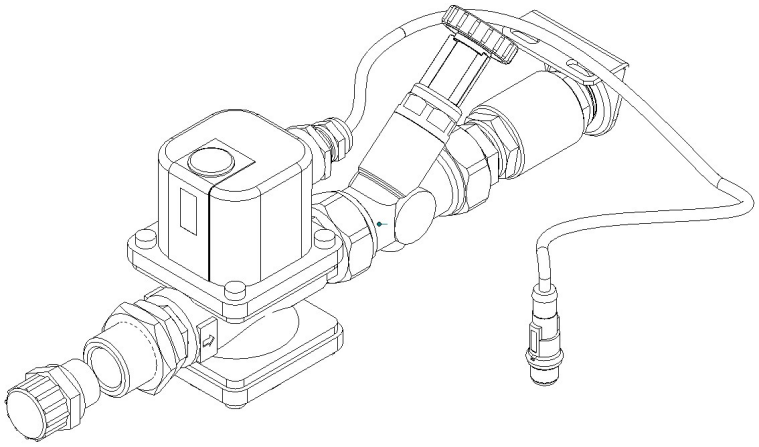
The water return circuit begins from right with a Parker Pushlock adapter (suitable for a Parker Pushlock DIN 20 078 A, we recommend a Parker Pushlock 39C82-15-8BK fitting).

It is also equipped with a flow control valve; the flow control can adjust the water flow to the desired flow level. The flow rate can be monitored by the scale on the flow control valve. The scale can be rotated so that easy reading can be performed. This will serve as a rough function check in the flow range between 1 to 8 liters per minute.

The flow control valve is when delivered adjusted for maximum flow.

The circuit ends with a check-valve that will stop any reversing water flow and ends with an internal G ½" thread. From this point the water is led to the factory water system.



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**Air supply circuit**

The air supply circuit provides the function package with filtered air (see Figure below).

The air supply circuit begins with a internal G ½" thread, manually operated shut off valve with residual pressure release though a silencer, air filter with nominal filtration of 5 µm with a metal protection of the bowl, a digital pressure switch and a cross interface containing plugged air outlet ports (internal G 3/8" thread).

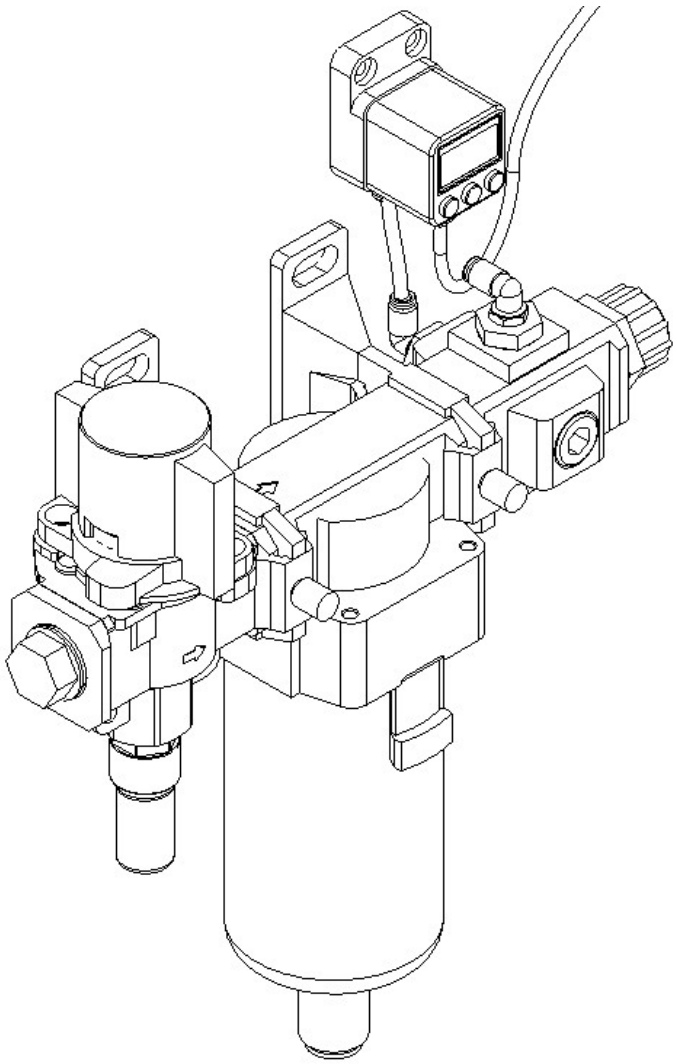
There is a digital pressure switch to monitor the air pressure and to give a signal to the control system if the pressure becomes too low.

The pressure switch is delivered with pre-set pressure limit, set to 0.6 MPa.

*Continues on next page*

2.7.1 Introduction to Water and Air unit
*Continued*

The air supply circuit ends with a Parker Pushlock adapter (suitable for a Parker Pushlock DIN 20 078 A, we recommend a Parker Pushlock 39C82-15-8BK fitting).



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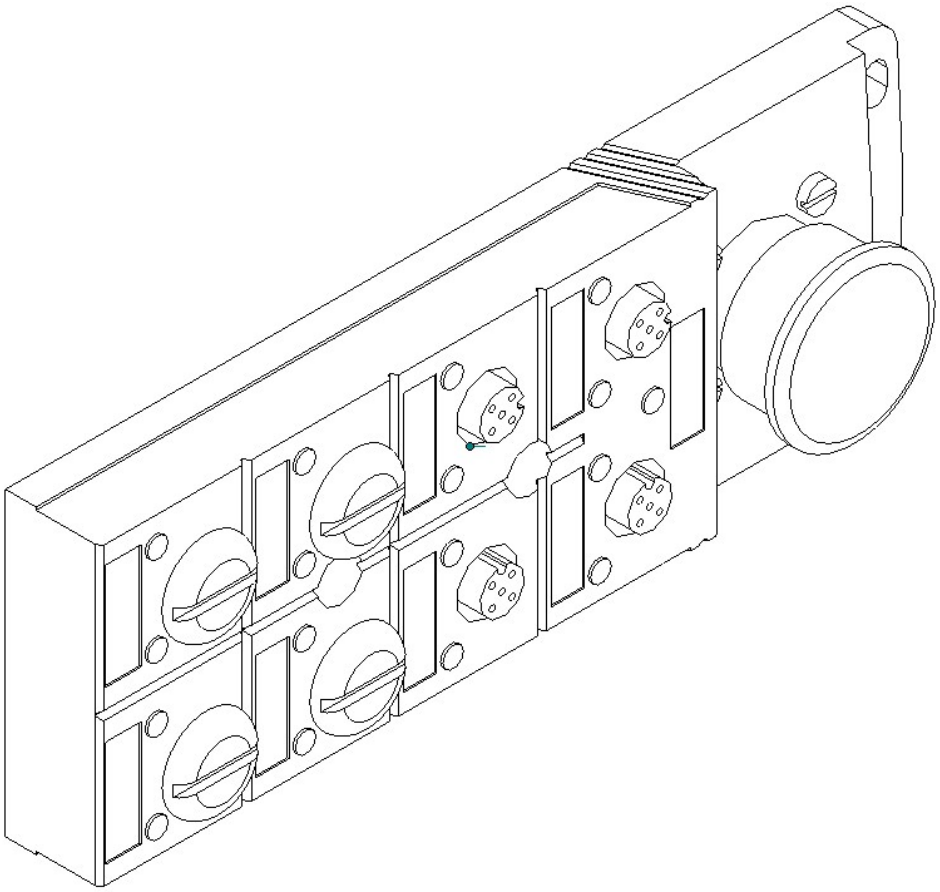
**Split box/Connection box**

With the split box, the 24VDC supply and signals are connected and distributed to the different units on the water and air unit, see Figure below. The design makes disconnection of separate items for service and repair on the water and air unit very easy. The split box has a protection class IP67, which means it is well protected against dust and water leakage.



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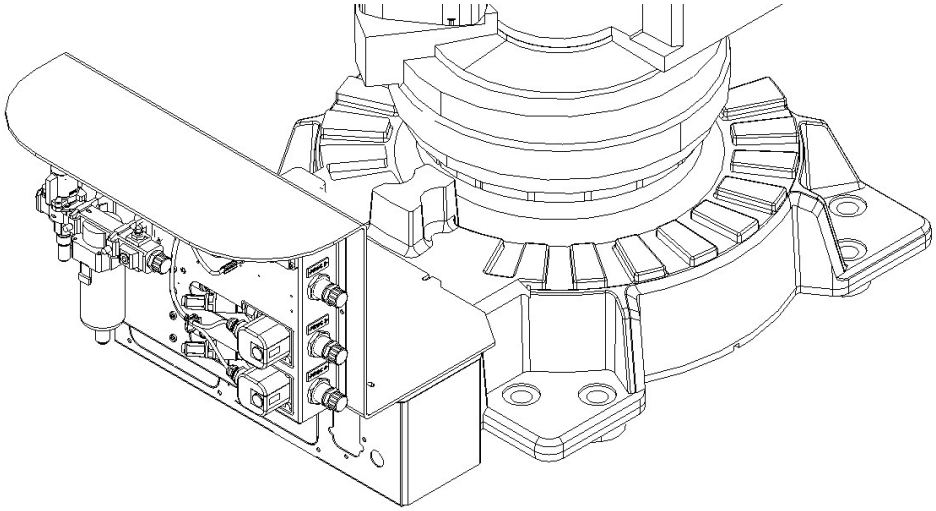
2.7.1 Introduction to Water and Air unit
*Continued*

### Mounting

Type S, robot mounted spot welding gun, is mounted at the robot at factory and water and air hoses are included and connected to the robot base.



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Type HS, robot handles part against a pedestal mounted spot welding gun, the Water and Air panel is delivered in a together with the robot.

### Signals for water and air unit

Electrical connections to robot I/O board are made via the Split box on the Water and Air unit or to connection box at robot base (Figure below shows Split box. For connection box see Circuit diagram.)

8 x M12 connections (4 pins) are available. The number in use depends on option choices. But at least two are free connection and can be used for customer purposes.

The Split box has six connections prepared for the following units:

1 Electric water shut off valve
2 Pressure switch
3 Flow switch 1
4 Flow switch 2
5 Proportional valve: Prop. ref. signal & pressure OK signal
6 Proportional valve: Power supply

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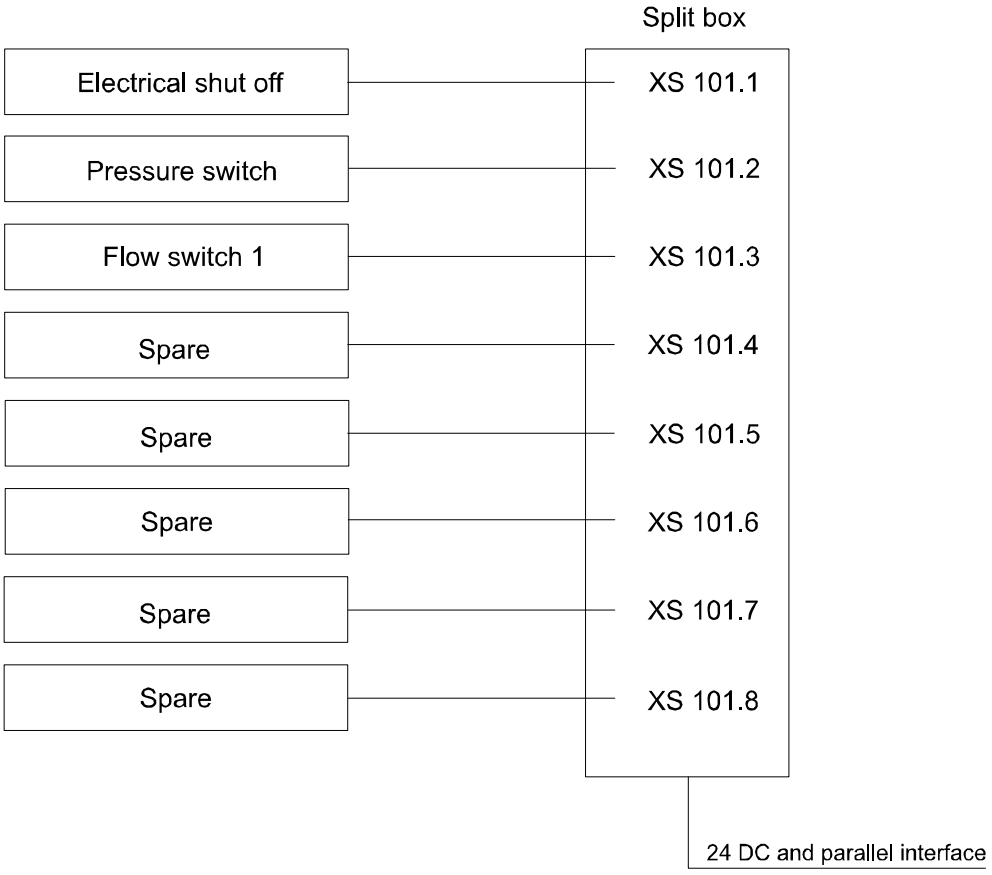
**The cable and cable length between the Split box and the Spot Welding cabinet must be specified (see option 797-1,-2,-3,-4).**

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| Option | Type | Description |
|---|---|---|
| 792-1 | Water and Air unit type | The basic water and air unit for type S is equipped for a robot handled gun and with the following components:<br>Water in circuit<br>Water return circuit<br>Air supply circuit<br>Split box<br>1/2 " hose between air supply circuit and manipulator base (PROC 1)<br>1/2 " hose between water in circuit and manipulator base (PROC 2)<br>1/2 " hose between water return circuit and manipulator base (PROC 3) |
| 792-2 | Water and Air unit, type HS | The basic water and air unit for type HS is equipped for a pedestal/stationary gun.<br>Hoses between water and air unit, welding equipment and robot are not supplied. These have to be arranged by the customer. |
| 797-1 | Cable to split box, 7 m | Offers floor cable of 7 m length for signals to the split box placed on the water and air unit. This cable is connected to the cabinet with a modular Harting and it ends with a quick connector at the split box. |

*Continues on next page*

2.7.1 Introduction to Water and Air unit
*Continued*

| Option | Type | Description |
|---|---|---|
| 797-2 | Cable to split box, 15 m | Offers floor cable of 15 m length for the split box. See description of option 797-1. |
| 797-3 | Cable to split box, 22 m | Offers floor cable of 22 m length for the split box. See description of option 797-1. |
| 797-4 | Cable to split box, 30 m | Offers floor cable of 30 m length for the split box. See description of option 797-1. |

## 2.7.2 Technical data Water and Air unit

### Media interface description

The interface towards the Water and Air unit is described in table below.

| Type | Pcs | Specification |
|---|---|---|
| Incoming water | 1 | G 1/2” thread[a] |
| Outgoing water | 1 | G 1/2” thread[a] |
| Incoming air | 1 | G 1/2” thread[a] |
| Extra air outlet | 1 | G 3/8” thread[b] |

a. Connection to be made by customer.

b. Plugged at delivery (to be used for other equipment)

### General data

| Water | Description |
|---|---|
| Operating pressure | Max. 0.6 MPa / 87PSI |
| Proof pressure | 1.2 MPa / 174 PSI |
| Maximum pressure drop | < 0.2 MPa at 8 litre/minute[a] |
| Flow regulating (each circuit) | 1 - 16 l/min |
| Flow setting range | -0.100 - 1.000 MPa |
| Water quality | Normal filtered industrial water 80 to 100 mesh. |

a. The pressure drop is measured under the following conditions: Measuring point 1: Incoming water connection at water and air unit. Measuring point 2: Outgoing water connection at water and air unit.

The water hoses (Proc 2 and Proc 3) are cross-connected at the end at axis 6 (the pressure drop is measured without any tool).

| Air | Description |
|---|---|
| Operating pressure | Max. 1.0 MPa / 145 PSI |
| Flow capacity | Max. 5800 litres/min. (at 0.7 MPa with a 0.1 MPa pressure drop |
| Pressure switch set range | - 0.100 - 1.000 MPa |
| Air quality | Use clean air.<br>When there is excessive condensate, install a device that eliminates water such as dryer or water separator (Drain Catch) on the inlet side of the air filter. |

## 2.8 Connection kits

### General

For detailed information on connection location see *Interface descriptions for DressPack on page 72*

Below is an example of a connector kit and its parts.


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### Base - Connector kits

| | | DressPack options | | Resolver conn., axis 7 | Description |
|---|---|---|---|---|---|
| Option | Name | 798-1 | 781-1 | 864-1 | |
| 459-1 | CP/CS, Proc 1 on base | X | X | | |
| 453-1 | FB 7 | | | X | |

Option 459-1, CP/CS, Proc 1 on base

R1. CP/CS and Proc 1 on base.

This option offers a kit with connectors. This must be assembled by the customer. The kit contains:

- 1 Hose fittings (Parker Pushlock, (½", M22x1,5 Brass, 24 degree seal))
- Connector with:

| | |
|---|---|
| 1 pcs Hood Foundry (Harting) | HAN EMC / M 40 |
| 1 pcs Hinged frame (Harting) | Shell size 16 |
| 2 pcs Multicontact, female (Harting) | Type HD (25 pin) |
| 1 pcs Multicontact, female (Harting) | Type DD (12 pin) |
| 1 pcs Multicontact, female (Harting) | Type EE (8 pin) |
| 10 pcs Female crimp contacts | For 1,5 $mm^2$ |

*Continues on next page*

| | |
|---|---|
| 10 pcs Female crimp contacts | For 0,5 $mm^2$ |
| 10 pcs Female crimp contacts | For 1,0 $mm^2$ |
| 10 pcs Female crimp contacts | For 2,5 $mm^2$ |
| 12 pcs Female crimp contacts | For 0,14– 0,37 $mm^2$ |
| 45 sockets | For 0,2– 0,56 $mm^2$ |
| Assembly Accessories to complete connector | |
| Assembly instruction | |

Option 453-1, FB 7

R3. FB 7 on base

This option offers a kit with a connector. This must be assembled by the customer. The kit contains:

- Connector with:

| | |
|---|---|
| 1 pcs Multiple connector (pin) | Souriau |
| 1 pcs Adaptor | 8 pin |
| 15 pcs Pin | for 0,13-0,25 $mm^2$ |
| Assembly Accessories to complete connector | |
| Assembly instruction | |

**Axis 3 - Connector kits**

| | | DressPack options | Description |
|---|---|---|---|
| Option | Name | 798-1 (MH 1) | |
| 458-1 | CP/CS, Proc 1 axis 3 | X | 4 Module Harting |

Option 458-1, CP/CS, Proc 1 axis 3

R2. CP/CS and Proc 1 on axis 3

This option offers a kit with connectors. This must be assembled by the customer.

The kit contains:

- 1 Hose fittings (Parker Pushlock, (½", M22x1,5 Brass, 24 degree seal))
- Connector with:

| | |
|---|---|
| 1 pcs Hood Foundry (Harting) | HAN EMC / M 40 |
| 1 pcs Hinged frame (Harting) | Shell size 16 |
| 2 pcs Multicontact, male (Harting) | Type HD (25 pin) |
| 1 pcs Multicontact, male (Harting) | Type DD (12 pin) |
| 1 pcs Multicontact, male (Harting) | Type EE (8 pin) |
| 10 pcs Male crimp contacts | For 1,5 $mm^2$ |
| 10 pcs Male crimp contacts | For 0,5 $mm^2$ |
| 10 pcs Male crimp contacts | For 1,0 $mm^2$ |
| 10 pcs Male crimp contacts | For 2,5 $mm^2$ |
| 12 pcs Male crimp contacts | For 0,14 – 0,37 $mm^2$ |

*Continues on next page*

2.8 Connection kits
*Continued*

| | |
|---|---|
| 45 pin | For 0,2 – 0,56 $mm^2$ |
| Assembly Accessories to complete connector | |
| Assembly instruction | |

**Axis 6 - Connector kits**

| | | | | Description |
|---|---|---|---|---|
| Option | Name | 780-3 (MH 3) | 781-1 | |
| 452-1 | Weld, Proc 1-4 axis 6 | | X | MC |
| 543-1 | CP/CS/BUS Proc 1 axis 6 | X | X | UTOW |

Option 543-1, CP/CS/CBus, Proc 1 axis 6

Harting

CP/CS/CBus, Proc 1 axis 6 on tool side for option 781-1.

This kit offers a kit with connectors to be mounted at toolside of axis 6.

This must be assembled by the customer.

The kit contains:

- 1 Hose fitting (Parker Push lock (1/2”, M22x1,5 Brass, 24 degree seal))
- Connector with:

| | |
|---|---|
| 1 pcs Hood Foundry (Harting) | HAN |
| 1 pcs Hinged frame (Harting) | Shell size 10 |
| 1 pcs Multicontact, male (Harting) | Type HD (25 pin) |
| 1 pcs Multicontact, male (Harting) | Type DD (12 pin) |
| 1 pcs Multicontact, male (Harting) | Type EE (8 pin) |
| 10 pcs Male crimp contacts | For 1,5 $mm^2$ |
| 10 pcs Male crimp contacts | For 0,5 $mm^2$ |
| 10 pcs Male crimp contacts | For 1,0 $mm^2$ |
| 10 pcs Male crimp contacts | For 2,5 $mm^2$ |
| 15 pcs Male crimp contacts | For 0,14 – 0,37 $mm^2$ |
| 30 pins | For 0,2 – 0,56 $mm^2$ |
| Assembly Accessories to complete connector | |
| Assembly instruction | |

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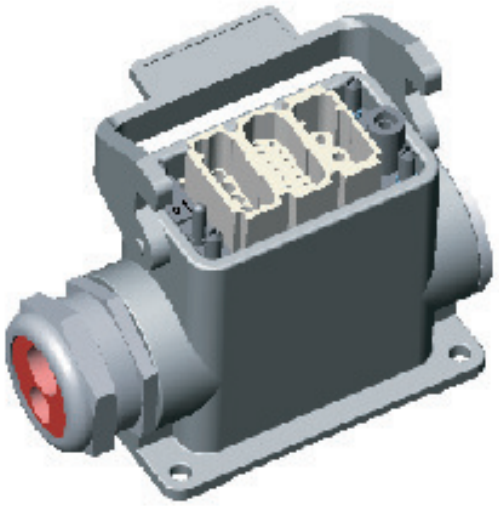

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2.8 Connection kits
*Continued*

Souriau

CP/CS/CBus, Proc 1 axis 6 on tool side for option 780-3.

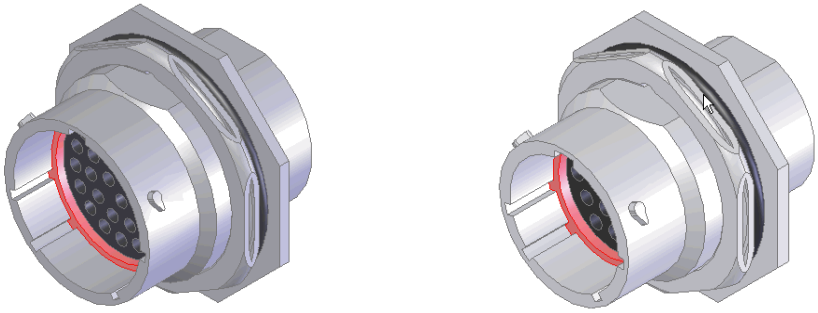
This kit offers a kit with connectors to be mounted at toolside of axis 6.

This must be assembled by the customer.

The kit contains:

- 1 Hose fitting (Parker Push lock (1/2”, M22x1,5 Brass, 24 degree seal))
- Connector with:

| | |
|---|---|
| 1 pcs UTOW Pin connector 32p (Souriau) | Shell size 18 |
| 1 pcs Backshell (Souriau) | Shell size 14 |
| 1 pcs Cable cland, EMC (Souriau) | M20 D=11,0-14,0 |
| 1 pcs UTOW Pin connector 19p (Souriau) | Shell size 14 |
| 1 pcs Backshell (Souriau) | Shell size 18 |
| 1 pcs Cable gland, EMC | M25 D=13,0-16,0 |
| 40 pcs Pin | 0.21-0.93 $mm^2$ |
| Assembly Accessories to complete connector | |
| Assembly instruction | |



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Option 452-1, Weld, Proc 1-4 axis 6

Weld and Proc 1-4 axis 6 on manipulator side

The process cable package from axis 2 to axis 6 (option 781-1) ends with free end for media and for weld power cable. The option 452-1 offers a kit for connectors. This must be assembled by the customer when hoses and power cable has been cut to required length.

The kit contains:

- 4 Hose fittings (Parker Pushlock, (½”, M22x1,5 Brass, 24 degree seal))
- 1 Multi contact connector (Female) type including:

| | |
|---|---|
| 1 pc Welding connector socket incl. housing | 3x35 $mm^2$ (35 $mm^2$ socket) |
| 1 pc Cable gland | |
| 1 pc End housing | |
| Assembly Accessories to complete connector | |
| Assembly instruction | |

# 3 Specification of variants and options

## 3.1 Introduction to variants and options

**General**

The different variants and options for the IRB 6620 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.

## 3.2 Manipulator

### Variants

| Option | IRB Type | Handling capacity (kg) | Reach (m) |
|---|---|---|---|
| 435-64 | 6620 | 150 | 2.2 |
| 435-101 [i] | IRB6620LX | 150 | 1.9 |

[i]

**Note**

Only to be used in combination with product IRB 6620LX, Linear Axis (described in Product Specification 3HAC036094-001). There are no guarantee that the mechanical unit will work with other linear axes.

The following options are not selectable together with option 435-101, IRB 6620LX-150/1.9

| Option | Option |
|---|---|
| • 209-2 ABB White standard<br>• 209 RAL code159-1 Fork lift device<br>• 37-1 Base plate<br>• 804-1 Synchronize labels<br>• 806-1 Base connector protection<br>• 872-1 Manipulator Cable protection<br>• 908-1 Foundry Plus Cable Guard<br>• 29-1/-2 Working range limit - Axis 1<br>• 34-1 Working range limit - Axis 3<br>• 561-1 Extended working range axis 1<br>• 1070-1 Prep. for IRBT<br>• 429-1 Underwriters Laboratory<br>• 210-4 / -5 Manipulator cables, 22 / 30 m<br>• 810-2 Position supervision computer | • 603-1 Absolute Accuracy<br>• 606-1 Conveyor Tracking<br>• 885-1 SoftMove<br>• 642-1 PickMaster 3<br>• 661-2 Force Control<br>• 778-2 SpotWelding<br>• 781-1 DressPack Base to axis 6<br>• 453-1 FB7<br>• 452-1 Weld Proc 1-4 axis 6<br>• 785-1 Robot Servo Gun<br>• 791-4 / -5 Weld power cable, 7 / 15 m |

### Manipulator color

| Option | Description | Note |
|---|---|---|
| 209-1 | ABB Orange standard | |
| 209-2 | ABB White standard | |
| 209-202 | ABB Graphite White standard | Standard color |
| 209-4 --192 | Colors according to RAL-codes | |

**Note**

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

### Protection types

| Option | Protection type | Note |
|---|---|---|
| 287-4 | Standard | IP 54 [i] |

*Continues on next page*

| Option | Protection type | Note |
|---|---|---|
| 287-3 | Foundry Plus 2 | See *Protection type Foundry Plus 2 on page 11* for a complete description of protection type Foundry Plus 2. |

i The upper arm, including the wrist, has protection class IP 67.

## Warranty

| 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.<br>**Note**<br>Special conditions are applicable, see *Robotics Warranty Directives*. |

## Warranty for DressPack

**Note**

Option 780-2 upper arm DressPack SW/HM2 is not covered by warranty.

**Note**

Option 780-3 upper arm DressPack HM3 is not covered by warranty.

## 3.3 Equipment

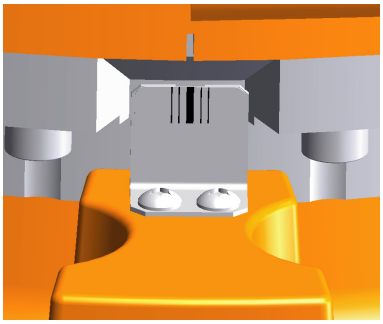
### General

| 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.<br>Note. When Cooling Fan for axis 1 motor unit is used, this must be disassembled in order to use fork lift device. |
| 37-1 | Base plate | Can also be used for IRB 6600 and IRB 7600. See *Mounting the manipulator on page 22*, for dimension drawing. |
| 804-1 | Synchronize labels | For a more accurate marking of the synchronization position of the robot. Assembly instructions are included.<br>See Figures on next page to Base connector protection chapter. |

### Synchronize labels

The option contains synchronize labels for each axis.

### Synchronize labels for Axis 1



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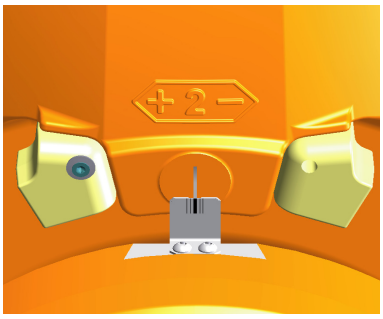
### Synchronize labels for Axis 2

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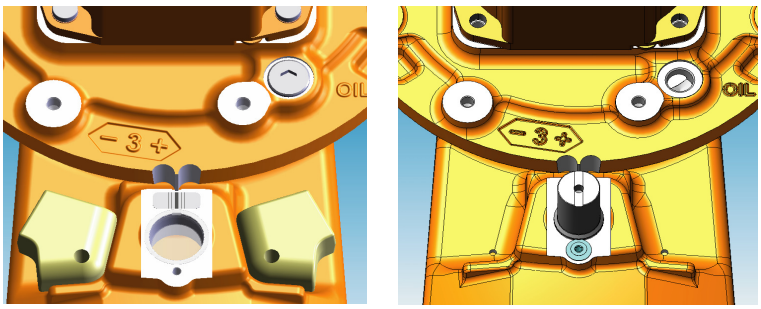
### Synchronize labels for Axis 3



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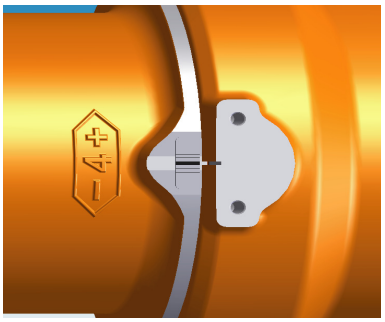
### Synchronize labels for Axis 4



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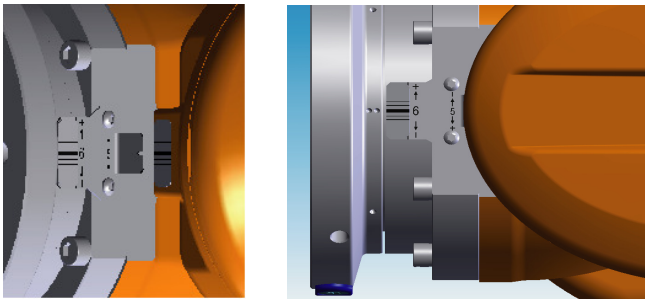
### Synchronize labels for Axis 5 and 6



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### 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. |

### Electronic Position Switches (EPS)

The mechanical position switches indicating the position of the three main axes are replaced with electronic position switches for up to 7 axes, for increased flexibility and robustness. For more detailed information, see *Product specification - Controller IRC5* and *Application manual - Electronic Position Switches*.

*Continues on next page*

### Foundry Plus Cable Guard

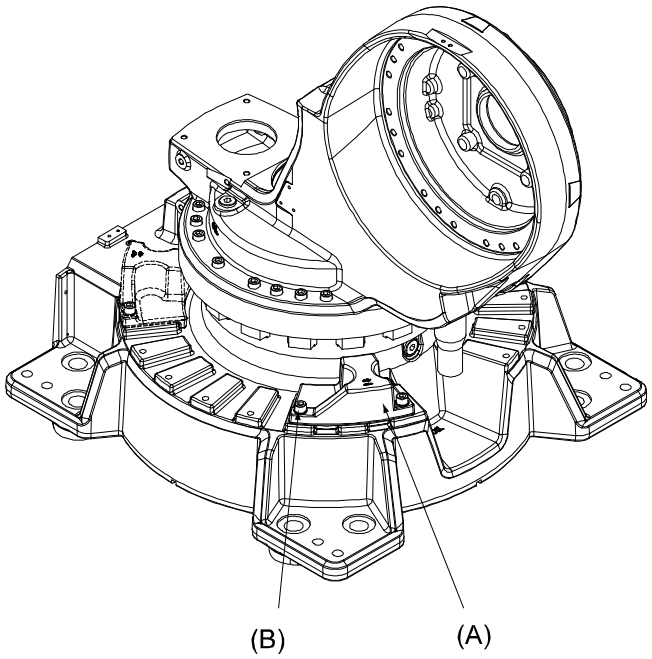
The manipulator cables are equipped with an additional protection of aluminized leather against e.g. aluminium spitz and flashes and chips from machining. Process cable for material handling from base to axis 3, option 798-1 has the same protection.

| Option | Description | Remark |
|---|---|---|
| 908-1 | Foundry Plus Cable Guard | For extra protection of cables.<br>Requires option 287-3 Foundry Plus. |

### Working Range Limit

To increase the safety of the robot, the working range of axes 1and 3 can be restricted by extra mechanical stops.

| Option | Type | Description |
|---|---|---|
| 29-1 | Axis 1,15 degrees | Two stops which allow the working range to be restricted in increments of 15°. |
| 29-2 | Axis 1, 7.5 degrees | Two stops which allow the working range to be restricted in increments of 7.5° intervals. |
| 34-1 | Work range limit Axis3 | One stop which limits the working range to -90°. No bending backwards motion. See Figure below. |

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| Pos | Description |
|---|---|
| A | Four mechanical stops |
| B | Bolt tightening torque: 120Nm |

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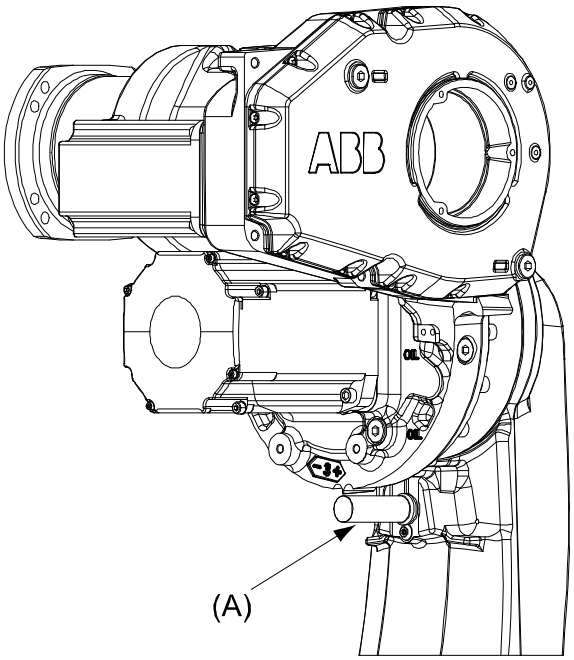


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| Pos | Description |
|---|---|
| A | One mechanical stop axis 3 |

## Extended working range

| Option | Type | Description |
|---|---|---|
| 561-1 | Extended working range axis 1 | To extend the working range on axis 1 from ± 170° to ± 220°<br>When the option is used the mechanical stop shall be disassembled.<br>EPS (Electronic Position Switches) functionality (option 810-1 or -2) is required. |

## Standard calibration method

| Option | Type | Description |
|---|---|---|
| 1999-1 | Axis calibration | Preferred standard calibration method. Robust, high performance axis calibration using only mechanical calibration stops and software.<br>**Note**<br>The axis calibration method is not available for IRB 6620LX. |
| 1999-2 | Calibration Pendulum | Previous standard calibration method only to be used in special cases if customers would like to harmonize calibration with already installed base.<br>**Note**<br>This is the standard method for IRB 6620LX. |

*Continues on next page*

**Note**

The calibration methods are not interchangeable.

## 3.4 Floor cables

### General

Additional floor cables for SpotPack options, see chapter DressPack Floor.

### Manipulator cable length

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

## 3.5 Process DressPack

### Connection to

| Option | Connection to | Description |
|---|---|---|
| 16-1 | Cabinet | The signals CP/CS are connected to 12-pole screw terminals, Phoenix MSTB 2.5/12-ST-5.08, in the controller. The cable between R1.CP/CS and the controller is supplied. For information about the limited number of signals available, see Type H to Type S. |

### Communication

| Option | Type | Description |
|---|---|---|
| 455-1 | Parallel communication | Includes customer power (CP), customer signals (CS). |
| 455-4 | Parallel and bus communication | Includes CP, customer signals, CAN/DeviceNet and Profibus for process cable package. |
| 455-8 | Parallel and Ethernet communication | Includes customer (CP), customer signals PROFINET or Ethernet/IP process cable package. |

## 3.6 DressPack Floor

**Connection to Parallel/CAN/DeviceNet/Profibus and Ethernet**

Following information specifies the cable length for Parallel, CAN/DeviceNet/Profibus and Ethernet for connection to cabinet.

| Option | Lengths | Description |
|---|---|---|
| 94-1/90-2/92-2/859-1 | 7 m | |
| 94-2/90-3/92-3/859-2 | 15 m | |
| 90-4/92-4/859-3 | 22 m | |
| 94-4/90-5/92-5/859-4 | 30 m | |

## 3.7 DressPack Lower/Upper arm

### DressPack process configuration

| Option | Description | Note |
|---|---|---|
| 778-1 | Material Handling | Includes signals and one air hose. |
| 778-2 | Spot Welding | Includes signals, weld power cable, one air hose and three media hoses. |

### DressPack lower arm

| Option | Description | Note |
|---|---|---|
| 798-1 | Material Handling from base to axis 3 | Requires option 778-1. |

### DressPack upper arm

| Option | Description | Note |
|---|---|---|
| 780-3 | External routing from axis 3 to axis 6 | Requires option 778-1 and option 798-1. |

### DressPack lower and upper arm

| Option | Description | Note |
|---|---|---|
| 781-1 | Routing Base to Axis6 | Routing without change-over connection. |

## 3.8 Connection Kits

### General

The connectors fit to the connectors at the manipulator base and axis 6 respectively.

### Content

The kit consists of connectors, pins and sockets. For technical description, see Connector kits.

| Option | Type | Description |
|---|---|---|
| 459-1 | R1.CP/CS and PROC1 | For the Customer Power/Customer Signal connector and one Process connector on the manipulator base. Sockets for bus communication are included. |
| 453-1 | R3.FB7 | For the 7-axis connector on the manipulator base. |
| 452-1 | R3.WELD and PROC1-3 axis 6 | Weld connector and four Process connectors at axis6, the manipulator side. |
| 543-1 | R3.CP/CS/BUS, PROC1 axis 6 | Connector for customer power/customer signal/customer bus at axis 6 tool side. |

## 3.9 Servo Gun

### Content

For technical description see chapter 1.9 Servo Gun.

| Option | Description |
|---|---|
| 785-1 | For robot handled Servo Gun |
| 785-5 | For Stationary Servo Gun |

### Connection to first drive

Following information specifies the cable length for Connection to first drive. For further information see chapter Servo Gun

| Option | Lengths |
|---|---|
| 786-1 | 7 m |
| 786-2 | 15 m |
| 786-3 | 22 m |
| 786-4 | 30 m |

## 3.10 SpotPack Floor Cables

### Weld Power Cable

Following information specifies the cable length for the Weld Power cable, from the Spot Welding process cabinet to the manipulator base.

| Option | Lengths | Description |
|---|---|---|
| 791-1 | 7 m | |
| 791-2 | 15 m | |

### Process Cable to Stationary Gun

Following information specifies the cable length for the Process Cable to the Stationary Gun, from the Spot Welding process cabinet to the Stationary Gun.

| Option | Lengths |
|---|---|
| 809-1 | 7 m |
| 809-2 | 15 m |

### Cable to Split Box

Following information specifies the cable length for the cable to Split Box, from the Spot Welding process cabinet to the Split box on the manipulator base.

| Option | Lengths |
|---|---|
| 797-1 | 7 m |
| 797-2 | 15 m |
| 797-3 | 22 m |
| 797-4 | 30 m |

## 3.11 Process Cabinet

### Empty Cabinet

| Option | Type | Description |
|---|---|---|
| 768-1 | Empty cabinet small | See Prod. Spec. IRC5 Chapter 2 |
| 768-2 | Empty cabinet large | See Prod. Spec. IRC5 Chapter 2 |
| 715-1 | Installation kit | See Prod. Spec. IRC5 Chapter 2 |

### Process Cabinet

| Option | Type | Description |
|---|---|---|
| 788-1 | Forced air cooling | See Chapter 2.6 Spot Welding cabinet |
| 789-1 | Earth fault protection unit | See Chapter 2.6 Spot Welding cabinet |
| 790-1 | Contactor for weld power | See Chapter 2.6 Spot Welding cabinet |

### Weld Timer capacity

| Option | Type | Description |
|---|---|---|
| 782-1 | Bosch Basic AC | See Chapter 2.6 Spot Welding cabinet |
| 782-7 | Bosch Basic MFDC | See Chapter 2.6 Spot Welding cabinet |
| 782-11 | Bosch MFDC ProfiNet | See Chapter 2.6 Spot Welding cabinet |

### Adaptive control

| Option | Type | Description |
|---|---|---|
| 858-1 | Bosch Adaptive control | Offers additional functionality for adaptive welding regulation. Only together with option 782-13. |

## 3.12 Water and Air

### Water and Air unit

| Option | Type | Description |
|---|---|---|
| 792-1 | Type S (e) | See Chapter 2.7 Water and Air unit |
| 792-2 | Type HS (e) | See Chapter 2.7 Water and Air unit |

### Electrical proportional valve for air

| Option | Type | Description |
|---|---|---|
| 796-1 | Electrical proportional valve for air | See Chapter 2.7 Water and Air unit |

## 3.13 User documentation

**User documentation**

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

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

# 4 Accessories

## 4.1 Introduction to accessories

**General**

There is a range of tools and equipment available.

**Basic software and software options for robot and PC**

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

**Robot peripherals**

- Motor Units[1]

[1] Not applicable for IRC5 Compact controller.

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# Index

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