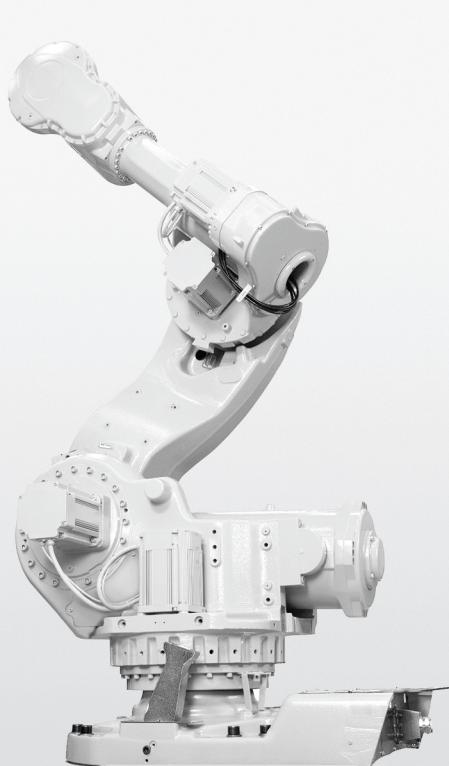


ROBOTICS

# Product specification

## IRB 7600



**Trace back information:**

Workspace 21C version a2

Checked in 2021-09-23

Skribenta version 5.4.005

**Product specification**

**IRB 7600-500/2.55  
IRB 7600-400/2.55  
IRB 7600-340/2.8  
IRB 7600-325/3.1  
IRB 7600-150/3.5**

**Document ID: 3HAC023934-001**

**Revision: AM**

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# Overview of this product specification

### About this product specification

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

- The structure and dimensional prints
- The fulfilment of standards, safety and operating requirements
- The load diagrams, mounting of extra equipment, the motion and the robot reach
- The specification of variant and options available

---

### Usage

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

---

### Users

It is intended for:

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

---

### References

Reference	Document ID
<i>Product specification - Controller IRC5</i> IRC5 with main computer DSQC1000.	3HAC047400-001
<i>Product specification - Controller software IRC5</i> IRC5 with main computer DSQC1000 and RobotWare 5.6x.	3HAC050945-001
<i>Product specification - Controller software IRC5</i> IRC5 with main computer DSQC1000 and RobotWare 6.	3HAC050945-001
<i>Product manual - IRB 7600</i>	3HAC022033-001
<i>Product manual - DressPack/SpotPack IRB 6650S/7600</i>	3HAC032103-001
<i>Application manual - Electronic Position Switches</i>	3HAC050996-001
<i>Product specification - Robot user documentation, IRC5 with RobotWare 6</i>	3HAC052355-001

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## Overview of this product specification

*Continued*

### Revisions

Revision	Description
2	<ul style="list-style-type: none"><li>- Options numbers for Servo Gun Description corrected.</li><li>- Spot Welding cabinet replaced with Weld Timer Capacity</li><li>- The Art. No. for 8 pin and 12 pin contacts for Harting connector corrected.</li><li>- The reference of Description of SpotPack Equipment corrected to chapter 1.8 and chapter 1.9</li><li>- Option 435-65 IRB 7600-500/2.55 added in Specification of Variants and Options.</li></ul>
3	<ul style="list-style-type: none"><li>- Range of movement for turn motion of axis 6 changed in the table in chapter Robot Motion.</li></ul>
4	<ul style="list-style-type: none"><li>- Version 500/2.3 for IRB 7600 removed.</li></ul>
E	<ul style="list-style-type: none"><li>- Changes in SpotPack and DressPack</li></ul>
F	<ul style="list-style-type: none"><li>- Introduction of Foundry Prime and the new media panel.</li><li>- Changed text in chapter Load diagrams, Control of load case by "Robot-Load"</li><li>- Servo gun configurations Stationary and Robot gun, Twin stationary gun and Stationary gun and Track Motion deleted.</li><li>- Option 91-2,-3,-4,-5 for parallel communication and field bus communication with Interbus deleted.</li></ul>
G	<ul style="list-style-type: none"><li>- Option Dedicated MH added.</li></ul>
H	<ul style="list-style-type: none"><li>- Variant IRB 7600-325/3.1 added.</li></ul>
J	<ul style="list-style-type: none"><li>- Changes for Calibration data</li><li>- Work range</li><li>- Explanation of ISO values (new figure and table)</li><li>- Stopping distance</li><li>- User documentation on DVD</li></ul>
K	<ul style="list-style-type: none"><li>- General update for 9.1 release</li></ul>
L	<ul style="list-style-type: none"><li>- New stopping distance/time added for variants 7600-500/2.55 and 7600-325/3.1.</li></ul>
M	<ul style="list-style-type: none"><li>- Option: Position switches removed</li></ul>
N	<ul style="list-style-type: none"><li>- Updated Foundry Plus 2 text- Updated Foundry Prime 2 text- ISO-Cube</li></ul>
P	<ul style="list-style-type: none"><li>- Text for Standards updated</li></ul>
Q	<ul style="list-style-type: none"><li>- Minor corrections</li></ul>
R	<ul style="list-style-type: none"><li>• Table for ambient temperature adjusted</li><li>• Ethernet added</li><li>• Minor corrections</li></ul>
S	<ul style="list-style-type: none"><li>• Machinery directive updated</li><li>• General corrections/update</li></ul>
T	<ul style="list-style-type: none"><li>• Base plate drawing updated</li><li>• General updates and minor corrections</li><li>• Drawing for reference holes updated</li></ul>
U	<ul style="list-style-type: none"><li>• General updates and minor corrections</li></ul>
V	<ul style="list-style-type: none"><li>• Minor corrections/update</li></ul>

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## Overview of this product specification

*Continued*

Revision	Description
X	<ul style="list-style-type: none"> <li>Text for ISO test adjusted</li> <li>Robot stopping distances and times for category 0 and category 1 stops are moved to a separate document, <i>Product specification - Robot stopping distances according to ISO 10218-1</i></li> <li>Minor corrections/update</li> </ul>
Y	<ul style="list-style-type: none"> <li>Text for Foundry Plus updated.</li> <li>Minor corrections/update</li> </ul>
Z	<ul style="list-style-type: none"> <li>Minor corrections/update</li> </ul>
AA	<ul style="list-style-type: none"> <li>LeanID added</li> <li>Section <i>SpotWelding cabinet</i> updated.</li> </ul>
AB	<ul style="list-style-type: none"> <li>Warranty information for DressPack updated.</li> <li>Text regarding cooling fans on motors axis 1 or 2 are changed in sections <i>Description/Cooling fan for axis 1-2 motor</i> and <i>Specification of variants and options/Equipment</i>.</li> </ul>
AC	<p>Published in release R17.1. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Illustrations for Tool flange is changed, see <a href="#">Holes for mounting extra equipment on page 56</a>.</li> <li>Connector name TSB160/35 is changed to TSB150/35.</li> <li>Working range value for IRB 7600 with option 780-4 (LeanID) is changed. See <a href="#">Type of Motion</a>.</li> <li>Restriction of load diagram added.</li> </ul>
AD	<p>Published in release R17.2. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Tool flange drawings changed.</li> <li>Updated list of applicable standards.</li> <li>TCP acceleration information added.</li> <li>Delete option 828-1, 828-2, 768-3 and 782-1 as they were all phased out.</li> </ul>
AE	<p>Published in release R18.1. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Motor measurement changed.</li> </ul>
AF	<p>Published in release R19B. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Minor changes.</li> <li>Updated information about <i>Absolute Accuracy</i>.</li> </ul>
AG	<p>Published in release R19C. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Graphics for DressPack changed. See <a href="#">Base on page 83</a>.</li> </ul>
AH	<p>Published in release R20A. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>M8 cable lug description added in DressPack section.</li> </ul>
AJ	<p>Published in release R20B. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Minor changes</li> </ul>
AK	<p>Published in release R20D. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Warranty section updated.</li> </ul>
AL	<p>Published in release R21B. The following updates are done in this revision:</p> <ul style="list-style-type: none"> <li>Text regarding fastener quality is updated.</li> <li>Full movement of axis 5 updated.</li> <li>Removed Axis resolution.</li> <li>Updated information about the option <i>Extended working range</i>.</li> </ul>

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## **Overview of this product specification**

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*Continued*

<b>Revision</b>	<b>Description</b>
AM	Published in release R21C. The following updates are done in this revision: <ul style="list-style-type: none"><li>• Removed option (SpotPack phase out) 782-13 Bosch MFDC ProfiNet, 858-1 Bosch Adaptive control, 788-1 Forced air cooling, 789-1 Earth fault protection unit, 790-1 Contactor for weld power, 791-1 Weld power cable, 7 m, 791-2 Weld power cable, 15 m, 809-1 process cable to stationary gun, 7 m, 809-2 process cable to stationary gun, 15 m, 792-1 Type S, 792-2 Type HS, 793-1 Second water return, 797-1 7m, 797-2 15m, 797-3 22m, 797-4 30m.</li></ul>

# 1 Description

## 1.1 Structure

### 1.1.1 Introduction

---

**General**

The IRB 7600 is available in five versions, with 500 kg, 400 kg, 340 kg, 325 kg and 150 kg handling capacities.

The IRB 7600 is ideal for heavy-weight applications, regardless of industry. Typical areas can be handling of heavy fixtures, turning car bodies, lifting engines, handling heavy parts, loading and unloading of machine cells, alternatively handling large and heavy pallet layers.

---

**Software product range**

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

---

**Process Options**

There are a large number of process options for Spot Welding and Material Handling integrated in the robot.

---

**Operating system**

The robot is equipped with the IRC5 controller and robot control software, RobotWare. RobotWare supports every aspect of the robot system, such as motion control, development and execution of application programs, communication etc. See Product specification - Controller IRC5 with FlexPendant.

---

**Safety**

Safety standards valid for complete robot, manipulator and controller.

---

**Additional functionality**

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

*Continues on next page*

# 1 Description

---

## 1.1.1 Introduction

*Continued*

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.

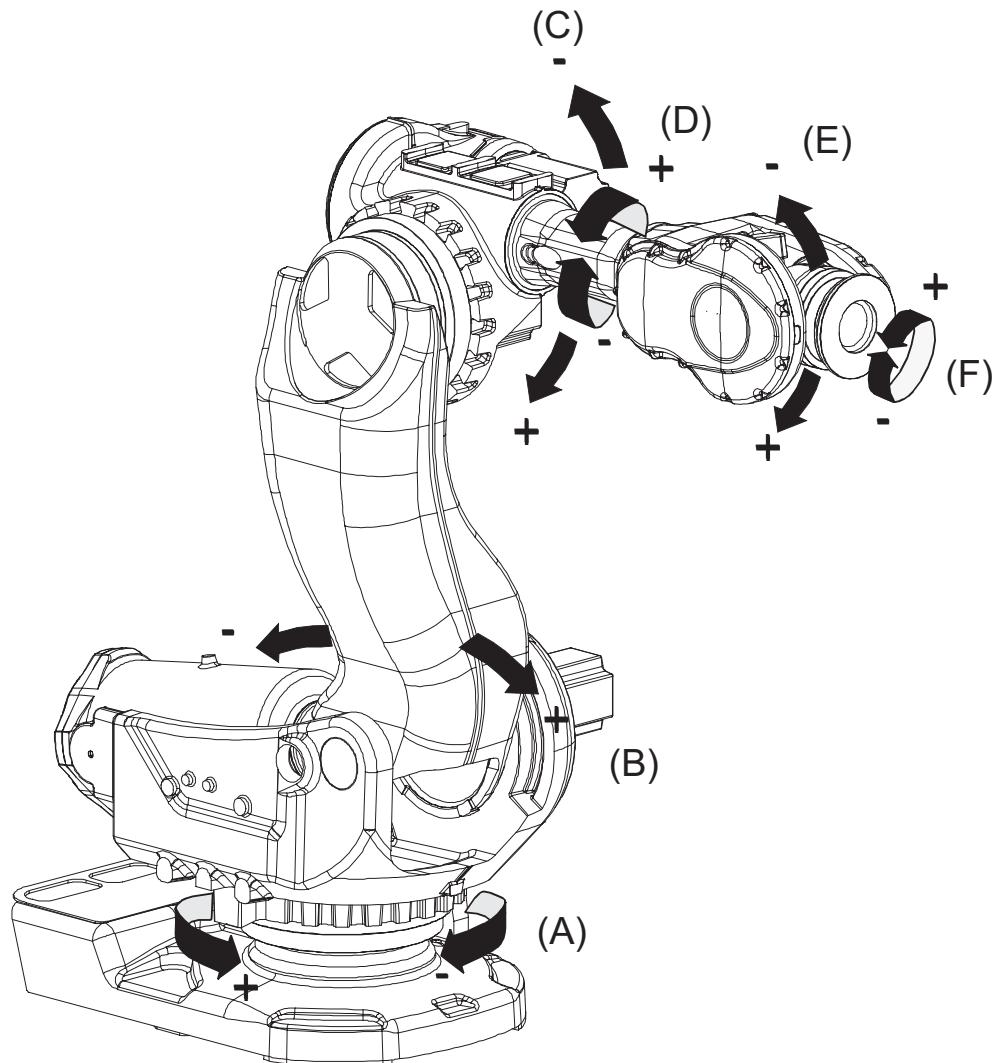
## Available robot versions

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

See [Specification of variants and options on page 137](#) for robot versions and other options not selectable together with Foundry Plus 2.

*Continues on next page*

### Axis movement



xx1000000563

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

# 1 Description

---

## 1.1.2 Different robot versions

### 1.1.2 Different robot versions

#### General

The IRB 7600 is available in five versions. The following different robot types are available:

#### Robot types

The following standard robot versions are available.

Robot type	Handling capacity	Handling capacity for LeanID	Reach
IRB 7600	500 kg	-	2.55 m
IRB 7600	400 kg	390 kg	2.55 m
IRB 7600	340 kg	320 kg	2.8 m
IRB 7600	325 kg	290 kg	3.1 m
IRB 7600	150 kg	-	3.5 m



#### Note

If option 780-4, LeanID is selected, the payload will decrease as stated above, for detailed information see [Load diagrams on page 36](#)

### 1.1.3 Definition of version designation

#### IRB 7600 Mounting - Handling capacity (kg)/ Reach (m)

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

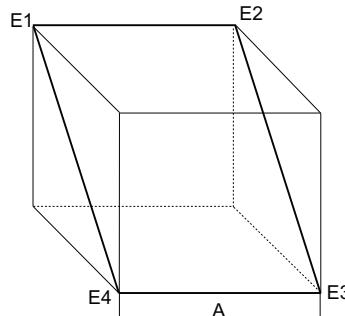
#### Manipulator weight

Manipulator	Weight (kg)
IRB 7600 - 500/2.55	2400 <sup>a</sup>
IRB 7600 - 400/2.55	2400 <sup>a</sup>
IRB 7600 - 340/2.8	2425 <sup>a</sup>
IRB 7600 - 325/3.1	2440 <sup>a</sup>
IRB 7600 - 150/3.5	2450 <sup>a</sup>

a. Without DressPack

#### Power consumption at max load

Type of Movement	Power consumption at maximum load (kW)
ISO Cube	3.4
Normal robot movements	5.8



xx1000000101

Pos	Description
A	1000 mm

#### Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside the working space	73 dB (A) Leq (acc. to Machinery directive 2006/42/EG).

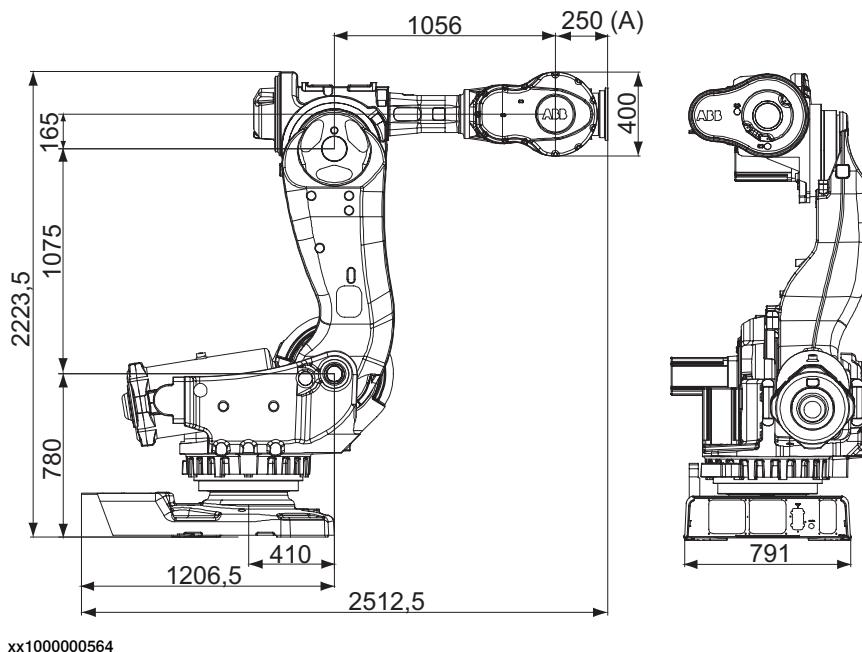
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# 1 Description

## 1.1.3 Definition of version designation

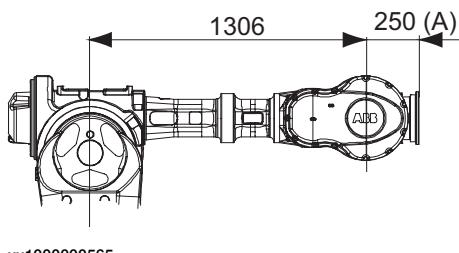
*Continued*

### IRB 7600 - 400/2.55 and IRB 7600 - 500/2.55



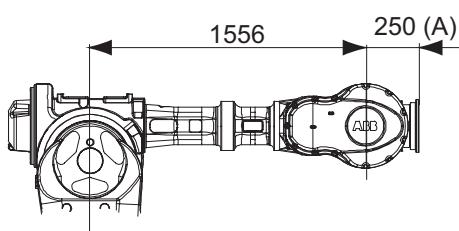
A	IRB 7600-400/2.55, 404 mm for LeanID
---	--------------------------------------

### IRB 7600 - 340/2.8



A	404 mm for LeanID
---	-------------------

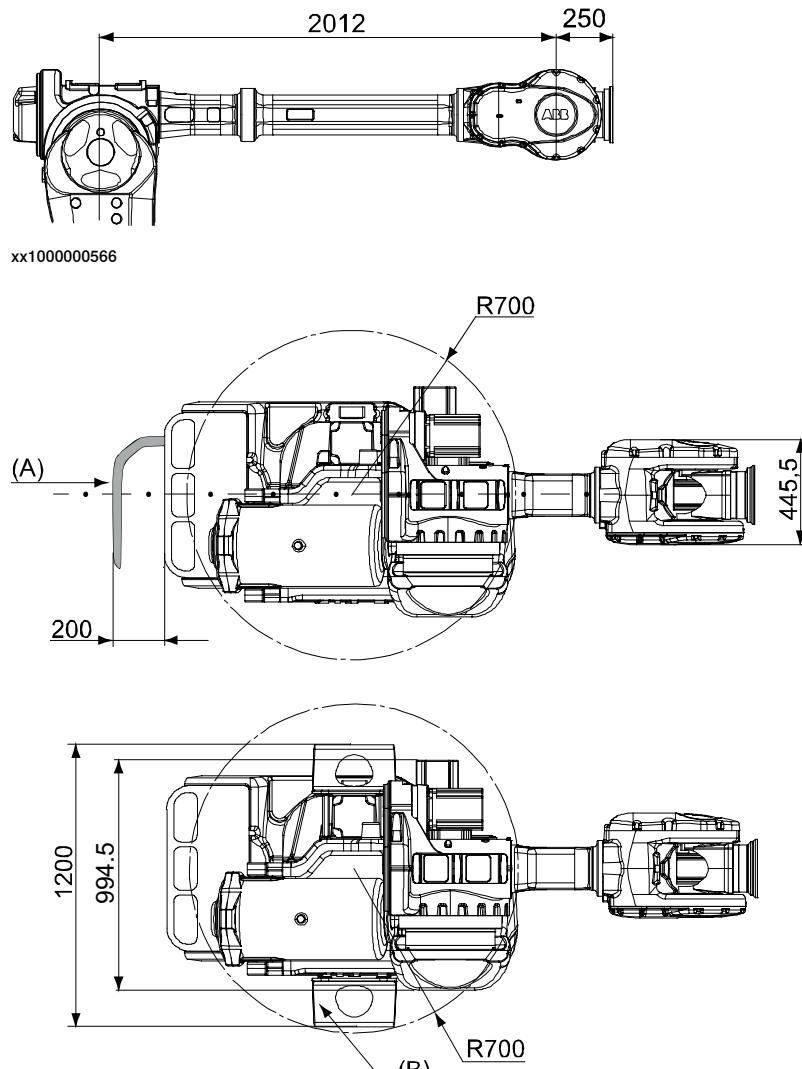
### IRB 7600 - 325/3.1



A	404 mm for LeanID
---	-------------------

*Continues on next page*

### IRB 7600 - 150/3.5



xx1000000566

Pos	Description
A	Robot power cable
B	Fork lift device

xx1000000607

# 1 Description

## 1.2.1 Applicable standards

## 1.2 Standards

### 1.2.1 Applicable standards



#### Note

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

#### General

The product is designed in accordance with ISO 10218-1:2011, Robots for industrial environments - Safety requirements -Part 1 Robots, and applicable parts in the normative references, as referred to from ISO 10218-1:2011. In case of deviations from ISO 10218-1:2011, these are listed in the declaration of incorporation which is part of the product delivery.

#### Normative standards as referred to from ISO 10218-1

Standard	Description
ISO 9283:1998	Manipulating industrial robots - Performance criteria and related test methods
ISO 10218-2	Robots and robotic devices - Safety requirements for industrial robots - Part 2: Robot systems and integration
ISO 12100	Safety of machinery - General principles for design - Risk assessment and risk reduction
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design
ISO 13850	Safety of machinery - Emergency stop - Principles for design
IEC 60204-1:2005	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
IEC 62061:2005	Safety of machinery - Functional safety of safety-related electrical, electronic and programmable electronic control systems

#### Region specific standards and regulations

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

#### Other standards used in design

Standard	Description
ISO 9787:2013	Robots and robotic devices -- Coordinate systems and motion nomenclatures
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments

*Continues on next page*

## 1 Description

### 1.2.1 Applicable standards

*Continued*

Standard	Description
IEC 61000-6-4 (option 129-1)	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13732-1:2006	Ergonomics of the thermal environment - Part 1
IEC 60974-1:2012 <sup>i</sup>	Arc welding equipment - Part 1: Welding power sources
IEC 60974-10:2014 <sup>i</sup>	Arc welding equipment - Part 10: EMC requirements
ISO 14644-1:2015 <sup>ii</sup>	Classification of air cleanliness
IEC 60529:1989 + A2:2013	Degrees of protection provided by enclosures (IP code)

<sup>i</sup> Only valid for arc welding robots. Replaces IEC 61000-6-4 for arc welding robots.

<sup>ii</sup> Only robots with protection Clean Room.

# **1 Description**

---

## **1.3.1 Introduction**

### **1.3 Installation**

#### **1.3.1 Introduction**

---

##### **General**

All versions of IRB 7600 are designed for floor mounting (no tilting allowed around X-axis or Y-axis). Depending on the robot version, an end effector with max. weight of 150 to 500 kg including payload, can be mounted on the mounting flange (axis 6). See [Load diagrams on page 36](#) for IRB 7600 generation robots.

---

##### **Extra loads**

Extra loads (valve packages, transformers) can be mounted on the upper arm with a maximum weight of 50 kg. On all versions an extra load of 500 kg can also be mounted on the frame of axis 1. For more information see [Mounting equipment on page 54](#).

---

##### **Working range**

The working range of axes 1-3 can be limited by mechanical stops.

## 1.3.2 Operating requirements

### Protection standards

<b>Robot version/ Protection standard</b>	<b>IEC60529</b>
All variants, manipulator	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 <sup>i</sup> (+ 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, for short periods (not exceeding 24 hours)	Standard	- 25°C (- 13°F) to + 55°C (+ 131°F) up to + 70°C (+ 158°F)

<sup>i</sup> At low environmental temperature < 10° 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 runs 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 Description

## 1.3.3 Mounting the manipulator

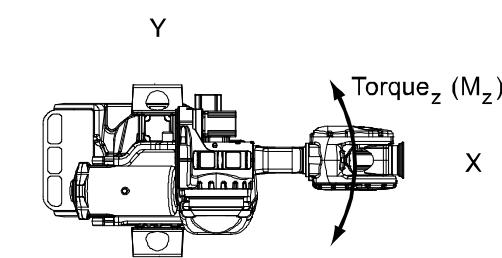
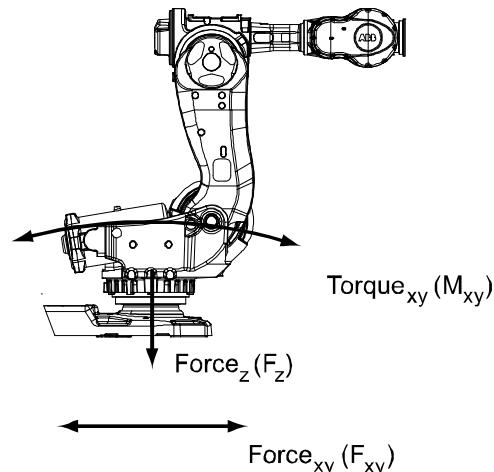
### 1.3.3 Mounting the manipulator

#### General

Maximum load in relation to the base coordinate system.

#### Floor Mounted

Force	Endurance load (in operation)	Max. load (emergency stop)
Force xy	$\pm 14 \text{ kN}$	$\pm 31 \text{ kN}$
Force z	$+32 \pm 10 \text{ kN}$	$+39 \pm 16 \text{ kN}$
Torque xy	$\pm 42 \text{ kNm}$	$\pm 72 \text{ kNm}$
Torque z	$\pm 11 \text{ kNm}$	$\pm 19.5 \text{ kNm}$



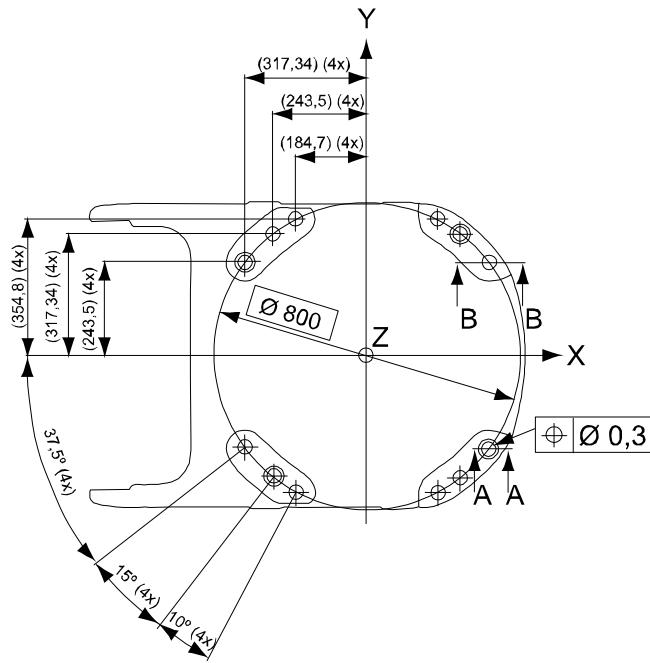
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#### Note regarding M<sub>xy</sub> and F<sub>xy</sub>

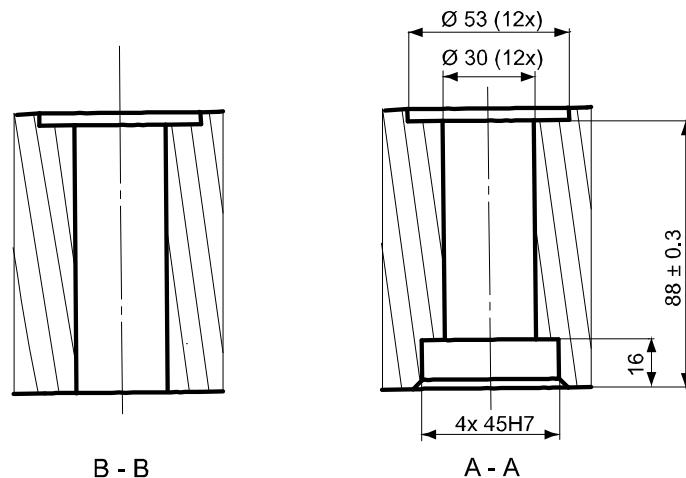
The bending torque (M<sub>xy</sub>) can occur in any direction in the XY-plane of the base coordinate system.

The same applies to the transverse force (F<sub>xy</sub>).

*Continues on next page*

**Fastening holes robot base**

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Recommended screws for fastening the manipulator to the base	M24 x 140 8.8 with 4 mm flat washer.
Torque value	725 Nm

Two guiding sleeves required, dimension see Figures in this chapter.

**Note**

Only two guiding sleeves shall be used. The corresponding holes in the base plate shall be circular and oval according to next two Figures below. Regarding AbsAcc performance, the chosen guide holes are to be recommended according to next two Figures below.

*Continues on next page*

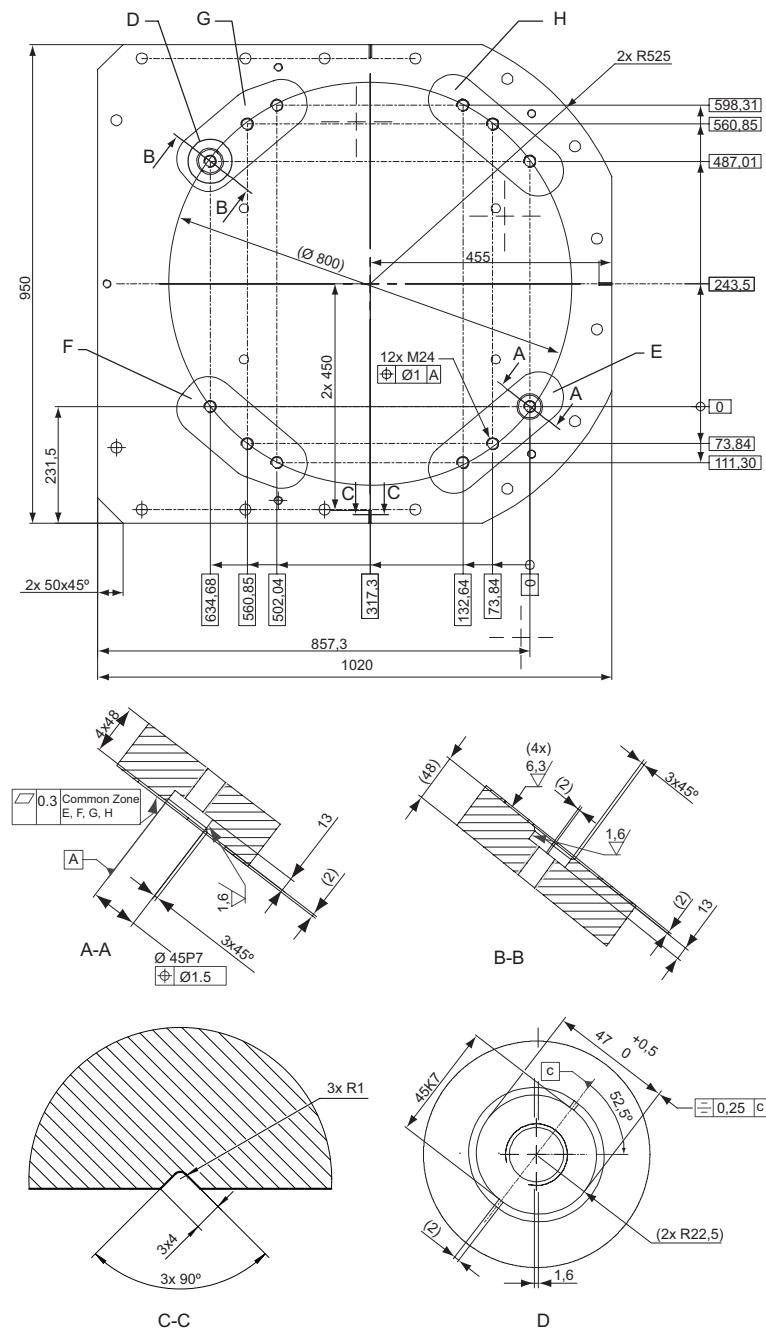
# 1 Description

## 1.3.3 Mounting the manipulator

*Continued*

### Base plate drawing

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



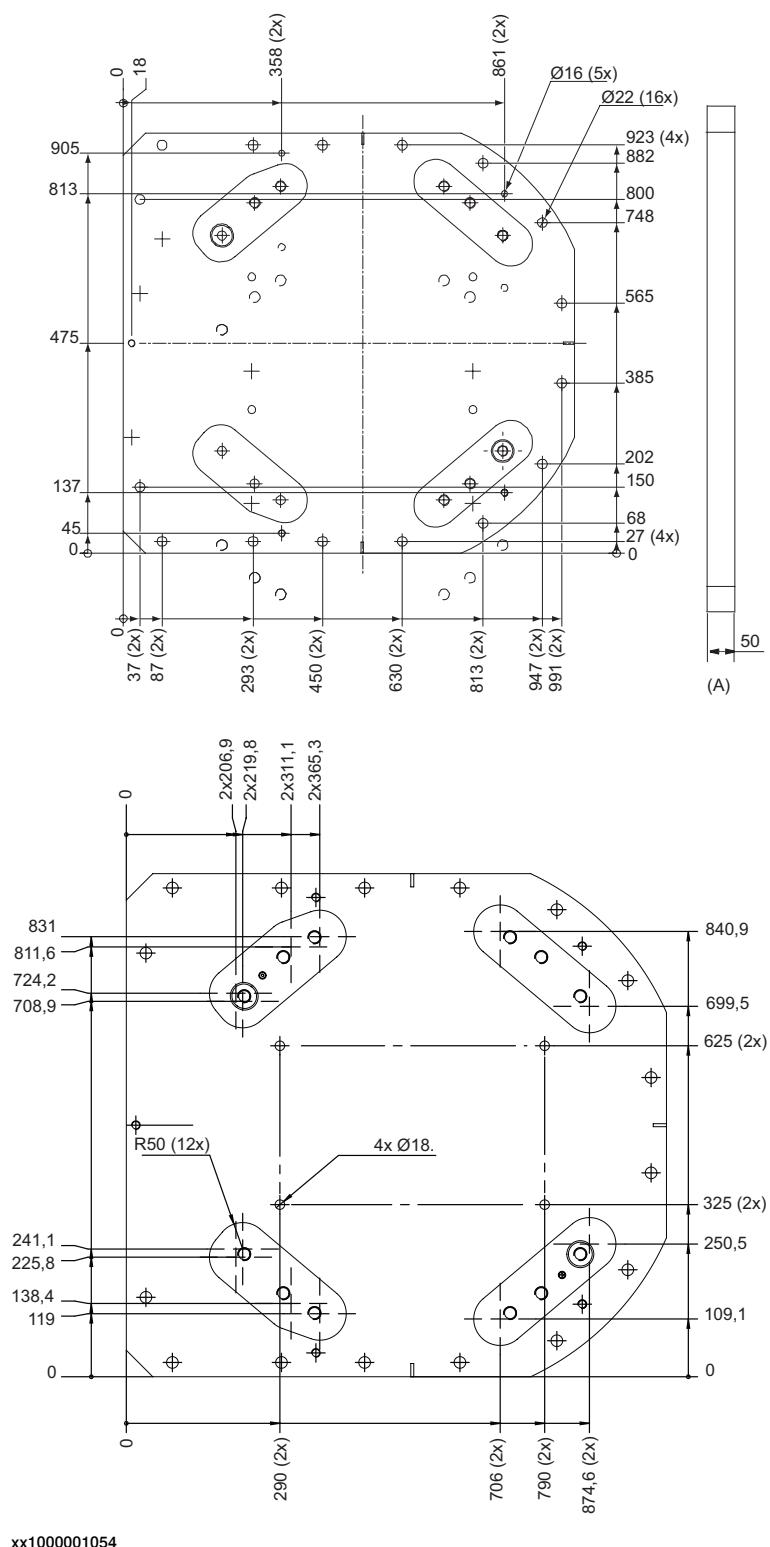
xx1000001053

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

*Continues on next page*

### 1.3.3 Mounting the manipulator

*Continued*



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

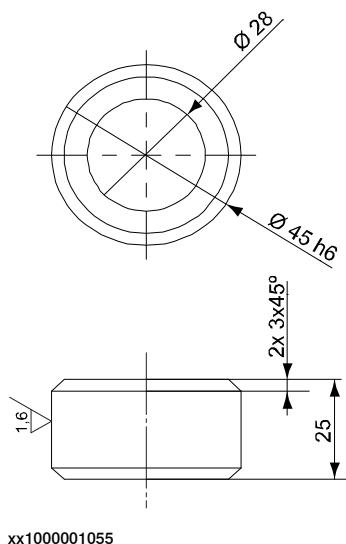
*Continues on next page*

## 1 Description

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### 1.3.3 Mounting the manipulator

*Continued*



Pos	Description
A	Guide sleeve protected from corrosion

---

#### Fastener quality

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

## 1.4 Calibration and references

### 1.4.1 Calibration methods

#### Overview

This section specifies the different types of calibration and the calibration methods that are supplied by ABB.

More information is available in the product manual.

#### Types of calibration

Type of calibration	Description	Calibration method
Standard calibration	<p>The calibrated robot is positioned at calibration position.</p> <p>Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot.</p> <p>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.</p>	Axis Calibration or Calibration Pendulum <sup>i</sup> Levelmeter calibration (alternative method)
Absolute accuracy calibration (optional)	<p>Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for:</p> <ul style="list-style-type: none"> <li>• Mechanical tolerances in the robot structure</li> <li>• Deflection due to load</li> </ul> <p>Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot.</p> <p>Absolute accuracy calibration data is found on the SMB (serial measurement board) in the robot.</p> <p>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.</p> <p>A robot calibrated with Absolute accuracy has a sticker next to the identification plate of the robot.</p> <p>To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure.</p>  <p><b>ABSOLUTE ACCURACY</b></p> <p>3HAC 14257-1</p> <p>xx0400001197</p>	CalibWare

*Continues on next page*

# 1 Description

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## 1.4.1 Calibration methods

*Continued*

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

- i The robot is calibrated by either Calibration Pendulum or Axis Calibration at factory. Always use the same calibration method as used at the factory.  
Information about valid calibration method is found on the calibration label or in the calibration menu on the FlexPendant.  
If no data is found related to standard calibration, 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 7600 and is the most accurate method for the standard calibration. It is the recommended method in order to achieve proper performance.

The following routines are available for the Axis Calibration method:

- Fine calibration
- Update revolution counters
- Reference calibration

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

The actual instructions of how to perform the calibration procedure and what to do at each step is given on the FlexPendant. You will be guided through the calibration procedure, step by step.

#### Wrist Optimization method

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

The following routines are available for the Wrist Optimization method:

- Wrist Optimization

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.

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*Continues on next page*

#### **CalibWare - Absolute Accuracy calibration**

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

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

# 1 Description

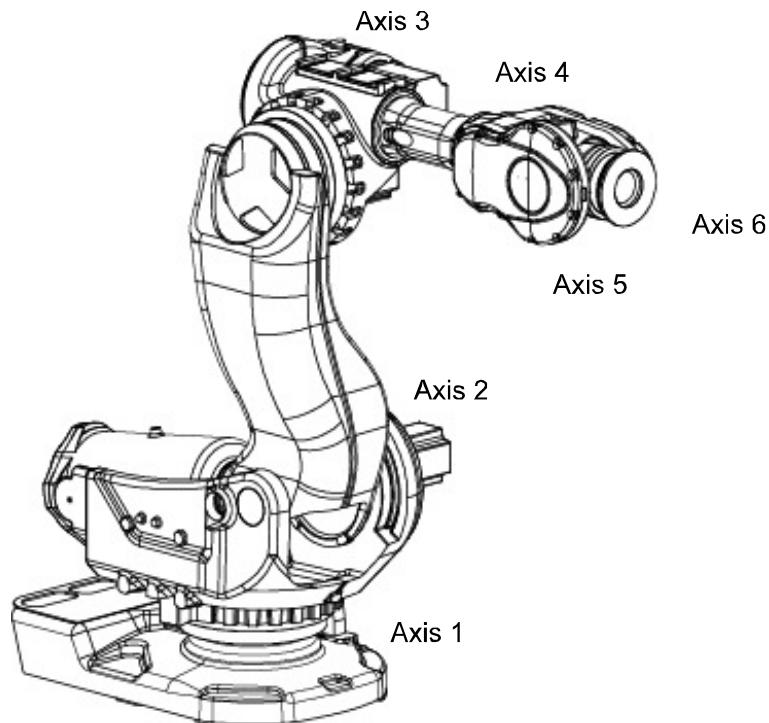
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## 1.4.2 Fine calibration

### 1.4.2 Fine calibration

#### General

Fine calibration is made using the Calibration Pendulum, see *Operating manual - Calibration Pendulum* or Axis calibration, see *Product manual - IRB 7600*.



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

### 1.4.3 Absolute Accuracy calibration

#### Purpose

**Absolute Accuracy** is a calibration concept that improves TCP accuracy. The difference between an ideal robot and a real robot can be several millimeters, resulting from mechanical tolerances and deflection in the robot structure. **Absolute Accuracy** compensates for these differences.

Here are some examples of when this accuracy is important:

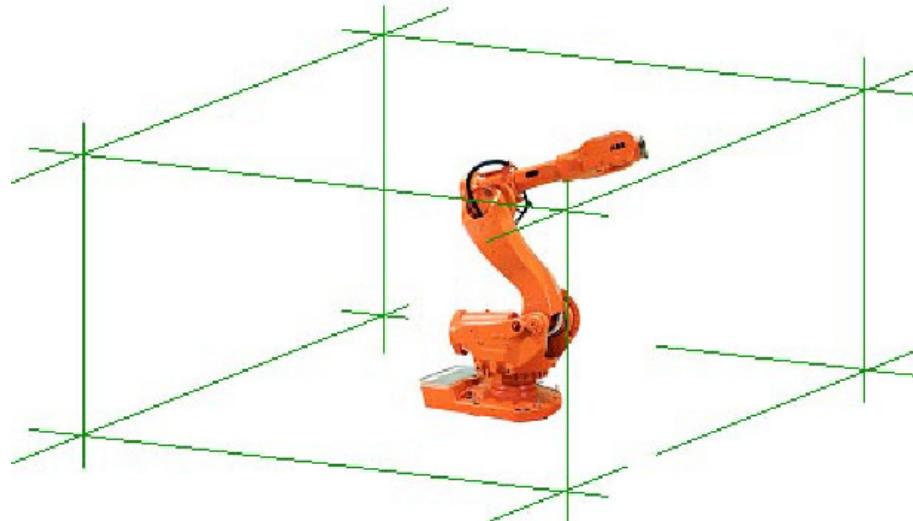
- Exchangeability of robots
- Offline programming with no or minimum touch-up
- Online programming with accurate movement and reorientation of tool
- Programming with accurate offset movement in relation to eg. vision system or offset programming
- Re-use of programs between applications

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*

# 1 Description

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## 1.4.3 Absolute Accuracy calibration

*Continued*

A robot with *Absolute Accuracy* calibration has a label with this information on the manipulator.

Absolute Accuracy supports floor mounted, wall mounted and ceiling mounted installations. Compensation parameters saved in the robot's serial measurement board differ depending on which Absolute Accuracy option is selected.

---

### When is *Absolute Accuracy* being used

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

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

#### Absolute Accuracy active

Absolute Accuracy will be active in the following cases:

- Any motion function based on robttargets (e.g. `MoveL`) and ModPos on robttargets
- 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.

*Continues on next page*

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#### Production data

Typical production data regarding calibration are:

Robot	Positioning accuracy (mm)		
	Average	Max	% Within 1 mm
IRB 7600-150/3.50	0.55	1.20	95
IRB 7600-340/2.80			
IRB 7600-325/3.1			
IRB 7600-400/2.55			
IRB 7600-500/2.55			

# 1 Description

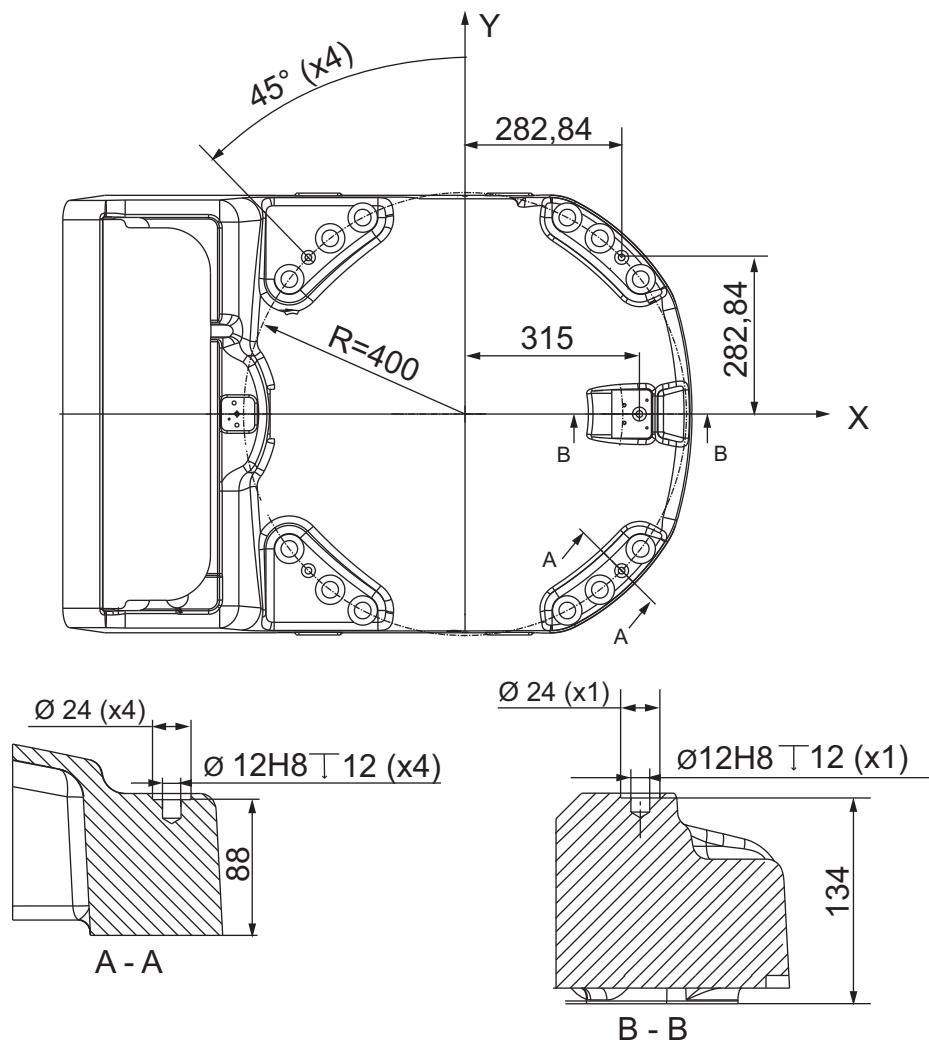
## 1.4.4 Robot reference

### 1.4.4 Robot reference

#### Base

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

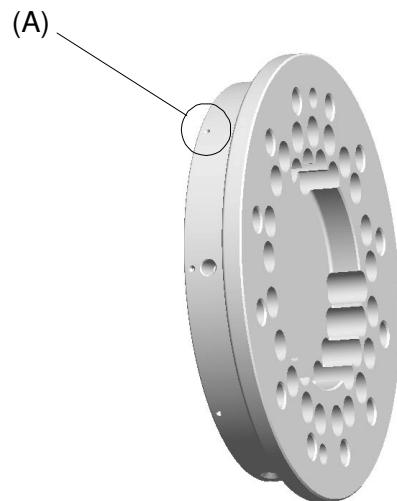
The holes are not available for option Foundry Plus.



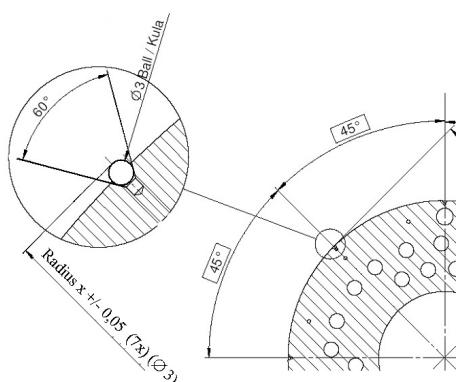
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### Tool Flange



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Robot	Radius X (mm) for references on tool flange
IRB 7600-150/3.50	R=113.5
IRB 7600-325/3.10	
IRB 7600-340/2.80	
IRB 7600-400/2.55	
IRB 7600-500/2.55	

# 1 Description

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## 1.5.1 Introduction

### 1.5 Load diagrams

#### 1.5.1 Introduction

##### Information



##### WARNING

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

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

- motors
- gearboxes
- mechanical structure



##### WARNING

In RobotWare, the service routine LoadIdentify can be used to determine correct load parameters. The routine automatically defines the tool and the load. See *Operating manual - IRC5 with FlexPendant*, for detailed information.



##### WARNING

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

---

##### General

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

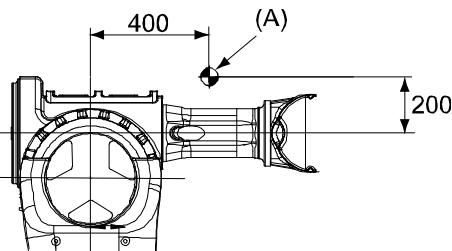
At different moment of inertia the load diagram will be changed. For robots that are allowed tilted, wall or inverted mounted, the load diagrams as given are valid and thus it is also possible to use RobotLoad within those tilt and axis limits.

*Continues on next page*

### Control of load case with RobotLoad

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

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



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Pos	Description
A	Center of gravity 50 kg

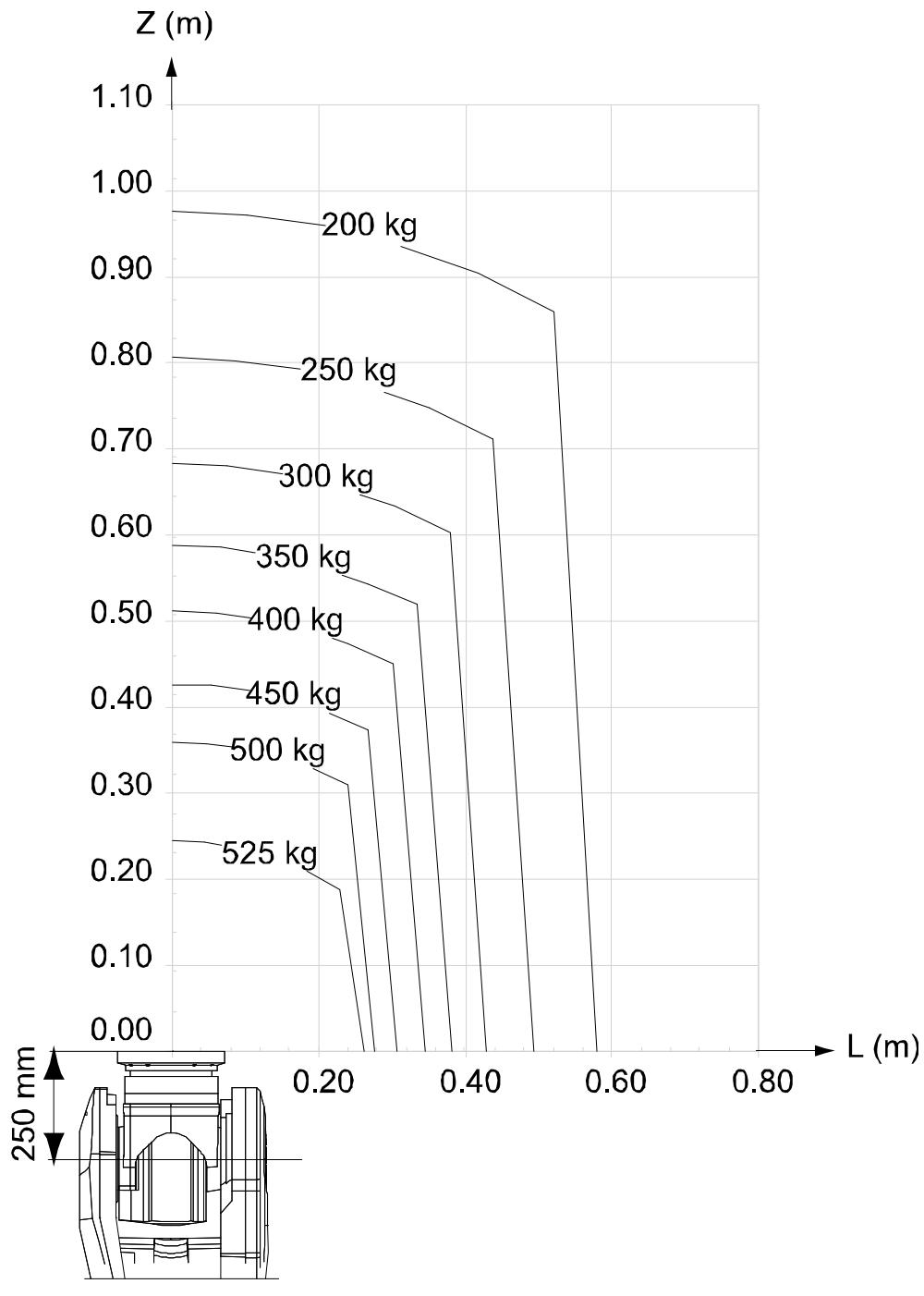
## **1 Description**

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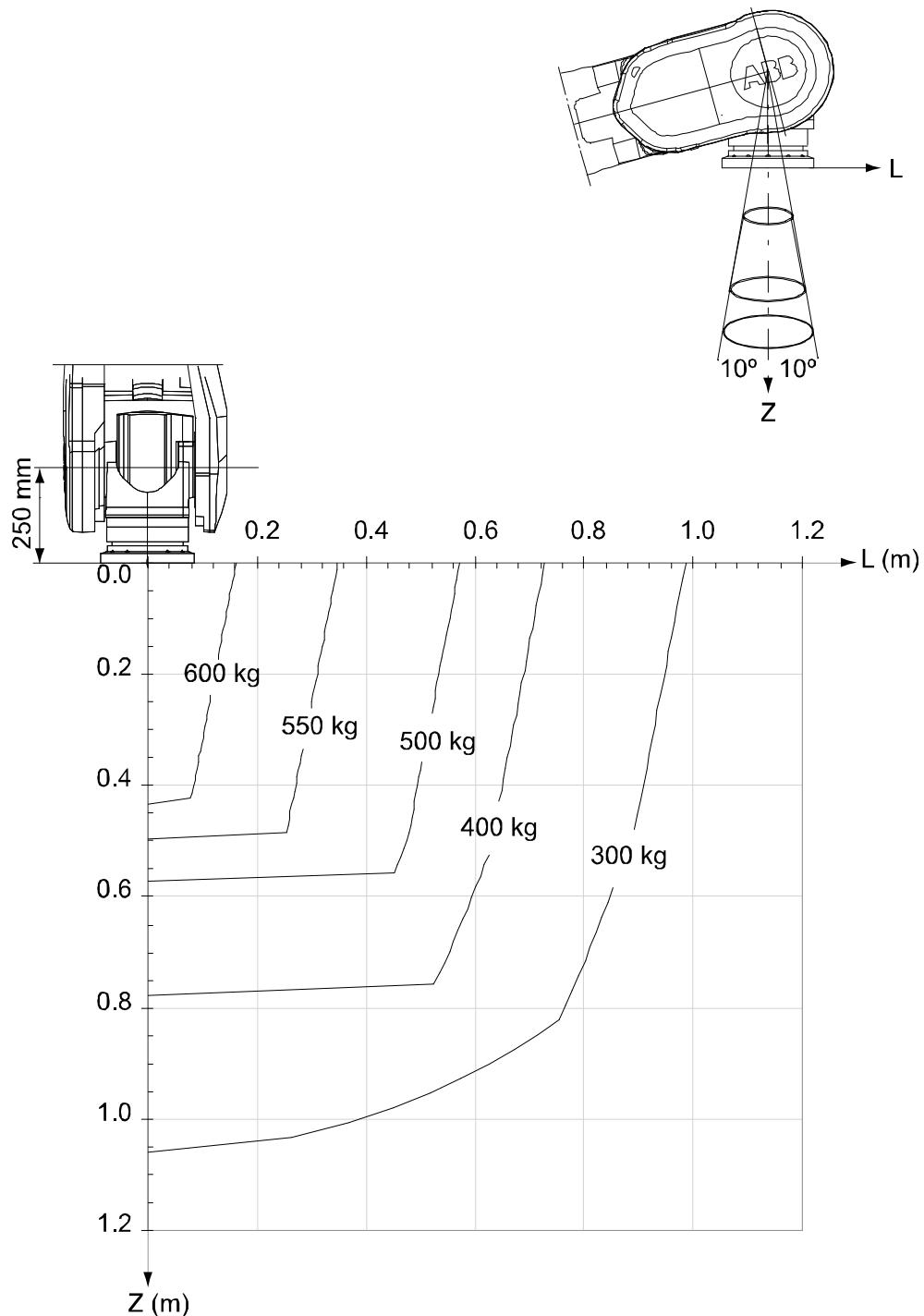
### **1.5.2 Load diagrams**

#### **1.5.2 Load diagrams**

**IRB 7600 - 500/2.55**



*Continues on next page*

IRB 7600 - 500/2.55 "Vertical Wrist" ( $\pm 10^\circ$ )

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	Description
Max load	630 kg
Z <sub>max</sub>	0,392 m
L <sub>max</sub>	0,099 m

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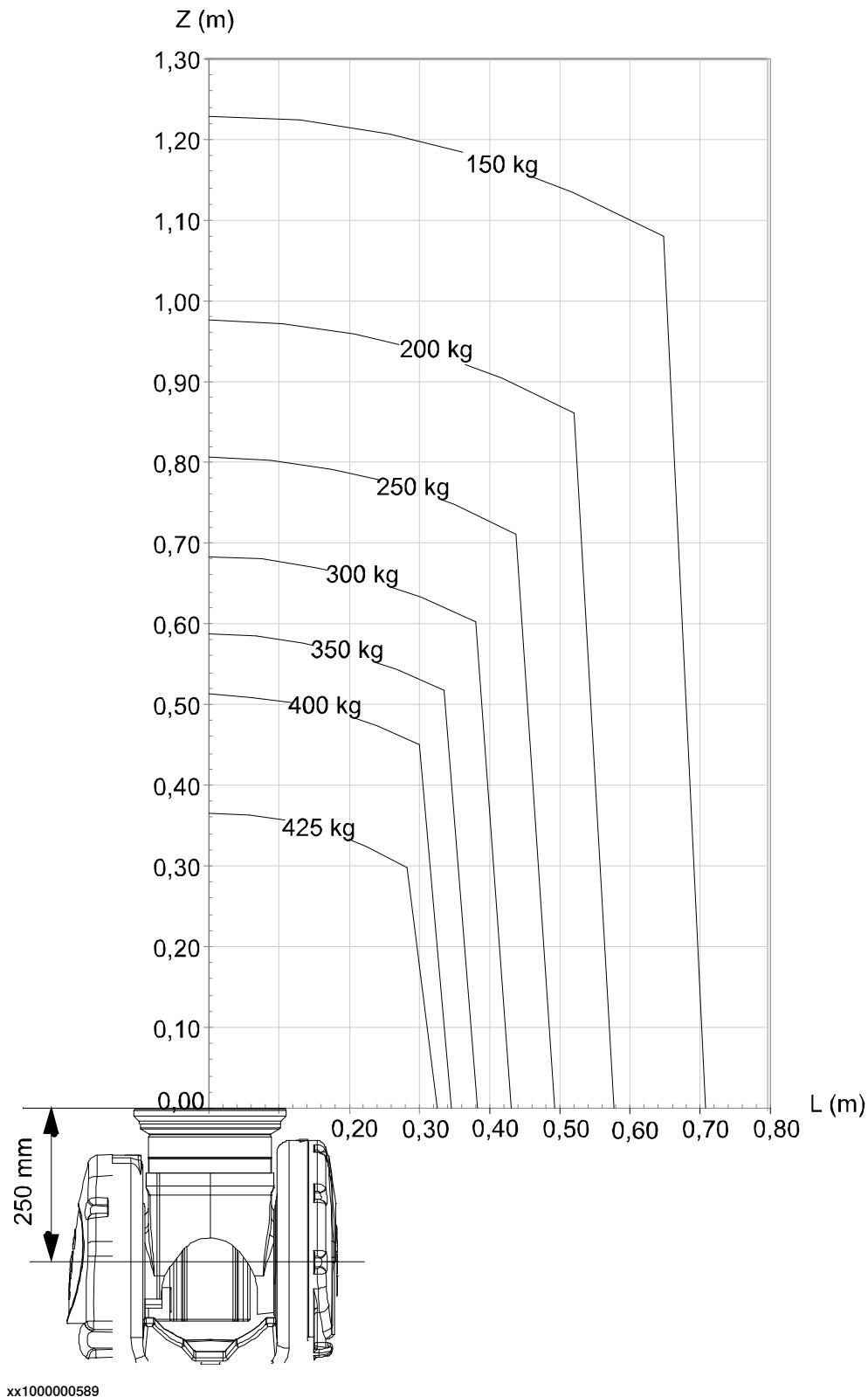
## 1 Description

### 1.5.2 Load diagrams

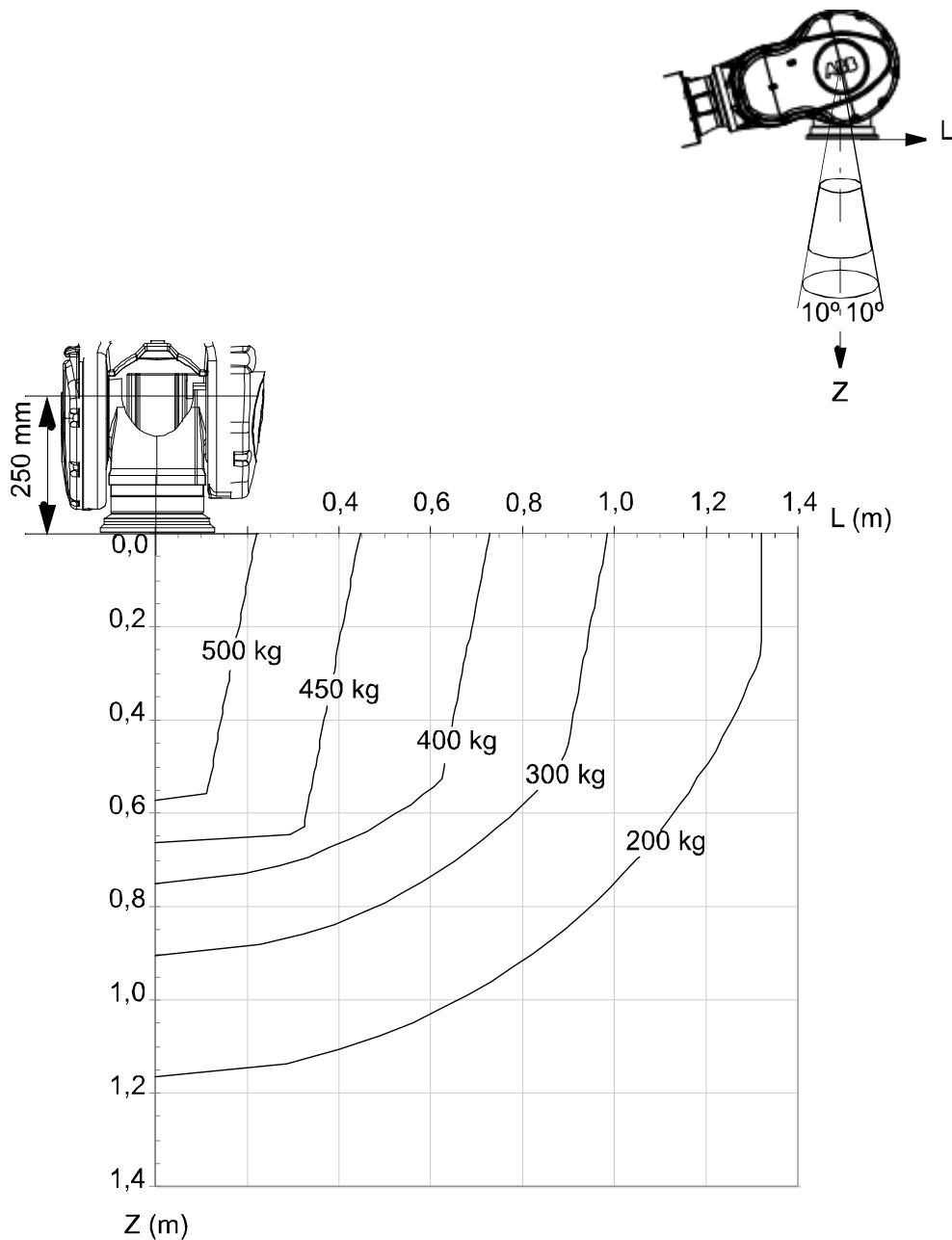
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IRB 7600 - 400/2.55



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IRB 7600 - 400/2.55 "Vertical Wrist" ( $\pm 10^\circ$ )

xx1000000584

Description	
Max load	540 kg
$Z_{max}$	0,498 m
$L_{max}$	0,103 m

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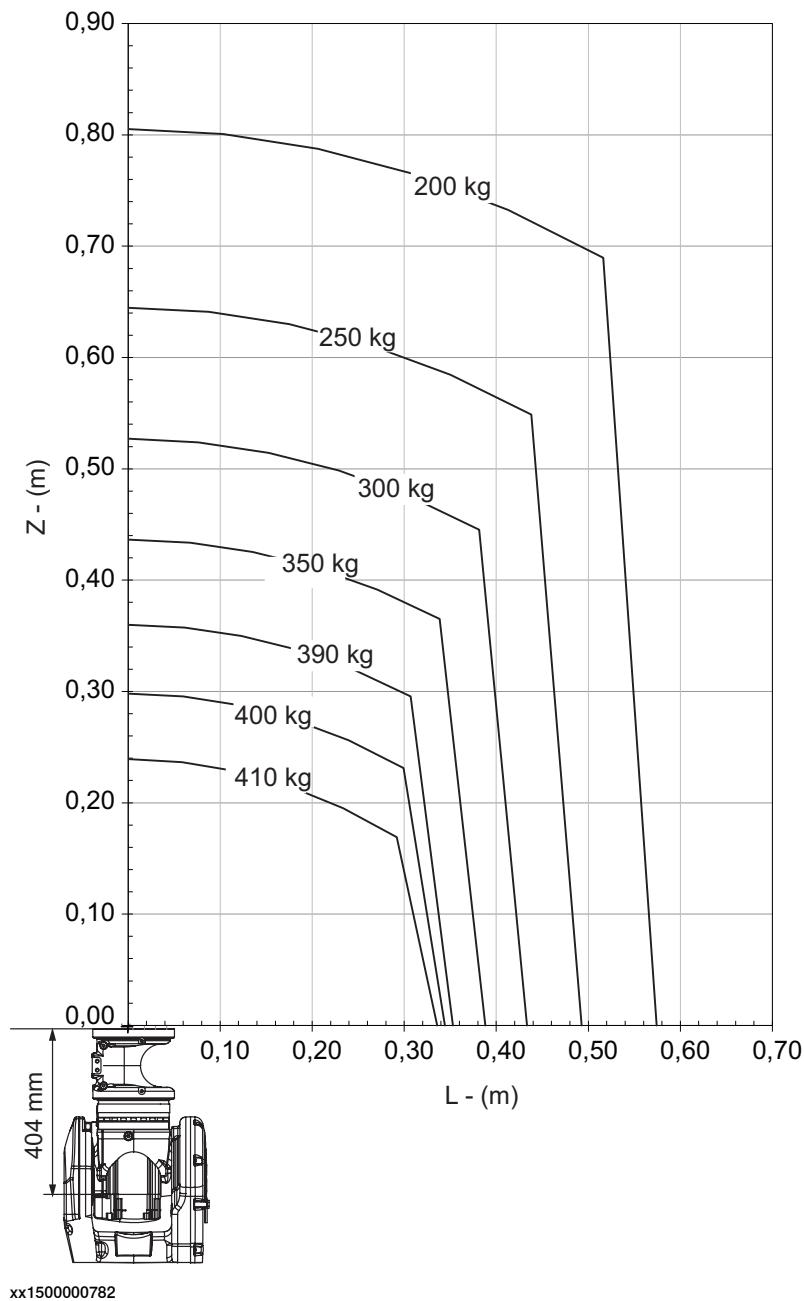
## 1 Description

### 1.5.2 Load diagrams

*Continued*

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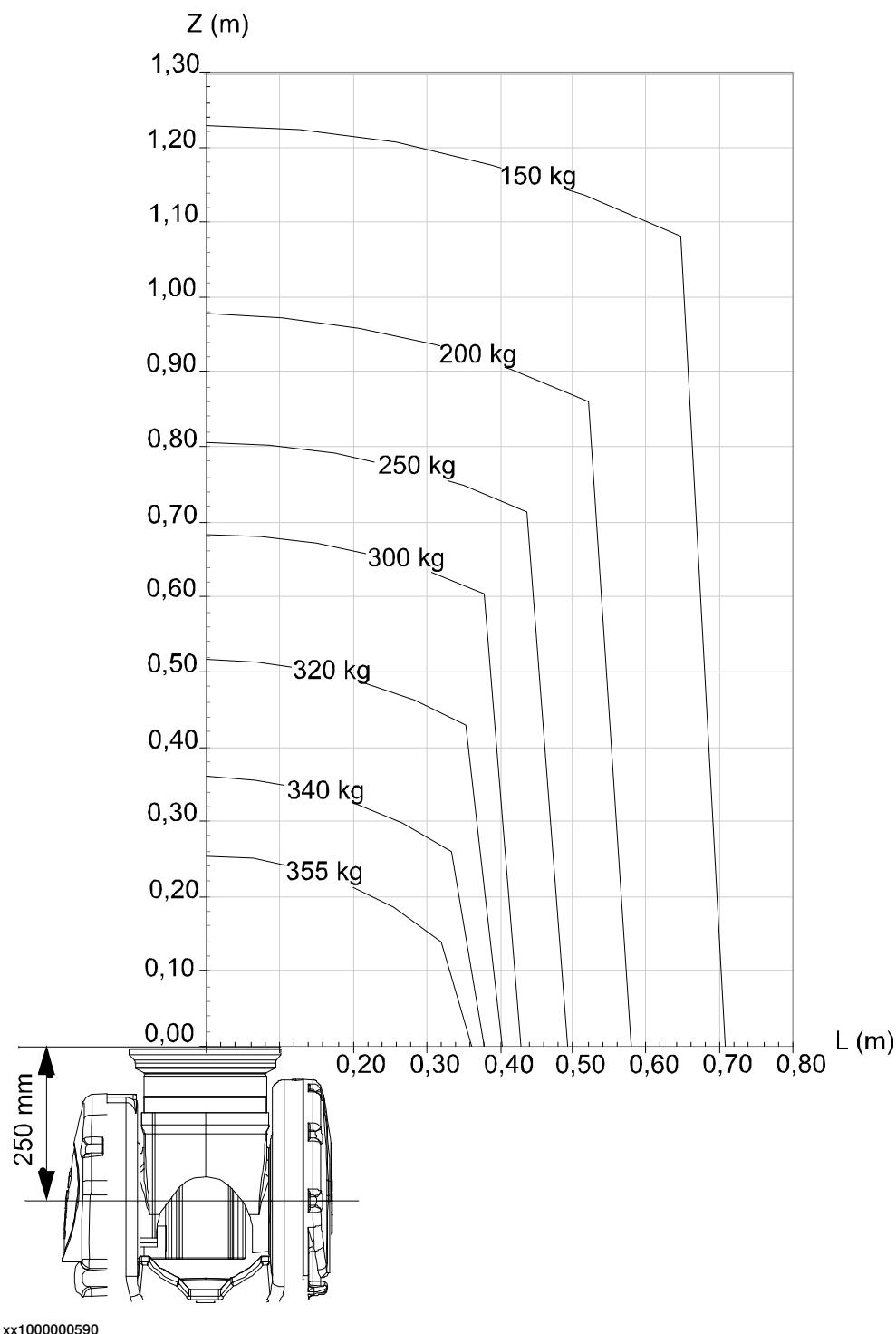
#### IRB 7600 - 400/2.55 "LeanID", option 780-4



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### IRB 7600 - 340/2.8



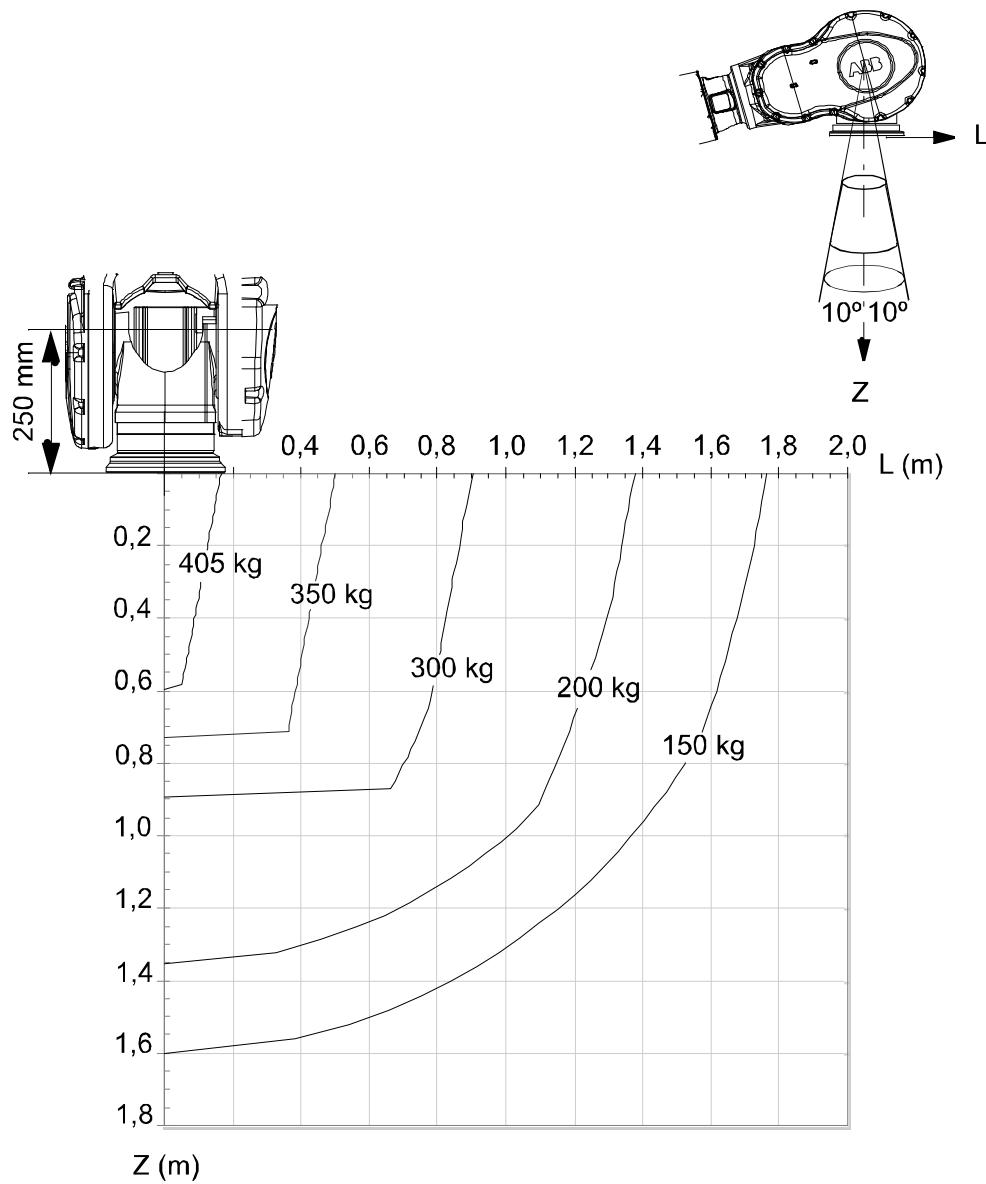
# 1 Description

## 1.5.2 Load diagrams

*Continued*

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### IRB 7600 - 340/2.8 "Vertical Wrist" ( $\pm 10^\circ$ )



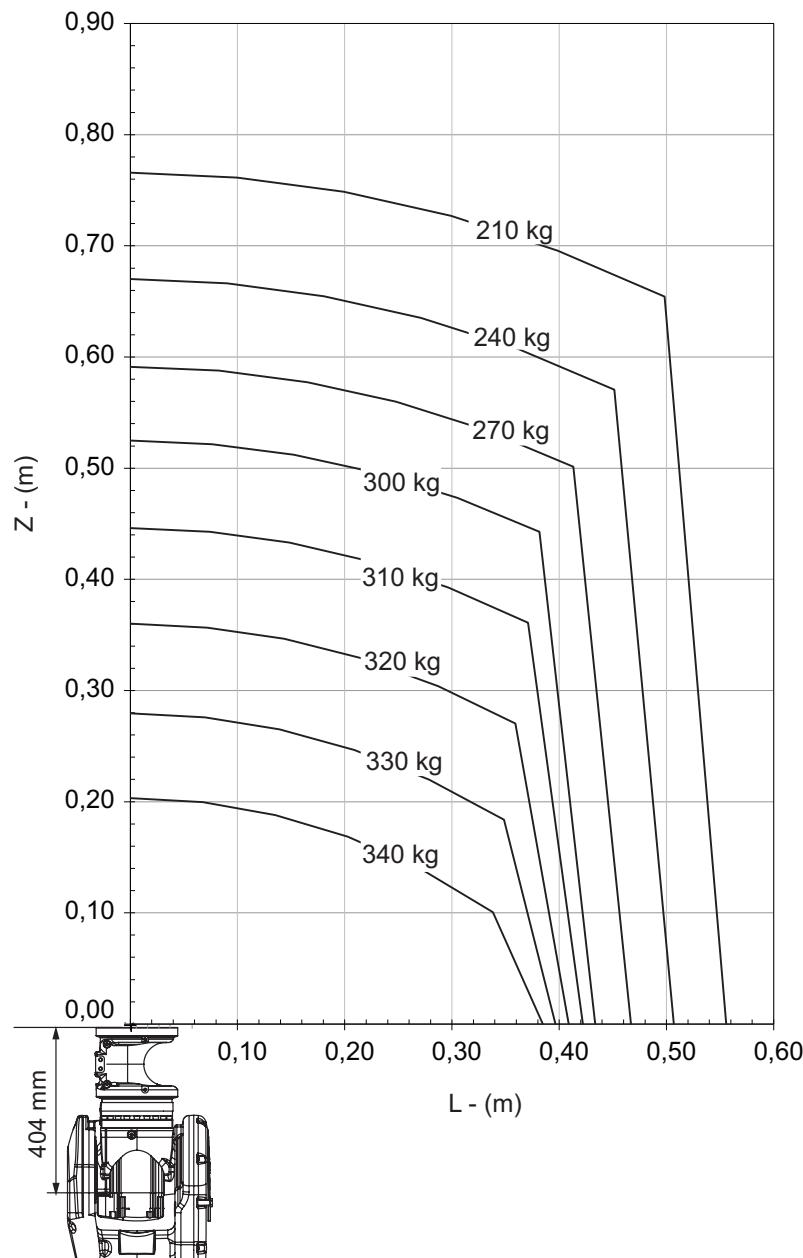
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For wrist down ( $0^\circ$  deviation from the vertical line).

	Description
Max load	420 kg
$Z_{\max}$	0,553 m
$L_{\max}$	0,121 m

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### IRB 7600 - 340/2.8 "LeanID", option 780-4



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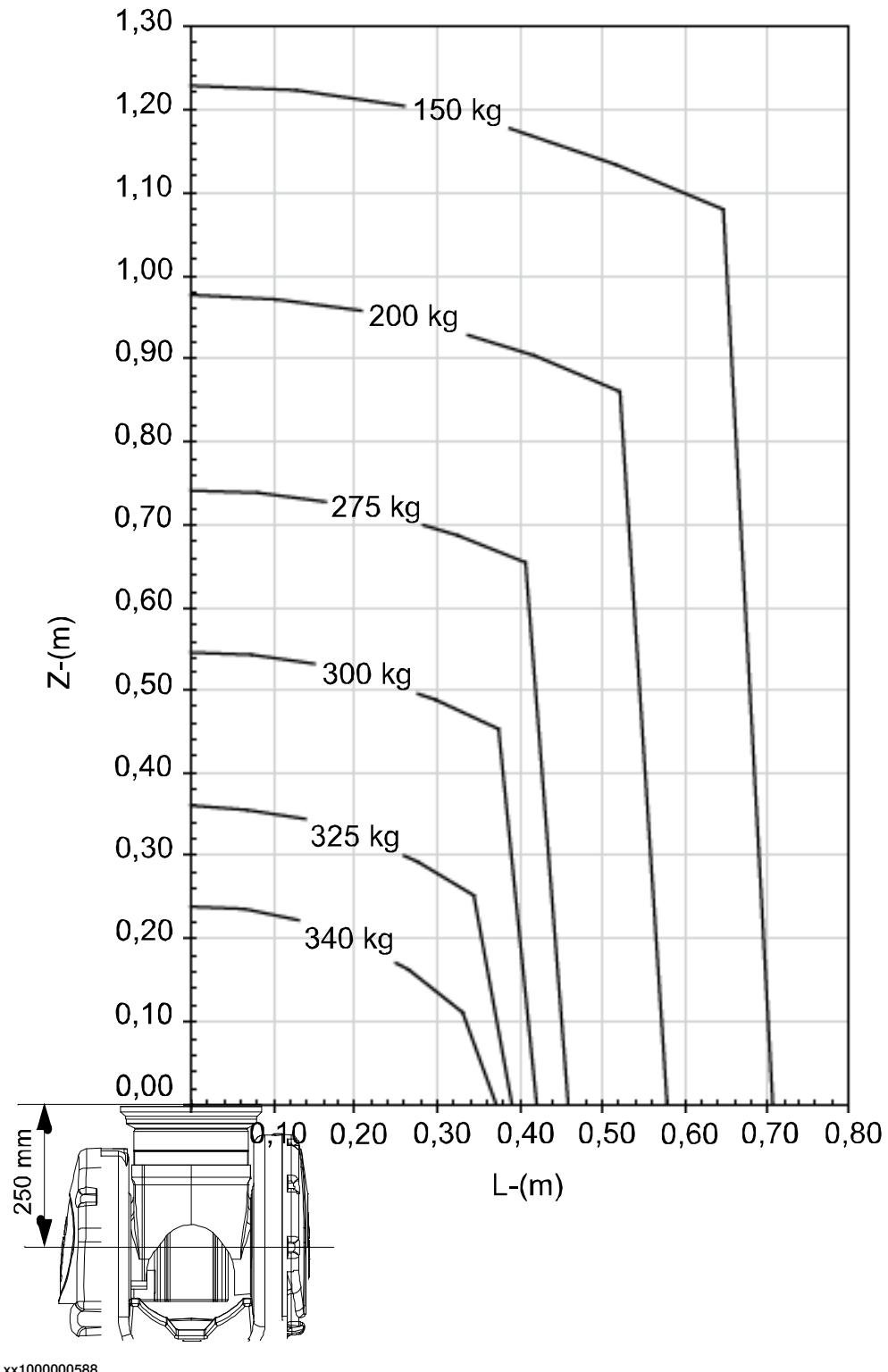
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## 1 Description

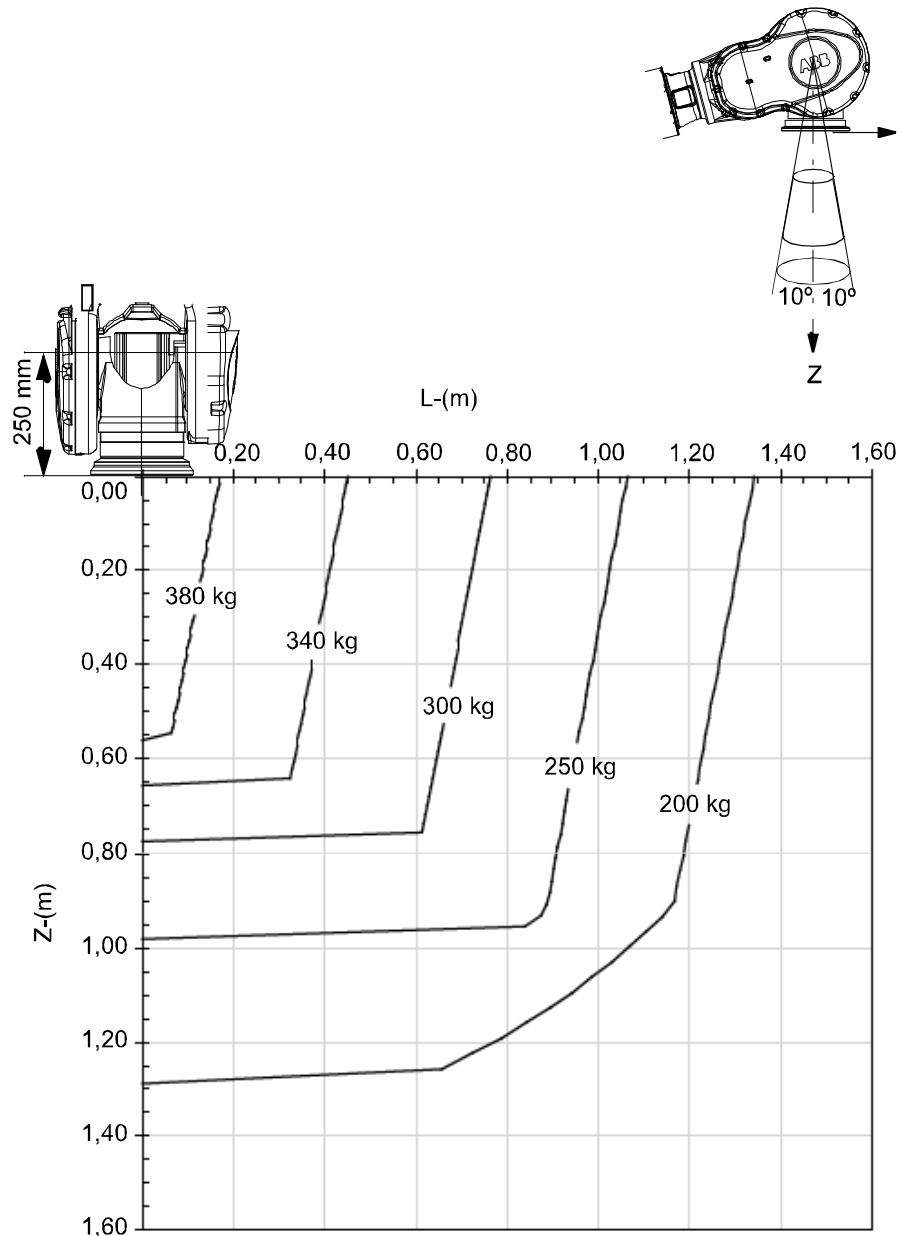
### 1.5.2 Load diagrams

*Continued*

IRB 7600 - 325/3.1



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IRB 7600 - 325/3.1 "Vertical Wrist" ( $\pm 10^\circ$ )

xx1000000582

For wrist down ( $0^\circ$  deviation from the vertical line).

	Description
Max load	400 kg
$Z_{max}$	0,519 m
$L_{max}$	0,095 m

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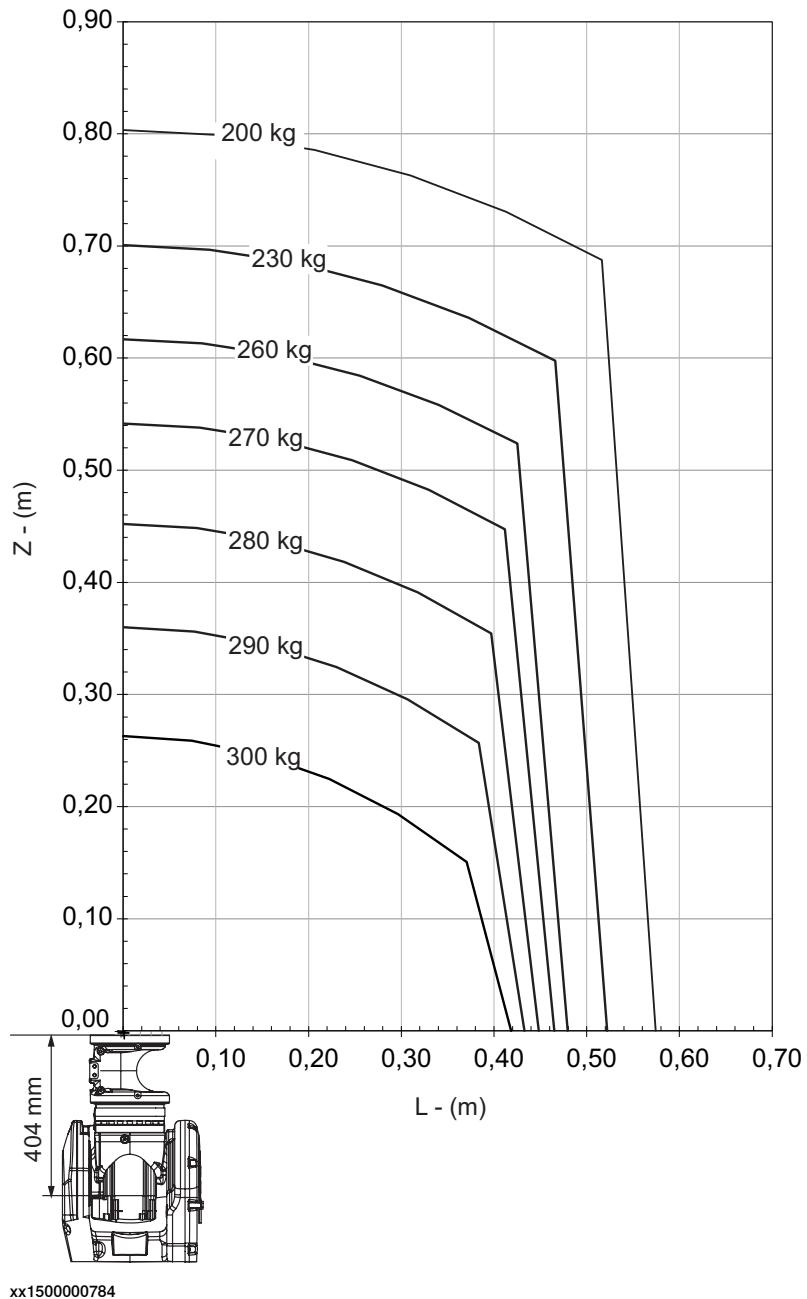
## 1 Description

### 1.5.2 Load diagrams

*Continued*

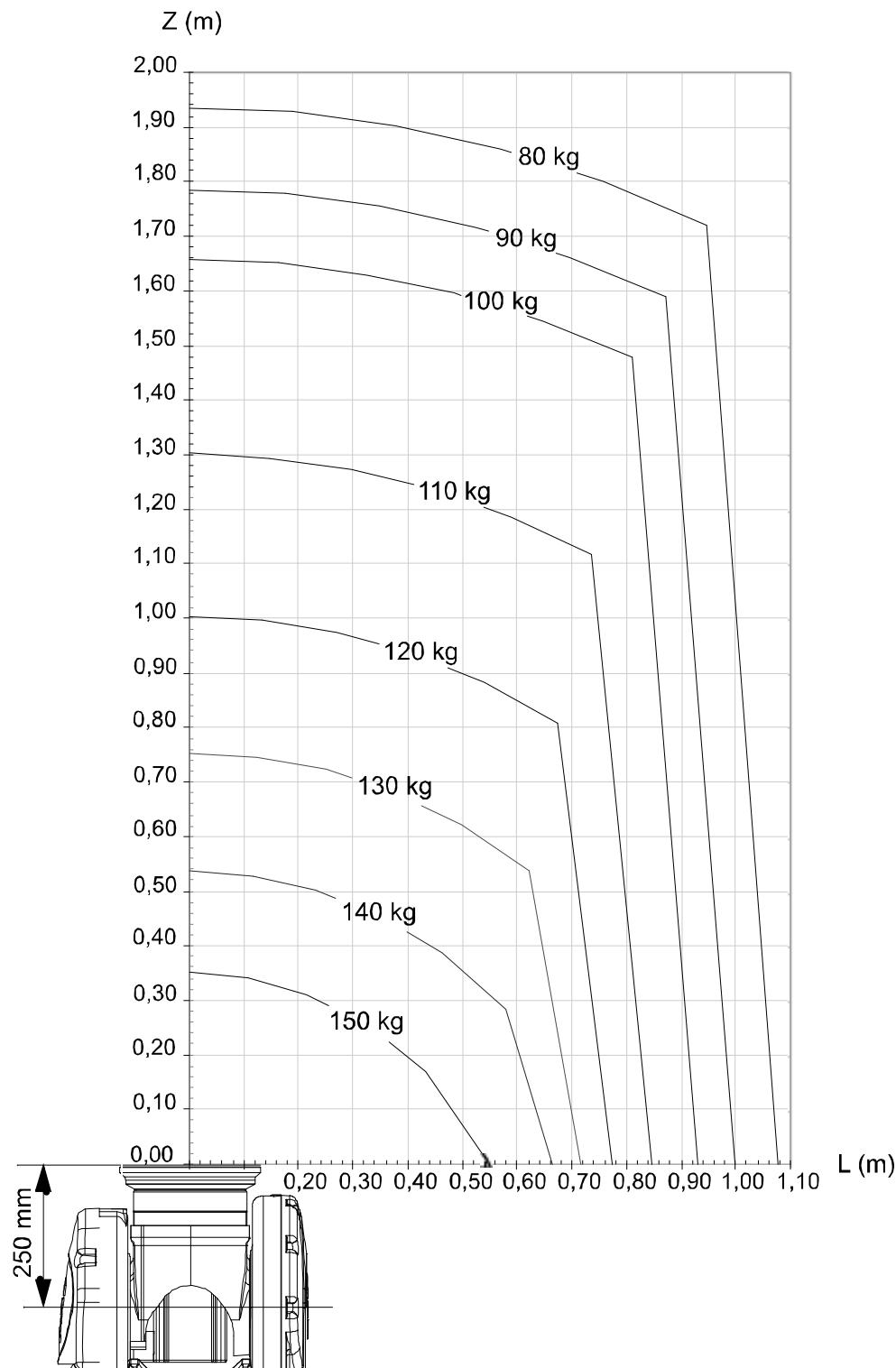
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#### IRB 7600 - 325/3.1 "LeanID", option 780-4



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**IRB 7600 - 150/3.5**

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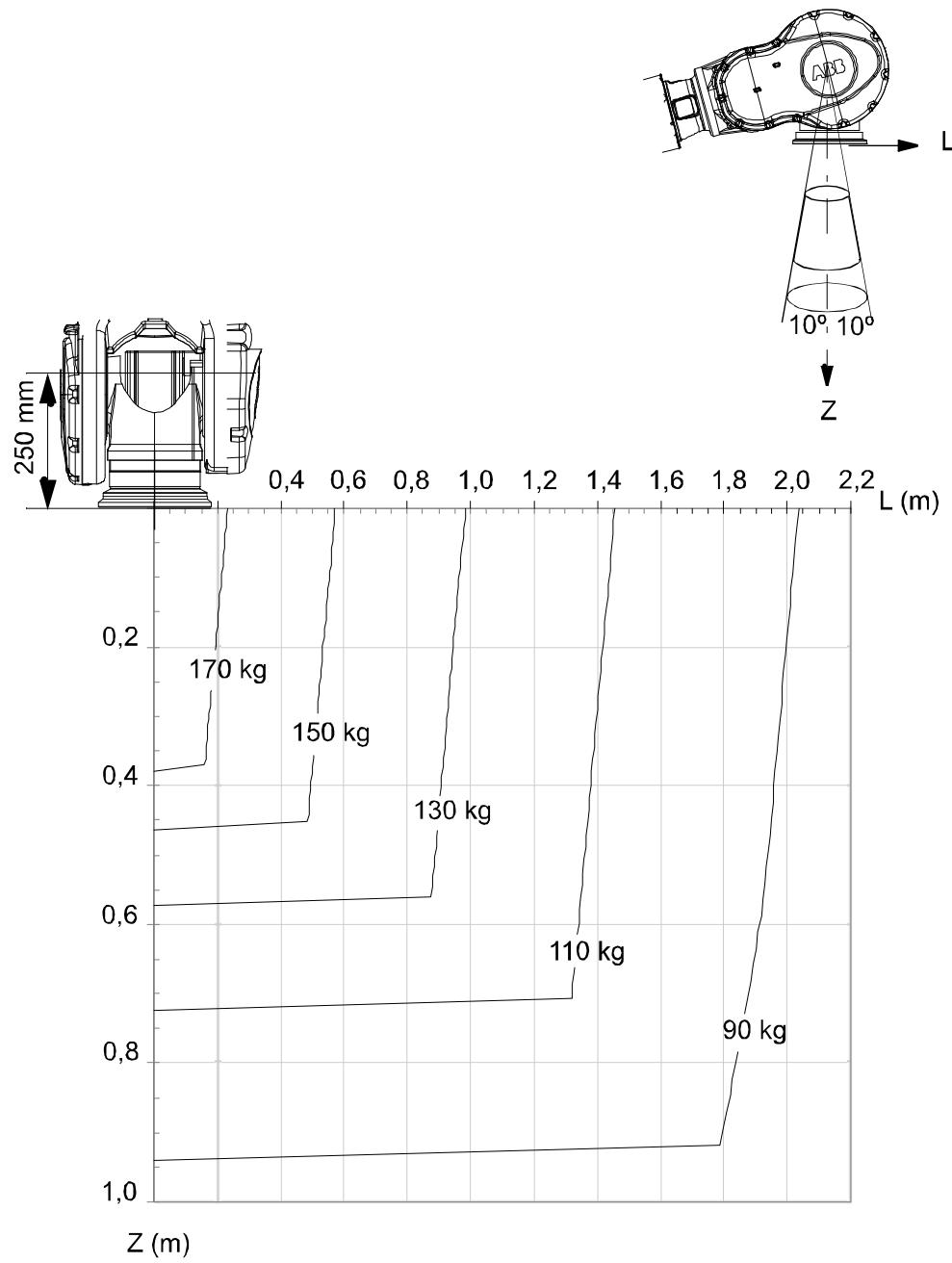
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# 1 Description

## 1.5.2 Load diagrams

*Continued*

### IRB 7600 - 150/3.5 "Vertical Wrist" ( $\pm 10^\circ$ )



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For wrist down ( $0^\circ$  deviation from the vertical line).

	Description
Max load	180 kg
$Z_{\max}$	0,337 m
$L_{\max}$	0,126 m

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

**1.5.3 Max. load and moment of inertia for full and limited axis 5 (center down line) movement****Note**

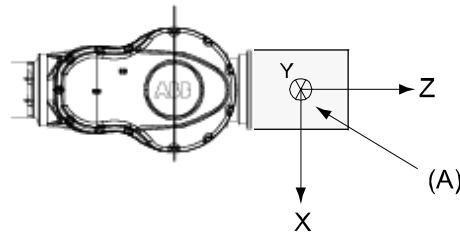
Total load given as: Mass in kg, center of gravity (Z and L) in meter and moment of inertia ( $J_{ox}$ ,  $J_{oy}$ ,  $J_{oz}$ ) in  $\text{kgm}^2$ .  $L = \sqrt{X^2 + Y^2}$ , see Figure below

**Full movement of axis 5 ( $\pm 100^\circ$ )**

Axis	Maximum moment of inertia
5	$J_{a5} = \text{Mass} \times ((Z+0.250)^2 + L^2) + \max(J_{0x}, J_{0y}) \leq 500 \text{ kgm}^2$
6	$J_{a6} = \text{Mass} \times L^2 + J_{0z} \leq 315 \text{ kgm}^2$

i For option 780-4, LeanID=0,404 m

	Description
$J_{ox}$ , $J_{oy}$ , $J_{oz}$	Max. moment of inertia around the X, Y and Z axes at center of gravity.



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Pos	Description
A	Center of gravity

**Limited axis 5, center line down**

Axis	Maximum moment of inertia
5	$J_{a5} = \text{Load} \times ((Z+0.250)^2 + L^2) + (J_{0x}, J_{0y}) \leq 550 \text{ kgm}^2$
6	$J_{a6} = \text{Load} \times L^2 + J_{0z} \leq 500 \text{ kgm}^2$

i For option 780-4, LeanID=0,404 m

	Description
$J_{0x}$ , $J_{0y}$ , $J_{0z}$	Max. moment of inertia around the X, Y and Z axes at center of gravity.

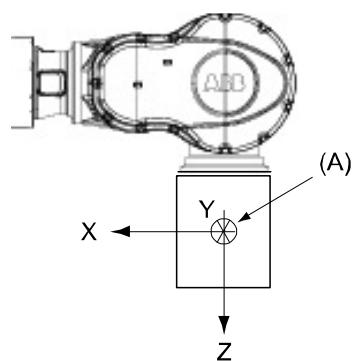
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## 1 Description

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

*Continued*



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Pos	Description
A	Center of gravity

## 1.5.4 Wrist torque

### General

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



#### Note

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

Robot type	Max wrist torque axis 4 and 5	Max wrist torque axis 6	Max torque valid at load
IRB 7600 - 500/2.55	2990 Nm	1354 Nm	500 kg
IRB 7600 - 400/2.55	2990 Nm	1354 Nm	400 kg
IRB 7600 - 340/2.8	2746 Nm	1265 Nm	300 kg
IRB 7600 - 325/3.1	2681 Nm	1241 Nm	278 kg
IRB 7600 - 150/3.5	1700 Nm	800 Nm	100 kg

# 1 Description

## 1.5.5 Mounting equipment

### 1.5.5 Mounting equipment

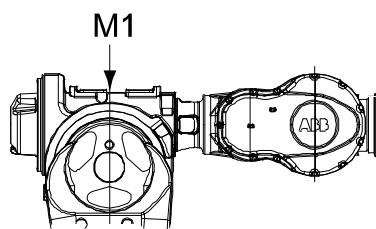
#### General

Extra loads can be mounted on the upper arm housing, the lower arm, and on the frame. Definitions of distances and masses are shown in Figure below and Figure on next page. The robot is supplied with holes for mounting extra equipment (see Figure in next chapter). Maximum permitted arm load depends on center of gravity of arm load and robot payload.

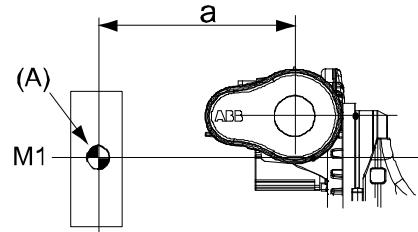
#### Upper arm

Permitted extra load on upper arm housing plus the maximum handling weight (see Figure below):

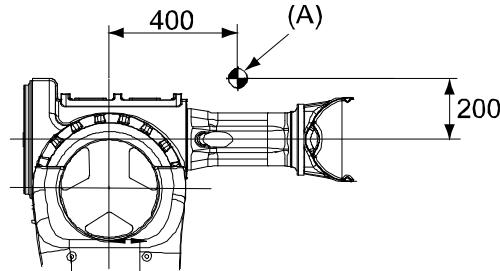
$M_1 \leq 50 \text{ kg}$  with distance  $a \leq 500 \text{ mm}$ , center of gravity in axis 3 extension.



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Pos	Description
A	Mass center



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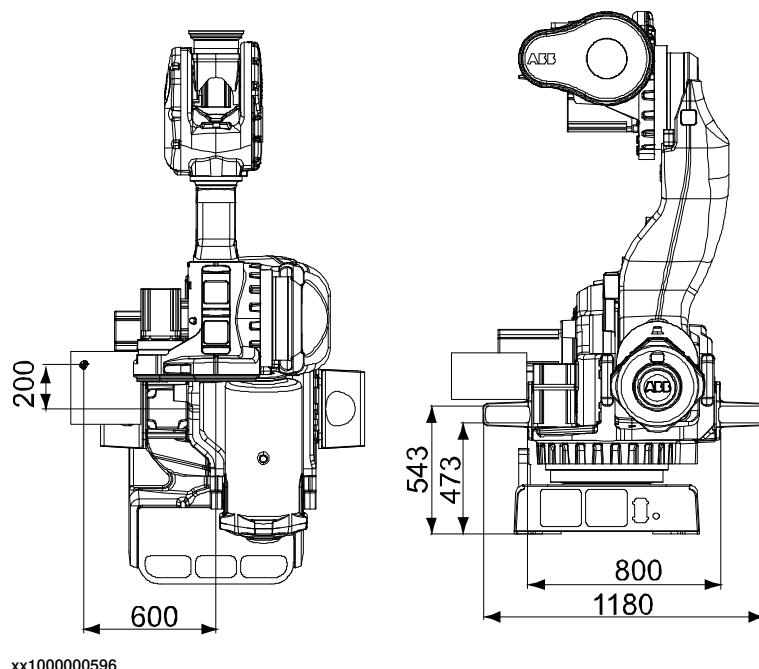
Pos	Description
A	Center of gravity 50 kg

*Continues on next page*

### Frame (Hip Load)

Permitted extra load on frame	$J_H = 200 \text{ kgm}^2$
Recommended position (see Figure below)	$J_{H0} + M_4 \times R^2$ where $J_{H+}$ is the moment of inertia of the equipment $R$ is the radius (m) from the center of axis 1 $M_4$ is the total mass (kg) of the equipment including bracket and harness ( $\leq 500 \text{ kg}$ ).

### View from above



# 1 Description

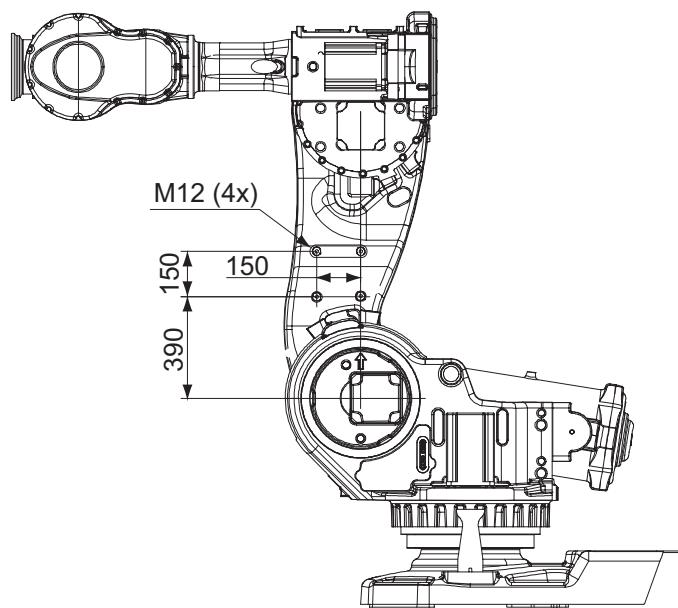
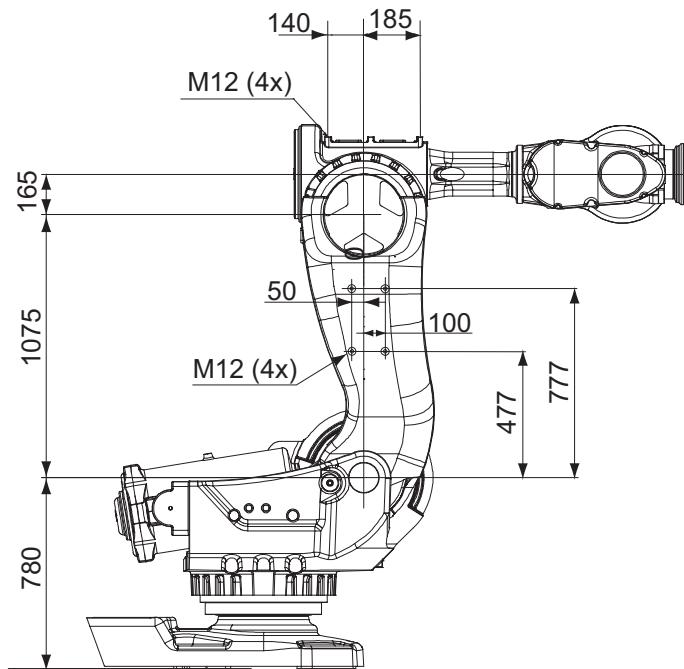
## 1.5.6 Mounting of hip load

### 1.5.6 Mounting of hip load

#### General

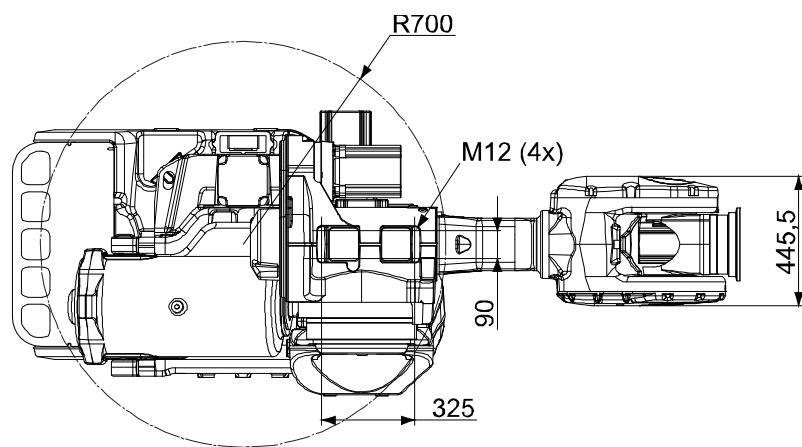
The extra load can be mounted on the frame. Holes for mounting see Figure below. When mounting on the frame all the four holes (2x2, Ø16) on one side must be used.

#### Holes for mounting extra equipment

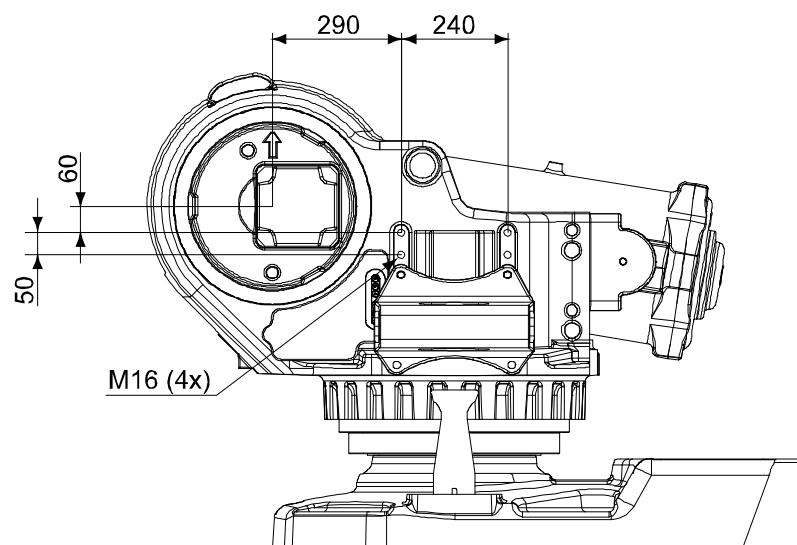


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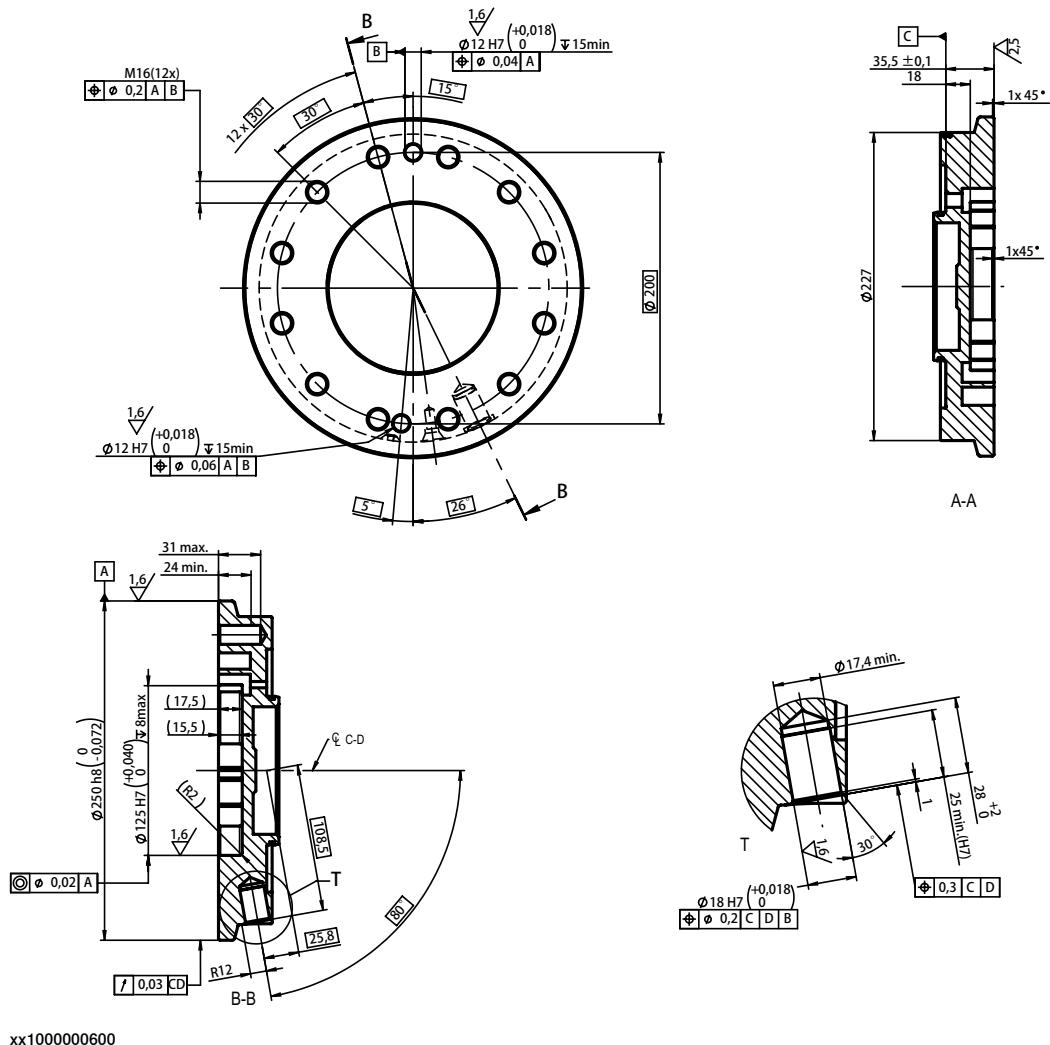
*Continues on next page*

# 1 Description

## 1.5.6 Mounting of hip load

*Continued*

The tool flange is also valid for LeanID.



### Fastener quality

Use suitable screws and tightening torque for your application.

## 1.5.7 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 Max acceleration at nominal load COG [m/s <sup>2</sup> ]	Controlled Motion Max acceleration at nominal load COG [m/s <sup>2</sup> ]
IRB 7600 - 500/2.55	34	15
IRB 7600 - 400/2.55	38	18
IRB 7600 - 340/2.8	41	18
IRB 7600 - 325/3.10	45	18
IRB 7600 - 150/3.50	55	24



#### Note

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

## **1 Description**

---

### **1.6.1 Introduction**

## **1.6 Maintenance and troubleshooting**

### **1.6.1 Introduction**

---

#### **General**

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

- Maintenance-free AC motors are used
- Liquid grease or 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.

## 1.7 Robot motion

### 1.7.1 Introduction

#### Type of motion

Axis	Type of motion	Range of movement	
		from	to
1	Rotation motion	+180°	-180°
2	Arm motion	+85°	-60°
3	Arm motion	+60°	-180°
4	Wrist motion	+300°	-300°
5	Bend motion	+100°	-100°
6	Turn motion	+360° Default <sup>i</sup> +67 Rev. max.	-360° Default -67 Rev. <sup>ii</sup> max. <sup>iii</sup>

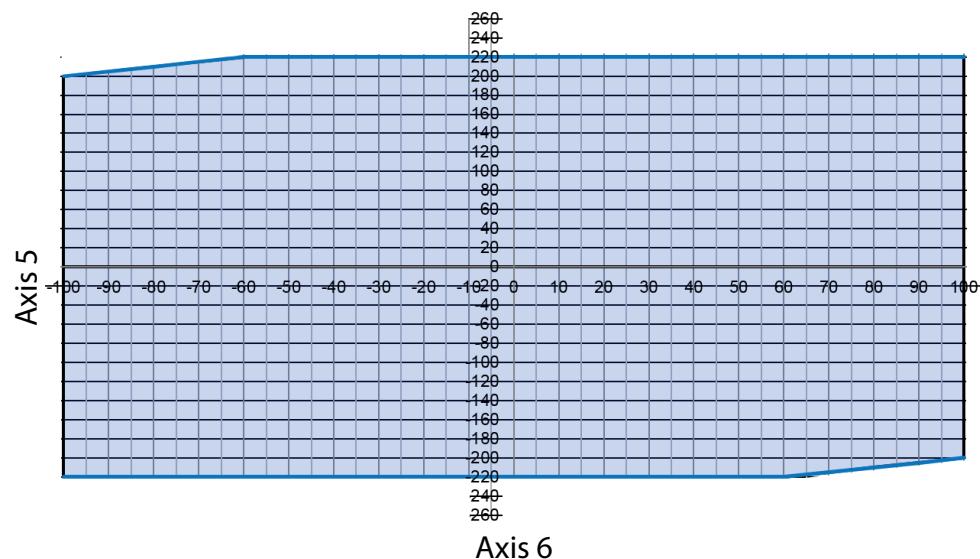
<sup>i</sup> Working range +220° to -220° for robots with LeanID, option 780-4.

<sup>ii</sup> Rev. = Revolutions

<sup>iii</sup> 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).

#### Working range axis 5 and axis 6 for LeanID, option 780-4

Allowed working area for axis 6 related to axis 5 position is shown in the figure below.



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Continues on next page

# 1 Description

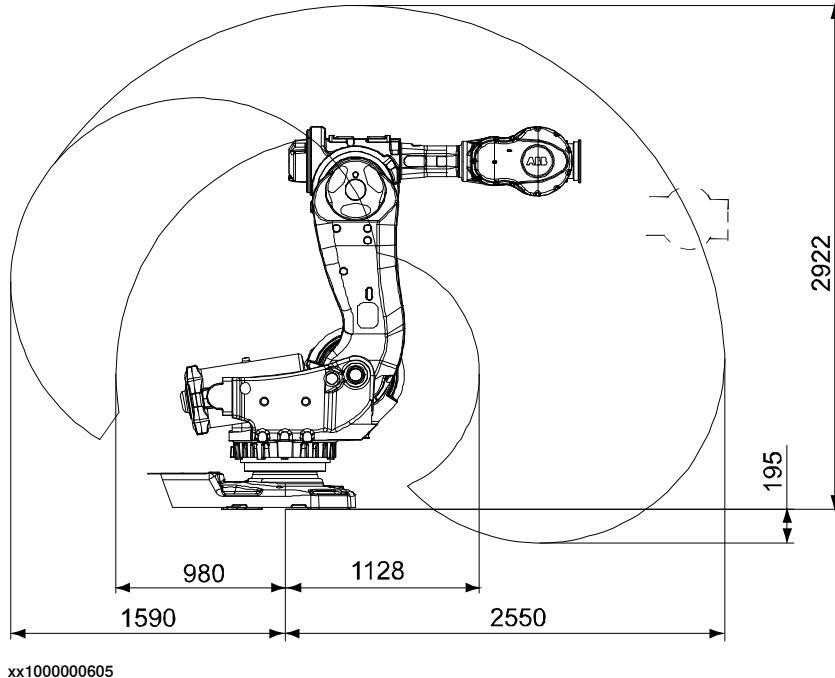
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## 1.7.1 Introduction

*Continued*

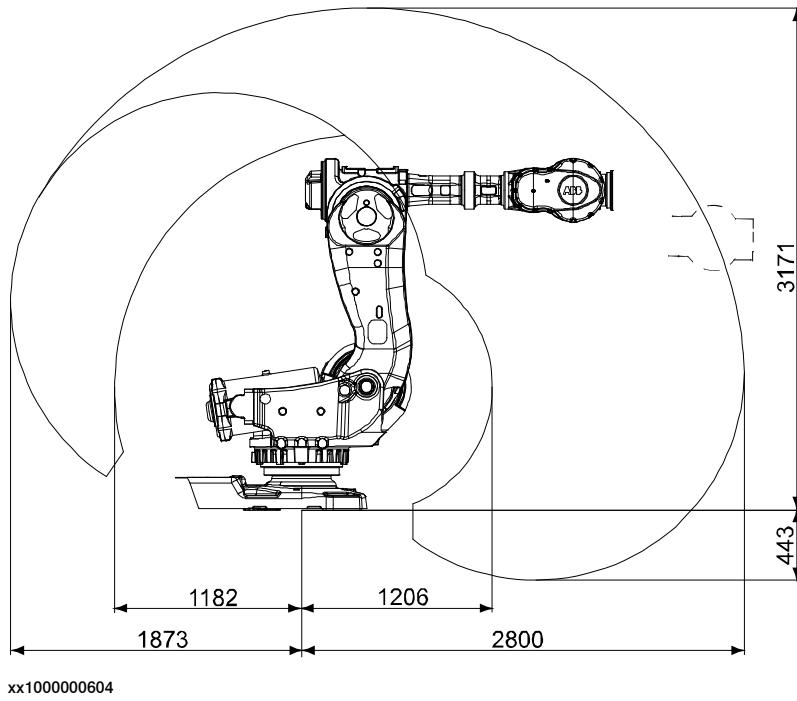
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### IRB 7600 - 400/2.55 and IRB 7600 - 500/2.55



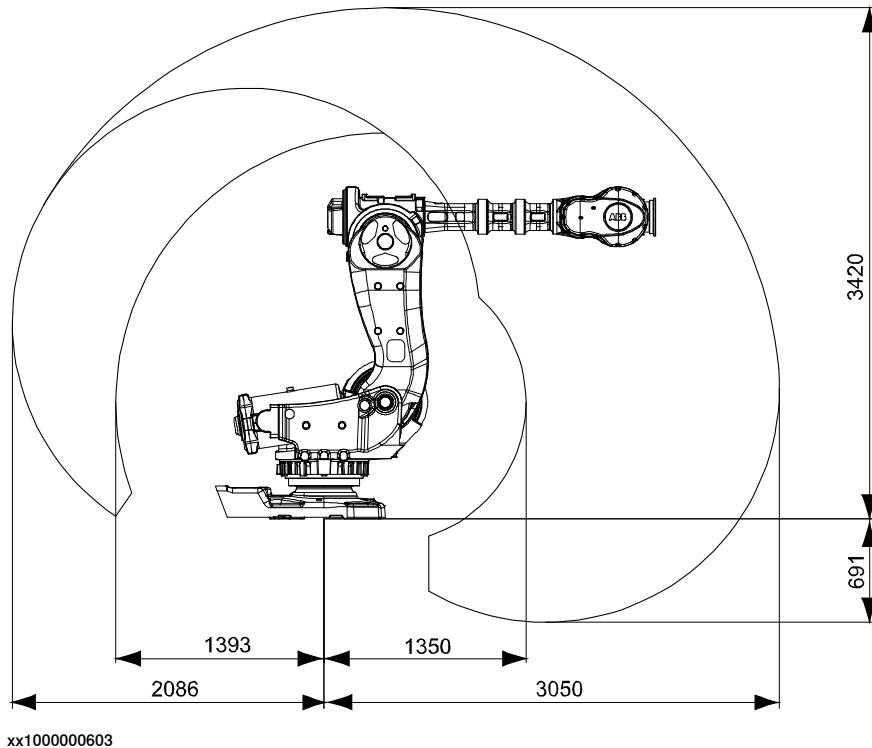
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### IRB 7600 - 340/2.8

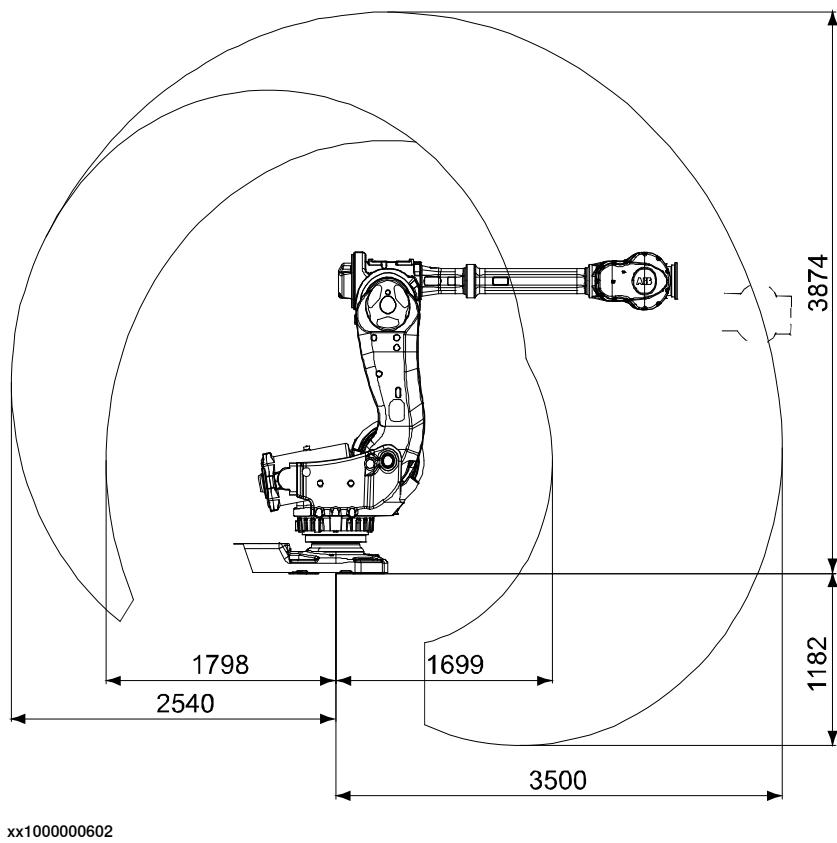


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### IRB 7600 - 325/3.1



### IRB 7600 - 150/3.5



# 1 Description

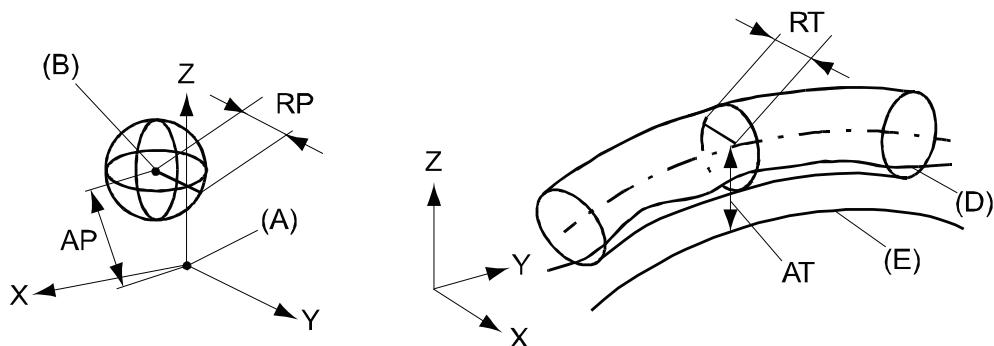
## 1.7.2 Performance according to ISO 9283

### 1.7.2 Performance according to ISO 9283

#### General

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

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



xx0800000424

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

IRB 7600	-500/2.55	-400/2.55	-340/2.8	-150/3.5	-325/3.1
Pose accuracy, AP (mm)	0.09	0.10	0.18	0.10	0.11
Pose repeatability, RP (mm)	0.08	0.19	0.27	0.19	0.10
Pose stabilization time, Pst (s) within 0.4 <sup>i</sup> (0.6 <sup>ii</sup> ) mm of the position	0.30	0.38	0.18	0.55	0.24
Path accuracy, AT (mm)	3.43	2.95	2.05	1.21	1.36
Path repeatability, RT (mm)	0.30	1.27	0.23	0.40	0.59

<sup>i</sup> Valid for variant 400/2.55 and 500/2.55

<sup>ii</sup> Valid for variant 340/2.8, 150/3.5 and 325/3.1

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

### 1.7.3 Velocity

#### General

Maximum axis speeds.

IRB 7600 Axis No.	- 500/2.55	- 400/2.55	- 340/2.8	- 150/3.5	- 325/3.1
	(°/s)	(°/s)	(°/s)	(°/s)	(°/s)
1	75	75	75	100	75
2	50	60	60	60	50
3	55	60	60	60	55
4	100	100	100	100	100
5	100	100	100	100	100
6	160	160	160	190	160

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

## **1 Description**

---

### **1.7.4 Robot stopping distances and times**

---

#### **Introduction**

The stopping distances and times for category 0 and category 1 stops, as required by EN ISO 10218-1 Annex B, are listed in *Product specification - Robot stopping distances according to ISO 10218-1 (3HAC048645-001)*.

### 1.8 Cooling fan for axis 1-2 motor

#### 1.8.1 Introduction

---

##### Options 87-1, 88-1

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

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

To determine the use of cooling fans for axis 1 or axis 2 motor use the “Gearbox Heat Prediction Tool” in RobotStudio. Reliable facts for the decision of need for fan or not will be achieved by entering the ambient temperature for a specific cycle. Please contact your local ABB organization.

## **1 Description**

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### **1.9.1 Introduction**

## **1.9 Servo gun**

### **1.9.1 Introduction**

---

#### **General**

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

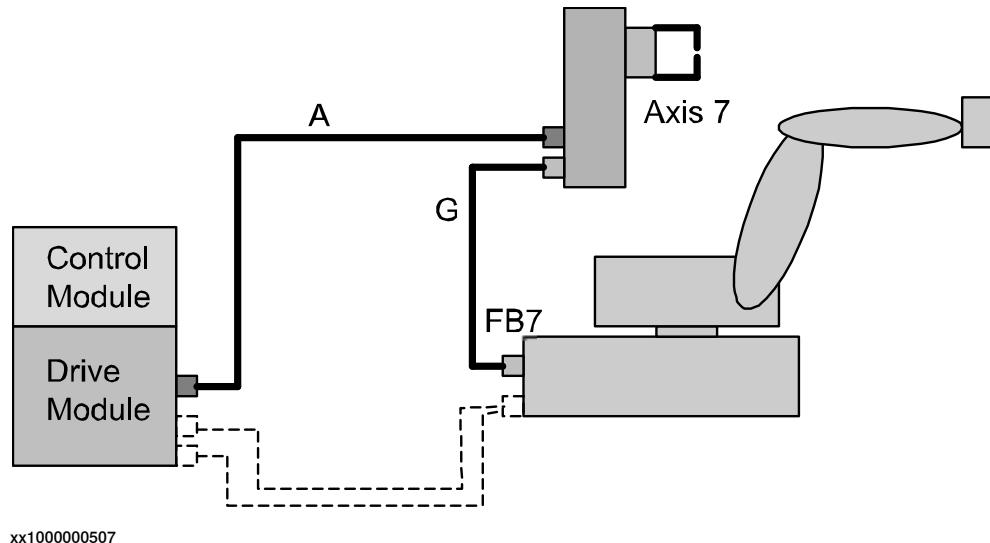
- Stationary Gun
- Robot Gun
- Robot Gun and Track Motion
- Track motion

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



### Options

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

Option	Description	Product specification
785-5	Stationary gun. This option includes: Cable G (7 m length) for resolver signals from robot base (FB7) to stationary gun/axis 7.	
907-1	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. 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 Description

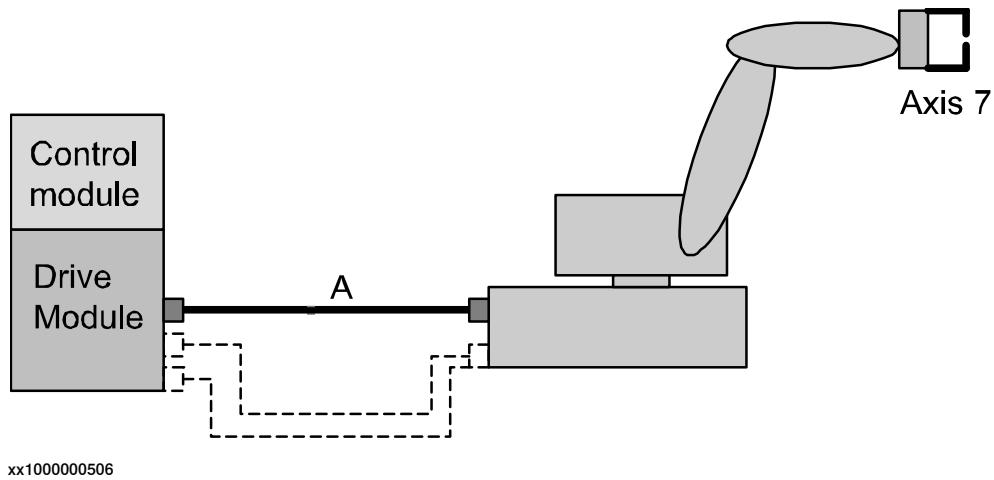
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## 1.9.3 Robot Gun

### 1.9.3 Robot Gun

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#### General



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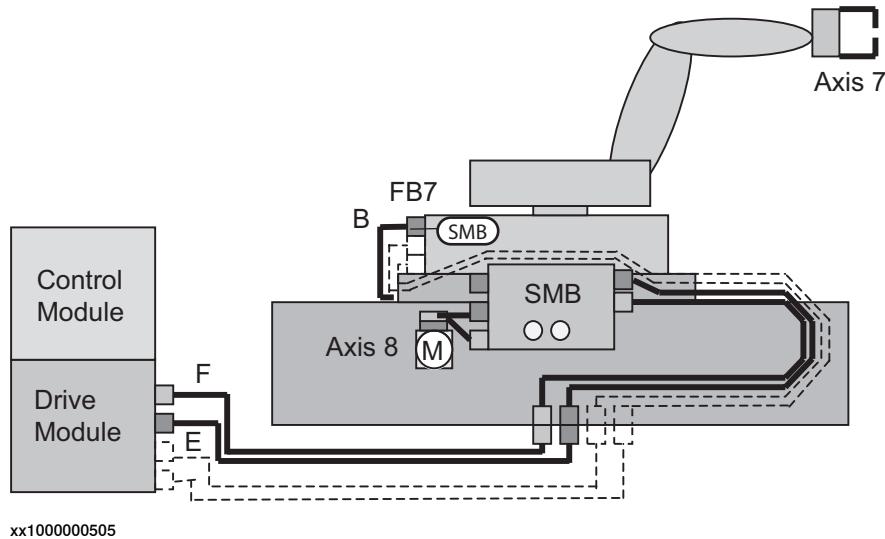
#### Options

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

Option	Description	Product specification
785-1	Robot gun. This option includes: Cables within manipulator for servo power signals (servo gun/axis 7).	
907-1	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. 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 IRBT 7004

### General



### Options

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

Option	Description	Product specification
785-1+1002-2 <sup>i</sup>	Robot Gun - Track Motion. This option includes: Cables within manipulator for servo power signals (servo gun/axis 7).	Track motion IRBT 7004 + IRB 7600
Track motion delivery includes	Serial measurement box (SMB2, Split box) for distribution of servo power to axis 8. The box is placed on the track motion. Cables from serial measurement box to track motion. Cable B for servo power (1.5 m length). Connection to first and second drive. Cable E and F (7-22 m) between Drive Module and serial measurement box for dual servo drive power/resolver signals.	Track motion IRBT 7004
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).	

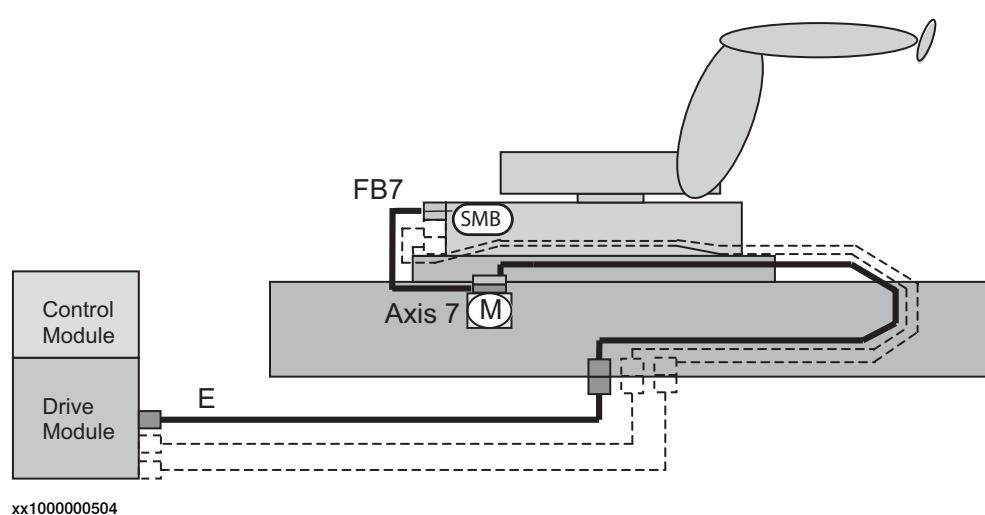
<sup>i</sup> To specify robot on track equipped with servo gun. Option 1002-2 from specification form for Track Motion.

# 1 Description

## 1.9.5 Track Motion IRBT 7004

### General

The robot can be supplied with a Track Motion, see Product specification - IRBT 7004. For configuration and specification of hardware see Figure below.



#### Note

General. The robot can be combined with a Track Motion, for further details see Product specification IRBT 6004/IRBT 7004.

### Options

Options according to the table below are required to complete the delivery. For further details 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. Cable E for between Drive Module and track motion servo for drive power.	Track motion IRBT 7004
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

### 2.1 General

#### 2.1.1 Introduction

##### DressPack

Includes options for Upper arm, Lower arm and Floor pos C, D and E, 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.

For the upper arm there are also internal routing alternative for some of the manipulator variants and Material Handling option.

##### Spot welding

The package supplies the transformer gun/gripper with necessary media, such as compressed air, electrical power and software.



##### Note

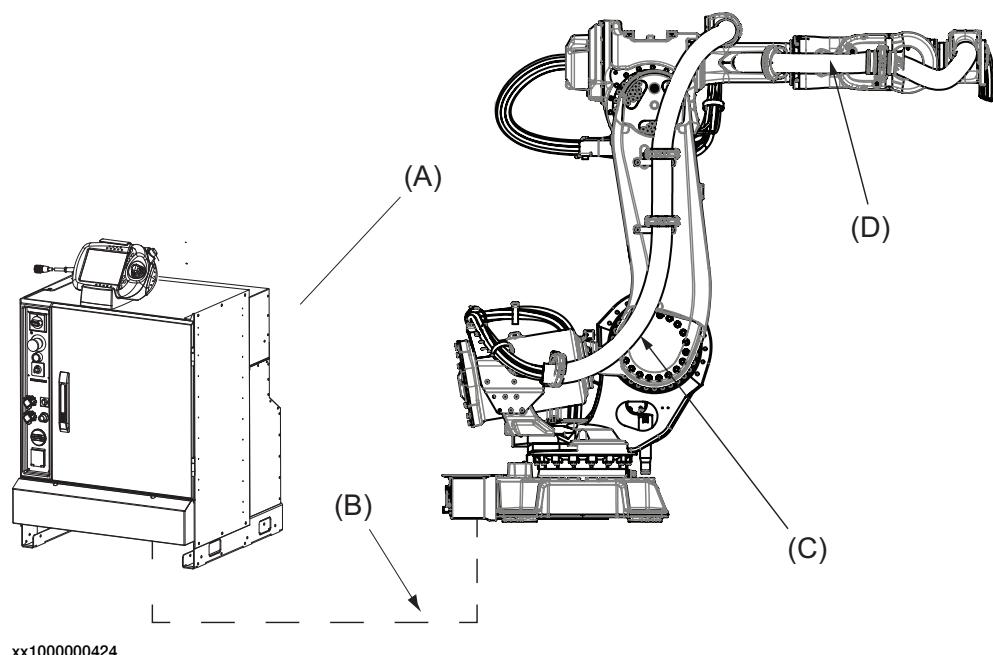
Note that some figures within Chapter 2 show the IRB 6600 instead of the IRB 7600. This is valid where principles and dimensions are equal between IRB 6600 and IRB 7600.

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## 2 DressPack

### 2.1.1 Introduction

*Continued*



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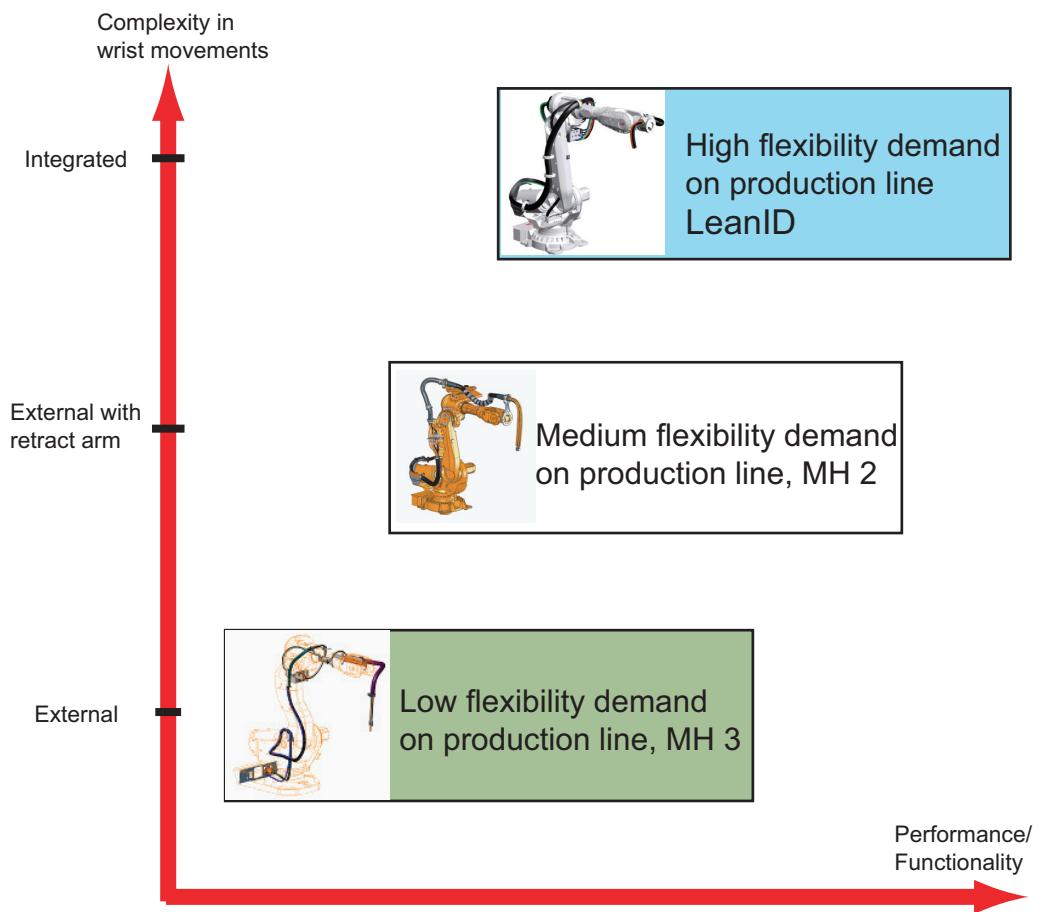
Pos	Description
A	Robot controller, (including 7th axis drive for servo gun)
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm

## 2.1.2 Product range

### DressPack solutions for different user's needs

The different robot types can be equipped with the well integrated cable and hose packages in the DressPack option. 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 two major levels of dress pack solutions available, see Figure below.



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*Continues on next page*

## **2 DressPack**

---

### **2.1.2 Product range**

*Continued*

---

#### **Integrated**

This type of dress pack is intended for a production where there are many complex wrist movements and the need for flexibility in changing products is high.

Available options are 798-3 and 780-4 for material handling/spot welding, the LeanID concept.

---

#### **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 too many different products running in the same production cell.

Available options are 798-2 and 780-2 for both material handling/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 798-3, 780-3 for material handling

### 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).

---

#### Restrictions for LeanID, option 780-4

Limitation for axis 6 depends on how the dress pack is assembled at the tool and how adjustment has been done.

Axis	Working range
Axis 6	220° to -220°

## **2 DressPack**

---

### **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 DressPack are structured in the following way.

The DressPack can be delivered in five versions developed for two different applications. Each type is described under separate chapter.

Chapter	Option	Description
2.2	DressPack	DressPack includes general description DressPack with common information.

### Material Handling application / DressPack

Chapter	Option	Description
2.3	Type H	DressPack for Material Handling.

### Spot Welding application / DressPack

Chapter	Option	Description
2.4	Type S	DressPack for pneumatic transformer guns carried by the robot manipulator.
2.5	Type HS	DressPack for handling the part against pneumatic transformer guns stationary mounted.
2.6	Type Se	DressPack for electrical servo driven transformer guns carried by the robot manipulator.
2.7	Type HSe	DressPack for handling the part against electrical servo driven transformer guns stationary mounted.

### Connector Kits

Chapter	Option	Description
2.10	Connector Kits	Includes general description of Connector kits for DressPack.

## **2 DressPack**

---

### **2.2.1 Introduction**

## **2.2 DressPack**

### **2.2.1 Introduction**

---

#### **Available DressPack configurations for Material Handling**

	<b>Lower arm</b>	<b>Upper arm</b>
Option 778-1, Material Handling	Option 798-3, Base to axis 3	Option 780-3, Axis 3 to 6 External routing
		Option 780-4, Axis 3 to 6 Internal routing
	Option 798-2, Base to axis 2	Option 780-2, Axis 2 to 6 External routing

---

#### **Available DressPack configurations for Spot Welding**

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

	<b>Lower arm</b>	<b>Upper arm</b>
Option 778-2, Spot Welding	Option 798-2, Base to axis 2 External routing	Option 780-2, Axis 2 to 6 External routing
	Option 798-3, Base to axis 3 External routing	Option 780-4, Axis 3 to 6 Internal routing

## 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.
- One version for all IRB 6640 versions.
- Adjustment for optimal hose/cable lengths.
- Easy exchange of DressPack

---

### External with retract arm

Spot welding and Material handling (option 780-2):

- Adjustable bracket axis 6 with position marking.

Adjustable retracting force to optimize the system depending on cycle and hose package.

---

### Internal

Spot welding and Material handling (option 780-4):

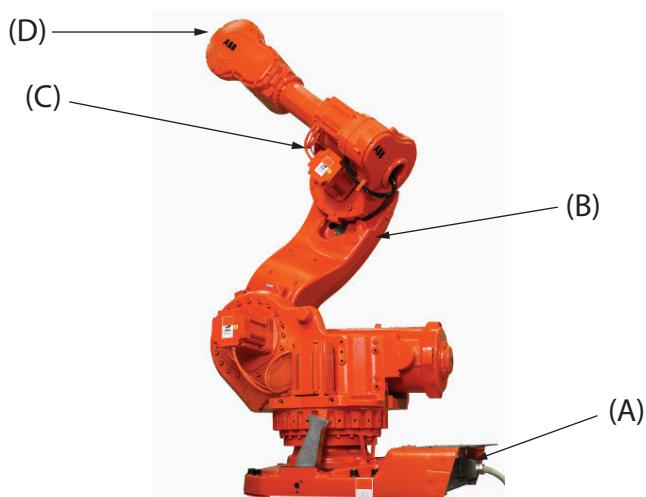
- Partly internal routing through the upper arm.
- Suitable for complex movements.
- High demands for flexibility and accessibility.
- Longer life time
- Predictable movements
- Easy exchange of DressPack

## 2 DressPack

### 2.2.3 Interface descriptions for DressPack

#### General

Below is an overview showing the different dresspack interfaces. For detailed information see the circuit diagram included in *Product manual - DressPack/SpotPack IRB 6650S/7600*.



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Pos	Location	Options
A	Base	798-2, 798-3 and 864-1
B	Axis 2	798-2
C	Axis 3	798-3
D	Axis 6	780-2, 780-3 and 780-4

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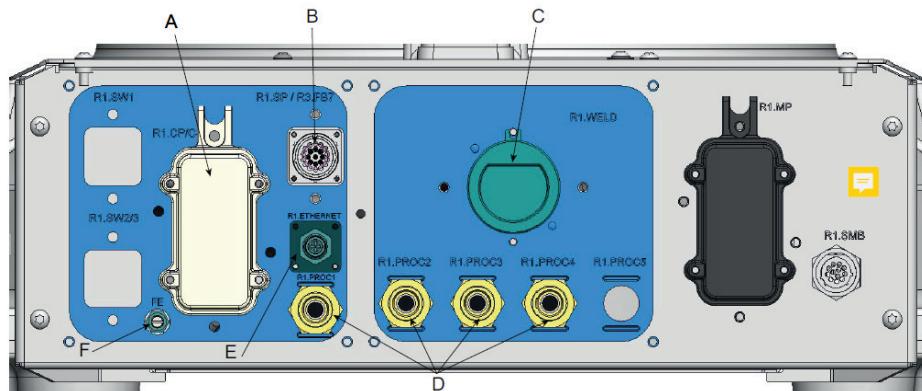
**Base**

**Material handling (option 798-3), see figure below:**

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

**Spot welding (option 798-3), see figure below:**

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



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For corresponding parts of the tool, see [Axis 6 - Connector kits on page 135](#).

Pos	Description
A	R1.CP/CS
B	R1.SP (Spot Welding Servo gun) or FB7 (Resolver connection)
C	R1.WELD 3x35mm <sup>2</sup> . (Spot Welding)
D	R1.PROC 1 (Material Handling/Spot Welding 1/2", M22x1.5, 24 degree seal) R1.PROC 2 - 4 (Spot Welding 1/2", M22x1.5, 24 degree seal)
E	R1.ETHERNET (M12 connector, when EtherNet communication is selected)
F	FE (Functional Earth, when EtherNet communication is selected)

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## 2 DressPack

### 2.2.3 Interface descriptions for DressPack

*Continued*

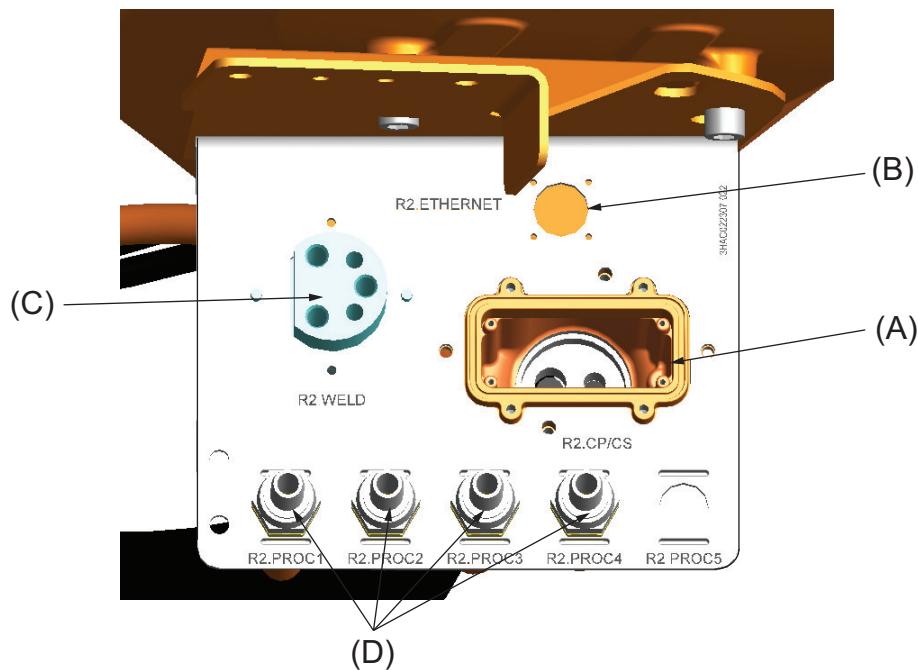
#### Axis 2

**Material handling (option 798-2), see figure below:**

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

**Spot welding (option 798-2), see figure below:**

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



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For corresponding parts of the tool, see [Connection kits on page 131](#).

Pos	Description
A	R2.CP/CS
B	R2.ETHERNET (M12 connector, when EtherNet communication is selected)
C	R2.WELD 3x35 mm <sup>2</sup> . (Spot Welding)
D	R2.PROC 1 (Material Handling/Spot Welding 1/2", M22x1.5, 24 degree seal) R1.PROC 2 - 4 (Spot Welding 1/2", M22x1.5, 24 degree seal)

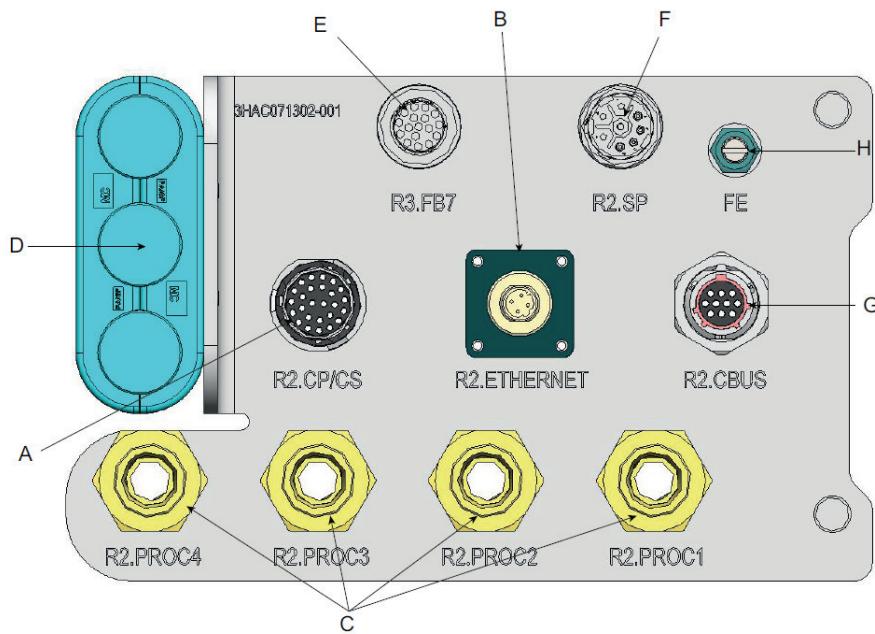
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**Axis 3****Material Handling (option 798-3), see figure below:**

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

**Spot welding (option 798-3), see figure below:**

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



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For corresponding parts of the tool, see [Axis 6 - Connector kits on page 135](#).

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) R2.PROC 2-4 (Spot Welding 1/2", M22x1.5, 24 degree seal)
D	R2.WELD 3x35mm <sup>2</sup> (Spot Welding)
E	R2.FB7
F	R2.SP (Spot Welding Servo gun)
G	R2.CBUS (UTOW connector when Profibus or DeviceNet communication is selected)
H	FE (Functional Earth, when EtherNet communication is selected)

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## 2 DressPack

### 2.2.3 Interface descriptions for DressPack

*Continued*

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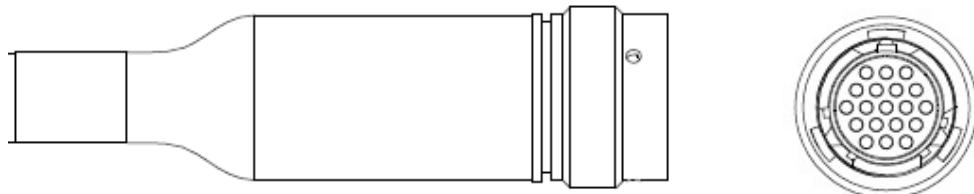
#### Axis 6

##### 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 131](#):



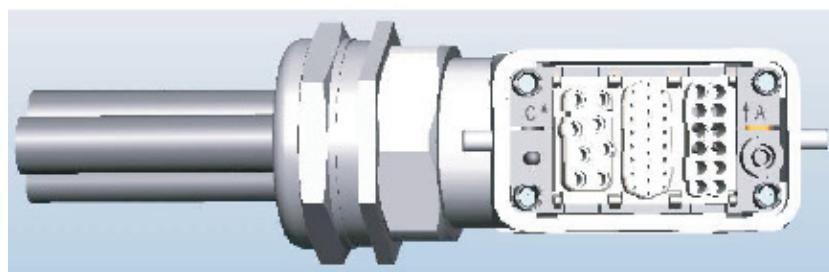
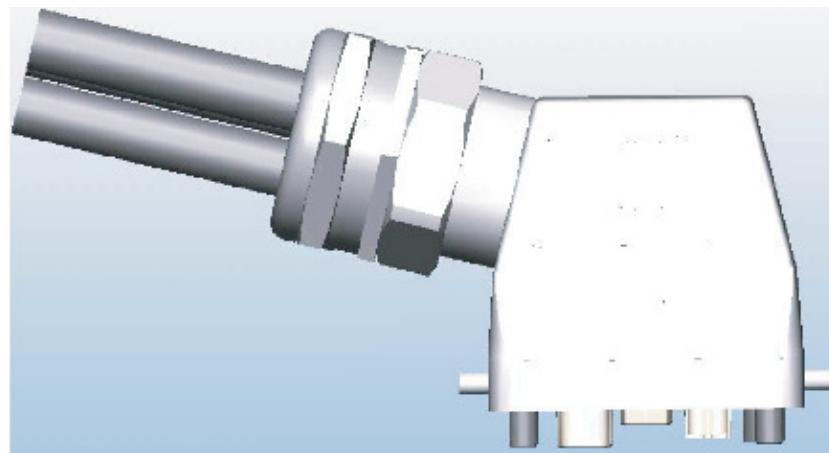
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##### External with retract arm

**Spot welding/Material handling (option 780-2), 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 131](#) and within the Harting product offer.



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## EtherNet connector

**Spot welding/Material handling (option 780-2/-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



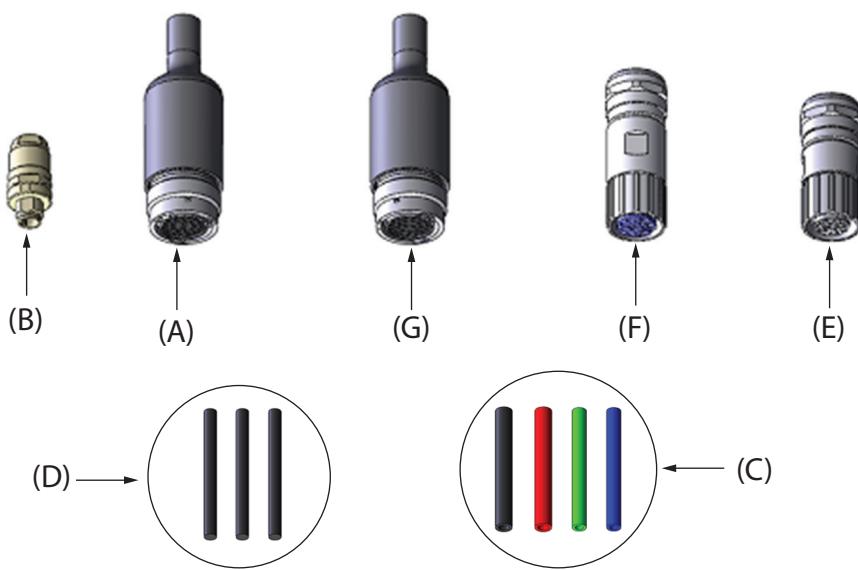
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## Integrated

**Material Handling/Spot Welding option 780-4 (LeanID), see figure below:**

- Hose and cable free length, min. 1160 mm.
- Hoses and weld power cable (only for spot welding) end with free end.

The cable ends with connectors, for corresponding parts of the tool, see [Connection kits on page 131](#) and within the UTOW product offer.



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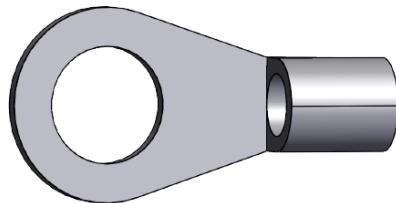
## 2 DressPack

### 2.2.3 Interface descriptions for DressPack

*Continued*

Pos	Description
A	R3.CP/CS (UTOW connector 26p) Customer signals and power
B	R3.ETHERNET (M12 connector) EtherNet signals (when EtherNet communication is selected)
C	R3.PROC 1-2 (1/2", freeend) R3.PROC 2-4 (3/8", free end) Media hoses
D	R3.WELD 3x25mm <sup>2</sup> (Free end) Spot Welding power
E	R3.FB7 (M23 connector 17p) Servo motor power (when Spot Welding Servo gun is selected)
F	R3.SP (M23 connector 8p) Servo motor feedback (when Spot Welding Servo gun is selected)
G	R3.CBUS (UTOW connector 10p) BUS signals (when Profibus or DeviceNet communication is selected)

- FE (M8 cable lug) Functional Earth 10mm<sup>2</sup> (When Parallel and Ethernet communication is selected)



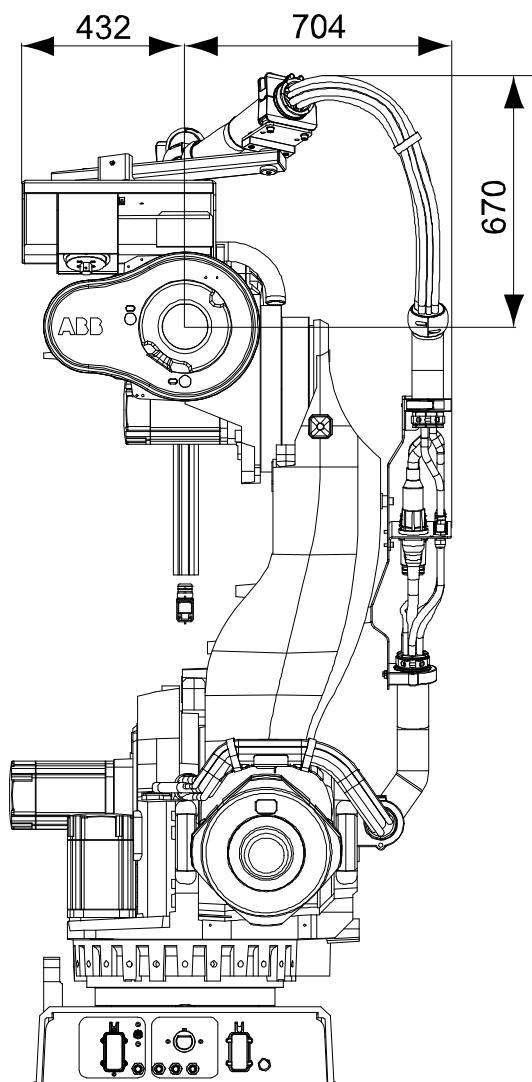
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## 2.2.4 Dimensions

### General

Dimensions are shown in Figures below.

All routing alternatives are shown in the Spot Welding version.



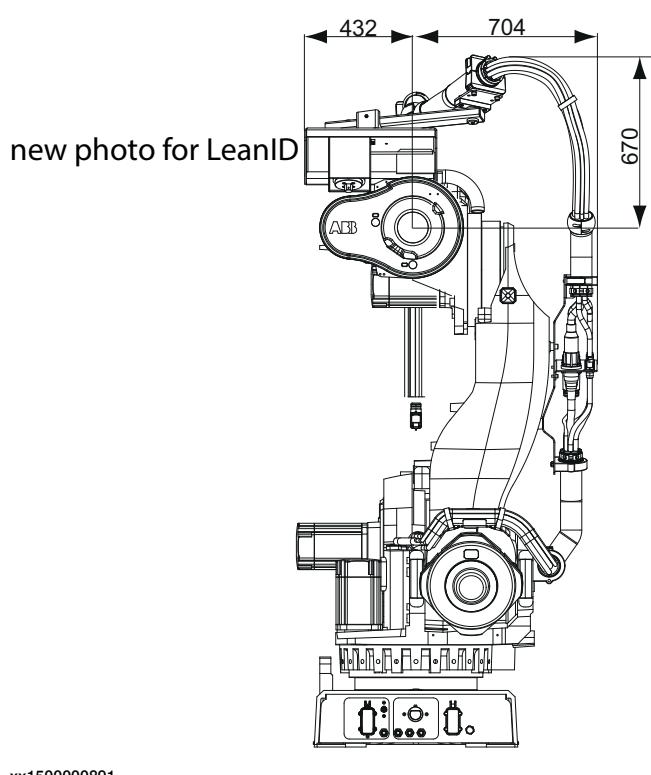
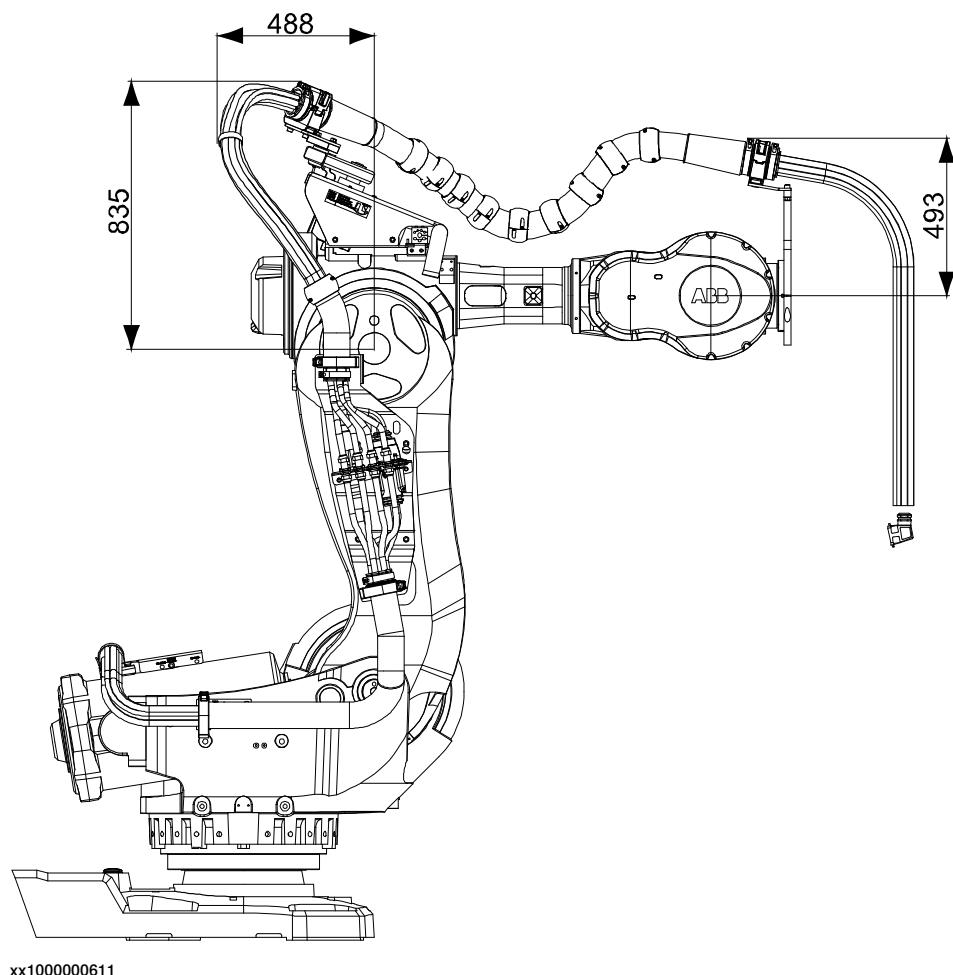
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## 2 DressPack

### 2.2.4 Dimensions

*Continued*

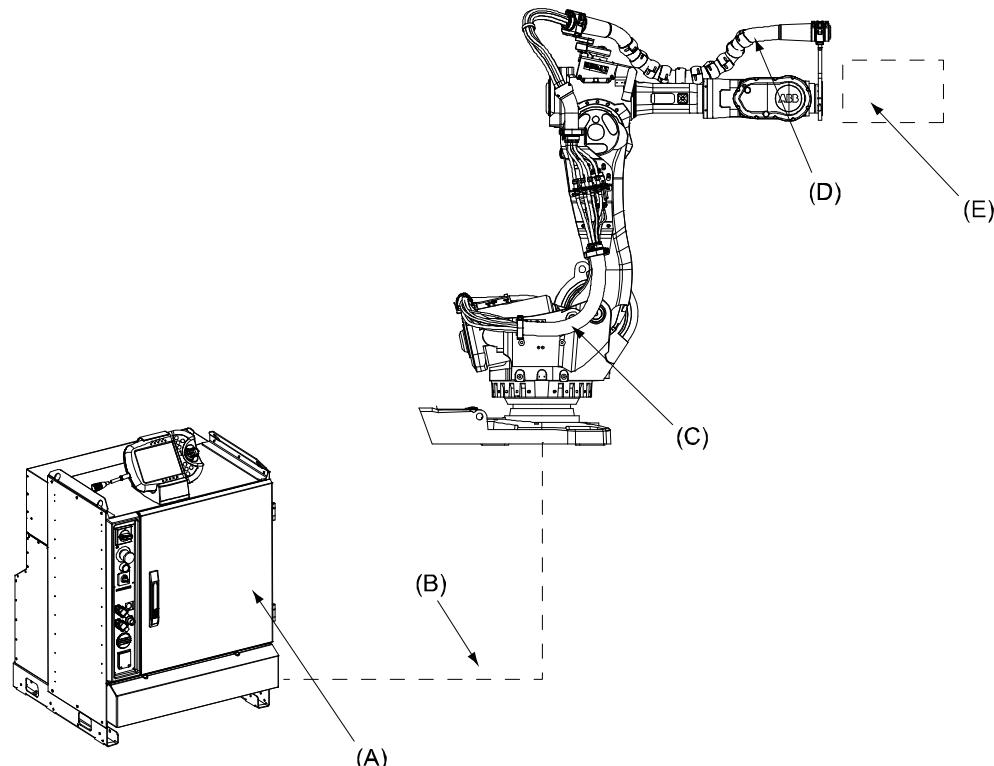


## 2.3 Type H

### 2.3.1 Introduction

#### General

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



xx1000000612

Pos	Name
A	Robot Cabinet IRC5
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm
E	Robot Gripper

Available configurations with linked option numbers are described below.

*Continues on next page*

## 2 DressPack

### 2.3.1 Introduction

*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. Option 94-1,-2,-4 for parallel communication. Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet. 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,-4
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.
455-8	Parallel and Ethernet	Offers the signal cables needed for the Ethernet communication in combination in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X.

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

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

#### DressPack

	Lower arm	Upper arm
Option 778-1. Material Handling	Option 798-3, Base to axis 3	Option 780-3, Axis 3 to 6 External routing
		Option 780-4, Axis 3 to 6 Internal routing
	Option 798-2, Base to axis 2	Option 780-2, Axis 2 to 6 External routing

## 2.3.2 Configuration result for Type H

### 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 Type H. 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 798-2 or Option 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and Option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC <sup>ii</sup>
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2) <sup>iii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 50 VAC / 60 VDC.

<sup>iii</sup> For option 780-3 8 signals instead of 20.

*Continues on next page*

## 2 DressPack

### 2.3.2 Configuration result for Type H

*Continued*

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#### DressPack Type H. Parallel and field bus communication, Can/DeviceNet

- Option 16-1 with Connection to cabinet
- (Option 90-2,-3,-4,-5 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-1. Material Handling
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and Option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC <sup>ii</sup>
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2) <sup>iii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	2	0,14 mm <sup>2</sup>	Can/DeviceNet spec
Bus signals	At bus board	2	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair	6	6(3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 50 VAC / 60 VDC.

<sup>iii</sup> For option 780-3 8 signals instead of 20.

*Continues on next page*

**DressPack Type H. Parallel and field bus communication, Profibus**

- Option 16-1 with Connection to cabinet
- (Option 92-2,-3 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-1. Material Handling
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and Option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC <sup>ii</sup>
<b>Customer Signals (CS)</b>				
Signals twisted pair	22	22(11x2) <sup>iii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	4	0,14 mm <sup>2</sup>	Profibus 12 Mbit/s spec
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 50 VAC / 60 VDC.

<sup>iii</sup> For option 780-3 8 signals instead of 20.

*Continues on next page*

## 2 DressPack

### 2.3.2 Configuration result for Type H

*Continued*

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#### DressPack Type H, Parallel and field bus communication, Ethernet

- Option 16-1 with Connection to cabinet
- (Option 859-1,-2, -3, -4 to specify cable length)
- (Option 94-1, -2, -3, -4 to specify cable length)
- Option 455-8. Parallel and Ethernet communication
- Option 778-1. Material Handling
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and Option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External/Internal routing.

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC <sup>ii</sup>
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20(11x2) <sup>iii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (Ethernet)</b>				
Bus signals	4	4	0,4 mm <sup>2</sup>	Ethernet CAT 5e, 100 Mbit <sup>iv</sup>
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner diameter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 50 VAC / 60 VDC.

<sup>iii</sup> For option 780-3 8 signals instead of 20.

<sup>iv</sup> Ethernet with wire colors according to PROFINET standard, M12-connectors.

### 2.3.3 Summary Type H

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#### General

The following options are required to form a complete DressPack Type H:

- Option 16-1. Connection to cabinet, (Cable length and communication type to be stated)
- Option 455-1, 455-4. Parallel or Parallel and Bus communication (communication type to be stated)
- Option 778-1. Material Handling
- Option 798-2 or 798-3. DressPack Lower arm (routing to be stated)
- Option 780-2, 780-3 or 780-4. DressPack Upper arm (routing to be stated)

## 2 DressPack

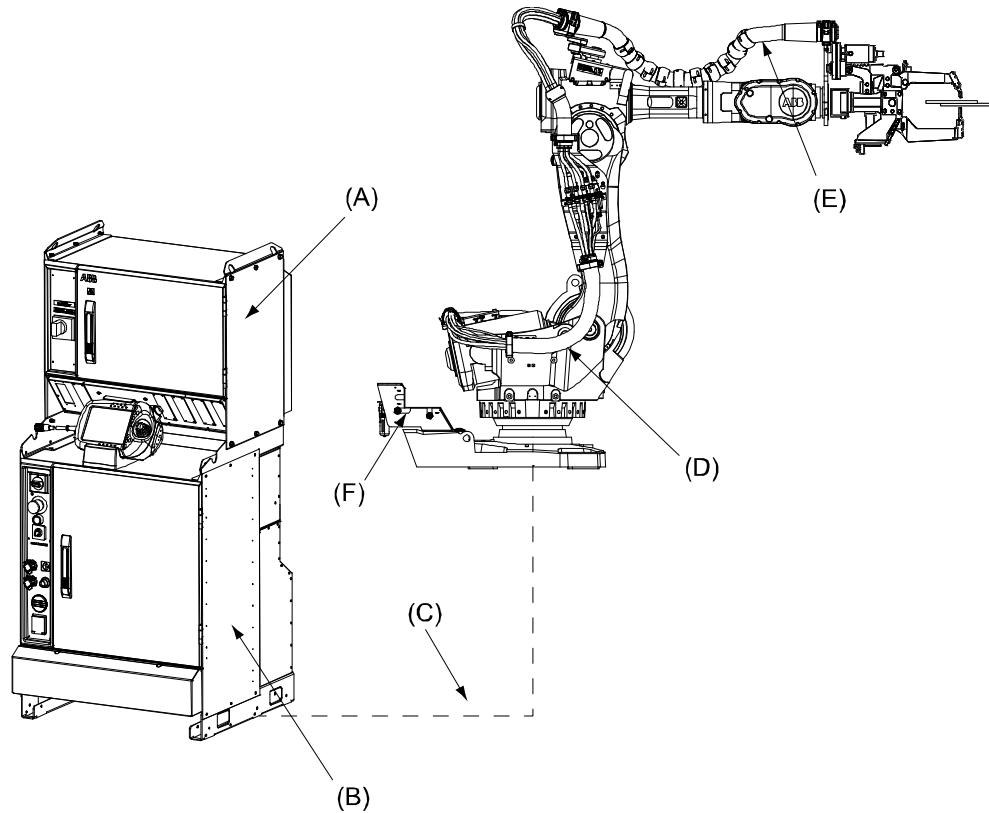
### 2.4.1 Introduction

## 2.4 Type S

### 2.4.1 Introduction

#### General

Variant Type S is designed for Spot Welding application with robot handled pneumatic gun. Included modules are shown in Figure below. Available configurations with linked option numbers are described below.



xx1000000615

Pos	Name
A	Robot Cabinet IRC5
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm
E	Pneumatic gun

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

*Continues on next page*

**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. Option 94-1,-2,-3,-4 for parallel communication Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet 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.
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	Offers the signal cables needed for the Ethernet communication in combination in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X.

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

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

Continued

	Lower arm	Upper arm
Option 778-2, Spot Welding	Option 798-2, Base to axis 2 External routing	Option 780-2, Axis 2 to 6 External routing
	Option 798-3, Base to axis 3 External routing	Option 780-4, Axis 3 to 6 Internal routing

## 2 DressPack

### 2.4.2 Configuration result for Type S

#### 2.4.2 Configuration result for Type S

##### 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 Type S. 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 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2.) External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner diameter <sup>i</sup>	Max. air pressure 16 bar/ 230 PSI Max. water pressure 10 bar/ 145 PSI
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> ii	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

i For LeanID 2x1/2" + 2x3/8", only upper arm

ii For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

Continues on next page

**DressPack Type S. Parallel and field bus communication, Can/DeviceNet**

- Option 16-1 with Connection to cabinet
- (Option 90-2,-3,-4,-5 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	1 mm <sup>2</sup>	250 VAC
<b>Customer signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	2	0,14 mm <sup>2</sup>	Can/DeviceNet spec
Bus signals	At bus board	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner dia- meter <sup>i</sup>	Max. air pressure 16 bar/230 PSI Max. water pres- sure 10 bar/145 PSI.
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> <sup>ii</sup>	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>ii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

## 2 DressPack

### 2.4.2 Configuration result for Type S

*Continued*

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#### DressPack Type S. Parallel and field bus communication, Profibus

- Option 16-1 with Connection to cabinet
- (Option 92-2,-3 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer signals (CS)</b>				
Signals twisted pair	22	22 (11x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	4	0,14 mm <sup>2</sup>	Profibus 12 Mbit/s spec
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner dia- meter <sup>i</sup>	Max. air pressure 16 bar/230 PSI Max. water pres- sure 10 bar/145 PSI.
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> <sup>ii</sup>	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>ii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

**DressPack Type S, Parallel and field bus communication, Ethernet**

- - Option 16-1 with Connection to cabinet
- (Option 859-1,-2, -3, -4 to specify cable length)
- (Option 94-1, -2, -3, -4 to specify cable length)
- Option 455-8. Parallel and Ethernet communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm
- One of the options:
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VACa
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20(10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (Ethernet)</b>				
Bus signals	4	4	0,4 mm <sup>2</sup>	Ethernet CAT 5e, 100 Mbit <sup>i</sup>
<b>Media</b>				
Air (PROC 1)		1	12.5 mm inner diameter <sup>ii</sup>	Max. air pressure 16 bar/230 PSI
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> <sup>iii</sup>	
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> Ethernet with wire colors according to PROFINET standard, M12-connectors.

<sup>ii</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>iii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

### 2.4.2 Configuration result for Type S

*Continued*

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#### Required general options for Type S

To enable the Spot welding function package IRB 7600 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
- Option 635-1. Spot. Software option for pneumatic guns
- (software option 635-2 could also be used)

### **2.4.3 Summary Type S**

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#### **General**

The following options are the minimum required to form a complete Spot welding function package Type S:

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#### **DressPack**

- Option 16-1. Connection to cabinet, (Cable length and communication type to be stated)
- Option 455-1, 455-4. Parallel or Parallel and Bus communication (Communication type to be stated)
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm
- Option 780-2, -4. DressPack Upper arm (routing type to be stated)

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#### **General options**

- 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

## 2 DressPack

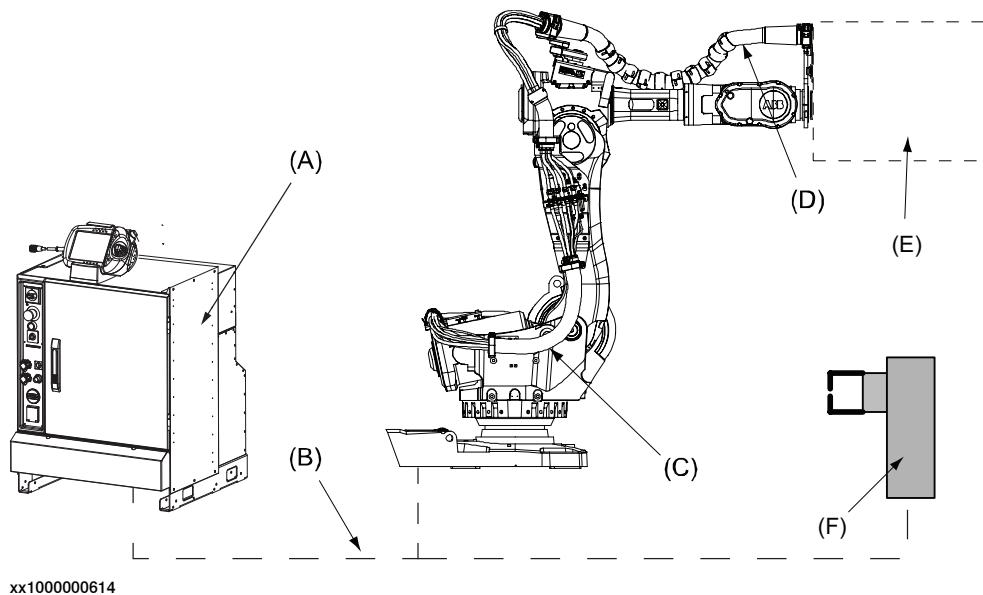
### 2.5.1 Introduction

## 2.5 Type HS

### 2.5.1 Introduction

#### General

Variant Type HS is designed for handling against a stationary mounted Spot Welding pneumatic gun. Included main modules are shown in Figure below. Available configurations with linked option numbers are described below starting at the DressPack.



Pos	Name
A	Robot Cabinet IRC5
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm
E	Robot Gripper
F	Stationary gun

Available configurations with linked option numbers are described below.

#### Option description

Option	Type	Description
16-1	Connection to cabinet	<p>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.</p> <p>Option 94-1,-2,-3,-4 for parallel communication.</p> <p>Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet.</p> <p>Option 92-2,-3 for parallel communication and field bus communication with Profibus.</p>

*Continues on next page*

Option	Type	Description
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.
455-8	Parallel and Ethernet	Offers the signal cables needed for the Ethernet communication in combination in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X.

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

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

Continued

	Lower arm	Upper arm
Option 778-1, Material Handling	Option 798-3, Base to axis 3	Option 780-3, Axis 3 to 6 External routing
		Option 780-4, Axis 3 to 6 Internal routing
	Option 798-2, Base to axis 2	Option 780-2, Axis 2 to 6 External routing

## 2 DressPack

### 2.5.2 Configuration result for Type HS

#### 2.5.2 Configuration result for Type HS

##### 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 Type HS. 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 798-2 or option 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-31). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

**DressPack Type HS. Parallel and field bus communication, Can/DeviceNet**

- Option 16-1 with Connection to cabinet
- (Option 94-1,-2,-3,-4 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-1. Material Handling
- Option 798-2 or option 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	2	0,14 mm <sup>2</sup>	Can/DeviceNet spec
Bus signals	At bus board	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair	6	6(3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner diameter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

## 2 DressPack

### 2.5.2 Configuration result for Type HS

*Continued*

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#### DressPack Type HS. Parallel and field bus communication, Profibus

- Option 16-1 with Connection to cabinet
- (Option 92-2,-3 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-1. Material Handling
- Option 798-2 or option 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	22	22 (11x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	4	0,14 mm <sup>2</sup>	Profibus 12 Mbit/s spec
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

**DressPack Type HS, Parallel and field bus communication, Ethernet**

- - Option 16-1 with Connection to cabinet
  - (Option 859-1,-2, -3, -4 to specify cable length)
  - (Option 94-1, -2, -3, -4 to specify cable length)
  - Option 455-8. Parallel and Ethernet communication
  - Option 778-1. Material Handling
  - Option 798-2 or option 798-3. Internal routing, DressPack Lower arm
  - Option 780-2 (and option 798-2). External routing with retract
  - Option 780-3 or 780-4 (and option 798-3). External routing

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20(10x2) <sup>ii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (Ethernet)</b>				
Bus signals	4	4	0,4 mm <sup>2</sup>	Ethernet CAT 5e, 100 Mbit <sup>iii</sup>
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner diameter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 8 signals instead of 20.

<sup>iii</sup> Ethernet with wire colors according to PROFINET standard, M12-connectors.

*Continues on next page*

### 2.5.2 Configuration result for Type HS

*Continued*

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#### Required general options for Type HS

To enable the Spot welding function package IRB 7600 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
- Option 635-1. Spot. Software option for pneumatic guns. (software option 635-2 could also be used)

## 2.5.3 Summary Type HS

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### General

The following options are the minimum required to form a complete Spot welding function package Type HS:

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### DressPack

- Option 16-1. Connection to cabinet, (Cable length and communication type to be stated)
- Option 455-1, 455-4. Parallel or Parallel and Bus communication (Communication type to be stated)
- Option 778-1. Material Handling
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm (Routing type to be stated)
- Option 780-2, 780-3 or 780-4. External routing, DressPack Upper arm (Routing type to be stated)

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### General options

- 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

## 2 DressPack

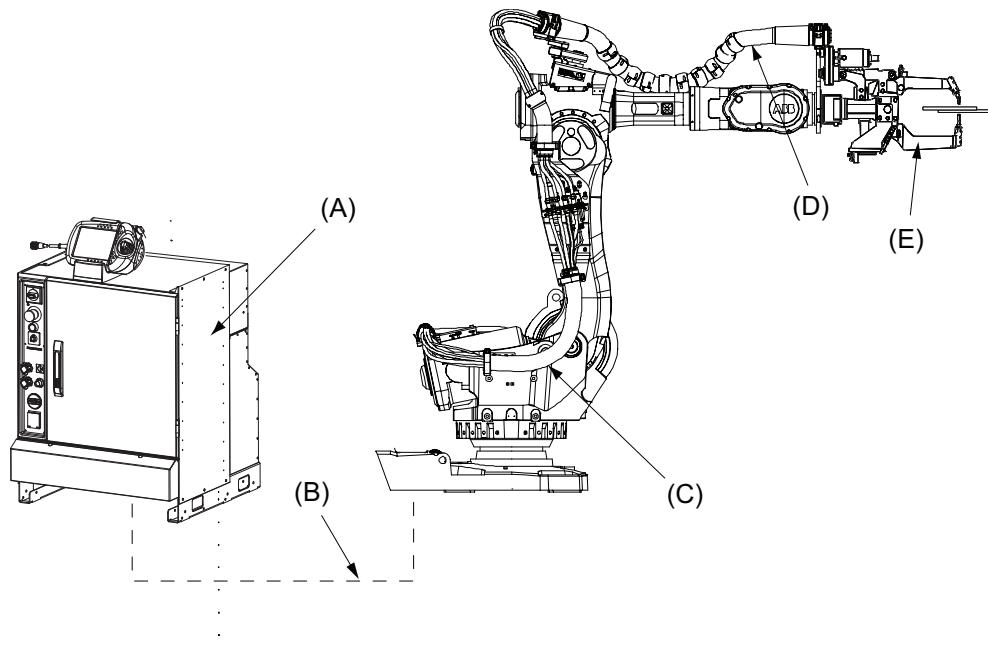
### 2.6.1 Introduction

## 2.6 Type Se

### 2.6.1 Introduction

#### General

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



xx1000000613

Pos	Name
A	Robot Cabinet IRC5 (including 7th axis drive)
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm
E	Servo gun

Available configurations with linked option numbers are described below. To achieve the specific servo motor connections within the DressPack option 785-1 Robot gun must also be chosen. See [Robot Gun on page 70](#) for details.

*Continues on next page*

**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. Option 94-1,-2,-3,-4 for parallel communication Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet 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.
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	Offers the signal cables needed for the Ethernet communication in combination in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X.

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

Application Interface connected to Option 16-1, Cabinet	Option 455-1, Parallel communication	Option 94-1,-3,-4 Cable length, Parallel communication	Option 778-2, Spot Welding
	Option 455-4, Parallel and bus communication	Option 90-2,-3,-4,-5 Option 92-2,-3 Cable length, Parallel and bus communication	
	Option 455-8, Parallel and Ethernet communication	Option 859-1, -2, -3, -4 Cable length, Ethernet communication	

**Continued**

	Lower arm	Upper arm
Option 778-2, Spot Welding	Option 798-2, Base to axis 2 External routing	Option 780-2, Axis 2 to 6 External routing
	Option 798-3, Base to axis 3 External routing	Option 780-4, Axis 3 to 6 Internal routing

## 2 DressPack

### 2.6.2 Configuration result for Type Se

#### 2.6.2 Configuration result for Type 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 Type Se. 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 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

##### One of the options:

- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	16	16 (8x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	4 (2x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Servo motor signals</b>				
Servo motor power	At drive	3	1,5 mm <sup>2</sup>	600 VAC, 12 A rms
Protective earth	At drive	1	1,5 mm <sup>2</sup>	600 VAC
Signals twisted pair for resolver	-	6	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Brake	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Temperature control/PTC	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner diameter <sup>i</sup>	Max. air pressure 16 bar/ 230 PSI. Max. water pressure 10 bar/ 145 PSI
<b>Welding power (WELD)</b>				

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2.6.2 Configuration result for Type Se  
*Continued*

Type	At terminals in cabinet	At connection point. Base, ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
Lower and Upper arm		2	35 mm <sup>2</sup>	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

i For LeanID 2x1/2" + 2x3/8", only upper arm

ii For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

## 2 DressPack

### 2.6.2 Configuration result for Type Se

*Continued*

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#### DressPack Type Se. Parallel and field bus communication, Can/DeviceNet

- Option 16-1 with Connection to cabinet
- (Option 90-2,-3,-4,-5 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2). External routing, DressPack Upper arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer signals (CS)</b>				
Signals twisted pair	14	14 (7x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	4	4 (2x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	2	0,14 mm <sup>2</sup>	Can/DeviceNet spec
Bus signals	At bus board	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Servo motor signals</b>				
Servo motor power	At drive	3	1,5 mm <sup>2</sup>	600 VAC, 12 A rms
Protective earth	At drive	1	1,5 mm <sup>2</sup>	600 VAC
Signals twisted pair for resolver	-	6	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Brake	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Temperature control/PTC	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner diameter <sup>i</sup>	Max. air pressure 16 bar/230 PSI. Max. water pressure 10 bar/145 PSI.
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> <sup>ii</sup>	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>ii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

**DressPack Type Se. Parallel and field bus communication, Profibus**

- Option 16-1 with Connection to cabinet
- (Option 92-2,-3 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer signals (CS)</b>				
Signals twisted pair	16	16 (8x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	4	4 (2x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	4	0,14 mm <sup>2</sup>	Profibus 12 Mbit/s spec
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Servo motor signals</b>				
Servo motor power	At drive	3	1,5 mm <sup>2</sup>	600 VAC, 12 A rms
Protective earth	At drive	1	1,5 mm <sup>2</sup>	600 VAC
Signals twisted pair for resolver	-	6	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Brake	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Temperature control/PTC	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner diameter <sup>i</sup>	Max. air pressure 16 bar/230 PSI. Max. water pressure 10 bar/145 PSI.
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> ii	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>ii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

*Continues on next page*

## 2 DressPack

### 2.6.2 Configuration result for Type Se

*Continued*

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#### DressPack Type Se, Parallel and field bus communication, Ethernet

- Option 16-1 with Connection to cabinet
- (Option 859-1,-2, -3, -4 to specify cable length)
- (Option 94-1, -2, -3, -4 to specify cable length)
- Option 455-8. Parallel and Ethernet communication
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm

One of the options:

- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-4 (and option 798-3). Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VACa
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20(10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (Ethernet)</b>				
Bus signals	4	4	0,4 mm <sup>2</sup>	Ethernet CAT 5e, 100 Mbit <sup>i</sup>
<b>Servo motor signals</b>				
Servo motor power	At drive	3	1,5 mm <sup>2</sup>	600 VAC, 12 A rms
Protective earth	At drive	1	1,5 mm <sup>2</sup>	600 VAC
Signals twisted pair for re- solver	-	6	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Brake	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Temperature control/PTC	-	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Water/Air (PROC 1-4)		4	12.5 mm inner dia- meter <sup>ii</sup>	Max. air pressure 16 bar/230 PSI Max water pres- sure 10 bar/145 PSI
<b>Welding power (WELD)</b>				
Lower and Upper arm		2	35 mm <sup>2</sup> <sup>iii</sup>	600 VAC, 150 A rms at 20°C (68°F)
Protective earth (Lower and Upper arm)		1		

<sup>i</sup> Ethernet with wire colors according to PROFINET standard, M12-connectors.

<sup>ii</sup> For LeanID 2x1/2" + 2x3/8", only upper arm

<sup>iii</sup> For LeanID upper arm 25 mm<sup>2</sup>, only upper arm, 135 A rms

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**Required general options for Type Se**

To enable the Spot welding function package IRB 7600 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 enable the spot welding function package IRB 7600 to run with a servo controlled gun, some additional (additional to those described in previous section "Required general options for Type Se") 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 785-1. 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 635-5 could also be used)

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

## **2 DressPack**

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### **2.6.3 Summary Type Se**

#### **2.6.3 Summary Type Se**

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##### **DressPack**

The following options are the minimum required to form a complete Spot welding function Se:

- Option 16-1. Connection to cabinet, (Cable length and communication type to be stated)
- Option 455-1, 455-4. Parallel or Parallel and Bus communication (Communication type to be stated)
- Option 778-2. Spot Welding
- Option 798-2, -3. External routing, DressPack Lower arm
- Option 780-2, -4. DressPack Upper arm (Routing type to be stated)



##### **Note**

See 1.9.3 Robot Gun for further drive details.

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##### **General options**

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

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##### **Required options for servo gun**

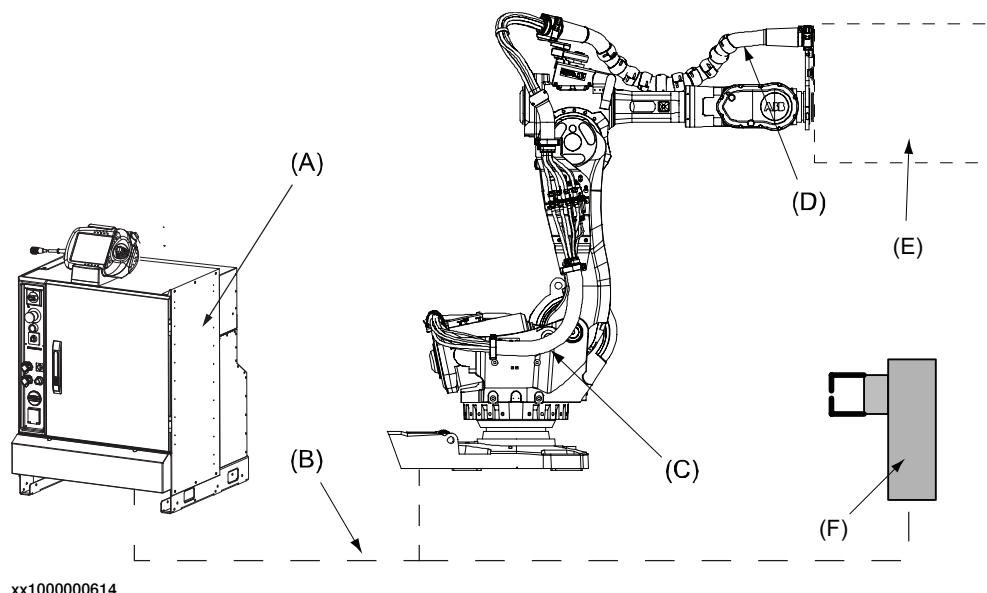
- Option 770-4. First additional drive, W Drive
- Option 785-1. Robot Gun
- Option 786-1,-2,-3,-4. Connection to first drive (cable length to be stated)
- Option 635-3. Spot Servo

## 2.7 Type HSe

### 2.7.1 Introduction

#### General

Variant Type HSe is designed for handling against a stationary mounted Spot Welding servo controlled tool (electrical gun). Included main modules are shown in Figure below. Available configurations with linked option numbers are described below with starting with the DressPack.



Pos	Name
A	Robot Cabinet IRC5 (incl. 7 th axis drive)
B	DressPack, Floor
C	DressPack, Lower arm
D	DressPack, Upper arm
E	Robot Gripper
F	Stationary gun with axis 7

Available configurations with linked option numbers are described below.

#### Option description

Option	Type	Description
16-1	Connection to cabinet	<p>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.</p> <p>Option 94-1,-2,-3,-4 for parallel communication.</p> <p>Option 90-2,-3,-4,-5 for parallel communication and field bus communication with Can/DeviceNet.</p> <p>Option 92-2,-3 for parallel communication and field bus communication with Profibus.</p>

*Continues on next page*

## 2 DressPack

### 2.7.1 Introduction

*Continued*

Option	Type	Description
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.
455-8	Parallel and Ethernet	Offers the signal cables needed for the Ethernet communication in combination in lower and upper arm DressPack. To be combined with option 859-1,-2,-3,-4. Requires selection of option 94-X.

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

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

*Continued*

	Lower arm	Upper arm
Option 778-1, Material Handling	Option 798-3, Base to axis 3	Option 780-3, Axis 3 to 6 External routing
		Option 780-4, Axis 3 to 6 Internal routing
	Option 798-2, Base to axis 2	Option 780-2, Axis 2 to 6 External routing

## 2.7.2 Configuration result for Type 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.

### DressPack Type HSe. 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 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and Option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

## 2 DressPack

### 2.7.2 Configuration result for Type HSe

*Continued*

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#### DressPack Type HSe. Parallel and field bus communication, Can/DeviceNet

- Option 16-1 with Connection to cabinet
- (Option 90-1,-2,-3,-4 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 778-1. Material Handling
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing with retract arm
- Option 780-3 or 780-4 (and Option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Ax- is 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20 (10x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	2	0,14 mm <sup>2</sup>	Can/DeviceNet spec
Bus signals	At bus board	2	0,23 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair	6	6(3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner dia- meter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

**DressPack Type HSe. Parallel and field bus communication, Profibus**

- Option 16-1 with Connection to cabinet
- (Option 92-2,-3 to specify cable length)
- Option 455-4. Parallel and bus communication
- Option 798-2 or 798-3. Internal routing, DressPack Lower arm
- Option 780-2 (and option 798-2). External routing
- Option 780-3 or 780-4 (and Option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms
Protective earth		1	0,5 mm <sup>2</sup>	250 VAC
<b>Customer Signals (CS)</b>				
Signals twisted pair	22	22 (11x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (CBus)</b>				
Bus signals	At bus board	4	0,14 mm <sup>2</sup>	Profibus 12 Mbit/s spec
Signals twisted pair	6	6 (3x2)	0,14 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner diameter	Max. air pressure 16 bar/230 PSI

*Continues on next page*

## 2 DressPack

### 2.7.2 Configuration result for Type HSe

*Continued*

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#### DressPack Type HS, Parallel and field bus communication, Ethernet

- - Option 16-1 with Connection to cabinet
  - (Option 859-1,-2, -3, -4 to specify cable length)
  - (Option 94-1, -2, -3, -4 to specify cable length)
  - Option 455-8. Parallel and Ethernet communication
  - Option 798-2 or 798-3. Internal routing, DressPack Lower arm
  - Option 780-2 (and option 798-2). External routing with retract arm
  - Option 780-3 or 780-4 (and option 798-3). External/Internal routing

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

Type	At terminals in cabinet	At connection point. Base, Axis 2/3 or axis 6	Cable/part area	Allowed capacity
<b>Customer Power (CP)</b>				
Utility Power	2+2	2+2	0,5 mm <sup>2</sup>	250 VAC, 5 A rms <sup>i</sup>
Protective earth		1	0,5 mm <sup>2</sup>	250 VACa
<b>Customer Signals (CS)</b>				
Signals twisted pair	20	20(10x2) <sup>ii</sup>	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
Signals twisted pair and separate shielded	8	8 (4x2)	0,24 mm <sup>2</sup>	50 V DC, 1 A rms
<b>Customer bus (Ethernet)</b>				
Bus signals	4	4	0,4 mm <sup>2</sup>	Ethernet CAT 5e, 100 Mbit <sup>iii</sup>
<b>Media</b>				
Air (PROC 1)		1	12,5 mm inner diameter	Max. air pressure 16 bar/230 PSI

<sup>i</sup> For option 780-3 50 VAC / 60 VDC.

<sup>ii</sup> For option 780-3 8 signals instead of 20.

<sup>iii</sup> Ethernet with wire colors according to PROFINET standard, M12-connectors.

*Continues on next page*

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**Required general options for Type HSe**

To enable the spot welding function package IRB 7600 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

## **2 DressPack**

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### **2.7.3 Summary Type HSe**

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#### **DressPack**

The following options are the minimum required to form a complete Spot welding function Type HSe:

- Option 16-1. Connection to cabinet, (Cable length and communication type to be stated)
- Option 455-1, 455-4. Parallel or Parallel and Bus communication (Communication type to be stated)
- Option 778-1. Material Handling
- Option 798-2 or 798-3. DressPack Lower arm (Routing type to be stated)
- Option 780-2, 780-3 and 780-4. DressPack Upper arm (Routing type to be stated)

---

#### **General options**

- 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**

- Option 770-4. First additional drive, W Drive
- Option 785-5. Stationary gun
- Option 786-1. Connection to first drive (other lengths available)
- Option 635-3. Spot Servo. Software option for servo controlled guns

## 2.8 Connection kits

### General

For detailed information on connection location see [Interface descriptions for DressPack on page 82](#)

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



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*Continues on next page*

## 2 DressPack

### 2.8 Connection kits

*Continued*

#### Base - Connector kits

		DressPack options Resolver conn., axis 7			Description
Option	Name	798-2	798-3	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 for option 798-1 and 798-2.

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

The kit contains:

- 1 Hose fittings (Parker Pushlock, (1/2", 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 <sup>2</sup>
10 pcs Female crimp contacts	For 0,5 mm <sup>2</sup>
10 pcs Female crimp contacts	For 1,0 mm <sup>2</sup>
10 pcs Female crimp contacts	For 2,5 mm <sup>2</sup>
12 pcs Female crimp contacts	For 0,14– 0,37 mm <sup>2</sup>
45 sockets	For 0,2– 0,56 mm <sup>2</sup>
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 <sup>2</sup>
Assembly Accessories to complete connector	
Assembly instruction	

*Continues on next page*

**Axis 2 - Connector kits**

		DressPack option	Description
Option	Name	798-2 (MH/SW 2)	
458-1	CP/CS, Proc 1 axis 3	X	4 module Harting
479-1	Weld, Proc 2-4 axis 3	X	MC

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

**R2. CP/CS and Proc 1 on axis 2/3**

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

The kit contains:

- 1 Hose fittings (Parker Pushlock, (1/2", 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 <sup>2</sup>
10 pcs Male crimp contacts	For 0,5 mm <sup>2</sup>
10 pcs Male crimp contacts	For 1,0 mm <sup>2</sup>
10 pcs Male crimp contacts	For 2,5 mm <sup>2</sup>
12 pcs Male crimp contacts	For 0,14 – 0,37 mm <sup>2</sup>
45 pin	For 0,2 – 0,56 mm <sup>2</sup>
Assembly Accessories to complete connector	
Assembly instruction	

Option 479-1, Weld, Proc 2-4 axis 3

**R2. Weld and Proc 2-4 on axis 2/3**

This option offers a kit with weld connector and fittings. This must be assembled by the customer.

The kit contains:

- 3 Hose fittings (Parker Pushlock, (1/2", M22x1,5 Brass, 24 degree seal))
- Weld connector with:

1 pcs Welding connector pin with flange (MC)	3x35 mm <sup>2</sup> (25 mm <sup>2</sup> pin)
1 pcs Cable gland, plastic	Diameter 24-28 mm
Assembly Accessories to complete connector	
Assembly instruction	

*Continues on next page*

## 2 DressPack

### 2.8 Connection kits

*Continued*

#### Axis 3 - Connector kits

		DressPack options	Description
Option	Name	798-3(MH)	
458-1	CP/CS/CBUS/SP/SS Proc 1 axis 3	X	UTOW

#### Option 458-1, CP/CS/CBUS/SP/SS, Proc 1 axis 3

R2. CP/CS and Proc 1 on axis 3, option 798-3 and on tool side for option 780-3 and 780-4.

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

The kit contains:

- 1 Hose fittings (Parker Pushlock, (1/2"), M22x1,5 Brass, 24 degree seal))
- Connector with:

CP/CS	
1 pcs UTOW Pin connector 26p, bulkhead	UTOW71626PH05, Shell size 16
26 pcs Pin	RM18W3K, 0.21-0.93 mm <sup>2</sup>
CBUS	
1 pcs UTOW Pin connector 10p, bulkhead	UTOW71210PH05 Shell size 12
10 pcs Pin	RM18W3K, 0.21-0.93 mm <sup>2</sup>
Ethernet	
1 pcs Socket connector M12	Harting 2103 88
4 pcs Socket	Harting 61 03 0, 0.13-0.33 mm <sup>2</sup>
SP (Servo Power)	
1 pcs Bulkhead contact M23	
4 pcs Crimp pin 1 mm	AWG 24-17
4 pcs Crimp pin 2 mm	AWG 18-14
SS (Servo Signal)	
1 pcs Bulkhead contact M23	
17 pcs Pin	AWG 28-20
Assembly Accessories to complete connector	
Assembly instruction	

*Continues on next page*

**Axis 6 - Connector kits**

					Description
Option	Name	780-2 (MH/SW 2)	780-3 (MH 3)	480- 4(LeanID)	
452-1	Weld, Proc 1-4 axis 6	X		X	MC
543-1	CP/CS/CBus/SP/SS Proc 1 axis 6	X	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 780-2.

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 <sup>2</sup>
10 pcs Male crimp contacts	For 0,5 mm <sup>2</sup>
10 pcs Male crimp contacts	For 1,0 mm <sup>2</sup>
10 pcs Male crimp contacts	For 2,5 mm <sup>2</sup>
15 pcs Male crimp contacts	For 0,14 – 0,37 mm <sup>2</sup>
30 pins	For 0,2 – 0,56 mm <sup>2</sup>
Assembly Accessories to complete connector	
Assembly instruction	

*Continues on next page*

## 2 DressPack

### 2.8 Connection kits

*Continued*

Souriau

CP/CS/CBus/SP/SS, Proc 1 axis 6 on tool side for option 780-3 and 780-4.

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:

CP/CS	
1 pcs UTOW Pin connector 26p, bulkhead	UTOW71626PH05, Shell size 16
26 pcs Pin	RM81W3K, 0.21-0.93 mm <sup>2</sup>
CBUS	
1 pcs UTOW Pin connector 10p, bulkhead	UTOW71210PH05 Shell size 12
10 pcs Pin	RM18W3K, 0.21-0.93 mm <sup>2</sup>
Ethernet	
1 pcs Socket connector M12	Harting 2103 88
4 pcs Socket	Harting 61 03 0, 0.13-0.33 mm <sup>2</sup>
SP (Servo Power)	
1 pcs Bulkhead contact M23	
4 pcs Crimp pin 1 mm	AWG 24-17
4 pcs Crimp pin 2 mm	AWG 18-14
SS (Servo Signal)	
1 pcs Bulkhead contact M23	
17 pcs Pin	AWG 28-20
Assembly Accessories to complete connector	
Assembly instruction	

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 780-2) 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, (1/2", M22x1,5 Brass, 24 degree seal))
- 1 Multi contact connector (Female) type including:

1 pc Welding connector socket incl. housing	3x35 mm <sup>2</sup> (35 mm <sup>2</sup> 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 7600 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 Specification of variants and options

#### 3.2 Manipulator

##### 3.2 Manipulator

###### Variants

Option	IRB type	Handling capacity (kg)/Reach (m)
435-36	7600	150/3.5
435-93	7600	325/3.1
435-24	7600	340/2.8
435-18	7600	400/2.55
435-65	7600	500/2.55

###### Manipulator color

Option	Description	Note
209-1	ABB Orange 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 67
287-3	Foundry Plus 2	See <a href="#">Protection type Foundry Plus 2 on page 11</a> for a complete description of protection type Foundry Plus 2. Not valid for LeanID Int. Axis 3 to 6 [780-4].

###### Warranty

For the selected period of time, ABB will provide spare parts and labour to repair or replace the non-conforming portion of the equipment without additional charges. During that period, it is required to have a yearly Preventative Maintenance according to ABB manuals to be performed by ABB. If due to customer restraints no data can be analyzed in the ABB Ability service *Condition Monitoring & Diagnostics* for robots with OmniCore controllers, and ABB has to travel to site, travel expenses are not covered. The Extended Warranty period always starts on the day of warranty expiration. Warranty Conditions apply as defined in the Terms & Conditions.



###### Note

This description above is not applicable for option *Stock warranty* [438-8]

Continues on next page

Option	Type	Description
438-1	Standard warranty	Standard warranty is 12 months from <i>Customer Delivery Date</i> or latest 18 months after <i>Factory Shipment Date</i> , whichever occurs first. Warranty terms and conditions apply.
438-2	Standard warranty + 12 months	Standard warranty extended with 12 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-4	Standard warranty + 18 months	Standard warranty extended with 18 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-5	Standard warranty + 24 months	Standard warranty extended with 24 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-6	Standard warranty + 6 months	Standard warranty extended with 6 months from end date of the standard warranty. Warranty terms and conditions apply.
438-7	Standard warranty + 30 months	Standard warranty extended with 30 months from end date of the standard warranty. Warranty terms and conditions apply.
438-8	Stock warranty	Maximum 6 months postponed start of standard warranty, starting from factory shipment date. Note that no claims will be accepted for warranties that occurred before the end of stock warranty. Standard warranty commences automatically after 6 months from <i>Factory Shipment Date</i> or from activation date of standard warranty in WebConfig.   <b>Note</b>  Special conditions are applicable, see <i>Robotics Warranty Directives</i> .

#### 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.



##### Note

Option 780-4 DressPack LeanID is covered by the warranty.

### 3 Specification of variants and options

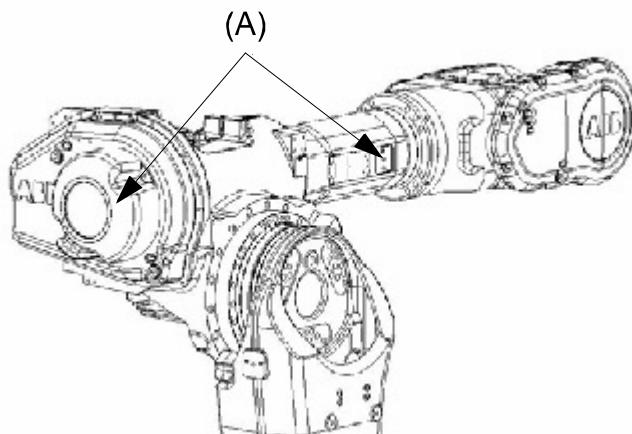
#### 3.3 Equipment

##### 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. 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 7600. See 1.3 Installation, for dimension drawing.
87-1	Cooling fan for axis 1 motor (IP 54)	Cannot be combined with Cooling fan for axis 2 motor option 88-1. For in use recommendations see 1.8 Cooling fan for axis 1-2 motor. Not for protection Foundry. Not together with track motion.
88-1	Cooling fan for axis 2 motor (IP 54)	Cannot be combined with Cooling fan for axis 1 motor option 87-1. For in use recommendations see 1.8 Cooling fan for axis 1-2 motor. Not for protection Foundry. Not together with track motion.
430-1	Upper arm covers	See Figure below. Included in protection Foundry.

###### Upper arm covers



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Pos	Description
A	Option 430-1

###### Resolver connection, axis 7

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

*Continues on next page*

#### 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*.

#### 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. Requires option 287-3 Foundry Plus.

#### Working Range Limit

To increase the safety of the robot, the working range of axes 1, 2 and 3 can be restricted by extra mechanical stops.

Option	Type	Description
29-1	Axis 1, 15°	Two stops which allow the working range to be restricted in increments of 15°.
29-2	Axis 1, 7.5°	Two stops which allow the working range to be restricted in increments of 7.5°.
32-1	Axis 2	Six stops which allow the working range to be restricted in increments of 15° at both end positions. Each stop decreases the motion by 15°.
34-1	Axis 3	Six stops which allow the working range to be restricted in increments of 20° at both end positions. Each stop decreases the motion by 20°.

#### Extended work range

Option	Type	Description
561-1	Extended work range axis 1	To extend the working range on axis 1 from ±180° to ±220°. When the option is used the mechanical stop shall be removed. Requires options SafeMove or EPS (Electronic Position Switches).

*Continues on next page*

### 3 Specification of variants and options

#### 3.3 Equipment

*Continued*



#### CAUTION

The option *Extended work range* enables an extension of the working range for axis 1, through a software configuration. With this option installed, the working range can exceed the range limited by the mechanical stop on axis 1. The working range shall be limited through the option SafeMove.

A risk analysis must be done to ensure that no risks remain when using option *Extended work range*, to limit the working range, and before removing the mechanical stops.

For information about the option SafeMove, see *Application manual - Functional safety and SafeMove2*.

If the mechanical stop is removed, then the manipulator should have a marking for this, for example, a label. If the robot is delivered with the option *Extended work range*, then such a label is included on delivery.

#### 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.
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.



#### Note

The calibration methods are not interchangeable.

## 3.4 Floor cables

### General

Additional floor cables for Spot welding options, see [DressPack Floor on page 145](#).

### Manipulator cable length

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

### **3 Specification of variants and options**

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#### **3.5 Process DressPack**

#### **3.5 Process DressPack**

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##### **Connection to**

<b>Option</b>	<b>Connection to</b>	<b>Description</b>
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 <a href="#">Type H on page 91</a> to <a href="#">Type Se on page 114</a>

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##### **Communication**

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

## **3.6 DressPack Floor**

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

Following information specifies the cable length for  
Parallel/CANDeviceNet/Profibus/Ethernet for connection to cabinet.

<b>Option</b>	<b>Lengths</b>	<b>Description</b>
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 Specification of variants and options

#### 3.7 DressPack Lower and Upper arm

#### 3.7 DressPack Lower and Upper arm

##### DressPack process configuration



##### Note

For more information about the process cable packages, see 1.2 DressPack.

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
798-2	MH/SW, routing from base to axis 2	
798-3	MH/SW, routing from base to axis 3	

##### DressPack upper arm

Option	Description	Note
780-2	External routing from axis 2 to axis 6	Requires option 798-2. Not together with IRB 7600-325/3.1, option 435-93.
780-3	External routing from axis 3 to axis 6	Requires option 778-1 and option 798-3. Not together with option 287-3 Foundry Plus.
780-4	Internal routing from axis 3 to axis 6	Requires option 798-3. LeanID.



##### Note

If option 780-4, LeanID, is selected the payload will decrease, for detailed information see [Load diagrams on page 36](#)

## 3.8 Connection Kits

### General

The connectors fit to the connectors at the manipulator base, axis 2/3 and 6 respectively.

### Content

The kit consists of connectors, pins and sockets. For technical description, see [Connection kits on page 131](#).

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.
458-1	R2.CP/CS and PROC1	For the Customer Power/Customer Signal connector and one Process connector at axis 2/3. Pins for bus communication are included.
452-1	WELD and PROC1-4 axis 6	Weld connector and four Process connectors at axis 6, the manipulator side.
543-1	CP/CS/BUS, PROC1 axis 6	Connector for customer power/customer signal/customer bus at axis 6 tool side.

### **3 Specification of variants and options**

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#### **3.9 Servo Gun**

#### **3.9 Servo Gun**

---

##### **Content**

For technical description see [Servo gun on page 68](#).

Option	Lengths
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 [Servo gun on page 68](#).

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

## **3.10 User documentation**

### **User documentation**

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



#### **Tip**

All documents can be found via myABB Business Portal, [www.abb.com/myABB](http://www.abb.com/myABB).

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# 4 Accessories

## 4.1 Introduction to accessories

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### General

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

---

### Basic software and software options for robot and PC

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

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### Robot peripherals

- Track Motion
- Motor Units

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