ROBOTICS

Product specification

IRB 930

Trace back information:
Workspace 23B version a11
Checked in 2023-06-20
Skribenta version 5.5.019

Product specification

IRB 930-12/0.85
IRB 930-12/1.05
IRB 930-22/1.05

OmniCore

Document ID: 3HAC086011-001

Revision: A

The information in this manual is subject to change without notice and should not be construed as a commitment by ABB. ABB assumes no responsibility for any errors that may appear in this manual.

Except as may be expressly stated anywhere in this manual, nothing herein shall be construed as any kind of guarantee or warranty by ABB for losses, damage to persons or property, fitness for a specific purpose or the like.

In no event shall ABB be liable for incidental or consequential damages arising from use of this manual and products described herein.

This manual and parts thereof must not be reproduced or copied without ABB's written permission.

Keep for future reference.

Additional copies of this manual may be obtained from ABB.

Original instructions.

Table of contents

This page is intentionally left blank

Overview of this specification

About this product specification

This product specification 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 equipment
- The load diagrams, mounting or extra equipment, the motion, and the robot reach
- The specification of available variants and options

The specification covers the manipulator using the OmniCore controller.

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.

The specification is intended for:

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

References

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

Document name	Document ID
Product manual - IRB 930	*3HAC086009-001*
Product manual - OmniCore C30	*3HAC060860-001*
Product manual - OmniCore C90XT	*3HAC073706-001*
Product specification - OmniCore C line	*3HAC065034-001*

Revisions

Revision	Description
A	First edition.

This page is intentionally left blank

1 Description of IRB 930

1.1 Structure

1.1.1 Introduction

General

The IRB 930 is one of ABB Robotics latest generation of 4-axis robot, with a payload of 12 kg and 22 kg designed based on industrial robot platform. The robot has an open structure that is especially adapted for flexible use, and can communicate extensively with external systems.

The IRB 930 contains the following variants:

- IRB 930-12/0.85
- IRB 930-12/1.05
- IRB 930-22/1.05

Note

Without any specific statement, IRB 930 represents all variants under this product.

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.

Operating system

The robot is equipped with the OmniCore C30/C90XT 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 *Operating manual - OmniCore*.

Safety

Safety standards valid for complete robot, manipulator and controller.

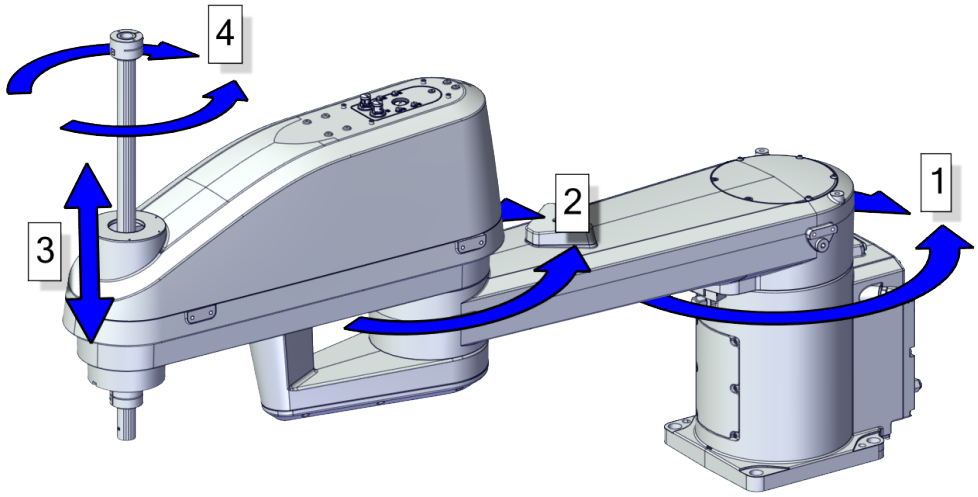
Additional functionality

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

Continues on next page

1.1.1 Introduction
Continued

Robot axes



xx2300000574

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

1.1.2 Different robot versions

General

The IRB 930 is available in following versions.

Robot types

The following robot versions are available.

Robot type	Handling capacity (kg)	Reach (m)
IRB 930-12/0.85	12 kg	0.85 m
IRB 930-12/1.05	12 kg	1.05 m
IRB 930-22/1.05	22 kg	1.05 m

1.1.3 Definition of version designations

1.1.3.1 Technical data

Weight, robot

The table shows the weight of the robot.

Robot model	Nominal weight
IRB 930	IRB 930-12/0.85: 64 kg IRB 930-12/1.05: 66 kg IRB 930-22/1.05: 66 kg

Note

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

Mounting positions

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

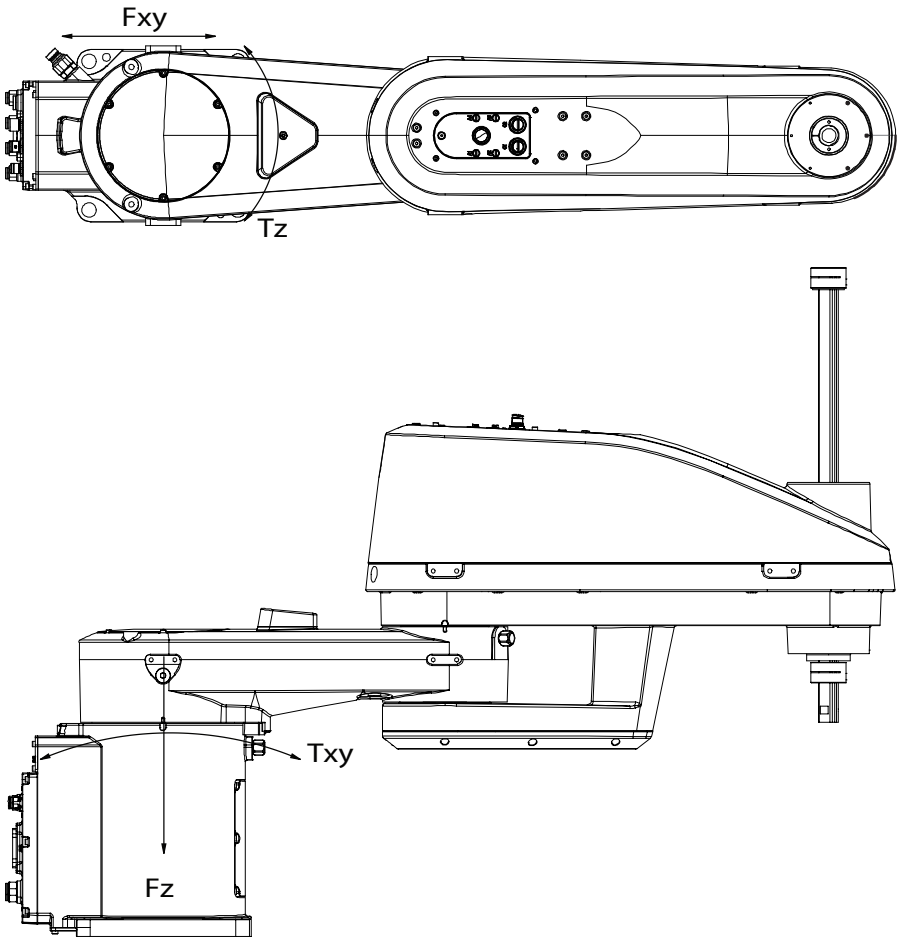
Mounting position	Installation angle
Floor mounted	0°

Note

The actual mounting angle must always be configured in the system parameters, otherwise the performance and lifetime is affected. See the product manual for details.

Continues on next page

Loads on foundation, robot



xx2300000160

F_{xy}	Force in any direction in Plane XY
F_z	Force along Axis Z
T_{xy}	Bending moment in any direction in Plane XY
T_z	Torsional moment around Axis Z

The table shows the various forces and torques working on the robot during different kinds of operation.

Note

These forces and torques are extreme values that are rarely encountered during operation. The values also never reach their maximum at the same time!

WARNING

The robot installation is restricted to the mounting options given in following load table(s).

Continues on next page

1.1.3.1 Technical data
Continued

Floor mounted

Force	Endurance load (in operation)	Maximum load (emergency stop)
Force xy	IRB 930-12/0.85: ±1200 N IRB 930-12/1.05: ±1000 N IRB 930-22/1.05: ±1000 N	±2000 N
Force z	IRB 930-12/0.85: ±815 N IRB 930-12/1.05: ±950 N IRB 930-22/1.05: ±950 N	IRB 930-12/0.85: ±1200 N IRB 930-12/1.05: ±1300 N IRB 930-22/1.05: ±1300 N
Torque xy	IRB 930-12/0.85: ±650 Nm IRB 930-12/1.05: ±800 Nm IRB 930-22/1.05: ±800 Nm	IRB 930-12/0.85: ±1310 Nm IRB 930-12/1.05: ±1550 Nm IRB 930-22/1.05: ±1550 Nm
Torque z	IRB 930-12/0.85: ±255 Nm IRB 930-12/1.05: ±250 Nm IRB 930-22/1.05: ±250 Nm	IRB 930-12/0.85: ± 510 Nm IRB 930-12/1.05: ±520 Nm IRB 930-22/1.05: ±520 Nm

Requirements, foundation

The table shows the requirements for the foundation where the weight of the installed robot is included:

Requirement	Value	Note
Flatness of foundation surface	0.1/500 mm	Flat foundations give better repeatability of the resolver calibration compared to original settings on delivery from ABB. The value for levelness aims at the circumstance of the anchoring points in the robot base. In order to compensate for an uneven surface, the robot can be recalibrated during installation. If resolver/encoder calibration is changed this will influence the absolute accuracy.
Minimum resonance frequency	22 Hz **Note** It may affect the manipulator lifetime to have a lower resonance frequency than recommended.	The value is recommended for optimal performance. Due to foundation stiffness, consider robot mass including equipment.[i] For information about compensating for foundation flexibility, see the description of *Motion Process Mode* in the manual that describes the controller software option, see *References on page 7*.
Minimum foundation material yield strength	150 MPa	

i The minimum resonance frequency given should be interpreted as the frequency of the robot mass/inertia, robot assumed stiff, when a foundation translational/torsional elasticity is added, i.e., the stiffness of the pedestal where the robot is mounted. The minimum resonance frequency should not be interpreted as the resonance frequency of the building, floor etc. For example, if the equivalent mass of the floor is very high, it will not affect robot movement, even if the frequency is well below the stated frequency. The robot should be mounted as rigid as possibly to the floor.

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

Continues on next page

Storage conditions, robot

The table shows the allowed storage conditions for the robot:

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

Operating conditions, robot

The table shows the allowed operating conditions for the robot:

Parameter	Value
Minimum ambient temperature	+5ºC [i]
Maximum ambient temperature	+45ºC
Maximum ambient humidity	5% - 95% non-condensing according to IEC61131-2

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

Protection classes, robot

The table shows the available protection types of the robot, with the corresponding protection class.

Protection type	Protection class [i]
Manipulator, protection type Standard	IP30 [ii]

[i] According to IEC 60529.
[ii] The protection class of the ballscrew area is IP20. For more information, please contact ABB.

Environmental information

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

Other technical data

Data	Description	Note
Airborne noise level	The sound pressure level outside the working space.	< 70 dB(A) Leq (acc. to machinery directive 2006/42/EC)

Power consumption at max load with OmniCore C30/90XT

Type of movement	IRB 930-12/0.85	IRB 930-12/1.05	IRB 930-22/1.05
ISO Cube Max. velocity (W)	403	294	279

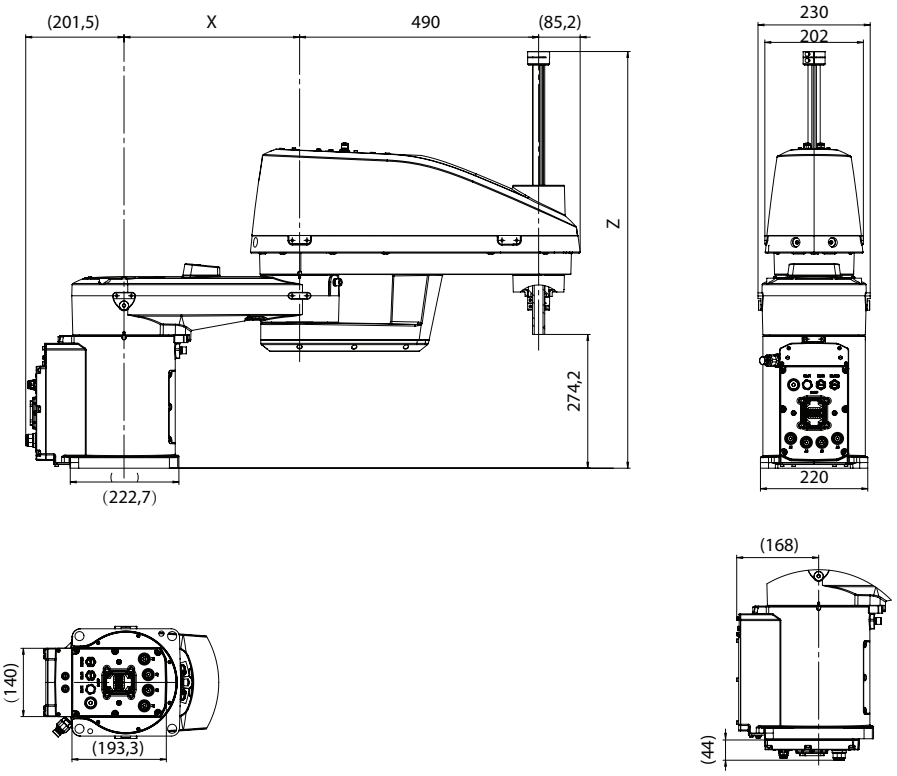
1.1.3.1 Technical data

Continued

Robot in calibration position	IRB 930-12/0.85	IRB 930-12/1.05	IRB 930-22/1.05
Brakes engaged (W)	74	73	74
Brakes disengaged (W)	121	122	138

1.1.3.2 Robot dimensions

Robots with standard protection class IP30



xx2300000161

Variants	0.85_0.3	0.85_0.45	1.05_0.3	1.05_0.45
X	360 mm	360 mm	560 mm	560 mm
Y	330 mm	330 mm	530 mm	530 mm
Z	854.2 mm	1,004.2 mm	854.2 mm	1,004.2 mm

1.2 Standards

1.2.1 Applicable standards

General

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

Robot standards

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

Other standards used in design

Standard	Description
IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1: General requirements, normative reference from ISO 10218-1
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13849-1:2006	Safety of machinery - Safety related parts of control systems - Part 1: General principles for design, normative reference from ISO 10218-1

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 434-03	Industrial robots and robot Systems - General safety requirements
EN ISO 10218-1	Robots and robotic devices — Safety requirements for industrial robots — Part 1: Robots

1.3 Installation

1.3.1 Introduction to installation

General

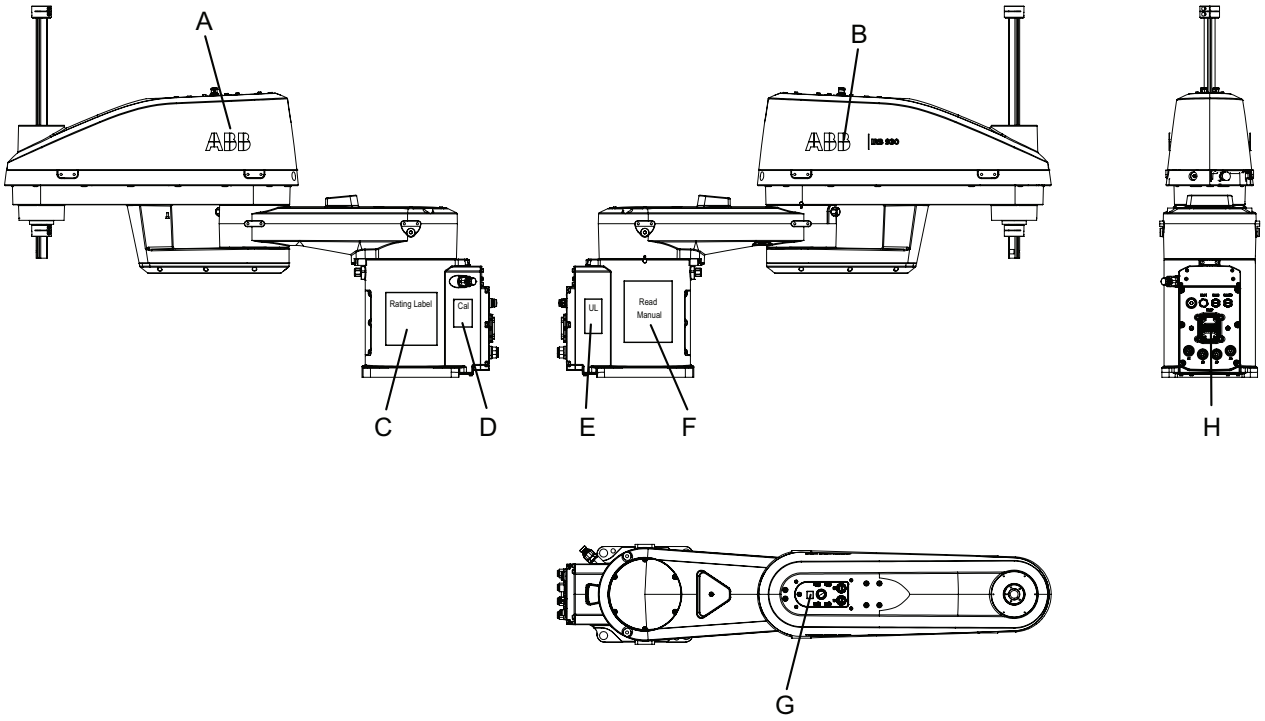
The detailed information for installing the IRB 930 at the working site is found in *Product manual - IRB 930*, *Product manual - OmniCore C30* and *Product manual - OmniCore C90XT*. .

Extra loads

See *Fitting equipment on the robot (robot dimensions) on page 42*.

1.3.2 Information labels

Illustration



xx2300000167

A	ABB logo
B	IRB 930 logo
C	Rating label
D	Calibration label
E	UL label
F	Read manual and caution
G	Brake release label
H	Extra O-ring fitting label

1.3.3 Assembling the manipulator

Attachment screws

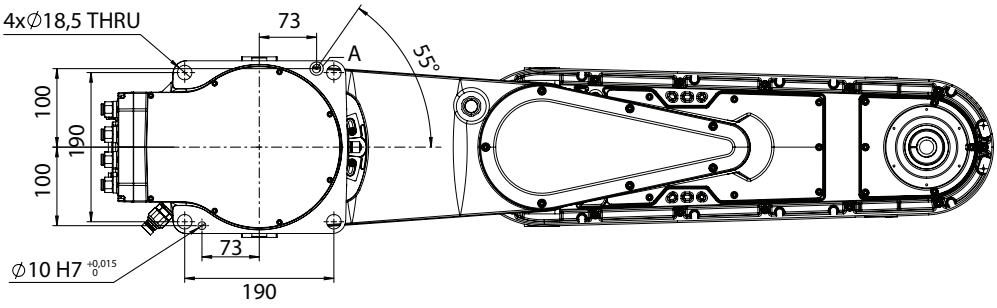
The table below specifies the type of securing screws and washers to be used for securing the robot to the base plate/foundation.

Suitable screws	M16x50
Quantity	4 pcs
Quality	8.8
Suitable washer	30 x 17 x 3 steel hardness class 200HV
Guide pins	2 pcs, D10x30, ISO 2338 - 10m6x30 - A1
Tightening torque	150 Nm±10 Nm
Length of thread engagement	Minimum 22 mm for ground with material yield strength 150 MPa
Level surface requirements	0.1/500 mm

Hole configuration, base

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

Illustration for rear outlet cable version:



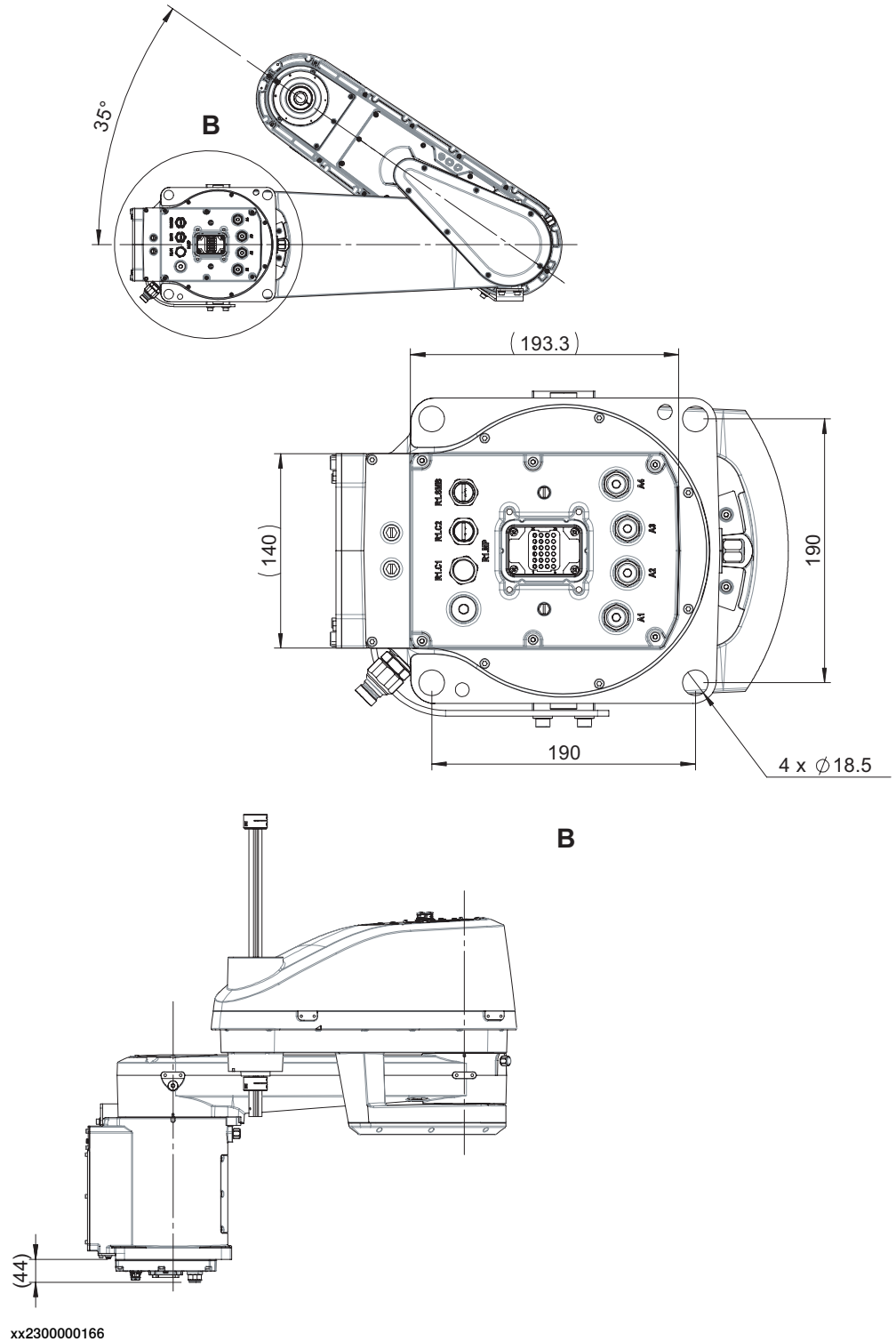
xx2300000165

Continues on next page

1.3.3 Assembling the manipulator

Continued

Illustration for underneath outlet cable version:



xx2300000166

1.3.4 Restricting the working range

1.3.4.1 Adjusting the working range

Reasons for adjusting the manipulator working range

The working range of each manipulator axis is configured in the software. If there is a risk that the manipulator may collide with other objects at installation site, its working space should be limited. The manipulator must always be able to move freely within its entire working space.

Working range configurations

The parameter values for the axes working range can be altered within the allowed working range and according to available options for the robot, either to limit or to extend a default working range. Allowed working ranges and available options for each manipulator axis are specified in *Working range on page 46*.

Mechanical stops on the manipulator

Mechanical stops are and can be installed on the manipulator as limiting devices to ensure that the manipulator axis does not exceed the working range values set in the software parameters.

Note

The mechanical stops are only installed as safety precaution to physically stop the robot from exceeding the working range set. A collision with a mechanical stop always requires actions for repair and troubleshooting.

Axis	Fixed mechanical stop[i]	Movable mechanical stop[ii]
Axis 1	yes	no
Axis 2	yes	no
Axis 3	yes	yes
Axis 4	no	no

i Part of the casting or fixed on the casting and can not /should not be removed.

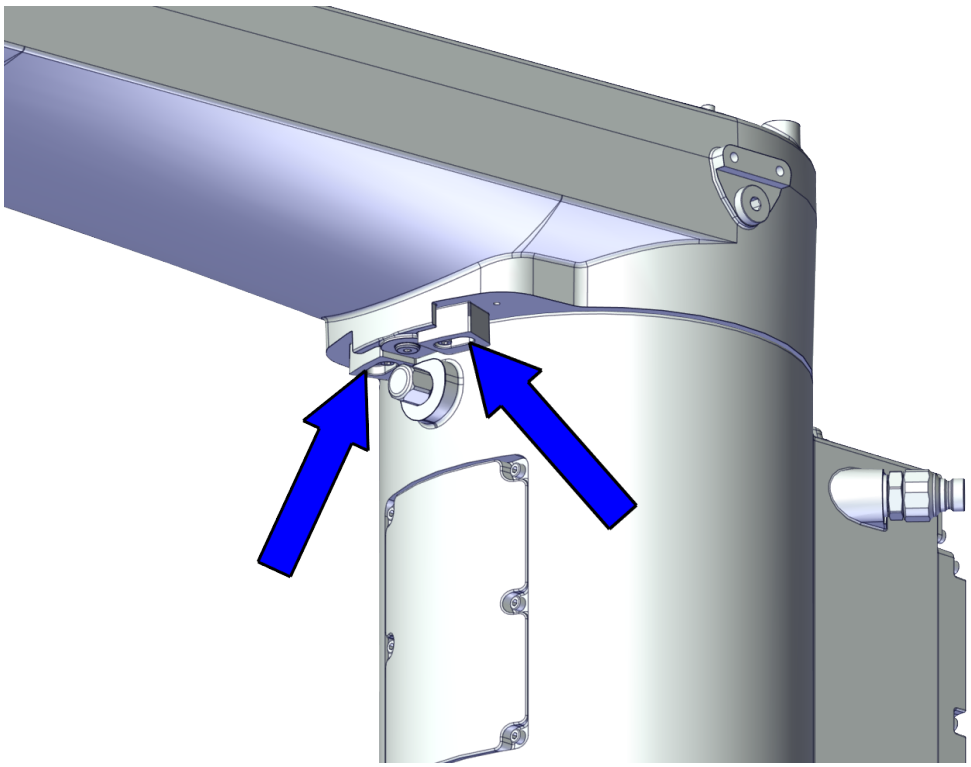
ii Can be installed in one or more than one position, to ensure a reduced working range, or be removed to allow extended working range.

1.3.4.2 Mechanically restricting the working range

Axis-1 mechanical stops

Location of the axis-1 mechanical stop

The figures shows where the axis-1 mechanical stop is placed on the robot.



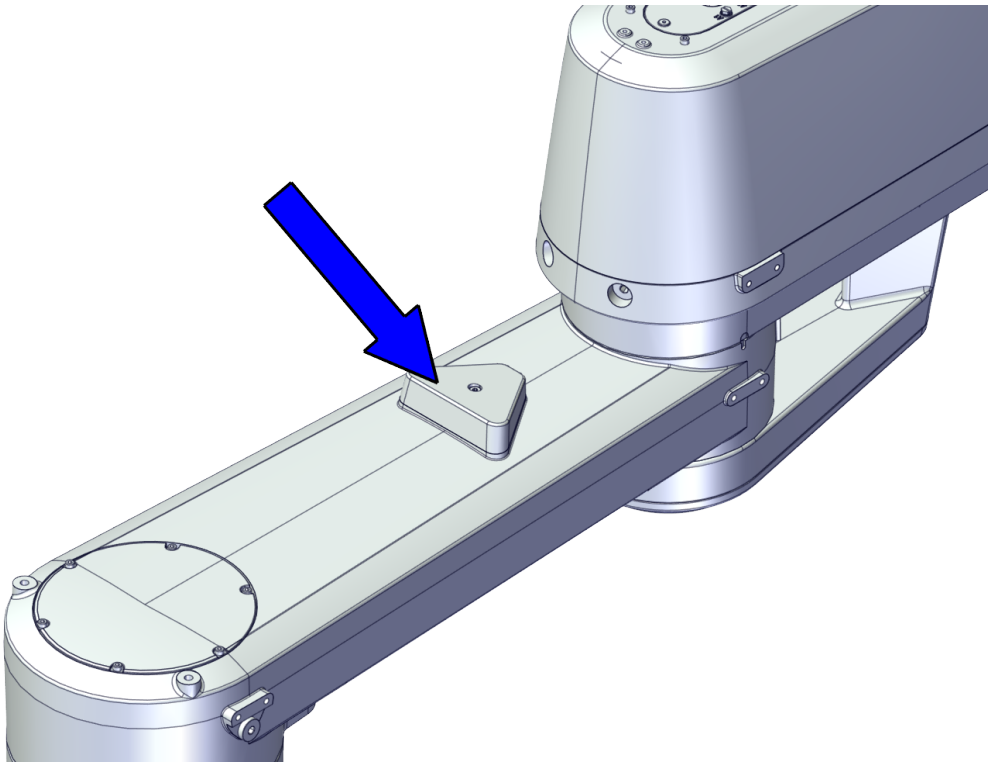
xx2300000173

Continues on next page

Axis-2 mechanical stops

Location of the axis-2 mechanical stop

The figures shows where the axis-2 mechanical stop is placed on the robot.



xx2300000174

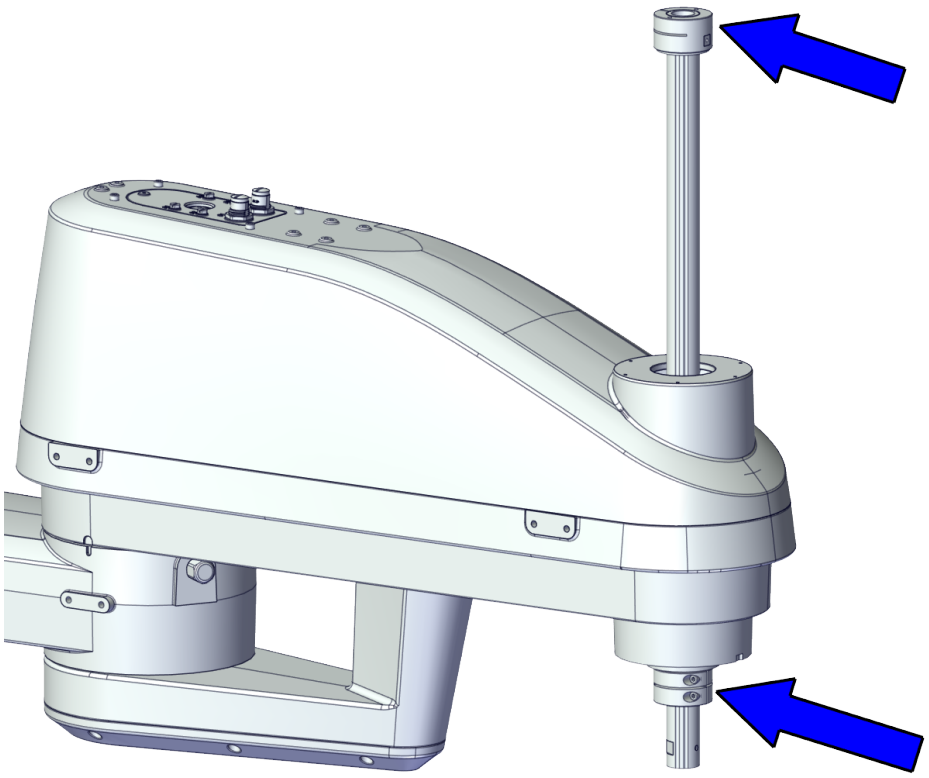
Continues on next page

1.3.4.2 Mechanically restricting the working range
Continued

Axis 3 mechanical stops

Location of the mechanical stops

The figures shows where the axis 3 mechanical stops are placed on the robot.



xx2300000172

1.4 Calibration and references

1.4.1 Calibration methods

Overview

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

More information is available in the product manual.

Types of calibration

Type of calibration	Description	Calibration method
Standard calibration	The calibrated robot is positioned at calibration position. Standard calibration data is found on the SMB (serial measurement board) or EIB in the robot.	Axis Calibration
Absolute accuracy calibration (optional)	Based on standard calibration, and besides positioning the robot at synchronization position, the Absolute accuracy calibration also compensates for: • Mechanical tolerances in the robot structure • Deflection due to load Absolute accuracy calibration focuses on positioning accuracy in the Cartesian coordinate system for the robot. Absolute accuracy calibration data is found on the serial measurement board (SMB) or other robot memory. A robot calibrated with Absolute accuracy has the option information printed on its name plate (OmniCore). To regain 100% Absolute accuracy performance, the robot must be recalibrated for absolute accuracy after repair or maintenance that affects the mechanical structure.	CalibWare

Brief description of calibration methods

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRB 930. 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.

Continues on next page

1.4.1 Calibration methods
Continued

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.

The Absolute Accuracy option varies according to the robot mounting position. This is printed on the robot name plate for each robot. The robot must be in the correct mounting position when it is recalibrated for absolute accuracy.

1.4.2 Calibration tools for Axis Calibration

Calibration tool set

The calibration tools used for Axis Calibration are designed to meet requirements for calibration performance, durability and safety in case of accidental damage.

The calibration tool will eventually break from fatigue after longer period of use and then needs to be replaced. There is no risk for bad calibrations as long as the calibration tool is in one piece.

WARNING

Calibrating the robot with Axis Calibration requires special calibration tools from ABB. Using other pins in the calibration bushings may cause severe damage to the robot and/or personnel.

Equipment, etc.	Article number	Note
Calibration toolbox, Axis Calibration	3HAC074119-001	Delivered as a set of calibration tools. Required if Axis Calibration is the valid calibration method for the robot.

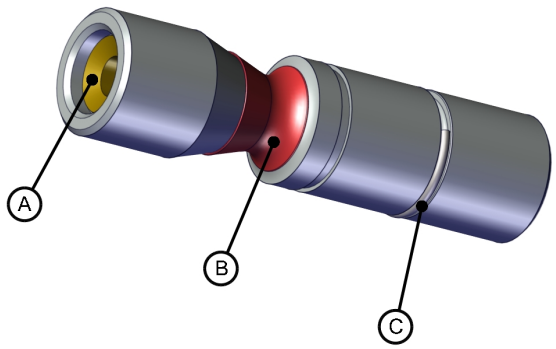
Examining the calibration tool

Check prior to usage

Before using the calibration tool, make sure that the tube insert, the plastic protection and the steel spring ring are present.

WARNING

If any part is missing or damaged, the tool must be replaced immediately.



xx1500001914

A	Tube insert
B	Plastic protection
C	Steel spring ring

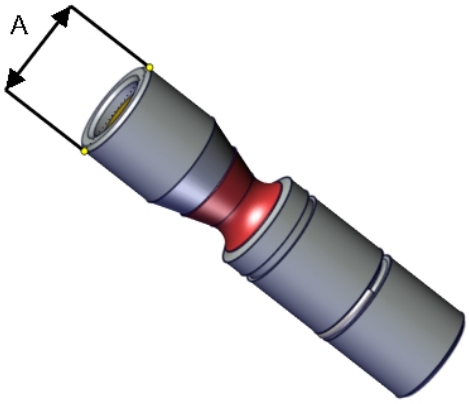
Continues on next page

1.4.2 Calibration tools for Axis Calibration
Continued

Periodic check of the calibration tool

If including the calibration tool in a local periodic check system, the following measures should be checked.

- Outer diameter within Ø12g4 mm, Ø8g4 mm or Ø6g5 mm (depending on calibration tool size).
- Straightness within 0.005 mm.



xx1500000951

A	Outer diameter

Identifying the calibrating tools

It is possible to make the calibration tool identifiable with, for example, an RFID chip. The procedure of how to install an RFID chip is described below.

Note

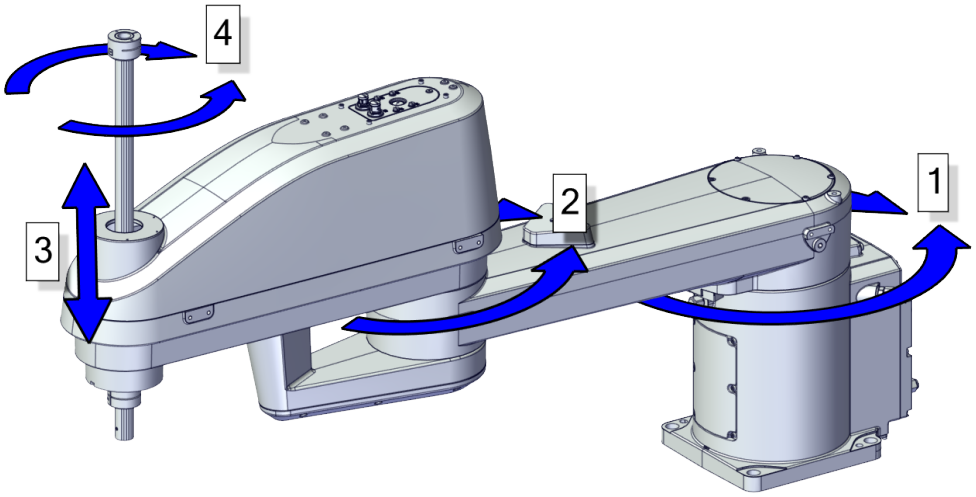
The tool identifier is NOT delivered from ABB, it is a customized solution.

	Action	Note
1	It is possible to use any RFID solution, with the correct dimensions. ABB has verifed function on some suppliers fulfilling the requirements of NFC compatible devices (13.56 Mhz) according to ISO 14443 or ISO 15693. **Note** The maximum dimensions on the RFID chip must not exceed Ø7.9 mm x 8.0 mm, Ø5.9 mm x 8.0 mm or Ø3.9 mm x 8.0 mm (depending on calibration tool size).	
2	There is a cavity on one end of the calibration tool in which the RFID chip can be installed. Install the RFID chip according to supplier instructions. Install the chip in flush with the tool end.	

1.4.3 Fine calibration

General

Fine calibration is made by moving the axes so that the synchronization mark on each joint is aligned. For detailed information on calibration of the robot see *Product manual - IRB 930*.



xx2300000574

Position	Description	Position	Description
1	Axis 1	2	Axis 2
3	Axis 3	4	Axis 4

1.4.4 Absolute Accuracy option

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.

What is included

Every *Absolute Accuracy* robot is delivered with:

- compensation parameters saved in the robot memory
- a birth certificate representing the *Absolute Accuracy* measurement protocol for the calibration and verification sequence.

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

Absolute Accuracy supports floor mounted, wall mounted, and ceiling mounted installations. The compensation parameters that are saved in the robot memory differ depending on which Absolute Accuracy option is selected.

When is *Absolute Accuracy* being used

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

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

Absolute Accuracy active

Absolute Accuracy will be active in the following cases:

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

Continues on next page

- 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.

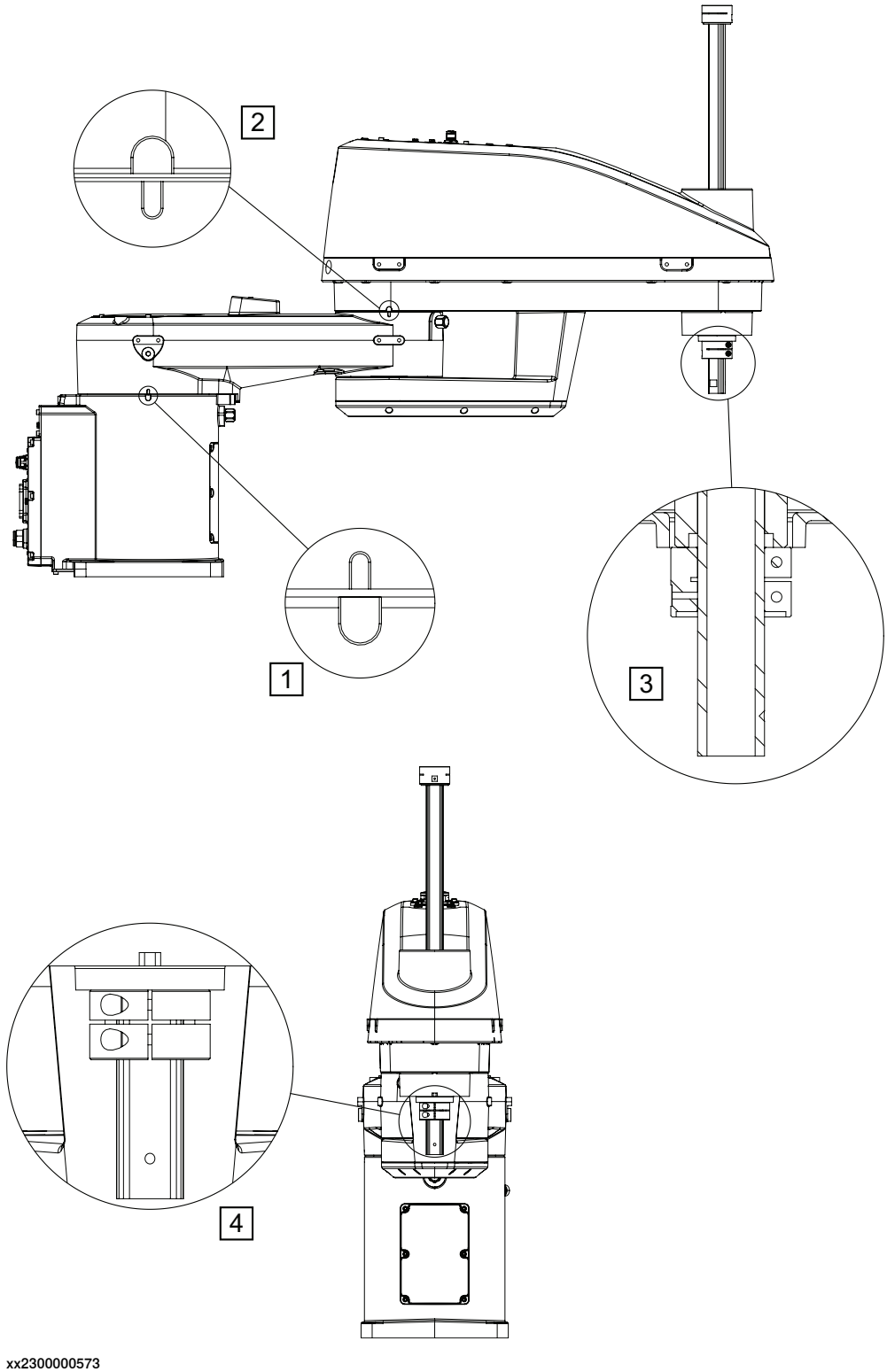
1.4.5 Synchronization marks and synchronization position for axes

Introduction

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

Continues on next page

Synchronization marks, IRB 930



xx2300000573

1.5 Load diagrams

1.5.1 Introduction to load diagram

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
- ball screw spline unit

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 - OmniCore*, for detailed information.

WARNING

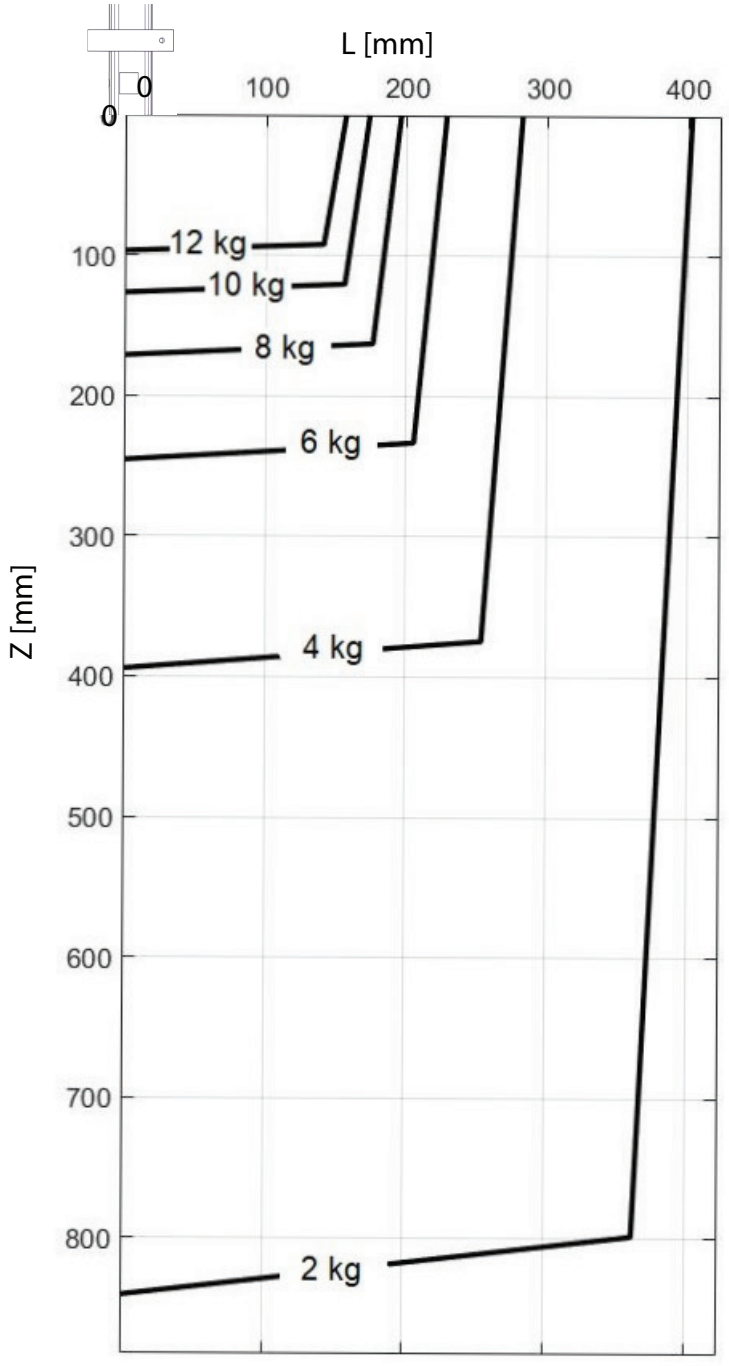
Robots running with incorrect load data and/or with loads outside the load diagram, will not be covered by robot warranty.

General

The load diagram includes a nominal pay load inertia, J_o of 0.01 kgm^2. At different moment of inertia the load diagram will be changed. For robots that are inverted mounted, the load diagrams as given are valid and thus it is also possible to use RobotLoad within those tilt and axis limits.

1.5.2 Diagrams

IRB 930-12/0.85



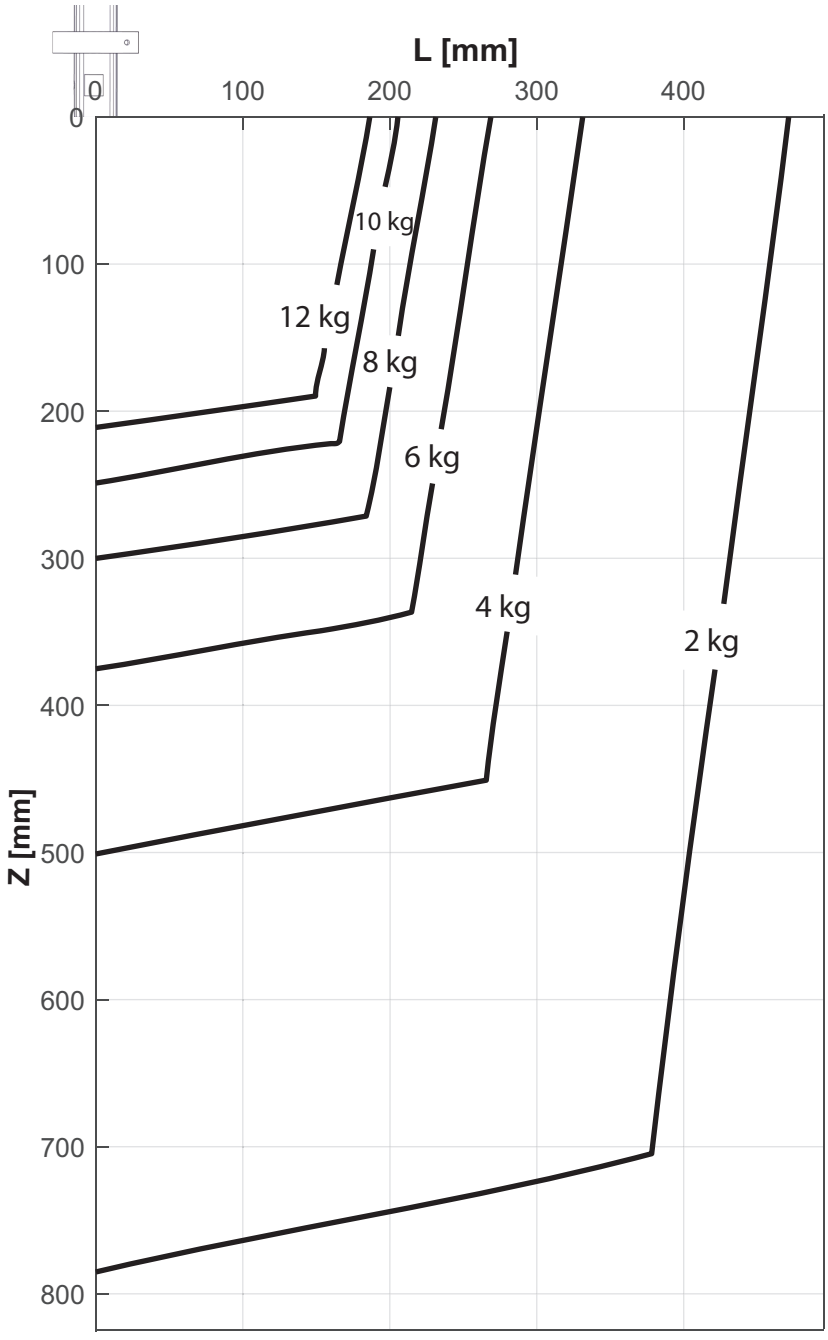
xx2300000263

IRB 930-12/0.85	Description
Max load	12 kg
Z_{max}	0.097 mm
L_{max}	0.156 mm

Continues on next page

1.5.2 Diagrams
Continued

IRB 930-12/1.05

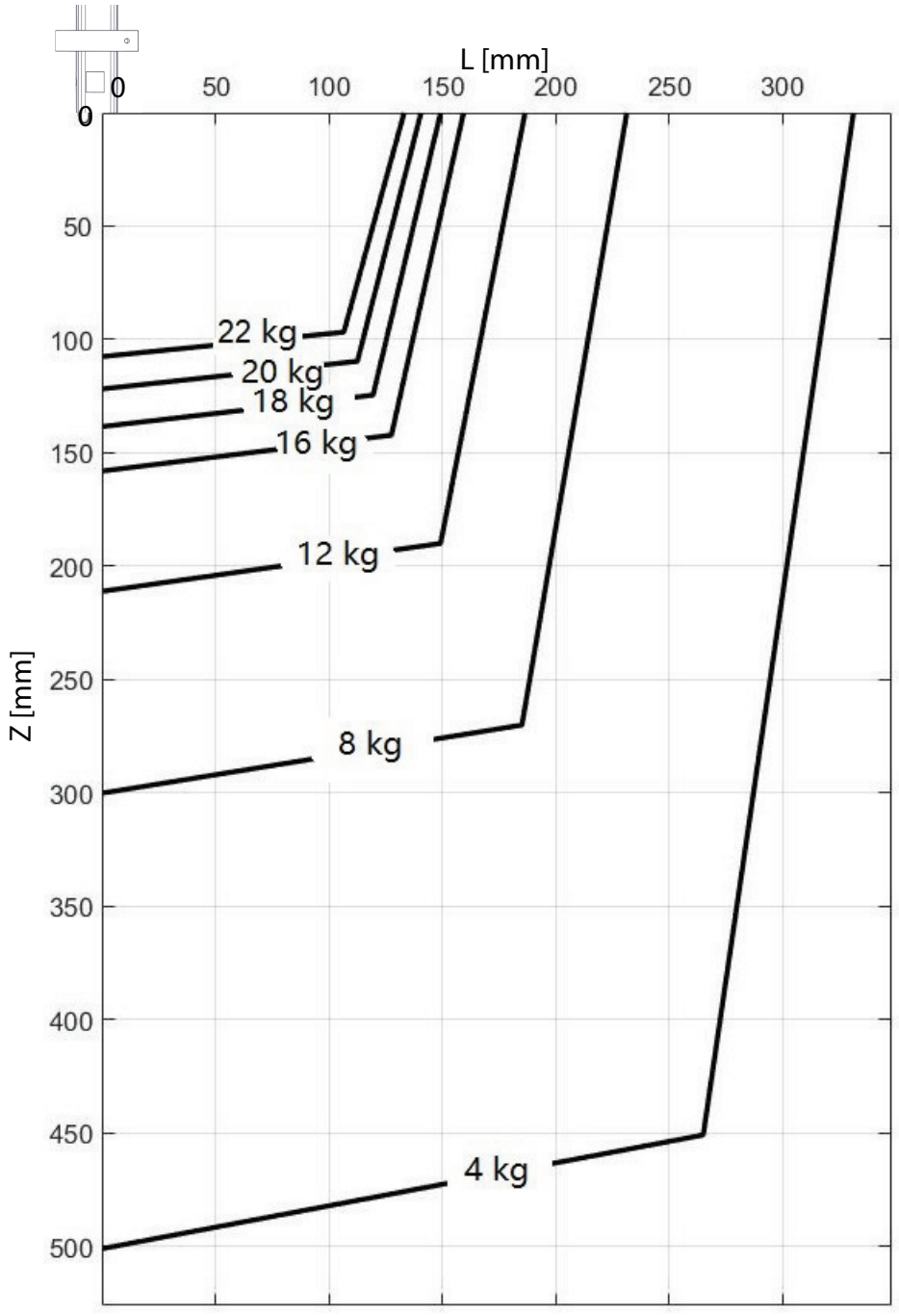


xx2300001008

IRB 930-12/1.05	Description
Max load	12 kg
Z_{max}	0.211 mm
L_{max}	0.186 mm

Continues on next page

IRB 930-22/1.05



xx2300000262

IRB 930-22/1.05	Description
Max load	22 kg
Z_{max}	0.107 mm
L_{max}	0.133 mm

1.5.3 Maximum load and moment of inertia

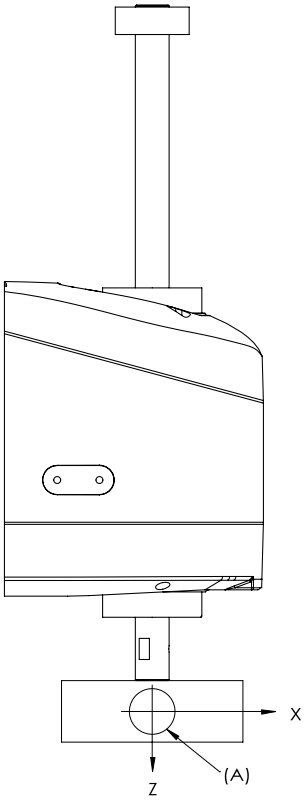
General

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

For IRB 930, L is 0 mm at the default rating and its maximum value changes with the payload. See *Load diagrams on page 36*.

Full movement

Axis	Robot variant	Max. value
4	IRB 930-12/0.85	J_4= Mass x L^2 + $J_{oz} \leq 0.3$ kgm^2
	IRB 930-12/1.05	J_4= Mass x L^2 + $J_{oz} \leq 0.45$ kgm^2
	IRB 930-22/1.05	J_4= Mass x L^2 + $J_{oz} \leq 0.45$ kgm^2



xx1900001317

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

1.5.4 Maximum TCP acceleration

General

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

Maximum Cartesian design acceleration for nominal loads

Robot type	E-stop Max acceleration at nominal load COG [m/s^2]		Controlled Motion Max acceleration at nominal load COG [m/s^2]	
	XYZ	XY	XYZ	XY
IRB 930-12/0.85	48	43	24	22
IRB 930-12/1.05	64	61	41	40
IRB 930-22/1.05	72	69	42	40

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).

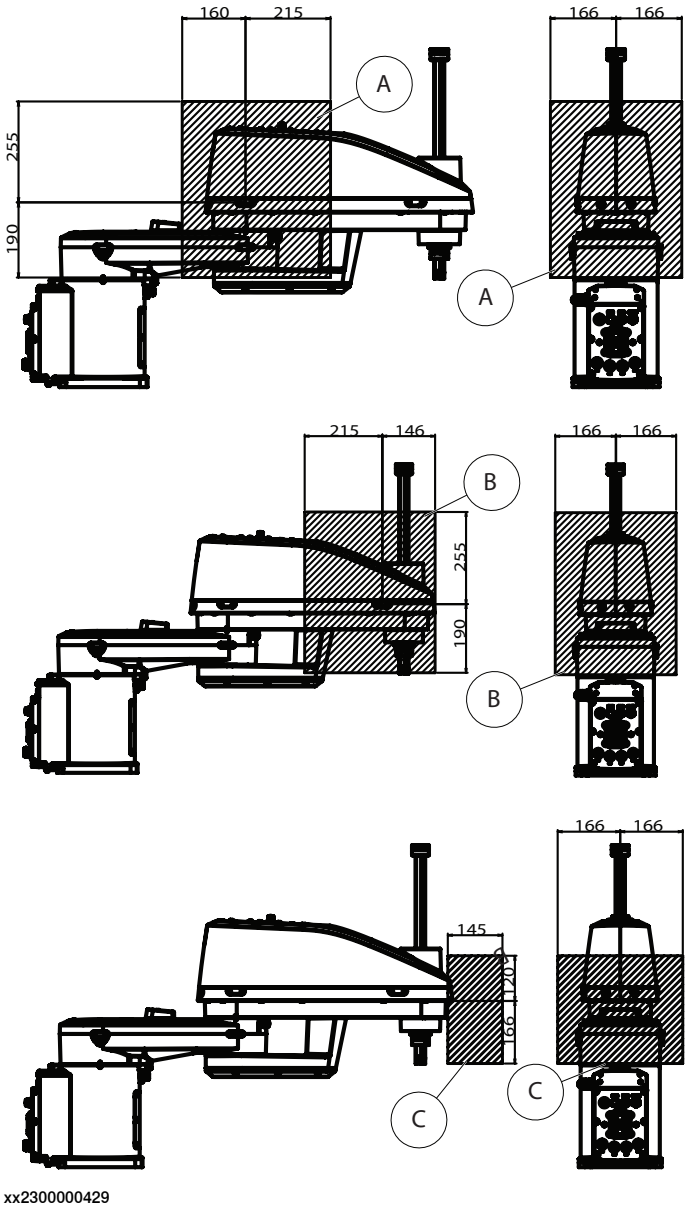
1.6 Fitting equipment on the robot (robot dimensions)

General

Arm loads can be mounted on the axis 2. The center of gravity of the extra load shall be within the marked load areas. The robot is supplied with holes for mounting of extra equipment. (See figures in Holes for mounting of extra equipment.)

Note

Maximum load on the frame must not be exceeded.



xx2300000429

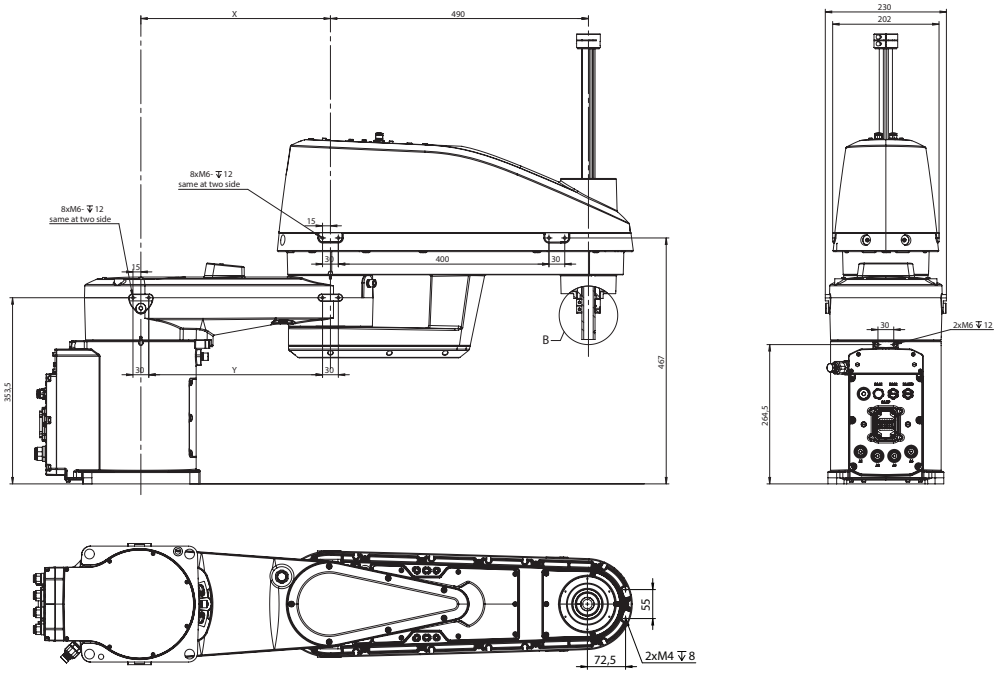
Continues on next page

Load area robot	Max load		
	A	B	C
IRB 930-12/0.85 IRB 930-12/1.05	1 kg	1 kg	1 kg
IRB 930-22/1.05	1.5 kg	1.5 kg	1.5 kg

Attachment holes and dimensions

Definitions of dimensions are shown in the following figures. The robot is supplied with holes for fitting extra equipment.

Holes for fitting extra equipment



xx2300000170

	0.85_0.3	0.85_0.45	1.05_0.3	1.05_0.45
X	360 mm	360 mm	560 mm	560 mm
Y	330 mm	330 mm	530 mm	530 mm
Z	854.2 mm	1,004.2 mm	854.2 mm	1,004.2 mm

Fitting of end effector to the ball screw spline shaft

An end effector can be attached to the lower end of the shaft of the ball screw spline unit. The dimensions for fitting the end effector is shown in the following figure.

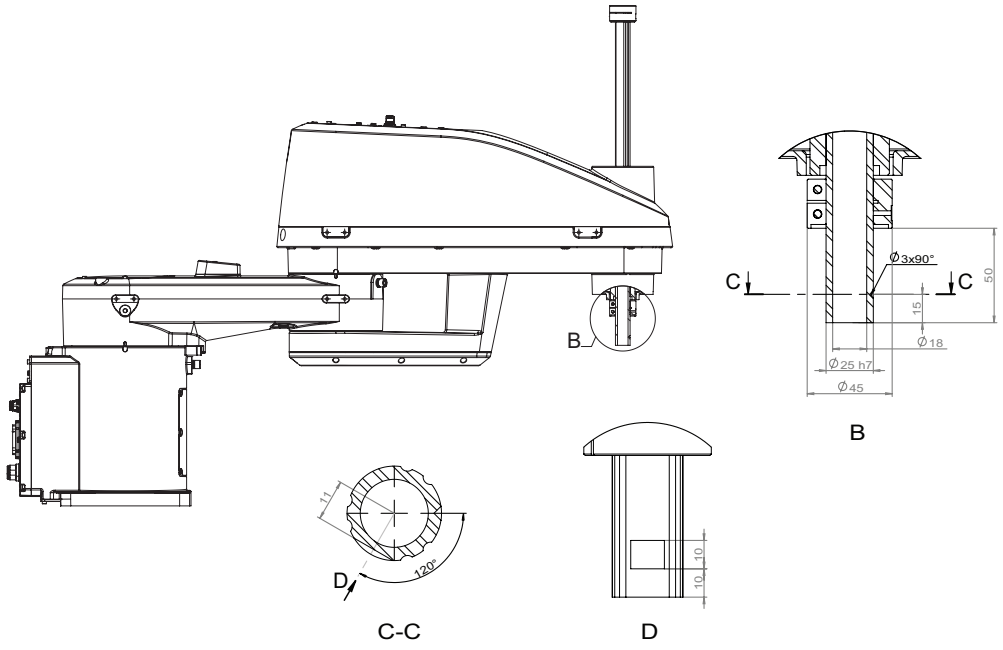
Note

Mounting of other equipment on the IRB 930 may damage the gearboxes.

Continues on next page

1.6 Fitting equipment on the robot (robot dimensions)
Continued

Robots with protection class IP30 3350-300



xx2300000171

Fastener quality

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

1.7 Maintenance and troubleshooting

General

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

- Maintenance-free AC motors are used.
- Oil is used for the gearboxes.
- 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 depend on the selected options. For detailed information on maintenance procedures, see the maintenance section in *Product manual - IRB 930*.

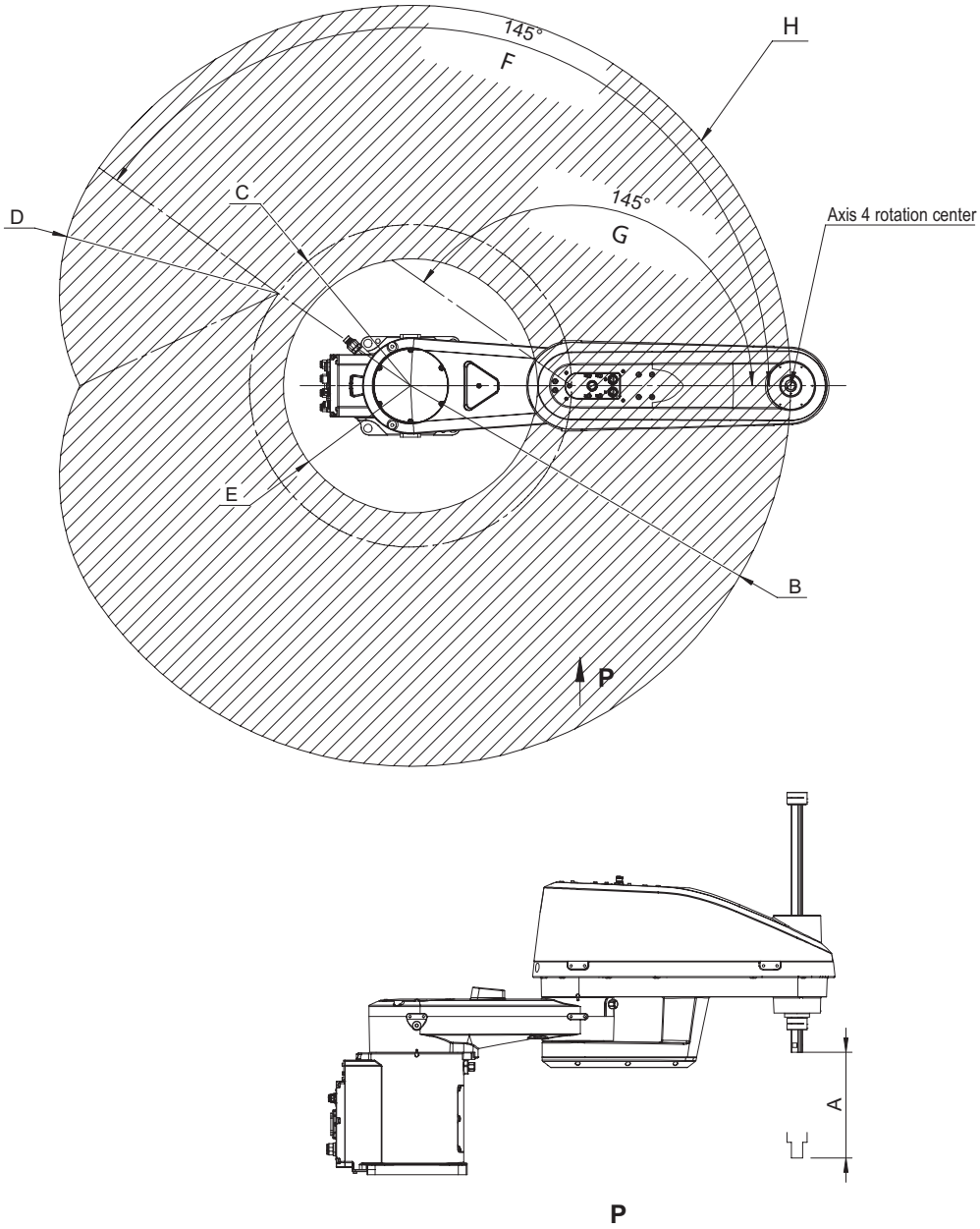
1.8 Robot motion

1.8.1 Working range

Illustration, working range

Robots with protection class IP30

This illustration shows the unrestricted working range of the robot.



xx2300000163

Variants	0.85_0.3	0.85_0.45	1.05_0.3	1.05_0.45
A (Axis3)	300 mm	450 mm	300 mm	450 mm

Continues on next page

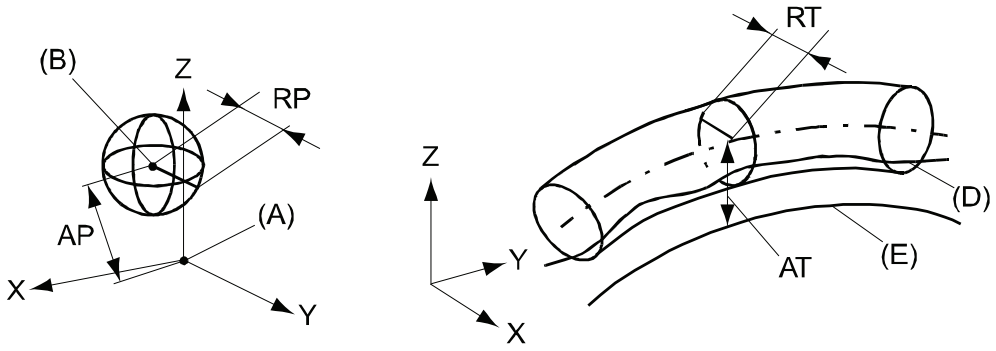
Variants	0.85_0.3	0.85_0.45	1.05_0.3	1.05_0.45
B	850 mm		1,050 mm	
C	360 mm		560 mm	
D	490 mm			
E	284.1 mm		322.7 mm	
F (Axis1)	±145°			
G (Axis2)	±145°			
H (Axis4)	±400°			

1.8.2 Performance according to ISO 9283

General

At 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 930	IRB 930-12/0.85	IRB 930-12/1.05	IRB 930-22/1.05
Pose accuracy, AP[i] (mm)	0.01	0.01	0.01
Pose repeatability, RP (mm)	0.01	0.02	0.02
Pose stabilization time, PSt (s) within 0.1 mm of the position	0.09	0.18	0.09
Path accuracy, AT (mm)	0.68	0.52	0.51
Path repeatability, RT (mm)	0.05	0.05	0.04

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

1.8.3 Velocity

Maximum axis speed

With OmniCore C30/C90XT

Robot type	Axis 1	Axis 2	Axis 3	Axis 4
IRB 930-12/0.85	410 °/s	534 °/s	2,240 mm/s	1,702 °/s
IRB 930-12/1.05	402 °/s	524 °/s	2,240 mm/s	1,702 °/s
IRB 930-22/1.05	402 °/s	524 °/s	2,240 mm/s	1,702 °/s

There is a supervision function to prevent overheating in applications with intensive and frequent movements (high duty cycle).

Down force (Z-stroke)

Robot Version	IRB 930-12/0.85	IRB 930-12/1.05	IRB 930-22/1.05
Max down force (Z stroke)	250 N	250 N	250 N

Suggested instruction:

Down force (N)	Force maintaining duration (S)	Force maintaining duty ratio[i] (%)	Force increment speed[ii] (mm/s)
<=250	<=15	<=50	<=1

i The ratio of down force maintaining duration / total cycle time
ii High speed is not recommended to avoid instantaneous down force larger than 250 N.

1.9 Robot stopping distances and times

1.9.1 Robot stopping distances according to ISO 10218-1

About the data for robot stopping distances and times

All measurements and calculations of stopping distances and times are done according to ISO 10218-1, with single axis motion on axes 1, 2, and 3. If more than one axis is used for the movement, then the stopping distance and time can be longer. Normal delays of the hardware and software are taken into account.

The stopping distances and times are presented using the tool data and extension zones presented for the respected robot variant. These variables are 100%, 66%, and 33% of the maximum values for the robot.

The stop categories 0 and 1 are according to IEC 60204-1.

Note

The category 0 stop is not necessarily the worst case (depending on load, speed, application, wear, etc.).

Note

For SCARA robots without brakes on axis 1 and 2, the stopping distances for category 0 stops in actual applications can be longer than those stated in this document because without brakes, it is the friction that will stop the robot (on axes without brakes).

Note

The stop category 1 is a controlled stop and will therefore have less deviation from the programmed path compared with a stop category 0.

Loads

The tool data that is used is presented for the respective robot variant.

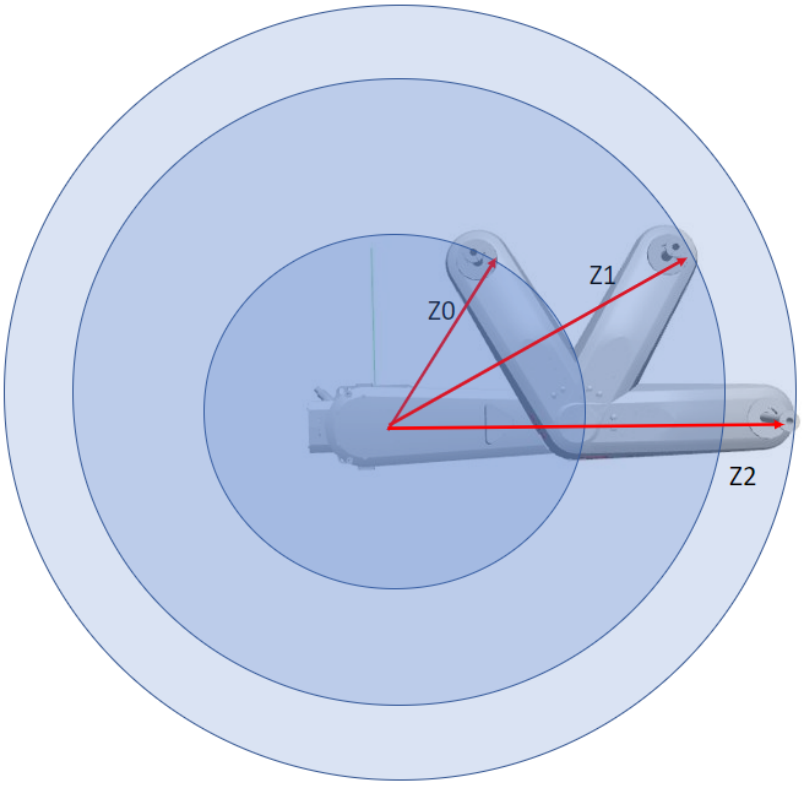
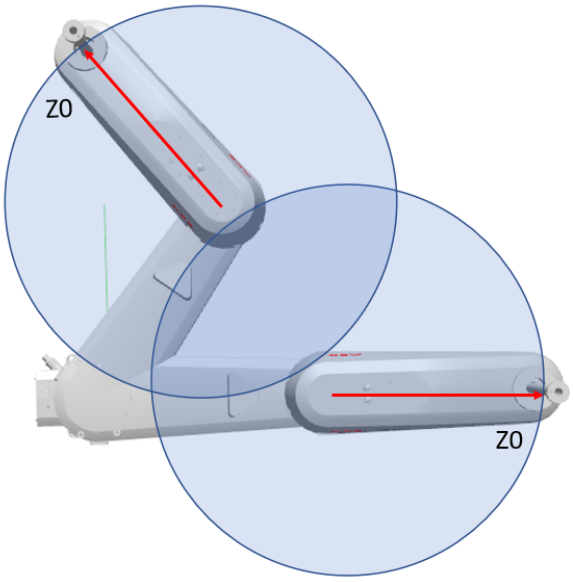
The used loads represent the rated load. No arm load is used. See the *Load diagrams on page 36*.

Continues on next page

Extension zones

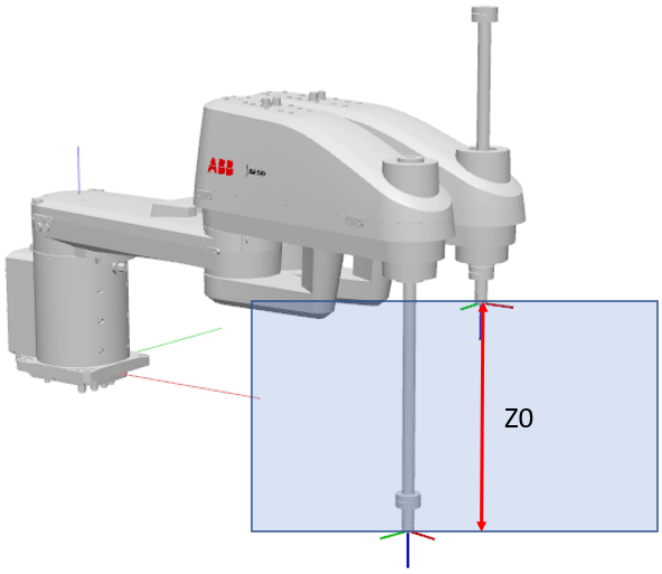
The extension zone for the stop category 1 is based on the tool mounting interface (tool flange) with the axis angles according to the following illustrations. The zone data is presented for the respective robot variant.

The extension zone outer limits are defined by the TCP0 position for the stated angles.

Axis 1	 xx2300000863
Axis 2	 xx2300000864

Continues on next page

1.9.1 Robot stopping distances according to ISO 10218-1
Continued

Axis 3	 xx2300000865

Speed

The speed in the simulations is based on TCP0.

The TCP0 speed is measured in meters per second when the stop is triggered.

Stopping distances

The stopping distance is measured in degrees or millimeters (depending on axis).

Stopping times

The stopping time is measured in seconds.

Limitations

The stopping distance can vary depending on additional loads on the robot.

The stopping distance for category 0 stops can vary depending on the individual brakes and the joint friction.

This document includes the robot variants that are part of the official product offer at the time of the release of this revision.

1.9.2 Measuring stopping distance and time

Preparations before measuring

For measurement and calculation of overall system stopping performance, see ISO 13855:2010.

The measurement shall be done for the selected stop category. The emergency stop button on the robot controller is configured for stop category 0 on delivery. A risk assessment can conclude the need for another stop category. The stop category can be changed through the system parameter *Function* (topic *Controller*, type *Safety Run Chain*). In case of deviations of the default configuration of stop category 0, then this is detailed in the product specification for the respective manipulator.

CAUTION

The measurement and calculation of overall stopping performance for a robot must be tested with its correct load, speed, and tools, in its actual environment, before the robot is taken into production.

All load and tool data must be correctly defined (weight, CoG, moment of inertia). The load identification service routine can be used to identify the data.

CAUTION

Follow the safety instructions in the respective product manual for the robot.

Measuring with TuneMaster

The software TuneMaster can be used to measure stopping distances and times for ABB robots. The TuneMaster software contains documentation on how to use it.

1. Download TuneMaster from *www.abb.com/robotics*, section **RobotStudio - Downloads - RobotWare Tools and Utilities**.
2. Install TuneMaster on a computer. Start the TuneMaster app and select **Log Signals**.
3. Connect to the robot controller.
4. Define the I/O stop signal to use for measurement, for example, ES1 for emergency stop.
5. Define the signal number to use for measurement, 1298 for axis position. The value is given in radians.
6. Start the logging in TuneMaster.
7. Start the test program on the controller.

Tip

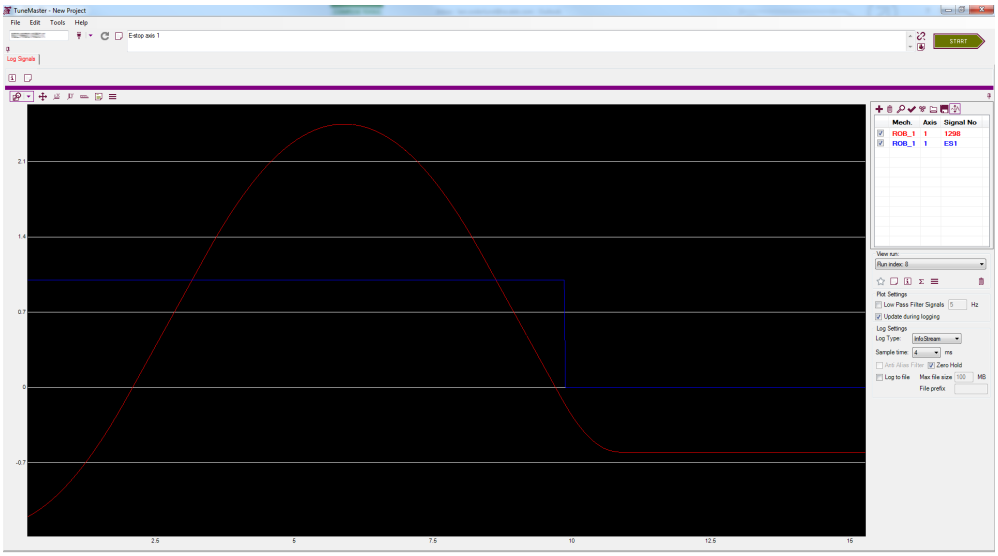
Use the tool and zone definitions for the respective variant in this document to get results that are comparable with this document.

Continues on next page

1.9.2 Measuring stopping distance and time
Continued

8 When the axis has reached maximum speed, press the emergency stop button.
9 In TuneMaster, measure the stopping distance and time.
10 Repeat for all installed emergency stop buttons until the identified hazards due to stopping distance and time for axes have been verified.

Example from TuneMaster



xx1600000386

1.9.3 IRB 930-12/0.85

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [12, [0,
     0, 92], [1, 0, 0, 0], 0.017, 0.017, 0.017]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [8, [0, 0,
     61], [1, 0, 0, 0], 0.0075, 0.0075, 0.0075]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4, [0, 0,
     31], [1, 0, 0, 0], 0.0019, 0.0019, 0.0019]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	63.2°	0.31 s
2*	77.7°	0.21 s
3	174.6 mm	0.12 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

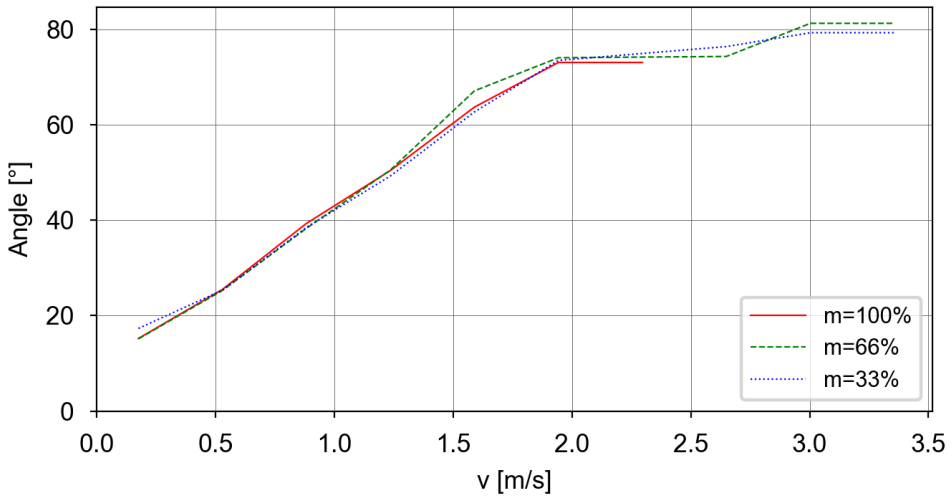
Axis 3

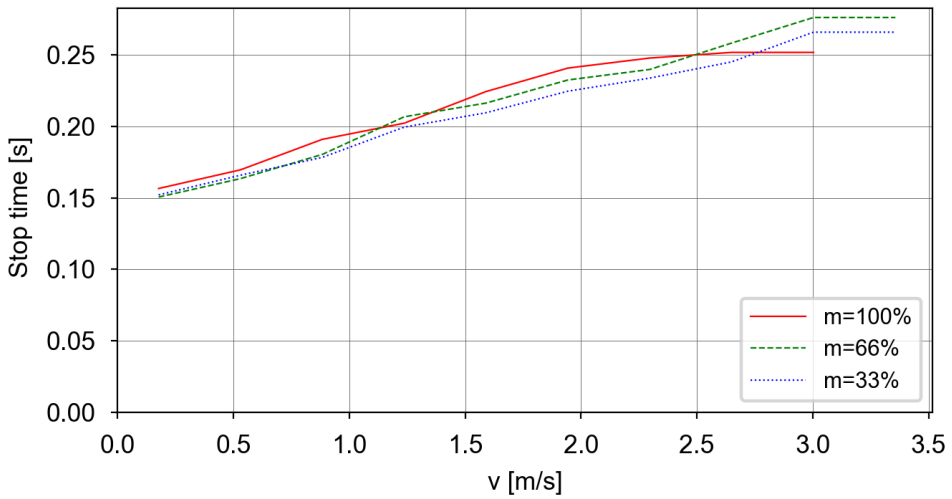
Only one zone exists.

Continues on next page

1.9.3 IRB 930-12/0.85
Continued

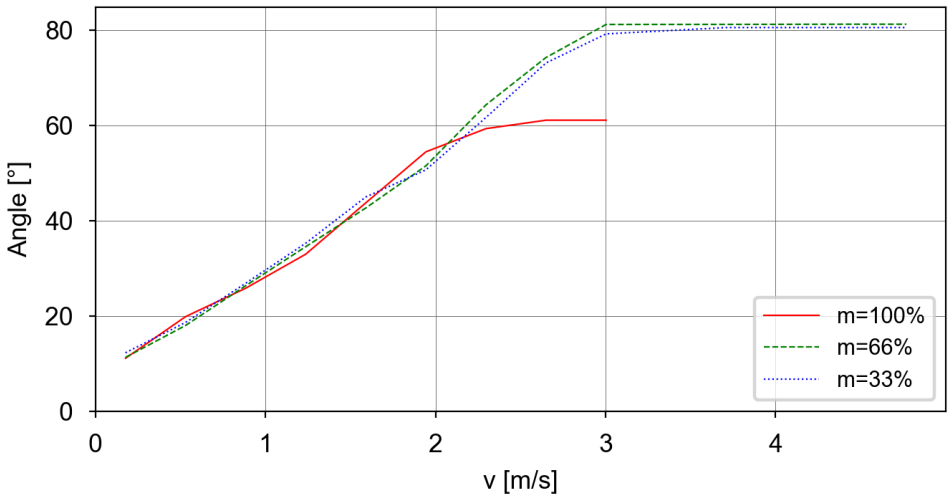
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

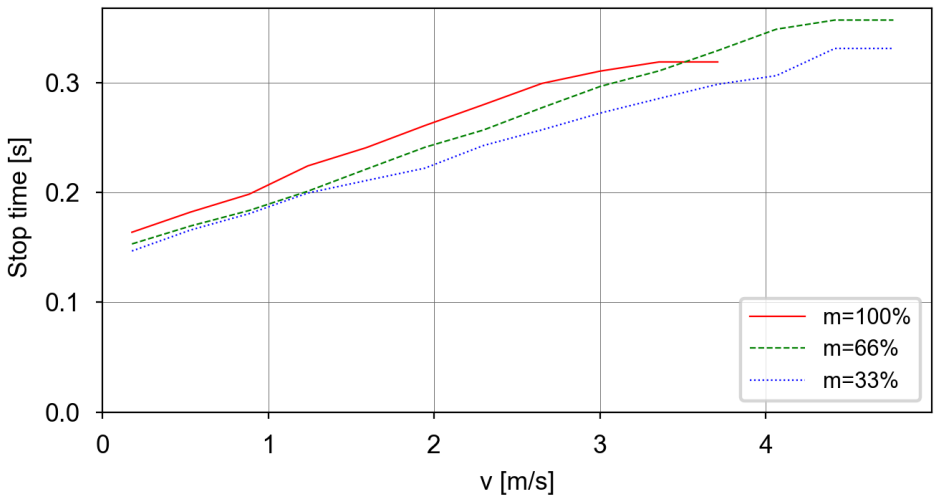




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

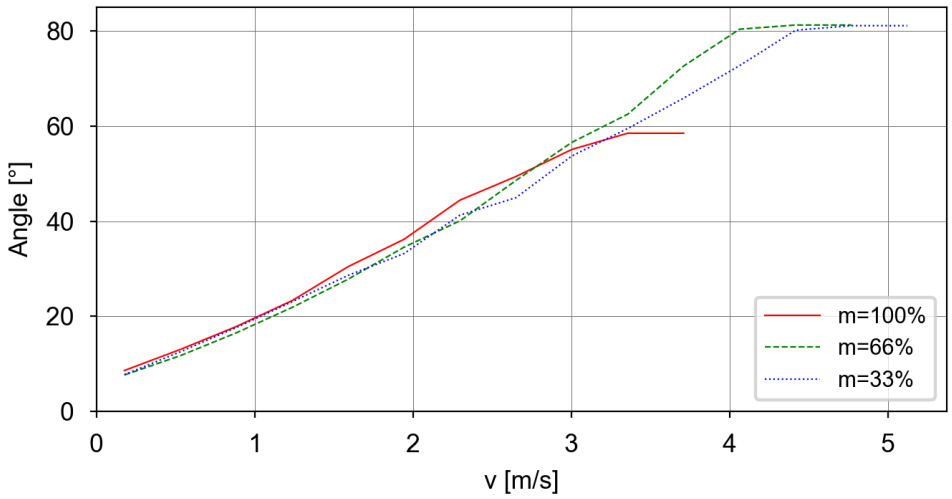


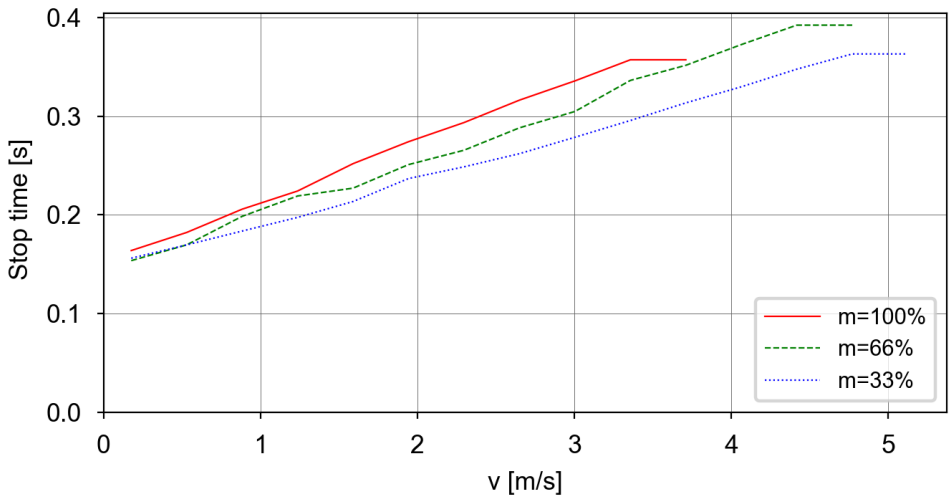


Continues on next page

1.9.3 IRB 930-12/0.85
Continued

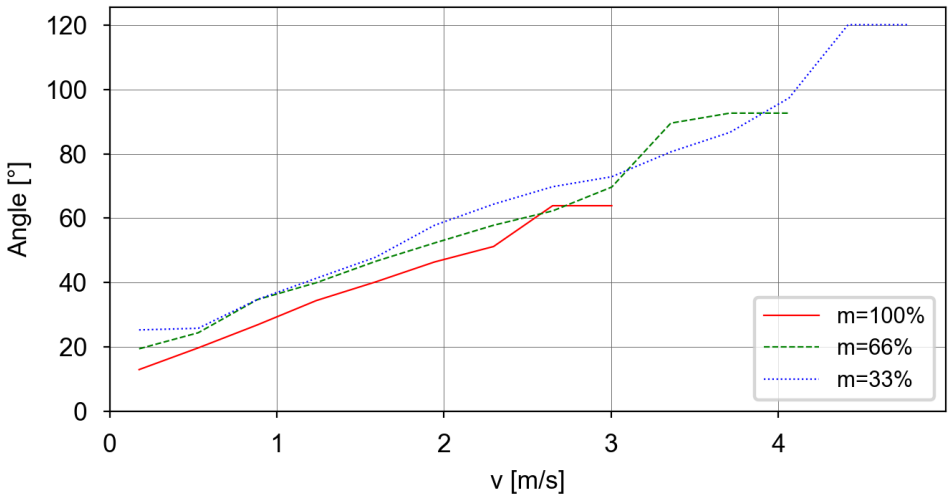
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

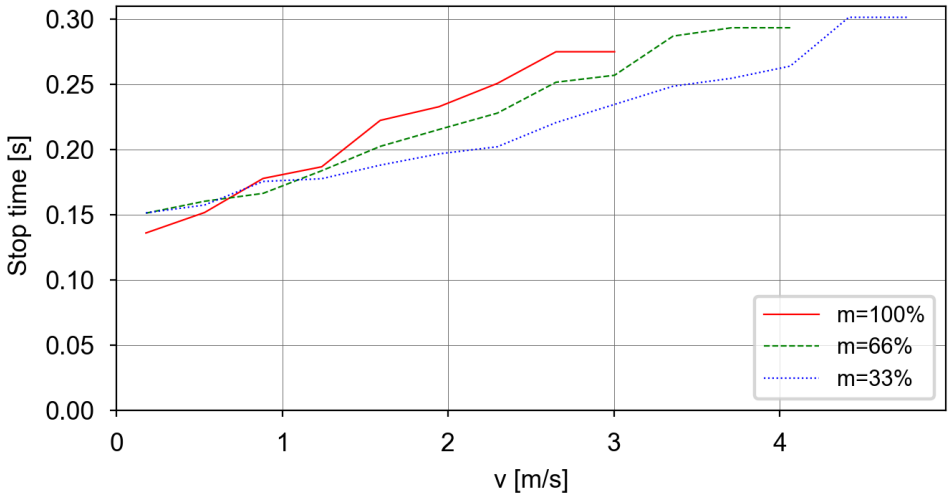




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

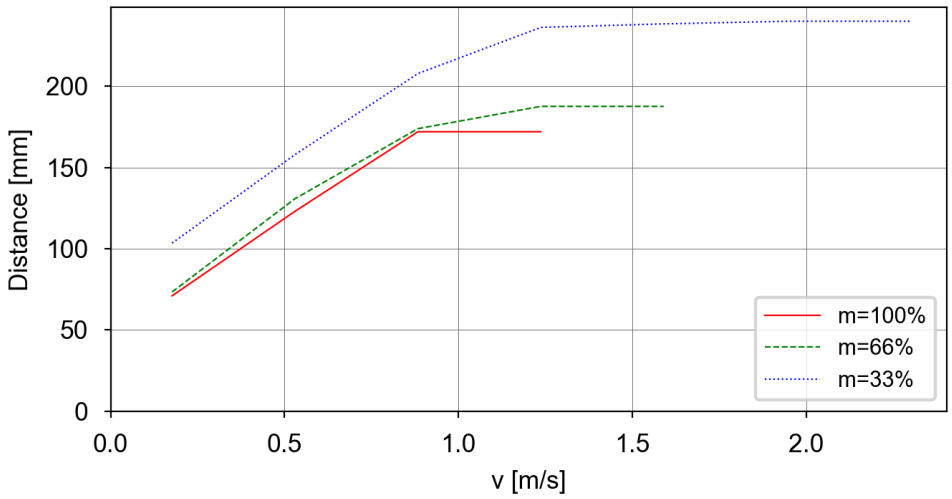


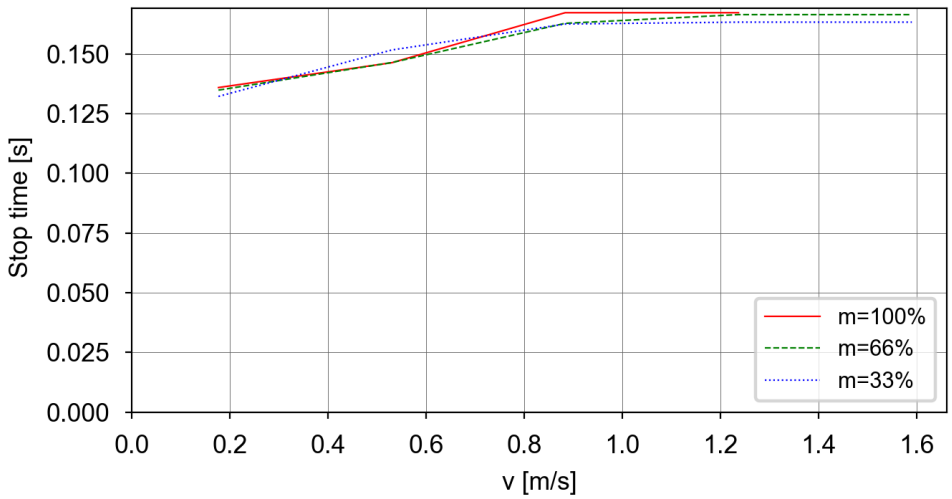


Continues on next page

1.9.3 IRB 930-12/0.85
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.4 IRB 930-12/0.85 Extended Stroke

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [12, [0,
     0, 92], [1, 0, 0, 0], 0.017, 0.017, 0.017]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [8, [0, 0,
     61], [1, 0, 0, 0], 0.0075, 0.0075, 0.0075]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4, [0, 0,
     31], [1, 0, 0, 0], 0.0019, 0.0019, 0.0019]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	63.9°	0.31 s
2*	78.5°	0.22 s
3	202.3 mm	0.12 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

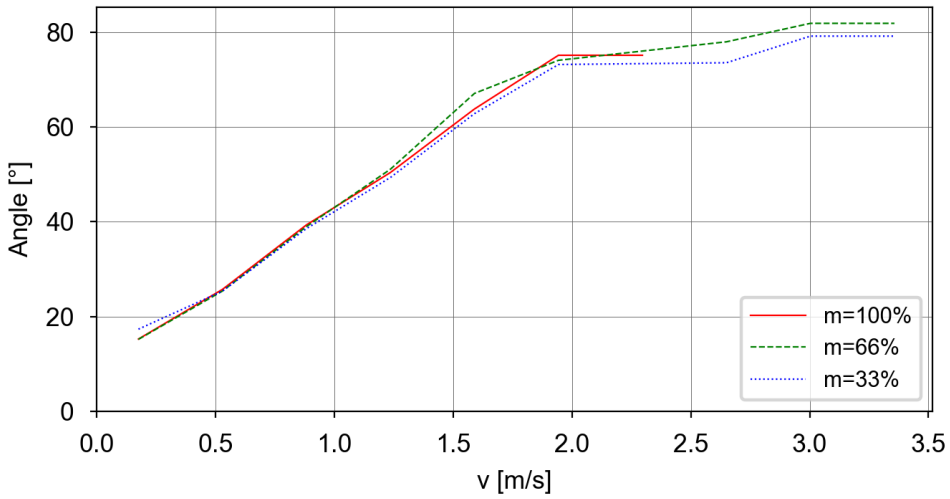
Axis 3

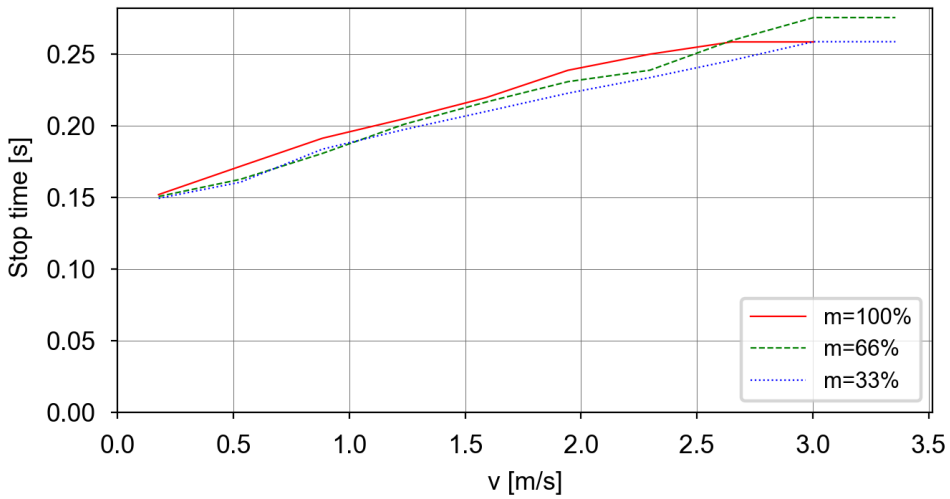
Only one zone exists.

Continues on next page

1.9.4 IRB 930-12/0.85 Extended Stroke
Continued

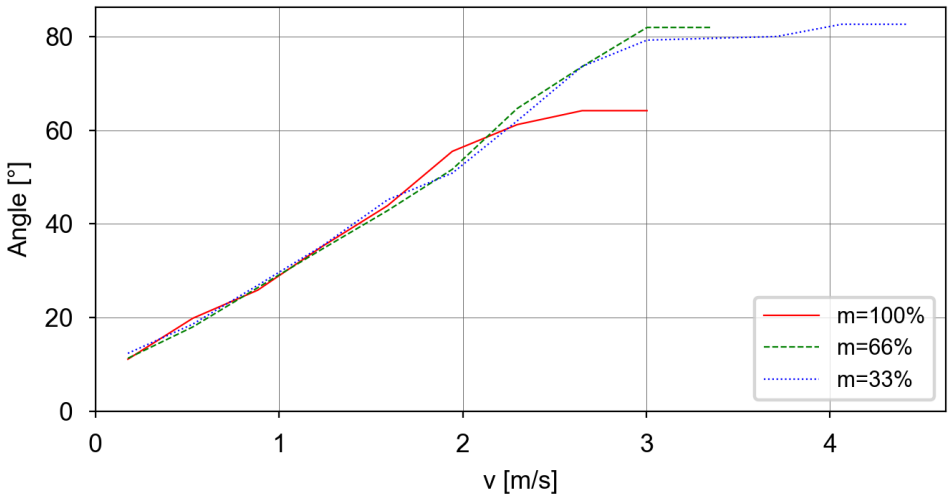
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

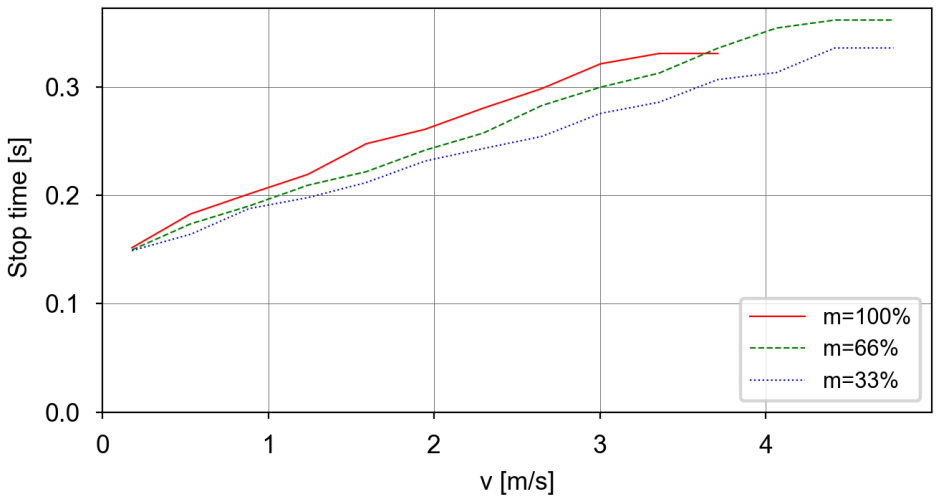




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

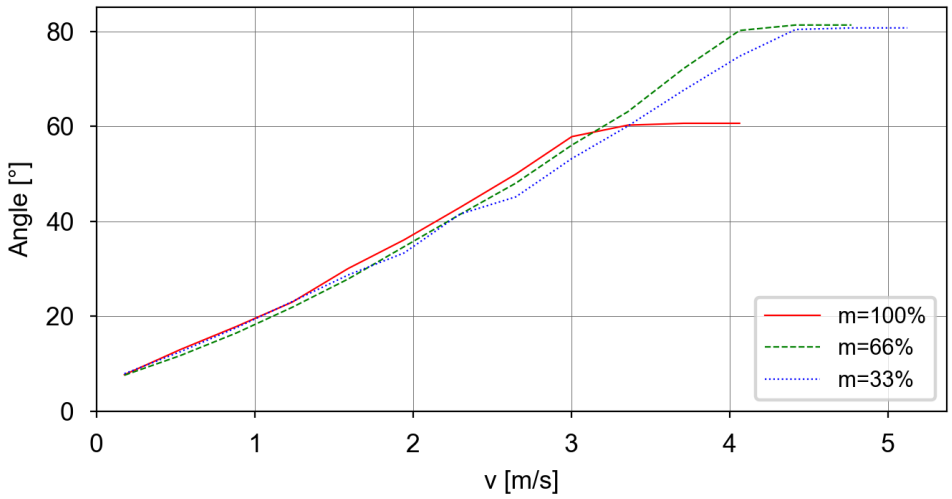


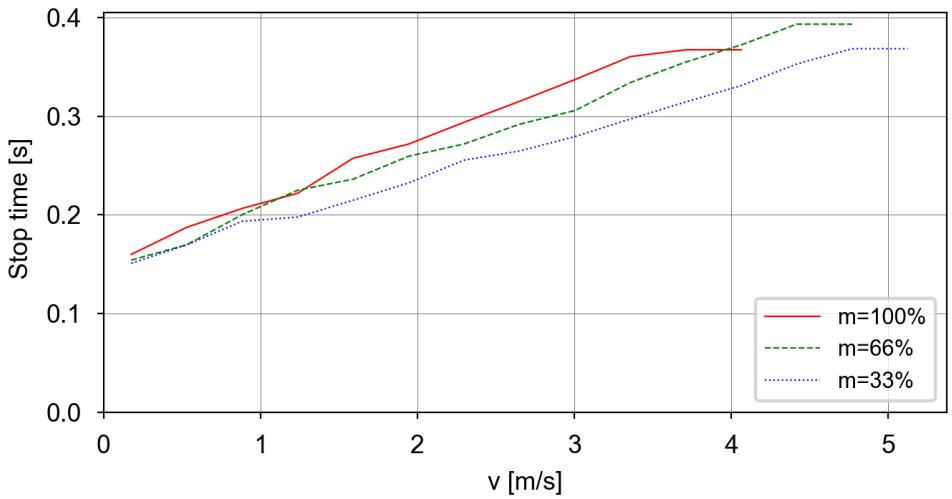


Continues on next page

1.9.4 IRB 930-12/0.85 Extended Stroke
Continued

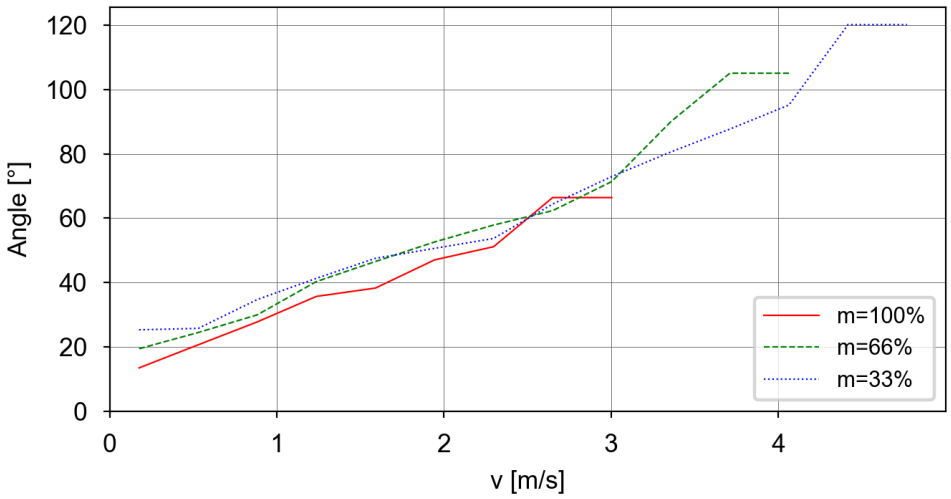
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

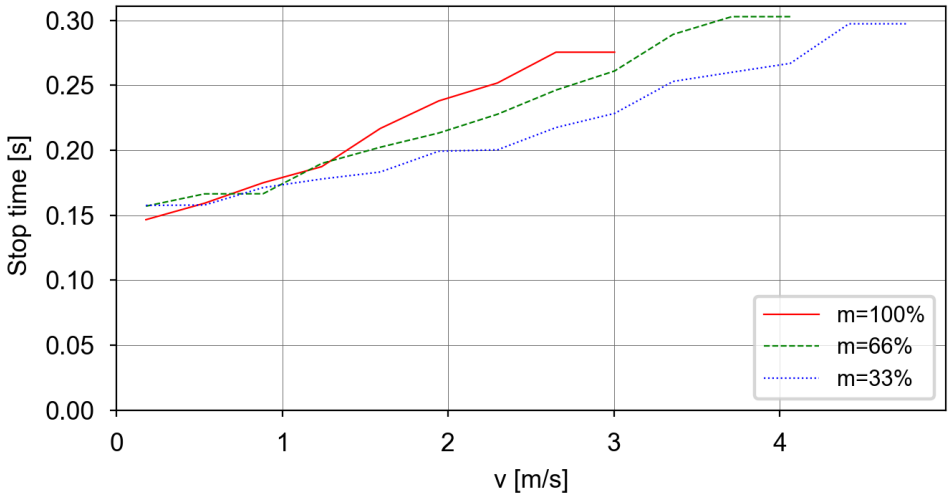




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

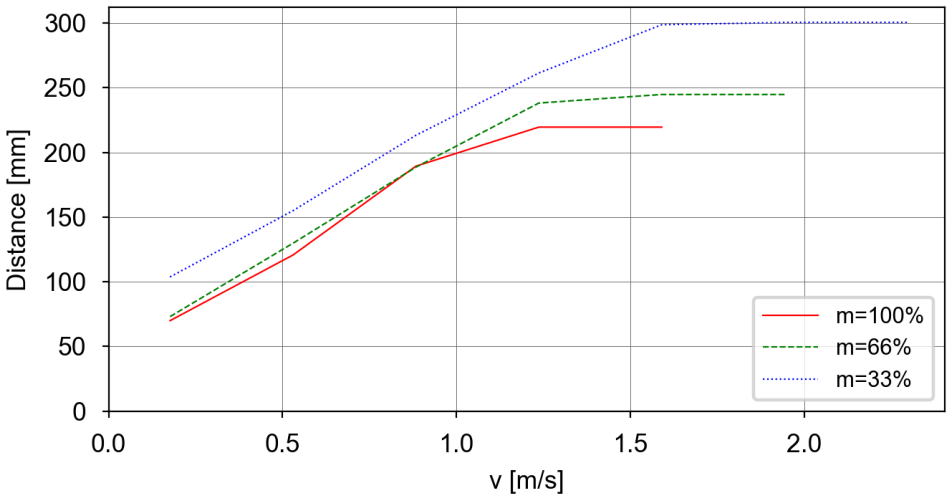


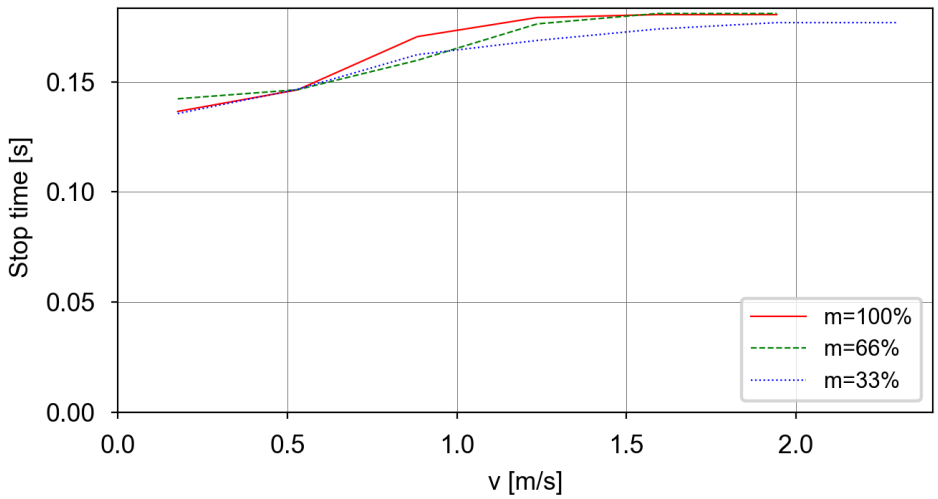


Continues on next page

1.9.4 IRB 930-12/0.85 Extended Stroke
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.5 IRB 930-12/1.05

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [12, [0,
     0, 190], [1, 0, 0, 0], 0.072, 0.072, 0.072]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [8, [0, 0,
     127], [1, 0, 0, 0], 0.032, 0.032, 0.032]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4, [0, 0,
     63], [1, 0, 0, 0], 0.008, 0.008, 0.008]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	67.1°	0.38 s
2*	80.8°	0.24 s
3	168.8 mm	0.12 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

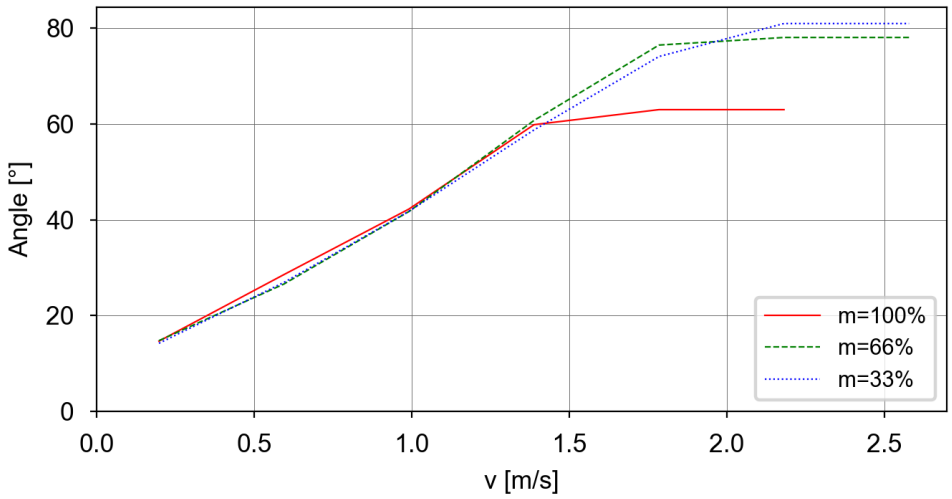
Axis 3

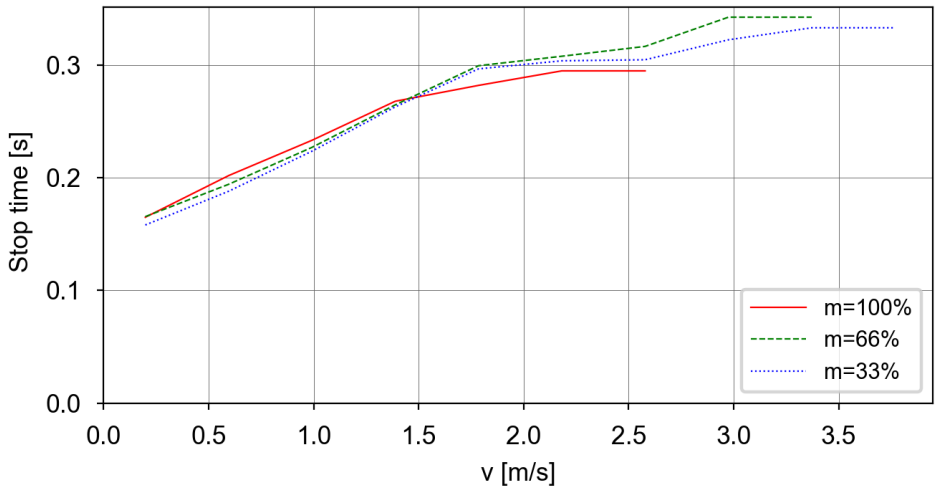
Only one zone exists.

Continues on next page

1.9.5 IRB 930-12/1.05
Continued

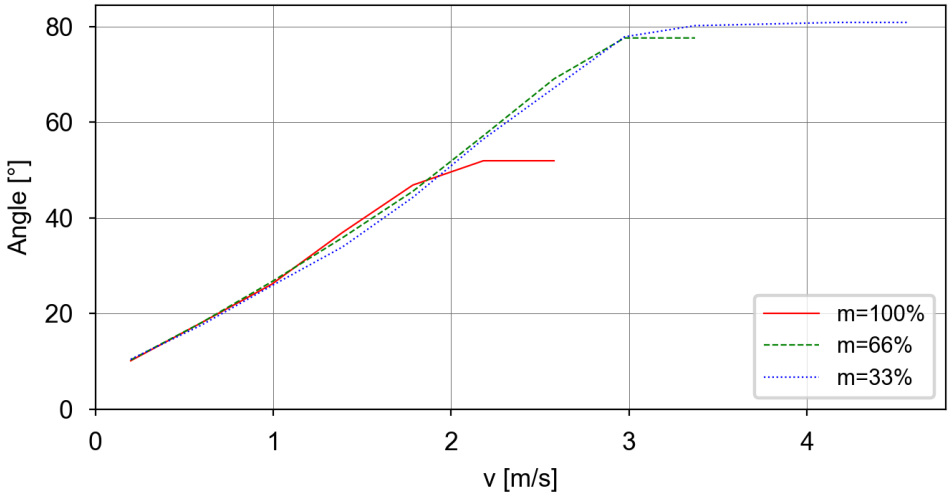
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

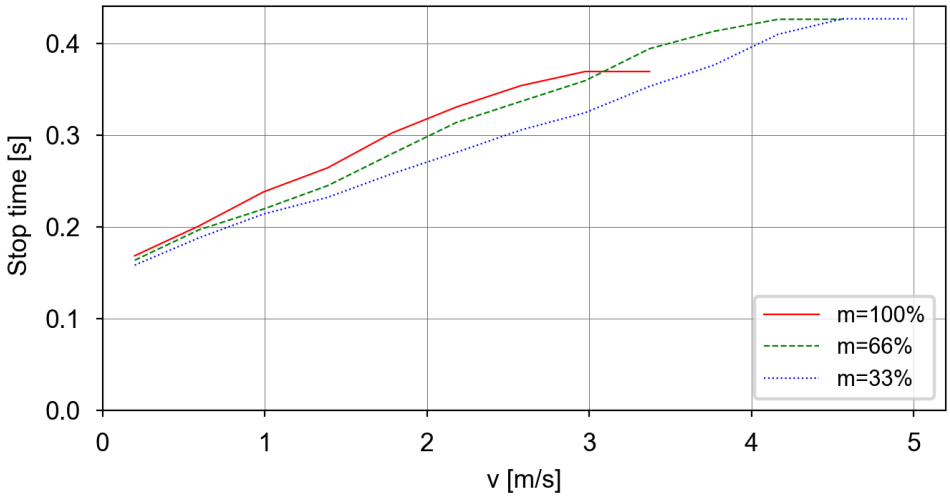




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

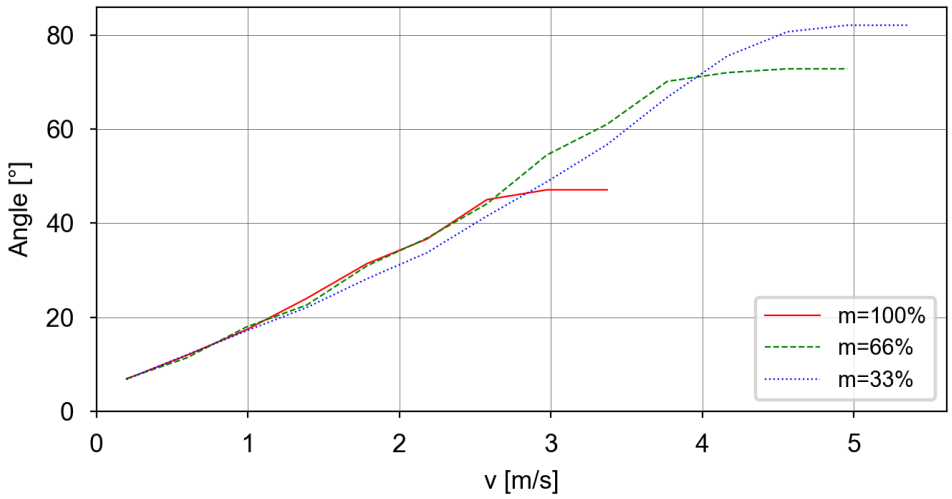


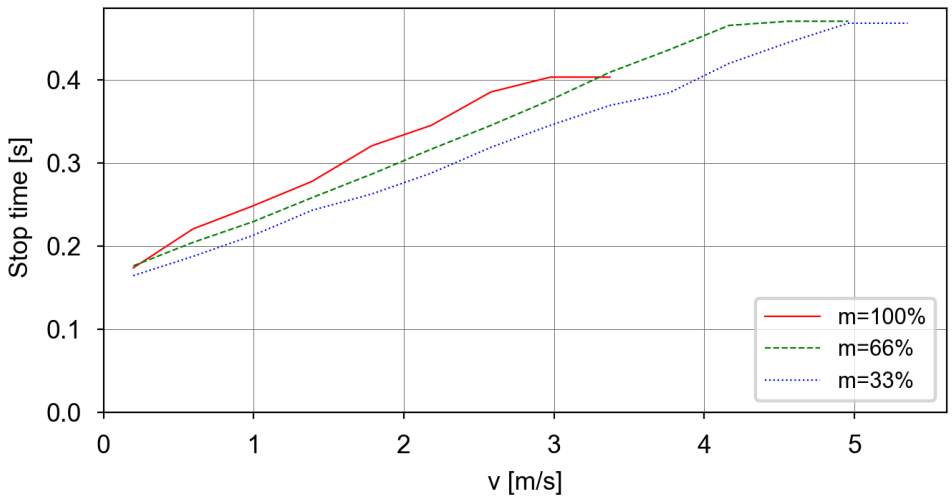


Continues on next page

1.9.5 IRB 930-12/1.05
Continued

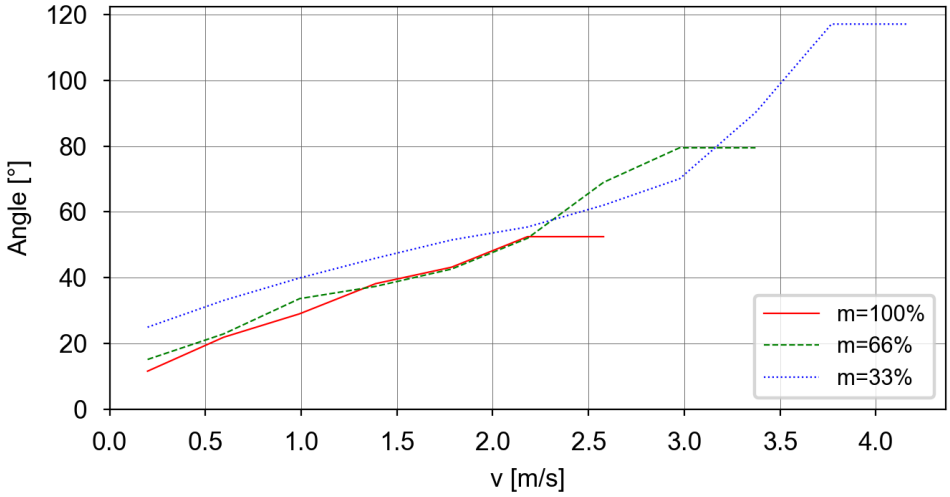
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

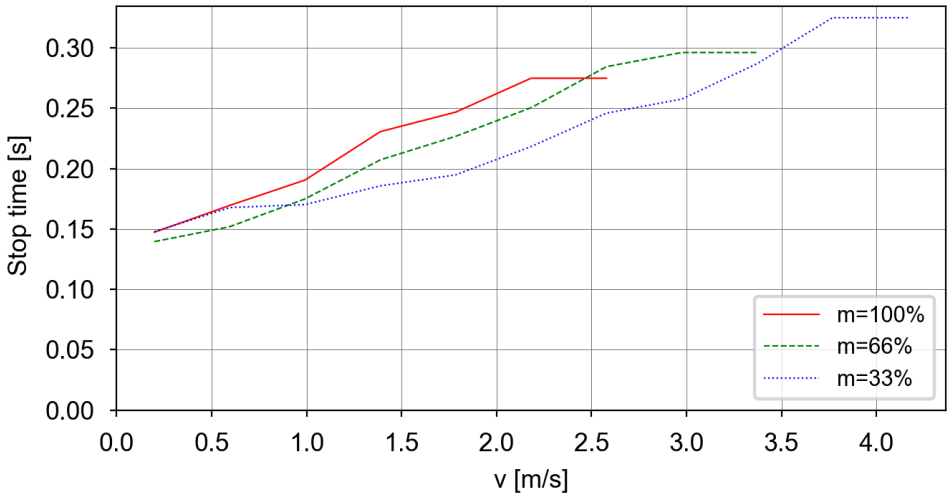




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

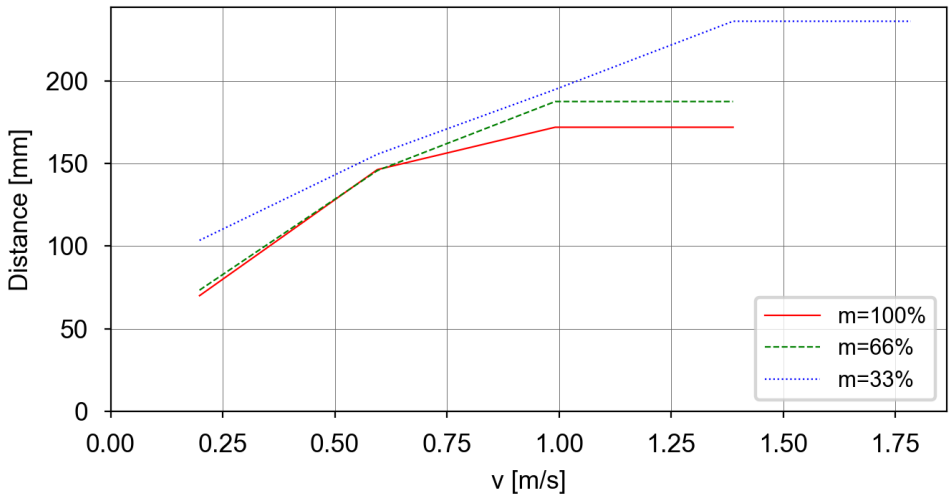


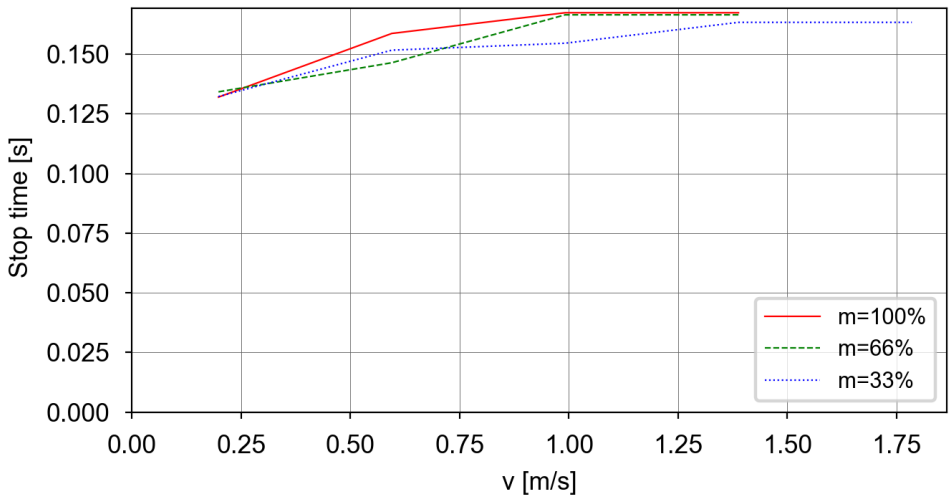


Continues on next page

1.9.5 IRB 930-12/1.05
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.6 IRB 930-12/1.05 Extended Stroke

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [12, [0,
     0, 190], [1, 0, 0, 0], 0.072, 0.072, 0.072]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [8, [0, 0,
     127], [1, 0, 0, 0], 0.032, 0.032, 0.032]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [4, [0, 0,
     63], [1, 0, 0, 0], 0.008, 0.008, 0.008]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	67.3°	0.39 s
2*	80.7°	0.24 s
3	202.2 mm	0.12 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

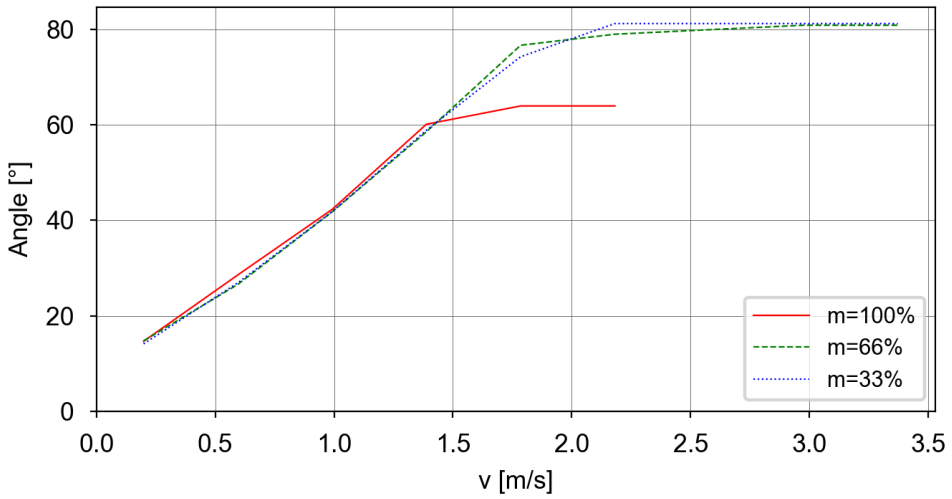
Axis 3

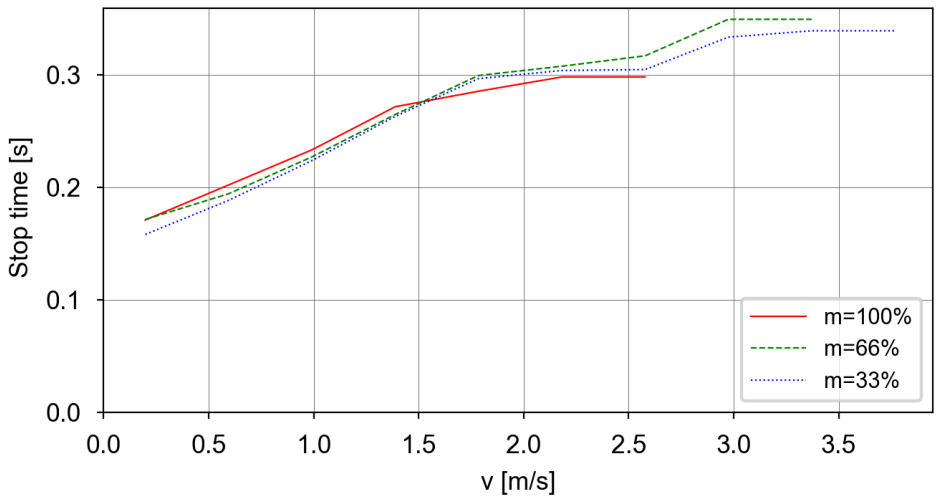
Only one zone exists.

Continues on next page

1.9.6 IRB 930-12/1.05 Extended Stroke
Continued

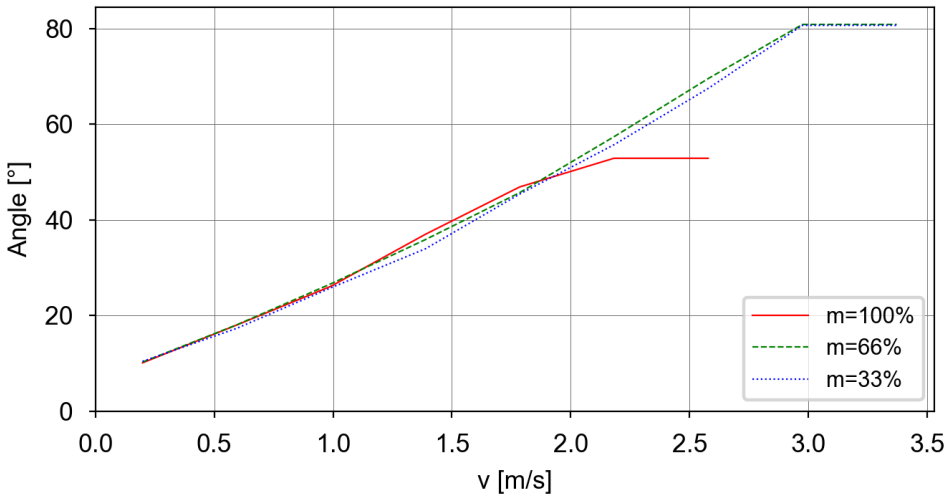
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

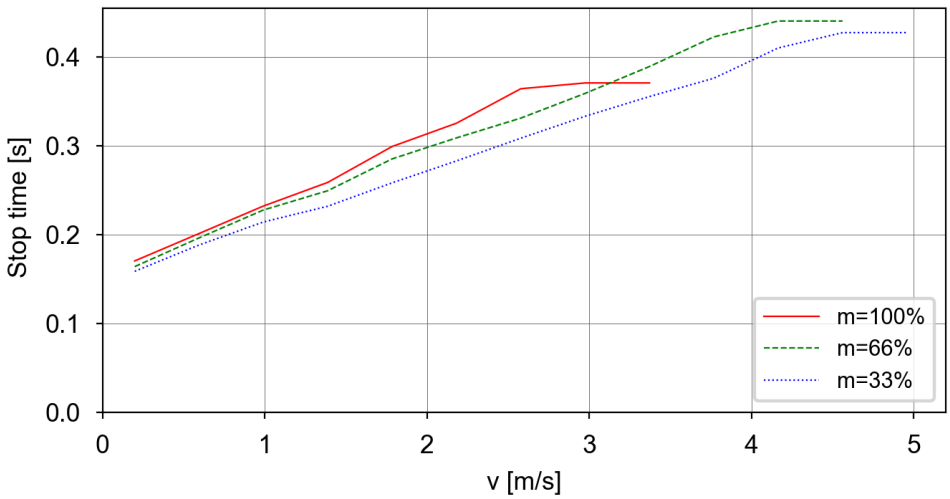




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

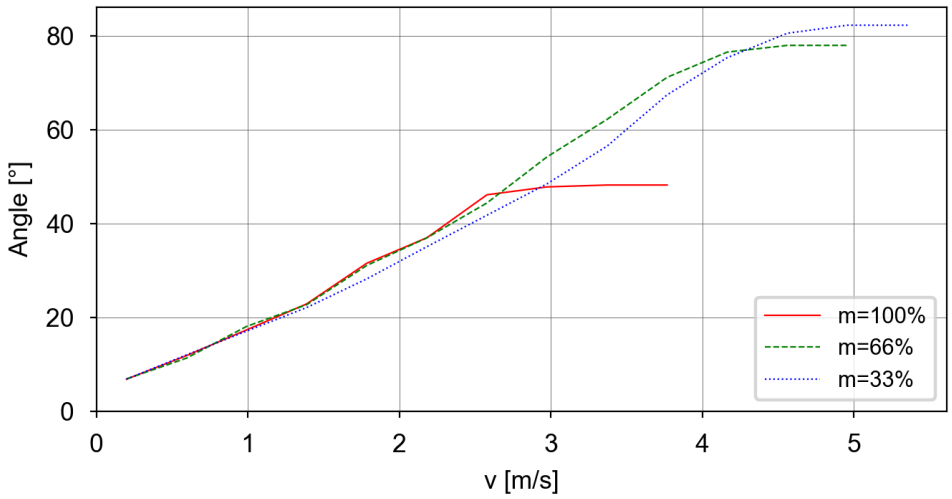


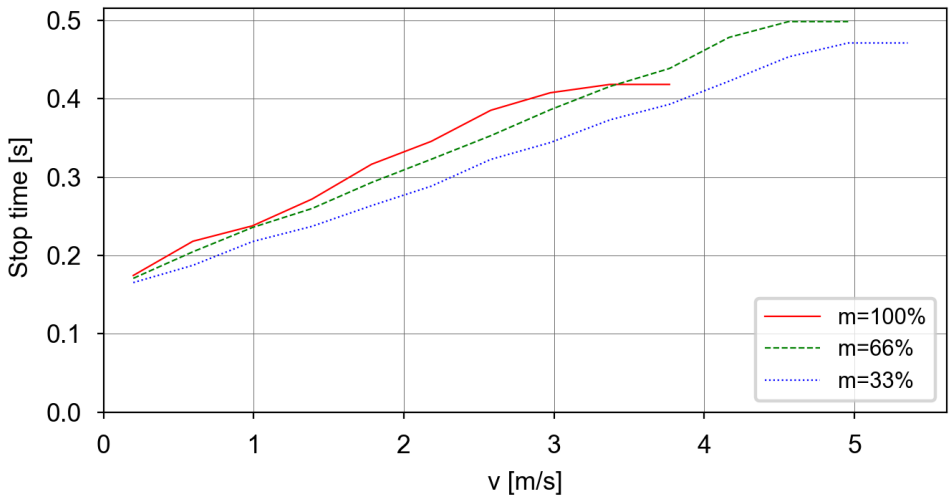


Continues on next page

1.9.6 IRB 930-12/1.05 Extended Stroke
Continued

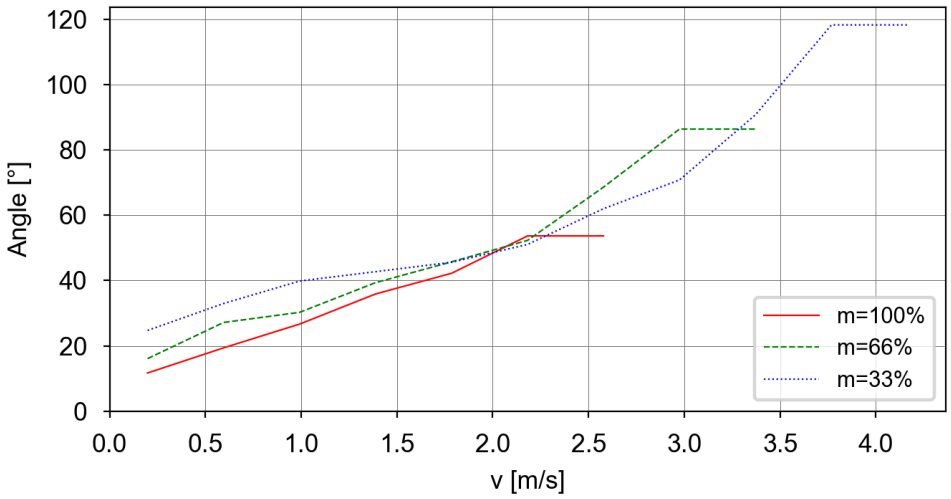
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

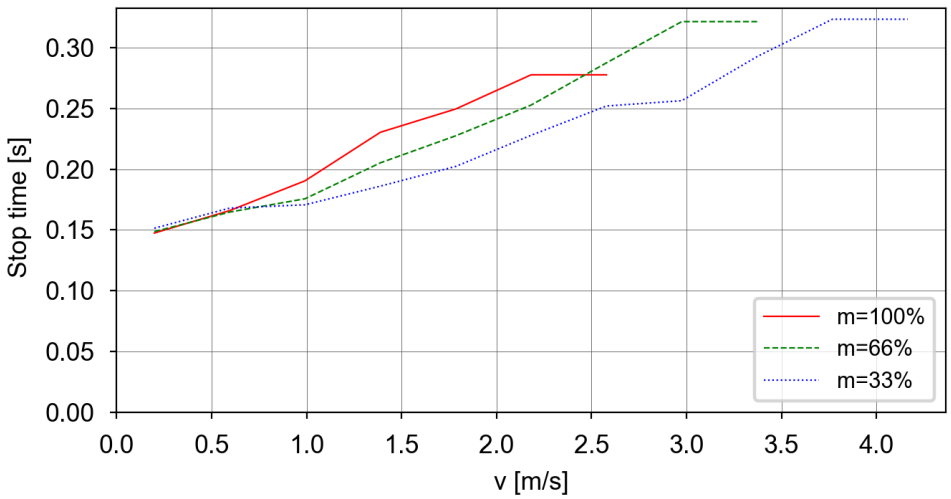




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

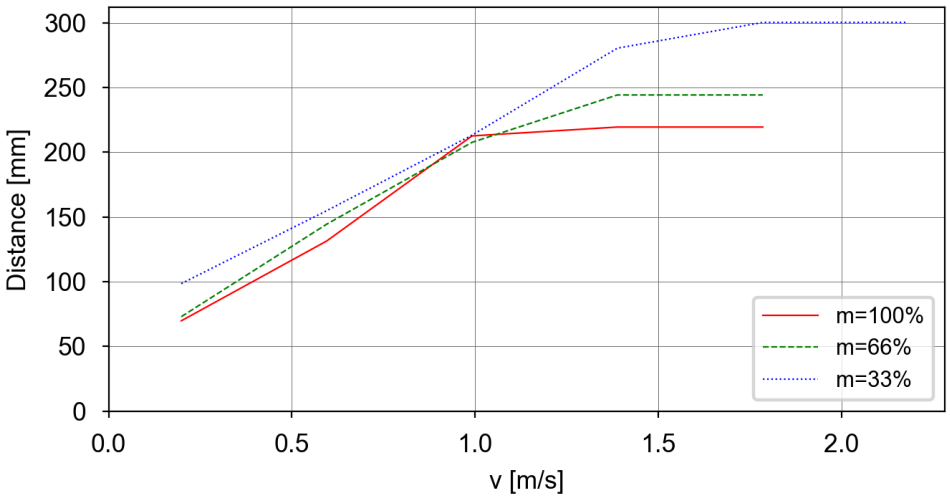


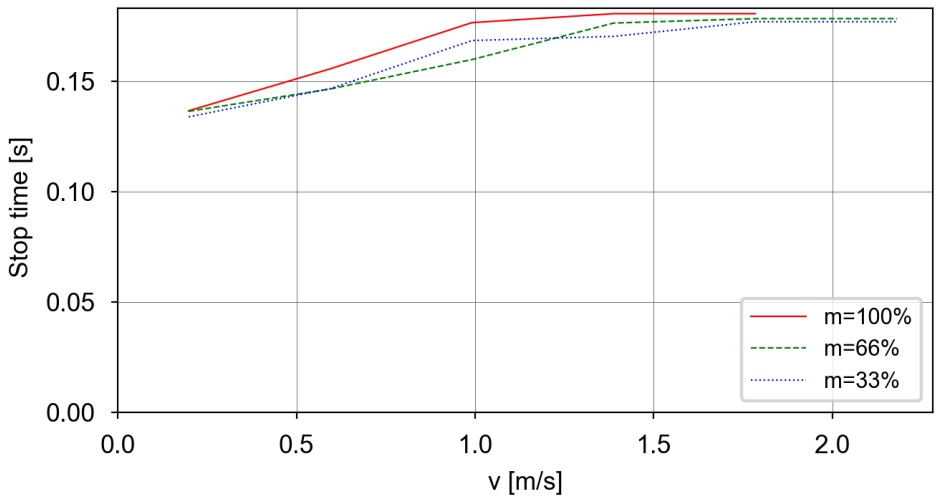


Continues on next page

1.9.6 IRB 930-12/1.05 Extended Stroke
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.7 IRB 930-22/1.05

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [22, [0,
     0, 96], [1, 0, 0, 0], 0.034, 0.034, 0.034]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [15, [0, 0,
     64], [1, 0, 0, 0], 0.015, 0.015, 0.015]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [7.3, [0,
     0, 32], [1, 0, 0, 0], 0.0038, 0.0038, 0.0038]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	67.3°	0.4 s
2*	76.9°	0.25 s
3	134.5 mm	0.13 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

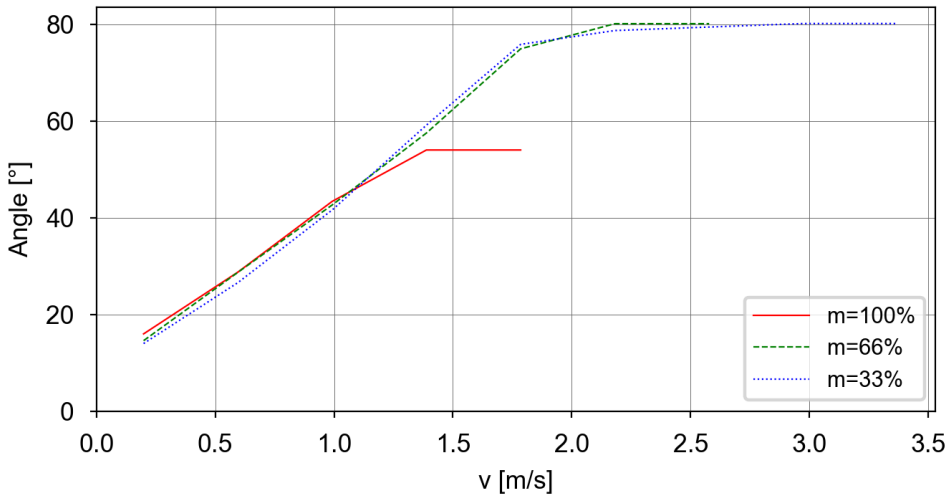
Axis 3

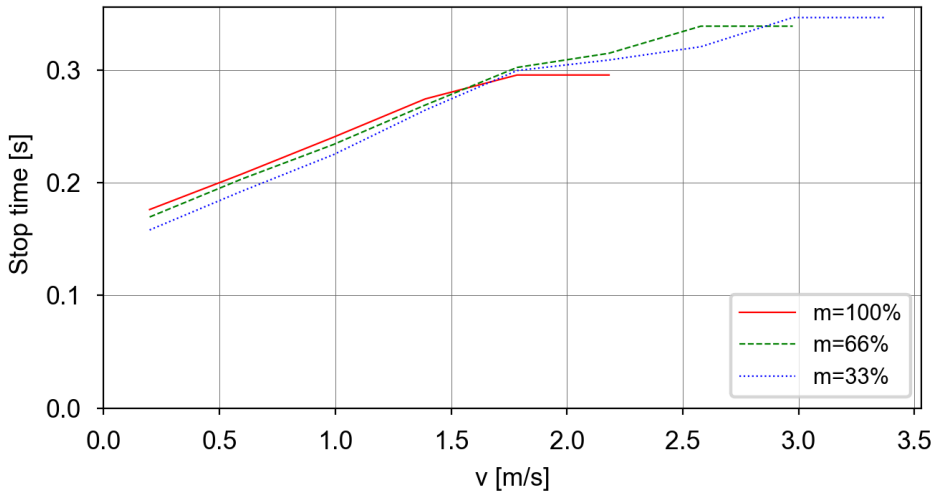
Only one zone exists.

Continues on next page

1.9.7 IRB 930-22/1.05
Continued

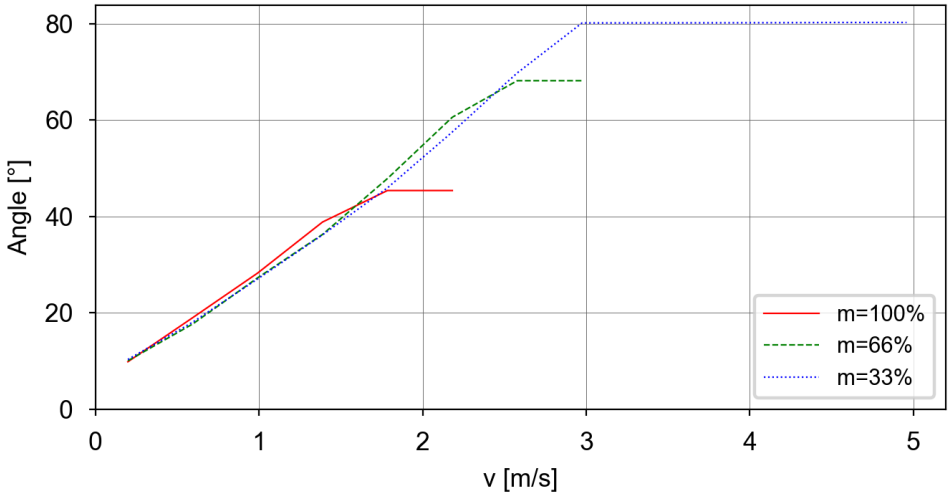
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

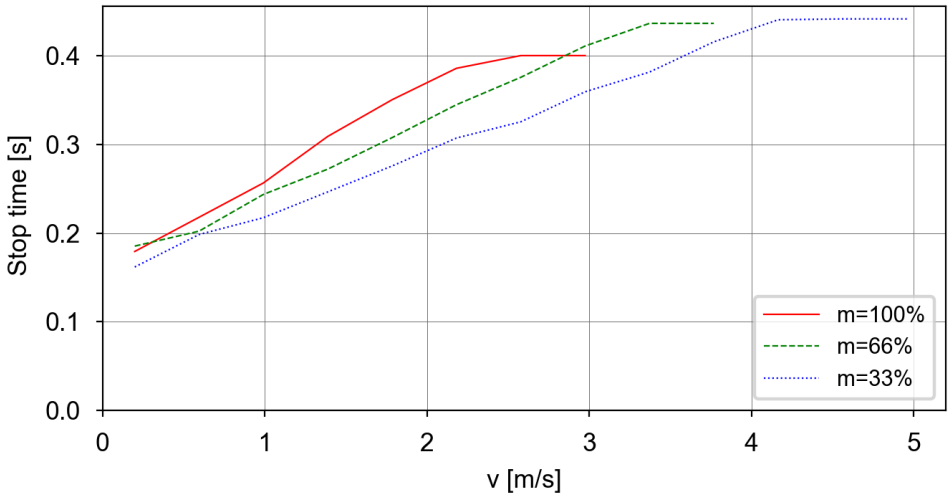




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

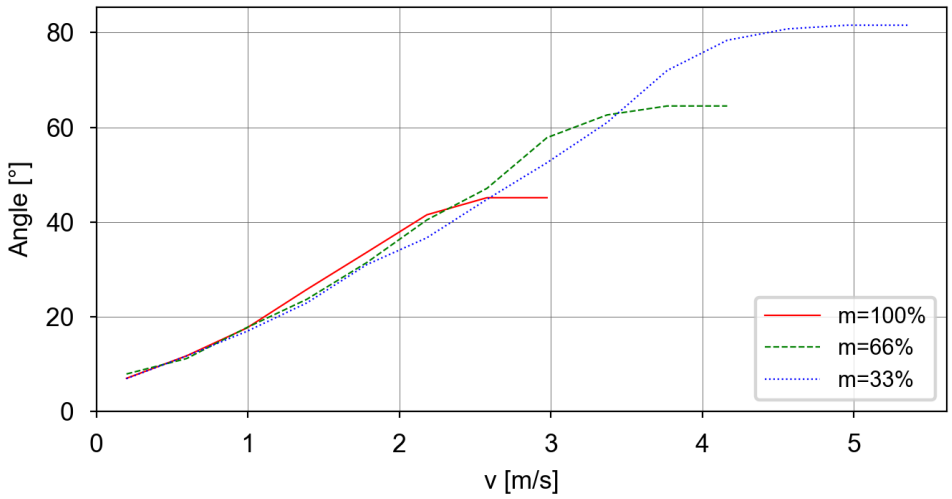


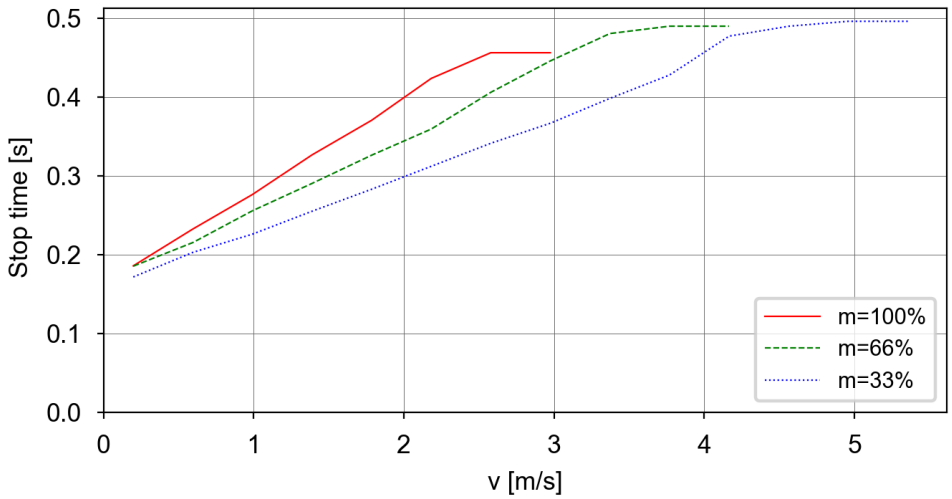


Continues on next page

1.9.7 IRB 930-22/1.05
Continued

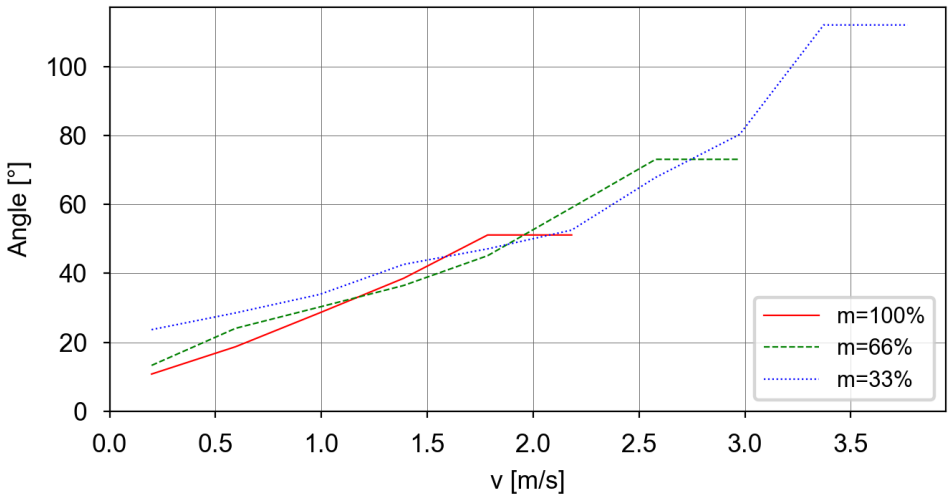
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

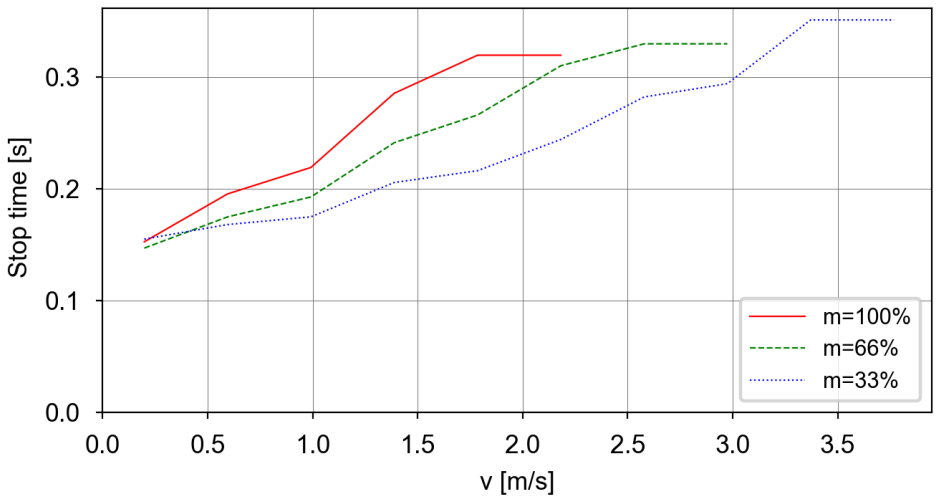




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

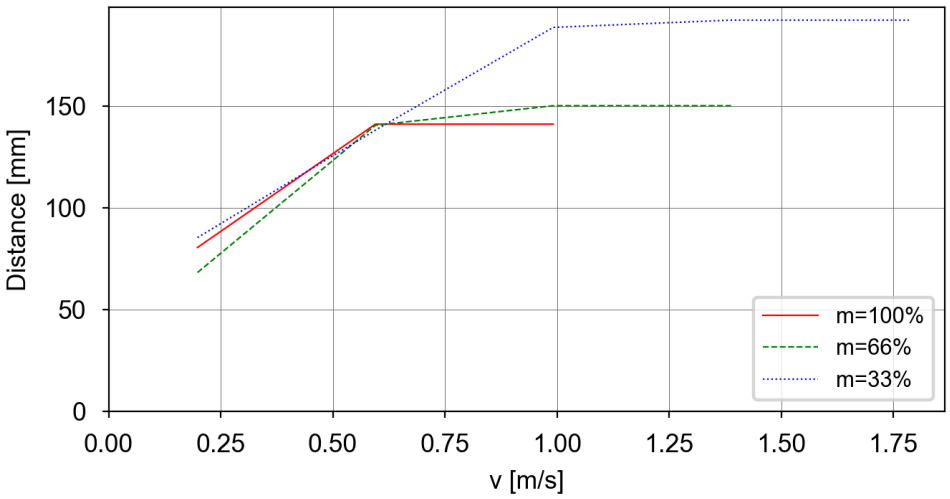


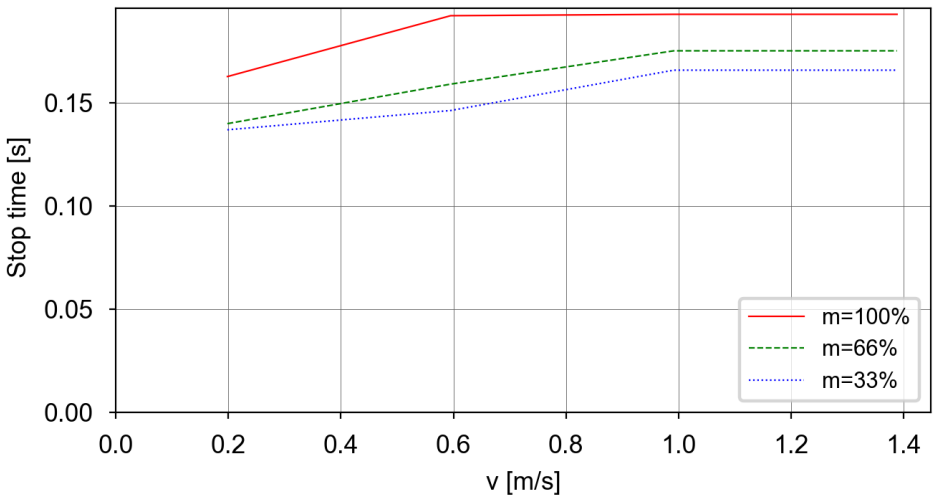


Continues on next page

1.9.7 IRB 930-22/1.05
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time





1.9.8 IRB 930-22/1.05 Extended Stroke

Used tooldata

```
PERS tooldata P100:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [22, [0,
     0, 96], [1, 0, 0, 0], 0.034, 0.034, 0.034]];
PERS tooldata P66:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [15, [0, 0,
     64], [1, 0, 0, 0], 0.015, 0.015, 0.015]];
PERS tooldata P33:= [ TRUE, [[0, 0, 0], [1, 0, 0 ,0]], [7.3, [0,
     0, 32], [1, 0, 0, 0], 0.0038, 0.0038, 0.0038]];
```

Category 0

The following table describes the stopping distance and time for category 0 stop.

Axis	Distance	Stop time
1*	67.4°	0.41 s
2*	76.7°	0.26 s
3	171.2 mm	0.14 s

*) The axis has no brake.

Category 1, extension zones

For definitions of the zones, see *Extension zones on page 51*.

The zone border is the mounting interface location for axis 2 and axis 3.

Axis 1

Zone border	Axis 2	Axis 3
z0-z1	120°	0 mm
z1-z2	60°	0 mm

Axis 2

Only one zone exists.

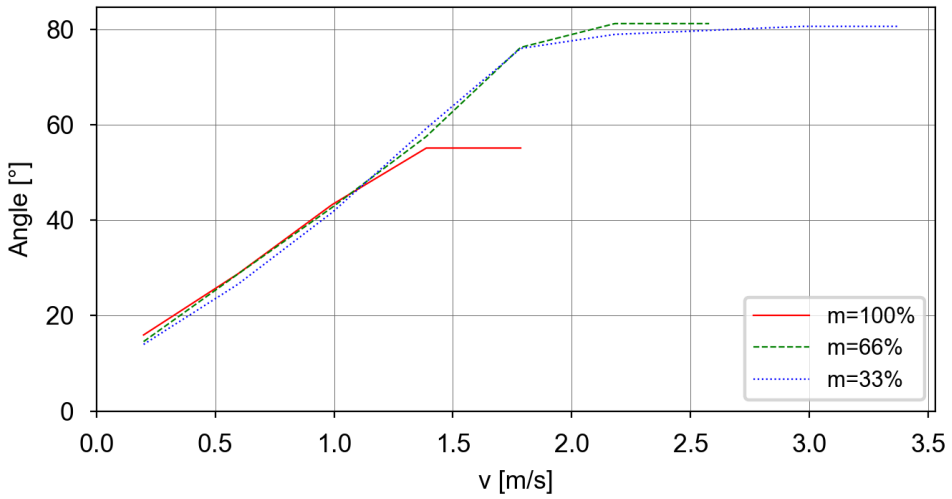
Axis 3

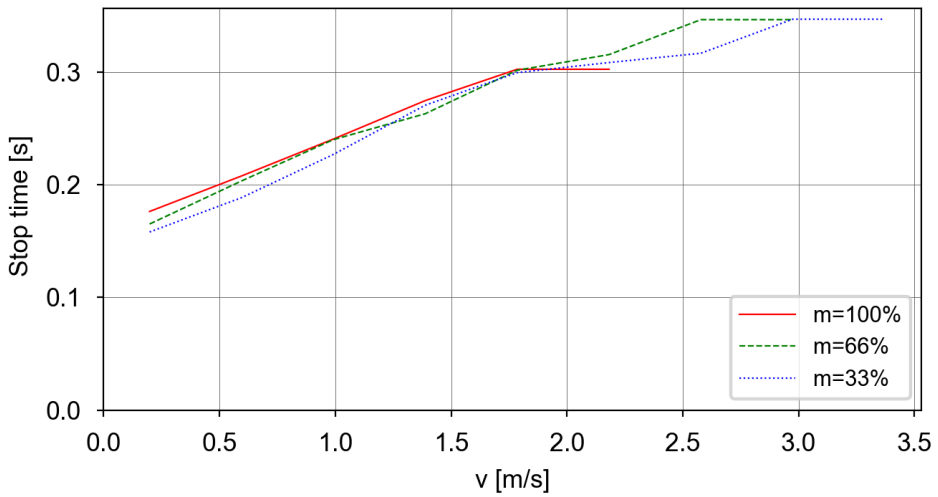
Only one zone exists.

Continues on next page

1.9.8 IRB 930-22/1.05 Extended Stroke
Continued

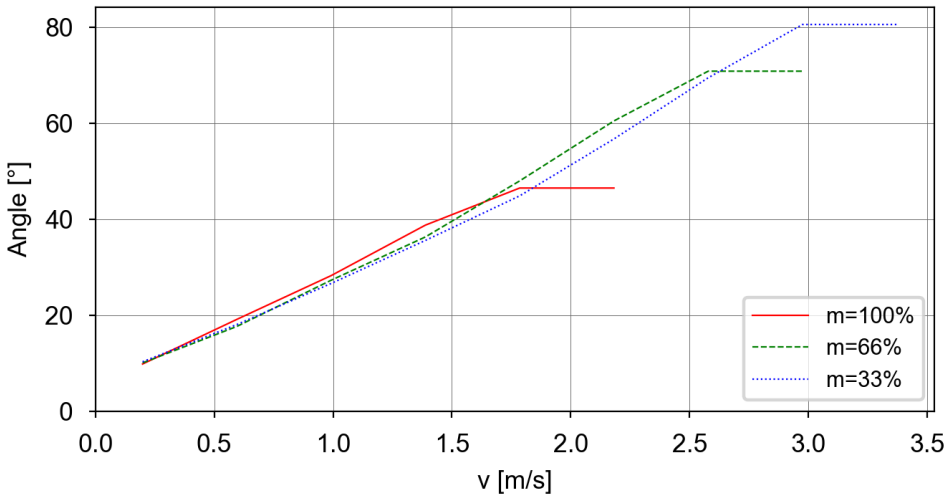
Category 1, Axis 1, Extension zone 0, stopping distance and stopping time

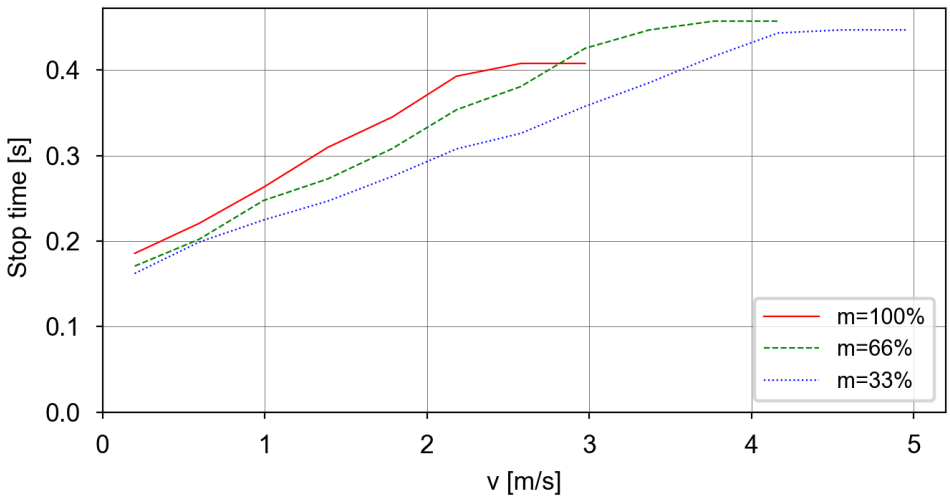




Continues on next page

Category 1, Axis 1, Extension zone 1, stopping distance and stopping time

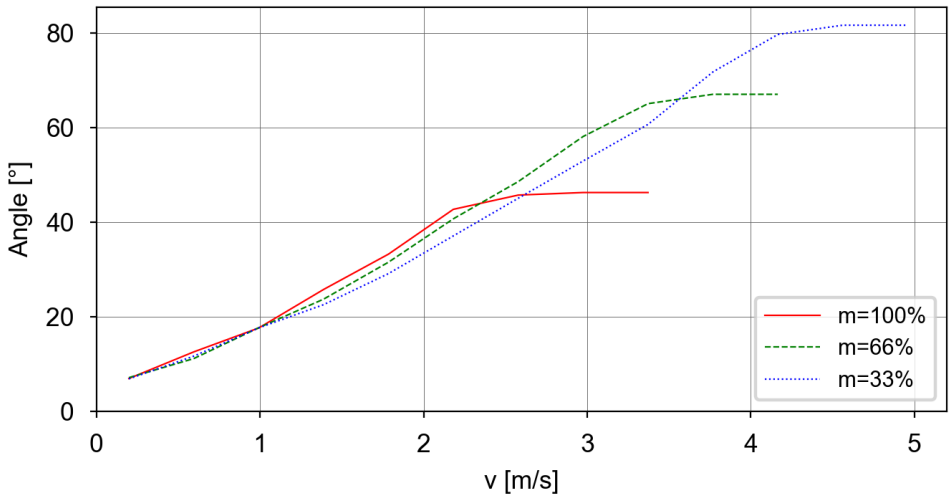


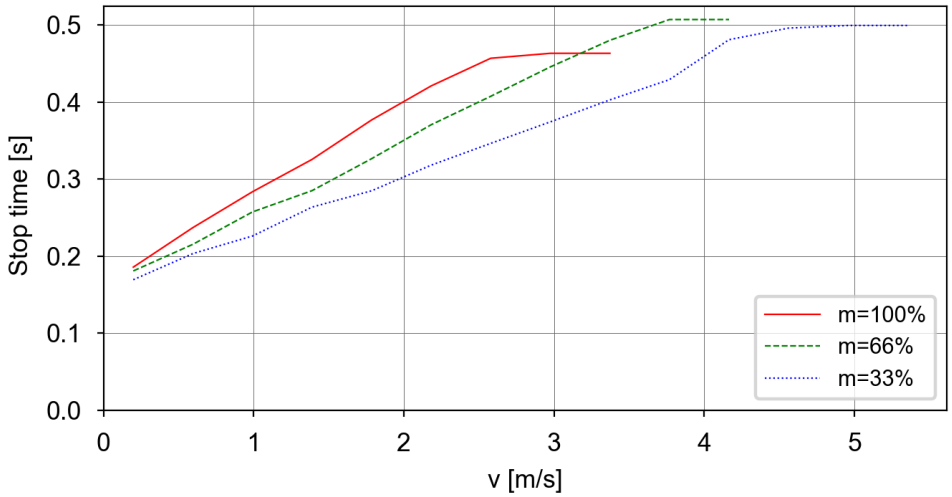


Continues on next page

1.9.8 IRB 930-22/1.05 Extended Stroke
Continued

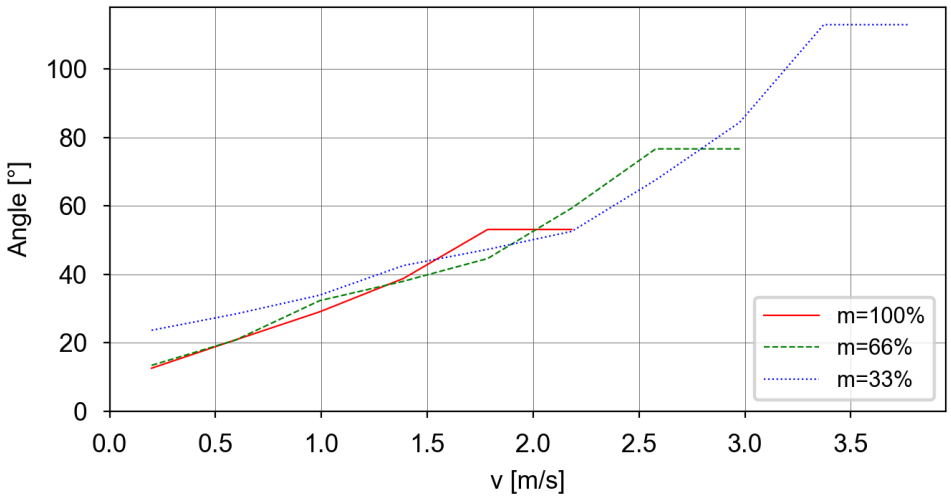
Category 1, Axis 1, Extension zone 2, stopping distance and stopping time

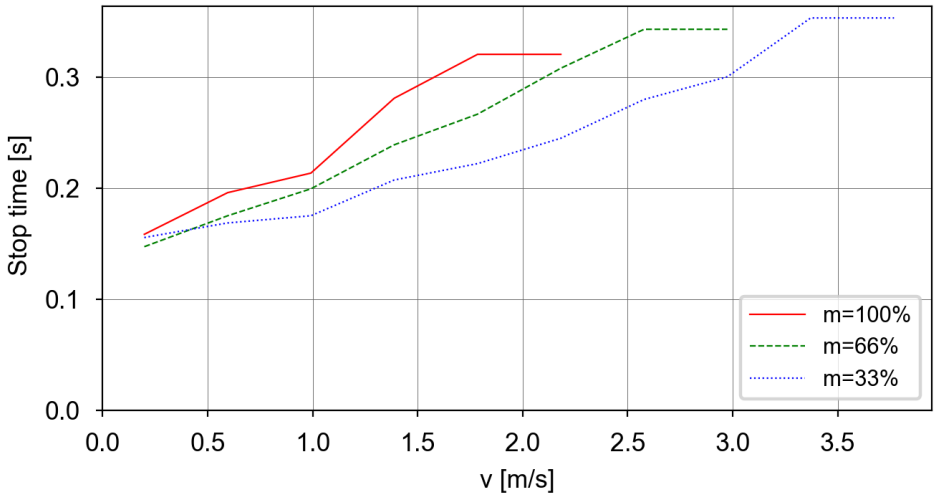




Continues on next page

Category 1, Axis 2, Extension zone 0, stopping distance and stopping time

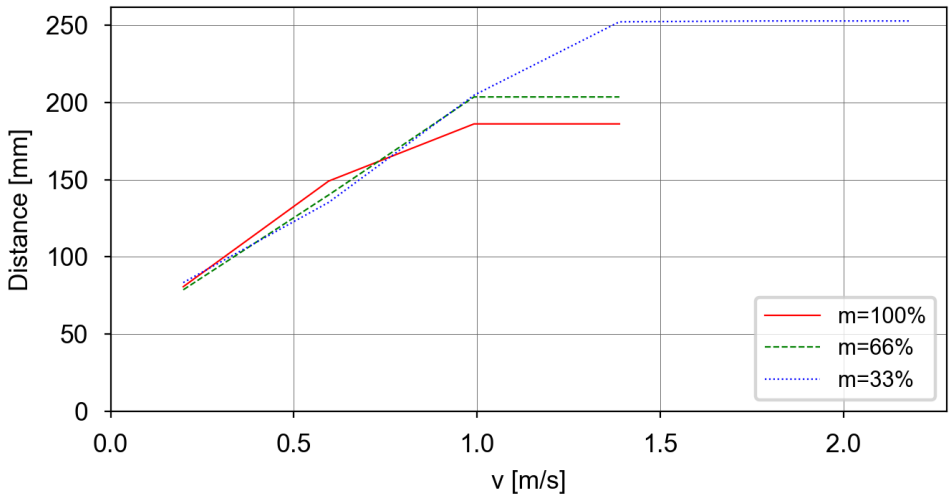


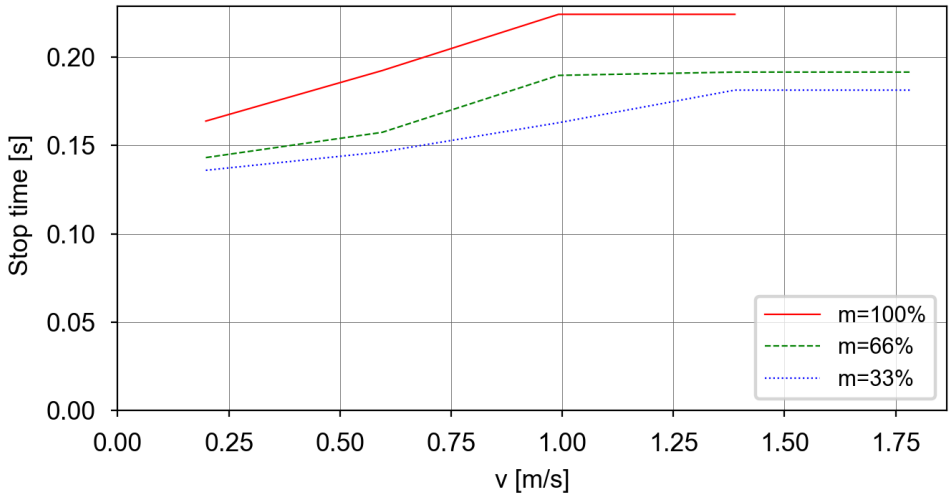


Continues on next page

1.9.8 IRB 930-22/1.05 Extended Stroke
Continued

Category 1, Axis 3, Extension zone 0, stopping distance and stopping time



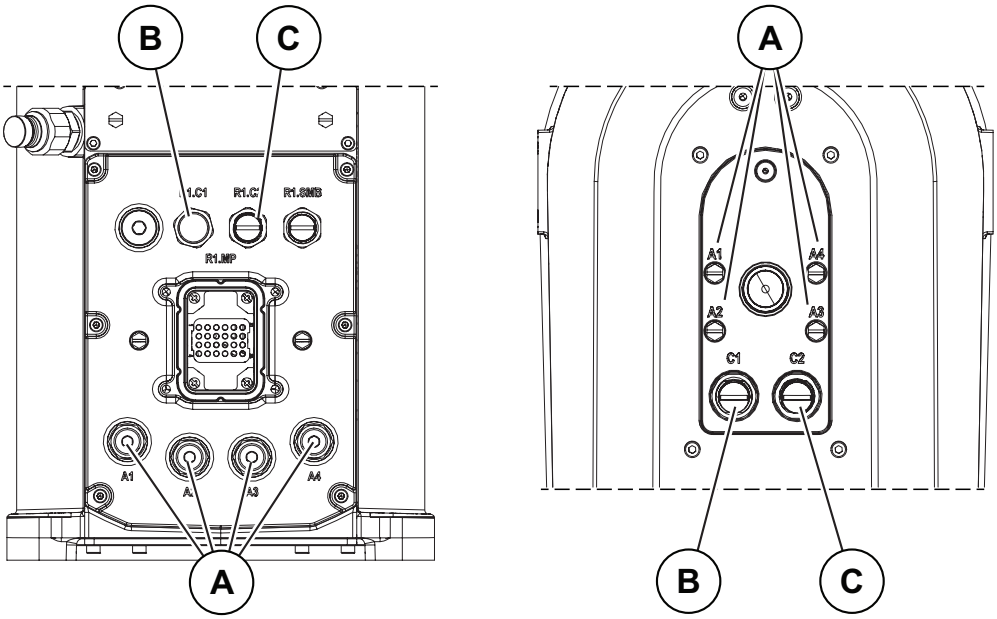


1.10 Customer connections

Introduction to customer connections

The cables for customer connection are integrated in the robot and the connectors are placed at the outer arm and base. There are two connectors C1/C2 at the outer arm. Corresponding connector R1.C1/R1.C2 are located at the base.

Hose for compressed air is also integrated into the manipulator. There are 4 inlets at the base (R1/8")) and 4 outlets (M5) on the outer arm.



xx2300000175

Position	Connection	Description	Number	Value
A	Air	Max. 6 bar	4	Air hose with outer diameter 6 mm, 4 pcs
B	C1	Customer power/signal	12 wires	30 V, 1.5 A
C	C2	Customer power/signal or ethernet	8 wires	30 V, 1 A or 1 Gbits/s

Connector kits (optional)

Connector kits, base

R1.C1 and R1.C2 connectors on the base are parts of the CP/CS cable and Ethernet floor cable, respectively. For details about the robot cabling, see "Robot cabling and connection points" in robot product manual.

Continues on next page

Connector kits, outer arm

The table describes the CP/CS and Ethernet (if any) connector kits for the outer arm.

Position	Description		Art. no.
Connector kits	CP/CS	M12 CPCS Male straight connector kits	3HAC066098-001
		M12 CPCS Male angled connector kits	3HAC066099-001
	Ethernet	M12 Ethernet Cat5e Male straight connector kits	3HAC067413-001
		M12 Ethernet Cat5e Male angled connector kits	3HAC067414-001

Protection covers

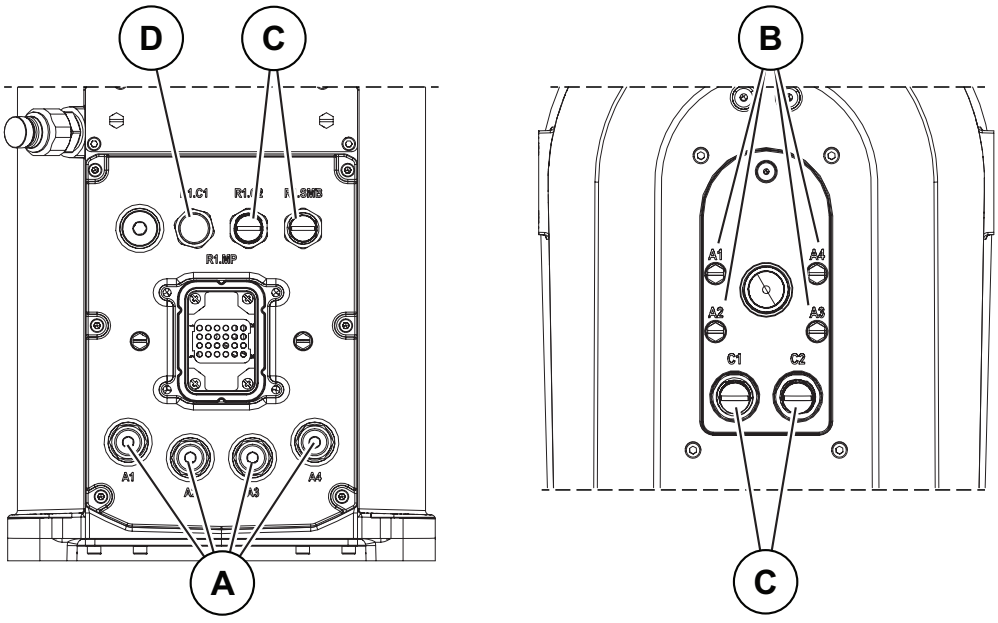
Protection covers for water and dust proofing

Protection covers are delivered together with the robot and must be well fitted to the connectors in any application requiring water and dust proofing.

Always remember to refit the protection covers after removing them.

Note

If the protection covers are not refitted back with the connectors exposed, the protection class will be lost.



xx2300000176

A	Protection covers for air hose connector on the base
B	Protection covers for air hose connector on the process hub
C	Protection covers for C2/SMB connector on the base and C1/C2 connector on the process hub

Continues on next page

D	Protection cover for C1 connector on the base

This page is intentionally left blank

2 Specification of variants and options

2.1 Introduction to variants and options

General

The different variants and options for the IRB 930 are described in the following sections. The same option numbers are used here as in the specification form.

The variants and options related to the robot controller are described in the product specification for the controller.

2.2 Manipulator

Variants

Option	IRB Type	Handling capacity (kg)	Reach (m)
3300-79	930	12	0.85
3300-80	930	12	1.05
3300-81	930	22	1.05

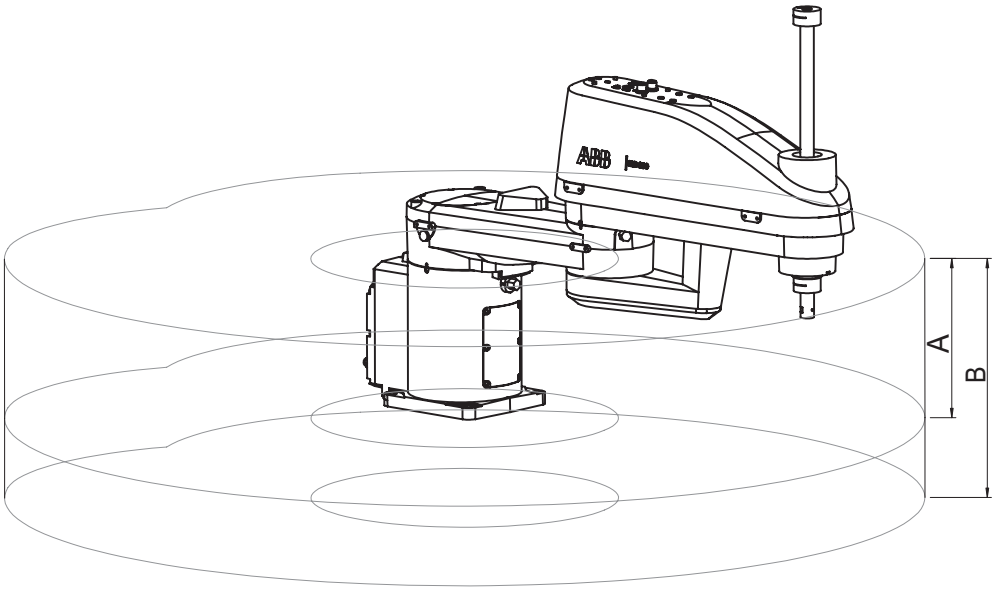
Extended stroke

The extended stroke can help user to pick or place something to the destined point where is higher or lower positioned than another.

Option	Description
3311-1	Extended Stroke

Stroke length

Option	Description
3312-6	300 mm
3312-11	450 mm



xx2300000347

Stroke	Description
A	300 mm
B	450 mm

Continues on next page

Manipulator color

Option	Color	RAL code[i]
209-202	ABB Graphite White std Standard color	RAL 7035

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

Protection

Option	Description
3350-300	Base 30, IP30[i]

[i] The protection class of the ballscrew area is IP20.

Note

Base 30 includes IP30, according to standard IEC 60529.

Media & Communication

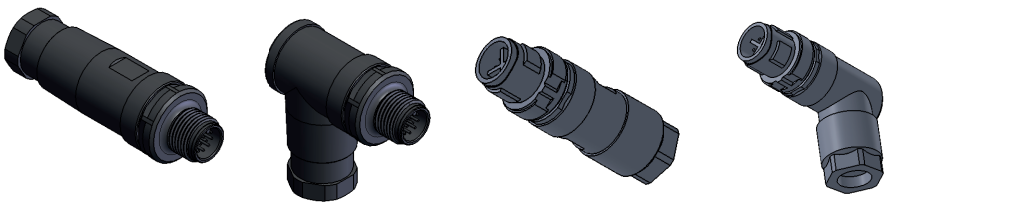
When 3303-1 Parallel & Air is selected then 3304-1 and 3305-1 options are activated for selecting.

When 3303-2 Ethernet, Parallel, Air is selected then 3304-1,3305-1,3306-1 and 3307-1 are activated for selecting.

Option	Type	Description
3303-1	Parallel & Air	Includes CP/CS (C1) and air.
3303-2	Ethernet, Parallel, Air	Includes CP/CS (C1) + Ethernet (C2), and air.

Connector kit

Option	Description
3304-1	Male-type, Straight arm connector kits
3305-1	Male-type, Angled arm connector kits
3306-1	Male-type, Straight arm Ethernet connector kits
3307-1	Male-type, Angled arm Ethernet connector kits



Straight connector kits | Angled connector kits | Straight Ethernet connector kits | Angled Ethernet connector kits

xx1900000140

Continues on next page

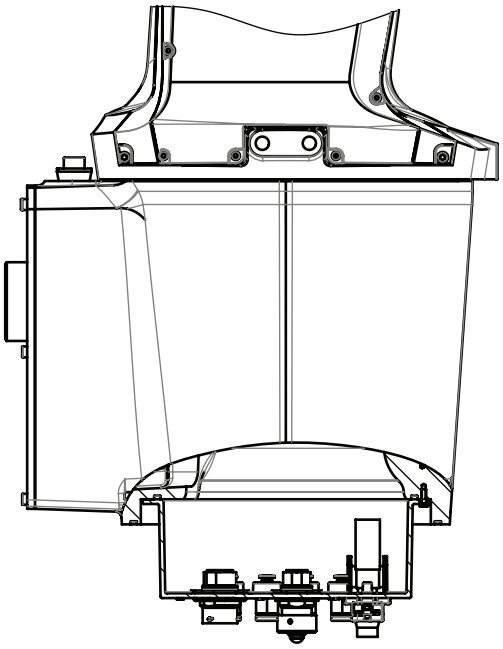
Note

The image shown here is indicative only. If there is inconsistency between the image and the actual product, the actual product shall govern.

The kits are designed and used for connectors on upper arm.

Robot cabling routing

Option	Description
3309-1	Under the base
3309-2	From side of base



xx1300000388

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

2.3 Floor cables

Manipulator cable - Straight

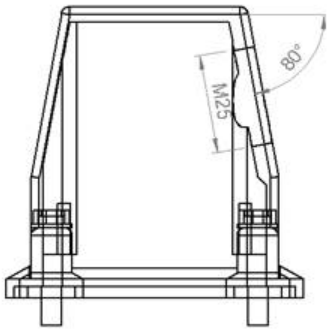
Option	Lengths
3200-1	3 m
3200-2	7 m
3200-3	15 m

xx2100001122

Manipulator cable - Angled

Option	Lengths
3209-1	Angled type connector

xx2100001123

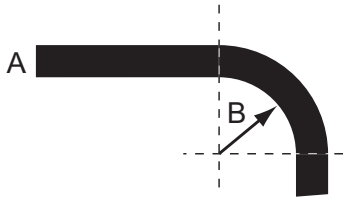


xx2100001124

Continues on next page

Bending radius for static floor cables

The minimum bending radius is 10 times the cable diameter for static floor cables.



xx1600002016

A	Diameter
B	Diameter x10

Parallel cable - Length

Option	Lengths
3201-1	3 m
3201-2	7 m
3201-3	15 m

Requirements

The option *Parallel cable - Length* requires [3303-1] Parallel & Air OR [3303-2] Ethernet, Parallel.

Ethernet cable - Length

Option	Lengths
3202-2	7 m, M12 X-coded to RJ45
3202-3	15 m, M12 X-coded to RJ45

Requirements

The option *Ethernet cable - Length* requires [3303-1] Parallel & Air OR [3303-2] Ethernet, Parallel.

This page is intentionally left blank

3 Accessories

General

There is a range of tools and equipment available.

Basic software and software options for robot and PC

For more information, see *Application manual - Controller software OmniCore*, *Product specification - OmniCore C line*

This page is intentionally left blank

Index

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

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

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

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

abb.com/robotics

3HAC086011-001, Rev A, en