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CONTENTS

1 Description

1.1 Structure

The IRB 340 family consists of a 4-axes industrial robot in a modular design. It is specially designed for industries with a great need of flexible automation, such as pick and place operations and assembly.

The IRB 340 is extremely powerful with an acceleration of up to 10 g's, and a handling capacity of up to 2 kg. Thanks to optimized drive-chains and ABB's patented QuickMove^{TM} functions it is the fastest robot in its class, up to 180 picks per minute (defined by cycle and load).

The robot is available in standard version, WashDown and Stainless WashDown. Standard version to be used in dry applications. WashDown versions are designed to be cleaned and disinfected, and therefor useful in wet applications.

The IRB 340 is classified for clean room class 10.

IRB 340 is designed for use together with the S4Cplus controller and robot control software, BaseWare OS. BaseWare OS supports every aspect of the robot system, such as motion control, development and execution of application programs, communication etc. See Product Specification S4Cplus.
Safety standards require a controller to be connected to the robot.

To increase functionality and performance of the robot system, a number of BaseWare Options might be added. Also available are ProcessWare products, designed for specific process applications to improve process result as well as simplify installation and programming. See the Product Specification RobotWare Options.

PickMaster is a specific application software for vision guided picking. It is providing a task-oriented programming and executions of fast pick and place operations.
See Product Specification PickMaster/PickWare.

Figure 1 The standard version of the IRB 340 manipulator.

Description

Different robot version

The IRB 340 is available in different versions depending on handling capacity and environment adaptation. All versions are classafied for clean room class 10 according to US Federal Standard 209. The following different robot types are available:

Pay load	Standard	WashDown	WashDown Stainless
1 kg	IRB 340	IRB 340 SA	IRB 340 SAS
2 kg	IRB 340/2	IRB 340 SA/2	IRB 340 SAS/2

Weight:	Manipulator Standard	140 kg
	WashDown Stainless	165 kg

Airborne noise level:

The sound pressure level outside the working space	< 70 dB (A) Leq (acc. to Machinery directive 89/392 EEC)

Figure 2 Views of the manipulator in the standard version (dimensions in mm).

Description

290

Axis 3   Axis 1

860

Axis 4
WashDown version

Axis 2

250

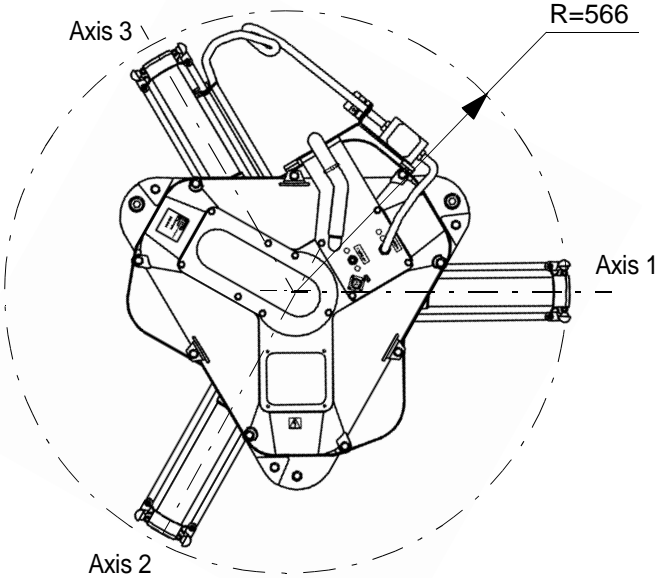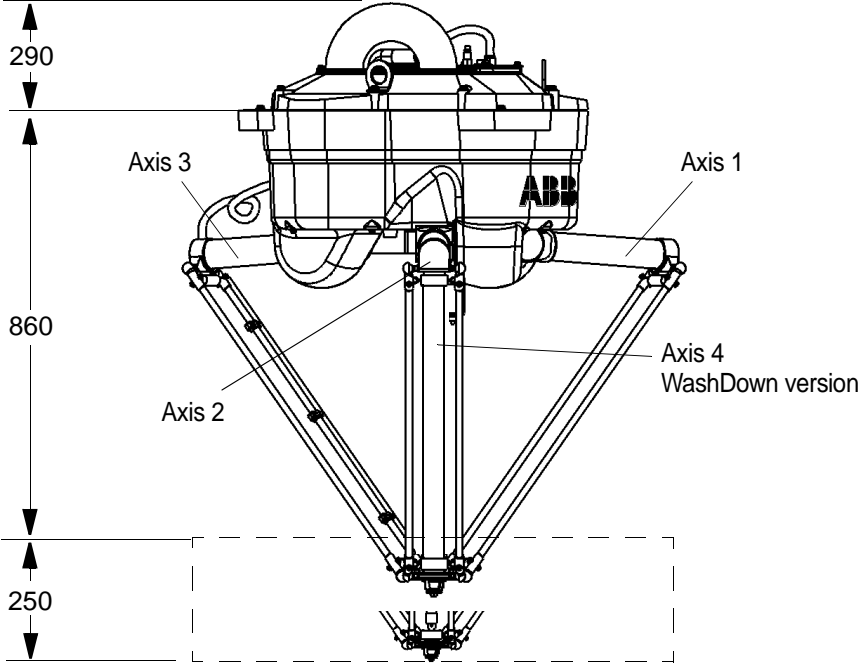Axis 3   R=566

Axis 1

Axis 2

Figure 3 Views of the manipulator in the WashDown version (dimensions in mm).

1.2 Safety/Standards

The robot conforms to the following standards:

EN 292-1	Safety of machinery, terminology
EN 292-2	Safety of machinery, technical specifications
EN 954-1	Safety of machinery, safety related parts of control systems
EN 60204	Electrical equipment of industrial machines
IEC 204-1	Electrical equipment of industrial machines
ISO 10218, EN 775	Manipulating industrial robots, safety
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IEC 529	Degrees of protection provided by enclosures
EN 50081-2	EMC, Generic emission
EN 50082-2	EMC, Generic immunity

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

The robot is designed with absolute safety in mind. It has a dedicated safety system based on a two-channel circuit which is monitored continuously. If any component fails, the electrical power supplied to the motors shuts off and the brakes engage.

Safety category 3
Malfunction of a single component, such as a sticking relay, will be detected at the next MOTOR OFF/MOTOR ON operation. MOTOR ON is then prevented and the faulty section is indicated. This complies with category 3 of EN 954-1, Safety of machinery - safety related parts of control systems - Part 1.

Selecting the operating mode
The robot can be operated either manually or automatically. In manual mode, the robot can only be operated via the teach pendant, i.e. not by any external equipment.

Reduced speed
In manual mode, the speed is limited to a maximum of 250 mm/s (600 inch/min.). The speed limitation applies not only to the TCP (Tool Centre Point), but to all parts of the robot. It is also possible to monitor the speed of equipment mounted on the robot.

Three position enabling device
The enabling device on the teach pendant must be used to move the robot when in manual mode. The enabling device consists of a switch with three positions, meaning that all robot movements stop when either the enabling device is pushed fully in, or when it is released completely. This makes the robot safer to operate.

Safe manual movement
The robot is moved using a joystick instead of the operator having to look at the teach pendant to find the right key.

Over-speed protection
The speed of the robot is monitored by two independent computers.

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Emergency stop
There is one emergency stop push button on the controller and another on the teach pendant. Additional emergency stop buttons can be connected to the robot's safety chain circuit.

Safeguarded space stop
The robot has a number of electrical inputs which can be used to connect external safety equipment, such as safety gates and light curtains. This allows the robot's safety functions to be activated both by peripheral equipment and by the robot itself.

Delayed safeguarded space stop
A delayed stop gives a smooth stop. The robot stops in the same way as at normal program stop with no deviation from the programmed path. After approx. one second the power supplied to the motors shuts off.

Restricting the working space
The movement of the manipulator can be restricted by using software limits, defined by an interval of x, y, z and θ coordinates.

Hold-to-run control
"Hold-to-run" means that you must depress the start button in order to move the robot. When the key is released the robot will stop. The hold-to-run function makes program testing safer.

Safety lamp (option)
As an option, the robot can be equipped with a safety lamp. This is activated when the motors are in the MOTORS ON state.

WashDown Statement
All components have been found to comply with USDA/FDA, Code of Federal Regulations Title 21 regarding choice of material, material behaviour, and sanitary operations. (Relevant chapters of CFR are part 100-199). The intended use is incidental food contact. Any gripper to be used has to be investigated separately.

1.3 Installation

Depending on robot version an end effector of max weight 1 to 2 kg including payload, can be mounted on the robot's mounting flange. See Load diagrams on page 11. Other equipment, such as a hose, can be mounted on the upper and lower arm, max weight 300 g/m. See Extra equipment mounted on the manipulator arms on page 17.

Operating requirements

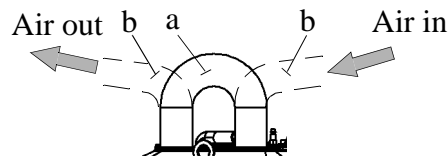| Protection standards	IEC529
Manipulator IRB 340, IRB 340/2	IP55
Manipulator IRB 340 SA, IRB 340 SA/2	IP67
Manipulator IRB 340 SAS, IRB 340 SAS/2	IP67

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

Ambient temperature

Manipulator during operation	+5°C (41°F) to +52°C (125°F)
Complete robot during transportation and storage	-25°C (13°F) to +55°C (131°F)

Note If the robot operates in low temperature or temperature >+35°C, the air flow, generated by the internal fan, is recommended to be evacuated. Hard environment and a lot of starts and stops may cause condensation inside the base and requires external air to keep the base dry.

The standard version requires the short cut hose (a) to be replaced by external hoses (b). For the WashDown version option 12-1, plate for external air circulation, replaces the plate for internal air.

Relative humidity

Complete robot during transportation and storage	Max. 95% at constant temperature
Complete robot during operation	Max. 95% at constant temperature

Mounting the manipulator

Maximum force in each fixing points is 500 N referring to the z-direction in the base coordinate system.

Robot frame is not included in the delivery.

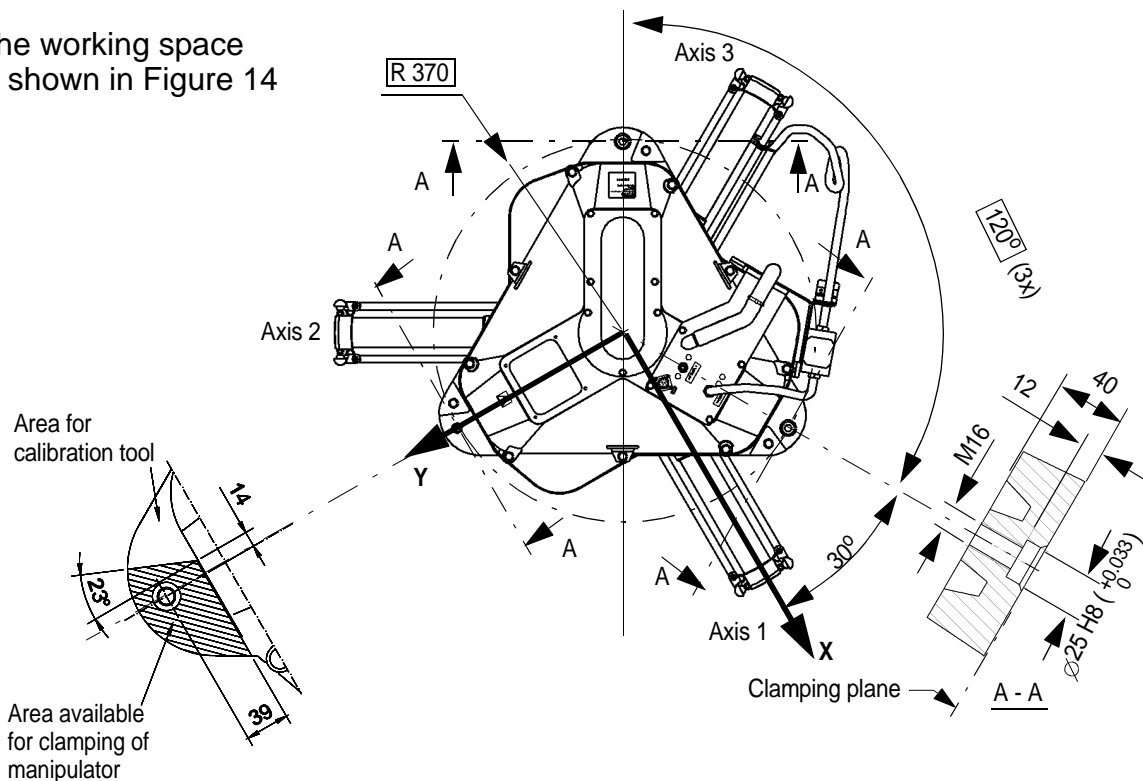Required stiffness of frame: Lowest natural frequency of frame with robot > 17 Hz.

Figure 4 Hole configuration (dimensions in mm).

Description

Two guiding pins are enough fore fastening the robot. The corresponding holes in the frame can be, on circular and one oval according to Figure 5.
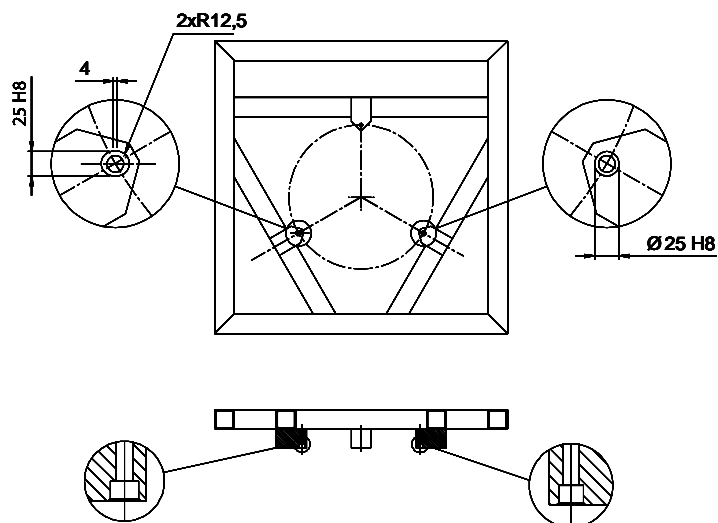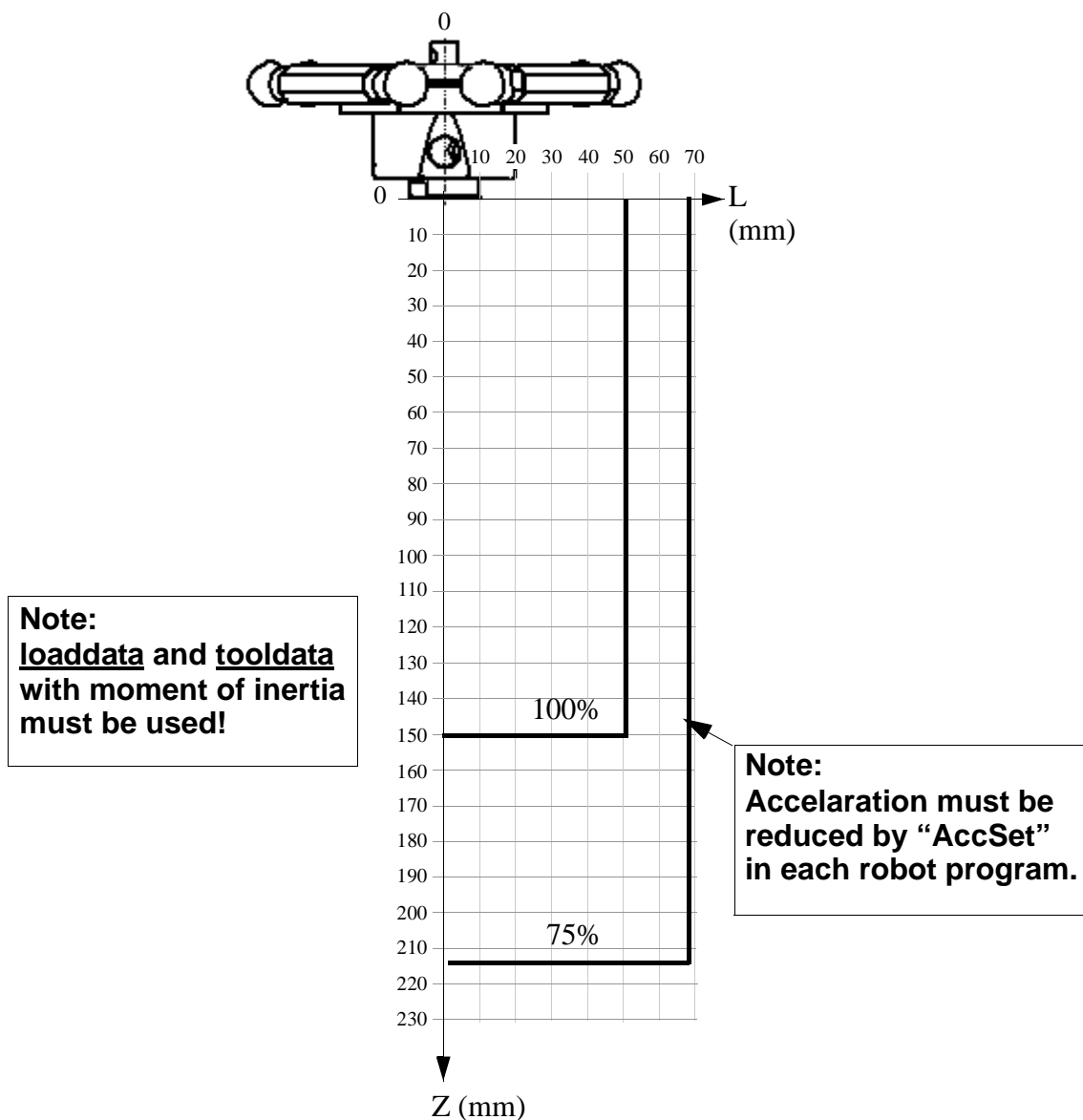

Figure 5 Example of fastening the manipulator(dimensions in mm).

Load diagrams

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 100 g

Note:
loaddata and tooldata
with moment of inertia
must be used!

100%

75%

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z (mm)

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance $Jo \leq 8,3 \times 10^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 6 Maximum weight permitted for load (100 g) mounting on the mounting flange at different positions (centre of gravity).

Description

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 300 g

Note:
loaddata and **tooldata**
with moment of inertia
must be used!

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

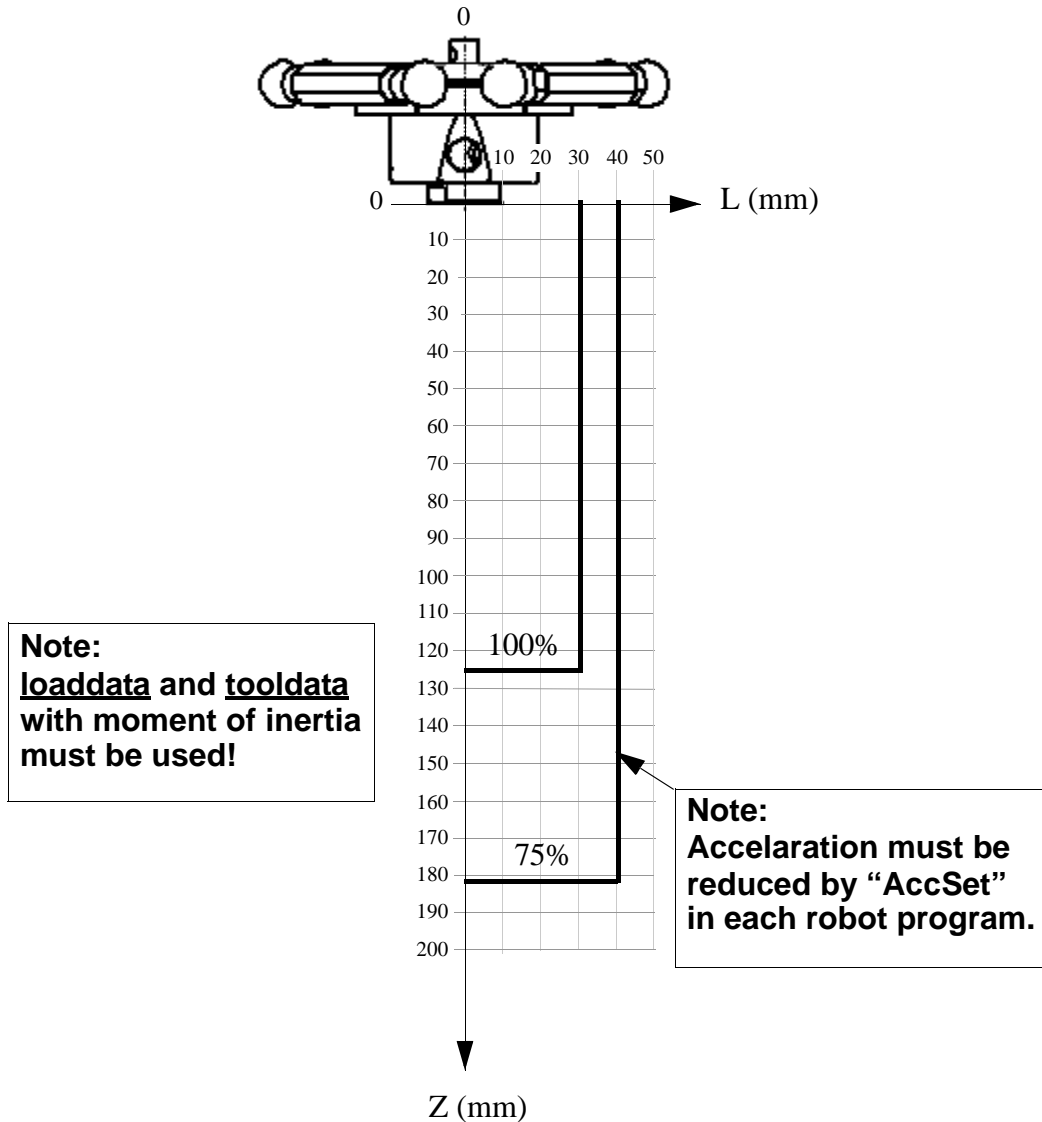No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance Jo $\leq$ 8,3 x 10 $^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 7 Maximum weight permitted for load (300 g) mounting on the mounting flange at different positions (centre of gravity).

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 500 g

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).
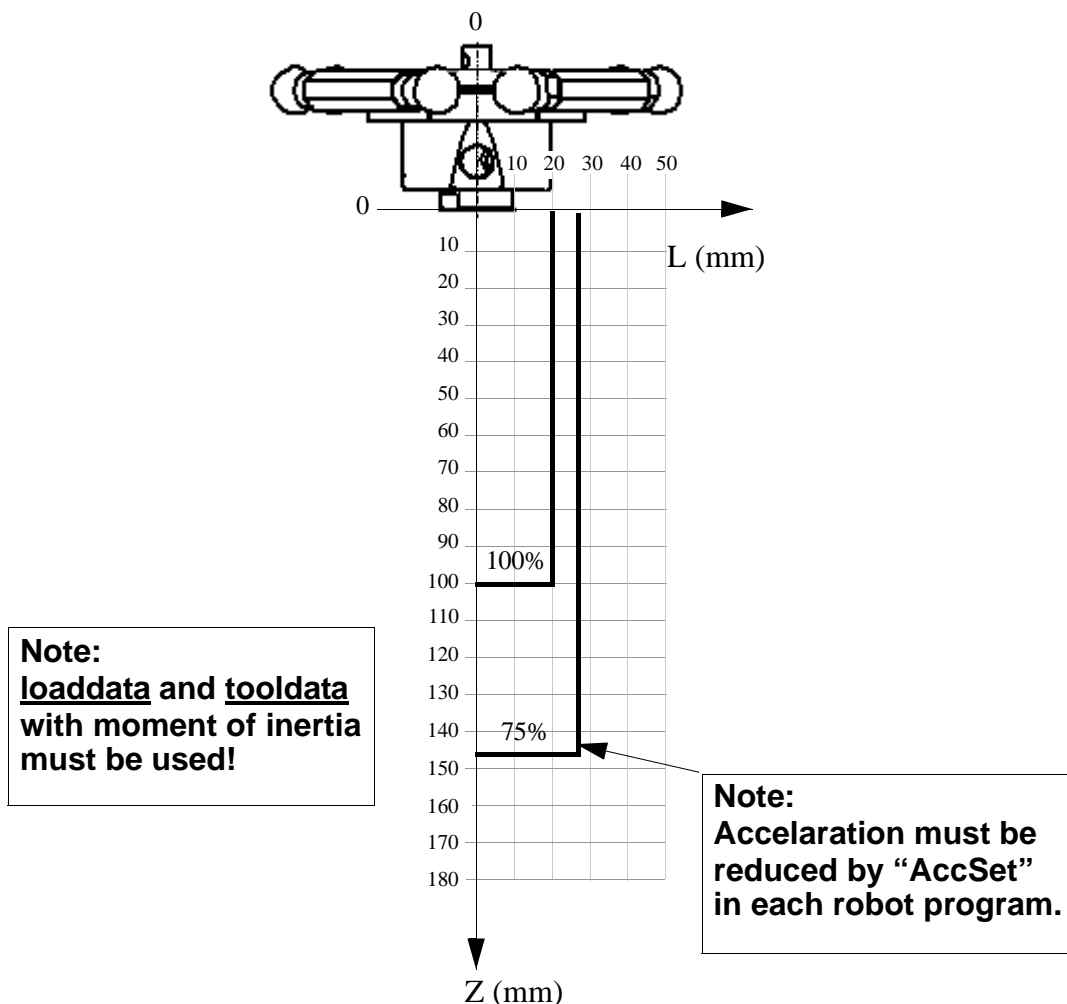
No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 8 Maximum weight permitted for load (500 g) mounting on the mounting flange at different positions (centre of gravity).

Description

> **Note** The weight permitted for loads includes grippers etc.

IRB 340, IRB 340 SA and 340 SAS
Load 750 g

Note:
loaddata and tooldata with moment of inertia must be used!

Note:
Accelaration must be reduced by "AccSet" in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.
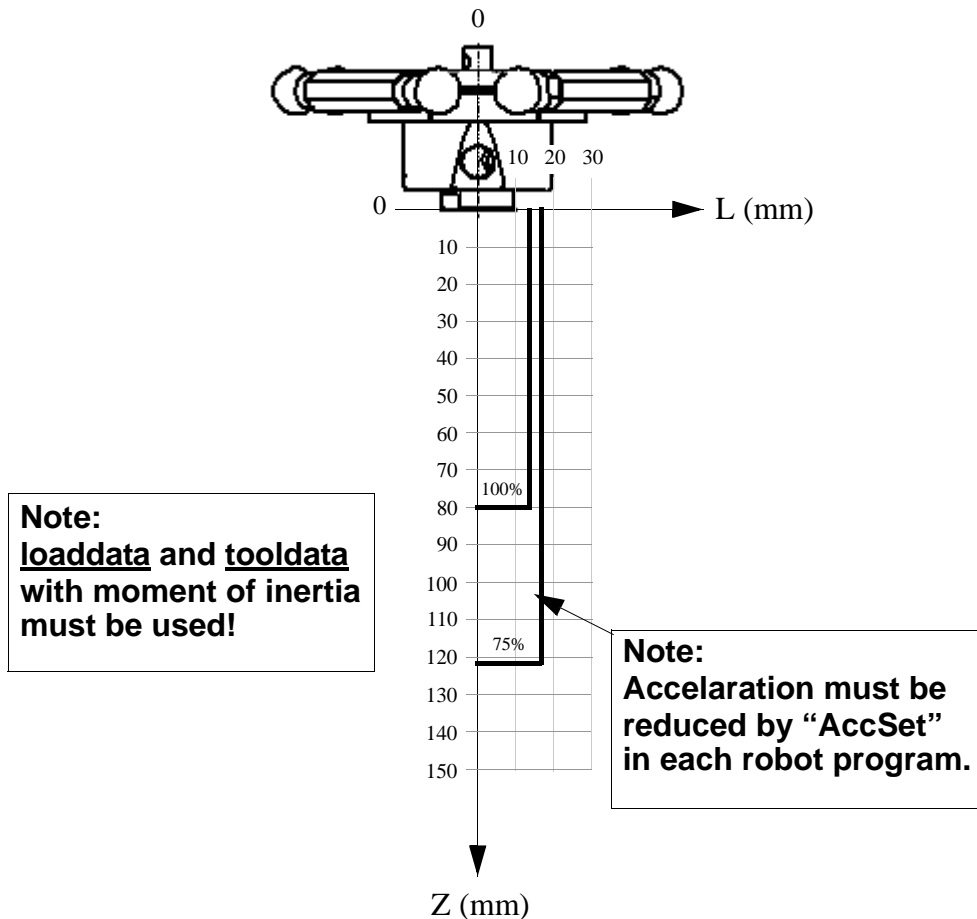
For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

> *Figure 9 Maximum weight permitted for load (750 g) mounting on the mounting flange at different positions (centre of gravity).*

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 1000 g

Note:
loaddata and **tooldata**
with moment of inertia
must be used!

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).
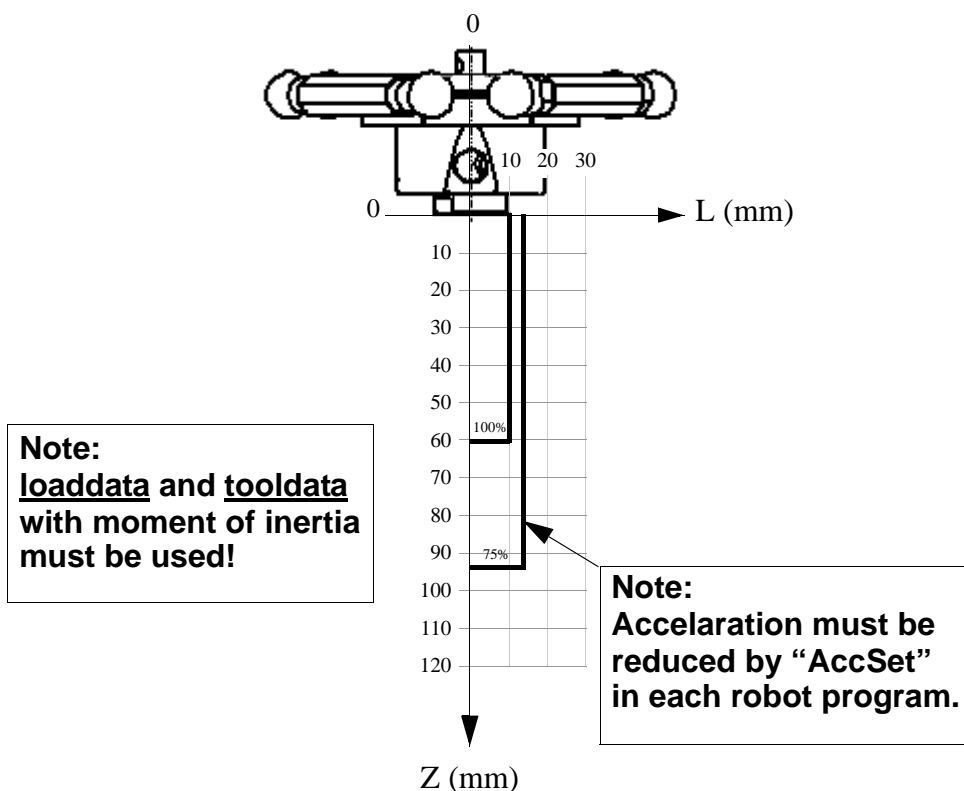
No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance $Jo \leq 8,3 \times 10^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 10 Maximum weight permitted for load (1000 g) mounting on the mounting flange at different positions (centre of gravity).

Description

Note The weight permitted for loads includes grippers etc.

IRB 340/2, 340 SA/2 and 340 SAS/2
Load 2000 g

Note:
loaddata and **tooldata** with moment of inertia must be used!

Note:
Accelaration must be reduced by "AccSet" in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
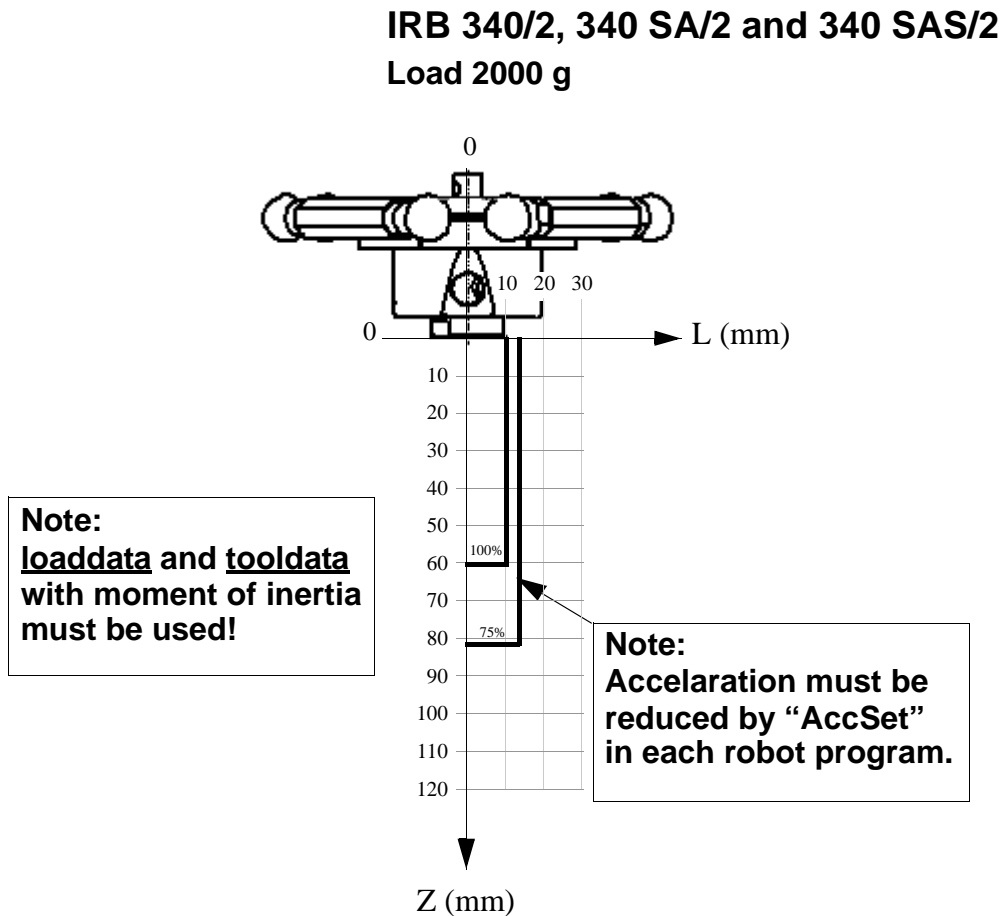tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance $Jo \leq 13{,}8 \times 10^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 11 Maximum weight permitted for load (2000 g) mounting on the mounting flange at different positions (centre of gravity).

Maximum Pressure Force

Maximum pressure force in X, Y and Z-direction is allowed to be 100 N.
Maximum torque of axis 4 = 1Nm.

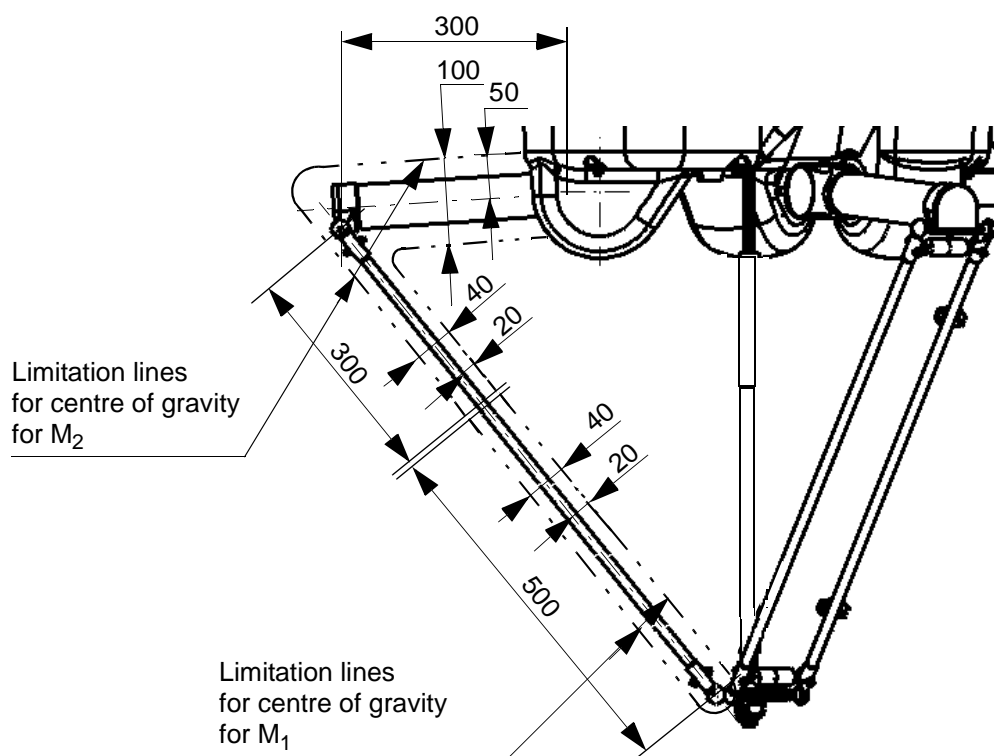**Extra equipment mounted on the manipulator arms**

Figure 12 Definition of extra load on robot arms (measures in mm).

The robot is tuned for the vacuum system (option 218-9) or medium hose
(option 174-2). If one of these options is used no extra load should be defined.

If neither the vacuum system nor the medium hose is chosen:

- and both M_1 and M_2 are less than 175 g each, the robot can run with full
performance and no extra load should be defined

- and M_1 is more than 175 g, an extra load should be defined in the load
definition. The extra load should be M_1-175 g.
Maximum extra load allowed is 175 g (M_1 max = 350 g)

- and M_2 is more than 175 g, an extra load should be defined in the load
definition. The extra load should be M_2-175 g.
Maximum extra load allowed is 175 g (M_2 max = 350 g)

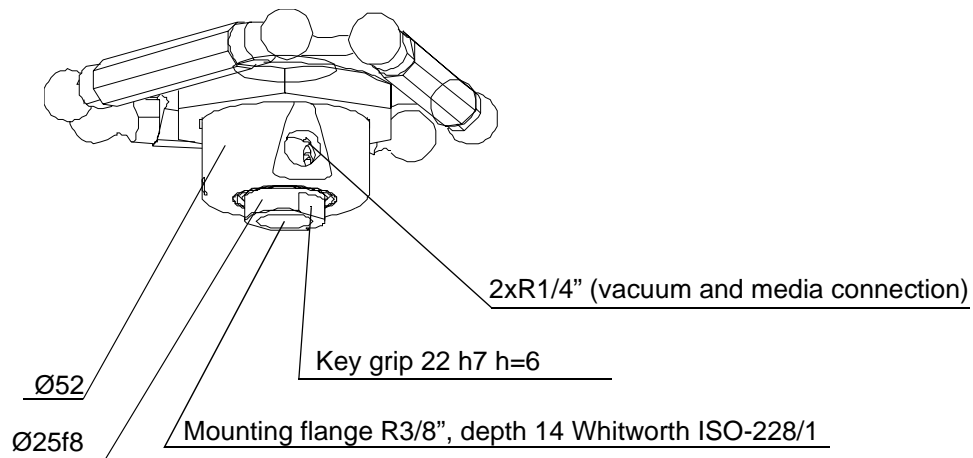The extra load should be defined in TCP 0.

Description

2xR1/4" (vacuum and media connection)

Key grip 22 h7 h=6

Ø52

Ø25f8

Mounting flange R3/8", depth 14 Whitworth ISO-228/1

Figure 13 The mechanical interface (mounting flange), dimensions in mm.

1.4 Maintenance and Troubleshooting

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

- Maintenance-free AC motors are used.

- Oil is used for the gear boxes.

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

The maintenance intervals depends on the use of the robot. For detailed information on maintenance procedures, see the Maintenance section in the Product Manual.

Description

1.5 Robot Motion

The extreme positions of robot arm is shown in Figure 15

860

250

Maximum working space inside cylinder.
Working space can be reduced in x-y-z coordinates

Marked area =
an example of restricted working space

Base coordinate system

Axis 3

R 566

Axis 1

X

Y

Axis 2

The numbers of the axes are marked
at the bottom of the clamping surface respectively

Figure 14 Working space of IRB 340 (dimensions in mm).

Description

Figure 15 The extreme positions of robot arms.

Extreme values of arm angles:
Position P1 U = 100° V = 95,5° W = 134,5°
Position P2 U = -46,1° V = -50,6° W = 43,9°
Angles defined according to figure
Mechanical stop: When angle V= -57° mechanical stop is reached.

Performance according to ISO 9283

At rated load and 0,8 m/s velocity on the inclined ISO test plane with all four robot axes in motion.

Tabell 1

Type of ISO test	At 0,1 kg pay-load	At 1,0 kg pay-load
Pose accuracy, AP (mm)	0,04	0,08
Pose repeatability, RP (mm)	0,07	0,07
Pose stabilization time, Pst (s)	0,05	0,03
Path accuracy, T (mm)	1,0	0,79
Path repeatability, RT (mm)	0,24	0,25

The values at 2,0 kg pay-load are not yet available.

Backlash axis 4:
Standard: 0,4^o
WashDown: 1,5^o

The above values are the range of average test results from a number of robots. When guaranteed values are required, please contact your nearest ABB office.
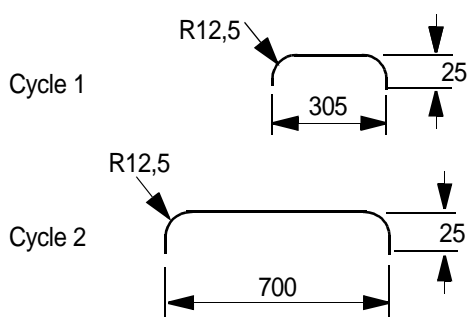
Velocity

Direction x, y, z   10 m/s
θ 3600 ^{o}/s

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

Acceleration

	IRB 340, SA, SAS	IRB 340/2, SA/2, SAS/2
x, y, z	100 m/s^2	60 m/s^2
θ	1200 rad/s^2	720 rad/s^2

Typical cycle times

Approx.cycle times	IRB 340, SA, SAS		IRB 340/2, SA/2, SAS/2
	0,1 kg	1,0 kg	2,0 kg
Cycle 1	0,33 s	0,38 s	0,65 s
Cycle 2	0,44 s	0,55 s	0,83 s

Cycle time data can be changed without notice.

Description

1 Description

1.1 Structure

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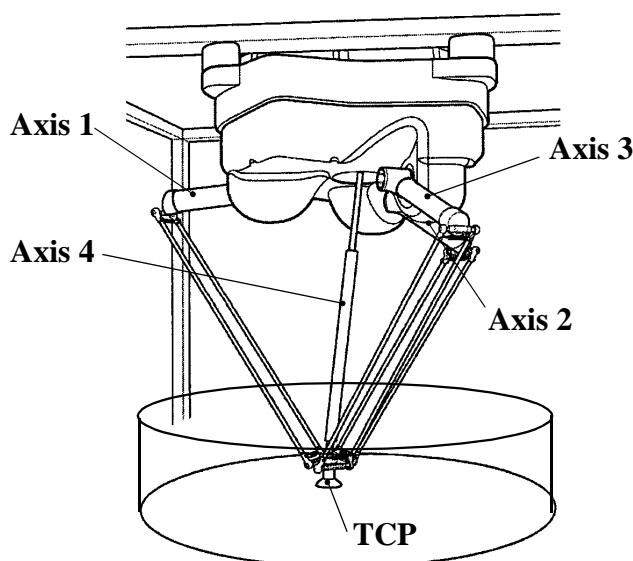See Product Specification PickMaster/PickWare.

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Airborne noise level:

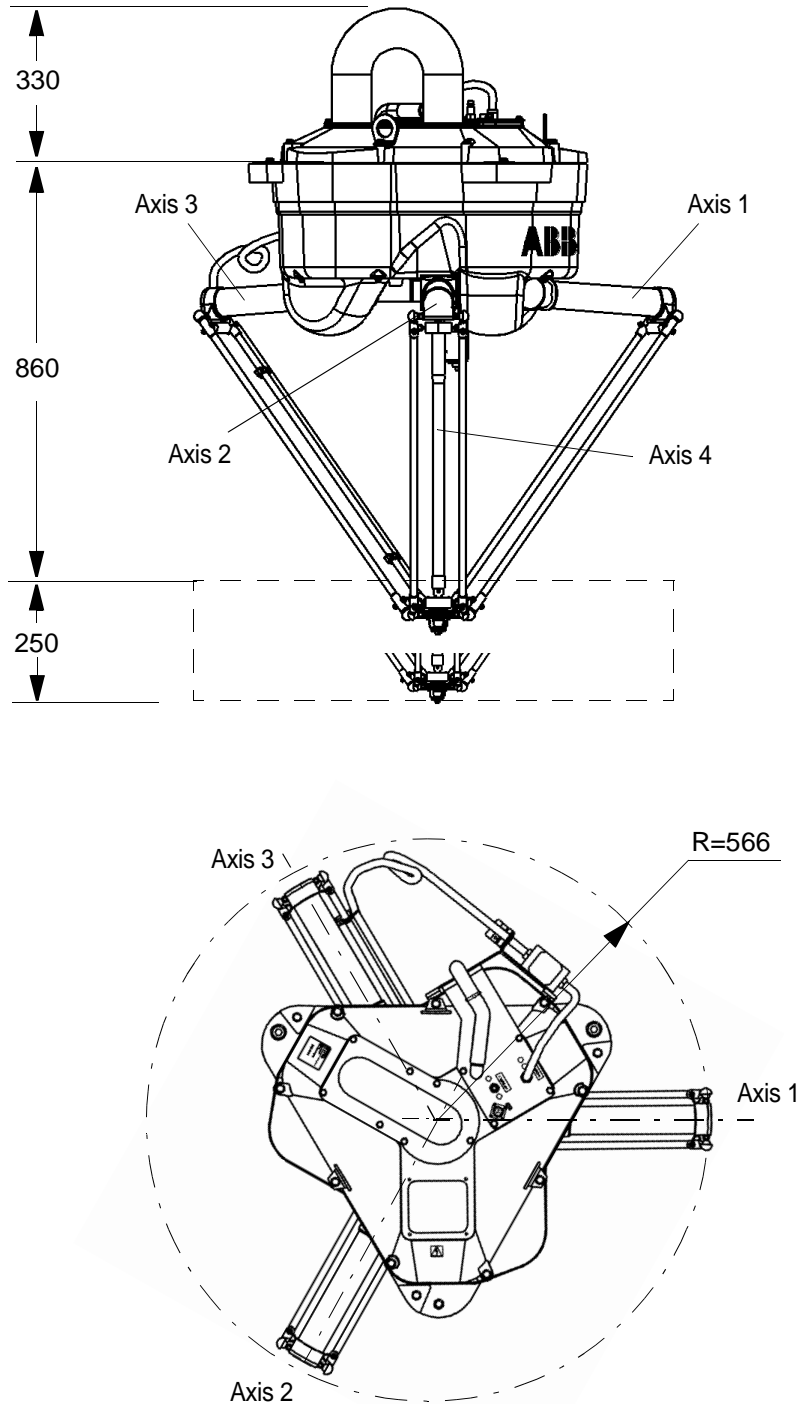| The sound pressure level outside the working space	< 70 dB (A) Leq (acc. to Machinery directive 89/392 EEC)

Figure 2 Views of the manipulator in the standard version (dimensions in mm).
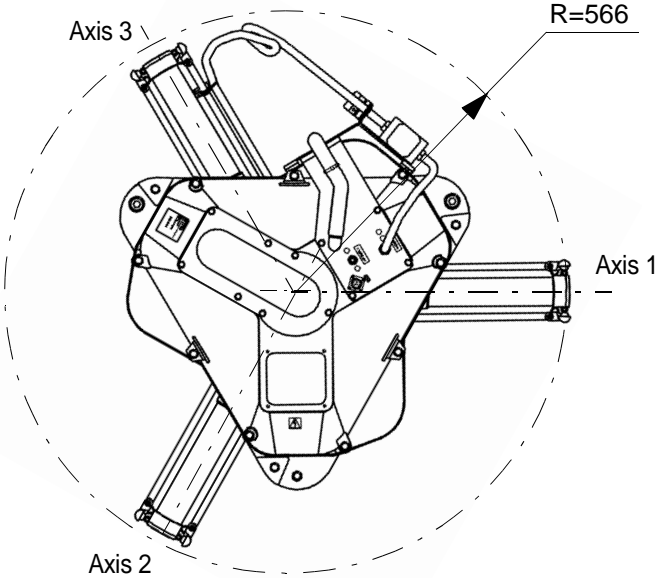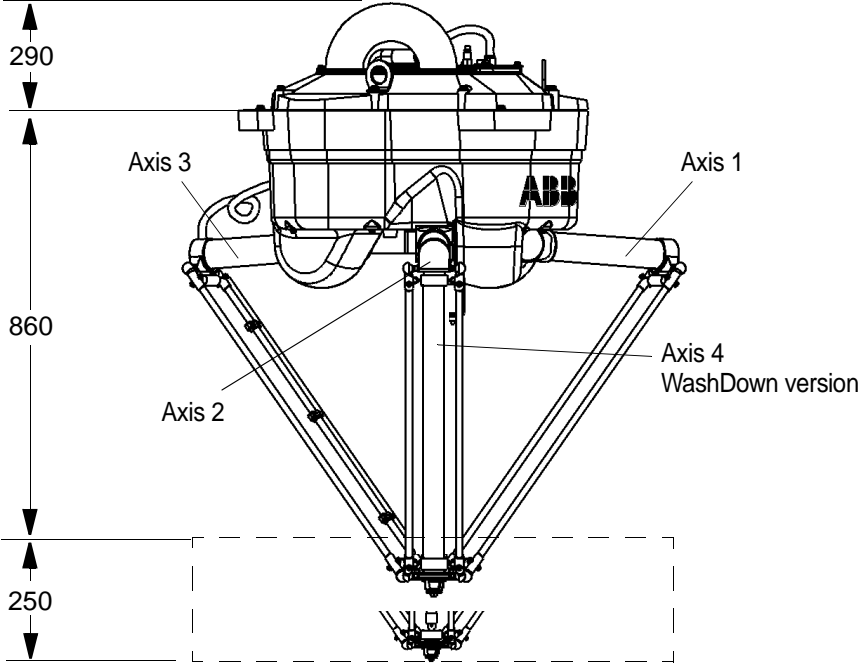
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Figure 3 Views of the manipulator in the WashDown version (dimensions in mm).

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Selecting the operating mode
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Reduced speed
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Three position enabling device
The enabling device on the teach pendant must be used to move the robot when in manual mode. The enabling device consists of a switch with three positions, meaning that all robot movements stop when either the enabling device is pushed fully in, or when it is released completely. This makes the robot safer to operate.

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As an option, the robot can be equipped with a safety lamp. This is activated when the motors are in the MOTORS ON state.

WashDown Statement
All components have been found to comply with USDA/FDA, Code of Federal Regulations Title 21 regarding choice of material, material behaviour, and sanitary operations. (Relevant chapters of CFR are part 100-199). The intended use is incidental food contact. Any gripper to be used has to be investigated separately.

1.3 Installation

Depending on robot version an end effector of max weight 1 to 2 kg including payload, can be mounted on the robot's mounting flange. See Load diagrams on page 11. Other equipment, such as a hose, can be mounted on the upper and lower arm, max weight 300 g/m. See Extra equipment mounted on the manipulator arms on page 17.

Operating requirements

Protection standards	IEC529

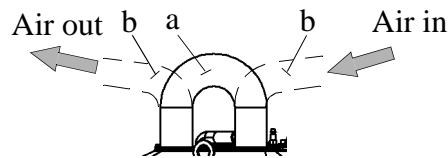|	
Manipulator IRB 340, IRB 340/2	IP55
Manipulator IRB 340 SA, IRB 340 SA/2	IP67
Manipulator IRB 340 SAS, IRB 340 SAS/2	IP67

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

Ambient temperature

Manipulator during operation +5°C (41°F) to +52°C (125°F)
Complete robot during transportation and storage -25°C (13°F) to +55°C (131°F)

Note If the robot operates in low temperature or temperature >+35°C, the air flow, generated by the internal fan, is recommended to be evacuated. Hard environment and a lot of starts and stops may cause condensation inside the base and requires external air to keep the base dry.

The standard version requires the short cut hose (a) to be replaced by external hoses (b). For the WashDown version option 12-1, plate for external air circulation, replaces the plate for internal air.

Relative humidity

Complete robot during transportation and storage Max. 95% at constant temperature
Complete robot during operation Max. 95% at constant temperature

Mounting the manipulator

Maximum force in each fixing points is 500 N referring to the z-direction in the base coordinate system.

Robot frame is not included in the delivery.

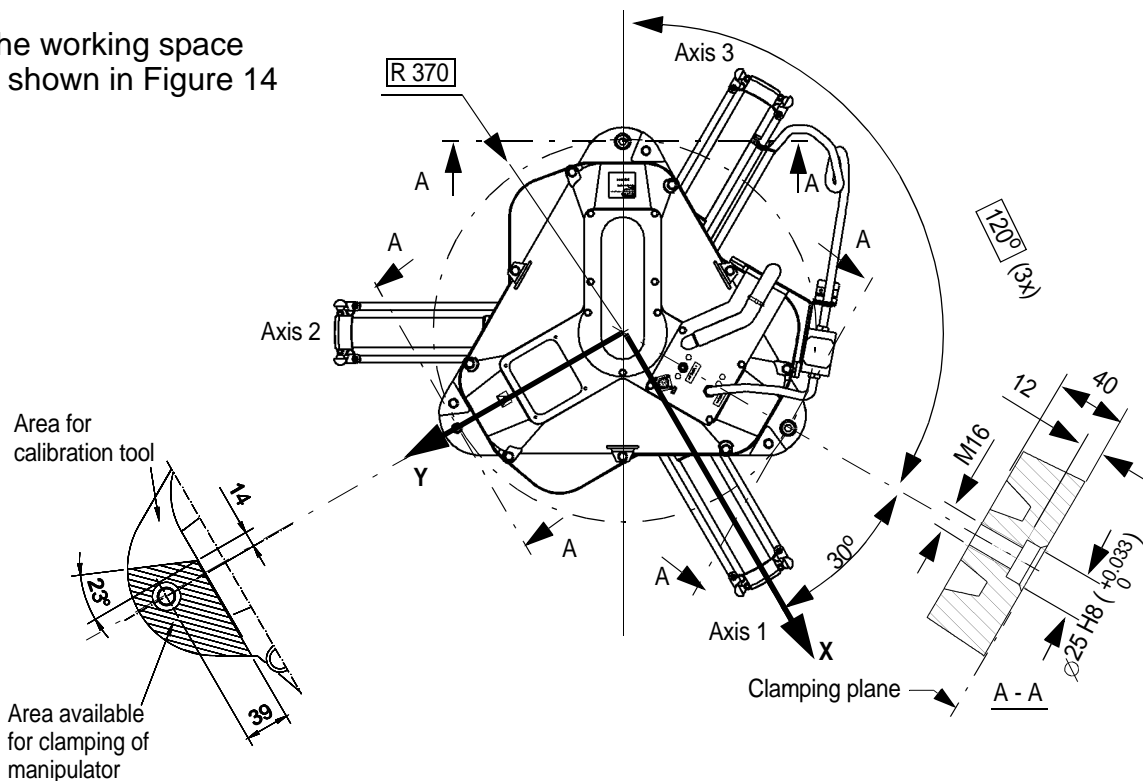Required stiffness of frame: Lowest natural frequency of frame with robot > 17 Hz.

Figure 4 Hole configuration (dimensions in mm).

Description

Two guiding pins are enough fore fastening the robot. The corresponding holes in the frame can be, on circular and one oval according to Figure 5.
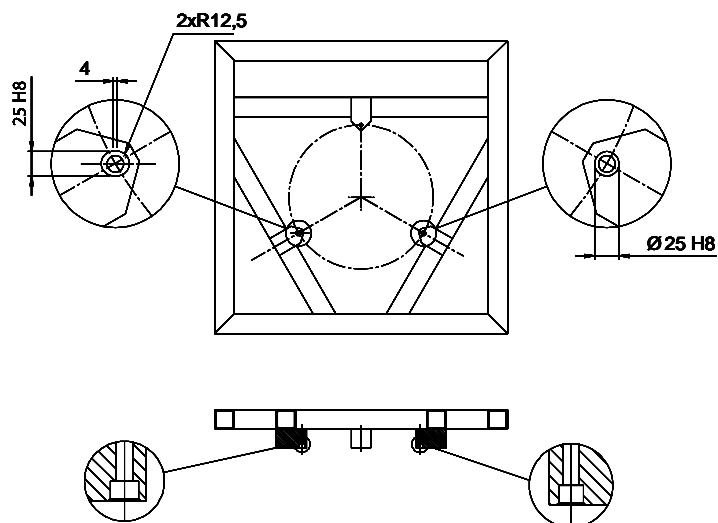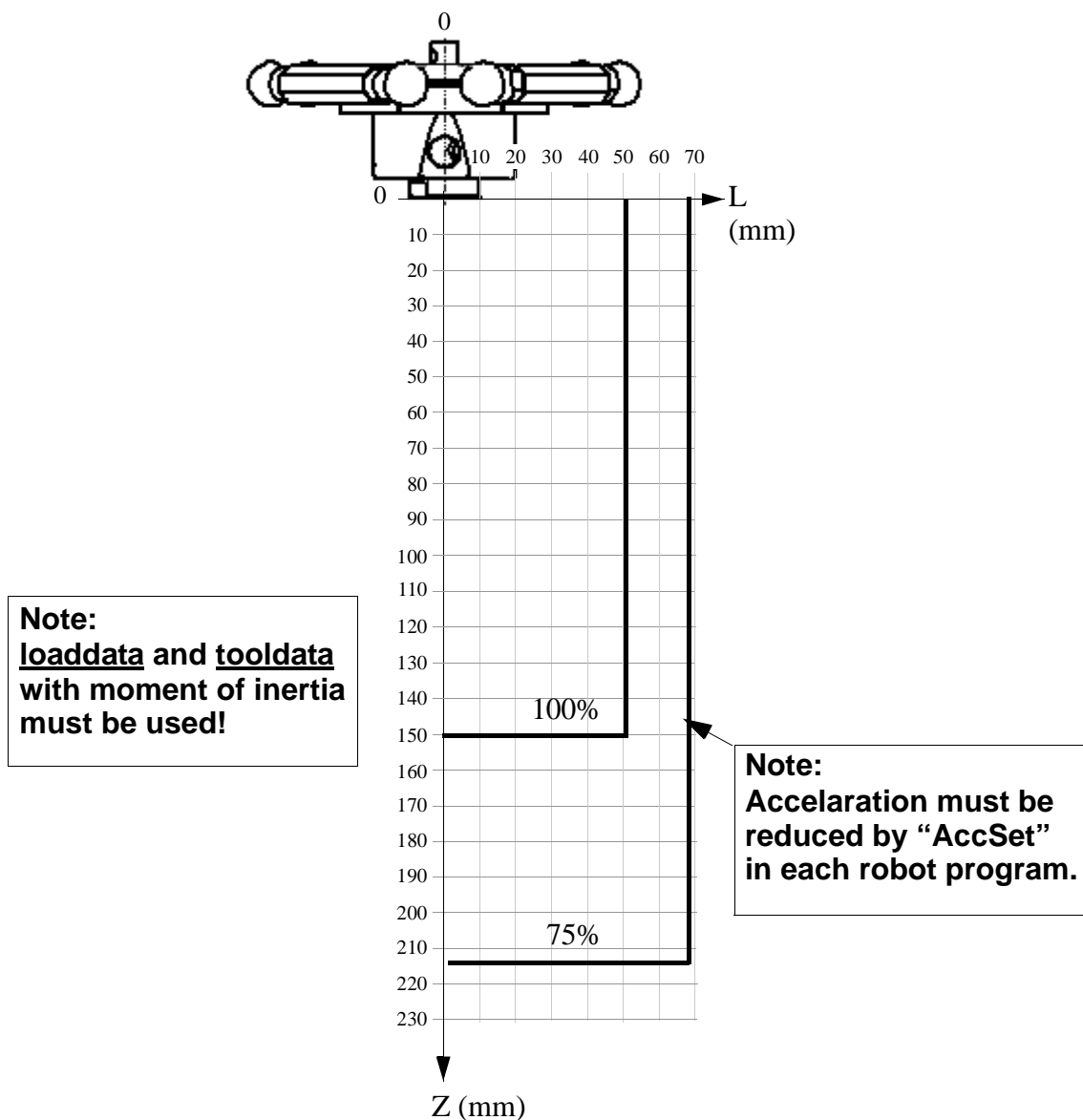

Figure 5 Example of fastening the manipulator(dimensions in mm).

Load diagrams

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 100 g

Note:
loaddata and **tooldata**
with moment of inertia
must be used!

100%

75%

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z (mm)

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.
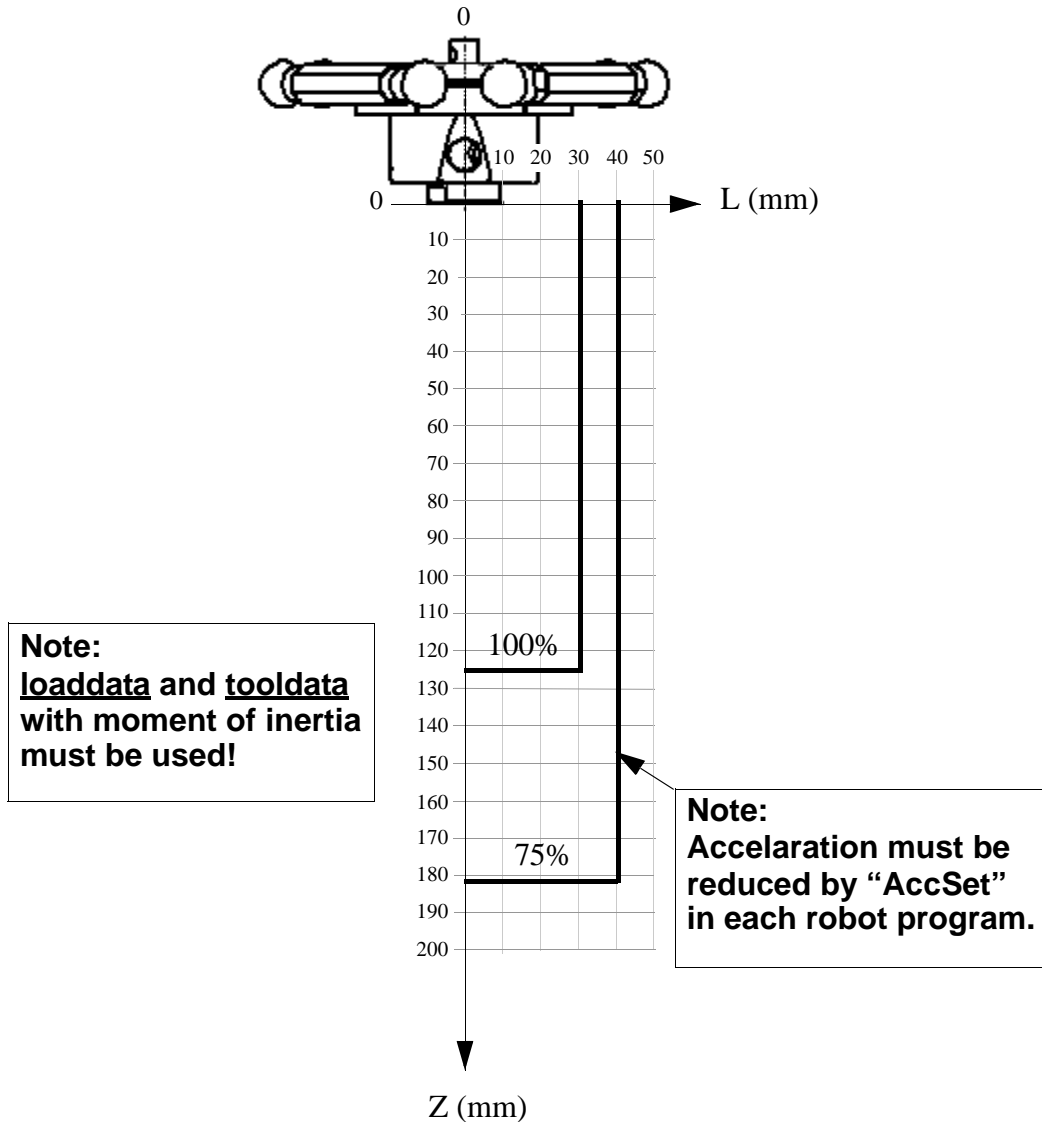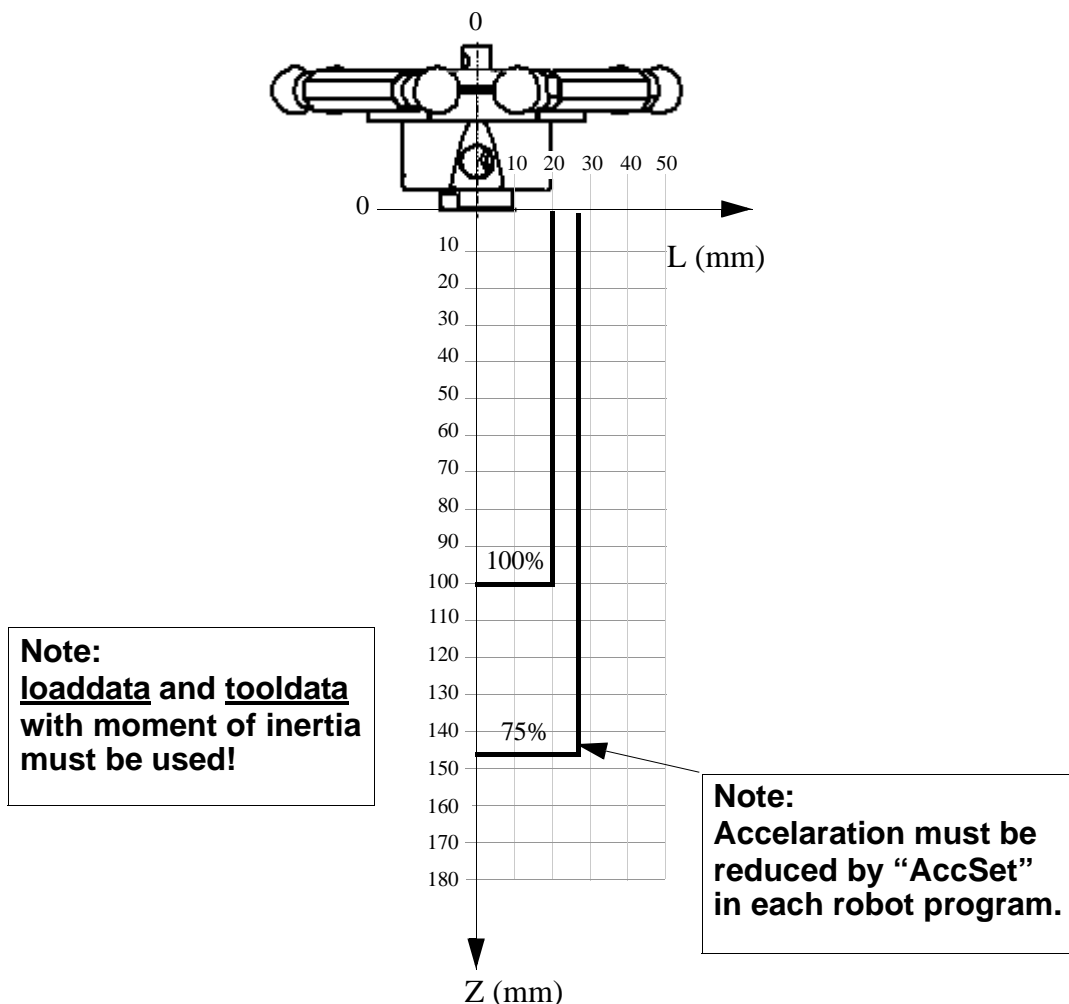
For max acc performance $Jo \leq 8,3 \times 10^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 6 Maximum weight permitted for load (100 g) mounting on the mounting flange at different positions (centre of gravity).

Description

   Note   The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 300 g

Note:
loaddata and **tooldata**
with moment of inertia
must be used!

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 7 Maximum weight permitted for load (300 g) mounting on the mounting flange at different positions (centre of gravity).

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 500 g

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.
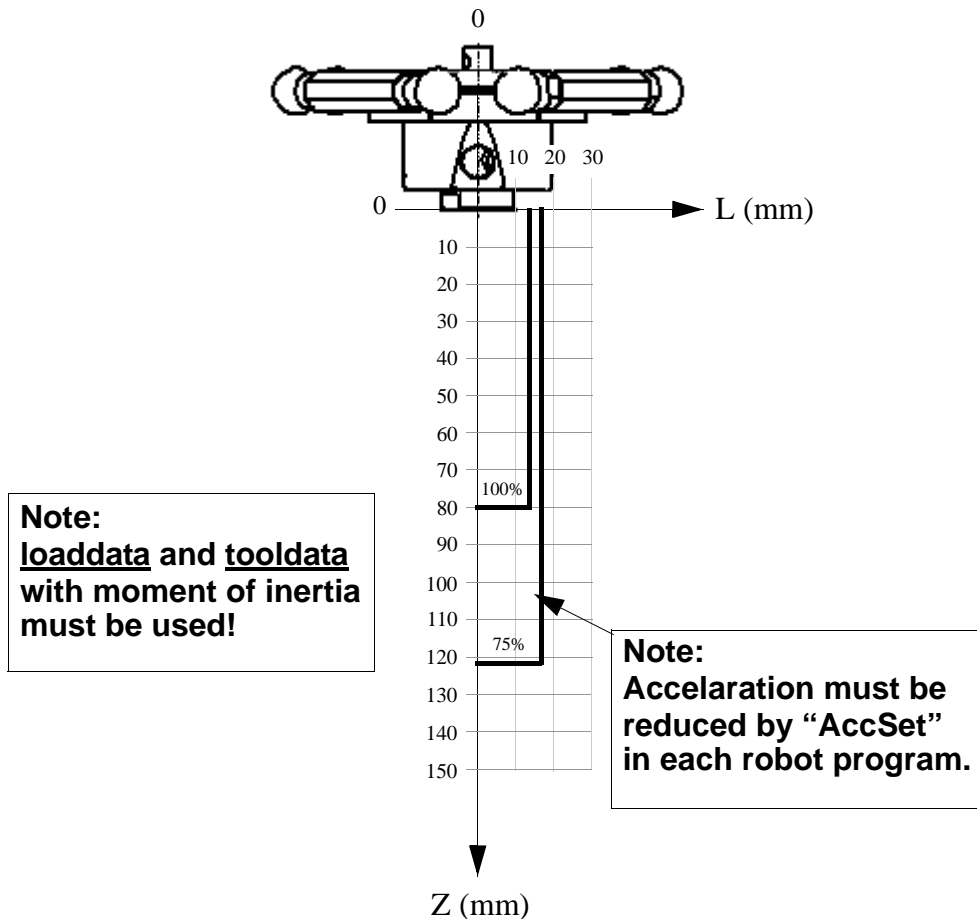
For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 8 Maximum weight permitted for load (500 g) mounting on the mounting flange at different positions (centre of gravity).

Description

Note The weight permitted for loads includes grippers etc.

IRB 340, IRB 340 SA and 340 SAS
Load 750 g

> **Note:**
> **loaddata** and **tooldata**
> **with moment of inertia**
> **must be used!**

> **Note:**
> **Accelaration must be**
> **reduced by "AccSet"**
> **in each robot program.**

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).
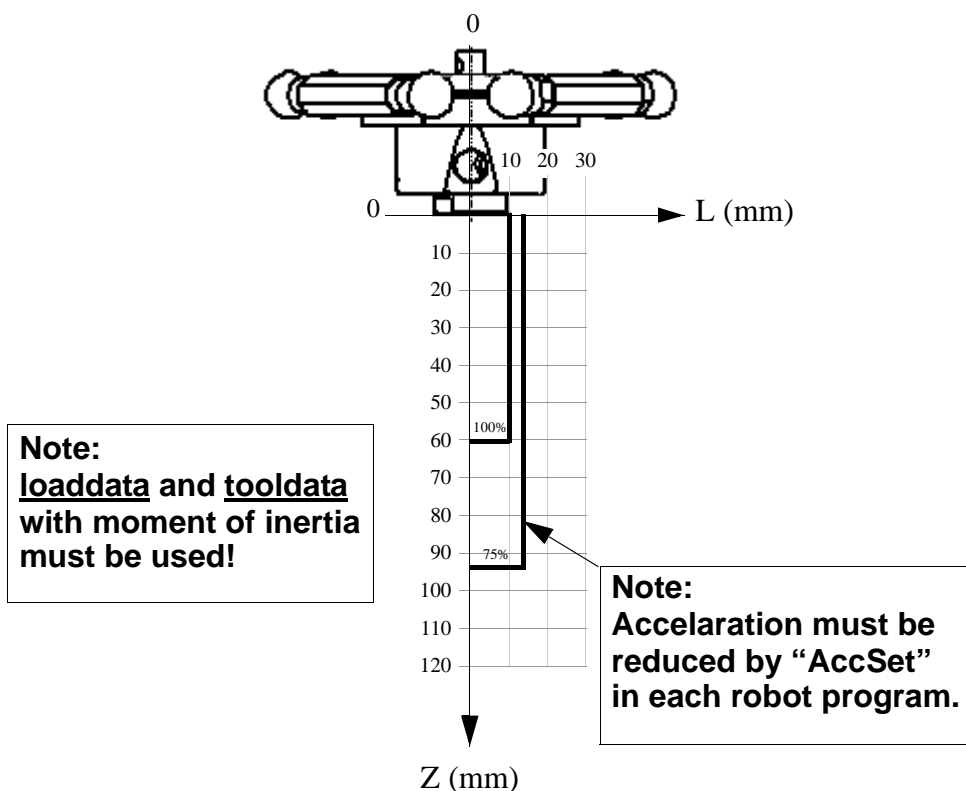
No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 9 Maximum weight permitted for load (750 g) mounting on the mounting flange at different positions (centre of gravity).

Product Specification IRB 340 M2000

Note The weight permitted for loads includes grippers etc.

IRB 340, 340 SA and 340 SAS
Load 1000 g

Note:
loaddata and tooldata
with moment of inertia
must be used!

Note:
Accelaration must be
reduced by "AccSet"
in each robot program.

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).
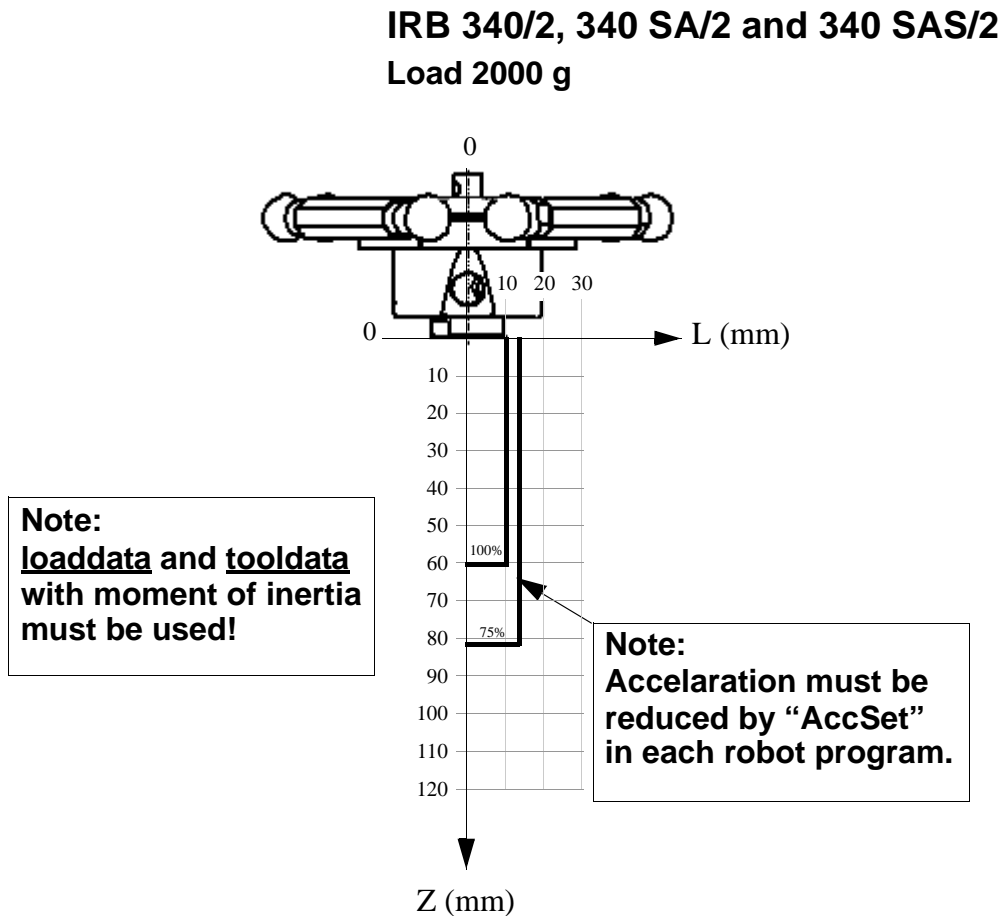
No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance Jo $\leq$ 8,3 x 10^{-4} kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 10 Maximum weight permitted for load (1000 g) mounting on the mounting flange at different positions (centre of gravity).

Description

Note The weight permitted for loads includes grippers etc.

IRB 340/2, 340 SA/2 and 340 SAS/2
Load 2000 g

> **Note:**
> **loaddata** and **tooldata**
> **with moment of inertia**
> **must be used!**

> **Note:**
> **Accelaration must be**
> **reduced by "AccSet"**
> **in each robot program.**

Z = See the above diagram and the coordinate system in Product Specification S4Cplus.
L = Distance in X-Y plane from Z-axis to the mass centre of gravity of the load.

Loads with mass centre of gravity outside the 100% performance curve can be used with reduced acceleration, see 75% performance curves. The performance must be reduced manually by using the RAPID instruction "AccSet" in the robot program.

loaddata Weight on the gripper (kg). The centre of gravity of the gripper (mm). The moment of inertia of the gripper (kgm^2).
tooldata Weight of the product (kg). The centre of gravity of the product (mm). The mnoment of inertia of the product (kgm^2).

No value or wrong value may damage the robot. For more information see RAPID Reference Manual.

For max acc performance $Jo \leq 13,8 \times 10^{-4}$ kgm^2. Jo= own moment of inertia of the total handle weight.

Figure 11 Maximum weight permitted for load (2000 g) mounting on the mounting flange at different positions (centre of gravity).

Maximum Pressure Force

Maximum pressure force in X, Y and Z-direction is allowed to be 100 N.
Maximum torque of axis 4 = 1Nm.

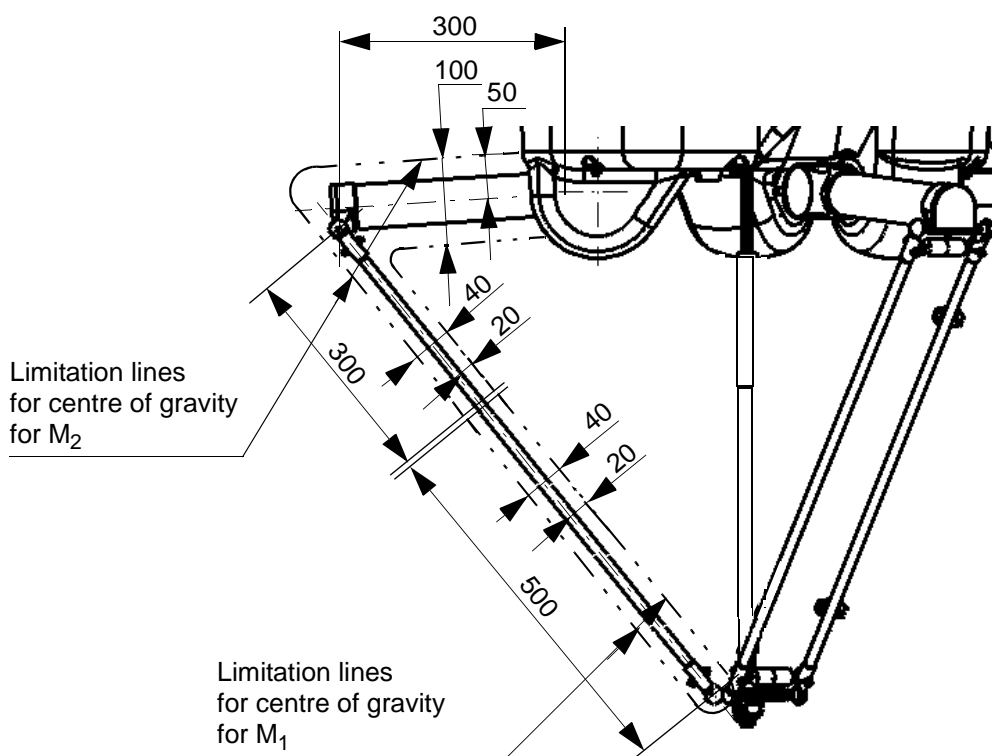**Extra equipment mounted on the manipulator arms**

Figure 12 Definition of extra load on robot arms (measures in mm).

The robot is tuned for the vacuum system (option 218-9) or medium hose (option 174-2). If one of these options is used no extra load should be defined.

If neither the vacuum system nor the medium hose is chosen:
- and both M_1 and M_2 are less than 175 g each, the robot can run with full performance and no extra load should be defined

- and M_1 is more than 175 g, an extra load should be defined in the load definition. The extra load should be $M_1 - 175$ g.
Maximum extra load allowed is 175 g (M_1 max = 350 g)

- and M_2 is more than 175 g, an extra load should be defined in the load definition. The extra load should be $M_2 - 175$ g.
Maximum extra load allowed is 175 g (M_2 max = 350 g)

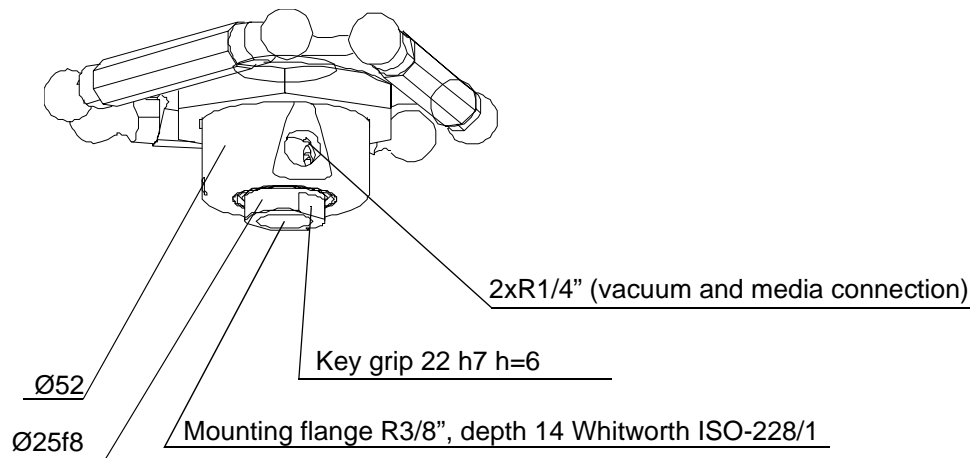The extra load should be defined in TCP 0.

Description

2xR1/4" (vacuum and media connection)

Key grip 22 h7 h=6

Ø52

Ø25f8

Mounting flange R3/8", depth 14 Whitworth ISO-228/1

Figure 13 The mechanical interface (mounting flange), dimensions in mm.

1.4 Maintenance and Troubleshooting

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

- Maintenance-free AC motors are used.

- Oil is used for the gear boxes.

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

The maintenance intervals depends on the use of the robot. For detailed information on maintenance procedures, see the Maintenance section in the Product Manual.
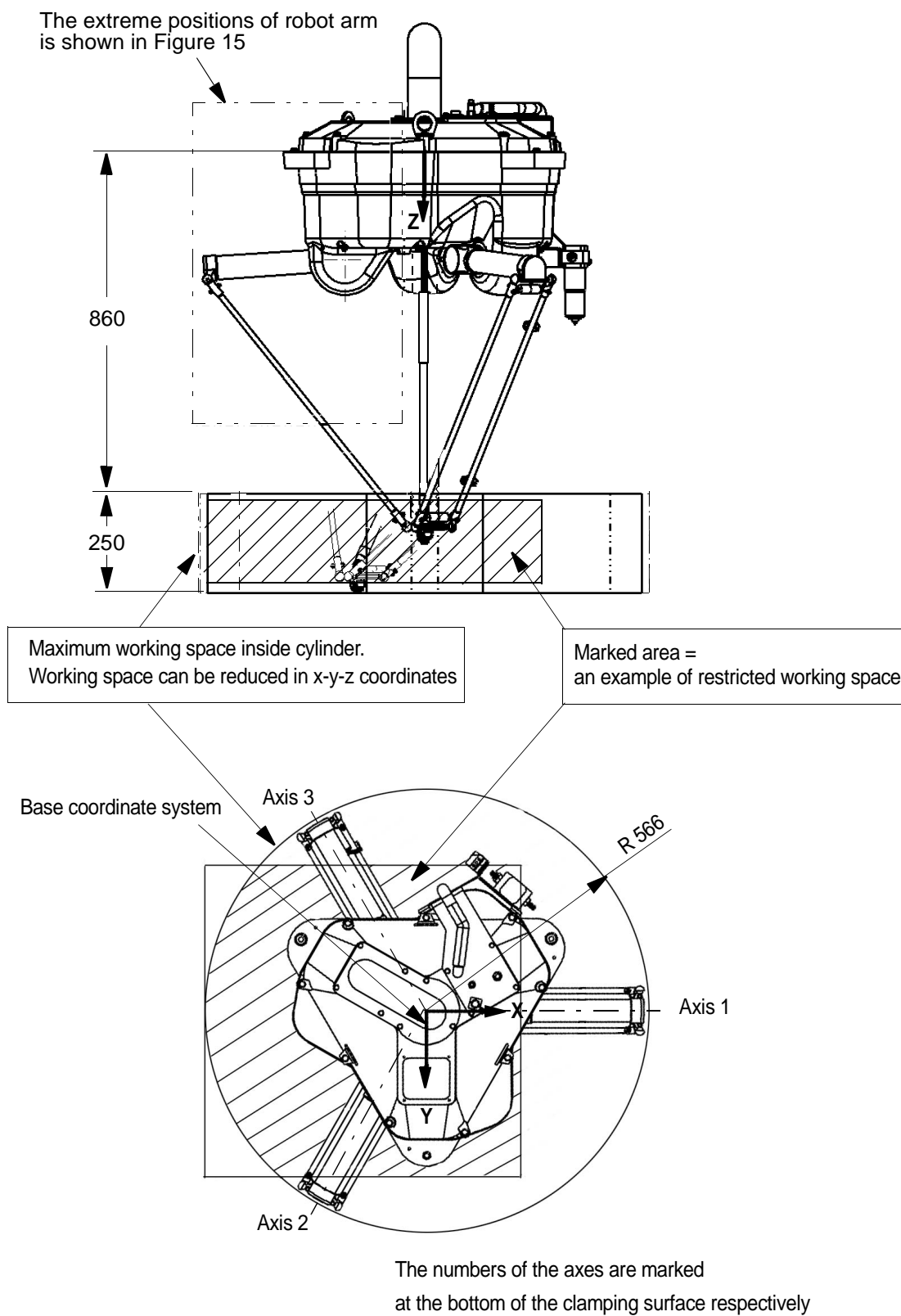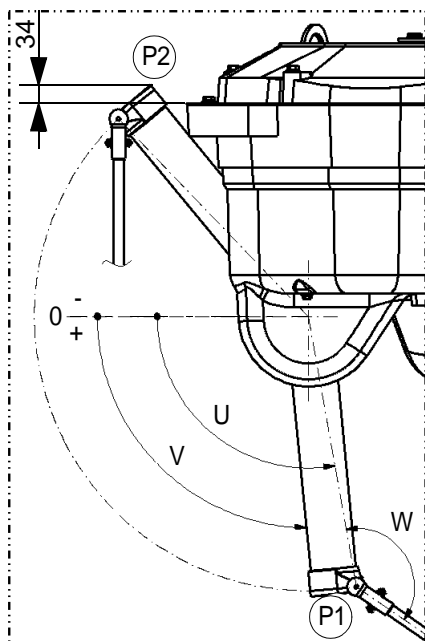
1.5 Robot Motion

The extreme positions of robot arm
is shown in Figure 15

860

250

Maximum working space inside cylinder.
Working space can be reduced in x-y-z coordinates

Marked area =
an example of restricted working space

Base coordinate system

Axis 3

R 566

X

Axis 1

Y

Axis 2

The numbers of the axes are marked

at the bottom of the clamping surface respectively

Figure 14 Working space of IRB 340 (dimensions in mm).

Description

Figure 15 The extreme positions of robot arms.

Extreme values of arm angles:

Position P1
U = 100°
V = 95,5°
W = 134,5°

Position P2
U = -46,1°
V = -50,6°
W = 43,9°

Angles defined according to figure

Mechanical stop:
When angle V= -57° mechanical stop is reached.

Performance according to ISO 9283

At rated load and 0,8 m/s velocity on the inclined ISO test plane with all four robot axes in motion.

Tabell 1

Type of ISO test	At 0,1 kg pay-load	At 1,0 kg pay-load
Pose accuracy, AP (mm)	0,04	0,08
Pose repeatability, RP (mm)	0,07	0,07
Pose stabilization time, Pst (s)	0,05	0,03
Path accuracy, T (mm)	1,0	0,79
Path repeatability, RT (mm)	0,24	0,25

The values at 2,0 kg pay-load are not yet available.

Backlash axis 4:
Standard: $0,4^o$
WashDown: $1,5^o$

The above values are the range of average test results from a number of robots. When guaranteed values are required, please contact your nearest ABB office.
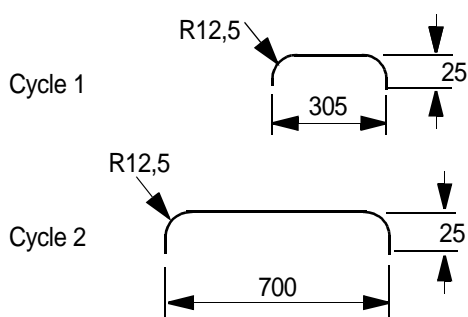
Velocity

Direction x, y, z   10 m/s
         θ $3600\ ^o$/s

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

Acceleration

	IRB 340, SA, SAS	IRB 340/2, SA/2, SAS/2
x, y, z	$100\ \text{m/s}^2$	$60\ \text{m/s}^2$
θ	$1200\ \text{rad/s}^2$	$720\ \text{rad/s}^2$

Typical cycle times

Approx.cycle times	IRB 340, SA, SAS		IRB 340/2, SA/2, SAS/2
	0,1 kg	1,0 kg	2,0 kg
Cycle 1	0,33 s	0,38 s	0,65 s
Cycle 2	0,44 s	0,55 s	0,83 s

Cycle time data can be changed without notice.

Description

2 Specification of Variants and Options

The different variants and options for the IRB 340 are described below.
The same numbers are used here as in the Specification form.
For software options, see Product Specification S4Cplus and Product Specification RobotWare Options.

1 MANIPULATOR

435-33　IRB 340
435-34　IRB 340 SA WashDown
435-35　IRB 340 WashDown Stainless
435-47　IRB 340/2
435-48　IRB 340 SA/2 WashDown
435-49　IRB 340 SAS/2 WashDown Stainless

APPLICATION INTERFACE

Media outlet

218-5　Signals and Power
The customer signal and power are connected directly to the robot base to one FCI 12-pin UT001412SHT (R2.CP) and one FCI 23-pin UT001823SHT (R2.CS) connector. The cable between manipulator and controller is included.
The signal and power are connected to one 12-pole screw terminal in the controller.

218-9　Vacuum System
An integrated vacuum system for picking of products with suction-cups.
The system includes ejector, valves, filter and hose (D=15/10) to tool point.
The system has three signals: grip, drop and vacuum level guard.

Connection of signals and power

The vacuum system

The ejector is of venturi principle and needs:
air supply: 4-6 bar,
air quality: dry and clean,
maximum particle size 5 μm
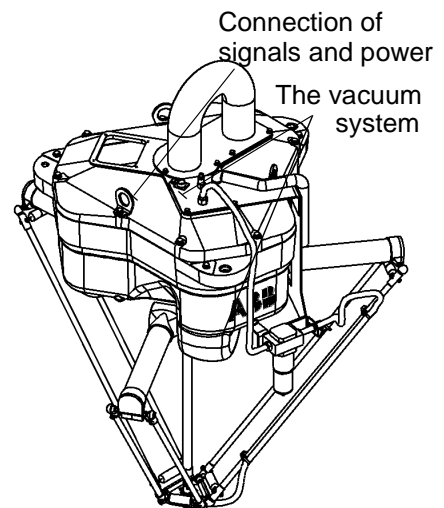air consumption: 270-380 l/min,
vacuum level: max −0.9 bar,
ejector capacity:　39 l/min −0.7 bar
　　　　　　　　180 l/min −0.3 bar

The signal cable between the manipulator and the controller is included. The cable is connected to one 12-pole screw terminal in the controller.

Note　　Only one of 218-5 and 218-9 can be selected.

Hose to tool point
Not available together with option 218-9 (hose included)

174-2   Medium hose, D = 15/10 mm
174-1   Large hose, D = 20/27 mm

Connection to cabinet (Cable lengths)

94-1   7m
94-2   15m
94-3   22m
94-4   30m

EQUIPMENT

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.

12-1   **In/outlet for external air** (only needed for WashDown version)
Plate for connecting external air into the base of the manipulator (inlet and outlet,
diameter 76 mm) for internal air circulation. Recommended for warm or cold
environments, and at the risk of getting condensation inside.

2 Specification of Variants and Options

The different variants and options for the IRB 340 are described below.
The same numbers are used here as in the Specification form.
For software options, see Product Specification S4Cplus and Product Specification
RobotWare Options.

1 MANIPULATOR

435-33 IRB 340
435-34 IRB 340 SA WashDown
435-35 IRB 340 WashDown Stainless
435-47 IRB 340/2
435-48 IRB 340 SA/2 WashDown
435-49 IRB 340 SAS/2 WashDown Stainless

APPLICATION INTERFACE

Media outlet

218-5 Signals and Power
The customer signal and power are connected directly to the robot base to one
FCI 12-pin UT001412SHT (R2.CP) and one FCI 23-pin UT001823SHT (R2.CS)
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The ejector is of venturi principle and needs:
air supply: 4-6 bar,
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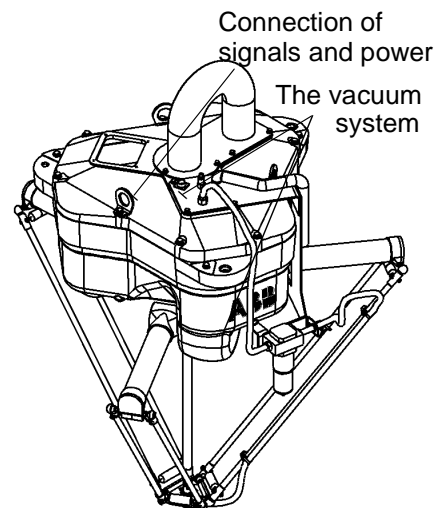air consumption: 270-380 l/min,
vacuum level: max -0.9 bar,
ejector capacity: 39 l/min -0.7 bar
                 180 l/min -0.3 bar

The signal cable between the manipulator and the controller is included. The cable
is connected to one 12-pole screw terminal in the controller.

Note   Only one of 218-5 and 218-9 can be selected.

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environments, and at the risk of getting condensation inside.

3 Accessories

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

Basic software and software options for robot and PC

For more information, see Product Specification S4Cplus, and Product Specification RobotWare Options.

PickMaster and Vision system

For more information, see PickMaster Product Specification and PickMaster User's Guide.

Accessories

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Accessories

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4 Index

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