Product specification

IRT 710 OmniCore

Product specification

IRT 710

OmniCore

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Revision: A

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Original instructions.

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Overview of this specification

About this product specification

This product specification describes the performance of the track motion or a complete family of track motion in terms of:

- The structure and dimensional prints
- The fulfilment of standards, safety, and operating equipment
- The mounting or extra equipment and the motio
- The specification of available variants and options

The specification covers the track motion using the OmniCore controller. And all mentioned product IRB 460/IRB 660/IRB 760/IRB 5710/IRB 5720/IRB 6650S/IRB 6700/IRB 6710/IRB 6720/IRB 6730/IRB 6740/IRB 7600... are refer to OmniCore version.

References

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

Document name	Document ID
Product manual - OmniCore V400XT	*3HAC081697-001*
Product manual - OmniCore V250XT Type B	*3HAC087112-001*
Product Manual - IRT 710 OmniCore	3HKA00000213430

Revisions

Revision	Description
A	First edition

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1 Description

1.1 Structure

1.1.1 Introduction

Overview of IRT 710 OmniCore New Track Motion

The IRT 710 OmniCore is a new large modular platform for large size robots (up to IRB 7600) and handling applications.

The IRT 710 OmniCore new track motion had high degree of modularity by the following aspects:

- Different process applications
- Different robots
- Different travel length
- Optimize performance based on actual load via dynamic model
- Flexibility to add functionality or extend working range also at a later stage

Operating system

IRT 710 OmniCore is prepared for the OmniCore V250XT/V400XT 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 require the connection of IRT 710 OmniCore to the robot system and are 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 welding, communication features - network communication - and advanced functions such as multitasking, sensor control etc. For a complete description on optional software, see the *Product specification - OmniCore V line*.

Performance

IRT 710 OmniCore and its respective robot is a seven-axis dynamic model. ABB's unique QuickMove and TrueMove can be fully exploited, which means optimal movement for the robot and the track with actual load. Furthermore, path accuracy and speed are optimized.

Continues on next page

1 Description

Identification plate

> 💡 **Tip**
>
> Always try to determine if the goods are as ordered, and that the package is not damaged before unpacking.

To identify the delivery, check the identification plate and compare it to the delivery note.

The identification plates are shown in the figure.

xx2400000637

*: R represents Robot; T represents Transfer.

1.1.2 Technical data

Protection standards

Protection type	Protection class
Standard	IP65 [i]

[i] Only the electrical parts.

Explosive environments

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

Required space for installation

> **Note**
>
> The tables only give the space that the track motion itself requires. In addition there probably needs to be additional space at the ends of the track motion at the installation site. Add space as required.

Formula for carriage tracks

Required space for carriage tracks is determined with the following formula:

Required space (mm) = 1000 x N[1] + 2 x 66 + 500[2]

Dimensions

Without external cable chain

980
1000
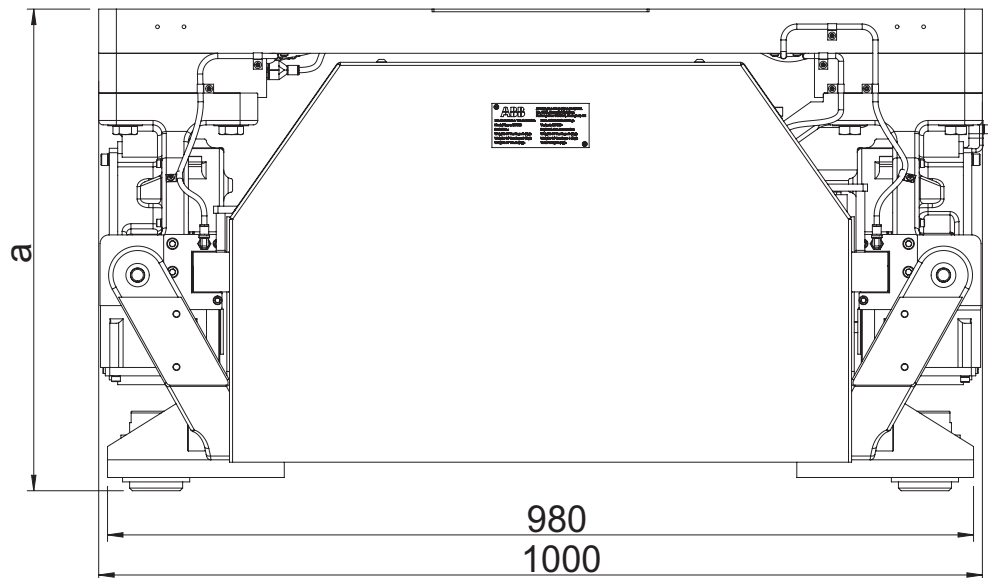
xx2200001281

[1] Value of N is equal to the number of sections.

[2] Valid if the length is N + 0.5 m

Continues on next page

Item	Description	Value
a	For IRB 4600/IRB 4400	530 mm
	For IRB 460/IRB 660/IRB 760/IRB 5710/IRB 5720/IRB 6650S/IRB 6700/IRB 6710/IRB 6720/IRB 6730/IRB 6740/IRB 7600	545 mm

With external cable chain
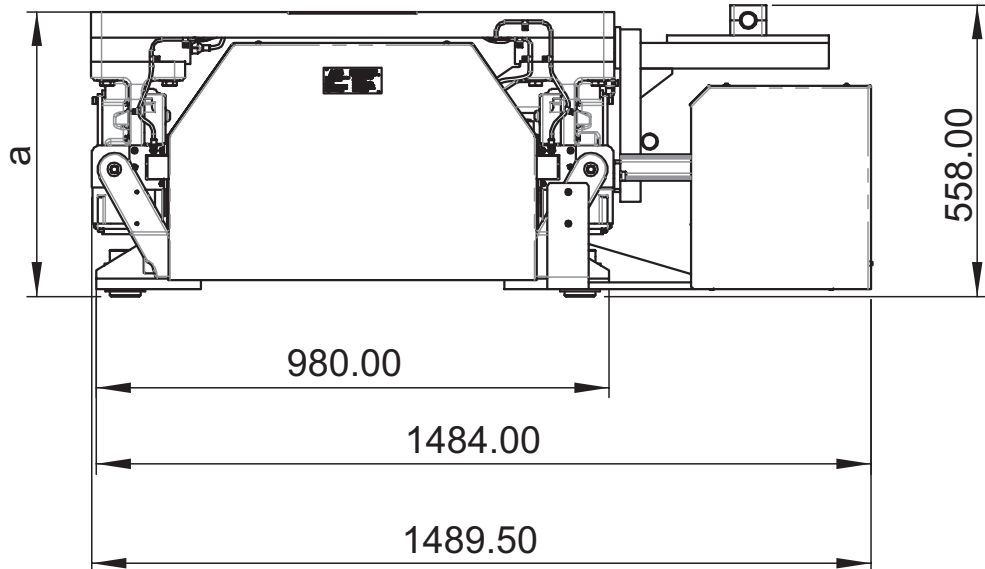
xx2200000400

Item	Description	Value
a	For IRB 4600/IRB 4400	530 mm
	For IRB 460/IRB 660/IRB 760/IRB 5710/IRB 5720/IRB 6650S/IRB 6700/IRB 6710/IRB 6720/IRB 6730/IRB 6740/IRB 7600	545 mm

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	1 mm/m (movement direction) 0.5 mm/m (Perpendicular to movement direction) Overall height difference ≤ 10 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.

Mechanical stops

There are no adjustable mechanical stops on the IRT 710 OmniCore. This needs to be considered while doing a risk assessment of the complete installation, the track can however be order in different lengths.

Weight, robot

For the detailed weight of each robot, see the robot product manual.

Weight, pedestal

Robot Pedestal	Height	Weight	IRB 7600	IRB 760	IRB 6740	IRB 6730	IRB 6720	IRB 6710	IRB 6700	IRB 6650S	IRB 660	IRB 5720	IRB 5710	IRB 4600	IRB 4400	IRB 460
3HKA00000190345	250 mm	213 kg	√	√	√	√	√	√	√	√	√	√	√			√
3HKA00000190346	500 mm	288 kg				√	√	√	√		√	√	√			√
3HKA00000190348	250 mm	220 kg												√	√	
3HKA00000190349	500 mm	276 kg												√	√	
3HKA00000190350	750 mm	331 kg												√		

Weight, track motion excluding harness and pedestal

The following table shows the weight of the track motion excluding harness and pedestal.

> **ℹ Note**
>
> This weight include the harness for the track motor (power and signal). But do not include the harness which connected to the robot or tooling, such as the robot power cable, CP/CS harness, welding cables, media pipes and etc.

> **💡 Tip**
>
> There are three types carriages used in IRT 710 OmniCore. For more information, see *Carriage overview* chapter in product manual.
>
> The following table takes the large robot carriage weight into count. If any robot carriageis used, please minus the corresponding weight. For more information on the carriages weight, see *Weight, Carriages* chapter in product manual.

Carriage NO.	1 Carriage		2 Carriages	
Length/m	only internal cable tray (Kg)	only external cable tray (Kg)	only internal cable tray (Kg)	only external cable tray (Kg)
3	1611	1783	X	X
3.5	1719	1891	X	X
4	1945	2160	2509	2767
4.5	2053	2268	2617	2875
5	2276	2534	2846	3147
5.5	2384	2642	2954	3255
6	2610	2911	3177	3521
6.5	2718	3019	3285	3629
7	2941	3285	3514	3901
7.5	3049	3393	3622	4009
8	3275	3662	3845	4275

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1.1.2 Technical data
Continued

Carriage NO.	1 Carriage		2 Carriages	
Length/m	only internal cable tray (Kg)	only external cable tray (Kg)	only internal cable tray (Kg)	only external cable tray (Kg)
8.5	3383	3770	3953	4383
9	3606	4036	4182	4655
9.5	3714	4144	4290	4763
10	3940	4413	4513	5029
10.5	4048	4521	4621	5137
11	4271	4787	4850	5409
11.5	4379	4895	4958	5517
12	4605	5164	5181	5783
12.5	4713	5272	5289	5891
13	4936	5538	5518	6163
13.5	5044	5646	5626	6271
14	5270	5915	5849	6537
14.5	5378	6023	5957	6645
15	5601	6289	6186	6917
15.5	5709	6397	6294	7025
16	5935	6666	6517	7291
16.5	6043	6774	6625	7399
17	6266	7040	6854	7671
17.5	6374	7148	6962	7779
18	6600	7417	7185	8045
18.5	6708	7525	7293	8153
19	6931	7791	7522	8425
19.5	7039	7899	7630	8533
20	7265	8168	7853	8799
20.5	7373	8276	7961	8907
21	7596	8542	8190	9179
21.5	7704	8650	8298	9287

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

Airborne noise level

The sound pressure level outside the working space.

IR(B)T type	Level
IRT 710 OmniCore	< 75 dB (A) / 1m

Continues on next page

Power consumption at max load

Type of Movement	IR(B)T
-	Within specification for respective robot. A power consumption measurement of a track motion with manipulator could be done with a simulated cycle in RobotStudio.

Storage conditions

The table shows the allowed storage conditions for the robot:

Parameter	Value
Minimum ambient temperature	5°C
Maximum ambient temperature	45°C
Maximum ambient temperature (less than 24 hrs)	70°C
Maximum ambient humidity	Maximum 95% at constant temperature.
Maximum ambient altitude	1,000 m

Operating conditions

The table shows the allowed operating conditions for the robot:

Parameter	Value
Minimum ambient temperature	+5°C [i] (41°F)
Maximum ambient temperature	+ 45°C (113°F)
Maximum ambient humidity	Maximum 95% at constant temperature.
Maximum ambient altitude	1,000 m

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

> **Note**
>
> In arc welding applications, it is necessary to avoid arc welding spatter from falling onto the surface of the rectangular rail.

> **Note**
>
> In gluing or sealing applications, it is necessary to avoid the glue from falling onto the surface of the rectangular rail.

Power consumption at max load
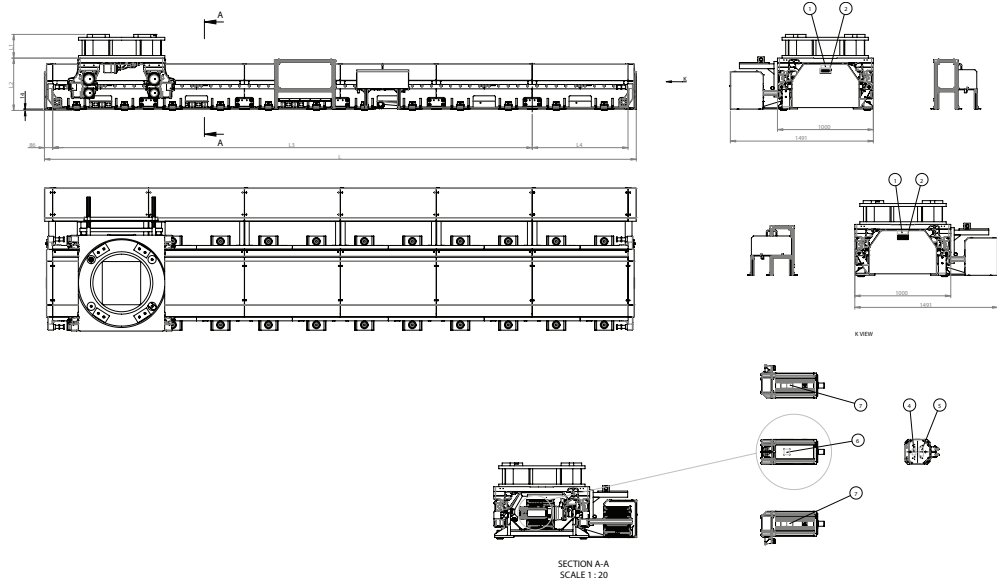
Type of Movement	IRT
-	Within specification for respective robot. A power consumption measurement of a track motion with manipulator could be done with a simulated cycle in RobotStudio. See *Operating manual - RobotStudio*.

1.1.3 Information labels

Illustration

xx2400000638

Item	Description
1	ABB Logo
2	Rating Label
3	Lifting Label
4	NO SHOCK Warning Label
5	Instruction Plate
6	Electric shock Warning Label
7	High Temperature Warning Label
8	WEEE label

1.2 Standards

1.2.1 Applicable standards

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

General

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

Normative standards as referred to from ISO 10218-1

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

Deviations from ISO 10218-1:2011 for IRT 710 OmniCore

Deviations from the standard are motivated for IRT 710 OmniCore in the table below.

Requirement	Deviation for IRT 710 OmniCore	Motivation
§5.12.1 Limiting the range of motion by adjustable stops (§5.12.2) or by safety functions (§5.12.3).	IRT 710 OmniCore does not have adjustable mechanical stops.	The track motion is designed as segments, which can be reduced to limit the range of motion. The positioner is designed with fixed positions.

Other standards used in design

Standard	Description
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments

Continues on next page

1 Description

1.2.1 Applicable standards
Continued

Standard	Description
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6-4: Generic standards – Emission standard for industrial environments
ISO 13732-1:2006	Ergonomics of the thermal environment - Part 1
IEC 60529:1989 + A2:2013	Degrees of protection provided by enclosures (IP code)

1.3 On-site installation

1.3.1 Track motion IRT 710 OmniCore overview

IRT 710 OmniCore overview
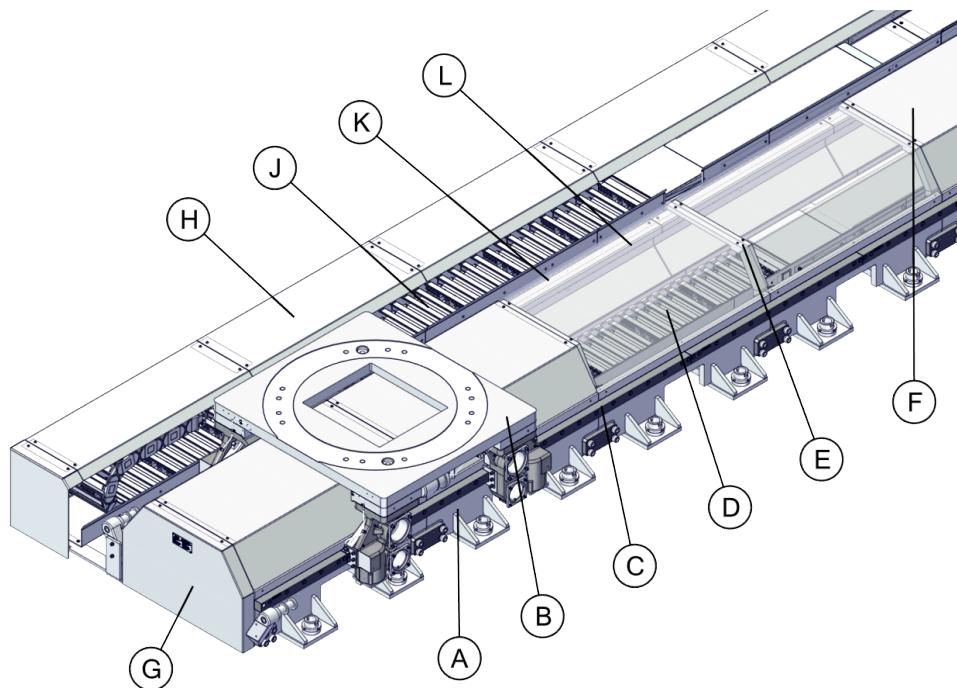
xx2200000409

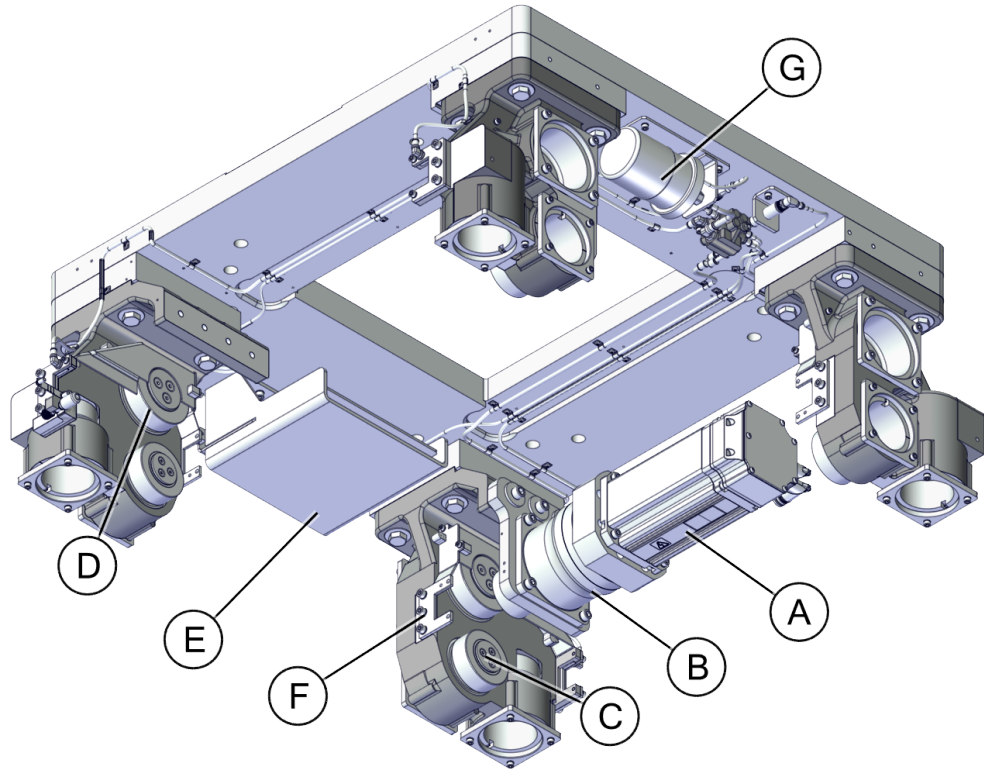|	
A	Section
B	Carriage
C	Rectangular Rail
D	Internal cable chain
E	Cover bracket
F	Track cover
G	Terminal cover
H	External cable chain cover
J	External cable chain
K	Rack cover
L	Rack

The same components are used in different layout variants.

IRT 710 OmniCore carriage overview

xx2400000790

A	Motor
B	Reducer
C	90 mm Cam roller holder unit
D	110 mm Cam roller holder unit
E	Scraper unit
F	Cable drawer
G	Lubrication system

Weight, Carriages

Carriage type	Large robot carriage	Medium robot carriage
Weight	556 kg	517 kg

Large robot carriage mounting plate , IRB 460/IRB 660/IRB 760/IRB 5710/IRB 5720/IRB 6650S/IRB 6700/IRB 6710/IRB 6720/IRB 6730/IRB 6740/IRB 7600

The large robot carriage mounting plate is used for IRB 460/IRB 660/IRB 760/IRB 5710/IRB 5720/IRB 6650S/IRB 6700/IRB 6710/IRB 6720/IRB 6730/IRB 6740/IRB 7600.
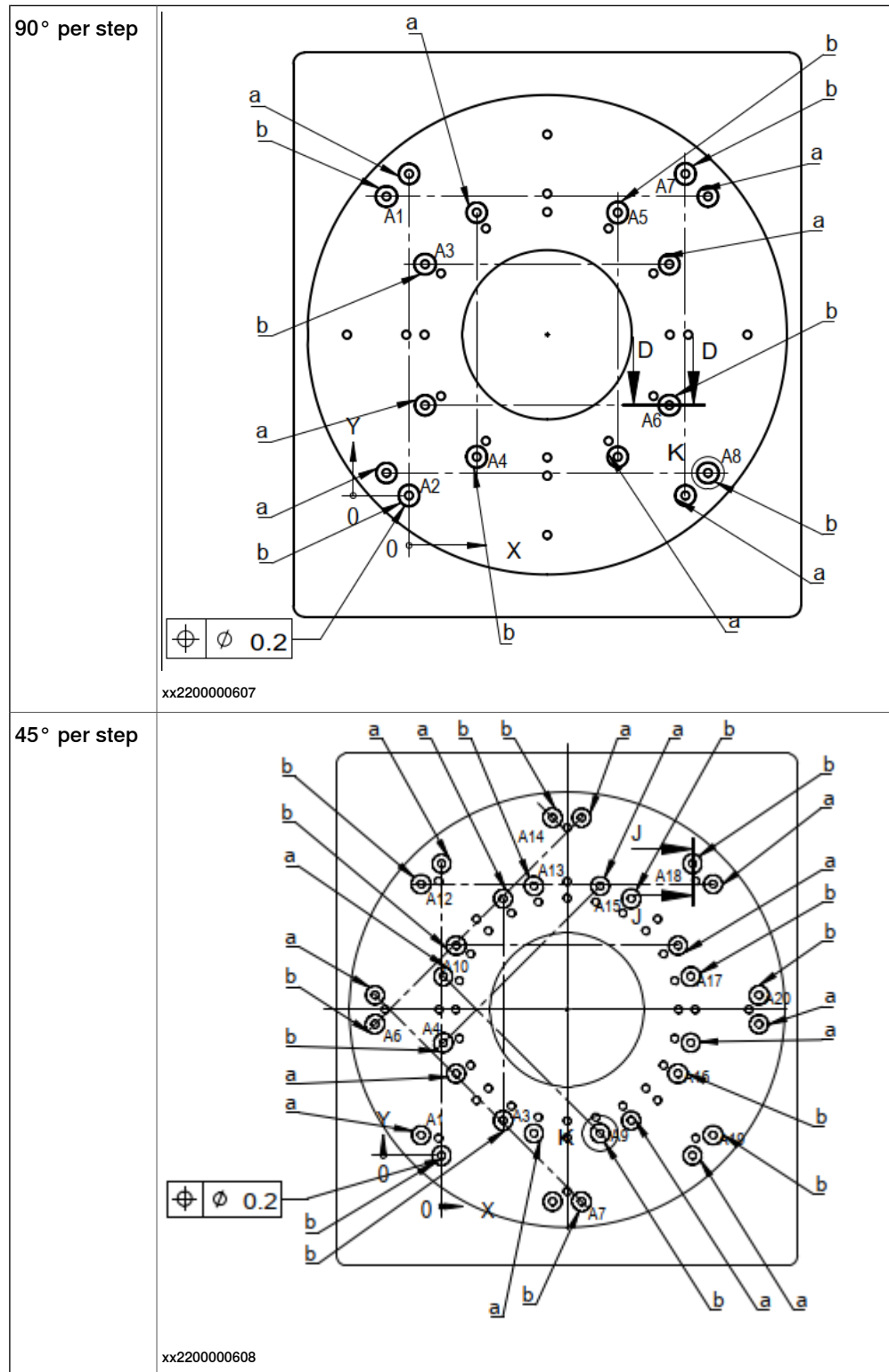
90° per step	

xx2200000605

45° per step	

xx2200000606

1 Description

Medium robot carriage mounting plate, IRB 4600, 4400

The medium robot carriage mounting plate is used for IRB 4600 and 4400.

90° per step	\nxx2200000607
45° per step	\nxx2200000608

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Easily damaged parts on the track motion

Do not step on the locations marked in the figure since they are easily damaged.
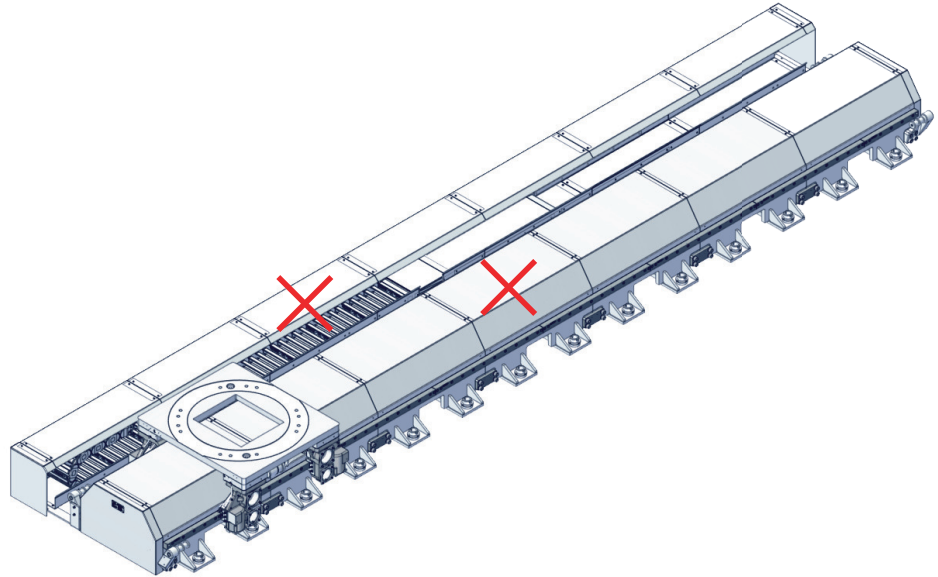
xx2200000644

1.3.2 Track motion IRT 710 OmniCore layout

> 💡 **Tip**
>
> The arrow in the illustration refers to the rack side.

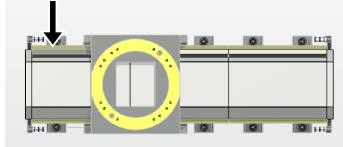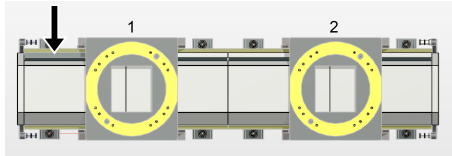**One carriage**

xx2200000610

Two carriages

xx2200000611

Direction of travel

Standard mounting
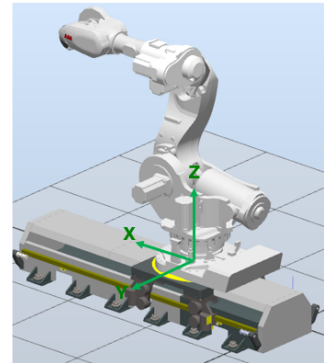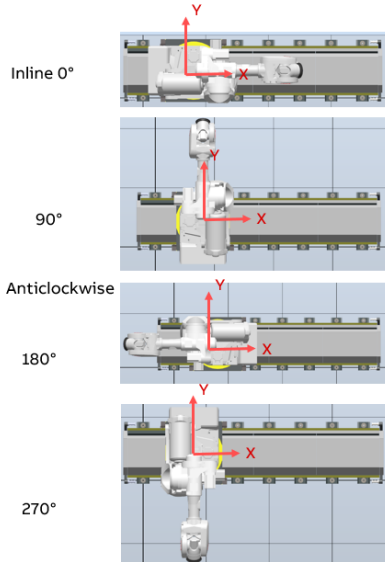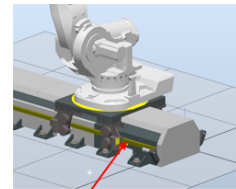
xx2200001151

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Mirrored mounting
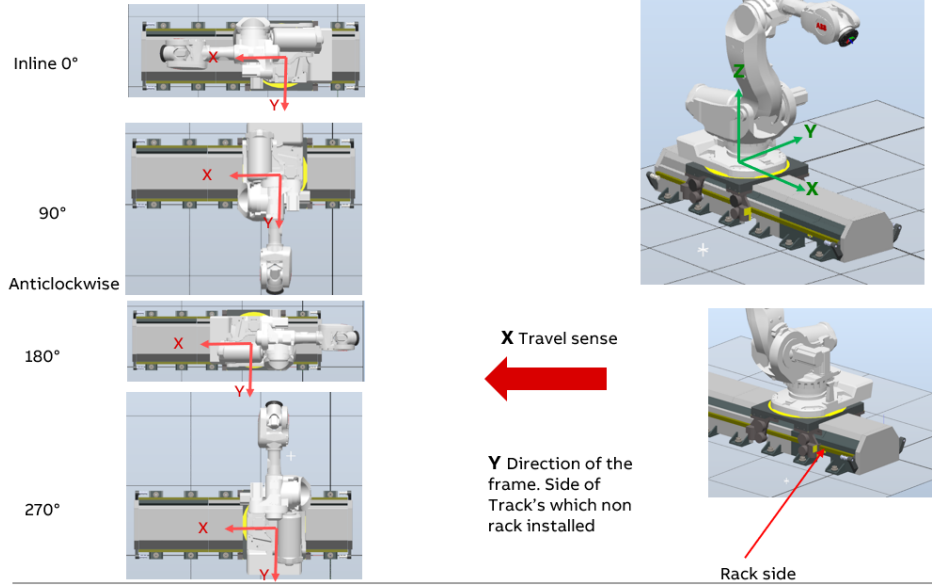
xx2200001152

1.3.3 Required installation space

Clean space required on the ends of the track
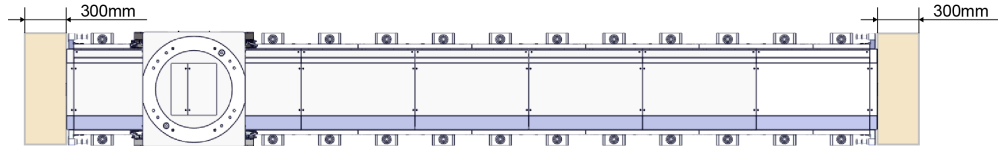
xx2400000381

Clean space for the carriage cabling(Track without external cable chain)

Clean space around the track is required when installing the track due to the cable from internal cable chain to robot base on the carriage.

The clean space is different when the robot is installed in different angle on the track.

In line with the track, 0° or 180°

When the robot is installed in line with the track, the clean space is as the following illustration.
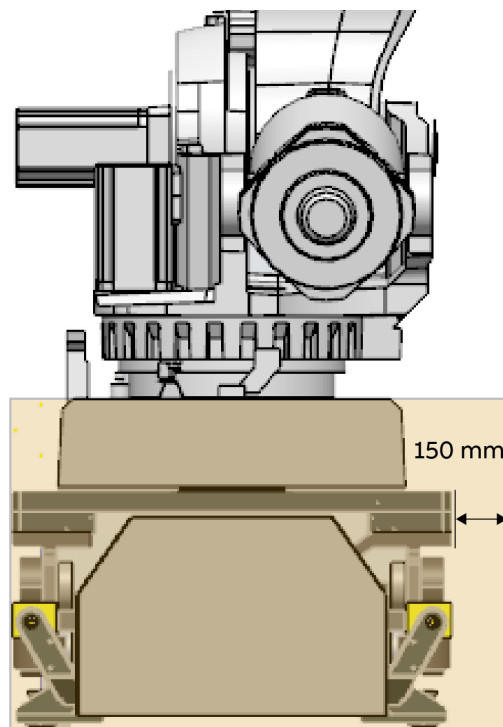
xx2400000483

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Standard 45° , 90°,, 135° or Mirrored 225° , 270°,, 315°

When the robot is installed on the track between 0° to 180°, the clean space is as the following illustration.
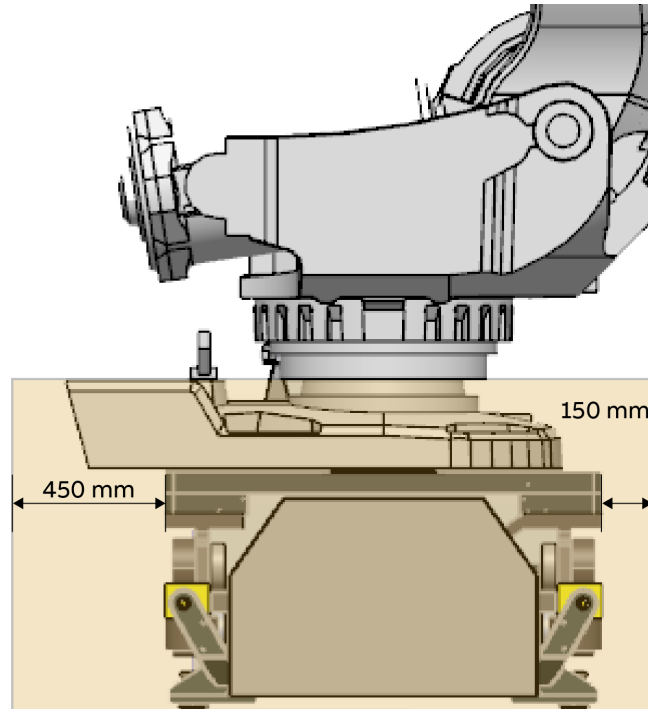
xx2400000484

1.3.3 Required installation space
Continued

Standard 225° , 270°,, 315°4 or Mirrored 45° , 90°,, 135°

When the robot is installed on the track between 180° to 360°, the clean space is as the following illustration.
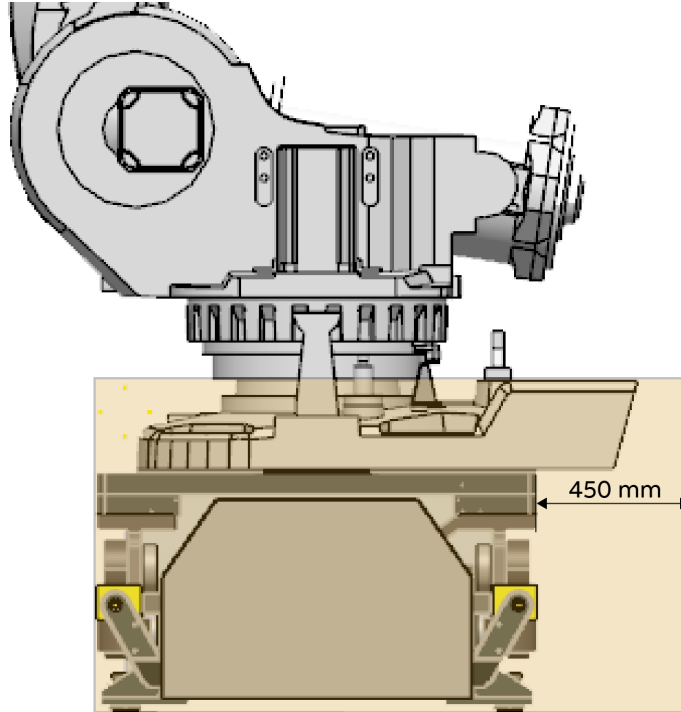
xx2400000485

1.3.4 Foundation

Robustness

The foundation must with stand the static loads caused by the weight of the equipment and the dynamic loads generated by the movement of the carriage and the manipulator. The minimum thickness of the concrete floor is 160 mm.

The concrete quality class must be at least C20/25 (or B25) to insure a good resistance of the anchor. Class C30/37 (or B35) is advisable.

The concrete compressive strength can be tested according to the European norm EN 206-1.

When IRT 710 OmniCore is mounted on the steel platform, M16 class 12.9 screws are required. Depth of thread must be min. 30 mm.

Inclination and flatness

The levelling of the track is done by screwing / unscrewing the M60 screws. However, in order to insure a good levelling, the concrete floor inclination must not exceed 1mm / meter in the translation direction, and 0.5mm / meter cross section. The levelling screws can also compensate a poor flatness of the slab and small bumps up to 20 mm. However, the surface under the levelling screw must be flat. A concrete surfacing grinder should be used to correct the flatness locally if necessary.

Forces

Maximum floor loads in relation to the base coordination system and indicated per each stand of the section of the track, see figure below.
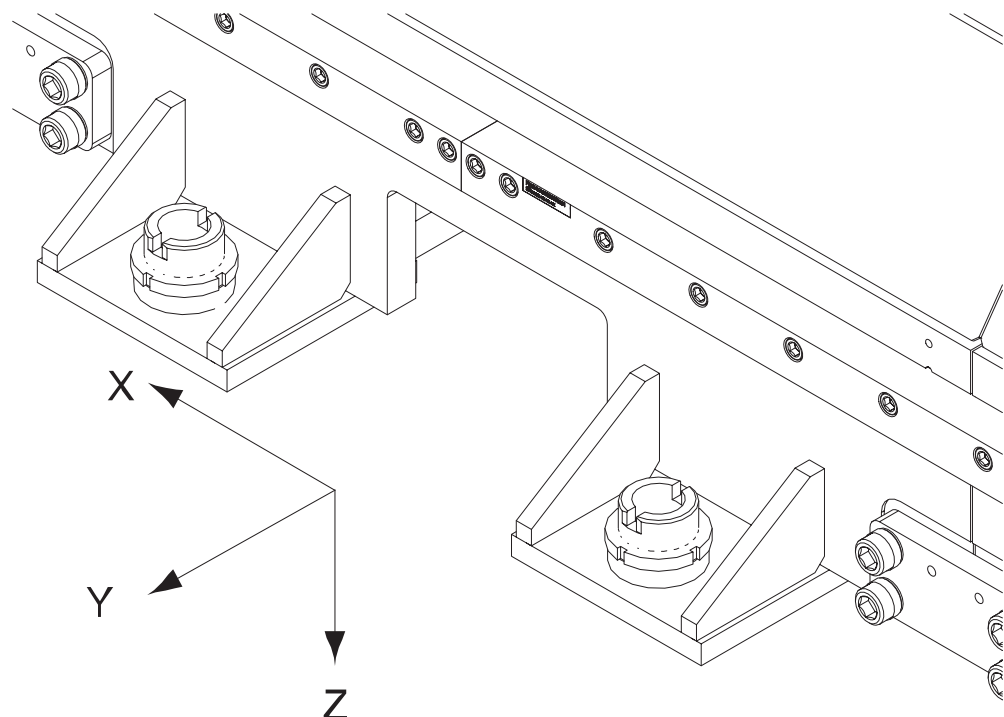
xx2200001254

1.3.4 Foundation
Continued

Robot	max. load at normal operation (KN)			max. load at emergency stop (KN)		
	Fxy max	Fz min	Fz max	Fxy max	Fz min	Fz max
4400	3.4	-4.3	10	4.7	-6.8	14
4400+riser	3.8	-4.8	12	5.1	-7.3	15
4600	2.2	-1.7	6.2	4.5	-7.3	13
4600+riser	2.8	-2.1	7.7	5.0	-8.1	14
5710	3.2	-4.9	11	5.9	-12	20
5710+riser	3.2	-4.9	11	6.2	-12	20
5720	3.6	-4.9	12	7.9	-17	28
5720+riser	3.8	-5.2	12	8.3	-17	30
6650S	7.2	-10	26	10	-17	31
6650S+riser	7.4	-10	26	11	-18	33
6700	5.2	-5.4	15	9.3	-16	27
6700+riser	5.6	-5.8	16	10	-18	30
6710	3.6	-4.9	12	7.8	-17	28
6710+riser	3.8	-5.2	12	8.2	-17	30
6720	3.8	-5.1	12	8.1	-17	29
6720+riser	3.9	-5.4	13	8.6	-18	31
6730	3.9	-5.3	13	8.5	-18	30
6730+riser	4.1	-5.6	13	8.9	-19	32
6740	4.1	-5.5	13	8.8	-19	32
6740+riser	4.3	-5.8	14	9.3	-20	33
660	7.7	-8.4	21	8.6	-12	25
660+riser	7.8	-8.6	21	8.9	-12	26
760	6.9	-8.8	23	13	-14	31
760+riser	6.9	-8.8	23	13	-14	31
460	4.4	-3.6	12	6.2	-8.1	17
460+riser	4.7	-3.8	12	6.5	-8.4	17
7600	7.6	-12	26	14	-28	47
7600+riser	7.6	-12	26	15	-29	49

> **ⓘ Note**
>
> If doing fatigue calculations with combined tension (Fz) and shear loads (Fxy), the shear loads (Fxy) are allowed to be reduced with a factor 0.7.

Floor plate

For these robots application, it is recommended to not put track on ground straightly, put one plate as interface surface to make it more stable. This is not a standard option in list, any request can reach the sales office for help.

Continues on next page

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The following images show the two types base plate of the IRT 710 OmniCore.

For general condition 1

This type base plate is used for better floor quality with lower cost.

xx2200001199

A-A

xx2200001282

1.3.4 Foundation
Continued

For general condition 2

This type base plate is used for worse floor quality but easier for adjustment onsite.
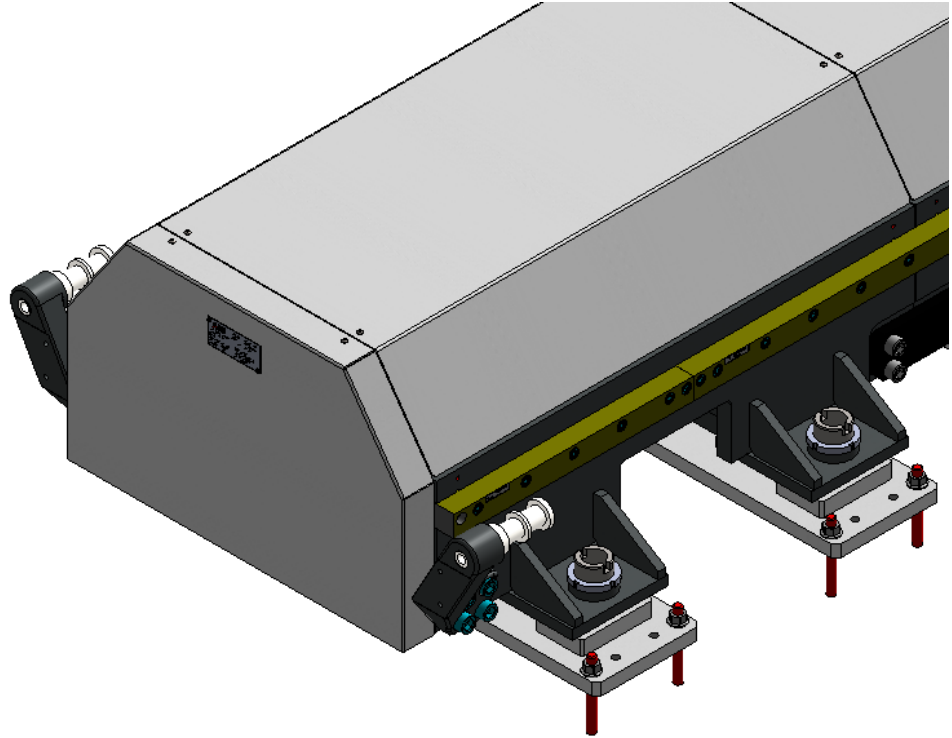
xx2200001200
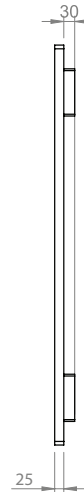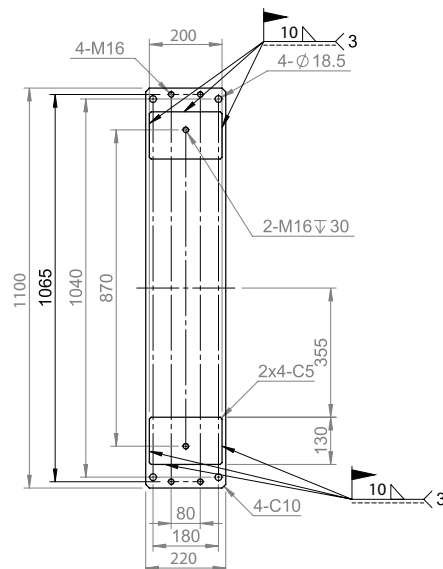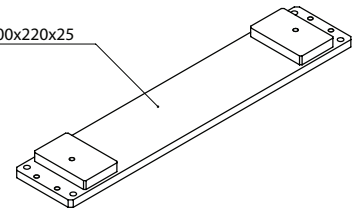
xx2200001283

> ℹ️ **Note**
>
> The small plate and large plate only could be welded during the geometric alignment of track. Welding them together in advance will result in the geometric alignment failure.
>
>
>
> xx2400001020
>
> | A | Large plate |
> |---|---|
> | B | Small plate |
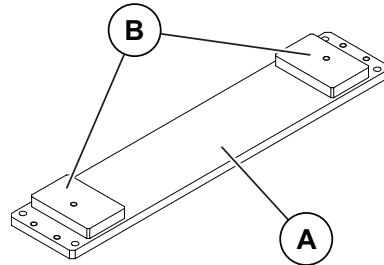
Robot compatible with floor plate

Robot compatible	IRB 7600	IRB 760	IRB 6740	IRB 6730	IRB 6720	IRB 6710	IRB 6700	IRB 6650S	IRB 660	IRB 5720	IRB 5710	IRB 4600	IRB 4400	IRB 460
Without floor plate												√	√	
With floor plate	√	√	√	√	√	√	√	√	√	√	√			√

Robot capabilities

The following table shows the robot capabilities of the IRT 710 OmniCore.

Standard pedestals are generally allowed between the robot but their height is limited and dependent on the type of robot.
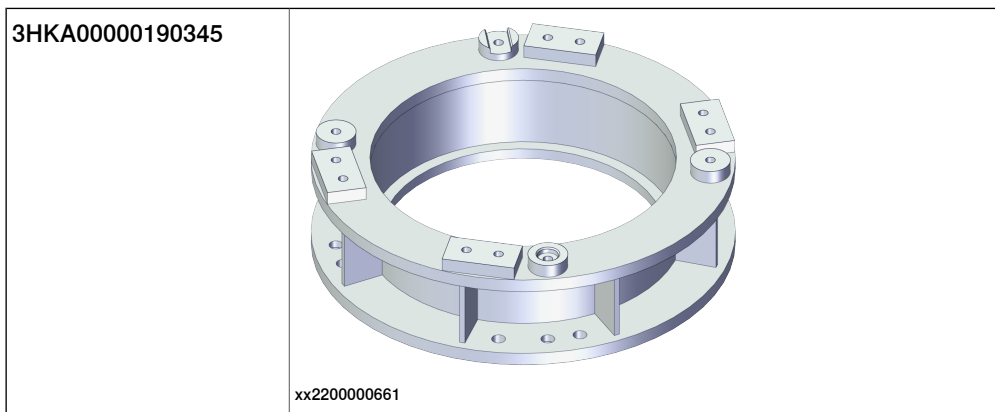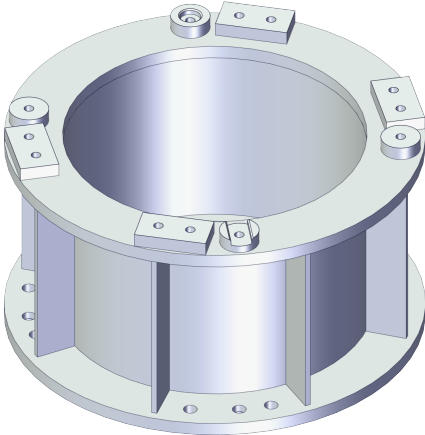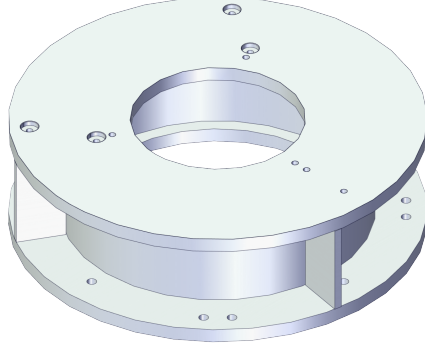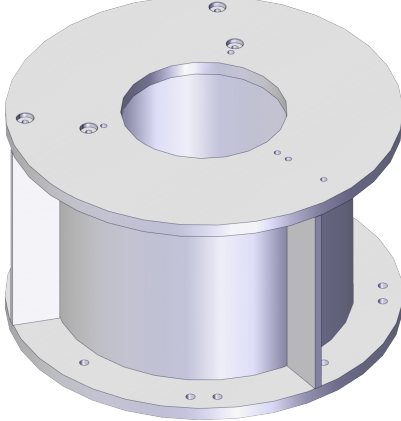
3HKA00000190345	
	xx2200000661

1 Description

1.3.4 Foundation
Continued

3HKA00000190346	 xx2200000663
3HKA00000190348	 xx2200000662
3HKA00000190349	 xx2200000664

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3HKA00000190350

xx2200000665

Weight, pedestal

Robot Pedestal	Height	Weight	IRB 7600	IRB 760	IRB 6740	IRB 6730	IRB 6720	IRB 6710	IRB 6700	IRB 660S	IRB 660	IRB 5720	IRB 5710	IRB 4600	IRB 4400	IRB 460
3HKA00000190345	250 mm	213 kg	√	√	√	√	√	√	√	√	√	√	√			√
3HKA00000190346	500 mm	288 kg				√	√	√	√		√	√	√			√
3HKA00000190348	250 mm	220 kg												√	√	
3HKA00000190349	500 mm	276 kg												√	√	
3HKA00000190350	750 mm	331 kg												√		

1.3.5 Screw joints

General

This section details how to tighten the various types of screw joints on the robot and the IRT 710 OmniCore.

The instructions and torque values are valid for screw joints comprised of metallic materials and do not apply to soft or brittle materials.

Screw class

Class 12.9 screw is recommended by ABB for certain screw joints. These screws are high grade quality and extremely resistant to fatigue. Whenever used, this is specified in the instructions, and in such cases, no other type of replacement screw is allowed! Using other types of screws will void any warranty and may potentially cause serious damage or injury!

Loctite 243
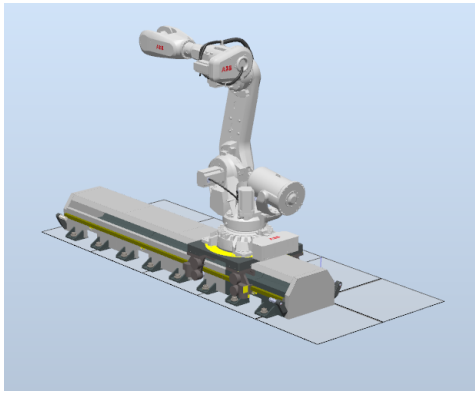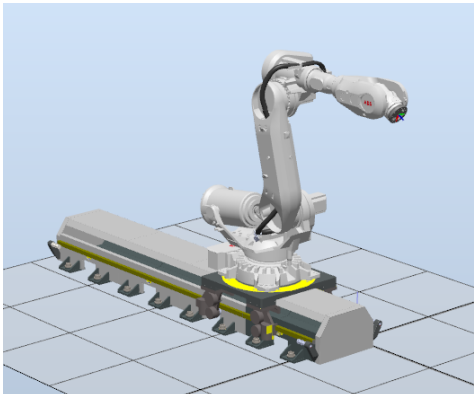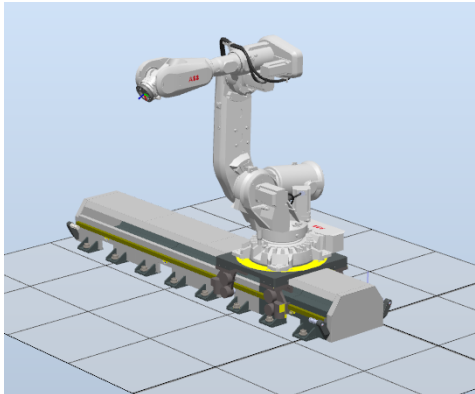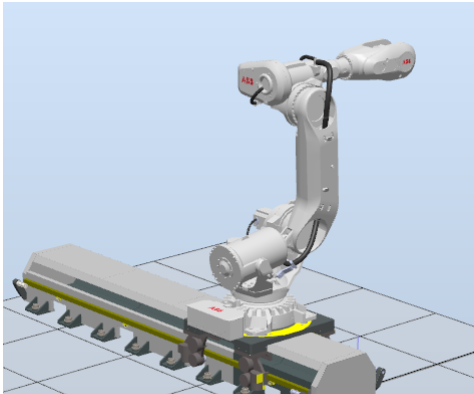
A thread lock should be used on all screws that have a specified torque and only where stated. This is required to prevent the risk of the screw loosening due to vibrations over the lifetime of the product. Loctite 243 is the recommended thread lock and should be applied to the screws before assembly and tightening to their recommend torque.

1.3.6 Assembly of the manipulator

Overview

When the IRT 710 OmniCore is carrying an IRB robot it behaves like an integrated 7th axis. The robot should be ordered with an additional drive unit (907-1) for the IRT 710 OmniCore motor, and optionally a resolver connection for 7th axis on the robot base (864-1).

The IRT 710 OmniCore unit is designed to be controlled with ABB OmniCore controller. For compatibility with other control systems please contact ABB.

Robot position on the carriage - 4 possibilities:				
Stand-ard[i]	In line with the track, 0°	xx2200000636	180°	xx2200000638
	90°	xx2200000637	270°	xx2200000639
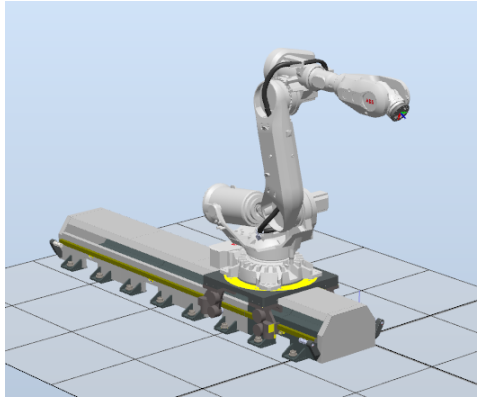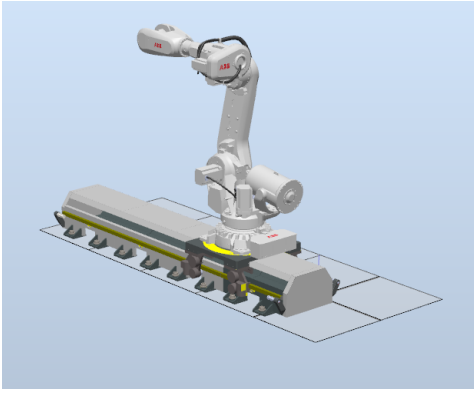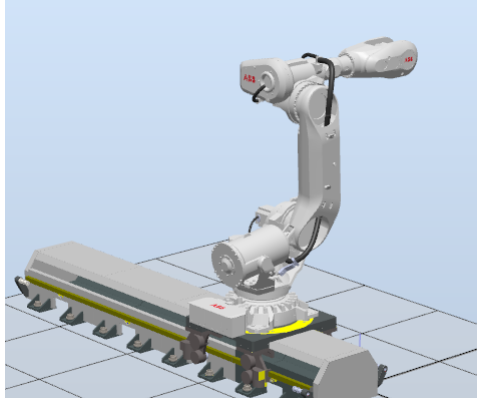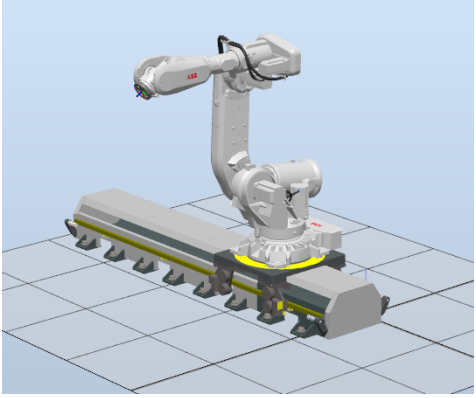
i   The illustration described the manipulator installation orientation 0°, 90°,180° and 270° on robot base and it deduced the manipulator installation orientation 45°, 135°,225° and 315° from this.
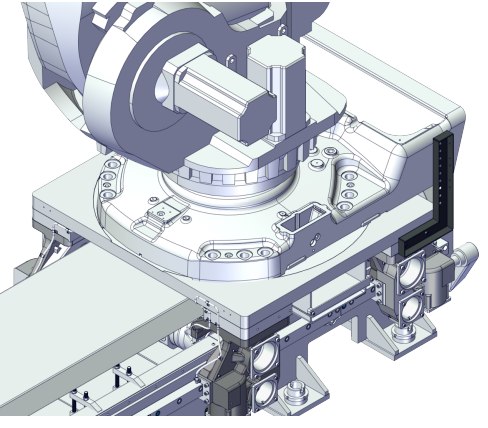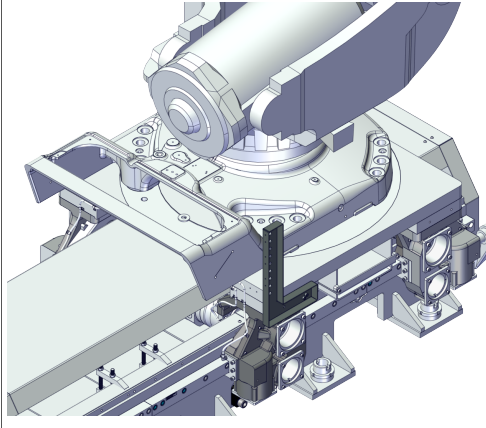
Robot position on the carriage - 4 possibilities:			
Mirrored[i]	In line with the track, 0°	 xx2200000640	180° xx2200000642
	90°	 xx2200000641	270° xx2200000643

i   The illustration described the manipulator installation orientation 0°, 90°,180° and 270° on robot base and it deduced the manipulator installation orientation 45°, 135°,225° and 315° from this.

Cable bracket for routing robot cables

Cable brackets on the carriage - Without external cable chain		
In line with the track, Standard 0° Mirrored 180°	 xx2400000961	Standard 180° Mirrored 0° xx2400000895

Continues on next page

Cable brackets on the carriage - Without external cable chain	
Standard 90° **Mirrored 270°** xx2400000894	**Standard 270°** **Mirrored 90°** xx2400000962
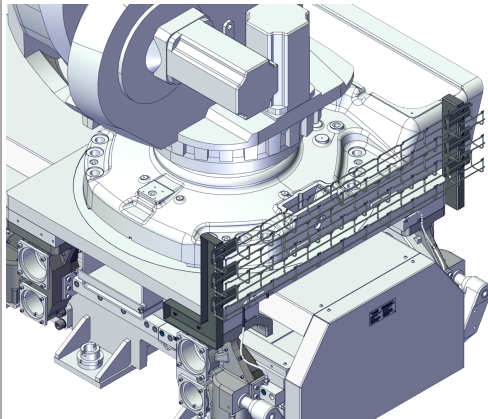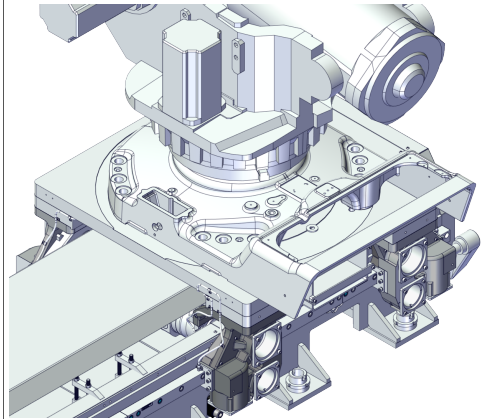
Cable brackets on the carriage - With external cable chain on the rack side	
In line with the track, Standard 0° **Mirrored 180°** xx2400000963	**Standard 180°** **Mirrored 0°** xx2400000897
Standard 90° **Mirrored 270°** xx2400000896	**Standard 270°** **Mirrored 90°** xx2400000964
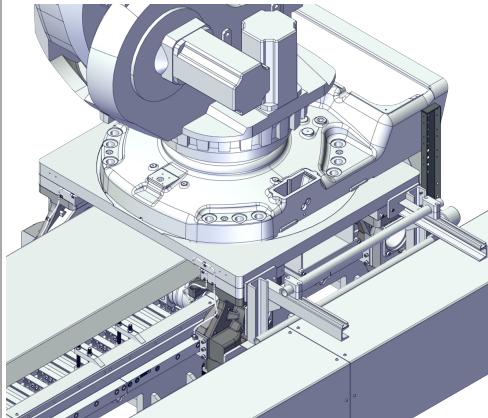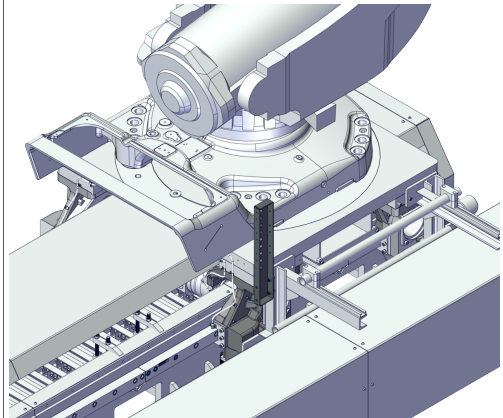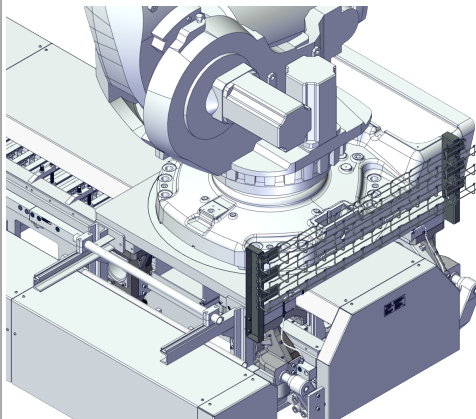
Cable brackets on the carriage - With external cable chain on the non-rack side			
In line with the track, Standard 0° Mirrored 180°	xx2400000967	Standard 180° Mirrored 0°	xx2400000965
Standard 90° Mirrored 270°	xx2400000966	Standard 270° Mirrored 90°	xx2400000968

Drawing

💡 **Tip**

The bracket left and bracket right are installed on the carriage.

The straight cable bracket is installed on the external cable chain bracket.

Continues on next page

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Requirement:
1, Material, Q235B GB/T700;
2, Weight, 4.2Kg;
3, Surface treatment, Galvanizing;
4, No indication edge with chamfer: 0.3x45°;
5, No indication machined surface roughness Ra6.3;
6, No indication for fillet smaller than R=0.3mm;
7, General Tolerance according below table;
8, Remove sharp angle.

xx2400000866

Figure 1.1: Cable bracket left

Requirement:
1, Material, Q235B GB/T700;
2, Weight, 4.2Kg;
3, Surface treatment, painted RAL7035;
4, No indication edge with chamfer: 0.3x45°;
5, No indication machined surface roughness Ra6.3;
6, No indication for fillet smaller than R=0.3mm;
7, General Tolerance according below table;
8, Remove sharp angle.
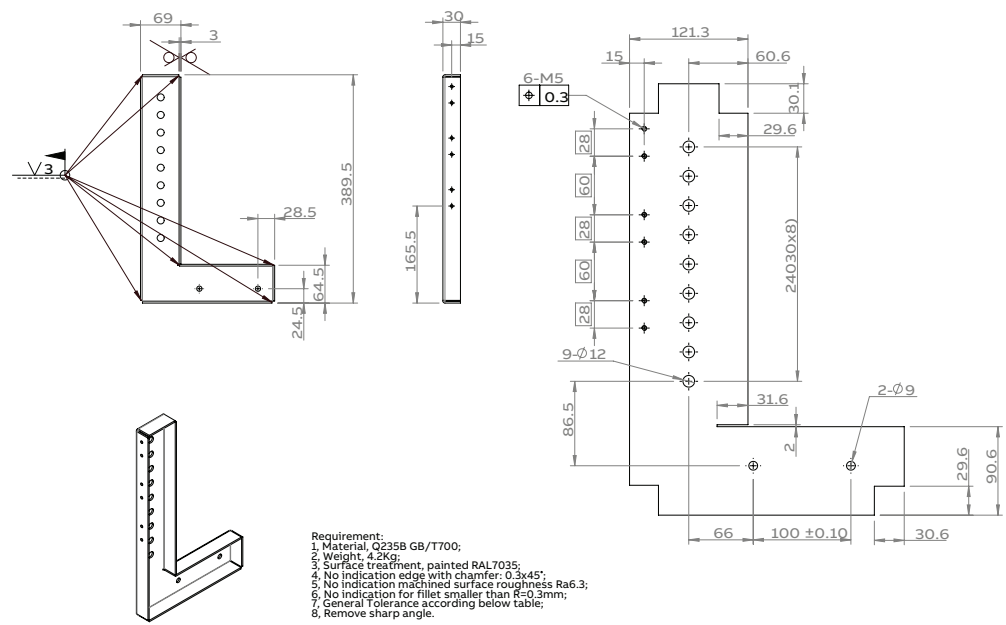
xx2400000867

Figure 1.2: Cable bracket right

1 Description

1.3.6 Assembly of the manipulator
Continued

Requirement:
1, Material, Q235A;
2, Weight, 1.43Kg;
3, Materil type: Squre Tube 30X30X3, Steel Plate thinkness 8
4, Cable tray type, reference CABLOFIL CF54/50,
5, Surface treatment, Galvaniting;
6, No indication edge with chamfer: 0.3x45°;
7, No indication machined surface roughness Ra6.3;
8, No indication for fillet smaller than R=0.3mm;
9, General Tolerance according below table.
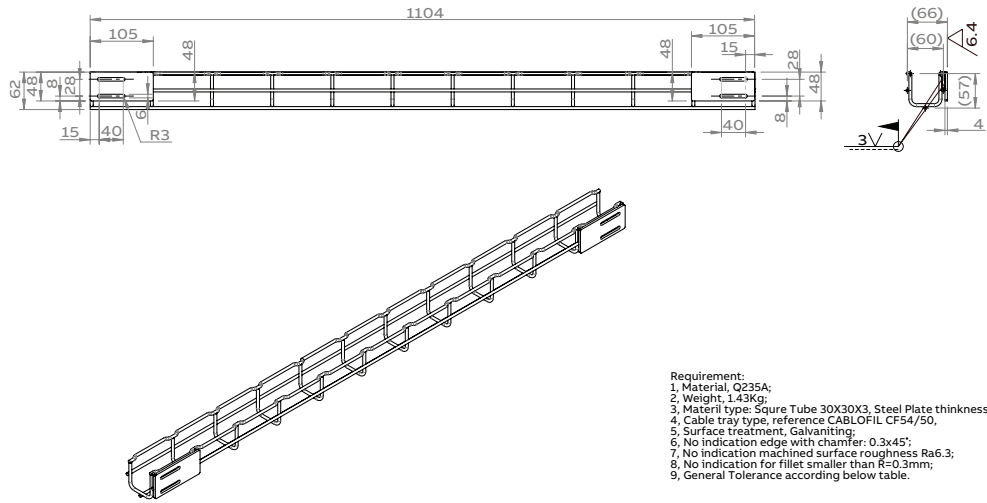
xx2400000868

Figure 1.3: Cable bridge

Requirement:
1, Material, Q235B GB/T700;
2, Weight, 4.2Kg;
3, Surface treatment, Galvanizing;
4, No indication edge with chamfer: 0.3x45°;
5, No indication machined surface roughness Ra6.3;
6, No indication for fillet smaller than R=0.3mm;
7, General Tolerance according below table;
8, Remove sharp angle.
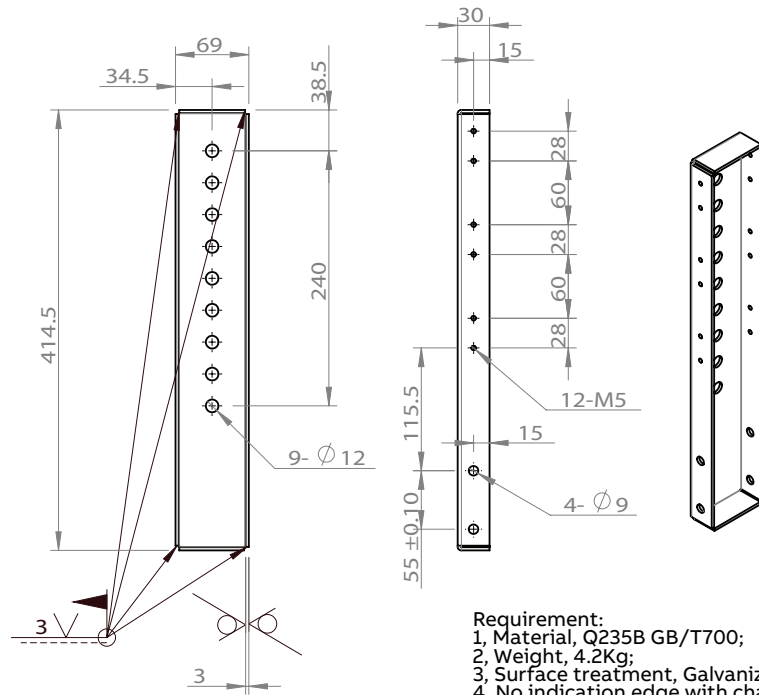
xx2400000869

Figure 1.4: Straight cable bracket

1.4 Calibration

1.4.1 Introduction to calibration

1.4.1.1 Introduction and calibration terminology

Calibration information

This chapter includes general information about the recommended calibration methods and also the detailed procedures for updating the revolution counters, checking the calibration position etc.

Detailed instructions of how to perform Axis Calibration are given on the FlexPendant during the calibration procedure. To prepare calibration with Axis Calibration method, see *Calibrating with Axis Calibration method on page 49*.

Calibration terminology

Term	Definition
Calibration method	A collective term for several methods that might be available for calibrating the ABB robot. Each method contains calibration routines.
Synchronization position	Known position of the complete robot where the angle of each axis can be checked against visual synchronization marks.
Calibration position	Known position of the complete robot that is used for calibration of the robot.
Standard calibration	A generic term for all calibration methods that aim to move the robot to calibration position.
Fine calibration	A calibration routine that generates a new zero position of the robot.
Reference calibration	A calibration routine that in the first step generates a reference to current zero position of the robot. The same calibration routine can later on be used to re-calibrate the robot back to the same position as when the reference was stored. This routine is more flexible compared to fine calibration and is used when tools and process equipment are installed. Requires that a reference is created before being used for recalibrating the robot. Requires that the robot is dressed with the same tools and process equipment during calibration as during creation of the reference values.
Update revolution counter	A calibration routine to make a rough calibration of each manipulator axis.
Synchronization mark	Visual marks on the robot axes. When marks are aligned, the robot is in synchronization position.

1.4.1.2 Calibration methods

Overview

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

Types of calibration

Type of calibration	Description	Calibration method
Standard calibration	The calibrated robot is positioned at calibration position.	Axis Calibration Pin Calibration

Brief description of calibration methods

Axis Calibration method

Axis Calibration is a standard calibration method for calibration of IRT 710 OmniCore. 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.

Pin calibration method

With the manual calibration method, the product's axes are positioned in specific calibration positions using calibration tools. Under this condition, the position of the axis to be calibrated is pre-determined. The axes must be calibrated one at a time.

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1.4.1.3 When to calibrate

When to calibrate

The system must be calibrated if any of the following situations occur.

The resolver values are changed

If resolver values are changed, the track motion must be recalibrated using the calibration methods supplied by ABB. Calibrate the track motion carefully with standard calibration.

The resolver values will change when parts affecting the calibration position are replaced on the track motion, for example motors or parts of the transmission.

This is detailed in *Pin calibration on page 55*.

The revolution counter memory is lost

If the revolution counter memory is lost, the counters must be updated.

- The battery is discharged
- A resolver error occurs
- The signal between a resolver and measurement board is interrupted
- A robot axis is moved with the control system disconnected

The revolution counters must also be updated after the robot and controller are connected at the first installation.

The track motion is rebuilt

If the track is rebuilt, for example after a crash or when the reach ability of the track is changed, it needs to be recalibrated for new resolver values.

This is detailed in *Pin calibration on page 55*.

1.4.2 Synchronization marks and track motion movement directions

1.4.2.1 Synchronization marks and synchronization position for track motions

Introduction

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

synchronization marks - Axis calibration

The calibration bracket should touch the axis pin on the track and be aligned with the nearest axis synchronization mark at the same time.
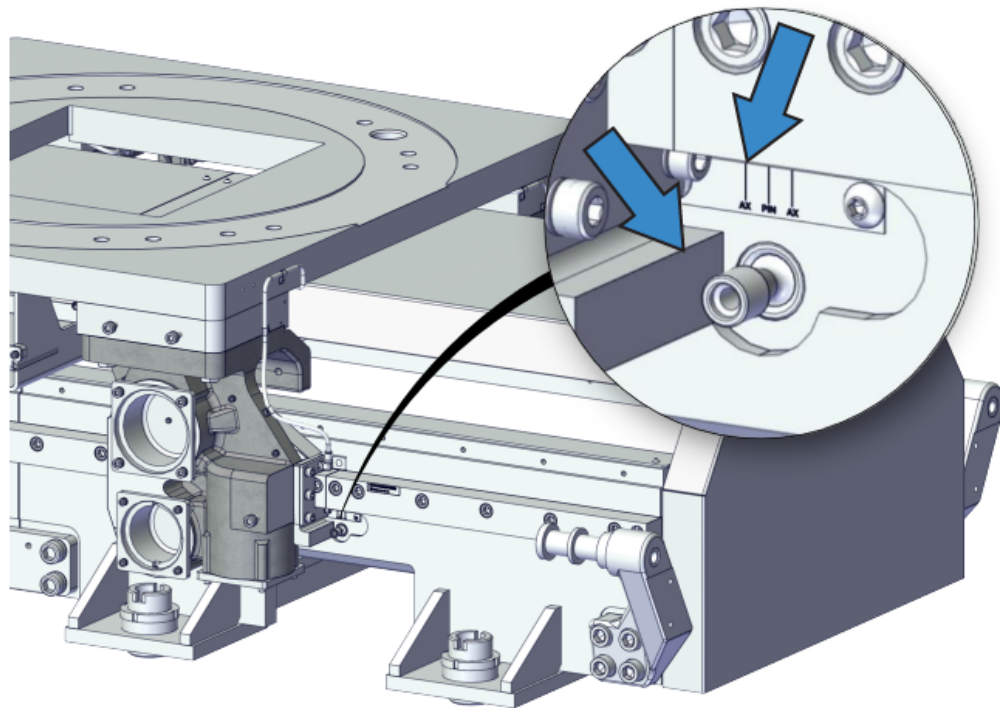
xx2200001157

Continues on next page

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synchronization marks - Pin calibration
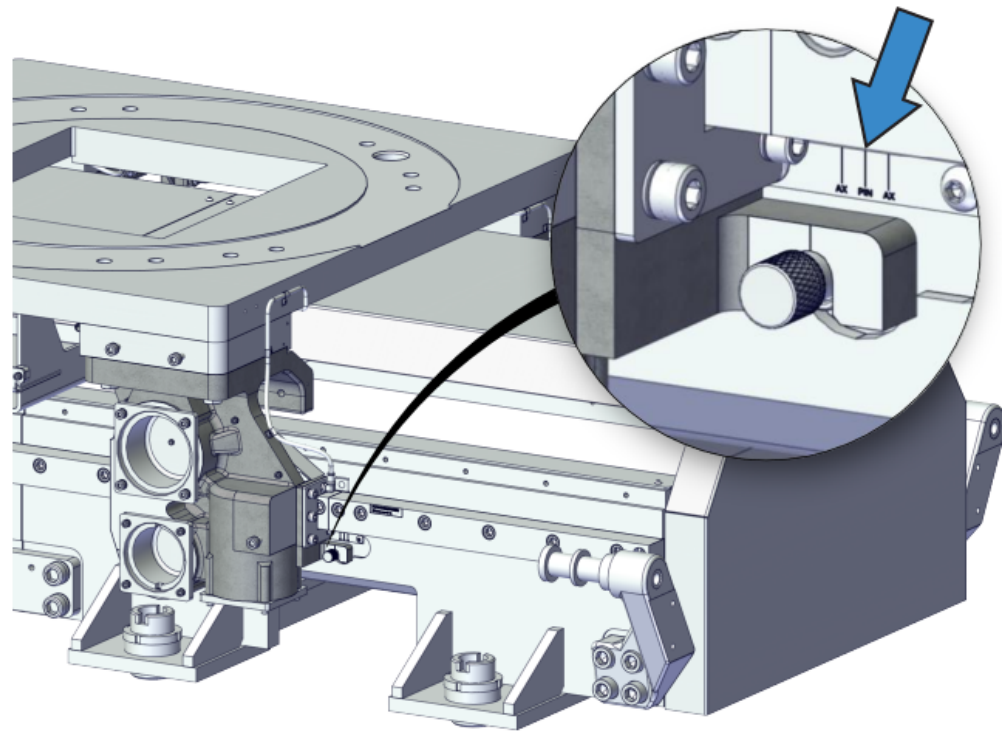
xx2200001158

Synchronization position and movement directions - One carriage

+1/ -1	First section from left/ First section from right
→	Carriage moving direction
▮	Synchronization position
▮	Rack

xx2200000394

Synchronization position and movement directions - Two carriages
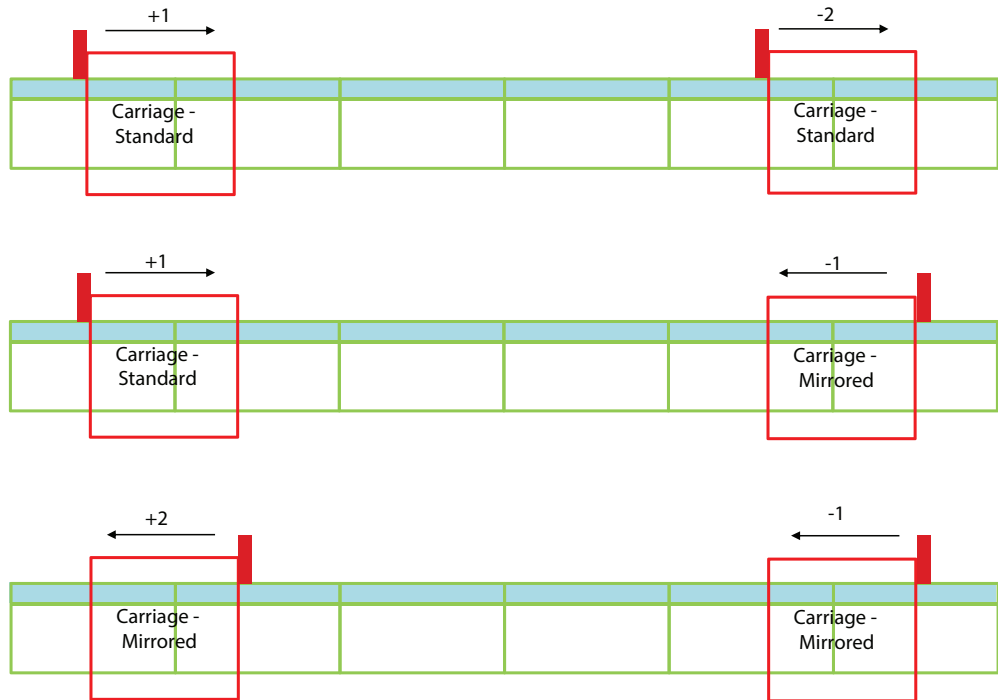
+1/ -1   First section from left/ First section from right

→   Carriage moving direction

▮   Synchronization position

▬   Rack

xx2200000395

1.4.3 Calibrating with Axis Calibration method

> **i** **Note**
>
> Make sure that the poses of the robots and work objects are always the same before calibration.

1.4.3.1 Description of Axis Calibration

Instructions for Axis Calibration procedure given on the FlexPendant

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.

This manual contains a brief description of the method, additional information to the information given on the FlexPendant, article number for the tools and images of where to fit the calibration tools on the robot.

Overview of the Axis Calibration procedure

The Axis Calibration procedure applies to all axes, and is performed on one carriage at the time. The carriages are both manually and automatically moved into position, as instructed on the FlexPendant.

Bushings are installed on each calibration position at delivery, for installation of the calibration tools.

The Axis Calibration procedure described roughly:

1   A removable calibration tool is inserted by the operator into a calibration bushing on the axis chosen for calibration, according to instructions on the FlexPendant.

   ⚠ **WARNING**

   Calibrating the track 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.

   ⚠ **WARNING**

   The calibration tool must be fully inserted into the calibration bushing, until the steel spring ring snaps into place.

2   During the calibration procedure, RobotWare moves the carriage chosen for calibration so that the calibration tools get into contact. RobotWare records values of the calibration position and repeats the coming-in-contact procedure several times to get an exact value of the axis position.

   ⚠ **WARNING**

   Risk of pinching! The contact force for large robots can be up to 150 kg. Keep a safe distance to the robot.

3   The axis position is stored in RobotWare with an active choice from the operator.

Continues on next page

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Routines in the calibration procedure

The following routines are available in the Axis Calibration procedure, given at the beginning of the procedure on the FlexPendant.

Fine calibration routine

Choose this routine to calibrate the track when there are no tools, process cabling or equipment fitted to the track.

Reference calibration routine

Choose this routine to create reference values and to calibrate the robot when the robot is dressed with tools, process cabling or other equipment.

ℹ Note

When calibrating the robot with the reference calibration routine, the robot must be dressed with the same tools, process cabling and any other equipment as when the reference values were created.

If calibrating the robot with reference calibration there must be reference values created before repair is made to the robot, if values are not already available. Creating new values requires possibility to move the robot. The reference values contain positions of all axes, torque of axes and technical data about the tool installed. A benefit with reference calibration is that the current state of the robot is stored and not the state when the robot left the ABB factory. The reference value will be named according to tool name, date etc.

Follow the instructions given in the reference calibration routine on the FlexPendant to create reference values.

When reference calibration is performed, the robot is restored to the status given by the reference values.

Update revolution counters

Choose this routine to make a rough calibration of each track carriage by updating the revolution counter for each carriage, using the FlexPendant.

Validation

In the mentioned routines, it is also possible to validate the calibration data.

1.4.3.2 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 track 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	3HAC055412-001	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.
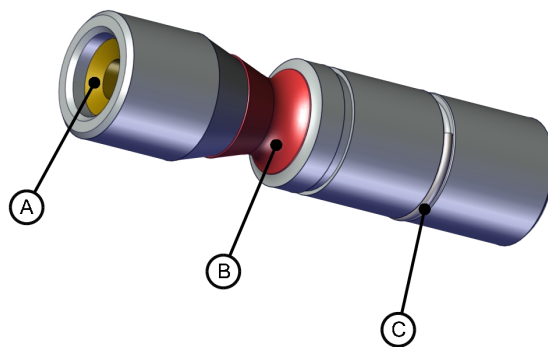
xx1500001914

A	Tube insert
B	Plastic protection
C	Steel spring ring

Continues on next page

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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.
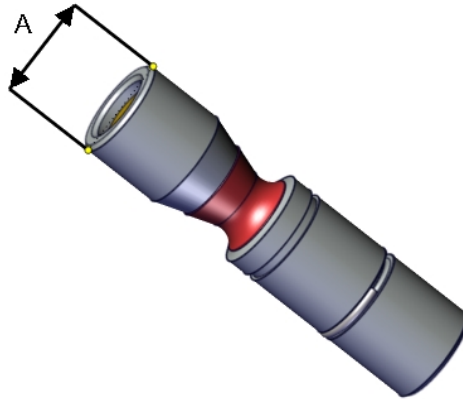
xx1500000951

A	Outer diameter

1.4.3.3 Installation locations for the calibration tools

Location of fixed calibration items

This section shows how the track is equipped with items for installation of calibration tools for Axis Calibration (fixed calibration pins and/or bushings). Installed calibration tools are not shown.
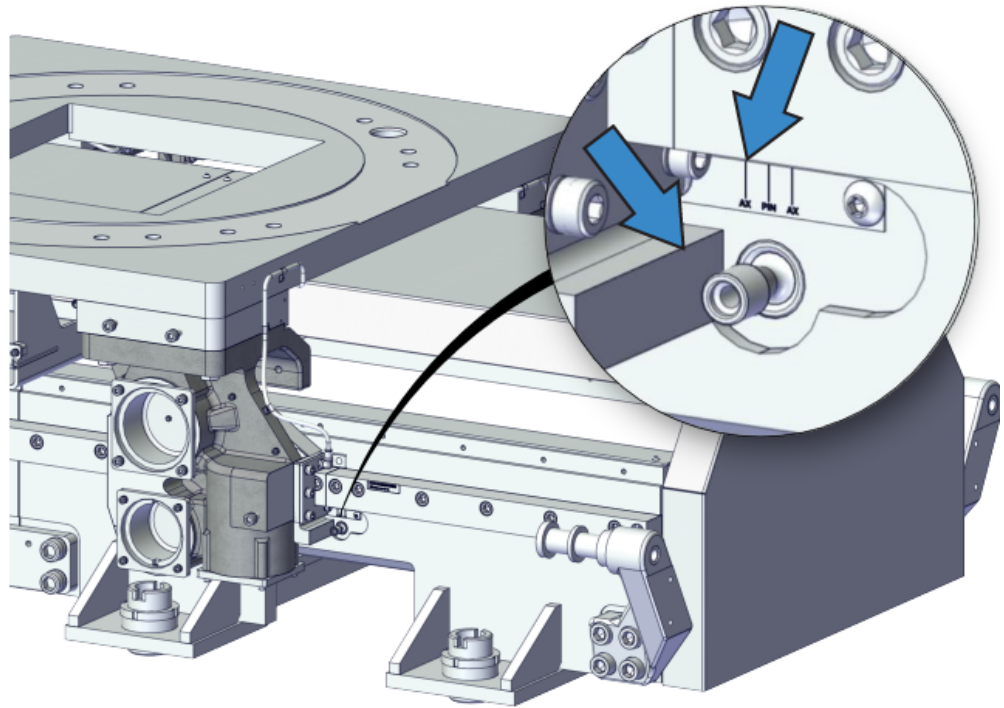
xx2200001157

1.4.4 Pin calibration

Location of calibration tool

The calibration tool is mounted on the track motion as shown in the figure.
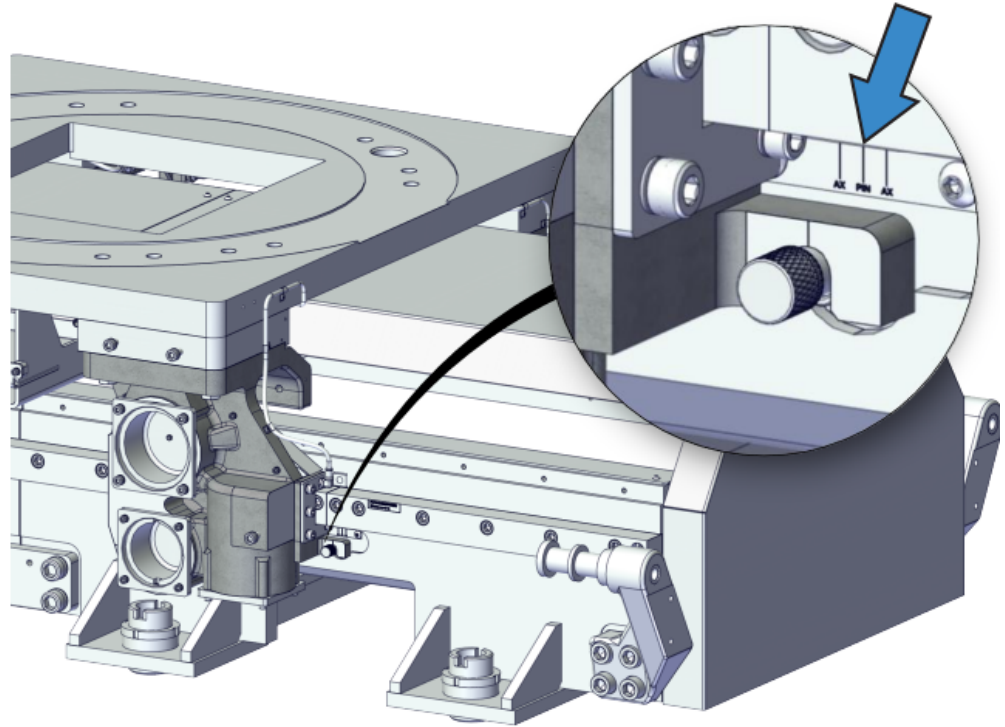
xx2200001158

Required equipment

Equipment etc.	Article number	Note
Calibration tool	3HAC042466-001	Attachment screws 9DA183-52 (M10x35), 2 pcs, required. Not included with the calibration tool.
Calibration tool, mirrored	3HAC042467-001	Attachment screw 9DA183-52 (M10x35), 1 pc, required. Not included with the calibration tool.
Cleaning agent	-	Isopropanol

1.5 Motion

1.5.1 Track type

Overview

The IRT 710 OmniCore track motion can be categorized into three main types based on the carriage type and carriage quantity, that is, single carriage for robot, double carriages for robot. Travel length varies according to track motion types. For the travel length, see *IRT 710 OmniCore carriage overview on page 20*.

1.5.2 Working range

Single carriage

Please check the layout of work range attached file and dimension information.
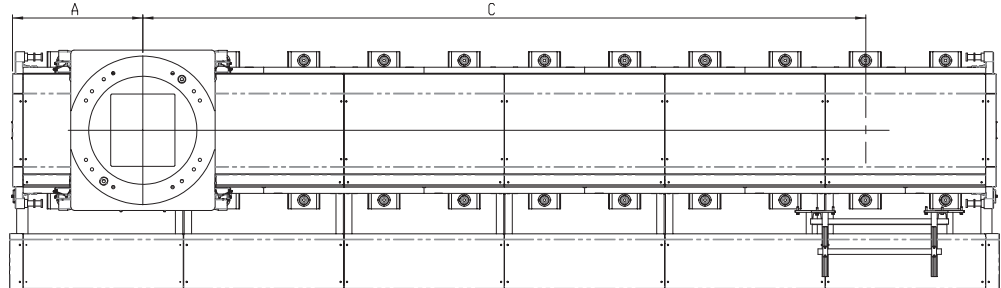
xx2200000401

Pos	Description
A	813 mm
C	Stroke

Carriage quantity is 1.				
	First Carriage			
	Stand-ard/Mirrored	**Work range**		
Track Length		**Start**	**End**	**Stroke**
3	Standard>	-309	1197	1506
3	Mirrored	-309	1197	1506
3.5	Standard>	-309	1697	2006
4	Standard>	-309	2197	2506
4	Mirrored	-309	2197	2506
4.5	Standard>	-309	2697	3006
5	Standard>	-309	3197	3506
5	Mirrored	-309	3197	3506
5.5	Standard>	-309	3697	4006
6	Standard>	-309	4197	4506
6	Mirrored	-309	4197	4506
6.5	Standard>	-309	4697	5006
7	Standard>	-309	5197	5506
7	Mirrored	-309	5197	5506
7.5	Standard>	-309	5697	6006
8	Standard>	-309	6197	6506
8	Mirrored	-309	6197	6506
8.5	Standard>	-309	6697	7006
9	Standard>	-309	7197	7506
9	Mirrored	-309	7197	7506

Continues on next page

Carriage quantity is 1.				
	First Carriage			
	Stand-ard/Mirrored	Work range		
Track Length		Start	End	Stroke
9.5	Standard>	-309	7697	8006
10	Standard>	-309	8197	8506
10	Mirrored	-309	8197	8506
10.5	Standard>	-309	8697	9006
11	Standard>	-309	9197	9506
11	Mirrored	-309	9197	9506
11.5	Standard>	-309	9697	10006
12	Standard>	-309	10197	10506
12	Mirrored	-309	10197	10506
12.5	Standard>	-309	10697	11006
13	Standard>	-309	11197	11506
13	Mirrored	-309	11197	11506
13.5	Standard>	-309	11697	12006
14	Standard>	-309	12197	12506
14	Mirrored	-309	12197	12506
14.5	Standard>	-309	12697	13006
15	Standard>	-309	13197	13506
15	Mirrored	-309	13197	13506
15.5	Standard>	-309	13697	14006
16	Standard>	-309	14197	14506
16	Mirrored	-309	14197	14506
16.5	Standard>	-309	14697	15006
17	Standard>	-309	15197	15506
17	Mirrored	-309	15197	15506
17.5	Standard>	-309	15697	16006
18	Standard>	-309	16197	16506
18	Mirrored	-309	16197	16506
18.5	Standard>	-309	16697	17006
19	Standard>	-309	17197	17506
19	Mirrored	-309	17197	17506
19.5	Standard>	-309	17697	18006
20	Standard>	-309	18197	18506
20	Mirrored	-309	18197	18506
20.5	Standard>	-309	18697	19006
21	Standard>	-309	19197	19506

Continues on next page

Carriage quantity is 1.					
	First Carriage				
	Stand-ard/Mirrored	**Work range**			
Track Length		**Start**	**End**	**Stroke**	
21	Mirrored	-309	19197	19506	
21.5	Standard>	-309	19697	20006	

Double carriages

Please check the layout of work range attached file and dimension information.
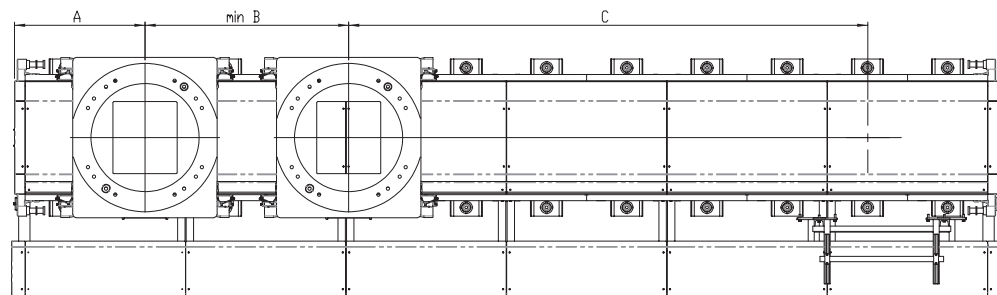
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Pos	Description
A	813 mm
B minim-um	1270 mm
C	Stroke

Carriage quantity is 2.							
	First Carriage			**Second Carriage**			
	Stand-ard/Mirrored	**Work range**		**Stand-ard/Mirrored**	**Work range**		
Track Length		**Start**	**End**		**Start**	**End**	**Stroke**
4	Standard	-309	927	Standard	-1039	197	1236
4	Standard	-309	927	Mirrored	-309	927	1236
4	Mirrored	-1039	197	Mirrored	-309	927	1236
4.5	Standard	-309	1427	Standard	-1539	197	1736
5	Standard	-309	1927	Standard	-2039	197	2236
5	Standard	-309	1927	Mirrored	-309	1927	2236
5	Mirrored	-2039	197	Mirrored	-309	1927	2236
5.5	Standard	-309	2427	Standard	-2539	197	2736
6	Standard	-309	2927	Standard	-3039	197	3236
6	Standard	-309	2927	Mirrored	-309	2927	3236
6	Mirrored	-3039	197	Mirrored	-309	2927	3236
6.5	Standard	-309	3427	Standard	-3539	197	3736
7	Standard	-309	3927	Standard	-4039	197	4236

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Carriage quantity is 2.							
	First Carriage			Second Carriage			
	Stand-ard/Mirrored	Work range		Stand-ard/Mirrored	Work range		
Track Length		Start	End		Start	End	Stroke
7	Standard	-309	3927	Mirrored	-309	3927	4236
7	Mirrored	-4039	197	Mirrored	-309	3927	4236
7.5	Standard	-309	4427	Standard	-4539	197	4736
8	Standard	-309	4927	Standard	-5039	197	5236
8	Standard	-309	4927	Mirrored	-309	4927	5236
8	Mirrored	-5039	197	Mirrored	-309	4927	5236
8.5	Standard	-309	5427	Standard	-5539	197	5736
9	Standard	-309	5927	Standard	-6039	197	6236
9	Standard	-309	5927	Mirrored	-309	5927	6236
9	Mirrored	-6039	197	Mirrored	-309	5927	6236
9.5	Standard	-309	6427	Standard	-6539	197	6736
10	Standard	-309	6927	Standard	-7039	197	7236
10	Standard	-309	6927	Mirrored	-309	6927	7236
10	Mirrored	-7039	197	Mirrored	-309	6927	7236
10.5	Standard	-309	7427	Standard	-7539	197	7736
11	Standard	-309	7927	Standard	-8039	197	8236
11	Standard	-309	7927	Mirrored	-309	7927	8236
11	Mirrored	-8039	197	Mirrored	-309	7927	8236
11.5	Standard	-309	8427	Standard	-8539	197	8736
12	Standard	-309	8927	Standard	-9039	197	9236
12	Standard	-309	8927	Mirrored	-309	8927	9236
12	Mirrored	-9039	197	Mirrored	-309	8927	9236
12.5	Standard	-309	9427	Standard	-9539	197	9736
13	Standard	-309	9927	Standard	-10039	197	10236
13	Standard	-309	9927	Mirrored	-309	9927	10236
13	Mirrored	-10039	197	Mirrored	-309	9927	10236
13.5	Standard	-309	10427	Standard	-10539	197	10736
14	Standard	-309	10927	Standard	-11039	197	11236
14	Standard	-309	10927	Mirrored	-309	10927	11236
14	Mirrored	-11039	197	Mirrored	-309	10927	11236
14.5	Standard	-309	11427	Standard	-11539	197	11736
15	Standard	-309	11927	Standard	-12039	197	12236
15	Standard	-309	11927	Mirrored	-309	11927	12236
15	Mirrored	-12039	197	Mirrored	-309	11927	12236
15.5	Standard	-309	12427	Standard	-12539	197	12736

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Carriage quantity is 2.							
	First Carriage			Second Carriage			
	Stand-ard/Mirrored	Work range		Stand-ard/Mirrored	Work range		
Track Length		Start	End		Start	End	Stroke
16	Standard	-309	12927	Standard	-13039	197	13236
16	Standard	-309	12927	Mirrored	-309	12927	13236
16	Mirrored	-13039	197	Mirrored	-309	12927	13236
16.5	Standard	-309	13427	Standard	-13539	197	13736
17	Standard	-309	13927	Standard	-14039	197	14236
17	Standard	-309	13927	Mirrored	-309	13927	14236
17	Mirrored	-14039	197	Mirrored	-309	13927	14236
17.5	Standard	-309	14427	Standard	-14539	197	14736
18	Standard	-309	14927	Standard	-15039	197	15236
18	Standard	-309	14927	Mirrored	-309	14927	15236
18	Mirrored	-15039	197	Mirrored	-309	14927	15236
18.5	Standard	-309	15427	Standard	-15539	197	15736
19	Standard	-309	15927	Standard	-16039	197	16236
19	Standard	-309	15927	Mirrored	-309	15927	16236
19	Mirrored	-16039	197	Mirrored	-309	15927	16236
19.5	Standard	-309	16427	Standard	-16539	197	16736
20	Standard	-309	16927	Standard	-17039	197	17236
20	Standard	-309	16927	Mirrored	-309	16927	17236
20	Mirrored	-17039	197	Mirrored	-309	16927	17236
20.5	Standard	-309	17427	Standard	-17539	197	17736
21	Standard	-309	17927	Standard	-18039	197	18236
21	Standard	-309	17927	Mirrored	-309	17927	18236
21	Mirrored	-18039	197	Mirrored	-309	17927	18236
21.5	Standard	-309	18427	Standard	-18539	197	18736

1.5.3 Performance

General

The following table describes the dynamic performances of the IRT 710 OmniCore.

IRT 710 OmniCore	Performance
Pose repeatability (mm)	≤ ± 0.02
Max. acceleration (m/s^2)	Large robot support: up to 2m/s^2
	Medium robot support: up to 2.5m/s^2

1.5.4 Velocity

Maximum axis speeds

IRT 710 OmniCore	Performance
Large robot support (IRB 7600, IRB 6650S, IRB 6700, IRB 760, IRB 660, IRB 460, IRB 6710/6720/6730/6740) support	1.8 m/s
Large robot support (IRB 5710, IRB 5720)	2.0 m/s
Medium robot support (IRB 4600, IRB 4400)	2.0 m/s

1.5.5 Positioning time

Positioning time at different travel length

The following table describes the typical positioning times.

Condition	Travel length (m)				
	1	2	3	4	5
IRT 710 OmniCore Load IRB 7600 with 500 kg payload.	1.50 s [i]	2.13 s [ii]	2.69 s	3.23 s	3.81 s

[i]   The distance is too short for the carriage to reach its maximum speed.
[ii]   The distance is too short for the carriage to reach its maximum speed.

1.5.6 Stopping distance/time

General

The following table describes the stopping distances and time.

		IRT 710 OmniCore Load IRB 7600 with 500 kg payload (robot static)
Category 0	Stopping time (s)	1.0
	Distance (m)	0.92
Category 1	Stopping time (s)	1.1
	Distance (m)	1.10

1.5.7 Thermal performance

General

The IRT 710 OmniCore is designed for intermittent operation. It is not meant to continuously accelerate/decelerate. The latter can result in overheating of the track motor which will lead to a stop of the system or possibly a motor failure due to overheating. Contact your local ABB Robotics office for advice in case of applications with high duty cycles.

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1.6 Maintenance and troubleshooting

General

The IRT 710 OmniCore 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.
- Grease is used for the rack & pinion, rectangular rail and cam roller.
- 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 IRT 710 OmniCore. The required maintenance activities also depend on the selected options. For detailed information on maintenance procedures, see the maintenance section in product manual.

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2 Specification of variants and options

2.1 Introduction to variants and options

General

Different variants and options for the IRT 710 OmniCore are described in the following sections. The same option numbers are used here as in the specification form.

2.2 Track motion type

Carriage quantity

Option	Description	Note
4300-1	Carriage quantity	Choose quantity (1-2), mandatory option.

Covered track - 1.0 m

Option	Description	Note
4301-1	Track length	Choose length (3-21), mandatory option.

Covered additional 0.5 m

Option	Description	Note
4302-1	Covered track - 0.5 m	REQUIRES: [4301-1] Covered Track - 1.0 m

Installation tool kit

Option	Description	Note
4303-1	Installation tool kit	Tool for levelling screw x1, Rail tooling (3 + 3), CAM Roller adjust tool x 1, Tooling bolt x (Covered track - 1.0 m quantity x 4), M60 Lock Nut tighten tooling x1, Track connecting tooling set x2, Y adjust tool x (Covered track - 1.0 m quantity x 2), Rack assembly tool x 3, Rack tool x 3

External cable chain Position

Option	Description	Note
4304-1	Standard in middle	REQUIRES: [4301-1] Covered Track - 1.0 m
4304-2	Mounted left handed	REQUIRES: [4301-1] Covered Track - 1.0 m
4304-3	Mounted right handed	REQUIRES: [4301-1] Covered Track - 1.0 m

Track color

Option	Color	RAL code [i]
209-202	ABB Graphite White std (Default value, standard color)	RAL 7035

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

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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]

Option	Type	Description
438-1	Standard warranty	Standard warranty is 12 months from *Customer Delivery Date* or latest 18 months after *Factory Shipment Date*, whichever occurs first. Warranty terms and conditions apply.
438-2	Standard warranty + 12 months	Standard warranty extended with 12 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-4	Standard warranty + 18 months	Standard warranty extended with 18 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-6	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 CARRIAGE BASICS (NUMBER 1/2)

General introduction

The IRT 710 OmniCore can be equipped with totally two carriages.

In the below lists, 1 & 2 means carriage 1, carriage 2.

Carriage travel 1/2

Option	Description	Note
4305-1	Carriage travel	Travel length, for carriage number 1
4322-1		Travel length, for carriage number 2

Bulkhead stand

Option	Description	Note
4306-1	Bulkhead stand [i]	For carriage number 1
4323-1		For carriage number 2

[i] The bulkhead is the interface mounting plate and protection box for the cable joints of flex cables and floor cables.
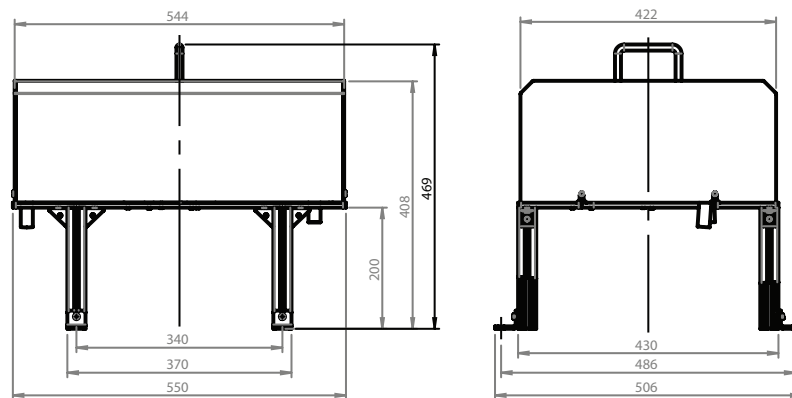
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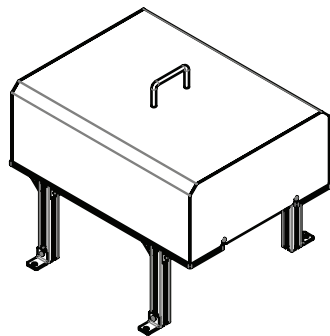
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Carriage lubrication

This option is mandatory option. If carriage quantity is 2, the option battery driven or 24V controlled will be automatically selected according to the selection of carriage 1.

Option	Description	Note
4307-1	Battery driven [i] (Default value)	For carriage number 1
4324-1		For carriage number 2

[i] The lubrication pump is driven by battery.

Option	Description	Note
4307-2	24V control w. feedback [i]	For carriage number 1
4324-2		For carriage number 2

[i] The lubrication pump is driven by 24V signal. To check if the lubrication system works well, it is viable to take use of lubrication feedback system with IRT 710 OmniCore.

Carriage calibration

This option is mandatory option. If carriage quantity is 2, the option Axis calibration will be automatically selected according to the selection of carriage 1.

Option	Description	Note
4308-1	Axis calibration	For carriage number 1
4325-1		For carriage number 2

Option	Description	Note
4308-2	Mechanical pin (Default value)	For carriage number 1
4325-2		For carriage number 2

Direction of travel

This option is mandatory option. For more details, see *Assembly of the manipulator on page 37*.

If carriage quantity is 1, standard or mirrored is selectable.

If carriage quantity is 2 and the carriage number 1 select standard, then the carriage number 2 can be standard or mirrored mounting.

If carriage quantity is 2 and the carriage number 1 select mirrored, then the carriage number 2 must be mirrored.

Option	Description	Note
4309-1	Standard (Default value)	For carriage number 1
4326-1		For carriage number 2

Option	Description	Note
4309-2	Mirrored	For carriage number 1
4326-2	NOT TOGETHER WITH: [4302-1] Additional 0.5 m	For carriage number 2

2 Specification of variants and options

2.3 CARRIAGE BASICS (NUMBER 1/2)
Continued

Valid for product

This option is mandatory option. The robot carriagecannot be selected at the same time.

Option	Description	Note
4310-1	IRB 4400 OmniCore	For carriage number 1
4327-1		For carriage number 2

Option	Description	Note
4310-2	IRB 4600 OmniCore	For carriage number 1
4327-2		For carriage number 2

Option	Description	Note
4310-3	IRB 5710	For carriage number 1
4327-3		For carriage number 2

Option	Description	Note
4310-4	IRB 5720	For carriage number 1
4327-4		For carriage number 2

Option	Description	Note
4310-5	IRB 6650S OmniCore	For carriage number 1
4327-5		For carriage number 2

Option	Description	Note
4310-6	IRB 6700 OmniCore	For carriage number 1
4327-6		For carriage number 2

Option	Description	Note
4310-7	IRB 6710	For carriage number 1
4327-7		For carriage number 2

Option	Description	Note
4310-8	IRB 6720	For carriage number 1
4327-8		For carriage number 2

Option	Description	Note
4310-9	IRB 6730	For carriage number 1
4327-9		For carriage number 2

Option	Description	Note
4310-10	IRB 6740	For carriage number 1
4327-10		For carriage number 2

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Option	Description	Note
4310-11	IRB 7600 OmniCore	For carriage number 1
4327-11		For carriage number 2

Option	Description	Note
4310-14	IRB 460 OmniCore	For carriage number 1
4327-14		For carriage number 2

Option	Description	Note
4310-15	IRB 660 OmniCore	For carriage number 1
4327-15		For carriage number 2

Option	Description	Note
4310-16	IRB 760 OmniCore	For carriage number 1
4327-16		For carriage number 2

Robot orientation

Option	Description	Note
4311-1	Inline	For carriage number 1
4328-1		For carriage number 2

Option	Description	Note
4311-2	45 Degrees	For carriage number 1
4328-2		For carriage number 2

Option	Description	Note
4311-3	90 Degrees	For carriage number 1
4328-3		For carriage number 2

Option	Description	Note
4311-4	135 Degrees	For carriage number 1
4328-4		For carriage number 2

Option	Description	Note
4311-5	180 Degrees	For carriage number 1
4328-5		For carriage number 2

Option	Description	Note
4311-6	225 Degrees	For carriage number 1
4328-6		For carriage number 2

Option	Description	Note
4311-7	270 Degrees	For carriage number 1
4328-7		For carriage number 2

2.3 CARRIAGE BASICS (NUMBER 1/2)
Continued

Option	Description	Note
4311-8	315 Degrees	For carriage number 1
4328-8		For carriage number 2

Robot pedestal

Option	Description	Note
4312-1	250mm	For carriage number 1
4329-1		For carriage number 2

Option	Description	Note
4312-2	500mm	For carriage number 1 NOT TOGETHER WITH: [4310-16] IRB 760 OmniCore, [4310-11] IRB 7600 OmniCore, [4310-10] IRB 6740, [4310-5] IRB 6650S Omni-Core
4329-2		For carriage number 2 NOT TOGETHER WITH: [4327-16] IRB 760 OmniCore, [4327-11] IRB 7600 OmniCore, [4327-10] IRB 6740, [4317-5] IRB 6650S Omni-Core

Option	Description	Note
4312-3	750mm	For carriage number 1 REQUIRES: [4310-2] IRB 4600 OmniCore
4329-3		For carriage number 2 REQUIRES: [4327-2] IRB 4600 OmniCore

Extra cable chain

Option	Description	Note
4313-1	Extra cable chain	For carriage number 1 NOT TOGETHER WITH: [4304-1] Standard in middle
4330-1		For carriage number 2 NOT TOGETHER WITH: [4304-1] Standard in middle

OmniCore Connection

This option is mandatory option.

Option	Description	Note
4314-1	No MCB box	For carriage number 1 NOT TOGETHER WITH: [4310-14] IRB 460 OmniCore, [4310-1] IRB 4400 OmniCore REQUIRES: Floor cables - Controller 1
4331-1		For carriage number 2 NOT TOGETHER WITH: [4327-14] IRB 460 OmniCore, [4327-1] IRB 4400 OmniCore REQUIRES: Floor cables - Controller 2

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Option	Description	Note
4314-2	Use MCB box	For carriage number 1
4331-2		For carriage number 2

MCB Box stand

Option	Description	Note
4315-1	MCB Box stand (For fixing and protection)	For carriage number 1 REQUIRES: [4314-2] Use MCB box
4332-1		For carriage number 2 REQUIRES: [4331-2] Use MCB box
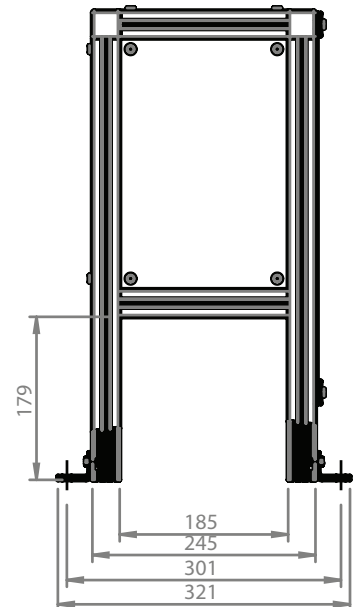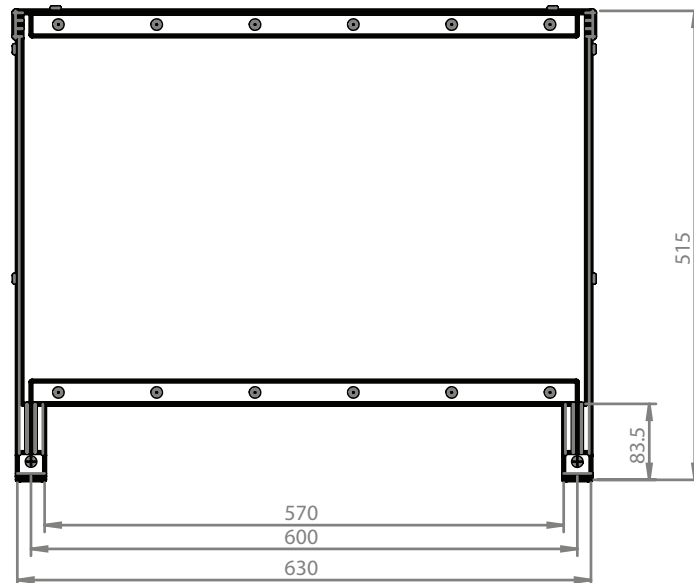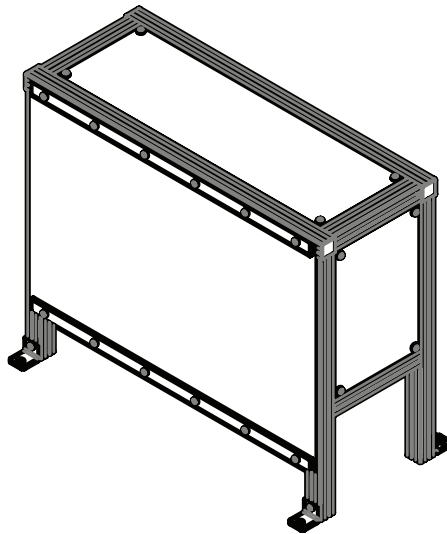
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2 Specification of variants and options

Floor cables - OmniCore to Track

This option is mandatory option.

Option	Description	Note
4316-1	7m Floor cables	For carriage number 1 REQUIRES: [4314-1] No MCB box
4333-1		For carriage number 2 REQUIRES: [4331-1] No MCB box

Option	Description	Note
4316-2	15m Floor cables	For carriage number 1 REQUIRES: [4314-1] No MCB box
4333-2		For carriage number 2 REQUIRES: [4331-1] No MCB box

Option	Description	Note
4316-3	22m Floor cables	For carriage number 1 REQUIRES: [4314-1] No MCB box
4333-3		For carriage number 2 REQUIRES: [4331-1] No MCB box

Welding power cable

Option	Description	Note
4318-1	Welding power cable	For carriage number 1 If [4305-1] Carriage travel 1 >10m, REQUIRES [4313-1] Extra cable chain REQUIRES: [4310-3] IRB 5710, [4310-4] IRB 5720, [4310-7] IRB 6710, [4310-8] IRB 6720, [4310-9] IRB 6730, [4310-10] IRB 6740, [4310-5] IRB 6650S OmniCore, [4310-6] IRB 6700 OmniCore, [4310-11] IRB 7600 OmniCore REQUIRES: [4314-2] Use MCB box
4335-1		For carriage number 2 If [4322-1] Carriage travel 1 >10m, REQUIRES [4330-1] Extra cable chain REQUIRES: [4327-3] IRB 5710, [4327-4] IRB 5720, [4327-7] IRB 6710, [4327-8] IRB 6720, [4327-9] IRB 6730, [4327-10] IRB 6740, [4327-5] IRB 6650S OmniCore, [4327-6] IRB 6700 OmniCore, [4327-11] IRB 7600 OmniCore REQUIRES: [4331-2] Use MCB box

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Servo-gun motor cable

Option	Description	Note
4319-1	Servo-gun motor cable	For carriage number 1 If [4305-1] Carriage travel 1 >10m, REQUIRES [4313-1] Extra cable chain REQUIRES: [4310-3] IRB 5710, [4310-4] IRB 5720, [4310-7] IRB 6710, [4310-8] IRB 6720, [4310-9] IRB 6730, [4310-10] IRB 6740, [4310-5] IRB 6650S OmniCore, [4310-6] IRB 6700 OmniCore, [4310-11] IRB 7600 OmniCore REQUIRES: [4314-2] Use MCB box
4336-1		For carriage number 2 If [4322-1] Carriage travel 1 >10m, REQUIRES [4330-1] Extra cable chain REQUIRES: [4327-3] IRB 5710, [4327-4] IRB 5720, [4327-7] IRB 6710, [4327-8] IRB 6720, [4327-9] IRB 6730, [4327-10] IRB 6740, [4327-5] IRB 6650S OmniCore, [4327-6] IRB 6700 OmniCore, [4327-11] IRB 7600 OmniCore REQUIRES: [4331-2] Use MCB box

CP/CS

Option	Description	Note
4320-1	Parallel	For carriage number 1 NOT TOGETHER WITH: [4310-1] IRB 4400 OmniCore
4337-1		For carriage number 2 NOT TOGETHER WITH: [4327-1] IRB 4400 OmniCore

Option	Description	Note
4320-2	DeviceNet	For carriage number 1 NOT TOGETHER WITH: [4310-1] IRB 4400 OmniCore, [4327-3] IRB 5710, [4327-4] IRB 5720, [4327-7] IRB 6710, [4327-8] IRB 6720, [4327-9] IRB 6730, [4327-10] IRB 6740
4337-2		For carriage number 2 NOT TOGETHER WITH: [4327-1] IRB 4400 OmniCore, [4327-3] IRB 5710, [4327-4] IRB 5720, [4327-7] IRB 6710, [4327-8] IRB 6720, [4327-9] IRB 6730, [4327-10] IRB 6740

Option	Description	Note
4320-3	Ethernet/Profinet	For carriage number 1 NOT TOGETHER WITH: [4310-1] IRB 4400 OmniCore
4337-3		For carriage number 2 NOT TOGETHER WITH: [4327-1] IRB 4400 OmniCore

2 Specification of variants and options

Option	Description	Note
4320-4	CP/CS for IRB 4400 REQUIRES: IRB 4400, Carriage stroke less than 20m	For carriage number 1 REQUIRES: [4310-1] IRB 4400 OmniCore
4337-4		For carriage number 2 REQUIRES: [4327-1] IRB 4400 OmniCore

Media hose

Option	Description	Note
4321-1	1x DN12	For carriage number 1
4338-1		For carriage number 2

Option	Description	Note
4321-2	3x DN12 Carriage stroke less than 10m	For carriage number 1 REQUIRES: [4318-1] Welding power cable
4338-2		For carriage number 2 REQUIRES: [4335-1] Welding power cable

Option	Description	Note
4321-3	4x DN12 Carriage stroke less than 10m	For carriage number 1 REQUIRES: [4318-1] Welding power cable
4338-3		For carriage number 2 REQUIRES: [4335-1] Welding power cable

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