

ROBOTICS

Product specification

FlexTrack IRT501



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Product specification

**FlexTrack IRT501-66
FlexTrack IRT501-66R
FlexTrack IRT501-90
FlexTrack IRT501-90R
FlexTrack IRT501-90RE
FlexTrack IRT501-90RS**

IRC5

Document ID: 3HAW050008591-001

Revision: D

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Overview

About this Product specification

It describes the performance of the FlexTrack in terms of:

- The structure and dimensional prints
- The fulfilment of standards, safety and operating requirements
- The payloads, mounting of extra equipment, the motion and reach
- The specification of variants and options available

Usage

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

Users

It is intended for:

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

Content

Please see Table of Contents.

References

Reference	Document ID
Product specification - Controller software IRC5	3HAC022349-001
Product specification - Controller IRC5 with FlexPendant	3HAC021785-001
Product specification - Robot user documentation	3HAC024534-001
Product manual - FlexTrack IRT501	3HAW050008590

Revisions

Revision	Description
-	First edition.
A	CP/CS options lengths corrected Acceleration values corrected IRT501-66 top plate drawing corrected
B	Robot capabilities information is updated. Robot plate for IRB 6700: option 1104-17 is added. Add lubrication feedback option. Robot controller requirement is updated. Other options as colors, cables are updated.

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Overview

Continued

Revision	Description
C	Changes made in: <ul style="list-style-type: none">• Added information of six bearings 90RE variant.• Added information of six bearings 90RS variant.• Updated specification information.
D	Changes made in: <ul style="list-style-type: none">• Updated specification information.• Minor updates from product manual to product specification.

1 Description

1.1 Structure

1.1.1 Introduction

General

The FlexTrack IRT 501-66 /66R /90 /90R/90RE/90RS is a linear track motion which, like the ABB robots, is driven by the IRC5 controller. It is designed with a great focus on compactness, protection and modularity.

It is possible to use the unit to translate a tooling positioning a car or a part in front of the process robots (material handling applications). As a linear track motion it can also be used to carry robots for various processes and therefore increase the robot working envelope by adding a programmable degree of freedom to the manipulator.

The FlexTrack integrates a powerful and compact servomotor equipped with a high quality gear, allowing high accelerations and speeds without compromise about accuracy and repeatability. All internal guidance and transmission components are protected against pollution from welding (International Protection Rating IP54).

Operating system

The IRT 501 series is equipped with the IRC5 controller and robot control software RobotWare, which supports every aspect of the robot system, such as motion control, development and execution of application programs, communication, etc. See *Product specification - Controller IRC5 with FlexPendant*.

Safety

FlexTrack supports safe move independently (without ABB robot).

To implement advanced safety control, it is viable to take use of SafeMove2 with FlexTrack.

Presently, the way that SafeMove2 functions with FlexTrack is as below:

- Robot coordinated with FlexTrack
- Independent FlexTrack with standalone controller

Regarding software and hardware options, installation and commissioning, safety etc., please follow the instructions in *Application manual - Functional safety and SafeMove2 (3HAC052610-001)*.

1 Description

1.1.2 FlexTrack versions overview

1.1.2 FlexTrack versions overview

Overview of the different versions

The FlexTrack is available in two versions which differ from their width:

- The FlexTrack IRT 501-66 which is 660 mm wide
- The FlexTrack IRT 501-90 which is 900 mm wide

Additionally, reinforced versions are available:

- The FlexTrack IRT 501-66R
- The FlexTrack IRT 501-90R/RE/RS

There are two areas that are affected by choosing the reinforced/standard option:

- The structure of the FlexTrack 66R and 90R have more crossmembers, increasing the stiffness of the track itself.
- The FlexTrack carriages 66R and 90R have a different combination of motor and reducer to allow for a higher payload.
- FlexTrack IRT 501-90RE has high load of robot application. The track section is same as FlexTrack IRT 501-90R, but has higher load.
- FlexTrack IRT 501-90RS has high load and high speed. The track section is same as FlexTrack IRT 501-90R, but has higher speed and load.

Note that it is possible to configure a FlexTrack with a structure type 66 or 90 and respectively carriage(s) type 66R or 90R. This is suitable for applications with low transversal loads such as workpiece transfer, but not suitable for use with robots (manipulators may generate high dynamic loads in all directions). In case of doubt, please contact ABB.

The table below shows the main differences between the different type of FlexTrack carriage, notably the speed and maximum payload:

Carriage type	IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R	IRT 501-90RE	IRT 501-90RS
Repeatability	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm	+/- 0.02 mm
Acceleration	2 m/s ²	1.2 m/s ²	1.2 m/s ²	1.0 m/s ²	1.0 m/s ²	1.6 m/s ²
Deceleration	2 m/s ²	1.8 m/s ²	1.8 m/s ²	1.2 m/s ²	1.2 m/s ²	1.6 m/s ²
Travel Speed	2 m/s	1.5 m/s	1.5 m/s	1.2 m/s	1.2 m/s	1.8 m/s
Maximum Payload	900 kg	2,000 kg	2,000 kg	3,000 kg	3,000 kg	3,000 kg



Note

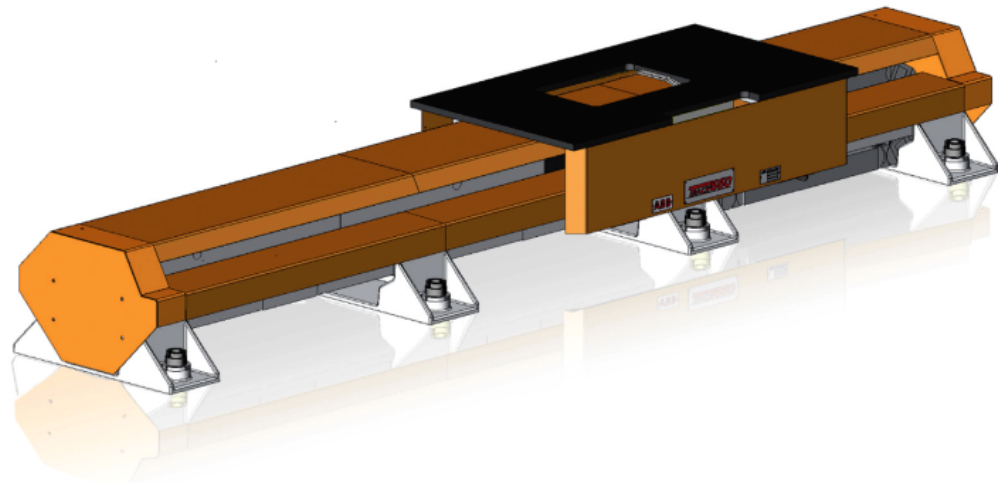
The payloads listed above are estimated for a wide range of FlexTrack applications.

For ModulFlex payload, please refer to ModulFlex specifications.

For Gate Framer payload, please refer to Gate Framer specifications.

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The figure below shows the FlexTrack IRT 501-66.



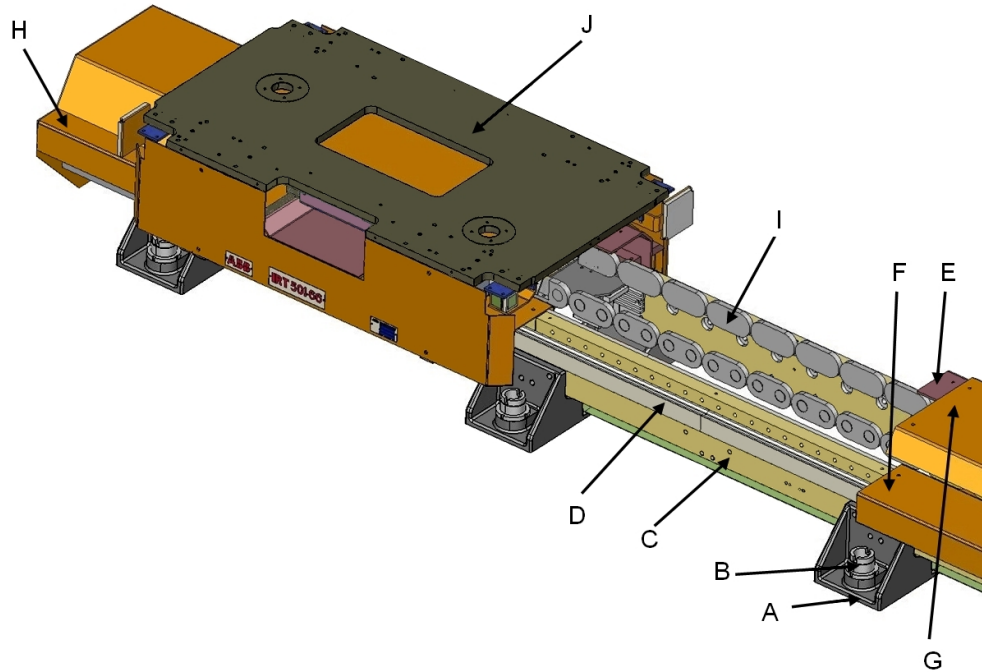
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1 Description

1.1.3 FlexTrack structure concept

1.1.3 FlexTrack structure concept

FlexTrack structure overview

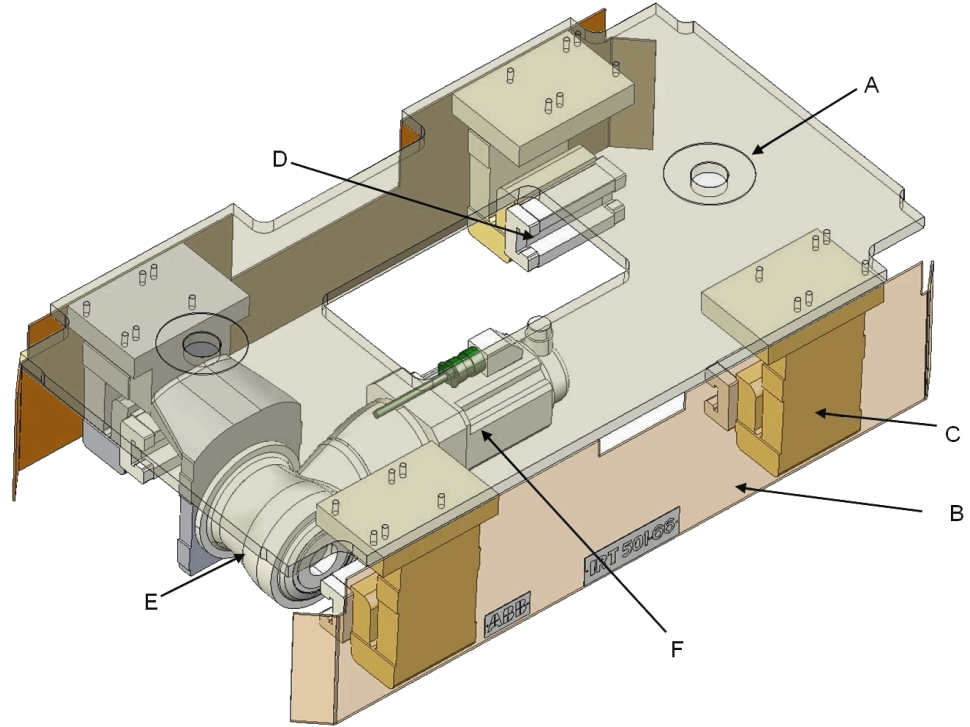


xx210000009

A	Crossmember
B	Levelling screw
C	Sidemember
D	Linear guideway
E	Cover bracket
F	Rack cover
G	Upper cover
H	End cover
I	Cable chain
J	Carriage

1.1.4 Carriage concept

FlexTrack carriage overview of IRT 501 - 66/66R/90/90R, with four bearings



xx210000010

A	Top plate
B	Side cover
C	Linear carriage support
D	Ball bearing block
E	Reducer
F	Servo motor

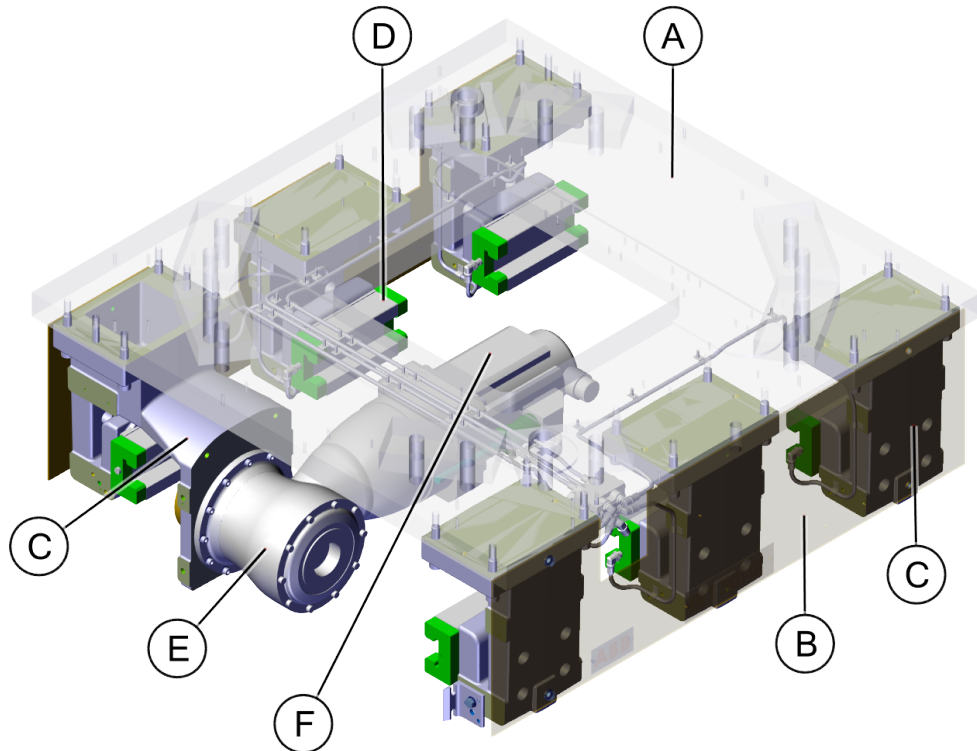
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1 Description

1.1.4 Carriage concept

Continued

FlexTrack carriage overview of IRT 501 - 90RE/90RS, with six bearings



xx2000002590

A	Top plate
B	Side cover
C	Linear carriage support
D	Ball bearing block
E	Reducer
F	Servo motor



Note

An additional "slave carriage" can be used when the required surface area of the carriage is not large enough to effectively support the workpiece. Such carriage is not equipped with a motor or a reducer. Instead, a primary motorized carriage is used to pull/push the slave carriage using a mechanical link ("linking bar").



Note that in such case, the maximum payload remains limited to that of the motorized carriage.

Continues on next page

Automatic lubrication

Each FlexTrack carriage is equipped as an option with an integrated automatic lubrication system and a dispatch circuit that routes lubricant to the ball bearing blocks, pinion, and rack.

There are two types of automatic lubrication system can be used in FlexTrack. One is HPS, and the other is EPS.

	HPS	EPS
Illustration	 <p>xx1800001961</p>	 <p>xx2000002593</p>
Power supply	4.5 battery	External 24 power
Control method	After setting the use period, install the time loop oil pump to work once, and then work independently according to the set use period until the oil bag is used up.	<p>A The same as the HPS time setting, except that the battery power supply is changed to an external power supply; but the oil pump works once when it is powered on, and then works according to the previously set time period under the condition of uninterrupted power, so it can be synchronized with the equipment (in shutdown Or the oil pump does not work during maintenance)</p> <p>B The working frequency of the oil pump is controlled by the equipment PLC. Because the oil pump works once when it is powered on, the customer can control the working frequency of the oil pump by controlling the power on and off frequency of the oil pump with the PLC.</p>

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1 Description

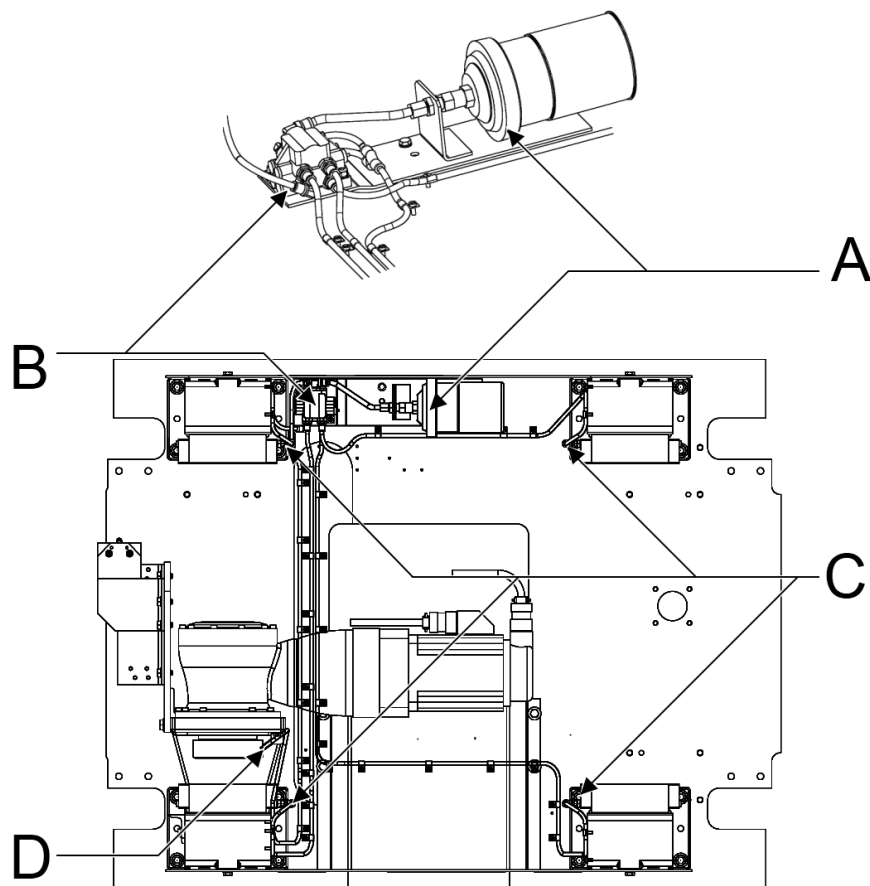
1.1.4 Carriage concept

Continued

Once the system has been activated, it delivers the exact quantity of needed grease to each port at required time interval, during at least one year. No other lubrication is required.

An opening on the side of the carriage casing allows to quickly check the quantity of grease left in the cartridge.

The figure below shows the automatic lubrication system with four bearings.

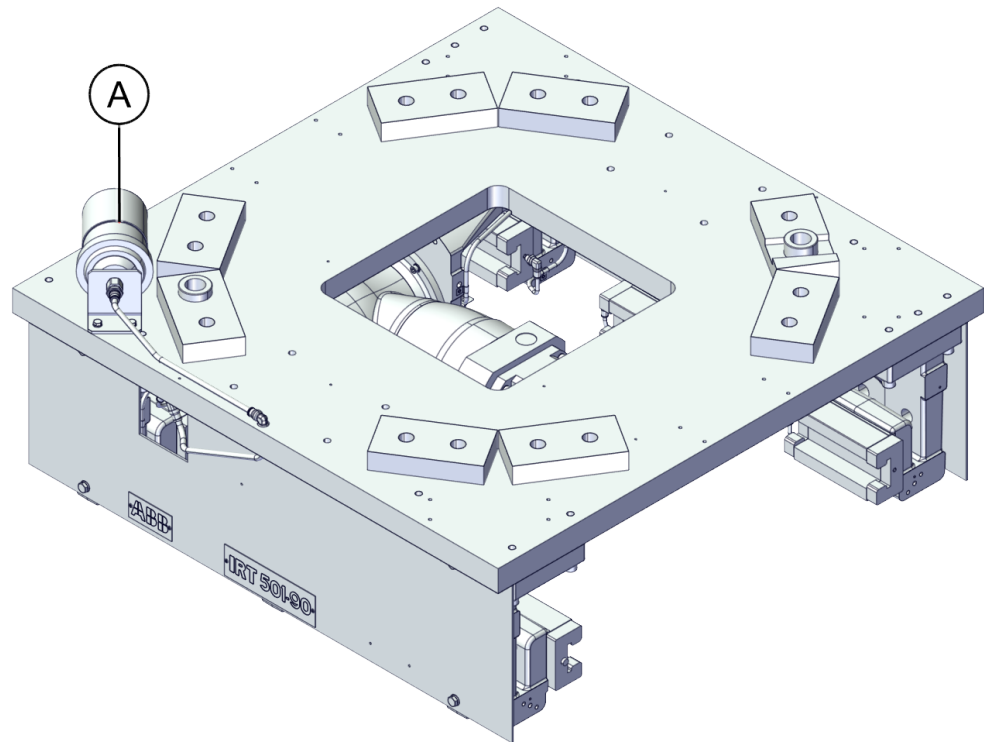


xx210000011

A	Automatic grease dispenser
B	Distributor 1 input - 6 outputs
C	Lubrication ports 1 to 4 (ball bearing blocks lubrication)
D	Lubrication port 5 (pinion and rack)

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The figure below shows the automatic lubrication system with six bearings.



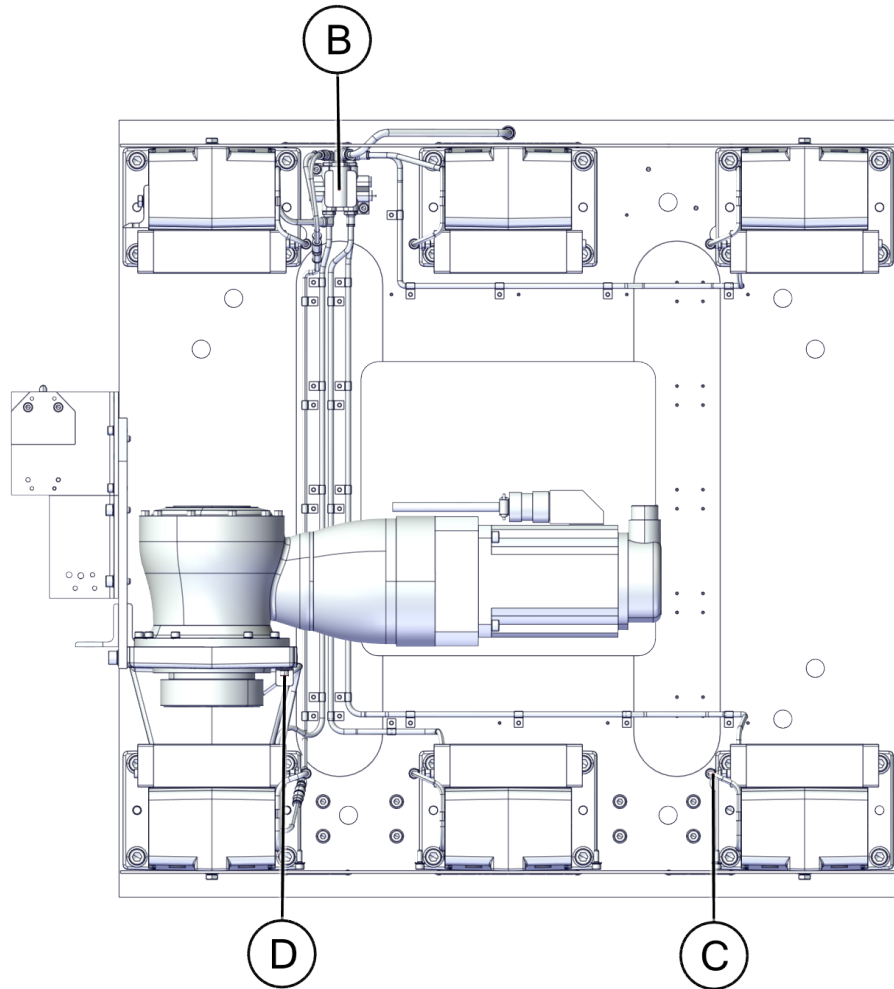
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1 Description

1.1.4 Carriage concept

Continued



xx2100000280

A	Automatic grease dispenser
B	Distributor 1 input - 8 outputs
C	Lubrication ports 1 to 6 (ball bearing blocks lubrication)
D	Lubrication port 7 (pinion and rack)

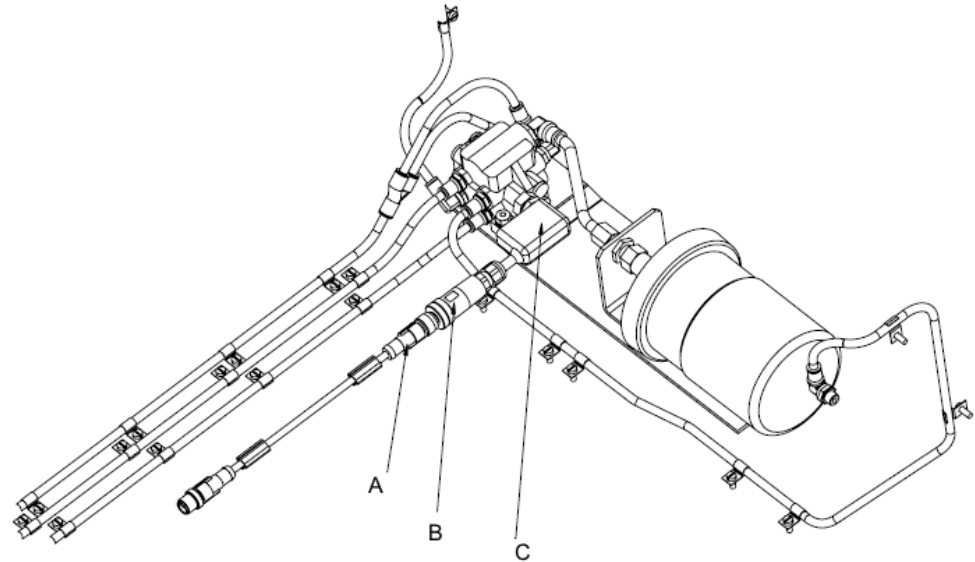
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Lubrication feedback

General

The auto lubrication system can be equipped in option with a switch that monitors the strokes of the pump.

The switch is delivered with a standard 4 poles M12 movement cable.



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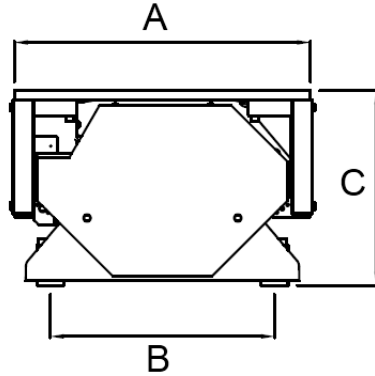
A	M12 cable
B	M12 connector
C	Switch

1 Description

1.1.5 Dimensions

1.1.5 Dimensions

Dimensions of the FlexTrack



xx210000013

Data		IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R	IRT 501-90RE	IRT 501-90RS
A (mm)	Total width	660	660	900 ⁱ	900 ⁱ	900 ⁱ	900 ⁱ
B (mm)	Width (foot print)	500	500	680	680	680	680
C (mm)	Height	435	435	495	495	495	495

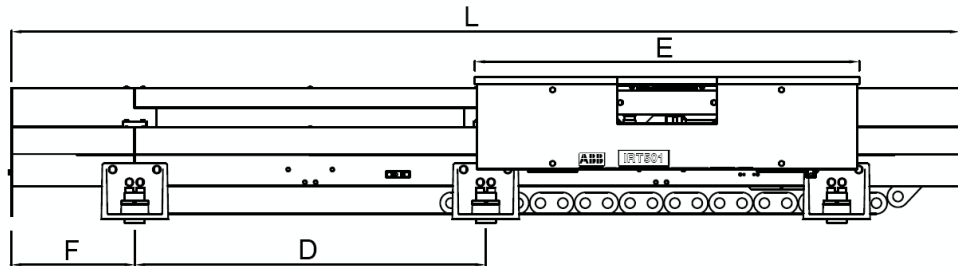
ⁱ When equipped with external cable chain, the IRT501-90 and IRT501-90R total width is extended to 1,200 mm. See [External cable chain on page 45](#).

Continues on next page

1 Description

1.1.5 Dimensions

Continued



xx210000014

Data		IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R	IRT 501-90RE	IRT 501-90RS
D (mm)	Distance between 2 feet	1050	525	1050	525	525	525
E (mm)	Top plate length	1150	1150	900	900	900	900
F (mm)	End cover length	366 ⁱ					
L (mm)	Total length	732 ⁱ + (M x 1050) ⁱⁱ with M = number of modules.					

- ⁱ In option, for FlexTracks with a single carriage, a short end cover can be used on one end. The length of such cover is 105 mm and the total length is then reduced to 474 + M x 1050. It is also possible to order the FlexTrack without any casing.
- ⁱⁱ The total length of the FlexTrack depends on the quantity of elementary modules, each module being 1,050 mm long. A FlexTrack can be assembled with a minimum of 2 modules and a maximum of 115 modules.

1 Description

1.1.6 Weight

1.1.6 Weight

Calculation

The weight of the FlexTrack depends on its type, length, and number of carriages.

The total weight can be determined with the following formulas:

Type	Weight (kg)
IRT 501-66	$W = 595 + M \times 195 + C \times 327$
IRT 501-66R	$W = 637 + M \times 237 + C \times 327$
IRT 501-90	$W = 710 + M \times 222 + C \times 393$
IRT 501-90R	$W = 752 + M \times 264 + C \times 393$
IRT 501-90RE/RS	$W = 805 + M \times 264 + C \times 446$

with:

M = Number of modules

C = Number of additional carriages (first carriage already included, C = 0 if only one carriage)

Table (complete FlexTrack with single carriage)

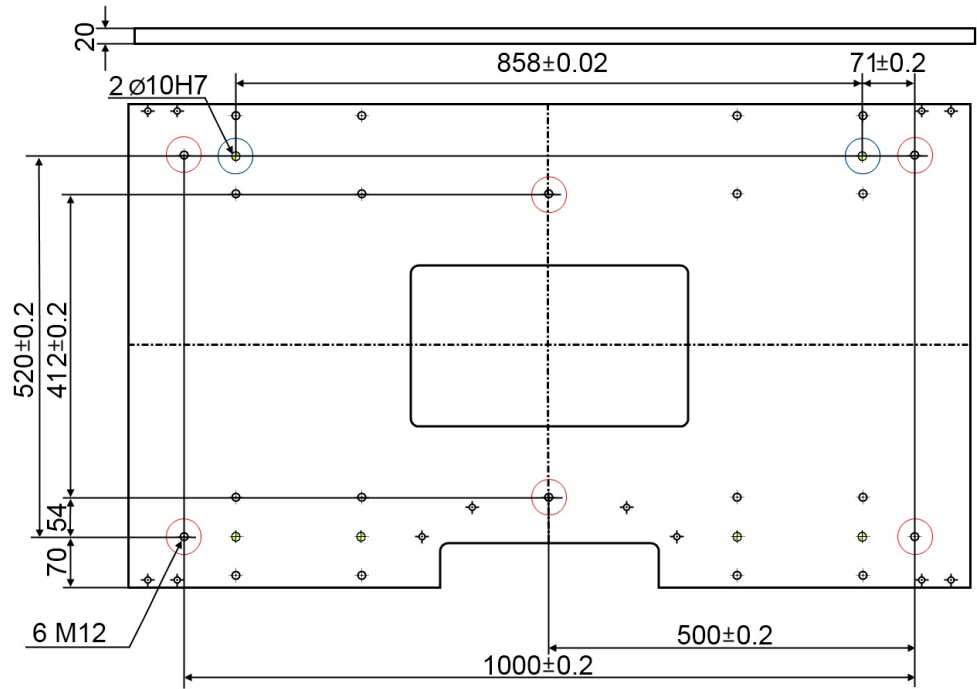
FlexTrack length			Weight (kg)				
In modules	In m	Travel length	66	66R	90	90R	90RE/90RS
2	2.9	1.1	985	1111	1154	1667	1720
3	3.9	2.1	1180	1348	1376	1931	1984
4	4.9	3.2	1375	1585	1598	2324	2377
5	6	4.2	1570	1822	1820	2717	2770
6	7	5.3	1765	2059	2042	3110	3163
7	8.1	6.3	1960	2296	2264	3503	3556
8	9.1	7.4	2155	2533	2486	3896	3949
9	10.2	8.4	2350	2770	2708	4289	4342
10	11.2	9.5	2545	3007	2930	4682	4735
11	12.3	10.5	2740	3244	3152	5075	5128
12	13.3	11.6	2935	3481	3374	5468	5521
13	14.4	12.6	3130	3718	3596	5861	5914
14	15.4	13.7	3325	3955	3818	6254	6307
15	16.5	14.7	3520	4192	4040	6647	6700
16	17.5	15.8	3715	4429	4262	7040	7093
17	18.6	16.8	3910	4666	4484	7433	7486
18	19.6	17.9	4105	4903	4706	7826	7879
19	20.7	18.9	4300	5140	4928	8219	8272
20	21.7	20	4495	5377	5150	8612	8665

1.1.7 Carriage table

Standard top plate

The standard top plates are designed with an opening in the middle to allow easy access to the motor connectors. They also include six M12 holes for the fastening of the fixture, as well as two Ø10H7 dowels for the locating.

Dimensions of the standard top plate for IRT 501-66 / IRT 501-66R:



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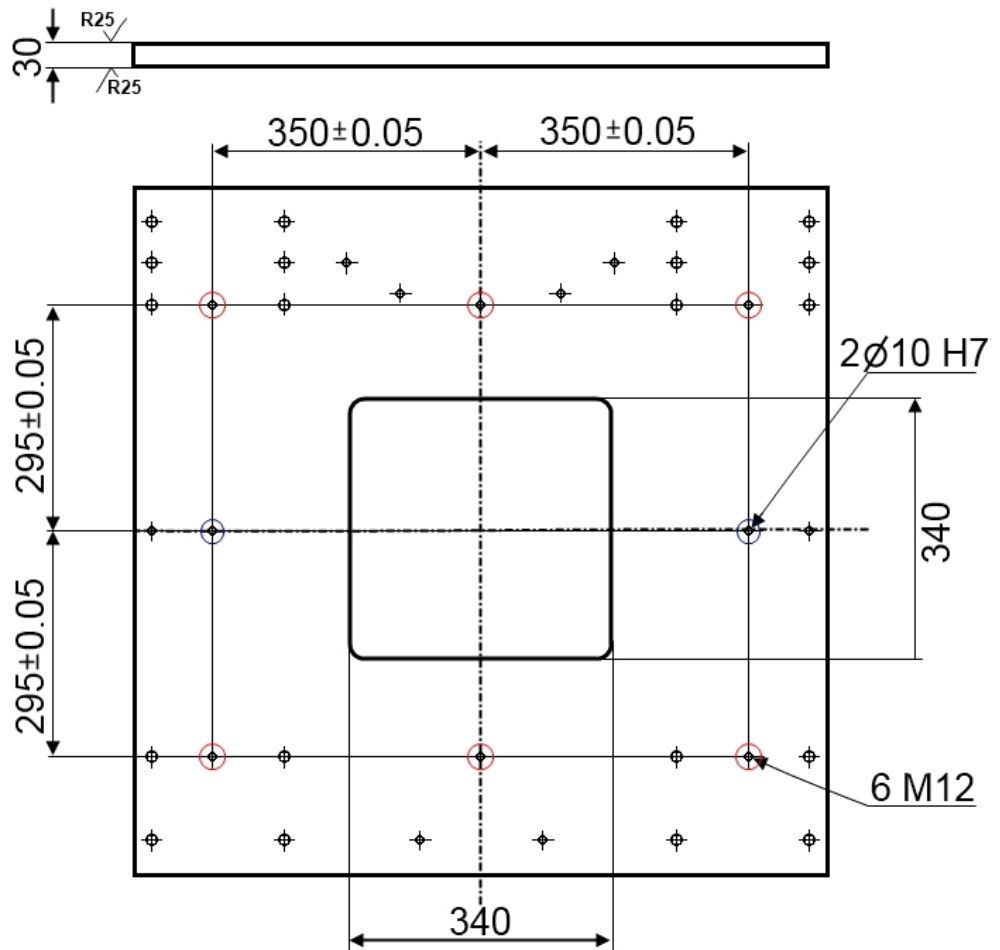
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1 Description

1.1.7 Carriage table

Continued

Dimensions of the standard top plate for IRT 501-90 / IRT 501-90R / IRT 501-90RE / IRT 501-90RS:



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Robot Plate

Robot plates exist for various robot models and their bolting patterns match that of the robot. Robot plates are symmetrically designed to allow different orientations of the manipulator mounting mounting (standard 90°, inverted -90°, in line, and in line 180°) regardless of the orientation of the plate. See the next chapter.

1.1.8 Mounting of a manipulator

Overview

When the FlexTrack is associated with a robot it behaves like an integrated 7th axis.

The FlexTrack unit is designed for ABB IRC5 controller.

The FlexTrack can be controlled with an IRC5 type panel mounted.

The FlexTrack can not be controlled with an IRC5 type compact.



Note

If a low voltage IRC5 controller is used to drive the FlexTrack (in particular when used with IRB1600/2400/2600), its performances (speed, acceleration) are reduced to 66.6% of their nominal values. See [Robot controller requirements on page 54](#).

Robot capabilities

The following table shows the robot capabilities of the FlexTrack.

Standard risers are generally allowed between the FlexTrack carriage and the robot but their height is limited and dependent on the type of FlexTrack and the type of robot.



Note

If the riser is too high, it may vibrate.

For higher riser application please contact ABB.

Robot	IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R	IRT 501-90RE	IRT 501-90RS
IRB 1410	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	X	X	X	X
IRB 1600	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	X	X	X	X
IRB 52	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	X	X	X	X
IRB 2400/2600	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	X	X	X	X
IRB 4400	X	X	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max
IRB 4600	X	X	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max

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1 Description

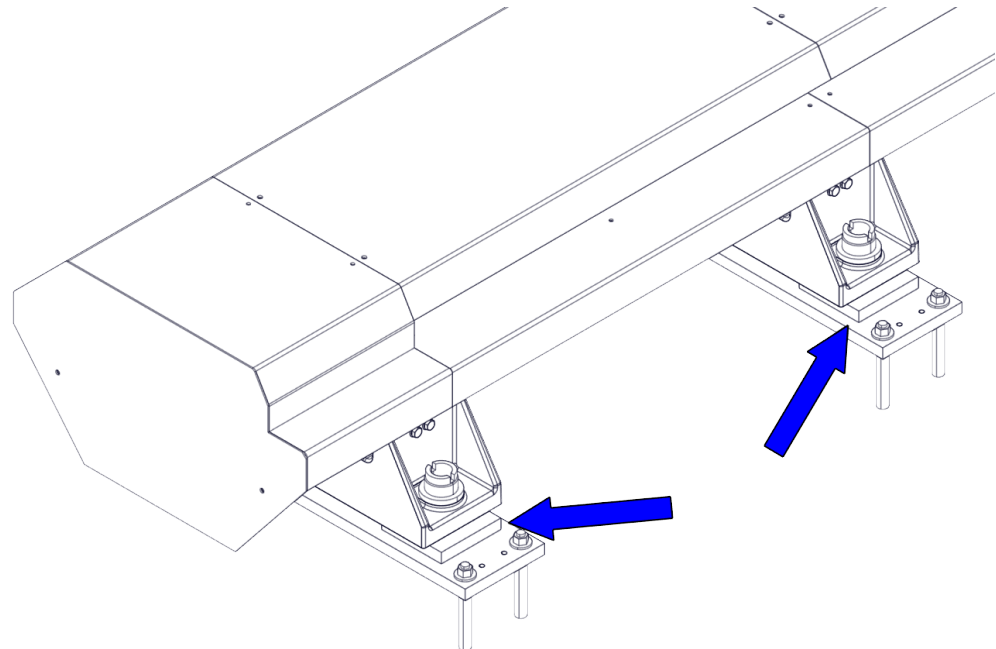
1.1.8 Mounting of a manipulator

Continued

Robot	IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R	IRT 501-90RE	IRT 501-90RS
IRB 460	X	✓ Riser 500 mm max	✓ Riser 500 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max	✓ Riser 1,000 mm max
IRB 6620/6640	X	X	✓ No riser allowed	✓ Riser 500 mm max	✓ Riser 500 mm max	✓ Riser 500 mm max
IRB 6700-200/2.6-235/2.65-205/2.8-155/2.85-175/3.05-150/3.2	X	X	✓ No riser allowed	✓ Riser 500 mm max	✓ Riser 500 mm max	✓ Riser 500 mm max
IRB 6700-300/3.7-245/3.0	X	X	X	X	✓ Riser 500 mm max	✓ Riser 500 mm max
IRB 660	X	X	X	X	✓ Riser 250 mm max	✓ Riser 250 mm max
IRB 6650	X	X	X	X	✓ No riser allowed	✓ No riser allowed
IRB 6650S	X	X	X	X	✓ No riser allowed	✓ No riser allowed
IRB 760	X	X	X	X	✓ No riser allowed	✓ No riser allowed
IRB 7600	X	X	X	X	✓ No riser allowed	✓ No riser allowed

Continues on next page

For these robots application, it is better to not put track on ground straightly, put one plate as interface surface to make it more stable.



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Robot orientation

The robot can be mounted on the Flextrack in 4 different orientations.

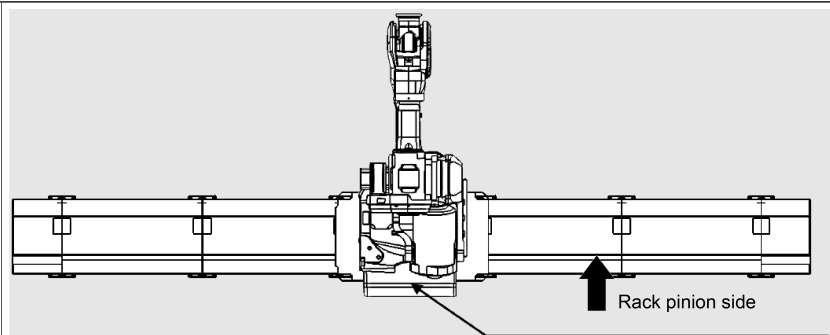
The +90° mounting is the standard orientation and should be chosen whenever possible.



Note

The robot connectors are closest to the carriage cable tray in the case of standard mounting. Other robot mounting orientations may require the flexible cables to be chosen longer!

Standard robot orientation 90°



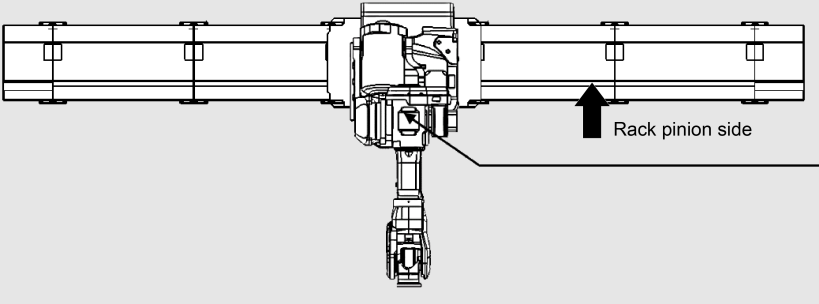
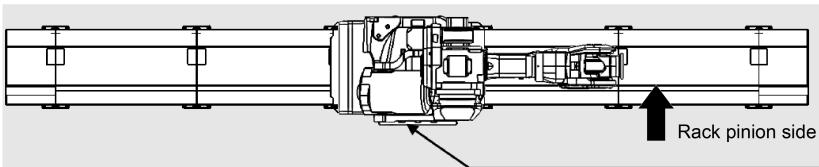
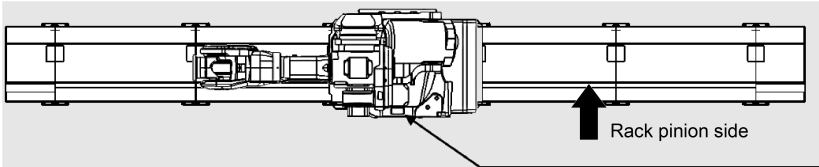
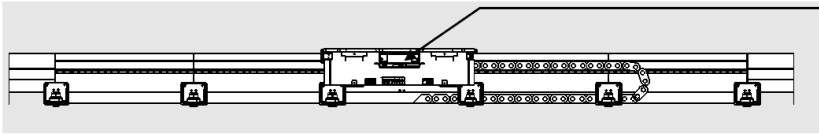
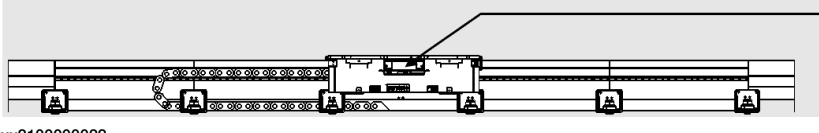
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1 Description

1.1.8 Mounting of a manipulator

Continued

Robot orientation 270°	 <p>Diagram showing the robot orientation at 270 degrees. The manipulator is mounted on a track. An arrow points to the right side of the track, labeled "Rack pinion side".</p> <p>xx210000018</p>
0°	 <p>Diagram showing the robot orientation at 0 degrees. The manipulator is mounted on a track. An arrow points to the right side of the track, labeled "Rack pinion side".</p> <p>xx210000019</p>
180°	 <p>Diagram showing the robot orientation at 180 degrees. The manipulator is mounted on a track. An arrow points to the right side of the track, labeled "Rack pinion side".</p> <p>xx210000020</p>
Standard ⁱ cable chain orientation	 <p>Diagram showing the standard cable chain orientation. The cable chain is mounted on the track, with the cables running parallel to the track.</p> <p>xx210000021</p>
Inverted ⁱ cable chain orientation	 <p>Diagram showing the inverted cable chain orientation. The cable chain is mounted on the track, with the cables running parallel to the track.</p> <p>xx210000022</p>

ⁱ See [Cable chain orientation \(Direction of travel\)](#) on page 47.

1.1.9 Position switch/ zone division

Overview

The purpose of the position switch system/zone division is to offer the possibility to confirm particular positions of the carriage and/or divide the track into zones. It consists of a mechanical switch mounted on the carriage and a set of cams mounted on the FlexTrack structure. One set of switches is used for two zones, and two sets of switches for four zones.

The wiring of the zone division is subject to the system layout. Hence, the design of the circuit is left to the system integrator. Refer to the wiring diagram developed by the system integrator for details on how the zone division sensors are used.

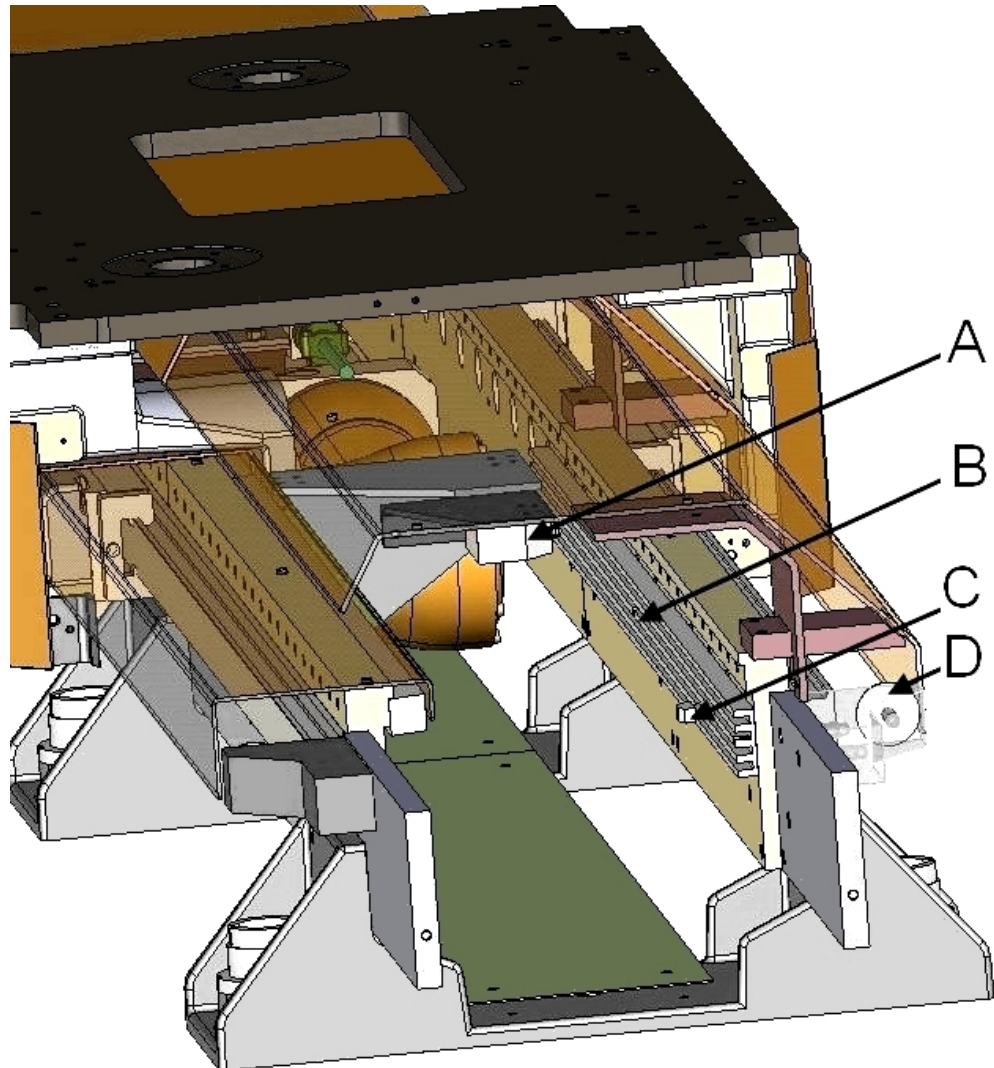
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1 Description

1.1.9 Position switch/ zone division

Continued

The figure below shows the location of the position switch:



xx1800001963

A	1, 2 or 4 position switch
B	Cam rail
C	Moveable zone division cam
D	Hard stop bumper



Tip

The 1, 2, 4 position switch can be useful to verify if the carriage is at a particular desired position. Usually 1 position switch is used at the end of the track to detect if the track reaches the limit position. 2 position and 4 position switch can be used when 2 particular positions and 4 particular positions are needed to be detected in the track stroke.

Continues on next page

The position switch can be connected to the IRC5 or a PLC depending on the system layout.



1 position switch



2 position switch



4 position switch

xx1800002102



Tip

If two carriages are used on the same track, setup the cam positions on rails in order to secure the working range. Two types of cam would be used.



cam for 1 position switch



cam for 2,4 position switch

xx1800002103

Typical use

The position switch is available with 1, 2 or 4 mechanical sensors. The cams positions can be easily adjusted along 1,200 mm long cam trays. The position of the cam trays can be adjusted as well, and each of them possesses 4 cam tracks that match the sensors locations.

The typical uses of the position switch are:

- 1 sensor switch: Used as a mechanical safety to detect if the upper or lower limit is exceeded by the carriage (in addition to the protection offered by the software limit).
- 2 sensors switch: Same as the above, as well as confirming that the carriage is in a particular position.
- 4 sensors switch: Same as the above, as well as verifying that the carriage zero position has not moved.

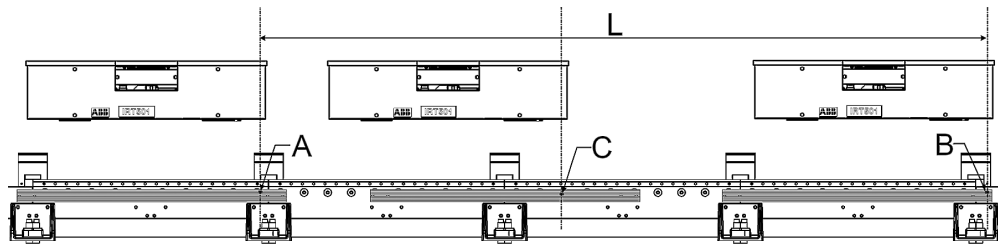
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1 Description

1.1.9 Position switch/ zone division

Continued

The figure below shows an example of position switch setting:



xx210000024

A	Lower limit cam (detected with sensor 1, cam mounted on track 1 of the cam tray)
B	Upper limit cam (detected with sensor 1, cam mounted on track 1 of the cam tray)
C	Position confirmation cam (detected with sensor 2, cam mounted on track 2 of the cam tray)
L	Travel length



Tip

If zone division is chosen, the option EPS (Electronic Position Switches) is not necessary, for more detailed information regarding EPS, see *Product specification - Controller IRC5 with FlexPendant and Application manual - Electronic Position Switches* (Document ID: 3HAC027709-001).

Wiring

The position switch can be connected to the IRC5 or a PLC depending on the system layout. The position switch cable is provided with both male and female connectors, however since the wiring of the zone division is subject to the system layout, the design of the circuit is left to the system integrator.

1.2 Standards

Standards

The manipulator system is designed in accordance with the requirements of:

Standard	Description
EN ISO 12100-1	Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles
EN ISO 13849-1	Safety of machinery, safety related parts of control systems - Part 1: General principles for design
EN ISO 13850	Safety of machinery - Emergency stop - Principles for design
EN ISO 13732	Robots for industrial environments - Safety requirements -Part 1 Robot ⁱ
EN ISO 10218-1	Robots for industrial environments - Safety requirements - Part 1 Robot ⁱ
EN ISO 9283	Manipulating industrial robots, Performance criteria and related test methods
EN ISO 9787	Manipulating industrial robots, Coordinate systems and motion nomenclatures
EN ISO 13732	Ergonomics of the thermal environment - Part 1
EN 61000-6-2	EMC, Generic immunity
EN 61000-6-4	EMC, Part 6-4: Generic standards - Emission standard for industrial environments
EN IEC 60204-1	Safety of machinery - Electrical equipment of machines - Part 1 General requirement
IEC 60529	Degrees of protection provided by enclosures (IP code)

ⁱ There is a deviation from paragraph 6.2 in that only worst case stop distances and stop times are documented.

1 Description

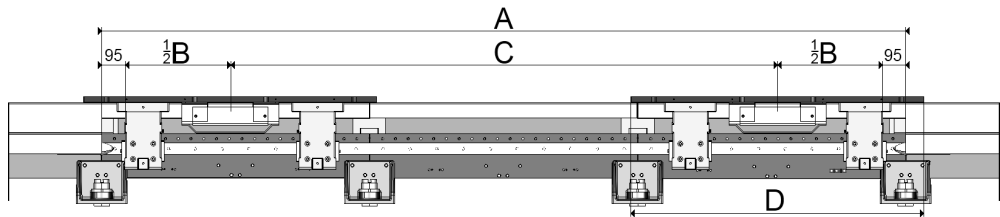
1.3.1 Travel length

1.3 Motion

1.3.1 Travel length

Calculation

The travel length (also referred to as stroke) is the displacement by which the carriage can move. The maximum travel length for one carriage is 25 meters. The limiting factor is the cable chain in which the cables are supported, as well as the cables lengths. For a requirement that exceeds this length, please contact ABB, a customized solution may be offered.



xx2100000025

The travel length is determined with the following formula:

$$C = A - B - 190$$

xx2100000026

With:

A = Total length of linear guideway = $M \times 1,050$ mm, with M the number of modules

B = Inner length of the carriage (from the edge of one carriage linear support to the opposite one) = 825 mm for standard carriages. If the top plate is customized, the length of the carriage can be approximated to the length of the custom top plate (D).

C = Travel length (in mm)

In the case of a FlexTrack with double carriages, and if the travels areas of the carriages don't overlap (recommended¹), the total travel length of the carriages is determined with the following formula:

$$C_1 + C_2 = A - B - D - 190$$

xx2100000027

With:

D = Length of the carriage top plate = 1,150 mm for IRT 501-66/66R and 900 mm for IRT 501-90/90R.

¹ In the case of multiple carriages with overlapping travel areas, the distance monitoring laser system option should be opted. See [Carriage on page 57](#).

Continues on next page

In the case of multiple carriages, with C_1, C_2, \dots, C_n being their respective travel lengths, and if the travels areas of the carriages don't overlap (recommended ¹), the formula is:

$$\sum_{k=1}^n C_k = A - B - (n-1) \times D - 190$$

xx210000028

Table

FlexTrack length		Travel length (m)		
In modules	In meters	Single carriage	Double carriages IRT 501-66 IRT 501-66R	Double carriages IRT 501-90 IRT 501-90R IRT 501-90RE IRT 501-90RS
2	2.8	1.1	-	-
3	3.9	2.1	0.5 / 0.5	0.6 / 0.6
4	4.9	3.2	1 / 1	1.1 / 1.2
5	6	4.2	1.5 / 1.6	1.7 / 1.6
6	7	5.3	2.1 / 2	2.2 / 2.2
7	8.1	6.3	2.6 / 2.6	2.7 / 2.7
8	9.1	7.4	3.1 / 3.1	3.3 / 3.2
9	10.2	8.4	3.6 / 3.7	3.8 / 3.7
10	11.2	9.5	4.2 / 4.1	4.3 / 4.3
11	12.3	10.5	4.7 / 4.7	4.8 / 4.9
12	13.3	11.6	5.2 / 5.2	5.4 / 5.3
13	14.4	12.6	5.8 / 5.7	5.9 / 5.9
14	15.4	13.7	6.3 / 6.2	6.4 / 6.4
15	16.5	14.7	6.8 / 6.8	6.9 / 7
16	17.5	15.8	7.3 / 7.3	7.5 / 7.4
17	18.6	16.8	7.9 / 7.8	8 / 8
18	19.6	17.9	8.4 / 8.3	8.5 / 8.5
19	20.7	18.9	8.9 / 8.9	9 / 9.1
20	21.7	20	9.4 / 9.4	9.6 / 9.5
21	22.8	21	10 / 9.9	10.1 / 10
22	23.8	22.1	10.5 / 10.4	10.6 / 10.6
23	24.9	23.1	11 / 11	11.1 / 11.1
24	25.9	24.2	11.5 / 11.5	11.7 / 11.6
25	27	25.2	12.1 / 12	12.2 / 12.1
26	28	26.3 ^l	12.6 / 12.5	12.7 / 12.7
27	29.1	27.3 ^l	13.1 / 13.1	13.2 / 13.2

Continues on next page

1 Description

1.3.1 Travel length

Continued

FlexTrack length		Travel length (m)		
In modules	In meters	Single carriage	Double carriages IRT 501-66 IRT 501-66R	Double carriages IRT 501-90 IRT 501-90R IRT 501-90RE IRT 501-90RS
28	30.1	28.4 ⁱ	13.6 / 13.6	13.8 / 13.7
29	31.2	29.4 ⁱ	14.2 / 14.1	14.3 / 14.2
30	32.2	30.5 ⁱ	14.7 / 14.6	14.8 / 14.8
31	33.3	31.5 ⁱ	15.2 / 15.2	15.3 / 15.3
32	34.3	32.6 ⁱ	15.7 / 15.7	15.9 / 15.8
33	35.4	33.6 ⁱ	16.3 / 16.2	16.4 / 16.3
34	36.4	34.7 ⁱ	16.8 / 16.7	16.9 / 16.9
35	37.5	35.7 ⁱ	17.3 / 17.3	17.4 / 17.4
36	38.5	36.8 ⁱ	17.8 / 17.8	18 / 17.9
37	39.6	37.8 ⁱ	18.4 / 18.3	18.5 / 18.4
38	40.6	38.9 ⁱ	18.9 / 18.8	19 / 19
39	41.7	39.9 ⁱ	19.4 / 19.4	19.5 / 19.5
40	42.7	41 ⁱ	19.9 / 19.9	20.1 / 20
41	43.8	42 ⁱ	20.5 / 20.4	20.6 / 20.5
42	44.8	43.1 ⁱ	21 / 20.9	21.1 / 21.1
43	45.9	44.1 ⁱ	21.5 / 21.5	21.6 / 21.7
44	46.9	45.2 ⁱ	22 / 22	22.2 / 22.1
45	48	46.2 ⁱ	22.6 / 22.5	22.7 / 22.6
46	49	47.3 ⁱ	23.1 / 23	23.2 / 23.2
47	50.1	48.3 ⁱ	23.6 / 23.6	23.7 / 23.7
48	51.1	-	24.1 / 24.1	24.3 / 24.2
49	52.2	-	24.7 / 24.6	24.8 / 24.7
50	53.2	-	25.2 / 25.1	25.3 / 25.3

ⁱ The maximum travel length for one standard carriage is 25 meters. For a requirement that exceeds this length, please contact ABB, a customized solution may be offered.



Note

For double carriages, the stroke scope doesn't include overlap.

For overlap, stroke can reach same distance of single carriage minus carriage length and safe distance.

1.3.2 Dynamic performances

Overview of the different versions

The table below shows the dynamic performances of each type of FlexTrack carriage:

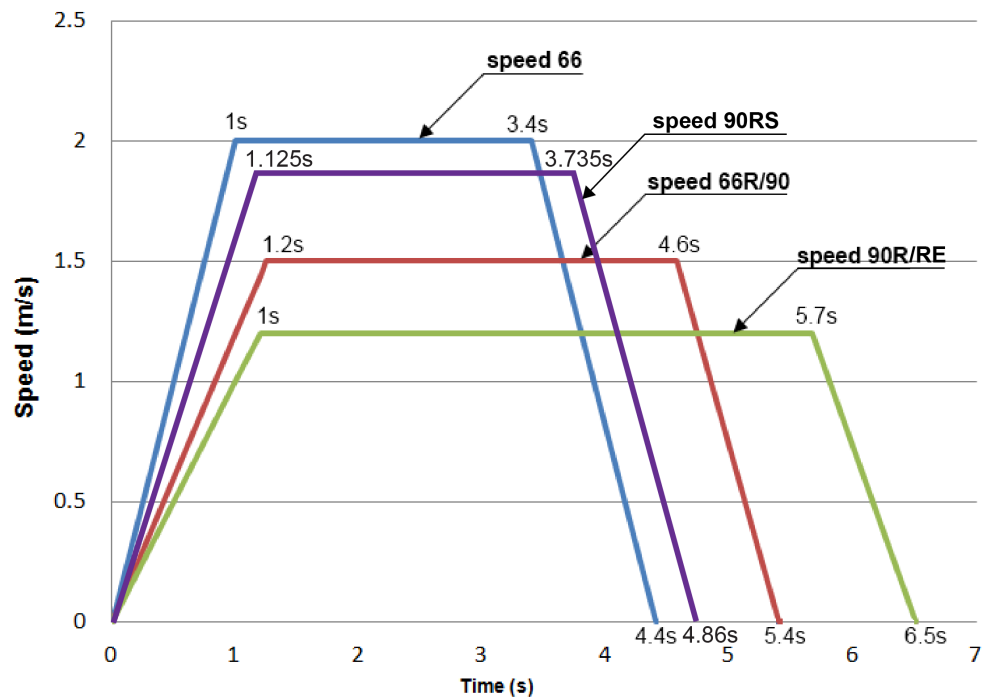


Note

The cycle time includes 0.4 sec for signal communication. If the time for signal communication is less, the total time will decrease.

FlexTrack	Gearbox ratio	Max speed (m/s)	Acceleration / Deceleration (m/s ²)	Acceleration/ Deceleration Time(s)	Cycle time for 6 m stroke
IRT 501-66	10	2.0	2.0/2.0	1.0/1.0	4.4 sec.
IRT 501-66R	16	1.5	1.2/1.8	1.25/0.83	5.4 sec.
IRT 501-90	16	1.5	1.2/1.8	1.25/0.83	5.4 sec.
IRT 501-90R/RE	20	1.2	1.0/1.2	1.20/1.00	6.5 sec.
IRT 501-90RS	12	1.8	1.6/1.6	1.125/1.125	4.86 sec.

The chart below shows the speed of a FlexTrack that travels 6 m with nominal load:



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Note

If a low voltage IRC5 controller is used to drive the FlexTrack (in particular when used with IRB1600/2400/2600), its performances (speed, acceleration) are reduced to 66.6% of their nominal values. See [Robot controller requirements on page 54](#).

1 Description

1.3.3 Positioning time

1.3.3 Positioning time

Positioning time at different travel distance

The table below shows the typical positioning times, with nominal load.



Note

The cycle time includes 0.4 sec for signal communication. If the time for signal communication is less, the total time will decrease.

	Travel distance								
FlexTrack	1 m	2 m	3 m	4 m	5 m	6 m	7 m	8 m	9 m
IRT 501-66	1.8 s ⁱ	2.4 s ⁱ	2.9 s	3.4 s	3.9 s	4.4 s	4.9 s	5.4 s	5.9 s
IRT 501-66R	2.1 s ⁱ	2.8 s	3.4 s	4.1 s	4.8 s	5.4 s	6.1 s	6.8 s	7.4 s
IRT 501-90	2.1 s ⁱ	2.8 s	3.4 s	4.1 s	4.8 s	5.4 s	6.1 s	6.8 s	7.4 s
IRT 501-90R/RE	2.4 s ⁱ	3.2 s	4.0 s	4.8 s	5.7 s	6.5 s	7.3 s	8.2 s	9 s
IRT 501-90RS	2.0 s ⁱ	2.64 s ⁱ	3.2 s	3.75 s	4.31 s	4.86 s	5.42 s	5.97 s	6.53 s

ⁱ Distance too short for the carriage to reach its maximum speed.



Note

If a low voltage IRC5 controller is used to drive the FlexTrack (in particular when used with IRB1600/2400/2600), its performances (speed, acceleration) are reduced to 66.6% of their nominal values. See [Robot controller requirements on page 54](#).

1.4 Cabling

1.4.1 Overview

Overview

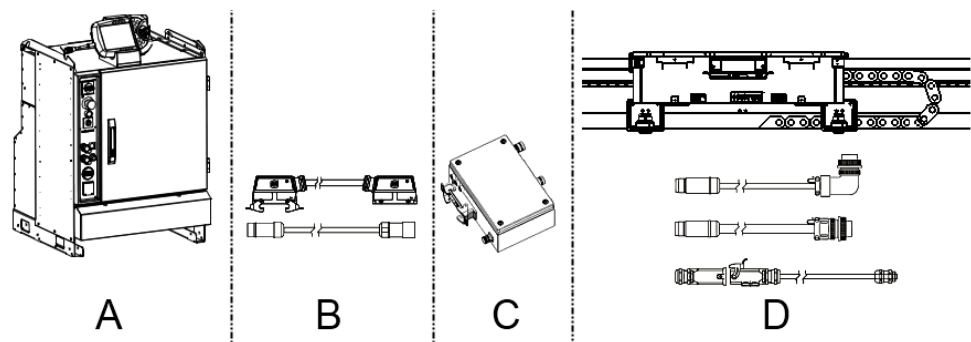
The FlexTrack is driven by the IRC5 through a set of static cables, an SMB box, and flexible movement cables. Each carriage is equipped with an internal cable chain that carries the movement cables underneath the casings, thus protecting them from a harsh environment.

The standard equipment includes the following movement cables:

- FlexTrack motor power cable
- FlexTrack resolver signal cable

In option, additional cables can be added (in particular, flexible extension cables are available for each type of ABB IRB robot):

- Position switch signal cable
- Manipulator power cable
- Manipulator signal cable
- Other cables: CP/CS DeviceNet, CP/CS Parallel, CP/CS Profibus, EtherNet/ProfiNet, Spot welding power cable, Protective Earth grounding, 24V power supply,...
- DN12 or DN16 hoses for air and fluids



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A	IRC5 Controller
B	Static cables (floor cables) <ul style="list-style-type: none"> • Power cable, available for IRC5's XP1 or XP7. • Signal cable, for IRC5's XS41-2
C	Serial Measurement Board Box Available for 1, 3 or 6 axis. Equipped with brake release trigger and back-up battery.
D	Flexible movements cables <ul style="list-style-type: none"> • Motor power cable • Motor resolver cable • Position switch cable • Other cables: manipulator cables, hoses, etc.

1 Description

1.4.2 Cables lengths

1.4.2 Cables lengths

Static cables

The static cables are used to connect the IRC5 controller to the SMB box. They are available in lengths of 5 m, 10 m, and 15 m.

Movement cables

The movement cables are flexible cables carried inside the cable chain. The FlexTrack movement cables (motor power and resolver) are connected to the SMB box. The movement cables are flexible cables carried inside the cable chain. The FlexTrack's movement cables (motor power and resolver) are connected to the external SMB box, or to the static floor cable (power cable only, for FlexTrack which resolver cable is connected to the robot's base). FlexTrack motor signal movement cable can directly be connected to the robot SMB box. Other movement cables (robot cables,...) are extension cables that must be connected to the floor cables (not provided).

Movement cables are available in lengths of 5 m, 10 m, and 15 m and are usually chosen according to the following table:

FlexTrack length	Travel length	Cable length
2 to 3 modules	1.1 to 2.1 m	5 m
4 to 12 modules	3.2 to 11.6 m	10 m
13 to 22 modules	12.6 to 22.1 m	15 m
> 22 modules	> 23 m	On request, 25 m cables may be offered. Please contact ABB.



Note

The movement cables length is chosen based on the assumption that the SMB box is located near the FlexTrack, at the middle point of the carriage stroke. If the SMB box is located further away from the FlexTrack, longer movement cables may be chosen.

1.4.3 Movement cables specifications

Movement cables diameter and weight

The internal cable chain usually contains the FlexTrack motor power and resolver cables. When additional cables are used, it is important to ensure that they can all fit in. In particular, if a number n of cables are used, you must make sure that:

- The total width of all the cables added together, as well as the width of $n-1$ separators (5 mm each), does not exceed the internal width of the cable chain (175 mm).
- The total weight of all cables does not exceed 10 kg/m.

See the cable chain specifications given in [Internal cable chain on page 43](#).

If necessary, an additional cable chain can be used. See [External cable chain on page 45](#).

Cable reference number	Cable type	Cable diameter in mm	Cable weight in kg/m
3HAW050008608 ⁱ	FlexTrack motor power	13.3 mm	0.3 kg/m
3HAW050008609 ⁱ	FlexTrack resolver	8.5 mm	0.2 kg/m
3HAW050008637 ⁱ	FlexTrack resolver (no SMB)	8.5 mm	0.2 kg/m
3HAW050008610 ⁱ	Position switch cable 1 sensor	6.6 mm	0.1 kg/m
3HAW050008654 ⁱ	Position switch cable 2 sensors	6.6 mm + 6.6 mm	0.4 kg/m
3HAW050008611 ⁱ	Position switch cable 4 sensors	11.2 mm	0.1 kg/m
3HEA802409 ⁱ	IRB2400/4400/6600/7600 movement resolver cable	8.5 mm	0.2 kg/m
3HAC029834 ⁱ	IRB1410/1600/2600/4600 movement resolver cable	7.8 mm	0.2 kg/m
3HAW050008617 ⁱ	IRB1410/2400 movement power cable	21.5 mm	1.2 kg/m
3HAW050008622 ⁱ	IRB4400 movement power cable	22.2 mm + 22.2 mm	1.7 kg/m
3HAW050008620 ⁱ	IRB2600/4600/6600/7600 movement power cable	22.2 mm + 22.2 mm	1.7 kg/m
3HEA801277 ⁱ	CP/CS Parallel	13.9 mm + 9.5 mm	0.7 kg/m
3HEA801279 ⁱ	CP/CS DeviceNet	14 mm + 13 mm + 9 mm	1 kg/m
3HEA801278 ⁱ	CP/CS INTERBUS	14 mm + 13 mm + 9 mm	0.7 kg/m
3HAW050008631 ⁱ	Spot welding servo motor	13 mm + 5.2 mm	0.4 kg/m
3HAW050008628 ⁱ	Spot welding power	12 mm + 12 mm + 12 mm	1.3 kg/m
3HAW050008644 ⁱ	Tooling Protective Earth	6.5 mm	0.2 kg/m
3HAW050008633 ⁱ	Power supply 24V	12.5 mm	0.4 kg/m

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1 Description

1.4.3 Movement cables specifications

Continued

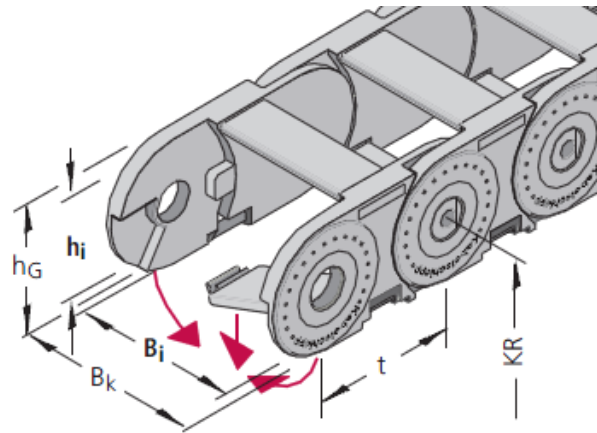
Cable reference number	Cable type	Cable diameter in mm	Cable weight in kg/m
(Depends on hoses quantity)	Water and Air pipe DN12	19 mm	0.2 kg/m
	Water and Air pipe DN16	23.5 mm	0.4 kg/m

ⁱ The exact reference depends on the length of the cable. See *Product manual - FlexTrack IRT 501*.

1.4.4 Internal cable chain

Specifications

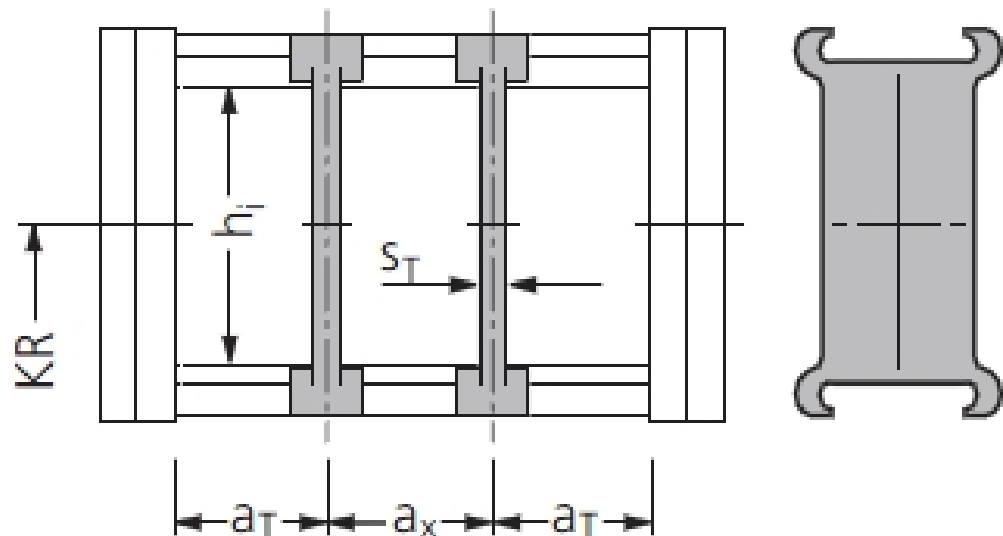
The internal cable chain is chosen to allow the customer to fit in additional flexible cables. However their specifications (size, weight, and bend radius) must be checked and compared with the cable chain specifications below.



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Max. total cables weight	KR: Bend radius	h_i	h_G	B_i	B_k	t: Pitch	Intrinsic chain weight
10 kg/m	120 mm	44 mm	60 mm	175 mm	202 mm	90.5 mm	2.85 kg/m

Between each cable, a cable chain divider must be used every 8 links:



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h_i	s_T	a_x	a_{Tmin}
44 mm	5 mm	25 mm	25 mm

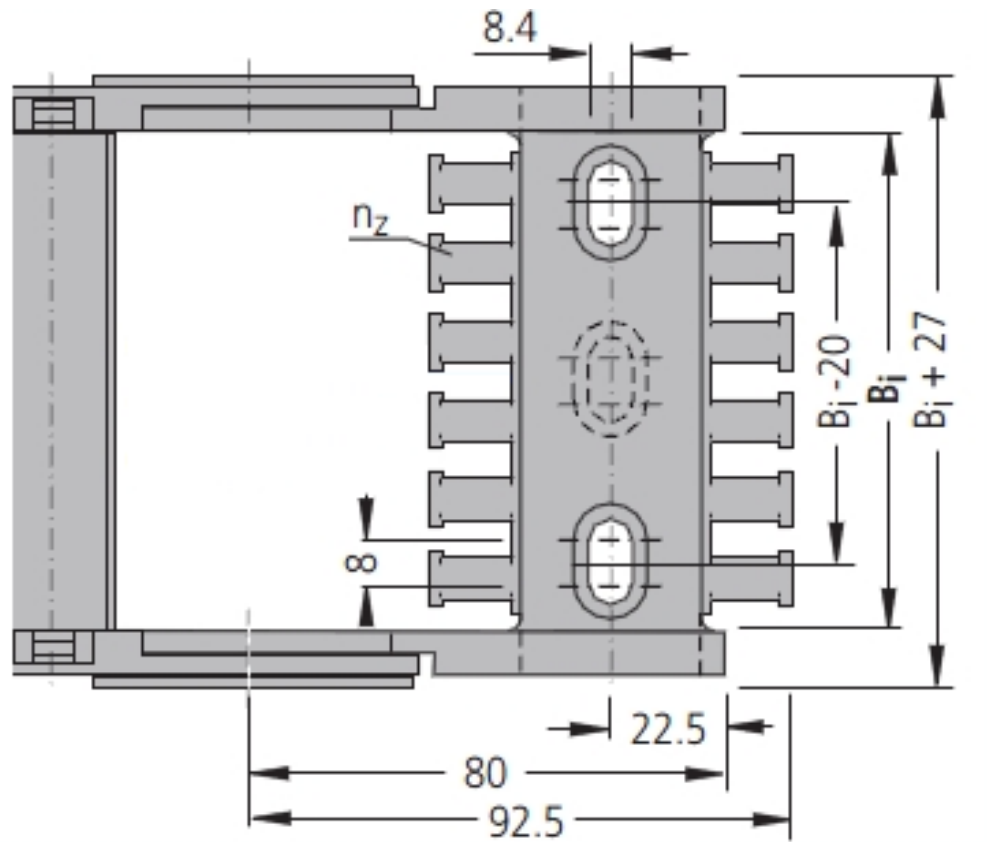
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1 Description

1.4.4 Internal cable chain

Continued

A strain relief comb is used at the carriage attachment point to fix the cables position:



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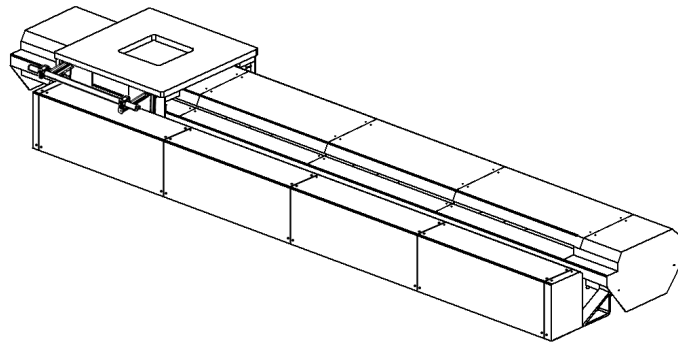
B_i	B_k	N_z
175 mm	202 mm	14 mm

1.4.5 External cable chain

Overview

If the internal cable chain is not wide enough to fit all the required cables, a wider external cable chain, assembled in a complete housing for optimal protection, can be offered.

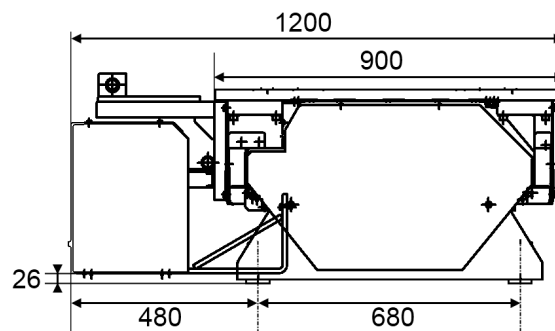
This option is available for FlexTrack types IRT 501-90, IRT 501-90R, IRT 501-90RE and IRT 501-90RS.



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FlexTrack dimensions

When equipped with an external cable chain, the FlexTrack width is extended to 1,200 m.



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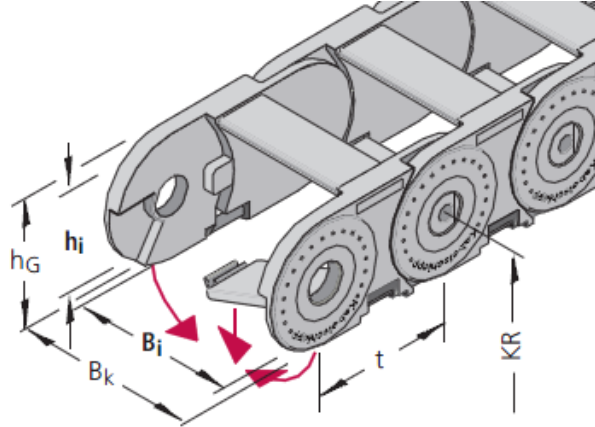
1 Description

1.4.5 External cable chain

Continued

Cable chain specifications

The external cable chain specifications are identical to those of the internal cable chain, apart from the width:



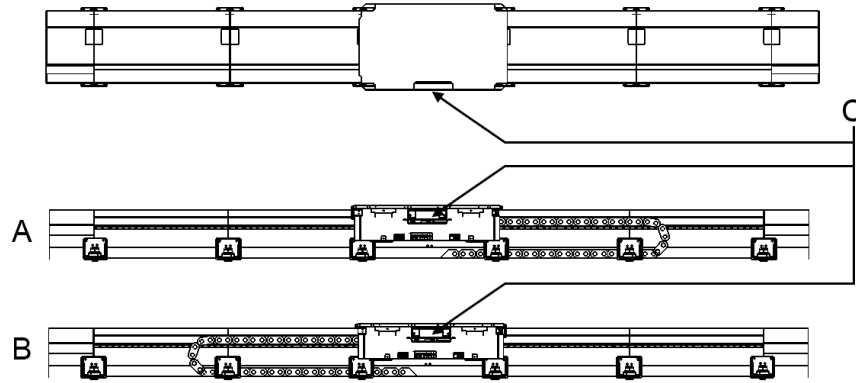
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Max. total cables weight	KR: Bend radius	h_i	h_G	B_i	B_k	t: Pitch	Intrinsic chain weight
10 kg/m	120 mm	44 mm	60 mm	200 mm	227 mm	90.5 mm	3 kg/m

1.4.6 Cable chain orientation (Direction of travel)

Overview

If required, and as an option, the internal and/or the external cable chains can be linked to the carriage symmetrically to the standard assembly:



xx210000033

A	Standard assembly of the cable chain
B	Inverted assembly of the cable chain
C	Carriage cable tray

Situations that require inverted assembly

The inverted assembly of the cable chain is required in the case of a double carriage, to prevent the risk of chain collision:



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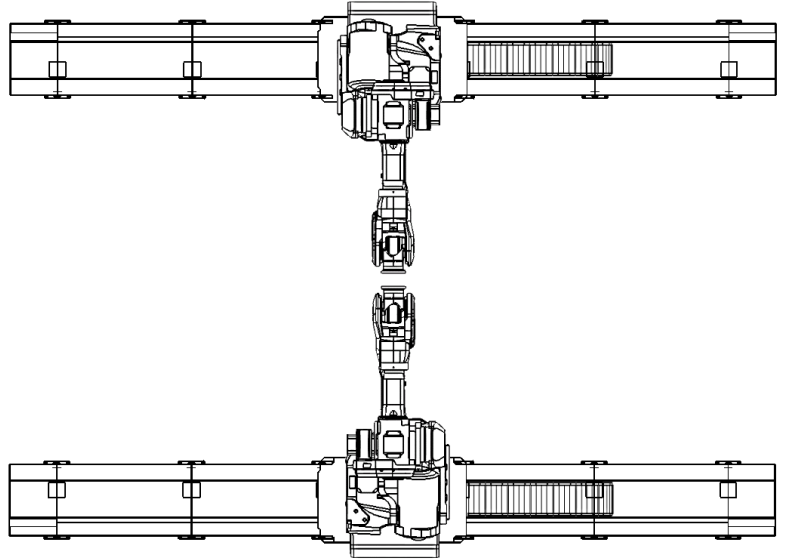
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1 Description

1.4.6 Cable chain orientation (Direction of travel)

Continued

Another typical use of the inverted assembly of the cable chain is the case of manipulators facing each other, if it is required that the cable chain movements of the FlexTracks mirror each other:



xx210000034

1.5 Installation

1.5.1 Foundation

Robustness

The FlexTrack is intended to be mounted on the floor or on a Flexicell platform. The foundation must withstand 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 175 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.

Inclination and flatness

The levelling of the track is done by screwing / unscrewing the M60 levelling 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 10 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.

Static loads

The following table shows the maximum payload of all FlexTrack carriage variants, and the corresponding load distributed to each levelling screw.

Load	IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R/90RE/90RS
Max. Load	900 kg	2,000 kg	2,000 kg	2,950 kg
Load on each levelling screw	320 kg	450 kg	800 kg	1,050 kg



Note

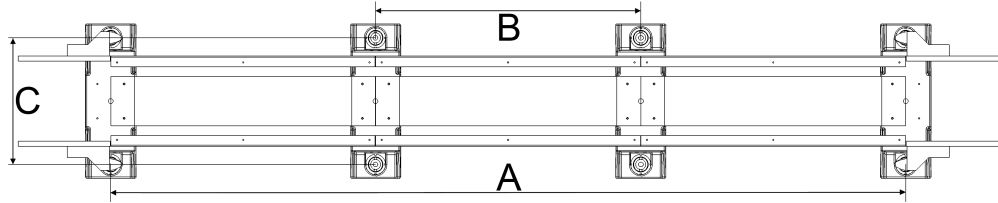
The payloads listed above are estimated for a wide range of FlexTrack applications. For ModulFlex payload, please refer to ModulFlex specifications.

1 Description

1.5.2 Hole configuration

1.5.2 Hole configuration

General

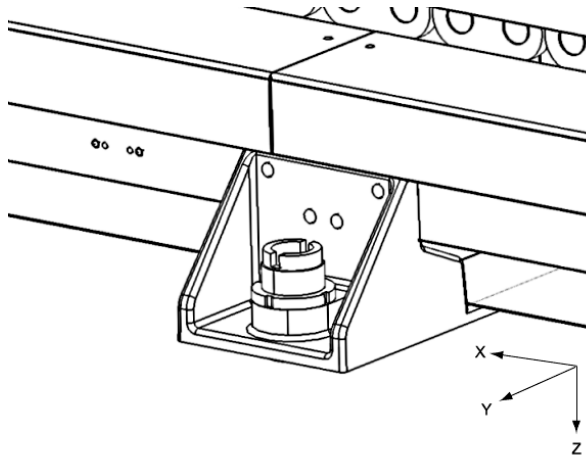


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Dimension	IRT 501-66	IRT 501-66R	IRT 501-90	IRT 501-90R/90RE/90RS
A	M x 1,050 mm, with M = number of modules			
B	1,050 mm	525 mm	1,050 mm	525 mm
C	500 mm	500 mm	680 mm	680 mm

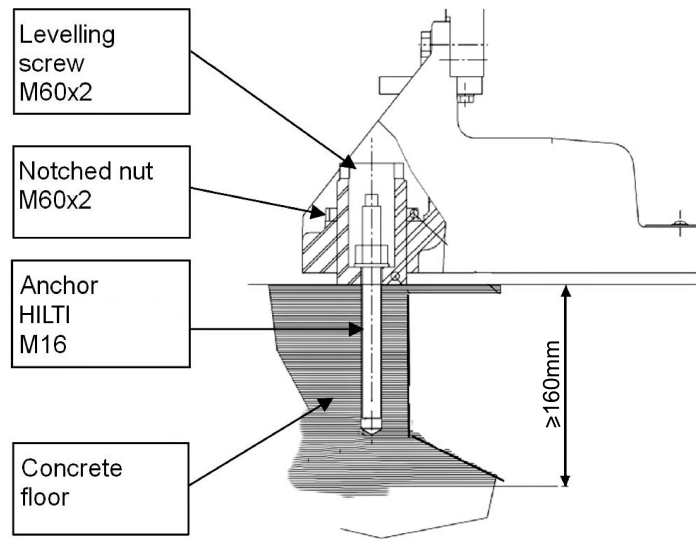
Anchor

It is recommended to use chemical anchors with M16 threaded rods to secure the unit to the floor.



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1 Description

1.5.3 Operating requirements

1.5.3 Operating requirements

Protection standards

International Protection Rating IP65 on electronics.

Explosive environments

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

Ambient temperature

Description	Standard/Option	Temperature
FlexTrack during operation	Standard	+ 5 °C (41 °F) to + 50 °C (122 °F)
For the controller	Standard	+ 5 °C (41 °F) to + 45 °C (113 °F)
For the controller	Option	+5 °C (41 °F) to + 52 °C (126 °F)
For short periods (not exceeding 24 hours)	Standard	up to + 70 °C (158 °F)

Relative humidity

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

2 Specification of Variants and Options

2.1 General

General

The different variants and options for the IRT 501 (FlexTrack) are described in the following sections.

The same numbers are used here as in the Specification form.

2 Specification of Variants and Options

2.2 Robot controller requirements

2.2 Robot controller requirements

Overview

The FlexTrack 501 series is controlled by the ABB IRC5 robot controller as an additional axis. It can be used in a robot system with or without manipulator.



Note

The FlexTrack 501 series is designed to perform with optimal performance when used with a drive type 144A 400-480V (IRC5's option 751-5). If an IRC5 controller with lower voltage is used to drive the motor (in particular when used with IRB1600/2400/2600/4600), its performances (speed, acceleration) are reduced to 66.6% of their nominal values.

Requirements for the controller - system with manipulator

The robot and controller equipment must fulfill the following requirements to integrate a FlexTrack:

Option number	Type	Description
907-1	Single drive unit	Drive unit for 7th axis with corresponding cables assembled inside Drive cabinet.
864-1	Resolver connection	Resolver connection axis 7 (on base except IRB4400)

Requirements for the controller - system without manipulator

The controller equipment must fulfill the following requirements to integrate a FlexTrack:

Option number	Type	Description
435-99	Variant	No IRB Manipulator
751-5	Drive system	144A 400-480V
604-2	MultiMove	MultiMove Independent NOTE: 884-1 (Multimove without robot) is required with 604-2 if the IRC5 is equipped with a main computer DSQ639.

2.3 FlexTrack

FlexTrack type and length

Select a FlexTrack base 2 modules, and add as many 1,050 mm modules as desired. 115 modules maximum.

See [Travel length on page 34](#).

Option	Description	Note	
FT001-1	IRT501-66, base 2 modules	Available length 2 to 115 modules, corresponding to a guideway length of 2.1 m to 120.75 m and a total travel length of 1.1 m to 119.7 m. Select FlexTrack base 2 modules, and add as many 1,050 mm modules as desired.	
FT001-2	IRT501-66, additional module		
FT002-1	IRT501-66R, base 2 modules		
FT002-2	IRT501-66R, additional module		
FT003-1	IRT501-90, base 2 modules		
FT003-2	IRT501-90, additional module		
FT004-1	IRT501-90R, base 2 modules		
FT004-2	IRT501-90R, additional module		
FT005-1	IRT501-90with external cable chain, base 2 modules		FlexTrack equipped with an external cable chain, required if not all of the movement cables can fit in the internal cable chain. See Movement cables specifications on page 41 and External cable chain on page 45 . Available length 2 to 115 modules, corresponding to a guideway length of 2.1 m to 120.75 m and a total travel length of 1.1 m to 119.7 m.
FT005-2	IRT501-90with external cable chain, additional module		
FT006-1	IRT501-90Rwith external cable chain, base 2 modules		
FT006-2	IRT501-90Rwith external cable chain, additional modules		

End Cover

Select the type of end cover. See [Dimensions on page 20](#).

Option	Description	Note
FT007-1	Standard end covers	Standard covers at both ends of FlexTrack (366 mm each)
FT007-2	One short end cover	One end of the Flextrack is equipped with a short end cover (250 mm shorter). Option available only for a FlexTrack with one single carriage.

Continues on next page

2 Specification of Variants and Options

2.3 FlexTrack

Continued

Diamond plate covers

Option	Description	Note
FT008-1	Diamond plate covers	Replace standard covers with diamond plate covers (no paint). Input the total FlexTrack length in modules.

Colors

Option	Description	Note
209-1	ABB orange standard	
209-202	ABB graphite white standard	
209		

2.4 Carriage

Motorization

Option	Description	Note
FT010-1	Motorized carrier type 66	Compatible with FT001-1 or FT002-1.
FT010-3	Motorized carrier type 66R	Compatible with FT001-1 or FT002-1.
FT010-4	Motorized carrier type 90	Compatible with FT003-1 or FT004-1 or FT005-1 or FT006-1.
FT010-5	Motorized carrier type 90R	Compatible with FT003-1 or FT004-1 or FT005-1 or FT006-1.
FT010-6	Motorized carrier type 90RE	Compatible with FT003-1 or FT004-1 or FT005-1 or FT006-1.
FT010-7	Motorized carrier type 90RS	Together with FT003-1 or FT004-1 or FT005-1 or FT006-1.
FT011-1	Slave carrier	
FT011-2	Linking bar length	Together with FT011-1. Specify the length in meter between master and slave carriages.

Travel length (carriage stroke)

Specify the travel length in meters. The travel length should be chosen in accordance with the FlexTrack length and the number of carriages. See [Travel length](#).

Option	Description	Note
FT012-1	Travel length	Enter the value in meters (decimal value allowed).

Direction of travel (Orientation of the cable chain)

Select the type of cable chain orientation. See [Cable chain orientation \(Direction of travel\)](#) on page 47.

Option	Description	Note
FT013-1	Standard cable chain mounting	Standard orientation of the cable chain mounting.
FT013-2	Inverted cable chain mounting	Symmetrical assembly of the cable chain to the carriage. Required for FlexTrack with double carriage or for mirrored layout.

Carriage plate

All carriages are delivered with an auto lubrication system mounted underneath the plate.

Option	Description	Note
FT014-1	Standard plate	
FT014-2	Prepared for IRB7600	Carriage adapted for IRB 7600. Only for FlexTrack IRT 501-90RE and IRT 501-90RS.

Continues on next page

2 Specification of Variants and Options

2.4 Carriage Continued

Option	Description	Note
FT014-3	Prepared for IRB6700	Carriage adapted for IRB 6700. Only for FlexTrack IRT 501-90 and IRT 501-90R.
FT014-4	Prepared for IRB6400	Carriage adapted for IRB 6400. Only for FlexTrack IRT 501-90R, IRT 501-90RE and IRT 501-90RS.
FT014-5	Prepared for IRB4600	Carriage adapted for IRB 4600.
FT014-6	Prepared for IRB4400	Carriage adapted for IRB 4400. Only for FlexTrack IRT 501-90 and IRT 501-90R.
FT014-7	Prepared for IRB2600	Carriage adapted for IRB 2600.
FT014-8	Prepared for IRB2400	Carriage adapted for IRB 2400.
FT014-9	Prepared for IRB1600	Carriage adapted for IRB 1600. Only for FlexTrack IRT 501-66.
FT014-10	Prepared for IRB1410	Carriage adapted for IRB 1410. Only for FlexTrack IRT 501-66.
FT014-11	FlexLifter 100	Adds an elevating table with 100 mm stroke and 1,000 kg payload. ⁱ
FT014-12	FlexLifter 190	Adds an elevating table with 190 mm stroke and 500 kg payload. ⁱ
FT014-13	FlexLifter 100with rotation	Adds an elevating table with 100 mm stroke, 1,000 kg payload and rotating capability $\pm 90^\circ$. ⁱ
FT014-14	FlexLifter 190with rotation	Adds an elevating table with 190 mm stroke, 500 kg payload and rotating capability $\pm 90^\circ$. ⁱ
FT014-15	Rotation unit	Adds a table with 1,000 kg payload and rotating capability $\pm 90^\circ$. ⁱ
FT014-16	FlexLifter IRL 190	Adds an elevating table with 600 mm stroke and 600 kg payload. ⁱ The IRL 600 can only be used on FlexTrack IRT501-66 and/or IRT501-66R. The IRL600 weighs 633 kg, therefore in order to use it with its maximum intrinsic payload (600 kg), it is necessary to select a FlexTrack type IRT501-66R (FT002-1/FT002-2), or to select a FlexTrack structure type IRT501-66 (FT001-1/FT001-2) with carriage(s) drive type 66R (FT010-1+FT010-2).
FT014-17	Customized top plate	Drawing of the customized top plate must be provided with the purchase order.

ⁱ See 3HAW050008890, Product Manual - FlexLifter IRL600 and 3HAW107703002, Product Manual - FlexLifter IRL100/190.

Orientation of the manipulator

Option	Description	Note
FT015-1	Standard robot orientation 90°	
FT015-2	Robot orientation 270°	

Continues on next page

2 Specification of Variants and Options

2.4 Carriage Continued

Option	Description	Note
FT015-3	Robot orientation 0°	In line with the track orientation
FT015-4	Robot orientation 180°	In line and in opposite direction of the track

Lubrication options

Option	Description	Note
FT016-2	Lubrication pump sensor with cable	Compatible with FT016-4 or FT016-5. Allows to monitor the strokes of the lubrication pump. Includes one 4 pole M12 movement cable.
FT016-3	Manual lubrication	Inject grease manually every week or 100 km.
FT016-4	Auto lubrication - battery driven	One electric pump which is driven by battery in fixed interval delivers grease automatically.
FT016-5	Auto lubrication - 24V controlled	One electric pump which is driven by 24V and can be controlled by logic delivers grease automatically.

2 Specification of Variants and Options

2.5 Position switch and anti-collision system

2.5 Position switch and anti-collision system

Position switch system

Select the type of position switch system. See [Position switch/ zone division on page 29](#).

Option	Description	Note
FT017-1	No position switch	
FT017-2	1 sensor position switch	Includes the sensor movement cable. Includes 2 cam trays and 2 cams assembled on the track.
FT017-3	2 sensors position switch	Includes the sensor movement cable. Includes 3 cam trays and 6 cams assembled on the track.
FT017-4	4 sensors position switch	Includes the sensor movement cable. Includes 4 cam trays and 16 cams assembled on the track.
FT018-1	Additional cam tray	This option adds 1 cam tray. Note that two cam trays are already included if one carriage is equipped with an one sensor position switch. Three cam trays are already included if a multi-sensors switch is selected, or if more than one carriages are equipped with one sensor position switch.

Distance monitoring laser system including movement cable

The distance monitoring system consists in a laser sensor embedded on one carriage, measuring the distance from a reflector embedded on another carriage. This option is highly recommended for carriages with overlapping travel areas controlled by separate IRC5.

Option	Description	Note
FT019-1	Set of 1 laser and 1 reflector	One laser sensor, one reflector plate and one 4 pole M12 movement cable.

2.6 Movement flexible cables

FlexTrack movement cables (power and signal) - SMB box to carriage

Select the length of the movement cables that connect the SMB box to the motor of the carriage. See [Cables lengths on page 40](#). The cables are used together with SMB box FT038- 1 and FT038-2 or FT038-3.

Option	Description	Note
FT020-1	5 m FlexTrack movement cables	Adapted for a carriage with a travel length model up to 3 m.
FT020-2	7.5 m FlexTrack movement cables	Adapted for a carriage with a travel length model up to 8 m.
FT020-3	10 m FlexTrack movement cables	Adapted for a carriage with a travel length model up to 12 m.
FT020-4	15 m FlexTrack movement cables	Adapted for a carriage with a travel length model up to 22 m.

FlexTrack movement power cable - For System without SMB box - static cable to carriage

The FlexTrack movement power cable is used together with No SMB Box FT038-4.

Option	Description	Note
FT021-1	5 m FlexTrack movement power cable	Adapted for a carriage with a travel length model up to 3 m.
FT021-2	10 m FlexTrack movement power cable	Flexible power cable only. Adapted for a carriage with a travel length model up to 12 m.
FT021-3	15 m FlexTrack movement power cable	Flexible power cable only. Adapted for a carriage with a travel length model up to 22 m.

Robot cables flexible extension (power and signal)

Select the length of the flexible cables that connect the robot floor cables and the robot movement cable. See [Mounting of a manipulator on page 25](#) and [Cables lengths on page 40](#).

Option	Description	Note
FT022-1	5 m robot power and signal	Set of one movement power cable and one movement signal cable, adapted for the chosen robot type. Select the length according to the carriage travel length, the type of robot mounting, and the installation layout.
FT022-2	10 m robot power and signal	
FT022-3	15 m robot power and signal	

Continues on next page

2 Specification of Variants and Options

2.6 Movement flexible cables

Continued

CP/CS robot flexible movement extension cables

Option	Description	Note
FT023-1	5 m robot CP/CS Parallel	CP/CS (Customer Power / Customer Signal) is used for connecting customer equipment such as a gripper or a welding gun. Connects the CP/CS Parallel floor cable to the base of robot. Currently available for IRB 1600F/2400F/2600/4400/4400F/4600/6640/7600
FT023-2	10 m robot CP/CS Parallel	
FT023-3	15 m robot CP/CS Parallel	

Option	Description	Note
FT024-1	5 m robot CP/CS DeviceNet	CP/CS (Customer Power / Customer Signal) is used for connecting customer equipment such as a gripper or a welding gun. Connects the CP/CS DeviceNet floor cable to the base of robot. Currently available for IRB 2600/4600/6640/7600
FT024-2	10 m robot CP/CS DeviceNet	
FT024-3	15 m robot CP/CS DeviceNet	

Option	Description	Note
FT025-1	5 m robot CP/CS PROFIBUS	CP/CS (Customer Power / Customer Signal) is used for connecting customer equipment such as a gripper or a welding gun. Connects the CP/CS PROFIBUS floor cable to the base of robot. Currently available for IRB 2600/4600/6640/7600
FT025-2	10 m robot CP/CS PROFIBUS	
FT025-3	15 m robot CP/CS PROFIBUS	

Option	Description	Note
FT026-1	5 m robot CP/CS Ethernet/PROFINET	CP/CS (Customer Power / Customer Signal) is used for connecting customer equipment such as a gripper or a welding gun. Connects the CP/CS Ethernet/PROFINET floor cable to the base of robot. Currently available for IRB 1410/1410F/1600/1600F/2400F/4600/6640/7600
FT026-2	10 m robot CP/CS Ethernet/PROFINET	
FT026-3	15 m robot CP/CS Ethernet/PROFINET	

Option	Description	Note
FT027-1	5 m robot CP/CS INTERBUS	CP/CS (Customer Power / Customer Signal) is used for connecting customer equipment such as a gripper or a welding gun. Connects the CP/CS INTERBUS floor cable to the base of robot. Currently available for IRB 2600/4600/6640/7600
FT027-2	10 m robot CP/CS INTERBUS	
FT027-3	15 m robot CP/CS INTERBUS	

Spot welding power extension cable

Option	Description	Note
FT028-1	5 m welding power	Flexible extension cable for spot welding power.
FT028-2	10 m welding power	
FT028-3	15 m welding power	

Continues on next page

Spot welding servo-gun motor power extension cable

Option	Description	Note
FT029-1	5 m servo-gun motor	Flexible extension cable for servo-gun motor power.
FT029-2	10 m servo-gun motor	
FT029-3	15 m servo-gun motor	

Tooling protective earth (Earth grounding)

Option	Description	Note
FT030-1	5 m tooling PE	Flexible extension cable for grounding.
FT030-2	10 m tooling PE	
FT030-3	15 m tooling PE	

DN12 hoses

Select the quantity and length of DN12 hoses, adapted for material handling robot. DN12 hoses include M22 female connectors on both ends as well as one bulkhead coupling on the fixed end.

Option	Description
FT031-1	1 hose DN12 5 m
FT031-2	1 hose DN12 10 m
FT031-3	1 hose DN12 15 m
FT032-1	2 hoses DN12 5 m
FT032-2	2 hoses DN12 10 m
FT032-3	2 hoses DN12 15 m
FT033-1	3 hoses DN12 5 m
FT033-2	3 hoses DN12 10 m
FT033-3	3 hoses DN12 15 m

DN16 hoses

Select the quantity and length of DN16 hoses, adapted for tooling. DN16 hoses include M18 female connectors on both ends as well as one bulkhead coupling on the fixed end.

Option	Description
FT034-1	1 hose DN16 5 m
FT034-2	1 hose DN16 10 m
FT034-3	1 hose DN16 15 m
FT035-1	2 hoses DN16 5 m
FT035-2	2 hoses DN16 10 m
FT035-3	2 hoses DN16 15 m

Continues on next page

2 Specification of Variants and Options

2.6 Movement flexible cables

Continued

Option	Description
FT036-1	3 hoses DN16 5 m
FT036-2	3 hoses DN16 10 m
FT036-3	3 hoses DN16 15 m

One power supply 24V (Tooling)

Select the length of the 24V power supply cable, adapted for tooling.

Option	Description
FT037-1	5 m 24V power supply
FT037-2	10 m 24V power supply
FT037-3	15 m 24V power supply

2.7 SMB box and static cables

IRC5 connection

Option	Description	Note
FT038-1	1 Axis SMB box-Connects to XS7	
FT038-2	3 Axis SMB box-Connects to XS7	
FT038-3	6 Axis SMB box-Connects to XS7	
FT038-4	No SMB box-Flex-Track resolver connects to robot'sFB7	For robot ordered with 864-1(On base). Not suitable for robot with servo-gun.

FlexTrack static power and resolver cables - IRC5 to SMB box

Select the length of the static FlexTrack power and resolver cables that connect the IRC5 and the SMB box. This option should be used together with SMB box FT038-1 or FT038-2 or FT038-3.

Option	Description	Note
FT039-1	5 m FlexTrack power and resolver cable	Select the length according to the carriage travel length, the type of robot mounting, and the installation layout.
FT039-2	10 m FlexTrack power and resolver cable	
FT039-3	15 m FlexTrack power and resolver cable	
FT039-4	25 m FlexTrack power cable	

FlexTrack static power cable - for system without SMB box

Option	Description	Note
FT040-1	5 m FlexTrackstatic power cable with brake release button	The static power cable for system without external SMB box is equipped with a brake release button. This option should be used together with the option No SMB Box FT038-4.
FT040-2	10 m FlexTrackstatic power cable with brake release button	
FT040-3	15 m FlexTrackstatic power cable with brake release button	
FT040-5	25 m FlexTrackstatic power cable with brake release button	

Continues on next page

2 Specification of Variants and Options

2.7 SMB box and static cables

Continued

FlexTrack extension floor cables - SMB box to movement cables

Specify the length of the extension floor cables. See [Cables lengths on page 40](#).

Option	Description	Note
FT041-1	5 m FlexTrack extension power and resolver cables	Set of extension cables (power and resolver). Connects to the external SMB box on one end, and to the movement flexible cables on the other end.
FT041-2	10 m FlexTrack extension power and resolver cables	
FT041-3	15 m FlexTrack extension power and resolver cables	

Warranty

Option	Description	Note
W001-2	Standard Warranty (18 months)	
W001-3	Standard + 6 months (24 months)	
W001-4	Standard + 12 months (30 months)	



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