ROBOTICS

Product specification

IRBT 2005

Trace back information:
Workspace 20B version a11
Checked in 2020-05-27
Skribenta version 5.3.033

Product specification
IRBT 2005

Document ID: 3HAC051131-001
Revision: E

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

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

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

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

Keep for future reference.

Additional copies of this manual may be obtained from ABB.

Original instructions.

Table of contents

This page is intentionally left blank

Overview of this specification

About this product specification

This product specification describes the performance of the track motion in terms of:

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

Usage

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

Users

It is intended for:

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

References

Reference	Document ID
Product specification - Controller IRC5 IRC5 with main computer DSQC1000.	*3HAC047400-001*
Product specification - Controller software IRC5 IRC5 with main computer DSQC1000 and RobotWare 6.	*3HAC050945-001*
Product specification - IRBT 4004/6004/7004	*3HEA802965-001*
Product manual - IRBT 2005	
Product specification - Robot user documentation, IRC5 with RobotWare 6	*3HAC052355-001*

Revisions

Revision	Description
-	First edition

Continues on next page

Continued

Revision	Description
A	This revision contains the following updates: • Modified information of track dimensions. See *Dimensions on page 19*. • Updated stopping distance/time information. See *Stopping distance/time on page 48*. • Provided the Intrinsic cable chain weight, and clarified the track payload with external cable chain and additional cables. See the table and table-note in *Specifications on page 57*. • Added connection options for tracks used with robots. See *Drives and connection on page 70*. • Added information about Arc Welding interfaces and connection kits. See *Arc Welding connection on page 61*. • Minor changes.
B	Published in release R16.2. The following updates are done in this revision: • Corrected the screws for fastening track to base to M16x125 mm. See *Hole configuration on page 40*. • Revised the description about external cable chain.
C	Published in release R17.2 The following updates are done in this revision: • Updated list of applicable standards. • Lifter options added.
D	Published in release R19B The following updates are done in this revision: • The list of flexible cables updated. See *Flexible cables on page 53*. • Graphic for lubrication sensor cable added. See *Circuit diagram for Lubrication sensor cable on page 14*. • Option description "Oil Detection sensor" changed to "Grease Detection sensor".
E	Published in release R20B The following updates are done in this revision: • Added introduction for Internal Cable Chain.

Product documentation

Categories for user documentation from ABB Robotics

The user documentation from ABB Robotics is divided into a number of categories. This listing is based on the type of information in the documents, regardless of whether the products are standard or optional.

All documents can be found via myABB Business Portal, *www.myportal.abb.com*.

Product manuals

Manipulators, controllers, DressPack/SpotPack, and most other hardware is delivered with a **Product manual** that generally contains:

- Safety information.
- Installation and commissioning (descriptions of mechanical installation or electrical connections).
- Maintenance (descriptions of all required preventive maintenance procedures including intervals and expected life time of parts).
- Repair (descriptions of all recommended repair procedures including spare parts).
- Calibration.
- Decommissioning.
- Reference information (safety standards, unit conversions, screw joints, lists of tools).
- Spare parts list with corresponding figures (or references to separate spare parts lists).
- References to circuit diagrams.

Technical reference manuals

The technical reference manuals describe reference information for robotics products, for example lubrication, the RAPID language, and system parameters.

Application manuals

Specific applications (for example software or hardware options) are described in **Application manuals**. An application manual can describe one or several applications.

An application manual generally contains information about:

- The purpose of the application (what it does and when it is useful).
- What is included (for example cables, I/O boards, RAPID instructions, system parameters, software).
- How to install included or required hardware.
- How to use the application.
- Examples of how to use the application.

Continues on next page

Continued

Operating manals

The operating manuals describe hands-on handling of the products. The manuals are aimed at those having first-hand operational contact with the product, that is production cell operators, programmers, and troubleshooters.

1 Description

1.1 Structure

1.1.1 Introduction

General

The IRBT 2005 is a linear track motion which, like ABB robots, is driven by the IRC5 controller. The movement on the track motion is programmed using the robot FlexPendant in the same way as on other robot's axes.

The IRBT 2005 track motion has different types categorized by the following aspects:

- Cover type: covered track and standard track

  The difference between the two is that the covered track has top covers, rail covers and two end covers while the standard track only has rail covers on both sides of the track.
- Carriage type: robot track and transfer track

  The difference between the two is that the robot track has a robot carriage table that enables robots to be fitted on while the transfer track can only do transfer motions. For the robot track, IRBT 2005 expands the movement pattern of the robot with an extra degree of programmable freedom.
- Carriage quantity: single carriage track (standard), double carriage track and multiple carriages for transfer track

  For the robot track, the number of carriages can only be one or two. For the transfer track, the number of carriages can be one or more.
- Cable chain type: standard track and mirrored track

  Mirrored tracks are tracks installed in an opposite way, which can be identified by the installation mode of the cable chain. For the robot track with single carriage and transfer track, the cable chain(s) of the IRBT 2005 track motion can be standard or mirrored. For the robot track with double carriages, one of the two cable chains is standard and the other is mirrored.

Operating system

IRBT 2005 is equipped with the IRC5 controller and robot control software, RobotWare. RobotWare supports every aspect of the robot system, such as motion control, development and execution of application programs, communication etc. See *Product specification - Controller IRC5 with FlexPendant*.

Safety

Safety standards require the connection of IRBT 2005 to the robot system and are valid for complete robot, manipulator and controller.

Continues on next page

1.1.1 Introduction
Continued

Additional functionality

For additional functionality, the robot can be equipped with optional software for application support - for example gluing and welding, communication features - network communication - and advanced functions such as multitasking, sensor control etc. For a complete description on optional software, see the *Product specification - Controller software IRC5*

Performance

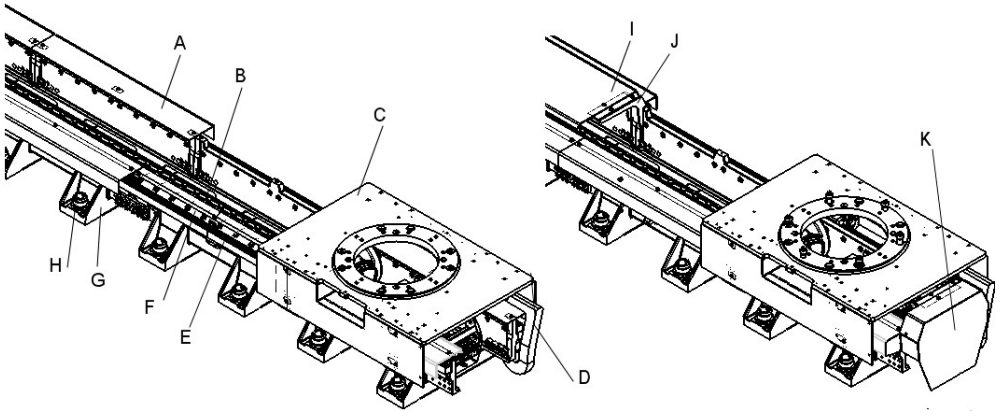
IRBT 2005 and its respective robot is a seven-axis dynamic model. ABB's unique QuickMove and TrueMove can be fully exploited, which means optimal movement for the robot and the track with actual load. Furthermore, path accuracy and speed are optimized.

Limitations

The option 610-1, Independent Axis, is not possible to use together with IRBT 2005.

Track motion

Stand unit and carriage unit



xx1400000178

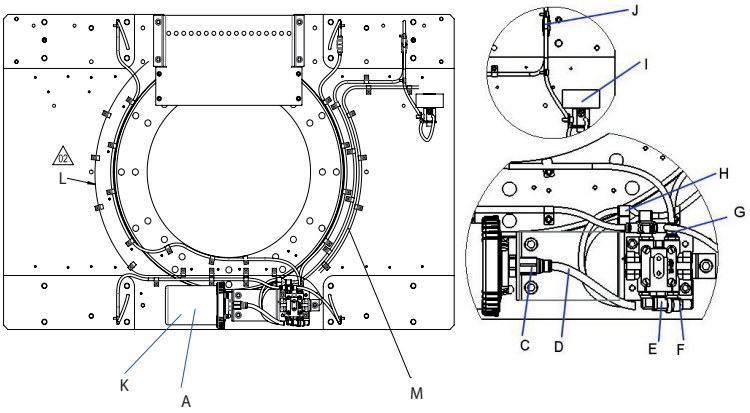
Pos	Description	Pos	Description
A	Rack cover	G	Section
B	Cable chain	H	Leveling screw
C	Carriage	I	Top cover
D	Mechanical stop	J	Top cover support
E	Linear guide	K	End cover
F	Rack		

Continues on next page

Automatic lubrication system

The IRBT 2005 track motion is equipped with an integrated automatic lubrication system and a dispatch circuit that routes lubricant to the ball bearing block, pinion, and rack. The lubrication 24V power is from the motor brake. If the system is activated, it delivers an exact quantity of grease to each port at a required time interval in at least one year. No other lubrication is required.

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



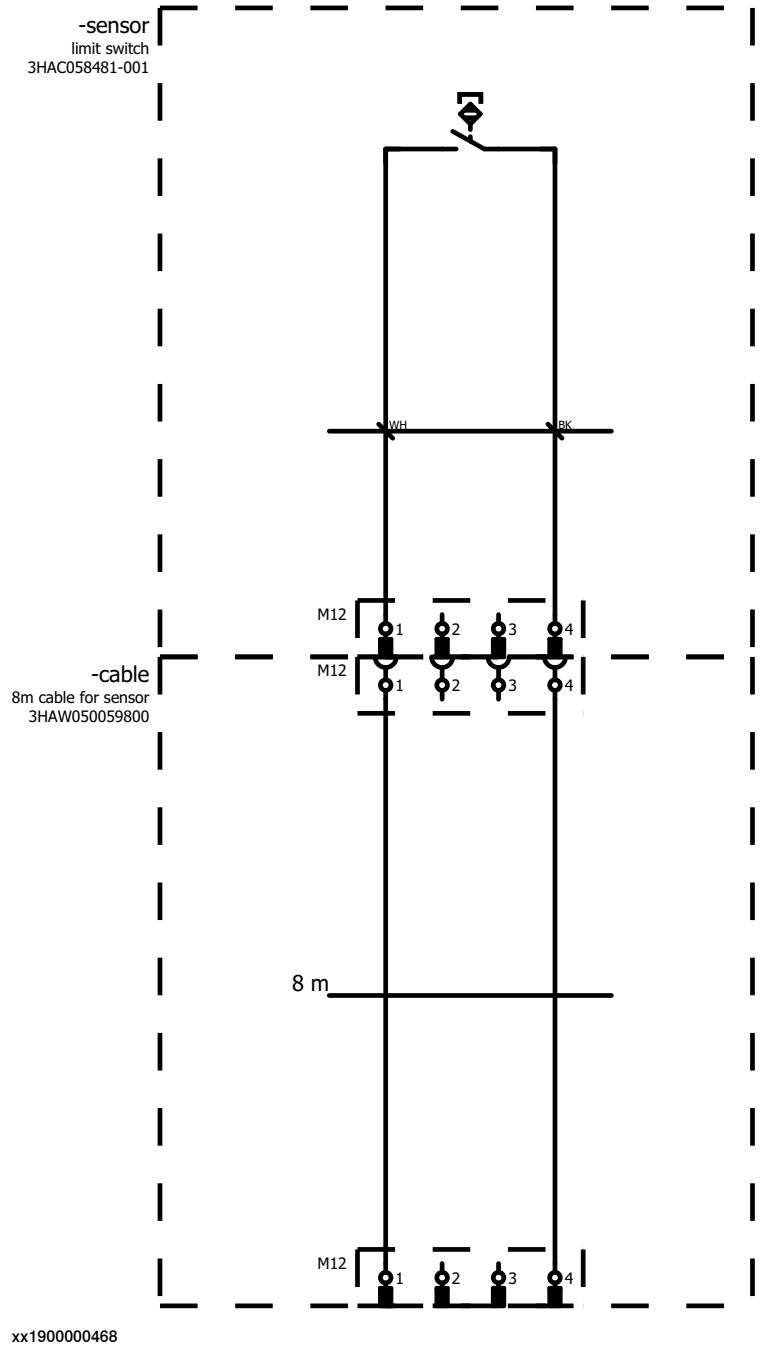
xx1900000133

Pos	Description
A	Lubrication pump
B	Polyamide tube 4x6
C	Straight adaptor F1/4-D8
D	Polyamide tube 6x8
E	Male stud elbow (white brass) D8 G1/4
F	Male stud elbow (white brass) D6 G1/8
G	Male stud straight (white brass) D6 G1/8
H	Y fitting D6-D6
I	Inline fitting-D6
J	Felt gear set
K	Grease package 240 CC
L	Lubrication sensor cable
M	3HAC049067-001,cable: from Memolub EPS to brake release box

Continues on next page

1.1.1 Introduction
Continued

Circuit diagram for Lubrication sensor cable



1.1.2 Technical data for track motion

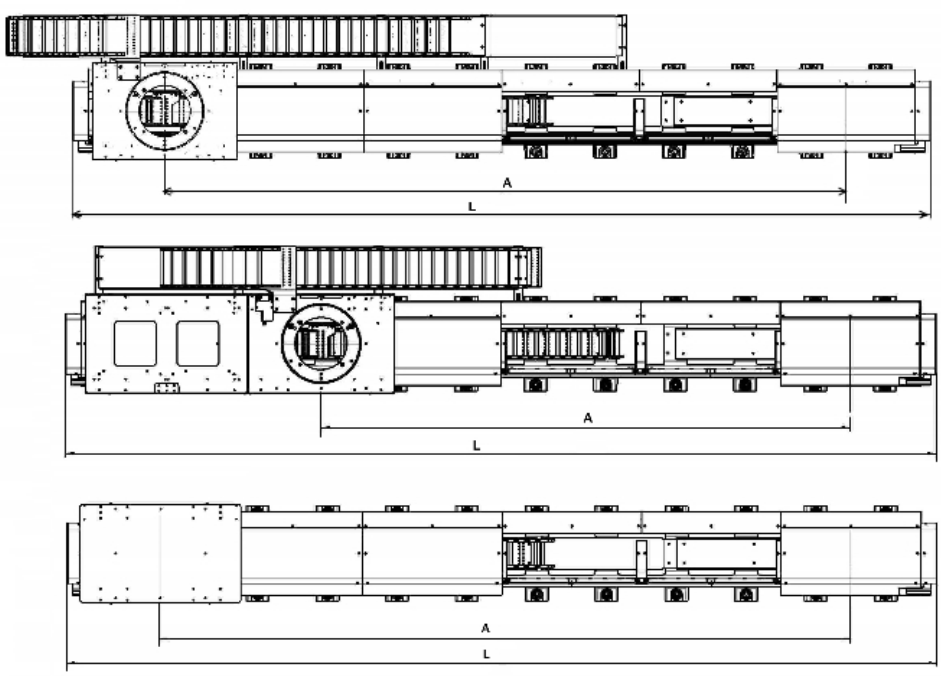
Travel length

The travel length of the IRBT 2005 track motion varies based on the carriage type and carriage quantity.

Carriage type	Carriage quantity	Description	Travel length (m) [i]
Robot track	Single carriage	Robot	0.8 to 19.8 (in steps of 1 m)
	Single carriage	Robot with extra plate	1.7 to 18.7 (in steps of 1 m)
	Double carriages	Robot + Robot	1.6 to 18.6 (in steps of 1 m)
	Double carriages	Robot + Robot with extra plate	1.4 to 17.4 (in steps of 1 m)
	Double carriages	Robot with extra plate + Robot with extra plate	1.3 to 16.3 (in steps of 1 m)
Transfer track	Single carriage/multiple carriages	Transfer	0.8 to 19.8 (in steps of 1 m) For every independent transfer track with a single carriage

[i] Travel length is the maximum distance that the carriage(s) can move.

Single carriage



xx1500001397

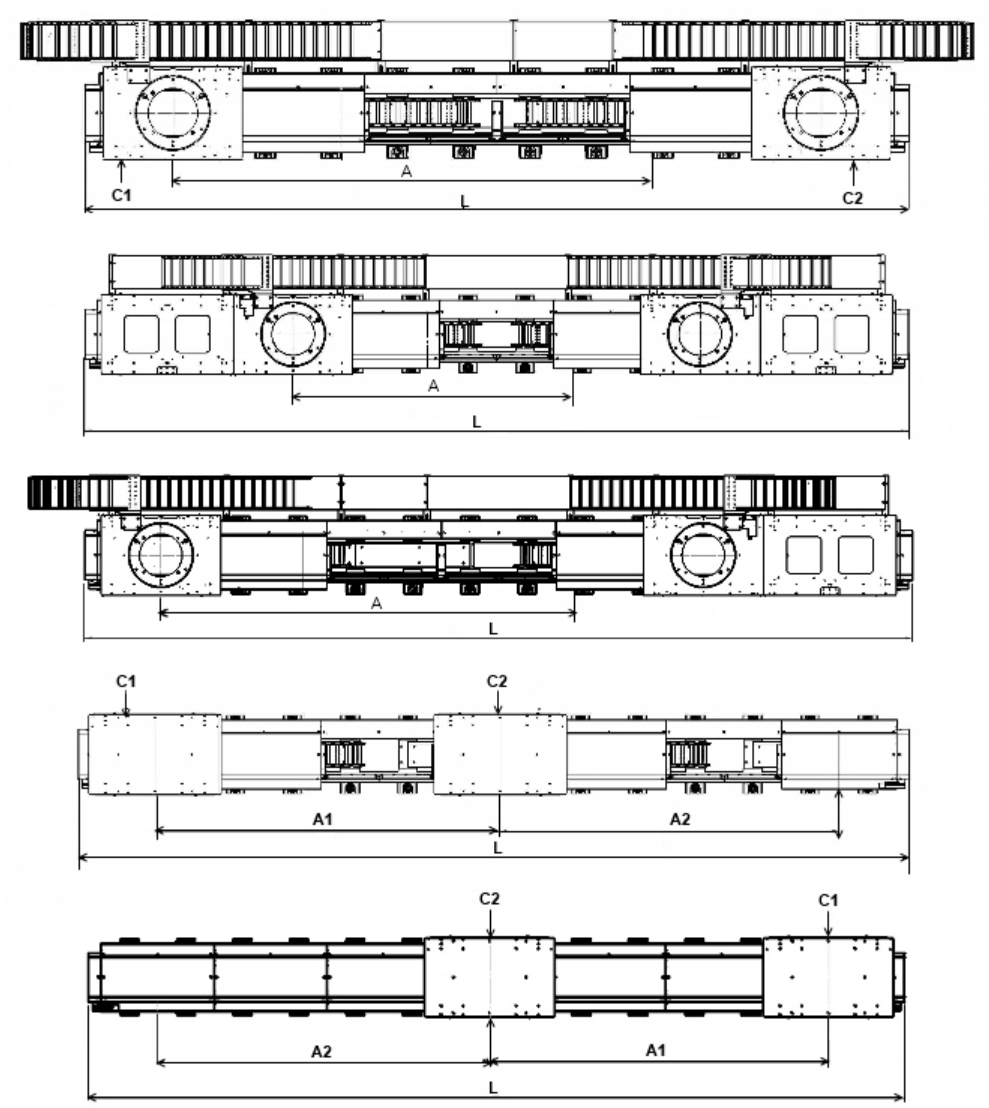
Item	Description
L	Total length of linear guide = 230 + 1000 x N mm, in which N indicates the number of sections.
A	Travel length (in mm)

Continues on next page

1.1.2 Technical data for track motion

Continued

Double carriages



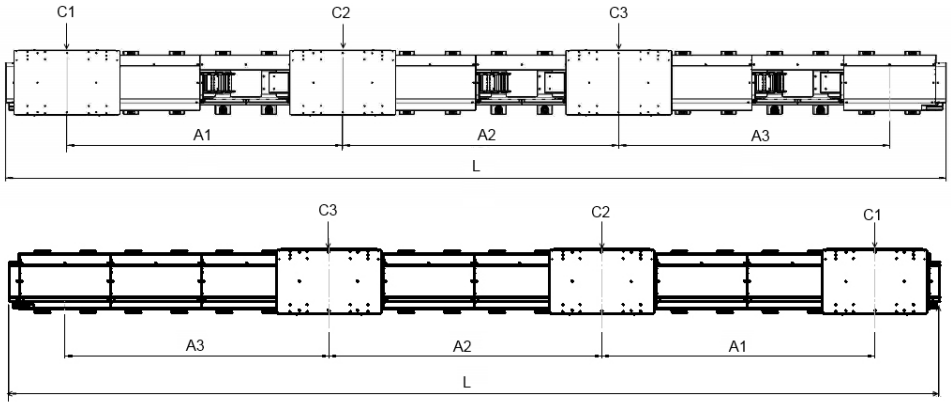
xx1500001396

Item	Description
L	Total length of linear guide = 230 + 1000 x N mm, in which N indicates the number of sections.
A	Travel length (in mm) of one carriage on the robot track Note: The two carriages on the robot track have the same travel length.
A1	Travel length (in mm) of carriage 1 on the transfer track
A2	Travel length (in mm) of carriage 2 on the transfer track
C1	Carriage 1 For robot track, this carriage is always in standard mounting. For transfer track, refer to *Mounting of manipulator on the track on page 32* to acquire the mounting direction, standard or mirrored, of the carriage.

Continues on next page

Item	Description
C2	Carriage 2 For robot track, this carriage is always in mirrored mounting. For transfer track, refer to *Mounting of manipulator on the track on page 32* to acquire the mounting direction, standard or mirrored, of the carriage.

Multiple carriages for transfer track



xx1500001398

Item	Description
L	Total length of linear guide = 230 + 1000 x N mm, in which N indicates the number of sections.
A1	Travel length (in mm) of carriage 1 on the transfer track
A2	Travel length (in mm) of carriage 2 on the transfer track
A3	Travel length (in mm) of carriage 3 on the transfer track
C1	Carriage 1 For transfer track, refer to *Mounting of manipulator on the track on page 32* to acquire the mounting direction, standard or mirrored, of the carriage.
C2	Carriage 2 For transfer track, refer to *Mounting of manipulator on the track on page 32* to acquire the mounting direction, standard or mirrored, of the carriage.
C3	Carriage 3 For transfer track, refer to *Mounting of manipulator on the track on page 32* to acquire the mounting direction, standard or mirrored, of the carriage.

Required space for track installation

Note

The following tables only provide the space that the track motion itself requires. There is possibilities that additional spaces are required at the ends of the track motion at the installation site. In this case, add spaces as required.

Formula for required space

Required space for the track is calculated using the following formula:

Continues on next page

1.1.2 Technical data for track motion
Continued

Required space (mm) = 230 + (1000 x N)

In which, N indicates the number of sections.

Required space for installation of single carriage track - without external cable chain

The following table describes the required spaces for the installation of the tracks in different travel lengths without the external cable chain.

Travel length (m) [i]		Sections (pcs)	Required space for installation (m) [ii iii]
Robot/Transfer	Robot with extra plate	Value of N	
0.8	N/A	2	2.23
1.8	N/A	3	3.23
2.8	1.7	4	4.23
3.8	2.7	5	5.23
4.8	3.7	6	6.23
5.8	4.7	7	7.23
6.8	5.7	8	8.23
7.8	6.7	9	9.23
8.8	7.7	10	10.23
9.8	8.7	11	11.23
10.8	9.7	12	12.23
11.8	10.7	13	13.23
12.8	11.7	14	14.23
13.8	12.7	15	15.23
14.8	13.7	16	16.23
15.8	14.7	17	17.23
16.8	15.7	18	18.23
17.8	16.7	19	19.23
18.8	17.7	20	20.23
19.8	18.7	21	21.23

i The travel length is described in *Travel length on page 15*.
ii The measurement for the required space is valid when not using the external cable chain.
iii How to calculate the required space is described in *Formula for required space on page 17*.

Required space for installation of double carriage track - without external cable chain

The following table describes the required spaces for the installation of double carriage tracks in different travel lengths without the external cable chain.

Travel length (m) [i]			Sections (pcs)	Required space for installation (m) [ii iii]
Robot + Robot	Robot + Robot with extra plate	Robot with extra plate + Robot with extra plate	Value of N	
1.6	N/A	N/A	4	4.23
2.6	1.4	N/A	5	5.23

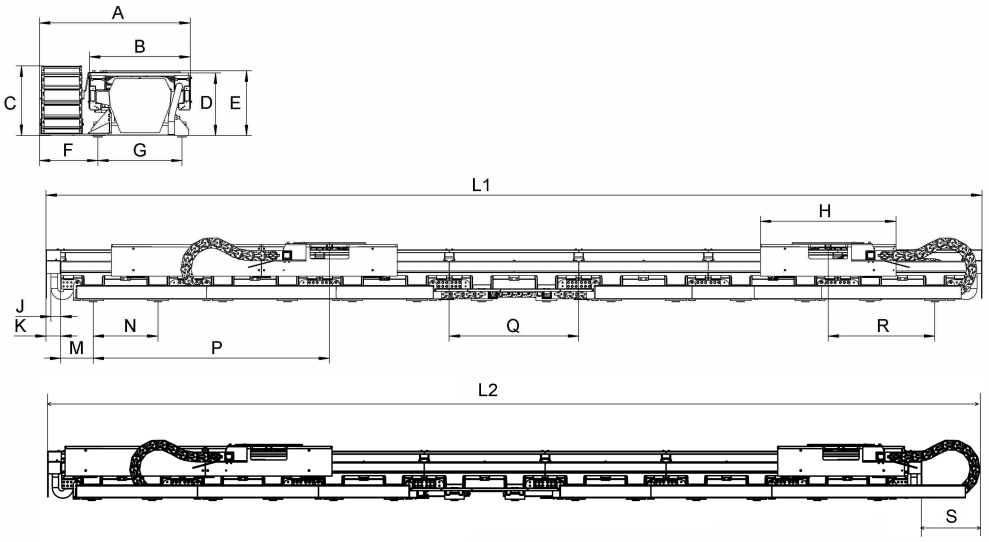
Continues on next page

Travel length (m) [i]			Sections (pcs)	Required space for installation (m) [ii iii]
Robot + Robot	Robot + Robot with extra plate	Robot with extra plate + Robot with extra plate	Value of N	
3.6	2.4	1.3	6	6.23
4.6	3.4	2.3	7	7.23
5.6	4.4	3.3	8	8.23
6.6	5.4	4.3	9	9.23
7.6	6.4	5.3	10	10.23
8.6	7.4	6.3	11	11.23
9.6	8.4	7.3	12	12.23
10.6	9.4	8.3	13	13.23
11.6	10.4	9.3	14	14.23
12.6	11.4	10.3	15	15.23
13.6	12.4	11.3	16	16.23
14.8	13.4	12.3	17	17.23
15.6	14.4	13.3	18	18.23
16.6	15.4	14.3	19	19.23
17.6	16.4	15.3	20	20.23
18.6	17.4	16.3	21	21.23

i The travel length is described in *Travel length on page 15*.
ii The measurement for the required space is valid when not using the external cable chain.
iii How to calculate the required space is described in *Formula for required space on page 17*.

Dimensions

Without FlexLifter



xx1400000180

Continues on next page

1.1.2 Technical data for track motion

Continued

Item	Description	Value (unit: mm)			
		Robot	Robot with extra plate	Transfer	External cable chain
A	Total width with external cable chain	1048			N/A
B	Total width	700			N/A
C	Height	N/A			490
D		N/A		435	N/A
E		450		N/A	N/A
F	Width from the outer edge of external cable chain to its nearby foot center	406			N/A
G	Width (foot print)	584			N/A
H	Carriage table length	1048	2209	1150	N/A
J	Distance between edges of the rack and mechanical stop	75.5			N/A
K	End cover	115			N/A
M	Distance between the rack edge and its nearest foot	250			N/A
N	Distance between two feet	500			N/A
Q	Section length	1000			N/A
P	Width from the center of first foot to the center of carriage table at calibration position	824.5	N/A	824.5	N/A
R		N/A	1824.5	N/A	N/A
S	Length of the external cable chain that exceeds the end of the track	N/A			0-490 [i]
L1	Total length of the track with internal cable chain	230 + (N x 1000) [ii] In which, N indicates the number of sections			N/A
L2	Total length of the track without external cable chain or with external cable chain but the chain does not exceed the end of the track [iii]	230 + (N x 1000) [ii] In which, N indicates the number of sections			N/A
	Total length of the track with one external cable chain exceeding the end of the track [iii]	720 + (N x 1000) [ii] In which, N indicates the number of sections			N/A
	Total length of the track with double external cable chains exceeding the end of the track [iii]	1210 + (N x 1000) [ii] In which, N indicates the number of sections			N/A

i For robot with extra plate, the external cable chain cannot exceed the end of the track.

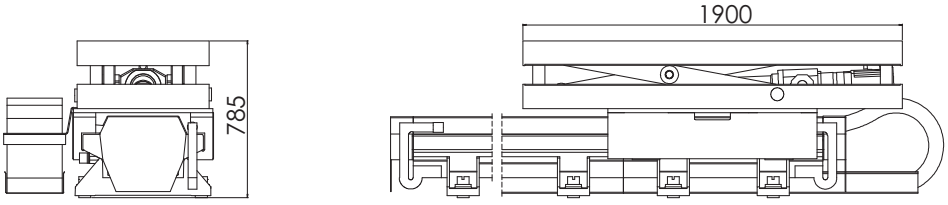
ii The total length of IRBT 2005 depends on the quantity of modules, each of which is 1000 mm long. IRBT 2005 can be assembled with a minimum of 2 modules and a maximum of 110 modules.

iii For details about the track with or without external cable chain and how the external cable chain exceeds the end of the track, see *Double carriages on page 16*.

Continues on next page

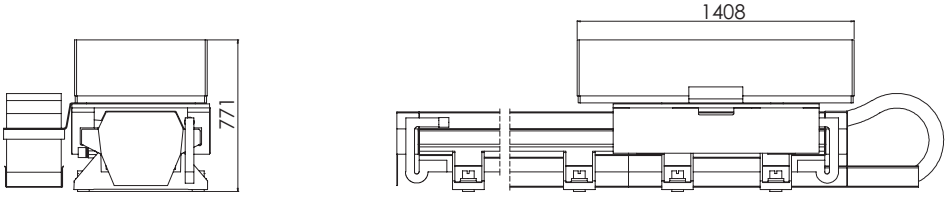
With FlexLifter

FlexLifter IRL 600



xx1700001514

FlexLifter IRL 100/190



xx1700001515

Note

Other dimensions are the same as those of the track motion without FlexLifter.

Weight of track motion and number of joined sections in transport

Formula for weight of track motion

Carriage quantity	Weight (Unit: kg; N indicates the number of sections)
Robot	W = 232 + 202 x N
Robot with extra plate	W = 375 + 202 x N
Transfer	W = 249 + 202 x N
Robot + Robot	W = 232 x 2 + 202 x N
Root + Robot with extra plate	W = (232 + 375) + 202 x N
Robot with extra plate + Robot with extra plate	W = 375 x 2 + 202 x N
Transfer + Transfer	W = 249 x 2 + 202 x N
Transfer + Transfer + Transfer	W = 249 x 3 + 202 x N

Weight of single carriage track

Sections (pcs)	Joined sections in transport	Weight (kg)		
Value of N		Robot	Robot with extra plate	Transfer
2	1	636	779	653
3	1	838	981	855
4	1	1040	1183	1057
5	1	1242	1385	1259

Continues on next page

1.1.2 Technical data for track motion

Continued

Sections (pcs)	Joined sections in transport	Weight (kg)		
Value of N		Robot	Robot with extra plate	Transfer
6	1	1444	1587	1461
7	1	1646	1789	1663
8	1	1848	1991	1865
9	1	2050	2193	2067
10	2	2252	2395	2269
11	2	2454	2597	2471
12	2	2656	2799	2673
13	2	2858	3001	2875
14	2	3060	3203	3077
15	2	3262	3405	3279
16	2	3464	3607	3481
17	2	3666	3809	3683
18	3	3868	4011	3885
19	3	4070	4213	4087
20	3	4272	4415	4289
21	3	4474	4617	4491

Weight of double carriage track

Sections (pcs)	Joined sections in transport	Weight (kg)			
Value of N		Robot + Robot	Robot + Robot with extra plate	Robot with extra plate + Robot with extra plate	Transfer + Transfer
4	1	1272	1415	1558	1306
5	1	1474	1617	1760	1508
6	1	1676	1819	1962	1710
7	1	1878	2021	2164	1912
8	1	2080	2223	2366	2114
9	1	2282	2425	2568	2316
10	2	2484	2627	2770	2518
11	2	2686	2829	2972	2720
12	2	2888	3031	3174	2922
13	2	3090	3233	3376	3124
14	2	3292	3435	3578	3326
15	2	3494	3637	3780	3528
16	2	3696	3839	4184	3730
17	2	3898	4041	3982	3932
18	3	4100	4243	4386	4134

Continues on next page

Sections (pcs)	Joined sections in transport	Weight (kg)			
Value of N		Robot + Robot	Robot + Robot with extra plate	Robot with extra plate + Robot with extra plate	Transfer + Transfer
19	3	4302	4445	4588	4336
20	3	4504	4647	4790	4538
21	3	4706	4849	4992	4740

Weight of triple carriage transfer track

Sections (pcs)	Joined sections in transport	Weight (kg)
Value of N		Transfer + Transfer + Transfer
4	1	1555
5	1	1757
6	1	1959
7	1	2161
8	1	2363
9	1	2565
10	2	2767
11	2	2969
12	2	3171
13	2	3373
14	2	3575
15	2	3777
16	2	3979
17	2	4181
18	3	4383
19	3	4585
20	3	4787
21	3	4989

Weight of pedestal

Pedestal height (mm)[i]	Weight (kg)
250	70
500	95
750	165
1000	190

[i] Heights 500, 750 and 1000 are unavailable for IRB 4600.

Airborne noise level

The sound pressure level outside the working space is less than 76 dB (A) / 1 m.

Continues on next page

1.1.2 Technical data for track motion
Continued

Power consumption at maximum load

Type of movement	IR(B)T
ISO Cube	Within specification for respective robot

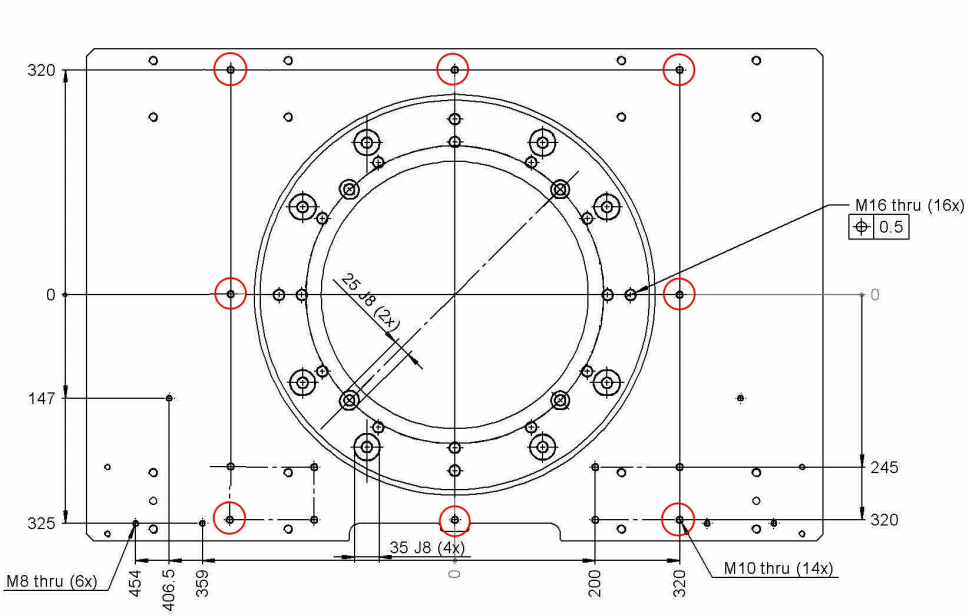
1.1.3 Measures of the carriage table

Robot carriage table

The robot carriage table is available to various robot models and the bolting patterns of the table match those of the robots. The robot carriage table is symmetrically designed to allow different manipulator mounting orientations (in line, 90 degrees, 180 degrees or 270 degrees) regardless of the table orientation.

Use the hole configuration for the manipulator when designing fixtures to be used on the track. The figures below show the dimensions of the robot carriage table in mm. Both tables on double carriage track are the same.

Eight M10 holes circled in the following figure are available for fastening the fixture on the carriage.



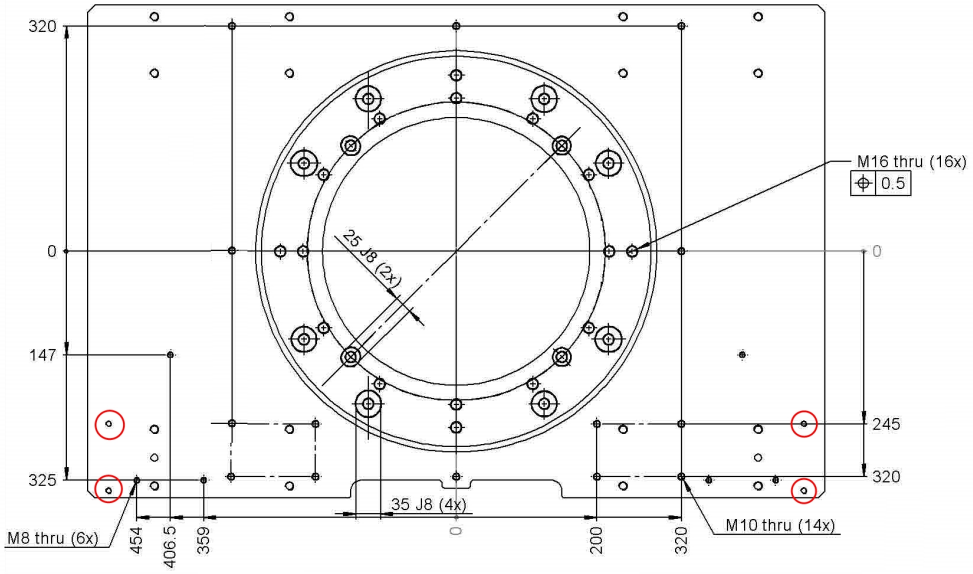
xx1400000467

Continues on next page

1.1.3 Measures of the carriage table

Continued

Two holes at each side of the carriage table, circled in the following figure, are available for ground cables.



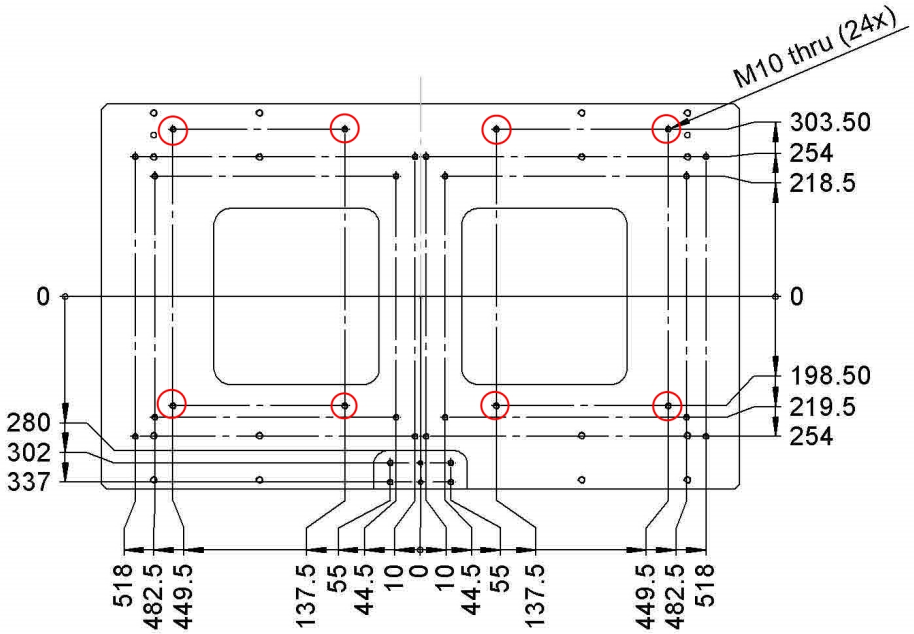
xx1500001610

Continues on next page

Extra plate

The figures below show the dimensions of the extra plate in mm. The holes in the figures are originally designed for fastening the arc welding equipment with a specific layout, but the holes can also be used for arc welding applications with other layouts and other equipment required to be fastened on the plate.

Eight M10 holes circled in the following figure are available for fastening the welder on the extra plate.



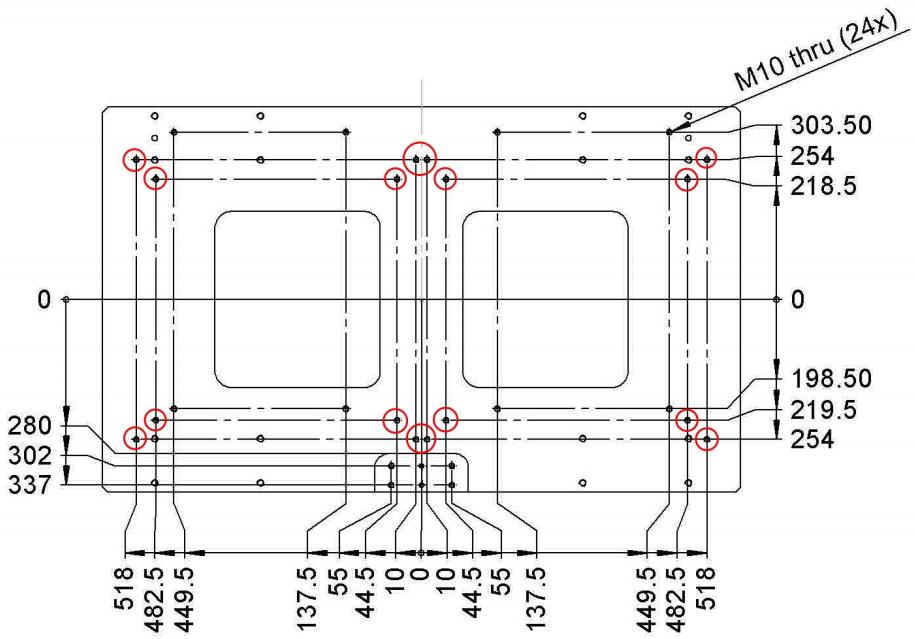
xx1500001607

Continues on next page

1.1.3 Measures of the carriage table

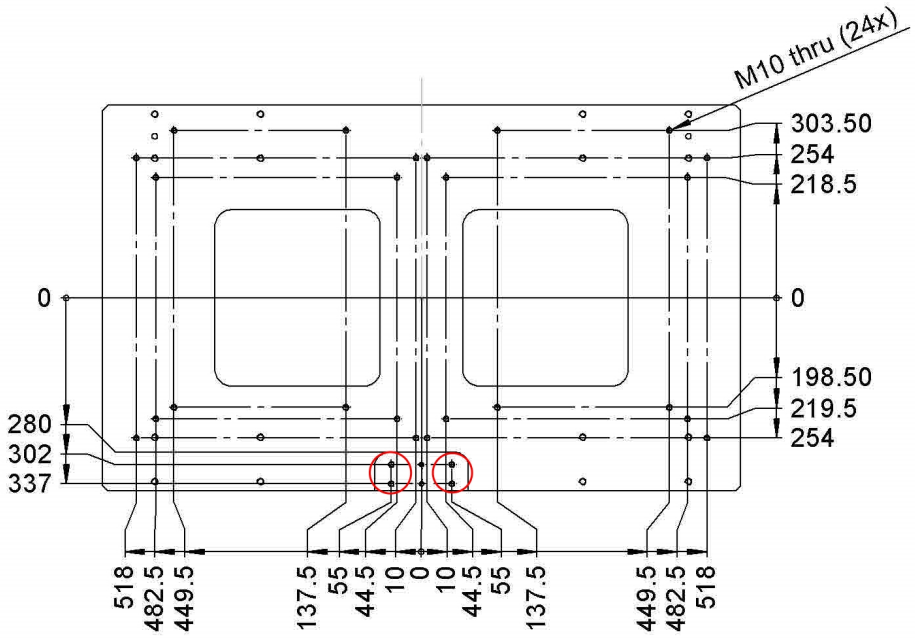
Continued

Sixteen M10 holes circled in the following figure are available for welder wires.



xx1500001613

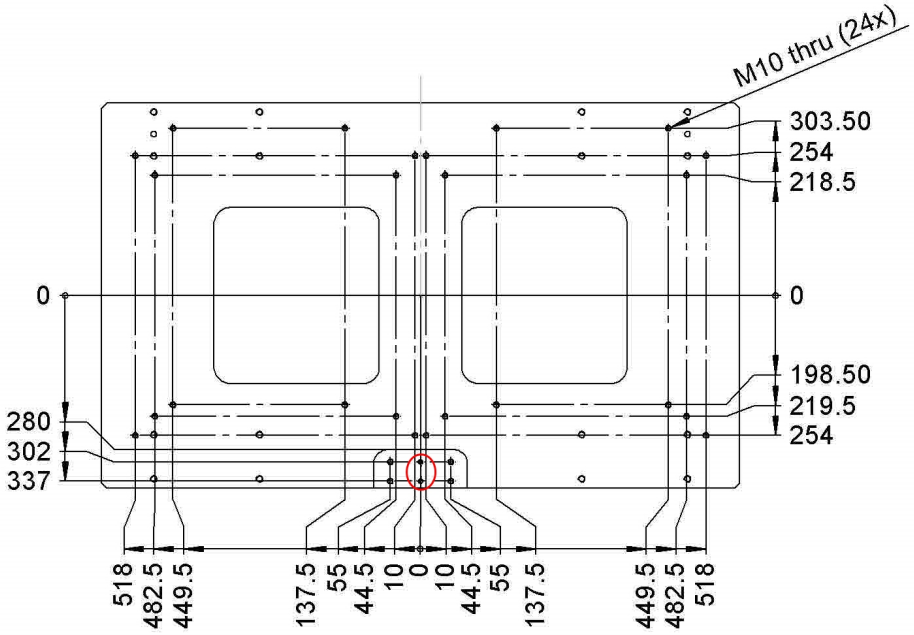
Four M10 holes circled in the following figure are available for fastening TSC.



xx1500001614

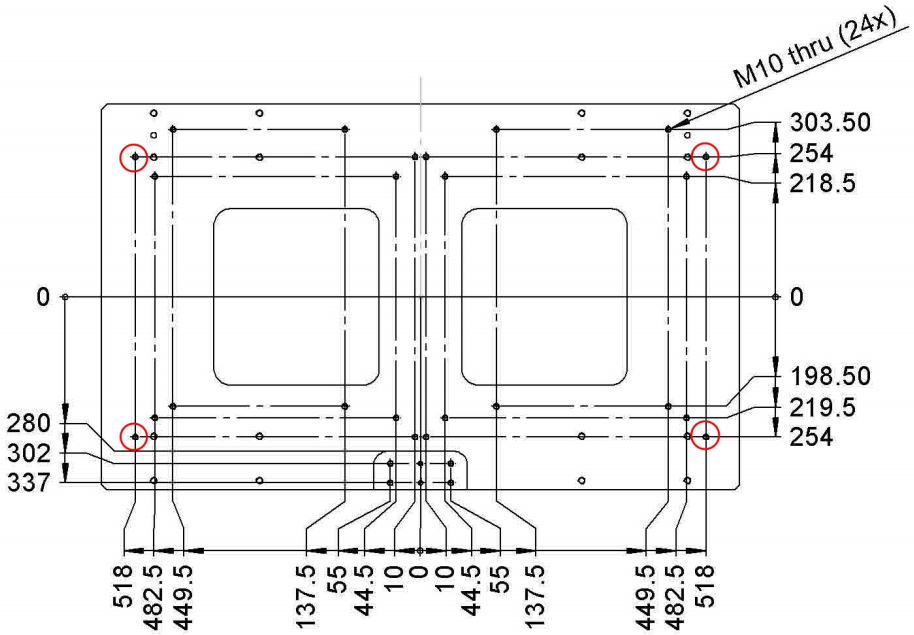
Continues on next page

Two pin holes circled in the following figure are available for locating TSC.



xx1500001615

Two holes at each side of the extra plate, circled in the following figure, are available for ground cables.



xx1500001612

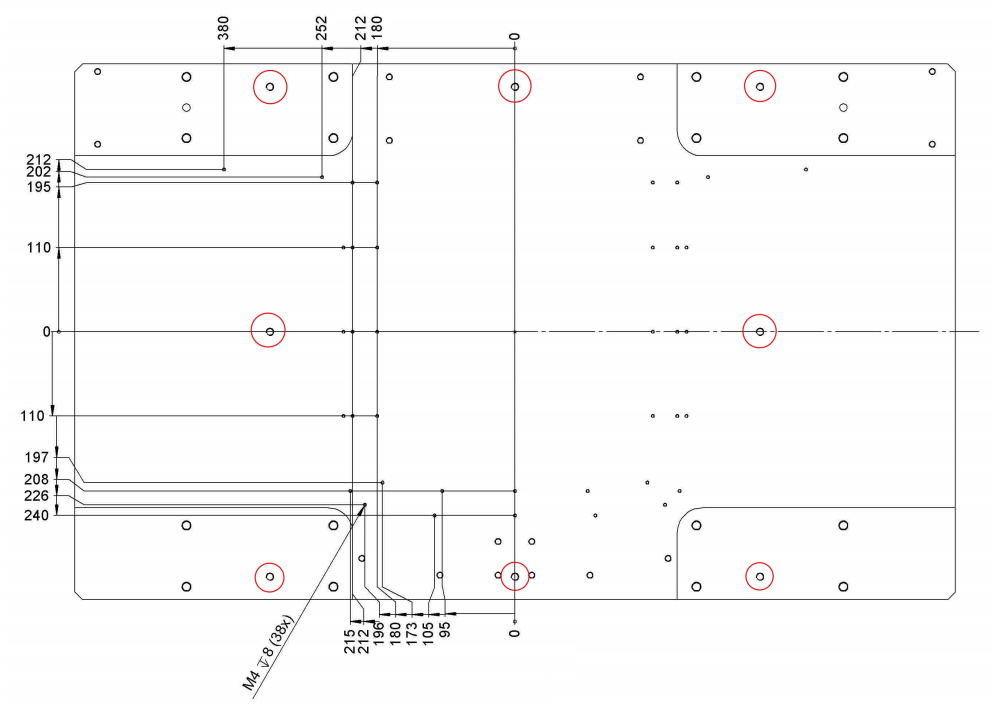
Continues on next page

1.1.3 Measures of the carriage table
Continued

Transfer carriage table

The figure below shows the dimensions of the transfer carriage table in mm.

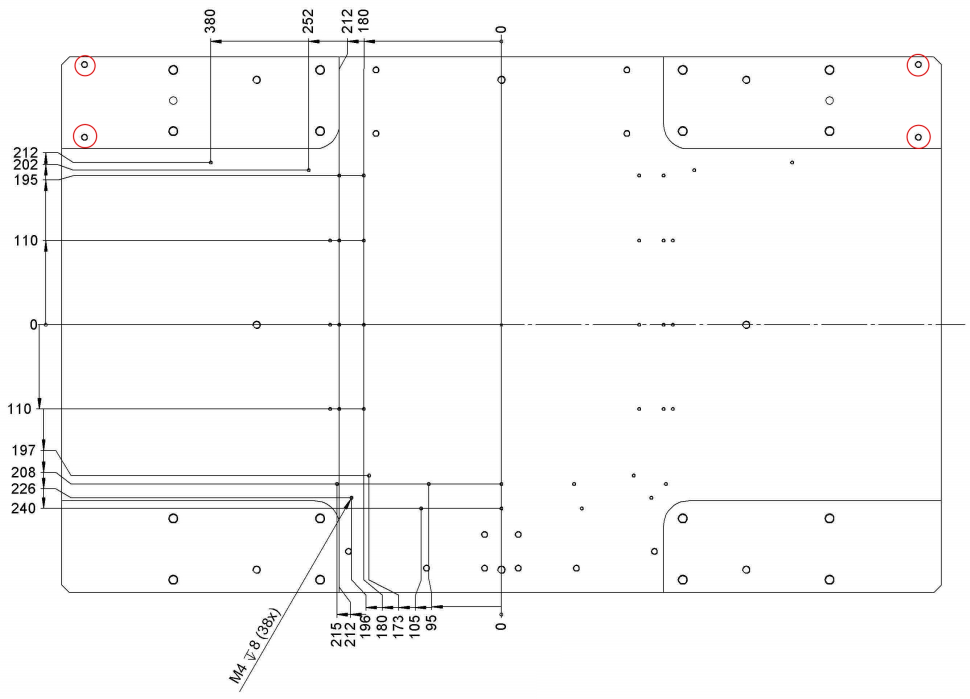
Eight M10 holes circled in the following figure are available for fastening the fixture on the carriage.



xx1400001407

Continues on next page

Two holes at each side of the carriage table, circled in the following figure, are available for ground cables.



xx1500001611

1.1.4 Mounting of manipulator on the track

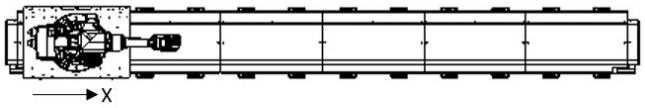
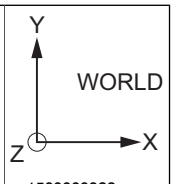
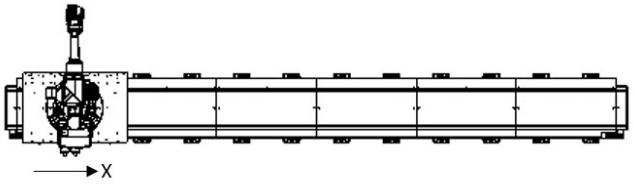
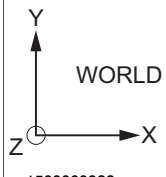
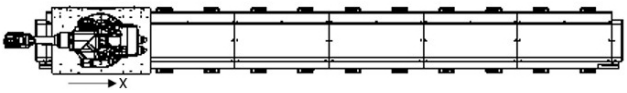
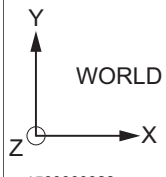
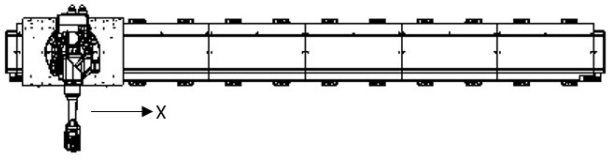
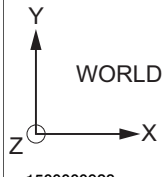
General

The manipulator can be mounted in four directions, 0 degrees (in line), 90 degrees, 180 degrees, and 270 degrees with the cable chain standard or mirrored. Other mounting orientations are not allowed. The world coordinate system is shown in the following figures.

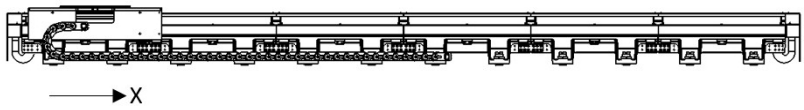
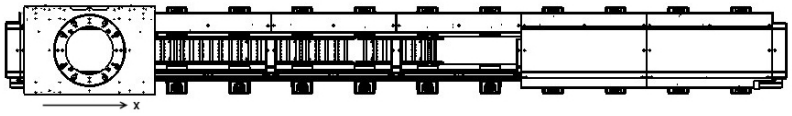
Robot orientation with standard cable chain

Following figures illustrate the manipulator mounted in different directions with the standard cable chain.

The positive X direction is the positive motion direction of the track. The positive Y direction is the direction of the cabling outlet on the carriage.

0 degrees (in line)	 xx1400001911	 xx1500000928
+90 degrees	 xx1400001912	 xx1500000928
+180 degrees	 xx1400001909	 xx1500000928
+270 degrees	 xx1400001910	 xx1500000928

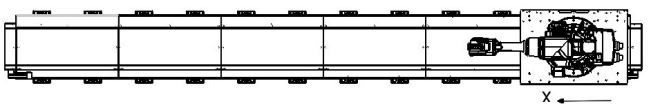
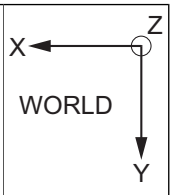
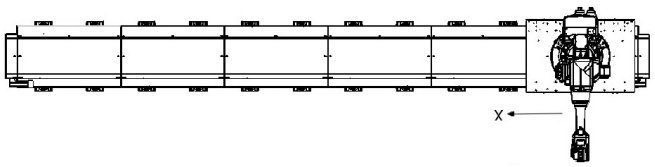
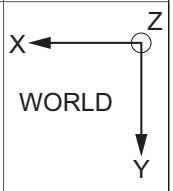
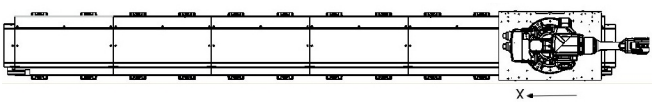
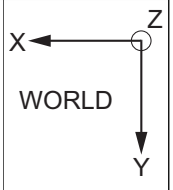
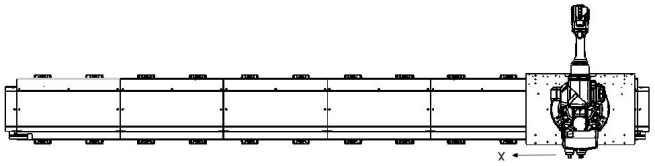
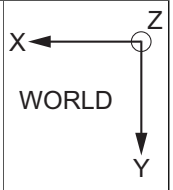
Continues on next page

Standard cable chain	Side view:  xx1500000597 Top view:  xx1400001952

Robot orientation with mirrored cable chain

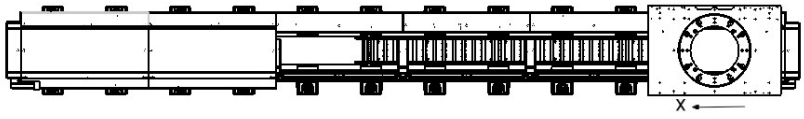
Following figures illustrate the manipulator mounted in different directions with the mirrored cable chain.

The positive X direction is the positive motion direction of the track. The positive Y direction is the opposite direction of the cabling outlet on the carriage.

0 degrees (in line)	 xx1500000631	 xx1500000927
+90 degrees	 xx1500000632	 xx1500000927
+180 degrees	 xx1500000633	 xx1500000927
+270 degrees	 xx1500000634	 xx1500000927

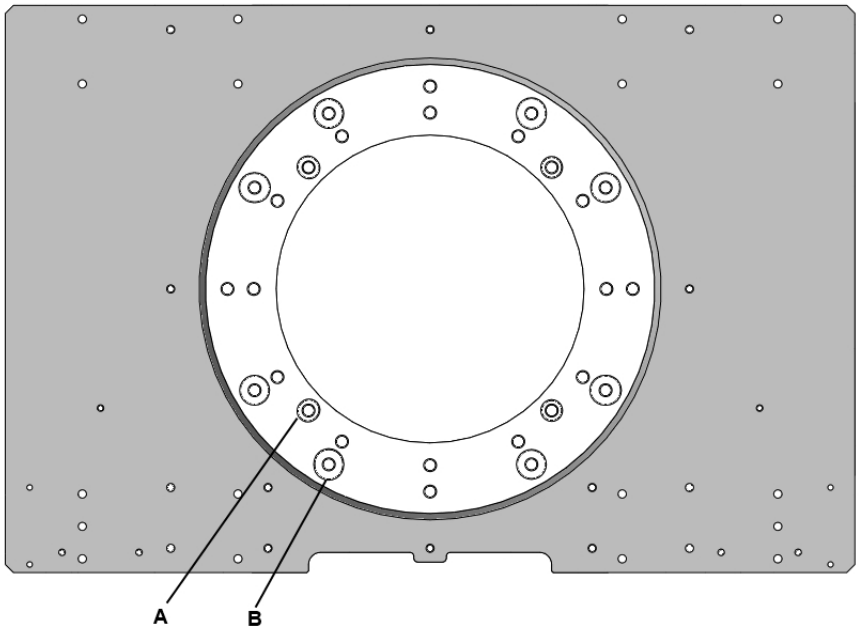
Continues on next page

1.1.4 Mounting of manipulator on the track
Continued

Mirrored cable chain	Side view:  xx1500000630 Top view:  xx1400001951

Assembly position

The following figure shows guide bushing assembly positions on the carriage table of the robot track.



xx1400002680

A	Guide bushing fitting hole for IRB 1520
B	Guide bushing fitting hole for IRB 1600/2600/4600

1.2 Standards

1.2.1 Applicable standards

Note

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

General

The product is designed in accordance with EN ISO 10218-1, Robots for industrial environments - Safety requirements -Part 1 Robot. If there are deviations, these are listed in the declaration of incorporation which is included on delivery.

Standards, EN ISO

The product is designed in accordance with selected parts of:

Standard	Description
EN ISO 12100:2010	Safety of machinery - General principles for design - Risk assessment and risk reduction
EN ISO 13849-1:2015	Safety of machinery, safety related parts of control systems - Part 1: General principles for design
EN ISO 13850:2015	Safety of machinery - Emergency stop - Principles for design
ISO 9787:2013	Robots and robotic devices -- Coordinate systems and motion nomenclatures
ISO 9283:1998	Manipulating industrial robots, performance criteria, and related test methods
EN ISO 14644-1:2015 [i]	Classification of air cleanliness
EN ISO 13732-1:2008	Ergonomics of the thermal environment - Part 1
EN 61000-6-4:2007 + A1:2011 IEC 61000-6-4:2006 + A1:2010 (option 129-1)	EMC, Generic emission
EN 61000-6-2:2005 IEC 61000-6-2:2005	EMC, Generic immunity
EN IEC 60974-1:2012 [ii]	Arc welding equipment - Part 1: Welding power sources
EN IEC 60974-10:2014 [ii]	Arc welding equipment - Part 10: EMC requirements
EN IEC 60204-1:2016	Safety of machinery - Electrical equipment of machines - Part 1 General requirements
IEC 60529:1989 + A2:2013	Degrees of protection provided by enclosures (IP code)

i Only robots with protection Clean Room.
ii Only valid for arc welding robots. Replaces EN IEC 61000-6-4 for arc welding robots.

Continues on next page

1.2.1 Applicable standards
Continued

European standards

The product is designed in accordance with selected parts of:

Standard	Description
EN 614-1:2006 + A1:2009	Safety of machinery - Ergonomic design principles - Part 1: Terminology and general principles
EN 574:1996 + A1:2008	Safety of machinery - Two-hand control devices - Functional aspects - Principles for design

UL, ANSI, and other standards

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

1.3 Installation

1.3.1 Introduction

General

The IRBT 2005 track motion is intended for floor mounting. Detailed information regarding mechanical installation can be found in the Product Manual.

Maximum load

The maximum load for different types of IRBT 2005:

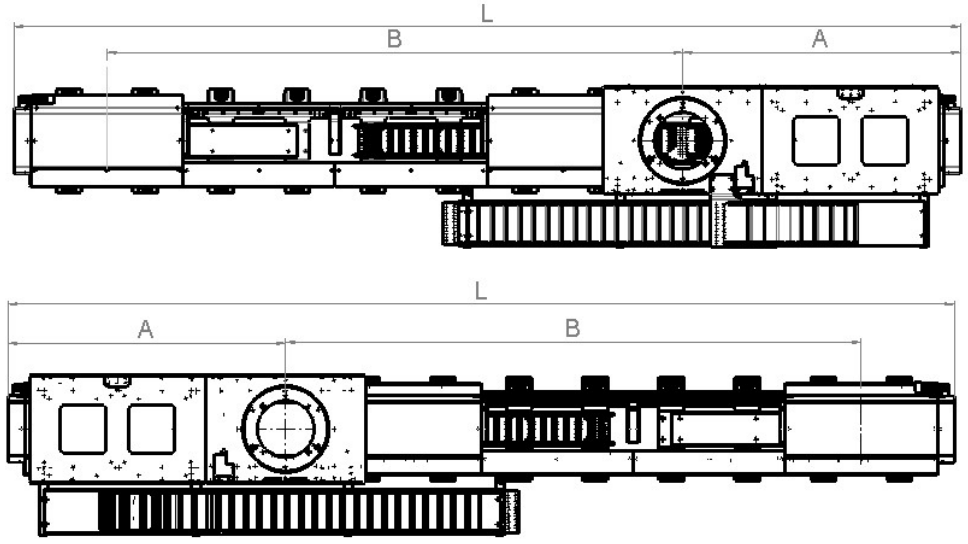
Type	Permitted load/carriage [i]
Robot track	Weight of IRB payload + robot pedestal + 50 kg (Max. 1.2 tons total)
Transfer track	Max. 1.2 tons total

[i] Maximum payload included. For the pedestal weight, refer to *Weight of pedestal on page 23*.

Robot payload is specified in the Product Specification for the robot.

Installation of standard and mirrored track

Below are an example of installed mirrored and standard IRBT 2005 track.



xx1400002687

Pos	Description
L	Total track length with external cable chain
A	1/2 x Inner length of the carriage (from the outward edge of one carriage to the opposite edge).
B	Travel length (in mm)

1.3.2 Operating requirements

Protection standards

Standard Track Motion IP65 for mechanical parts and main electrical connections.

Explosive environments

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

Ambient temperature

Description	Standard/Option	Temperature
Track motion during operation	Standard	+5°C[i] (41°F) to + 50°C (122°F)
For the controller	Standard/Option	See *Product specification - Controller IRC5 with FlexPendant*

[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.

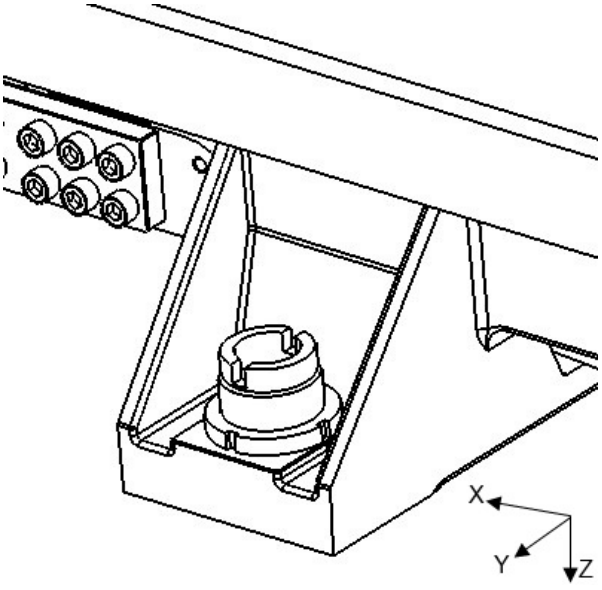
Relative humidity

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

Continues on next page

Forces

Maximum floor loads in relation to the base coordination system are indicated per each foot of the section, see the following figure.

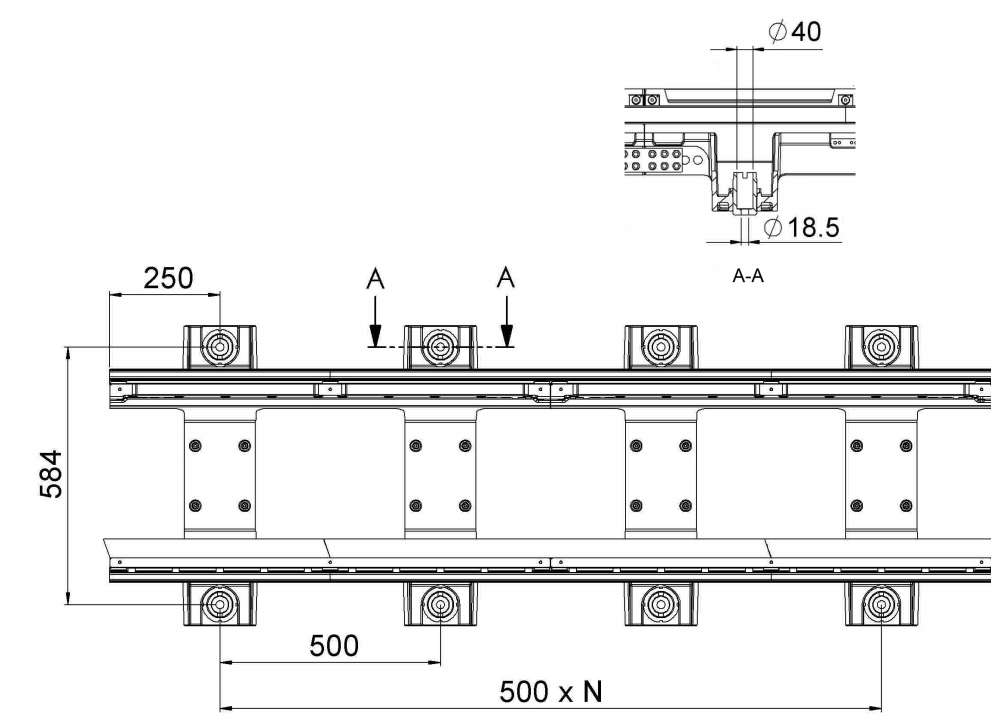


xx1400000039

Robot	Endurance load in operation (kN)		Max. load at emergency stop (kN)	
	Fxy	Fz	Fxy	Fz
IRB 2600 with 1000 mm pedestal	±1.5	3.0±5.5	±3.5	3.0±11.0
IRB 4600 with 250 mm pedestal	±1.5	3.0±7.0	±3.5	3.0±15.0

1.3.3 Hole configuration

Dimension



xx1400001434

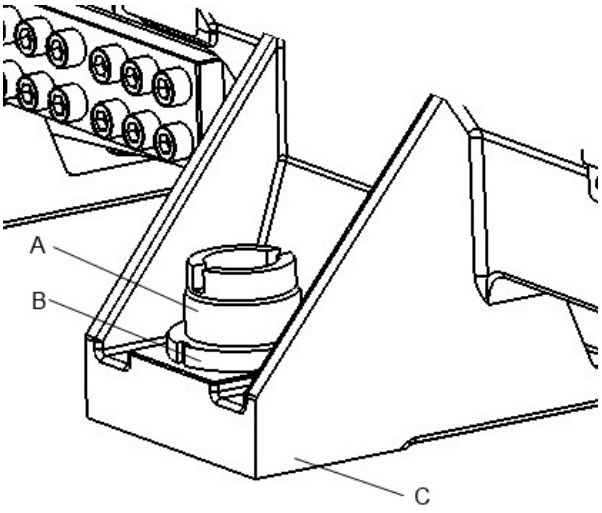
The table describes the value of N in the figure above with different travel lengths.

Travel length	Total length of the stand	Quantity N
2.8 / 1.6 m	4 m	4
3.8 / 2.6 m	5 m	5
4.8 / 3.6 m	6 m	6
etc.		

Continues on next page

Hole configuration

The stands have leveling screws for adjusting the level of the track.



xx1400000649

Item	Art.	Art. No.	Note
A	Lifting threaded block M60x2,00	3HAW108201422	Leveling screw
B	Slotted nut KM12 for leveling screw	3HAWC100857	Fitting nut
C	-	-	Stand

Screws for fastening track to base

Recommended screws for fastening the track to the base	
Steel structure	M16x125 mm
Concrete floor	M16x125 mm[i]

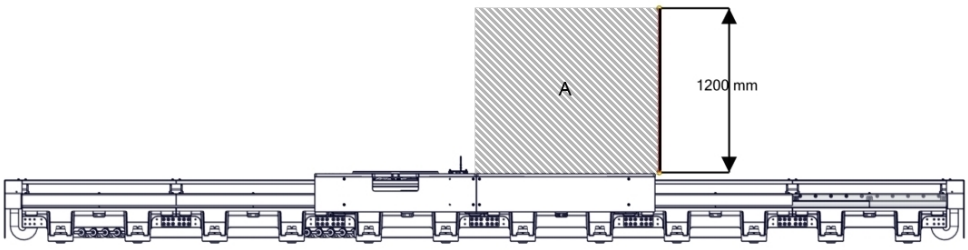
[i] The type and dimension of screws depend on the foundation conditions. See description for maximum floor loads in Operating environment.

1.4 Fitting of equipment

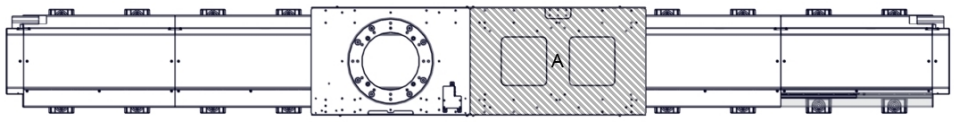
1.4.1 Introduction of fitting of equipment

General

Extra loads can be mounted on to the track carriages. Definitions of load area and permitted load are shown in figures below. The center of gravity of the extra load shall be within the marked load areas. The track is supplied with holes for fitting of extra equipment. (See *Measures of the carriage table on page 25*).



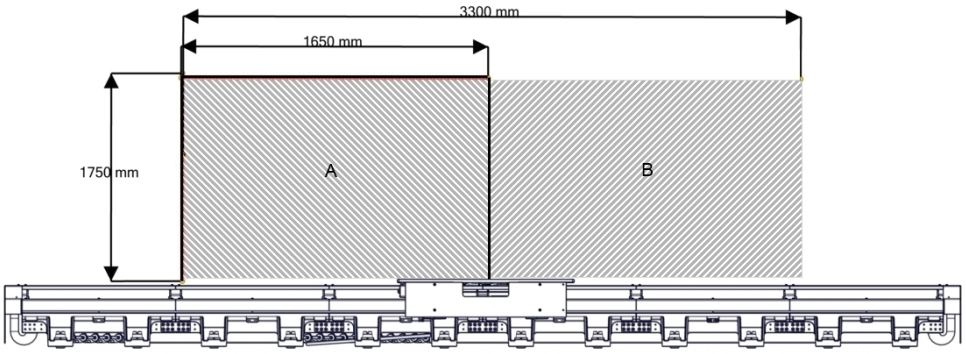
xx1500001618



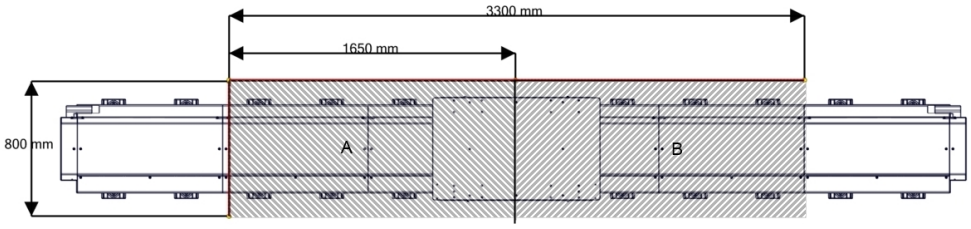
xx1500001619

Track type	Load area	Max load
Robot track, extra plate	A	700 kg

Continues on next page



xx1500001617



xx1500001616

Track type	Load area[i]	Max load
Transfer track	A	625 kg
	B	625 kg

i Extra load can be put on load area A, load area B, or a combined load area A+B.

1.5 Motion

1.5.1 Track type

Overview

The IRBT 2005 track motion can be categorized into three main types based on the carriage type and carriage quantity, that is, single carriage for robot/transfer, double carriages for robot/transfer and multiple carriages for transfer track. Travel length varies according to track motion types. For the travel length, see *Travel length on page 15*.

1.5.2 Performance

General

The following table describes the dynamic performances of the IRBT 2005.

IRBT 2005	Performance
Pose repeatability (mm)	≤ ± 0.05
Max. acceleration (m/s^2)	≤ 4 [i]

[i] The maximum acceleration is limited to 4 m/s^2; however, under the maximum payload 1.2 tons, a maximum acceleration of 2.5 m/s^2 can be achieved.

1.5.3 Velocity

Maximum axis speeds

The maximum axis speed of IRBT 2005 is 2 m/s.

1.5.4 Positioning time

Positioning time at different travel length

The following table describes the typical positioning times.

Load	Travel length (m)									
	1	2	3	4	5	6	7	8	9	10
Max payload (1.2 tons)	1.42 s[i]	1.95 s	2.48 s	2.96 s	3.46 s	3.96 s	4.47 s	4.95 s	5.47 s	5.94 s
< 600 kg payload	1.15 s	1.65 s	2.15 s	2.66 s	3.16 s	3.66 s	4.14 s	4.65 s	5.14 s	5.65 s

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

1.5.5 Stopping distance/time

General

The following table describes the stopping distances and time.

		< 600 kg payload	1.2 tons payload
Category 0	Stopping time (s)	0.43	0.62
	Distance (m)	0.42	0.61
Category 1	Stopping time (s)	0.51	0.69
	Distance (m)	0.55	0.75

1.5.6 Thermal performance

General

The IRBT 2005 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.

1.6 Cabling

1.6.1 Overview

Cable delivery

The IRBT 2005 is driven by IRC5 controller through a set of floor cables, an SMB box (in transfer application) and flexible cables. Each carriage is equipped with an internal cable chain as standard, which carries the flexible cables under the castings, thus protecting the cables from a harsh environment.

The standard equipment includes the following flexible cables:

- IRBT 2005 motor power cable
- IRBT 2005 signal cable
- IRBT 2005 cable grounding

In option, additional cables can be added:

- Manipulator power cable
- Manipulator signal cable
- Other cables: CP/CS devicenet, CP/CS Parallel, CP/CS Profibus, EtherNet/ProfiNet, cable grounding, welder power supply
- Hoses for air
- Cables for transfer track including lifter/rotation

Connection overview

For robot track, connectors that connect cable harness from the carriage (flexible cables) to cable harness from the controller (floor cables) are freely positioned on the ground.

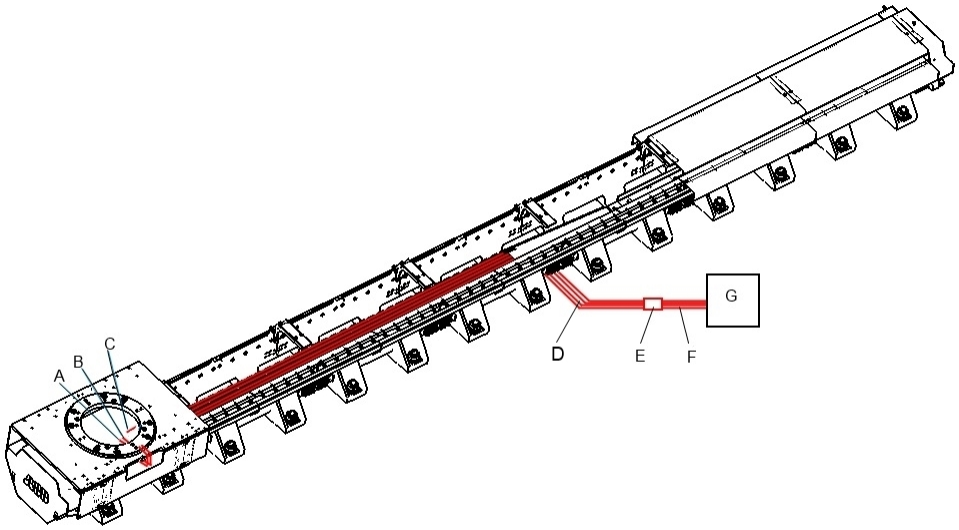
For transfer track, an SMB box is used as the connection between the cable harness from the track (flexible cables) and the cable harness from the controller (floor cables).

CAUTION

The floor cables must be grounded based on the requirements described in section *Circuit diagrams* in *Product manual - IRBT 2005*. Single-stranded copper wires with a diameter larger than 7 mm are recommended to be used as customer grounding cables, which will connect the cable grounding (Art. No.: 3HAC046927) of the track.

Continues on next page

The following figure illustrates connection based on the robot track.



xx1400001286

Pos	Description
A	Robot or conveyor power cable
B	Signal cables
C	IRBT power cables
D	Flexible cable harness from the carriage • Power cables for track, robot or lifter etc. (A, C, etc.) • Motor, manipulator signal cables (B) • Other cables: cable grounding and hoses etc.
E	Connectors connecting cable harness from the carriage and cable harness from the controller.[i]
F	Floor cables from the controller • Power cable, available for IRC5 • Signal cable, available for IRC5
G	Controller, available for IRC5

[i] For transfer track, this is an SMB box.

Note

Cabling between the controller and the track should thread cable channels on the floor.

1.6.2 Floor cables

Floor cables

For detailed cable length and other spare part information about floor cables, see *Product manual, spare parts - IRBT 2005*.

1.6.3 Flexible cables

Diameter and weight

The internal cable chain usually contains the motor power cable and resolver cables, robot cable and extra plate cable, which can be referred to the following table.

If necessary, an additional cable chain can be used. See *External cable chain on page 57*.

Cable reference No.	Description	Cable diameter (mm)	Cable weight (kg/m)
3HAC046925	IRBT 2005 motor power cable from IRC5	14.5	0.401
3HAC039603	IRBT 2005 motor signal cable from SMB box	14.5	0.401
3HAC046926[i]	IRBT 2005 motor resolver cable from IRB 1520	7.1	0.074
3HAC039602	IRBT 2005 motor resolver cable from IRB 1600/2600/4600 or SMB box	7.1	0.074
3HAC046920	IRB 1520 movement power cable	16.4	0.55
3HAC046921	IRB 1600 movement power cable	15.4 mm + 15.4 mm	1.06
3HAC046922	Customer cable, CP/CS (for IRB 1600)	9.9 mm + 12.2 mm	0.25
3HAC029834	IRB 1520/1600/2600/4600 movement resolver cable	8.7	0.1
3HAC046924	IRB 2600/4600 movement power cable	15.4 mm + 15.4 mm	1.06
3HEA801277	CP/CS Parallel (for IRB 2600 and IRB 4600)	13.9 mm + 9.5 mm	0.7
3HEA801279	CP/CS DeviceNet	14 mm + 13 mm + 9 mm	1.0
3HEA801280	CP/CS/ProfiBus (for IRB 2600 and IRB 4600)	n/a	n/a
3HAC032951	ProfiNet cable flex (for IRB 2600 and IRB 4600)	n/a	n/a
3HAC046927	Cable grounding	7	0.2
3HAC046928	Arc welding, DeviceNet cable	8.76	0.1
3HAC046929	Arc welding, Welder Power cable	15	0.4
3HAC050223	Arc welding, Welding Current cable	Max. 15.5	0.665
3HAC046930	Arc welding, Gas Hose	11.6	0.051
3HAC046931	Arc welding, Air Hose	11.6	0.051
3HAC046932	Arc welding, TSC cable	7.6	0.11

[i] The exact reference No. depends on the cable length. See *Product manual - IRBT 2005*.

Continues on next page

1.6.3 Flexible cables
Continued

Other specifications

The following table describes the available types of wires/media.

Type	At terminals in cabinet	At Connection point, base/extra plate	Cable/part area	Allowed capacity
Customer cable, CP/CS, (for IRB 1600)				
Customer Power (CP)				
Utility Power	12	12	0.8 mm^2	300 V RMS, (-20°C to +80°C)
Customer Signals (CS)				
Signals twisted pair	11 x 2 + 1	11 x 2 + 1	0.23 mm^2	300 V RMS, (-20°C to +80°C)
CP/CS Parallel (for IRB 2600/4600)				
Customer Power (CP)				
Utility Power	4	4	1.0 mm^2	300/500 V RMS, (-40°C to +90°C)
Protective earth	1	1	1.0 mm^2	300/500 V RMS, (-40°C to +90°C)
Customer Signals (CS)	10 x 2	10 x 2		
Signals twisted pair	5 x 2	5 x 2	0.25 mm^2	50 V AC RMS, (-5°C to +90°C)
Signals twisted pair and separate shielded	8	8 (4 x 2)	0.25 mm^2	50 V AC RMS, (-5°C to +90°C)
CP/CS DeviceNet (for IRB 2600/4600)				
Customer Power (CP)				
Utility Power	4	4	1.0 mm^2	600 V, (-40°C to +80°C)
Protective earth	1	1	1.0 mm^2	600 V, (-40°C to +80°C)
Customer Signals (CS)				
Signals twisted pair	3 x 2	3 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair	9 x 2	9 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair and separate shielded	5 x 2	5 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Customer bus (CAN)			0.25 mm^2	

Continues on next page

Type	At terminals in cabinet	At Connection point, base/extra plate	Cable/part area	Allowed capacity
Bus signals	At bus board	1 x 2	AWG22	30 V, (-20°C to +80°C)
Bus signals	At bus board	1 x 2	AWG24	30 V, (-20°C to +80°C)
Customer Power (CP)				
Utility Power	4	4	1.0 mm^2	600 V, (-40°C to +80°C)
Protective earth	1	1	1.0 mm^2	600 V, (-40°C to +80°C)
Customer Signals (CS)				
Signals twisted pair and separate shielded	2 x 2	2 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair	9 x 2 +1	9 x 2 +1	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair and separate shielded	5 x 2	5x2	0.25 mm^2	450 V, (-40°C to +80°C)
Customer bus (InterBus)				
Bus signals	At bus board	2 x 2 +1	0.25 mm^2	Max 250 V, (-30°C to +70°C)
CP/CS PROFIBUS (for IRB 2600/4600)				
Customer Power (CP)				
Utility Power	4	4	1.0 mm^2	600 V, (-40°C to +80°C)
Protective earth	1	1	1.0 mm^2	600 V, (-40°C to +80°C)
Customer Signals (CS)				
Signals twisted pair	3 x 2	3 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair	10 x 2	10 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Signals twisted pair and separate shielded	5 x 2	5 x 2	0.25 mm^2	450 V, (-40°C to +80°C)
Customer bus (InterBus)				
Bus signals	At bus board	2 x 2 +1	0.64 mm^2	Max 250 V, (-30°C to +70°C)
Media				

Continues on next page

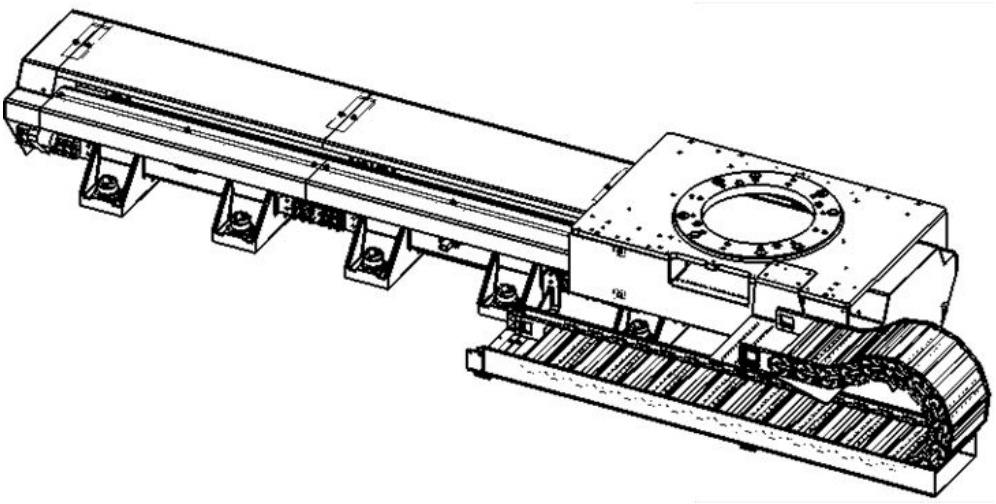
1.6.3 Flexible cables
Continued

Type	At terminals in cabinet	At Connection point, base/extra plate	Cable/part area	Allowed capacity
Air (CP/CS)		1	9 mm inner diameter	Max. air pressure 10 bar (-35°C to +60°C)
Welder Power cable (Arc Welding)				
Welder power cable		4	6.0 mm^2	450/750 V, (-5°C to +70°C)
Protective earth		1	6.0 mm^2	450/750 V, (-5°C to +70°C)
DeviceNet Power cable (Arc Welding)				
Bus signals	At bus board	1x2	AWG22	30 V, (-20°C to +80°C)
Bus signals	At bus board	1x2	AWG24	30 V, (-20°C to +80°C)
Welder Current cable (Arc Welding)				
Welding current cable		2	50 mm^2	600 V, 200 A RMS at 20°C
TSC Cable (Arc Welding)				
TSC Signals	11	11	0.5 mm^2	300 V, (-5°C to +70°C)
Media				
Gas/Air Hose		2	9 mm inner diameter	Max. air pressure 10 bar (-35°C to +60°C)

1.6.4 External cable chain

Overview

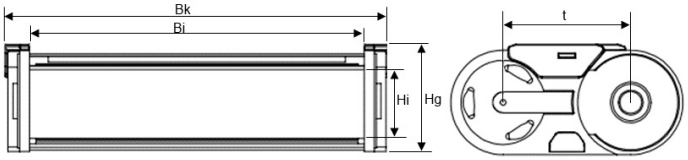
An external cable chain can be offered to fit additional customer cables and assembled in a complete housing for optimal protection.



xx1400001974

Specifications

Except the cable chain width, all other dimension specifications of the external cable chain are identical to those of the internal cable chain.



xx1400001975

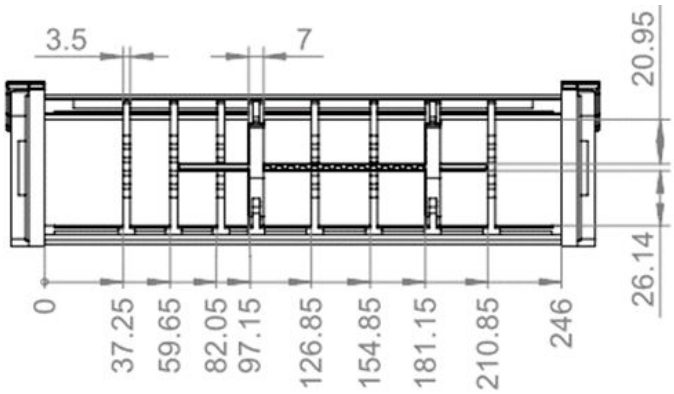
Item	Value
Cable chain bend radius (mm)	200
Inner width Bi (mm)	246
External width Bk (mm)	282
Inner height Hi (mm)	52
External height Hg (mm)	78.5
t (Pitch) (mm)	91
Intrinsic chain weight (kg/m) [i]	1.5

[i] The track payload includes both the chain weight and the weight of additional cables or pipes used in the external cable chain.
Total weight of additional cables/pipes = Weight of the additional cables/pipes per meter x travel length.

Continues on next page

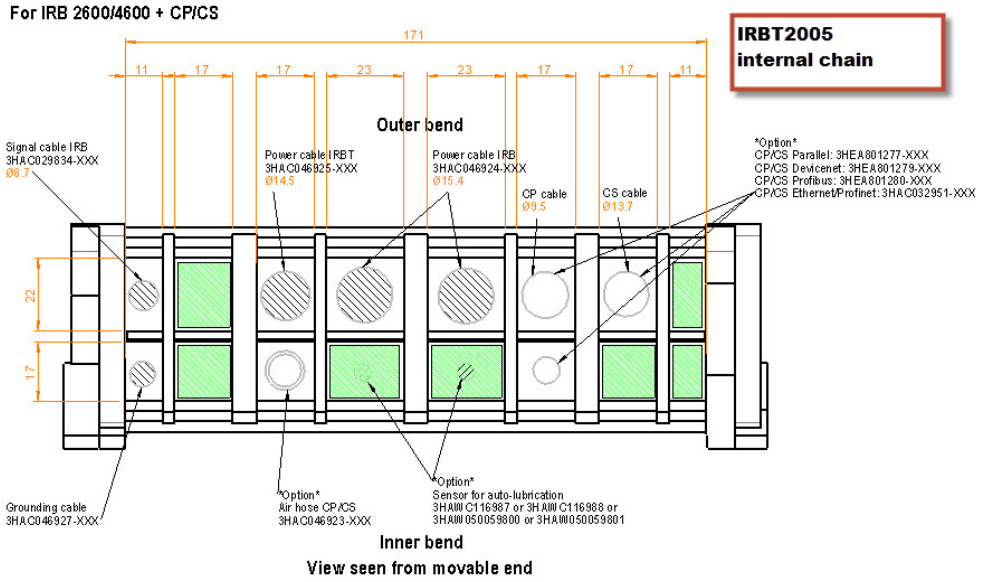
1.6.4 External cable chain
Continued

Within each cable, an external cable chain divider must be used every 8 links.



xx1400001976

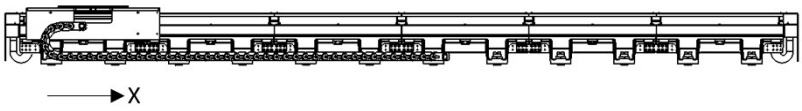
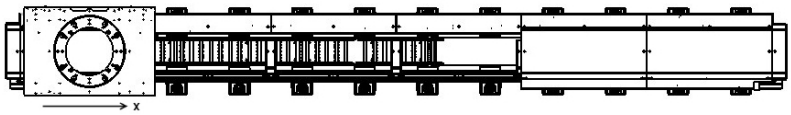
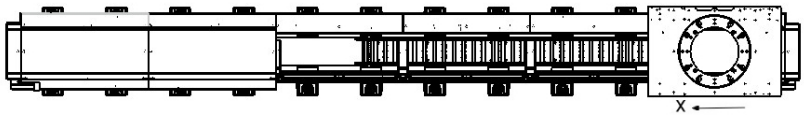
1.6.5 Internal cable chain



1.6.6 Cable chain orientation

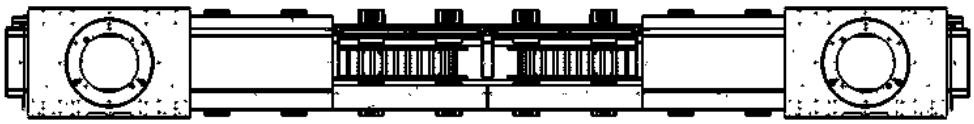
Overview

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.

Standard cable chain orientation	Side view:  xx1500000597 Top view:  xx1400001952
Mirrored cable chain orientation	Side view:  xx1500000630 Top view:  xx1400001951

Situation that requires mirrored assembly

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



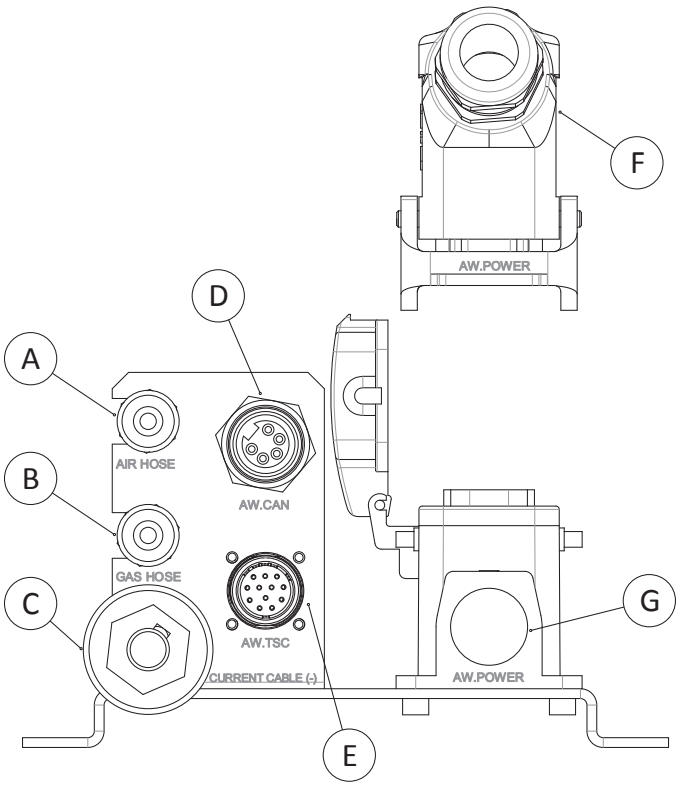
xx1400001977

1.7 Arc Welding connection

1.7.1 AW interfaces

Interface descriptions

The following interfaces are provided on the track carriage for cable connection when option 1436-X or 1449-X is selected.



xx1500003191

Pos	Interface	Description
A	AIR HOSE	Air hose for the torch and TSC
B	GAS HOSE	Gas hose for the torch
C	CURRENT CABLE (-)	Current cable (-) for the power source
D	AW.CAN	DeviceNet bus cable for the power source
E	AW.TSC	12-pin connector for the new generation TSC (available when Prepared for TSC option 1435-1 or 1448-1 is selected)
F	AW.POWER	AC connector reserved for customer's power source
G	AW.POWER	AC power connector from cable chain

Continues on next page

1.7.1 AW interfaces
Continued

Interface pins

DeviceNet connection pins

The following table describes the pins of interface AW.CAN. For details, see *Circuit Diagram - IRBT 2005.*

Pin	Description
1	DRAIN
2	V+
3	V-
4	CAN_H
5	CAN_L

TSC connection pins

The following table describes the pins of interface AW.TSC. For details, see *Circuit Diagram - IRBT 2005.*

Pin	Description
1	Bulls eye input signals
2	0V
3	+24V
4	Cleaning finished input signals
5	Spare
6	0V
7	Cleaning output signals
8	Lubrication output signals
9	Clamped input signals
10	Cutter down input signals
11	Cutter up input signals
12	Low-level cleaning fluid input signal

Power connection pins

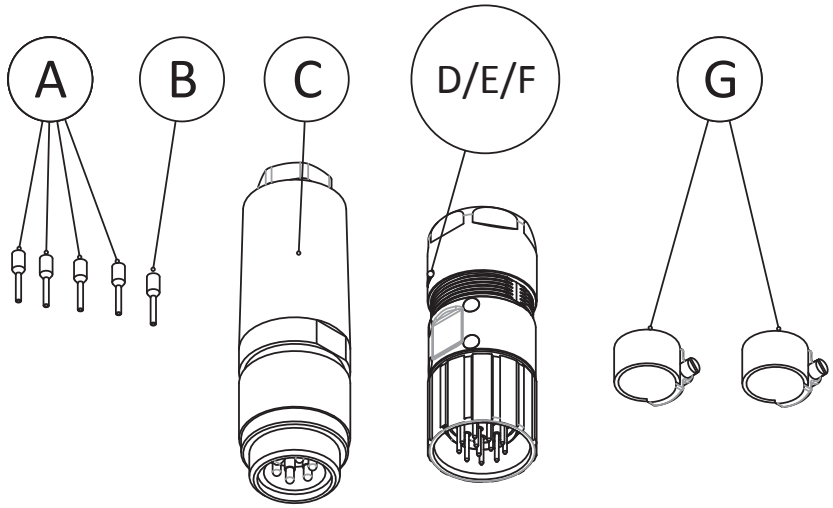
The following table describes the pins of interface AW.POWER. For details, see *Circuit Diagram - IRBT 2005.*

Pin	Description
1	R
2	S
3	T
4	N
5	Spare
6	Ground

1.7.2 Connection kits

With option 1436-1 or 1449-1

When option 1436-1 or 1449-1 is selected, a kit with connectors is offered and must be assembled by the customer. Assembled cables ending with these connectors will connect to the interfaces specified in *AW interfaces on page 61*.



xx1600000037

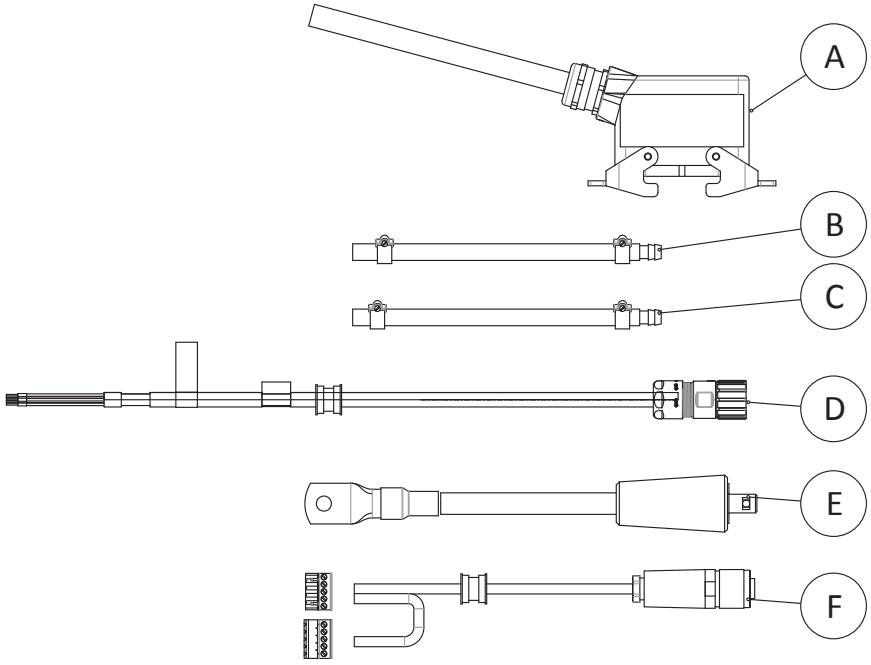
Pos	Description	Used for connecting interface	Qty.	Article
A	End sleeve 0.25 mm^2	AW.CAN	4	Common article, buy locally
B	End sleeve 0.5 mm^2		1	Common article, buy locally
C	DeviceNet male connector		1	Lumberg, RSC 50/9
D	M23, Straight connector, female	AW.TSC	1	Hummel, 7.106.500.000
E	M23, Insert 12-pole pins		1	Hummel, 7.003.912.101
F	Crimp contacts, pin, 1 mm, 0.14-1 mm^2		12	Hummel, 7.010.901.001
G	Hose clamp D 13/7	AIR HOSE and GAS HOSE	2	Common article, buy locally

Continues on next page

1.7.2 Connection kits
Continued

With option 1437-X or 1450-X

When option 1437-X or 1450-X is selected, the following floor cables with connectors are offered.



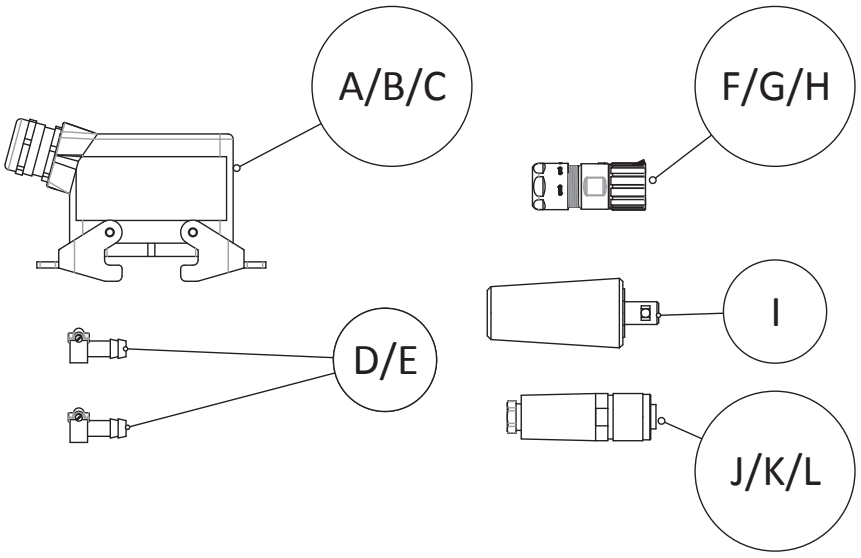
xx1600000038

Pos	Description	Used for connecting interface	Qty.	Spare part number
A	AW welder power cable, floor	AW.POWER	1	7 m: 3HAC046935-001 15 m: 3HAC046935-002 22 m: 3HAC046935-003
B	AW gas hose, floor	GAS HOSE	1	7 m: 3HAC046936-001 15 m: 3HAC046936-002 22 m: 3HAC046936-003
C	AW air hose, floor	AIR HOSE	1	7 m: 3HAC046937-001 15 m: 3HAC046937-002 22 m: 3HAC046937-003
D	AW TSC cable, floor	AW.TSC	1	7 m: 3HAC046938-001 15 m: 3HAC046938-002 22 m: 3HAC046938-003

Continues on next page

Pos	Description	Used for connecting interface	Qty.	Spare part number
E	AW welding current cable. floor	AW.CURRENT(-)	1	7 m: 3HAC053948-001 15 m: 3HAC053948-002 22 m: 3HAC053948-003
F	AW DeviceNet cable, floor	AW.CAN	1	7 m: 3HAC046934-001 15 m: 3HAC046934-002 22 m: 3HAC046934-003

If the option 1437-X or 1450-X is not selected, floor cables must be prepared by the customer, with the following detailed connector information as reference.



xx1600000039

Pos	Description	Used for connecting interface	Qty.	Article
A	Hoods: side entry 1xM25	AW.POWER	1	Harting, 19300161531
B	Female insert 400/690V 35A		1	Harting, 09310062701
C	Progress MS, M25		1	AGRO, 1060.25
D	Hose joint	AIR HOSE	2	ESAB, 365803004
E	Hose clamp D 13/7	GAS HOSE	2	Common article, buy locally

Continues on next page

1.7.2 Connection kits
Continued

Pos	Description	Used for connecting interface	Qty.	Article
F	M23 Straight connector, female	AW.TSC	1	Hummel, 7.106.500.000
G	M23, Insert, 12-pole socket		1	Hummel, 7.003.912.102
H	Crimp contacts, socket, 1 mm, 0.34-1 mm^2		12	Hummel, 7.010.901.002
I	Connector OKC male	AW.CURRENT(-)	1	ESAB, 160360883
J	DeviceNet female conn.	AW.CAN	1	Lumberg, RKC 50/9
K	End sleeve 0.25 mm^2		4	Common article, buy locally
L	End sleeve 0.5 mm^2		1	Common article, buy locally

1.8 Maintenance and troubleshooting

1.8.1 Introduction

General

The track motion requires only the minimum maintenance during operation. It has been designed to make it as easy for services as possible:

- Maintenance-free AC motor is used.
- Oil is used for the gear boxes.
- The cabling is routed for longevity, and in the unlikely event of a failure, its modular design makes it easy to change.

Maintenance

The maintenance intervals depend on the use of the track motion. For detailed information about maintenance procedures, see *Maintenance* in the product manual.

This page is intentionally left blank

2 Specification of variants and options

2.1 Introduction to variants and options

General

Different variants and options for the IRBT 2005 track motion are described in the following sections. The same option numbers are used here as in the specification form.

Related information

For the controller, see *Product specification - Controller IRC5 with FlexPendant*.

For the software options, see *Product specification - Controller software IRC5*.

2.2 Track motion

Drives and connection

The following table describes the drives that are used in the robot controller for different types of robots used together with the track, as well as the connection for the robot types.

IRBT	For	Option
IRBT 2005	IRB 1520	• Option 907-1, drive unit ADU-790A • Option 864-1 Resolver connection, axis 7 (on base)
	IRB 1600	• Option 907-1, drive unit ADU-790A • Option 864-1 Resolver connection, axis 7 (on base)
	IRB 2600	• Option 907-1, drive unit ADU-790A • Option 864-1 Resolver connection, axis 7 (on base)
	IRB 4600	• Option 907-1, drive unit ADU-790A • Option 864-1 Resolver connection, axis 7 (on base)
	Transfer track motor quantity N ≤ 6	Option 435-94, IRB 4600 variant controller
	Transfer track motor quantity 6 < N ≤ 9	• Option 907-1, drive unit ADU-790A • Option 435-94, IRB 4600 variant controller

Track type based on carriage type

Option	Description[i]	Travel length (m)
1422-1	Robot carriage	For single carriage, available travel length from 0.8 m to 19.8 m in steps of 1 m For double carriage, available travel length from 1.6 m to 18.6 m in steps of 1 m
1423-1	Transfer carriage	Available travel length from 0.8 m to 19.8 m in steps of 1 m

i The carriage quantity can be chosen.

Track type based on cover type

Option	Description[i]	Travel length (m)
1401-1	Covered track	Available travel length from 2 m to 21 m in steps of 1 m
1402-1	Standard track	Available travel length from 2 m to 21 m in steps of 1 m
1403-1	Covered extension	Extension to an existing track and only applicable with option 1423-1 Transfer carriage. Available travel length from 2 m to 21 m in steps of 1 m
1403-2	Standard extension	Extension to an existing track and only applicable with option 1423-1 Transfer carriage. Available travel length from 2 m to 21 m in steps of 1 m

i Internal chain is standard.

2.3 Floor cables and SMB boxes

Floor cables and SMB 3 axis

Option	Description	Note
1424-1	7 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.
1424-2	15 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.
1424-3	22 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.

Floor cables and SMB 6 axis

Option	Description	Note
1425-1	7 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.
1425-2	15 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.
1425-3	22 m cables with SMB	Only applicable with option 1423-1 Transfer carriage.

Actual Travel Length Robot C

Option	Description	Note
N/A	Actual Travel Length Robot C	The actual travel length is automatically calculated. No manual value-inputting is required during option selection.

2.4 Carriage basics (NUMBER 1)

Travel length 1

Option	Description	Note
1426-1	Travel length 1	Automatically calculated and cannot be chosen if option 1422-1 Robot carriage is selected. Must be specified with a value larger than or equal to 1 if option 1423-1 Transfer carriage is selected.

Direction of travel 1

Option	Description	Note
1427-1	Standard mounting 1	Select to mount the track in the standard direction.
1427-2	Mirrored mounting 1	Select to mount the track in the mirrored direction.

Valid for product 1

Option	Description	Note
1428-1	IRB 4600	Only applicable with option 1422-1 Robot carriage with the carriage quantity larger than or equal to one.
1428-2	IRB 2600	Only applicable with option 1422-1 Robot carriage with the carriage quantity larger than or equal to one.
1428-3	IRB 1600	Only applicable with option 1422-1 Robot carriage with the carriage quantity larger than or equal to one.
1428-4	IRB 1520	Only applicable with option 1422-1 Robot carriage with the carriage quantity larger than or equal to one.
1428-5	Transfer track	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to one.
1428-6	Prep. for IRL600	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to one.
1428-7	Prep. for IRL1x0Lift	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to one.
1428-8	Prep. for IRL1x0Rot	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to one.
1428-9	Prep. for IRL1x0LiftRot	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to one.

Continues on next page

Robot orientation 1

Option	Description	Note
1429-1	Inline	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1429-2	90 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1429-3	180 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1429-4	270 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).

Robot pedestal 1

Option	Description	Note
1430-1	250 mm	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1430-2	500 mm	Only applicable with option 1422-1 Robot carriage and one of options 1428-2, 1428-3, and 1428-4 (Product IRB 2600/1600/1520).
1430-3	750 mm	Only applicable with option 1422-1 Robot carriage and one of options 1428-2, 1428-3, and 1428-4 (Product IRB 2600/1600/1520).
1430-4	1000 mm	Only applicable with option 1422-1 Robot carriage and one of options 1428-2, 1428-3, and 1428-4 (Product IRB 2600/1600/1520).

The robot pedestal is designed to fix the robot. Six M18.5 screw holes are used to secure the pedestal on the carriage table.

The pedestal has two height models, 250 mm and 500 mm. Users can choose the suitable pedestal/pedestal combination to meet their requirements. The following height models can be provided by the pedestal/pedestal combination: 250 mm, 500 mm, 750 mm and 1000 mm.

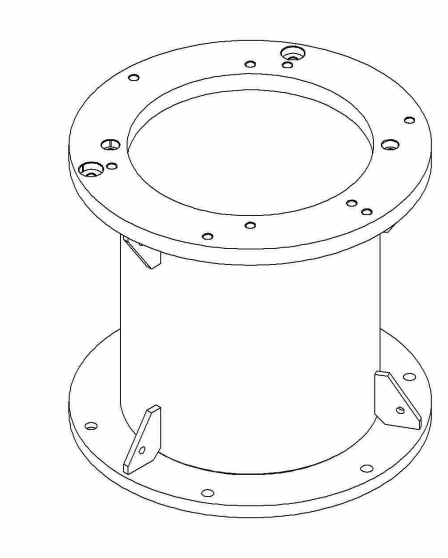
Note

500mm, 750 mm and 1000 mm risers are not applicable to IRB 4600.

Continues on next page

2.4 Carriage basics (NUMBER 1)
Continued

The following illustration shows a pedestal with the height of 500 mm.



xx1400000468

External cable chain 1

Option	Description	Note
1431-1	External cable chain 1	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520). Available length from 1 m to 20 m in steps of 1 m. Must be the same value as option 1426-1 Travel length 1.

Floor cables IRC5 to track 1

Option	IRBT Type	Note
1432-1	7 m Track to floor cables	Only applicable with option 1422-1 Robot carriage and one of options1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1432-2	15 m Track to floor cables	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).
1432-3	22 m Track to floor cables	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2, 1428-3, and 1428-4 (Product IRB 4600/2600/1600/1520).

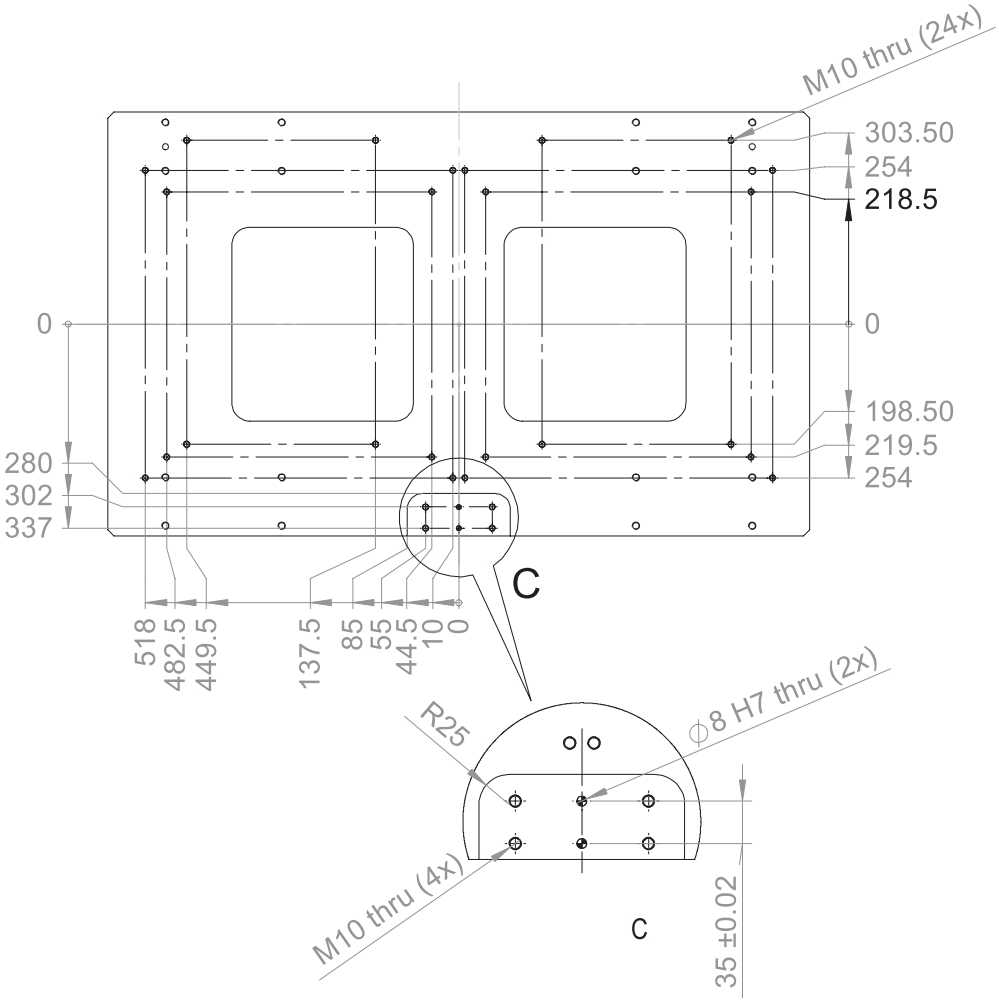
Floor cables SMB box - track 1

Option	IRBT Type	Note
1433-1	5 m Floor cables	Only applicable with option 1423-1 Transfer track.
1433-2	10 m Floor cables	Only applicable with option 1423-1 Transfer track.
1433-3	15 m Floor cables	Only applicable with option 1423-1 Transfer track.

Continues on next page

Additional carriage plate 1

Option	Description	Note
1434-1	Extra plate	Only applicable with option 1422-1 Robot carriage



xx1400000462

Prepared for TSC option 1

Option	Description	Note
1435-1	TSC, TS96, Bulls eye	Only applicable with option 1434-1 Extra plate and prepared for option 1436-X AW Power Source 1.

Prepared for AW power source 1

Option	Description	Note[i]
1436-1	Only Interface box	Only applicable with option 1434-1 Extra plate and one of options 1428-1, 1428-2, 1428-3 and 1428-4 (Product IRB 4600/2600/1600/1520).
1436-2	AristoMig 5000i	Only applicable with option 1434-1 Extra plate and one of options 1428-1, 1428-2 and 1428-3 (Product IRB 4600/2600/1600).

Continues on next page

Option	Description	Note[i]
1436-3	S-400	Only applicable with options 1434-1 Extra plate and 1428-4 (Product IRB 1520).
1436-4	P-250	Only applicable with options 1434-1 Extra plate and 1428-4 (Product IRB 1520).

i For details about the AW interfaces, connection pins and connection kits, see *Arc Welding connection on page 61*.

Note

When you choose 1436-X(AW Power Source 1), isolation kit will be chosen according to 1428-X (robot type of carriage no.1)

When you choose 1449-X(AW Power Source 2), isolation kit will be chosen according to 1441-X (robot type of carriage no.2)

Isolation kits:

Robot	Kits	Parts	Description	Qty
IRB 2600 IRB 4600	3HAC063441-001	3HAC063350-001	Bottom insulation washer with pin hole	2
		3HAC063351-001	Bottom insulation washer w/o pin hole	1
		3HAC063352-001	Top insulation washer	3
		3HAC063353-001	Top washer	3
IRB 1600	3HAC063442-001	3HAC063350-001	Bottom insulation washer with pin hole	2
		3HAC063351-001	Bottom insulation washer w/o pin hole	1
		3HAC063354-001	Top insulation washer	3
		3HAC063355-001	Top washer	3
IRB 1520	3HAC063443-001	3HAC063356-001	Bottom insulation washer with pin hole	2
		3HAC063357-001	Bottom insulation washer w/o pin hole	2
		3HAC063358-001	Top insulation washer	4
		3HAC063359-001	Top washer	4

Floor cables - Power Source 1

Option	Description	Note[i]
1437-1	7 m	Prepared for option 1436-X AW Power source 1.
1437-2	15 m	Prepared for option 1436-X AW Power source 1.
1437-3	22 m	Prepared for option 1436-X AW Power source 1.

i For details about the floor cables ending with connectors and alternative connection kits for AW, see *Arc Welding connection on page 61*.

CP/CS 1

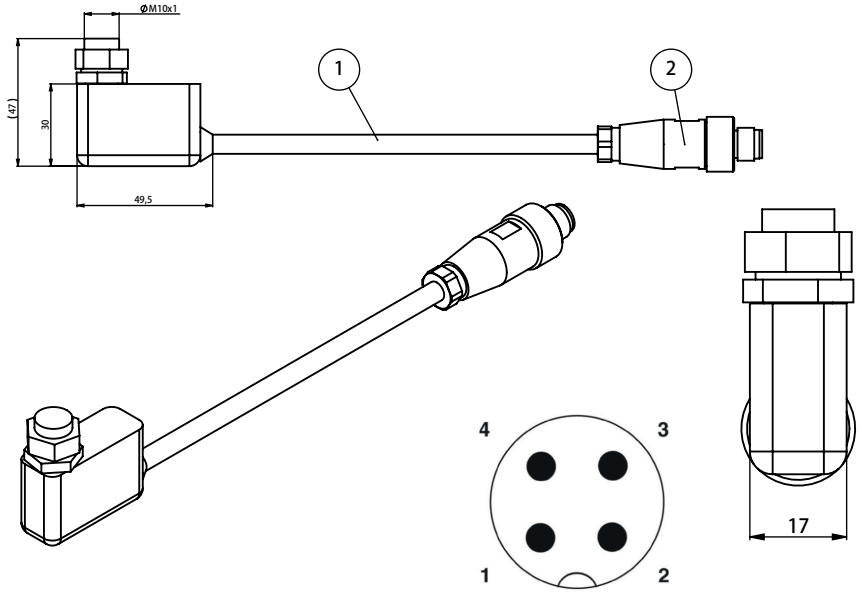
Option	Description	Note
1438-1	Parallel	Only applicable with option 1422-1 Robot carriage and one of options 1428-1, 1428-2 and 1428-3 (Product IRB 4600/2600/1600).

Continues on next page

Option	Description	Note
1438-2	DeviceNet	Only applicable with option 1422-1 Robot carriage and one of options 1428-1 and 1428-2 (Product IRB 4600/2600).
1438-3	Profibus	Only applicable with option 1422-1 Robot carriage and one of options 1428-1 and 1428-2 (Product IRB 4600/2600).
1438-4	Ethernet/Profinet	Only applicable with option 1422-1 Robot carriage and one of options 1428-1 and 1428-2 (Product IRB 4600/2600).

Lubrication detection 1

Option	Description	Note
1475-1	Grease Detection sensor	Select to choose a sensor to detect if lubrication system functionally works or oil is empty.



xx1900000138

Pos	Description
1	Memolub feedback sensor
2	M12 connector

Switch cables 1

Option	Description	Note
1476-1	IRL switch cables	Only applicable with one of options 1428-6,1428-7,1428-8 and 1428-9.

Air hose 1

Option	Description	Note
1477-1	2x DN10	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.

Continues on next page

2.4 Carriage basics (NUMBER 1)
Continued

Fieldbus cables 1

Option	Description	Note
1478-1	Profinet cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1478-2	Ethernet-IP cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1478-3	Devicenet cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1478-4	Profibus cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.

2.5 Carriage basics (NUMBER 2)

Travel length 2

Option	Description	Note
1439-1	Travel length 2	Automatically calculated and cannot be chosen if option 1422-1 Robot carriage is selected. Must be specified with a value larger than or equal to 2 if option 1423-1 Transfer carriage is selected.

Direction of travel 2

Option	Description	Note
1440-1	Standard mounting 2	Select together with option 1427-2 Mirrored mounting if option 1422-1 Robot carriage is chosen with two carriages. Select together with option 1427-1 Standard mounting if option 1423-1 Transfer carriage is chosen with two or more carriages.
1440-2	Mirrored mounting 2	Select together with option 1427-1 Standard mounting if option 1422-1 Robot carriage is chosen with two carriages. Select together with option 1427-2 Mirrored mounting if option 1423-1 Transfer carriage is chosen with two or more carriages.

Valid for product 2

Option	Description	Note
1441-1	IRB 4600	Only applicable with option 1422-1 Robot carriage with two carriages.
1441-2	IRB 2600	Only applicable with option 1422-1 Robot carriage with two carriages.
1441-3	IRB 1600	Only applicable with option 1422-1 Robot carriage with two carriages.
1441-4	IRB 1520	Only applicable with option 1422-1 Robot carriage with two carriages.
1441-5	Transfer track	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to two.
1441-6	Prep. for IRL600	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to two.
1441-7	Prep. for IRL1x0Lift	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to two.
1441-8	Prep. for IRL1x0Rot	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to two.
1441-9	Prep. for IRL1x0LiftRot	Only applicable with option 1423-1 Transfer carriage with the carriage quantity larger than or equal to two.

Continues on next page

2.5 Carriage basics (NUMBER 2)
Continued

Robot orientation 2

Option	Description	Note
1442-1	Inline	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1442-2	90 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1442-3	180 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1442-4	270 Degrees	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).

Robot pedestal 2

Option	Description	Note
1443-1	250 mm	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1443-2	500 mm	Only applicable with option 1422-1 Robot carriage and one of options 1441-2, 1441-3 and 1441-4 (Product IRB 2600/1600/1520).
1443-3	750 mm	Only applicable with option 1422-1 Robot carriage and one of options 1441-2, 1441-3 and 1441-4 (Product IRB 2600/1600/1520).
1443-4	1000 mm	Only applicable with option 1422-1 Robot carriage and one of options 1441-2, 1441-3 and 1441-4 (Product IRB 2600/1600/1520).

External cable chain 2

Option	Description	Note
1444-1	External cable chain 2	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520). Available length from 1 m to 20 m in steps of 1 m. Must be the same value as option 1439-1 Travel length 2.

Floor cables IRC5 to Track 2

Option	Description	Note
1445-1	7 m Track-floor cables	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1445-2	15 m Track-floor cables	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 11441-4 (Product IRB 4600/2600/1600/1520).
1445-3	22 m Track-floor cables	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2, 1441-3 and 11441-4 (Product IRB 4600/2600/1600/1520).

Continues on next page

Floor cables SMB box - track 2

Option	Description	Note
1446-1	5 m Floor cables	Only applicable with option 1423-1 Transfer track.
1446-2	10 m Floor cables	Only applicable with option 1423-1 Transfer track.
1446-3	15 m Floor cables	Only applicable with option 1423-1 Transfer track.

Additional carriage plate 2

Option	Description	Note
1447-1	Extra plate	Only applicable with option 1422-1 Robot carriage.

Prepared for TSC option 2

Option	Description	Note
1448-1	TSC, TS96, Bulls eye	Only applicable with option 1447-1 Extra plate and prepared for option 1449-X Arc Welding Power Source 2.

Prepared for AW power source 2

Option	Description	Note[i]
1449-1	Only Interface box	Only applicable with option 1447-1 Extra plate and one of options 1441-1, 1441-2, 1441-3 and 1441-4 (Product IRB 4600/2600/1600/1520).
1449-2	AristoMig 5000i	Only applicable with option 1447-1 Extra plate and one of options 1441-1, 1441-2 and 1441-3 (Product IRB 4600/2600/1600).
1449-3	S-400	Only applicable with options 1447-1 Extra plate and 1441-4 (Product IRB 1520).
1449-4	P-250	Only applicable with options 1447-1 Extra plate and 1441-4 (Product IRB 1520).

i For details about the AW interfaces, connection pins and connection kits, see *Arc Welding connection on page 61*.

Floor cables - Power Source 2

Option	Description	Note[i]
1450-1	7 m	Prepared for option 1449-X AW Power source 2.
1450-2	15 m	Prepared for option 1436-X AW Power source 2.
1450-3	22 m	Prepared for option 1436-X AW Power source 2.

i For details about the floor cables ending with connectors and alternative connection kits for AW, see *Arc Welding connection on page 61*.

CP/CS 2

Option	Description	Note
1451-1	Parallel	Only applicable with option 1422-1 Robot carriage and one of options 1441-1, 1441-2 and 1441-3 (Product IRB 4600/2600/1600).

Continues on next page

2.5 Carriage basics (NUMBER 2)
Continued

Option	Description	Note
1451-2	DeviceNet	Only applicable with option 1422-1 Robot carriage and one of options 1441-1 and 1441-2 (Product IRB 4600/2600).
1451-3	Profibus	Only applicable with option 1422-1 Robot carriage and one of options 1441-1 and 1441-2 (Product IRB 4600/2600).
1451-4	Ethernet/Profinet	Only applicable with option 1422-1 Robot carriage and one of options 1441-1 and 1441-2 (Product IRB 4600/2600).

Lubrication detection 2

Option	Description	Note
1479-1	Grease Detection sensor	Select to choose a sensor to detect if lubrication system functionally works or oil is empty.

Switch cables 2

Option	Description	Note
1480-1	IRL switch cables	Only applicable with one of options 1441-6,1441-7,1441-8, and 1441-9.

Air hose 2

Option	Description	Note
1481-1	2x DN10	Only applicable with one of options 1441-6,1441-7,1441-8, and 1441-9.

Fieldbus cables 2

Option	Description	Note
1482-1	Profinet cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1482-2	Ethernet-IP cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1482-3	Devicenet cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.
1482-4	Profibus cables	Only applicable with one of options 1428-6,1428-7,1428-8, and 1428-9.

2.6 Carriage basics (NUMBER 3)

Travel length 3

Option	Description	Note
1452-1	Travel length 3	Must be specified with a value larger than or equal to 3 if option 1423-1 Transfer carriage is selected.

Direction of travel 3

Option	Description	Note
1453-1	Standard mounting 3	Only applicable with option 1423-1 Transfer carriage with three carriages and select together with options 1427-1 Standard mounting 1 and 1440-1 Standard mounting 2.
1453-2	Mirrored mounting 3	Only applicable with option 1423-1 Transfer carriage with three carriages and select together with options 1427-2 Mirrored mounting 1 and 1440-2 Mirrored mounting 2.

Valid for product 3

Option	Description	Note
1454-1	Transfer track	Only applicable with option 1423-1 Transfer carriage with three carriages.
1454-2	Prep. for IRL600	Only applicable with option 1423-1 Transfer carriage with three carriages.
1454-3	Prep. for IRL1x0Lift	Only applicable with option 1423-1 Transfer carriage with three carriages.
1454-4	Prep. for IRL1x0Rot	Only applicable with option 1423-1 Transfer carriage with three carriages.
1454-5	Prep. for IRL1x0LiftRot	Only applicable with option 1423-1 Transfer carriage with three carriages.

Floor cables SMB box - track 3

Option	Description	Note
1456-1	5 m Floor cables	Only applicable with option 1423-1 Transfer track.
1456-2	10 m Floor cables	Only applicable with option 1423-1 Transfer track.
1456-3	15 m Floor cables	Only applicable with option 1423-1 Transfer track.

Lubrication detection 3

Option	Description	Note
1483-1	Grease Detection sensor	Select to choose a sensor to detect if lubrication system functionally works or oil is empty.

Continues on next page

2.6 Carriage basics (NUMBER 3)
Continued

Switch cables 3

Option	Description	Note
1484-1	IRL switch cables	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.

Air hose 3

Option	Description	Note
1485-1	2x DN10	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.

Fieldbus cables 3

Option	Description	Note
1486-1	Profinet cables	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.
1486-2	Ethernet-IP cables	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.
1486-3	Devicenet cables	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.
1486-4	Profibus cables	Only applicable with one of options 1454-2,1454-3,1454-4, and 1454-5.

2.7 Warranty

Warranty

Option	Type	Description
438-1	Standard warranty	Standard warranty is valid during 12 months from *Customer Delivery Date* or latest 18 months after *Factory Shipment Date*, whichever event occurs first. Warranty terms and conditions apply.
438-2	Standard warranty + 12 months	Standard warranty extended with 12 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-4	Standard warranty + 18 months	Standard warranty extended with 18 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-5	Standard warranty + 24 months	Standard warranty extended with 24 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-6	Standard warranty + 6 months	Standard warranty extended with 6 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-7	Standard warranty + 30 months	Standard warranty extended with 30 months from end date of the standard warranty. Warranty terms and conditions apply. Contact Customer Service in case of other requirements.
438-8	Stock warranty	Maximum 6 months postponed the start date 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. Warranty terms and conditions apply. Note: Special conditions are applicable, see Robotics Warranty Directives.

This page is intentionally left blank

Index

ABB AB, Robotics
Robotics and Motion
S-721 68 VÄSTERÅS, Sweden
Telephone +46 (0) 21 344 400

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

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

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

abb.com/robotics

3HAC051131-001, Rev E, en