

ABB Robotics

# Product manual RTT 1600/2400L, IRC5



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# **Product manual**

## **Track Motion**

RTT 1600/2400L

M2004  
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# 1: Description

## 1.1: Overview

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### General

RTT 1600/2400L is a single axis robot carrier intended for an IRB 1600/2400L with or without a Marathon Pac with electrode or a Bobin. It is controlled and positioned as an external axis for the robot control system.

Holders for the cooling unit and splatter cleaning equipment are not included.

---

### Travel length

The Track Motion is available with a travel length from 1.7 m to 11.7 m in increments of 1 m.

## 1.2: Principal design

### Track Motion

The illustration shows the principle design of the Track Motion.

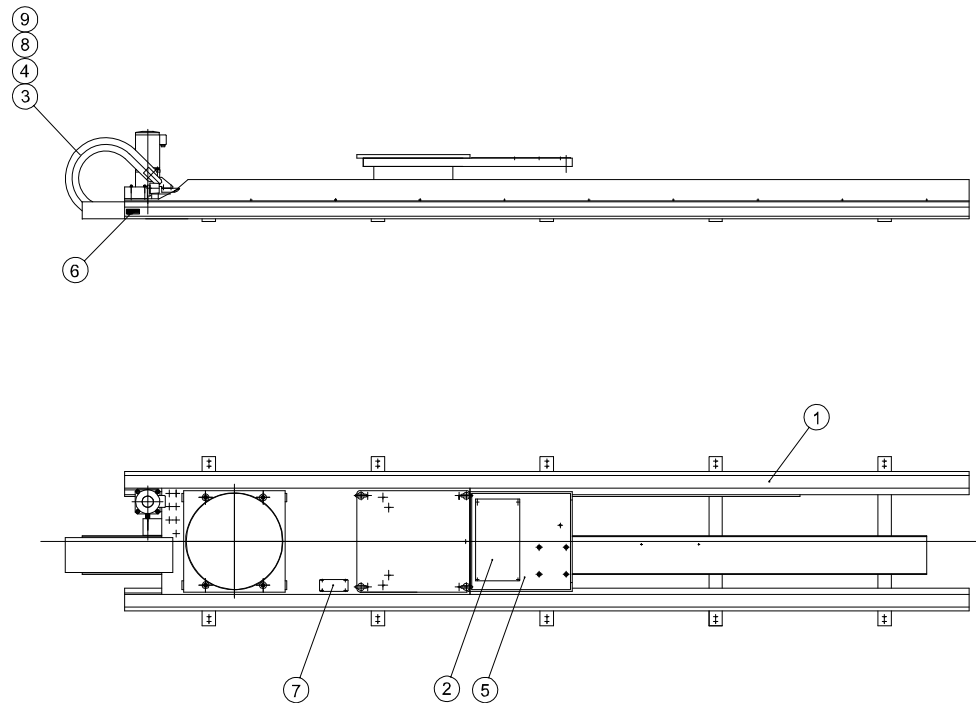


Figure 1: Track Motion with Marathon Pac or Bobin

Item	Description
1	Track Motion with Marathon Pac or Bobin
2	Internal cable set
3	Joint set
4	Cable set
5	Holder for TC/TSC
6	Rating plate
7	Station indicating
8	Motor cable
9	Resolver cable



---

## 1.3: Terms and concepts

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### Definitions

The table below lists terms and concepts used in the documentation.

Description	Definition
Robot	Manipulator and control equipment together.
Manipulator	The mechanical, moving part of the robot.
Track Motion	Carriage, stand and cable chain and attendant parts, assembled.
Carriage	The moving part, on which the manipulator is mounted.
Stand	The assembled framework for the Track Motion.
Travel lenght	The carriage's maximum range.
SMB	Serial measurement box.



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## 2: Safety instructions

### 2.1: Description

---

#### General





There are safety instructions in this chapter for all steps that involve a risk of personal injury or material damage. In addition, they are written out beside the instructions for each step.




General warnings where the intention is to avoid difficulties are only set out by the instruction in question.

---

#### Key to symbols

The different types of warnings are marked with symbols in accordance with the table below:

Symbol	Designation	Signification
 Danger	DANGER	Warns that an accident <i>will</i> occur if the instructions are not followed, resulting in a serious or fatal injury and/or severe damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height etc.
 Warning	WARNING	Warns that an accident <i>may</i> occur if the instructions are not followed, that can lead to serious injury, possibly fatal, and/or great damage to the product. It applies to warnings that apply to danger with, for example, contact with high voltage electrical units, explosion or fire risk, risk of poisonous gases, risk of crushing, impact, fall from height etc.
 Electrical shock	ELECTRICAL SHOCK	The electrocution or electrical shock symbol indicates electrical hazards which could result in severe personal injury or death.
 Caution	CAUTION	Warns that an accident may occur if the instructions are not followed, that can result in injury and/or damage to the product. It also applies to warnings of risks that include burns, eye injury, skin injury, hearing damage, crushing or slipping, tripping, impact, fall from height etc. Furthermore, it applies to warnings that include function requirements when fitting and removing equipment, where there is a risk of damaging the product or causing a breakdown.

Symbol	Designation	Signification
 Electrostatic discharge (ESD)	ELECTROSTATIC DISCHARGE (ESD)	The electrostatic discharge (ESD) symbol indicates electrostatic hazards which could result in severe damage to the product.
 Note	NOTE	Note symbols alert you to important facts and conditions.
 Tip	TIP	Tip symbols direct you to specific instructions, where to find additional information or how to perform a certain operation in an easier way.

---

## 2.2: Safety during unpacking and handling

---

### General

Read carefully through the safety instructions, before the Track Motion is unpacked and installed.

---

### Lifting instructions

Only units that are 6 meters or shorter may be lifted. If the units are joined, the joints must be prefitted on delivery.

---

## 2.3: Safety during Mechanical installation

---

### Adjusting the level

The distance between the leveling bolts and the top edge of the ground plates must be at least 10 mm.

### 2.3.1 Safety during assembling the cable tray and manipulator

---

#### Assembling the manipulator

Always refer to the documentation for the manipulator when the manipulator is to be lifted.

### 2.3.2 Safety during electrical installation

---

#### The robot's cable harness

Make sure that the cable harness cannot come into contact with any moving parts.

### 2.3.3 Safety during commissioning

---

#### Calibration

Make sure no persons are on the Track Motion when the carriage is in motion. Also make sure that the Track Motion's cover plates are free from loose objects, otherwise they can get trapped between the carriage and the plates.

---

#### Checking the working area

The Track Motion's working area must be inspected before the system is taken into operation.

### 2.3.4 Safety during mechanical installation

---

#### Refilling the lubricant

Only use grease injectors with 3 months supply or shorter.

---

## 3: Technical specifications and requirements

### 3.1: Technical data

#### 3.1.1 Performance

The table below contains important technical data for the performance of the Track Motion.

Function	Performance
Travel length	1.7-11.7 m
Max. speed	1.06 m/s at 3,000 rpm on motor
Stand length	3-13 m
Acceleration	2.5 m/s <sup>2</sup> , 1.5 m/s <sup>2</sup> for +250 kg
Retardation	2.6 m/s <sup>2</sup> , 1.6 m/s <sup>2</sup> for +250 kg
Repeater accuracy <sup>1</sup>	
Maximum load	250 kg in addition to weight of robot
Weigh carriage	220-430 kg
Degree of protection	IP54
Positioning accuracy	± 0.05 mm

1. Repeated stopping in the travel direction, at the same point

---

#### Time for positioning

At maximum speed with acceleration and deceleration time included:

Transport length	Time
0.5 m	1.2 s
1 m	1.7 s
2 m	2.7 s

### 3.1.2 Dimensions

#### Marathon Pac or Bobin

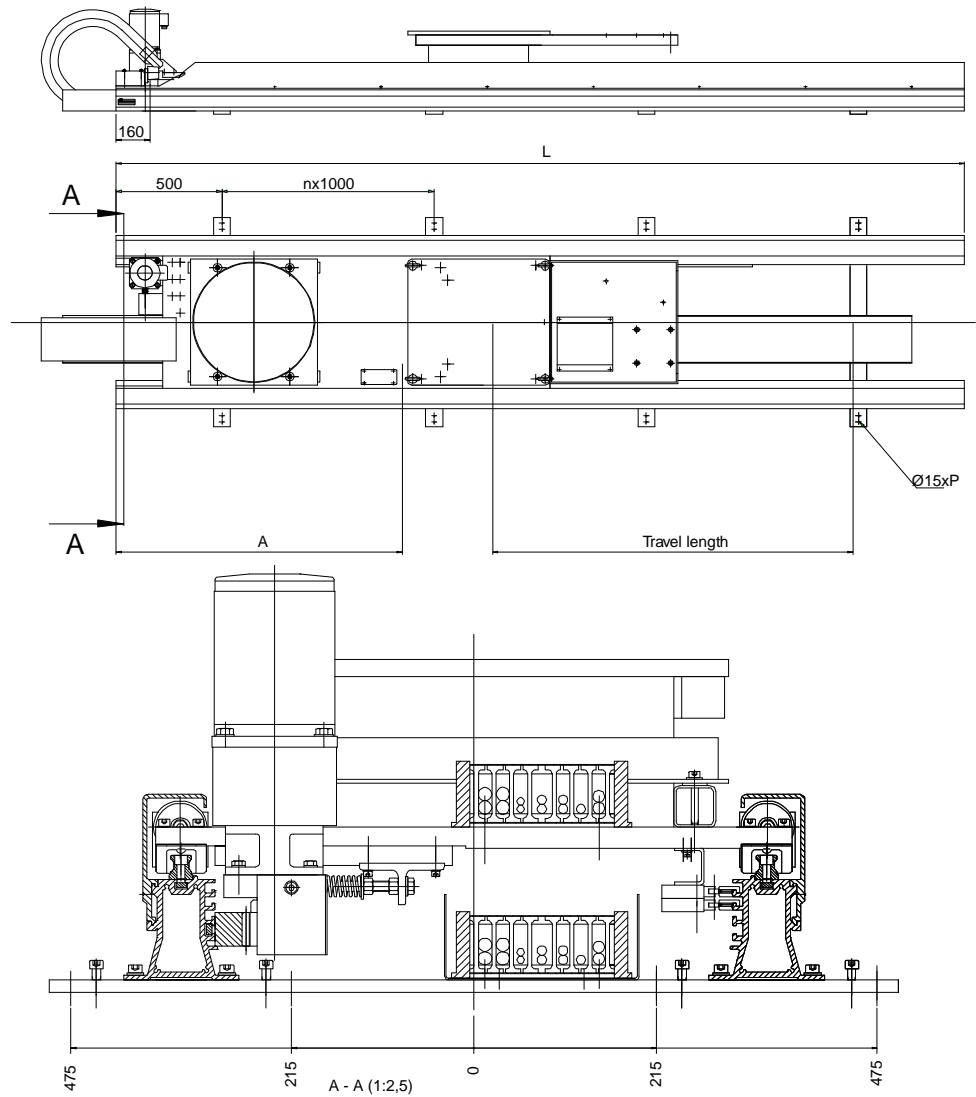


Figure 2: Dimensions for Track Motion with Marathon Pac or Bobin



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## Cable chain

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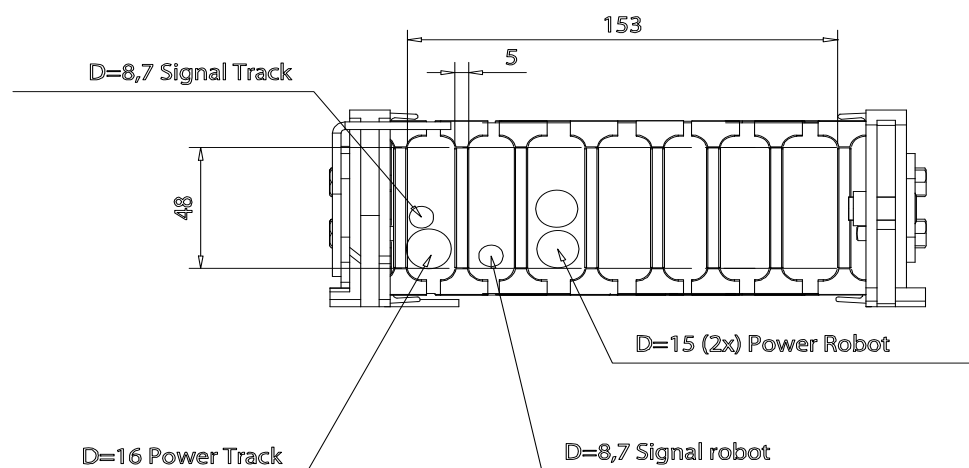


Figure 3: Dimensions for cable chain



---

## 4: Variants and options

### 4.1: Variants and options for RTT 1600/2400L

#### 4.1.1 Connection cable

The robot's standard cables can be used to connect the Track Motion to the control equipment.

#### 4.1.2 Power cable

The power cable to the seventh axis is 7, 15 or 22 meters long, measured from the connection point in the center of the unit.

#### 4.1.3 Variants

The tables describe the variants and options that can be ordered for RTT 1600/2400L. Please contact ABB for further specifications.

Option	RTT Type	Reach (m)
1000-5	With Bobbin	With a travel length of 1,7 m. Available travel length 1,7 to 11,7 in steps of 1 m.
1000-6	With Marathon Pac	With a travel length of 1,7 m. Available travel length 1,7 to 11,7 in steps of 1 m.



## 5: Installation and operation

### 5.1: Unpacking and handling



#### Caution

Read carefully through the safety instructions, before the Track Motion is unpacked and installed.

#### 5.1.1 Lifting instructions

Stand modules can be moved by using an overhead crane.



#### Warning

The Track Motion must only be lifted with equipment that complies with the applicable lifting standards, and must be carried out by qualified personnel.

Only units that are 6 meters or shorter must be lifted. If the units are joined, the joints must be prefitted on delivery.

#### Lifting the Track Motion

Track part with carriage and robot mounted:

	Action	Info/Illustration
1.	Position the carriage in the middle of the joint on the track section.	
2.	Place lifting straps round the base of the robot or the carriage.	

Track part without carriage and robot mounted

	Action	Info/Illustration
1.	Place lifting straps on each side of the joint on the track section.	

---

## 5.1.2 Acceptance inspection

---

### Identification

The identification plates, located by (X), specify the carriage type, serial number, and delivery date etc.

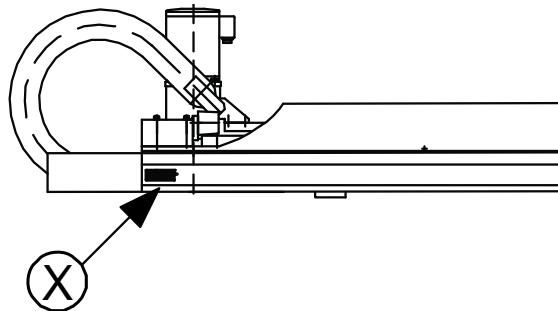


Figure 4: Identification plates

---

### Contents

As standard the Track Motion includes the following on delivery:

- One carriage with drive unit.
- Stand modules and cable chain  
Track Motions with a travel length longer than 4.7 m are designed with several stand modules that are interconnected during installation.
- Mounting bolts and guide sleeves  
Mounting bolts with washers and guide sleeves for the robot.

---

### Inspection

Unpack the equipment and check for any visible transport damage. If this is the case, contact ABB.

---

### Cleaning

Before transport the equipment has been protected against rust by a thin film of oil that has been applied before packing. This film of oil must be wiped off before installation.

	Action
1.	Wipe off any surplus oil using a lint-free cloth

---

## 5.2: Mechanical installation

Refer to the station layout to obtain a correct alignment of the Track Motion.

Before starting up lubricate the gear wheels and gear rack with grease, see table [page 34](#).

### 5.2.1 Foundation

---

#### Robustness

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.

---

#### Incline

The foundation must be designed so that the Track Motion can be mounted without the incline exceeding 0.5 mm/m in the direction of travel, and 0.1 mm/m across this.

---

#### Static loads

The floor surface for the installation should have a bearing capacity of 1,000 kg/m<sup>2</sup>.

---

#### Dynamic loads

The dynamic loads from the movement of the Track Motion and manipulator can change direction independently of each other. In such cases where loads are added to each other the foundation must be able to bear these combined loads.

The maximum dynamic loads for the Track Motion are:

***(Weight, carriage + Weight, manipulator + Weight extra load) × Acceleration***

See robot documentation for dynamic loads for the manipulator.

#### Warning

The Track Motion must not be used so that the maximum loads from the robot and Track Motion are added to each other. If, for example, the carriage is used at maximum speed in one direction the manipulator arm must be stationary, or move in the opposite direction.

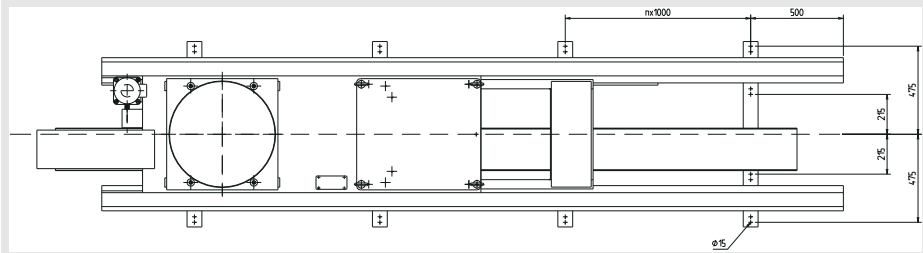


## Attachment

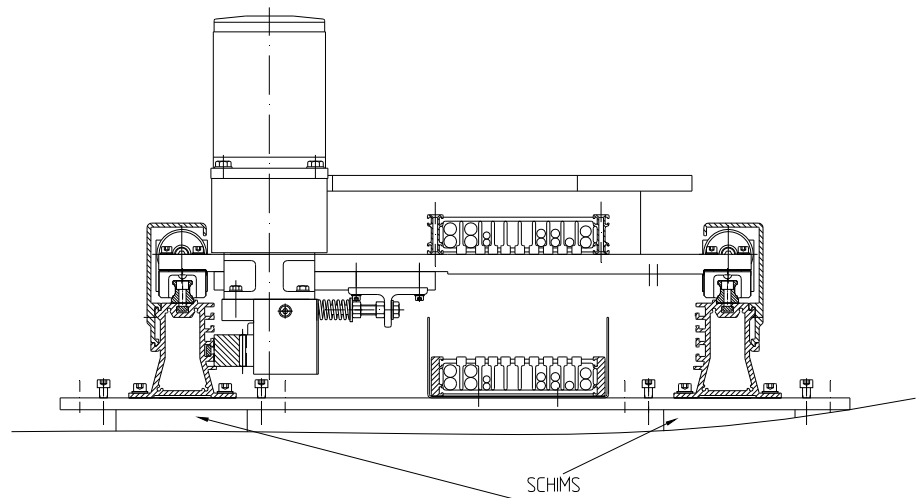
Chemical anchor bolts are recommended to secure the Track Motion to the floor. However, the mounting bolts are not supplied since they must be selected on the basis of the material the foundation is made of.

### Action

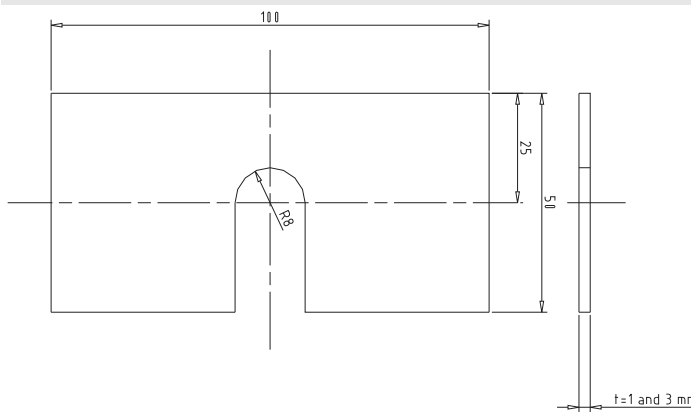
1. Bolt the Track Motion to the foundation.



2. Before it is finally secured the track must be aligned by means of the leveling bolts. To obtain a stable attachment use shims on both sides of the leveling bolts.



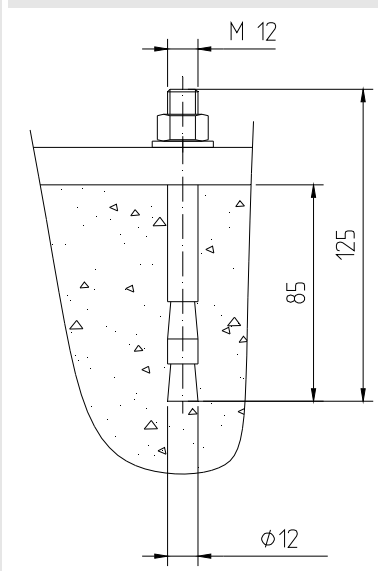
3. Proposal for shims.





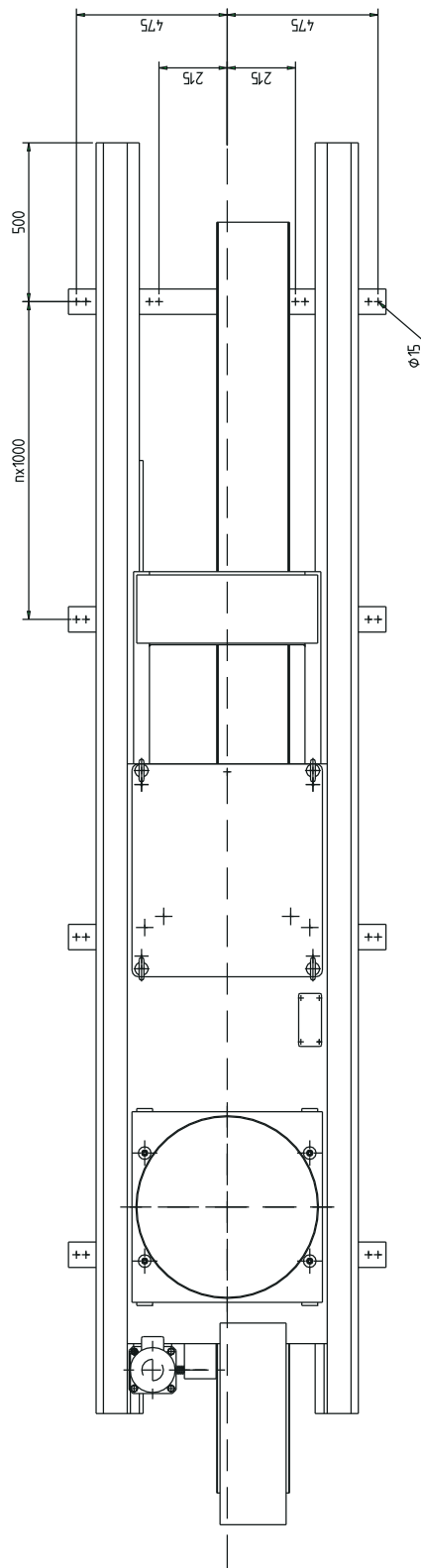
### Action

4. The foundation bolts have the following dimensions (supplied by customer).



Hole configuration
--------------------

The stand's ground plates have holes with a diameter of 24 mm.



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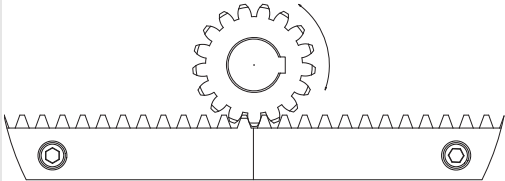

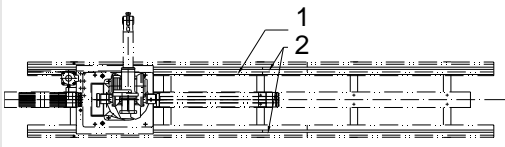
---

The table shows the value of n in the figure above for different travel lengths:

Travel length	n	Number of foundation bolts
1.7 m	3	16
2.7 m	4	20
3.7 m	5	24
4.7 m	6	28
5.7 m	7	32
6.7 m	8	36
7.7 m	9	40
8.7 m	10	44
9.7 m	11	48
10.7 m	12	52
11.7 m	13	56

## 5.2.2 Installing the Track Motion

The Track Motion is normally supplied in lengths of max. 6 m, which means that tracks with a travel length from 4.7 m are jointed during installation:

	Action	Info/Illustration
1.	Position the track part with the carriage and robot correctly aligned in relation to the foundation plan.	
2.	Remove the guards over the rail guides.	
3.	Fit the connecting track part so that the rail guides and gear rack fit to the previous section.	
4.	Screw tight the rail guide and gear rack. <ul style="list-style-type: none"> <li>• Unscrew one of the gear racks with the screws so that it can slide slightly to the side.</li> <li>• Run the carriage so that the gear wheel passes the joint backwards and forwards.</li> <li>• Tighten the screws somewhat, and run the carriage backwards and forwards again. Repeat until the gear wheel passes the joint without making a noise.</li> <li>• Tighten the gear rack.</li> </ul>	 
5.	Replace the guards over the rail guides. (1) Gear rack. (2) Rail guide.	

---

## 5.2.3 Adjusting

---

### Synchronization

The Track Motion synchronization position is when the rear of the carriage is directly over the middle line on the sync mark. In this position the carriage counter is updated.

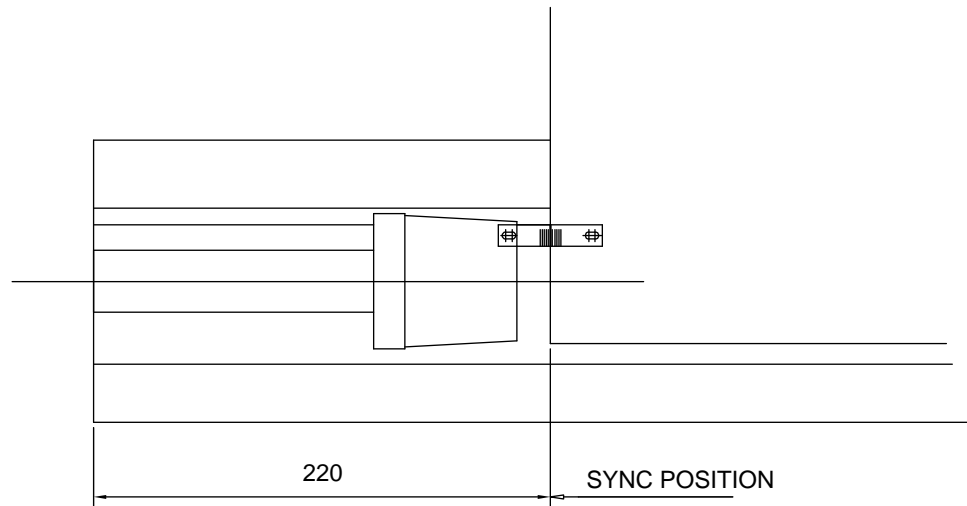


Figure 5: Synchronization

## 5.2.4 Installation of manipulator on Track Motion

---

### General

Refer to the manipulator's product manual for the relevant type of manipulator. Normally the manipulator is mounted on the Track Motion on delivery.

---

## 5.3: Electrical installation



### Note

See circuit diagram and block diagram for the complete plant.

See the manipulator parameters for the parameters for the external axes.

---

### The robot's cable harness

The robot's cable harness is sufficiently long for installation in one of the two positions on the carriage. Any surplus should be placed in a cable chain on the floor, depending on the local conditions.



### Caution

Make sure that the cable chain cannot come into contact with any moving parts.

---

## 6: Commissioning

### 6.1: Preparations

Before the Track Motion is taken into operation the system must be prepared. The following steps should be carried out before starting the Track Motion:

	Action	Description
1.	Configuration	Configure the control equipment
2.	Updating	Update the Track Motion
3.	Coordination	Define base frame

#### 6.1.1 Configure the control equipment

---

##### Travel length

The different travel length working areas are defined on the basis of the calibration mark. The travel length is set to maximum in the parameter file for the ordered travel length.

#### 6.1.2 Updating



##### Warning

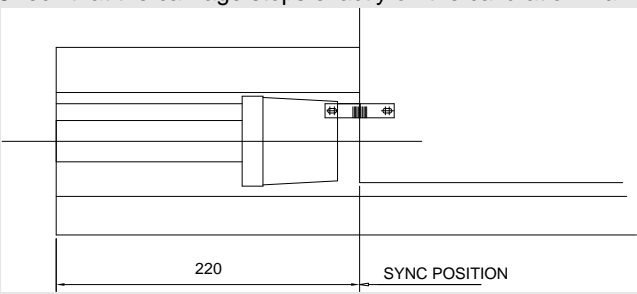
Make sure no persons are on the Track Motion when the carriage is in motion. Also make sure that the Track Motion's cover plates are free from loose objects, otherwise they can get trapped between the carriage and the plates.

---

##### Updating the Track Motion

Before the robot system can be used the resolvers need to be updated.

Perform the update in accordance with the instructions below.

	Action
1.	Update as per the instructions in the manipulator documentation.
2.	Check that the carriage stops exactly on the calibration mark. 
3.	Save the system parameters as per the instructions in the manipulator documentation.

---

### 6.1.3 Define base frame

---

#### General

In order to run coordinated axes, the base frame must be defined. See *Application manual - Additional axes and stand alone controller - chapter 4.3.2. Coordinated track motion.*



---

## 6.1.4 Checking the working area



### **Warning**

The Track Motion's working area must be inspected before the system is taken into operation.

Run the system manually using the joystick and check that:

- It can be run in both directions.
- Both end positions are reached.



---

## 7: Maintenance intervals

### 7.1: Routine checks and preventive maintenance

#### 7.1.1 Maintenance chart

The Track Motion is designed to need a minimum of maintenance. However, routine checks and preventive maintenance always need to be carried out at regular intervals.

The maintenance chart describes the routine maintenance and routine checks in chronological order.

Interval	Part	Maintenance
Every month (every 160 hours of operation)	Gear	Check that there is no oil leakage from the gear.
	Drive unit	Check all the retaining screws.
	Rail guides	Check all the retaining screws.
	Gear wheel and gear rack	Check the contact between gear wheel and gear rack.
		Check the pressure of the gear wheel to the gear rack by measuring the spring: it should be compressed to a length of 40 mm.
		Clean the gear wheel and gear rack, and lubricate with grease.
	Cable duct	Clean the cable duct
	Electrical operation	Check all the electrical functions.
	Cables and connectors	Check visible cables
	Cable chain	Check the visible cable chain.
	Junction boxes	Check
	Drive motor	Check
Every 3rd month (500 hours of operation)	Guide rails	Check the guide rails.
	Guide rail carriages	Check and lubricate the guide rail carriages.
	Linear guides	Clean the linear guides.
Every 3years	SMB battery	

---

## 7.1.2 Mechanical maintenance

---

### Cleaning and lubrication of the gear wheel and gear rack

Clean and lubricate gear wheels and gear racks manually with one of the following lubricants:

Manufacture	Lubricant
BP	Energol OGL 461 F
SHELL	SHELL gear grease (new) or Maleus GL 205
MOBIL OIL	Mobiltac 81

---

### Lubrication in extremely dirty environments

A special dust and dirt-repelling lubricant is recommended if there is a risk of welding sparks or other airborne particles becoming attached to the lubricated gear rack:

Manufacture	Lubricant
OPTIMOL	VISCOGEN EPL

---

### Lubricate the guide rail carriages

Clean and lubricate the guide rail carriages manually with the following lubricant:

Lubricant
Lithium based grease with consistency grade NLGI2 as per DIN 51818

---

## 7.1.3 Electrical maintenance

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### Inspection of electrical functions

The Track Motion must be checked monthly with regard to:

- All electrical functions
- End position functions:  
Run the Track Motion and check that both end positions are reached.

---

### Check the emergency stop

The function of the emergency stop should be checked monthly as follows:

	Action
1.	Allow the Track Motion to stop.
2.	Press in the emergency stop.
3.	Try to start the Track Motion.

---

### Checking the cabling

Check monthly:

If any cables...	then...
have been damaged through wear or pinching	replace the cable.
rub against sharp edges	route the cable so that it runs freely.

---

### Checking the connectors

Check monthly:

- That all connectors are correctly fitted and that there is no risk of loose contact.

---

### Checking the cable chain

Check monthly the visible part of the cable chain with regard to:

- The link system, replace if necessary.
- Attachment points, replace if necessary.

---

### Checking the junction boxes

Check, and rectify if necessary, the junction boxes monthly with regard to:

- Damage
- Connections
- Attachment

---

### Checking the drive motor

Check the drive motor monthly with regard to:

- Abnormal bearing noise
- Connections

## Backup battery

The Track Motion's serial measurement box (SMB) has a built-in serial measurement card. The serial measurement card uses a battery for the memory backup in order to maintain position data.

The battery is a rechargeable lithium battery.

The battery should be replaced:

- Every 3 years

or

- When the battery is going flat.  
The battery low alert (38213 Battery charge low) is displayed when the battery needs to be replaced. The recommendation to avoid an unsynchronized robot is to keep the power to the controller turned on until the battery is to be replaced.



### Note

There are different variants of SMB units and batteries. The variant with the 3-pole battery contact has longer lifetime for the battery.

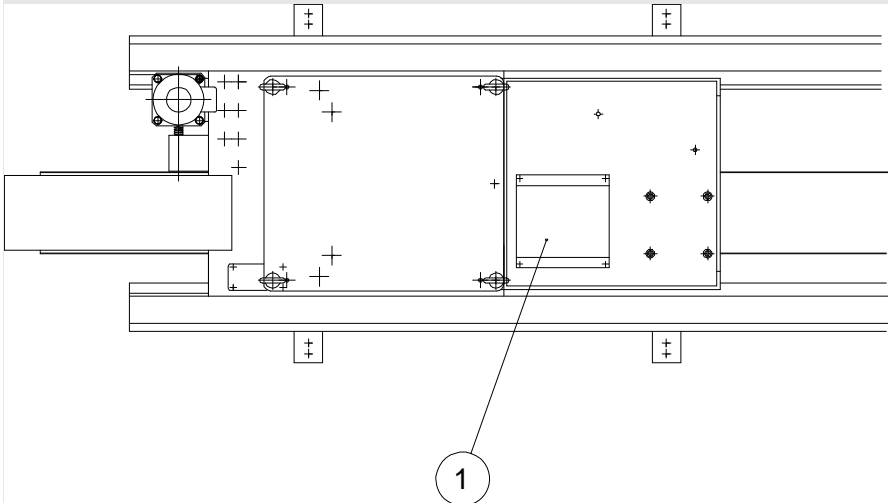
It is important that the SMB unit uses the correct battery. Make sure to order the correct spare parts. Do not replace the battery contact!



### Note

Some types of batteries need to be charged before use (not applicable for battery with the 3-pole contact). The batteries are charged to full capacity after a few hours in STANDBY mode.

Change the battery as follows:

Action	
1.	Localize the battery inside the SMB. 
2.	Cut off the cable tie holding the battery.
3.	Disconnect the two-wire cable and remove the battery.
4.	Fit the battery in the reverse order.

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## 8: Spare parts

### 8.1: Order

Spare parts are to be ordered from ABB AB. Kindly indicate type of unit, serial number, denominations and ordering number according to the spare parts list.

Rights reserved to alter specifications without notice.



#### **Note**

Replace x in the article number according to the following table.

## 8.2: Track Motion, Marathon Pac or Bobin

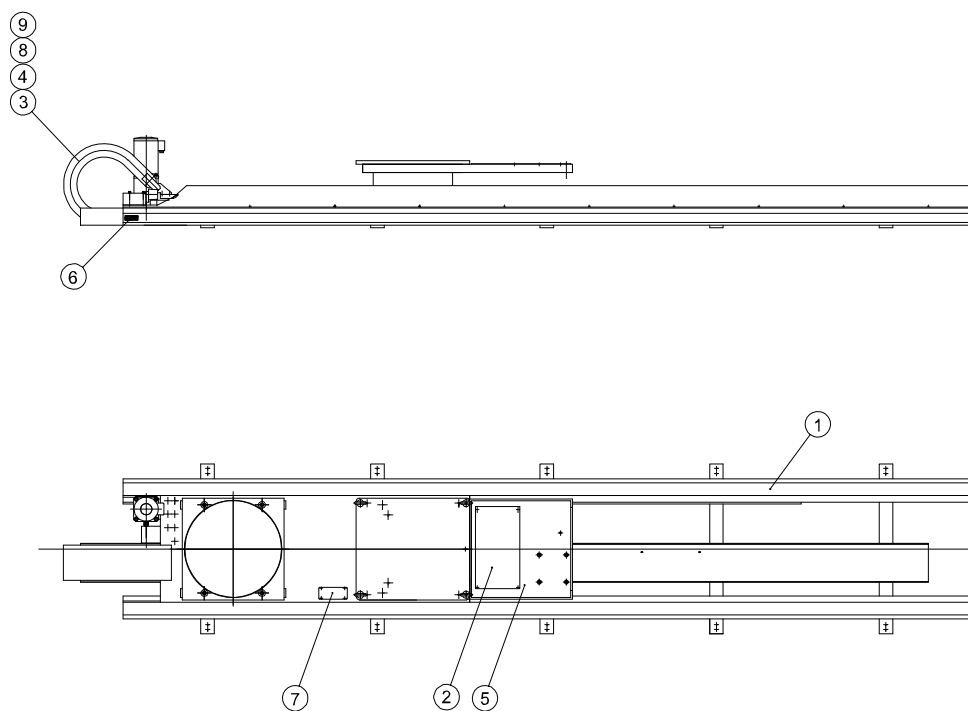
### 8.2.1 IRB 1600 Complete

Item	Art.no.	Description	Note
1	506250-880-890	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA801312-002	Cable set internal Marathon	
3	3HEA802560-x	Joint set for robot foot - robot controller	See table below
4	3HEA801375-x	Cable set IRB 1600	See table below
5	505397-880	Holder for TC/TSC	
6	506233-001	Rating plate	
7	3HEA801440-x	Station indication	See table below
8	3HEA800538-x	Cable motor flexible	See table below
9	3HEA801340-x	Cable resolver flexible	See table below

Replace x in the article number according to the table:

Travel length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/length)	Pos/Item 7 (x/length)	Pos/Item 8 (x/length)	Pos/Item 9 (x/length)
1,7	001	002/14	002/4	005/14	006/16
2,7	002	003/16	003/5	006/16	008/18
3,7	003	003/16	004/6	006/16	008/18
4,7	004	004/18	005/7	007/18	010/20
5,7	005	004/18	006/8	007/18	010/20
6,7	006	005/20	007/9	008/20	012/22
7,7	007	005/20	008/10	008/20	012/22
8,7	008	006/22	009/11	009/22	014/24
9,7	009	006/22	010/12	009/22	014/24
10,7	010	007/25	011/13	010/24	016/26
11,7	011	007/25	012/14	010/24	016/26



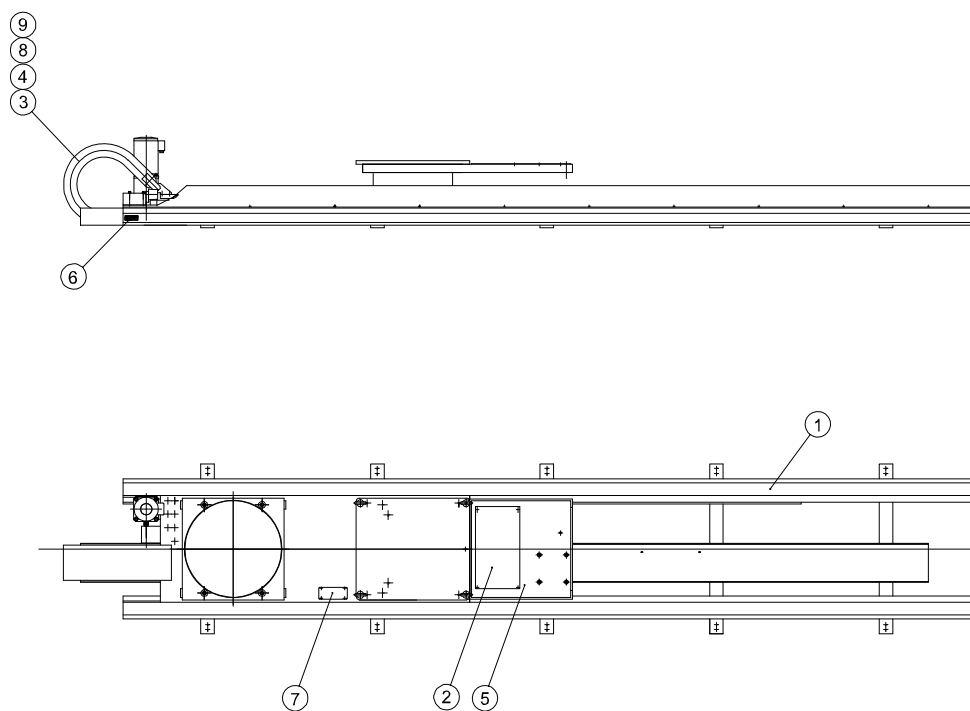


## 8.2.2 IRB 2400 Complete

Item	Art.no.	Description	Note
1	506250-880-890	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA801312-002	Cable set internal Marathon	
3	3HEA802560-x	Joint set for robot foot - robot controller	See table below
4	3HEA801377-x	Cable set IRB 2400	See table below
5	505397-880	Holder for TC/TSC	
6	506238-001	Rating plate	
7	3HEA801440-x	Station indication	See table below
8	3HEA800538-x	Cable motor flexible	See table below
9	3HEA801340-x	Cable resolver flexible	See table below

Replace x in the article number according to the table::

Travel length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/length)	Pos/Item 7 (x/length)	Pos/Item 8 (x/length)	Pos/Item 9 (x/length)
1,7	001	002/14	002/4	005/14	006/16
2,7	002	003/16	003/5	006/16	008/18
3,7	003	003/16	004/6	006/16	008/18
4,7	004	004/18	005/7	007/18	010/20
5,7	005	004/18	006/8	007/18	010/20
6,7	006	005/20	007/9	008/20	012/22
7,7	007	005/20	008/10	008/20	012/22
8,7	008	006/22	009/11	009/22	014/24
9,7	009	006/22	010/12	009/22	014/24
10,7	010	007/25	011/13	010/24	016/26
11,7	011	007/25	012/14	010/24	016/26



### 8.2.3 Track Motion (Base)

Item	Qty	Art.no.	Description	Note
4		551151-x	Track profile	See table below
7		551153-x	Cover profile	See table below
9	x	553818-001	Sole	See table below
11		553810-x	Cable chute	See table below
13		435565-x	Rack	See table below
20		439029-x	Guide rail	See table below
24	4	550541-001	Guide carriage	
25	1	506252-880	Drive unit	
27		553811-x	Cable cover	See table below
32	4	551165-880	Buffer holder	
33	4	551166-001	Rubber buffer	
34		503917-x	Cable chain	See table below
54		551168-002	Nut bar	M6
56		551168-001	Nut bar	M8
64		2111029-73	Pin	D6x40
65	1	413588-001	Sign	
70	4	2183010-04	Lifting eye	
73	4	551179-001	Nipple	
74	2	500077-002	Clamp	
75	1	553817-001	Lubricant	Molycote D321 R

#### Pos/Item 4

551151-x

		/Qty at different track lengths										
Length	Art. no.	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
2m	-001				1							
3m	-002					1	1				1	1
4m	-005	1										
5m	-003		1		1	1		2	1		2	1
6m	-004			1			1		1	2		1

#### Pos/Item 7, 11

551153-x, 553810-x

		/Qty at different track lengths										
Length	Art. no.	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
2m	-001		2	1		2	1		2	1		2
3m	-002	1		1	2	1	2	3	2	3	4	3

---

**Pos/Item 9**

553818-001

	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
Track Length	5m	6m	7m	8m	9m	10m	11m	12m	13m	14m	4m
Qty	5	6	7	8	9	10	11	12	13	14	4
A	2,35m	2,85m	3,35m	3,85m	4,35m	4,85m	5,35m	5,85m	6,35m	6,85m	1,85m

---

**Pos/Item 13**

435565-x

		/Qty at different track lengths										
Length	Art. no.	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
1,5m	-004			1		1	1	1	1	1	1	1
2m	-003	1				1		2	1		2	1
2,5m	-002			1	2	1	1	1	1	1	1	1
3m	-005		1				1		1	2	1	2

---

**Pos/Item 20**

439029-x

		/Qty at different track lengths										
Length	Art. no.	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
2m	-004				2	2		4	2	2		4
2,32m	-008		4	2	4	2	2	2	2			
2,96m	-009						2		2	2	4	2
3,36m	-010			2	1	2	2	2	2	4	4	4
3,68m	-011	2										

---

**Pos/Item 27**

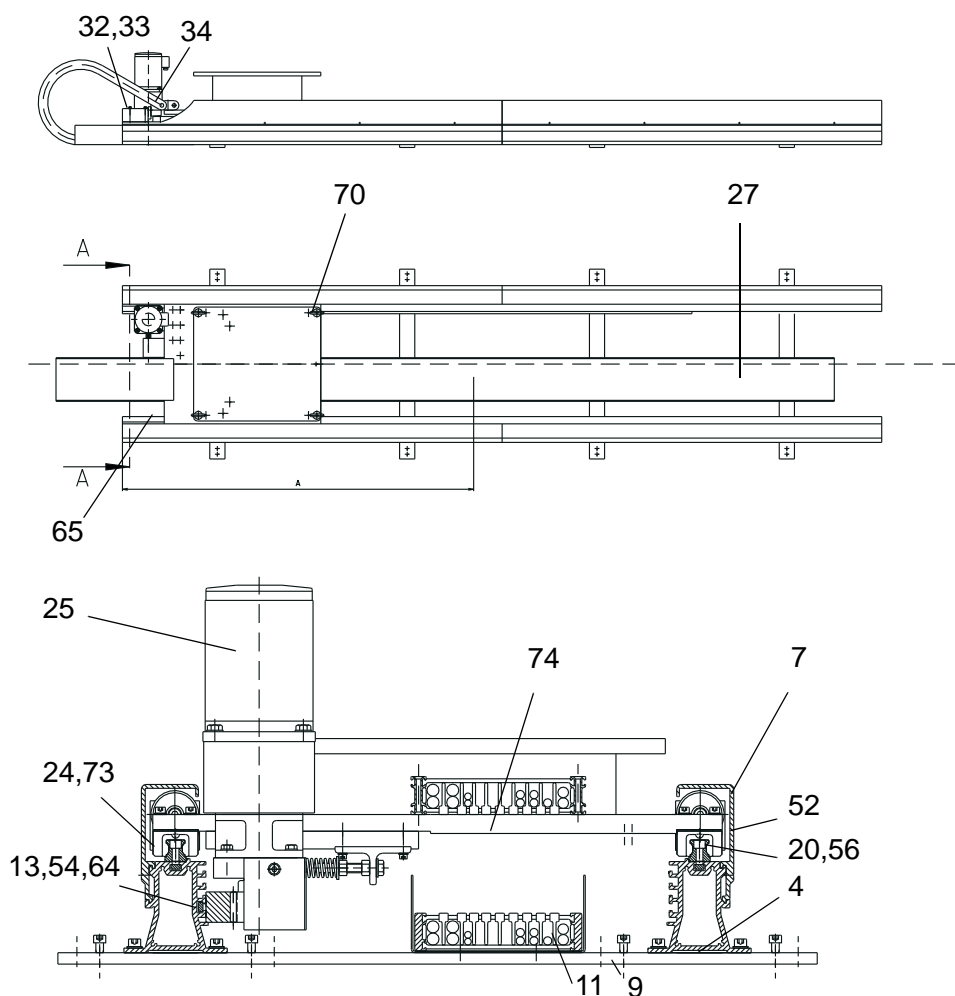
553811-x

		/Qty at different track lengths										
Length	Art. no.	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
1m	-003			1						1		
1,5m	-004		1		1				1		1	
2m	-001		1			1			1			1
2,5m	-005						1					
3m	-002	1		1	1	1	1	2	1	2	2	2

## Pos/Item 34

503917-x

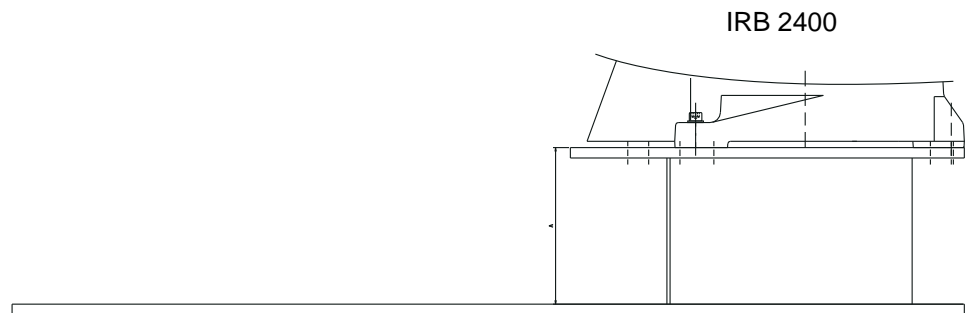
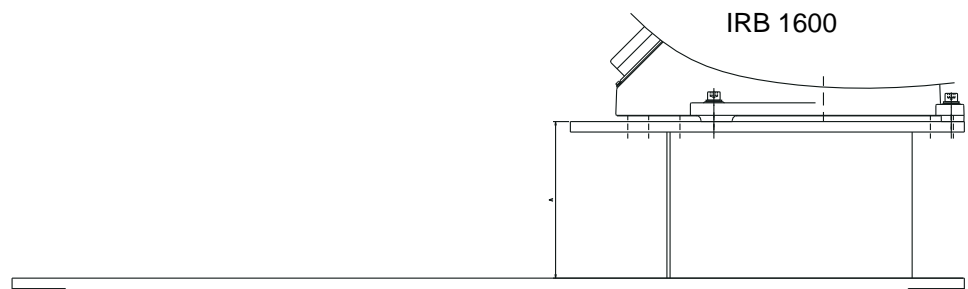
	1,7m	2,7m	3,7m	4,7m	5,7m	6,7m	7,7m	8,7m	9,7m	10,7m	11,7m
Length	2,37m	2,87m	3,37m	3,87m	4,37m	4,87m	5,37m	5,87m	6,37m	6,87m	7,37m
Art. no.	-002	-003	-004	-005	-006	-007	-008	-009	-010	-011	-012



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## 8.2.4 Carriage

Art. no.	Description	Note
553816-880	Robot carriage	H=200
553816-881	Robot carriage	H=300
553816-882	Robot carriage	H=400
553816-883	Robot carriage	H=500
553816-884	Robot carriage	H=600
553816-885	Robot carriage	H=700
553816-886	Robot carriage	H=800
553816-887	Robot carriage	H=900
553816-888	Robot carriage	H=1000







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## 9: Decommissioning

### 9.1: General

The components of the robot are manufactured from many different materials. Some of them are listed below to facilitate scrapping, i.e. so that the components can be disposed of in a way that does not have a detrimental effect on anyone's health or the environment.

#### 9.1.1 Material in robots

Material	Examples of components	Part of
Grey cast iron	Counter-weight	IRB 6400RF
Batteries, NiCad or Lithium	Serial measurement board	All robot types
Copper	Cables, motors	All robot types
Cast iron/nodular iron	Base, lower arm, upper arm, parallel bar/arm	All robot types
Steel	Gears, screws, base-frame, etc.	All robot types
Samarium-Cobalt	Brakes, motors	IRB 1400, 2400, 4400
Neodymium	Brakes, motors	IRB 6400, 640
Plastic/rubber (PVC)	Cables, connectors, drive belts, etc.	All robot types
Oil, grease	Gearboxes	All robot types
Aluminium	Covers, sync. brackets	All robot types
	Castings in wrist, upper arm tubular	IRB 1400, 2400

### 9.2: Scrapping



#### **WARNING!**

The Counter-weight for robots 6400 contains grey cast iron and must therefore always be recycled.

#### 9.2.1 General warning



#### **WARNING!**

Before removing any parts from the robot, study the dismantling instructions for the component in question. Dismantling instructions can be found under Repairs.

#### 9.2.2 Oil and grease

Where possible, arrange for the oil and grease to be recycled. Dispose of via an authorized person/contractor in accordance with local regulations. Do not dispose of oil and grease near lakes, ponds, ditches, down drains, or on to soil. Incineration may be carried out under controlled conditions in accordance with local regulations.

Also note that:

- Spills may form a film on water surfaces causing damage to organisms. Oxygen transfer could also be impaired.
- Spillage may penetrate the soil causing ground water contamination.

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### 9.2.3 Parts requiring special treatment when scrapping

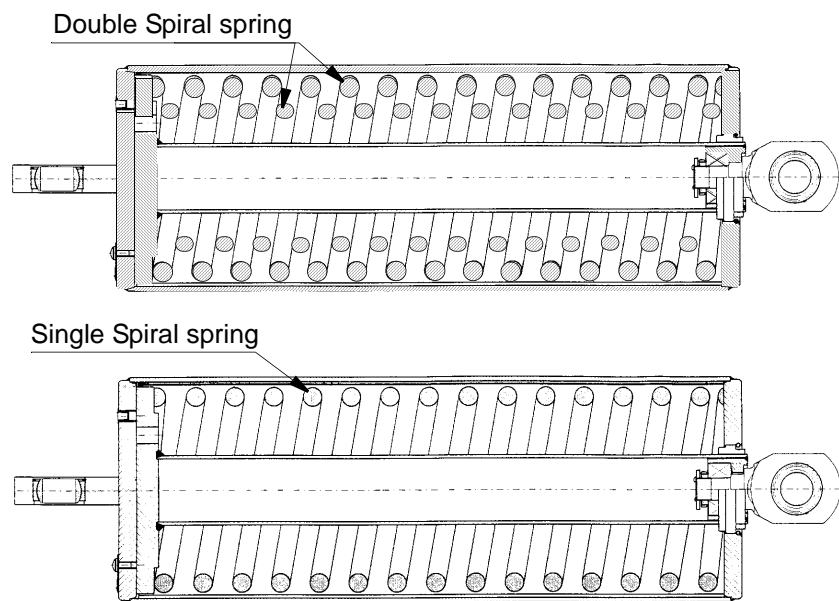
Special care is needed when removing certain parts from the robot, before scrapping the part in question. The types of robot on which there are such parts are listed below together with a description of how they should be removed.

### 9.2.4 IRB 6400R Balancing cylinder

The balancing cylinder contains 1–2 pre-loaded spiral springs. Before scrapping (melting down, or other form of destruction) the springs must be unloaded in a safe way, (see [Scrapping balancing cylinders on page 50](#)).

There are different types of balancing cylinder with a pre-loading force between 4500–8000 N

The free length of the unloaded springs is about 300–400 mm excluding the length of the balancing cylinder.



*Figure 1 Balancing cylinder, IRB 6400.*

---

## 9.2.5 Scrapping balancing cylinders



### WARNING!

It is most important that no enclosed spaces remain when the scrap is shipped to the steel plant for recycling.

---

### General method

The normal way to scrap the balancing cylinder is to use a so-called shredder or scrapping mill. All the balancing cylinders can be treated in this way.

All-enclosed scrapping mills in which the scrap is ground to chips, e.g. “**Newell heavy duty shredder plant 2205**” or similar, are available at all major scrap merchants.

---

### Alternative methods

If a scrapping mill is not available, the balancing cylinder (except 3HAA 0001-EZ) can be opened by means of a blowpipe as shown in the sketches (see figure below).

- **Balancing unit for IRB 6400RF.**  
Cut a hole (250 x 150 mm) in the mantel surface and then cut all the uncovered spring. Finally cut a hole (40 mm) in the piston rod, alt. A, or cut off the piston rod end, alt. B.
- **Balancing unit for Shelf version.**  
Cut a hole (250 x 150 mm) in the outer mantel surface and cut the uncovered spring so it will be possible to cut another hole (200 x 100 mm) in the inner mantel surface. Cut the inner spring and cut off the piston rod end.

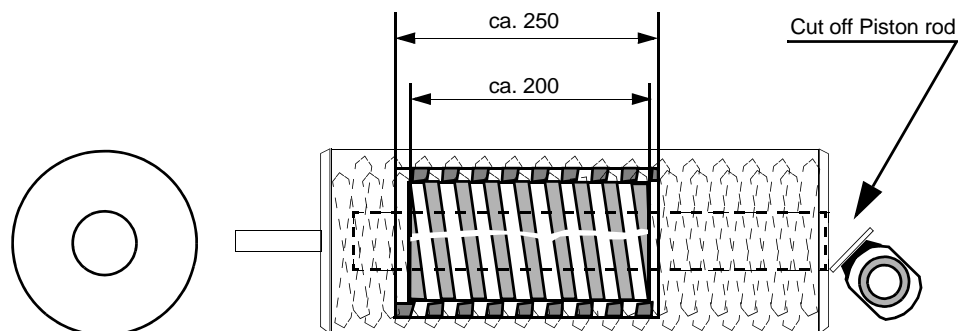
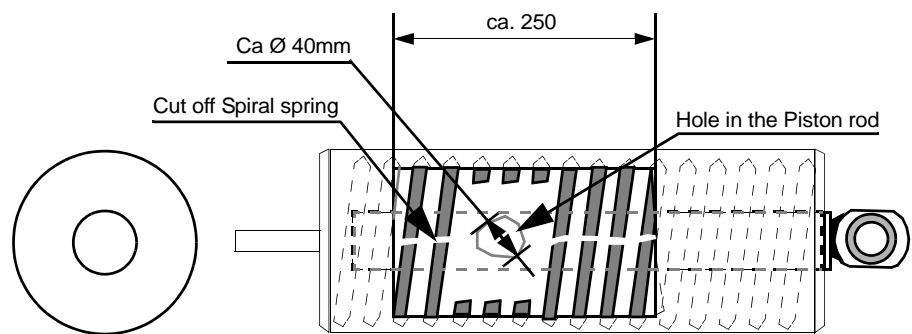
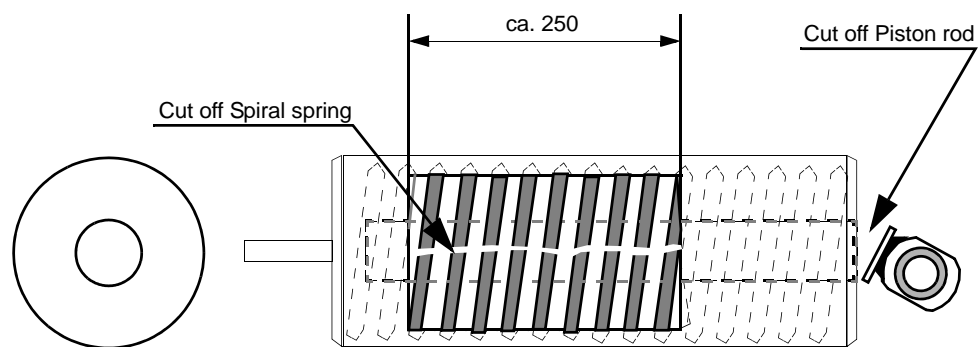


Figure 2 Scrapping balancing cylinders



Alternative A



Alternative B

Figure 3 Scrapping balancing cylinders

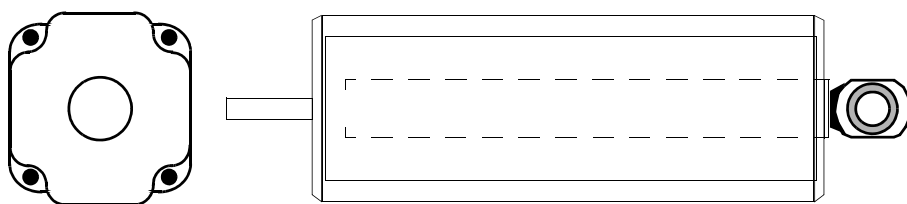


Figure 4 scrapping Balancing cylinders





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