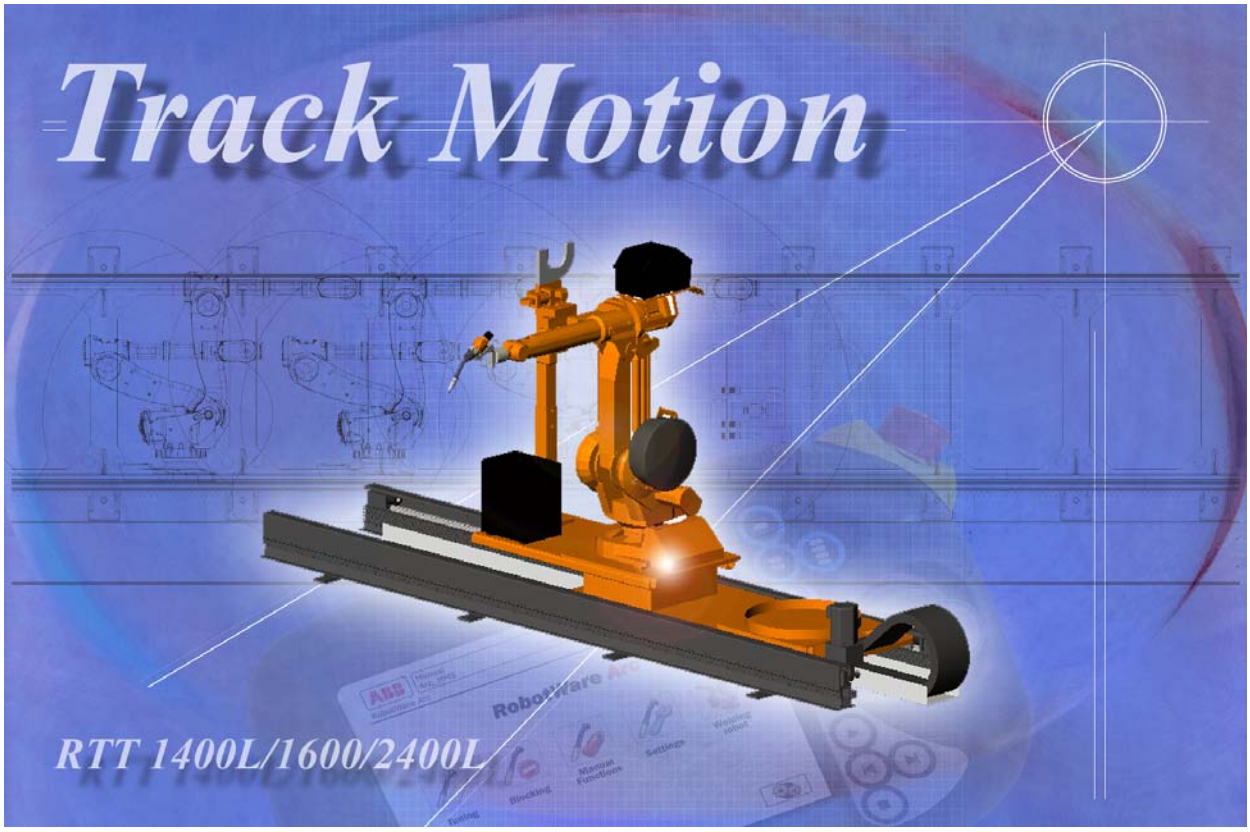
The heart of Robotics

Product Manual

Track Motion

RTT 1400L
RTT 1600
RTT 2400L
IRC 5
M2004



Product Manual
Track Motion

IRC5

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Contents

Product Manual
Robot Travel Track
RTT 1400L/1600/2400L

Tab 1: Specification

1 Description

1.1 General

RTT 1400/2400L is a single axis robot carrier intended for an IRB 1400/2400L with or without a Marathon Pac with electrode. 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 MotionTrack Motion with Marathon Pac

The illustration shows the principle design of the Track MotionTrack Motion.

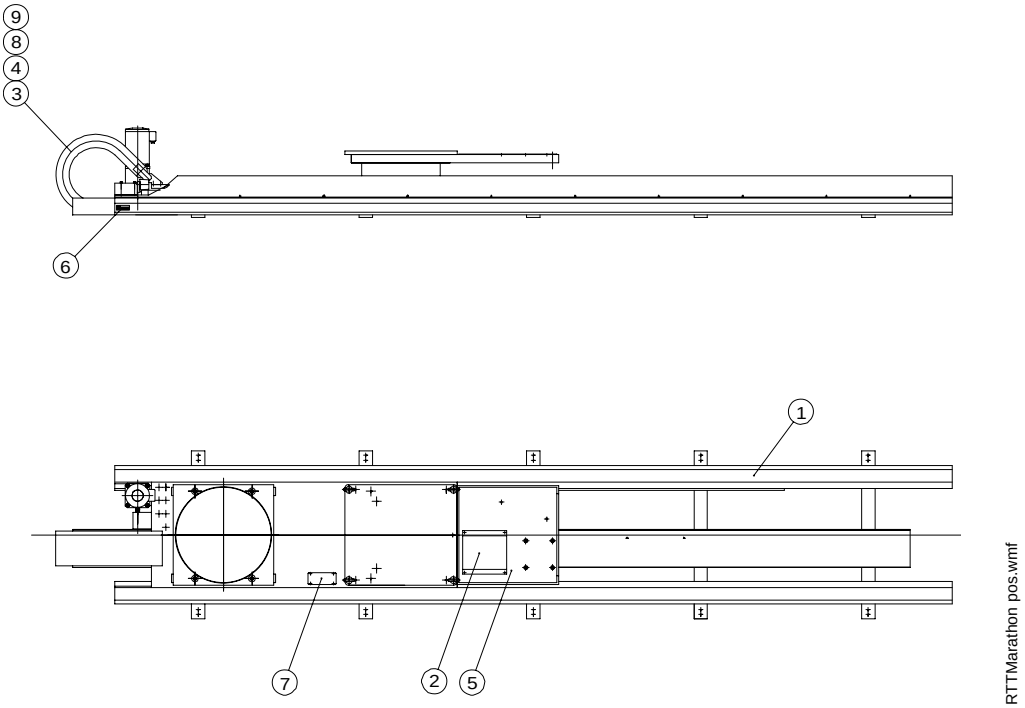


Figure 1 Track MotionTrack Motion with Marathon Pac

Component parts

Item	Description	Item	Description
1	Track MotionTrack Motion with Marathon Pac	6	Rating plate
2	Internal cable set	7	Station indicating
3	Joint set	8	Motor cable
4	Cable set	9	Resolver cable
5	Holder for TC92		

Track Motion with Bobbin

The illustration shows the principle design of the Track Motion.

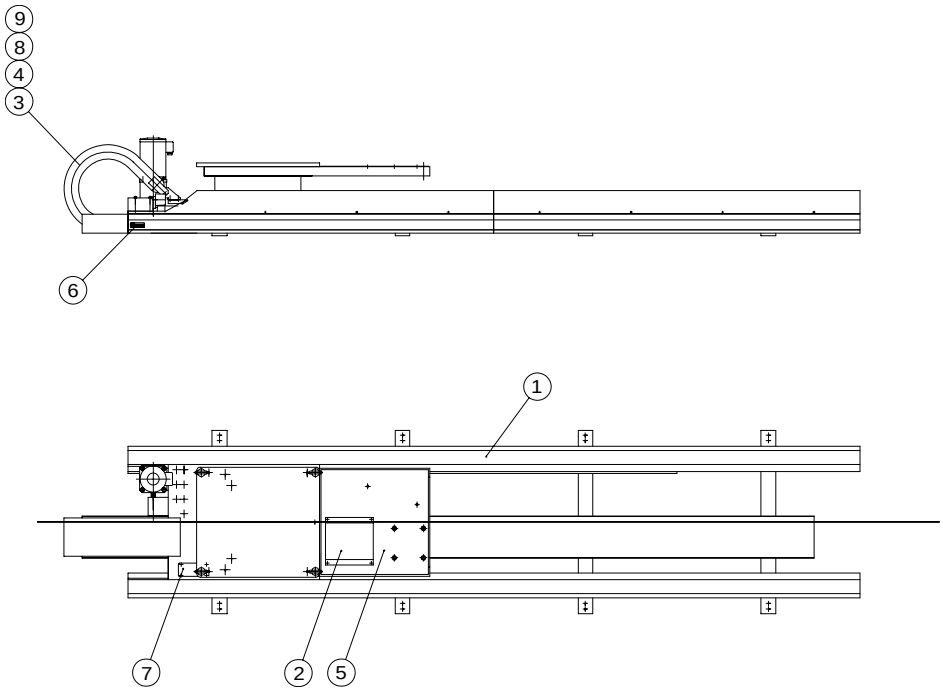


Figure 2 Track Motion with Bobbin

Item	Description	Item	Description
1	Track Motion RTT with Bobbin	6	Rating plate
2	Internal cable set	7	Station indicating
3	Joint set	8	Motor cable
4	Cable set	9	Resolver cable
5	Holder for TC92		

1.2.1 Terms and concepts

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 length	The carriage's maximum range.
SMB	Serial measurement box

2 Safety instructions

2.1 Description

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	Name	Meaning
	Danger	Warning for severe or fatal personal injury, and/or serious damage to the product if the instructions are not followed.
	Warning	Warning for the risk of personal injury, or serious damage to the product. Always follow the instructions given in association with this symbol.
	Electric shock	Warning for electric shock that can cause severe or fatal personal injury. Always follow the instructions given in association with this symbol.
	Caution	Draws your attention to the fact that damage to the product can occur if an action is not performed, or is performed incorrectly.
	Static electricity, ESD	The ESD symbol indicates the risk of static electricity that can result in serious damage to the product.
	Note	Information on important details.
	Tip	The Tip symbol refers to an instruction that provides further information on a special procedure.

2.2 Safety during Unpacking and handling

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.

Safety instructions

Safety during Mechanical installation

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^2, 1.5 m/s^2 for +250 kg
Retardation	2.6 m/s^2, 1.6 m/s^2 for +250 kg
Repeater accuracy[1]	
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

Bobbin

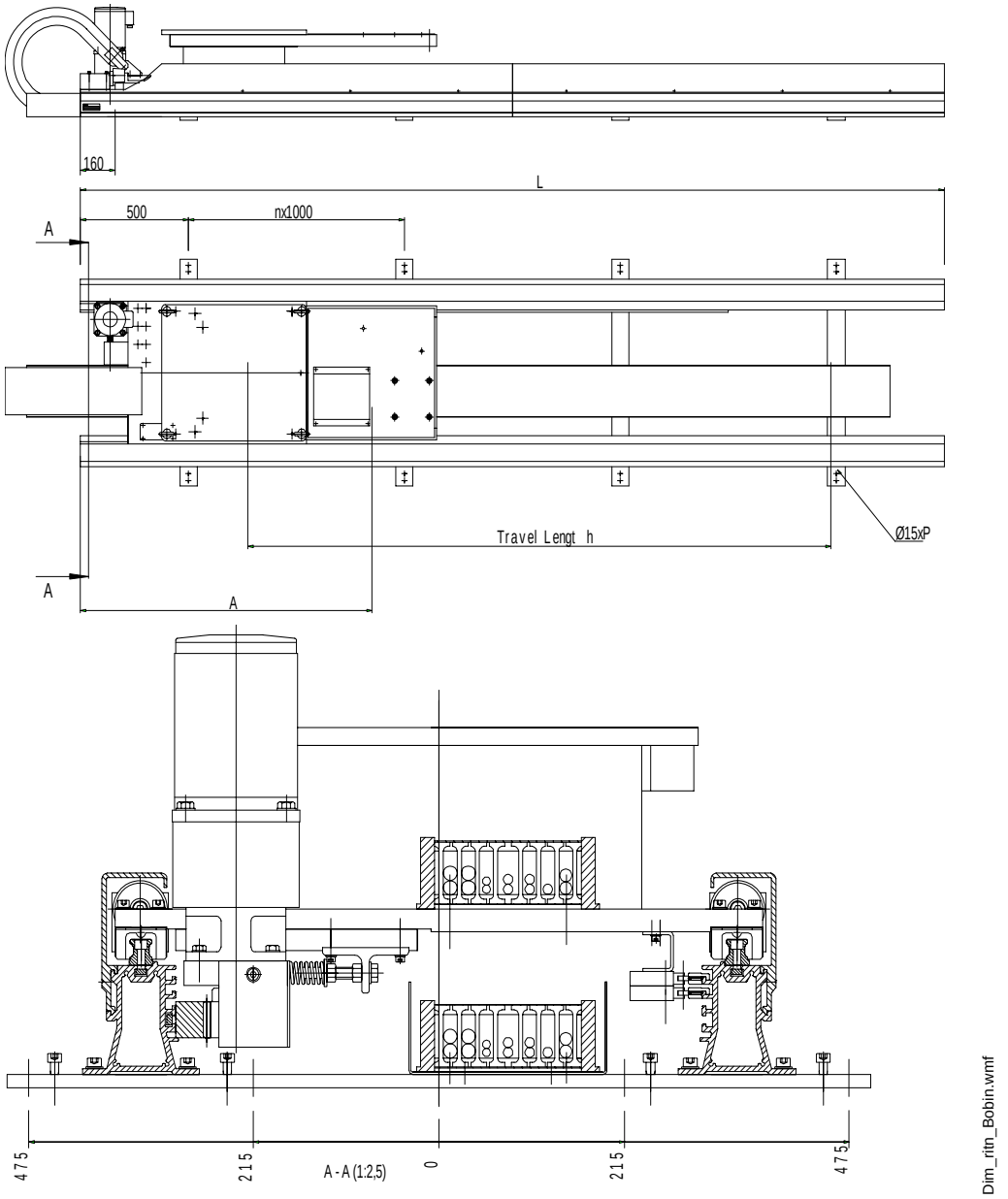


Figure 3 Dimensions for Track Motion with Bobbin

Marathon Pac

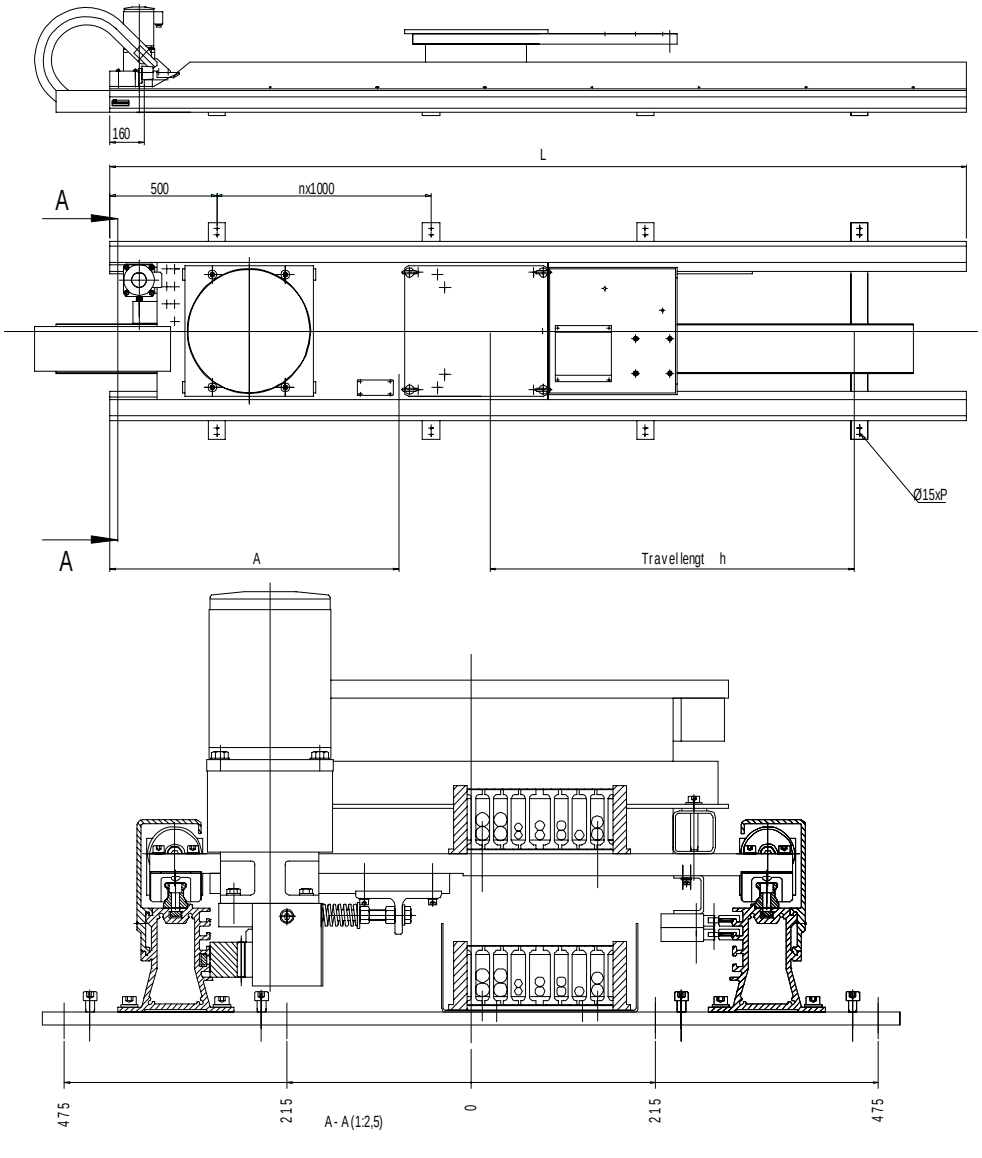


Figure 4 Dimensions for Track Motion with Marathon Pac

Cable chain

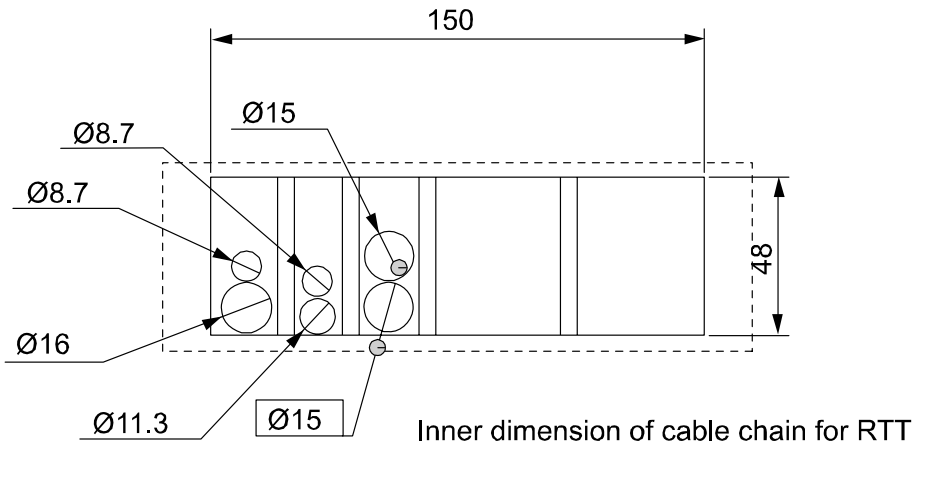


Figure 5 Dimensions for cable chain

4 Variants and options

4.1 Variants and options for RTT 1400/2400L

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 1400/2400L. Please contact ABB for further specifications.
The last number in the article number is replaced with "x" because the article numbers vary with the length of the Track Motion.

Variants	Art. no.
IRB 1400	
Track Motion with Bobbin, complete	3HEA 801 208-x
Track Motion with Marathon Pac, complete	3HEA 801 206-x
IRB 2400	
Track Motion with Bobbin, complete	3HEA 801 209-x
Track Motion with Marathon Pac, complete	3HEA 801 207-x

Travel length	x
1.7 m	001
2.7 m	002
3.7 m	003
4.7 m	004
etc.	

Variants and options

Variants

Tab 2: Installation and operation

1 Installation and operation

1.1 Unpacking and handling

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

1.1.1 Lifting instructions

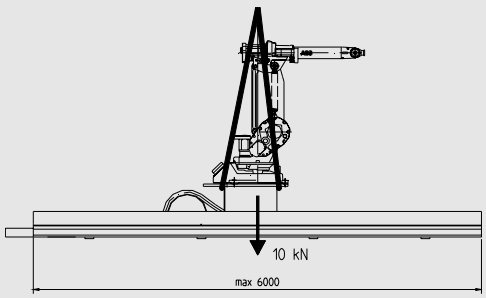
Stand modules can be moved by using an overhead crane.

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

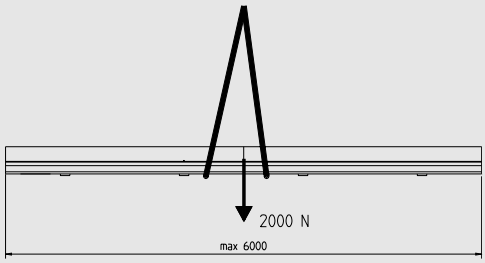
Only units that are 6 meters or shorter must be lifted. If the units are joined, the joints must be prefitted on delivery.

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.	

1.1.2 Acceptance inspection

Identification

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

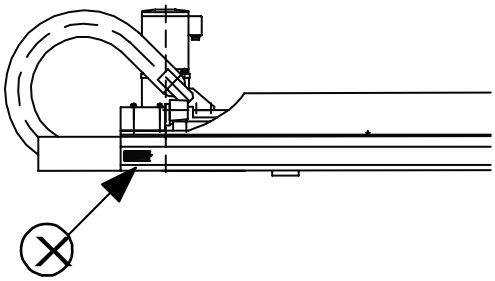


Figure 1 Identification plates (X)

Contents

As standard the Track Motion includes the following on delivery:

- One carriage with drive unit.
  The carriage weighs:

Marathon Pac	346-433 kg
Bobbin	220-280 kg

- 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

1.2 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 3 - 2.

1.2.1 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^2.

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.

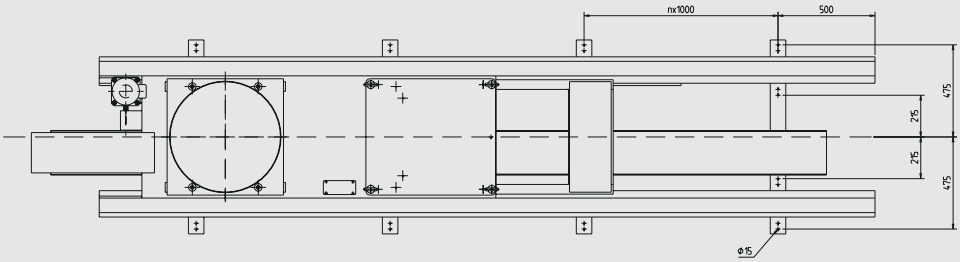
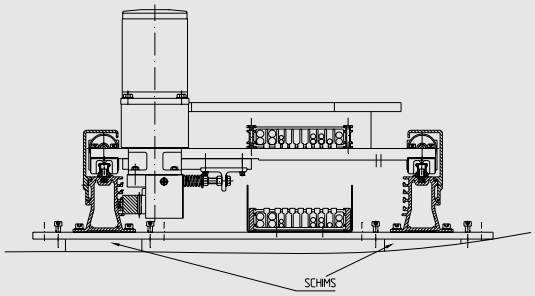
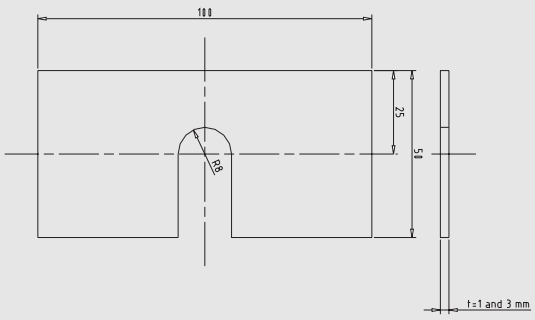
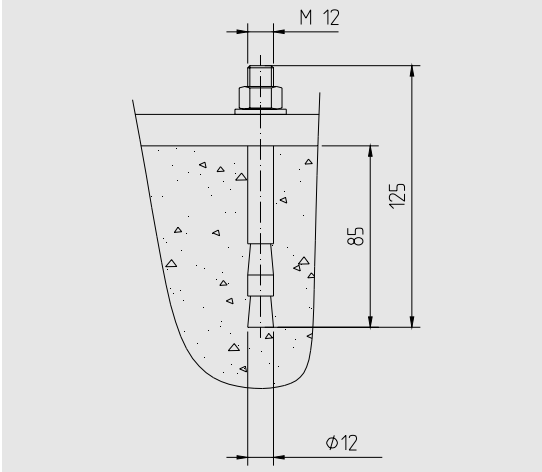
The maximum dynamic loads for the Track Motion are:
(Weight, carriage + Weight, manipulator + Weight extra load) × Acceleration

See robot documentation for dynamic loads for the manipulator.

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	Info/Illustration
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.	
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.

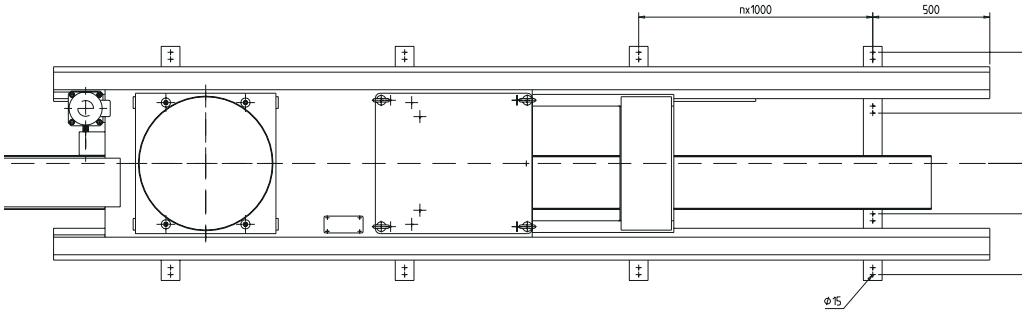


Figure 2 Hole configuration

Track Motion with Marathon Pac

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

Variant	Travel length	n	Number of foundation bolts
-880	1.7 m	3	16
-881	2.7 m	4	20
-882	3.7 m	5	24
-883	4.7 m	6	28
-884	5.7 m	7	32
-885	6.7 m	8	36
-886	7.7 m	9	40
-887	8.7 m	10	44
-888	9.7 m	11	48
-889	10.7 m	12	52
-890	11.7 m	13	56

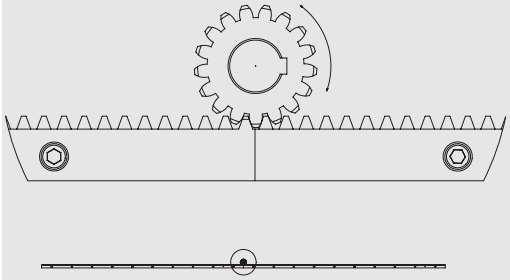
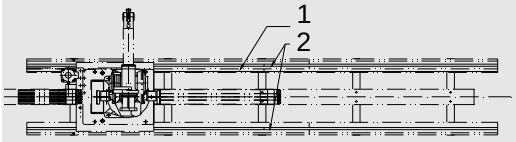
Track Motion with Bobbin

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

Variant	Travel length	n	Number of foundation bolts
-880	1.7 m	2	12
-881	2.7 m	3	16
-882	3.7 m	4	20
-883	4.7 m	5	24
-884	5.7 m	6	28
-885	6.7 m	7	32
-886	7.7 m	8	36
-887	8.7 m	9	40
-888	9.7 m	10	44
-889	10.7 m	11	48
-890	11.7 m	12	52

1.2.2 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. • Unscrew one of the gear racks with the screws so that it can slide slightly to the side. • Run the carriage so that the gear wheel passes the joint backwards and forwards. • Tighten the screws somewhat, and run the carriage backwards and forwards again. Repeat until the gear wheel passes the joint without making a noise. • Tighten the gear rack.	
5.	Replace the guards over the rail guides. (1) Gear rack. (2) Rail guide.	

1.2.3 Adjusting

Synchronization

The Track Motion's 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.

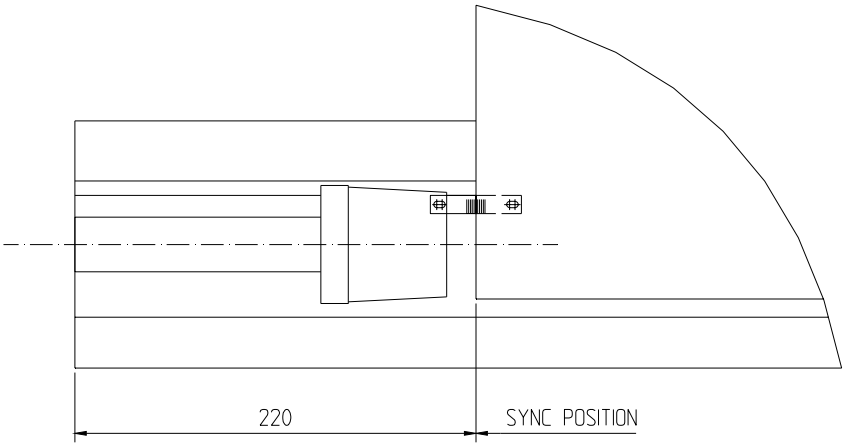


Figure 3 Synchronization

1.2.4 Installation of manipulator on Track Motion

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

1.3 Electrical installation

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.

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

2 Commissioning

2.1 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

2.1.1 Configure the control equipment

Travel length

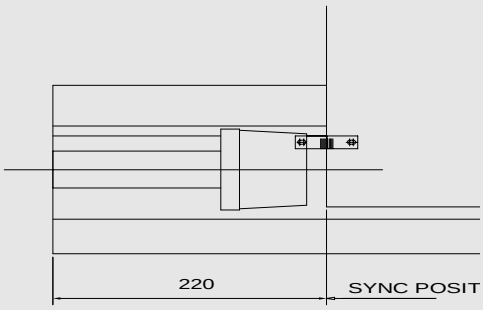
The different travel length working areas are defined on the basis of the calibration mark. The travel length is set to maximum in the parameter file for the ordered travel length.

2.1.2 Updating

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	Info/Illustration
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.	

2.1.3 Checking the working area

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.

Tab 3: Maintenance

1 Maintenance intervals

1.1 Routine checks and preventive maintenance

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 5 years	Backup battery	Change the battery if it shows signs of going flat.

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

Electrical maintenance

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:

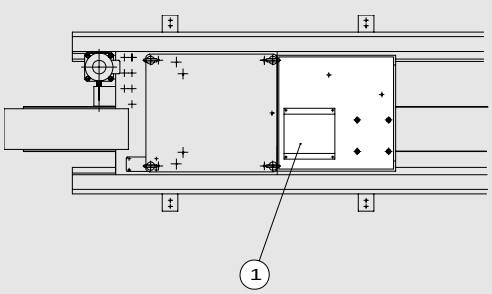
- Every 5 years

or

- When the battery is going flat.
  This is generally shown by an error code on the FlexPendant character display. Information about error codes can be found in the documentation for the control equipment.

In a new system the batteries are charged to full capacity after a few hours in STANDBY mode.

Change the battery as follows:

	Action	Info/Illustration
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.	

2 Reservdelar/Spare parts

2.1 Beställning/Order

Reservdelar beställs genom ABB Automation Technologies AB. Vid beställning var vänlig uppge typ och tillverkningsnummer samt benämningar och beställningsnummer enligt reservdelsförteckningen.

Rätt till ändring av specifikationer utan avisering förbehålles.

Spare parts are to be ordered from ABB Automation Technologies 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.

Byt ut x i artikelnumret enligt efterföljande tabell.
Replace x in the article number according to the following table.

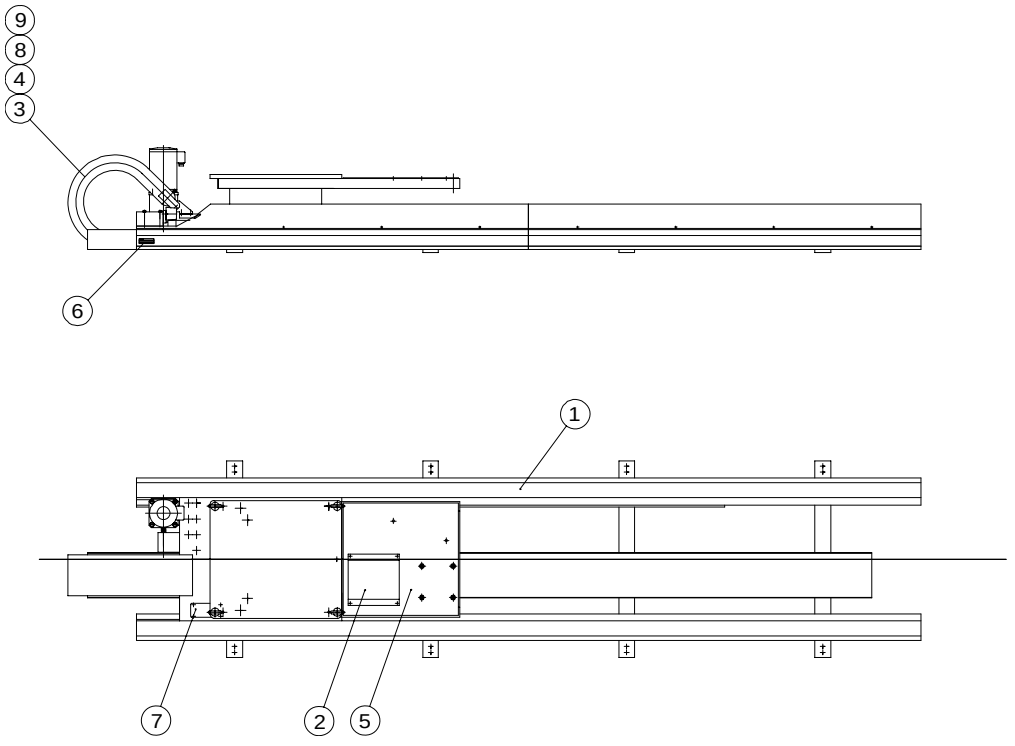
2.2 Åkbana Bobin/Track Motion Bobbin

2.2.1 IRB 1400/1600 Komplett/Complete

Pos Item	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
1	506 251-880-890	Åkbana - RTT	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA 801 312-001	Kabelsats intern RTT Bobin	Cable set internal RTT Bobbin	
3	3HEA 802 560-x	Skarvsats robotfot-styrutrustning	Joint set for robot foot - robot controller	Se tabell nedan See table below
4	3HEA 801 375-x	Kabelsats IRB 1400	Cable set IRB 1400	Se tabell nedan See table below
5	505 397-880	Hållare för TC92	Holder for TC92	
6	506 243-001	Märkskylt	Rating plate	
7	3HEA 801 440-x	Stationsindikering	Station indication	Se tabell nedan See table below
8	3HEA 800 538-x	Kabel motor flexibel	Cable motor flexible	Se tabell nedan See table below
9	3HEA 801 340-x	Kabel resolver flexibel	Cable resolver flexible	Se tabell nedan See table below

Byt ut x i artikelnumret enligt följande tabell:
Replace x in the article number according to the table:

Åklängd RTT Travel Length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/längd) (x/length)	Pos/Item 7 (x/längd) (x/length)	Pos/Item 8 (x/längd) (x/length)	Pos/Item 9 (x/längd) (x/length)
1,7	001	001/12	001/3	004/12	003/13
2,7	002	002/14	002/4	005/14	005/15
3,7	003	002/14	003/5	005/14	005/15
4,7	004	003/16	004/6	006/16	007/17
5,7	005	003/16	005/7	006/16	007/17
6,7	006	004/18	006/8	007/18	009/19
7,7	007	004/18	007/9	007/18	009/19
8,7	008	005/20	008/10	008/20	011/21
9,7	009	005/20	009/11	008/20	011/21
10,7	010	006/22	010/12	009/22	013/23
11,7	011	006/22	011/13	009/22	013/23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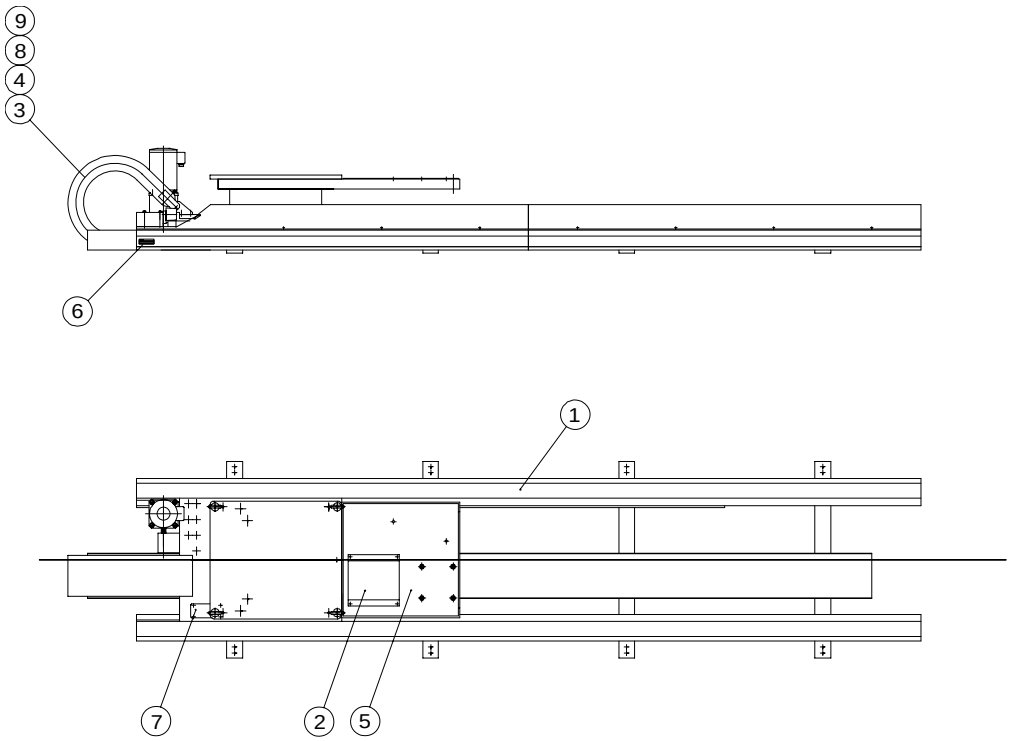
RTTBobin pos.wmf

2.2.2 IRB 2400 Komplett/Complete

Pos Item	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
1	506 251-880-890	Åkbana - RTT	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA 801 312-001	Kabelsats intern RTT Bobin	Cable set internal RTT Bobbin	
3	3HEA 802 560-x	Skarvsats robotfot-styrutrustning	Joint set for robot foot - robot controller	Se tabell nedan See table below
4	3HEA 801 377-x	Kabelsats	Cable set	Se tabell nedan See table below
5	505 397-880	Hållare för TC92	Holder for TC92	
6	506 248-001	Märkskylt	Rating plate	
7	3HEA 801 440-x	Stationsindikering	Station indication	Se tabell nedan See table below
8	3HEA 800 538-x	Kabel motor flexibel	Cable motor flexible	Se tabell nedan See table below
9	3HEA 801 340-x	Kabel resolver flexibel	Cable resolver flexible	Se tabell nedan See table below

Byt ut x i artikelnumret enligt följande tabell:
Replace x in the article number according to the table:

Åklängd RTT Travel length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/längd) (x/length)	Pos/Item 7 (x/längd) (x/length)	Pos/Item 8 (x/längd) (x/length)	Pos/Item 9 (x/längd) (x/length)
1,7	001	001/12	001/3	004/12	003/13
2,7	002	002/14	002/4	005/14	005/15
3,7	003	002/14	003/5	005/14	005/15
4,7	004	003/16	004/6	006/16	007/17
5,7	005	003/16	005/7	006/16	007/17
6,7	006	004/18	006/8	007/18	009/19
7,7	007	004/18	007/9	007/18	009/19
8,7	008	005/20	008/10	008/20	011/21
9,7	009	005/20	009/11	008/20	011/21
10,7	010	006/22	010/12	009/22	013/23
11,7	011	006/22	011/13	009/22	013/23


9
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RTTBobin pos.wmf

2.2.3 Åkbana (Bas)/Track Motion (Base)

Pos Item	Antal Qty	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
4		551 151-x	Banprofil	Track profile	Se tabell nedan See table below
7		551 153-x	Skyddsprofil	Cover profile	Se tabell nedan See table below
9	x	553 818-001	Syll	Sole	Se tabell nedan See table below
11		553 810-x	Kabelränna	Cable chute	Se tabell nedan See table below
13		435 565-x	Kuggstång	Rack	Se tabell nedan See table below
20		439 029-x	Styrskena	Guide rail	Se tabell nedan See table below
24	4	550 541-001	Styrvagn	Guide carriage	
25	1	506 252-880	Drivenhet	Drive unit	
27		553 811-x	Kabelskydd	Cable cover	Se tabell nedan See table below
32	4	551 165-880	Bufferfäste	Buffer holder	
33	4	551 166-001	Gummibuffert	Rubber buffer	
34		503 917-x	Kabelsläpkedja	Cable chain	Se tabell nedan See table below
54		551 168-002	Mutterlist	Nut bar	M6
56		551 168-001	Mutterlist	Nut bar	M8
64		2111 029-73	Pinne	Pin	D6×40
65	1	413 588-001	Synkskylt	Sign	
70	4	2183 010-04	Lyftögla	Lifting eye	
73	4	551 179-001	Smörjnippel	Nipple	
74	2	500 077-002	Stålklamma	Clamp	
75	1	553 817-001	Smörjmedel	Lubricant	Molycote D321 R

Pos/Item 4 **551 151-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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
6m	-004				1			1		1	2	

Pos/Item 7, 11 **551 153-x, 553 810-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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 **553 818-001**

	1,7m	**2,7m**	**3,7m**	**4,7m**	**5,7m**	**6,7m**	**7,7m**	**8,7m**	**9,7m**	**10,7m**	**11,7m**
Banlängd Track length	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m	13m
Antal Qty	3	4	5	6	7	8	9	10	11	12	13
A	1,35m	1,85m	2,35m	2,85m	3,35m	3,85m	4,35m	4,85m	5,35m	5,85m	6,35m

Pos/Item 13 **435 565-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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 **439 029-x**

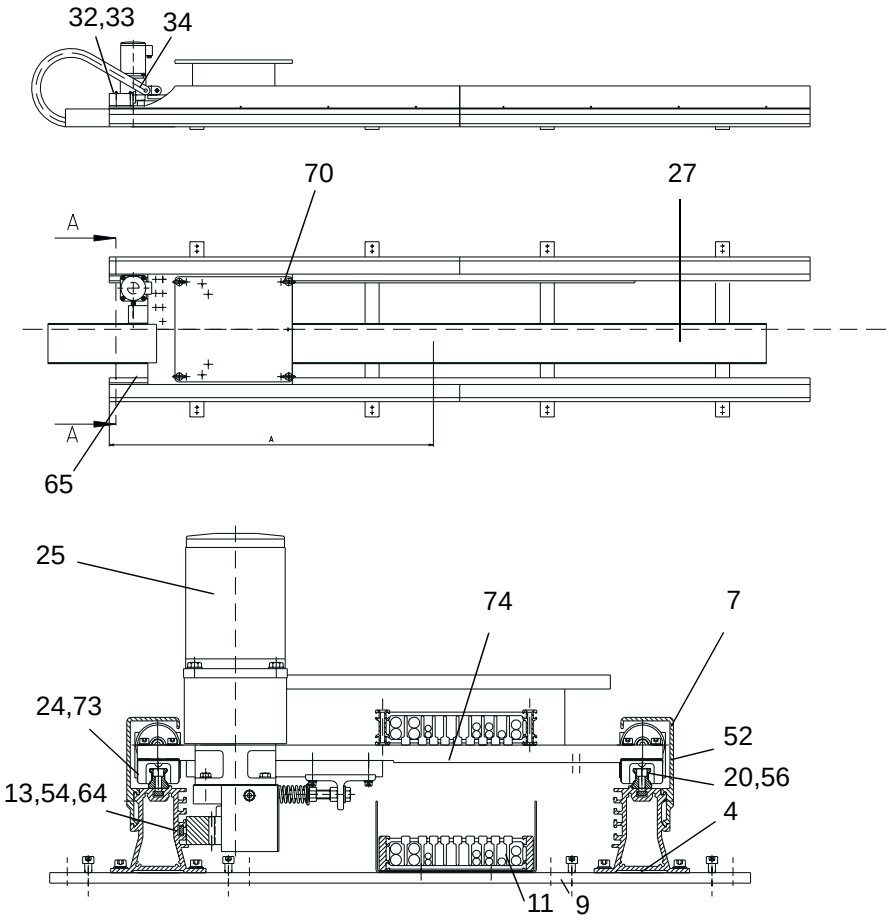
		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr Art no**	**1,7m**	**2,7m**	**3,7m**	**4,7m**	**5,7m**	**6,7m**	**7,7m**	**8,7m**	**9,7m**	**10,7m**	**11,7m**
2m	-004					2	2		4	2	2	
2,32m	-008			4	2	4	2	2	2	2		
2,64m	-012	2										
2,96m	-009							2		2	2	4
3,36m	-010				2		2	2	2	2	4	4
3,68m	-011		2									

Pos/Item 27 **553 811-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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	
2m	-001	1			1			1	1	1	1	2
2,5m	-005		1									
3m	-002			1		1	1	1	1	1	1	1

Pos/Item 34 **503 917-x**

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

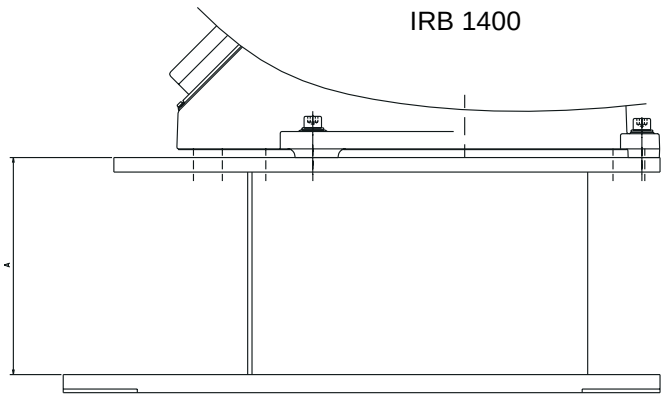


Maintenance

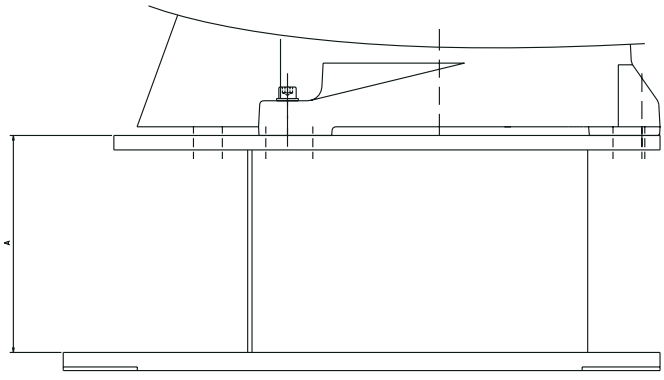
2.2.4 Vagn Bobin/Carriage Bobbin

Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
553 815-880	Robotvagn Bobin	Robot carriage Bobbin	H=200
553 815-881	Robotvagn Bobin	Robot carriage Bobbin	H=300
553 815-882	Robotvagn Bobin	Robot carriage Bobbin	H=400
553 815-883	Robotvagn Bobin	Robot carriage Bobbin	H=500
553 815-884	Robotvagn Bobin	Robot carriage Bobbin	H=600
553 815-885	Robotvagn Bobin	Robot carriage Bobbin	H=700
553 815-886	Robotvagn Bobin	Robot carriage Bobbin	H=800
553 815-887	Robotvagn Bobin	Robot carriage Bobbin	H=900
553 815-888	Robotvagn Bobin	Robot carriage Bobbin	H=1000

IRB 1400



IRB 2400



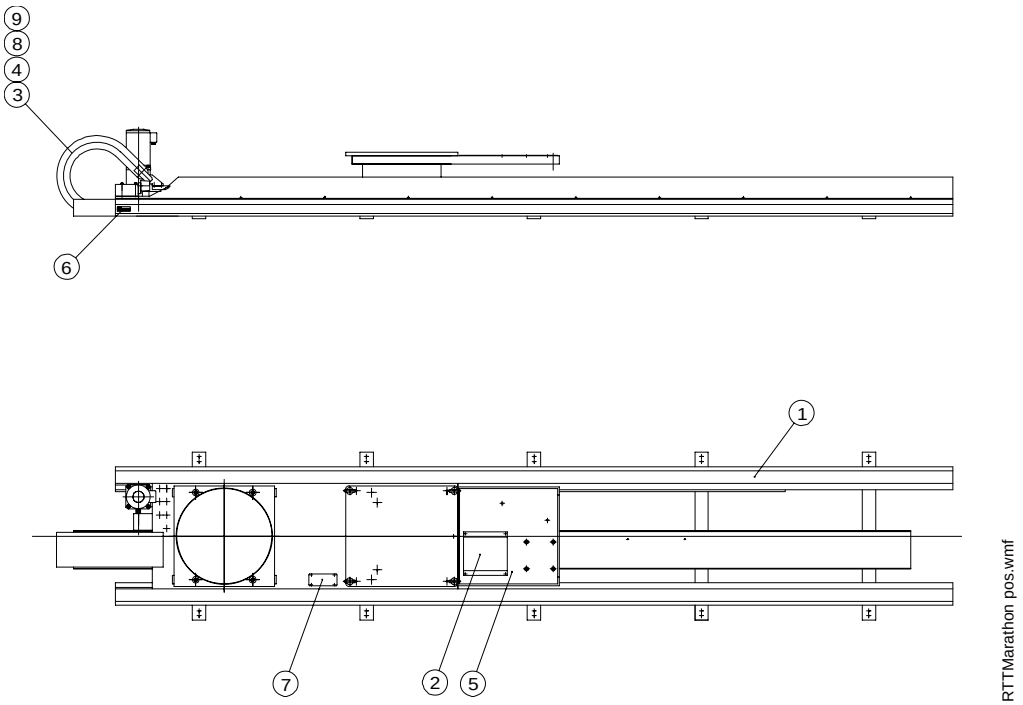
2.3 Åkbana/Track Motion, Marathon Pac

2.3.1 IRB 1400/1600 Komplett/Complete

Pos Item	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
1	506 250-880-890	Åkbana - RTT	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA 801 312-002	Kabelsats intern Marathon	Cable set internal Marathon	
3	3HEA 802 560-x	Skarvsats robotfot-styrutrustning	Joint set for robot foot - robot controller	Se tabell nedan See table below
4	3HEA 801 375-x	Kabelsats IRB 1400	Cable set IRB 1400	Se tabell nedan See table below
5	505 397-880	Hållare för TC92	Holder for TC92	
6	506 233-001	Märkskylt	Rating plate	
7	3HEA 801 440-x	Stationsindikering	Station indication	Se tabell nedan See table below
8	3HEA 800 538-x	Kabel motor flexibel	Cable motor flexible	Se tabell nedan See table below
9	3HEA 801 340-x	Kabel resolver flexibel	Cable resolver flexible	Se tabell nedan See table below

Byt ut x i artikelnumret enligt följande tabell:
Replace x in the article number according to the table:

Åklängd RTT Travel length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/längd) (x/length)	Pos/Item 7 (x/längd) (x/length)	Pos/Item 8 (x/längd) (x/length)	Pos/Item 9 (x/längd) (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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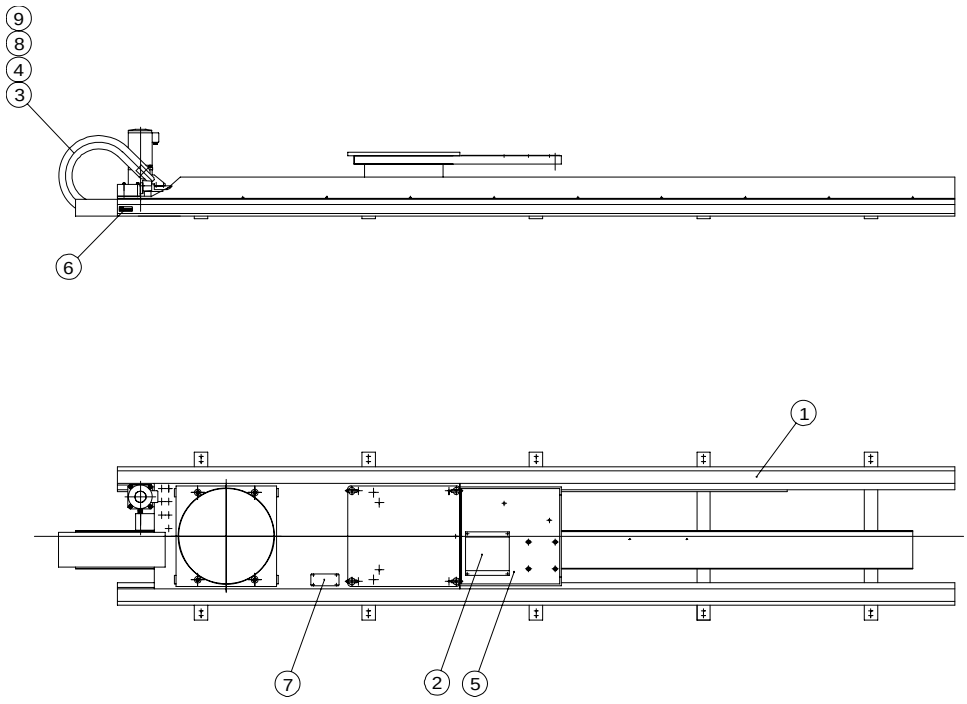
RTTMarathon pos.wmf

2.3.2 IRB 2400 Komplett/Complete

Pos Item	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
1	506 250-880-890	Åkbana - RTT	Track Motion - RTT	L=1,7m - 11,7m
2	3HEA 801 312-002	Kabelsats intern Marathon	Cable set internal Marathon	
3	3HEA 802 560-x	Skarvsats robotfot-styrutrustning	Joint set for robot foot - robot controller	Se tabell nedan See table below
4	3HEA 801 377-x	Kabelsats IRB 1400	Cable set IRB 1400	Se tabell nedan See table below
5	505 397-880	Hållare för TC92	Holder for TC92	
6	506 238-001	Märkskylt	Rating plate	
7	3HEA 801 440-x	Stationsindikering	Station indication	Se tabell nedan See table below
8	3HEA 800 538-x	Kabel motor flexibel	Cable motor flexible	Se tabell nedan See table below
9	3HEA 801 340-x	Kabel resolver flexibel	Cable resolver flexible	Se tabell nedan See table below

Byt ut x i artikelnumret enligt följande tabell:
Replace x in the article number according to the table:

Åklängd RTT Travel Length RTT	Pos/Item 3 (x)	Pos/Item 4 (x/längd) (x/length)	Pos/Item 7 (x/längd) (x/length)	Pos/Item 8 (x/längd) (x/length)	Pos/Item 9 (x/längd) (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


9
8
4
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6
1
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RTTMarathon pos.wmf

2.3.3 Åkbana (Bas)/Track Motion (Base)

Pos Item	Antal Qty	Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
4		551 151-x	Banprofil	Track profile	Se tabell nedan See table below
7		551 153-x	Skyddsprofil	Cover profile	Se tabell nedan See table below
9	x	553 818-001	Syll	Sole	Se tabell nedan See table below
11		553 810-x	Kabelränna	Cable chute	Se tabell nedan See table below
13		435 565-x	Kuggstång	Rack	Se tabell nedan See table below
20		439 029-x	Styrskena	Guide rail	Se tabell nedan See table below
24	4	550 541-001	Styrvagn	Guide carriage	
25	1	506 252-880	Drivenhet	Drive unit	
27		553 811-x	Kabelskydd	Cable cover	Se tabell nedan See table below
32	4	551 165-880	Bufferfäste	Buffer holder	
33	4	551 166-001	Gummibuffert	Rubber buffer	
34		503 917-x	Kabelsläpkedja	Cable chain	Se tabell nedan See table below
54		551 168-002	Mutterlist	Nut bar	M6
56		551 168-001	Mutterlist	Nut bar	M8
64		2111 029-73	Pinne	Pin	D6×40
65	1	413 588-001	Synkskylt	Sign	
70	4	2183 010-04	Lyftögla	Lifting eye	
73	4	551 179-001	Smörjnippel	Nipple	
74	2	500 077-002	Stålklamma	Clamp	
75	1	553 817-001	Smörjmedel	Lubricant	Molycote D321 R

Pos/Item 4 **551 151-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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

Maintenance

Pos/Item 7, 11 **551 153-x, 553 810-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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 **553 818-001**

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

Pos/Item 13 **435 565-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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 **439 029-x**

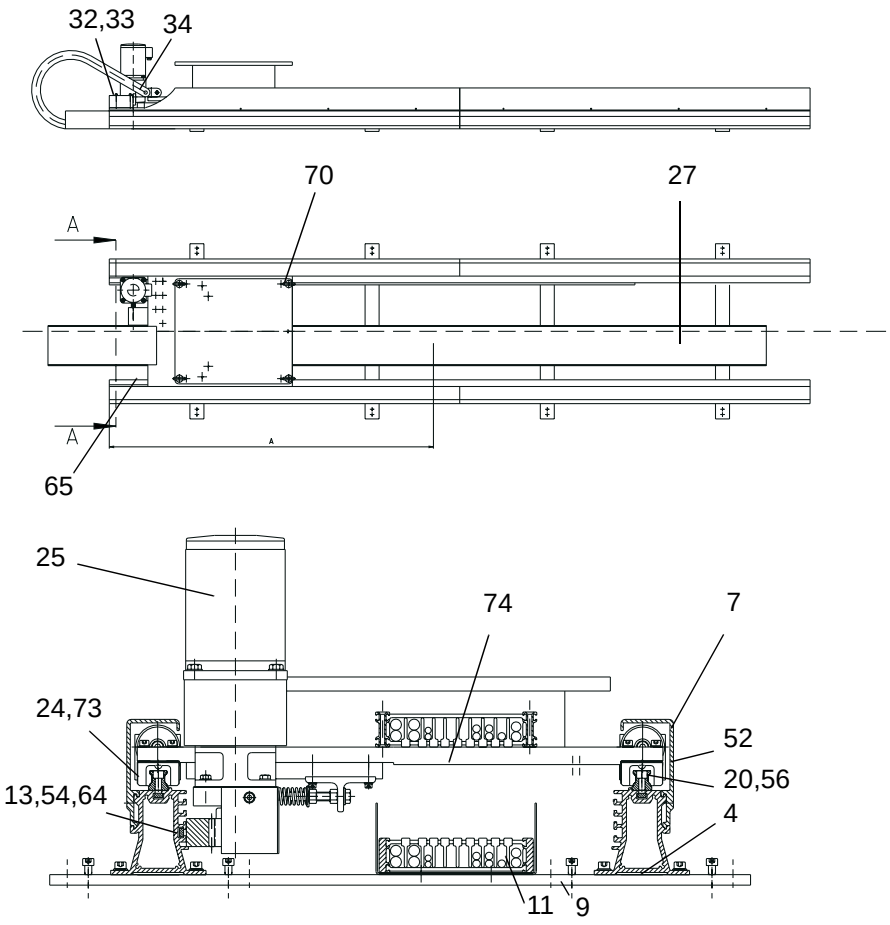
		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr Art no**	**1,7m**	**2,7m**	**3,7m**	**4,7m**	**5,7m**	**6,7m**	**7,7m**	**8,7m**	**9,7m**	**10,7m**	**11,7m**
2m	-004				2	2		4	2	2		4
2,32m	-008		4	2	4	2	2	2	2			
2,96m	-009						2		2	2	4	2
3,36m	-010			2	1	2	2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

Pos/Item 27 **553 811-x**

		Antal vid olika åklängder/Qty at different track lengths										
Längd Length	**Art. nr 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

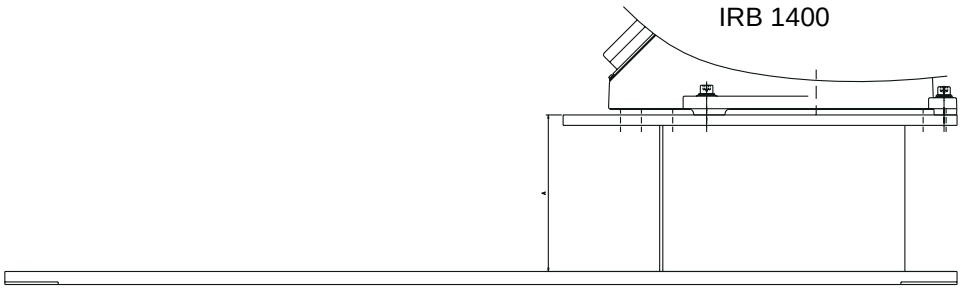
Pos/Item 34 **503 917-x**

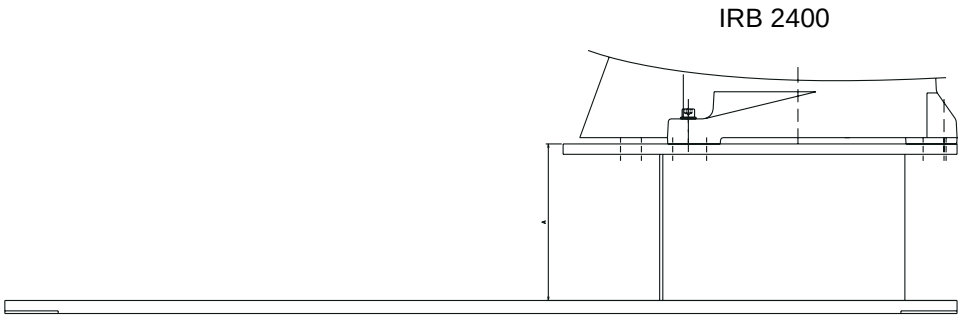
	1,7m	**2,7m**	**3,7m**	**4,7m**	**5,7m**	**6,7m**	**7,7m**	**8,7m**	**9,7m**	**10,7m**	**11,7m**
Längd Length	2,37m	2,87m	3,37m	3,87m	4,37m	4,87m	5,37m	5,87m	6,37m	6,87m	7,37m
Art nr Art no	-002	-003	-004	-005	-006	-007	-008	-009	-010	-011	-012



2.3.4 Vagn/Carriage, Marathon Pac

Art. nr Art. No	Beskrivning	Description	Anmärkning Remark
553 816-880	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=200
553 816-881	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=300
553 816-882	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=400
553 816-883	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=500
553 816-884	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=600
553 816-885	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=700
553 816-886	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=800
553 816-887	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=900
553 816-888	Robotvagn Marathon Pac	Robot carriage Marathon Pac	H=1000





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