TECHNICAL GUIDE

Aluminum Light Crane System

SI

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1 UPDATE HISTORY

Section	Changes	Date	Handled by
All	First release of the document	03/2015	XJAUHIJA
1.4.1	Group classification added	11/2015	XJAUHIJA
2.4.4	Topic title modified	11/2015	XJAUHIJA
2.4.5	New topic on energy chain power supply added	11/2015	XJAUHIJA
3.2	Abbreviation table for single girder crane bridges clarified Bridge kit references corrected throughout the tables Dimension illustrations added and modified in and above the main tables	11/2015	XJAUHIJA
3.3.2	New topic with load spectrum calculation and rated capacity determination added	11/2015	XJAUHIJA
3.3.3	Abbreviation table updated	11/2015	XJAUHIJA
3.3.4	Topic title updated, new paragraphs added, formulas modified (missing dynamic factor), other minor corrections	11/2015	XJAUHIJA
3.3.5	Load spectrum calculation added, other minor corrections	11/2015	XJAUHIJA
4.1	Text modifications in the limiting values section	11/2015	XJAUHIJA
4.1.4	Product code table modified, new paragraphs and a table at the end	11/2015	XJAUHIJA
4.5.4	New topic on single push trolley for ATB added	11/2015	XJAUHIJA
4.5.5.	New paragraphs and a new note added	11/2015	XJAUHIJA
4.6.1	Text added, illustration updated to include the connection box	11/2015	XJAUHIJA
4.6.2	Small text updates	11/2015	XJAUHIJA
4.7	Illustrations updated with more details on the electric kits	11/2015	XJAUHIJA
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General	Document style and layout corrections, typo corrections	11/2016	XJAUHIJA
3.3	Corrections made to the table Compatibility matrix: track size / crane bridge size	11/2016	XJAUHIJA
3.3.4	Minimum span added	11/2016	XJAUHIJA
3.3.5	Minimum span information updated	11/2016	XJAUHIJA
3.4	Old chapter 3.4.2 Crane bridges for ATL vertical lifter removed New chapter 3.4.4 Buffer extension and distance trolleys added Chapter numbering changed accordingly	11/2016	XJAUHIJA
3.4.2	Chapter Telescopic crane bridges: a new descriptive paragraph added	11/2016	XJAUHIJA
4.1	Description of the purpose of the table clarified. Note about outreach crane type with rigid crane bridge clarified	11/2016	XJAUHIJA
4.2	New bridge kit versions added to some single and double girder articulated cranes in the quick selection table Option for 400 kg rated capacity crane removed from quick selection table	11/2016	XJAUHIJA
4.4.2	Bridge kit information updated	11/2016	XJAUHIJA
4.4.5	Bridge kit information updated	11/2016	XJAUHIJA
4.4.7	Push trolley information in the second table corrected	11/2016	XJAUHIJA
5.6.1	Information about flat cable length corrected. Information about the lockable main isolation switch and the power supply cable added Correct connection box illustration added	11/2016	XJAUHIJA
5.6.2	Information about flat cable length and conductor element length corrected	11/2016	XJAUHIJA

2 GENERAL INTRODUCTION

2.1 About this manual

This technical guide describes the aluminum light crane system product content and basic selection rules. The technical guide supports other sales tools for proper product selection. This document includes standard products available in price lists and the sales configurator, and certain special applications that require separate offer engineering.

2.2 Symbols used in this manual

The readers should familiarize themselves with the following symbols which are used in this manual.

Note: Indicates items which require special attention by the reader. There is no obvious risk of injury associated with notes.

2.3 Terminology

Light crane system	Assembly of lifting equipment, crane bridges, trolleys, and tracks with their suspensions for lifting operations.
Crane bridge	Aluminum profile carrying the lifting device and supported on trolleys running on tracks.
Track	Stationary aluminum profiles on which a crane bridge or lifting device is running. A track consists of one or more track lines. In light crane systems, a track can be removed from the supporting building structures without influence on the strength of the supporting structures.
Suspension	All necessary clamps, hanger rods, and other fittings by which a track is suspended from a building or other supporting structure.
Monorail	Stationary aluminum profile on which the lifting device is running. The monorail together with a lifting device is a particular type of a light crane system.
Span	Horizontal distance between the centers of the crane track rails.
Rated capacity	Maximum net load that the crane is designed to lift for a given crane configuration and load location during normal operation.
Lifting device	The equipment needed for lifting and lowering the load.

2.4 About this product

This product is a modular light crane system based on light-weight aluminum profiles, proposed as kits, for manual or motorized operations. The crane kits can be used to suspend different lifting devices, although this document and the quick selection tables focus on the electric chain hoist. The lifting device is excluded from the crane kit and has to be calculated separately.

The crane system is designed to be suspended from the building or a secondary steel structure, for example, a free standing system. The strength of the support structure shall be calculated by a civil engineer to ensure that it can support the forces involved when the crane is in operation. The pendular design brings only vertical downward forces to the supporting structure.

This product is typically selected because of ergonomics, light weight, modern and modular design, and easy installation.

2.4.1 Technical regulations

This state-of-the-art product has been designed and manufactured to conform to European and international standards and directives:

- European directive: 2006/42/EC

The standards and directives to which the product conforms are stated in the Declaration of Conformity or the Declaration by Manufacturer delivered with the product.

The light crane system has been designed for A4 application according to FEM1.001:1998 booklet 2: classification and loading on structures and mechanisms. Some parts of the product are designed according to EN13001.

A crane is classified on the basis of the total duration of use (number of hoisting cycles) and a load spectrum. The total duration of use is divided into utilization classes (U0 to U9). The load spectrum is also divided into classes (Q1 to Q4).

Utilization classes

Class	Total duration of use (n_{max} = number of hoisting cycles)		
U0		$n_{max} \leq$	16 000
U1	16 000	$< n_{max} \leq$	32 000
U2	32 000	$< n_{max} \leq$	63 000
U3	63 000	$< n_{max} \leq$	125 000
U4	125 000	$< n_{max} \leq$	250 000
U5	250 000	$< n_{max} \leq$	500 000
U6	500 000	$< n_{max} \leq$	1 000 000
U7	1 000 000	$< n_{max} \leq$	2 000 000
U8	2 000 000	$< n_{max} \leq$	4 000 000
U9	4 000 000	$< n_{max}$	

Load spectrum classes

Class	Load spectrum factor k_p		
Q1		$< k_p \leq$	0.125
Q2	0.125	$< k_p \leq$	0.250
Q3	0.250	$< k_p \leq$	0.500
Q4	0.500	$< k_p$	1.000

Group classification

Load spectrum class	Utilization class									
	U0	**U1**	**U2**	**U3**	**U4**	**U5**	**U6**	**U7**	**U8**	**U9**
Q1	A1	A1	A1	A2	A3	**A4**	A5	A6	A7	A8
Q2	A1	A1	A2	A3	**A4**	A5	A6	A7	A8	A8
Q3	A1	A2	A3	**A4**	A5	A6	A7	A8	A8	A8
Q4	A2	A3	**A4**	A5	A6	A7	A8	A8	A8	A8

Ax	Application with safety margin
A4	Acceptable application
Ax	Application not acceptable

All tables in this document are given for utilization class U2 and load spectrum Q4 (Spectrum factor k_p=1)

See chapter Calculating load spectrum and determining rated capacity for the calculation of the load spectrum factor k_p, and chapter Examples of calculations for an example of verification of the group classification.

2.4.2 Safety regulations

This state-of-the-art product has been designed and manufactured to conform to European and international standards and directives.

- European directive: 2006/42/EC

Safety instructions for installation and operation are detailed in the installation instructions and in the operator's manual delivered with the product. They shall be read and understood before proceeding and followed during the entire lifetime of the product.

2.4.3 Installation of light crane system

The crane shall be installed by using genuine parts supplied and/or approved by the manufacturer. Components from any other source may cause risk towards equipment or personnel and will void the warranty.

Installation instructions are provided with delivery in paper format, and can be supplied in electronic format (pdf file) under request indicating the particular order number.

Note: The installation procedure requires special skills and suitable tools to ensure safe and reliable operation of the product.

It is recommended that the installation work is carried out only by authorized service personnel or an experienced service technician authorized by the product's manufacturer.

2.4.4 Inspection, preventive maintenance

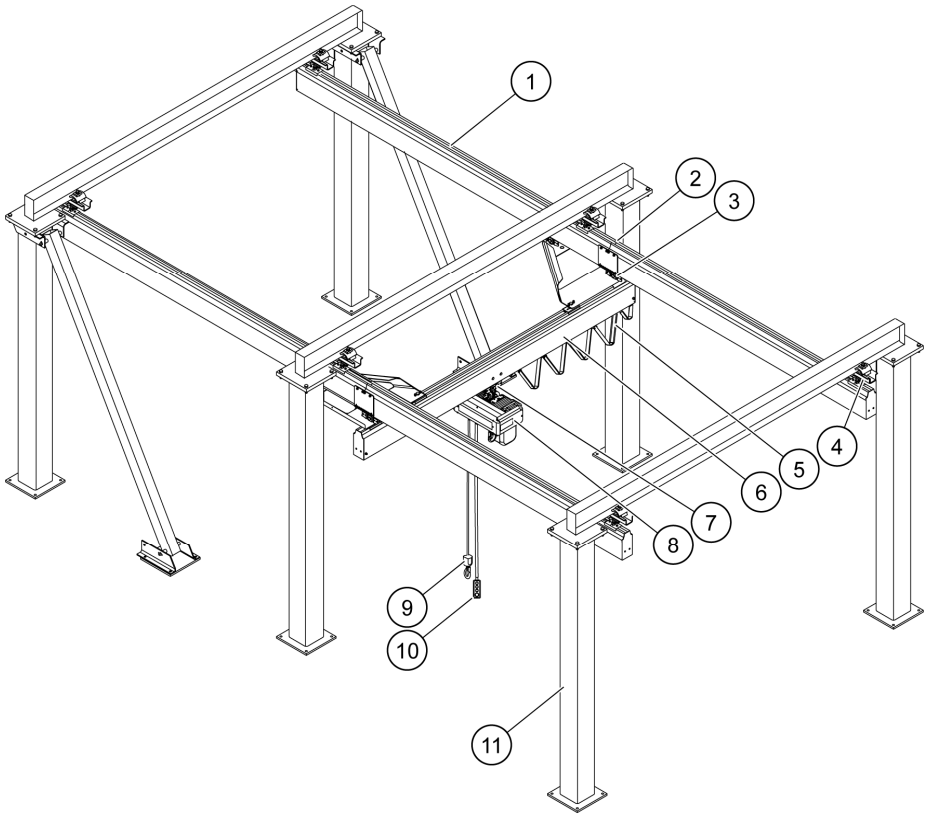
Light crane systems and monorails are built with modular components that require low maintenance. The fixing torque of bolted connection sets shall be checked periodically, similarly as the condition of safety components and wearing parts. The correct maintenance interval depends on the actual use of the crane, minimum once a year.

Inspection intervals

Utilization	Interval
Single shift usage	Every 12 months
Double shift usage	Every 8 months
Three shift usage	Every 6 months

Note: This table is a general guideline. The needed inspection interval can be shorter, depending on other factors, such as the environmental conditions. The instructions for proper maintenance are included in the (crane) Operator's manual.

Typical (but not limited to these points) **inspection points** are highlighted in the following illustration:



1	**Track** • Condition and shape of profile • Condition of driving surface • Locking and condition of end stops and end plate sets	**7**	**Push trolley for lifting device** • Locking clip of load shaft • Condition of wheels • Rotation of guiding wheels
2	**Connection set** • Tightening of bolts • Contact between the profiles	**8**	**Lifting device** • Function of safety equipment (for example, limit switches) • Tightening of lifting device suspension parts • Condition and shape of load chain or rope • Lubrication of load chain or rope • Overall condition of lifting device
3	**Crane bridge trolley** • Locking clip of load shaft • Condition of wheels • Rotation of guiding wheels • Tightening of crane bridge suspension bolts • Condition of crane bridge suspension eye	**9**	**Load hook** • Condition and shape of load hook
4	**Suspension** • Safety pins • Tightening of nuts • Condition of suspension rod • Condition of upper and lower bearing parts • Shape of suspension profile	**10**	**Pendant controller** • Function and condition of push buttons • Function of emergency stop
5	**Power feeding system** • Condition of wheels • Fixing of cable/hose suspension • Tightening of wiring connections	**11**	**Supporting structure** • Tightening of fixing bolts • Overall condition
6	**Crane bridge** • Condition and shape of profile • Condition of driving surface • Locking and condition of end stops and end plate sets		

2.4.5 Other relevant documents

Other documents related to the complete product selection and/or delivery are, for example:

- Crane operator's manual
- Assembly instruction for crane
- Spare part catalogue
- Technical guide for the selected lifting device
- Owner's manual for the selected lifting device
- Installation manual for the selected lifting device
- User instructions for sales configurator.

3 PRODUCT RANGE

3.1 Environmental conditions

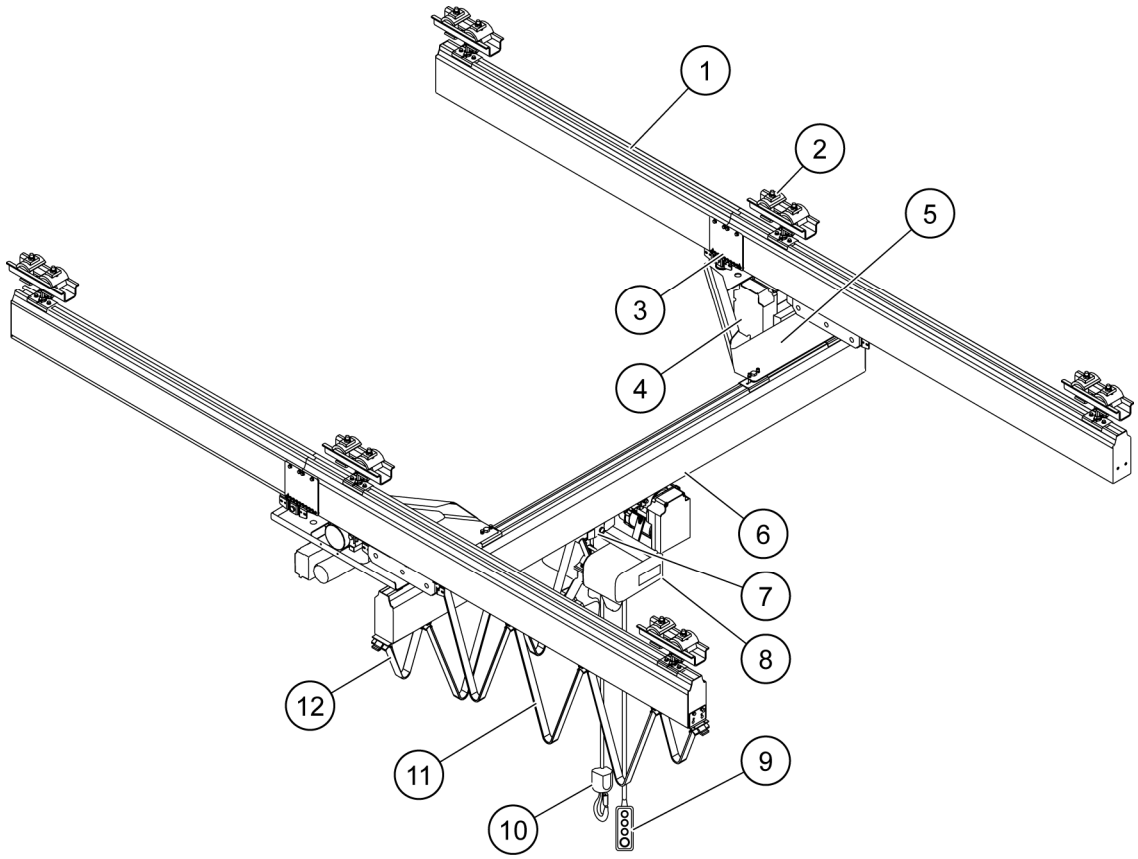
This product is designed for indoor use in typical industrial environments. Typical customer segments are, for example, automotive industry and general manufacturing.

- Rated capacity range is up to 2000 kg.
- Temperature range is -10℃…+40℃
- Atmospheric corrosivity category is C2 according to EN ISO 12944-2.

Note: This document does not include the products for Hazardous Environments (explosive atmosphere).

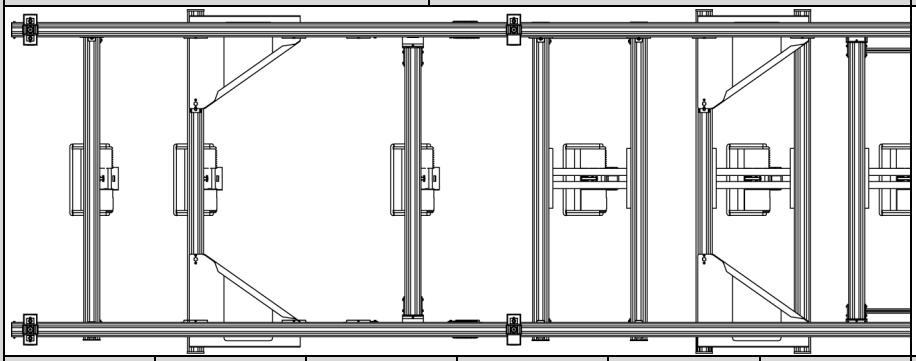
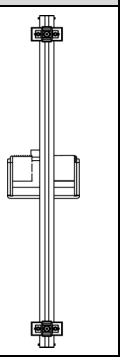
3.2 Aluminum crane kit at a glance

An aluminum crane kit is built with the following components:



Pos.	Component	Scope of the crane kit
1	Track profile and end stops and end plate sets	Yes
2	Suspension	Yes
3	Connection set	Yes
4	Motor trolley	Yes
5	Crane bridge kit (single girder rigid in the example)	Yes
6	Crane bridge profile	Yes
7	Push trolley	Yes
8	Lifting device	No
9	Pendant controller	No
10	Hook	No
11	Power supply for track (flat cable in the example)	Yes
12	Power supply for crane bridge (flat cable in the example)	Yes

Compatibility matrix: crane system / lifting device

Crane bridge type		Single girder			Double girder			Monorail
								
		Articulated	Rigid	Low headroom	Articulated (*)	Rigid	Low headroom	Monorail
Maximum rated capacity [kg]		2000	2000	2000	2000 (1000)*	2000	2000	2000
Traveling motors	Lifting device	OK	OK	OK	OK (n/a)*	OK	OK	OK
	Crane bridge	n/a	OK	OK	n/a (n/a)*	OK	OK	n/a
Lifting device	ECH	OK	OK	OK	OK (option)*	OK	OK	OK
	ATB	OK	OK	OK	Option (option)*	Option	Option	OK
	HCB	OK	OK	OK	Option (option)*	Option	Option	OK
	BH	Option	Option	Option	Option (option)*	Option	Option	Option

*Articulated plate trolleys.

Abbreviations	
ECH	Electric chain hoist
ATB	Air balancer
HCB	Hand chain block (manual lifting equipment)
BH	Belt hoist
OK	Available as standard
n/a	Not available
Option	Special arrangement with the Sales Support team

Compatibility matrix: track size / crane bridge size

		Crane bridge profile				Crane bridge traveling motor	Crane bridge power supply (along the track)				
							Festoon		Enclosed conductor lines[1]		
		AL06	AL08	AL10	AL14	ALTM2	Cable support	Hose support	Akapp RC4	Vahle KBH[2]	Vahle MKH[2]
Track profile	AL06	OK	OK	OK	OK	n/a	OK	OK	n/a	OK	n/a
	AL08	OK	OK	OK	OK	n/a	OK	OK	n/a	OK	n/a
	AL10	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
	AL14	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Lifting device travel motor	ALTM2	n/a	n/a	OK	OK						
Lifting device power supply (along the crane bridge)	Festoon cable support	OK	OK	OK	OK						
	Festoon hose support	OK	OK	OK	OK						
	RC4/RC7	n/a	n/a	OK	OK						
	MKH	n/a	n/a	OK	OK						
	KBH	OK	OK	OK	OK						

[1] For details on enclosed conductor lines, see chapter Parallel enclosed conductors.

[2] The KBH and MKH products are available as options. Contact Sales Support team.

3.3 Suspended cranes (downward forces)

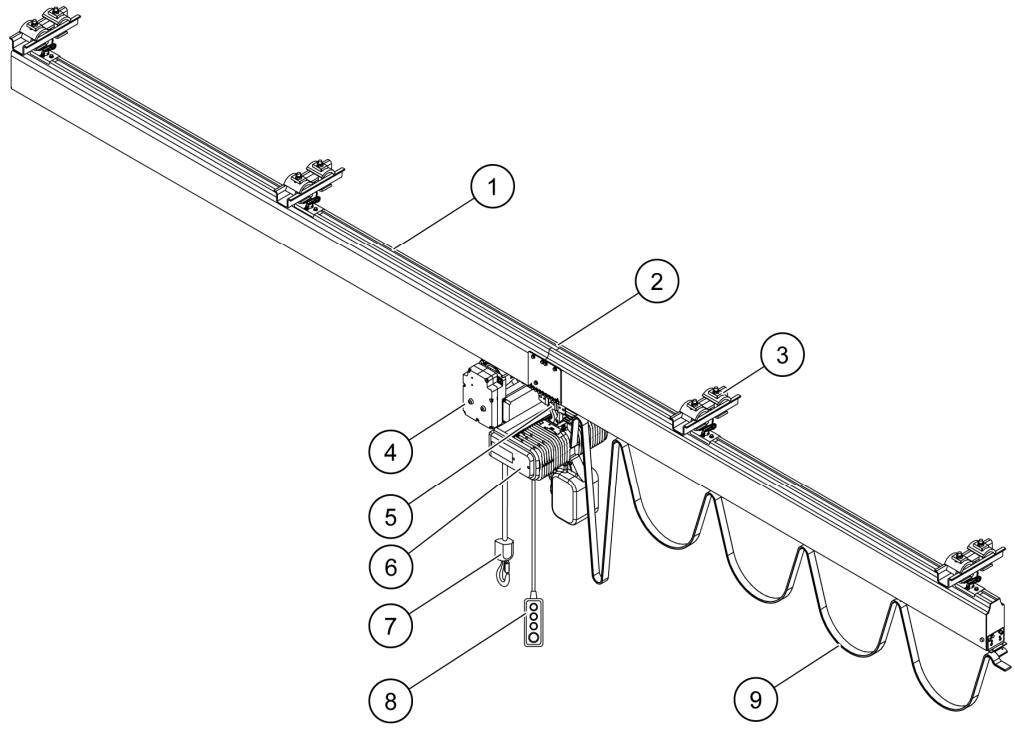
The cranes and monorails have typically only downward forces. With a telescopic construction, or a combination of long outreach, high capacity, short span, and/or integration of torque (vertical lifter), it is possible that also upward forces occur. This document covers the downward forces. For information about the upward forces, contact the Sales Support team.

3.3.1 Monorail

A monorail crane is used for linear transport of material. Restrictions in the lateral movement of some lifting devices can cause side-pulling. If a lateral movement beyond the limitations is required, for example, for assembly type of work, a more suitable girder crane type can be selected instead.

The length of a monorail is limited by the power supply and heat expansion; the maximum value is set at 100 m for the standard application.

For information on the optional double monorail configuration, contact the Sales Support team.



Pos.	Part	Description
1	Monorail track	The lifting device moves along the monorail track.
2	Connection set	The track segments are connected to each other to form the track.
3	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
4	Motor trolley	The motor trolley is used where motorized movement of the lifting device is required.
5	Push trolley	The lifting device is mounted on trolleys which run inside the track profile.
6	Lifting device	The lifting device lifts and lowers the load.
7	Hook	The hook is used to attach the load for lifting.
8	Pendant controller	The lifting device is operated using the pendant controller.
9	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).

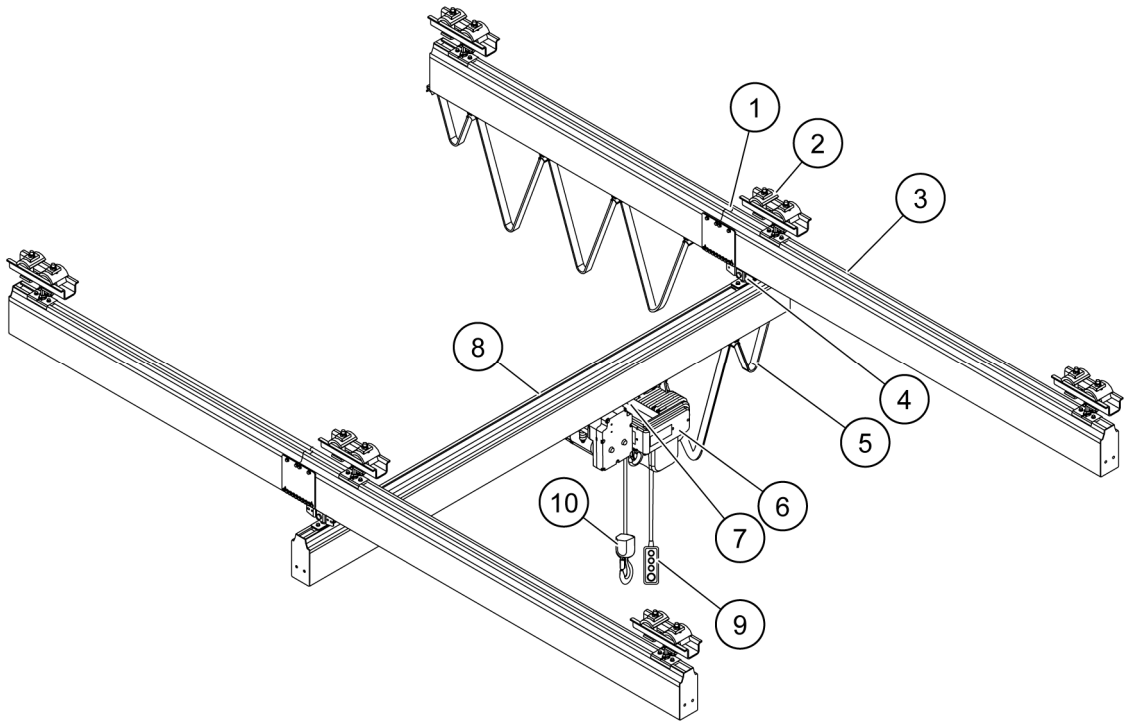
3.3.2 Single girder articulated crane bridge

The girder cranes are used for two-dimensional traveling. The articulated crane is recommended for manually operated crane bridge motions.

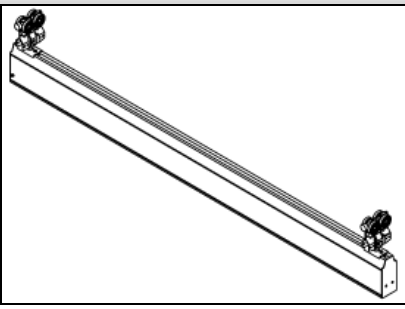
The cranes with a single girder articulated crane bridge are very light and efficient tools for assembly work with manual movement. The crane bridge suspension allows the crane bridge to skew while pulling it along the track, which, combined with the lowest dead weight, reduces efforts to move the load.

The articulated crane construction does not allow traveling motors for crane bridge travel, but a rigid or low headroom construction can be used instead.

If the crane span is more than 6 m, the increased skewing effect can affect the performance of the crane.



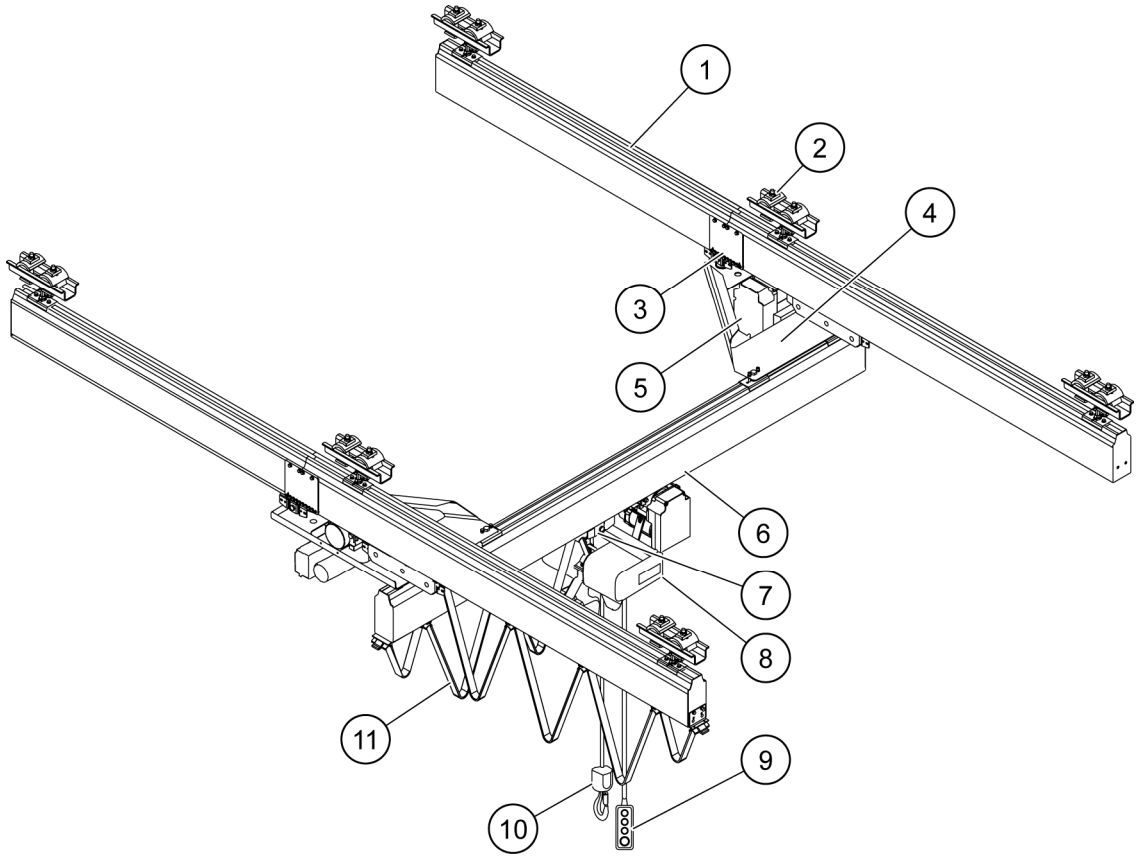
Pos.	Part	Description
1	Connection set	The profiles are connected to each other to form the track.
2	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
3	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
4	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profile.
5	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).
6	Lifting device	The lifting device lifts and lowers the load.
7	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
8	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
9	Pendant controller	The crane is operated using the pendant controller.
10	Hook	The hook is used to attach the load for lifting.

Bridge kit contents	
• Push trolleys (2) • Bridge suspensions (2) • End plate sets (2) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

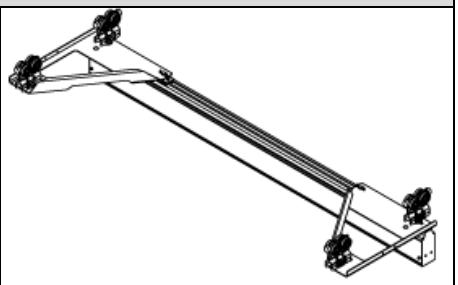
3.3.3 Single girder rigid crane bridge

The cranes with a single girder rigid crane bridge are suitable for both manual and motorized use. The triangle pieces keep the crane bridge always fully perpendicular to the track, and allow for a crane bridge length up to 8 m (maximum length of the aluminum profile). As the recommended solution for the motorized crane bridge motion, the single girder rigid crane bridge is available as the AL10 and AL14 profiles. To optimize the bridge approach, the crane bridge motor trolleys can be installed inside the triangle plates.

Due to the size of the triangle pieces, the minimum span is 2 m.



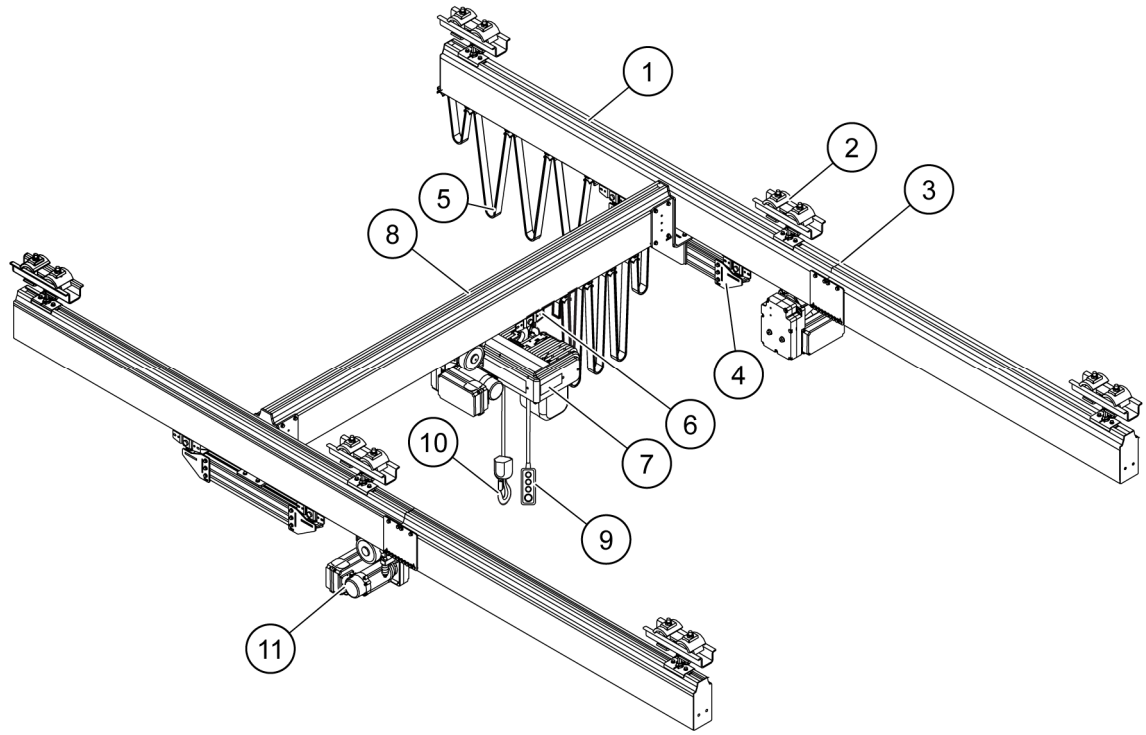
Pos.	Part	Description
1	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
2	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
3	Connection set	The profiles are connected to each other to form the tracks.
4	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profiles.
5	Motor trolley	The motor trolley is used where horizontal motorized movement of the crane bridge or lifting device is required.
6	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
7	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
8	Lifting device	The lifting device lifts and lowers the load.
9	Pendant controller	The crane is operated using the pendant controller.
10	Hook	The hook is used to attach the load for lifting.
11	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).

Bridge kit contents	
• Push trolleys (4) • Triangle kits (2) • End plate sets (2) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

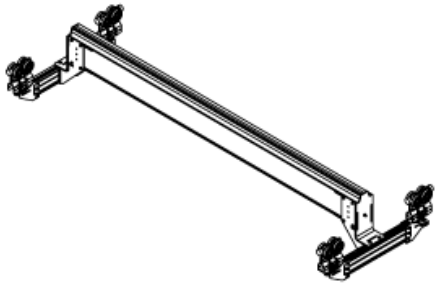
3.3.4 Single girder low headroom crane bridge

The low headroom construction reduces the total height of the system significantly, and therefore increases the hook stroke. The low headroom construction keeps the crane bridge always fully perpendicular to the track, and prevents any skewing effect. It also allows for longer spans than the articulated or rigid ones. In this configuration, there is no crane bridge outreach.

The minimum span is 1000 mm.



Pos.	Part	Description
1	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
2	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
3	Connection set	The profiles are connected to each other to form the tracks.
4	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profiles.
5	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).
6	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
7	Lifting device	The lifting device lifts and lowers the load.
8	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
9	Pendant controller	The crane is operated using the pendant controller.
10	Hook	The hook is used to attach the load for lifting.
11	Motor trolley	The motor trolley is used where horizontal motorized movement of the crane bridge or lifting device is required.

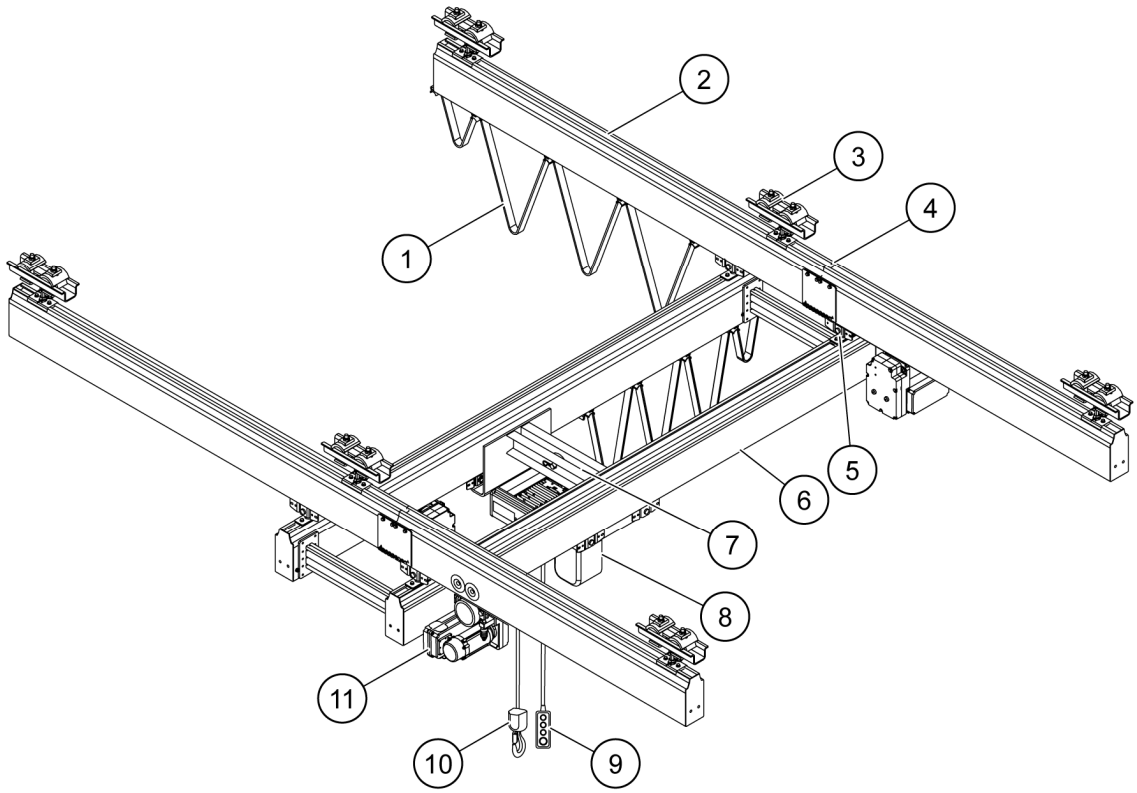
Bridge kit contents	
• Push trolleys (4) • Low headroom supports (2) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

3.3.5 Double girder articulated crane bridge

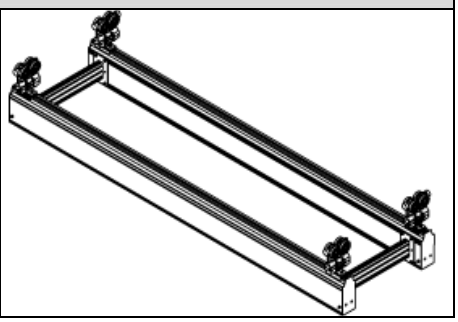
A crane with a double girder articulated crane bridge allows for a longer span and/or higher loads than a single girder crane. It also provides improved headroom as the push trolley is located between the girders. The articulated crane is recommended for manually operated crane bridge motions.

The maximum length of the crane bridge is limited by the load, the B dimension of the crane bridge profile, or the outreach. Only one connection per crane bridge profile is allowed.

The recommended minimum span is 600 mm for the AL06 and AL08 crane bridges and 700 mm for the AL10 and AL14 crane bridges.



Pos.	Part	Description
1	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).
2	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
3	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
4	Connection set	The profiles are connected to each other to form the track or crane bridge.
5	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profiles.
6	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
7	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
8	Lifting device	The lifting device lifts and lowers the load.
9	Pendant controller	The crane is operated using the pendant controller.
10	Hook	The hook is used to attach the load for lifting.
11	Motor trolley	The motor trolley is used where motorized movement of the crane bridge or lifting device is required.

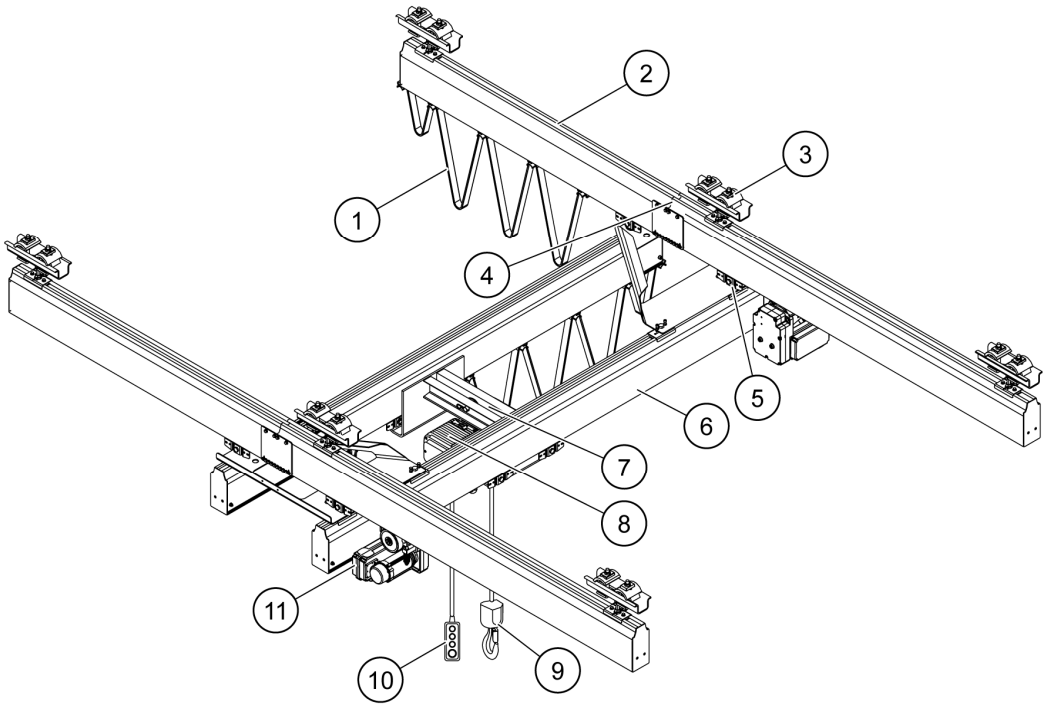
Bridge kit contents	
• Push trolleys (4) • Bridge suspensions (4) • Connection beams (2) • End plate sets (4) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

3.3.6 Double girder rigid crane bridge

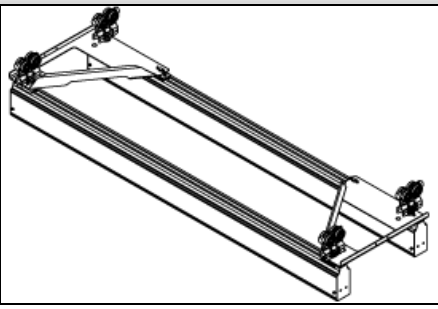
A crane with a double girder rigid crane bridge is suitable for both manual and motorized use. The triangle pieces keep the crane bridge always fully perpendicular to the track. As the recommended solution for motorized crane bridge motion, the double girder rigid crane bridge is available as the AL10 and AL14 profiles. To optimize the bridge approach, the crane bridge motor trolleys can be installed inside the triangle plates.

Due to the size of the triangle pieces, the minimum span is 2 m.

The maximum length of the crane bridge is limited by the load, the B dimension of the crane bridge profile, or the outreach. Only one connection per crane bridge profile is allowed.



Pos.	Part	Description
1	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).
2	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
3	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
4	Connection set	The profiles are connected to each other to form the track or crane bridge.
5	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profile.
6	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
7	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
8	Lifting device	The lifting device lifts and lowers the load.
9	Hook	The hook is used to attach the load for lifting.
10	Pendant controller	The crane is operated using the pendant controller.
11	Motor trolley	The motor trolley is used where motorized movement of the crane bridge or lifting device is required.

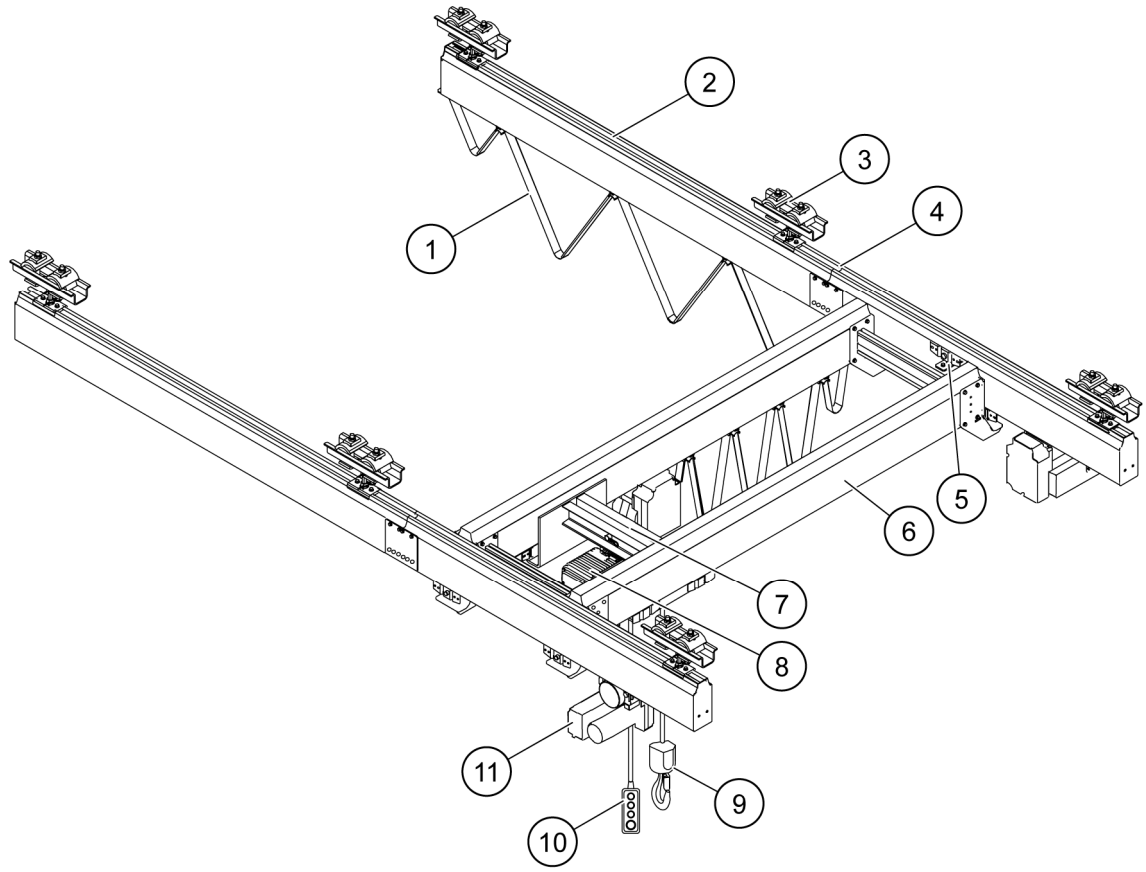
Bridge kit contents	
• Push trolleys (4) • Triangle kits (2) • End plate sets (4) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

3.3.7 Double girder low headroom crane bridge

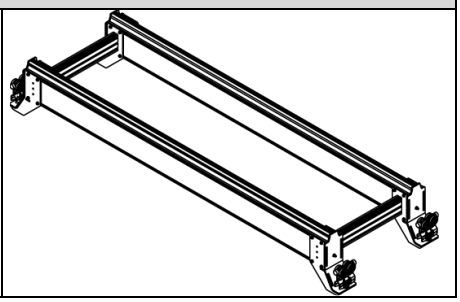
The double girder low headroom crane bridge is is the most compact crane solution, providing a very low headroom and the maximum possible hook stroke.

The low headroom construction allows for longer spans than the articulated or rigid ones. In this configuration, there is no crane bridge outreach.

The minimum span is 1000 mm.



Pos.	Part	Description
1	Power feeding system	The power feeding systems supplies power to the lifting device and motor trolley (if equipped).
2	Track	An overhead track is made up of profiles and is used for the crane bridge to move along its length.
3	Suspension	The crane can be suspended off the ceiling or other overhead structure from support brackets.
4	Connection set	The profiles are connected to each other to form the track or crane bridge.
5	Crane bridge trolley	The crane bridge is mounted on trolleys which run inside the track profile.
6	Crane bridge	The crane bridge is also made up of profiles and is used for the lifting device to move along its length.
7	Push trolley	The lifting device is mounted on trolleys which run inside the crane bridge profile.
8	Lifting device	The lifting device lifts and lowers the load.
9	Hook	The hook is used to attach the load for lifting.
10	Pendant controller	The crane is operated using the pendant controller.
11	Motor trolley	The motor trolley is used where motorized movement of the crane bridge or lifting device is required.

Bridge kit contents	
• Push trolleys (4) • Low headroom supports (2) **Note**: Profiles are not included in the bridge kit, they are selected separately.	

3.4 Advanced suspended cranes

3.4.1 Long outreach crane bridges

Due to its light weight, the aluminum crane bridge loses balance when the load is suspended outside of the track. However, it is possible to extend the girder of articulated and rigid crane bridges for festoon storage area. This possibility is limited by the maximal length of the profiles, as no connection is allowed on single girder crane bridges.

For more information about this option, contact the Sales Support team.

3.4.2 Telescopic crane bridges

The telescopic crane allows a greater outreach through a second girder moving under the main girder crane. This solution can be required when it is not possible to place the track above the lifting or lowering position of the load. The purpose of the solution is to lift or lower the load out of the span. The load must be moved inside the span area to allow a long travel.

For more information about this option, contact the Sales Support team.

3.4.3 Extended cross travel crane bridges

When very long travel is required for the crane bridge, specific arrangements with three tracks are possible. In this case, rigid motorized crane bridges are mandatory.

For more information about this option, contact the Sales Support team.

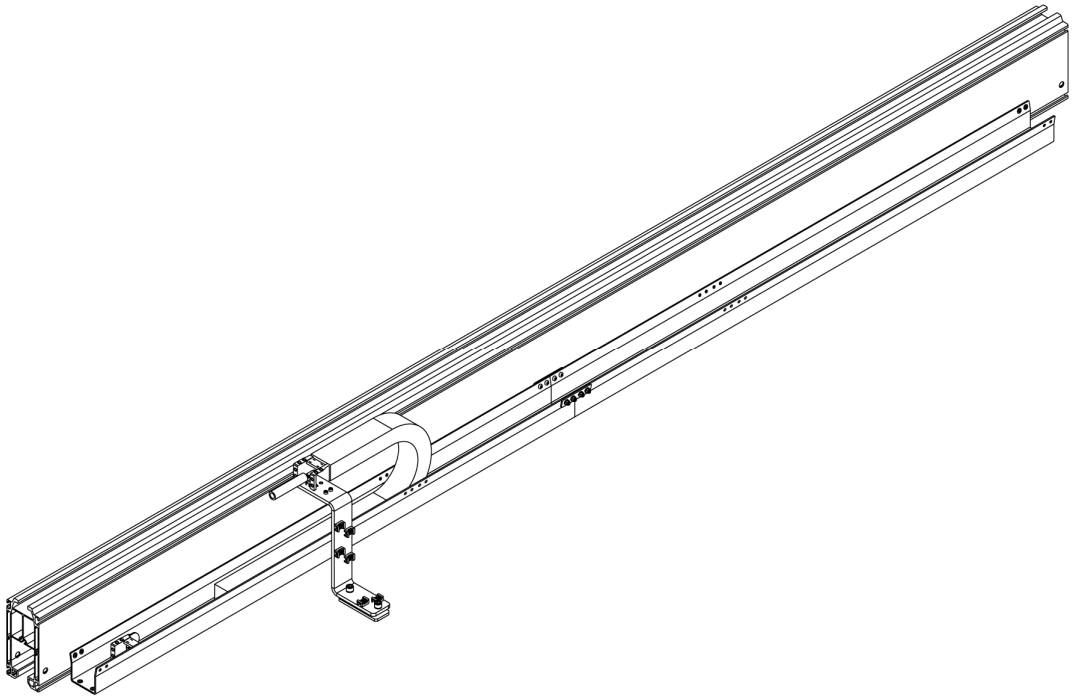
3.4.4 Buffer extension and distance trolleys

In a light crane system with multiple crane bridges, it may be necessary ensure a minimum distance between bridges. This is done to prevent collisions between hoists and to avoid overloading the track and suspensions. Predefined buffer extensions and distance trolleys allow for modularity and easy installation without impairing the ability of the crane bridges to cover the largest possible area.

For more information about this option, contact the Sales Support team.

3.4.5 Energy chain power supply

The standard power supply method is either the festoon cable under the profile or the parallel enclosed conductor line. As an option, the power supply can be provided with the energy chain beside the profile.



For more information about this option, contact the Sales Support team.

4 LIGHT CRANE SYSTEM CONFIGURATION

4.1 Selection of crane type

The following table summarizes the main criteria to take into account when selecting the crane type and crane bridge construction:

Selection criteria		Single girder crane bridge			Double girder crane bridge			Monorail
		Articulated	Rigid	Low headroom	Articulated	Rigid	Low headroom	
Transportation method	**Linear**	+	+	+	+	+	+	++
	2-dimensional	++	++	++	++	++	++	n/a
Rated capacity [kg]	**63–1250**	++	++	++	+	+	+	++
	1250–2000	+	+	+	++	++	++	+
Span	**< 6 m**	++	+	+	+	+	+	n/a
	> 6 m	+	++	+	+	+	+	n/a
Position of load on crane bridge during crane bridge travel	**In between track profiles**	++	+	+	+	+	+	n/a
	In outreach area	+	++[1)]	n/a	+	++	n/a	n/a
Limited height		n/a	n/a	++	+	+	++	n/a

[1)]Especially, when the parallel enclosed conductors are used along the track, to optimize the movements of the crane bridge.

Explanations	
++	Recommended
+	Possible
n/a	Not applicable

4.2 Quick selection

The quick selection helps to determine quickly the required profile sizes for the crane.

Note: The results of the quick selection must be evaluated with the sales configurator.

Note: The quick selection tables and the graphs for determining the rail type do not take into account an outreach that is longer than 100 mm. This means that the load is always located between the track profiles.

The outreach can be extended, for example, for storing the festoon trolleys. See chapter Festoon under profile for the calculation of the number of the festoon trolleys required.

For longer load-supporting outreaches, contact the Sales Support team.

Note: For limitations on the hook approach, see the following chapters of this document:

- Chapter Crane dimensions for the minimum distance between the hook and the end of the rail.
- Chapter Energy supply for the details regarding the space requirements for the energy supply.

A predetermined lifting device weight has been taken into account when the measurements were calculated. If a different lifting device weight or crane span is needed, the detailed calculations in the following chapter must be executed.

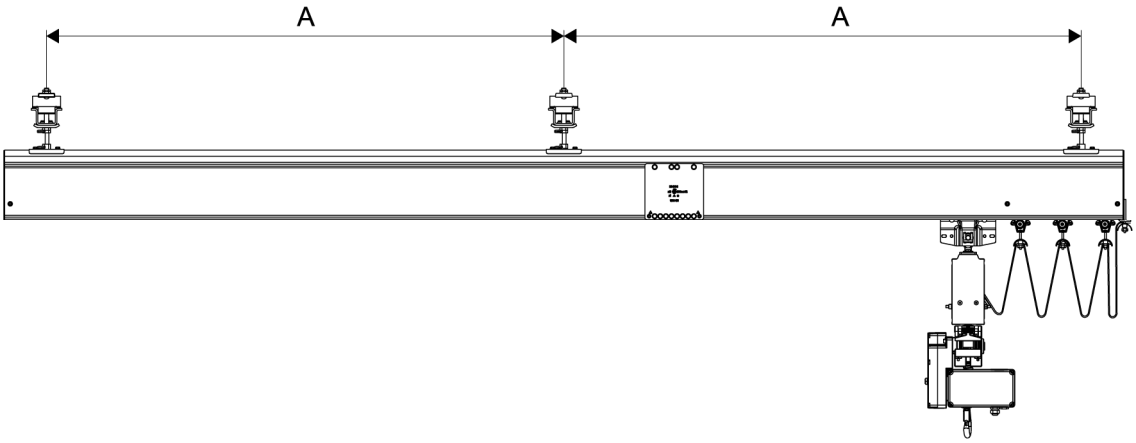
All given values are maximum values, and are given in millimeters (mm). The deflection criteria used is L/500.

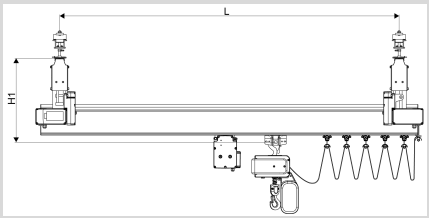
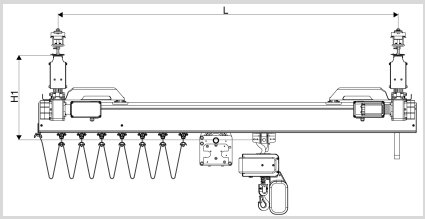
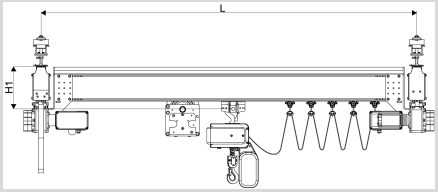
The quick selection tables and graphs are applicable to single bridge configurations. For configurations with multiple bridges, contact the Sales Support team.

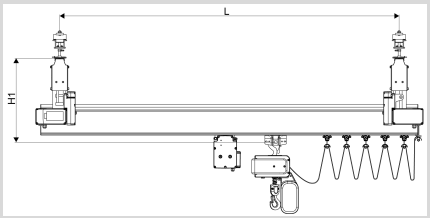
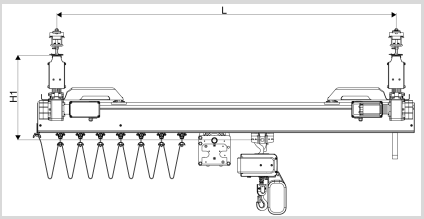
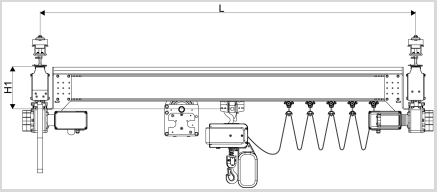
Single girder crane bridges

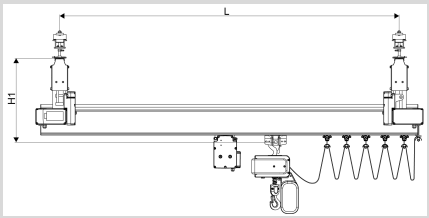
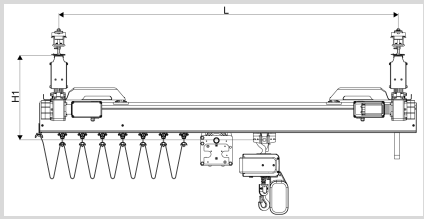
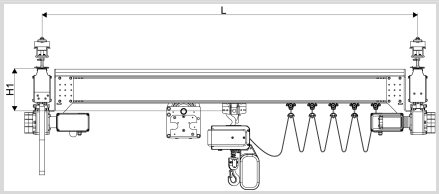
The following abbreviations are used in the quick selection table:

L_{max}	Span: maximum distance between tracks
A_{max}	Maximum distance between suspensions on the track
H1	**H1 = H_T + H_B** H_T Height of track (between top of track profile and top of crane bridge profile) H_B Height of the crane bridge/monorail (between top of crane bridge / monorail profile and top of push trolley bolt)



Single girder articulated						Single girder rigid						Single girder low headroom					
																	
Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1
Rated capacity 63 kg, lifting device weight 30 kg																	
5390	AL06	**4970**	AL06	AL06B110	405.5	n/a						**5590**	AL06	**4830**	AL06	AL06B160	174.5
		7360	AL08	AL06B110	455.5									**7190**	AL08	AL06B160	224.5
		8000	AL10	AL06B115	498									**8000**	AL10	AL06B165	267
		8000	AL14	AL06B115	529									**8000**	AL14	AL06B165	298
7800	AL08	**4710**	AL06	AL08B110	455							**8070**	AL08	**4520**	AL06	AL08B160	180
		7040	AL08	AL08B110	505									**6780**	AL08	AL08B160	230
		8000	AL10	AL08B115	547.5									**8000**	AL10	AL08B165	272.5
		8000	AL14	AL08B115	578.5									**8000**	AL14	AL08B165	303.5
7800	AL10	**8000**	AL10	AL10B110	590.5	**7800**	AL10	**7820**	AL10	AL10B130	600.5	**8200**	AL10	**7800**	AL10	AL10B160	270.5
		8000	AL14	AL10B110	621.5			**8000**	AL14	AL10B130	631.5			**8000**	AL14	AL10B160	301.5
7800	AL14	**7850**	AL10	AL14B110	621.5	**7800**	AL14	**7590**	AL10	AL14B130	631.5	**8200**	AL14	**7570**	AL10	AL14B160	271.5
		8000	AL14	AL14B110	652.5			**8000**	AL14	AL14B130	662.5			**8000**	AL14	AL14B160	302.5
Rated capacity 80 kg, lifting device weight 30 kg																	
5060	AL06	**4720**	AL06	AL06B110	405.5	n/a						**5260**	AL06	**4620**	AL06	AL06B160	174.5
		7050	AL08	AL06B110	455.5									**6910**	AL08	AL06B160	224.5
		8000	AL10	AL06B115	498									**8000**	AL10	AL06B165	267
		8000	AL14	AL06B115	529									**8000**	AL14	AL06B165	298
7480	AL08	**4500**	AL06	AL08B110	455							**7680**	AL08	**4340**	AL06	AL08B160	180
		6770	AL08	AL08B110	505									**6550**	AL08	AL08B160	230
		8000	AL10	AL08B115	547.5									**7790**	AL10	AL08B165	272.5
		8000	AL14	AL08B115	578.5									**8000**	AL14	AL08B165	303.5
7800	AL10	**4340**	AL06	AL10B115	498							n/a					
		6550	AL08	AL10B115	548												
		7820	AL10	AL10B110	590.5	**7800**	AL10	**7560**	AL10	AL10B130	600.5	**8200**	AL10	**7550**	AL10	AL10B160	270.5
		8000	AL14	AL10B110	621.5			**8000**	AL14	AL10B130	631.5			**8000**	AL14	AL10B160	301.5
7800	AL14	**4170**	AL06	AL14B115	529	n/a						n/a					
		6330	AL08	AL14B115	579												
		7590	AL10	AL14B110	621.5	**7800**	AL14	**7350**	AL10	AL14B130	631.5	**8200**	AL14	**7340**	AL10	AL14B160	271.5
		8000	AL14	AL14B110	652.5			**8000**	AL14	AL14B130	662.5			**8000**	AL14	AL14B160	302.5
Rated capacity 125 kg, lifting device weight 30 kg																	
4410	AL06	**4200**	AL06	AL06B110	405.5	n/a						**4610**	AL06	**4150**	AL06	AL06B160	174.5
		6370	AL08	AL06B110	455.5									**6300**	AL08	AL06B160	224.5
		7600	AL10	AL06B115	498									**7520**	AL10	AL06B165	267
		8000	AL14	AL06B115	529									**8000**	AL14	AL06B165	298
6650	AL08	**4050**	AL06	AL08B110	455							**6850**	AL08	**3950**	AL06	AL08B160	180
		6170	AL08	AL08B110	505									**6020**	AL08	AL08B160	230
		7380	AL10	AL08B115	547.5									**7220**	AL10	AL08B165	272.5
		8000	AL14	AL08B115	578.5									**8000**	AL14	AL08B165	303.5
7800	AL10	**3900**	AL06	AL10B115	498							n/a					
		5950	AL08	AL10B115	548												
		7180	AL10	AL10B110	590.5	**7800**	AL10	**6980**	AL10	AL10B130	600.5	**8120**	AL10	**6980**	AL10	AL10B160	270.5
		8000	AL14	AL10B110	621.5			**8000**	AL14	AL10B130	631.5			**8000**	AL14	AL10B160	301.5
7800	AL14	**3780**	AL06	AL14B115	529	n/a						n/a					
		5790	AL08	AL14B115	579												
		7000	AL10	AL14B110	621.5	**7800**	AL14	**6810**	AL10	AL14B130	631.5	**8200**	AL14	**6810**	AL10	AL14B160	271.5
		8000	AL14	AL14B110	652.5			**8000**	AL14	AL14B130	662.5			**8000**	AL14	AL14B160	302.5

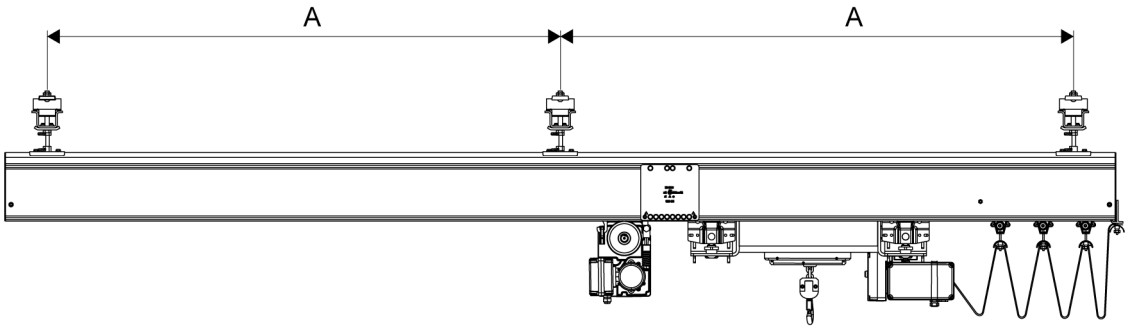
Single girder articulated						Single girder rigid						Single girder low headroom					
																	
Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1
Rated capacity 160 kg, lifting device weight 30 kg																	
4040	AL06	**3890**	AL06	AL06B110	405.5	n/a						**4240**	AL06	**3870**	AL06	AL06B160	174.5
		5940	AL08	AL06B110	455.5									**5910**	AL08	AL06B160	224.5
		7140	AL10	AL06B115	498									**7110**	AL10	AL06B165	267
		8000	AL14	AL06B115	529									**8000**	AL14	AL06B165	298
6150	AL08	**3780**	AL06	AL08B110	455							**6350**	AL08	**3700**	AL06	AL08B160	180
		5790	AL08	AL08B110	505									**5680**	AL08	AL08B160	230
		6970	AL10	AL08B115	547.5									**6850**	AL10	AL08B165	272.5
		8000	AL14	AL08B115	578.5									**8000**	AL14	AL08B165	303.5
7400	AL10	**3650**	AL06	AL10B115	498							n/a					
		5610	AL08	AL10B115	548												
		6800	AL10	AL10B110	590.5	**7400**	AL10	**6620**	AL10	AL10B130	600.5	**7600**	AL10	**6640**	AL10	AL10B160	270.5
		8000	AL14	AL10B110	621.5			**8000**	AL14	AL10B130	631.5			**8000**	AL14	AL10B160	301.5
7800	AL14	**3540**	AL06	AL14B115	529	n/a						n/a					
		5440	AL08	AL14B115	579												
		6620	AL10	AL14B110	621.5	**7800**	AL14	**6450**	AL10	AL14B130	631.5	**8200**	AL14	**6460**	AL10	AL14B160	271.5
		8000	AL14	AL14B110	652.5			**8000**	AL14	AL14B130	662.5			**8000**	AL14	AL14B160	302.5
Rated capacity 250 kg, lifting device weight 30 kg																	
3390	AL06	**3320**	AL06	AL06B110	405.5	n/a						**3590**	AL06	**3340**	AL06	AL06B160	174.5
		5130	AL08	AL06B110	455.5									**5160**	AL08	AL06B160	224.5
		6240	AL10	AL06B115	498									**6270**	AL10	AL06B165	267
		7900	AL14	AL06B115	529									**7930**	AL14	AL06B165	298
5240	AL08	**3250**	AL06	AL08B110	455							**5440**	AL08	**3220**	AL06	AL08B160	180
		5040	AL08	AL08B110	505									**4990**	AL08	AL08B160	230
		6140	AL10	AL08B115	547.5									**6080**	AL10	AL08B165	272.5
		7770	AL14	AL08B115	578.5									**7720**	AL14	AL08B165	303.5
6380	AL10	**3180**	AL06	AL10B115	498							n/a					
		4930	AL08	AL10B115	548												
		6030	AL10	AL10B110	590.5	**6380**	AL10	**5900**	AL10	AL10B130	600.5	**6580**	AL10	**5940**	AL10	AL10B160	270.5
		7650	AL14	AL10B110	621.5			**7500**	AL14	AL10B130	631.5			**7550**	AL14	AL10B160	301.5
7800	AL14	**3080**	AL06	AL14B115	529	n/a						n/a					
		4780	AL08	AL14B115	579												
		5850	AL10	AL14B110	621.5	**7800**	AL14	**5740**	AL10	AL14B130	631.5	**8200**	AL14	**5760**	AL10	AL14B160	271.5
		7450	AL14	AL14B110	652.5			**7320**	AL14	AL14B130	662.5			**7340**	AL14	AL14B160	302.5
Rated capacity 320 kg, lifting device weight 35 kg																	
3040	AL06	**2990**	AL06	AL06B110	405.5	n/a						**3240**	AL06	**3030**	AL06	AL06B160	174.5
		4650	AL08	AL06B110	455.5									**4710**	AL08	AL06B160	224.5
		5690	AL10	AL06B115	498									**5760**	AL10	AL06B165	267
		7270	AL14	AL06B115	529									**7350**	AL14	AL06B165	298
4720	AL08	**2950**	AL06	AL08B110	455							**4920**	AL08	**2940**	AL06	AL08B160	180
		4590	AL08	AL08B110	505									**4570**	AL08	AL08B160	230
		5620	AL10	AL08B115	547.5									**5600**	AL10	AL08B165	272.5
		7180	AL14	AL08B115	578.5									**7160**	AL14	AL08B165	303.5
5790	AL10	**2890**	AL06	AL10B115	498							n/a					
		4510	AL08	AL10B115	548												
		5540	AL10	AL10B110	590.5	**5790**	AL10	**5440**	AL10	AL10B130	600.5	**5990**	AL10	**5490**	AL10	AL10B160	270.5
		7080	AL14	AL10B110	621.5			**6970**	AL14	AL10B130	631.5			**7030**	AL14	AL10B160	301.5
7370	AL14	**2810**	AL06	AL14B115	529												
		4390	AL08	AL14B115	579												
		5400	AL10	AL14B110	621.5	**7370**	AL14	**5310**	AL10	AL14B130	631.5	**7570**	AL14	**5350**	AL10	AL14B160	271.5
		6920	AL14	AL14B110	652.5			**6810**	AL14	AL14B130	662.5			**6860**	AL14	AL14B160	302.5

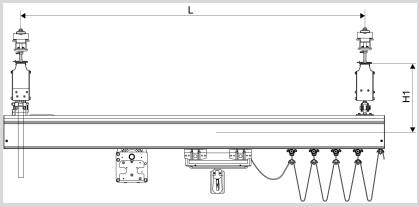
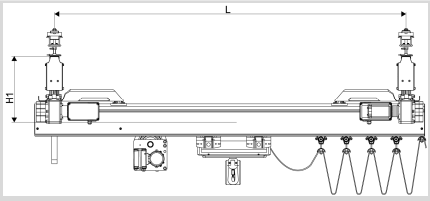
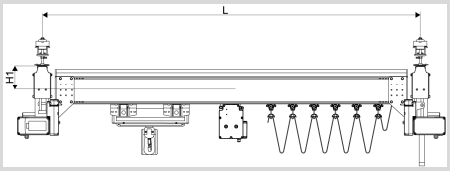
Single girder articulated						Single girder rigid						Single girder low headroom					
																	
Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1	L max.	Profile	A max.	Profile	Bridge kit	H1
Rated capacity 500 kg, lifting device weight 35 kg																	
2500	AL06	**2480**	AL06	AL06B110	405.5	n/a						**2700**	AL06	**2550**	AL06	AL06B160	174.5
		3890	AL08	AL06B110	455.5									**3980**	AL08	AL06B160	224.5
		4790	AL10	AL06B115	498									**4910**	AL10	AL06B165	267
		6190	AL14	AL06B115	529									**6330**	AL14	AL06B165	298
3910	AL08	**2460**	AL06	AL08B110	455							**4110**	AL08	**2480**	AL06	AL08B160	180
		3850	AL08	AL08B110	505									**3880**	AL08	AL08B160	230
		4750	AL10	AL08B115	547.5									**4780**	AL10	AL08B165	272.5
		6140	AL14	AL08B115	578.5									**6180**	AL14	AL08B165	303.5
4830	AL10	**2430**	AL06	AL10B115	498							n/a					
		3810	AL08	AL10B115	548												
		4710	AL10	AL10B110	590.5	**4830**	AL10	**4640**	AL10	AL10B130	600.5	**5030**	AL10	**4710**	AL10	AL10B160	270.5
		6090	AL14	AL10B110	621.5			**6010**	AL14	AL10B130	631.5			**6090**	AL14	AL10B160	301.5
6240	AL14	**2390**	AL06	AL14B115	529	n/a						n/a					
		3740	AL08	AL14B115	579												
		4630	AL10	AL14B110	621.5	**6240**	AL14	**4570**	AL10	AL14B130	631.5	**6440**	AL14	**4620**	AL10	AL14B160	271.5
		5990	AL14	AL14B110	652.5			**5920**	AL14	AL14B130	662.5			**5980**	AL14	AL14B160	302.5
Rated capacity 630 kg, lifting device weight 35 kg																	
4370	AL10	**4290**	AL10	AL10B110	590.5	**4370**	AL10	**4240**	AL10	AL10B130	600.5	**4570**	AL10	**4320**	AL10	AL10B160	270.5
		5570	AL14	AL10B110	621.5			**5510**	AL14	AL10B130	631.5			**5600**	AL14	AL10B160	301.5
5670	AL14	**4230**	AL10	AL14B110	621.5	**5670**	AL14	**4190**	AL10	AL14B130	631.5	**5870**	AL14	**4240**	AL10	AL14B160	271.5
		5500	AL14	AL14B110	652.5			**5440**	AL14	AL14B130	662.5			**5510**	AL14	AL14B160	302.5
Rated capacity 800 kg, lifting device weight 60 kg																	
3870	AL10	**3820**	AL10	AL10B110	590.5	**3870**	AL10	**3790**	AL10	AL10B130	600.5	**4070**	AL10	**3870**	AL10	AL10B160	270.5
		4990	AL14	AL10B110	621.5			**4950**	AL14	AL10B130	631.5			**5050**	AL14	AL10B160	301.5
5040	AL14	**3790**	AL10	AL14B110	621.5	**5040**	AL14	**3750**	AL10	AL14B130	631.5	**5240**	AL14	**3810**	AL10	AL14B160	271.5
		4940	AL14	AL14B110	652.5			**4900**	AL14	AL14B130	662.5			**4980**	AL14	AL14B160	302.5
Rated capacity 1000 kg, lifting device weight 60 kg																	
3500	AL10	**3480**	AL10	AL10B110	590.5	**3500**	AL10	**3450**	AL10	AL10B130	600.5	**3700**	AL10	**3540**	AL10	AL10B160	270.5
		4550	AL14	AL10B110	621.5			**4510**	AL14	AL10B130	631.5			**4620**	AL14	AL10B160	301.5
4580	AL14	**3450**	AL10	AL14B110	621.5	**4580**	AL14	**3420**	AL10	AL14B130	631.5	**4780**	AL14	**3490**	AL10	AL14B160	271.5
		4510	AL14	AL14B110	652.5			**4480**	AL14	AL14B130	662.5			**4560**	AL14	AL14B160	302.5
Rated capacity 1250 kg, lifting device weight 60 kg																	
3150	AL10	**3230**	AL10	AL10B120	599	**3150**	AL10	**3210**	AL10	AL10B140	615.5	**3350**	AL10	**3300**	AL10	AL10B160	270.5
		4230	AL14	AL10B120	630			**4200**	AL14	AL10B140	646.5			**4320**	AL14	AL10B160	301.5
4130	AL14	**3180**	AL10	AL14B120	630	**4130**	AL14	**3160**	AL10	AL14B140	646.5	**4330**	AL14	**3230**	AL10	AL14B160	271.5
		4170	AL14	AL14B120	661			**4140**	AL14	AL14B140	677.5			**4230**	AL14	AL14B160	302.5
Rated capacity 1600 kg, lifting device weight 70 kg																	
2800	AL10	**2890**	AL10	AL10B120	599	**2800**	AL10	**2870**	AL10	AL10B140	615.5	**3000**	AL10	**2970**	AL10	AL10B160	270.5
		3790	AL14	AL10B120	630			**3770**	AL14	AL10B140	646.5			**3890**	AL14	AL10B160	301.5
3670	AL14	**2850**	AL10	AL14B120	630	**3670**	AL14	**2840**	AL10	AL14B140	646.5	**3870**	AL14	**2910**	AL10	AL14B160	271.5
		3740	AL14	AL14B120	661			**3720**	AL14	AL14B140	677.5			**3810**	AL14	AL14B160	302.5
Rated capacity 2000 kg, lifting device weight 70 kg																	
2520	AL10	**2620**	AL10	AL10B120	599	**2520**	AL10	**2610**	AL10	AL10B140	615.5	**2720**	AL10	**2700**	AL10	AL10B160	270.5
		3440	AL14	AL10B120	630			**3430**	AL14	AL10B140	646.5			**3550**	AL14	AL10B160	301.5
3310	AL14	**2580**	AL10	AL14B120	630	**3310**	AL14	**2570**	AL10	AL14B140	646.5	**3510**	AL14	**2640**	AL10	AL14B160	271.5
		3390	AL14	AL14B120	661			**3380**	AL14	AL14B140	677.5			**3470**	AL14	AL14B160	302.5

Double girder crane bridges

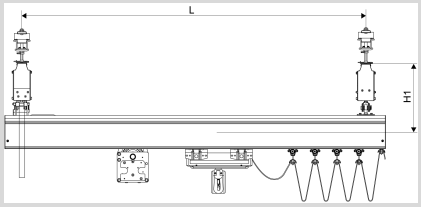
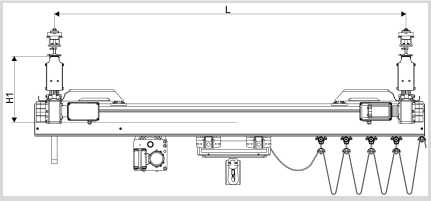
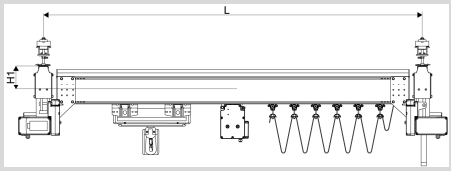
The following abbreviations are used in the quick selection table:

L_{max}	Span: maximum distance between tracks
A_{max}	Maximum distance between suspensions on the track
H1	**H1 = H_T + H_B** H_T Height of track (between top of track profile and top of crane bridge profile) H_B Height of the crane bridge / monorail (between top of crane bridge / monorail profile and top of push trolley bolt)

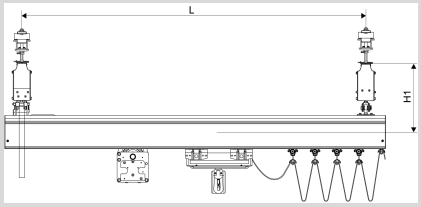
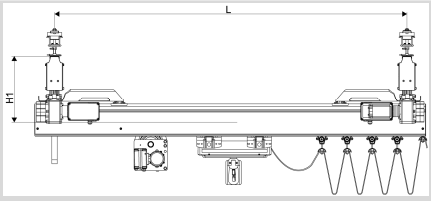
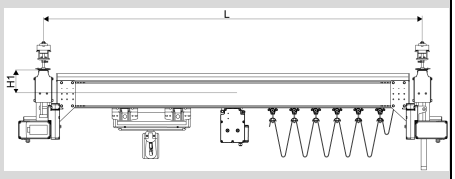


Double girder articulated	Double girder rigid	Double girder low headroom
		

Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**
Rated capacity 63 kg, lifting device weight 30 kg																	
6210	AL06	**4180**	AL06	AL06B210	215.5	n/a						**6410**	AL06	**4140**	AL06	AL06B260	-11
		6330	AL08	AL06B210	265.5									**6280**	AL08	AL06B260	39
		7510	AL10	AL06B215	308									**7450**	AL10	AL06B265	81.5
		8000	AL14	AL06B215	339									**8000**	AL14	AL06B265	112.5
8780	AL08	**3850**	AL06	AL08B210	265.5							**8980**	AL08	**3810**	AL06	AL08B260	-12.5
		5880	AL08	AL08B210	315.5									**5840**	AL08	AL08B260	38
		7040	AL10	AL08B215	358									**6990**	AL10	AL08B265	80.5
		8000	AL14	AL08B215	389									**8000**	AL14	AL08B265	111.5
8880	AL10	**3510**	AL06	AL10B215	331.5							n/a					
		5410	AL08	AL10B215	381.5												
		6560	AL10	AL10B210	424	**8880**	AL10	**6520**	AL10	AL10B230	434	**9080**	AL10	**6600**	AL10	AL10B260	96.5
		8000	AL14	AL10B210	455			**8000**	AL14	AL10B230	465			**8000**	AL14	AL10B260	127.5
9040	AL14	**3300**	AL06	AL14B215	362.5	n/a						n/a					
		5110	AL08	AL14B215	412.5												
		6230	AL10	AL14B210	455	**9040**	AL14	**6190**	AL10	AL14B230	465	**9240**	AL14	**6270**	AL10	AL14B260	113.5
		7880	AL14	AL14B210	486			**7840**	AL14	AL14B230	496			**7920**	AL14	AL14B260	144.5
Rated capacity 80 kg, lifting device weight 30 kg																	
5970	AL06	**4030**	AL06	AL06B210	215.5	n/a						**6170**	AL06	**4000**	AL06	AL06B260	-11
		6140	AL08	AL06B210	265.5									**6100**	AL08	AL06B260	39
		7300	AL10	AL06B215	308									**7260**	AL10	AL06B265	81.5
		8000	AL14	AL06B215	339									**8000**	AL14	AL06B265	112.5
8520	AL08	**3740**	AL06	AL08B210	265.5							**8720**	AL08	**3710**	AL06	AL08B260	-12.5
		5730	AL08	AL08B210	315.5									**5690**	AL08	AL08B260	38
		6870	AL10	AL08B215	358									**6830**	AL10	AL08B265	80.5
		8000	AL14	AL08B215	389									**8000**	AL14	AL08B265	111.5
8860	AL10	**3410**	AL06	AL10B215	331.5							n/a					
		5270	AL08	AL10B215	381.5												
		6410	AL10	AL10B210	424	**8860**	AL10	**6370**	AL10	AL10B230	434	**9060**	AL10	**6440**	AL10	AL10B260	96.5
		8000	AL14	AL10B210	455			**8000**	AL14	AL10B230	465			**8000**	AL14	AL10B260	127.5
9020	AL14	**3220**	AL06	AL14B215	362.5	n/a						n/a					
		4990	AL08	AL14B215	412.5												
		6100	AL10	AL14B210	455	**9020**	AL14	**6060**	AL10	AL14B230	465	**9220**	AL14	**6130**	AL10	AL14B260	113.5
		7730	AL14	AL14B210	486			**7690**	AL14	AL14B230	496			**7770**	AL14	AL14B260	144.5
Rated capacity 125 kg, lifting device weight 30 kg																	
5420	AL06	**3710**	AL06	AL06B210	215.5	n/a						**5620**	AL06	**3700**	AL06	AL06B260	-11
		5680	AL08	AL06B210	265.5									**5670**	AL08	AL06B260	39
		6820	AL10	AL06B215	308									**6810**	AL10	AL06B265	81.5
		8000	AL14	AL06B215	339									**8000**	AL14	AL06B265	112.5
7900	AL08	**3480**	AL06	AL08B210	265.5							**8100**	AL08	**3460**	AL06	AL08B260	-12.5
		5360	AL08	AL08B210	315.5									**5340**	AL08	AL08B260	38
		6470	AL10	AL08B215	358									**6450**	AL10	AL08B265	80.5
		8000	AL14	AL08B215	389									**8000**	AL14	AL08B265	111.5
8800	AL10	**3190**	AL06	AL10B215	331.5							n/a					
		4950	AL08	AL10B215	381.5												
		6040	AL10	AL10B210	424	**8800**	AL10	**6010**	AL10	AL10B230	434	**9000**	AL10	**6080**	AL10	AL10B260	96.5
		7660	AL14	AL10B210	455			**7630**	AL14	AL10B230	465			**7710**	AL14	AL10B260	127.5
8970	AL14	**3030**	AL06	AL14B215	362.5	n/a						n/a					
		4710	AL08	AL14B215	412.5												
		5770	AL10	AL14B210	455	**8970**	AL14	**5740**	AL10	AL14B230	465	**9170**	AL14	**5810**	AL10	AL14B260	113.5
		7360	AL14	AL14B210	486			**7320**	AL14	AL14B230	496			**7400**	AL14	AL14B260	144.5

Double girder articulated	Double girder rigid	Double girder low headroom
		

Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**
Rated capacity 160 kg, lifting device weight 30 kg																	
5080	AL06	**3500**	AL06	AL06B210	215.5	n/a						**5280**	AL06	**3500**	AL06	AL06B260	-11
		5390	AL08	AL06B210	265.5									**5390**	AL08	AL06B260	39
		6500	AL10	AL06B215	308									**6500**	AL10	AL06B265	81.5
		8000	AL14	AL06B215	339									**8000**	AL14	AL06B265	112.5
7490	AL08	**3310**	AL06	AL08B210	265.5							**7690**	AL08	**3300**	AL06	AL08B260	-12.5
		5120	AL08	AL08B210	315.5									**5110**	AL08	AL08B260	38
		6200	AL10	AL08B215	358									**6190**	AL10	AL08B265	80.5
		7840	AL14	AL08B215	389									**7830**	AL14	AL08B265	111.5
8610	AL10	**3050**	AL06	AL10B215	331.5							n/a					
		4740	AL08	AL10B215	381.5												
		5800	AL10	AL10B210	424	**8610**	AL10	**5770**	AL10	AL10B230	434	**8810**	AL10	**5840**	AL10	AL10B260	96.5
		7390	AL14	AL10B210	455			**7360**	AL14	AL10B230	465			**7440**	AL14	AL10B260	127.5
8940	AL14	**2910**	AL06	AL14B215	362.5	n/a						n/a					
		4530	AL08	AL14B215	412.5												
		5560	AL10	AL14B210	455	**8940**	AL14	**5530**	AL10	AL14B230	465	**9140**	AL14	**5590**	AL10	AL14B260	113.5
		7100	AL14	AL14B210	486			**7070**	AL14	AL14B230	496			**7150**	AL14	AL14B260	144.5
Rated capacity 250 kg, lifting device weight 30 kg																	
4420	AL06	**3080**	AL06	AL06B210	215.5	n/a						**4620**	AL06	**3110**	AL06	AL06B260	-11
		4790	AL08	AL06B210	265.5									**4820**	AL08	AL06B260	39
		5830	AL10	AL06B215	308									**5860**	AL10	AL06B265	81.5
		7420	AL14	AL06B215	339									**7460**	AL14	AL06B265	112.5
6660	AL08	**2960**	AL06	AL08B210	265.5							**6860**	AL08	**2960**	AL06	AL08B260	-12.5
		4600	AL08	AL08B210	315.5									**4610**	AL08	AL08B260	38
		5610	AL10	AL08B215	358									**5620**	AL10	AL08B265	80.5
		7170	AL14	AL08B215	389									**7180**	AL14	AL08B265	111.5
7790	AL10	**2770**	AL06	AL10B215	331.5							n/a					
		4330	AL08	AL10B215	381.5												
		5320	AL10	AL10B210	424	**7790**	AL10	**5300**	AL10	AL10B230	434	**7990**	AL10	**5370**	AL10	AL10B260	96.5
		6830	AL14	AL10B210	455			**6800**	AL14	AL10B230	465			**6880**	AL14	AL10B260	127.5
8860	AL14	**2640**	AL06	AL14B215	362.5	n/a						n/a					
		4130	AL08	AL14B215	412.5												
		5090	AL10	AL14B210	455	**8860**	AL14	**5060**	AL10	AL14B230	465	**9060**	AL14	**5120**	AL10	AL14B260	113.5
		6550	AL14	AL14B210	486			**6520**	AL14	AL14B230	496			**6590**	AL14	AL14B260	144.5
Rated capacity 320 kg, lifting device weight 35 kg																	
4030	AL06	**2830**	AL06	AL06B210	215.5	n/a						**4230**	AL06	**2860**	AL06	AL06B260	-11
		4410	AL08	AL06B210	265.5									**4460**	AL08	AL06B260	39
		5390	AL10	AL06B215	308									**5450**	AL10	AL06B265	81.5
		6910	AL14	AL06B215	339									**6980**	AL14	AL06B265	112.5
6130	AL08	**2730**	AL06	AL08B210	265.5							**6330**	AL08	**2750**	AL06	AL08B260	-12.5
		4260	AL08	AL08B210	315.5									**4290**	AL08	AL08B260	38
		5220	AL10	AL08B215	358									**5250**	AL10	AL08B265	80.5
		6710	AL14	AL08B215	389									**6740**	AL14	AL08B265	111.5
7250	AL10	**2590**	AL06	AL10B215	331.5							n/a					
		4050	AL08	AL10B215	381.5												
		4990	AL10	AL10B210	424	**7250**	AL10	**4970**	AL10	AL10B230	434	**7450**	AL10	**5040**	AL10	AL10B260	96.5
		6440	AL14	AL10B210	455			**6410**	AL14	AL10B230	465			**6500**	AL14	AL10B260	127.5
8800	AL14	**2470**	AL06	AL14B215	362.5	n/a						n/a					
		3860	AL08	AL14B215	412.5												
		4770	AL10	AL14B210	455	**8800**	AL14	**4750**	AL10	AL14B230	465	**9000**	AL14	**4810**	AL10	AL14B260	113.5
		6160	AL14	AL14B210	486			**6140**	AL14	AL14B230	496			**6210**	AL14	AL14B260	144.5

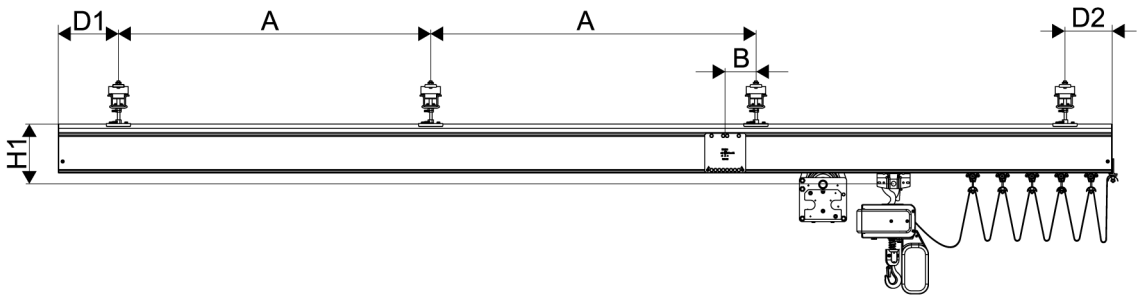
Double girder articulated	Double girder rigid	Double girder low headroom
		

Crane bridge		Track				Crane bridge		Track				Crane bridge		Track			
L max.	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**	**L max.**	**Profile**	**A max.**	**Profile**	**Bridge kit**	**H1**
Rated capacity 500 kg, lifting device weight 35 kg																	
3380	AL06	**2410**	AL06	AL06B210	215.5	n/a						**3580**	AL06	**2450**	AL06	AL06B260	-11
		3770	AL08	AL06B210	265.5									**3840**	AL08	AL06B260	39
		4640	AL10	AL06B215	308									**4730**	AL10	AL06B265	81.5
		6010	AL14	AL06B215	339									**6110**	AL14	AL06B265	112.5
5230	AL08	**2340**	AL06	AL08B210	265.5							**5430**	AL08	**2370**	AL06	AL08B260	-12.5
		3670	AL08	AL08B210	315.5									**3710**	AL08	AL08B260	38
		4530	AL10	AL08B215	358									**4580**	AL10	AL08B265	80.5
		5870	AL14	AL08B215	389									**5930**	AL14	AL08B265	111.5
6290	AL10	**4390**	AL10	AL10B210	424	**6290**	AL10	**4380**	AL10	AL10B230	434	**6490**	AL10	**4440**	AL10	AL10B260	96.5
		5690	AL14	AL10B210	455			**5680**	AL14	AL10B230	465			**5770**	AL14	AL10B260	127.5
7950	AL14	**4230**	AL10	AL14B210	455	**7950**	AL14	**4220**	AL10	AL14B230	465	**8150**	AL14	**4280**	AL10	AL14B260	113.5
		5500	AL14	AL14B210	486			**5490**	AL14	AL14B230	496			**5560**	AL14	AL14B260	144.5
Rated capacity 630 kg, lifting device weight 35 kg																	
5780	AL10	**4060**	AL10	AL10B210	424	**5780**	AL10	**4050**	AL10	AL10B230	434	**5980**	AL10	**4120**	AL10	AL10B260	96.5
		5290	AL14	AL10B210	455			**5280**	AL14	AL10B230	465			**5360**	AL14	AL10B260	127.5
7370	AL14	**3940**	AL10	AL14B210	455	**7370**	AL14	**3930**	AL10	AL14B230	465	**7570**	AL14	**3990**	AL10	AL14B260	113.5
		5140	AL14	AL14B210	486			**5120**	AL14	AL14B230	496			**5190**	AL14	AL14B260	144.5
Rated capacity 800 kg, lifting device weight 60 kg																	
5200	AL10	**3680**	AL10	AL10B210	424	**5200**	AL10	**3670**	AL10	AL10B230	434	**5400**	AL10	**3740**	AL10	AL10B260	96.5
		4810	AL14	AL10B210	455			**4800**	AL14	AL10B230	465			**4890**	AL14	AL10B260	127.5
6690	AL14	**3590**	AL10	AL14B210	455	**6690**	AL14	**3580**	AL10	AL14B230	465	**6890**	AL14	**3640**	AL10	AL14B260	113.5
		4690	AL14	AL14B210	486			**4690**	AL14	AL14B230	496			**4750**	AL14	AL14B260	144.5
Rated capacity 1000 kg, lifting device weight 60 kg																	
4760	AL10	**3380**	AL10	AL10B210	424	**4760**	AL10	**3380**	AL10	AL10B230	434	**4960**	AL10	**3450**	AL10	AL10B260	96.5
		4430	AL14	AL10B210	455			**4420**	AL14	AL10B230	465			**4510**	AL14	AL10B260	127.5
6150	AL14	**3310**	AL10	AL14B210	455	**6150**	AL14	**3310**	AL10	AL14B230	465	**6350**	AL14	**3360**	AL10	AL14B260	113.5
		4340	AL14	AL14B210	486			**4330**	AL14	AL14B230	496			**4400**	AL14	AL14B260	144.5
Rated capacity 1250 kg, lifting device weight 60 kg																	
4330	AL10	**3100**	AL10	AL10B210	424	**4330**	AL10	**3090**	AL10	AL10B230	434	**4530**	AL10	**3160**	AL10	AL10B260	96.5
		4060	AL14	AL10B210	455			**4050**	AL14	AL10B230	465			**4140**	AL14	AL10B260	127.5
5620	AL14	**3040**	AL10	AL14B210	455	**5620**	AL14	**3040**	AL10	AL14B230	465	**5820**	AL14	**3090**	AL10	AL14B260	113.5
		3990	AL14	AL14B210	486			**3980**	AL14	AL14B230	496			**4050**	AL14	AL14B260	144.5
Rated capacity 1600 kg, lifting device weight 70 kg																	
3870	AL10	**2790**	AL10	AL10B210	424	**3870**	AL10	**2790**	AL10	AL10B230	434	**4070**	AL10	**2860**	AL10	AL10B260	96.5
		3660	AL14	AL10B210	455			**3660**	AL14	AL10B230	465			**3750**	AL14	AL10B260	127.5
5050	AL14	**2750**	AL10	AL14B210	455	**5050**	AL14	**2740**	AL10	AL14B230	465	**5250**	AL14	**2800**	AL10	AL14B260	113.5
		3600	AL14	AL14B210	486			**3600**	AL14	AL14B230	496			**3670**	AL14	AL14B260	144.5
Rated capacity 2000 kg, lifting device weight 70 kg																	
3500	AL10	**2540**	AL10	AL10B220	432.5	**3500**	AL10	**2530**	AL10	AL10B240	444	**3700**	AL10	**2600**	AL10	AL10B260	97.5
		3330	AL14	AL10B220	463.5			**3330**	AL14	AL10B240	475			**3420**	AL14	AL10B260	128.5
4580	AL14	**2500**	AL10	AL14B220	463.5	**4580**	AL14	**2500**	AL10	AL14B240	475	**4780**	AL14	**2550**	AL10	AL14B260	114.5
		3280	AL14	AL14B220	494.5			**3280**	AL14	AL14B240	506			**3350**	AL14	AL14B260	145.5

Monorail

The following abbreviations are used in the quick selection table:

A_{max}	Maximum distance between suspensions on the track
B_{max}	Maximum distance between suspension and connection between track/monorail segments
D1	Outreach of track/monorail, opposite of festoon side
D2	Outreach of track/monorail, festoon side
H1	Height of the monorail (between top of monorail profile and top of push trolley bolt)



Monorail						
A_{max}	Profile	B_{max}	D1, D2 min.	D1, D2 max.	Push trolley	H1
Rated capacity 63 kg, lifting device weight 30 kg						
5390	AL06	530	100	150	AL08T100	172.5
7870	AL08	780	100	150	AL08T100	222
8000	AL10	910	100	150	AL14T100	265
8000	AL14	1080	100	150	AL14T100	296
Rated capacity 80 kg, lifting device weight 30 kg						
5060	AL06	500	100	150	AL08T100	172.5
7480	AL08	740	100	150	AL08T100	222
8000	AL10	870	100	150	AL14T100	265
8000	AL14	1050	100	150	AL14T100	296
Rated capacity 125 kg, lifting device weight 30 kg						
4410	AL06	440	100	150	AL08T100	172.5
6650	AL08	660	100	150	AL08T100	222
7920	AL10	790	100	150	AL14T100	265
8000	AL14	960	100	150	AL14T100	296
Rated capacity 160 kg, lifting device weight 30 kg						
4040	AL06	400	100	150	AL08T100	172.5
6150	AL08	610	100	150	AL08T100	222
7400	AL10	730	100	150	AL14T100	265
8000	AL14	910	100	150	AL14T100	296
Rated capacity 250 kg, lifting device weight 30 kg						
3390	AL06	330	100	150	AL08T100	172.5
5240	AL08	520	100	150	AL08T100	222
6380	AL10	630	100	150	AL14T100	265
8000	AL14	800	100	150	AL14T100	296
Rated capacity 320 kg, lifting device weight 35 kg						
3040	AL06	300	100	150	AL08T100	172.5
4720	AL08	470	100	150	AL08T100	222
5790	AL10	570	100	150	AL14T100	265
7370	AL14	730	100	150	AL14T100	296
Rated capacity 500 kg, lifting device weight 35 kg						
2500	AL06	240	100	150	AL08T100	172.5
3910	AL08	390	100	150	AL08T100	222
4830	AL10	480	100	150	AL14T100	265
6240	AL14	620	100	150	AL14T100	296
Rated capacity 630 kg, lifting device weight 35 kg						
4370	AL10	430	100	150	AL14T100	265
5670	AL14	560	100	150	AL14T100	296
Rated capacity 800 kg, lifting device weight 60 kg						
3870	AL10	380	100	150	AL14T100	265
5040	AL14	500	100	150	AL14T100	296
Rated capacity 1000 kg, lifting device weight 60 kg						
3500	AL10	340	100	150	AL14T100	265
4580	AL14	450	100	150	AL14T100	296
Rated capacity 1250 kg, lifting device weight 60 kg						
3150	AL10	310	100	150	AL14T200	270
4130	AL14	410	100	150	AL14T200	301
Rated capacity 1600 kg, lifting device weight 70 kg						
2800	AL10	270	100	150	AL14T200	270
3670	AL14	360	100	150	AL14T200	301
Rated capacity 2000 kg, lifting device weight 70 kg						
2520	AL10	250	100	150	AL14T200	270
3310	AL14	330	100	150	AL14T200	301

4.3 Detailed calculation

4.3.1 Data required for calculation

To properly select a crane system, knowledge of the crane operation environment, the limits of the components, the geometry of the crane, the type of load (including dynamic factor), and product weights are required.

To determine the suitable product and profiles, product weights need to be calculated. The calculations are explained in the following sections, and summarized in the table below.

Product	Description		Suitability	Weight [kg/m]
AL06	Profile		Crane bridge and track	6.5
AL08	Profile		Crane bridge and track	8.6
AL10	Profile		Crane bridge and track	10.9
AL14	Profile		Crane bridge and track	14.6
Product	**Description**	**[Kg] (max.)**	**Suitability**	**Weight [kg]**
AL08T100	Push trolley, single	500, max.	AL06 and AL08 profiles, single girder crane bridges and monorails	2.3
AL14T100	Push trolley, single	1250, max.	AL10 and AL14 profiles, single girder crane bridges and monorails	3.2
AL14T200	Push trolley, double	2500, max.	AL10 and AL14 profiles, single girder crane bridges and monorails	12.2
AL08T500	Push trolley	500	AL06 and AL08 profiles, double girder crane bridges	33.0
AL14T500	Push trolley	2000	AL10 and AL14 profiles, double girder crane bridges	52.7
ALTM2	Motor trolley		AL10 and AL14 profiles	24.0
Lifting devices	Refer to the lifting device technical documentation			
Bridge kit	See chapter Crane dimensions			

Note: The results of the detailed calculation must be evaluated with the sales configurator.

4.3.2 Calculating load spectrum and determining rated capacity

All tables are given for a load spectrum k_p=1, spectrum class Q4, and utilization class U2 (maximum number of hoisting cycles = 63000 at full capacity).

When a higher number of cycles is required, the rated capacity shall be increased compared to the real load to decrease the load spectrum and thereby stay in the A4 application class.

The load spectrum is calculated as follows:

$$k_p = \sum_{i=1}^{r} \left(\frac{ml_i}{RC}\right)^3 * \frac{n_i}{n_{max}}$$

Abbreviations	
ml	Real lifted loads
n	Number of hoisting cycles when the hoisted load is equal to **ml**
n_{max}	Number of hoisting cycles determining the total duration of use
RC	Rated capacity

4.3.3 Determining rail type

The following graphs show the maximal crane spans and loadings. The loading is not the rated capacity. The weight of the lifting device, motor trolley, and possible additional weight, such as power feeding lines and handling equipment, have to be added to the lifted load.

These curves can be used for crane bridge span and maximum distance between track suspensions for crane systems with one single crane bridge. In this case, crane bridge dead weight shall be added.

Other limits that can reduce the maximum span: outreach, length of segment (connections are not allowed on single girder crane bridges), loading of suspensions, among others.

Note: In addition to this maximum span, the following points must be checked:

- Maximum outreach
- Trolley and suspension capacities
- Connection positions on the track.

Abbreviations used in the calculations

Abbreviation	Description
RC	Rated capacity
HW	Lifting device weight
TW	Push trolley weight
MW	Motor trolley weight
PLW	Profile linear weight
PL	Bridge profile length (including outreaches)
GN	Girder number
HF	Horizontal force
BW	Bridge kit weight
PTL	Push trolley loading
CBL	Crane bridge loading
TL	Track loading
SL	Suspension loading
A	Distance between suspensions
MM	Moving mass
Dynfactor	Dynamic factor given by acceleration during lifting motion (Dynfactor = 0.25)

Push trolley selection

The trolley for the lifting device shall be selected according to the loading limit

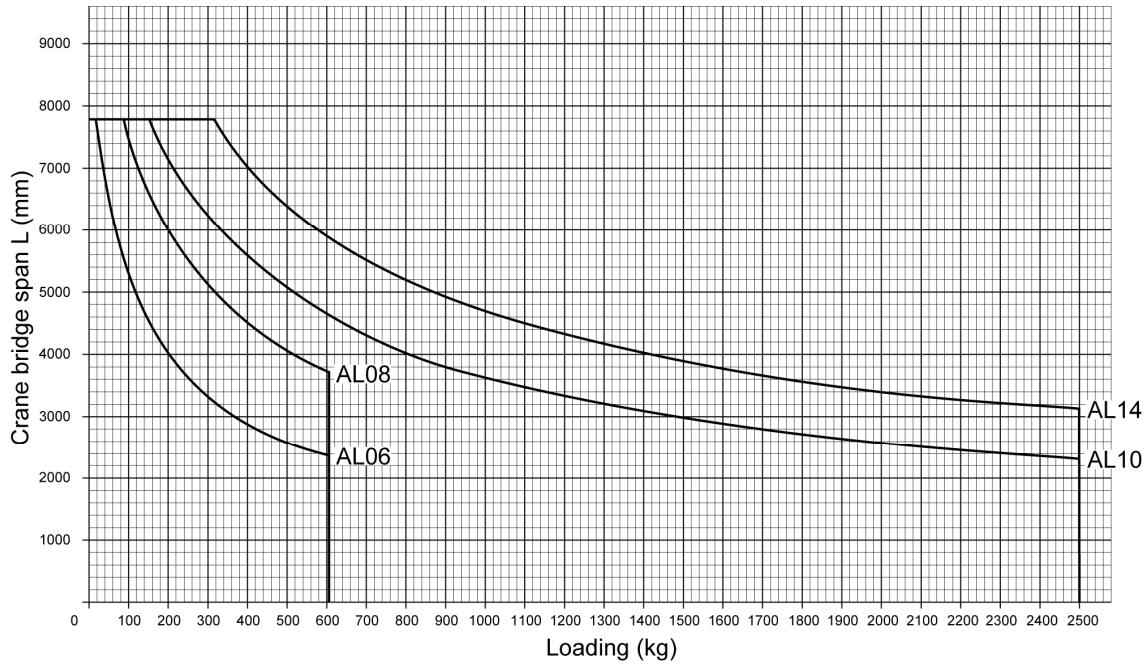
$$PTL = RC + HW$$

Trolley loading is limited as follows:

Trolley	AL08T100	AL08T500	AL14T100	AL14T200	AL14T500
Use case	AL06/AL08 single girder	AL06/AL08 double girder	AL10/AL14 single trolley single girder	AL10/AL14 double trolley single girder	AL10/AL14 double girder
Loading limit [kg]	600	600	1250	2500	2500

For more information on trolleys, see chapter Trolleys.

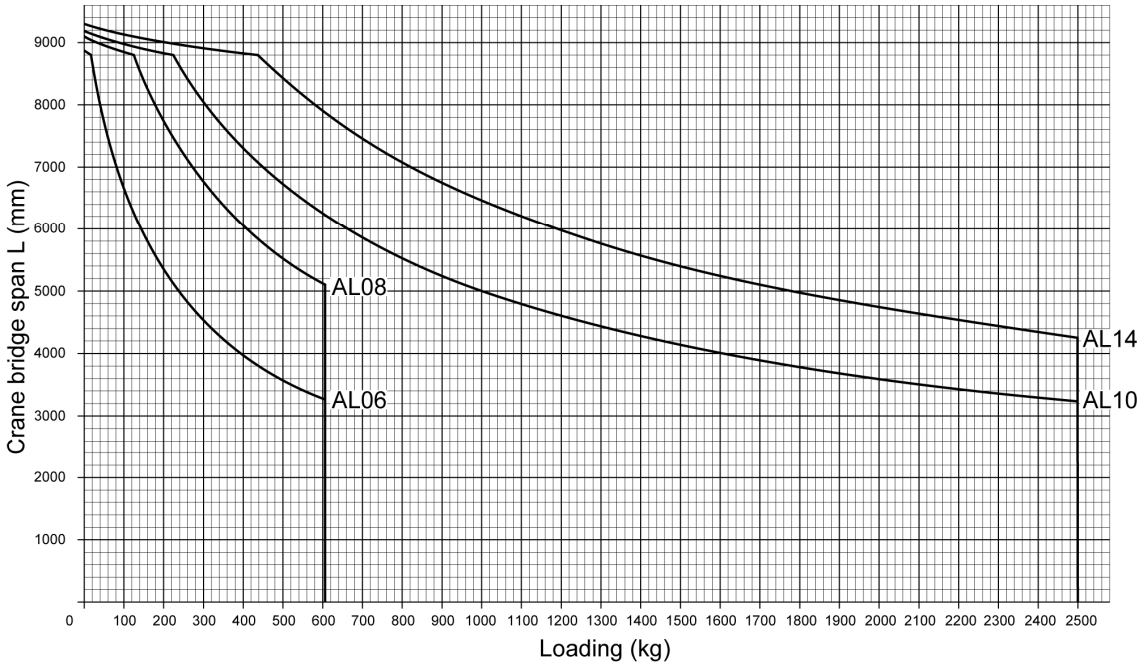
Single girder crane bridges, deflection criteria L/500



Loading calculation:

$$CBL = RC + HW + TW + MW$$

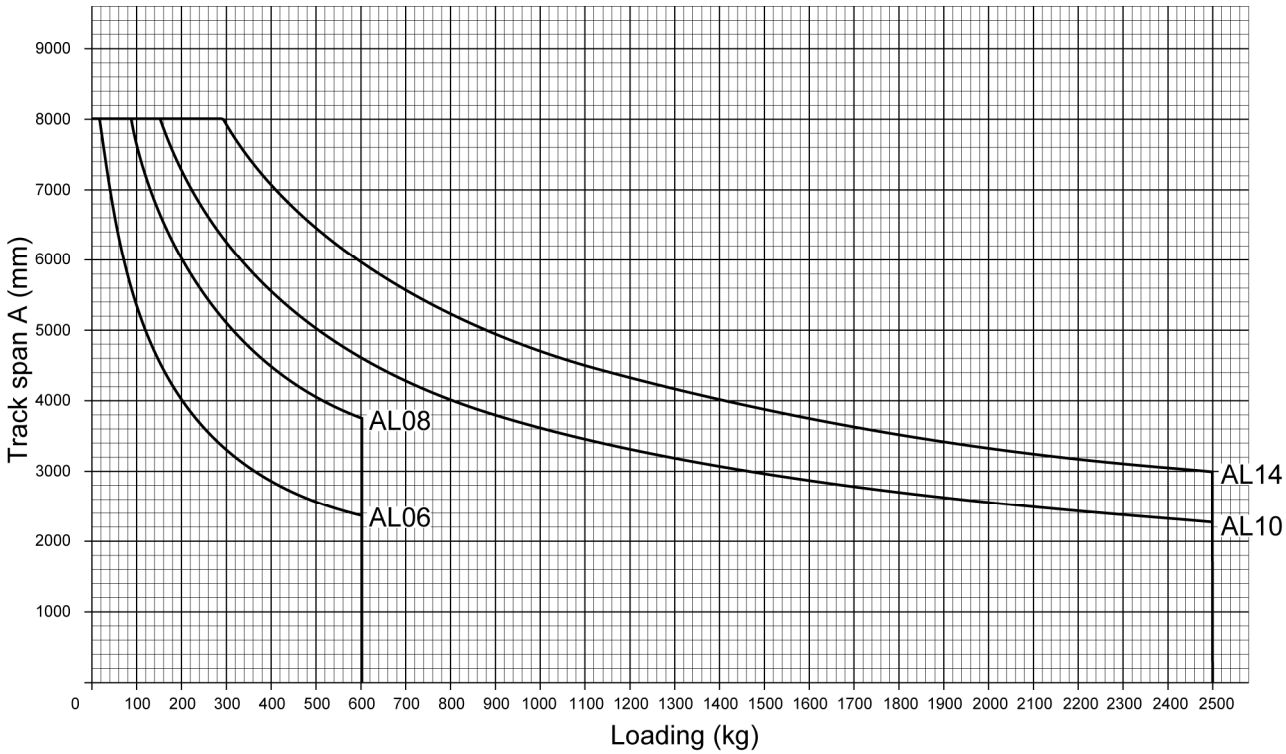
Double girder crane bridges, deflection criteria L/500



Loading calculation:

$$CBL = RC + HW + TW + MW$$

Tracks and monorails, deflection criteria L/500



Loading calculations:

Track:

$$TL = CBL + \frac{PLW * PL * GN + BW}{2} + MT$$

Check that the track loading is lower than the crane bridge trolley limit. The crane bridge trolley type is given in the bridge kit reference tables in chapter Crane dimensions.

Track rail size	AL06/AL08	AL10/AL14	AL10/AL14
Bridge trolley type	Single push trolley	Single push trolley	Double push trolley
Loading limit [kg]	600	1250	2500

Monorail:

$$TL = RC + HW + TW + MT$$

4.3.4 Suspension limits and forces back to supporting structure

The suspension loading is calculated as follows:

$$SL = TL + PLW * A + RC * Dynfactor$$

The suspension loading is limited to 3000 kg.

The vertical force back to the supporting structure to be taken into account for checking is calculated without the dynamic factor.

$$VF = TL + PLW * A$$

The horizontal force back to the supporting structure to be taken into account for checking is 10% of the moving mass.

$$MM = CBL + PLW * PL + BW + MT$$

$$HF = MM * 0.1$$

4.3.5 Examples of calculations

Load spectrum calculation

A crane is used to load a machine. The rated capacity of the crane is 500 kg. The lifting equipment is fitted with a lifting beam which weighs 120 kg. Each part weighs 300 kg, and is lifted from the floor and lowered onto the machine. After removing the part, the lifting beam is lifted and lowered to get the next part.

There are two hoisting cycles per production cycle (one with the load and one with the lifting beam only)

Spectrum factor calculation:

$$k_p = \left(\frac{420}{500}\right)^3 * \frac{1}{2} + \left(\frac{120}{500}\right)^3 * \frac{1}{2} = 0.303$$

The spectrum class is Q3 (see table Load spectrum classes in chapter Technical regulations).

The maximum number of hoisting cycles in utilization group A4 is 125000 as per utilization class U3.

Example 1: Monorail

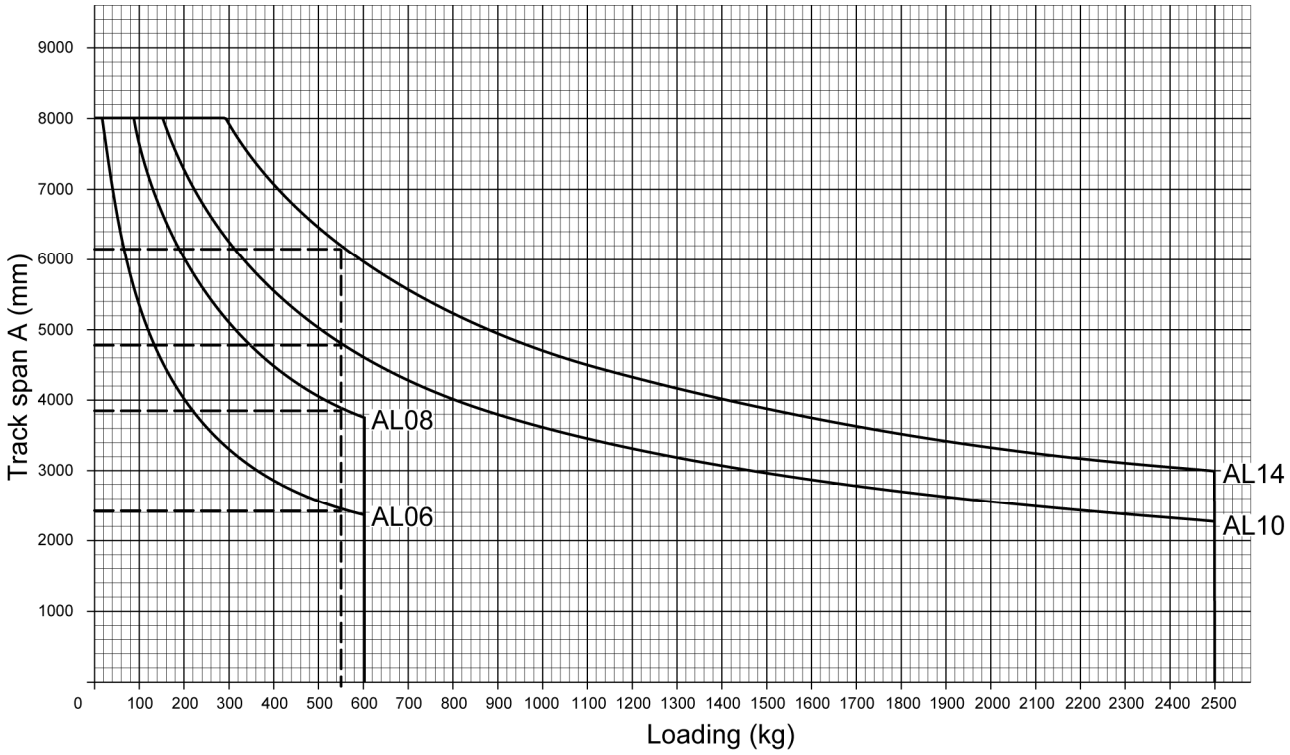
- Lifting capacity required: RC=500 kg
- Lifting device weight: HW=50 kg
- Manual movement

Trolley selection:

- PTL=500+50=550 kg
- Push trolleys allowed: AL08T100, AL14T100
- AL14T200 will not bring added value
- AL08T500 and AL14T500 are for double girder bridges only, not suitable for monorail

Rail type selection:

Push trolley	RC [kg]	HW [kg]	TW	MT	TL
AL08T100	500	50	2.3	0	552.3
AL14T100	500	50	3.2	0	553.2



Maximum distance between suspensions:

- AL06: 2400 mm
- AL08: 3800 mm
- AL10: 4700 mm
- AL14: 6100 mm

Suspension loading and vertical force to structure

Track rail size	TL	PLW [kg/m]	A	RC [kg]	SL	VF
AL06	552.3	6.5	2.4	500	692.9	567.9
AL08	552.3	8.6	3.8	500	689.7	564.7
AL10	553.2	10.9	4.7	500	729.5	604.5
AL14	553.2	14.6	6.1	500	767.3	642.3

Example 2: Light Crane System

- Lifting capacity required: RC=500 kg
- Lifting device weight: HW=50 kg
- Motor movement for cross travel direction, manual movement for long travel direction
- Span L required: 5.6 m, outreach 100 mm

According to the requirements, an articulated crane bridge can be used in this example. To evaluate the most suitable crane bridge type, this example shows calculations with different alternatives.

Trolley selection:

- PTL=500+50=550 kg
- Push trolleys allowed: AL08T100, AL14T100 (single girder bridges), AL08T500, AL14T500 (double girder bridges)
- Push trolley AL14T200 is not required because PTL is lower than 1250 kg

Rail type selection:

First calculate the crane bridge loading:

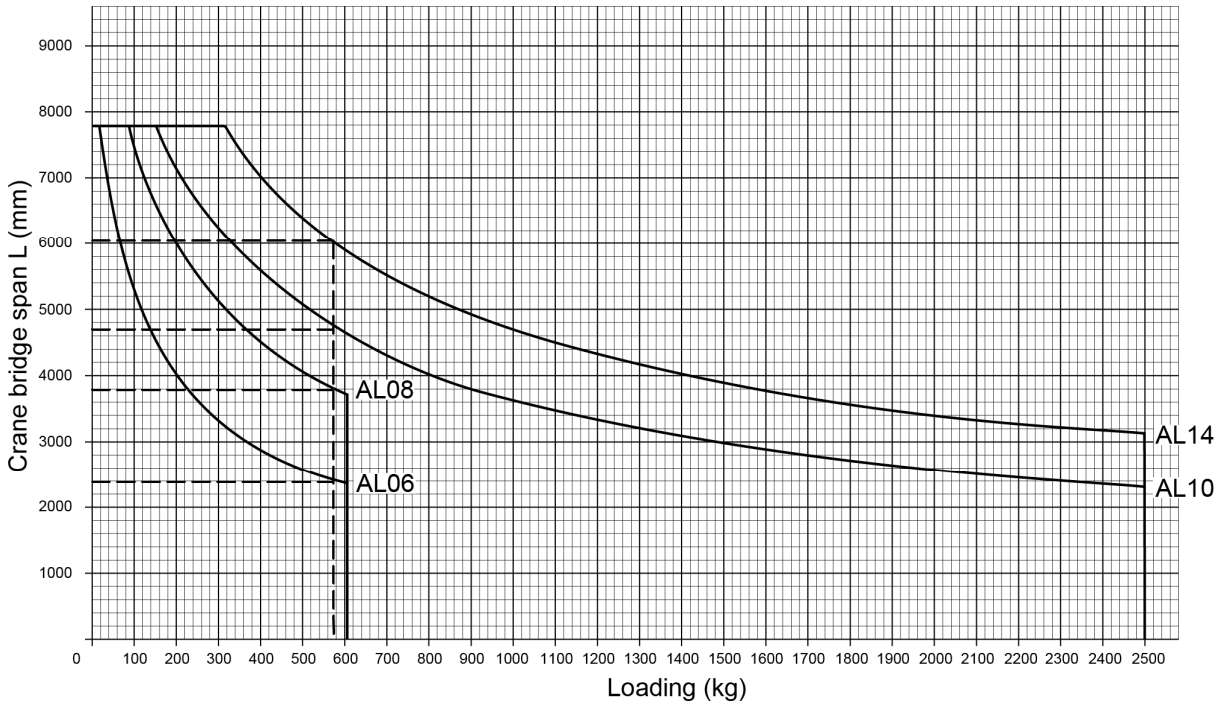
$$CBL = RC + HW + TW + MW$$

Push trolley	RC [kg]	HW [kg]	TW	MT	CBL
AL08T100	500	50	2.3	24	576.3
AL08T500	500	50	33	24	607
AL14T100	500	50	3.2	24	577.2
AL14T500	500	50	61.4	24	635.4

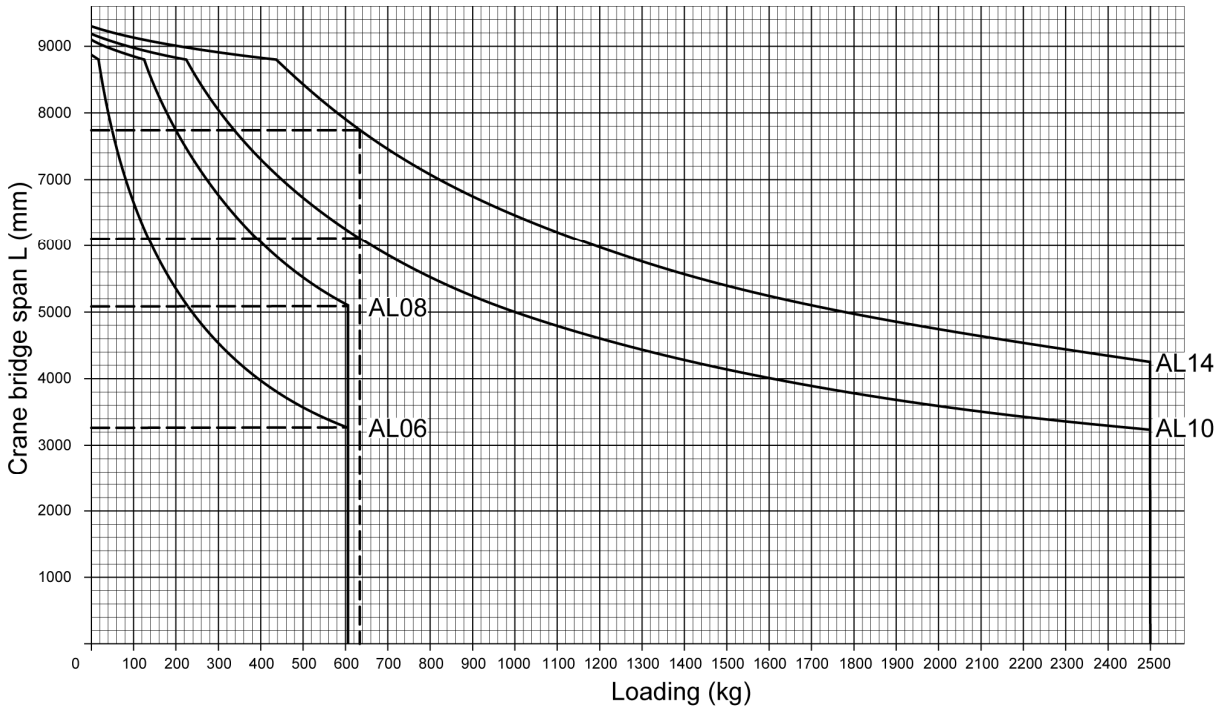
Maximum span allowed

Use the CBL values in the single or double girder graphs to check the maximum span L.

Single girder



Double girder



Profile and crane bridge type suitable with the required span:

Profile size	Crane bridge type	Bridge kit reference
AL14	Single girder articulated	AL14B110
AL10	Double girder articulated	AL10B210
AL14	Double girder articulated	AL14B210

Calculating maximum distance between suspensions

First calculate the track loading:

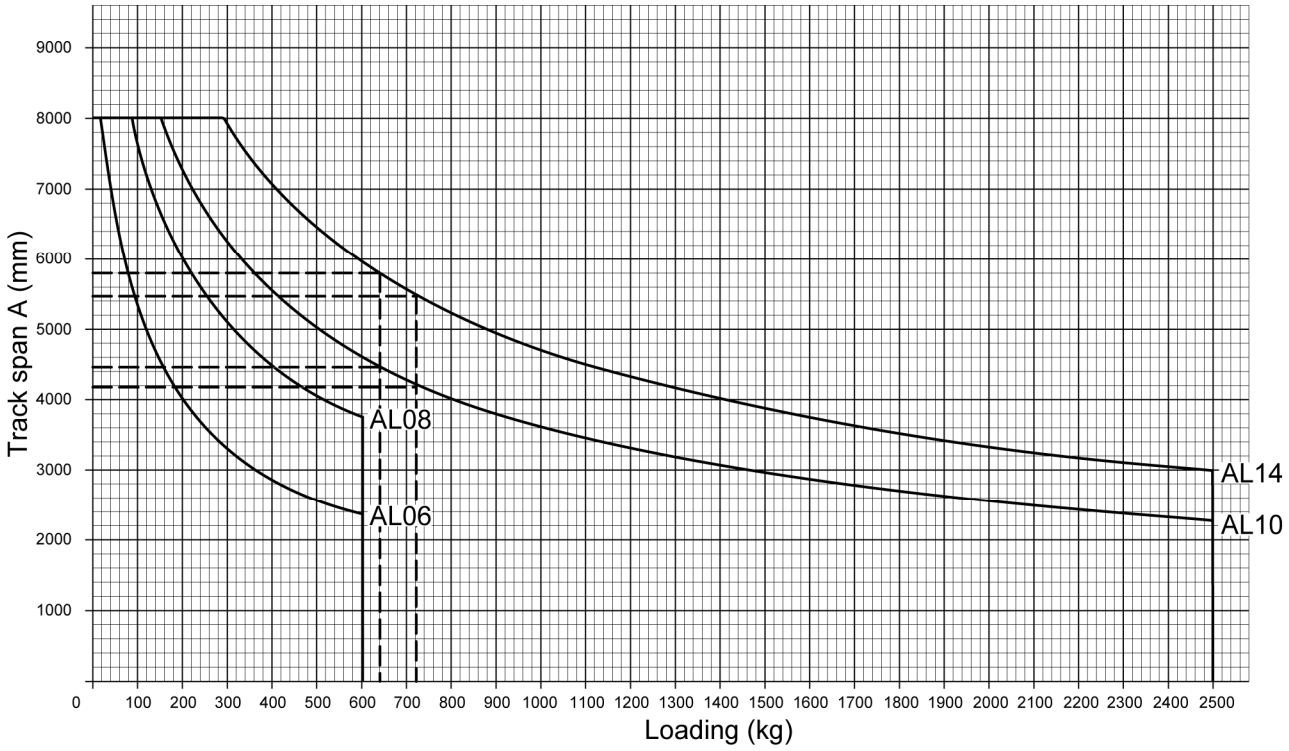
$$TL = CBL + \frac{PLW * PL * GN + \frac{BW}{2}}{2} + MT$$

Bridge	CBL	PLW [kg/m]	PLxGN	BW	MT	TL
AL14B110	577.2	14.6	5.8 x 1	17.7	0	628.4
AL10B210	635.4	10.9	5.8 x 2	47.6	0	722.4
AL14B210	635.4	14.6	5.8 x 2	47.8	0	744

Bridge	AL14B110	AL10B210	AL14B210
Track rail size	AL14	AL10	AL14
Bridge trolley type	Single push trolley	2 x single push trolley	2 x single push trolley
Loading limit [kg]	1250	2500	2500

The bridge kit AL14B210 is not required, as lighter solutions can be used.

Use the TL value in the Track graph to find the maximum distance between the suspensions (A).



Maximum distance between suspensions:

- AL14B110 + Track AL10: 4500 mm
- AL14B110 + Track AL14: 5800 mm
- AL10B210 + Track AL10: 4200 mm
- AL10B210 + Track AL14: 5400 mm

Suspension loading:

$$SL = TL + PLW * A$$

Crane system	TL	PLW [kg/m]	A	RC	SL	VF
AL14B110 + Track AL10	628.4	10.9	4.5	500	802.4	677.4
AL14B110 + Track AL14	628.4	14.6	5.8	500	838.1	713.1
AL10B210 + Track AL10	722.4	10.9	4.2	500	893.2	768.2
AL10B210 + Track AL14	722.4	14.6	5.4	500	926.3	801.3

Moving mass:

$$MM = CBL + PLW * PL * GN + BW + MT$$

Crane system	CBL	PLW [kg/m]	PLxGN	BW	MT	MM
AL14B110	577.2	14.6	5.8 x 1	17.7	0	679.6
AL10B210	635.4	10.9	5.8 x 2[1)]	47.6	0	809.5

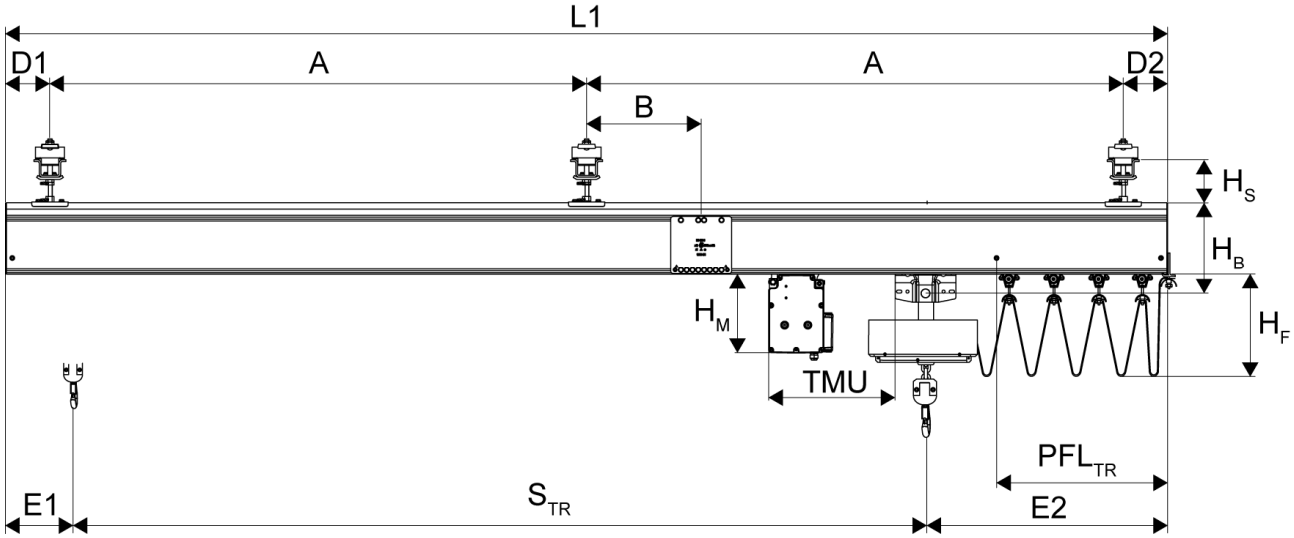
[1)]Profile length is to be multiplied by 2 for double girder bridges.

4.4 Crane dimensions

List of measurements and dimensions used in the crane diagrams and specification tables:

L1	Length of monorail or track
L2	Length of crane bridge
D1	Outreach of track/monorail, without festoon
D2	Outreach of track/monorail, with festoon
D3	Outreach of crane bridge, without festoon
D4	Outreach of crane bridge, with festoon
E1	Distance between end of track/monorail and push trolley bolt axle (hook approach), without festoon
E2	Distance between end of track/monorail and push trolley bolt axle (hook approach), with festoon
E3	Distance between end of crane bridge and push trolley bolt axle (hook approach), without festoon
E4	Distance between end of crane bridge and push trolley bolt axle (hook approach), with festoon
A	Distance between suspensions on the track
A_{MAX}	Maximum distance between suspensions, depends on total loading and profile size, has to be calculated according to instructions given in chapter Detailed calculation
B	Maximum distance between suspension and connection between track/monorail segments
L	Distance between tracks, maximum value to be calculated according to instructions given in chapter Detailed calculation depending on total load and profile size
H_T	Height of track (between top of track profile and top of crane bridge profile)
H_B	Height of crane bridge / monorail (between top of crane bridge / monorail profile and top of push trolley bolt)
H_S	Height of suspension, see chapter Selection of crane type
H_C	Height of lower part of the crane bridge kit (console)
H_L	Height of lower part of the push trolley
H_U	Distance between the highest point of hoist trolley and top of the crane bridge profile, or the height of triangle part in rigid crane
H_M	Height of motor trolley below profile (272.5 mm)
H_F	Height of festoon below profile (800 mm)
S	Hook stroke
S_{TR}	Travel along track
S_{BR}	Travel along crane bridge
TMU	Length of motor trolley, based on the ALTM2 motor trolley, to be added to E1 or E2 depending on which side of push trolley the ALTM2 will be fitted
PFL_{TR}	Length of festoon on track for power feeding
PFL_{BR}	Length of festoon on crane bridge for power feeding
NFT_{TR}	Number of festoon trolleys on track
NFT_{BR}	Number of festoon trolleys on crane bridge

4.4.1 Monorail

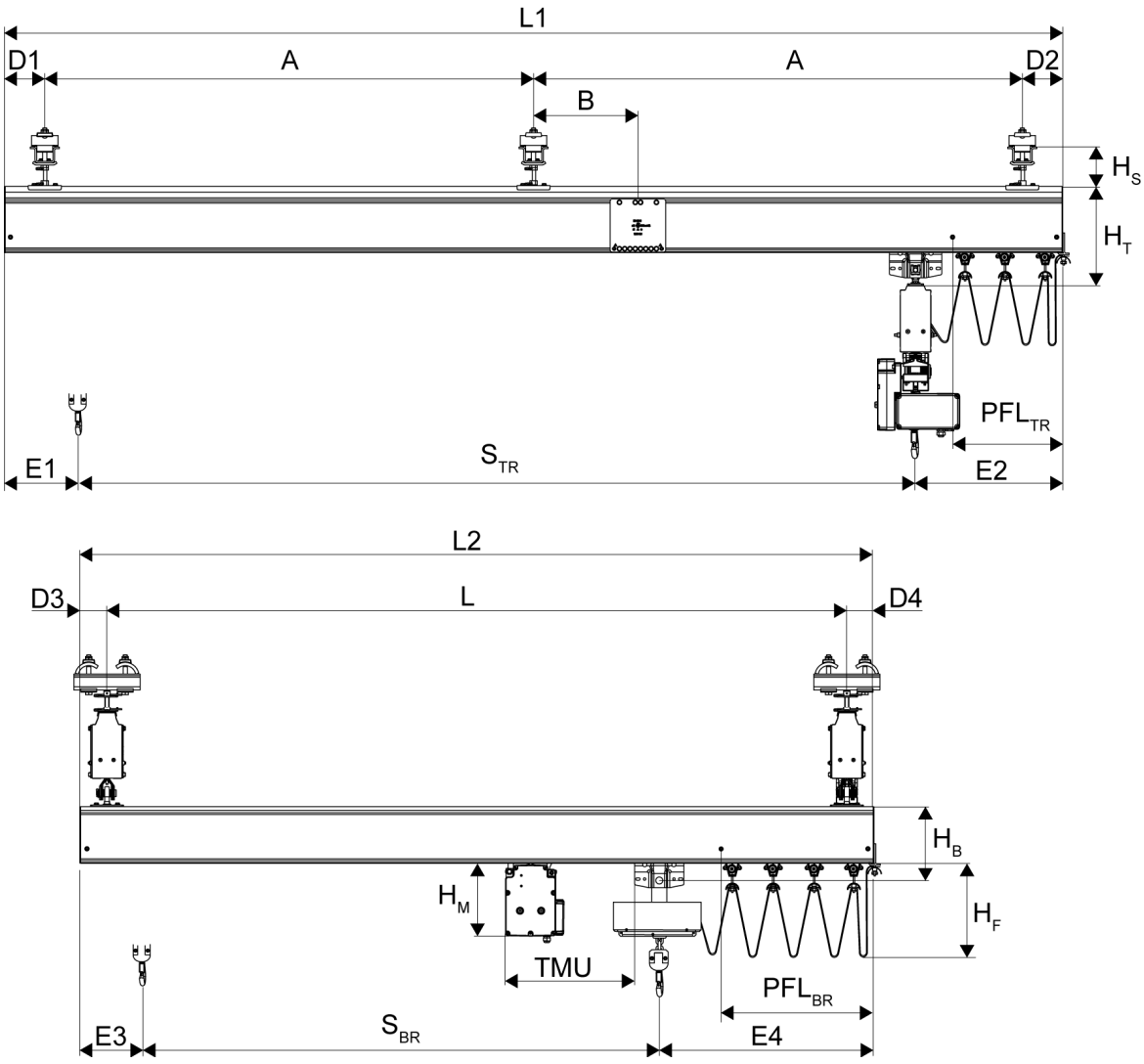


Track	E1 [mm]			E2 [mm]			H_B [mm]		D1, D2 min./max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL	Single push trolley	Double push trolley		
AL06	140	n/a	n/a	140+PFL	n/a	60+110xNFT	172.5	n/a	100/150	*
AL08	140			140+PFL			222			
AL10	150	300	370	150+PFL	300+PFL	60+110xNFT	265	270		
AL14	150	300	370	150+PFL	300+PFL		296	301		

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

4.4.2 Single girder articulated crane bridge



Track	E1 [mm]			E2 [mm]			H_T [mm]		D1, D2 min./ max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{TR}	Single push trolley	Double push trolley		
AL06	140	n/a	n/a	140+PFL	n/a	60+110xNFT$_{TR}$	233	n/a	100/150	*
AL08	140			140+PFL			283			
AL10	150	300		150+PFL	300+PFL		325.5	334		
AL14	150	300		150+PFL	300+PFL		356.5	365		

***Note**: B min.= 100 mm, B max. = 10 % of AMAX.

Crane bridge	E3 [mm]			E4 [mm]			H_B [mm]		D3 min./ max. [mm]	D4 min./max. [mm][1)]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{BR}	Single push trolley	Double push trolley		
AL06	140	n/a	n/a	140+PFL	n/a	60+110xNFT_{BR}	172.5	n/a	100/150	100/150+PFL_{BR}
AL08	140			140+PFL			222			
AL10	150	300	370	150+PFL	300+PFL		265	270		
AL14	150	300	370	150+PFL	300+PFL		296	301		

[1)]It is possible to extend the bridge outreach as much as is needed for storing the festoon (PFL). The extended area cannot be used for handling loads.

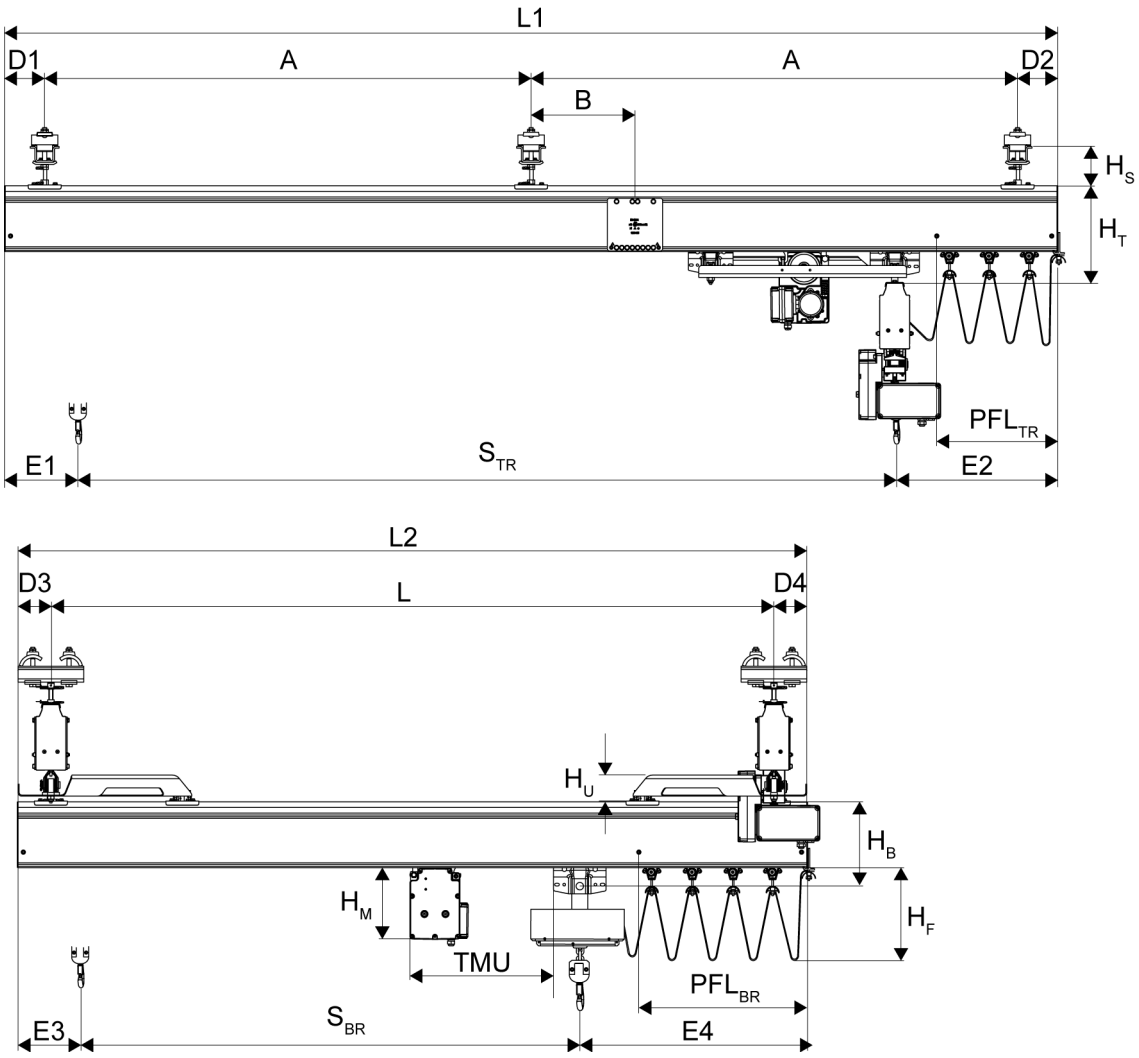
See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

The L2 is limited to the maximum profile length of 8 m, as no connections are allowed on the single girder crane bridges.

Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]							
		AL06		AL08		AL10		AL14	
AL06/08	Single push trolley	AL06B11	9.6	AL08B11	9.9	AL10B115	10.9	AL14B115	11.7
AL10/14	Single push trolley	AL06B11	16.2	AL08B11	16.5	AL10B110	17.4	AL14B110	17.7
AL10/14	Double push trolley	n/a		n/a		AL10B120	40.4	AL14B120	40.7

4.4.3 Single girder rigid crane bridge



Track	E1 [mm]			E2 [mm]			H_T [mm]		D1, D2 min./max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{RW}	Single push trolley	Double push trolley		
AL10	810	810	n/a	150+PFL	300+PFL	$60+110xNFT_{TR}$	335.5	345.6	100/150	*
AL14	810	810	n/a	150+PFL	300+PFL		366.5	376.6		

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

The ALTM motor trolley fits inside the triangle part, so no additional length is required.

Crane bridge	E3 [mm]			E4 [mm]			H_U [mm]	H_B [mm]		D3 min./ max. [mm]	D4 min./max. [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{BR}		Single push trolley	Double push trolley		
AL10	150	300	370	150+PFL	300+PFL	$60+110xNFT_{BR}$	102	265	270	100/150	$100/150+PFL_{BR}$
AL14	150	300	370	150+PFL	300+PFL		102	296	301		

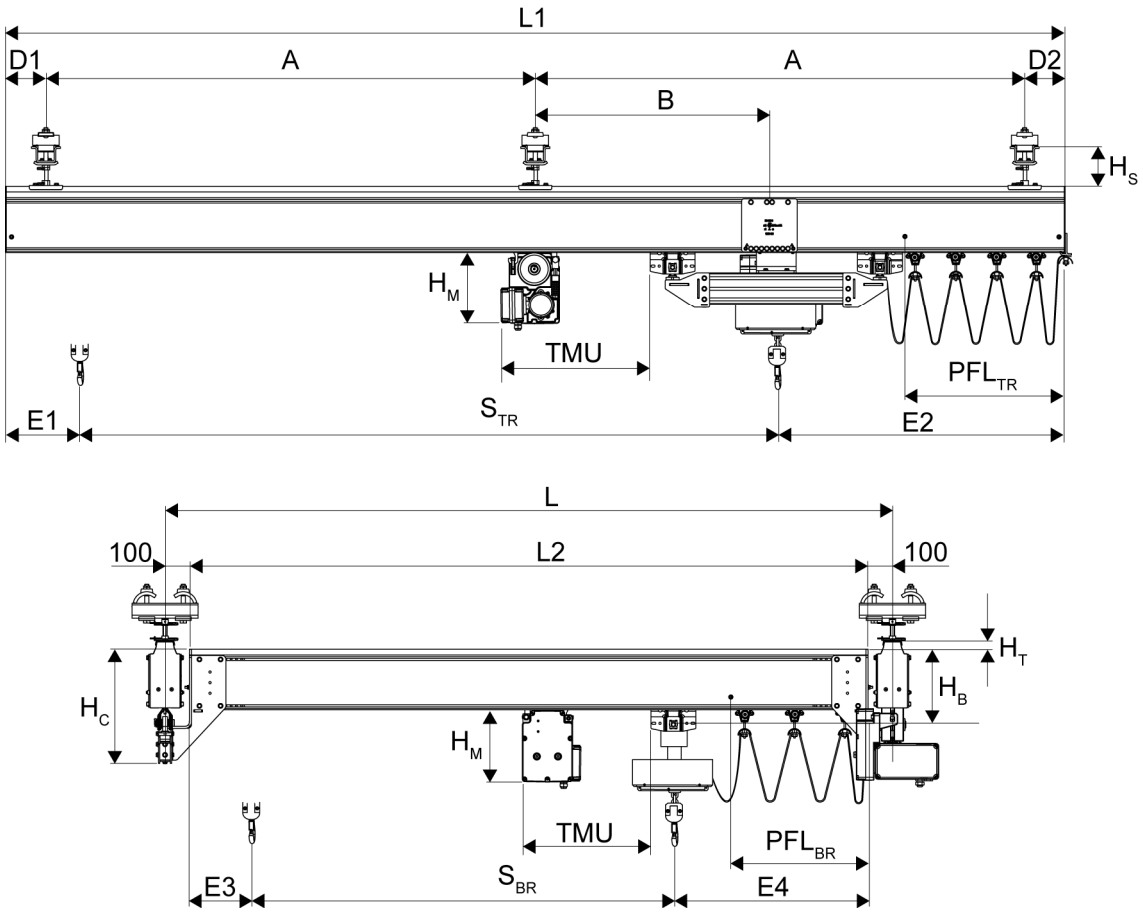
See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

The L2 is limited to the maximum profile length of 8 m, as no connections are allowed on the single girder crane bridges.

Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]					
		AL06	AL08	AL10		AL14	
AL06/08	Single push trolley	n/a	n/a	n/a		n/a	
AL10/14	Single push trolley	n/a	n/a	AL10B130	51.1	AL14B130	51.4
AL10/14	Double push trolley	n/a	n/a	AL10B140	71	AL14B140	74.2

4.4.4 Single girder low headroom crane bridge



Track	E1 [mm]			E2 [mm]			D1, D2 max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{TR}		
AL06	530	n/a	n/a	530+PFL	n/a	$60+110xNFT_{TR}$	100/150	*
AL08	530			530+PFL				
AL10	540	540	370	540+PFL	540+PFL			
AL14	540	540	370	540+PFL	540+PFL			

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

Crane bridge	E3 [mm]			E4 [mm]		
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{BR}
AL06	120	n/a	n/a	120+PFL	n/a	$60+110xNFT_{BR}$
AL08	120			120+PFL		
AL10	130	275	370	130+PFL	275+PFL	
AL14	130	275	370	130+PFL	275+PFL	

See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

The L2 is limited to the maximum profile length of 8 m, as no connections are allowed on the single girder crane bridges.

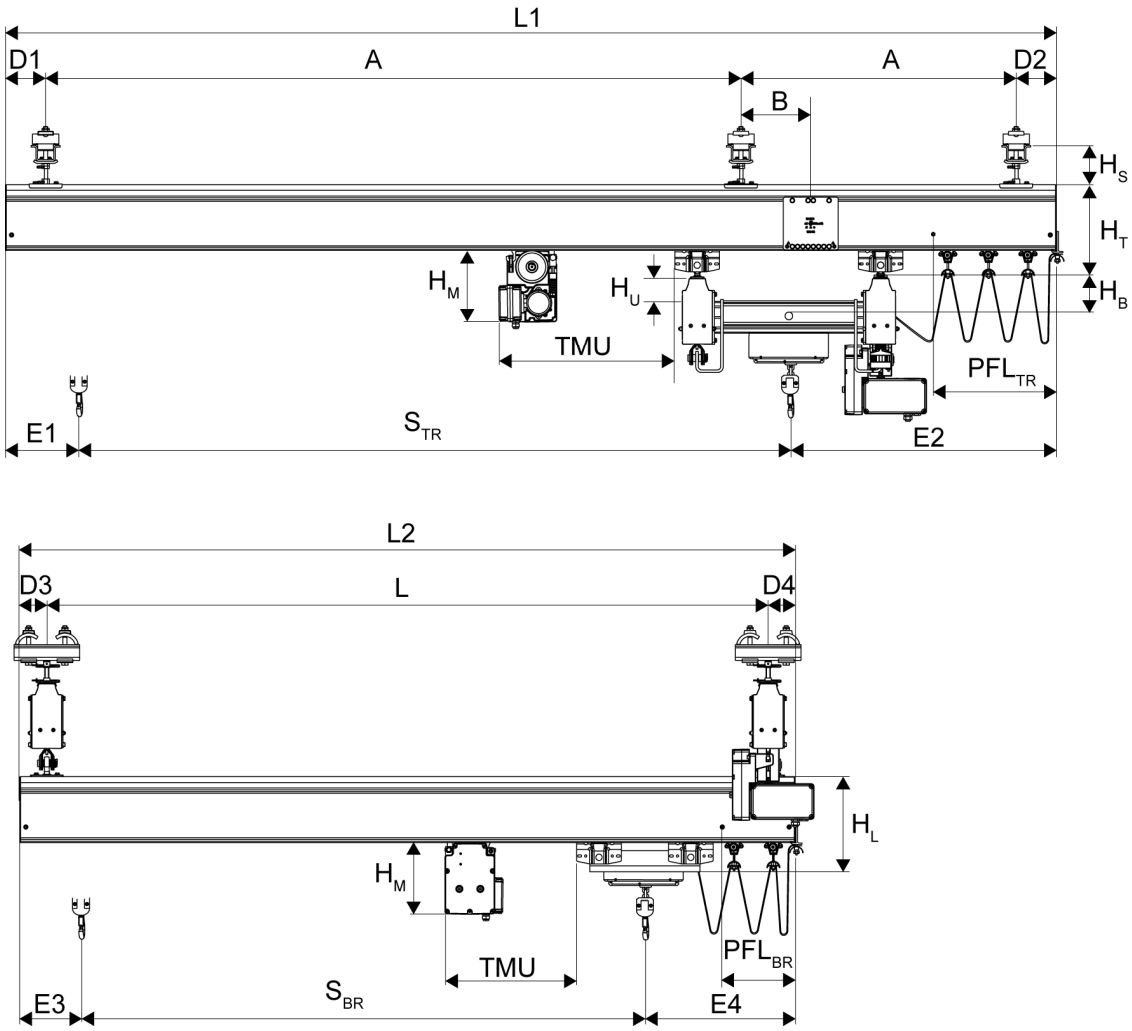
Crane bridge	H_T [mm]				H_B [mm]		H_L [mm]
	AL06	AL08	AL10	AL14	Single push trolley	Double push trolley	
AL06	2	52	94.5	125.5	172.5	n/a	333
AL08	-42.5	7.5	50	81	222.5		377.5
AL10	n/a	n/a	5.5	36.5	265	270	422
AL14	n/a	n/a	-24.5	6.5	296	301	452

Note: A negative H_T value means that the crane bridge is higher than the track.

Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]							
		AL06		AL08		AL10		AL14	
AL06/08	Single push trolley	AL06B160	34.7	AL08B160	44.8	n/a		n/a	
AL10/14	Single push trolley	AL06B165	41.3	AL08B165	51.4	AL10B160	58.7	AL14B160	59.7

4.4.5 Double girder articulated crane bridge



Track	E1 [mm]			E2 [mm]			H_T [mm]		D1, D2 min./max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{TR}	Single push trolley	Double push trolley		
AL06	440	n/a	n/a	440+PFL	n/a	$60+110xNFT_{TR}$	233	n/a	100/150	*
AL08	440			440+PFL			283			
AL10	500	650	370	500+PFL	650+PFL		325.5	333.9		
AL14	500	650	370	500+PFL	650+PFL		356.5	364.9		

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

Crane bridge	E3 [mm]		E4 [mm]		H_U	H_L	H_B [mm]	D3 min./max. [mm]	D4 min./max. [mm]
	Double push trolley	TMU	Double push trolley	PFL_{BR}			Double push trolley		
AL06	318	n/a	258+PFL	60+110xNFT_{BR}	-42.5	238.5	-17.5	100/150	100/150+PFL_{BR}
AL08	318		258+PFL		7.5	288.5	32.5		
AL10	378	370	323+PFL		54	330	98.5		
AL14	378	370	323+PFL		85	361	129.5		

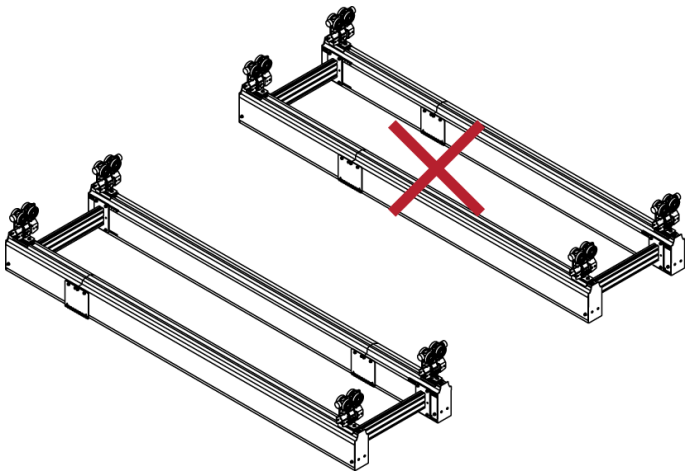
The B max. dimension also applies between the crane bridge suspension and the connection set fitted on the crane bridge.

See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

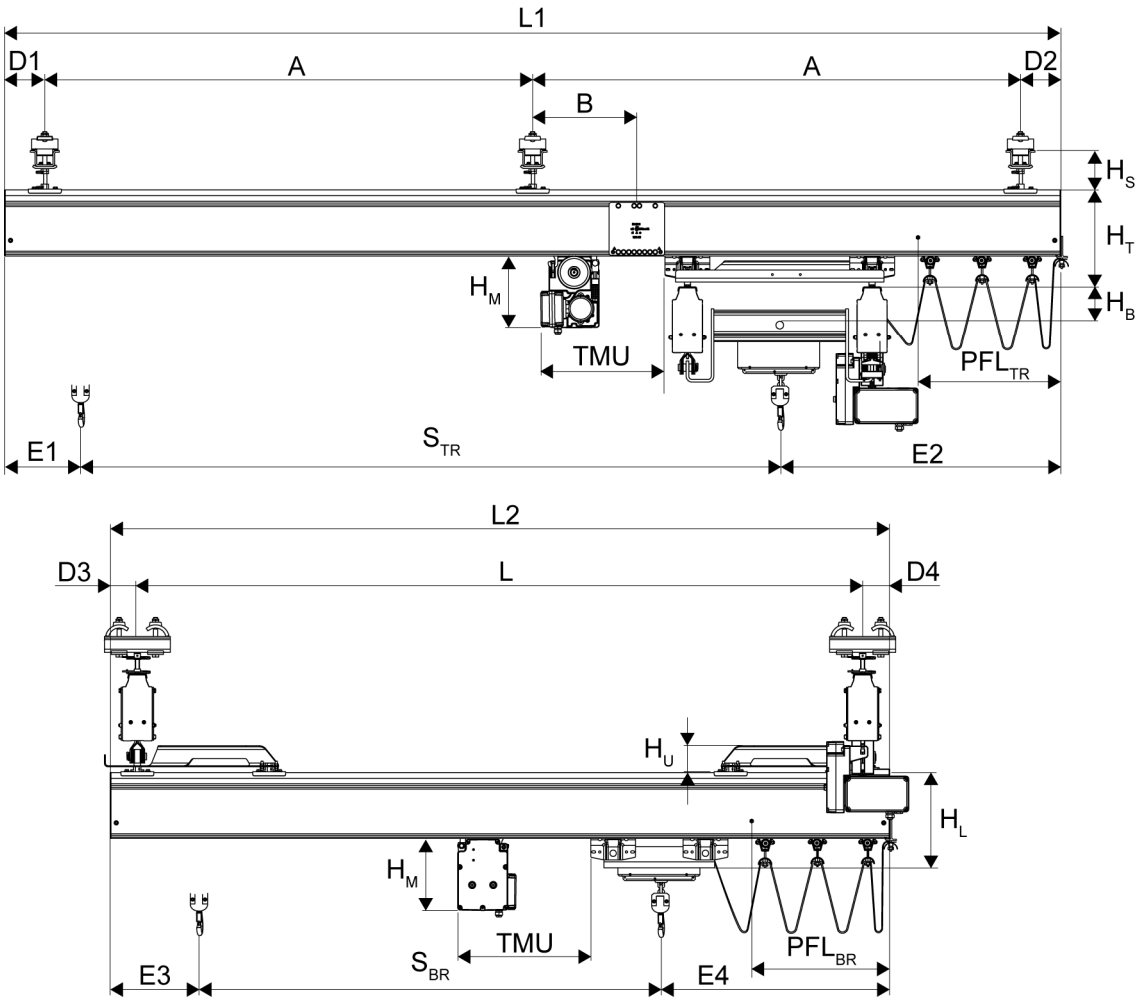
Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]							
		AL06		AL08		AL10		AL14	
AL06/08	Single push trolley	AL06B210	27.8	AL08B210	29.5	AL10B215	34.2	AL14B215	35.7
AL10/14	Single push trolley	AL06B215	40.6	AL08B215	42.6	AL10B210	47.6	AL14B210	47.8
AL10/14	Double push trolley	n/a		n/a		AL10B220	74.2	AL14B220	75.8

Note: The connection sets on girders must be installed diagonally.



4.4.6 Double girder rigid crane bridge



Track	E1 [mm]			E2 [mm]			H_T [mm]		D1, D2 min./ max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{TR}	Single push trolley	Double push trolley		
AL10	498	643	0	498+PFL	643+PFL	$60+110xNFT_{TR}$	335.5	345.6	100/150	*
AL14	498	643	0	498+PFL	643+PFL		366.5	376.6		

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

The ALTM motor trolley fits inside the triangle part, so no additional length is required.

Crane bridge	E3 [mm]		E4 [mm]		H_U	H_L	H_B [mm]	D3 min./max. [mm]	D4 min./max. [mm]
	Double push trolley	TMU	Double push trolley	PFL_{BR}			Double push trolley		
AL10	330	370	330+PFL	$60+110xNFT_{BR}$	102	330	98.5	100/150	$100/150+PFL_{BR}$
AL14	330	370	330+PFL		102	361	129.5		

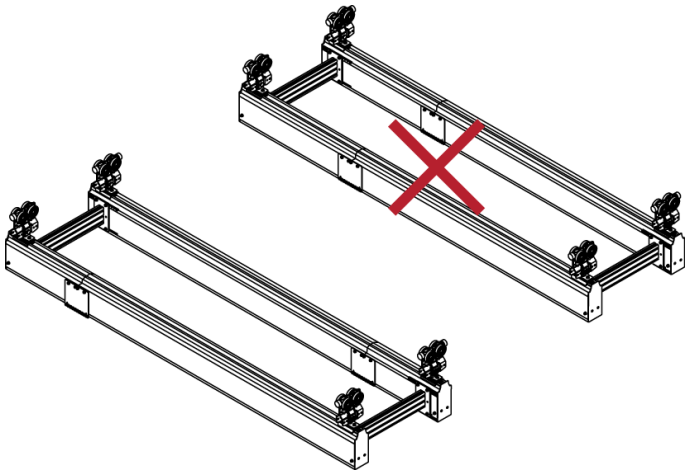
See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

The B max. dimension also applies between the crane bridge suspension and the connection set fitted on the crane bridge.

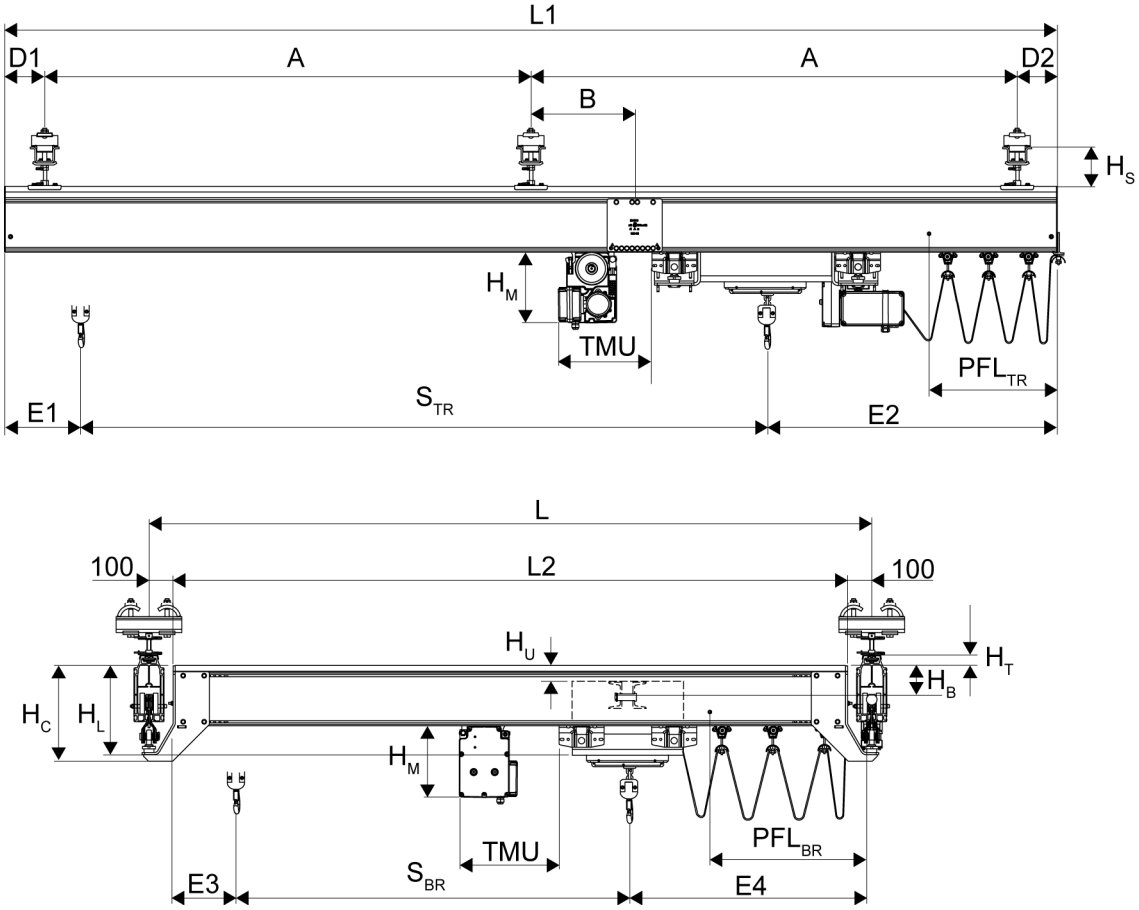
Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]					
		AL06	AL08	AL10		AL14	
AL06/08	Single push trolley	n/a	n/a	n/a		n/a	
AL10/14	Single push trolley	n/a	n/a	AL10B230	56.2	AL14B230	56.8
AL10/14	Double push trolley	n/a	n/a	AL10B240	102	AL14B240	102.5

Note: The connection sets on the girders must be installed diagonally.



4.4.7 Double girder low headroom crane bridge



Track	E1 [mm]			E2 [mm]			D1, D2 min./max. [mm]	B [mm]
	Single push trolley	Double push trolley	TMU	Single push trolley	Double push trolley	PFL_{TR}		
AL06	440	n/a	n/a	440+PFL	n/a	$60+110xNFT_{TR}$	100/150	*
AL08	440			440+PFL				
AL10	500	645	370	500+PFL	645+PFL			
AL14	500	645	370	500+PFL	645+PFL			

***Note**: B min. = 100 mm, B max. = 10 % of AMAX.

Crane bridge	Rated capacity [kg]	E3 [mm]		E4 [mm]		H_U	H_L	D4 max. [mm]
		Double push trolley	TMU	Double push trolley	PFL_{BR}			
AL06	500	320	n/a	320+PFL	$60+110xNFT_{BR}$	-42.5	238.5	100
AL08	500	280		280+PFL		7.5	288.5	100
AL10	2000	305	370	305+PFL		54	371	100
AL14	2000	305	370	305+PFL		85	361	100

See chapter Festoon under profile for the calculation of the number of festoon trolleys (NFT) required.

The B max. dimension also applies between the crane bridge suspension and the connection set fitted on the crane bridge.

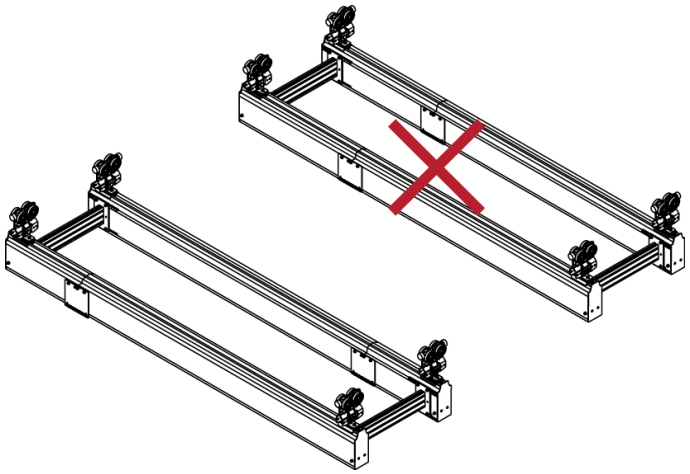
Crane bridge	H_T [mm]				H_B [mm]	H_C [mm]
	AL06	AL08	AL10	AL14		
AL06	6.5	56.5	99	130	-17.5	270
AL08	-45	5.5	48	79	32.5	321.5
AL10	n/a	n/a	-2	29	98.5	371
AL10	n/a	n/a	-1	30	98.5	371
AL14	n/a	n/a	-16	15	129.5	385
AL14	n/a	n/a	-15	16	129.5	385

Note: A negative H_U or H_T value means that the crane bridge is higher than the track.

Bridge kit references and weights

Track profile	Push trolley type	Crane bridge profile and weight [kg]							
		AL06		AL08		AL10		AL14	
AL06/08	Single push trolley	AL06B260	45.8	AL08B260	44.5	n/a		n/a	
AL10/14	Single push trolley	AL06B265	59	AL08B265	57.7	AL10B260	51.5	AL14B260	51.5
AL10/14	Double push trolley	n/a		n/a		AL10B270	94.4	AL14B270	96.4

Note: Connection sets on girders must be installed diagonally.



5 CRANE COMPONENTS IN DETAIL

5.1 Interfaces with support steel works

The suspensions are an important part of a light crane system. Their articulated construction minimizes the horizontal stresses transmitted to the building structure. Due to the identical interface shape on all profile types, any suspension type can be selected for any profile type.

The suspensions can be easily adjusted vertically on site in a range of ±30 mm with threaded bars, and in a wider range by a simple cutting at length according to the building configuration. This allows compensating for the possible unevenness of the building structure.

Limiting values

All suspensions are designed for a maximum load of 3000 kg, taking into account the dynamic factor value of 0.25. See chapter Suspension limits and forces back to the supporting structure for the calculation of the suspension load.

The articulated construction allows for slight misalignment during assembly and operation, and coping with the building structure tolerances. The maximum angle between the suspension rod and the vertical direction is 5°. This tolerance helps to minimize the horizontal stress to the supporting structure.

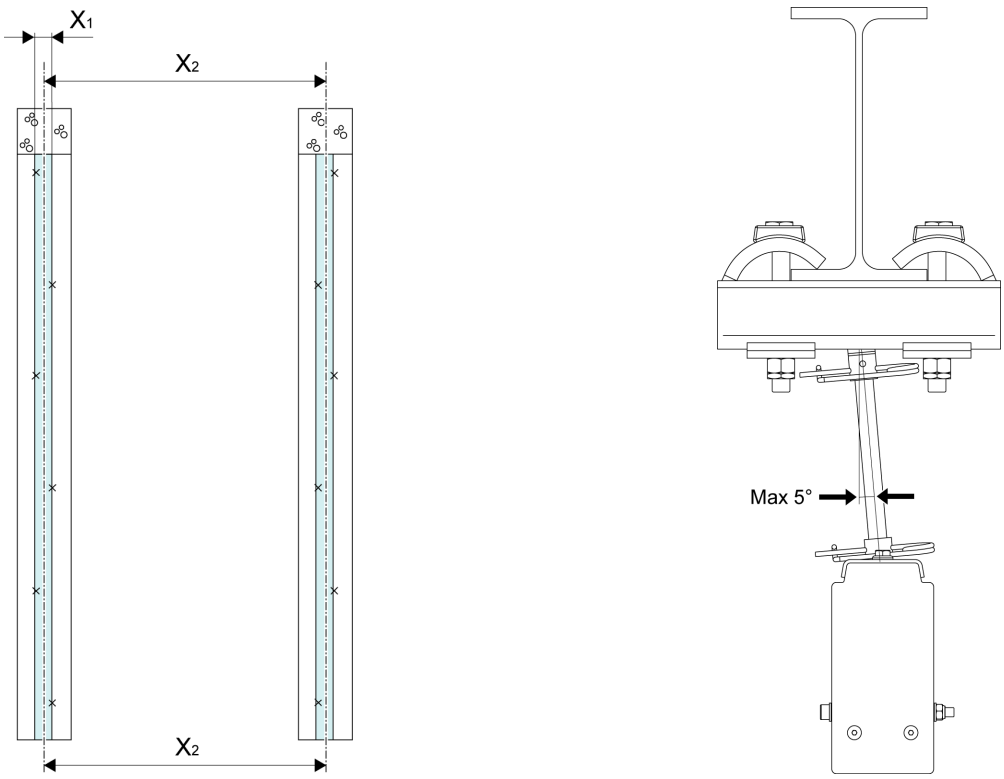


Figure 1. X_1 = ±5 mm, X2 = ± 5 mm.

Suspension range

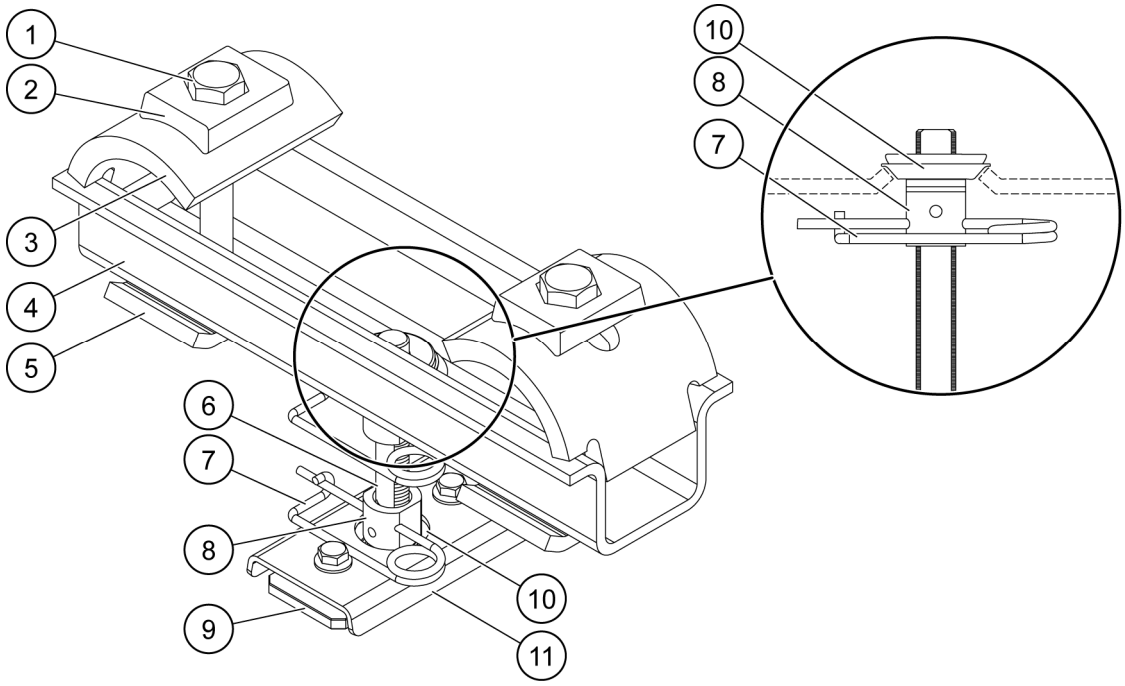
The suspensions are available in different sizes and shapes depending on the existing building structures, and can be connected to an I or H beam 80–300 mm wide, or directly to a ceiling or a wall.

For information on suspensions for inclined building structures, contact the Sales Support team.

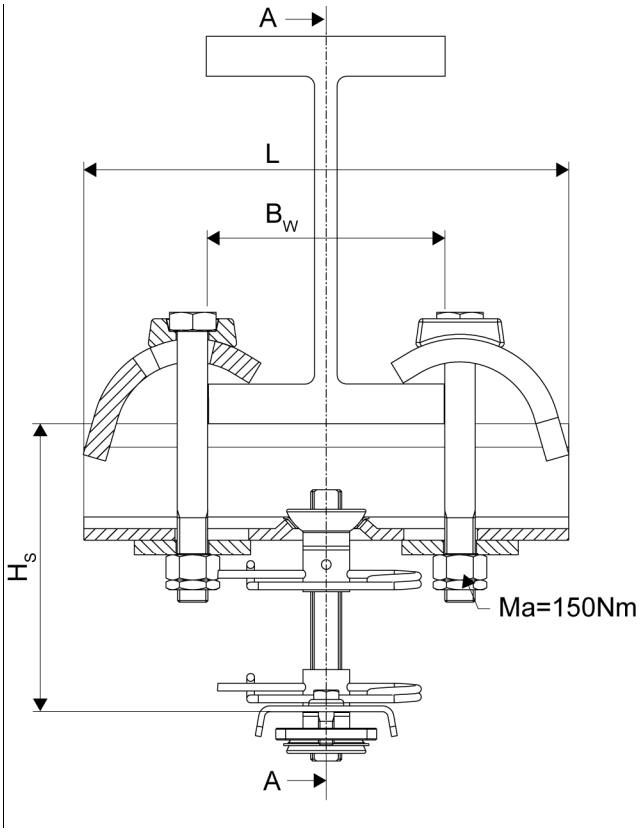
Safety locking

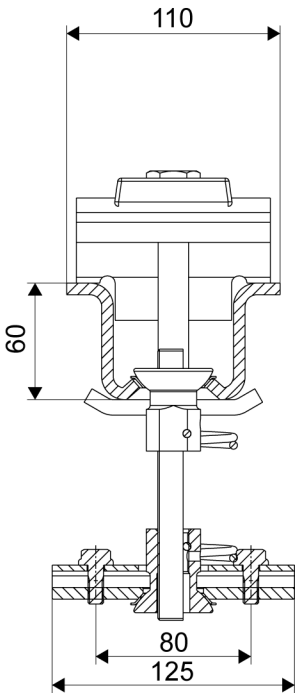
When the height is adjusted, the threaded rod is locked by safety pins at the top and the bottom to prevent any rotation of the suspension nuts.

5.1.1 Suspension for I-beam structure



Pos.	Part	Description
1	Fastening	Used to fasten the suspension parts to the I-beam.
2	Counter plate	Used to ensure that the head of the screw is correctly placed.
3	Beam clamp	The beam clamps rest on either side of the I-beam.
4	Upper suspension profile	Used to fasten the suspension parts to the I-beam.
5	Profile fixing plate	The profile fixing plates spread the forces across the metal U-profile.
6	Threaded bar	The threaded bar supports the weight of the crane.
7	Securing pin	The securing pin prevents the rotation of the threaded bar.
8	Suspension nut	The suspension nut connects the threaded bar to other suspension parts.
9	Suspension plate	The suspension plate slides into the groove on top of the track profile.
10	Washer plate	The washer plate works as a slide bearing between suspension parts.
11	Locking plate	The locking plate fastens the track profile to the suspension.

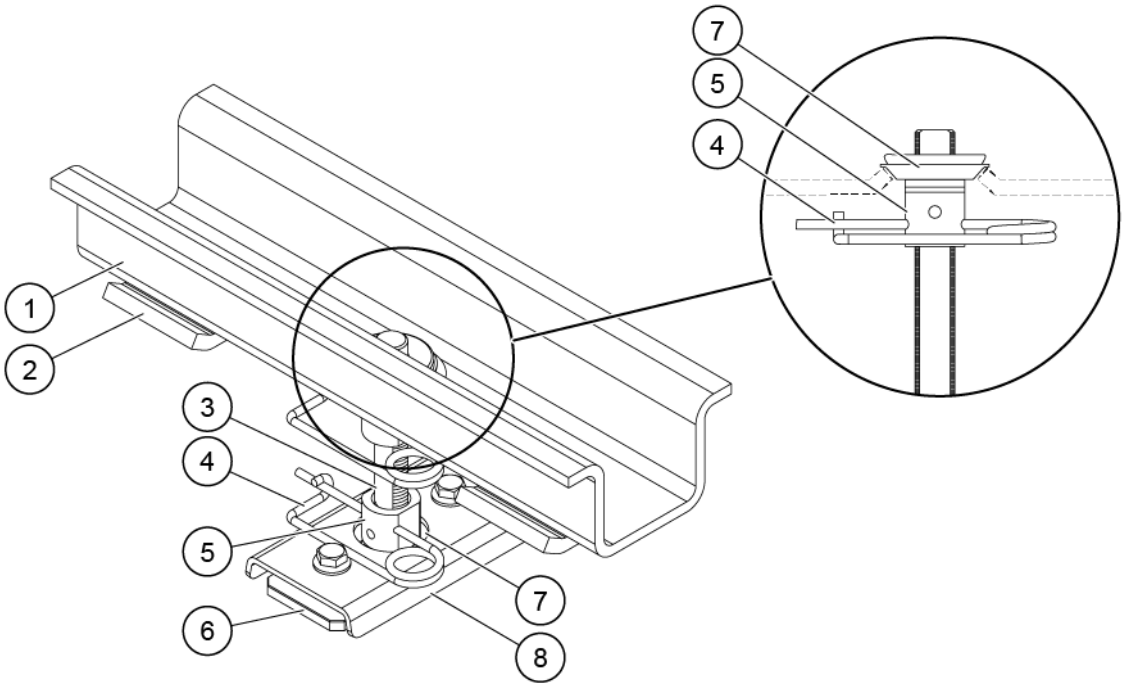




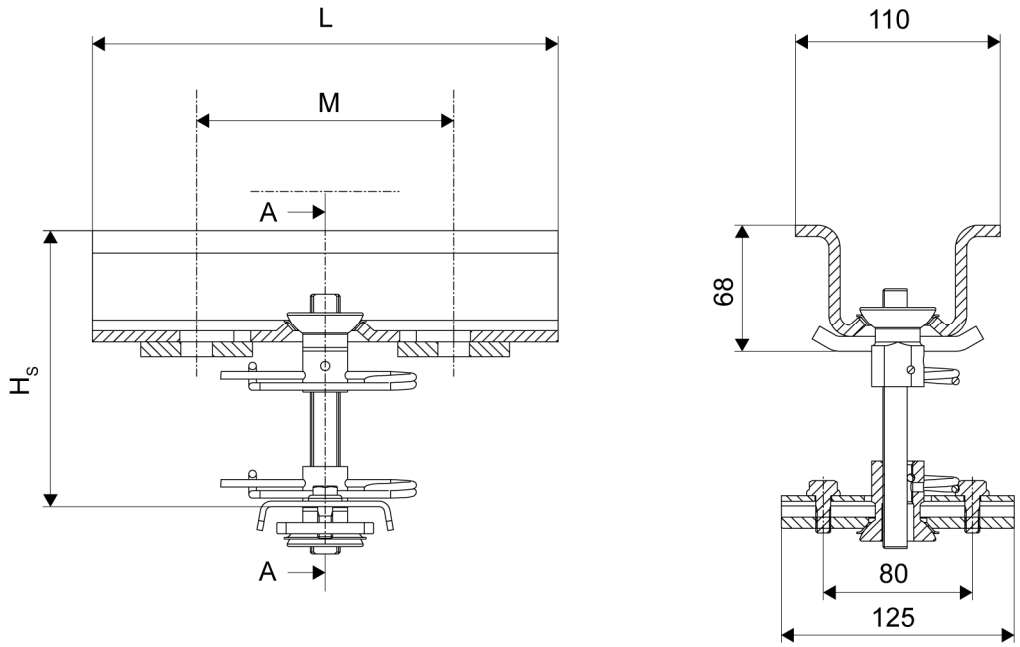
Type	H_S [mm]		Beam width B_W [mm]		Suspension profile length L [mm]	Product code
	min.	max.	min.	max.		
Short	110	220	80	120	250	AL14R020250
			80	220	350	AL14R020350
			160	300	430	AL14R020430
Long	110	480	80	120	250	AL14R040250
			80	220	350	AL14R040350
			160	300	430	AL14R040430
Fixing part for side support[1)]	n/a	n/a	80	120	250	PS4R100250
			80	220	350	PS4R100350
			160	300	430	PS4R100430

[1)] H_S > 350 mm: side supports are required, see chapter Extension sets and side supports.

5.1.2 Suspension for straight ceiling



Pos.	Part	Description
1	Upper suspension profile	Used to fasten the suspension parts to the building structure.
2	Profile fixing plate	The profile fixing plates spread the forces across the upper suspension profile.
3	Threaded bar	The threaded bar supports the weight of the crane.
4	Securing pin	The securing pin prevents the rotation of the threaded bar.
5	Suspension nut	The suspension nut connects the threaded bar to the other suspension parts.
6	Suspension plate	The suspension plate slides into the groove on top of the track profile.
7	Washer plate	The washer plate works as a slide bearing between suspension parts.
8	Locking plate	The locking plate fastens the track profile to the suspension



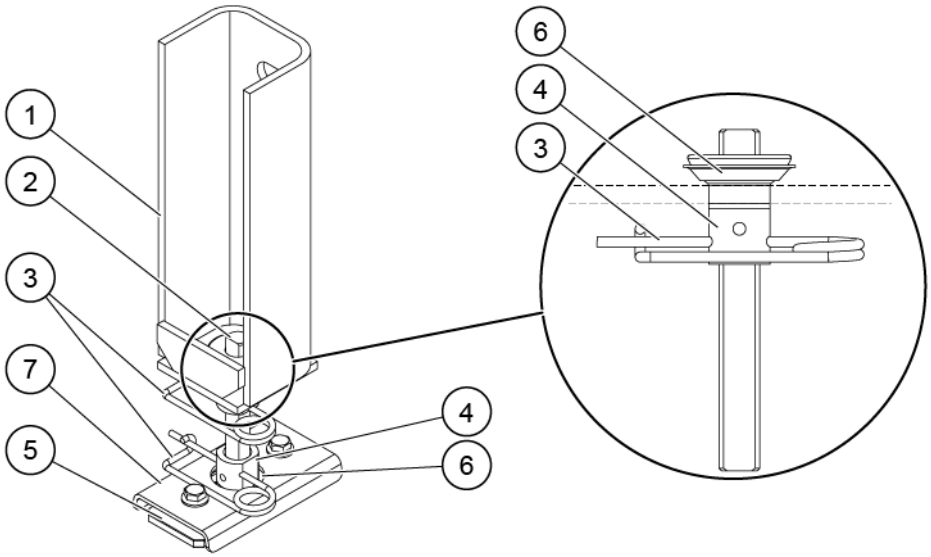
Type	H_S [mm]		Distance between fixing bolts M [mm]		Suspension profile length L [mm]	Product code
	min.	max.	min.	max.		
Short	110	220	98	138	250	AL14R010250
			98	238	350	AL14R010350
			178	318	430	AL14R010430
Long	110	480	98	138	250	AL14R030250
			98	238	350	AL14R030350
			178	318	430	AL14R030430
Fixing part for side support[1)]	n/a	n/a	98	138	250	PS4R090250
			98	238	350	PS4R090350
			178	318	430	PS4R090430

[1)] H_S > 350 mm: side supports are required, see chapter Extension sets and side supports

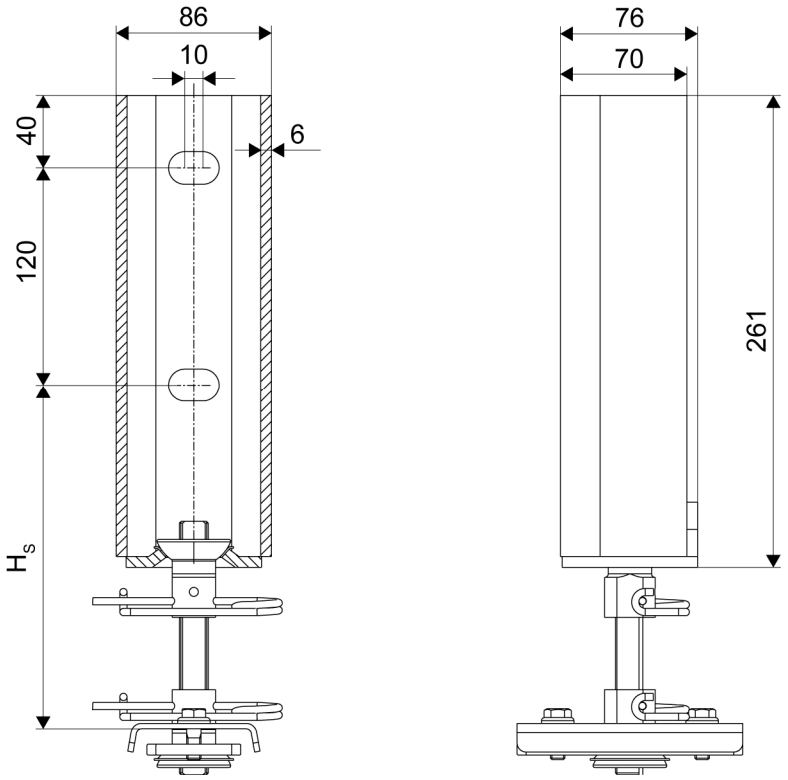
Use the M16 8-8 screws for anchor bolts.

Note: Local regulations concerning fixings on ceilings must be obeyed.

5.1.3 Bracket type suspension



Pos.	Part	Description
1	Upper suspension profile	Used to fasten the suspension parts to the building structure.
2	Threaded bar	The threaded bar supports the weight of the crane.
3	Securing pin	The securing pin prevents rotation of the threaded bar.
4	Suspension nut	The suspension nut connects the threaded bar to other suspension parts
5	Suspension plate	The suspension plate slides into the groove on top of the track profile.
6	Washer plate	The washer plate works as a slide bearing between suspension parts.
7	Locking plate	The locking plate fastens the track profile to the suspension.

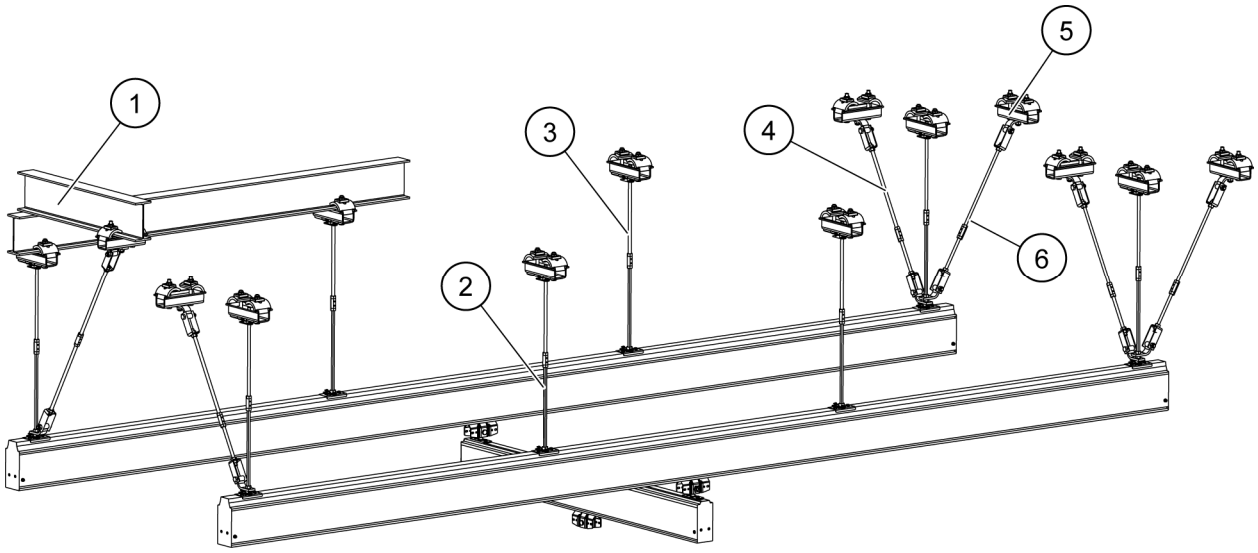


Type	H_S [mm]		Height between fixing bolts [mm]	Bracket height [mm]	Product code
	min.	max.			
Short	160	270	120	261	AL14R050
Long	160	630	120	261	AL14R060
Fixing part for side support[1)]	n/a	n/a	120	261	PS4R110

[1)] H_S > 350 mm: side supports are required, see chapter Extension sets and side supports.

Use the M16 8-8 screws for anchor bolts.

5.1.4 Extension sets and side supports



Pos.	Part	Description
1	Building structure	The crane is attached to the building structure (not supplied), or a free standing structure.
2	Suspension assembly	The interface between the track and the building structure.
3	Extension set	The suspension can be extended if necessary.
4	Lateral side support	Prevents lateral movement of the crane.
5	Side support bracket	The side support is attached to a suspension with the side support bracket.
6	Longitudinal side support	Prevents longitudinal movement of the crane.

When suspending height (Hs) exceeds the maximum nominal values stated in the tables above, it is possible to add 500-mm long extension sets, with a maximum quantity of 2 extension sets per suspension. The maximum Hs is 1480 mm.

Depending on the height of the suspensions, the rated capacity, and the rail type, side supports are required to prevent excessive movements of the crane. Longitudinal side supports are located at the end of the track in the direction of the track, and lateral side supports are located all along the track perpendicularly. The angle of the side supports shall be within the range of 30°–45°.

The following tables summarize the calculations of the quantities of side supports required depending on the working conditions and the profile sizes.

- Short suspensions: No side supports required
- Long suspensions, H_S lower than 350 mm: No side supports required
- Long suspensions, H_S higher than 350 mm: Side supports are required.

Longitudinal side supports

Rated capacity	350<HS≤500	500<HS≤700	700<HS≤1000	HS>1000
≤500	1 per track line	1 per track line	1 per track line	1 at each end
≤1000	1 per track line	1 per track line	1 at each end	1 at each end
≤2000	1 per track line	1 at each end	1 at each end	1 at each end

Lateral side supports

Rated capacity	350<HS≤500	500<HS≤700	700<HS≤1000	HS>1000
≤500	1 at each end	1 at each end	1 at each end	2 at each end
≤1000	1 at each end	1 at each end	2 at each end	2 at each end
≤2000	1 at each end	2 at each end	2 at each end	2 at each end

Maximum distance between consecutive lateral side supports

Rated capacity	350<HS≤500	500<HS≤700	700<HS≤1000	HS>1000
≤500	1 every X m [1)]	1 every X m	1 every X m	2 every X m
≤1000	1 every X m	1 every X m	2 every X m	2 every X m
≤2000	1 every X m	2 every X m	2 every X m	2 every X m

[1)]Value for X.

Rail size	Dimension X [m]
AL06	10
AL08	
AL10	20
AL14	

Product codes

Part	Product code
Extension set for suspension	PS4R080
Side support	PS4R070
Extension set for side support	PS4R085

Extension sets for suspension use threaded rods with a flat section to allow securing with safety pin.

Extension sets for side support use round threaded rods and are secured with counternuts.

Fixing parts for side supports

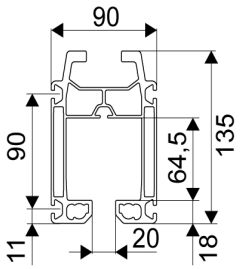
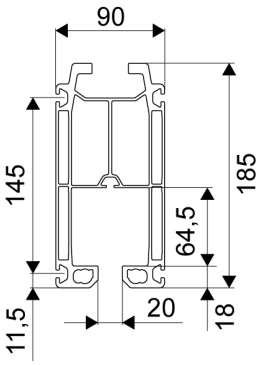
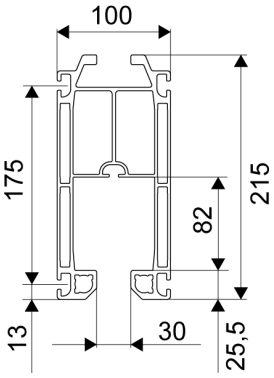
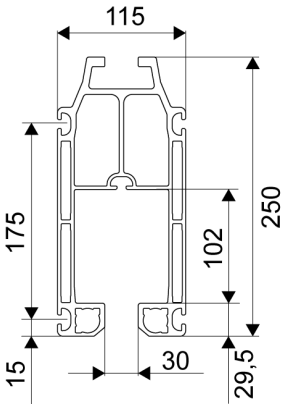
Suspension profile length L [mm]	Suspension type		
	Bracket	I-beam	Straight ceiling
276	PS4R110	PS4R100250	PS4R090250
344	-	PS4R100350	PS4R090350
420	-	PS4R100430	PS4R090430

5.2 Rail profiles

Material characteristics

Material	Aluminum alloy EN-AW6063 T66 according to EN755-2, anodized color C0 (natural)
E modulus [MPa]	69500
Poisson ratio	0.33
Density [kg/m³]	2700

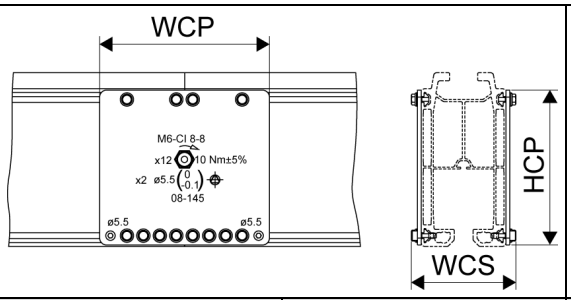
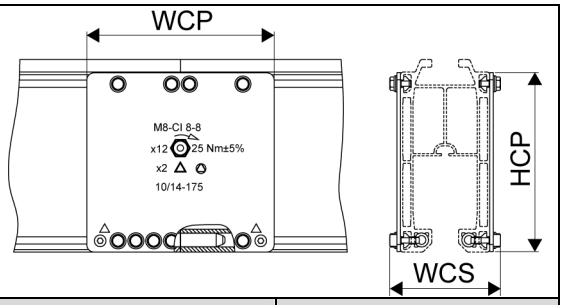
Dimensions

Profile size	**AL06**		**AL08**		**AL10**		**AL14**	
								
Inertia [mm⁴]	5010000		12530000		19570000		34020000	
Linear weight [kg]	6.55		8.64		10.9		14.6	
Groove size	Item 6		Item 6		Item 8		Item 8	
Length [mm]	**Weight [kg]**	**Product code**	**Weight [kg]**	**Product code**	**Weight [kg]**	**Product code**	**Weight [kg]**	**Product code**
1000	6.55	AL06P100	8.64	AL08P100	10.9	AL10P100	14.6	AL14P100
2000	13.1	AL06P200	17.28	AL08P200	21.8	AL10P200	29.1	AL14P200
3000	19.65	AL06P300	25.92	AL08P300	32.7	AL10P300	43.7	AL14P300
4000	26.2	AL06P400	34.56	AL08P400	43.6	AL10P400	58.3	AL14P400
5000	32.75	AL06P500	43.2	AL08P500	54.5	AL10P500	72.9	AL14P500
6000	39.3	AL06P600	51.84	AL08P600	65.4	AL10P600	87.4	AL14P600
7000	45.85	AL06P700	60.48	AL08P700	76.3	AL10P700	102	AL14P700
8000	52.4	AL06P800	69.12	AL08P800	87.2	AL10P800	116.6	AL14P800

5.3 Connection sets

The connections allow the construction of long-distance monorails and tracks. The design of the profile connection sets ensures total safety after the assembly: in addition to the fixing screws (4 at the top, 6 or 8 at the bottom), self-forming screws are added during the assembly to provide a positive locking. The tightening torques are engraved on the plates to ensure proper assembly and ease maintenance work.

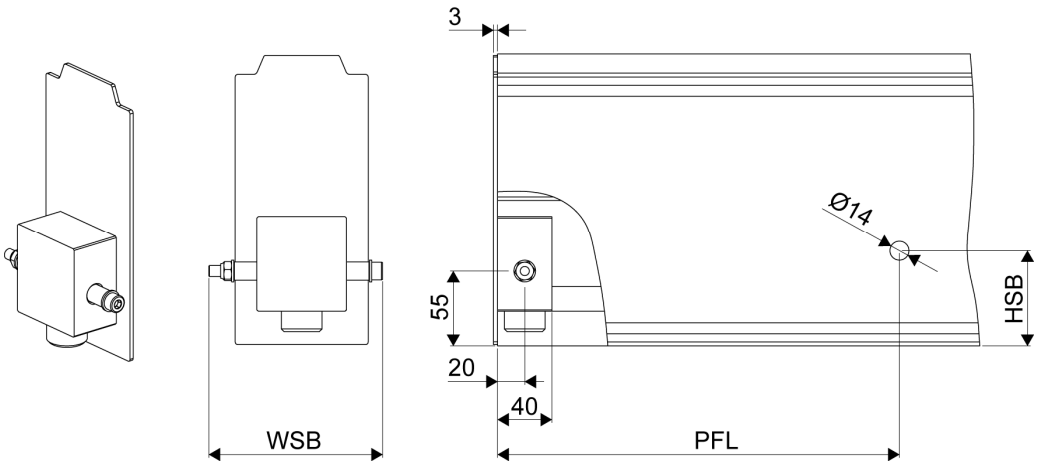
In addition to the connection plates, the AL10 and AL14 profiles are connected with additional connection pins inside the running surface. This provides a better force transfer when the load trolleys move from one rail segment to another.

Profile				
Profile size	**AL06**	**AL08**	**AL10**	**AL14**
Product code	AL06E020	AL08E020	AL10E020	AL14E020
Weight [kg]	1.57	2.3	3.9	4.2
Connection pins	No	No	Yes	Yes
WCP	145.5	180.5	210	210
HCP	110	165	200	200
WCS	111	111	124	139
Nbr of screws and screw size	12 x M6	14 x M6	14 x M8	14 x M8

5.4 End plate sets and end stops

The end plates are fixed to the ends of the monorails, tracks, and girders. They provide the function of visually closing the rails and preventing the trolley from falling out of the rail. The aluminum profiles are prepared (drilled and chamfered) at the factory to allow easy assembly on site. However, when the festoon power supply is used, an additional drilling has to be done during the assembly for the additional end stop that prevents the festoon trolleys from being damaged by the load trolley.

The end plate sets are not supplied for the low headroom crane bridges, as their functions are integrated in the design of the low headroom consoles.



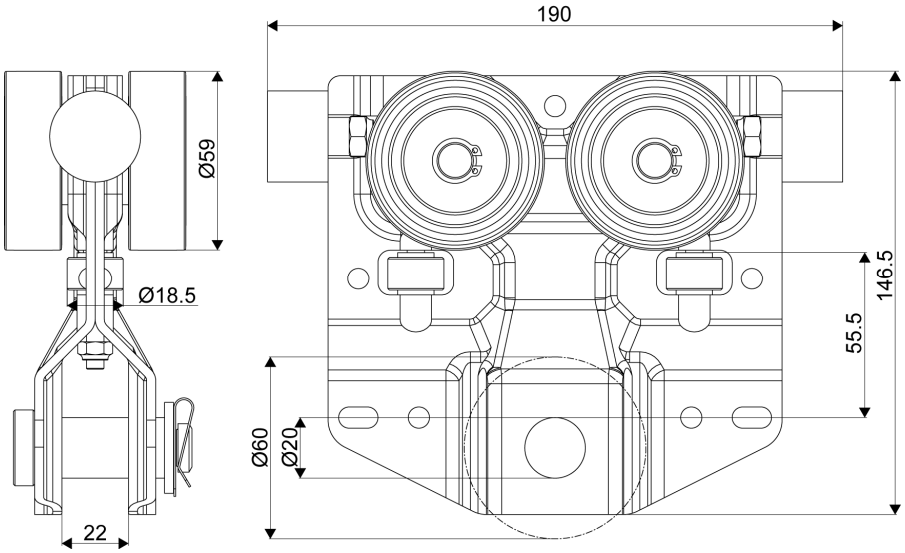
Profile size	Product code	Weight [kg]	WSB [mm]	HSB [mm]	PFL [mm]
AL06	AL06E010	1.4	118	60	60+110xNFT
AL08	AL08E010	1.5	118	60	
AL10	AL10E010	2.0	128	80	
AL14	AL14E010	2.2	138	85	

5.5 Trolleys

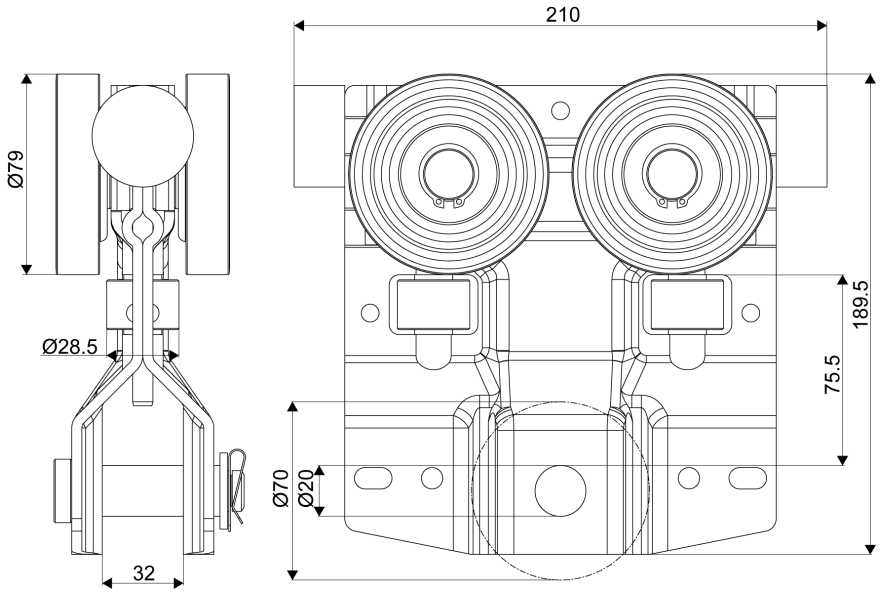
5.5.1 General characteristics

- Steel plate frame, electroplated for corrosion protection
- Support wheels made of wear-resistant plastics, mounted on maintenance-free ball bearing
- Guiding wheels made of wear-resistant plastics, mounted on maintenance-free ball bearing, thus minimizing friction from side forces, and preventing the crane bridge from getting stuck, especially for articulated crane bridges
- Rubber buffers at each end to damper shock against end plates and end stop
- Modular system allowing later motorization of an existing crane (for AL10 and AL14 rails).

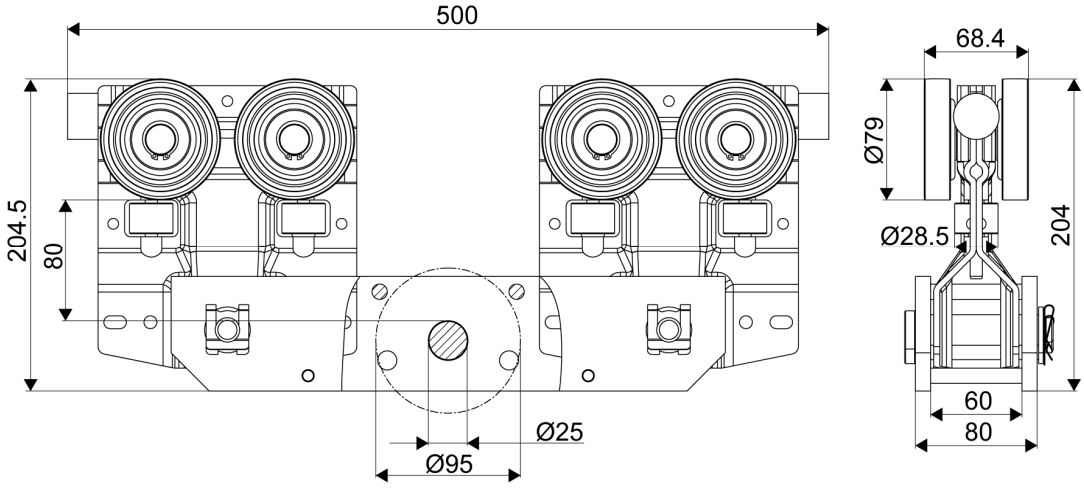
5.5.2 Single push trolley



Trolley	AL08T100
Maximum load on the bolt [kg]	600
Profile compatibility	AL06, AL08
Weight [kg]	2.3

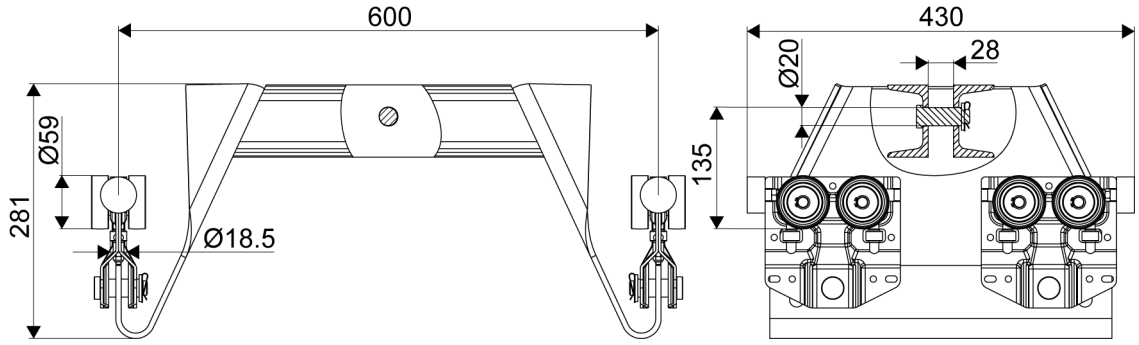


Trolley	AL14T100
Maximum load on the bolt [kg]	1250
Profile compatibility	AL10, AL14
Weight [kg]	3.2

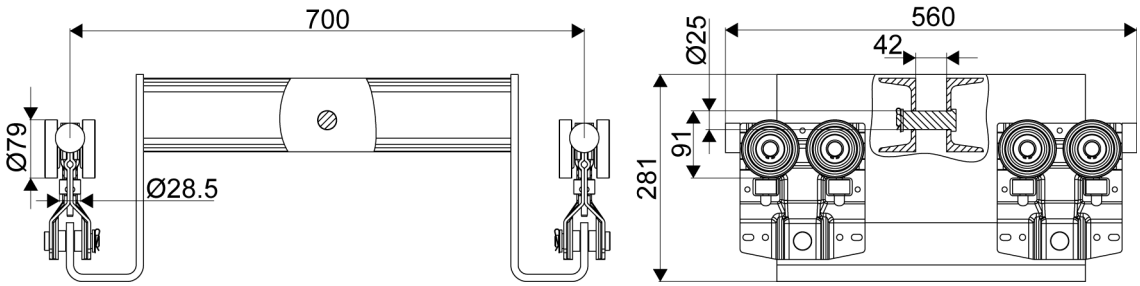


Trolley	AL14T200
Maximum load on the bolt [kg]	2500
Profile compatibility	AL10, AL14
Weight [kg]	12.2

5.5.3 Double push trolley

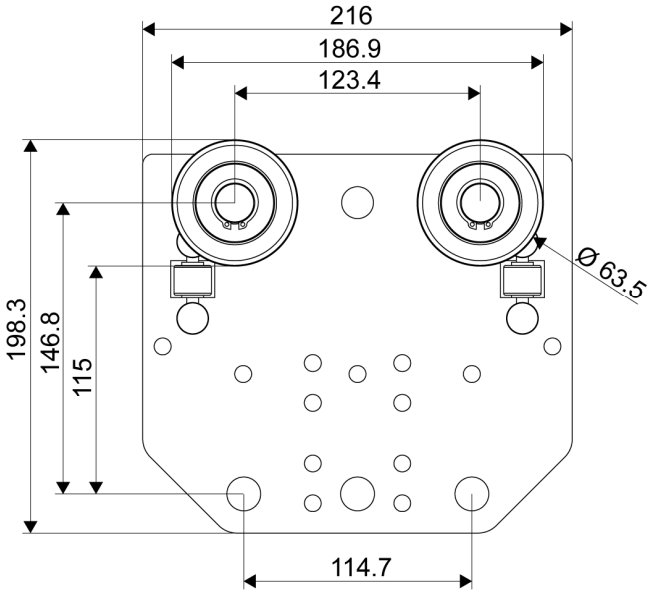


Trolley	AL08T500
Maximum load on the bolt [kg]	600
Profile compatibility	AL06, AL08
Weight [kg]	28.6

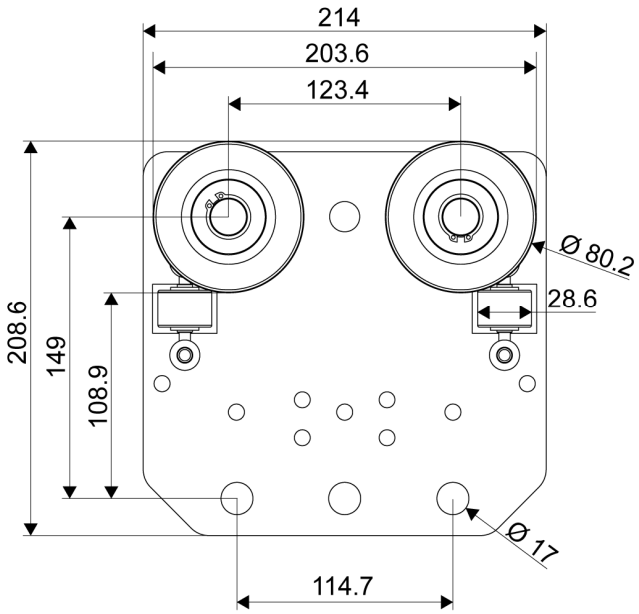


Trolley	AL14T500
Maximum load on the bolt [kg]	2500
Profile compatibility	AL10, AL14
Weight [kg]	61.4

5.5.4 Single push trolley for ATB

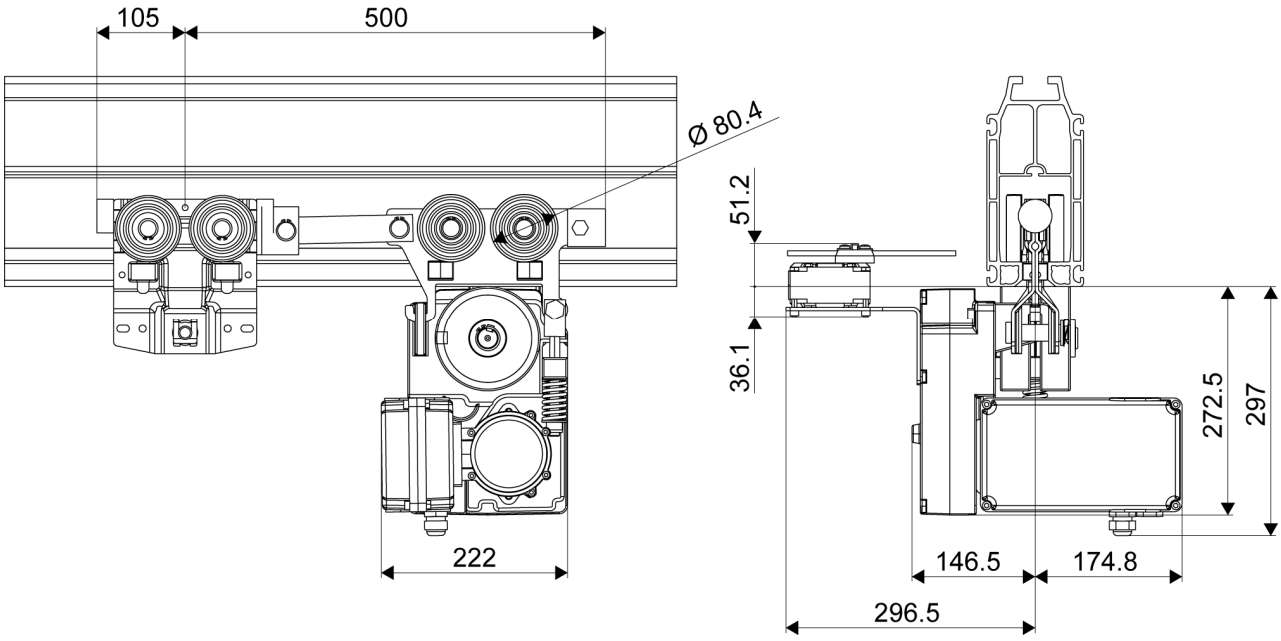


Trolley	TXS
ATB compatibility	All
Profile compatibility	AL06, AL08
Weight [kg]	2.35



Trolley	TXL
ATB compatibility	All
Profile compatibility	AL10, AL14
Weight [kg]	2.35

5.5.5 Motor trolley ALTM2



Trolley	ALTM2
Profile compatibility	AL10, AL14
Weight [kg]	22.4
H_M	272.5

The use of the motor trolleys is recommended in the following cases:

Criteria	Value	Long travel motorized	Cross travel motorized
Rated capacity [kg]	> 1000	Recommended	Recommended
Long span [m]	> 6	Recommended	Possible, not necessary
Long travel along track [m]	> 20	Recommended	Possible, not necessary
Difficult/hindered access to load preventing manual operation	–	Recommended	Recommended
Height of hook during travel too high to be reached	–	Recommended	Recommended
Installation height of crane (lifting device trolley) [m]	> 5	Recommended	Recommended
Working in outreach area	–	Recommended	Possible, not necessary

The ALTM motor trolleys are designed to push/pull the manual lifting device or crane bridge trolleys. They are fitted with the latest generation of KONECRANESTDV motors. This motor enables a large variety of speed combinations thanks to a simple fitting (dual or stepless speed) in the products. For additional safety, the traveling limit switches are recommended to prevent excessive stress to the end plates.

The ALTM motor trolley is directly attached to the manual trolley (lifting device or crane bridge trolley) with a rigid connection. It can be easily added on an existing “manual” installation at a later stage.

The motion is ensured by a rubber wheel. Its pressure against the profile is adjusted by a spring-loaded device.

See chapter Electric kits for motor trolleys for an overview of the mounting positions and possible combinations of the motor trolley.

The motor trolleys can be mounted between the festoon and the push trolley or on the opposite side of the festoon, depending on the hook approach requirements. The single girder rigid crane bridges are designed to house the motor trolley inside the triangle plate, thus saving in the hook approach.

Note: The ALTM motor trolleys are available with the AL10 and AL14 profiles only.

Note: See chapter Aluminum crane kit at a glance for the compatibility matrix.

Technical data for TMU motor in ALTM2 motor trolleys

The TMU units used in ALTM2 motor trolleys are driven with fixed voltages and frequencies. A frequency converter that is integrated in the ALTM2 motor trolley enables the handling of different power supply characteristics. The technical data is therefore the same for all line voltages.

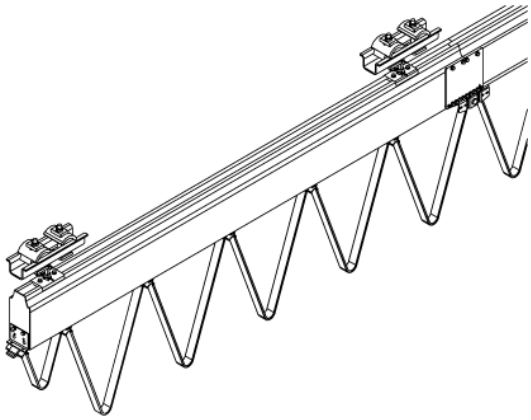
The scope of standard power supply covers voltages from 380 V to 480 V under frequency 50 or 60 Hz. If the power voltages are outside the range (min. 230 V, max. 600 V), transformers are supplied for each motor trolley.

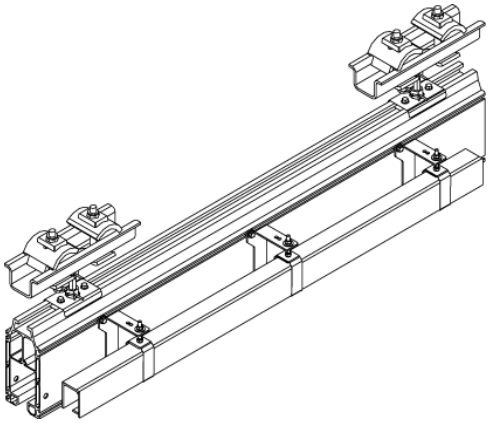
TMU motor				
Motor code	MF06MK200			
Speed control	Frequency converter TMK003			
Duty factor [%]	S3-40			
Main supply voltage [V] (-15 % ... +10 %, 3 phases)	380–480			
Main supply voltage frequency [Hz]	45…66			
Max current (starting) [A]	5.4			
Control voltage for digital inputs [V] (15±5 mA)	42–240			
Nominal power [W]	0.15			
IP class	IP55			
Rated capacity to carry [kg]	1000	1250	1600	2000
Speed range [m/min.]: 18.5-34.1	34.1	29.2	23.4	18.5
Min. acceleration and deceleration times [s]: 1.5-5.5	1.5	2.5	4	5.5

5.6 Energy supply

Two different solutions are available to supply the lifting devices and motor trolleys with electricity:

- Festoon under the profile for electric flat cable or pneumatic hoses (pneumatic lifting devices)
- Parallel enclosed conductor.





5.6.1 Festoon under profile

Festoon trolleys provide support for both the flat electric cable and pneumatic hoses. They run inside the profile. This solution is economical and ideal for light-duty applications with up to 40 m maximum electric flat cable length and only one crane bridge. The maximum length includes flat cable for both track and crane bridge.

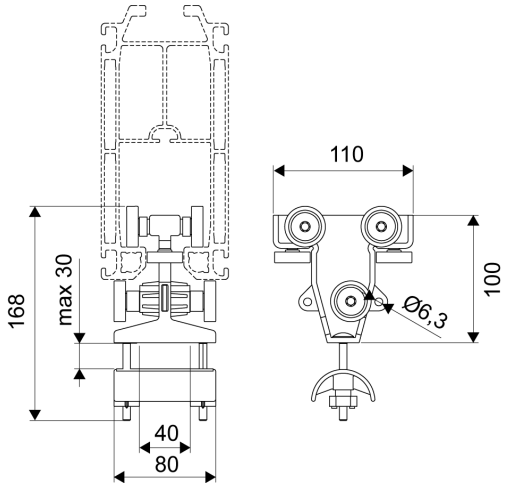
When required, the crane bridge outreach can be extended to make room for storing the festoon, thus increasing the load to be lifted for a given crane bridge length, or increasing the hook stroke for a given span.

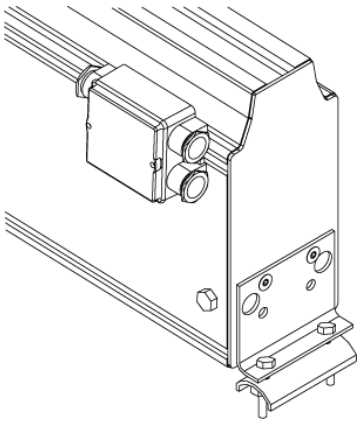
A lockable main isolation switch (type code UME104) can be provided for any power supply type to disconnect the light crane system from the main power supply.

A power supply cable between the main isolation switch and the system is also available. It contains a 3-meter long steel pipe and 5 m of round cable.

Electrical flat cable

Flat cable festoon systems comprise of the flat cable supported by cable trolleys. A connection box, an end attachment part, a towing chain, and carabiners are part of the supply. The height of the festoon is about 800 mm.





The cable storage area must be taken into account in the hook approach, and it is calculated as follows:

$$NFT = \text{rounded up}\left(\frac{S[m] * 1.25}{1.6}\right) - 1$$

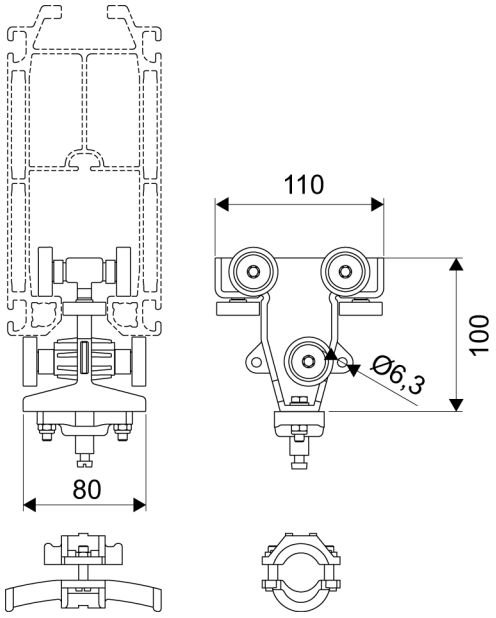
$$PFL = NFT * FTW + 60mm$$

See chapter Crane dimensions for the list of abbreviations used.

Rail size	Product code	Festoon trolley width [mm]	Trolley capacity [kg]
AL06/AL08	AL06F030	110	6.3
AL10	AL10F030	110	6.3
AL14	AL14F030	110	6.3

Pneumatic hose

The cable trolleys support the pneumatic hoses through a ball end joint that allows the spiral to extend.



The cable storage area must be taken into account in the hook approach, and it is calculated as follows:

$$NFT = \text{rounded up}\left(\frac{S[m] * 1.25}{1.6}\right) - 1$$

$$PFL = NFT * FTW + 60mm$$

See chapter Crane dimensions for the list of abbreviations used.

Rail size	Product code	Festoon trolley width [mm]	Trolley capacity [kg]	Spiral hose support	
				Hose diameter[mm]	Product code
AL06/AL08	AL06F030	110	6.3	10–16	AL06F131
AL10	AL10F030	110	6.3	17–25	AL10F131
AL14	AL14F030	110	6.3	26–36	AL14F131

Example of calculation (continued from Example 2 in chapter Examples of calculations)

- Lifting device trolley: Single push trolley AL14T100
- Crane bridge: Single girder articulated AL14B110, span L 5.6 m, outreach 0.1 m, Profile length 5.8 m
- Track: AL14, length 12 m

$$S_{BR} = 5800 - 2 * 150 = 5500$$

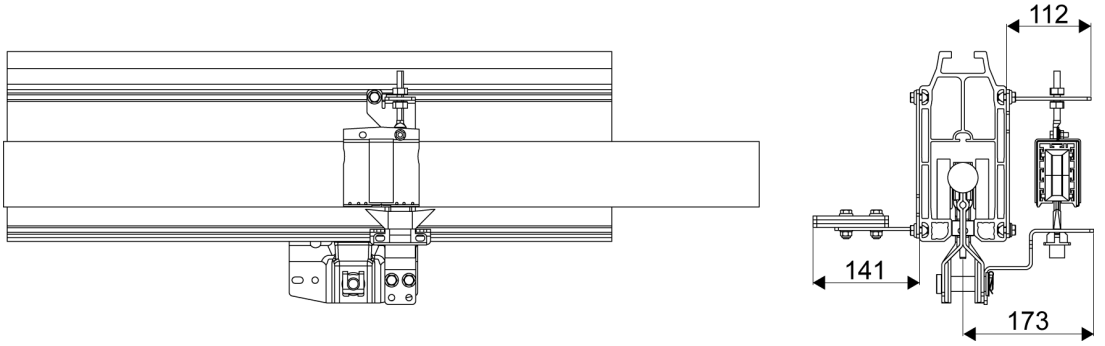
$$NFT_{BR} = \text{rounded up } (\frac{5.5 * 1.25}{1.6}) - 1 = 4$$

$$PFL_{BR} = NFT_{BR} * FTW + 60mm = 500mm$$

$$NFT_{TR} = \text{rounded up } (\frac{12 * 1.25}{1.6}) - 1 = 9$$

$$PFL_{BR} = NFT_{BR} * FTW + 60mm = 1050mm$$

5.6.2 Parallel enclosed conductors

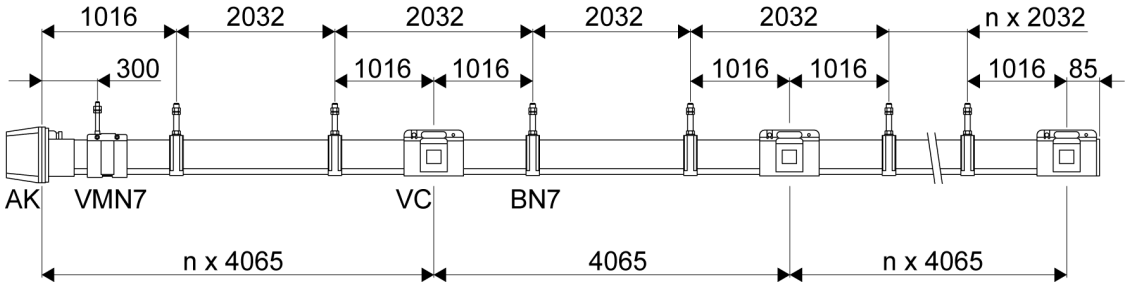


The use of the parallel enclosed conductors is recommended in the following situations: when the flat cable length exceeds 40 m, when there are more than two crane bridges, or when height-saving is needed. The parallel enclosed conductors also allows the use of the complete crane bridge length, which saves in the hook approach, especially in the low headroom crane bridges.

The counterweights are provided when their use is required to prevent the tilting of the profiles. The number of the counterweights is automatically defined by the product configurator. For more information, contact the Sales Support team.

The enclosed conductors are delivered in segment lengths of 3 or 4 m. The distance between the supports is around 2 m.

Example of installation with end feed



As a standard solution, the parallel enclosed conductors are the Koneductor RC4 or RC7, depending on the electric kits and the motorized movements that are required. Note that the Koneductor is available for the profiles AL10 and AL14 only, it is not available for the profiles AL06 and AL08.

As an option, the Vahle MKH and KBH enclosed conductors are available. The KBH allows only the supply of the lifting equipment and cross travel (electric kit “A”), and is available for all profile sizes. The MKH allows all electric kits but is available only for the profiles AL10 and AL14.

Enclosed conductor	Nbr of conductors	Max. current [A]	Height [m]	Width [m]	Collector trolley length [m]	Electric kits[1)]
Koneductor RC4	4	40	87	52	210	Track, A
Koneductor RC7	7	40	87	52	210	B, C
Vahle MKH	7	40	88	57	220	B, C
Vahle KBH	4	40	70	54	170	Track, A

[1)]Track: The conductor line along the track. A, B, C: The conductor line along the crane bridge.

The specially designed towing arms link the collector trolley to the push trolley, thus providing a continuous electrical connection.

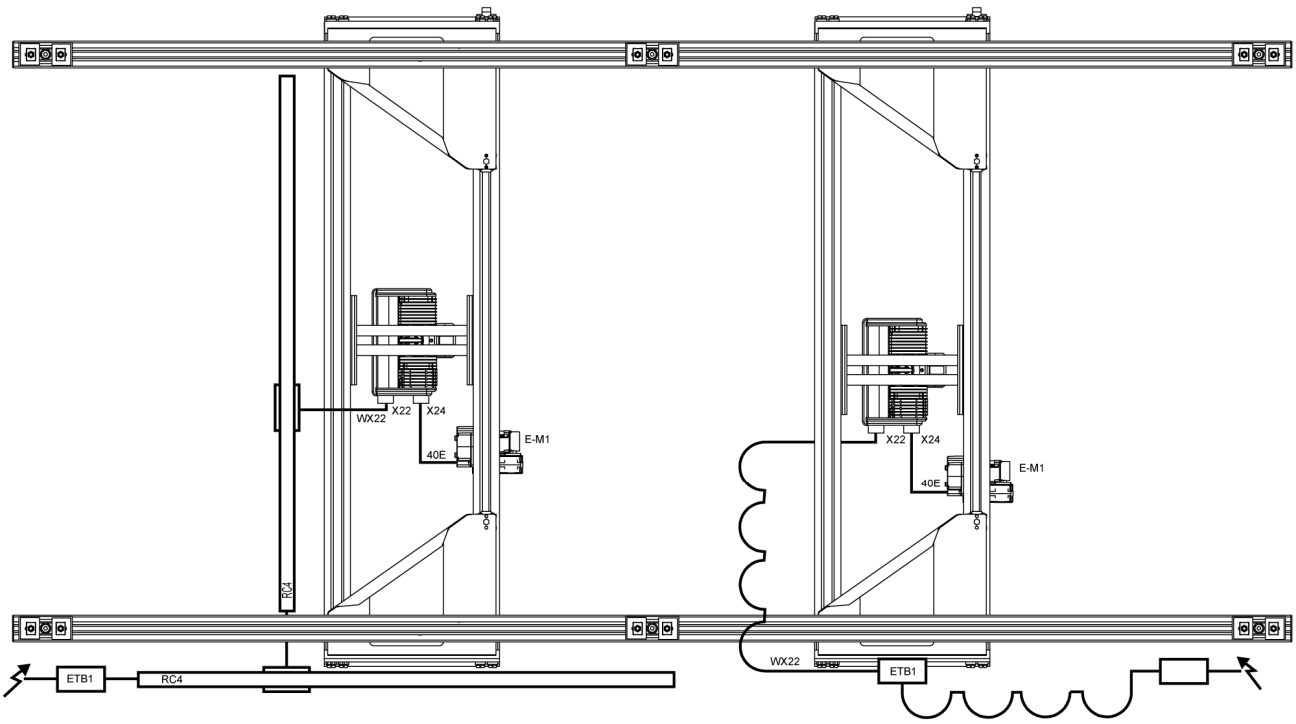
5.7 Electric kits for motor trolleys

The ALTM motor trolleys are supplied with an electric kit which does not require any particular wiring. The installation is made very easy with “plug & play” -connections betweenthe flat cables, motors, and cubicles. Each end has a number to simplify the assembly on site, without a diagram.

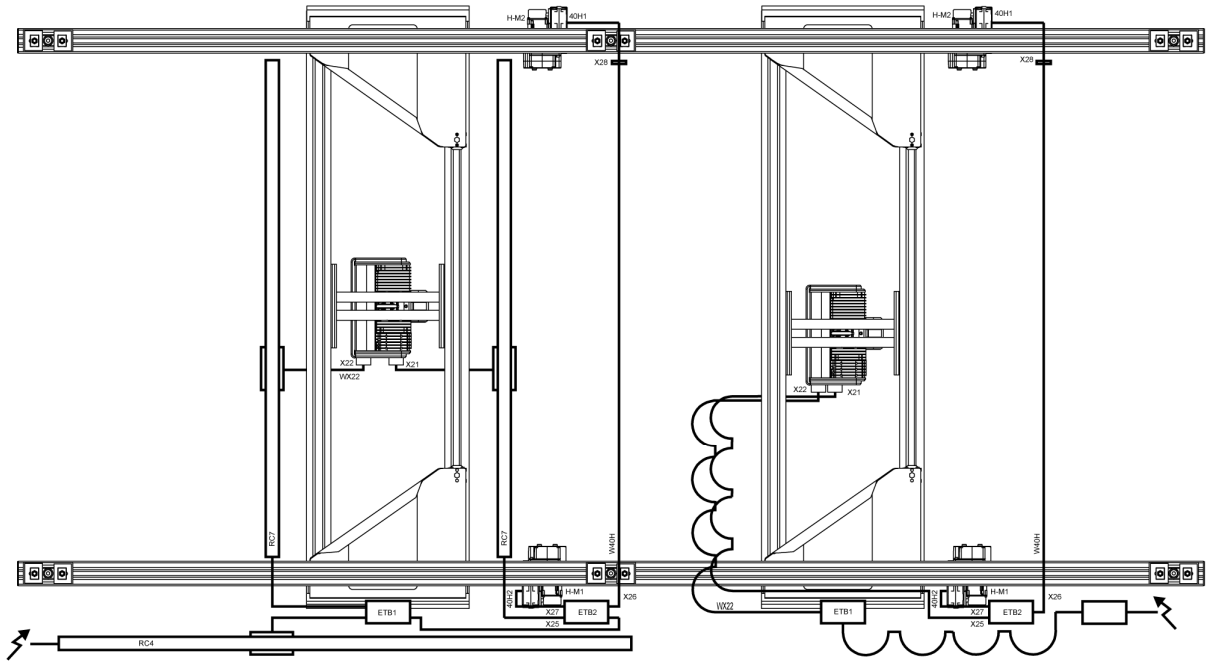
The ALTM motors are fed through the lifting device cubicle which is delivered as adapted to the required motions (cross and/or long travel). No extra contactors are needed.

The available solutions are the parallel enclosed conductors and the flat cable festoon. The default solution is the flat cable festoon. For more information, contact the Sales Support team.

Electric kit “A” for lifting device alone and with cross travel



Electric kit “B” for lifting device and long travel



Electric kit “C” for lifting device, cross travel, and long travel