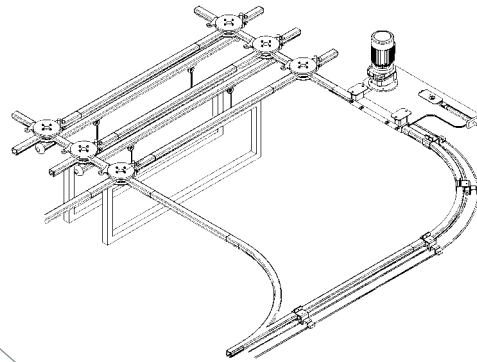


INSTALLATION & MAINTENANCE MANUAL

for overhead
conveyor systems



Scan QR code for
instructions about trolleys



Prologue:

On the instructions:

The instructions have been written so as to facilitate the installation of NIKO conveyor systems as much as possible. The information on this form has been checked carefully for their accuracy. However, there is not given guarantee for the correctness of the contents. The information on this form may change without notice.

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NIKO is a brand name of Helm Hellas SA and will be used from herein to describe the company.

Official manufacturer:



HELM HELLAS S.A.
82 Km Athens – Korinthos P.O. Box 209 GR 20100 Korinthos
Tel: 0030 (0) 2741076800
Fax: 0030 (0) 2741025368
e-mail: info@niko.eu.com
www.niko.eu.com

	<p> DANGER</p> <p>Read and fully understand operator's manual and all other safety instructions before using this equipment.</p> <p>Failure to follow operating instructions could result in serious <u>injury</u> or even <u>death</u>.</p>	
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INSTALLATION & MAINTENANCE of Overhead Conveyor Systems

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Prologue

Copyright

Brands

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4. ANNEX







1 SAFETY INDICATIONS

1.1 Safety symbols explanation

The following safety symbols are used to draw the attention of the reader to security indications.








SYMBOL	WARNING
	This symbol indicates danger and risk for the people or the conveyor system.
	This symbol indicates risk of electrical hazards.
	This symbol does not indicate safety instructions, but rather information to help gain a better understanding of the conveyor system operations.

1.2 Intended use of the conveyor system

SYMBOL	WARNING
	The conveyor system is to be used strictly for the transportation of goods, under the constraint of the maximum permitted load provided by the manufacturer. Any modifications to the system are prohibited and all operations must be carried out in accordance to all valid national and international legal requirements for safety and accident prevention [EC directives, DIN/ISO standards]
	Any operation of the conveyor system requires the study and understanding of the included instruction manuals provided by the manufacturer and the component suppliers.
	Any use other than the intended use is prohibited, especially personnel travelling on the conveyor facility.
	The conveyor system must only be operated when in perfect working condition. Regular checks must be performed concerning the conveyor support and the electrical connections of the system.

1 SAFETY INDICATIONS

1.3 Operators








SYMBOL	WARNING
	Only trained and authorised personnel are permitted to be involved with installation, operation or maintenance.
	The operator must study and fully understand the safety rules and intended use of the conveyor system.
	The personnel involved with installation, maintenance and operation must wear appropriate clothing (e.g. helmet, proper shoes, fall protection equipment etc.)
	Operators are obliged to keep other users informed about any abnormality, damage or inefficiency of the conveyor system, that might occur during operation.
	The operator is responsible for third parties in the work area
	The operator must be aware of the procedures to be followed in dangerous situations.
	Before any transportation of a load, ensure that it is well balanced and secured.

1.4 Noise Emmission

SYMBOL	WARNING
	The operator is responsible for identifying noise zones and taking the necessary protection measures.

1 SAFETY INDICATIONS

1.5 Residual risks

SYMBOL	WARNING
	It is forbidden to tamper with the conveyor system.
	The conveyor system must not be altered or modified without authorisation.
	Conveyor system operations must not exceed the safe working load (SWL), provided by the manufacturer. [SWL : the maximum working load to be safely lifted/suspended by the system]
	Any faults or damage to the conveyor system must be reported immediately.
	Manual moving of flight bars is strictly prohibited in automatic areas, while the conveyor is running.
	Do not use the conveyor system if the working condition of the structure or the components has been compromised.
	It is absolutely vital to use original fastenings supplied by the manufacturer, to avoid potential hazardous situations.

Please inform us of:

- ✓Faulty devices
- ✓Operating problems
- ✓Crashes

This information allows us to monitor the overall running of the system and helps our constant improvement on future applications.

2

INSTALLATION INSTRUCTIONS

2.1 NIKO Track profiles & Track bends

The standard length of NIKO track profiles is 6m.

The material of the profiles is low carbon steel S235JRG2.

The profiles can be delivered electro-zinc plated (15-20 μm thickness), painted (powder coating) or plain.



For conveyor areas with temperatures exceeding 120°C, profiles and bends are recommended to be plain, without surface treatment.

The dimensions and mechanical properties of the NIKO track profiles are provided in the following table :

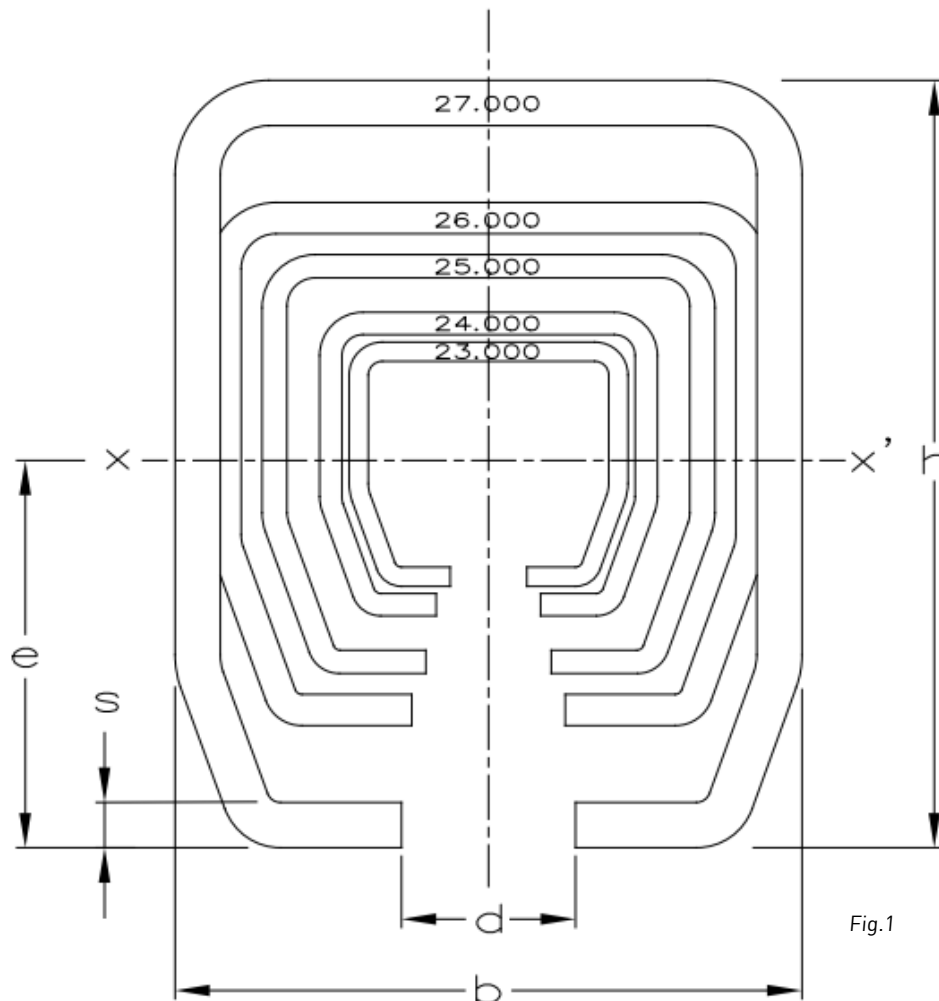


Table 1.

NIKO Track Profile No.	DIMENSIONS (mm)				Mechanical properties			
	h	b	d	s	Wx (cm ³)	Ix (cm ⁴)	e (mm)	Load (kg)*
23.000	35	40	11	2.75	2.5	5	19.9	120
24.000	43.5	48.5	15	3.2	4.4	10.9	24.8	180
25.000	60	65	18	3.6	10.1	34.1	33.8	470
26.000	75	80	22	4.5	19.8	83.1	42	730
27.000	110	90	25	6.5	51.7	312.7	60.5	1370

*Maximum permitted load per meter of track profile, for suspension /support distance 1m.

Depending on the layout of the system, various cut profile sections are often required. Therefore, the profiles must be cut to the corresponding lengths, prior to installation, following the process below :

STEP 1: Cut the track profile to the appropriate length. It is absolutely critical that the profile is cut vertically, as to avoid any possible misalignment problems, during profile installation or connection.

STEP 2: Grind/debur the cut edges.

All burrs must be thoroughly removed, to ensure free/smooth trolley movement during operation. All track profile edges should be lightly chamfered (max chamfer 0,3mm), using a metal file, as to eliminate any possible "gaps" or "steps" at the profile connection points. (fig.2)

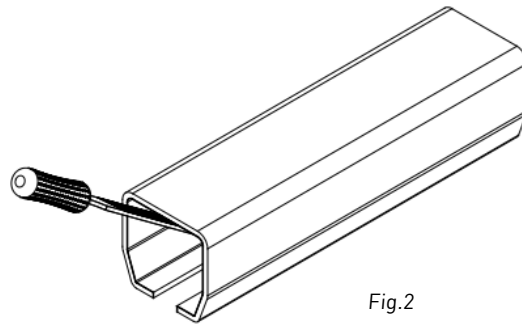


Fig.2

STEP 3: Check the slot dimension of the profile. Due to the stresses created during the production of the tracks, the profile ends may have widened after being cut, resulting, mainly, in wider profile slots. In order to restore the slots of the sections ends to their original width, the two profile side surfaces must be pressed together with a vice or clamp. (fig.3)

Nominal slot dimensions according to Table 2.

2

INSTALLATION INSTRUCTIONS

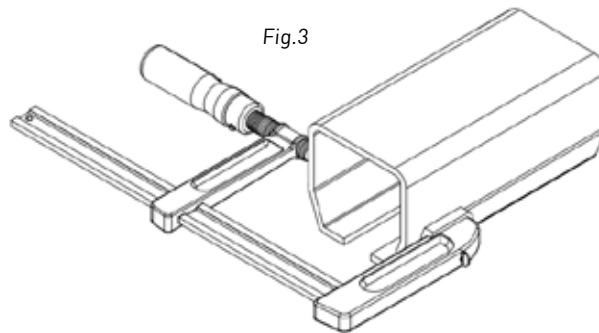


Table 2.

NIKO Track Profile No.	Nominal slot dimensions (mm)
23.000	11+1/-0.5
24.000	15+1/-0.2
25.000	18±1
26.000	22±1
27.000	25±1

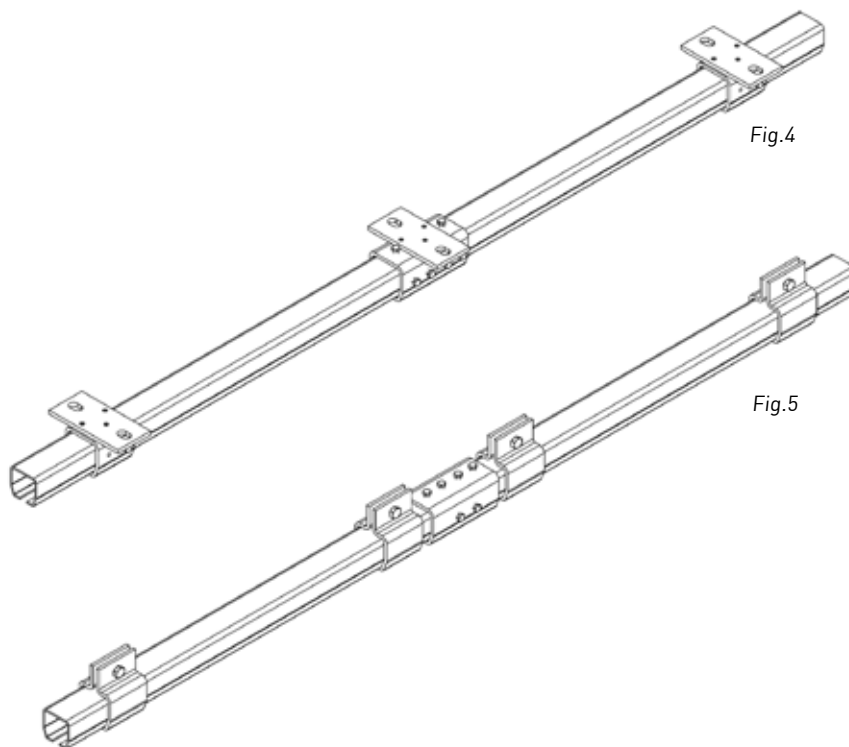
STEP 3 : Is not necessary for profile ends which will be connected through splice joints. Splice joints act as restrainers, perserving the measurements of the profile section.

STEP 4 : Clean the inner surfaces of the profile sections, if necessary, removing all burrs and material residues. The free/smooth movement of the trolleys must be ensured.

2.2 Splice joints

Splice joints are used for the connection between two straight profile sections. This includes track profile sections, track bends with straight sections at both ends, tongue switches, etc. The minimum length of the straight section of any connecting component must be half the length of the corresponding splice joint. This is necessary for the installation of the joints, as they cannot be installed on curved sections.

Splice joints are either self supported (e.g. type xx.B30, xx.B11, fig.4) or supported by two support brackets, one on each side (type xx.B49, fig.5).



For the installation of self supporting joints (fig. 4), position the joint on one of the connecting components (profile section, track bend, tongue switch, etc).



For the installation of splice joints (fig. 5), firstly position a support bracket on each connecting component and then position the splice joint on one of the components.

2

INSTALLATION INSTRUCTIONS

Generally, for splice joints installation the process below should be followed:

STEP 1 : Position the two connecting components inside the splice joint and slide the end surfaces together, precisely to the center of the joint.

STEP 2 : Tighten the upper bolts of the splice joint, lowering and securing the profile sections tightly onto the splice joint. Adjust the bolts accordingly, to ensure both profile sections are horizontal and there is no gap or the minimum possible gap between the two connected sections. The running/working surface must be flat, continuous and even throughout the joint.

STEP 3 : Adjust the side bolts of the splice joint, accordingly, to ensure the total alignment of the track slots, with no protrusions ensuring a smooth transition between tracks.



Horizontal and vertical alignment of the connecting profile sections is crucial and absolutely necessary. Horizontal alignment prevents unintentional trolley drift/movement. Vertical alignment prevents clashes or friction between protruding edges and the trolleys. Both alignments allow minimum connection gaps, avoiding unnecessary bearing clashes and wear.

The correct profile alignment is illustrated in fig. 6 below :

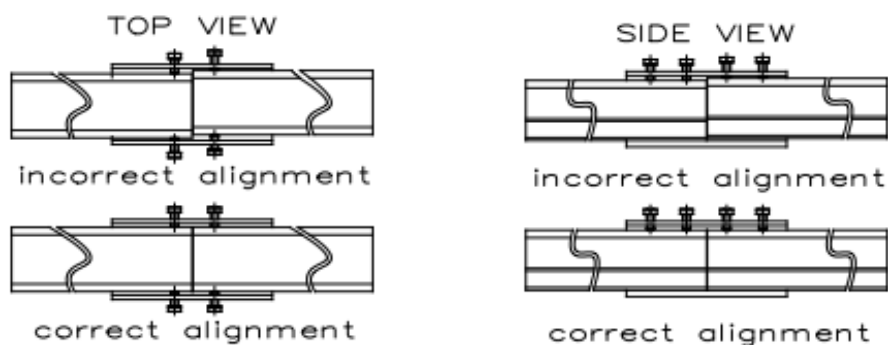


Fig.6

2.3 Support brackets

Support brackets are used to support tracks, track bends, switches etc, from a steel structure or the ceiling. The determination of the type of support brackets and the support distance are crucial for the safe operation of the conveyor system. Therefore, it is strongly recommended to follow the instructions and drawings provided by the manufacturer, regarding the suspension distance, the type and quantity of the support brackets.

General guidelines regarding support brackets :



As mentioned in the splice joint section (chapter 2.2), standard splice joints xx.B49 require support from both sides. xx.B49 are used strictly for profile connections and can not sustain loads. The positioning of the support brackets must be according to the maximum permitted distance given below, for each profile series (fig 7, Table 3) :

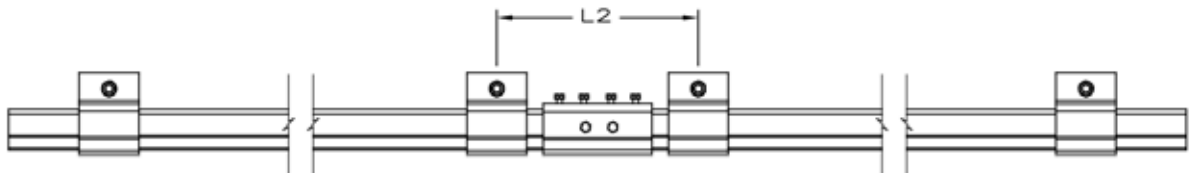


Fig. 7

Table 3.

NIKO Track Profile No.	Dimension L2 (mm)
23.000	270
24.000	300
25.000	370
26.000	430
27.000	470

2

INSTALLATION INSTRUCTIONS

- The initial stage of a profile section installation, requires two support brackets at both ends.
- The initial stage of a bend section installation requires minimum three support brackets, two at both ends and one the middle of the bend, as illustrated in fig. 8. These support brackets must not be omitted in any case.
- Additional support brackets can be positioned according to the instructions and drawing provided by the manufacturer.

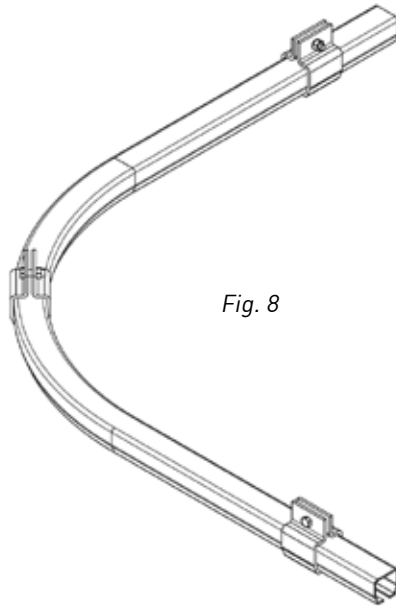


Fig. 8

- The initial stage of a switch installation requires three support brackets for series 23.000 to 24.000 and four support brackets for series 25.000 to 27.000, as illustrated in fig. 9. These support brackets must not be omitted in any case.

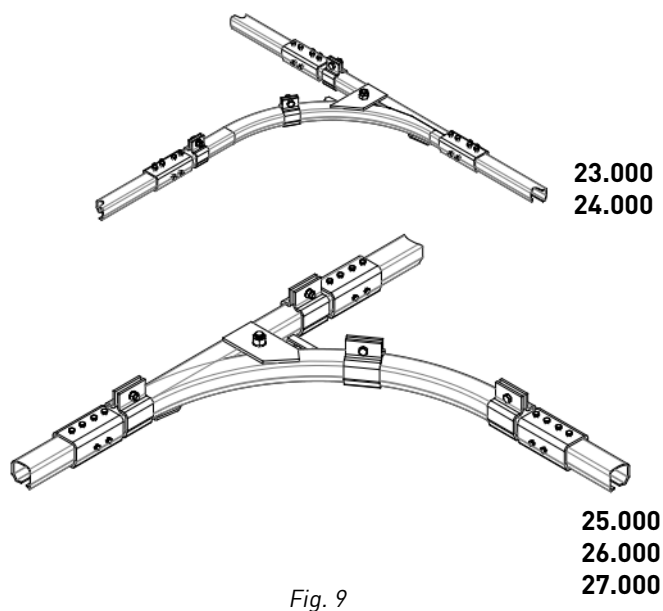


Fig. 9

INSTALLATION INSTRUCTIONS

- One piece support brackets (xx.B02, xx.B36, xx.B04 etc.) must always be installed onto the profile/bend/switch, prior to the installation of the component or the xx.B49 splice joints.
- Split suspension brackets can be positioned onto the profile/bend/switch after the initial installation with the required support brackets. Split suspension brackets are used for mounting directly to the underside flange of i-beams. Please consult NIKO technical catalogues for the suitability of the support brackets taking into consideration the type and size of the I-beam.
- Support bracket installation and positioning must be carried out according to the instructions and drawings provided by the manufacturer.



Support brackets xx.B02 must not be used in conveyor areas with switches and turn table switches. Switches require specific height for installation and operation, therefore space between the support structure and the profile is mandatory.

Generally, for support brackets installation the process below should be followed :

Step 1: Prepare all support brackets by loosening or removing all bolts and nuts.

Step 2: Position the support brackets of the track bends or switches, at the indicated support points, according to the layout. The support brackets positioned at the center of the bends must not be omitted.

Step 3: In the case of one piece support brackets, position the brackets on the profile sections, according to the layout, prior to the xx.B49 splice joints and installation. Secure into position by tightening the corresponding bolts.

In the case of split brackets, position one support bracket at each end of the profile section, to allow the suspension of the profile and continue with the remaining brackets, according to the layout, after installation.

Step 4: Suspend the component (profile section, bend or switch) by the support brackets positioned at each end.

Step 5: Continue with the rest of the components, according to the layout, following the manufacturer's instructions concerning the support points and distances.

Step 6: Secure and tighten all support brackets onto the supporting structures (steel structure, ceiling etc). recommended bolt tightening torques for each profile series, according to the table 4:

2

INSTALLATION INSTRUCTIONS

Table 4.

NIKO Split Support bracket No.	Torque (Nm)
23.B08-23.B14	24
24.B08-24.B20	26
25.B10-25.B26	70
26.B16-26.B26	110
27.B20-27.B26	130

Support distance calculation



For the calculation of the distance between support brackets, the following should be taken into account:

- The loading type, point load or distributed load between two consecutive support brackets.
- The quantity of the loads - Total load applied.
- Possible trolley accumulation areas of the conveyor system, for example buffer zones.
- Maximum allowable deflection under load $l/300$, l =suspension distance

A point load is considered to be applied on the profile through a loaded trolley or a flight bar positioned between two consecutive support brackets, as illustrated in fig. 10.

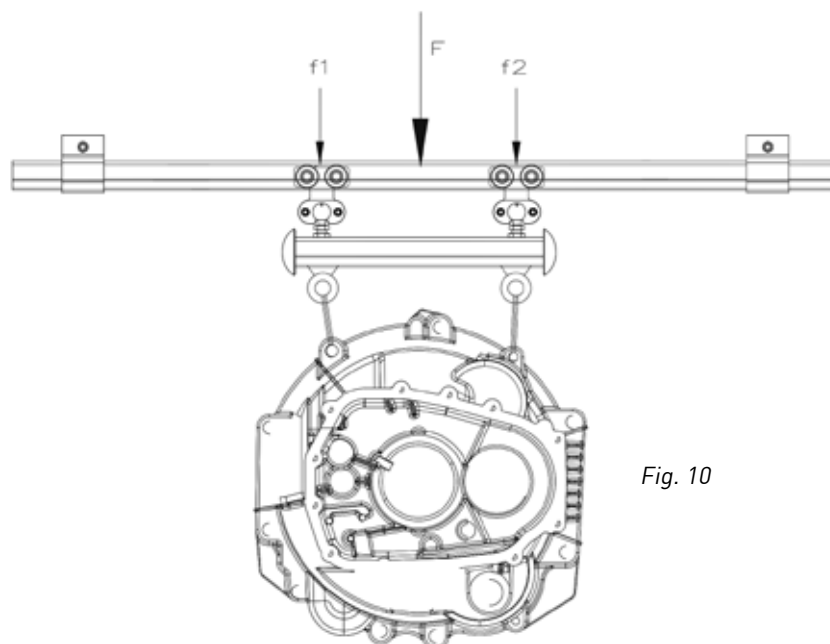


Fig. 10

2

INSTALLATION INSTRUCTIONS

A distributed load is considered to be applied on the profile through multiple trolleys of flight bars, accumulated side by side between two consecutive support brackets, as illustrated in fig. 11

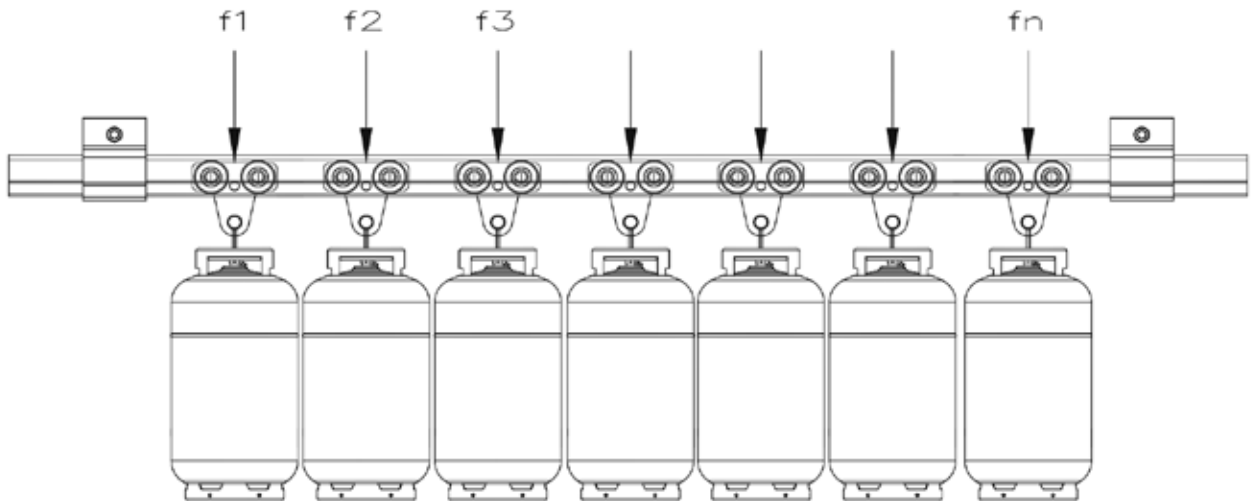


Fig. 11

2

INSTALLATION INSTRUCTIONS

The support distance can be determined using the following diagrams, depending on the load type, point load (diagram 1) or distributed load (diagram 2)

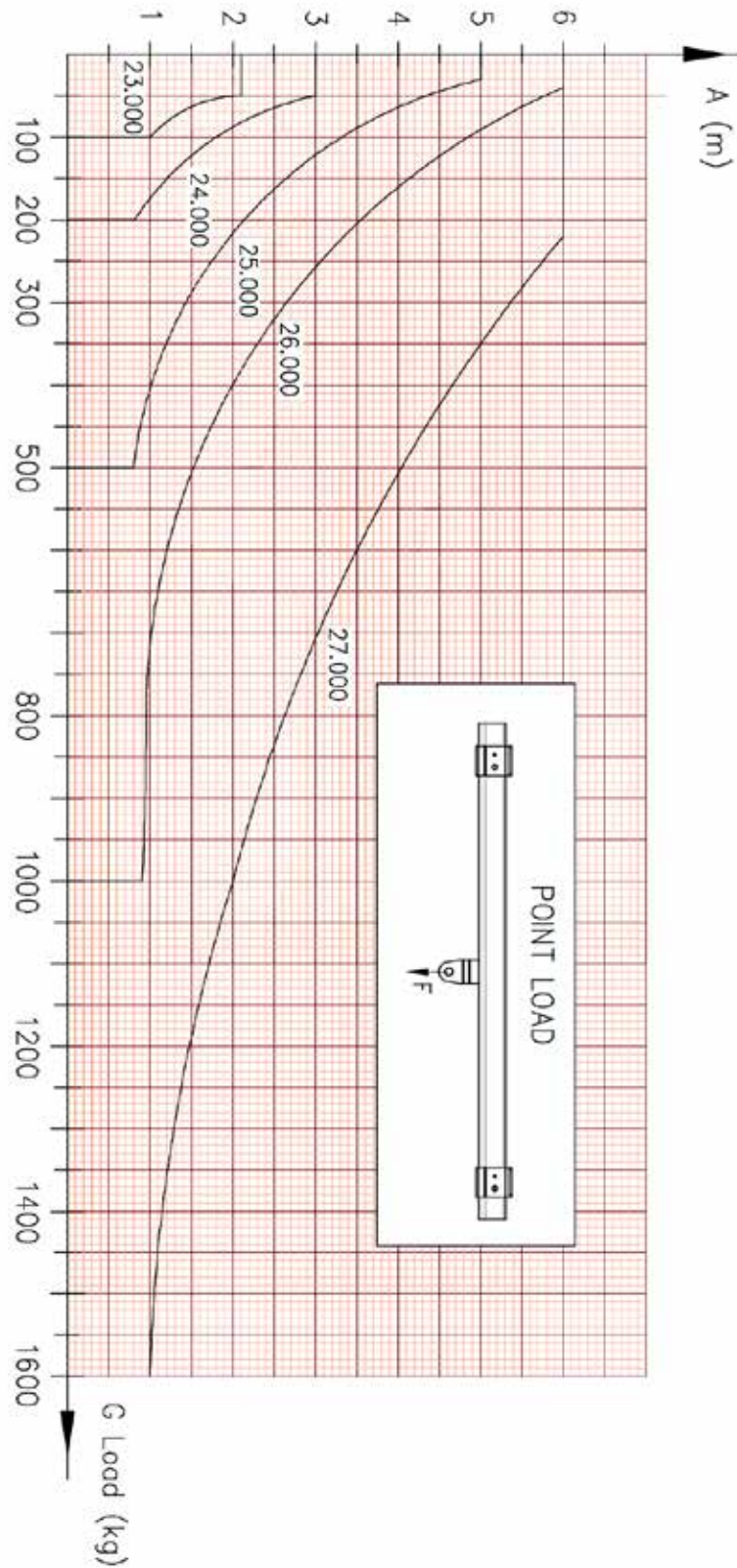


Diagram 1: Point Load - Support distance calculation diagram

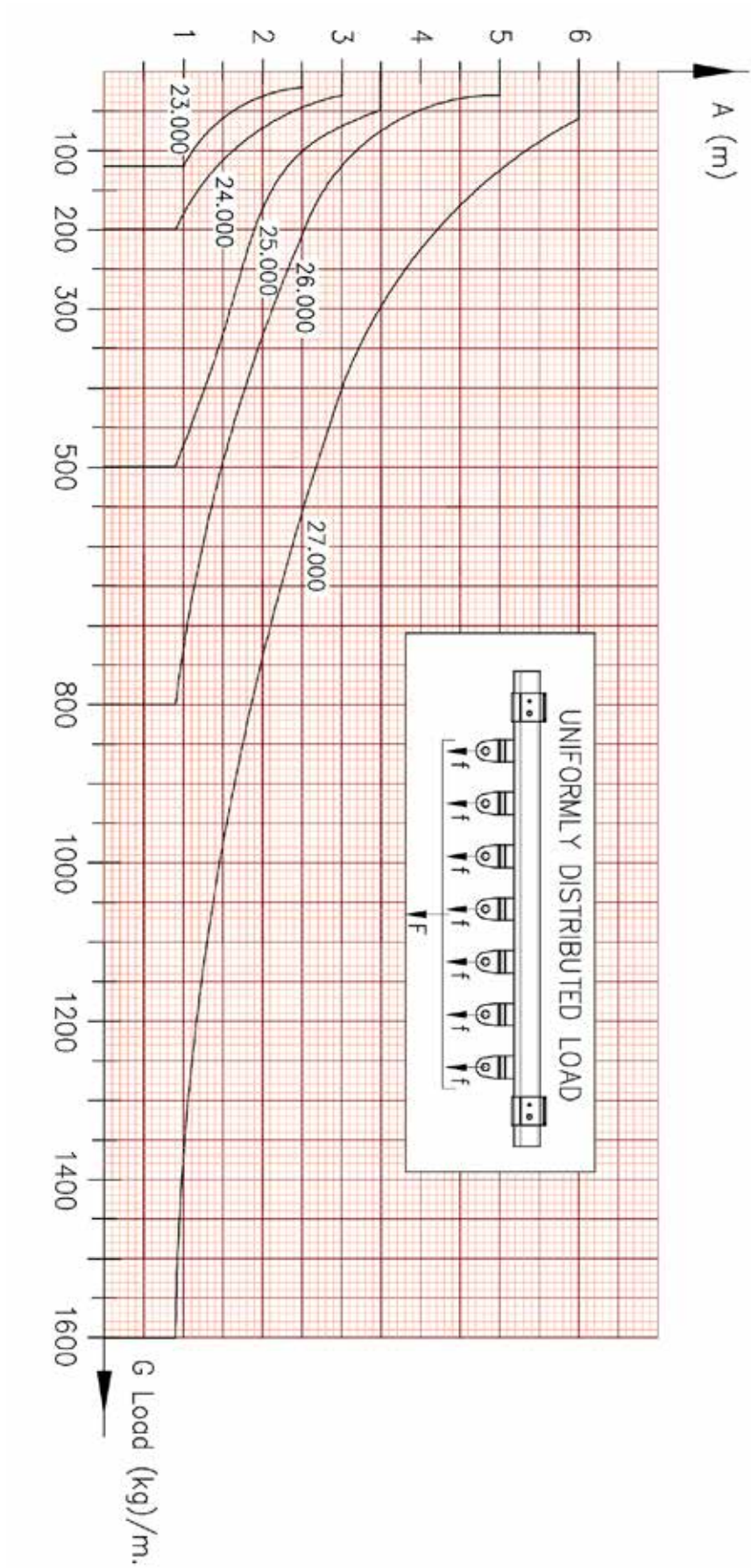


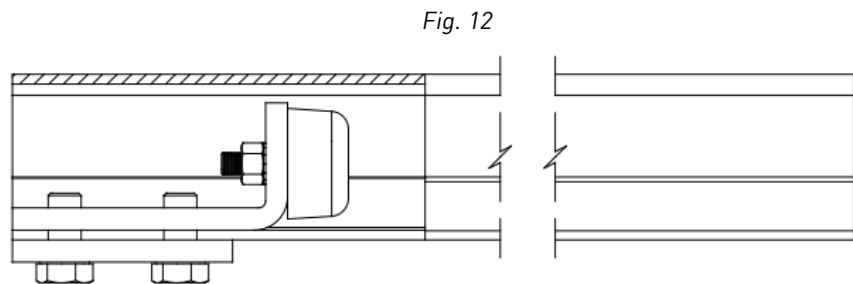
Diagram 2: Distributed Load - Support distance calculation diagram

2.4 Track end stops

The installation of track end stops at all track ends is crucial, for safety reasons. Track end stops ensure the trolleys and flight bars remain inside the profile, eliminating accidents caused by trolleys falling from heights.

For the Installation of track end stops the process below should be followed :

Step 1 : Loosen the two main bolts of the track end stop and slide the stop onto the profile end. The correct orientation of the stopper is illustrated in fig. 12.



Step 2 : Tighten the bolts of the end stop, securing the stopper tightly onto the profile. Bolt tightening torques for each profile series, according to the table below :

Table 5.

NIKO Track end stop No.	Torque (Nm)
23.X01	10
24.X01	10
25.X01	32
26.X01	80



For conveyor areas with temperatures exceeding 100°C, track end stops must be high temperature end stops TH.xx.X01, with no rubber bumpers.

2.5 Trolleys & Flight bars

The most important components of a conveyor system are the trolleys and the flight bars. The selection of the trolley/flight bar type is critical. The wrong trolley/flight bar could result in a dysfunctional system and even physical strain of the operators.

It is strongly recommended to follow the manufacturer's suggestion regarding the trolley/flight bar type. Please consult with NIKO for further information.

All trolleys are equipped with high precision sealed special ball bearings with maximum permitted load for each series, according to the table below :

Table 6.

NIKO Track Profile No.	2-Wheel trolleys SWL (kg)	4-Wheel trolleys SWL (kg)
23.000	20	40
24.000	40	80
25.000	100	200
26.000	200	400
27.000	400	800



- Maximum permitted working loads must be obtained to ensure smooth conveyor operation and prevent undue wear of the profile and the bearings.
- The operating temperatures of the conveyor systems must not exceed the maximum permitted temperatures specified by the manufacturer. Higher temperatures will destroy the trolley bearings.
- If customers design and manufacture their own flight bars, the weight of the structure must be calculated in the total load the trolleys can carry. Overloading can cause extensive wear to the track profiles, damage to the bearings and also jeopardise the safe operation of the overhead conveyor.
- Loads must be attached/suspended securely onto the flight bars and the load must be equally distributed on both trolleys.

2

INSTALLATION INSTRUCTIONS

Concerning 27.000 series conveyors containing tongue switches and track bends, with product loads greater than 800kg, the following must be applied :

- 1.:** Flight bar trolley distance must not exceed 900mm. Recommended trolley distance is 700mm.
- 2.:** The use of load carriers 27.T143, illustrated in fig. 13, is mandatory.

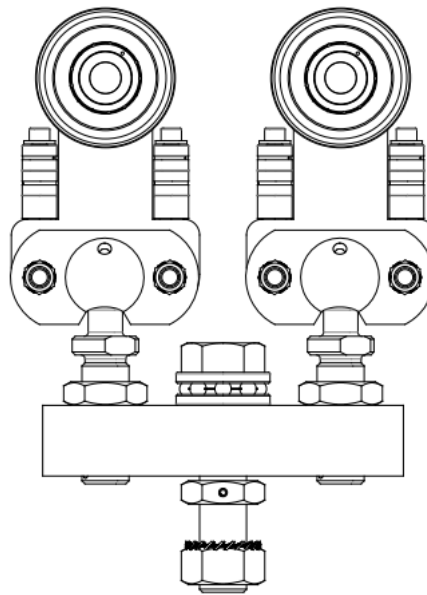


Fig. 13

- 3.:** Two operators may be required for moving the flight bar.

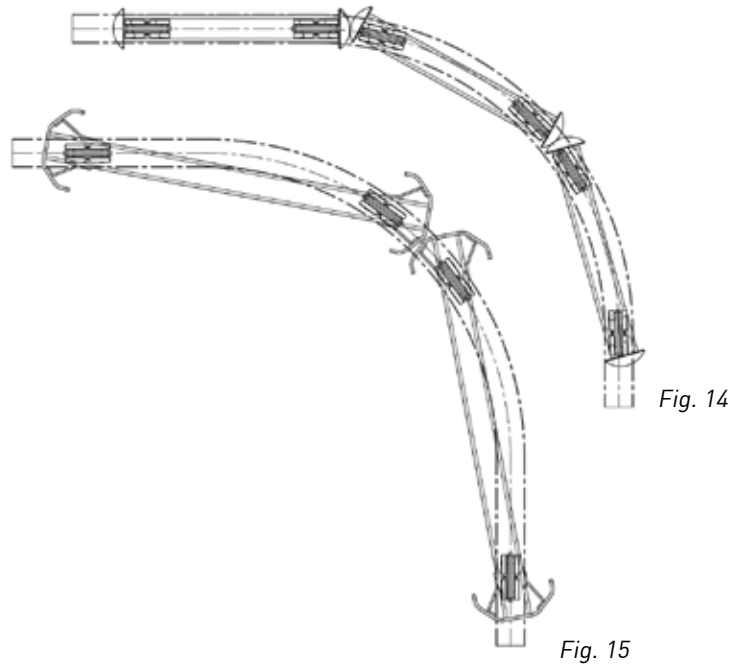
Buffer plates on flight bars

Buffer plates are welded at both ends of the flight bars to ensure the continuous movement of consecutive flight bars through track bends and switches. However, they can only be used for flight bars whose total length does not exceed the radius of the profile series track bends. (fig. 14)

Special buffer plates must be installed on flight bars whose length is greater than the radius the profile series track bends. (fig. 15)

2

INSTALLATION INSTRUCTIONS



The total length of a flight bar should be greater than the maximum length of the products, in order to protect them in case of flight bar clashes. (fig. 16)

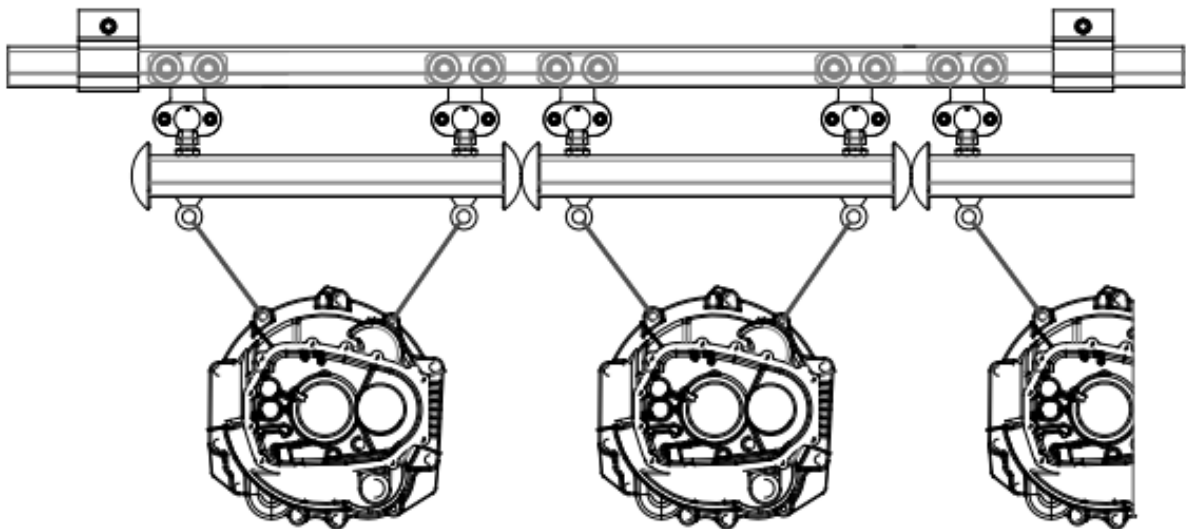


Fig. 16

2.6 Tongue switches

Tongue switches are the components that determine the direction of movement/travel for the trolleys or flight bars in a conveyor system.

The tongue switches are divided into the two following categories :

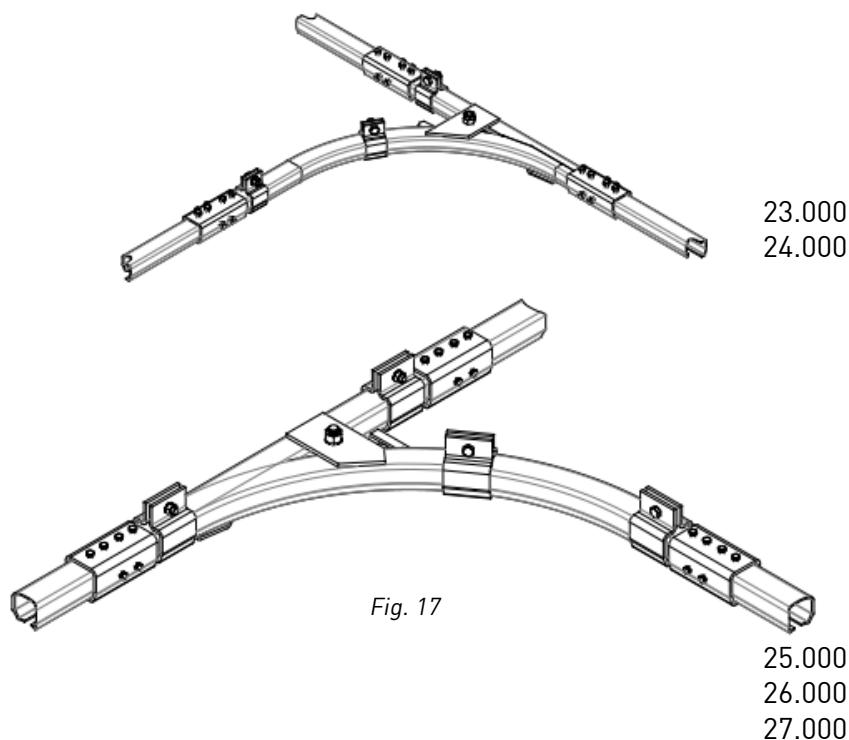
- **Manual tongue switches (Type A, B, C)**

The tongue position is determined by the operator through a lever, therefore determining the movement direction of the trolleys.

- **Automatic tongue switches (Type A, B, C)**

The tongue position is changed automatically through the force exerted by the passing trolley on the tongue. Please consult the NIKO technical catalogue for the type and movement direction of the tongue switches.

As mentioned in chapter 2.3 the tongue switches must be supported at all ends and also at the center of the bend. (fig. 17)



Support brackets xx.B02 must not be used in conveyor areas with switches and turn trable switches. Switches require specific height for installation and operation, therefore space between the support structure and the profile is mandatory.

2

INSTALLATION INSTRUCTIONS

Manual tongue switches can be operated through the following ways :

- *Standard switch levers*

For conveyor installation heights up to 2,5m from the ground. (fig. 18)

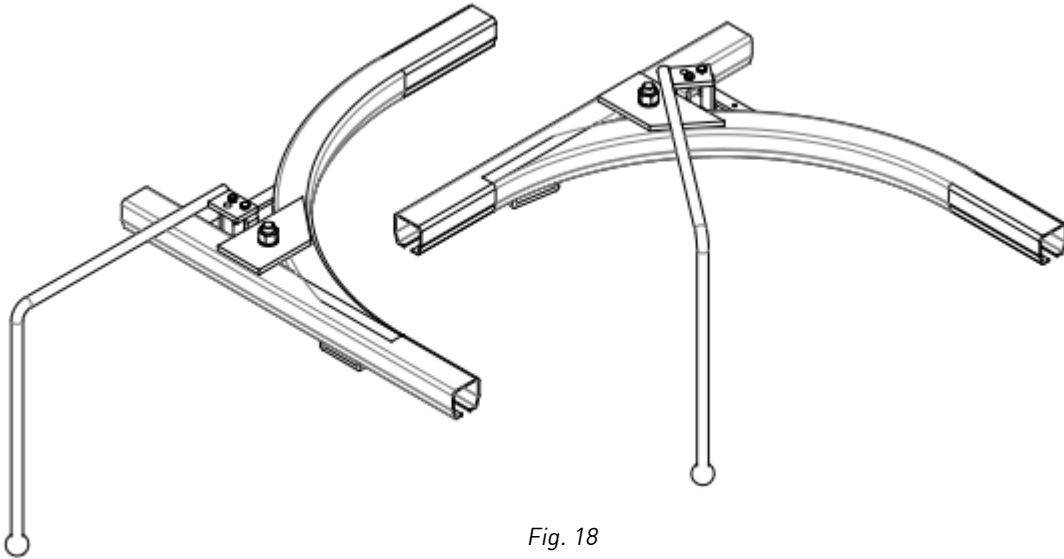


Fig. 18

NOT AVAILABLE FOR 27.000 SERIES

- *Switch levers with double pulling chains*

Suitable for any installation height. Recommended for conveyor heights greater than 2,5m. (fig. 19)

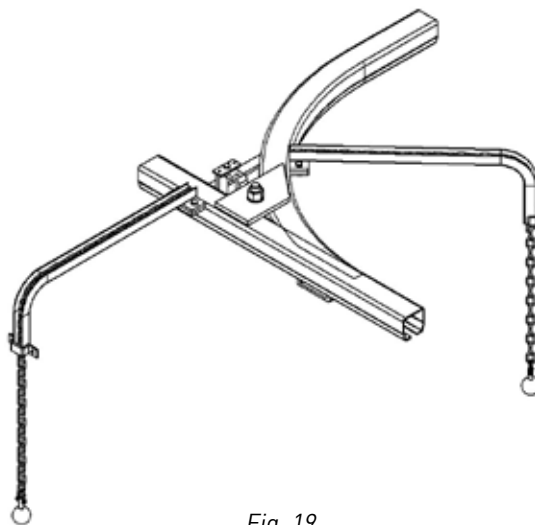


Fig. 19

NOT AVAILABLE FOR 27.000 SERIES

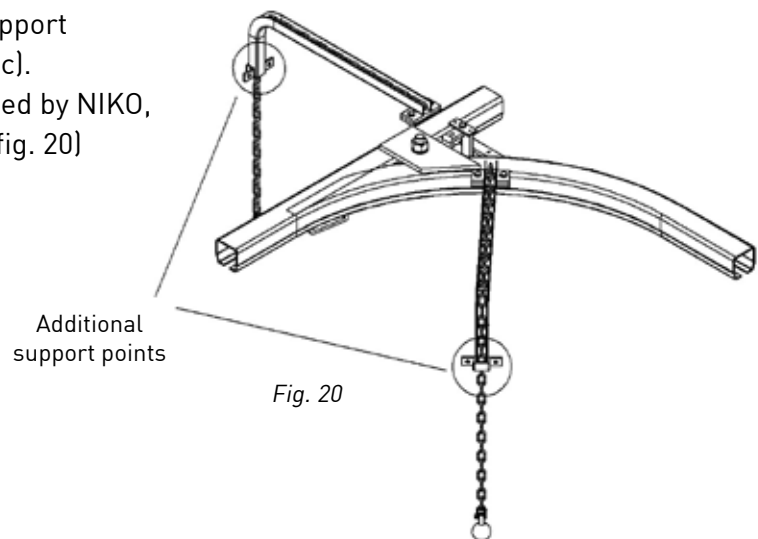
2

INSTALLATION INSTRUCTIONS



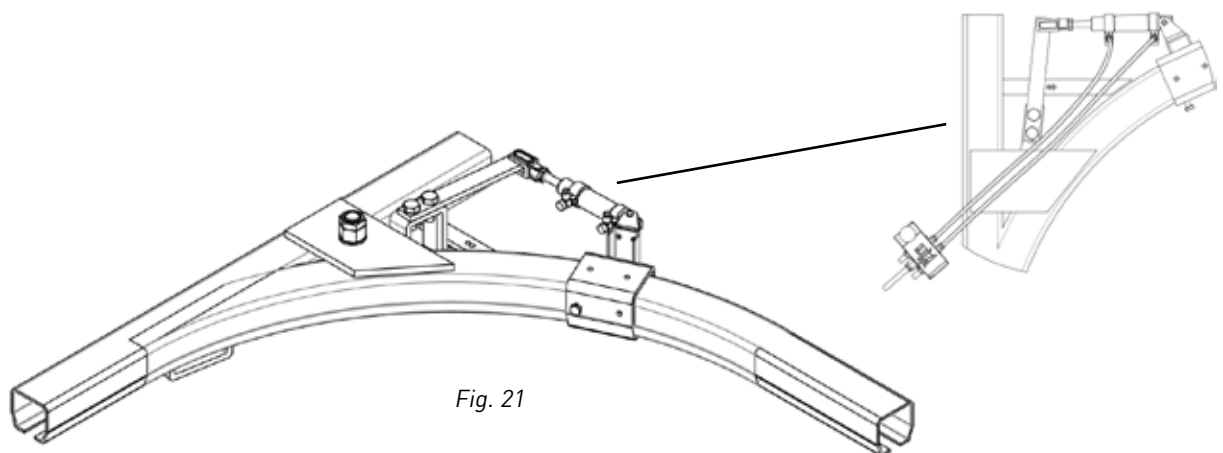
For manual tongue switches with standard levers or double pulling chain levers, the width of the load must be taken into account. The maximum width of the load should not exceed 900mm.

Double pulling chain levers require additional support from a fixed point of the support structure (steel structure/ceiling etc). The additional support is not provided by NIKO, it is the customer's responsibility. (fig. 20)



- *Pneumatic operation set - pneumatic valve*

Suitable for any installation height. Recommended for conveyor heights greater than 2,5m. (fig. 21)



27.000 SERIES ONLY AVAILABLE ON PN



General guidelines regarding the installation of pneumatic operation for a tongue switch (fig. 21) :

- Only trained and authorised personnel are permitted to be involved with the installation.
- During installation there should be no supply of compressed air.
- Maximum permitted operating pressure 6 bar.
- System operating environment temperatures must not exceed 40°C.
- Tongue switches with operating temperatures up to 150°C, can be provided upon request.

Please consult with NIKO for more information.

Automatic tongue switches are divided in the following 3 categories, depending on the allowable travel direction of movement for the trolleys/flight bars :

1. Automatic switch - Type A

The trolleys/flight bars travel from the opposite direction to that indicated by the tongue, as shown below in fig. 22. Each section, straight or bend, remains open until an incoming trolley changes the direction of the tongue. For example, if the bend is open, trolleys/flight bars will constantly travel through, until a trolley inserted in the straight section moves the tongue and opens the straight section.

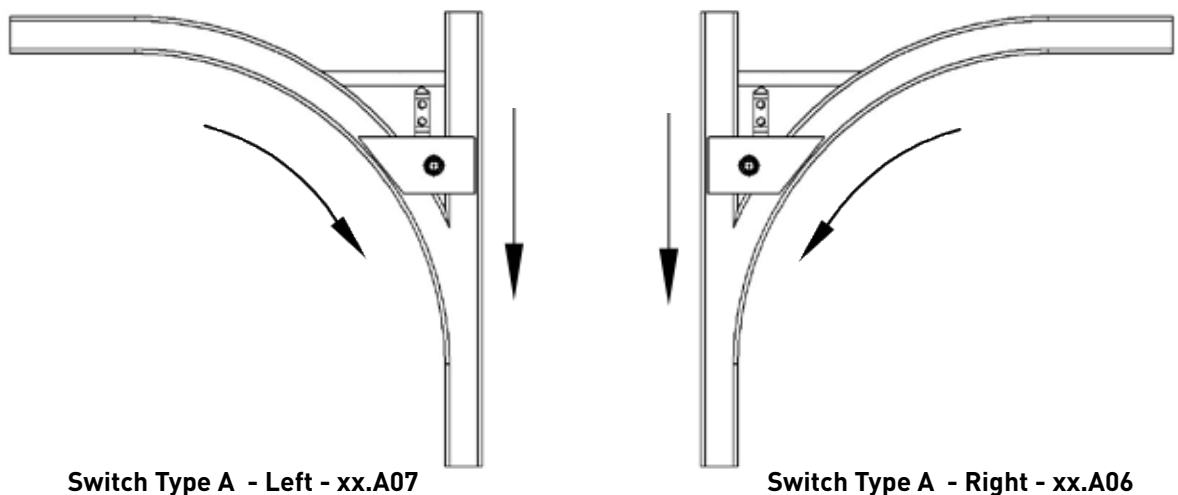


Fig. 22

*27.000 Series automatic switches are only provided with unidirectional roller levers instead of springs, defining the direction of movement through the switch (see fig. 26 & 27).

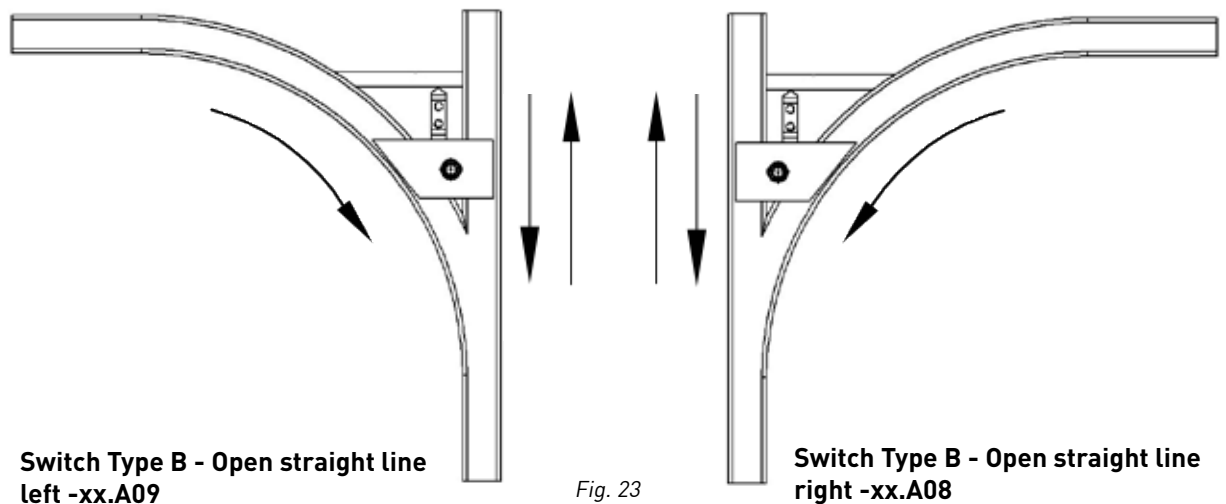
2. Automatic switch - Type B

Automatic switches type B are divided into two categories :

i) Type B - open straight line

The switch tongue is continuously pressed by a spring into position, keeping the straight section open and allowing the trolleys/flight bars to travel through the straight section from both directions. An incoming trolley from the bend can pass through, but the switch tongue will be pressed back into position by the spring, obtaining the straight section open.

Product flow direction is show in fig. 23.



*27.000 Series automatic switches are only provided with unidirectional roller levers instead of springs, defining the direction of movement through the switch (see fig. 26 & 27).

2

INSTALLATION INSTRUCTIONS

ii) Type B -Open track bend

The switch tongue is continuously pressed by a spring into position, keeping the bend track open and allowing the trolleys/flight bars to travel through the bend section from both directions. An incoming trolley to the straight section can pass through, but the switch tongue will be pressed back into position by the spring, obtaining the bend track open. Product flow direction is show in fig. 24.

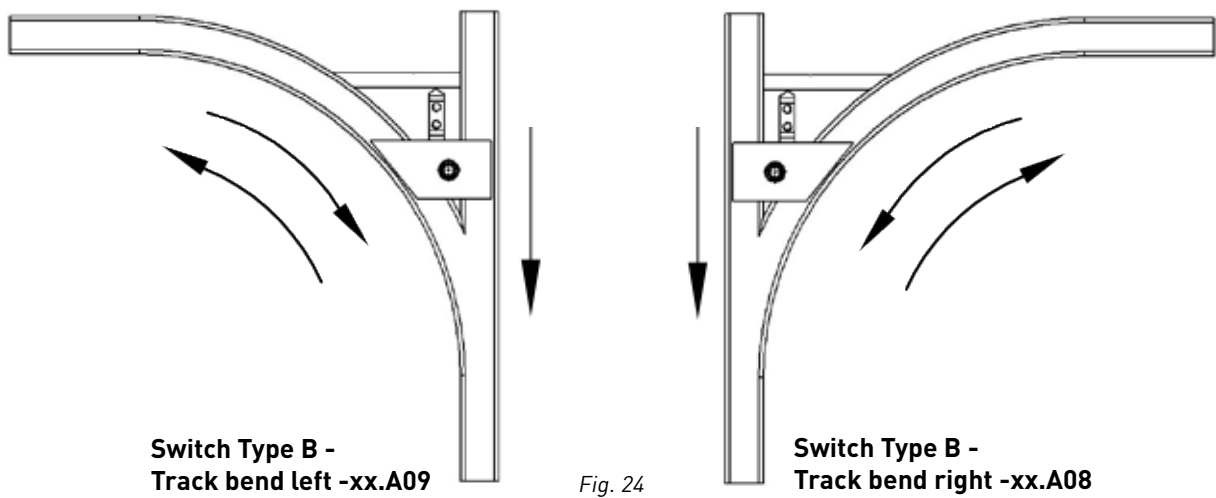
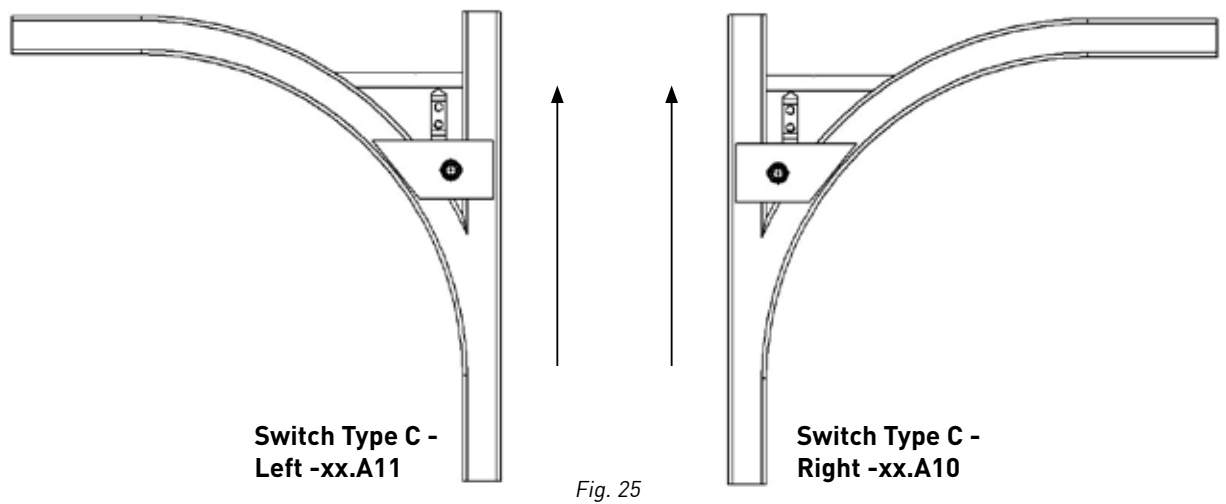


Fig. 24

*27.000 Series automatic switches are only provided with unidirectional roller levers instead of springs, defining the direction of movement through the switch (see fig. 26 & 27).

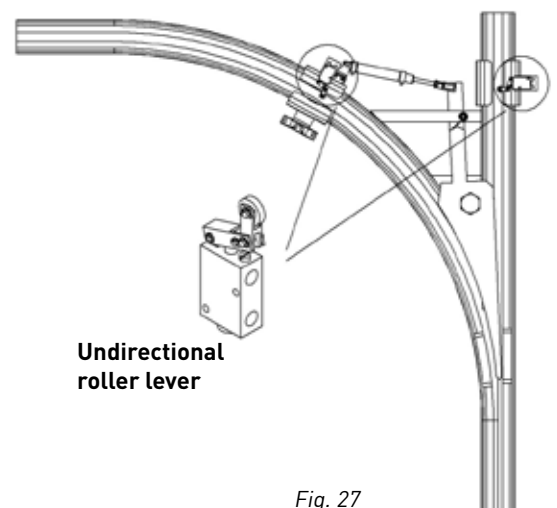
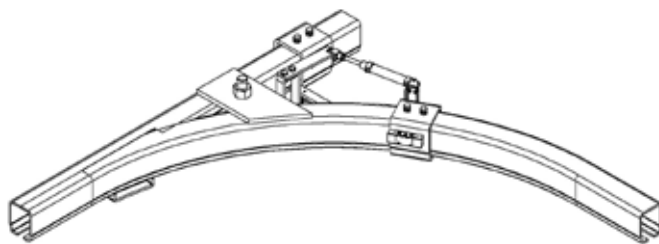
3. Automatic switch - Type C

The switch tongue leads the trolleys into different directions. When a trolley passes through, the tongue automatically switches to the other direction. This type of switch is not suitable for flight bars moving through the switch, as each trolley would be directed to a different section, one trolley into the straight section and one trolley into the bend. Product flow direction is shown in fig. 25.



*27.000 Series automatic switches are only provided with unidirectional roller levers instead of springs, defining the direction of movement through the switch (see fig. 26 & 27).

In 27.000 series automatic switches the manipulation of the tongue is achieved through the use of unidirectional roller levers instead of springs, as shown below in fig. 26 & 27.



2.7 Swivel switches

Swivel switches are used at the entrances and exits of drying and curing ovens. Ever though the installation of swivel switches requires quite a lot of space, length wise, they enable the management of consecutive parallel lines positioned closely, at small distances.

Swivel switches are always connected with track bends and operated through double pulling chain levers or pneumatic control.

The product codes provided by NIKO are the following :

- **DL.xx.A35**

Triple swivel switch with double pulling chain lever.

- **PN.xx.A35**

Triple swivel switch with pneumatic operation.

*Includes two pneumatic cylinder which require two pneumatic valves X7.003 for operation.

- **DL.xx.A38 -DL.xx.A39**

Single swivel switch with double pulling chain lever. (right & left)

- **PN.xx.A38 -PN.xx.A39**

Single swivel switch with pneumatic operation.

Various examples of the support conditions for swivel switches are illustrated in fig. 28 and fig. 29. The connection points/joints with the bends and the straight profile sections are supported from both sides.

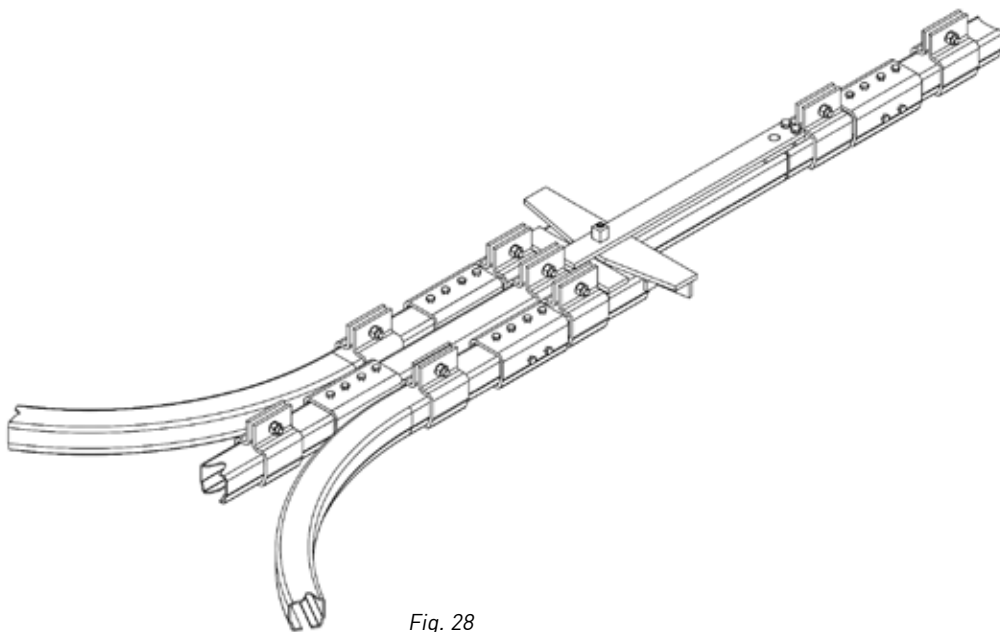


Fig. 28

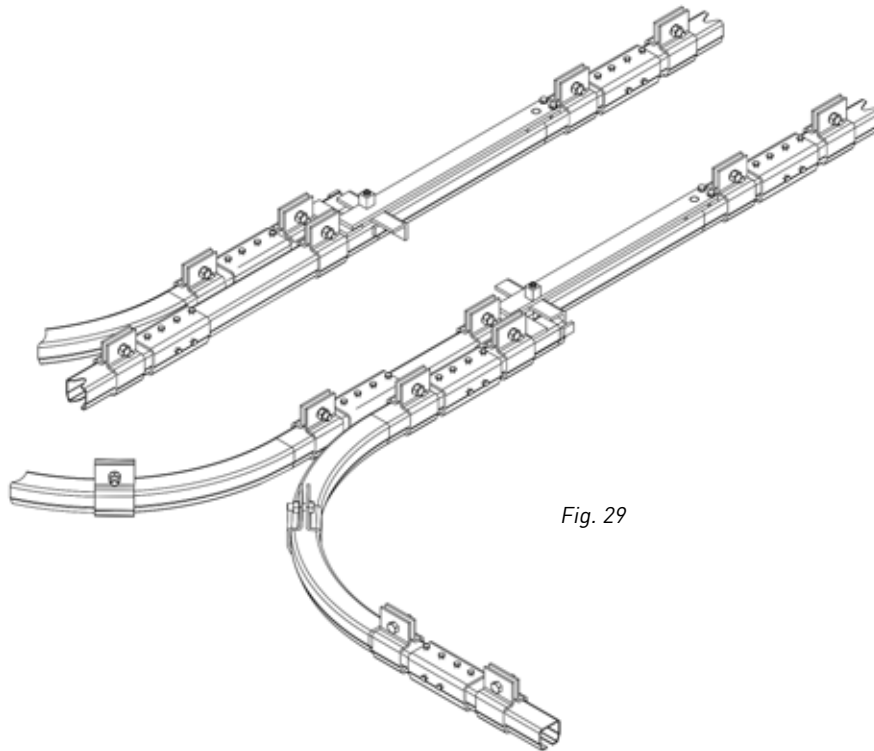


Fig. 29



Support brackets xx.B02 must not be used in conveyor areas with switches and turn table switches. Switches require specific height for installation and operation, therefore space between the support structure and the profile is mandatory.



General guidelines regarding the installation of pneumatic operation for a swivel switch :

- Only trained and authorised personnel are permitted to be involved with the installation.
- During installation there should be no supply of compressed air.
- Maximum permitted operating pressure 6 bar.
- System operating environment temperatures must not exceed 40°C. Swivel switches with operating temperatures up to 150°C, can be provided upon request. Please consult with NIKO for more information.

2

INSTALLATION INSTRUCTIONS

Pneumatic control installation must be carried out according to fig. 30 & 31, below :

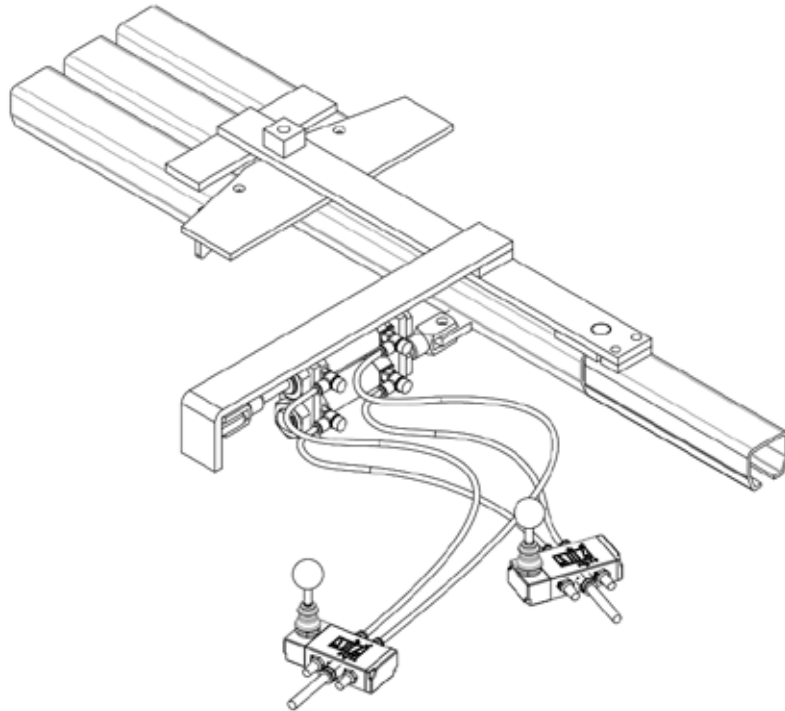


Fig. 30

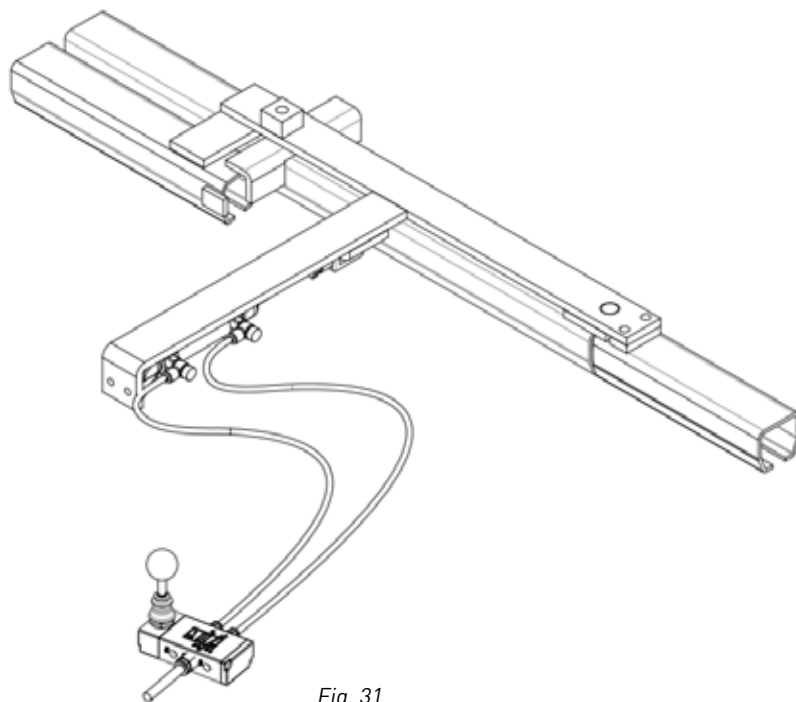


Fig. 31

2.8 Turn tables

Turn tables are used for a 90° shift/rotation of a trolley or a flight bar. Operation is always pneumatic. The most common application of turn tables is for consecutive parallel profile lines positioned at small distances.

The product codes provided by NIKO are the following :

- **xx.A44**

Standard pneumatic turn table switch

*includes pneumatic cylinder which requires pneumatic valve X7.003 for operation.

- **xx.A44S**

Pneumatic turn table switch with positioning stoppers

*includes pneumatic cylinder which requires pneumatic valve X7.003 for operation.

xx.A44S are installed in intermediate positions to facilitate the operator to manipulate the trolley of the flight bar inside the turn table, using an additional positioning feature. Fig. 32 illustrates the correct positioning of the turn tables xx.A44S according to the direction of the conveyor system.

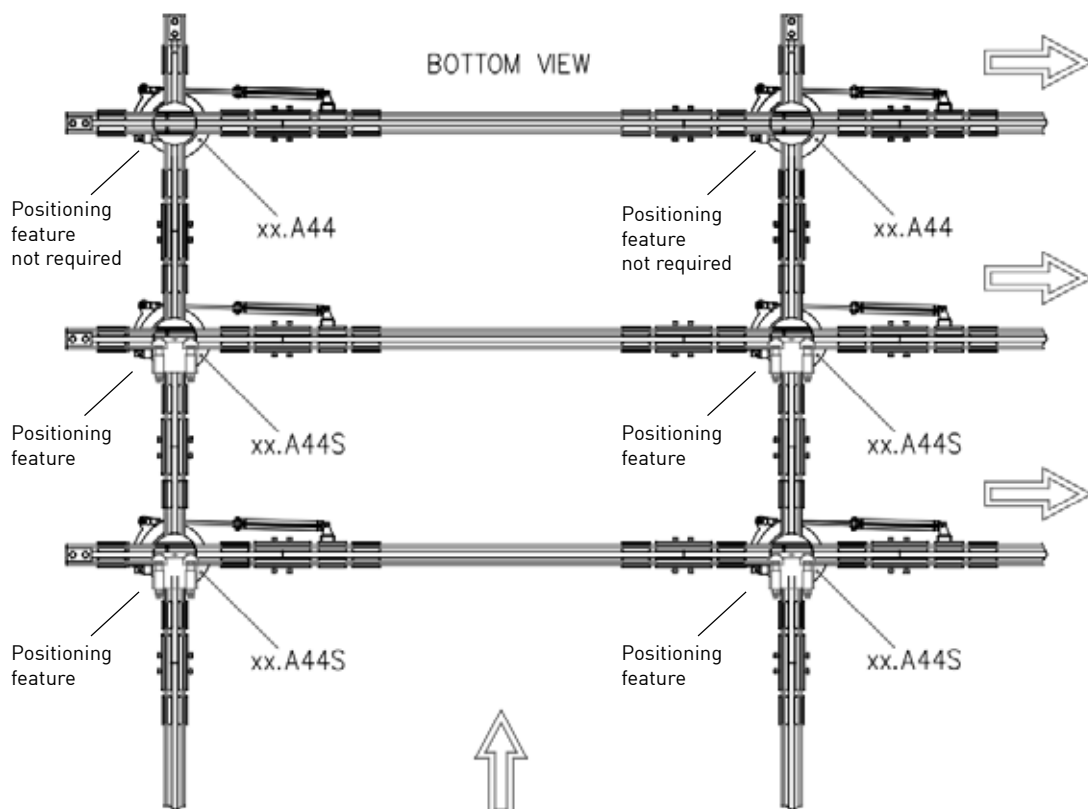


Fig. 32

2

INSTALLATION INSTRUCTIONS

- **xx.A44D**

Pneumatic turn table switch with connection plates

*Includes pneumatic cylinder which requires pneumatic valve X7.003 for operation.

xx.A44D are installed in cases of space limitations, where the turn tables are positioned closely to each other, leaving no space for splice joints and support brackets. Distance limitations (fig. 33) for xx.A44D are provided in table 7 below :

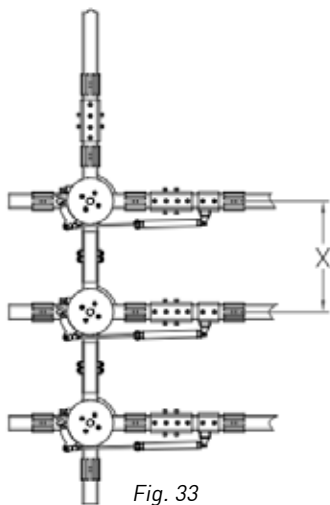


Fig. 33

Table 7

NIKO Turn table xx.A44D	min Distance (x) [mm]	max Distance (x) [mm]*
23.A44D	200	330
24.A44D	200	360
25.A44D	280	470
26.A44D	320	530
27.A44D	410	670

* Max permitted distance for consecutive connected pneumatic turn table switches, without including profile sections and splice joints in between.

Pneumatic turn tables can be manufactured with customised length upon request. Please consult with NIKO for further information.

Depending on the installation area and layout, the pneumatic turn table features 'S' and 'D' can be combined to xx.A44SD.



It is absolutely necessary for track end stops to be installed at all free ends of the pneumatic turn tables, to ensure the trolleys/flight bars remain inside the profile, eliminating accidents caused by trolleys falling from heights.

2

INSTALLATION INSTRUCTIONS

The following figures 34 and 35 illustrate the support conditions of conveyor system sections with turntable switches.

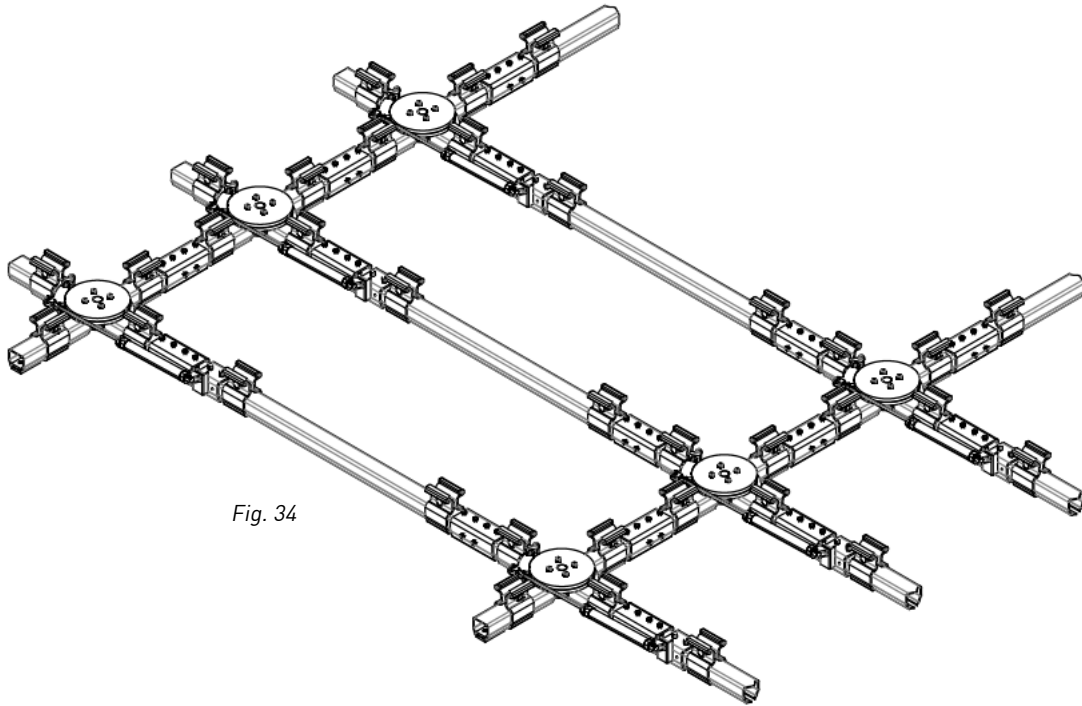


Fig. 34

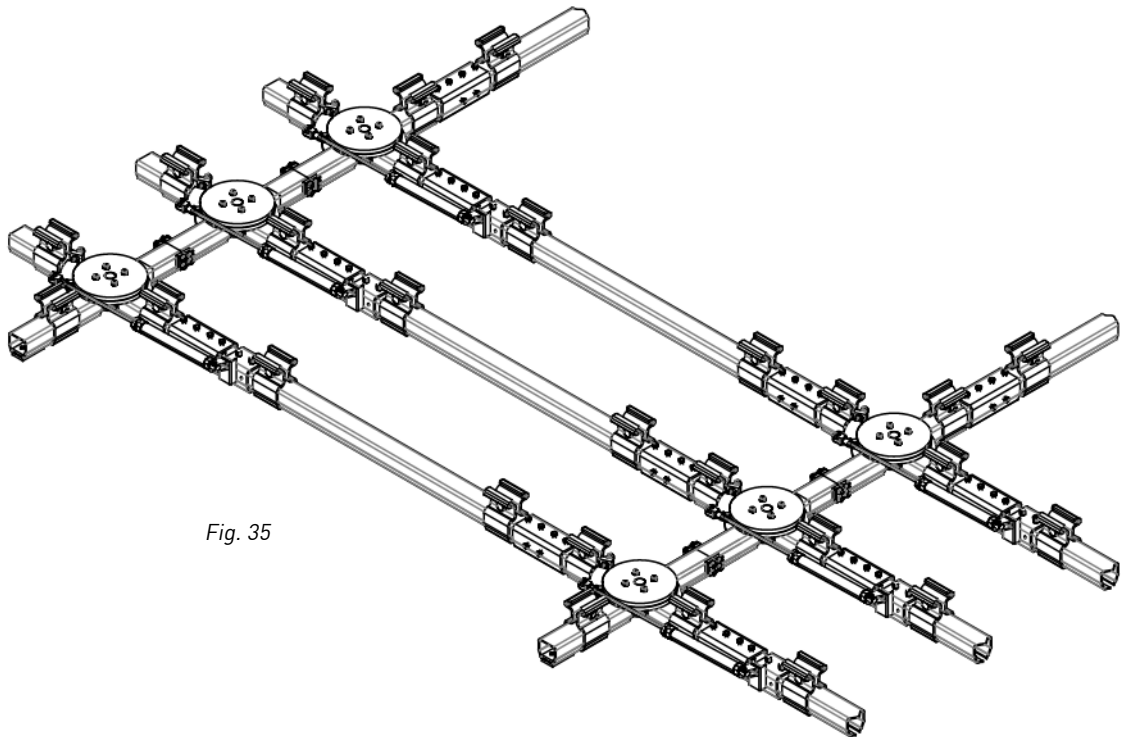


Fig. 35

These illustrations are provided only as an example of typical layouts and may not be identical to the customer's layout.



Support brackets xx.B02 must not be used in conveyor areas with switches and turn trable switches. Switches require specific height for installation and operation, therefore space between the support structure and the profile is mandatory.



General guidelines regarding the installation of pneumatic operation for a swivel switch :

- Only trained and authorised personnel are permitted to be involved with the installation.
- During installation there should be no supply of compressed air.
- Maximum permitted operating pressure 6 bar.
- System operating environment temperatures must not exceed 40°C. Swivel switches with operating temperatures up to 150°C, can be provided upon request. Please consult with NIKO for more information.
- The manipulation of multiple turn tables in consecutive positions is achieved through a single pneumatic operation, using air manifolds, as illustrated in fig. 36 below.

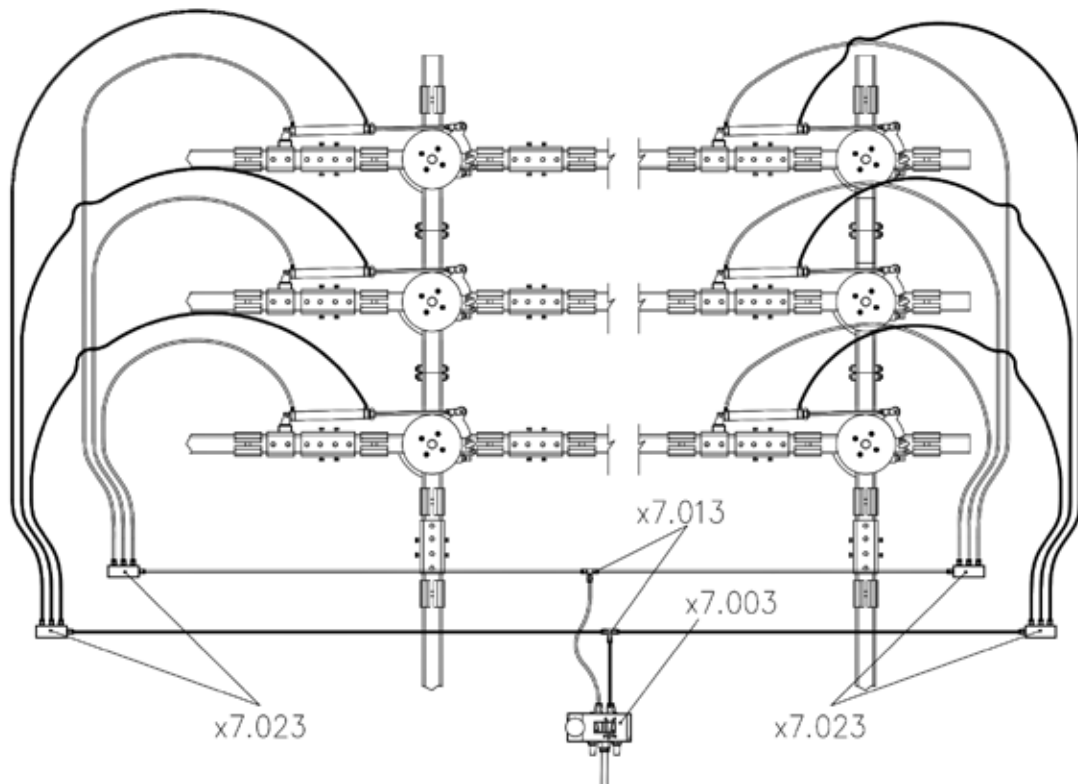


Fig. 36

2.9 Cruciform & multiple turn tables

Cruciform turn tables are switches connecting 4 points of an overhead conveyor system, allowing the transit of a flight bar from one branch of the system to another or the rotation of the flight bar inside the table. Depending on the allowable transit direction of the flight bar the turn table are provided with the following formats :

- **xx.A41**

Turn table with a straight profile section allowing the cross over of the flight bars through the turn table or the 90°/180° rotation of the load. (fig. 37)

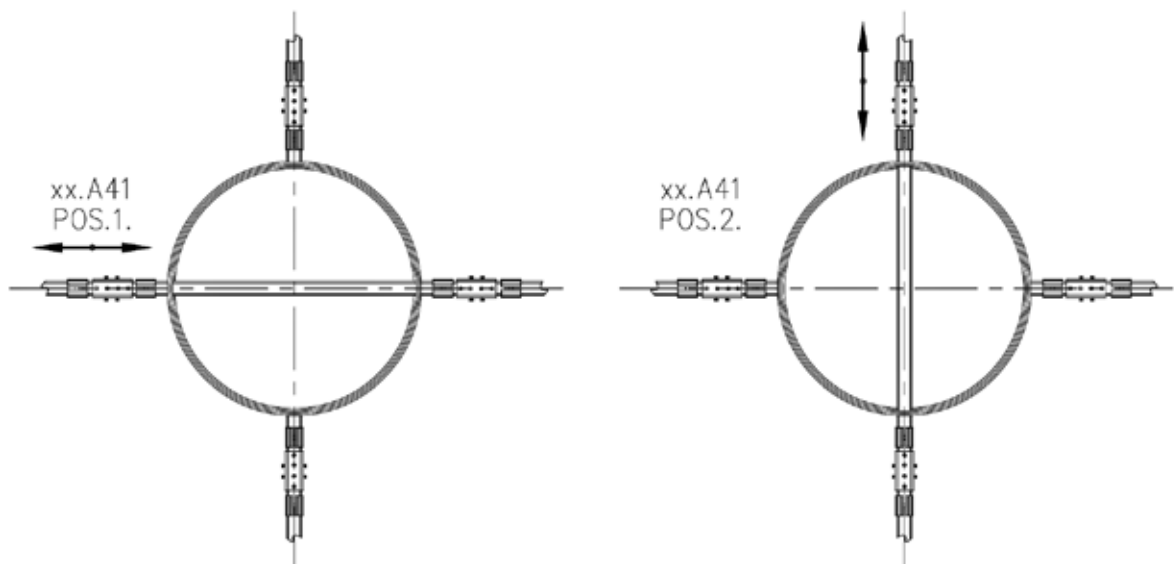


Fig. 37

2

INSTALLATION INSTRUCTIONS

- **xx.A42**

Turn table with a straight profile section and a track bend, allowing the cross over of the flight bars through the turn table ,the 90°/180° rotation of the load and the connection with track bends for 90° direct transit through the turn table. (fig. 38)

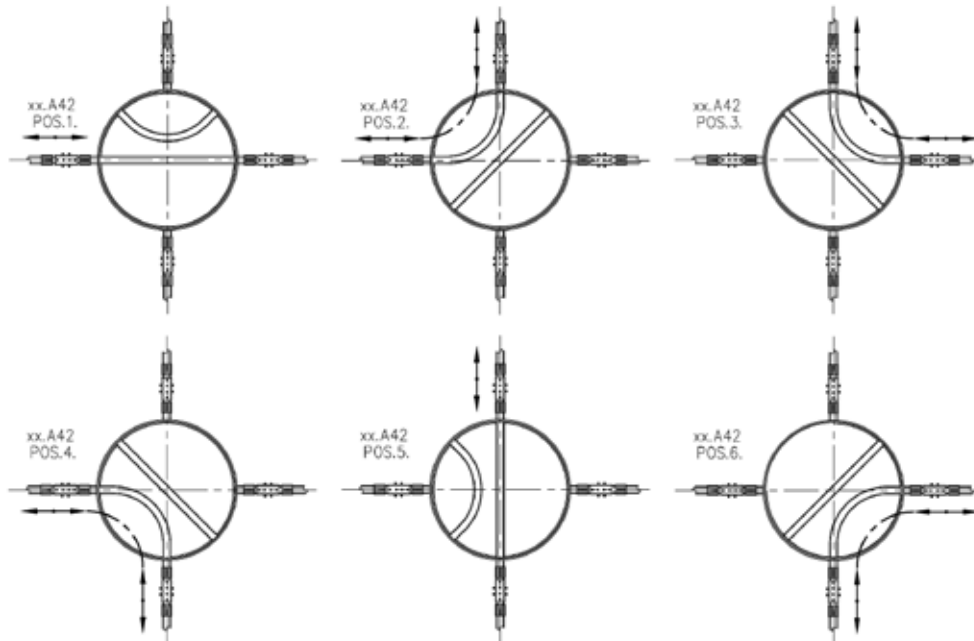


Fig. 38

- **xx.A43**

Turn table with a straight profile section and two track bends, allowing the cross over of the flight bars through the turn table ,the 90°/180° rotation of the load and the connection with track bends for 90° direct transit through the turn table, towards two directions simultaneously. (fig. 39)

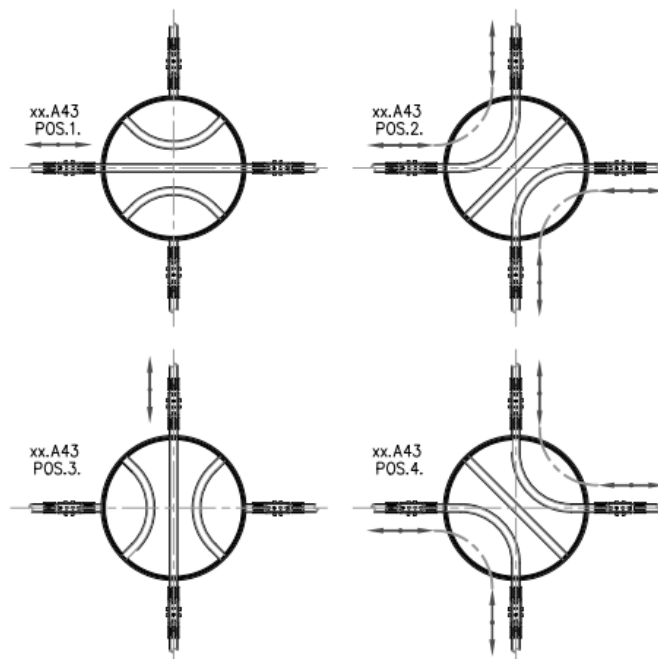


Fig. 39

2

INSTALLATION INSTRUCTIONS

Cruciform and multiple turn tables can be manufactured with customised dimensions upon request. Please consult with NIKO for further information.

The turn tables can be provided with manual operation, electric operation (EL.xx.A4x) or pneumatic (PN.xx.A4x).

The following figure illustrates the support conditions of a cruciform turn table. The turn tables are supported by 4 support brackets positioned beside the connections points/joints and 4 additional points for support from a fixed point of the system's support structure.

*Support distance of splice joints according to Table 3, chapter 2.3.

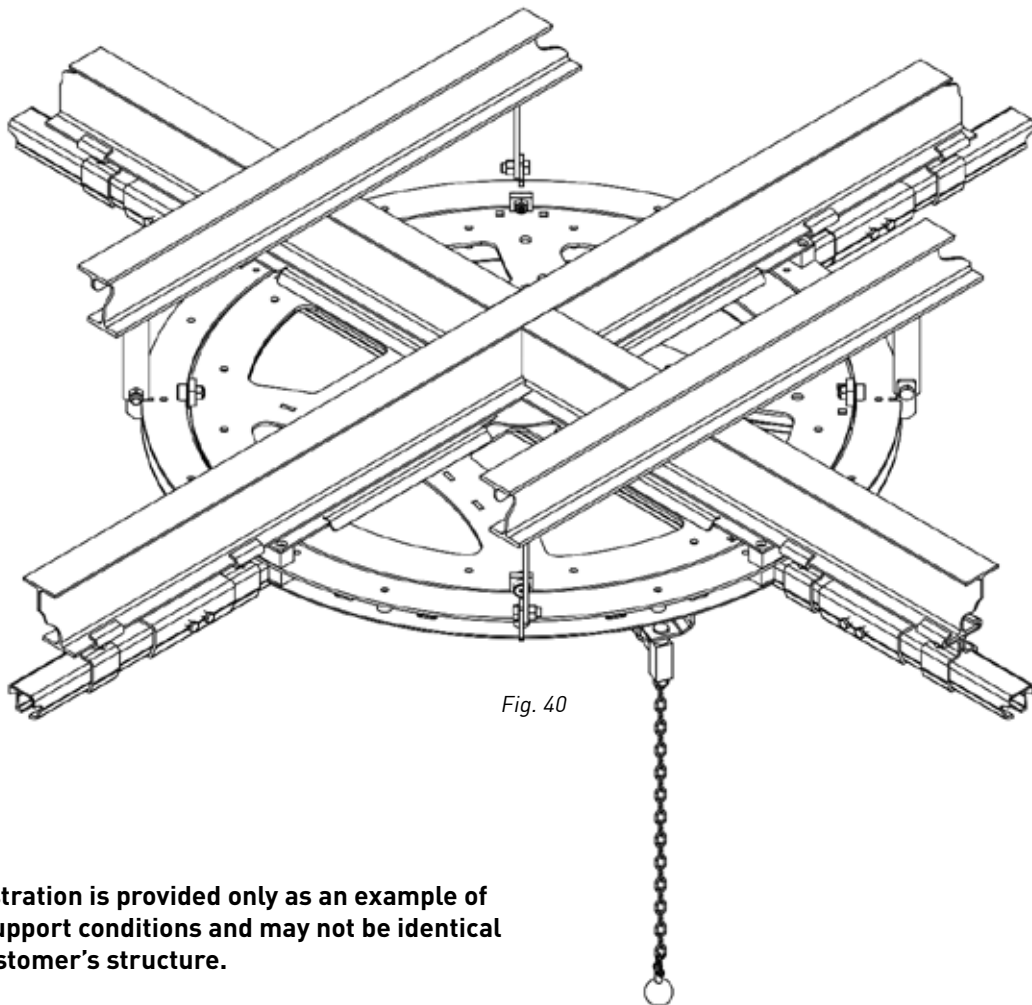


Fig. 40

This illustration is provided only as an example of typical support conditions and may not be identical to the customer's structure.



Support brackets xx.B02 must not be used in conveyor areas with switches and turn table switches. Switches require specific height for installation and operation, therefore space between the support structure and the profile is mandatory.

2.10 Wagon cranes

A substantial number of conveyor systems include wagon cranes. Wagon cranes enable the simultaneous transit of multiple loads between locations, such as cabins, painting booths, cooling areas etc. depending on the system requirements and layout, a wagon can convey up to 5 loads and be connected to the system either on one side, left or right, or on both sides, through interlocks.

A general installation guide for crane wagons is provided below, through an example of a 3-line crane wagon :

Step 1 : Install the runway/long travel tracks for the wagon, positioning the support brackets/ splice joints according to the manufacturer's drawing/instructions. (fig. 41)

*Profile, support brackets and joints installation according to chapters 2.1, 2.2, 2.3.

It is recommended to use split support brackets xx.B03, xx.B08-xx.B26 etc. support brackets such as xx.B02, xx.B35 etc could cause clashes of the interlocks or the wagon handling system, due to the protruding surfaces towards the working area of the wagon.



Before installation, ensure the runway/long travel tracks are clean and free of dust, oil or any other contaminants.

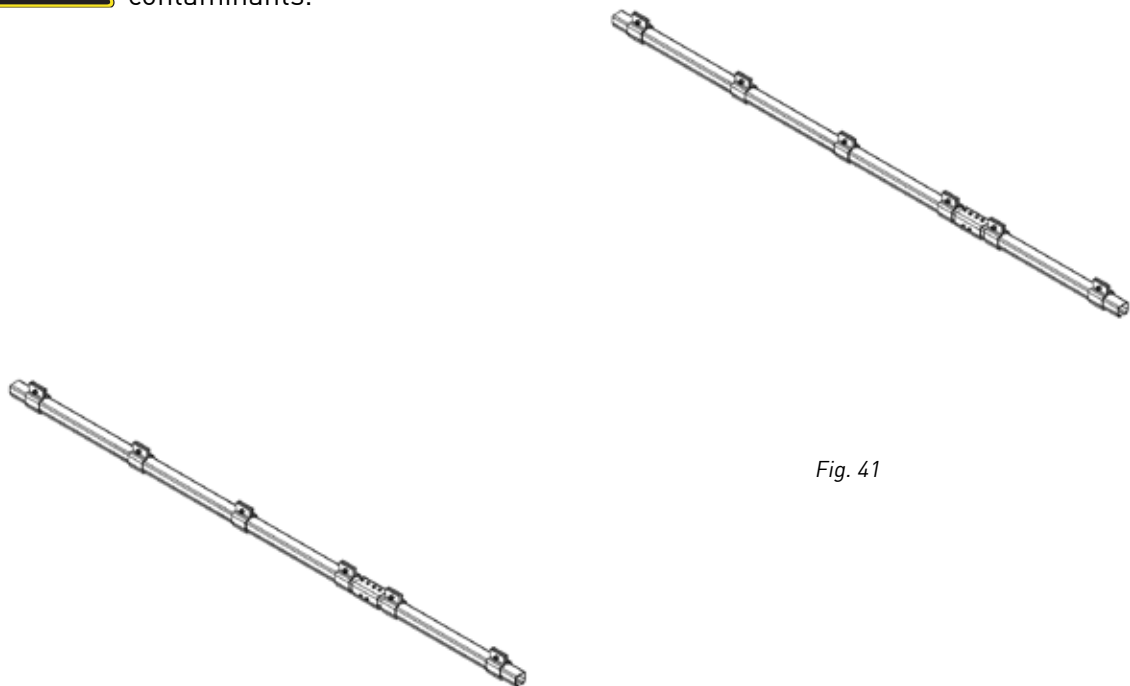
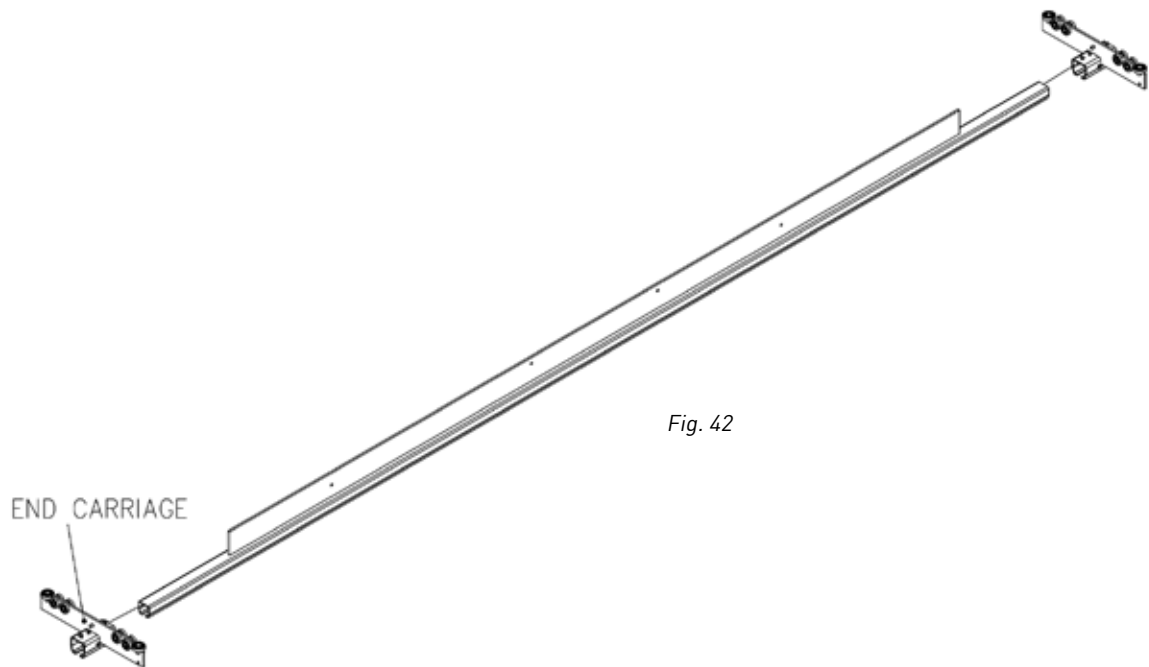


Fig. 41

2

INSTALLATION INSTRUCTIONS

Step 2 : Slide the corresponding end carriages of the reinforced track and secure on the track loosely, at the distance/span of the runway tracks. (fig. 42)



Loose fittings allow re-adjustments after the end of the wagon installation.

Step 3 : Lift and insert each reinforced bridge profile with the carriages into the runway tracks. (fig. 43) Secure all end stops of the runway tracks into position, to ensure the bridge profiles remain safely inside the tracks.

The end carriages carrying the articulated wire rope connector must be installed on the operator's side, the side with the wagon handling system. (fig. 43)

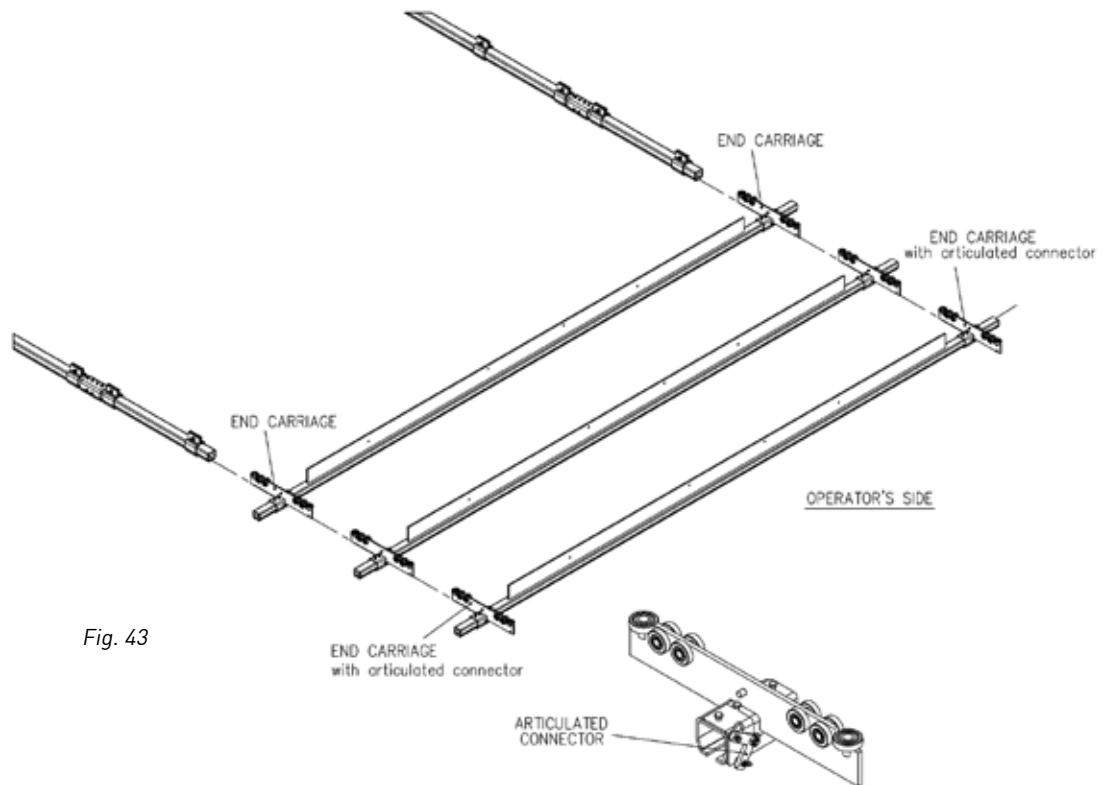


Fig. 43

Step 4 : Align the reinforced bridge profiles and secure the bridge connectors xx.T95 in position, loosely, using the appropriate bolts and nuts. (fig. 44)

Step 5 : Connect the consecutive end carriages between them, loosely, using the connecting plates xx.T96, with the corresponding bolts and nuts. (fig. 44)

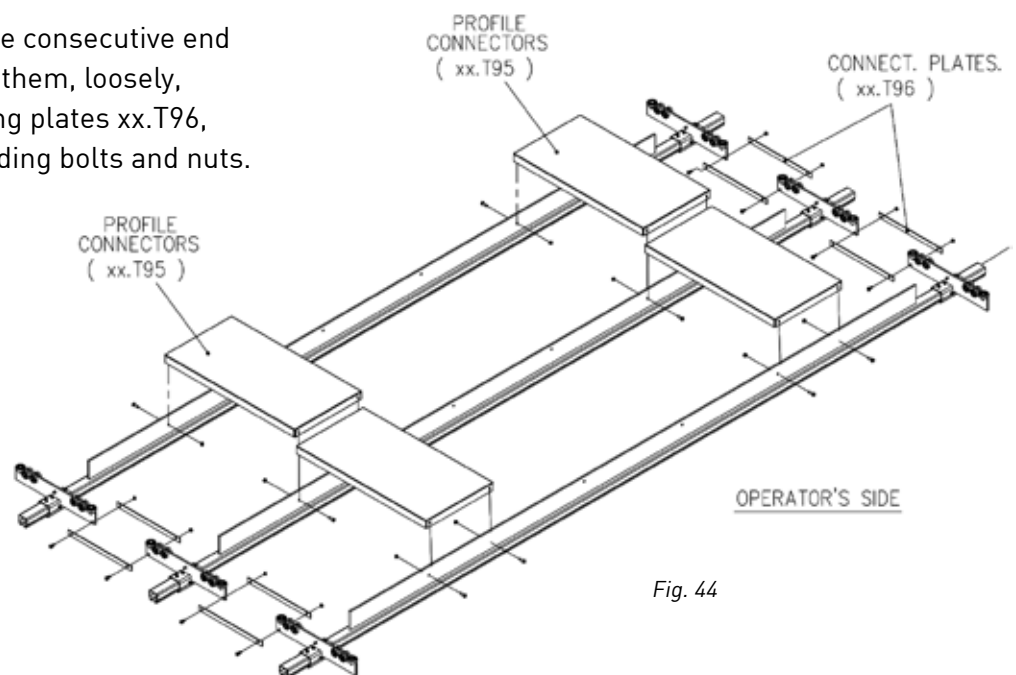


Fig. 44

2

INSTALLATION INSTRUCTIONS

Step 6 : Slide the bridge interlocks xx.H01 onto the reinforced tracks and secure loosely. Fig. 45 illustrates the correct interlock orientation (left/right). (fig. 45)



Loose fittings allow re-adjustments after the end of the wagon installation.

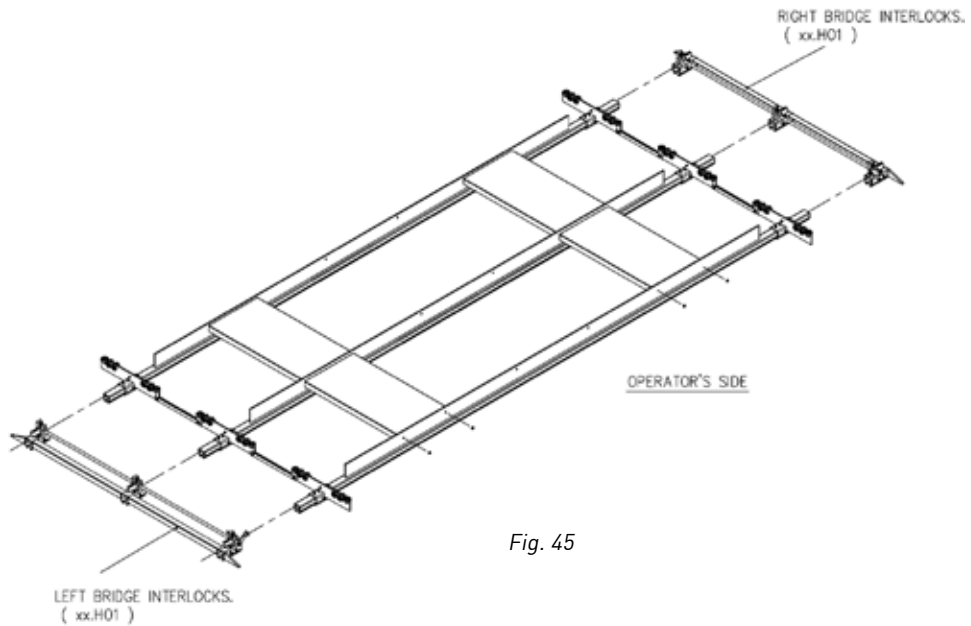


Fig. 45

Step 7 : Move the assembled crane wagon further along the long travel tracks, ensuring the wagon remains safely inside the tracks. (fig. 46)

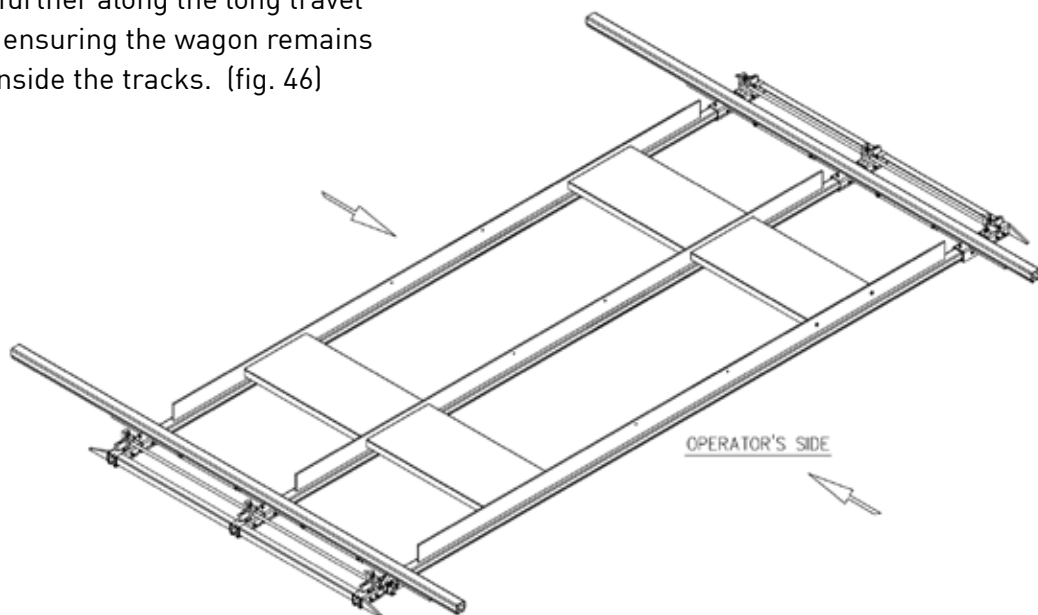


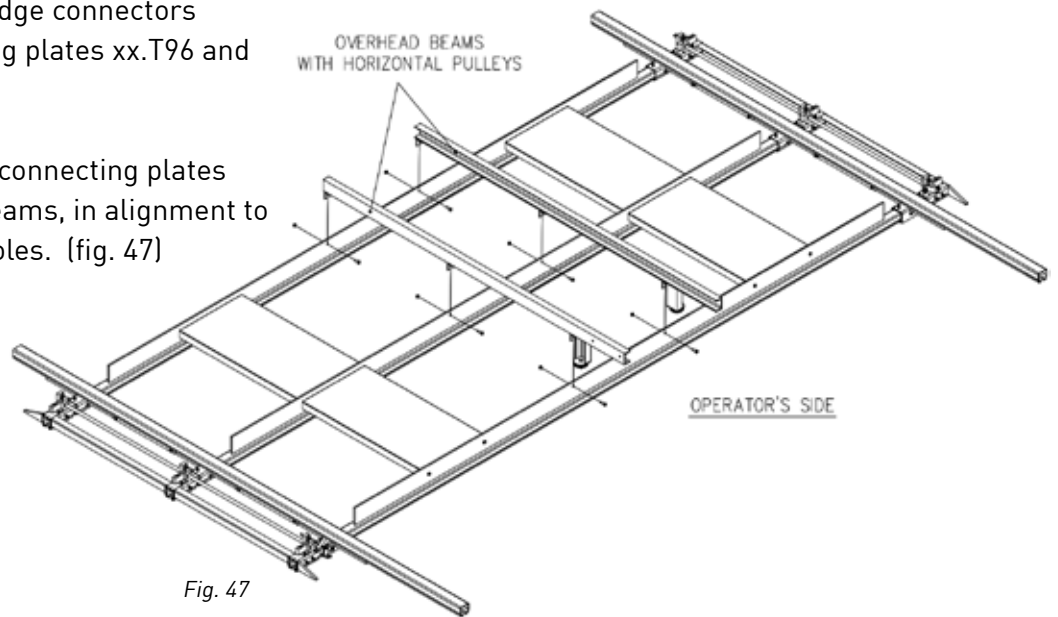
Fig. 46

2

INSTALLATION INSTRUCTIONS

Step 8 : Realign the trolleys and interlocks and secure into position tightly. If necessary readjust the positioning of the bridge connectors xx.T95 and connecting plates xx.T96 and secure tightly.

Step 9 : Position the connecting plates onto the overhead beams, in alignment to the corresponding holes. (fig. 47)

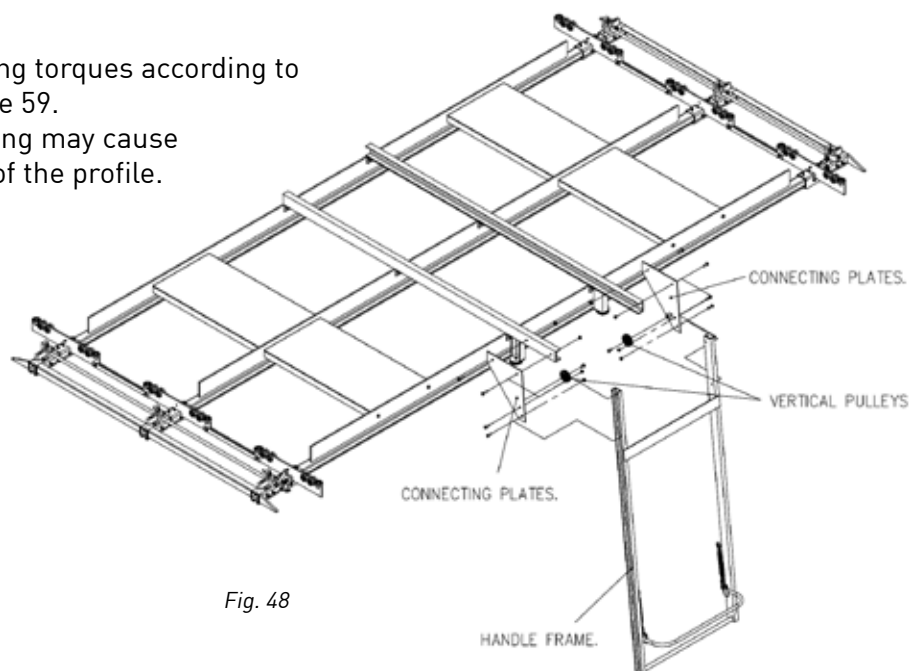


Step 10 : Position the handle frame on the outside of the connecting plates, in alignment to the corresponding holes and secure the assembly using the appropriate bolts and nuts. (fig. 48)

Step 11 : Secure the vertical pulleys into position, using the corresponding bolts. (fig. 48)



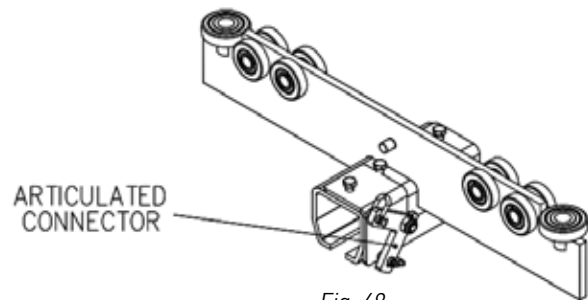
Bolt tightening torques according to annex a, page 59.
Over tightening may cause deformities of the profile.



2

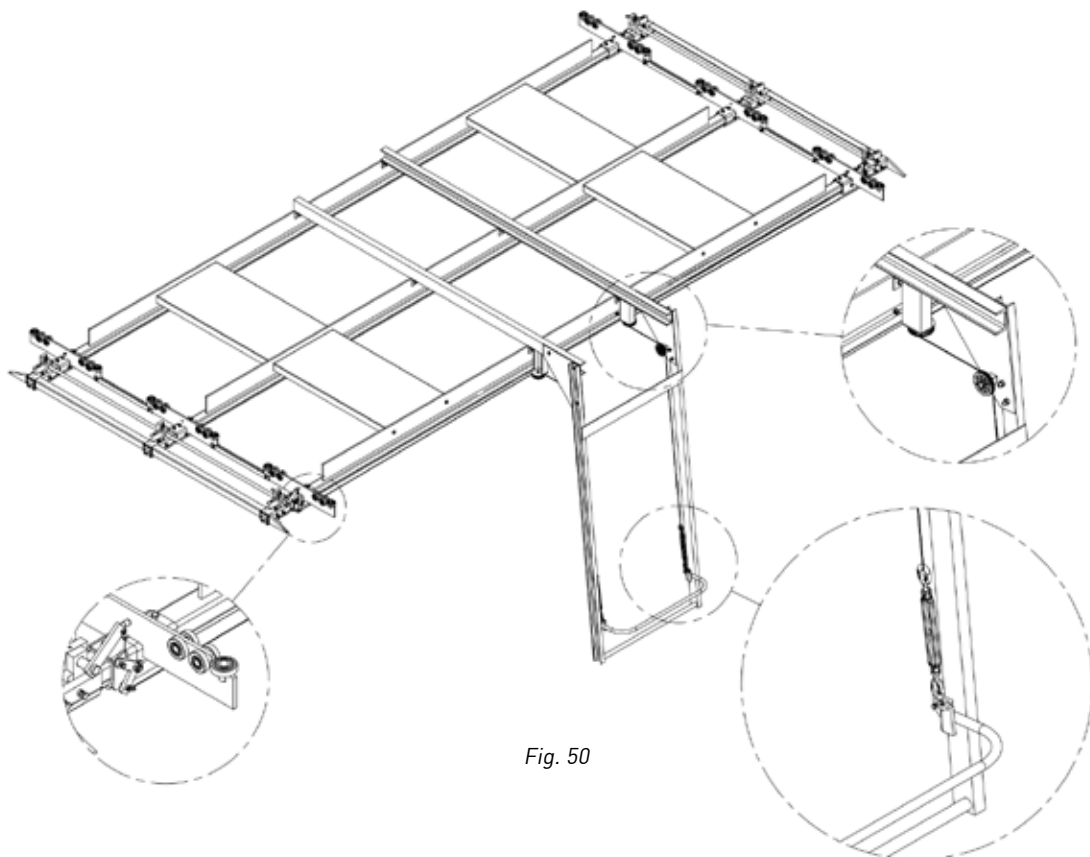
INSTALLATION INSTRUCTIONS

Step 12 : Connect the wire rope end on the shackle of the articulated connector. (fig. 49)



Step 13 : Thread the wire rope through the pulleys, both horizontal and vertical. Align the pulleys guide if necessary, by adjusting the corresponding screws. (fig. 50)

Step 14 : Keeping the handle in lock position (upper position), with the turnbuckle expanded, thread the wire rope through the upper eye of the turnbuckle and fix the wire rope's position, using 2 u-bolt connectors. (fig. 50)



Step 15 : Check the operation of the interlock mechanism and adjust the wire rope if necessary. (fig. 50)

2

INSTALLATION INSTRUCTIONS

Step 16 : For wagon cranes with interlock connections only on one side, stoppers must be positioned and secured at all free bridge profile ends, to ensure the trolleys remain inside the tracks. (fig. 51)

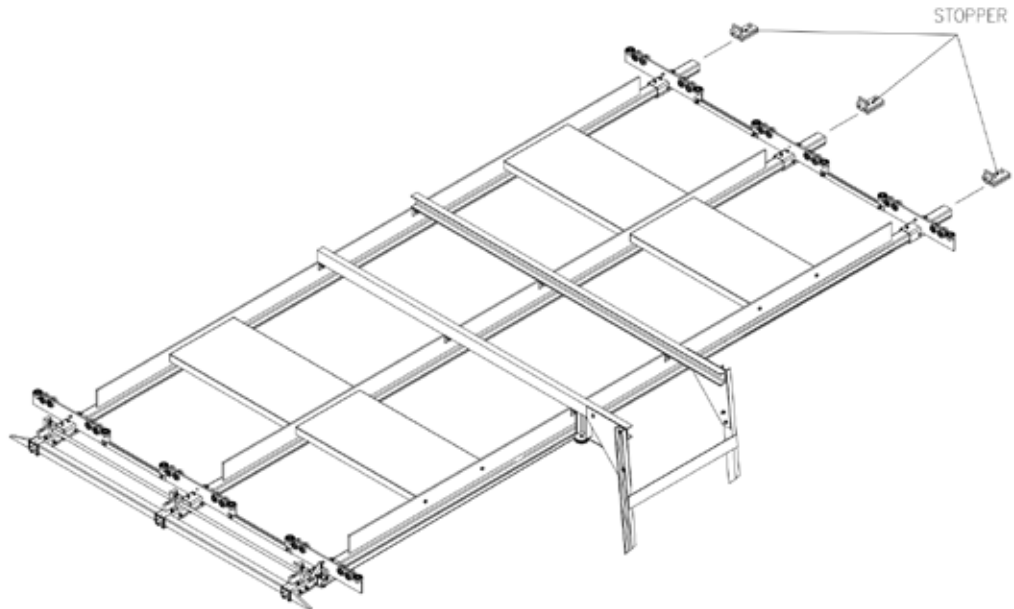


Fig. 51

Step 17 : Continue with the installation of the rest of the conveyor system, according to the layout and drawing provided by the customer.

2.11 Dilatation joints

Dilatation joints are installed in high temperature areas, such as curing ovens, drying ovens etc, with temperatures exceeding 120°C. The dilatation joints allow the linear thermal expansion of the profiles minimizing the developing stresses between the consecutive profile sections. The main dimensions of the dilatation joints are illustrated in fig. 52 and provided in the following table :

Table 8

NIKO Track Profile No.	Dimension L [mm]	Dimension B [mm]	Dimension H [mm]
23.000	240	50	48.3
24.000	300	61	50.8
25.000	360	81	79.9
26.000	400	100	101.5
27.000	500	116	144

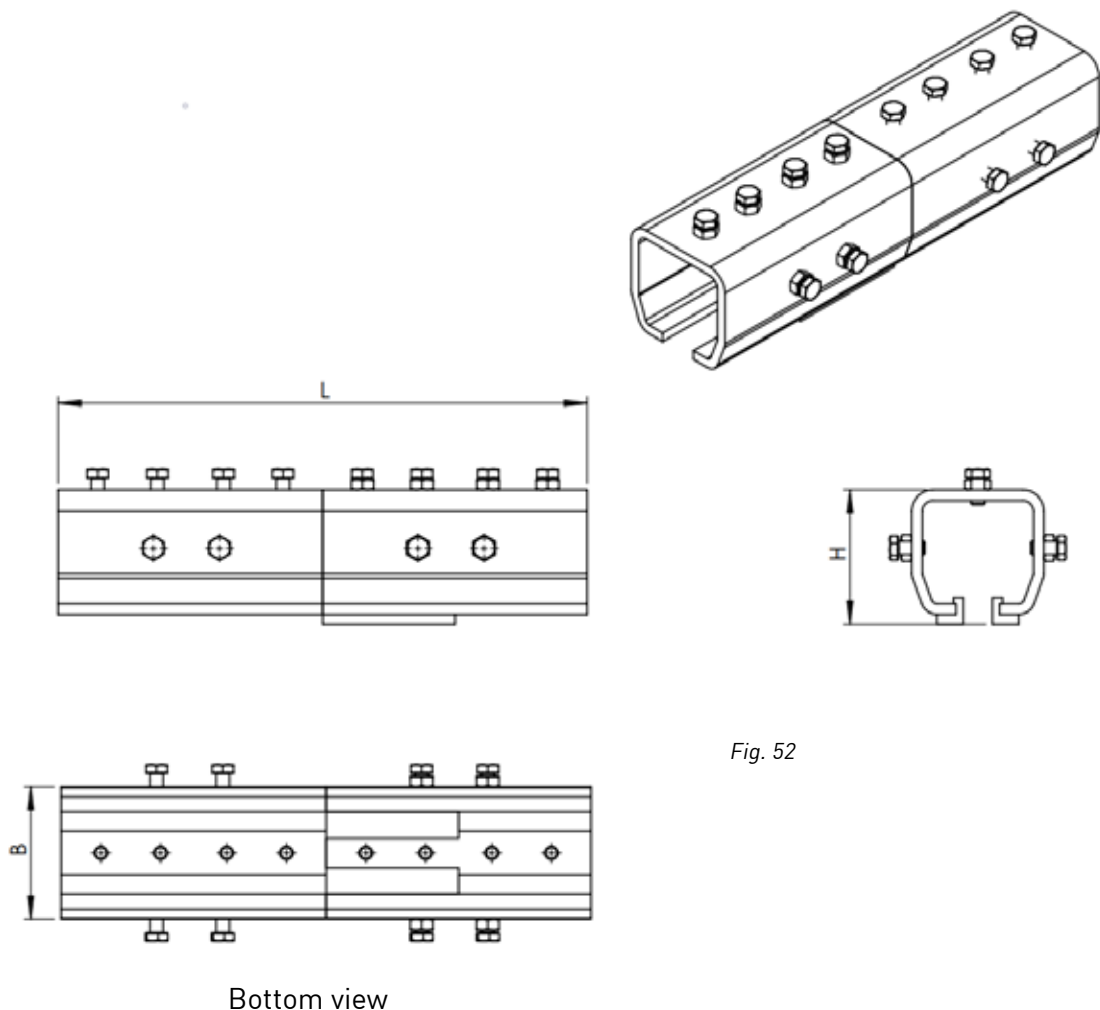


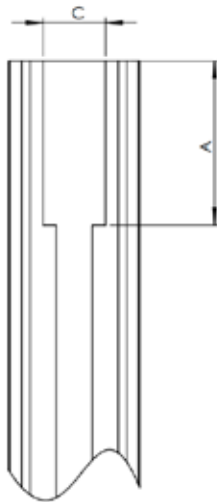
Fig. 52

2

INSTALLATION INSTRUCTIONS

Generally, for dilatation joints installation the process below should be followed :

Step 1 : Cut the profile section to be installed, as illustrated in fig. 53, according to the table below :



Bottom view

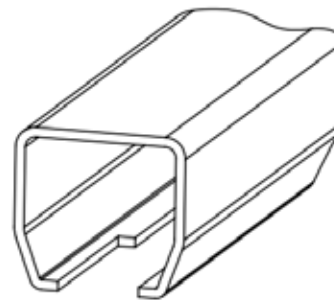
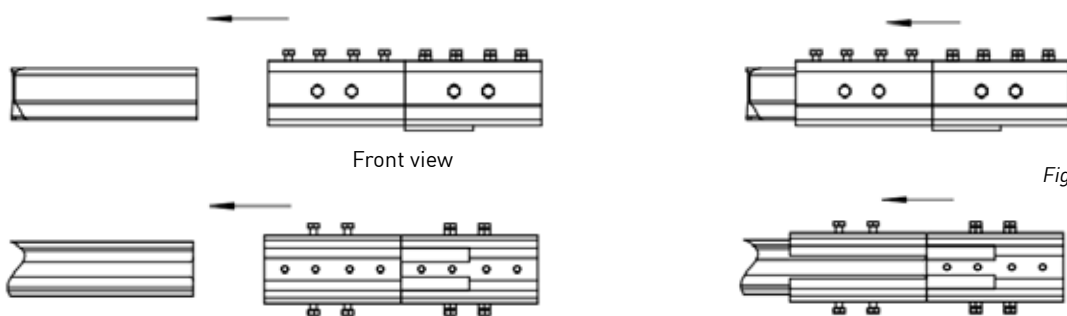


Fig. 53

Table 9

NIKO Track Profile No.	Dimension A [mm]	Dimension C [mm]
23.000	60	19.2
24.000	75	23.5
25.000	90	25.3
26.000	100	38.5
27.000	125	47

Step 2 : Slide the dilatation joint onto the uncut profile section, up to the welded plates, as illustrated in fig. 54 & fig. 55 and secure the profile into position by tightening the bolts of the upper and side surfaces of the joint. Adjust the bolts accordingly, to ensure the profile section is horizontal and there is no gap or the minimum possible gap between the profile and the welded plates of the dilatation joint. The running/working surface must be flat, continuous and even throughout the joint.



Front view

Fig. 54

Bottom view

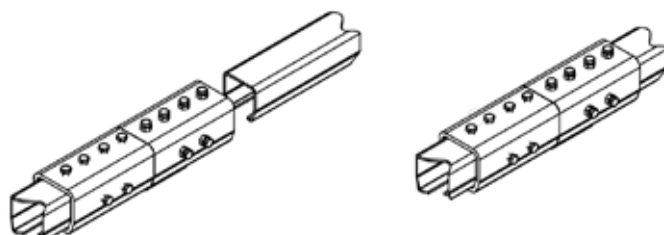


Fig. 55

2

INSTALLATION INSTRUCTIONS

Step 3 : Slide the cut profile section into the dilatation joint, as illustrated in fig. 56 and position the profile edge at the specific distance from the center of the joint, according to Table 10.

Tighten the bolts of the upper and side surfaces onto the upper surface of the cut profile section, loosely, allowing the profile to move freely during expansions/contractions due to temperature rises.

✓ Secure the bolts into position using the corresponding lock nuts.

✓ The bolts should only position the profile and prevent vertical and side movement.

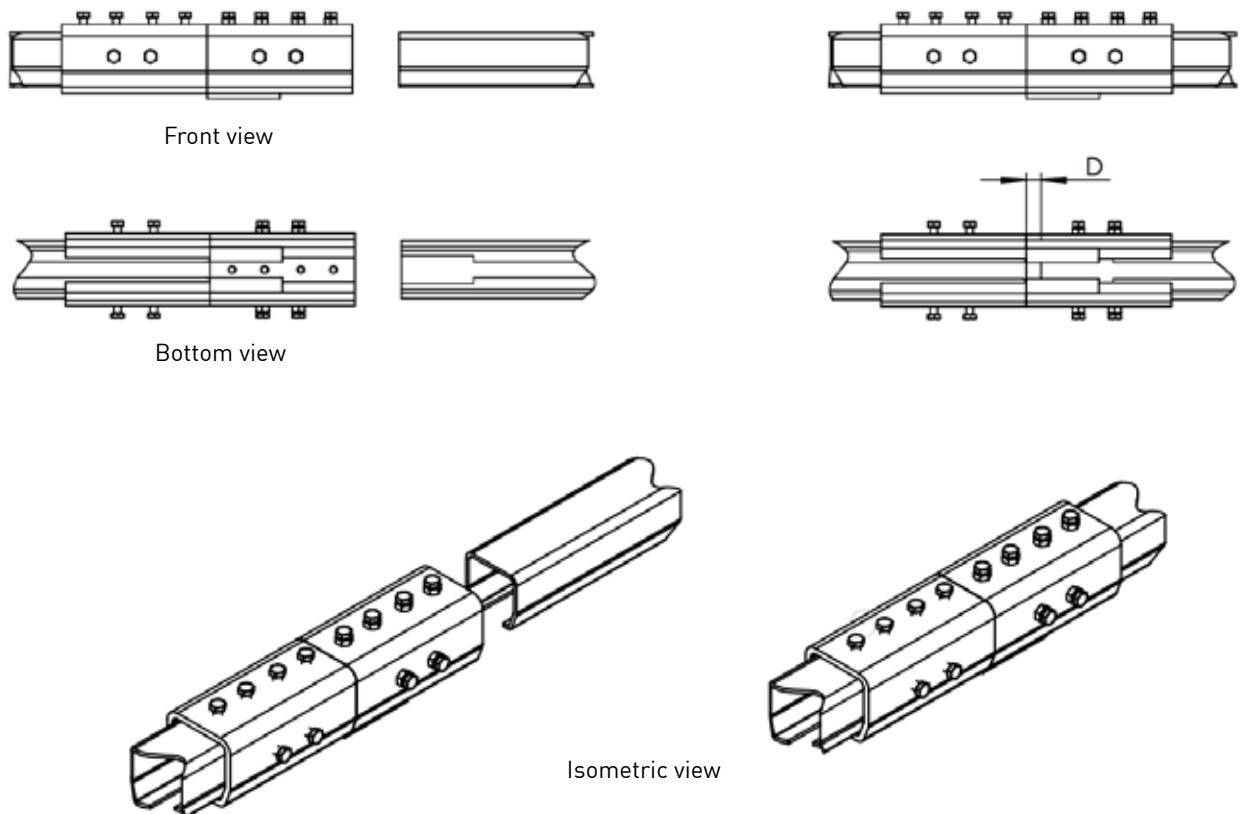


Fig. 56

Table 10

NIKO Track Profile No.	Dimension D [mm]
23.000	15
24.000	20
25.000	25
26.000	30
27.000	50

3

MAINTENANCE AND SERVICE

3.1 NIKO Track profiles & track bends maintenance

Routine maintenance does not require the use of special instruments and equipment, therefore it can be performed either by qualified personnel or directly by the operator.

- Every six months or less, depending on the operating and environment conditions, clean the track profiles and track bends.
- Every six months or less, check the working surfaces of the track profiles and bends for wear, using a micrometer. (fig. 57) A table with the nominal thickness and the minimum permitted thickness of the track profiles for each series is provided below.



Fig. 57

Table 11

NIKO Track Profile No.	s [mm]	s-10% [mm]
23.000	2.75	2.45
24.000	3.2	2.9
25.000	3.6	3.2
26.000	4.5	4
27.000	6.5	5.8



Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

3.2 Splice joints maintenance

Annually, inspect the tightness, stability and alignment of all splice joints of the conveyor system. Adjust or tighten the bolts if necessary.

3.3 Support brackets maintenance

Annually, inspect all support brackets for bolt tightness, depending on the size of the bolt, according to the Table 4, chapter 2.3.

3.4 Track end stops maintenance

- Annually, inspect the tightness of the track end stop bolts.
- Annually, inspect the track end stop rubber bumpers for wear and replace if necessary.



Scan QR code for
instructions about trolleys

3.5 Trolleys & Flight bars maintenance

- Annually, inspect all trolleys and flight bars for bolt tightness, depending on the size of the bolt, according to the table below :

Table 12

Bolt 8.8 size	M6	M8	M10	M12	M16	M20	M24	M30
Torque [Nm]	10	25	50	87	210	412	711	1422

Trolleys with ball headed screws (xx.T14, xx.T47, xx.T12 etc)

For trolleys accomodating screws with ball heads, preventive maintenance and a specific inspection program should be carried out.

- Every three months, unscrew the housing plates containing the ball headed bolts and check the diameter of the head, taking into consideration the minimum permitted diameter provided in Table 13. The ball headed bolt must be immediately replaced if the diameter measurement is below the permitted value, due to excessive wear.

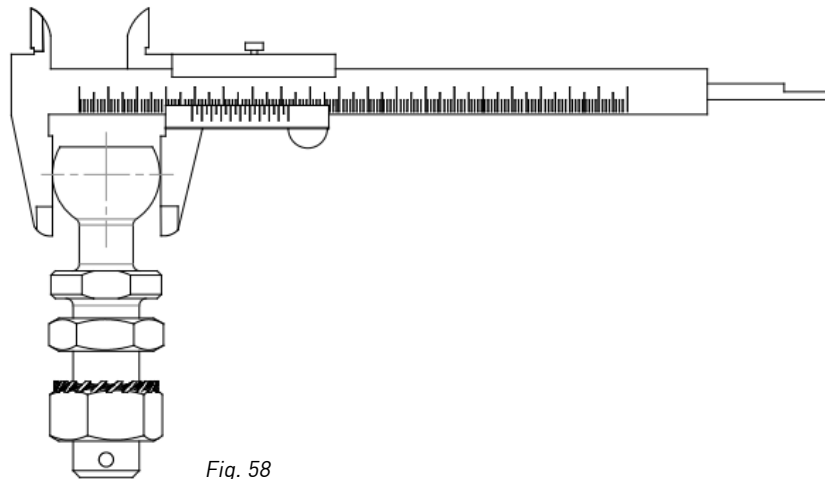


Fig. 58

Table 13

NIKO Track Profile No.	Nominal diameter \varnothing [mm]	Minimum diameter \varnothing [mm]
23.000	17.9	16.1
24.000	22.6	20.3
25.000	29.8	26.8
26.000	39	35.1
27.000	42	37.8

3

MAINTENANCE AND SERVICE

If the diameter of the ball headed bolts is measured within limits, lubricate the area as following :

Step 1 : Unscrew the bolts and nuts, releasing the housing plates and rotating bolt. (fig. 59)

Step 2 : Using a soft cloth, thoroughly clean all surfaces of the screw and inner parts of the plates, completely removing the old grease and any residues.

Step 3 : Apply a thin layer of grease/lubricant on the cases and reassemble the trolley. During grease application it is important to obtain a uniform and coherent layer of lubricant.

Step 4 : Reassemble the wheel trolley, tighten the nuts and rotate the ball headed bolt to allow the grease to spread uniformly. Wipe off any excess grease.



- For trolleys with operating temperatures up to 80°C, use the recommended multipurpose grease 'shell alvania' or any equivalents.
- For trolleys xx.TH.Txx with high operating temperatures, from 80°C up to 250°, use the recommended high temperature grease 'barrierta/kluber L55'.
- Lubricants used for conveyor systems of painting lines must be silicone free.
- Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

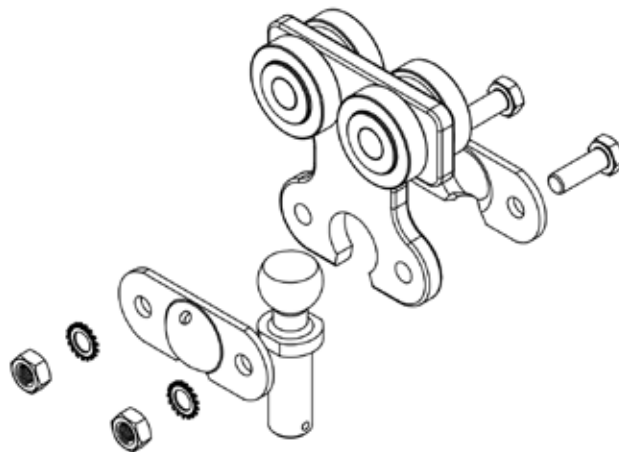


Fig. 59

Trolleys with side rollers (xx.T42, xx.T47 etc)

For trolleys accommodating screws with ball heads, preventive maintenance and a specific inspection program should be carried out.

- Every six months, remove the lock washers DIN 6799 and thoroughly clean the side rollers and the corresponding shafts, using a soft cloth. Lubricate the area with synthetic oil sae 30, reassemble the side rollers and secure with new lock washers DIN 6799. (fig. 60)

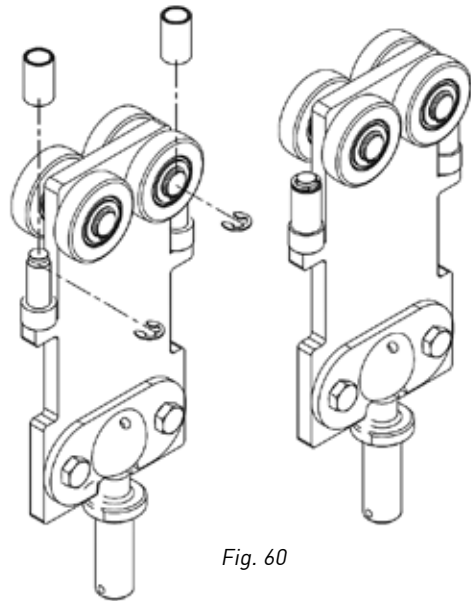


Fig. 60

Trolleys with rotating eye nut DIN 582 (xx.T20, xx.T13 etc)

For trolleys accommodating rotating eye nuts, preventive maintenance and a specific inspection program should be carried out.

- Every six months, check the tubular safety pin for wear or excessive rust and replace if necessary. (fig. 61)

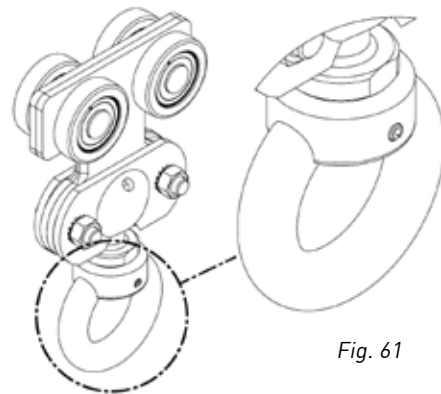


Fig. 61

Bearings maintenance

For trolleys accommodating screws with ball heads, preventive maintenance and a specific inspection program should be carried out.

- Annually, inspect the ball bearings of all trolleys and flight bars individually, as follows :

3

MAINTENANCE AND SERVICE

Step 1 : Check the rotation of each bearing individually. If the rotation is not smooth and there is friction or the bearing even gets stuck, the trolley should be replaced. In the case of bearing shafts with retaining rings ,the bearing can simply be replaced along with the din 471 retaining rings.

Step 2 : Check if the bearings have large clearance and replace if necessary.

- Annually, regrease the ball bearings of all trolleys and flight bars using a hand grease gun, through the hole located on the bearing's seal/ shield, as shown below in fig. 62.

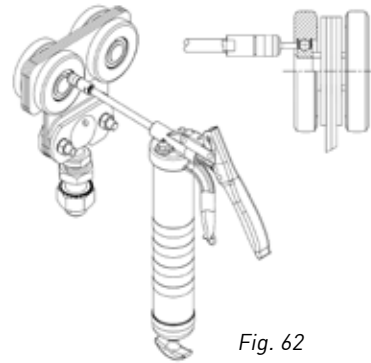


Fig. 62



- For trolleys with operating temperatures up to 80°C, use the recommended multipurpose grease 'shell alvania' or any equivalents.
- For trolleys xx.TH.xx with high operating temperatures, from 80°C up to 250°, use the recommended high temperature grease 'barrierta/kluber L55'.
- Lubricants used for conveyor systems of painting lines must be silicone free.
- The bearings and also the trolleys are shipped from NIKO lubricated and ready for use. Overgreasing should be avoided. Re-lubrication of the ball bearings should be carried out according to the table below.
- Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

Table 14

NIKO Ball bearing No.	Lubricant (gr)
23.000	0.8
24.000	1
25.000	2.2
26.000	4
27.000	5.6



Operating temperature ranges provided by the manufacturer, for trolleys and flight bars, must be obtained to avoid the destruction of the ball bearings.

3.6 Tongue switches maintenance

- Every six months, clean the tongue. The cleaning intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system.
- Every six months, check the working surfaces of the tongue switches for wear. Minimum permitted profile thickness according to Table 11, chapter 3.1.
- Annually, inspect the tightness of all bolt connections of the switch and adjust if necessary.
- Every six months, inspect the spring and apply grease between the tongue and the spring.

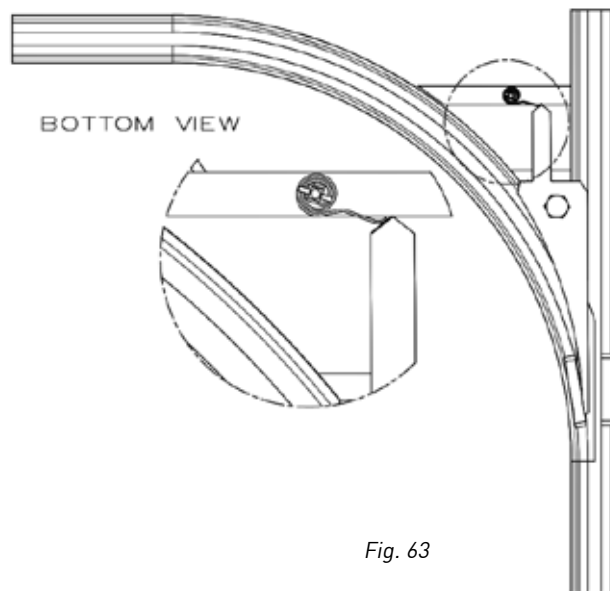


Fig. 63

- Periodically, check for air leaks from the cylinder seal rings and the pipe connections. *
- Periodically, thoroughly clean any foreign particles on the piston rod, using a soft cloth. All non-abrasive cleaning agents are permitted. Recommended cleaning agent 'loctite 7070'. *



Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

***Applicable only for tongue switches with pneumatic operation**

3.7 Swivel switches maintenance

- Every six months, clean the swivel switch. The cleaning intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system.
- Every six months, check the working surfaces of the swivel switches for wear. Minimum permitted profile thickness according to Table 11, Chapter 3.1.
- Annually, inspect the tightness of all bolt connections of the switch and adjust if necessary.
- Annually, regrease the sliding surface of the swivel switch (hatched surfaces_fig. 63) and inspect the locking device. Regulate if necessary.
- Periodically, check for air leaks from the cylinder seal rings and the pipe connections. *
- Periodically, thoroughly clean any foreign particles on the piston rod, using a soft cloth. All non-abrasive cleaning agents are permitted. Recommended cleaning agent 'loctite 7070'. *



Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

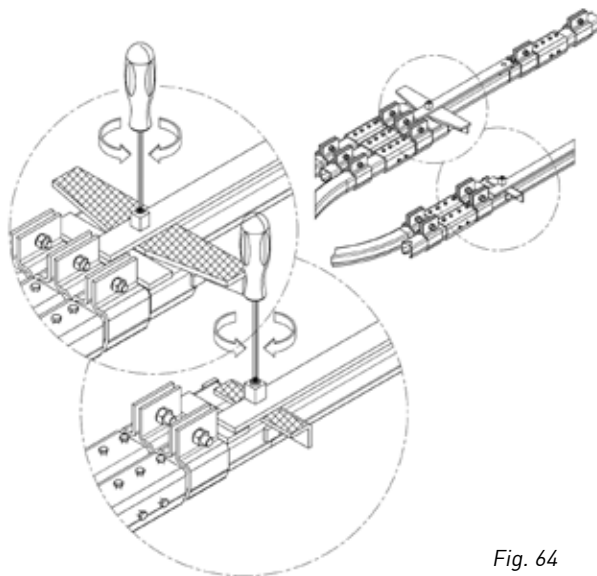


Fig. 64

***Applicable only for swivel switches with pneumatic operation**

3.8 Turn table maintenance

- Every six months, clean the turn table switch. The cleaning intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system.
- Every six months, check the working surfaces of the turn tables for wear. Minimum permitted profile thickness according to Table 11, Chapter 3.1.
- Annually, inspect the tightness of all bolt connections of the turn table and adjust if necessary.
- Annually, regrease the working surfaces between the rotating plates and the bearing balls of the turn table switches. (fig. 64)
- Annually, check the stoppers of the turn table and adjust if necessary. (fig. 65)
- Periodically, check for air leaks from the cylinder seal rings and the pipe connections.
- Periodically, thoroughly clean any foreign particles on the piston rod, using a soft cloth. All non-abrasive cleaning agents are permitted. Recommended cleaning agent 'loctite 7070'.



Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

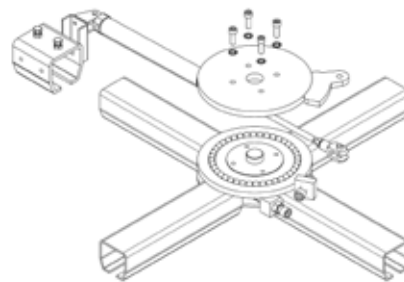


Fig. 65

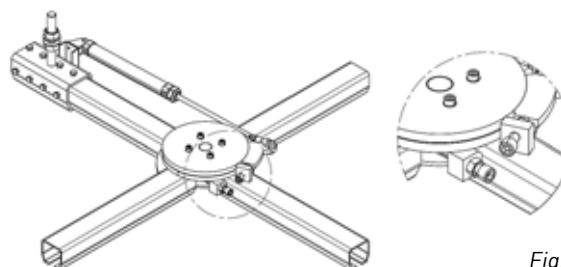


Fig. 66

3.9 Cruciform & multiple turn tables maintenance

- Every six months, clean the tongue switch. The cleaning intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system.
- Every six months, check the working surfaces of the turn tables for wear. Minimum permitted profile thickness according to table 11, chapter 3.1.
- Annually, inspect the tightness of all bolt connections of the turn table and adjust if necessary.
- Annually, regrease the locking pin of the turn table (fig. 66)
- Periodically, check for air leaks from the cylinder seal rings and the pipe connections. *
- Periodically, thoroughly clean any foreign particles on the piston rod, using a soft cloth. All non-abrasive cleaning agents are permitted. recommended cleaning agent 'loctite 7070'. *



Wear inspection intervals may be shorter if deemed necessary, depending on the operating and environmental conditions of the system. The recommended inspection intervals have been determined assuming one work shift operating time for the system (8h). For continuous operating times, exceeding one work shift, it is strongly recommended that wear inspections are carried out more frequently.

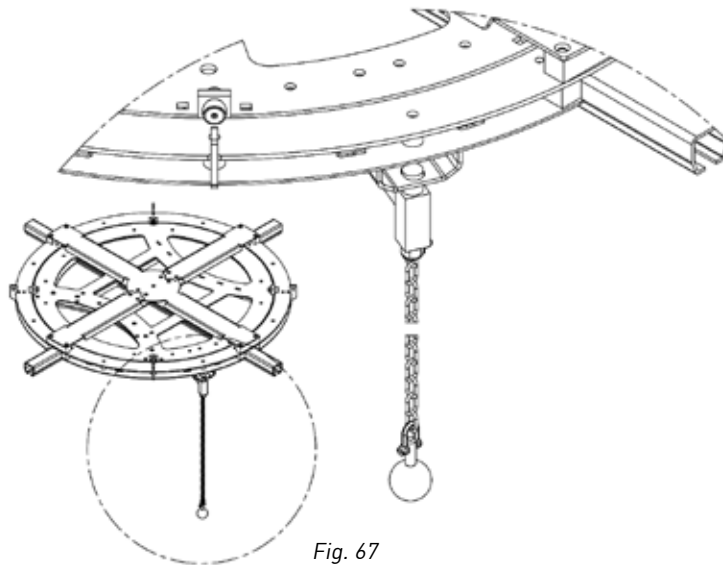


Fig. 67

***Applicable only for cruciform & multiple turn tables with pneumatic operation.**

ANNEX A

NIKO Split support brackets tightening torque

NIKO split support bracket No.	Torque (Nm)
23.B08-23.B14	24
24.B08-24.B20	26
25.B10-25.B26	70
26.B16-26.B26	110
27.B20-27.B26	130

NIKO track end stops tightening torque

NIKO track end stop No.	Torque (Nm)
23.X01	10
24.X01	10
25.X01	32
26.X01	80

Manufacturer's specified tightening torque

Bolt (grade 8.8)	M6	M8	M10	M12	M16	M20	M24	M30
Torque (Nm)	10	25	50	87	210	412	711	1422

TERMS AND CONDITIONS FOR THE SALE OF GOODS

§ 1.Preamble

1.These Standard Terms and Conditions for the sale of export Goods shall exclusively apply, save as varied by express agreement accepted in writing by both parties. 2.The offer, order acknowledgement, order acceptance or sale of any products covered herein is conditioned upon the terms contained in this instrument. Any conditional or different terms proposed by the buyer are objected to and will not be binding upon the seller unless assented in writing by the seller. Our Terms and Conditions apply exclusively also in the case of goods being delivered without reservation to the buyer despite our full awareness of contradicting or varying terms and conditions of the buyer.3.These conditions shall govern any future individual contract of sale between the seller and the buyer to the exclusion of any other terms and conditions subject to which any such quotation is accepted or purported to be accepted, or any such order is made or purported to be made, by the buyer. 4.Any typographical, clerical or other error or omission in any sales literature, quotation, price list, acceptance of offer, invoice or other document of information issued by the seller shall be subject to correction without any liability on the part of the seller. 5.The provisions of these Standard Terms and Conditions extend to standard contract conditions which are used in a contract with a merchant in the course of business only and apply only to companies, legal persons under public law or public special assets.

§ 2.Orders and Specifications

1.No order submitted by the buyer shall be deemed to be accepted by the seller unless and until confirmed in writing by the seller or the seller's representative within 2 weeks after submittal.2.The quantity and description of and any specification for the goods shall be those set out in the seller's quotation or the buyer's order.3.Any such specification, sales literature, quotation etc. shall be strictly confidential and must not be made available to third parties.4.The buyer shall be responsible for the seller for ensuring the accuracy of the terms of any order submitted by the buyer, and for giving the seller any necessary information relating to the goods within a sufficient time to enable the seller to perform the contract in accordance with its terms.5.If the goods are to be manufactured or any process is to be applied to the goods by the seller in accordance with the specification submitted by the buyer, the buyer shall indemnify the seller against all loss, damages, costs and expenses awarded against or incurred by the seller in connection with infringement of any patent, copyright, design, trade mark or other industrial or intellectual property rights of any other person which results from the seller's use of the buyer's specification.6.The seller reserves the right to make any changes in the specification of the goods which are required to conform with any applicable statutory requirements or, where the goods are to be supplied to the seller's specification, which do not materially affect their quality or performance.

§ 3.Price of the Goods

1.The price of the goods shall be the seller's quoted price or, where no price has been quoted the price listed in the seller's published price list current at the date of acceptance of the order. 2.The seller reserves the right, by giving notice to the buyer at any time before delivery, to increase the price of the goods to reflect increase in the cost to the seller which is due to any factor beyond the control of the seller (such as foreign exchange fluctuation, currency regulation, alteration of duties, significant increase in the cost of materials or other costs of manufacture) or any change in delivery dates. 3.Except as otherwise stated under the terms of any quotation or in any price list of the seller, and unless otherwise agreed in writing between the buyer and the seller, all prices are given by the seller on an ex works basis, and where the seller agrees to deliver the goods otherwise than at the seller's premises, the buyer shall be liable to pay sellers charges for transport.4.The seller bears the cost of the usual packaging; charges for special packaging will be borne by the buyer 5.On buyers request, the seller will insure the goods at the expense of the buyer.6.Prices are exclusive of VAT, which must then be paid to the seller additionally.

§ 4.Terms of Payment / Prepayments

1.The buyer shall pay the price of the goods immediately upon receipt of invoice, unless a payment deadline is granted in the invoice.2.Payment shall be effected by inter bank payment transaction only; no cheque or bill of exchange will be considered as fulfillment of the payment obligation.3.It may be agreed between the parties that the buyer has to deliver a letter of credit issued by his bank (or any bank acceptable to the seller). In this individual case it is assumed that any letter of credit will be issued in accordance with the Uniform Customs and Practice for Documentary Credits, 1993 Revision; ICC Publication No. 500. 4.If the buyer fails to make any payment on the due date then, without any prejudice to any other right or remedy available to the seller, the seller shall at his discretion be entitled to:
•cancel the contract or suspend any further deliveries to the purchaser; or
•charge the buyer interest on the amount unpaid, at the rate of 4 per cent per annum above Federal Reserve Bank Rate/Bundesbank Discount Rate from then being valid, until payment in full is made. The buyer shall be entitled to prove that the delay of payment caused no or little damage only.
5.Advancements, prepayments and installments paid by the buyer to the seller regarding customized goods or goods which empirically have a rare demand are not refundable by the seller. 6.Payments will first be applied to accumulated costs, then to interest and then to the oldest main demand.

§ 5.Delivery

1.Delivery of the goods shall be made by the buyer collecting the goods at the seller's premises at any time after the seller has notified the buyer that the goods are ready for collection or, if some other place for delivery is agreed by the seller, by the seller delivering the goods to that place.2.If a fixed time for delivery is provided for in the contract, and the seller fails to deliver within such time or any extension thereof granted, the buyer shall be entitled, on giving notice in writing to the seller within a reasonable time, to claim a reduction of 0.5 % per week (and up to a maximum of 5%) of the price payable under the contract, unless it can be reasonably concluded from the circumstances of the particular case that the buyer has suffered no loss. This limit shall not apply if the business had to be settled on a fixed date or if the delay was caused negligently or intentionally by the seller, his agents or representatives or if there is any future breach of any essential contractual obligation.3.If for any reason whatever the seller fails within such time to effect delivery, the buyer shall be entitled by notice in writing to the seller to fix a deadline after the expiry of which the buyer shall be entitled to terminate the contract. After the expiry of the above mentioned fix deadline the buyer may also recover from the seller any loss suffered by the buyer by reason of the failure of the seller.4.If the buyer fails to accept delivery on due date, he shall nevertheless make any payment conditional on delivery as if the goods had been delivered. The seller shall arrange for the storage of the goods at the risk and cost of the buyer. If required by the buyer the seller shall insure the goods at the cost of the buyer.

§ 6.Transfer of Risk

Risk of damage to or loss of the goods shall pass to the purchaser as follows:

- in the case of goods to be delivered otherwise than at the seller's premises, at the time of the delivery or, if the buyer wrongfully fails to take delivery of the goods, the time when the seller has tendered delivery of the goods;
- in the case of goods to be delivered at the seller's premises ("ex works", Incoterms 2010) at that time when the seller notifies the purchaser that the goods are available for collection.

§ 7.Risk of damage to or loss of the goods shall pass to the purchaser as follows:

- in the case of goods to be delivered otherwise than at the seller's premises, at the time of the delivery or, if the buyer wrongfully fails to take delivery of the goods, the time when the seller has tendered delivery of the goods;
- in the case of goods to be delivered at the seller's premises ("ex works", Incoterms 2010) at that time when the seller notifies the purchaser that the goods are available for collection.

1.Notwithstanding delivery and the passing of risk in the Goods, or any other provision of these conditions, the property in the goods shall not pass to the buyer until the seller has received payment in full of the price of the goods and all other goods agreed to be sold by the seller to the buyer for which payment is then due.2.After termination of the contract the seller shall have absolute authority to retake, sell or otherwise deal with or dispose of all or any part of the goods.3.Until such time as the property in the goods passes to the buyer, the buyer shall hold the goods as the seller's fiduciary agent, and shall keep the goods properly stored, protected and insured.Until that time the buyer shall be entitled to resell or use the goods in the ordinary course of business, but shall account to the seller for the proceeds of sale or otherwise of the goods including insurance proceeds, and shall keep all such proceeds separate from any moneys or properties of the buyer and third parties.4.The buyer is only entitled to further disposal or processing in consideration of the following conditions:

- The buyer may only dispose of or process the reserved merchandise in a proper business office and only if there is no lasting decline in his financial circumstances.
- The buyer herewith transfers the demand with all secondary rights resulting from sales of the reserved merchandise -including possible balance demands- to the seller.
- If the goods are processed or reshaped by the buyer and if processing is done with goods that the seller has no property in, the seller shall become co-owner of the goods. The same shall apply if the seller's goods are completely reshaped and mixed with other goods.
- If the buyer has sold the demand within the bounds of a real factoring, he will transfer the newly resulting demand of the factor to the retailer and will forward him a share of his sales proceeds amounting to the value of the seller's right on the merchandise. The buyer is obligated to reveal the transfer to the factor if he is more than 10 days overdue with the payment of an invoice or if his financial circumstances decline substantially. The seller accepts this transfer.

5.If third parties take up steps to pledge or otherwise dispose of the goods, the buyer shall immediately notify the seller in order to enable the seller to seek a court injunction. If the buyer fails to do so in due time he will be held liable for any damages caused.6.The seller shall on demand of the buyer release any part of the collateral if the value of the collateral held in favour of the seller's decision to release those parts of the collateral suitable for him.

§ 8.Warranties, exclusion clauses and limitation period

1.The buyer shall examine the goods as required and raise any objections within 8 days after receiving the goods. 2.The seller warrants that all items delivered under this agreement will be free from defects in material and workmanship, conform to applicable specifications, and, to the extent that detailed designs have not been furnished by the buyer, will be free from design defects and suitable for the purposes intended by the buyer.3.The seller shall not be liable for the normal process of wearing down during use of the goods and goods being fit for a particular purpose unless otherwise agreed upon, to which the buyer intends to put them. 4.The above warranty is given by the seller subject to the following conditions:

- the seller shall not be liable in respect of any defect in the goods arising from any design or specification supplied by the buyer;
- the seller shall not be liable under the above warranty if the total price for the goods has not been paid by the due date for payment;
- the above warranty does not extend to parts, materials or equipment manufactured by or on behalf of the buyer unless such warranty is given by the manufacturer to the seller.

5.This warranty does not cover defects in or damage to the products which are due to improper installation or maintenance, misuse, neglect or any cause other than ordinary application.6.Any discharge from liability will be void if a defect results from negligent or intentional breach of contract on the part of the seller. The same applies if the seller may be held responsible for the breach of any further essential contractual obligation.7.The buyer is entitled to demand the delivery of any substitute goods, or repair.8.Where any valid claim in respect of any goods which is based on any defect in the quality or condition of the goods or their failure to meet specification is notified to the seller in accordance with these conditions, the seller shall be entitled at the seller's sole discretion to either replace the goods free of charge or repair the goods. If the seller is neither ready nor able to either repair or replace the goods the buyer shall be entitled at the buyer's sole discretion to claim for a reduction of price or a cancellation of the contract.9.All the purchaser's demands concerning defects will lapse within a limitation period of 1 year as of the legal lapse beginning.

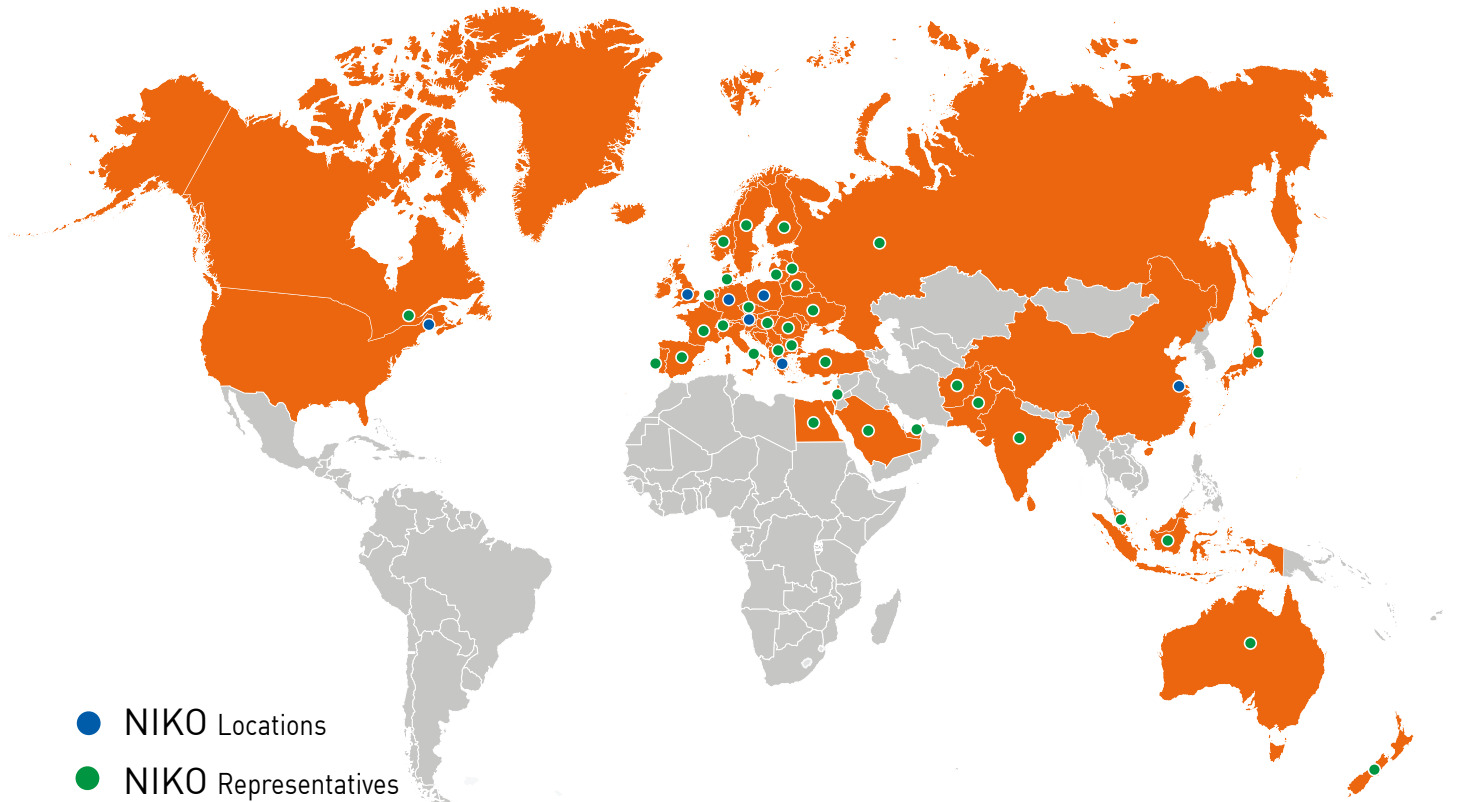
§ 9.Miscellaneous clauses

1.The seller reserves the right to improve or modify any of the products without prior notice, provided that such improvement or modification shall not affect the form and function of the product. 2.This agreement supersedes and invalidates all other commitments and warranties relating to the subject matter hereof which may have been made by the parties either orally or in writing prior to the date hereof, and which shall become null and void from the date of the agreement is signed.3.This agreement shall not be assigned or transferred by either party except with written consent of the other. 4.Each party shall be responsible for all ist legal, accountancy or other costs and expenses incurred in the performance of ist obligation hereunder.

§ 10.Choice of law: Place of jurisdiction

1.This agreement is subject to the law applicable in the country in which the seller has its registered office. Both parties consent to the exclusive jurisdiction of the court at the registered office of the seller. 2.The seller has the right to sue at the court of competent jurisdiction for the buyer or any other court which may have jurisdiction under national or international law.

Global LOCATIONS



- NIKO Locations
- NIKO Representatives

**AUSTRIA-
NIKO Vertriebs GmbH**
Hainfelder Straße 48
A - 2560 Berndorf
Tel. 0043 (0) 2672 21201
Fax 0043 (0) 2672-21201-13
office.at@niko.eu.com

**POLAND-
NIKO Polska**
Skrzynno 192a
Ostrowek 98-311
Tel. +48 504 003 556
info.pl@niko.eu.com

**GREECE-
Helm Hellas S.A.**
82nd Km Athens-Korinthos
P.O. Box 209
GR - 201 00 KORINTHOS
Tel. 0030 27410 76800
Fax 0030 27410 25368
info@niko.eu.com

NIKO Track LLC
210 Century Drive
Bristol, CT 06010
Tel. 001 860-845-8179
Fax 001 860-584-8612
info@niko-track.com
www.niko-track.com

NIKO US
9 Stockholm St,
Newport, RI 02840
C: 401-835-8640
Alex.Koza@niko.eu.com

**CANADA -
NIKO Crane Canada**
615, rue du Nickel
Québec (Québec) G2N 0J9
Tel. 418 841.2287
info@smakdesign.ca
www.smakmanutention.com

**UNITED KINGDOM-
NIKO Ltd**
Airfield Park Business Park
Welsh Road East, Southam
Warwickshire, CV47 1NE
Tel. 0044 (0) 1926 813111
Fax 0044 (0) 1926 815599
Sales@niko.co.uk
www.niko.co.uk

**USA Light Crane Systems-
NIKORAIL**
8000 Joliet Rd.
McCook, IL 60525
Toll Free 888.352.1213
Tel. 001 708-352-1213
sales@hsicrane.com
www.nikorail.com

**GERMANY-
NIKO Technik GmbH**
Robert-Bosch-Str. 14
DE - 42489 Wülfrath
Tel. 0049 (0) 2058 9093603
Fax 0049 (0) 2058 9093604
office.de@niko.eu.com

**CHINA-
NIKO TRADING (SHANGHAI) Co., Ltd**
Room 901-156, No.354
Tianshan Road, Changning District,
P.R.China - 201802 Shanghai
Tel. 0086 134 2785 9785
info.cn@niko.eu.com



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