



PALLET RACKING ASSEMBLY MANUAL



Doc: 20MTRPEN01_ASS

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1. ASSEMBLY

The assembly process will be made by qualified personnel and with the adequate means so as to end the installation within the specified time and with the tolerances required.

There are different phases:

2. PRELIMINAR STAGE

Personnel in charge of the assembly should check the reception of the goods, the control of the packages (number, conditions, etc.). This is shown in the corresponding delivery note.

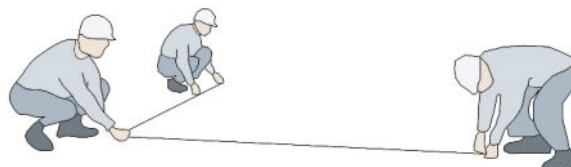
The contents of the received packages should be checked before starting to assemble, in order to avoid delays. In case something is wrong, it might be indicated immediately so as to give a rapid solution.

While the installation is being done, and pending on the location characteristics, all materials need to be identified, ordered and placed in an area secure and damage-free.

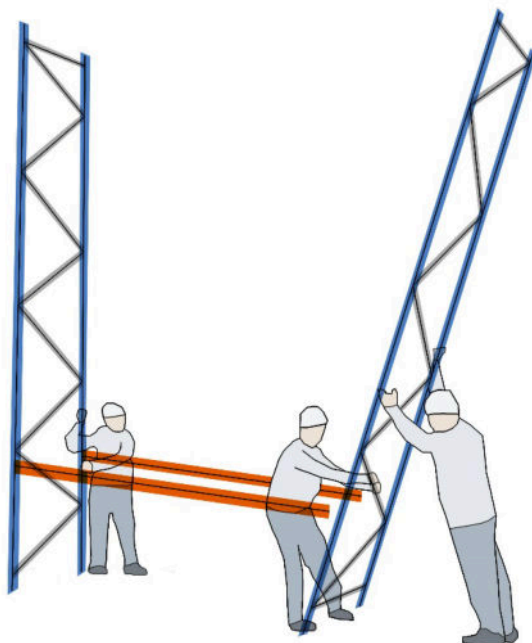
If any difficulty comes out while installing some element, this should not be forced. In fact, this/these element/s should be checked in case dimensions or type of the material are not the correct ones.

3. BASIC ASSEMBLY PROCESS

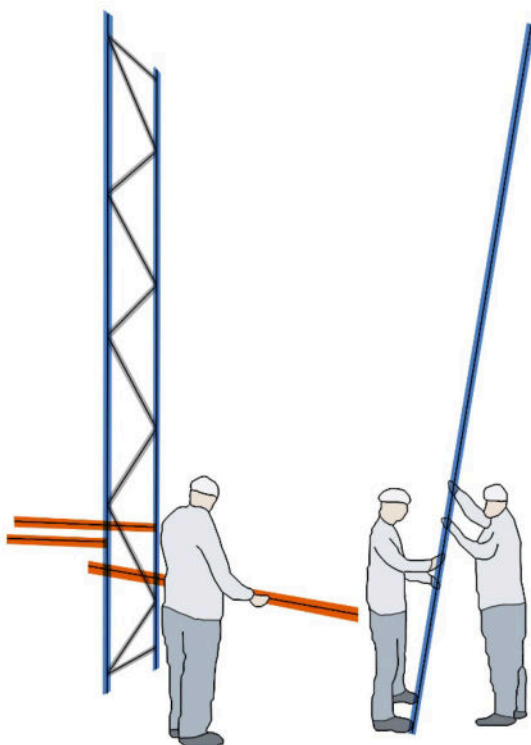
- 1- First of all, it's important to measure and clean the area where this Pallet Racking will be installed. It's compulsory to check floor's flatness.



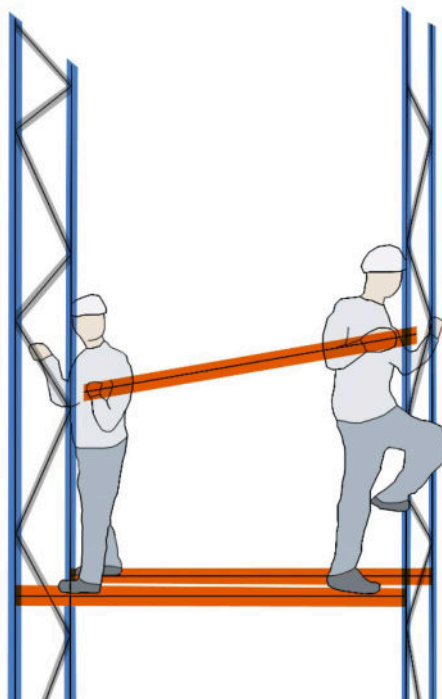
- 2- Elevate the first upright and embed bottom level beams, and then elevate the second upright. Unless otherwise states, the horizontal's simple node should be placed towards the working aisle.



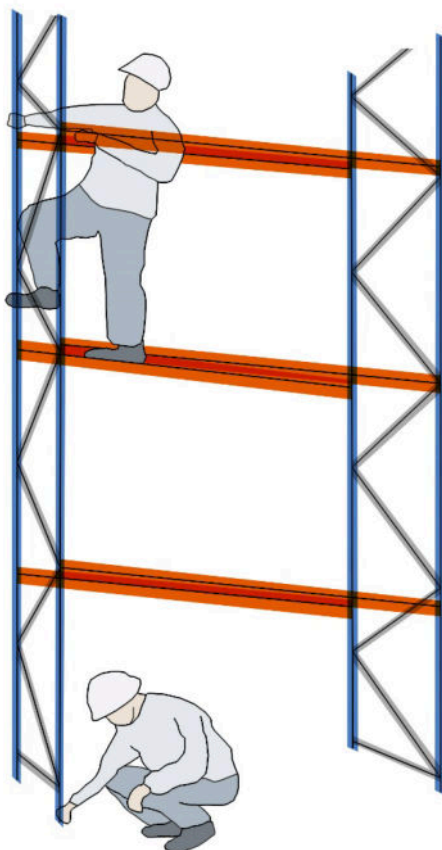
- 3- Elevate the remaining frames according to what has been said in previous steps



4- Install the rest of beams in the specified levels.

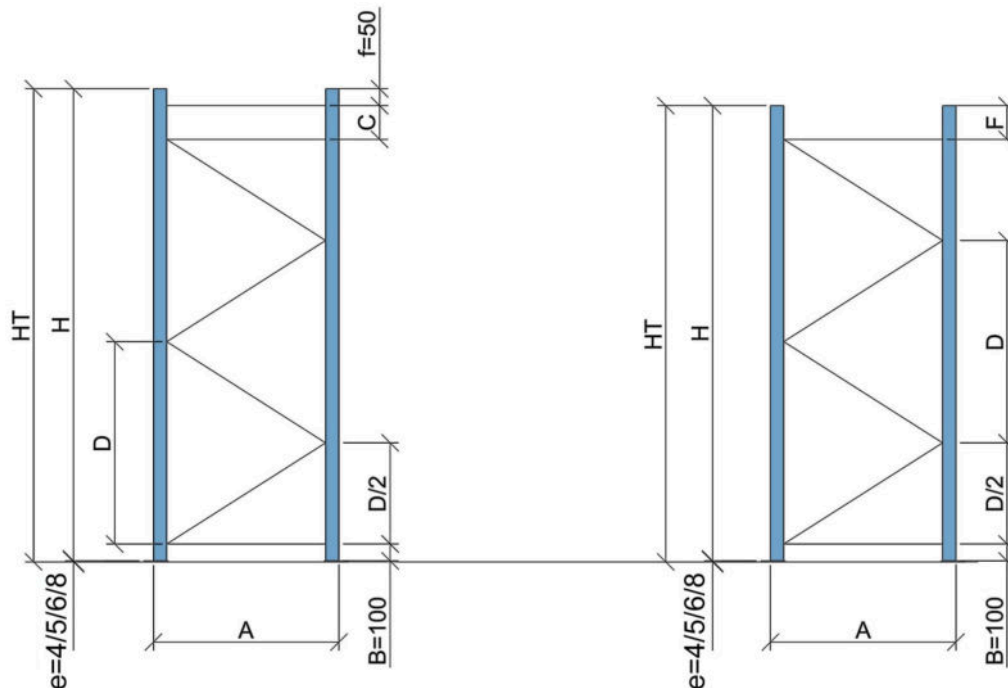


5- Check the anchoring, levelling and the vertical position of the frames.



4. CONFIGURATION AND FRAME COMPONENTS

Racks, pending on the upright type, vary their configuration as shown in the attached schematic and table. This type of configuration is valid for all types **except front 85mm**.



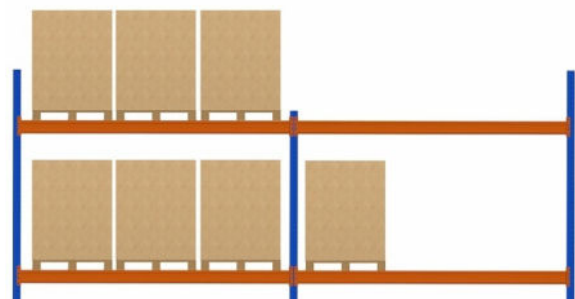
TYPE OF FRAME	ER76M, ER76A, ER100A	ER100B	ER115B,ER115C
e - Thickness of the footplate in mm.	4 / 5 / 6	5 / 6 / 8	5 / 8
B - Height of the first horizontal mm.	100*		
C - Height lower / higher mm.	250 / 550	250 / 650	
D - Distance between diagonal nods mm.	1200	1400	
F - Min./Max. length of frame protruding mm.	50 / 250		
HT - Total height of the frame.	Num. steps x 50 + Footplate thickness		

* With foot plates DV, the first horizontal must be at 150mm.

The height of the frame "H" is considered without taking into account the thickness of the foot, it must always be a multiple of 50 mm. and it is supplied as standard in sections of 250 mm.

The exterior side frames will be prolonged a minimum of 500 mm above the last loading level. The interior side frames will be prolonged a minimum of 100 mm.

For frame configurations different to the standard range offered, please contact the Esnova Technical Department.



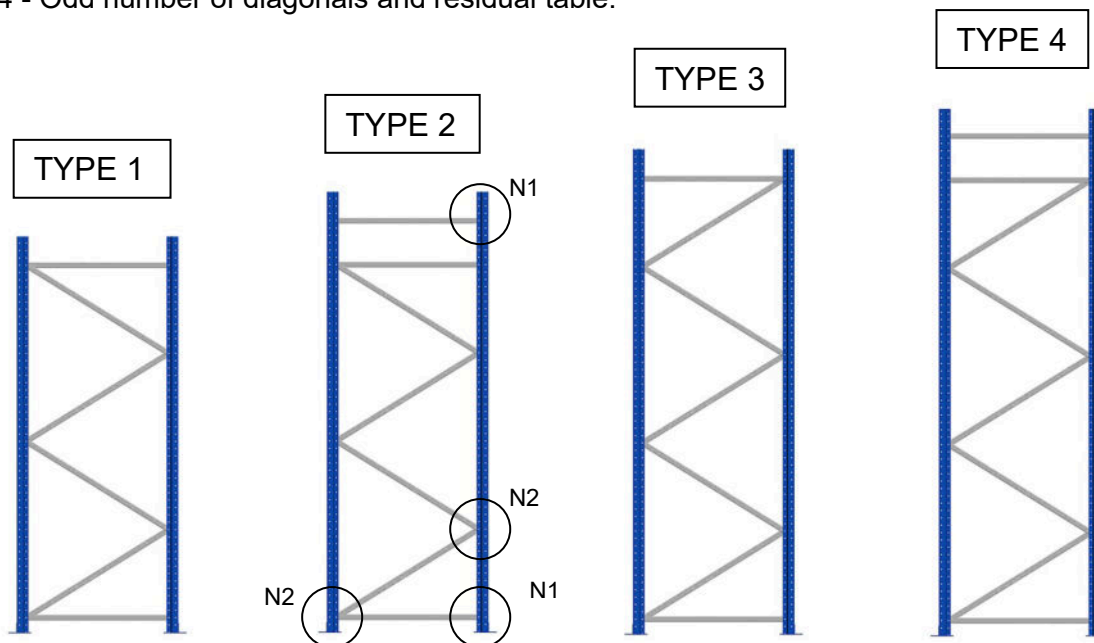
There are different types of standard frames. The standard frames present four configurations that are repeated cyclically pending on their height.

TYPE 1 - Number of even diagonals.

TYPE 2 - Number of even diagonals and residual table.

TYPE 3 - Odd number of diagonals.

TYPE 4 - Odd number of diagonals and residual table.



FRAME COMPONENTS							
DENOMINATION				TYPE			
				1	2	3	4
UPRIGHTS ER [] / H				2	2	2	2
FOOTPLATES NBP, PLK,RK, FTN or DV				2	2	2	2
FOOTPLATE PLATE JOIN	NBP	76M, 76A	FIXING SET CT AW 895	2	2	2	2
	PLK	100A, 100B	CONJ FIXING SET TORN. CT CB 1030	4	4	4	4
		115B, 115C					
DIAGONALS CZ [36, 42, 50] / D8,5 / L				<i>Integer[(H – 150)/0.5D]</i>			
HORIZONTALS CZ [36, 42, 50] / D8,5 / L				2	3	2	3
NODES 1 N1	76M, 76A		FIXING SET CT AE 845	2	4	2	4
	100A, 100B		FIXING SET CT AE 870				
	115B, 115C		FIXING SET CT AE 885				
NODES 2 N2	76M, 76A		FIXING SET CT AA 845	Nr. DIAGONALS + 1			
	100A, 100B		FIXING SET CT AA 870				
	115B, 115C		FIXING SET CT AA 885				

In case of frame configurations from the standard range, please contact Esnova Technical Department.

LIST OF FRAME COMPONENTS:

MAX. DISTANCE BETWEEN DIAGONALS **D=1200** (Frames ER76M, ER76A, ER 100A)

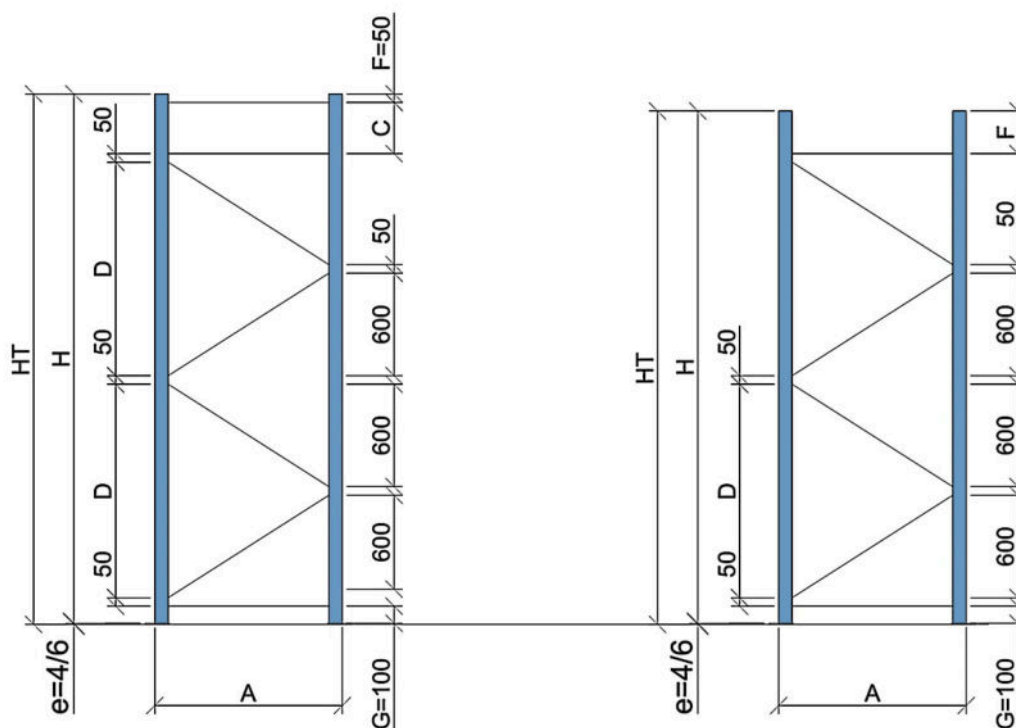
Frame Height H	TYPE				N° (N)	N° (N3)	N1	N2	C	F
	1	2	3	4	Diagonals	Horizontals	Nodes 1	Nodes 2	mm	mm
2000			•		3	2	2	4	0	100
2500				•	3	3	4	4	550	50
3000		•			4	3	4	5	450	50
3500				•	5	3	4	6	350	50
4000		•			6	3	4	7	250	50
4500			•		7	2	2	8	0	200
5000	•				8	2	2	9	0	100
5500		•			8	3	4	9	550	50
6000				•	9	3	4	10	450	50
6500		•			10	3	4	11	350	50
7000				•	11	3	4	12	250	50
7500	•				12	2	2	13	0	200
8000			•		13	2	2	14	0	100
8500				•	13	3	4	14	550	50
9000		•			14	3	4	15	450	50
9500				•	15	3	4	16	350	50
10000		•			16	3	4	17	250	50
10500			•		17	2	2	18	0	200
11000	•				18	2	2	19	0	100
11500		•			18	3	4	19	550	50
12000				•	19	3	4	20	450	50

MAX. DISTANCE BETWEEN DIAGONALS **D=1400** (Frames ER100B, ER115B, ER 115C)

Frame Height H	TYPE				N° (N)	N° (N3)	N1	N2	C	F
	1	2	3	4	Diagonals	Horizontals	Nodes 1	Nodes 2	mm	mm
2000		•			2	3	4	3	450	50
2500				•	3	3	4	4	250	50
3000	•				4	2	2	5	0	100
3500		•			4	3	4	5	550	50
4000				•	5	3	4	6	350	50
4500	•				6	2	2	7	0	200
5000		•			6	3	4	7	650	50
5500				•	7	3	4	8	450	50
6000		•			8	3	4	9	250	50
6500			•		9	2	2	10	0	100
7000				•	9	3	4	10	550	50
7500		•			10	3	4	11	350	50
8000			•		11	2	2	12	0	200
8500				•	11	3	4	12	650	50
9000		•			12	3	4	13	450	50
9500				•	13	3	4	14	250	50
10000	•				14	2	2	15	0	100
10500		•			14	3	4	15	550	50
11000				•	15	3	4	16	350	50
11500	•				16	2	2	17	0	200
12000		•			16	3	4	17	650	50

4.1. ER85 UPRIGHT CONFIGURATION.

Below are the various possible configurations for upright **front 85mm**.



TYPE OF FRAME	ER85A
e - Thickness of the footplate in mm.	4 / 6
G - Height of the first horizontal mm.	100
D- Max. diagonal spacing mm.	1250
C - Minimum/maximum frame mm	250 / 650
F - Min. / max. free stanchion mm	50 / 250

The height of the "H" frame is considered without taking into account the thickness of the foot, it must always be a multiple of 50 mm. and is supplied as standard in sections of 250 mm.

For frame configurations other than the standard range, please contact Esnova's technical department.

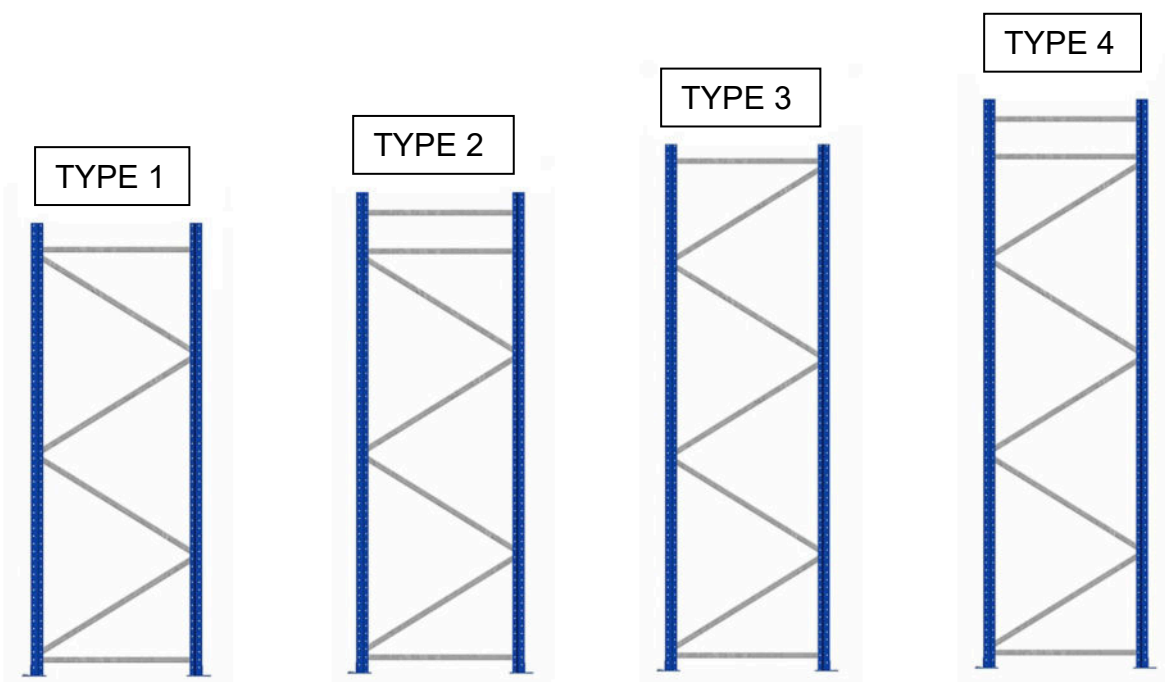
The standard frames in their different types have four configurations that are repeated cyclically depending on the height.

TYPE 1 - Number of even diagonals.

TYPE 2 - Number of even diagonals and residual table.

TYPE 3 - Odd number of diagonals.

TYPE 4 - Odd number of diagonals and residual table.



FRAME COMPONENTS							
DENOMINATION				TYPE			
				1	2	3	4
UPRIGHTS ER [85] / H				2	2	2	2
FOOTPLATES NBP, RK o FTN				2	2	2	2
FOOTPLATE UNION	NBP	85A	FIXING SET CT AW 895	2	2	2	2
DIAGONALS CRZ [36] / D8,5 / 18 / L				$Integer[(H - 100)/ 0.5D]*2$			
HORIZONTALS CRZ [36] / D8.5 / 18 / L				2	3	2	3

The 85 front uprights are diagonally arranged with CRZ, with only one profile per node.



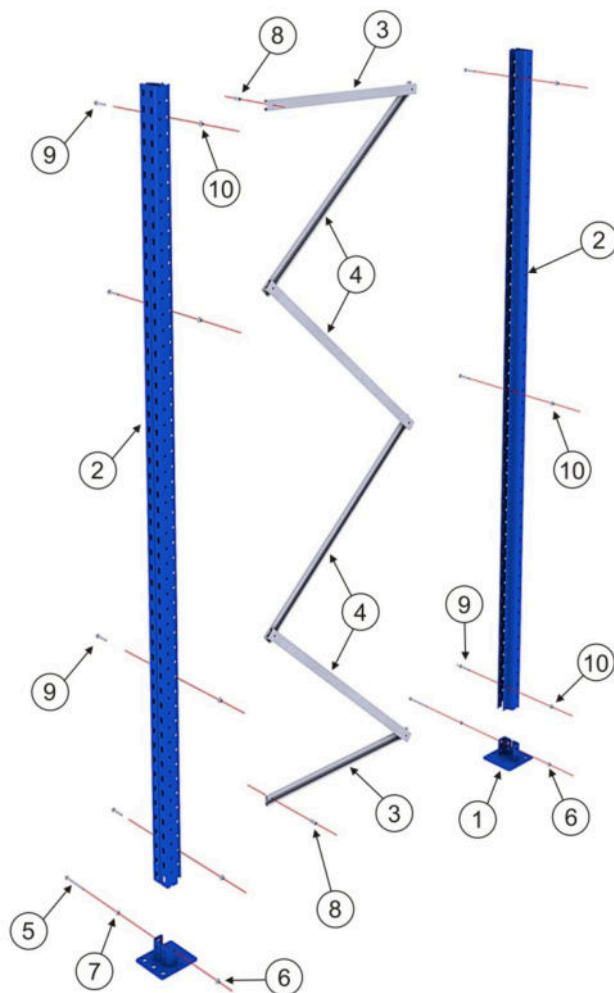
COMPONENTS PER FRAME:
MAXIMUM SEPARATION BETWEEN DIAGONALS D=1250 (Frame ER85A).

Frame Height H	TYPE				Nº (N)	Nº (N3)	C	F
	1	2	3	4	Diagonals	Horizontals	mm	mm
2000		•			2	3	500	50
2500				•	3	3	350	50
3000		•			4	3	200	50
3500			•		5	2	0	100
4000				•	5	3	550	50
4500		•			6	3	400	50
5000				•	7	3	250	50
5500	•				8	2	0	150
6000		•			8	3	600	50
6500				•	9	3	450	50
7000		•			10	3	300	50
7500			•		11	2	0	200
8000	•				12	2	0	50
8500		•			12	3	550	50
9000				•	13	3	350	50
9500		•			14	3	200	50
10000			•		15	2	0	100
10500				•	15	3	550	50
11000		•			16	3	400	50
11500				•	17	3	250	50
12000	•				18	2	0	150

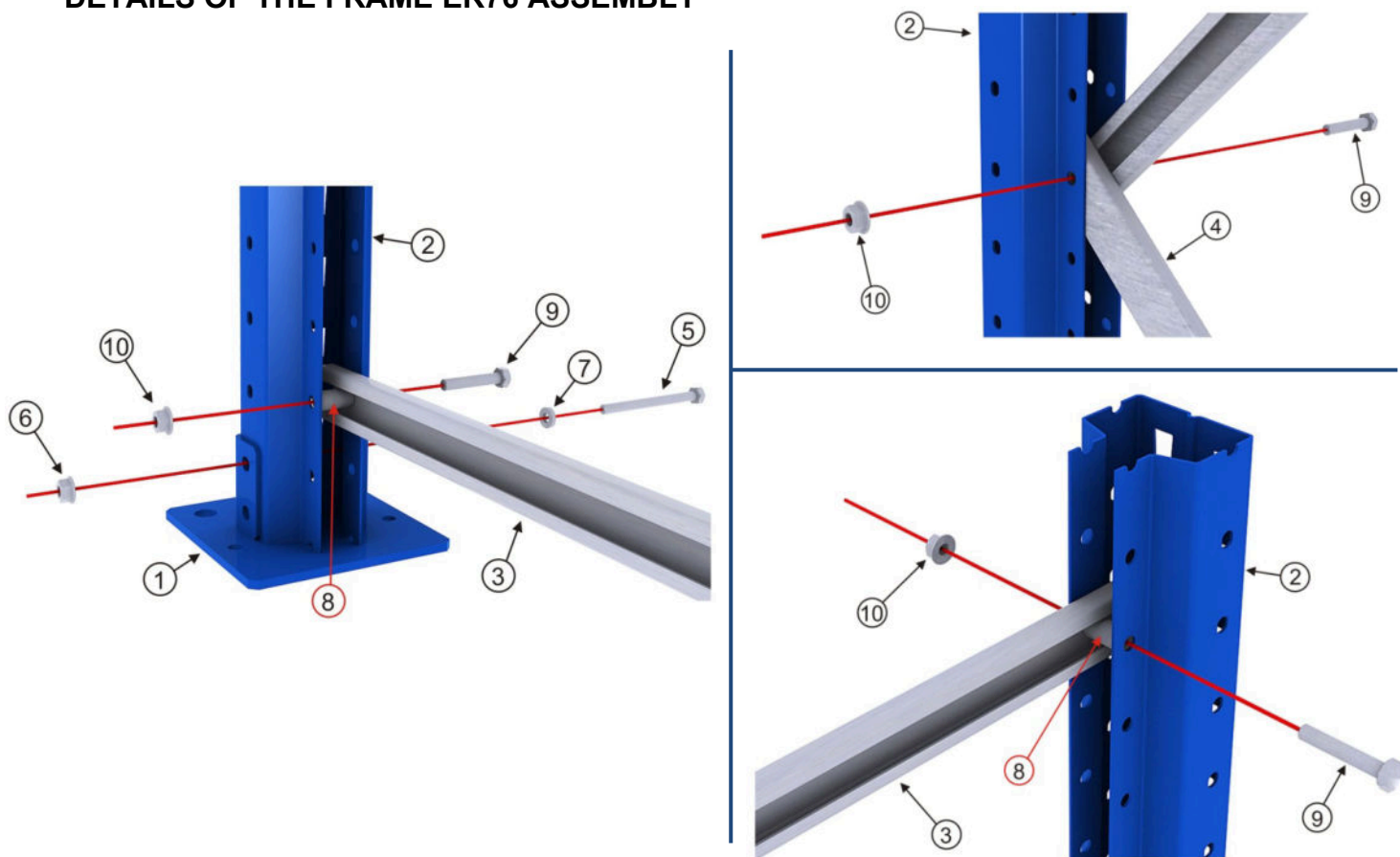
5. FRAME ASSEMBLY

5.1. Frame ER76M15 / ER76M18 / ER76M23

Frame ER76A15 / ER76A18 / ER76A20 / ER76A23 / ER76A25



POSITION	DENOMINATION	DRAWING	OBSERVATIONS
1	FOOTPLATE RK6/76	PL-000107	FOOTPLATE
2	UPRIGHT ER76M o ER76A	PL-006094 / 000094	UPRIGHT
3	PROFILE CZ36/D8.5	PL-000095	HORIZONTAL
4	PROFILE CZ36/D8.5	PL-000095	DIAGONAL
5	BOLT DIN 931-8,8 M8x95/Z	E.C.	FIXING SET CT AW 895
6	NUT DIN 6923-8 M8/Z	E.C.	
7	WASHER DIN 125-8 M8/Z	E.C.	
8	SEPARATING TUBE TS/13/25/Z	E.C.	FIXING SET CT AE 845
9	BOLT DIN 931-8,8 M8x45/Z	E.C.	
10	NUT DIN 6923-8 M8/Z	E.C.	
9	BOLT DIN 931-8,8 M8x45/Z	E.C.	FIXING SET CT AA 845
10	NUT DIN 6923-8M8/Z	E.C.	

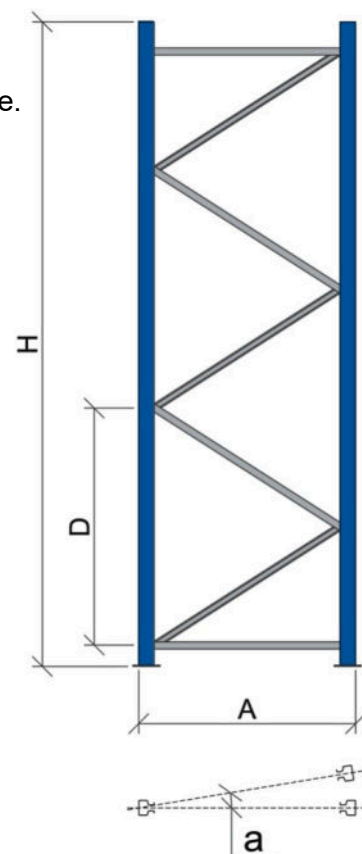
DETAILS OF THE FRAME ER76 ASSEMBLY

ASSEMBLY SEQUENCE:

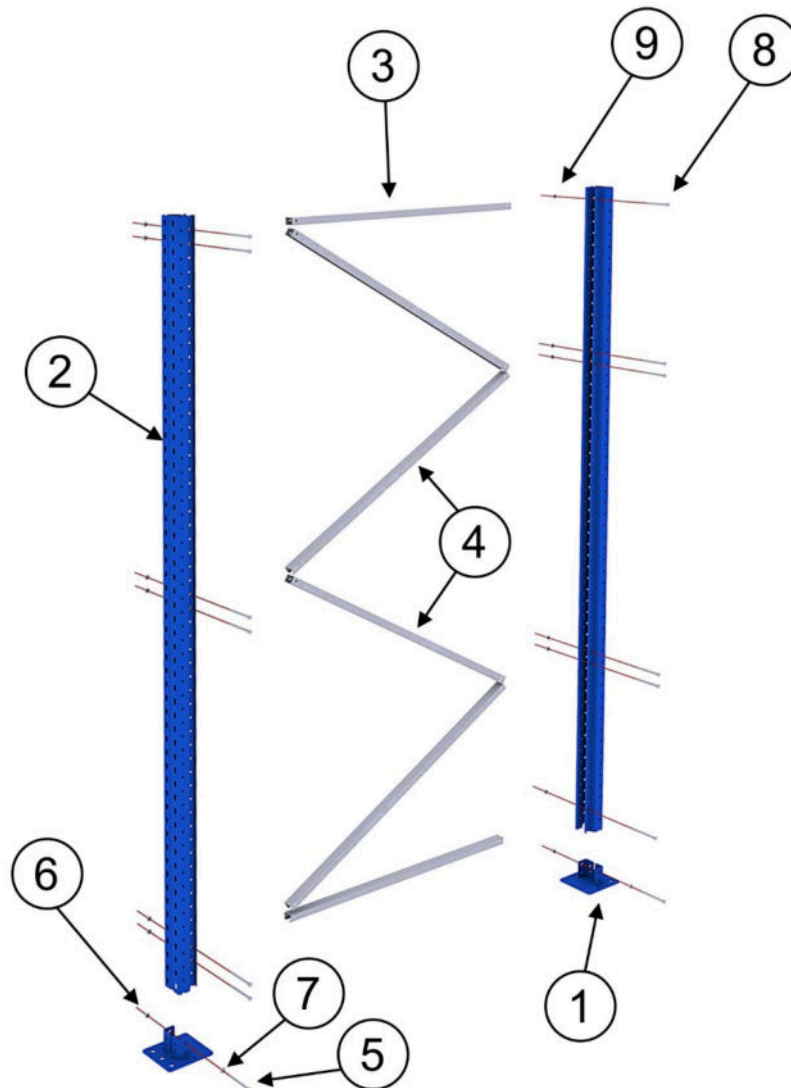
- A. Position the frame props horizontally (on trestles).
- B. Fix the first and last horizontal with a screw and place the frame.
Do not put the nut yet. Start with the diagonals at one end and pre-assemble with the accessories and screws.
At the end, tighten all screws to their tightening torque.
- C. Check the mounted material and position the frame vertically.

VERIFICATION:

- Frame width (A)
- Height (H)
- Distance between knots (D)
- Frame deviation angle (a)

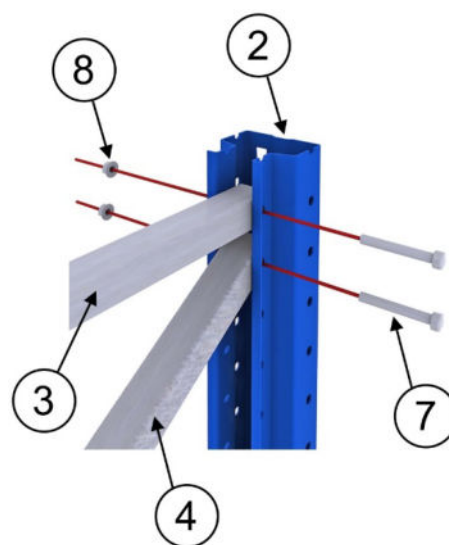
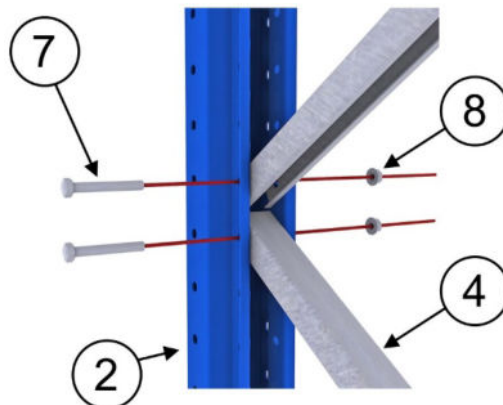
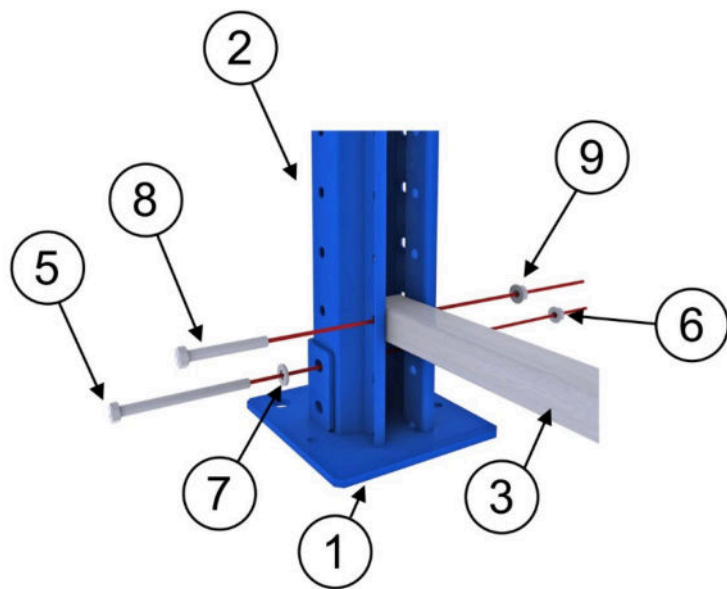
Tightening torque of the bolts (1,5 kg/m)



5.2. Frame ER85A15 / ER85A18 / ER85A20 / ER85A23 / ER85A25


POSITION	DENOMINATION	DRAWING	OBSERVATIONS
1	FOOTPLATE RK6/85	PL-000107	FOOTPLATE
2	UPRIGHT ER85A	PL-022486	UPRIGHT
3	PROFILE CRZ/3615/L	PL-023727	HORIZONTAL
4	PROFILE CRZ/3615/L	PL-023727	DIAGONAL
5	BOLT DIN 931 – 8.8 M8x105/Z	E.C.	FIXING SET CT AW 8105
6	NUT DIN 6923 – 8 M8/Z	E.C.	
7	WASHER DIN 125 – 8.8/Z	E.C.	
8	BOLT DIN 931-8,8 M8x50/Z	E.C.	FIXING SET CT AA 850
9	NUT DIN 6923-8M8/Z	E.C.	

DETAIL OF THE FRAME ER85 ASSEMBLY



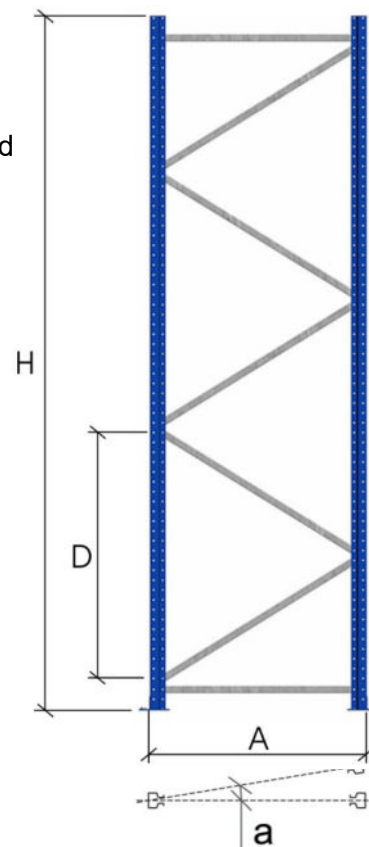
ASSEMBLY SEQUENCE:

- Position the frame props horizontally (on trestles).
- Fix the first and last horizontal with a screw and place the frame. Do not tighten the nut yet. Start with the diagonals at one end and pre-assemble with the accessories and screws. At the end, fix all screws with their tightening torque.
- Check the mounted material and place the frame vertically.

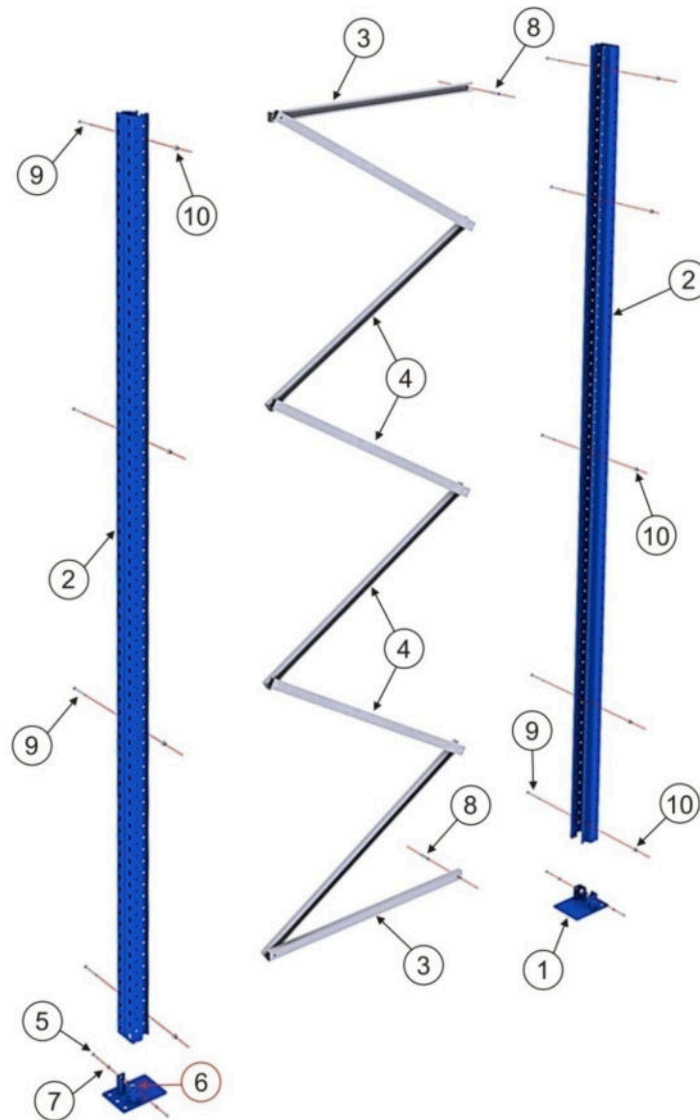
VERIFICATION:

- Frame width (A)
- Height (H)
- Distance between knots (D)
- Frame deviation angle (a)

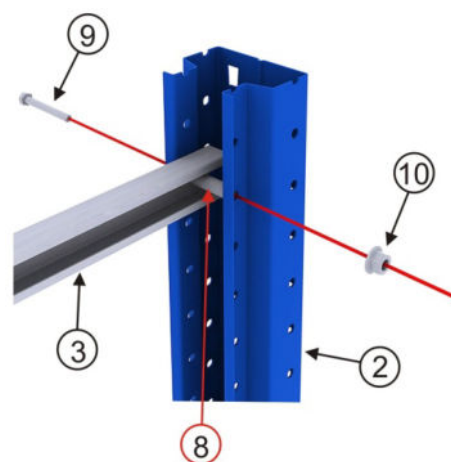
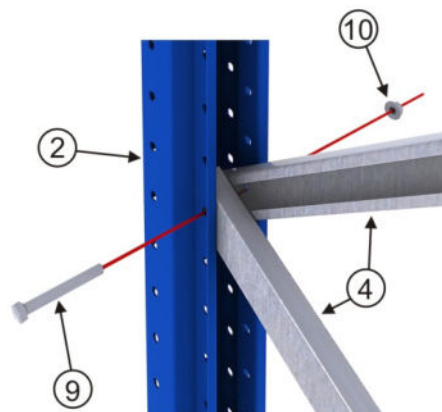
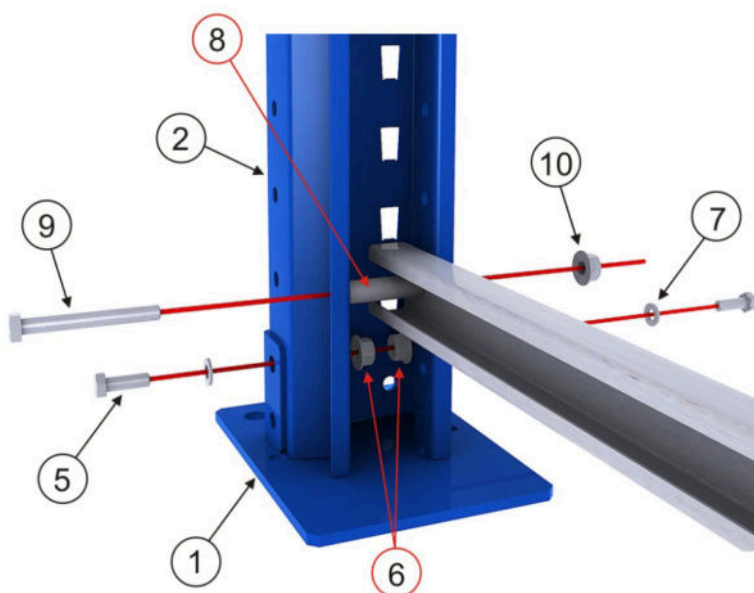
Tightening torque of the bolts (1,5 kg/m)



5.3. Frame ER100A18 / ER100A20 / ER100A23 / ER100A25
Frame ER100B18 / ER100B20 / ER100B23 / ER100B25 / ER100B30



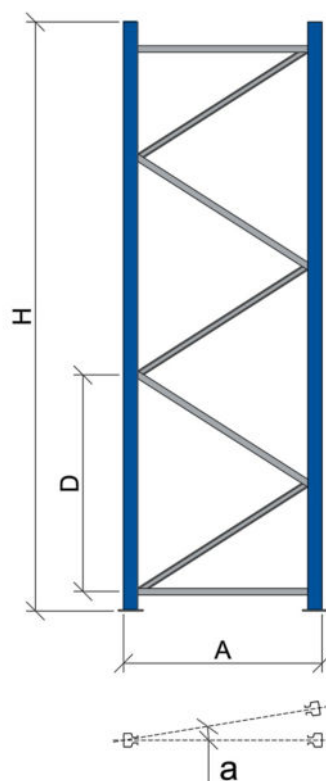
POSITION	DENOMINATION	DRAWING	OBSERVATIONS
1	FOOTPLATE RKe/100[A o B]	PL-000107	FOOTPLATE
2	UPRIGHT ER100A / 100B	PL-000096/ PL-000097	UPRIGHT
3	PROFILE CZ42/D8.5	PL-000100	HORIZONTAL
4	PROFILE CZ42/D8.5	PL-000100	DIAGONAL
5	BOLT DIN 933-8.8 M8x20/Z	E.C.	FIXING SET CT AC 820
6	NUT DIN 6923-8 M8/Z	E.C.	
7	WASHER DIN 125 M8/Z	E.C.	
8	SEPARATOR TUBE TS/13/48/Z	E.C.	FIXING SET CT AE 870
9	BOLT DIN 931-8.8 M8x70/Z	E.C.	
10	WASHER DIN 6923-8M8/Z	E.C.	
9	BOLT DIN 931-8.8 M8x70/Z	E.C.	FIXING SET CT AA 870
10	NUT DIN 6923-8M8/Z	E.C.	

DETAILS OF FRAME ER100 ASSAMBLY

ASSEMBLY SEQUENCE:

- A. Position the frame uprights horizontally (on trestles).
- B. Fix the first and last horizontal with a bolt and place the frame. Do not put the nut yet. Start with the diagonals at one end and pre-assemble with the accessories and screws. At the end, tighten all screws to their tightening torque.
- C. Check the mounted material and position the frame vertically.

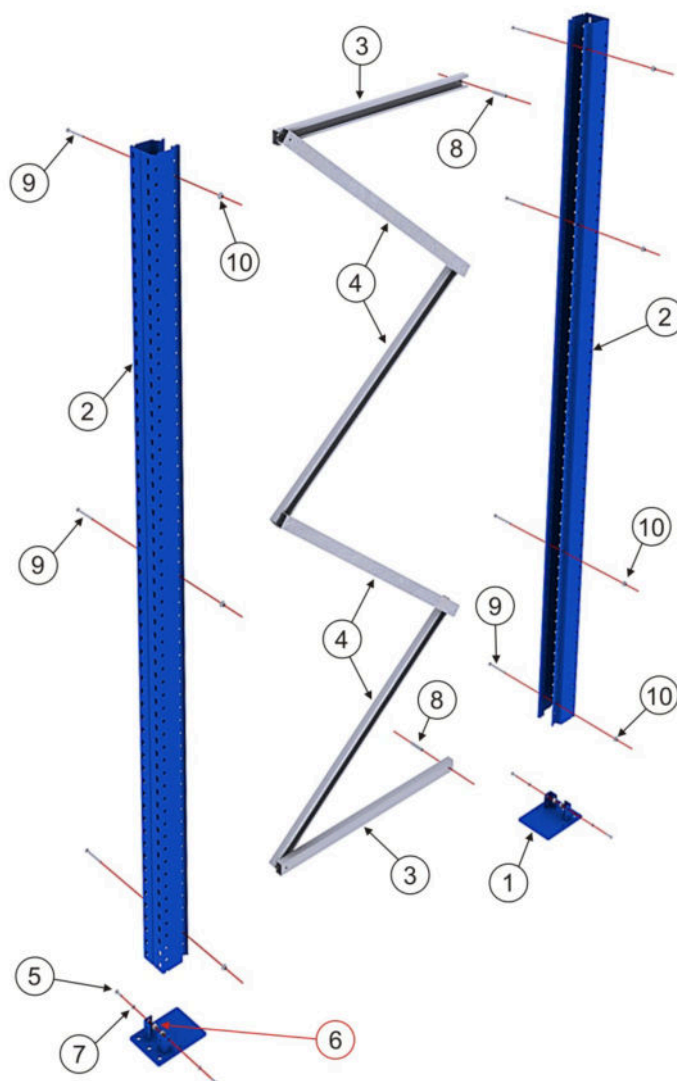
VERIFICATION:

- Frame width (A)
- Height (H)
- Distance between knots (D)
- Frame deviation angle (a)

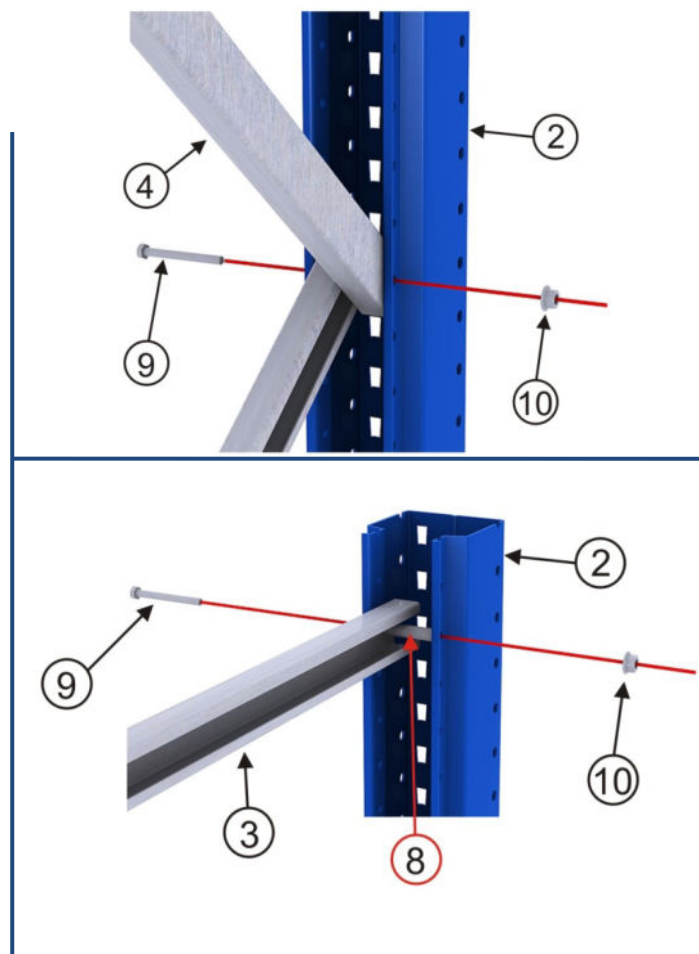
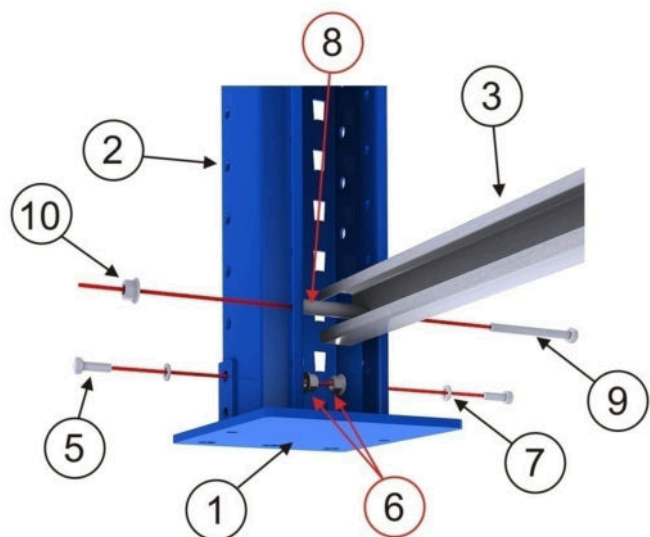


Tightening torque of the bolts (1,5 kg/m)

5.4. Frame ER115B18 / ER115B20 / ER115B23 / ER115B25 / ER115B30 Frame ER115C20 / ER115C25 / ER115C30 / ER115C35



POS	DESCRIPTION	DRAWING	REMARKS
1	FOOTPLATE RK8/115 [B o C]	PL-000107	FOOTPLATE
2	UPRIGHT ER115B / 115C	PL-001009/ PL-001010	UPRIGHT
3	PROFILE CZ50/D8.5	PL-000148	HORIZONTAL
4	PROFILE CZ50/D8.5	PL-000148	DIAGONAL
5	BOLT DIN 933-8.8 M8x20/Z	E.C.	FIXING SET CT AC 820
6	NUT DIN 6923-8 M8/Z	E.C.	
7	WASHER DIN 125 M8/Z	E.C.	
8	SEPARATING TUBE TS/13/48/Z	E.C.	FIXING SET CT AE 885
9	BOLT DIN 931-8,8 M8x70/Z	E.C.	
10	NUT DIN 6923-8 M8/Z	E.C.	FIXING SET CT AA 885
9	BOLT DIN 931-8,8 M8x70/Z	E.C.	
10	NUT DIN 6923-8M8/Z	E.C.	

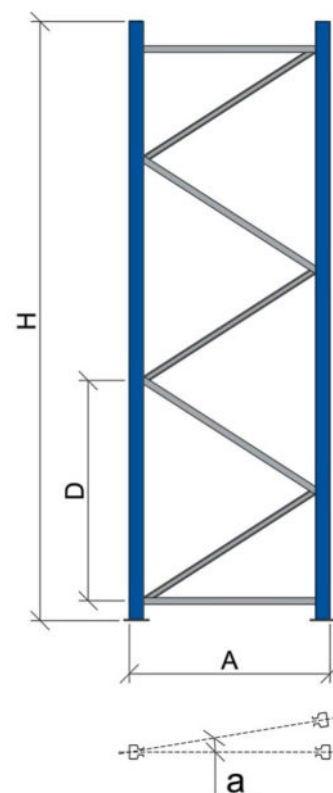
FRAME ER115 ASSEMBLY DETAIL

ASSEMBLY SEQUENCE:

- A. Position the frame props horizontally (on trestles).
- B. Fix the first and last horizontal with a screw and place the frame.
Do not put the nut yet. Start with the diagonals at one end and pre-assemble with the accessories and screws.
At the end, tighten all screws to their tightening torque.
- C. Check the mounted material and position the frame vertically.

VERIFICATION:

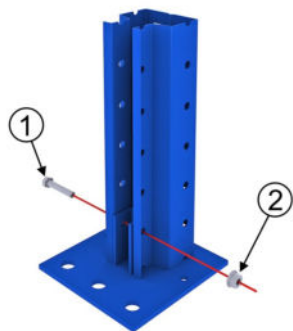
- Frame width (A)
- Height (H)
- Distance between knots (D)
- Frame deviation angle (a)

Tightening torque of the bolts (1,5 kg/m)



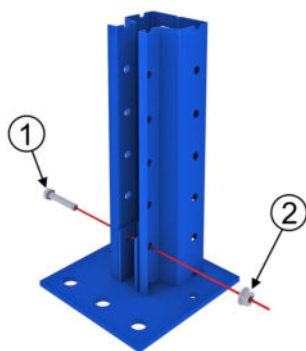
FRAMES WITH FOOTPLATE FTN.

- For frames of front 76.



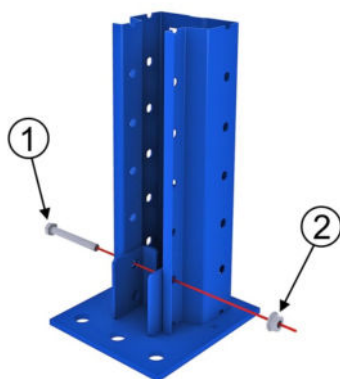
	1	FIXING SET CT AA 845 COD. - 13010002
1	1	BOLT DIN 931 – 8.8 M8x45 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

- For frames of front 85.



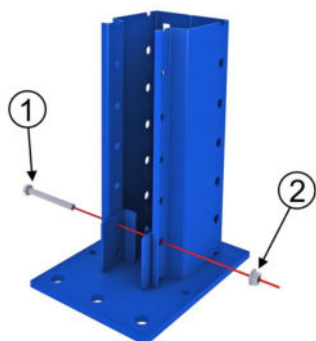
	1	FIXING SET CT AA 850 COD. - 13010293
1	1	BOLT DIN 931 – 8.8 M8x50 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

- For frames of front 100.



	1	FIXING SET CT AA 870 COD. - 13010003
1	1	BOLT DIN 931 – 8.8 M8x70 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

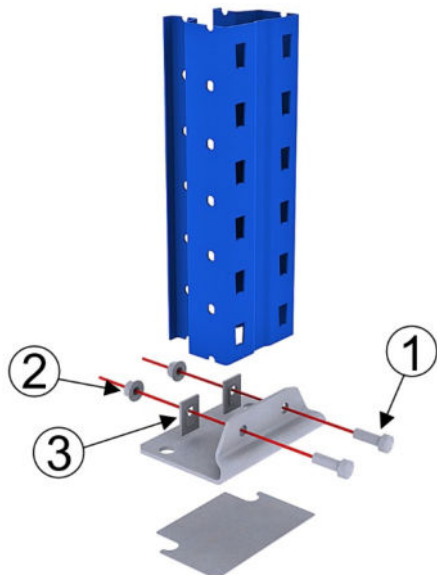
- For frames of front 115.



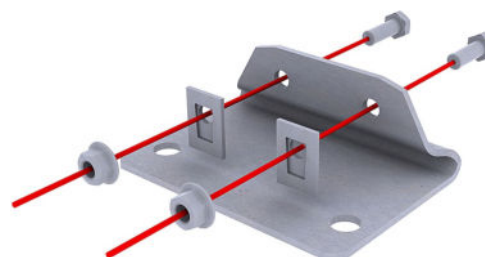
	1	FIXING SET CT AA 885 COD. - 13010048
1	1	BOLT DIN 931 – 8.8 M8x85 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

FRAMES WITH FOOTPLATE PLK.

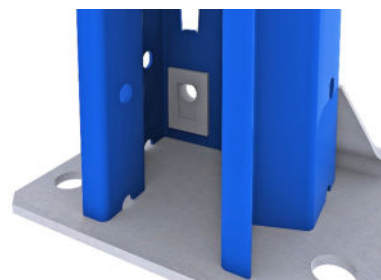
It's very important to make the assembly of footplate before starting with diagonalization, since this will ease its correct position.



		FIXING SET CT CB 1030 COD. - 13010228
1	1	BOLT DIN 933 – 8.8 M10x30 / Z
2	1	NUT DIN 6923 – 8 M10 / Z
3	1	WASHER PLK

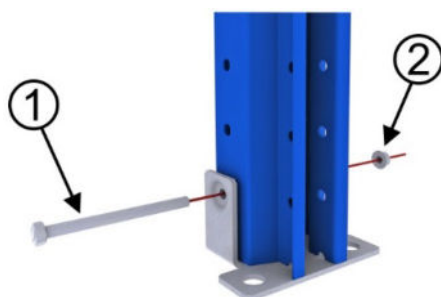


The washer bulge used to join to the footplate PLK must be correctly aligned with the upright hole.



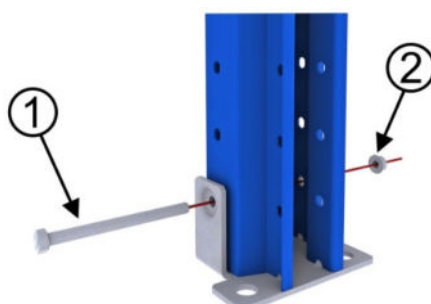
FRAMES WITH FOOTPLATE NBP.

For frames of front 76



		FIXING SET CT AA 895 COD. - 13010004
1	1	BOLT DIN 931 – 8.8 M8x95 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

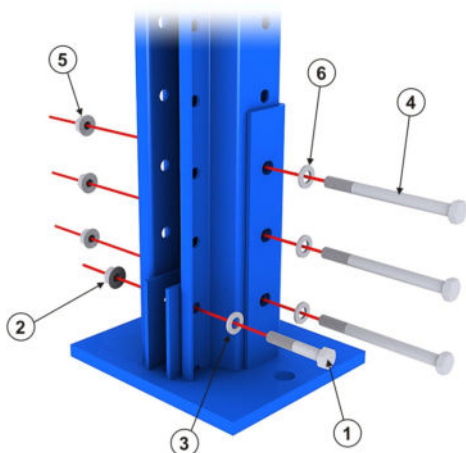
For frames of front 85



		FIXING SET CT AA 8105 COD. - 13010294
1	1	BOLT DIN 931 – 8.8 M8x105 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

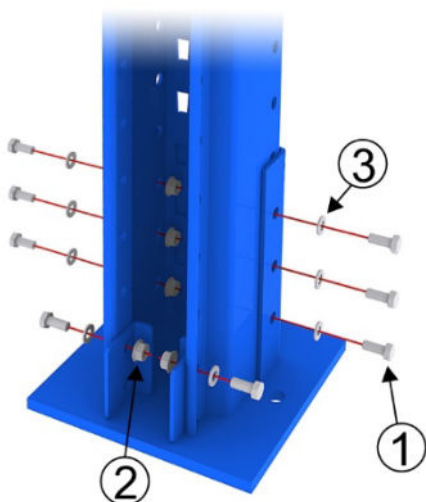
FRAMES WITH FOOT PLATE DV.

- Frames 76mm wide.



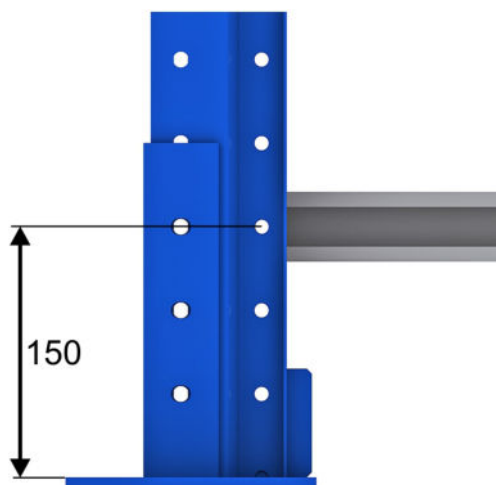
COD. - 13010181		
CONJ. TORN. CT AW 845		
1	1	TORNILLO DIN 931 – 8.8 M8x45 / Z
2	1	TUERCA DIN 6923 – 8 M8 / Z
3	1	ARANDELA DIN 125 M8 / Z
COD. - 13010180		
CONJ. TORN. CT AW 895		
4	1	TORNILLO DIN 931 – 8.8 M8x95 / Z
5	1	TUERCA DIN 6923 – 8 M8 / Z
6	1	ARANDELA DIN 125 M8 / Z

- Frames 100 and 115mm wide.

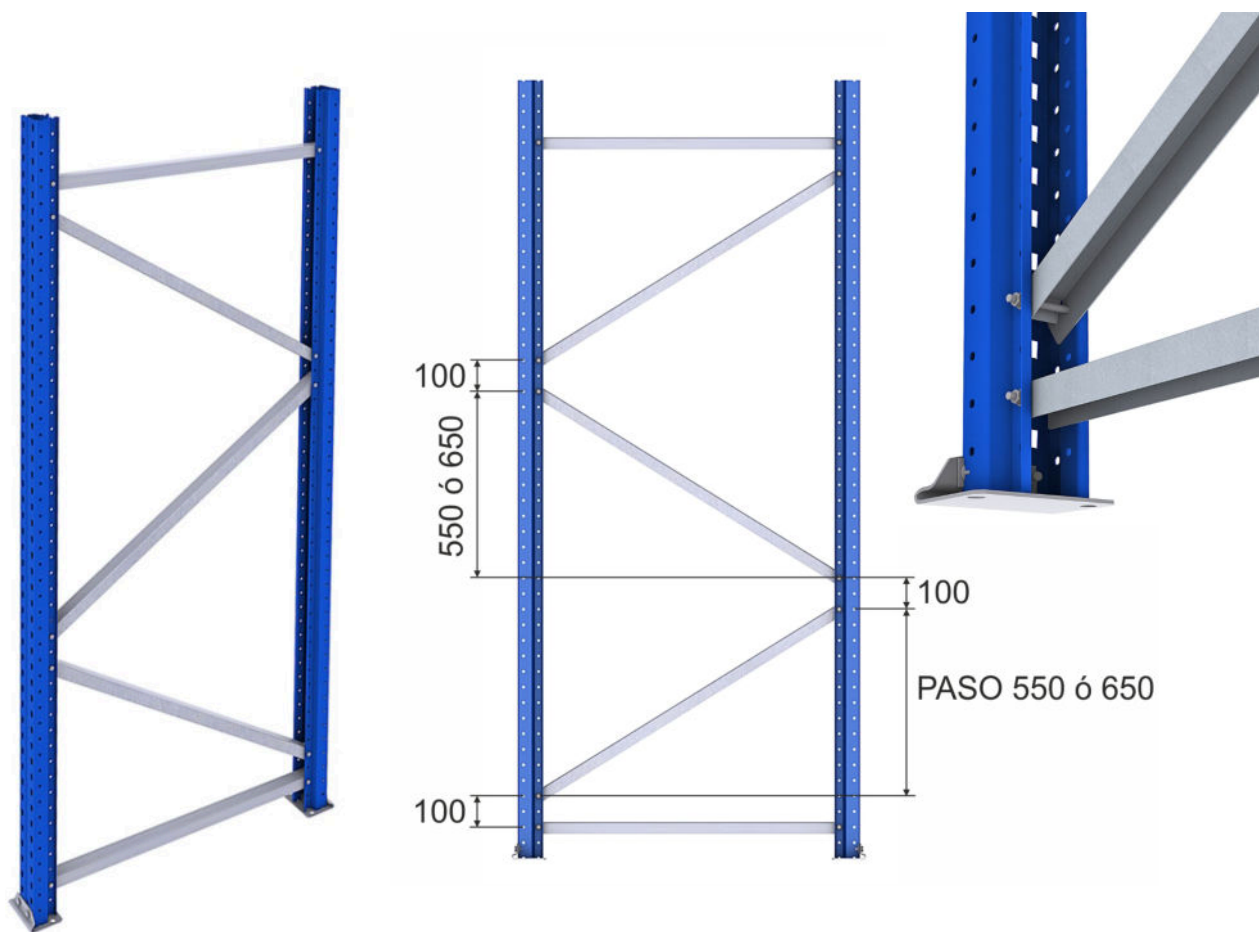


COD. - 13010182		
CONJ. TORN. CT AC 820		
1	8	TORNILLO DIN 933 – 8.8 M8x20 / Z
2	1	TUERCA DIN 6923 – 8 M8 / Z
3	1	ARANDELA DIN 125 M8 / Z

With footplate DV, the first horizontal will be placed at 150mm from top of the plate to avoid interferences:

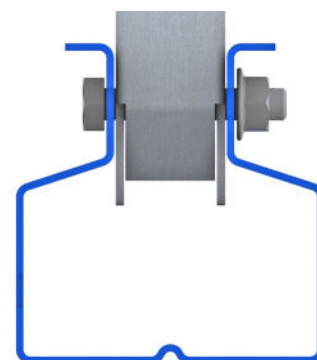
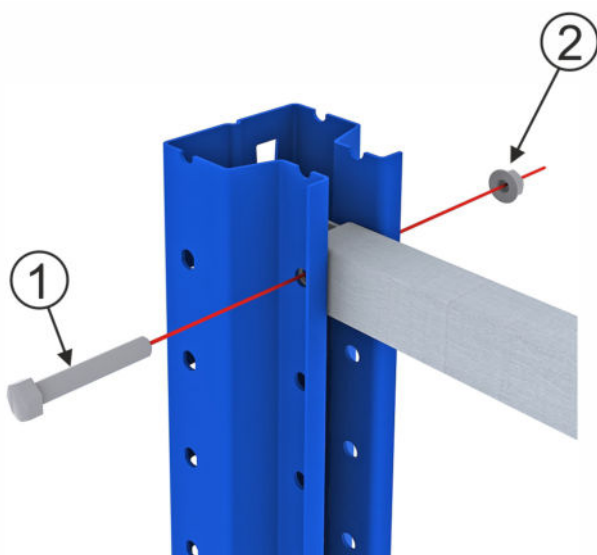


5.5. Assembly of frames with USZ diagonals.



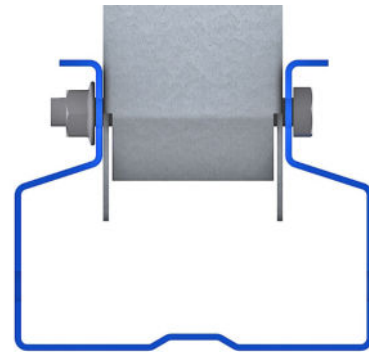
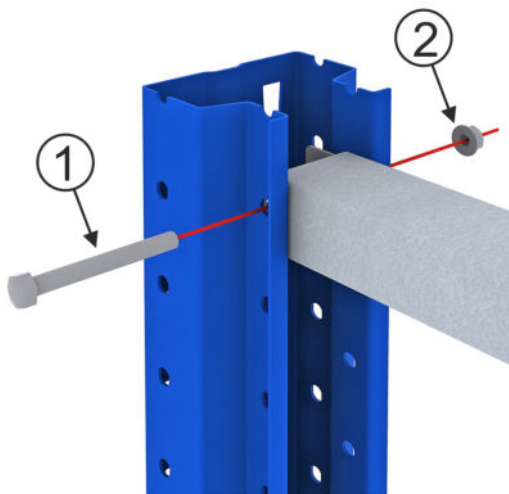
Pitch 550 for uprights ER76M, ER76A, ER100A. **Pitch 650** for uprights ER100B, ER115B y ER115C.

UPRIGHT FRONT 76 – PROFILE UR 27



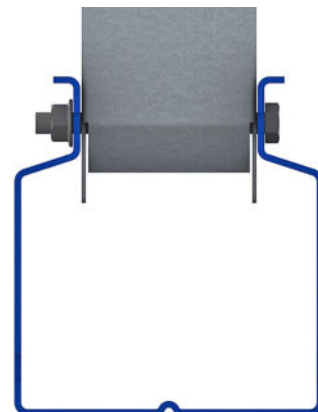
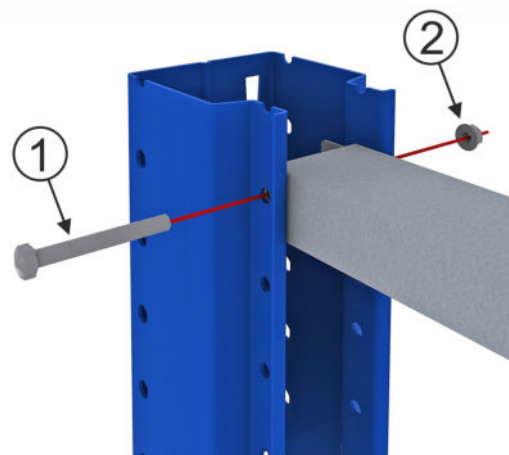
		1	FIXING SET CT AA 845 COD. - 13010002
1	1		BOLT DIN 931 – 8.8 M8x45 / Z
2	1		NUT DIN 6923 – 8 M8 / Z

UPRIGHT FRONT 100 – PROFILE UR 50



	2	FIXING SET CT AA 870 COD. - 13010003
1	1	BOLT DIN 931 – 8.8 M8x70 / Z
2	1	SEPARATING TUBE TS/13/45/Z

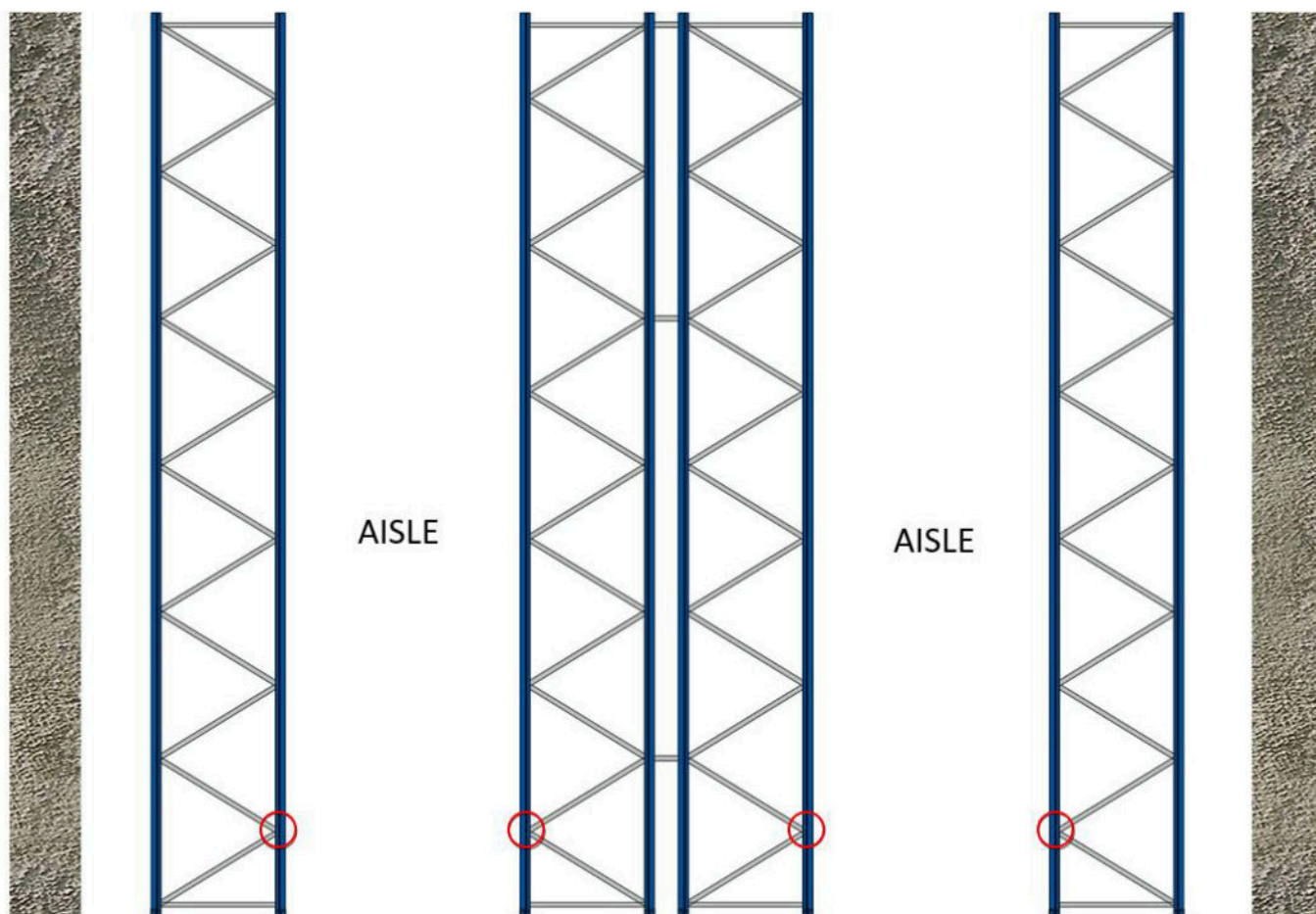
UPRIGHT FRONT 115 – PROFILE UR 65



	2	FIXING SET CT AA 885 COD. - 13010048
1	1	BOLT DIN 931 – 8.8 M8x85 / Z
2	1	SEPARATING TUBE TS/13/60/Z

6. FRAMES DIRECTION

The frames direction is understood as the position of the diagonals with regard to the entrance aisle.

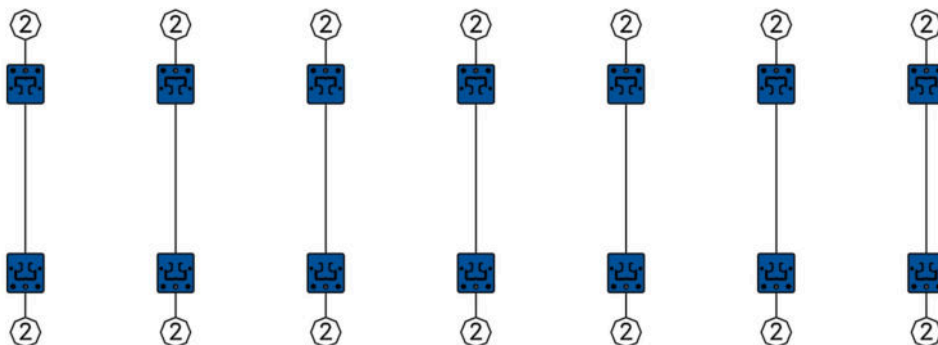


As it's shown in the picture, the frames in pallet - racking systems should be placed with the first diagonal node oriented the working aisle.

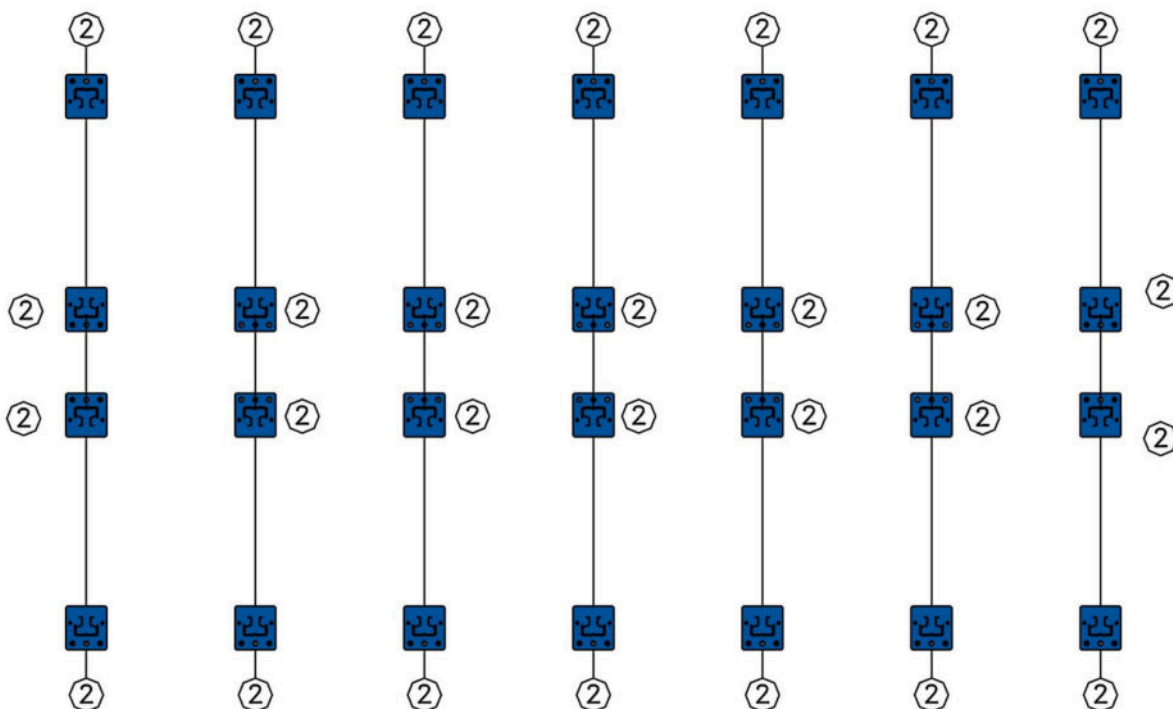
7. SHIM LATES AND ANCHORING ASSEMBLY

In both single and double runs and for all footplate types, two anchors will be installed per footplate.

SIMPLE RUN:

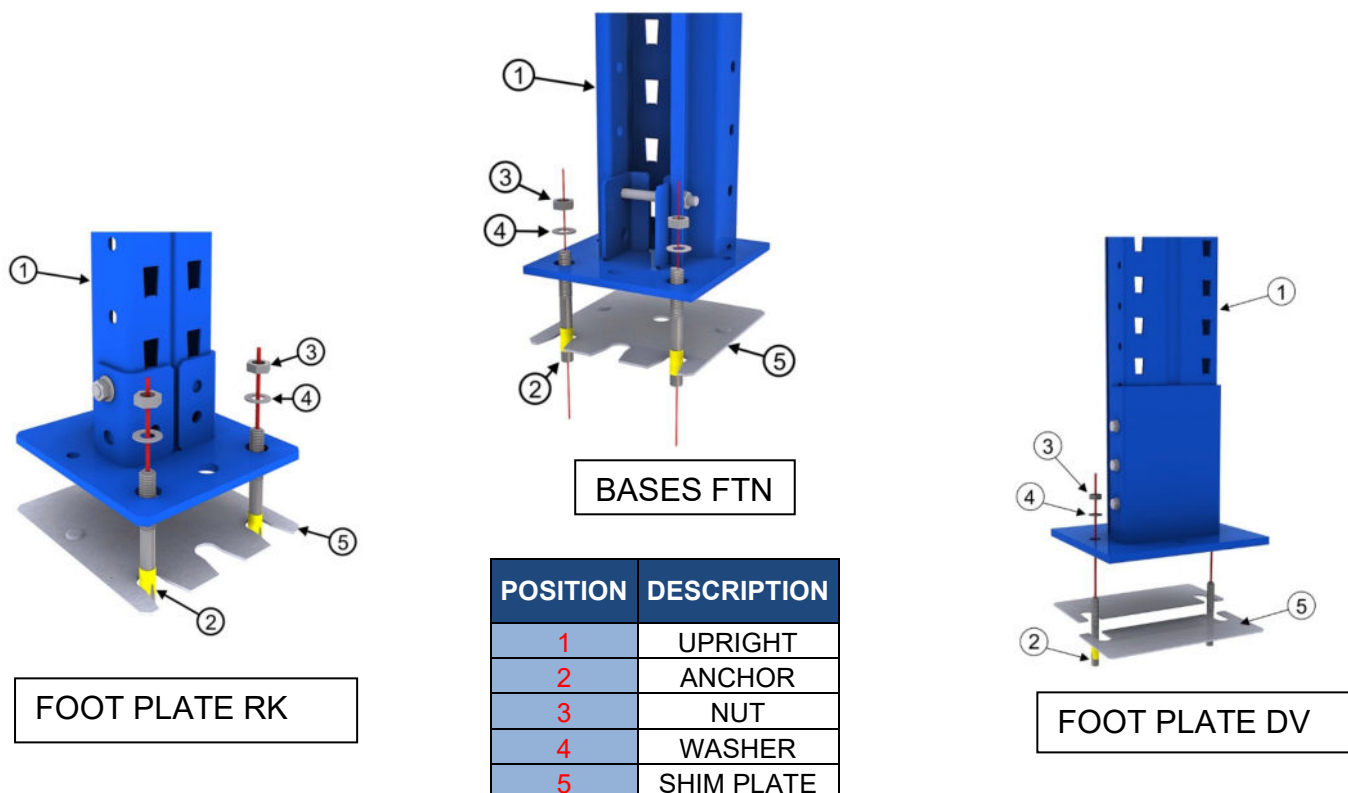


DOUBLE RUN:

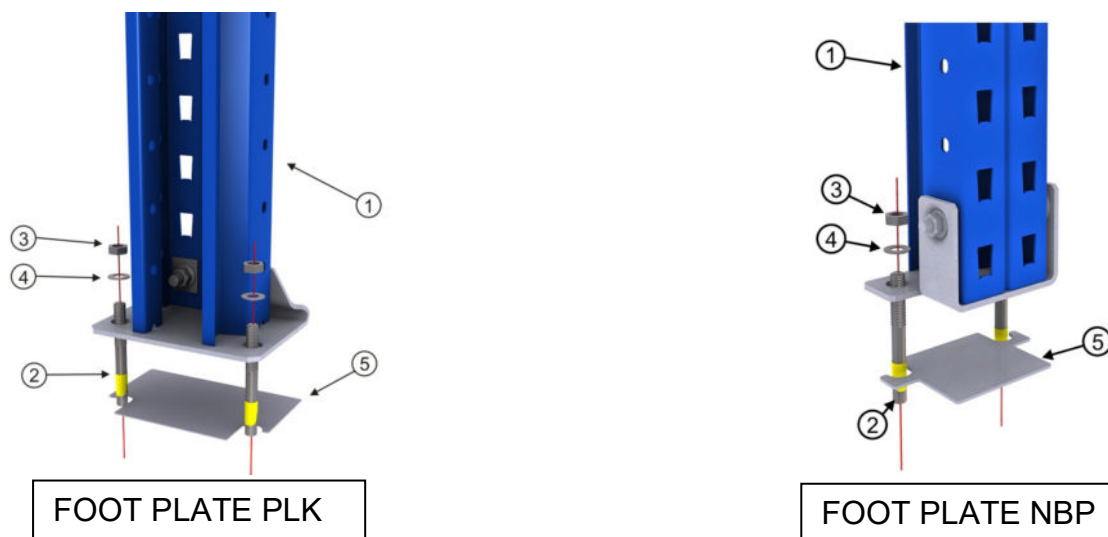


The numbers mean the number of anchors needed per footplate.

7.1. POSITION OF THE ANCHORS WITH WELDED FOOTPLATE.



7.2. POSITION OF THE ANCHORS WITH FOLDED FOOTPLATES

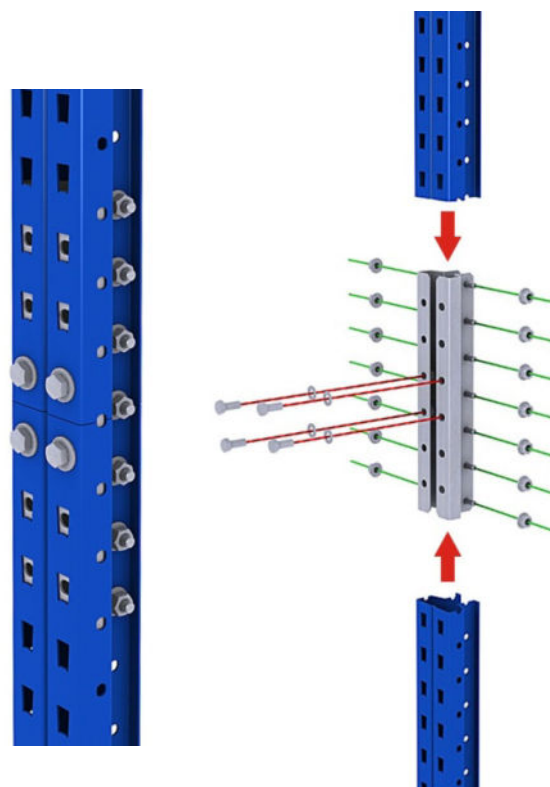
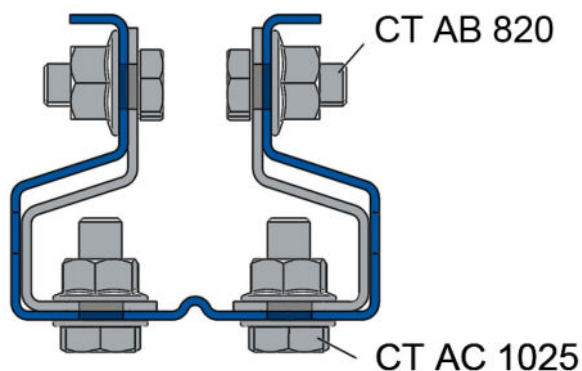


8. FRAME SPLICES

8.1. ER76M

	14	FIXING SET CT AB 820
1	1	BOLT DIN 933 – 8.8 M8x20 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

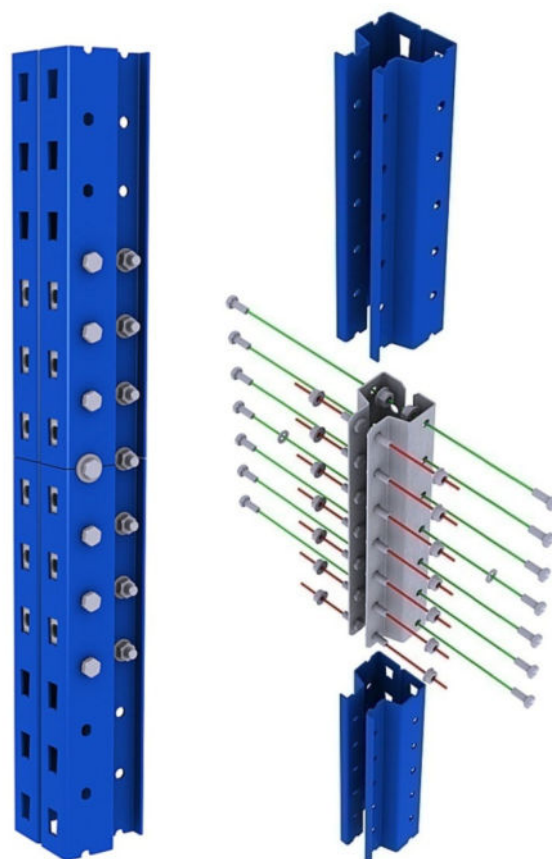
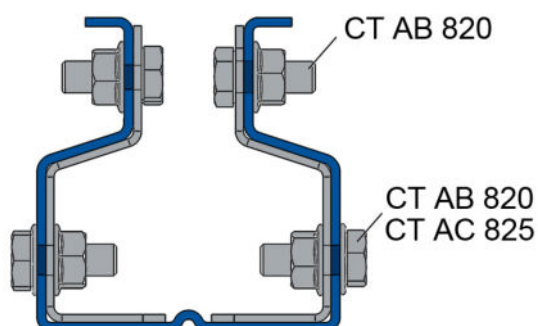
	4	FIXING SET CT AC 1025
1	1	BOLT DIN 933 – 8.8 M10x25 / Z
2	1	NUT DIN 6923 – 8 M8 / Z
3	1	WASHER DIN 125 M8 / Z



8.2. ER76A, ER85A

	24	FIXING SET CT AB 820
1	1	BOLT DIN 933 – 8.8 M8x20 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

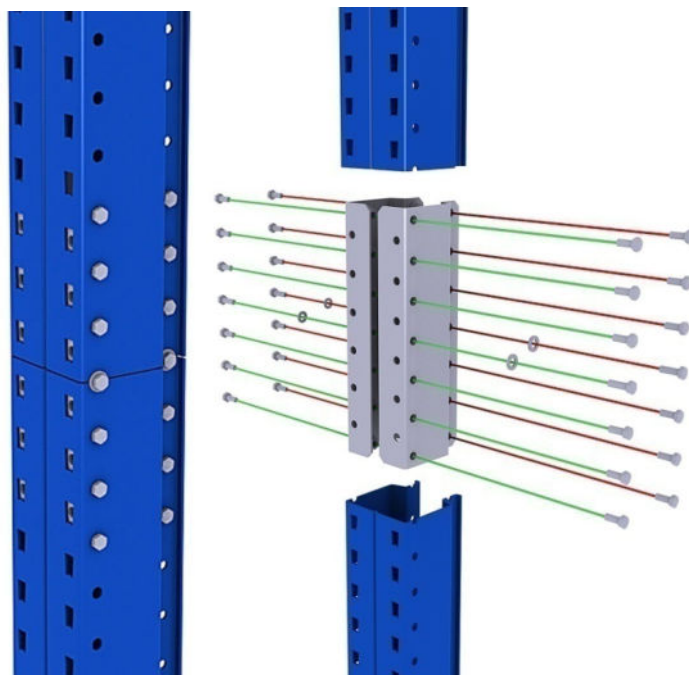
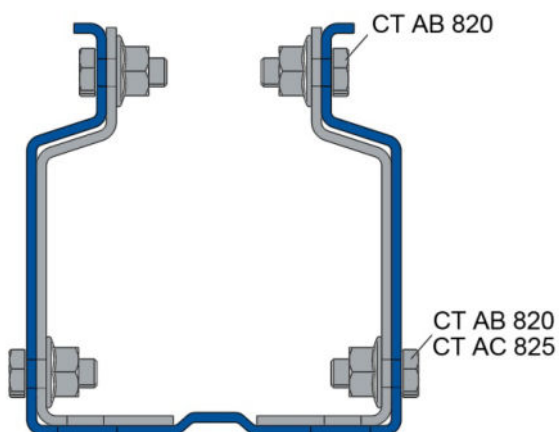
	4	FIXING SET CT AC 825
1	1	BOLT DIN 933 – 8.8 M8x25 / Z
2	1	NUT DIN 6923 – 8 M8 / Z
3	1	WASHER DIN 125 – 8 M8 / Z



8.3. ER100A, ER100B, ER115B and ER115C

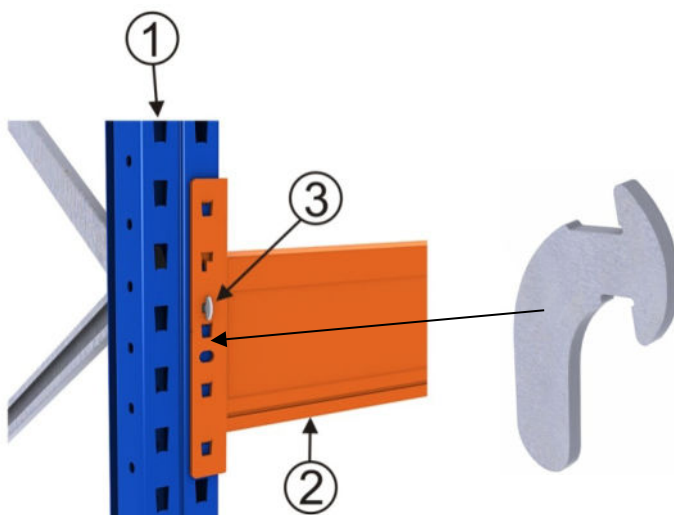
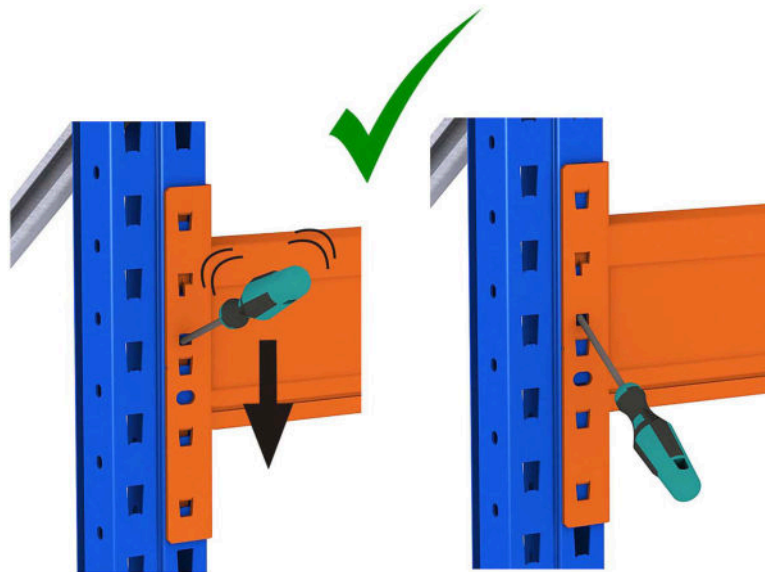
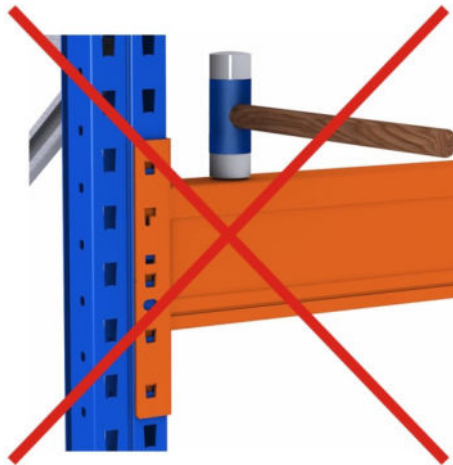
	24	FIXING SET CT AB 820
1	1	BOLT DIN 933 – 8.8 M8x20 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

	4	FIXING SET CT AC 825
1	1	BOLT DIN 933 – 8.8 M8x20 / Z
2	1	NUT DIN 6923 – 8 M8 / Z
3	1	WASHER DIN 125 – 8 M8 / Z



9. BEAMS

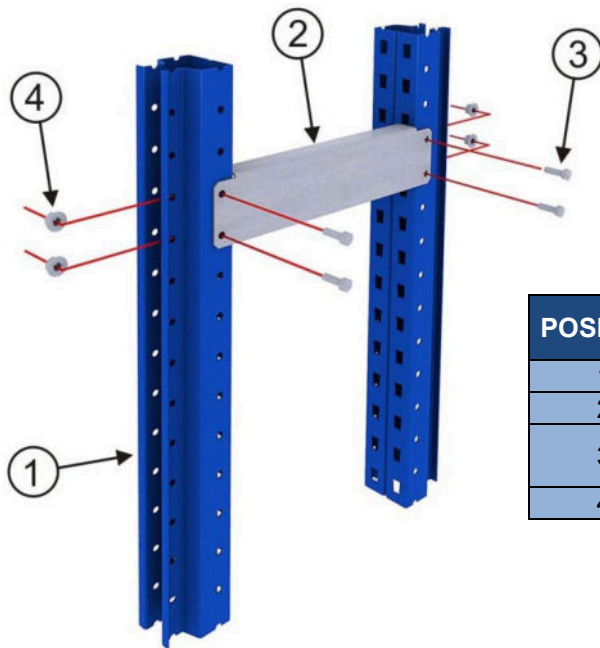
9.1. BEAMS AND SAFETY CLIP CSD



MARK	DENOMINATION
1	Upright
2	Beam
3	Safety clip CSD

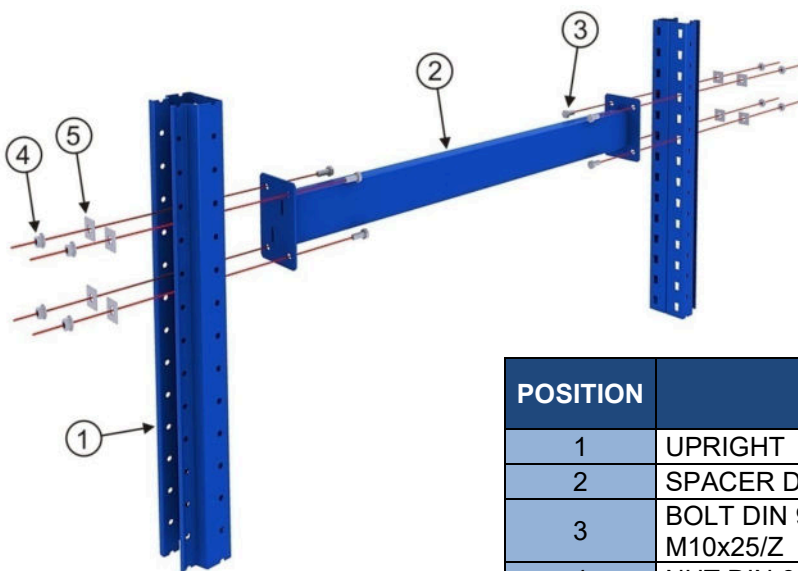
10. SPACERS

10.1. SPACER DEZ



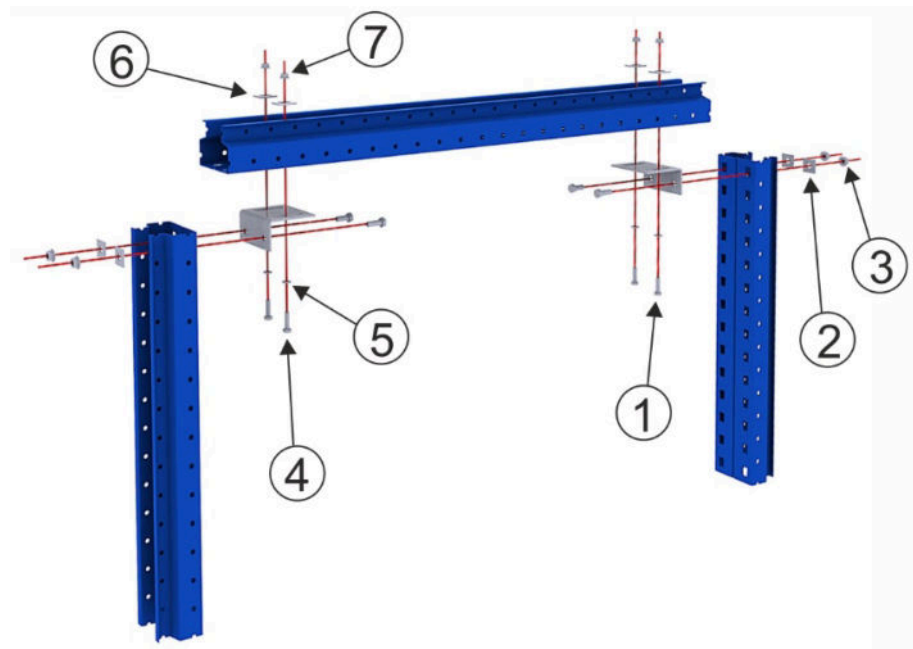
POSITION	DENOMINATION		QUANTITY
1	UPRIGHT		-
2	SPACER DEZ		1
3	BOLT DIN 933-8.8 M8x25/Z	FIXING SET CT AB 825	4
4	NUT DIN 6923-8 M8/Z		

10.2. SPACER DPT



POSITION	DENOMINATION		QUANTITY
1	UPRIGHT		-
2	SPACER DPT		1
3	BOLT DIN 933-8.8 M10x25/Z	FIXING SET CT AG 1025	1
4	NUT DIN 6923-8 M10/Z		
5	WASHER AC30/11/220/Z		

10.3. TOP PORTAL TIE



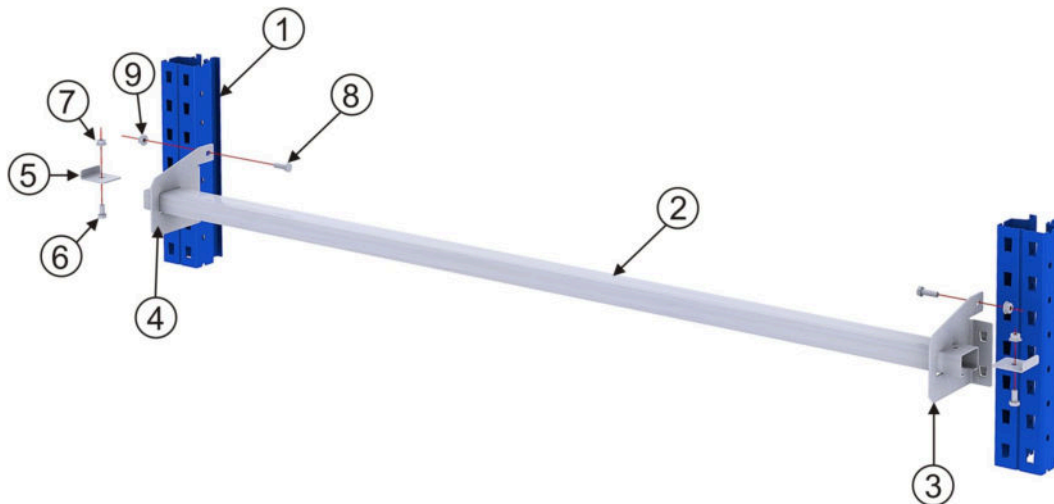
Quantities per portal:

	4	FIXING SET CT AG 1025
1	1	BOLT DIN 933 – 8.8 M10x25 / Z
2	1	WASHER AC30/D11/Z
3	1	NUT DIN 6923 – M10 / Z

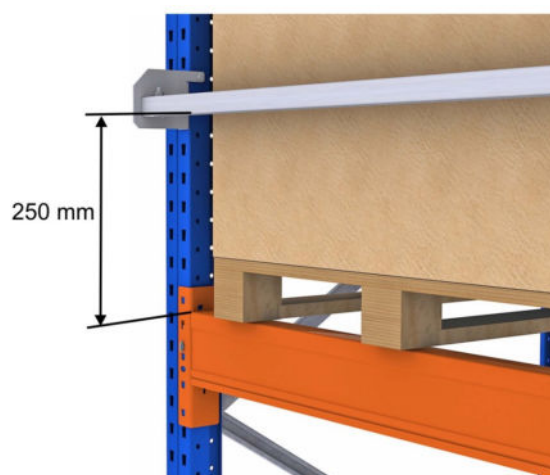
	4	FIXING SET CT BV 830
4	1	BOLT DIN 933 – 8.8 M8x30 / Z
5	1	WASHER DIN 125 M8 / Z
6	1	WASHER ERZ / D8,5
7	1	NUT DIN 6923 – M8 / Z

11. BACK STOPS ASSEMBLY

11.1. BACK STOP.

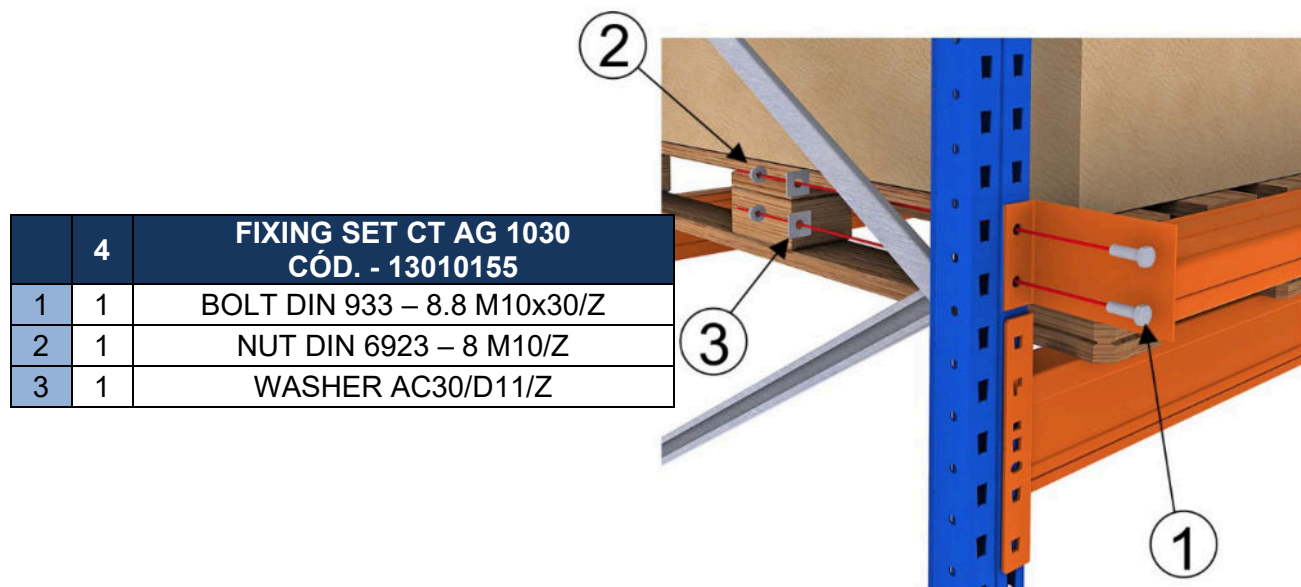


POSITION	DENOMINATION	
1	UPRIGHT	
2	PROFILE C50/e/D8,5	
3	CONNECTOR LTCD-CLAWS	
4	CONNECTOR LTCI-CLAWS	
5	TOP LTC50	
6	BOLT DIN 603-8.8 M8x20/Z	FIXING SET CT AF 820
7	NUT DIN 6923-8 M8/Z	
8	BOLT DIN 933-8.8 M8x25/Z	FIXING SET CT AB 825
9	NUT DIN 6923-8 M8/Z	

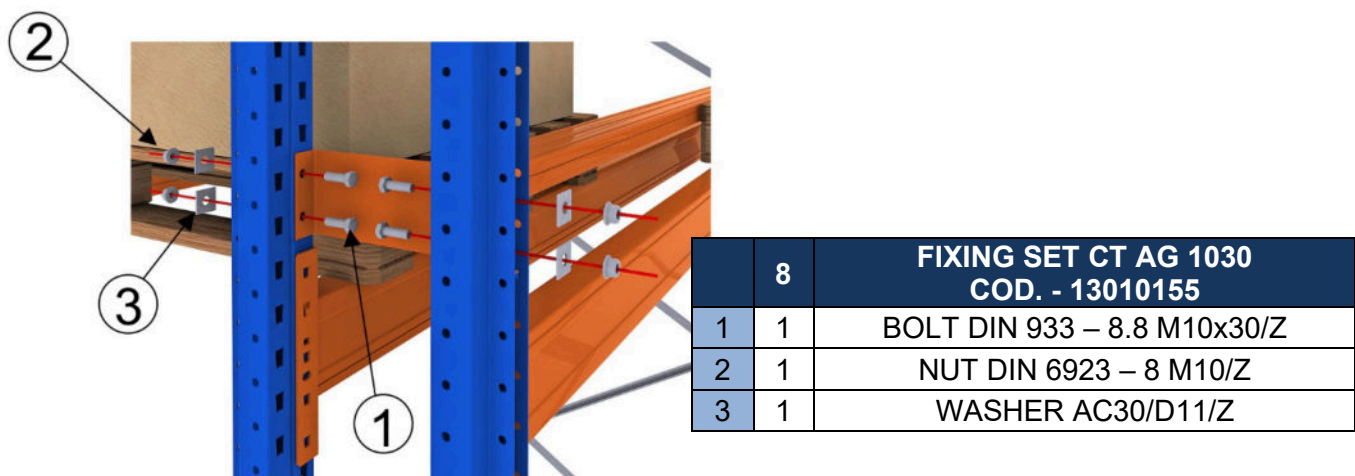


11.2. SAFETY BACK STOP.

SINGLE:



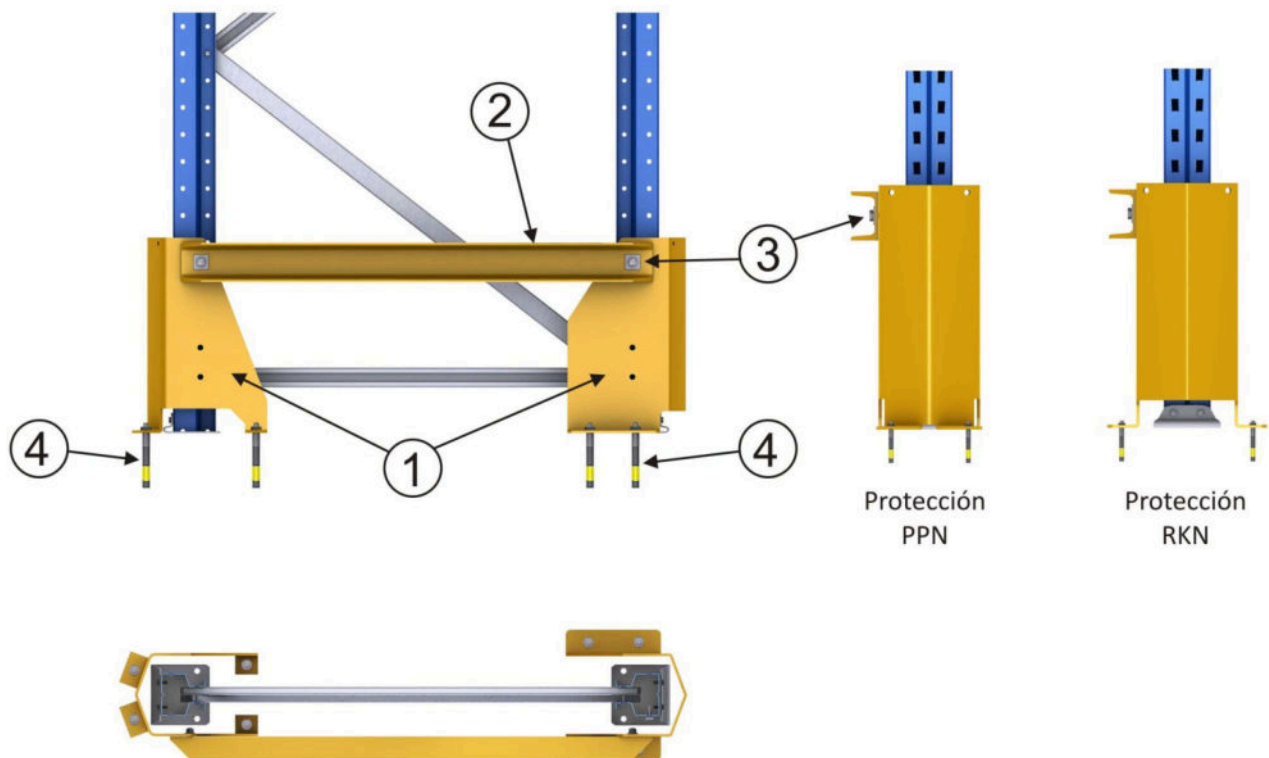
DOUBLE:



12. FULL FRAME PROTECTION ASSEMBLY

12.1. FULL FRAME PROTECTION PBS/1U.

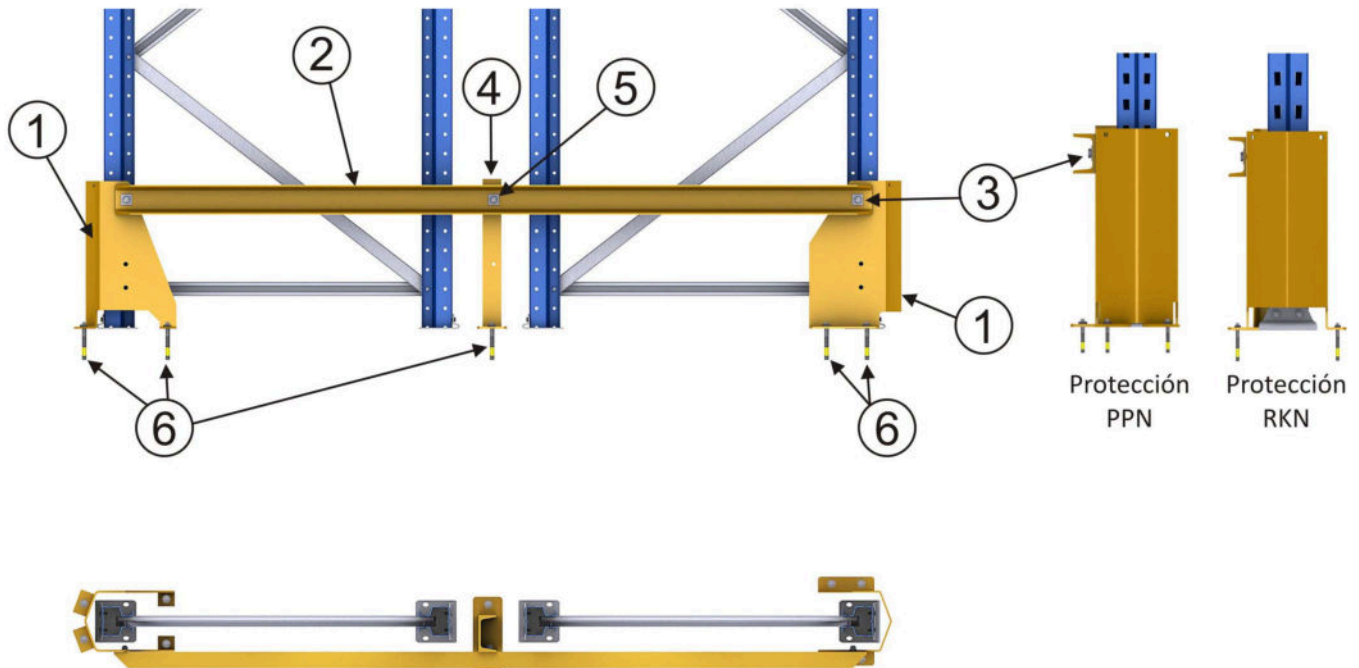
They are always placed in simple frame rows.



POSITION	DENOMINATION	QUANTITY
1	UPRIGHT PROTECTION [TYPE]	2
2	TIE U8 80 RK / L	1
3	FIXING SET AG 1025	2
4	SEGMENT ANCHORS M12	8

12.2. FULL FRAME PROTECTION DOUBLE PBD/1U ASSEMBLY.

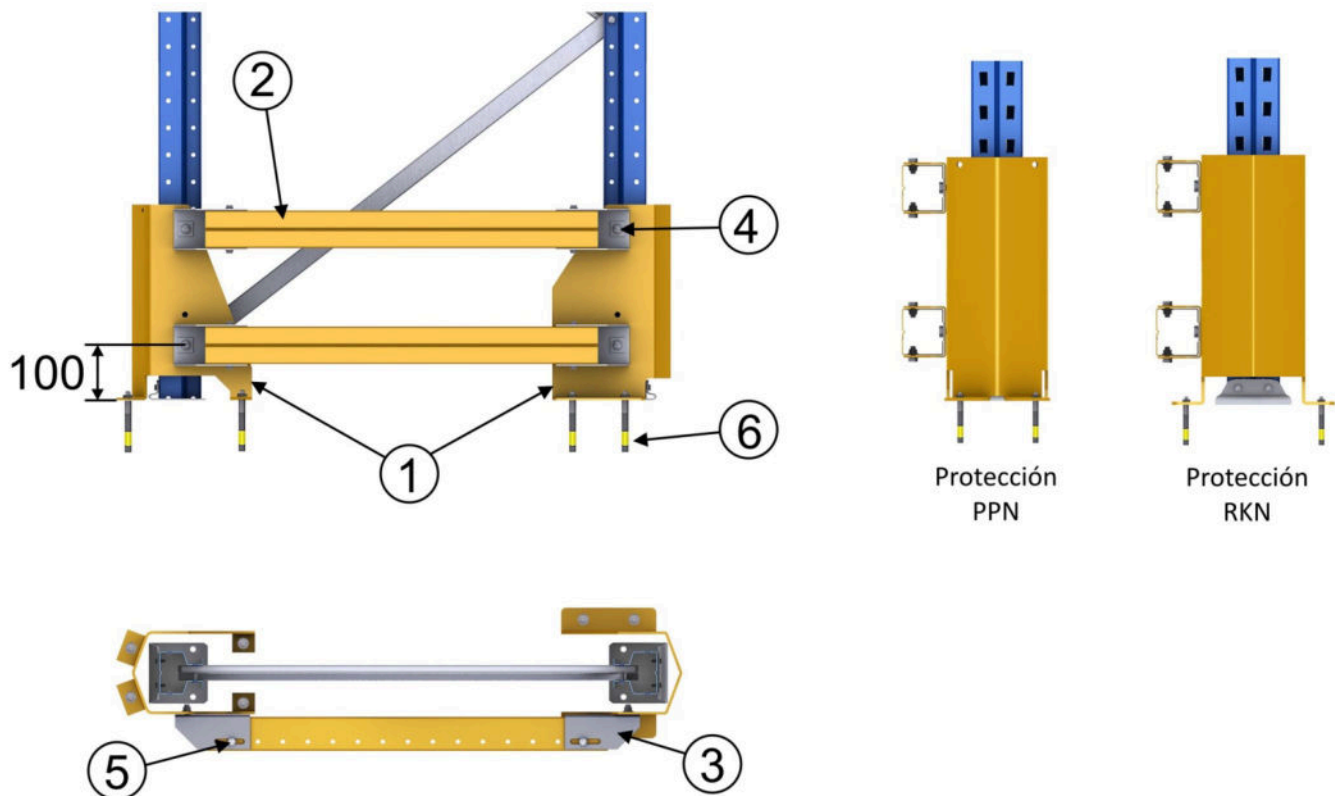
They are always placed in double frame rows



POSITION	DENOMINATION	QUANTITY
1	UPRIGHR PROTECTION [TYPE]	2
2	TIE UPN 80 RK / L	1
3	FIXING SET CT AG 1025	2
4	INTERMEDIATE FOOT UPN	1
5	FIXING SET CT AG 1025	1
6	SEGMENT ANCHORS M12	10

12.3. FULL FRAME PROTECTION SIMPLE PBS/2C ASSEMBLY.

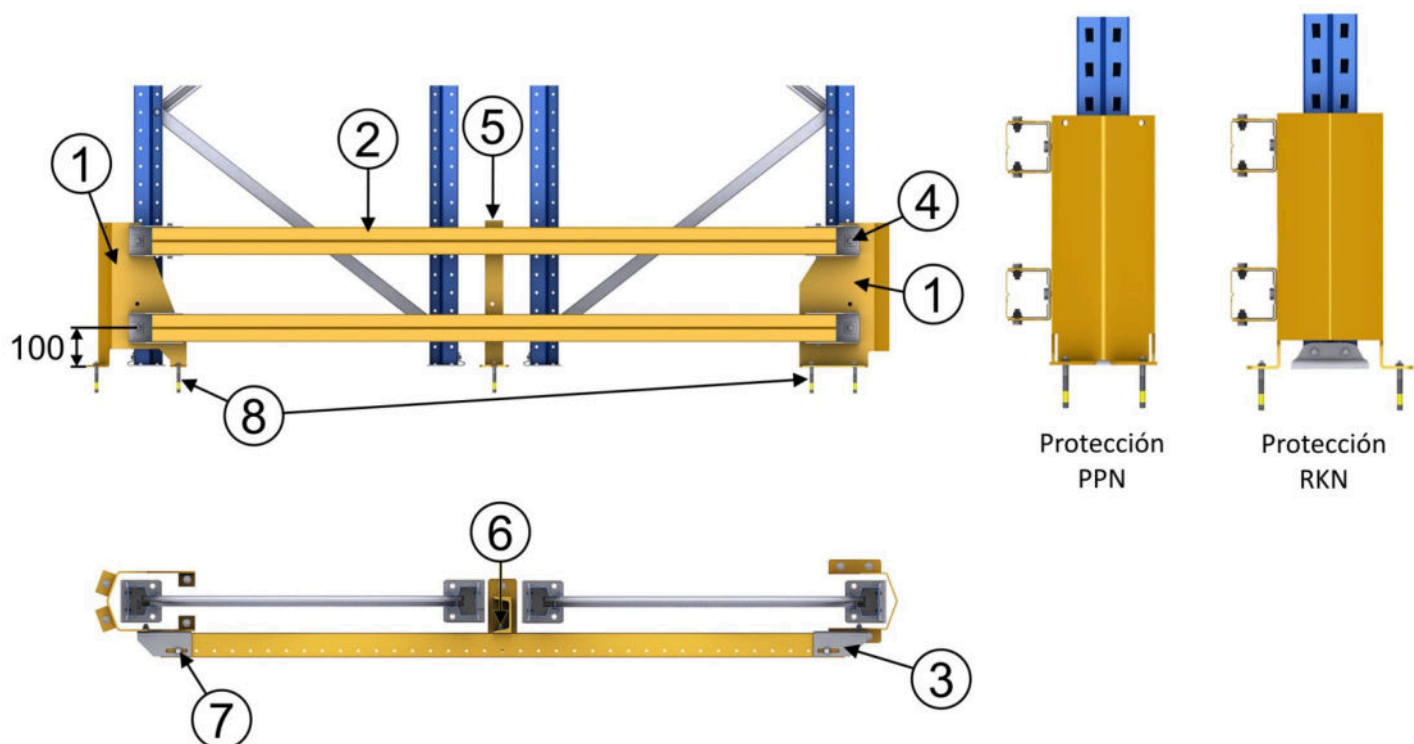
They are always paced in simple frame rows.



POSITION	DENOMINATION	QUANTITY
1	UPRIGHT PROTECTION [TYPE]	2
2	PROFILE C76A	2
3	CONNECTOR DC 76	4
4	FIXING SET CT AG 1025	4
5	FIXING SET CT AC 820	8
6	SEGMENT ANCHORS M12	8

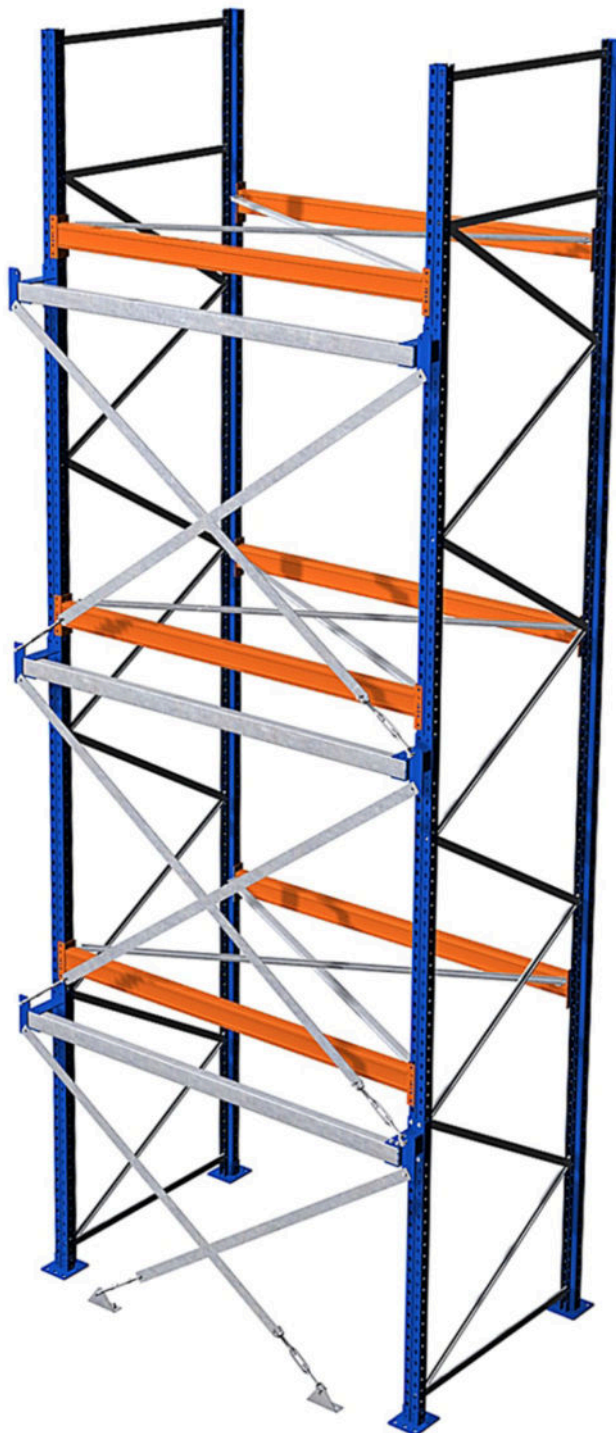
12.4. FULL FRAME PROTECTION DOBLE PBD/2C ASSEMBLY.

They are always placed in double frame rows.

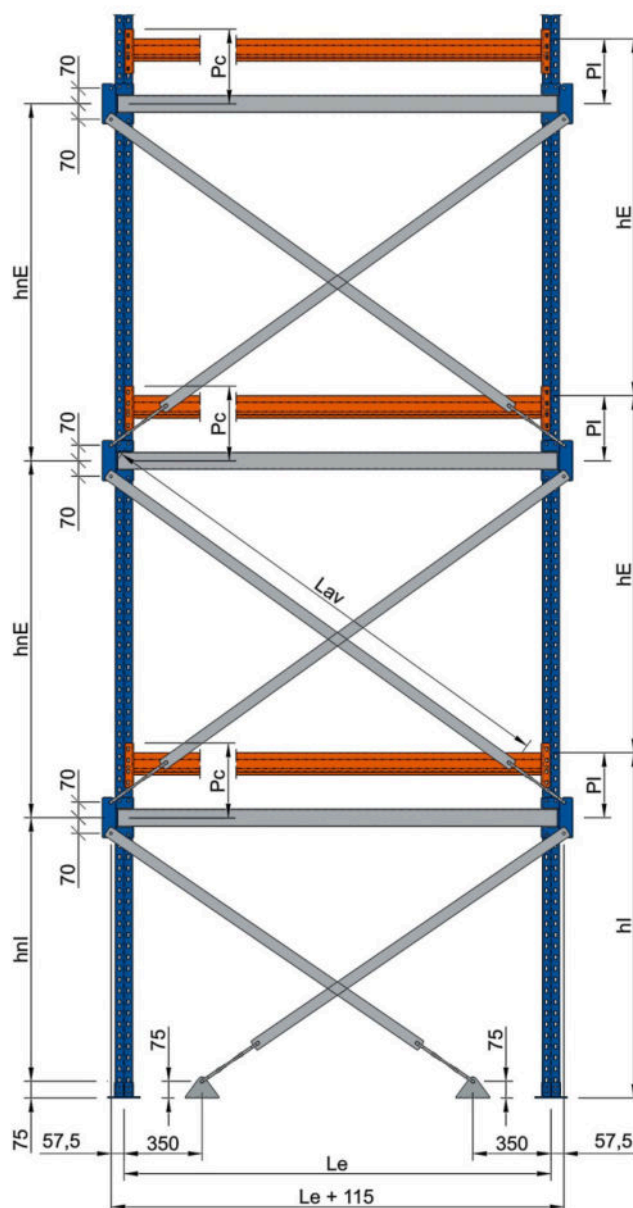


POSITION	DENOMINATION	QUANTITY
1	UPRIGHT PROTECTION [TYPE]	2
2	PROFILE C76A	2
3	CONNECTOR DC 76	4
4	FIXING SET CT AG 1025	4
5	INTERMEDIATE FOOT UPN	1
6	FIXING SET CT BX 825	2
7	FIXING SET CT AC 820	8
8	SEGMENT ANCHORS M12	10

13. VERTICAL BRACING ASSEMBLY



DIMENSIONS - POSITIONING:



	CONNECTORS DUO 40	CONNECTORS DUO 65
Pl	347	322
Pc	387	387
hI	Initial beam level	Initial beam level
hE	Extension beam level	Extension beam level
hnl	$hI + 40 - 387 - 75$	$hI + 65 - 387 - 75$
hnE	hE	hE

Le – Length to the upright's axes.

hI, hE – They are taking the corresponding values, depending on the layout (single or double level).

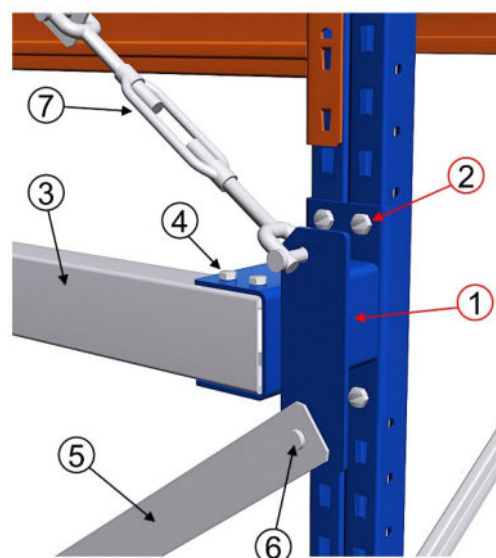
Lav – Stiffening rims AV are manufactured with a relation of 50x3 finishing in pre- galvanized and no length restriction.

ANCHOR PLATE FIXING AV ESP:

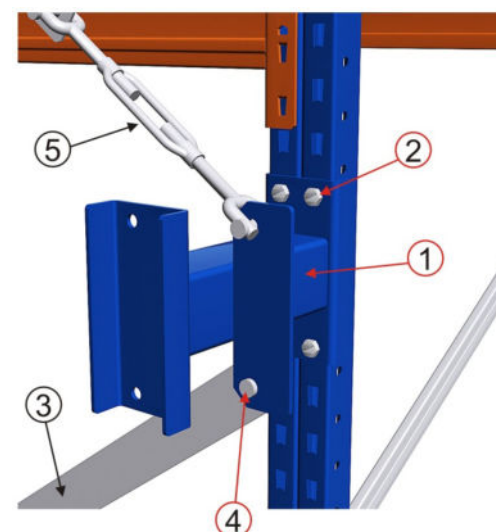
Mark	Denomination	Quantity
1	ANCHOR PALTE ESP	1
2	ANCHORS SEGMENT M12	2
3	FORK TENSOR ½ M12	1


SIMPLE BRACING FIXING:

Mark	Denomination	Quantity
1	SIMPLE CONNECTOR AV	1
2	FIXING SET CT AG 1025	4
3	PROFILE CZ76-AV	1
4	FIXING SET CT AC 1025	4
5	STIFFENING RIM AV	1
6	FIXING SET CT AC 1025	1
7	FORK TENSOR ½ M12	1


DOUBLE BRACING FIXING:

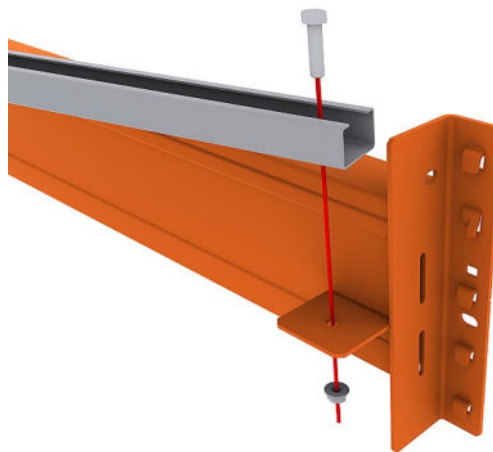
Mark	Denomination	Quantity
1	DOBLE CONNECTOR AV	1
2	FIXING SET CT AG 1025	4
3	STIFFENING RIM AV	1
4	FIXING SET CT AC 1025	1
5	FORK TENSOR ½ M12	1



14. HORIZONTAL BRACING ASSEMBLY



4 FIXING SET CT AB 825 per bay with horizontal bracing. It's necessary to put the screw head on the open side of the profile CZ42.



MARK	DENOMINATION	QUANTITY	CODE
1	BOLT DIN 933 M8x25	1	10010069
2	NUT DIN 6923 M8	1	10020019

15. FALL PROTECTION MESH ASSEMBLY

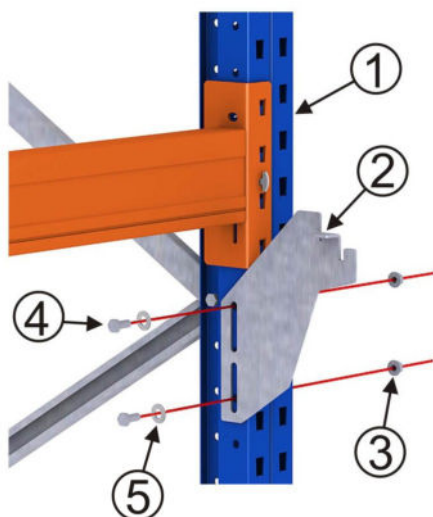
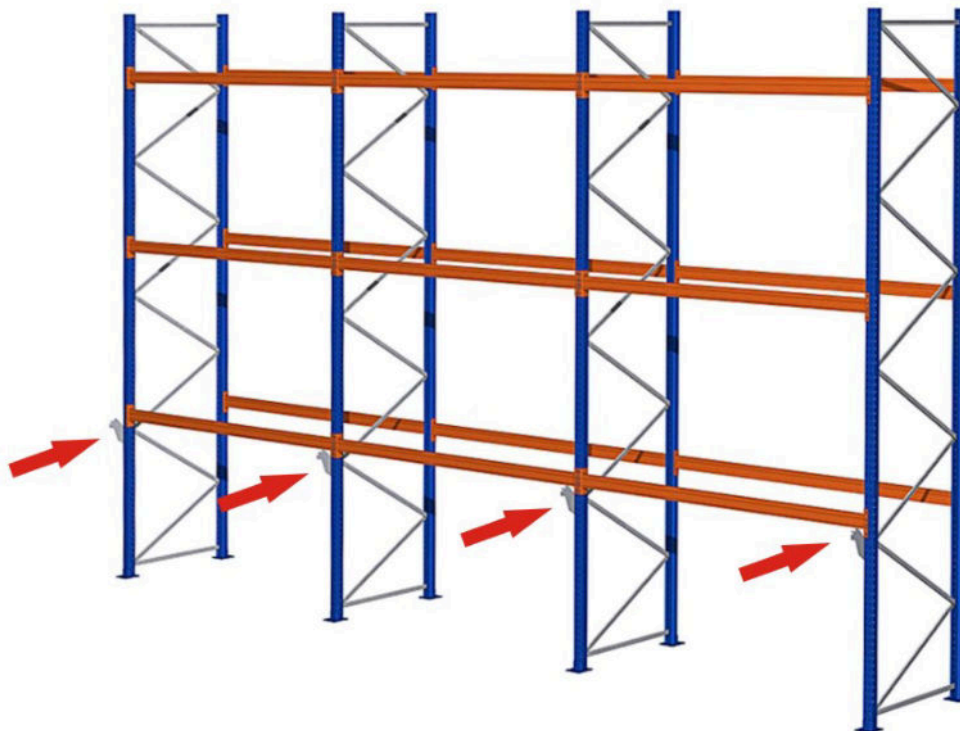
15.1. BACK FALL PROTECTION MESH ASSEMBLY

It's necessary to know the expected arrangement for the anti – collapsing mesh, which will depend on the arrangement of the beams and frames

The installation is made bottom - up.

15.1.1 Assembly of the second run of connectors.

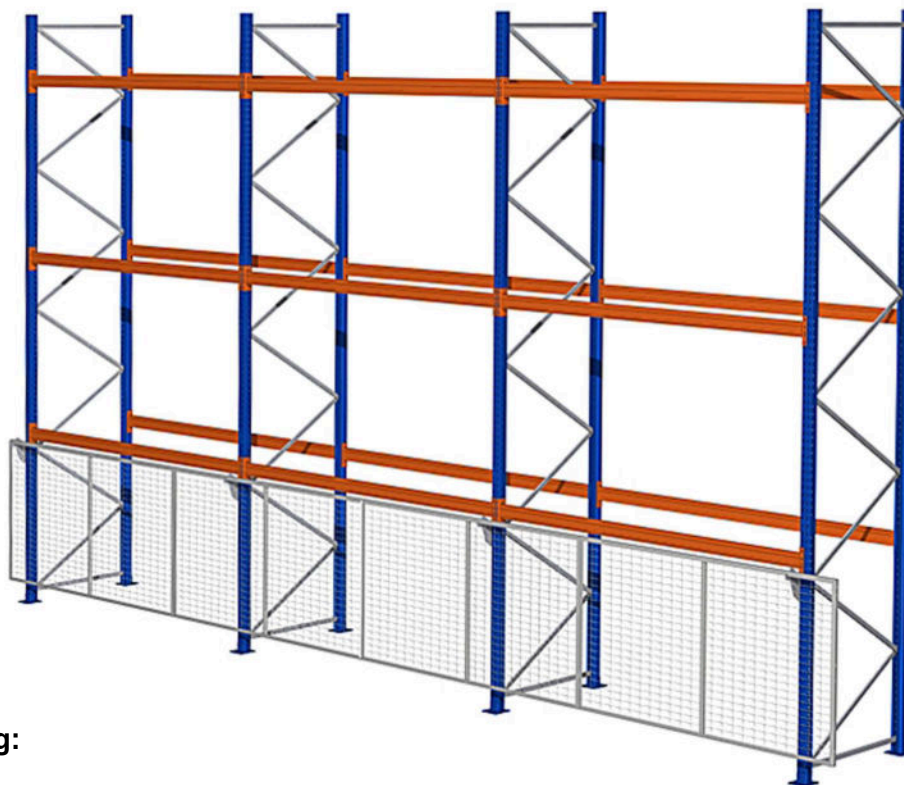
De acuerdo con las cotas indicadas en el plano se van colocando la segunda fila de conectores en los puntales de la estantería. Los conectores se pueden colocar indistintamente a la derecha o a la izquierda del puntal.



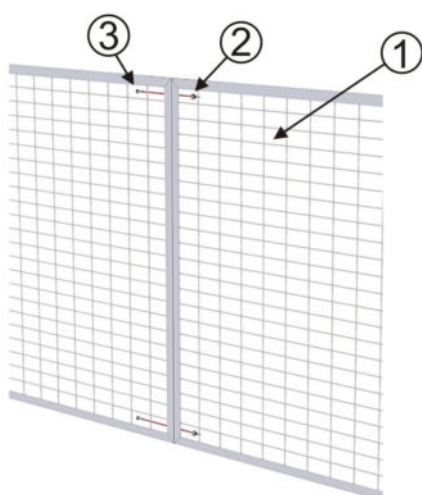
MARK	DESCRIPTION	
1	UPRIGHT	
2	FALL PROTECTION MESH BRACKET RK2	
3	NUT DIN 6923-8 M8/Z	FIXING SET CT AC 820
4	BOLT DIN 933-8.8 M8x20/Z	
5	WASHER DIN 125 M8/Z	

15.1.2 Mesh panels assembly.

The mesh panels should be placed on the second row of connector and they must be joined together with the fixing sets.



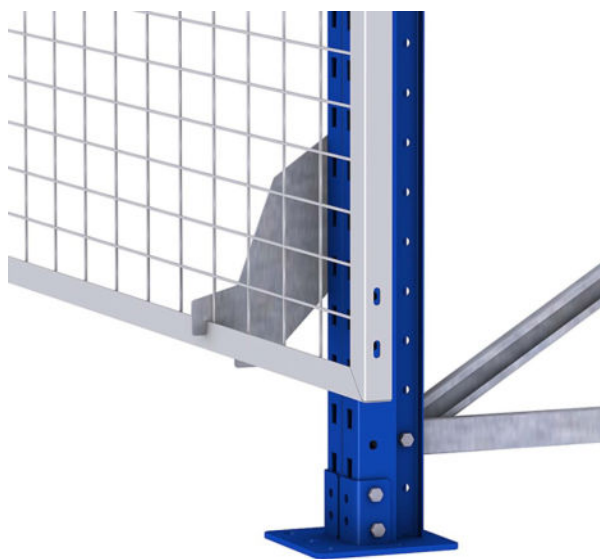
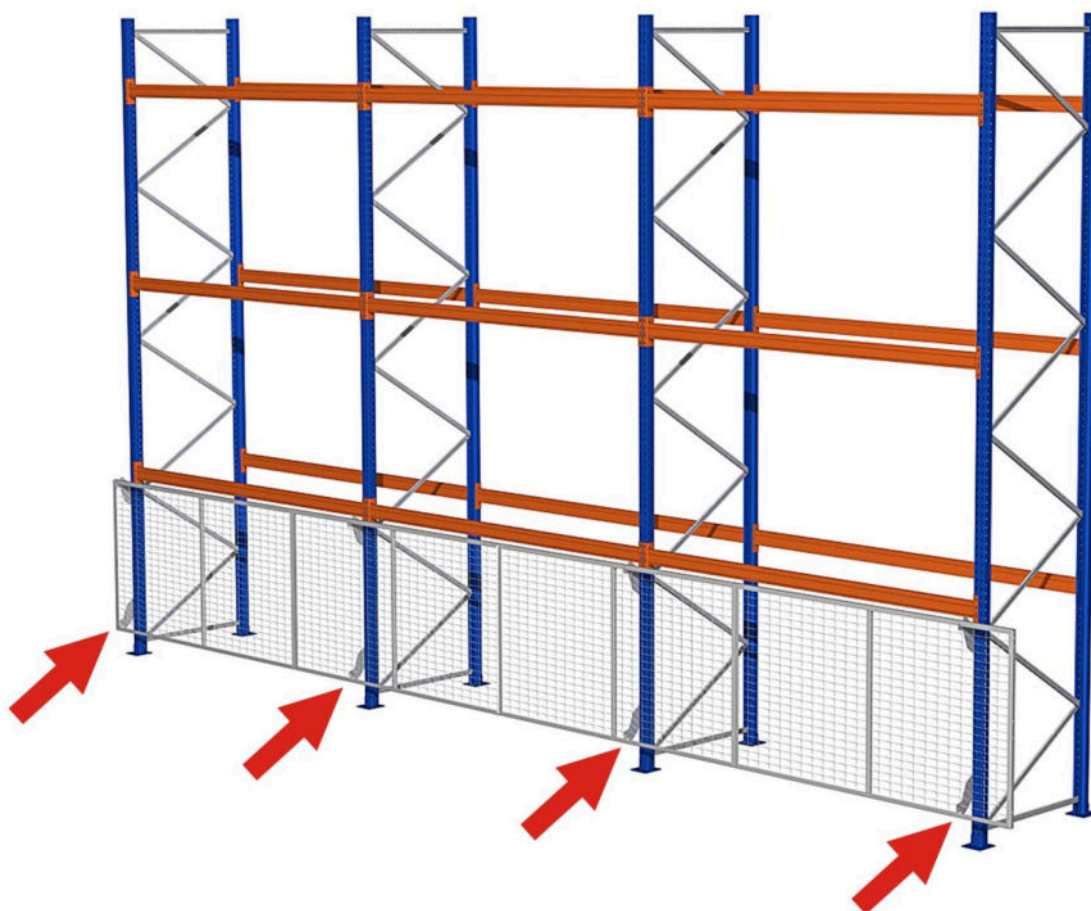
Vertical fixing:



POSITION	DENOMINATION	
1	MESH PANEL RK/PANEL MESH WITH REINFORCEMENT RK	
2	NUT DIN 6923-8 M8/Z	FIXING SET CT AB 820
3	BOLT DIN 933-8.8 M8x20/Z	

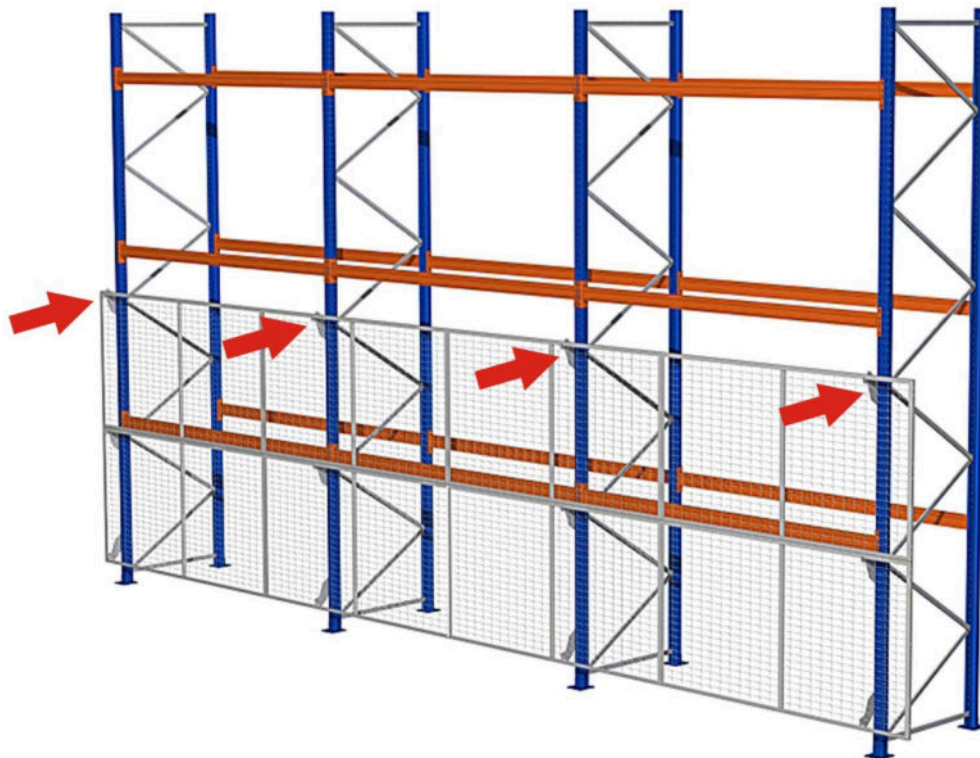
15.1.3 First row of connectors assembly

The first line of bays is collocated simultaneously with the first run connectors. They are placed twisted so as to avoid the fall of the meshes by a misuse.

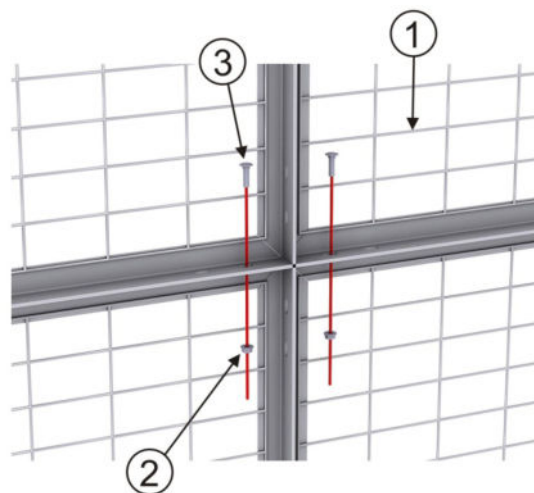
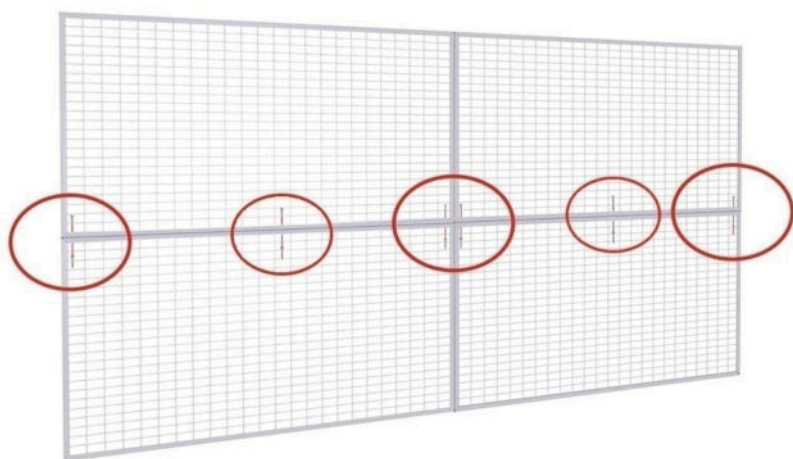


15.1.4. Third row of connectors assembly.

The third row of connectors should be placed before the second row of mesh panels so as they can be joined in both directions.

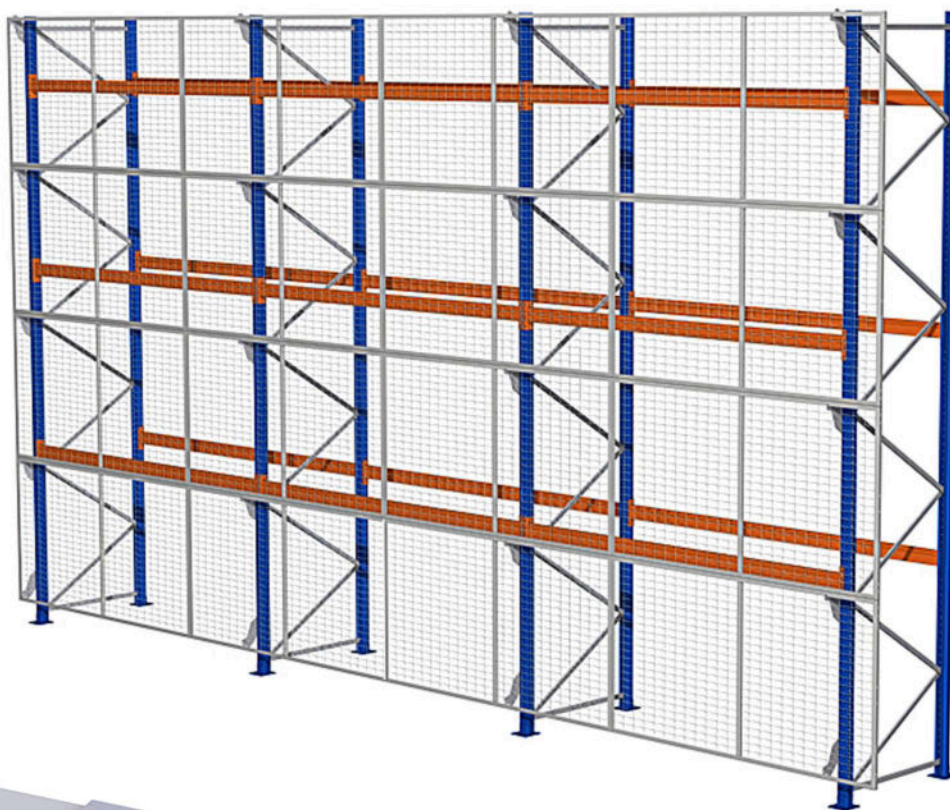


Horizontal fixing:

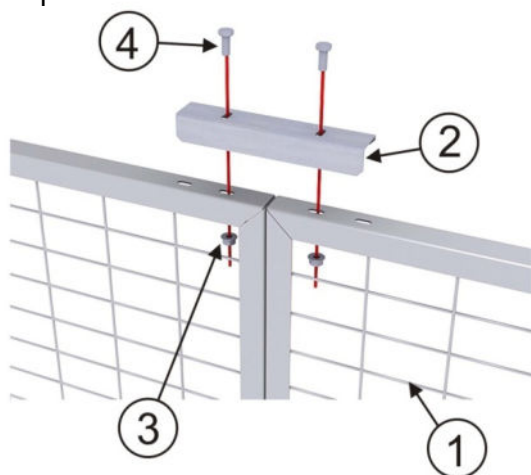


POSITION	DENOMINATION	
1	MESH PANEL RK/PANEL MESH WITH REINFORCEMENT RK	
2	NUT DIN 6923-8 M8/Z	CONJ.TORN CT AB 820
3	BOLT DIN 933-8.8 M8x20/Z	

This process is repeated throughout the whole installation.



Finally, the mesh panel unions RK must be placed in the upper or the bottom joining part of the panels.



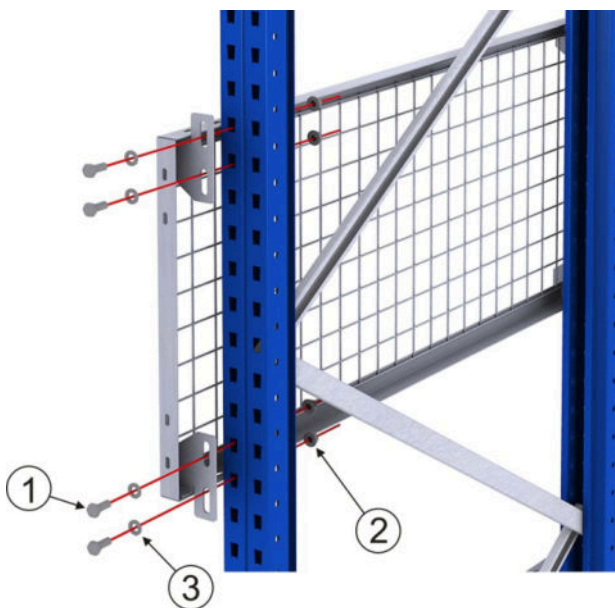
POSITION	DENOMINATION	
1	MESH PANEL RK/MESH PANEL REINFORCEMENT RK	
2	MESH UNION PANEL RK	
3	NUT DIN 6923-8 M8/Z	FIXING SET CT AB 820
4	BOLT DIN 933-8.8 M8x20/Z	

15.2. SIDE ANTI - COLLAPSING MESH ASSEMBLY

LATERAL CLAMPING WITH OVERHANG (STANDARD SOLUTION):

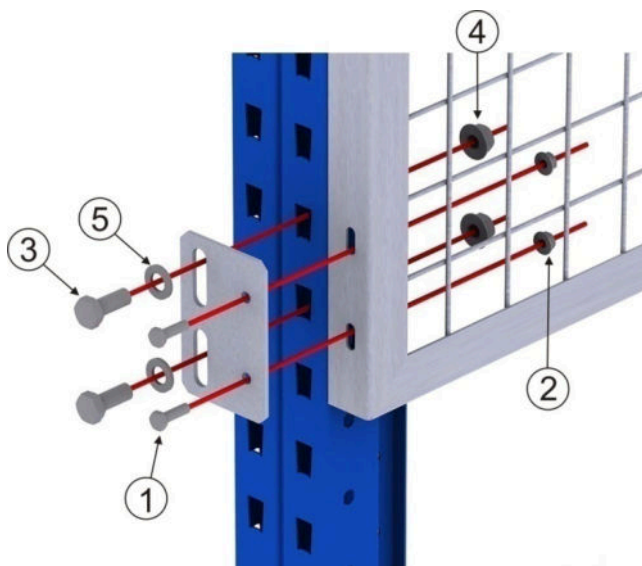


FIXING PART “LATERAL CLOSURE BRACKET”:



	2	FIXING SET CT AC1030
1	1	BOLT DIN 933 – 8.8 M10x25 / Z
2	1	NUT DIN 6923 – 8 M10 / Z
3	1	WASHER DIN 125 – 8 M10 / Z

LATERAL CLAMPING WITHOUT OVERHANG:

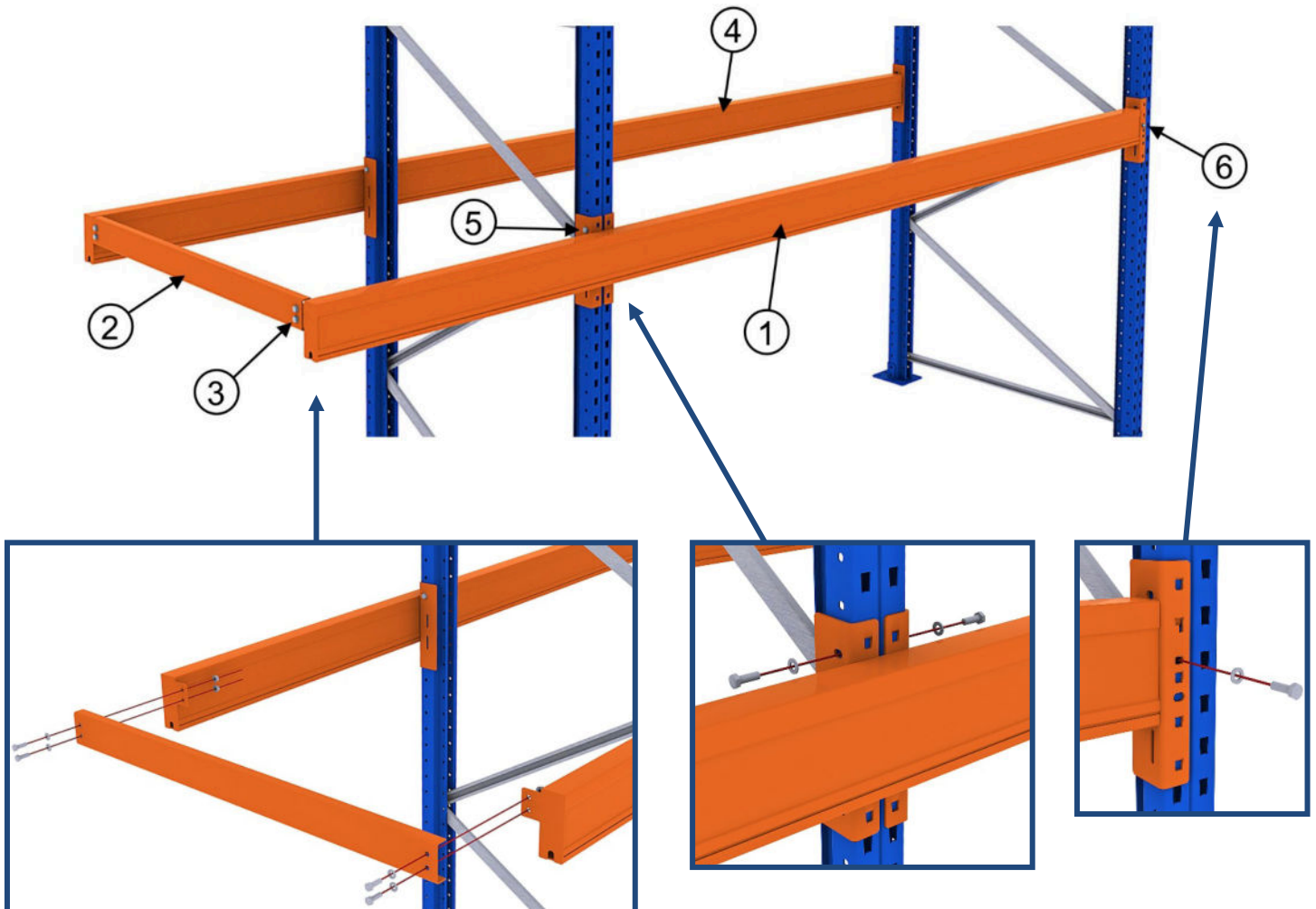
FIXING PART “LATERAL CLOSURE PLATE”:


	2	FIXING SET CT AB820
1	1	BOLT DIN 933 – 8.8 M8x20 / Z
2	1	NUT DIN 6923 – 8 M8 / Z

	2	FIXING SET CT AC1030
3	1	BOLT DIN 933 – 8.8 M10x30 / Z
4	1	NUT DIN 6923 – 8 M10 / Z
5	1	WASHER DIN 125 – 8 M10 / Z

16. PICK UP AND DEPOSIT STATIONS ASSEMBLY

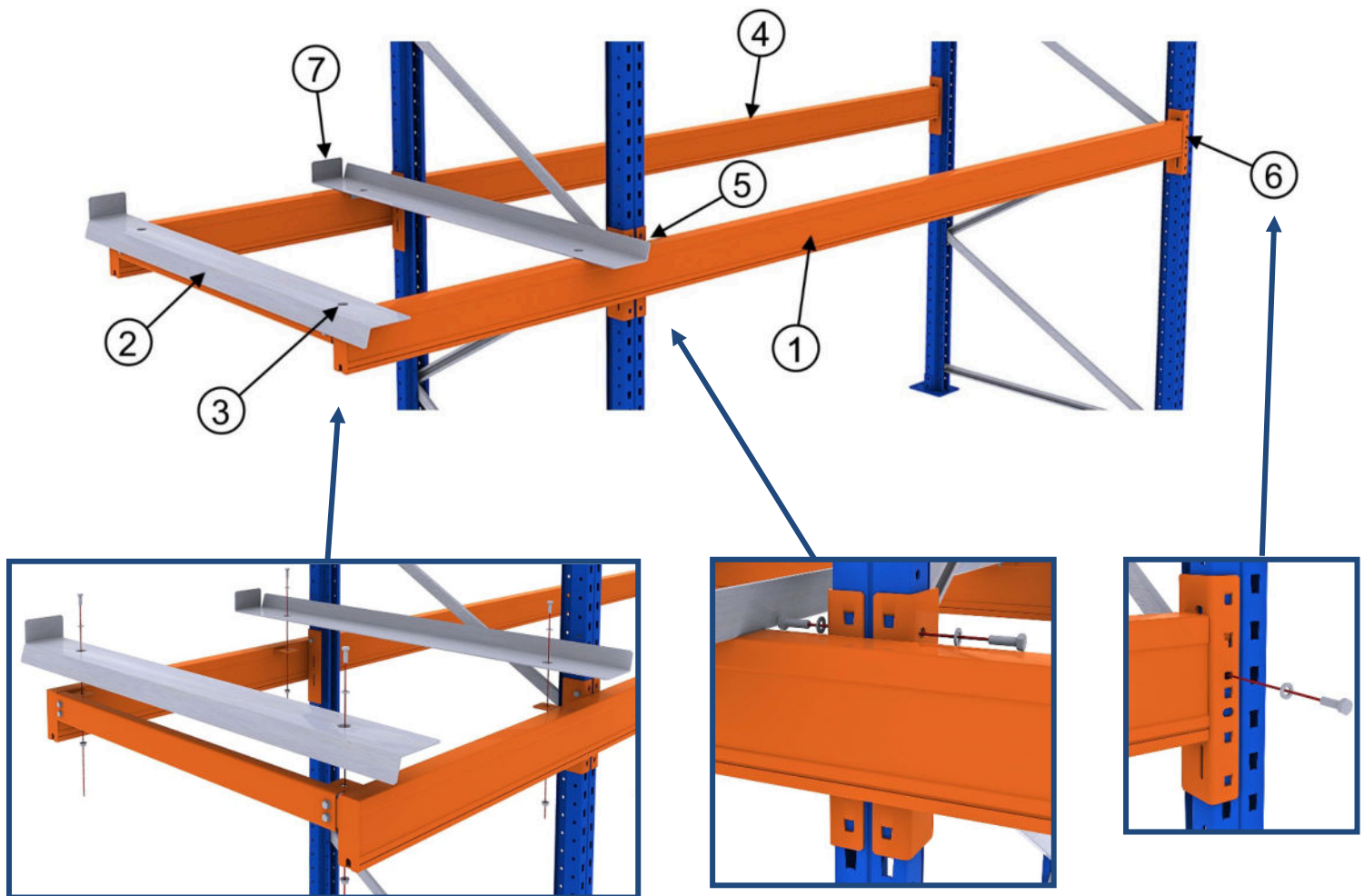
16.1. P&D STATIONS WITH EGN BEAMS.



Components per set:

Mark	Denomination	Nr. Pieces
1	LEFT BEAM. EE RK EGN [TYPE]/F/Lp/Lm/La/L/Finish	1
2	Spacer EE EGN/L/Finish	1
3	FIXING SET CT AC 825	4
4	RIGHT BEAM. EE RK EGN [TIPO]/F/Lp/Lm/La/L/Finish	1
5	FIXING SET CT AC 825	4
6	FIXING SET CT AC 825	2

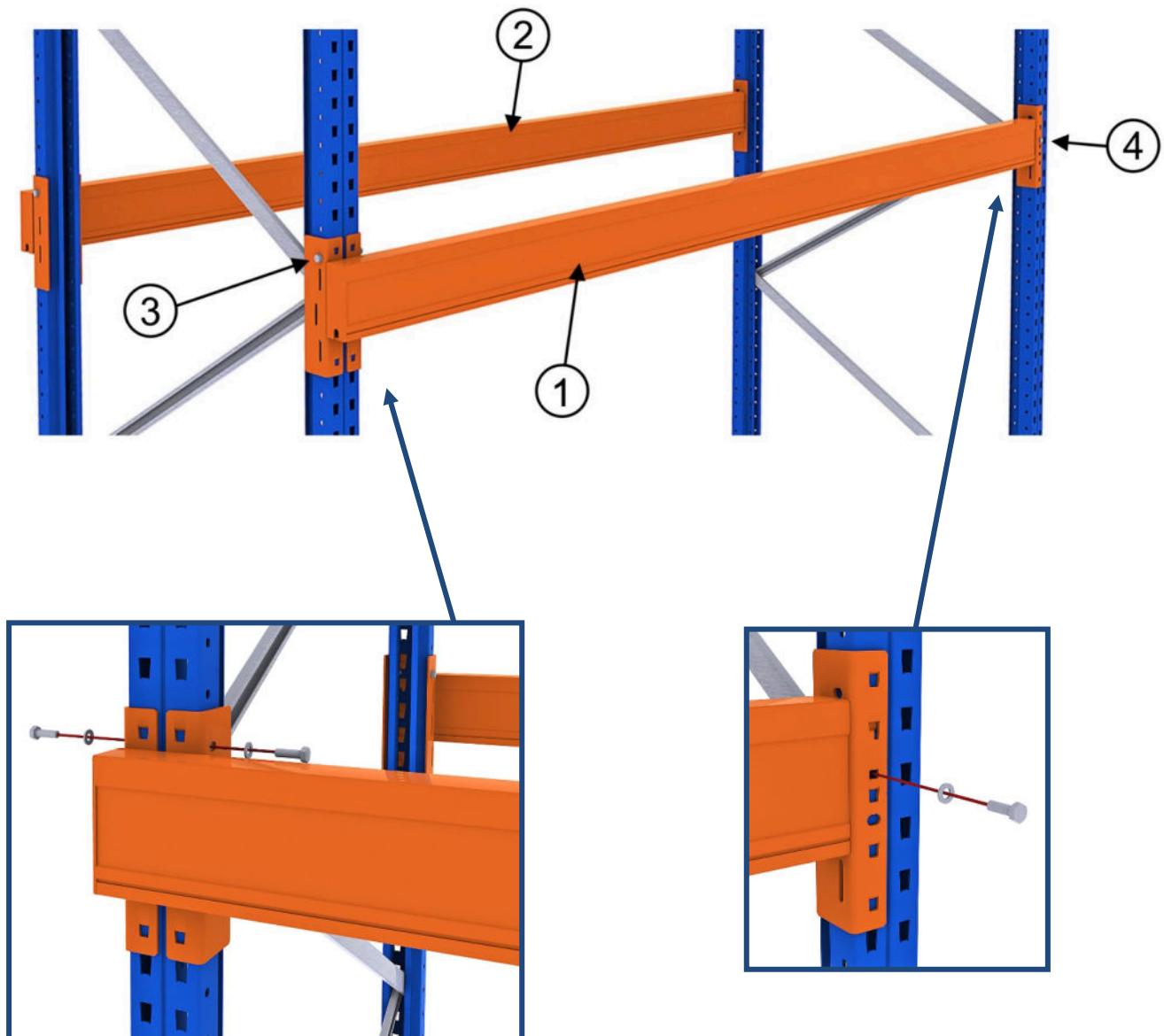
16.2. CENTRING STATIONS WITH EGN BEAMS.



COMPONENTS PER SET:

MARK	DENOMINATION	Nr. Pieces	
		LEFT	RIGHT
1	LEFT BEAM. EC RK EGN [TYPE]/F/Lp/Lm/La/L/Finish	1	1
2	RIGHT BACK CENTERING EGN [Thickness]/D/H/V1/Finish	-	1
	LEFT BACK CENTERING EGN [Thickness]/D/H/V1/Finish	1	-
3	FIXING SET CT AF 820	4	4
4	RIGHT BEAM. EC RK EGN [TYPE]/F/Lp/Lm/La/L/Finish	1	1
5	FIXING SET . CT AC 825	4	4
6	FIXING SET . CT AC 825	2	2
7	RIGHT FRONT CENTERING EGN [Thickness]/D/H/V1/Finish	-	1
	LEFT FRONT CENTERING EGN [Thickness]/D/H/V1/Finish	1	-
8	FIXING SET . CT AC 825	4	4

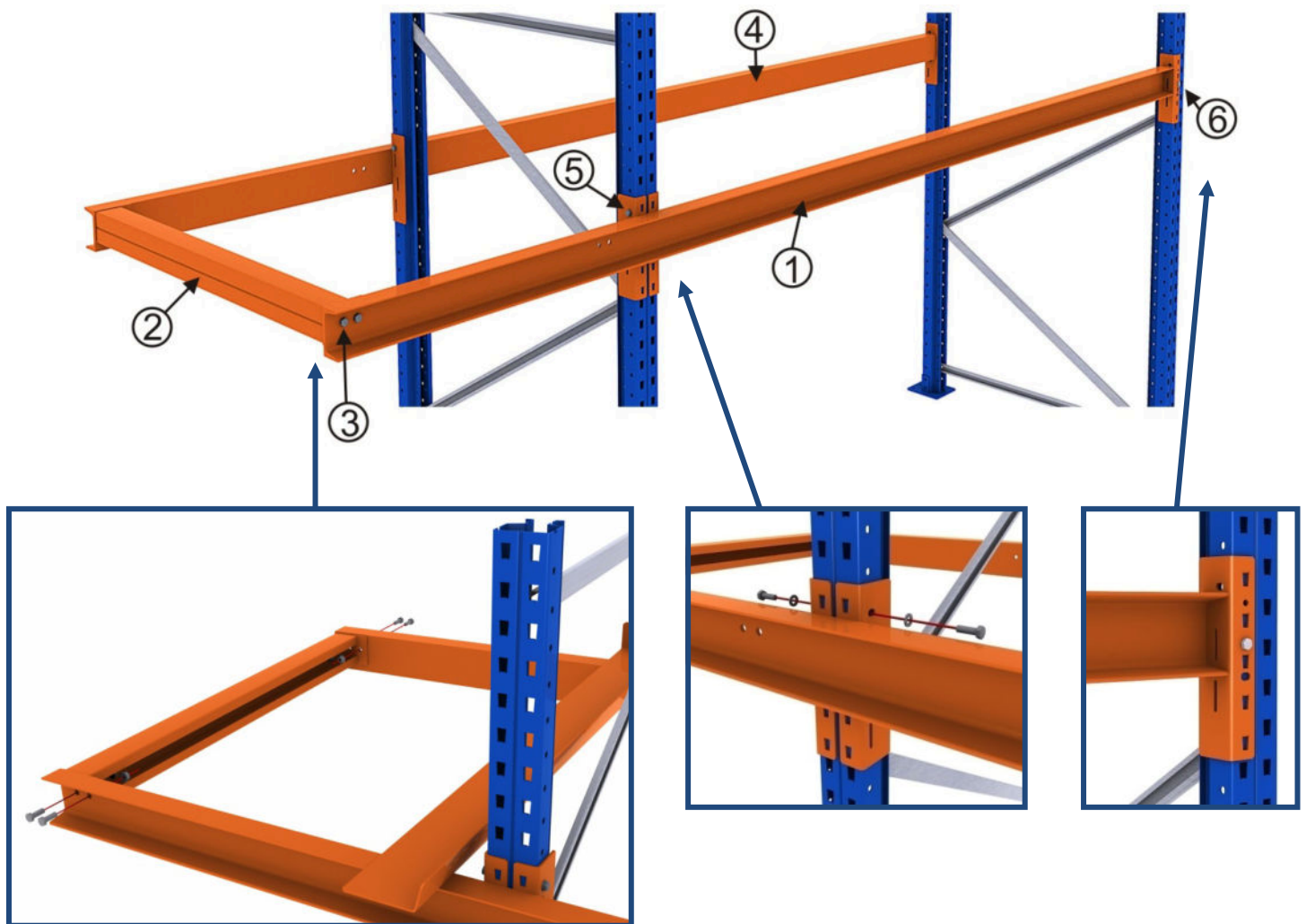
16.3. EGN BEAMS WITH OVERHANG.



Components por set:

MARK	DENOMINATION	Nr. pieces
1	BEAM EGN[TIPO]/LEFT OVERHANG/F/LP/L/Lm/FINISH	1
2	BEAM EGN[TIPO]/RIGHT OVERHANG/F/LP/L/Lm/FINISH	1
3	FIXING SET CT AC 825	4
4	FIXING SET CT AC 825	2

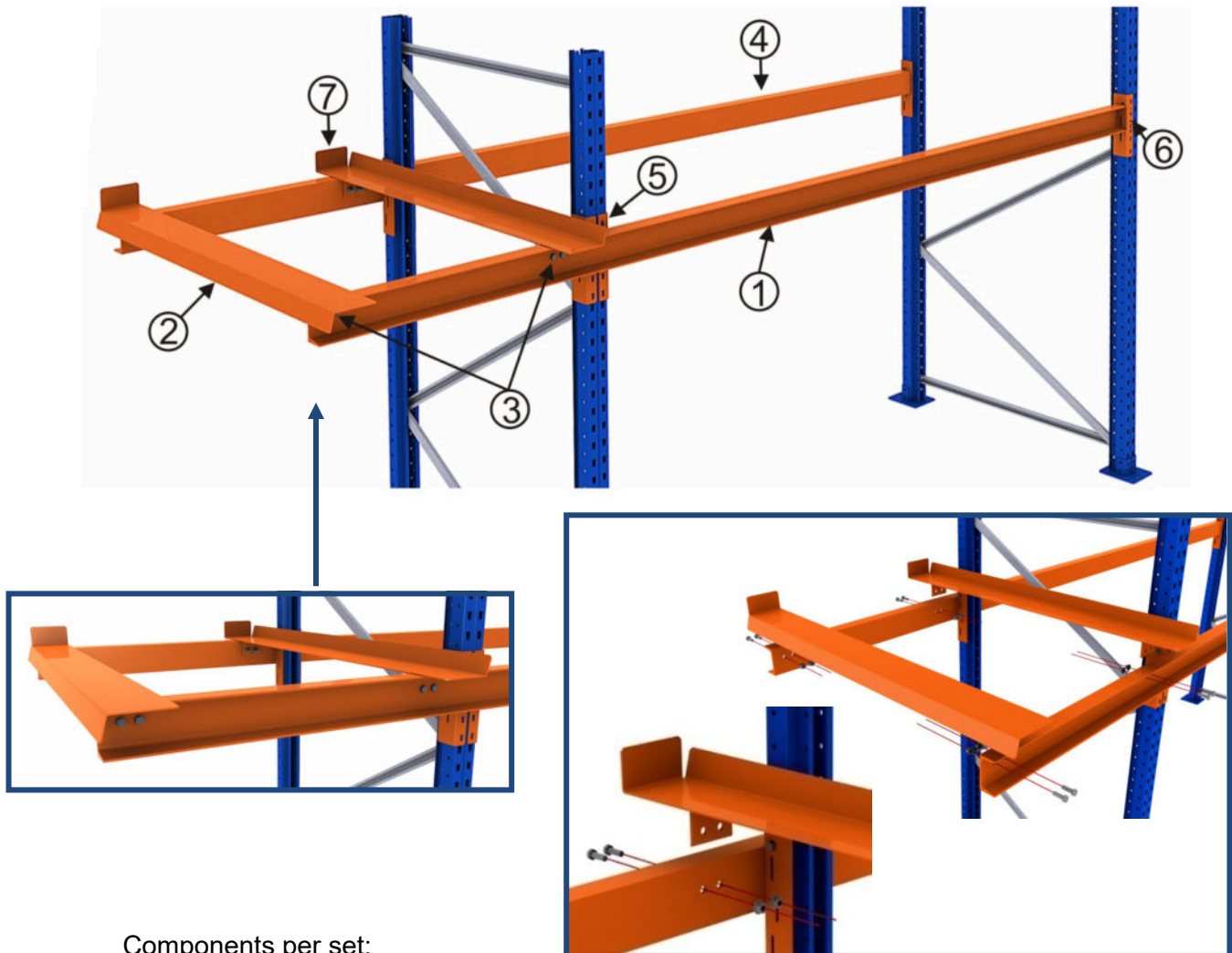
16.4. P&D STATIONS WITH UPN BEAMS.



Components per set

Marck	Denomination	Nr. Pieces according to UPN
		80 / 100 / 120 / 140
1	LEFT BEAM. EE RK UPN [TYPE]/F/Lp/Lm/La/L/Finish	1
2	Spacer EE/L/Finishing	1
3	FIXING SET CT AC 1030	4
4	RIGHT BEAM. EE RK UPN [TYPE]/F/Lp/Lm/La/L/Finish	1
5	FIXING SET CT AC 825	4
6	FIXING SET CT AC 825	2

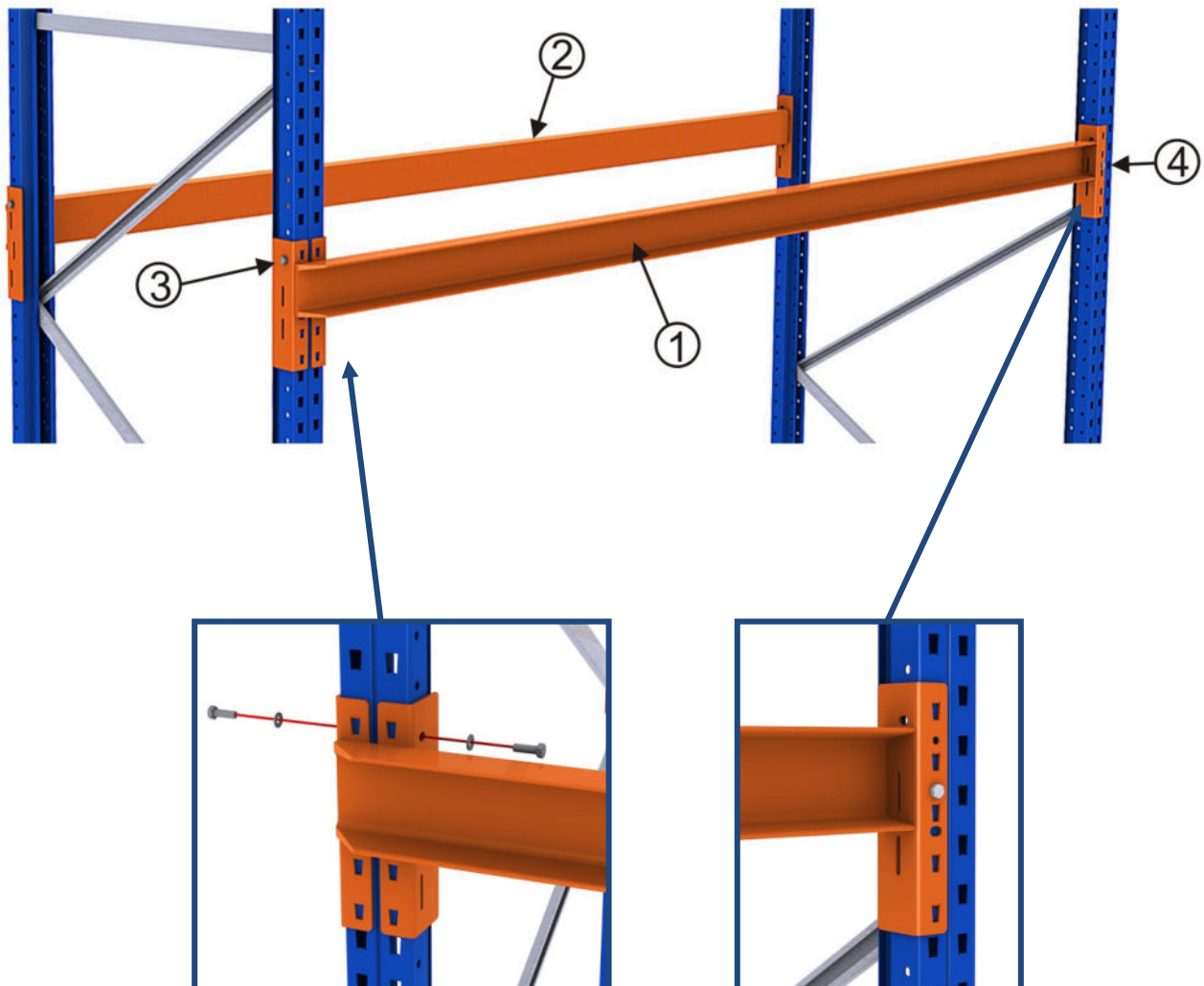
16.5. CENTRING STATIONS WITH UPN BEAMS.



Components per set:

Mark	Denomination	Nr. Pieces according to UPN	
		D 80 / 100 / 120 / 140	I 80 / 100 / 120 / 140
1	LEFT BEAM EE RK UPN [Type]/F/Lp/Lm/La/L/Finish	1	1
2	RIGHT BACK CENTERING [Thickness]/[Type AB]/D/V1/H/Finish	1	-
	LEFT BACK CENTERING I[Thickness]/[Type AB]/D/V1/H/Finish	-	1
3	FIXING SET CT AC 1030	8	8
4	LARGUERO DCH. EE RK UPN [Type]/F/Lp/Lm/La/L/Finish	1	1
5	FIXING SET CT AC 825	4	4
6	FIXING SET CT AC 825	2	2
7	RIGHT BACK CENTERING [Thickness]/[Type AB]/D/V1/H/Finish	1	-
	LEFT BACK CENTERING [Thickness]/[Type AB]/D/V1/H/Finish	-	1

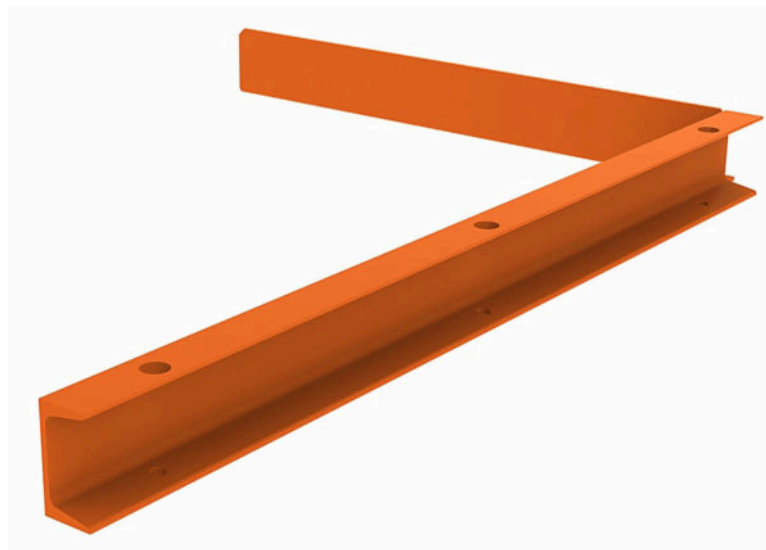
16.6. UPN BEAMS WITH OVERHANG.



Components per set:

Mark	Denomination	Nr. according to UPN
		80 / 100 / 120 / 140
1	UPN BEAM [Type] OVERHANG DCH/F/L/Finishing	1
2	UPN BEAM [Type] OVERHANG IZQ/F/L/Finishing	1
3	FIXING SET CT AC 825	4
4	FIXING SET CT AC 825	2

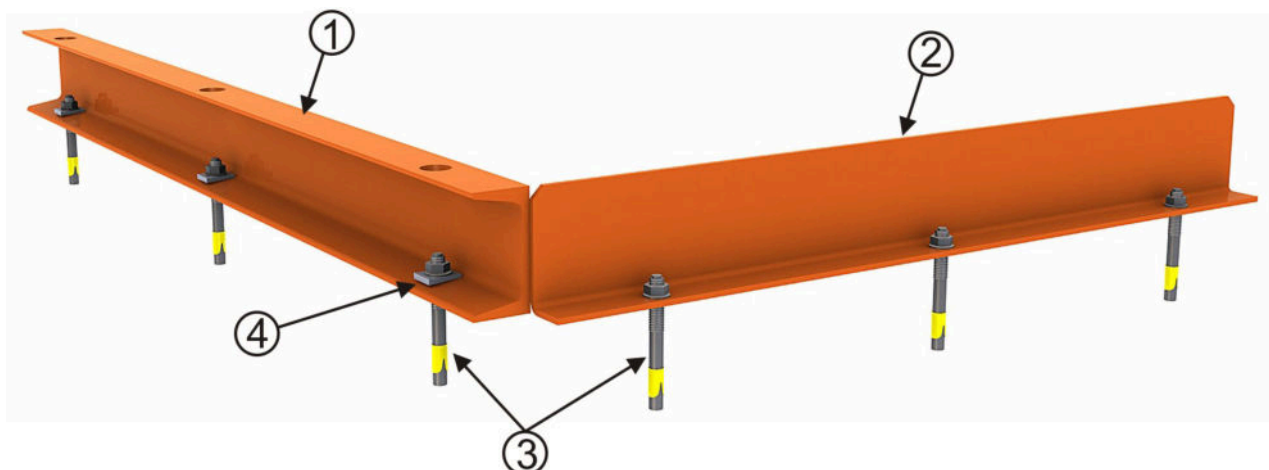
16.7. GROUND LEVEL CENTRING STATIONS.



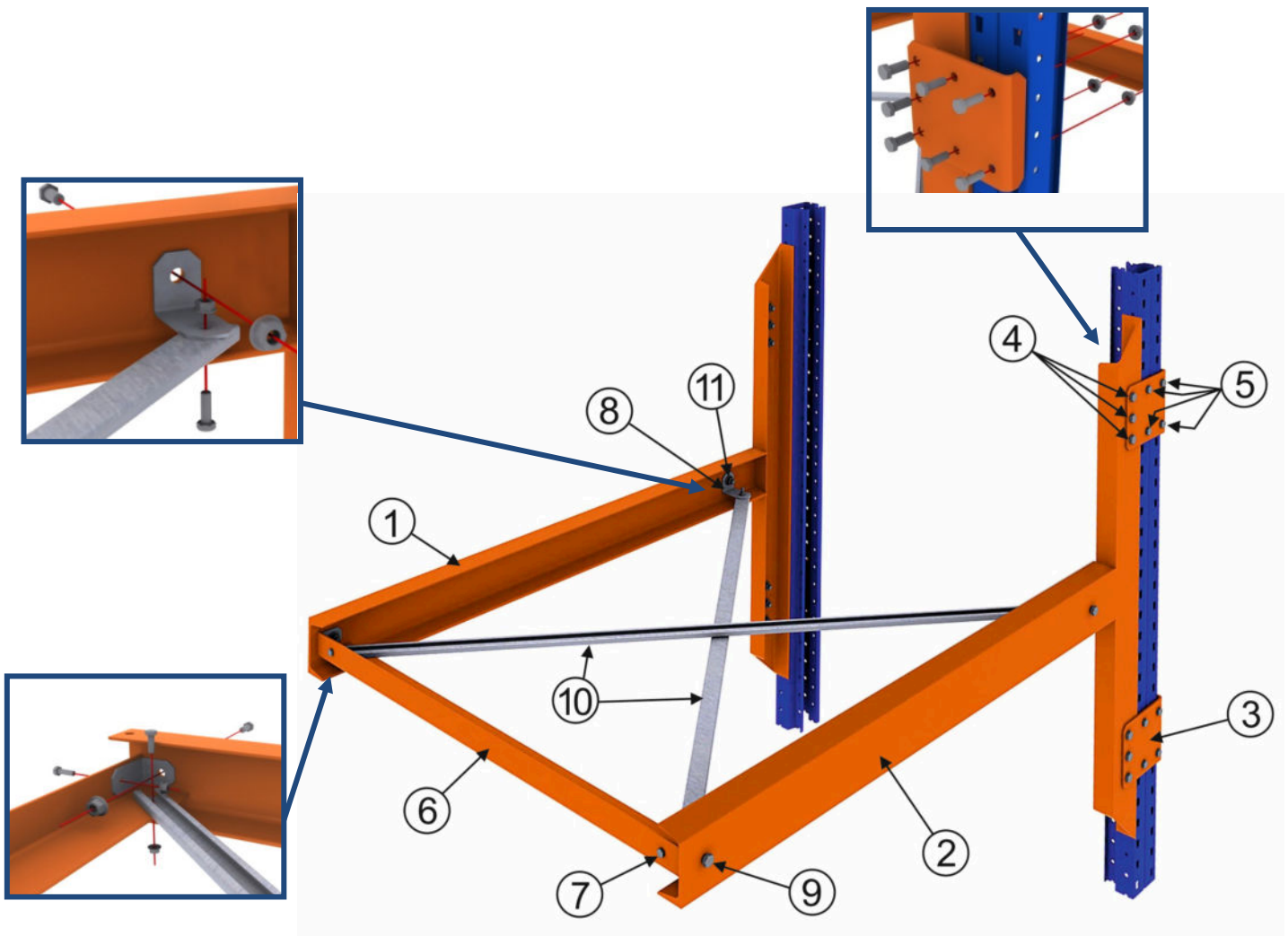
Components per set:

MARK	DENOMINATION	Numbre of pieces	
		Single Station	Double Station
1	Front stop TF/L1/Finishing	1	2
2	Lateral stop TL/L/Finishing	1	2
3	Segment anchors M12	6	12
4	Washer 14 DIN 434 Zn	3	6

How to fix them:



16.8. ASSEMBLY OF STATION WITH BRACKETS TYPE T.

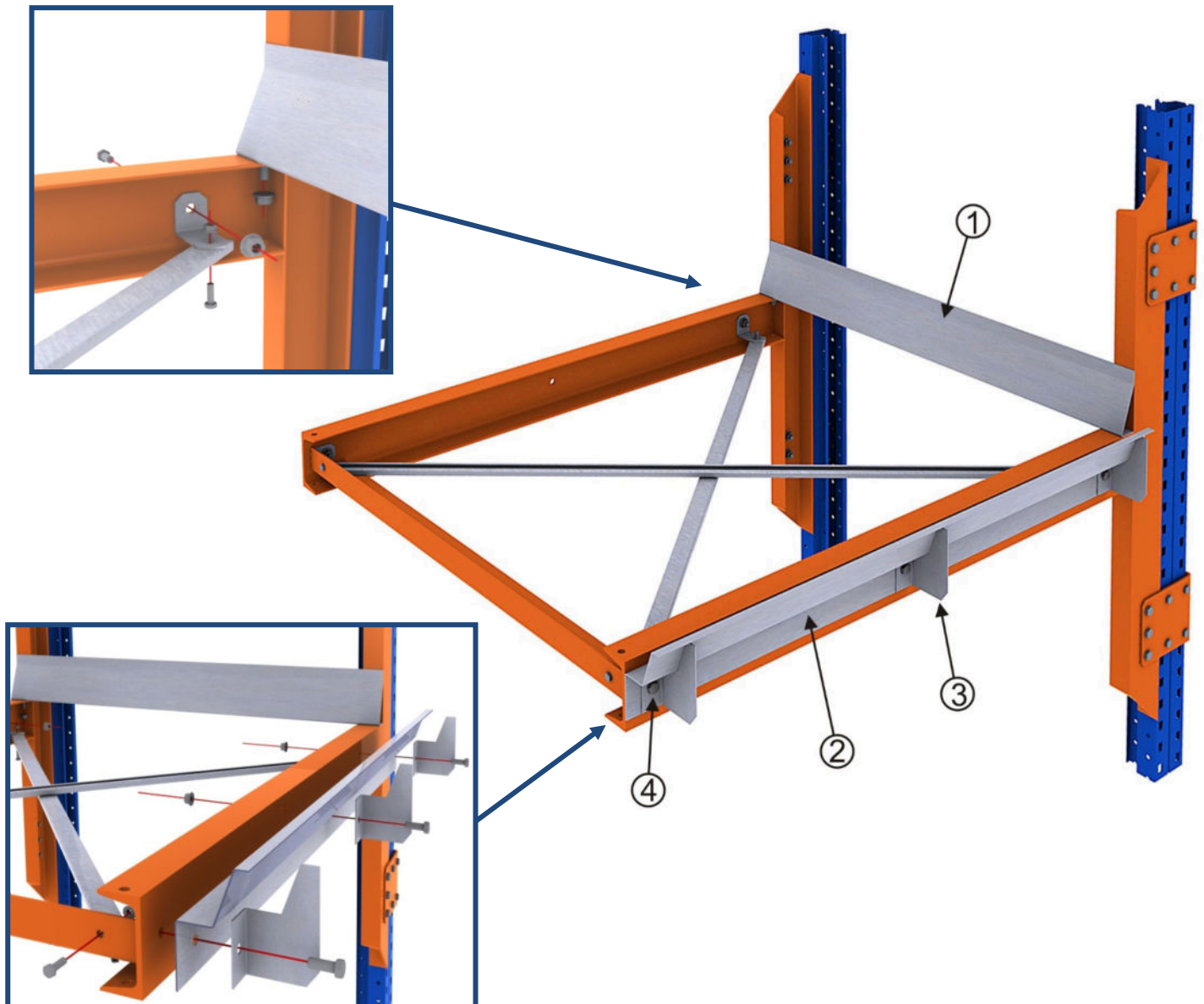


Components per set:

BRACKET SET WITHOUT CENTRING/UPRIGHT FRONT/L/FINISH

Mark	Denomination	Nº Pieces
1	CONJUNTO T ESTACION ESPERA/IZQ/L	1
2	CONJUNTO T ESTACION ESPERA/DCH/L	1
3	BRACKET FIXING PLATE ESP EE	4
4	FIXING SET CT AC 1030	12
5	FIXING SET CT AG 1025	16
6	ANGLE EXT. EE	1
7	FIXING SET CT AB 825	2
8	UNION ANGLE EE	4
9	FIXING SET CT AB 825	4
10	PROFILE CZ 36	2
11	FIXING SET CT AB 825	4

16.9. ASSEMBLY OF TYPE T BACKERS WITH CENTERING.

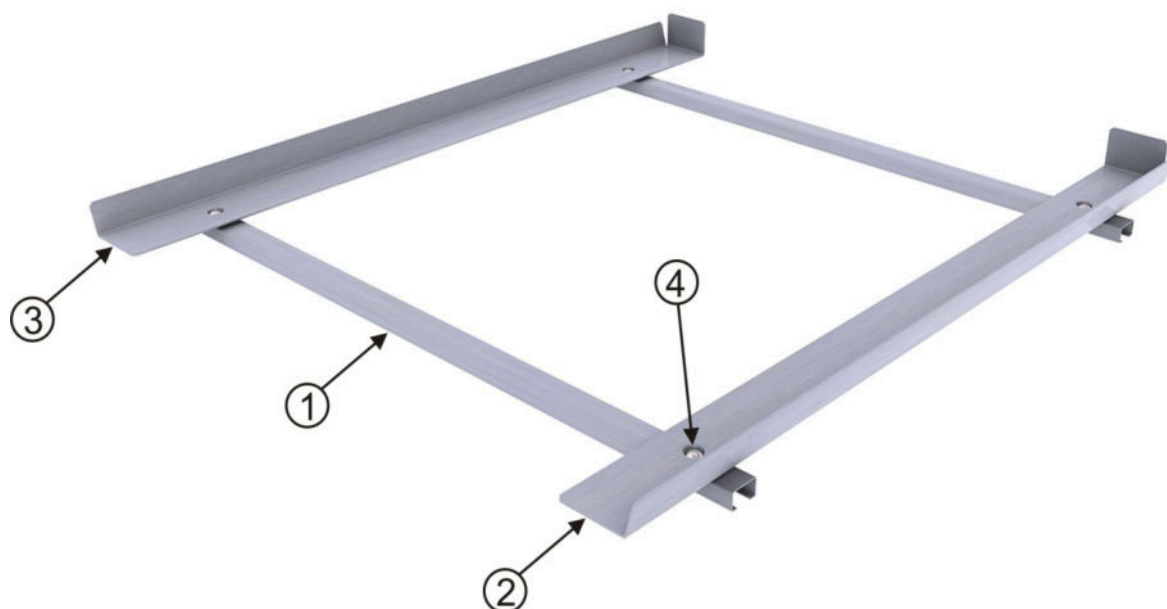


Components per set:

BRACKET CENTRING SET/L/FINISH

Mark	Denomination	Nº of pieces
1	FRONTAL STOP BRACKET	1
2	LATERAL STOP BRACKET	1
3	LATERAL BRACKET STOP SUPPORT	3
4	FIXING SET CT AB 825	3

17. CONTAINER SUPPORT

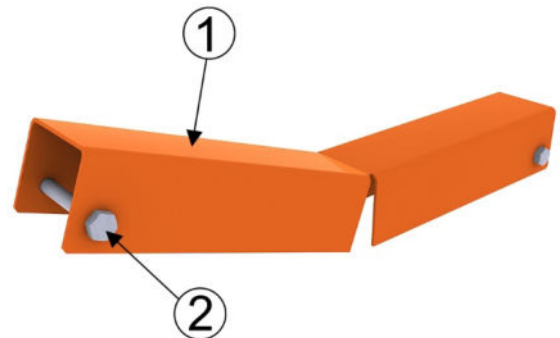


Mark	Denomination	Nº Pieces
1	PROFILE CZ42-SC1/D8,5/71,3/L1	2
2	RIGHT SUPPORT SC1/L2/Y	1
3	LEFT SUPPORT SC1/L2/Y	1
4	FIXING SET CT AF 820	4



18. DRUM SUPPORTS

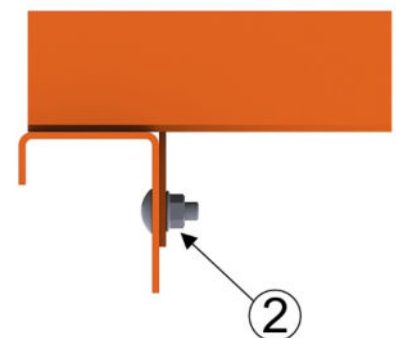
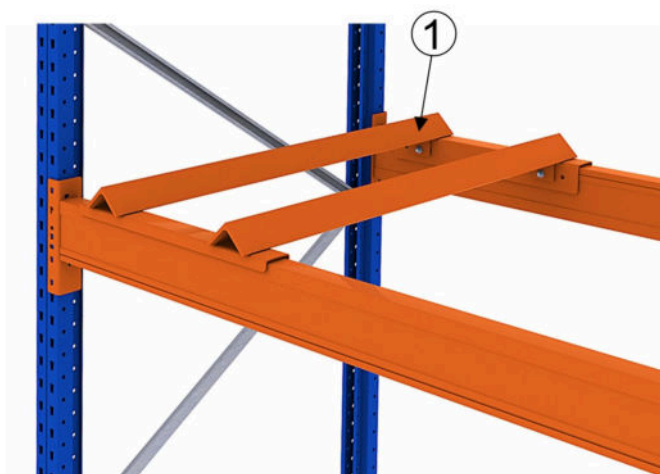
18.1 DRUM CHOCK CB



Drum chock components:

Marca	Denominación	Nº Piezas
1	DRUM CHOCK CB/X/[ex10]/FINISH	2
2	FIXING SET CT AA 870	4

18.2 COIL CRADDLE SB1 70

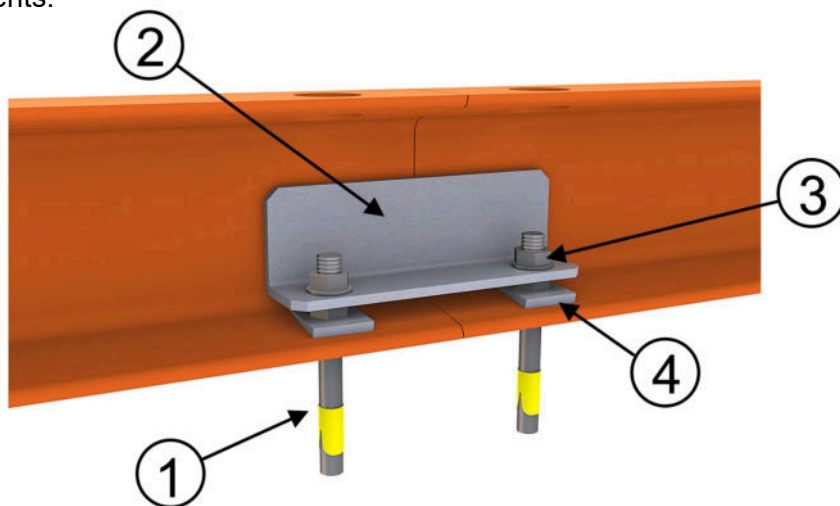


Coil cradle components:

Marca	Denominación	Nº Piezas
1	COIL CRADDLE SB1 70/B/L1/L2/FINISH	1
2	FIXING SET CT AF 820	4

19. TRUCK GUIDE RAILS

The union between the head and the guide rail or between guide rail stretches will be made by the following elements:



MARK	QUANTITY	DENOMINATION	DRAWING	CODE
1	2	Segment anchors M12	-	10080027
2	1	Guide rail unions UPN	PL-029885	
3	2*	Nut DIN 934-8.8 M12/Z	-	10020012
4	2	Washer DIN 434 M12/Z	-	10030093

* The 2 nuts served with the anchor rods are not counted.

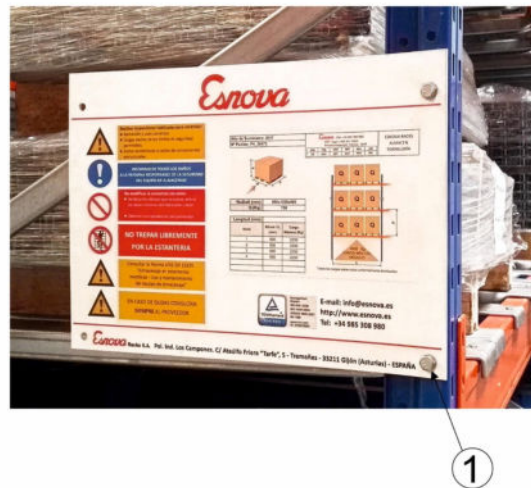
To fix the guide rails to the floor, we need to use the anchors below:



CODE	DESCRIPTION	WEIGHT (Kg)
10080027	Segment anchors M12	0,100

20. LOAD WARNING NOTICE

20.1 LOAD WARNING NOTICE



Mark	Denomination	Num. Pieces	CODE
1	FIXING SET CT AC 825	2	13010006

20.2 RUN SIGNS



Mark	Quantity	Denomination	CODE
1	1	RUN SIGN/1007	-
2	1 or 2	SIGNAL VINYL 420X420	29000566
3	2	FIXING SET. CT AC 825	13010006

21. ASSEMBLY TOLERANCES

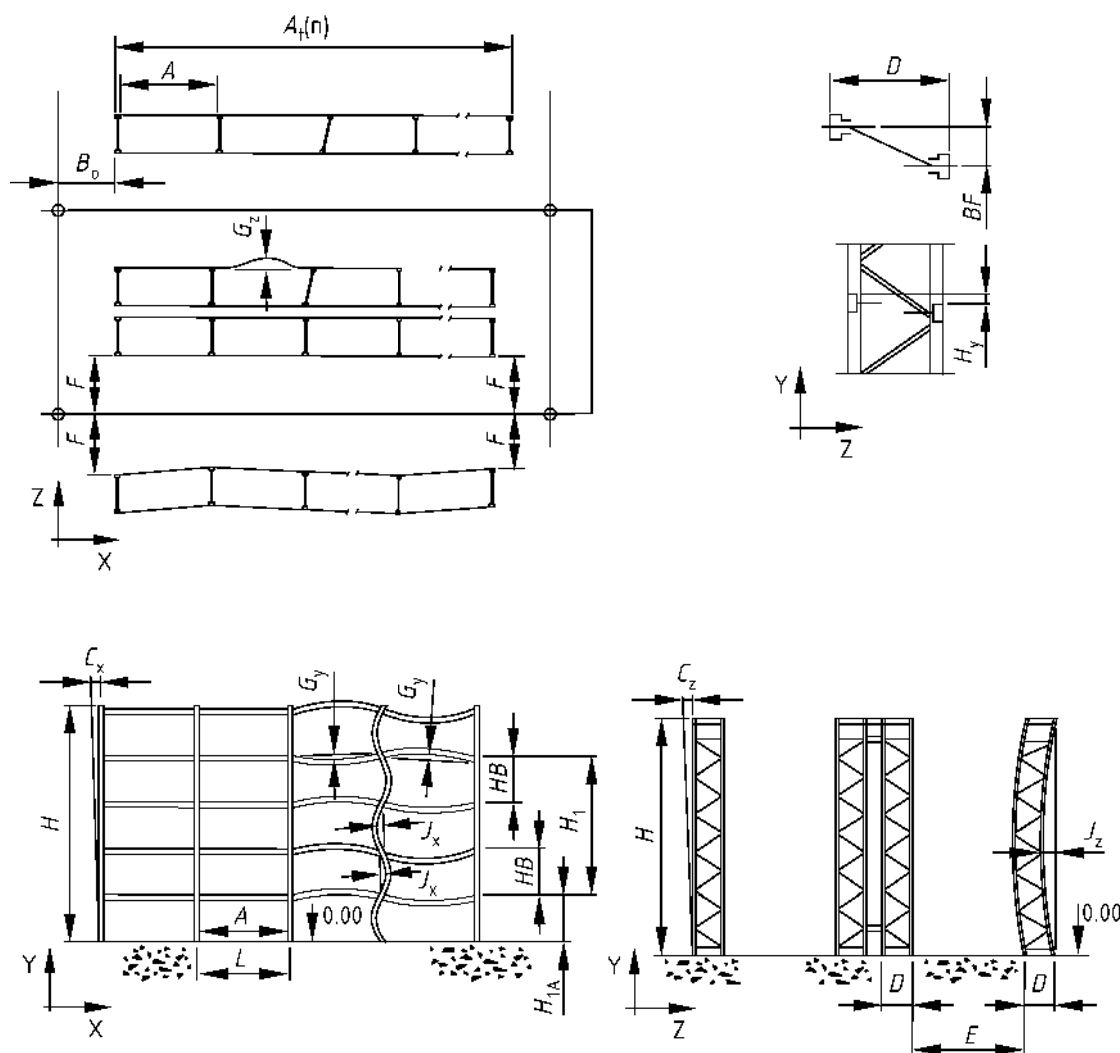
CLASE 400 – Horizontal tolerances.

HORIZONTAL TOLERANCE LIMITS FOR PLANE X Z (mm)	
Symbol of the dimension and description of the tolerance.	Assembly tolerances for shelvings of class 400
δA Difference of the free nominal dimensions measured between two uprights in whichever level of the shelf.	± 3
δAt Difference of the nominal dimensions of the total shelving's length, accumulated by the number of bays 'n', measured near the floor.	$\pm 3n$
δB₀ Difference of dimensions from the frontal part of the shelf with respect to the Z referential line, measured near the floor.	± 10
BF Lack of alignment in the crosswise direction of the opposite uprights of the frames.	± 20
C_x It is the out of plumb of each upright in the X direction.	$\pm H/350$
C_z It is the out of plumb of each frame in the Z direction.	$\pm H/350$
δD Difference of the nominal dimensions at the bottom of the frame (single frame)	± 6
δE Difference of the nominal dimension of the aisle width, measured near the floor.	± 15
δF Difference of the straightness nominal dimensions of the aisle measured near the floor with respect to the X referential line of the system.	± 15
G_z Beam's straightness in the Z direction.	$\pm A/400$
	The greatest tolerance value of the following.
J_x Uprights' straightness in the X direction between beam's levels separated by a distance 'Hb'	$\pm 3 \text{ o } \pm HB/400$
J_z The initial straightness of a frame's upright in the Z direction.	$\pm H/500$
T_w Twisting at the centre of beam's length.	1° per m

CLASE 400 – Vertical tolerances

VERTICAL TOLERANCE LIMITS FOR DIRECTION Y (mm).	
Symbol of the dimension and description of the tolerance.	Assembly tolerances for shelvings of class 400
	The greatest tolerance value of the following.
G_y Beam straightness in direction Y.	$\pm 3 \text{ o } \pm A/500$
δH_{1A} Variation from the upper part of the bottom beam to the upper part of the base plate.	± 10
δH₁ Variation from the upper part of the bottom beam to the upper part of a beam placed in whichever level H1.	$\pm 5 \text{ o } \pm H_1/500$
H_y Difference of level between the upper parts of the frontal and back beams of the same storage cell.	± 10

NOTE: A tolerance and clearance measuring protocol can be made before the shelving is loaded. The tolerances indicated in this European standard can be out of application the moment the shelving has been loaded.



Key

- A Free space between two uprights
- B₀ Distance between the Z reference line of the system and the frontal of the shelf
- BF Lack of alignment in the crosswise direction of the opposite uprights of the frames.
- C_z C_x It is the out of plumb of each frame in the Z and X direction, respectively
- D Frame's depth
- E Aisle's width
- F Distance between the X reference line of the aisle and the frontal part of the upright.
- G_z G_y Beams' straightness in Z and Y directions, respectively.
- H Height between the upper part of the base plate and the upper part of the upright.
- HB Height between the upper part of a beam and the upper part of the top beam.
- H_y Difference in level between the upper parts of the frontal and the back beams of the same storage cell.
- H_{1A} Height between the upper part of the base plate and the upper part of the bottom beam.
- H₁ Height between the upper part of the bottom beam and the upper part of whichever beam.
- J_x Upright's straightness in the X direction between adjacent level beams.
- J_z The initial straightness of an upright in the Z direction.
- L Distance between upright's axes.

CLASS 400 – Horizontal and vertical tolerances

CLASS 300 – Horizontal tolerances

HORIZONTAL TOLERANCE LIMITS FOR PLANE X Z (mm)	
Symbol of the dimension and description of the tolerance.	Assembly tolerances for shelvings of class 300 A and B
δA Difference of the free nominal dimensions measured between two uprights in whichever level of the shelf.	± 3
δA_t Difference of the nominal dimensions of the total shelving's length, accumulated by the number of bays 'n', measured as nearer as possible to the base plate.	$\pm 3n$
	The greatest value of the following.
B Lack of alignment in the uprights throughout the aisle, accumulated by the number of bays 'n', and measured near the ground. For Class 300A, it is only applied to the aisle uprights. For Class 300B, it is applied for aisle uprights and back uprights.	± 10 o For class 300A: $\pm 1,0n$ For class 300B: $\pm 0,5n$
δB₀ Difference of dimensions from the frontal part of the shelf with respect to the Z referential line, measured near the floor.	± 10
C_x It is the out of plumb of each upright in the X direction.	$\pm H/500$
C_z It is the out of plumb of each frame in the Z direction.	For non-fixed stroke forks $\pm H/500$ For fixed stroke forks $\pm H/750^a$
δD Difference of the nominal dimensions at the bottom of the frame (single or double frame)	For single frames ± 3 For double frames ± 6
δE Difference of the nominal dimension of the aisle width, measured near the floor.	± 5
δE₁ Difference of the nominal dimension of the width between forklift guide rails.	$+5 / - 0$
δE₂ Difference of the uprights of one side to the forklift guide rail.	± 5
δF Difference of the straightness nominal dimensions of the aisle measured near the floor with respect to the X referential line of the system or according to the specifications of forklift suppliers.	± 10
F₁ Difference between adjacent uprights measured near the ground in the Z direction.	± 5
G_z Beam's straightness in the Z direction.	$\pm A/400$
	The greatest value of the following.
J_x Uprights' straightness in the X direction between beam's levels separated by a distance 'Hb'	± 3 o $\pm HB/750$
J_z The initial straightness of a frame's upright in the Z direction.	$\pm H/500$
δM Tolerance of the upper guide rail	Defined by the client or by the forklift supplier
T_w Twisting at the centre of beam's length.	1° per m
^a H/500 is also an acceptable value whenever the blocks or pallet rollers overhang of the frontal beam in 75mm or more and if they are duly endorsed on the beam.	

CLASS 300 – Vertical tolerances

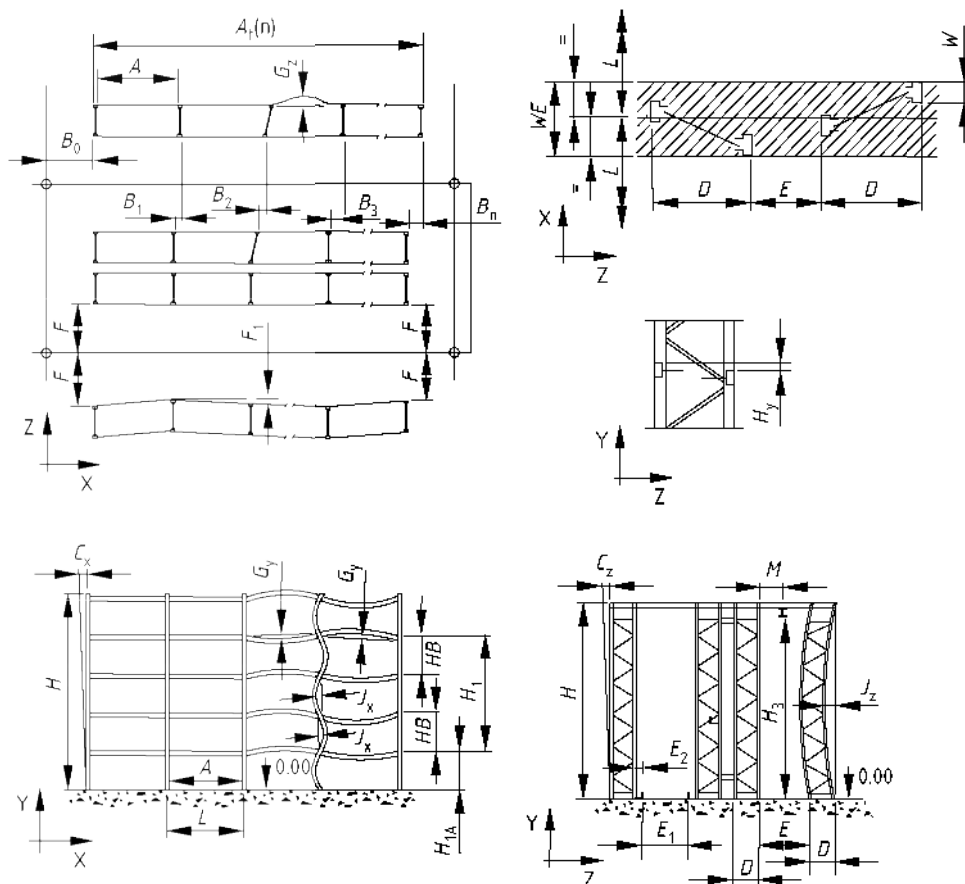
VERTICAL TOLERANCE LIMITS FOR DIRECTION Y (mm).

Symbol of the dimension and description of the tolerance.	Assembly tolerances for shelvings of class 300 A and B
	The greatest value of the following.
G_y Beam straightness in direction Y.	± 3 o $\pm A/500$
δH_1 Variation from the upper part of the bottom beam to the upper part of a beam placed in whichever level H1.	300A: ± 5 o $\pm H_1/500$ 300B: ± 3 o $\pm H_1/1\ 000$
δH_{1A} Variation from the upper part of the bottom beam from ground level in each upright.	± 7
δH_3 Tolerance of the upper guide rail, if specified.	If it is specified, it must be provided by the supplier of the forklift.
H_y Difference of support level of the loading units between the frontal and back beams within the same storage cell.	± 10

NOTE 1 A tolerance and clearance measuring protocol can be made before the shelving is loaded. The tolerances indicated in this European standard can be out of application the moment the shelving has been loaded. Those measuring verifications are made when they are required by individual contracts.

NOTE 2 The individual clearances which are shown in this document are minimum values. The client should determine the global clearances of the system by using clearances and tolerances defined in this document. If greater clearances were needed, those must be specified by the forklift supplier or by the client.

NOTE 3 The client should determine if all tolerance values should be considered in the worst possible scenario or if those values can be deviated from those specified in this document by technical or economic reasons, as long as the functionality of the whole system is guaranteed.



A	Free space between two uprights
B ₀	Distance between the Z reference line of the system and the frontal of the shelf
B ₁ , B ₂	Lack of alignment in the uprights throughout the aisle in bays 1 and 2, respectively.
C _z , C _x	It is the out of plumb of each upright in the Z and X direction, respectively
D	Frame's depth
E	Aisle's width
E ₁	Distance between forklift guide rails.
E ₂	Distance between the forklift guide rail and the front part of the upright.
F	Distance between the X reference line of the aisle and the frontal part of the upright.
F ₁	Difference between adjacent uprights measured near the ground in the Z direction.
G _z , G _y	Beams' straightness in Z and Y directions, respectively
H	Height between the upper part of the base plate and the upper part of the upright.
HB	Height between the upper part of a beam and the upper part of the beam of the following level.
H _y	Difference in level between the upper parts of the frontal and the back beams of the same storage cell.
H _{1A}	Height between the upper part of the base plate and the upper part of the bottom beam.
H ₁	Height between the upper part of the bottom beam and the upper part of whichever beam.
J _x	Upright's straightness in the X direction between adjacent level beams.
J _z	The initial straightness of an upright in the Z direction.
L	Distance between upright's axes.
M	Distance between the frontal part of an upright and the centre of the upper guide rail.

CLASS 300 – Horizontal and vertical tolerances.