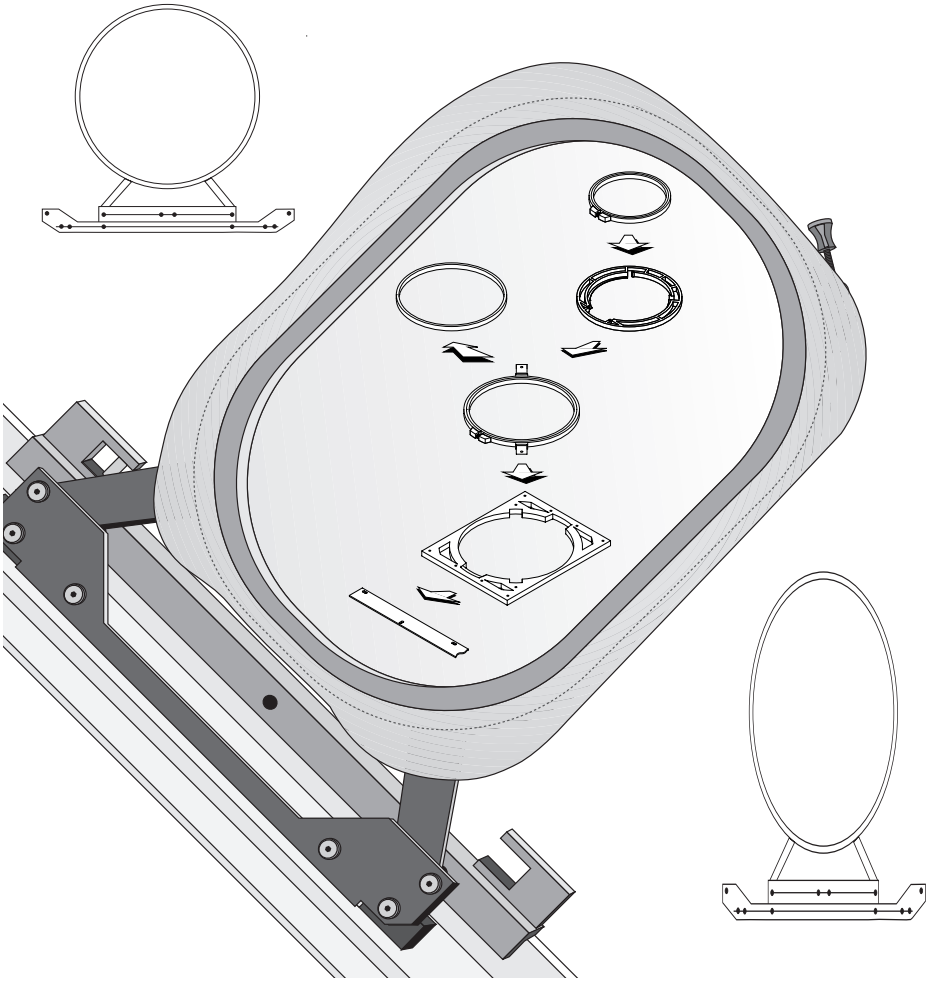
Operating Manual



Frame technology

Version 2.1

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Contents

1. General

Both the Multisticktronic and the automatic tambouring machine permit embroidering of large designs (with a border frame) as well as small and medium-sized design (with single frames). The operator decides which frame system to use according to the envisaged embroidery material.

1.1 Rapid clamping system

When using single frames, the embroidery material is generally clamped in the round or oval frame and placed in a frame rail attached to the pantograph underneath each embroidery head. After embroidering, the round or oval frame with embroidery material can be replaced quickly and easily by a prepared changeover frame. The set-up times associated with changing frames are very short.

The frame mounting system has been further developed to improve on conventional designs that require the changeover frames to be released by knurled screws or fastening elements with levers. The benefits are as follows:

a) Reduced set-up time:

- No knurled screws or spring-mounted fastening elements to be released.

b) Flat design:

- The presser feet can run over the single frames because they do not have any raised parts.
- The frames can be stacked for storage purposes.

c) Some existing round and oval frames can remain in use:

- Round and oval frames with the dimensions c=180 mm and c=380 mm.

d) Conversion from border to single frames:

- Requires relatively little work.

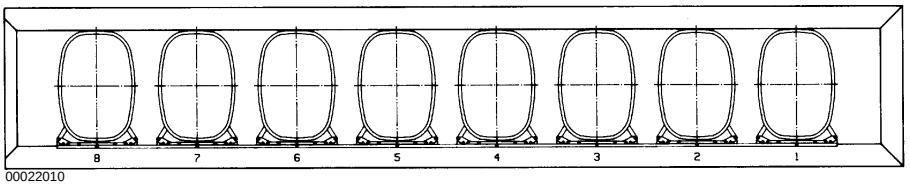
1.2 Application scope for embroidering with single frames

The new system for mounting round or oval frames offers the user a variety of combinations that reduce set-up times to a minimum. The size and intensity of the design are crucial factors.

1.2.1 Equipping pantograph with one round or oval frame per embroidery head

One single frame is assigned to each embroidery position.

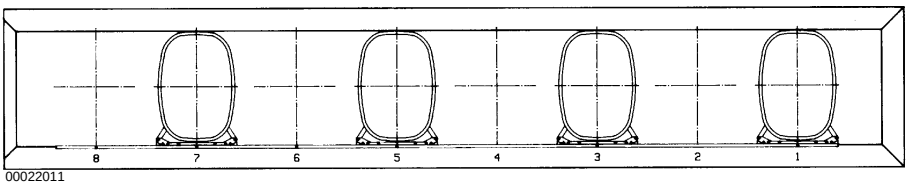
Figure 1:



00022010

If the single frame exceeds the embroidery field available per head, an appropriate single frame can be assigned to every second head. Depending on the lateral travel path of the pantograph, the full width of the frame may not be available for embroidering.

Figure 2:



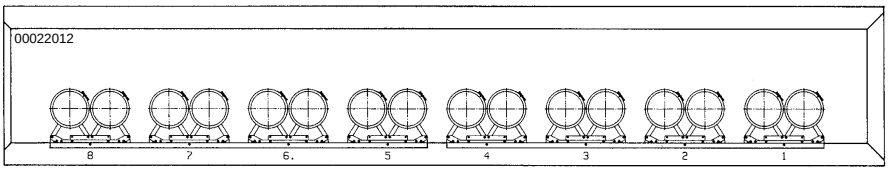
00022011

1.2.2 Equipping pantograph with twin round or oval frames

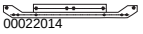
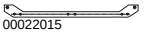
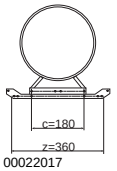
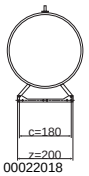
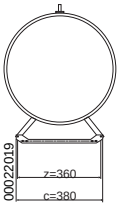
The use of round or oval frames in a twin arrangement can reduce the time required to change frames and thus increase the embroidery machine's productivity.

The full width of the twin frame must not exceed the machine's head spacing. Mounting assemblies with the dimension z=360 mm are required for this type of twin arrangement.

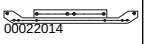
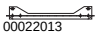
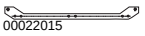
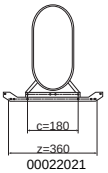
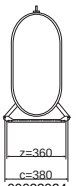
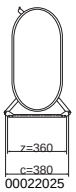
Figure 3:



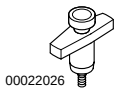
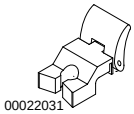
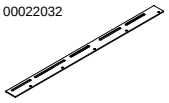
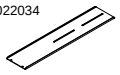
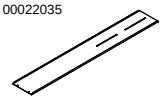
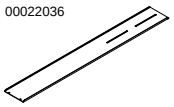
1.3 Round frame overview

OVERVIEW ROUND FRAMES		Z = 200	Z = 360	Z = 200	Z = 360
		Holder 172.010.910  00022013	Holder 172.010.909  00022014	Holder 172.010.910  00022013	Holder 172.010.912  00022015
		Part No. of frame complete with holder			
Frame size	**Part No. of frame** without holder	 00022016	 00022017	 00022018	 00022019
Rd 80	159.852.800	172.010.914	172.010.915		
Rd 100	159.999.814	172.010.916	172.010.917		
Rd 120	159.857.800	172.010.918	172.010.919		
Rd 135	199.111.809	172.010.920	172.010.921		
Rd 150	159.858.800	172.010.922	172.010.923		
Rd 170	159.851.801	172.010.924	172.010.925		
Rd 180	167.032.803	172.010.926	172.010.927		
Rd 200	167.999.824	172.010.928	172.010.929		
Rd 240	172.010.830	172.010.930	172.010.931		
Rd 265	172.010.832	172.010.932	172.010.933		
Rd 300	270.010.800			270.010.900	
Rd 340	270.010.801				270.010.901
Rd 370	270.010.802				270.010.902
Rd 420	270.010.803				270.010.903
Rd 470	270.010.804				270.010.904

1.4 Oval frame overview

OVERVIEW OVAL FRAMES		Z = 200	Z = 360	Z = 200		Z = 360	
		Holder 172.010.910  00022013	Holder 172.010.909  00022014	Holder 172.010.910  00022013		Holder 172.010.912  00022015	
		Part No. of frame complete with holder					
Frame size	**Part No. of frame** without holder	 c=180 z=200 00022020	 c=180 z=360 00022021	 c=180 z=200 00022022	 c=180 z=200 00022023	 z=360 c=380 00022024	 z=360 c=380 00022025
110 x 80	172.010.850	172.010.950	172.010.951				
200 x 120	172.010.852	172.010.952	172.010.953				
230 x 170	172.010.854	172.010.954	172.010.955				
240 x 120	172.010.856	172.010.956	172.010.957				
240 x 180	172.010.858	172.010.958	172.010.959				
260 x 210	172.010.860	172.010.960	172.010.961				
285 x 190	172.010.862	172.010.962	172.010.963				
335 x 215	270.010.810			270.010.910			
345 x 280	270.010.811			270.010.911			
360 x 290	270.010.816			270.010.916			
370 x 166	270.010.814			270.010.914			
420 x 300	270.010.812					270.010.912	
440 x 235	270.010.813			270.010.913			
490 x 275	270.010.817				270.010.917		
490 x 350	270.010.819				270.010.919		
490 x 430	270.010.824						270.010.924
510 x 190	270.010.820				270.010.920		
510 x 275	270.010.821						270.010.921
510 x 350	270.010.822						270.010.922
510 x 430	270.010.823						270.010.923

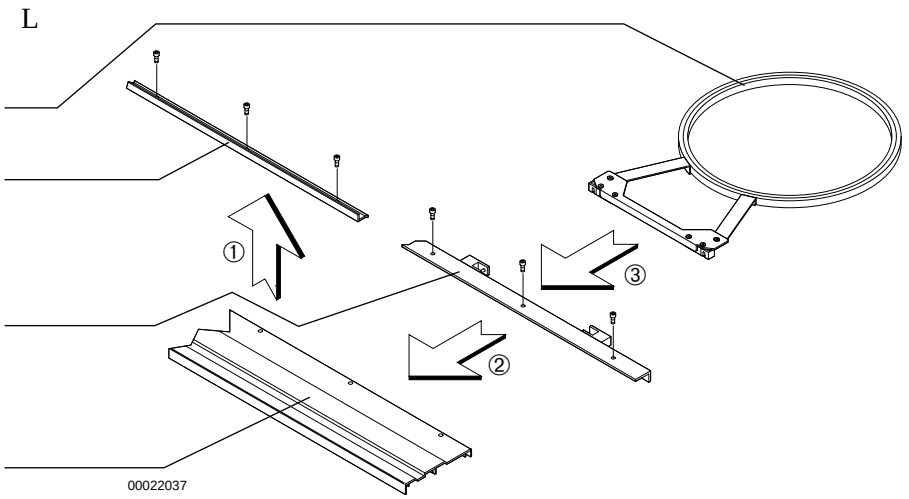
1.5 Overview of fastening elements

FASTENING ELEMENTS		
PART	DESIGNATION	PART NUMBER
 00022026	FRAME CLAMP	159.213.900
 00022027	PAN-HEAD SCREW	172.010.200
 00022028	COIL SPRING	575.586
 00022029	THREAD TENSION DISC	575.133
 00022030	KNURLED SCREW	157.111.202
 00022031	FIXING CLAMP	270.010.930
00022032 	LATERAL FIXING PLATE	172.010.511
00022033 	REAR FIXING PLATE, 500 MM EMBROIDERY FIELD L=210 MM	172.010.513
00022034 	REAR FIXING PLATE, 700 MM EMBROIDERY FIELD L=476 MM	172.010.512
00022035 	REAR EMBROIDERY FIELD, 700/900 MM EMBROIDERY FIELD L=676 MM	172.080.500
00022036 	REAR FIXING PLATE, 1000 MM EMBROIDERY FIELD L=776 MM	220.010.505

2. 2-Point fast-change frame

2.1 Converting to 2-point fast-change frame

Figure 4:



- Unscrew border frame angle rails *(4.2)* and detach from front frame rail *(4.4)* ①.
- For each head, align the appropriate single frame locating rail *(4.3)* (with z=200 mm or z=360 mm) with the center of the embroidery field and attach to the front border frame rail. Make certain that the locating rail lies flat against the front frame profile ②.
- Place the required single frames *(4.1)* in the locating rail ③.

2.2 Application scope of round frame system C=180 / Z=200

Round frame system (C = 180 / Z = 200)													
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Rd 80**	**Rd 100**	**Rd 120**	**Rd 135**	**Rd 150**	**Rd 170**	**Rd 180**	**Rd 200**	**Rd 240**	**Rd 265**
172/4	600	4	174.410.906	X	X	X	X	X	X	X	X	X	X
172/6	480	6	172.610.920	X	X	X	X	X	X	X	X	X	X
172/8-400	400	8	172.210.920	X	X	X	X	X	X	X	X	X	X
172/12	240	12	172.910.920	X	X	X	X	X	X	X	X		
	480	6		X	X	X	X	X	X	X	X	X	X
174/4	900	4	174.410.920	X	X	X	X	X	X	X	X	X	X
174/8	495	8	174.810.920	X	X	X	X	X	X	X	X	X	X
174/10	400	10	174.110.920	X	X	X	X	X	X	X	X	X	X
174/12	330	12	174.910.920	X	X	X	X	X	X	X	X	X	X
B 212/12	400	12	212.010.920	X	X	X	X	X	X	X	X	X	X
B 215/15	330	15	215.010.920	X	X	X	X	X	X	X	X	X	X
B 218/18	275	18	218.010.920	X	X	X	X	X	X	X	X	X	
	550	9		X	X	X	X	X	X	X	X	X	X
B 220/20	240	20	220.010.920	X	X	X	X	X	X	X	X		
	480	10	220.010.921	X	X	X	X	X	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.920	X	X	X	X	X	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.920	X	X	X	X	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.921	X	X	X	X	X	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.920	X	X	X	X	X	X	X	X	X	X
276/15 (L 15 ..)	330	15	215.010.920	X	X	X	X	X	X	X	X	X	X
278/12 (X 12 ..)	495	12	278.210.900	X	X	X	X	X	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.900	X	X	X	X	X	X	X	X	X	X
278/18 (X 18 ..)	330	18	278.410.900	X	X	X	X	X	X	X	X	X	X
278/22 (X 22 ..)	275	22	278.610.900	X	X	X	X	X	X	X	X	X	
	550	11		X	X	X	X	X	X	X	X	X	X
278/25 (X 25 ..)	240	25	278.710.900	X	X	X	X	X	X	X	X		
	480	12		X	X	X	X	X	X	X	X	X	X
279/18 (XL 18 ..)	350	18	278.410.900	X	X	X	X	X	X	X	X	X	X
362/2 (J 02 ..)	495	2	202.010.901	X	X	X	X	X	X	X	X	X	X
363/4 (J 04 ..)	400	4	263.410.900	X	X	X	X	X	X	X	X	X	X
366/6 (J 06 ..)	400	6	366.610.903	X	X	X	X	X	X	X	X	X	X
376/10 (T 10 ..)	495	10	376.110.900	X	X	X	X	X	X	X	X	X	X
376/12 (T 12 ..)	400	12	212.010.920	X	X	X	X	X	X	X	X	X	X
CS 601/- 606	550	6	172.610.906	X	X	X	X	X	X	X	X	X	X

2.3 Application scope of round frame system C=180 / Z=360

Round frame system (C = 180 / Z = 360)												
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Rd 80**	**Rd 100**	**Rd 120**	**Rd 135**	**Rd 150**	**Rd 170**	**Rd 180**	**Rd 200**	**Rd 240**	**Rd 265**
172/4	600	4	174.410.905	X	X	X	X	X	X	X	X	X	X
172/6	480	6	172.610.921	X	X	X	X	X	X	X	X	X	X
172/8-400	400	8	172.210.921	X	X	X	X	X	X	X	X	X	X
172/12	480	6	172.910.921	X	X	X	X	X	X	X	X	X	X
174/4	900	4	174.410.905	X	X	X	X	X	X	X	X	X	X
174/8	495	8	174.810.921	X	X	X	X	X	X	X	X	X	X
174/10	400	10	174.110.921	X	X	X	X	X	X	X	X	X	X
	800	5	174.110.922	X	X	X	X	X	X	X	X	X	X
174/12	660	6	174.910.921	X	X	X	X	X	X	X	X	X	X
B 212/12	400	12	212.010.921	X	X	X	X	X	X	X	X	X	X
B 220/20	480	10	220.010.922	X	X	X	X	X	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.921	X	X	X	X	X	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.921	X	X	X	X	X	X	X	X	X	X
	800	5	174.110.922	X	X	X	X	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.922	X	X	X	X	X	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.921	X	X	X	X	X	X	X	X	X	X
278/12 (X 12 ..)	495	12	278.210.901	X	X	X	X	X	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.901	X	X	X	X	X	X	X	X	X	X
278/25 (X 25 ..)	480	12	278.710.901	X	X	X	X	X	X	X	X	X	X
362/2 (J o2 ..)	495	2	202.010.902	X	X	X	X	X	X	X	X	X	X
364/4 (J 04 ..)	400	4	263.410.901	X	X	X	X	X	X	X	X	X	X
366/6 (J 06 ..)	400	6	366.610.904	X	X	X	X	X	X	X	X	X	X
376/10 (T 10 ..)	495	10	376.110.901	X	X	X	X	X	X	X	X	X	X
376/12 (T 12 ..)	400	12	212.010.921	X	X	X	X	X	X	X	X	X	X
CS 601/- 606	550	6	172.610.905	X	X	X	X	X	X	X	X	X	X

2.4 Application scope of oval frame system C=180 / Z=200

Oval frame system (C = 180 / Z = 200)										
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**110 x 80**	**200 x 120**	**230 x 170**	**240 x 120**	**240 x 180**	**260 x 210**	**285 x 190**
172/4	600	4	174.410.906	X	X	X	X	X	X	X
172/6	480	6	172.610.920	X	X	X	X	X	X	X
172/8-400	400	8	172.210.920	X	X	X	X	X	X	X
172/12	240	12	172.910.920	X	X	X	X	X	X	X
	480	6		X	X	X	X	X	X	X
174/4	900	4	174.410.906	X	X	X	X	X	X	X
174/8	495	8	174.810.920	X	X	X	X	X	X	X
174/10	400	10	174.110.920	X	X	X	X	X	X	X
174/12	330	12	174.910.920	X	X	X	X	X	X	X
B 212/12	400	12	212.010.920	X	X	X	X	X	X	X
B 215/15	330	15	215.010.920	X	X	X	X	X	X	X
B 218/18	275	18	218.010.920	X	X	X	X	X	X	X
	550	9		X	X	X	X	X	X	X
B 220/20	240	20	220.010.920	X	X	X	X	X	X	X
	480	10	220.010.921	X	X	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.920	X	X	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.920	X	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.921	X	X	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.920	X	X	X	X	X	X	X
276/15 (L 15 ..)	330	15	215.010.920	X	X	X	X	X	X	X
278/12 (X 12 ..)	495	12	278.210.900	X	X	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.900	X	X	X	X	X	X	X
278/18 (X 18 ..)	330	18	278.410.900	X	X	X	X	X	X	X
278/22 (X 22 ..)	275	22	278.610.900	X	X	X	X	X	X	X
	550	11		X	X	X	X	X	X	X
278/25 (X 25 ..)	240	25	278.710.900	X	X	X	X	X	X	X
	480	12		X	X	X	X	X	X	X
279/18 (XL 18 ..)	350	18	278.410.900	X	X	X	X	X	X	X
362/2 (J 02 ..)	495	2	202.010.901	X	X	X	X	X	X	X
363/4 (J 04 ..)	400	4	263.410.900	X	X	X	X	X	X	X
366/6 (J 06 ..)	400	6	366.610.903	X	X	X	X	X	X	X
376/10 (T 10 ..)	495	10	376.110.900	X	X	X	X	X	X	X
376/12 (T 12 ..)	400	12	212.010.920	X	X	X	X	X	X	X
CS 601/- 606	550	6	172.610.906	X	X	X	X	X	X	X

2.5 Application scope of oval frame system C=180 / Z=360

Oval frame system (C = 180 / Z = 360)										
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**110 x 80**	**200 x 120**	**230 x 170**	**240 x 120**	**240 x 180**	**260 x 210**	**285 x 190**
172/4	600	4	174.410.905	X	X	X	X	X	X	X
172/6	480	6	172.610.921	X	X	X	X	X	X	X
172/8-400	400	8	172.210.921	X	X	X	X	X	X	X
172/12	480	6	172.910.921	X	X	X	X	X	X	X
174/4	900	4	174.410.905	X	X	X	X	X	X	X
174/8	495	8	174.810.921	X	X	X	X	X	X	X
174/10	400	10	174.110.921	X	X	X	X	X	X	X
	800	5	174.110.922	X	X	X	X	X	X	X
174/12	660	6	174.910.921	X	X	X	X	X	X	X
B 212/12	400	12	212.010.921	X	X	X	X	X	X	X
B 220/20	480	10	220.010.922	X	X	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.921	X	X	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.921	X	X	X	X	X	X	X
	800	5	174.110.922	X	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.922	X	X	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.921	X	X	X	X	X	X	X
278/12 (X 12 ..)	495	12	278.210.901	X	X	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.901	X	X	X	X	X	X	X
278/25 (X 25 ..)	480	12	278.710.901	X	X	X	X	X	X	X
362/2 (J o2 ..)	495	2	202.010.902	X	X	X	X	X	X	X
364/4 (J 04 ..)	400	4	263.410.901	X	X	X	X	X	X	X
366/6 (J 06 ..)	400	6	366.610.904	X	X	X	X	X	X	X
376/10 (T 10 ..)	495	10	376.110.901	X	X	X	X	X	X	X
376/12 (T 12 ..)	400	12	212.010.921	X	X	X	X	X	X	X
CS 601/- 606	550	6	172.610.905	X	X	X	X	X	X	X

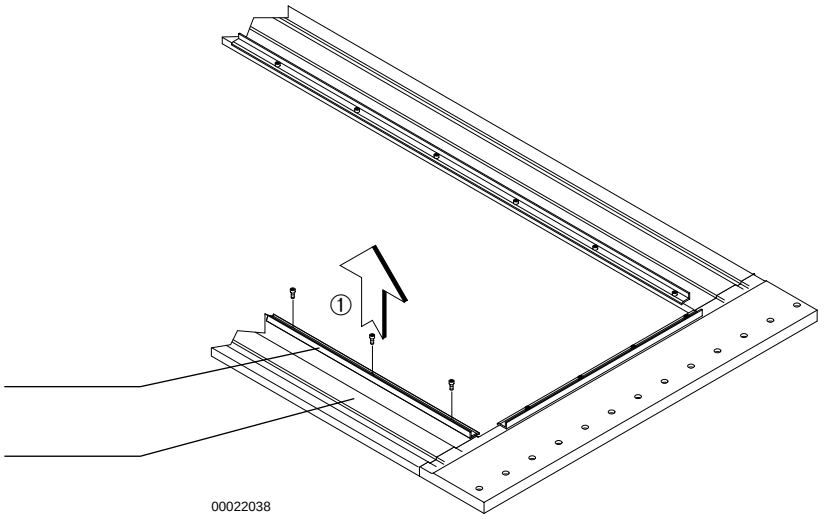
3. 3-Point quick-change frame without adjustable rail

3.1 Converting to 3-point quick-change frame without adjustable rail

NOTE

The 3-point frame without adjustable rail can be used only with an embroidery field depth of 500 mm.

Figure 5:

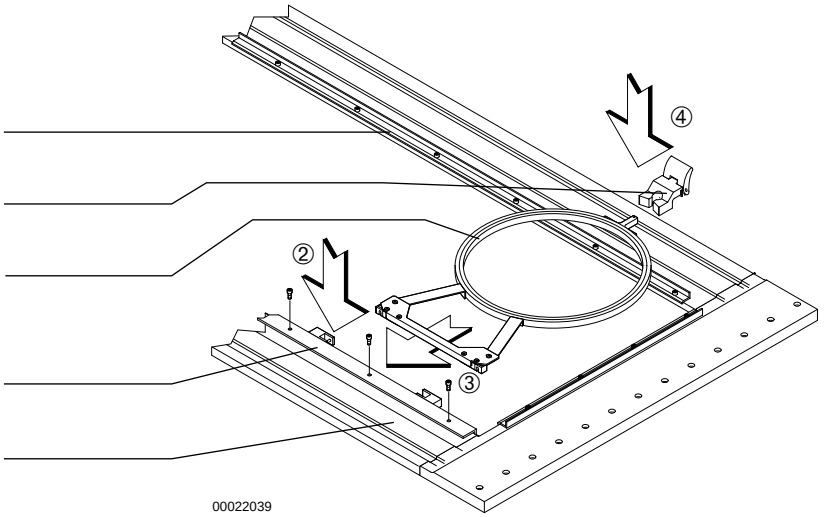


5.1

5.2

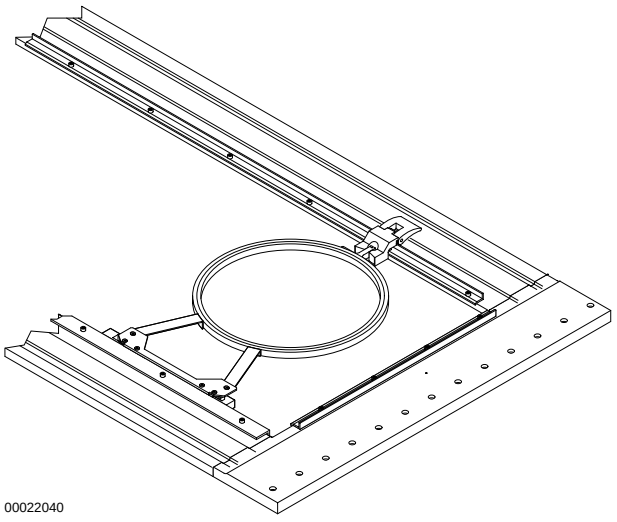
- Unscrew border frame angle rails *(5.1)* and detach from pantograph front frame rail *(5.2)* ①.

Figure 6:



- For each head, align the appropriate single frame mounting assembly *(6.4)* (with z=200 mm or z=360 mm) with the center of the embroidery field and attach to the front pantograph frame rail *(6.5)*. Make certain that the mounting assembly lies flat against the front frame profile ②.
- Place the required single frames *(6.3)* in the mounting assembly ③.
- Attach the third mounting point of the single frame to rear border frame angle rail *(6.1)* with fixing clamp *(6.2)* ④.

Figure 7:



3.2 Application scope of system C=180 / Z=200

3-point quick-change frame system (c = 180 / Z = 200) without adjustable rail								
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**440 x 235**	**490 x 275**	**490 x 350**	**490 x 430**	**510 x 190**
172/4	600	4	174.410.906	X	X	X	X	X
172/6	480	6	172.610.920	X	X	X	X	X
172/8-400	400	8	172.210.920	X	X	X		X
172/12	240	12	172.910.920					X
	480	6		X	X	X	X	X
174/4	900	4	174.410.906	X	X	X	X	X
174/8	495	8	174.810.920	X	X	X	X	X
174/10	400	10	174.110.920	X	X	X		X
174/12	330	12	174.910.920	X	X			X
B 212/12	400	12	212.010.920	X	X	X		X
B 215/15	330	15	215.010.920	X	X			X
B 218/18	275	18	218.010.920	X				X
	550	9		X	X	X	X	X
B 220/20	240	20	220.010.920					X
	480	10	220.010.921	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.920	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.920	X	X	X		X
276/10 (L 10 ..)	480	10	220.010.921	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.920	X	X	X		X
276/15 (L 15 ..)	330	15	215.010.920	X	X			X
278/12 (X 12 ..)	495	12	278.210.900	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.900	X	X	X		X
278/18 (X 18 ..)	330	18	278.410.900	X	X			X
278/22 (X 22 ..)	275	22	278.610.900	X				X
	550	11		X	X	X	X	X
278/25 (X 25 ..)	240	25	278.710.900					X
	480	12		X	X	X	X	X
279/18 (XL 18 ..)	350	18	278.410.900	X	X			X
362/2 (J 02..)	495	2	202.010.901	X	X	X	X	X
363/4 (J 04 ..)	400	4	263.410.900	X	X	X		X
366/6 (J 06 ..)	400	6	366.610.903	X	X	X		X
376/10 (T 10 ..)	495	10	376.110.900	X	X	X	X	X

3-point quick-change frame system (c = 180 / Z = 200) without adjustable rail								
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**440 x 235**	**490 x 275**	**490 x 350**	**490 x 430**	**510 x 190**
376/12 (T 12 ..)	400	12	212.010.920	X	X	X		X
CS 601/- 606	550	6	172.610.906	X	X	X	X	X

3.3 Application scope of system C=380 / Z=360

3-point quick-change frame system (c = 380 / Z = 360) without adjustable rail									
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Rd 420**	**Rd 470**	**420 x 300**	**510 x 275**	**510 x 350**	**510 x 430**
172/4	600	4	174.410.905	X	X	X	X	X	X
172/6	480	6	172.610.921	X		X	X	X	X
172/8-400	400	8	172.210.921			X	X	X	
172/12	480	6	172.910.921	X		X	X	X	X
174/4	900	4	174.410.905	X	X	X	X	X	X
174/8	495	8	174.810.921	X		X	X	X	X
174/10	400	10	174.110.921			X	X	X	
	800	5	174.110.922	X	X	X	X	X	X
174/12	660	6	174.910.921	X	X	X	X	X	X
B 212/12	400	12	212.010.921			X	X	X	
B 220/20	480	10	220.010.922	X		X	X	X	X
274/8 (M 08 ..)	495	8	174.810.921	X		X	X	X	X
274/10 (M 10 ..)	400	10	174.110.921			X	X	X	
	800	5	174.110.922	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.922	X		X	X	X	X
276/12 (L 12 ..)	400	12	212.010.921			X	X	X	
278/12 (X 12 ..)	495	12	278.210.901	X		X	X	X	X
278/15 (X 15 ..)	400	15	278.310.901			X	X	X	
278/25 (X 25 ..)	480	12	278.710.901	X		X	X	X	X
362/2 (J o2 ..)	495	2	202.010.902	X		X	X	X	X
364/4 (J 04 ..)	400	4	263.410.901			X	X	X	
366/6 (J 06 ..)	400	6	366.610.904			X	X	X	
376/10 (T 10 ..)	495	10	376.110.901	X		X	X	X	X
376/12 (T 12 ..)	400	12	212.010.921			X	X	X	
CS 601/- 606	550	6	172.610.905	X	X	X	X	X	X

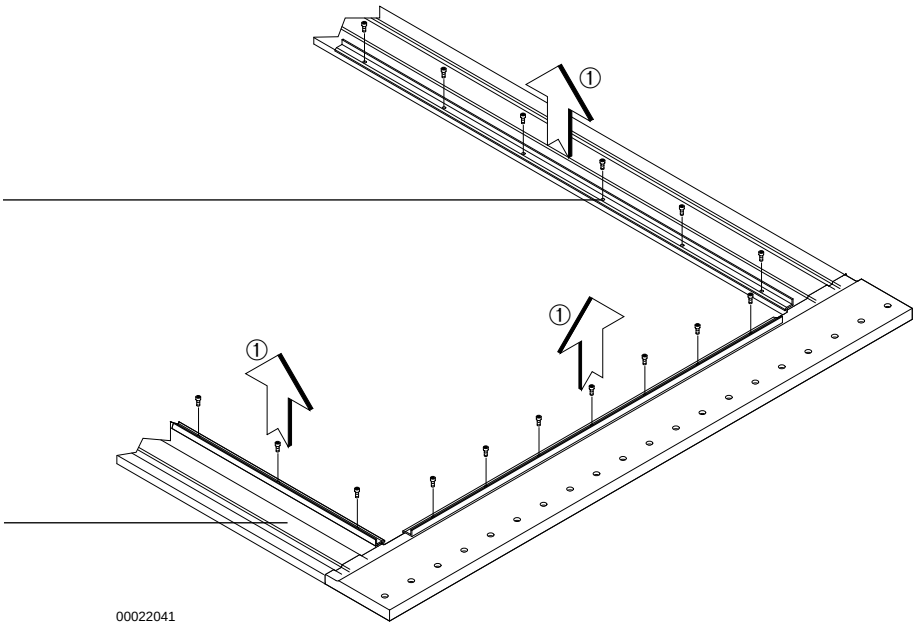
4. 3-Point quick-change frame with adjustable rail

4.1 Converting to 3-point quick-change frame with adjustable rail

NOTE

Appropriate 3-point frames with adjustable rail can be used with all embroidery field depths.

Figure 8:

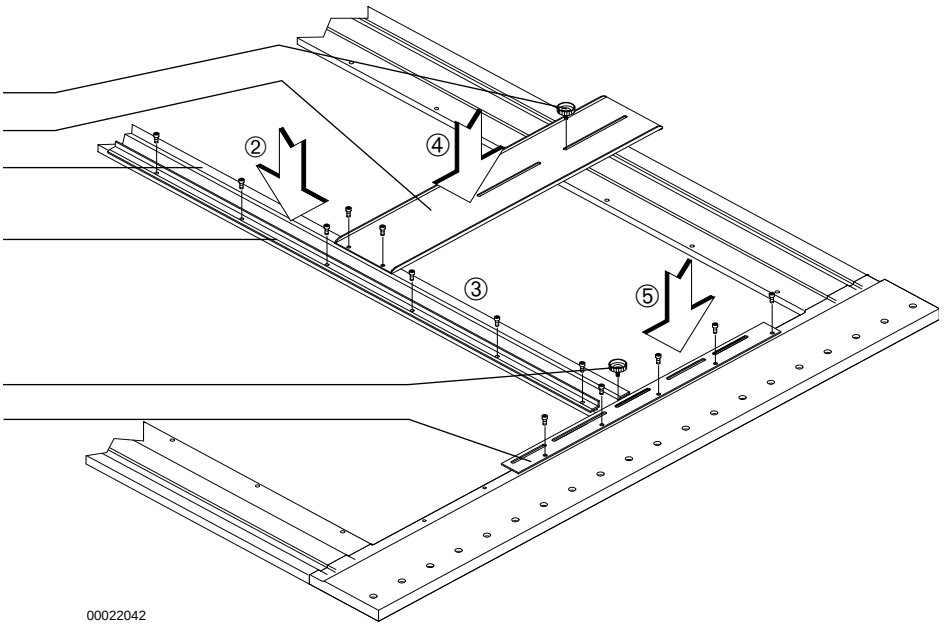


8.1

8.2

- Unscrew all border frame angle rails *()* and detach from pantograph frame rails *(8.2)* ①.

Figure 9:



9.1
9.2
9.3
9.4
9.5
9.6

- Install border frame rear angle rail *(9.4)* on adjustable rail *(9.3)* ②.

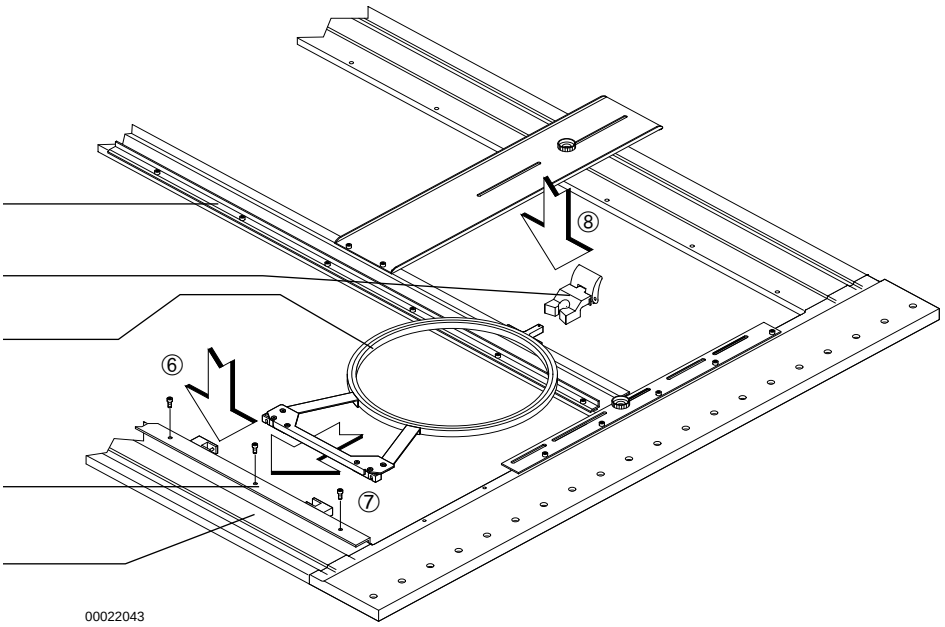
NOTE

The angle rail does not have to be installed if one is already mounted on the adjustable rail.

- Place the adjustable rail in the pantograph frame with the angle rail facing the front and position the adjustable rail according to the size of the frame ③.

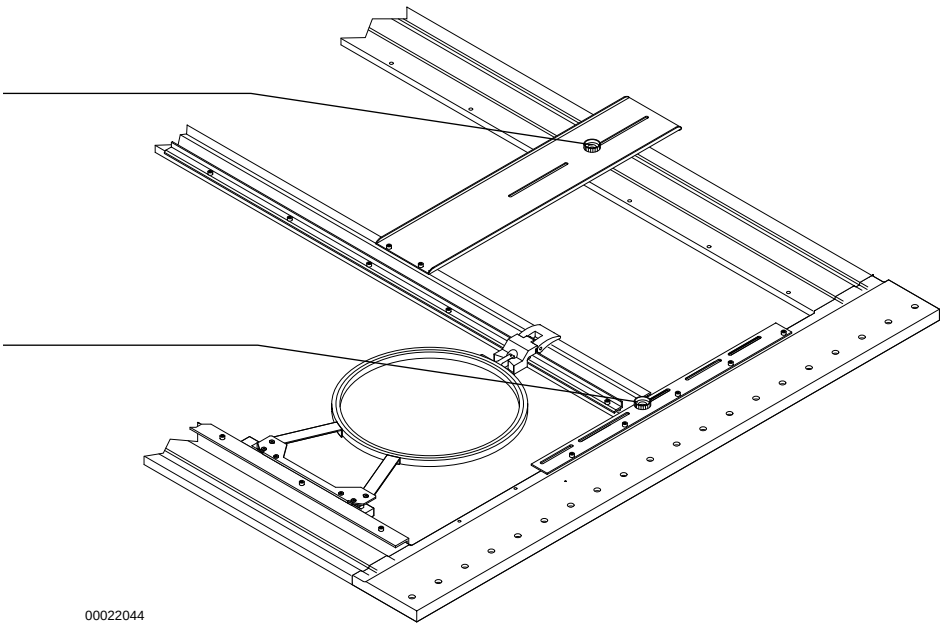
- Install rear *(9.2)* and lateral fixing plates *(9.6)* but only lightly tighten knurled screws *()*, *(9.5)* ④, ⑤.

Figure 10:



- For each head, align the appropriate single frame mounting assembly *(10.4)* (with z=200 mm or z=360 mm) with the center of the embroidery field and attach to the front pantograph frame rail *(10.5)*. Make certain that the mounting assembly lies flat against the front frame profile ⑥.
- Place the required single frames *(10.3)* in the mounting assembly ⑦.
- Attach the third mounting point of the single frame to angle rail *(10.1)* with fixing clamp *(10.2)* ⑧.

Figure 11:



- Fully tighten knurled screws *(11.1)*, *(11.2)*.

4.2 Application scope of system C=180 / Z=200 embroidery field depth 500 mm

3-point quick-change frame system (c = 180 / Z = 200) with adjustable rail Embroidery field depth 500 mm									
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Adjustable rail 500 mm embroidery field depth**	**Rd 300**	**335 x 215**	**345 x 280**	**370 x 166**	**360 x 290**
172/4	600	4	174.410.906	172.410.901	X	X	X	X	X
172/6	480	6	172.610.920	172.010.900	X	X	X	X	X
172/8-400	400	8	172.210.920	172.210.900	X	X	X	X	X
172/12	240	12	172.910.920	172.010.900				X	
	480	6			X	X	X	X	X
174/8	495	8	174.810.920	174.010.900	X	X	X	X	X
174/10	400	10	174.110.920	174.110.901	X	X	X	X	X
174/12	330	12	174.910.920	174.010.900	X	X	X	X	X
B 212/12	400	12	212.010.920	212.010.900	X	X	X	X	X
B 215/15	330	15	215.010.920	215.010.900	X	X	X	X	X
B 218/18	275	18	218.010.920	218.010.900		X		X	
	550	9			X	X	X	X	X
B 220/20	240	20	220.010.920	220.010.900				X	
	480	10	220.010.921		X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.920	174.010.900	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.920	174.110.901	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.921	210.010.900	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.920	212.010.900	X	X	X	X	X
276/15 (L 15 ..)	330	15	215.010.920	215.010.900	X	X	X	X	X
278/12 (X 12 ..)	495	12	278.210.900	278.210.904	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.900	278.310.904	X	X	X	X	X
278/18 (X 18 ..)	330	18	278.410.900	278.410.904	X	X	X	X	X
278/22 (X 22 ..)	275	22	278.610.900	278.610.904		X		X	
	550	11			X	X	X	X	X
278/25 (X 25 ..)	240	25	278.710.900	278.710.910				X	
	480	12			X	X	X	X	X
279/18 (XL 18 ..)	350	18	278.410.900	279.410.900	X	X	X	X	X
362/2 (J 02..)	495	2	202.010.901	362.210.900	X	X	X	X	X
364/4 (J 04 ..)	400	4	263.410.900	364.410.900	X	X	X	X	X
366/6 (J 06 ..)	400	6	366.610.903	366.610.900	X	X	X	X	X
376/10 (T 10 ..)	495	10	376.110.900	376.010.902	X	X	X	X	X
376/12 (T 12 ..)	400	12	212.010.920	376.010.902	X	X	X	X	X
CS 601/- 606	550	6	172.610.906	300.010.900	X	X	X	X	X

4.3 Application scope of system C=380 / Z=360 embroidery field depth 500 mm

3-point quick-change frame system (c=380 / Z=360) with adjustable rail Embroidery field depth 500 mm						
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Adjustable rail 500 mm embroidery field depth**	**Rd 340**	**Rd 370**
172/4	600	4	174.410.905	172.410.901	X	X
172/6	480	6	172.610.921	172.010.900	X	X
172/8-400	400	8	172.210.921	172.210.900	X	X
172/12	480	6	172.910.921	172.010.900	X	X
174/8	495	8	174.810.921	174.010.900	X	X
174/10	400	10	174.110.921	174.110.901	X	X
	800	5	174.110.922		X	X
174/12	660	6	174.910.921	174.010.900	X	X
B 212/12	400	12	212.010.921	212.010.900	X	X
B 220/20	480	10	220.010.922	220.010.900	X	X
274/8 (M 08 ..)	495	8	174.810.921	174.010.900	X	X
274/10 (M 10 ..)	400	10	174.110.921	174.110.901	X	X
	800	5	174.110.922		X	X
276/10 (L 10 ..)	480	10	220.010.922	220.010.900	X	X
276/12 (L 12 ..)	400	12	212.010.921	212.010.900	X	X
278/12 (X 12 ..)	495	12	278.210.901	278.210.904	X	X
278/15 (X 15 ..)	400	15	278.310.901	278.310.904	X	X
278/25 (X 25 ..)	480	12	278.710.901	278.710.910	X	X
362/2 (J o2 ..)	495	2	202.010.902	362.210.900	X	X
364/4 (J 04 ..)	400	4	263.410.901	364.410.900	X	X
366/6 (J 06 ..)	400	6	366.610.904	366.610.900	X	X
376/10 (T 10 ..)	495	10	376.110.901	376.010.902	X	X
376/12 (T 12 ..)	400	12	212.010.921	376.010.902	X	X
CS 601/- 606	550	6	172.610.905	300.010.900	X	X

4.4 Application scope of system C=180 / Z=200 embroidery field depth 700, 900, 1000 mm

3-point quick-change frame system (c = 180 / Z = 200) with adjustable rail Embroidery field depth 700, 900, 1000 mm																
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Adjustable rail 700 mm embroidery field depth**	**Adjustable rail 900 mm embroidery field depth**	**Adjustable rail 1000 mm embroidery field depth**	**Rd 300**	**335 x 215**	**345 x 280**	**440 x 235**	**370 x 166**	**360 x 290**	**490 x 275**	**490 x 350**	**490 x 430**	**510 x 190**
172/4	600	4	174.410.906	172.480.900			X	X	X	X	X	X	X	X	X	X
172/8-400	400	8	172.210.920	172.280.900			X	X	X	X	X	X	X	X		X
174/4	900	4	174.410.906	174.480.900			X	X	X	X	X	X	X	X	X	X
174/8	495	8	174.810.920	174.080.900			X	X	X	X	X	X	X	X	X	X
174/10	400	10	174.110.920	174.180.901			X	X	X	X	X	X	X	X		X
174/12	330	12	174.910.920	174.080.900			X	X	X	X	X	X	X			X
B 212/12	400	12	212.010.920	212.080.900			X	X	X	X	X	X	X	X		X
B 215/15	330	15	215.010.920	215.080.900			X	X	X	X	X	X	X			X
B 218/18	275	18	218.010.920	218.080.900				X		X	X					X
	550	9					X	X	X	X	X	X	X	X	X	X
B 220/20	240	20	220.010.920	220.080.900							X					X
	480	10	220.010.921				X	X	X	X	X	X	X	X	X	X
274/8 (M 08 ..)	495	8	174.810.920	174.080.900			X	X	X	X	X	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.920	174.180.901			X	X	X	X	X	X	X	X		X
276/10 (L 10 ..)	480	10	220.010.921	220.080.900			X	X	X	X	X	X	X	X	X	X
276/12 (L 12 ..)	400	12	212.010.920	212.080.900			X	X	X	X	X	X	X	X		X
278/12 (X 12 ..)	495	12	278.210.900	278.280.900		278.210.910	X	X	X	X	X	X	X	X	X	X
278/15 (X 15 ..)	400	15	278.310.900	278.380.900		278.310.910	X	X	X	X	X	X	X	X		X
278/18 (X 18 ..)	330	18	278.410.900	278.480.900			X	X	X	X	X	X	X			X
278/22 (X 22 ..)	275	22	278.610.900	278.680.900		278.610.910		X		X	X					X
	550	11					X	X	X	X	X	X	X	X	X	X
278/25 (X 25 ..)	240	25	278.710.900	278.780.900		278.710.911					X					X
	480	12					X	X	X	X	X	X	X	X	X	X
CS 601/- 606	550	6	172.610.905	300.080.900		301.010.910	X	X	X	X	X	X	X	X	X	X

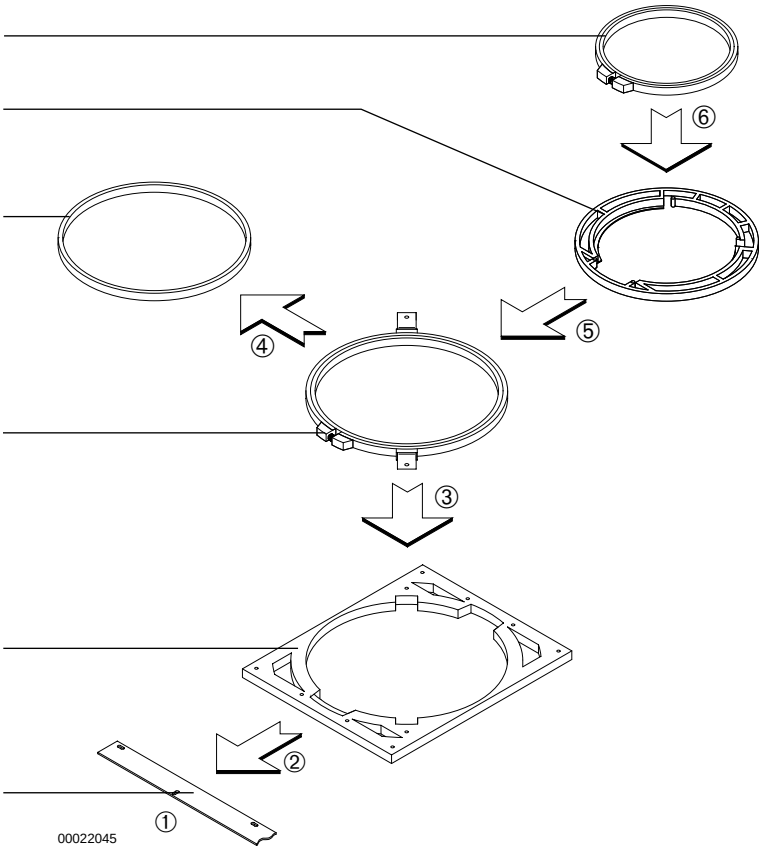
4.5 Application scope of system C=380 / Z=360 embroidery field depth 700, 900, 1000 mm

3-point quick-change frame system (c = 380 / Z = 360) with adjustable rail Embroidery field depth 700, 900, 1000 mm														
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Adjustable rail 700 mm embroidery field depth**	**Adjustable rail 900 mm embroidery field depth**	**Adjustable rail 1000 mm embroidery field depth**	**Rd 340**	**Rd 370**	**Rd 420**	**Rd 470**	**420 x 300**	**510 x 275**	**510 x 350**	**510 x 430**
172/4	600	4	174.410.905	172.480.900			X	X	X	X	X	X	X	X
172/8-400	400	8	172.210.921	172.280.900			X	X			X	X	X	
174/4	900	4	174.410.905	174.480.900			X	X	X	X	X	X	X	X
174/8	495	8	174.810.921	174.080.900			X	X	X		X	X	X	X
174/10	400	10	174.110.921	174.180.901			X	X			X	X	X	
	800	5	174.110.922				X	X	X	X	X	X	X	X
174/12	660	6	174.910.921	174.080.900			X	X	X	X	X	X	X	X
B 212/12	400	12	212.010.921	212.080.900			X	X			X	X	X	
B 220/20	480	10	220.010.922	220.080.900			X	X	X		X	X	X	X
274/8 (M 08 ..)	495	8	174.810.921	174.080.900			X	X	X		X	X	X	X
274/10 (M 10 ..)	400	10	174.110.921	174.180.901			X	X			X	X	X	
	800	5	174.110.922				X	X	X	X	X	X	X	X
276/10 (L 10 ..)	480	10	220.010.922	220.080.900			X	X	X		X	X	X	X
276/12 (L 12 ..)	400	12	212.010.921	212.080.900			X	X			X	X	X	
278/12 (X 12 ..)	495	12	278.210.901	278.280.900		278.210.910	X	X	X		X	X	X	X
278/15 (X 15 ..)	400	15	278.310.901	278.380.900		278.310.910	X	X			X	X	X	
278/25 (X 25 ..)	480	12	278.710.901	278.780.900		278.710.911	X	X	X		X	X	X	X

5. Plastic frames

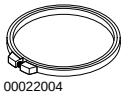
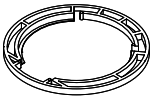
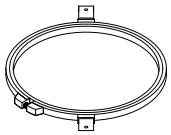
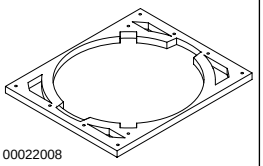
5.1 Converting to plastic frame system

Figure 12:



- Release the border frame angle rails and detach them from the pantograph front frame rail.
- Install locating rail*Abb. 12.6* on front pantograph frame rail ①.
- Attach frame mounting*Abb. 12.5* to the locating rail ②.
- Position frame (210 mm)*Abb. 12.4* in frame mounting and screw tight ③.
- To embroider with smaller plastic frames, take inner ring*Abb. 12.3* out of frame*Abb. 12.4* and replace with the appropriate frame mounting*Abb. 12.2* for smaller round plastic frames ④, ⑤.
- Place chosen round plastic frame*Abb. 12.1* in the frame mounting ⑥.

5.2 Overview of plastic frames

Overview of plastic frames						
	Frame sizes			Frame mounting		
	Outside diameter of Inner ring (mm)	Inside diameter of Inner ring (mm)	PART NUMBER	PART NUMBER	for inner ring with outside diameter of (MM)	
 00022004	90	80	570.151	570.201	90	 00022005
	120	110	570.152	570.202	120	
	150	140	570.153	570.203	150	
	180	170	570.154	570.204	180	
	210	200	570.156			
 00022006	210 (COM-PLETE)	200	172.010.947	172.010.823	210 (complete)	 00022008

5.3 Application scope of plastic frames

Plastic frame system								
Type	**Head spacing**	**No. of heads**	**Mounting assembly**	**Rd 80**	**Rd 110**	**Rd 140**	**Rd 170**	**Rd 200**
172/6	480	6	172.610.909	X	X	X	X	X
172/12	240	12	172.910.911	X	X	X	X	X
174/8	495	8	174.810.907	X	X	X	X	X
174/12	330	12	174.910.911	X	X	X	X	X
B 215/15	330	15	215.010.911	X	X	X	X	X
B 218/18	275	18	218.010.911	X	X	X	X	X
B 220/20	240	20	220.010.911	X	X	X	X	X
274/10 (M 10 ..)	400	10	174.110.914	X	X	X	X	X
276/15 (L 15..)	330	15	215.010.911	X	X	X	X	X
278/12 (X 12..)	495	12	278.210.907	X	X	X	X	X
278/15 (X 15..)	400	15	278.310.909	X	X	X	X	X
278/18 (X 18..)	330	18	278.410.911	X	X	X	X	X
278/22 (X 22..)	275	22	278.610.903	X	X	X	X	X
278/25 (X 25..)	240	25	278.710.909	X	X	X	X	X
279/18 (XL 18..)	350	18	279.410.902	X	X	X	X	X
362/2 (J 02..)	495	2	362.210.901	X	X	X	X	X
364/4 (J 04..)	400	4	364.410.902	X	X	X	X	X
366/6 (J 06..)	400	6	366.610.902	X	X	X	X	X
376/10 (T 10..)	495	10	376.110.903	X	X	X	X	X
376/12 (T 12..)	400	12	376.210.901	X	X	X	X	X

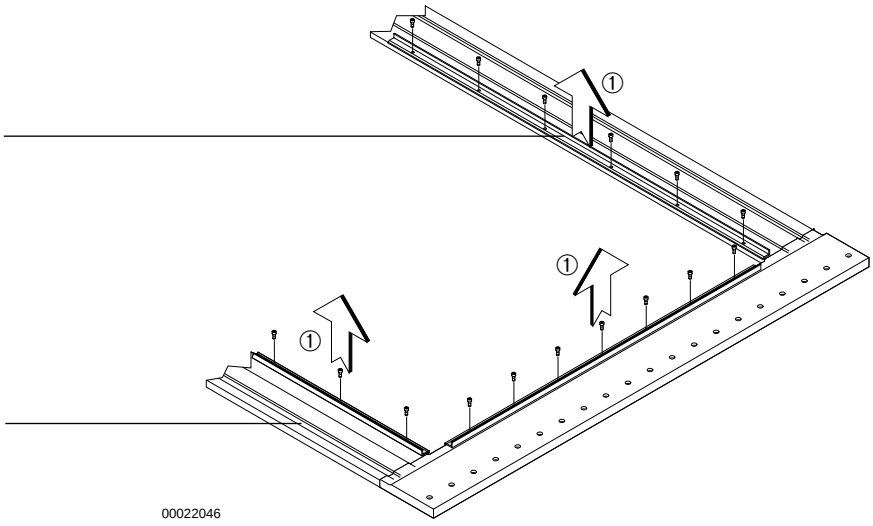
6. 2-Point frames (c=variable)

6.1 Converting to 2-point frame (C=variable)

NOTE

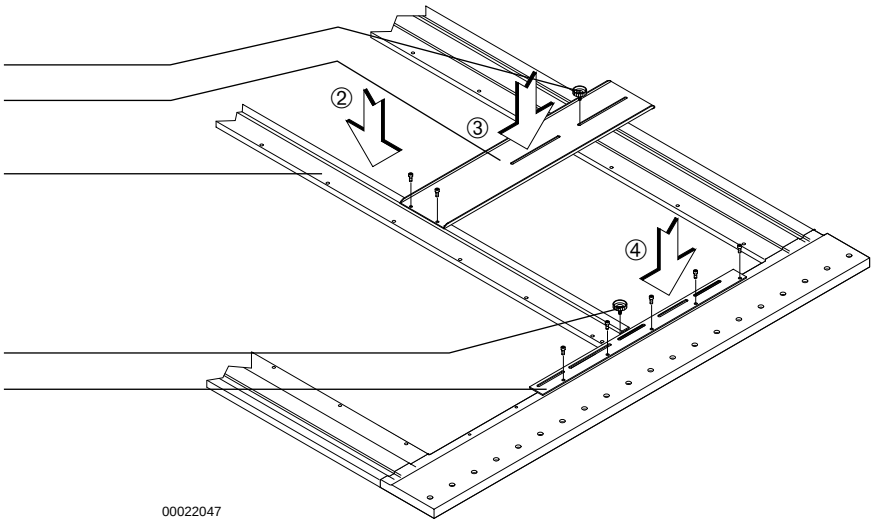
With embroidery field depths of 700 mm, an adjustable rail is required as a general rule when using 2-point frames with variable C dimension.
With an embroidery field depth of 500 mm, some frame sizes do not require an adjustable rail.

Figure 13:



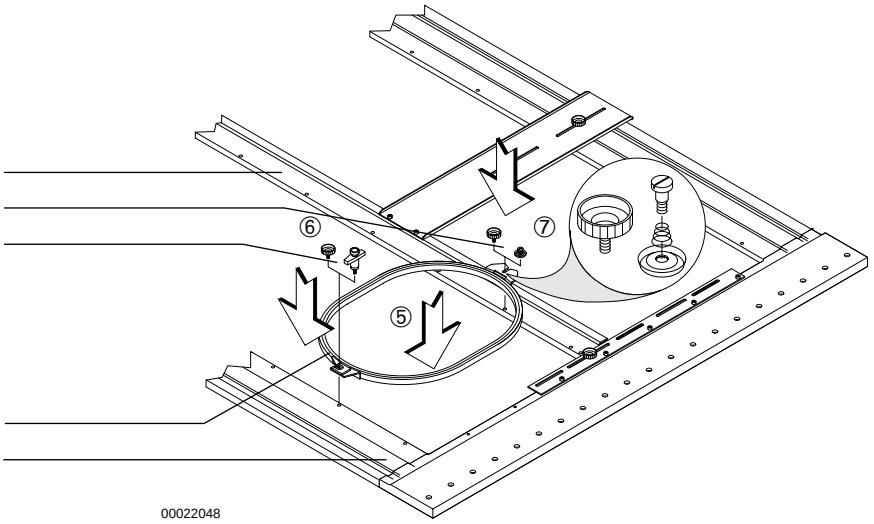
- Release all border frame angle rails *(13.1)* and detach from pantograph frame rails *(13.2)* ①.

Figure 14:



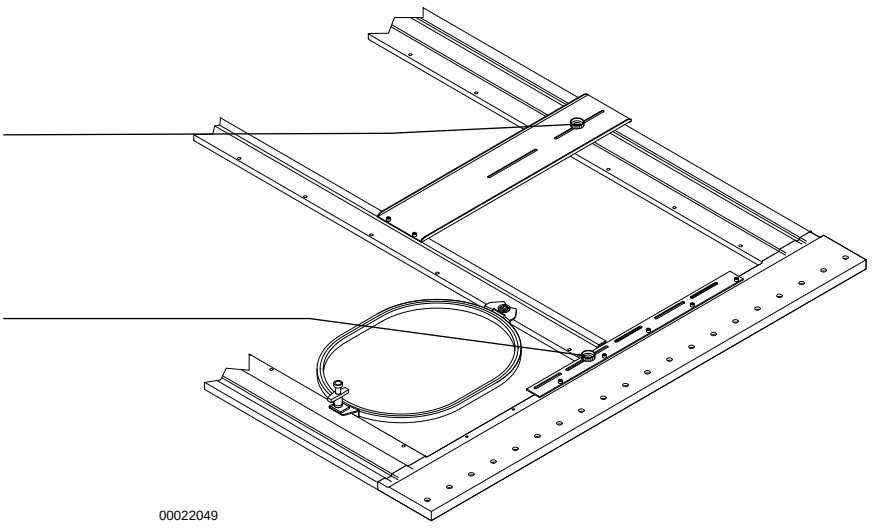
- Place adjustable rail *(14.3)* in the pantograph frame with the threaded holes facing the front and position the adjustable rail according to size of the frame ②.
- Attach rear fixing plates *(14.2)* and lateral guide plates *(14.5)* but only lightly tighten knurled screws *(14.1)*, *(14.4)* ③, ④.

Figure 15:



- Place appropriate single frames *(15.4)* between pantograph front frame rail *(15.5)* and variable rail *(15.1)* ⑤.
- Attach the front mounting point of the single frame to the frame rail with the frame clamp or knurled screw *(15.3)* ⑥.
- Secure the rear mounting point of the single frame to the adjustable rail with the knurled screw or the pan-head screw, spring and disc *(15.2)* ⑦.

Figure 16:



- Fully tighten knurled screws *(16.1)*, *(16.2)*.

6.2 Application scope of system C=variable

FRAME SYSTEM (C = VARIABLE)			700, 900 AND 1000 MM EMBROIDERY FIELD WITH ADJUSTABLE RAIL																
			500 MM EMBROIDERY FIELD WITH ADJUSTABLE RAIL											500 MM EMBROIDERY FIELD WITHOUT ADJUSTABLE RAIL					
			C=124	C=166	C=198	C=220	C=254	C=294	C=340	C=390	C=400	C=422	C=476	C=494	C=572					C=576
Type	Head spacing	No. of heads	Rd 80	Rd 120	Rd 150	Rd 180	200 x 120	240 x 180	285 x 190	335 x 215	345 x 280	370 x 166	420 x 300	440 x 235	510 x 190	510 x 275	510 x 310	510 x 350	510 x 430	Rd 510
172/4	600	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
172/6	480	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
172/8-400	400	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
172/12	240	12	X	X	X	X	X	X	X			X			X					
	480	6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
174/4	900	4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
174/8	495	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
174/10	400	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
174/12	330	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
B 212/12	400	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
B 215/15	330	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
B 218/18	275	18	X	X	X	X	X	X	X	X		X		X	X					
	550	9	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
B 220/20	240	20	X	X	X	X	X	X	X			X			X					
	480	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
274/8 (M 08 ..)	495	8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
274/10 (M 10 ..)	400	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
276/10 (L 10 ..)	480	10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
276/12 (L 12 ..)	400	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
276/15 (L 15 ..)	330	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
278/12 (X 12 ..)	495	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
278/15 (X 15 ..)	400	15	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		
278/18 (X 18 ..)	330	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X				
278/22 (X 22 ..)	275	22	X	X	X	X	X	X	X	X		X		X	X					
	550	11	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
278/25 (X 25 ..)	240	25	X	X	X	X	X	X	X			X			X					
	480	12	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
279/18 (XL 18 ..)	350	18	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			

6.3 Overview of frame system C=variable

OVERVIEW OF FRAME SYSTEM (C=VARIABLE)		
FRAME (MM)	C DIMENSION	PART NUMBER
Rd 80	124	172.010.800
Rd 120	166	172.010.801
Rd 150	198	172.010.802
Rd 180	220	172.010.803
200 x 120	254	172.010.822
240 x 180	294	172.010.804
285 x 190	340	172.010.805
335 x 215	390	172.810.800
345 x 280	400	172.810.801
370 x 166	422	172.010.806
420 x 300	476	172.810.802
440 x 235	494	172.810.803
510 x 190	572	172.010.807
510 x 275	572	172.810.804
510 x 310	572	172.810.805
510 x 350	572	172.610.800
510 x 430	572	172.610.801
Rd 510	576	172.010.820

6.4 Overview of adjustable rails

OVERVIEW OF ADJUSTABLE RAIL SYSTEM (C = VARIABLE)						
Type	**Head spacing**	**No. of heads**	**Adjustable rail 500 mm embroidery field depth**	**Adjustable rail 700 mm embroidery field depth**	**Adjustable rail 900 mm embroidery field depth**	**Adjustable rail 1000 mm embroidery field depth**
172/4	600	4	172.410.901	172.480.900		
172/6	480	6	172.010.900	172.280.900		
172/8-400	400	8	172.210.900			
172/12	240	12	172.010.900			
	480	6				
174/4	900	4			174.480.900	
174/8	495	8	174.010.900	174.080.900		
174/10	400	10	174.110.901	174.180.901		
174/12	330	12	174.010.900	174.080.900		
B 212/12	400	12	212.010.900	212.080.900		
B 215/15	330	15	215.010.900	215.080.900		
B 218/18	275	18	218.010.900	218.080.900		
	550	9				
B 220/20	240	20	220.010.900	220.080.900		
	480	10				
274/8 (M 08 ..)	495	8	174.010.900	174.080.900		
274/10 (M 10 ..)	400	10	174.110.901	174.180.901		
276/10 (L 10 ..)	480	10	210.010.900	220.080.900		
276/12 (L 12 ..)	400	12	212.010.900	212.080.900		
276/15 (L 15 ..)	330	15	215.010.900			
278/12 (X 12 ..)	495	12	278.210.904	278.280.900		278.210.910
278/15 (X 15 ..)	400	15	278.310.904	278.380.900		278.310.910
278/18 (X 18 ..)	330	18	278.410.904	278.480.900		
278/22 (X 22 ..)	275	22	278.610.904	278.680.900		278.610.910
	550	11				
278/25 (X 25 ..)	240	25	278.710.910	278.780.900		278.710.911
	480	12				
279/18 (XL 18 ..)	350	18	279.410.900			

7. AFT (adjustable fabric tensioner)

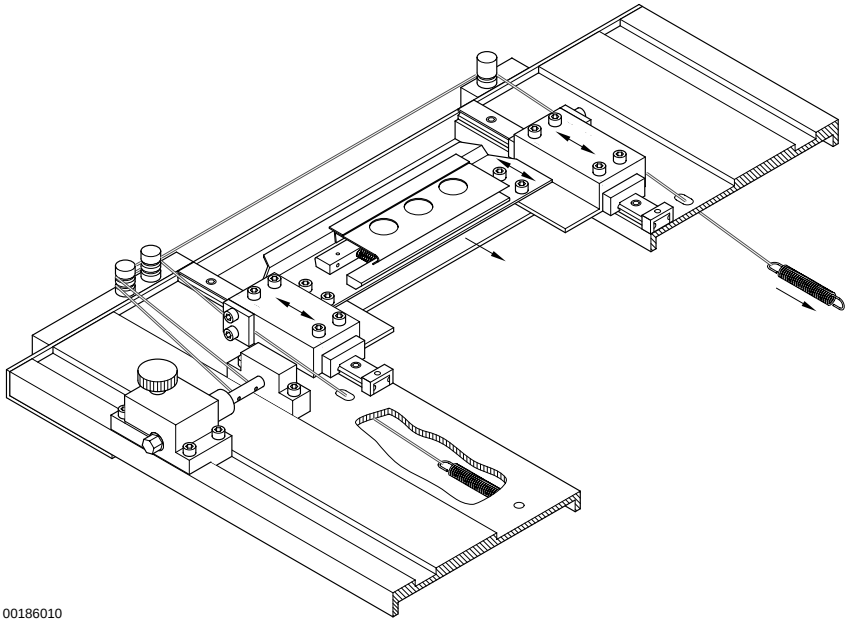
7.1 Benefits

- Adjustable work tension in the X and Y directions for border embroidery
- Work can be retensioned to obtain straight threads
- Uniform and reproducible material tension along the full length of the border frame
- Compatible with different embroidery materials
- Easy operation
- Maintenance-free tensioning elements

7.2 Transverse retensioner (Y direction)

The transverse retensioner takes up slack in the work in a horizontal direction.

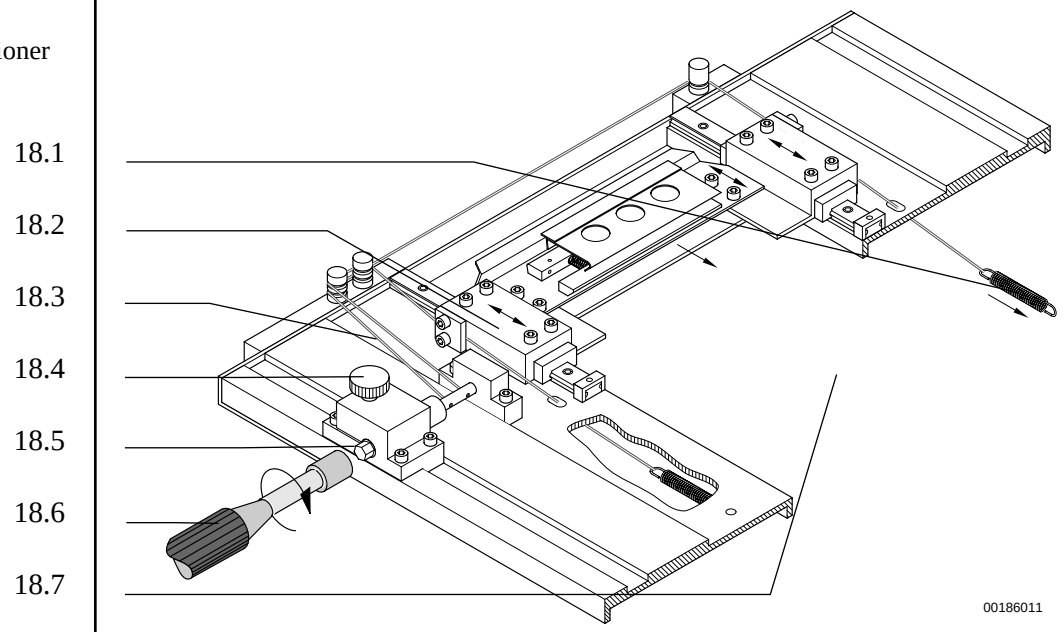
Figure 17:
Transverse retensione



7.3 Horizontal retensioning (Y direction)

7.3.1 Using the automatic fabric tensioner

Figure 18:
Adjustable fabric tensioner



The adjustable fabric tensioner keeps the work taut with all the threads running in a straight line *Abb. 18.7*. The shaft is rotated clockwise by turning the torque wrench *Abb. 18.6*. The wires *Abb. 18.3* draw the profile towards the border frame and thus achieve uniform tension. Depending on the wrench's torque setting, the fabric tension can be adjusted and reproduced. The knurled screw *Abb. 18.4* is made tight; it arrests the return stop on the shaft *Abb. 18.5*. It is released once the work has been completed. The tensioner is set to the clamping position by hand. Operation is assisted by the retracting springs in the pantograph profile *Abb. 18.2*.

NOTE

In order to maintain the prior tension of the fabric, the return stop on the shaft must be properly locked; make certain that the knurled screw is fully tightened.

7.3.2 Clamping instructions

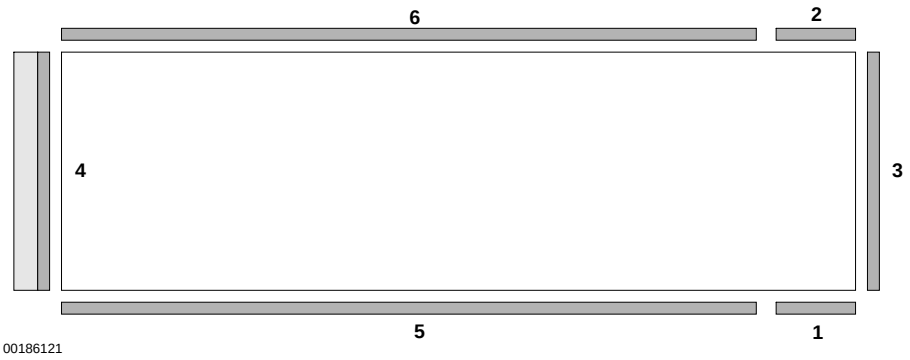


Figure 19: Spannschema, Horizontale Spanneinrichtung

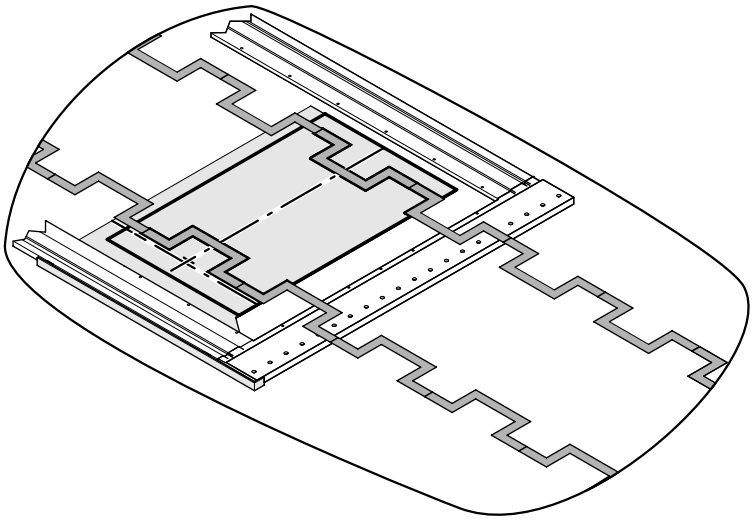
Setting up machine for first time

- Move the pantograph to the front of the table.
- Place the embroidery material on the pantograph.
- Clamp the material with clips **1** and **3**.
- Attach the material to the fabric adjuster with clip **4**.
- Adjust the horizontal tension of the material with the fabric adjuster.
- Attach clips **5** to the front clamping rail of the border frame.
- Move the pantograph back and place clips **6** and **2** on the rear clamping rail of the border frame.
- Move the pantograph to the design starting position.
- Start embroidering the first run.

Subsequent machine set-ups

- Remove all the clips from the border frame.
- Move the pantograph forwards to the retensioning position, which is the position in which the template can be inserted underneath the pantograph.
- Slide the template with the design plot attached underneath the pantograph at embroidery head 1.
- Pull through the embroidery material until you reach the next clamping position.

Figure 20:
Completed run with inserted template



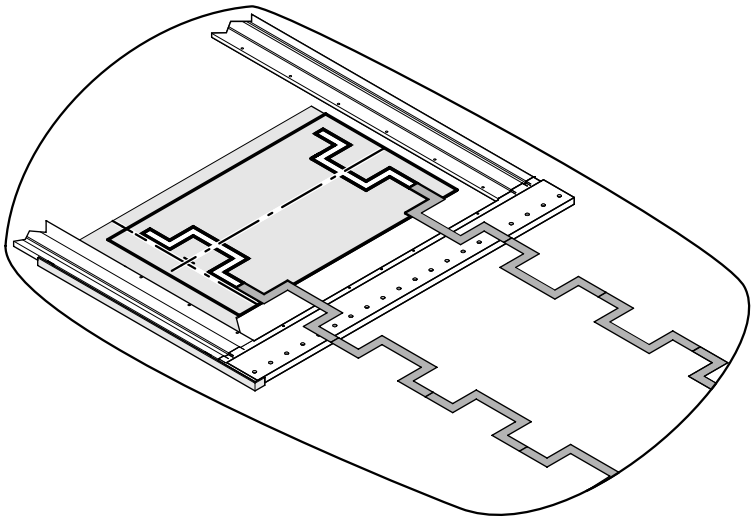
00186123

- Align the most recently completed design with the right side of the design plot (see note below)..

NOTE

In order perfectly to align the last completed design with the design plot, you may have to make a small allowance when positioning the embroidery material for clamping. The amount of offset depends on the material and needs to be ascertained by trial and error. The threads in the curtain material must be straight and the work properly aligned on completion of the retensioning operation.

Figure 21:
Embroidery material positioned with template



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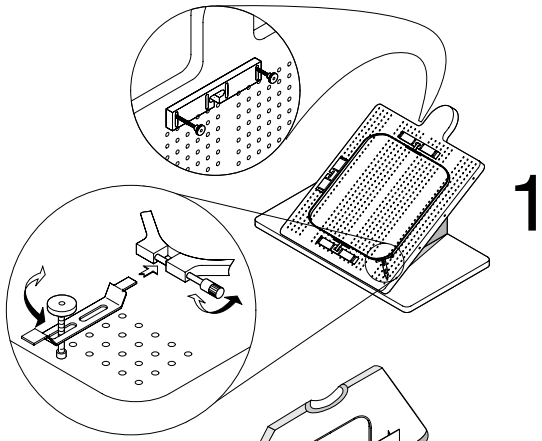
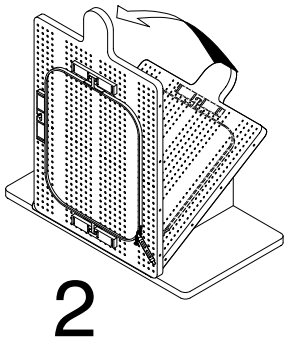
- Once it is correctly positioned, clamp the material with clips **1**, **2** and **3**.
- Attach the material to the fabric adjuster with clip **4**.
- Adjust the horizontal tension of the material with the fabric adjuster.
- Remove the template from underneath the pantograph.
- Attach clips **5** in the envisaged position on the front clamping rail of the border frame.
- Move the pantograph back and place clips **6** on the rear clamping rail of the border frame.
- Move the pantograph to the design starting position.
- Embroider the next run.

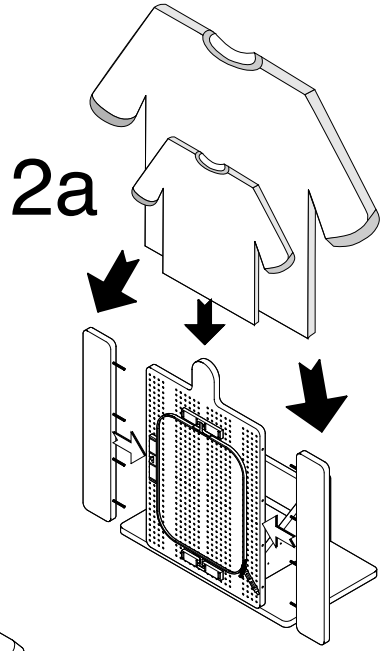
NOTE

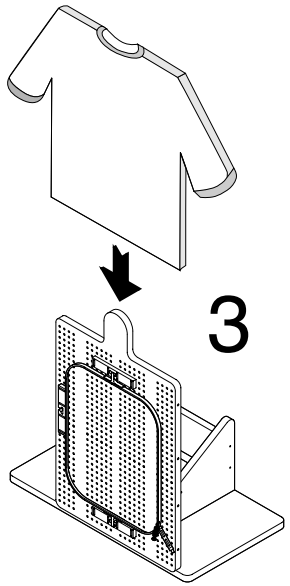
When retensioning the embroidery material the next time, proceed as described above.

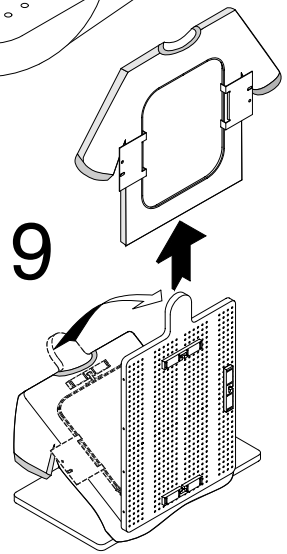
Einspannplatte / Elemento ausiliario per l'intelaiatura del capo confezionato/tubolar / Clamping plate / Plaque de centrage / Placa de centralización / Płyta naprężająca

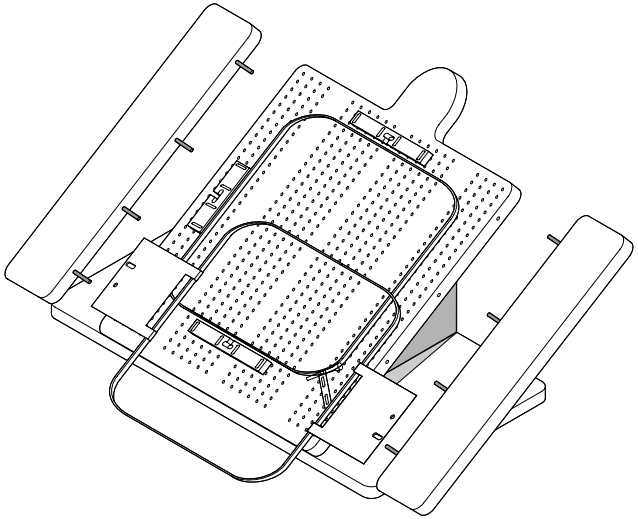


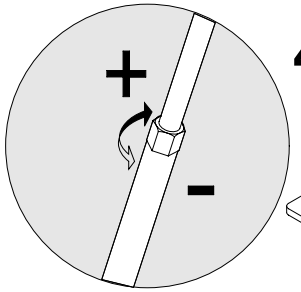


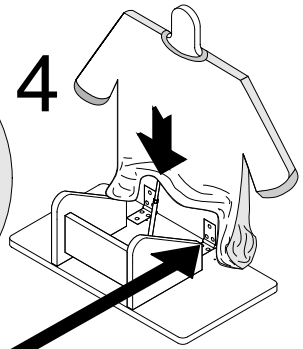


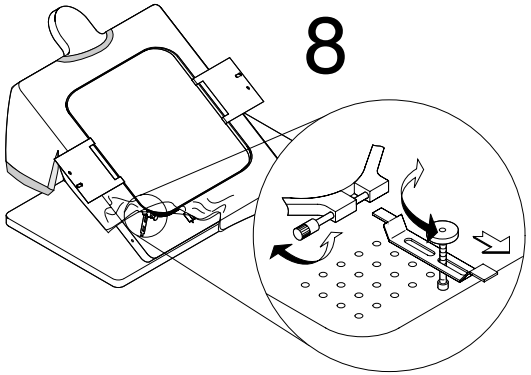


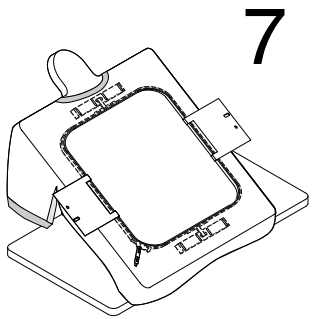


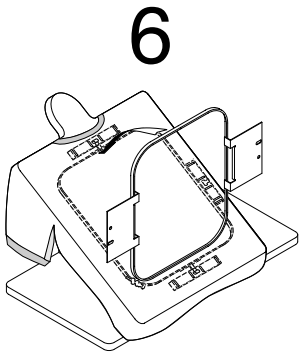


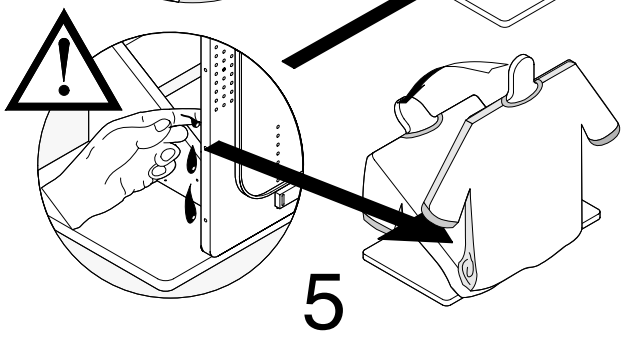












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