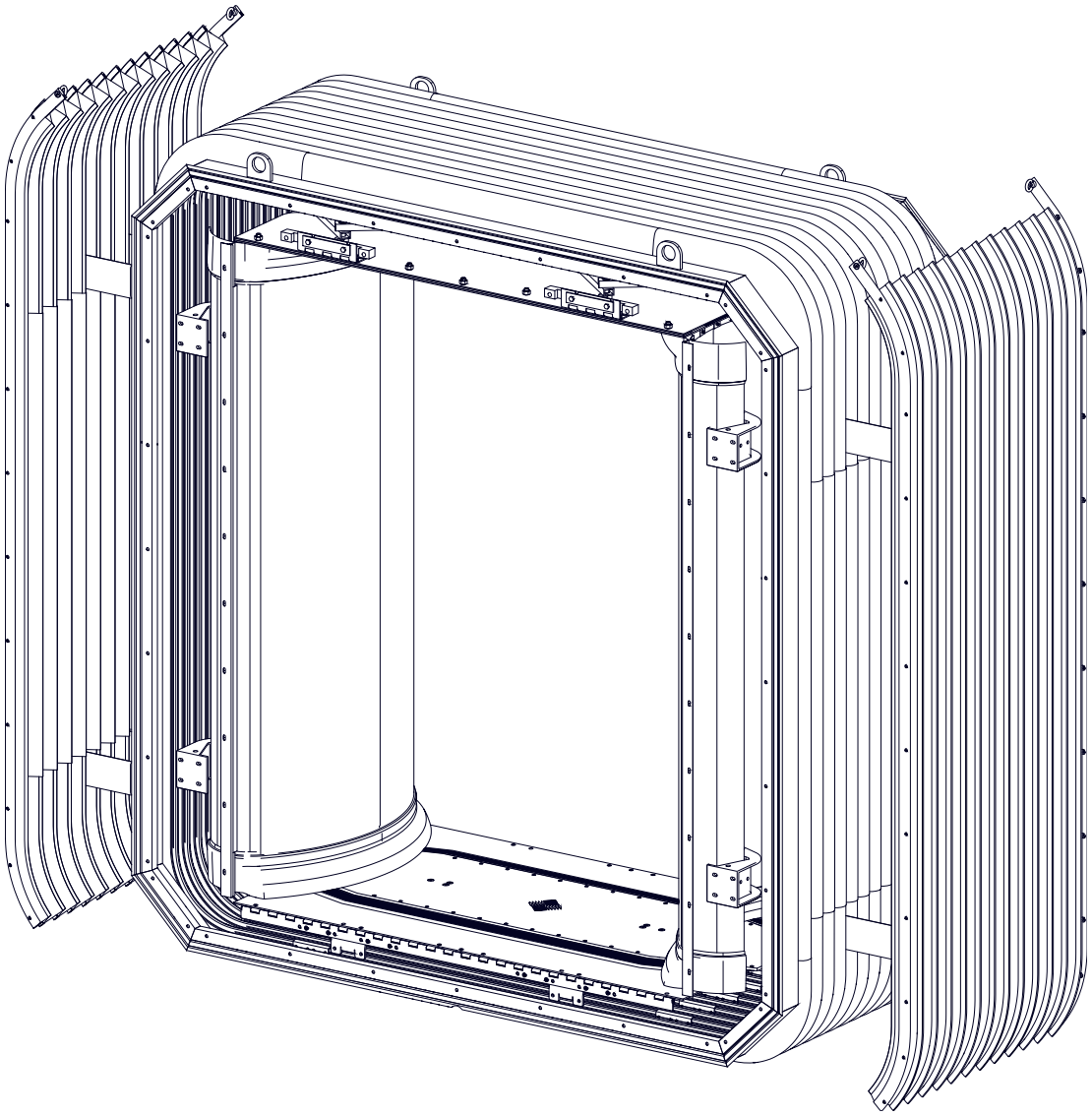
Gangway, assy. mounting

041448517

ICF / Train 18



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0 List of revisions

Revision	Date	Name	Modifications	Page(s)
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A				
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Index

1 Safety

1.1 General

Attentively read the Technical Description prior to taking the gangway into operation and/or proceeding with maintenance tasks in order to avoid accidents or damage.
Note the safety information within the separate chapters!

Endangering passengers, train staff and operating personnel has to be avoided by appropriate hazard avoiding measures by the operator.

1.2 Safety information

This Technical Description contains the following safety information:

CAUTION / ATTENTION
Information about a risk which, when not being obeyed, can lead to bodily injury and/or extensive material damage.

NOTICE
Important information, which has to be additionally noted.

1.3 Usage as directed

The gangway is designed by the manufacturer to exclusively meet the requirements of the operating conditions. The manufacturer cannot be held liable if operating conditions are changed without prior notice to the manufacturer.

The operating conditions for usage as directed include:

- Maintaining the standard according to the technical data
- Movements and operating conditions permitted by the manufacturer
- Environment (temperature, humidity, pressure, dust)
- Usage of original accessories (components)
- Observance of this Technical Description

CAUTION
Danger of falling.
Injury and material damage possible.
➢ Do not step onto and/or walk on the roof area respectively inside of the bellows.

CAUTION / ATTENTION
Danger of damage.
Injury and material damage possible.
➢ Movements with max. height misalignment which might occur e.g. in failure cases do require an unmounting of the linking ceiling and side walls.

Usage beyond and exceeding these limits is considered inappropriate. The manufacturer will not be liable for such claims.

2 Introduction

The gangway is the flexible part of the train, allowing the relative movements between the wagons and offering passengers a secure and comfortable passageway.

3 Product Description

3.1 Product breakdown structure

The main assembly groups/components of the gangway are shown in Illustration 1:

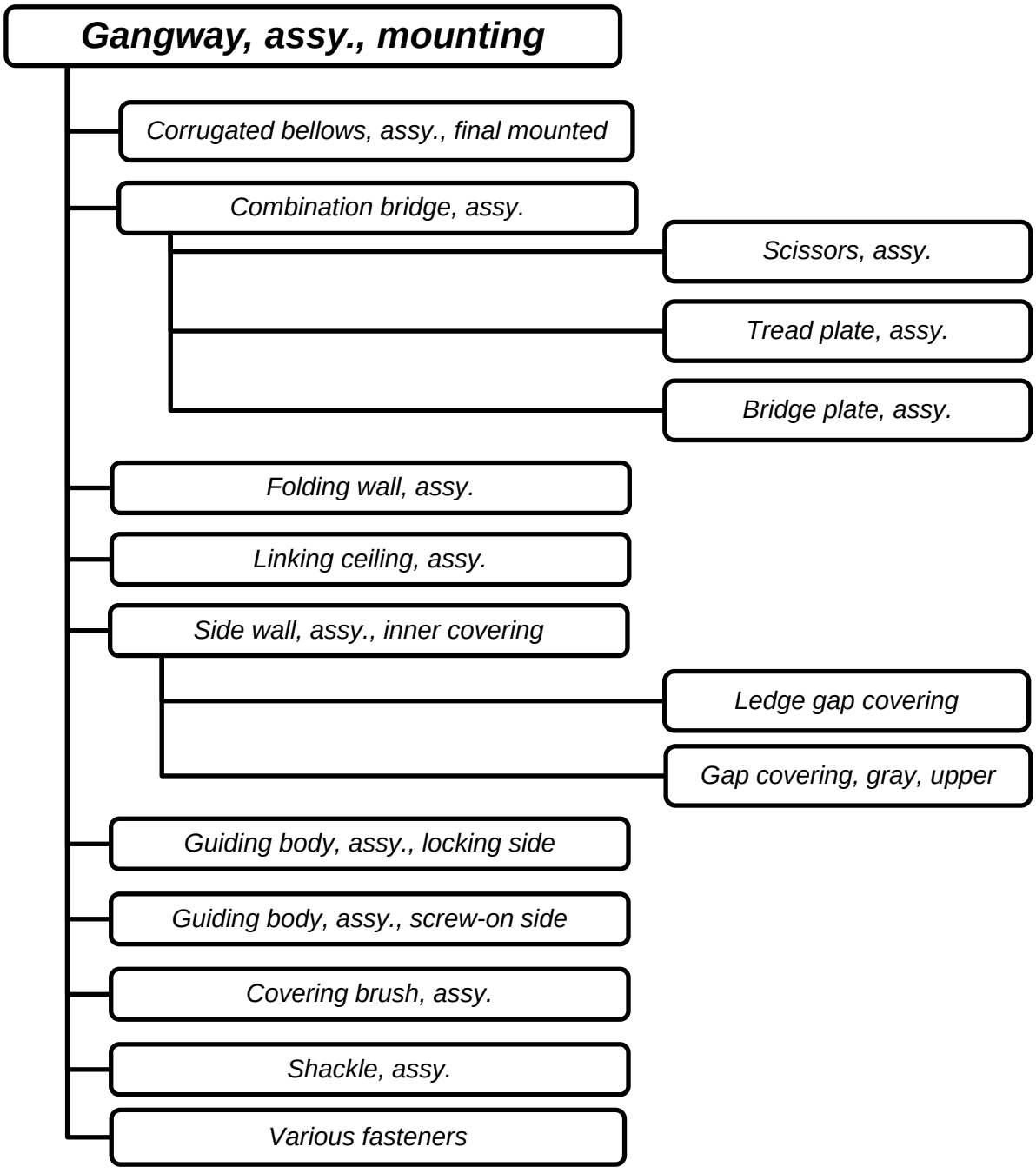
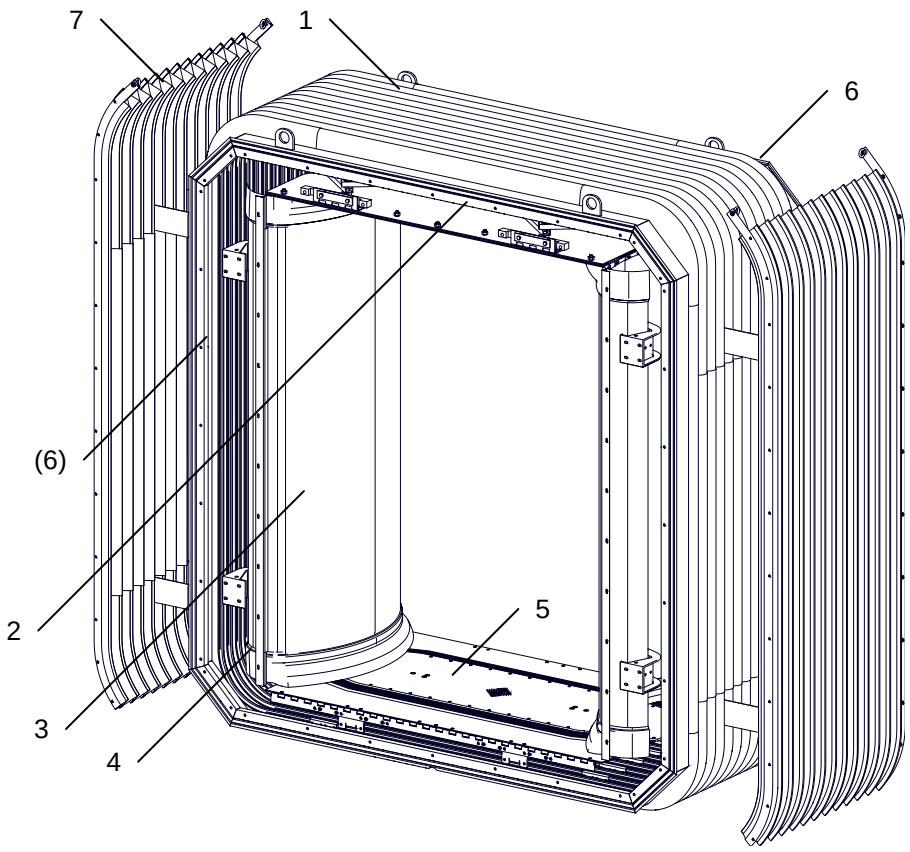


Illustration 1: Main assembly groups/components

The following illustrations show the above mentioned assembly groups, sub-assembly groups and components:

3.2 Graphical representation



1	*Corrugated bellows, assy., mounted*	2	*Linking ceiling, assy.*
3	*Side wall, assy. inner covering*	4	*Covering brush, assy.*
5	*Combination bridge, assy:*	6	*Screw-on frame*
7	*Folding wall, assy.*		

Illustration 2: Gangway, assy. mounting

3.3 Detailed description

3.3.1 Gangway, assy. mounting

The Gangway, assy. mounting comprises the Corrugated bellows, assy. final mounted, the combination bridge, assy., the folding wall, the Linking ceiling, assy., two Side walls, assy. inner covering, four covering brushes, assy., two guiding body, assy., locking side, two guiding body, assy., screw–on side, four shackles, assy. and fasteners.

3.3.1.1 Corrugated bellows, assy. final mounted

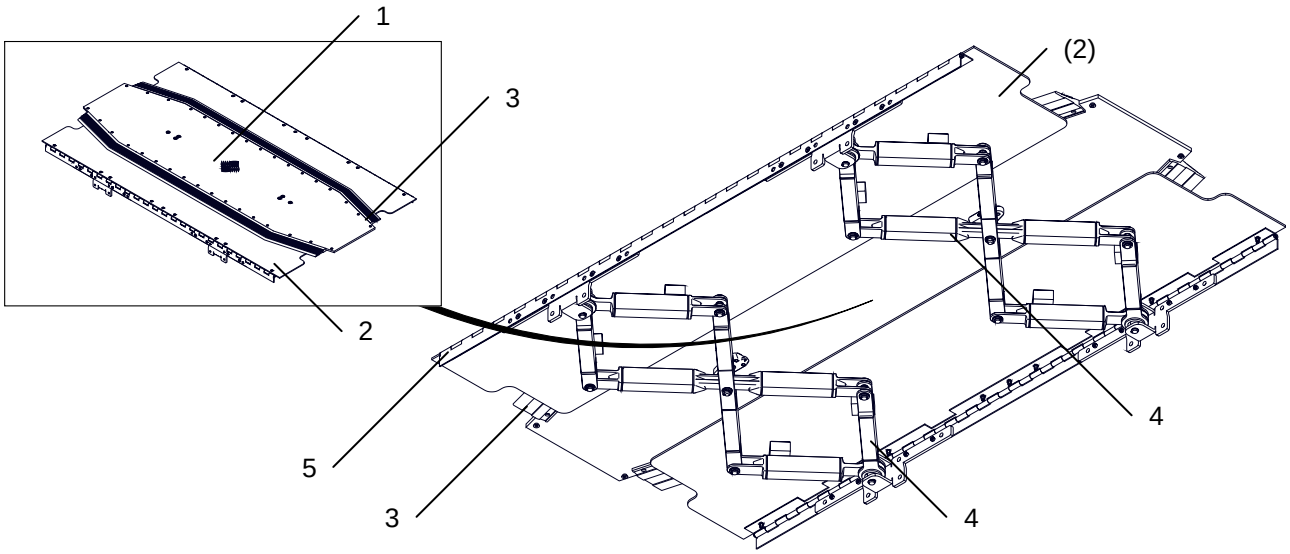
The corrugated bellows, assy. final mounted comprises the corrugated bellows, assy., the Screw-on frames, the Sealing profiles as well as fasteners.

Corrugated bellows
The corrugated bellows is comprising flexible material corrugations which are open towards the inside. The material corrugations, made out of a special material, are connected to each other on the inner side with crimped-on aluminum frames.

Screw-on frame
Each screw-on frame consists of welded aluminum profiles. The screw-on frame ensures the frictional connection of the corrugated bellows to the wagon-interface.

3.3.1.2 Combination bridge, assy.

The combination bridge consists of the scissors system, the bridge plates (wagon sided) and the tread plate (middle).
The combination bridge when mounted between the carbodies is self-supporting and does not require a coupler support or any other support.
Specific provisions at the carbody interfaces like boxes to support the bridge are not required.
The scissors system supports both screw-on frames sided bridge plates. It ensures a consistent level of the bridge plates independently of the particular movement situation. On the top of the scissors system sliding ledges are mounted on which the bridge plates rest during operation.
The scissors system is mounted on both sides to the wagon-interfaces. The flexible mounting of the scissors system allows compensating the various relative movements.
The connection of the tread plate to the scissors ensures that there are no gaps during all relative movements including roll.



1	*Tread plate*	2	*Bridge plate*
3	*Sliding ledge*	4	*Scissors system*
5	*Hinge*		

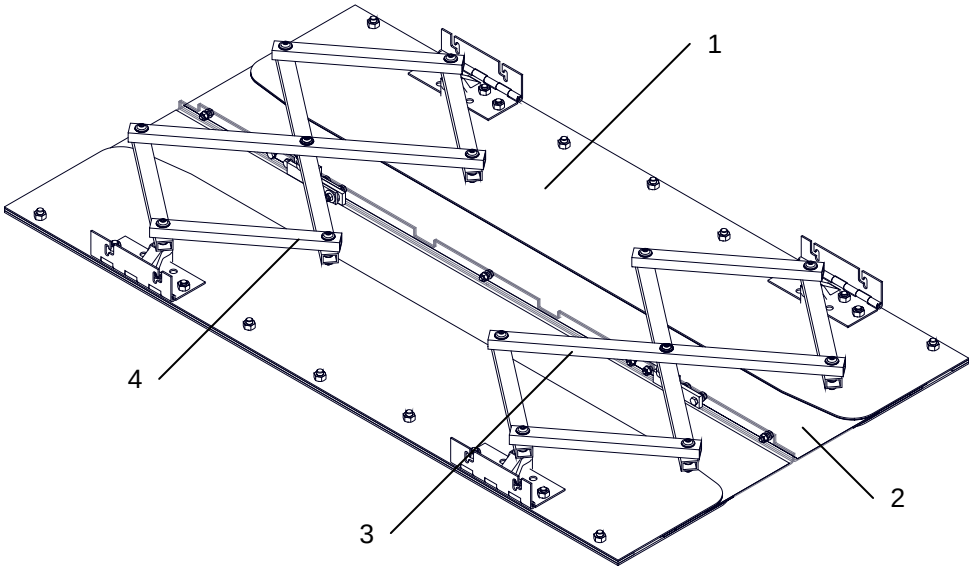
Illustration 3: Combination bridge, assy., view from underside

3.3.1.3 Folding wall, assy.

The folding wall, assy., closes the lateral gap between the two end walls of the wagon. It protects the bellows behind it from vandalism and improved the aerodynamic performance of the train.

3.3.1.4 Linking ceiling, assy.

The linking ceiling comprises one simple and two slotted ceiling plates. Their shape suits the relative movements of the wagons to each other. A scissors suspension ensures that the simple ceiling plate is properly positioned and guided inside the slotted ceiling plates.
The linking ceiling is by means of hinges and shackles attached to the wagon-interfaces. The advantage of attaching the ceiling to the wagon-interfaces is that it can be easily mounted and unmounted.
The specially designed linking ceiling parts allow all relative movements between the wagons.
All mounting and bearing parts of the linking ceiling are not visible to the passenger.

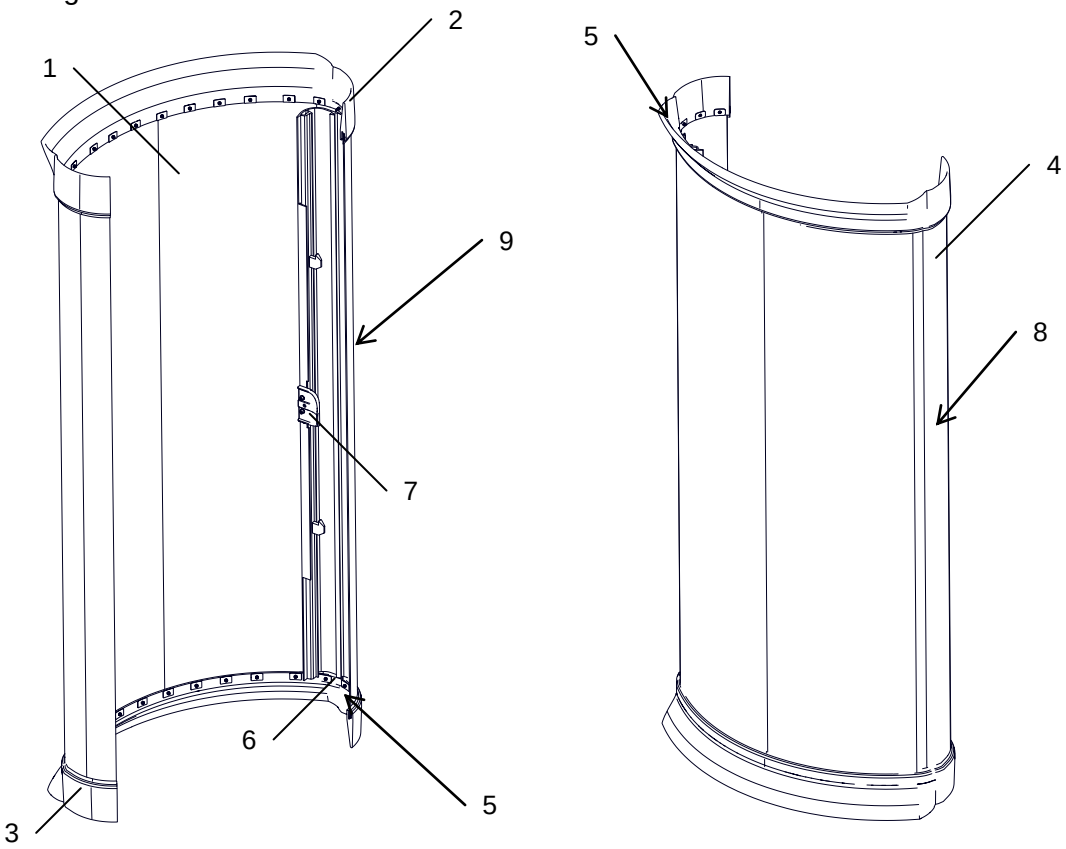


1	*Lamella, assy. screw-on side*	2	*Lamella, assy. center part*
3	*Tube, long*	4	*Tube, short*

Illustration 4: Linking ceiling, assy.

3.3.1.5 Side wall, assy.

The side wall is made of two roll bodies rotating around vertical axes. The roll bodies are connected to each other through a vaulted flexible side part. The roll bodies of the side wall are bolted resp. locked to the guiding bodies. The specially designed side parts allow all relative movements between the wagons.
The side parts are vaulted towards the passageway by a special pre-tension.
Its one piece design with a decorative surface ensures that there are no gaps and no moving edges during all relative movements.



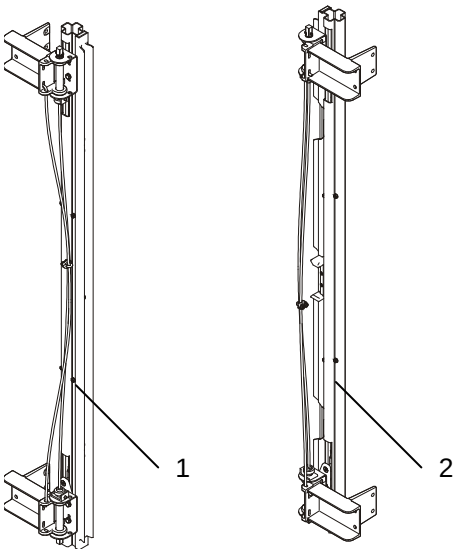
1	*Side panel, assy.*	2	*Gap covering, upper*
3	*Gap covering, lower*	4	*Roll body*
5	*Short screws*	6	*Locking hook (of side wall)*
7	*Lead-in latch*	8	*Side wall, screw-on side*
9	*Side wall, locking side*		

Illustration 5: Side wall, assy. (front and rear view)

Pinching protection
One piece gap coverings without any seam are used to cover the gaps between the side walls and the bridge plates, as well as the gaps between the side walls and the linking ceiling.
The for passengers invisible locking/unlocking mechanism of the side wall behind this gap covering avoids unallowed access and opening through unauthorized passengers

3.3.1.6 Guiding body, assy. screw-on side and locking side

The guiding bodies, which include also the holders receiving the side walls, are bolted to the wagon-interfaces.

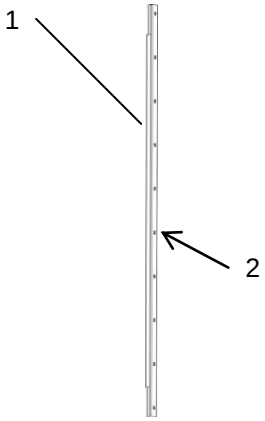


1	*Guiding body, assy., screw-on side*	2	*Guiding body, assy., locking side*

Illustration 6: Guiding body, assy., screw-on side and locking side (schematic)

3.3.1.7 Covering brush, assy.

Vertical brushes are attached to both wagon-interfaces (left and right hand side) in order to cover the small gap between the roll bodies and the carbody interface.

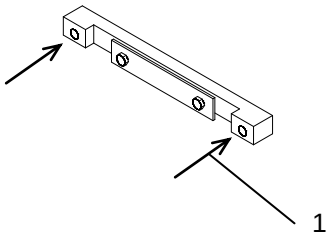


1	*Bristles (brush)*	2	*Attachment to wagon-interface*

Illustration 7: Covering brush, assy. (schematic)

3.3.1.8 Shackle, assy.

The shackles are made of stainless steel and are mounted to the wagon-interfaces (2 per wagon-interface) in order to receive the linking ceiling.



1	*Attachment to wagon-interface*		

Illustration 8: Shackle, assy. (schematic)

4 Technical data

4.1 Main dimensions

Distance between wagon-interfaces:	900 mm
Clear passage height:	1953,5 ±5 mm
Clear passage width (at half height):	approx. 1150 mm
Max. speed:	160 km/h
Max. bridge system load:	435 kg (6 pers/m^2 with 70 kg/pers)

4.2 Weight

Gangway, assy. mounting	394 kg ±10 %

4.3 Materials

• Corrugated bellows, assy.	
◦ Corrugated bellows	Bellows fabric with proven service life of more than 12 years, Aluminium profiles
◦ Screw-on	Aluminium profiles
• Side walls	GRP, Aluminium, Rubber, Stainless Steel
• Linking ceiling	Aluminium, Stainless Steel
• Guiding bodies	Aluminium profile
• Combination bridge	Aluminium plates, Stainless Steel, Sliding material

4.4 Fire behaviour

The non-metallic materials used for the gangway meet the fire requirements according to the following standard:

- EN 45545 HL2

4.5 Sound insulation

Due to experiences in laboratories with similar gangways a sound insulation of the mounted bellows of R_W = 27 dB can be expected.

4.6 Operating temperature

The operating temperature is approx. -30 °C to +80 °C in case of normal environmental influences.

4.7 Service life

The gangway system can achieve a life time of up to 12 years under normal conditions of use and performed maintenance as specified. This is a non-binding forecast based on experience and does not constitute any guarantee or warranty claims.

5 Transport and Storage

5.1 Transport

ATTENTION
Material damage possible.
Obey the instructions on the transport-packaging regarding the removal of the gangway(s) respectively the assembly groups/components!

ATTENTION
Material damage possible.
For transport or shunting movements secure or support one-sided mounted gangways resp. bellows, with appropriate means to avoid damage.

Generally the following specifications and instructions for the transportation of the gangways resp. the sub-components/sub-assembly groups have to be obeyed:
The gangways resp. the sub-components/sub-assembly groups are suitably packaged and are delivered with elements for stabilization if applicable.

5.2 Storage

ATTENTION
Material damage possible.
If applicable obey the instructions on the wooden crates regarding the removal out of the packaging of the gangways resp. the sub-components/sub-assembly groups!

The gangways resp. the sub-components/sub-assembly groups can be stored on a wooden support standing upright. The room for storage has to be dry and well ventilated.

CAUTION
Unsecured or tipping over components.
Risk of injury and material damage possible.
- ➢ Secure the gangways resp. the sub-assembly groups/components against tipping over.

The wooden crate containing the remaining assembly groups/components has to be stored as well in a dry and well ventilated room.

6 Mounting

6.1 Personnel qualification

Mounting and commissioning of a passenger gangway can only be executed by authorized technical personnel or by authorized personnel with comparable mechanical knowledge.

6.2 General information

ATTENTION

For mounting procedure in any case use besides the mounting instruction also the corresponding HÜBNER-drawings.

ATTENTION

Note the accident prevention and safety regulations as well as the industrial safety regulations.

WARNING

Danger of injury or running over.
Severe injury or death possible.

- Prior to mounting works secure the wagons against rolling away.

CAUTION

Danger of falling.
Injury and material damage possible.

- Do not step onto and/or walk on the roof area of the bellows.

ATTENTION

Material damage possible.

- Secure or support one-sided mounted gangways/bellows with appropriate means to avoid damage.

NOTICE

Apply suitable thread locking fluid (e.g. “Loctite 243”) to all screw connections during mounting. Exception microcapsulated screws!

NOTICE

Fasteners for attachment of the gangway/bellows are not in the scope of supply of HÜBNER.
This excludes also the specification of tightening torques for the assembly of these components.

6.3 Special tools and aid

6.3.1 Tools

- Overhead crane with a capacity of at least 600 kg
  (ensure to maintain the normal position as described)
- Fork lift
- Ropes for mounting purposes (carrying ropes)
- Standard-Work shop equipment and tools
- Hollow square spanner (9 mm)

6.3.2 Special tools

None.

6.4 Mounting preparation

The following components have to be available (acc. to BOM 04144851700):

Item 1:	1 pc.	Corrugated bellows, assy. final mounted
Item 2:	1 pc.	Folding wall, assy.
Item 3:	1 pc.	Combination bridge, assy.
Item 4:	1 pc.	Linking ceiling, assy.
Item 5:	2 pc.	Side wall, assy. inner covering
Item 6:	2 pc.	Guiding body, assy. locking side
Item 7:	2 pc.	Guiding body, assy. screw-on side
Item 8:	4 pc.	Covering brush, assy.
Item 9:	4 pc.	Shackle, assy.
Item 12:	4 pc.	Socket cap screw DIN 6912-M8x30-A2
Item 13:	4 pc.	Washer DIN 433-8.4-140 HV-A2
Item 15:	24 pc.	Socket cap screw DIN 912-M6x12-A2-70
Item 16:	48 pc.	Washer DIN 9021-6,4-140 HV-A2P
Item 17:	24 pc.	Cap nut DIN 1587-M6-A2-70

The fasteners required to mount items 1– 3 and 6 – 9 to the wagon end wall have to be supplied by the customer.

ATTENTION

Material damage possible.

- The gangway system shall not stay only mounted to one wagon interface. Always mount the gangway system to both wagon interfaces

NOTICE

Ensure that prior to mounting the gangway system the first time, the stabilization elements and their fasteners which were attached for transportation purpose are removed.

Wagon-interfaces – Hole patterns:

NOTICE

The hole patterns of the wagon-interfaces of the vehicles receiving the screw-on frames and guiding bodies have to exist (performed by customer). Maintain the true positions of the holes!

Wagon-interfaces – Flatness:

NOTICE
Ensure that the wagon-interface(s) have a surface flatness of ±1.5 mm/500 mm. No steps allowed!

Wagon-interfaces – Cleanliness:

NOTICE
Ensure the cleanliness of the mounting surfaces at the wagon-interfaces and the gang-way (both screw-on frames) prior to mounting!

Verification of condition of rubber seals:

NOTICE
Ensure that the rubber seals of the screw-on frames are not damaged (e.g. torn, brittle) and there is no rippling!

6.5 Tightening torques

None of the fasteners to attach the gangway system to the wagon-interfaces are included in the scope of supply of HÜBNER GmbH & Co. KG. The tightening moment (depending on the grade and type of fasteners coming to application) are given for reference and maintenance purpose.

Source: DIN 25201-2: 2015-12 Design guide for railway vehicles and their components – Bolted joints – Part 2: Design – Mechanical applications

Thread	*Strength class*	F_M *in N for* μ_G							M_A *in Nm for* μ_K						
		0,08	0,09	0,1	0,12	0,14	0,16	0,20	0,08	0,09	0,1	0,12	0,14	0,16	0,20
M4	8.8	4,6	4,6	4,5	4,4	4,3	4,2	3,9	2,3	2,4	2,6	3,0	3,3	3,6	4,1
	10.9	6,8	6,7	6,7	6,5	6,3	6,1	5,7	3,3	3,6	3,9	4,6	4,8	5,3	6,0
	A2-70	3,3	3,2	3,2	3,1	3,0	2,9	2,8	1,6	1,7	1,8	2,1	2,3	2,5	2,9
	A4-80	4,4	4,3	4,3	4,1	4,0	3,9	3,7	2,1	2,3	2,5	2,8	3,1	3,4	3,8
M5	8.8	7,6	7,5	7,4	7,2	7,0	6,8	6,4	4,4	4,8	5,2	5,9	6,5	7,1	8,1
	10.9	11,1	11,0	10,8	10,6	10,3	10,0	9,4	6,5	7,0	7,6	8,6	9,5	10,4	11,9
	A2-70	5,3	5,3	5,2	5,1	4,9	4,8	4,5	3,1	3,4	3,6	4,1	4,6	5,0	5,7
	A4-80	7,1	7,0	6,9	6,8	6,6	6,4	6,0	4,1	4,5	4,8	5,5	6,1	6,6	7,6
M6	8.8	10,7	10,6	10,4	10,2	9,9	9,6	9,0	7,7	8,3	9,0	10,1	11,3	12,3	14,1
	10.9	15,7	15,5	15,3	14,9	14,5	14,1	13,2	11,3	12,2	13,2	14,9	16,5	18,0	20,7
	A2-70	7,5	7,4	7,3	7,2	7,0	6,8	6,4	5,4	5,8	6,3	7,1	7,9	8,6	9,9
	A4-80	10,0	9,9	9,8	9,5	9,3	9,0	8,5	7,2	7,8	8,4	9,5	10,5	11,5	13,2
M8	8.8	19,5	19,3	19,1	18,6	18,1	17,6	16,5	18,5	20,1	21,6	24,6	27,3	29,8	34,3
	10.9	28,7	28,4	28,0	27,3	26,6	25,8	24,4	27,2	29,5	31,8	36,1	40,1	43,8	50,3
	A2-70	13,7	13,6	13,4	13,1	12,7	12,4	11,7	13,0	14,1	15,2	17,3	19,2	21,0	24,1
	A4-80	18,3	18,1	17,9	17,5	17,0	16,5	15,6	17,3	18,8	20,3	23,0	25,6	28,0	32,1
M10	8.8	31,0	30,7	30,3	29,6	28,8	27,9	26,3	36	40	43	48	54	59	68
	10.9	45,6	45,1	44,5	43,4	42,2	41,0	38,6	53	58	63	71	79	87	100
	A2-70	21,8	21,6	21,3	20,8	20,3	19,7	18,6	26	28	30	34	38	41	48
	A4-80	29,1	28,8	28,5	27,8	27,0	26,3	24,8	34	37	40	45	51	55	64
M12	8.8	45,2	44,7	44,1	43,0	41,9	40,7	38,3	63	68	73	84	93	102	117
	10.9	66,3	65,7	64,8	63,2	61,5	59,8	56,3	92	100	108	123	137	149	172
	A2-70	31,8	31,4	31,1	30,3	29,5	28,7	27,1	44	48	52	59	65	72	82
	A4-80	42,4	41,9	41,4	40,4	39,4	38,3	36,1	59	64	69	78	87	95	110
(M14)	8.8	62,0	61,1	60,6	59,1	57,5	55,9	52,6	100	108	117	133	148	162	187
	10.9	91,0	89,7	88,9	86,5	84,4	82,1	77,2	146	159	172	195	218	238	274
	A2-70	43,4	43,0	42,5	41,4	40,3	39,2	37,0	70	76	82	94	104	114	131
	A4-80	57,9	57,3	56,6	55,2	53,8	52,3	49,3	93	102	110	125	139	152	175
M16	8.8	84,7	84,0	82,9	80,9	78,8	76,6	72,2	153	167	180	206	230	252	291
	10.9	124,4	123,4	121,7	118,8	115,7	112,6	106,1	224	245	264	302	338	370	428
	A2-70	59,7	59,1	58,4	57,1	55,6	54,1	51,1	108	117	127	145	162	178	206
	A4-80	79,6	78,8	77,9	76,1	74,1	72,2	68,1	143	157	169	193	216	237	274
M20	8.8	136	135	134	130	127	123	116	308	336	363	415	464	509	588
	10.9	194	193	190	186	181	176	166	438	479	517	592	661	725	838
	A2-70	93	92	91	89	87	84	80	210	229	248	284	317	347	402
	A4-80	124	123	122	119	116	113	106	280	306	331	378	422	463	536
M24	8.8	196	195	192	188	183	178	168	529	579	625	714	798	875	1 011
	10.9	280	277	274	267	260	253	239	754	825	890	1017	1 136	1 246	1 440
	A2-70	134	133	131	128	125	122	115	362	395	427	488	545	598	691
	A2-50	63	62	61	60	58	57	54	169	184	199	228	254	279	322

Table 1: Tightening torques

6.6 Mounting the components/assembly groups

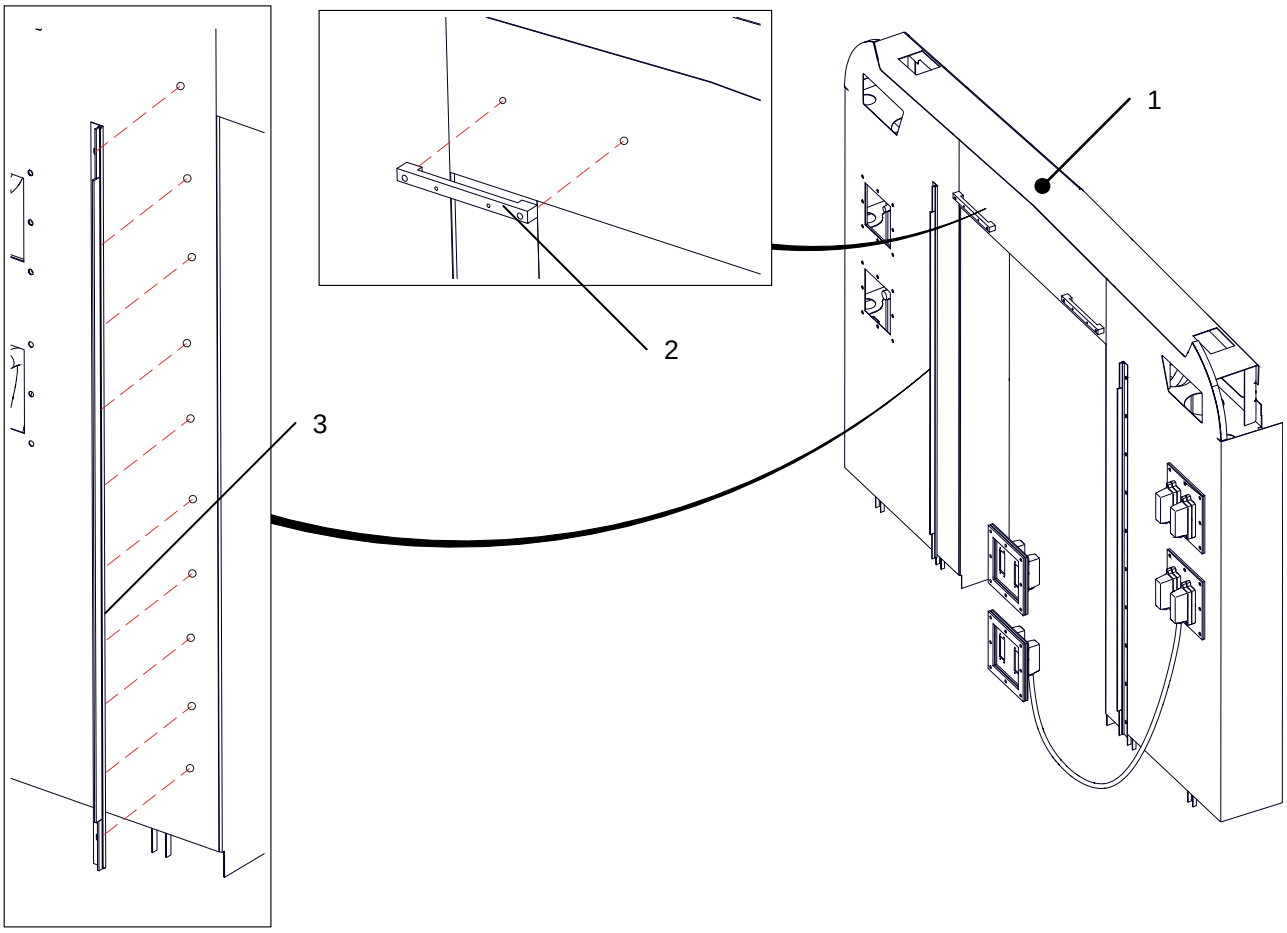
6.6.1 Mounting the loose parts - Overview

Both wagon-interfaces have to have the hole pattern to receive:

- the screw-on frames of the “corrugated bellows, assy. final mounted”
- the folding wall
- the combination bridge,
- the covering brushes,
- the guiding bodies and
- the shackles.

Mount the following components to each wagon-interfaces acc. to drawing 01448517:

- 4 pc. Covering brush, assy.
- 4 pc. Shackle, assy.



1	*Wagon-interface*	2	*Shackle*
3	*Covering brush*		

Illustration 9: Mounting parts – Wagon-interface No. 1 and No. 2 (No. 2 = opposite side)

6.6.1.1 The covering brushes to the wagon-interfaces

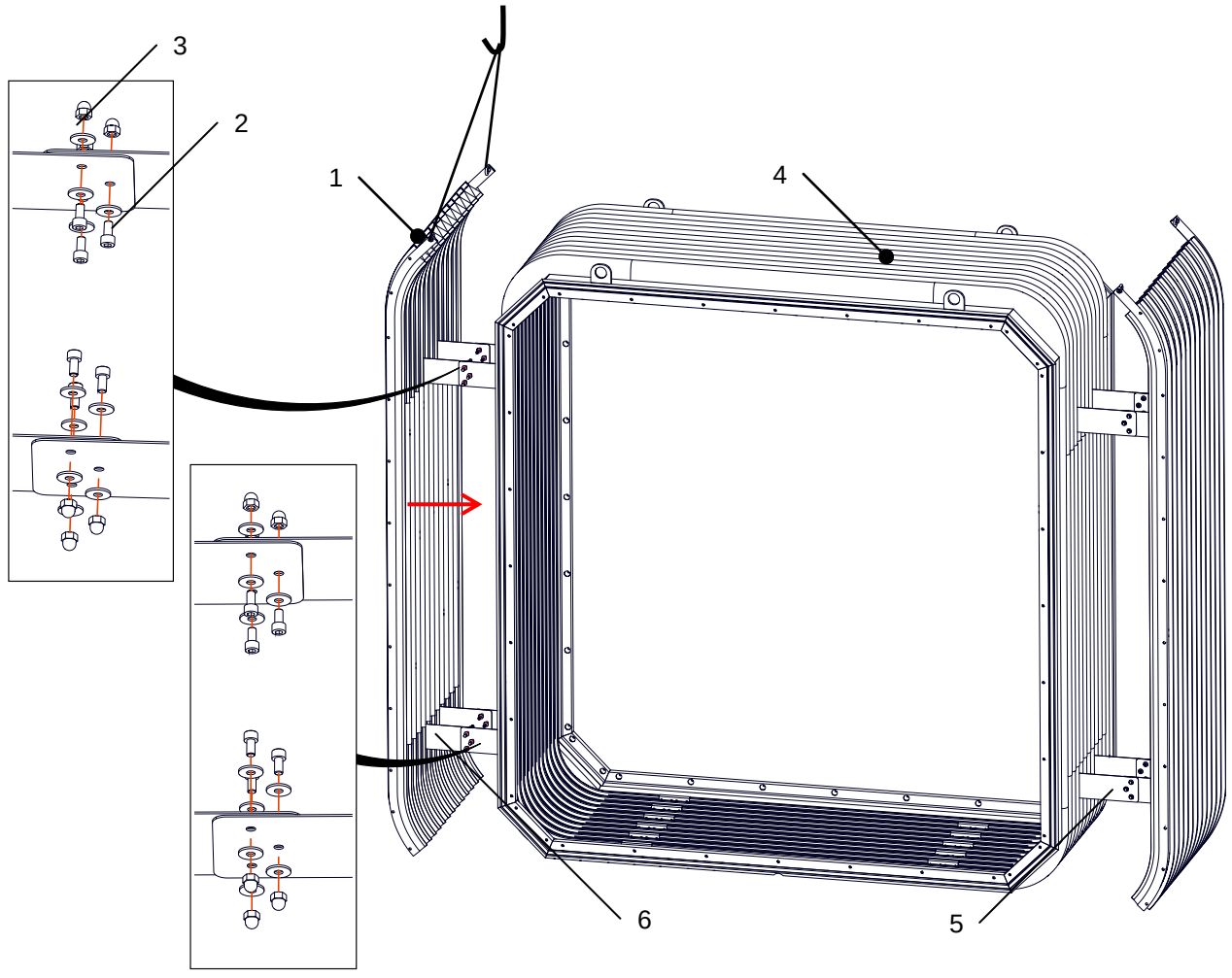
- Bolt the covering brushes to the wagon-interfaces (each 10x M6). Refer to Illustration 9.

6.6.1.2 The shackles to the wagon-interfaces

- Bolt two shackles (receiving later-on the linking ceiling) to each wagon-interface. Each 2x M10 – refer to Illustration 9.

6.6.2 The folding wall, assy. to the corrugated bellows

1. Lift the folding walls by means of a crane and bring it into approximate mounting position.
2. Bolt with screws, washers and nuts the connecting plates of the folding wall with the connecting plates of the corrugated bellows.
3. Perform the same procedure for the other folding wall.



1	*Folding wall, assy.*	2	*Screw and washer*
3	*Nut and washer*	4	*Corrugated bellows, assy., final mounted*
5	*Connecting plate (bellows)*	6	*Connecting plate (folding wall)*

Illustration 10: Mounting folding wall, assy. on corrugated bellows

6.6.3 The corrugated bellows, final mounted to wagon interfaces

ATTENTION

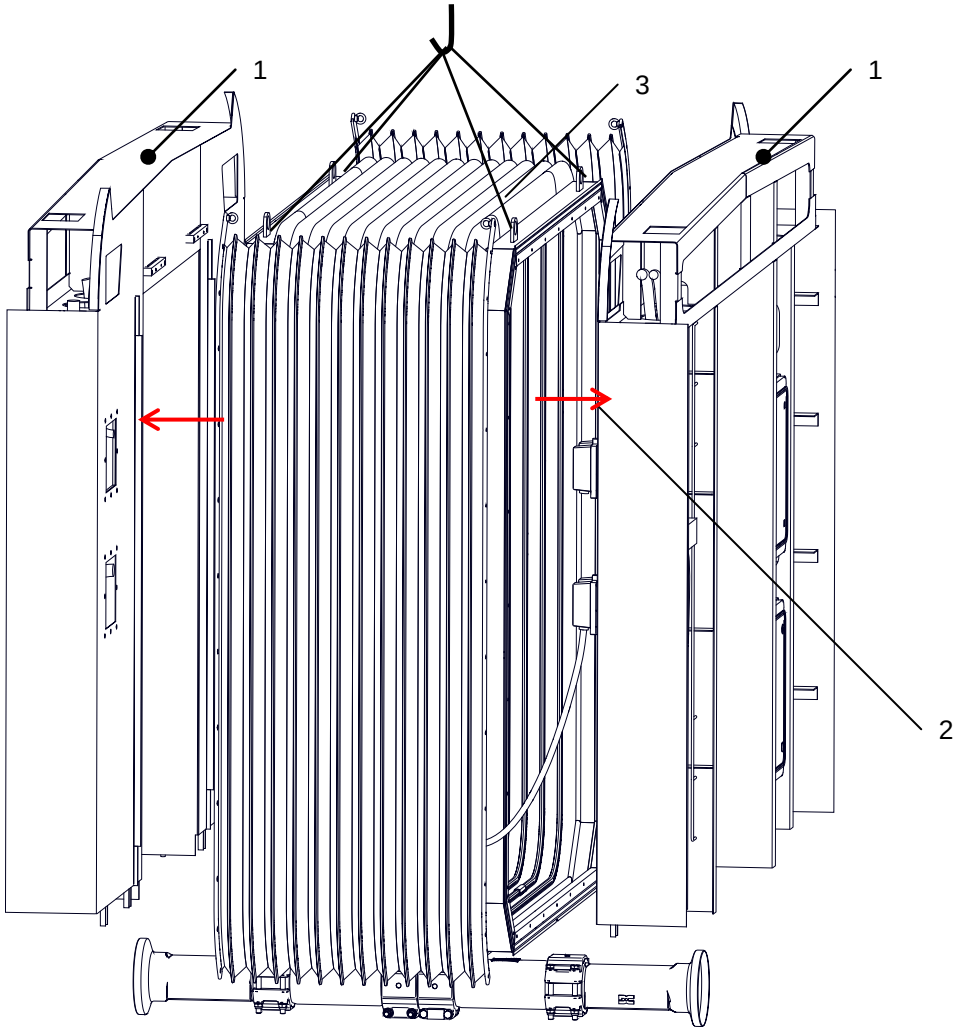
Material damage possible.

- Ensure that for lifting the corrugated bellows, always all four crane lugs are used and that the load is distributed equally to all of them. Please also refer to the illustration below.

1. Couple the wagon coupling of the cars.
2. Lift the corrugated bellows by means of a crane and bring it into approximate mounting position between the wagons.
3. Align the hole pattern of the wagon-interface and the screw-on frame. Screw the screw-on frame of the corrugated bellows to the wagon- interface.
4. Repeat the previous step at the other wagon-interface.
5. Bolt on the screw-on frames of the folding walls to the wagon interfaces.

After mounting the “Corrugated bellows, assy. final mounted” mount the following components to the wagon-interfaces acc. to drawing 041448517:

- 1 pc. Combination bridge, assy. (refer to Chap. 6.6.4)
- 1 pc. Linking ceiling, assy. (refer to Chap.6.6.5)
- 2 pc. Guiding body, assy. screw-on frame side (refer to Chap. 6.6.7)
- 2 pc. Guiding body, assy. locking side (refer to Chap. 6.6.7)
- 2 pc. Side wall, assy. (refer to Chap. 0)

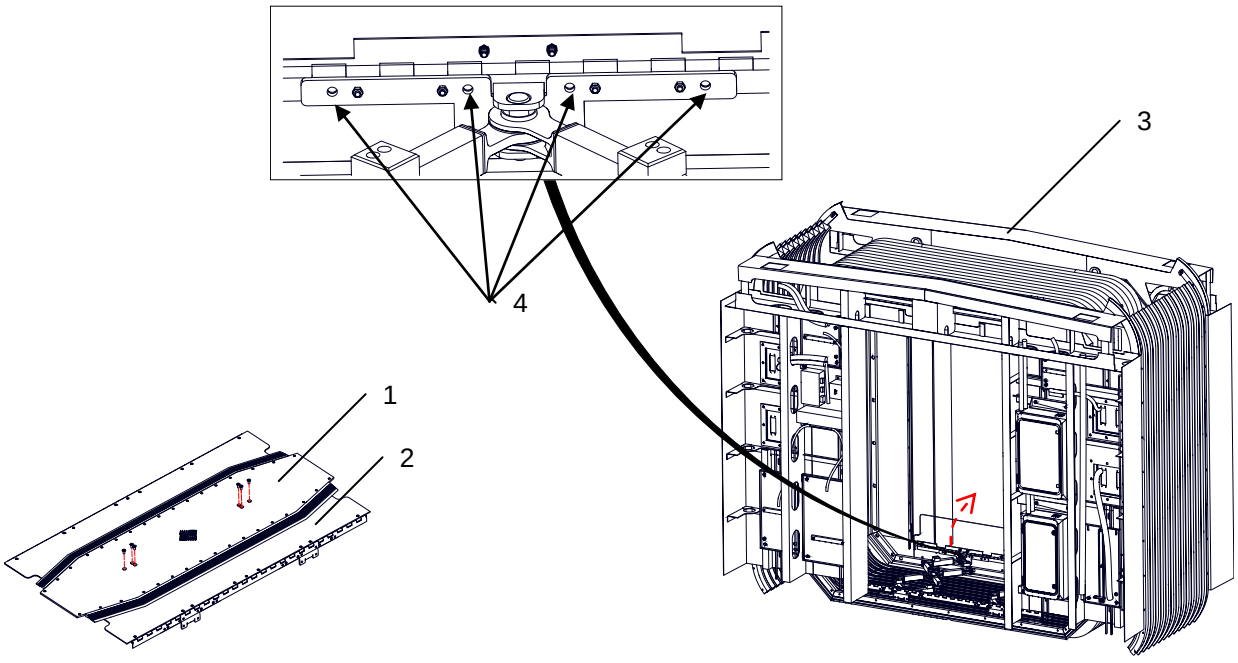


1	*Wagon-interface*	2	*Bolt Bellows to hole pattern of wagon-interface all around contour*
3	*Corrugated bellows, assy., final mounted*		

Illustration 11: Mounting corrugated bellows on vehicle interfaces

6.6.4 The combination bridge, assy.

1. Before installing the combination bridge, assy. between the wagon interfaces. Unscrew the six screw of the tread plate and remove the tread plate. (see Illustration 12)
2. Insert the combination bridge into the corrugated bellows.
3. Flip up the wagon sided bridge plates of the combination bridge.
4. Screw the combination bridge to the vehicle interface near the scissors by using appropriated screws.
5. Bolt the combination bridge to the vehicle interface on the other side near the scissors using screws.
6. Flip down the bridge plates.
7. Put in the tread plate and bolt it on with the six screws.



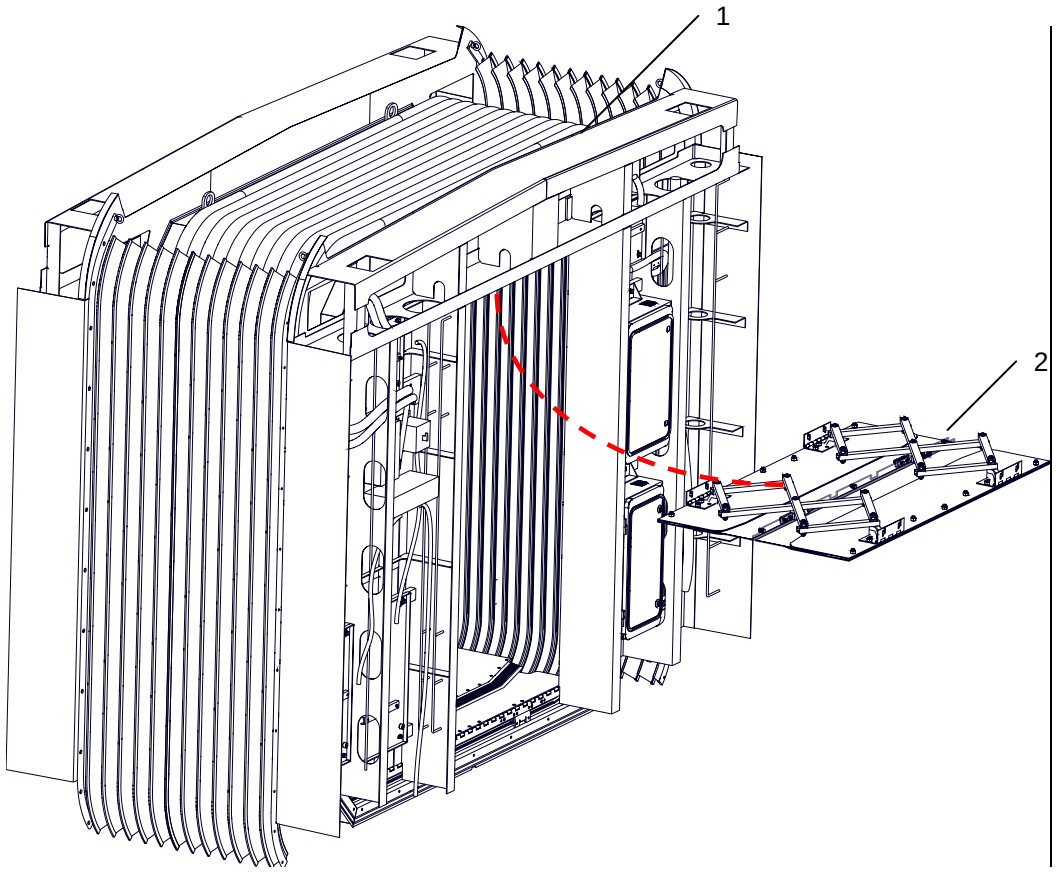
1	*Tread plate, assy.*	2	*Bridge plate, assy.*
3	*Wagon interface*	4	*Holes for screws*

Illustration 12: Mounting combination bridge, assy.

6.6.5 The linking ceiling

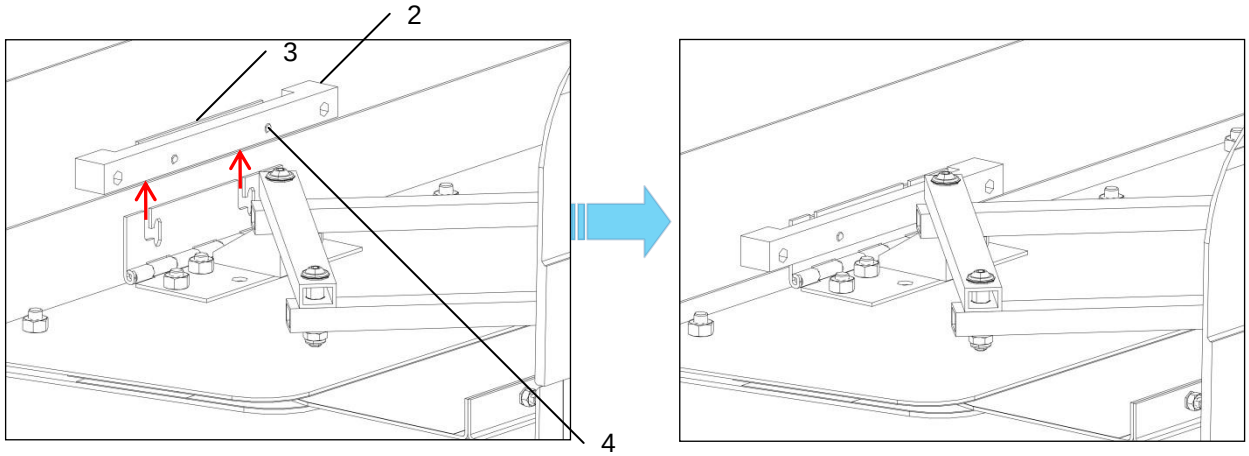
Mounting of the linking ceiling requires two persons.

1. Compress the unmounted linking ceiling by pushing the outer ceiling plates onto the middle (simple) ceiling plate.
2. Bring the linking ceiling into mounting position into the gangway area.
3. Bolt the hinges (per hinge 2x M8) of the linking ceiling to the already mounted shackles of the screw-on frame side No. 1 by sliding the hinges of the linking ceiling **in-between** the plate of the shackle and the shackle body - refer also to Illustration 14.
   Note: The attachment drillings of the rod hinges are slots (refer to Illustration 14) in order to be able to align the height of the linking ceiling with the interior lining in the respective area. Place (hang) the hinges onto the screws before used to bolt the shackles to the wagon-interfaces.
4. Tighten the attachment screws of the linking ceiling (per hinge 2x) by reaching into the gap between wagon-interface and linking ceiling using a flat open-end spanner (Size 13).
5. Repeat on 2nd wagon-interface.



1	*Wagon-interface*	2	*Linking ceiling*

Illustration 13: Mounting the linking ceiling to the shackles already mounted to the wagon-interfaces



1	*Wagon-interface*	2	*Shackle*
3	*Plate*	4	*Screw*

Illustration 14: Mounting the linking ceiling to the shackles already mounted to the wagon-interfaces (schematic)

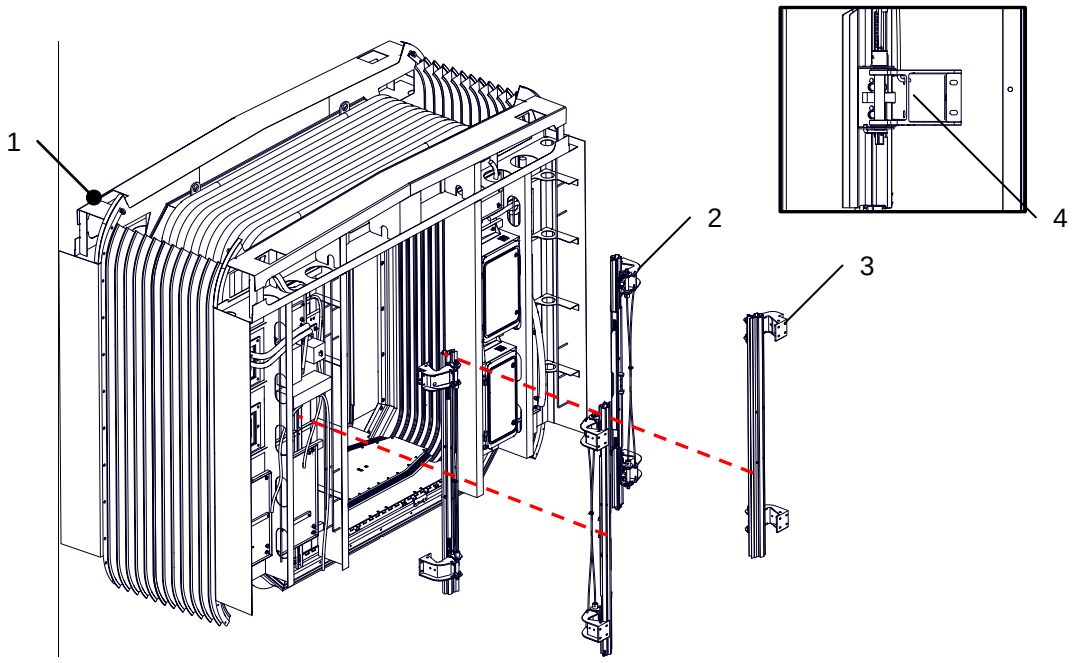
6.6.6 Handling – Height adjustment of linking ceiling

1. The attachment screws of the linking ceiling can be loosened through the horizontal gaps between wagon-interface and linking ceiling element using a flat open end spanner size 13.
2. Adjust the height of the linking ceiling successively on each side is up to ±5 mm possible to meet the interior lining. After height adjustment retighten the attachment screws at the required height.

6.6.7 Mounting the guiding bodies to the wagon-interfaces

NOTICE
The linking ceiling is already mounted! Proceed with care when mounting the guiding bodies to avoid damage (e.g. scratches) to the linking ceiling!

1. Bring the guiding body into mounting position into the gangway area.
2. To each wagon-interface one “screw-on side” and one “locking side” guiding body is mounted. For details regarding the upper and lower sides of the guiding bodies refer to the attached drawing 041448517.
3. Align the hole pattern and bolt the cast holders to the wagon-interface (4x M10).
4. Repeat for other guiding bodies.



1	*Wagon-interface*	2	*Guiding body, locking side*
3	*Guiding body, screw-on side*	4	*Holder side wall*

Illustration 15: Mounting the guiding bodies to the wagon-interfaces

6.6.8 Mounting the side walls

Mounting of the side wall requires two persons.

Pre-condition

- The bellows is mounted
- The combination bridge is mounted
- The linking ceiling is mounted
- The guiding bodies are mounted to the wagon-interfaces.

1. At the guiding body screw-on side (right hand side; looking orthogonal to the longitudinal axis of the wagons) pull the guiding body downwards.
2. Place a spacer (Size: approx. 100 mm x 50 mm x 20 mm) in the upper opening at the guiding body – refer to Illustration 16. (The spacer will pre-tension the spring. It is suggested to secure the spacer with a tape to prevent it from falling into the inside of the gangway).
3. Insert the pin of the side wall into the hole of the guiding body screw-on side.
4. Bolt (2x M8x30) the screw-on side of the side wall to the guiding body (screw-on side) which is already mounted to the wagon-interface (refer to Illustration 17).
5. Repeat for opposite side wall.
6. Remove the spacer out of the opening (guiding body).
7. Refer to Chap. 7.1 for locking the side walls.

NOTICE

If a spacer was used to mount the side wall(s) ensure that the spacer is removed prior to proceed with locking the side wall(s).

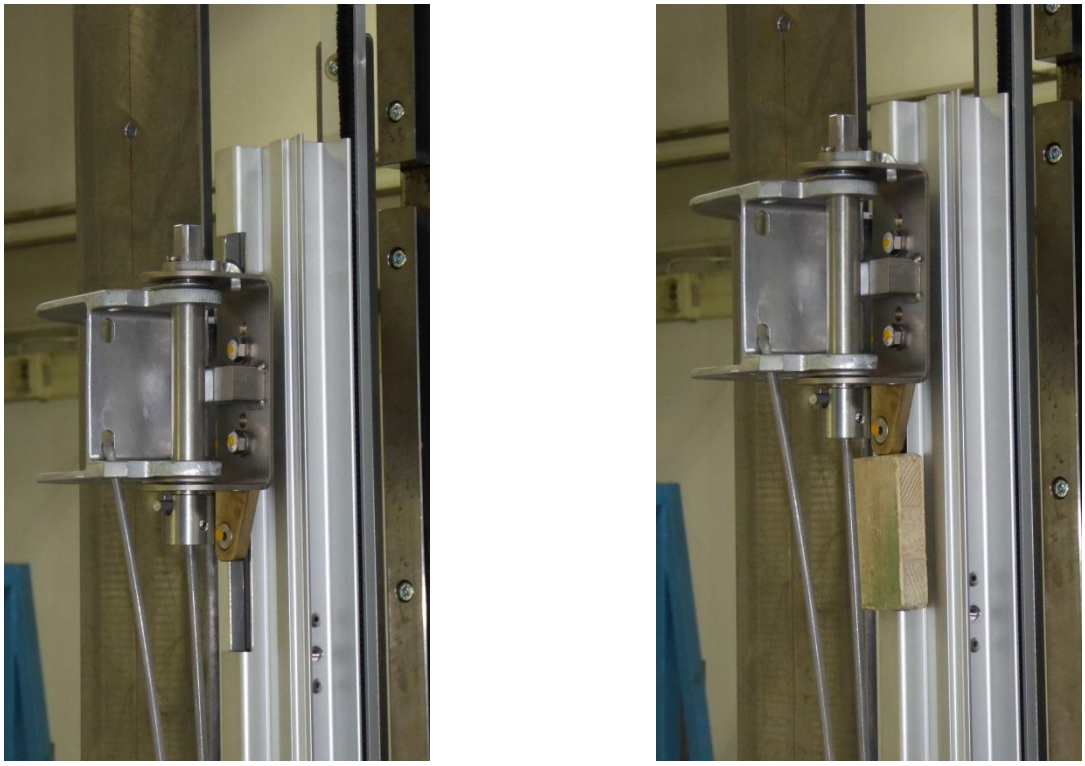
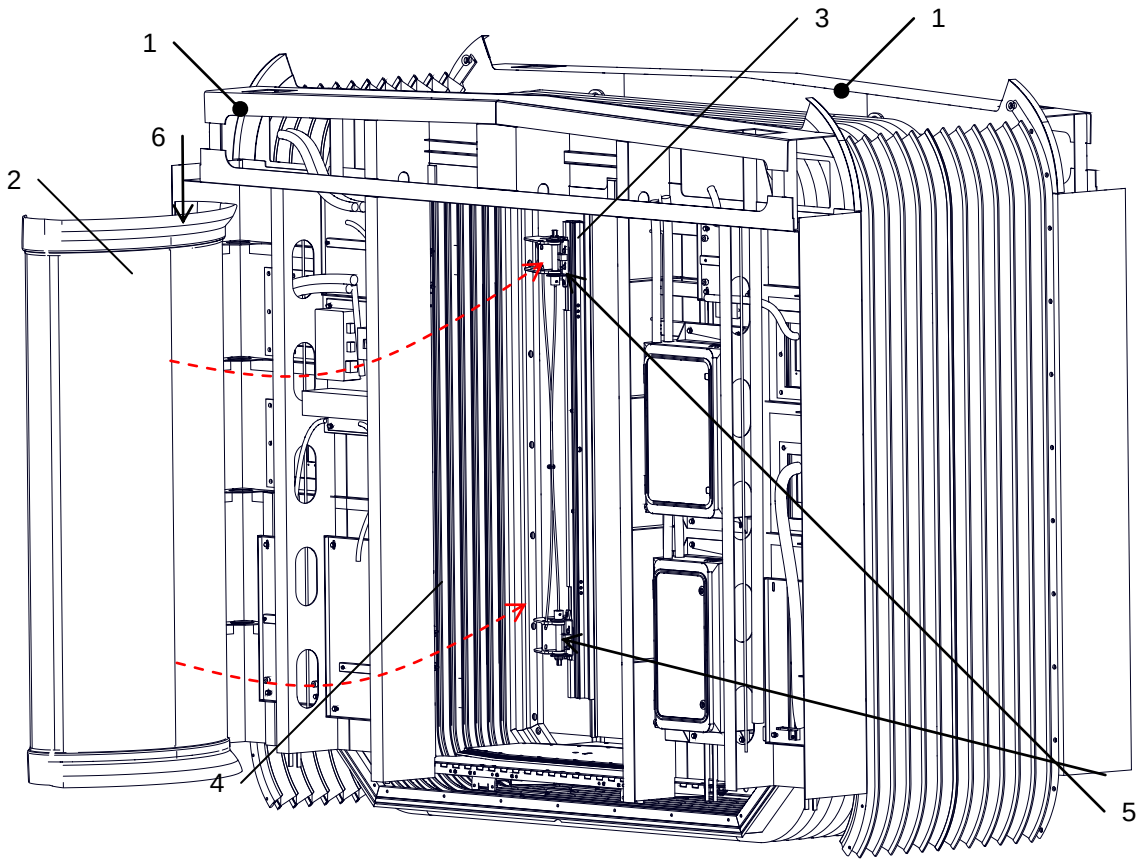


Illustration 16: Guiding body without (left) and with spacer (right) as mounting aid



1	*Wagon-interface*	2	*Side wall*
3	*Guiding body – screw-on side*	4	*Guiding body, locking side*
5	*Attachment points of side wall at guiding body, screw-on side*	6	*Screw-on side of side wall*

Illustration 17: Mounting the side wall to the guiding bodies, screw-on side

6.6.9 Locking the side walls after mounting to the wagon-interfaces

For closing and locking the side walls refer to Chapter 7.1.

7 Locking/Unlocking the side wall(s)

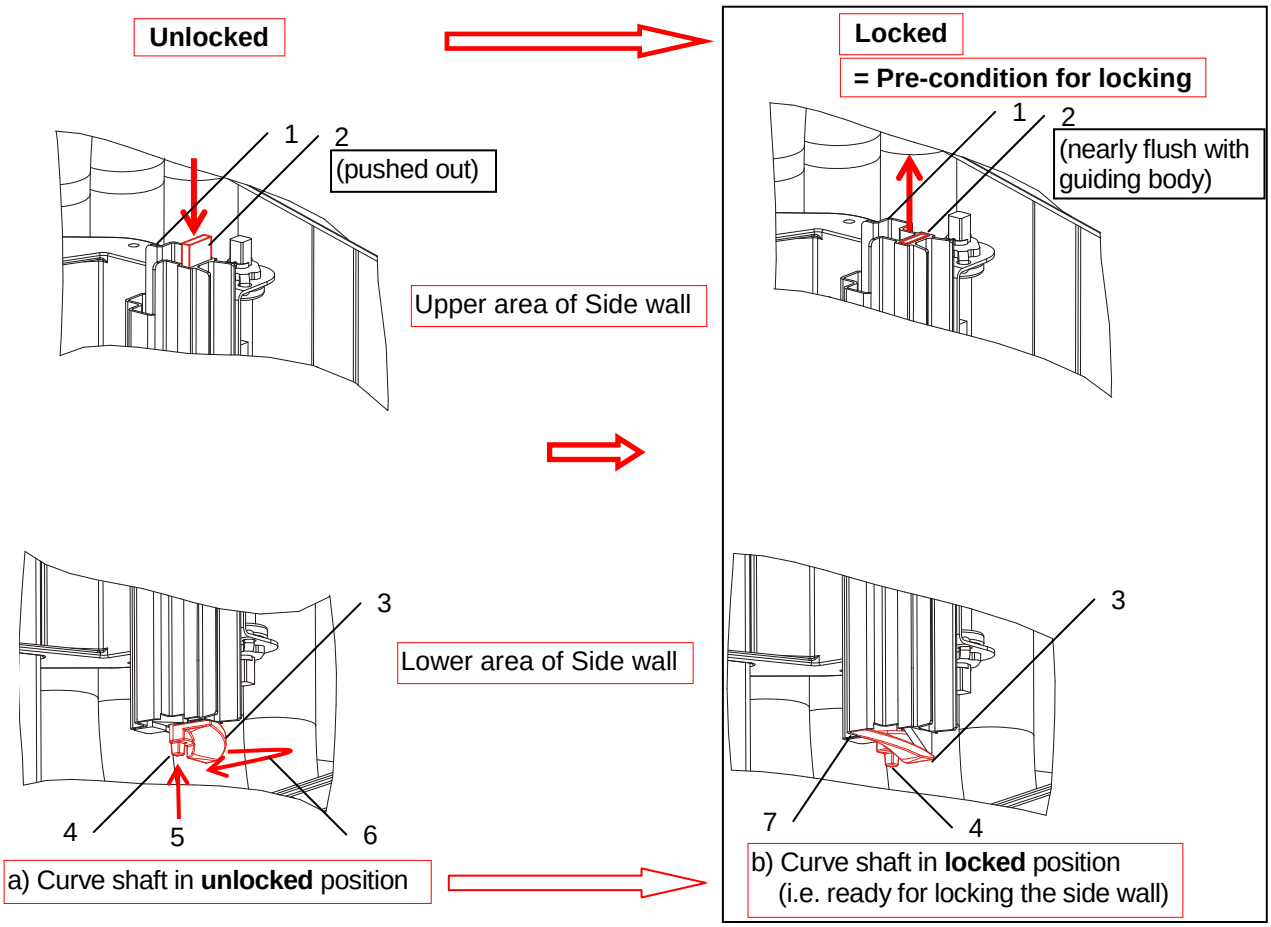
7.1 Locking the side wall(s)

Pre-condition:

- The vehicles must be in normal position on straight track.

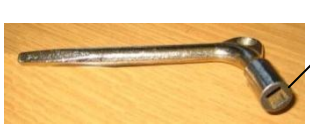
Procedure:

1. Prior to locking the side wall ensure that the curve shaft and the locking bar of the guiding body are in locked position (Illustration 18b)). For this the curve shaft is turned clockwise to the right until the stop is reached. The locking bar should now be in the lower position (Illustration 18b)). This position of the locking rod is required to make the locking of the side wall possible.
2. To lock the side walls they have to be turned and guided between brush ledge and guiding body until locked with the locking bar of the guiding body.
3. Repeat procedure for second side wall.



1	*Guiding body*	2	*Locking rod*
3	*Curve shaft*	4	*Square end of curve shaft*
5	*Place hollow square spanner onto curve shaft*	6	*Direction of turning curve shaft for locking*
7	*Stop (Guiding body)*		

Illustration 18: Locking the Side wall(s) (schematic)



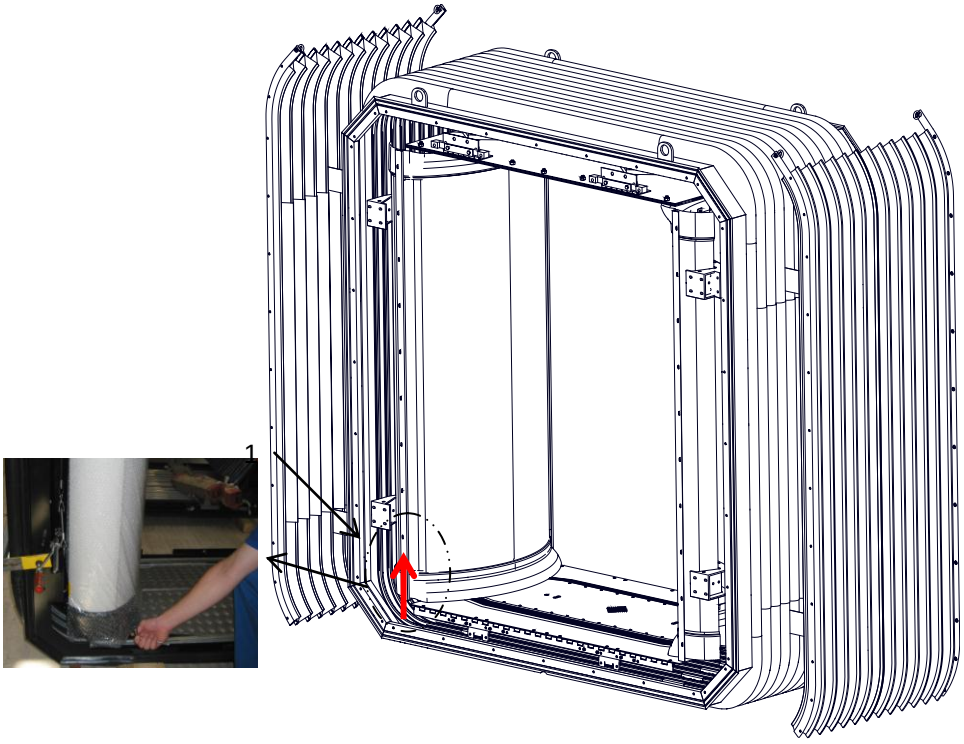
1	*Hollow square spanner*		

Illustration 19: Hollow square spanner - Aid

7.2 Unlocking the side wall(s)

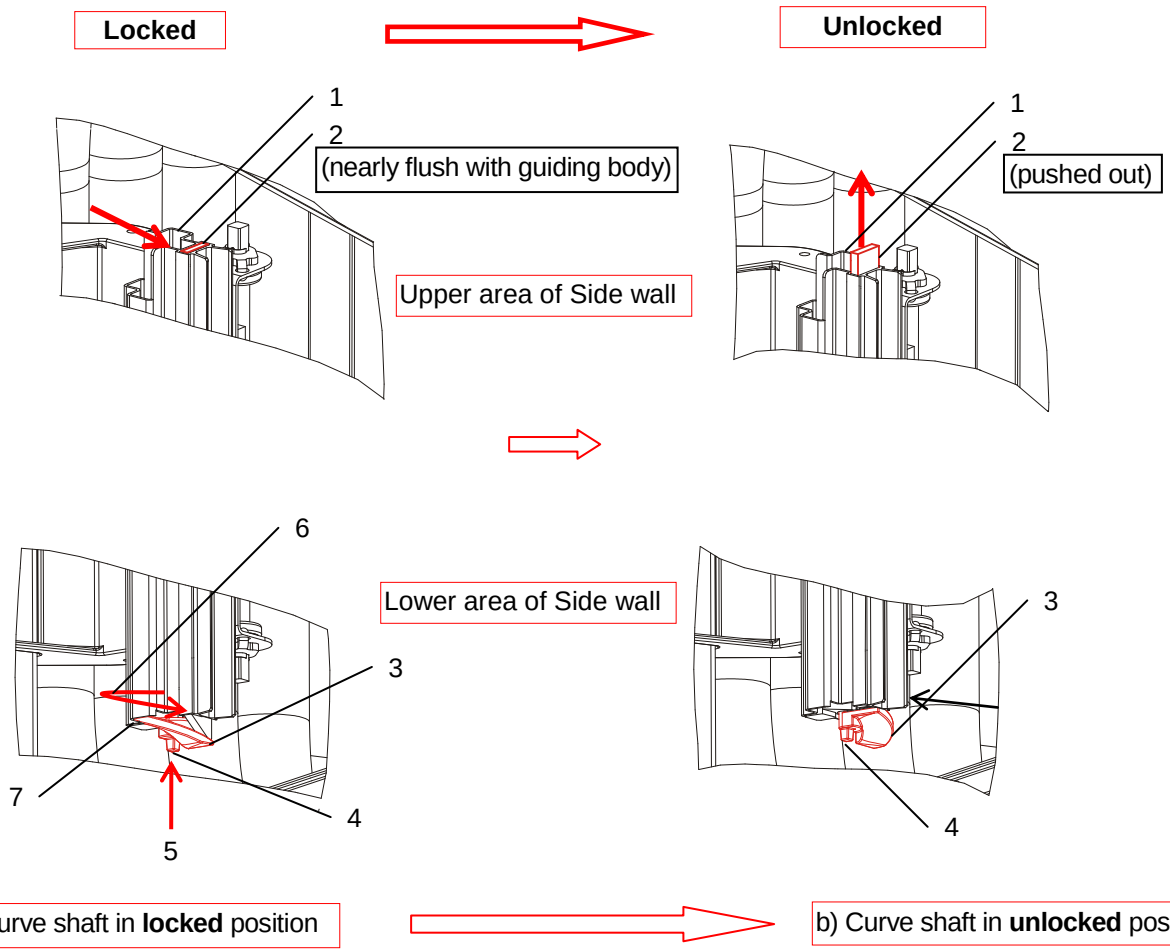
The side walls have to be unlocked and opened prior to proceeding with unmounting maintenance tasks.

1. Unlocking of the side walls occurs at the lower left hand side of the side wall behind the folds of the gap covering by means of a 9 mm square spanner.
2. Correct unlocking of the side wall through turning the curve shaft is achieved if the locking rod at the upper end of the guiding body is pushed out by approx. 30 mm (Illustration 21).



1	*Lower left hand side of side wall*		

Illustration 20: Unlocking the Side wall(s)



1	*Guiding body*	2	*Locking rod*
3	*Curve shaft*	4	*Square end of curve shaft*
5	*Place hollow square spanner onto curve shaft*	6	*Direction of turning curve shaft for **unlocking***
7	*Stop (Guiding body)*		

Illustration 21: Unlocking the Side wall(s) (schematic)

8 Commissioning

8.1 Inspections prior to starting operation

Prior to starting operation the inspections listed in Table 2 have to be executed:

Component/Assembly group	Function to be checked	Inspection methods
Linking ceiling	Free movement of the linking ceiling elements	Check for correctly mounted shackles and linking ceiling
Side walls	Firm fit of the side walls	Pull and move the side walls
Combination bridge	Free movement	Check easy running
Screw-on frames	Gap free fit of the screw-on frames (corrugated bellows and folding walls)	External inspection
Folding walls	Connection between folding walls and corrugated bellows	External inspection

Table 2: Inspections prior to starting operation

8.2 Starting operation

If no faults have been located according to Table 2 the gangway is ready for operation.

9 Maintenance, cleaning and repair instructions

9.1 Maintenance

The following inspections listed in Table 3 should be carried out when inspecting the wagons:

No.	Component	Task description / Possible failure	Interval			Action / Remedy
			1 Month	1 Year	12 Years[1]	
01	Bellows and folding wall	**Visual inspection:** ➢ Tears or holes in bellows fabric				Repair according to Chap. 9.3.4
		➢ Broken aluminum profiles				Repair according to Chap. 9.3.2
		➢ Fabric torn out of bellows frames				Repair according to Chap. 9.3.3
		➢ Sealing of screw-on frames worn/damaged				Replace sealing(s)
		➢ No gap-free fit of screw-on frames at wagon-interfaces	X	X		Fasten/attach screw-on frame as required
		➢ Connection between bellows and folding wall loosen				Fasten/attach connection
		Visual inspection / Cleaning: ➢ Accumulation of dirt/garbage on bellows floor				Cleaning as required. Use industrial vacuum cleaner, if necessary.
02	Combination bridge	**Visual/functional inspection:** ➢ Damage				Replace
		➢ Sliding ledges worn/damaged	X	X		Replace sliding ledges as required, chap. 10.4
03	Linking ceiling	**Visual inspection:** ➢ Linking ceiling damaged	X	X		Replace linking ceiling, chap. 6.6.5
04	Side wall	**Visual/functional inspection:** ➢ Tears in gap covering	X	X		Replace gap covering – refer to Chap. 10.2
		➢ Firm fit				Tighten attachment screws
05	Bellows – Cleaning the floor area of the bellows	**Visual/functional inspection:** ➢ Dirt and rubbish on the bellows floor area (visual inspection through flipping-up the floor flaps of the bridge plates)		X		Clean if necessary using the industrial vacuum cleaner
06	Gangway system	**Overhaul / Replacement:** ➢ Replacement at end of lifetime			X	Replace gangway system

Table 3: Preventive maintenance instructions

[1] On request Hübner offers at the end of the lifetime a condition assessment to evaluate the possibility of an extended usage of the gangway system.

9.2 Cleaning

ATTENTION
Limited resistance of bellows fabric and aluminum profiles against cleaning devices.
Material damage possible.
- Avoid material damage to the bellows fabric.
- Use of high-pressure cleaners or steam cleaners is not allowed.

ATTENTION
Draining suds through the bellows can lead to irreparable damage at the bellows.
Material damage possible.
- Do not spill under any circumstances any liquids, which are used for cleaning the interior of the vehicle, in the bellows.
- Draining suds through the bellows can lead to irreparable damage at the bellows!

ATTENTION
Material damage possible.
- To clean the gangway system it not allowed using any other cleaning agent than the once mentioned in this chapter. The usage of other cleaning agent might lead to irreparable damages in particular of the bellows fabric.

9.2.1 Cleaners

ATTENTION
Check cleaner before using:
- Cleaners may only be applied on non-disturbed surfaces without scratches.
- Longer reaction time of the cleaners is to be avoided. Application shall be done by using a soft rag.
- Before applying and using the cleaner, apply the chosen cleaner in an inconspicuous place and check for any changing of surface conditions!

CAUTION
Harmful substances.
Hazardous to health.
- Note the safety data sheets and manufacturer remarks of the used cleaners.

The following cleaners can be used to clean the bellows fabric and the linking ceiling:

a) For slight soiling:
   - pH neutral industrial cleaners (pH6 - pH8)

b) For strong soiling or Graffiti - soiling the following cleaning agents on the basis of citric or orange acid can be used:
   - DERCAM ® GRAFFORANGE BIO
   - Comorcap LP
   - NOVO PEN-OFF

The coating of the interior lining (powder coating and lacquer of side wall) are chosen in a way that graffiti can be removed by using the following product:

a) For slight soiling:
   - NOVO PEN-OFF

b) For strong soiling or Graffiti:
   - DERCAM ® GRAFFORANGE BIO
     from MC2 Chimie, 77 rue Albert GARRY, 94450 LIMEIL BREVANNES

9.2.2 Cleaning the bridge plates (passage area of gangway)

ATTENTION

➢ Do not spill any kind of liquid in the bridge plate area of the gangway when cleaning!

1. In order to remove dirt use an industrial vacuum cleaner or a broom.
2. Only for very hard to remove soiling use a damp cleaning method.

9.2.3 Cleaning the bellows floor area (underneath bridge plates)

1. In order to remove dirt and/or rubbish accumulated over time, cleaning the area of the bellows underneath the bridge plates has to occur if necessary, but at least once a year, using an industrial vacuum cleaner.

Proceed as follows:

WARNING - DANGER OF INJURY

➢ Proceed with care when working at the bridge plates!

1. Unlock, open and dismount the side walls.
2. Dismount the middle tread plate of the combination bridge.
3. Flip up the wagon sided bridge plates.
4. Insert the nozzle of the industrial vacuum cleaner into the opening and remove the dirt/garbage accumulated in the lower area of the bellows.

ATTENTION

➢ No suds or any kind of liquid to remain in the bottom area of the bellows after any kind of cleaning!

9.2.4 Cleaning the bellows fabric, the linking ceiling and the side walls

- Thoroughly clean the soiled fabric of the bellows using the above mentioned cleaners (refer to Chap. 9.2.1). Use a soft rag.
- Thoroughly clean the soiled surface and the gap coverings of the side wall using the above mentioned cleaners (refer to Chap. 9.2.1). Use a soft rag.

9.3 Repair

9.3.1 General

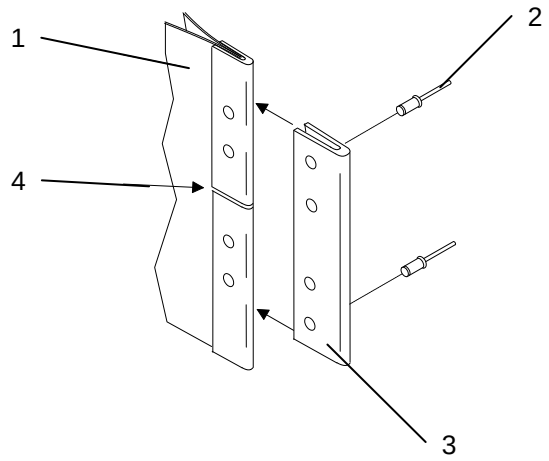
The required spare parts can be ordered from HÜBNER GmbH & Co. KG. The order can be made with the list of spare parts according to the HÜBNER-article number.
All repair instructions, special tools, materials and repair patches required for repair purposes are included in the HÜBNER-Repair-Set.

CAUTION
Harmful substances.
Hazardous to health.
➢ Note the safety data sheets and manufacturer remarks of the used cleaners.

Note: A detailed repair instruction is included in the HÜBNER-Repair-Set.

9.3.2 Repair of broken aluminum bellows profiles

1. Set the repair-set enclosed aluminum cross profile onto the broken profile.
2. Knock the profile into shape using the enclosed PVC hammer.
3. Drill at four suitable places holes (e.g. Ø 4.2 mm – diameter depending on profile size – refer to repair instructions of HÜBNER-Repair-Set), two holes to each side of the broken profile.
4. Secure with the enclosed blind rivets.
5. Should profiles be broken in the corner area it is possible to order respective repair corners according to the article number.

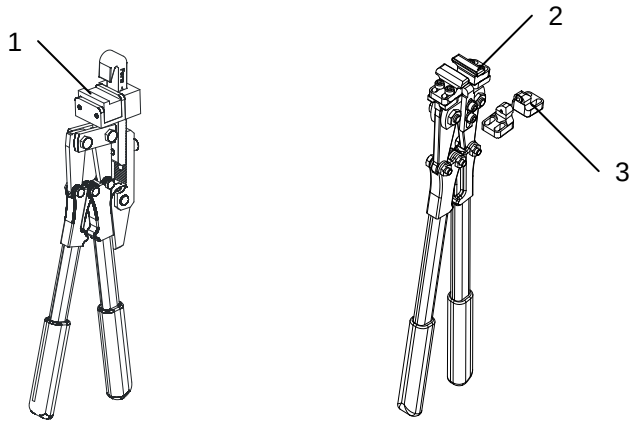


1	*Bellows fabric*	2	*Rivet*
3	*Cross profile*	4	*Broken bellows frame*

Illustration 22: Repair of broken bellows frames

9.3.3 Repair of torn out bellows fabric

1. Slightly open the aluminium profile in the repair area using the enclosed opener pliers.
2. Re-position the bellows' fabric by hand into the aluminium profile.
3. Pre-clamp the repair area every 5 cm using the enclosed crimping pliers. Pre-clamping in corner areas every 3 cm.
4. Close the entire repair area using the special hand-closure pliers.

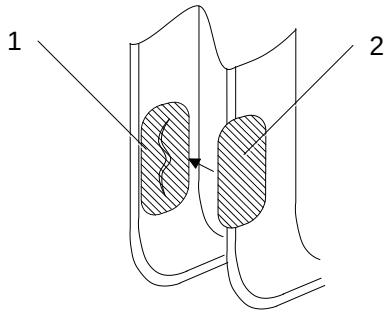


1	*Opener pliers*	2	*Multipurpose pliers (as closure pliers)*
3	*Multipurpose pliers (as crimping pliers)*		

Illustration 23: Special pliers

9.3.4 Repair of damaged bellows fabric (cuts, tears etc.)

1. Clean the affected area of the bellows fabric with the repair-set provided cleaning agent on the side onto which the patch will be attached.
2. Cut patches of fabric according to the size of the damaged area. Patch has to exceed size of damaged area by approximately 10 mm. Round off the edges.
3. Apply "Elastosil E 43" evenly onto the patch using a brush (approximately 2–3 mm thick).
4. Place patch onto damaged area and firmly press the patch to the bellows fabric using the enclosed cellular rubber roller. Support area from the inside with a suitable hard item (e.g. board). Avoid air bubbles. Note: "Elastosil E 43" has to come out all around the patch edges.
5. Press the patch with a suitable helping device (e.g. wooden clamps, screw clamp etc.), possibly covering the entire repair area to the bellows fabric until the "Elastosil E 43" has hardened.
6. After hardening the glued section can be subject to strain. Note: The repaired area is after six hours firm to contact and after five days ready to be subject to strains.
7. In the roof, floor and corner area the patches should additionally be secured with the hollow rivets contained in the repair set. All patches exceeding the size of 3 x 5 cm have to be secured with hollow rivets. The riveting has to occur prior to hardening of the adhesive.
    a. Let the applied adhesive dry for approximately one hour.
    b. Drill out or punch holes in the bellows fabric and the patch at suitable places and according to the patch size (at a size of 3 x 5 cm use 3 hollow rivets) using a drill (∅ 4.2 mm), a hollow punch or another suitable tool.
    c. Insert hollow rivets (NK 10 and NN 7). Support one side of the hollow rivet with a hard object and rivet using the PVC hammer.



1	*Damaged bellows fabric*	2	*Patch*

Illustration 24: Repair of damaged bellows fabric

9.3.5 Repair of small damage of bellows fabric (e.g. detachments of silicone coating)

Small detachments of the silicone coating (maximum size: 5 mm) caused by normal operation, can be repaired according to the following repair instruction:

1. Clean the affected area of the bellows fabric with the repair-set provided cleaning agent (note the safety data sheet and manufacturer remarks of the cleaner) with the aim to completely remove dirtying by oil, grease or dust.
2. Caulk the respective area by squirting "Elastosil E 43" (note the safety data sheet) onto the affected area. If needed, the silicone can be smoothened by use of soapy water (curd soap etc.) and a plastic spatula.
3. At a relative air humidity of 50 % and a temperature of 23 °C, the silicone is hardened after 24 hours and ready to be subject to normal strains, if a layer thickness of max. 2 mm was maintained. A layer thickness larger than 2 mm requires a longer hardening time, generally the hardening time can be shortened by higher temperature and/or air humidity.

9.3.6 Repair of small holes of bellows fabric

Small holes (diameter 2–3 mm) of bellows fabric, caused by normal operation, can be repaired according to the following repair instruction:

1. Clean the punched area inside and outside of the bellows fabric with the repair-set provided cleaning agent (note the safety data sheet and manufacturer remarks of the cleaner) with the aim to completely remove dirtying by oil, grease or dust.
2. Caulk the hole by squirting "Elastosil E 43" (note the safety data sheet) onto the affected area so that the "Elastosil E 43" comes out on the other side of the bellows fabric. If needed, the silicone can be smoothened by use of soapy water (curd soap etc.) and a plastic spatula.
3. At a relative air humidity of 50 % and a temperature of 23 °C, the silicone is hardened after 24 hours and ready to be subject to normal strains, if a layer thickness of max. 2 mm was maintained. A layer thickness larger than 2 mm requires a longer hardening time, generally the hardening time can be shortened by higher temperature and/or air humidity.

10 Replacement of components/assembly groups

10.1 Replacing the side wall

10.1.1 Unmounting the side wall

Refer to Chap. 6.6.8 and 7.2.

The unmounting of the side wall requires two persons.

1. Unlock the side wall (see Chap. 7.2).
2. Open side wall and hold in opened position.
3. Remove the lower and the upper screw (M8) of the roll body using an Allen key (size 6).

ATTENTION

- Do **not** remove the screw at half height. This screw is used for attaching the centering bolt. The centering bolt will drop into the inner body of the guiding body when this screw is removed.

4. Remove the roll body of the side wall out of the guiding body profile (two persons).

ATTENTION

- The pressure of the springs is released and pushes the guiding body upwards!

5. For a replacement of the gap coverings bring the side wall into horizontal position.

ATTENTION

- Do **not** store the side wall resting on the gap coverings!

10.1.2 Mounting the side wall

NOTICE

Apply suitable thread locking fluid (e.g. “Loctite 243”) to all screw connections during mounting. Exception microcapsulated screws!

1. At the guiding body screw-on side (right hand side) – pull the guiding body downwards.
2. Place a spacer (Size: approx. 100 mm x 50 mm x 20 mm) in the opening at the guiding body – refer to Illustration 16 (The spacer will pre-tension the spring. It is suggested to secure the spacer with a tape to prevent it from falling into the inside of the gangway).
3. Place the roll body of the side wall onto the guiding body profile and insert the guiding bolt into the hole.
4. At the right hand side: Bolt the roll body of the side wall with two screws and washers to the guiding body.
5. Remove spacer.
6. Lock the side wall (see Chapter 7.1).

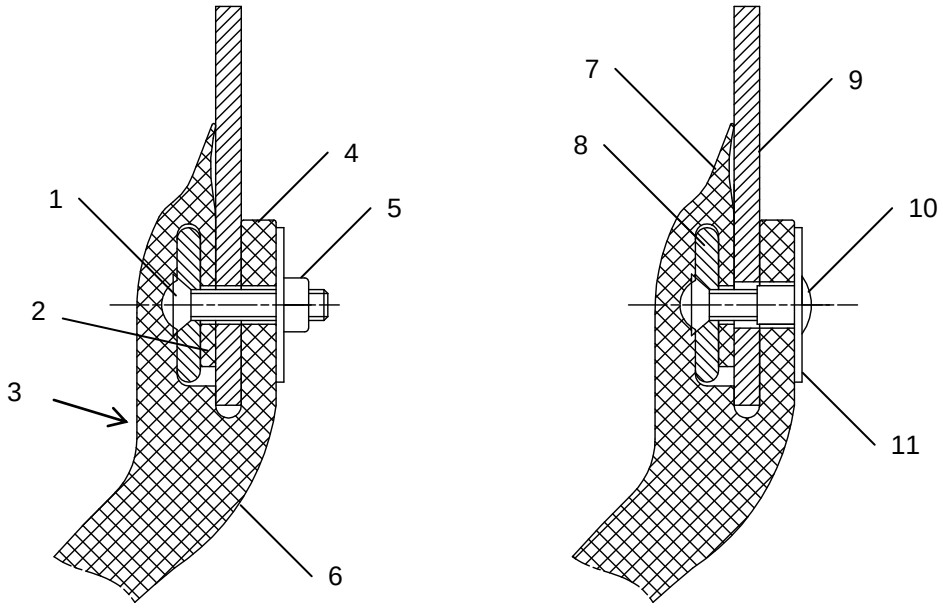
10.2 Replacement of the gap covering

Damaged or torn gap coverings of the side walls have to be replaced.
For this procedure the side wall has to be unmounted (see Chapter 10.1.1) and brought into horizontal position.

10.2.1 Unmounting the gap covering

At surface facing during operation the inner gangway – front surface:

1. Cut the rubber lip of the damaged gap covering at height of screws.
2. Secure the heads of the screws using an Allen key (2.5 mm) against turning.
3. Remove hexagon nut at the rear side of the gap covering using a spanner (Size 7).
4. Remove hexagon head screw and washer.
5. Remove rubber lip from the side wall (removes also gap covering and plastic ledge).
6. Remove plastic ledge out of the gap covering and set aside for re-usage.



	Hexagon socket screw Size 2.5 mm	3	*Inner rubber lip*
4	*Front side (of Gap covering)*	5	*Outer rubber lip*
6	*Hexagon nut Size 7 mm*	7	*Gap covering*
8	*Rubber lip*	9	*Plastic ledge*
10	*Side wall*	11	*Sleeve nut*
12	*Packing piece*		

Illustration 25: Gap covering of the Side wall

10.2.2 Mounting the gap covering

NOTICE

Apply suitable thread locking fluid (e.g. “Loctite 243”) to all screw connections during mounting. Exception microcapsulated screws!

1. Transfer the hole pattern of the side wall onto the gap covering.
2. Drill the holes into the gap covering acc. to Illustration 26. Maintain the following sequence:
   1) Transfer the hole pattern to the outer rubber lip.
   2) Punch out the holes (∅ 4.5 mm) at the rubber lip.
   3) Transfer the hole pattern to the inner rubber lip.
   4) Punch out the holes (∅ 4.5 mm) at the inner rubber lip (height difference is required to achieve a tight fit of the rubber lip at the side wall).
3. Screws which became loose during unmounting have to be glued back into the plastic ledge using a suitable thread locking fluid (e.g. Loctite 243).
4. Insert the existing plastic ledge with the glued in screws behind the inner lip of the gap covering.
5. **Note**: The short screws have to be located at the roll body of the locking side.
6. Insert the screws into the holes of the side wall and the roll body.
7. Place the outer lip of the gap covering over the screws.
8. Place the packing parts and nuts onto the screws and tighten nuts until the rubber lip is slightly pressed out of the packing parts (use sleeved nuts for the short screws at the locking side).
9. Secure the nuts with suitable thread locking fluid (e.g. Loctite 243).
10. Adjust the length of the gap covering (cut gap coverings flush with roll bodies using a knife).
11. Mount the side wall (refer to Chapter 10.1.2).

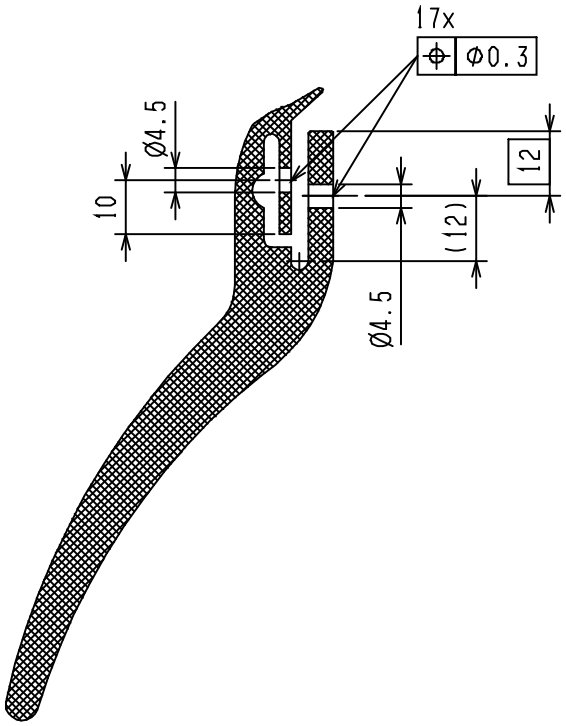


Illustration 26: Attachment of Gap coverings

10.3 Replacing the linking ceiling

Replacement of the linking ceiling requires two persons.

10.3.1 Unmounting the linking ceiling

Proceed in the following sequence for replacing the linking ceiling:

1. Loosen the attachment screws of the linking ceiling by reaching into the gap between wagon-interface and linking ceiling using a flat open-end spanner (Size 13).
2. The attachment holes of the rod hinges are slots (Illustration 14). Therefore after loosening the screws slightly lift the linking ceiling up, move it slightly to the side and then remove it from the shackles against the resistance of the elastic gap coverings.
3. Push the outer ceiling plates onto the middle (simple) ceiling plate.
4. Rotate the linking ceiling by approx. 90° and remove it out of the gangway area.

10.3.2 Mounting the linking ceiling

NOTICE

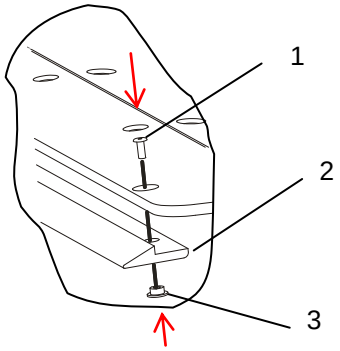
Apply suitable thread locking fluid (e.g. “Loctite 243”) to all screw connections during mounting. Exception microcapsulated screws!

- Mounting of the linking ceiling occurs acc. Chap.6.6.5.

10.4 Replacing the sliding ledges and parts

Replacement of the sliding ledges has to occur when they are heavily worn (e.g. when the heads of the rivets of the sliding ledge(s) are rubbing on the bridge plates they are resting on).

1. Drill-out the rivets of the sliding ledge (drill ∅ 4 mm) of the respective floor flap segment (from the top).
2. Remove the bushings and set aside for re-usage.
3. Remove the sliding ledge.
4. Clean. Ensure to remove all chips. No burrs allowed.
5. Place new sliding ledge onto the floor flap segment, insert the bushings and rivet (blind rivets ∅ 4.2 mm).



1	*Rivet*	2	*Sliding ledge*
3	*Bushing*		

Illustration 27: Replacement of the sliding ledges

10.4.1 Tread plate

To change the sliding ledges on the tread plate, it must be removed.

1 Loosening the six screws of the tread plate and remove the tread plate
2 Change the sliding ledges see chapter 10.4
3 Built the tread plate in and screw it on.

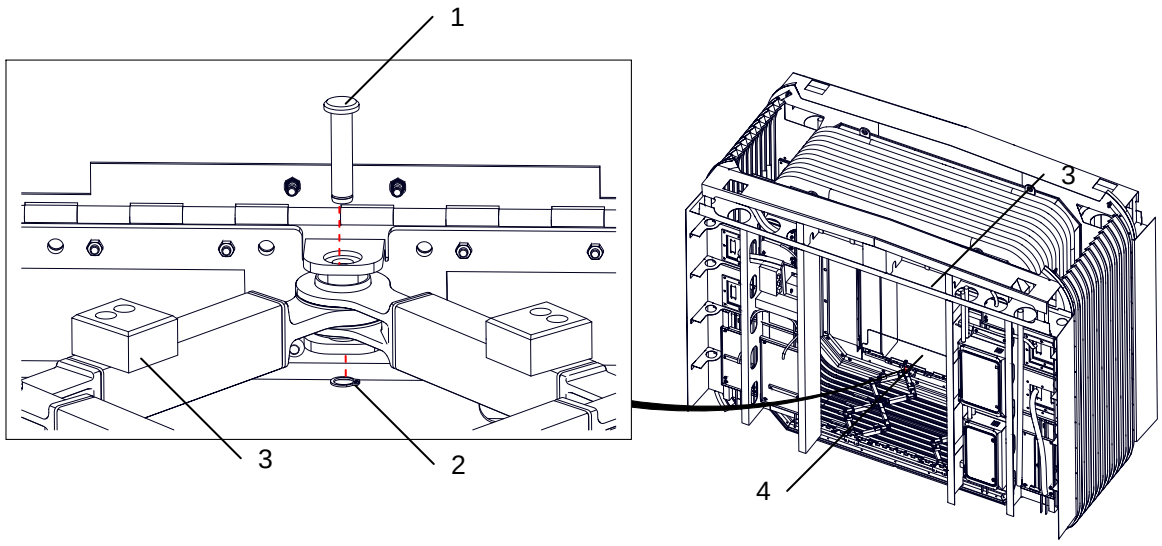
10.4.2 Scissors

For changing the sliding elements

1 Open the side walls on left and right side.
2 Loosening the six screws of the tread plate and remove the tread plate.
3 Flip up the both bridge plates.
4 Loosening the two screws of sliding element and remove it, see Illustration 28.
5 Built in a new sliding element and screw it on
6 Built the tread plate in and screw it on.
7 Close the side walls
8 For changing the others elements do step 4 and 5 again.

For changing other wear parts of the scissors.

1 Do step 1-3 for changing sliding elements
2 Loosening the circlip and remove the pin. On both sides, see Illustration 28
3 Remove the scissors.
4 Loosening the other circlips and change the collar bushes and sealing washers.
5 Built the scissors together and built it in the vehicle interface.
6 Put in the pin and save it with the circlip.
7 Flip down the bridge plates.
8 Do step 6 and 7 from changing sliding elements.



1	*Pin*	2	*Circlip*
3	*Sliding element*	4	*Bridge plate*

Illustration 28: Replace wear parts of combination bridge

11 Appendix

11.1 Gangway, assy., mounting 041448517

1001513679_000_04
1448517_-_Uebergar

11.2 Corrugated bellows, assy., final mounted 041448515

1001592710_000_04
1448515_-_Wellenba

11.3 Folding wall, assy. 041448420

1001594236_000_04
1448420_-_Faltenwa

11.4 Combination bridge, assy. 041445191

1001587194_000_04
1445191_-_Kombinat

11.5 Linking ceiling, assy. 041448481

1001503738_000_04
1448481_-_Gliederde

11.6 Side wall, assy., inner covering 041445174

1001587942_000_04
1445174_-_Seitenwa

11.7 Guiding body, assy., locking side 041448060 and Guiding body, assy., screw-on side 041448066

1001515673_000_04
1448060_-_Fuehrung

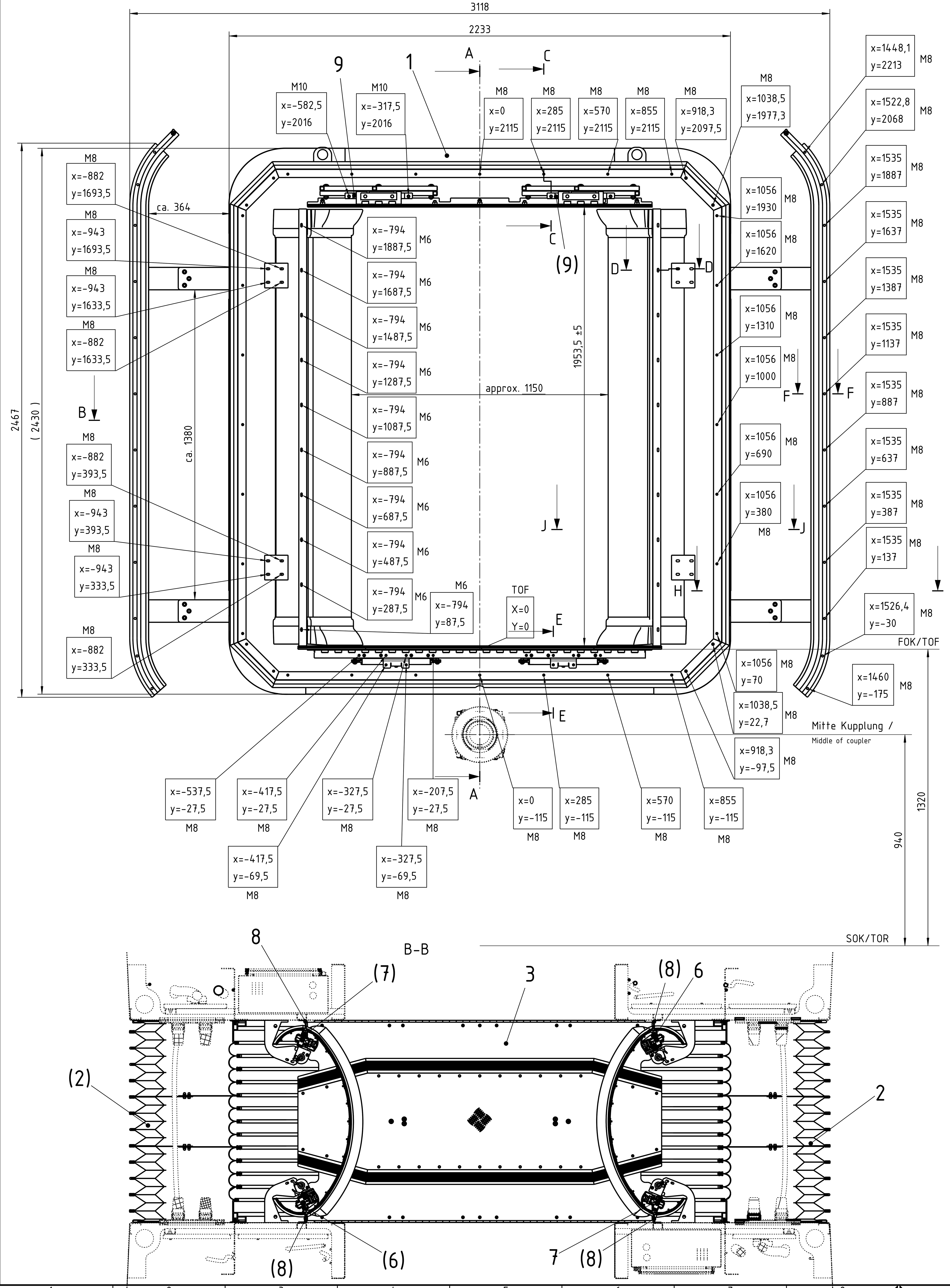
1001515555_000_04
1448066_-_Fuehrung

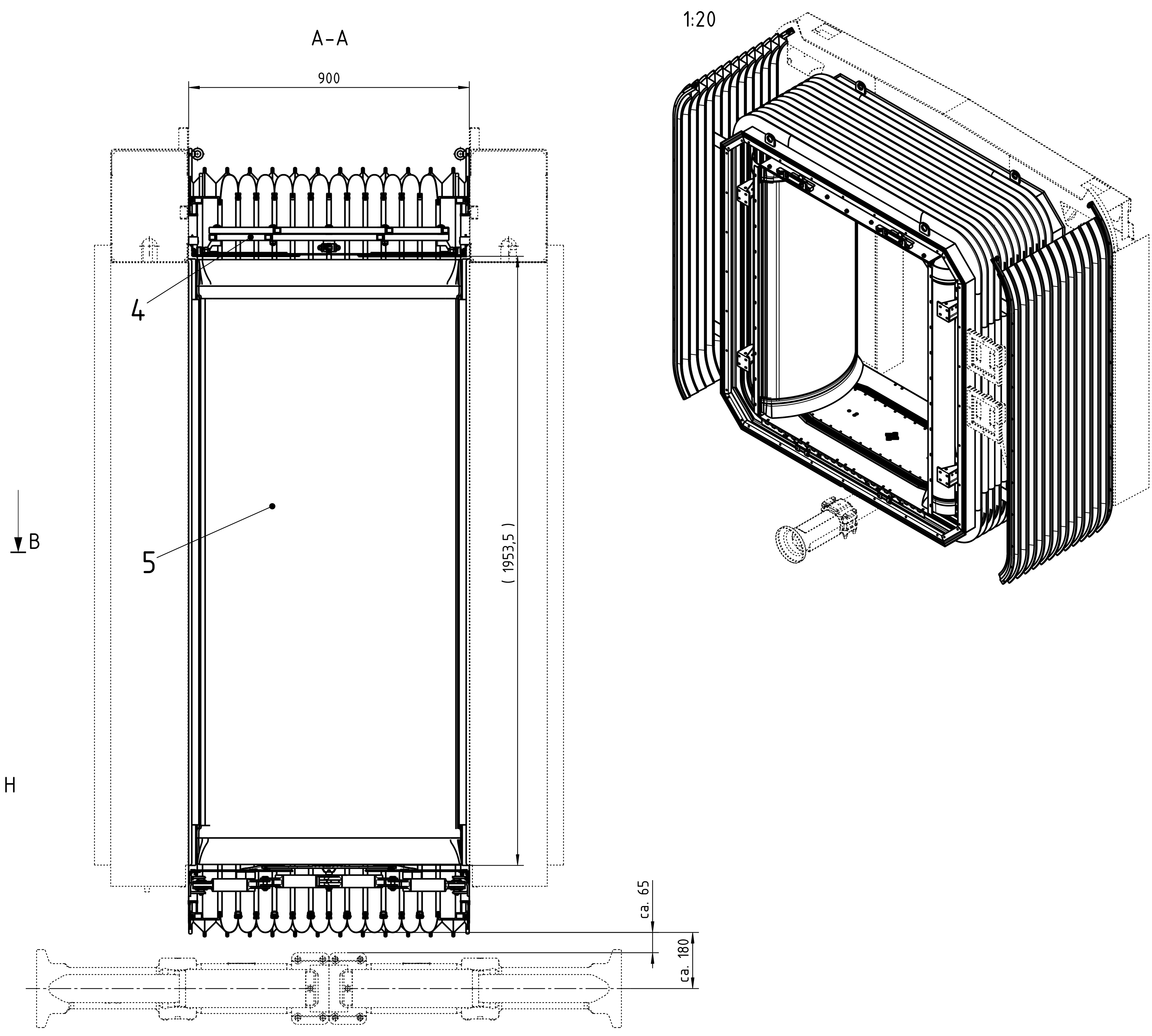
11.8 Covering brush, assy. 041448476

1001503809_000_04
1448476_-_Abdeckbu

11.9 Shackle, assy. 041292226

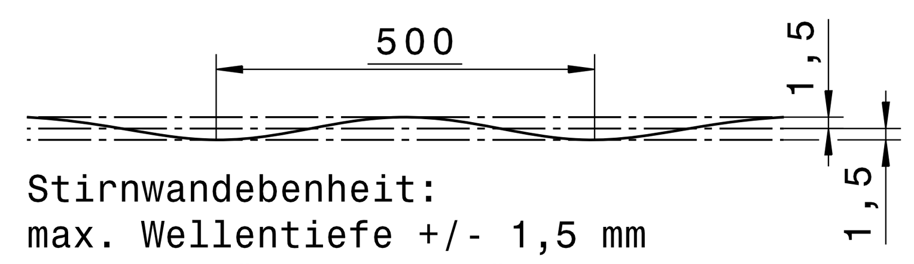
041292226#-#1#Haltebuegel__vollst.#.tif





Fuer alle Bohrungen und Gewinde gilt folgende Toleranz: ⌖ Φ0,4

For all holes and threads the following tolreance:



Stirnwandebenheit:
max. Wellentiefe +/- 1,5 mm
gemessen über eine Länge von 500 mm

Flatness of wagon interface:
max. short waveness +/- 1,5 mm
depth of waves measured over a length of 500 mm

Toleranz fuer Faltenbalgabmessungen
Tolerance for dimensions of folding bellows

Nennmassbereich Nominal size	1 bis 20	20 bis 200	200 bis 1000	1000 bis 2500	>2500
Grenzabmasse Tolerance	+/- 5	+/- 6	+/- 10	+/- 15	+/- 20

- -Linienform der Balgrahmen umlaufend (+3/1000) (konvex)
  -Line shape of bellows frames all around contour (convex)
- -von Balgrahmen zu Balgrahmen ist ein Versatz von +/- 4 mm zulaessig
  -Allowable offset of adjacent bellows frames: +/- 4 mm
- -Versatz ueber alle Balgrahmen von 10 mm zulaessig
  -Allowable offset over all bellows frames: 10 mm
- -zulaessiger Durchhang im Boden: 2 mm pro Falte
  -Allowable sag in floor area per fold: 2 mm
- -Stoffbezogene Masse sind zirka (ca.) Masse
  -Fabric relating dimensions are approximate dimensions

Toleranz fuer Wellenbalgabmessungen mit positiver Welle
Tolerance for dimensions of corrugated bellows with positiv corrugations

Nennmassbereich Nominal size	1 bis 20	20 bis 200	200 bis 1000	1000 bis 2500	>2500
Grenzabmasse Tolerance	+/- 5	+/- 6	+/- 10	+/- 15	+/- 20

- -Linienform der Balgrahmen umlaufend (-4/1000) (konkav)
  -Line shape of bellows frames all around contour (concave)
- -von Balgrahmen zu Balgrahmen ist ein Versatz von +/- 6 mm zulaessig
  -Allowable offset of adjacent bellows frames: +/- 6 mm
- -Versatz ueber alle Balgrahmen von 20 mm zulaessig
  -Allowable offset over all bellows frames: 20 mm
- -zulaessiger Durchhang im Boden: 2,5 mm pro Welle
  -Allowable sag in floor area per corrugation: 2,5 mm
- -Stoffbezogene Masse sind zirka (ca.) Masse
  -Fabric relating dimensions are approximate dimensions

ISO 13715 | DIN ISO 1302

Train 18-1

Schutzvermerk ISO 16016 beachten
Refer to protection notice ISO 16016

Allgemeintoleranz | Ursprung | Dokumentenart | Masse | Volumen | Querschnittsfläche

Referenzkennzeichen | Maßeinheit: mm | Maßstab: 1:10 | Sprachenschlüssel: de (en)

ISO 128-30 | Zeichnungsnorm: HWN 516-3 | Halbzeug | Werkstoff

KE: 003			
Bearbeitet	2018-01-30	hon
Geprüft	2018-01-30	tat
Normgeprüft	2018-01-31	jaw
----	2018-01-31	----
Genehmigt	2018-01-31	kgg

Rev.	Änderungsnr.	Datum	Nkz.
-	500000064848	2018-01-31	hon

Übergang, vollst., Anbau
Gangway, assy., mounting

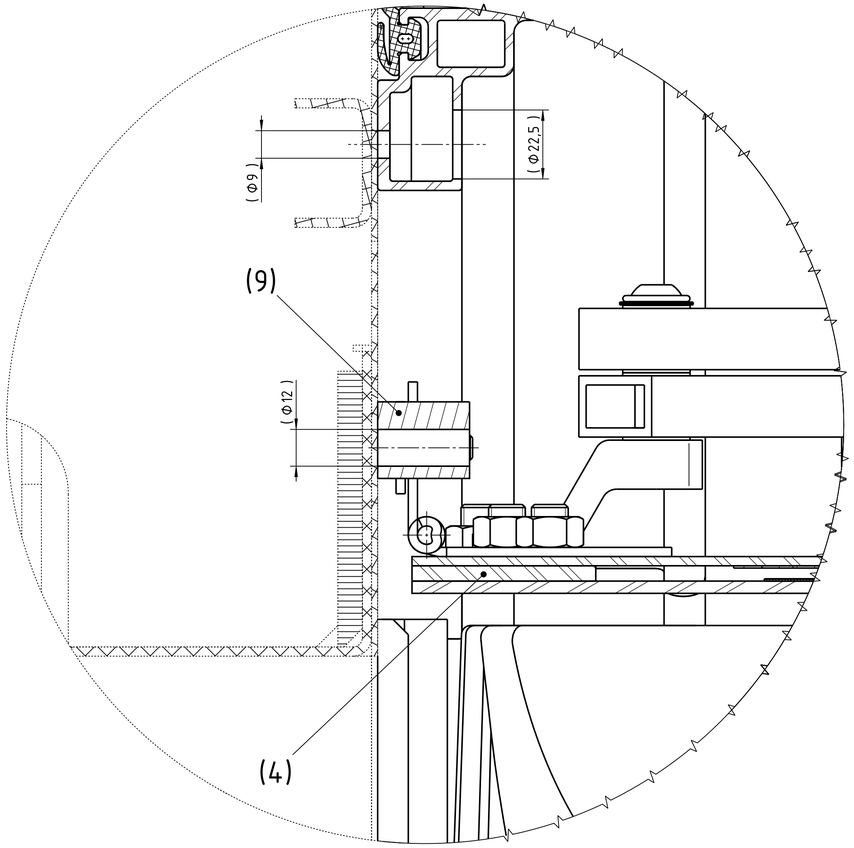
HÜBNER

Dokument-ID: ZDR 1001513679 000 -

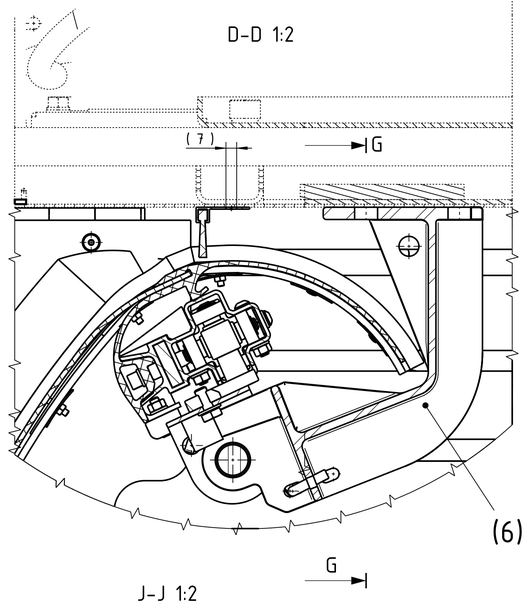
Zeichnungsnummer: 041448517 | Version: - | Blatt 1 / 2 Bl.

NUR MIT CAD ÄNDERN A1

C-C 1:1



D-D 1:2



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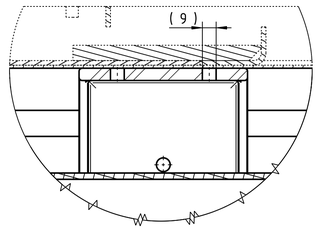

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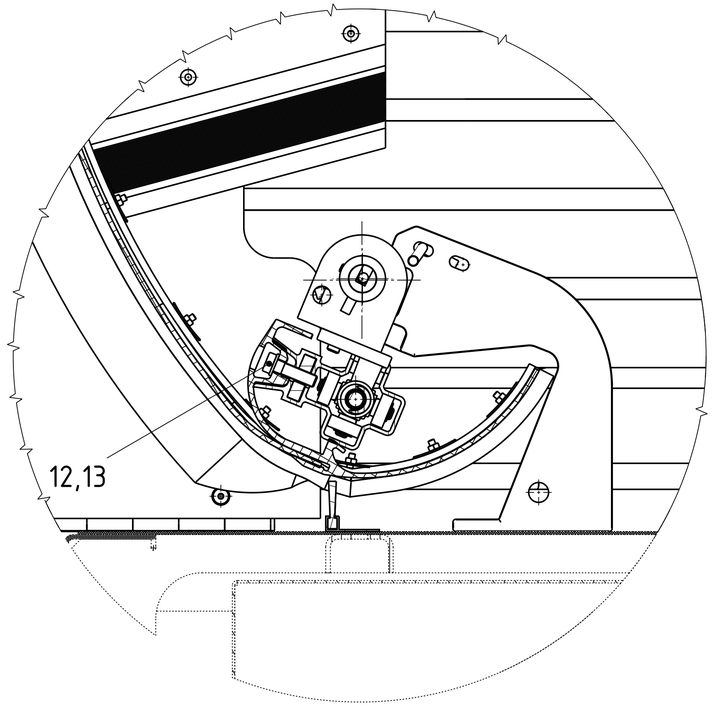

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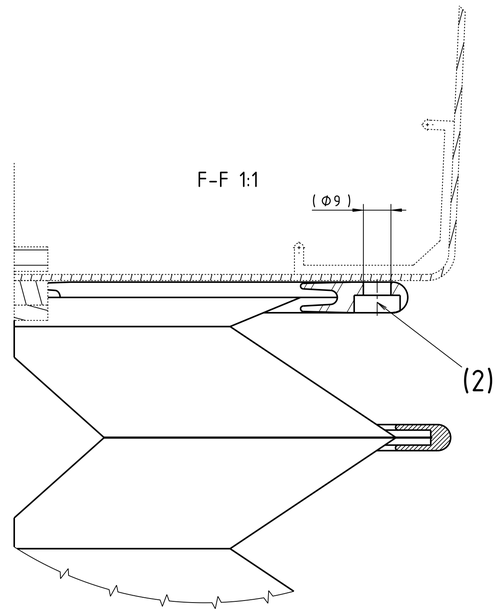

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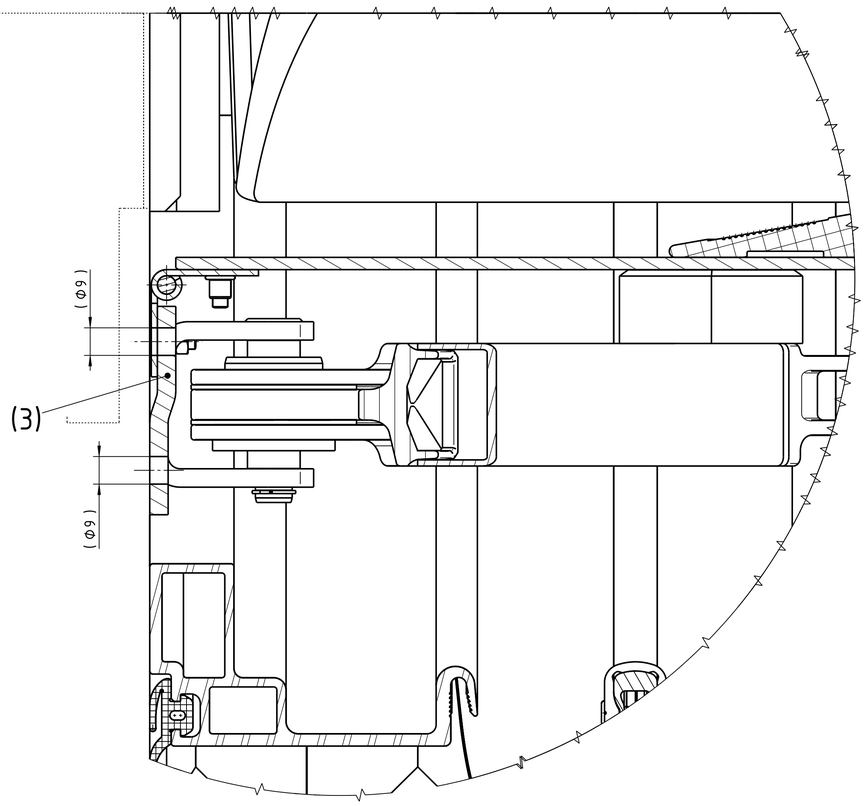
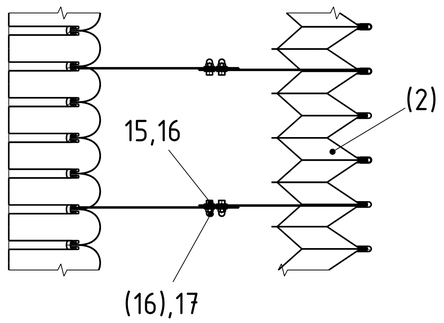


H-H 1:5



ISO 13715 | DIN ISO 1302

Train 18-1

Schutzvermerk ISO 16016 beachten
Refer to protection notice ISO 16016

Allgemeintoleranz

Ursprung

Dokumentenart	Masse	Volumen	Querschnittsfläche
Referenzkennzeichen	Maßeinheit: mm	Maßstab: 1:10	Sprachenschlüssel: de (en)

ISO 128-30 | Zeichnungsnorm: HWN 516-3

Halbzeug

Werkstoff

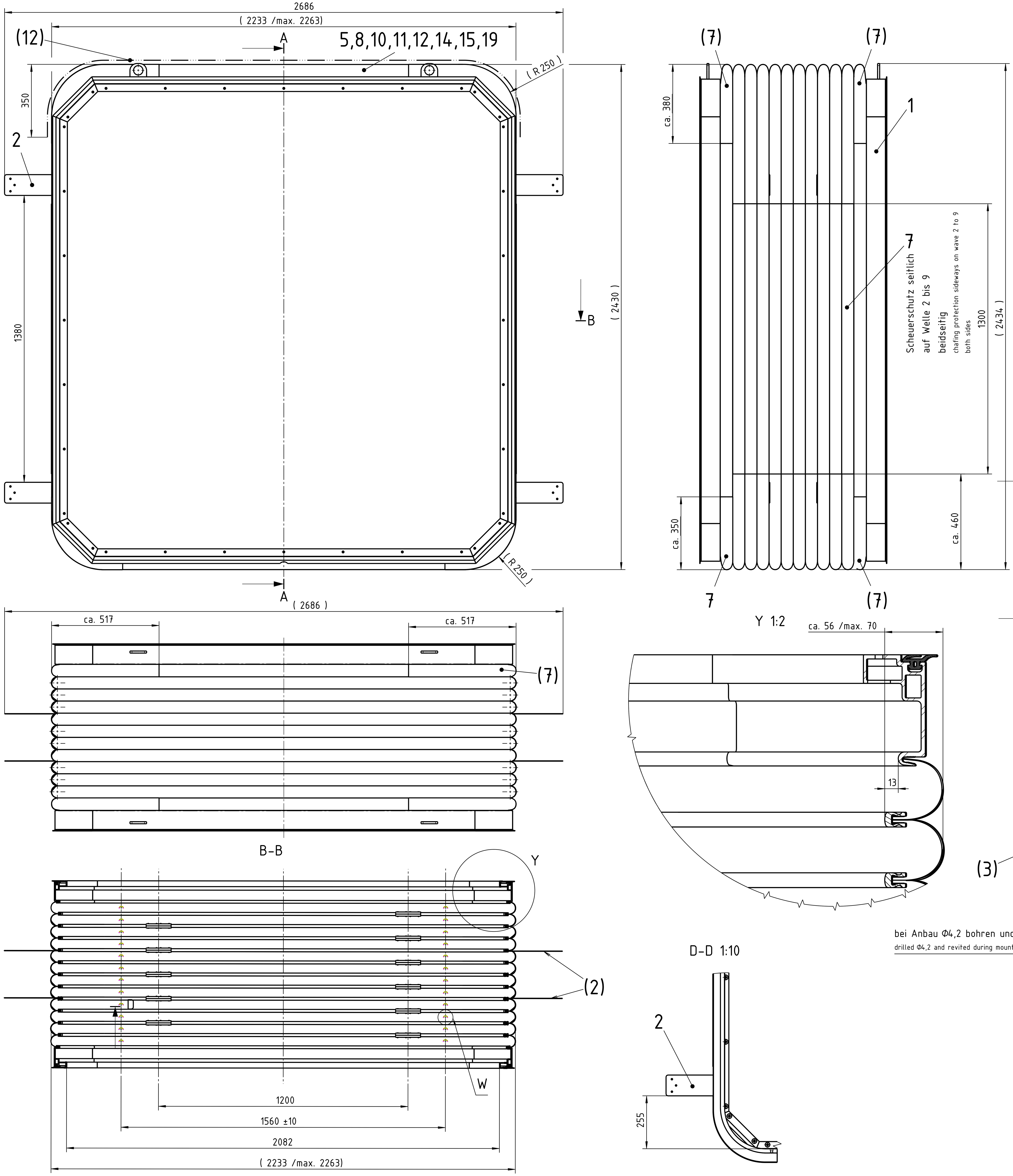
Bearbeitet	2018-01-30	hon
Geprüft	2018-01-30	tat
Normgeprüft	2018-01-31	jaw
----	2018-01-31	----
Genehmigt	2018-01-31	kgg
Rev.	Änderungsnr.	Datum	Nkz.
-	5000006484	2018-01-31	hon

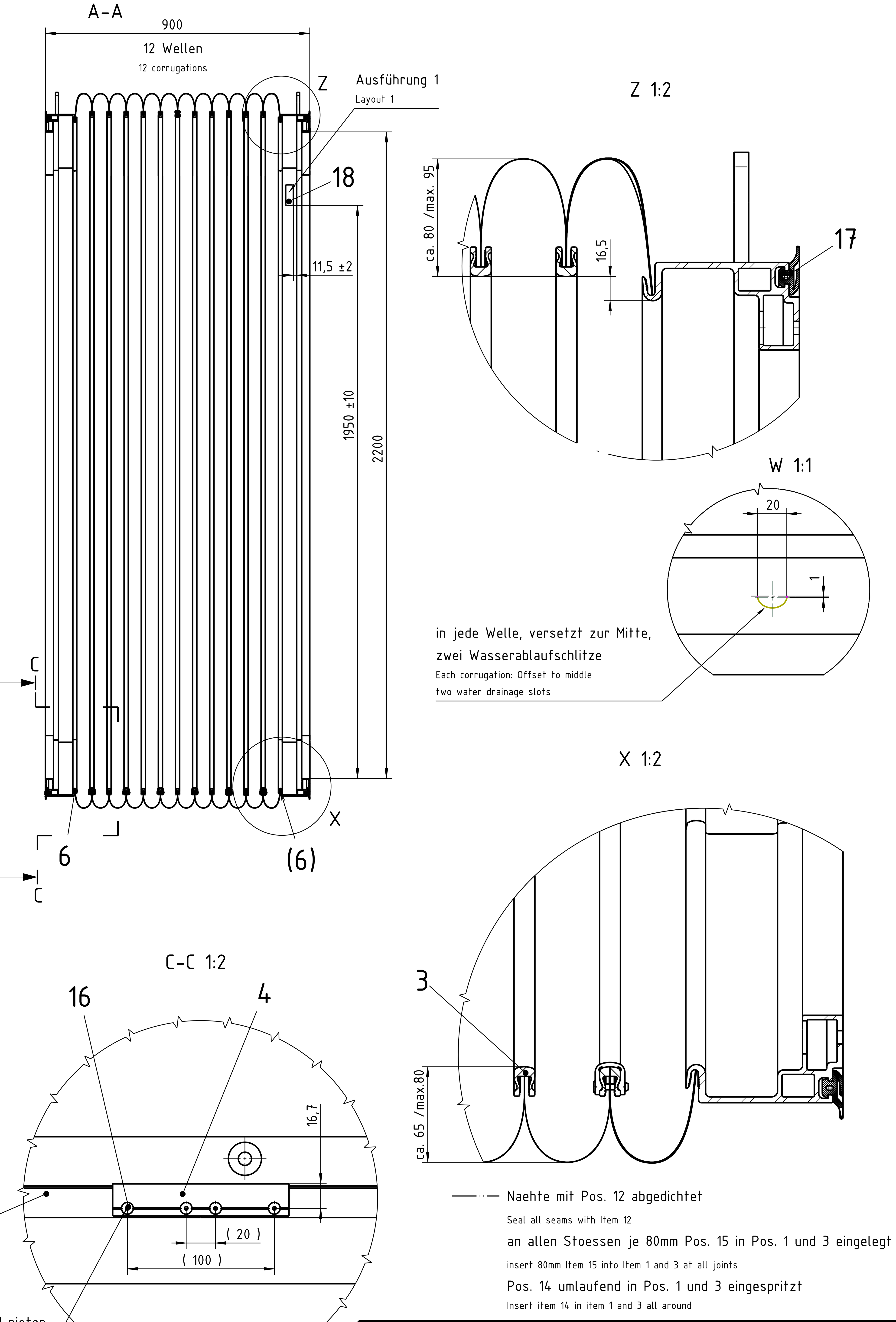
Benennung
Übergang, vollst., Anbau
Gangway, assy., mounting

HÜBNER

Dokument-ID: ZDR 1001513679 000 -
Zeichnungsnummer: 041448517
Version: -
Blatt: 2 2

NUR MIT CAD ÄNDERN A1





Toleranz fuer Wellenbalgabmessungen mit positiver Welle
Tolerance for dimensions of corrugated bellows with positiv corrugations

Nennmassbereich Nominal size	1 bis 20	20 bis 200	200 bis 1000	1000 bis 2500	>2500
Grenzabmasse Tolerance	+/- 5	+/- 6	+/- 10	+/- 15	+/- 20

- -Linienform der Balgrahmen umlaufend -4/1000 (konkav)
  -Line shape of bellows frames all around contour (concave)
- -von Balgrahmen zu Balgrahmen ist ein Versatz von +/- 6 mm zulaessig
  -Allowable offset of adjacent bellows frames: +/- 6 mm
- -Versatz ueber alle Balgrahmen von 20 mm zulaessig
  -Allowable offset over all bellows frames: 20 mm
- -zulaessiger Durchhang im Boden: 2,5 mm pro Welle
  -Allowable sag in floor area per corrugation: 2,5 mm
- -Stoffbezogene Masse sind zirka (ca.) Masse
  -Fabric relating dimensions are approximate dimensions

ISO 13715 | DIN ISO 1302

Train 18

Allgemeintoleranz: ISO 2768-cK

Ursprung			
Dokumentenart	Masse	Volumen	Querschnittsfläche
Referenzkennzeichen	Maßeinheit: mm	Maßstab: 1:10	Sprachenschlüssel: de (en)

ISO 128-30 | Zeichnungsnorm: HWN 516-3

Halbzeug

Werkstoff

KE: 003			
Bearbeitet	2018-01-25	ple	
Geprüft	2018-01-30	tat	
Normgeprüft	2018-01-31	jaw	
----	2018-01-31	----	
Genehmigt	2018-01-31	kgg	

Rev.	Änderungsnr.	Datum	Nkz.
-	500000065224	2018-01-31	ple

Wellenbalg, vollst., endmontiert
Corrugated bellows, assy., final mounted

HÜBNER

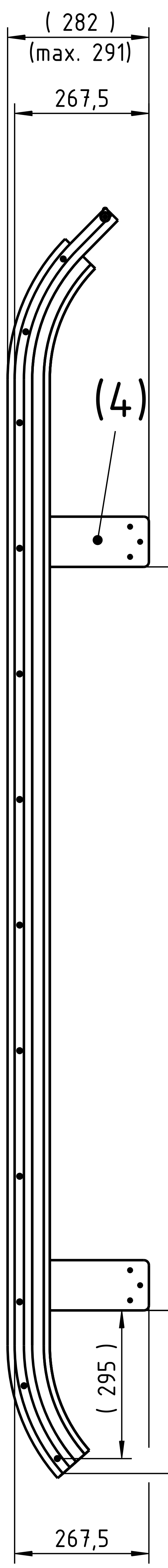
Dokument-ID: ZDR 1001592710 000 -

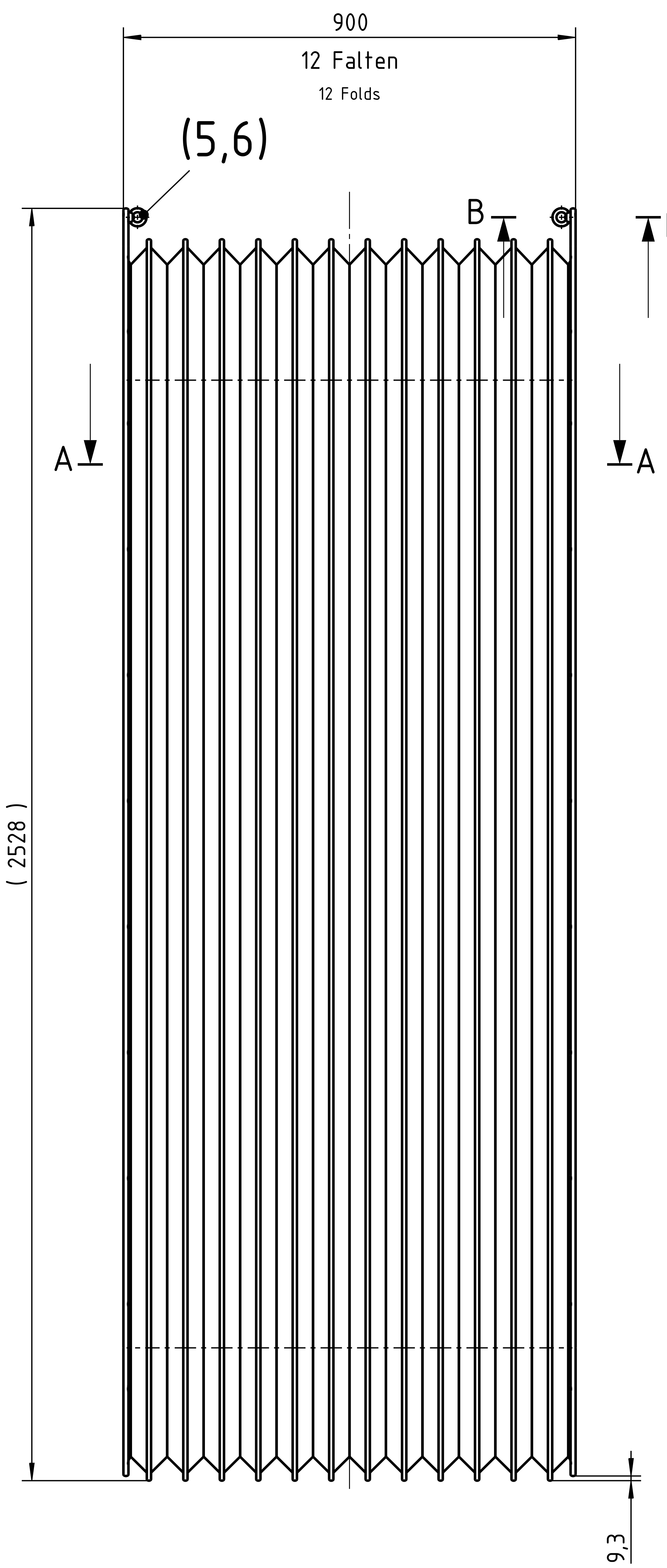
Zeichnungsnummer: 041448515

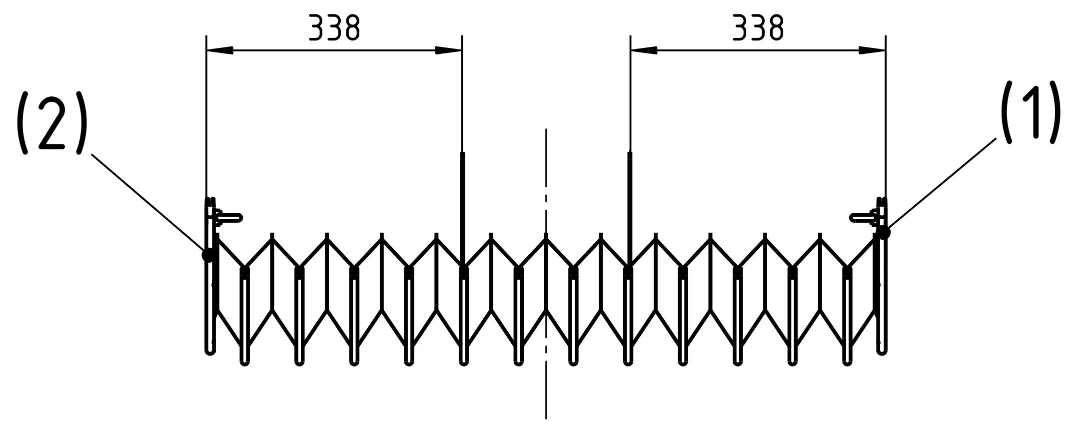
Version: -

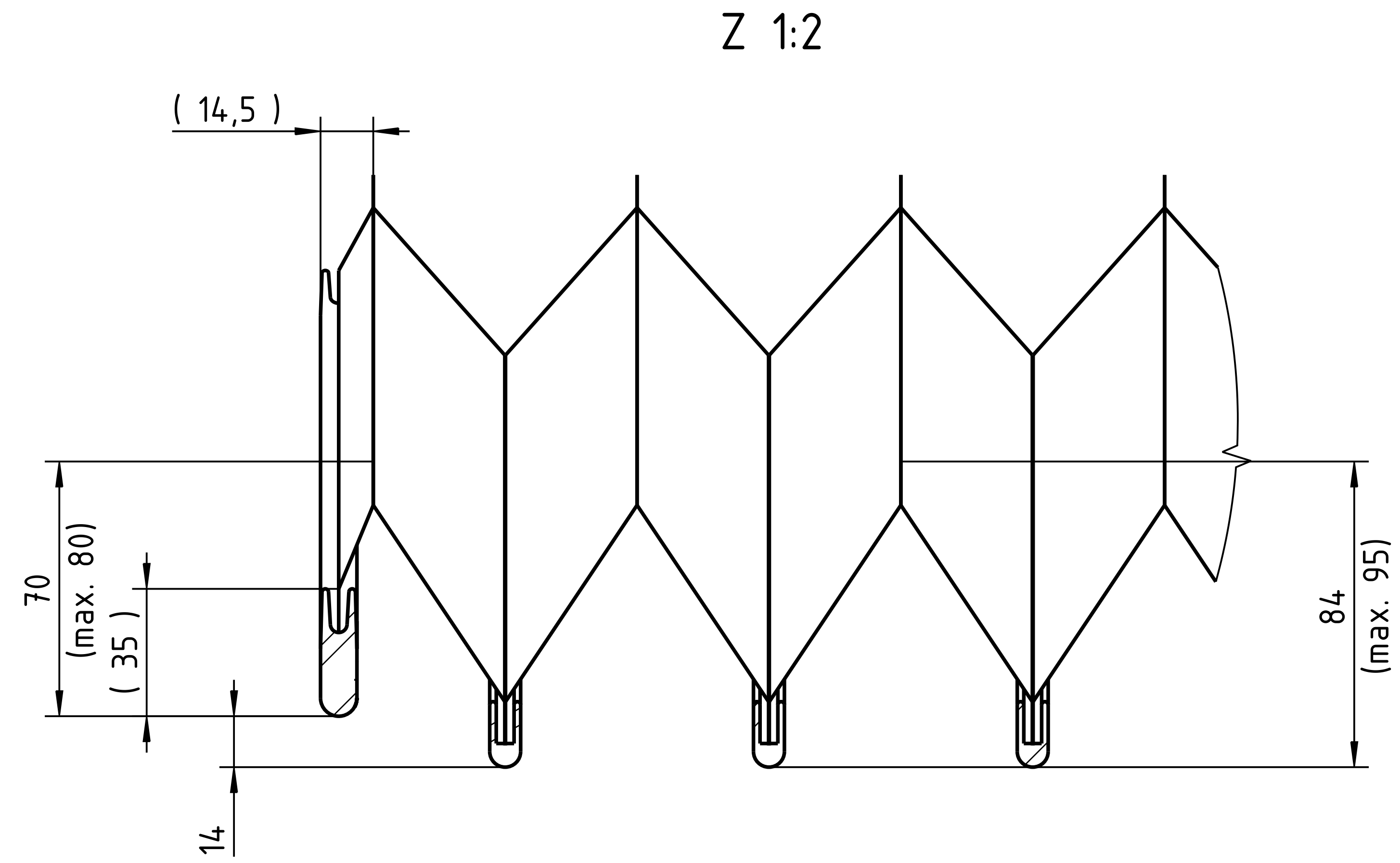
Blatt: 1 / 1 Bl.

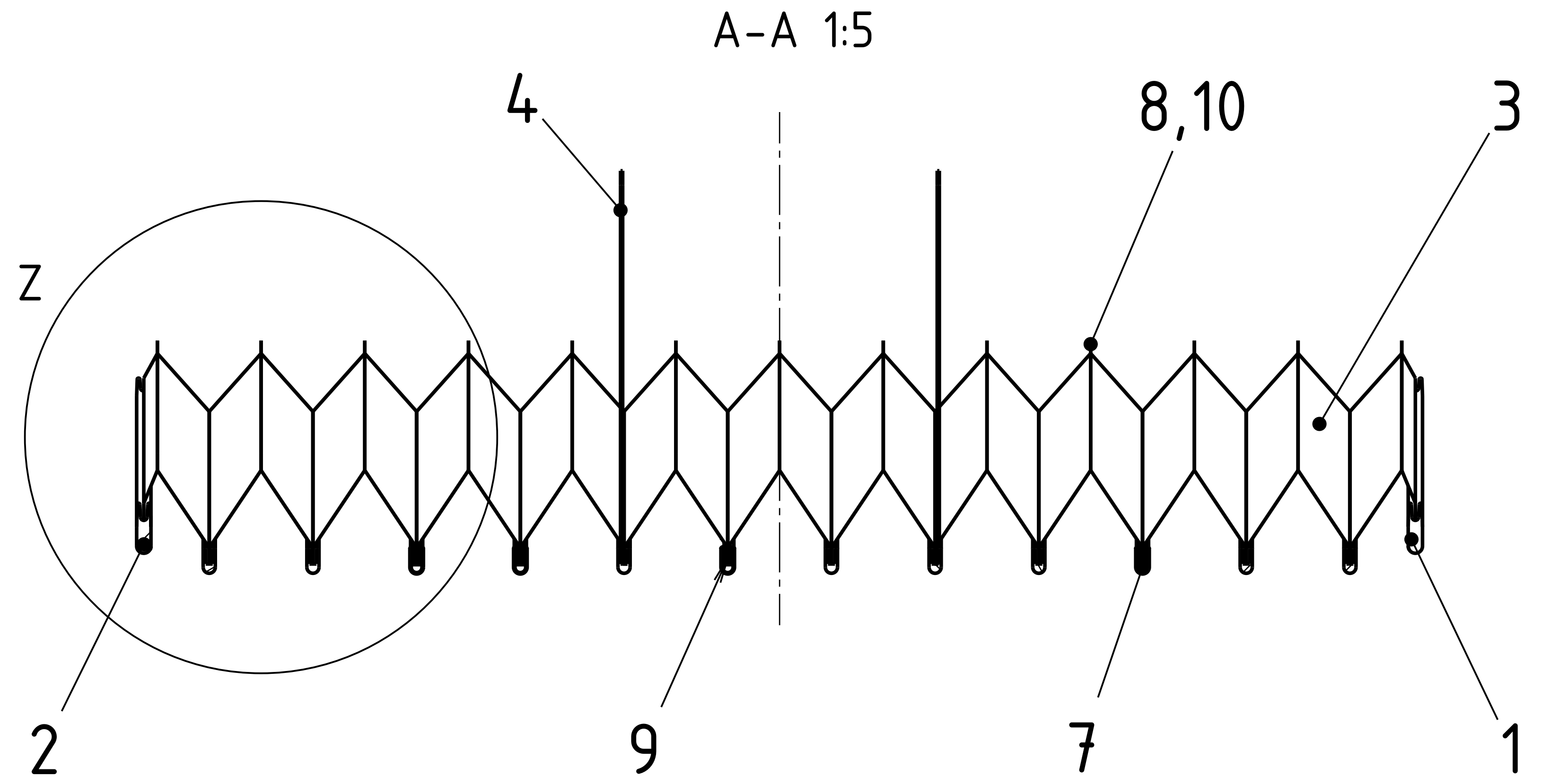
NUR MIT CAD ÄNDERN A1

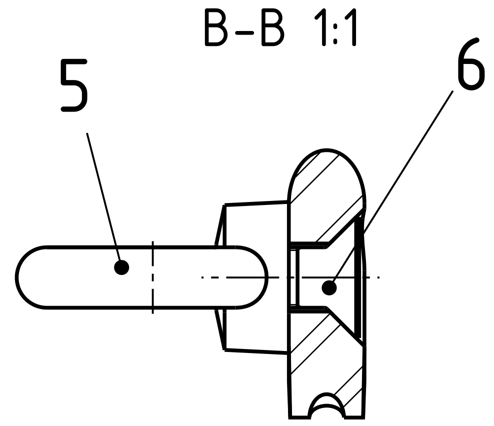


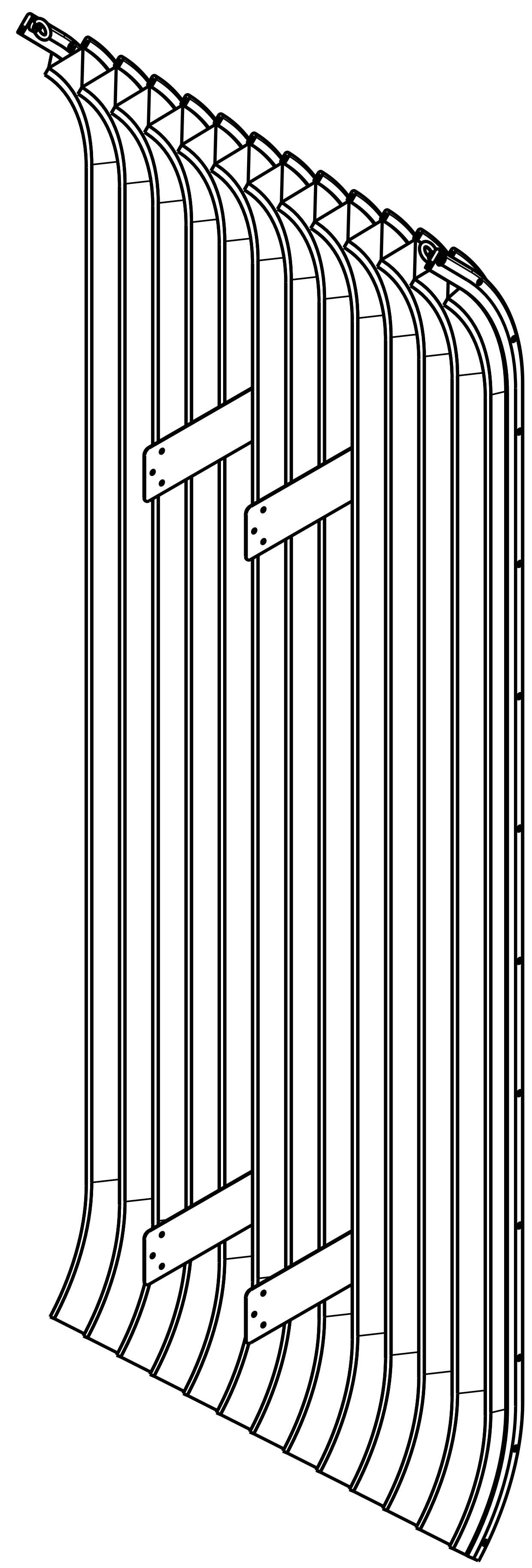












Toleranz fuer Faltenbalgabmessungen
Tolerance for dimensions of folding bellows

Nennmassbereich Nominal size	1 bis 20	20 bis 200	200 bis 1000	1000 bis 2500	>2500
Grenzabmasse Tolerance	+/- 5	+/- 6	+/- 10	+/- 15	+/- 20

-Linienform der Balgrahmen umlaufend +3/1000 (konvex)
-Line shape of bellows frames all around contour (convex)

-von Balgrahmen zu Balgrahmen ist ein Versatz von +/- 4 mm zulaessig
-Allowable offset of adjacent bellows frames: +/- 4 mm

-Versatz ueber alle Balgrahmen von 10 mm zulaessig
-Allowable offset over all bellows frames: 10 mm

-zulaessiger Durchhang im Boden 2 mm pro Falte
-Allowable sag in floor area per fold: 2 mm

-Stoffbezogene Masse sind zirka (ca.) Masse
-Fabric relating dimensions are approximate dimensions

ISO 13715 — DIN ISO 1302

Train 18

Schutzvermerk ISO 16016 beachten
Refer to protection notice ISO 16016

Allgemeintoleranz: ISO 2768-c	Ursprung: 041285669			
	Dokumentenart	Masse	Volumen	Querschnittsfläche
	Referenzkennzeichen	Maßeinheit: mm	Maßstab: 1:10	Sprachenschlüssel: de (en)
ISO 128-30 — Zeichnungsnorm: HWN 516-3	Halbzeug			

KE: 003			
Bearbeitet	2018-01-29	ple	
Geprüft	2018-01-30	tat	
Normgeprüft	2018-01-31	jaw	
----	2018-01-31	----	
Genehmigt	2018-01-31	kgg	

Rev.	Änderungsnr.	Datum	Nkz.
-	500000065261	2018-01-31	ple

Werkstoff

Faltenwand, vollst.
Folding wall, assy.

HÜBNER

Dokument-ID: ZDR 1001594236 000 -

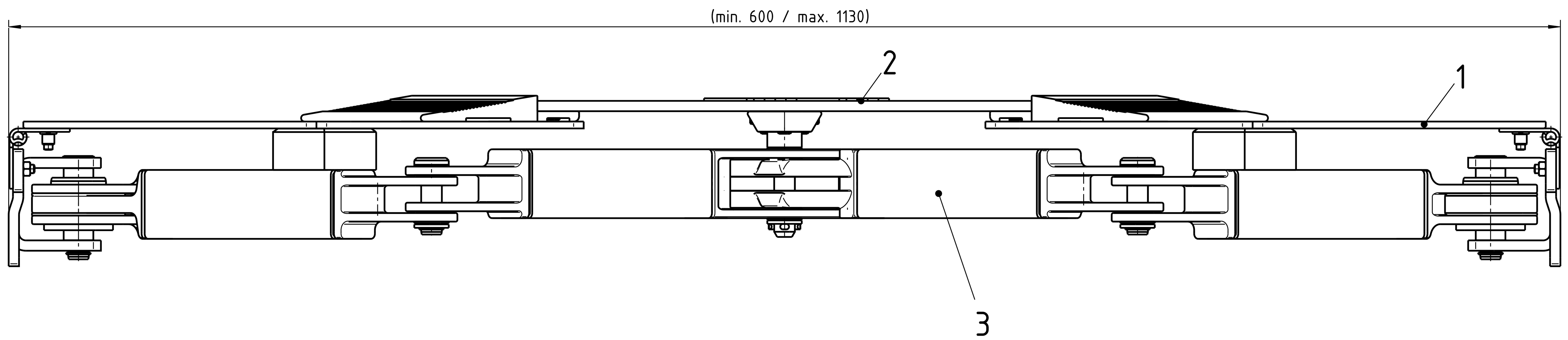
Zeichnungsnummer: 041448420

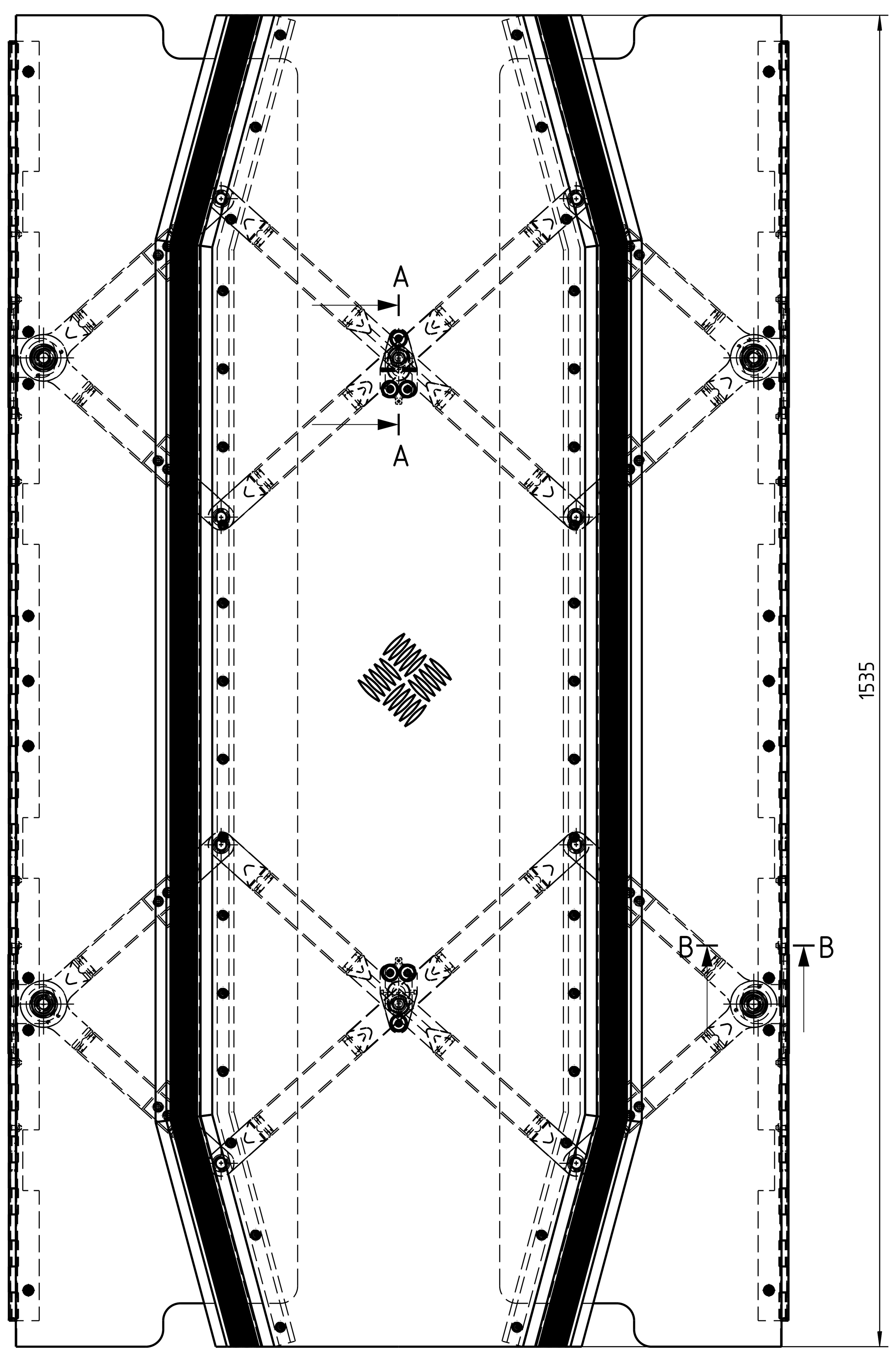
Version: -

Blatt: 1 / 1 Bl.

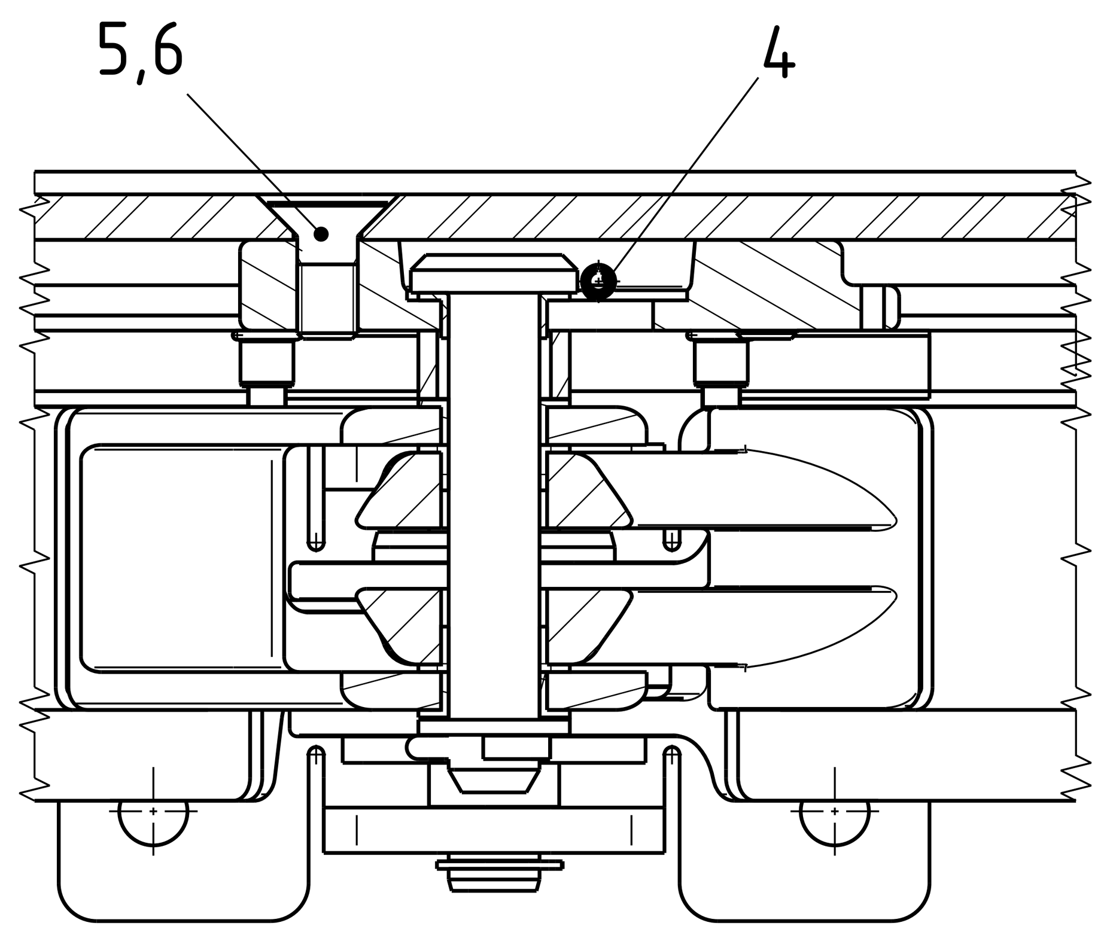
NUR MIT CAD ÄNDERN A2

1:2

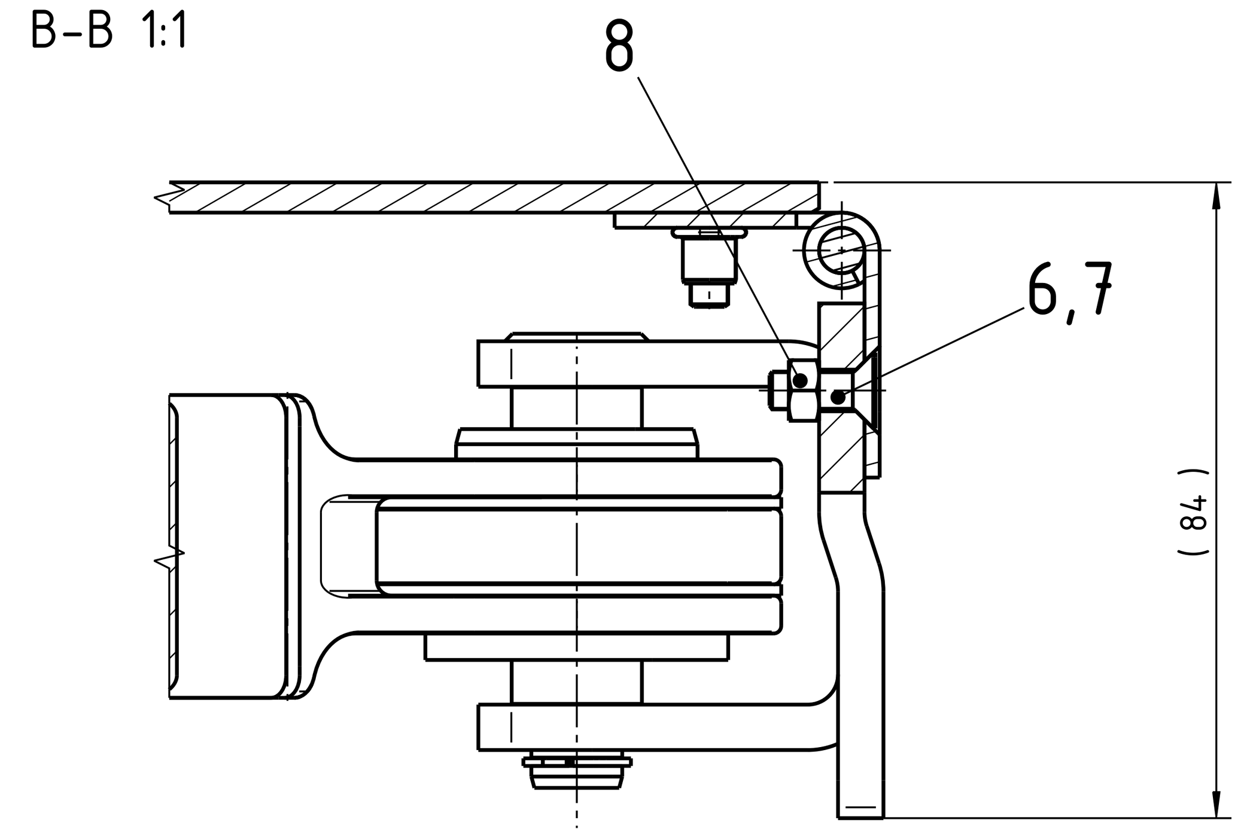




A-A 1:1 90°



B-B 1:1



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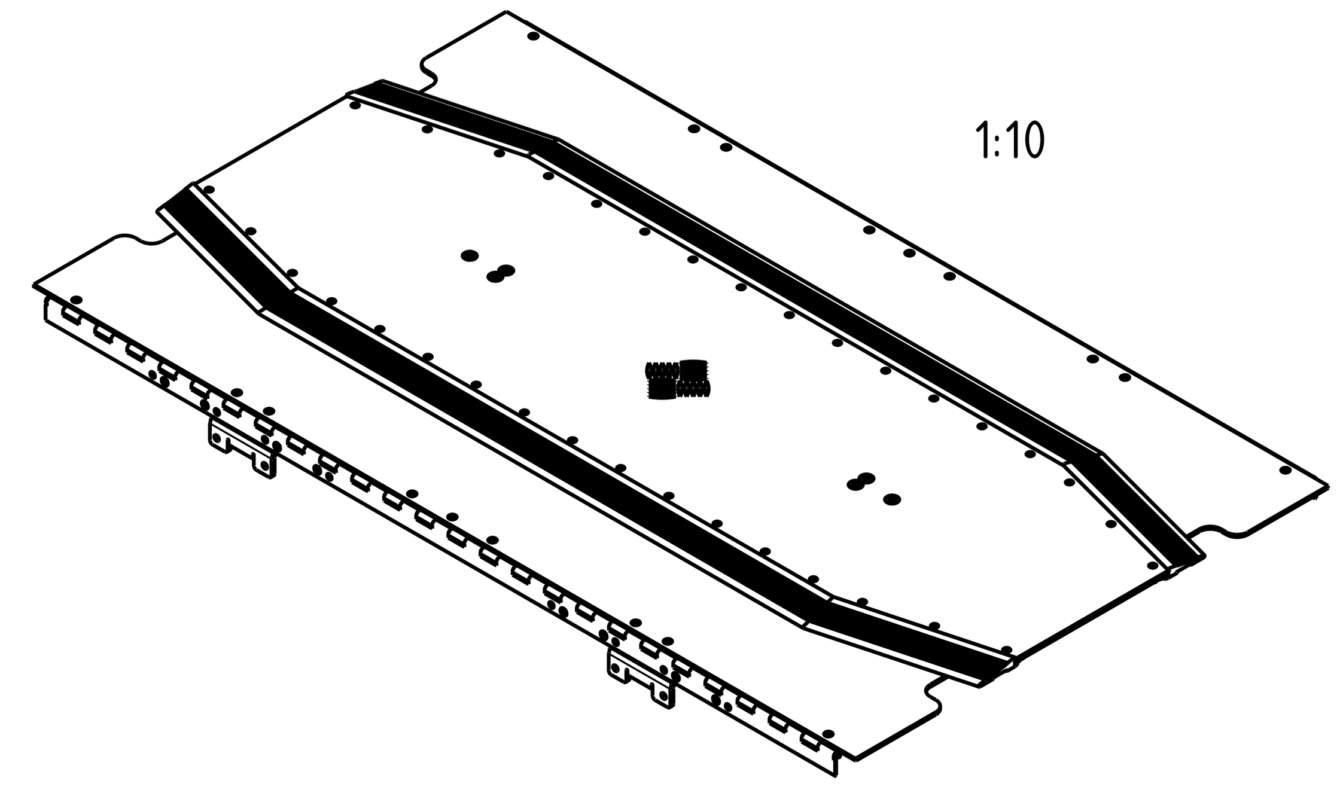
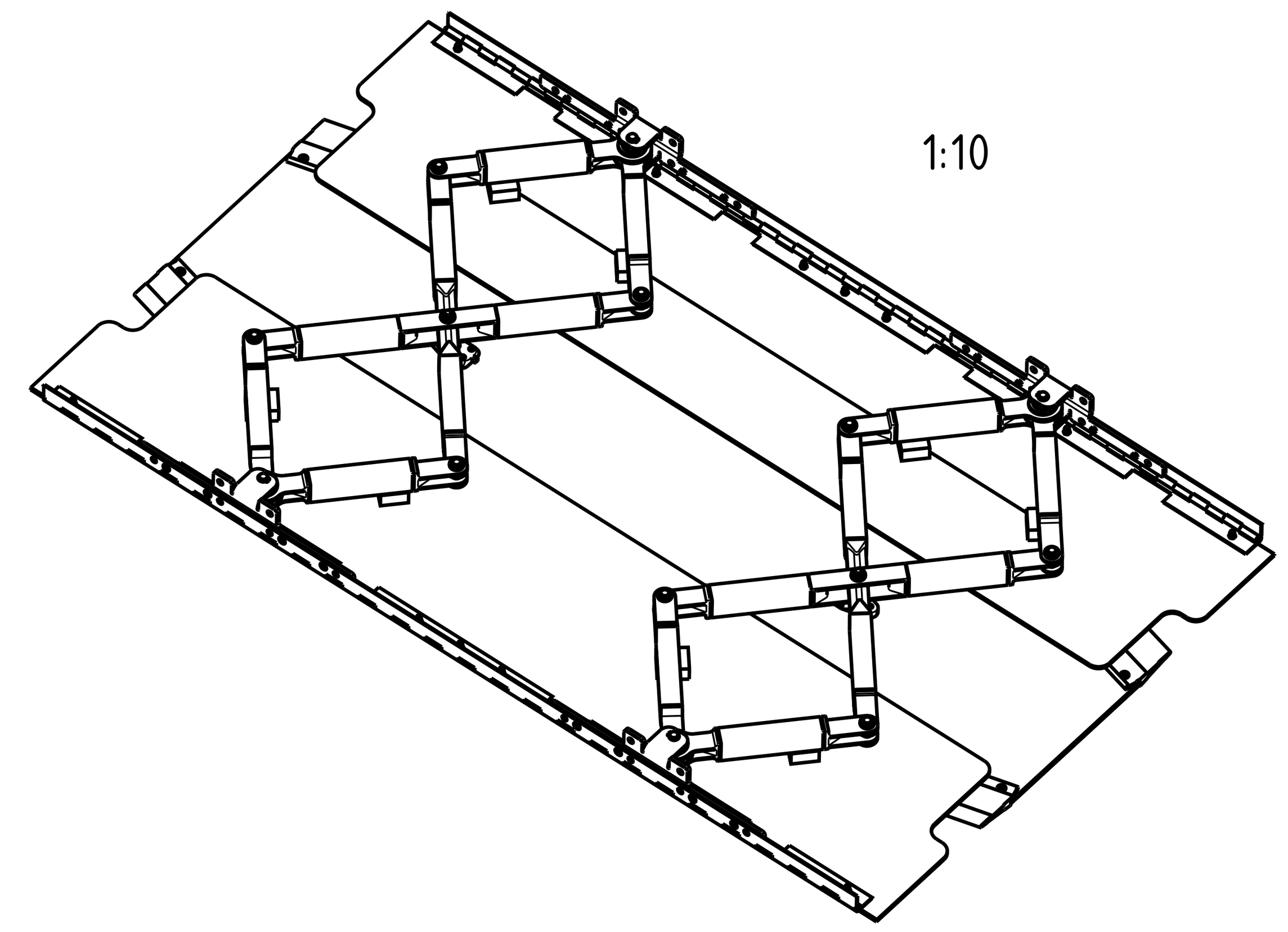


1:10



ISO 13715		DIN ISO 1302	
	Train 18		
Schutzvermerk ISO 16016 beachten Refer to protection notice ISO 16016			
Allgemeintoleranz	Ursprung 041448233		
	Dokumentenart	Masse	Volumen / Querschnittsfläche
	Referenzkennzeichen	Maßeinheit mm	Maßstab 1:5 / Sprachenschlüssel de (en)
ISO 128-30	Zeichnungsnorm HWN 516-3	Halbzeug	

KE: 003			
	Bearbeitet	2018-01-19	hon
	Geprüft	2018-01-22	tat
	Normgeprüft	2018-01-23	jaw
	----	2018-01-23	----
	Genehmigt	2018-01-23	kgg
Rev.	Änderungsnr.	Datum	Nkz.
-	500000064976	2018-01-23	hon

Werkstoff

Kombinationsbrücke, vollst.

Combination bridge, assy.

HÜBNER

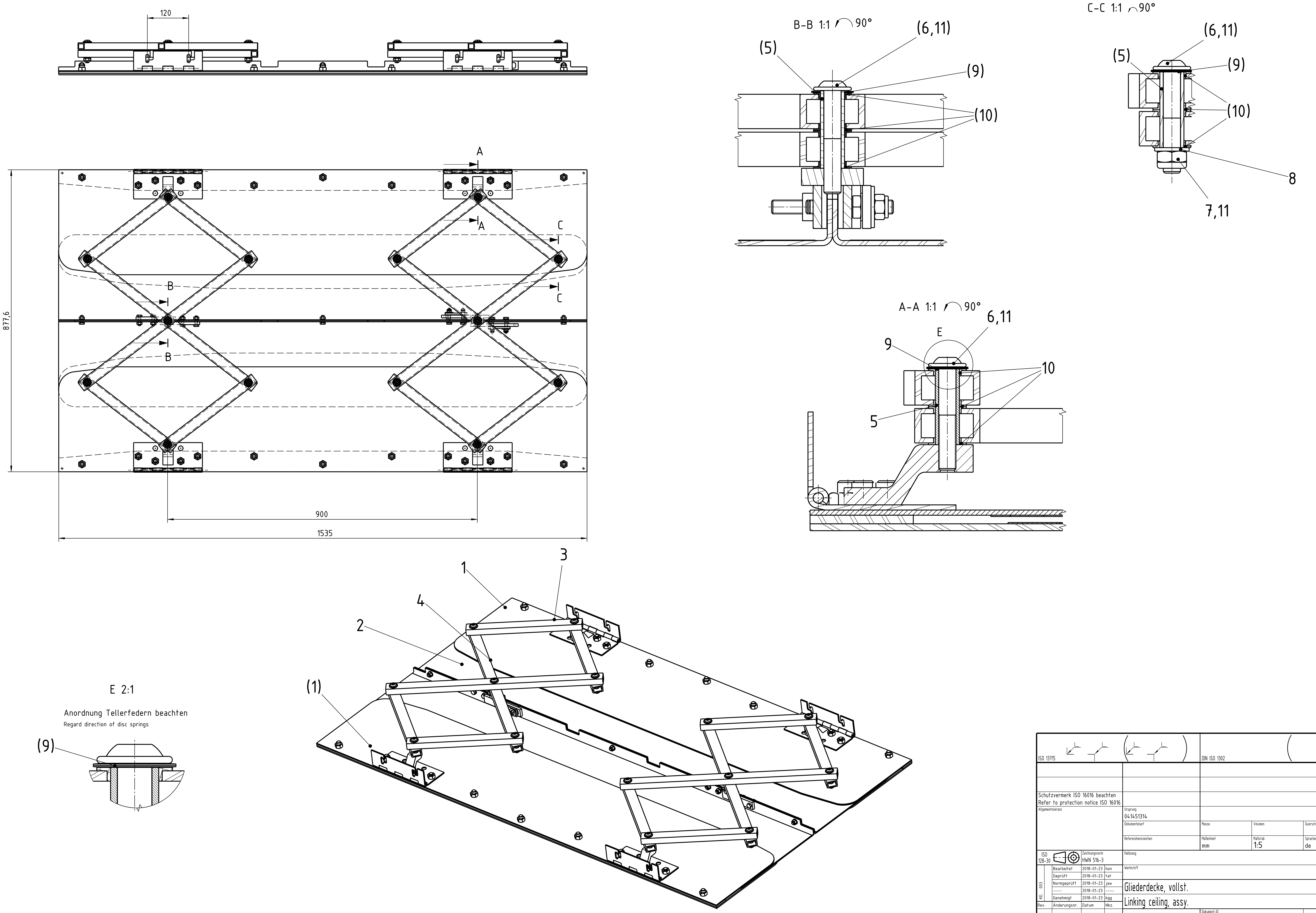
Dokument-ID
ZDR 1001587194 000 -

Zeichnungsnummer
041445191

Version: -

Blatt 1 / 1 Bl.

NUR MIT CAD ÄNDERN A1



ISO 13715		DIN ISO 1302	
Schutzvermerk ISO 16016 beachten Refer to protection notice ISO 16016			
Allgemeintoleranz	Ursprung 041451314		
	Dokumentenart	Masse	Volumen / Querschnittsfläche
	Referenzkennzeichen	Maßeinheit mm	Maßstab 1:5 / Sprachenschlüssel de (en)
ISO 128-30	Zeichnungsnorm HWN 516-3	Halbzeug	
KE: 003	Bearbeitet 2018-01-23 hon	Werkstoff	
	Geprüft 2018-01-23 tat		
	Normgeprüft 2018-01-23 jaw	Gliederdecke, vollst.	
	---- 2018-01-23 ----		
	Genehmigt 2018-01-23 kgg	Linking ceiling, assy.	
Rev.	Änderungsnr. / Datum / Nkz.	Dokument-ID ZDR 1001503738 000 -	
-	500000065077 / 2018-01-23 / hon	Zeichnungsnummer 041448481	Version – / Blatt 1 / 1 Bl.

HÜBNER

NUR MIT CAD ÄNDERN A1

Pos. 23: Farbanstrich bei Schraubverbindungen:
Markierung nach DIN 25201-T7 fuer
alle Schrauben groesser M5.
Ausfuehrung der Markierung gemaess
Foto der PA SC 143

Item 23: Marking according to DIN 25201-T7 for
all screws larger M5.
Execution of marking according to
Photo of the PA SC 143

ISO 13715		DIN ISO 1302	
	Train 18		
Schutzvermerk ISO 16016 beachten Refer to protection notice ISO 16016			
Allgemeintoleranz	Ursprung 041445956		
	Dokumentenart	Masse	Volumen / Querschnittsfläche
	Referenzkennzeichen	Maßeinheit mm	Maßstab 1:5 / Sprachenschlüssel de (en)
ISO 128-30 · Zeichnungsnorm HWN 516-3	Halbzeug		
Bearbeitet 2018-01-17 hon	Werkstoff		
Geprüft 2018-01-18 tat			
Normgeprüft 2018-01-19 jaw	Seitenwand, vollst., Innenverkleidung		
---- 2018-01-19 ----			
KE: 003 · Genehmigt 2018-01-19 kgg	Side wall, assy., inner covering		

Rev.	Änderungsnr.	Datum	Nkz.
-	500000064861	2018-01-19	hon

HÜBNER

Dokument-ID: ZDR 1001587942 000 -

Zeichnungsnummer: 041445174 | Version: - | Blatt 1 / 1 Bl.

NUR MIT CAD ÄNDERN A1

ISO 13715		DIN ISO 1302	
	Train 18		
Schutzvermerk ISO 16016 beachten Refer to protection notice ISO 16016			
Allgemeintoleranz	Ursprung 041461307		
	Dokumentenart	Masse	Volumen / Querschnittsfläche
	Referenzkennzeichen	Maßeinheit mm	Maßstab 1:2 / Sprachenschlüssel de (en)
ISO 128-30 / Zeichnungsnorm HWN 516-3	Halbzeug		
	Werkstoff		

KE: 003	Bearbeitet	2018-01-17	hon
	Geprüft	2018-01-18	tat
	Normgeprüft	2018-01-19	jaw
	----	2018-01-19	----
	Genehmigt	2018-01-19	kgg
Rev.	Änderungsnr.	Datum	Nkz.
-	500000064886	2018-01-19	hon

Führungskörper, vollst., Riegelseite
Guiding body, assy., locking side

HÜBNER

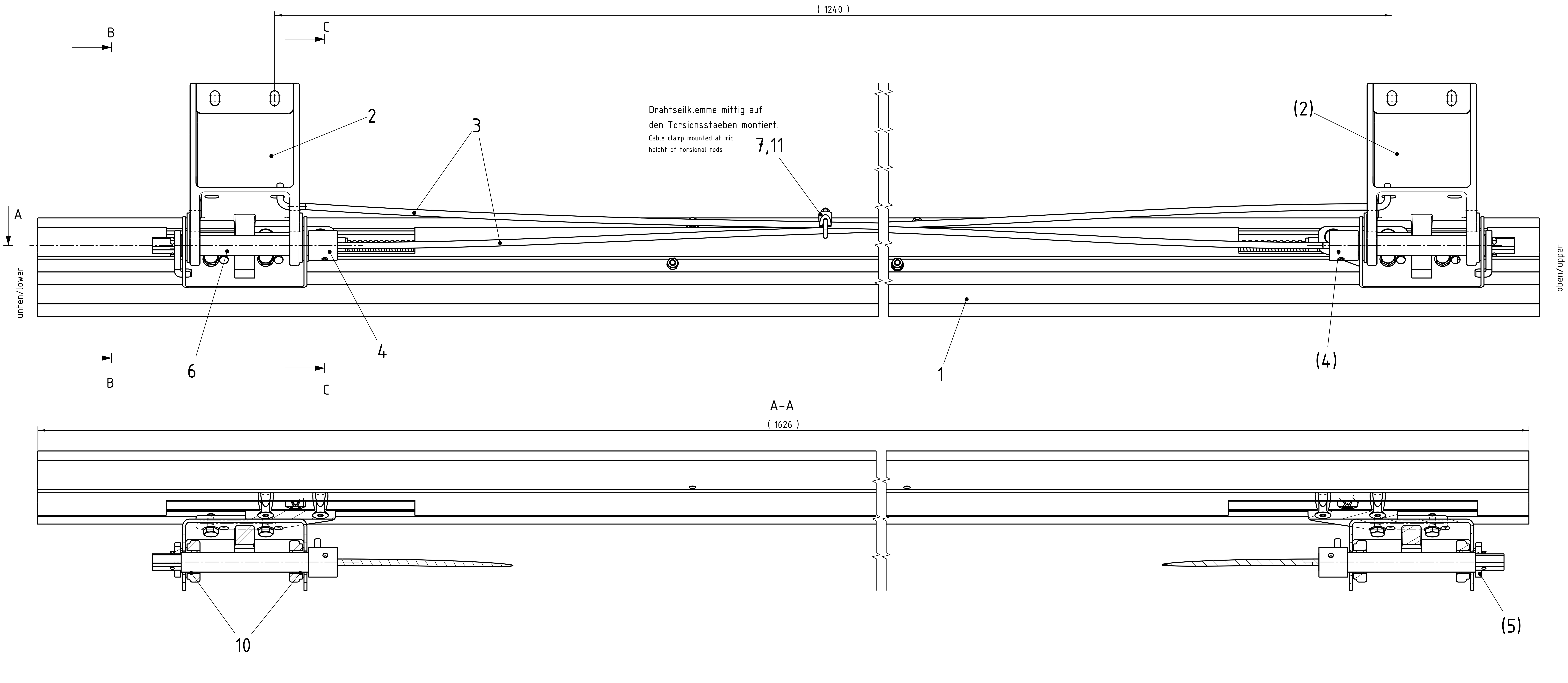
Dokument-ID: ZDR 1001515673 000 -

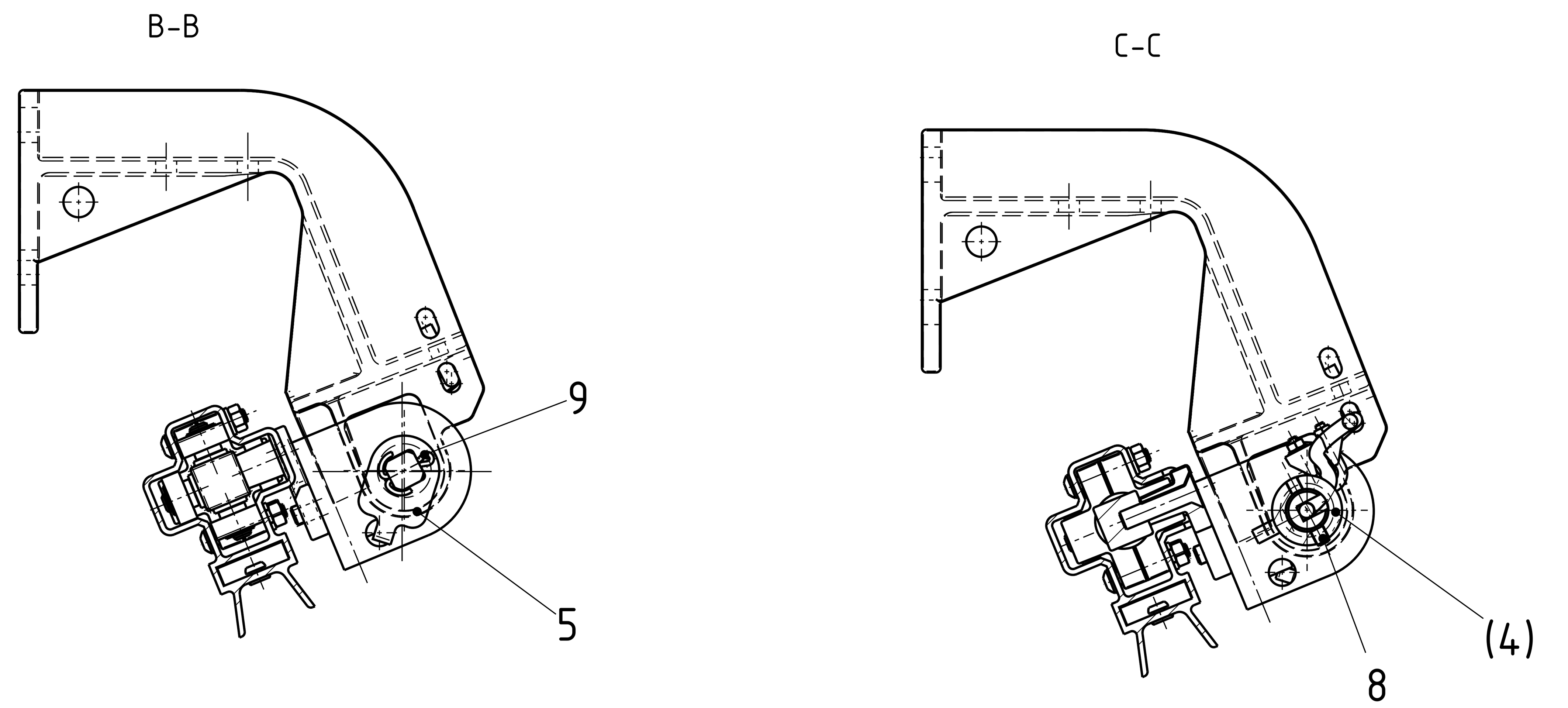
Zeichnungsnummer: 041448060

Version: -

Blatt: 1 / 1 Bl.

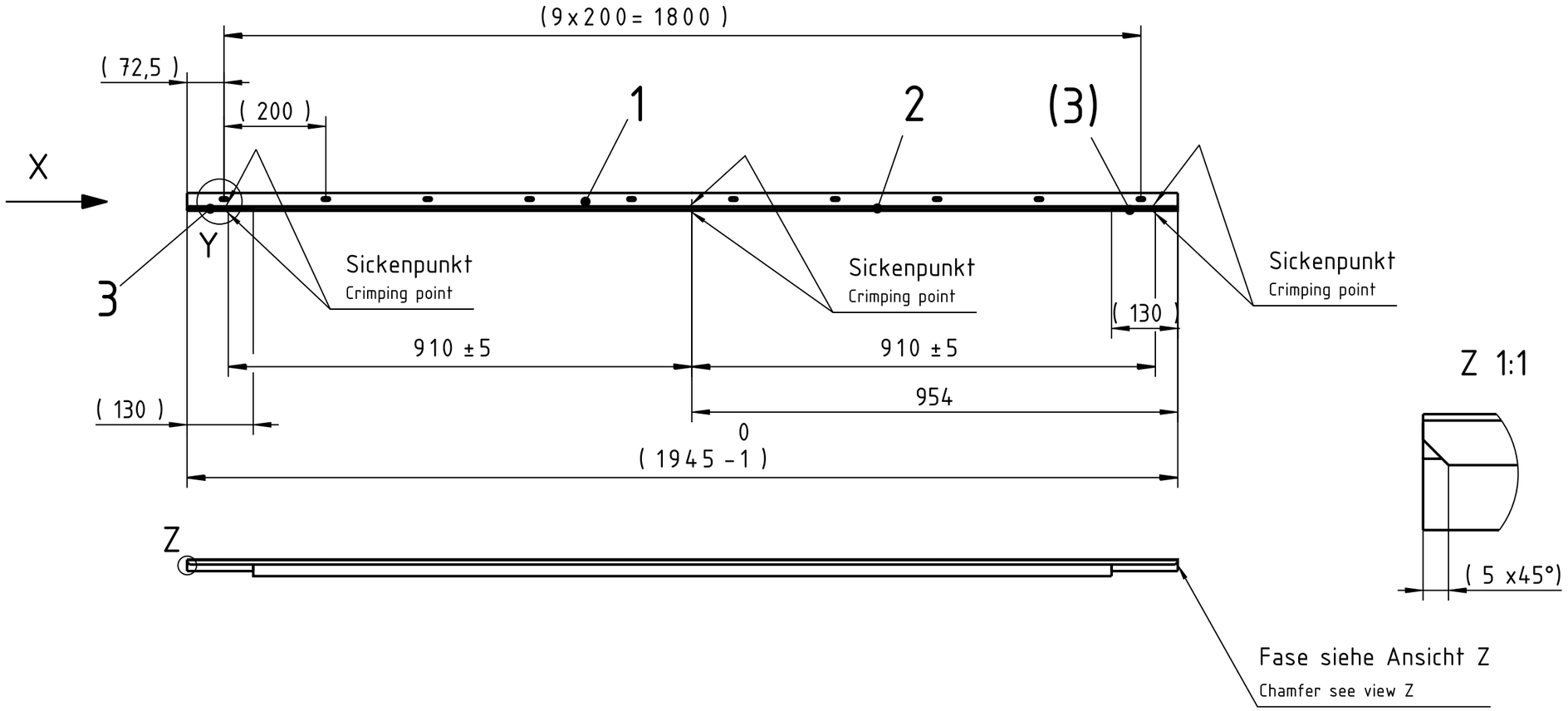
NUR MIT CAD ÄNDERN A1

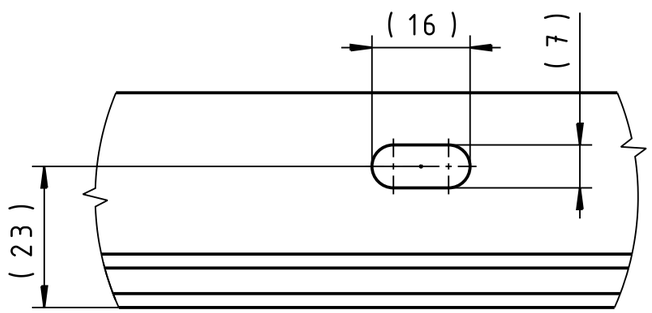


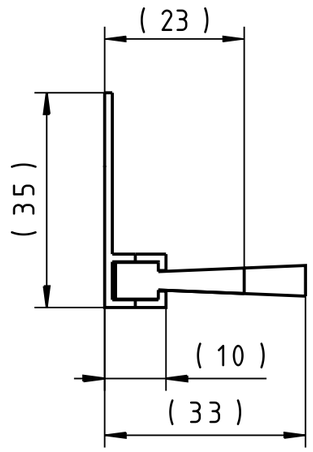


ISO 13715			DIN ISO 1302			
		Train 18				
Schutzvermerk ISO 16016 beachten Refer to protection notice ISO 16016						
Allgemeintoleranz		Ursprung 041461296				
		Dokumentenart	Masse	Volumen	Querschnittsfläche	
		Referenzkennzeichen	Maßeinheit mm	Maßstab 1:2	Sprachenschlüssel de (en)	
ISO 128-30	Zeichnungsnorm HWN 516-3	Halbzeug				
KE: 003	Bearbeitet	2018-01-17	hon	Werkstoff		
	Geprüft	2018-01-18	tat			
	Normgeprüft	2018-01-19	jaw	Führungskörper, vollst., Schraubseite		
	----	2018-01-19	----			
	Genehmigt	2018-01-19	kgg	Guiding body, assy., screw-on side		
Rev.	Änderungsnr.	Datum	Nkz.			
				HÜBNER	Dokument-ID ZDR 1001515555 000 -	
-	500000064886	2018-01-19	hon		Zeichnungsnummer 041448066	Version - / Blatt 1 / 1 Bl.

NUR MIT CAD ÄNDERN A1







ISO 13715 | DIN ISO 1302

Train 18

Schutzvermerk ISO 16016 beachten
Refer to protection notice ISO 16016

Allgemeintoleranz

Ursprung: 041460097

Dokumentenart	Masse	Volumen	Querschnittsfläche
Referenzkennzeichen	Maßeinheit	Maßstab: 1:10	Sprachenschlüssel: de (en)

ISO 128-30 | Zeichnungsnorm: HWN 516-3 | Halbzeug

KE: 003

Bearbeitet	2018-01-23	hon	
Geprüft	2018-01-23	tat	
Normgeprüft	2018-01-23	jaw	
----	2018-01-23	----	
Genehmigt	2018-01-30	kgg	

Vers.	Änderungsnr.	Datum	Nkz.
-	500000065089	2018-01-30	hon

Werkstoff

Abdeckbürste, vollst.
Covering brush, assy.

HÜBNER

Dokument-ID: ZDR 1001503809 000 -

Zeichnungsnummer: 041448476 | Version: - | Blatt: 1 | Bl.: 1

NUR MIT CAD ÄNDERN A3