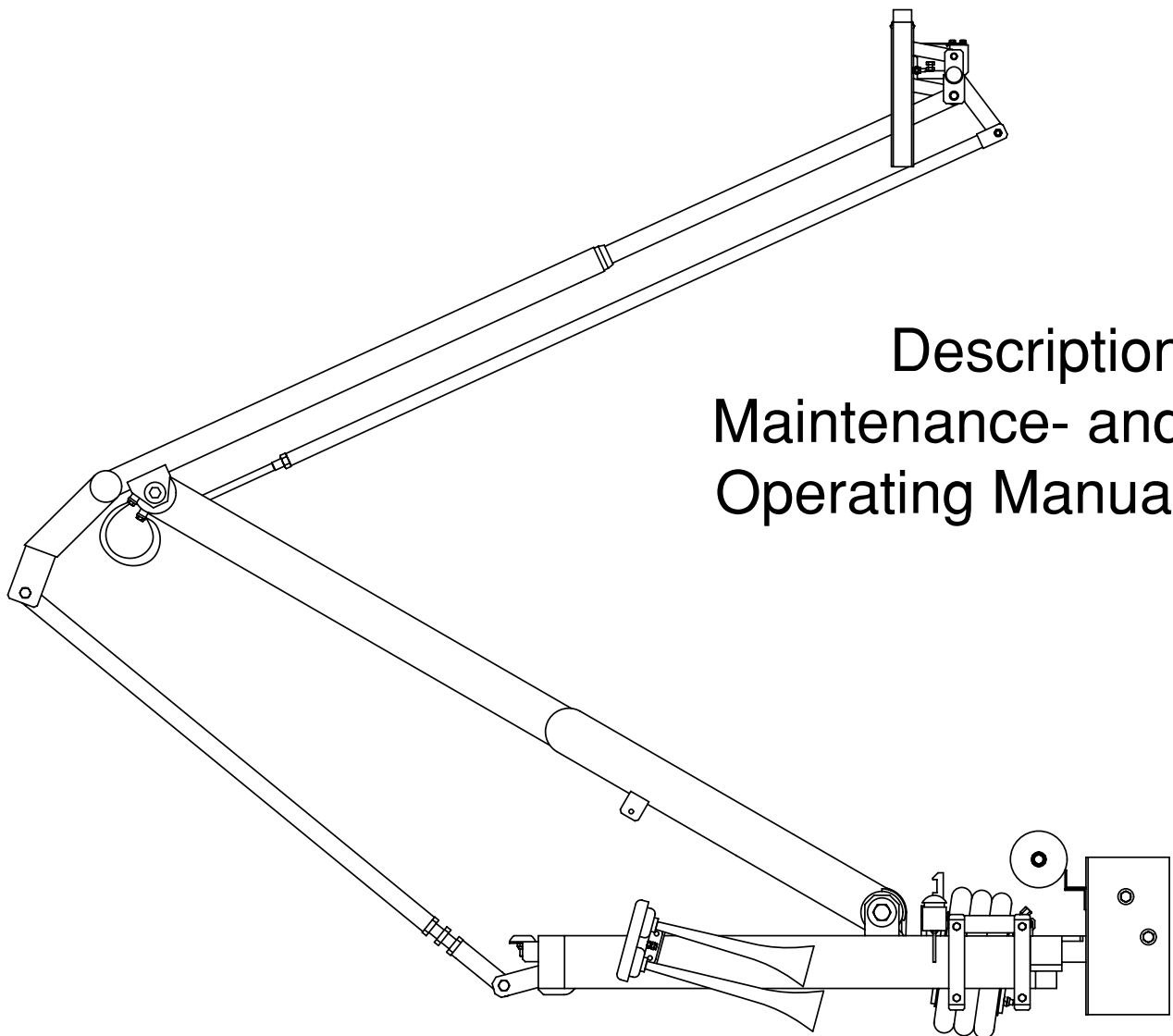




Single Arm Pantograph

Model: WBL 85 - Balfour Beatty Permaquip, SRS



Description Maintenance- and Operating Manual



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1. Introduction

The single arm pantograph WBL 85 Balfour Beatty has been developed as an earthing pantograph which allows for a mobile electrical earthing of the catenary. Please note that the earthing pantograph should only be used as an additional earthing between two stationary earthing poles.

Our objective was to design and manufacture a simple, light weight, and easy to maintain, Pantograph. We further wanted to achieve an optimum in catenary contact behavior, even under the most basic overhead wire conditions, and combine with it a maximum of operating safety.

The last chapter contains the spare parts drawings. We kindly request you to describe the needed parts as accurate as possible and in accordance with this catalogue to assure a problem free order processing, and subsequent delivery.

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2. Safety Instructions

2.1 General



Warning:

Earthing with the aid of the WBL 85 earthing pantograph may only be carried out by authorised personnel. For this reason the pantograph can only be activated by a key-switch, which is provided inside the car.

2.2 Carrying Out Earthing

- Check the overhead wire with a voltage indicator pole.
- Set up fixed earthing points at the ends of the working area in front of and behind the vehicle (distance of 5-6 km).
- Check again the overhead wire with a voltage indicator pole for correct earthing.
- If the overhead wire is voltage free, raise the pantograph up to the catenary

2.2.1 Safety Device

During raising and lowering of the pantograph, a signal horn sounds. As soon as the pantograph has reached the desired contact pressure for the appropriate earthing function, the acoustic signal ceases.

If the contact pressure falls below the preset level, then the signal sounds indicating that the earthing function of the pantograph has ceased.

2.2.2 Safety Check

(has to be made every time from authorised personnel when panto gets raised):

- Raise pantograph: check that horn sounds
- When carbon strip contacts the catenary, check that the signal ends
- Wait about 10-15 sec
- Lower pantograph: check that horn sounds
- Raise panto into working position.

2.2.3 Repair and Maintenance Work

Before carrying out any repair and maintenance work ensure that:

- the power to the catenary is switched off
- the pantograph is lowered.

After completing any repair and maintenance work ensure that:

- no tools or other loose parts have been left on the vehicle roof.

2.2.4 Transport



Attention

Persons are not allowed to stay underneath the pantograph during lifting and transportation.



3. Technical Data

Height in resting position	454 ±10 mm	
Fixation distance - crossways	950 ±1 mm	
Fixation distance longitudinal	800 ±1 mm	
Min. working height over resting position	100 mm	
Max. working height over resting position	2250 mm	
Max. raising height over resting position	2460 ±50 mm	
Total length	2484 ±10 mm	
Lateral deflection at max. working height and a lateral force of 300 N, according to IEC 494		30 mm
Weight	~120 kg	
Contact strip length	920 mm	
Pan width	1600 ±10 mm	
Pan height	300 ±5 mm	
Contact strip width	35 mm	
Contact strip material	Graphit-carbon	
Rated voltage	25 kV	
Static contact force	120 N ±10 N (adjustable)	
Rising time to max. working height	max. 10 sec.	
Lowering time from max. working height	max. 10 sec	
Supply pressure from vehicle	min. 5 bar	
Electrical resistance of pantograph	5 mW	
Max. speed for earthing function	10 km/h	
Contact force monitoring:	by signal horn	
Raising and lowering controlled by	key-switch inside vehicle (provided by vehicle supplier)	

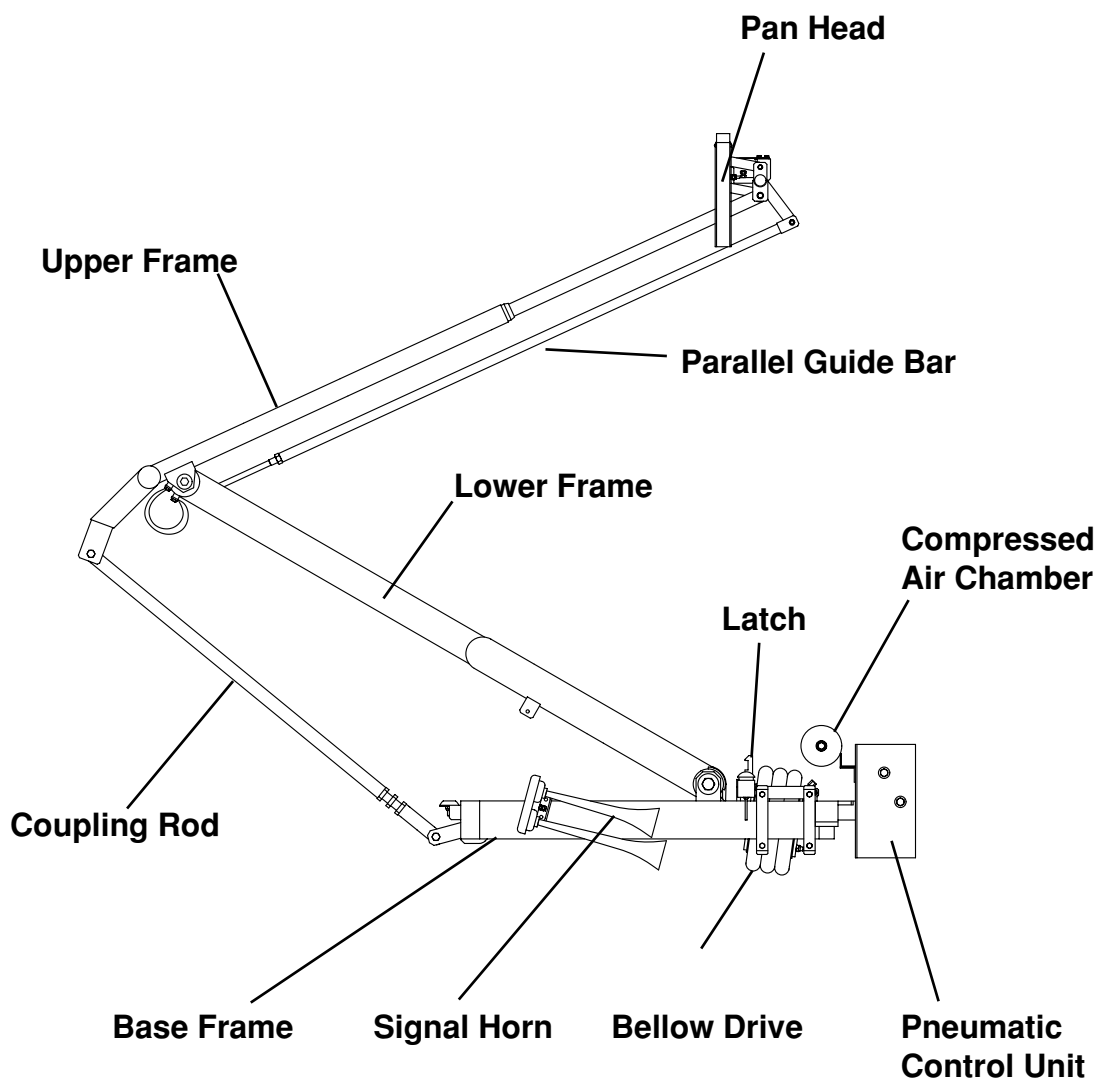
4. Description of Pantograph Components

4.1 General Information

Main features of the Single Arm Pantograph WBL 85 are:

- Low weight
- Simple construction
- Minimum maintenance
- Excellent contact behavior, even under basic catenary conditions
- Maximum operating safety

4.2 Structural Components





4.2.1 Base Frame

The base is a welded structure of closed rectangular hollow steel profiles.

The following component parts are located on the base frame:

- Basic bearings for the lower frame
- Resting buffer for upper and lower frame
- Mounting fixtures for:
 - Air bellow
 - Coupling rod
 - High voltage hook-up
 - Pneumatic control unit
 - Signal horn

4.2.2. Lower Frame

The lower frame is a welded structure. Its seating is located on the base frame.

The following component parts are mounted to the lower frame:

- Cam disks with suspension fixture for the bellow-drive ropes
- Parallel guide bar

4.2.3 Upper Frame

The upper frame is a welded structure made of seamless tubes. Necessary lateral stability is achieved through a cross wire-rope construction.

Attached to the upper frame are the following component parts:

- Pan head
- Coupling rod
- Lower frame
- Bearing blocks for the knuckle joint bearings

4.2.4 Coupling Rod

The coupling rod consists of two individually welded round-tubes. Both tubes are then connected through a control element. Through this control element the geometry of the pantograph will be adjusted and fine tuned.

4.2.5 Pan Head

The pan is fixed to the upperframe of the pantograph by means of a pantube. Fitted to the pan tube are two levers which at the other ends take up the carbon strip via a collectorstrip support. These levers guide the collectorstrip when moving vertically.

The collectorstrip is raised up against weight and contact pressure by means of leaf springs. As the carbon strip presses against the catenary with increasing force, it tensions up until the spring system is arrested by an adjustable stopper.

On the pan, a monitoring valve is located which applies pressure to a pneumatic signalhorn (located on the baseframe) – as long as the correct contact force between carbonstrip and catenary is not reached. When the pre-set contact pressure is achieved, the carbon strip tensions against the stopper, the monitoring valve switches over, the horn is no longer pressured, and the signal ceases.

In addition, the following parts are located on the pan:

- Shunts for the connection between contact strip and upperframe
- 3/2 way monitoring valve

4.2.6 Parallel Guide Bar

The parallel guide bar prevents the pan head from rotating,. It holds the collector strip in a horizontal position.

4.2.7 Air Bellow-Drive

The pneumatic bellow drive allows the pantograph to rise. It is mounted between the base frame and the lower frame. A pneumatic line connects the bellow drive with the valve control unit. The contact pressure as well as the raising and lowering time is adjusted through the valve control system unit.

4.2.8 Electrical Equipment

All bearing locations are by-passed by shunt connectors. These prevent the current from flowing through the bearings. The shunts are consisting of flexible copper cables with clamped end pieces. The current connectors are greased with copper grease to achieve good conducting properties between the shunts and the frame parts.

4.2.9 Pneumatic Control Unit

The pneumatic control unit is fitted inside a switching box which is fixed on the baseframe.

The pneumatic control unit ensures pneumatic adjustment of the pantograph like contactforce and raising- and loweringtime.



The main components of the valve control unit are:

- Airfilter with condensate separator
- Pressure regulation valve
- Throttle valve
- Security valve

There is also a pneumatic conduction for the latch, which is leading through the switchingbox.

4.2.11 Compressed Air Chamber

A compressed air chamber is integrated into the pneumatic feed to the signalhorn, forming a pressure air reservoir, ensuring that – in the event of a fall in air pressure in the feed to the signal horn (when the pantograph is lowered or when a loss of air pressure occurs in the feed as a result of a fault) – sufficient air volume is still available to enable the signal horn to sound for the appropriate duration.

4.2.12 Compressed Air Signal Horn

A signal horn is attached to the baseframe. The horn sounds during the raising and lowering operations and when there is too little contact pressure onto the catenary. As soon as the pantograph has reached the required contact pressure for correct earthing function, the acoustic signal ends. A monitoring valve on the pan controls the signal horn operation.

4.2.13 Latch

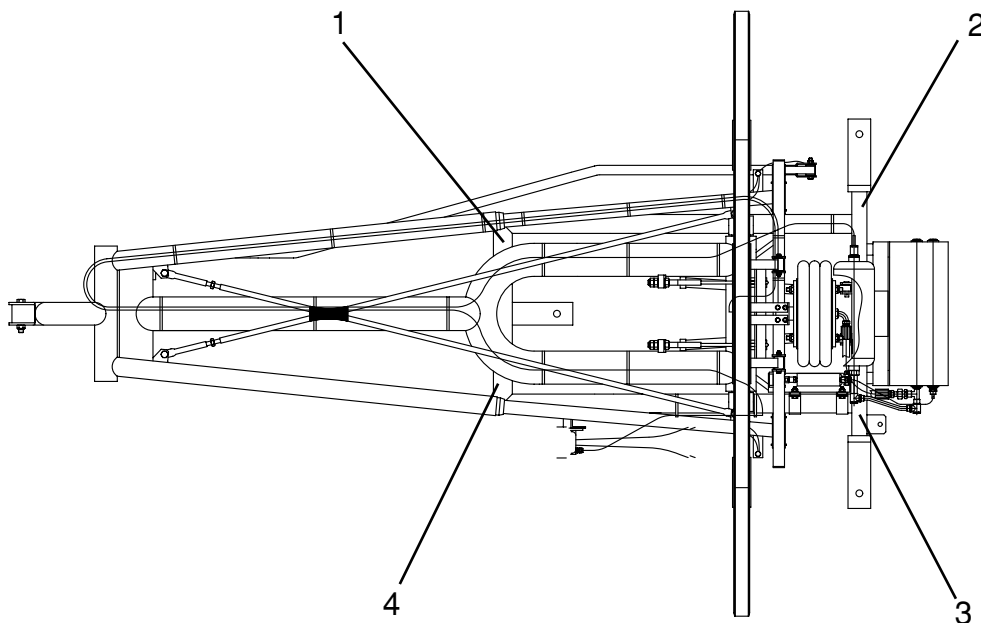
The latch ensures, that the pantograph is secured in restingposition, when it is out of service. The pneumatic circuit inside the vehicle is layed out in a way, that the latch opens before the the airbellow get under pneumatic-pressure for raising the pantograph.

5. Assembly

5.1 General Information

The Single Arm Pantograph is manufacturer-adjusted according to your system's requirements.

5.2 Transport



For transportation and lifting purposes fix panto only on fixing points (1, 2, 3, 4) of the base frame.



Attention:

No one admitted underneath the pantograph during lifting and transportation !

Caution: ***Do not damage coating during transportation !***

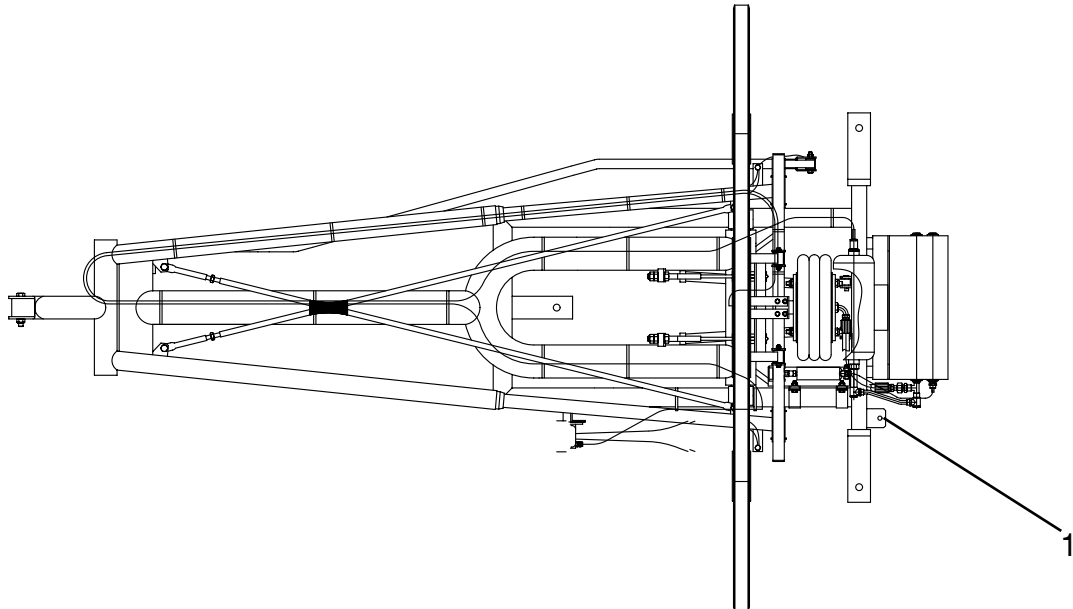
5.3 Mounting

The base frame has to be mounted tension free onto the vehicle roof. The base pipe of the lower frame has to be horizontal. If needed washers may be installed underneath the fixing lappets.

5.4 Installation of Electrical Equipment

5.4.1 High Voltage Connection

The high voltage earthing has to be made on the connecting strap (1) connection. The connecting spot needs to be well greased with conducting grease.

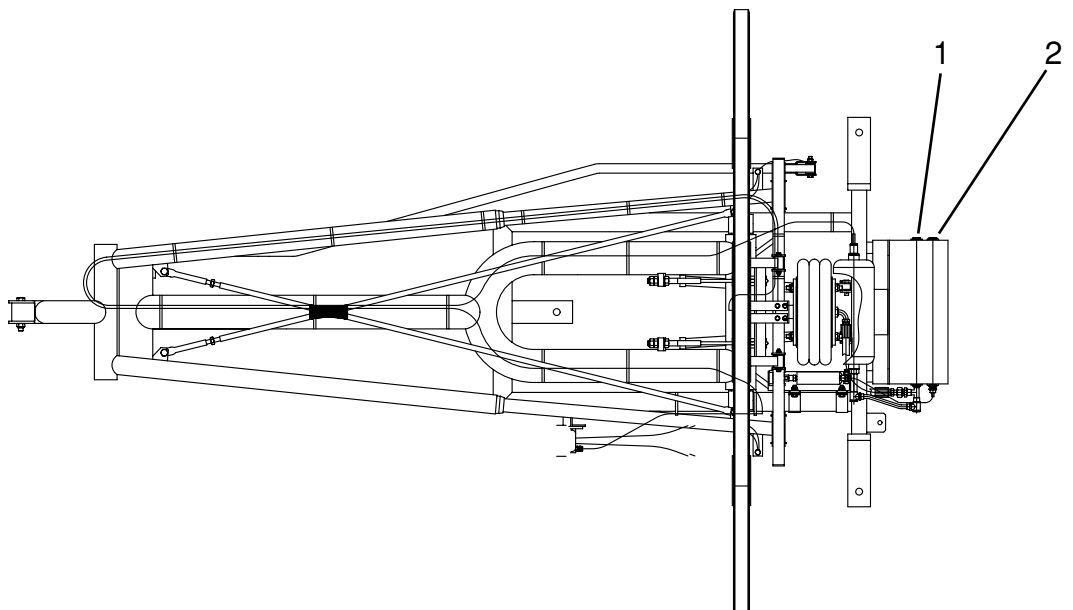


5.5 Mounting of Pneumatic Air Connection

The pneumatic connection between vehicle and pantograph has to be accomplished on the connections (1) and (2). Both connections have a 1/4" inside thread.

Connection (1): Connection for pantograph-airbellowdrive

Connection (2): Connection for latch





6. Start - Up

6.1 Checklist (also see # 10. "Adjustment")

Check before start-up :

- Screw connections of high voltage hook-up, and verify that they are well greased
- Contact pressure of pantograph (120N, \pm 10N)
- Raising and Lowering time to be in according with technical data
- Check signal horn for proper function (see 2.2)

7. Maintenance

7.1 General Information

The Single Arm Pantograph WBL 85 requires less maintenance. At the regular maintenance intervals of the vehicles, the following procedures are recommended:

During each inspection (max. 10000 km):

- Inspection of carbon strips (breaks, wear).
- Inspection of horns.
- Check proper function of signalhorn and contact force monitoring system.

Every year:

- Visual inspection of screws and shunts.
- Visual inspection of cable of raising mechanism, if needed, grease with TOP 2000 of company AGIP Schmiertechnik.
- Inspection upward force, adjust, if necessary.
- Inspection easy motion of bearings, pan head springs, etc.
- Pneumatic equipment for leakages.

After max. 3 years:

- Grease the ends of the tow-rope with TOP 2000 of AGIP Schmiertechnik.
- Replace shunts.

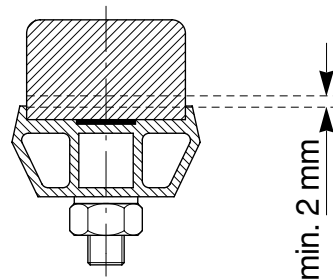
After every 8 to 10 years and on any main inspection
(max. after 2000000 km / 1250000 miles):

- Change all ball bearing.
- Inspect for corrosion, if necessary replace coating.
- Change rubber bumpers on base frame.
- Change leaf springs of pan head.
- Change cable of raising mechanism.
- Inspect/change of valve control unit.
- Change plain bearings.
- Replace all air tubes.
- Inspect/replace air bellow drive.
- Replace 3/2-way monitoring valve on pan head.

7.2 Carbon Current Collector Strip

The carbon strip need to be checked for damage and wear at every visual inspection. As a guide line to determine the intervals between visual inspections, please consider:

- Anticipated operating and wear life.
- Extreme weather conditions (ice, snow, rain, etc).



Latest with a remaining carbon height of 2 mm the carbon strips should be replaced.

7.3 Bearings

7.3.1 Grooved Ball Bearing, Ball Bearing Guide, Ball Bushing

The grooved ball bearings are to be cleaned and greased during every main inspection, and tested for flexibility of motion and bearing play. If motion of bearings is slow, determine the reasons (e.g. misalignment, bent component part, locked up stress, etc.). Damaged grooved ball bearings are to be exchanged. The space of the ball bearings needs to be filled completely with

grease TOP 2000 of AGIP Schmiertechnik

in order to avoid condensation.

7.3.2 Plain Bearing

All plain bearings of pantograph WBL 85 are maintenance free. The plain bearings are either:

- Teflon-coated bronze bushings or
- Plastic bushings

If plain bearings are slow, reason of slowness has to be determined and eliminated. Damaged plain bearings need to be exchanged. Dirty plain bearings have to be cleaned. We recommend to grease bearings with

grease TOP 2000 of AGIP Schmiertechnik.

7.4 Screw Connections

All mounting screws are to be checked for damage and tight fit, especially:

- Mounting screws for carbon strips.
- Pan Head connections.

Hex nuts according DIN 985 must be replaced by new ones after dismantling !

7.4.1 Fastening Moment for Screw Connections

Thread	Fastening Moment	Thread	Fastening Moment	Thread	Fastening Moment
M3	1,1 Nm	M8	21,4 Nm	M16	183,0 Nm
M4	2,6 Nm	M10	44,0 Nm	M20	370,0 Nm
M5	5,1 Nm	M12	74,0 Nm		
M6	8,8 Nm	M14	119,0 Nm		

7.5 Bellow Drive

The bellow drive is maintenance free.

Check bellow drive for operation during each main inspection by lifting and lowering the pantograph. If needed, replace damaged or bent parts.

The cables are to be greased with TOP 2000 of AGIP Schmiertechnik, if necessary.

7.6 Pneumatic Control Unit

During each main inspection the safety valve needs to be tested by increasing the pressure through the pressure regulator.

After completed test, adjust contact pressure to required level.



8. Troubleshooting

8.1 General Information

Adjustment works are referred to in the “Adjustment Work“ chapter.

8.2 Trouble Table

Defect	Reason(s)	Correction
Pantograph does not rise or lower.	Air bellow damaged.	Check air bellow, exchange broken air bellow. (also see defect: Bellow drive defective)
	Cable torn.	Replace cables. (also see defect: Cable torn)
	Pneumatic control unit defective.	Exchange valve unit.
	Pneumatic tube defect.	Replace pneumatic tube.
	Inner friction of panto is too high.	Check pantograph for damages, and eliminate damages.
		Replace defective bearings.
Uneven wear of carbon strip.	Parallel guide bar is poorly adjusted.	Adjust turning capacity of pan head. (also see # 10.7, adjust turning capacity of pantograph head)
Cable torn.	Bellow drive is improper adjusted; bellow does not expand straight-lined.	Replace cables, adjust bellow to achieve straight expanding line. (also see # 10.3, adjusting the bellow drive)
	Cables are not greased	Replace cables and grease in area of cam disk with non-water-soluble grease.
Bellow drive defective.	Screws are loose.	Tighten screws.
	Hose line leaking.	Exchange leaking hose with new hose line.



Defect	Reason(s)	Correction
	Bellow cylinder leaking.	Exchange bellow cylinder; find reason for leakage and check bellow joints.
Excessive air leakage.	Pressure-regulator defective (normal air leakage of pressure regulator = 0,5 l / min.).	Exchange pressure regulator.
Increase of contact pressure without previous adjustment of pressure regulator.	Pressure regulator defective.	Exchange pressure regulator.
Signal horn for contact force monitoring does not sound during raising or lowering.	Monitoring valve on pan defective	Replace valve
	Restrictor in compressed air line defective	Replace restrictor
	Compressed air line defective	Replace air hose
	Signal horn defective	Replace signal horn
Signal horn sounds while pantograph in operation (on catenary)	Contact force incorrectly set.	Check contact force and re-adjust setting
	Monitoring valve on pan poorly set	Adjust setting of valve
	Pan head spring stop incorrectly set	Re-adjust setting
	Excessive inner friction of pantograph	Find cause of excessive friction and replace defective component
	Pan lever bearings are stiff.	Replace bearings. Check pan levers for deformation and replace if necessary.

9. Repairs

9.1 General Information

Prior to disassembling the pantograph, please make familiar with the relationship of the individual component parts by studying the drawings (chapter #11).

Deformed component parts are to be disassembled before adjusting.

The alignment of the bearings is only accurately measurable on a measuring table.

9.2 Dismounting of Pantograph from Top of Vehicle Roof

- Lower pantograph into lowest resting position.
- Make sure that current in catenary is switched off.
- Detach electrical connection between pantograph and vehicle.
- Unscrew pneumatic connections to vehicle.
- Secure upper frame to base frame (e.g. with a rope)
- Secure pantograph at the transport fixing points. (see # 5.2 Transport Chapter).
- Detach pantograph from fixing-supports on vehicle.
- Lift pantograph off vehicle roof.

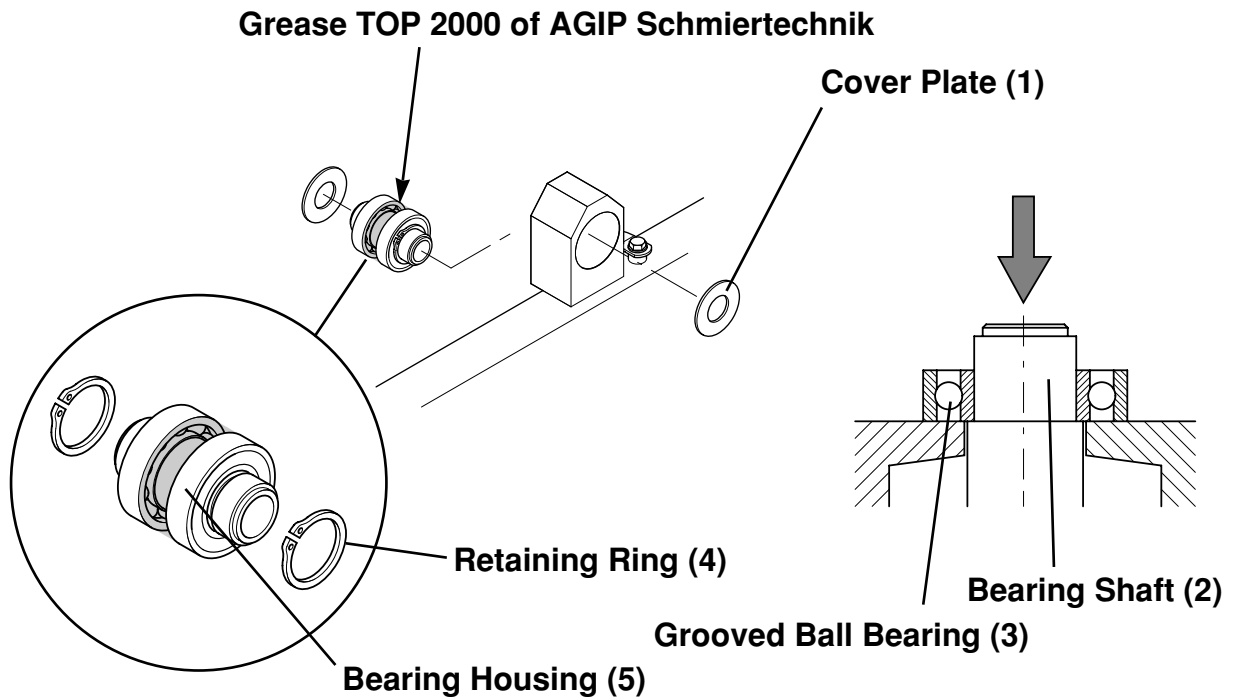
Attention: No persons is allowed to be underneath the transported pantograph.

9.3 Complete Disassembly of Pantograph

- Mount pantograph on suitable resting feets to protect air bellow and signal horn.
- Lower pantograph into lowest resting position.
- Detouch signal horn from base frame.
- Detach air conditions.
- Detach shunts and carbon strips.
- Detach parallel guide bar.
- Detach pan head from upper frame..
- Detach coupling rod from upper frame and base frame.
- Detach upper frame from lower frame.
- Detach air bellow drive.
- Detach lower frame from base frame.
- Detach latch from base frame.
- Detach pneumatic control unit from base frame and compressed air chamber.

9.4 Repairs of Component Parts

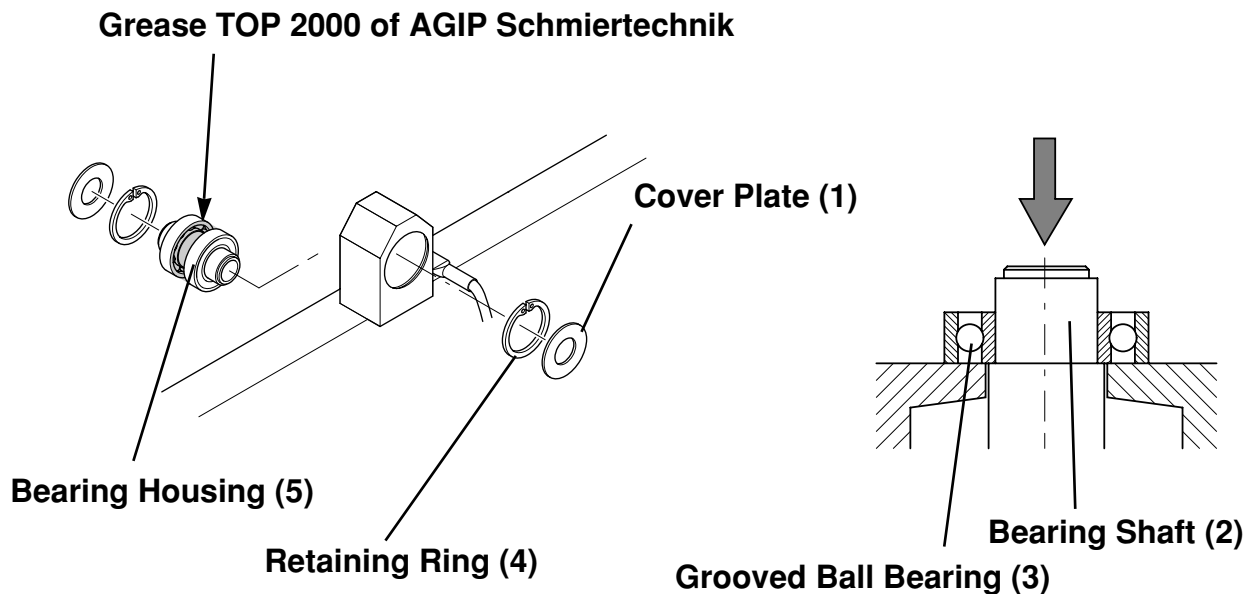
9.4.1 Free Bearing of Base Frame and Upper Frame



Instructions:

- ❑ Remove both cover plates (1) (e.g. using a screwdriver).
- ❑ Push bearing housing (5) out of bearing block by means of a sleeve, which only rests on the outer ring of the grooved ball bearing.
- ❑ Detach both retaining rings (4) with retaining ring pliers.
- ❑ Push bearing shaft (2) out of grooved ball bearing (3), clean, check for moveability and bearing play, and replace if necessary.
- ❑ Assembly of bearings vice versa - pack space between grooved ball bearings with grease TOP 2000 of AGIP Schmiertechnik.

9.4.2 Fixed Bearing of Base Frame, Coupling Rod and Upper Frame



Instructions:

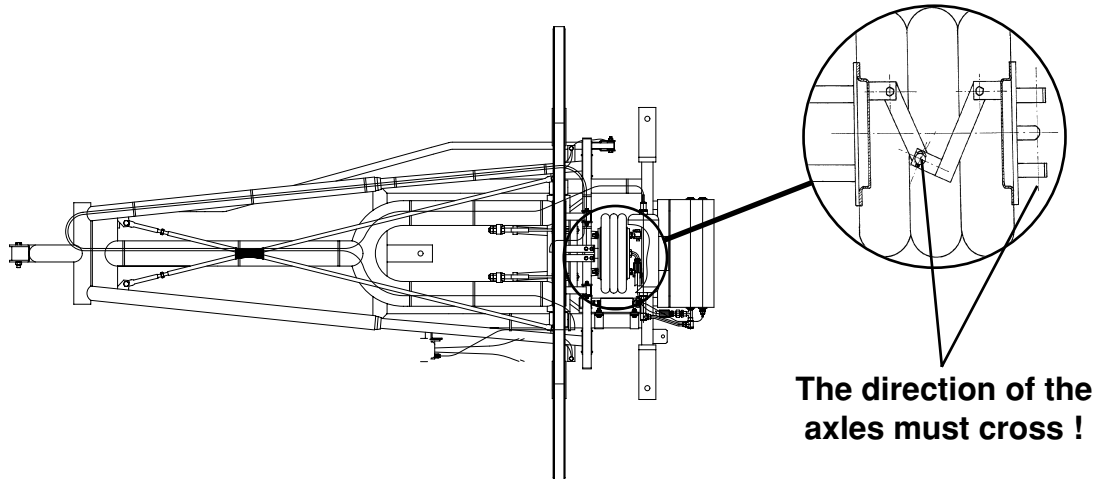
- Remove both cover plates (1) (e.g. using a screwdriver).
- Detach both retaining rings (4) with retaining ring pliers.
- Push bearing housing (5) out of bearing block by means of a sleeve, which only rests on the outer ring of the grooved ball bearing.
- Push bearing shaft (2) out of grooved ball bearing (3), clean, check for movebility and bearing play, and replace if necessary.
- Assembly of bearings vice versa - pack space between grooved ball bearings with grease TOP 2000 of AGIP Schmiertechnik.

9.4.3 Pan Head

- Detach 3/2 way monitoring-valve from pantube
- Detach pneumatic screw-joints and blind from 3/2 way-valve
- Detach collectorstripsupport from levers
- Detach axle and springroll from collectorstripsupport
- Detach levers from pantube
- Detach leafsprings and underlayingsprings from pantube
- Detach axles and plainbearings from levers and pantube
- Detach horns and tubs from collectorstrip

9.4.4 Bellow Drive

- Detach bellow drive, check parts and replace defective ones.



Caution is required during assembly of the bellow drive that the axle joint is positioned correctly. The axle joint prevents “buckling” of the bellow.

- Mount of bellow to pantograph.
Caution: Do not overtorque the cables, as it otherwise may jam the bellow.
- Tighten both ropes evenly and adjust bellow (see # 10.3 chapter Adjust Bellow).

9.4.5 Other Component Parts

If the pantograph is damaged, all components need to be checked very carefully and replaced if needed.

9.5 Re-assembly after Complete Disassembly

If the pantograph had been completely disassembled, the re-assembly is to be conducted as follows:

- Mount free bearings and fixed bearings for lower frame as well as rubber puffer.
- Attach cam discs to lower frame.
- Mount lower frame to base frame.
- Attach drive cables to bellow and secure with lock nut
- Mount elevation stop to bellow.

- Attach bellow drive to base frame.
- Mount drive cables to lower frame and secure with lock nuts.
- Assemble coupling rod (bearing, calibration) and mount to base frame.
- Install bearings of upper frame.
- Mount upper frame to lower frame, and coupling rod to upper frame.
- Mount diagonal cables to upper frame and tighten (caution during tightening, upper frame may not distort).
- Attach plainbearings and axles into levers.
- Mount levers to pantube.
- Screw leafsprings and underlayingspring onto pantube.
- Mount axle and springroll on collectorstripsupport.
- Mount collectorstripsupport on levers.
- Attach pneumatic screw connections and blind to 3/2 way-valve.
- Screw 3/2-way-monitoring-valve to pantube.
- Mount horns and tubs to collectorstrip.
- Mount collectorstrip complete with horns on collectorstripsupport.
- Attach bearing for parallelguide to pantube.
- Mount panhead on upperframe.
- Assemble parallel guide bar.
- Attach parallel guide bar between lower frame and pan head mount.
- Mount latch on base frame.
- Mount shunts.
- Screw pneumatic control unit to baseframe.
- Screw compressed air chamber to baseframe.
- Mount signalhorn on baseframe.
- Install pneumatic conductions.
- Intermediate Check - verify tightness of all screws.
- Adjust pantograph (see chapter 10, Adjustment Work).
- Final inspection on pantograph.
- Mount pantograph to vehicle roof.
- Establish electrical connection between pantograph and vehicle.
- Establish pneumatic connection from panto to vehicle.
- Before operation follow instructions of checklist in chapter 6.1.



Caution: No tools or loose parts may remain on vehicle roof.

10. Adjustment Work

10.1 General Information

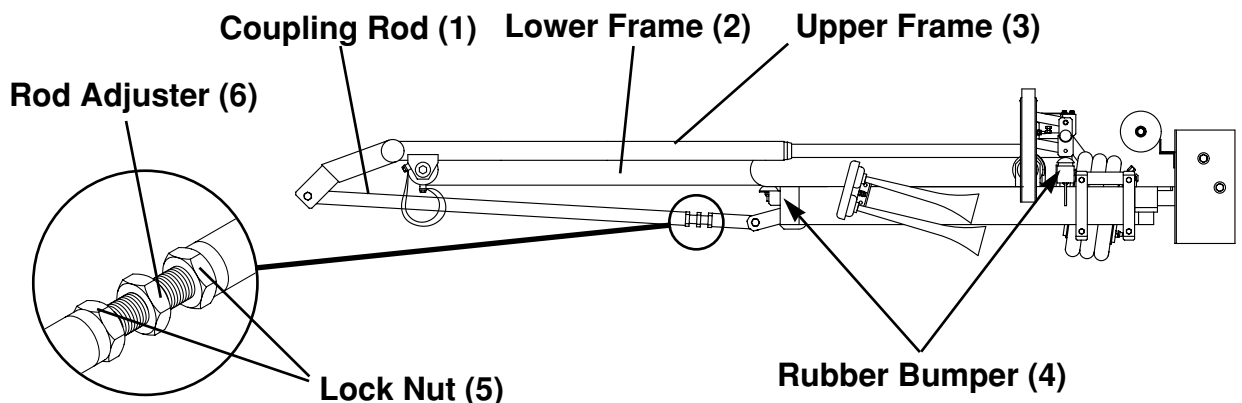
Each pantograph had been calibrated by the manufacturer.

Adjustment works are to be carried out in the following order:

- Adjust coupling rod and resting position
- Adjust contact pressure
- Adjust curve of contact pressure
- Adjust turning of pan head
- Adjustment of pan
- Adjustment of contact force monitoring system

10.2 Adjustment of Coupling Rod and Resting Position

The resting position of the pantograph is adjusted through the coupling rod (1).



Instructions:

- Adjustments are made through the rod adjuster (6) on the coupling rod (1).
- After adjustments tighten lock nuts (5).

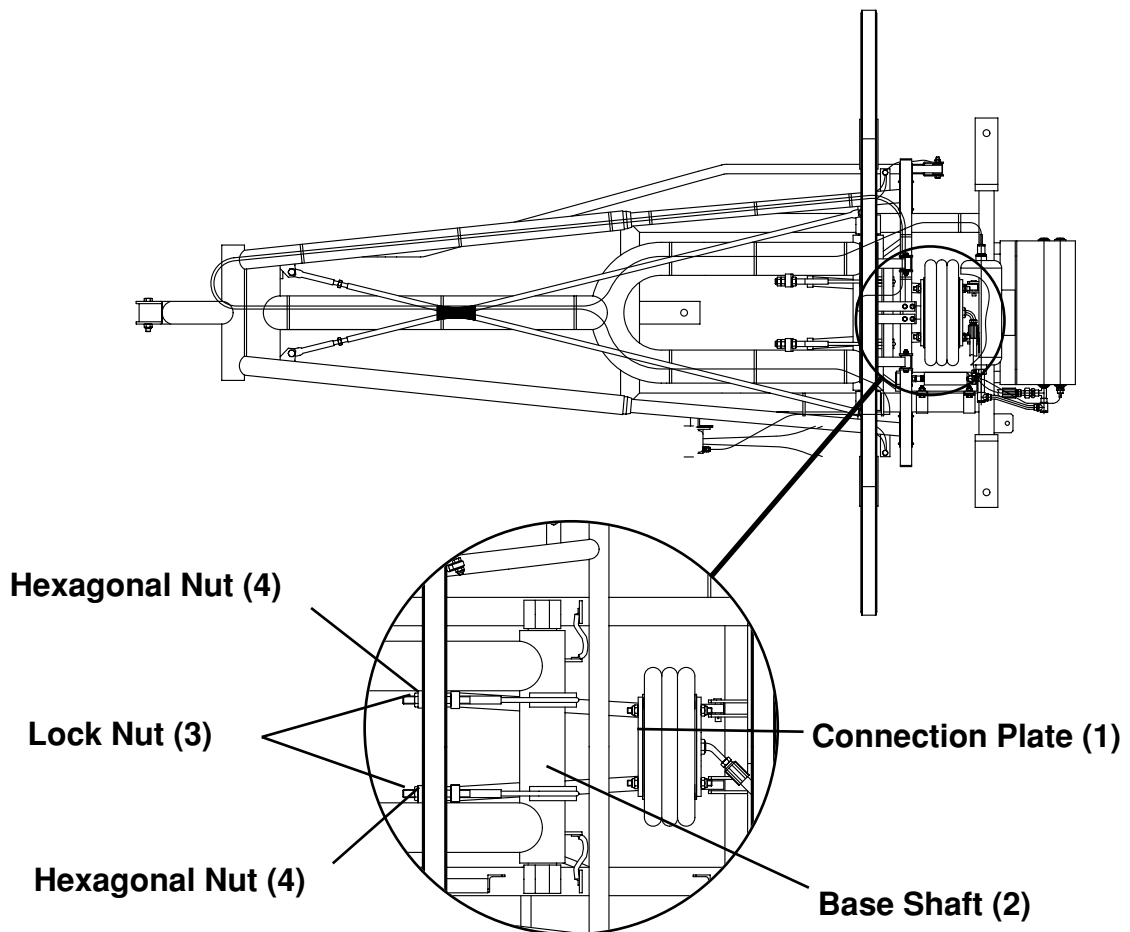
Check: Lower Pantograph. Lower frame (2) and upper frame (3) have to rest on rubber bumper (4).



Through changing the length of the coupling rod the geometry of the pantograph has changed. Therefore check the curve of the contact pressure and adjust if necessary.

10.3 Adjusting the Bellow Drive

Check: Lift and lower the pantograph. Parallelism of the connection plate (1) to the base shaft (2) of the lower frame has to be assured during the raising and lowering procedures.



If fine tuning is required, proceed as follows:

- Lower pantograph, bellow has to be completely without pressure.
- Loosen lock nuts (3) on both drive wire ropes.
- Adjust length of wire ropes by means of hexagonal nuts (4) until parallelism between the connection plate (1) and base shaft (2) is accomplished.
- Verification through raising and lowering of pantograph.
- Secure again with lock nuts.
- Final inspection of the fine tuning through raising and lowering of the pantograph.

10.4 Adjustment of Contact Pressure

The medium contact pressure is 120 N.

After each replacement of carbon strip the contact pressure needs to be verified. Contact pressure may be measured with a spring scale or with the SCHUNK Pantograph Contact Pressure Measuring Gauge KM 11.

Measurement of contact pressure with spring balance:

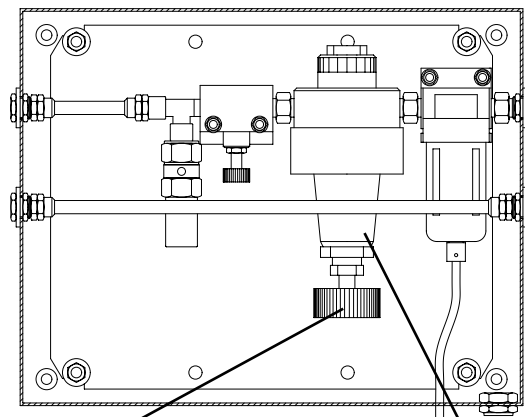
Value 1: Measuring of contact pressure from highest working position with slow descending motion into resting position.

Value 2: Measuring of contact pressure from resting position with slow ascending motion into the highest working position.

Results: $\frac{(\text{Value 1} + \text{Value 2})}{2} = \text{Average Value} = \text{Contact Pressure}$

Friction: Difference of contract pressure between Value # 1 and Value # 2 (ideal value lower than 20 N)

If the difference of the contact pressure is greater than 40 N, determine the reason (e.g. defective component part, dirt in the bearings, etc.) and have it corrected.



Regulating Screw (2)

Pressure Regulator (1)

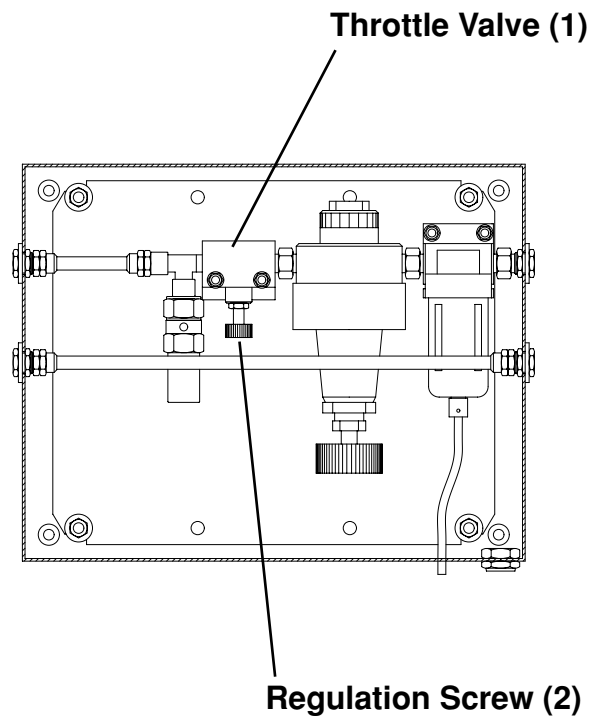
The calibration is done by means of the regulating screw (2) at the pressure regulator (1) on the pneumatic guide system.

Adjust through:

- turning clockwise = increase contact pressure
- turning counter-clockwise = decrease contact pressure

10.5 Adjustment of Raising- and Lowering Time

The adjustment of the raising and lowering time can be made by turning the regulation screw (2) of the throttle valve (1).



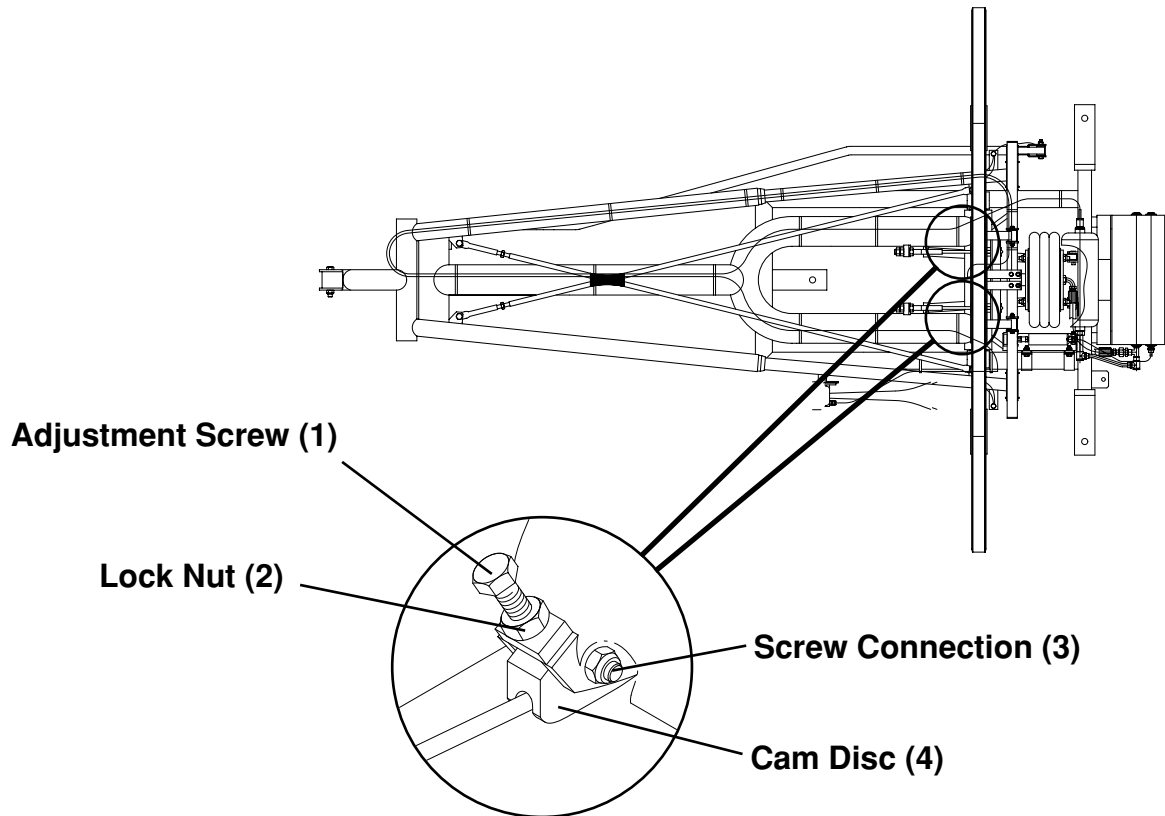
Adjustment:

- ❑ For increasing the raising- and lowering time turn regulation screw (2) into clockwise direction
- ❑ For decreasing the raising- and lowering time turn regulation screw (2) against clockwise direction

The max. raising- and lowering time up to max. working height is 10 sec.

10.6 Adjustment Curve of Contact Pressure

The contact pressure should be nearly constant over the entire working range.



Instructions:

- Loosen the four screw connections (3).
- Calibration is done by means of adjustment screw (1) on the cam disc (4) of the lower frame.

Adjustment through:

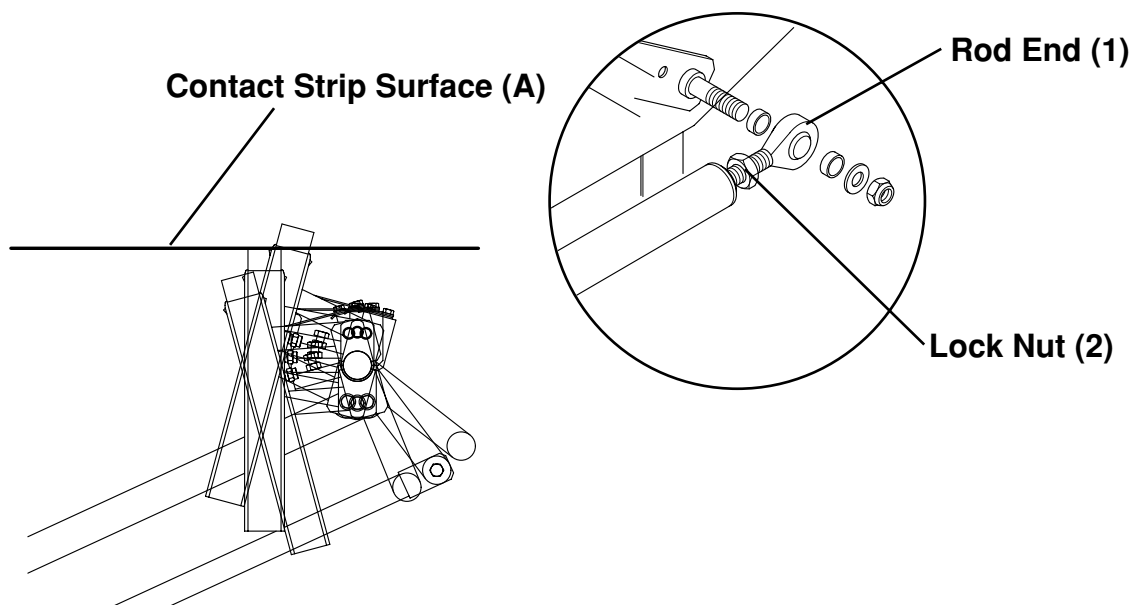
- Turns clockwise = contact pressure increases in the lower working range
- Turns counter clockwise = contact pressure decreases in the lower working range

Adjustment is required until curve of contact pressure is nearly constant over the entire working range. Verification with spring balance or with the SCHUNK pantograph contact pressure measuring gauge KM 11.

- Then tighten lock nuts and screw connections.

10.7. Adjust Turning of Pan Head

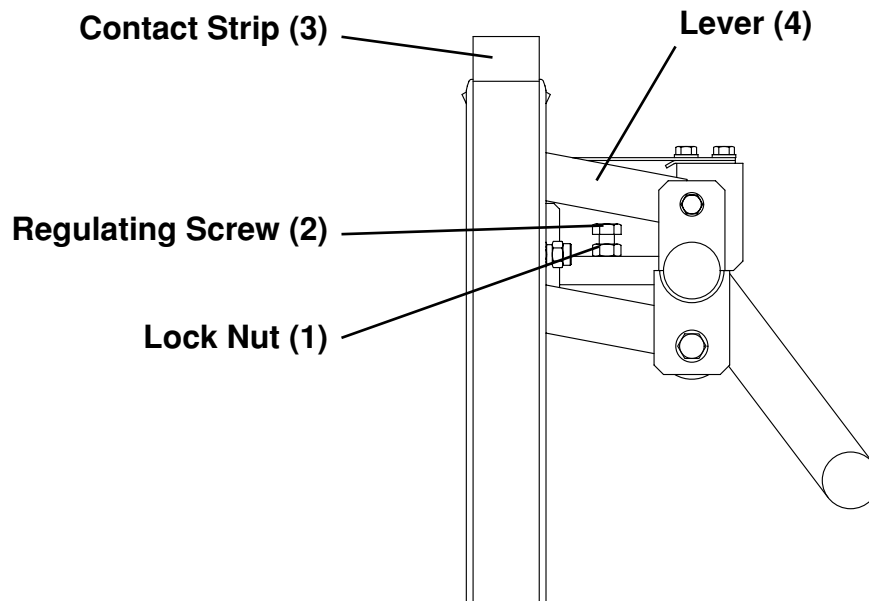
The adjustment of the panheadturning has to be made in medium workingheight of the pantograph (about 1100 mm above resting position). By means of the adjustment on the parallelguide, the contact strip surface (A) has to be adjusted to an exact horizontal position. Measurement can be made by means of a spirit-level.



Instructions:

- Remove the parallel guide bar from lower frame.
- Loosen lock nut (2).
- Adjustment is accomplished through screwing in or screwing out of the parallel guide bar at the rod end (1).
- After adjustment tighten lock nut and re-check adjustment.

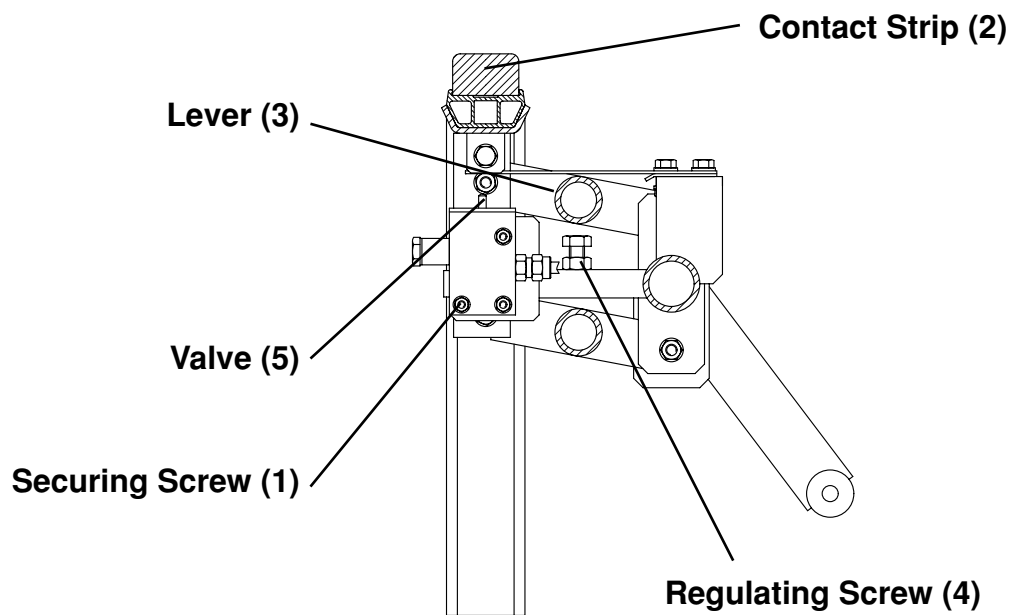
10.8 Adjustment of Pan



Instructions:

- Loosen lock nut (1), turn in regulating screw (2) completely.
- Hang spring balance onto contact strip (3) and pull down vertically with 90 N.
- Screw out regulating screw (2) until screw sits against lever (4).
- Tighten lock nut (1).
- Allow pan to release
- Check: Pull down contact strip vertically again by means of spring balance, and check whether vertical movement of contact is blocked by screw (2) exactly at a force of 90 N.

10.9 Adjustment of Contact Force Monitoring System



Instructions:

- Loosen securing screws (1) of 3/2-way valve
- Slide valve (5) down all the way
- Switch pantograph in raising position
- Apply load on contact strip (2) vertically, until lever (3) contacts the regulating screw (4). (The pan must have been adjusted before – see 10.8.)
- Slide the valve (5) upwards over oblong holes until the lifter of valve (5) is actuated by the pan spring, causing the signal of the compressed air horn to cease.
- Tighten screws (1).
- Check: Tension and release contact strip. As soon as the lever (3) hits the regulating screw (4), the acoustic signal must cease. Whenever lever (3) moves away from screw (4), the signal horn must sound.**

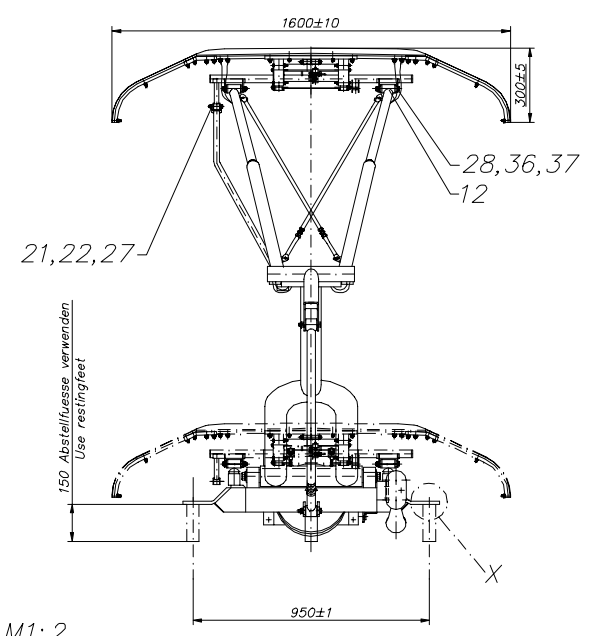
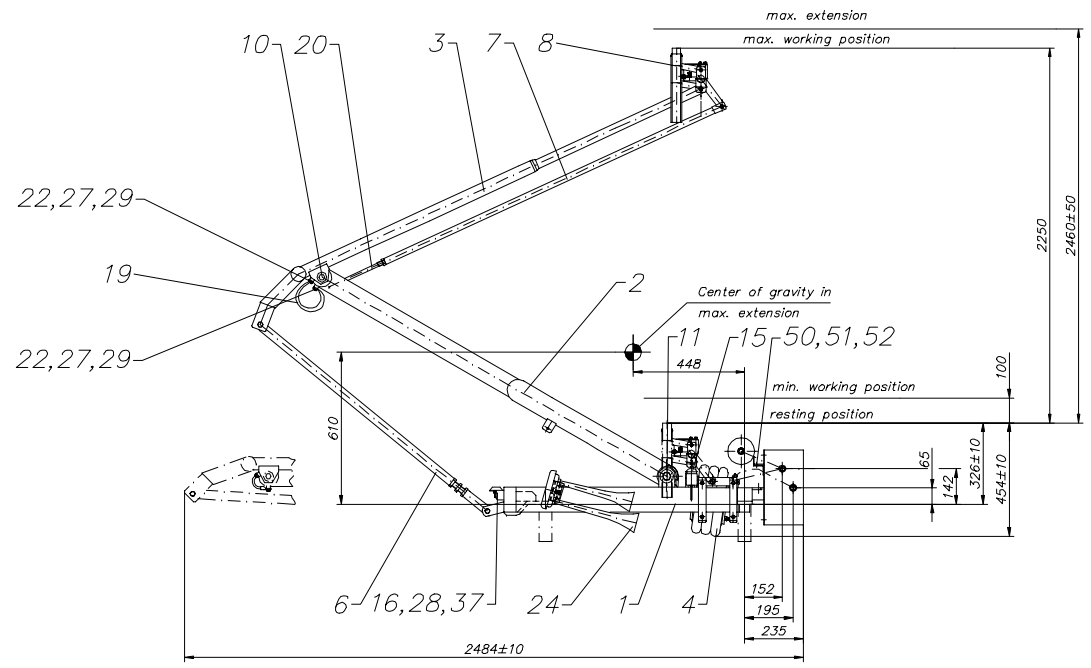
11. Drawings of Component Parts

In your order please specify:

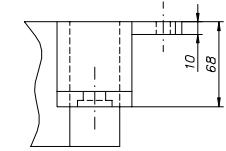
- Type and serial number of pantograph
- Drawing number, item number on drawing, name and number of component part
- Required quantity

The component parts are shown on the following drawings annexed hereto:

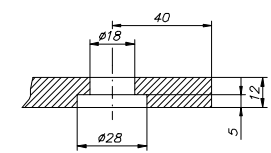
1-9910.4961	Pantograph WBL 85
1-B14.2022	Bellow drive
1-9915.4985	Pneumatic control
1-9918.4957	Pan Head
1-KL19.2700	Latch
3-L03.1977	Upper frame bearing
3-L01.1973	Base frame bearing



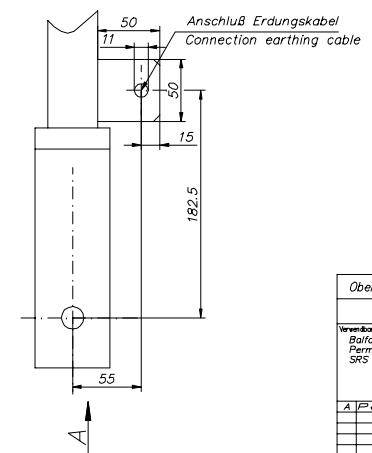
Ansicht A: M1:2



Detail X: M 1:1



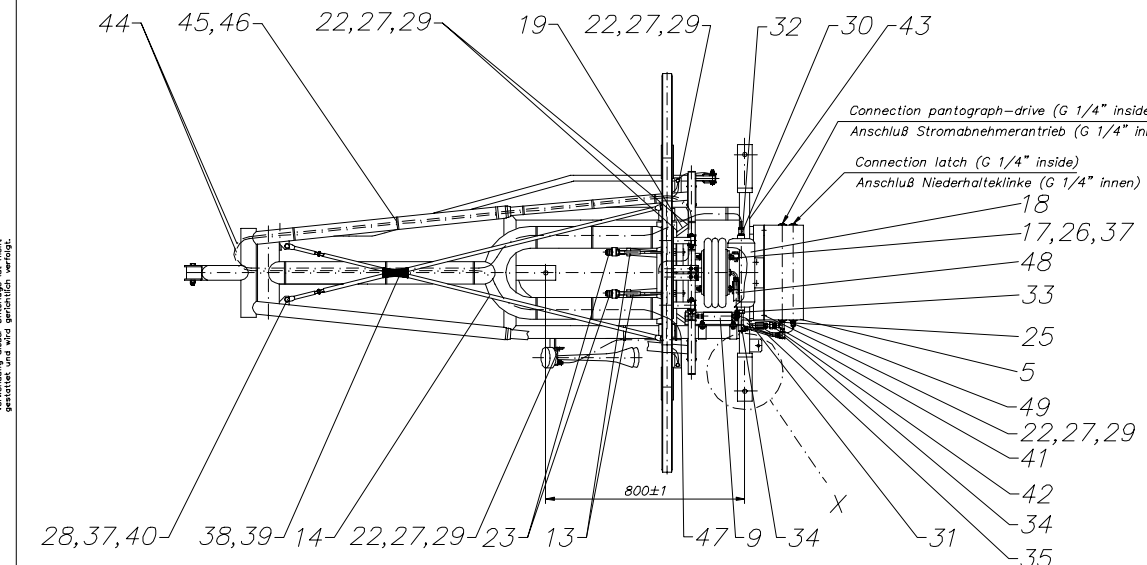
Detail Y: M 1:2



A

Connection pantograph-drive (G 1/4" inside)
Anschluß Stromabnehmertrieb (G 1/4" innen)


Connection latch (G 1/4" inside)
Anschluß Niederhalteklinke (G 1/4" innen)




Allgemeintoleranzen nach DIN ISO 2768 mites				Allgemeintoleranzen für Schweißkonstruktionen nach DIN ISO 15020				Rauheitsgrade nach DIN ISO 1302								
Laengen	0,5-8	>8-30	>30-120	>120-400	>400-1000	>1000-2000	>2000-4000	Klasse A	0-400	400-1000	1000-2000	2000-4000	Spandte Bearbeitung	bei Bedarf	vergeschriben	verboten
Maße	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2	1	2	3	4					
Kantenmaße	±0,5	±1	±1,5	±2	±3	±4	±5	1	2	3	4					
Winkelmaße	±10'	±15'	±20'	±25'	±30'	±40'	±50'	1	2	3	4					
Winkel bei Auerz	±1'	±0,30"	±0,20"	±0,10"	±0,08"	±0,07"	±0,06"	1	2	3	4					
Schneid	±1'	±0,30"	±0,20"	±0,10"	±0,08"	±0,07"	±0,06"	1	2	3	4					

Oberflächenbehandlung		Zug	
Verwendbar für:	Balfour Beatty Parmaquip SRS	Maßstab	1:10 (1:1, 1:2)
Abgemessen nach:	DIN ISO 2768 mites	Material	~120 kg
Bezeichnung:	Stromabnehmer WBL 85 Pantographe WBL 85	Datum	01
Bezeichnung:	Schunk	Gepr.	01
Bezeichnung:	1-9910.4961	Blatt	01
Bezeichnung:	510-00-4961	Blatt	01
Zust.	Änderung	Datum	Name
10		11	


1	2				3	4	5	6	7	8
Pos.	Menge				Einheit	Benennung	Sachnummer Normbezeichnung	Werkstoff	Gewicht kg/Einheit	Bemerkung
	D	C	B	A						
1				1	Stk	Grundrahmen	Zg. Nr. 1-9911.4982 10-01-4982			
2				1	Stk	Unterschere	Zg. Nr. 1-7555 S10-02-7555			
3				1	Stk	Oberschere	Zg. Nr. 1-7556 11-03-7556			
4				1	Stk	Balgantrieb	Zg. Nr. 1-B14.2022 S10-04-2022			
5				1	Stk	Ventilsteuerung	Zg. Nr. 1-9915.4985 S10-05-4985			
6				1	Stk	Kuppelstange	Zg. Nr. 2-K16.4699 10-06-4699			
7				1	Stk	Parallelführungsstange	Zg. Nr. 2-7544 60-07-0106			Ohne P. 4,5,6,7,10,11
8				1	Stk	Wippe	Zg. Nr. 1-9918.4957 S10-08-4957			
9				1	Stk	Niederhalteklinke	Zg. Nr. 1-KL19.2700 S10-16-2700			Ohne P. 20,23
10				1	Stk	Oberscherenlager	Zg. Nr. 3-L03.1977 S10-03-1977			
11				1	Stk	Basislager	Zg. Nr. 3-L03.1973 S10-01-1973			
12				2	Stk	Wippenlagerung	Zg. Nr. 4-L18.2697 S10-08-2697			
13				2	Stk	Seil	Zg. Nr. 3-7609 11-04-7609			
14				2	Stk	Diagonale für Oberschere	Zg. Nr. 3-7574 11-03-7574			
15				2	Stk	Auflagepuffer	Zg. Nr. 4-G01.2544 46-02-4772			
16				1	Stk	SM-Anschlagpuffer	M10 Form Nr. 25 481 46-03-1050			

Angaben zu den Mengenspalten			Zg. Ausg.	St. Ausg.	Aenderung/Datum					
A	WBL 85 Balfour Beatty Permaquip, SRS			A	A	Pos. 8 / 01.00				
B							Bearb.	14.12.99	Santner	
C							Gepr.	14.12.99	Pardeller	
D							Norm.			
							 Schunk Bahntechnik GmbH Salzburg		1-9910.4961 S10-00-4961	Blatt 01 04 Bl.
							Ers.f.			


1	2				3	4	5	6	7	8
Pos.	Menge				Einheit	Benennung	Sachnummer Normbezeichnung	Werkstoff	Gewicht kg/Einheit	Bemerkung
	D	C	B	A						
33				1	Stk	Doppelreduziernippel	2511-1/4-1/2 28-30-1214	Ms vernickelt		
34				2	Stk	L-Schwenkverschraubung	1525-10/8-1/4 28-23-1012	Ms vernickelt		
35				..	m	Druckluftschlauch	ø10/8 29-04-1008	PU-schwarz		
36				2	Stk	Sechskantschraube	M10x95 DIN 931 21-10-0953	A2-70		
37				15	Stk	Scheibe	A 10,5 DIN 125 32-10-0003	A2		
38				2	Stk	Schrumpfschlauch	19/6 Länge = 70 mm 42-01-0196	selbstklebend		
39				1	Stk	Kabelbinder	5x250 43-05-2508	schwarz		
40				4	Stk	Sechskantschraube	M10x25 DIN 933 20-10-0253	A2-70		
41				1	Stk	T-Stück 1/4"	2070-1/4-1/4 28-36-1212	Ms vernickelt		
42				1	Stk	Ger. Einschraubverschr.	GE 12 PLR 1/4" 28-01-1212	verzinkt		
43				1	Stk	Typenschild	Zg. Nr. 4-G01.2545 60-16-0036			
44				..	m	Druckluftschlauch	ø6/4 29-05-0604	Pu-schwarz		
45				20	Stk	Kabelbinder	7,8x365 43-07-3658	UV-beständig, schwarz		
46				20	Stk	Montageschelle	CH-B7 43-07-0000	PU		
47				1	Stk	Winkelverschraubung	1550-6/4 28-25-0620	Ms vernickelt		
48				1	Stk	Druckluftschlauch	Zg. Nr. 3-B14.4785 29-02-4785			

Angaben zu den Mengenspalten		Zg. Ausg.	St. Ausg.	Aenderung/Datum				
A	WBL 85 Balfour Beatty Permaquip, SRS	A	A	Pos. 8 / 01.00				
B					Bearb. 14.12.99	Santner	Stromabnehmer WBL 85 Pantograph WBL 85	
					Gepr. 14.12.99	Pardeller		
C					Norm.			
D					 Schunk Bahntechnik GmbH Salzburg		1-9910.4961 S10-00-4961	Blatt 03
							Ers.f.	04 Bl.

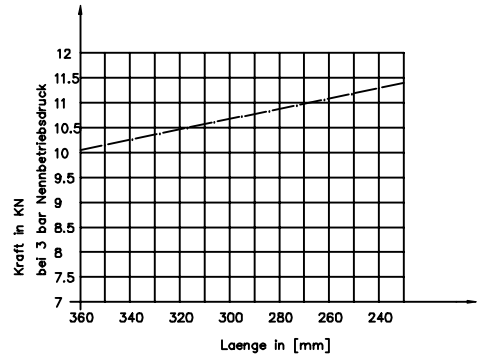
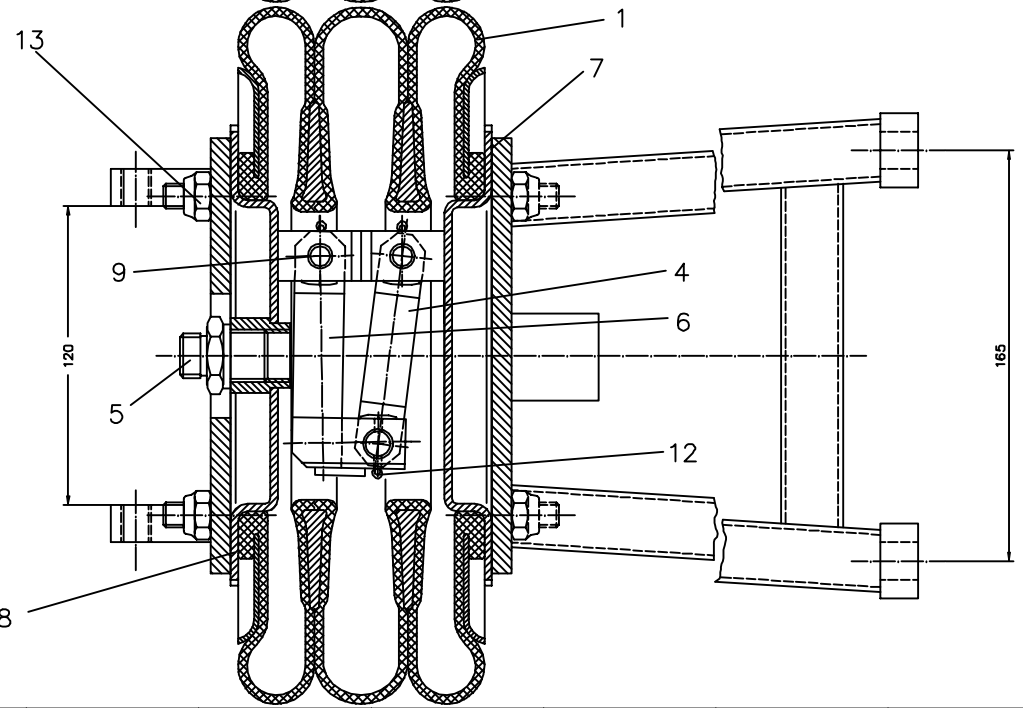
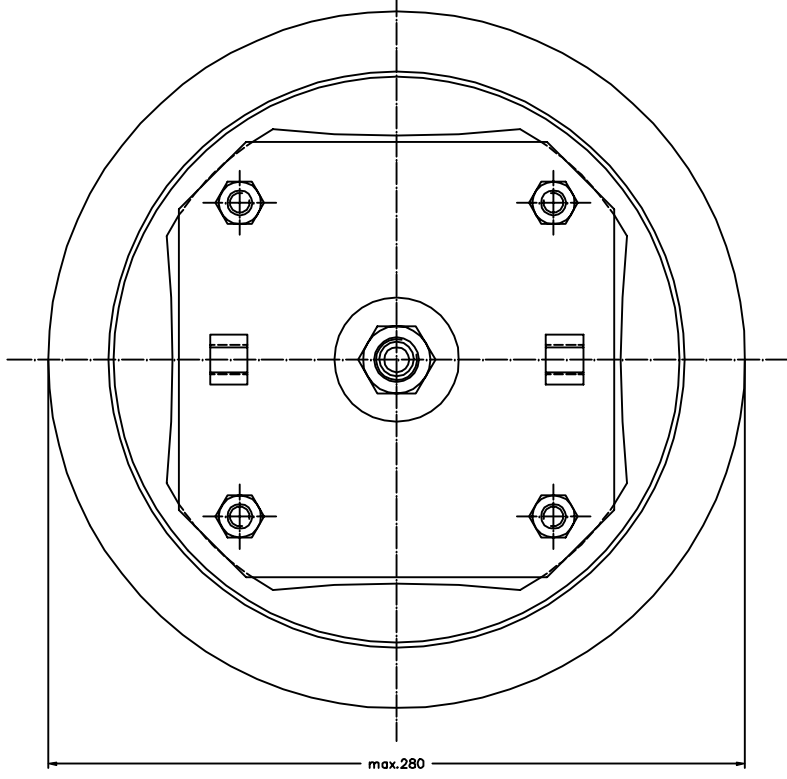
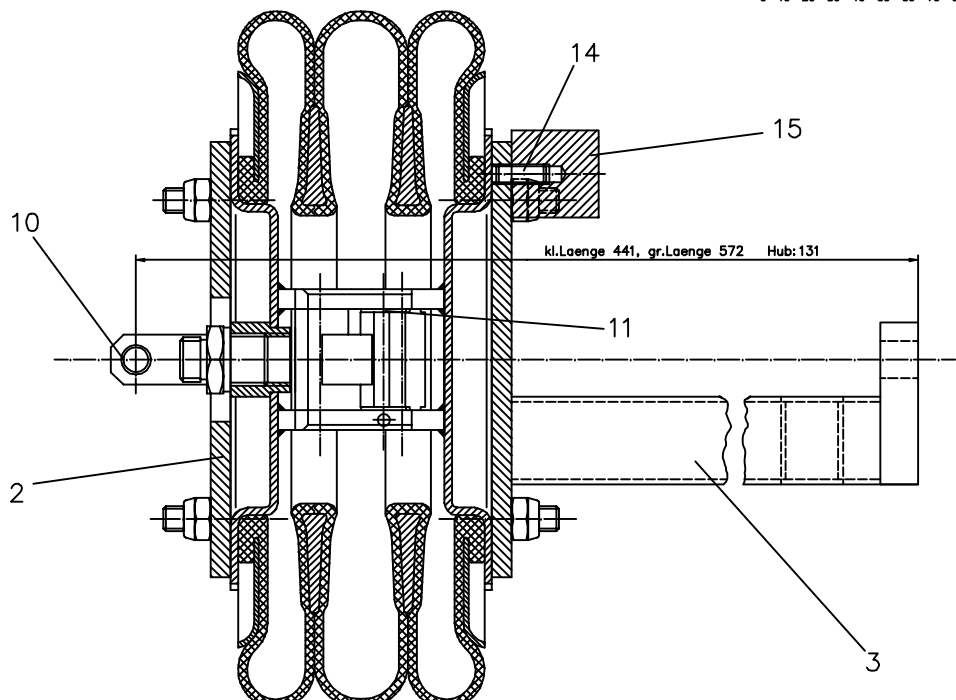
1 Pos.	2 Menge				3 Ein- heit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 Gewicht kg/Einheit	8 Bemerkung
	D	C	B	A						
17				2	Stk	Niro-Achse	Zg. Nr. 4-7605 10-01-7605			
18				1	Stk	Druckluftkessel MDS-2	L 149.1010 60-05-0118			
19				8	Stk	Stromband	Zg. Nr. 4-S00.4630 S10-14-4630			
20				1	Stk	Adapter f. Parallelführungsst.	Zg. Nr. 3-2617.2262 S10-07-2262			
21				1	Stk	Sechskantschraube	M8x50 DIN 931 21-08-0503	A2-70		
22				21	Stk	Sechskantmutter	M8 DIN 985 30-08-0023	A2-70		
23				12	Stk	Sechskantmutter	M14 DIN 934 30-14-0003	A2-70		
24				1	Stk	Drucklufthorn 400 mm	093162202 60-05-0119	A2		
25				1	Stk	Rückschlagventil 1/4"	VNR-843-07 55-23-0012	Ms vernickelt		
26				2	Stk	Splint	3x25 DIN 94 38-03-0253	A2		
27				22	Stk	Scheibe	A 8,4 DIN 125 32-08-0003	A2		
28				7	Stk	Sechskantmutter	M10 DIN 985 30-10-0023	A2-70		
29				16	Stk	Sechskantschraube	M8x25 DIN 933 20-08-0253	A2-70		
30				1	Stk	Reduzierung 1/2" a-1/4"i	2531-1/2-1/4 28-30-1412	Ms vernickelt		
31				..	m	Druckluftschlauch	Dekorun ø6 29-10-0604	Polyäthylen-Al		
32				1	Stk	L-Schwenkverschraubung	1525-6/4-1/4 28-23-0612	Ms vernickelt		

Angaben zu den Mengenspalten		Zg. Ausg.	St. Ausg.	Aenderung/Datum					
A	WBL 85 Balfour Beatty Permaquip, SRS	A	A	Pos. 8 / 01.00					
B					Bearb.	14.12.99	Santner	Stromabnehmer WBL 85 Pantograph WBL 85	
					Gepr.	14.12.99	Pardeller		
C					Norm.				
D					Schunk  Bahntechnik GmbH Salzburg			1-9910.4961 S10-00-4961	Blatt 02
								Ers.f.	04 Bl.

1 Pos.	2 Menge				3 Ein- heit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 Gewicht kg/Einheit	8 Bemerkung
	D	C	B	A						
49				1	Stk	Ger. Einschraubverschr.	1050-6-1/4 28-21-0612	Ms vernickelt		
50				2	Stk	Sechskantschraube	M6x20 DIN 933 20-06-0203	A2-70		
51				4	Stk	Scheibe	A 6,4 DIN 125 32-06-0003	A2		
52				2	Stk	Sechskantmutter	M6 DIN 985 30-06-0023	A2-70		

Angaben zu den Mengenspalten			Zg. Ausg.	St. Ausg.	Aenderung/Datum						
A	WBL 85 Balfour Beatty Permaquip, SRS			A	A	Pos. 8 / 01.00					
B							Bearb.	14.12.99	Santner	Stromabnehmer WBL 85 Pantograph WBL 85	
C							Gepr.	14.12.99	Pardeller		
D							Norm.				
							 Schunk Bahntechnik GmbH Salzburg			1-9910.4961 S10-00-4961	Blatt 04 04 Bl.

0 10 20 30 40 50 60 70 80 90 100

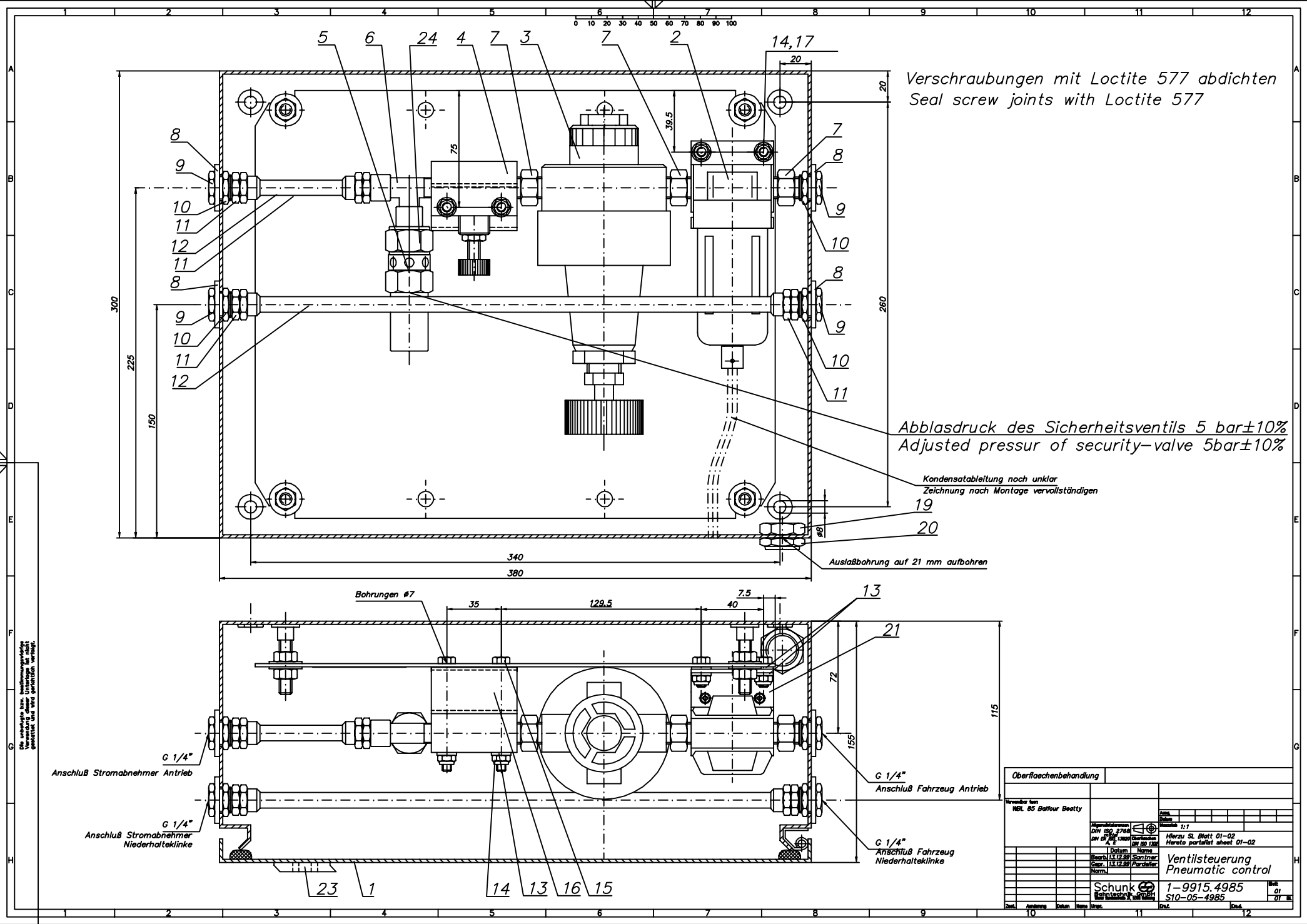


Die vorliegende Zeichnung ist Eigentum der Schunk & Co. KG. Sie darf nicht ohne schriftliche Genehmigung der Schunk & Co. KG ververvielt werden.

Verwendbar für:		Name:		Datum:	
WELBS		Werkstoff:		Zeichn. Nr.:	
ÖBB/Doeremark		Mittel:		Blatt:	
		DIN 7188		Titel:	
1. Gesamtmenge:	12.11.62	Techn. Name:			
2. Querschr.:	12.2.88	Gepr.:			
		Norm:			
Schunk			Balgantrieb		
Balmtechnik GmbH			1-B14.2022		
S. 1212 b L. 12-13					
Zust.:	Änderung:	Belast.:	Name:	Urspr.:	Blatt:
					12

1 Pos.	2 Menge				3 Ein- heit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 kg/Einh. (fertig)	8 Bemerkung RC
	D	C	B	A						
1				1	Stk	Balg	Martonair M/30103	Neopren		
2				1	Stk	Zylinderhalterung	Zn.Nr. 2-B14.2023			
3				1	Stk	Zylinderhalterung	Zn.Nr. 1-B14.2024			
4				1	Stk	Gelenk	Zn.Nr. 4-B14.2326			
5				1	Stk	Verschraubung	GE12-LR 1/2"			
6				1	Stk	Gelenk	Zn.Nr. 4-B14.2327			
7				1	Stk	Deckel	Zn.Nr. 3-B14.2325			
8				1	Stk	Deckel (Anschluss)	Zn.Nr. 3-B14.2374			
9				3	Stk	Lagerachse	Zn.Nr. 4-B14.2328			
10				2	Stk	Gleitlager	1015 DU-B	Bronce		
11				6	Stk	Bundbuchse	BB 1012 DU-B	Bronce		
12				3	Stk	Splint	3x25 DIN94	1.4571		
13				8	Stk	Sechskantmutter	M10 DIN985	A2		
14				1	Stk	Gewindestift	M8x20 DIN551	A2		
15				1	Stk	Hoehenanschlag	Zn.Nr. 4-B14.2031			

Angaben zu den Mengenspalten				Zg. Ausg.	St. Zust.	Aenderung/Datum						
A	Balgantrieb											
B								Bearb.	8.10.91	Peter	Balgantrieb	
C								Gepr.				
D								Norm				
								Schunk		1-B14.2022/1		Blatt 01
								Bahntechnik GmbH				01 Bl.




Verschraubungen mit Loctite 577 abdichten
 Seal screw joints with Loctite 577

Abblasdruck des Sicherheitsventils 5 bar±10%
 Adjusted pressur of security-valve 5bar±10%


Kondensatableitung noch unklar
 Zeichnung nach Montage vervollständigen

Auslaßbohrung auf 21 mm aufbohren


Oberflächenbehandlung			
Hersteller WEL 65 Balfour Beatty	Zeichnungsnummer DIN 9139 SW 61 111 K 2	Blatt Herzu SL Blatt 01-02 Hereto partiellet sheet 01-02	Skala 1:1
	1 Datum 2 Revidiert 3 Geprüft 4 Freigegeben 5 Freigegeben 6 Freigegeben 7 Freigegeben 8 Freigegeben 9 Freigegeben 10 Freigegeben 11 Freigegeben 12 Freigegeben	Schunk 1-9915.4985 S10-05-4985	
Zust.	Arbeitsstelle	Datum	Handl.
		10	11

1 Pos.	2 Menge				3 Einh.	4 Benennung	5 Sachnummer	6 Werkstoff	7 kg/Einh.	8 Bemerkung RC
	D	C	B	A						
1				1	Stk	Schaltschrank mit MTP control box compl.	10 30 600 55-51-0002			
2				1	Stk	Druckluftfilter mit Kondensatabscheider	EAF 3000 - F2 D 55-15-0012			
3				1	Stk	Druckregler Pressure regulation valve	EIR 402-F02-P-L 55-01-0012			
4				1	Stk	Drosselventil Throttle valve	ED 1/6 STK 5567/3 55-21-0012			
5				1	Stk	Sicherheitsventil Security valve	C 10 A.1301.1 G1/2" SV 12 3-6bar Viton/ 70 140 55-53-0014			
6				1	Stk	T-Stück T-screw joint	2070-1/4-1/4 28-36-1212			
7				3	Stk	Doppelnippel Screw joint	1/4" T12 872 28-29-1212	Messing vernickelt Messing vernickelt		
8				4	Stk	Scheibe Washer	A 17 32-17-0003	DIN 125	A2	
9				4	Stk	Schottnippel Reduction	dwg.no. 4-915.4097 11-09-4097			
10				4	Stk	Rohrmutter Nut	A R 3/8" DIN 431 30-13-0093		A2	
11				4	Stk	Gerade Verschraubung Screw joint	1511-10/8-1/4" 28-20-1012	Messing vernickelt Messing vernickelt		
12				0.4	m	Druckluftschlauch air hose	10/8 T15516 29-04-1008	PA schwarz PA schwarz		
13				6	Stk	Scheibe Washer	A6 32-06-0003	DIN 125	A2	
14				4	Stk	Sechskantmutter Hex nut	M6 30-06-0023	DIN 985	A2-70	
15				2	Stk	Sechskantschraube Hex screw	M6x70 21-06-0703	DIN 931	A2-70	
16				1	Stk	Distanzrohr Distance tube	dwg.no. 4-V15.4363 10-05-4363			
Angaben zu den Mengenspalten						Zg. Ausg.	St. Zust.	Aenderung/Datum		
A	WBL 85 Balfour Beatty, Permaquip, SRS									
B								Bearb. 13.12.99 Santner Gepr. 13.12.99 Pardeller	Ventilsteuerung Pneumatic control	
C								Norm		
D								 Schunk Bahn-technik GmbH Wiener Bundesstraße 21, 5300 Hallwang		Blatt 01
										02 Bl.



1 Pos.	2 Menge				3 Einh.	4 Benennung	5 Sachnummer	6 Werkstoff	7 kg/Einh.	8 Bemerkung
	D	C	B	A						
17				2	Stk	Sechskantschraube Hex screw	M6x16 20-06-0163	DIN 933	A2-70	
18				-	-	entfällt to be left	-			
19				1	Stk	Kontermutter Nut	G 1/2" 28-15-0014	LV 42.8006	Messing vernickelt	
20				1	Stk	Schalldämpfer Filter	7010-1/2 55-14-0014			
21				1	Stk	Befestigungswinkel inkl. Schrauben Mounting angle incl. screws	B 340 55-13-0000			
22				-	-	entfällt to be left	-			
23				1	Stk	Verschuß Einsatz lock insert	SZ 2461.000 Ausf. A 55-51-0004	Rital	Zink-Druckguß	
24				1	Stk	Reduziernippel screw joint	2521-1/4-1/2 28-34-1214		Messing vernickelt	

Angaben zu den Mengenspalten		Zg. Ausg.	St. Zust.	Aenderung/Datum				
A	WBL 85 Balfour Beatty, Permaquip, SRS							
B					Bearb.	13.12.99	Santner	Ventilsteuerung Pneumatic control
C					Gepr.	13.12.99	Pardeller	
D					Norm			1-9915.4985 S10-05-4985
					Schunk 		Blatt 02	
					Bahntechnik GmbH Wiener Bundesstraße 21, 5300 Hallwang		02 Bl.	

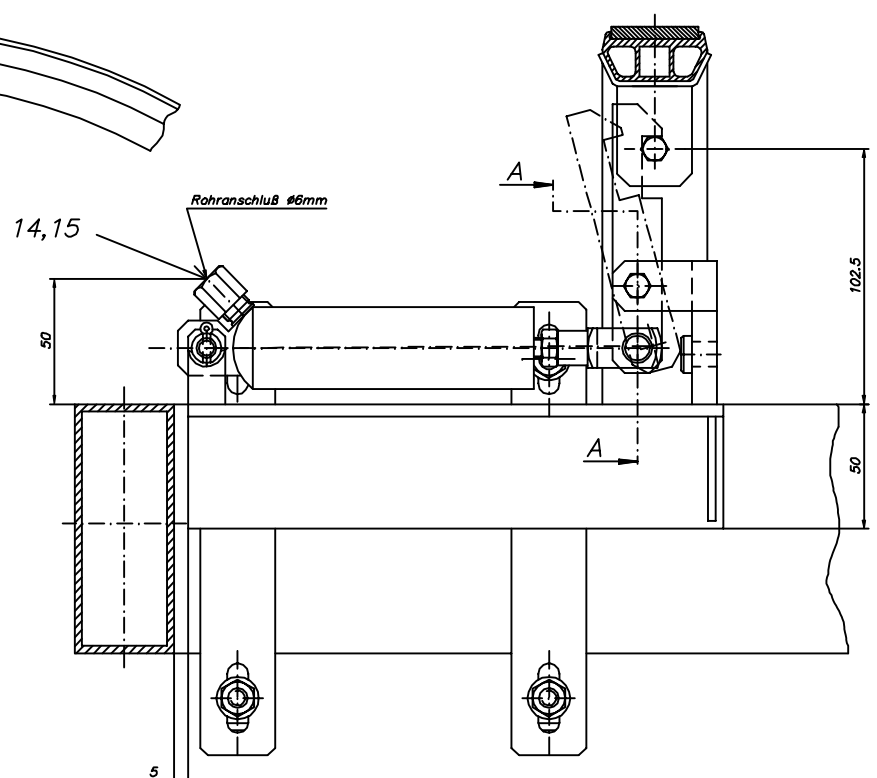
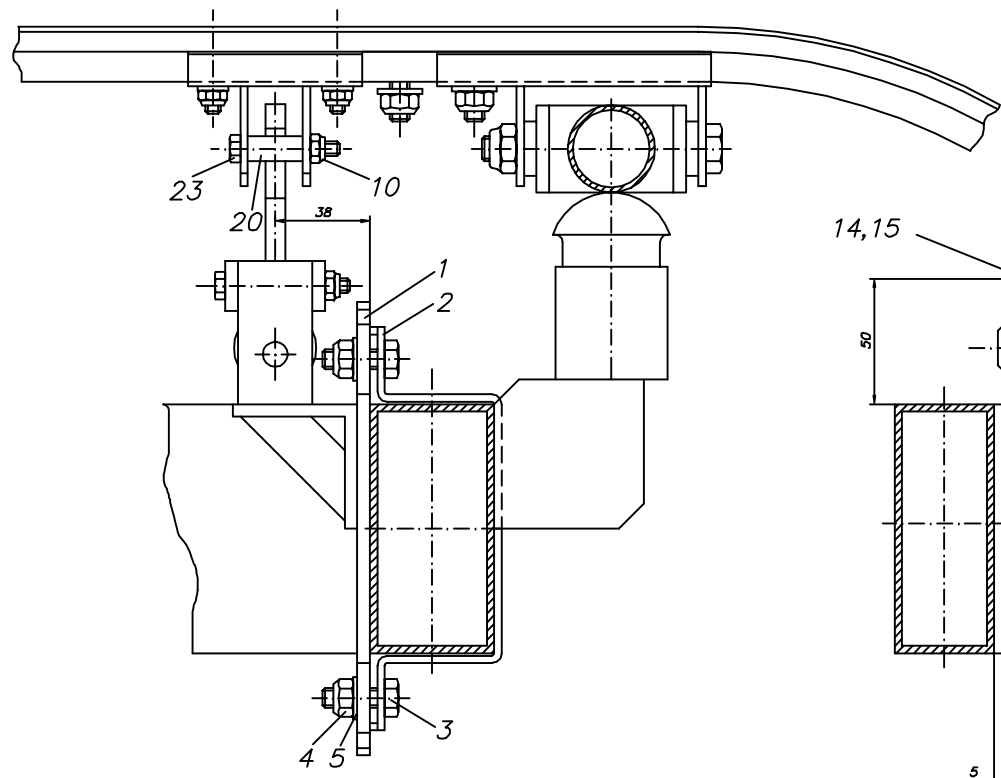
1 Pos.	2 Menge				3 Einheit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 Gewicht kg/Einheit	8 Bemerkung
	D	C	B	A						
1				1	Stk pcs	Kohleschleifstück Carbonstrip	dwg. no. 2-10018.5021 S04-00-5021			
2				1	Stk pcs	Schleifstückträger Collectorstripsupport	dwg. no. 2-9918.4972 10-08-4972			
3				2	Stk pcs	Hebel Lever	dwg. no. 2-W08.4974 10-08-4974			
4				8	Stk pcs	Achse Axle	dwg. no. 4-L08.4973 10-15-4973			
5				16	Stk pcs	Gleitlager Bushing	GFM-1214-12 40-14-1212	Iglidur G		
6				1	Stk pcs	Scheitelrohr Pantube	dwg. no. 1-9918.4978 10-08-4978			
7				8	Stk pcs	Sechskantschraube Hex-screw	M6x55 DIN 931 21-06-0553	A2-70		
8				12	Stk pcs	Sechskantmutter Hex-nut	M6 DIN 985 30-06-0023	A2-70		
9				26	Stk pcs	Scheibe Washer	A 6,4 DIN 125 32-06-0003	A2		
10				2	Stk pcs	Unterlagsfeder Underlaying spring	dwg. no. 4-W28.4575 10-08-4575			
11				2	Stk pcs	Flachfeder Leafspring	dwg. no. 4-W08.4976 10-08-4976			
12				4	Stk pcs	Sechskantschraube Hex-screw	M6x20 DIN 933 20-06-0203	A2-70		
13				2	Stk pcs	Achse Axle	dwg. no. 4-L28.2118 10-08-2118			
14				2	Stk pcs	Federrolle Springroll	dwg. no. 4-1038.1244 10-08-1244			
15				1	Stk pcs	Sechskantschraube Hex-screw	M6x80 DIN 931 21-06-0803	A2-70		
16				1	Stk pcs	Sechskantschraube Hex-screw	M8x25 DIN 933 20-08-0253	A2-70		

Angaben zu den Mengenspalten			Zg. Ausg.	St. Ausg.	Aenderung/Datum					
A	Balfour Beatty			A	Pos. 1, 29,30 /01.00					
B						Bearb.	13.12.99	Santner	Wippe Panhead	
						Gepr.	13.12.99	Pardeller		
C						Norm.				
D						 Schunk Bahntechnik GmbH Salzburg			1-9908.4957 S10-08-4957	Blatt 01
									Ers.f.	02 Bl.

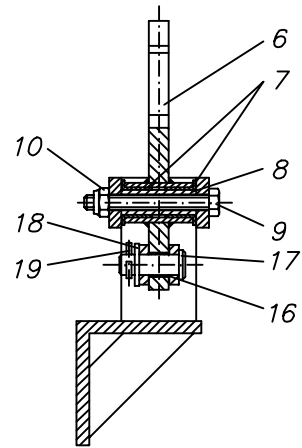
1 Pos.	2 Menge				3 Ein- heit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 Gewicht kg/Einheit	8 Bemerkung
	D	C	B	A						
17				1	Stk pcs	Sechskantmutter Hex-nut	M8 DIN 934 30-08-0003	A2-70		
18				1	Stk pcs	3/2 Wegeventil 1/8" 3/2 way-valve 1/8"	BRVS 3 55-30-0011			
19				3	Stk pcs	Sechskantschraube Hex-screw	M4x35 DIN 931 21-04-0353	A2-70		
20				6	Stk pcs	Scheibe Washer	A4,3 DIN 125 32-04-0003	A2		
21				3	Stk pcs	Sechskantmutter Hex-nut	M4 DIN 985 30-04-0023	A2-70		
22				1	Stk pcs	L-Schwenkverschraubung Screw joint	1525-6/4-1/8 28-27-0611	Ms vernickelt		
23				1	Stk pcs	Blende Blind	dwg. no. 4-V15.4979 10-05-4979			
24				1	Stk pcs	Ger. Verschraubung Srew joint	1511-6/4-1/8 28-20-0611	Ms vernickelt		
25				1	Stk pcs	Verschlusschraube Screw joint	G 1/8" A LV 42.6004 28-31-0011	Ms vernickelt		
26				2	Stk pcs	Bundbuchse Bushing	dwg. no. 4-L28.4626 10-08-4626			
27				2	Stk pcs	Gleitlager Bushing	GFM-1618-12 40-14-1612	Iglidur G		
28				4	Stk pcs	Stromband Shunt	Länge bei Montage ermitteln	Werkstoff		
29				2	Stk pcs	Horn komplett Horn complete	dwg. no. 2-10018.5025 S10-08-5025			
30				2	Stk pcs	Wanne Tub	dwg. no. 3-10018.5026 10-08-5026			

Angaben zu den Mengenspalten			Zg. Ausg.	St. Ausg.	Aenderung/Datum				
A	Balfour Beatty			A	Pos. 1, 29,30 /01.00				
B						Bearb. 13.12.99	Santner	Wippe Panhead	
						Gepr. 13.12.99	Pardeller		
C						Norm.			
D						 Schunk  Bahn-technik GmbH Salzburg		1-9908.4957 S10-08-4957 Ers.f.	Blatt 02 02 Bl.

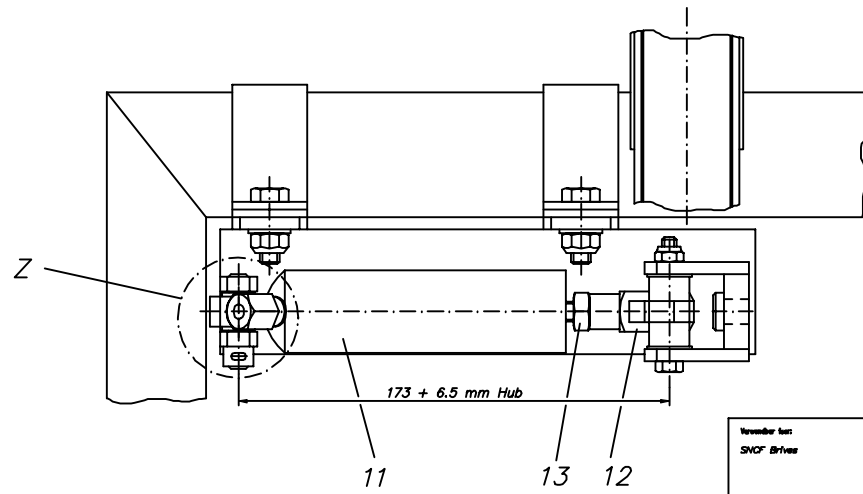
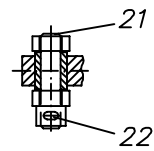
0 10 20 30 40 50 60 70 80 90 100



Schnitt A-A:



Detail Z:



Die vorliegende Zeichnung ist Eigentum der Schunk-Gruppe.
 Die Weitergabe dieser Zeichnung ist nicht gestattet und wird gerichtlich verfolgt.

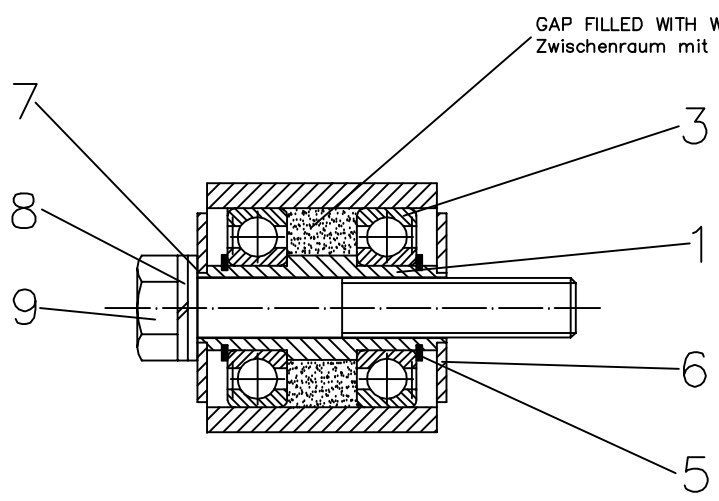
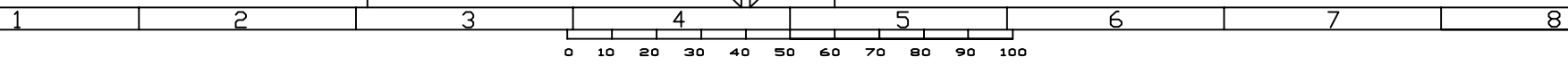
Hersteller: SNCF Drivers		Name des Bauelements: DN7189 mittel		Datei: 1-1	
1/1	Del. Z. Pos. 203.1.04	Stz.	Norm:	Niederhalteklinke	
Schunk			1-KL19.2700		
Bohrtechnik GmbH			07		
503 Salzgitter, Merseburger Str.			07		
Zust.	Änderung	Datum	Name	Urs.	Blatt
					12

1 Pos.	2 Menge				3 Einheit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 kg/Einh. (fertig)	8 Bemerkung RC
	D	C	B	A						
17				1	Stk	Splintbolzen Ø8	Best.Nr.12008			
18				1	Stk	Scheibe	A8.4 DIN 125	A2		
19				1	Stk	Splint	2x20 DIN 94	A2		
20				1	Stk	Rolle	Zg.Nr.4-KL19.2717			
21				1	Stk	Achse	Zg.Nr. 4-L09.2713			
22				1	Stk	Splint	3x25 DIN 94	A2		
23				1	Stk	Sechskantschraube	M6x40 DIN 931	A2		

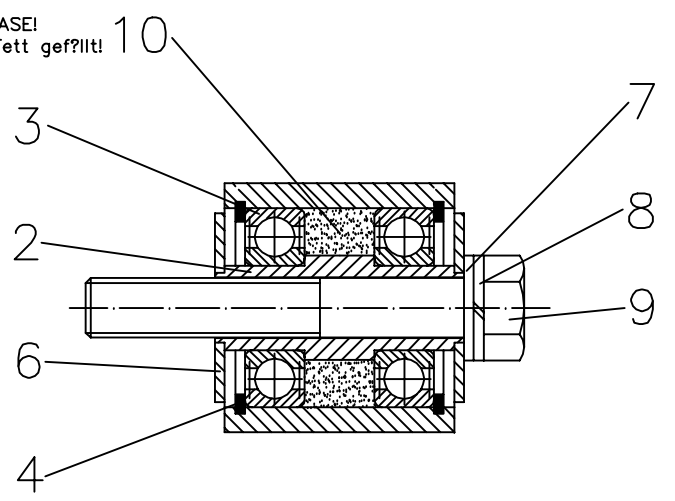
Angaben zu den Mengenspalten				Zg. Ausg.	St. Zust.	Aenderung/Datum				
A	SNCF Brives			1		Pos.20,24 3.94				
B							Bearb.	28.01.94	Santner	
C							Gepr.			
D							Norm			
							Schunk		Niederhaltekinke	
							Bahntechnik GmbH		1-KL19.2700	
									Blatt 02	
									02 Bl.	

1 Pos.	2 Menge				3 Ein- heit	4 Benennung	5 Sachnummer Normbezeichnung	6 Werkstoff	7 kg/Einh. (fertig)	8 Bemerkung RC
	D	C	B	A						
1				1	Stk	Klinkenhalter	Zg.Nr. 2-KL19.2701			
2				2	Stk	Klemme	Zg.Nr. 4-KL19.2707			
3				4	Stk	Sechskantschraube	M8x25 DIN 933	A2		
4				4	Stk	Sechskantmutter	M8 DIN 985	A2		
5				4	Stk	Scheibe	A 8.4 DIN 125	A2		
6				1	Stk	Klinke	Zg.Nr. 4-KL19.2708			
7				2	Stk	Bundbuchse	FMB 1012 DU			
8				1	Stk	Achse	Zg.Nr.4-L09.2712			
9				1	Stk	Sechskantschraube	M6x50 DIN 931	A2		
10				2	Stk	Sechskantmutter	M6 DIN 985	A2		
11				1	Stk	Bremszylinder	Best.Nr.SZ1161			
12				1	Stk	Gabelkopf kurz	Best.Nr.12056			
13				1	Stk	Sechskantmutter	M8 DIN 934	A2		
14				1	Stk	Schneidring ø6	DPR 6 L/S			
15				1	Stk	Überwurfmutter	M6-L	verz.		
16				1	Stk	Gleitlagerbuchse	MB 0808	Werkstoff		

Angaben zu den Mengenspalten						Zg. Ausg.	St. Zust.	Änderung/Datum					
A	SNCF Brives						1	Pos.20,24 3.94					
B									Bearb.	28.01.94	Santner	Niederhaltekinke	
C									Gepr.				
D									Norm				
								Schunk			1-KL19.2700		Blatt 01
								Bahntechnik GmbH					02 Bl.



Loslager
FLOATING BEARING



Festlager
FIXED BEARING

Die unbefugte bzw. bestimmungswidrige Verwendung dieser Unterlage ist nicht gestattet und wird gerichtlich verfolgt.

Verwendbar fuer/USED FOR:				Ausgabe/ISSUE						
Oberschere/UPPER FRAME				Datum/DATE						
		Masze ohne Toleranzangabe: DIN 7168		Maszstab/SCALE		1:1				
		m								
A	Pos. 3, 10	28.5.97	Packler	Datum/DATE	Name/NAME					
B	Sprache	23.9.97	Packler	Bearb./DRAWN	2.9.91	Peter	UPPER FRAME BEARING Oberscherenlager			
				Exp./APPR.	2.9.91	Santner				
				Norm./STD.						
				Schunk		3-L03.1977		Blatt/SHEET		
				Bahntechnik GmbH				01		
				5023 Salzburg, Mayrwies 56				01		
ZUST./LEVEL	Änderung/REVISION	Datum/DATE	NAME	Urspr.	Ers.f.	Ers.d.				

1 Pos. ITEM	2 Menge/QTY				3 Einheit UNIT	4 Benennung/DESCRIPTION	5 Sachnummer/Normbezeichnung P/N	6 Werkstoff/MATERIAL	7 kg/Einh. kg/UNIT	8 Bemerkung/NOTE RC
	D	C	B	A						
1				1	pcs Stk	AXLE FOR FLOATING BEARING Lagerachse f. Loslager	Zn.Nr. 4-L03.1979			
2				1	pcs Stk	AXLE FOR FIXED BEARING Lagerachse f. Festlager	Zn.Nr. 4-L03.1978			
3				4	pcs Stk	BALL BEARING Rillenkugellager	6203.2RSR DIN625			
4				2	pcs Stk	INTERNAL RETAINING RING Seegerring	40x1.75 DIN472			
5				2	pcs Stk	EXTERNAL RETAINING RING Seegerring	17x1 DIN471			
6				4	pcs Stk	COVER Abdeckscheibe	Zn.Nr. 4-L03.1980			
7				2	pcs Stk	WASHER Scheibe	A13 DIN125	A2		
8				2	pcs Stk	SPRING WASHER Federring	A12 DIN127	A2		
9				2	pcs Stk	HEX HEAD SCREW Sechskantschraube	M12x80 DIN931	A2		
10				.	pcs Stk	GREASE Fett	Autol Top 2000			

Angaben zu den Mengenspalten			Zg. Ausg.	St. Zust.	Aenderung/Datum					
A	Oberschere/UPPER FRAME			A		Pos. 3,10/28.5.97				
				B		Sprache/23.9.97				
B							Bearb.	2.9.91	Peter	UPPER FRAME BEARING Oberscherenlager
							Gep.	2.9.91	Santner	
C							Norm			
D							Schunk		3-L03.1977	Blatt
							Bahntechnik GmbH			Bl.

1 2 3 4 5 6 7 8

0 10 20 30 40 50 60 70 80 90 100

A

B

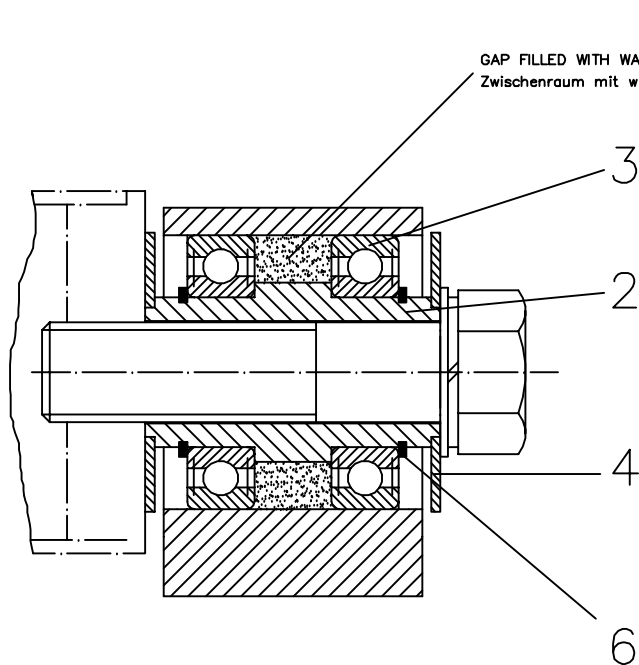
C

D

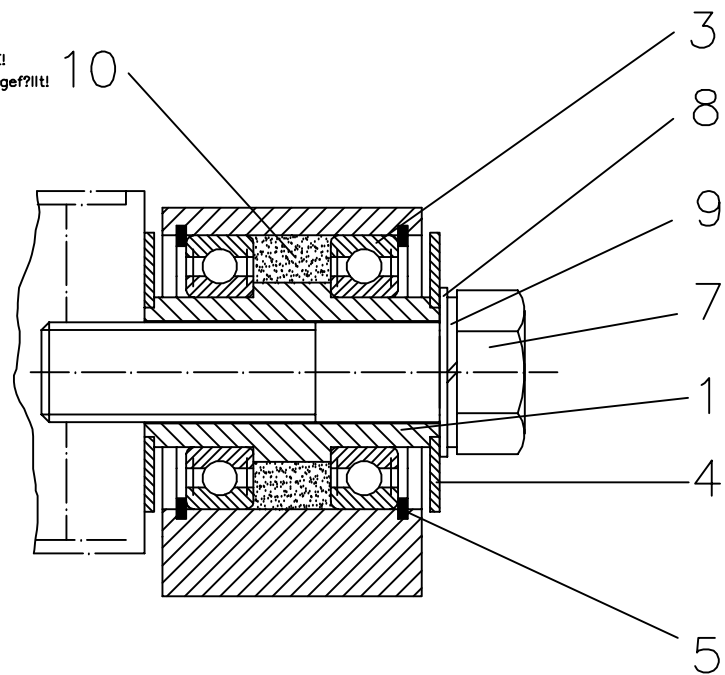
E

F

Die unbefugte bzw. bestimmungswidrige Verwendung dieser Unterlage ist nicht gestattet und wird gerichtlich verfolgt.



Loslager
FLOATING BEARING



Festlager
FIXED BEARING

Verwendbar fuer/USED FOR:				Ausgabe/ISSUE						
Grundrahmen/BASE FRAME				Datum/DATE						
		Masze ohne Toleranzangabe: DIN 7168 m		Maszstab/SCALE		1:1				
A	Pos. 3, 10	28.5.97	Packler	Datum/DATE	Name/NAME					
B	Sprache	23.9.97	Packler	Bearb./DRAWN	30.8.91	Peter				
				Gepr./APPR.	30.8.91	Santner				
				Norm./STD.						
				Schunk		BASE FRAME BEARING				
				Bahntechnik GmbH		Basislager				
				5023 Salzburg, Mayrwies 56		3-L01.1973		Blatt/SHEET		
				Zust./LEVEL		Ers.f.		01		
				Znderung/REVISION		Ers.d.		01		

1 Pos. ITEM	2 Menge/QTY				3 Einheit UNIT	4 Benennung/DESCRIPTION	5 Sachnummer/Normbezeichnung P/N	6 Werkstoff/MATERIAL	7 kg/Einh. kg/UNIT	8 Bemerkung/NOTE RC
	D	C	B	A						
1				1	pcs Stk	AXLE FOR FIXED BEARING Lagerachse f. Festlager	Zn.Nr. 4-L01.1974			
2				1	pcs Stk	AXLE FOR FLOATING BEARING Lagerachse f. Loslager	Zn.Nr. 4-L01.1975			
3				4	pcs Stk	BALL BEARING Rillenkugellager	6006.2RSR DIN625			
4				4	pcs Stk	COVER Abdeckscheibe	Zn.Nr. 4-L01.1976			
5				2	pcs Stk	INTERNAL RETAINING RING Seegerring	55x2 DIN472			
6				2	pcs Stk	EXTERNAL RETAINING RING Seegerring	30x1.5 DIN471			
7				2	pcs Stk	HEX HEAD SCREW Sechskantschraube	M20x90 DIN931	A2		
8				2	pcs Stk	WASHER Scheibe	A21 DIN125	A2		
9				2	pcs Stk	SPRING WASHER Federring	A20 DIN127	A2		
10				·	pcs Stk	GREASE Fett	Autol Top 2000			

Angaben zu den Mengenspalten				Zg. Ausg.	St. Zust.	Aenderung/Datum				
A	Grundrahmen/BASE FRAME			A		Pos. 3,10/28.5.97				
				B		Sprache/23.9.97				
B							Bearb.	30.8.91	Peter	BASE FRAME BEARING Basislager
							Gep.	30.8.91	Santner	
C							Norm			
D							Schunk		3-L01.1973	Blatt
							Bahntechnik GmbH			Bl.



12. Annex

Pneumatic diagramm drawing no. 3-9919.4963

