BHARAT FORGE CDP

KALYANI

Technical Instruction for the Installation and Maintenance

of the low-maintenance clamp lock (EVZ) and supplementary device (EBV)

Free translation from

Deutsche Bahn AG
low 92.1034

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Content

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Revisions:

Revision	Release date	Remarks	Page
A 02	01/14	- Complete revision	
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A 08	07/20	- Reference to the arrangement drawings added - Notes on wedge bracing added - Special features for mech. set turnouts – new - Arrangement of side engagement at 2nd level device for turnouts with hollow bearers corrected - Section on EBV supplementary device - new - Section disassembly: tension-free middle position of the switch blades	3 5 12 13ff 15 19
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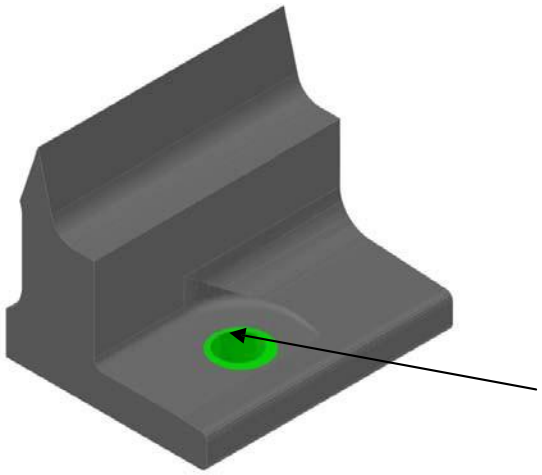
1 Requirement, Use

The low-maintenance clamp lock EVZ can be used in all turnouts, crossings and crossing points S49, S54 and UIC60.
An assignment of the closures to the respective turnouts can be found on

low 50.0025 for UIC 60 turnouts
low 54.50.0026 for S54 turnouts
low 49.50.0026 for S49 turnouts

The basic adjustment of the eccentric bushing in the switch rail



Rail profile	Narrow side of eccentric bushing	
	First device	**Second device**
S49	Middle of track	Running edge (Fig.1)
S54	Middle of track	Running edge
UIC60	Running edge	Running edge

Fig. 1 Adjustment of the eccentric bushing

Required tools for installation

- Torque Wrench with a setting range of 15 to 50 Nm (Wrench insert 13)
- Torque Wrench with a setting range of 100 to 300 Nm (Wrench inserts 24, 30 und 36)
- Flat wrench or Ring wrench with wrench sizes: 2x13, 2x24, 1x30 und 1x36 mm
- Hexagon socket screw key (14), shortened to 25 mm (Fig. 2)
- Feeler gauge (0.5 mm), shims (4 / 5 mm),
- Gauging tool for locking throw and overlapping
- Nylon hammer

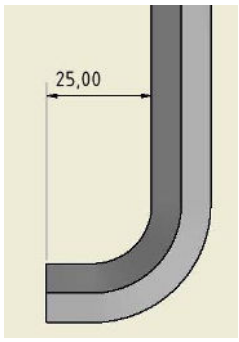


Fig. 2 Hexagon socket screw key

Note:
Due to constricted room in hollow bearers and on 2nd level locks (Second device) a torque wrench with ring spanner insert should be used.

Fig. 3 Torque wrench with ring spanner insert

2 Installation of the Clamp Lock EVZ

- The low-maintenance clamp lock is delivered partly assembled in a wooden crate.

2.1 Assembly of the tongue attachment with pushing rod

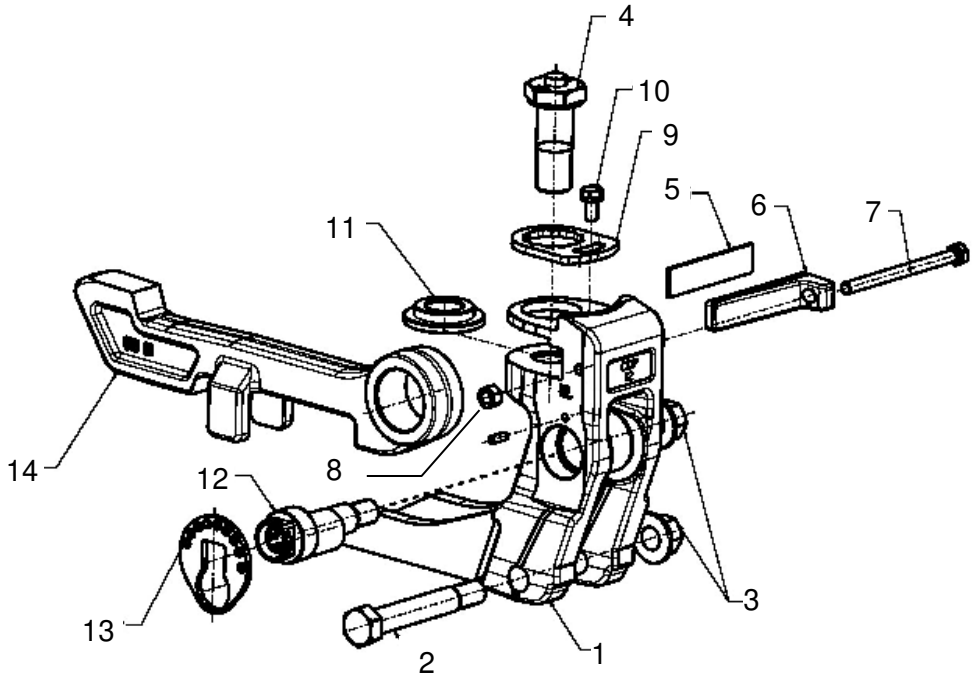


Fig. 4 Tongue attachment exploded view

1. Tongue attachment
2. Fitted bolt
3. Nut M16
4. Locking bolt
   First device: Vks 6
   Second device: Vks 6a
5. Adjustment shim
6. Wedge
7. Hexagonal screw
8. Safety nut M8 for wedge fixing
9. Safety shim Sib 20
10. Safety screw
11. Collar bushing
12. Eccentric bolt
13. Fixing shim
14. Locking clamp

- Pre-assembled tongue attachment with clamp and pushing rod part* to be positioned on the tongue rail foot and the locking bolt Vks 6 (respectively Vks 6a) to be slightly fixed. The right assignment of the according side has to be considered. The fixing shim has to show in the direction of the beginning of the turnout.
- Correct adjustment shim to be chosen (5) and wedge to be driven by impact (6) for protection against turning
- Protection of the wedge by a hexagonal screw (7) and safety nut (8)
- Locking bolt to be fixed
- Assembly of the safety shim Sib 20 (9), the locking bolt (4) and the safety screw (10)

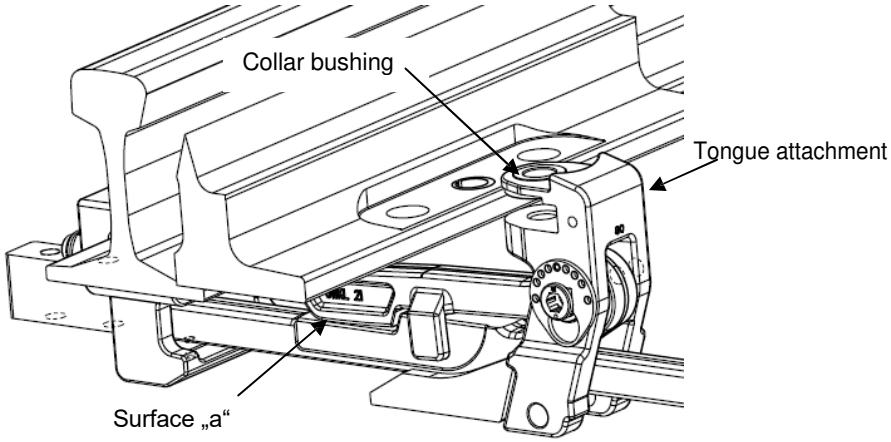


Fig. 5 Assembly of the tongue attachment

Remarks:

- *The clamp must lay on the surface „a“ of the pushing rod, to push the clamp underneath the stock rail foot.*
- *In condition as delivered, the collar bushing (10) is glued to the tongue attachment (1) for easier assembly (Fig. 5)*
- *Wedge to be inserted maximum to the corner arc. If necessary, adjustment shims need to be used. The tip of the wedge does not need to overlap on the opposite side (Fig. 6).*
  If the distance between the tongue foot and the tongue attachment is too narrow, it is permissible to mount it without a shim. In this case, the two guiding edges for the adjustment shim on the wedge must be ground down to allow a level support on the tongue foot.
  Caution: Wedges from which the guiding edges have been removed may no longer be used together with a shim!
- *In case, the bolt of the wedge gets contact to the control rod, an additional bushing has to be installed (Fig. 6 – left hand).*
- *For disassembly of the wedge, an according tool has to be used (e.g. drill bit) at the angled end.*
- *Not used material (bushings, shims, socket screw key) has to be handed over to the maintenance team!*

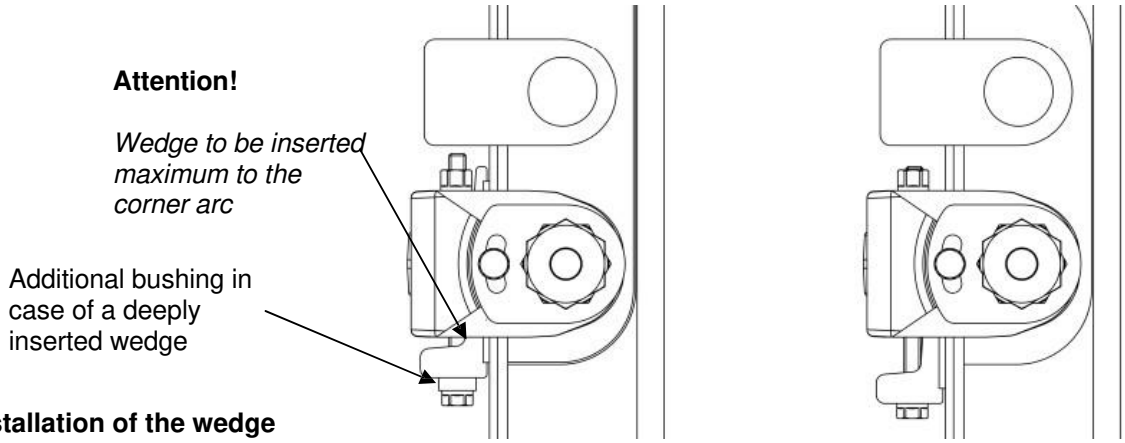


Fig. 6 Installation of the wedge

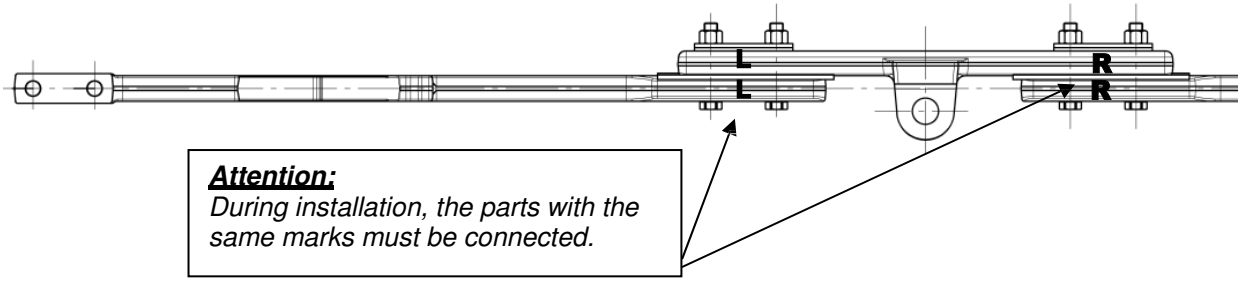
	**Tightening torque**	**Tool**
Safety nut M8 for wedge (Fig. 4, item 8)	20 Nm ± 2 Nm	Torque wrench SW 13

Safety screw M8 for safety shim Sib 20 (Fig. 4, item 10)	50 Nm ± 5 Nm	Torque wrench SW 13
Locking screw Vks 6 resp. Vks 6a (Fig. 4, item 4)	300 Nm ± 30 Nm	Torque wrench SW 36

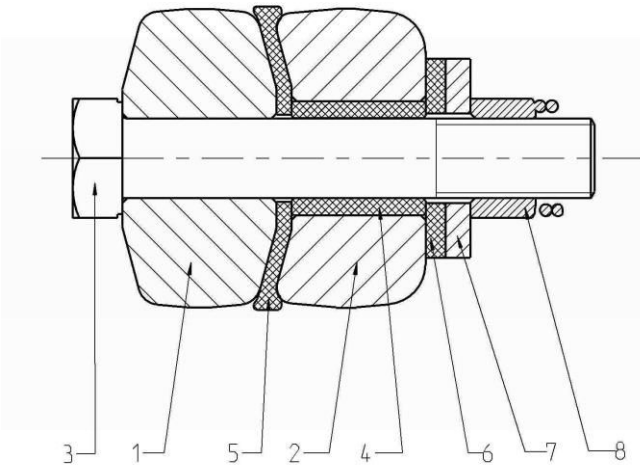
2.2 Assembly of the pushing rod

– Bolting of the two parts of the pushing rod with the intermediate plate and according insulating material (Fig. 7).

Remarks:
- *Intermediate plate <u>with</u> connecting lug:*
  → All first devices except installation in a hollow bearer
- *Intermediate plate <u>without</u> connecting lug:*
  → All second devices and all first devices installed in a hollow bearer
- *Intermediate plates are always located in direction of the end of the turnout*
- *The connecting lug is located in direction of the beginning of the turnout*
- *The bolted connection can also be done in opposite direction as to the shown fig. 7*



<u>Attention:</u>
During installation, the parts with the same marks must be connected.



1. Pushing rod part
2. Intermediate plate
3. Hexagonal screw M16 x 95 (SW24)
4. Insulating bushing UIB 1/1
5. Insulating plate ULP 1
6. Insulating plate ULP 2
7. Shim UUL 3
8. Safety nut M16 (SW24)

Fig. 7 Assembly of the pushing rod

	**Tightening torque**	**Tool**
Safety nut M 16 (Fig. 7, item 8)	100 Nm ± 10 Nm	Torque wrench SW 24

2.3 Assembly of the locking box

- Screws of the profile adjustment rod to be loosened and the profile adjustment rod to be pushed inside
- Locking boxes to be hooked into the outer sides of the rail foots
- Hook bolts of the locking boxes to be mounted and fixed with self-locking nuts and to be tightened for achieving a contact to the rail foot (Fig. 8)
- Locking boxes to be positioned centralized to the holes of the tongue rails (consider temperature during installation!)
- Fixing of the profile adjustment rod for achieving a contact between locking box and bottom side of the rail foot
- Hook bolts of the locking boxes to be tightened

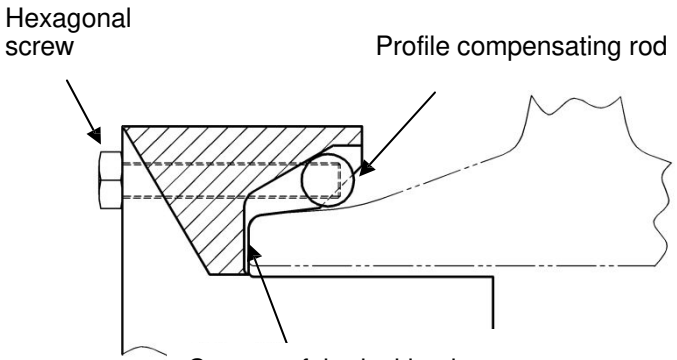


Fig. 8a Position of the profile-compensating rod during assembly

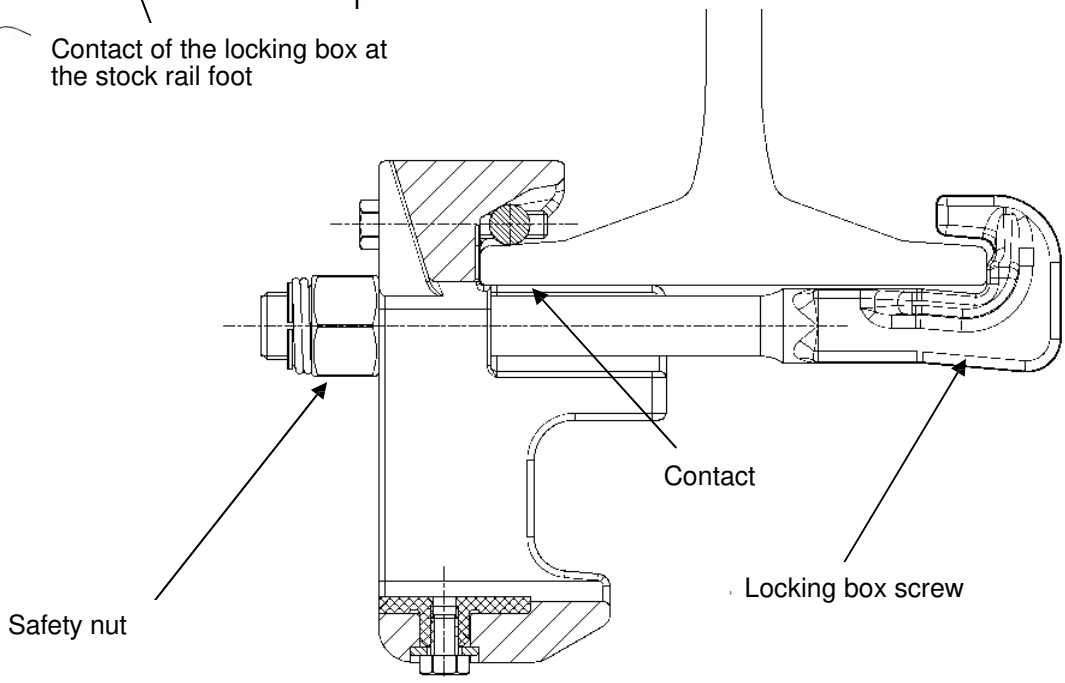


Fig. 8b Assembly of the locking box

	Tightening torque	Tool
Safety nuts M 20 of the locking box screws	200 Nm ± 20 Nm	Torque wrench SW 30
Screws M 8 of the profile adjustment rod	20 Nm ± 2 Nm	Torque wrench SW 13

3 Adjustment of the clamp lock

- Bolting of the eccentric bolt to be released, until the fixing shim is positioned outside of the interference of the cotter pin (Fig. 9)
- Pushing rod to be positioned in one end position
- Adjustment of the clamp length by turning the eccentric bolt with Hexagon socket screw key 14 mm
- Fine adjustment to the next hole in the fixing shim (Fig. 10) and tightening the nut of the eccentric bolt

Note:
- *The correct longitudinal position of the clamp is achieved, as soon as the clamp pushes against the locking box (noticeable resistance of the eccentric bolt) during a given gap of 0.5 mm between stock and tongue rail.*
- *The flat shaped side of the eccentric bolt avoids an adjustment outside of 180° (maximum adjustment).*
- *Using the reverse side of the fixing shim, further hole positions can be used.*

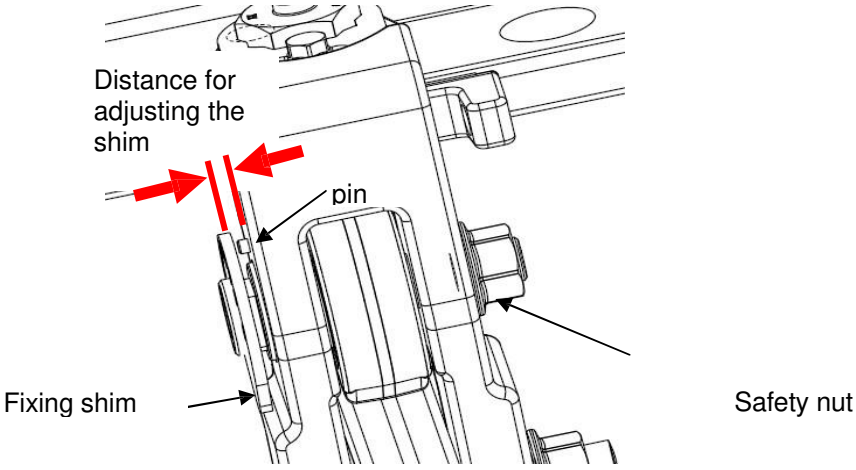


Fig. 9 Release of the eccentric bolt for adjustment of clamp length

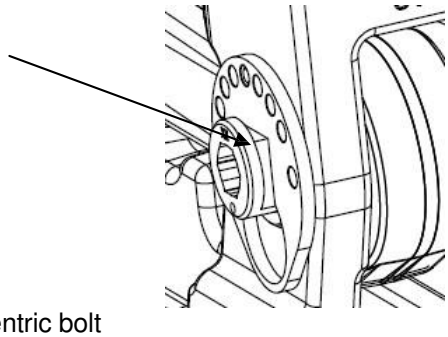


Fig. 10 Fine adjustment of the eccentric bolt

	**Tightening torque**	**Tool**
Safety nut M 16 (Fig. 9)	100 Nm ± 10 Nm	Torque wrench SW 24
Eccentric bolt	-	Hexagon socket screw key 14 mm

Assembly of the safety shim:

- Side openings to snap over the head of the eccentric bolt and the flange of the safety nut (Avoids losing fixing shim, eccentric bolt and safety nut; fig. 11)
- Protection of the locking screw by snapping of upper hole over the pin of the locking screw (Fig. 12)

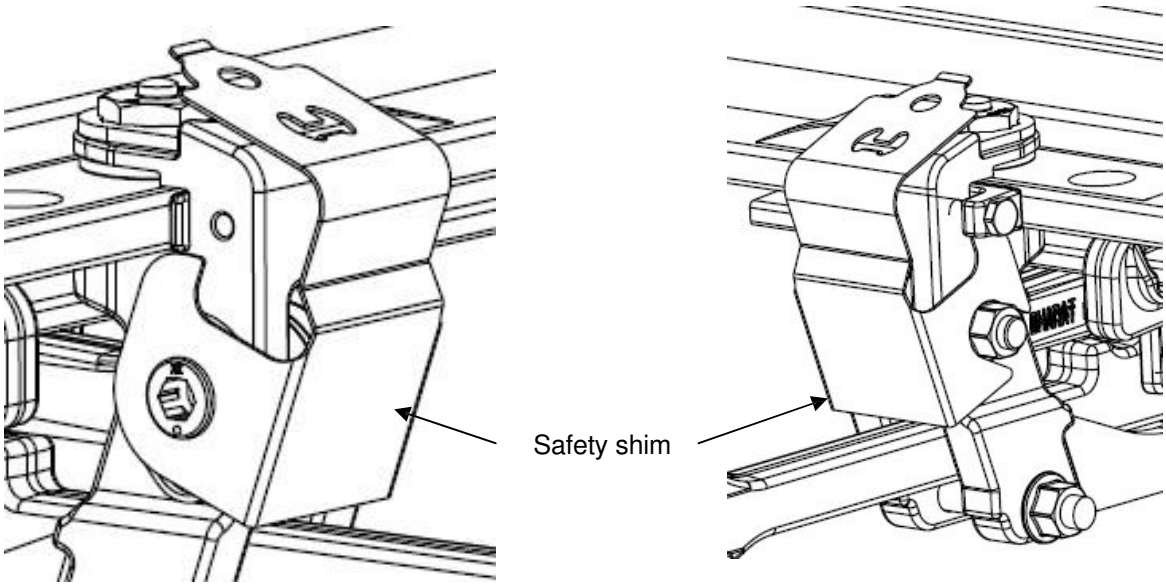


Fig. 11 Assembly of safety shim

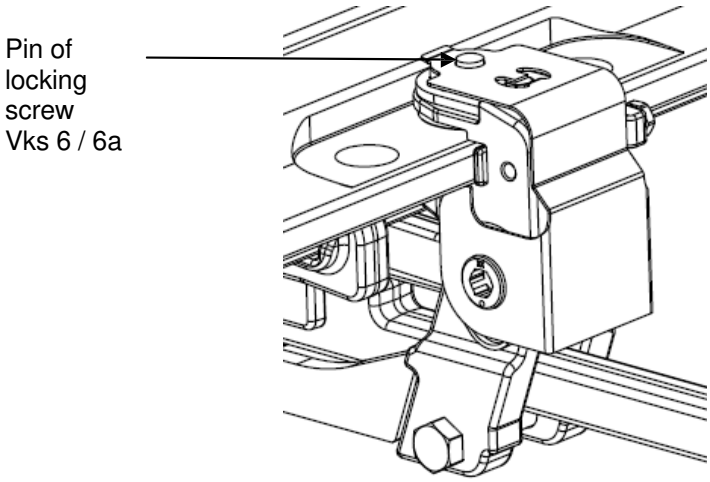


Fig. 12 Fixing by snapping over the pin of the locking screw

Attention!

The safety shim has to snap over the pin of the locking screw until it lays firmly on the head of the locking screw. In case it does not, the shim can be slightly bended.

4 Verification of the correct adjustment

4.1 Symmetrical tongue opening

– The tongue opening shall be approx. the same on both sides.

Hinweis:

Bei Zungenaufschlägen außerhalb der Toleranzen nach Ril 982.9302V56 kann der Zungenaufschlag durch Austausch der Mittellaschen der Schieberstangen reguliert werden (Tabelle1). Voraussetzung dafür ist der vorhandene, erforderliche Stellweges nach Iow (54./49.) 50.0026.

4.2 Overlap and idle stroke

– Verification of the overlap and idle stroke measure will be executed by using a measuring gauge according to DB-drawing S414.09 Bl.2.

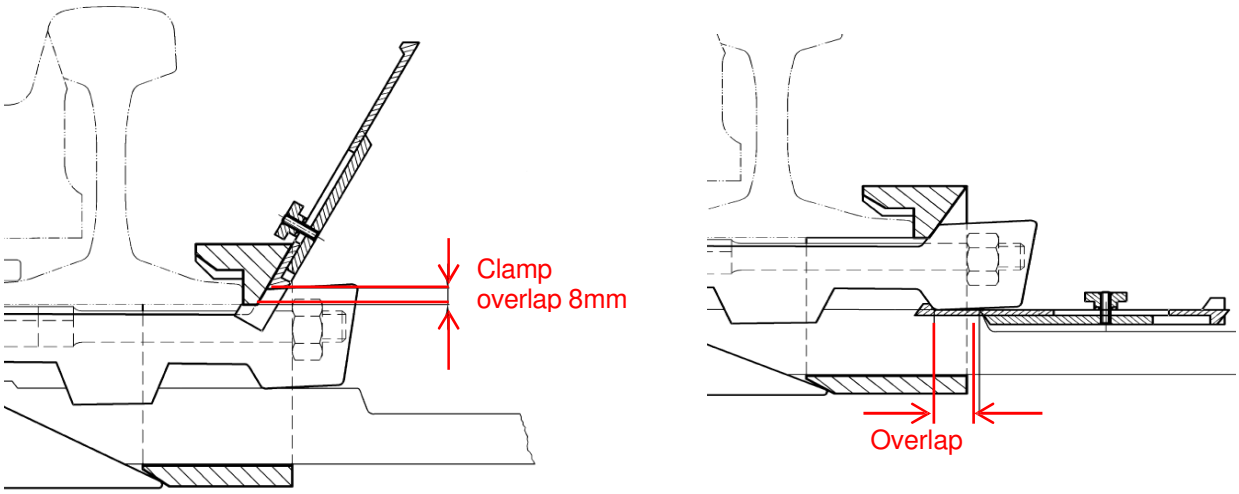


Fig. 13 Use of gauges

- Dimensions and tolerances according to Ril 892.9302V56 apply.
- The results of the measurements are to be documented in the form of the test sheet Ril 892.9302V55.

4.3 4 mm-test (First device) respectively 5 mm-test (Second device)

– With positioning of a 4 mm thick obstacle between stock and switch rail, the locking device must not achieve the locked end position after operation. (If necessary, the longitudinal position of the clamp needs to be shortened.)

5 Special features for curved switches and diamond crossings:

5.1 Curved switches

The offset of the switchblade hole in curved switches must be compensated for by packing 3 mm thick intermediate plates in the valve rod (Fig. 14). The clamp and valve rod must be aligned with each other.

If using intermediate plates (shims) the standard M16x95 bolts must be replaced with M16x100 bolts. The equalization kits are supplied by the turnout manufacturer together with the points, according to the information on the layout drawing and are to be taken into account when installing the guide rods.

In general, two intermediate plates maximum must be used, the overhang of the thread (at least 1.5 thread turns) must be met.

Up to 5 shim plates may be used for adjustment; in this case, M16x115 bolts must be used.

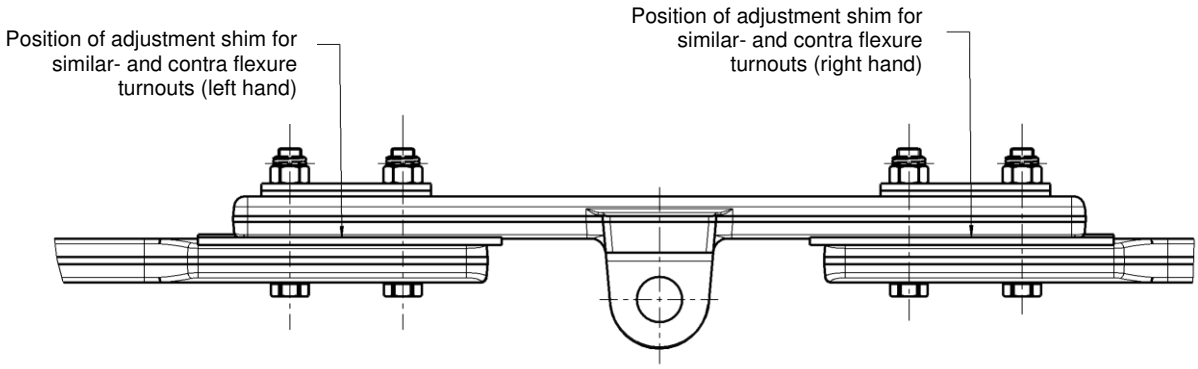


Fig. 14 Installation of adjustment shims for curved switches

Turnout geometry	Radius of main track	Adjustment height
ABW 54-190	1410 m ≥ R_s ≥ 705 m 705 m ≥ R_s > 470 m	3 mm 6 mm
IBW... - 300	1500 m ≥ R_s ≥ 840 m 840 m ≥ R_s > 560 m	3 mm 6 mm
IBW... - 500	1500 m ≥ R_s ≥ 968 m 968 m ≥ R_s > 645 m	3 mm 6 mm
IBW... - 760	1500 m ≥ R_s ≥ 1178 m 1178 m ≥ R_s > 785 m	3 mm 6 mm
IBW... - 1200	1500 m ≥ R_s ≥ 1155 m 1155 m ≥ R_s > 770 m	3 mm 6 mm

Note: The values given are theoretical values. The balance must be made in such a way that the alignment is guaranteed.

5.2 Slip diamond crossing

Within single or double slip diamond crossing EKW 49/54-190 / DKW 49/54-190, the offset of the holes in the tongue rail foot are is compensated by a relocation of the outer parts of the valve rod related to the intermediate part.

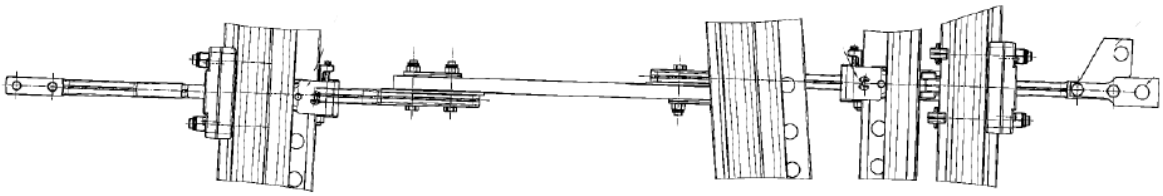


Fig. 15 Compensation of the offset of the tongue bores for crossing points

5.3 Diamond crossing

Within diamond crossings, locking devices with curved valve rods will be installed at moveable obtuse crossings.

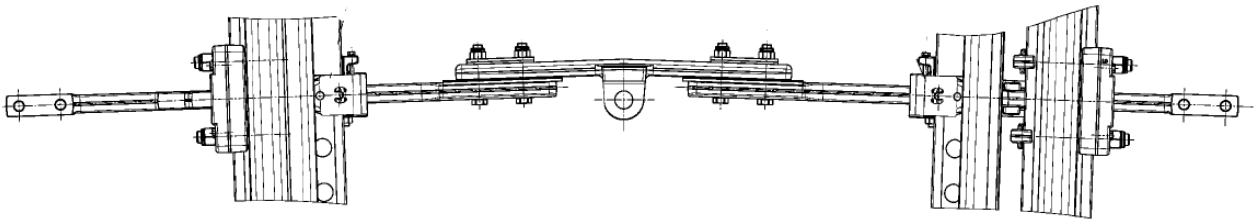


Fig. 16 Angled connecting bars at crossings

5.4 Mechanically set points

The connection of the angle lever connecting rod to the point lock on mechanically set turnouts requires specified lock designs (e.g. EVZ 54-2m). These have adapted slide rods and side handles (fig. 18) as well as a modified screw connection of the locking piece with anti-rotation device in the area of the side handle (fig. 17).

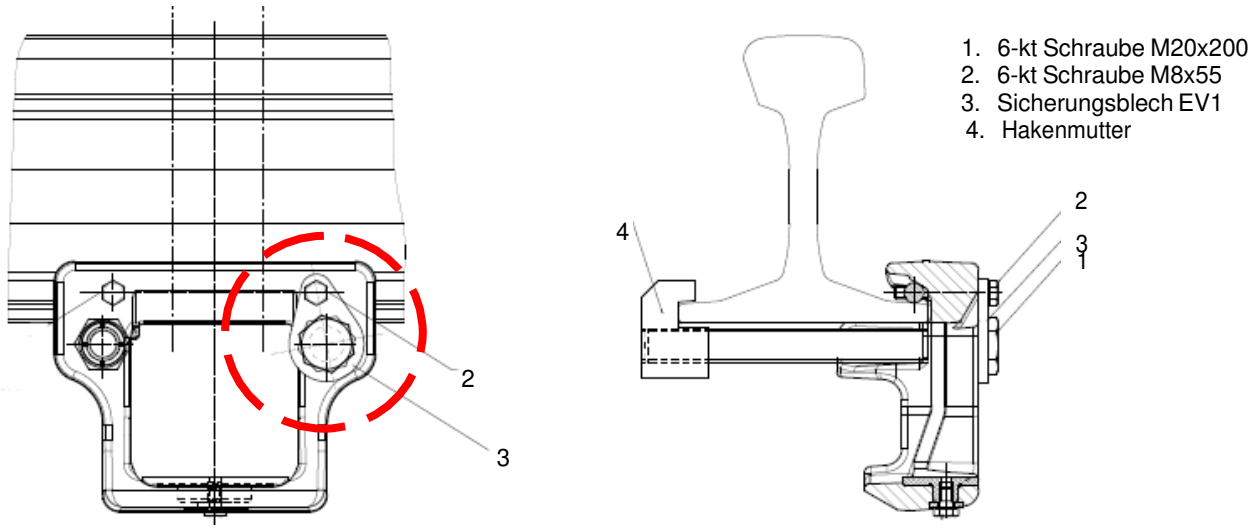


Fig. 17 Locking box fastening for SpV with mechanically set turnouts

6 Assembly of the side attachments for pushing rods

- For achieving the connection sizes to transmission parts (position of connection holes in the valve rod of the claw lock) the first and second locks need to be equipped with according side attachments.
- The side handles for the angle lever rods are generally to be arranged in the direction of the end of the turnout for turnouts without hollow bearers (Fig. 18).
- For turnouts with hollow bearers, the side handles are to be arranged at:
  - the pushing rod at 1st level in the direction of the start of the turnout
  - the lever rod at 1st level in the direction of the end of the turnout
  - the lever rod at 2nd level in the direction of the start of the turnout (acc. to Fig. 19)
- The side attachments have to be bolted in according position with hexagonal screws M16x100 and safety nuts M16. In case of switches, mechanically operated from distance, flat head screws have to be used.
- Side attachments for setting lever connection rod for turnouts without hollow bearer will be delivered together with the claw lock device (Fig. 18).
- Side attachments for switches with hollow bearers have to be ordered separately (Fig. 19).

1st level lock Turnouts, diamond crossings with 1-2 slips 500	**2nd level lock**	**diamond crossings** with 1-2 slips 190, remote point machine	**mechanic remote operated switches**
side attachment EVZ 2	side attachment EVZ 1	side attachment EVZ 3 + EVZ 4	side attachment EVZ 5R (5L)

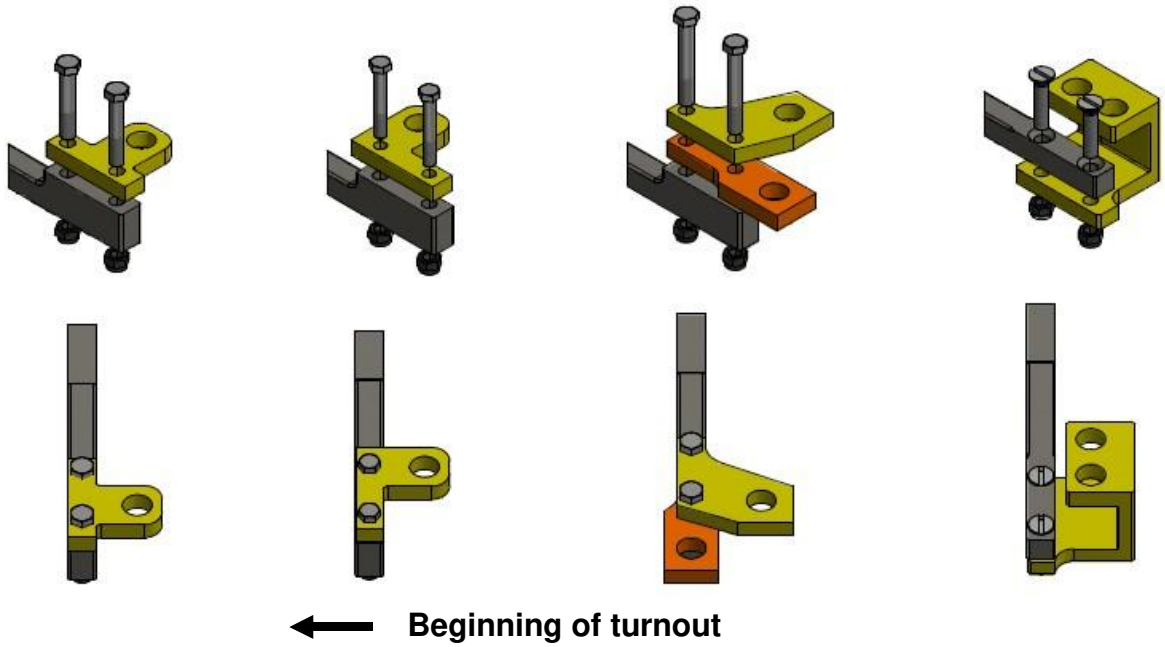


Fig. 18 Assembly of side attachments in turnouts without hollow bearers (right side shown)

For turnouts with hollow bearers:

Fig. 19 Assembly of side attachments in turnouts with hollow bearers

	**Tightening torque**	**Tool**
Safety nut M 16	100 Nm ± 10 Nm	Torque wrench SW 24

Note:

When changing the claw lock in existing systems, it may happen that the position of the angle lever deviates from the theoretical dimension. In this case, suitable side handles can also be installed in a different position to compensate.

7 Supplementary device EBV assembly

The supplementary device is mounted on some S54 and UIC 60 turnouts. The allocation tables are deposited on the arrangement drawings:

low 50.0031
low 54.50.0028

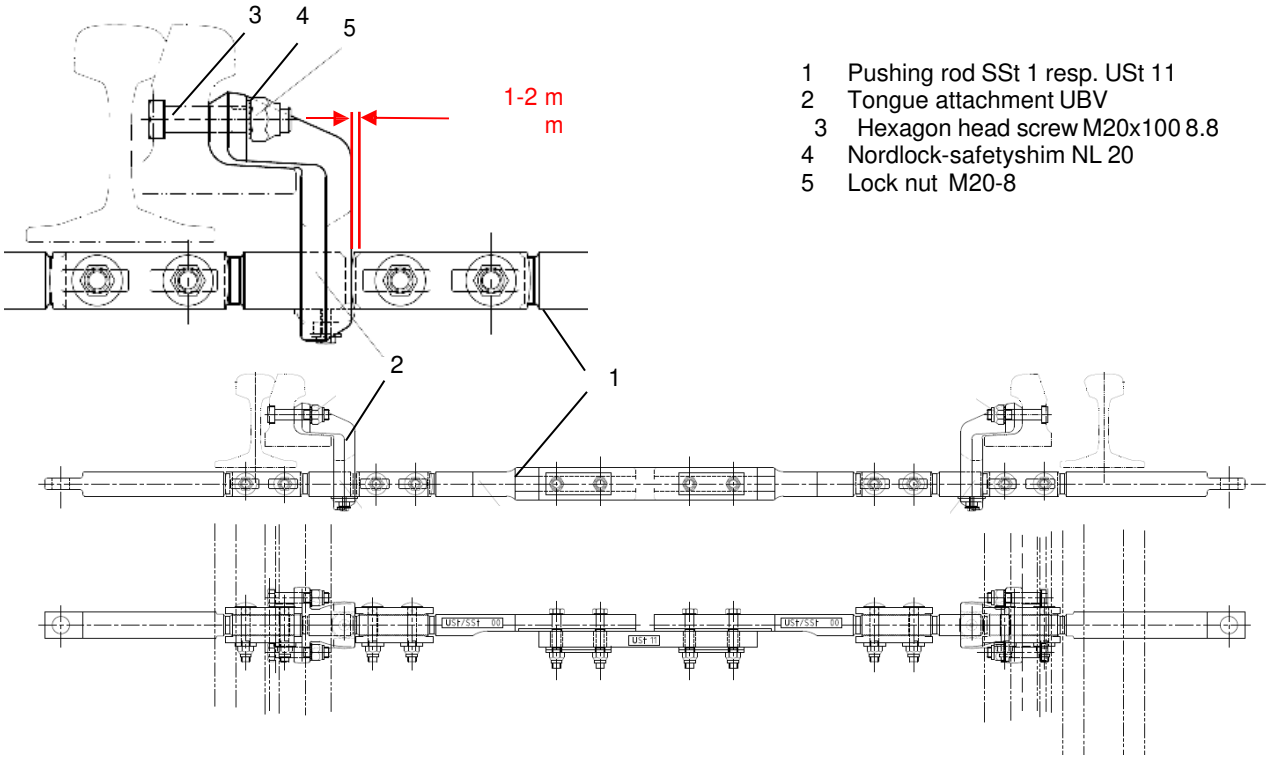


Fig. **20** Supplementary device EBV 60

The slide rods SSt 1 or USt 11 are used for the respective type, as they are also beeing used for the CKA 13 and some 2nd level fork locks.
In contrast to other types, the EBV tongue attachment is screwed to holes in the tongue bridge instead of to the tongue foot. This means that it cannot be mounted on tongues with tongue foot holes.

Note:

- *If only one cam device is replaced, mixed designs are permitted, i.e. the standard supplementary device can be combined with the tongue attachment CKA13 or the fork centre lock.*
- *A combination with the WEV is not possible!*
  The reason for this is the use of different slide rods.

7.1 Assembly of tongue attachment

The pre-assembled unit consisting of the tongue attachment and pushing rod is placed on the tongue foot on the right and left side and positioned at the tongue bridge holes. The tongue attachments are each fastened with two M20 screw connections and a tightening torque of 290 Nm.

7.2 Adjustment of supplementary device EBV

- Loosen the screw connection of the four pairs of pressure pieces (on both sides) so that they can be moved.
- Move the turnout to the middle position with the crank handle. By adjusting the length of the angle lever connecting rod, the slide rod is moved in such a way that the projection of the slide rod to the stock rail is the same on both sides.
- The turnout is switched to the two end positions one after the other and in each case:
  - On the adjacent tongue, the thrust pieces are pushed inside the track up to approx. 1 mm on the tongue attachment. The thrust pieces, which are engaged in the teeth of the pushing rod, are then screwed together (tightening torque 102 Nm).
  - The outer pressure pieces are pushed onto the tongue attachment (open tongue) and screwed to the pushing rods. The clearance groove, the smallest distance between the tongue and the stock rail, must be at least 58 mm.

7.3 Shutdown of turnouts with EBV

Due to the lack of a tongue foot bore, turnouts with a EBV must be proceeded different from the specifications for decommissioning according to Ril 819.1711A01.

Temporary shutdown (drawing low 50.0032)

1. Exchange the connecting straps on the pushing rod USt 11 or SSt 1 with Stg 195
2. Replacement of a screw connection of the tongue attachment of the open tongue with threaded rod (2) M20x250
3. Adjust the tongue opening until a drive through groove of at least 65 mm is achieved
4. Welding the nuts (3) with the threaded rod (Fig. 21).
5. Adjust the inner thrust pieces on the adjacent tongue until they are in contact (distance max. 2 mm).

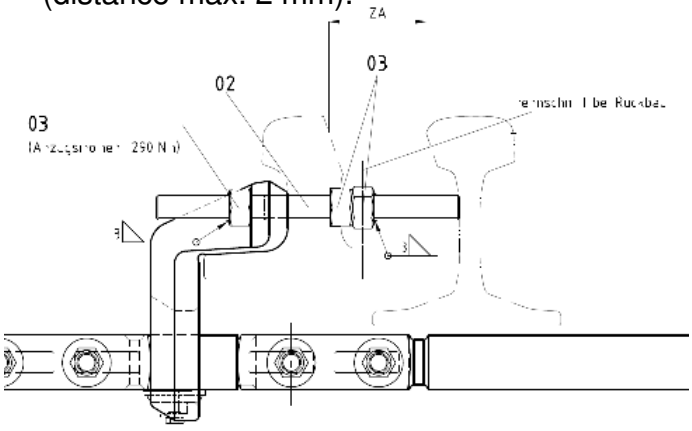


Fig. 21 Temporary shutdown with EBV 54/60, open tongue

Shutdown type I and II
Adjacent tongue (low 50.0033 Fig. 1)

1. Disassembly of the pushing rod
2. Attaching the shaped piece (02) to the outer stock rail foot equivalent to the locking piece (see section 2.3).
3. Insert a threaded rod M24x420 (10) as a connection between the tongue clamp and the shaped piece.
4. Place the striking plates (08)(09) on the tongue attachment and screw the nuts until the tongue is in contact.
5. Welding the nuts to the threaded rod and the respective striking plate (Fig. 22).

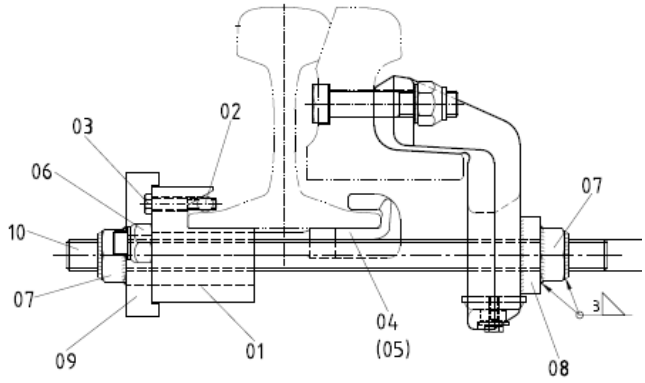


Fig. 22 Shutdown type I and II with EBV 54/60, adjacent tongue (low 50.0033 Fig. 1)

Shutdown type I
Open tongue (low 50.0033 Fig. 1)

1. Disassembly of the EBV tongue attachment on the open tongue
2. Installation of the threaded rod M20x250 according to drawing
3. Adjust the tongue opening until a drive through groove of at least 65 mm is achieved
4. Welding the nuts (3) with the threaded rod (Fig. 23).

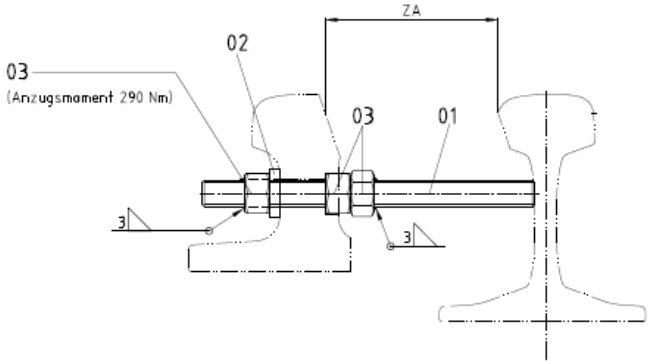


Fig. 23 Shutdown type I with EBV, open tongue

	Tightening torque	Tool
Tongue attachment screw M 20 (Fig. 20)	290 Nm ±10%	Torque wrench SW 30
Pushing rod screw M16 (Fig. 20)	102 Nm ±10%	Torque wrench SW 24

8 Maintenance

8.1 Maintenance

The device is nearly lubrication free. Lubrication has to be done only during regular inspection.

8.2 Inspection and repair

8.2.1 Inspection

Inspection has to be executed according to 892.9302A20.

The inspection results shall be documented in inspection sheet 892.9302V55.

8.2.2 Repair

In case of wear and tear, the sliding insert in the locking box can be exchanged by release of the bolting at the bottom side (Fig. 24).
Therefore, the pushing rod has to be dismantled.
Together with a new sliding insert, a new bolting has to be used.

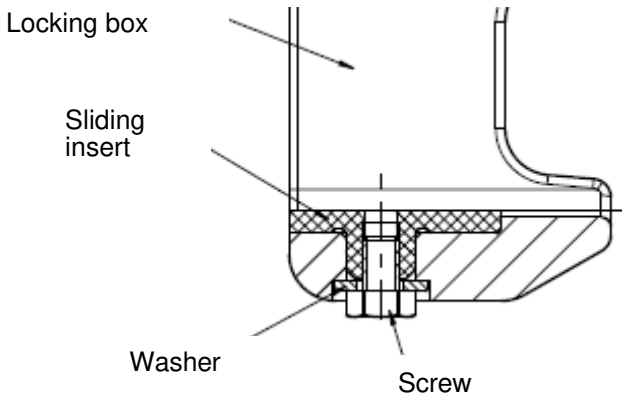


Fig. 24 Exchange of the sliding insert in the locking box

> ***Remark***
>
> *The sliding insert needs to be exchanged before wear and tear occurs at the pushing rod or the locking box.*

	**Tightening torque**	**Tool**
Screw M 8	20 Nm ± 2 Nm	Torque wrench SW 13

9 Demounting of the locking device

The demounting of the locking device is carried out in the reverse sequence as the described mounting.

Note
Bring the switch tongues into the tension-free middle position, especially for disassembling the locking clamp screw on the tongue attachment as well as for disassembling the pushing rod parts.
When working on the clamp lock, the open tongue should be secured against accidental repositioning (e.g. with a wooden block)