REX
BY COMBI WEAR PARTS

User Guide

Installation & welding

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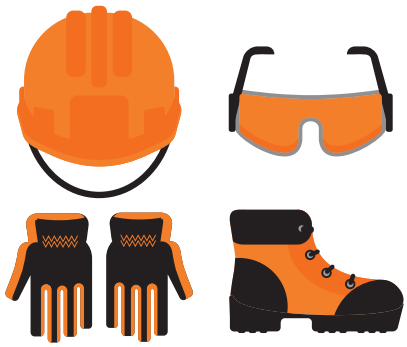
1. Welding instructions

1.1 General welding instructions

Before starting installation or removal, read all instructions completely. All personal performing maintenance and welding work must wear O.S.H.A. approved head protection, safety glasses, safety shoes and work gloves suitable to the task being performed.

Work pieces must be securely held and supported. Ventilation and fume extraction must be good. All parts outweigh 20 kg (44 pounds) are designed with a lifting eye for use of lifting aid equipment.



1.2 Some advice about welding

First, clean the parts to weld. The surface to weld must be free from dirt, scale, rust, grease, paint, water etc. Grind the fitting surface of the adapter and cutting edge smooth. The top leg of the adapter must be in full contact with the top surface and bevel on the cutting edge in order to minimize residual stresses in the joint.

Preheat the adapter as well as the cutting edge, extending 75mm/2,96 inches from the adapter, to recommended temperature shown in Table A. Preheating will reduce the risk of hydrogen cracking, minimize the shrinkage stresses and avoid deformation.

It is recommended to preheat from the bottom side using burners with insulating blankets on the top side, or to use electric preheater elements around the prepared joints. The temperature shall be measured 75 mm/2,96 inches from the welding area and on the opposite side of the heated side by using a temperature indicating crayon or an infrared thermometer. Maintain the temperature throughout the welding process.

Preheating	
Item	Preheating temp.
R10	150°C / 300°F
R14	150°C / 300°F
R18	150°C / 300°F
R23	150°C / 300°F
R29	200°C / 392°F
R35	200°C / 392°F
R50	200°C / 392°F
R70	200°C / 392°F
R90	200°C / 392°F
R110	200°C / 392°F
R130	200°C / 392°F

Table A

It is important to prevent hardness loss in the adapter and cutting edge by not exceeding the temperatures of 250°C (482°F). Keep on welding all adapters completely without any longer stops. Let the work piece cool down slowly afterwards, not faster than 50°C (122°F) per hour. It is highly recommended to keep insulation blankets on the piece after finishing welding.

Always use dry and undamaged electrodes. Electrodes in open package should be kept in a heating container at 100°C (212°F). If electrodes have become damp, they should be dried in an oven for 8-10 hours at a temperature of 200-250°C (392-482°F). If the electrodes are damaged by humidity to the extent that they begin to rust, they should be discarded. Use soft welding consumables with a yield strength of up to 500 MPa. Such welding consumables reduce the residual stress level in the joint and thus the risk of hydrogen cracking.

General Welding	
Method	Filler material
MMA	AWS A5: I E-7016, E-7018
	DIN 1913 E51 53 B10
	ISO 2560 E51 5B 120 20 H
	UNE-AN 499 E423, E46B
	OK 48.00, OK 53.68
MIG/MAG	AWS A5. 18 ER 70S-X
	DIN 8559 SG2
	UNE-EN 440 G46M, G50M
	OK Autorod 12.51, 12.64
FCAW	AWS A5.20 E 70 T5
	DIN 8559 SGBI C 5254
	OK Tubrod 15.00

1.3 Number of adapters

This guide helps to determine how many adapters to attach to a bucket. The formula to the right on this page can be used as guidance. Column Measure L1 shows minimum and maximum distance between the adapters (Table B). Column L2 shows the distance from the bucket's front corner to the center of the first adapter (Fig. 1). General speaking, the higher the number of teeth, the less wear of the cutting edge and the lower the stress on each individual tooth. However, these benefits are sometimes gained at the cost of a reduction in penetration efficiency.

$$\text{Min: } \frac{(W\text{-}L2 \times 2)}{L1\ max} + 1 = \square$$

$$\text{Max: } \frac{(W\text{-}L2 \times 2)}{L1\ min} + 1 = \square$$

	Excavator		Loader		
	Measure L1 (mm)		Measure L1 (mm)		L2
Size	Min	Max	Min	Max	(mm)
R10	190	260	250	345	75
R14	190	265	260	350	85
R18	245	335	325	445	95
R23	280	375	365	500	110
R29	310	420	415	565	120
R35	350	480	470	640	135
R50	400	545	530	725	155
R70	420	560	610	780	180

Table B

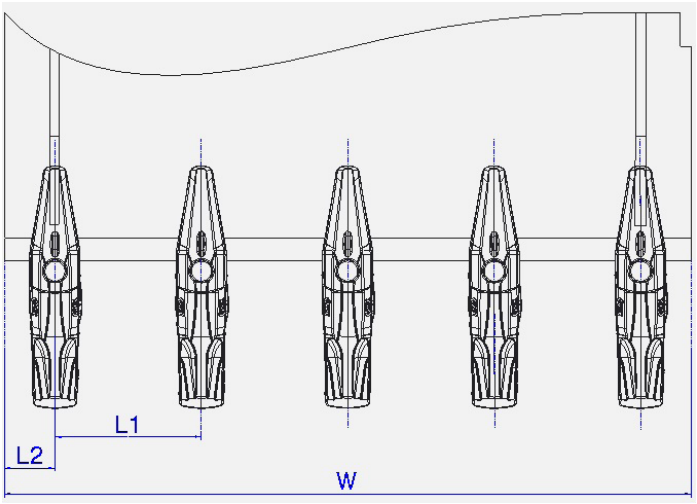


Fig. 1

For installation of R90, R110 and R130 please consult your contact at Combi Wear Parts.

2. Preparing the lip and side plates

2.1 Lip

The front edge of the lip must be beveled according to Fig. 2 and Table C. Cut the side plates to fit the shape of the upper adapter leg according to Fig. 3 and Fig. 4.

When a V or spade nose lip is used we recommend producing a drawing to get exact form and dimension of the front edge showing the number and position of the adapters. Place minimum two adapters on the straight front. See Fig. 5 and Table D.

Bevel recommendations

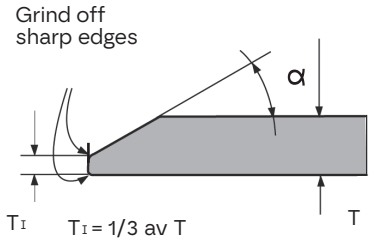


Fig. 2

Bevel. α	Excavator	Loader
R10	30°	25°
R14	30°	25°
R18	30°	25°
R23	30°	25°
R29	30°	25°
R35	30°	30°
R50	30°	30°
R70	30°	30°
R90	30°	30°
R110	30°	30°
R130	30°	30°

Table C

2.2. Side plates and corner adapters

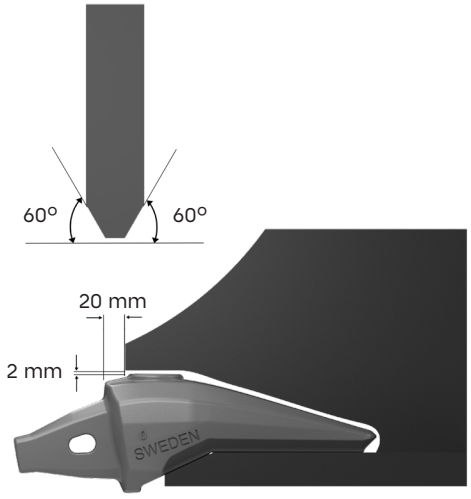


Fig. 3

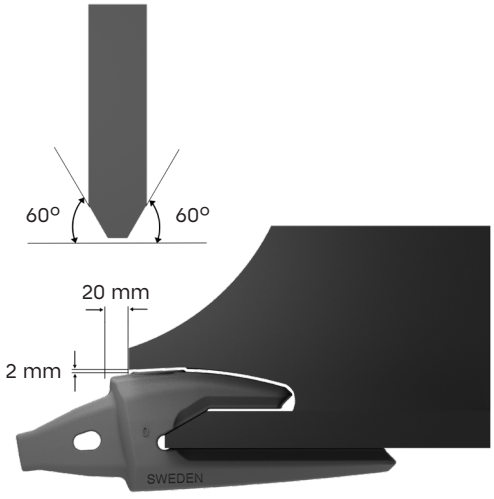


Fig. 4

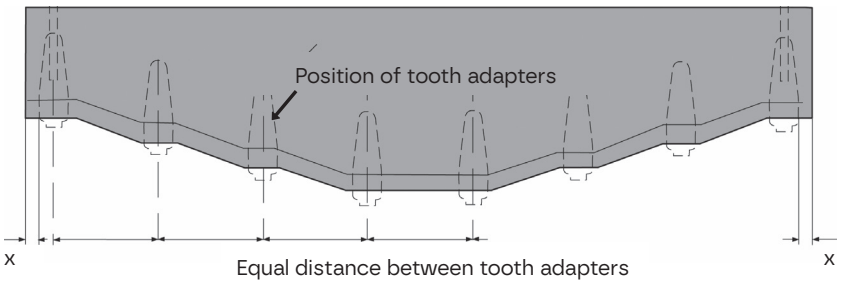


Fig. 5

Recommended placement of corner adapters	
Size	DIM X
R10	30 mm / 0,12 inch
R14	35 mm / 0,14 inch
R18	40 mm / 0,16 inch
R23	50 mm / 0,20 inch
R29	55 mm / 0,22 inch
R35	60 mm / 0,24 inch
R50	70 mm / 0,28 inch
R70	80 mm / 0,30 inch

Table D

For installation of R90, R110 and R130 please consult your contact at Combi Wear Parts.

3. Welding the adapters

3.1. Positioning of adapters

Position the adapters with equal spacing along the lip and tack weld them into position, see Fig. 6 and Fig. 7. Minimum length of the tack weld should be 15 mm / ½ inch, Fig. 8 and placed to the bottom of the weld groove in the adapter.

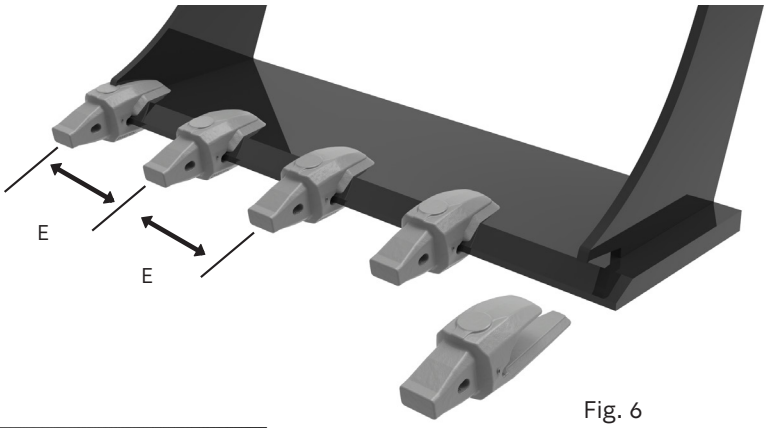


Fig. 6

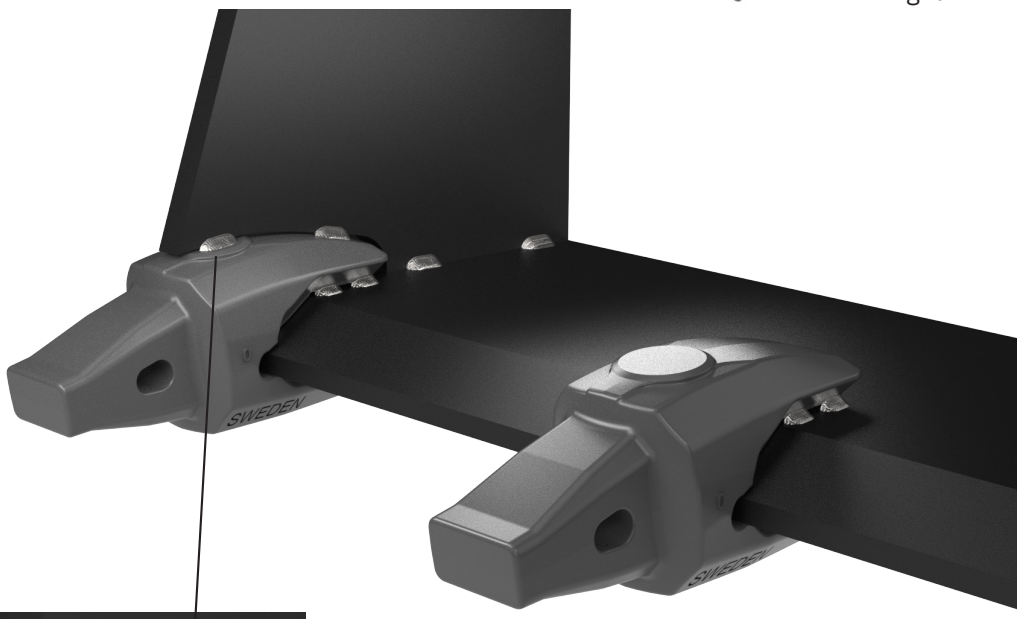


Fig. 7

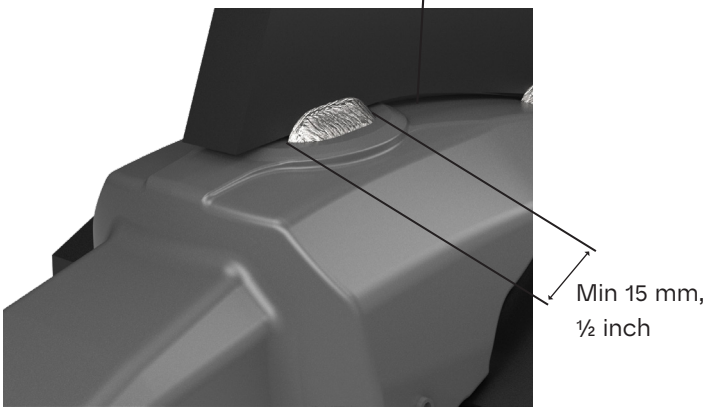


Fig. 8

Please note:
Tack welding for installing adapters are not different from the main weldings. The welding procedure and filler materials must be the same.

3.2. Welding sequence

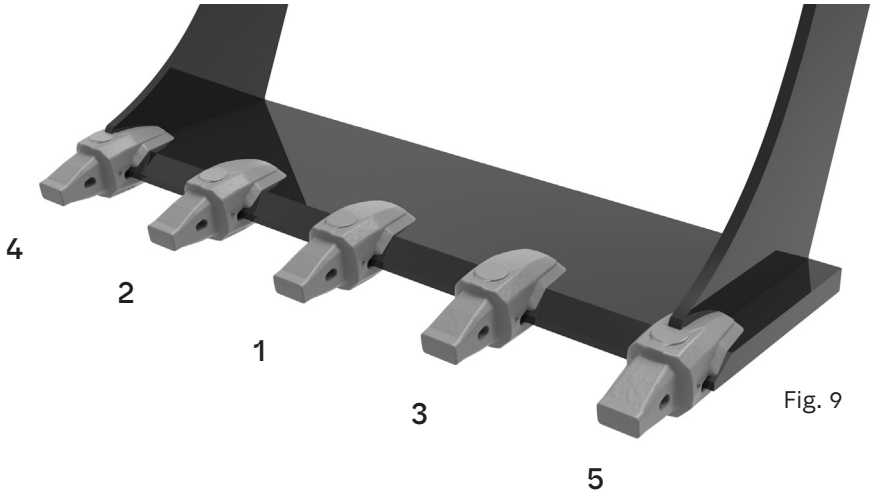


Fig. 9

Start welding the adapter in the middle, progressing alternately on each side towards the corner, in order to minimize distortions on cutting edge, see Fig. 9.

Weld the adapters starting with the bottom leg first (Fig. 10). Vary the length of the beads so that the starts and stops are not exactly the same location. Follow welding sequences as shown in Fig. 11.

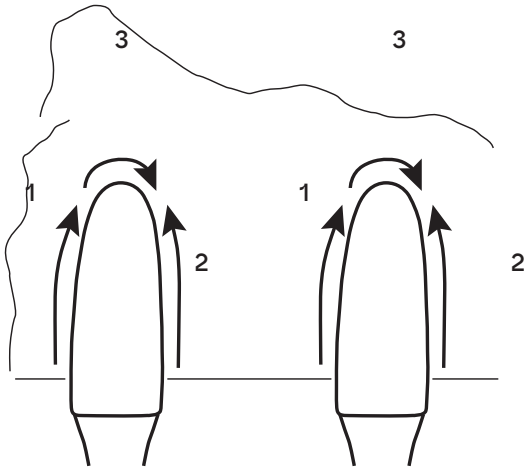


Fig. 11

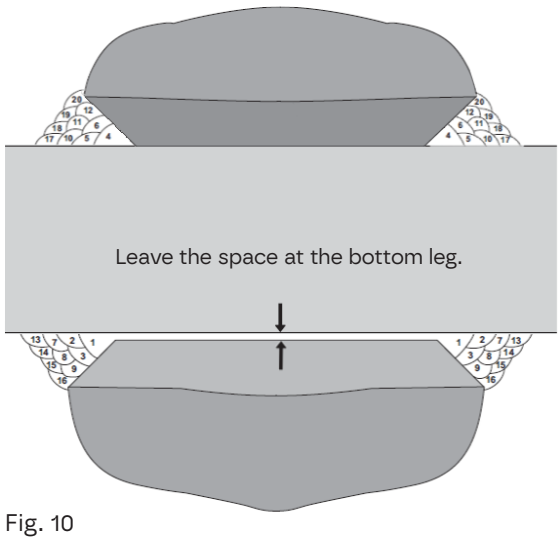


Fig. 10

Weld with small multiple runs following the weld groove in the adapter. Place the root beam at the bottom of the groove and continue welding as shown in sequences filling up to the groove in Fig. 10 by alternating between bottom and top leg at the adapter.

Clean each beam before applying next pass of the weld; use a hammer for slag removal and a steel brush. Welding defect such as cracks, slag inclusions, porosities, overlaps and undercuts shall be removed by grinding.

3.3. Type SL adapter

Prepare the bucket side plates to fit over the adapter placed in the bucket corner Fig. 3 and 4 page 5.

Position the adapters with equal spacing along the lip and tack weld them into position Fig. 6, Fig. 7 and Fig. 8 page 6.

Weld the preheated adapters with small multiple runs and fill the weld bevel to dimension A Table E (Fig. 12). Avoid starts and stops in the critical zones Fig. 13 and Fig. 14. Any cracks, slag inclusions and undercutting must be grind away and filled with weld and the critical zones grinded smooth Fig. 13 and Fig. 14. Start and stop area should be grinded smooth.

Clean each beam before applying next pass of the weld; use a hammer for slag removal and a steel brush. Welding defect such as cracks, slag inclusions, porosities, overlaps and undercuts shall be removed by grinding.

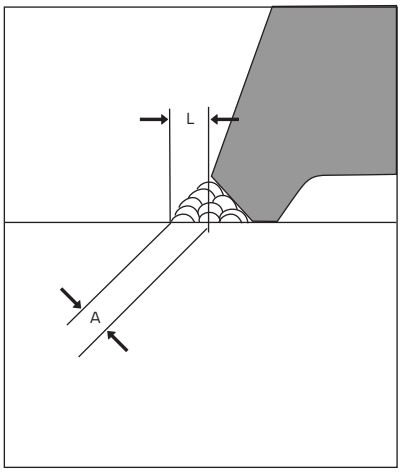


Fig. 12

Size	L (mm)	A (mm)
R10	9	7
R14	13	9
R18	14	10
R23	14	10
R29	16	12
R35	18	13
R50	18	13
R70	20	14
R90	23	16
R110	24	17
R130	25	18

Table E

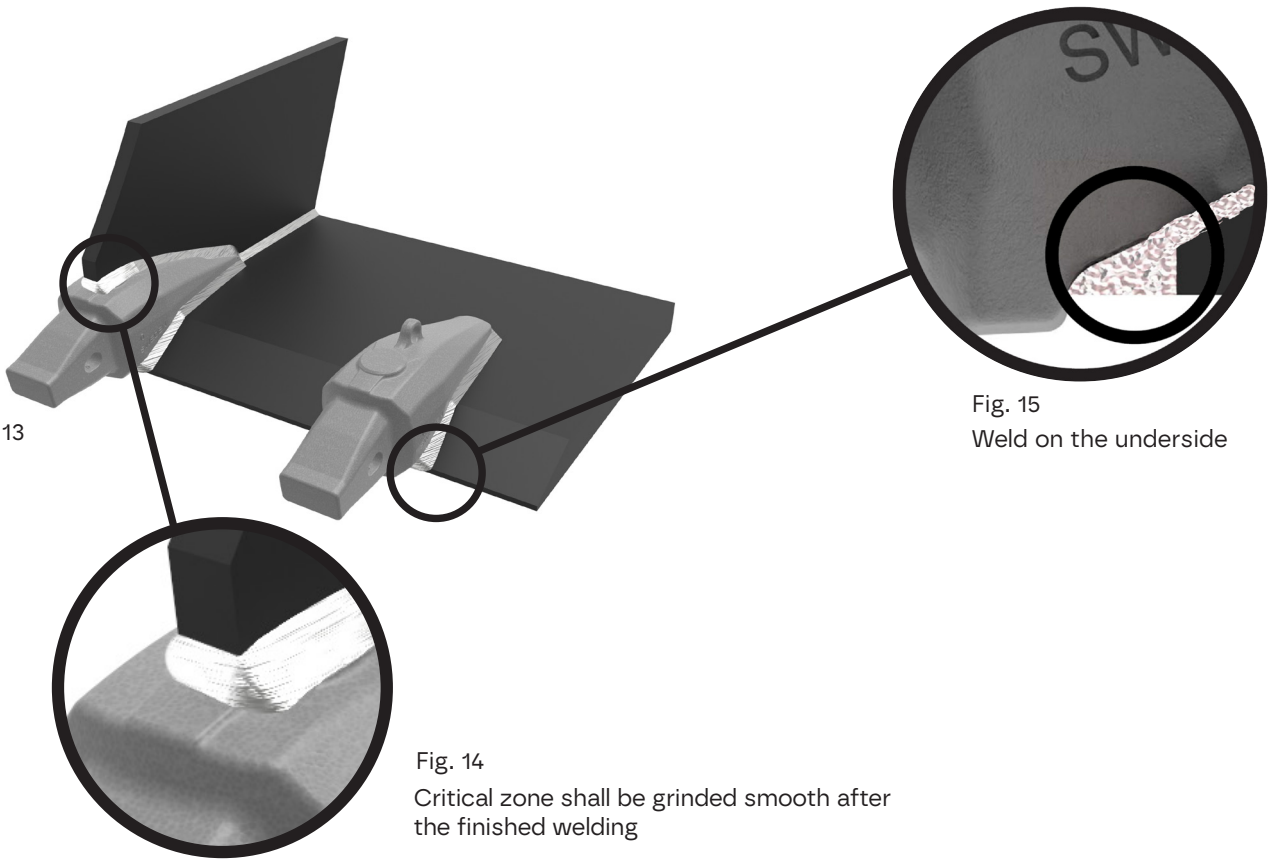


Fig. 13

Fig. 14
Critical zone shall be grinded smooth after the finished welding

Fig. 15
Weld on the underside

3.4. Type UA, BE and TL adapter

There are two versions of the adapter:
- Long top leg.
- Long bottom leg.

Both are welded using the same procedure. Prepare the bucket side plates to fit over the adapter placed in the bucket corner Fig. 3 and 4 page 5. Position the adapters with equal spacing along the lip and tack weld them into position Fig. 6 and Fig. 7 page 6.

Weld the preheated adapters with small multiple runs and fill the weld bevel to dimension A Table E, Fig. 12 page 8.

Avoid starts and stops in the critical zones shown in Fig. 11 page 7. Any cracks slag inclusions and undercutting should be grind away and filled again with weld and the critical zones grinded smooth Fig. 15.

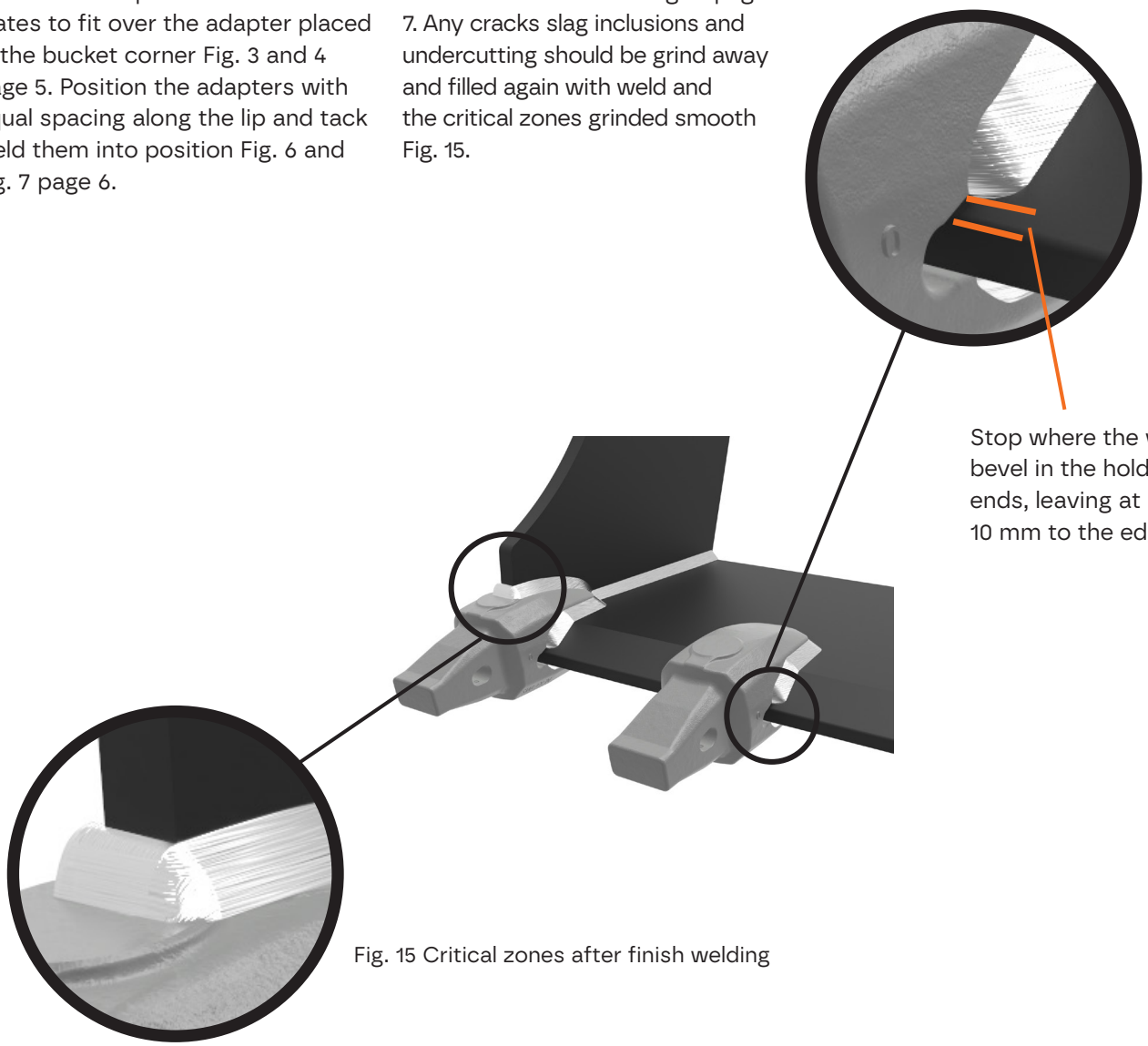


Fig. 15 Critical zones after finish welding

3.5. Type cast corner adapter

Prepare bucket lip and side plates as shown in Fig.16 - 18 below when using cast corner adapters. Tack weld the corner adapter with 50 mm tacks and leave a welding gap of 5mm (1/4 inch). Make sure that the corner adapter is not tilting in any direction.

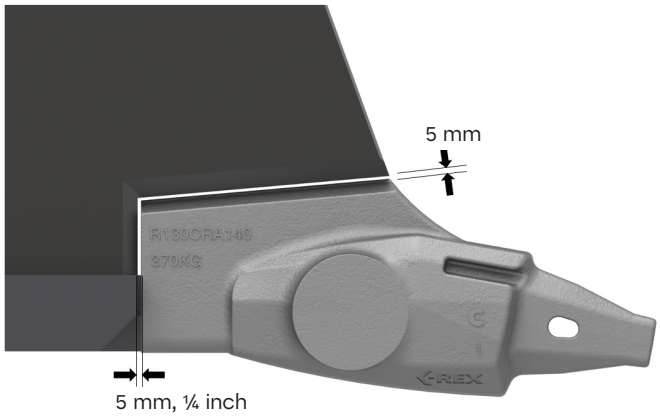


Fig. 16

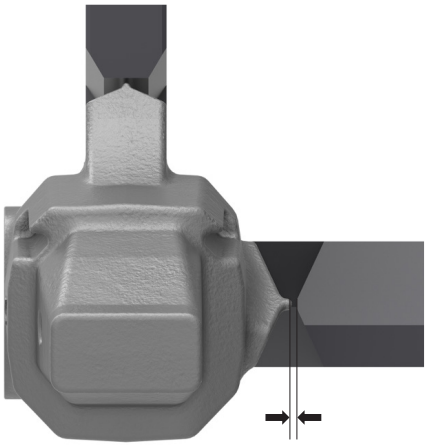


Fig. 17 5 mm, ¼ inch

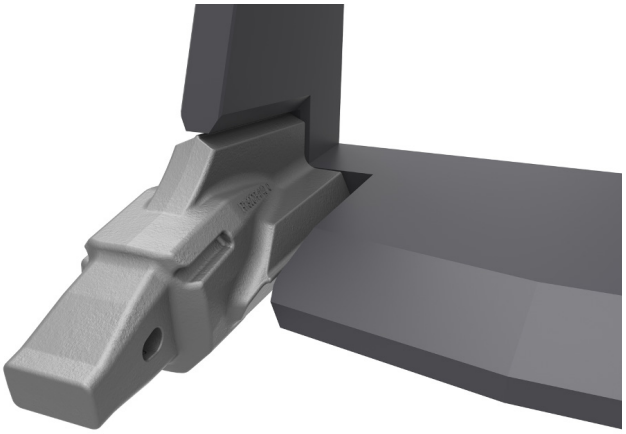


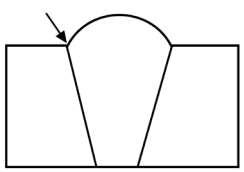
Fig. 18

3.6. Finishing of welds

When the assembly is cold, grind all welds with a rotating grinding tool. Grind all welds smooth and create a larger radius between weld and plate. Fig. 19.

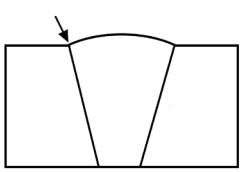
High stress concentration

Excessive cap typically gives small radius between the weld and plate.



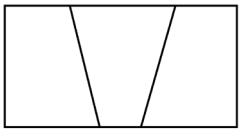
Medium stress concentration

Correct cap typically gives larger radius between the weld and plate.



Low stress concentration

Cap and root completely grinded.



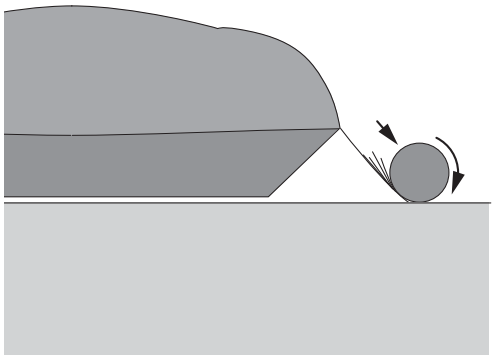


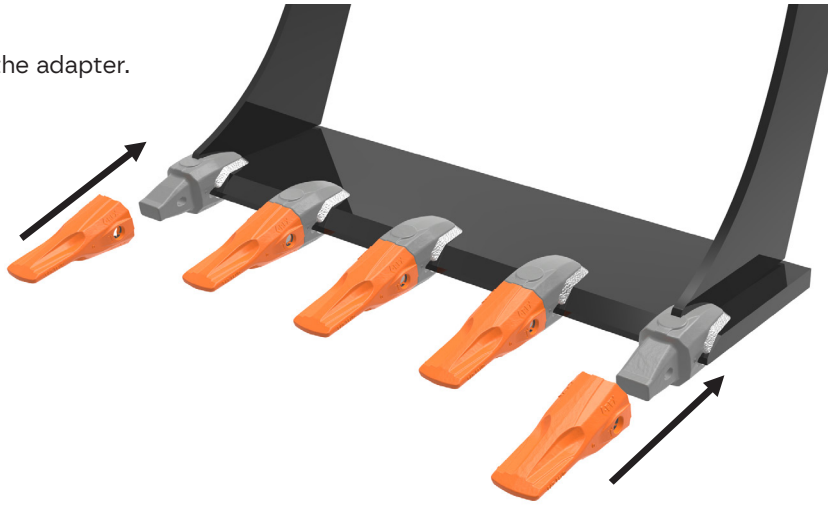
Fig. 19

4. Mounting & dismounting of tooth and lock

4.1. Mounting

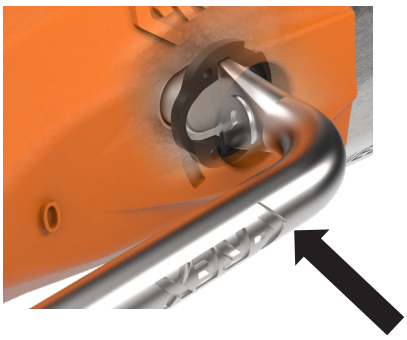
INSTRUCTIONS

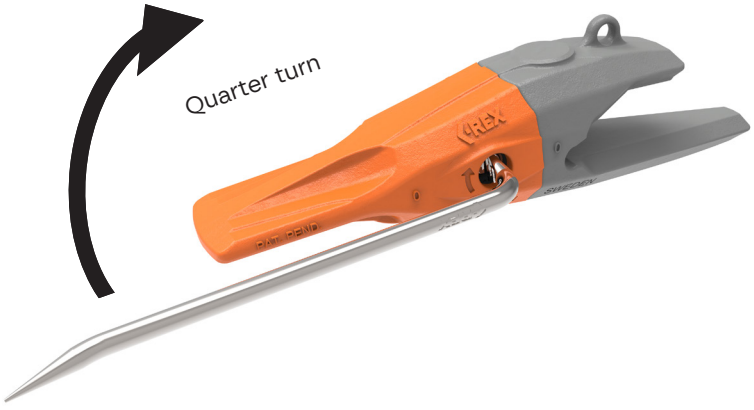
1. Place the tooth on the adapter.



2. Insert the locking pin as marked on the pin. Push the pin inside the locking ring.

3. Ensure the tool is correctly fitted into the grooves in the locking ring. Close the locking ring by turning it a quarter turn clockwise until stop. In this position the ring will block the pin.

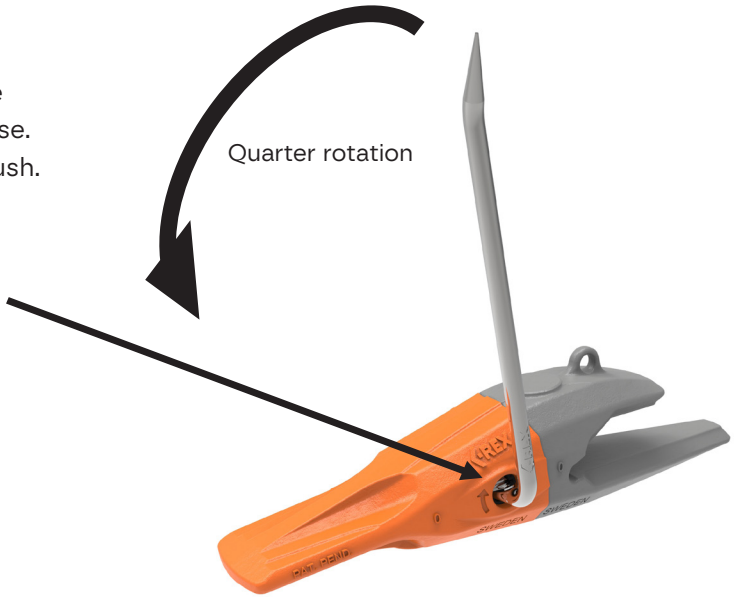




4.2. Dismounting

INSTRUCTIONS

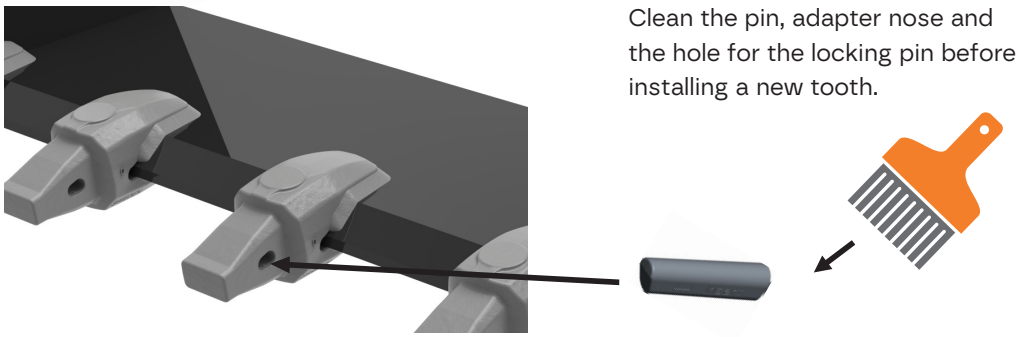
1. Clean the locking hole to get good access to the grooves in the locking ring. Turn the locking ring a quarter turn counterclockwise. To clean, use a screwdriver and a steel brush.



2. Use the back of the tool to knock the pin out.

TIPS
If you need to switch the positions, don't forget to clean the inside of the tooth as well, as dirt can prevent a tooth from fitting onto another adapter. If the locking ring is stuck, use a bit of lubricant.

IMPORTANT!
Clean the pin, adapter nose and the hole for the locking pin before installing a new tooth.



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