

USER GUIDE

INSTALLATION, WELDING AND MAINTENANCE



TABLE OF CONTENTS

1. WELDING INSTRUCTIONS

1.1. General welding instructions	3
1.2. Some advice about welding	3
1.3. Number of teeth	4

2. PREPARING THE LIP AND SIDE PLATES

2.1. Lip	5
2.2. Side plates and corner adapters	5

3. WELDING THE ADAPTERS

3.1. Positioning of adapters	6
3.2. Welding sequence	7
3.3. Type SL adapter	8
3.4. Type BE, TL, UA adapter	9
3.5. Finishing of welds	9

4. MOUNTING & DISMOUNTING OF TOOTH & LOCK

4.1. Mounting	10
4.2. Dismounting	11

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 25 kg (55 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 B. 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. 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.

It is important to prevent hardness loss in the adapter and cutting edge by not exceeding the temperatures of 200-250°C (392-482°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
MIG/MAG	OK 48.00, OK 53.68
	AWS A5. 18 ER 70S-X
	DIN 8559 SG2
	UNE-EN 440 G46M, G50M
FCAW	OK Autorod 12.51, 12.64
	AWS A5.20 E 70 T5
	DIN 8559 SGBI C 5254
	OK Tubrod 15.00

Table A

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

Table B

1.3. NUMBER OF TEETH

This guide helps to determine how many teeth to attach to a bucket. The formula to the right on this page can be used to give the same result. Column Measure L1 shows minimum and maximum distance between the adapters (Table A). 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.

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

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

Size	Excavator		Loader		L2 (mm)
	Measure L1 (mm) Min	Measure L1 (mm) Max	Measure L1 (mm) Min	Measure L1 (mm) Max	
R10	190	260	250	345	40
R14	190	265	260	350	45
R18	245	335	325	445	60
R23	280	375	365	500	70
R29	310	420	415	565	75
R35	350	480	470	640	85
R50	400	545	530	725	100
R70	420	560	610	780	110

Table A

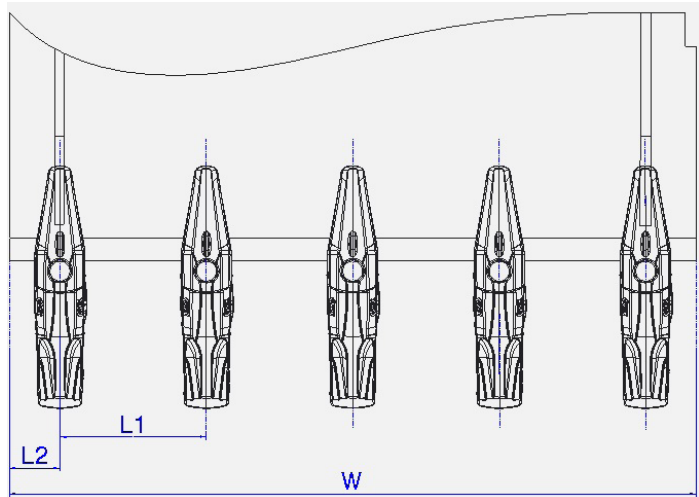


Fig. 1

2. PREPARING THE LIP AND SIDE PLATES

2.1. LIP

The front edge of the lip must be beveled according to Fig. 1 and Table A. Cut the side plates to fit the shape of the upper adapter leg according to Fig. 2 and Fig. 3.

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, see Fig. 4 and Table B.

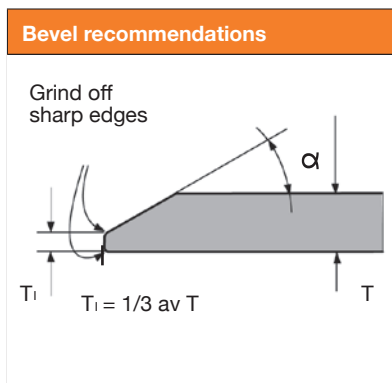


Fig. 1

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°

Table A

2.2. SIDE PLATES AND CORNER ADAPTERS

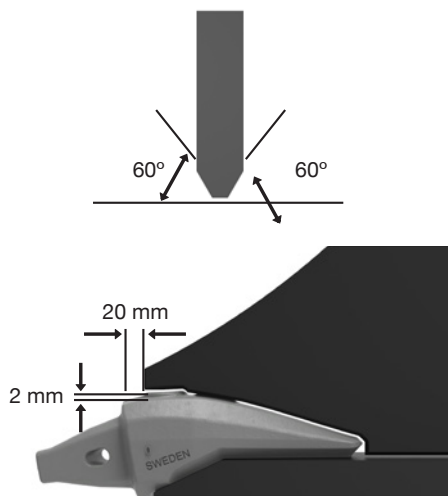


Fig. 2

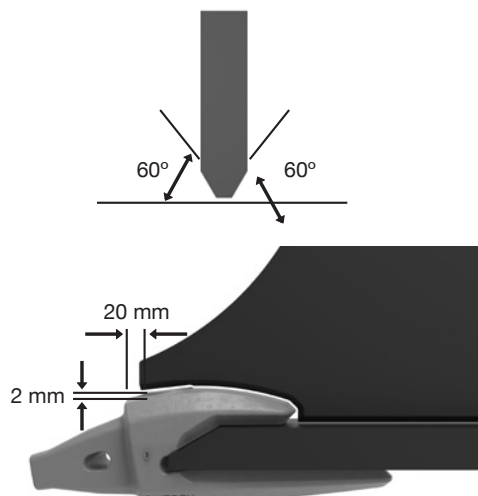


Fig. 3

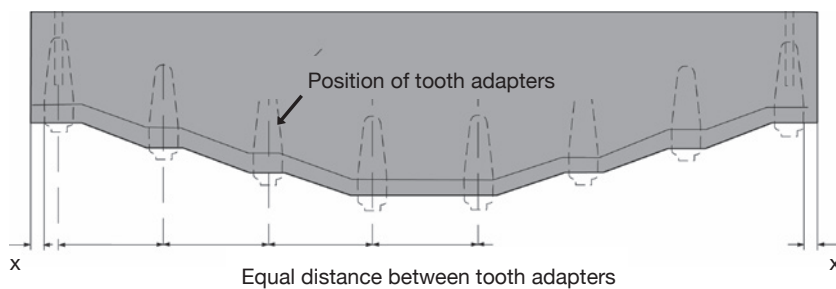


Fig. 4

Recommended placement of corner adapters	
Size	DIM X
R10	10 mm / 0,39 inch
R14	11 mm / 0,39 inch
R18	12 mm / 0,39 inch
R23	15 mm / 0,59 inch
R29	20 mm / 0,79 inch
R35	20 mm / 0,79 inch
R50	25 mm / 1,0 inch
R70	30 mm / 1,18 inch

Table B

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. 1 and Fig. 2. Minimum length of the tack weld should be 15 mm / ½ inch, Fig. 3 and placed to the bottom of the weld groove in the adapter.

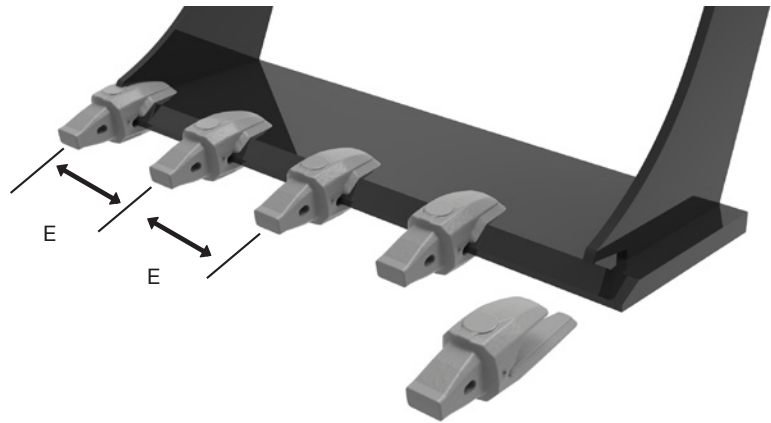


Fig. 1

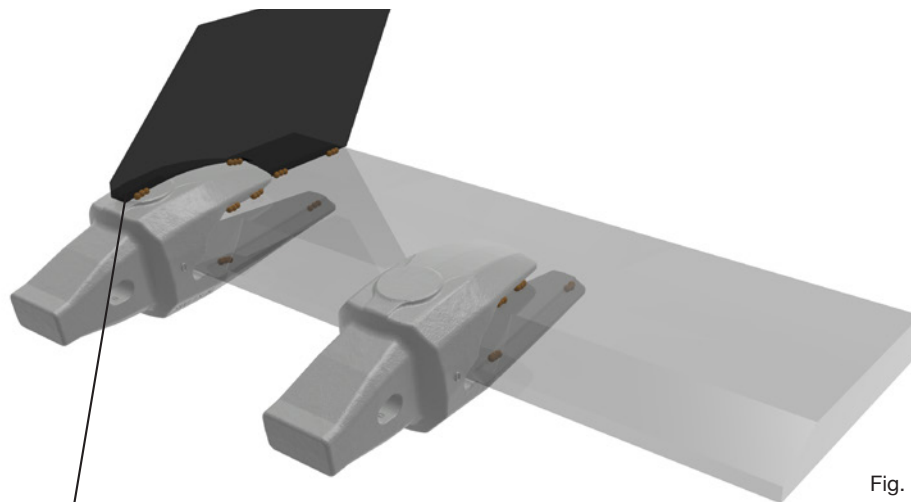


Fig. 2

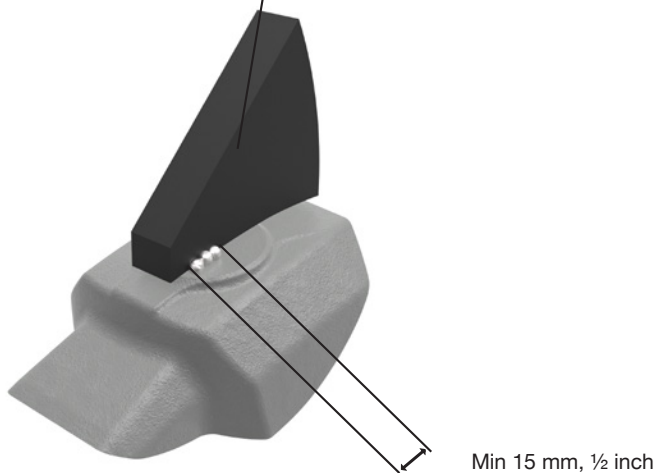


Fig. 3

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

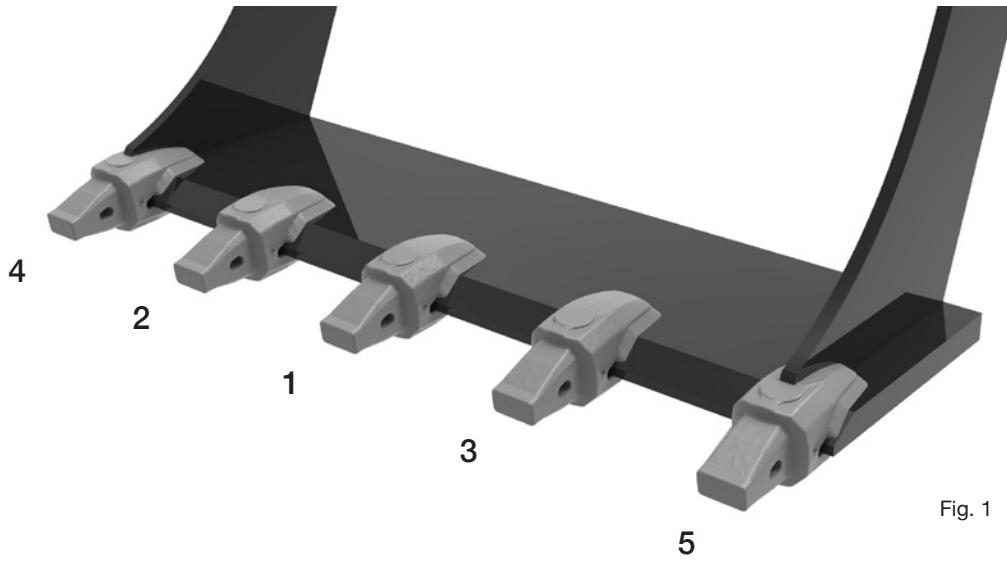


Fig. 1

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. 1.

Weld the adapters starting with the bottom leg first. 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. 2.

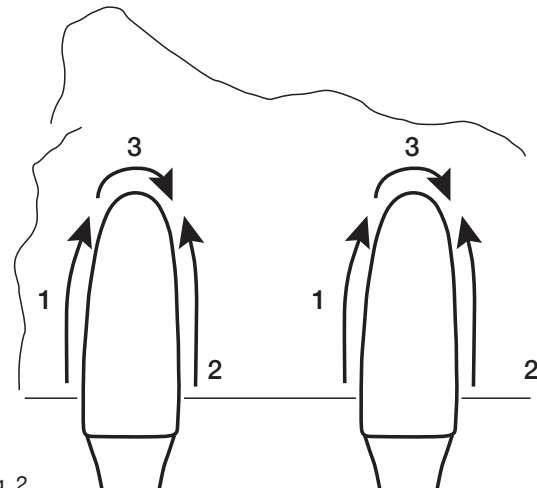


Fig. 2

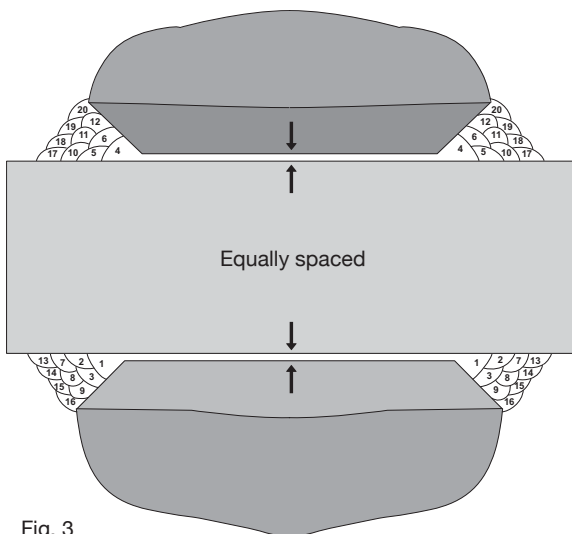


Fig. 3

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. 3 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. 2 page 5.

Position the adapters with equal spacing along the lip and tack weld them into position Fig. 1, Fig. 2 and Fig. 3 page 6.

Weld the preheated adapters with small multiple runs and fill the weld bevel to dimension A Table A (Fig. 1). Avoid starts and stops in the critical zones Fig. 3 and Fig. 4.

Any cracks, slag inclusions and undercutting must be grind away and filled with weld and the critical zones grinded smooth Fig. 2 page 9.

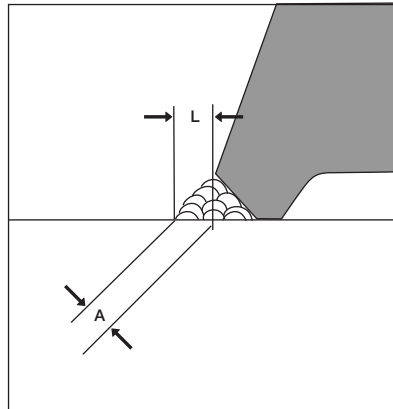


Fig. 1

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

Table A

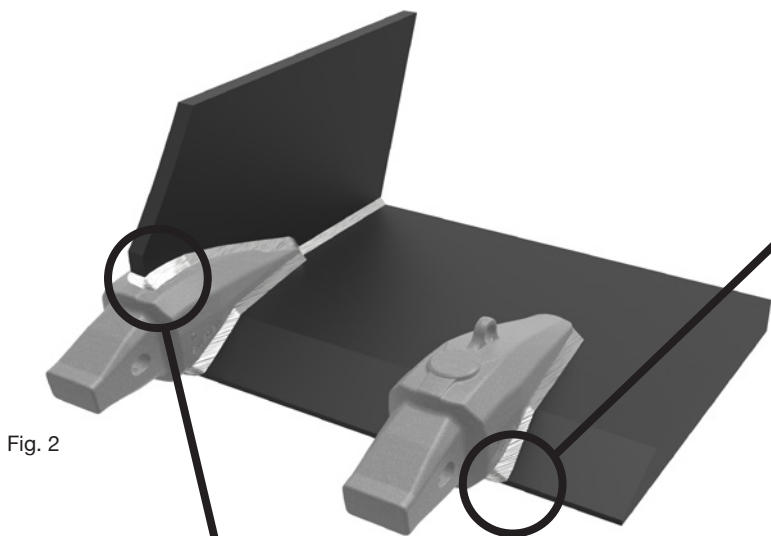


Fig. 2

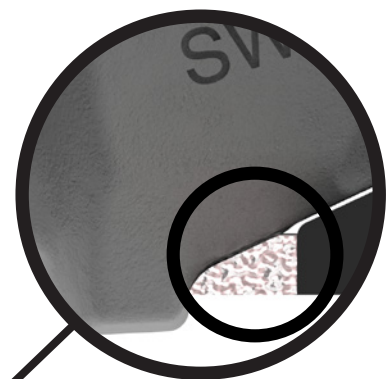


Fig. 4
Weld on the underside

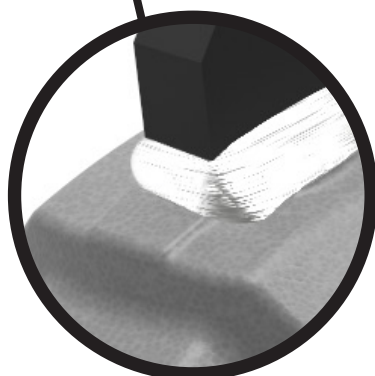


Fig. 3
Critical zone after finish welding

CRITICAL ZONE

3.4. TYPE BE, TL, UA ADAPTER

There are two versions of the adapter:

- Long top leg.
- Long bottom leg.

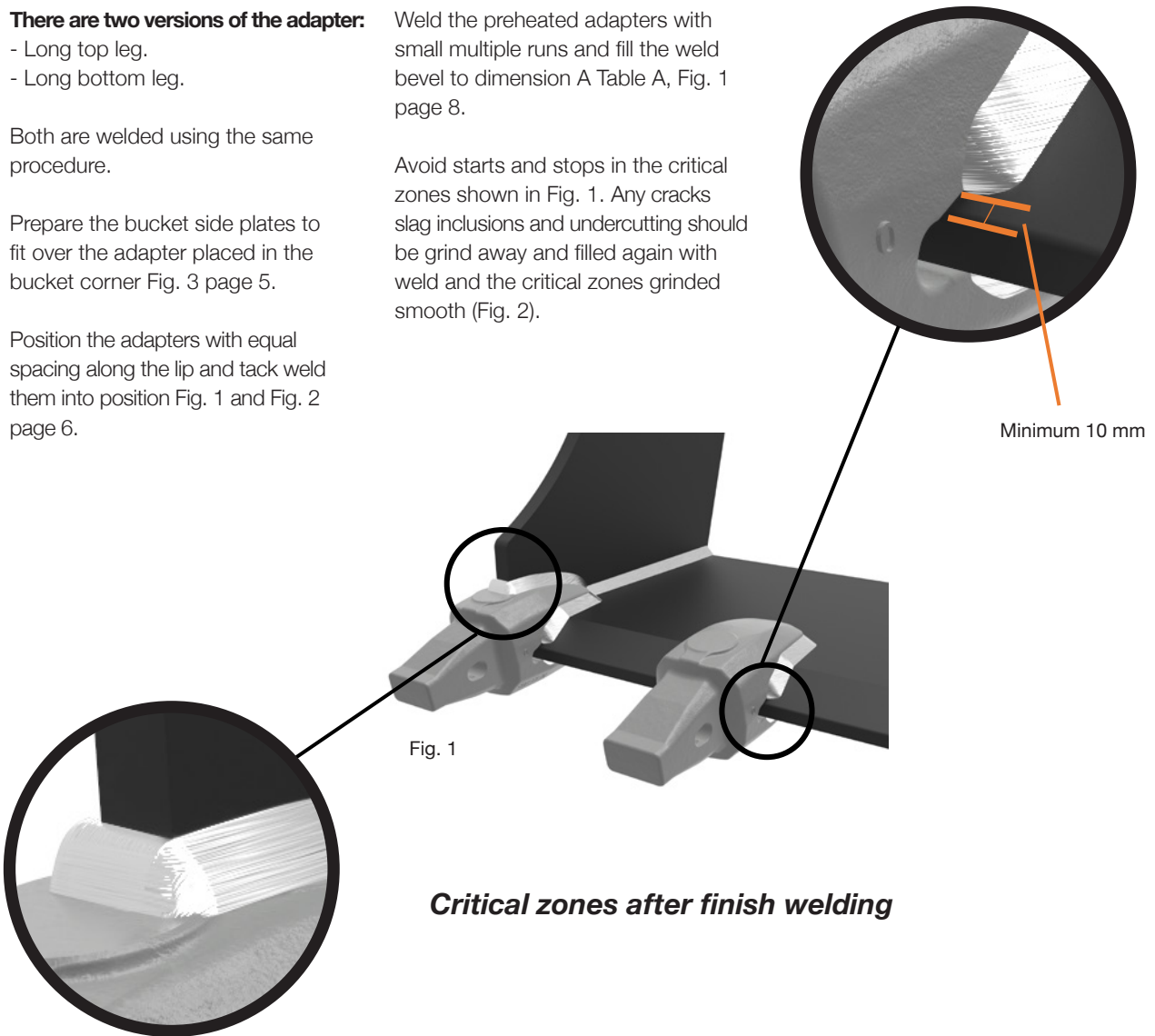
Both are welded using the same procedure.

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

Position the adapters with equal spacing along the lip and tack weld them into position Fig. 1 and Fig. 2 page 6.

Weld the preheated adapters with small multiple runs and fill the weld bevel to dimension A Table A, Fig. 1 page 8.

Avoid starts and stops in the critical zones shown in Fig. 1. Any cracks slag inclusions and undercutting should be grind away and filled again with weld and the critical zones grinded smooth (Fig. 2).



3.5. FINISHING OF WELDS

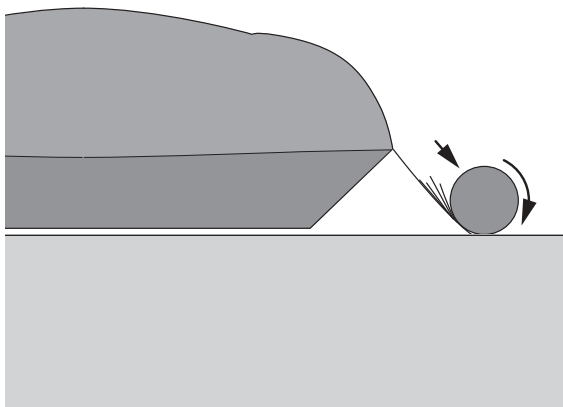


Fig. 2

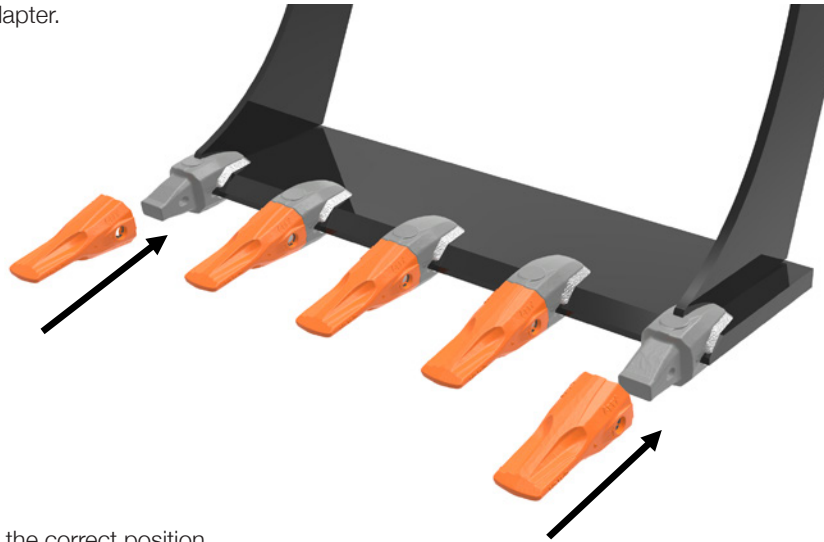
When the assembly is cold, grind the welds as shown in Fig. 2.

MOUNTING & DISMOUNTING OF TOOTH & LOCK

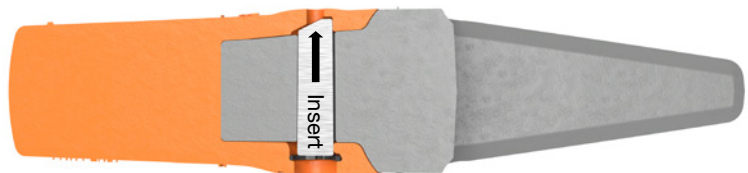
4.1. MOUNTING

INSTRUCTIONS

1. Place the tooth on the adapter.



2. Insert the locking pin into the correct position.



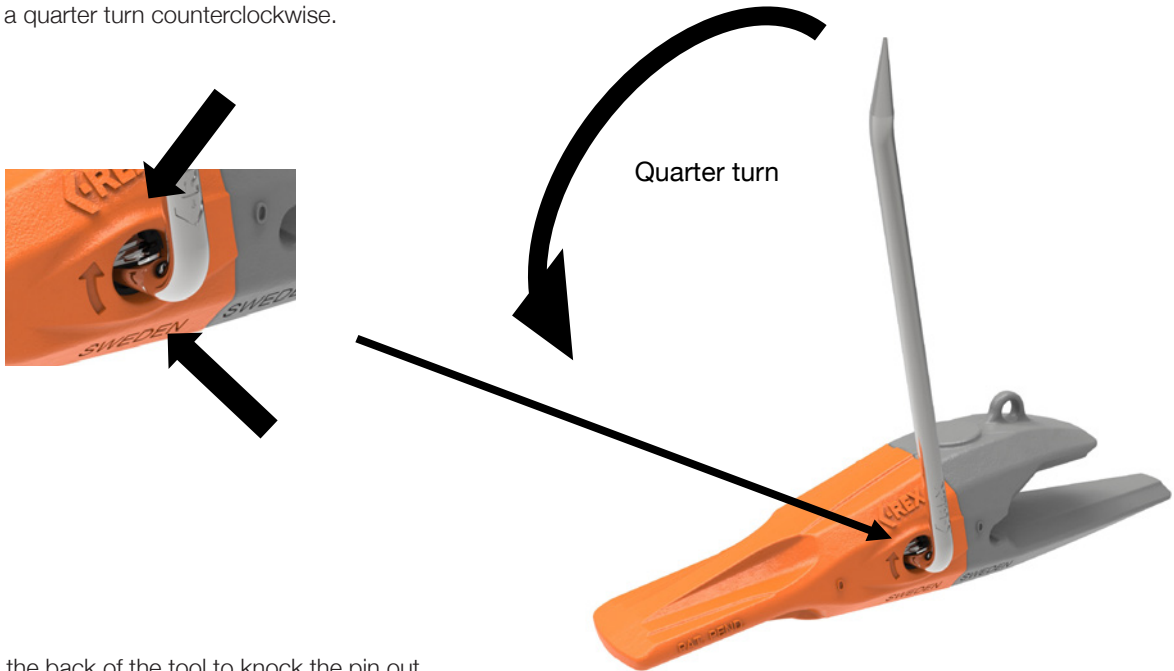
3. Ensure the tool is correctly fitted into the grooves in the locking ring. Close the locking ring by turning it a quarter turn clockwise.



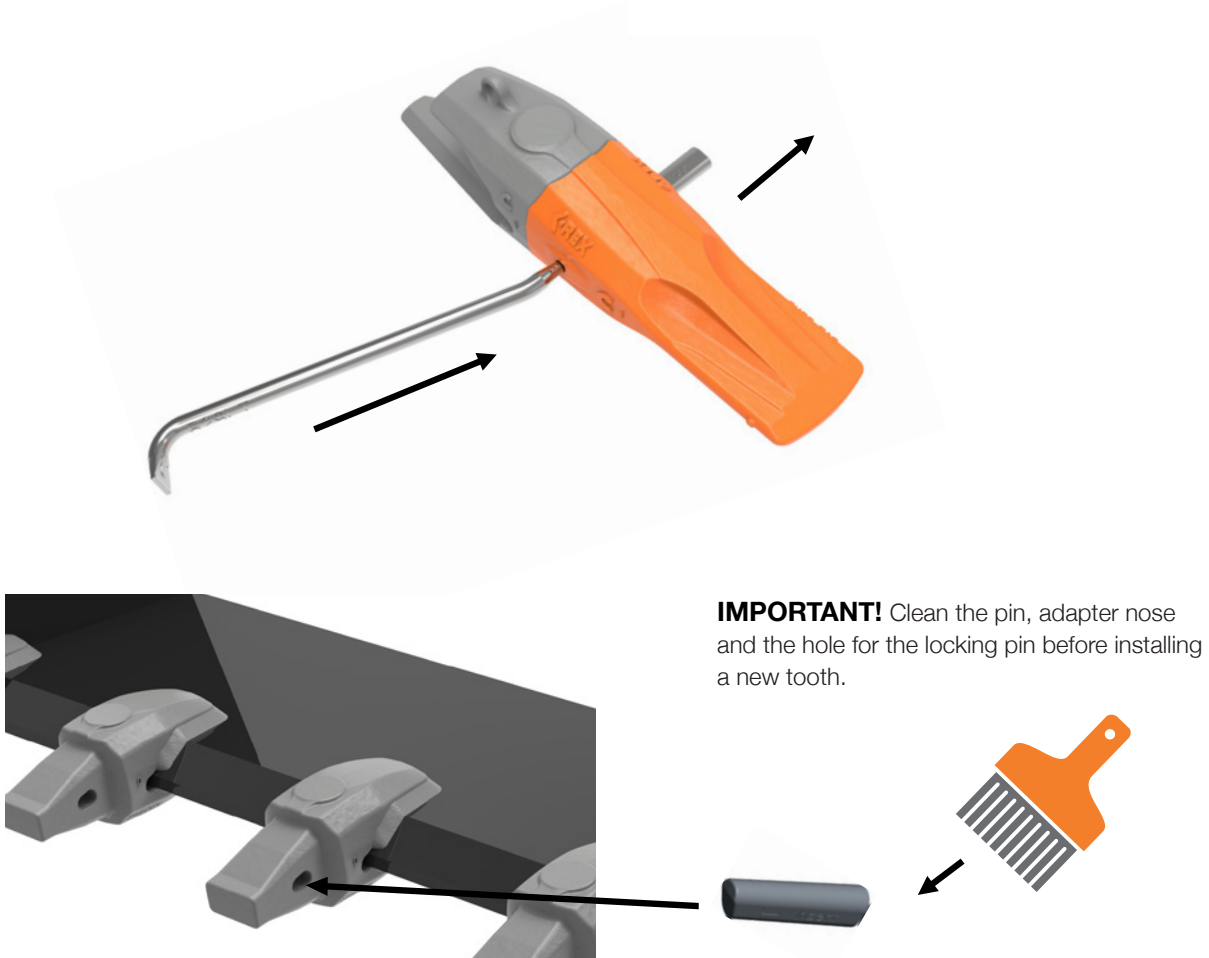
4.2. DISMOUNTING

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.



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



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



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