



## The Next Step in Belting



# Welding & Fabrication Tools FBW-Flat Butt Welding System Model II

Instruction Manual

Table of Contents	Page
How to use this manual .....	3
Symbols used in this manual .....	3
Identification Data .....	3
1. Introduction .....	4
2. Technical Specifications .....	5
2.1. (FBW Flat Butt Welding System Model II) Layout.....	6
2.2. The Storage Case .....	7
2.3. The Electrical System .....	7
2.4. Care and Maintenance .....	7
2.5. Safety Precautions .....	8
2.6. Warning Notice for Welding Tools .....	8
3. Welding Instruction .....	9
3.1. Preparing the Temperature Controller .....	9
3.2. Preparing the Pliers .....	9
3.3. Preparing the Belt .....	10
3.4. Welding the Belt .....	11
3.5. Trimming and Checking the Weld .....	12
4. Welding Texture Top Belts .....	13
4.1. Saw Tooth (IST) & Nub Top ( NT) .....	13
4.2. MiniCleat (MC).....	14
4.3. Spikes (SP) .....	15
4.4. Crescent top (CT).....	17
5. Instructions for Splicing Reinforced Flat Belts.....	18
6. Instructions for Welding Narrow Belts .....	19
7. Instructions for Welding H Material Belts.....	19
8. Welding Positive Drive Belts.....	20
8.1. Instructions for Welding Super Drive™ H/M Material Belts .....	20
8.2. Instructions for Welding SuperDrive™ Belts Using FBW Adapter .....	22
8.3. Positioner for Welder .....	22
8.4. Welding DualDrive™ Belts.....	23
8.5. Welding Mini SuperDrive™ and Mini DualDrive™ Belts .....	25
8.6. Welding Mini SuperDrive™ MiniCleat Belt .....	27
8.7. Welding Volta Hinge Lace System .....	29
8.8. RoundFlex™ Lace Installation Instructions .....	31
9. Baseless Sidewall (SW) Welding with FBW-SW Cutting & Welding Set .....	34
10. General Tips .....	38
11. Troubleshooting Guide .....	38
12. FBW System Model II Shinko Controller and Welder Electrical Diagram .....	39
13. Calibrating the FBW Welder System Model II Shinko Controller .....	40
14. Pitch Gauge Measuring Tool for the Positive Drive Belts.....	43

Thank you for buying the Volta FBW Welding Kit. If you have any questions about the use of this tool please contact our Technical Service Department at email: [sales@voltabelting.com](mailto:sales@voltabelting.com) or visit our website [www.voltabelting.com](http://www.voltabelting.com).

### How to Use this Manual

This manual has been designed to provide the operator with all the necessary information on how to use the above tool correctly. Warnings in the manual should be carefully followed for your personal safety. Be sure you carefully read the instructions in this manual before using the tool. This will ensure use in compliance with safety standards.

### Symbols Used in the Manual



This symbol is used for important Notes & Tips.



This symbol is used to warn you of actions that are dangerous for the operator. Read the associated warnings and instructions carefully.

### Identification Data

The identification plate is on the front of the clamp. You should include the model and serial number in all inquiries to Volta Belting about this tool.



**Important:** the identification plate should never be removed. The data on the plate should not be modified.

## 1. Introduction

The FBW Welding Kit is designed to splice Volta flat conveyor belts of up to 2300mm/ 90" wide.

The FBW Welding Kit is available in a variety of sizes and voltage/power ratings. The model number indicates the maximum width of belt that may be welded on a 90° joint. For example, the Model FBW 301 welds a 300mm (12") wide belt and the model FBW 1301 welds a belt that is 1300mm (51") wide.



FBW Welding Kit

No.	Qty.	Description	FBW Standard Welding Kit Components
1	1	Case for FBW	
2	1	Pliers	
3	1	Welding Accessories (Welder, Control Box - Shinko)	
4	1	SD Cutting Bar	
5	1	Locator Bar	
6	1	V Trim knife	
	1	Temperature Controller Instructions	
	1	FBW Welding Instructions Manual	
	1	Carrying Handle for welding sets bigger than FBW 1061	



FBW Case see picture at the top of the page

Models 301, 721, 1061 and 1301 may be operated by one person. The FBW 1701, 2101 and 2301 require two operators for correct and safe operation because of the length and weight of the Welder. The FBW Welding Kit is supplied in a storage case to store the system components. Store only the FBW Welding components in this box to avoid damage of the items.

No.	Qty.	Description	FBW Positive Drive (PD & Mini) Welding Kit Components
1	1	Case for FBW	
2	1	Pliers	
3	1	Welding Accessories (Welder, Control Box - Shinko)	
4	1	SD Cutting Bar	
5	1	Locator Bar	
6	1	V Trim knife	
7	2	DD Adapter	
8	2	PD1" Adapter Set	
9	2	Stopper for the DD	
	1	Temperature Controller Instructions	
	1	FBW Welding Instructions Manual	
10	2	Positioner for welder*	
		Carrying Handle for welding sets bigger than FBW 1061	

Note: Positioner for welder\* available in the FBW-1301 and FBW-1701 PD & Mini welding kits only.



FBW Case see picture at the top of the page

## 2. Technical Specifications

Table 1: FBW Welder System Specifications

	FBW 301	FBW 721	FBW 1061	FBW 1301	FBW 1701	FBW 2101	FBW 2301
<b>Electricity</b>	120 / 230 VAC Single phase 450 W	120 / 230 VAC Single phase 860 W	120 / 230 VAC Single phase 1200 W	230 VAC Single phase 1440 W	230 VAC Single phase 2100 W	230 VAC Single phase 2420 W	230VAC Single phase 2650W
<b>Maximum Current</b>	<b>120 VAC</b>	5 amps	10 amps	14 amps	N/A	N/A	N/A
	<b>230 VAC</b>	2.3 amps	4.6 amps	6.3 amps	7.5 amps	10.5 amps	12.1 amps
<b>Fuse</b>	<b>Type</b>	slow-blow	slow-blow	slow-blow	slow-blow	slow-blow	Slow blow
	<b>120 VAC</b>	10 amps	10 amps	15 amps	15 amps	N/A	N/A
	<b>230 VAC</b>	10 amps	10 amps	10 amps	10 amps	10 amps	15 amps
<b>AC plug</b>	<b>120 VAC</b>	yes	yes	yes	yes	N/A	N/A
	<b>230 VAC</b>	yes	yes	yes	yes	yes	yes
<b>Pliers Weight lb/ kg</b>	13 / 6	35 / 16	48 / 22	82 / 37	106 / 48*	121 / 55*	130/60*
<b>Total Weight lb/ kg</b>	22 / 10	70 / 32*	92 / 42*	181 / 82**	225 / 102**	255 / 116**	275/125**
<b>Max. Belt Width at 90° in/ mm</b>	12 / 300	28 / 720	41.7 / 1060	51 / 1300	66.9 / 1700	82.5 / 2100	90.5/2300
<b>Max. Belt Width at 45° in/ mm</b>	6 / 150	15.7 / 400	24.4 / 620	33 / 845	45.7 / 1160	56 / 1420	59/1500
<b>Belt Thickness</b>	<b>inch</b>	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2	0.06-0.2
	<b>mm</b>	1.5-5	1.5-5	1.5-5	1.5-5	1.5-5	1.5-5
<b>Preheating in minutes</b>	15	15	15	15	15	15	15
<b>Working Temperature</b>		428 - 518°F	428 - 518°F	428 - 518°F	428 - 518°F	428 - 518°F	428 - 518°F
		220 - 250°C	220 - 250°C	220 - 250°C	220 - 250°C	220 - 250°C	220 - 250°C



\* This equipment is heavy and must be carried by two persons.



\*\* This equipment is heavy and must be carried by a forklift.



In the USA, units are supplied with a 120 VAC North American Standard plug. In Europe, units are supplied with a 230V German standard plug. Users must adapt the plug to the local electrical standards. This must be done by a certified electrician and in compliance with local electrical codes and standards.

## 2.1. FBW Layout

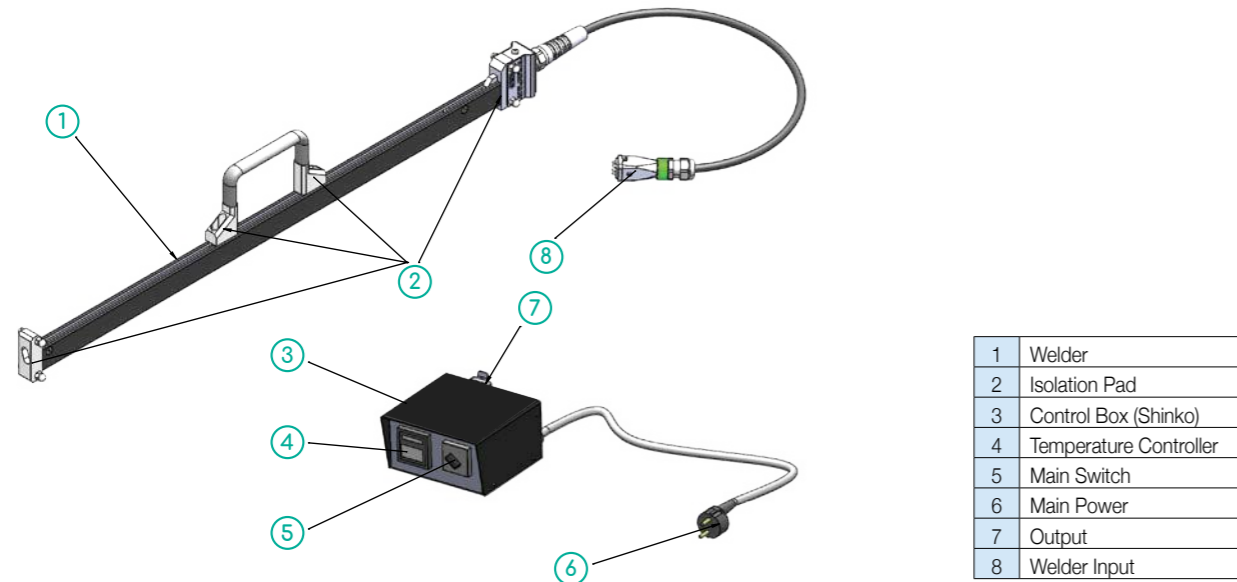


Figure 3: FBW Welder and Temperature Controller - Shinko

## 2.2. The Storage Case

The storage case is meant to protect the tools against dirt and damage during transportation. The case is designed to store the entire FBW system. Tools and other items that do not belong to the FBW Welding System should not be placed in the storage case. Loose, unsecured items may move around and damage the Teflon coating of the Welder. Do not store chemicals in the FBW storage case - chemical fumes and possible spills may damage the wiring and internal components of the Controller.

## 2.3. The Electrical System

All metal parts of the FBW Welding System are grounded. Ensure that the electrical plug is connected to a power source with an earth ground and a Residual-current device (RCD). The thermo-couple wires must not be disconnected as this will cause uncontrolled heating and damage the Welder.



Electrical Shock Hazard - Never remove the ground from the power cord or internal wiring.

## 2.4. Care and Maintenance

Keep the system dry and clean.

Occasionally apply a light coating of oil to sliding metal parts.

The quality of the finished weld is affected by the condition of the Welder. To obtain the highest quality results from your Welder, always wipe the Welder's flat surfaces with a clean cotton cloth to remove material and dirt immediately after welding.

When welding is completed, return the tools to their storage box. There is no need to wait for the Welder to fully cool down. The partitions inside the box will ensure that the system does not move during transportation and guarantee the tool's long lasting functioning.



The Welder must be cleaned while hot. Because the temperature of the welder is high, extra care must be taken to avoid burns. It is recommended that you wear protective gloves.

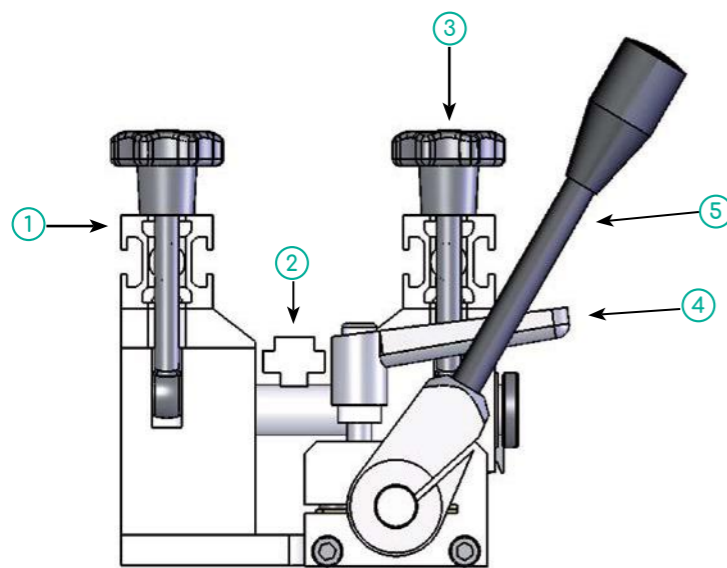


Figure 4: FBW Pliers



## 2.5. Safety Precautions

Volta Belting accepts no liability for use of this tool in a manner other than that specified in this manual. Volta Belting accepts no responsibility for unauthorized modifications performed on this tool. This Instruction Manual and the warnings contained herein must be read carefully and kept clearly visible in the vicinity of the FBW Welding Tool. Failure to pay attention to these warnings can lead to accidents, injuries or damage to health.



## 2.6. Warning Notice for Welding Tools

1. Always use the original storage box to keep the welding tool when not in use. Always store tools in a dry and secure environment.
2. Select and use the most appropriate welding tool for your application. The selection is based on material dimensions.
3. Use the welding tool only at its rated voltage (See Table 1 - FBW Welder System Specifications).
4. Ensure that the unit is connected to an earth grounded power source. Failure to comply with this requirement can cause electrical shock.
5. Do not use the welding tool in a damp or wet environment.
6. Do not carry the welder by its power cord or use it for unsuitable purposes.
7. Protect the cord from heat and sharp objects.
8. Do not pull on the power cord to remove the plug from its socket.
9. Always work in a well ventilated area when welding. Some materials can generate toxic fumes when overheated.
10. Always weld on a non-combustible surface and be aware of surrounding materials. Heat may cause fire or damage other materials.
11. Ensure that the surface of the welding bar is clean and in good condition.
12. Hold the Welder from the handles only. The Welder surface and the Isolation pads can be very hot and will cause burns.
13. If the unit requires repair, return it to Volta Belting or to your local Volta distributor.
14. If the unit requires repair, this must be done by a certified electrician and in compliance with local electrical codes and standards.
15. Use a protecting glove (metal net glove preferred) when engaging in various activities that involve the use of sharp objects. Handle the knife with care. Cut away from your body, not toward it.

## 3. Welding Instructions



Before starting to weld check that:

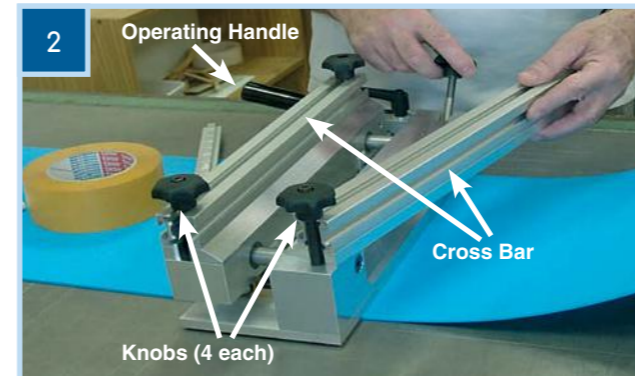
- the electric core is not damaged
- the control box is not damaged
- the welder is not damaged.



### 3.1. Preparing the Temperature Controller

- a. Connect the Welder to the Controller, and then connect the main power to the power supply. Turn the Power Switch to "ON" and allow 15 minutes for the Welder to warm up and the temperature to stabilize. The Welder is supplied after factory adjustment and should not be altered unless there is a problem. The Temperature Controller should be adjusted to 220°C (428°F) for all belt types. If you need to readjust the temperature, please refer to Calibrating the FBW/PDW Welder Control Box & Welder Bar.

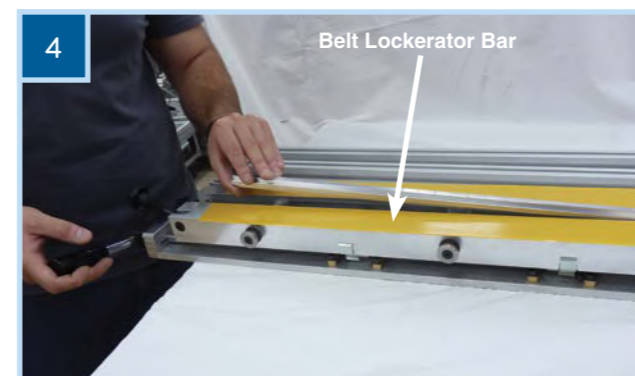
### 3.2. Preparing the Pliers



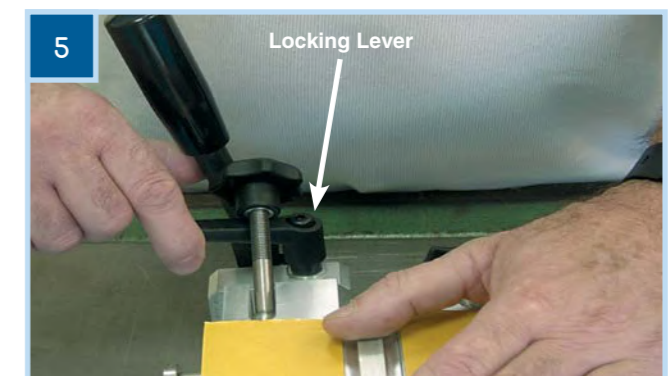
- a. Position the Pliers with the Operating Handle closest to you.
- b. Loosen the 4 knobs securing the Crossbars. The two knobs closest to the Operating Handle are hinged and can be swung out and down to remove the Crossbars.



- c. Remove the Crossbars and set them aside. FBW models 1301, 1701 & 2101 are equipped with magnetic crossbars. To remove these crossbars, slide or roll them off the Pliers.
- d. Apply strips of good quality double-sided tape on the upper surfaces of the Pliers' jaws. hinged and can be swung out and down to remove the Crossbars.



- e. Position the Locator Bar between the jaws of the Pliers. Place the Locator Bar in the center of the Pliers and over the Pliers Shafts. The belt locator has reference marks for belt alignment, Each side of the Belt Locator Bar has notes for different belt thicknesses. One side is marked for 1.5 to 2.5 mm belts and the opposite side for 3 to 5 mm belts.



- f. Ensure that you have the correct side facing up. Move the Operating Handle to close the Pliers jaws and lock in place using the Locking Lever. (By pulling the lever up you can adjust the handle position).



Pay attention to your fingers when closing the pliers - especially while working with the wide pliers where 2 operators are needed.

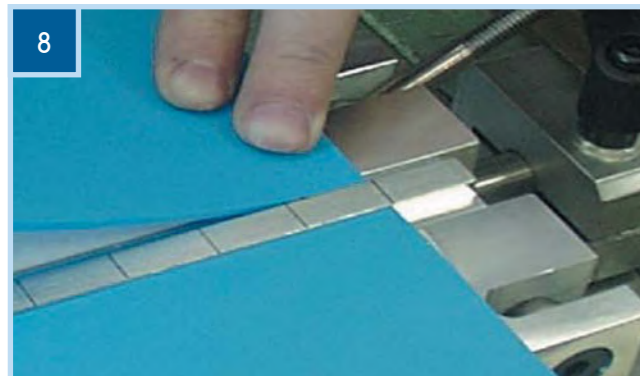
### 3.3. Preparing the Belt



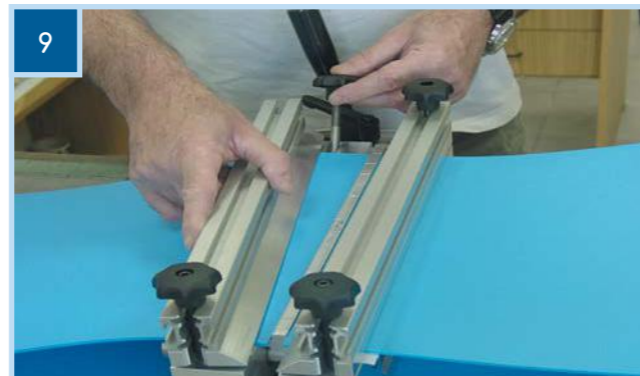
- a. Cut the two ends of the belt at 90°. Ensure that the cut is accurate and straight.
- b. Clean the belt ends with denatured alcohol. The belt ends must be free of dirt and grease in order to ensure a consistent, high quality weld.



- c. Remove the protective paper from one piece of the doublesided tape and place one end of the belt against the Locator Bar in line with a reference mark. Press the belt onto the tape to ensure good adhesion. There should be no gaps between the belt edge and the Locator Bar. Gaps will produce an inconsistent weld and lead to early failure of the weld.



- d. Repeat this procedure for the opposite belt end. Make sure you align the edge of the belt with the reference mark on the Locator Bar, to ensure a straight edge between the two ends of the belt.



- e. Set the Crossbars in place and swing the Locking Bolt into position. Finger tighten the nuts. Be careful to apply even pressure on Crossbars. Uneven pressure will allow the belt to shift during welding and too much pressure will cause the Crossbars to bend.

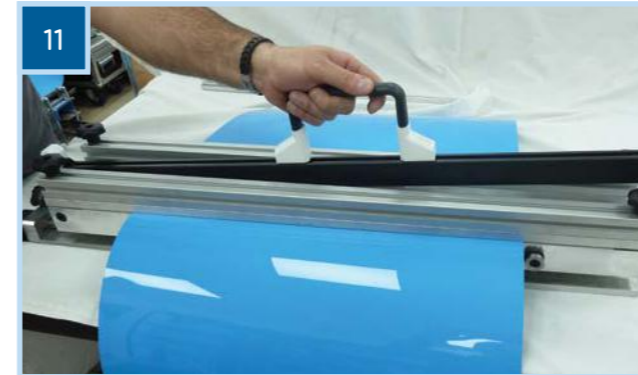


**Note:** If the belt is narrow in comparison to the tool, add belt pieces to each side of the belt to fill the gap. This will prevent bending of the crossbar.



- f. Open the Pliers and remove the Locator Bar. Leave the Pliers open. The system is now ready for welding.

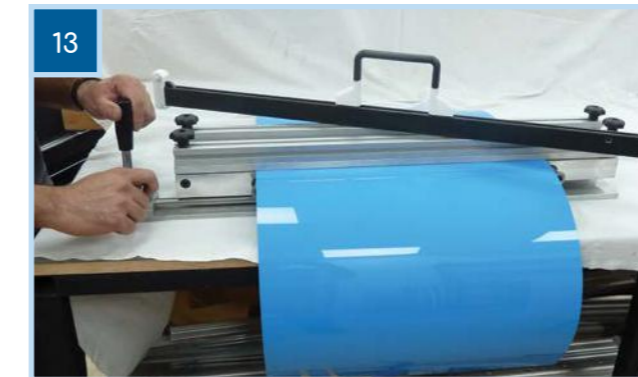
### 3.4. Welding the Belt



- a. Clean the belt and Welder. With the Welder cable away from the operator, place the pre-heated Welder between the two edges of the belt. Position the Welder over the Pliers guide bars.



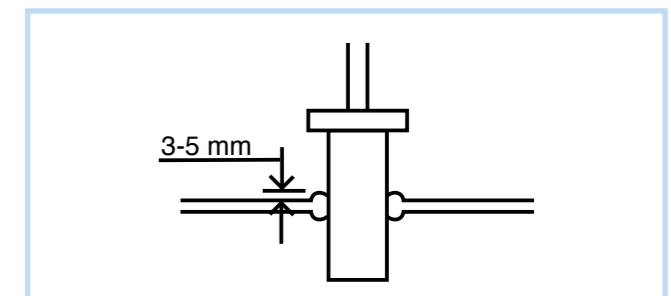
- c. Using the Operating Handle bring the two belt ends into contact with the Welder. Apply very gentle pressure and observe the melting of the material along both sides of the Welder. Do not hold the Welder during the welding process. The Welder should be free to move with the belt. When the material is evenly melted along the length of both sides of the Welder, move the Operating Handle to open the Pliers. Quickly remove the Welder and close the Pliers. This operation should be performed quickly but without too much force.



- d. With the belt ends pressed together, lock the Adjusting Lever. The weld requires approximately 5 minutes to cool. The time required for cooling depends on the thickness of the belt and the ambient temperature. When removing the Welder, pull it straight up in a quick movement. This will prevent the welder from pulling melted material off of the belt ends.



- e. The cooling process can be sped up by directing compressed air along the weld. .



Amount of excess when belt ends are properly melted.



e. Clean the Welder using a clean, dry, lint-free soft Cotton cloth while the Welder is hot. Leaving material on the Welder will damage the Welders surface and reduce the efficiency of the Welder and the quality of the welds.



f. When the belt is cooled, leave the Pliers closed and remove the two Crossbars.



g. Welded belt with excess.



**The following factors must be kept in mind when welding:**

- The amount of pressure required to secure the ends of the belt depends on the thickness and type of material being welded.
- During welding, air bubbles are formed in the melted ends. The bubbles should be pressed out during the operation.
- If too much pressure is applied during welding, the heat will penetrate only a very narrow section along the edge of the belt. When the Pliers are closed this small amount of melted material will be pushed out. To ensure a quality weld, the heat must penetrate a wide section of the belt.

### 3.5. Trimming and Checking the Weld

Using a Leister Knife or other appropriate tool, trim the excess from the top of the belt.



b. Separate the belt from the Pliers and turn it over placing the trimmed surface on the Pliers. Trim the excess from the bottom of the belt.



c. Check the splice quality by bending the belt in both directions. Check the quality of the splice across the width of the belt and on both sides. A good weld will be free of cracks and defects. In case of a bad splice repeat the above steps (this will cause the loss of about 5 mm of the belt's length).



Use a protecting glove (metal net glove preferred) when engaging in various activities that involve the use of sharp objects. Handle the knife with care. Cut away from your body, not toward it.

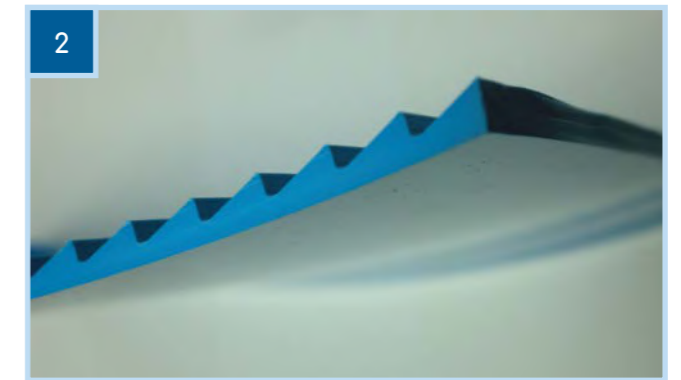
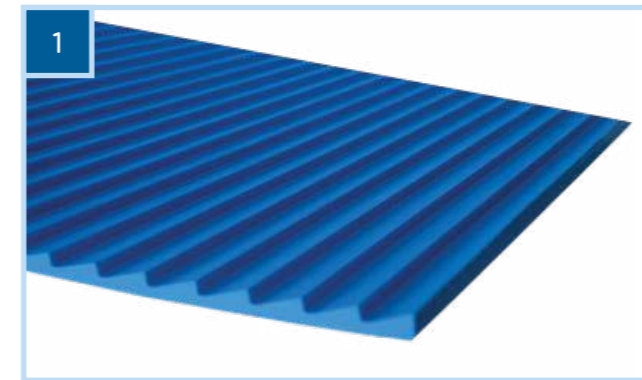
## 4. Welding Texture Top Belts

### 4.1 Saw Tooth (IST) & Nub Top (NT) Required Tools:

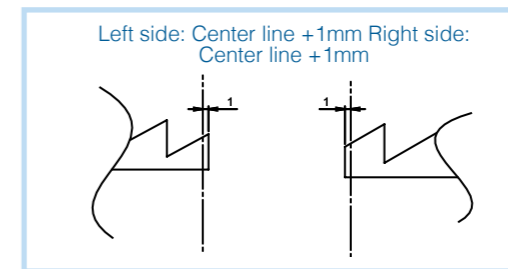
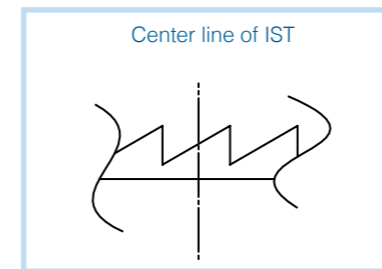
FBW Welding Kit	
V Trim Knife Cat. #8153108	Cat. #8153108
Utility Knife	
Heat Resistant gloves *	
Metal gloves *	

For welding these textured top belts IST-Saw Tooth and NT-Nub Top use the same adapter as for the flat belts. No special adapter required. If you haven't welded this product before, weld a section of a trial belt before welding your Volta conveyor belt. Follow the instructions from Page 9 to prepare the Temperature Controller and the Pliers.

#### 1. Welding IST-Impression Saw Tooth Belt

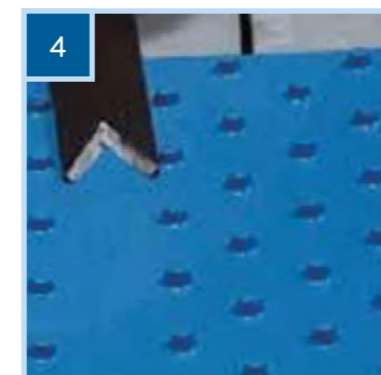
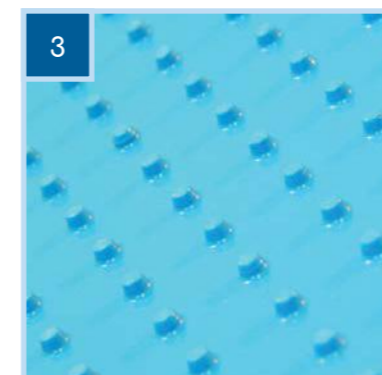


Cut the two ends of the belt at 90° following the instructions from the sketch below:



- Position both sides of the belt on the Pliers with the belts' pattern facing up.
- Weld the belt according to the FBW Instructions Manual Page 10-12.

#### 2. Welding IST-Impression Saw Tooth Belt



Trim out 1 row of Nub Top Texture on all the width of the belt from both sides:

- Cut the belt on the middle of the trimmed Nub Top area at 90°.
- Position both sides of the belt on the Pliers with the belts' pattern facing up.
- Weld the belt according to the FBW Instructions Manual Page 10-12.

## 4.2. Welding MiniCleat (MC) Required Tools:

FBW Welding Kit	
MC Adapter Set for FBW - 301	Cat. #813072510
MC Adapter Set for FBW - 721	Cat. #81307241
MC Adapter Set for FBW - 1061	Cat. #81310601
MC Adapter Set for FBW - 1301*	Cat. #81313008

Positioner for welder**	Cat. #81626342
V Trim Knife	Cat. #8153108
Utility Knife	
Heat Resistant gloves***	
Metal gloves ***	

\* Non-standard  
 \*\* Positioner for welder FBW - 1301 and FBW - 1701 only.  
 \*\*\* Not supplied by Volta  
 Positioner for welder FBW - 1301 and FBW - 1701 only.  
 Instructions on Page 22

## 4.3. Welding Volta Spikes (SP) Required Tools:

FBW Welding Kit	
Spikes Adapter Set for FBW - 301	Cat. #813072535
Spikes Adapter Set for FBW - 721	Cat. #81307248
Spikes Adapter Set for FBW - 1061	Cat. #81310608
Spikes Adapter Set for FBW - 1301*	Cat. #81313011

Positioner for welder**	Cat. #81626342
V Trim Knife	Cat. #8153108
Utility Knife	
Heat Resistant gloves***	
Metal gloves ***	

\* Non-standard  
 \*\* Positioner for welder FBW - 1301 and FBW - 1701 only.  
 \*\*\* Not supplied by Volta  
 Positioner for welder FBW - 1301 and FBW - 1701 only.  
 Instructions on Page 22



You must be familiar with the instructions for welding with FBW before continuing with this procedure.



You must be familiar with the instructions for welding with FBW before continuing with this procedure.



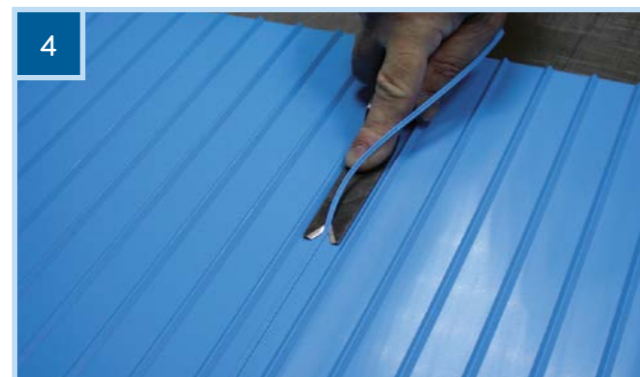
To ensure correct position on the pliers and right pitch of the pattern, place the adapter on the belt and cut the two ends of the belt along the "Cutting" side of the Adapter.



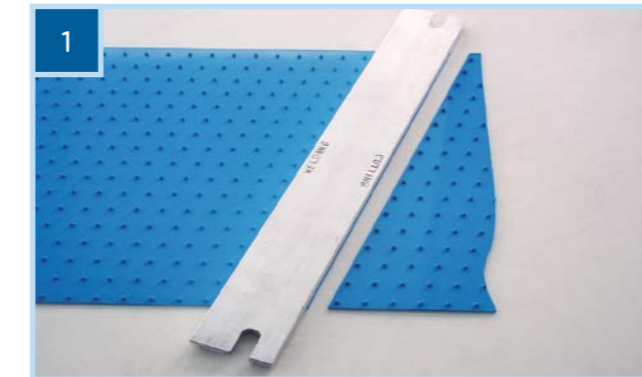
Position both sides of the belt on the Pliers with the belts' pattern facing up. Position the Adapters onto the Belt. Align the belt pattern to the Adapter grooves.



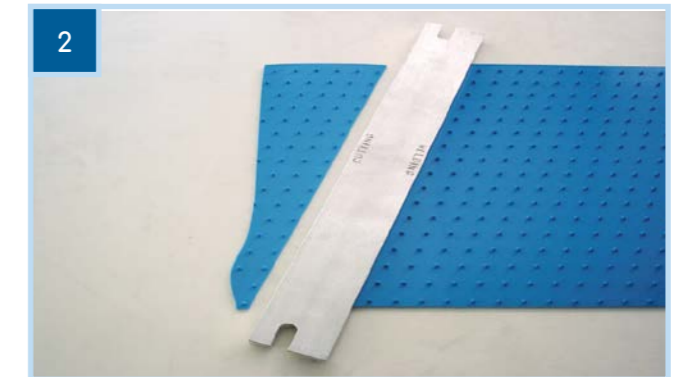
Position and then tighten the FBW Crossbars. Weld the belt according to the FBW Instructions Manual.



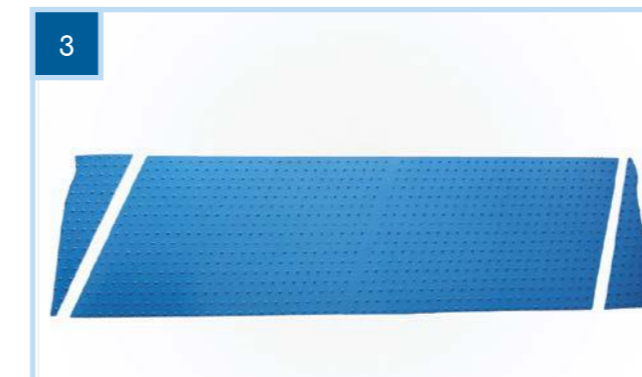
Trim and check the weld. A good weld will be free of cracks and defects.



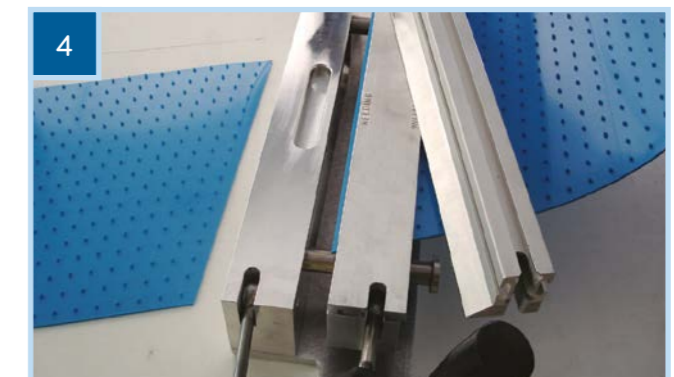
Insert the Cutting Bar at an angle between the Patterns when the "Cutting" engraving (on the bar) and the belt scrap is on the right-hand side. Push the cutting bar toward the "Cutting" side and cut the first side with a sharp knife. Measure the belt length and mark other end.



Rotate the cutting bar 180 degree, and insert the Cutting Bar as close to the required size. Make sure that the scrap and the "Cutting" engraving (on the bar) are on your right-hand side. Add or deduct from the length of the belt according to the position of the pattern.

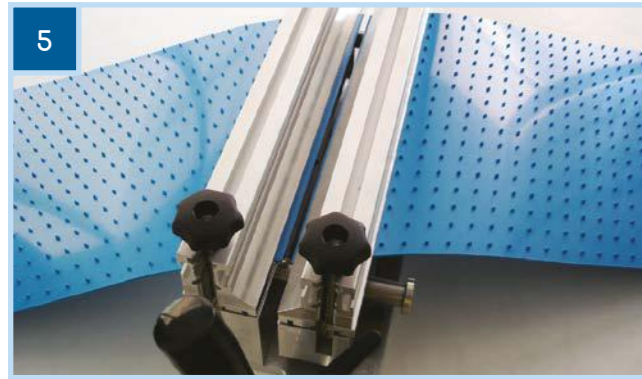


The weld is performed at an angle alongside the pattern. There will be about 15 mm difference on the final length of the belt according to the cutting line between the patterns.



Position the adapter on top of the belt with the «Welding» side facing outward, position the belt and the adapter on the FBW.

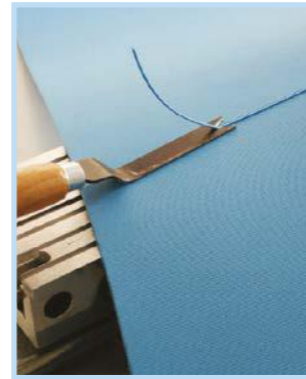




Insert the cross bar on the first side and repeat the same stages on the other side. As the cut is in an angle, position the belts ends according to reinforced belt joining instructions (Page 13). Weld the belt according to the instructions as described in the FBW Users Manual.



After the belt is cooled down, trim the weld with the 'V' shape knife. Use liquid soap to improve the cut if required. Turn the belt and position it on top of the cutting bar in a way that the spikes are inserted to the grooves, this will allow you an easy trim of the underside. Check the weld and perform "cosmetic" finish if necessary. A good weld will be free of cracks and defects.



### 4.4. Welding Crescent top (CT)

The weld is performed at an angle alongside the crescent pattern. There will be a 20 mm difference on the final length of the belt according to the cutting line between the patterns.

#### Required Tools:

FBW Welding Kit	
CT Cutting Bar for all FBW welding tool sizes	Cat. #81626365
Wood Chisel 6 mm (1/4")	
Heat Resistant gloves*	
Metal gloves *	

\* Non-standard



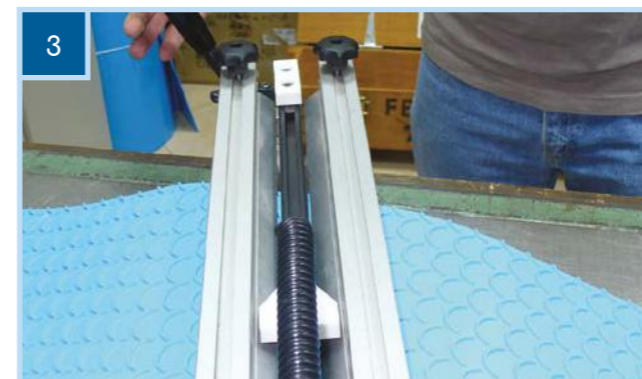
You must be familiar with the instructions for welding with FBW before continuing with this procedure.



Place the belt with the pattern facing to the left as shown in the picture. Insert the Cutting Bar at an angle between the patterns when the "Cutting" engraving (on the bar) and the belt scrap is on the right-hand side. Cut the belt with a sharp knife. If the belt is wider than the adapter, cut the belt in two steps.



Go to the other side of the belt and insert the Cutting Bar as close to the required size. Make sure that the scrap and the "Cutting" engraving (on the bar) are on your right-hand side. To carry out this step, please stand on the opposite side of the belt. Add or deduct from the length of the belt according to the position of the pattern.



Weld the belt according to the instructions as described in the FBW Instruction Manual (Page 13). When welding belts made of L material, be careful and use less pressure during the melting process and tightening after melting.



After cooling the belt, trim the weld with a wood chisel when the flat side is facing the belt. Use liquid soap to improve the cut if required. Turn the belt and trim the bottom weld as usual. Check the weld and perform "cosmetic" finish if necessary. A good weld will be free of cracks and defects.

## 5. Instructions for Splicing Reinforced Flat Belts



Reinforced belts must be spliced in an angle (15° - 45°).



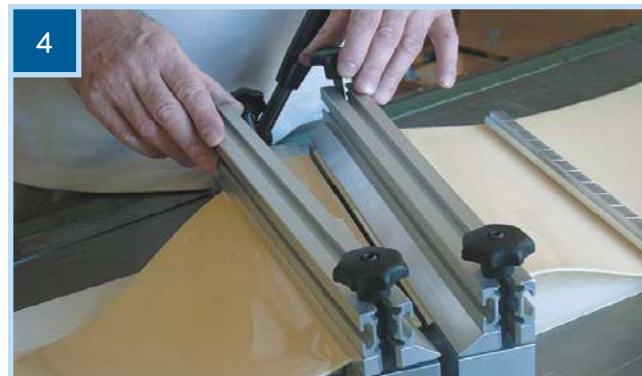
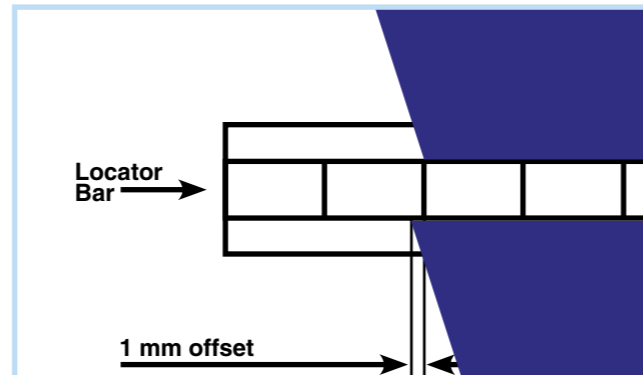
- a. Prepare the Control Box and Pliers.
- b. Cut both ends of the belt to the desired angle.



- d. Align the sharp upper edge of the belt with a reference mark on the Belt Locator Bar and press the belt onto the double-sided tape.



- c. Position the second belt end on the opposite Pliers base. Ensure that there is an offset of 1 mm. This offset will compensate for the material melted during welding and ensure a smooth Straight edge.



- f. Mount the Crossbars on the Pliers. Perform weld as per welding instructions.



- g. After trimming the weld, check that the belt edge is aligned. A small disalignment may be trimmed.

## 6. Instructions for Welding Narrow Belts

The FBW models 301, 721 and 1061 can be used to weld narrow belts from 150 mm, by using double-sided tape and without assembling the Crossbars. Observe the following rules:

- a. Use good quality tape and make sure it is thoroughly adhered to the Pliers.
- b. When welding reinforced belts, work upside down with the fabric facing upwards.
- c. If the belt still moves while welding, raise the welding temperature by 15°C to 20°C to allow an easier melting of the material and reduce the pressure required. When you finish, return the Temperature Controller to 220° C.

## 6. Instructions for Welding H Material Belts

The procedures for welding M and H family materials are basically the same.

However when welding H family belts it is necessary to be extra careful.

The following are specific areas to watch out for:

- a. When welding H material belts, and especially belts 4 mm thick or more, in ambient conditions of low temperature and high humidity, it is necessary to warm the belt ends before welding.
- b. With the belt ends secured in the Pliers, use a Leister Hot Air Gun to direct hot air over the belts' ends for approximately 2 minutes.
- c. Without delay continue with the standard welding procedures described above.
- d. If you do not have a Leister Hot Air Gun, you can place the Welder in the Pliers over the Pliers supports. Close the Pliers without bringing the belt ends into contact with the Welder at least for a minute. The heat from the Welder will warm the belt ends before you begin to weld.
- e. When you bring the belt ends in contact with the Welder, press gently until the two ends have an even melt along the entire length of both sides of the Welder. At this point stop pressing and maintain this position for approximately 20 seconds. This allows the heat from the Welder to penetrate farther into the "H" material providing a sufficiently large softened area to ensure a good weld. Open the Pliers quickly and with a "snap", which will prevent material from sticking to the Welder. Release pressure, remove the Welder continue with the standard welding procedures described above.
- f. Using the Operating Handle, quickly close the pliers, because the H material cools down quickly. When working with H material belts, especially those that are 4 mm or thicker, apply extra pressure when closing the belt. This is needed to force any air bubbles out of the joint. However, remember that applying too much pressure will reduce the quality of the weld by forcing all of the melted material out of the area of the joint and leaving only cold material.
- g. The splice must be left to cool for at least 10 minutes after welding. Checking the splice by bending it too soon will weaken or break the splice.
- h. Because of the care needed to ensure a quality weld, it is important to perform several trial welds before welding a belt. This will allow you to get the feel for the pressure required while welding and closing the Pliers after welding. If you still have problems, please contact Volta for additional technical advice.

## 8. Welding Positive Drive Belts

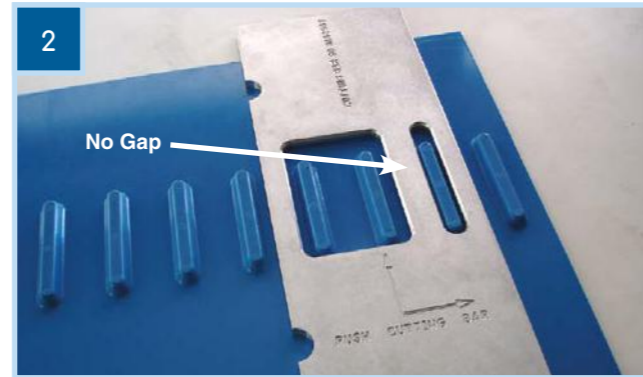
### 8.1. Instructions for Welding SuperDrive™ H/M Material Belts Using FBW-301, FBW-721, FBW-1061 or FBW-1301.



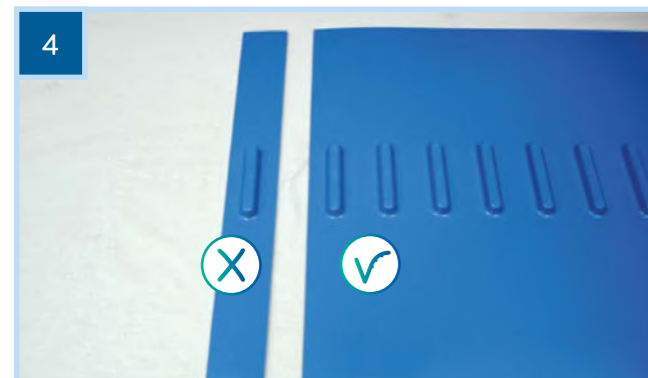
It is Essential to carry out several welding trials to become familiar with welding the Positive Drive conveyor belts.



1. The cutting bar is marked with positioning arrows as per photo 1.



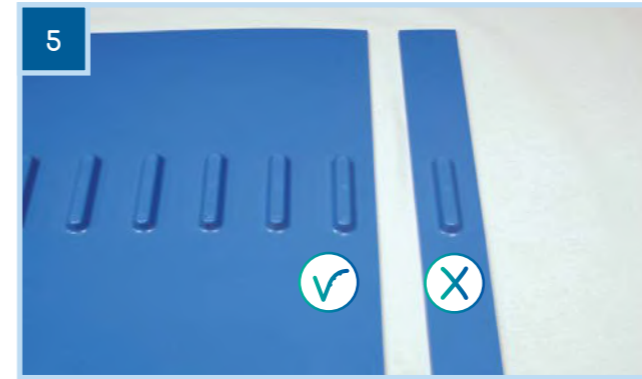
a. Use the Cutting Bar to cut the belt between the teeth, to ensure a 90° cut and the correct pitch. Push the cutting bar away from you and then against the right side until the single tooth stencil fits exactly in line with the tooth, giving you a perfect 90° position for marking your line. Draw a line and then check that the line is parallel to the teeth. Photo's 2 & 3. When cutting the belt this line will help us to make sure that the cut is square.



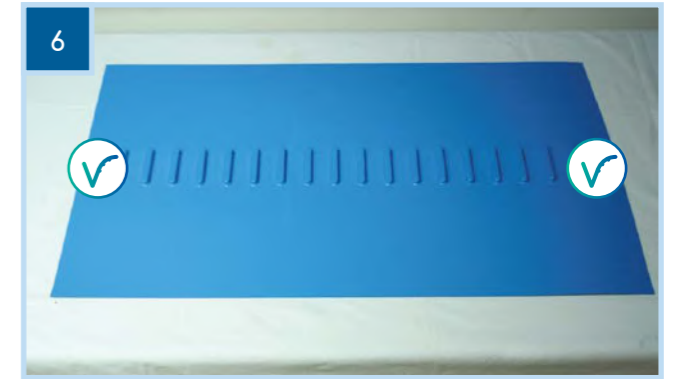
b. Reposition the cutting bar make a clean cut using a sharp knife. When cutting the SD, we will have 2 ends one usable and one unusable (Photo 4, 5, 6) this is due to the fact that we did not cut in the middle of the pitch.



**Tip.** Use double sided tape on the bottom side of the cutting bar to prevent slippage while cutting.



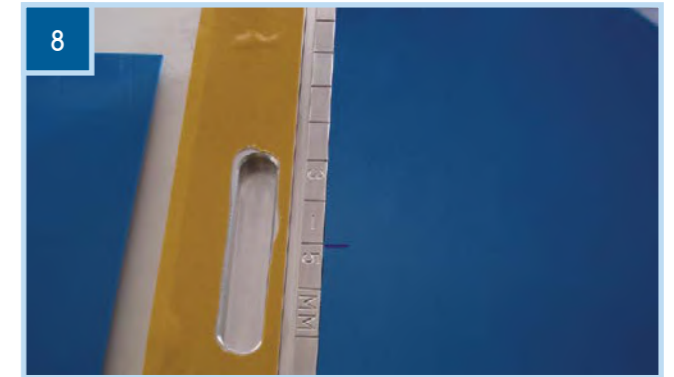
c. Now you must turn the cutting bar 180° and cut the second end of the belt so the scrap/unusable piece will not be part of the belt. **Both edges of the belt must be cut so that both the final ends are usable (1/2 pitch+2 to 3mm).**



d. The end result is that both ends of the belt will have a combined pitch of SuperDrive™ tooth pitch + 3-4mm. When welding the belt, those 3-4mm will melt and the final pitch should be the exact pitch needed. **Pitch tolerance should be +0.0 mm, -2.0 mm.**

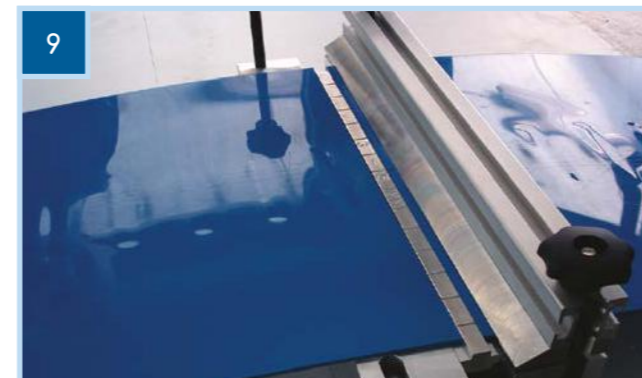


2. Place double-sided tape on both sections of the Pliers. Cut the tape away from the teeth grooves in the base.



3. Position the locator bar as per normal operation of 3mm - 5mm belt, and then slide it until one of the positioning lines is in the center of the groove. (Photo 8).

4. Remove the protective paper from the double-sided tape on one side and position the belt. The difference in working with the SuperDrive™ belt is that you must position the teeth over the groove before bringing the rest of the belt into contact with the tape. To make this easier mark the center of the tooth on the top side of the belt and aline it against the central positioning line. Press the belt against the locator bar and onto the tape to ensure a firm, constant contact (Photo 8).



5. Position the second belt end against the locator bar and fix the belt with the cross bar. (Photo 9).

6. Position the FBW Welder in place. Weld the belt according to the welding instructions in the FBW Manual.

7. Check the weld for any cracks or bubbles, if needed cut the belt and rejoin it (you will lose about 80mm from the belt length).

8. Check the pitch; pitch larger than normal is not acceptable, however welding results with pitch up to 2mm shorter is acceptable. **Pitch tolerance should be +0.0 mm, -2.0 mm.**

## 8.2. Instructions for welding SuperDrive™ Belts Using FBW Adapter

For owners of the FBW-721 FBW-1061 and FBW-1301, Volta has prepared an Adapter kit for welding SuperDrive™ 'H' and 'M' material belts.

	For FBW-300	For FBW-720	For FBW-1060	FBW-1300
<b>Cutting Bar, SuperDrive™ H/M (Fig. 1)</b>	Cat. #8162567	Cat. #8 1625901	Cat. # 81625907	Cat. #81626192
<b>Adapter Bar, SuperDrive™ H/M (Fig. 2)</b>	Cat. #81307252	Cat. #81307242	Cat. # 81310602	Cat. #81313001
<b>Locator Bar Spacer, SuperDrive™ H/M (Fig. 3)</b>	Cat. #81625902	Cat. # 81625903	Cat. # 81625905	Cat. #81625906
<b>Positioner for welder (Fig. 4)</b>				Cat.#81626342



Fig. 1  
Cutting Bar -  
SuperDrive™ H/M



Fig. 2  
FBW Adapter Bar -  
SuperDrive™ H/M

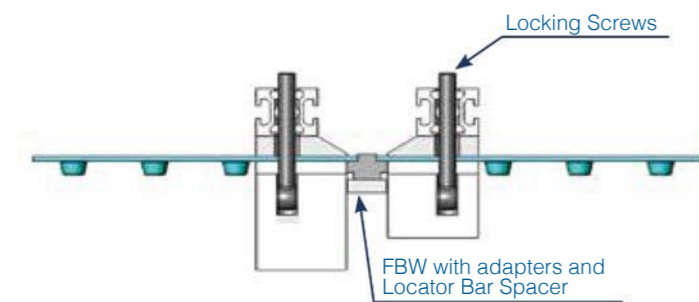


Fig. 3  
Locator Bar Spacer -  
SuperDrive™ H/M



Fig. 4  
Positioner for  
welder

- a. Use the Cutting Bar to cut the belt between the teeth. To ensure a 90° cut, Repeat stages a-d on page 15-16.
- b. Position the Locator Bar Spacer and the Adapters on the Pliers Base. Raise the two hinged Locking Screws to a vertical position and close and lock the Pliers (see figure below).

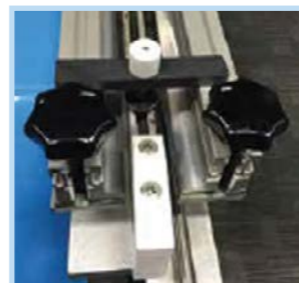


FBW Pliers with adapters and Locator Bar Spacer in place

## 8.3. Positioner for Welder

Is available in the kits FBW1301 and FBW1701 PD & Mini and is used for welding all the Volta belts where an adapter is needed.

- Prior to heating the wand connect both Positioners to both ends of the wand. (Pic.1)
- The adapters of the DD, 1" pitch positive drive belts and impression top belts elevate the belt. The Positioners keep the welder leveled with the top bars. (Pic.2)



## 8.4. Welding DualDrive™ with FBW and Adapter

To ensure an accurate and efficient weld of DualDrive™ belts when splicing with the FBW Welder, choose the DD Adapter suitable to your FBW Tool from the table below. If you haven't welded this product before, weld a section of a trial belt before welding your Volta conveyor belt

### Required Tools:

FBW Welding Kit	
DD Adapter Set for FBW - 301	Cat. #813072530
DD Adapter Set for FBW - 721	Cat. #81307245
DD Adapter Set for FBW - 1061	Cat. #81310605
DD Adapter Set for FBW - 1301*	Cat. #81313005
DD Adapter Set for FBW - 1701**	Cat. #81313005

V Trim Knife	Cat. #8153105
Stoppers (2 units)	Cat. #81626340
Positioner for welder**	Cat. #81626342
Heat Resistant gloves***	
Metal gloves ***	

- \* Non-standard
- \*\* Positioner for welder FBW - 1301 and FBW - 1701 only.

\*\*\* Not supplied by Volta  
Positioner for welder FBW - 1301 and FBW - 1701 only.

Instructions on Page 22



You must be familiar with the instructions for welding with FBW before continuing with this procedure.



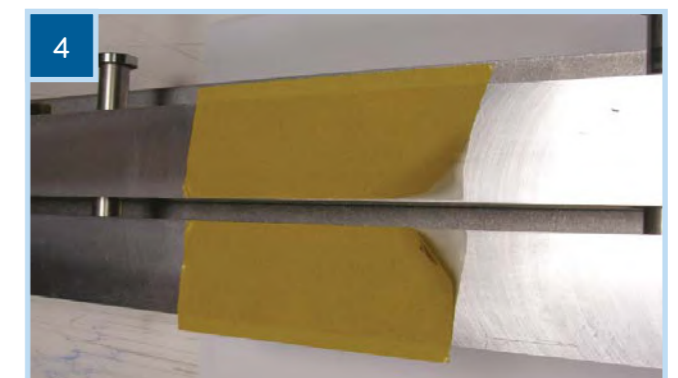
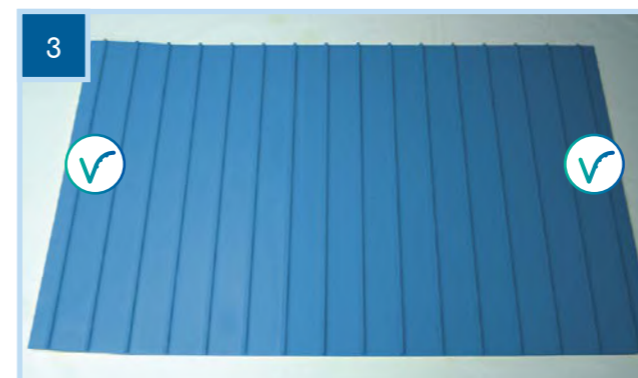
To keep the correct pitch, place the stopper on the welder. Loosen the screws of the Stoppers and place them in the groove on the end sides of the Welder. Tightly secure the screws.



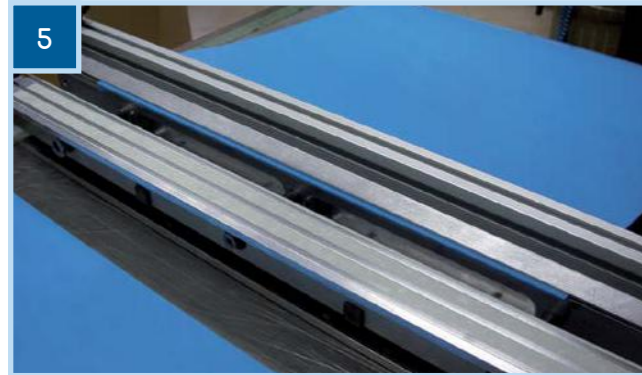
Do not assemble/disassemble stoppers when welder is hot.



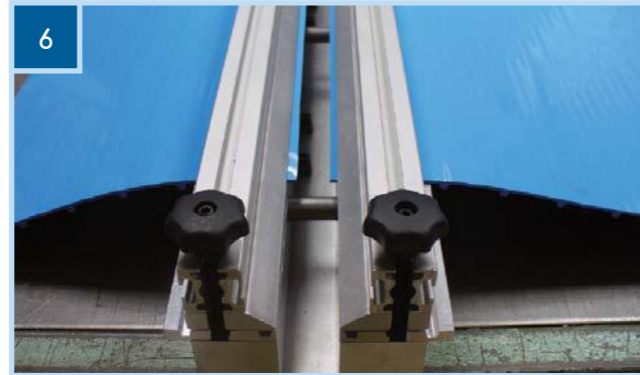
Place the adapter on the belt and push the cutting bar against the tooth towards the cutting side. Cut the first end of the belt along the "Cutting" side. Turn the cutting bar 180° and cut the second end of the belt.



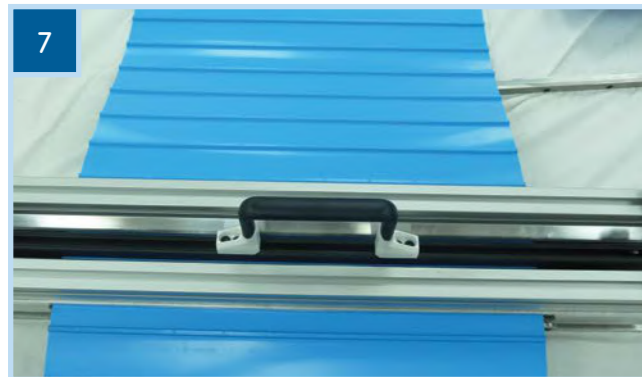
For the FBW-721 and FBW-1061 apply about 10cm of double sided tape on the center plier base, this will hold the adapters in place.



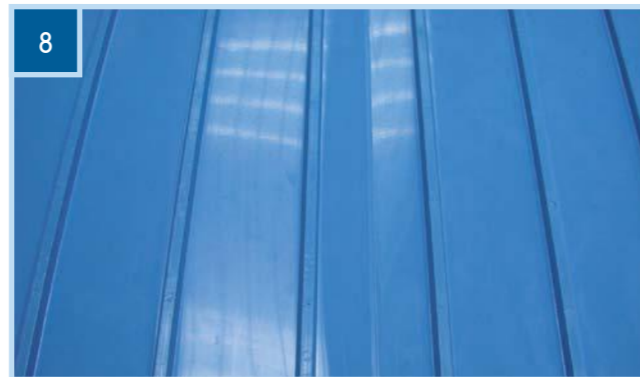
Position the Adapters onto the Pliers with the “Cutting” sides facing outwards. Position both sides of the belt on the Pliers. The belts’ teeth should face down and interlock with the grooves of the adapters.



Position the crossbar without tightening the knobs. Close the plier and push the two ends together, this will align the two ends of the belt with the adapters. Now tighten the FBW Crossbars.



Position the FBW Welder in place. Apply consistent and gentle pressure until the Stoppers do not allow you to continue. **Immediately** open the Pliers. Weld the belt according to the welding instructions in the FBW Manual.



Trim and check the weld. A good weld will be free of cracks and defect.  
**Pitch tolerance should be +0.0 mm, -2.0 mm.**

## 8.5. Welding Mini SuperDrive™ and Mini DualDrive™

To ensure an accurate and efficient weld of Mini SuperDrive™ and Mini DualDrive™ belts when splicing with the FBW Kit, choose the MSD/MDD Adapter suitable to your FBW Tool from the table below.

If you haven’t welded this product before, weld a section of a trial belt before welding your Volta conveyor belt.



### Required Tools:

FBW Welding Kit	
PD 1" Adapter Set for FBW - 301	Cat. #813072541
PD 1" Adapter Set for FBW - 721	Cat. #813072442
PD 1" Adapter Set for FBW - 1061	Cat. #813106042
PD 1" Adapter Set for FBW - 1301*	Cat. #81313017
PD 1" Adapter Set for FBW - 1701**	Cat. #81313024

Positioner for welder**	Cat.#81626342
V Trim Knife	Cat. #8153108
Utility Knife	
Heat Resistant gloves***	
Metal gloves ***	

\* Non-standard  
 \*\* Positioner for welder FBW - 1301 and FBW - 1701 only.  
 \*\*\* Not supplied by Volta  
 Positioner for welder FBW - 1301 and FBW - 1701 only.  
 Instructions on Page 22



An operator must be made familiar with the standard practice for welding with an FBW prior to continuing with this procedure.



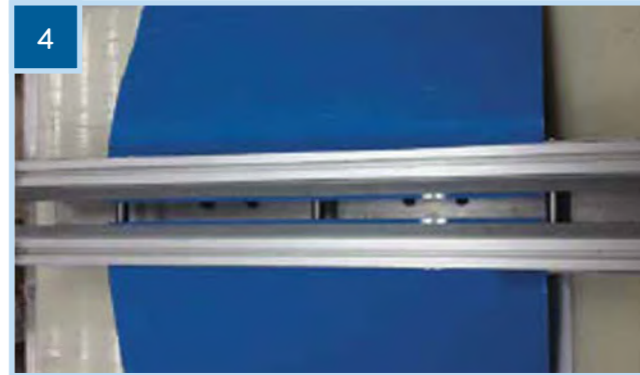
Select the PD 1" Adapter suited to your existing tool. Place the adapter on the belt and cut each end of the belt in turn using the adapter edge marked “Cutting”. This ensures the correct tooth pitch. Take great care to ensure that the cut is accurate and straight.



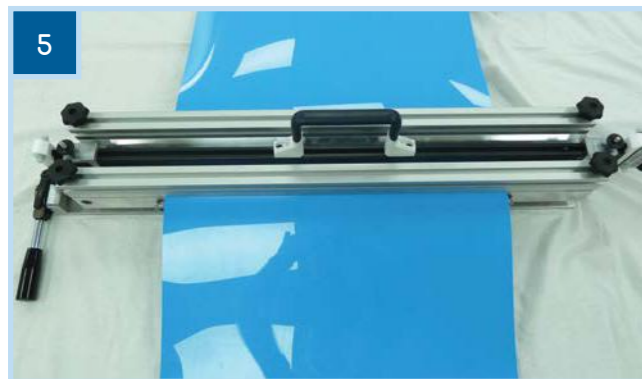
Position both Adapters onto the FBW belt clamp so that the location lugs fit into the existing SuperDrive™ slots. Ensure that the Adapters are aligned with each other. Small sections of double-sided tape are essential to fix the adapters onto the clamp bed.



Double-sided adhesive tape should be applied to the top of the adapters as indicated in the photo. It is important that the **whole belt width** will be taped using the double sided adhesive tape. The tape should be trimmed to fit the pattern of the grooves.



Position both sides of the belt so that the teeth face down and mesh with the adapter grooves.



Position and tighten the FBW Crossbars over both belt edges. Weld the belt according to the FBW User Manual Instructions.



Trim and check the weld. A good weld will be free of cracks and defect.  
**Pitch tolerance should be +0.0 mm, -1.0 mm.**

## 8.6. Welding Mini SuperDrive™ MiniCleat

To ensure an accurate and efficient weld of Mini SuperDrive™-MiniCleat belts when splicing with the FBW Kit, choose the Adapter suitable to your FBW Tool from the table below. If you haven't welded this product before, weld a section of a trial belt before welding your Volta conveyor belt.

### Required Tools:

FBW Welding kit (one of the following, according to your tool)	
PD 1" Adapter Set for FBW - 300/301	Cat. #813072538
PD 1" Adapter Set for FBW - 720/721	Cat. #813072440
PD 1" Adapter Set for FBW - 1060/1061	Cat. #813106040
PD 1" Adapter Set for FBW - 1300/1301*	Cat. #81313017
PD 1" Adapter Set for FBW - 1700/1701*	Cat. #81313020

MSD-MC Accessories Set	Cat. #8153107MSDMC
Heat Resistant gloves***	
Metal gloves ***	

\* Non-standard  
\*\* Not supplied by Volta



You must be familiar with the instructions for welding with FBW before continuing with this procedure.



Choose the PD 1" Adapter that fits your pliers. Place the adapter on the MSD side of the belt and cut the two ends of the belt along the "Cutting" side. You must use this side for cutting the belt to ensure correct pitch of the teeth.  
Make sure that the cut is accurate and straight.



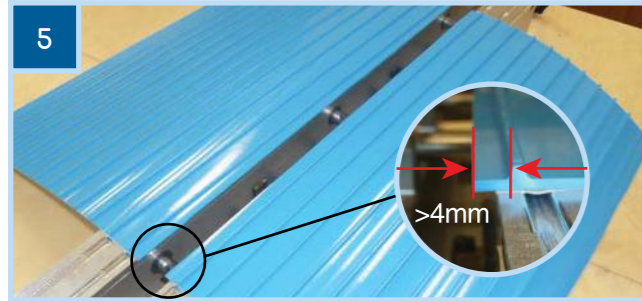
Position the Adapters onto the Pliers so the location block is inserted into the SuperDrive slots on the pliers. Make sure the Mini SuperDrive grooves in both adapters are aligned. It is recommended to use small strips of double sided tape to secure the adapters onto the Pliers.



Place double sided tape on the top surface of the adapters and carefully trim the tape along the MSD grooves in the adapters with a utility knife. The double sided tape will help achieve a better, bubble free, weld.



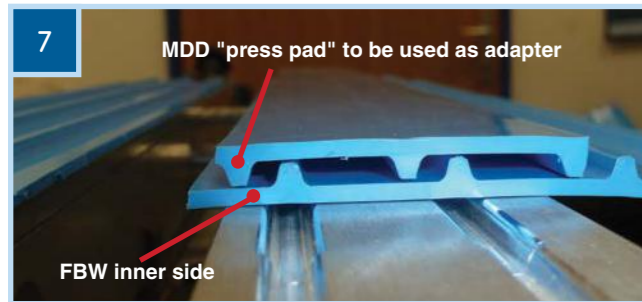
Position both sides of the belt on the Pliers. The belt's MSD teeth should face down and interlock with the grooves of the adapters.



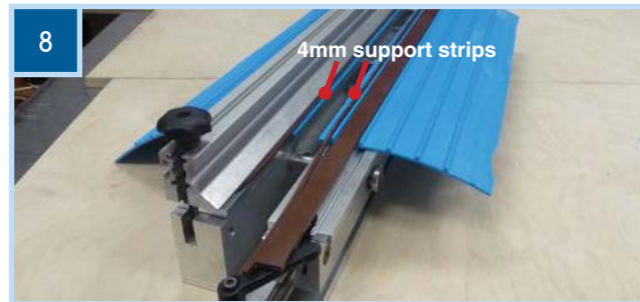
If the position of the MiniCleave is less than 4mm to the belt edge, it is recommended to remove the MiniCleave from the belt edge using the straight trim knife.



Rub a small amount of soap on the MiniCleave and on the blade of the straight trim knife (see figure 11). Close the FBW sides to use the second adapter as an anvil while carefully cutting the MiniCleave away from the belt.



Place a MDD belt (see figure 12) over the MSD-MC, make sure the MDD tooth is close to the edge of the FBW's inner side but does not exceed the edge. The purpose of the MDD teeth is to apply pressure near the welded edge to the belt to prevent the belt from moving during the welding.



An alternative to using MDD as "press pad", a strip (see figure 7) is to use a plain 4mm thick belt strip



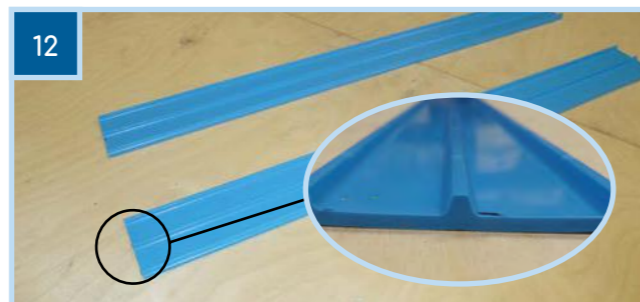
Position and tighten the FBW Crossbars. Weld the belt according to the FBW User Manual Instructions.



Trim and check the weld. A good weld will be free of cracks and defect.  
**Pitch tolerance should be +0.0 mm, -1.0 mm.**



The Straight trim knife is used for cutting a Mini Cleave away from the belt. Cat. #8153107



In order to maintain the pressure applied by means of the FBW crossbars on the belt, we recommend using sections of MDD belt as "press pads" with a width of exactly 3 teeth pitch as shown in figure.

## 8.7. Welding Volta Hinge Lace System with FBW

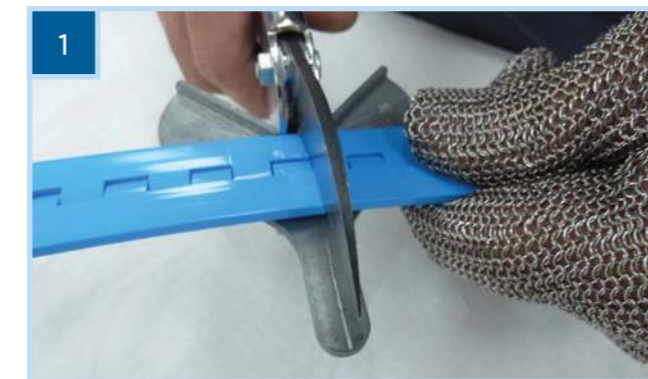
Both Volta Universal Lace and Volta Roundflex™ lace is a device that allows a belt to be opened for cleaning or servicing of the conveyor. It is used in metal detection systems where a polyester hinge pin is used in place of steel. The Volta laces are compatible with Volta 'M' Family Flat and Positive Drive belts including 1" pitch MSD & MDD belts from 2.5mm to 5 mm thickness. All Volta belt materials are easy to clean without removing from conveyor and therefore we only recommend lace when absolutely necessary. The strength of the belt will be affected at the joint where lace is used.

When working with lace, it is important to work according the following instructions. If you haven't welded this product before, weld a section of a trial belt before welding your Volta conveyor belt.

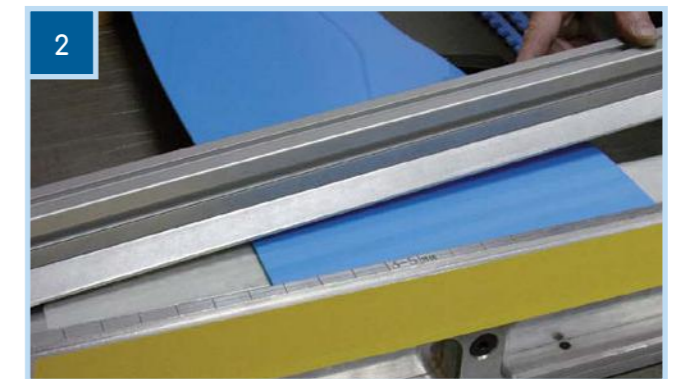


You must be familiar with the welding instruction in the FBW Manual before continuing with this procedure.

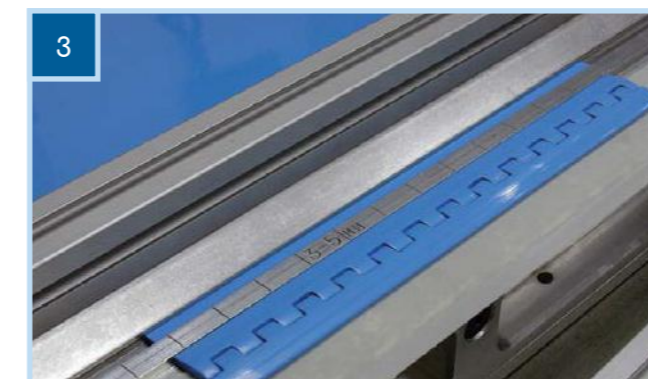
### Universal Lace Welding



1 Cut the belt to the required length taking into consideration the lace. Join the lace and cut to the belt's width.



2 Position one side of the belt on the Pliers according to the welding instructions in the FBW Manual. Remember to use double-sided tape for this task.



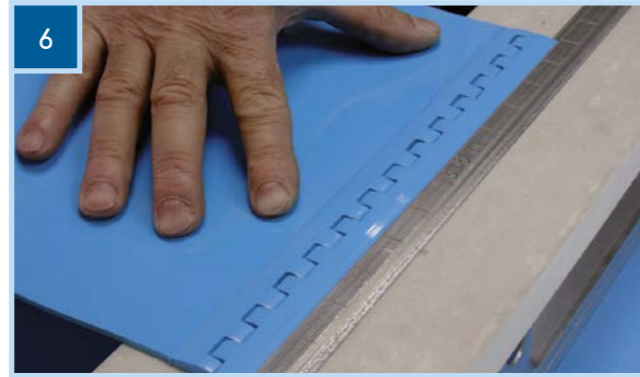
3 Position the lace as you did the belt. Make sure the lace sides interlock and the flat side faces down. The lace should be symmetrically aligned to the belt.



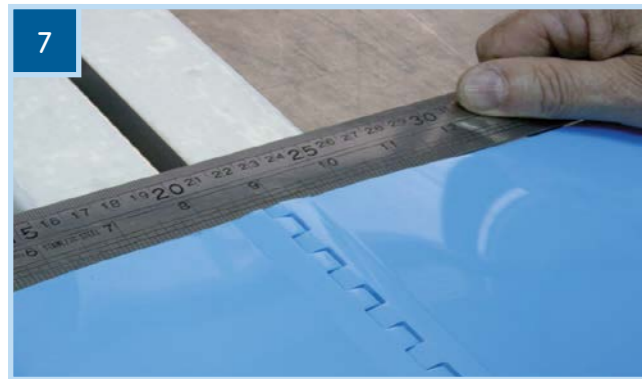
4 Weld the belt to the lace according to the welding instructions for FBW. The thicker the belt, the longer the melt should be to match the thickness of your belt.



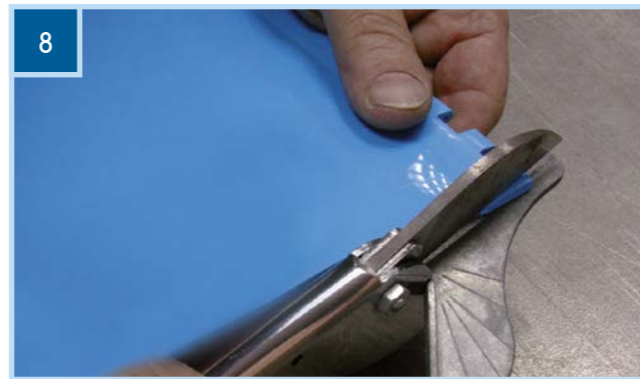
Heat a Round Chisel with the Leister Hot Air Gun and trim the excess from the top of the belt, or apply some soapy water for easier trimming. You may use a V-Knife or a Lesiter Knife to trim the excess from the bottom of the belt.



Repeat from Step 3 to weld the other end of the belt.



Make sure the lace and the belt are symmetrically aligned.



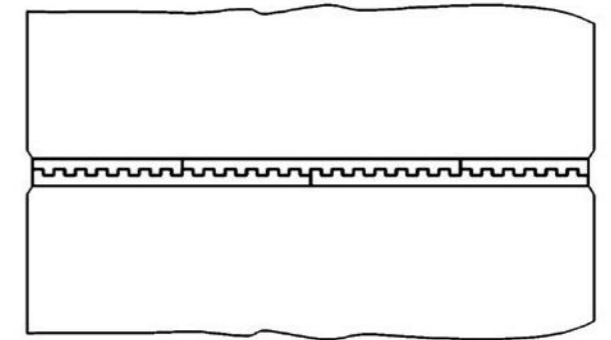
Trim the lace approximately 5 mm from each side. Insert a hinge pin into the slit and check its symmetry and adequacy.



Belt with Volta Universal Lace.

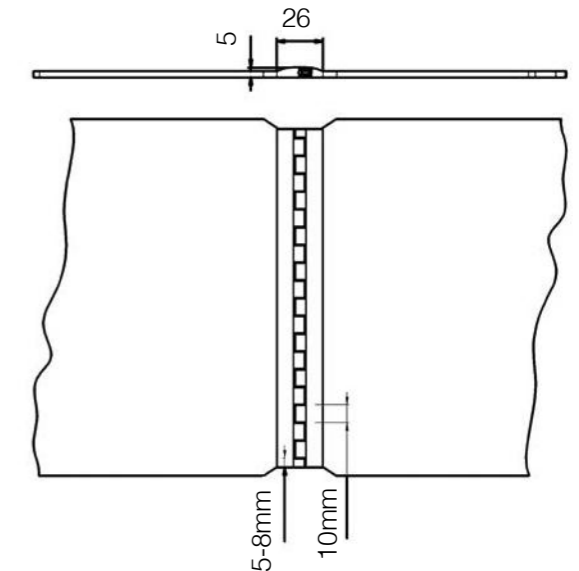
## 8.8. Roundflex™ Lace with 2.4mm Pin Installation Instructions

The lace is supplied in modules of 260mm length. In order to assemble on a wider belt, you will need to join a number of such elements and/or a part of one, in order to get to the required belt width. The modules should, in this case, be welded onto the opposing belt edges in an offset manner, as indicated in the sketch, to avoid matching the modules one to another. Note, that the adjacent modules on the same edge are not welded to one another. As will be seen below, the lace should not be flush with the belt edge but indented 5-8mm.



It is advised to position the outer edge of the lace 5-8mm in from the original belt edge as shown in this sketch.

After welding, the belt should be cut back slightly, as shown, to avoid sharp edges. The interlocking pin can be folded back into the resulting indent so as not to protrude beyond the belt edge.



This work should only be performed by a fabricator who is fully trained on the Volta FBW welder.



Stages of welding with the FBW – firstly the offset lace is prepared by measuring against the belt edges. This should be done and completed before anything is welded as described below.



Prepare a number of lace modules which will fit the belt width or slightly over the width. Open the lace into its two composite parts and interlock them again in an offset fashion so that one part protrudes beyond the belt width.





3 Mark the desired lace position (both ends) on the belt and take into account the indent described above.



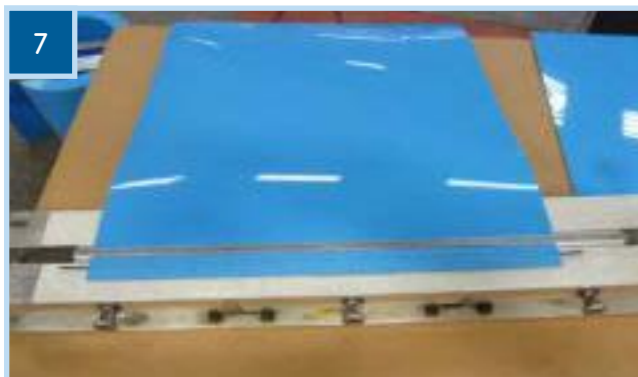
4 As can be seen, a single module has been placed opposite the measured lace edge. The remaining sections on either side of this module should now be cut to size.



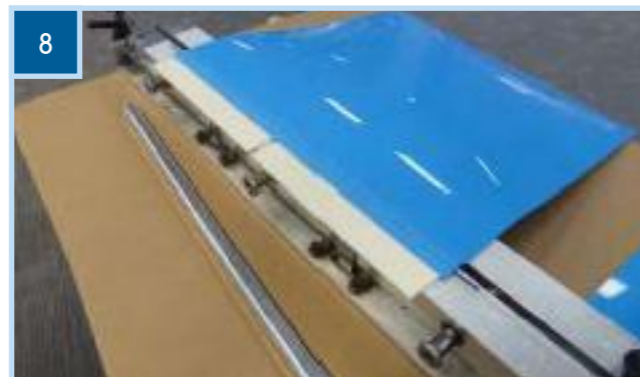
5 So that they make a complete lace insert matching the second belt edge to the first.



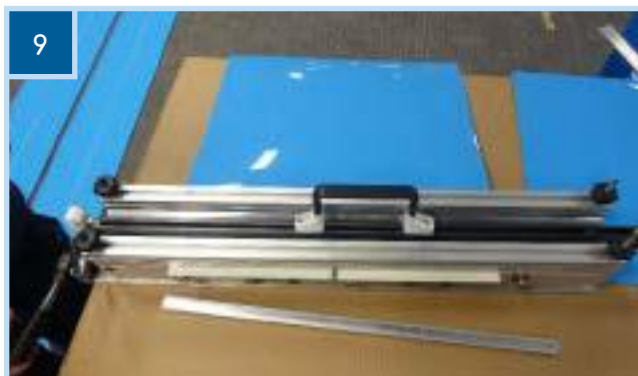
6 Cut the lace to the exact required width and use the markings previously made on the belt to aid this.



7 Insert the pin into the lace. Position the belt on one bar of the FBW and the lace on the other.



8 Position the belt (3-5mm thick) behind the lace to prevent it moving during the welding process.



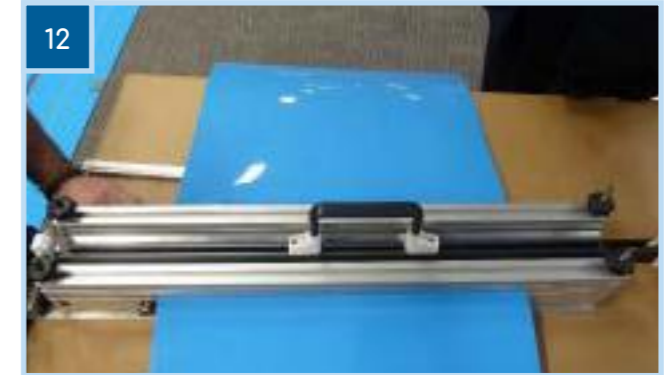
9 Clamp the bars on the FBW over the belt and lace and perform the welding.



10 Open the bars and clean the edges of the weld.



11 Position the second belt edge. Note that the first edge and lace are in position.



12 Clamp the bars of the FBW and weld the second side.



13 Clean the weld on this side too.



14 Now cut the belt edges to form the indent mentioned at the beginning of the lace instructions.



15 Mesh the pin and bend the edges over. The finished lace should look like this.

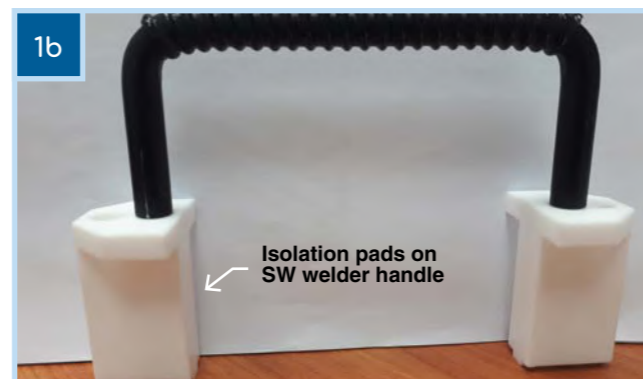
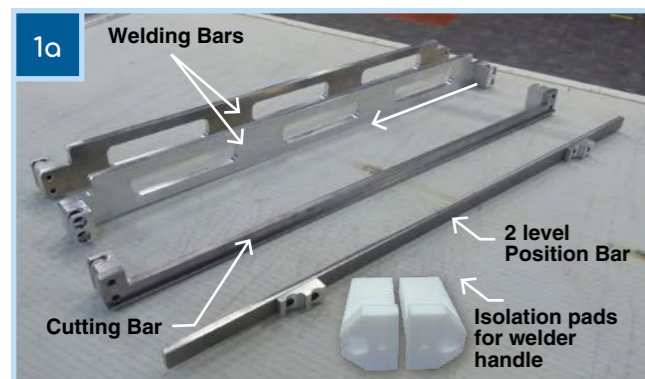
## 9. Baseless Sidewall (SW) Welding with a Flat Butt Welding - Sidewall (FBW-SW) Cutting & Welding Set

To improve the quality and aesthetic appearance of endless welded belts with baseless SW, Volta offers a set of bars and accessories to fit the regular FBW system that enables the attaching of the SW onto the base belt at the joint. The concept is to reduce the length of walling that requires fitting. Therefore, we have designed narrow bars that allow the weld of the belt base with only ~24mm (1") excess SW. The set is designed to allow welding endless SW on flat belts and SuperDrive™ (SD) belts and to use standard adapters for other Positive Drive belts such as DualDrive™(DD).

### Required Tools:

FBW Welding Kit	In the relevant size (See the Welding and Fabrication Tools manual)	* Not supplied by Volta
Adapter set FBW-720/721 SW	Cat. #81307236	
Adapter set FBW-1060/1061 SW	Cat.#81310595	
Heat Resistant gloves*		
Metal gloves *		

### Set Content



When using an FBW welding system for closing a belt with baseless sidewall, replace the two white isolation pads under the welder handle with the longer pads supplied in the FBW-SW set. The welder handle is for the tools purchased before 2019.



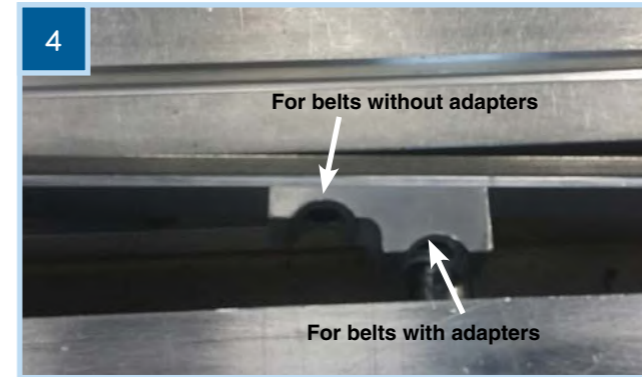
You must be familiar with the instructions for welding with FBW before continuing with this procedure.



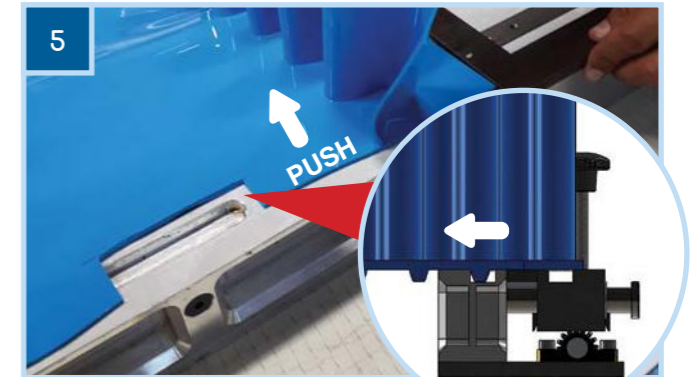
**Using double sided tape**  
Place Double sided tape over the length of the FBW tool, cut out the relevant areas in the tape if welding a positive drive belt (Figure 2).



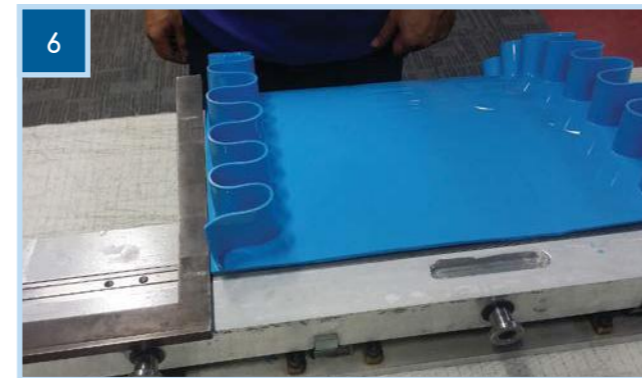
**Placing the 2 level position bar**  
Place the 2-level position bar on the FBW shafts (Figure 3).



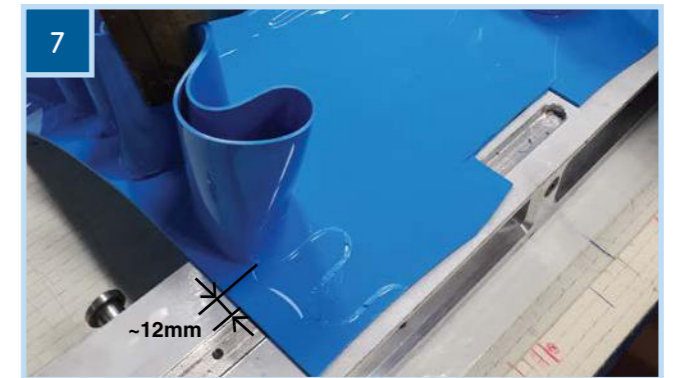
**Choosing the position level**  
Use the lower level for belts that do not require adapters (flat or SD belts). Use the Upper level for belts that require adapters (DD, MSD, MDD) (Refer to Figure 4).



**Placing the belt on the FBW tool**  
Place one side of the belt on the FBW tool. Make sure the SD teeth are pressed towards the outer side of the SD Groove (Figure 5). Refer to arrow direction in Figure 5. Make sure to cut out a belt section with a SD tooth.



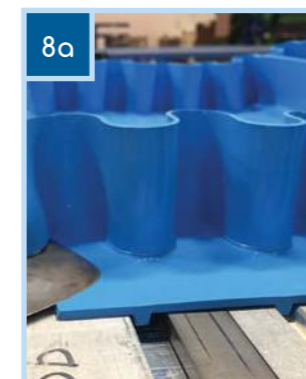
**Belt is perpendicular to the FBW tool**  
Make sure the belt is perpendicular to the FBW tool. Use ruler and mark perpendicular guiding lines along the belt edges (Figure 6).



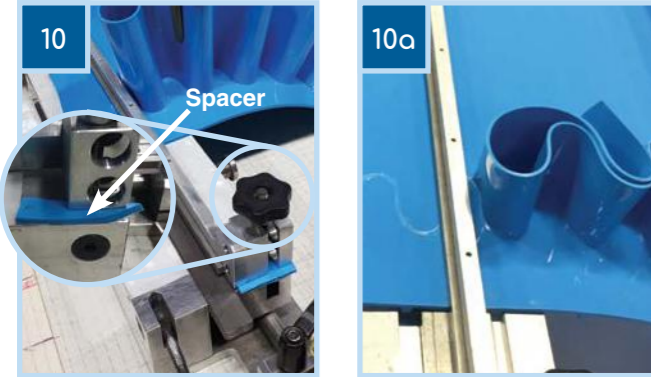
**Markings on the belt**  
Mark approximately 12mm from the FBW tool inner edge as shown in figure 7.



**Separating the sidewall from the belt**  
Separate the Sidewalls from the belt up to the markings using a sharp utility knife or a V-trim knife. Fig. 8a shows a DD belt. Do not cut away any excess sidewall, these will be needed when re-welding the sidewalls to the belt.



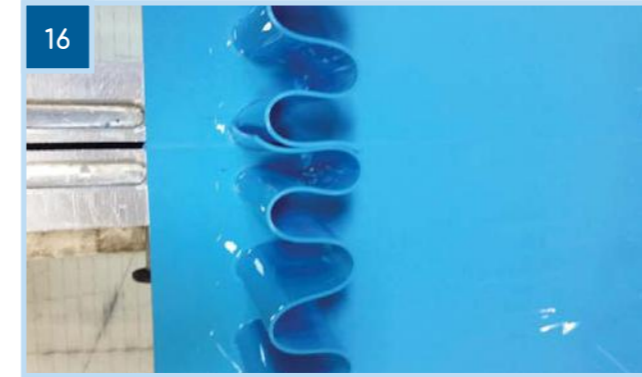
**Clamping the excess sidewall**  
Fold the sidewall back and use a clamp to hold it in place (Figure 9).



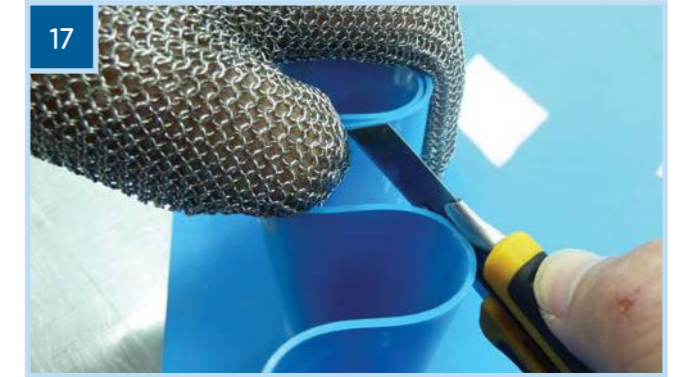
**Placing the Cutting Bar**  
Place the Cutting Bar on the belt. Insert small spacers that are the same thickness as the belt to keep the cutting bar leveled (Figure 10). Fig.10a shows a DD belt. Tighten the knobs to secure the bar in place.



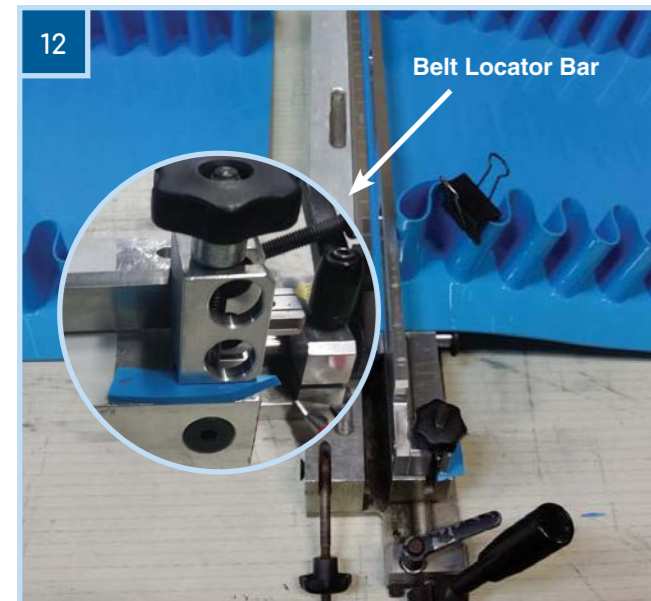
**Cutting the belt**  
Cut the belt along the Cutting Bar using a sharp utility knife (Figure 11). Repeat the procedure to cut the second side of the belt.



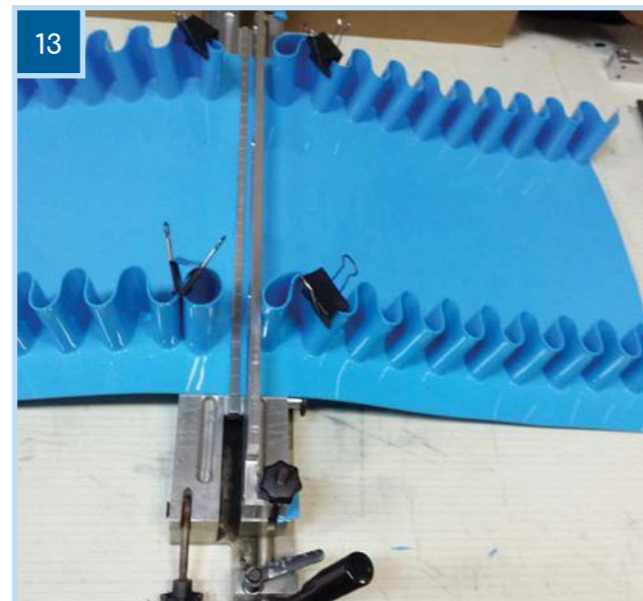
**Aligning the sidewalls**  
Overlap both edges of the sidewall to get an endless sidewall (Figure 16).



**Cutting excess sidewall strip**  
Cut any excess strip from the sidewalls (Figure 17 & 18).



**Securing one side of the belt for welding**  
When both sides of the belt are cut, position one side of the belt on the FBW tool using the Belt Locator Bar. Secure the belt in place with the welding bar and tighten the knobs. Insert small spacers that are the same thickness as the belt to keep the cutting bar level (Figure 12).



**Securing the second side of the belt for welding**  
Repeat step 12 to secure the second side of the belt to the FBW tool, making sure both sides of the belt are aligned (Figure 13).



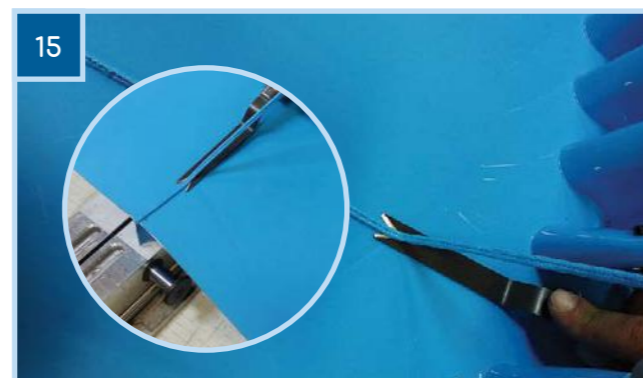
**Sidewall Ready to be Re-welded**  
Cut any excess strip from the sidewalls (Figure 17 & 18).



**Re-Welding the Sidewalls**  
Re-Weld the Sidewall to the belt using a hot air gun (Figure 19 & 20).



**Welding the belt**  
Weld the belt using a welder with the SW welder handle (Figure 14). For DD belts use the stoppers to keep the correct pitch.



**Trimming the melt**  
Trim the melt on the top and bottom sides of the belt using a V-Trim knife (Figure 15). When welding a Positive Drive Belt, check the pitch between the teeth on the joint is in tolerance.

## General Instructions:

Leister Gun, initial temperature set to 3.5 (note each heat gun is different). Use relatively low heat. Weld the SW to the base belt in small sections at a time (about 12mm-1/2" at a time), by heating the base of the SW and the base belt section together.

Once the belt shininess changes slightly, stop heating and press the SW tight towards the belt. Hold it for about 60 seconds before releasing the pressure.

The overlap section: split the SW (Figure 19), apply heat between both ends of SW. Start from the lower end, adjacent to the belt, 2mm-1/2" sections at a time. Once the belt shininess changes slightly, stop heating and press the SW ends together.

Using a steel plate to shape the SW (Figure 19 & 20), could assist.  
Using a flat screw drive tip, covered with Teflon tape, can be used to smooth out the welding sections.  
Optional to use a Dremel grinder to "shave" the overlap end sections to a smooth pattern.

## 10. General Tips

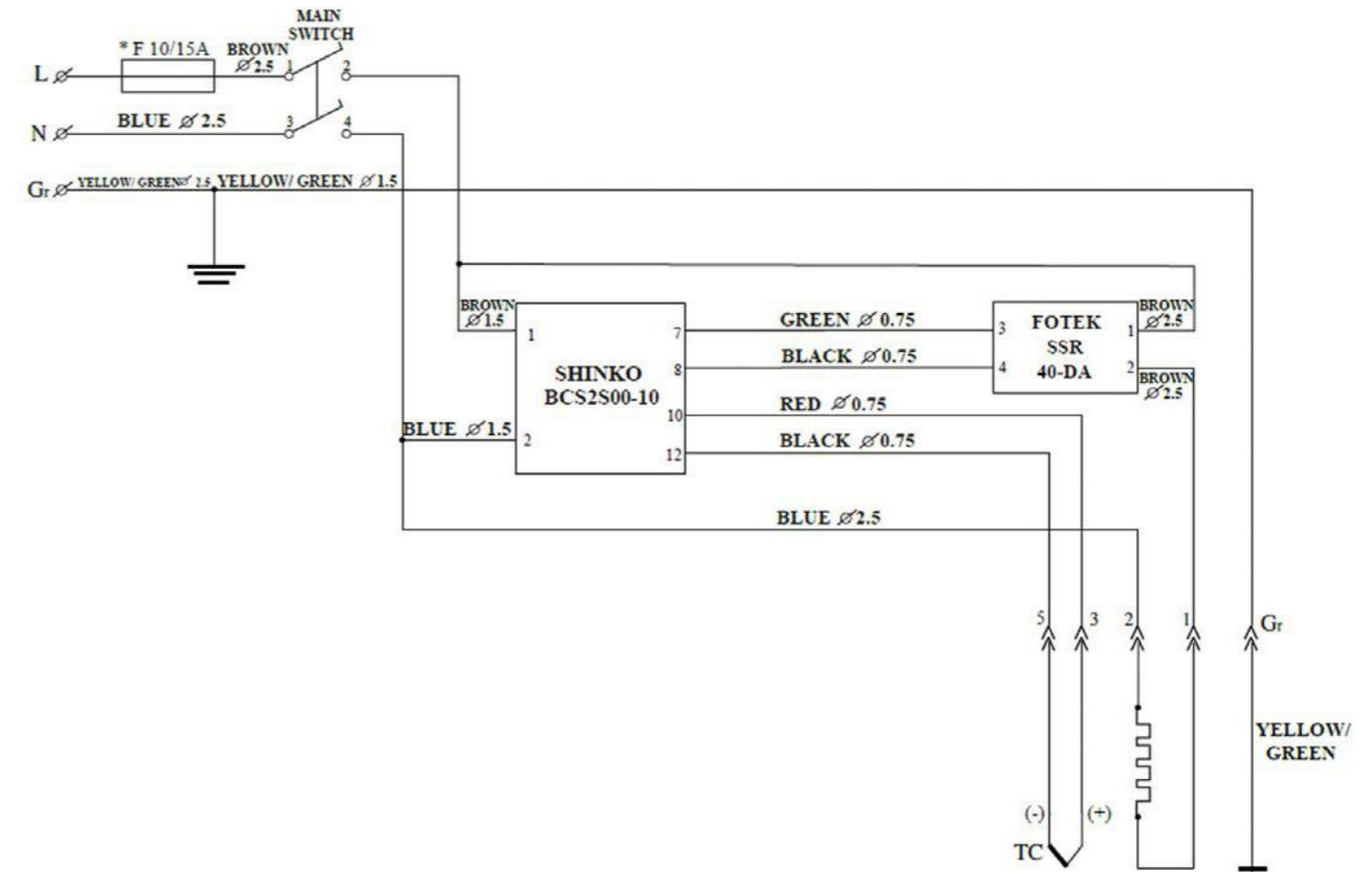
Before splicing “H” family belts, FELW 1.6, FELW-2, FRL 2 or belts with special adapters, it is strongly recommended that you spend a few minutes practicing before welding the actual belt.

## 11. Troubleshooting Guide

Symptom	Possible cause	Suggested solution
Unstable temperature reading	Thermocouple	Contact a qualified technician.
Welder overheating	Thermocouple	Contact a qualified technician.
Irregularity in the excess	Belt not cut properly.	Re-cut and re-weld.
Belt moves during welding	Low quality double-sided tape.	Use a high-quality double-sided tape.
	Inadequate or uneven pressure on the Crossbars.	Make sure the Crossbars have been properly tightened. Refer to Welding Instructions.
Bubbles in the joint	Welder Temperature is too high.	Ensure that the Temperature Controller has been properly setup.
	Insufficient pressure when closing the Pliers after removing the Welder, or too slow an action.	Perform a number of trial welds to improve closing pressure and/ or speed.
Bad or inadequate joint on “H” material belts	Pressing too hard when closing the Pliers after welding.	Reduce pressure when closing the Pliers. Refer to Page 14, Instructions for Welding “H” Material.
	Too slow an operation when closing the Pliers after welding.	Repeat the procedure to increase speed Refer to Page 14, Instructions for Welding “H” Material.

## 12. FBW Controller and Welder Electrical Diagram

Model SHINKO-BCS2S00-10

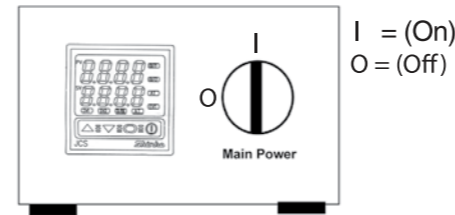


\* Fuse rating should suit the power rating of the controlled welder  
 110 V up to 800W 10A  
 110V above 800W 15A  
 230V up to 1.7KW 10A  
 230V above 1.7KW 15A

FBW Welder and Temperature Controller Electrical Schematic

## 13. Calibrating the FBW/PDW Welder Control box & Welder Bar

These instructions apply to Temperature Controller Model SHINKO-BCS2S00-10



I = (On)  
O = (Off)



Before calibrating the welder, make sure it is not plugged to a power source and that the Welder Bar is at room temperature.

Connect the Welder-Bar to the controller and secure the latch on the connector. Place the Welder Bar up-right on an even surface where it is safe for it to heat up. DO NOT Touch the Welder Bar as it heats up. Use protective gloves and use the bar handle to hold the Welder Bar.

### 1. Temperature Scale Selection

Select Fahrenheit or Celsius temperature scales.

- Plug the control box to an appropriate outlet and Turn the Main Power switch on to 'I' and wait until the measured temperature is displayed on the PV line & the SV line displays the temperature set value. This state is referred to from here on as the "Normal Display".
- Press and hold **[V]** & then **[C]** for 3 seconds until **hEnh** appears in the PV line. On the SV line the selected Thermocouple Type and temperature scale are shown.
- Use the **[V]** or **[A]** to scroll through the thermocouple & scale options. There are about 20 options to scroll through.

CHOOSE:

either thermocouple **[J]** = Centigrade (°C) scale.

or thermocouple **[F]** = Fahrenheit (°F) scale.

To save your selection long press on the **[C]** key until the display returns to Normal display.

### 2. Temperature Limit Setting

Sets the Welder's maximum allowable temperature.

Select the Welder limits temperature.

- Press and hold **[V]** & then **[C]** keys until **hEnh** appears in the PV line.
- Press the **[C]** button. The symbol **hFLH** will appear in the PV line. The value on the SV line is the maximal allowable set temperature value.
- Press on **[V]** or **[A]** to set the maximum allowable temperature (250°C / 482°F).
- Press the **[V]** button once. The symbol **hFLl** will appear in the PV line. The value on the SV line is the minimal allowable set temperature value. NOTE: There could be a minus (-) sign to the left of the value.
- Use the **[V]** or **[A]** keys to set the minimum allowable temperatures are between 0°C / 0°F – (factory settings) to 200°C / 390°F. Setting higher minimum may prevent error in setting the desired working temperature.
- To save your selection press & hold on **[C]** until the display changes back to Normal display.
- Press and hold both **[V]** & **[A]** for 3 seconds until **Lock** appears in PV line.
- Press **[C]** several times until the symbol **hFLF** appears in the PV line.
- Use the **[V]** or **[A]** keys to set the value to (1.0).
- To save your selection press & hold on **[C]** until the display changes back to Normal display.

### 3. Welder Working Temperature

Set the Welder operating temperature.

- Press **[C]** until the symbol **h** appears on the PV line.
- Press on **[V]** or **[A]** to set the desired temperature (220°C / 428°F).
- Press on **[C]** key once to save and return to the Normal display.

✓ Turn the Main Power switch off to "O".

### 4. Temperature Correction (Off-Set)

This step provides compensation the difference between the actual temperature on Welder Bar and that measured by the controller.

✓ This procedure should be performed if:

- A major system component was replaced i.e. control box/controller Welder Bar/heating element.
- Change of temperature scale from °C to °F or wise-versa.

Calibrated industrial face thermometer capable of measuring temperatures in the range 150°C / 300°F to 300°C / 570°F, is required for this step.

- Turn the main switch on the control box on "I" and wait until the display turns to Normal.
- Press and hold both **[V]** & **[A]** keys for 3 seconds until **Lock** appears in the PV line and 4 non-blinking dots on the SV line.
- Press **[C]** several times until the symbol **h0** appears on the PV line.
- Using the **[V]** or **[A]** keys, set the value on SV line to 50. Make sure it is not (-50).
- To save your selection press & hold on **[C]** until the display changes back to Normal display.
- Wait for the PV line to stabilized (even if it's not equal to the SV Line).
- Use the thermometer and measure the temperature on the surface of the Welder Bar at a point between 200 to 250mm (8" to 10") from the cable entry side.

✓ A large difference can be expected between this measure and the value displayed on the PV line.

✓ Make sure you measure the temperature at about the same point every time.

- Subtract the thermometer temp from the temperature displayed on the PV line. Record this value (it may be negative). If this value is less than 5°C / 9°F offset calibration is completed.
- Press and hold both **[V]** & **[A]** keys for 3 seconds until **Lock** appears in the PV line and 4 non-blinking dots on the SV line and then Press **[C]** several times until the symbol **h0** appears on the PV line.
- If this is the first iteration the value 50 appears on the SV line (as set in step c. above).
- Subtract the recorded value from the SV value (negative values are possible).
- Using **[V]** or **[A]** to change the SV value to the value you calculated in (j.) above.
- To save your selection press & hold on **[C]** until the display changes back to Normal display.
- Allow about 10 minutes for the welder temperature to stabilize.
- Repeat the procedure form step (g.) above.

- ✓ **Example:**  
 Temperature Controller PV display shows a temperature of 428°F.  
 Welder temperature is measured as being 394°F.  
 On our first iteration the difference is  $428 - 394 = 34$ .  
 Performing step (h.) we get the value 50.  
 $50 - 34 = 16$  we decrease the SV Value to 16.  
 And press & hold to return to normal display.  
 Waiting for the temperature to stabilize it again shows 428 on the PV line.  
 We now measure a temperature of 408°F i.e. the difference is 20.  
 At Step (h.) the SV value is  $16 - 20 = -4$ . We decrease the SV value to (-4).

## 5. Auto Tuning

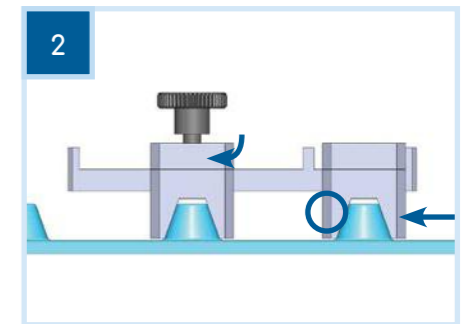
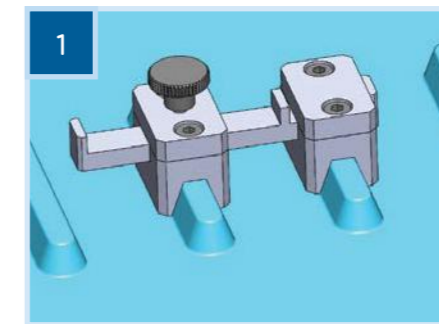
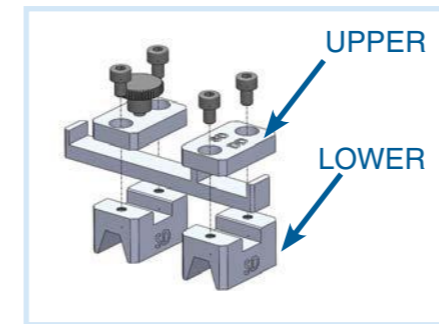
This step calibrates the Temperature Controller to a new Welder.  
 Perform the Auto-tune procedure in the following cases:

- You performed Temperature Correction (Off-Set) (section 4 above).
  - The controller or the Welder Bar/heating element are replaced.
  - There's a significant difference of the environment (indoor vs outdoor etc.).
- a. Make sure the Welder Bar is properly connected and the latch connector is secured.
  - b. Make sure it is safe to let the Welder Bar to heat up.
  - c. Make sure the Welder Bar temperature is below 150°C / 300°F.
  - d. Turn the Main Power switch on "I".
  - e. Press and hold & then for 3 seconds until **RT** (red) appears in the PV line and Four (4) non-blinking lights appears on the SV line.
  - f. Press until the **RT** (green) appears on the SV Line.
  - g. Press to start the Auto Tuning cycle.
  - h. The display changes to Normal Display.
  - i. An orange "AT" is blinking on the Left side of the display.
  - j. Wait until the "AT" stops blinking (this process may take about 30 min.)  
 Should an "Err" message appear on the display (sometimes with a code):  
 Turn the Power switch off "O" wait for the bar to cool and repeat from step (d.) above.
  - k. When the "AT" indication extinguishes the Welder Bar is ready for work.

## 14. Pitch Gauge Measuring Tool for Volta Positive Drive Belts

Volta Positive drive belts need to be welded endlessly while maintaining a correct pitch tolerance between the teeth closest to the weld. A small tool has been developed to ensure this.  
 The Pitch Gauge Measuring Tool is not included in the FBW Welding kit.  
 This tool can be purchased as a separate unit - Cat.No. - 81307570.

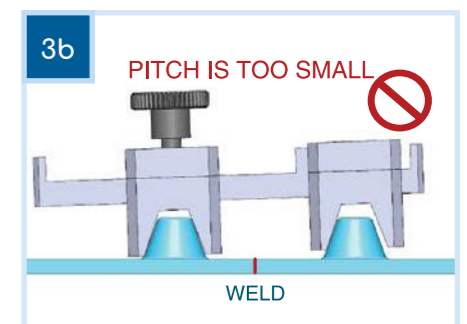
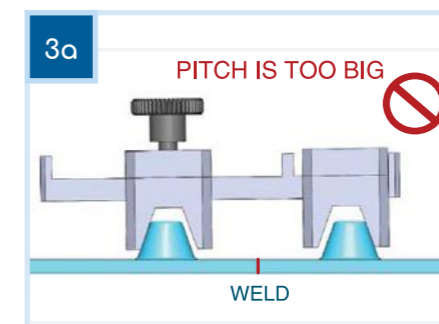
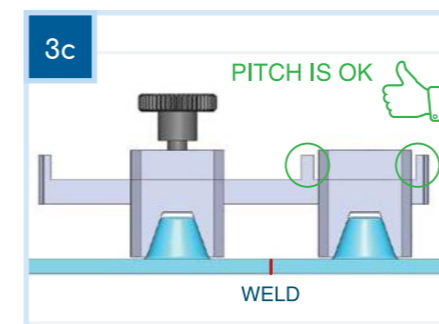
### Positive Drive Pitch Gauge Tool Instructions



**Replacing the belt type gauge blocks:**  
 Remove the four bolts using the supplied 3mm Allen key and reconnect upper and lower to the desired belt type gauge block.

**Calibrating the gauge:**  
 1. Unfasten the knob and place the gauge blocks on two adjacent belt teeth. (Not the teeth adjacent to the weld).

2. Push the gauge base to the position so it sits firmly to the outer side of the gage block. (The gauge blocks should sit firmly on both teeth). Tighten the knob to lock the gauge in place.

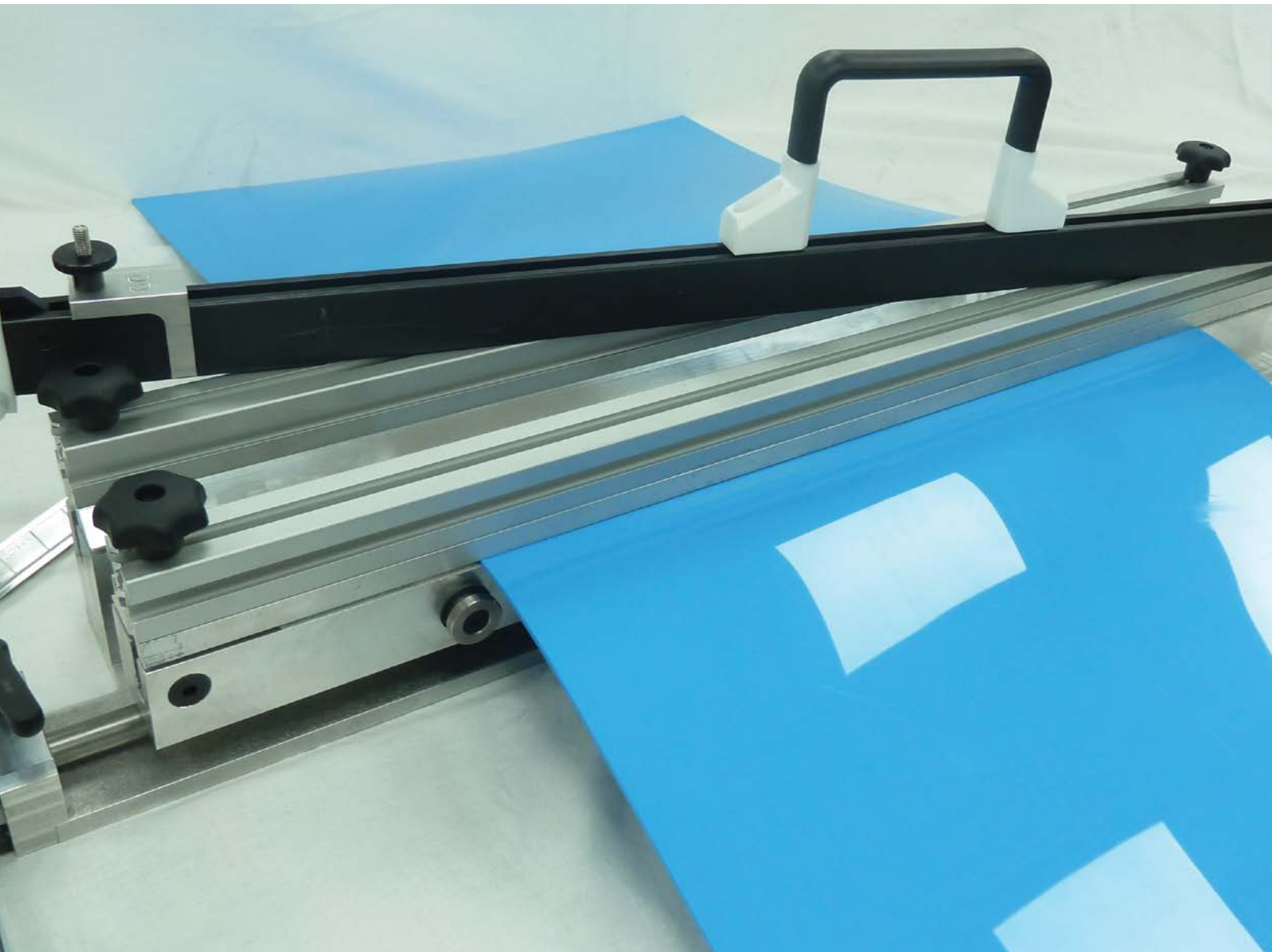


**3. Checking the weld:**  
 Place the gauge on the two closest teeth on both sides of the weld.  
 The gauge should sit firmly on both teeth. If there is a small gap as seen in picture 3a the pitch is within the allowed tolerance. In case the gauge doesn't sit firmly on the teeth refer to pictures 3b and 3c.



# With Volta Tools You Can Never Go Wrong!

- ✓ Fast and simple belt installation.
- ✓ Unique and versatile design - compact, rugged and easy-to-use.
- ✓ Designed for both shop and field use.
- ✓ Light-weight construction.
- ✓ Usually does not require cooling water or air pressure.
- ✓ Convenient design and method of storing and carrying your tools.
- ✓ Welds and fabrications are strong, reliable and will last as long as your belt life.



**volta**™  
Belting Technology

CORPORATE  
HEADQUARTERS  
Sales and Manufacturing  
[sales@voltabelting.com](mailto:sales@voltabelting.com)

USA  
Tel. +1 973 276 7905  
Toll Free, 1-877-VOLTAUS  
[voltaus@voltabelting.com](mailto:voltaus@voltabelting.com)

EUROPE  
Tel. +31 546 580166  
[voltaeu@voltabelting.com](mailto:voltaeu@voltabelting.com)

[www.voltabelting.com](http://www.voltabelting.com)

Volta Belting makes no warranty with respect to any of its products for a particular purpose. See Volta General Terms and Conditions.

Copyright© Volta Belting Technology Ltd.  
CAT600EN00 - Ver.D - September 2022

[now-branding.co.il](http://now-branding.co.il)