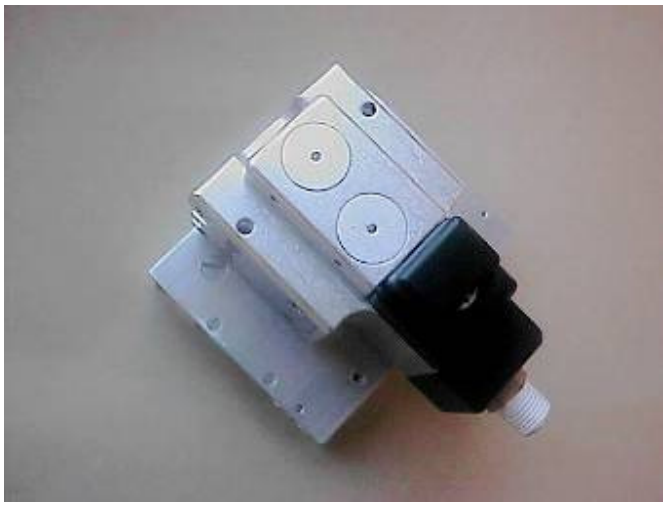
Airbond Splicers

1-11 Series splicers



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Getting started

Model 1-11 - getting started

Please read this section before you start operating the splicer. The rest of the manual deals with maintenance, and with details of products; these sections will not be needed immediately.

Remove all packaging. For each splicer, you will have the appropriate splicing chamber – which will usually already be fitted.

Depending on what you have ordered, you will have some or all of the following:

- Splicer
- Additional splicing chamber(s)
- Optional carrying strap
- Optional buckle
- Optional hanger and screws
- Optional hanging clip

If they have been supplied, place the buckle and strap over the air union, before connecting the splicer to the air supply. The operator may then loop the strap round his wrist to reduce the likelihood of the splicer being dropped.

It may be useful to have a fixed place to store the splicer temporarily when the operator has finished. If it has been supplied, bolt the hanging clip to a convenient spot on a machine. Fix the hanger to the back of the splicer, using the screws provided. (This operation will involve the removal and replacement of the splicing chamber). The splicer can then be placed in the hanging clip when not in use. This reduces the likelihood of the splicer being dropped and damaged in service.

Connect the splicer to an air line, normal pressure around 6 bar, unless otherwise specified. **(See Appendix 4, page 55, for compressed air Health and Safety issues).**

A lower pressure may be specified, if there are special requirements, such as splicing fine glass. The line should preferably be fitted with a pressure regulator so that adjustment may be made to suit local needs.

Hold the splicer with the trigger button facing the body, and press the trigger with the thumb.

- Look down into the splicer
- Press trigger part-way down - See the pad move until it hits the chamber
- Press trigger further - Listen for the air blast

Look at the trigger button. The locking screw on the top of the button will NOT be tight, so the adjuster wheel can be moved. Move the adjuster wheel. See the positions marked on the adjuster wheel, from 0 to 6.

- Set wheel to position 0. Press trigger slowly. See the knives close BEFORE the air blast comes on
- Set wheel to position 6. Press trigger slowly. See the knives close AFTER the air blast comes on.

The wheel will be used to optimise the performance of the splicer, for any particular yarn.

Blast timer models

See the timer adjustment dial on the timer box.

- Press the splicer trigger. Watch the pad close. Keep the trigger pressed. After a time, the pad returns. Release the trigger.
- The adjustment dial is marked with the blast time. Adjust according to your yarn type requirements.

Flow models

See the flow adjustment screw on the back of the splicer.

- The flow of air is controlled by the adjustment screw. The groove in the vertical position is maximum flow. The groove in a horizontal position is zero flow.

Making an ends-opposed splice

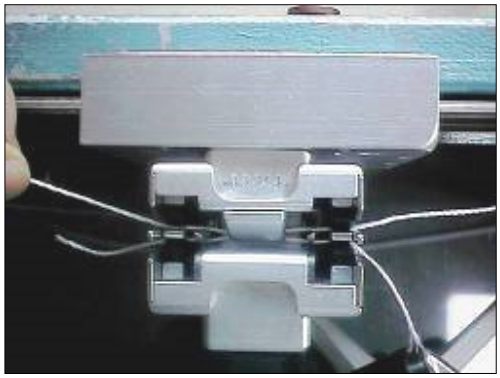
"Ends – opposed" is the normal form of splice, for which the 1-11 was designed.

Figure 1.

First stage: present first yarn to splicer

The first yarn is placed in the splicer. The yarn enters from the right-hand side; it enters via the upper right clamp, and leaves via the lower left clamp.

Figure 2.



Second stage: present second yarn to splicer

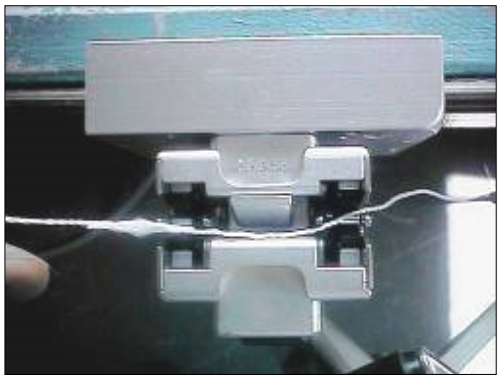
The second yarn is placed in the splicer. The yarn enters from the left-hand side; it enters via the upper left clamp, and leaves via the clamp at lower right. Note the flat "X" form of the string-up

Third stage: make the splice

Press the trigger in one swift, single movement.

If the splicer has no timer, press the trigger until the chosen blast period has elapsed. Then release it. If the splicer has a timer, keep pressing the trigger until the blast ceases automatically. Then release it.

Figure 3.



Fourth stage: remove the splice

Once the splice is made, the completed joint is withdrawn and the waste ends are discarded. This typical ends-opposed splice has a wide section at the centre, corresponding to the position of the blast hole in the splicing chamber. Just visible in this splice are the "tails" - the cut ends of the yarns project very slightly from the ends of the splice.

VERY occasionally, the user may wish to make a splice which we call "ends-together". This splice is less attractive than the one described above, but it is useful in special circumstances. See Appendix 5 for details of this form of splice.

Optimising splicing performance - knife timing

The operator has a number of operating parameters which can be changed at will, so that the optimum performance may be achieved for a given situation. The following variations are possible:

- Change of splicing chamber.
- Change of air pressure.
- Positioning of the adjusting wheel.

The third parameter needs to be explained. All splicers of the 1-11 range are capable of dealing with a wide range of yarn counts. The splicer requires fewer chambers than most in order to cover its operating range. One reason for this flexibility is the technology of the splicing chamber; another reason relates to the special adjuster built into the trigger. The function of the adjuster radically affects the splicer performance. This function needs to be explained, if the splicer is to be used at maximum efficiency.

The Model 1-11 is unusual in that it separates completely the functions of cutting and blasting, two functions of a splicer which are usually closely linked. The splicer actually consists of two independent sub-systems within the same body.

- The right hand valve controls the movement of the chamber pad, and the entry of blast air into the splicing chamber. It does not actuate the knives.
- The second valve, the left hand one, controls nothing but the knives. The actuation of the knives is therefore completely independent of the pad/chamber operation.
- The knife control is effected by the rotation of the brass adjusting wheel.
- The adjustment of this feature has been made as simple as possible; the wheel is marked with numbers from 0 to 6 which may be "dialled up" according to the user's needs.

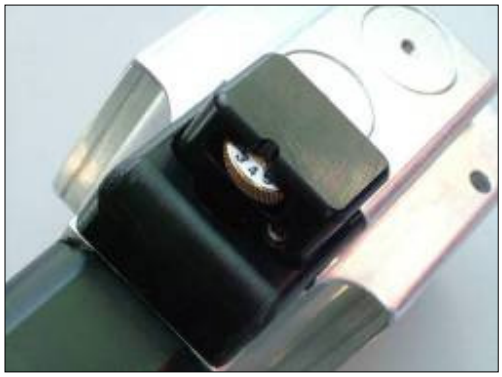
Figure 4.

This photograph shows the trigger, detached from the splicer. The variation of width of the adjusting wheel can be seen clearly.

The adjusting wheel has seven settings – from 0 to 6. The numbered scale can be seen in Figure 5.

At setting 0, the thickest part of the wheel faces the end of the knife air valve. Then the wheel touches the valve after minimal movement, and the knife valve is actuated; the knives cut soon after the trigger is pressed - just before the chamber blast.

Figure 5.



At setting 3 or 4, the intermediate-thickness part of the wheel faces the end of the valve. The wheel touches the valve after moving further than at setting 0. The knife cut is then simultaneous with the chamber blast.

At setting 6, the thinnest part of the adjusting wheel faces the valve. The wheel touches the valve only

after substantial movement of the trigger; then the knives cut only after the main chamber blast has already started.

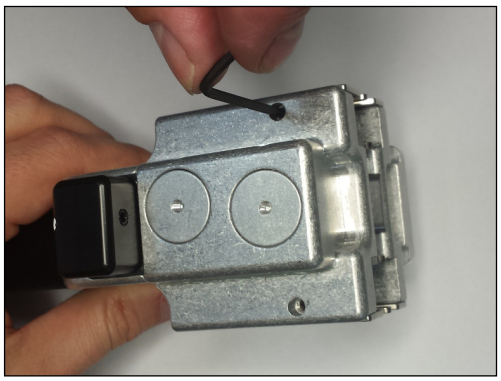
The adjuster wheel is used to optimise the performance of the splicer for a particular application. The best setting for a given application should be found by trial-and-error. Once the best operating position has been found, the wheel then can be secured with a small locking screw which is built into the trigger button. The performance of the splicer should then remain consistent.

Optimising splicing performance – yarn clamp strength

All splicers of the 1-11 range are capable of dealing with a wide range of yarn counts, therefore yarn clamp strength needs to be addressed, if the splicer is to be used at maximum efficiency.

The Model 1-11 has 4 yarn clamp pads that you can clearly see in Figure 1. They are set up as standard for mid-high count yarns but can easily be adjusted by rotating the yarn clamp adjusting screws on the four corners as demonstrated in one corner in Figure 6.

Figure 6.



Rotating clockwise increases the clamps strength. This is needed for higher count yarns to keep the yarn under control during the splicing process. Do not rotate the screw all the way in, as the yarn clamp will become shut permanently and is unusable.

Rotating anti-clockwise decreases the clamp strength. This is needed for the fine yarns as you only need a small amount of strength to keep the yarns under control. This is a key action for the very fine brittle yarns as if the yarn clamp strength is too high, then the yarn will break during string up as you are fighting against the clamps.

If the yarn clamps are not at the correct pressure, then the yarn will get drawn into the splicing chamber during the splicing process and will result in a bad appearance splice.

Important maintenance information

Apart from accidental damage, and the occasional replacement of cutters, the Model 1-11 requires little attention. However, cleaning and lubrication should NEVER be neglected.

Obviously, there should be frequent examination for signs of fibre build-up in the inner parts of the splicer. Fibre should be removed.

The knives should be lightly oiled at regular intervals.

Most important, both the piston which actuates the chamber pad and the piston which actuates the cutters need regular lubrication. The frequency of lubrication depends upon the nature of the factory environment and the workload on the splicer. As a general rule, the pistons should be removed and greased with Molykote 111 (available from the company) at least once per month. The service interval should be reduced if the splicer experiences very heavy work loads. The removal of these components is shown in Figures 19 to 22.

Model 1-11 – general product information

1-11 Series splicers - general

Figure 7.

The 1-11 Series splicers make a joint of the "ends-opposed" form. This type of splice does not have as good an appearance as a splice of the "ends-opposed" form. "Tails" are visible in each joint. However, the splice is much quicker to make, and is usually completely satisfactory for carpet processes, such as tufting, Wilton and Axminster weaving.

The 1-11 is the outcome of a programme to apply new design principles to ends-opposed splicers. Improved splicing chambers were developed, and a new, adjustable cutting system was fitted. The result was a new ends-opposed splicer which was vastly more flexible than its predecessors, the old-style 400 and 500 series.

Like the 101 and 103 splicers, the 1-11 has been designed to be as uncomplicated as possible, with a simple, durable body structure. When the 1-11 was being developed, the opportunity was taken to incorporate modular principles of design. The new splicer therefore is available in twelve different forms, to suit different customer needs. All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed. The new splicer therefore is available in 12 different forms, to suit different customer needs.

- All 1-11 splicers have a simple straight-line string-up.
- All have an unusually simple construction.
- Simple construction leads to simple maintenance; the splicer in its basic form can be completely dismantled and re-assembled in about twenty minutes.
- The splicer has a very strong construction; it resists damage in service very well.
- The splicers contain some new and patented technology, and need a smaller range of splicing chambers than splicers of earlier generations.
- The splicer can join S-twist or Z-twist yarns without any modification; it can even splice S-twist and Z-twist together, or can splice flat yarn to high-twist such as tyre cord.

Typical applications (all models)

Splice format	Ends-opposed
Typical applications	Weaving Knitting Fine-gauge tufting Wool worsted suitings Heat-set synthetics
Yarns	Synthetic continuous filament Synthetic staple Wool worsted Wool/synthetic Glass (low pressure operation) Carbon (low pressure operation)
Yarn count, small splicing chamber	Nm 10 to Nm 200
Yarn count, standard chamber	Nm 2.5 to Nm 20
Yarn count, large splicing chamber	Nm 1.5 to Nm 2.5
Yarn count, extra-large splicing	Nm 0.7 to Nm 1.5 (but cutting may be a problem)
Yarn twist direction	Medium twist, any direction, no modification needed.

1-11 Series splicers – model range

	MODEL	Description	Handle	Hanger	Timer	Flow
1	1-11 H	Portable, hand held	Long	No	No	No
2	1-11 S	Portable, hand held	Short	No	No	No
3	1-11 B	Moveable, rail mounted	No	No	No	No
4	1-11 HT	Portable, hand held	Long	No	Yes	No
5	1-11 ST	Portable, hand held	Short	No	Yes	No
6	1-11 BT	Moveable, rail mounted	No	No	Yes	No
7	1-11 HW	Portable, hand held, hanging assembly	Long	Yes	No	No
8	1-11 SW	Portable, hand held, hanging assembly	Short	Yes	No	No
9	1-11 BW	Moveable, rail mounted, hanging assembly	No	Yes	No	No
10	1-11 HTW	Portable, hand held, hanging assembly	Long	Yes	Yes	No
11	1-11 STW	Portable, hand held, hanging assembly	Short	Yes	Yes	No
12	1-11 BTW	Moveable, rail mounted, hanging assembly	No	Yes	Yes	No
13	1-11 HF	Portable, hand held, flow control	Long	No	No	Yes
14	1-11 SF	Portable, hand held, flow control	No	Yes	Yes	Yes
15	1-11 HFW	Portable, hanging assembly, flow control	No	Yes	Yes	Yes
16	1-11 SFW	Portable, hanging assembly, flow control	No	Yes	Yes	Yes
17	1-11 *E	Extended knife separation	Yes/No	Yes/No	Yes/No	Yes/No

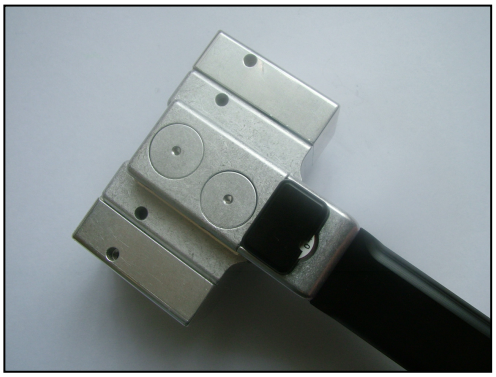
Figure 8. Model 1-11 H. Base unit fitted with simple handle, no timer unit.

This illustration shows a front view of the simple non-timer hand-held splicer, Model 1-11 H. The actual splicer unit is roughly square-section metal unit. Just visible in the black trigger button is the trigger and brass adjusting wheel.

Figure 9. Splicer Model 1-11 S

This illustration shows the Model 1-11 S, the simplest version of the range. The 1-11 S consists of the base splicer, plus a small lower cover. The splicer is designed to be bolted to a textile machine in a fixed position. The small lower cover, in black acetal, can be seen at the base of the splicer. Air enters through the brass union in the lower cover, here wrapped with white PTFE sealing tape.

Figure 10. Splicer Model 1-11 *E



This picture shows a front view of the Model 1-11 HE, the hand-held splicer fitted with side covers to extend the knife-chamber separation. This addition is needed for when extra strength is needed in a single splice configuration.

Figure 11. Splicer Model 1-11 HT

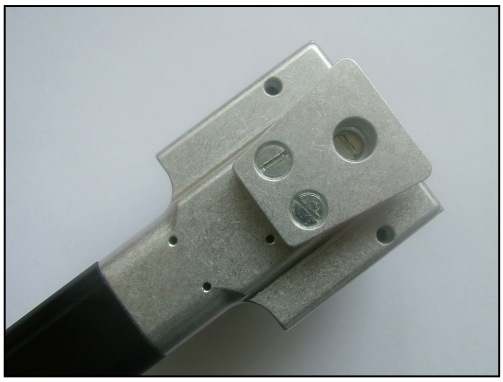
This picture shows the Model 1-11 HT, it comprises two sections the hand-held splicer and the timer box. The blast time is easily adjusted with the dial on the timer box.

Figure 12. Splicer Model 1-11 HF

This picture shows a rear view of the Model 1-11 HF, the hand-held splicer fitted with a flow control. The flow control is clearly distinguishable and easily adjusted.

The five examples above describe the standard splicers in the 1-11 range. The remaining splicers in the range differ only in the provision of a hanging assembly and / or carriage system. The hanging assembly comprises two elements:

Figure 13.

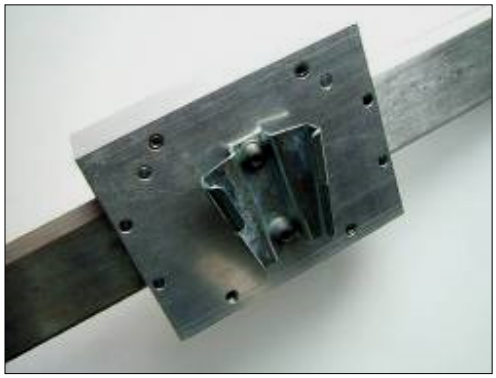


The hanger, fitted to the rear face of each splicer unit. This is a wedge-shaped component, attached to the splicer with two countersunk screws. This illustration shows the hanger, fitted to a splicer Model 1-11 HW. (the third screw which can be seen is the splicing chamber securing screw)

Figure 14.

To complete the hanging assembly, a hanging clip is supplied. Here the hanging wedge is shown sliding into the clip. It is normal for the splicer to be supplied with a number of hanging clips, so that the splicer can be "parked" safely in any number of chosen locations on a textile machine.

Figure 15.



This illustration shows how the hanging clip may be attached to the carriage running along a rail. A splicer equipped with a hanger can the simply be slotted into the clip.

Figure 16.

This picture shows how a Model 1-11 splicer equipped with a hanging assembly can be attached to the carriage, and run along a rail (Model 1-11 BW). The splicer can be removed easily. Alternatively, the splicer can be close-coupled to the carriage.

Maintenance and repair

Maintenance - introduction

The 1-11 has been designed to accomplish its greater variety of functions in the simplest manner possible - great attention has been paid to durability, and ease of maintenance. The base splicer of the 1-11 range has eight sub-assemblies, mounted on a simple body, through which air-ways conduct the compressed air for the splicing action.

1. **Trigger**. Pressing the trigger initiates the splicing operation.

2. **Air valve - blast**. When the trigger is pressed, it moves the valve, allowing compressed air to pass into the main splicer body for splicing.

3. **Air valve - knife**. When the trigger is pressed, it moves the valve, allowing compressed air to pass into the main splicer body for cutting of the waste yarn ends.

4. **Pad.** When the air valve - blast begins to move, it allows compressed air to close the pad onto the surface of the splicing chamber, prior to the splicing operation.

5. **Splicing chamber** This has a profiled recess on the front face which, with the closed pad, forms the volume in which the splice is formed. Movement of the air valve allows compressed air to enter the chamber, to form the splice.

6. **Side plates**. The side plates provide a means of guiding the yarn across the splicing chamber.

7. **Yarn clamps** Yarn clamps attached to the side plates, on either side of the splicing chamber, restrain the yarns, holding them in the correct position for the splicing operation.

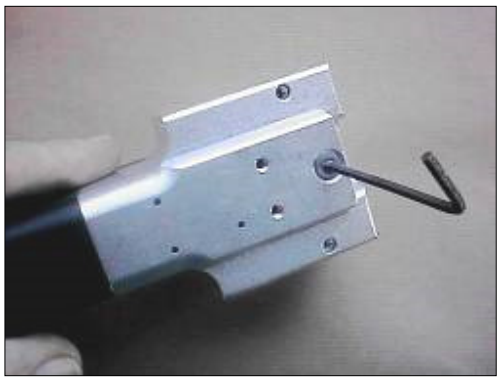
8. **Knives** Two pairs of scissor-knives are fitted, one pair on either side of the splicing chamber. These cut off waste yarn during the splicing operation.

Splicing chamber - removal and refitting

WARNING:

If the splicing chamber is removed while the splicer is connected to the air supply, DO NOT press the trigger; the pad will be blown out of the main bore. This will almost certainly damage the pad spring, and entail some remedial work

Figure 17.



To release the splicing chamber, remove the single fixing screw from the rear of the splicer body. Depending on the date of splicer manufacture, this screw may have a socket head or a cross-head.

The chamber can then be lifted clear of the body. The same general procedure is used, whether the splicer is hand-held, rail-mounted, or fixed, and whether or not the splicer is fitted with a hanger.

In the case of the rail mounted splicer, an access hole for the screw is provided in the carriage assembly.

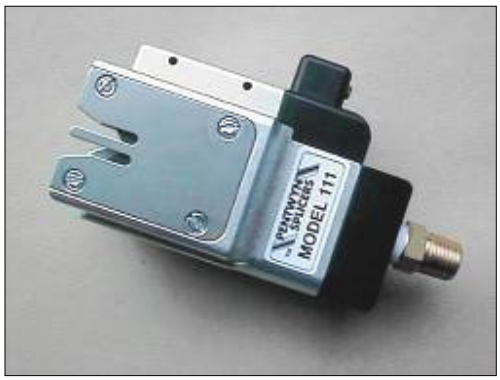
In the case of the fixed splicer, the body must be released from the machine to which it is mounted, to give access to the screw.

Replacement is the reverse of removal. Apply a little thread-locking adhesive to the threads of the fixing screw before reassembly. Before finally tightening the screw, take care to ensure that the chamber is exactly positioned and aligned in the splicer body.

Pad assembly - removal, maintenance, refitting

After some service, especially if lubrication disciplines have been neglected, the chamber pad movement may become slow, or the pad may jam completely in its bore. At this point, it will be wise to remove the pad assembly for some remedial action. The pad may merely need to be lubricated, but it is possible that the assembly may be damaged in some way.

Figure 18.



The picture shows the side view of a Model 1-11 S. (The layout is identical for all models in the 1-11 series). At the top of the picture can be seen the two small threaded holes which accommodate small set screws; the screws secure the sealing plugs of the splicer. There is another pair of similar screws on the opposite side of the splicer.

Figure 19. Undo plug screws

This picture shows the first stage in the removal of the upper sealing plug. The splicer has two pistons and associated plugs; the plugs are seen as circles in this illustration. Each plug is secured by a small grub-screw in the side of the splicer. The plug is released by loosening the grub-screw, using a hexagon wrench as shown.

Figure 20. Upper sealing plug removal

This shows the start of the removal of the top plug which is part of the chamber-pad sub-assembly.
With the small securing screws loosened, the top plug and chamber pad sub-assembly can be removed. A screw, or a length of threaded rod, is introduced into the threaded hole in the plug; the screw thread size will be M3 or M4, depending on the date of manufacture of the splicer. The plug and chamber pad sub-assembly can then be withdrawn.

Figure 21. Remove top plug

This illustration shows the last stage of removing the chamber pad/plug sub-assembly. With the upper plug released, by the removal of the two small grub screws, the plug and chamber pad sub-assembly is simply removed as one unit.

Figure 22. Plug and chamber pad assembly

This picture shows the chamber pad sub-assembly separated from the splicer body. At the top is a pointer. Projecting from the left is the screw used to extract the assembly. There are three parts:
Chamber pad, thick disk with O-ring, to the right.
Pad spring, opposite the pointer.
Plug, the largest element, to the left, which also has an O-ring. The spring is screwed and glued into both the plug and the chamber pad.

Maintenance of the plug/pad assembly.

If the assembly appears to be sound, then lubrication should suffice. Grease the O-ring with a small amount of Molykote 111, and replace the assembly, by reversing the dismantling procedure.

If there is sign of damage (usually a misaligned or rusty pad spring), then the assembly should be dismantled and rebuilt. The individual parts may be obtained from GTW Developments Ltd; alternatively the complete assembly can be ordered as Item Number 1102 A.

Proceed as follows:

1. The pad is tethered to the upper sealing plug by an extension spring; the spring is screwed into the plug, and the pad is screwed to the spring. Dismantle the assembly by unscrewing the components. Unless it is clearly perfect, discard the spring, and use a new one. Thoroughly clean and degrease the threads in the pad and the plug.

2. Before final assembly, it is necessary to ensure that the components will fit together correctly. It is recommended that the components be "dry-assembled". Screw the spring into the plug until four or five coils of the spring remain exposed. Screw the pad onto the spring for a few turns. Check that the rear face of the pad is parallel to the plug, and that the gap between pad and plug is 1.5 to 2.0 mm. If these two conditions cannot be met, then repeat the process of cleaning and degreasing the threads. When the conditions are met, proceed to final assembly, using adhesive.

3. Apply a drop of Loctite Structural Adhesive 326 to the coils of one end of the spring. Screw the spring into the cap until four or five coils of the spring remain exposed. Allow the adhesive to cure for approximately 30 minutes. Apply more adhesive to the exposed coils, and screw the pad onto the spring. Once more, check that the rear face of the pad is parallel to the cap, and that the gap between pad and plug is 1.5 to 2.0 mm. Leave to cure for a further 30 minutes.

4. Lightly smear the pad and O-ring with Molykote grease, and reassemble, by reversing the order of dismantling.

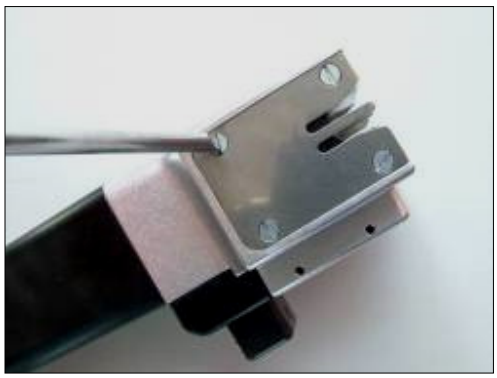
Knife assembly - removal, maintenance, refitting

On each side of the splicer is a knife assembly, consisting of a pair of scissor knives. Each assembly has a fixed knife and a moving knife. The fixed knife is screwed to the body of the splicer; the moving knife is mounted close to the fixed knife, and is driven through a small arc, rotating on a pivot pin, by a peg which projects through the splicer body.

Figure 23. Splicer side-plate

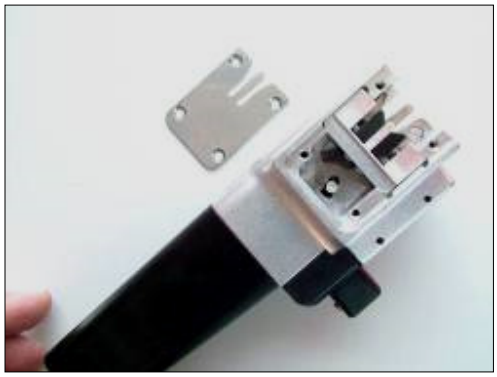
This illustration shows a splicer side-plate, which also functions as a yarn guide plate. This plate is made of quite thick stainless steel. This material is strong, and gives strength to the splicer body. The side plate is not quite symmetrical, as can be seen from the illustration. So each side plate is handed, and the splicer has two different plates. Care must therefore be taken in reassembly of the splicer, so that the plates are fitted in the correct positions.

Figure 24. Remove side-plate



Removal of four screws allows the side-plate to be withdrawn.

Figure 25. Side plate off

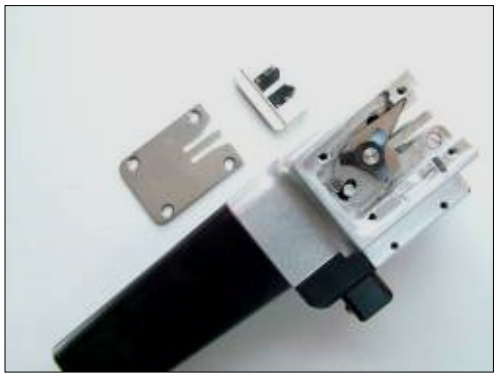


In this shot, the splicer is shown with the side plate removed. The yarn clamp assembly is now revealed, and can be lifted out

NOTE:

When lifting out the yarn clamp assembly it may be necessary to screw in the yarn clamp adjusters a little, so that they do not foul the body.

Figure 26. Yarn clamp holder removed



Clearly visible is the W-shaped yarn clamp holder, and inside it the two black yarn clamps. Also visible is the knife assembly, with its three- legged compression spring, and circular tip of the knife shaft, just below the compression spring.

Figure 27. Yarn clamps alone

This illustration shows the yarn clamp assembly, after removal from the splicer body. This assembly is a single set of clamps, for one side of the splicer. Another identical assembly is fitted to the other side.

The clamps themselves are small black plastic pads, which can be seen clearly in this shot. The clamps float free on small coil springs. Clamp pressure is adjusted by turning small screws. (See Figure 30)

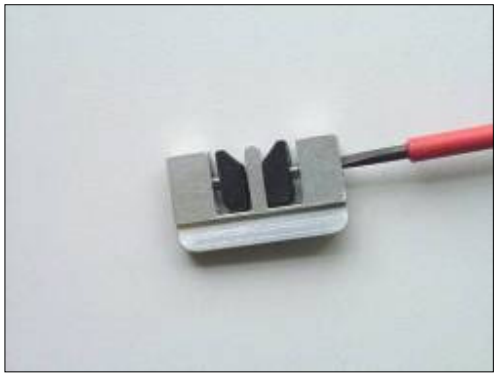
Figure 28. Release stabilising pin

The movement of the yarn clamps is moderated by a stabilising pin, which passes through both of the clamps. The pin can be removed simply, by pushing it out through the whole assembly, using a small thin implement.

Figure 29. Stabilising pin out

Here the stabilising pin has been completely removed, allowing the yarn clamps themselves to be released.

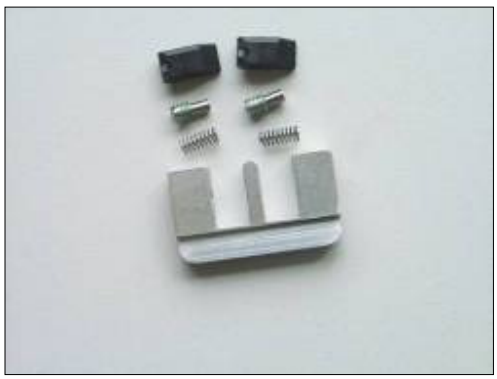
Figure 30. Release yarn clamp adjuster screw



This illustration shows the yarn clamp assembly, after removal from the splicer body.

The clamp pressure adjusting screws fit in small threaded holes; they are removed using a suitable small-bladed screwdriver.

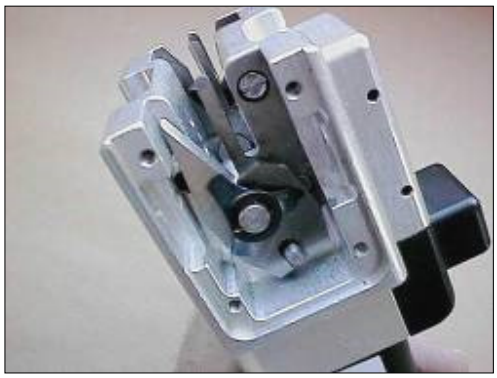
Figure 31. Yarn clamp assembly dismantled



This illustration shows the yarn clamp assembly, fully dismantled. From the top:

- Black nylon yarn clamps
- Yarn clamp pressure adjuster screws
- Yarn clamp pressure adjuster springs
- Yarn clamp holder

Figure 32. Knife assembly in splicer



This illustration shows knife assembly (left side) after the yarn clamp assembly has been removed. A similar knife assembly is fitted to the other side. The knife assembly consists of a pair of knives, one fixed and one moving. Note the knife drive shaft, a rod whose tip is just visible at the bottom of the moving knife. Note the circlip and three-legged spring, which together apply a compressive force to the knife assembly.

Figure 33. Knife assembly close up

This is a close-up of the knife assembly. The components are as follows:

A knife pivot, the large bright disc just right of centre. On the pivot fits a circlip, securing a three-legged spring. One leg of the spring, top, has a small projection locating in a hole in the moving knife. The moving knife is shaped like a figure "6" lying on its back. The drive shaft for the moving knife is visible at the right, located in a slot in the knife. The fixed knife lies under the moving knife; one of its securing screws can be seen at upper left.

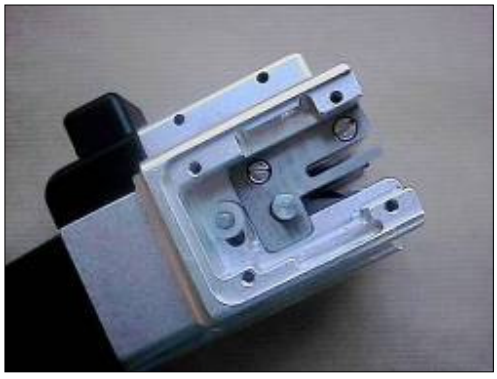
Figure 34. Remove circlip

This illustration shows the start of the procedure for removing the knife spring and moving knife. The knife assembly is shown close-up, as in Figure 33, above. The securing circlip is released by the sideways push of a small screwdriver or other tool, or by the use of special circlip pliers.

Figure 35. Knife spring removed

This frame shows the knife cluster after the removal of the knife circlip and compression spring. Knife drive shaft is clearly visible at left. Knife pivot is at centre. Knife spring locating hole is clearly visible at the top of the moving knife. One of the two screws for securing the fixed knife can be seen at upper right.

Figure 36. Moving knife out

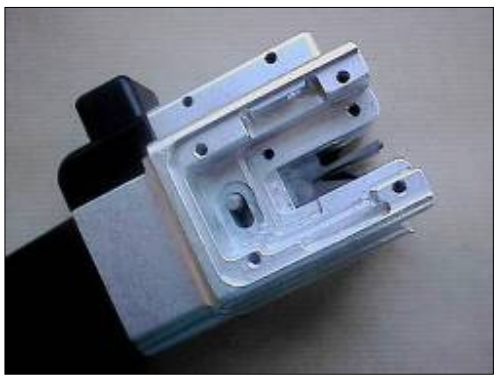


This illustration shows the splicer after the removal of the moving knife. The fixed knife, and both its securing screws, can now be seen completely. Note the white spacer fitted over the end of the knife drive shaft. The spacer imparts a slight scissor angle to the knives. The knife pivot remains in place, coming free only when the fixed knife is removed.

Figure 37. Spacer out

This frame shows the splicer with the moving knife and the spacer removed. The knife shaft is clearly visible at the left. The knife pivot remains in place, coming free only when the fixed knife is removed.

Figure 38. Both knives out



This illustration shows the splicer, once both knives and the spacer have been removed. Removal of the knife spacer has exposed fully the end of the knife shaft. The shaft moves back and forth in the oval hole, driven by an internal piston, to drive the moving knife. The shaft projects similarly on the other side of the splicer, to drive the other moving knife.

Reassembly notes

Reassembly is the reverse process.

1. Check the condition of the knife drive shaft. It is made of hardened steel, but may have worn after extended service. If its diameter has reduced, then the movement of the knife will be reduced.
2. Check the condition of the spacer. If it is damaged, replace it. The spacer defines the small scissor angle of the knives.
3. The three-legged spring has a small extension to one of its legs. This should be located in a small hole in the moving knife.
4. If the yarn clamp pressure screws were moved while removing the clamp assembly, re-set the clamps.

Knife drive - removal, maintenance, refitting

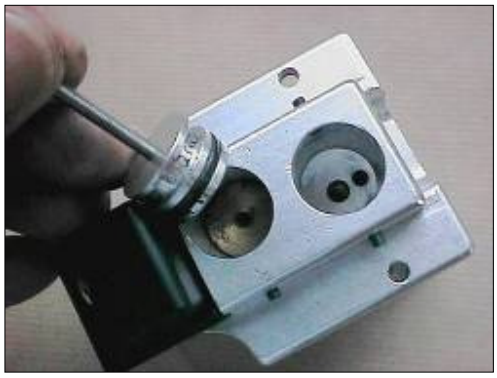
Removal notes

First remove the knife assemblies as in the previous section. The knives are driven by the knife piston in the upper bore, which is controlled by the left-hand air valve. This air valve allows air into the upper bore. The piston is driven forward, carrying with it the shaft, whose two ends drive the knives. Removing the knife drive assembly involves removing the shaft and the drive piston.

Figure 39. Removal of lower sealing plug

This illustration shows the first stages of the removal of the lower sealing plug, under which is accommodated the knife actuating piston. The two small securing grub-screws are loosened using a hexagon wrench (the picture shows the screw on the right-hand side being released) Note the two different lengths of screw. With the small screws released, the plug can be removed, but it is not possible to grip the plug with the fingers. The plug has been provided with a threaded hole, size M3. Screw in a length of M3 threaded rod, or an M3 screw. This will be size M3 or M4, depending on the date of manufacture of the splicer.

Figure 40. Knife piston plug removal



This frame shows the removal of the knife piston plug. With the securing screws loosened, and the screw in place, the plug can be withdrawn. The knife actuating piston is clearly visible inside the lower bore. It is necessary to remove the knife drive shaft before the piston can be removed.

Figure 41. Unlock knife drive shaft

This illustration shows the first step in the release of the knife drive shaft. The knives are actuated by a shaft, driven by the piston which is visible in the lower bore, in this photo. The knife shaft passes through a hole in this piston, and is secured in the piston by a small grub-screw. To release the knife drive shaft, undo the screw, using a hexagon wrench as shown.

Figure 42. Remove knife drive shaft

This picture shows the final stage of the removal of the knife shaft. The last internal components of the splicer body to be removed are the knife drive piston and the knife drive shaft. The knife shaft must be removed first. After the shaft has been released, by freeing the screw as in Figure 41, the shaft can be pushed out through the side of the body as shown. Once the shaft has been removed, the drive piston can be withdrawn.

Figure 43. Remove knife drive piston

The final component to be removed is the knife drive piston.

Removal of the knife drive shaft leaves the drive piston completely free to move in the lower bore. Use a piece of M4 threaded rod, or a long M4 screw, to remove the piston. Turn the screw a few times, so that it enters the threaded hole in the piston. Pull out the screw, and, with it, the piston.

Figure 44. Knife drive piston assembly

This photograph shows the knife drive piston, completely removed from the splicer. Note that the M4 screw remains attached to the piston, after being used to withdraw the component from the splicer. The piston return spring also remains attached, at the left of the frame. Note the hole through which the knife drive shaft passes. Note the two sealing O-rings. The piston may be made of brass or acetal, depending on the date of manufacture of the splicer.

Reassembly notes

Reassembly is the reverse of the dismantling process.

1. Apply a small amount of Molykote grease to the piston before inserting it into the splicer body.
2. Ensure that the holes in the drive piston line up with the corresponding holes in the splicer body, to allow easy fitting of the shaft.
3. Line up the shaft so that it projects equally on either side of the splicer body.
4. Be sure to re-tighten the grub-screw which fixes the peg in the piston.
5. Lightly grease the projecting tips of the shaft.

Trigger assembly, valves: removal, refitting

Removal notes

When withdrawing the valves, take careful note of positions of valves, and of minor components such as air valves and shells. Failure to reassemble in the correct sequence will compromise the performance of the splicer.

Figure 45. Removal of trigger button

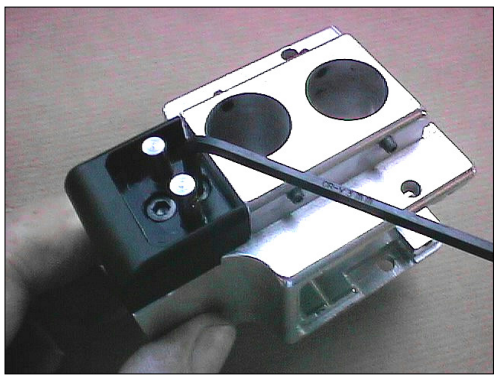
This illustration shows first stage of removing the trigger button.

The illustration shows the lower part of the splicer, with the trigger button and the trigger housing. The trigger button is secured to the main air blast valve by a small screw, which passes through the base of the button. The screw is released by using a hexagon wrench as shown. The button is lifted off, complete with the brass knife adjuster wheel.

Figure 46. Trigger off; valves exposed

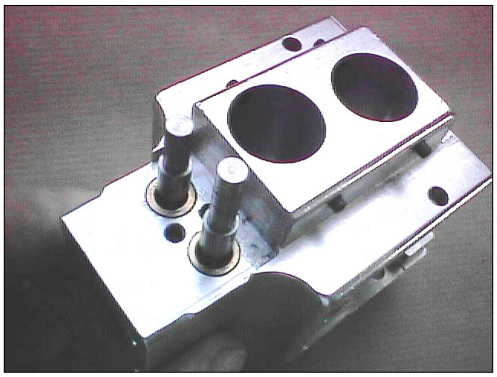
This frame shows the trigger housing and valves, after removal of the button. The ends of the two main air-valves can be seen projecting from the recess in the trigger housing. Clearly visible inside the recess are two hexagon screws; these screws attach the trigger housing to the main splicer body, and retain the air valves.

Figure 47. Release trigger housing



This illustration shows the first stage in the removal of the black trigger housing. The picture shows the two main air valves. The longer valve, at right, controls the main splicer blast. The shorter valve, at left, controls the timing of the knife cut. The trigger housing is released by removing the two socket head screws, The picture shows a hexagon wrench releasing the first of the screws.

Figure 48. Exposure of air valves



This picture shows the two air valves, just before removal from the splicer. The trigger and trigger housing have been removed. The different lengths of the two valves can be seen clearly in the picture. The valves can now be removed. This is done simply by pulling upward. After the valves are removed, the internal components (air shells and O-rings) can be extracted.

Figure 49. Valve assemblies

This photograph shows the two valves which fit inside the main splicer body. The upper, shorter valve controls the knife timing; the lower valve controls the chamber pad and the main air blast.
Note the length difference. Both valves are fitted with springs, which bear on the inner surface of the splicer body, to return the valves to the rest position after splicing. Both valves have the same arrangement of shells and O-rings. The arrangement is (from right, or deepest in the bore):

O-ring, Shell, O-ring, Shell, Shell, O-ring, Shell, O-ring, Spacer washer

Refitting notes

Re-fitting is the reverse of the above. Take particular note of the following:

1. The sequence of O-rings and shells should be correct, as shown in the illustration.
2. The shells and O-rings should be lubricated with Molykote grease before replacement.
3. Since the two valves are different, they should each be fitted in the correct bores.
4. When the trigger button is replaced, ensure that its fixing screw enters the small locating hole in the valve stem.

Appendix 1. Troubleshooting

1) Sticking pad

Occasionally, a pad may stick because of some form of damage to the internal components, but the explanation is normally much simpler; a lack of lubrication around the O-rings which seal the pad assembly, or an extension spring which has come adrift.

Remove the pad assembly. Clean the pad assembly and the surface of the large bore with a small quantity of light solvent

Examine the pad assembly for signs of damage - particularly a damaged or displaced extension spring. If there is damage to any of the components, **proceed as in the section in the main text, dealing with the pad.**

Examine the surface of the large bore. Minor scuffing - the stuff of normal wear and tear in service - should be of no consequence. Look closely, to determine whether the bore surface is scratched. This is a very rare occurrence, usually associated with an earlier rebuild having gone wrong. Minor scratching can generally be rectified with careful use of a reamer.

When any faults have been eliminated, reassemble as in the main text.

2) Poor cutting

Good performance from the cutting knives is essential for satisfactory splicing efficiency.

Most important; is the yarn simply too big or too tough for the splicer? First, there is a simple physical limit to the size of what can fit into the knives. Second, certain materials pose big problems, because of their physical properties. Kevlar, for instance, will blunt standard steel knives very quickly.

Obviously, all knives will eventually become blunt, even in perfectly normal service. If the poor cutting performance is simply a matter of long service, new cutters can be purchased from GTW Developments Ltd. Alternatively, provided that the knives have not worn too far, we can offer a resharpening service.

Sometimes, cutting performance is poor, but it is known that the knives are not near the end of their normal service life. In that case, try some of the following:

2.1) Knife travel.

When the splicer is operated, and the knives move, there should be reasonable overlap of the edges in the cutting zone. If there is no overlap, there are a number of possibilities:

The knives may have been resharpened too many times**. Remove the knives and replace with new. See main text.**

The shaft may be a sloppy fit in the pocket at the base of the moving knife - this can happen if either the knife slot or the peg are worn. **Replace knife or peg as appropriate. See main text**

The knife piston may be sticking. **Remove piston, as in the main text.** Service or replace.

2.2) Knife and accessory wear/damage

The knives may appear to be satisfactory, but there may be damage to the cutting edge at its lowest point. This is rare, but may happen if something has happened to force the knives over into an excessive scissor angle. Such misalignment causes chipping of the cutting edge where contact is first made. **Replace the knife, as in the main text.**

Examine the small spacer washers, located on either side of the splicer, over the ends of the shaft. The purpose of the spacer is to provide the slight scissor angle mentioned above. The spacer may be absent, or worn, or damaged. **Replace the spacer, as in the main text.**

Check for correct seating of the compression spring. If it is not seated correctly, **remove and re-seat, as in the main text.**
Check to see whether the arched compression spring has become flatter than normal. If it has, remove the compression spring, and fit a new one.

3) Poor splicing

Trouble with splicers generally takes one of two forms:

- Splicing performance deteriorates without apparent breakage or malfunction
- Pieces break or malfunction

This section is concerned only with splicing performance.

If there is no apparent damage to the splicer, there may still be something subtle, which cannot easily be seen. It will be best, however, to look at the possible causes which are easy to spot. These include:

Simple checks:

1. Has yarn specification changed markedly? The splicer is very flexible, but it can't do ALL yarns on one configuration. If the yarn has changed, try adjusting the knife wheel.
2. Is the air pressure as it should be?
3. Are there any obstructions in the main air line?
4. Are there any signs of obstruction within the splicer itself? (it has been known for foreign matter to get into the air-line, and to obstruct the chamber blast hole; this is usually accompanied by a reduction in the noise level of the blast)
5. Have operating procedures changed?
6. Has the adjusting wheel moved?
7. If fitted, has the timer calibration changed?
8. Are the knives cutting perfectly? Slight deterioration of performance on one side can result in poor splicing.
9. Are the yarns slipping in the clamps? Sometimes the yarns will slip, and "balloon" in the region between clamp and chamber, giving a bad splice.

Appendix 2. 1-11 Series splicers – more information

Figure 50. 1-11 H splicer

All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The 1-11 H is a variant of the 1-11 which has a simple one-piece acetal handle. It is designed to be held by the operator, and simply carried from place to place as needed. The 1-11 H is made of two main components:

- A Model 1-11 carcass
- A handle

In the illustration, both these elements can be seen clearly; the handle is secured to the carcass in use by two long through-bolts.

The Model 1-11 H is NOT fitted with an automatic blast timer. We have found that many users are perfectly capable of making acceptable splices without the need to resort to blast timing, and wish to avoid the additional costs which timing incurs. If the customer does decide to opt for timing, he can choose the 1-11 HT counterpart - or indeed can convert easily from H to HT at a later date at modest cost. (This is one of the benefits of modular construction.)

The Model 1-11 H is generally used in environments such as large creels. It can be carried from position to position, and its ease of use may be enhanced if the creel has a number of quick-release air connectors, fitted at convenient positions round the frame of the creel.

Like all 1-11 series splicers, the 1-11 H uses our patented splicing chamber technology, derived from that originally developed for the Model 101. This makes the 1-11 extremely flexible in its operation. Like all 1-11 series splicers, the 1-11 H uses our unique knife control system, which makes the 1-11 more flexible still.

Figure 51. 1-11 HT splicer

All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The Model 1-11 HT is fitted with an automatic blast timer housed in a separate unit. The 1-11 HT is designed to be held by the operator, and simply carried from place to place as needed.

The 1-11 HT is made of two main components:

- A Model 1-11 carcass
- A timer assembly

In the illustration, both these elements can be seen clearly.

The Model 1-11 HT is generally used in environments such as large creels. It can be mounted on a rail or carried from position to position, and its ease of use may be enhanced if the creel has a number of quick-release air connectors, fitted at convenient positions round the frame of the creel.

Like all 1-11 series splicers, the 1-11 HT uses our patented splicing chamber technology, derived from that originally developed for the Model 101. This makes the 1-11 extremely flexible in its operation. Like all 1-11 series splicers, the 1-11 HT uses our unique knife control system, which makes the 1-11 more flexible still.

Figure 52. 1-11 S splicer

All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The 1-11 S is a variant of the 1-11 which is designed to be fitted at a fixed position on a textile machine. This arrangement has the disadvantage that the splicer cannot be moved about, but the advantage that it is almost immune to accidental damage. It is made of two main components:

- A Model 1-11 carcass
- A black acetal lower cover

In the illustration, both these elements can be seen clearly; the black acetal lower cover is secured to the splicer by short through bolts. The rear surface of the splicer is provided with tapped holes, so that the splicer can easily be secured to a machine.

The Model 1-11 S is NOT fitted with an automatic blast timer. We have found that many users are perfectly capable of making acceptable splices without the need to resort to blast timing, and wish to avoid the additional costs which timing incurs. If the customer does decide to opt for timing, he can choose the 1-11 ST counterpart - or indeed can convert easily from S to ST at a later date at modest cost. (This is one of the benefits of modular construction.)

The Model 1-11 S is generally used in environments where heavy usage in a fixed position is expected.

Like all 1-11 series splicers, the 1-11 S uses our patented splicing chamber technology, derived from that originally developed for the Model 101. This makes the 1-11 extremely flexible in its operation. Like all 1-11 series splicers, the 1-11 S uses our unique knife control system, which makes the 1-11 more flexible still.

Figure 53. 1-11 Rail splicer

All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The 1-11 Rail splicer is a variant of the 1-11 which is designed to be fitted to a mono-rail, so that the unit can be moved up and down the length of a textile machine. It is made of four main components:

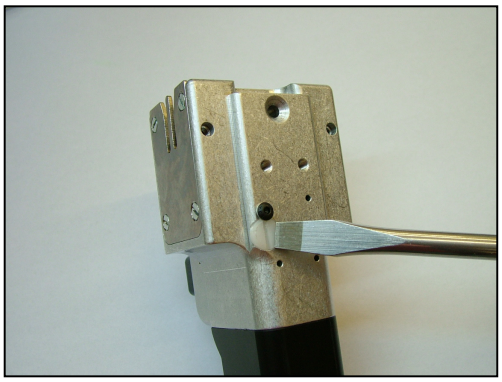
- A Model 1-11 carcass
- A carriage unit
- A rail assembly

In the illustration, the elements can be seen clearly; the carriage unit is the rectangular aluminium component to which the splicer is attached.

The Model 1-11 Rail splicer is NOT fitted with an automatic blast timer. We have found that many users are perfectly capable of making acceptable splices without the need to resort to blast timing, and wish to avoid the additional costs which timing incurs. If the customer does decide to opt for timing, he can choose the timer option.

The Model 1-11 Rail splicer is generally used in environments where free and frequent movement of the splicer is needed without encumbering the operator - a bit-winding machine, for example. The carriage and rail assemblies represent additional cost over a plain splicer. However, significant saving may be made overall, as it becomes convenient to use a single splicer, or a very few, to cover the length of the entire winding machine. The alternative would be to use one splicer per position, which would be expensive.

Figure 54. 1-11 HF splicer



All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The Model 1-11 HF is fitted with a flow control screw. This screw is located at the rear of the splicer and acts as an internal pressure regulator for quick adjustments of line pressure as needed. It is made of three main components:

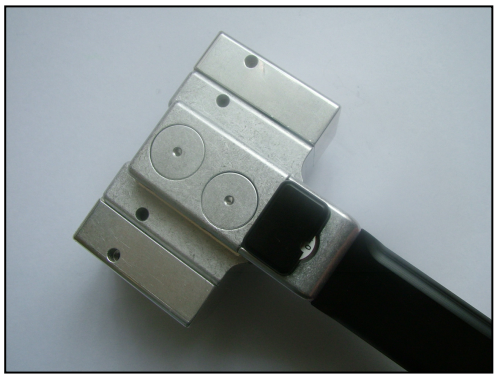
- A modified Model 1-11 carcass
- A handle
- A flow control screw

In the illustration, the elements can be seen clearly; the screw orientation of the flow control is visible on the back of the splicer and can be adjusted by a screw driver and locked into place with a socket screw.

The Model 1-11 HF is generally used in environments where pressure regulators are not available or if the individual splicer is going to be splicing many different counts.

Like all 1-11 series splicers, the 1-11 HF uses our patented splicing chamber technology, derived from that originally developed for the Model 101. This makes the 1-11 extremely flexible in its operation. Like all 1-11 series splicers, the 1-11 HF uses our unique knife control system, which makes the 1-11 more flexible still.

Figure 55. 1-11 HE splicer



All of the Model 1-11 series of splicers have a common base unit. Parts are added to the base unit, to make up the complete splicer assembly as needed.

The Model 1-11 HE is fitted with side covers on both left and right in order to extend the knife separation. The increased splice length improves overall splice strength where high pressure is unattainable. It is made of four main components:

- A Model 1-11 carcass
- A handle
- A left hand and right hand side cover

In the illustration, the elements can be seen clearly; the side covers are visible on both sides of the 1-11 carcass

Appendix 3. Compressed air

Pneumatic splicers are operated by compressed air. Therefore the air supply must be appropriate. The following points are important:

1. Splicers generally operate at a pressure between 3 and 8 bar.
2. Pressure may vary according to application, but it must be as uniform as possible.
3. The air supply should be reasonably dry and clean, with the lowest possible flow resistance.
4. Because the time taken to make a splice is short, transient pressure drops associated with other demands in the mill may become important,
5. When the splicer is operated, line pressure at the splicer head normally drops by about 1 bar. If there are restrictions in the line, air will not be replenished, so that the pressure drop will be greater; weak splices may result.
6. Compressed air installations should therefore be designed to minimise pressure drop.
7. Never use narrow-bore supply tube; this introduces resistance.
8. When there is doubt about the quality of the air supply system, a pressure gauge should be fitted - temporarily - as near as possible to the splicer, so that static pressure and pressure drop can be monitored. This is particularly desirable in an installation which uses long lengths of coiled hose; losses in such hoses then to be significant.
9. Sometimes, static line pressure is known to be adequate, but there are demonstrable problems with transients. Then it may be useful to fit a few meters of wide-bore pipe or other form of plenum, close to the splicer. This will act as a reservoir, to minimise pressure drops while the splicer is in use.
10. Do not fit lubricators in the line very near to the splicer; an excess of oil on the yarn may weaken the splice.

Compressed air and safety

All our splicers have been designed with safety in mind. The few moving parts have been enclosed or shielded to reduce the possibility of injury to the operator. In normal use, the only component which is in any way a source of hazard is the knife assembly. By design, however, the blades are difficult to reach, and are not dangerous in any normal circumstances. Knives represent a hazard only during removal and disposal. So, in normal use, the splicers present no risk.

However, the splicers do use compressed air, and that has the potential to cause injury.

1. Compressed air is dangerous: avoid any bodily contact with it.
2. Always follow the safety precautions recommended by the compressor manufacturer.
3. Always ensure that unions and connectors are fully tightened and sealed, and that there are no leaks.
4. Check the conditions of air supply lines on a regular basis. Always ensure that any flexible hoses are unblemished; if there are any cuts or abrasions to the outer surface of the hose, stop using the splicer and have the hose replaced by qualified personnel.
5. Do not look into the working parts of the splicer when it is being operated.
6. If a splicer malfunctions, do not use it until it has been repaired by qualified personnel.
7. For maintenance staff, additional advice is necessary. When cleaning or servicing is being carried out, access to the internal mechanism of the splicer is essential. Under these circumstances, maintenance engineers will be at greater risk than ordinary users. The engineer should adhere strictly to the following guidelines:
8. Before undertaking any service work, disconnect the splicer from the air supply.
9. During service work, exercise care while handling knives and springs.
10. Under normal circumstances, always refit safety covers before reconnecting the splicer to the air supply.
11. Under exceptional circumstances, it may be necessary - for test purposes - to reconnect the splicer to the air supply without its safety covers. While the splicer is being tested, wear protective gear and exercise due caution.

Compressed air and noise

A splicer uses compressed air, which for a brief period - about 1 to 2 seconds - is vented to atmosphere while the splice is being made. Air at perhaps 7 bar pressure escapes through a small blast hole, creating intense turbulence in a small volume. Noise is inevitable.

Typical maximum noise levels vary from 80 db to 98 db, depending on the splicing chamber.

Some chambers are quieter than others, simply because they have a smaller blast-hole, and allow less air to escape.

Our noisiest splicer, with the biggest blast hole in our range, generates a noise spectrum as shown in the table below:

Hz	63	125	250	500	1000	2000	4000	8000	16000
dB	47	52	57	63	74	89	92	93	95

In practice, splicers are barely noticeable in a textile mill. This is because the other mill machinery tends to be very noisy, and the sound of the splicer is lost in the general noise. Also, the blast only lasts for about one second.

Nevertheless, in compliance with UK health and safety regulations, we recommend that ear defenders (to local standards equivalent to British Standard 6344 Part 1) be worn.

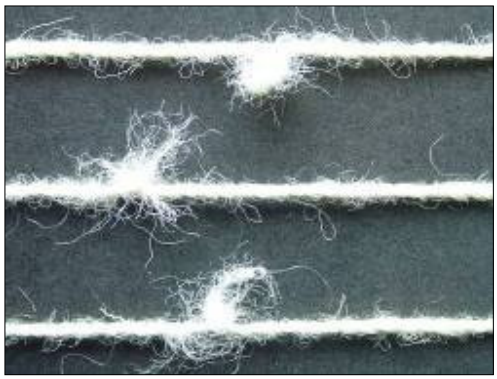
Appendix 4. Making an ends-together splice

VERY occasionally, the user may wish to make a splice which we call "ends-together". The ends together splice is less attractive than the one described above, but it may be useful in special circumstances.

Figure 56. Ends-opposed splice

The splices shown here are the conventional ends-opposed joints, for which the 1-11 Series splicers have been designed. The splices have a smooth appearance.

Figure 57. Ends-together splice

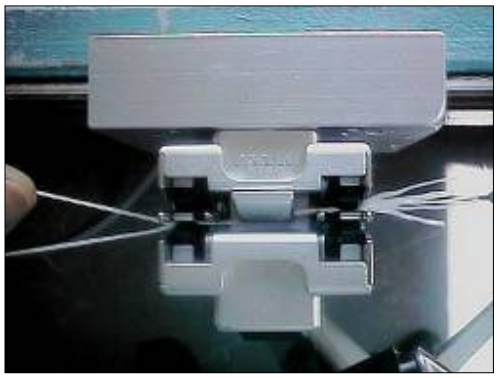


The splices shown here are the ends-together joints, for which splicers such as the 101 Series are normally used. The appearance is less good, but the splice can be made very quickly.

Figure 58. First stage: present both yarns to splicer

The yarns enter together, here from the right-hand side. The yarns enter via the upper right clamp, and leave via the lower left clamp.

Figure 59. Second stage: place yarns in splicer



The two yarns are placed together into the splicer. The yarns enter here from the left-hand side, and are threaded diagonally, in a form which is arranged so that only the free ends are cut.

Third stage: make the splice

Press the trigger in one swift, single movement. Press the trigger until the chosen blast period has elapsed, or until the fully-formed splice escapes spontaneously from the chamber.

Figure 60. Fourth stage: withdraw the completed splice

The completed splice is withdrawn from the splicer. The two yarns have been tightly intermingled over about 15 mm. Once the yarns have been withdrawn, it will be necessary to part them, and to open up the structure. With the yarns once more in a single line, the characteristic "tail" of the ends-together splice will appear, roughly at right-angles to the line of the yarns.

Appendix 5. 1-11 Series splicers – parts list

Description	Item No.	Part No.	Quantity
1/4 " BSPP x BSPP adapter	157	22000-04-04	1
Knife spring	241	201-1088	2
Shutter spindle-30.3mm long	252	201-1006-3	2
'O' Ring - BS010	264	01-10-10	8
Shell for air valve-43004-A3	276	2200-43-04	8
2 mm tapered Al plugs	280	201-1055	2
Label, ear protection	282	201-1256	1
Yarn clamp spring	307	301-1007	4
M3 x 4 socket set screw	501	17-13-04	1
M3 x 6 slotted countersunk head screw	516	16-43-06	12
Knife piston return spring	530	10-136-013	1
M5 x 20 socket cap head screw	647	11-15-20	2
M4 x 20 countersunk slotted head screw	705	16-44-20	1
5 mm spacer	717	10-133-107	2
Timer adjusting valve-SCA-M5-A	719	2200-40-50	1
'O' Ring RM0050-15	729	02-05-15	2
Adjusting wheel spring	780	10-136-017	1
Air valve return spring	787	10-136-018	2
O-ring BS006	788	01-10-06	1
M4 x 6 socket set screw	869	17-14-06	2
Shutter pad	899	10-113-112	1
Spacing bush	902	10-133-114	2
Extension spring	904	10-136-113	1
'O' Ring RM0140 - 20	905	02-14-20	5
Blast valve & yarn clamp adjusting screw	1017	10-138-118	5
M5 x 100 socket cap head screw	1035	11-15-100	2
Locking pad	1039	10-111-114	1
M4 x 4 socket set screw	1040	10-138-114	1
Knife piston	1097	10-113-119	1
Lower sealing plug	1098	10-135-128	1

Adjusting wheel	1099	10-173-107	1
Splicer Body 1-11	1100	10-100-120	1
Upper sealing plug	1102	10-135-126	1
Air valve - blast	1104	10-113-121	1
Air valve - knife	1105	10-113-122	1
Knife pivot	1106	10-137-149	2
Yarn clamp block	1107	10-142-115	2
Yarn clamp pad	1108	10-142-117	4
Trigger housing	1109	10-121-102	1
Spacer - moving knife	1110	10-133-118	2
Trigger button	1111	10-114-102	1
Plain handle (100 mm)	1114	10-119-104	1
R.H. moving knife	1115	10-106-125-1	1
R.H. fixed knife	1116	10-106-126-1	1
L.H. moving knife	1117	10-106-125-2	1
L.H. fixed knife	1118	10-106-126-2	1
Splicing chamber		To be specified by customer	1
O-ring - body to handle	1123	BS 014	1
Circlip	1124	65-15-21	2
M6 x 6 socket set screw	1125	17-16-06	1
M6 x 4 socket set screw	1126	17-16-04	1
M4 x 8 socket cap head screw	1127	11-14-08	2
M3 x 10 socket set screw	1128	17-13-10	3
Lower cover 1-11	1129	10-177-107	1
Scale-adjuster wheel	1130	10-139-138	1
Knife shaft 1-11	1131	10-137-150	1
R.H. side plate	1132	10-105-147-1	1
L.H. side plate	1133	10-105-147-2	1
Adjusting wheel pin, 3 x 7.8 NR 1-11	1136	10-137-153	1
Protection cap 1-11	1140	10-cap-111	1
Timer box assembly	1168	10-119-110	1
Flow restrictor valve	1162	10-113-114	1
O-ring BS006	788	01-10-06	2
Flow Restrictor Valve Assembly	1163	10-113-114A	1

Hanging Assembly parts			
Splicer holding clip	170	201-1199	SPECIFY
C/sunk slotted screw M4 x 16	908	16-14-16	2
Hanging wedge (adaptor plate)	1008	10-165-109	1
Side Cover parts			
Knife shaft 1-11E	1170	10-137-160	1
M3 x 25 countersunk slotted head screw	1042	25-43-25	8
R.H. Side cover	1171	10-177-117	1
L.H. Side cover	1172	10-177-118	1
R.H. Side cover assembly	1174	10-177-120	SPECIFY
L.H. Side cover assembly	1173	10-177-119	SPECIFY

MODEL 1-11 Assembly