airbond

THE QUEEN'S AWARDS FOR ENTERPRISE: INNOVATION 2019

Airbond Splicers

133 Series Splicers

Splicers for Carpet and Upholstery Yarns

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The new-generation Airbond splicers

Airbond has a well-established reputation for supplying tough, reliable splicers. We have achieved this reliability by developing simple designs, and by the use of rugged components.

We have now moved on; our products are now even simpler, and even stronger. We've done this by investing in cutting-edge new additive-manufacturing (3d printing) technology.

From 2020 onward, all Airbond products will be printed, in materials which are more durable than those used in the past.

The first generation of printed products will be familiar to our customers; they are direct replacements for the existing products - identical in shape and function.

The Model 133 is the printed equivalent of the long-established 103.

Model 133

All the merits of the class-leading Model 131 – with auto-cut

The 133 is the latest development of the splicing principles established long ago by the Airbond Models 101 and 105.

Those splicers are still used and respected world-wide by carpet manufacturers and spinners. The 103 improved on them; its performance was enhanced with the fitting of a set of automatic cutters, which are adjustable for optimum performance.

The new Model 133 is a lighter, stronger, better counterpart to the old Model 103. The new 133 moves standards up even further, by reducing the need for operator skill.

Like its predecessors, the 133 joins a vast range of yarns. It can join high- or low-twist, S-twist or Z-twist on one chamber. Even S-twist to Z-twist, wool to cotton, glass to tyre cord.

Because it is printed, its body can be supplied in many forms. In its base form, it can be a tiny splicer, designed to work in confined spaces; but it can be fitted with handles, or with a hanging device to be used in a fixed position, or with a carriage for sliding along a rail. It can be also offer enhanced yarn control – using a side-plate fitted with yarn clamps. It can have flow control, so that line the air blast can be adjusted without altering the factory line pressure.

The range is simple, durable, and easy to maintain. The splicers can handle a wide range of yarn counts

Splice format	Ends together.
Industrial applications	Carpet weaving, carpet tufting, knitting, upholstery yarns, fancy yarns.
Yarns:	Nylon, Polyester, Synthetic C.F., Synthetic staple, Worsted spun, woollen spun, all blends.
Yarn counts:	Nm 0.7 to 200, 5 to 1500 tex.
Twist	Any twist direction and level. S twist to Z twist. No modification needed.

Getting started

Model 133 – 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; those 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 may have some or all of the following:

- Additional splicing chamber(s)
- Optional hanger
- Optional hanging clip
- Optional flow control device

It may be useful to have a fixed place to store the splicer temporarily when the operator has finished, in which case you will have specified the "W" modification. This modification will change the splicer designation – the Model 133 H, for example, becomes the 133 HW. If it has been supplied, bolt the hanging clip to a convenient spot on a machine. 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.

You may have chosen to have a flow control device fitted. In that case, you will have specified the "F" modification. This modification changes the splicer designation further – the Model 133 H, for example, becomes the 133 HF, and the Model 133 HW becomes the 133 HFW.

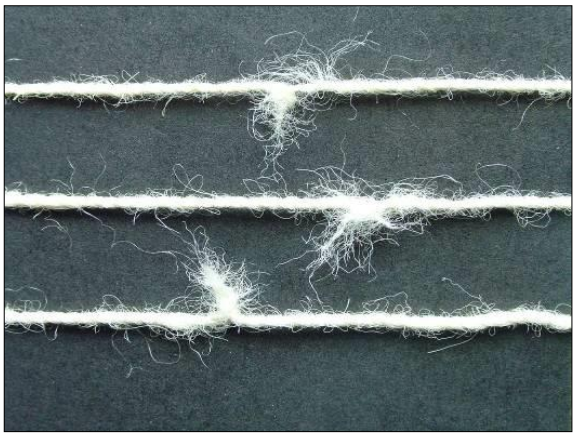
Connect the splicer to an air line.

Under normal circumstances, the line pressure should be around 6 bar. 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

Making a splice

Ends-opposed splices.

Suitable for higher-quality applications



Ends-together splices.

Suitable for less critical applications

Splicer threading - Model 133: Making an ends-together splice

First stage: place yarns in splicer

The yarns enter the splicer together, here seen from the right-hand side. The yarns enter via the yarn entry side plate, and leave via the yarn exit side plate.

The incoming yarn should be lightly gripped (on the right in this picture) by one or two fingers of the right hand.

The splicer seen from the exit side. In some variants of the Model 133, the configuration on the exit side includes an adjustable yarn clamp; other variants have a plain exit plate, without a yarn clamp.

Here the yarn has been pulled down so that it engages fully with the clamp, while the splice is being made.

Splicer threading - Model 133: Making an ends-together splice

Second stage: make the splice.

Press the trigger in one swift, single movement.

Hold the trigger until the chosen blast period has elapsed, or until the fully-formed splice escapes spontaneously from the chamber.

Frequently, the spliced joint will emerge without any operator intervention; here the splice is emerging from the splicer , After about one second's duration of the blast..

Occasionally, it may be necessary to draw the tarn gently from the chamber.

Withdraw the completed splice; the two yarns will be tightly intermingled over about 15 mm. Once the yarns have been withdrawn, you should part them, 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.

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 133 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 133 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.

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.

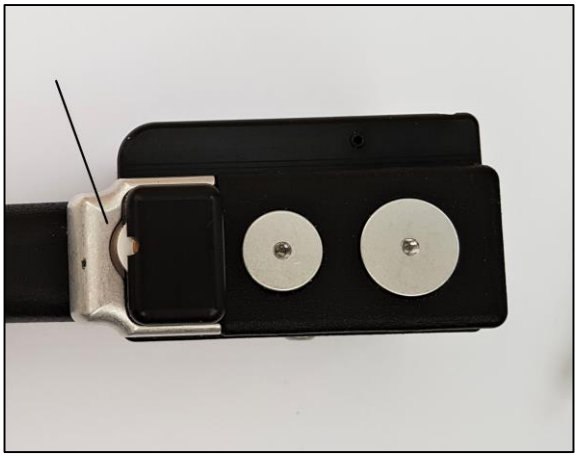
This photograph shows the trigger, detached from the splicer.

The variation of width of the adjusting wheel can be seen clearly.

The adjusting wheel has seven settings – from 0 to 6.

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.



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

At setting 6, the thinnest part of the adjusting wheel faces the valve, touching he valve only after substantial movement of the trigger; the knives cut after the air blast has started.

Important service information

Apart from accidental damage, and the occasional replacement of cutters, the Model 133 requires very little attention. However, one aspect of maintenance should NEVER be neglected. The upper bore, in which the chamber pad moves, needs 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 cap and pad assembly 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.

Model 133 – General product information

Introduction

The 103 Series of splicers has been an important product in the Airbond range for many years. It was the outcome of a programme to apply new design principles to ends-together splicers. Improved splicing chambers were developed, and a new, adjustable cutting system was fitted. The result was a new ends-together splicer which was vastly more flexible than its predecessors.

The 103 Series was designed to be as uncomplicated as possible, with a simple, durable body structure. For simplicity of manufacture and maintenance, the 103 Series was developed, using modular principles of design. All of the Model 103 splicers had a common base unit. Parts were added to the base unit, to make up the complete splicer assembly as needed. The splicer was therefore is available in many different forms, to suit different customer needs.

- All 103 Series splicers had a simple straight-line string-up.
- All had an unusually simple construction.
- Simple construction leads to simple maintenance; the splicer in its basic form could be completely dismantled and re-assembled in about fifteen minutes.
- The splicer had a very strong construction; it resisted damage in service very well.
- The splicers contained new and patented technology, and need a smaller range of splicing chambers than splicers of earlier generations.
- The splicer could 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.

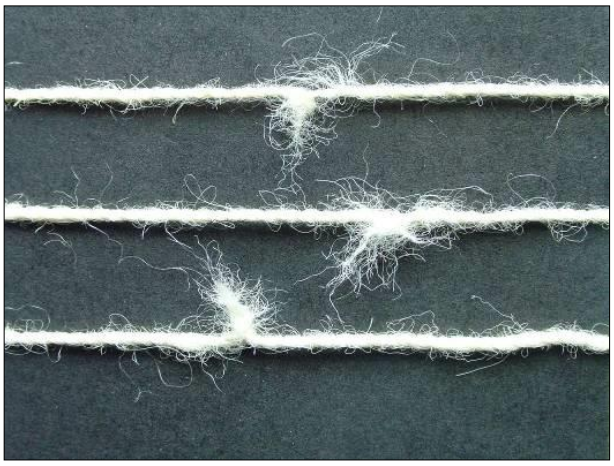
In its quest for continuing improvement, Airbond has adopted 3d printing manufacturing technology, and this has enabled us to transform the splicer. No longer do we need the modular construction (which was not quite as flexible as customers required.) Instead, printing enables Airbond to make a multiplicity of designs – almost "designing to order" to meet customer needs.

So, from this latest phase of development has emerged the 133 Series of splicers. The 133 Series splicers are the successors to the Model 103s; similar in appearance, but radically different in detail. Stronger that the 103s, but not much more than half the weight, the 133 Series will be much more comfortable for operators over a busy shift.

These two photographs show that, while the 133 Series splicers are replacements for the Model 103, they are similar in overall appearance but they are very different in their construction.

Most notably, the 133 is made in one piece – handle and splicer body are printed all-in-one, whereas the 103s body and handle are separate items – connected by 100 mm through-bolts.

The 133 is lighter, and because most of the weight saving is in the splicer body, it is better-balanced and easier to handle,.



The 103 Series splicers make a joint of the “ends-together” form. This type of splice generally has a small tail but with excellent strength, whether used on “well-behaved” yarns such as multi-filament nylon, or on more difficult yarns such as those made from staple blends or highly twisted yarns.

This illustration shows a splice on wool worsted.

General description

Being printed from tough PA12 polymer, the new Model 133 Splicer is capable of standing up to heavy-handed use, but is still much lighter than its predecessor, the 103.

The Model 133 Splicer has a number of components mounted on a body in which airways conduct the compressed air for the splicing action.

Trigger - pressing the trigger initiates the splicing operation.

Valve - operation of the trigger moves the valve allowing compressed air to pass into the body head for splicing.

Pad - in the initial operation, compressed air closes the pad onto the splicing chamber prior to the splicing operation.

Splicing chamber - having a profiled recess on the front face which, with the closed pad, forms a chamber in which the splice is made. Air enters into the chamber to form the splice.

Knife and guide plates - the plates provide a means of guiding the yarn across the splicing chamber; a static knife on the exit side enables the yarn to be severed during splicing.

The Model 133 is simple, and easy to maintain. Moreover, its construction is such that it is extremely rugged, and requires very little attention in service. The splicer has revolutionary and patented splicing chamber technology, which enables the splicer to make joints in a wide range of yarns without any change - in general, there is no need to change chambers when changing yarns.

133 Model range

133 H	Splicer with 100 mm handle
133 HW	Splicer with 100 mm handle, wedge hanging assembly
133 HF	Splicer with 100 mm handle and flow control device.
133 HWF	Splicer with 100 mm handle, wedge hanging assembly and flow control device.
133 M	Splicer with 60 mm handle
133 MW	Splicer with 60 mm handle, wedge hanging assembly
133 MF	Splicer with 60 mm handle and flow control device.
133 MWF	Splicer with 60 mm handle, wedge hanging assembly and flow control device.
133 S	Splicer with no handle – just a simple lower section.
133 SW	Splicer of 133 S form, with wedge hanging assembly
133 SF	Splicer of 133 S form, with a flow-control device.
133 SWF	Splicer of 133 S form, with wedge hanging assembly and a flow-control device.

Example:

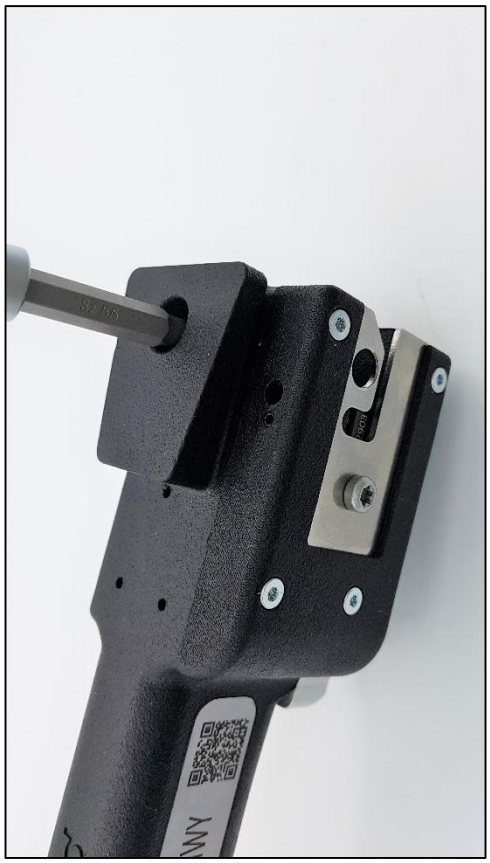
Splicer Model 133 HW, fitted with wedge hanger and yarn clamp assembly.

Note the QR code; scanning this code will enable the user to access the Airbond web site - and an on-line version of this technical manual for the splicer

Model 133 – maintenance

Changing splicing chambers

The Model 133 can splice a wide range of textile yarns on a single splicing chamber, so it is rarely necessary to change chambers. Nevertheless, you will sometimes need to remove the splicing chamber - during routine maintenance, or because the splicer has become fouled with fibres,

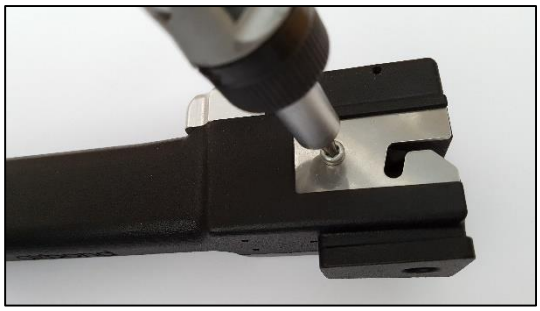


To release the splicing chamber, remove the single fixing screw Item 908 from the rear of the splicer body, when the splicing chamber can be lifted clear of the splicer.

Usually, it is not necessary to remove the yarn guide side plates, but if the interior of the splicer is particularly filthy, removal of the plates will help cleaning.

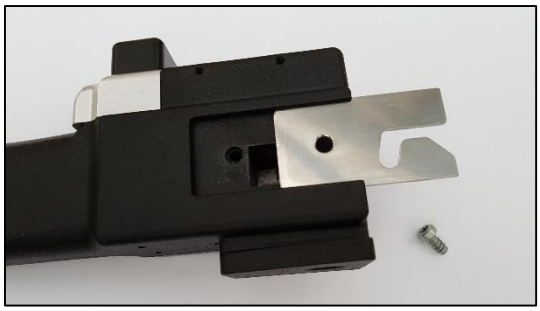
This photograph shows a Model 133 HW; the hanging wedge of the Model 133 can be seen, printed as part of the body, rather than a separate item as on the old Model 103.

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 chamber. There will almost certainly be damage to the extension spring.



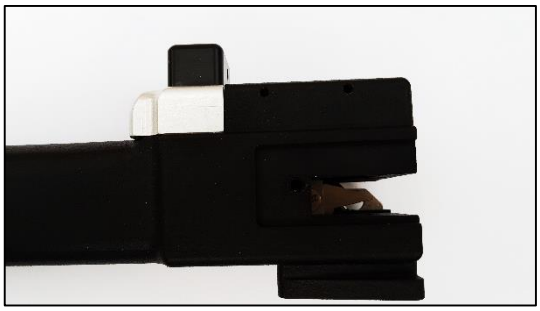
Removal of yarn guide plate, entry side.

The yarn entry guide plate, Item 1032, is attached to the splicer body by a single screw, Item 1194. Remove the screw.



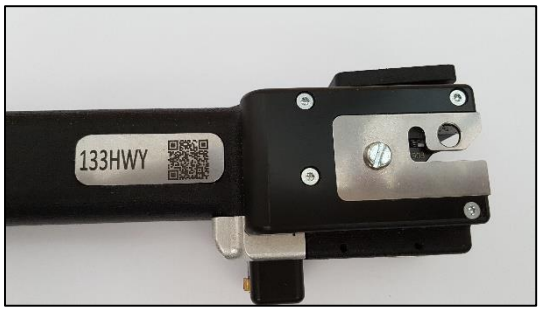
Removal of yarn guide plate, entry side.

Once the screw has been removed, the guide plate is retained in the splicer body by a small moulding. The guide plate is then removed by sliding it upward in the splicer body, until it becomes free.



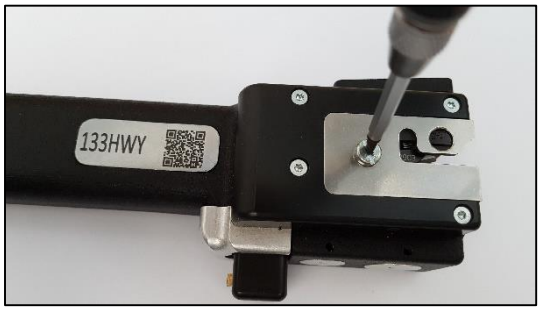
Removal of yarn guide plate, entry side.

The splicer, entry side, once the yarn guide plate has been removed.



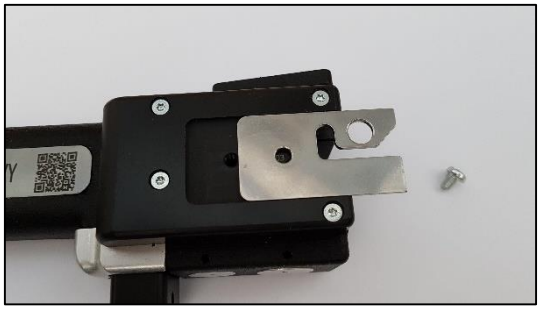
Removal of yarn guide plate, exit side.

The yarn exit side of the splicer is a little more complex. The yarn exit guide plate, Item 1031, is attached to a black side plate by a single screw.



Removal of yarn guide plate, exit side.

Remove the single screw, Item 1194.



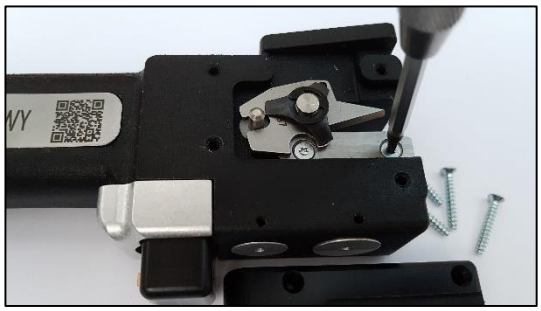
Removal of yarn guide plate, exit side.

Slide out the guide plate, in the same way as the plate on the entry side was removed.

Removal of side plate, exit side.

The side plate houses the cutter assembly. It may have yarn clamps, or it may be a plain structure. The yarn clamp option offers superior yarn control, at the cost of greater complexity.

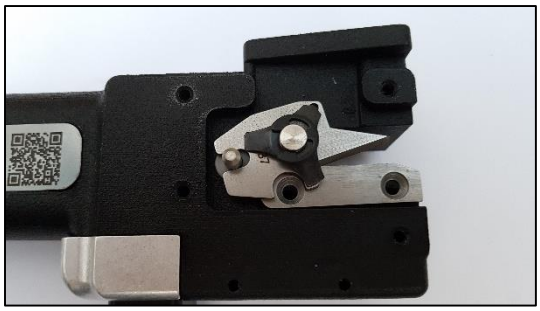
The side plate is attached to the body by four screws, Item 1192. Remove the four screws.



Removal of cutter sub-assembly.

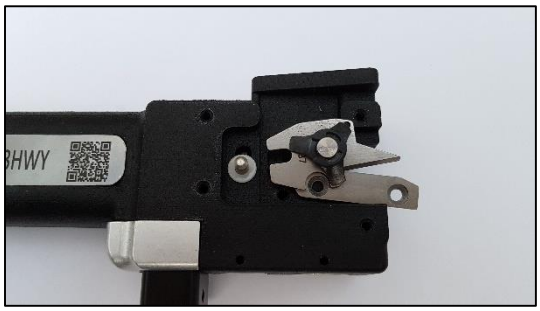
The cutter sub-assembly it attached to the splicer body by two screws, Item 1190. It is also restrained by being housed in a shallow recess in the splicer body..

Remove the two screws.



Removal of cutter sub-assembly.

With the screws removed, the entire cutter sub-assembly can be lifted out.

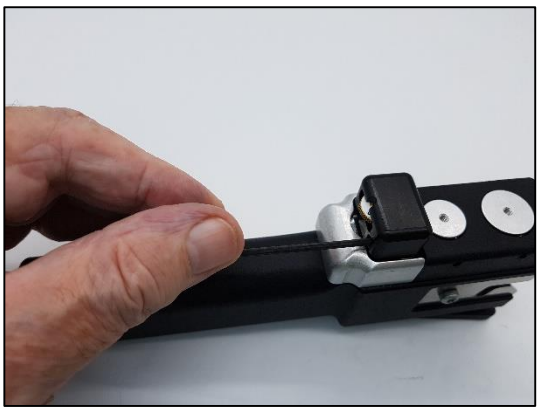


Removal of cutter sub-assembly.

The cutter assembly part-removed. Note the presence of the small white washer, Item 1110. DO NOT lose the small white washer at the left side of this photo. This is a important component which sets the scissor angle, so that the knives cut efficiently. The washer must, during re-assembly, be returned to this position.

Removal of cutter sub-assembly.

The cutter assembly removed from the splicer body.



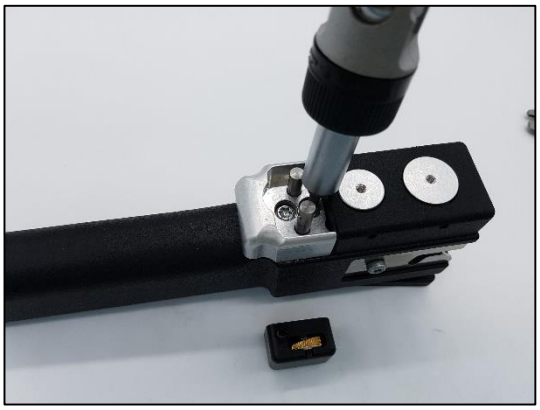
Removal of trigger button sub-assembly.

The trigger button, Item 1111, is attached to the blast valve stem by a small socket head grub screw, Item 501.

Unscrew it until the trigger assembly can be released.

Removal of trigger surround

Removal of the trigger button exposes the two screws, Item 1127, which attach the trigger surround to the splicer body.
The trigger surround, Item 1021, is an important component; it retains and aligns the two main valve stems, which actuate the air blast and the cutter action.



Removal of trigger surround

Remove the two trigger surround securing screws.

Removal of operating valves.

Removal of the trigger surround exposes the two operating valves.

Removal of operating valves

This shows the ends of the main operating valves, protruding from the splicer body.

One valve controls the air blast through the splicing chamber, item 1104, and one valve controls the cutter knife action, item 1105.

Removal of operating valves

The valves, completely removed from the splicer. Note the small springs, Item 787, seated in a small recess in each of the valves. These are the valve return springs, which reposition the valves after splicing has finished.

Removing valves, spacers, and O-rings

After withdrawal of the two air valves, check that the valve stems are coated with Molykote grease; if not, then be sure to re-grease the valve during reassembly.

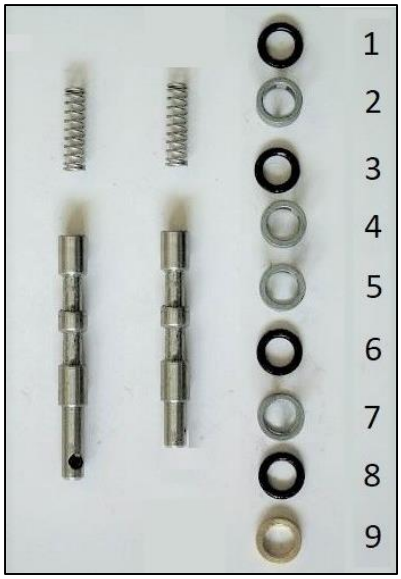
Removing valves, spacers, and O-rings

Using an appropriate tool, withdraw the O-rings, shells, and compression spacer from the valve bore in the splicer body.

The upper photo shows the valve, Item 1104, which controls the actuation the air blast. Note the small hole near the end of the valve stem. This is the hole which locates the socket set screw restraining the trigger button.

The lower photo shows the valve, Item 1105, which controls the cutters. Note that it is shorter than the air blast valve, and has no hole for a set screw.

Each valve has a small spring, Item 530,, housed in a recess at the end of the valve. These springs return the valves, and the trigger button, to their rest positions after the splicing action is complete.
The return springs fall out quite easily; they can be kept in position by applying Molykote grease to the recess in the end of the valve.

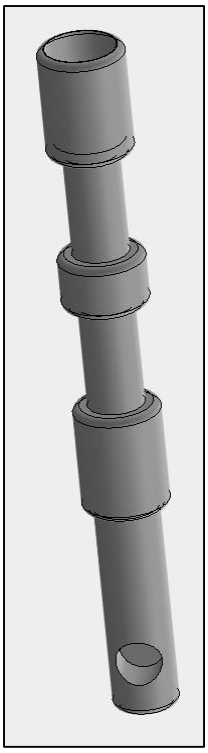


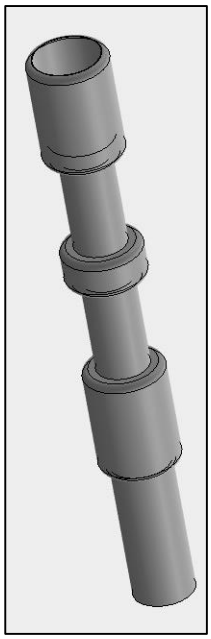
Removing valves, spacers, and O-rings

Valves and accessories separated. The small components, and their assembly sequence, are the same for both valves.

Note the brass spacer, numbered 9, Item 902, at bottom. This spacer is important; it compresses the O-rings, so that the assembly seals properly.

Sequence for reassembly; 1 – 9. First item placed in the bore is the O-ring (1), Item 264, followed by the Shell (2), Item 276, and so on to the Spacer (9).

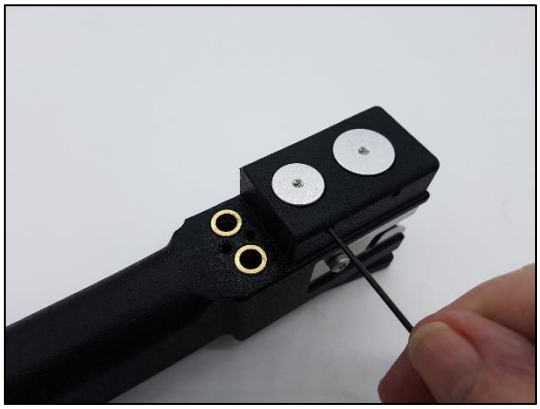




Removing valves, spacers, and O-rings

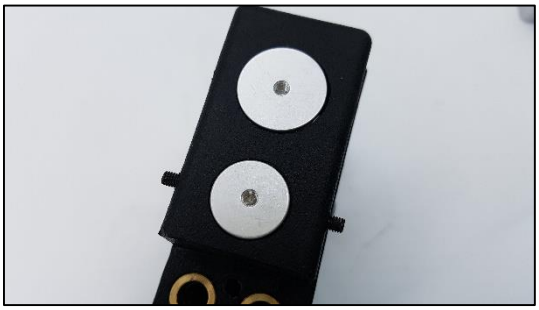
The valves in more detail.

The drawings show clearly the recesses in each valve for accommodating the return springs, and the hole in the stem of the air blast valve.



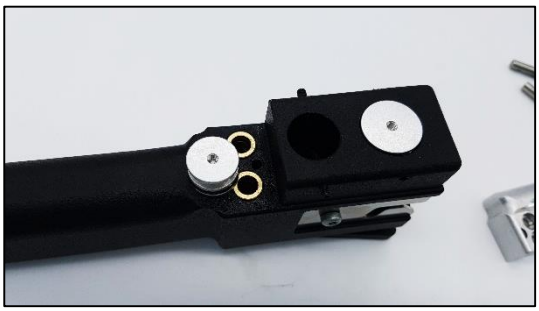
Removal of lower sealing plug and knife piston

First remove the lower sealing plug. This is secured by two grub-screws, Item 502, through the splicer body.



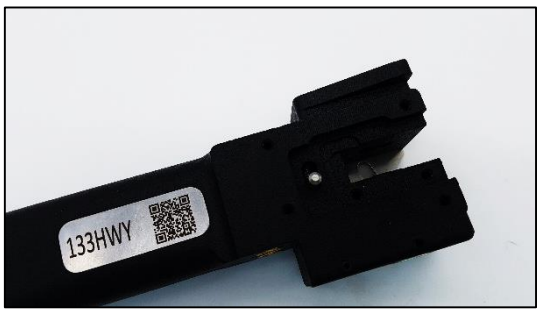
Removal of lower sealing plug and knife piston

The two grub-screws do not have to be removed completely from through the splicer body.



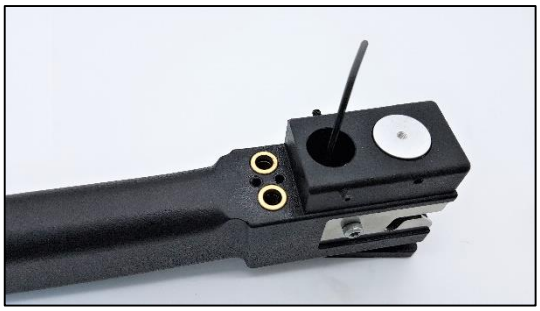
Removal of lower sealing plug and knife piston

Once the grub-screws have been released sufficiently, use a length of threaded rod, screwed into the lower sealing plug, Item 1005, to withdraw.



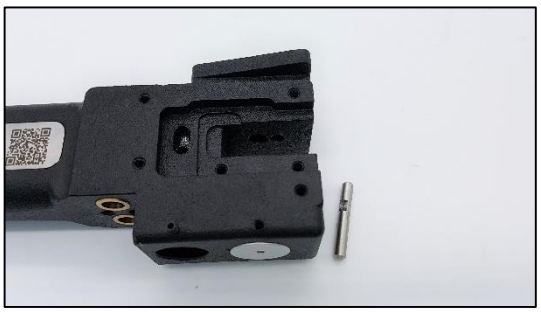
Removal of lower sealing plug and knife piston

The lower sealing plug removed.
Once the plug has been removed, the knife drive shaft must be removed. This photo shows the end of the shaft.



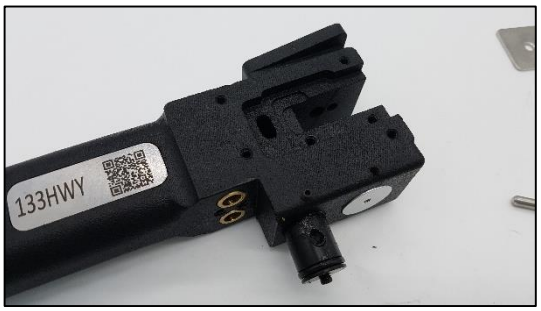
Removal of lower sealing plug and knife piston

The knife drive shaft, Item 1028, must be released from the knife drive piston, Item 1004. It is secured to the piston by a grub-screw, Item 869, which can be accessed via the piston bore as shown, using a hexagon wrench.



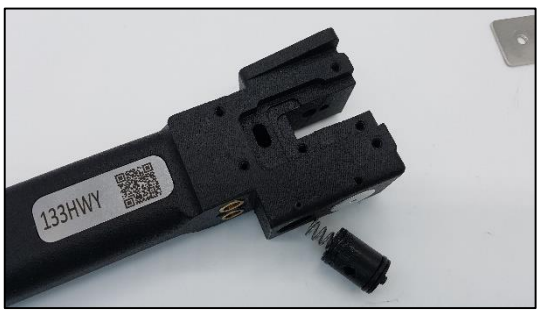
Removal of lower sealing plug and knife piston

With the grub-screw loosened, the knife drive shaft can be withdrawn from the knife drive piston, out through the side of the splicer body.



Removal of lower sealing plug and knife piston

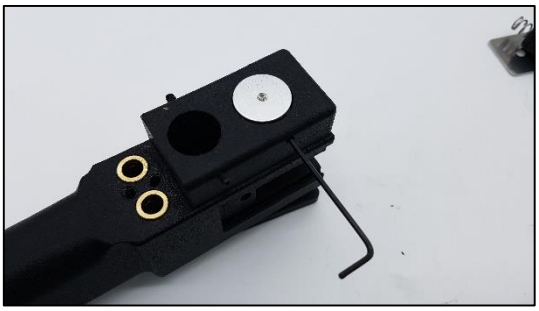
The knife drive piston can now be removed from the bore. A length of threaded rod will make this operation very simple.



Removal of lower sealing plug and knife piston

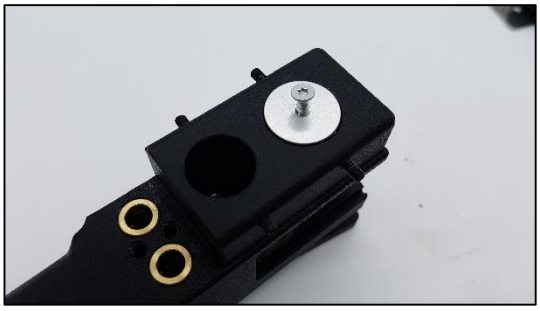
This shows the knife drive piston removed from the bore.

The return spring, Item 530, for the piston can be seen. The function of this spring is to return the knives to their rest position, once splicing is complete.



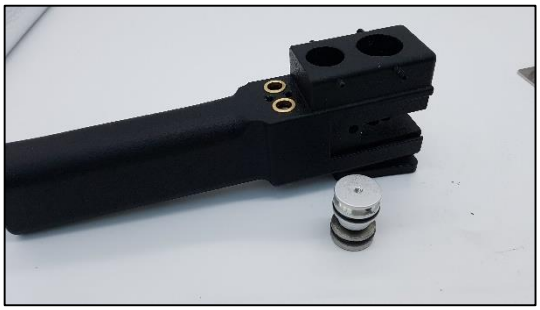
Removal of upper sealing plug and pad assembly

The closure pad assembly is attached to the upper sealing plug. The upper sealing Plug, Item 1102, must be removed, in the same manner as the lower plug.



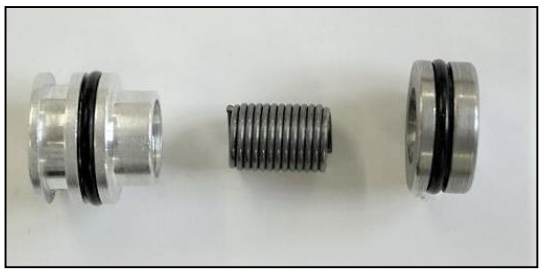
Removal of upper sealing plug and pad assembly

Once the grub screws are loosened, the upper sealing plug can be released using a short length of threaded rod.



Removal of upper sealing plug and pad assembly

The upper sealing plug / closure pad assembly released from the splicer body.



The pad is tethered to the upper sealing plug by an extension spring. The extension spring is screwed into the sealing plug, and the pad screwed to the spring. When the splicer has been dismantled, we recommend that the spring always be replaced.

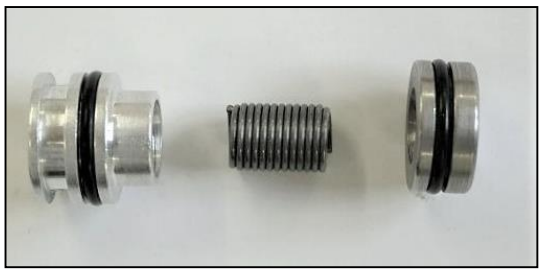
Unscrew the pad from the spring, and the spring from the sealing plug. Discard the spring.
Thoroughly clean and de-grease the screw threads in the sealing plug and pad.

We recommend that a special flat-tipped M10 tap be used to clean out the threads in plug and pad.

Before reassembly, ensure that the sealing plug, spring, and pad will fit together correctly. We recommend that the components first be 'dry assembled'.

Screw the spring into the sealing plug until four or five coils of the spring remain exposed. Screw the pad onto the spring for a few turns.

Check that the pad is approximately parallel to the sealing plug and that a gap of 1.5 to 2.0 millimetres between sealing plug and pad can be achieved. If the components are markedly out of parallel, discard the spring.



If the 'dry assembly' is satisfactory, dismantle and repeat the operation using adhesive. Apply a drop of Loctite Structural Adhesive 326 to the coils at one end of the spring, and screw the spring into the sealing plug until four or five coils of the spring remain exposed.

Apply more adhesive to the exposed coils of the spring and screw the pad onto the spring, ensuring that the gap between sealing plug and pad is roughly parallel and is between 1.5 and 2.0 mm. Allow the adhesive to cure for about 30 minutes.

Before replacing the assembly, lightly smear the 'O' ring in the pad with Molykote grease. Apply a small amount of grease to the surface of the main bore.

Compressed air

Pneumatic splicers are operated by compressed air. Therefore the air supply must be appropriate.

The following points are important:

Splicers generally operate at a pressure between 3 and 8 bar.

Pressure may vary according to application, but it must be as uniform as possible.

The air supply should be reasonably dry and clean, with the lowest possible flow resistance.

Because the time taken to make a splice is short, transient pressure drops associated with other demands in the mill may become important,

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.

Compressed air installations should therefore be designed to minimise pressure drop.

Never use narrow-bore supply tube; this introduces resistance.

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 tend to be significant.

Sometimes, static line pressure is known to be adequate, but there sometimes serious problems with transients. Then it may be useful to fit a few metres 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.

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. Compressed air is dangerous: avoid any bodily contact with it.

Always follow the safety precautions recommended by the compressor manufacturer. Always ensure that unions and connectors are fully tightened and sealed, and that there are no leaks.

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.

Do not look into the working parts of the splicer when it is being operated.

If a splicer malfunctions, do not use it until it has been repaired by qualified personnel.

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:

- Before undertaking any service work, disconnect the splicer from the air supply.
- Under normal circumstances, always refit safety covers before reconnecting the splicer to the air supply.
- 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 emerge.

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.

Troubleshooting

Trouble with splicers generally takes one of two forms: poor splicing or component malfunctioning.

1) 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:

- 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, take another look at your operating procedures and – possibly – the splicing chamber specification. If, for instance with glass, the yarn count has remained constant, but the level of sizing has increased, it may be necessary to increase air pressure and/or increase the duration of the blast.

- Is the air pressure as it should be? The line pressure may have changed – upward or downward. Excessive air pressure will cause bad filamentation, and low air pressure will result in weak splices. Consideration should be given to using flow-control versions of the splicer.

- If you have a splicer with flow control – has the position of the flow controller shifted? This can happen if the clamping screw has come slightly loose.

- Are there any obstructions in the main air line or in 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.

- Have operating procedures changed? If the procedure changes, performance will change.

- Are the splice ends being trimmed properly? For perfect performance, all splicers rely on the waste ends of yarn being cleanly trimmed. Good cutting performance must be maintained at all times. (See more details on next page for information on cutting issues and how to resolve)

- If fitted, has the timer calibration changed?

- 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.

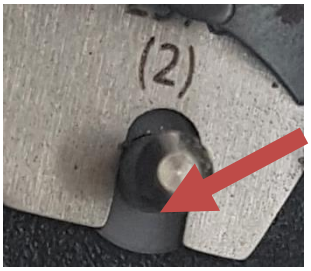
More detail

Cutting problems:

- The cutters may have become blunt. The cutters are manufactured to a high standard (sometimes tipped with tungsten carbide) but it is inevitable that, after some service, the edges will become dull. Poor cutting – and splicing – performance is then inevitable.

- It is impossible to give exact guidance on cutter life, because materials vary so much; a soft wool may not trouble the cutters for a year, while an aramid will always pose problems. Remember that the cutters are designed to be re-sharpened at the customer's premises; the straight edges are quite easy to re-grind – and perhaps 5 or 6 re-sharpening cycles will be possible before the knives have to be replaced.

- Finally, the washer, Item 1110, which is used to set the scissor angle, may have been lost during maintenance; that omission will guarantee poor cutting. The presence of the washer can be verified by removing the yarn guide plate and the clamp assembly; the white circle can be seen in this photo at the base of the moving knife, below the number "2"



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 re-sharpened too many times. Remove the knives and replace with new.
    - 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 is worn. Replace knife or peg as appropriate.
    - The knife piston may be sticking. Remove piston, as in the main text. Service or replace.

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.

- 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 replace with new.

2) Sticking closure pad

Occasionally, the main valve in the splicing unit may stick. This could be the result 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 entire valve / O-ring assembly from the splicer unit, as shown in the main text. Clean the components and the surface of the large bore with a small quantity of light solvent

Examine the components for signs of damage - particularly a damaged or displaced O-ring, or extension spring. If there is damage to any of the components, proceed as in the maintenance section of the main text, replacing components as appropriate.

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.

3) 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 Airbond. Alternatively, provided that the knives have not worn too far, we can offer a resharpening service.

Model 133 Splicer - Parts list

Description	Item No.	Part No.	Quantity
Knife spring	241	201-1088	1
Shutter spindle - 30.3mm long	252	201-1006-3	1
'O' Ring - BS010	264	01-10-10	9
Shell	276	2200-43-04	8
Yarn clamp spring	307	301-1007	1
M3 x 4 socket set screw	501	17-13-04	2
M3 x 6 socket set screw	502	18-13-06	2
Spring knife piston return	530	10-136-013	1
Spring adjuster wheel	780	10-136-017	1
Spring air valve return	787	10-136-017	2
M4 x 6 socket set screw	869	17-14-06	1
Pad	899	10-113-112	1
Spacing bush	902	10-133-114	2
Pad (with item 905) – Item 889 without O-ring 905	903	10-113-112A	1
Extension spring	904	10-136-113	1
O-ring RM-0140-20	905	02-14-20	2
M4 x 16 countersunk slotted screw	908	16-44-16	1
Knife piston 103	1004	10-113-120	1
Lower sealing plug 103	1005	10-135-127	1
O-ring lower bore	1014	02-11-15	3
Blast valve & yarn clamp adjusting screw	1017	10-138-118	2
Knife piston assembly	1019	10-113-120A	1
Lower sealing plug assembly	1020	10-135-127A	1
Trigger housing 103	1021	10-121-103	1
RH moving knife	1022	10-106-129-1	1
RH fixed knife	1023	10-106-130-1	1
LH moving knife	1024	10-106-129-2	1
LH fixed knife	1025	10-106-130-2	1

Knife shaft 103	1028	10-137-151	1
Yarn guide plate (knife side) 103	1031	10-105-149	1
Yarn guide plate (yarn entry side) 103	1032	10-105-150	1
Splicing Chamber		SPECIFY	
Locking pad	1039	10-111-114	1
M4 x 4 socket set screw	1040	10-138-114	1
Side cover 133	1072	10-121-108	1
Adjusting wheel	1099	10-173-107	1
Upper sealing plug	1102	10-135-126	1
Upper sealing plug assembly	110201A	10-135-126A	1
Air valve - blast	1104	10-113-121	1
Air valve - knife	1105	10-113-122	1
Knife pivot	1106	10-137-149	1
Yarn clamp pad	1108	10-142-117	1
Spacer - moving knife	1110	10-133-118	1
Trigger button	1111	10-114-102	1
Trigger button assembly complete	111101	10-114-102A	1
Adjusting wheel assembly	1112	10-173-107A	1
Circlip	1124	65-15-21	1
M6 x 4 socket set screw	1126	17-16-04	1
M4 x 8 socket head cap screw	1127	11-14-08	2
M3 x 10 socket set screw	1128	17-13-10	2
Scale - adjuster wheel	1130	10-139-138	1
Adjuster wheel pin	1136	10-137-153	1
M3 x 8 torx countersunk head self tapping screw	1190	19-43-08	2
M3 x 20 torx countersunk self tapping screw	1192	19-43-20	4
M4 x 8 torx cap head self tapping screw	1194	19-44-08	2
Splicer body - 133H	1335	10-133-135	1
Name plate (45 x 16)	1503	10-139-153	1
Splicer body – 133S	1344	10-133-144	1

Description	Item No.	Part No.	Quantity
Hanging Assembly parts			
Splicer holding clip	170	201-1199	SPECIFY
Splicer body - 133HW	1336	10-133-136	1

Model 133HY assembly