Airbond splicers.

152 Series splicers

Advanced splicer for heavy yarns and tows

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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 152 is the printed equivalent of the long-established 111.

MODEL 152

The semi-automatic bench-mounted splicer for higher-count synthetics, up to 16000 tex.

Airbond has already established its position in the composites market with class-leading products such as the Models 113 and 114 splicers. These products are light, handy and quick to maintain. However, some customers identified a requirement for a splicer which is largely immune to operator error.

Originally, the 122 met that need. With its fixed-geometry splicing arrangement, and powerful reciprocating cutters, the bench-mounted 122 offered completely consistent, high-level performance.

The adoption of 3d printing has now permitted Airbond to transform the design of the old Model 122.

The new 152 is far simpler and lighter than its predecessor, and at least as strong. And much more elegant. And, like all other splicers in the Airbond range, the 152 is rugged, reliable, and easy to maintain.

Splice format:	Ends opposed.
Applications:	Filament winding, pultrusion, weaving.
Yarns:	Carbon fibre, glass fibre, aramid, Panox, synthetic C.F.
Yarn counts:	Up to 16000 tex.
Twist:	Zero or low twist yarns and tows.

Getting started

Model 152 – 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 position on a trolley, or on a rail system, 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 152 H, for example, becomes the 152 HW. If it has been supplied, bolt the hanging system to an appropriate spot on the trolley, the bench, or the rail system.

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 152 H, for example, becomes the 152 HF, and the Model 152 HW becomes the 152 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.

Grasp the splicer with the trigger buttons facing the body, and press the first trigger with the thumb. Look down into the splicer. Listen for the loud hissing of air emerging from each chamber.

Press the two triggers on the right. Listen for the loud buzzing of the reciprocating knives in action.

Safe use and care of your splicing equipment

This product is only designed for factory use. Any other use may invalidate the guarantee and might be dangerous. Airbond has designed and made this product to meet European safety standards, but - as with any pneumatic equipment – the user must take certain precautions, to ensure personal safety, and to maximise the working life of the product.

Read these instructions carefully before you try to use the equipment.

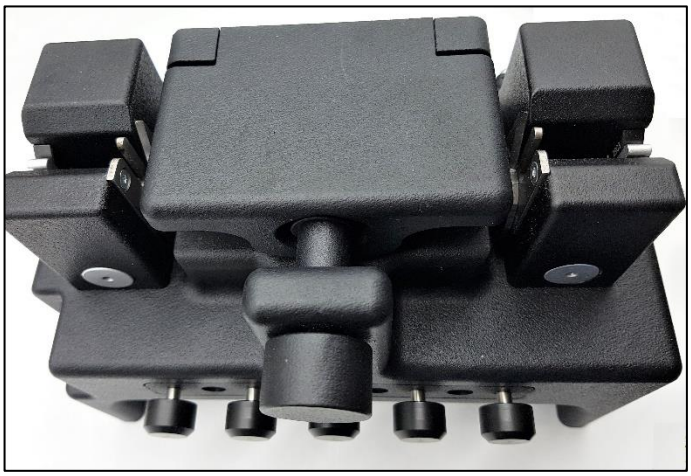
- If anything goes wrong, do not try to fix it yourself; get a qualified service agent to look at it.
- Protect the airline feed. Ensure that the lead cannot be walked on, crushed, chafed, cut, or otherwise damaged.
- Do not expose the equipment to harsh conditions such as wet or strong vibration.
- Never push objects into holes and ventilation slots.
- Small parts. Do not allow unqualified people to attempt to operate the equipment.

Features of the splicer

In most Airbond operating manuals, the “Getting started” section deals immediately with the method of making splices. This is because all splicers in our range have common characteristics, and it is simple for an operator to move from one design to another.

The Model 152, is very different, however, an we think that it’s necessary to introduce the user to the unique form of the tool.

Therefore the following pages explain the basic design of the product, and the purpose of its unique components.

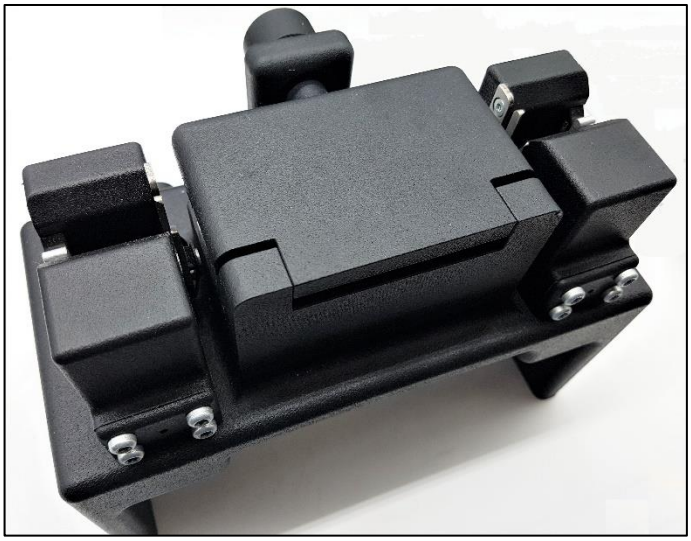


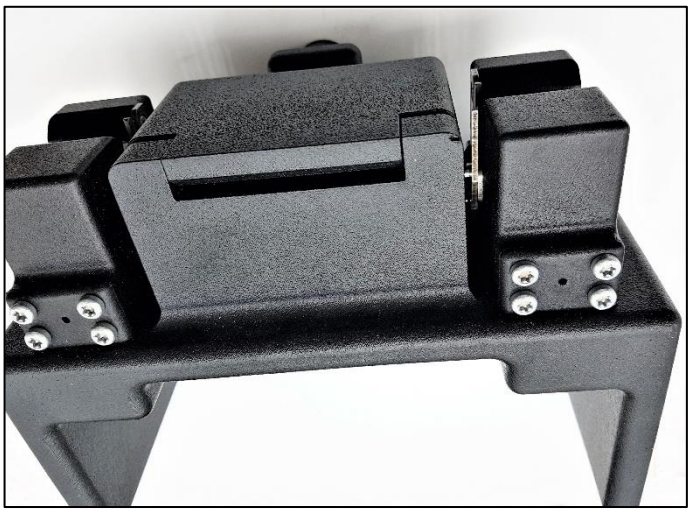
The first image is the top view of the Model 152.

The large rectangular element at upper middle is the cover, which functions as a closure pad for all three splicing chambers. The cover is hinged.

Projecting from the top front, towards the viewer, is the device which secures the cover when the splicer is in action; this locking device applies downward pressure on the cover, to seal all three chambers. The pressure is applied by a "snail" cam.

At the base, the five operating buttons are visible.





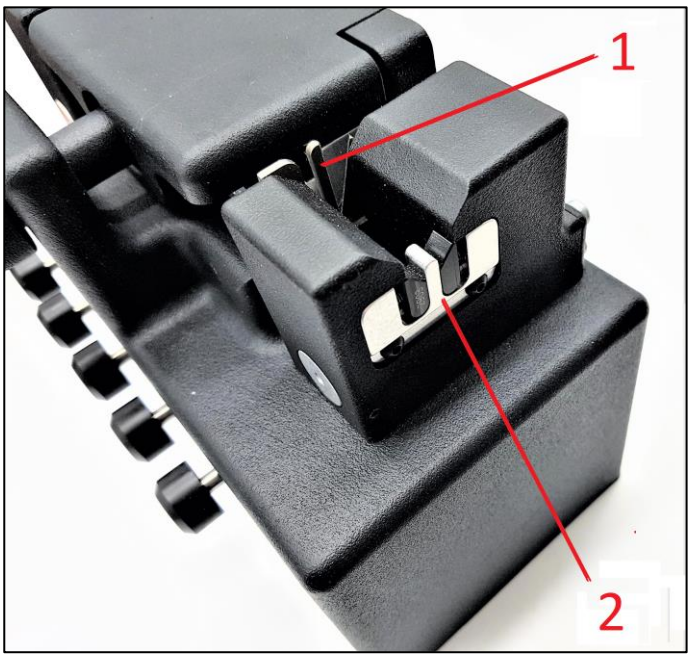
The second and third images are rear views of the splicer.

The rectangular blocks to left and right are the "cutter motor" blocks. These devices are designed to impart a rapid reciprocating motion to the cutters, greatly enhancing their effectiveness.

The hinge of the cover is clearly visible in these images.

This is a view of the front of the splicer, in particular showing the operating buttons.

From left to right, the first three buttons send an air blast to the three splicing chambers, and the remaining two actuate the reciprocating cutters.



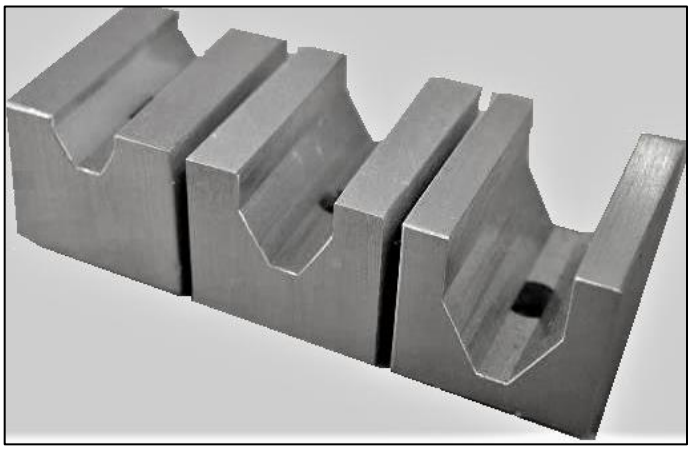
Each cutter motor block is fitted with two important sub-assemblies:
The yarn cutters (here just visible, at position 1)
The yarn clamps (at 2). These clamps keep the yarns under control during the splicing process.

The underside of the splicer. This is notable for its simplicity; it is devoid of all tubes and fittings – features which were very evident on the earlier Model 122.

The splicer in the open position.

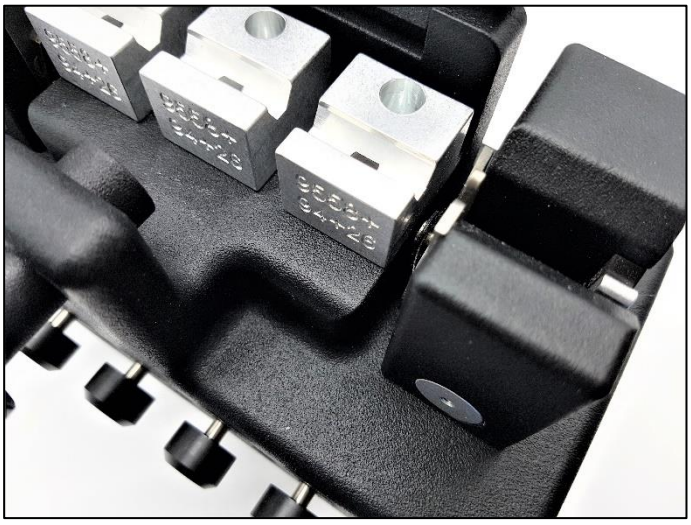
The snail cam has been withdrawn, allowing the cover to pivot upwards. Opening the cover reveals the three splicing chambers.

The three splicing chambers can be removed easily, and replaced with others having a larger or smaller profile – to meet the requirements of the yarn being joined.

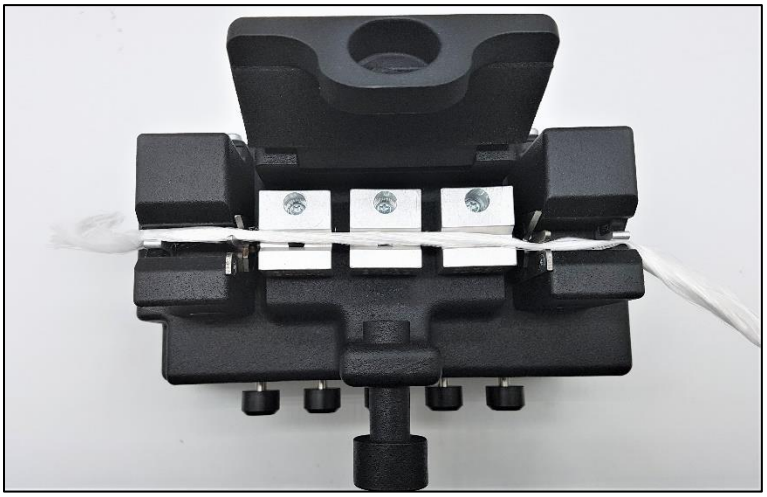


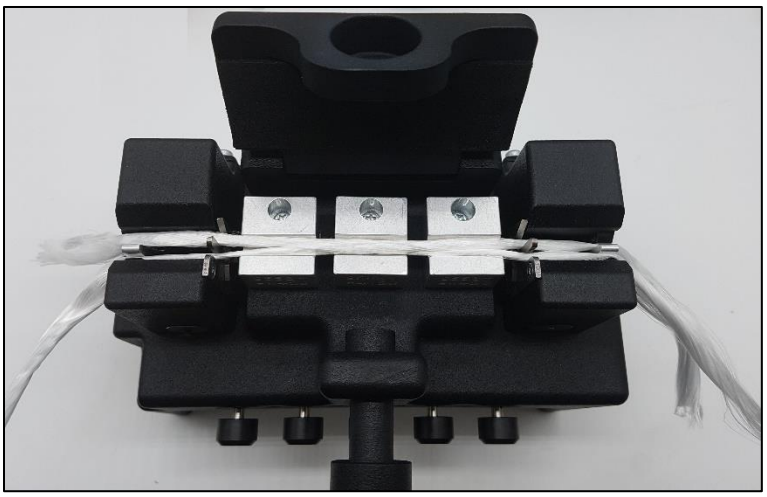
An indication of the range of splicing chamber profiles available on Airbond Products. The largest profiles can join yarns up to around 16000 tex.

(the chambers shown are from another splicer in the Airbond range, but the chambers for the Model 152 splicer have exactly the same profiles, differing only by the presence of a hole for the securing screw)



A closer view of the splicing chambers, showing the hole for the securing screw, mentioned above.





Select the first yarn. Take a length of yarn which is sufficient to pass through the splicer, leaving an excess length of about 5 - 10 cm.

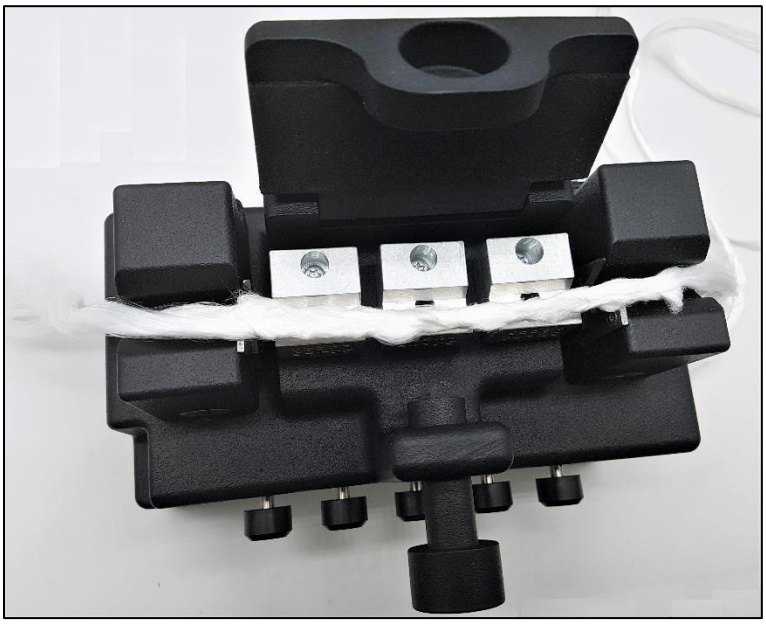
Thread the first yarn through the splicer from to left, so that the free end projects on the left hand side.

The first yarn should pass through the knife scissors at the left-hand end of the splicer, but it must not pass through the knife scissors at the right-hand end.

The yarn should be secured in the clamps at either end of the splicer.

Ensure that the yarn passes cleanly through the three splicing chambers, so that no stray filaments escape from the chambers.

Then repeat the process in the opposite direction. Thread the second yarn through the splicer, from left to right, so that the second yarn passes through the scissors at the right-hand end of the splicer, but not through the scissors at the left. Again, ensure that no stray filaments escape from the chambers.



Close the lid, secure the cam and then press the 5 button sequence from left to right.

Rotate the cam to the open position, and open the lid.

This photograph shows a splice being removed form the splice.

The photo demonstrates the unique capacity of the Model 152 for splicing and auto-trimming very heavy yarns – this one is a 15000 tex Dyneema.

Optimising splicing performance

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 splicing chamber.
- Change air pressure.
- Change blast duration
- Change duration of cutting cycle

The Model 152 separates the functions of cutting and blasting, two functions of a splicer which are usually closely linked. The splicer actually consists of five independent sub-systems within the same body.

The three buttons on the left-hand side control the air blasts in the three splicing chambers.
The buttons are pressed in sequence, so that three distinct intermingled sections are created.

The two buttons on the right-hand side control the reciprocating cutters. Pressing the fourth button actuates the left-hand cutter, and the fifth button actuates the right-hand cutter.

The characteristics of this cutting control system is explained in the section on “Maintenance”.

Important service information

Apart from accidental damage, and the occasional replacement of cutters, the Model 152 requires very little attention. However, one aspect of maintenance should NEVER be neglected. The main bores of the two cutter motors need regular lubrication. (These are the bores in which the knife drive piston moves). The frequency of lubrication depends upon the nature of the factory environment and the workload on the splicer.

As a general rule, the cutter drive 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 152 – general product information

About the splicer

The Model 152 is a completely new form of yarn splicer, with a number of advanced features. It has been designed to make splices of the highest quality in modern materials such as carbon fibre, which are used in composites for new engineering applications. These composites demand excellent appearance and unmatched consistency.

We consider that the Model 152 is something special.

Airbond's new printing technology for splicers has already produced some remarkable results:

- Existing splicers have been re-engineered, to perform like their well-established predecessors, but with reduced weight and improved durability.
- Completely new splicers, for new applications, have been made possible because of printing technology.

Of all the new range of Airbond products, however, the Model 152 probably represents the biggest advance.

Its predecessor, the 122, was simple in function but complex in construction; engineering constraints meant that, to achieve the required performance, it was something of a plumbing nightmare, with many pieces of tubing and connectors. It all worked well, but the product lacked elegance.

The design opportunities offered by printing are such that the 152 splicer is now a model of simplicity. The external tubing has gone, replaced by hidden conduits, printed within the structure. The outcome is a product which is far more elegant, and much lighter than its predecessor. The multiple aluminium plates have been replaced by a printed body with complex curves.

In Airbond's range it is the most accomplished example of what printing can achieve.

Like its predecessor, the Model 152 has some powerful features. It has:

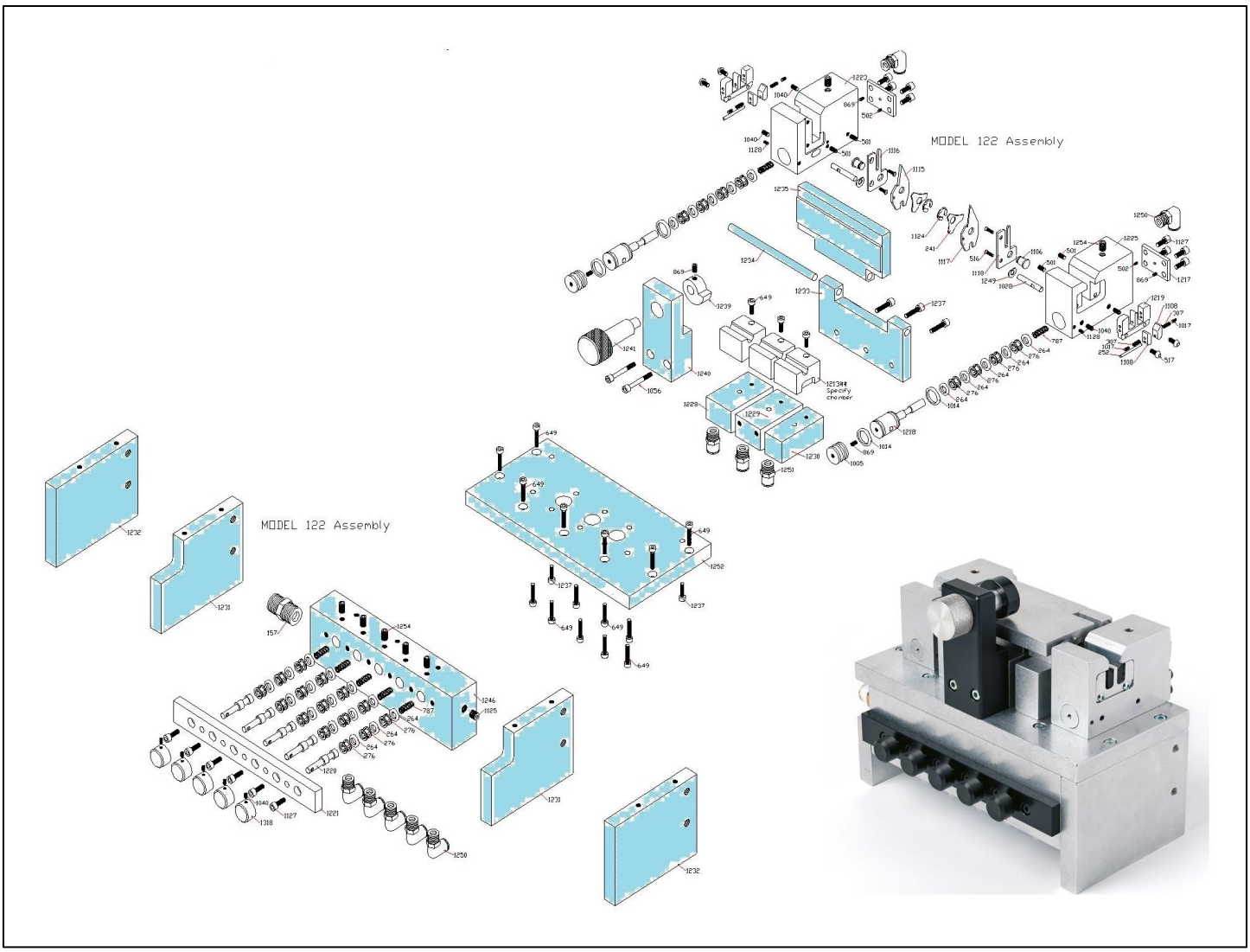
- multiple splicing chambers
- an advanced cutting system

But the most significant technical advance is that, though the functions of the 152 are identical to those of the 122, the switch to printing – with its simplification of design – results in a remarkable reduction in maintenance and repair rime. The pages which follow show this change very clearly.

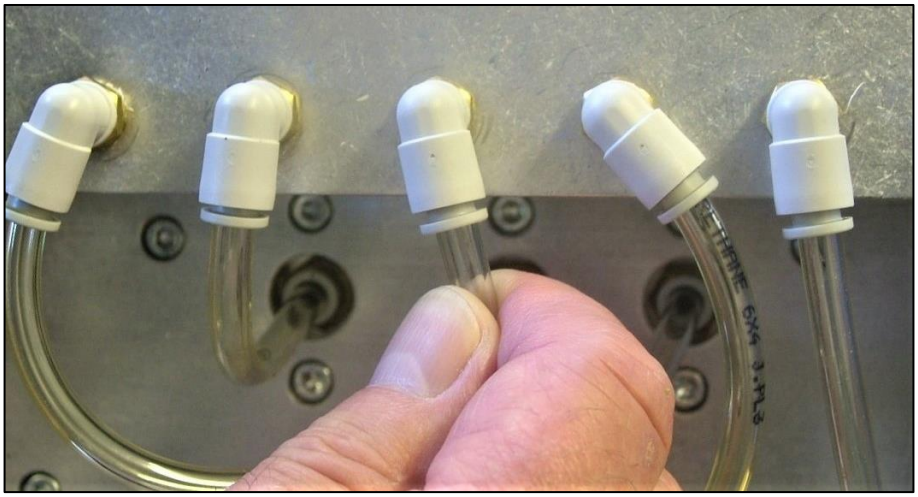
Design advances

This is the structure of the old Model 122. Notable features visible in this exploded diagram are the substantial aluminium plates (in blue) which were bolted together to make the distinctive rectangular shape.

NOT visible (at the rear of the splicer) are the plastic tubes and compression fittings which were needed to supply and control the air flow to the three splicing chambers and the two cutter motors. These tubes and their fittings added significantly to the complexity of the product.



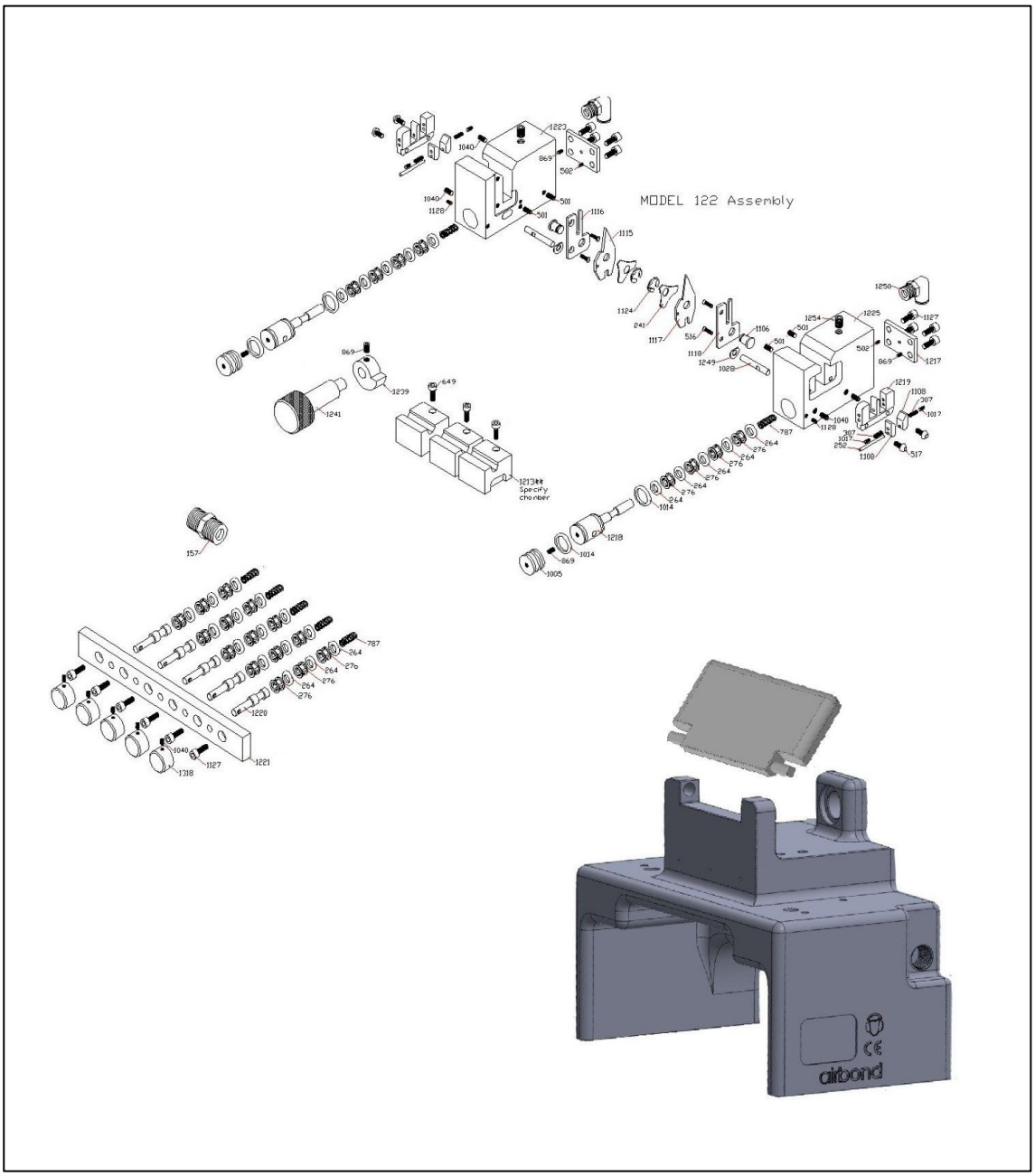
Here are the tubes and their fittings, which added to the complexity of the product
On the latest splicer, all f this has been completely eliminated.



Design advances

This shows the structure of the Model 152 has been simplified – with the promise of greater reliability and swifter maintenance.

All the aluminium plates have gone – replaced by a single printed chassis. The maze of plastic tubes and compression fittings have also gone – the plumbing being printed and concealed elegantly inside the structure of the chassis.



Why multiple splicing chambers?

This element of the design is relevant to:

- Carbon and glass fibre yarns
- Tough yarns such as aramids
- Very large yarns and tows

Carbon fibre and glass fibre are strong in extension, but they are brittle in bending. When exposed to the powerful jet of air in the single chamber of a conventional pneumatic yarn splicer, filaments of glass and carbon are bent violently, and disintegrate, resulting in a weak splice and many broken filaments. Using multiple splicing chambers allows the splicer to operate at lower pressures; the result is that the fibres are not damaged. This principle has been used successfully for some years on our existing splicers.

Tough yarns such as aramids do not have the brittleness problem of carbon. However, the immense strength of aramids in extension poses problems. The strength of the splice is produced by inter-filament friction, so that the absolute strength of an aramid splice is not much greater than that of a nylon splice. This means that the strength of the splice as a percentage of the parent yarn strength tends to be lower with aramid. Using multiple splicing chambers allows the splicer to increase the levels of inter-filament friction – and therefore increase the strength of the splice.

Very large yarns and tows pose a problem with conventional splicers, because of their physical size. To maintain satisfactory performance, as the count of a yarn rises, so too should the splice length. There is a good physical explanation for this observation, but it is too complex to discuss in this introduction to the splicer. Using multiple splicing chambers allows us to increase the length of the spliced joint to suit the demands of the increased yarn count.

Why an advanced cutting system?

Carbon fibre and glass fibre are generally used in the form of tows – from perhaps 600 tex to 15000 tex, and above. Large tows, because of their size, are difficult to cut with conventional scissor systems. Aramid yarns are simply very difficult to cut, and they cause conventional scissor knives to go blunt very quickly.

So an improved cutting system is needed both for large tows and for aramids.

By fitting the splicer with two cutter drive systems - “cutter motors” – the performance of the splicer is greatly enhanced. Instead of a single movement of the scissor blades, there is a very rapid reciprocating action, at about 30-40 cuts per second. This transforms the performance of the splicer.

In ordinary circumstances, cutting a relatively easy material such as glass, the change in design means that the cutters can remain in service for much longer periods between re-sharpening.

In special circumstances, cutting a tough material such as aramid or Dyneema, the somewhat brutal battering action means that the splicer can trim the yarn successfully, when a single action would fail dismally.

General description

Being printed from tough PA12 polymer, the new Model 152 Splicer is capable of standing up to heavy-handed use, but is still much lighter than its predecessor, the 122.

The inner splicer unit has a novel, patented design, which is simple to operate and extremely simple to repair. The number of components has been reduced, when compared to the 122, and it can be dismantled and re-assembled in about fifteen minutes, without any special tools.

The splicer has a number of components mounted inside the casing, via which compressed air is conducted for the splicing action.

Splicing chambers. The splicer is designed to make three linked splices in a line – to achieve a strong joint in large yarns. The splicing chambers are arrange in a line at a spacing which has proved optimal for yarns from 2000 to 16000 tex.

Pad - the large closure pad seals all three chambers in one motion. It is locked firmly into position with a “snail” cam.

Triggers – pressing first three trigger buttons in sequence causes air to pass through each of the three relevant splicing chambers. It is perfectly possible to actuate all three blasts simultaneously; however, that poses problems of air “starvation” because normal air hoses found in factories are limited in the total air volume which they can deliver. So the sequential blast system is far more robust, especially for very heavy yarns.

The Model 152 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 completely new blast air technology, which is simple, revolutionary and patented. The splicer design allows the tool to make joints in a wide range of yarn counts without any change of configuration.

152 Model range

The list below is indicative, not exhaustive. Customers may specify combinations of features according to need.

Examples:

152 H	152 splicer for simple bench mounting
152 HW	152 splicer with a hanging assembly
152 HFW	152 splicer with a 100 mm handle and hanging kit and flow control
152 B	152 splicer – equipped for sliding along the length of a machine
152 BF	152 B splicer - equipped for sliding along the length of a machine plus flow control

Example: Model 152 H

Model 152 – maintenance

Model 152 – maintenance

The construction of the Model 152 is unlike any other product in the Airbond range.
Although it is much larger that any other splicer, and has unparalleled performance, its design is inherently simple, with some repetition of identical parts.

For example:

There are NO connecting tubes and associated fittings, such as on the earlier Model 122. These air conduits have been printed within the splicer body; there is no need for any maintenance.

The two knife drive blocks are essentially identical. They are mirror-images of each other, so there is no functional difference between the dismantling, maintenance and assembly procedures or the assemblies.

The five buttons and valves involved in operating the splicer are all simple – and all identical.

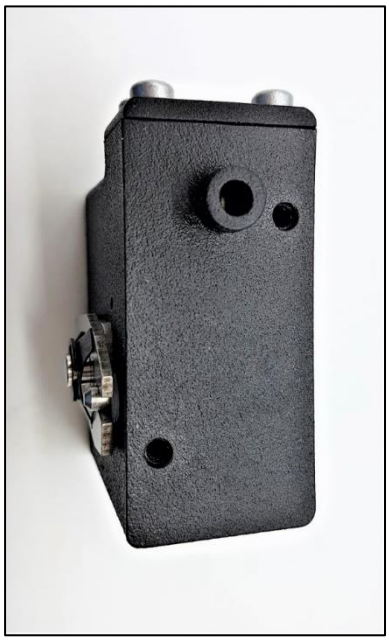
Therefore the maintenance procedures for the splicer are – despite its size – remarkably simple.
The servicing amounts to:

1. Work on the knife drive blocks
2. Work on the buttons and valves

The knife drive blocks are the more complex parts, so these will be described first.

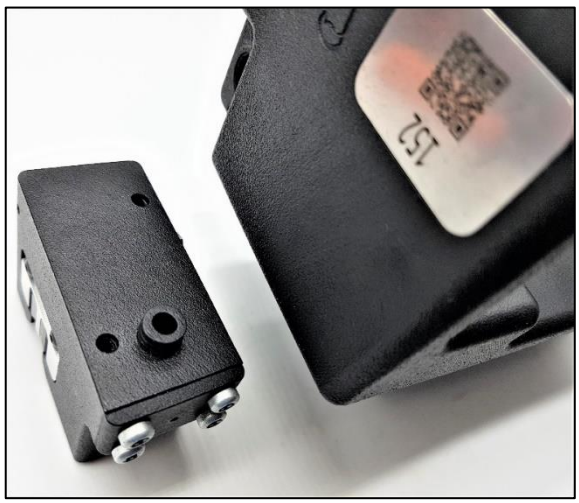
Dismantling of knife drive motor and knife assembly.

Each knife drive block is secured to the splicer chassis with two screws, Item These screws can be accessed from the underside of the splicer, through four holes, visible in this photograph.
The photo shows a screwdriver being used to remove the first of the screws, which will release the knife drive block.

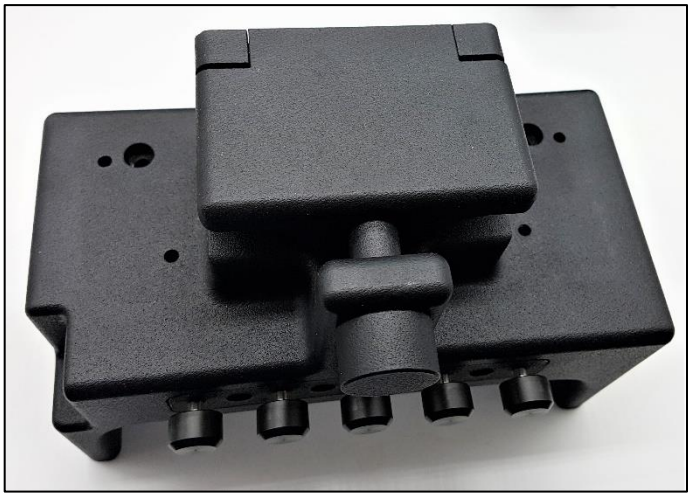


The knife drive block contains several sub-assemblies:
The yarn clamps
The knife cluster
The knife drive system – which is actually a small pneumatic motor.

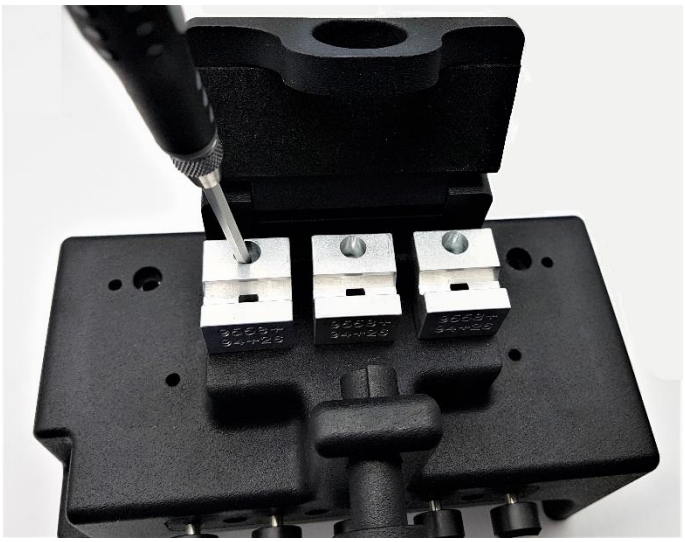
This is the view from the bottom of the block, showing the knife assembly, (left), the closure plate (top), and the air inlet, near the top.



The knife drive block, after removal from the splicer chassis.



The splicer, after the knife drive blocks have been removed.



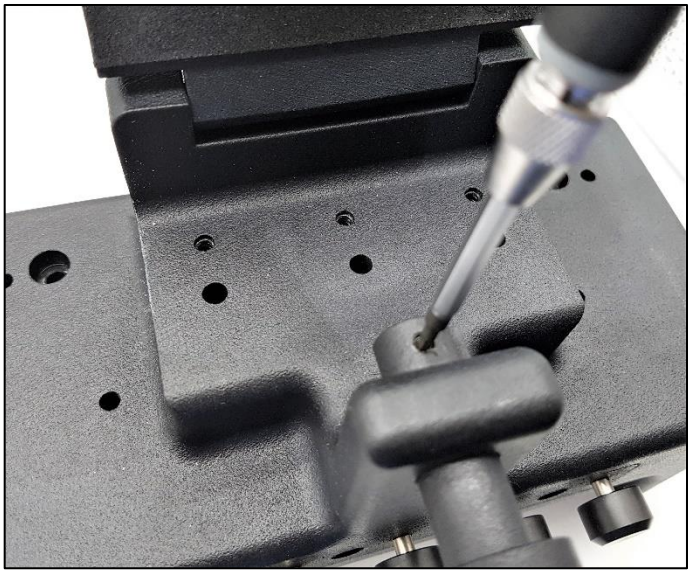
Removal of splicing chambers.

Each of the three splicing chambers is secured to the splicer chassis with a single screw Item XXXX.

Unscrew each one, to release the corresponding splicing chamber.

Removal of splicing chambers.

The appearance of the splicer, once the three splicing chambers have been removed.



Removal of cover lock system

During the splicing process, the cover is locked into place with a “snail” cam.

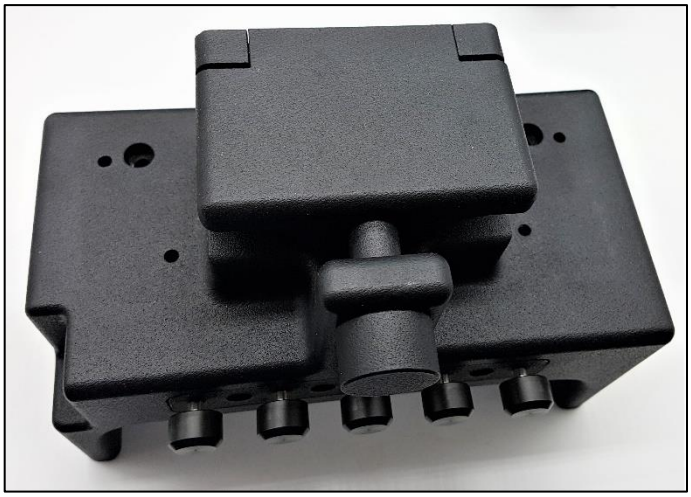
The snail cam system can be dismantled and removed by removing a socket set screw, Item XXXX.

Removal of cover lock system

The appearance of the splicer after the snail cam locking system has been removed.

Visible at the bottom of the photo are:

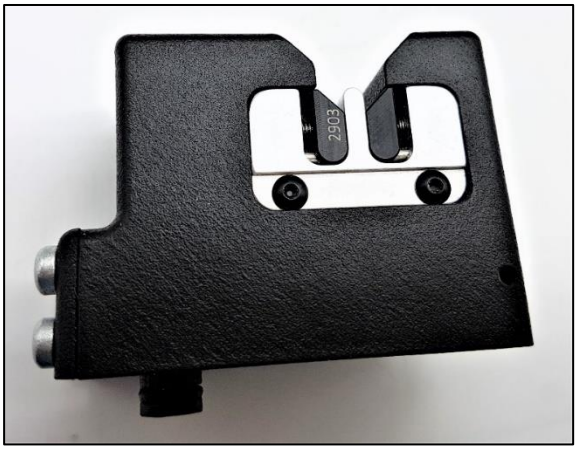
- The locking system rod, Item XXXX
- The snail cam, Item XXXX
- The socket set screw, Item XXXX.



The splicer, after the knife drive blocks have been removed.

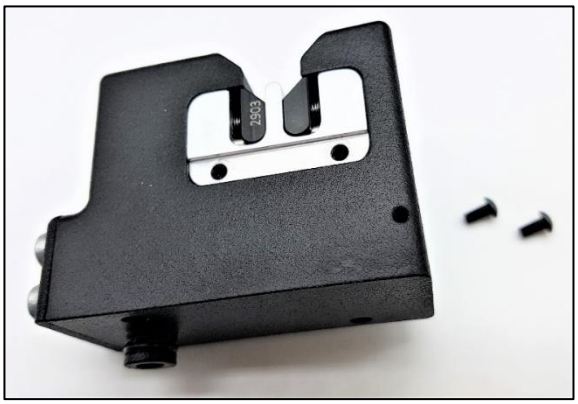
Removal of yarn clamp assembly.

Remove the two button-head screws using an appropriate hexagon wrench.



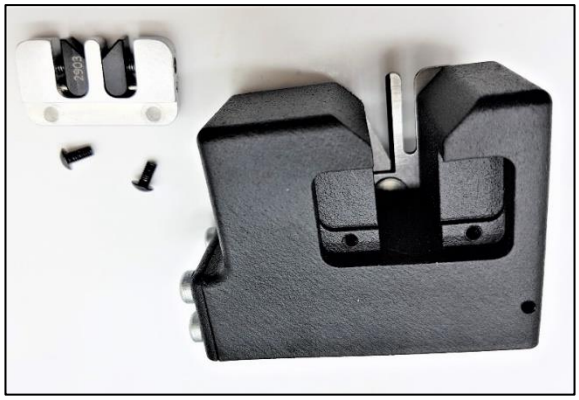
Removal of yarn clamp assembly

Here is the tarn clamp system, which is attached to the side of the main block. It is secured by two M3 x 8 button-head socket screws, Item XXXX



Removal of yarn clamp assembly.

The yarn clamp assembly, with both screws removed.



Removal of yarn clamp assembly.

The yarn clamp assembly, removed from the knife drive block.

Removal of knife assembly.

The assembly consists of two cutters, with a pivot pin and compression spring. The assembly is secured to the block by two M3 x 8 countersunk head screws, Item XXXX.

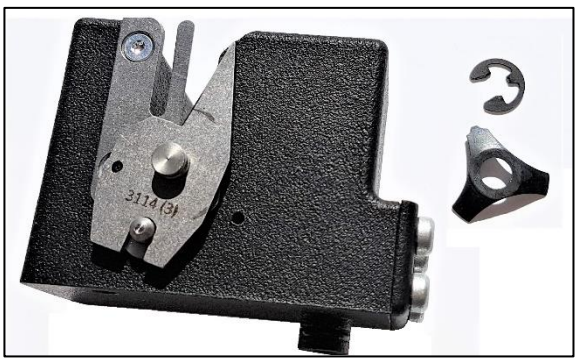
Removal of knife assembly.

The knife assembly is secured by a circlip, which can be removed using a suitable tool – here, a small screwdriver Is being used.

Removal of knife assembly.

The knife assembly, showing the circlip removed.

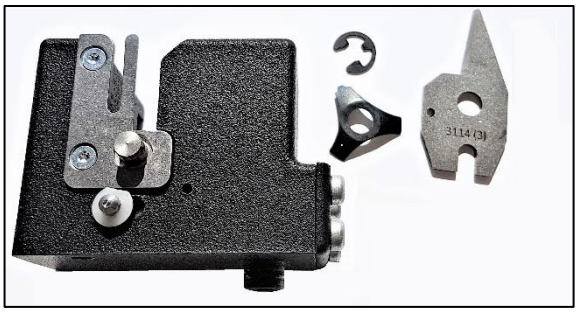
The three-legged compression spring, Item XXX can now be removed.



Removal of knife assembly.

The knife assembly, showing the circlip and compression spring removed.

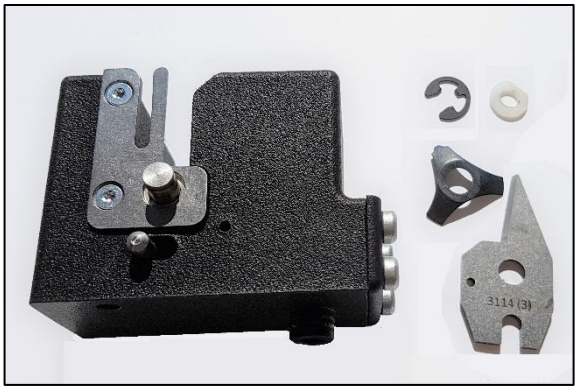
The moving knife can now be lifted from the pivot pin, Item XXX.



Removal of knife assembly.

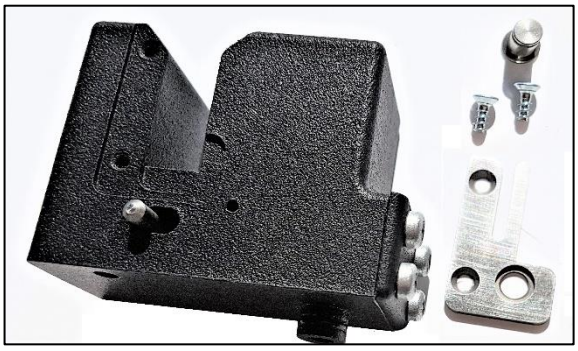
The knife assembly, showing the moving knife removed.

Note the small white spacer washer, Item XXXX, at the lower left of the photo. This is an important component which must not be lost; it sets the scissor angle between the two knives.



Removal of knife assembly.

The knife assembly, with the spacer washer removed. The fixed knife may now be removed, by undoing the two securing screws.



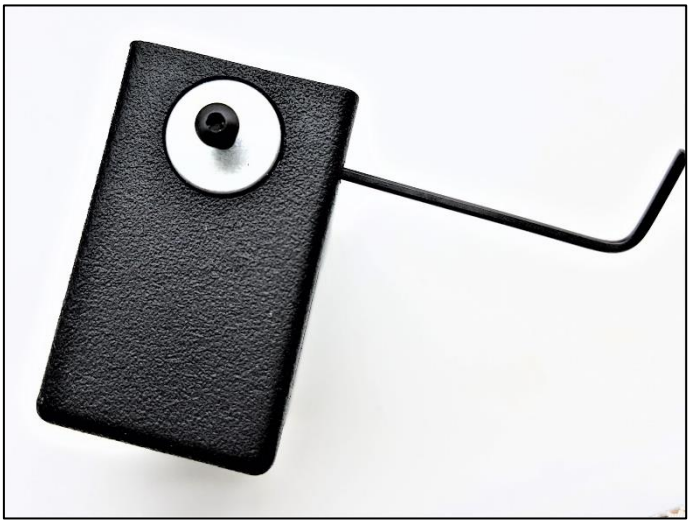
Removal of knife assembly.

The knife assembly, completely dismantled.

Note the knife drive shaft, Item XXX, projecting from the body. This cannot be removed at this stage; it can only be released once the knife drive piston has been accessed – described later in this document.

Removal of knife drive system

The sealing plug, Item XXX, has an M3 tapped hole. This is used to remove the plug once its securing screw has been removed.



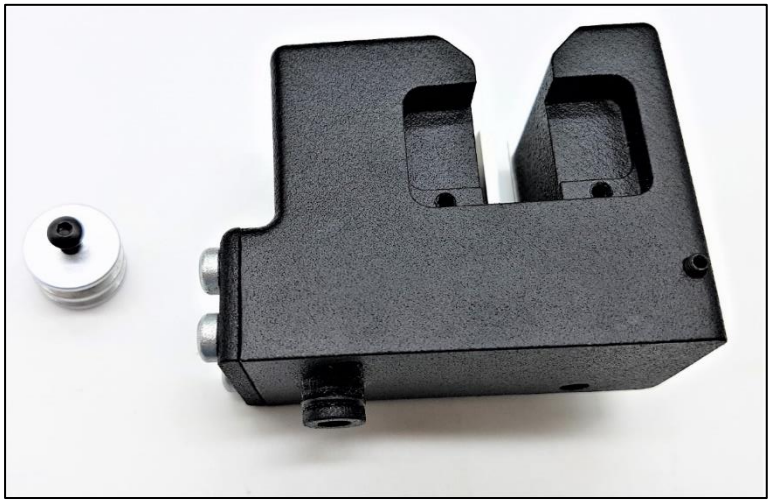
Removal of knife drive system

The sealing plug securing screw is an M3 socket set screw, Item XXXX. The screw can be released with a suitable hexagon wrench.

With the securing screw withdrawn, insert an M3 screw into the tapped hole in the sealing plug;

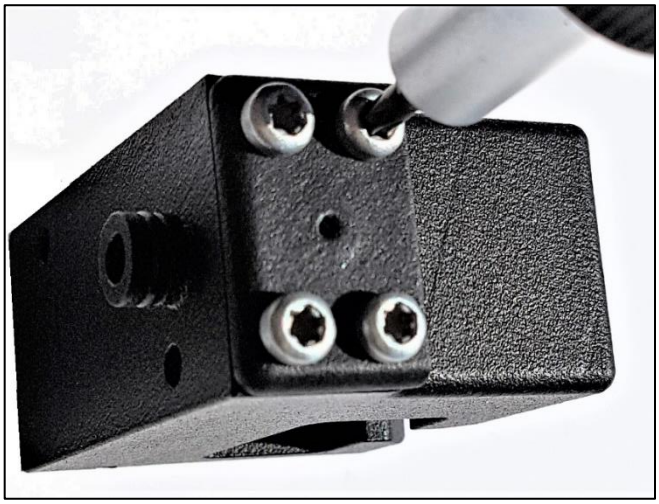
Removal of knife drive system

Use the M3 screw to remove the sealing plug.



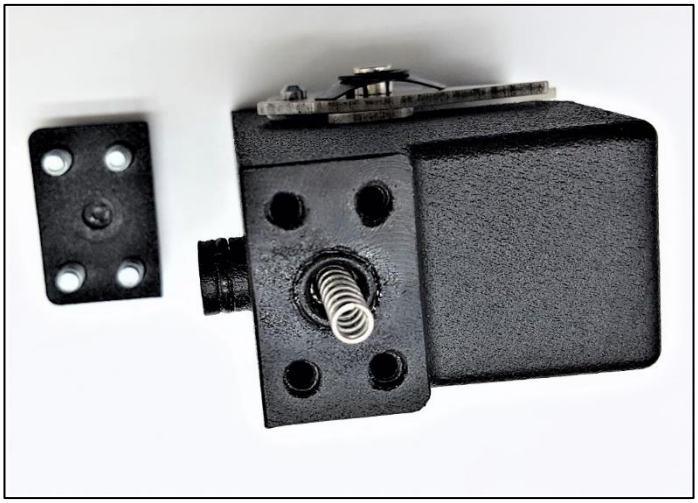
Removal of knife drive system

The sealing plug removed.



Removal of knife drive system

Next, release the COVER PLATE, by removing the four screws, Item XXXX.



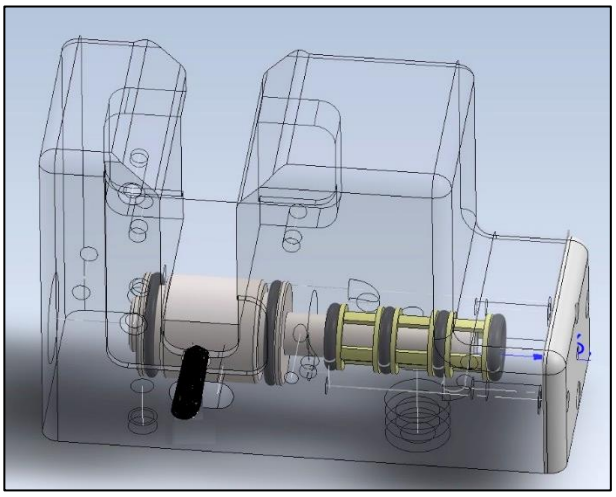
Removal of knife drive system

With the COVER PLATE, removed, the knife drive return spring, Item XXXX, is exposed. Remove the spring.

Removal of knife drive system

The knife drive block and SEALING PLATE, after the removal of the return spring.

The internal components are now accessible.



Removal of knife drive system

The internal components of the knife drive system. Projecting from the large knife drive piston is the short (black) knife drive shaft. Before the internal components can be removed from the body, this shaft must be removed.

Removal of knife drive system

The knife drive shaft can be freed by releasing the securing screw, which is an M4 x XXXX socket head set screw, Item xxxx.

The screw can be reached through the larger bore, as shown here.

Removal of knife drive system

The knife drive shaft, shown after removal from the knife drive block.

Removal of knife drive system

Once the knife drive shaft has been removed, all the internal components are free to move. The simplest method to remove them is to pass a suitable tool through the small bore, and to push gently until the assembly emerges from the other end of the block.

Removal of knife drive system

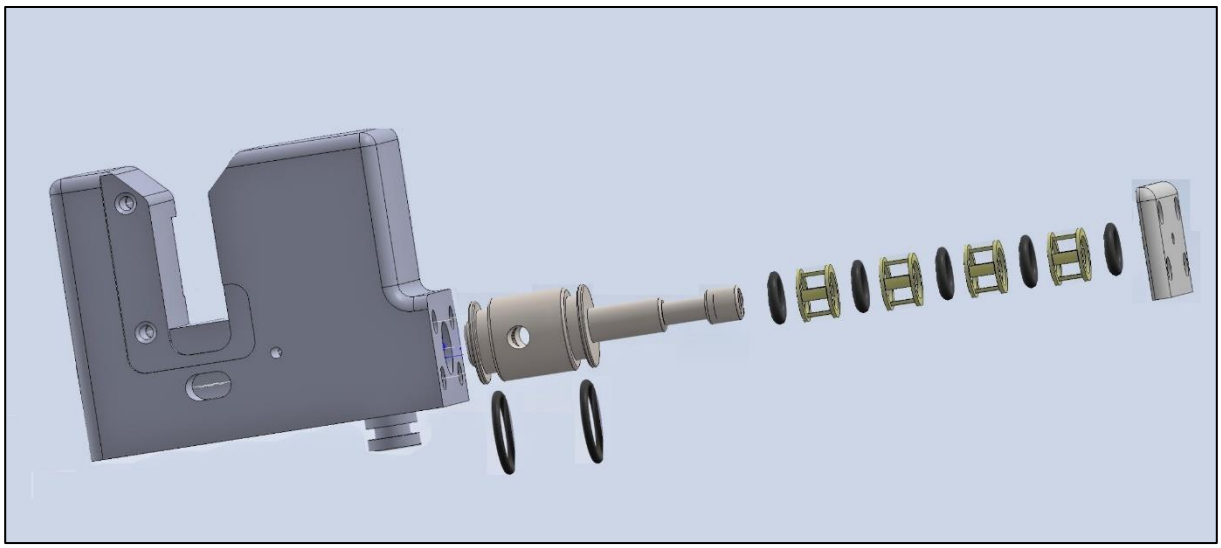
The knife drive piston assembly, after removal form the block.

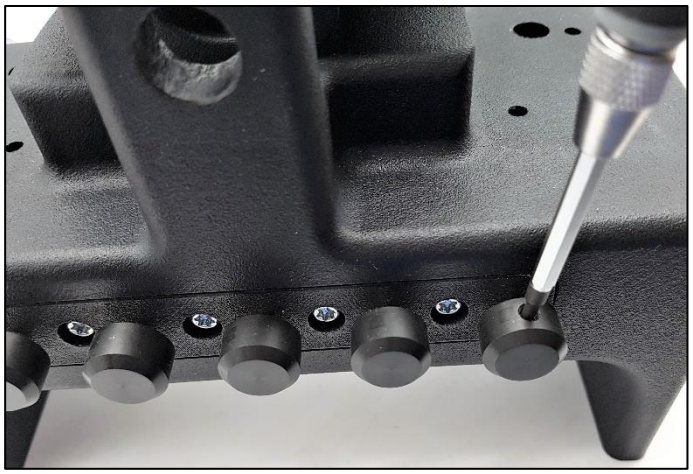
Removal of knife drive system

The knife drive piston and its associated O-rings, Item 264, and shells, Item 276.

The shells and O-rings can be removed from the bore by careful use of a suitable hooked tool. Be careful, during this process, not to score the surface of the bore.

Note also the two large O-rings, Item 905, on the main piston.





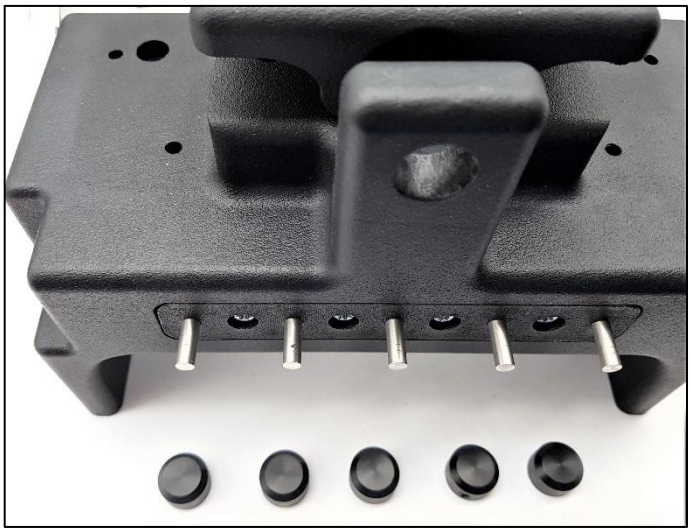
Removal of air valve system

At the front of the splicer are five buttons.

The three buttons at the left each control air-flow to a single splicing chamber. The two buttons at the right each control the air flow to a single cutter motor.

To gain access to the valve system, it is first necessary to remove the buttons. Each button is secured by an M3 x XXX socket set screw, Item XXXX.

Remove the screws, one by one, and slide the buttons off the air valve shafts.



Removal of air valve system

The splicer with the buttons removed.

The stems of the five air valves, Item XXXX are exposed.

Removal of air valve system

With the buttons removed, the next item to be removed is the valve cover, Item XXX. The valve cover is attached to the splicer chassis with four M4 x 8 self-tapping Torx screws, Item XXXX.

NOTE: When re-assembling this component take care, because it is flexible. The screws should be tightened bit-by-bit, so that the valve cover remains approximately parallel to the splicer body throughout.

Removal of air valve system

The valve cover with all four screws loosened.

Removal of air valve system

The splicer once the valve cover has been removed, exposing the five air valve stems.

At this point, the valve stems can simply be lifted out, leaving O-rings and shells inside each small bore.

Removal of air valve system

The air valve stems, with their return springs, removed from the splicer body.

Check that the stems are adequately greased – if necessary, apply a small amount of Molykoye grease before reassembly..

Removal of air valve system

One of the five identical air valve stems, with its return spring, O-rings and shells, Items 264 and 276, removed from the splicer body.

The shells and O-rings can be removed from the bore by careful use of a suitable hooked tool. Be careful, during this process, not to score the surface of the 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

1) 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:

- Has the 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? It has been known for operators, for the sake of speed, to make an “ends-together” splice instead of an “ends-opposed” one. Certainly quicker, but the quality of the joint is compromised.

- 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.

Cutting problems

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.

Sometimes, cutting performance is poor, but it is known that the knives are not near the end of their normal service life. Then some diagnostic work will be needed.

1. 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.

2) 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 on each side.

3) 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. See main text.

3) 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. 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

4) 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.

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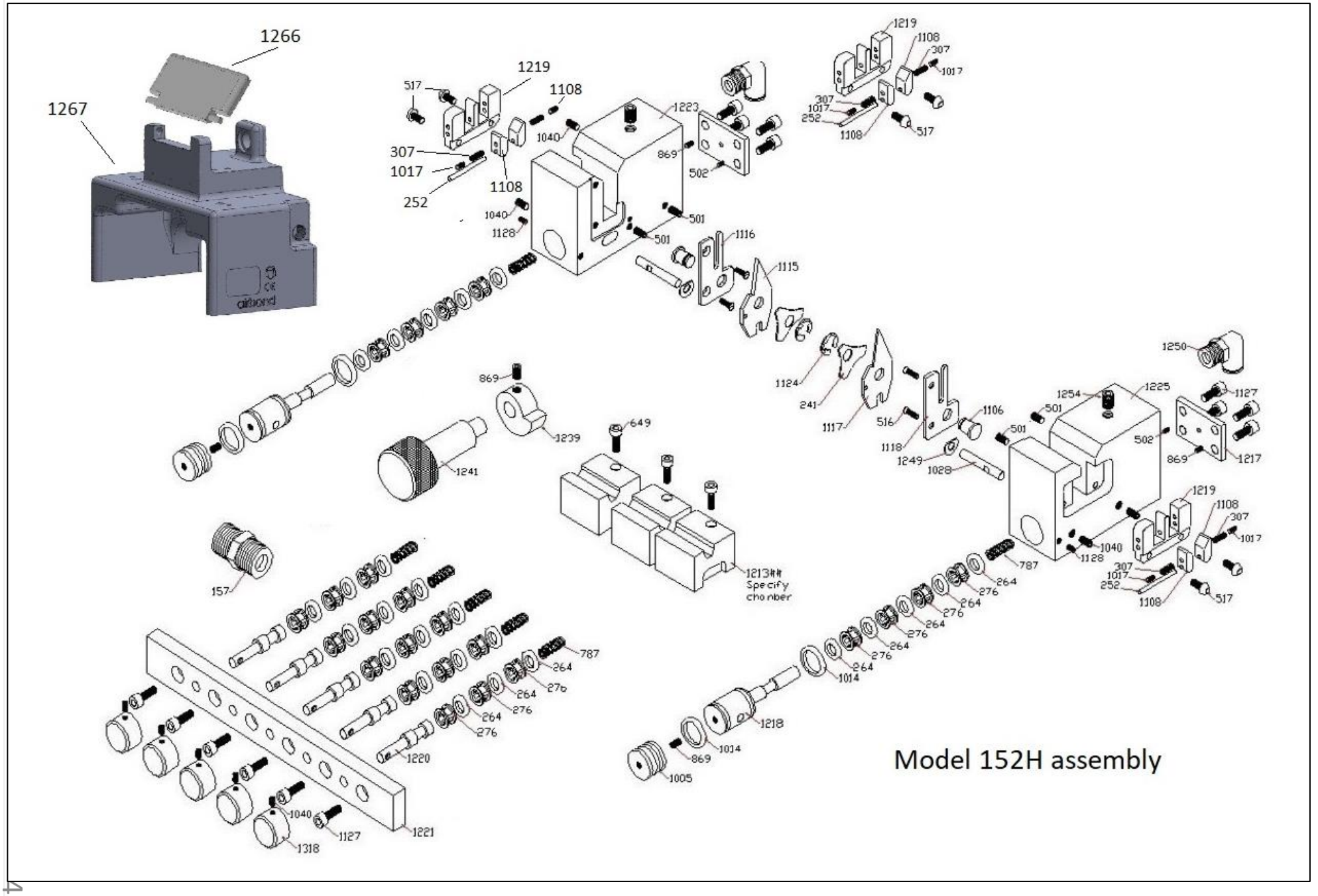
5) Check for correct seating of the compression spring. If it is not seated correctly, remove and re-seat, as in the main text. Check to see whether the arched compression spring has become flatter than normal. If it has, remove the compression spring, and fit a new one.

6) Cutter motors. The 152 is unique in having reciprocating cutter mechanisms. These are enclosed in the two blocks at either end of the splicer. We can call the units “cutter motors”.
So, are the cutter motors performing properly?
Check if the motors are working at all – are the knives moving backward and forward at high speed?
Even if the cutters are moving, is the cutter travel too short? The cutters must overlap comfortably for the cutting action to be effective.

If the action of the cutter motors is unsatisfactory in any way, then remove the cutter unit from the splicer, and repair / service as shown in the main text.

Description	Item No.	Quantity
Knife spring	241	2
Shutter spindle-30.3mm long	252	2
O-Ring - BS010	264	25
Shell for air valve-43004-A3	276	23
Yarn clamp spring	307	4
M3 x 6 socket button head screw	517	4
M4 x 16 Socket head cap screw	649	3
Air valve return spring LC-022B-8SS	787	7
M4 x 6 socket set screw	869	2
Lower sealing plug 103	1005	2
O-Ring lower bore	1014	4
Blast valve & yarn clamp adjusting screw	1017	4
M4 x 4 socket set screw	1040	5
Knife pivot	1106	2
Yarn clamp pad 111	1108	4
Right hand moving knife 111	1115	1
Right hand fixed knife 111	1116	1
Left hand moving knife 111	1117	1
Left hand fixed knife 111	1118	1
Circlip	1124	2
M6 x 6 socket set screw	1125	1
M3 x 10 socket set screw	1128	2
M4 x 12 torx cap head self tapping screw	1191	4
M3 x 6 torx cap head self tapping screw	1193	4
M4 x 8 torx cap head self tapping screw	1194	5
Chambers (Please specify)	1213##	3
Knife Valve 122	1218	2
Yarn clamp block 122	1219	2
Air valve 122	1220	5
M4 x 12 socket cap head screw	1237	5
Cam 122 (will check solidworks in case Cam 152)	1239	1
Cam Spindle	1241	1
Spacing-Moving Knife 122	1249	2
Knife block 152 - LH	1260	1
Knife block 152 – RH	1261	1
Knife shaft 152	1263	2
Knife Valve Plate 152	1264	2
Valve retaining strip 152	1265	1
Hinge Lid 152 & Rubber Strip Assembly	1266	1
Splicer body 152H	1267	1
Trigger button 105/113/114	1318	5
Hanging assembly parts (if not custom)	1242	
Splicer holding clip	170	2
Splicer body 152HW	1268	1
Flow Control Parts		
M3 x 6 socket button head screw	517	3
O-ring BS006	788	2
Flow Restrictor Valve 122	1258	3
Splicer body 152HF	1269	1
Splicer body 152HFW	1280	1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1241
157
1213## Specify chamber
1220
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1127
1040
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1005
Model 152H assembly