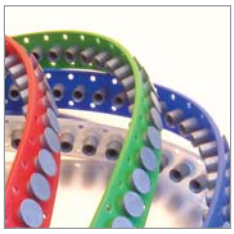
Self-pierce riveting products

Henrob®
Innovative Joining Solutions

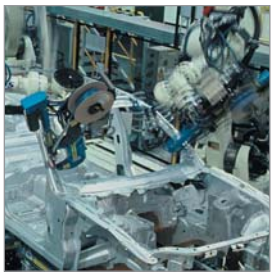
Typical range of Ø5mm rivets



Rivets in tape

Self-piercing threaded studs

The Rivlite handheld tool



Robot mounted electric servo systems

Hydraulic powered system

‘for use in many different industries and applications.’

The **Henrob** product range

Henrob designs and manufactures a wide range of self-pierce riveting (SPR) systems and rivets, for use in many different industries and applications.

Rivets are available in Ø3mm and Ø5mm versions, in lengths from 3.5mm to 14mm. Typically joints up to 10mm* thick in aluminium, and 6mm* thick in steel can be joined using **Henrob** rivets.

Rivets can be supplied loose, for use in **Henrob** RivTrans riveting systems. Alternatively rivets can be supplied in tape for use in **Henrob** sprocket drive, mechanical feed, or RivLite riveting systems.

Specialist self-piercing products are constantly under development, one example being self-piercing stud that **Henrob** has recently introduced to the market in M5 & M6 variants.

Henrob self-pierce riveting systems are available to suit a wide variety of applications and production styles. Equipment types include the simple, hand held RivLite tool, useful for repair work, on-site riveting and low volume production. For higher volume production, hydraulic powered systems are available, offering fast cycle times and automatic rivet feed. For use in heavily automated, high volume production, **Henrob** self-piercing electric servo systems are highly effective, especially when robot mounted.

* **Depending on the specific material used**

Rivet process selection?

With many hundreds of different rivet types to choose from, selecting the correct riveting process for an application requires skill and experience.

As pioneers of the self-pierce riveting process, **Henrob** has built up many years of experience in the optimisation of self-pierce riveted joints, and we have all the equipment and expertise necessary to fully evaluate applications.

Henrob is happy to provide advice on the suitability of our self-pierce riveting processes for any potential application. Please contact us or our authorised distributors for more information.

‘selecting the correct riveting process for an application requires skill and experience.’

In house fatigue testing of a riveted coupons.

Computer microscopy of a riveted joint cross section



System selection

‘high quality cost effective and reliable.’

There are 4 basic types of self-pierce riveting system available from **Henrob**.

Selection of the most appropriate riveting system for an application is fundamental in achieving high quality cost effective and reliable production.

The following guidelines give an indication of which system to choose. **Henrob** recommends that potential applications are discussed in detail with **Henrob** or an authorised distributor in order to make the best possible choice.

RivLite

Hydraulic Double Acting

Hydraulic Pre-Clamping

Electro Servo

The **RivLite** system is typically used for vehicle repair, prototype build, site work and very low volume production. The RivLite system is based on a hand held actuator (battery or mains powered), fitted with a range of accessories to enable the tool to be configured for various applications. RivLite design ensures a high quality joint.

The **Hydraulic** DA (double acting) system comprises a tool head, as shown opposite, and a separate hydraulic powerpack. The tool head can be configured with a large variety of different accessories to allow access to various sizes and shapes of components. The hydraulic DA system is typically used in the manufacture of steel framed buildings, road signs, and other fabrications used in the construction and white goods industries.

The **Hydraulic** PC (pre-clamping) system comprises a tool head, as shown opposite, and a separate hydraulic powerpack. This system has been developed to give the best possible riveted joint quality, and is commonly used in automotive vehicle assembly. The system is highly configurable, and can be used for manual, automated and robotic production. The system can also be fitted with **Henrob’s** RivMon process monitoring unit.

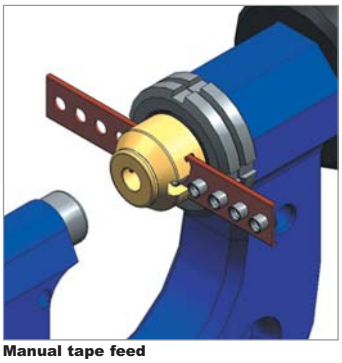
The **Electric Servo** system comprises a tool head, as shown opposite, and a separate control cabinet. The electric servo system has been developed specifically for automated and robotic applications, with a reduced cycle time compared with the equivalent hydraulic Pre-Clamping system. The system is highly configurable, and can be used for automated and robotic production, but is not recommended for manual operation. The system can also be fitted with **Henrob’s** RivMon process monitoring unit.

Rivet feed selection

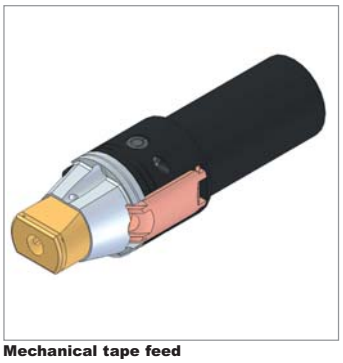
‘sophisticated automatic systems for high volume production.’

To complement the four self-pierce riveting systems detailed previously, there are a variety of accessories available for feeding rivets into the tools.

These range from simple manual feed through to sophisticated automatic systems for high volume production.



Manual tape feed



Mechanical tape feed

Sprocket tape feed

RivTrans loose feed

A brief description of the available rivet feed options is as follows.

Manual tape feed

This rivet feeding method is only available for the RivLite riveting system. Rivets are supplied on a short length of tape that is fed through the nose of the RivLite tool by hand.

Mechanical tape feed

This rivet feeding method is available for Hydraulic Double Acting and Hydraulic Pre-Clamping riveting systems only. Rivets are supplied in tape on spools or in cassettes, and are fed into the riveting tool automatically by a mechanical cam and spring mechanism built into the nose of the tool.

Sprocket tape feed

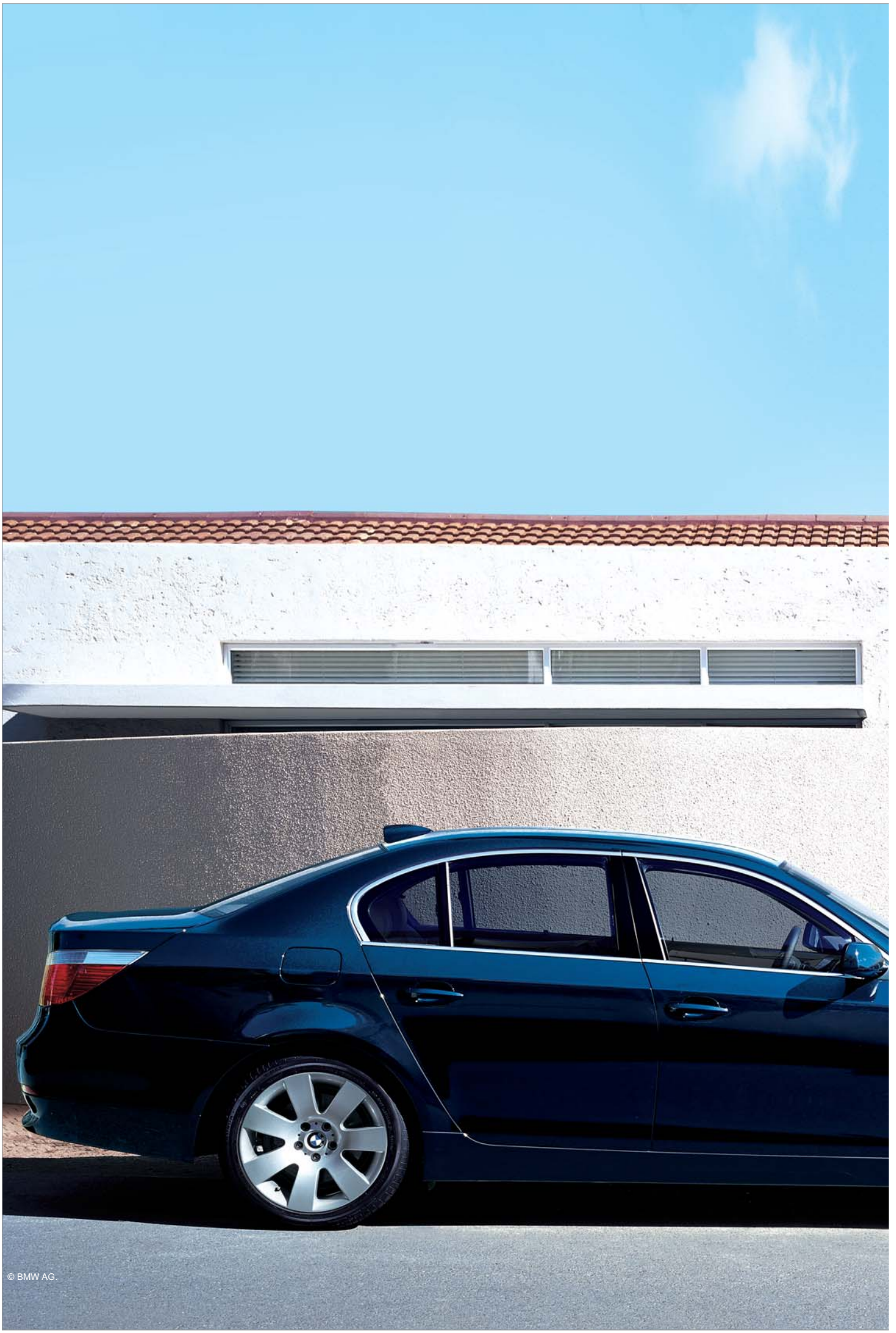
This rivet feeding method is available for Hydraulic Double Acting and Pre-Clamping and Electric Servo riveting systems only. Rivets are supplied in tape on spools or in cassettes, and are fed into the riveting tool automatically by a pneumatic sprocket mechanism. A sensor is built into the nose ensures that a rivet is always present prior to setting. A pneumatic guillotine to automatically cut the used tape is also available.

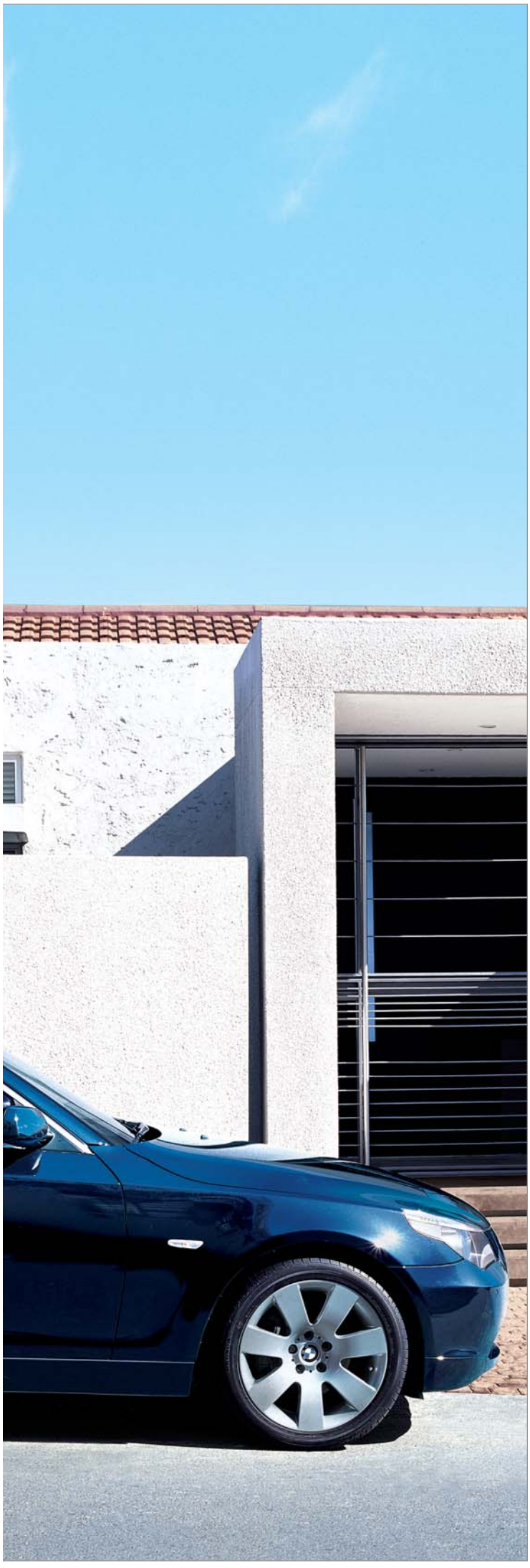
RivTrans loose feed

This rivet feeding method is available for Hydraulic Pre-Clamping and Electric Servo riveting systems only. Rivets are supplied loose and are fed into the riveting tool automatically from a separate supply cabinet by blowing them along a special tube. This avoids having to manage waste tape, and is especially useful in high volume automated applications. A sensor is built into the nose to provide a ‘ready to rivet’ signal to the hydraulic power pack or electrical control cabinet.

System features

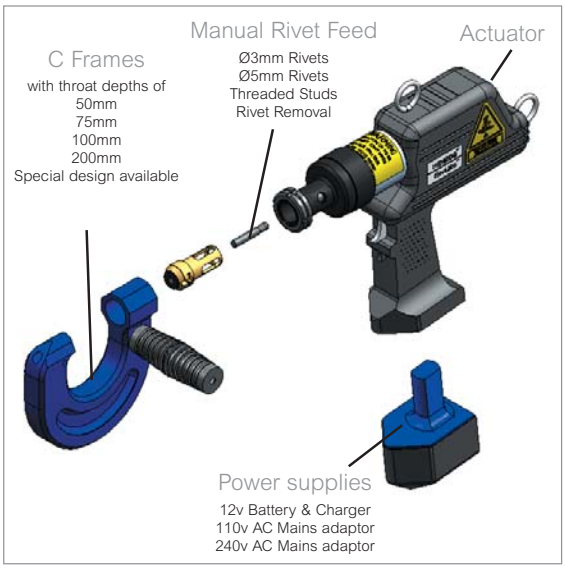
Feature	**Type of Riveting System**			
	RivLite	Hydraulic Double Acting	Hydraulic Pre-Clamping	Electric Servo
Motive Power	12v battery. 110v mains adaptor. 240v main adaptor.	Hydraulic powerpack. 400v 3PH supply.	Hydraulic powerpack. 400v 3PH supply.	Control cabinet 240v 1PH 16A supply.
Uses	Manual operation only. Heavier tools may require a tool balance.	Manual operation with tool balance. Simple automation.	Manual operation with tool balance. Automation systems. Robotic systems with one tool per robot.	Automated systems. Robot systems with one or more tools per robot via toolchanger.
Functionality	Ø3mm rivets. Ø5mm rivets. Self-piercing studs. Rivet removal.	Ø3mm rivets. Ø5mm rivets.	Ø3mm rivets. Ø5mm rivets. Self-piercing studs.	Ø3mm rivets. Ø5mm rivets.
Rivet Sizes	Ø3x4mm - Ø3x8mm. Ø5x5mm - Ø5x14mm.	Ø3x5mm -Ø3x8mm. Ø5x5mm - Ø5x14mm.	Ø3x5mm - Ø3x8mm. Ø5x5mm - Ø5x14mm.	Ø3x4mm - Ø3x8mm. Ø5x4mm - Ø5x14mm.
Rivet feed compatibility	Manual tape feed.	Mechanical tape feed. Sprocket tape feed.	Mechanical tape feed. Sprocket tape feed. RivTrans loose feed.	Sprocket tape feed. RivTrans loose feed.
Cycle time (approximate only)	5 ~9 seconds.	1.5~3.5 seconds.	2.0~4.0 seconds.	1.5~4.0 seconds.
RivMon process monitoring	Not compatible.	Not compatible.	Compatible.	Compatible.
Max daylight opening (nose to die gap)	25mm.	45mm (standard). 110mm (long stroke). 70mm (long nose).	Tools available with max daylight openings from 22mm to 170mm.	Tools available with max daylight openings from 70mm to 210mm.
Comparative cost	*	**	****	*****

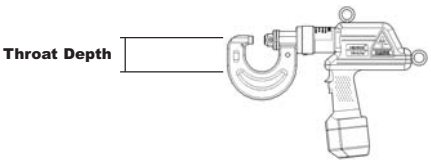




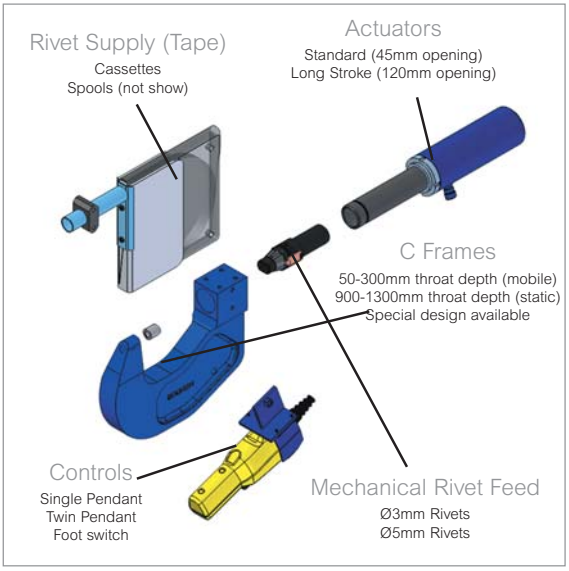
Options

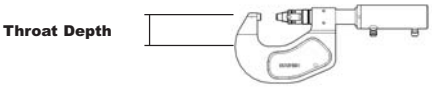
RivLite





Hydraulic Double Acting

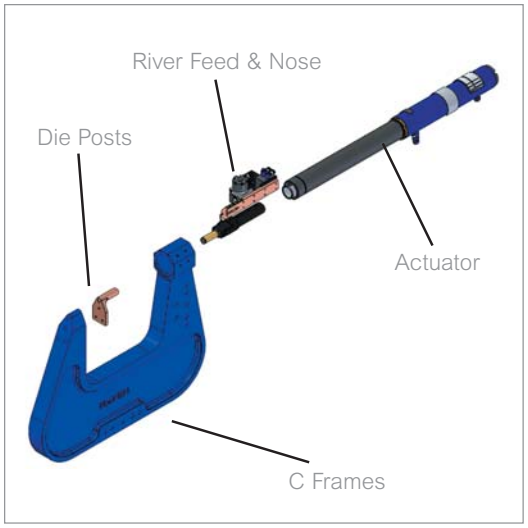




Hydraulic Powerpacks (not shown)

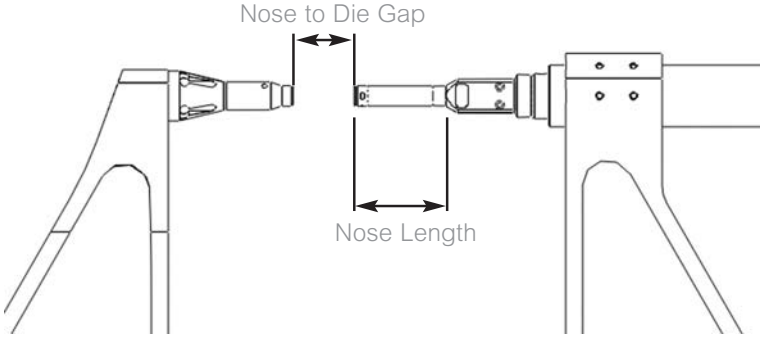
Single tool operation
Twin tool operation (non-synchronous)

Hydraulic Pre-Clamping



Actuators

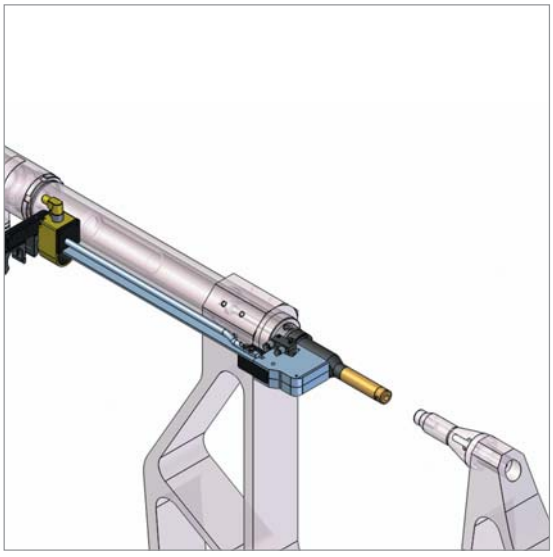
Actuator Size	Nose to Die Gap	Diameter & Nose Length	Rivet Feed Compatibility		
			Mechanical Tape Feed	Sprocket Tape Feed	RivTrans Blow Feed
22/22	22mm	Ø18x15mm	✓	✓	✓
45/32	45mm	Ø18x15mm	✓	✓	✓
85/32	85mm	Ø18x15mm	✓	✓	✓
135/32	135mm	Ø18x15mm	✓	✓	✓
170/32	170mm	Ø18x15mm	✓	✓	✓
95/72	95mm	Ø18x55mm	✓	✓	✓
125/72	125mm	Ø18x55mm	✓	✓	✓
100/100	100mm	Ø18x85mm	✗	✓	✓



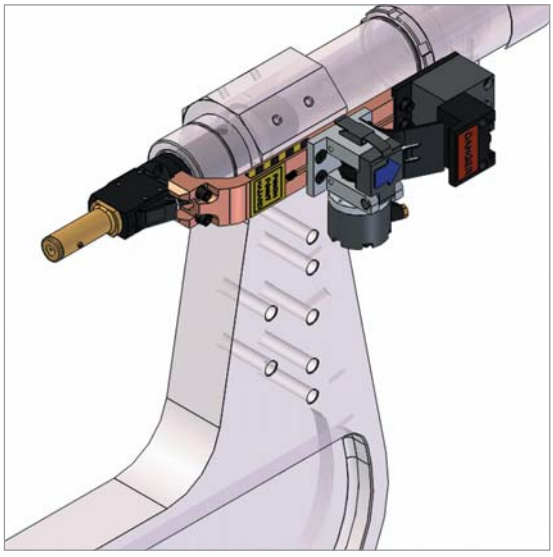
Hydraulic Pre-Clamping

Rivet Feed

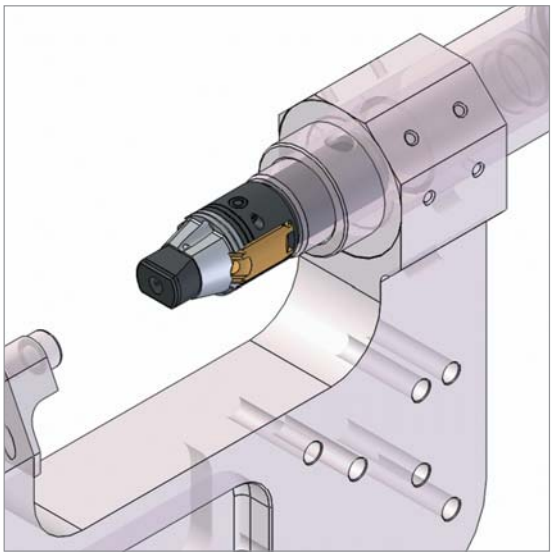
Feed Type	Rivet Compatibility		
	Ø3mm	Ø5mm	Studs
Mechanical Tape	5 - 8mm length	5 - 14mm length	X
Sprocket Tape	4 - 8mm length	4 - 14mm length	X
RivTrans Blowfeed	3.5 - 6mm length	4 - 9mm length	M5 & M6



RivTrans Blowfeed Mechanism.



Sprocket Tape Mechanism.



Mechanical Tape Mechanism.

Hydraulic Pre-Clamping

C frames & die posts

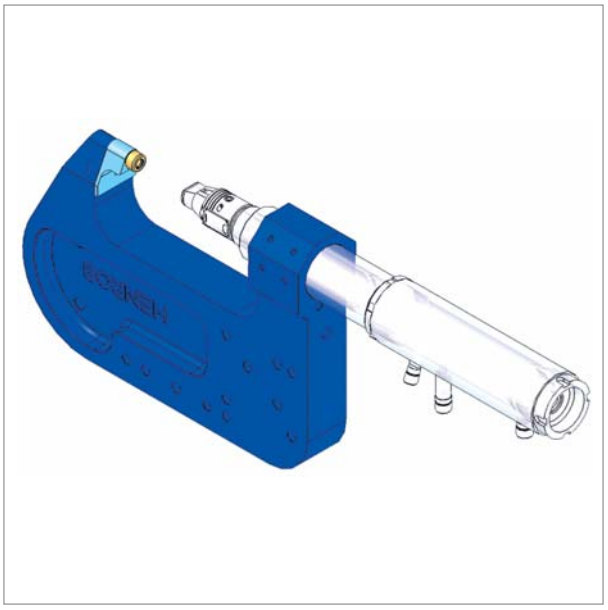
Henrob has many designs of C frames & die posts for hydraulic Pre-Clamping systems.

C frames vary in size, with throat depths from 60mm to 1500mm. The range includes C frames for manually operated tools, floor standing tools and special lightweight C frames for robot mounted tools.

C frames and die posts are designed on a modular basis, and can accept all the different types of hydraulic actuator so long as the actuator maximum opening is not exceeded. This range of C frames and die posts will also accept **Henrob** electric servo actuators.

Selection of the correct C frame and die post is very important in order to get the best performance from the **Henrob** self-pierce riveting system. Therefore we recommend that you contact **Henrob**, or your local authorised distributor, for advice in choosing the correct combination of C frames and die posts for specific applications.

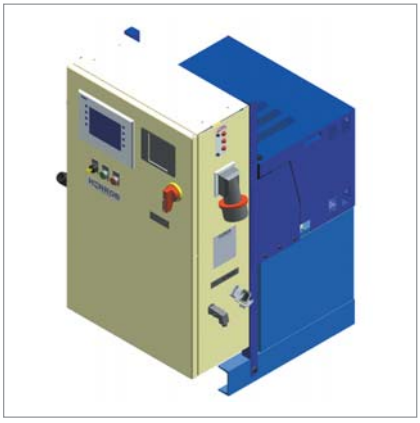
Floor standing C frame 900mm throat depth 160mm die post.



Manual C frame 70mm throat depth 20mm die post..

Lightweight C frame 350mm throat depth 100mm die post.

Options



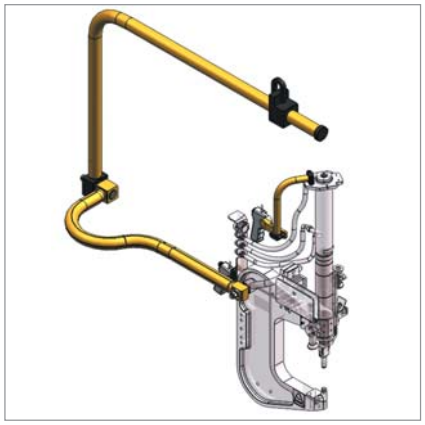
Hydraulic Pre-Clamping powerpack with control cabinet fitted.

Handling accessories

Henrob can supply a wide range of accessories for manual handling of the riveting tool, including shackles, tool balancers and sophisticated pivoting gimbals.

For robot mounted or fixed automation tools, **Henrob** can provide bespoke designed mounting brackets, incorporating optional pneumatic compliant mountings and tool changers.

Note that the hydraulic services to robot mounted tools have to be routed separately from the tool changer if fitted.



Manually operated tool using a multi axis hanger and twin handed controls.

Robot mounted tool incorporating specially designed bracket.

Hydraulic powerpacks

Powerpacks for hydraulic Pre-Clamping riveting systems are available as single tool units (standard configuration). Twin tool, non-synchronous, units are also available (non-standard configuration).

The powerpack operates at a hydraulic pressure of up to 250 Bar, which generates a force of up to 6 tonnes In the riveting tool. Typical cycle times for setting a rivet range from 2 seconds to 4 seconds, depending on the size of the hydraulic actuator connected to the powerpack.

The powerpacks have sophisticated electrical control systems fitted, which govern the action of the riveting tool and allow communications with external devices such as manual pendants, robot controllers, safety circuits.

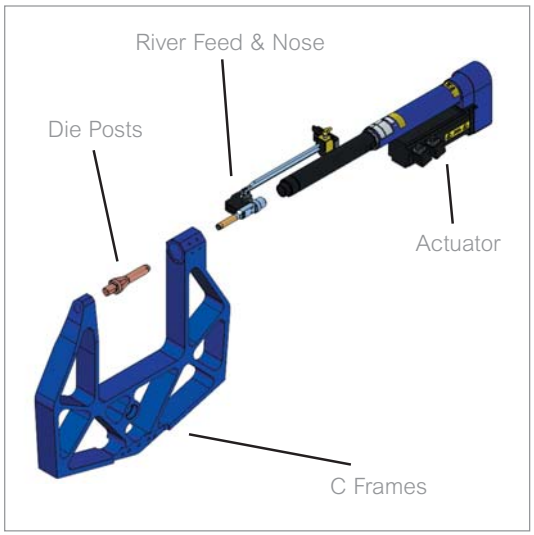
Henrob's standard control systems are based on Modicon and Siemens PLCs, using Interbus communication protocols. Other communication protocols can be used if required.

The RivMon process monitoring system can be used with the standard **Henrob** hydraulic control cabinet.

Note that if RivTrans blowfeed is used as the rivet feed method, a separate rivet supply cabinet must be connected to the system.

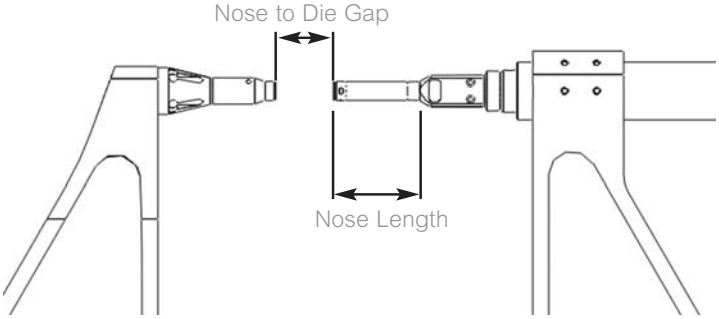
The standard Henrob hydraulic control system designs comply with European Standards EN292 Parts 1&2, EN574, EN954, EN60204-1, IEC60204-1 & BS5304 for safety and control.

Electric Servo

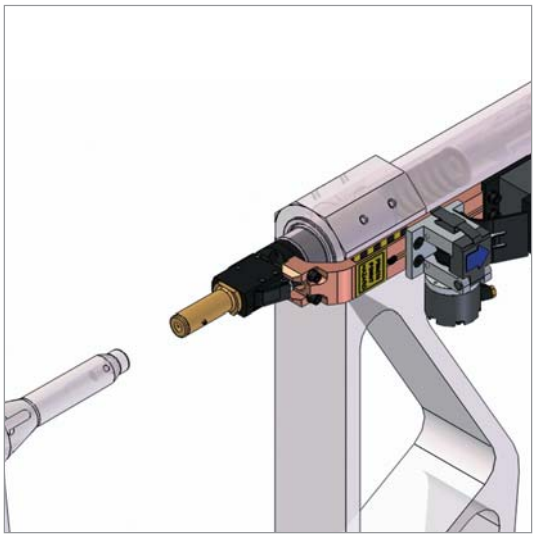


Actuators

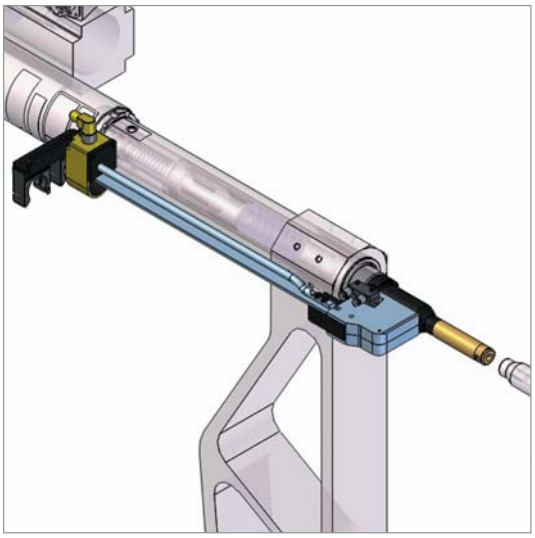
Actuator Size	Nose to Die Gap	Rivet Diameter	Diameter & Nose Length
150/032/3	110mm	3	Ø18x15mm
150/032/5	110mm	5	Ø18x15mm
150/072/3	70mm	3	Ø18x55mm
150/072/5	70mm	5	Ø18x55mm
250/032/3	210mm	3	Ø18x15mm
250/032/5	210mm	5	Ø18x15mm
250/072/3	170mm	3	Ø18x55mm
250/072/5	170mm	5	Ø18x55mm



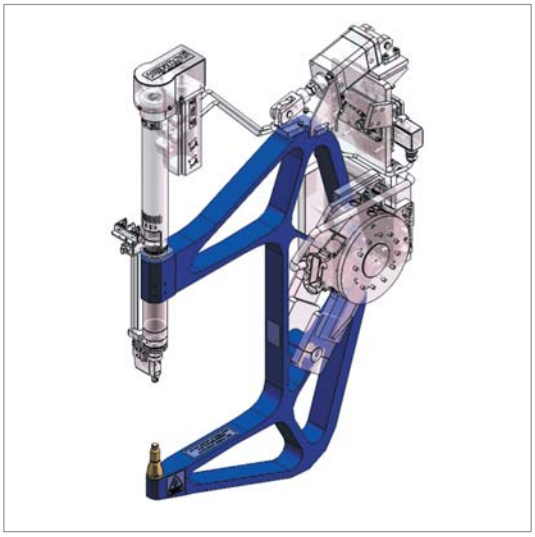
Electric Servo



Sprocket Tape Mechanism.



RivTrans Blowfeed Mechanism.



Lightweight C frame & die post.

Rivet Feed

Feed Type	Rivet Compatibility	
	Ø3mm	Ø5mm
Sprocket Tape	4 - 8mm length	4 - 14mm length
RivTrans Blowfeed	4 - 6mm length	4 - 9mm length

C frames & die posts

Henrob has many designs of C frames & die posts for electric servo systems. A standard library is available electronically.

C frames vary in size, with throat depths from 60mm to 1500mm. The range includes C frames for fixed automation tools, floor standing tools and special lightweight C frames for robot mounted tools.

C frames and die posts are designed on a modular basis, and can accept all the different types of servo actuator so long as the actuator maximum opening is not exceeded. This range of C frames and die posts will also accept **Henrob** hydraulic PC actuators.

Selection of the correct C frame and die post is very important in order to get the best performance from the **Henrob** self-pierce riveting system. Therefore we recommend that you contact **Henrob**, or your local authorised distributor, for advice.

Electric Servo

Control cabinets

Control cabinets for electric servo riveting systems are available in two formats. For servo systems that have sprocket drive tape rivet feed, a stand-alone control cabinet is used. For systems that use RivTrans blowfeed rivet supply, a combined rivet supply and servo control cabinet is available.

The control cabinets have sophisticated digital servo drive control systems fitted, which govern the action of the riveting tool and allow communications with external devices such as manual pendants, robot controllers, safety circuits etc. The system has a category 1 motor stop circuit.

Henrob's standard control systems are based on Modicon and Siemens PLCs, using Interbus communication protocols. Other communication protocols can be used if required.

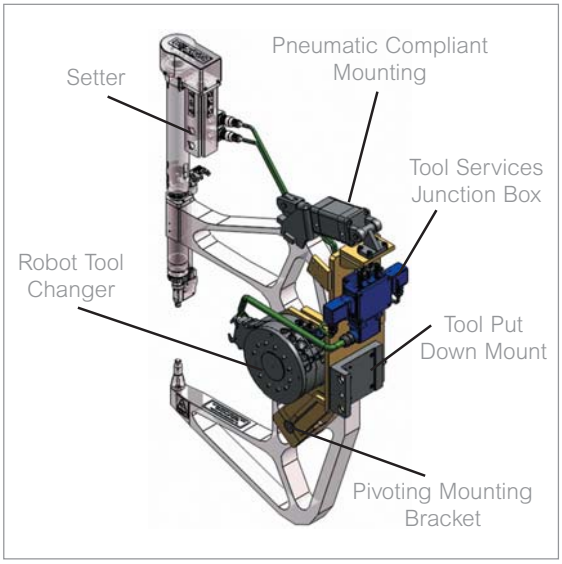
The RivMon process monitoring system can be fixed to the **Henrob** electric servo control cabinet.

The **Henrob** servo control system complies with European Standards EN292 Parts 1&2, EN574,EN60204-1, IEC60204-1 & BS5304 for safety and control. The system also complies with EN50081-2 for EMC emissions & EN50082-2 for EMC immunity.

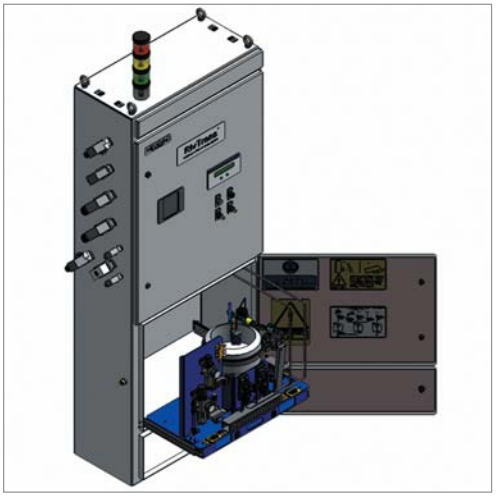
Handling accessories

For robot mounted or fixed automation tools, **Henrob** can provide bespoke designed mounting brackets, incorporating optional pneumatic compliant mountings and tool changers.

All of the services required to run the **Henrob** electric servo system can be passed through the tool changer so that the riveting tool can be completely separated from the robot and multiple riveting tools can be used by one robot.



Electric Servo Riveting Tool showing typical accessories available from Henrob for Robot Mounting.



Combined RivTrans feed and electric servo control cabinet.

Stand-alone electric servo control cabinet for use with sprocket tape rivet feed systems.

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