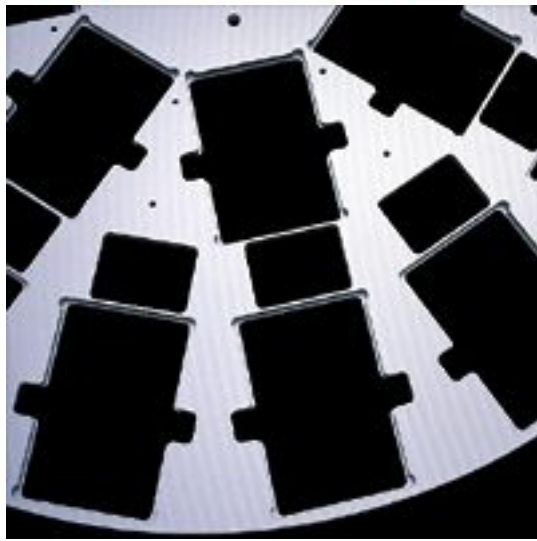
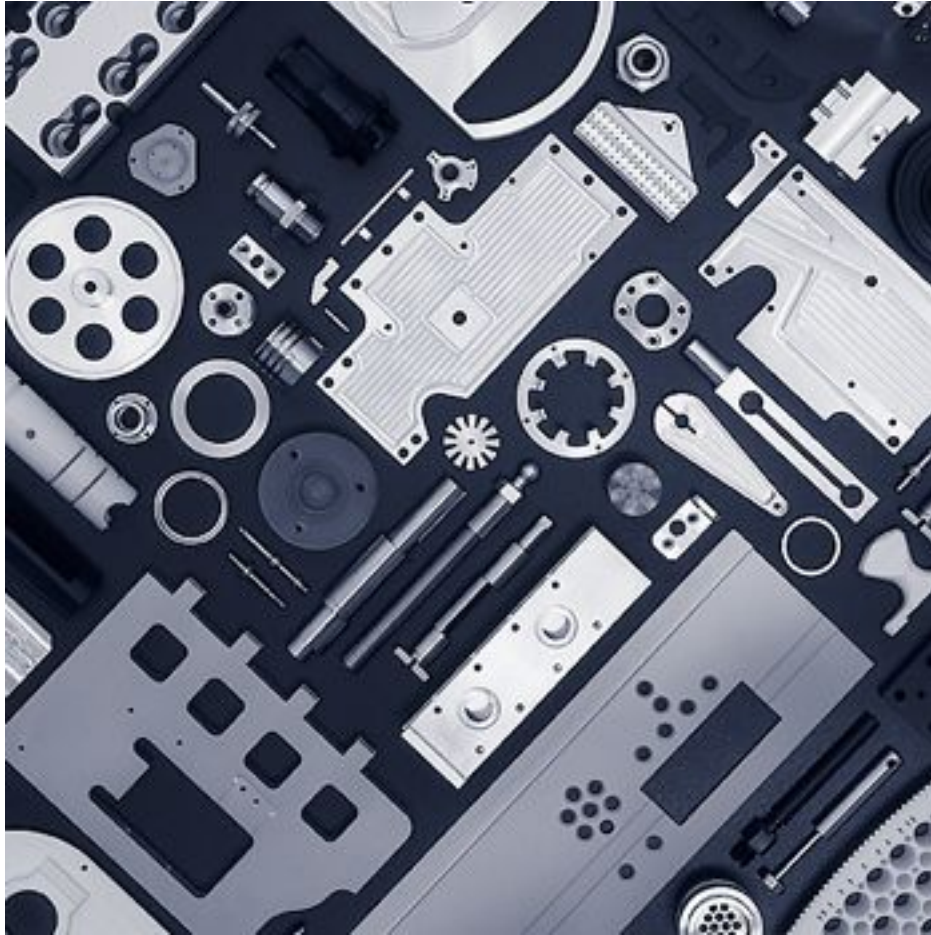



PARAGON
PRECISION ENGINEERING LTD

The logo features the word "PARAGON" in a large, bold, black sans-serif font. Below it, the words "PRECISION ENGINEERING LTD" are displayed in a smaller, black sans-serif font. The word "PRECISION" is highlighted with a red background. The entire text is enclosed within a red outline that forms a diamond shape at the top and bottom, with several red lines radiating from the top point of the diamond.

.....from prototype to production

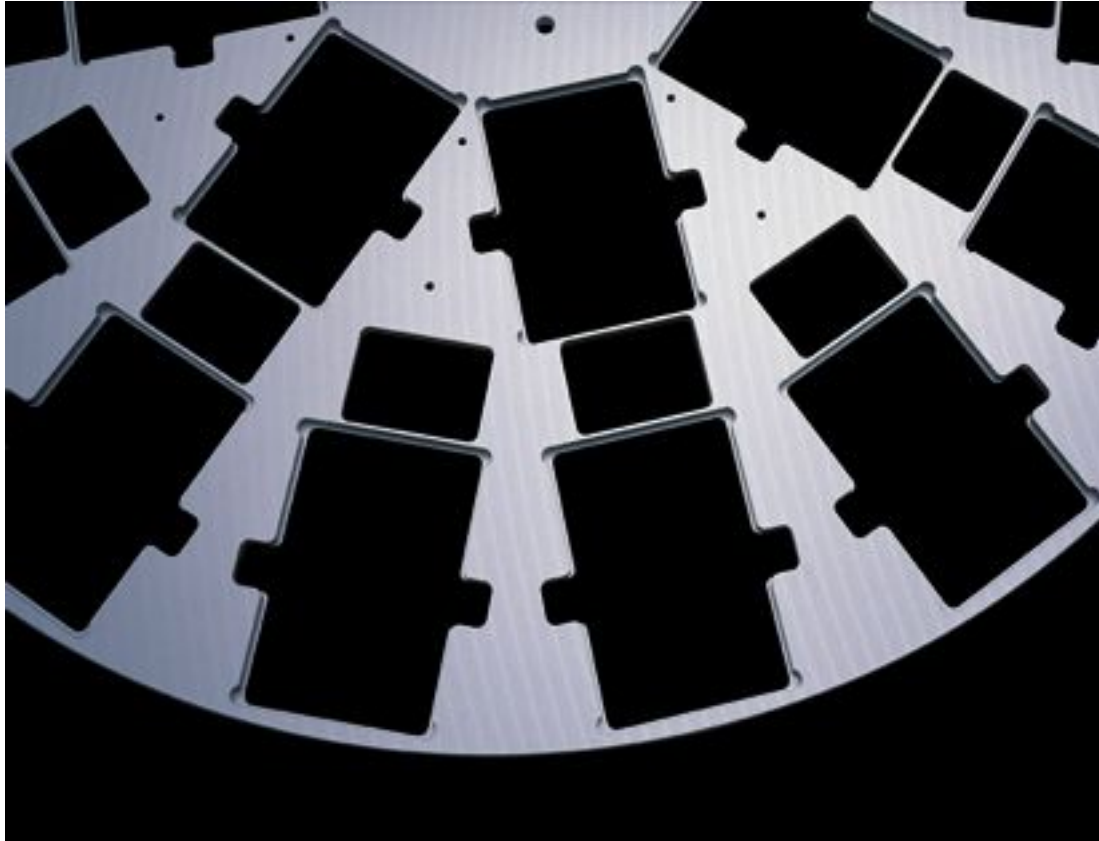


Paragon specialises in CNC machining and sheet metal work. We produce components for companies operating within a wide range of specialist markets. We have always had close connections in medical and scientific fields, but our client base throughout the UK and in Europe also includes manufacturers involved in the following:-

- injection moulding
- laser technology
- motor racing
- MP3 audio equipment
- photographic equipment
- production control
- reprographic equipment
- specialist vehicle fittings.

This 'electronic brochure' is designed to give a fairly detailed picture of what we do and how we operate. After seven years of rapid growth we are still adding to our suite of machines to cope with increasing orders. We are always happy to look at new jobs, both for prototyping and for production. We hope that you will find this information useful. If you like the look of what we have to offer, please do give us a call!

John Kent
Andy Watson
Gary Mills
Steven Voak
(Directors)



CNC machining

Our CNC milling machines can make single parts up to 1,600mm x 1,000mm with great precision. The turntable shown here is machined from a solid plate of aluminium to a diameter approaching a metre and a thickness of only 6mm, with a tolerance of less than 0.1mm over the whole diameter.

CNC machining offers the ideal means of prototyping and producing such complex, precisely-specified parts, with minimal set-up costs and the ability to modify designs as a new product establishes itself in the market.



Paragon makes sheet metal enclosures and metal structures for a range of scientific and recreational equipment. Mild steel is the main raw material, but we also use aluminium, stainless steel, brass, galvanised steel and various other metals.

We apply the same high-quality criteria to our sheet metal work as to our machining. Our monthly output is based on regular orders from long-established customers, with quantities varied according to their short-term needs, but we also handle prototype and one-off jobs. We have always been involved in helping our customers to develop new products: sheet metal is an ideal medium whenever high quality coupled with low set-up costs and flexibility are required.

.....introduction - sheet metal



CNC machining centres

CNC milling machines represent the core of our business. They offer the ability to make one-off prototypes and full-scale production runs using the same precision equipment throughout. Many jobs which were traditionally made by a combination of casting and manual machining are now better handled from start to finish on a CNC machine, keeping set-up costs low and maintaining the highest production quality at competitive prices.

CNC machining also offers a worthwhile alternative to mass-production whenever the volume of prospective sales is uncertain, since tooling costs are minimal and parts may be modified as needed during the early production phases when a product is still evolving. Our customers are able to order parts in whatever quantity is required, with none of the risk involved in committing capital to large stocks of mass-produced components.

CNC machining centres.....



Paragon's largest machines are horizontal and vertical machining centres, the Haas HS1 and VF8. These machines are extremely versatile, allowing us to make production runs of components cut in sets from single blanks as well as giving us the capacity to make parts which would have traditionally involved a slow, expensive combination of castings and machining.

These machines can be left unattended, making a long sequence of complex cuts using up to twenty-four different tools while our engineers are busy operating smaller machines.

Our investment has quickly paid off in cutting lead-times as well as by keeping costs competitive.

We can make parts up to 1,600mm x 1,000mm by 750mm from a single block of aluminium or, as here, machine an assembled unit created from several different parts.



CNC lathes

To complement our suite of CNC machining centres, we have a set of automatic CNC lathes capable of all kinds of one-off and production jobs. There is a choice of bar-fed or single-piece operations, with a maximum capacity of 250mm x 500mm parts.

CNC lathes are a cost-effective means of producing prototypes and short to medium-scale production runs. The bar-fed lathes can make batches of components with minimal set-up and handling time, keeping unit costs low.

Even for small components which are to be made in batches of a thousand or more, turning is often cheaper than casting or moulding.



Tolerances can be as fine as a few microns, far surpassing what can be achieved by mass-production methods.

Turning produces a superb finish and allows our customers to utilise materials such as phosphor-bronze and PTFE to achieve the performance required in demanding applications such as bio-robotics.

The skills of our staff are as important as the CNC technology. Many years of workshop experience, coupled with up-to-date programming skills make the best use of the equipment to produce top-quality components at competitive prices.

We are always happy to advise customers on the best way to make a component, in terms of cost, performance and ease of production. Using the same machines and staff for prototyping and production keeps quality consistent from start to finish.



Prototype to production

Since opening for business in 1995, Paragon has always specialised in work which follows the complete development process from prototype to production.

The huge practical workshop experience of our Directors and staff are invaluable to many of our customers, playing a key role in the development of successful new products at the cutting edge of technology.

Working in this way offers many advantages over mass-production. Of particular importance are the following:-

- *low prototyping and setup costs
- *quick and efficient development from prototype to full-scale production under the same roof, using the same materials, skilled staff and production methods
- *wide choice of materials to provide the best performance
- *complete control over quality and precision at all stages, working to the same manufacturing tolerances from start to finish
- *ability to anticipate potential production problems right from the beginning of the development process
- *freedom to modify designs at any time as a product and its market evolve
- *ability to provide batches of any size to regular or special orders.



New orders are usually received as a sketch either faxed or sent by email. On the basis of initial drawings we are happy to provide an estimate of costs along with suggestions for the most efficient method of production if required. Final quotations are supplied without obligation on the basis of detailed drawings and quantities.

CAD (computer-aided design) and CNC (computer numerical control) technology are at the heart of our workflow. Most designs are still received as paper drawings, but increasingly customers are supplying electronic CAD files which can be input directly or entered via a separate computer.

.....prototype to production.....



Most of our work is done on fully-enclosed wet-running machines operating automatically, but for one-off or short-run prototyping, modification and finishing jobs where step-by-step manual control is needed, we have a Bridgeport Series 1 EZ-Trak semi-automatic CNC milling machine which can be run with or without lubricant.

The majority of our machines take fourth-axis rotary tables which rotate the workpiece between or during operations. This allows parts to be made which could not be made on a static bed, as well as cutting production costs by reducing machine down-time.

..... prototype to production.....



The practical workshop skills of our engineers are vital to the quality of our output. Our staff have been carefully chosen for the experience and talents which they have to offer.

Parts are carefully inspected and hand-finished as they leave the machine, giving us constant quality control at the point of production.

.....prototype to production



Sheet metal

Paragon specialises in fine sheet metal work, but we also make rugged structures for uses as diverse as outdoor security units and laboratory test-benches.

Sheet metal.....



Our sheet metal operations are based on CNC machines for cutting, punching and folding.

CNC sheet metal work offers precision, flexibility and low set-up costs. It is surprising how cost effective sheet metal can be as an alternative to plastics and mass-production, at the same time as giving superior strength, durability as well as the special quality feel and weight of metal.

.....sheet metal.....



Blanks are guillotined from the sheet and a variety of punching machines are used, ranging from the fully automatic Nisshimbo 26-station turret punch press to small manual punches which are sometimes used for fine operations on small parts.

Folding is an incredibly versatile method of fabrication, offering strength and elegance of design at the same time as cutting production costs by reducing time spent on slower operations such as welding. Complex folds can be achieved which simplify greatly designs.

.....sheet metal.....



Welding is the mainstay of our sheet-metal operations, but we also use a variety of cold fastening methods ranging from traditional rivets and screws to various hi-tech metal fasteners and high-performance adhesives.

Whenever possible, mild steel should be considered first as the most versatile and cost-effective material for sheet metal structures. Mild steel offers the widest range of joining and finishing options, at the same time as useful magnetic properties and excellent forming capabilities. A range of finishes including plating, powder-coating and epoxy paint give sheet steel enclosures a superb quality look and feel, with a huge range of finish textures and colours.

Aluminium is used whenever increased corrosion resistance and lighter weight are required. Aluminium parts are usually anodised to harden the surface and provide an attractive sheen, after tumbling, finishing or bead blasting to blend the surface.

Stainless and galvanised steel are used for numerous applications when a combination of thin sheet metal and corrosion resistance are required. We use various other sheet materials, such as brass, when requested.

As well as enclosures and structures, we have also always provided basic cutting and punching services, such as for nameplates and fascia panels which are either pre-finished or supplied as blanks ready for coating and screen-printing.

Complete integration of our sheet metal and machining operations allows us to deliver a comprehensive service to our customers. Many of the parts which we make go to make complex computer-controlled equipment such as laboratory robots, communications systems etc..





Engraving and finishing

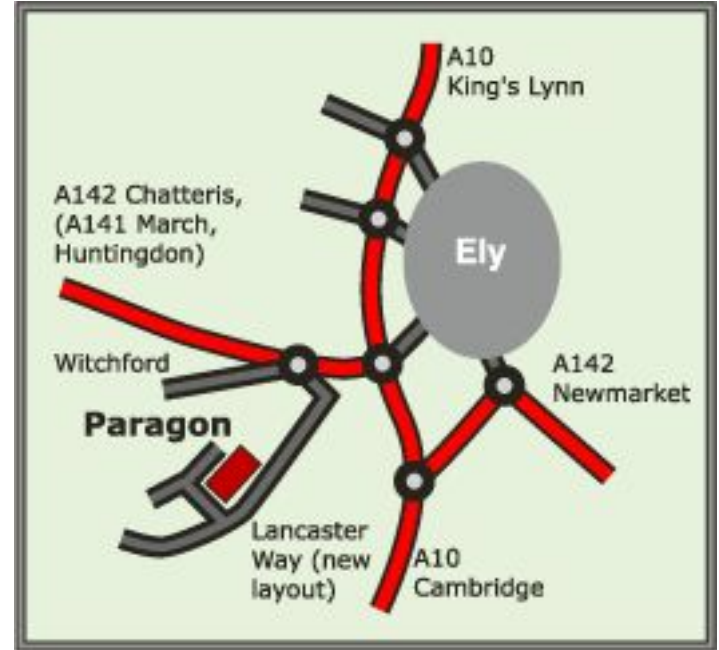
Engraving is the latest service which Paragon has to offer. We use computer-controlled and manual machines for engraving nameplates and components, but we are also able to engrave bulky, difficult objects such as trophies and large machined parts.

We offer a range of high quality finishes including plating and anodising, powder-coating and epoxy paint. It is always worth considering the finish to be used, in terms of cost, performance and the impact which this has on the choice of materials.

Aluminium, brass and mild steel parts are usually plated or coated. We used a tumbler, finishing and bead-blasting to give the required surface before plating or coating.

Some machined plastics are also coated to simulate the grained, stippled or leatherette finishes typically used on moulded polymers, for example where it is necessary to harmonise with the overall design of products which use a combination of moulded and machined components. In this way niche-market products can be developed which have great visual and tactile appeal, using high-performance synthetic materials with the precision, low set-up costs and unmatched flexibility of CNC machining.

After coating, parts may be screen-printed to add logos, calibrations and so on. Screen printing directly onto the part is cost-effective for relatively short runs, as well as offering a superior quality and style to other forms of labelling.



How to find us

Paragon is based just outside the small Cambridgeshire cathedral city of Ely, close to the busy A10 and A142. We are very well situated at one of the gateways between East Anglia, the Midlands, London and the North, with easy access to the A1M at Huntingdon and M11 at Cambridge.

Our own vehicles provide deliveries and collections within the Cambridge business area, while customers further afield are served by an excellent nationwide courier service.

How to find us.....



Paragon's situation on the edge of Ely was the natural outcome of a number of factors: all four Directors living in the area, our first customers having connections here, good suppliers available within a small radius, an excellent business-park location with potential for expansion etc..

Between Ely and Cambridge there has been enormous growth of small-to-medium sized businesses with links to the high-tech Cambridge-based manufacturing and research industries. The heart of Ely is a relatively unspoilt and deceptively tranquil Fenland market town, now on the brink of an explosive growth, with part of the outskirts already looking like the most prosperous suburbs of the south-east.

Right from the start in 1995, our major customers have been pioneering manufacturers in science-led market sectors such as DNA research, communications and fibre-optics. Our investment in state-of-the-art machinery has been essential to allow us to produce parts to the highest specifications, quickly and efficiently. We are therefore well-equipped, in terms of skill, experience and machinery, to provide a world-class engineering service to the most demanding customers. Being situated where we are, we have also been able to preserve the special personal, friendly approach which our customers value.

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*Design and photography © Quadrophoto, Grimston, Norfolk PE32 1BG
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PLANT LIST

Turning

Takisawa TC2 CNC lathe

Takisawa TC20 cnc lathe

Haas SL20 CNC lathe (250mm x 500mm maximum capacity with 50mm diameter through-the-spindle bar-feeder)

Milling

Bridgeport 460

Bridgeport 500

Bridgeport 800

VF2 Haas

3 VFOE SP Haas

VF8 Haas (X1600 - Y1000 - Z750)

(all the above machines have full 4th-axis capability.)

2 Haas mini mills

Haas HS1 twin pallet 24-tool horizontal

Wintec VMC40 twin pallet

Bridgeport Series 1 EZ-Trak

Sheet metal and fabrication

Nisshinbo CNC turret punch press - 26 station

1.5m 30 tonne Guifil cnc press brake

2m 50 tonne LVD CNC press brake

Pemsarter series 4 guillotine

Pierce-All (punch)

2 spot welders

tig & mig welding

bead blaster & rumbler

Engraving & finishing

Full engraving facilities

Silk-screen printing, painting and plating service

Issue No 6.0 03/01/02

Please call for further details if your job requires specific machine capabilities.

Paragon Precision Engineering Ltd

May 2002