



**MANUFACTURING
INNOVATIVE SOLUTIONS
TO HELP OUR CUSTOMERS STAY AHEAD**

**Engines, Transmissions & Components | EV Battery & Hybrid Systems
Machining & Assembly | Fixture Design & Manufacture**

www.AutocraftSG.com

Our Company



Autocraft Solutions Group is one of Europe's leading OEM partners for the manufacture of outsourced engines, EV battery assembly and remanufacture, and future propulsion solutions to a global market. Combining the expertise at three sites across the UK, Autocraft Solutions Group provides an array of engineering services to the global OEMs and their supply chains.

Our ethos is to 'provide innovative engineering solutions to help our customers stay ahead'. To do this, our main capabilities include:

- » New engine assembly, modification and conversion
- » Engine remanufacturing, testing and auditing
- » Hybrid vehicle systems, power electronics, EV battery assembly and remanufacture
- » Cylinder head and block machining
- » Prototype to high volume 5-axis machining
- » Fixture design and manufacture

AUTOCRAFT SOLUTIONS GROUP AT A GLANCE

200+
EMPLOYEES

3
LOCATIONS

40+
YEARS AT
GRANTHAM SITE

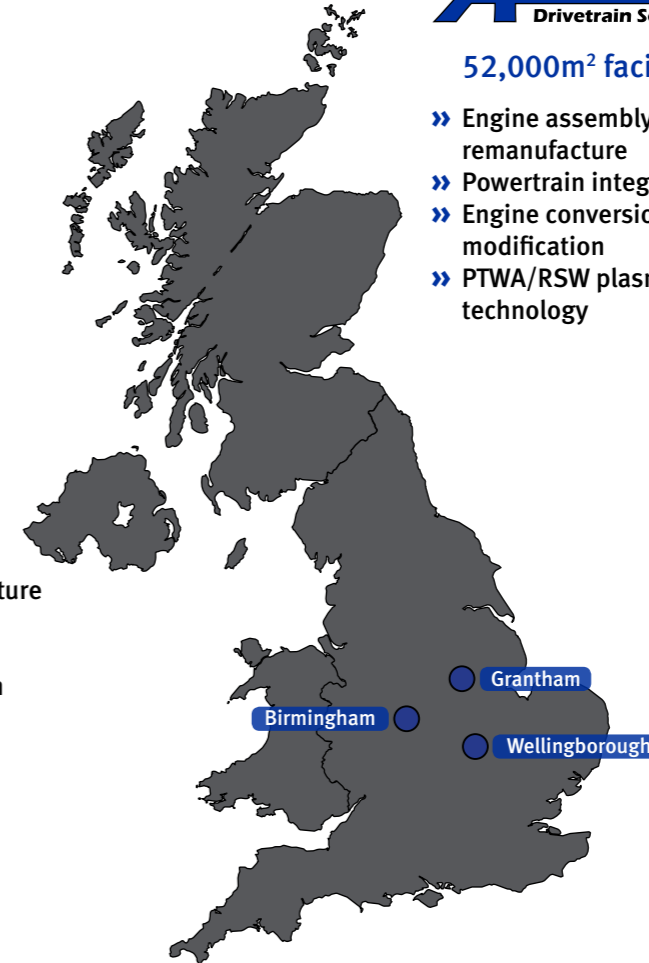
£25M
REVENUE
PER ANNUM

Autocraft Solutions Group Overview



1,000m² facility in Birmingham

- » Fixture design & manufacture
- » Low volume 3, 4 & 5-axis machining
- » Prototype machining from solid & castings
- » 2 & 3-axis CNC turning
- » Mould & die
- » Spark erosion (EDM)



52,000m² facility in Grantham, Lincolnshire

- | | |
|---|---|
| <ul style="list-style-type: none"> » Engine assembly & remanufacture » Powertrain integration » Engine conversion & modification » PTWA/RSW plasma spray technology | <ul style="list-style-type: none"> » Electric Vehicle (EV) battery assembly » Used EV battery testing, remanufacture & warranty » Distribution of failed cells & modules to 2nd life and recycling partners |
|---|---|



7,000m² facility in Wellingborough, Northamptonshire

- » Engine cylinder head & block machining
- » Bed plates & ladder frames
- » Gear & EV motor casings
- » Transmission housings
- » Structural BIW components



At Autocraft Drivetrain Solutions in Grantham we continuously develop and improve our facilities for the assembly of new engines for OEM service requirements, and conversion and modification of niche high-performance engine ranges.

Our class-leading assembly halls replicate OEM process quality standards on a more flexible and more responsive scale.

A moving trolley build process is used to aid variations in model and throughput. ‘No fault forward DC tooling’ is installed throughout the area and all data is collected using our Industry 4.0 systems to provide full process control and traceability.

Autocraft has over 40 years experience in modifying engines for niche vehicles and markets. This includes engines for sports cars, commercial vehicles, taxis, aviation, power generator sets, military vehicles, off-highway and marine.

We have extensive experience in providing the complete powertrain package including transmissions, transfer cases and axles so that you have the option of a ‘one-stop-shop’ for your powertrain supply.

Quality and performance is measured and assured through our rigorous testing and engine auditing processes. We have on-site test capability including:

- » 5 latest technology Hot-Test dynamometer beds
- » 2 high specification durability dyno test cells
- » 5 highly capable Cold-Test facilities
- » Modern and extensive metrology equipment
- » Dedicated tear down and quality auditing facility fully equipped to OEM standards
- » Specialist crank and camshaft measuring equipment
- » Cleanliness analysis

Autocraft offers a complete engineering and remanufacturing service including feasibility studies, defining the reman specification, ongoing product development, engine validation and warranty.

Autocraft works in partnership with OEMs when they design new engines with end-of-life “Design for Reman” in mind. We support the OEM from initial engine design through prototype phases into serial production.

We assist the engine designers by transferring our knowledge of historical engine failures to improve their product quality. The experience we gain during the design and serial production phases allows us to develop remanufacturing solutions for our customers that make our reman engines better than new!

We are the only remanufacturer to have in-house PTWA/RSW plasma spray capability for new and reman cylinder blocks! And we support our customers for up to 20 years after serial engine production has ended.

Autocraft remanufactures:

- » 3 to 6 cylinder inline, and V6 to V12 engine configurations
- » Gasoline, diesel and hybrid system engines





Our EV Solutions division in Grantham, Lincolnshire provides EV battery remanufacturing and new battery assembly, with capacity of up to 2,000 vehicle sets per year.

Assembly of new packs, remanufacturing of failed modules and full testing and warranty is available from Autocraft's **EV Battery Service Centre** in Grantham where we offer our unique '5R' programme:

Recover → Repair → Remanufacture → Reuse → Recycle

We have also designed our EV capability to be a global in-market solution to avoid sometimes costly and difficult return logistics for failed packs.

Our technologies and processes are built into a **Mobile EV Battery Repair Centre** inside a shipping container for ultimate portability. Mobile EV Battery Repair Centres can be located to give global coverage at a local level, with fixed or mobile solutions available:

1. In Super Dealerships that specialise in EV battery repairs for each region
2. On a trailer transported by HGV and driven between dealerships

Each Mobile EV Battery Repair Centre has the capability to fully repair EV battery packs including:

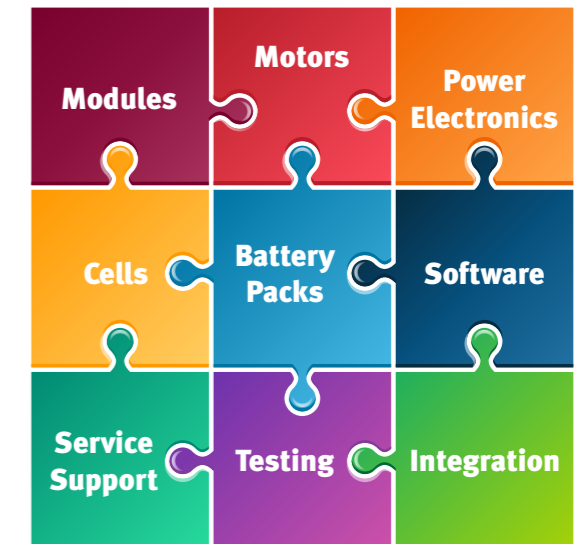
- » Pack integrity safety check using our patented State of Health (SoH) test equipment
- » Fault identification & repair planning
- » Pack discharge and disassembly
- » Module replacement and pack re-assembly
- » Pack charge / discharge and SoH testing confirming the pack is ready for use and can be returned to the vehicle

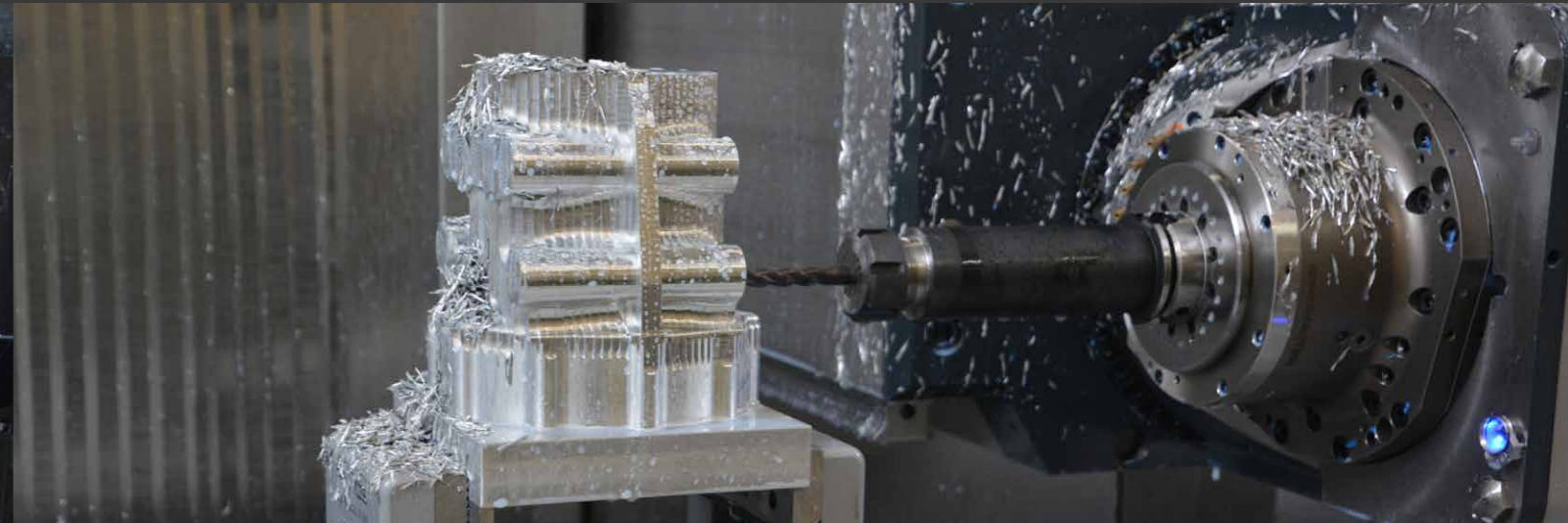
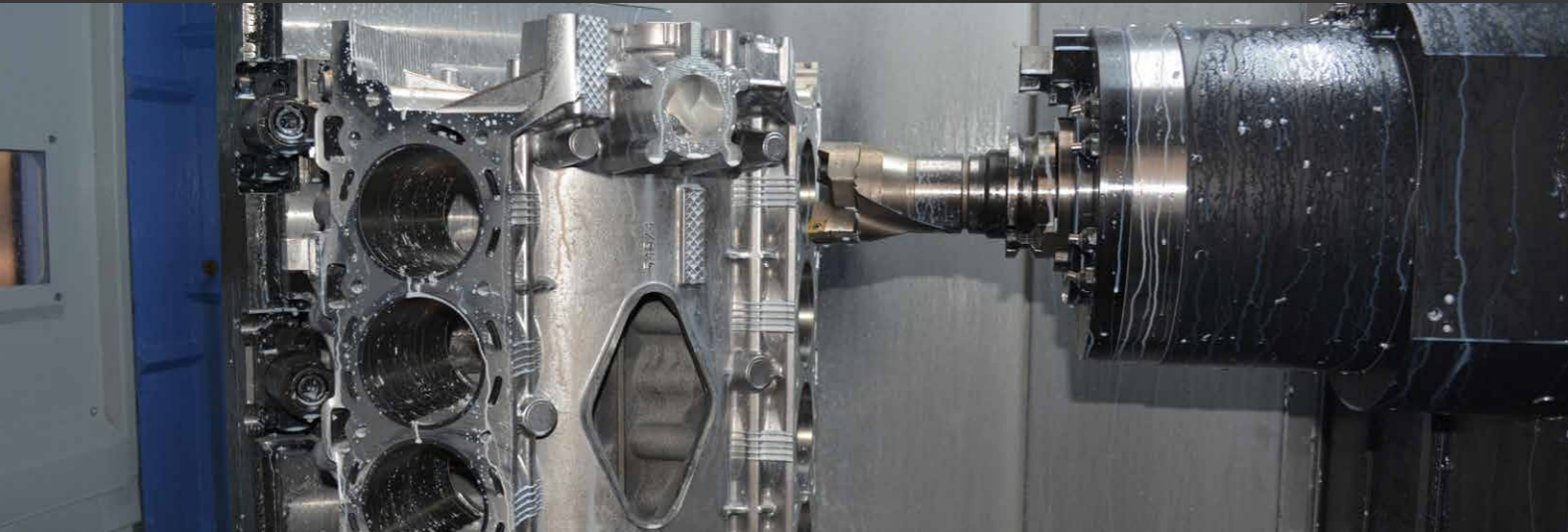
Autocraft EV Solutions is more than just EV battery repair and remanufacture. If you're a niche or low volume vehicle builder and require an electric solution, we can assist with the design, manufacture and assembly of your electric propulsion system.

Firstly we identify the specification you require, coupled with any constraints you may have in your vehicle such as size, weight etc. Through our global supply network of battery manufacturers, we source the cells and design the modules to fit the chassis in the most compact and productive way.

We identify the correct battery chemistry for your application, whether it be high power or long, consistent range, to ensure the battery packs will meet the needs of the vehicle's end user. In doing this, we consider variables such as vehicle weight, application, running time and duty cycle.

Autocraft EV Solutions also manufactures a range of Power Electronics, to provide a full integration service:





At Autocraft Machining Solutions, we are focused on delivering OE standard medium-to-high volume machined parts to the linesides of many automotive and aerospace OEM and Tier 1 customers.

Our 7,000sqm site in Wellingborough, Northamptonshire (in the UK's F1 corridor) has a long history of cylinder head and block machining.

Acquired in 2018, Autocraft Machining Solutions was originally set-up to machine heads and blocks for both new and remanufactured engine production at sister company Autocraft Drivetrain Solutions in Grantham. Since then, our technical capability at the site has grown, resulting in increased cylinder head, block and component machining capacity up to 80,000 parts per annum.

Our engineers use Solidworks, Draftsight 2D and Delcam solid modelling CAD/CAM software for fast and easy interpretation of your components, and we can receive and send files in all major CAD formats.

We match the service we provide to our customers' needs. We support OEMs as a Tier 1 but also work for foundries and forges as a Tier 2. We have our own dedicated Purchasing Department including Supplier STA Management and can assist you with material sourcing.

In addition to cylinder head and block production, Autocraft Machining Solutions possesses a large number of 3, 4 and 5-axis vertical machining centres, CMMs and automated washes at the Wellingborough production plant to support the medium to high volume production of many automotive components such as gear cases, flywheel housings, bed plates, transmission housings, structural BIW castings and Electric Vehicle motor casings.

For prototype and low volume machining, **Vertex Engineering Solutions** is in its element. Our toolroom in the heart of Birmingham is equipped with high-specification, versatile machine tools with the flexibility to machine 5-axis components up to 3.2m long and 1.1m wide.

Vertex's highly skilled and experienced engineers are specialists in producing prototype machined components from solid & castings, and they relish the challenge of low volume, complex parts in a variety of

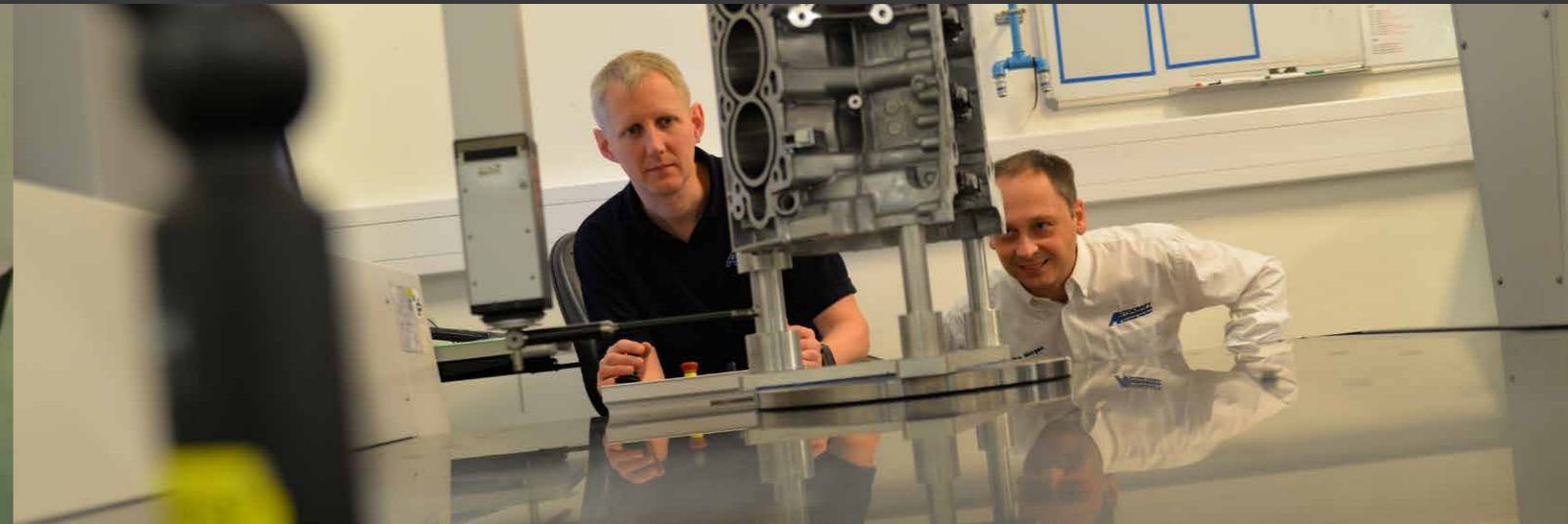
materials from aluminium to hard steels, and specialist metals such as NiAlBronze and gunmetals.

Vertex also has many years of mould and die toolmaking in extrusion, foil, lamination and medium progression tools. We can produce many types of tools including injection and pressure dies, prototype and vacuum forming moulds and tools, as well as lost wax tooling.

Autocraft Solutions Group's Machine Tools

- » 3, 4 & 5-axis vertical machining centres
- » 4 & 5-axis twin-pallet machining centres
- » Multi-axis driven tool CNC turning centres
- » Specialist honing, jig boring and grinding machines
- » Spark & wire erosion (EDM) machines
- » Specialist crank grinding and lapping machines
- » PTWA/RSW plasma bore spray centre





At Vertex Engineering Solutions, we have a long history of high quality, high accuracy fixture design and manufacture. We can produce pallets and tombstones for all your machining needs and our new DMG DMF 5-axis travelling column VMC allows us to machine very long and very wide fixture components.

Our customer base is diverse so we're very experienced in accepting CAD data from a variety of different software packages. We use Vero Visicam CAD/CAM and Solidworks as our main platforms to provide machining fixture design and manufacture for the automotive and aerospace sectors.

Vertex can supply:

- » Gauging and Inspection Fixtures
- » Assembly & Welding Fixtures
- » Machining Fixtures
- » Tombstone Fixtures



Across the Autocraft Solutions Group, we offer a variety of Engineering Services to provide a 'one-stop-shop' for our customers.

» Engineering Remanufacturing Specifications

Autocraft has a proven track record of producing accurate, high quality engine specifications and Bills of Materials for our OEM customers. With over 40 years of remanufacturing techniques, we are your 'go-to' partner for quality specifications with correct tolerances.

» Engine Auditing & Warranty Analysis

Autocraft audits engines from our OEM partners by stripping, measuring every torque, clearance and critical dimension. This provides our customers with independent quality assurance. Our 40 years of remanufacturing failed engines puts us in a unique position to identify engine weaknesses and root causes of failure, and propose design changes or manufacturing improvements.

» Design for Remanufacture

Autocraft works in partnership with the OEM's product development departments to ensure parts are designed for optimal remanufacture. By assisting their engineers at the design stage, component costs can be reduced and remanufacturing quality built into the initial design.

» Durability & COP Testing

We use our Dynamometers to support our own engine projects as well as additional outsource capacity for our OEM customers to support their product development and manufacturing activities. We can help you to validate that your engines are meeting your specifications.

» CMM Measurement Service

We offer a sub-contract metrology service with specialist measurement support for components, with 8 very high accuracy Mitutoyo and Zeiss CMMs across our group.



Autocraft Solutions Group Limited
Syston Lane, Belton, Grantham
Lincolnshire, NG32 2LY, UK

Tel: +44 (0)1476 581300
Fax: +44 (0)1476 581301
Email: info@autocraftsg.com



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Solutions Group

www.AutocraftSG.com