melett

Melett newsletter issue eleven

PRECISION ENGINEERED TURBOCHARGERS & PARTS

Absolute Accuracy: Melett Turbochargers

Here, Ian Warhurst, Melett's Owner and Managing Director talks about our decision to produce complete turbochargers.

We have been asked for many years to produce turbochargers. Invaluable customer feedback about applications which are often destroyed beyond repair, the lack of availability of old core in the aftermarket and complexities with electronic actuation, has strongly influenced our decision to produce this new range. Melett Turbochargers allow you to offer a premium brand turbo as an alternative to an OEM turbo, whilst retaining the exchange unit to restart the repair cycle.

Our aim is to produce the turbochargers you require and in particular, the turbos you are unable to repair. A critical part of this, however, will be further market feedback which will drive our product development programme.

Melett Turbochargers are manufactured to Melett drawings, created by our in-house engineering team, and the majority of parts are produced using Melett owned and controlled tooling. The turbos undergo extensive in-house and vehicle testing to ensure they match the OE specification. All Melett Turbochargers are built, balanced and flowed to the highest quality standards in our dedicated UK production facility.

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Melett CHRA's Better than ever!

Electronic Actuator Repair Kits

Melett: Lean initiatives

Movie Premier Melett Turbochargers

Melett - Helping the Reconditioning Industry to keep Reconditioning

Melett CHRA's Better than ever!

Here, Tom Wright, Product Manager, explains the factors that can affect balance specifications and how our production improvements have benefitted the quality of our CHRA's.

VSR Balancing

As we know, every CHRA needs balancing after it has been dismantled and rebuilt, just like a wheel needs balancing after changing the tyre.

All objects which rotate around a centre axis have a certain amount of imbalance and this imbalance will create a resonant frequency at a specific rpm. In a CHRA (centre housing and rotating assembly), the speed and strength of the vibration is directly related to the amount of imbalance within the assembled rotor. To compare this to the car wheel, the vibration would be felt in the steering wheel. If the wheel is balanced more accurately, the resonant frequency is both reduced and moves to a higher rpm. The vibration will then occur beyond the fastest speed of the vehicle and the issue of balance is solved.

A turbo is a complex piece of machinery which has been designed to operate at temperatures up to 1050°C, whilst reaching rotational speeds in excess of 230,000rpm. To operate under such extreme conditions each component within a turbocharger, is manufactured to some of the tightest tolerances in the automotive industry (some as low as 2 microns, this is smaller than a tobacco smoke particle). The turbine and compressor wheels are precision engineered components which are balanced on specialist equipment as part of their manufacturing process. When the rotor is assembled, the accumulation of the remaining marginal imbalance in each part can create an out of balance rotor which will vibrate at critical speeds within the CHRA operating range.

Traditionally, larger commercial turbo rotors were balanced at lower speeds. By achieving a certain level of balance at low speed, the resonant frequency of the rotor would be well above the operating speed of the turbo. As turbos have become smaller, the rotational speed has increased significantly and as such a CHRA will pass through areas of resonant frequency within the normal operating range. To ensure the CHRA does not vibrate excessively during operation, it must be precision balanced on a high speed/VSR (vibration sorting rig) balancing machine. The VSR accelerates the CHRA through its full operating speed whilst measuring the vibration as the rotor passes through its resonant frequency. In over 95% of cases, an unbalanced CHRA will have vibrations outside the acceptable limits and must be further balanced to ensure it will operate correctly on the engine.

Complexity of Balancing

In today's market, there are a number of different balancing machines available. Unfortunately, the complexity of precision balancing and the effect of machine variance has led to disagreements within the industry as some of the newer machines introduced to the market don't work in the exact same way as the older models, resulting in different balance results.

New machines adopt new technology, which can often create problems with the older technology. As an example, the exact position in speed range of peak imbalance can be significantly different. This is down to the machine's natural frequency and the way the vibration from the CHRA affects this. To reduce these effects, balancing machine manufacturers have measured the machines natural frequency and try to cancel this out from the balance trace – but with varying results. Unfortunately, a change of environment or modifications to the machine after delivery then upsets the machines natural frequency cancellation giving different results. New nozzles and air feeds on the machines are just one example of this.

Tom Wright, Product Manager (left)

The level of sensitivity between VSR balancing machines can vary. Results often show the characteristics of the machine, not the balanced CHRA. To improve consistency in results, new technology such as pneumatic clamping, automatic run ups and consistent warm up time produce less erratic results. Unfortunately, remanufacturers using older machines, which are more sensitive to machine resonance, are often presented with what looks to be an out of balance CHRA when the difference in balance graphs are actually down to machine variance.

Melett Quality

All Melett parts are engineered in the UK by our in-house team of highly skilled mechanical engineers. We have continued to invest heavily in our manufacturing and core production facilities, meaning we maintain 100% control of the complete production process. Our production team has a wealth of experience in production processes, systems and quality control.

Every Melett CHRA is assembled and VSR balanced in the UK. These are produced from Melett parts only, incorporating, where possible, improvements in the original design giving you an improved CHRA.

Melett CHRA Improvements

The secret to good quality products and services is continuous improvement. Whilst Melett has been supplying quality CHRA to the industry for many years, where we see an area for further improvement, we will investigate it and make improvements where possible.

We have continued to invest heavily in our manufacturing and core production facilities, meaning we maintain 100% control of the complete production process.

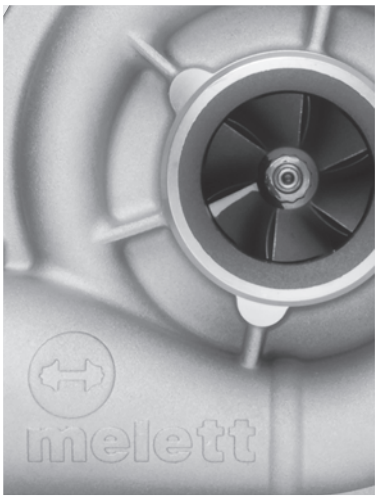
It is important to understand that balance levels are based upon acceptable limits vs economical time to balance, so whilst 'flat lining' the balance graph isn't necessary, a lower imbalance is generally better than being just on the limit. It's also important to understand that low balance with a high peak in one area is better than higher imbalance across the range.

As we have been refining the manufacturing processes for our components and also improving the component balance with better equipment, we have noted that it is possible to balance the CHRA to existing specifications with less time. Improved balance techniques and equipment have also allowed us to produce more consistent balance results. We have also investigated more complex balance specifications to ensure peaks – whilst in limit – are not in sensitive parts of the operating range.

As a result of this, we have been able to improve the balance specification of many of our CHRA without effecting the time to balance – giving you an improved product without extra cost.

Here at Melett, we take great pride in what we do and the quality of the components which we produce. High levels of accuracy and precision are in our DNA. Whether we are producing Turbochargers, CHRA or components you can rest assured it has been done with the highest levels of precision.

Absolute Accuracy: Melett Turbochargers



(continued from front) In addition, we have spent the last two years working closely with industry automotive experts to develop our new range of electronically controlled actuators. The REA/SREA actuators have undergone extensive testing, and include different configurations offering analogue or digital communication to the vehicle's ECU, the digital option also uses PWM and CAN bus control interfaces. The electronic actuators will be available separately offering a robust, yet cost effective alternative to the OE product.

Fitting kits will be included with each Melett Turbocharger, including an oil syringe, stainless steel gaskets (turbine), fibre or metal-rubber gaskets (oil) and copper washers, studs and nuts, where necessary.

The decision to produce complete turbochargers is not a substitute for our vast range of turbocharger parts, repair kits and core assemblies. The new range is designed to complement our current product offering to further support the turbo reconditioning industry.

Melett is renowned for producing OE quality parts to help you produce the highest quality repairs. The same commitment to engineering excellence has been applied to produce Melett Turbochargers, providing a cost effective alternative to a new OE turbocharger.

Melett Product Developments

All the latest development news

NEW Core Assembly Developments:

In line with industry demand, we have recently launched a series of core assemblies for passenger and commercial vehicle applications. All of our core assemblies are assembled and VSR balanced in our own, fully equipped, Core Production facility here in the UK. Individual components are also available.

Garrett Applications:

- **GTC1446MVZ –** Volkswagen Amarok 2.0D. Melett no. **1102-314-900** (Fits Turbo **795090-0003**)
- **GTC1446VMZ -** Volkswagen Crafter 2.0D. Melett no. **1102-314-902** (Fits Turbo **803955-0003/5**)
- **GT1546JS-** Renault Master 2.3D. Melett no. **1102-015-958** (Fits Turbo **795637-0001**)
- **GTB1752LV-** Renault Trafic/ Master. Melett no. **1102-217-901** (Fits Turbo **765176-0001**)
- GTA45 Detroit Diesel Highway Truck 12.7D. Melett no. **1102-045-900** (Fits Turbo **758204-0006**)
- GTB2260VK - BMW 3 Series, 3.0D. Melett no. **1102-222-901** (Fits Turbos **758352-0021-22/26**)
- GTA1759V - BMW 3 Series, 2.0D. Melett no. **1102-222-902** (Fits Turbos **740911-0001/3/6/7**)
- GTA2256VK - Ford Transit 3.2D. Melett no. **1102-122-903** (Fits Turbo **773098-0008**)
- GTA1752LV - Honda CR-V 2.2D. Melett no. **1102-117-904** (Fits Turbo **759394-0002**)
- GTB2056V - Fiat Croma, Alfa Romeo Brera/159 2.4D. Melett no. **1102-220-902** (Fits Turbo **767878-0001**)
- GTA2056V - Volvo-Penta Marine 2.5D. Melett no. **1102-120-901** (Fits Turbo **763263-0005**) **Coming soon!**

BorgWarner Applications:

- K04 - Mercedes Benz Sprinter 2.2D MFS compressor wheel. Melett no. **1302-004-930** (Fits Turbo **5304-970-0086**)
- KP39 - BMW 5 Series 3.0D. Melett no. **1303-039-924** (Fits Turbos **5439-970-0065/0089**)
- K14 - Volkswagen T3 Transporter 1.6D. Melett no. **1301-014-900** (Fits Turbos **5314-970-6000/6085**)
- KP39 - Proton 1.6L. Melett no. **1303-039-926** (Fits Turbo **5439-970-0109**)

Mitsubishi Applications:

- TD04 - Volkswagen 2.5D. Melett no. **1401-404-930** (Fits Turbo **49377-07515**)
- TD04L - Volkswagen 2.5D. Melett no. **1401-404-933** (Fits Turbo **49377-07535**)

IHI Applications:

- RHF5V - Toyota Avensis/Corolla 2.2D. Melett no. **1450-050-903** (Fits Turbo **VB16**)
- RHF5 - Audi A4/A5/Q5/S5 2.0L. Melett no. **1450-050-905** (Fits Turbo **JH5-06H145702Q**)

Melett Turbochargers:

Our initial range of complete turbochargers will be closely followed by further releases during the year. Should you require a specific application please do not hesitate to contact our sales team – sales@melett.com.

Melett No.	Replace	Make & Model
9102-117-001	708639-0010	Renault Laguna/ Mégane 1.9D
9102-115-001	753420-0005	Peugeot 206/ 207/ 307, Citroen Picasso/ C4/ C3/ C5, Volvo S40/ V50, Ford Focus/ C-Max 1.6D
9102-117-006	761618-0003	Suzuki Grand Vitara 1.9D
9102-117-007	724930-0010	Volkswagen Touran/ Golf/ Jetta/ Passat, Seat Altea/ Leon, Skoda Octavia/ Superb 2.0D
9102-117-002	717858-0001-9	Audi A4/ A6, Volkswagen Passat, Skoda Superb 1.9/2.0D
9102-117-005	760680-0003	Suzuki Grand Vitara 1.9D
9102-120-001	765155-0004/7/	Mercedes Benz C Class/ E Class/ M Class/ R Class/ CLS320, Jeep Grand Cherokee, Chrysler 300C 3.0D
9102-117-004	721164-*/ 801891-0001-4 801891-0001-4	Toyota Avensis/ Estima/ Picnic/ Previa/ Rav 4 2.0D
9303-035-001	5435-970-0002	Nissan Micra/ Almera, Renault Kangoo/ Clio/ Thalia 1.5D

We pride ourselves on our robust product development process, which is led by our customers' wants and needs. It is very simple, tell us what you need and we will make it!

Electronic Actuator Repair Kit

We recently launched an electronic actuator repair kit, Melett no. **1850-300-750**

The kit includes:

- The original motor & motor choke assembly - **Melett's assembly is spot welded to prevent vibration or temperature failure;**
- Plastic worm gear – manufactured from the same high quality plastic material used in the original gearbox (imported and only available from Germany);
- Motor screw cap & motor screw;
- Worm gear spacers & worm gear axle.

For a 100% quality repair Melett continues to recommend replacing the complete gearbox, however, we do recognise there is a need for a more cost effective quality repair solution. If you are going to repair the actuator we strongly recommend you replace the whole motor assembly and worm gear together to avoid premature failure.

COMING SOON
Melett Electronic Actuators

Nozzle Ring Cages

By popular demand, we have recently introduced a range of Nozzle Ring Cages. We have also added a request development function to the website, making it easy for you to request the parts you require.

Melett No.	Fits Turbos
1102-217-890	800089-0001, 760699-0003, 760699-0004, 759688-0005, 760700-0003, 760700-0004, 759688-0007, 765176-0003, 762965-0001, 762965-0017, 752990-0006, 752990-0007, 777159-0003
1102-216-890	775261-0007, 756867-0001, 765261-0003, 762463-0006
1102-217-893	791715-0009, 798128-0002, 753544-0020, 753544-0017, 787556-0016, 757042-0011, 757042-0013
1102-217-891	763647-0019, 758532-0012, 742110-0007
1102-217-892	760698-0003, 760698-0004
1102-216-891	757886-0003
1102-222-892	777318-0001
1102-222-893	776470-0001 Coming Soon!

New Repair Kits

HE531V/HE551V - Cross Shaft Repair Kit

Our new cross shaft repair kit is a direct replacement for the Holset **4032986** kit but also includes the actuator cross shaft bushings. These bushings are manufactured using a high performance self-lubricating alloy which is designed to reduce wear to the cross shaft mechanism.

Melett no. **1154-551-765. Fits many applications**: Cummins ISM/ ISM02/ RV/ Firetruck/ Coack/ ISX/ ISX04/ Enforcer MFS4/ Enforcer

Further repair developments include:

Repair Kit (Major) B03 - BMW 335i & M135i, 3.0L, from 2011 onwards.
Melett no. **1332-203-755** (Fits Turbo **1853-970-0007**)

Repair Kit (Major) BV45 - Nissan Nivara, 2.5D, from 2010 onwards.
Melett no. **1303-045-755** (Fits Turbo **5303-970-0210**)

Repair Kit (Major) HX50 - This repair kit includes **3529162** collar.
Melett no. **1153-050-755** (Fits various applications)

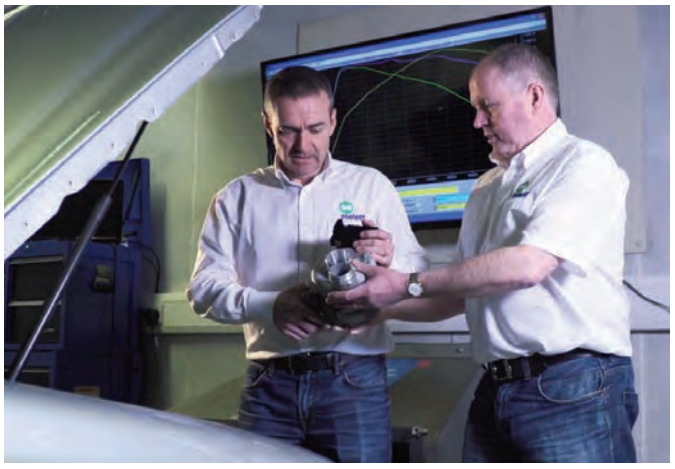
For monthly product updates by email, please email sales@melett.com to register.

Melett News & Updates

Melett - A Turbo Production

In line with the launch of Melett Turbochargers, we are pleased to introduce our new Turbo Production video. The video emphasises the detailed design and strict quality control processes that our turbochargers go through, as part of the development process. We take you on a journey through the initial analysis and design stages, including Melett supplier capabilities for consistent component quality. The video continues through to the first test builds and flow testing to meet the exacting standards of the OE, highlighting the stages included in assessing the performance of the turbochargers in the vehicle, before going into production. Recognising increasing levels of turbocharger complexity, the video concludes with a behind the scenes look at the development of our electronic actuators and the rigorous testing carried out.

Watch it today at www.melett.com



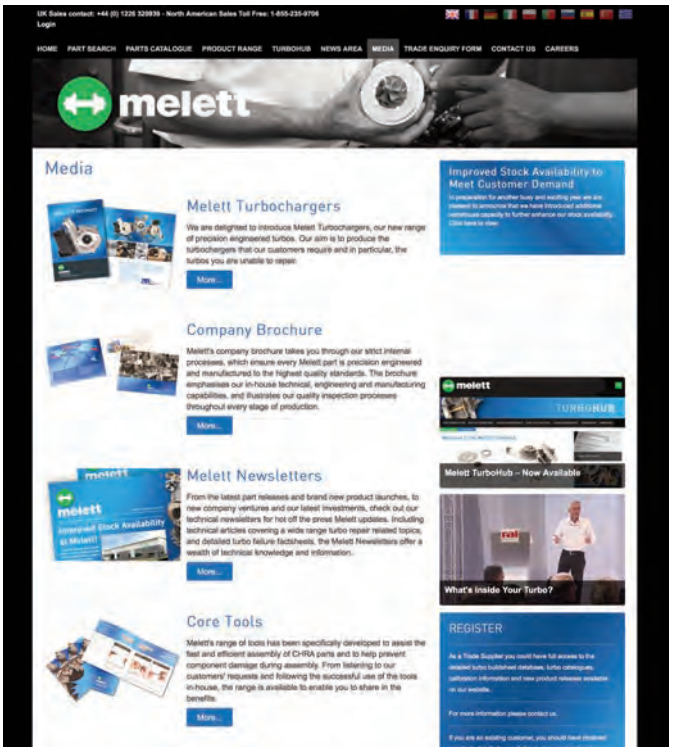
Melett Website Update

Throughout 2016 we have been developing our website capabilities as well as improving the Home page, Media section and News areas, making it quicker and easier for you to find our promotional material and latest product news.

News Area: Our designated News Area contains hot off the press updates. From the latest turbocharger and part releases and brand new product launches, to new company ventures and our latest investments. Including technical articles, covering a wide range of turbo related topics, as well as detailed turbo failure factsheets and help guides, the News Area offers a wealth of technical knowledge and information to help you produce the highest quality turbocharger repairs.

Media: Download Area

Check out our new download area which provides you with an opportunity to view, download or print our range of promotional flyers and posters. Here you will find product information about new and existing products, such as Gasket Kits and Actuator Gearboxes, as well as a range of help guides featuring the most common turbo failures.



Don't forget, the TurboHub gives you access to in-depth technical information on a wide range of turbo related topics. If you would like access to the TurboHub please email login@melett.com.

Alternatively, should you have any further topics you would like us to provide technical information for, please do not hesitate to contact our Marketing department via email turbo@melett.com

Industry and Turbocharger News

The Rising Trend of 'Click and Fit'

eBay has caused a stir amongst the repair industry as they launch a new campaign throughout the UK to encourage consumers to buy parts for their MOT, as a way of saving money. To read the full article, check out 'Online advice?' under Industry Articles on the Melett website. [Source: Aftermarket Magazine – April'16 Edition]

Mustang's European Debut

As part of Ford's global vehicle strategy, they have launched the iconic Mustang into Europe with an option for a downsized, turbocharged 2.3L four-cylinder gasoline engine. To read the full article, check out 'Ford Mustang' under Industry Articles on the Melett website. [Source: Automotive Engineer Magazine – May'16]

Improving Air Quality – Diesel scrappage is not the way!

As industry rumours continue about the introduction of a diesel scrappage scheme in response to the increasing concerns over air quality in the UK, the RAC Foundation has carried out research which suggests such a scheme will do little to help the situation. To read the full article, check out 'Diesel scrappage will not improve air quality' under Industry Articles on the Melett website. [Source: Aftermarket Magazine – May'16]

Continental Launches New Turbocharger Technology

Continental has developed a new gasoline turbocharger with a unique technology known as RAAX, which stands for "radial-axial". Unlike other gasoline applications, the new innovation has a modified turbine wheel design which allows a substantial reduction of approximately 40% in the rotational moment of inertia of the turbine wheels. The new innovation, according to Continental, provides substantial improvement in response and efficiency with a robust design. To read the full article, check out 'Continental's RAAX turbochargers enter production with Audi' under Industry Articles on the Melett website. [Source: Engine Technology International – June'16]

New Lightweight Audi A5

The latest generation A5 Coupé is set to be so efficient, it will emit as little as 105g/km CO_2. It includes a turbocharged 2-litre diesel engine which has an overall weight reduction of up to 60kg to achieve the low figure. To read the full article, check out 'Audi cuts emissions in latest generation A5 Coupe' under Industry Articles on the Melett website. [Source: Automotive Engineer Magazine – June'16]

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