Conference topics

- Combustion & $\lambda=1$
  for RDE in gasoline powertrains
- Combustion, RDE in Diesel
  passenger & light duty
  powertrains
- Flex fuel & alternative fuels
- Large bore
- OBD & calibration
- Design, friction reduction
  & validation

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DEAR COLLEAGUES,

A major benefit of the VCR technology is the CO$_2$ improvement for gasoline powertrains. Tailoring of the compression ratio to the engine load, leads to a significant fuel consumption reduction for the customer. Nowadays, enlargement of the $\lambda=1$ operating area to fulfill RDE legislation is an additional major benefit. The effectiveness of the VCR technology can be demonstrated on a gasoline engine with a specific power output of 90 kW/l. To achieve this power, enrichment for component protection of approximately $\lambda = 0.8$ is required. Applying stoichiometric operation ($\lambda = 1$) in the entire map leads to a power drop of 27% (to 66 kW/l) with a constant exhaust temperature of 980 °C. The 2-stage VCR technology enables the full recovery to the initial power level under RDE compliant boundary conditions. Furthermore, significant fuel consumption benefits of 4.1% in WLTC is achieved (Please read the full paper: “All Lambda 1 Gasoline Powertrains” from 5. Internationaler Motorenkongress in BadenBaden).

Varying the compression ratio on Diesel engines results in reduced peak firing pressures, beneficial for lowered thermo-mechanical stress. Additionally the cylinder temperature decreases which leads to reduced engine-out pollutant emissions. This enables two different opportunities for VCR application: Extending the power output on an already peak firing pressure limited base engine or rightsizing the bearing dimension according the reduced peak firing pressure which enables friction reduction and finally an improved fuel consumption. On top of these mechanical advantages, VCR provides potential to lower engine-out NO$_x$ under higher operating loads, important for optimal compliance of future RDE demands.

Dual fuel engines suffer from the compromise for the compression ratio. E.g. marine engines require a low compression ratio for the gas application while running most of the time on heavy fuel oil where the high compression ratio would enable fuel consumption and operator cost reduction.

The FEV conference on „Variable Compression Ratio“ will tackle various of these aspects, reviewing the state of the art and introduce new VCR solutions. Apart from the deep insight into latest VCR research and developments, this new platform offers multiple opportunities for mutual exchange with reputable industry representatives and engineering experts.

With best regards

DR.-ING.
ALEXANDER TOLGA UHLMANN
DIRECTOR GASOLINE POWERTRAINS
AND PRODUCT MANAGER VCR

SCIENTIFIC COMMITTEE

DR. R. WURMS
AUDI

M. POEPPEL
HILITE GERMANY

PROF. DR. K. WITTEK
HEILBRONN

DR. H. BAUMGARTEN
FEV GROUP

DR. A. T. UHLMANN
FEV EUROPE
Thursday, February 7th

Combustion, fuels & calibration

07:50  Registration and welcome coffee

08:30  Welcome, Dr. Alexander Tolga Uhlmann, FEV Europe: Hybridisation and VCR - Synergy or competition?

09:00  Keynote, Karsten Wilbrand, Shell Global Solutions: Fuels for future mobility

09:40  Nissan  Shuji Kojima  The world's first mass production variable compression ratio engine NISSAN VC-Turbo

10:20  Coffee break

10:50  Hilite  Dietmar Schulze  2 Step variable compression ratio  - System development and industrialization

11:30  FEV/VKA  Lucas Leyens/Simon Gottorf  VCR – Online compression ratio monitoring

12:10  Lunch

13:40  Pierburg  Dr. Michael Breuer  VariMot: A concept engine combining VCR and VVA

14:20  MCE-5  Cyrille Constensou  Impact of continuous variable compression ratio on SI engines fueled with various ethanol blends

15:00  Coffee break

15:30  Gomecsys  Bert de Gooijer  Gomecsys VCR technology:  Testing results of driving a demo car

16:10  Panel discussion  E-Fuels and electrification -  The future of VCR in an electrified world

17:30  End of first conference day

19:30  Reception dinner  at the restaurant “Zur Schranne“  Address: Griesstraße 4, 82467 Garmisch-Partenkirchen
Friday, February 8th

Program

Hardware, concepts & methods

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<tr>
<td>08:30</td>
<td>AVL</td>
<td>Dr. Wolfgang Schöffmann</td>
<td>Dual Mode VCS™ - System integration and vehicle requirements</td>
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<tr>
<td>09:10</td>
<td>HS Heilbronn</td>
<td>Prof. Karsten Wittek</td>
<td>Dyno- and vehicle testing of engines equipped with VCR conrods</td>
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<tr>
<td>10:20</td>
<td>FEV/VKA</td>
<td>Christopher Marten</td>
<td>VCR conrod concept for large dual-fuel engines</td>
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<td>11:00</td>
<td>VKA</td>
<td>Denis Pendovski</td>
<td>Numerical methods for a holistic design of a VCR conrod</td>
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<td>11:40</td>
<td>Ricardo</td>
<td>Dr. Richard Osborne</td>
<td>Application of variable compression ratio to a gasoline engine with continuously variable valve-lift</td>
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<td>12:20</td>
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<td>13:40</td>
<td>iwis</td>
<td>Dr. Kai Arens</td>
<td>Dual Mode VCS – A modular system approach</td>
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<td>14:20</td>
<td>Nami</td>
<td>George Ter-Mkrtichyan</td>
<td>Variable compression ratio NAMI engines – Recent development experience and new trends</td>
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<td>15:00</td>
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<td>Discussion Round</td>
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<td>15:40</td>
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<td>Concluding remarks and adjournment, Dr. Henning Baumgarten, FEV Group</td>
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<td>16:00</td>
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<td>End of second conference day</td>
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Demonstrator vehicles of four companies - book your test ride immediately!
Exhibition and Sponsoring

CONFERENCE LOCATION
Kongresshaus Garmisch-Partenkirchen
Rathausplatz 1D
82467 - Garmisch-Partenkirchen
Germany

There is only a small number of available hotel rooms. Please book your room early.

More information about the hotels nearby at: www.fev.com/vcr-conference

FOCUS ON NETWORKING
To enhance your conference experience, the 2nd edition of Variable Compression Ratio offers multiple opportunities for technical exchange and business conversations among engineering experts and industry representatives. In the evening of the first conference day the delegates are invited to join the reception dinner in the traditional Bavarian restaurant „Gasthaus zur Schranne“.

EXHIBITION & NETWORKING
> Technology displays and branding close to the conference area
> Vehicle demonstrations and exclusive sponsoring packages

Target groups:
> OEM
> Tier1 & Tier2 suppliers
> Developers & engineering providers
> Scientific institutes & universities
Contact Information and Registration

Please contact us for further information about Variable Compression Ratio:

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Other FEV Conferences

2\textsuperscript{nd} INTERNATIONAL FEV CONFERENCE
ZERO CO\textsubscript{2} MOBILITY
Hotel Pullman Aachen Quellenhof
Aachen, Germany
November 13-14, 2018

5\textsuperscript{th} INTERNATIONAL FEV CONFERENCE
DIESEL POWERTRAINS 3.0
Rouen, France
June/July, 2019