

Jacobs®

VVA

2-STEP VARIABLE
VALVE ACTUATION

FOR EXHAUST THERMAL MANAGEMENT, ENGINE PERFORMANCE & EMISSIONS

Two-Step Variable Valve Actuation (VVA) is for OEMs challenged with meeting future transient emissions and fuel economy targets. A variable lift valvetrain opens up possibilities to meet these needs with minimal changes to the base engine and aftertreatment system while using proven mechanisms to achieve these benefits.



LEARN MORE & SEE
2-STEP VVA IN ACTION

BENEFITS

- Helps OEMs meet the 2027/29 NO_x emissions regulations
- Reduces fuel consumption
- Optimizes compression ratio vs load
- Improves transient response when compared to fixed miller
- Improves emissions by keeping the aftertreatment system hot during low load operation
- Reduces engine out NO_x emissions
- Developed with over 60 years of engine brake and integrated valvetrain experience
- Available for multiple valvetrain and fuel types including diesel, natural gas, and hydrogen
- Applicable to all engine displacements, including large engines
- Provides the benefits of a fully-flexible VVA system with a less complex, lower cost system
- Compatible with Jacobs® CDA and engine brake
- Higher engine braking power due to increased compression ratio

BENEFITS

EARLY OR LATE INTAKE VALVE CLOSING

- Reduces fuel consumption 1-2%
- Improves emissions by keeping the aftertreatment system hot during low load operation up to 125°C without BSFC penalty
- Reduces engine out NO_x up to 3 g/kWh at equivalent BSFC

VVA Benefits Over Fixed Miller

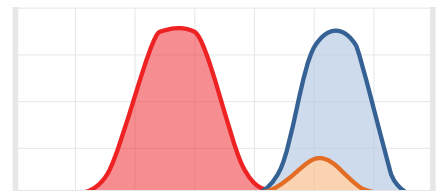
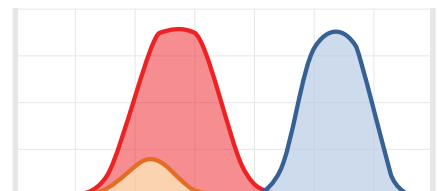
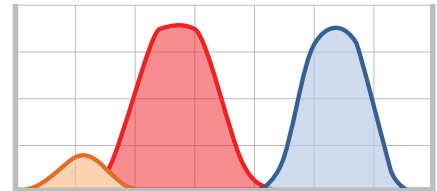
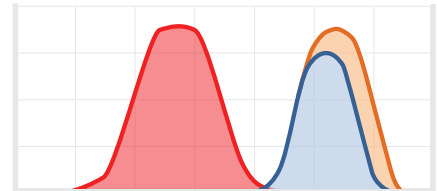
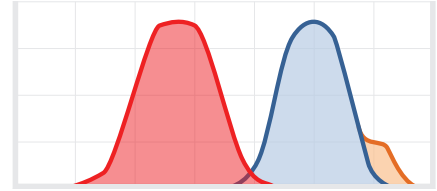
- Optimizes compression ratio for two operating modes with up to 20% reduced CPC
- Eliminates engine start problem due to compression ratio
- Faster transient torque response
- Better low engine speed performance
- Corrects engine brake power losses and allows for even higher brake power potential due to greater net compression ratio

EARLY EXHAUST VALVE OPENING

- Faster warm up of engine and aftertreatment system
- Improves transient turbocharger response
- Improves torque at lowest engine speeds
- In-cylinder solution for DPF regeneration replacing expensive exhaust heaters and dosers
- Improves emissions by keeping the aftertreatment system hot during low load operation

INTERNAL EXHAUST GAS RECIRCULATION

- Improves emissions
- Stabilizes cold start-up combustion
- Improves engine warm-up time
- Eliminates or downsizes problematic external EGR systems and intake throttles
- Provides up to 40% EGR at low loads
- Improves aftertreatment performance
- Faster response than external EGR systems
- Improves transient emissions
- Improves emissions by keeping the aftertreatment system hot during low load operation
- Intake or exhaust opening systems available



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Bulletin 6482468 Produced in U.S.A. 6/23
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