



## Single Cylinder Combustion Development Systems

**Intelligent Valve Actuation (IVA)** from Camcon Auto brings real-time digital control to the gas exchange process in combustion engines. Dramatically reducing emissions and improving drivability, IVA is designed for manufacture and affordability.

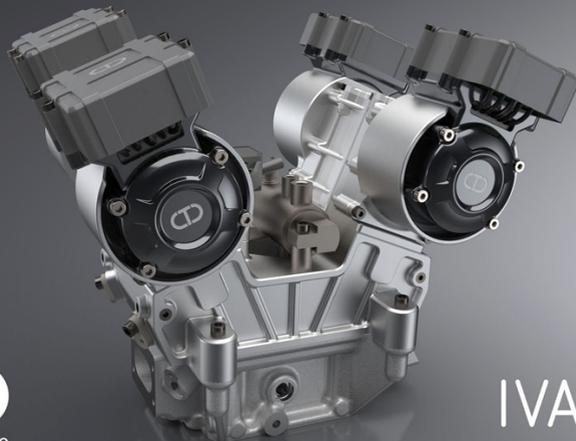
Camcon Auto makes and sells IVA systems compatible with all gasoline single cylinder combustion development engines, enabling on-the-fly cam changes, innovative combustion strategies - significantly reducing development cycle time and cost.

# IVA

Intelligent  
Valve  
Actuation

## Your Last Camshaft

Use IVA to speed your development



IVA | Intelligent  
Valve  
Actuation

# IVA has been developed and tested on the dyno and in-vehicle....

Single Cylinder IVA (SCI) is a generic design of IVA specially developed to enable the flexibility of IVA to be used in combustion development. A bespoke adapter plate is designed to provide the mechanical interface between the Client's single cylinder engine and the SCI mechanism. Our SCI Systems use 4 independent IVA actuators (one per valve). Each IVA rotary actuator is under full-time, fast feedback control permitting the generation of any valve timing, period or lift required at the touch of a button. Both conventional and unconventional event profiles can be achieved. The conventional camshafts are completely eliminated and valve position can be monitored throughout the event using a specialised sensor.

The system has built in fail-safes and automatic protection against selection of events at risk of producing valve clash. A single cylinder engine using this

equipment can either reduce the time taken to gather a set of combustion data covering a given set of valve event options by orders of magnitude or permit hugely more complete data sets to be gathered in the same development time. In practice, much larger data sets will be gathered, allowing much more detailed response surfaces to be determined in a fraction of the time a conventional SCE programme would take.

The system is compact, quiet and, apart from the actuators fitted to the cylinder head assembly, and a dedicated absolute crank position sensor, requires only a power supply in the cell plus a laptop with a custom interface to control the system. The entire system including valve position instrumentation and power supply can be provided ready to interface with your data acquisition equipment.

Parameter	Value
Nominal rated engine speed (rpm)	6500
Minimum full-lift period	~ 5mS
Valve lift above ramp (max)	9mm
Max cylinder pressure at EO	16 bar
Max exhaust valve diameter	32mm
Max inlet valve diameter	35mm

IVA offers virtually independent and infinitely variable control of both valve lift and period up to the maximum and can mimic any conventional valvetrain.

Additionally, IVA permits "Event Shaping" – the maximum opening point can be skewed within the event, the event feature a dwell period at full lift, other, more elaborate shapes are also possible. Multiple events within one engine cycle can be achieved – allowing extra exhaust events for HCCI or CAI combustion studies for instance, or running in 2-stroke mode (or 6 stroke or 8 or 12).

IVA provides each valve with a virtual camshaft of its own that can be “changed” from one firing stroke to the next, rather than needing an engine strip and rebuild. It is this feature that saves so much time – and improves accuracy by allowing a-b-c-b-a-c type testing to be conducted consecutively in the same run without even stopping the engine and therefore under the same running conditions and with no engine strip to disturb frictional effects.

Because we employ individual actuators for each valve and the way we configure them, there are essentially no constraints on valve spacing between pairs of valves. It would be unusual for the spacing between inlet and exhaust valve actuators to present a problem on modern petrol engine combustion chambers and three valve chambers can be accommodated within the “generic” parts kit.

Scope of Supply	
1	4 IVA valve control actuators, complete with all necessary electronics and control equipment to ensure operation to be fitted to a designated single cylinder engine head, including cover, mounts and seals
2	A purpose designed adaptor plate to marry the IVA componentry to your cylinder head (we always try to avoid changes to the head itself. If these are essential we will provide the data to permit you to procure the head from your normal supplier}
3	IVA interface software, loaded onto a dedicated PC (included)
4	Adapted inlet and exhaust valves (longer stem) to suit application
5	Crank position sensor, Valve position sensors
6	Interface to data acquisition software (data acquisition software not included)
7	Shipping, installation, commissioning and up to 3 days training for engineers at one site
8	Operation, service and maintenance manuals
9	Telephone and web-based engineering support
10	Software upgrades for 2 years

## To find out more, contact us

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