

FUEL INJECTORS

IMPORTANT INFORMATION ABOUT FUEL INJECTORS**Important Information About Technical Specifications**

- Bosch fuel injectors have their flow rates defined in N-Heptane as part of their engineering specification. N-Heptane is a pure chemical and does not have the same viscosity and density as standard petrol. Hence the N-Heptane flow rate figures stated should be used as a general guide for comparison purposes only.
- For safety reasons, Bosch strongly recommends that Local and/or Federal Government health and safety regulations are adhered to when using or handling any of the mentioned test fluids.
- Stated "Operating Pressure" is the pressure that the fuel injector is designed to operate at to give optimal fuel atomisation and control. This is more critical to the EV1 pintle type fuel injectors.
- Whilst it is common industry practice to request static flow rate only of a fuel injector, it is important to note that one type of valve group with a specific static flow rate can be used for a number of fuel injectors with different dynamic flow rates.
- Fuel flow specifications are given in grams per minute [g/min]. This is an internationally accepted standard at vehicle manufacturing level. As development engineers deal with the weight or mass of air inducted by an engine not its expected power rating, the weight of fuel that an injector can provide is the pivotal measurement. Bosch does not rate fuel injectors related to expected engine power outcomes.

Bosch Does Not Warrant the Performance of its Components when they are Used with Certain Fuels or Fuel Additives.

- Bosch fuel injectors are designed for use with standard grade petrol. Subject to statutory warranties, Bosch does not warrant the performance characteristics or specifications of these fuel injectors if they are used with Alcohol or Ethanol based fuels or fuel additives that are corrosive.
- Fuel Injector 0 280 150 842 is designed for CNG operation only. Bosch has not tested this fuel injector for permanent service using liquid fuels, therefore it is not recommended for liquid fuel control systems. Control issues may result due to internal valve group sensitivity to viscosity differences between liquid and gaseous fuels.

Bosch Is Not Liable For Third Party Recommendations or Modifications

- Modification of fuel management systems should only be carried out by suitably qualified personnel. It is the responsibility of the purchaser/consumer to ensure the product is compatible with the fuel management system used to avoid damage and/or injury.
- In any event, subject to statutory warranties, Bosch is not liable for damage caused by third party recommendations or modifications.
- Modification of fuel management systems may cause a vehicle to contravene state or federal emission laws. Bosch does not endorse or recommend the modification of standard vehicles and does not accept liability for damages or consequential loss related to any modification undertaken.

FUEL INJECTORS

Purpose and Function.

Fuel injectors perform an important role in the accurate metering and atomisation of fuel. These electro-mechanical valves react in milli-seconds to open and close giving the electronic control unit optimal control over fuel flow to the engine.

Method of Measurement.

Fuel flow specifications are given in grams per minute, as this is an internationally accepted standard at vehicle manufacturing level. As vehicle development engineers deal with the weight or mass of air inducted by an engine not its expected power rating, the weight of fuel that an injector can provide is the pivotal measurement. Bosch does not rate fuel injectors related to expected engine power outcomes for this reason.

Power Ratings of Fuel Injectors. [Horsepower]

It has become an aftermarket performance industry practice to rate fuel injectors in relation to expected engine power outputs, mainly Horsepower.

As this method of measurement has many issues in relation to various calculation methods, accuracy, individual interpretation and overall relevance, Bosch as an Original Equipment supplier of fuel injectors, does not subscribe to this specification method.

There are many design requirements taken into account when undertaking the design and manufacture of a fuel injector to suit a particular application. Further explanation can be found under the "Method of Measurement" heading in this section.

Effects of Fuel Pressure on Pintle Type Fuel Injectors.

Fuel velocity through a pintle type fuel injector [type code EV 1] can dramatically affect its ability to atomise fuel. The profile of the pintle used in a fuel injector has a direct relationship to the operating pressure it is designed to operate under. Whilst Bosch produce various fuel injectors that may flow the same amount of fuel at a given specification, the system operating pressure will influence the pintle profile. Correct pressure will result in a well atomised spray, while insufficient pressure will result in a "hosing" effect. Excessive pressure will result in either "hosing" or a spray angle that is too large for the targeted area dependent on the pintle profile.

The consequence of excessive fuel pressure on a pintle type injector may well be that as the pressure is increased the mixture values of the engine may appear to get leaner. This is of course not the case, but the fuel being injected is no longer atomised and is entering the cylinder as a liquid mass. This will typically cause the Hydrocarbon [HC] values to rise due to the raw fuel exiting the cylinder, and the Carbon Monoxide [CO] to drop due to insufficient combustion.

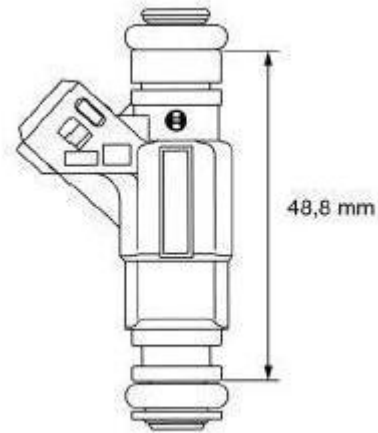
Later design fuel injectors [type code EV 6] use "director plate" multi-orifice technology to better atomise fuel across various operating pressures. These injectors allow more flexibility in relation to operating pressures without compromising spray efficiency or fuel atomisation.

APPLICATION NOTE

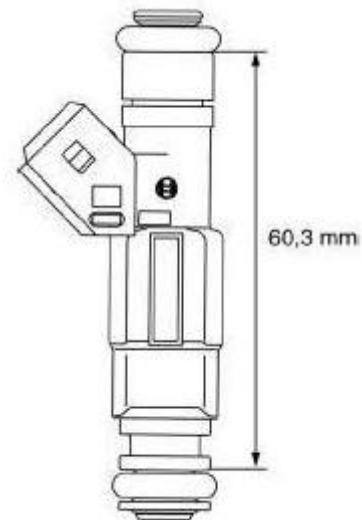
Fuel Injector 0 280 150 842 is designed for CNG operation only. Bosch has not tested this fuel injector for permanent service using liquid fuels; therefore it is not recommended for liquid fuel control systems. Control issues may result due to internal valve group sensitivity to viscosity differences between liquid and gaseous fuels.

* IMPORTANT NOTE

Bosch fuel injectors have their flow rates defined in N-Heptane as part of their engineering specification. N-Heptane is a pure chemical and does not have the same viscosity and density as standard petrol. Hence the N-Heptane flow rate figures stated should be used as a general guide for comparison purposes only.



EV6 - Standard Version



EV6 - Long Version

FUEL INJECTOR TECHNICAL DATA

Part Number	Flow Qty* g/min @ 3 Bar	Operating Pressure (Bar)	Resistance (ohms)	Design Type	Connector	Comments
0 280 150 036	364.3	2.0	2.4	EV 1	1 284 485 002	Hose Type
0 280 150 135	147.4	2.5	2.4	EV 1	9 122 067 011	Hose Type
0 280 150 166	185.7	2.5	2.4	EV 1	9 122 067 011	Hose Type
0 280 150 215	187.3	2.5	16.2	EV 1	9 122 067 011	
0 280 150 363	479.8	2.7	0.7	EV 1	9 122 067 011	
0 280 150 403	402.8	2.7	2.3	EV 1	9 122 067 011	Manufacturer Specific Inlet
0 280 150 558	326.8	2.7	14.5	EV 1	9 122 067 011	
0 280 150 706	186.7	2.5	15.9	EV 1	9 122 067 011	
0 280 150 775	186.7	3.3	15.9	EV 1	9 122 067 011	
0 280 150 790	149.7	2.7	15.9	EV 1	9 122 067 011	
0 280 150 791	311.0	3.8	12.0	EV 1	9 122 067 011	
0 280 150 803	286.6	2.5	4.6	EV 1	9 122 067 011	
0 280 150 842	1207.2	1.0	4.6	EV 1	9 122 067 011	Refer Application Note
0 280 150 901	146.3	3.0	14.5	EV 1	9 122 067 011	
0 280 150 960	150.5	3.0	14.5	EV 1	9 122 067 011	
0 280 150 967	269.7	2.7	14.5	EV 1	9 122 067 011	
0 280 155 777	150.0	3.5	12.0	EV 6	9 122 067 011	Long Body
0 280 155 821	150.0	3.0	14.5	EV 6	9 122 067 011	Long Body
0 280 155 844	150.2	2.7	14.5	EV 6	9 122 067 011	Long Body
0 280 155 868	261.1	3.5	12.0	EV 6	9 122 067 011	Long Body
0 280 155 890	172.0	3.5	12.0	EV 6	9 122 067 011	Long Body
0 280 155 917	142.5	2.7	14.5	EV 6	Non-Bosch Plug	Long Body
0 280 155 931	187.0	3.5	12.0	EV 6	9 122 067 011	Long Body
0 280 155 968	310.0	3.8	12.0	EV 6	9 122 067 011	Dual Spray/Long Body
0 280 156 012	310.0	3.8	12.0	EV 6	9 122 067 011	Standard Body
0 280 156 013	172.0	3.5	12.0	EV 6	9 122 067 011	Long Body
0 280 156 123	213.0	2.7	14.5	EV 6	9 122 067 011	Dual Spray/Long Body
0 280 156 186	213.0	4.0	14.5	EV 6	9 122 067 011	Dual Spray/Long Body

FUEL INJECTOR TECHNICAL DATA

Part Number	Flow Qty* g/min @ 3 Bar	Operating Pressure (Bar)	Resistance (ohms)	Design Type	Connector	Comments
B 280 431 128	364.3	> 8	12	EV6	9 122 067 011	Standard body 25° spray angle
B 280 431 129	364.3	> 8	12	EV6	9 122 067 011	Standard body 70° spray angle
B 280 431 130	493.1	> 8	12	EV6	9 122 067 011	Standard body 25° spray angle
B 280 431 131	493.1	> 8	12	EV6	9 122 067 011	Standard body 70° spray angle

Revision 1 - December 2003

Injection Valve EV 6

The development of the EV 6 took into account all the essential functional requirements which originate from injector operation in multipoint electronic fuel injection systems (EFI).

This resulted in: low weight, “dry” solenoid winding, plastic encapsulation, finely matched flow-rate classes, good valve-seat sealing, excellent hot-start capabilities, close tolerances of the specified functional values, high level of corrosion resistance and long service life.



Mechanical data

System pressure	max. 8 bar
Weight	45, 8 g

Electrical data

Solenoid resistance	e.g. 12 Ω
Max. power supply	16 V

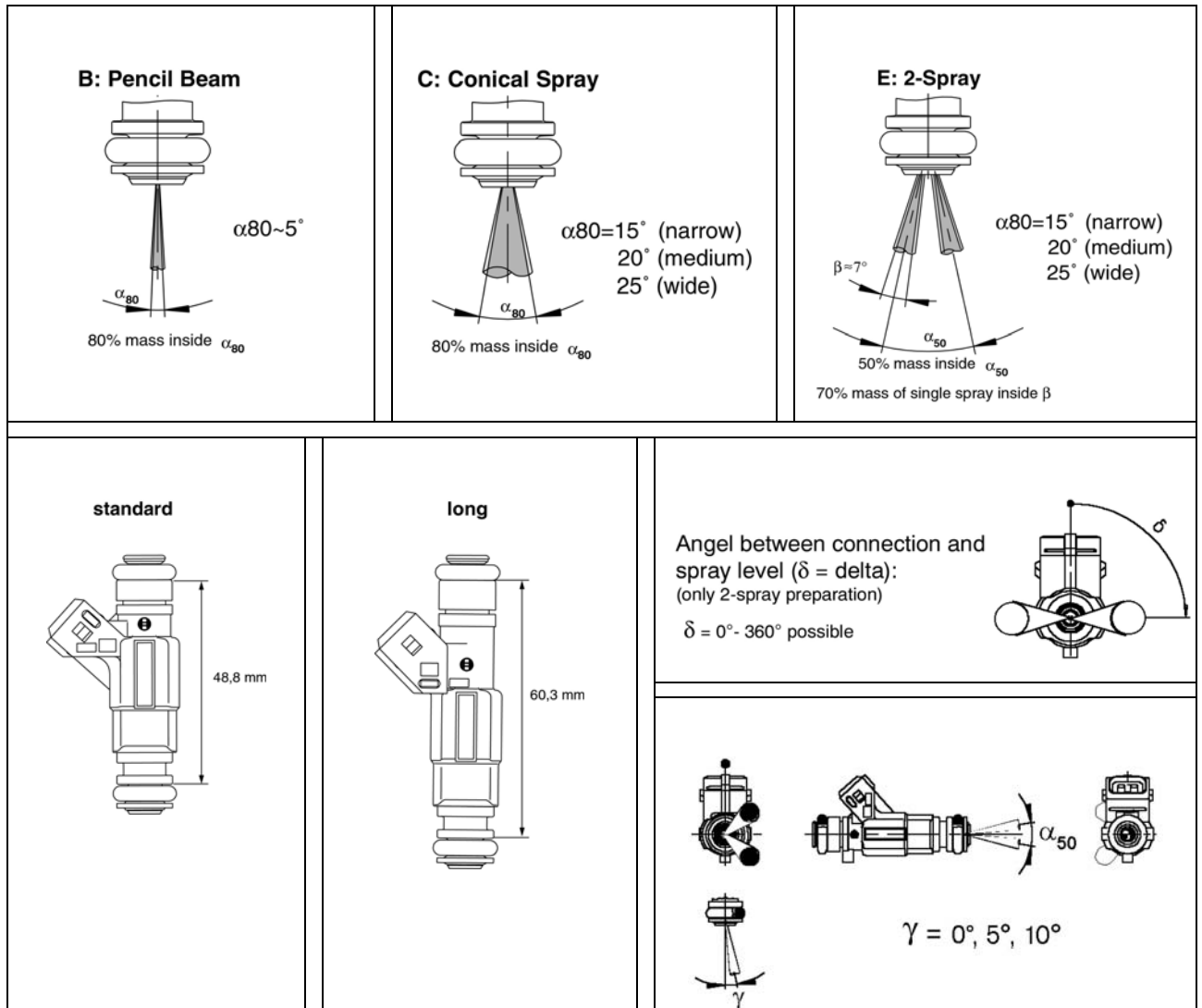
Conditions for use

Fuel input	axial (top-feed)
Operating temperature	-40 ... 110°C
Permissible fuel temperatures	≤ 70°C
Climate proofness corresponds to saline fog test	DIN 53 167

Technical data

Order numbers	Design	Fuel type	Spray type	Flow rate at 3 bar (N-Heptan)	Spray angle α	Impedance
B 280 431 126	Standard	Gasoline	C	261,2 g/min	25°	12 Ω
B 280 431 127	Standard	Gasoline	C	261,2 g/min	70°	12 Ω
0 280 155 737	Long	Gasoline	C	261,2 g/min	15°	12 Ω
B 280 431 128	Standard	Gasoline	C	364,3 g/min	25°	12 Ω
B 280 431 129	Standard	Gasoline	C	364,3 g/min	70°	12 Ω
B 280 431 130	Standard	Gasoline	C	493,1 g/min	25°	1,2 Ω
B 280 431 131	Standard	Gasoline	C	493,1 g/min	70°	1,2 Ω
0 280 156 012	Standard	Gasoline	C	310,1 g/min	20°	12 Ω
B 280 434 499_01	Standard	Methanol	C	658 g/min	25°	12 Ω
B 280 434 499_02	Standard	Gasoline	C	658 g/min	25°	12 Ω

Further injection valves on request



Injection Valve EV 12

The EV 12 injector is a development based on the EV 6. Its main feature is the fact that the position of its injection point can be varied. Compared with the EV 6, the EV 12 injection point can be moved forward up to 20 mm.



Mechanical data

System pressure	max. 8 bar
Weight	40 g

Electronic data

Solenoid resistance	e.g. 12 Ω
Max. power supply	16 V

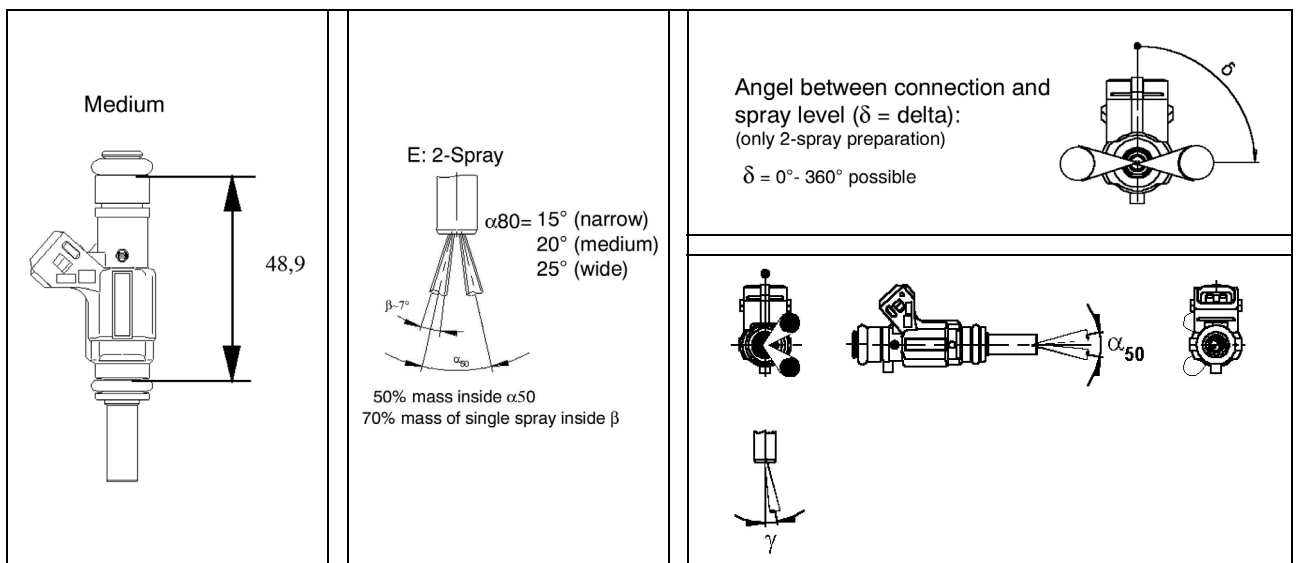
Conditions for use

Fuel input	axial (top-feed)
Operating temperatures	-40 ... 110°C
Permissible fuel temperatures	$\leq 70^\circ\text{C}$
Climate proofness corresponds to	saline fog test DIN 53 167

Technical data

Order numbers	Design	Type	Flow rate at 3 bar (N-Heptan)	Spray angle				Impedance
				α	β	γ	δ	
0 280 155 892	Medium	E	269 g/min	15°	7°	10°	270°	12 Ω
0 280 155 897	Medium	E	217 g/min	15°	7°	10°	270°	12 Ω

Further special versions on request



Injection Valve EV 14

The EV 14 injector is a further development based on the EV 6. It is even more compact, what allows its integration into the fuel rail.

In addition, this injector is also available with a variety of installation lengths, what makes an individual adaptation to the intake manifold possible.



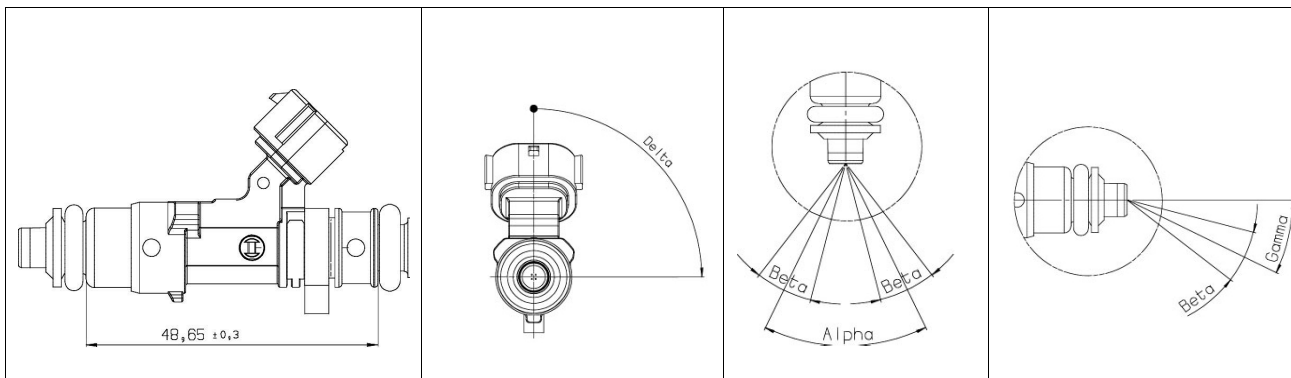
Mechanical data	
System pressure	max. 8 bar
Weight	25 g
Spray angle	25° or 70°

Electronic data	
Solenoid resistance	e.g. 12 Ω
Max. power supply	16 V

Conditions for use	
Fuel input	axial (top-feed)
Operating temperatures	-40 ... 110°C
Permissible fuel temperatures	≤ 70°C
Installation lengths	48,65 mm
Climate proofness corresponds to	saline fog test DIN 50 021

Technical data						
Order numbers	Design	Type	Flow rate at 3 bar (N-Heptan)	Spray angle α	Impedance	
B 280 436 038_06	Standard	C	387,3 g/min	25°	12 Ω	
B 280 436 038_02	Standard	C	503,5 g/min	25°	12 Ω	
B 280 436 038_05	Standard	C	387,3 g/min	70°	12 Ω	
B 280 436 038_01	Standard	C	503,5 g/min	70°	12 Ω	

Further special versions on request.



HPI Valve HDEV 1.2

The HDEV 1.2 can be used in combination with direct injection systems as well as in high pressure manifold injection systems.

Its most remarkable features are the small size and weight and the freedom in defining both – spray and jet. Every jet is free definable in terms of position, flow rate and penetration. Moreover, asymmetric sprays are possible.



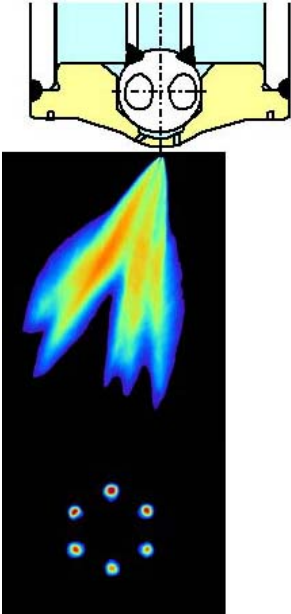

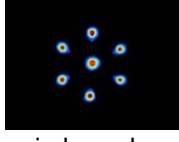
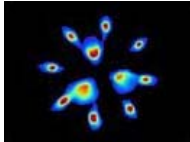
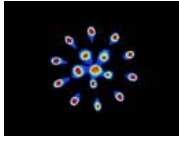

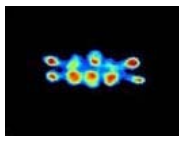
Mechanical data	
System pressure	max. 200 bar
Flow rate	e.g. 30 ccm/sec at 100 bar
Weight	78 g
Length	85 mm

Electrical data	
Resistance	0,9 Ω
Voltage	90 V
Peak current	20 A

Conditions for use	
Fuel input	axial (top-feed)
Operating temperatures	-30 ... 120°C
Permissible fuel temperatures	< 80°C

Order number
on request

Examples of variations, further variations on request

	 <p>Jets on a circle</p>	 <p>Jets on a circle and a middle jet</p>
	 <p>Jets on two circles</p>	 <p>Jets on two circles and a middle jet</p>
	 <p>Jet configuration regarding the spark plug position</p>	 <p>Flat jet configuration</p>

HPI Valve Mini-HDEV 1.2

The Mini HDEV 1.2 can be used in high pressure manifold injection systems.

Its most remarkable features are the small size and weight and the freedom in defining both – spray and jet. Every jet is free definable in terms of position, flow rate and penetration. Moreover, asymmetric sprays are possible.



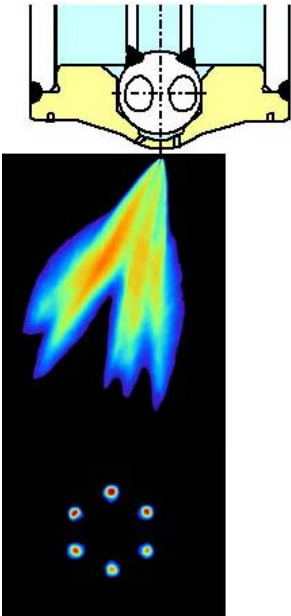

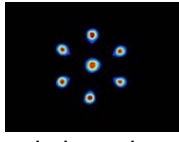
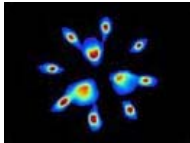
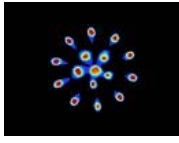

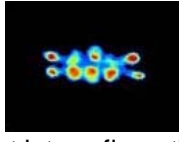
Mechanical data	
System pressure	max. 200 bar
Flow rate	e.g. 30 ccm/sec at 100 bar
Weight	48 g
Length	51 mm

Electrical data	
Resistance	1,1 Ω
Voltage	14 V
Peak current	13,2 A

Conditions for use	
Fuel input	axial (top-feed)
Operating temperatures	-30 ... 120°C
Permissible fuel temperatures	< 80°C

Order number
on request

Examples of variations, further variations on request

	 <p>Jets on a circle</p>	 <p>Jets on a circle and a middle jet</p>
	 <p>Jets on two circles</p>	 <p>Jets on two circles and a middle jet</p>
	 <p>Jet configuration regarding the spark plug position</p>	 <p>Flat jet configuration</p>

HPI Valve Mini-HDEV LV

The Mini-HDEV LV can be used in high pressure manifold injection systems.

Its most remarkable features are the small size and weight and the freedom in defining both – spray and jet. Every jet is free definable in terms of position, flow rate and penetration. Moreover, asymmetric sprays are possible.



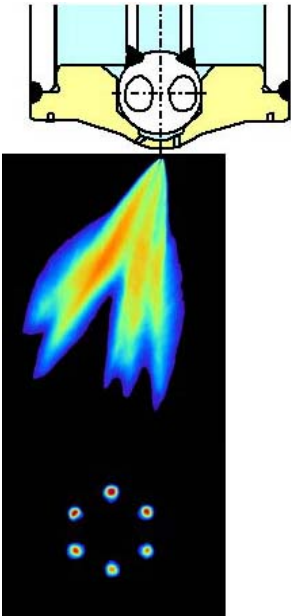

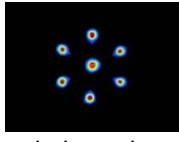
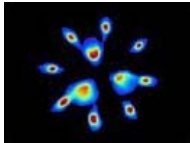
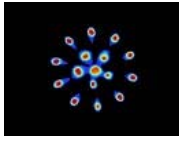

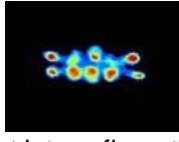
Mechanical data	
System pressure	max. 100 bar
Flow rate	e.g. 30 ccm/sec at 100 bar
Weight	48 g
Length	51 mm

Electrical data	
Resistance	<0,2 Ω
Voltage	14 V
Peak current	26 A

Conditions for use	
Fuel input	axial (top-feed)
Operating temperatures	-30 ... 120°C
Permissible fuel temperatures	< 80°C

Order number
on request

Examples of variations, further variations on request

	 <p>Jets on a circle</p>	 <p>Jets on a circle and a middle jet</p>
	 <p>Jets on two circles</p>	 <p>Jets on two circles and a middle jet</p>
	 <p>Jet configuration regarding the spark plug position</p>	 <p>Flat jet configuration</p>