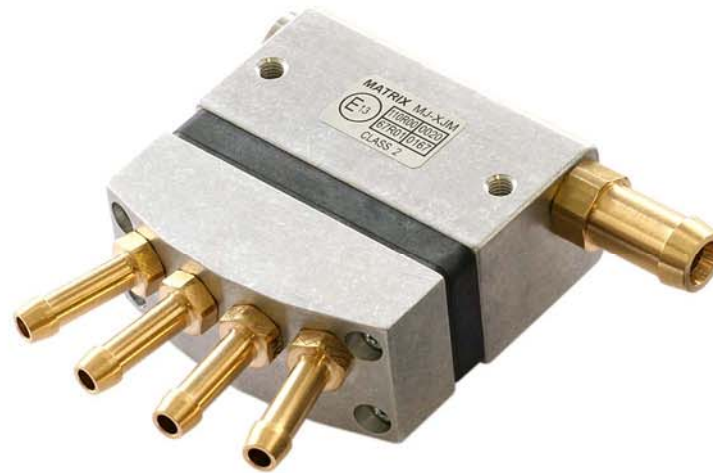


MATRIX GAS INJECTORS

HD Series - CNG & LPG

Ultra Silent Compactness



MATRIX
mechatronics

MATRIX GAS INJECTORS

HD SERIES

The HD Series represents the natural evolution of the innovative characteristics and performances introduced by MATRIX with the XJ Series in alternative fuel multipoint sequential injection applications.

Compactness, low-noise operations, precision, linearity and reliability are some of the key elements of these integrated injection rails, offering outstanding performances for OEM modern engine applications.

MATRIX unique Zero Internal Friction technology grants an outstanding reliability and durability to over 500 Million cycles, equivalent to more than 400.000 Km.

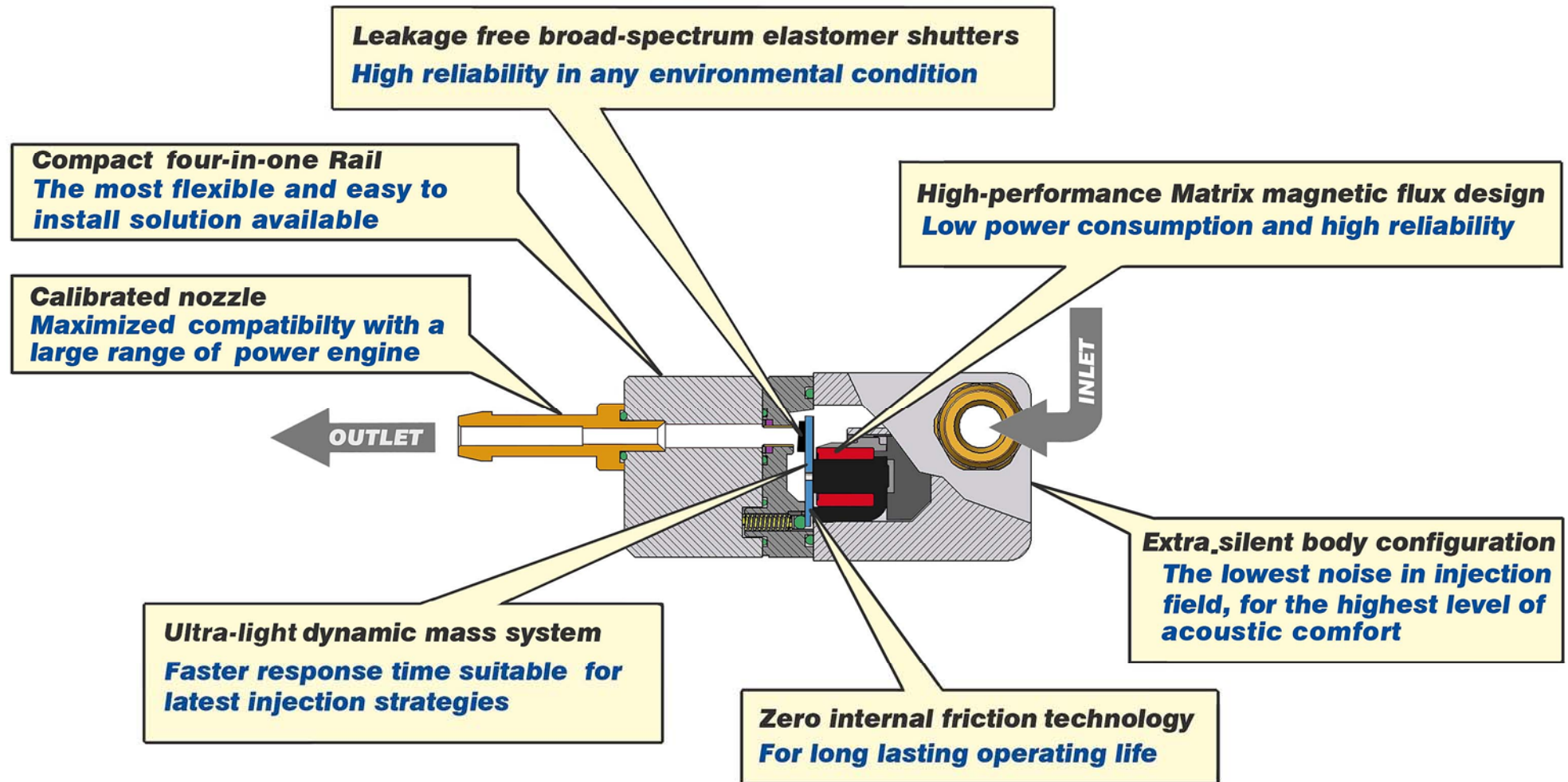
Both the ultra-light dynamic mass shutter system and the high-performance magnetic flux design ensure extremely fast and accurate response times for an enhanced fuel supply linearity.

Through the use of leakage free broad-spectrum elastomers the HD Series offers perfect sealing characteristics in any environmental condition.

An extra-silent body configuration ensures the lowest level of noise in the injection field (less-than 62 dB at 600 rpm), for the highest level of acoustic comfort.

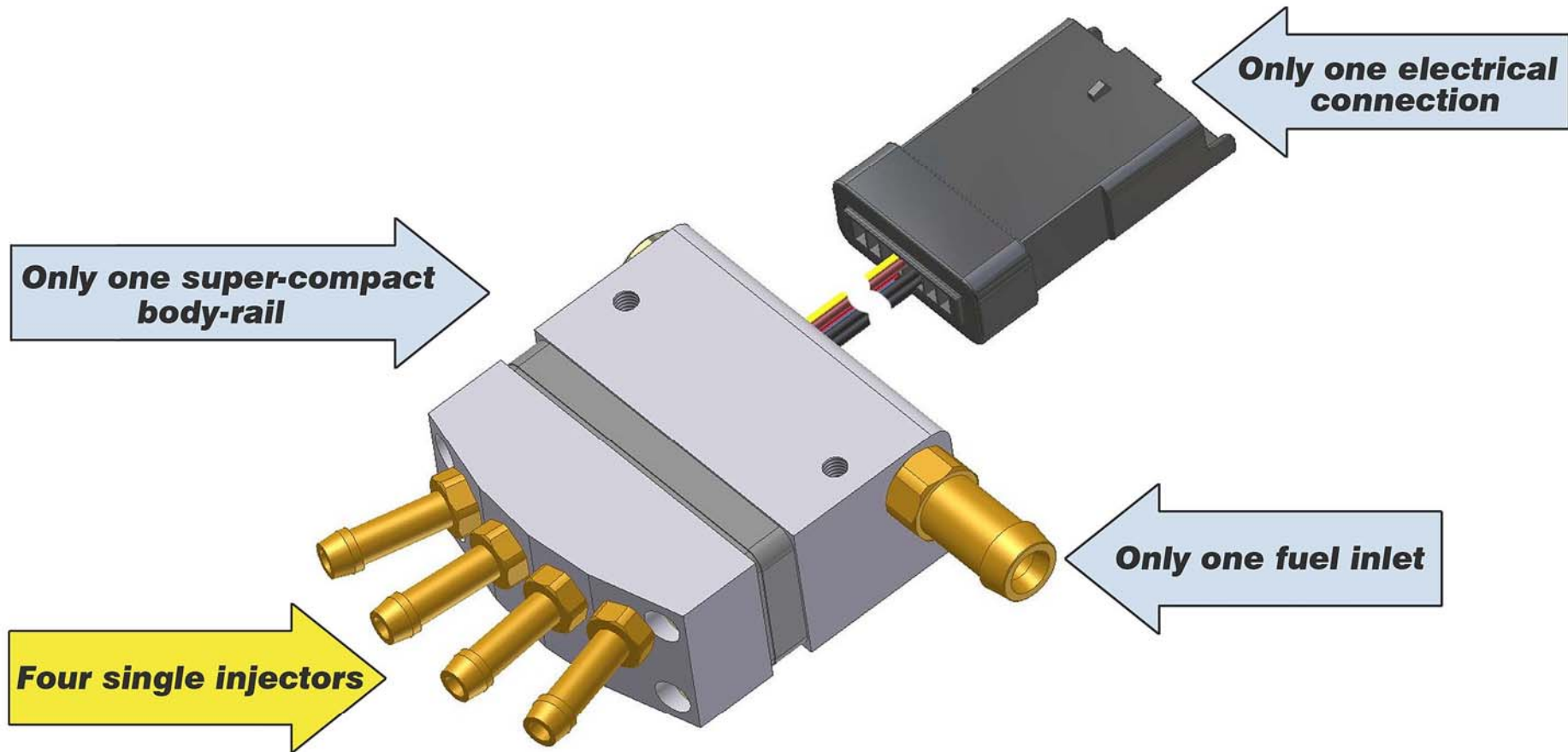
HD INJECTORS HIGHLIGHTS

Ultra Silent Compactness

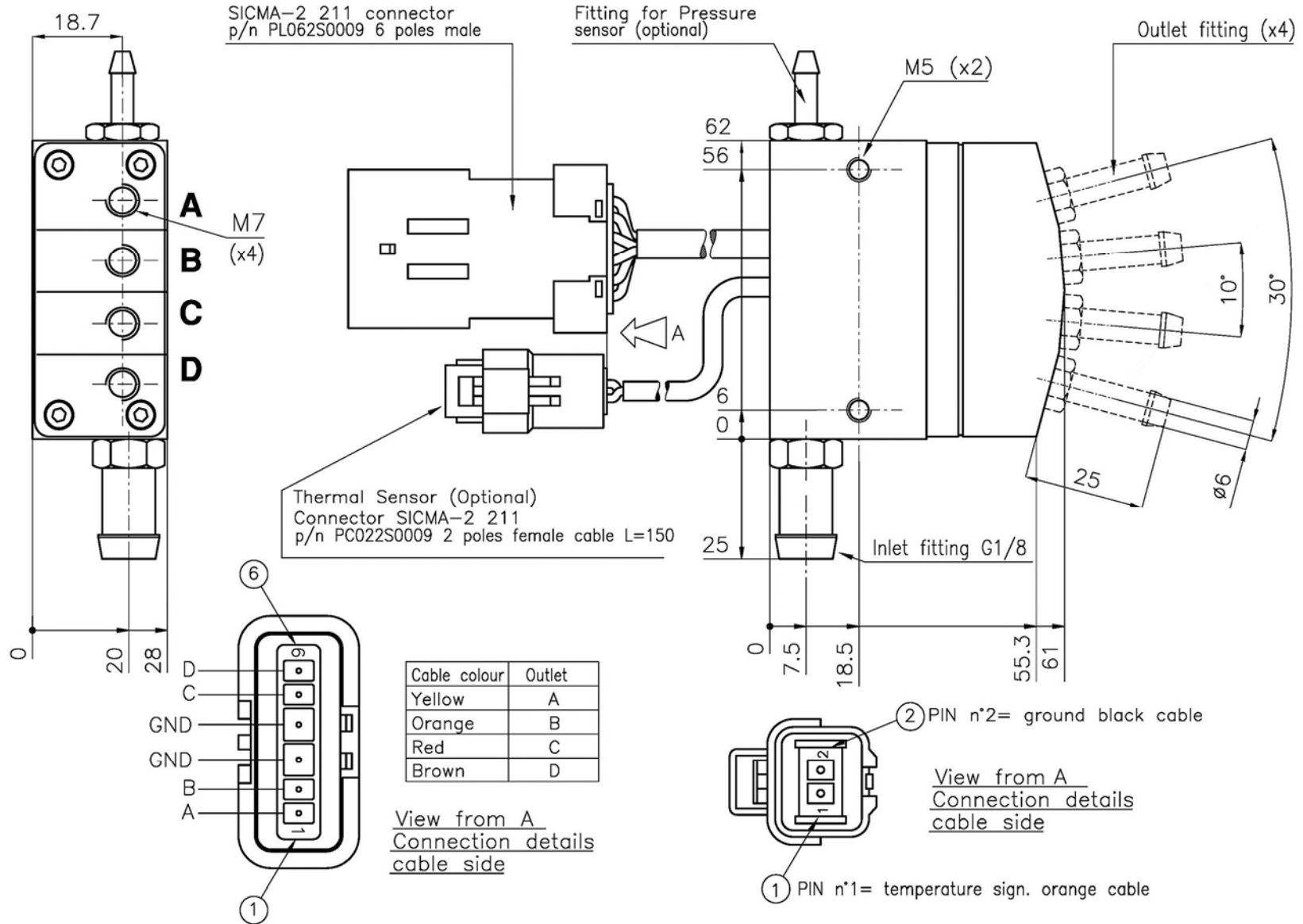


HD INJECTOR - 344 VERSION

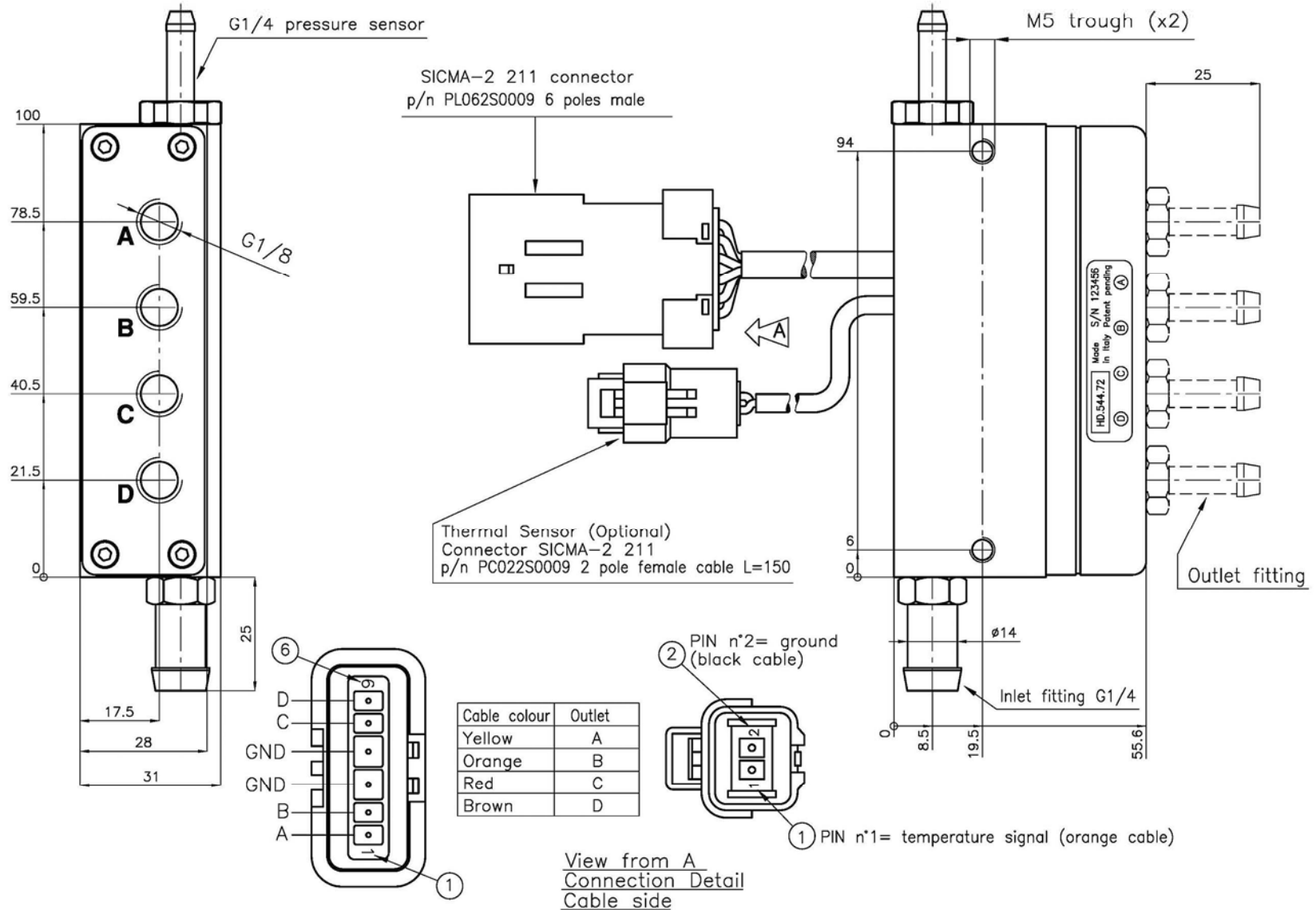
The best of Four-in-One



HD SERIES 344 - DIMENSIONS



HD SERIES 544 - DIMENSIONS



HD INJECTORS - CHARACTERISTICS 1

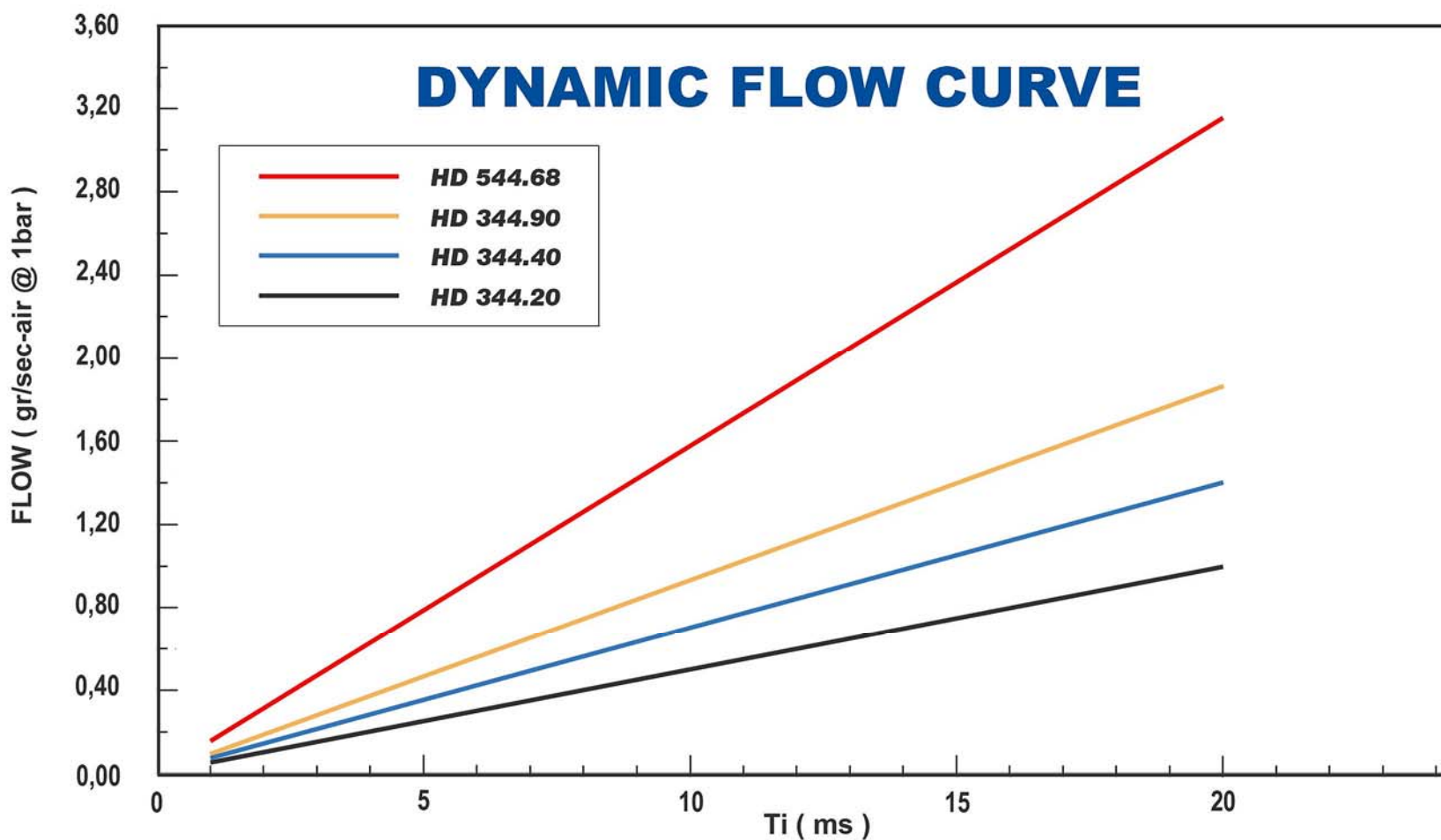
GENERAL CHARACTERISTICS	HD 344.20	HD 344.40	HD 344.90	HD 544.68
Handled fluid	LPG - CNG			
Ambient temperature range	- 20°C to 120°C			
Lubrication	Not required			
Max operating frequency (@1bar 1,5ms peak)	150 Hz			
Product life expectancy	500 MI. cycles			
Leakage max	15 cc/h			
IP Protection ratio	IP 65			
PRESSURE				
Typical working pressure	1,0 - 2,0 bar			
Handled pressure	0,5 - 3,0 bar			
Classification pressure (R67-R110 Class 2)	4,5 bar			
FLOW RATE				
Static Flow Rate (@ 1 bar)	1,02 g/s	1,41 g/s	1,85 g/s	3,14 g/s
Static Flow Rate (@ 2 bar)	1,58 g/s	2,24 g/s	2,84 g/s	4,79 g/s
RESPONSE TIME				
Opening response time (@12VDC -1bar)	0,85 ms	0,95 ms	1,00 ms	1,10 ms
Closing response time (@12VDC -1bar)	0,85 ms	1,00 ms	1,00 ms	0,90 ms
Pressure response time (0 - 2 bar or 2 - 0 bar)	0,50 ms	0,50 ms	0,50 ms	0,50 ms

HD INJECTORS - CHARACTERISTICS 2

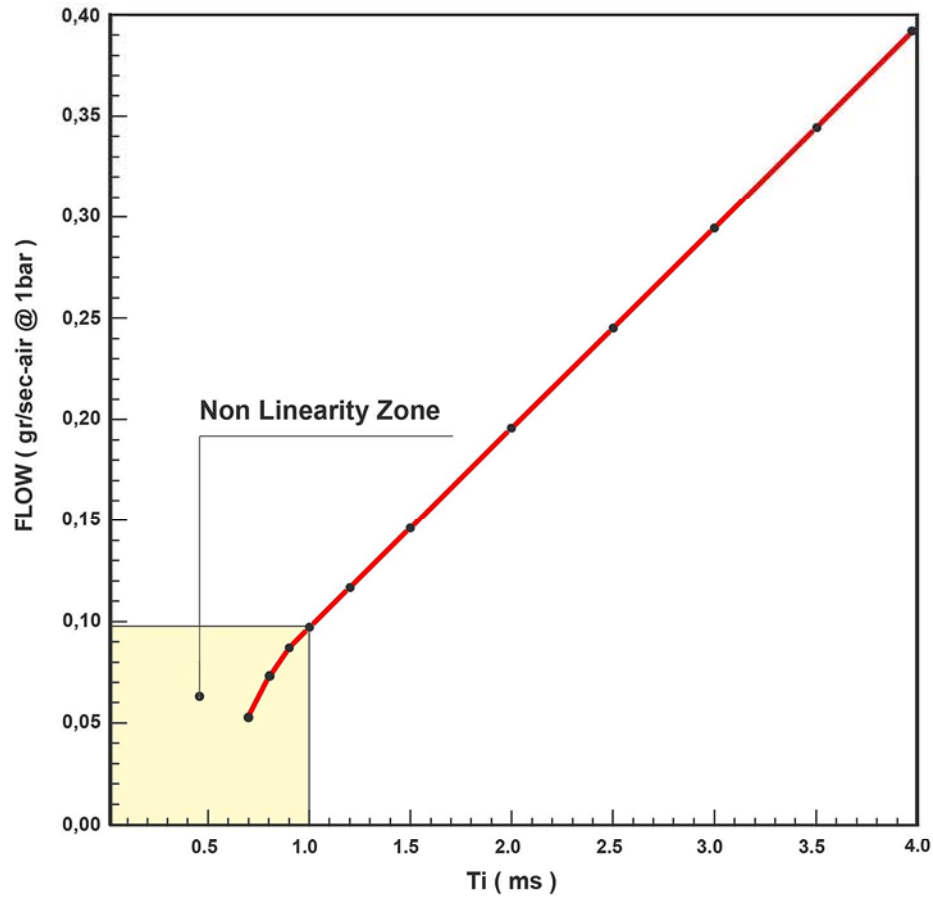
ELECTRICAL CHARACTERISTICS	HD 344.20	HD 344.40	HD 344.90	HD 544.68
Electrical control	Peak & hold			
Coil resistance (@ 20°C)	2,0 Ohm	3,0 Ohm	2,0 Ohm	2,0 Ohm
Inductance (@ 20°C open/closed)	0,78/0,85 mH	1,25/1,40 mH	0,78/0,85 mH	0,90/0,92 mH
Speed-up voltage range	10 to 14 VDC			
Min. operating range (@ 2bar-3ms peak)	6,0 VDC	6,0 VDC	6,5 VDC	6,5 VDC
PEAK & HOLD CHARACTERISTICS				
Typical speed-up time (@ 12VDC 50Hz)	2,0 ms (from 0,5 to 1,5 bar)			
	2,5 ms (from 1,5 to 2,0 bar)			
	3,0 ms (from 2,0 to 3,0 bar)			
Speed-up current (@ 12VDC)	6 Amp max	4 Amp max	6 Amp max	6 Amp max
Holding current	0,8 Amp	0,6 Amp	0,8 Amp	1,0 Amp
MECHANICAL CHARACTERISTICS				
Dimensions (standard configuration) mm	62 x 61 x 28			100 x 55 x 31
Electrical connection	Sicma II			
Weight (standard configuration)	305 g			470 g
ECE REGULATION COMPLIANCE				
ECE R67 approval	67R01 0167			
ECE R110 approval	110R00 0020			

DYNAMIC FLOW RANGE

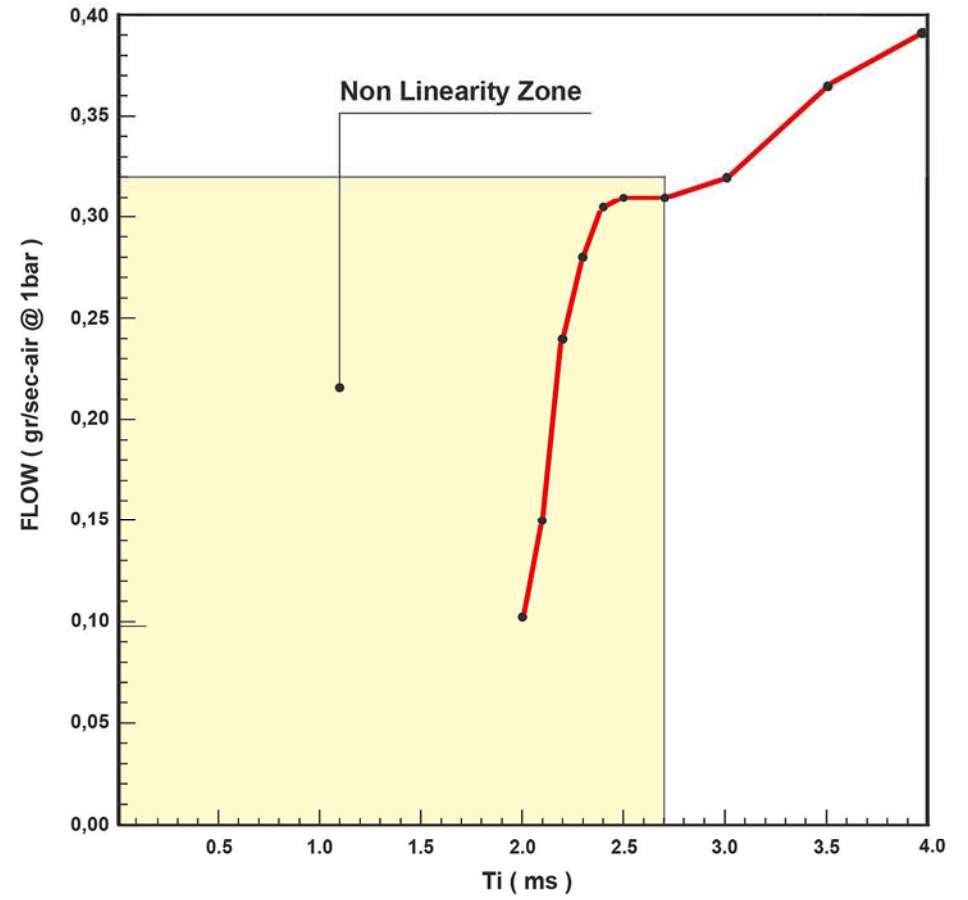
HD series	Injection time (ms)	2	4	6	10	16	20
Flow rate gr/sec-air @ 1bar	HD 344.20	0,11	0,20	0,30	0,50	0,80	1,02
	HD 344.40	0,15	0,29	0,43	0,70	1,14	1,41
	HD 344.90	0,19	0,37	0,56	0,92	1,46	1,85
	HD 544.68	0,34	0,62	0,91	1,52	2,49	3,14



MATRIX HD SERIES

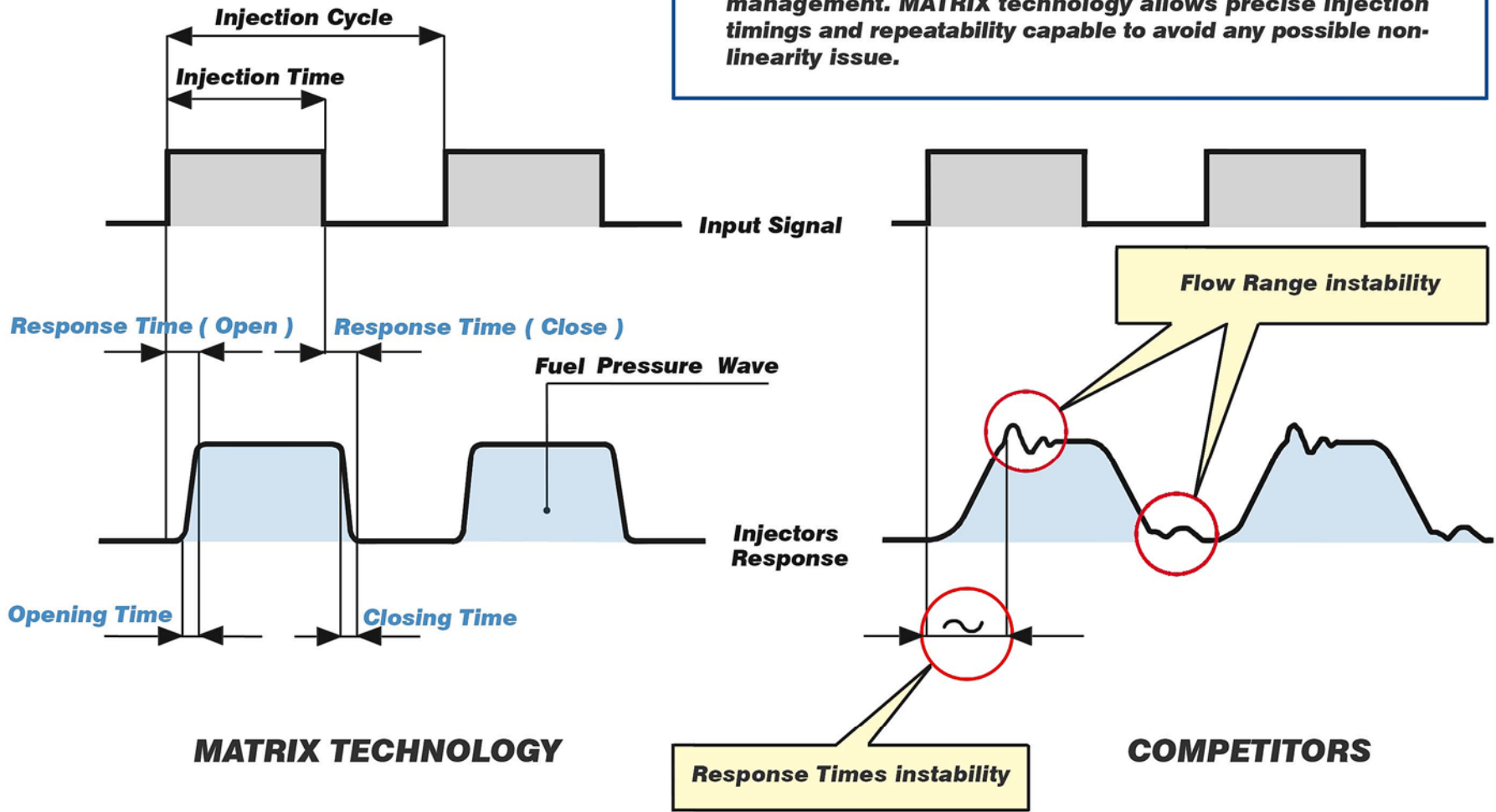


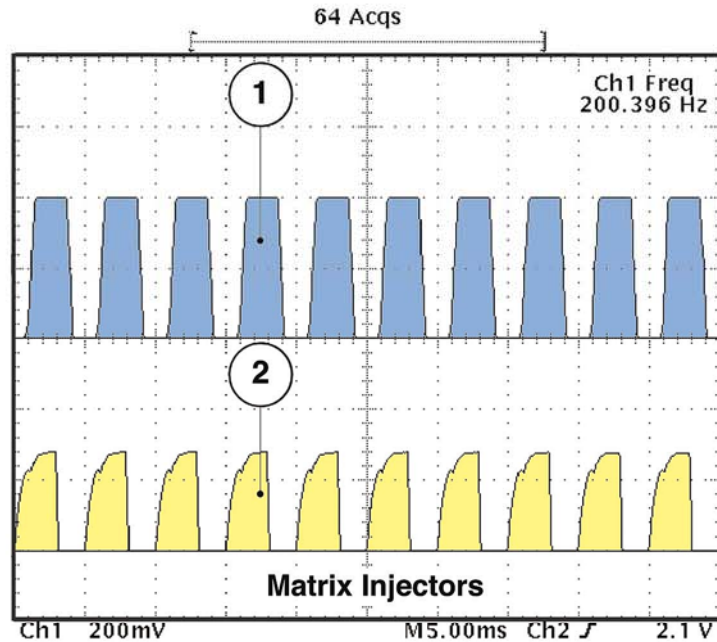
COMPETITORS



LINEARITY PERFORMANCE - COMPARISON

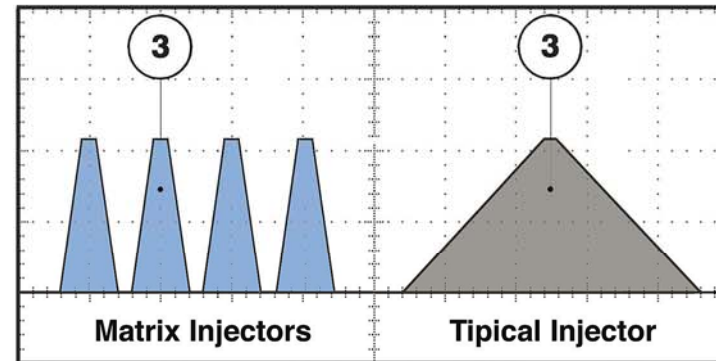
MATRIX injectors grant an overall improvement of response accuracy and fuel supply linearity, two key performance factors in driving quality perception and engine emissions management. MATRIX technology allows precise injection timings and repeatability capable to avoid any possible non-linearity issue.





REPEATABILITY AND PRECISION. The graph shows the high level of precision and repeatability guaranteed by Matrix's injectors. Fluctuation of response times are lower than measurable levels; such values, due to a functional principle which is absence of friction, remain constantly unaltered in all environment conditions featured by product specifications.

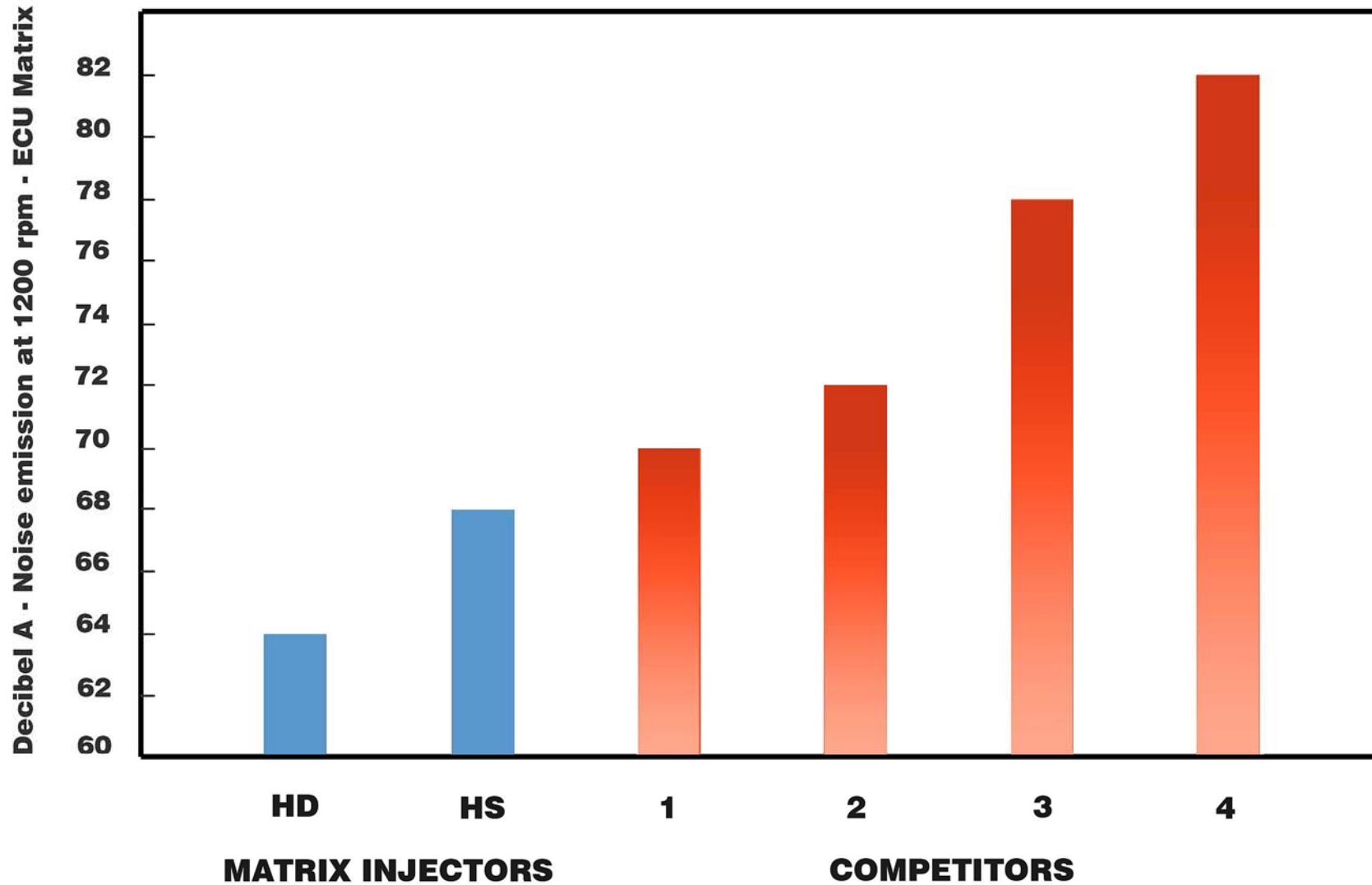
- 1** Outlet pressure wave **2** Current wave



HIGH LINEARITY and NEW APPLICATIONS. The remarkable injection time reduction typical of Matrix's injectors grants an engine output linearity enhancement, currently not available with any other injector or technology. For this reason Matrix's injectors have been chosen for the development and implementation of new and innovative gas injection strategies in gasoline and diesel applications such as micro-injections and multi-injections, focused on performance improvements both in terms of fuel consumption and emissions reduction.

- 3** Minimum injection time

NOISE EMISSION - COMPARISON



RELIABILITY & PHISICAL TEST

Test	Test condition
Compatibility	ECE R67 (LPG) and ECE R110 (CNG)
Working life	500.000.000 Cycles
Salt spray	In compliance with 15500-2
Ozone ageing	In compliance with iso 1431-1
Damp resistance	90° umidity at 60°C
Vibration	40 to 500 Hz , 1 Oct/min frequency sweep, 20g
Thermal shock	-30°C to 120°C
High temperature exposure	130°C stabilized
Low temperature exposure	-40°C stabilized
Mechanical shock	Ref. SAE J1832 11/89 regulation 5.8.7
Leakage	Ref. ECE R67 and ECE R110
Over pressure	7 bar
Over voltage	24 VDC 1 min. 50Hz

COMPLETE HD SERIES RANGE

