

# **RAIL GAS INJECTORS**

## **IG4 DAKOTA AFTER MARKET VERSION**

**FOR CNG & LPG**



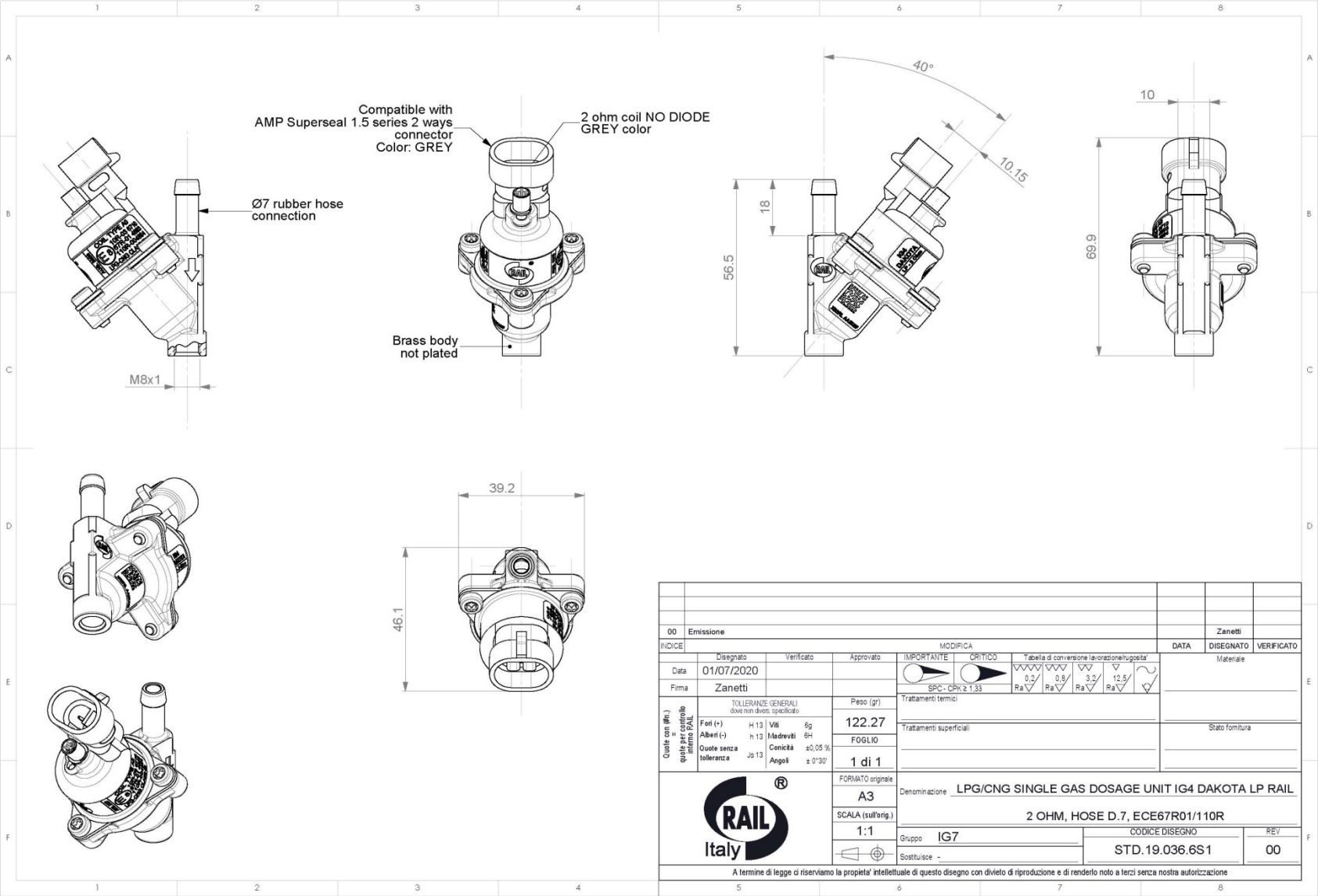
## IG4 DAKOTA «HIGH SPEED» SINGLE INJECTOR


The new **IG4 DAKOTA A.M.** is a new high-performance injector, designed in 2 different versions:

- **IG4 DAKOTA LP:** for LPG/CNG working, from 1 bar ( 100 kPa ) to 3 bar ( 300 kPa ) working pressure; 4,5 bar ( 450 kPa ) max pressure. Neutral coloured body.
- **IG4 DAKOTA LHF:** for LPG/CNG working, from 1 bar ( 100 kPa ) to 3 bar ( 300 kPa ) working pressure; 4,5 bar ( 450 kPa ) max pressure. Neutral coloured body , version with increased flow rate until 60 HP /cyl. for LPG and 50 HP/cyl. for CNG



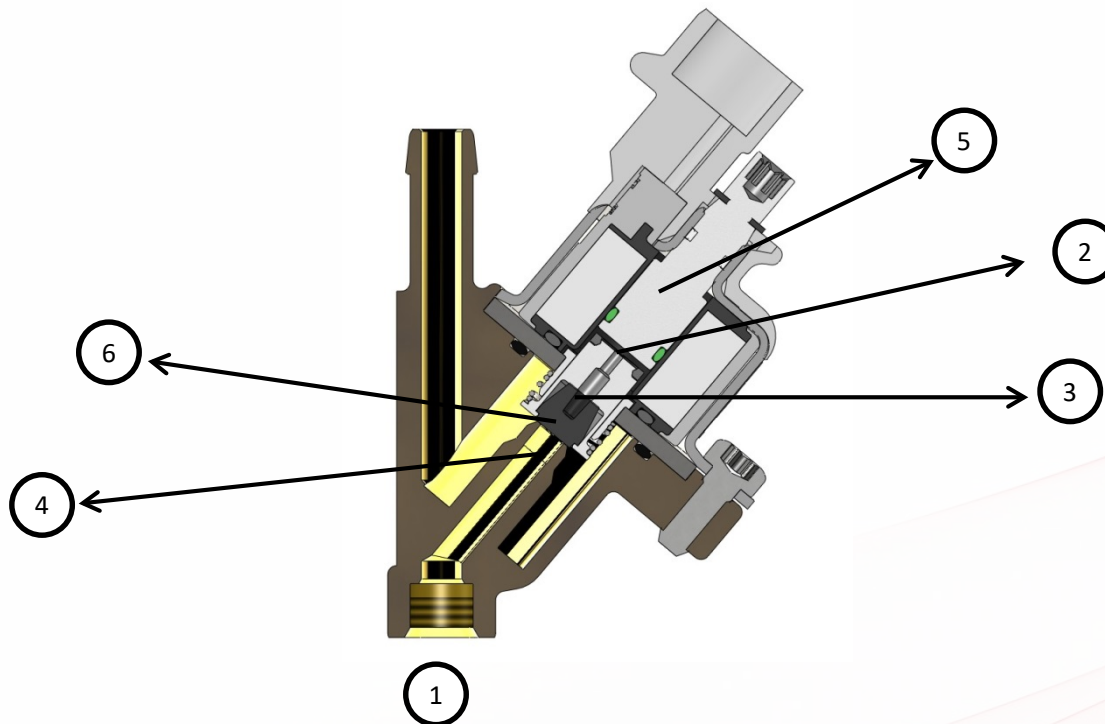
DIMENSIONS



00 Emissione				Zanetti						
INDICE				MODIFICA				DATA	DISEGNATO	VERIFICATO
Data		Disegnato		Verificato		Approvato		Materiale		
Firma		Zanetti								
Quote con (R.A.) quote per controllo interno RAIL		TOLLERANCE GENERALI dove non divers specificato				Peso (gr)		Trattamenti termici		
		Fori (+) H 13 Viti 6g				122.27				
		Alberi (-) h 13 Madreviti 6H				FOGLIO				
		Quote senza tolleranza J6 13 Conicità ±0.05 %				1 di 1		Stato fornitura		
		Angoli ± 0°30'								
		FORMATO originale				A3		Denominazione <u>LPG/CNG SINGLE GAS DOSAGE UNIT IG4 DAKOTA LP RAIL</u>		
		SCALA (sull'orig.)				1:1		2 OHM, HOSE D.7, ECE67R01/110R		
		Gruppo IG7				CODICE DISEGNO		REV		
		Sostituisce -				STD.19.036.6S1		00		
A termine di legge ci riserviamo la proprietà intellettuale di questo disegno con divieto di riproduzione e di renderlo noto a terzi senza nostra autorizzazione										

# DEVELOPMENT

1. Developed for gaseous fuel: LPG & CNG
2. Special internal treatments for long operation and reliability; internal damper for quiet operation
3. Advanced design, for good working with high-speed engines
4. LHF Version for high flow capacity
5. Steels realized for specific application
6. Optimized compounds in order to improve the mechanical and chemical resistance



# BASIC TECHNICAL DATA

IG4 DAKOTA LP A.M. VERSION – page 1

Characteristic	Unit	Value	Note
Injector Version	N° of cylinders	1 - single injector	
Material body and treatment		Brass	
Relative Pressure	Bar (Psi)	From 0,5 to 3,0 (7 to 43)	Working pressure
		4,5 (65)	Max pressure
Rated voltage (at coil)	Volt	10,8 - 14,4	
Minimum copper wire section for coil connection	mm <sup>2</sup>	0,75	
Coil type	by encoding	E2 - Grey cap	
Resistance	Ω	2	± 5% at T= 25°
Suggested peak current time (duration)	ms	2,4	
Suggested holding current	A	1,4	
Complete OPENING Response Time	ms	2	±5% tested with max nozzle diameter at 14V Δp=2 bar T= 25°C
Complete CLOSING Response Time	ms	1,6	
Minimum injection pulse	ms	2,1	14V Δp=2bar T= 25°C
Stroke	Micron		
Seat Diameter	mm	3,3	
Static flow rate (with max nozzle Φ) at 20°C (with air)	SLPM (sL/min)	110	at 1 bar inlet pressure
		164	at 2 bar inlet pressure



Calculated max flow rate(with max nozzle $\Phi$ ) CNG at 20°C (G20 CNG fluid)	gr/sec	1,6	at 1 bar inlet pressure
		2,4	at 2 bar inlet pressure
	Kg/h	5,8	at 1 bar inlet pressure
		8,7	at 2 bar inlet pressure
Calculated max flow rate(with max nozzle $\Phi$ ) LPG at 20°C	gr/sec	2,7	at 1 bar inlet pressure
		4,1	at 2 bar inlet pressure
	Kg/h	9,9	at 1 bar inlet pressure
		14,8	at 2 bar inlet pressure
Leakage (tested with air)	cc/h	$\leq 15$	
Noise level	dB		$\pm 1$ dB Rail Test Condition
Compatibility with gas		LPG, CNG	
Driver Stage		Peak and Hold (PWM)	
Coil Connector type		2 way Amp/Delphi super seal female connector with tab contacts	Connector dimensions are shown in the RAIL drawing, code 114.01.AMP.001
Approvals		T.B.D.	
Operating Ambient Temperature Range	°C	-40° + 120° C	
Principle of operation		Solenoid valve - Normally closed - Mobile Plunger	
Power handling capability LPG	HP/cyl	1 bar up to 40 HP/cyl	
Power handling capability CNG	HP/cyl	2 bar up to 35 HP/cyl	
Coil IP Rating		IP67	

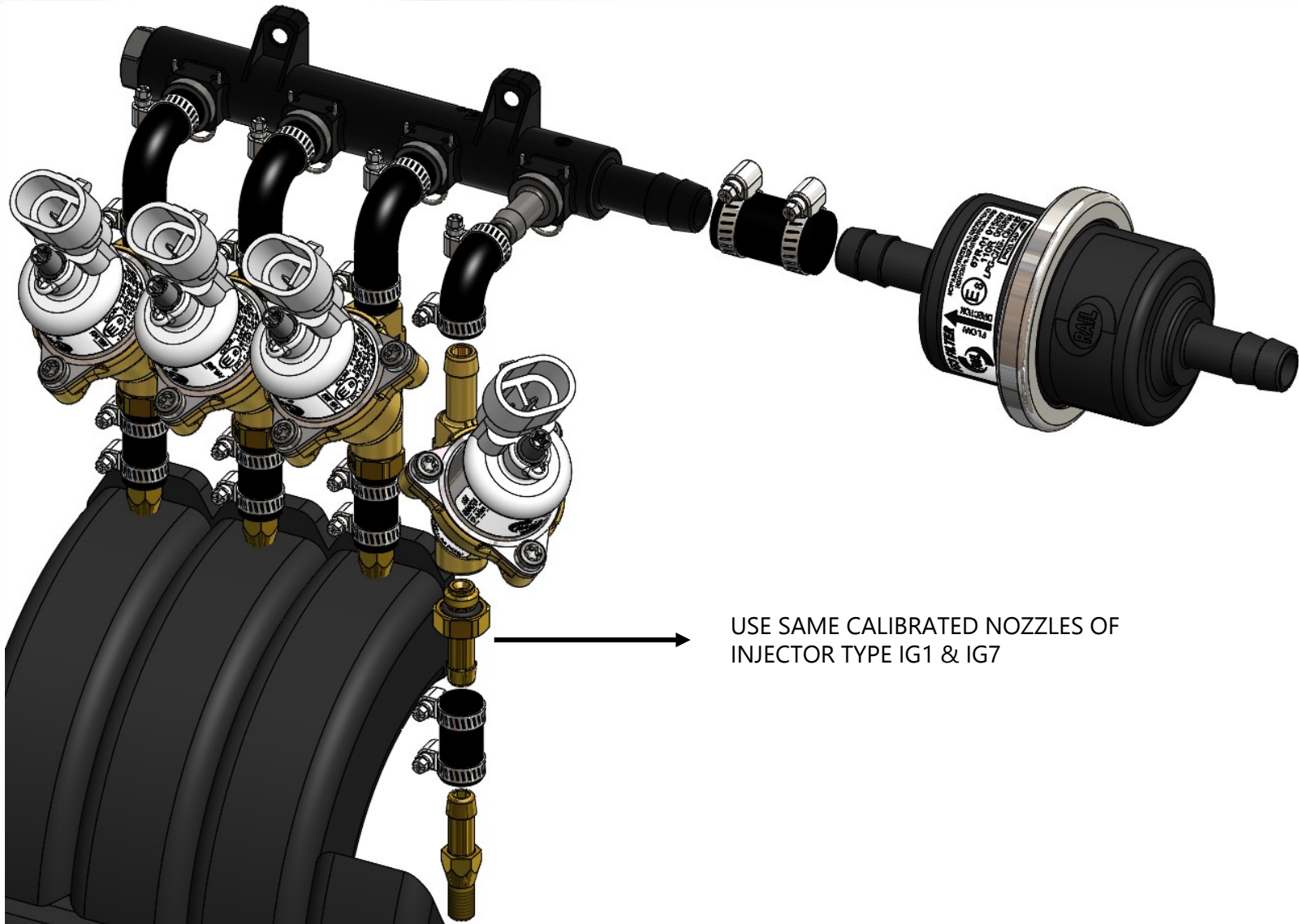
## IG4 DAKOTA LHF A.M. VERSION - page 1

Characteristic	Unit	Value	Note
Injector Version	N° of cylinders	1 - single injector	
Material body and treatment		Brass	
Relative Pressure	Bar (Psi)	From 0,5 to 3,0 (7 to 43)	Working pressure
		4,5 (65)	Max pressure
Rated voltage (at coil)	Volt	10,8 - 14,4	
Minimum copper wire section for coil connection	mm <sup>2</sup>	0,75	
Coil type	by encoding	E2 - Grey cap	
Resistance	Ω	2	± 5% at T= 25°
Suggested peak current time (duration)	ms	2,4	
Suggested holding current (±10%)	A	1,4	
Complete OPENING Response Time	ms	2,1	(±10% - total injection time 5 ms) ±5% tested without nozzle at 14V Dp=2bar T= 25°C
Complete CLOSING Response Time	ms	1,4	
Minimum injection pulse	ms	2,2	tested with 2 mm nozzle diameter at 14V Δp=2bar T= 25°C
Stroke	Micron		
Seat Diameter	mm	3,8	
Static flow rate (with max nozzle Φ) at 20°C (with air)	SLPM (sL/min)	140	at 1 bar inlet pressure
		210	at 2 bar inlet pressure

Calculated max flow rate(with max nozzle $\Phi$ ) CNG at 20°C (G20 CNG fluid)	gr/sec	2,1	at 1 bar inlet pressure
		3,7	at 2 bar inlet pressure
	Kg/h	7,4	at 1 bar inlet pressure
		11,1	at 2 bar inlet pressure
Calculated max flow rate(with max nozzle $\Phi$ ) LPG at 20°C	gr/sec	3,5	at 1 bar inlet pressure
		5,3	at 2 bar inlet pressure
	Kg/h	12,6	at 1 bar inlet pressure
		18,9	at 2 bar inlet pressure
Leakage (tested with air)	cc/h	$\leq 15$	
Noise level	dB		$\pm 1$ dB Rail Test Condition
Compatibility with gas		LPG, CNG	
Driver Stage		Peak and Hold (PWM)	
Coil Connector type		2 way Amp/Delphi super seal female connector with tab contacts	Connector dimensions are shown in the RAIL drawing, code 114.01.AMP.001
Approvals		T.B.D.	
Operating Ambient Temperature Range	°C	-40° + 120° C	
Principle of operation		Solenoid valve - Normally closed - Mobile Plunger	
Power handling capability LPG	HP/cyl	1 bar up to 60 HP/cyl	
Power handling capability CNG	HP/cyl	2 bar up to 50 HP/cyl	
Coil IP Rating		IP67	



## INJECTOR INSTALLATION EXAMPLE



# MAINTENANCE

