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Direct injection training

General info

Petrol direct injection is also known as gasoline direct injection (GDI), spark-ignited direct injection (SIDI) and fuel-stratified injection (FSI) or Turbo fuel-stratified injection (TFSI). It's a form of fuel injection employed in modern two stroke and four-stroke gasoline engine. The petrol is highly pressurized and injected through common rail fuel line directly into the combustion chamber of each cylinder, as opposed to **Port fuel injection** (conventional multipoint) that injects fuel into the intake manifold. There is a technology named **Dual** that combine the conventional port multipoint fuel injection and the direct fuel injection, in this kind of application for a 4 cylinder vehicle there are 4 injectors multipoint in the intake manifold and 4 direct injectors in the combustion chamber.

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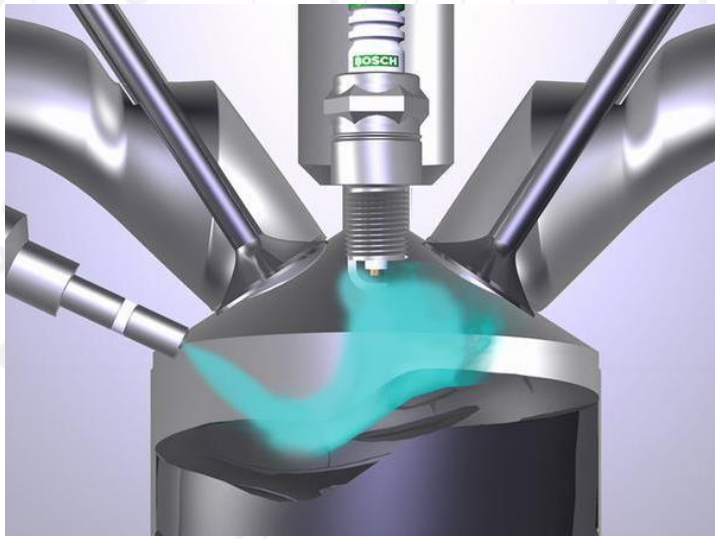
General info

Directly injecting fuel into the combustion chamber requires high-pressure injection that according to the different engine model can have a range between 20-250 bar, whereas low pressure is used to inject into the intake manifold like a port injection or in the dual (port and direct injection).
In some applications, especially the old engine models, gasoline direct injection enables a **stratified fuel charge (ultra lean burn)** combustion to improve the fuel efficiency and to reduce emission levels at low load when the engine is warm.
When the vehicles use this strategy, usually, there is a temperature sensor on the catalyst.



Stratified fuel charge (ultra lean burn) .
Petrol injited when the inlet valve is closed

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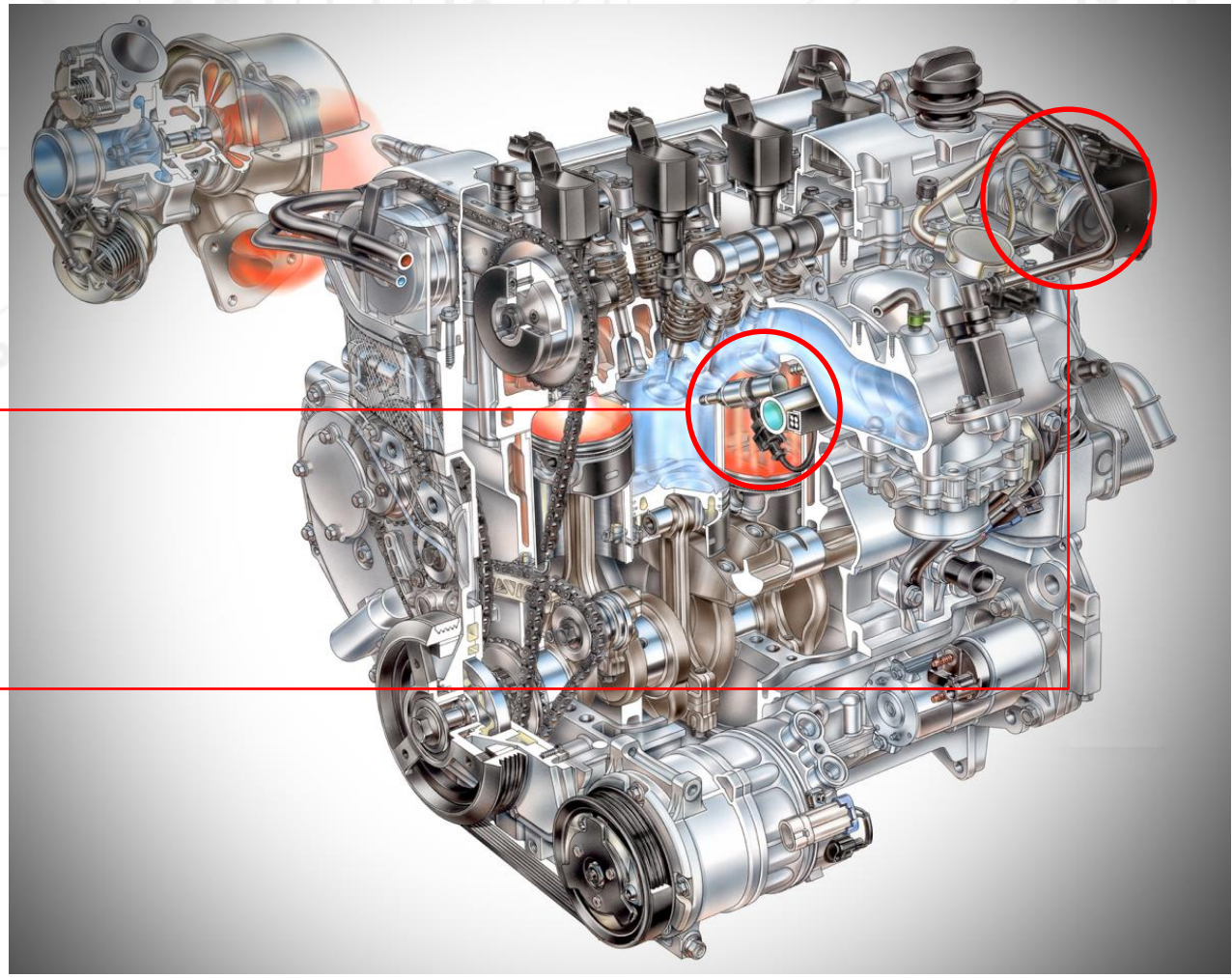
Engine overview

The petrol injectors location is in the combustion chamber

High pressure petrol pump mounted on the engine (range 20-250 bar)



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Installation procedure

OBTAIN CAR INFORMATION:
- Car manufacturer
- Car model
- Engine capacity
- Engine power
- Engine code
- Petrol Ecu code
- Model year

IS THE CAR PRESENT ON THE «AUTRONIC CONVERSION LIST»?

NO → DOES THE CAR OWNER WANTS TO TRY THE CONVERSION ANYWAY? (We cannot guarantee the proper working of the system. We haven't direct knowledge of the car / engine. It will be client / installer risk and responsability to accept any malfunction and also the worst case: unistalling the system.)

YES → HAVE YOU EVER DONE A TRAINING COURSE WITH AUTRONIC TEAM?

NO → WE SUGGEST YOU TO PLAN IT, IN ORDER TO MANAGE THE SYSTEM AT IT'S BEST

YES → SEND AN E-MAIL TO YOUR KIT SUPPLIER FOR OBTAIN THE SPECIFIC VEHICLE DATABASE FOLDER BY MIAIL

NO → KEEP IN TOUCH WITH YOUR KIT SUPPLIER FOR FUTURE UPDATE.

YES → TOOLS NECESSARY FOR THE TEST: PICOTECH PICOSCOPE (WITH CURRENT CLAMP AND VOLTAGE PROBE) TEAM VIEWER CONNECTION WITH AUTRONIC TEAM CONTACT US FOR A SESSION AUTRONIC

IF YOU DON'T HAVE A OSCILLOSCOPE WITH A CURRENT CLAMP, WE CAN SUPPLY AN AUTRONIC OSCILLOSCOPE KIT

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Car list

AUDI

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
AXW	A3 FSI	2000	110	L4	2003 - 2008	BOSCH MED 9.5.10	CP / AP / Old A	7004	LPG
BPG	A4 TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7008	LPG
BPJ	A6 TFSI	2000	125	L4	2005 - 2008	BOSCH MED 9.1	CP / AP / Old A	7002	LPG
BWA	A3 TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7003	LPG
BWA	TT TFSI	2000	147	L4	2006 - 2010	BOSCH MED 9.1	CP / AP / Old A	7006	LPG
BWE	A4 TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7009	LPG
BWT	TT TFSI	2000	149	L4	2006 - 2009	BOSCH MED 9.1	CP / AP / Old A	7120	LPG
BZB	A3 TFSI	1800	115	L4	2007 - 2009	BOSCH MED 17.5	CP / AP / Old A	7005	LPG
CAB	A5 TFSI	1800	125	L4	2007 - 2008	BOSCH MED 17.5	CP / AP / Old A	7122	LPG
CAB	A4 TFSI	1800	118	L4	2007 - 2008	BOSCH MED 17.5	CP / AP / Old A	7097	LPG
CAE	A6 TFSI	2000	155	L4	2011	BOSCH MED 17.5	CP / AP / Old A	7012	LPG
CCZA	A3 TFSI	2000	147	L4	2008 - 2013	BOSCH MED 17.5	CP / AP / Old A	7098	LPG
CDAA	A3 TSI	1800	118	L4	2008 - 2013	BOSCH MED 17.5	CP / AP / Old A	7123	LPG
CDHA	A4 TFSI	1800	88	L4	2008 - 2015	BOSCH MED 17.5	CP / AP / Old A	7099	LPG
CDHB	A4 TFSI	1800	118	L4	2008 - 2012	BOSCH MED 17.5	CP / AP / Old A	7007	LPG
CDL	S3 TFSI	2000	195	L4	2008 - 2014	BOSCH MED 9.1	CP / AP / Old A	7013	LPG
CDNB	Q5 TFSI	2000	132	L4	2009 - 2012	BOSCH MED 17.1	CP / AP / Old A	7001	LPG
CDNC	A5 TFSI	2000	155	L4	2008 - 2014	BOSCH MED 17.1	CP / AP / Old A	7011	LPG
CESA	TT TFSI	2000	155	L4	2010 - 2014	BOSCH MED 17.1	CP / AP / Old A	7100	LPG
CPMA	A4 TSI	2000	155	L4	2012	BOSCH MED 17.5	CP / AP / Old A	7010	LPG

CITROEN

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
5FV	C5 THP	1600	115	L4	2009 - 2015	BOSCH MEV 17.4	CP / AP / Old A	7014	LPG
5FV	DS4 THP	1600	115	L4	2011 - 2015	BOSCH MEV 17.4	CP / AP / Old A	7015	LPG

FORD

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
JQDA	FOCUS ECOBOOST	1600	110	L4	2011 - 2015	BOSCH MED 17.2	CP / AP / Old A	7019	LPG
JQDB	C-MAX ECOBOOST	1600	110	L4	2010 - 2015	BOSCH MED 17.2	CP / AP / Old A	7038	LPG
JTMA	FUSION ECOBOOST	1600	134	L4	2013 - 2015	BOSCH MED 17.2	CP / AP / Old A	7020	LPG
JTMA	KUGA ECOBOOST	1600	134	L4	2013 - 2015	BOSCH MED 17.5.2	CP / AP / Old A	7021	LPG
M9MA	ESCAPE ECOBOOST	1500	133	L4	2014 - 2018	BOSCH MED 17	CP / AP / Old A	7101	LPG
M9MA	FUSION ECOBOOST	1500	133	L4	2014 - 2018	BOSCH MED 17	CP / AP / Old A	7102	LPG
MGDA	FOCUS DURATEC TI-VCT	2000	125	L4	2011 - 2015	BOSCH MED 17	CP / AP / Old A	7116	CNG
TNCD	MONDEO ECOBOOST	2000	149	L4	2014 - 2018	BOSCH MED 17.2	CP / AP / Old A	7022	LPG
TPBA	MONDEO ECOBOOST	2000	176	L4	2010 - 2015	BOSCH MED 17.2	CP / AP / Old A	7023	LPG

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HYUNDAI

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	CONTINENTAL	HW TYPE	ID	FUEL
G4FD	IX35 GDI	1600	99	L4	2010 - 2016	BOSCH MED 17.9.8	CP / AP / Old A	7025	LPG
G4FD	TUCSON GDI	1600	99	L4	2015 - 2019	BOSCH MED 17.9.8	CP / AP / Old A	7030	LPG
G4FJ	TUCSON TGDI	1600	130	L4	2014 - 2019	BOSCH MED 17.9.8	CP / AP / Old A	7029	LPG
G4KH	SANTAFE TGDI	2000	188	L4	2015 - 2019	CONTINENTAL	CP / AP / Old A	7115	LPG
G4KJ	SANTAFE GDI	2400	141	L4	2012 - 2016	BOSCH MED	CP / AP / Old A	7026	LPG
G4NC	I40 GDI	2000	130	L4	2011 - 2015	BOSCH MED 17.9.8	CP / AP / Old A	7024	LPG
G4NC	I40 GDI	2000	122	L4	2013 - 2015	BOSCH MED 17.9.8	CP / AP / Old A	7106	LPG

KIA

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
G4FD	CEE'D GDI	1600	99	L4	2012 - 2018	BOSCH MED 17.9.8	CP / AP / Old A	7031	LPG
G4FD	SPORTAGE GDI	1600	99	L4	2010 - 2016	BOSCH MED 17.9.8	CP / AP / Old A	7032	LPG
G4KH	SPORTAGE TGDI	2000	188	L4	2014	CONTINENTAL	CP / AP / Old A	7034	LPG
G4NC	SPORTAGE GDI	2000	122	L4	2010 - 2016	BOSCH MED 17.9.8	CP / AP / Old A	7033	LPG

MAZDA

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
L3	MAZDA 3 DISI	2300	191	L4	2006 - 2014	MITSUBISHI	CP / AP / Old A	7035	LPG
L3	CX-7 DISI	2300	191	L4	2007 - 2013	MITSUBISHI	CP / AP / Old A	7037	LPG
LF3F	MAZDA 5 DISI	2000	110	L4	2009 - 2014	MITSUBISHI	CP / AP / Old A	7036	LPG

MINI

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
N14B16A	COOPER	1600	128	L4	2006 - 2010	BOSCH MED 17.4	CP / AP / Old A	7039	LPG
N18B16A	COUNTRYMAN	1600	135	L4	2009 - 2015	BOSCH MED 17.2.2	CP / AP / Old A	7040	LPG

OPEL

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
A20NHT	INSIGNA	2000	162	L4	2008 - 2012	BOSCH E69-E89 2 CONNECTORS	CP / AP / Old A	7028	LPG
Z22YH	VECTRA	2200	114	L4	2003 - 2008	SIEMENS SIMTEC 81.1	CP / AP / Old A	7041	LPG
Z22YH	ZAFIRA	2200	114	L4	2005 - 2012	SIEMENS SIMTEC 81.1	CP / AP / Old A	7109	LPG

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PEUGEOT

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
5FV	3008 THP	1600	115	L4	2009 - 2015	BOSCH MEV 17.4	CP / AP / Old A	7017	LPG
5FV	508 THP	1600	115	L4	2011 - 2015	BOSCH MEV 17.4	CP / AP / Old A	7017	LPG
5FX	308 THP	1600	110	L4	2007 - 2011	BOSCH MEV 17.4	CP / AP / Old A	7043	LPG
5FX	207 THP	1600	110	L4	2006 - 2011	BOSCH MEV 17.4	CP / AP / Old A	7044	LPG
5FY	308 THP	1600	128	L4	2007 - 2012	BOSCH MEV 17.4	CP / AP / Old A	7055	LPG

SEAT

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
BLR	ALTEA FSI	2000	110	L4	2004 - 2009	BOSCH MED 9.5.10	CP / AP / Old A	7049	LPG
BZB	ALTEA XL TSI	1800	118	L4	2006 - 2009	BOSCH MED 17.5	CP / AP / Old A	7048	LPG
CBZB	IBIZA TSI	1200	77	L4	2010 - 2015	CONTINENTAL SIMOS 10.10H03	CP	7097	LPG
CDAA	LEON TSI	1800	118	L4	2009 - 2013	BOSCH MED 17.5	CP / AP / Old A	7050	LPG

SKODA

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
BLR	OCTAVIA FSI	2000	110	L4	2004 - 2009	BOSCH MED 9.5.10	CP / AP / Old A	7060	LPG
BVX	OCTAVIA FSI	2000	110	L4	2005 - 2009	BOSCH MED 9.5.10	CP / AP / Old A	7058	LPG
BWA	OCTAVIA RS TFSI	2000	147	L4	2006 - 2009	BOSCH MED 9.1	CP / AP / Old A	7061	LPG
CAXC	SUPERB TSI	1400	92	L4	2008 - 2015	BOSCH MED 17.5.5	CP / AP / Old A	7062	LPG
CBZA	ROOMSTER TSI	1200	63	L4	2010 - 2015	CONTINENTAL SIMOS 10.11H02	CP	7052	LPG
CBZB	RAPID TSI	1200	77	L4	2012 - 2015	CONTINENTAL SIMOS 10.10H03	CP	7053	LPG
CBZB	YETI TSI	1200	77	L4	2013 - 2015	CONTINENTAL SIMOS 10.10H03	CP	7027	LPG
CCZA	SUPERB TSI	2000	147	L4	2009 - 2015	BOSCH MED 17.5	CP / AP / Old A	7067	LPG
CDA	OCTAVIA	1800	118	L4	2008 - 2013	BOSCH MED 17.5	CP / AP / Old A	7016	LPG
CDAA	SUPERB TSI	1800	118	L4	2008 - 2015	BOSCH MED 17.5	CP / AP / Old A	7054	LPG
CDAB	SUPERB TSI	1800	112	L4	2009 - 2015	BOSCH MED 17.5	CP / Old C	7066	LPG
CHPA	OCTAVIA TSI	1400	103	L4	2013 - 2015	BOSCH MED 17.5.21	CP / Old C	7057	LPG
CJZA	OCTAVIA TSI	1200	77	L4	2013 - 2015	BOSCH MED 17.5.21	CP / Old C	7130	LPG
CJZB	OCTAVIA TSI	1200	77	L4	2013 - 2015	BOSCH MED 17.5.21	CP / Old C	7056	LPG
CJZC	FABIA TSI	1200	66	L4	2014 - 2017	BOSCH MED 17.5.21	CP / Old C	7063	LPG
CJZD	RAPID TSI	1200	81	L4	2015 - 2017	BOSCH MED 17.5.21	CP / Old C	7064	LPG

VOLVO

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
B4164T3	S60	1600	110	L4	2011 - 2015		CP / AP / Old A	7113	LPG
B4204T6	V70 ECOBOOST	2000	147	L4	2009 - 2011	BOSCH MED 17.4	CP / AP / Old A	7096	LPG

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VOLKSWAGEN

ENGINE CODE	VEHICLE MODEL	ENGINE CAPACITY (CC)	ENGINE POWER (KW)	CYLINDERS	MODEL YEAR	PETROL ECU	HW TYPE	ID	FUEL
AXU	POLO FSI	1400	63	L4	2002 - 2006	BOSCH MED 7.5.11	CP / AP / Old A	7085	LPG
AXW	TOURAN FSI	2000	110	L4	2003 - 2005	BOSCH MED 9.5.10	CP / AP / Old A	7089	LPG
AXX	PASSAT TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7091	LPG
BAG	GOLF FSI	1600	85	L4	2003 - 2007	BOSCH MED 9.5.10	CP / AP / Old A	7076	LPG
BLF	PASSAT FSI	1600	85	L4	2005 - 2008	BOSCH MED 9.5.10	CP / AP / Old A	7079	LPG
BLF	GOLF FSI	1600	85	L4	2005 - 2009	BOSCH MED 9.5.10	CP / AP / Old A	7119	LPG
BLN	GOLF FSI	1400	66	L4	2005 - 2009	BOSCH MED 9.5.10	CP / Old C	7072	LPG
BLR	PASSAT B6 FSI	2000	110	L4	2005 - 2009	BOSCH MED 9.5.10	CP / AP / Old A	7095	LPG
BLX	GOLF FSI	2000	110	L4	2005 - 2008	BOSCH MED 9.5.10	CP / AP / Old A	7114	LPG
BMY	GOLF TSI	1400	103	L4	2006 - 2008	BOSCH MED 17.5.1	CP / AP / Old A	7073	LPG
BPY	PASSAT B6 TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7092	LPG
BVY	PASSAT FSI	2000	110	L4	2005 - 2010	BOSCH MED 9.5.10	CP / AP / Old A	7082	LPG
BWA	PASSAT TFSI	2000	147	L4	2005 - 2009	BOSCH MED 9.1	CP / AP / Old A	7111	LPG
BZB	PASSAT TSI	1800	118	L4	2007 - 2010	BOSCH MED 17.5	CP / AP / Old A	7080	LPG
CAVA	TIGUAN TSI	1400	90	L4	2008 - 2012	BOSCH MED 17.5.5	CP / AP / Old A	7087	LPG
CAVD	GOLF TSI	1400	118	L4	2008 - 2015	BOSCH MED 17.5.5	CP / AP / Old A	7069	LPG
CAXA	GOLF TSI	1400	90	L4	2007 - 2015	BOSCH MED 17.5.5	CP / AP / Old A	7074	LPG
CAXA	PASSAT TSI	1400	90	L4	2007 - 2015	BOSCH MED 17.5.5	CP / AP / Old A	7084	LPG
CAXA	TIGUAN TSI	1400	90	L4	2010 - 2015	BOSCH MED 17.5.5	CP / AP / Old A	7051	LPG
CBFA	CC TFSI	2000	155	L4	2008 - 2013	BOSCH MED 17.5	CP / Old C	7086	LPG
CBFA	PASSAT TFSI	2000	155	L4	2008 - 2013	BOSCH MED 17.5	CP / AP / Old A	7065	LPG
CBZ	GOLF TSI	1200	77	L4	2010 - 2013	CONTINENTAL SIMOS 10.10H03	CP	7105	LPG
CBZB	NEW BEETLE TSI	1200	77	L4	2011 - 2015	CONTINENTAL SIMOS 10.10H03	CP	7078	LPG
CCTA	TIGUAN TFSI	2000	147	L4	2007 - 2009	BOSCH MED 17.5	CP / AP / Old A	7059	LPG
CCTA	CC TFSI	2000	147	L4	2008 - 2010	BOSCH MED 17.5	CP / AP / Old A	7093	LPG
CCZ	TIGUAN TFSI	2000	125	L4	2009 - 2011	BOSCH MED 17.5	CP / AP / Old A	7117	LPG
CCZA	PASSAT TSI	2000	147	L4	2009 - 2012	BOSCH MED 17.5	CP / AP / Old A	7083	LPG
CCZB	GOLF TFSI	2000	155	L4	2009 - 2015	BOSCH MED 17.5	CP / AP / Old A	7075	LPG
CCZB	PASSAT TSI	2000	155	L4	2010 - 2015	BOSCH MED 17.5	CP / AP / Old A	7094	LPG
CCZD	TIGUAN TFSI	2000	132	L4	2011 - 2015	BOSCH MED 17.5	CP / AP / Old A	7112	LPG
CDAA	PASSAT TSI DSG	1800	118	L4	2009 - 2015	BOSCH MED 17.5	CP / AP / Old A	7081	LPG
CHPA	GOLF TSI	1400	103	L4	2012 - 2015	BOSCH MED 17.5.21	CP / Old C	7071	LPG
CJKA	TRANSPORTER T6 TFSI	2000	150	L4	2015 - 2019	BOSCH MED 17.5.5	CP / AP / Old A	7090	LPG
CJZA	GOLF TSI	1200	77	L4	2012 - 2015	BOSCH MED 17.5.21	CP / Old C	7110	LPG
CJZC	POLO TSI	1200	66	L4	2014 - 2018	BOSCH MED 17.5.21	CP / Old C	7088	LPG
CXSA	GOLF TSI	1400	90	L4	2013 - 2015	BOSCH MED 17,5,21	CP / Old C	7070	LPG
CYVB	GOLF TSI	1200	81	L4	2014 - 2018	BOSCH MED 17.5.21	CP / Old C	7077	LPG
CZCB	CADDY TSI	1400	92	L4	2015 - 2019	BOSCH MED 17.5.21	CP / Old C	7068	LPG

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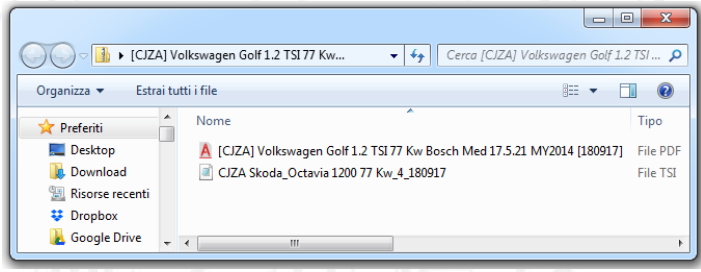
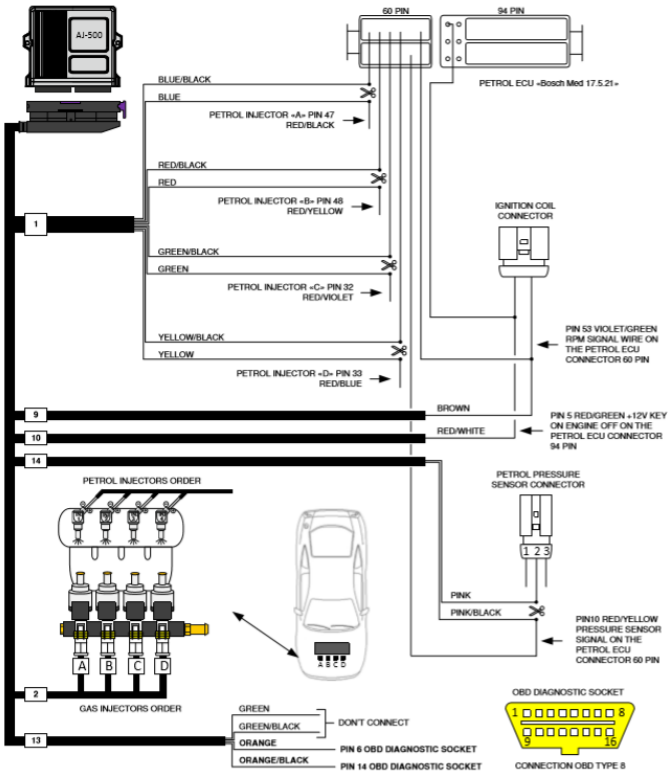
Installation

[CJZA] Volkswagen Golf 1.2 TSI 77 Kw Bosch Med 17.5.21 MY2014.zip



All vehicles in the list have a specific database folder that contain the wiring diagram and configuration made in according to the different signals and hardware specification for each engine code and petrol Ecu.

[CJZA] Volkswagen Golf 1.2 TSI 77 Kw Bosch Med 17.5.21 MY2014



The diagram suggests all the electronics connections and the correct drilling place in the manifold for a successful installation.

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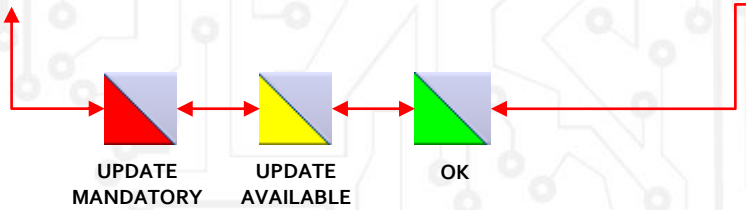
Configuration upload

Check if the Gas Ecu has the latest firmware version; if the square "ECU" border is green like in the picture, the Ecu is updated, if it's yellow the update is required but you can skip it and if it's red you must update it and you cannot skip it.



Upload the Gas Ecu with the specific configuration inside the folder, it contains all the settings in according to the vehicle strategy.

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Configuration check

After loading the configuration verify in the “MONITOR” page if the gas Ecu properly read the all the signals input.

Select “PARAMETERS / CARBURATION” page in order to verify the drivability, fuel trims and adjust the gas map.

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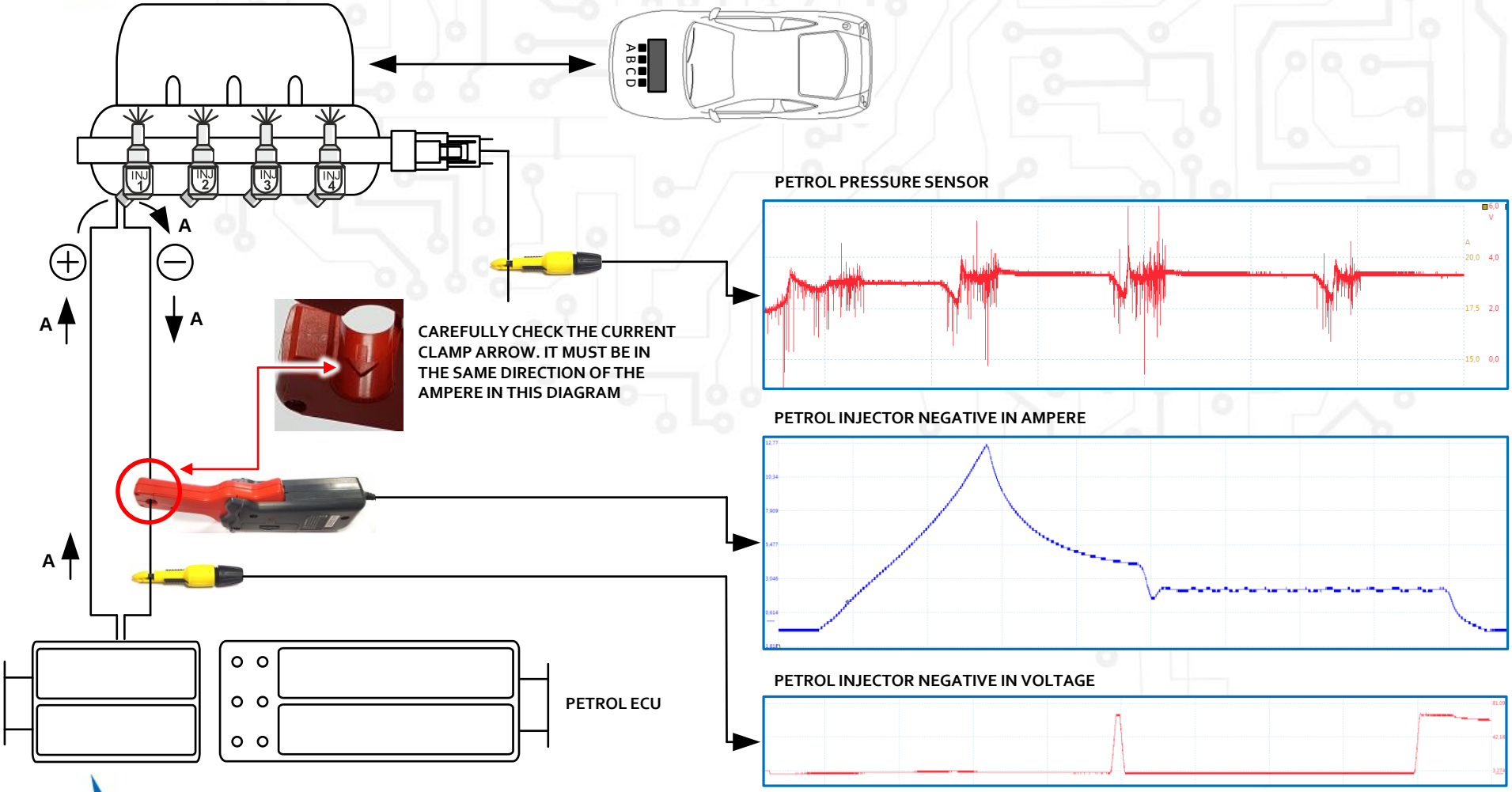
Oscilloscope connection without Gas Ecu



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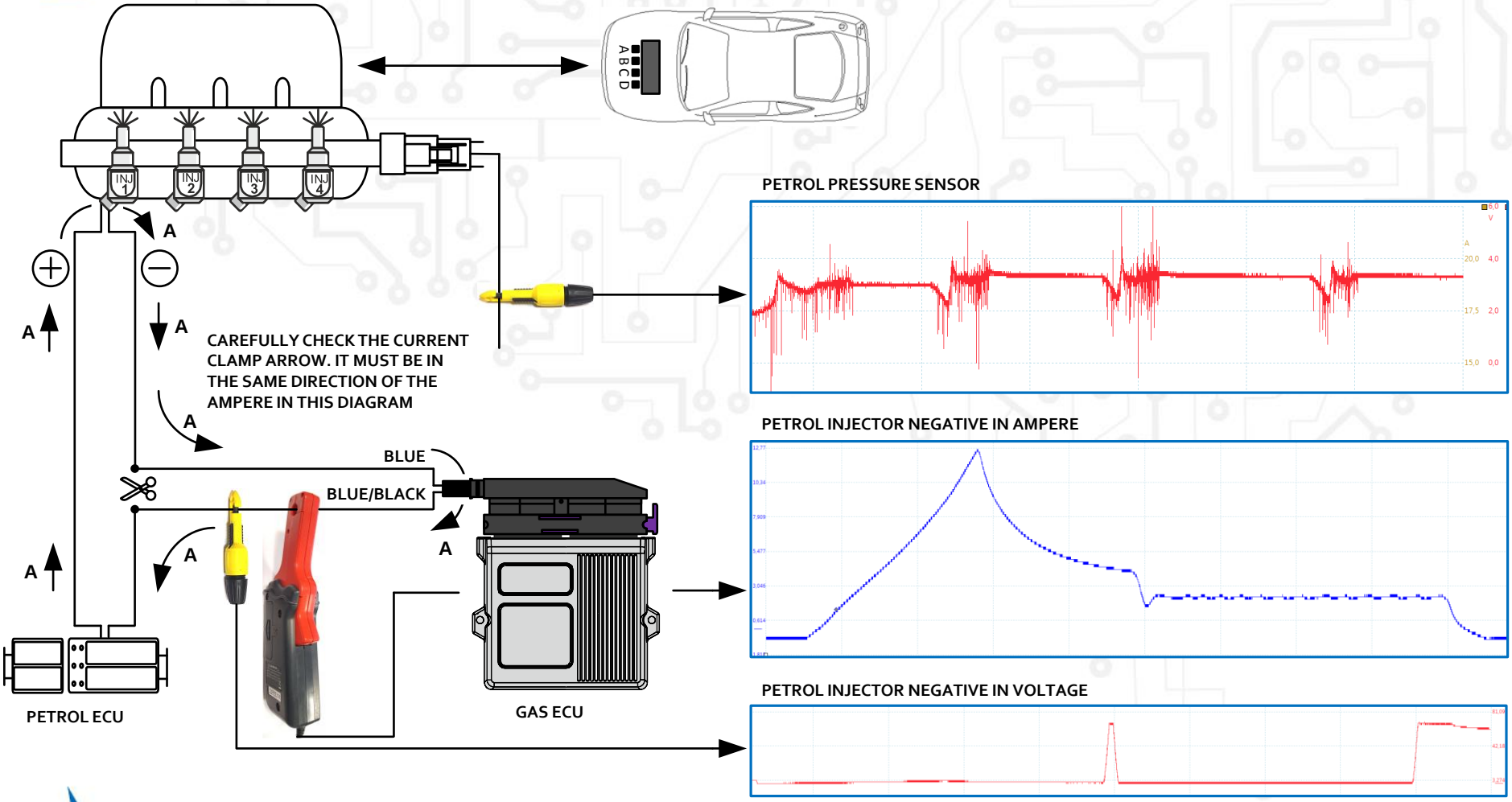
Oscilloscope connection with Gas Ecu



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Thank you!

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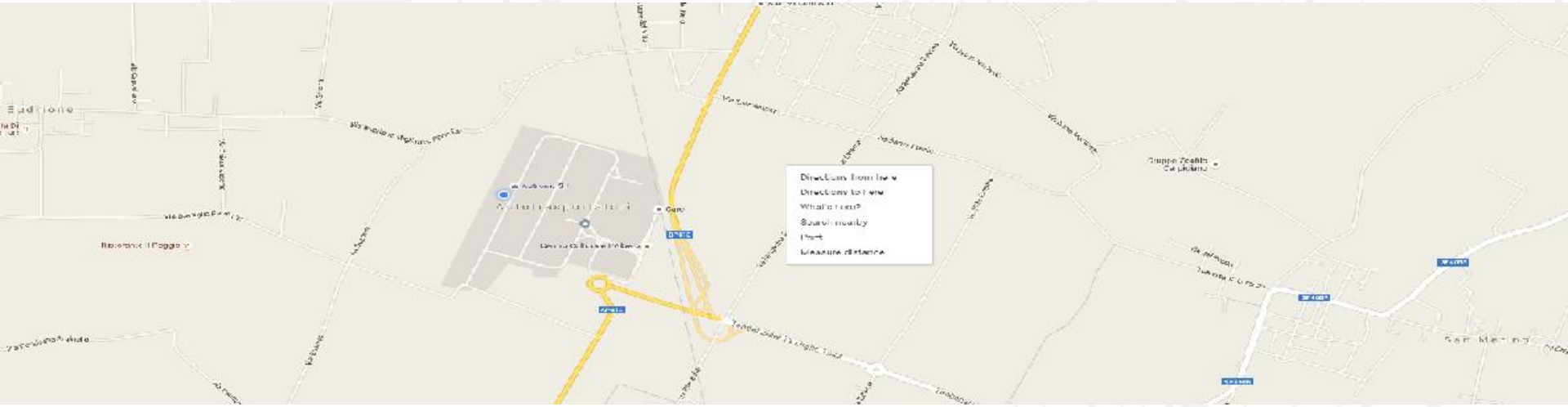
Contacts



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