

DIGITRONIC

MP48 Dual Fuel System Installation Manual



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2. Vehicle Characteristics
3. Component Description
4. Connections
5. Installation



2. Vehicle Characteristics

The Digitronic Dual Fuel System can be fitted if the engine is:

- Diesel Engine with 12V Electric system
- Diesel Engine with common rail injection system
- Diesel Pressure sensor with analog signal type
- Accelerator pedal with linear signal (0 to 5V or 0 to 10V)

3. Component Description

MP48DF Dual Fuel System



3.1: Accessory Bag

3.2: Switch
Code AEB119B

3.3: Dual Fuel System ECU
Code MP48 DF

3.4: Main Harness
Code 612998000

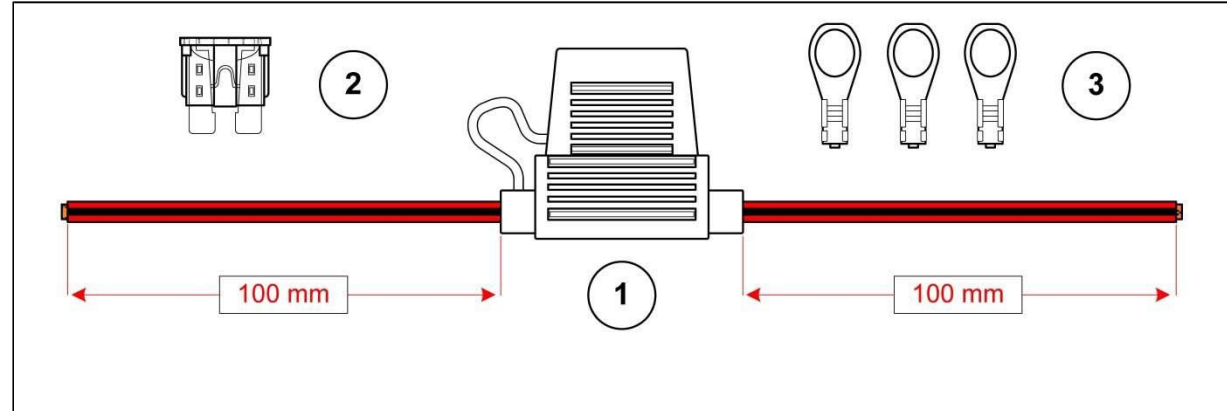
3.5: Exhaust Temperature Sensor
Code 620500172

3.6: Gas Pres & Temp Sensor Kit
Code 620500174

3.7: MAP sensor Kit
Code 620500173

3.1 Accessory Bag

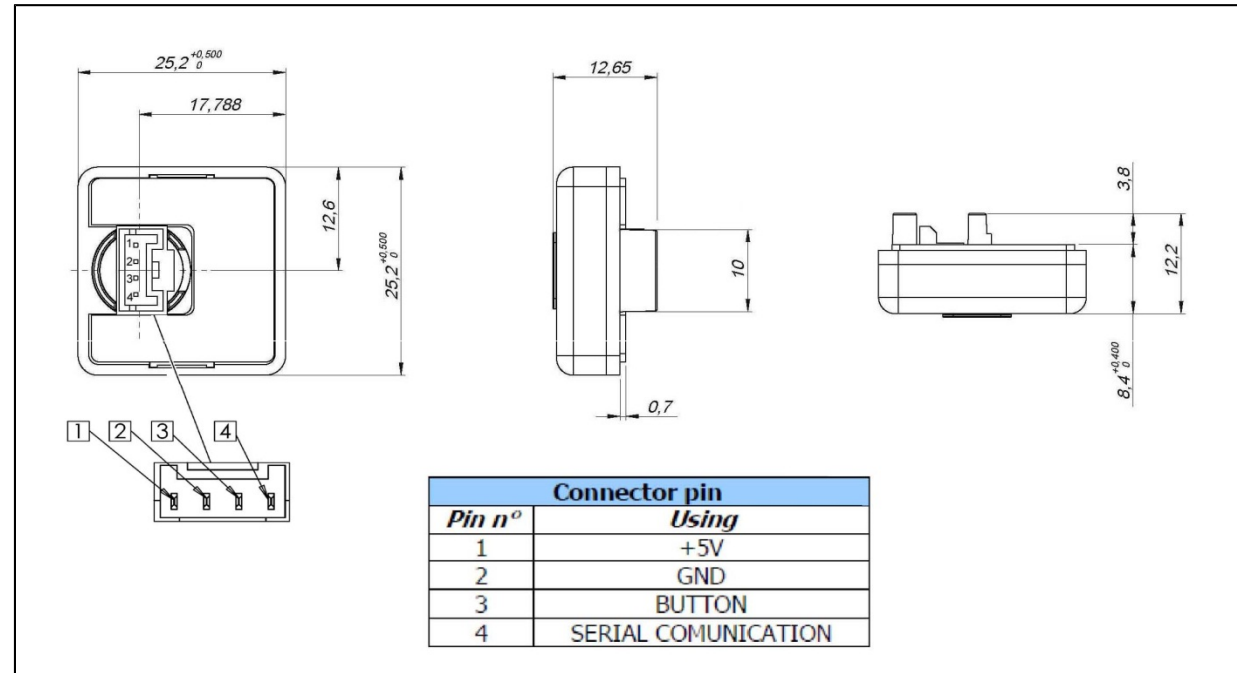
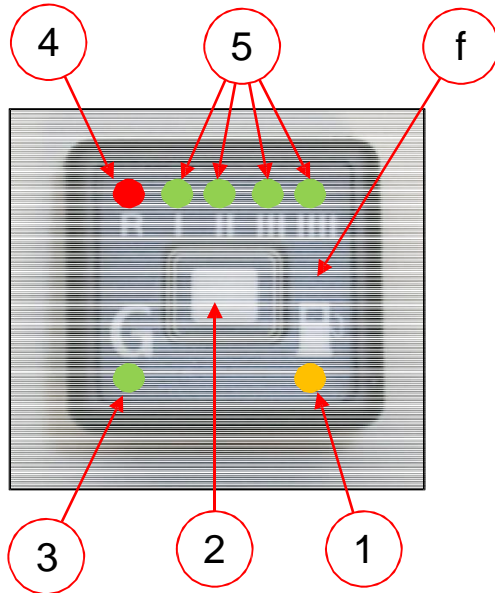
Accessory for battery and ground connection (ring terminals) and System protection (fuse)



Bill of Material		
Pos.	Description	QTY
1	Fuse Box Sealed	1
2	Fuse 15° series ATU	1
3	Ring Terminal 6,3x0,8 for wire section 0,5mm ² to 1,5mm ²	3

3.2 Switch code AEB119B

3.2.1 AEB119B Description







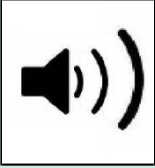


Switch and leds Description

Pos	Description
1	Yellow Led – Fix ON, Diesel mode, when flashing Diesel mode for FAP regeneration
2	Button – for fuel type selection
3	Green Led – Fix ON, Dual fuel Mode, when flashing diesel mode but ready to pass on Dual Fuel
4	Red Led – Fix ON, alternative fuel reserve indication
5	4 Green Leds – In quarters, alternative fuel level indication
f	Buzzer Build inside the Switch – if blinking quickly with the leds 3, 4 and 5 it indicates the system switched back to Diesel mode for alternative fuel tank empty; if blinking slowly with the led 3 indicates there is some error in the Dual Fuel System

3.2 Switch code AEB119B

3.2.2 AEB119B Functioning

Switch	Buzzer	Functioning
	OFF	Diesel Mode: the vehicle runs 100% diesel
	OFF	Diesel Mode: ready to pass on gas, the vehicle is running on diesel but as soon the settings are respected it will pass on Dual Fuel.
	OFF	Dual Fuel Mode: the vehicle runs with a percentage of diesel mixed with gas
		Empty Tank Mode: MP48 DF will switch the system back to Diesel Mode advising the driver of an empty gas tank by the gas level leds flashing and buzzer beeping fast
		Diagnosis Mode: in case of gas component failure the MP48 DF automatically will get the failure code and will switch the system back to Diesel Mode advising the driver by the gas led flashing and buzzer beeping slow

3.3 Dual Fuel ECU code MP48 DF

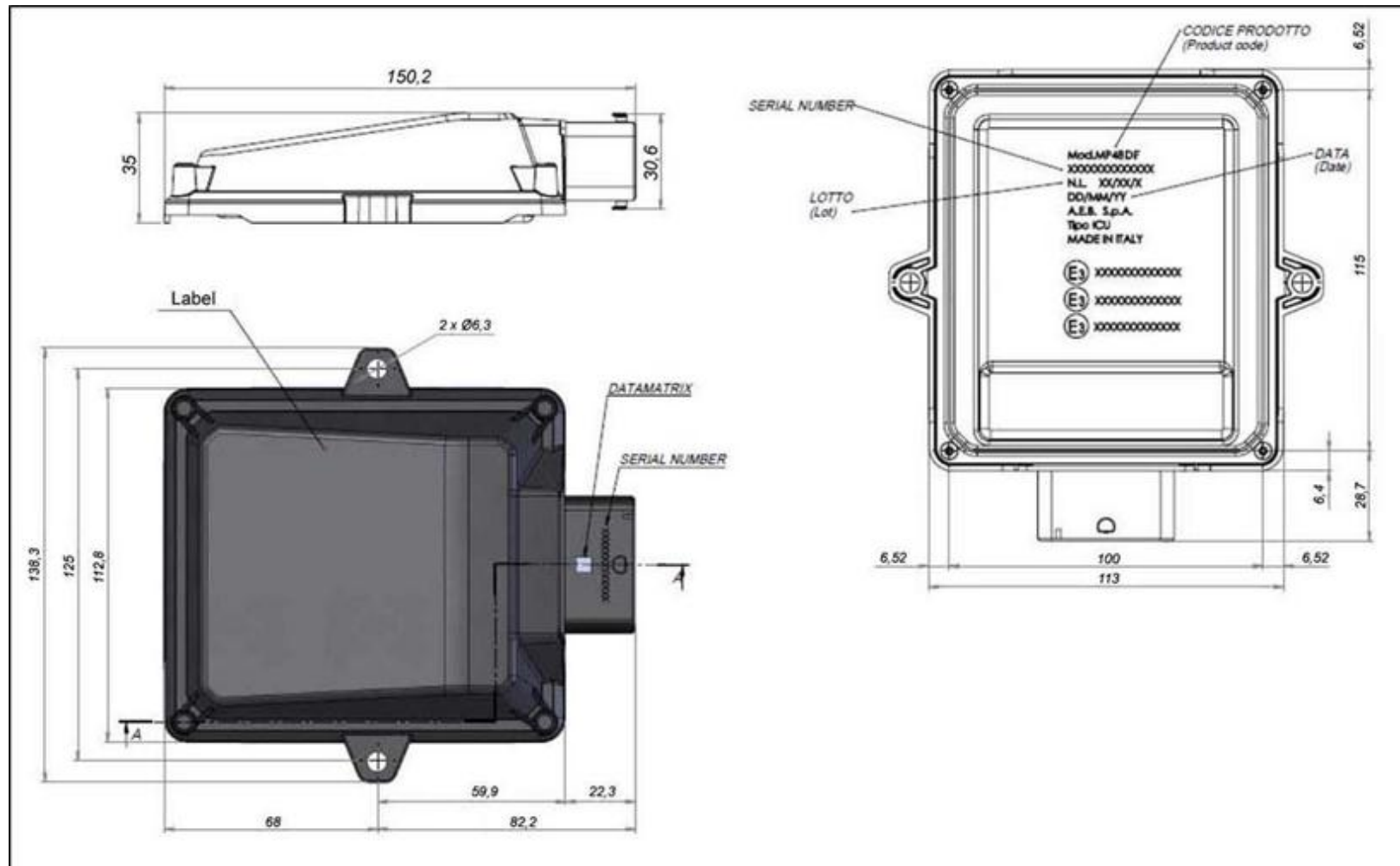
3.3.1 Digitronic MP48 DF Characteristics

Technical specification	
Supply voltage range	Vbatt=10÷16V
Operating temperature range	-40÷120°C
Current Absorbing with actuators disable	$I_{max} \leq 0,5^\circ$
Current Absorbing in Standby mode	$I_{standby} \leq 5mA$
Gas Injectors Managed	Up to 2 injectors; $I_{max}=6^\circ$ Vbat max=16V
Gas Valve output	$P_{max}=25W$, $I_{max}=2A$ (power & current when both the output are used)
	$P_{max}=50W$, $I_{max}=4A$ (power & current when only one output is used)
Analogue sensors managed	Gas pressure & temperature sensor
	MAP Sensor
	Water temperature sensor
	Exhaust Temperature sensor
	Linear Oxygen sensor (Bosch & NTK)
	Gas Level Gauge (AEB, 0-90ohm, Not standard and Not standard inverted)
	RPM sensor Hal Effect and Inductive type
Switch	AEB119B



3.3 Dual Fuel ECU code MP48 DF

3.3.2 Digitronic MP48 DF Drawings



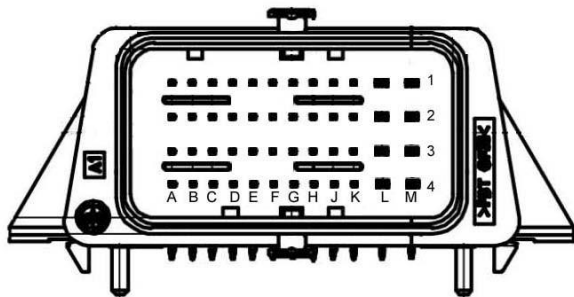
3.3 Dual Fuel ECU code MP48 DF

3.3.3 Digitronic MP48 DF Pin-out

Main connector 48 Pins



Front view



	<h2>PINOUT</h2>	Cod.	MP48DF
		Data	30/07/12
		Rev.	00

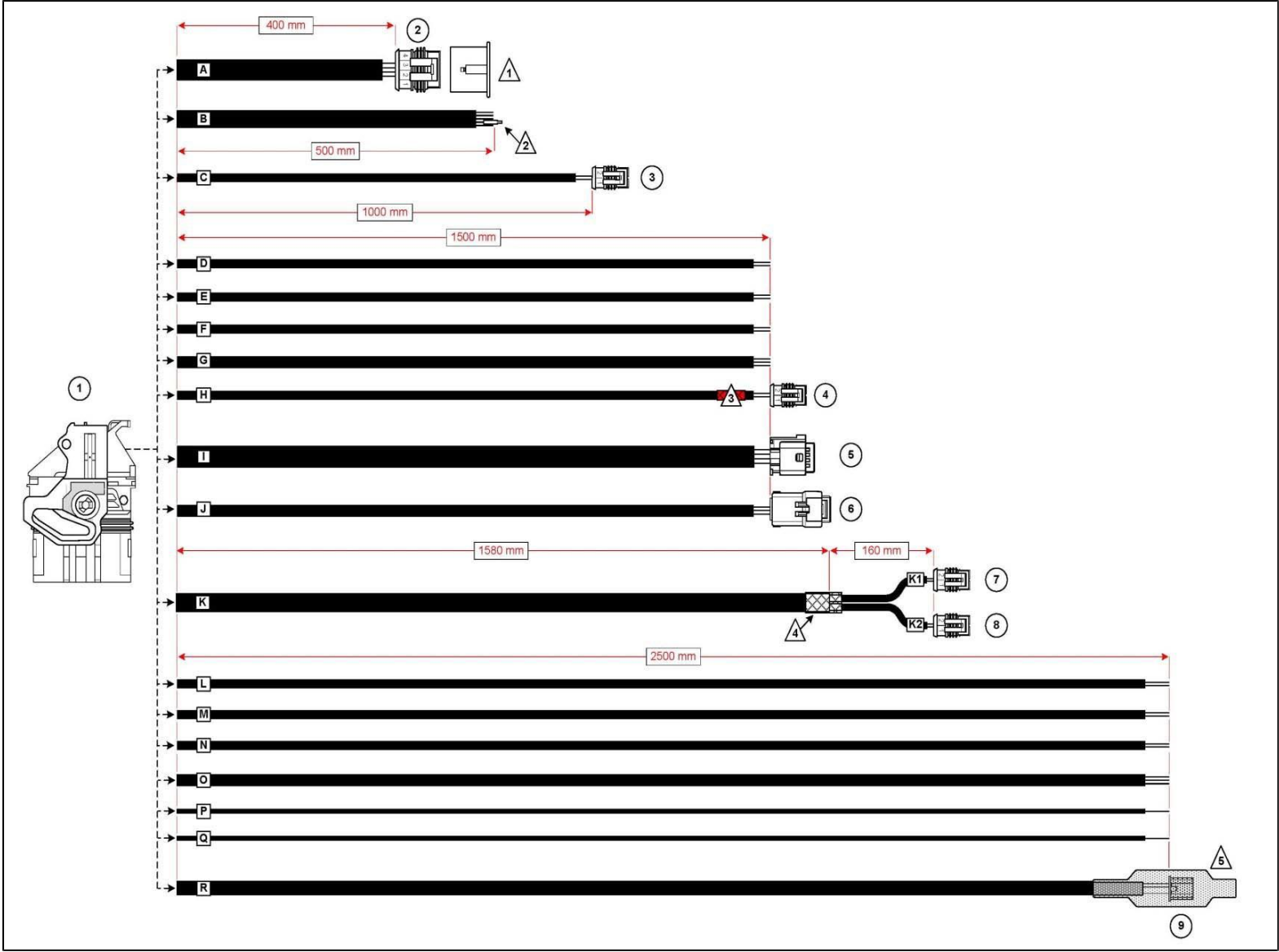
AEB Dual Fuel System MP48DF Pin-Out

PIN #	DESCRIPION	PIN #	DESCRIPION
1A	CAN HIGH	2A	CAN LOW
1B	LAMBDA (pin1 Bosch)	2B	LAMBDA (pin5 Bosch)
1C	GAS TEMP. SENSOR	2C	WATER TEMP SENS GROUND
1D	GAS LEVEL SENSOR +5V	2D	GAS LEVEL SENSOR SIGNAL
1E	MAP SENSOR +5V	2E	GAS PRESSURE SIGNAL
1F	DIESEL PRESSURE EMULATION	2F	SWITCH +5V
1G	SWITCH	2G	SWITCH GROUND
1H	INTERFACE +5V	2H	RX RS232
1J	TX RS232	2J	INTERFACE GROUND
1K	POS. INJ 1	2K	POS. INJ 2
1L	OUT GAS 2	2L	GND OUT GAS 2
1M	OUT GAS 1	2M	GND OUT GAS 1

PIN #	DESCRIPION	PIN #	DESCRIPION
3A	OPTIONAL – NOT USED	4A	RPM SIGNAL FROM INDUCTIVE SENSOR (NEGATIVE SIGNAL)
3B	ACCELERATOR PEDAL SIGNAL	4B	RPM SIGNAL FROM INDUCTIVE SENSOR (POSITIVE SIGNAL)
3C	WATERT TEMP. SIGNAL	4C	DIESEL PRESSURE INPUT
3D	MAP SENSOR GROUND	4D	EXHAUST TEMPERTURE SENSOR GROUND (PT200)
3E	MAP SENSOR SIGNAL	4E	EXHAUST TEMPERTURE SENSOR SIGNAL (PT200)
3F	K-LINE	4F	GAS INJECTOR #4 SIGNAL
3G	+12v IGNITION	4G	GAS INJECTOR #1 SIGNAL
3H	RPM SIGNAL FROM HALL EFFECT SENSOR	4H	GAS INJECTOR #3 SIGNAL
3J	OPTIONAL – NOT USED	4J	GAS INJECTOR #2 SIGNAL
3K	OPTIONAL – NOT USED	4K	OPTIONAL – NOT USED
3L	GROUND	4L	GROUND
3M	+12V BATTERY	4M	+12 BATTERY

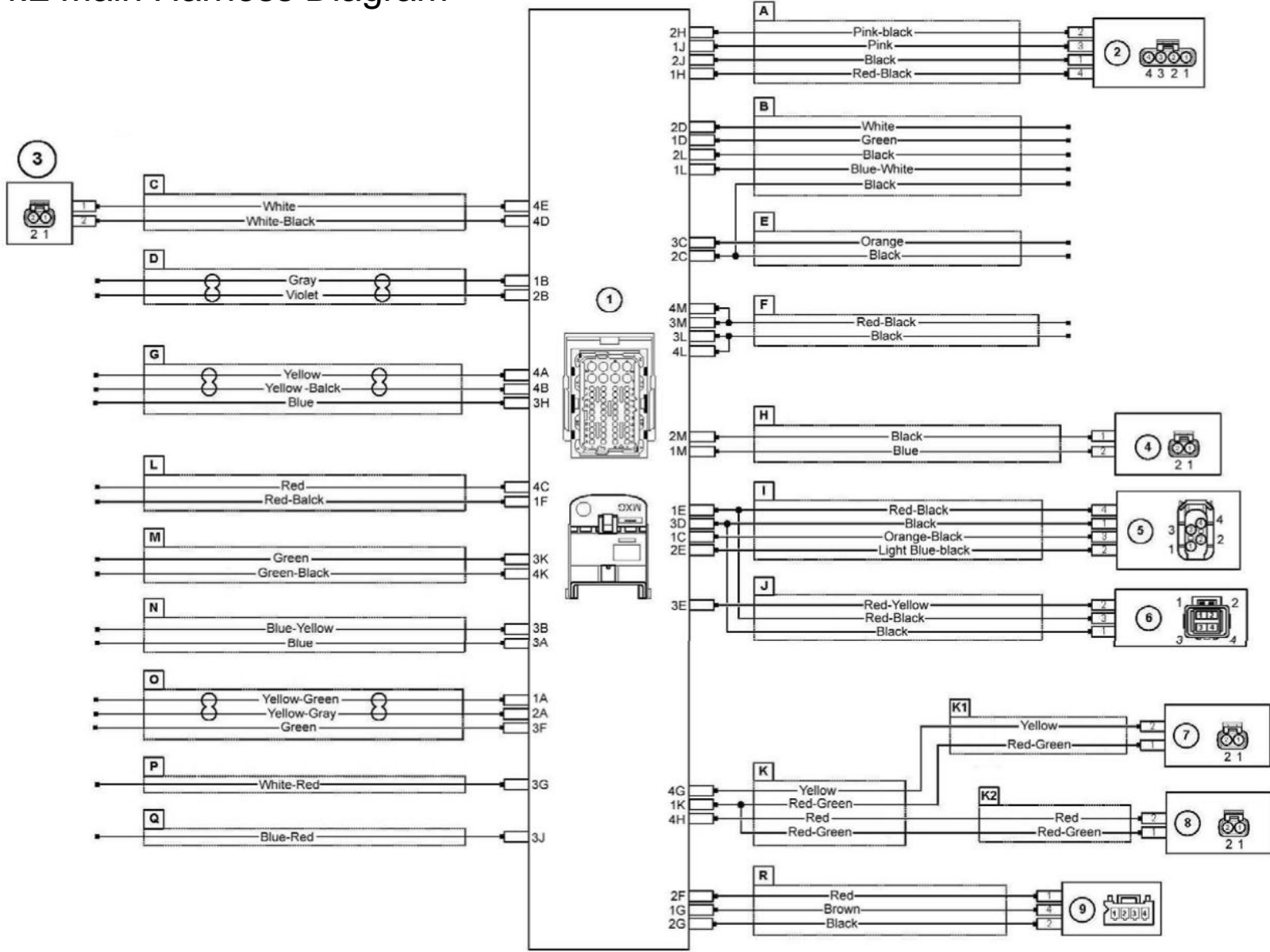
3.4 Main Harness code 612998000

3.4.1 Main Harness Layout



3.4 Main Harness code 612998000

3.4.2 Main Harness Diagram



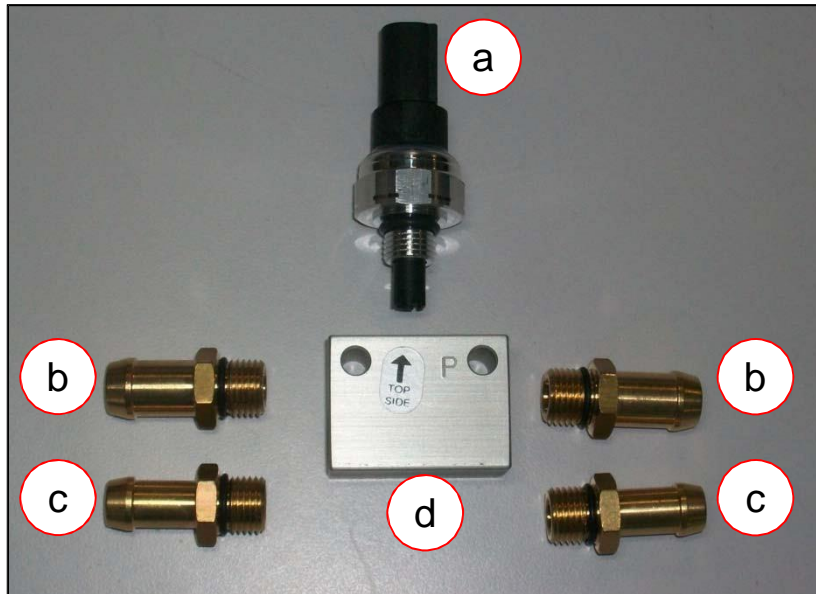
3.4 Main Harness code 612998000

3.4.3 Main Harness Component Description

Nr.	Description			In/out
1	MP48DF Main connector; CMC Molex Type 48 ways, female contacts			In-out
2	Data link connector; AMP Superseal type, 4 ways female contacts with CAP			In-Out
3	Exhaust Gas Temperature connector; AMP Superseal type , 2 ways female contacts			In
4	Reducer Gas valve connector; AMP Superseal type , 2 ways female contacts			Out
5	Gas Pressure & Temperature sensor Connector; MQS Tyco type, 4 ways female contacts			In
6	MAP sensor connector; Sicma FCI type, 4 ways female contacts			In
7	Gas Injector 1 connector; AMP Superseal type , 2 ways female contacts			Out
8	Gas Injector 2 connector; AMP Superseal type , 2 ways female contacts			Out
9	Mode Selection Switch, PAP-04V-S PA JST sries, 4 ways female contacts			In-out
B	Sheath 5 wires	Level Sender	Green = Level supply (5V) White = Level signal Black 0,5mm ² = ground	Out In Out
		Second gas Valve	Blue-White = activation signal Black Ø1,5mm ² = ground	Out Out
D	Sheath 2 wires	Oxygen sensor	Gray = Signal (pin 1) Violet = Signal (pin 5)	In In
E	Sheath 2 wires	Water Temperature	Orange = signal Black = ground	In Out
F	Sheath 2 wires	12V Battery Supply	Red-Black = power supply (12V) Black = Ground	In In
G	Sheath 3 wires	RPM signal	Yellow-Black = inductive positive signal Yellow = inductive negative signal Blue = Holl effect signal	In In In
L	Sheath 2 wires	Diesel Pressure Sensor	Red = Sensor signal (Sensor Side) Red-black = Sensor Emulation (ECU side)	In Out
M	Sheath 2 wires	NOT USED	Green / Green-Black	
N	Sheath 2 wires	Accelerator Pedal	Blue = NOT USED Blue-Yellow = Signal	----- In
O	Sheath 3 wires	CAN Bus	Yellow-Green = CAN H to pin 6 OBD plug Yellow- Gray = CAN L to pin 14 OBD plug Green = K Line to pin 7 OBD plug	In In In
P	Sheath 1 wire	12V Ignition	Red-White = 12V ignition	In
Q	Sheath 1 wire	NOT USED	Blue-Red	-----

3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5 Gas Pressure & Temperature Sensor Kit Description

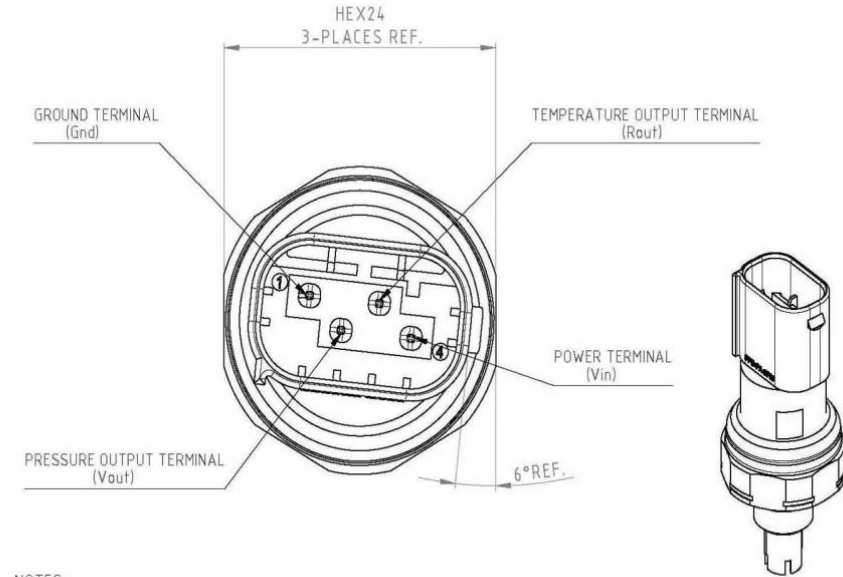
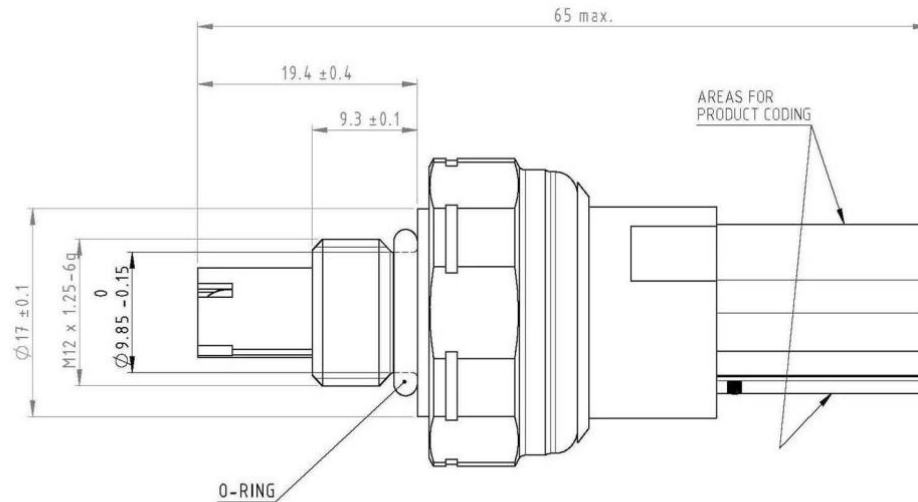


Gas Pressure & Temperature Sensor Kit Description

Pos.	Description	QTY
a	Gas pressure & Temperature sensor	1
b	Pipe holder ¼”G fo rubber pipe with internal Ø12,5mm code AEBRC005	2
c	Pipe holder ¼”G fo rubber pipe with internal Ø10mm code AEBRC001	2
d	Sensor & pipes holder housing code 236034200	1

3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.1 Gas Pressure & Temperature Drawing



TECHNICAL SPECIFICATIONS

GENERAL

ELECTRICAL

• POWER SUPPLY VOLTAGE	: 5.0 ± 0.1 VDC
• SUPPLY CURRENT	: 10 mA MAX
• OUTPUT VOLTAGE RANGE (PRESSURE)	: 0.5 TO 4.5V TYPICAL
• OUTPUT RESISTANCE RANGE (TEMPERATURE)	: 316181 TO 271 OHMS TYPICAL

ENVIRONMENT

• OPERATING TEMPERATURE	: -30 TO 130 °C
• PRESSURE RANGE	: 50 TO 1200 kPa abs
• MEDIUM	: COMPRESSED NATURAL GAS OR LPG.

MATERIAL

• HOUSING	: ALUMINUM
• CONNECTOR	: POLYPHENYLENE ETHER + POLYAMIDE RESIN (PPE/PA) 30% GLASS,
• INTERNAL SEAL	: FKM
• EXTERNAL SEAL	: FKM (DIMENSIONS: 9.4 X 2.1)
• THERMISTOR	: NTC THERMISTOR
• MASS	: 21.3 gram

PRESSURE REQUIREMENT

- $V_{out} = 0.0696 \times \text{PRESSURE} + 6.52$
- WHERE PRESSURE = [kPa abs]
- WHERE V_{out} = [% V supply]
- Leakrate 1 cc/hr max.

NOTES:

- CONNECTOR DESIGNED TO MATE WITH AMP MICRO QUADLOCK SYSTEM.
HOUSING: 1-96764-0-1 (CODE A)
WIRE SEAL: 967067-1
SOCKET CONTACT: 962885-1
- SIX SIDED 24.0 MM DRIVER REQUIRED TO TORQUE HEX.
- RECOMANDED TORQUE TO BE APPLIED ONLY TO HEX FLATS 6-8 Nm. MAX. TORQUE 25Nm.
- PART TO BE CODED ACCORDING TO:



110R - 000095
67R - 010179

CNG HOMOLOGATION Nr.
LPG HOMOLOGATION Nr.

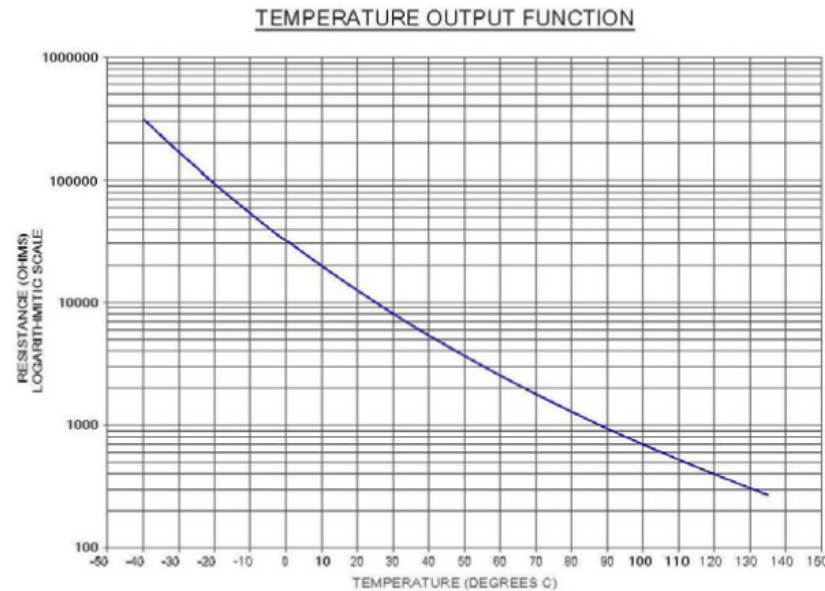
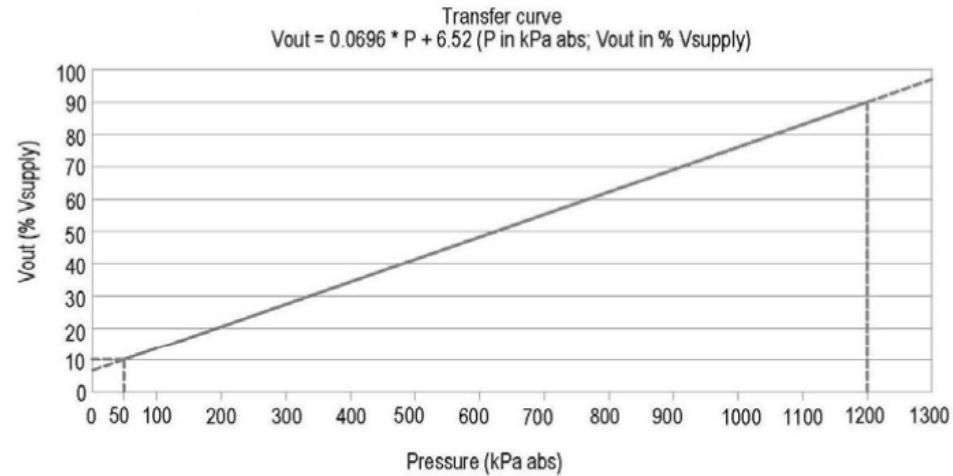
SIDE 2:
SENSATA
51CP26-01
DDYYSS
MX

BRAND NAME
SENSATA P/N
DATE CODE DDD: DAY OF THE YEAR.
YY: LAST TWO DIGITS OF THE YEAR
S: SHIFT NUMBER
COUNTRY OF ORIGIN (MX FOR MEXICO).

3.5 Gas Pressure & Temperature Sensor kit code 620500174

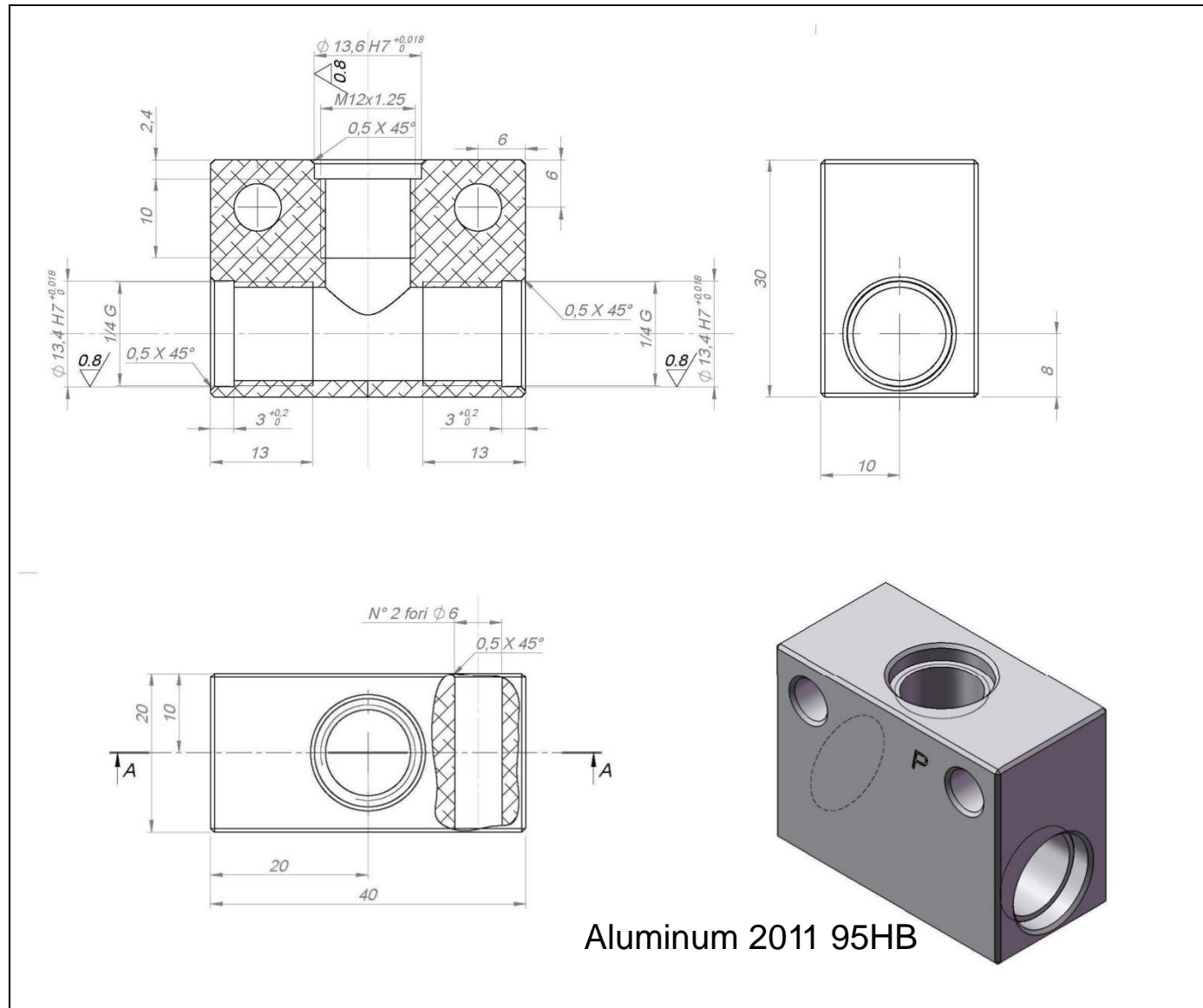
3.5.2 Gas Pressure & Temperature Characteristics

THERMISTOR RESISTANCE TABLE			
T [°C]	R _{nom} [Ω]	R _{min} [Ω]	R _{max} [Ω]
-40	316181	301183	331179
-30	169149	162304	175994
-20	94143	90938	97349
-10	54308	52781	55836
0	32014	31290	32738
10	19691	19346	20036
20	12474	12315	12633
25	10000	9900	10100
30	8080	7977	8182
40	5372	5282	5462
50	3661	3585	3737
60	2536	2474	2598
70	1794	1744	1844
80	1290	1250	1330
90	941.8	909.6	974.0
100	697.2	671.3	723.1
110	524.9	504.0	545.9
120	399.6	382.6	416.6
130	308.4	294.6	322.3
135	271.3	258.6	283.9



3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.3 Sensor & Pipes Housing



3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.4 Rubber Pipes holder

Pipe Older

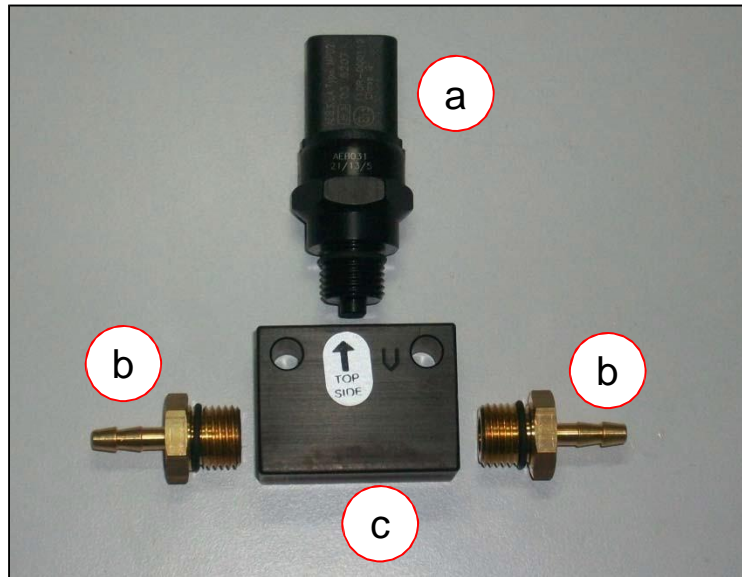
Pos.	Description
1	O-Ring O-Ring 10x1.5 Viton 75Sh
2	Pipe holder Brass Available 1/4"G pipe Ø12,5

Pipe Older

Pos.	Description
1	O-Ring O-Ring 10x1.5 Viton 75Sh
2	Pipe holder Brass Available 1/4"G pipe Ø10,5

3.6 MAP Sensor kit code 620500174

3.6 MAP Sensor kit Description

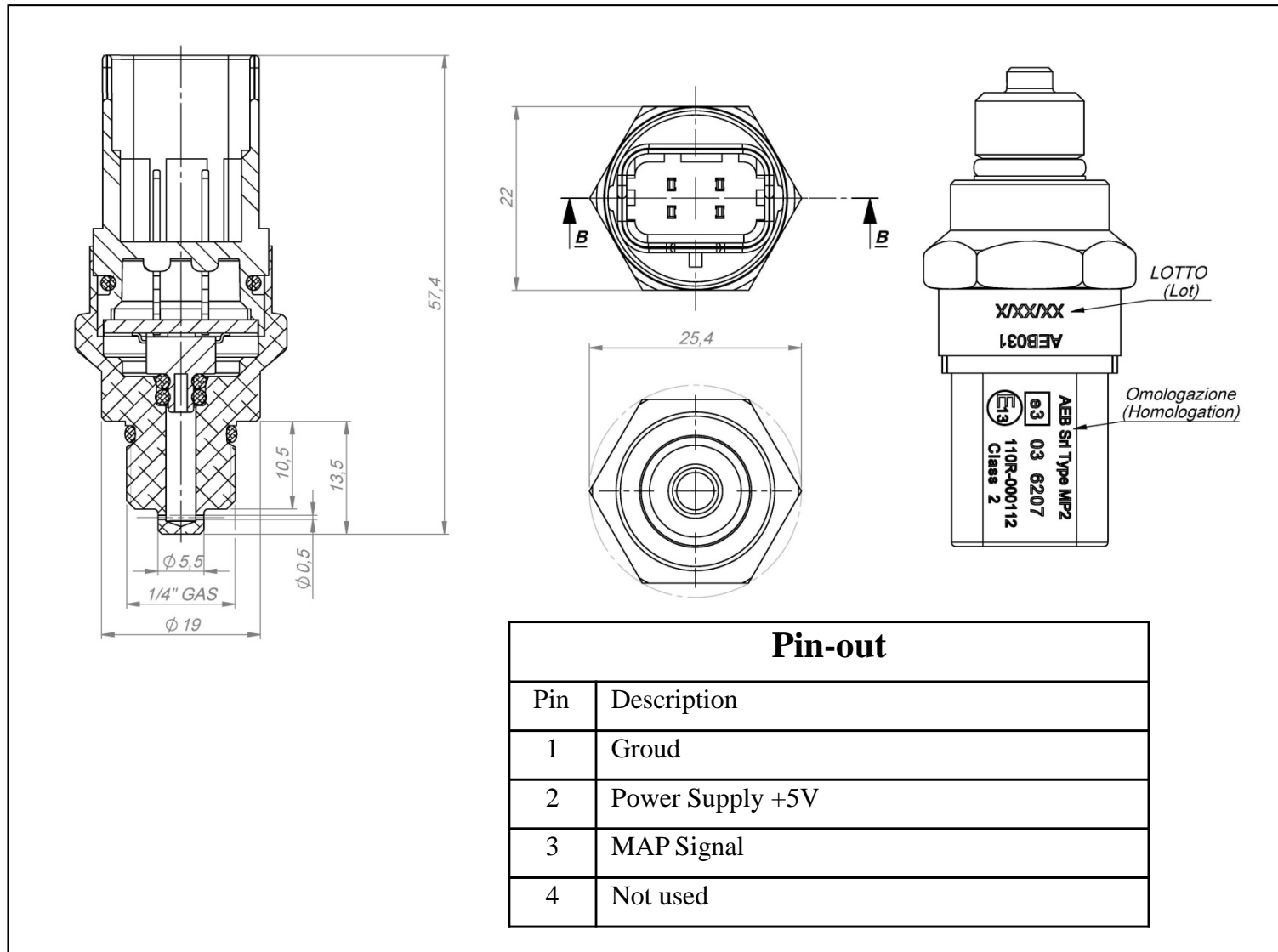


Gas Pressure & Temperature Sensor Kit Description

Pos.	Description	QTY
a	MAP sensor AEB031	1
b	Pipe holder fo rubber pipe with internal Ø 4mm AEBRC002	2
c	Sensor & pipes holder housing 236035200	1

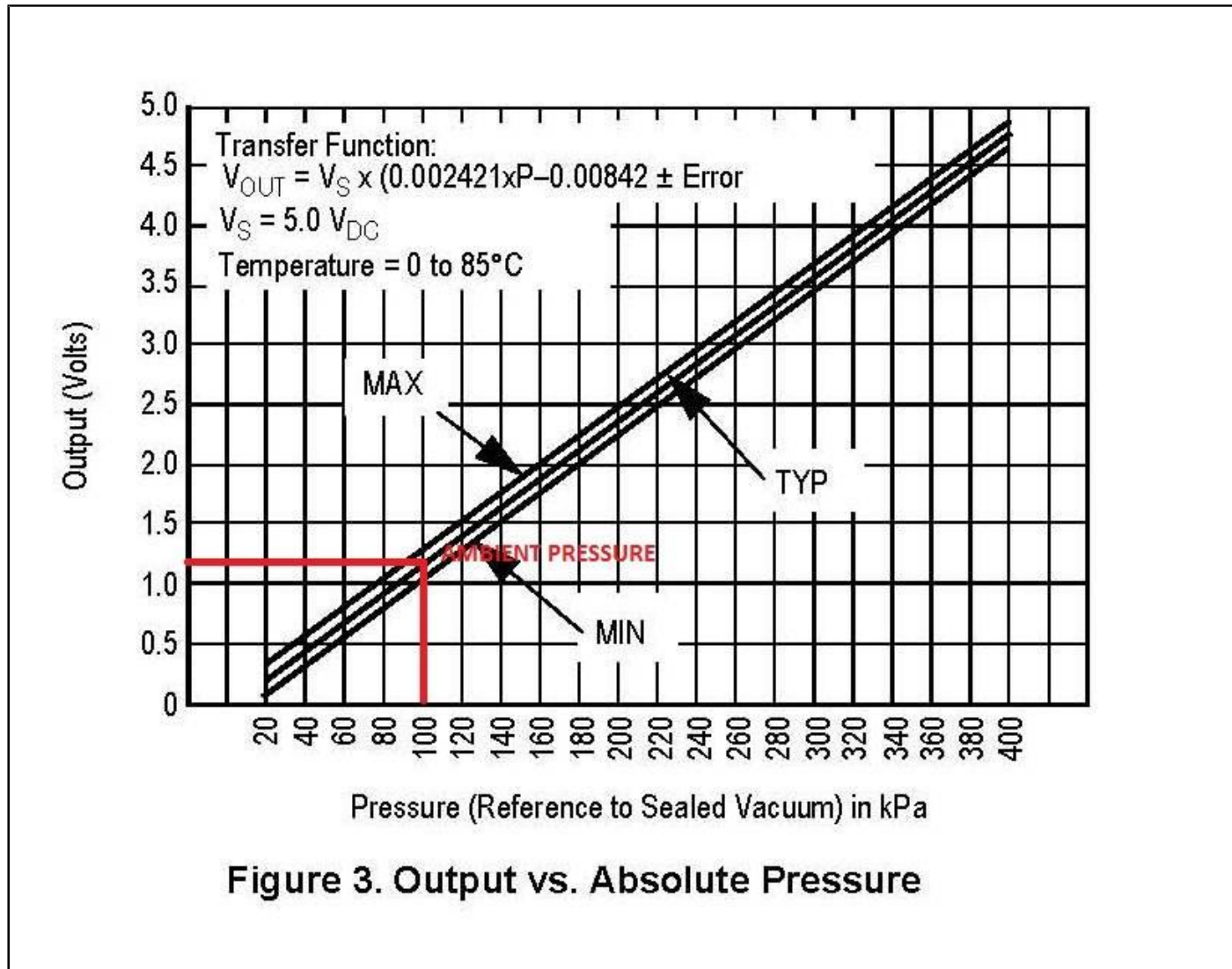
3.6 MAP Sensor kit code 620500174

3.6.1 MAP Sensor Drawing



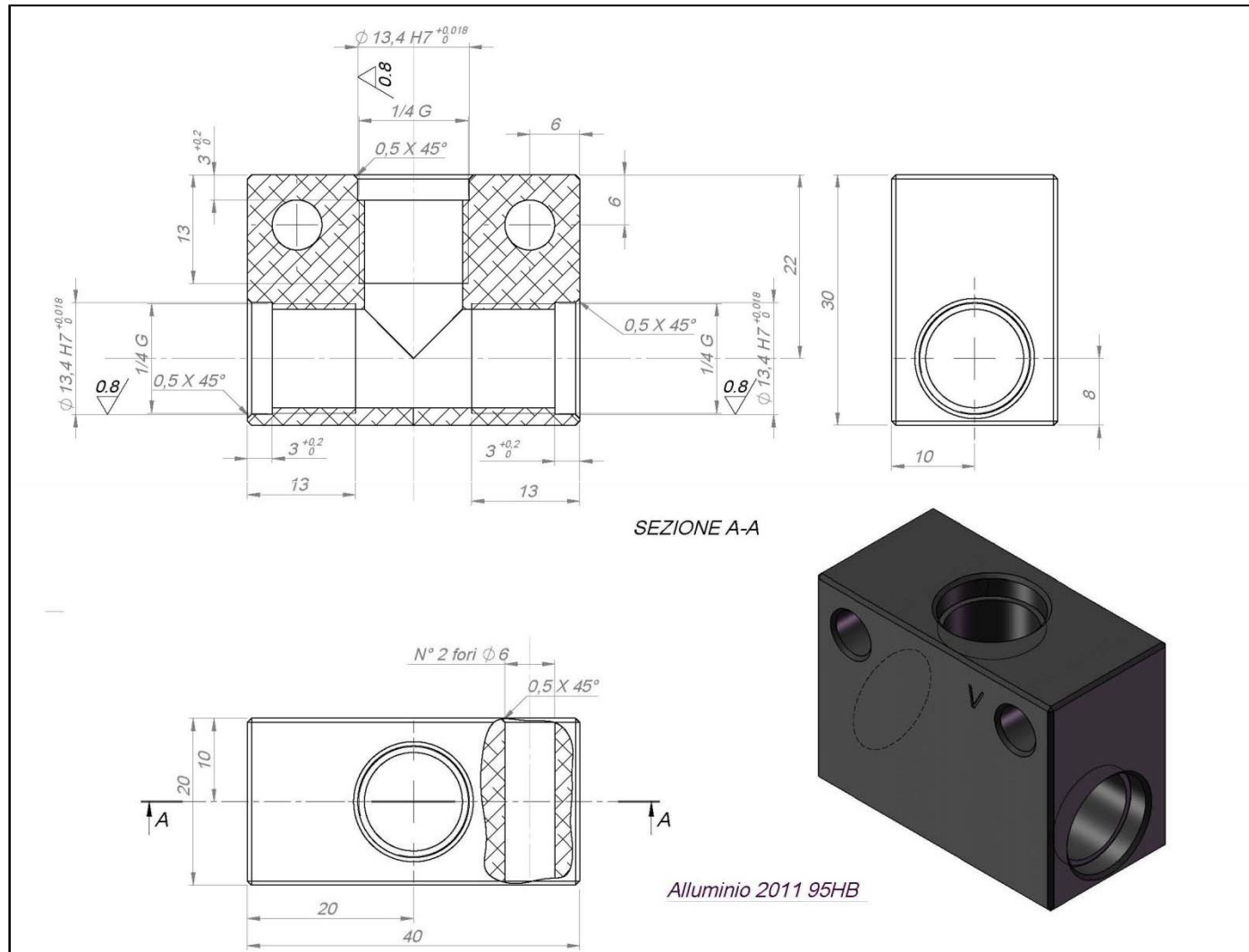
3.6 MAP Sensor kit code 620500174

3.6.2 MAP Sensor Characteristics



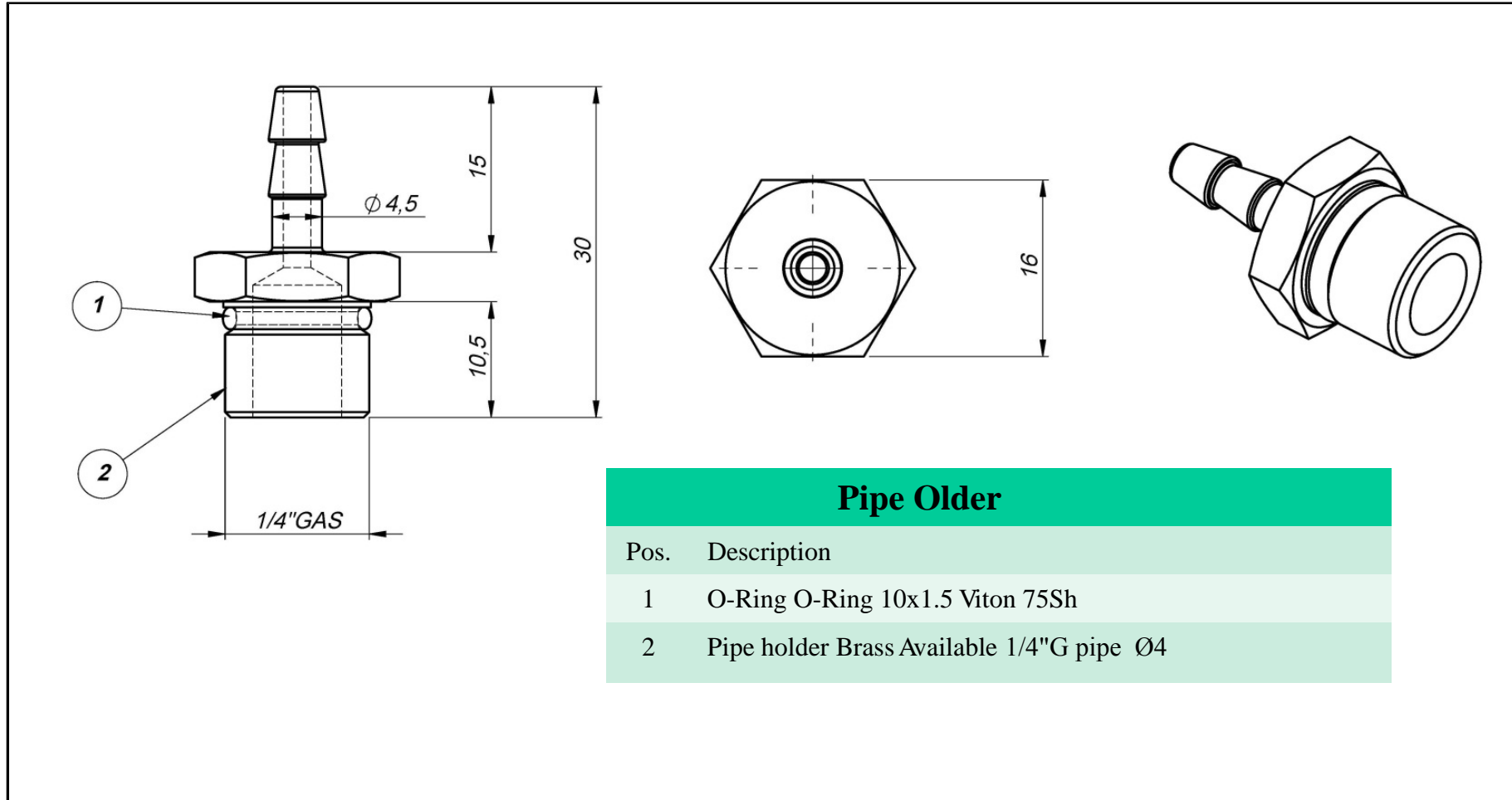
3.6 MAP Sensor kit code 620500174

3.6.3 Sensor & Pipes Housing



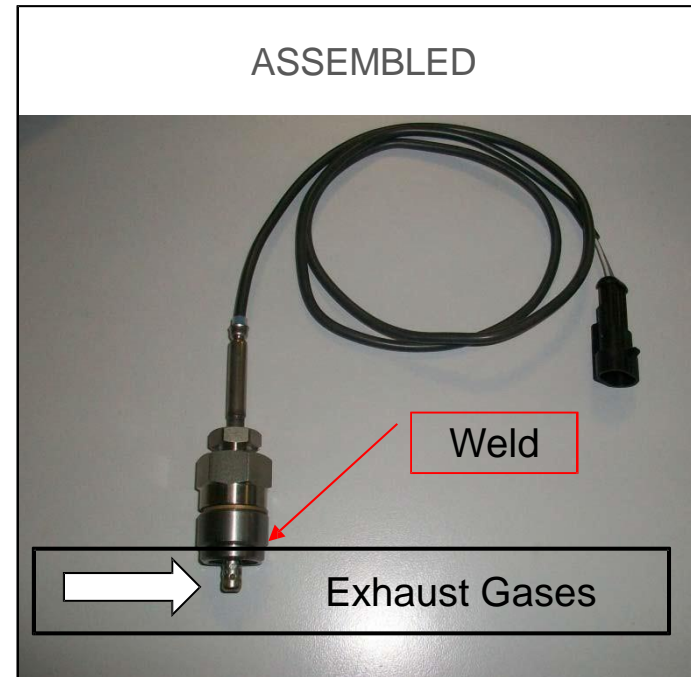
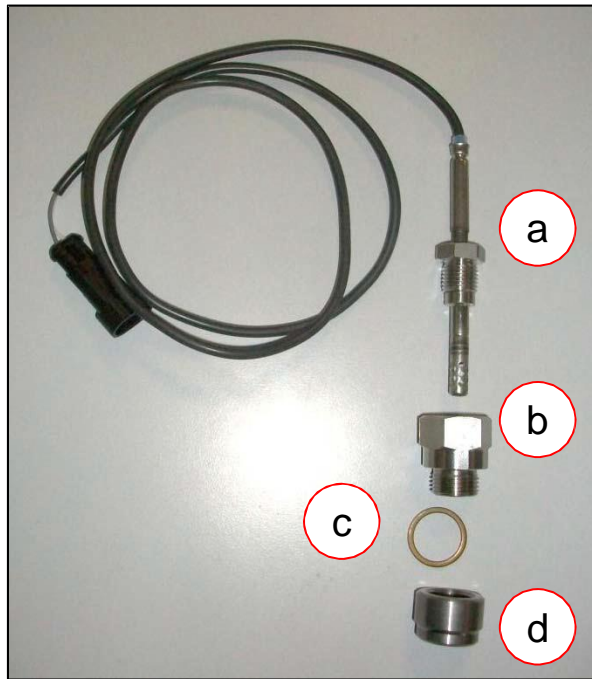
3.6 MAP Sensor kit code 620500174

3.6.4 Rubber Pipes holder



3.7 Exhaust Temperature Sensor kit code 620500172

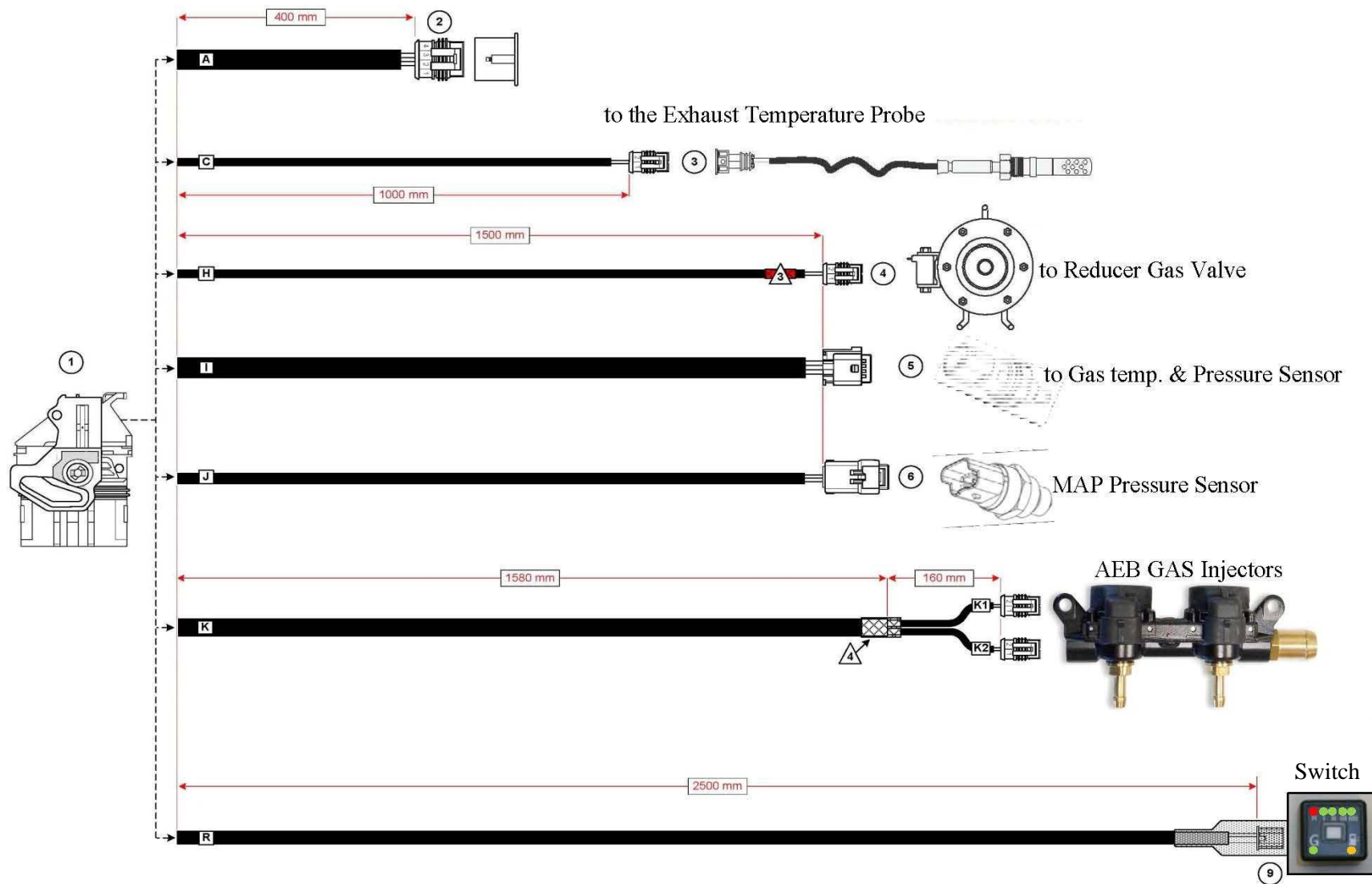
3.7 Exhaust Temperature Kit Description



Gas Pressure & Temperature Sensor Kit Description

Pos.	Description	QTY
a	Exhaust Temperature probe	1
b	Temperature Sensor Adapter 236003070	1
c	Copper Washer	1
d	Oxygen sensor Housing 121003010	1

4. Components Connections



4.1 Electronics Connections

