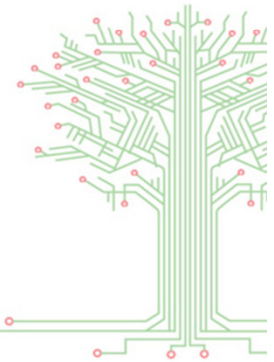
A.E.B.®

ALTERNATIVE FUEL ELECTRONICS

Dual Fuel System Installation Manual

INDEX



2. Vehicle Characteristics

The AEB 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
- Acceleretor pedal with linear signal (0 to 5V or 0 to 10V)

3. Component Description

MP48DF Dual Fuel System

A: Accessory Bag

B: Switch
Code AEB119B

C: Dual Fuel System ECU
Code MP48DF

D: Main Harness
Code 612998000

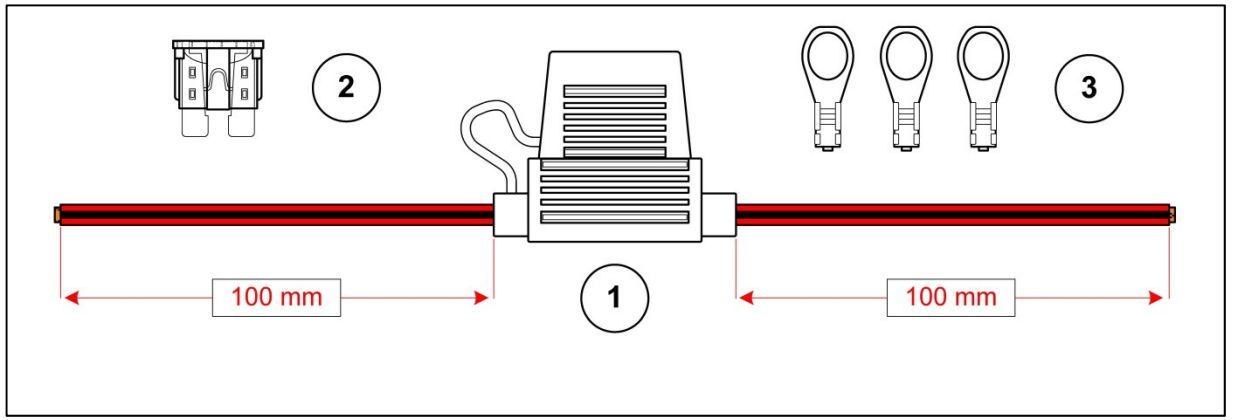
E: Exhaust Temperature Sensor
Code 620500172

F: Gas Pres & Temp Sensor Kit
Code 620500174

G: MAP sensor Kit
Code 620500173

3.1 Accessory Bag

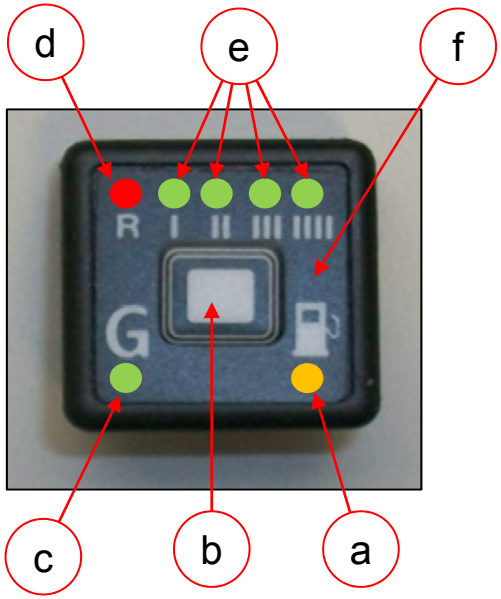
Accessory for battery and ground connection (ring terminals) and System protection (Fuse)

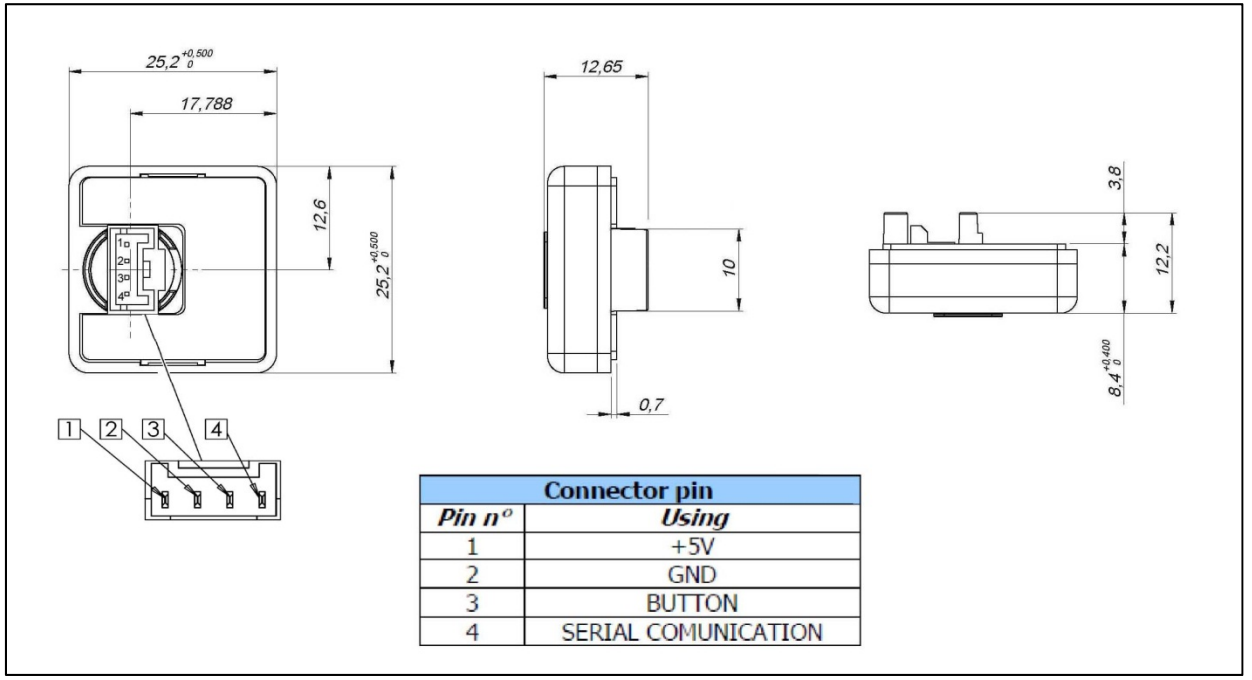


Bill Of Material		
Pos.	Description	Q.Ty
1	Fuse Box Sealed	1
2	Fuse 15° series ATU	1
3	Ring Terminal 6,3x0,8 for wire section 0,5mm^2 to 1,5mm^2	3

3.2 Switch code AEB119B

3.2.1 AEB119B Description



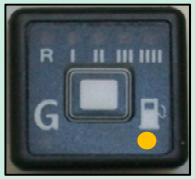
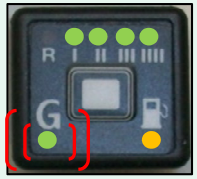
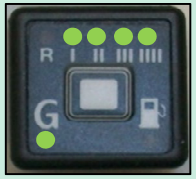
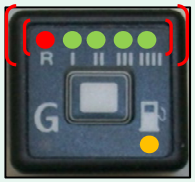
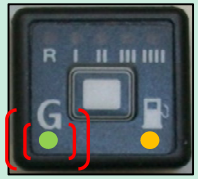


Connector pin	
Pin n°	*Using*
1	+5V
2	GND
3	BUTTON
4	SERIAL COMUNICATION

Switch and leds Description	
Pos	Description
a	**Yellow** Led – Fix ON, Diesel mode, When flashing Diesel mode for FAP regeneration
b	**Button** – for fuel type selection (pression torque 2n)
c	**Green** Led – Fix ON, Dual fuel Mode, When Flashing diesel mode but ready to pass on Dual Fuel
d	Red Led – Fix ON, Alternative fuel Reserve Indication
e	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 indicateds the system switch back to Diesel mode for Aternative 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 run 100% Diesel
	OFF	Diesel Mode, ready to pass on gas, the vehicle is running on Diesel but as soon the setting are respected it will pass on Dual Fuel.
	OFF	Dual Fuel mode, the vehicle run with a percentage of Diesel mixed with Gas
		Empty tank mode; when the gas finish automatically the MP48DF will switch the system back to Diesel mode advising the driver by the Gas Level leds flashing and Buzzer bipping fast
		Diagnosis mode; in case of gas component failure the MP48DF automatically wil get the failure code an will switch the system back to Diesel mode advising the driver by the Gas led flashing and Buzzer bipping slow.

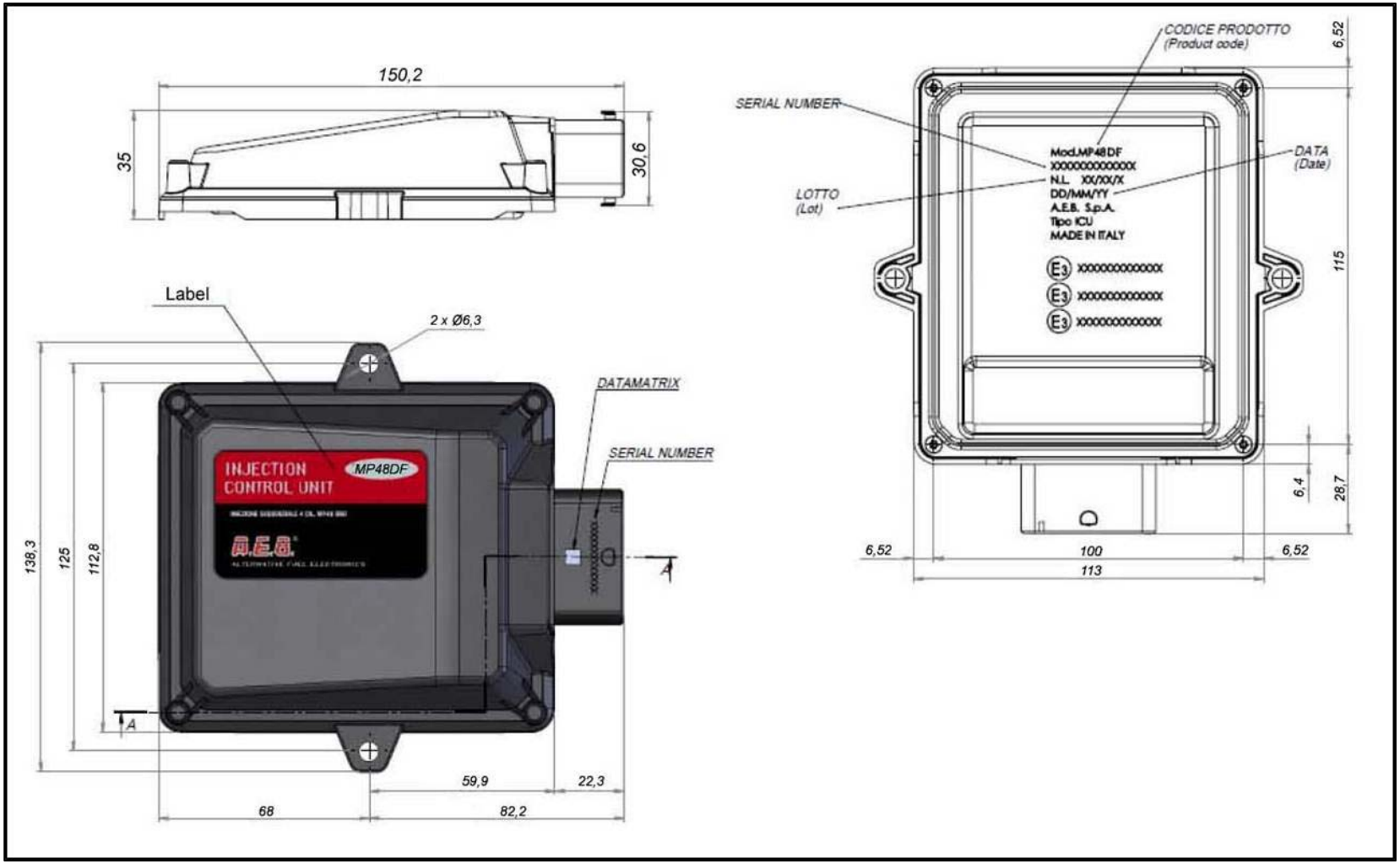
3.3 Dual Fuel ECU code MP48DF

3.3.1 AEBMP48DF Characteristics

Technical specification	
Supply voltage range	Vbatt=10÷16V
Operating temperature range	-40÷120°C
Current Absorbing with actuators disable	Imax ≤ 0,5°
Current Absorbing in Standby mode	Istandby ≤ 5mA
Gas Injectors Managed	Up to 2 injectors; Imax=6° Vbat max=16V
Gas Valve output	Pmax=25W, Imax=2A (power & current when both the output are used)
	Pmax=50W, Imax=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 MP48DF

3.3.2 AEBMP48DF Drawings

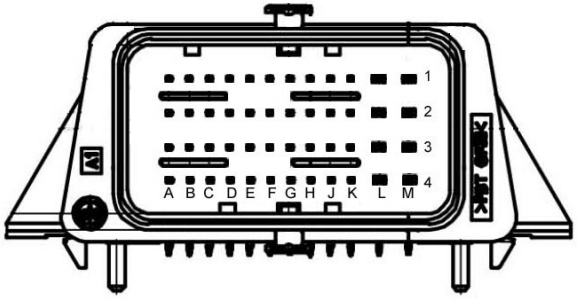


3.3 Dual Fuel ECU code MP48DF

3.3.3 AEBMP48 Pin-out

Main connector 48 Pins

Front view



AEB TECHNOLOGIES	PINOUT	Cod.	MP48DF
		Data	30/07/12
		Rev.	00

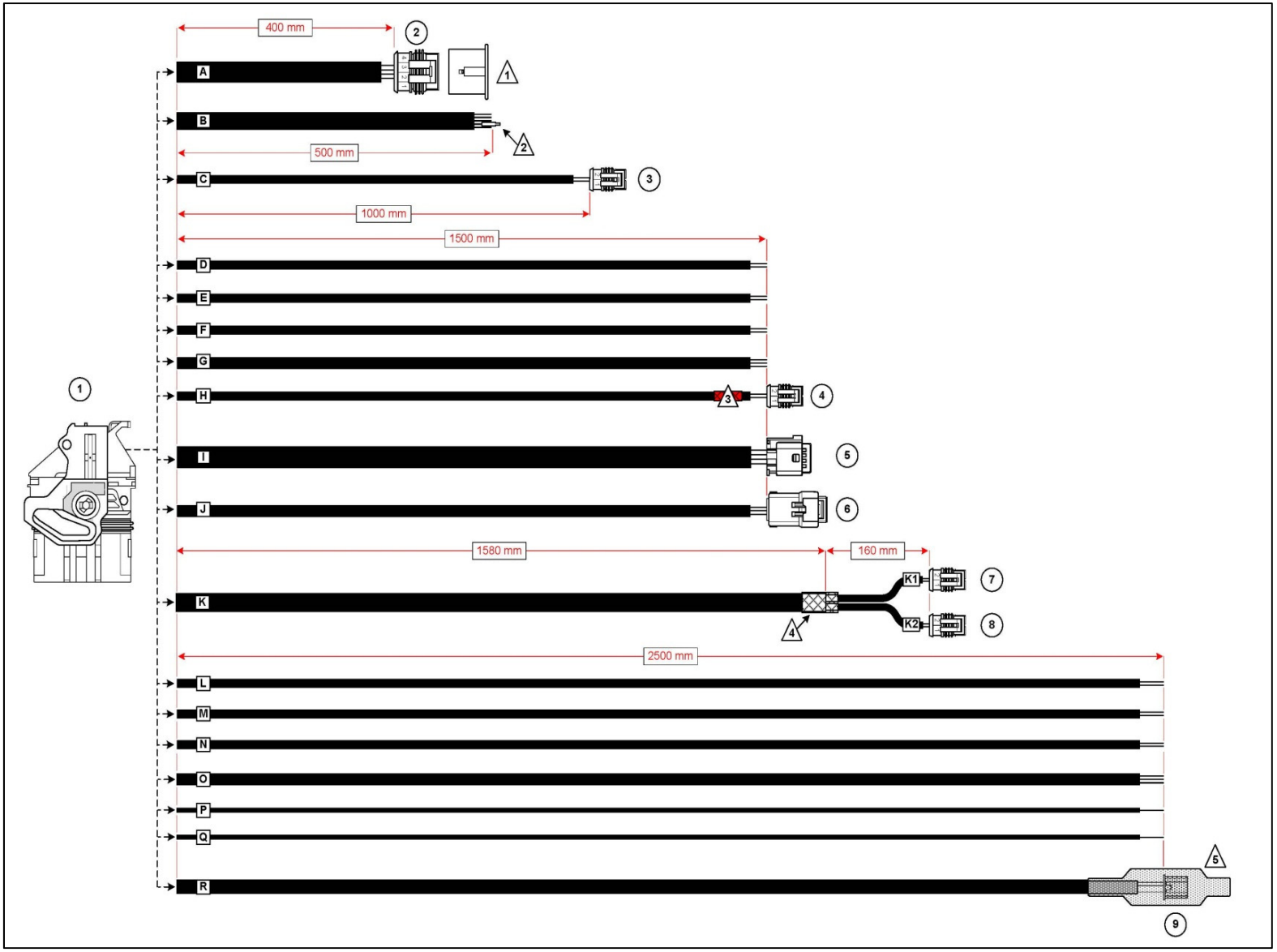
AEB Dual Fuel System MP48DF Pin-Out

PIN #	DESCRIPRION		PIN #	DESCRIPRION
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 #	DESCRIPRION		PIN #	DESCRIPRION
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

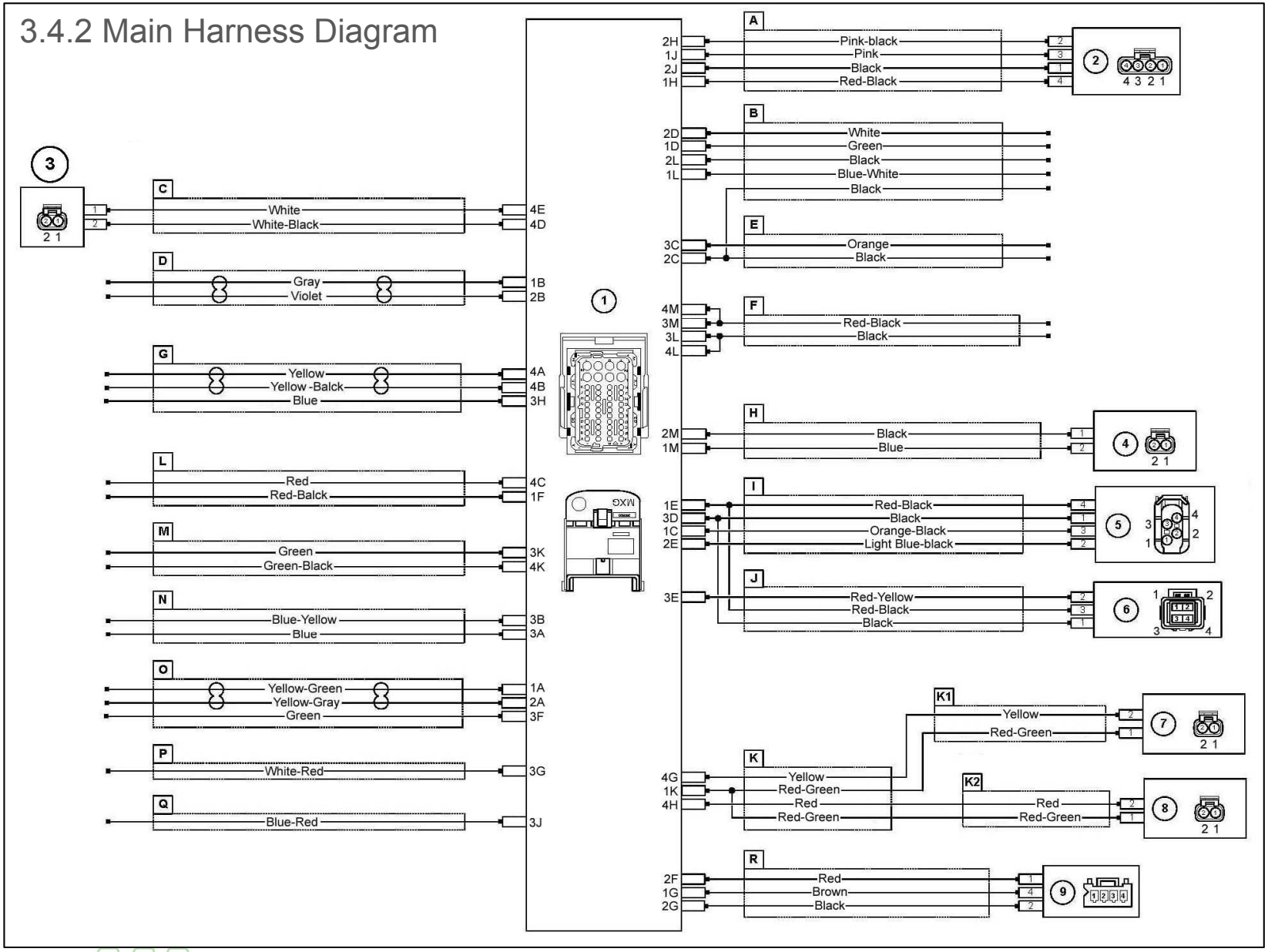
3.4 Main Harness code 612998000

3.4.1 Main Harness Layout



3.4 Main Harness code 612998000

3.4.2 Main Harness Diagram



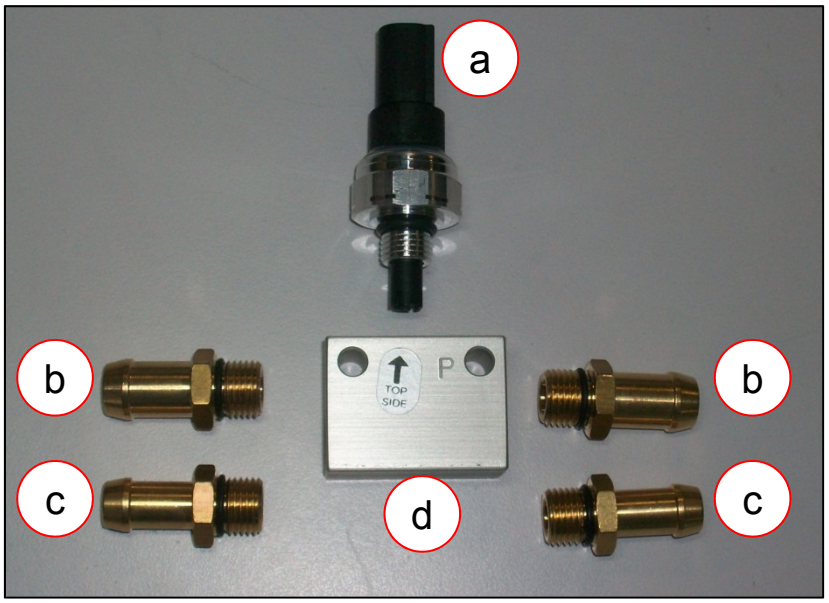
3.4 Main Harness code 612998000

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 felame 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 / Greeen-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

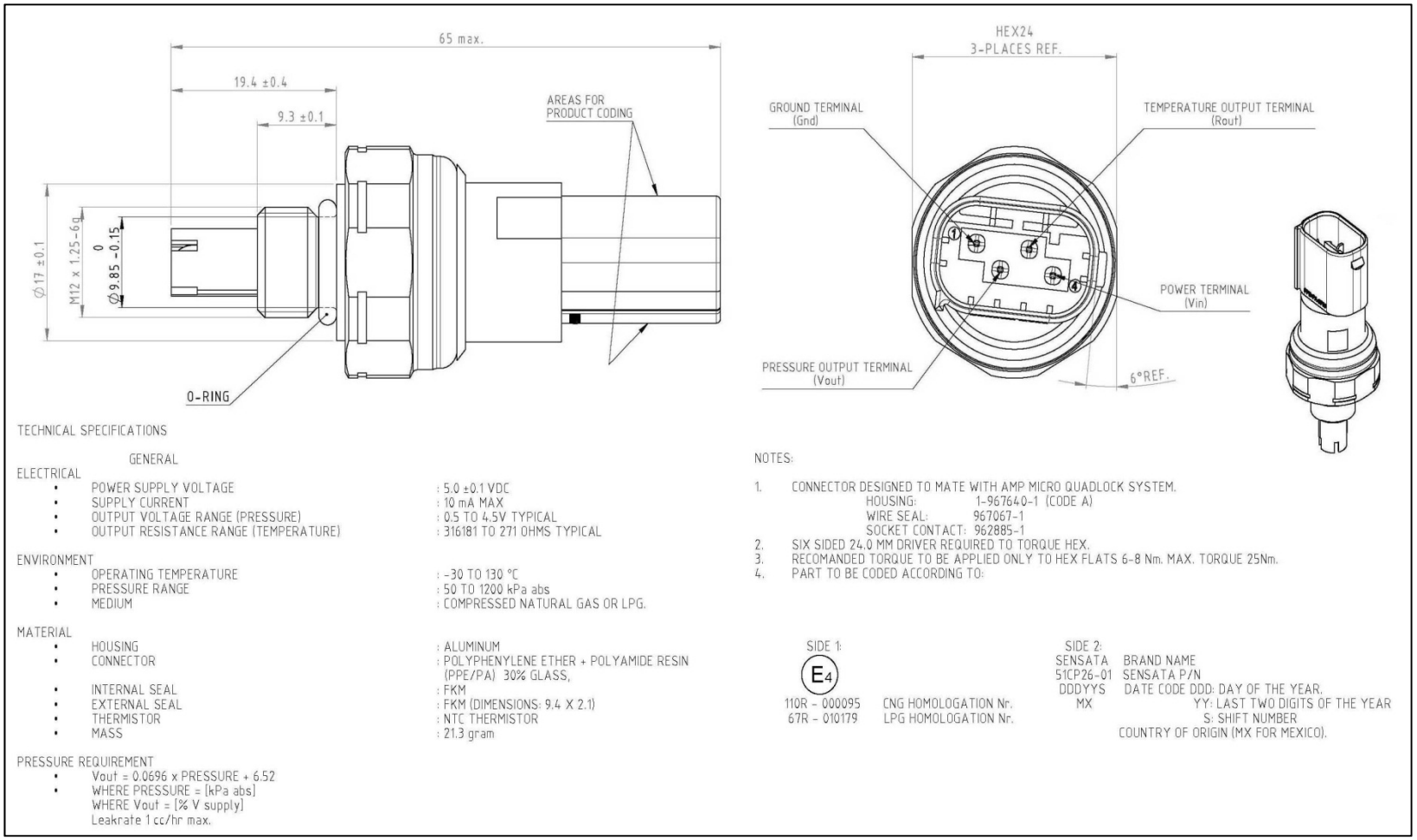


ASSEMBLED

Gas Pressure & Temperature Sensor Kit Description		
Pos.	Description	Q.ty.
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

- Vout = 0.0696 x PRESSURE + 6.52
- WHERE PRESSURE = [kPa abs]
  WHERE Vout = [% V supply]
  Leakrate 1 cc/hr max.

NOTES:

1. CONNECTOR DESIGNED TO MATE WITH AMP MICRO QUADLOCK SYSTEM.
   HOUSING: 1-967640-1 (CODE A)
   WIRE SEAL: 967067-1
   SOCKET CONTACT: 962885-1
2. SIX SIDED 24.0 MM DRIVER REQUIRED TO TORQUE HEX.
3. RECOMANDED TORQUE TO BE APPLIED ONLY TO HEX FLATS 6-8 Nm. MAX. TORQUE 25Nm.
4. PART TO BE CODED ACCORDING TO:

SIDE 1:

E4

110R - 000095 CNG HOMOLOGATION Nr.
67R - 010179 LPG HOMOLOGATION Nr.

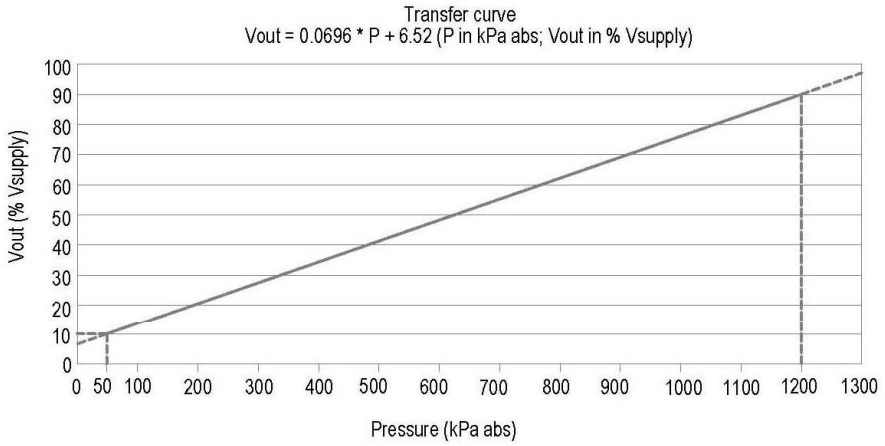
SIDE 2:

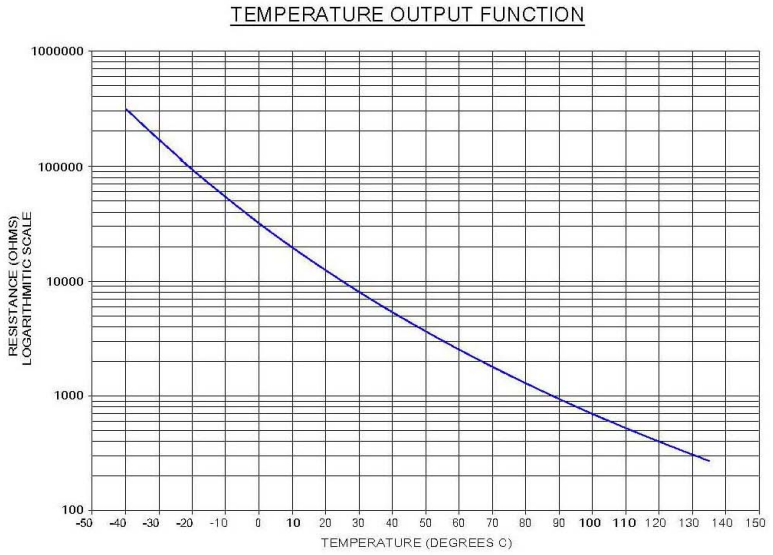
SENSATA BRAND NAME
51CP26-01 SENSATA P/N
DDDYYS DATE CODE DDD: DAY OF THE YEAR.
YY: LAST TWO DIGITS OF THE YEAR
S: SHIFT NUMBER
MX COUNTRY OF ORIGIN (MX FOR MEXICO).

3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.2 Gas Pressure & Temperature Characteristics

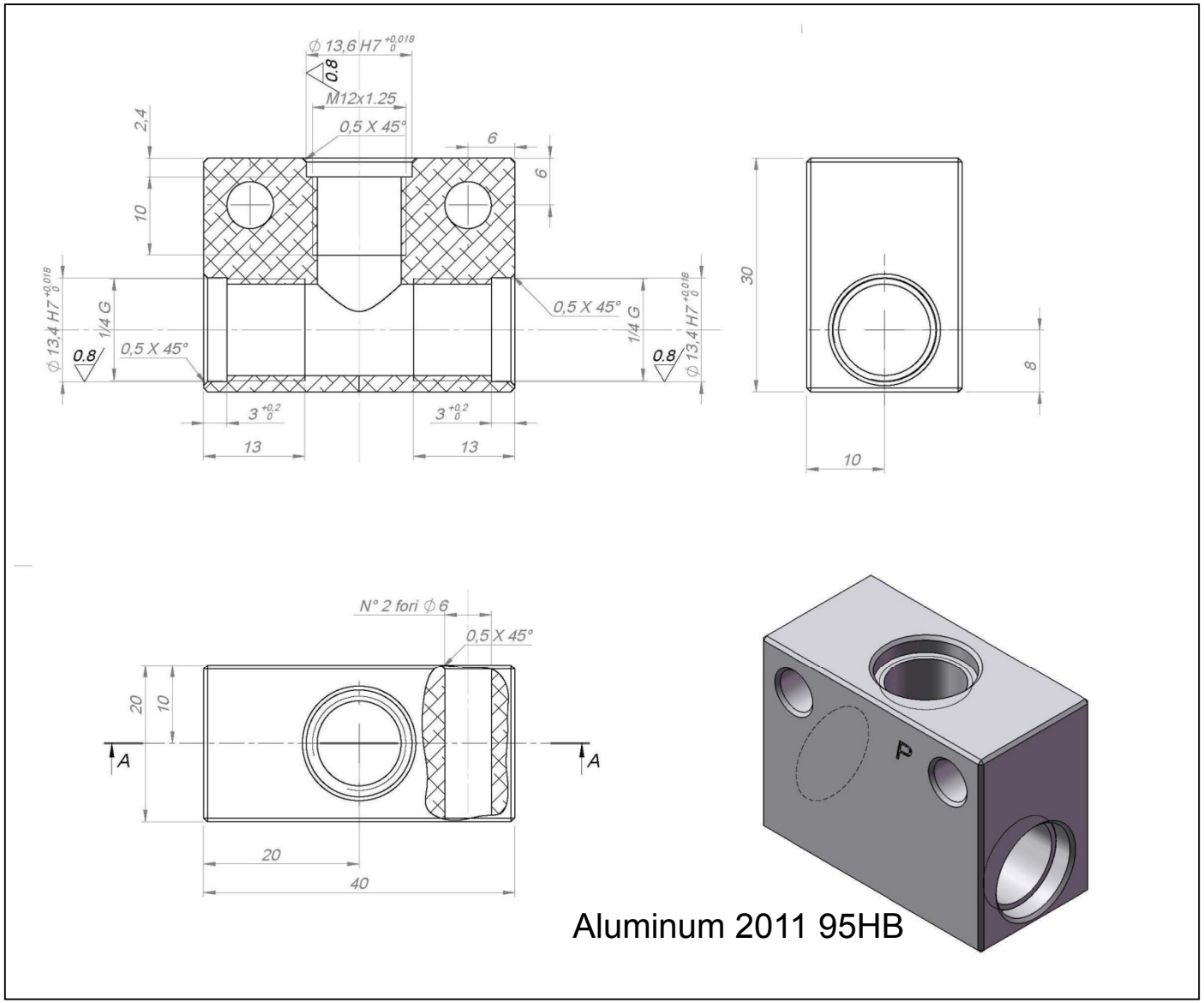
THERMISTOR RESISTANCE TABLE			
T [°C]	R_nom [Ω]	R_min [Ω]	R_max [Ω]
-40	316181	301183	331179
-30	169149	162304	175994
-20	94143	90938	97349
-10	54308	52781	55836
0	32014	31290	32738
10	19691	19346	20036
20	12474	12315	12633
25	10000	9900	10100
30	8080	7977	8182
40	5372	5282	5462
50	3661	3585	3737
60	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





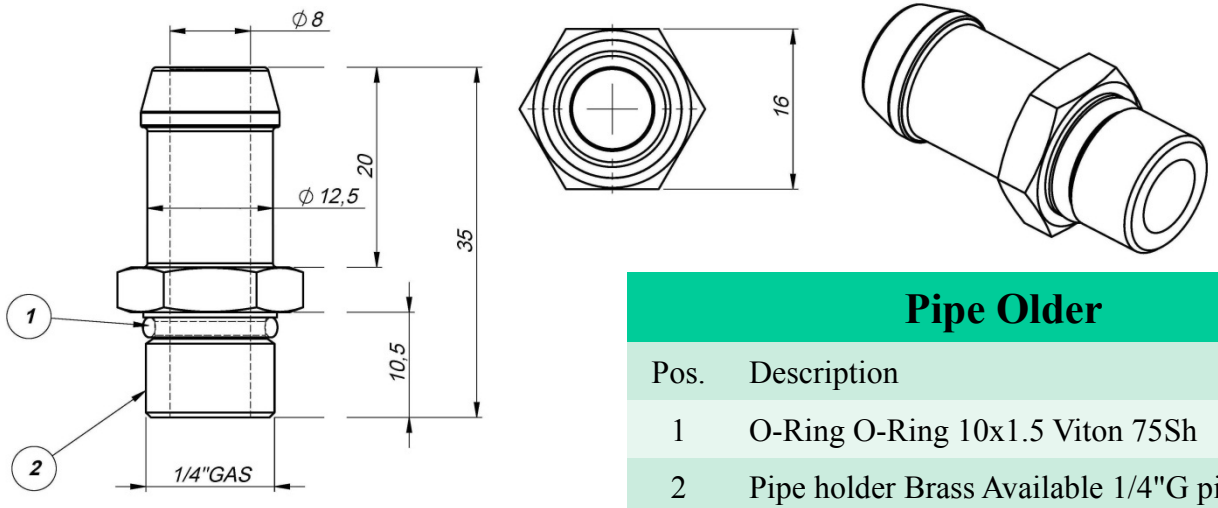
3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.3 Sensor & Pipes Housing

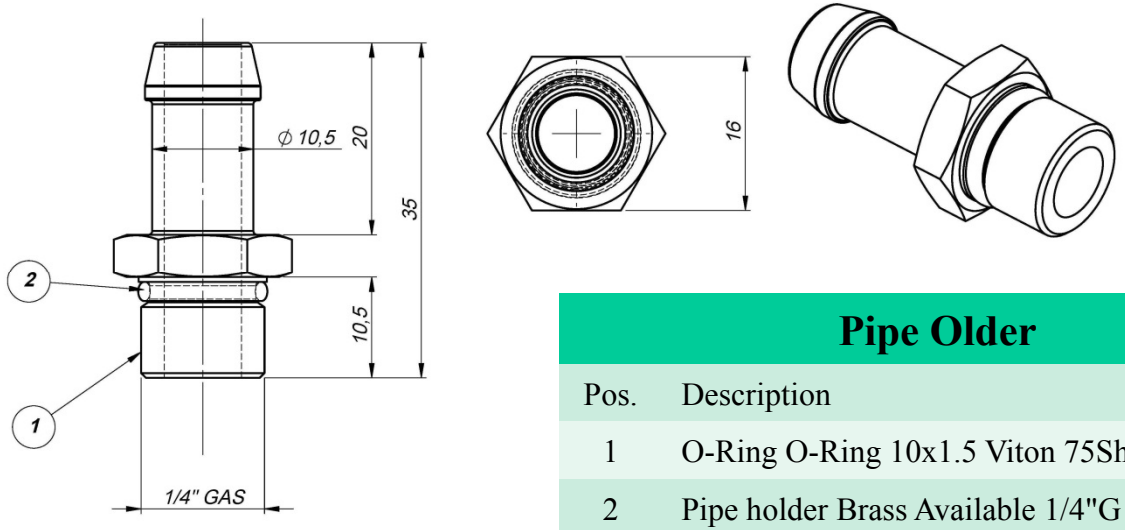


3.5 Gas Pressure & Temperature Sensor kit code 620500174

3.5.4 Rubber Pipes holder



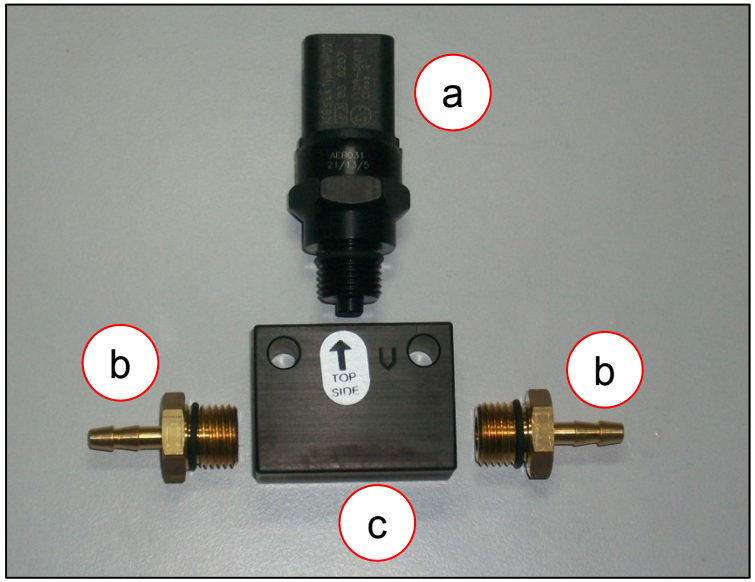
Pipe Older	
Pos.	Description
1	O-Ring O-Ring 10x1.5 Viton 75Sh
2	Pipe holder Brass Available 1/4"G pipe Ø12,5



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

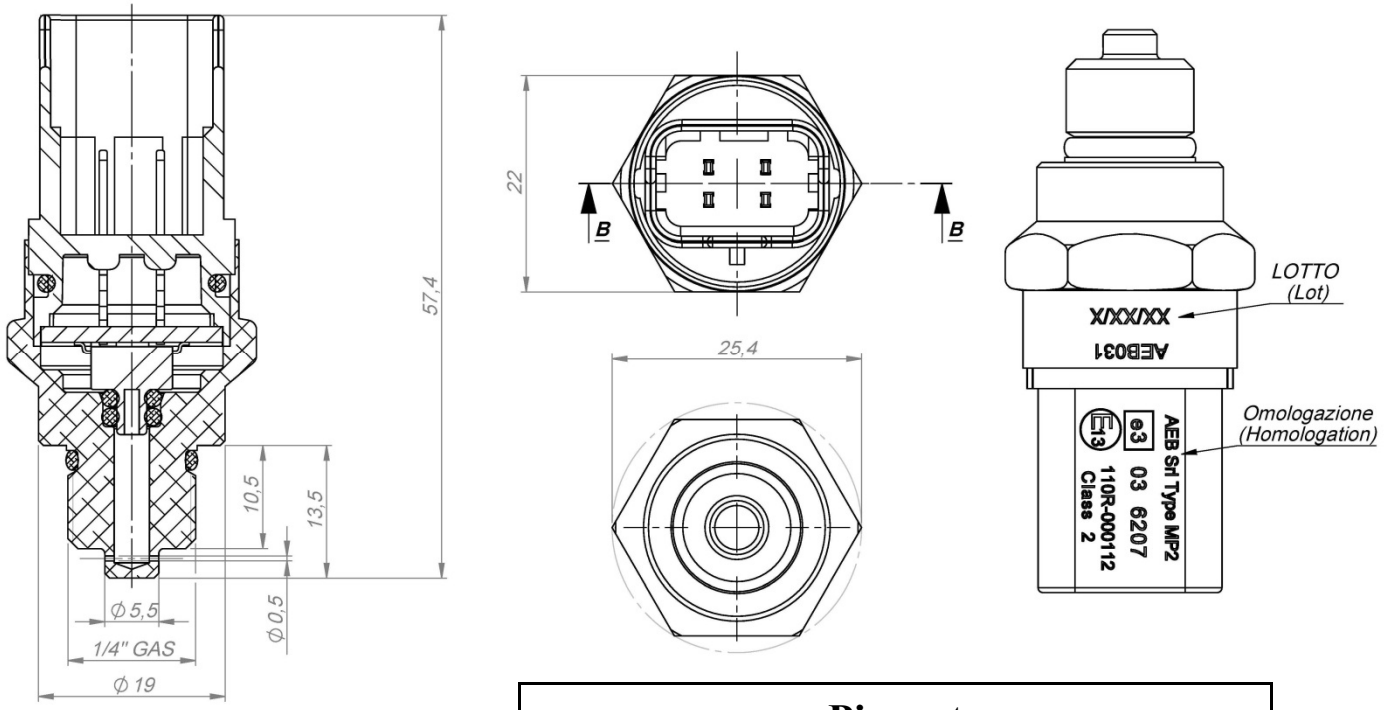


ASSEMBLED

Gas Pressure & Temperature Sensor Kit Description		
Pos.	Description	Q.ty.
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



Pin-out	
Pin	Description
1	Groud
2	Power Supply +5V
3	MAP Signal
4	Not used

3.6 Gas Pressure & Temperature Sensor kit code 620500174

3.6.2 MAP Sensor Characteristics

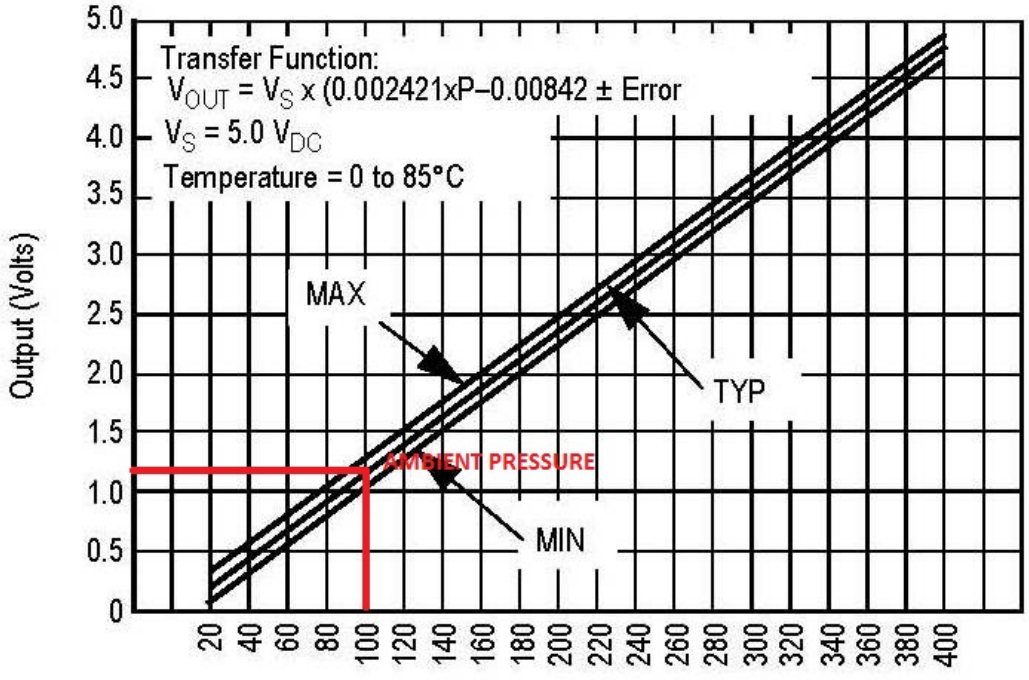
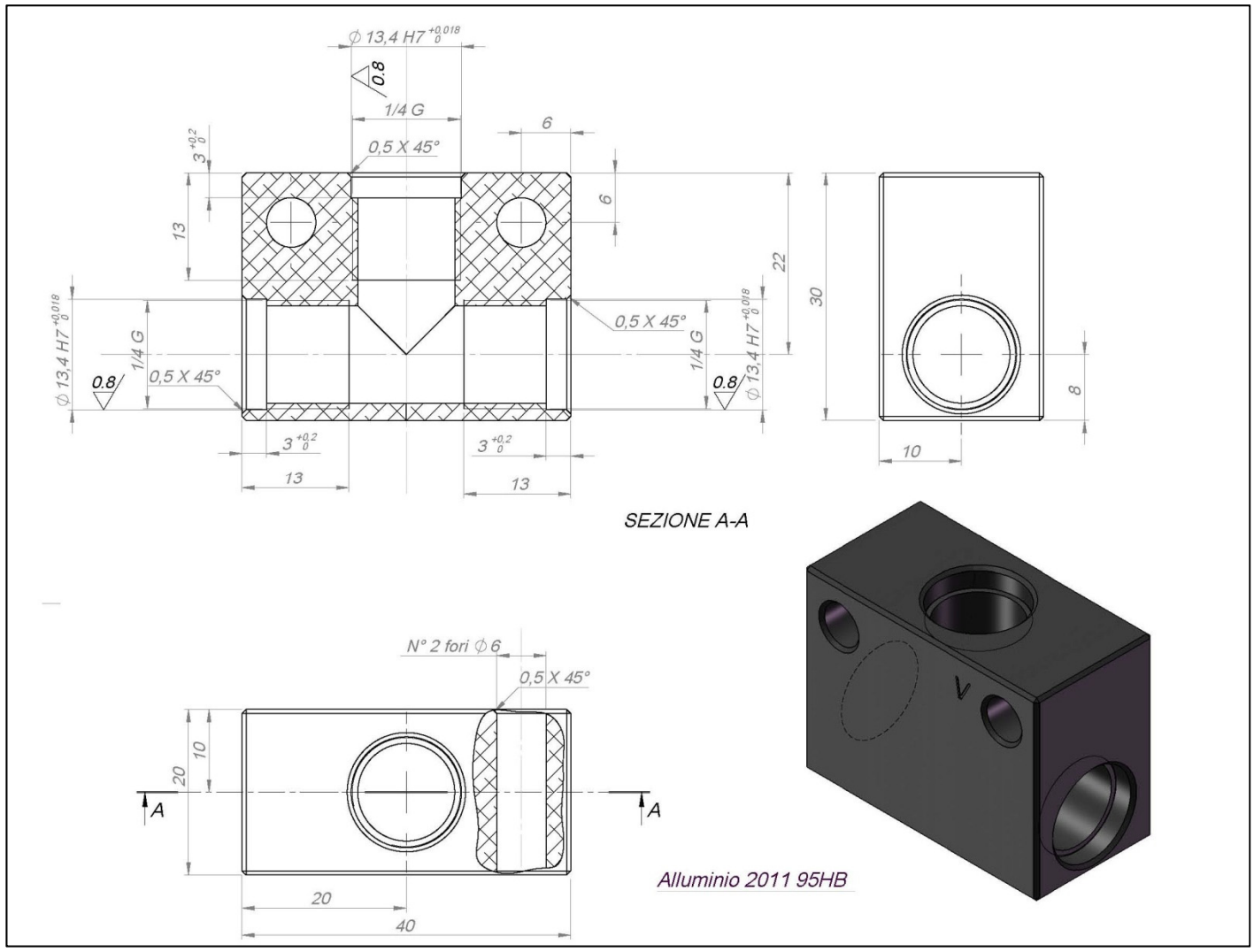


Figure 3. Output vs. Absolute Pressure

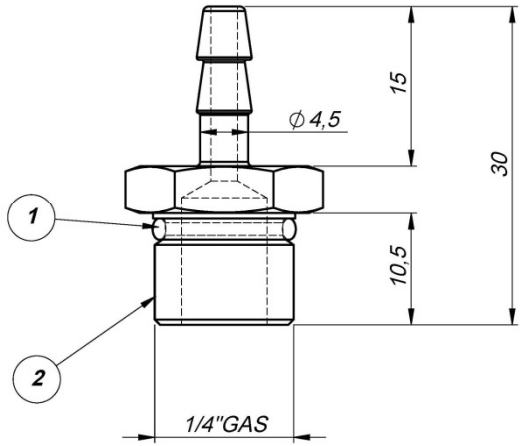
3.6 MAP Sensor kit code 620500174

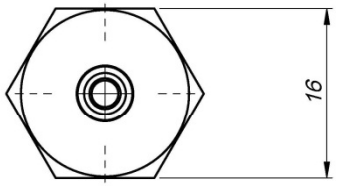
3.6.3 Sensor & Pipes Housing

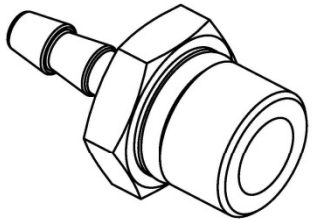


3.6 MAP Sensor kit code 620500174

3.6.4 Rubber Pipes holder



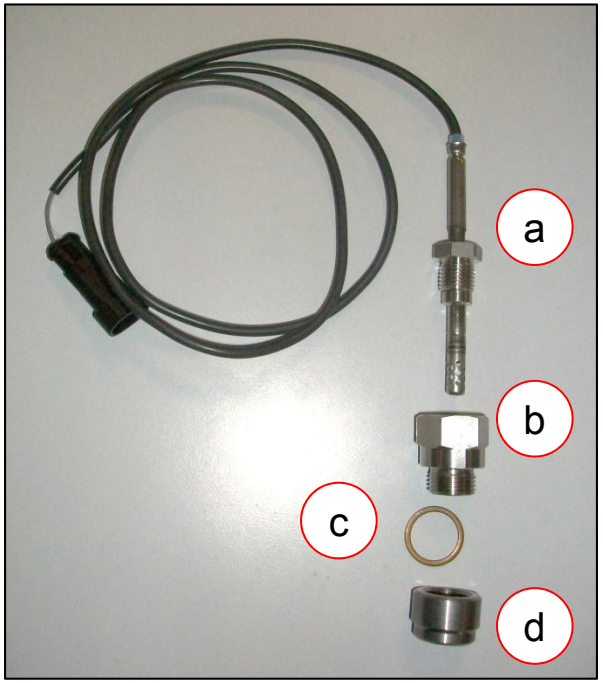


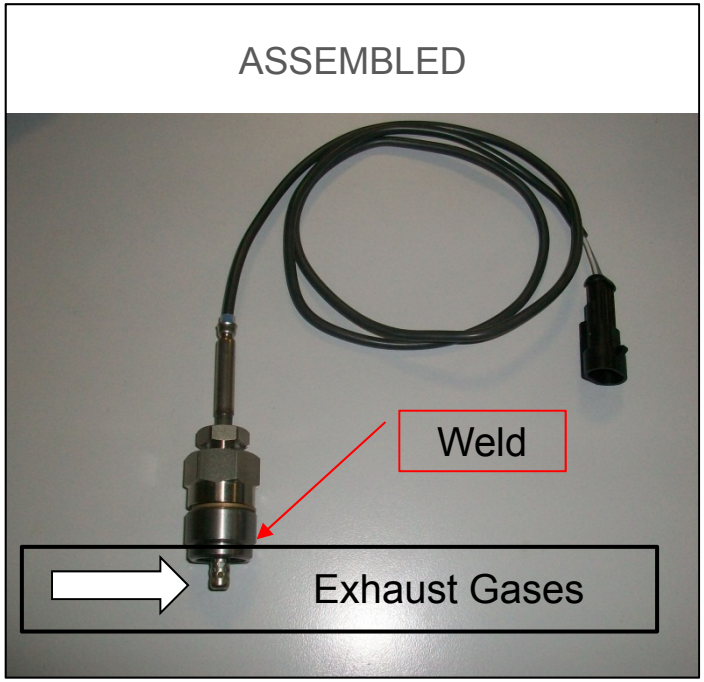


Pipe Older	
Pos.	Description
1	O-Ring O-Ring 10x1.5 Viton 75Sh
2	Pipe holder Brass Available 1/4"G pipe Ø4

3.7 Exhaust Temperature Sensor Kit code 620500172

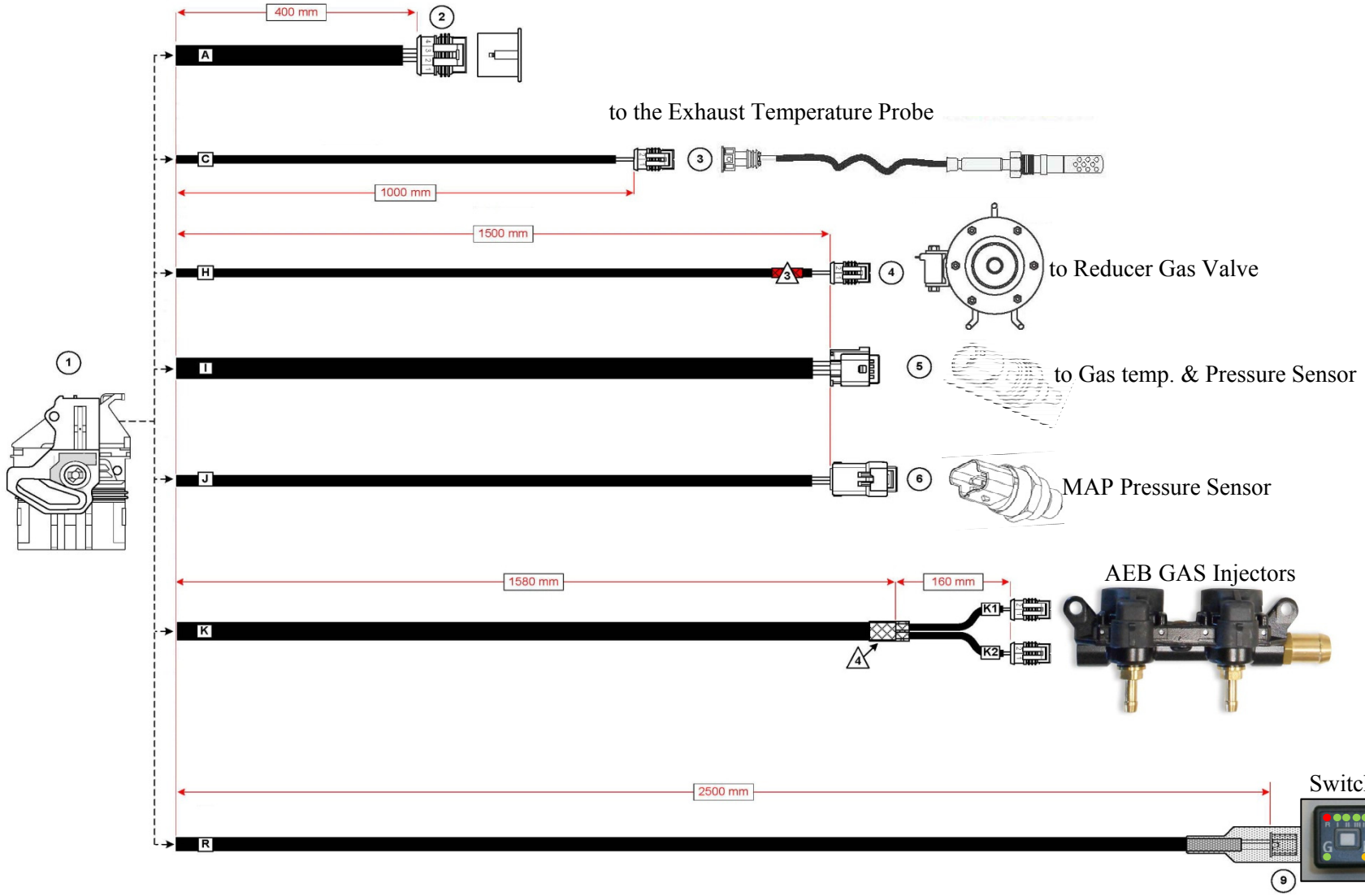
3.7 Exhaust Temperature Kit Description



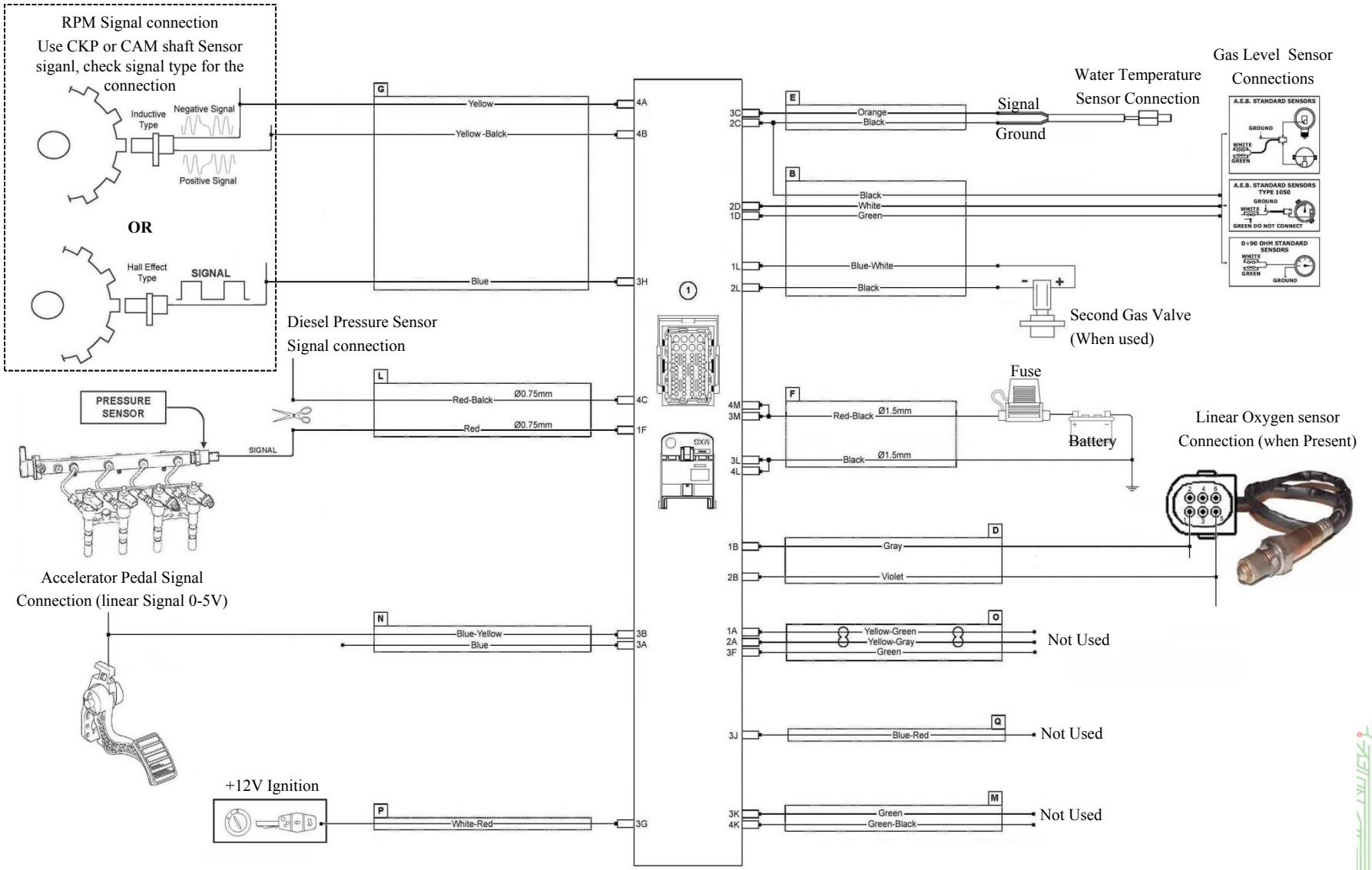


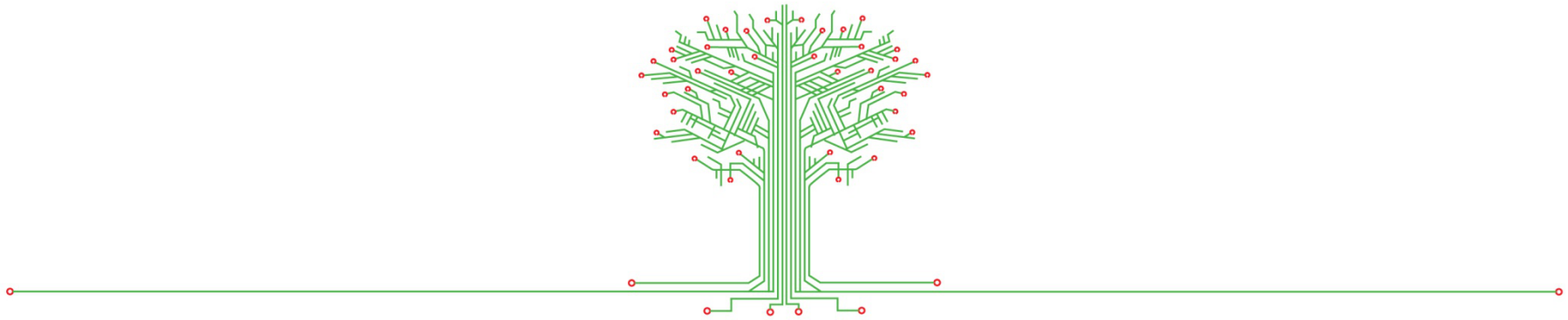
Gas Pressure & Temperature Sensor Kit Description		
Pos.	Description	Q.ty.
a	Exhaust Temperature probe	1
b	Temperature Sensor Adapter 236003070	1
c	Copper Washer	1
d	Oxygen sensor Housing 121003010	1

4 Components Connections



4.1 Electrics Connections





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