



Service Data

Fuel Delivery System

Items	Specification	
Fuel Tank	Capacity	60 L (15.8 U.S.gal., 63.4 U.S.qt., 52.7 Imp.qt.)
Fuel Filter	Type	Paper type
Fuel Pressure	Low Pressure Fuel Line	Over 290 kPa (Over 2.9 bar, Over 2.95 kgf/cm ² , Over 42.06 psi)
	High Pressure Fuel Line	2.0 - 20 MPa (20.4 - 203 kgf/cm ² , 290.1 - 2900 psi)
Fuel Pump	Type	Electrical, in-tank type
	Driven by	Electric motor
High Pressure Fuel Pump	Type	Mechanical type
	Driven by	Camshaft

Fuel pump motor

Item	Specification	
Output Voltage (V)	12.6	
Low Pressure Fuel Line	bar	3.5 - 6.0
	kPa	350 - 600
	kgf/cm ²	3.5 - 6.1
	psi	50.7 - 87.0

Fuel sender

[Main Fuel Sender]

Position	Resistance (Ω)	Capacity (ℓ)
E	148 - 152	4.5
1/2	6.5 - 8.5	31.2
F	6.5 - 8.5	58.5

[Sub Fuel Sender]

Position	Resistance (Ω)	Capacity (ℓ)
E	148 - 152	4.5
1/2	148 - 152	31.2
F	6.5 - 8.5	58.5

[Main Fuel Sender + Sub Fuel Sender Composite resistance]

Position	Resistance (Ω)	Capacity (ℓ)
E	296 - 304	4.5
1/2	154.5 - 160.5	31.2
F	13 - 17	58.5

Sensors

Boost Pressure Sensor (BPS)

▷ Type: Piezo-resistive pressure sensor type

▷ Specification

Pressure [kPa (kgf/cm ² , psi)]	Output Voltage (Vref = 5V)
20 (0.20, 2.90)	0.5
40 (0.40, 5.80)	0.79

80 (0.81, 11.60)	1.36
120 (1.22, 17.40)	1.93
160 (1.63, 23.20)	2.5
200 (2.03, 29.00)	3.07
220 (2.24, 31.90)	3.36
240 (2.44, 34.80)	3.64
280 (2.85, 40.61)	4.21
300 (3.05, 43.51)	4.5

Intake Air Temperature Sensor (IATS)

- ▷ Type: Thermistor type
- ▷ Specification

Temperature		Resistance (kΩ)
°C	°F	
-40	-40	38.88 - 50.77
-20	-4	13.19 - 16.82
0	32	5.11 - 6.11
10	50	3.30 - 4.09
20	68	2.19 - 2.69
40	104	1.02 - 1.26
60	140	0.51 - 0.64
80	176	0.27 - 0.35

Manifold Absolute Pressure Sensor (MAPS)

- ▷ Type: Piezo-resistive pressurpe sensor
- ▷ Specification

Pressure [kPa (kgf/cm², psi)]	Output Voltage (Vref = 5V)
20 (0.20, 2.90)	0.5
40 (0.40, 5.80)	0.79
80 (0.81, 11.60)	1.36
120 (1.22, 17.40)	1.93
160 (1.63, 23.20)	2.5
200 (2.03, 29.00)	3.07
220 (2.24, 31.90)	3.36
240 (2.44, 34.80)	3.64
280 (2.85, 40.61)	4.21
300 (3.05, 43.51)	4.5

Engine Coolant Temperature Sensor (ECTS)

- ▷ Type: Thermistor type
- ▷ Specification

Temperature		Resistance (kΩ)
°C	°F	
-40	-40	48.14
-20	-4	14.13 - 16.83
0	32	5.79
20	68	2.31 - 2.59
40	104	1.15
60	140	0.59

12/22/2018

Kia Global Information System (KGIS)

80	176	0.32
100	212	1.19
120	230	0.14 - 0.15

Throttle Position Sensor (TPS) [integrated into ETC module]
▷ Specification

Throttle angle(°)	Output Voltage (V) [Vref = 5V]	
	TPS1	TPS2
0	0.5	4.5
10	0.96	4.05
20	1.41	3.59
30	1.87	3.14
40	2.32	2.68
50	2.78	2.23
60	3.23	1.77
70	3.69	1.32
80	4.14	0.86
90	4.6	0.41
98	4.65	0.35
C.T (0)	0.5	4.5
W.O.T (86)	4.41	0.59

Item	Specification
Coil Resistance (Ω)	0.3 -100 [20°C(68°F)]

Crankshaft Position Sensor (CKPS)
▷ Type: Magnetic field sensitive sensor
▷ Specification

Item	Specification
Coil Resistance (Ω)	500 - 620 [20°C(68°F)]

Camshaft Position Sensor (CMPS)
▷ Type: Hall effect type
▷ Specification

Item	Specification
Air Gap (mm)	0.8 - 1.2

Knock Sensor (KS)
▷ Type: Piezo-electricity type
▷ Specification

Item	Specification
Capacitance (pF)	850 - 1150
Resistance (MΩ)	3.90 - 5.84

Heated Oxygen Sensor (HO2S) [Bank 1,2/Sensor 1]
▷ Type: Zirconia (ZrO2) [Linear] Type
▷ Specification

Item	Specification
Heater Resistance (Ω)	2.4 - 4.0 [23°C(73.4°F)]

Heated Oxygen Sensor (HO2S) [Bank 1,2/Sensor 2]
▷ Type: Zirconia (ZrO2) [Binary] Type

▷ Specification

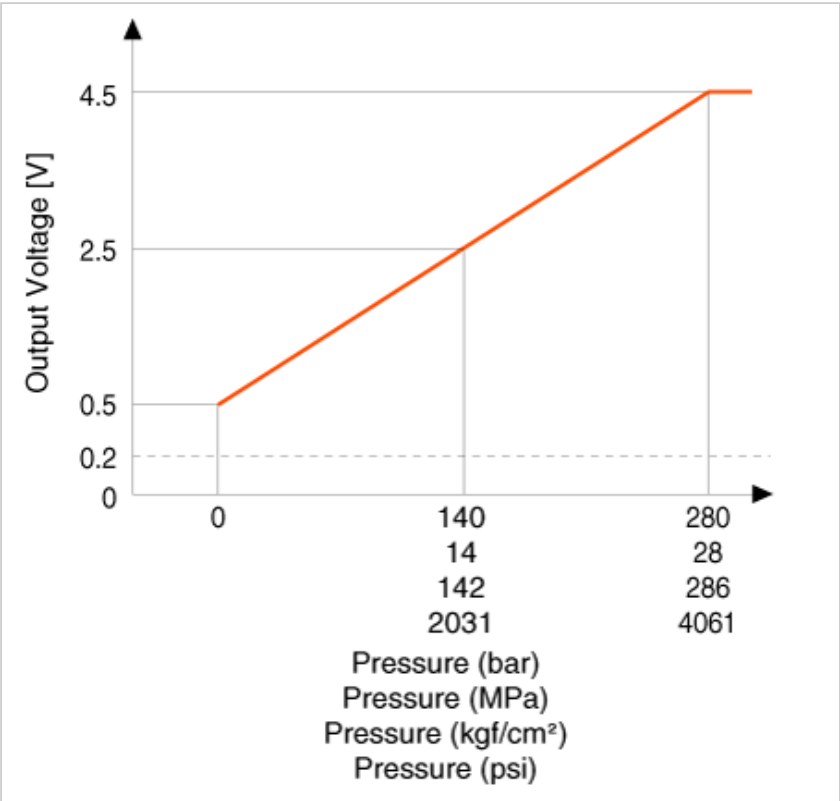
Item	Specification
Heater Resistance (Ω)	3.3 - 4.1 [20°C(68°F)]

Rail Pressure Sensor (RPS)

▷ Type: Piezo-electricity type

▷ Specification

Pressure		Output Voltage (V) [Vref=5V]
bar	[MPa (kgf/cm², psi)]	
0	0 (0, 0)	0.5
140	14 (142, 2031)	2.5
280	28 (286, 4061)	4.5



CVVT Oil Temperature Sensor (OTS)

▷ Type: Thermistor type

▷ Specification

Temperature		Resistance (kΩ)
°C	°F	
-40	-40	41.74 - 54.54
-20	-4	14.13 - 16.83
0	32	5.28 - 6.3
25	77	1.88 - 2.14
80	176	0.31 - 0.33
140	284	0.07 - 0.08

Oil Pressure Sensor (OPS)

▷ Type: Piezo-resistive pressure sensor

▷ Specification

Pressure (Bar)	Output Voltage (V) [Vref=5V]
0	0.5

12/22/2018

Kia Global Information System (KGIS)

5	2.5
10	4.5

Accelerator Position Sensor (APS)

▷ Type: Variable resistor type

▷ Specification

Accelerator Position	Output Voltage (V) [Vref=5V]	
	APS1	APS2
C.T	0.7 - 0.8	0.33 - 0.43
W.O.T	3.98 - 4.22	1.93 - 2.17

Fuel Tank Pressure Sensor (FTPS)

▷ Type: Piezo-Resistive Pressure Sensor

▷ Specification

Pressure [kPa (kgf/cm², in H2O)]	Output Voltage (V)
-6.67 (-0.068, -26.8)	0.5
0	2.5
+6.67 (0.068, 26.8)	4.5

Actuators

Injector

▷ Specification

Item	Specification
Coil Resistance (Ω)	1.3 - 1.43 [20°C(68°F)]

ETC Motor [integrated into ETC Module]

▷ Specification

Item	Specification
Coil Resistance (Ω)	1.1 - 1.7 [20°C(68°F)]
Operation Voltage (V)	7.7 - 16.0

Purge Control Solenoid Valve (PCSV)

▷ Specification

Item	Specification
Coil Resistance (Ω)	18.5 - 22.5 [20°C(68°F)]
Operation Voltage (V)	9 - 16
Rated current (A)	0.66

Variable Force Solenoid (VFS) [Bank 1,2/Intake]

▷ Specification

Item	Specification
Coil Resistance (Ω)	7.0 - 8.0 [20°C(68°F)]
Operation Voltage (V)	10 - 16

CVVT Oil Control Valve (OCV) [Bank 1,2 / Exhaust]

▷ Specification

Item	Specification
Coil Resistance (Ω)	9.4 - 10.4 [20°C(68°F)]
Supply Voltage (V)	10 - 16

Variable Intake Solenoid (VIS) Valve

▷ Specification

--	--

Item	Specification
Coil Resistance (Ω)	30.0 - 35.0 [20°C(68°F)]
Operation Voltage (V)	9 - 16
pin	2

Fuel Pressure Control Valve (FPCV)
▷ Specification

Item	Specification
Coil Resistance (Ω)	1.09 - 1.21 [20°C(68°F)]
Supply Voltage (V)	6.5

Canister Close Valve (CCV)

Item	Specification
Coil Resistance (Ω)	19.8 - 21.8 (20°C)

Service Standard

Item		Specification	
Ignition Timing (°)		BTDC 5° ± 10°	
Idle Speed (rpm)	A/C OFF	Neutral, N, P-range	650 ± 100
		D-range	600 ± 100
	A/C ON	Neutral, N, P-range	650 ± 100
		D-range	600 ± 100