

MODBUS RTU REGISTER MAP

Can query a total of 125 successive registers. (1 register = 2 bytes)

Modbus RTU set to 9600,19200,N,8,1,2

NOTE: Registers are initially set to HEX FFFF.

Some PID's occupy two registers. (ie. 247)

**Register
Address**

1	127	91	92	94	100	102	105	110
9	190	84	168	172	173	174	175	177
17	247	247	93	183	52	90	98	99
25	109	111	124	19	101	153	158	176
33	20	22	184	185	186	30	XX	XX
41	182	235	235	236	236	244	244	245
49	245	XX	XX	XX	XX	248	248	249
57	249	250	250	XX	XX	XX	44	194A-1
65	194A-1	194A-2	194A-2	194A-3	194A-3	194A-4	194A-4	194A-5
73	194A-5	194A-6	194A-6	194A-7	194A-7	194A-8	194A-8	194A-9
81	194A-9	194A-10	194A-10	194I-1	194I-1	194I-2	194I-2	194I-3
89	194I-3	194I-4	194I-4	194I-5	194I-5	194I-6	194I-6	194I-7
97	194I-7	194I-8	194I-8	194I-9	194I-9	194I-10	194I-10	XX
105	XX	XX	XX	XX	XX	XX	XX	XX
113	XX	XX	XX	XX	XX	XX	XX	XX
121	XX	XX	XX	XX	XX	XX	XX	XX

<i>Sample Modbus RTU Request:</i>	<i>Sample Slave Response to the Modbus RTU Request:</i>
To fetch Register 20 to 22 121,03,00,19,00,03,CRC_LO,CRC_HI 121 = Slave Address 03 = Function Code 00 = Starting Address High 19 = Starting Address Low 00 = No. of Registers High 03 = No. of Registers Low	121,03,06,D1,D2,D2,D4,D5,D6,CRC_LO,CRC_HI 121 = Slave Address 03 = Function Code 06 = Byte Count D1 - D6 = Data

PARAMETER I.D. DESCRIPTION

19. Extended Range Oil Pressure

Parameter Data Length: 1 byte
 Bit Resolution: 0.58 psi

20. Extended Range Engine Coolant Pressure

Parameter Data Length: 1 byte
 Bit Resolution: 0.29 psi

22. Extended Crankcase Blow-By Pressure

Parameter Data Length: 1 byte
 Bit Resolution: 0.004245 psi

30. Crankcase Blow-By Pressure

Parameter Data Length: 1 byte
 Bit Resolution: 0.125 psi
 Data Type: Signed Integer

44. Attention/Warning Indicator Lamp Status

Parameter Data Length: 1 byte
Byte Format:
Bit 8-7: Unused
Bit 6-5: Protect lamp status
Bit 4-3: Amber lamp status
Bit 2-1: Red lamp status

Status Definitions:
00 – Off
01 – On
10 – Error Condition
11 – Not Available

52. Engine Intercooler Temperature

Parameter Data Length: 1 byte
Bit Resolution: 1.0EF

84. Road Speed

Parameter Data Length: 1 byte
Bit Resolution: 0.5 mph

90. Power Takeoff Oil Temperature

Parameter Data Length: 1 byte
Bit Resolution: 1.2EF

91. Percent Accelerator Pedal Position

Parameter Data Length: 1 byte
Bit Resolution: 0.40%

92. Percent Engine Load

Parameter Data Length: 1 byte
Bit Resolution: 0.50%

93. Output Torque

Parameter Data Length: 1 byte
Bit Resolution: 20 lb-ft

94. Fuel Delivery Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.5 psi

98. Engine Oil Level

Parameter Data Length: 1 byte
Bit Resolution: 0.50%

99. Engine Oil Filter Differential Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.0625 psi

100. Engine Oil Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.5 psi

101. Crankcase Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.125 psi
Data Type: Signed Integer

102. Boost Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.125 psi

105. Intake Manifold Temperature

Parameter Data Length: 1 byte
Bit Resolution: 1.0EF

109. Coolant Pressure

Parameter Data Length: 1 byte
Bit Resolution: 0.125 psi

110. Engine Coolant Temperature

Parameter Data Length: 1 byte
Bit Resolution: 1.0EF

111. Coolant Level

Parameter Data Length: 1 byte
Bit Resolution: 0.50%

124. Transmission Oil Level

Parameter Data Length: 1 byte
Bit Resolution: 0.50%

127. Transmission Oil Pressure

Parameter Data Length: 1 byte
Bit Resolution: 2.0 psi

153. Crankcase Pressure

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 1.133x10⁻³ psi
Data Type: Signed Integer

158. Battery Potential Voltage - Switched

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.05V

168. Battery Potential (Voltage)

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.05V

172. Air Inlet Temperature

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.25EF
Data Type: Signed Integer

173. Exhaust Gas Temperature

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.25EF
Data Type: Signed Integer

174. Fuel Temperature

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.25EF
Data Type: Signed Integer

175. Engine Oil Temperature

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.25EF
Data Type: Signed Integer

176. Turbo Oil Temperature

Parameter Data Length: 2 bytes (msb first)
Bit Resolution: 0.25EF
Data Type: Signed Integer

177. Transmission Oil Temperature

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 0.25EF
 Data Type: Signed Integer

182. Trip Fuel

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 0.125 gal

183. Fuel Rate (Instantaneous)

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 4.34x10⁻⁶ gal/s

184. Instantaneous Fuel Economy

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 1/256 mpg

185. Average Fuel Economy

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 1/256 mpg

186. Power Takeoff Speed

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 0.25 rpm

190. Engine Speed

Parameter Data Length: 2 bytes (msb first)
 Bit Resolution: 0.25 rpm

194A. Active Diagnostic Trouble Codes

Parameter Data Length: 4 bytes (msb first)
 Byte Format:

Bit 32-17: PID/SID Number
 Bit 16-14: Unused
 Bit 13: 1=SID, 0=PID
 Bit 12-9: FMI Number
 Bit 8-1: Occurrence Count

194I. Inactive Diagnostic Trouble Codes

Parameter Data Length: 4 bytes (msb first)
 Byte Format:

Bit 32-17: PID/SID Number
 Bit 16-14: Unused
 Bit 13: 1=SID, 0=PID
 Bit 12-9: FMI Number
 Bit 8-1: Occurrence Count

235. Total Idle Hours

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.05 h

236. Total Idle Fuel Used

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.125 gal

244. Trip Distance

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.1 mi

245. Total Vehicle Distance

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.1 mi

247. Total Engine Hours

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.05 h

248. Total PTO Hours

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.05 h

249. Total Engine Revolutions

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 1000 r

250. Total Fuel Used

Parameter Data Length: 4 bytes (msb first)
 Bit Resolution: 0.125 gal

Notes on PID 194:

There are 20 modbus registers dedicated to active trouble codes (194A), and 20 modbus registers dedicated to inactive trouble codes (194I). These registers are located between register 64 and register 103, and can contain up to 10 different active trouble codes and 10 different inactive trouble codes (each trouble code occupies two modbus registers).

When an active trouble code is broadcast from the engine, it is placed into the first available register pair between 64 and 83, and it will stay there until the code becomes inactive, or until the code is no longer broadcast by the engine.

When an inactive trouble code is broadcast from the engine, it is placed into the first available register pair between 84 and 103, and it will stay there until the code becomes active again, or until the code is no longer broadcast by the engine.

When there is no active or inactive trouble code in a pair of registers, the registers will contain a value of 4294967295 or 0xFFFFFFFF.

If there is no occurrence count available for a code, an occurrence count of 0 will be reported.