

## RIO-2010 Modbus Function List

### 1 01 (0x01) Read Coils(Outputs)

#### 1.1 Request

Function code	1 Byte	<b>0x01</b>
Starting Address	2 Bytes	0x0000 to 0x0007
Quantity of coils	2 Bytes	1 to 8 (0x0008)

#### 1.2 Response

Function code	1 Byte	<b>0x01</b>
Byte count	1 Bytes	0x01
Coil Status	1 Bytes	

#### 1.3 Error

Function code	1 Byte	<b>0x81</b>
Exception code	1 Bytes	01 or 02

### 2 02 (0x02) Read Discrete Inputs

#### 2.1 Request

Function code	1 Byte	<b>0x02</b>
Starting Address	2 Bytes	0x0000 to 0x000F
Quantity of Inputs	2 Bytes	1 to 16 (0x0010)

#### 2.2 Response

Function code	1 Byte	<b>0x02</b>
Byte count	1 Bytes	N: 0x01 or 0x02
Input Status	N x 1 Bytes	

#### 2.3 Error

Function code	1 Byte	<b>0x82</b>
Exception code	1 Bytes	01 or 02

### 3 03 (0x03) Read Holding Registers

#### 3.1 Request

Function code	1 Byte	<b>0x03</b>
Starting Address	2 Bytes	0x0000
Quantity of Registers	2 Bytes	0x0001

### 3.2 Response

Function code	1 Byte	<b>0x03</b>
Byte count	1 Bytes	N: 0x00 to 0x30
Register value	N x 1 Bytes	

### 3.3 Error

Function code	1 Byte	<b>0x83</b>
Exception code	1 Bytes	01 or 02

### 3.4 Register value

1- wire DS18B20 thermometer uses 16-byte register value. Up to three 1-wire sensor can be supported.

2- Register definition for DS18B20 is as follow

#### 8-byte ID: 64-BIT LASERED ROM CODE:

8-BIT FAMILY CODE (28h)	28
48-BIT SERIAL NUMBER	8A
	21
	4A
	04
	00
	00
8-BIT CRC	6B

#### 8-bytes SCRATCHPAD data:

Temperature LSB	AC
Temperature MSB	01 (26.75 degrees Celsius)
TH Register or User Byte 1	4B
TL Register or User Byte 2	46
Configuration Register	7F
Reserved (FFh)	FF
Reserved	07
Reserved (10h)	10

Note: Byte count is 0 if there is no sensor

## 4 05 (0x05) Write Single Coil(Output)

### 4.1 Request

Function code	1 Byte	<b>0x05</b>
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Output Address	2 Bytes	0x0000 to 0x0007
Output Value	2 Bytes	0x0000 or 0xFF00

0xFF00:ON:Relay energized

0x0000:OFF:Relay de-energized

#### 4.2 Response

Function code	1 Byte	<b>0x05</b>
Output Address	2 Bytes	0x0000 to 0x0007
Output value	2 Bytes	0x0000 or 0xFF00

#### 4.3 Error

Function code	1 Byte	<b>0x85</b>
Exception code	1 Bytes	01 or 02

### 5 15 (0x0F) Write Multiple Coils(Outputs)

#### 5.1 Request

Function code	1 Byte	<b>0x0F</b>
Starting Address	2 Bytes	0x0000 to 0x0007
Quantity of Outputs	2 Bytes	0x0001 to 0x0008
Byte count	1 Byte	<b>N:</b> 0x01 or 0x02
Outputs Value	N x 1 Byte	

#### 5.2 Response

Function code	1 Byte	<b>0x0F</b>
Starting Address	2 Bytes	0x0000 to 0x0007
Quantity of Outputs	2 Bytes	0x0001 to 0x0008

#### 5.3 Error

Function code	1 Byte	<b>0x8F</b>
Exception code	1 Bytes	01 or 02