NavigateWorx

NR500 Series
Industrial Cellular VPN Router

Application Note 041

Modbus Slave

Version: V1.0.1
Date: May 2020
Status: Confidential

Directory

1. Introduction

1.1 Overview

This document contains information regarding the configuration and use of Modbus Slave.

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product, and of the requirements for their specific application.

1.2 Compatibility

This application note applies to:
Models Shown: NR500 series.
Firmware Version: V1.1.2(3be6e5a) or newer
Other Compatible Models: None

1.3 Version

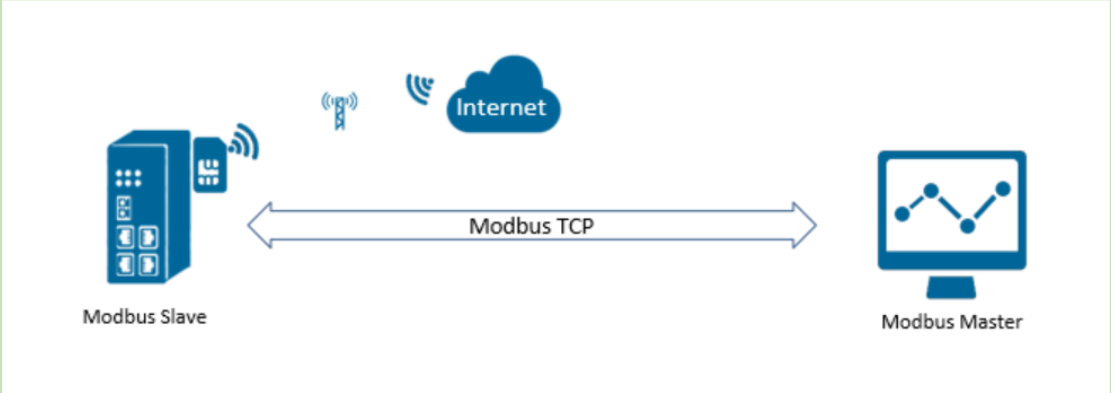
Updates between document versions are cumulative. Therefore, the latest document will include all the content of previous versions.

Release Date	Doc. Version	Firmware Version	Change Description
2019/07/18	V1.0.0	V1.1.0(ddcaac4)	First released
2020/05/13	V1.0.1	V1.1.2(3be6e5a)	Register Table changed

1.4 Corrections

Appreciate for corrections or rectifications to this application note, and if any request for new application notes please email to: **support@navigateworx.com**

2. Topology



1. NR500 router runs as Modbus Slave with static public IP address with SIM card.
2. Modbus Master connect to NR500 router (Modbus Slave) via TCP connection.
3. Modbus Master read the statue of Digital IO and control DO.

Note: For this Application Note will run the software "Modbus Poll" to simulate Modbus Master.

3. Digital IO Register Table

Index	Item	Function	Write Function	Address (Decimal)	Quantity	Value
1	Digital Input 1	02 Input Status	NULL	13800	1	0 - Low 1 - High
2	Digital Input 2	02 Input Status	NULL	13801	1	0 - Low 1 - High
3	Digital Output 1	01 Coil Status	05/15	13802	1	0 - Low 1 - High
4	Digital Output 1	01 Coil Status	05/15	13803	1	1 - Pulse
5	Digital Output 2	01 Coil Status	05/15	13804	1	0 - Low 1 - High
6	Digital Output 2	01 Coil Status	05/15	13805	1	1 - Pulse
7	DO1 Pulse Width	03 Holding Registers	06/16	13806	1	Default:500(ms) range:1~1000
8	DO2 Pulse Width	03 Holding Registers	06/16	13807	1	Default:500(ms) range:1~1000

Example: Read DI Status (DI1 High Level)

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Tx	01 90	00 00	00 06	01	02	35 E8	00 01

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Byte length	Value
Rx	01 90	00 00	00 04	01	02	01	01

Example: Read Two Register Values (DI1 and DI2 High Level)

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Tx	01 91	00 00	00 06	01	02	35 E8	00 02

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Byte length	Value
Rx	01 91	00 00	00 04	01	02	01	03

Example: Read DO Status (DO1 Output Low Level)

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Quantity
Tx	04 81	00 00	00 06	01	01	35 EA	00 01

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Byte length	Value
Rx	04 81	00 00	00 04	01	01	01	00

Example: Control DO1 Output High Level

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Tx	07 29	00 00	00 06	01	05	35 EA	FF 00

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Rx	07 29	00 00	00 06	01	05	35 EA	FF 00

Example: Control DO1 Output Low Level

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Tx	07 30	00 00	00 06	01	05	35 EA	00 00

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Rx	07 30	00 00	00 06	01	05	35 EA	00 00

Example: Control DO1 Output Pulse

Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Tx	07 31	00 00	00 06	01	05	35 EB	FF 00

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Rx	07 31	00 00	00 06	01	05	35 EB	FF 00

Example: Modify the width of the output pulse -- 500ms (The current output is Pulse to modify the width)

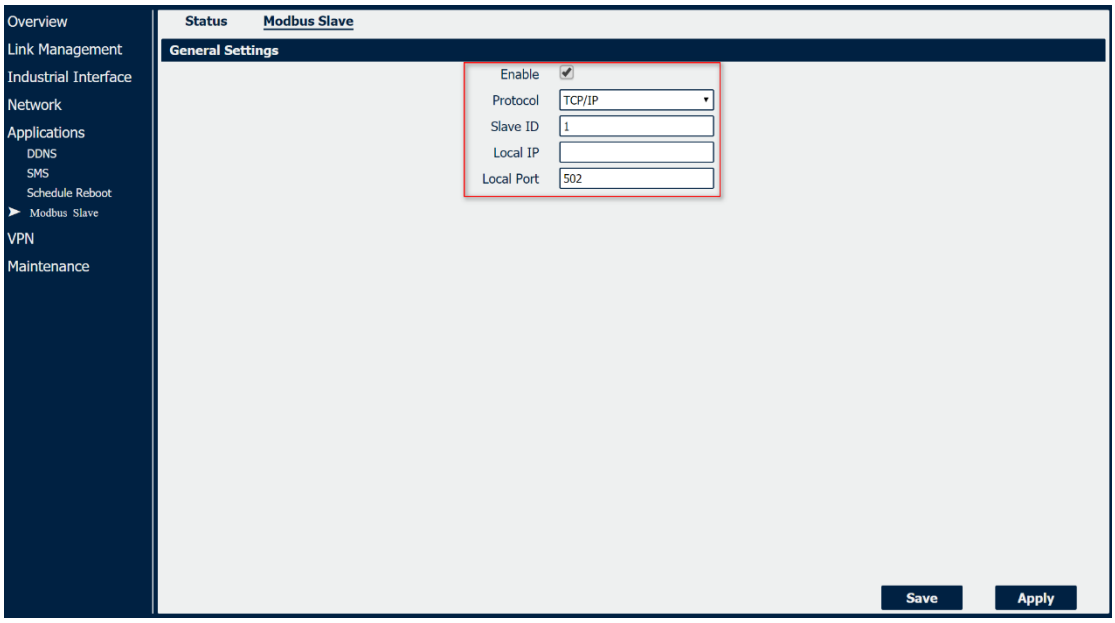
Master	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Tx	07 2C	00 00	00 06	01	06	35 EE	01 F4

Slave	Transaction id	Protocol id	Data length	Slave id	Function code	Address	Value
Rx	07 2C	00 00	00 06	01	06	35 EE	01 F4

4. Configuration

4.1 NR500 Pro Configuration

1. Go to **Application>Modbus Slave**, enable Modbus Slave feature like below:

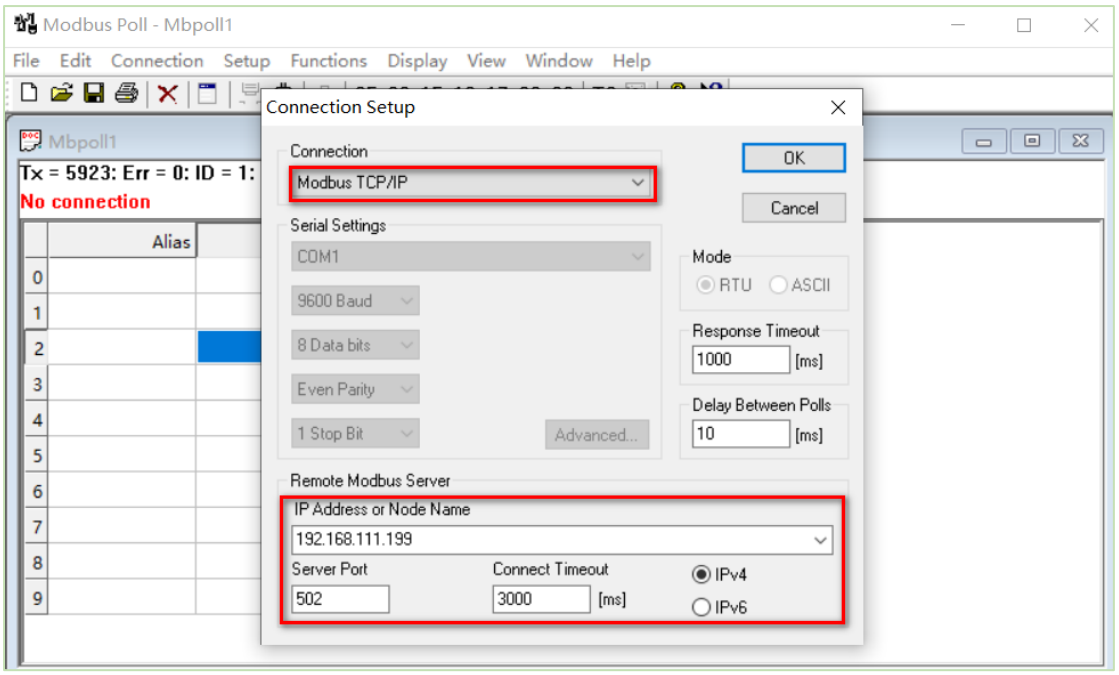


2. Click Save>Apply.

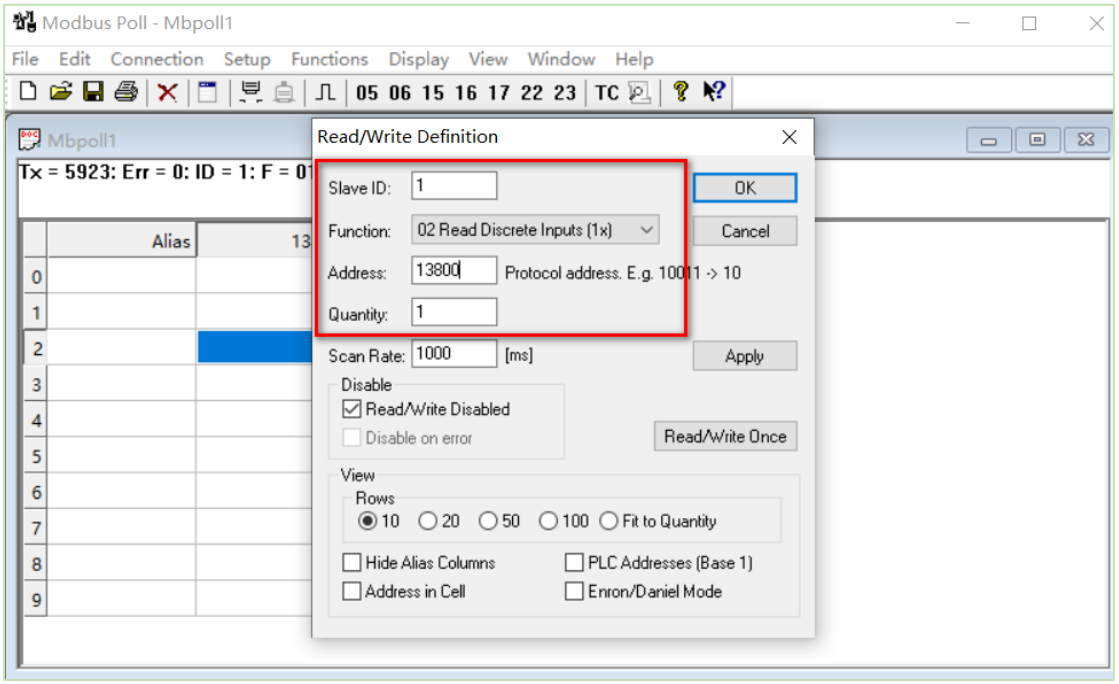
5. Testing.

5.1 Read Digital Input Status

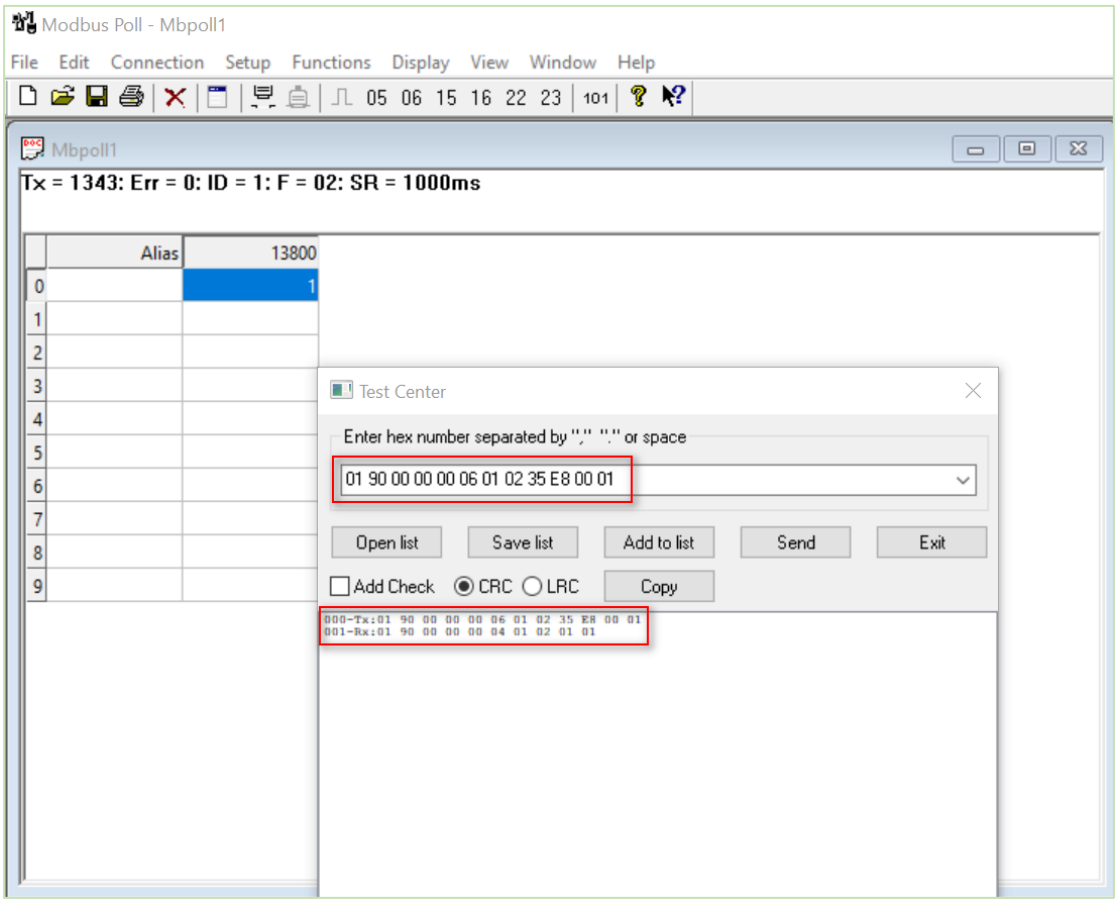
1. Run software "Modbus Poll" to connect to NR500 (Modbus Slave), like below: (Path: Connection>Connect)



(Path: Setup>Read/Write Definition)



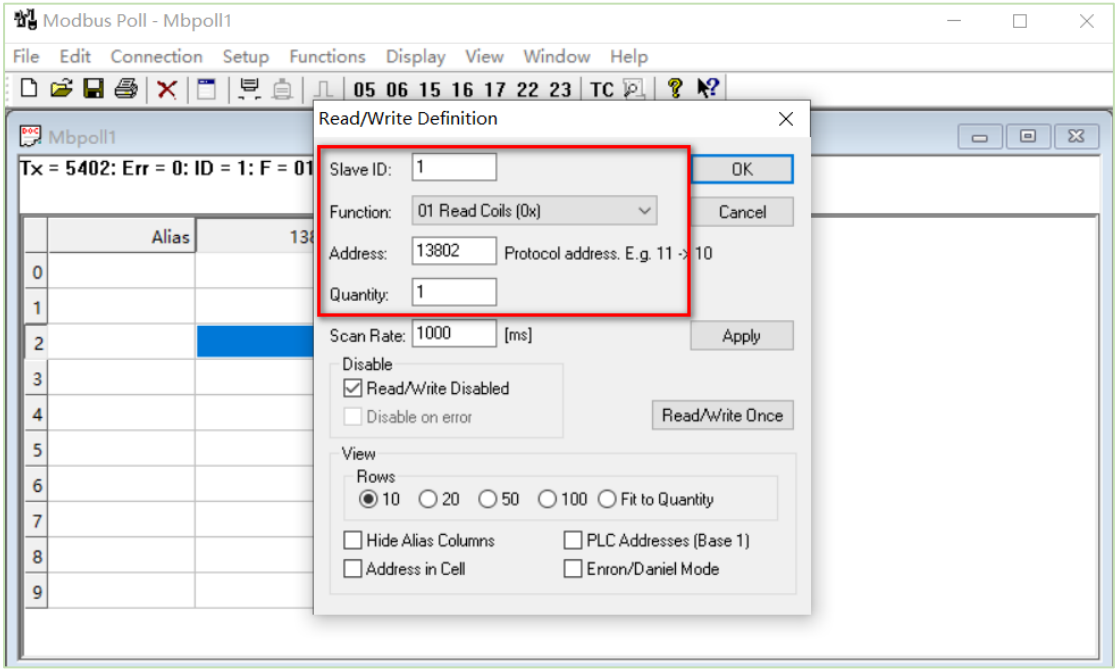
2. Send the command to read the status of DI1:
(Path: Functions>Test Center)



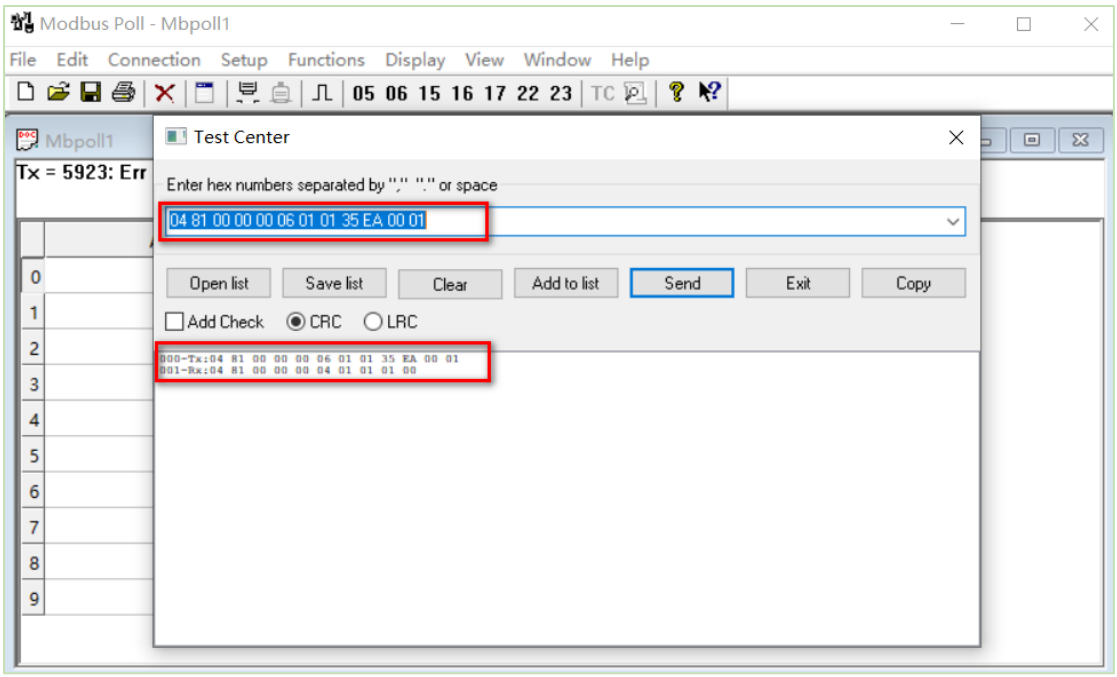
The reply Value is "01", DI1 status is "High". Test successfully.
Note: The meaning of "Tx" and "Rx" command, please refer to "Digital IO Register Table".

5.2 Read Digital Output Status

1. Set the Function Code to "01", Address is "13802" and Quantity is "1":
(Path: Setup>Read/Write Definition)



2. Send the command to read the status of DI1:
(Path: Functions>Test Center)

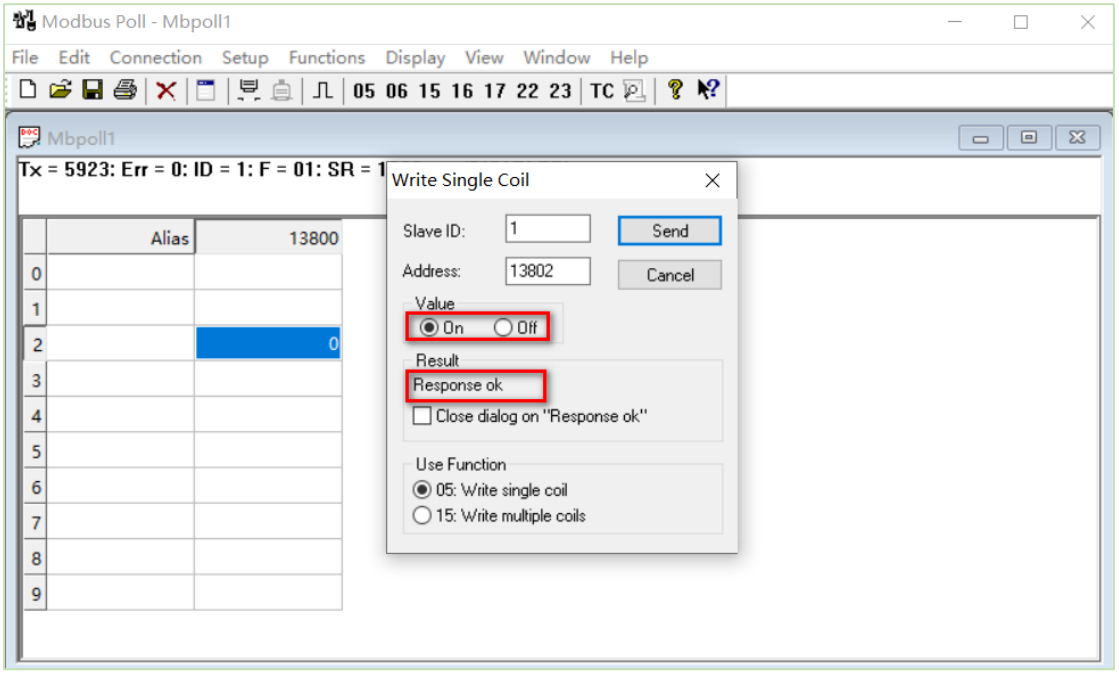


The reply Value is "00", DO1 status is "Low". Test successfully.

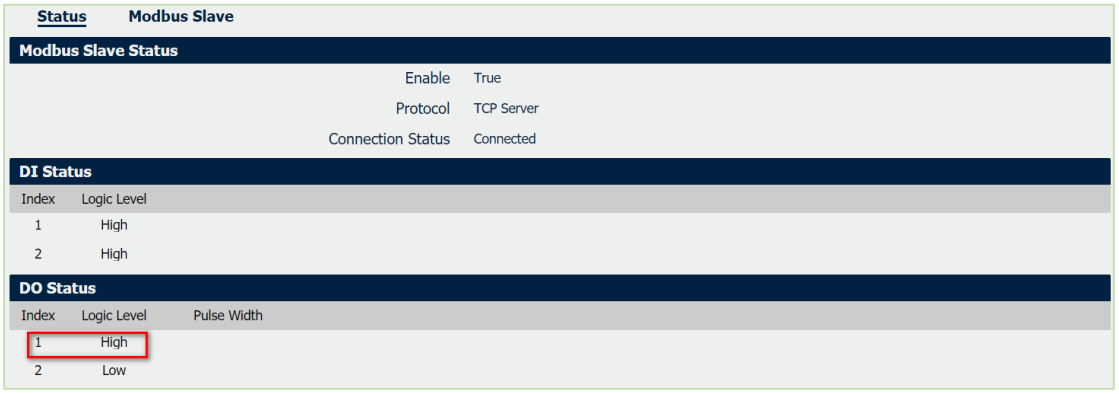
Note: The meaning of "Tx" and "Rx" command, please refer to "Digital IO Register Table".

5.3 Control Digital Output

Go to **Functions>05: Write Single Coils**, to change the DO statue from "0" to "1".



Go to Application>Modbus Slave>DO Status, the DO Logic Level change to High:



Test successfully.