

# **TERACOM TDO340 Modbus RTU Relay Output Module User Manual**

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**TERACOM TDO340 Modbus RTU Relay Output Module** 



### **FAQs**

- Q: What should I do if I need to switch dangerous voltages using the device?
  - A: If you need to switch dangerous voltages (over 30V), a skilled person must install the device in rooms with controlled access as per safety guidelines.

# **Short description**

The MODBUS RTU relay output module, model TDO340, is a dependable 4-channel SPST device featuring independent contacts. It fully supports the MODBUS RTU protocol, enabling you to configure relay safety statuses both at startup and in the event of communication loss, ensuring continued system protection. The module is equipped with a watchdog function that detects communication failures and takes prompt action to maintain safety. Additionally, the TDO340 utilizes nonvolatile memory to retain and restore relay states following power outages. This device can be used as a relay output extension for MODBUS RTU master devices.

### **Features**

- RS-485 interface supporting up to 63 nodes
- Non-volatile memory for the relays' status
- · LED indicator for communication status
- · Watchdog functionality for communication loss
- · Reinforced isolation of relay contacts
- Built-in 120 ohms termination resistor
- · DIN rail mounting
- Firmware update via the interface

# **Applications**

- AC/DC consumers commutation;
- Industrial process control;

# **Specifications**

### · Physical characteristics

• **Dimensions**: 52x91x59mm (3-module enclosure)

• Weight: 101g

Mounting: On 35 mm DIN top-hat rail

#### Environmental limits

Operating temperature range: -20 to 60°C

• Operating relative humidity range: 10 to 90% (non-condensing)

Storage temperature range: -25 to 65°C

Storage relative humidity range: 5 to 95% (non-condensing)

• Ingress protection: IP40 (connections IP20)

# · Power supply

 Operating voltage range (including -15/+20% according to IEC 62368-1): 5 to 28VDC Current consumption: 130mA@5V

# · Relay outputs

• Maximum switching current: 3A

• Maximum switching AC voltage: 250V

Maximum switching DC voltage: 30V

• Rated load: 3A at 250VAC, resistive, 50k cycles

3A at 30VDC, resistive, 30k cycles

• Isolation: 4000 Vrms coil to contact

1000 Vrms between open contacts

**Caution!** If TDO340 is used to switch dangerous voltages (over 30V), a skilled person must install the device in rooms with controlled access.

#### Interface

• Protocol: Modbus RTU

Physical layer: RS-485 serial line

Number of bus transceivers: up to 63
 Bus cable: Twisted, shielded, 2×0.5mm²

Response time ≤ 50ms

Master response time-out ≥ Response time + Answer time The answer time depends on the number of bits and the baud rate.

### Connectors

• Communication: 3.81mm pitch screwless pluggable for 28 to 16 (AWG) / 0.081 to 1.31 (mm²) wires

• Relay outputs: 5.08mm pitch screwless pluggable for 26 to 14 (AWG) / 0.2 to 1.5 (mm²) wires

# Warranty

Warranty period: 3 years

### **Indicators**

The status of the device is shown by "Status" LED:

- If the LED blinks every 1 second, the sensor is working properly;
- If the LED blinks every 3 seconds, there is no communication with the controller;
- If the LED does not blink, there is no power supply.

Each relay has a dedicated LED to show its status. A lit LED means the relay is activated (contacts are closed)

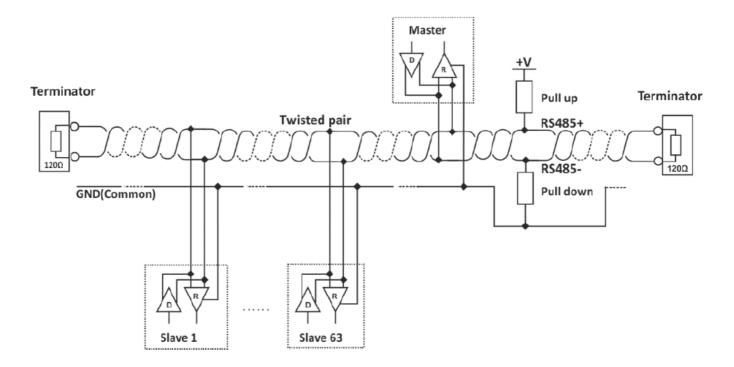
## **Pinout**

- 5-pins connector
  - 1 +VDD (5 to 28)
  - 。 2 GND
  - · 3 RS485+
  - · 4 RS485-
  - 5 Terminator
- 8-pins connector
  - 1-2 Relay 1 NO contacts
  - 3-4 Relay 2 NO contacts
  - 5-6 Relay 3 NO contacts
  - 7-8 Relay 4 NO contacts

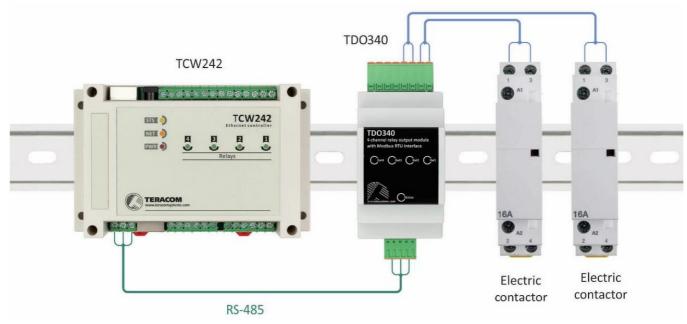


# Installation

According to modbus.org, the "Two-Wire" MODBUS definition states: "A MODBUS solution over a serial line should implement a "Two-Wire" electrical interface in accordance with the EIA/TIA-485 standard. On such a "Two-Wire" topology, only one driver can transmit at any time. Additionally, a third conductor must interconnect all the devices on the bus – the common."



A daisy-chain (linear) topology and UTP/FTP cables are strongly recommended for multiple sensors. For proper operation of the interface, terminators (120 ohms resistors) must be installed at both ends of the bus. The device has a built-in 120-ohm resistor. To terminate the bus, the "RS485-" and "Term" terminals must be shorted.



# **Factory default settings**

- · Disconnect the power supply.
- Press and hold the "Setup" button.
- While holding the button, connect the power supply.
- The status LED will turn ON for 3 seconds, then flash for 7 seconds, and finally turn ON again.
- Release the button. The device will restart with factory default settings.

# Firmware update

 The firmware of the device can be updated by Teracom controller with MODBUS RTU supports or MBRTUUpdate software.

- To put the sensor in update mode, follow these steps:
- Disconnect the sensor from the bus and the power supply.
- Press and hold the "Setup" button. While holding the button, reconnect the power supply.
- The status LED will turn ON for 3 seconds. During these 3 seconds, release the button and press it 3 times to] enter update mode.
- In update mode, the status LED will remain ON permanently.
- Important: The sensor can be updated only if it is the sole device on the bus.

# Modbus address table

Register name	R/W	FC	Decimal addre		Data size	Defaul					
			PDU	Logical	Dala Size	t	Valid values				
Holding registers	Holding registers										
RS-485 address	R/W	3, 6, 1 6	10	40011	uint16	1	1 to 247				
Baud rate *	R/W	3, 6, 1 6	11	40012	uint16	19200	2400, 4800, 9600, 192 00, 38400, 57600				
Parity, data, stop bits *	R/W	3, 6, 1 6	12	40013	uint16	1	1=E81, 2=O81, 3=N81				
Device code	R	3	14	40015	uint16		0x00DF				
FW version	R	3	15	40016	uint16						
Vendor URL	R	3	18	40019	64 bytes UTF-8		teracomsystems.com				
Unsigned integer test value	R	3	91	40092	uint16		999(0x03E7)				
All relay outputs, binary	R/W	3	100	40101	uint16		0b000000000000000000000000000000000000				
All relay outputs, billary	11/00		100	40101	unitro		11				
							0b00000000000000000				
Relay 1 output, binary	R/W	3	101	40102	uint16		to 0b00000000000000000000000000000000000				
							0b00000000000000000				
Relay 2 output, binary	R/W	3	102	40103	uint16		to 0b00000000000000000000000000000000000				

Relay 3 output, binary	R/W	3	103	40104	uint16		0b000000000000000000000000000000000000
Relay 4 output, binary	R/W	3	104	40105	uint16		0b000000000000000000000000000000000000
Relays after power on	R/W	3	200	40201	uint16	0	0 – all relays will retur n to the last successful ly set states  1 – all relays will be a ctivated  2 – all relays will be d eactivated  3 – relays will follow s ettings in registers 201 to 204
Relay 1 after power on	R/W	3	201	40202	uint16	0	0 – relay will return to the last successfully set state 1 – relay will be activated 2 – relay will be deactivated
Relay 2 after power on	R/W	3	202	40203	uint16	0	<ul> <li>0 – relay will return to the last successfully s et state</li> <li>1 – relay will be activa ted</li> </ul>
							2 – relay will be deactivated
Relay 3 after power on	R/W	3	203	40204	uint16	0	0 – relay will return to the last successfully set state 1 – relay will be activated 2 – relay will be deactivated

Relay 4 after power on	R/W	3	204	40205	uint16	0	0 – relay will return to the last successfully set state 1 – relay will be activated 2 – relay will be deactivated
Relay1 behavior in case of no communication with the device for a period longer than the Timeout (set in register 305)	R/W	3	301	40302	uint16	0	0 - relay will remain in its last state; no chang es  1 - relay will be activa ted 2 - relay will be de activated  3 - relay will be switch ed to the opposite stat e for the duration set in register 306; The pulse  can be used to reset a nother device.
Relay2 behavior in case of no communication with the device for a period longer than the Timeout (set in register 305)	R/W	3	302	40303	uint16	0	0 - relay will remain in its last state; no chang es  1 - relay will be activa ted 2 - relay will be de activated  3 - relay will be switch ed to the opposite stat e for the duration set in register 306; The pul se can be used to rese t another device.

Relay3 behavior in case of no communication with the device for a period longer than the Timeout (set in register 305)	R/W	3	303	40304	uint16	0	0 – relay will remain in its last state; no chang es  1 – relay will be activa ted 2 – the relay will be deactivated  3 – relay will be switch ed to the opposite stat e for the duration set in register 306; The pul se can be used to rese t another device.
Relay4 behavior in case of no communication with the device for a period longer than the Timeout (set in register 305)	R/W	3	304	40305	uint16	0	0 - relay will remain in its last state; no chang es  1 - relay will be activa ted 2 - relay will be de activated  3 - relay will be switch ed to the opposite stat e for the duration set in register 306; The pul se can be used to rese t  another device.
Timeout of no communication with the device over MODBUS RTU	R/W	3	305	40306	uint16	0	0 – Infinity communication timeou t 1 to 65535 – timeout in seconds
Watch-dog pulse period	R/W	3	306	40307	uint16	1	1 to 255 – pulse period in seconds
Discrete outputs							

Relay 1	R/W	1, 5	1	2	bit	0	0 or 1
Relay 2	R/W	1, 5	2	3	bit	0	0 or 1
Relay 3	R/W	1, 5	3	4	bit	0	0 or 1
Relay 4	R/W	1, 5	4	5	bit	0	0 or 1

- The shown logic decimal addresses are calculated with offsets 1 (discrete outputs) and 40001 (holding registers).
- PDU address the actual address used in a Modbus Protocol Data unit, transmitted over the bus;
  - The settings will take effect after restarting the device by power off, and power on.

# Recycling

- · Recycle all applicable materials.
- Do not dispose of in the regular household refuse.

## **MORE INFORMATION**

• www.teracomsystems.com

## **Documents / Resources**



TERACOM TDO340 Modbus RTU Relay Output Module [pdf] User Manual TDO340 Modbus RTU Relay Output Module, TDO340, Modbus RTU Relay Output Module, Rel ay Output Module, Output Module

# References

- Remote monitoring and control solution for your automation challenges
- User Manual

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