TERACOM Systems TD1340 SO Pulse Counter User Manual

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TERACOM Systems TD1340 SO Pulse Counter

Specifications

- Weight: 60g
- Operating voltage range: 5 to 30VDC
- Isolation: Functional, 1kV DC
- Maximum count value: 2^32 – 1
- Maximum input voltage: +5.5VDC
- Maximum source impedance for 0 reading: 800Ohm
- Minimum source impedance for 1 reading: 1MOhm
- Current max. (With 0-ohm source impedance): 3mA
- Maximum frequency for edge counter mode: 100Hz
- Polling period: 10ms
- Protocol: Modbus RTU
- Physical layer: RS-485 serial line

Product Usage Instructions

Installation:
For proper installation, follow these steps:

1. Implement a Two-Wire electrical interface according to EIA/TIA-485 standards.
2. Use a daisy-chain (linear) topology and UTP/FTP cables for multiple sensors.
3. Install terminators (120-ohm resistors) at both ends of the bus.
4. To terminate the line, Line-B and Term must be shortened.

Factory Default Settings:
To reset the device to factory default settings:

1. Disconnect the power supply.
2. Press and hold the Setup button.
3. Connect the power supply without releasing the button.
4. The status LED will indicate the reset process.
5. Release the button after the LED indicates completion.

Short description

TDI340 is a S0 pulse counter with the MODBUS RTU interface. It has 4 isolated digital inputs, complying with the S0 standard 62053-31. The S0 pulse counter works in polling or edge modes. In edge mode, it can be set up to count on rising, falling, and both edges. The device is dedicated to the S0 pulse counter, but it also provides simultaneous readings for the state of the digital inputs – OPEN/CLOSE. Independent delays for Low-To-High and High-To-Low transitions can be applied. The delays are from 0 to 656 seconds in a 10mS step and work if the counter for the corresponding digital input is in polling mode.

Features

- RS-485 interface carrying up to 63nodess;
- Non-volatile memory for the counters;
- LED indicator for the status of communication;
- Isolated digital inputs;
- 32-bit counters;
- Built-in 120ohms termination resistor;
- DIN rail mounting;
- Firmware update via the interface.

Applications

- Remote monitoring of measurement device with an S0 output;
- Remote data acquisition;
- Industrial process control.
- Process monitoring.
- Energy management.

Specifications

- Physical characteristics
- Dimensions: 35x86x59mm2-modulele enclosure)
- Weight: 60g
- 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 30VDC
- Current consumption: 50mA@5V

Digital inputs

- Isolation: Functional, 1kV DC
- Independent modes: OPEN/CLOSED (“Dry contact”) and COUNTER (S0 compatible)
- Maximum count value: 232 – 1
- Maximum input voltage: +5.5VDC
- Maximum source impedance for “0” reading: 800Ohm
- Minimum source impedance for “1” reading: 1MOhm
- Current max. (With 0-ohm source impedance): 3mA
- Maximum frequency for edge counter mode: 100Hz
- Polling period: 10ms
- L- H/H-L transition delay interval: 0 to 65535 x (polling period); not available for edge counter mode

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

      Type: 3.81mm pitch screwless pluggable for 28 to 16 (AWG) / 0.081 to 1.31 (mm²) wires
- Warranty

  Warranty period: 3 years

Status indicator

The status of the device is shown by a single LED, located behind the semitransparent front panel:

- If the LED blinks for a period of 1 second, the sensor works properly;
- If the LED blinks for 3 seconds, there isn‘t communication with the controller;
- If the LED doesn‘t blink, there isn‘t a power supply.

Pinout

- 5-pins connector

  1 – +VDD (5 to 30)

  2 – GND

  3 – RS485+ (A+)

  4 – RS485- (B-)

  5 – Terminator
- 6-pins connector

  1 – Digital input 1 (S01+)

  2 – SGND

  3 – Digital input 2 (S02+)

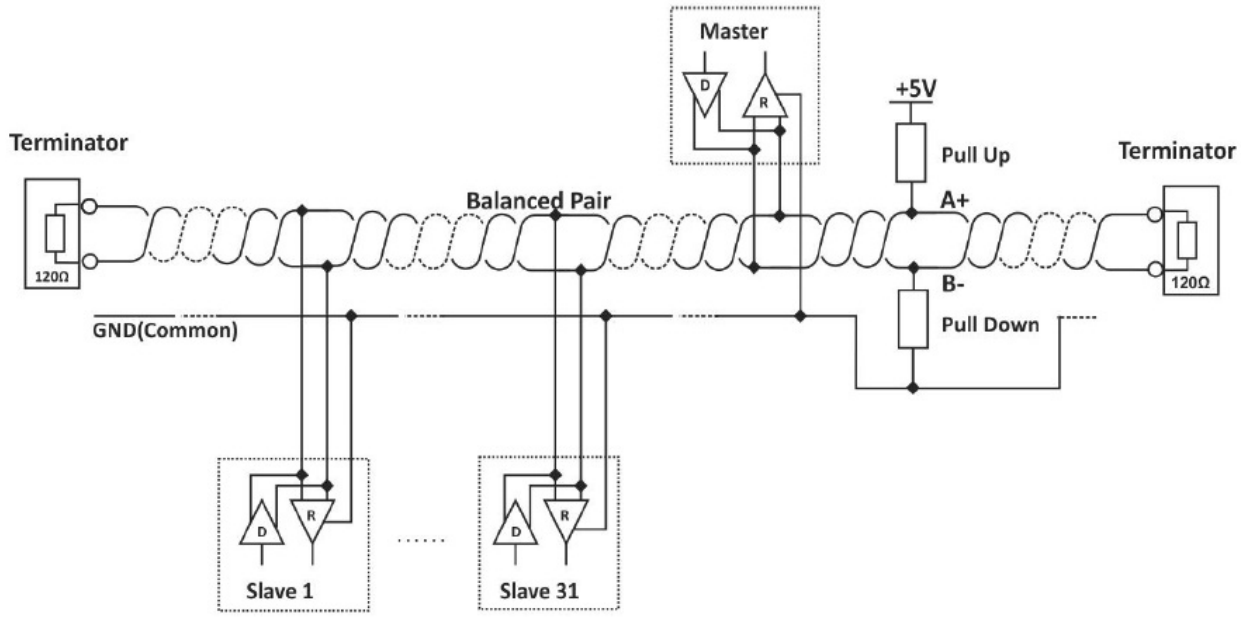
  4 – Digital input 3 (S03+)

  5 – SGND

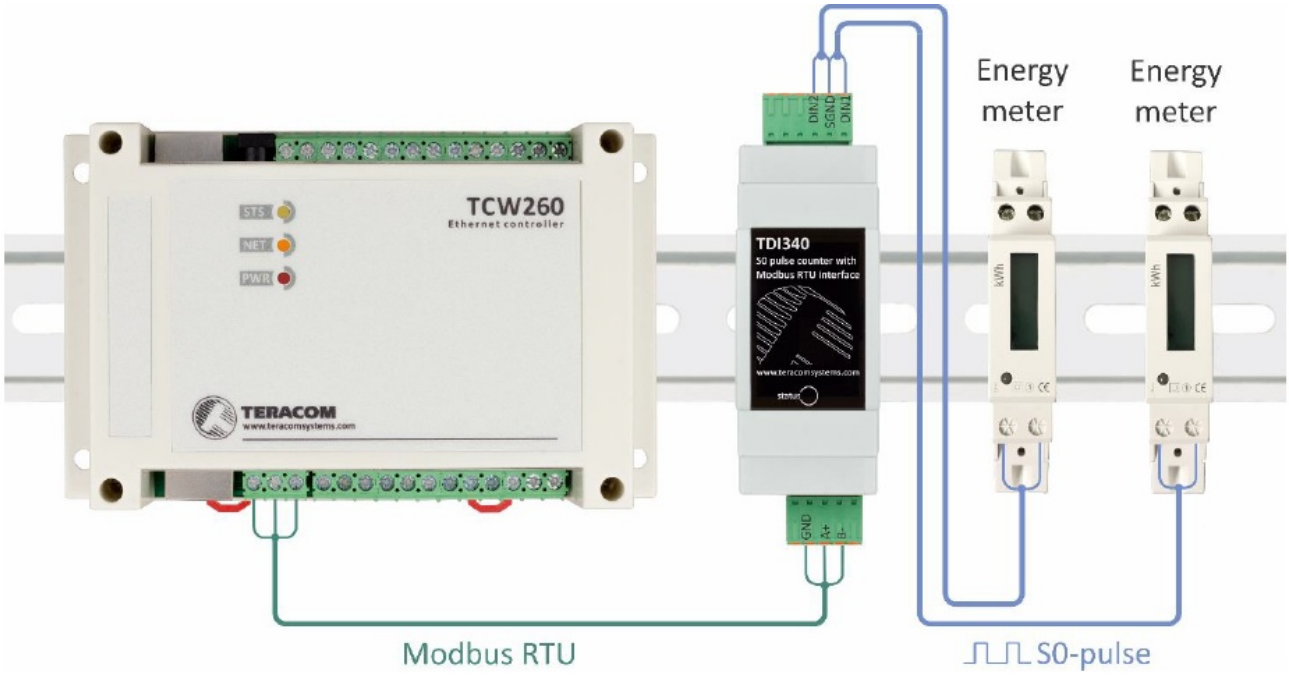
  6 – Digital input 4 (S04+)

Installation

The two-wire MODBUS definition, according to modbus.org:
“A MODBUS solution over a serial line should implement a’ ‘Two-Wire’ electrical interface by EIA/TIA-485 standard. On such a “Two-Wire” topology, at any time, one driver only has the rightto transmitg.Aa third conductor must also interconnect all the devices of the bus – the common.”



A daisy-chain (linear) topology and UTP/FTP cables for multiple sensors are strongly recommended. 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 and to terminate the line, “Line-B-“and “Term” must be shortened.



Factory default settings

- Disconnect the power supply.
- Press and hold the “Setup” button. Connect the power supply, not releasing the button.
- The status LED will be ON for 3 seconds and after this will flash for 7 seconds. After that, the LED will be ON again. Release the button. The device will restart withthe factory default settings.

Firmware update

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

- To put the sensor in update mode, do the following:
- Disconnect the sensor from the bus. Disconnect the power supply.
- Press and hold the “Setup” button. Connect the power supply, not releasing the button.
- The status LED will be ON for 3 seconds. If in these 3 seconds, the button is released and pressed 3 timess the device goes into update mode.
- In the update mode status LED will be ON permanently.

Important: The sensor can be updated only if it is alone on the bus.

Modbus address table

Register name	R/W	FC	PDU decimal address	Logical decimal address	Data size	Default	Valid values
Holding registers							
RS-485 address	R/W	3,6,16	10	40011	uint16	1	1 to 247
Baud rate *	R/W	3,6,16	11	40012	uint16	19200	2400, 4800, 9600, 19200, 38400, 57600
Parity, data, stop bits *	R/W	3,6,16	12	40013	uint16	1	1=E81, 2=O81, 3=N81
Data order	R/W	3,6,16	13	40014	uint16	1	1=MSWF (MSW, LSW) 2=LSWF (LSW, MSW)
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
Counter mode Input1	R/W	3,6,16	110	40111	uint16	2	1=Polling 2=Edge
Counter edge Input1	R/W	3,6,16	111	40112	uint16	1	1=Rising 2=Falling 3=Both
Pulses per real value Input1	R/W	3,6,16	112	40113	uint16	2000	0 to 65535

Delay Low-to-High Input1 (x 10mS)	R/W	3,6,16	113	40114	uint16	0	0 to 65535
Delay High-to-Low Input1 (x10mS)	R/W	3,6,16	114	40115	uint16	0	0 to 65535
Counter mode Input2	R/W	3,6,16	120	40121	uint16	2	1=Polling 2=Edge
Counter edge Input2	R/W	3,6,16	121	40122	uint16	1	1=Rising 2=Falling 3=Both
Pulses per real value Input2	R/W	3,6,16	122	40123	uint16	2000	0 to 65535
Delay Low-to-High Input2 (x 10mS)	R/W	3,6,16	123	40124	uint16	0	0 to 65535
Delay High-to-Low Input2 (x10mS)	R/W	3,6,16	124	40125	uint16	0	0 to 65535
Counter mode Input3	R/W	3,6,16	130	40131	uint16	2	1=Polling 2=Edge
Counter edge Input3	R/W	3,6,16	131	40132	uint16	1	1=Rising 2=Falling 3=Both
Pulses per real value Input3	R/W	3,6,16	132	40133	uint16	2000	0 to 65535
Delay Low-to-High Input3 (x 10mS)	R/W	3,6,16	133	40134	uint16	0	0 to 65535
Delay High-to-Low Input3 (x10mS)	R/W	3,6,16	134	40135	uint16	0	0 to 65535
Counter mode Input4	R/W	3,6,16	140	40141	uint16	2	1=Polling 2=Edge

Counter edge Input4	R/W	3,6,16	141	40142	uint16	1	1=Rising 2=Falling 3=Both
Pulses per real value Input4	R/W	3,6,16	142	40143	uint16	2000	0 to 65535
Delay Low-to-High Input4 (x 10mS)	R/W	3,6,16	143	40144	uint16	0	0 to 65535
Delay High-to-Low Input4 (x 10mS)	R/W	3,6,16	144	40145	uint16	0	0 to 65535
All digital inputs binary	R	3	200	40201	uint16		0b0000000000000000 to 0b000000000000111 1
Digital Input1 binary	R	3	201	40202	uint16		0b0000000000000000 to 0b000000000000000 1
Digital Input2 binary	R	3	202	40203	uint16		0b0000000000000000 to 0b000000000000000 1
Digital Input3 binary	R	3	203	40204	uint16		0b0000000000000000 to 0b000000000000000 1
Digital Input4 binary	R	3	204	40205	uint16		0b0000000000000000 to 0b000000000000000 1

Counter Input1 32-bit	R/W	3,6,16	210	40211	uint32		
Counter Input2 32-bit	R/W	3,6,16	212	40213	uint32		
Counter Input3 32-bit	R/W	3,6,16	214	40215	uint32		
Counter Input4 32-bit	R/W	3,6,16	216	40217	uint32		
Counter Input1 LOW 16-bit	R/W	3,6,16	220	40221	uint16		The HIGH 16-bits are z ero after writing

Counter Input2 LOW 16-bit	R/W	3,6,16	221	40222	uint16		The HIGH 16-bits are zero after writing.ng
Counter Input3 LOW 16-bit	R/W	3,6,16	222	40223	uint16		The HIGH 16-bits are zero after writing
Counter Input 4 LOW 16-bit	R/W	3,6,16	223	40224	uint16		The HIGH 16-bits are zero after writing.
Counter Input1 real value	R	3	230	40231	32-bit float		Counter Input1/ (Pulses per real value Input1)
Counter Input2 real value	R	3	232	40233	32-bit float		Counter Input2/ (Pulses per real value Input2)
Counter Input 3 real value	R	3	234	40235	32-bit float		Counter Input3/ (Pulses per real value Input3)
Counter Input 4 real value	R	3	236	40237	32-bit float		Counter Input4/ (Pulses per real value Input4)
Float test value (MSW)	R	3	840	40841	32-bit float		-9.9(0xC11E6666)
Float test value (LSW)	R	3	842	40843	32-bit float		-9.9(0xC11E6666)
Signed integer test value	R	3	844	40845	sint16		-999(0xFC19)
Signed integer test value (MSW)	R	3	845	40846	sint32		-99999(0xFFFE7961)
Signed integer test value (LSW)	R	3	847	40848	sint32		-99999(0xFFFE7961)
Unsigned integer test value	R	3	849	40850	uint16		999(0x03E7)
Unsigned integer test value (MSW)	R	3	850	40851	uint32		99999(0x0001869F)
Unsigned integer test value (LSW)	R	3	852	40853	uint32		99999(0x0001869F)
Discrete inputs							

Input1	R	2	1	10002	bit		0 or 1
Input2	R	2	2	10003	bit		0 or 1
Input3	R	2	3	10004	bit		0 or 1
Input4	R	2	4	10005	bit		0 or 1

- The shown logic decimal addresses are calculated with offsets 10001 (discrete inputs) and 40001 (holding registers). MSW – Most significant word first – (bits 31 … 16), (bits 15 … 0);
- LSW – Least significant word first – (bits 15 … 0), (bits 31 … 16);
- PDU address – Actual address bytes used in a Modbus Protocol Data Unit;
- A “NaN” value is returned for unavailable floating-point values (e.g., in case of error);
- The settings will take effect after restarting the device by bypoweringr off, powering on.

Recycling

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

TDI340-R1.8 – September 2024

FAQS

- **Q: What is the maximum count value supported by the device?**
  A: The maximum count value supported is 2^32 – 1.
- **Q: What is the recommended polling period for the device?**
  A: The recommended polling period is 10 ms.
- **Q: How can I reset the device to factory default settings?**
  A: To reset the device to factory default settings, follow the steps mentioned in the user manual under “Factory Default Settings.”

Documents / Resources

	TERACOM Systems TD1340 SO Pulse Counter [pdf] User Manual TDI340-R1.8, TD1340 SO Pulse Counter, TD1340, SO Pulse Counter, Pulse Counter, Counter

References

- User Manual

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