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# User's Guide

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# TSD600

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Customer Service: 1-800-622-2378 (USA & Canada only)
Engineering Service: 1-800-872-9436 (USA & Canada only)
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The TSD600 is a temperature indicator, data logger, alarm unit and configuration tool for Omega infrared temperature sensors. It is compatible with all models in the OS210-C4 and OS-MINIHUB series, as well as all OS-MINI and OS-MINIFB models with Modbus output.

The TSD600 functions as the Modbus Master on an RS485 network of up to 6 temperature sensors, and can itself be connected as a slave device to another RS485 network via a second, isolated Modbus interface. This allows multiple TSD600 units to be multi-dropped to create a large network of sensors and displays.

Optional alarm relay modules allow the TSD600 to be connected to alarm equipment such as sounders and beacons, and optional analogue output modules allow it to be connected to non-Modbus instrumentation.

All the configurable parameters for the hub, the connected sensors and the optional output modules are adjustable via the TSD600's built-in resistive touch screen interface, which can be operated even with gloves on.

With an optional MicroSD Card inserted, the TSD600 functions as a fully-configurable data logger.

## SPECIFICATIONS

| | | |
|---|---|---|
| **Display** | 2.83" (72 mm) resistive touch TFT,<br>320 x 240 pixels, backlit | |
| **Supply Voltage** | 10 to 30 V DC | |
| **Maximum Current Draw** | 100 mA | |
| **Ambient Temperature Range** | 0°C to 60°C | |
| **Relative Humidity** | Maximum 95%, non-condensing | |
| **Configurable Parameters (global)** | Temperature units, date and time, data logging, graph channels, alarm logging | |
| **Configurable Parameters (per channel)** | Signal processing, emissivity setting, reflected energy compensation, alarms, Modbus address | |
| **Alarm Configuration** | 12 alarms (2 per sensor) with adjustable level, individually configurable as HI or LO. | |
| **Temperature Units** | °C or °F selectable | |
| **Temperature Resolution** | 0.1° below 1000°; 1° above 1000° | |
| **Signal Processing** | Average, peak hold, valley hold, minimum, maximum | |
| **Display Sample Period** | 120 ms per device (720 ms in total for 6 devices) | |
| **Compatible Sensor Types** | OS201-C4 (all models),<br>OS-MINIHUB (all models),<br>OS-MINI (-BB and -BRT models),<br>OS-MINIFB (–BRT models) | |
| **Compatible Output Module Types** | ICP DAS M-7061<br>ICP DAS M-7024 | 12-channel relay output module<br>4-channel analogue output module, selectable V/mA |

| MECHANICAL | |
|---|---|
| **Dimensions** | 98(w) x 64(h) x 36(d) mm excluding cable glands |
| **Weight** | 280 g |

## DATA LOGGING

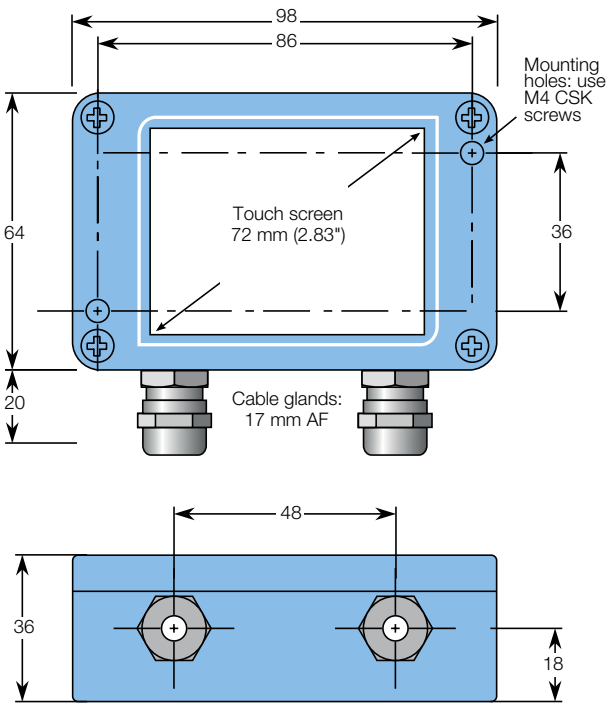
With an optional MicroSD Card installed in the slot inside the TSD600, data logging may be manually started and stopped via a button on the temperature display screen, or scheduled to begin at a pre-determined time via the Settings menu.

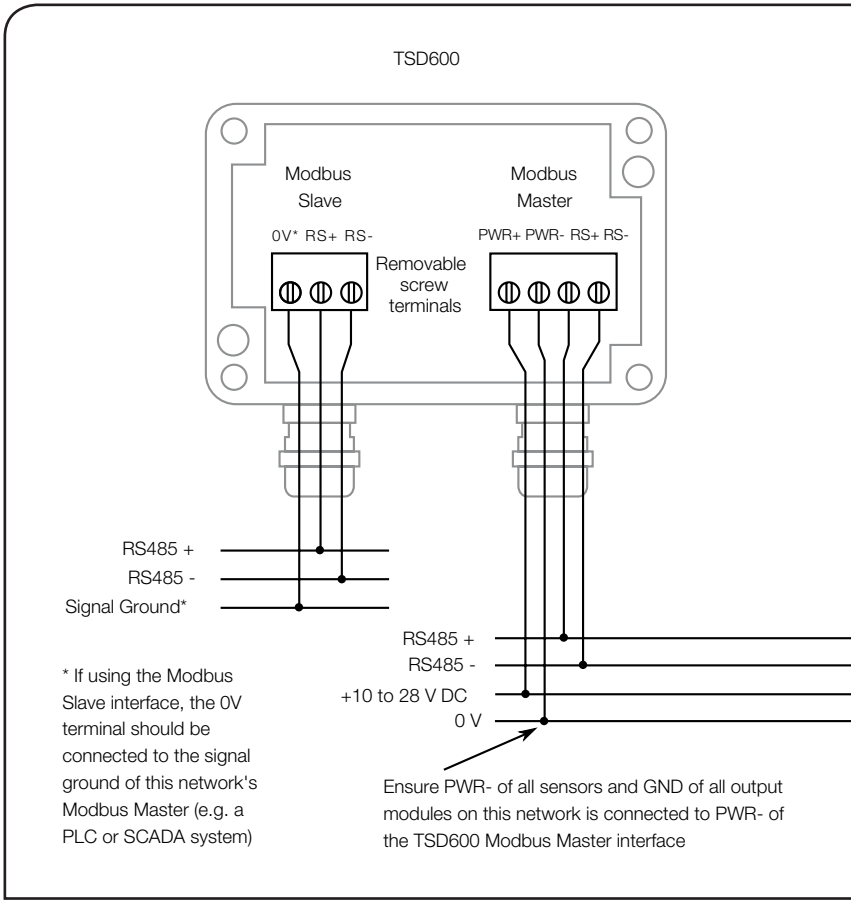
If the TSD600 is connected via the slave interface to another Modbus network, logging may also be started remotely by the Modbus Master on that network.

## DATA LOGGING SPECIFICATIONS

| | |
|---|---|
| **Logging Interval** | 1 to 86,400 seconds (1 day) |
| **MicroSD Card** | Max. capacity: 32 GB (not included) |
| **Internal Clock Battery** | 1 x BR 1225 3V (not included) |
| **Variables Logged** | Target temperature, sensing head temperature, alarm events |
| **File Format** | .csv (can be imported to Excel) |
| **Configurable Parameters** | Sample period, number of samples, scheduled start date and time |

## DIMENSIONS (MM)






The TSD600 has removable screw terminal blocks for the Modbus Slave and Modbus Master interfaces.

- Connect the Master interface to the sensors and output modules. Be sure to check the power supply requirements of each device before applying power.
- Optionally, connect the Slave interface to another Modbus network with its own Modbus Master such as a PLC or SCADA system.

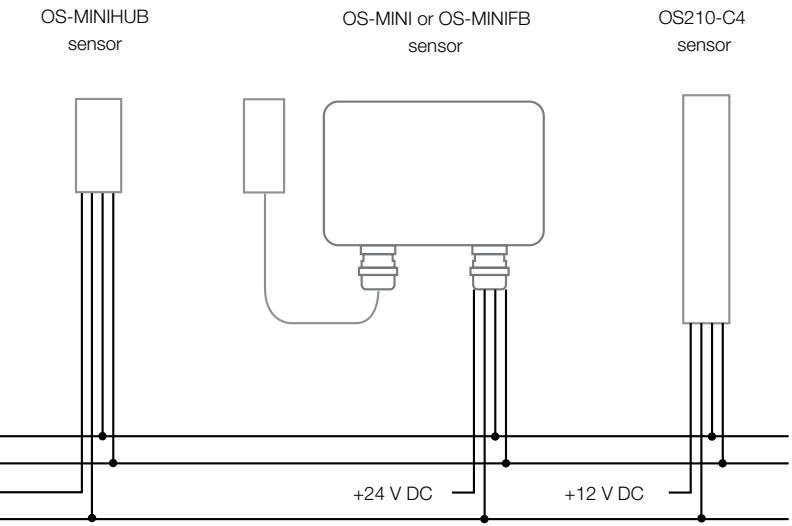
Isolation is provided between the Slave and Master interfaces.

**MICROSD CARD AND BATTERY**

The MicroSD Card and battery slots are located on the touch screen circuit board. Unscrew the lid of the TSD600 to access them.

The battery is optional. With a battery fitted, the internal clock will continue to run when the power is off. Without a battery, the unit will request the date and time each time the power is cycled.

All other settings are stored in the unit's permanent memory and will be preserved when it is switched off, regardless of whether a battery is fitted.




**PASSWORD**

The default password is 1234. The password may be changed via the touch screen interface.

**USING THE TOUCH SCREEN INTERFACE**

Visit www.omega.com for help on how to use the touch screen interface, including a diagram showing how to navigate to each setting.

## MODBUS OVER SERIAL LINE (RS485)

**INTERFACE**

**Baud rate** 9600
**Format** 8 data, No parity, 1 stop bit
**Reply delay (ms)** 20

**SUPPORTED FUNCTIONS**

**Read register** 0x03, 0x04
**Write single register** 0x06
**Write multiple register** 0x10

The list below includes all available addresses:
R = Read, W = Write

| Address | Length (words) | Description | R/W |
|---|---|---|---|
| 0x0000 | 1 | MODBUS slave address | R/W |
| 0x0001 | 7 | Sensor identification string in ASCII | R |
| | | "TSD600vx.xx" where x.xx is the firmware version | |
| 0x0008 | 2 | Serial number | R |
| 0x000A | 2 | Sample Period (1 to 86400) | R/W |
| 0x000C | 2 | Number of Samples (0 to 86400) | R/W |
| 0x000E | 1 | Data acquisition enabled (0 for disabled, 1 for enabled) | R/W |
| 0x000F | 1 | Data acquisition start time: Hours (0 to 23) | R/W |
| 0x0010 | 1 | Data acquisition start time: Minutes (0 to 59) | R/W |
| 0x0011 | 1 | Data acquisition start time: Seconds (0 to 59) | R/W |
| 0x0012 | 1 | Data acquisition start time: Day (1 to 31) | R/W |
| 0x0013 | 1 | Data acquisition start time: Month (1 to 12) | R/W |
| 0x0014 | 1 | Data acquisition start time: Year (2012 to 2105) | R/W |
| 0x0015 | 1 | Alarm log settings | R/W |
| | | Bit 0 - Log trigger time | |
| | | Bit 1 - Log while triggered | |
| | | Bit 2 - Log acknowledge time | |
| | | Bit 3 - Log reset time | |
| 0x0020 | 1 | Remote request - Start logging | R/W |
| | | Write 1 - request start of data logging | |
| | | Read 1 - request pending, Read 0 - no request pending | |
| 0x0021 | 1 | Remote request - Stop logging | R/W |
| | | Write 1 - request termination of data logging | |
| | | Read 1 - request pending, Read 0 - no request pending | |
| 0x0022 | 1 | Remote request - Acknowledge alarms | R/W |
| | | Write 1 - request acknowledgement of alarms | |
| | | Read 1 - request pending, Read 0 - no request pending | |
| 0x0023 | 1 | Remote request - Reset alarms | R/W |
| | | Write 1 - request reset of alarms | |
| | | Read 1 - request pending, Read 0 - no request pending | |

## SENSOR SETTINGS ADDRESS SPACE

The settings of attached sensors can be read by adding the following offsets to the addresses specified by the sensor manufacturer:

| Sensor index | Address offset |
|---|---|
| 0 | 0x1000 |
| 1 | 0x1100 |
| 2 | 0x1200 |
| 3 | 0x1300 |
| 4 | 0x1400 |
| 5 | 0x1500 |
| 6 | 0x1600 |

See sensor manual for further details.

Notes:
1. For further information please refer to http://www.modbus.org/specs.php
2. Use address 255 to communicate with any connected unit (only one sensor connected)
3. Use address 0 to broadcast to all connected units (no response expected)

## WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

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Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of theproduct, and
3. Repair instructions and/or specific problems relative to the product.

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