



## Compact industrial-grade multi-pixel thermal camera

Terabee IND-Thermal-90 is one of the smallest industrial-grade multi-pixel thermal cameras on the market. Its large (90°) Field of View enables temperature monitoring of larger areas, whilst programmable thresholds can be set via Modbus to trigger temperature alarms. It can also count the number of hot/cold spots within its Field of View.



## Key features

- Small, lightweight and easy to mount
- Advanced Thermopile technology enables the sensor to operate over a wide temperature range
- No need for frequent re-calibration
- Modbus RS485 interface
- NO/NC for event triggers, alarms, emergency stop etc
- Embedded intelligence (EDGE processing) enables simple data processing and local feedback loops that can eliminate the need for a PLC
- Thermal image outputs, enabled by onboard storage of raw temperature pixels on Modbus registers

# Technical specifications

Product code	TB-IND-T90
<b>Performance</b>	
Detection principle	Thermopile
Sensor resolution	32 x 32 pixels
Field of View (FOV)	90° x 90°
Frame rate	7 Hz
Measurable temperature range	-20 °C to 670 °C
Temperature accuracy <sup>1</sup>	±2 °C for targets below 100 °C ±2% for targets above 100 °C
Thermal sensitivity (At 1 Hz and 25 °C ambient temperature)	329 mK
<b>Electronics</b>	
Supply voltage $V_{DD}$	12V DC to 24V DC
Typical current consumption (Without NO/NC load, 20°C ambient temperature)	38 mA (at 12V DC) 21 mA (at 24V DC)
Initialization time	< 4 s
<b>Interfaces</b>	
<b>Serial (temperature measurement and remote settings)</b>	
Type	RS485 (half-duplex, 1.2 ... 256 kbps), unprotected
Communication protocol	Modbus
<b>Digital output (alarm)</b>	
Type	Switching (NO/NC in PNP/NPN configuration), 0V - $V_{DD}$
Maximum output current	450 mA (at 24V DC), unfused
Output delay	< 200 ms
<b>Visual notification (status, communication, error)</b>	
Type	3 x LEDs (multi-color)
<b>Mechanics</b>	
Dimensions	95 mm x 57 mm x 27 mm
Weight	<100 g
Enclosure rating	IP65 <sup>(2)</sup>
Housing material	Main body: ABS Backplate: Aluminium
Type of connection	M12 A-coded male connector, 5-pin
Ambient operating temperature (at $V_{DD}$ = 24 VDC)	-10°C to 65°C
Mounting	4 slots for M4 screws
<b>Conformity</b>	
Reference Standard	CE, RoHS, Vibration & Shock <sup>(2)</sup>

(1) Reference Application 2 (see below): central 4x4 pixels and 10 frames temporal moving average. Accuracy may also vary depending on distance, target emissivity, and ambient temperature.

(2) Refer to the conformity certificate in the User Manual for details.

## Operation and indicators

### COMMUNICATION

1. M12 A-coded male connector, 5-pin

### LED INDICATORS

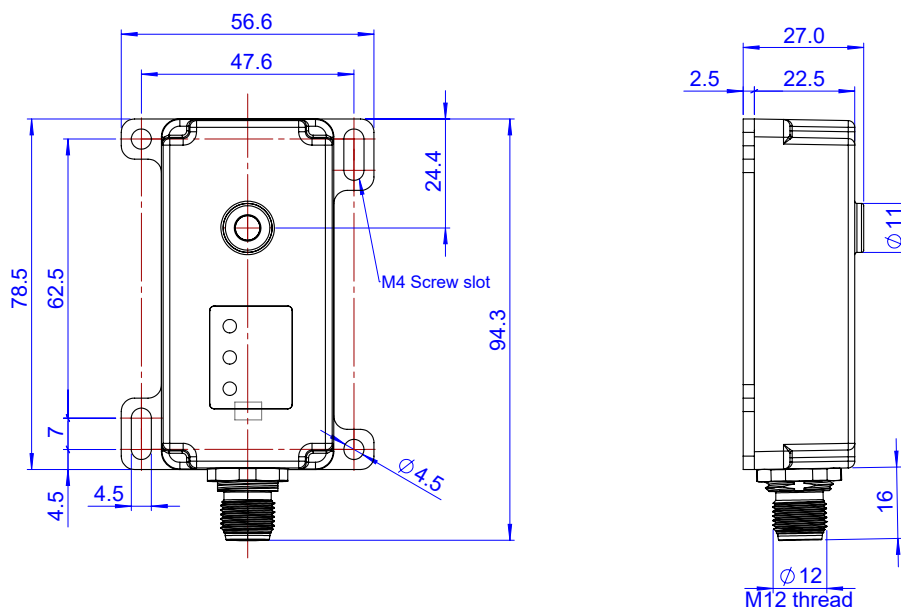
1. STATUS: alarm / error status
2. COM: communication
3. PWR: power



## Applications

- Heat monitoring and fire detection
- Energy efficiency monitoring
- Process and production control
- Predictive and Preventive maintenance

## Dimensions

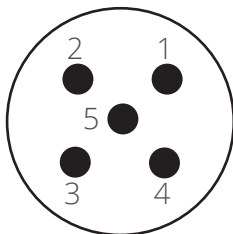


## Embedded Applications

	Application 1	Application 2	Application 3
<b>Setup</b>	Via RS485 (Modbus) or Graphical User Interface (GUI)		
<b>Operation Sensor data</b>	Available via RS485 (Modbus)		
<b>Operation Switching output (NO/NC)</b>	Temperature Threshold Alarm (triggered by min/max temperature over the available Field of View)	Threshold Alarm from the average over a Centered area (expandible to the available Field of View)	Counting and monitoring of Regions of Interest (ROI)
<b>Application examples</b>	Temperature control of continuous flow of extruded material  Temperature monitoring of electrical cabinets	Automatic control of water spray when hot materials (e.g. bricks) pass on conveyor belts (in the centre of the Field of View)	Fire and explosion prevention

## Connector pinout

M12 A-coded male connector



1	+V <sub>DD</sub>	12V ... 24V DC power supply
2	GND	Ground (power supply and data)
3	NO/NC	Normally Open or Normally closed (PNP/NPN) connection
4	Tx/Rx+	RS485 differential line
5	Tx/Rx-	RS485 differential line

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