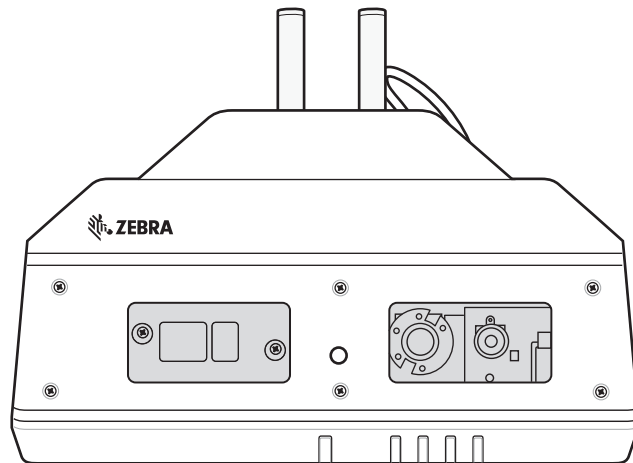


TM2000



Installation Guide



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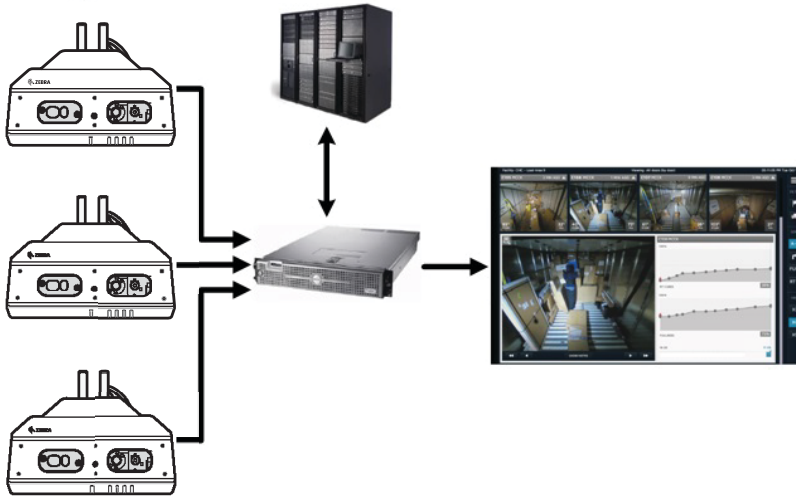
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Introduction

The TM2000 captures trailer load information using an onboard RGB camera and 3D sensor, processes the captured data, and sends the results to a server over a wired or wireless connection. The TM2000 is installed on dock doors at loading facilities to monitor trailer load progress and provide real time data about important load metrics. The Trailer Load Analytics (TLA) Dashboard displays this data in a web based interface.



Box Contents and Unpacking

The TM2000 box contains the following items:

- TM2000
- Four mounting screws
- TM2000 Regulatory Guide.

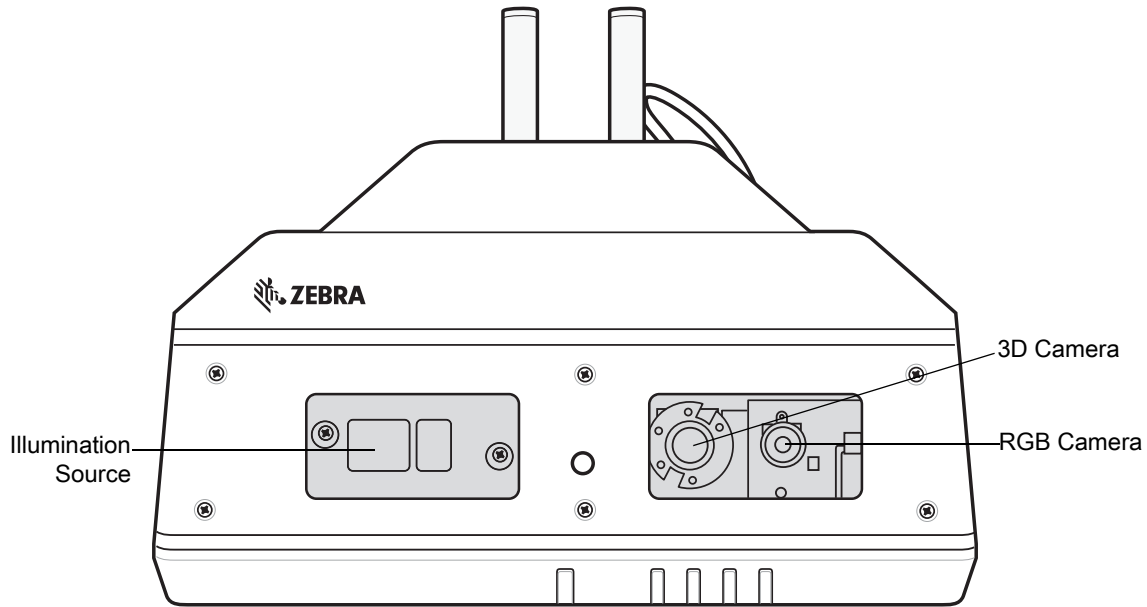
Carefully remove the device from the packaging to avoid damaging the hardware. Inspect the device for damage.



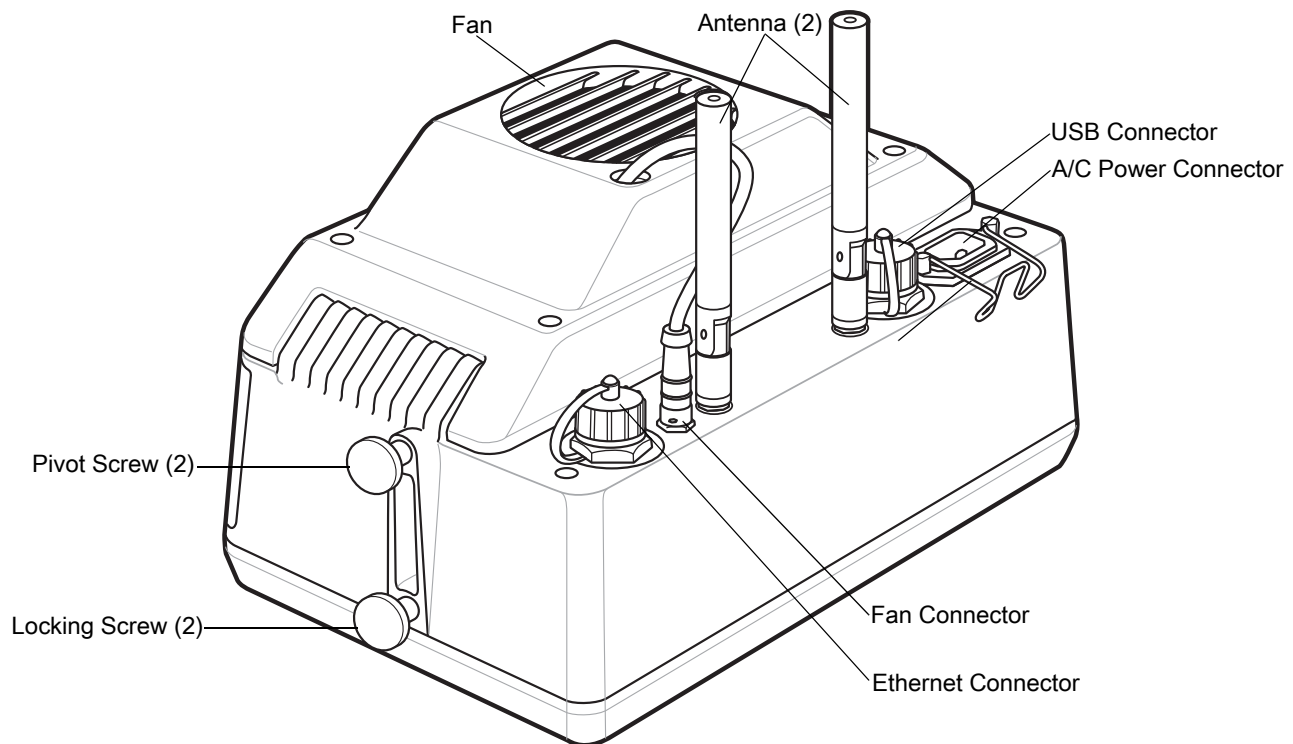
NOTE The mounting bracket is sold separately. For information or to purchase the mounting bracket, contact your Zebra sales representative.

TM2000 Features

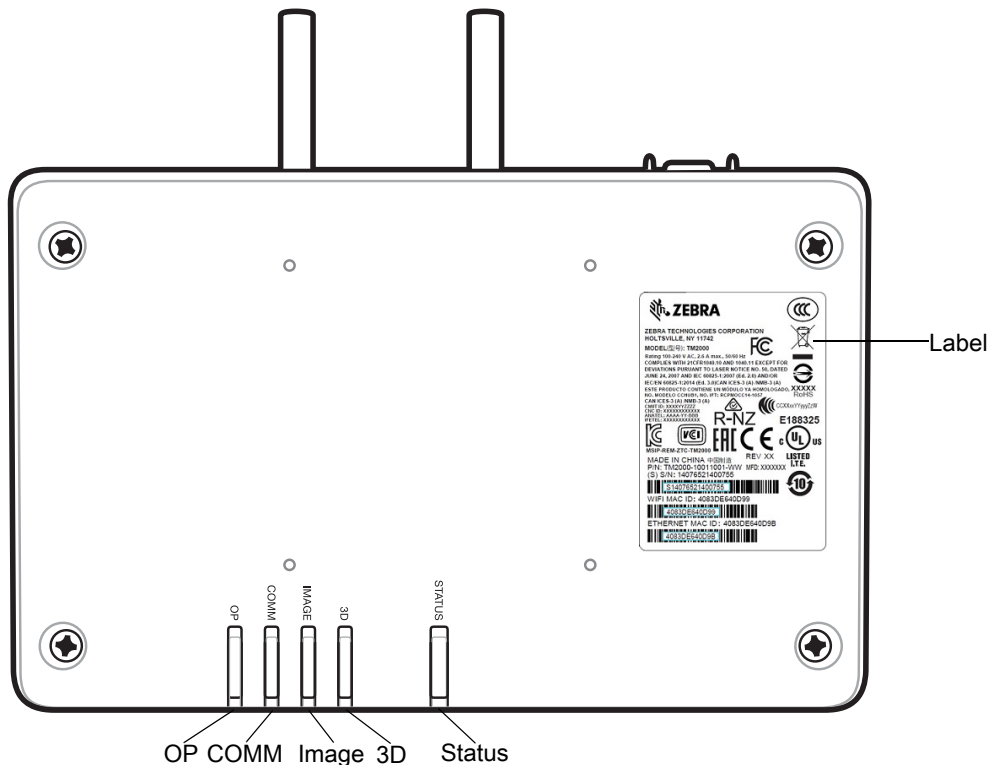
Front View



Top View



Bottom View



Installation Requirements

Tools

- Impact drill (an 8mm allen wrench or ratchet hand socket wrench can also be used although it is not as time efficient)
- Torque wrench with 6 mm allen key
- 3/8 in. hex socket for screws.

Hardware

✓ **NOTE** Hardware requirements are based on mounting to structural steel.

- Mounting bracket, p/n BRKT-10002-02R (sold separately)
- Four #12 x 1 in., type F, galvanized steel, thread cutting screws (no washers needed) for attaching the mounting bracket to the door frame (not provided)
- Mounting screws for attaching the device to the mounting bracket
- Power receptacle located near (approximately 1 ft) the top of the dock door frame
- Ladder or step stool.

Software

- Add TM2000 Wi-Fi MAC addresses to the site access point control list (contact your local IT support person).
- If using an ethernet connection, the ethernet MAC address must be added to the control list (contact your local IT support person).

Mounting Bracket Installation



IMPORTANT

The device power cord is three feet in length. Ensure the electrical receptacle is easily accessible and located within proper distance to the device.

Installing Mounting Bracket With Template

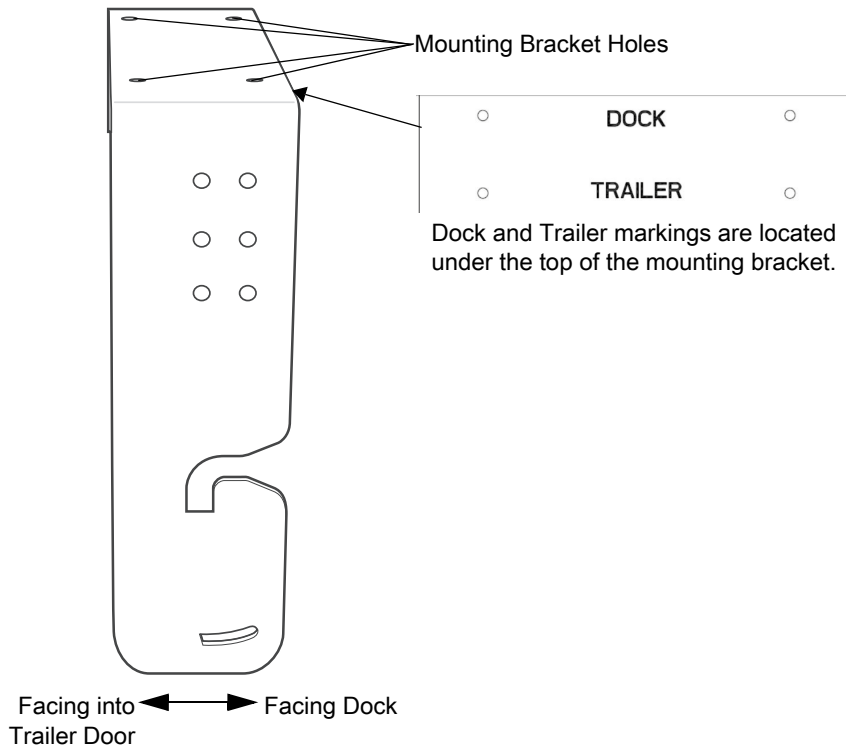
To install the mounting bracket using the TMU Mounting Bracket Template included in the bracket box:

1. Place the TMU Mounting Bracket Template in the center of the trailer door. Position the edge of the template, facing the dock, 2 in. from the edge of the dock door frame and tape the template in place.
2. Drill the mounting bracket holes.
3. Remove the template.
4. Install the bracket using four #12 x 1 in. thread cutting screws.

Installing Mounting Bracket Without Template

To install the mounting bracket (without the use of the TMU Mounting Bracket Template):

1. Place the mounting bracket in the center of the trailer door. Position the edge of the bracket, facing the dock, 2 in. from the edge of the dock door frame.



2. While holding the mounting bracket in position, mark the surface with a pencil through each of the four mounting bracket holes to determine the location of the screw holes to drill. It is recommended to use four screws to mount the bracket securely. Use two screws on each side. If there is a center hole (not shown), do not use the center hole.
3. Drill the holes and install the bracket using four #12 x 1 in. thread cutting screws.

TMU Installation



WARNING! Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

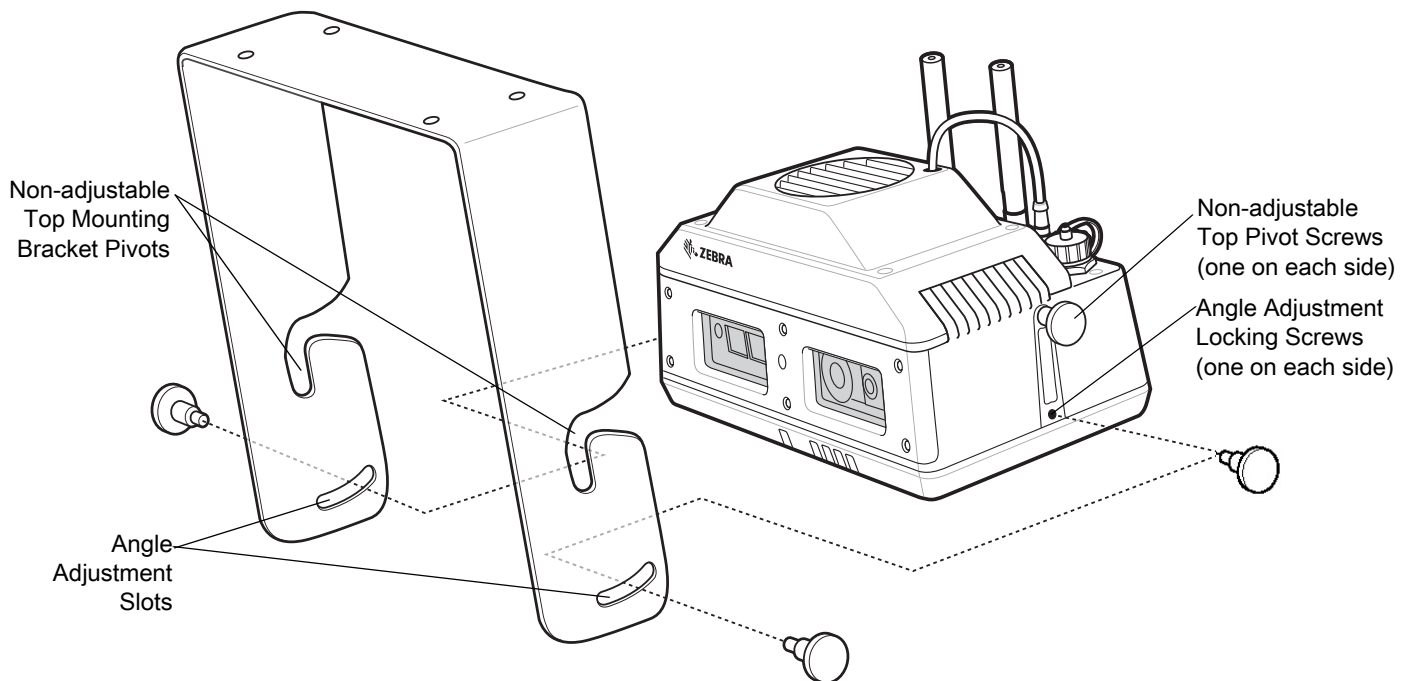


CAUTION Always utilize professional installers to safely install, mount, and supply power to the device. Always ensure device mounting and power routing meets regional building codes.

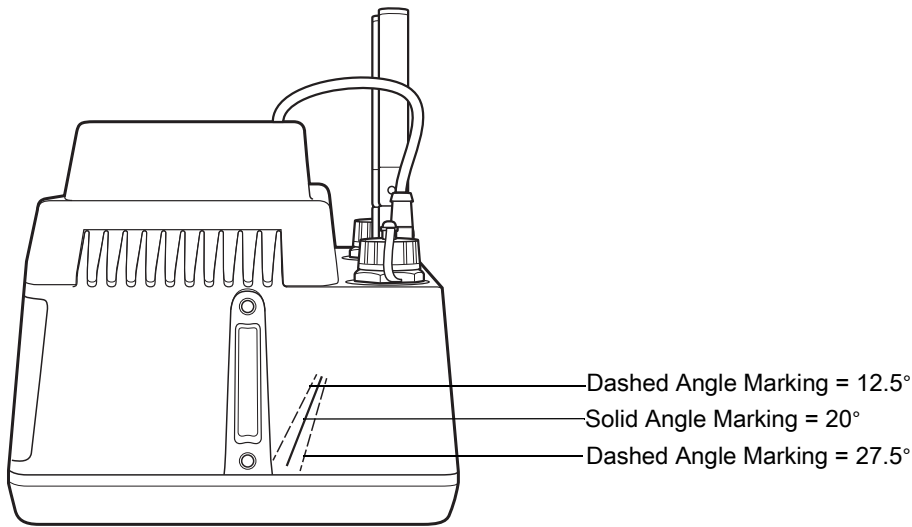


CAUTION Double Pole/Neutral Fusing: If a fuse in the neutral conductor is out, the fuse in the line conductor may still be intact which can result in internal parts remaining energized. Take extreme caution when servicing the unit.

1. Screw and torque the non-adjustable top pivot screws on each side of the device to 4.5 ft-lbs.
2. Make sure the required installation tools are within reach (see [Tools on page 5](#)).
3. Place a ladder or step stool at the trailer door.
4. Hang the device on the mounting bracket (see [Mounting Bracket Installation on page 6](#)) by sliding the two non-adjustable top pivot screws into the non-adjustable top mounting bracket pivots.
5. Allow the device to rotate backwards and come to a stop. Release the unit and hand thread the angle adjustment locking screws. Do not tighten the locking screws in this position.

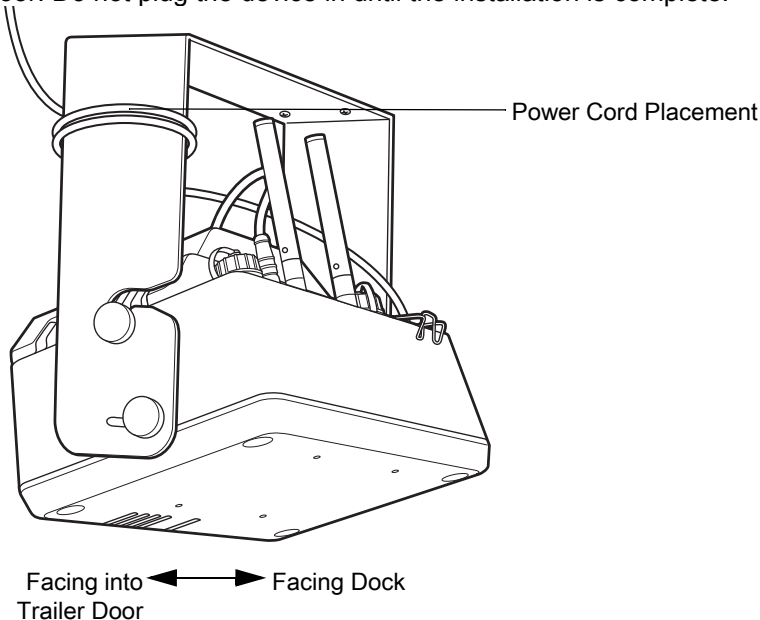


6. Rotate the device to the proper operating orientation of 20° (minimum angle marking is 12.5°; maximum angle marking is 27.5°). The angle markings on the device are guidelines only.



NOTE When the TM2000 is connected to the server, it can be viewed on the TLA Dashboard to confirm it has the proper angle for maximum viewing coverage of the trailer.

7. Torque the angle adjustment locking screws to 4.5 ft-lbs.
8. Wrap the power cord around the bracket. Leave adequate length for the cable to reach the power receptacle at the trailer door. Do not plug the device in until the installation is complete.

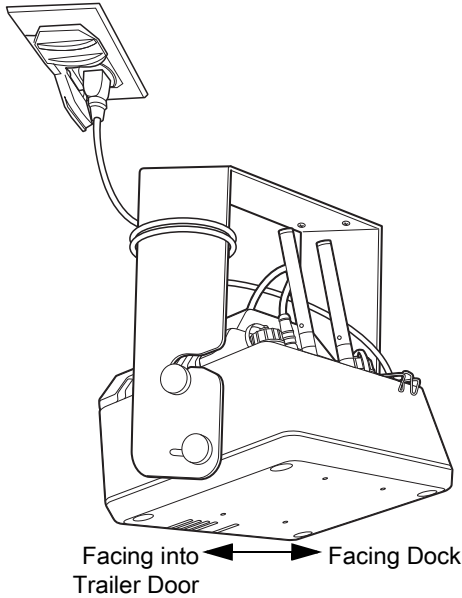


9. Ensure that the antenna's are positioned vertically.



NOTE The preferred antenna orientation is vertical or 45 degrees (90 degree antenna orientation is not recommended).

10. Plug the power cord into a socket outlet with earthing connection, which is grounded in accordance with local regulations. It may take 2-3 minutes for the device to boot up



11. Check the LEDs for normal operation.

LED Indicators

The device LED indicators display to indicate status.

- Image - RGB camera indicator lights to indicate the device is taking an image.
- 3D - Depth sensor indicator lights when acquiring a depth image.
- COMM - Wi-Fi communication lights when Wi-Fi is running.
- Status - Provides current operational status of the device.
- OP - Lights to indicate that the device has power.

The standard LED indicators are defined as follows:

Image	3D	COMM	Status	OP	Description
---	---	---	---	On	Device has power.
---	---	On	---	On	Wi-Fi is running and accessible.
---	---	Off	---	On	Wi-Fi interference does not have an IP address or cannot connect to an AP.
Off	On	---	---	On	Acquiring depth image.
On	Off	---	---	On	Acquiring RGB image.
On	On	---	---	On	Writing PCD or JPG RGB image to file.
Off	Off	---	---	On	Processing scene.
---	---	---	Blinking Red	On	Depth camera not operational due to the device overheating.

(---) Indicates that the LED may or may not be illuminated

TM2000 Specifications

Feature	Description
Operating System	Linux OS with associated drivers for USB, UART, SDIO, I2C, Ethernet and Wi-Fi
CPU	1.5GHz dual-core ARM Cortex A9
NAND Flash	64 GB
SDRAM	1 GB
Environmental	
Operating Temperature	-30°C to 50°C
Storage Temperature	-40°C to 70°C
Dust and Water IP	IP54 of IEC529
Power Consumption	Maximum: 100W Initial inrush current: 40A max when operating from 115VAC.
Case Dimensions	11.3 in. x 7.1 in. x 6.3 in.
Depth Sensor	
Working Range and Resolution	Resolve a 1x1x2 ft ³ (X*Y*Z) brown cardboard box at 54 feet
FOV	57.5° x 45°
Image Size	320 x 240
Laser Safety	Class 1
Data Interference	USB 2.0
Power Consumption	Less than 2.5 watts
RGB Camera	
Field of View	120°
Data Interference	USB 2.0
Power Consumption	Less than 2 watts continuous
Frame Rate	30 frames per second
Image Size	1920 x 1080
Depth Capture Rate	One per 15 sec
Exposure Time	64 ms max

Cleaning and Maintenance

Perform routine cleaning and maintenance. To keep the sensor window free of dust and debris, clean regularly using a dry, soft duster on a long pole.

Service Information

To return a faulty device:

1. Complete a repair return request (RMA) form at: www.zebra.com/repair.
2. Place a clean cloth over the device camera window to protect it from damage during transit.
3. Put the device in a container provided by the on-site contact.

Ship to the repair depot address identified in the RMA.

