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1 Introduction

TZ is the inventor of intelligent fastening and actuation technologies that in combination with TZ software and networking devices provide a platform on which to extend traditional access control networks to create compelling security, locking, monitoring and control applications across a number of market segments. TZ networks consist of TZ Intevia® Radial and other locking mechanisms, a line of interconnect modules, physical and environmental sensors, and industry standard access control input translators, all of which can be connected to and controlled from stand alone-control devices, computers, or the internet. This manual only provides detailed technical information about the TZ Intevia® Radial 4100 Series locking mechanism. Please refer to the appropriate system or component manual for information on other TZ products.

2 TZ Module Overviews

2.1.1 TZ Wiegand Translator 8105CF

The TZ Wiegand Translator 8105CF adds the ability to connect Wiegand data devices to a TZ network using the TZ CF protocol. It connects to a TZ network using standard Category 5 (Cat5) cabling and provides access control by interpreting a Wiegand data stream from commercially available third-party security modules—including RFID readers, magnetic card readers, and fingerprint scanners. It can operate both as a stand-alone device that controls a small group of devices, or as a network device that transmits information, like access attempts, to the rest of the network.



Figure 1: Wiegand Translator 8105CF

2.1.2 TZ RFID Plus Wiegand Translator 8101CF

The TZ RFID Plus Wiegand Translator 8101CF adds RFID sensing capability plus the ability to connect Wiegand data devices anywhere on a TZ network running CF protocol. The device connects to a TZ network and provides access control through either an on-board RFID module or by interpreting a Wiegand data stream from commercially available third-party security inputs—including RFID readers, keypads, magnetic card readers, and fingerprint scanners. It can operate both as a stand-alone device that controls a small group of devices, or as a network device that transmits information, like access attempts, to the rest of the network.



Figure 2: RFID Plus Wiegand Translator 8101CF

2.2 Contents of the Standard Package

You will receive different TZ components depending on which TZ package you choose.

2.2.1 Wiegand Translator

The TZ Wiegand Translator 8105CF Module comes complete with the following items in the box:

- 1 x Wiegand Translator TZ 8105CF Module
- 1 x screw terminal block

TZ CF Wiegand Translators

2.2.2 RFID Plus Wiegand Translator

The TZ RFID Plus Wiegand Translator 8101CF Module comes complete with the following items in the box:

- 1 x TZ 8101CF RFID Module
- 1 x screw terminal block
- 5 unique RFID cards

2.3 Capabilities

Wiegand devices are commercially available units used for security access functions such as fingerprint scanners, card readers, RFID readers and proximity sensors. They are all engineered around a common, commercially agreed upon standard known as the Wiegand Protocol.

At a fundamental level, the two models discussed in this manual (the TZ Wiegand Translator 8105CF and the TZ RFID Plus Wiegand Translator 8101CF) are nearly the same unit. Both are Wiegand translators that allow third-party devices to become part of TZ device networks. The difference is that the TZ RFID Plus Wiegand Translator has an internal RFID reader that is compatible with the Wiegand protocol, effectively allowing it to be a stand-alone RFID access module.

Both units have the following capabilities:

- Translate the Wiegand protocol to the TZ CF network
- Internally store up to 100 IDs in
- Directly trigger any connected TZ devices in Stand-Alone Mode
- Supply power to third-party Wiegand devices
- Convey status and activity via LEDs
- Provide audible alerts when successful or unsuccessful reads are performed

Throughout this manual, because the units are so similar, phrases such as “Wiegand packets” and “RFID” are nearly synonymous and interchangeable, depending on which unit you are using. When working with the TZ RFID Plus Wiegand Translator 8101CF, the phrases often refer to the RFID cards that come with the device, or the Wiegand packets that are transferred and processed within the unit. When working with the TZ Wiegand Translator 8105CF, the phrases typically refer to the Wiegand packets transferred to the unit from third party reader and/or the specific Wiegand cards or similar keys that the third party device works with. The reader should use the context of the situation to determine the appropriate meaning.

***Note: Neither unit keeps an internal history of access attempts. However, when used in Network Mode in conjunction with a CloudHub or a CloudPoint, unsuccessful access attempts are logged.**

***Note: both units rely on the third-party Wiegand reader to deal with unsuccessful reads (e.g., bad card swipes).**

2.4 Operation Specific to the RFID Plus Wiegand Translator 8101CF

The TZ RFID Plus Wiegand Translator 8101CF has an internal RFID reader that is compatible with the Wiegand protocol, effectively allowing it to be a stand-alone RFID access module. To use the internal RFID reader, simply hold the RFID card between one and three inches above and parallel to the top face of the unit.

TZ CF Wiegand Translators

***Note: If you have connected a third party Wiegand device, your internal RFID reader will be disabled.**

2.5 Wiring Connections, Switches, and LEDs

Both the Wiegand Translator and RFID Plus Wiegand Translator have two main sets of electrical connections as well as various control switches and status LEDs as shown in Figure 3. The functions of these connections are described below:

- There is one port that accepts an RJ-45 (8P8C) plug used to make connections to the TZ device network. Note that these accept exactly the same Category 5 (Cat 5) cabling often used in computer networks. However, this port can not directly communicate with Ethernet or other computer networks, and those networks should not be connected. Only the cabling from a TZ device network should be connected.
- There is a mating header that accepts a block of screw terminals used to wire directly to the third-party Wiegand devices.
- There are two push-buttons used to store or erase RFIDs or third-party Wiegand cards or similar items. These are used only when the unit is in Stand-Alone Mode. In Network Mode, the decision to accept or reject an RFID or Wiegand card is made by the network control device. These will be discussed in later sections.
- There is a group of two LEDs near the RJ-45 port that portray exactly how the unit is working. The bottom LED (termed the Mode LED) is lit whenever the translator is powered, and indicates whether the unit is operating in Stand-Alone Mode (indicated by green) or Network Mode (indicated by yellow). The top LED (termed the Read LED) lights up when Wiegand packets are read by the connected third-party device. It will light green if the Wiegand packet (or RFID) is known and accepted, or it will light yellow if the Wiegand packet (or RFID) is not known or should not be given access.
- There is an additional Status LED located on the top of the unit beneath (but visible through) the label. The function is very similar to the Read LED on the side, but is placed in a more convenient and visible position when access to the other buttons, LEDs, and connections are restricted for security reasons. The Status LED will light red when powered, and will change to green if an acceptable RFID or Wiegand packet is read, or yellow if an unacceptable or unknown RFID or Wiegand packet is read.

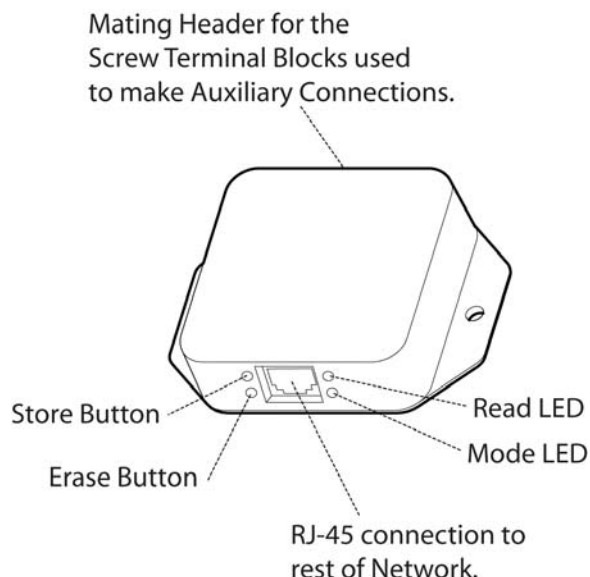


Figure 3: Electrical connections for both the Wiegand Translator and the RFID Plus Wiegand Translator.

TZ CF Wiegand Translators

The block of screw terminals is used to link directly to the third-party Wiegand device and to offer a means to control other devices. The identities of the connections are shown in Table 1 and Figure 4.

Pin	Designation	Explanation
1	AUXIN1	In Stand-Alone Mode, this line can be used trigger other TZ network devices.
2	Wiegand Data 0	Used to read data from the third-party Wiegand device.
3	GND	
4	AUXOUT1 (Open Drain)	AUXOUT1 is an open drain capable of sinking up to 2 A. In Stand-Alone Mode, this line can be used trigger other devices such as lights, horns, or door strikes.
5	Wiegand Data 1	Used to read data from the third-party Wiegand device.
6	+V	Used to transmit power to the third-party Wiegand device.

Table 1: Wiegand identities and connections

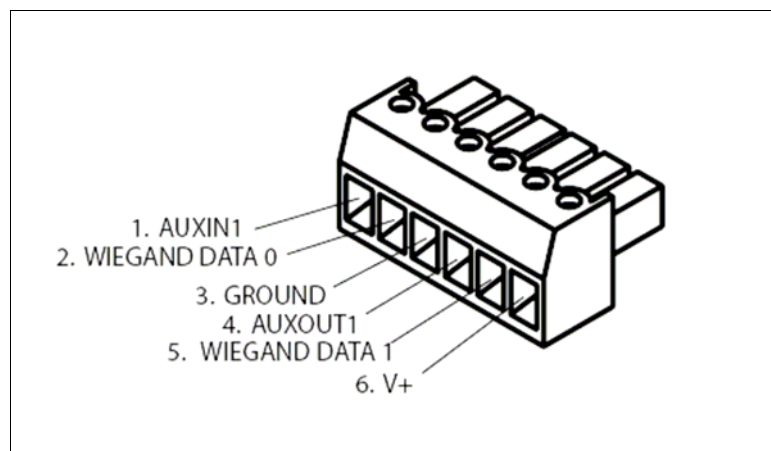
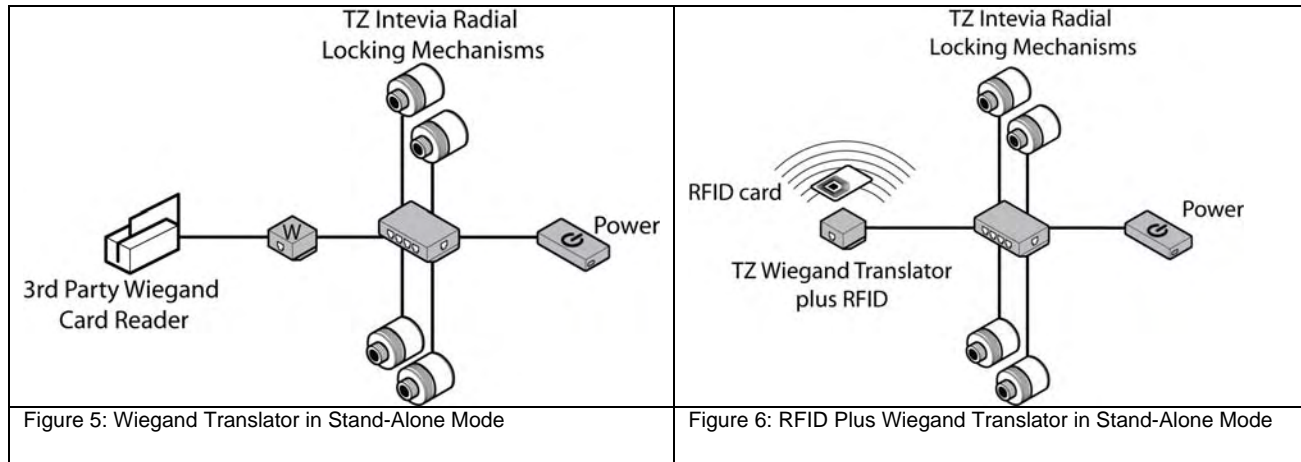


Figure 4: Screw terminal pin-out diagram for the Wiegand Translator and the RFID Plus Wiegand Translator.

3 Stand-Alone Mode

When first received, both the Wiegand Translator as well as the RFID Plus Wiegand Translator will be in Stand-Alone Mode. When used in Stand-Alone Mode, either unit is used to control simple networks of devices. The networks are relatively limited in that (1) all devices will trigger at the same time and for the same events, and (2) there is no true network controller, therefore no audit trail of network access attempts. An example of this type of network is shown in Figure 5 for the Wiegand Translator and in Figure 6 for the TZ RFID Plus Wiegand Translator.



***Note:** This mode of operation could conceptually be used to trigger devices in a larger network with a controller. However, if it is used in this manner, RFID or Wiegand scans will not be transmitted along to the rest of the network or be recorded in an audit trail. This means that the Event log will only show that some connected devices were triggered.

3.1 Operation in Stand-Alone Mode

Most TZ devices can be configured to be triggered by a single switch. For a small network, both the Wiegand Translator as well as the RFID Plus Wiegand Translator can perform this function and control a specific set of devices that are grouped by CloudLink modules (e.g., the dip switches within the CloudLink connect all the AUXIN1 lines from the devices).

In normal Stand-Alone Mode, when an RFID is presented or a third-party Wiegand device is successfully used (i.e., a card is swiped), it sends a packet of information along the Wiegand 0 and 1 wires. The packet is then checked against an internal list. If the packet matches an entry on the internal list, the following events occur:

- The Read LED and the Status LED will light green for one second
- The buzzer will sound for one second
- The AUXIN1 and AUXOUT1 lines—both in the screw terminal block and the RJ-45 connector—will pull low, effectively behaving like a switch that closes to ground. Any devices that are directly connected to these lines will trigger to open.

If the RFID or Wiegand packet does not match any entry on the internal list, (e.g., if an unauthorized card is read), the following events occur:

- The Read LED will light red for one second

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- The Status LED will light yellow for one second
- The buzzer will sound for one second

***Note: If the card is improperly swiped (i.e., too fast or too slow), the third-party device typically does not send a packet to be deciphered. However, this behavior depends solely on the third-party device.**

3.2 Set Up/Initialization for Stand-Alone Mode

Both the Wiegand Translator and the RFID Plus Wiegand Translator are initially set at the factory to operate in Stand-Alone Mode, and contain an empty internal list. When their internal lists are empty, the behavior of the individual modules is special in order to accommodate the initial wiring and debugging during the setup process. Any RFID or Wiegand packet (i.e. card read by the third-party device) will cause the Wiegand Translator or RFID Plus Wiegand Translator trigger all connected devices as though the RFID or Wiegand packet is acceptable and valid for accessing every connected portion of the network. Consequently, the Read and Status LEDs will turn green, the buzzer will sound, and the AUXIN1 and AUXOUT1 lines will be pulled low.

***Note: To allow the Wiegand Translator or RFID Plus Wiegand Translator to differentiate between acceptable and unacceptable cards, the internal list must contain at least one entry.**

3.3 Storing RFID Cards or Wiegand Translator Packets

To add an entry to the internal list of the Wiegand Translator or RFID Plus Wiegand Translator, use the following steps:

1. Press and hold the Store (top) button until the Read LED blinks green.
2. While continuing to press the Store button, present the RFID card appropriately or swipe the third-party Wiegand card.
3. If successful, the Read LED will display a long green flash and store the Wiegand ID.
4. Release the Store button.

The identity that corresponds to either the RFID or the Wiegand packet that corresponds to the card is now stored in the internal list and any subsequent card swipe will cause the Wiegand Translator or RFID Plus Wiegand Translator to trigger all attached devices.

3.4 Erasing RFID Cards or Wiegand Packets

To erase an entry from the internal list of a Wiegand Translator or RFID Plus Wiegand Translator, use the following steps:

1. Press and hold the Erase (bottom) button until the Read LED blinks red.
2. While continuing to press the Erase button, present the RFID appropriately or swipe the card through the card reader (or third-party Wiegand device being used).
3. If successful, the Read LED will display a long red flash and erase the appropriate entry from the internal list.
4. Release the Erase button

***Note: Even if the entry was not originally in the internal list, the unit provides the same acknowledgement.**

3.5 Erasing the Complete Internal List

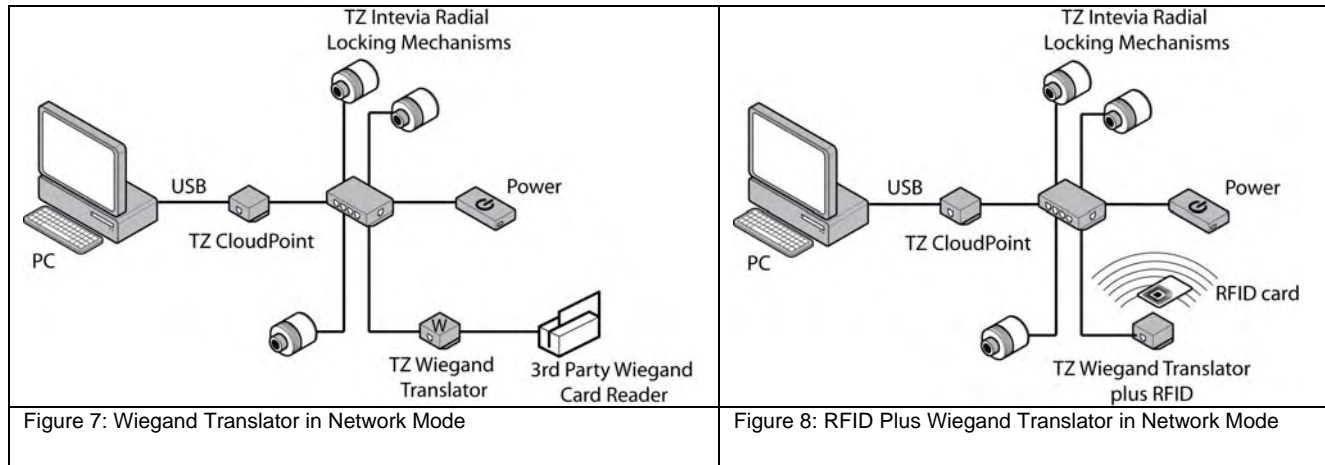
To erase all entries in the internal list, hold both the Store and Erase buttons simultaneously. The Wiegand Translator or RFID Plus Wiegand Translator will perform the following actions:

- Both LEDs will turn red
- A short beep will occur
- A second short beep will occur
- A third, long beep will occur

***Note: Both buttons must be held for the entire process. If the buttons are released prior to the third long beep, the Wiegand Translator or RFID Plus Wiegand Translator will not erase its list. If the internal list is completely erased, either unit will effectively behave as though it were fresh out of the box—meaning that any card swiped will cause it to trigger all attached devices rather than selective devices that have been individually recognized.**

4 Network Mode

Both the TZ Wiegand Translator and RFID Plus Wiegand Translator offer more flexibility, power, and traceability when used as a component in a TZ device network that is controlled with either a CloudPoint or a CloudHub interconnect module. This type of network is shown in Figures 7 and 8.



4.1 Operation in Network Mode

The Wiegand Translator or RFID Plus Wiegand Translator must be placed in Network Mode through the use of the TZ Device Manager software (refer to the manual for details). If the module is operating in Network Mode, the Mode LED will be yellow.

In normal Network Mode, when an RFID is presented or the third-party Wiegand device is used, it sends a packet of information—primarily a number identifying the card—to the internal processor. When received, the information is deciphered and transmitted to the network controller, typically a CloudHub or CloudPoint interconnect module.

Once this is complete, the network controller performs the following tasks:

- Logs the access attempt and records card information
- Verifies card information against the internal list in the interconnect module. If the card is valid, it triggers all devices or alternatively, gives access to all areas/cabinets associated with the card. ***Note: This set can be larger and more complex than the 100 stored IDs possible in Stand-Alone Mode.**
- Records triggered device activity through their interconnect module (i.e., CloudHub or CloudPoint) and when they are returned to a locked state

4.2 Wiegand Translator Set Up/Initialization in Network Mode

As is standard in all TZ CF networks, the management and setup of the Wiegand Translator or RFID Plus Wiegand Translator is done through the TZ Device Manager software. Refer to the TZ Device Manager manual for details regarding the following actions:

- Discovering devices in the network
- Placing the device (either the Wiegand Translator or RFID Plus Wiegand Translator) in Network Mode

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- Using TZ Device Manager to store card identities

***Note: In large networks, the final installation may place either a Wiegand Translator or RFID Plus Wiegand Translator some distance from the CloudHub, CloudPoint, and the PC running the TZ Device Manager. A second or moveable unit that allows the TZ Device Manager user to manage RFID entries is recommended.**

5 Installation & Mechanical Information

The Wiegand Translator and RFID Plus Wiegand Translator devices exhibit the same installation process and mechanical information, outlined below:

- Since electrical connections are problematic if they are not secure, it is important to attach the CloudHub unit to a flat and sturdy surface using two x M4 (#8) panhead screws through the flanges or with a strong adhesive medium (see Appendices for details).
- Extra care and thought should be used in mounting the device if it is to be used in Stand-Alone Mode, as access is needed to the buttons to add or erase the Wiegand cards or similar access keys. During normal operation however, access to these buttons could lead to a security breach.

6 Caution

Changes or modifications not expressly approved by TZ could void the user's authority to operate the equipment. (FCC Code of Federal Regulations Title 47 Part 15.21)

The TZ Wiegand Translator 8105CF and the TZ RFID Plus Wiegand Translator 8101CF have both been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

7 Disclaimer

This document is intended to provide basic technical information related to the TZ Wiegand Translator 8105CF and the TZ RFID Plus Wiegand Translator 8101CF.

This document is not meant to be an exhaustive statement of all relevant data. By using this document, however, you agree to accept and comply with the terms, conditions, notices and disclaimer contained in this document.

While Telezygology Inc. (TZ) has used all due care and skill to ensure that the information contained in this document is accurate, correct, and current at the time of publication, it does not warrant or represent that the information is free from errors or omissions, and does not accept responsibility for any defect in the information.

8 Use of Information Contained in This Document

The correct functions of the TZ Wiegand Translator 8105CF and the TZ RFID Plus Wiegand Translator 8101CF will require consideration of installation and system integration issues such as installation of third-party hardware, networking for power and data, and subsequent programming for functionality.

To ensure the successful functionality of the mechanism as part of an integrated system, it is recommended that advice is sought from TZ regarding the application of the mechanism, its integration, and its control system.

The TZ Wiegand Translator 8105CF and the TZ RFID Plus Wiegand Translator 8101CF described has not been tested or qualified for a specific application other than for compliance to the specification outlined. Specific qualification testing may be required for fit-for-purpose application design.

9 About TZ

TZ is a publicly listed intellectual property and technology development company with design and engineering operations throughout the US and Europe and Australia. The company is a leader in the integration of

TZ CF Wiegand Translators

intelligence and software control into everyday objects to enable new levels of functionality. Supported by a full product development capability, TZ technology is a platform on which many different solutions can be created by third parties seeking to integrate remote controlled intelligent locking and sensory devices to add functionality to their products.

TZ solutions fuse software controlled remote locking and fastening, environmental sensing, real time analysis and measurement to provide adopters with compelling benefits for their products and businesses.

Appendix 1: TZ Wiegand Translator 8105CF Specifications

CHARACTERISTICS – TZ WIEGAND TRANSLATOR 8105CF

Physical and Mountings

Dims: 63.5mm (88.9 mm with flange) x 63.5mm x 25.4mm (2.5" (3.5" with flange) x 2.5" x 1.0")

Weight: 75g

Mounting: via 2 X M4 (#8) screws through flange or adhesive on bottom surface (not included).

CAUTION: This product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill or otherwise produce metal shavings around electronic equipment.

Environmental & Performance

Operating temperature: -15°C - +55°C (5°F - 131°F)

Survival temperature: -55°C - +85°C (-67°F - +185°F)

Humidity (operating): 95% RH at 50°C (122°F)

Non combustible

Ingress Protection: IP 21

Electrical

Power supplied via RJ-45 connection

Accepts 9.0 – 32.0 VDC supply voltage.

RS-485 multi-drop communications interface via RJ-45

1 x RJ-45 connection to rest of device network

RJ-45 pin-out: 1: +Coms, 2: -Coms, 3: AUX-OUT1, 4: AUX-IN1, 5: Gnd, 6: AUX-OUT2, 7: AUX-IN2, 8: +V

One pluggable screw terminal block included to make additional electrical connections with devices.

Screw terminal pin-out: 1: AUX-IN1, 2: Wiegand Data 0, 3: Gnd, 4: AUX-OUT1, 5: Wiegand Data 1, 6: +V

Two Pushbuttons: Store and Erase

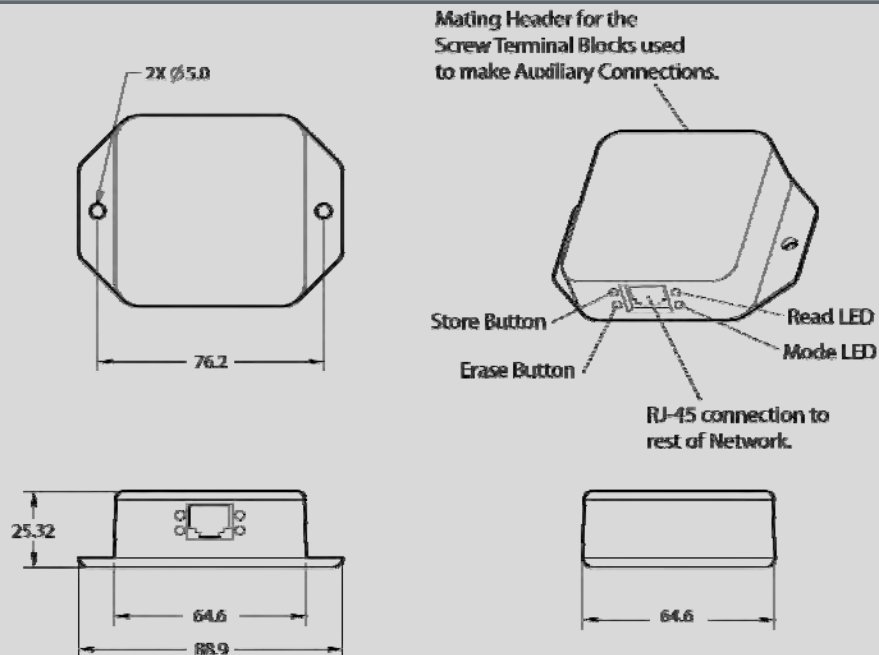
Three LEDs: Network / Stand-Alone Mode and Read

Standards Compliance

FCC Part 15, CE, IC

RoHS compliant, One Year Limited Warranty

Dimensions (in mm)



Appendix 2: TZ RFID Plus Wiegand Translator 8101CF Specifications

CHARACTERISTICS – TZ RFID PLUS WIEGAND TRANSLATOR 8101CF

Physical and Mountings

Dims: 63.5mm (88.9 mm with flange) x 63.5mm x 25.4mm (2.5" (3.5" with flange) x 2.5" x 1.0")

Weight: 75g

Mounting: via 2 X M4 (#8) screws through flange or adhesive on bottom surface (not included).

CAUTION: This product should not be installed in a way that compromises the Ingress Protection (IP) rating of the enclosure in which it is mounted. Do not drill or otherwise produce metal shavings around electronic equipment.

Environmental & Performance

Operating temperature: -15°C - +55°C (5°F - 131°F)

Survival temperature: -55°C - +85°C (-67°F - +185°F)

Humidity (operating): 95% RH at 50°C (122°F)

Non combustible

Ingress Protection: IP 21

Electrical

Power supplied via RJ-45 connection

Accepts 9.0 – 32.0 VDC supply voltage.

RS-485 multi-drop communications interface via RJ-45

1 x RJ-45 connection to rest of device network.

RJ-45 pin-out: 1: +Coms, 2: -Coms, 3: AUX-OUT1, 4: AUX-IN1, 5: Gnd, 6: AUX-OUT2, 7: AUX-IN2, 8: +V

One pluggable screw terminal block included to make additional electrical connections with devices.

Screw terminal pin-out: 1: AUX-IN1, 2: Wiegand Data 0, 3: Gnd, 4: AUX-OUT1, 5: Wiegand Data 1, 6: +V

Two Pushbuttons: Store and Erase

Three LEDs: Network / Stand-Alone Mode and Read

RFID

EM4100 and Compatible cards

125 kHz, 64bit

Standards Compliance

FCC Part 15, CE, IC

RoHS compliant, One Year Limited Warranty

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Dimensions (in mm)

