![MagTek logo - SECURITY FROM THE INSIDE]

mDynamo with Outdoor Bezel

IP34 Rated EMV Chip Card Module
Installation and Operation Manual

June 2022

Document Number:
D998200546-10

REGISTERED TO ISO 9001:2015

Table 0-1 - Revisions

Rev Number	Date	Notes
10	Jun 30, 2022	Initial Release

LIMITED WARRANTY

MagTek warrants that the products sold pursuant to this Agreement will perform in accordance with MagTek's published specifications. This warranty shall be provided only for a period of one year from the date of the shipment of the product from MagTek (the "Warranty Period"). This warranty shall apply only to the "Buyer" (the original purchaser, unless that entity resells the product as authorized by MagTek, in which event this warranty shall apply only to the first repurchaser).

During the Warranty Period, should this product fail to conform to MagTek's specifications, MagTek will, at its option, repair or replace this product at no additional charge except as set forth below. Repair parts and replacement products will be furnished on an exchange basis and will be either reconditioned or new. All replaced parts and products become the property of MagTek. This limited warranty does not include service to repair damage to the product resulting from accident, disaster, unreasonable use, misuse, abuse, negligence, or modification of the product not authorized by MagTek. MagTek reserves the right to examine the alleged defective goods to determine whether the warranty is applicable.

Without limiting the generality of the foregoing, MagTek specifically disclaims any liability or warranty for goods resold in other than MagTek's original packages, and for goods modified, altered, or treated without authorization by MagTek.

Service may be obtained by delivering the product during the warranty period to MagTek (1710 Apollo Court, Seal Beach, CA 90740). If this product is delivered by mail or by an equivalent shipping carrier, the customer agrees to insure the product or assume the risk of loss or damage in transit, to prepay shipping charges to the warranty service location, and to use the original shipping container or equivalent. MagTek will return the product, prepaid, via a three (3) day shipping service. A Return Material Authorization ("RMA") number must accompany all returns. Buyers may obtain an RMA number by contacting MagTek Support Services at (888) 624-8350.

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MAGTEK'S SOLE LIABILITY AND BUYER'S EXCLUSIVE REMEDIES ARE STATED IN THIS SECTION AND IN THE SECTION RELATING TO MAGTEK'S LIMITED WARRANTY.

FCC INFORMATION

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.

Note: This equipment has 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.

Caution: Changes or modifications not expressly approved by MagTek could void the user's authority to operate this equipment.

CE STANDARDS

Testing for compliance with CE requirements was performed by an independent laboratory. The unit under test was found compliant with standards established for Class B devices.

UL/CSA/CUR/UR

This product is recognized per *UL 60950-1, 2nd Edition, 2011-12-19* (Information Technology Equipment - Safety - Part 1: General Requirements), *CSA C22.2 No. 60950-1-07, 2nd Edition, 2011-12* (Information Technology Equipment - Safety - Part 1: General Requirements).

ROHS STATEMENT

When ordered as RoHS compliant, this product meets the Electrical and Electronic Equipment (EEE) Reduction of Hazardous Substances (RoHS) European Directive 2002/95/EC. The marking is clearly recognizable, either as written words like "Pb-free," "lead-free," or as another clear symbol (⊘).

Table of Contents

1   Introduction

1.1   Engineering Easier Solutions

mDynamo with Outdoor Bezel is an IP34 rated EMV chip card module that is designed for integration into indoor and outdoor, unattended kiosks. The card insertion slot features a spring-loaded door to help prevent dust and moisture from entering the reader.

1.2   Delivering Flexible Solutions

mDynamo with Outdoor Bezel contact **only** EMV chip card reader ideal for use in unattended kiosks, vending, parking garages, car wash establishments, ATMs, and fuels pumps can benefit from this cost-effective solution.

1.3   Key Features

mDynamo with Outdoor Bezel is an affordable and flexible card reading module. It is designed to read contact chip cards that conform to ISO 7816 standards. mDynamo with Outdoor Bezel is easy to install and configure, and has key features that include:

- USB interface allows for easy-to-use plug-n-play connectivity
- Available with custom bezel

1.4   Built for Easier Integration

mDynamo with Outdoor Bezel is supported with a variety of software developer kits (SDKs), mDynamo with Outdoor Bezel is supported by the full suite of Magensa's Services: data decryption, card and device authentication, gateway, device configuration and key injection. MagTek provides well-defined and documented web services and several off-the-shelf applications for reader configuration on Windows and Android platforms.

1.5   The Next Generation of Security

mDynamo with Outdoor Bezel is built on the MagneSafe® Security Architecture which uses 3DES encryption and DUKPT key management to protect EMV chip data.

1.6   Magensa Web Services

- Gateway
- Data Protection
- Remote Services

1.7   About Terminology

In this document, mDynamo with Outdoor Bezel is referred to as the **device**. It is designed to be connected to a **host**, which is a piece of general-purpose electronic equipment which can send commands and data to, and receive data from, the device. Host types include PC computers/laptops, tablets, and smartphones. Generally, the host must have **software** installed that communicates with the device and is capable of processing transactions. During a transaction, the host and its software interact with the **operator**, such as a cashier or bank teller, while the device interacts with the **cardholder**.

1.8   About Solution Planning

A smooth deployment of a solution that integrates mDynamo with Outdoor Bezel requires some up-front planning and decision-making:

- Determine the overall **functional requirements** and desired **user experience** of the solution mDynamo with Outdoor Bezel will be integrated into.

- Determine what **documentation** and **training** will be required from solution design through testing and field deployment.

- Determine what type of **host** mDynamo with Outdoor Bezel will connect to. When planning, include any additional support or devices required by the host and its connection, such as physical locations, mounting, and power connections.

- Determine which model of mDynamo with Outdoor Bezel the solution will include, and what accessories you need. **Table 1-1** provides a list of available devices, auxiliary devices, and accessories.

- Determine what **software** will be installed on the host and how it will be configured. Software can include operating system, transaction processing software, security software, and so on. Include any additional support required by the software, such as network connections.

- Determine how mDynamo with Outdoor Bezel should be **configured** and specify that when you order devices. MagTek or your reseller can advise. For deep detail about configuration options and how they affect device behavior, see *D998200151 mDynamo Programmer's Manual (COMMANDS)*.

- Determine how the solution design will integrate mDynamo with Outdoor Bezel electrically (see section **2 Electrical Integration** for details).

- Determine how the solution design will integrate mDynamo with Outdoor Bezel mechanically (see section **3 Mechanical Integration** for details).

- Determine how the solution will be **tested** and, if appropriate, how it will be **certified**.

- Develop an **installation procedure**. Installing technicians will need solution-specific materials. In addition, technicians may be supported by incorporating a Maintenance Mode into the host software for configuration, updates, and diagnostic tests.

- Determine how the solution will be **maintained**. See section **5 Maintenance** for guidance on maintaining the mDynamo with Outdoor Bezel portion of the solution.

- Determine how the solution will be **regularly inspected**. Proper inspection will require solution-specific training, instructions, and visual references for inspecting the entire solution for tampering, unauthorized added components such as eavesdropping or skimming devices, and so on.

Table 1-1 - Available Accessories

Part Number	Description
21079852	MDYNAMO WITH OUTDOOR BEZEL FLAT BEZEL
96700004	CLEANING CARD, DOUBLE SIDED

1.9 Handling

⚠ CAUTION
Proper handling of the device throughout delivery, assembly, shipping, installation, usage, and maintenance is very important. Not following the guidelines in this document could damage the device, render it inoperable, and/or violate the conditions of the warranty.

From device delivery through assembly, shipping, installation, usage, and maintenance, the device must not be exposed to conditions outside the ratings in **Appendix A Technical Specifications**.

If the device is exposed to cold temperatures, adjust it to warmer temperatures gradually to avoid condensation, which can interfere with the operation of the device or cause permanent damage.

Upon receiving the device, inspect it to make sure it originated from an authentic source and has not been tampered with.

Do not drop or shake the device.

The device should be transported/stored inside an anti-static bag at all times.

Before removing the device from the package, remove any static charge from your body by touching an earth-grounded metal surface.

Avoid touching the exposed pins on the connectors when handling the device.

For information about ongoing maintenance of the device, such as cleaning, see section **5 Maintenance**.

2 Electrical Integration

2.1 Overview

This section provides information and guidelines for designing the electrical aspects of a solution that incorporates mDynamo with Outdoor Bezel. MagTek strongly recommends vetting and testing solution designs before finalizing and deploying them, to make sure the design meets all requirements (e.g., functional, legal, security, certification, safety, and so on).

When designing a solution that incorporates mDynamo with Outdoor Bezel, consider the following:

- Review section **1.6 Magensa Web Services**
- **Gateway**
- **Data Protection**
- Remote Services
- for an overall introduction to the device's physical features and what they are called.
- Review section **3.4 Mounting** for recommended mounting configuration.
- Review **Appendix A Technical Specifications** to make sure the device is suitable for the solution.
- Review safe handling practices in section **1.9 Handling** to make sure the logistical aspects of the solution design meet the device's handling requirements.
- Develop solution-specific installation procedures and training materials before distribution to installation technicians.
- Review section **5 Maintenance** and develop a maintenance procedure and schedule. When installed in the solution-specific enclosure, the device may require additional maintenance not covered in the general guidelines provided here.

2.2   About the Connectors

mDynamo with Outdoor Bezel provides a permanently attached USB **cable (see Figure 2-1 - Using the Alternate Earth Grounding Standoff).** A **USB Device port** must be connected directly to a host's USB port, or connected to the host via a powered USB hub, to provide power to the device and bidirectional communication with the host. The device's USB connector is a Micro-USB B receptacle designed to mate with a standard Micro-USB B connector found on the peripheral end of commercially available cables. MagTek does not support connecting multiple mDynamo with Outdoor Bezel devices simultaneously to the same host. Depending on usage, the device expects to draw up to 500mA at 5V from the USB port, and the solution design must ensure 500mA is available to the device at all times. The mDynamo controller board in mDynamo with Outdoor Bezel draws a maximum of 300mA.

2.3　Grounding / ESD Protection

To guard against ground loops and to protect the device against electrostatic discharge (ESD), it is important for the solution design to ground the device correctly. MagTek strongly recommends checking whether the host's USB port provides earth ground, and whether the selected USB cable carries that ground all the way to the shield of USB port on the device's board. This will help make an informed decision about proper grounding. There are two paths to provide earth ground to the device; **MagTek recommends all solution designs bring in earth ground to the device using one and only one of the possible paths:**

- Bring in earth ground from the host through the USB cable's metal connector shell to the **USB Device Port,** See **Figure 2-1** for details.

- Bring in earth ground through the Alternate Earth Grounding Standoff. See **Figure 2-1** for details.
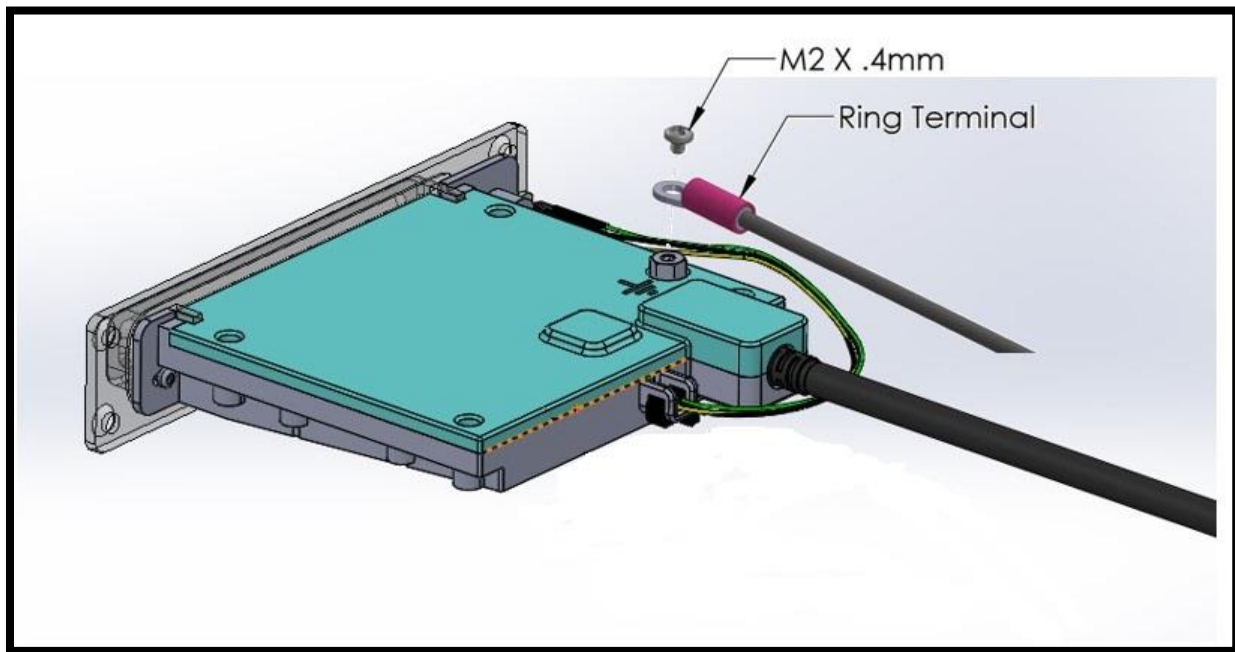
Figure 2-1 - Using the Alternate Earth Grounding Standoff

After deciding which point will be grounded, make sure none of the remaining ground points are connected to a different ground.

In addition, solutions that incorporate devices with a metal bezel must ground the bezel to the same earth ground potential as the point chosen above. This provides an additional path to protect the device from electrostatic discharge during card insertion and provides additional protection for the device's electronics. MagTek recommends this earth grounding cable comprise 18AWG stranded wires.

2.4   Shielding and Conditioning

MagTek recommends using shielded cables to provide noise immunity and to prevent radiated emissions. The device itself has been tested by an FCC lab for Class B radiated susceptibility and has no special shielding requirements. For details, see the FCC information provided at the beginning of this document.

MagTek also recommends that all communication cabling (i.e., USB) should be draped together where possible, and isolated from any unrelated earth ground cables and other wiring nearby that could potentially couple noise into the device.

The device has no special requirements for power conditioning or signal conditioning.

3   Mechanical Integration

3.1   Overview

This section provides information and guidelines for designing the mechanical aspects of a solution that incorporates mDynamo with Outdoor Bezel. MagTek strongly recommends vetting and testing solution designs before finalizing and deploying them, to make sure the design meets all requirements (e.g., functional, legal, security, certification, safety, and so on).

When designing the mechanical portions of a solution that incorporates mDynamo with Outdoor Bezel, consider the following:

- Review section **1.6 Magensa Web Services**
- **Gateway**
- **Data Protection**
- Remote Services
- for an overall introduction to the device's physical features and what they are called.
- Review **Appendix A Technical Specifications** to make sure the device is suitable for the solution.
- See section **3.2 Dimensions** for overall device dimensions.
- Determine device orientation. Options and constraints are provided in section **3.3 Orientation**.
- Determine how the device will be mounted. See section **3.4 Mounting** for details. Coordinate with the electrical design team to make sure the panel design, mounting hardware, and solution-specific installation instructions meet electrical requirements.
- Review safe handling practices in section **1.9 Handling** to make sure the logistical aspects of the solution design meet the device's handling requirements.
- Develop solution-specific installation procedures and training materials before distribution to installation technicians.
- Review section **5 Maintenance** and develop a maintenance procedure and schedule. When installed in the solution-specific enclosure, the device may require additional maintenance not covered in the general guidelines provided here.

3.2   Dimensions

Overall dimensions of the device are shown in **Figure 3-1 - mDynamo with Outdoor Bezel Mechanical Dimensions in Inches [mm] - Front View**. On request, MagTek can provide a 3D model of the device's envelope to assist with the mechanical portion of solution design. MagTek strongly recommends building and testing prototypes with actual devices before finalizing the solution design.
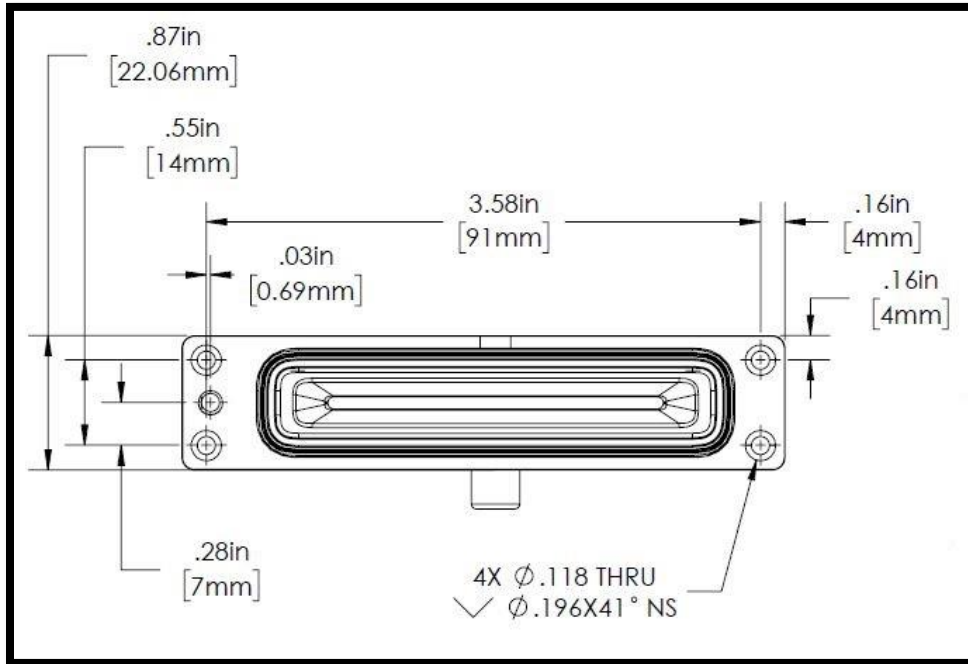

Figure 3-1 - mDynamo with Outdoor Bezel Mechanical Dimensions in Inches [mm] - Front View

3.3   Orientation

The device can be oriented horizontally **only** (see **Figure 3-2**).
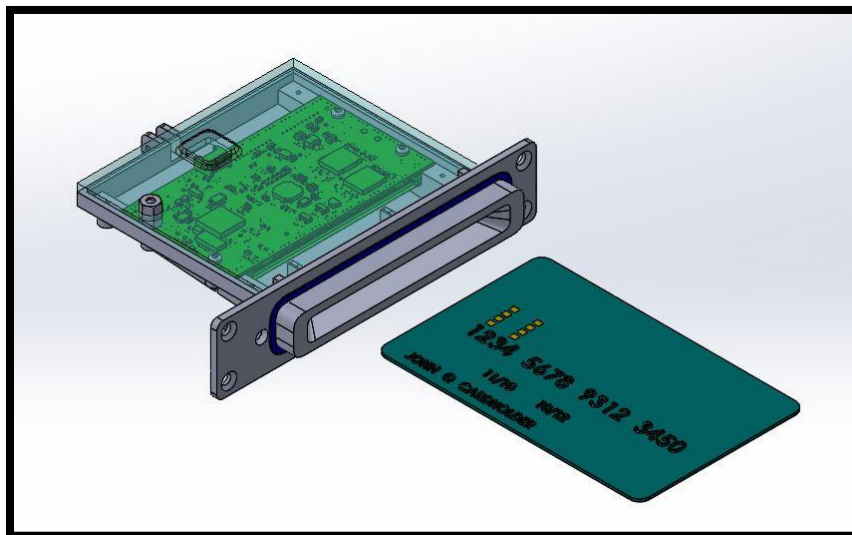
Figure 3-2 - mDynamo with Outdoor Bezel Mounting Orientations

The device should be installed such that cardholders have a full, unobstructed view of the housing around the card insertion slot opening ("entry zone") prior to insertion. This is to allow cardholders to easily detect suspicious objects in or around the card slot entry, such as bugs / skimmers / tapping mechanisms, and their wires or antennas. Installation height and pitch are factors in meeting this requirement.

3.4   Mounting

mDynamo with Outdoor Bezel is an IP34 rated device. Mounting is dependent on customer design; however, it is recommended that the built-in external drain be facing down to ensure proper drainage should moisture enter the interior of the device.

Figure 3-3 - Recommended Drain Position

4 Operation

4.1 Card Reading / Transactions
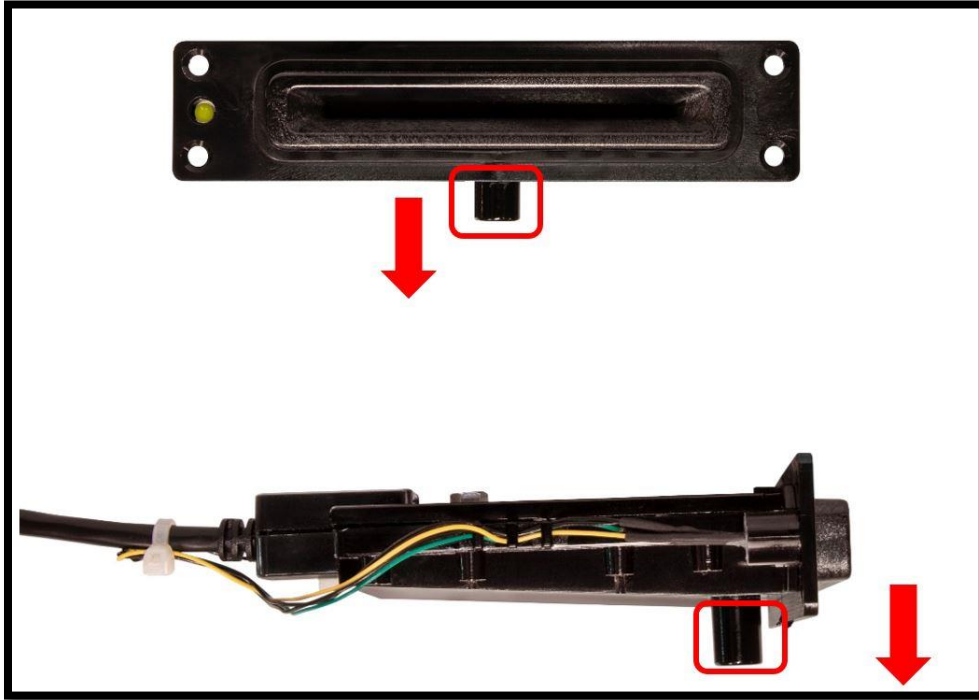
Transactions begin when the host software initiates them. Cardholders should insert cards according to the card orientation guide on the bezel (see **Figure 3-2 - mDynamo with Outdoor Bezel Mounting Orientations**).

If a cardholder inserts a contact chip card, the device detects the chip and attempts to communicate with the card. The host software may choose to use the notifications from the device as events to trigger additional guidance (such as audible, visual, or tactile feedback) to the cardholder. For example, for chip cards, the host software may direct cardholders to leave the card inserted until the transaction is complete, then to remove the card.

Before and during transactions, an operator may control or monitor the device using the host software and/or the General Status LED, which is a red/green LED that can be host-controlled.

Programmers of host software should see section **6 Developing Host Software** for cross-references to programming tools and documentation for communicating with the device.

4.2 About the General Status LED

The device's General Status LED can be used to provide feedback to operators and cardholders about the internal state of the device. Custom software on the host the device is connected to may completely customize / override the External LED behavior.

Table 4-1 shows how to interpret the colors and flashing patterns of the General Status LED if the host is not overriding the LED behavior.

Table 4-1 – General Status LED Meaning

Color	Flashing Pattern		Meaning
Off	Off	———	The device is not receiving adequate power from the host via the USB port.
Green	Steady On	———	The device is ready to read a card.
Red	Steady On	———	An operator is updating the firmware. On completion, the device will reset and the LED will turn off briefly.

5   Maintenance

5.1   Mechanical Maintenance

⚠ CAUTION
To avoid damaging the read head, only clean the card path with approved cleaning cards. DO NOT use liquid cleaning products or insert any other objects into the device.

Periodic cleaning of mDynamo with Outdoor Bezel's exterior may be required. To clean the outside of the device, wipe down the device with a soft, damp cloth and then wipe with a dry cloth.

Solution training should direct assemblers, operators, and maintenance personnel to use a clean, dry cloth to clean the device. Do not use chemicals or solvents.

5.2   Updates to Firmware, Documentation, Security Guidance

In addition to the security guidance in the product manuals, MagTek may provide updates to this document, as well as supplemental security guidance or notices regarding vulnerabilities, at www.magtek.com. MagTek advises checking the product's home page periodically for the most up-to-date information.

MagTek may also contact customers when it is necessary to update firmware to address critical product bugs or security vulnerabilities. For details about obtaining and updating the device's firmware, contact MagTek Support Services or your reseller.

6   Developing Host Software

This section provides high-level information about communicating with the device in various software development frameworks, and provide pointers to available SDKs, which include sample code. All product documentation and SDKs are available for download by searching for the product name on www.magtek.com and navigating to the **Support** tab.

When developing host software, it is important to note that mDynamo with Outdoor Bezel is a combination of two devices integrated into a common enclosure:

- mDynamo with Outdoor Bezel's primary control unit and chip card reader is MagTek's **mDynamo**. When the host communicates with the device through the USB port, it is communicating directly with mDynamo.

MagTek produces software development kits (SDKs) with API libraries that provide higher-level functions wrapped around **USB HID** communication protocols. These libraries simplify the development of custom host software that interfaces with mDynamo with Outdoor Bezel. See:

- *99510109 SOFTWARE, SDK, ADYNAMO, BULLET, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO, UDYNAMO (ANDROID)*

- *99510132 SOFTWARE, SDK, ADYNAMO, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO, UDYNAMO (WINDOWS .NET)*

- *99510133 SOFTWARE, SDK, DYNAMAG, DYNAMAX, DYNAWAVE, EDYNAMO, IDYNAMO 6, MDYNAMO, TDYNAMO (WINDOWS C++ / JAVA)*

In addition to MagTek's SDKs, custom software on any operating system can communicate directly with the device using the operating system's native USB libraries and protocols. For details, see *D998200151 mDynamo Programmer's Manual (COMMANDS).*

For more information about developing custom applications that integrate with mDynamo with Outdoor Bezel, see the MagTek web site or contact your reseller or MagTek Support Services.

Appendix A   Technical Specifications

mDynamo with Outdoor Bezel Technical Specifications	
Reference Standards and Certifications	
Identification Cards and Financial Transaction Cards (ISO 7810, ISO 7811, ISO 7812, ISO 7813) Identification Cards Integrated Circuits with Contacts (ISO/IEC 7816-1, 2, 3, & 4) EMV ICC Specifications for Payment Systems Version 4.3, L1 Contact and L2 Contact Encryption: TDEA (3DES)-CBC using DUKPT FCC Title 47 Part 15 Class B CE Level B EMC CE Safety UR/CUR UL Recognized MasterCard TQM California Proposition 65 (California) IPC-A-610 Class II Assembly EU Directive Waste Electrical and Electronic Equipment (WEEE) EU Directive Restriction of Hazardous Substances (RoHS) Universal Serial Bus Specifications 1.1, 2.0	
Physical Characteristics	
Dimensions (L x W x H):	3.9 in. W x 0.9 in. H x 3.4 in. T (99.1 mm x 23.4 mm 86.4 mm)
Weight	Reader only – 1.8oz (52.0g). Reader with USB cable 3.4oz (95.5g) **Note**: USB cable will always be included and attached. This cable cannot be removed unless you remove the top cover and cover mounting screws.
Supported Mounting Options:	Solution-specific enclosure with card slot, screws, and inserts
Card Read Characteristics	
Magnetic Stripe Reader:	NO
EMV Contact Reader:	EMVCo L1 and L2 Contact Reader
User Interface Characteristics	
Status Indicators:	General Status LED (Red/Green)
Display Type:	Not Applicable
Display Size (viewable area):	Not Applicable
Display Resolution:	Not Applicable
Keypad:	Not Applicable
Security Characteristics	
Certifications:	Not Applicable
Tamper Protection:	Not Applicable

mDynamo with Outdoor Bezel Technical Specifications	
Code Protection:	Signed firmware. Any attempt to install unsigned firmware on the device renders it unusable.
Eavesdrop Protection:	Not Applicable
Electrical Characteristics	
Power Inputs:	USB powered
Power Outputs:	5 VDC on USB power
Battery Type:	Not Applicable
Battery Capacity:	Not Applicable
Battery Charge Time:	Not Applicable
Battery Time, Standby:	Not Applicable
Battery Time, Transactions:	Not Applicable
Voltage Requirements:	5 VDC from USB port
Current Draw:	500mA from USB port maximum
Data Storage:	Not Applicable
Communication Characteristics	
Wired Connection Types:	Micro-USB B, compatible with USB 1.1, USB 2.0 Vendor-defined USB Human Interface Device (HID) data format
Wireless Connection Types:	Not Applicable
Wireless Range:	Not Applicable
Wireless Frequency:	Not Applicable
Software Characteristics	
Tested Operating System(s):	Windows 7, Windows 8.1, Windows 10
Environmental Resistance	
Ingress Protection:	Not Applicable
Operating Temperature:	-4°F to 149°F (-20°C to 65°C)
Operating Relative Humidity:	5% to 90% non-condensing
Storage Temperature:	-4°F to 149°F (-20°C to 65°C)
Storage Relative Humidity:	5% to 90% non-condensing
Vibration Resistance:	Not Applicable
Shock Resistance:	Not Applicable

mDynamo with Outdoor Bezel Technical Specifications	
Vapor Resistance:	Not Applicable
Reliability	
Shelf Life:	Not Applicable
EMV Insertions:	500K
Battery Shelf Life:	Not Applicable
Battery Cycle Life:	Not Applicable