

# EFM-70 User Manual

EF-70-based modular iris recognition system with dual iris image capture and central positioning LCD

Version 0.6.0, October 2024



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## APPLICATION

For customized integration into kiosks, ATM's, and similar automated, self-service applications.

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# About This Manual






The EFM-70 is the modular version of CMITech's next generation EF-70 dual iris imaging system. This manual contains the descriptions and operational instructions for EFM-70 device. It is intended and written for system administrators who are in charge of overall operation including installation and management. We recommend you familiarize yourself with this manual in order to make use of the product correctly and effectively.



- The figures and screenshots in this guide are given for illustration purposes only and may differ from the actual product.
- Due to continuous technological improvements, the guide may not contain the most updated information. For further information not covered in this guide, please contact us at [service@cmi-tech.com](mailto:service@cmi-tech.com) or [sales@cmi-tech.com](mailto:sales@cmi-tech.com).

## Conventions in This Manual

The following symbols are used throughout this manual. Make sure that you fully understand the meaning of each symbol and follow the instructions accompanied.

Symbol	Name	Description
	WARNING	Indicates information that should be followed with the utmost care. Failure to comply with a warning could cause severe damage to the equipment or injury to personnel.
	CAUTION	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
	IMPORTANT	Emphasizes essential information required for user success.
	NOTE	Provides important supplemental information that might enhance users' understanding or alternative steps to accomplish their goals.
	TIP	Provides optional information to help users be more successful in their tasks.

# Safety Instructions

Follow the safety instructions to use the product safely and prevent any risk of personal injury or damage to the product.



## WARNING

### Choosing Location

- DO NOT expose the product to direct sunlight, excess heat, open flames, corrosive gasses, moisture, or dust. Doing so may cause electrical shock, electrical short, or fire.
- DO NOT install the product near heaters, air conditioners, electrical fans, refrigerators, or water. Doing so may create the risk of a short circuit or fire caused by water or condensation that may come into contact with the product.
- DO NOT install the product in an environment that is susceptible to explosion.

### Operation

- DO NOT let any type of liquid, mists, or sprays get into the product. Doing so may cause electrical shock, electrical short, or product damage.
- If smoke, odors or noise rise from the device, stop using the device immediately, disconnect the power cable, and contact our customer support.

### Maintenance

- DO NOT attempt to disassemble, repair, or modify the device yourself. Opening or removing covers may expose you to electrical shock or other risks and may void your warranty. If the product does not work correctly, contact your dealer or our customer support.



## CAUTION

### Choosing Location

- Keep the front side of the device away from strong ambient light, direct sunlight, or both. Sunlight, halogen lamps or other strong illumination may degrade the performance of the device, that is, increase in failure-to-capture rates or occasional authentication problem.
- DO NOT install the product outdoors unless environmental factors such as water, temperature, or sunlight in the location are controlled by means of proper protection.
- DO NOT expose the product to high electro-magnetic radiation. Device failure or performance degradation may occur caused by electro-magnetic interference.
- DO NOT install the product next to devices that contain magnets or generate magnetic fields such as speakers. Device malfunction or performance degradation may occur caused by magnetic interference.

## Installation

- DO NOT install the product on a surface subject to vibration or physical shock. Doing so can cause damage to the product.
- DO NOT install the power supply cable in a high-traffic area where people pass by. Doing so may create a trip hazard and cause the cable to become worn or frayed.
- Use only a power cord set complying with the national regulation of the countries intended for sale.
- DO NOT connect multiple devices to one power adapter. Overload on power adapter may cause over-heat or fire hazard.
- DO NOT use any type of extension cord to connect the product to a power supply.

## Operation

- DO NOT use any sharp tools when pressing the buttons to prevent damage to the touch screen from scratches or cuts.

## Maintenance

- When cleaning the product, wipe the product with a soft and dry cloth. Do not apply water, benzene, alcohol, or spray cleaner. These may cause product failure or fire.

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# 1. Introduction to EFM-70

The EFM-70 is the modular version of CMITech's next generation EF-70 dual iris imaging system. It is intended for specialized solution integrators to incorporate high accuracy iris recognition biometrics into a kiosk or similar self-service terminal. This system's operation is identical to CMITech's EF-70 iris recognition terminal product, which combines dual iris imaging with face imaging and provides unprecedented subject ease of use through a highly innovative and intuitive user positioning approach.

New to the EFM-70 is a central 1.45" touch LCD , which assists the user in intuitive positioning, making capture of the iris and face images faster and easier.

This independent user interface allows the integrator to position the units without regard to the kiosk's own display panel. It provides the same positioning feedback cues and instructions as in the EF-70 system including sound.

Subjects will view their own face in the LCD to position themselves correctly. Each subject will intuitively and naturally move to the correct position by simply centering and sizing their face image to the positioning box within the display. In addition, this box turn green to indicate that the subject is within the proper distance range of 40 to 70cm, after which the iris biometrics images are automatically captured. For face recognition, the working distance is 0.4 to 1.0 meters so that the subject needs only look at the display to initiate face image capture.

The EFM-70 is an embedded system that includes its own ARM main board to manage all iris and face imaging processes. The communication options to the host system are TCP/IP via an Ethernet connection or a USB connection.

## 1.1. Key Features

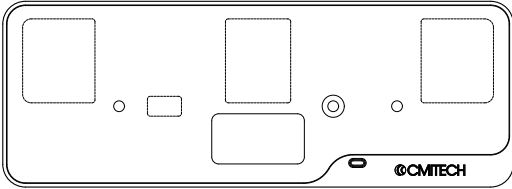




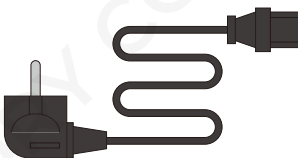
The key features of EFM-70 are shown in the following table:

Feature	Description
Advanced real time subject tracking with simple user instructions	EFM-70 accurately locates the subject face in real time and tracks the face tilting automatically to provides easy positioning.
Automatically tilting at user height	+25 to -25 degree
Utilization of ultra-high performance face matching engines	Advanced, dedicated co-processor allows utilization of latest and most powerful face algorithms.
Supports multiple languages in GUI	English, Korean
Large on-board (embedded) iris and face template database	Store up to 200,000 active iris templates on-board in 1:N recognition (verification) identification mode. For the face store up to 50,000 Active face templates on-board in 1:N recognition (verification) identification mode.
High speed face matching	Can provide up to 50,000 matches per second on-board.
Use in widest range of lighting conditions	Embedded illuminators in both white and NIR ranges expand use in adverse ambient light environments. Indoor use only.
Standard I/O Interface	USB OTG, Ethernet, RS-232/RS-485
User Interface	LCD with touch screen and speaker embedded
Fully compatibility with CMITech CMID Manager and SDK software	Supports full integration with CMID and Software Development Kit (SDK)

## 1.2. Components

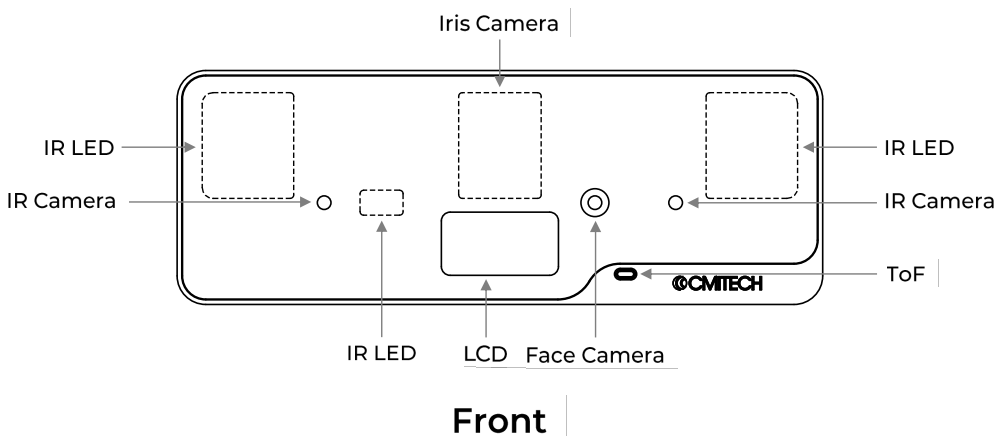
Before you begin, make sure that all the following items are included with your device. If you find anything is missing, contact your dealer.

*EFM-70 component table*

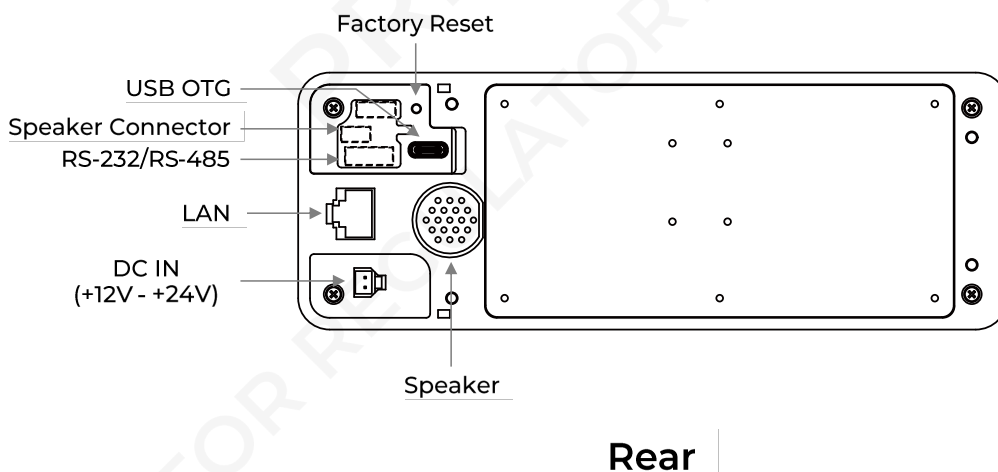
Name	Quantity	Image	Note
EFM-70	1		
Cables	Power		Optional
	Speaker		Optional
	RS-232/RS-485		Optional
AC adapter	1		Optional
Power cord	1		Optional



## 1.3. Parts and Controls



Name	Description	Note
Iris Camera	Captures the iris images	IR
Face Camera	Captures the face images	RGB
IR Camera	Measures the distance between the subject and the device	
IR LED	Illuminates the iris using the NIR lighting when capturing the irises	
LCD	Shows preview images for capture and its results	Touch screen
ToF sensor	Detects the subject's motion	



Name	Description	Note
Factory Reset	Resets to the factory default settings	
USB-C OTG port	Connects a USB flash drive or a PC host	
Speaker Connector	Connects with internal or external audio output	
RS-232/RS-485	Connects the RS-232 or RS-485 cable	

Name	Description	Note
LAN	Connects the ethernet cable	
DC IN	Connects the power cable	
Speaker	Delivers sound from device	

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## 2. Installing EFM-70

This chapter gives the information about the requirements and the prerequisites for installing EFM-70 and the installation procedures.

### 2.1. Installation Requirements

Before installation, make sure that the following requirements are met.

#### 2.1.1. Environmental Requirements



The EFM-70 is designed and intended for indoor use only. The device is not weatherproof and must not be exposed to water, ice, extreme temperatures or other adverse weather conditions. If it is required to use the device in outdoor or extreme environments, contact local sales or [service@cmi-tech.com](mailto:service@cmi-tech.com) for more information.

- ☒ Avoid the location that is exposed to backlight, direct sunlight, and other strong illumination.
- ☒ Choose the location with moderate ambient light.
- ☒ Determine the height at which you install the device.



The recommended mounting height is 135 cm (53 inches) from the floor to the bottom of the device. It covers a person's height from 140 cm (55 inches) up to 210 cm (83 inches).

#### 2.1.2. Electrical Requirements

- ☒ Use a stable power supply adapter of DC 12/24V ( $\pm 5\%$ ) with a minimum 2A.
- ☒ Make sure that the power cable is as short as possible and have correct wire gauge (22 AWG or smaller in number)
- ☒ Use CAT5 or later for ethernet cable.

*Power requirements depending on cable length and wire gauge*


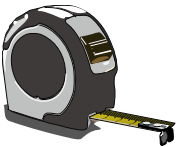




Input voltage (V)	Wire gauge (AWG)	Power cable length (m)		Note
		Recommended	Maximum	
12	16	30.3	44.6	
	18	19.0	28.0	
	20	12.0	17.7	

15	20	37.5	50.1	<i>Standard Configuration</i>
	22	23.6	31.4	
24	20	105.1	140.1	
	22	66.0	88.1	

### 2.1.3. Tool Requirements

The following tools can be necessary for installation and are not supplied by default.

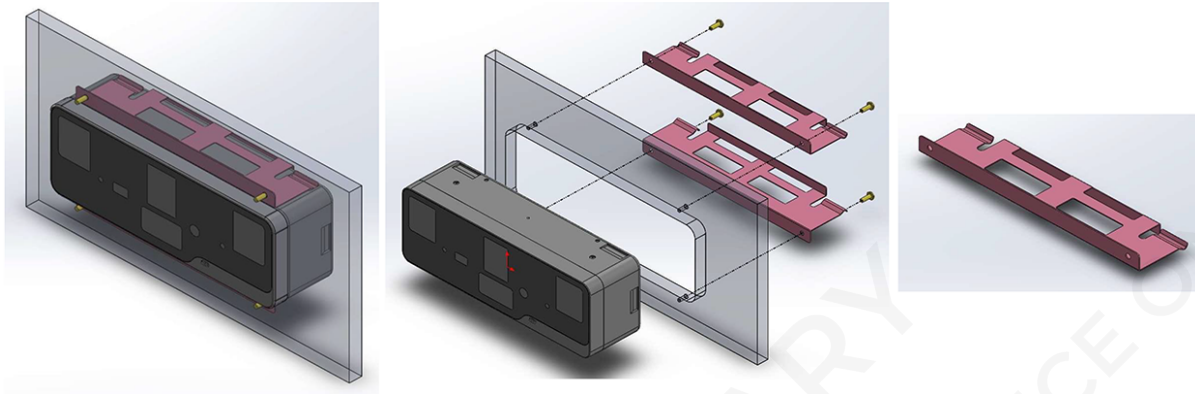
#### Required tools

Purpose	Name	Figure	Note
General	Screw driver		Cross head
	Tape ruler		For measuring the installation height
	Cutting plier		
Concrete wall mount	Electric drill		With a drill bit and anchor bolts
	Marker		
	Hammer		

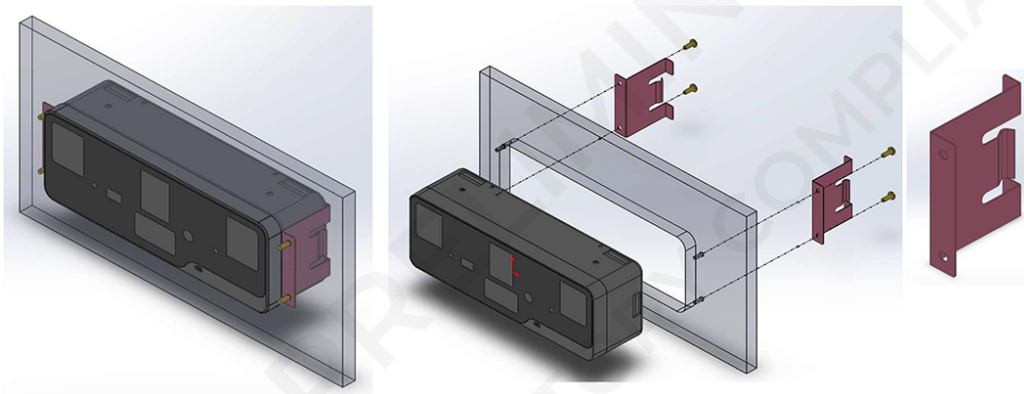
## 2.2. Mounting Types

The EFM-70 is primarily intended for flush installation in kiosk front panel. Depending on the installation environment, user should utilize a customized bracket or clamp as shown below. Please contact CMITech for more information.

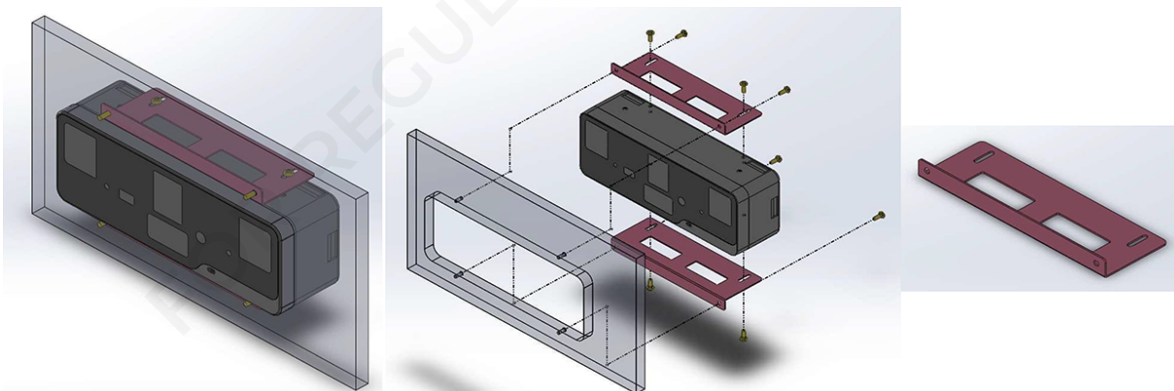
*Type A : Top/Bottom side mount using a clamp bracket (Snap-in)*



*Type B : Side mount using a clamp bracket (Snap-in)*



*Type C : Top/Bottom side mount using a bracket*



## 3. Using EFM-70

### 3.1. Enrollment

You can enroll or manage users by using the CMID Manager or the Software Development Kit (SDK) provided by CMITech. See the CMID Manager V2 User Guide for more information on how to enroll users.

### 3.2. Authentication

EFM-70 detects a subject and captures the images of subject's irises and face automatically once it's at an appropriate distance and position.

1. Position yourself facing straight at the LCD display. When the device detects your movement from over 1.0 meter, it initiates the image capture sequence. A rectangular-shaped user guide box will appear on the screen.
  - If it is **BLUE**, it means you are too far from the device. Move forward.



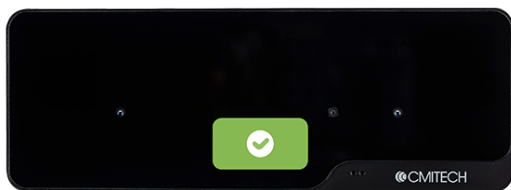
- If the user guide box flashes **GREEN**, it means you are at an appropriate position. Stop and hold your position until the device captures image of your face and/or iris.



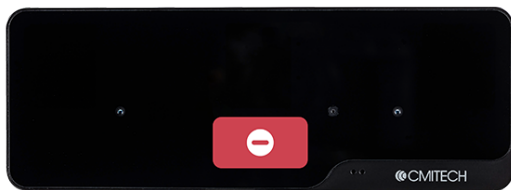
- If you are standing too close to the device, your face will not fit in the LCD display. When the user guide box flashes **RED**, it means the device cannot capture your image because you are too close. Move back until the box turns green.



2. Authentication result is displayed on the top of the screen depending on whether your face is recognized successfully.
  - **Success:** Authentication success or capture of iris and face is completed.



- **Failed** or **Denied**: Authentication failed or denied. Or capture of iris and face is failed.

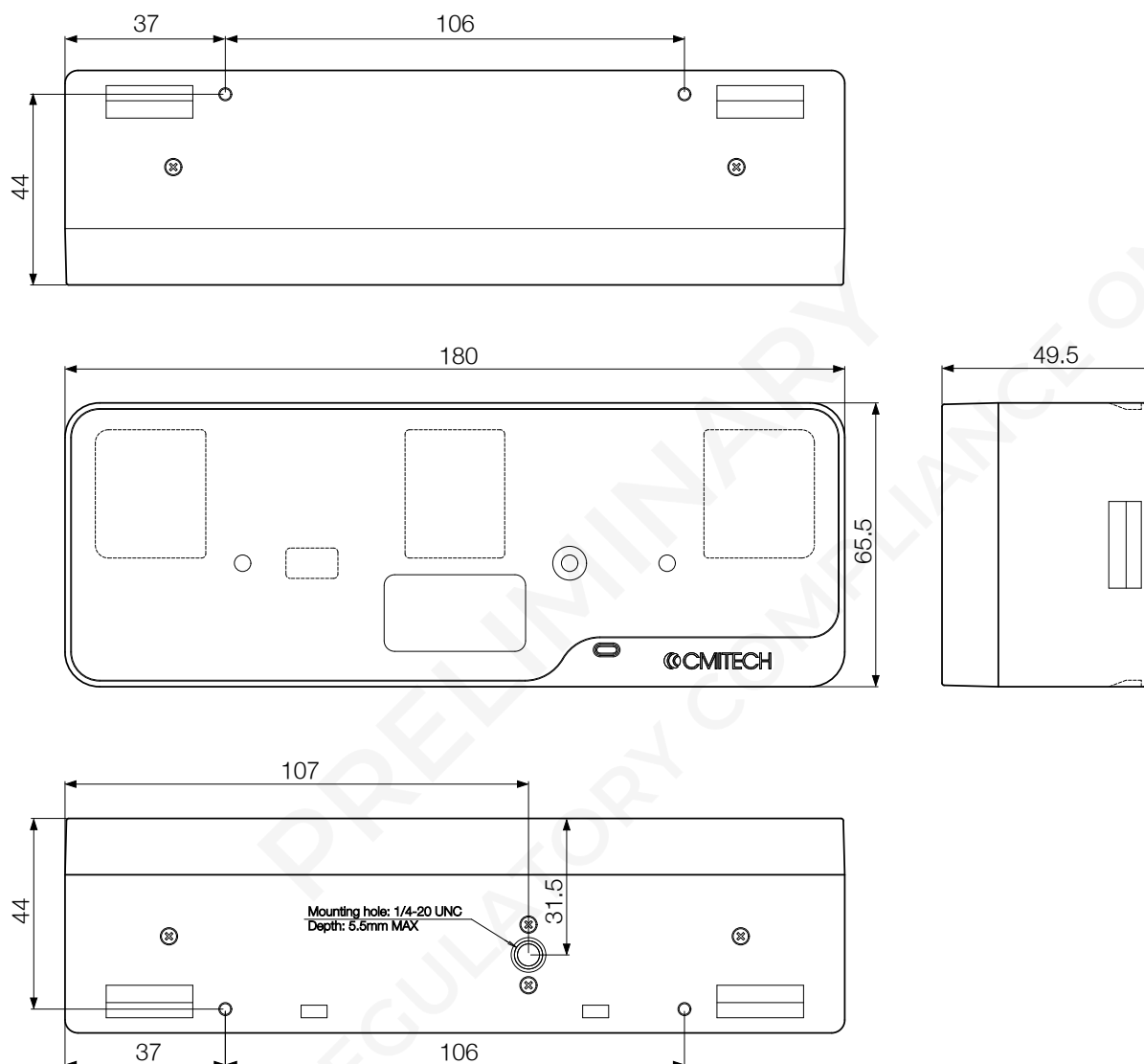


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## 4. Product Specifications

### 4.1. Mechanical Specifications

#### 4.1.1. Dimensions (unit: mm)



### 4.2. Technical Specifications

Specification	Description
Embedded CPU	ARM quad-core
On-board iris and face algorithms for embedded encoding and matching	Standard in all configurations



Specification	Description
Flexible Software Development Kit (SDK) configurations	High level SDK is RESTful type that includes host side application for LAN or USB connection to EFM-70 resident services layer. Requires Windows API development to EFM-70 host side application. Reference code included.
Host side compatibility	Windows C# (.NET), Windows C, Linux C on x86 platform. Please contact CMITech for Java or Android support.
Configuration Utility software application	This host side software application provides centralized (network) control and setup of system configuration including IP address settings and centralized FW upgrades.
Dimensions	180 x 65.5 x 49.5 mm (7.1 x 2.6 x 1.9 inches) without mounting wall plate
Weight	450 g without wall plate
On-board data storage	Up to 200,000 iris template pairs with match speed about 1.0 second either in 1:N mode (identification) or 1:1 mode (verification).
	Up to 50,000 face templates
Iris image pixel resolution	Exceeds ISO 19794-6 2011 and ISO 29794-6 2015 iris imaging standards with MTF of 3.0 lp / mm at 50% contrast
Iris image output	640 x 480 pixels, 8bit depth, supports multiple formats
Enrollment mode operational iris imaging distance (stand-off range) and depth of field	50 to 70 cm range (20 cm depth of capture range) in enrollment mode.  Meets or exceeds ISO 19794-6 2011 and 29794-6 2015 specifications.
Recognition mode operational iris imaging distance	Recognition mode provides up to 40 to 70 cm range (30 cm depth of capture) for small scale applications. Does not necessarily meet ISO specifications. Range selectable in SDK.

Specification	Description
Iris positioning indicators	<p>Face positioning within box in LCD serves to center users face in X-Y dimensions.</p> <p>Subject will fit size of face to box size within LCD display for distance(Z) positioning, with simultaneous color bar display for correct distance positioning:</p> <ul style="list-style-type: none"> <li>• <b>Blue</b>: too far away</li> <li>• <b>Green</b>: OK</li> <li>• <b>Red</b>: too close</li> </ul> <p>Supplemental voice distance feedback is also simultaneous. Vocalizations convertible to local language via .wav file substitution.</p>
Auto tilt	Internal: +25 to -25 degree up/down tilt
LCD	1.45" (172 x 320 pixels) with touch screen
Time of iris image capture and authentication	Typically about 0.5 second from time the subject's eyes are properly placed within capture volume.
IR illumination for iris imaging	Dual wavelength LEDs (spectral range of 700 to 900 nm) that conforms to ISO best practices for iris imaging.
Face image capture	Standard 24bit color and NIR images, both accessible from SDK
Face recognition	Standard on-board encoding and matching
Audio	1W embedded speaker
Operating temperature	-20 to 50°C
Humidity	10 to 90% RH, non-condensing
Illuminator eye safety standard	IEC 62471
Ethernet	10/100 Mbps (RJ45 connector)
I/O	USB OTG (Type-C), RS-232/RS-485, Factory Reset
Power requirement	15V DC, 30W
Power adaptor	Optional
Tripod mount thread	1/4 / 20 UNC (standard consumer tripod)

# Appendix A: Legal Information

## A.1. Disclaimer

The words of which the initial letter is capitalized have meanings defined under the following conditions. The following definitions shall have the same meaning regardless of whether they appear in singular or in plural.

For the purposes of this Disclaimer:

- **Company** (referred to as either "the Company", "We", "Us" or "Our" in this Disclaimer) refers to CMITech Co. Ltd.
- **You** means the individual accessing the Product, or the company, or other legal entity on behalf of which such individual is accessing or using the Product, as applicable.
- **Product** means the electronic device provided by the Company named EFM-70 and its manual.

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We reserve the right to make any alterations which may be required due to technical improvement. For the most current information, contact your CMITech representative.

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## Appendix B: Regulatory Information

### B.1. FCC compliance statement

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.

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 to 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.

Changes or modifications to this product not authorized by CMITech could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

This product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components. It is important that you use compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, television sets, and other electronic devices.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi-transmitter product procedures.

A minimum separation distance of 20cm must be maintained between the antenna and the person for this appliance to satisfy the RF exposure requirements.

### B.2. EU Declaration of Conformity (CE)

This product is CE marked according to the provisions of the RED (Radio Equipment Directive) Directive (2014/53/EU). CMITech Co., Ltd. hereby declares that this product is in compliance

with the essential requirements and other relevant provisions of Directive 2014/53/EU. This device is a class 1 radio device according to the directive. For more information, contact us using the following contact information.

CMITech Company, Ltd.

- Website: <https://www.cmi-tech.com/>
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## Appendix C: Contact Information

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