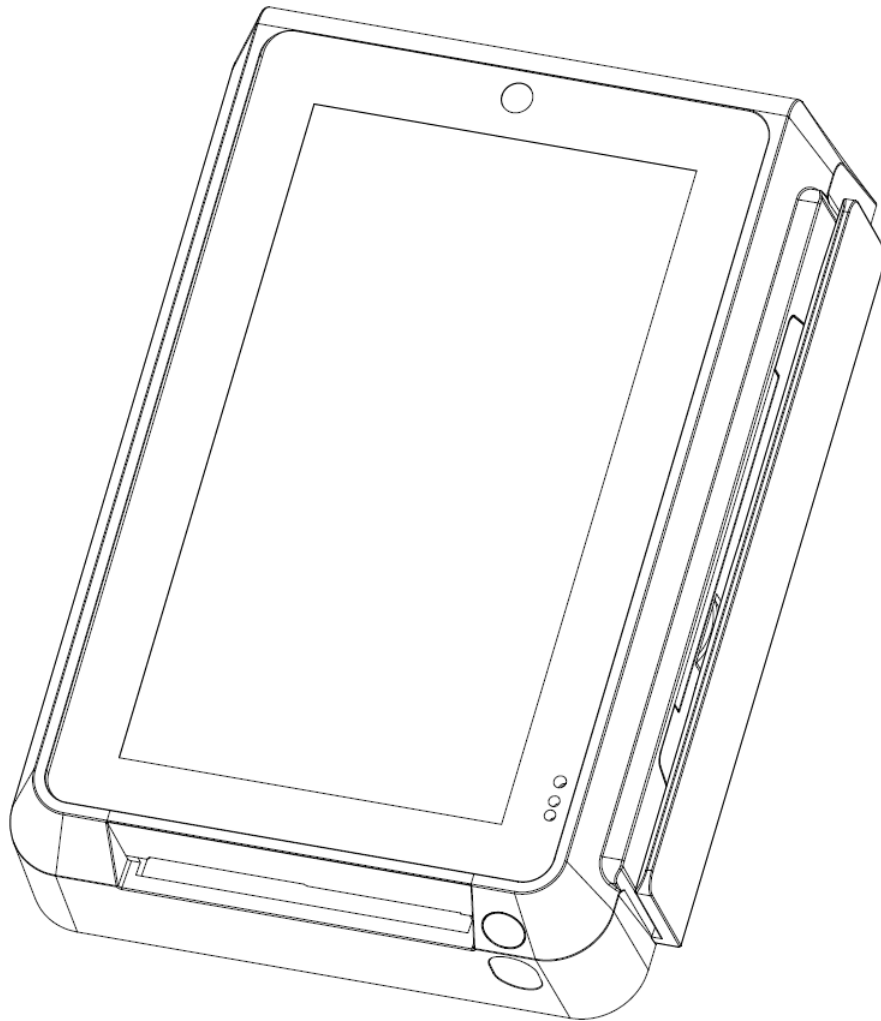




IM30 UNATTENDED PAYMENT TERMINAL PRODUCT MANUAL



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Revision History

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This document is meant to aid in the installation and operation of the IM30 unattended payment terminal.

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1 Product Overview

1.1 Glossary

Table 1: Terms and Definitions

Term	Definition
UPM	Unattended Payment Module
EPP	Encrypting PIN Pad
SCR	Secure Card Reader
ESD	Electrostatic Discharge
GND	Ground
LCD	Liquid Crystal Display
MDB	Multidrop Bus
USB	Universal Serial Bus
RS232	Recommended Standard 232
RAM	Random Access Memory
MCU	Microcontroller Unit
CPU	Central Processing Unit
SAM	Secure Access Module
SIM	Subscriber Identity Module

1.2 Product Introduction

The IM30 unattended payment terminal is a POS terminal designed to operate in self-service environments. This device is designed to be used in variety of indoor or outdoor settings, such for vending, parking, ticketing or self-service checkout registers.

By combining a wide variety of payment options such as magnetic strip cards, smart cards, contactless cards and devices as well as 1D/2D code scanning, the IM30 provides a comprehensive solution to cashless payments. The IM30 is also designed to operate in a wide range of temperatures, repel the ingress of dust and water, resist physical impacts, and disperse electrostatic discharges. These are all qualities that allow the device to be installed in a wide variety of outdoor or indoor locations

1.3 Product Contents

The following items are include with the IM30 unattended payment terminal. If any items are missing or damaged, contact your dealer.

Table 2: Product Contents

Item	Quantity
IM30 unattended payment terminal	1
IM30 mounting bracket	1
M4 nuts	4
M4 screws	4
IM30 Quick Setup Guide	1

2 Product Specifications

2.1 Device Illustration

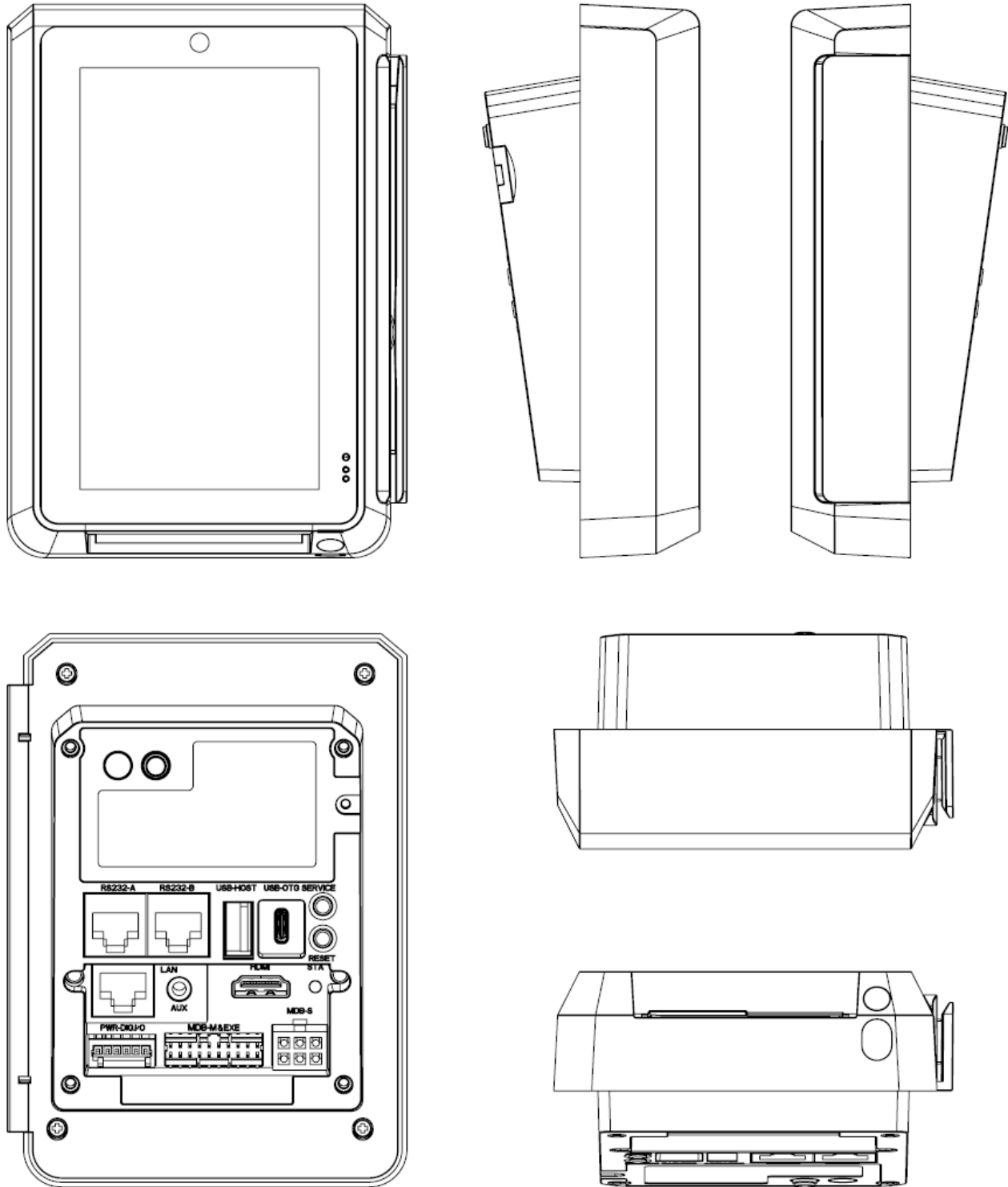


Figure 1: view from all sides

2.2 Device Specifications

2.2.1 Device Modules

Table 3: IM30 Device Module Outline

Module	Specifications	
CPU	AP processor	ARM Cortex-A53
	SP processor	ARMv7-M
operating system	Linux	
memory	1GB or 2GB LPDDR3 SDRAM 8GB EMMC	
display	5" TFT color display 1280 x 720 pixels capacitive touchscreen	
audio	built in speaker	maximum volume of at least 80 dB at 10 cm supports WAV, WMA, RAW, and MP3 audio is synchronized with video
wireless communications	Bluetooth (optional, available in certain product configurations)	
	Wi-Fi (optional, available in certain product configurations)	
	4G cellular module	
external ports	USB Type A (Host)	
	USB Type C (OTG)	
	2 RS232 (RJ45)	
	Ethernet (RJ45)	
	Auxiliary jack	
	HDMI port	
	MDB slave	
	MDB master and Executive custom port (20 pin header)	
power source	7 to 48 VDC (digital IO)	
	7 to 48 VDC (MDB Slave)	
	12 to 48 VDC (RS232)	
	19 to 30 VAC (Executive)	
SAM card slot	2 to 4 micro SIM (3FF) SAM card slots (depending on product configuration)	

SIM card slot	0 to 1 micro SIM (3FF) SIM card slot (depending on product configuration)	
card readers	magnetic strip card reader	triple track bidirectional read
	smart card reader	ISO7816 compatible EMV2000 L1 & L2 compliant PBOC3.0 compliant
	contactless card reader	reads ISO14443 Type A/B cards reads Mifare cards reads NFC devices
operating environment	Temperature	-20°C ~ 70°C
	Humidity	5% ~ 95% (without condensation)
storage environment	Temperature	-30°C ~ 70°C
	Humidity	5% ~ 95% (without condensation)

2.2.2 Components, Interface, and Ports

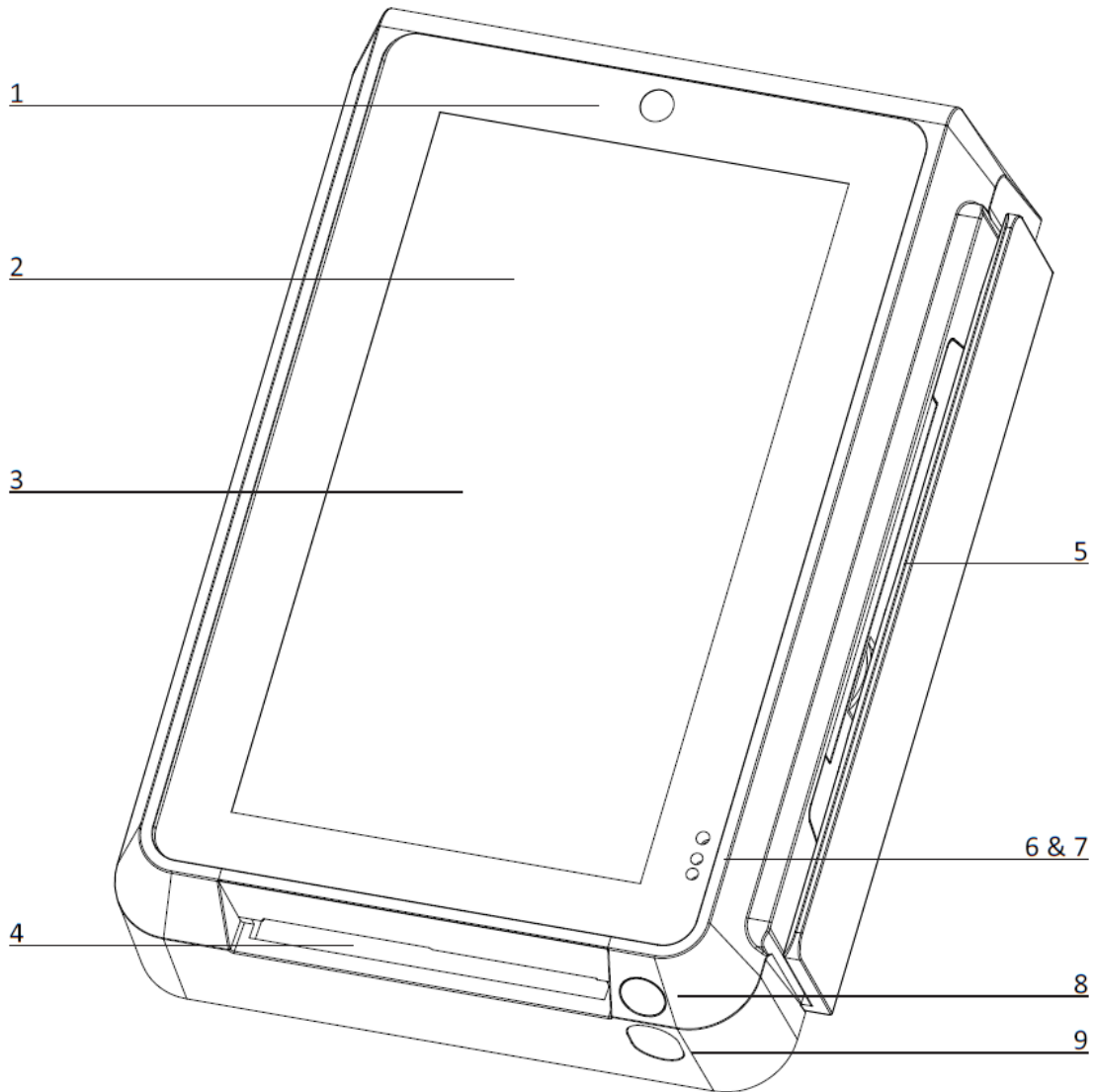


Figure 2: components, interface, and ports (front)

- | | |
|--------------------------------------|---|
| 1. front facing camera | 6. LED indicator (upper position) |
| 2. contactless card/device interface | 7. proximity sensor (lower 2 positions) |
| 3. LCD screen | 8. code scanning camera |
| 4. smart card reader | 9. camera locator light |
| 5. magnetic strip card reader | |

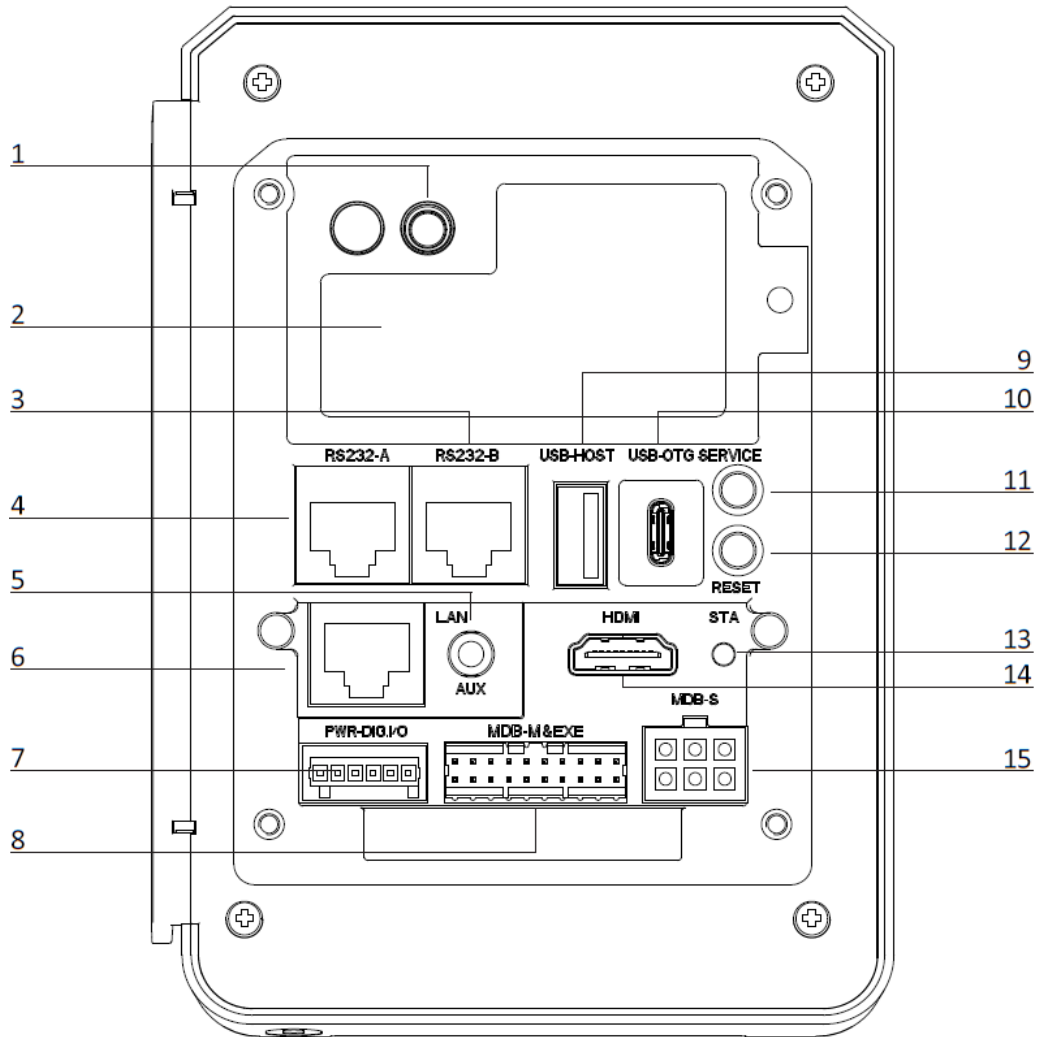


Figure 3: components, interface, and ports (back)

- | | |
|-----------------------------------|--------------------------|
| 1. 4G antenna (optional) | 9. USB Type-A port |
| 2. 4G module & SAM/SIM card slots | 10. USB Type-C port |
| 3. RS232-B (host) | 11. service button |
| 4. RS232-A (device) | 12. reset button |
| 5. auxiliary port (mic & speaker) | 13. status indicator LED |
| 6. Ethernet port | 14. HDMI port |
| 7. digital IO port | 15. MDB Slave port |
| 8. Executive & MDB Master port | |

2.2.3 Output Connectors

RS232: Recommended Standard 232 (RS232) is a protocol for serial communication. The two RJ45 ports on the IM30, labeled RS232-A and RS232-B, both use this protocol and has the following pinouts:

Table 4: RJ45 pinout (RS232-A)

pin	signal
1	POWER_IN
2	RX
3	TX
4	MDB_WAKEUP
5	RTS
6	CTS
7	GND
8	GND

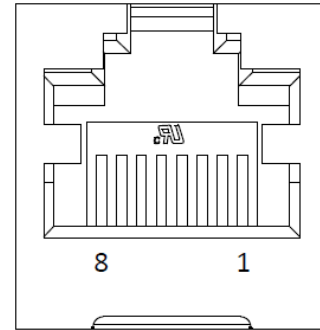


Figure 4: RJ45 port (RS232-A)

Table 5: RJ45 pinout (RS232-B)

pin	signal
1	POWER_OUT
2	RX
3	TX
4	MDB_WAKEUP
5	RTS
6	CTS
7	GND
8	GND

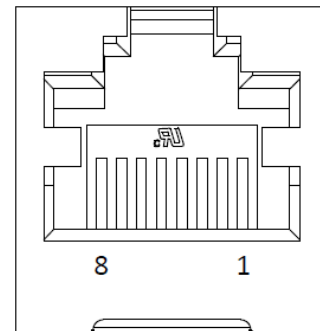


Figure 5: RJ45 port (RS232-B)

USB: Universal Serial Bus (USB) is a widely adopted communication protocol used across a broad range of electronic devices. The IM30 has both a USB Type-A and Type-C port available for use, they can accept 5 V input to power the device.

Table 6: USB pinout (Type-A)

pin	signal
1	VIN
2	D-
3	D+
4	GND

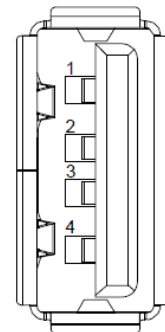


Figure 6: USB Type A port

Table 7: USB pinout (Type-C)

pin number	pin name	signal
1	A1	GND
2	A2	NC
3	A3	NC
4	A4	VBUS
5	A5	USB_ID
6	A6	D+
7	A7	D-
8	A8	NC
9	A9	VBUS
10	A10	NC
11	A11	NC
12	A12	GND
13	B1	GND
14	B2	NC
15	B3	NC
16	B4	VBUS
17	B5	USB_ID
18	B6	D+
19	B7	D-
20	B8	NC
21	B9	VBUS
22	B10	NC
23	B11	NC
24	B12	GND

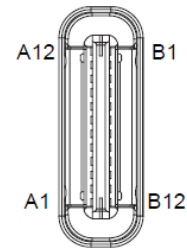


Figure 7: USB Type-C port

MDB: Multidrop Bus (MDB) is a communication protocol commonly used in the vending machine industry. The IM30 has a MDB slave port that can communicate to a vending machine controller as well as accept an input voltage of 9V to 42V.

Table 8: MDB pinout

pin	signal
1	VDC
2	GND
3	NC
4	MASTER_RX
5	MASTER_TX
6	COM (D_GND)

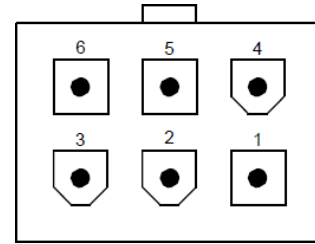


Figure 8: MDB port

MDB+EXE: The Executive protocol (also known as BDV 001 protocol) is a communication protocol used in the vending machine industry in certain locales in Europe. The IM30 has a custom 20 pin connector that functions as an MDB master port as well as an Executive port.

Table 9: 20 pin connector pinout

pin	signal
1	MDB_PWR_IN
2	GND
3	V_OUT (unswitched)
4	GND
5	MDB_MASTER_RX
6	MDB_MASTER_TX
7	GND
8	GND
9	EXE_MASTER_RX+
10	EXE_MASTER_TX+
11	GND
12	GND
13	DIGI_IN4_H
14	DIGI_OUT2_H
15	DIGI_IN4_L
16	DIGI_OUT2_L
17	MDB_WAKEUP
18	V_OUT# (switched)
19	EXE_PWR_L
20	EXE_PWR_N

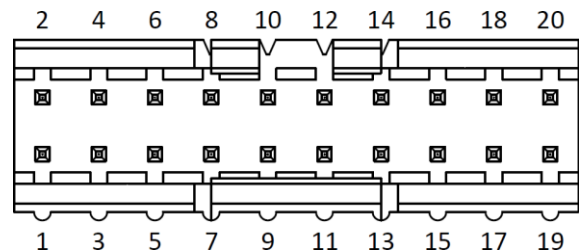


Figure 9: 20 pin connector (Amphenol 69168)

Digital IO: Digital input and output signals can be used to directly interface with a CPU to perform custom functions. The IM30 has a custom 6 pin digital IO port that can be programmed to accept a variety of inputs or output a specific control signal.

Table 10: digital IO pinout

pin	signal
1	DIGI_IN3
2	DIGI_IN2
3	DIGI_IN1
4	DIGI_OUT1
5	GND
6	MDB_PWR_OUT

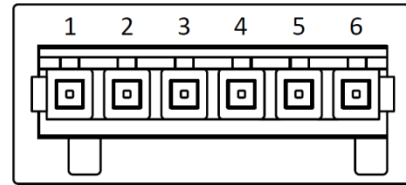


Figure 10: digital IO port

Ethernet: Ethernet is a common networking protocol for local area networks. The IM30 has a Ethernet 10/100 Base-T port that it can use to connect to a wired LAN.

Table 11: Ethernet port pinout

pin	signal
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

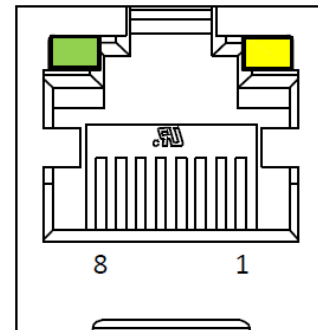


Figure 11: Ethernet port

AUX Jack: The auxiliary jack is a term for a variety of analog port usually made to transfer audio-visual data. The IM30 has a 3.5 mm auxiliary jack that can output a stereo audio signal and accept the input of a microphone.

Table 12: auxiliary jack pinout

Pin	Signal
7	MIC
2	GND
3	AUDIO_LEFT
4	AUDIO_FEEDBACK
5	AUDIO_DETECT
6	AUDIO_RIGHT

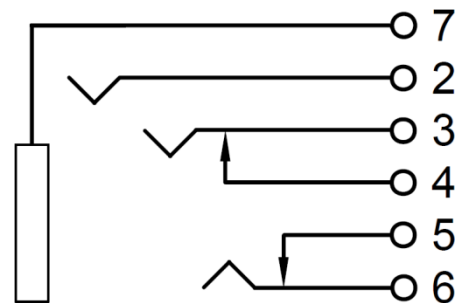


Figure 12: auxiliary jack schematic

2.2.4 SAM/SIM card Installation

The IM30 is available in multiple configurations that have a variable number of SAM and SIM card slots available for use.

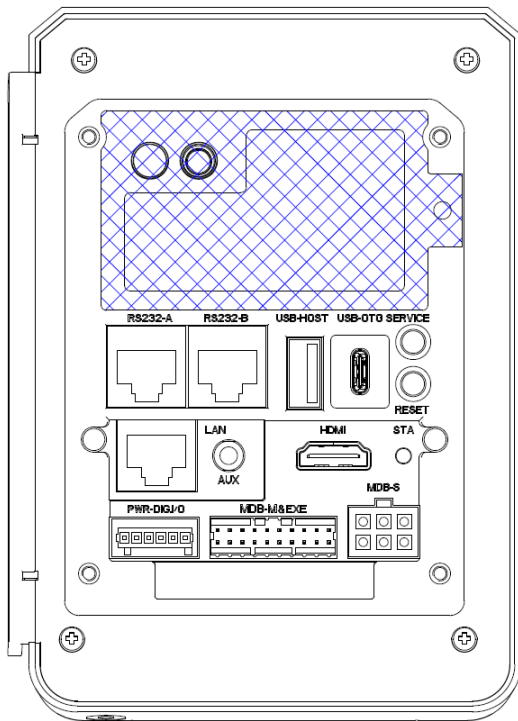


Figure 13: 4G module (outlined in blue hatch)

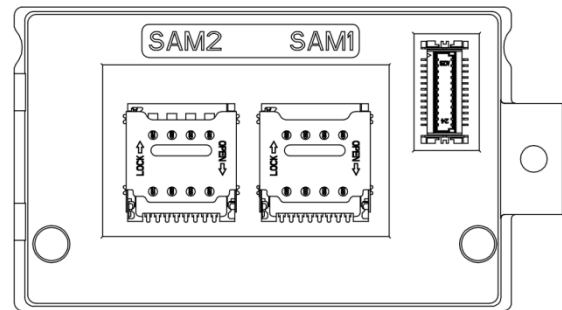


Figure 14: SAM card mounts



Figure 15: no card slots

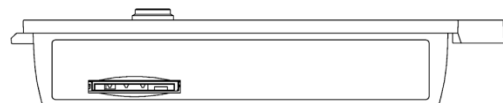


Figure 16: SIM card slot

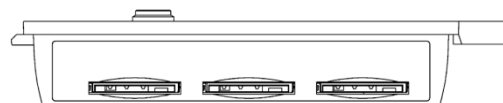


Figure 17: SIM & SAM card slots

Every available model of the IM30 has at least 2 micro-SIM sized SAM card slots on the main body of the device as illustrated in Figure 14: SAM card mounts. These two card slots are normally hidden under the 4G module outlined in Figure 13: 4G module (outlined in blue hatch). If the screw holding the 4G module in place is loosened, it can be removed from the main body of the device by prying the tab on the right side of the module. In order to install a SAM card into either of these two card slots, open the mount and insert the card into the slot with the contacts facing downwards and the clipped corner of the card to the upper right, then lock the mount with the card inside.

The 4G module is available in several configurations, one configuration has no 4G functionality and the module merely serves as a cover for SAM card slots (shown in Figure 15: no card slots), another configuration has 1 micro-SIM sized SIM card slot (shown in Figure 16: SIM card slot), and yet another configuration has 2 micro-SIM sized SAM card slots in addition to the SIM card slot (shown in Figure 17: SIM & SAM card slots). In order to install a SIM or SAM card into any of these slots on the 4G module, insert a card into the card slot with the contacts facing upwards and the clipped corner of the card facing forward and to the right.

2.2.5 Touchscreen

The IM30 has a 5" LCD capacitive touchscreen located on its front face.

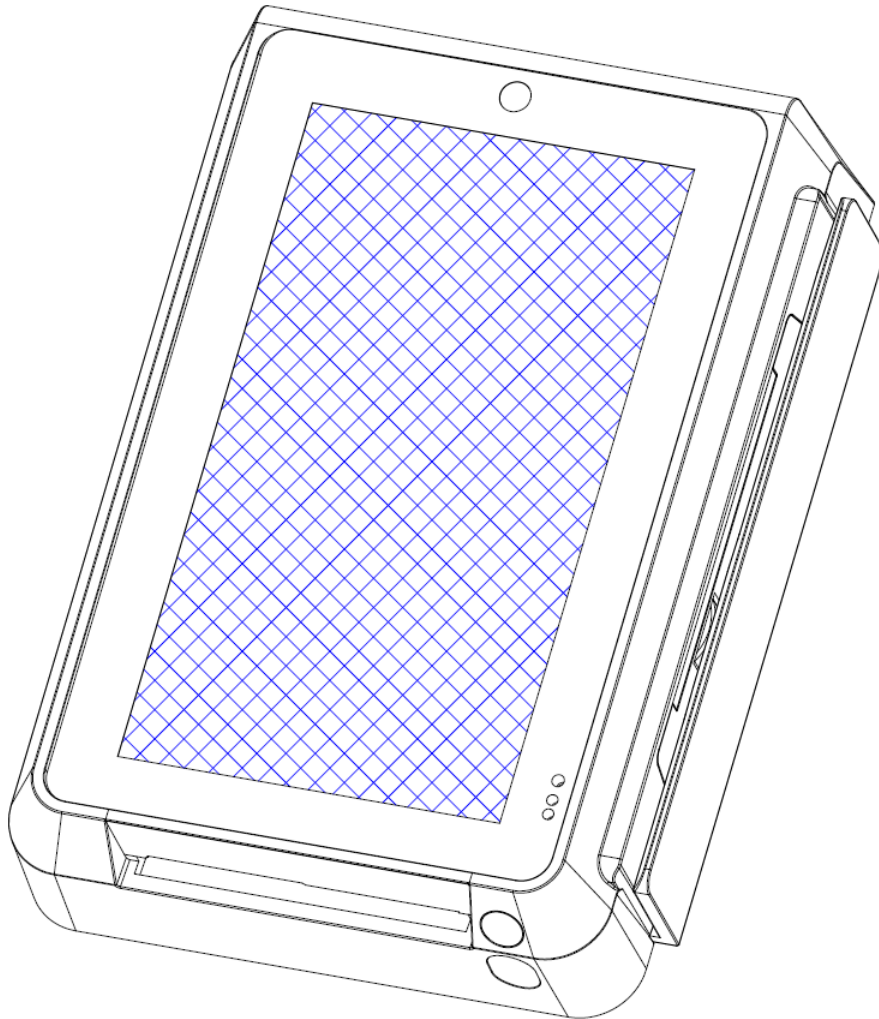


Figure 18: touchscreen (outlined in blue hatch)

This display has a resolution of 1280 x 720 pixels and is equipped with an adjustable LED backlight. This touchscreen functions as the primary user interface for the device as well as the primary mechanism for the device to display information to users. The brightness of the backlight is software controlled and can be adjusted to suit user needs.

2.2.6 Front Facing Camera

The IM30 has a front facing camera located on the top portion its forward face.

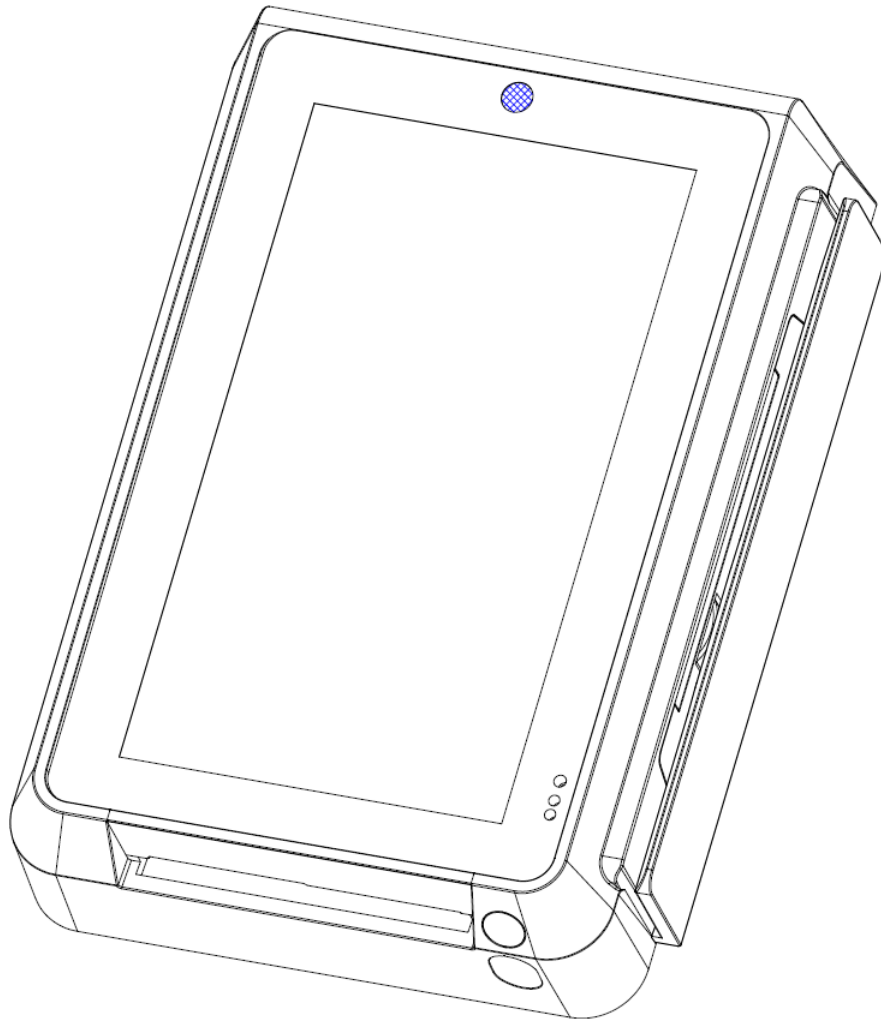


Figure 19: front facing camera (in blue)

This 2 megapixel (1616 x 1232) camera is capable of capturing video or photos of anything facing the front of the IM30 unit. Its primary purpose is for facial recognition in localities where such a function would be useful.

2.2.7 Code Scanning Camera

The IM30 has a code scanning camera located near the bottom right corner of its forward face.

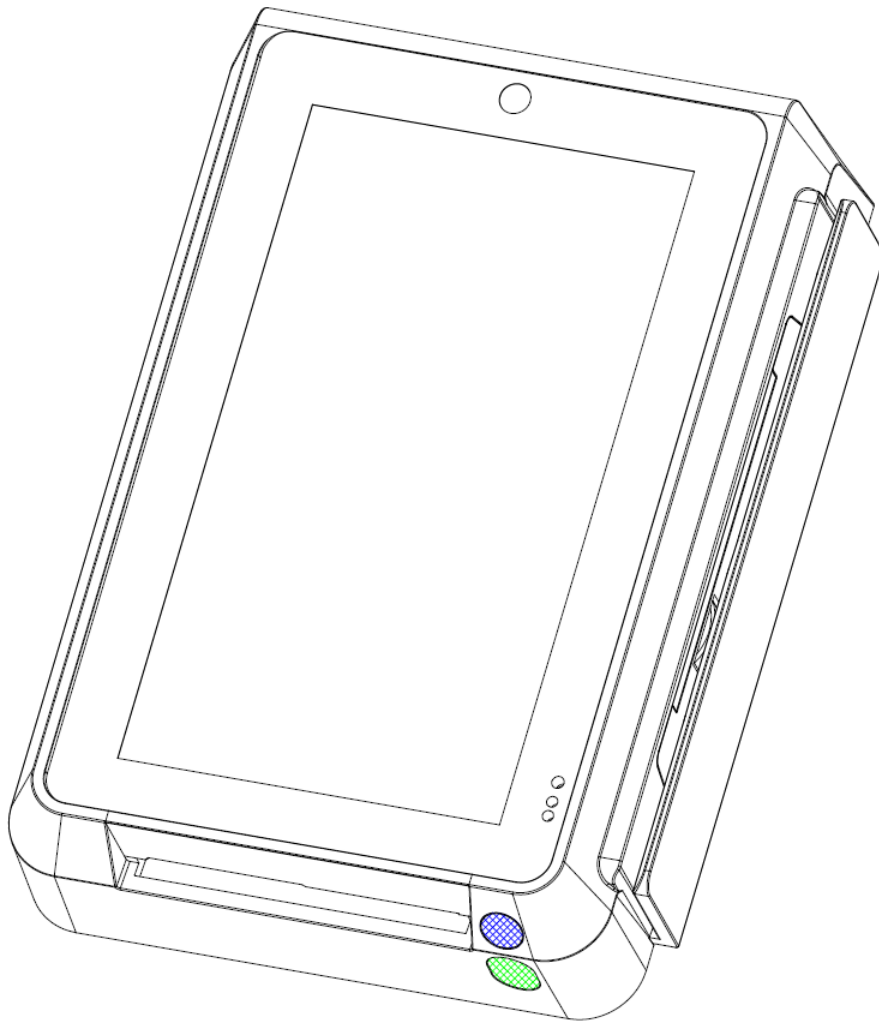


Figure 20: code scanning camera and position indicator LED (in blue and green respectively)

This 0.3 megapixel (648 x 488) camera located near the bottom of the IM30 is designed to read common 1D or 2D codes (such as barcodes and QR codes). The camera is paired with a position indicator LED that allows users to orient their coupons, cards, or mobile devices so that the code is positioned at the optimal location and distance when the light from the LED directly illuminates the code.

2.2.8 Magnetic Strip Card Reader

The IM30 has a magnetic strip card reader located on right hand side of the device.

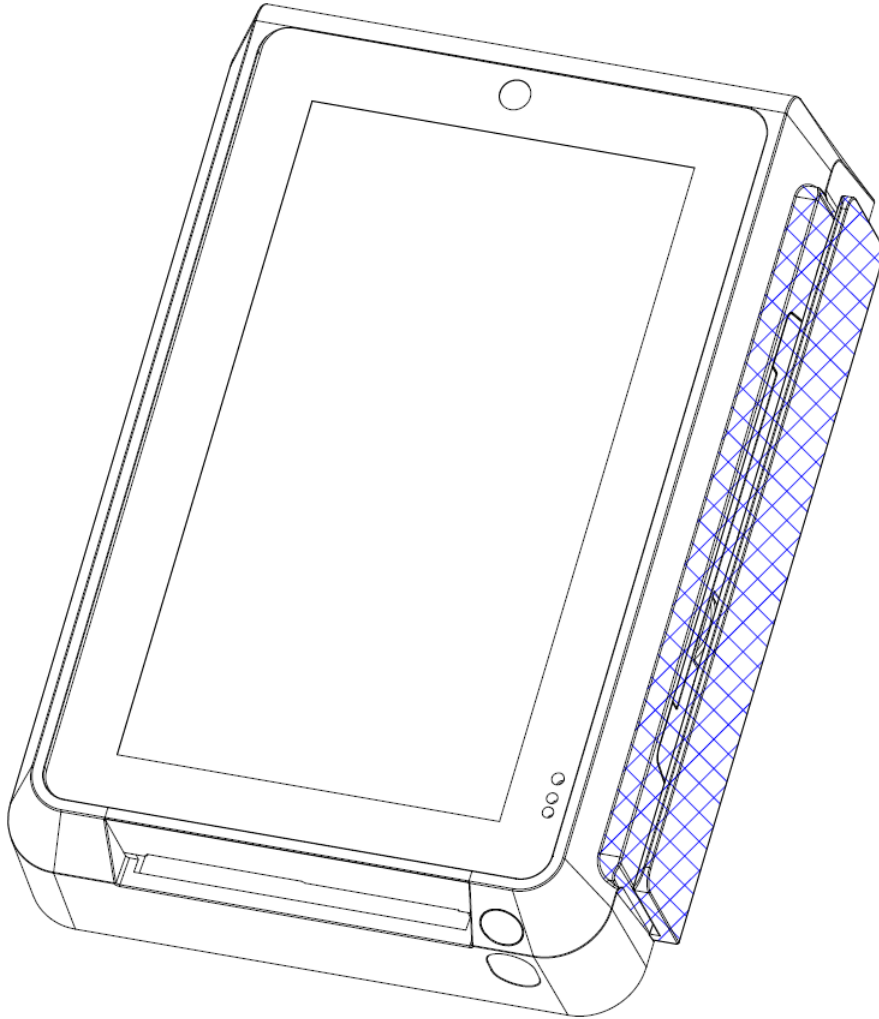


Figure 21: magnetic strip card reader (outlined in blue)

Magnetic Strip Card Reader

- triple track reading
- bidirectional reading
- card reader slot illuminated with an RGB LED indicator
- lifecycle of over 500k reads
- conforms to ISO/IEC 7810, ISO/IEC 7811 parts 1-6, and ISO 7813
- **card reader use:** Slide the card through the card reader slot from top to bottom or from bottom to top with the magnetic strip oriented towards the body of the device (Figure 22: smart card reader (outlined in blue)). Make sure that the card is fully inserted into the card reader while scanning the card.

2.2.9 Smart Card Reader

The IM30 has a magnetic smart card reader located on bottom side of the device.

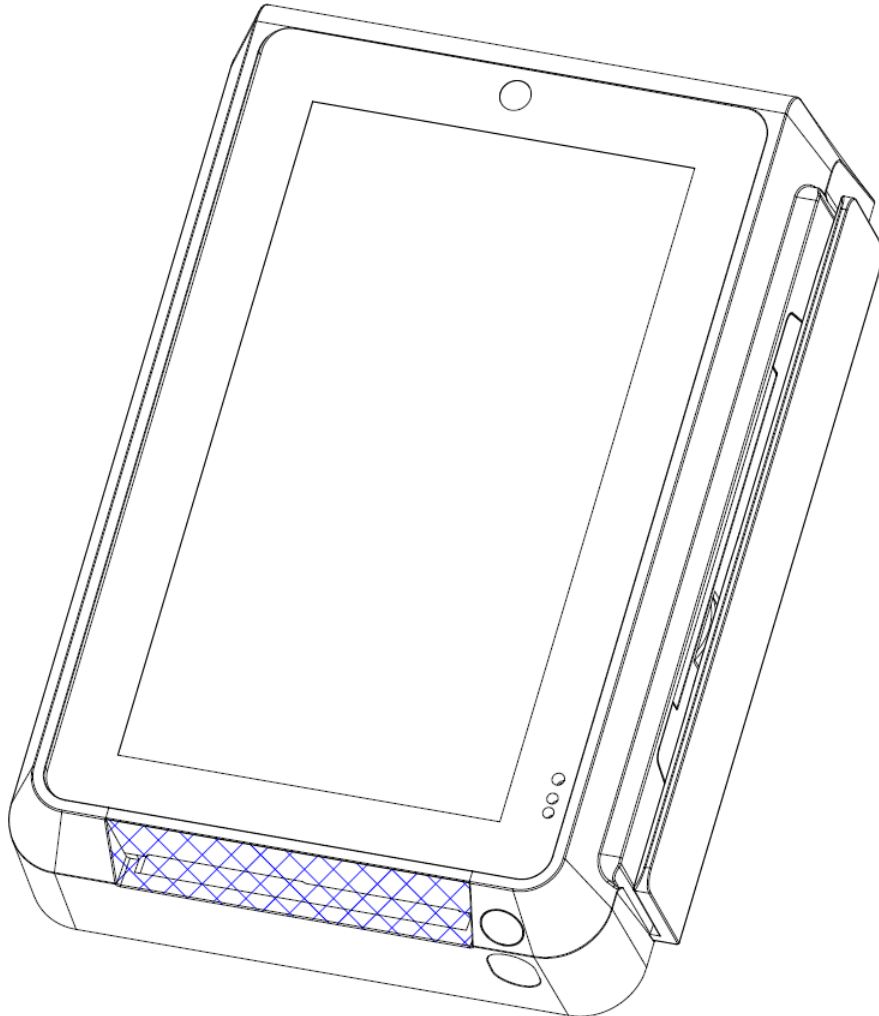


Figure 22: smart card reader (outlined in blue)

Smart Card Reader

- reads 1.8V, 3V and 5V synchronous and asynchronous cards
- card reader slot illuminated with an RGB LED indicator
- lifecycle of over 500k reads
- conforms to ISO/IEC 7810:2003, ISO/IEC 7816, and EMVCo L1 & L2
- **card reader use:** Insert the card fully into the reader with the metallic contacts facing up and towards the device. Make sure that the card is fully inserted into the card reader while scanning the card.

2.2.10 Contactless Card Reader

The IM30 has a contactless card reader with an RF antenna located on its front face. The read area for this card reader roughly corresponds to the top half of the touchscreen on the front of the device.

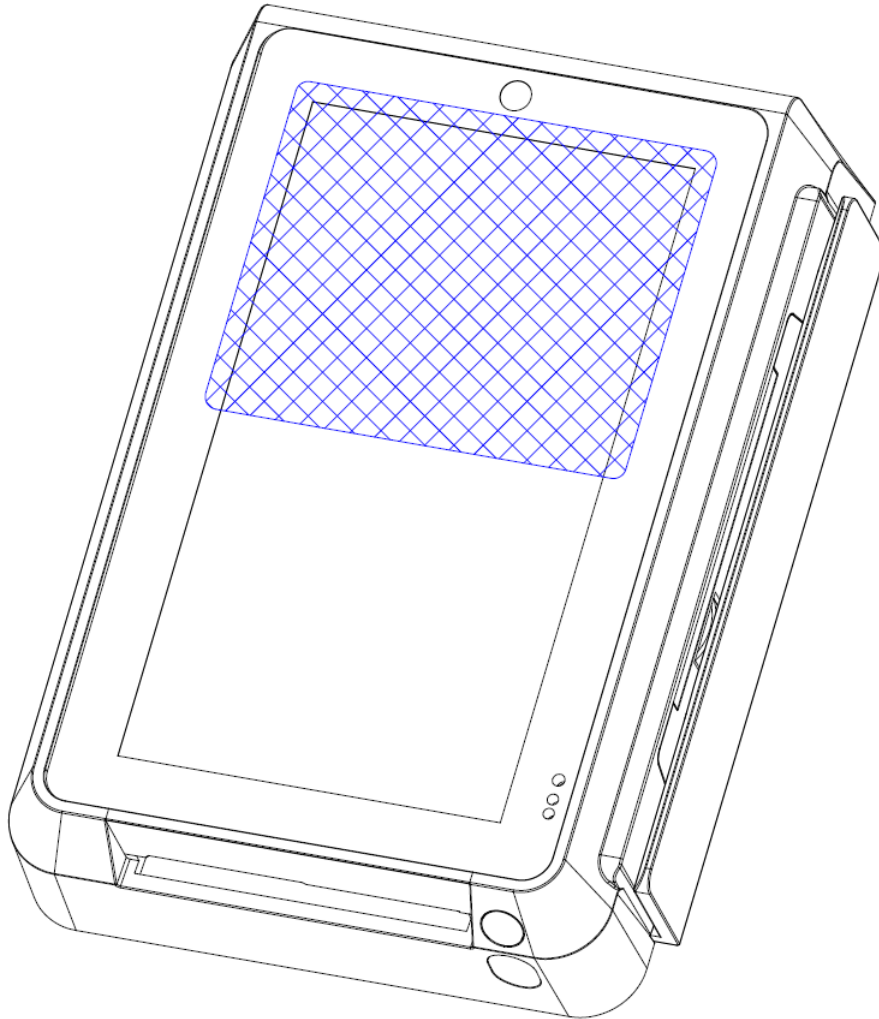


Figure 23: contactless card reader (contactless card outlined in blue)

Contactless Card Reader

- supports ISO14443 Type A/B
- **card reader use:** The contactless card reader reads cards and devices placed roughly parallel to the area indicated in Figure 23: contactless card reader (contactless card outlined in blue) from a distance of anywhere from 0 to 4 cm. For best results, place as close to the screen as possible and center the card over the indicated area.

2.2.11 Proximity Detector

The IM30 has a optical proximity detector located near the lower right side of its front face.

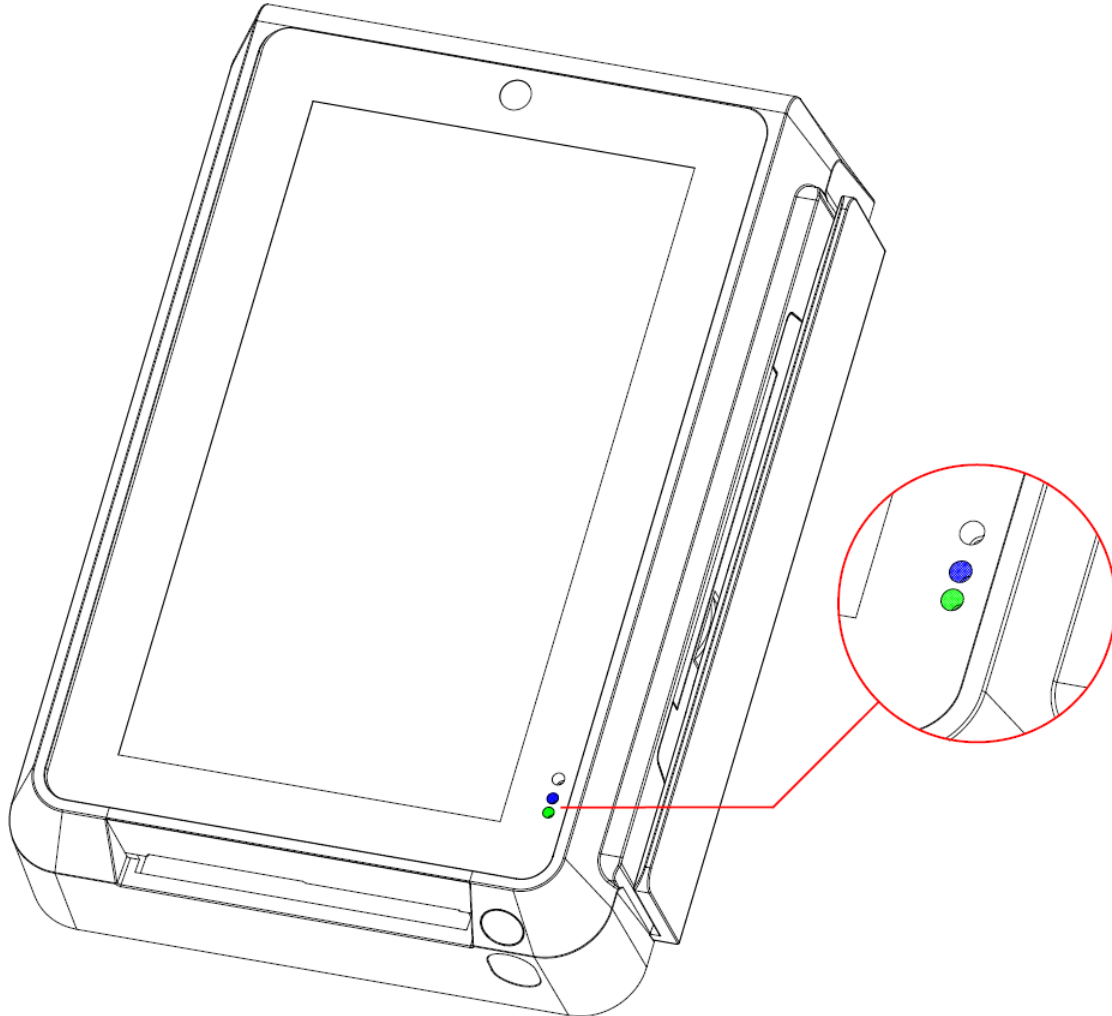


Figure 24: proximity detector (optical emitter in blue, receiver in green)

The proximity sensor detects light in the visible spectrum and is tuned to detect objects within 5 to 8 cm of the sensor. It is meant to perform functions such as providing a wakeup signal to the rest of the device when a user is detected or calibrating backlight intensity to fit the brightness of a given environment.

2.2.12 LED Status Indicator

The IM30 has a RGB status indicator LED located near the lower right side of its front face near the proximity detector.

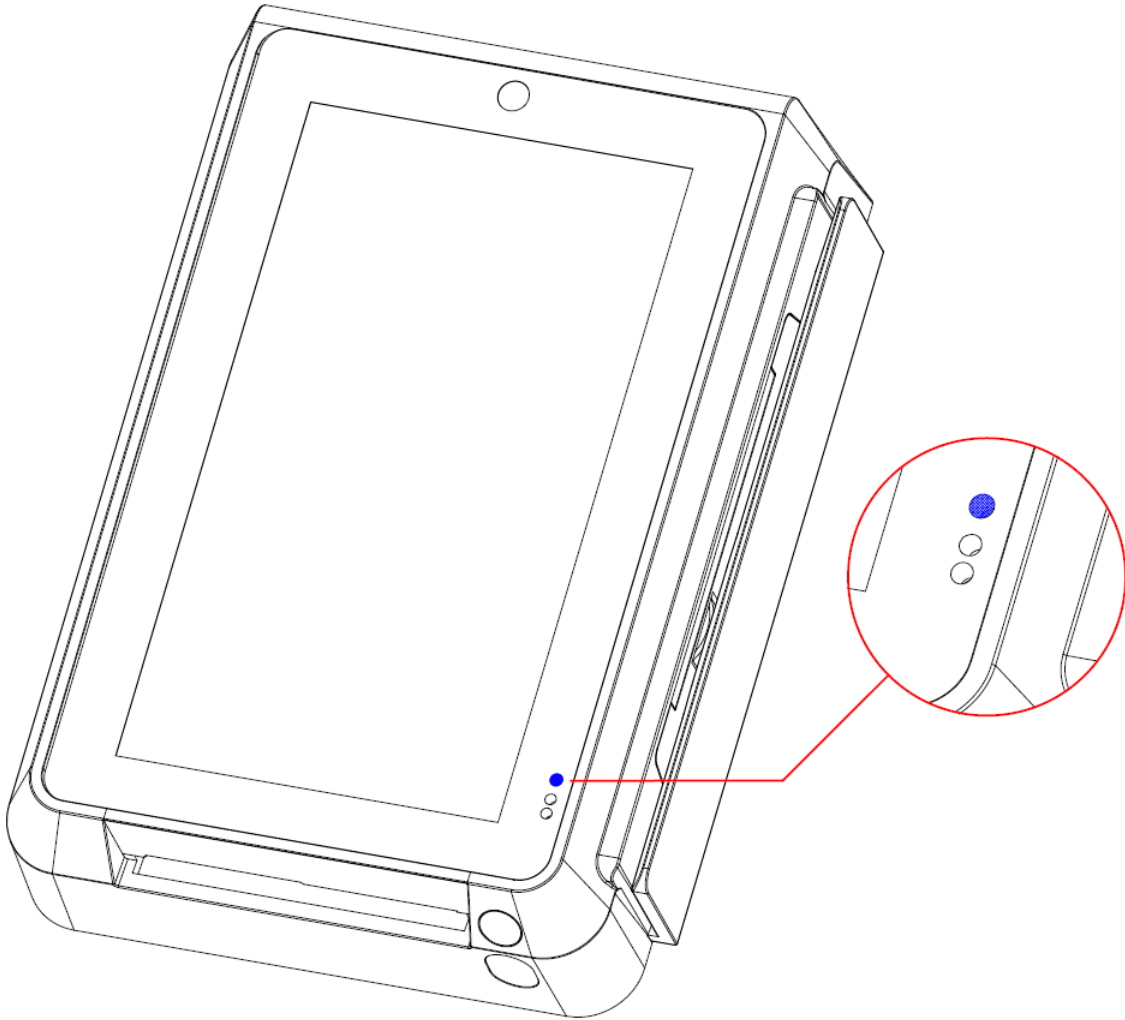


Figure 25: LED status indicator (highlighted in blue)

The operation of the LED status indicator is software controlled and depends on the specific configuration of the device. It can display an indicator light in red, green, or blue.

3 Product Installation

3.1 Device Dimensions

The IM30 has the physical dimensions shown in Figure 26. Note that various cables plug directly into the back of the device, so greater clearance than shown for the back end of the device is needed to properly install an IM30 unit.

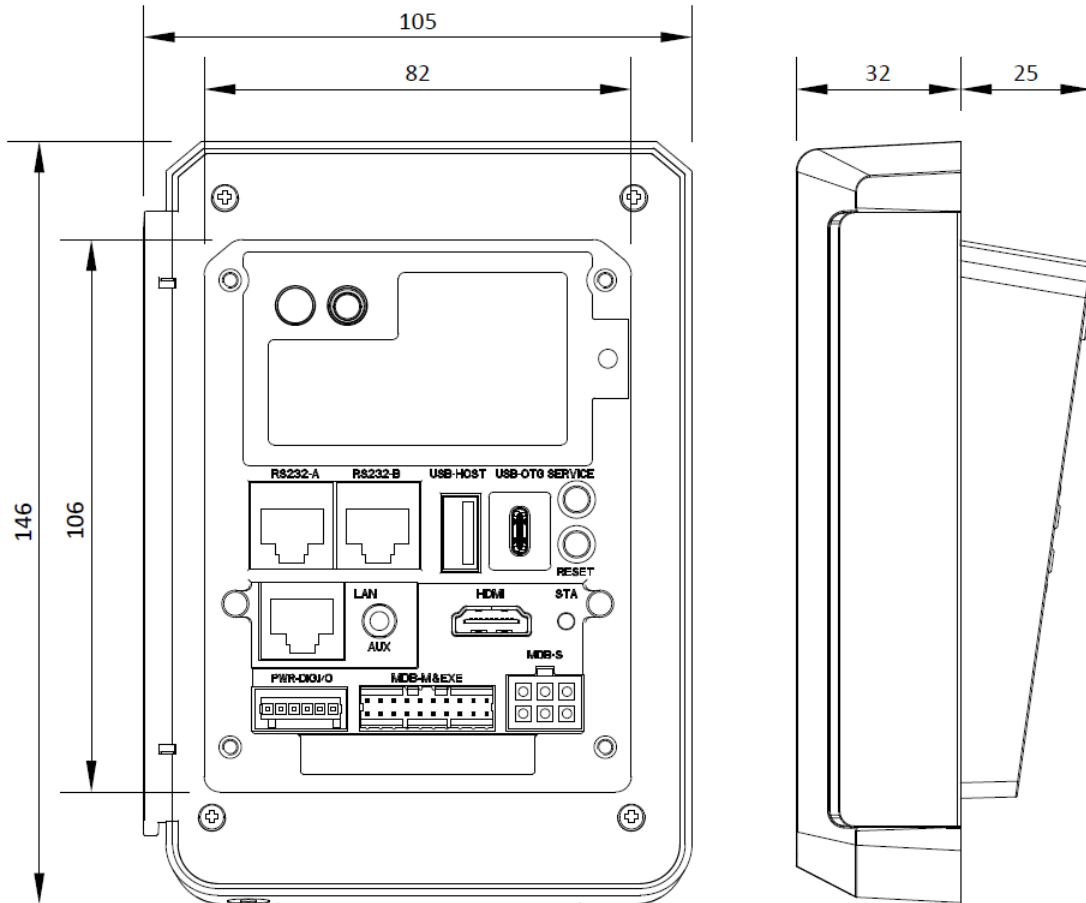


Figure 26: device dimensions (mm)

3.2 Mounting Bracket

The IM30 is equipped with a plastic mounting bracket that allows it to be fixed into place on a mounting plate.

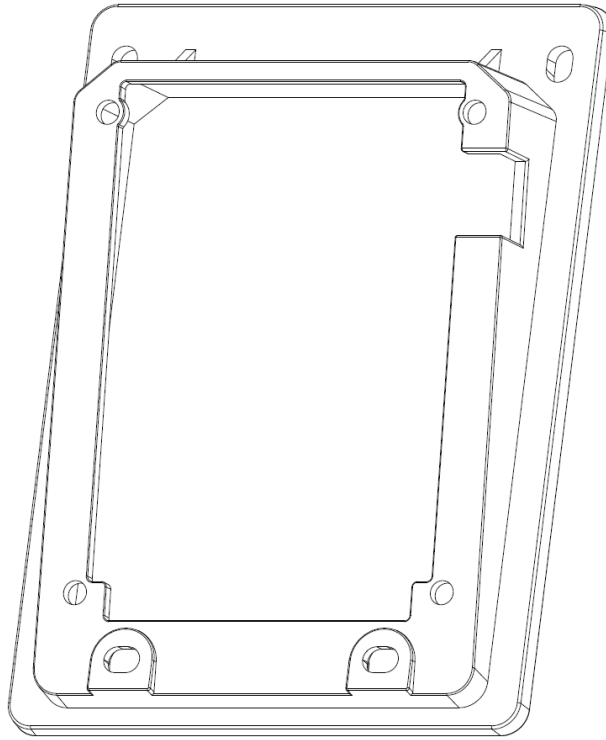


Figure 27: mounting bracket (outward oriented face)

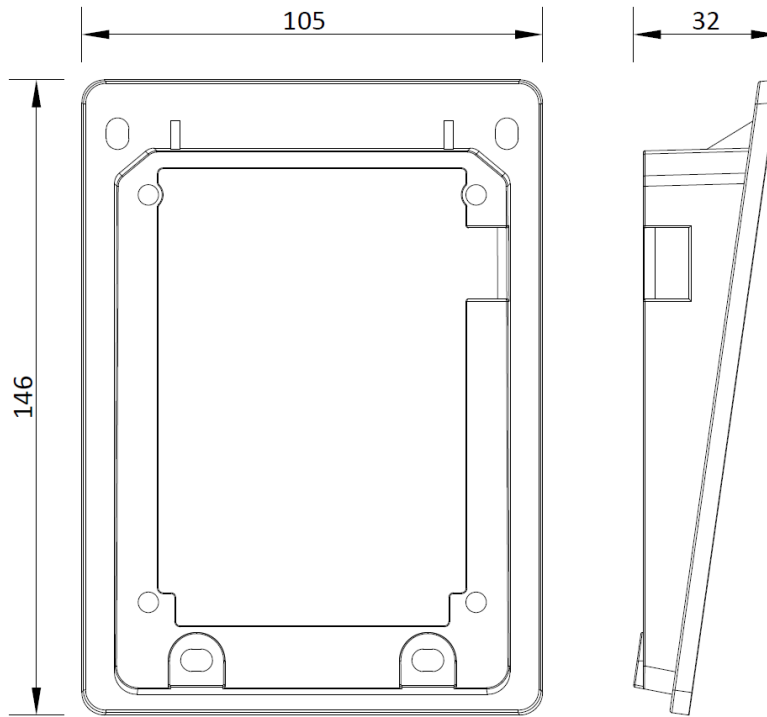


Figure 28: mounting bracket dimensions

3.3 Mounting Plate Dimension

The IM30 is designed to be mounted on vertical surfaces through a mounting plate.

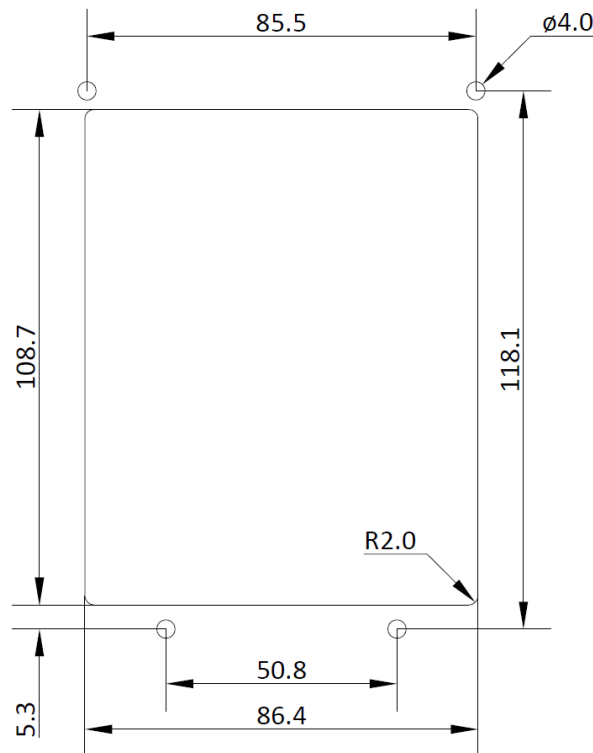


Figure 29: mounting plate dimensions (mm)

These dimensions are those of a *standard door module* as defined by the European Vending Association.

The M4 stud bolts should extrude from the back of the mounting plate to allow for the mounting bracket to slot into place.

3.4 Device Installation

Installing the mounting bracket

The first step to installing the IM30 as part of an unattended payment terminal is to secure the mounting bracket onto the mounting plate. The back of the mounting plate should have four M4 stud bolts that correspond to the four outer mounting points on the mounting bracket. Slid the mounting bracket onto the four bolts with its as illustrated in Figure 30: attaching the mounting bracket to the mounting plate, then use four M4 nuts to secure it in place.

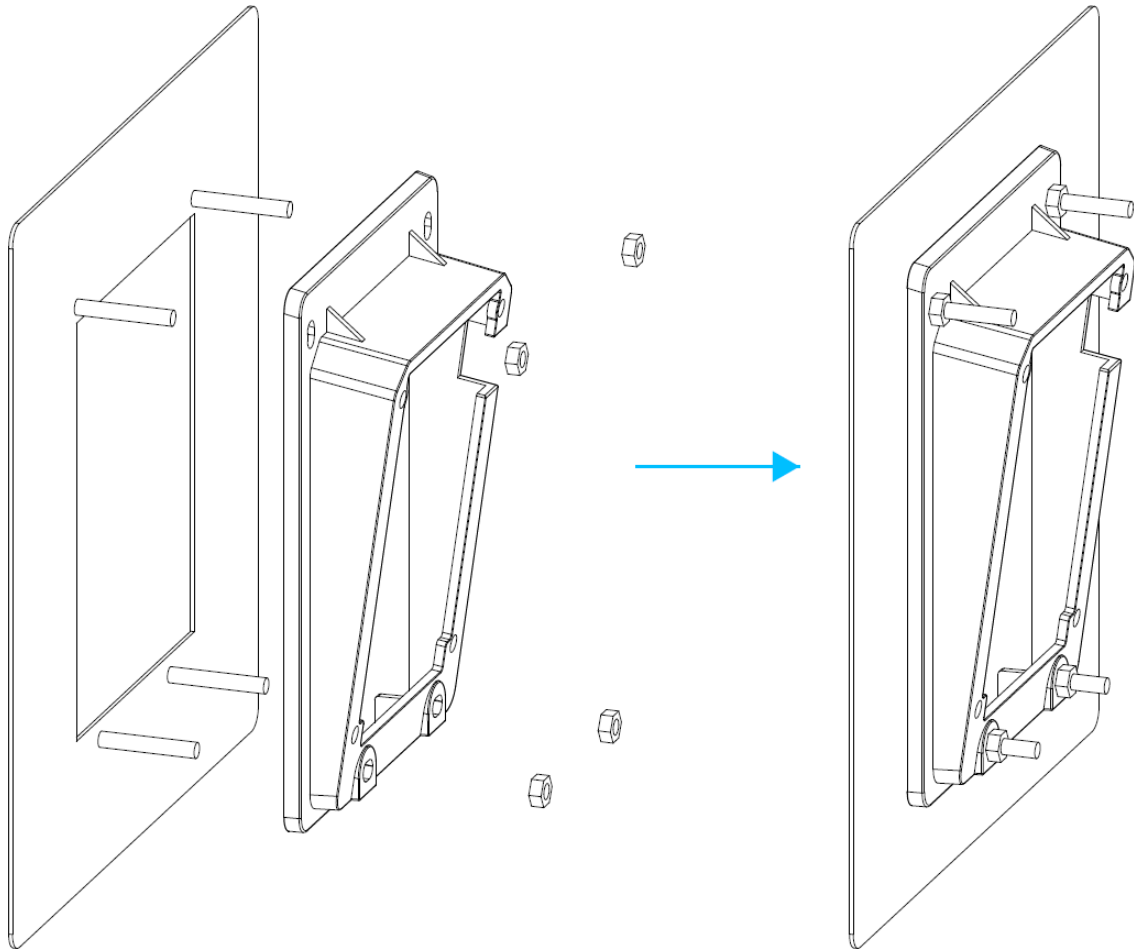


Figure 30: attaching the mounting bracket to the mounting plate

Installing the IM30 unit

After the mounting bracket is secured to the mounting plate, insert the IM30 unit through the front of the mounting plate into the mounting bracket. Then apply a torque of 1.2 ± 0.2 Nm to the four M4 screws to secure the IM30 to the mounting bracket through its four inner mounting points.

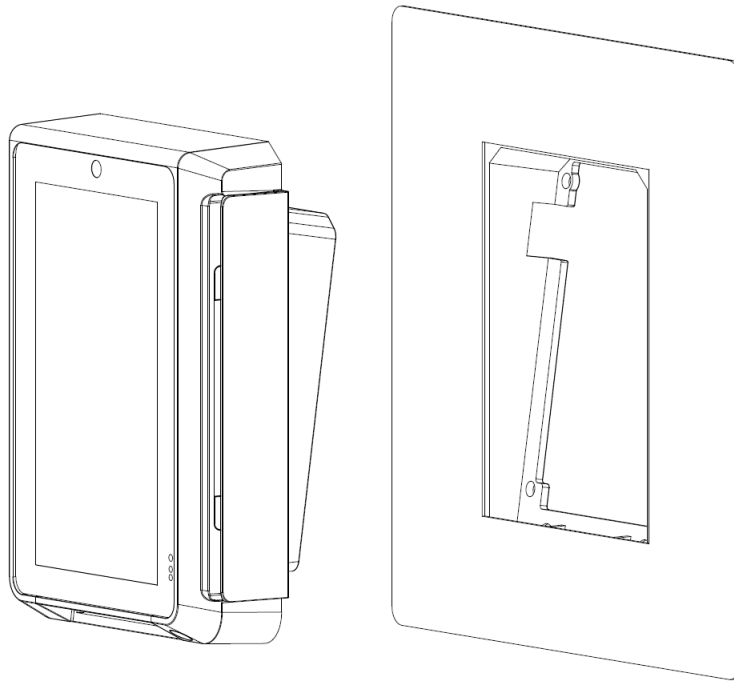


Figure 31: inserting the IM30 unit into the front of the mounting plate

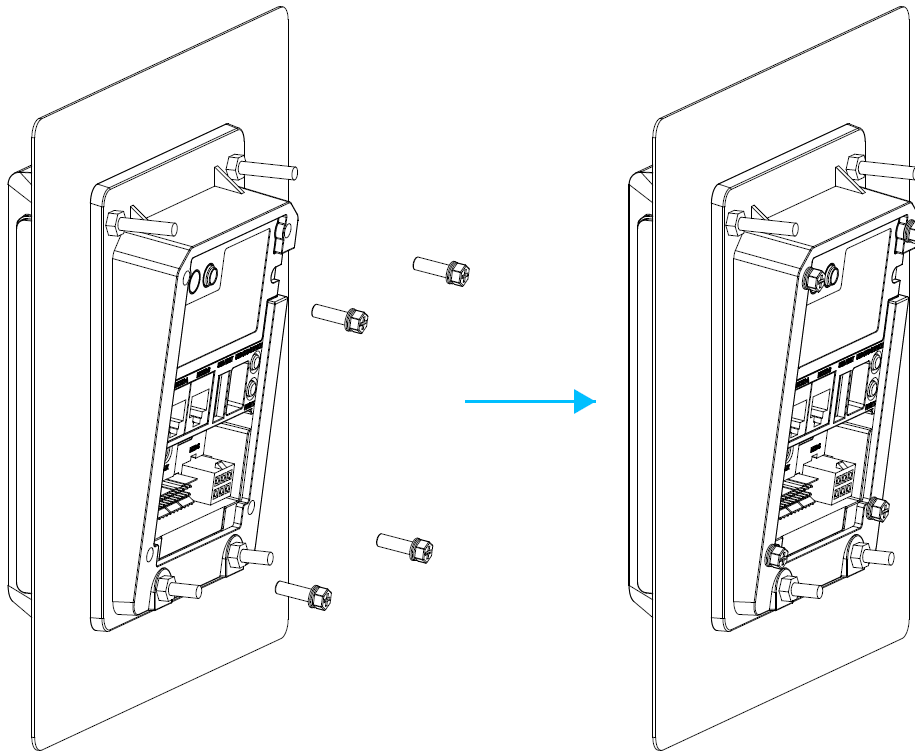


Figure 32: securing the IM30 unit in place with the four M4 screws

4 Product Services

4.1 FAQ

display

Q: Why is screen so bright/dim?

A: The brightness of the screen be adjusted; the level of illumination provided by the backlight can be changed in the device settings.

touchscreen

Q: What should I do if the touchscreen is unresponsive or begins lagging?

A: First confirm that the surface of the screen is free from liquids, if there is a protective plastic film over the screen, remove that as well before attempting to use the device again. Check to see if there are any metallic objects touching the screen and if there is a source of magnetic waves near the device. If there are, remove the metallic objects and keep the device away from any sources of magnetic waves before attempting to use it again.

card readers

Q: What should I do if the contactless card reader is not working?

A: First check to see if the card or device being used has contactless functionality. If it does, then make sure the card or device is placed and oriented properly, the proper use of the contactless card reader is outlined in 2.2.10. Also avoid placing the device near metallic objects or nearer than 20 cm to another device with a contactless card reader. Afterwards, attempt to read another contactless card to determine whether the problem is a defective card. Last of all manually enter the card information to process the transaction and confirm that the device has malfunctioned. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q: What should I do if the smart card reader is not working?

A: First check to see if the smart card has been inserted fully and oriented properly, the proper use of the smart card reader is outlined in Smart Card Reader. Also check the metallic contacts on the smart card for signs of corrosion or other damage and attempt to use another card to determine whether the problem is a defective card. Then check the card reader to see if there is foreign matter clogging the card reader slot, the card reader can be cleaned using standard cleaning cards to prevent buildup of dirt and debris. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q: What should I do if there a transaction error when using a smart card?

A: If a smart card is properly read by the card reader but the device indicates that there is a transaction error or that the card is not supported, attempt to use another card for the transaction instead or consult the service provider that issued that card to resolve the problem. Before attempting to use a smart card, make sure that the device is not near any object producing a strong electromagnetic field. Such conditions may interfere with the device when it attempts to read the smart card.

Q: What should I do if the magnetic strip card reader is not working?

A: First check to see if the magnetic strip card has been oriented and read properly, the proper use of the magnetic strip card reader is outlined in 2.2.8. Then attempt to use another card for the transaction instead to determine whether the problem is a defective card. Last of all manually enter the card information to process the transaction and confirm that the device has malfunctioned. If none of the above steps resolve the problem, contact an agent from your local vendor to repair the device.

Q: What should I do if there a transaction error when using a magnetic strip card?

A: If a magnetic strip card is properly read by the card reader but the device indicates that there is a transaction error or that the card is not supported, attempt to use the IC card reader for the transaction instead or consult the service provider that issued that card to resolve the problem. Before attempting to use a magnetic strip card, make sure that the device is not near any object producing a strong electromagnetic field. Those conditions may interfere with the device when it attempts to read the magnetic strip card.

Q: What should I do if the device does not detect a SAM card?

A: First confirm that a SAM card has been installed into the terminal. Then check to see if the card is damaged or if the contacts are tarnished. If the contacts are dirty, clean them and check whether that resolves the problem. Lastly, check to see if the SAM card is properly mated with the device, attempt to use another card to see if that resolves the problem.

communication modules

Q: What should I do if the USB port is not working?

A: First confirm that there are no foreign objects present in the USB port and that the USB cable is fully plugged into the port. Also make sure that the cable used follows USB specifications, attempt to use another cable if possible. Check to see if the USB drivers are present and up to date.

Q: What should I do if there are errors while using the USB port?

A: Use the USB cable packaged with the IM30 unit instead of a third party cable. Do not use an USB hub, directly attach the cable to whatever device is being linked.

Q: What should I do if there are errors while using the Wi-Fi module?

A: First confirm that the Wi-Fi module and the router is turned on, and that the router is broadcasting a signal with sufficient strength. Then check that the network setting is compatible with the device you wish to use (the IM30 uses DHCP). Make sure that the name and password of the network you are attempting to connect to are both correct. Check to see if the network you are attempting to connect to only accepts preset IP or MAC addresses; if so, add the IM30 to the list of devices allowed on the network. You can determine if an error with that specific router or network by attempting to connect to another network instead. If the device is connected to a network but there is no internet access, check that the network is connected to the internet. Finally, you can attempt to place the device closer to the router or restart the device and attempt to connect to the network again.

camera and code scanner

Q: What should I do if the code scanner is not working?

A: Confirm that the code you are scanning is placed properly with the locator light next to the camera, and maintain a distance of approximately 10 cm from the camera lens. Also make sure that the barcode or QR code being scanner is not covered, stained, or otherwise damaged. If there are signs of damage, replace the code being scanned. Check to see if the camera lens is clean, if there is a protective plastic film over the lens, remove that as well before attempting to use the camera again. If reading the code off of an electronic display, increase the resolution or screen brightness before attempting to read the code again. If there is no damage to the code, it's possible that the device does not support the code you are attempting to scan, in which case you should contact an agent from your local vendor for possible solutions.
