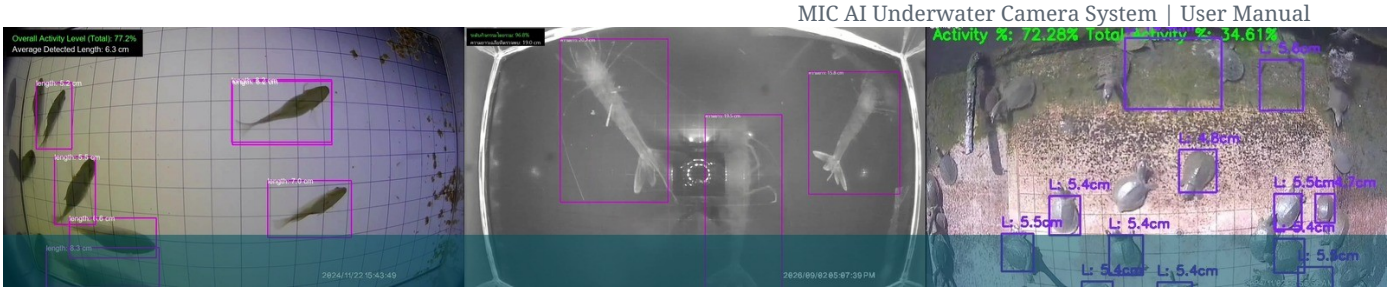

MIC AI UNDERWATER CAMERA SYSTEM

Installation, DVR Operation & AI Analysis User Manual

Smart Aquaculture Underwater Imaging | Fish & Shrimp Analysis

Document Version

Version 1.1 | September 2026
Prepared for MIC Meter Industrial Co., Ltd. customer installation, operation and training.

MIC Meter Industrial Co., Ltd.

Data-Driven Innovation for Smart Farming, Sustainable Future

Document Control

Item	Description
Product	MIC AI Underwater Camera / Underwater Imaging & AI Analysis System
Manual scope	Underwater camera workflow, DVR setup and operation, remote camera access, fish/shrimp AI analysis, recording, playback, backup, maintenance and troubleshooting
Recorder family referenced	HS-HU4311 / HS-HU8311 / HS-HU6321 / HS-HU3382
Language	English
Version	1.1
Date	September 2026

How to Use This Manual

This manual combines the information supplied in MIC DVR documentation, MIC IoT/AIoT setup information, and the uploaded underwater AI demonstration videos. The exact camera housing, cable length, recorder channel count, AI model and application interface may vary by project configuration or software version.

Important

The DVR screenshots and menu names in this manual are based on the supplied recorder manual. If your installed software version differs, use the same functional menu (Live View, Camera, Record, Playback, Backup, Network) even if the icon or menu location has changed.

Contents

1. System Overview

1.1 Purpose

The MIC AI Underwater Camera System is designed to turn underwater video into practical aquaculture information. The system combines underwater imaging, local DVR recording, remote camera access and AI analysis so users can observe animals below the water surface and review measurable indicators from recorded or uploaded video.

1.2 Main Functions

- Real-time underwater observation of fish or shrimp.
- Local video recording through a DVR with H.264/H.265 compression.
- Remote camera access through the supported Hi Sharp camera application.
- AI object detection with bounding boxes around detected fish or shrimp.
- Individual length estimation in centimeters when the configured AI model supports measurement.
- Fish activity analysis, including overall activity level and average detected length in the demonstration system.
- Multi-animal detection and measurement in the same frame.
- Shrimp length analysis and shrimp-size estimation expressed as pcs/kg in the demonstrated mobile AI workflow.
- History review and data export from the demonstrated shrimp analysis interface.

1.3 Typical System Workflow

Stage	Typical Function
1. Underwater Camera	Captures fish/shrimp movement and the calibrated measurement area.
2. DVR / Recorder	Displays, records and stores camera video locally.
3. Monitor + Mouse	Used for first-time setup, live viewing, recording, playback and backup.
4. Network / Internet	Enables supported remote camera access and MIC AI services.
5. MIC AI Analysis	Processes video to detect animals and calculate enabled AI results such as length and activity.
6. History / Export	Stores or displays processed results for later comparison when enabled.

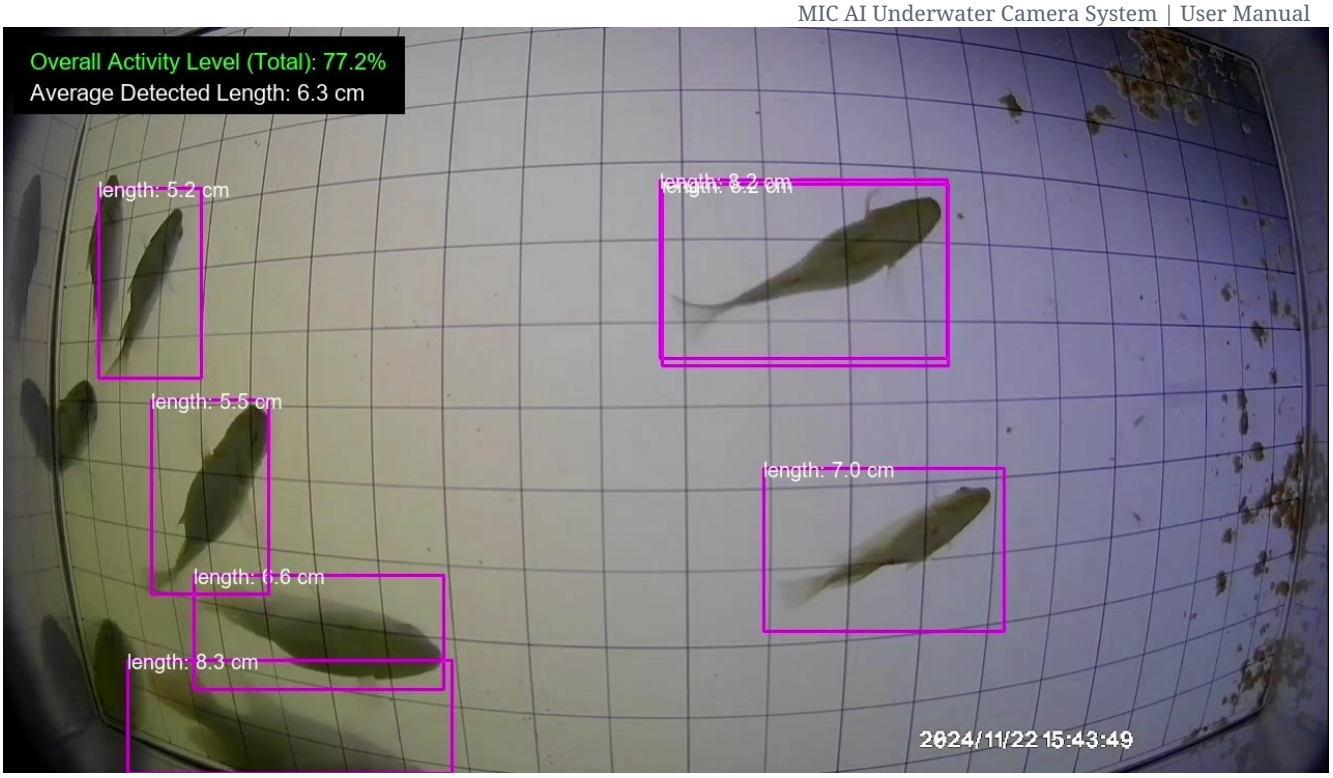

Figure 1. Example fish AI output: detection boxes, individual length, overall activity level and average detected length.

AI Result Note

The numerical values shown in the screenshots are examples from demonstration footage, not fixed product specifications. AI output depends on the installed model, camera view, water conditions and system configuration.

2. Safety and Installation Conditions

2.1 DVR Safety

- Read the operating and safety instructions before use.
- Clean the DVR and accessories with a dry cloth.
- Unplug the recorder during lightning storms or when it will not be used for an extended period.
- Use the specified power supply and the supplied/approved power cable.
- Keep the DVR away from rain, excessive moisture and dust; the DVR itself is not an underwater device.
- Install the DVR in a well-ventilated location and keep it away from heat-generating equipment.
- Do not install the DVR where it is exposed to strong vibration.
- Turn off related equipment before making or changing hardware connections.

◆ 用戶須知

本手冊是操作指導書，非產品保證書。本公司保留對此手冊的列印錯誤、軟體升級、產品改進以及與最新版本不一致等的修改和最終解釋權。有關變更恕不另行通知，將直接編入新版說明書。

◆ 安全與安全指導

使用前，請您詳閱使用手冊的操作及安全指導。
請您遵守所有指導內容。
請注意所有警告標語。
請用乾燥布料清潔本機和相關配件。
雷擊、暴風雨時或長期不使用期間，請拔除電源插頭。
本產品電源規格必須符合製造商指導頁籤的規格，並請使用隨貨所附電源線提供電力。

◆ 安裝環境和條件

為了避免雷擊或者其他危險，請勿讓本機接觸雨水、濕氣或灰塵。
請將產品安置於通風良好處，並且請勿在機旁放置其他會產生熱能的物體。
請勿將本產品設定於容易遭受外力震動的區域。
請勿在超標的潮濕或高溫環境下使用本機。

◆ 注意

安裝時，請務必關閉所有相關設備電源。

警告使用者：

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

公司=昇銳電子股份有限公司
地址=桃園市八德區長興路 673 號

出廠預設用戶名/密碼
使用者: admin
密碼: 123456

※若產品出貨包含硬碟，則硬碟為 1 年保固(非人為)。

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Figure 2. Safety and installation conditions from the supplied DVR manual.

2.2 Underwater Installation Best Practices

Recommended Practice

The following items are practical installation guidance for stable AI analysis. They complement the supplied recorder manual and should be confirmed against the site-specific MIC installation plan.

- Fix the underwater camera securely so its angle and distance do not change during measurement.
- Keep the measurement area, reference grid or calibrated field of view clearly visible when the AI model uses it for size estimation.
- Avoid placing the camera directly in front of strong glare, intense reflection or turbulent aeration when it obscures the animal outline.
- Keep the lens/window clean. Biofouling, mud, suspended solids, bubbles and algae can reduce detection accuracy.
- Provide a clear path for fish or shrimp to pass through the camera view without excessive obstruction.
- After calibration, do not relocate the camera without repeating the required setup/calibration procedure for the project.

2.3 Before Power-On Checklist

- Underwater camera is physically secured and cable connectors are fully seated.
- DVR video input or IP camera connection is connected as required by the project.
- Monitor is connected by HDMI or VGA.
- USB mouse is connected.
- Network cable is connected if remote access / AI upload is required.
- HDD is installed if local recording is required.
- All connectors are dry and protected according to the installation design.

3. Hardware and System Connections

3.1 System Components

Component	Role
Underwater camera	Captures underwater video for monitoring and AI processing.
DVR / hybrid recorder	Receives camera channels, records video, supports live view, playback, backup and network functions.
HDD	Stores recorded video. New drives must be initialized/formatted in the DVR before normal recording.
Monitor	Connects to HDMI or VGA for setup and local operation.
USB mouse	Primary local control device for menus and playback.
Router / LAN	Provides local network and, when configured, remote/Internet access.
Mobile phone / PC	Used for supported remote camera viewing and MIC AI analysis access.

3.2 DVR Connection Points

Depending on channel count, the supplied DVR family provides BNC video inputs, HDMI/VGA/CVBS video output, RJ45 network connection, USB ports, audio I/O, alarm I/O and RS485. Port quantity varies by 4-, 8-, 16- or 32-channel model.

Interface	Purpose
HDMI / VGA	Connect local display.
BNC Video Input	Connect supported camera video channels.
RJ45 LAN	Network connection.
USB	Mouse and/or USB backup media depending on model.
SATA HDD	Internal recording storage.
RS485	Control interface for supported devices/keyboards.
Alarm I/O	Optional alarm sensor/output integration on supported models.

3.3 Recorder Models Referenced

The supplied DVR manual lists the following applicable models: HS-HU4311, HS-HU8311, HS-HU6321 and HS-HU3382. The complete recorder specification table is reproduced in Section 14.

Camera-Specific Specification

The uploaded materials do not provide a separate camera model number, lens specification, IP/waterproof rating, cable length or camera power specification. These items should be filled in from the project BOM or camera datasheet for the specific installation.

4. First-Time DVR Setup

4.1 Power-On

1. Connect the display to the DVR HDMI or VGA output.
2. Connect the USB mouse.
3. Connect power. The DVR power indicator should turn on.
4. On first use, the setup wizard appears and asks for display language and region.

Figure 3. First-time language, privacy and time setup.

Figure 4. Login credentials and HDD setup.

4.2 Login and Password

Factory DVR Login

User name: admin
Default password: 123456
For security, change the default password after commissioning and store the new password in the project handover record.

4.3 System Time

Set the correct time zone, date format, time format and system time. Correct time is essential for playback, event search, video evidence and matching AI results to the corresponding recording.

4.4 HDD Setup

1. Open the HDD step in the setup wizard or go to Start > Settings > HDD > HDD Management.
2. Confirm that the installed HDD is detected and shows the expected capacity and read/write state.

3. Format a new HDD before normal recording. Formatting erases existing data.

4.5 Network Setup

The DVR supports automatic network addressing through DHCP or manual IP configuration. In the setup wizard, enable automatic IP and DNS when the site router provides DHCP. Otherwise, enter the IP address, subnet mask, gateway and DNS information provided by the site network administrator. The DVR manual also references HTTP, RTSP and data ports.

硬碟格式化。點擊【下一步】繼續。

6. 點擊【使用開機精靈】開始登入。

7. 網路設定：勾選“自動獲得 IP 地址”和“自動獲得 DNS 伺服器位址”可快速獲得 IP 位址和 DNS 伺服器位址（需在區域網內開啟路由器 DHCP 功能）或手動輸入 IP 位址。輸入 HTTP 埠、RTSP 埠、數據埠。點擊【下一步】繼續。

8. 新增攝影機：點擊【更新】可更新區域網內線上的 IPC 列表。點擊 增加攝影機；點擊【新增全部】按鈕可一次增加所有可被搜索到的 IPC；點擊 刪除已增加的 IPC；點擊【全部刪除】可一次移除所有已

Figure 5. HDD, network and camera discovery steps in the first-time setup wizard.

4.6 Add Camera / IPC

1. Open the camera discovery / Add Camera page.
2. Click Refresh/Update to search the local network for online IP cameras.
3. Use Add or Add All for discovered devices, or manually enter the camera IP address, port, protocol, user name and password.
4. Use Test when available to confirm communication before saving.
5. If the camera IP information is edited, ensure the new address remains in the correct site subnet.

增加的 IPC。

在搜索到的攝影機列表中點擊 可編輯 IPC 的 IP 頻道訊息，如下圖所示，輸入新的 IP 位址、子網路遮罩、閘道，然後輸入攝影機的使用者名稱和密碼後，點擊【確定】。

在已增加的 IPC 列表中點擊 可編輯 IPC 的 IP 頻道訊息。如下圖所示，輸入攝像機新的 IP 頻道名稱，IP 位址，然後輸入攝影機的使用者名稱和密碼，點擊【確定】保存修改。點擊【下一步】繼續。

※只有 IPC 處於線上狀態時，才能變更 IP 頻道名稱。

9. **影像設定**：用戶可選擇“自動”或“手動”模式進行錄影。

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Figure 6. Camera discovery, IP channel editing and recording-mode selection.

4.7 Complete the Wizard

Select the required recording mode, complete the mobile/QR step if it is part of your installation, then save and exit the wizard. The supplied DVR manual notes that the cloud-upgrade item shown in the wizard may be unavailable by default.

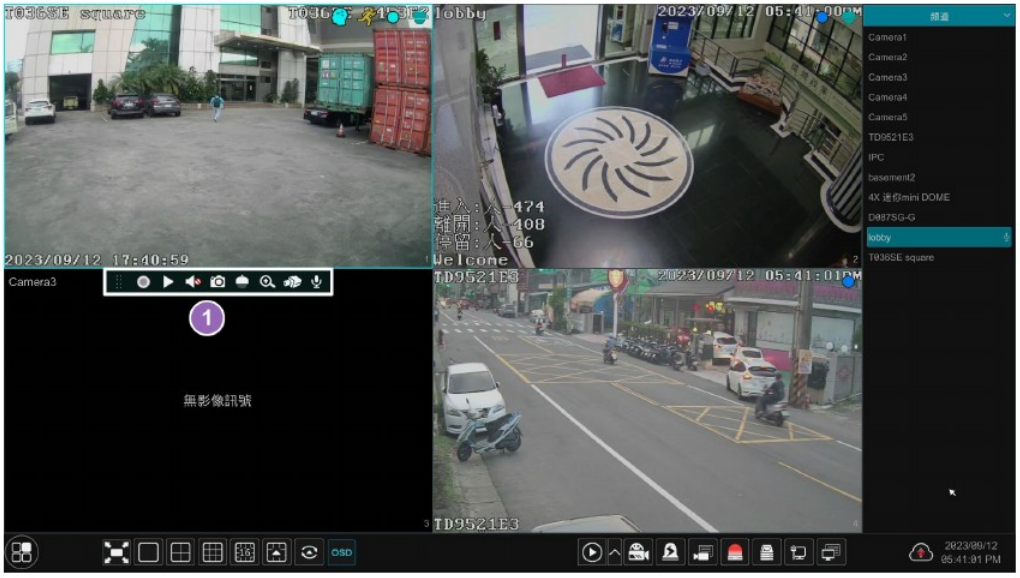
5. Live View and Daily DVR Operation

5.1 Live View

After the camera channel has been added, the live preview page displays the connected channels. In multi-channel view, camera windows can be repositioned by dragging. Double-click a channel to switch between single-channel and multi-channel display.

4.1 預覽介面

登錄系統後，需首先增加 IPC 才能預覽。增加 IPC 後，預覽介面如下所示，在多畫面預覽介面中，滑鼠拖曳某一個視窗畫面到另一個視窗，可將即時視窗內的畫面切換。



滑鼠左鍵單擊圖像視窗，在視窗底端出現視窗工具列(如上圖區域①)，右鍵單擊圖像視窗，出現右鍵選單欄(開啟手動錄影、即時回放、開啟聲音、截圖、PTZ 控制、放大和頻道訊息)。視窗工具列與右鍵選單欄介紹如下：

圖標按鈕	右鍵選單按鈕	說明
	--	位移工具，拖動該圖標可位移工具列到任意位置。
	開啟手動錄影	點擊開始手動錄影。
	即時回放	點擊 開始回放頻道錄影；點擊【即時回放】後可選擇或自定即時回放的時間。
	開啟聲音	點擊打開聲音，可監聽目前頻道。
	截圖	點擊彈出手動截圖視窗。在手動截圖視窗中點擊【保存】按鈕保存圖片；點擊【導出】將圖片導出。
	PTZ 控制	點擊進入 PTZ 控制介面。
	放大	點擊可進入單頻道電子放大介面。
	影像調整	點擊進入頻道圖像調整介面。
	開啟對講	點擊開啟對講。

單頻道電子放大介面如下圖所示，按住藍色方框進行拖曳，可選擇放大區域；點擊 或 可以調整放大比例。點擊底部 IPC 頻道下拉清單可選擇其他 IPC 進行放大。 點擊【返回】則回到即時預覽介面。

Figure 7. DVR live preview interface and channel toolbar.

5.2 Common Live-View Actions

Action	Operation
Manual Record	Start or stop manual recording for the selected channel.
Instant Playback	Open recent playback and select a preset or custom

	time.
Audio	Enable audio monitoring if the channel includes audio.
Snapshot	Capture a still image; save/export as required.
Digital Zoom	Open single-channel electronic zoom and select the area to enlarge.
Image Adjustment	Open image adjustment for the selected channel.
Channel Information	Review channel status/details.

5.3 Normal Shutdown

1. Use Start > System Shutdown (or the approved power/shutdown menu).
2. Confirm Shut Down and wait for the DVR to stop normally.
3. Disconnect power only after the system has completed shutdown.

Do Not

Do not routinely remove DVR power without a normal software shutdown. Sudden power removal can risk recording corruption or file-system problems.

6. Recording, Playback and Backup

6.1 Recording Modes

The supplied DVR supports manual recording, scheduled recording, alarm recording, motion-detection recording and smart-event recording. Automatic modes may combine continuous 24/7 recording with motion, sensor or smart-event recording depending on configuration.

【視頻編碼】：用於設置通道規頻編碼格式，與選擇的 IP 設備有關。若接入的 IP 設備支援 H.265，則規頻編碼可選為 H.265 和 H.264；若接入的 IP 設備不支援 H.265，則規頻編碼只顯示 H.264。

【GOP】：畫面組。使用者可自訂畫面組的數量，1 個 GOP 就是一組連續的畫面。

【解析度】：解析度越高，圖像越清晰。

【張數】：張數越高，圖像越流暢，所需存儲空間越大。

【碼流類型】：固定碼率（CBR）和變動碼率（VBR）。固定碼率是無論頻道源發生什麼發化，壓縮碼流大小基本保持恒定。便於用戶在限定的碼率下使得壓縮的圖像品質盡可能到最好，同時可以準確評估硬碟所占空間。變動碼率是根據頻道源調節壓縮碼率大小。對於運行非劇烈的物體可調低碼率，對劇烈運行的物體可調高碼率，可達到最大限度節約硬碟空間。

【圖像品質】： 碼率類型為變動碼率時，需要對圖像品質進行選擇。選項有：最高，較高，中等，較低，最低。圖像品質不碼率成正比，畫質越好，碼率需要越高。

【碼率上限】：在對運行劇烈的圖像進行壓縮時，需要對最大碼率進行選擇，選擇範圍為 32Kbps ~10240Kbps。

手動影像模式

選擇手動模式，系統將切換至手動錄影模式。使用此模式進行錄影前，需手動設定 編碼參數和錄影排程。

5.1.1 手動影像

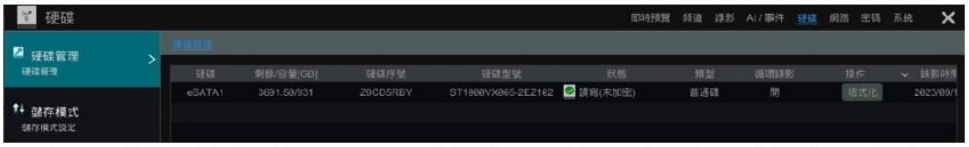
方法一：進入即時預覽介面，點擊介面底端工具列上的 開啟手動錄影。
方法二：點擊預覽視窗右鍵選單欄中的“開啟手動錄影”或視窗底端工具列上的 按鈕開始手動錄影。

5.1.2 定時影像

定時影像：按照設定的時間進行錄影。需設定各個頻道的定時錄影排程。

5.2 硬碟管理

點擊開始→設定→硬碟→硬碟管理，進入硬碟管理介面，可查看 DVR 中硬碟的數量 以及讀寫狀態等。點擊【格式化】按鈕可將硬碟格式化。



※ 1.新硬碟需進行格式化後，才可正常使用。2. 若在新的 DVR 中使用已在其他 DVR 中使用過的硬碟，如果原設備與新設備同型號，則需將原設備的配置導入新設備或格式化硬碟才可以正常使用該硬碟；若原設備與新設備機型不同，需格式化硬碟。

6. 備份與回放

6.1 即時回放

Figure 8. Recording settings and HDD management.

6.2 Encoding Settings

Setting	Meaning / Effect
Codec	H.264 or H.265 when supported by the connected camera.
Resolution	Higher resolution provides more image detail and generally uses more storage/bandwidth.
Frame Rate	Higher frame rate produces smoother motion and uses more storage/bandwidth.
CBR / VBR	CBR keeps bitrate relatively constant; VBR varies bitrate with scene complexity.
Image Quality	In VBR mode, higher image quality generally requires higher bitrate.
Bitrate Limit	The supplied manual lists a configurable maximum range of 32 Kbps to 10240 Kbps.

6.3 Playback

Playback can be opened from the live-view toolbar or through the Playback/Search menu. The recorder supports single- and multi-channel playback, with up to 16 channels simultaneously according to the supplied manual.

在預覽頻道點擊左鍵視窗會出現工具列，在工具列上點選 回放頻道錄影。選擇預覽窗口右鍵選單欄中的即時回放，然後選擇或自訂回放時間點，也可即時回放頻道錄影。

6.2 回放介面介紹

點擊預覽介面底端工具列中回放按鈕 或點擊開始回放（可點擊即時預覽介面 底端工具列上 設定預設回放時間點）進入回放介面。

已增加的預覽頻道將自動進入回放介面進行回放。也可手動增加回放頻道，點擊回放頻道視窗上 增加頻道，在彈出的視窗中勾選頻道，點擊【增加】最大支援 16 路同時回放。介面底端工具列（如上圖區域 ①）介紹：

按鈕	含義
	開始按鈕，點擊此按鈕彈出區域 ②
	全屏按鈕，點擊此按鈕後回放介面全屏顯示，再次點擊退出全屏。
	畫面分割按鈕（根據不同機種）。
	OSD 開啟/關閉按鈕。點擊此按鈕可開啟回放頻道 OSD；再次點擊即可關閉 OSD。
	停止回放按鈕。
	倒放按鈕，點擊後錄影倒著回放。
	播放按鈕，點擊後開始播放。

Figure 9. Playback interface with timeline and playback controls.

6.4 Search Methods

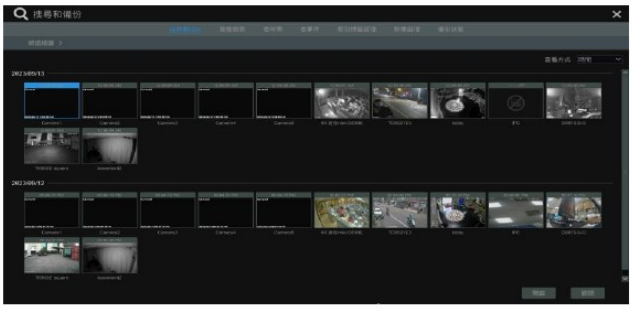
- Time Slice Search: review recorded segments by date/time or channel using thumbnails.
- Time Search: select date, recording type and a specific timeline position.
- Event Search: select event type, time range and channels, then review matching recordings.
- Tag Management: add tags during playback and later search/play from those tags.

點擊時間尺規下側 查看下側未顯示 時間。按住時間尺規上下拖動或在時間列區域滑動滑鼠滾輪也可查看上下未顯示的時間。 拖動時間列下方滑動條可查看未顯示的回放頻道。錄影時間列上以相同顏色區分各錄影類型：綠色表示手動錄影，紅色表示警報器錄影，黃色表示位移偵測錄影，藍色表示排程錄影。點擊錄影條任意位置，則回放頻道從該位置時間點開始回放。拖選錄影時間列上錄影條區域，然後點擊 或右鍵單擊該區域，會彈出備份視窗。在備份視窗中選擇備份設備，備份頻道以及備份格式，點擊【備份】開始錄影備份。

6.3 影像搜尋與回放

6.3.1 依時間切片搜尋回放

① 點擊開始→搜尋和備份→依時間切片，進入依錄影切片搜尋介面，在“查看方式”中選擇按時間或按頻道查看。選擇按時間切片方式查看時，列表中數目超過 64 個時，以縮圖表示並直接以列表方式顯示頻道名稱；目列表中數目超過 196 個時，無法使用時間切片回放，只能按頻道查看。



② 選擇按時間查看或按頻道查看時，在介面中選擇某個頻道，點擊【開啟】

③ 點擊介面中某圖像視窗（有圖像的視窗代表該時間段有錄影數據）如下圖所示，該圖像視窗的錄影數據將在介面左側的回放小視窗中回放。在時間列上拖選錄影條區域選擇頻道錄影段，然後點擊【備份】按鈕，在彈出的視窗中選擇備份設備，備份頻道以及備份格式，點擊【備份】開始備份。

④ 點擊【回放】進入回放介面。點擊【關閉】 按鈕關閉此介面。

時間切片模式選擇：

方法一：點擊時間列右下方的“年”、“月”、“日”等按鈕，可使用不同時間切片模式顯示錄影數據。目以“日”模式顯示時，點擊時間列左側的 查看前一天的錄影數 據，點擊右側的 查看後一天的錄影數據，在時間列下方的“畫面”選項中選擇“分” 切換至“分”模式(“分”模式時，點擊時間列可切換 60 個視窗上的顯示時間）選擇“時” 切換至“時”模式。

方法二：點擊介面左上角“頻道縮略圖”後的 選擇時間切片模式。

方法三：在按時間切片回放介面任意位置點擊滑鼠右鍵可逐層返回。

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Figure 10. Time-slice search and recording review.

6.5 Backup

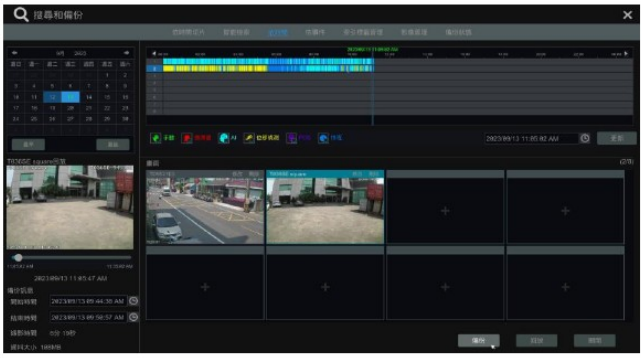
1. Insert a compatible USB storage device. The supplied DVR manual specifies FAT32 for USB backup media.
2. Open Search and Backup, select the channel/date and choose the required time range or event.
3. Choose the backup device and backup format.
4. Start Backup and wait until the backup status shows completion before removing the USB device.

6.4 備份

錄影數據或圖片支援網路備份，USB 備份載體的檔案系統需為 FAT32 格式才能正常進行備份。

6.4.1 按時間備份

① 點擊開始→搜尋和備份，進入依時間備份介面，如下圖所示。



② 點擊介面下側 ，彈出增加頻道對話框。在對話框中勾選頻道，點擊【新增】增加頻道後，點擊頻道右上角的“修改”切換頻道，點擊“刪除”移除頻道。

③ 在介面左上方選擇日期，在時間列上拖選備份時間段，或在時間列下方點擊 設定具體備份開始時間和結束時間點。

④ 點擊【備份】在彈出的錄影備份視窗選擇備份“設備名稱”。在備份視窗左下角選擇備份格式（使用私有格式備份，會自動備份一個 RPAS 播放機到 USB 設備，私有格式的錄影數據只能通過 RPAS 播放機進行播放）在視窗清單中選擇備份路徑，點擊【備份】開始備份。

6.4.2 依事件備份

① 點擊開始→搜尋和備份→依事件，進入依事件備份介面，如下圖所示。

Figure 11. DVR time-based backup workflow.

Private Backup Format

The DVR manual notes that when its private format is selected, a compatible playback program is copied to the USB device and is required to play that private-format recording.

7. Remote Camera Access

7.1 Hi Sharp Camera App

The MIC setup sheet identifies Hi Sharp as the NVR / Camera System App for the underwater camera recorder. The recorder MAC number is used for device access/registration in the camera app according to the supplied setup information.

Platform	Application / Access
Android	Hi Sharp - Google Play package: com.hisharp.hisharp
iOS	HiSharp-Ex - App Store ID 1460337403
Device identification	Scan or enter the recorder MAC number as required by the app.
Credentials	Use the account/password assigned for the MIC system / project.

7.2 MIC Underwater Camera AI Access

Use the following MIC web access points for the AI underwater camera workflow. The QR codes and direct links below can be used during installation, commissioning and customer training.

AI Underwater Camera AI Analysis: https://www.mic-meter.com:8501/

MIC System Login: https://www.mic-meter.com/Micc/Home/Login?ui=d

Use the MIC account and password assigned to the customer/project. Do not publish project credentials in a public manual or shared message.

Connection Requirement

Remote camera viewing and online AI functions require the recorder/device and user terminal to have the necessary network/Internet access. Local recording can continue independently when configured, but online functions require connectivity.

Quick Access - QR Codes and Web Links

Scan a QR code with a phone camera, or click the corresponding web link in the Word/PDF version of this manual.

Access Item	Web / App Link	QR Code
AI Underwater Camera AI Analysis	https://www.mic-meter.com:8501/	
MIC System Login	https://www.mic-meter.com/Micc/Home/Login?ui=d	
Hi Sharp - Android	https://play.google.com/store/apps/details?id=com.hisharp.hisharp&hl=en	
HiSharp-Ex - iOS	https://apps.apple.com/us/app/hisharp-ex/id1460337403	

8. MIC AI Underwater Analysis System

8.1 What the AI System Does

The AI analysis system processes underwater footage and overlays detection information on animals recognized by the configured model. The uploaded demonstrations show fish and shrimp detection, individual length values, overall/total activity indicators, average detected fish length, and shrimp summary statistics.

8.2 General AI Workflow

1. Open the MIC AI analysis system using the assigned account.
2. Confirm the relevant farm/site or analysis record information.
3. Upload or select the underwater video to be analyzed, depending on the configured workflow.
4. Wait for upload completion and AI detection/processing to finish.
5. Review the processed video and calculated results.
6. Check history records and export result data when required.

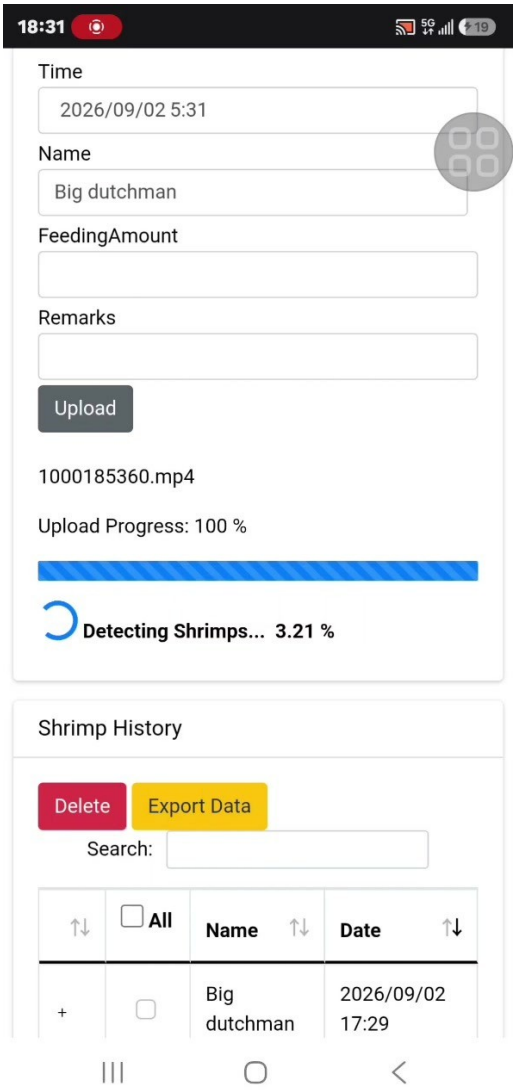


Figure 12. Example upload and AI detection progress screen.

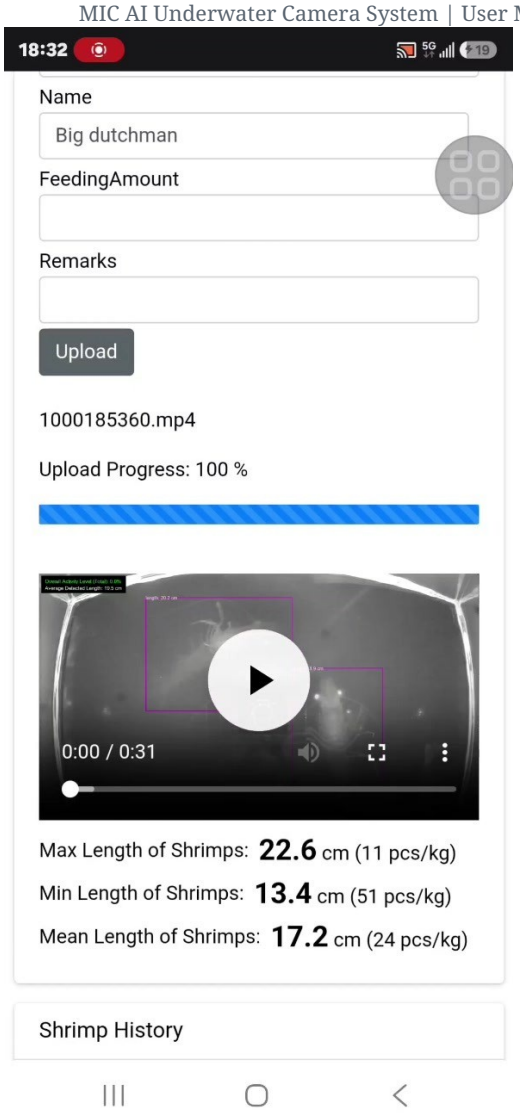


Figure 13. Example processed shrimp result with video and size summary.

8.3 Interpreting AI Overlays

Display Element	Meaning
Detection box	The AI has detected an animal inside the outlined region.
Length label (cm)	Estimated individual body length for that detected animal.
Activity %	Activity indicator calculated by the fish analysis model in the demonstration footage.
Average Detected Length	Average length of detected fish shown in the demonstration overlay.
Max / Min / Mean Length	Summary of processed shrimp lengths in the demonstrated mobile analysis result.
pcs/kg	Estimated shrimp size count per kilogram in the demonstrated shrimp workflow.

Measurement Interpretation

AI measurements are estimates generated from image analysis. Use them primarily for monitoring, comparison and trend analysis unless the specific project has been validated for a required measurement tolerance.

9. Fish AI Analysis

9.1 Individual Fish Detection and Length

In the uploaded fish demonstration, the AI places a magenta detection box around each detected fish and prints an estimated length in centimeters. Multiple fish can be detected in the same frame.

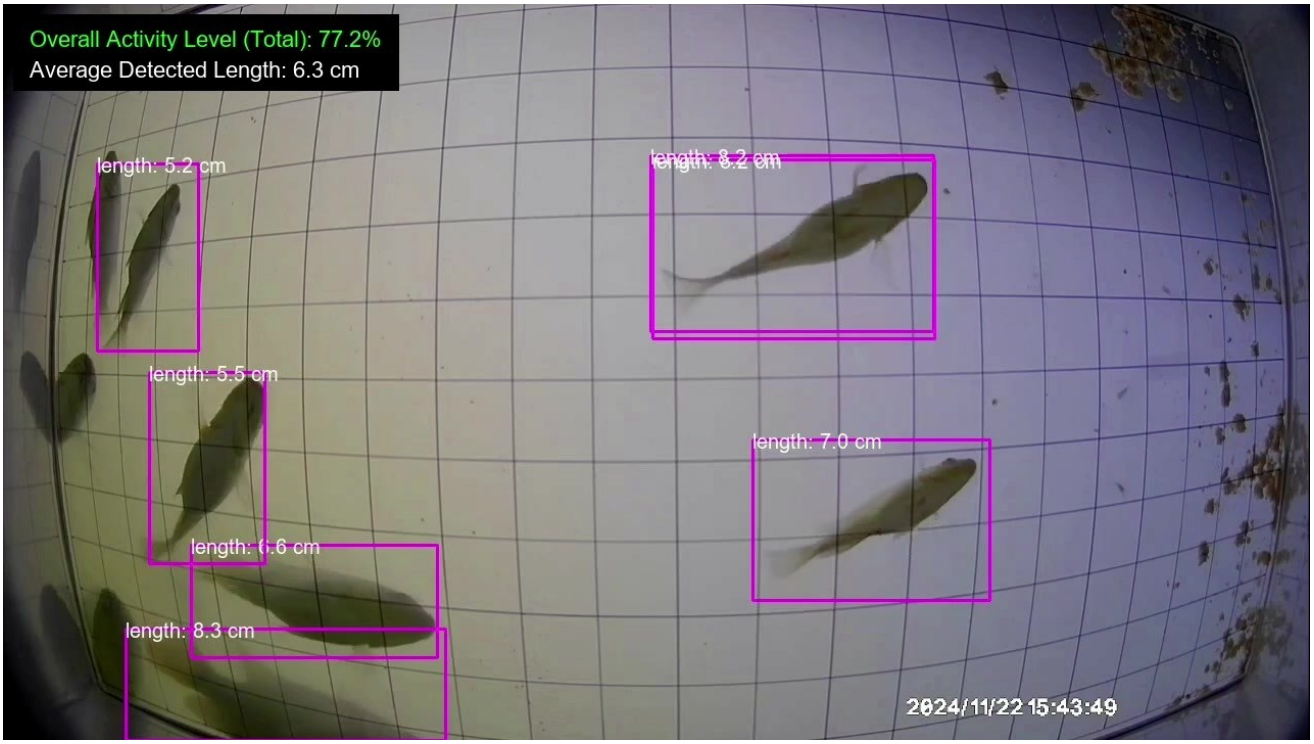


Figure 14. Fish length analysis example from uploaded footage.

9.2 Activity Analysis

The same demonstration displays an Overall Activity Level (%) and an Average Detected Length (cm). These indicators can be used to compare changes in fish movement and average detected size over time, provided the camera position and operating conditions are consistent.

9.3 Dense / Multi-Fish Scene

A second uploaded demonstration shows many smaller fish in one camera view. The AI detects multiple individuals simultaneously, shows a length label for each detected fish and displays activity information at the top of the video.

Figure 15. Multi-fish detection with simultaneous length labels and activity indicators.

9.4 Recommended Review Procedure

1. Check that most visible fish entering the analysis zone receive a detection box.
2. Check that box position follows the animal rather than background objects.
3. Confirm that the measurement reference area remains unchanged from the calibrated installation.
4. Compare activity and length trends across similar times/conditions rather than relying on a single frame.
5. Review original video when an unusual value appears to confirm whether occlusion, overlap or poor visibility affected the result.

10. Shrimp AI Analysis

10.1 Underwater Shrimp Detection

The shrimp demonstration shows the AI detecting multiple shrimp in a low-light underwater scene. Magenta detection boxes and length labels are overlaid on individual shrimp when they are visible to the model.

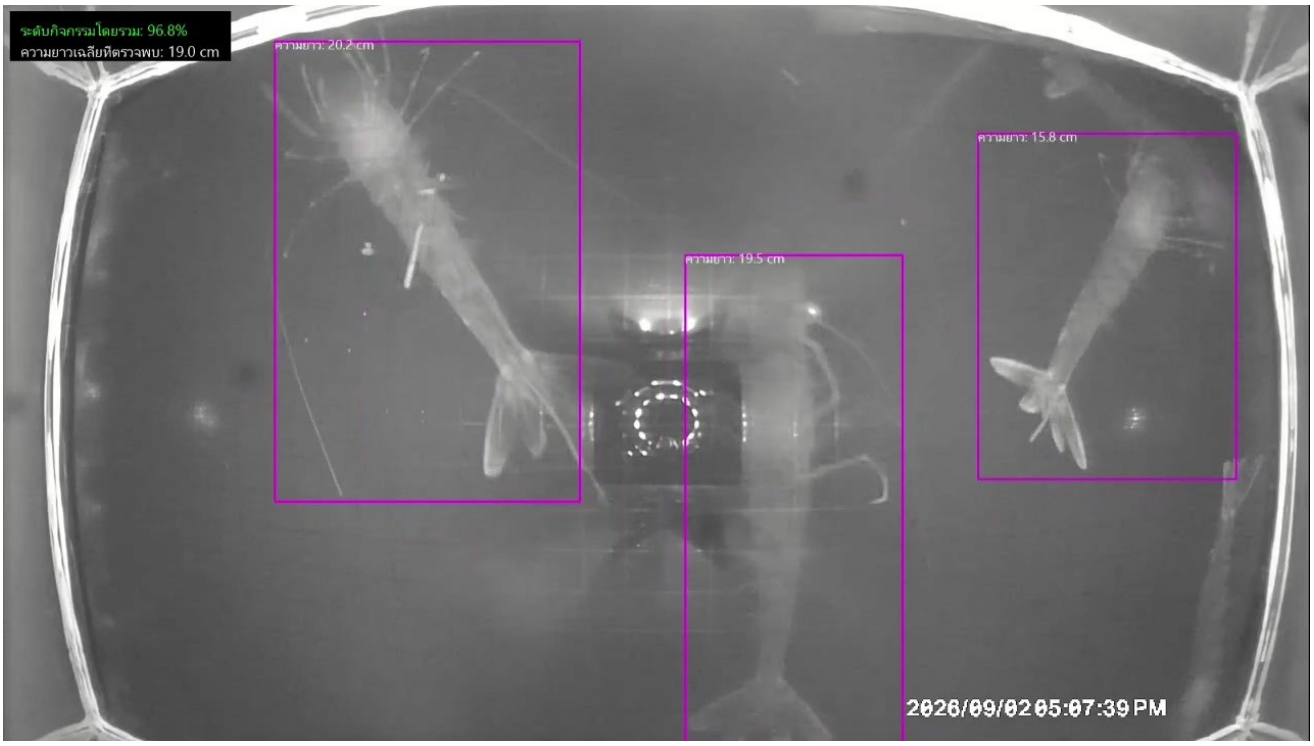


Figure 16. Shrimp detection and individual length labels in underwater footage.

10.2 Mobile Shrimp Analysis Workflow

The uploaded mobile demonstration shows a shrimp-analysis record with fields such as Time, Name, Feeding Amount and Remarks, followed by a video upload. The screen displays upload progress and a Detecting Shrimps progress indicator while the AI processes the video.

10.3 Result Summary

After processing, the demonstrated interface displays the analyzed video together with summary values for maximum shrimp length, minimum shrimp length and mean shrimp length. The same interface also shows an estimated pcs/kg value associated with the length result.

10.4 History and Export

The Shrimp History section allows the user to review previous analysis records. The demonstration also includes an Export Data function for exporting processed result data.

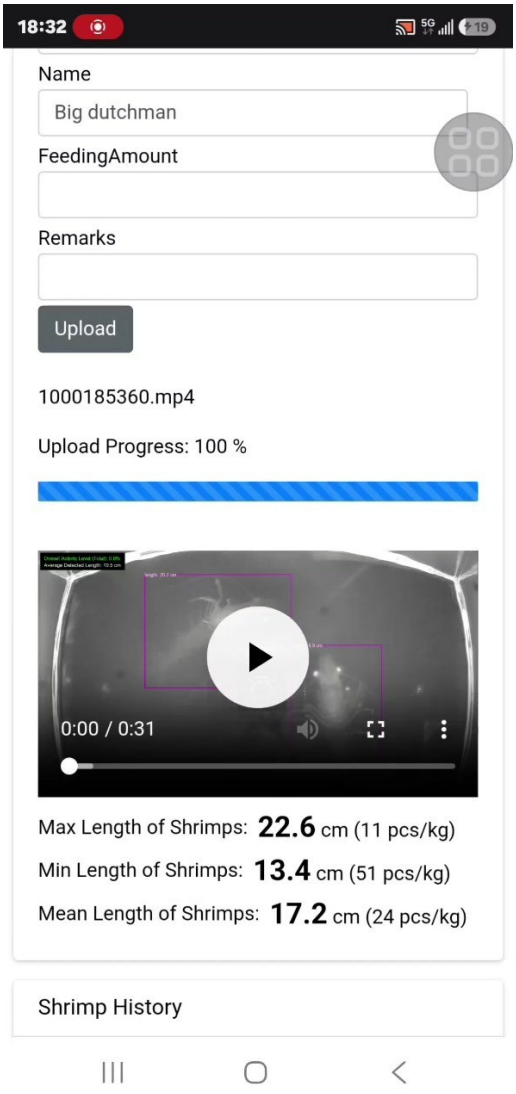


Figure 17. Example shrimp analysis result.

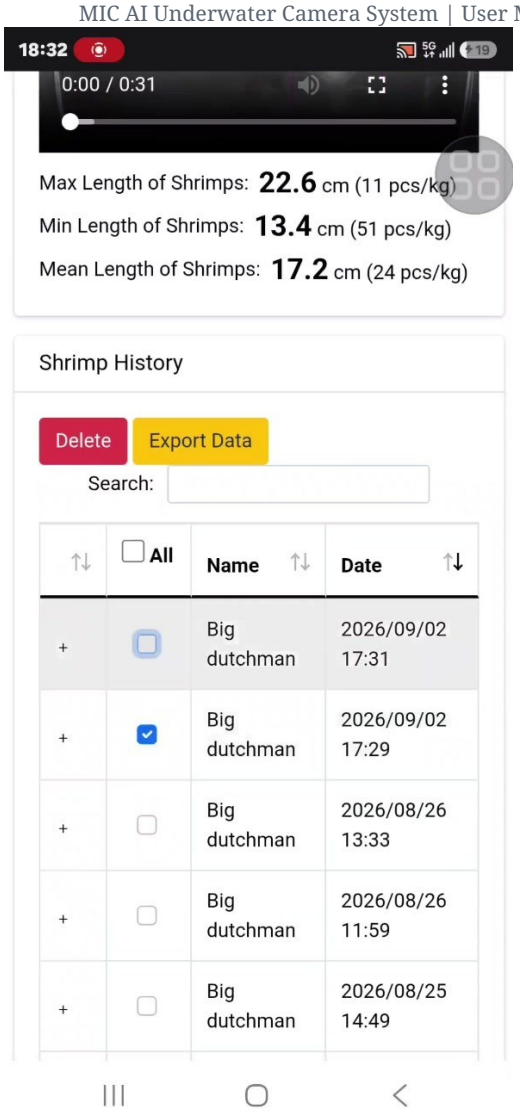


Figure 18. Example shrimp history selection and stored records.

Example Data Only

Values visible in the demo (for example, a specific maximum/minimum/mean length or pcs/kg) are results of that uploaded test video and must not be treated as fixed thresholds or specifications.

11. Operational Best Practices

11.1 For Reliable AI Results

- Keep camera position, focal distance and analysis area stable.
- Keep the optical window clean and inspect it regularly for algae, sediment or biofouling.
- Minimize severe glare, bubbles and suspended particles in the measurement zone when possible.
- Use sufficient recording duration to capture representative animal movement rather than a single short pass.
- For trend comparison, review data at similar times and under similar feeding/lighting/flow conditions.
- If the system is moved to a different species, size range, tank/pond geometry or camera angle, confirm whether recalibration or AI model adjustment is required.

11.2 Data Management

- Keep DVR system time correct so recordings match AI analysis records.
- Export important video evidence before the HDD overwrites old footage in cyclic recording mode.
- Use history/export functions to retain key AI analysis results for farm records.
- Regularly confirm available HDD capacity/status and backup critical recordings.

11.3 User Accounts and Security

- Change the factory DVR password after installation.
- Use project-specific MIC accounts and do not share credentials outside authorized users.
- When staff change, update or revoke access according to the customer’s account policy.
- Keep the recorder and router on a managed network and avoid unnecessary public exposure.

12. Troubleshooting

Problem	Checks / Corrective Action
No image on local monitor	Confirm DVR power; verify HDMI/VGA cable and monitor input; confirm camera channel is connected/online.
Camera channel not found	Refresh camera list; confirm camera and DVR are on the same network/subnet; verify IP, port, protocol, user name and password.
Live view works but no recording	Check HDD detection/status; format new HDD; verify recording mode/schedule and channel settings.
Playback has no data	Confirm correct date/time/channel and recording type; verify DVR system time and HDD recording status.
USB backup fails	Use a compatible USB device; the supplied manual specifies FAT32 for USB backup; reselect the channel/time segment and retry.
Remote app cannot connect	Confirm recorder network connection and Internet access; verify recorder MAC/device registration and assigned account.
AI analysis does not start	Confirm upload completed; verify Internet access and MIC login; retry with a supported video file/record.
Few or no AI detections	Check visibility, focus, camera angle, animal size in frame, occlusion, bubbles/turbidity and whether the correct AI model is enabled.
Length result appears inconsistent	Confirm camera/reference geometry has not moved; check for overlap/partial animals; inspect original frame and repeat under clear conditions.
Wrong recording / analysis time	Correct DVR/site time zone and system time, then verify timestamps on new recordings.

12.1 Escalation Information to Prepare

- DVR model and channel number.
- Camera model/project ID if available.
- DVR network IP and whether local live view is normal.
- Screenshot/photo of the error message or abnormal AI result.
- Example recording file and exact timestamp of the problem.
- MIC user account name (do not send the password in plain text unless MIC support specifically requests a secure method).

13. Maintenance

13.1 Routine Inspection

Interval	Recommended Check
Daily / before use	Confirm live image, correct date/time and recorder status.
Weekly	Review camera view for fouling, obstruction, loose mounting or abnormal glare.
Monthly	Check HDD status, available recording history and backup capability; verify remote access if used.
As required	Clean underwater optical surface using the method approved for the installed housing/material.
After moving equipment	Confirm camera angle, measurement area and AI output; recalibrate if required by the project.

13.2 HDD Care

The supplied recorder documentation recommends surveillance HDD models and supports cyclic recording. Use compatible storage, monitor HDD health/status in the DVR menu, and back up important files before drive replacement or reformatting.

13.3 Software / Interface Changes

The supplied DVR manual states that menu appearance and functions may change with software updates. When a screen differs from this manual, follow the equivalent functional menu and contact MIC if an expected feature is unavailable.

14. Technical Specifications

14.1 DVR / Hybrid Recorder - Core Specifications

Item	4CH	8CH	16CH	32CH
Compression	H.264/H.265	H.264/H.265	H.264/H.265	H.264/H.265
Video Input	BNC x4	BNC x8	BNC x16	BNC x32
Video Output	VGA x1 / HDMI x1 / CVBS x1	Same	Same	Same
HDMI/VGA Resolution	1920x1080 / 1280x1024 / 1024x768	Same	Same	Same
Recording Resolution	5MP Lite / 4MP Lite / 1080P / 1080P Lite / 720P / WD1 / D1	Same	Same	Same
IP Camera Channels	2	4	8	8
Alarm Input	4	8	16	16
Alarm Output	1	2	4	4
Network	RJ45	RJ45	RJ45	RJ45
HDD	SATA x1	SATA x2	SATA x2	SATA x8
Power	DC12V	DC12V	DC12V	ATX-250W
Operating Temp.	0-40 C	0-40 C	0-40 C	0-40 C
Operating Humidity	10%-90%	10%-90%	10%-90%	10%-90%

14.2 Recording Modes

Manual Recording / Scheduled Recording / Alarm Recording / Motion Detection / Smart Event.

14.3 Recommended HDD Models in Supplied Recorder Manual

Brand	Model	Capacity
Seagate	ST1000VX005 FW:CV12	1 TB
Seagate	ST2000VX007 (SkyHawk Lite) FW:CV11	2 TB
Seagate	ST2000VX008 FW:CV12	2 TB

附件 A_相容性設備

建議硬碟廠牌

品牌	型號	容量
SEAGATE	ST1000VX005 FW:CV12	1TB
	ST2000VX007(SkyHawk Lite) FW:CV11	2TB
	ST2000VX008 FW:CV12	2TB

附件 B_產品規格

機種		4 路	8 路	16 路	32 路
壓縮標準		H.264 / H.265 Main Profile			
影像輸出		VGA × 1, HDM I× 1, CVBS × 1			
影像輸入		BNC × 4	BNC × 8	BNC × 16	BNC × 32
HDMI 解析度		1920 × 1080 / 1280 ×1024 / 1024 ×768			
VGA 解析度					
錄影解析度		5MP Lite / 4MP Lite / 1080P /1080P Lite / 720P / WD1 / D1			
錄影總張數 AHD+TVI+960H	5MP Lite	40FPS	80FPS	160FPS	10FPS
	4MP Lite	48 FPS(PAL)/ 60 FPS(NTSC)	96 FPS(PAL)/ 120 FPS(NTSC)	192 FPS(PAL)/ 240 FPS(NTSC)	12FPS(PAL)
	1080P	48 FPS(PAL)/ 60 FPS(NTSC)	96 FPS(PAL)/ 120 FPS(NTSC)	192 FPS(PAL)/ 240 FPS(NTSC)	12FPS(PAL)
	720P/ 1080P Lite / WD1	100 FPS(PAL)/ 120 FPS(NTSC)	200 FPS(PAL)/ 240 FPS(NTSC)	400 FPS(PAL)/ 480 FPS(NTSC)	25FPS(PAL)/30FPS(NTSC)
錄影張數 IP	IP 5M/4M/1080P /1080PLite/ 720P / WD1 /D1	25 FPS(PAL)/ 30 FPS(NTSC)			
支援 IP camera ch 數		2	4	8	8
音效輸入		RCA × 4	RCA × 8		RCA × 16
音效輸出		RCA × 1			
警報輸入		4	8	16	16
警報輸出		1	2	4	4
錄影模式		手動錄影/排程錄影/警報錄影/位移偵測/智能事件			
網路介面		RJ45			
球機控制		是			
通信介面		RS485, USB2.0 × 2 (一個備份,另一個滑鼠 USB 介面)	RS485, USB2.0 × 1, USB 3.0 × 1 (一個備份,另一個滑鼠 USB 介面)		RS485, USB2.0 x 1 ; USB3.0 x 1
E-SATA		N/A	1		
硬碟資訊		SATA × 1		SATA × 2	SATA × 8
遙控器		選配			
電源		DC12V			ATX-250W
工作溫度		0℃ ~ 40℃			
工作濕度		10% ~ 90%			

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Figure 19. Complete DVR specification table from the supplied recorder manual, including frame-rate matrix and interfaces.

14.4 Camera Specification - Project Field

Parameter	Project Value
Underwater camera model	To be confirmed from project BOM / datasheet
Resolution	To be confirmed
Lens / field of view	To be confirmed
Waterproof / submersion rating	To be confirmed

Power supply	To be confirmed
Cable length	To be confirmed
AI model / species	To be confirmed
Measurement/calibration method	To be confirmed

15. Quick Reference & Glossary

15.1 Quick Start

1. Power on the DVR, monitor and underwater camera system.
2. Confirm the camera image is visible in Live View.
3. Confirm the DVR date/time is correct and recording is active.
4. For remote viewing, open Hi Sharp and connect using the assigned recorder/device information.
5. For AI analysis, sign in to the MIC underwater AI system with the assigned account.
6. Upload/select the underwater video and wait for AI processing.
7. Review detection, length/activity or shrimp summary results.
8. Use History / Export Data when records need to be retained.
9. Back up important DVR video before it is overwritten.

15.2 Key Access Information

Function	Access
MIC AI analysis service	https://www.mic-meter.com:8501/
MIC System login	https://www.mic-meter.com/Micc/Home/Login?ui=d
Camera/NVR Android app	https://play.google.com/store/apps/details?id=com.hisharp.hisharp&hl=en
Camera/NVR iOS app	https://apps.apple.com/us/app/hisharp-ex/id1460337403
DVR factory login	admin / 123456 (change after commissioning)

QR codes for these links are provided in Section 7.2, "Quick Access - QR Codes and Web Links."

15.3 Glossary

Term	Meaning
AI	Artificial Intelligence - image analysis used to detect and measure animals in video.
DVR	Digital Video Recorder. The local recorder used for live view, recording, playback and backup.
IPC	IP Camera. A network-connected camera channel/device.
H.264 / H.265	Video compression formats supported by the DVR.
FPS	Frames per second. Higher FPS produces smoother motion but typically uses more storage.
CBR / VBR	Constant Bit Rate / Variable Bit Rate video encoding modes.
pcs/kg	Estimated number of shrimp per kilogram, used as a shrimp size indicator in the demonstrated AI workflow.
Activity %	AI-generated movement/activity indicator shown in the fish demonstration.
MAC	Hardware identifier used by the camera/NVR app workflow for recorder identification.

15.4 Support

For project-specific camera specifications, calibration, account setup, AI model selection or abnormal results, contact your MIC Meter Industrial Co., Ltd. sales or technical support representative and provide the troubleshooting information listed in Section 12.1.

Document Basis

- MIC supplied 4/8/16/32CH Hybrid DVR Quick Operation Manual (models HS-HU4311, HS-HU8311, HS-HU6321, HS-HU3382).
- MIC IoT / AIoT Equipment - Setup Details, QR Codes & Links (English/Chinese setup sheet).
- Uploaded underwater fish AI, shrimp AI, multi-fish AI and shrimp mobile-analysis demonstration videos.

End of Manual

Keep this manual together with the site-specific BOM, camera datasheet, network settings and customer handover record.